



**FCC 47 CFR PART 15 SUBPART C**

**CERTIFICATION TEST REPORT**

**FOR**

**LTE PHONE BLUETOOTH AND WLAN**

**MODEL NUMBER: LG-VS980**

**FCC ID: ZNFVS980**

**REPORT NUMBER: 13U15118-3, Revision B**

**ISSUE DATE: JULY 15, 2013**

*Prepared for*

**LG ELECTRONICS MOBILECOMM U.S.A., INC.**

**1000 SYLVAN AVENUE**

**ENGLEWOOD CLIFFS, NEW JERSEY 07632**

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**NVLAP LAB CODE 200065-0**

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	07/08/13	Initial Issue	P.KIM
A	07/09/13	Update 802.11ac data and information	P. Kim
B	07/15/13	Update accessory information, Section 5.6 Description of Test Set Up - Support Equipment	P. Kim

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** LG ELECTRONICS MOBILECOMM U.S.A., INC.  
1000 SYLVAN AVENUE  
ENGLEWOOD CLIFFS, NEW JERSEY 07632

**EUT DESCRIPTION:** GSM/CDMA/WCDMA + LTE Phone Bluetooth, WLAN (2.4GHz & 5GHz) and NFC

**MODEL:** VS980, LGVS980 and LG-VS980

**SERIAL NUMBER:** 99000250000211(CONDUCTED) AND  
256691464000002160 (RADIATED)

**DATE TESTED:** MAY 24, 2013

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	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 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 Verification Services Inc. By:

Tested By:



PHIL KIM  
WiSE PROJECT LEADER  
UL Verification Services Inc.

STEVEN TRAN  
WiSE LAB TECH  
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, ANSI C63.10-2003, 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 Verification Services Inc. 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 an LTE Phone with Bluetooth and WLAN capability that is manufactured by LG Electronics.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	19.43	87.70
2412 - 2462	802.11g	22.84	192.31
2412 - 2462	802.11n HT20	20.73	118.30
2422 - 2452	802.11ac HT20	21.21	132.13

### **5.3. DESCRIPTION OF AVAILABLE ANTENNAS**

The radio utilizes an FPCB antenna, with a maximum gain of -1.05 dBi.

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### **5.4. SOFTWARE AND FIRMWARE**

The test utility software used during was VS9800RA and firmware used was g2\_vzw-userdebug 4.2.2 JDQ39B VS9800RA.1368678220.

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## 5.5. WORST-CASE CONFIGURATION AND MODE

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

The fundamental of the EUT was investigated in three orthogonal orientations X,Y, and Z, it was determined that Y-orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y-orientation.

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

802.11b mode: 1 Mbps  
802.11g mode: 6 Mbps  
802.11n HT20mode: MCS0

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

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	TEN PAO	MCS-04WT2	NA	NA
Headset	I-SOUND	EAB62729001	NA	NA

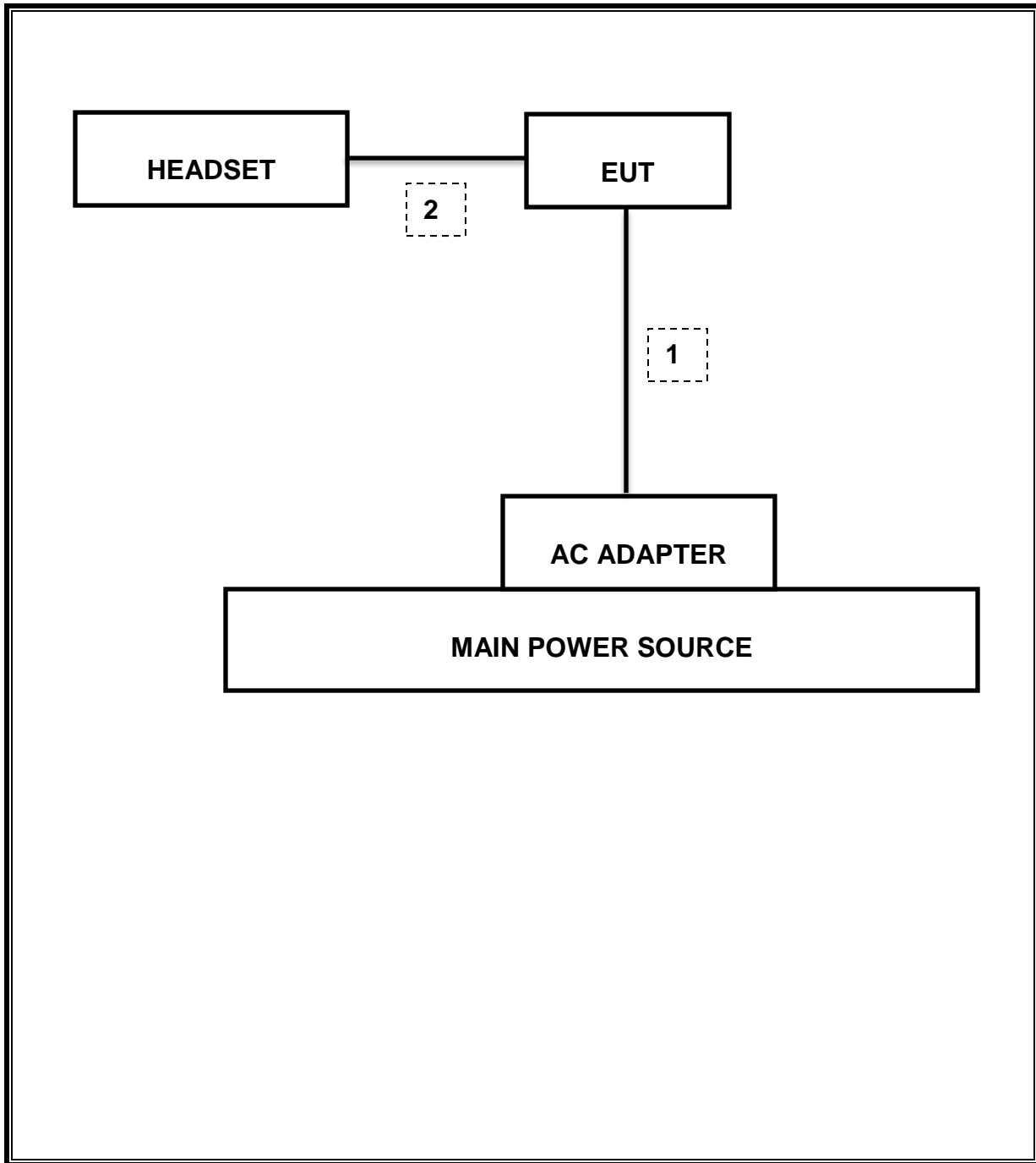
### I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Mini-USB	Shielded	1.2m	N/A
2	Audio	1	Mini-Jack	Unshielded	1m	N/A

### TEST SETUP

The EUT is a stand-alone unit during the tests. 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:

Test Equipment List				
Description	Manufacturer	Model	Asset	Cal Due
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	C01016	08/14/13
Antenna, Horn, 18 GHz	ETS	3117	C01006	12/11/13
Antenna, Horn, 25.5 GHz	ARA	MWH-1826/B	C00980	11/14/13
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	01/16/14
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	10/22/13
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	10/21/13
PXA SIGNAL ANALYZER	Agilent / HP	N9030A	N/A	05/09/14
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/08/13
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/14
Reject Filter, 2.4GHz	Micro-Tronics	BRM50702	N02684	CNR

## 7. MEASUREMENT METHODS

KDB 558074 Measurement Procedure PK2 is used for power and PKPSD is used for power spectral density.

Unwanted emissions within Restricted Bands are measured using traditional radiated procedures.

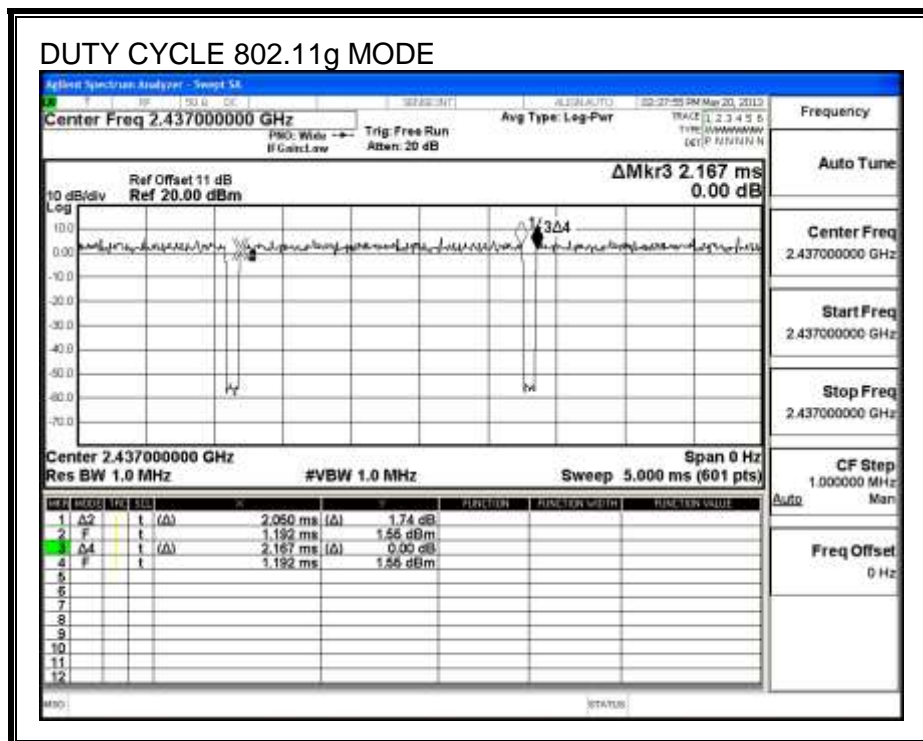
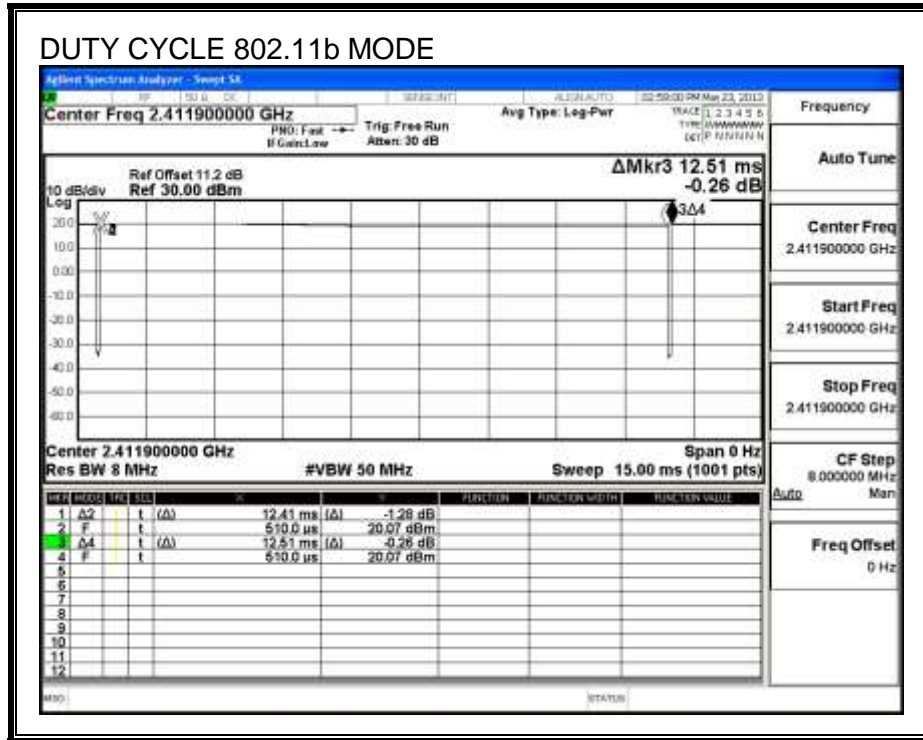
## 8. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

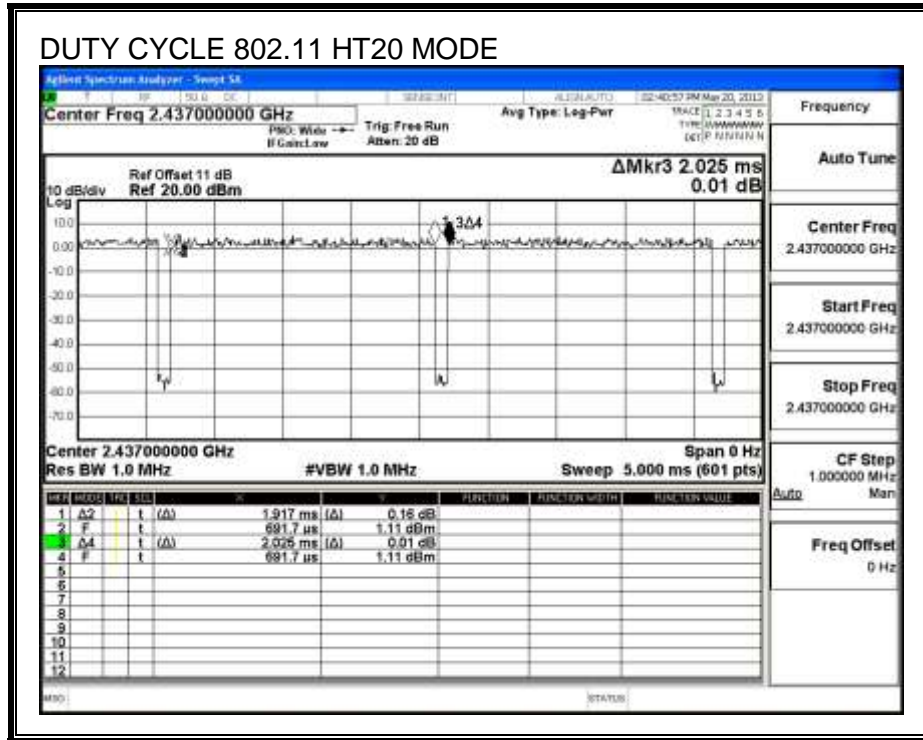
### LIMITS

None; for reporting purposes only.

### 8.1. ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
802.11b	12.40	13	0.992	99.2%	0.00
802.11g	2.050	2.167	0.946	94.6%	0.24
802.11n HT20	1.917	2.025	0.947	94.7%	0.24





## 9. ANTENNA PORT TEST RESULTS

### 9.1. 802.11b MODE IN THE 2.4 GHz BAND

#### 9.1.1. 6 dB BANDWIDTH

##### LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

##### TEST PROCEDURE

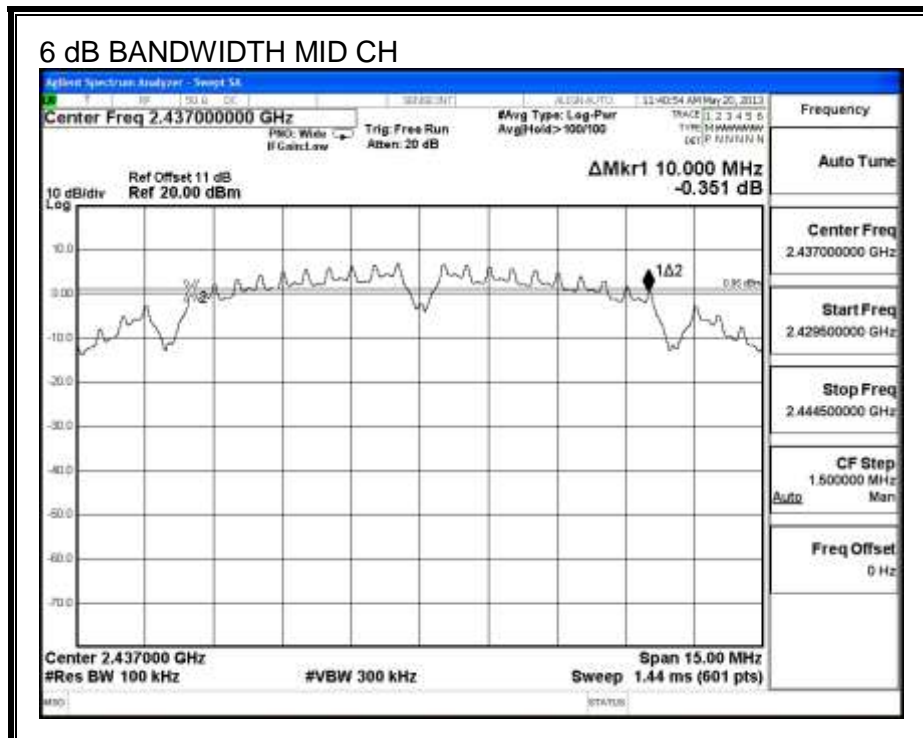
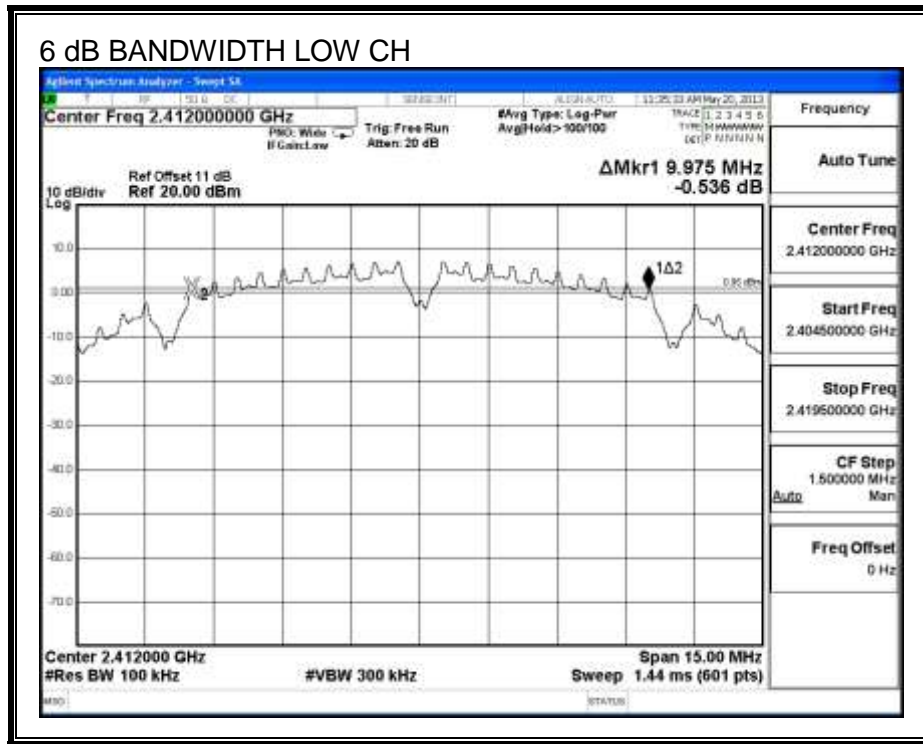
The transmitter output is connected to a spectrum analyzer with the RBW set between 1% and 5% of the EBW, the VBW  $\geq 3 \times$  RBW, peak detector and max hold.

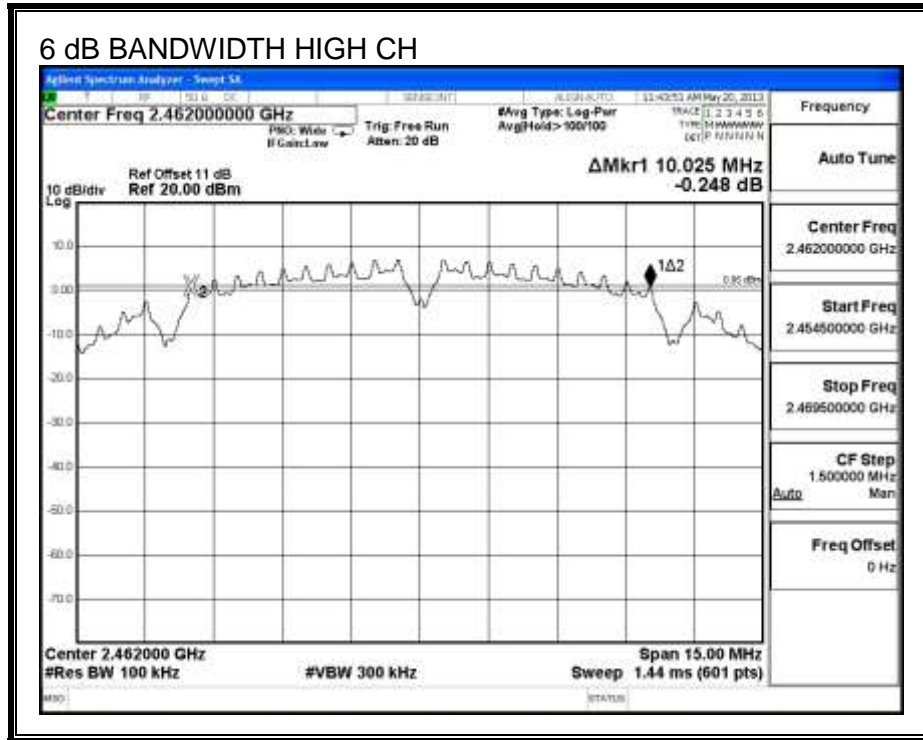
##### RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	9.975	0.5
Mid	2437	10.000	0.5
High	2462	10.025	0.5



**6 dB BANDWIDTH**





## 9.1.2. 99% BANDWIDTH

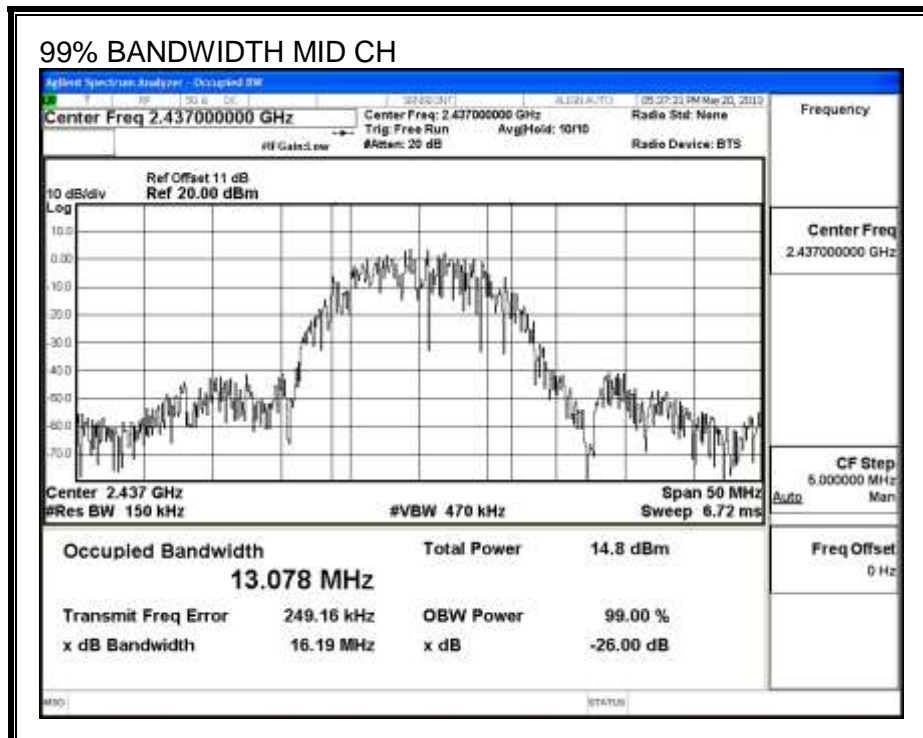
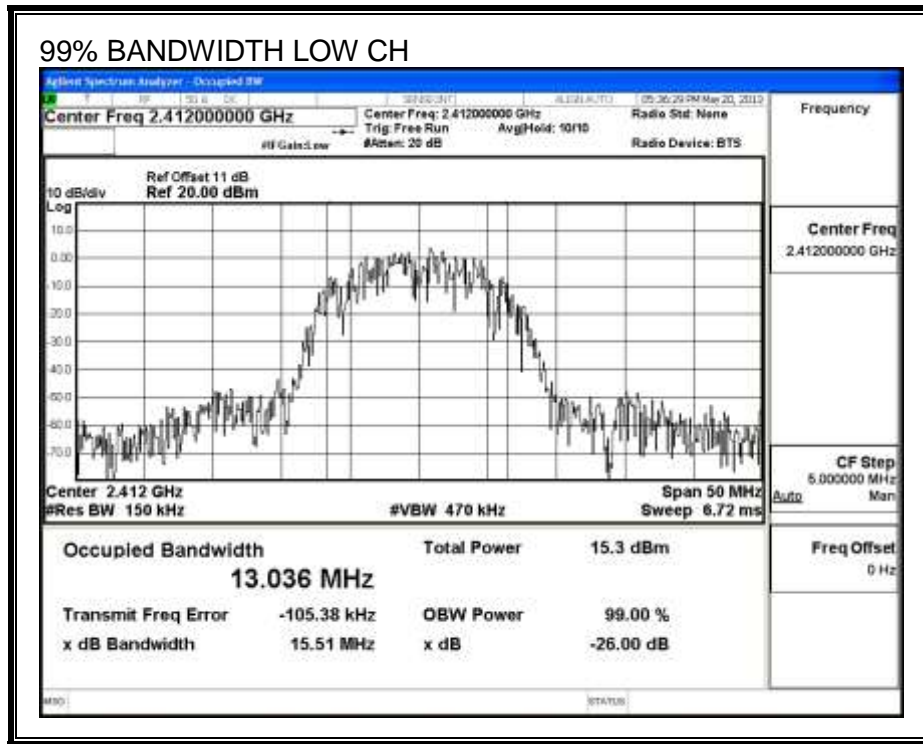
### LIMITS

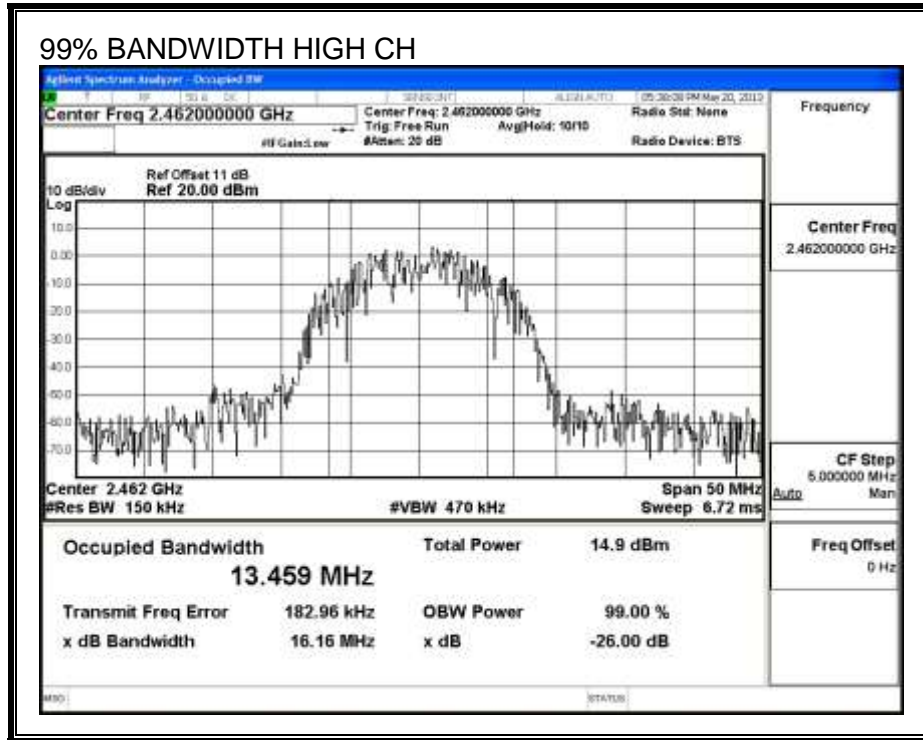
None; for reporting purposes only.

### RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	13.0360
Mid	2437	13.0780
High	2462	13.4590

**99% BANDWIDTH**





### 9.1.3. AVERAGE POWER

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10 dB (including 10 dB pad and 0.68 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	2412	15.92
Mid	2437	15.36
High	2462	15.57

## 9.1.4. OUTPUT POWER

### LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### DIRECTIONAL ANTENNA GAIN

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

**RESULTS**

**Limits**

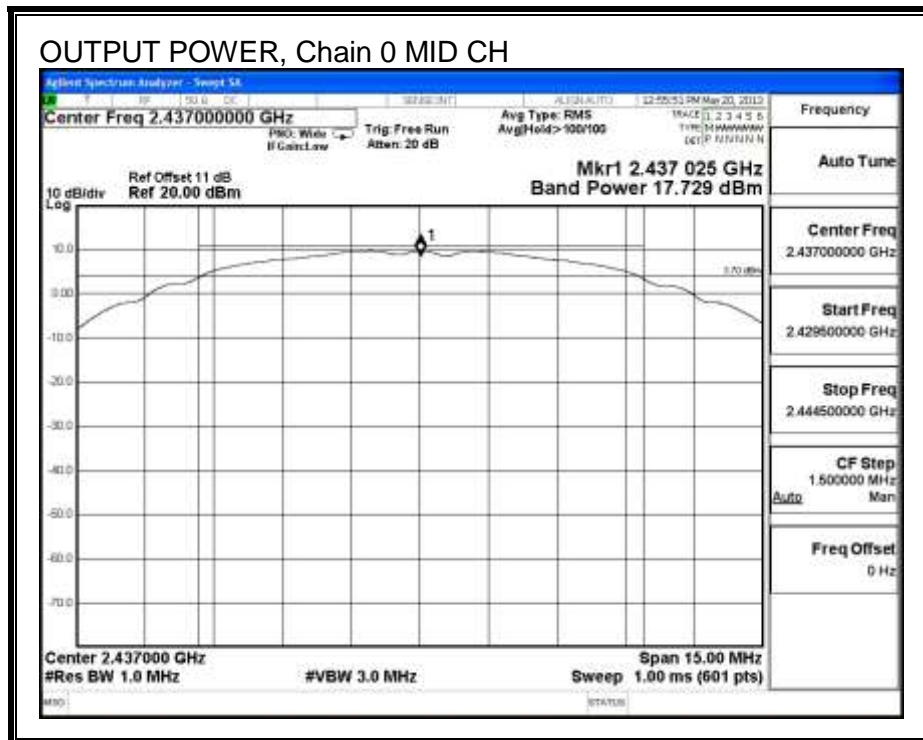
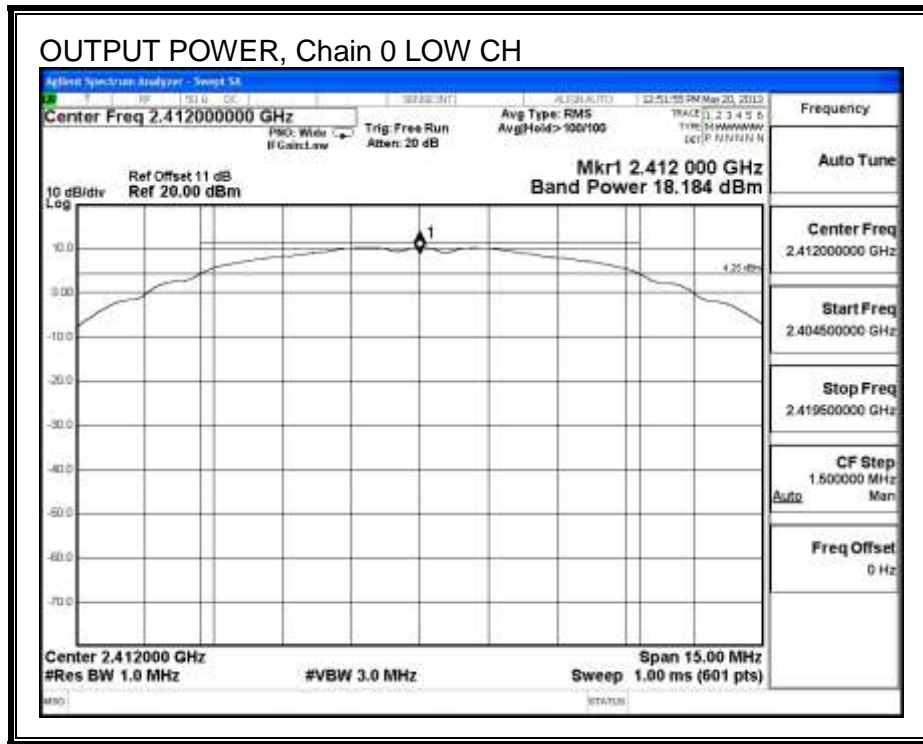
Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	1.00	30.00	30	36	30.00
Mid	2437	1.00	30.00	30	36	30.00
High	2462	1.00	30.00	30	36	30.00

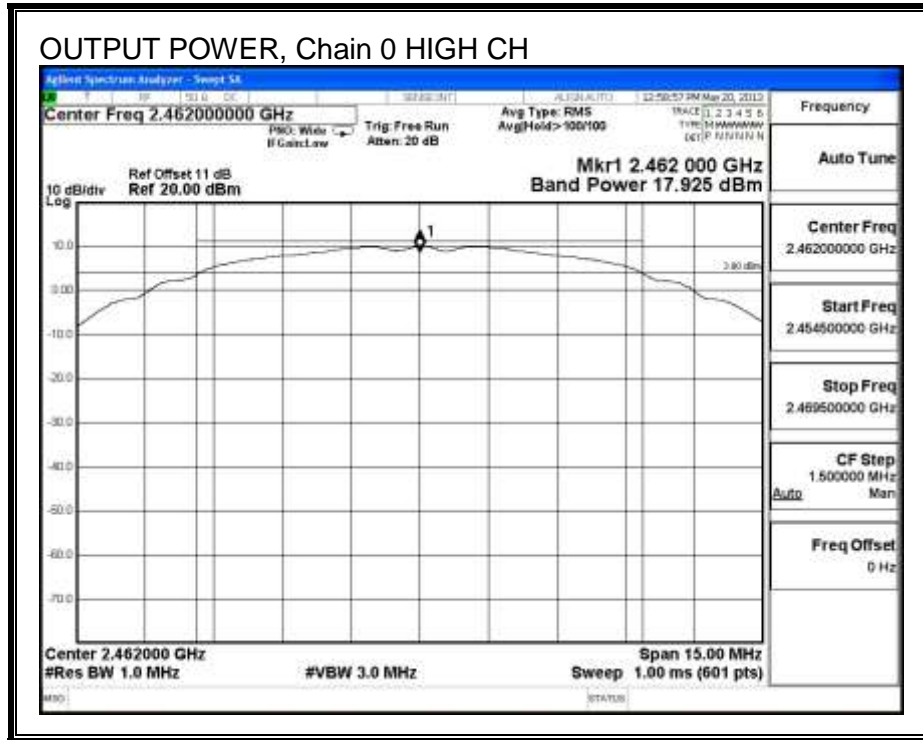
**Results**

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	18.18	18.18	30.00	-11.82
Mid	2437	17.73	17.73	30.00	-12.27
High	2462	17.93	17.93	30.00	-12.08



**OUTPUT POWER, Chain 0**





### 9.1.5. PSD

#### LIMITS

FCC §15.247

IC RSS-210 A8.2

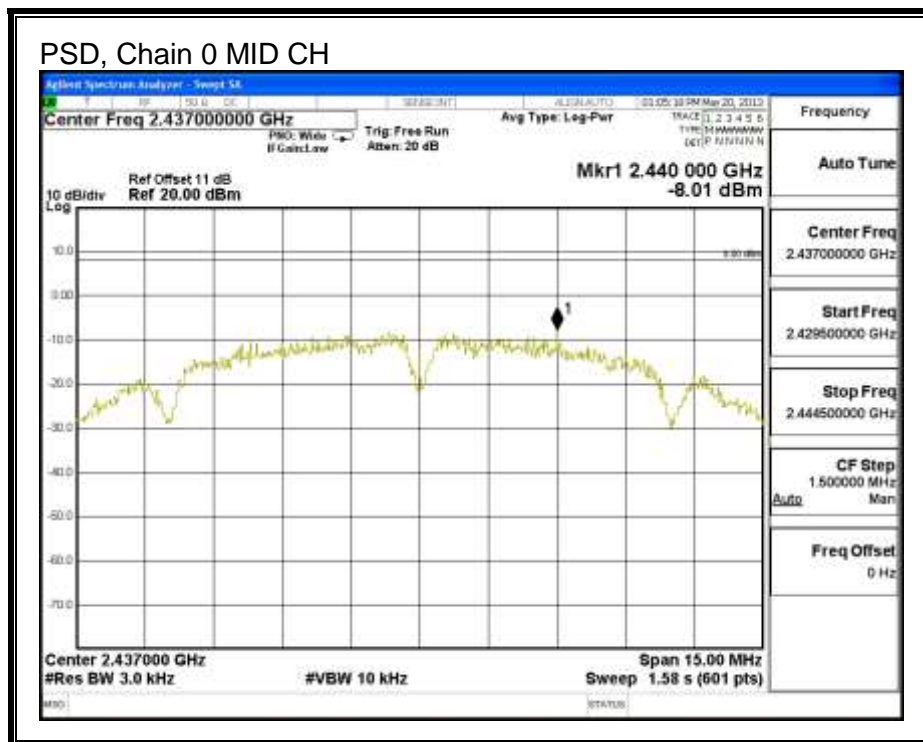
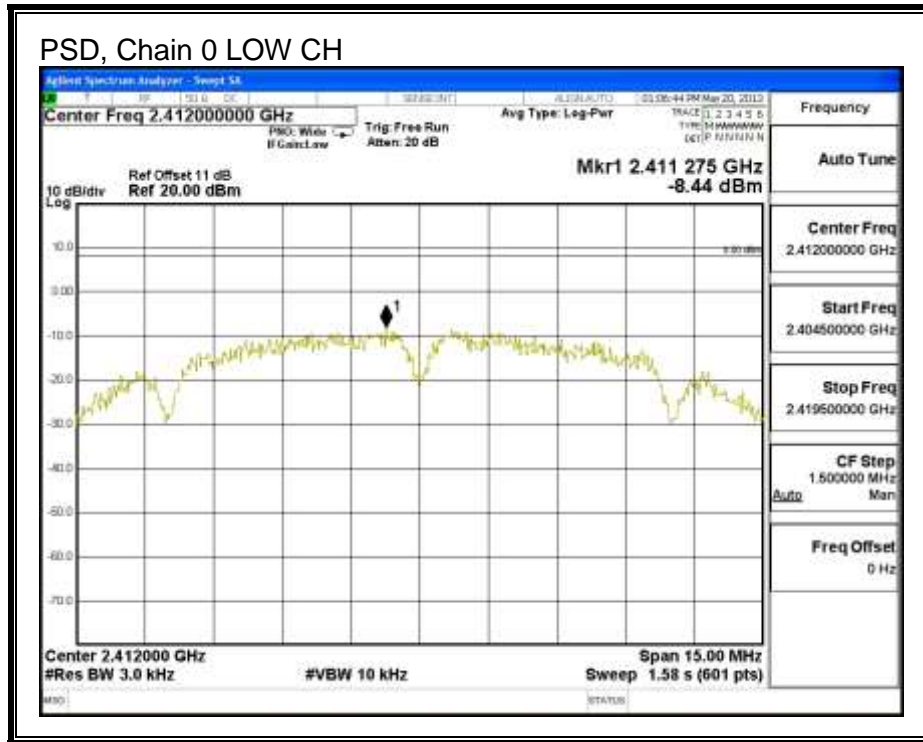
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

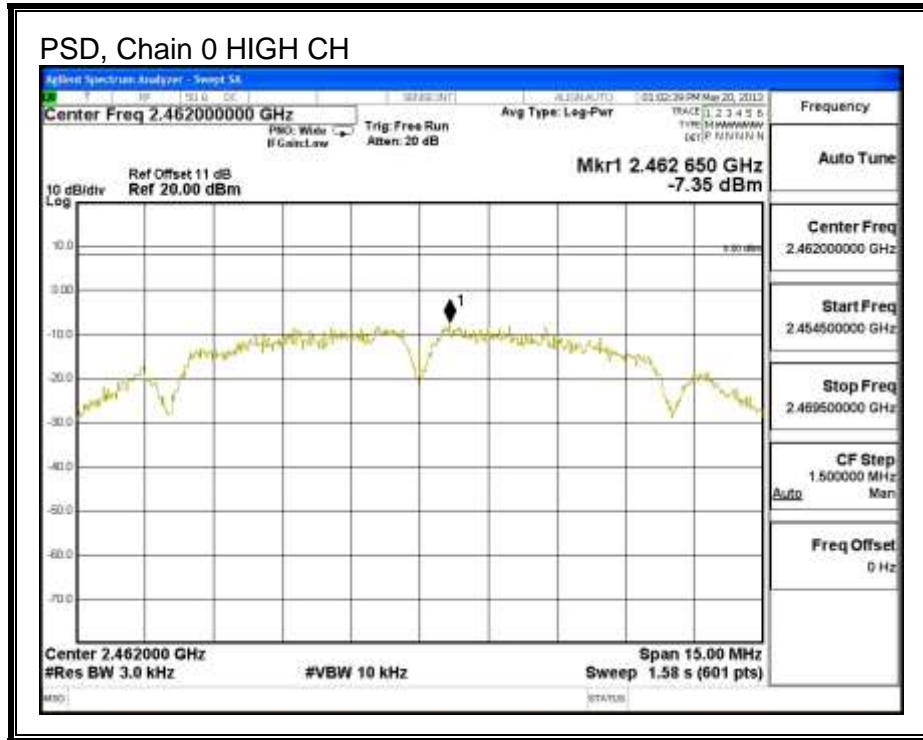
#### RESULTS

##### PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-8.44	8.0	-16.4
Mid	2437	-8.01	8.0	-16.0
High	2462	-6.69	8.0	-14.7

**PSD, Chain 0**





## 9.1.6. OUT-OF-BAND EMISSIONS

### LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

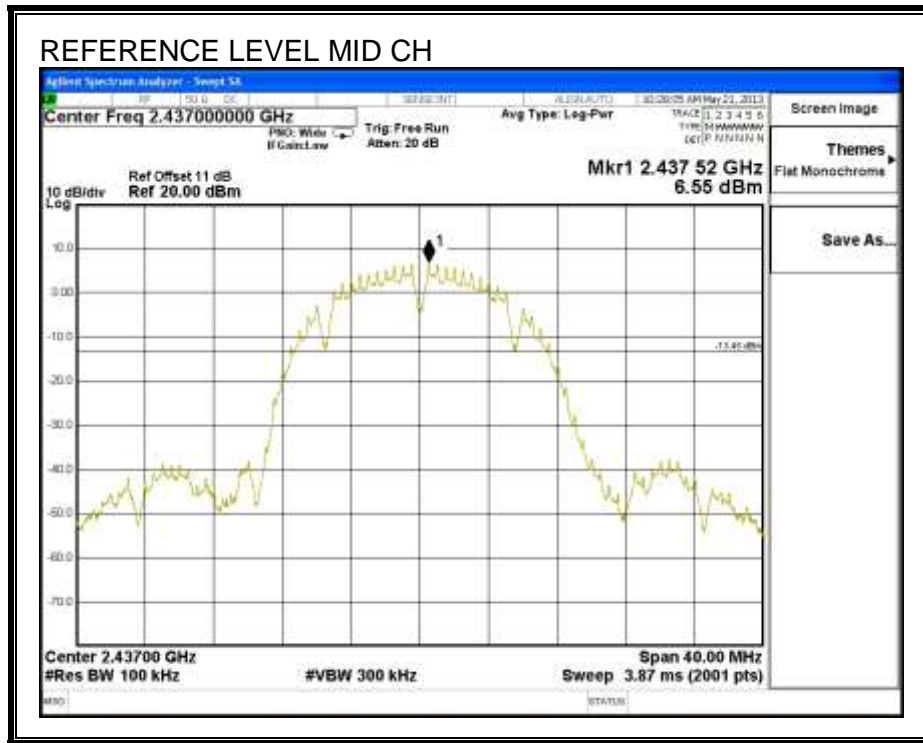
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

### TEST PROCEDURE

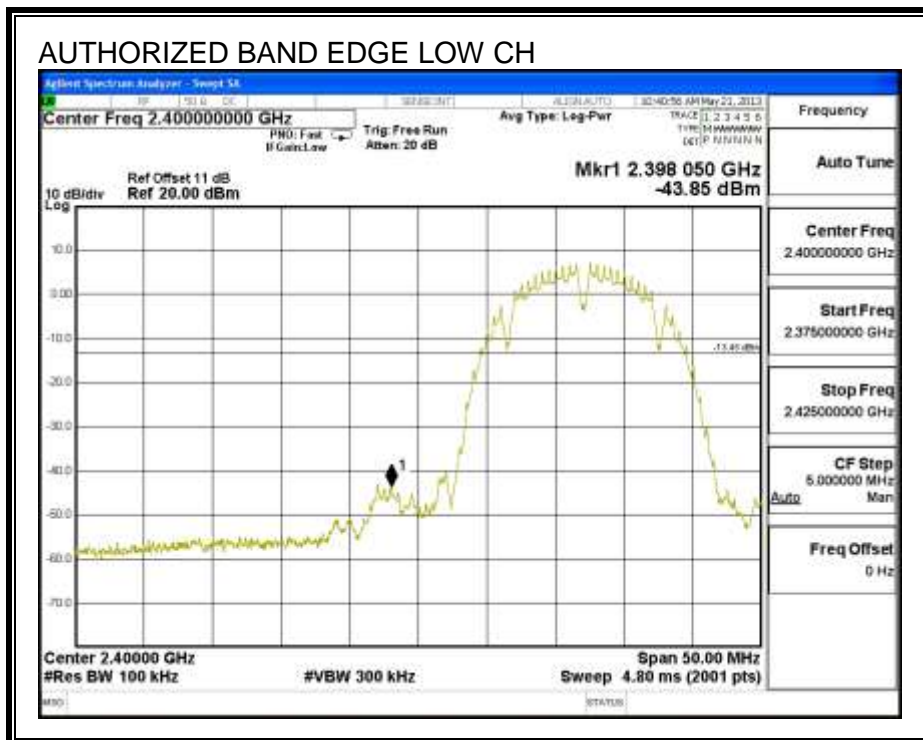
The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

## RESULTS

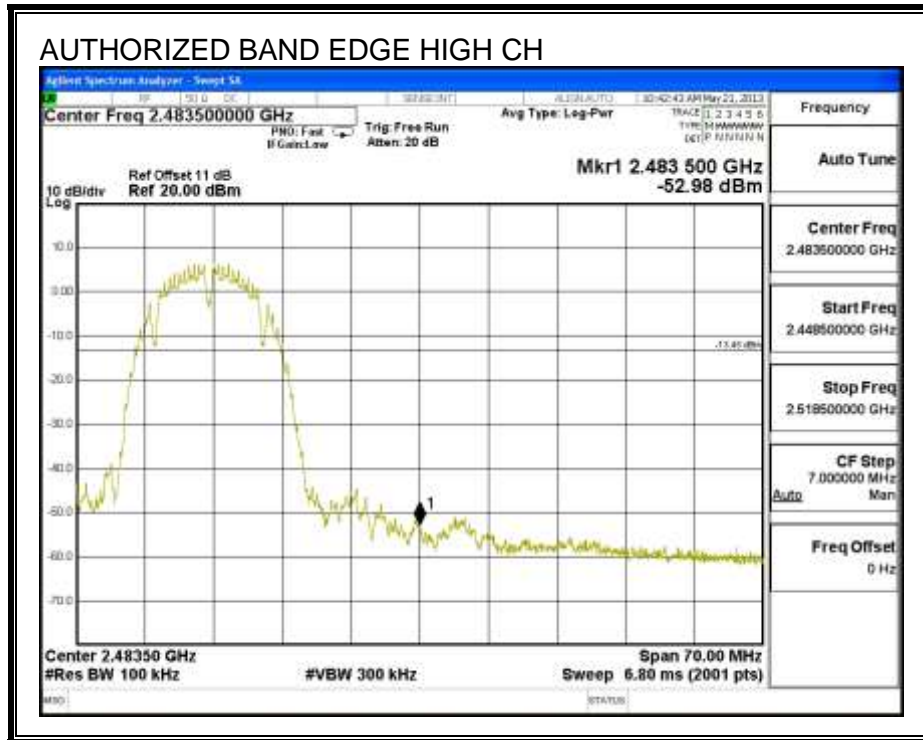
### IN-BAND REFERENCE LEVEL



### LOW CHANNEL BANDEDGE

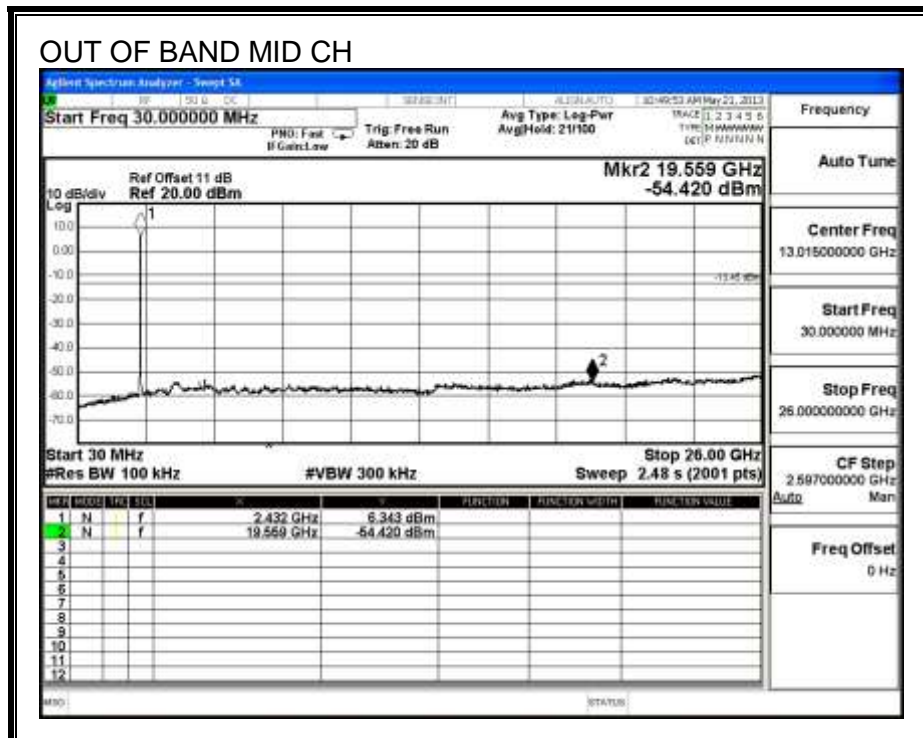
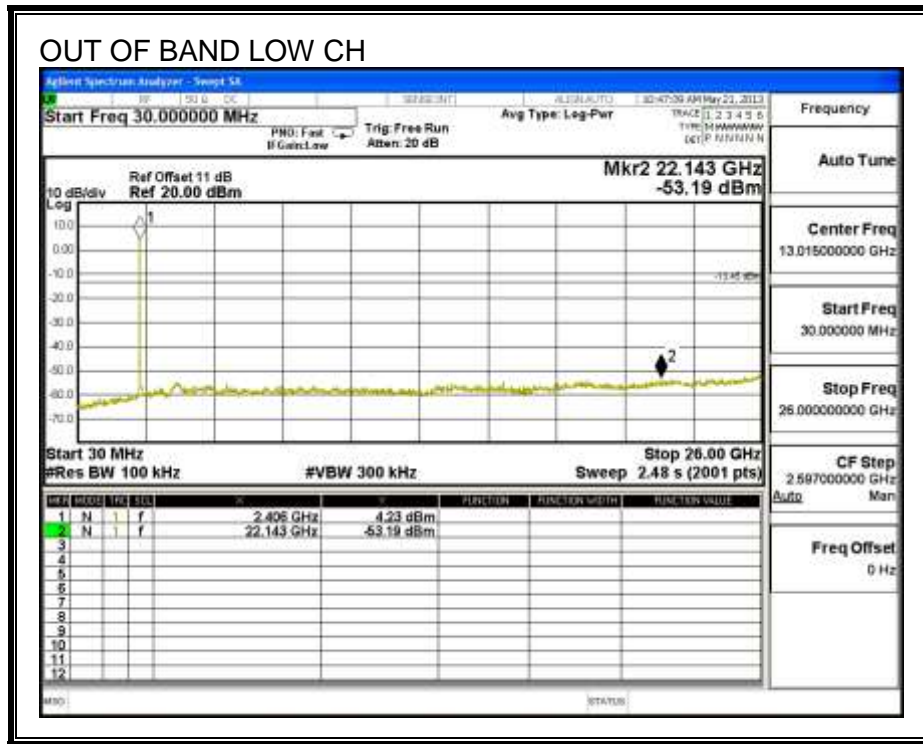


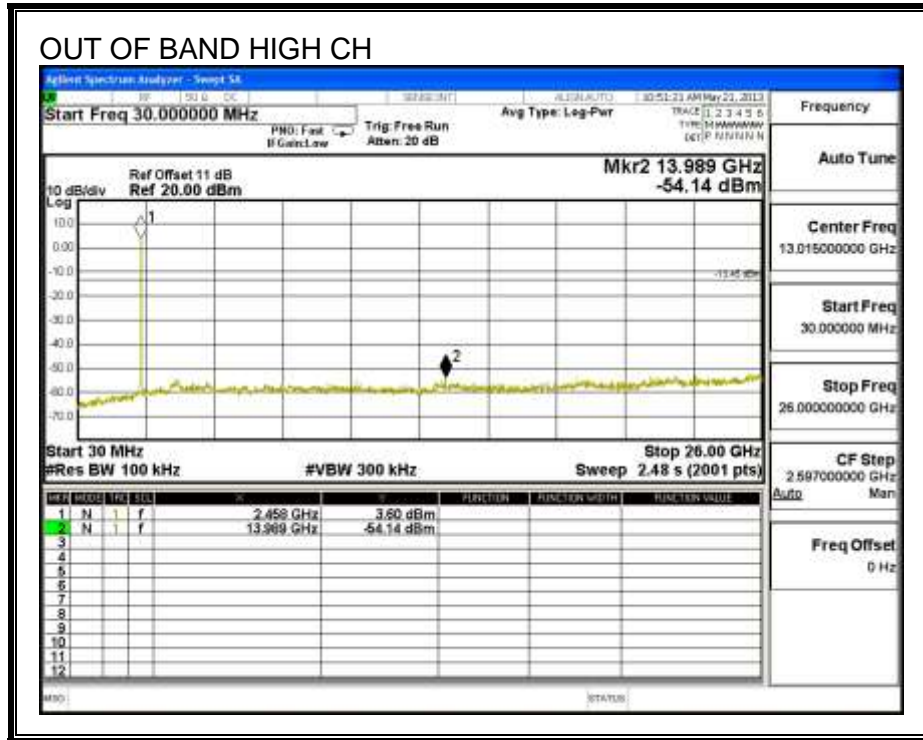
**HIGH CHANNEL BANDEDGE**





**OUT-OF-BAND EMISSIONS**





## 9.2. 802.11g MODE IN THE 2.4 GHz BAND

### 9.2.1. 6 dB BANDWIDTH

#### LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

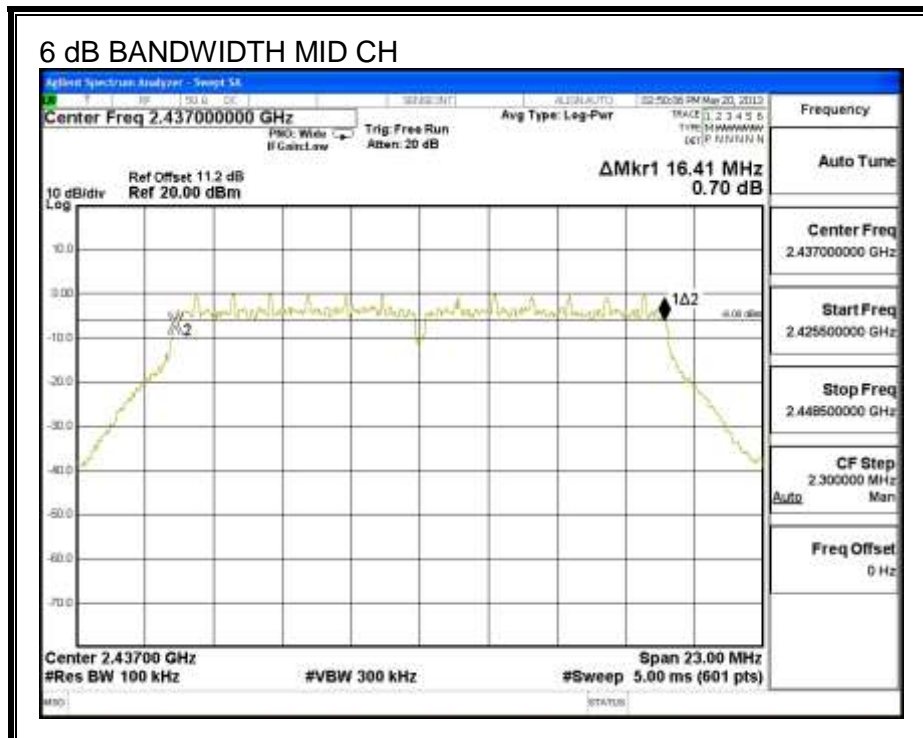
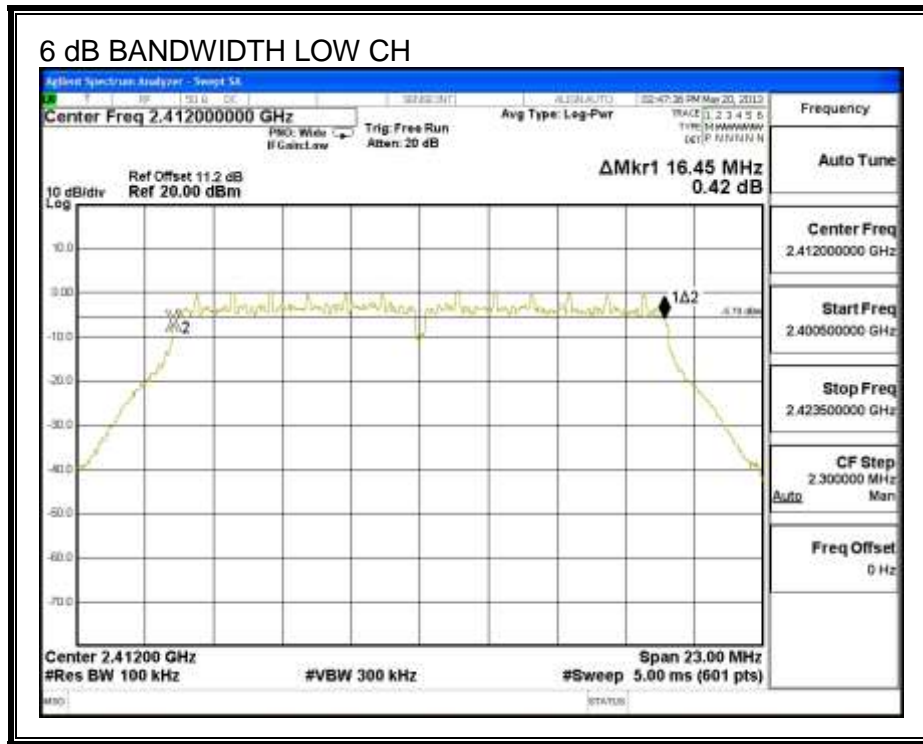
#### TEST PROCEDURE

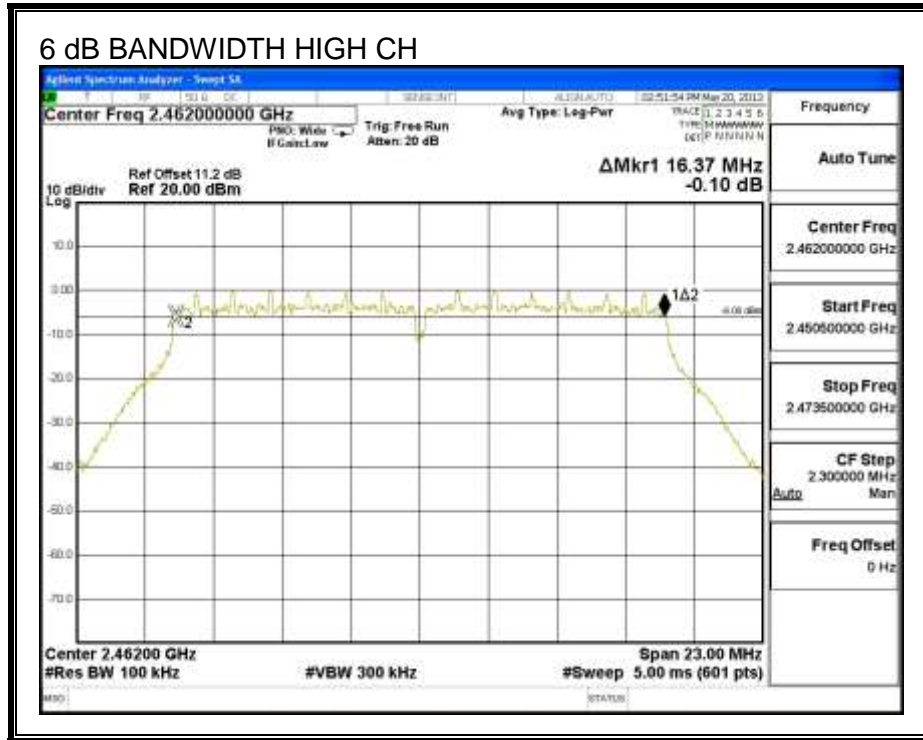
The transmitter output is connected to a spectrum analyzer with the RBW set between 1% and 5% of the EBW, the VBW  $\geq 3 \times$  RBW, peak detector and max hold.

#### RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.450	0.5
Mid	2437	16.410	0.5
High	2462	16.370	0.5

**6 dB BANDWIDTH**





## 9.2.2. 99% BANDWIDTH

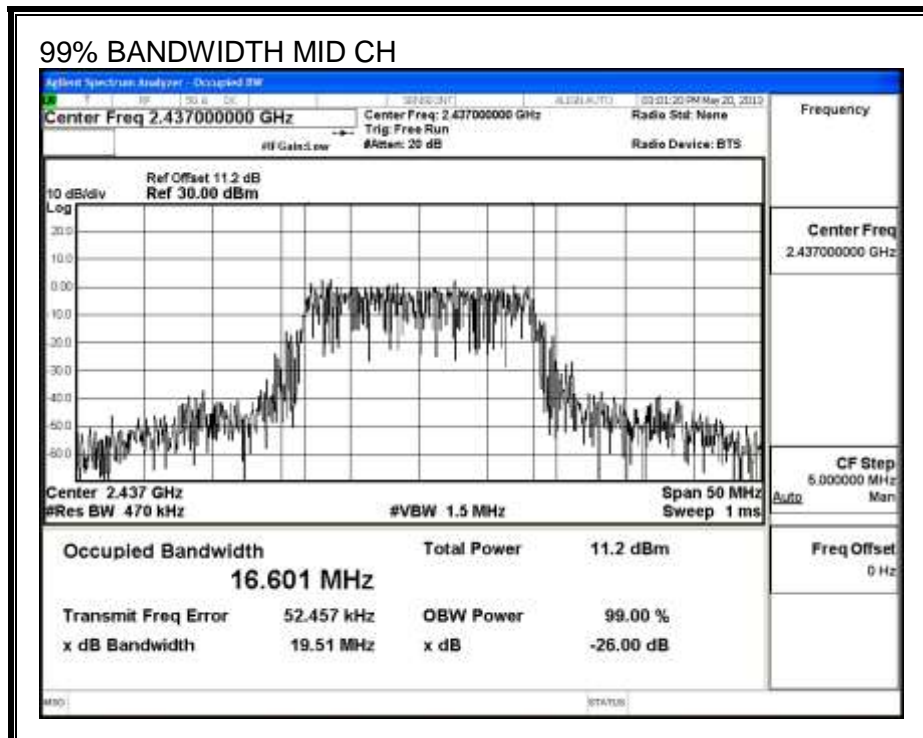
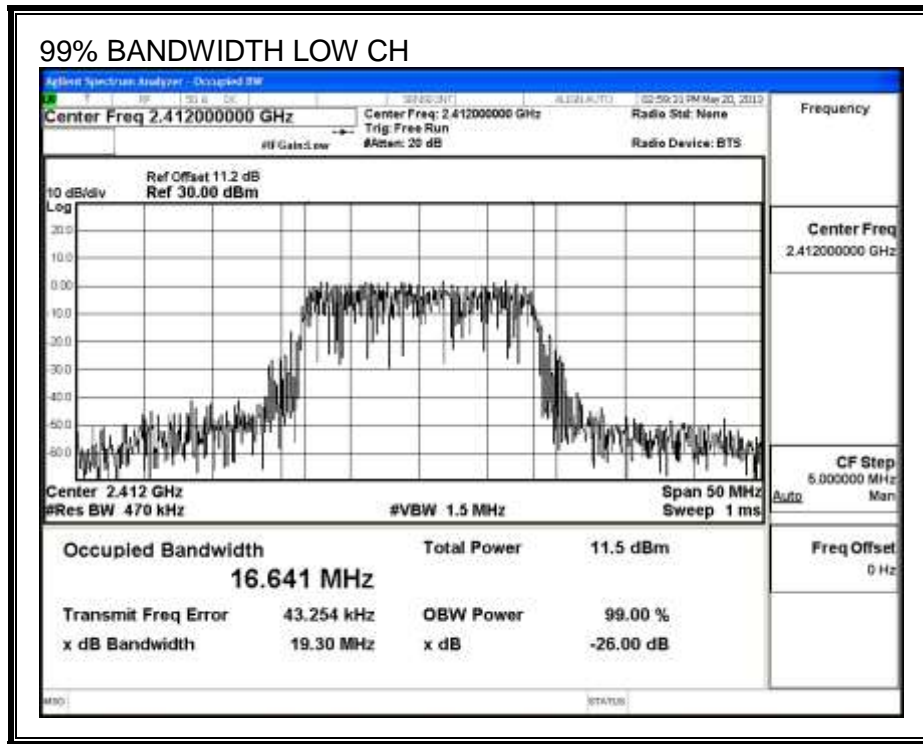
### LIMITS

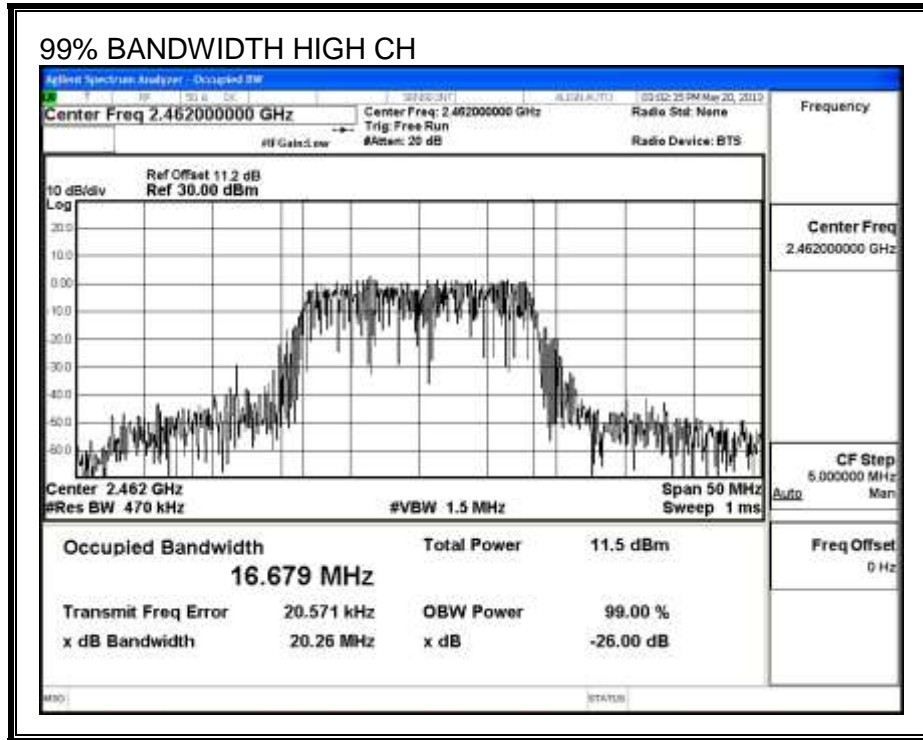
None; for reporting purposes only.

### RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.6410
Mid	2437	6.6010
High	2462	16.6790

**99% BANDWIDTH**







### 9.2.3. AVERAGE POWER

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	2412	11.77
Mid	2437	11.41
High	2462	11.65

## **9.2.4. OUTPUT POWER**

### **LIMITS**

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **DIRECTIONAL ANTENNA GAIN**

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

**RESULTS**

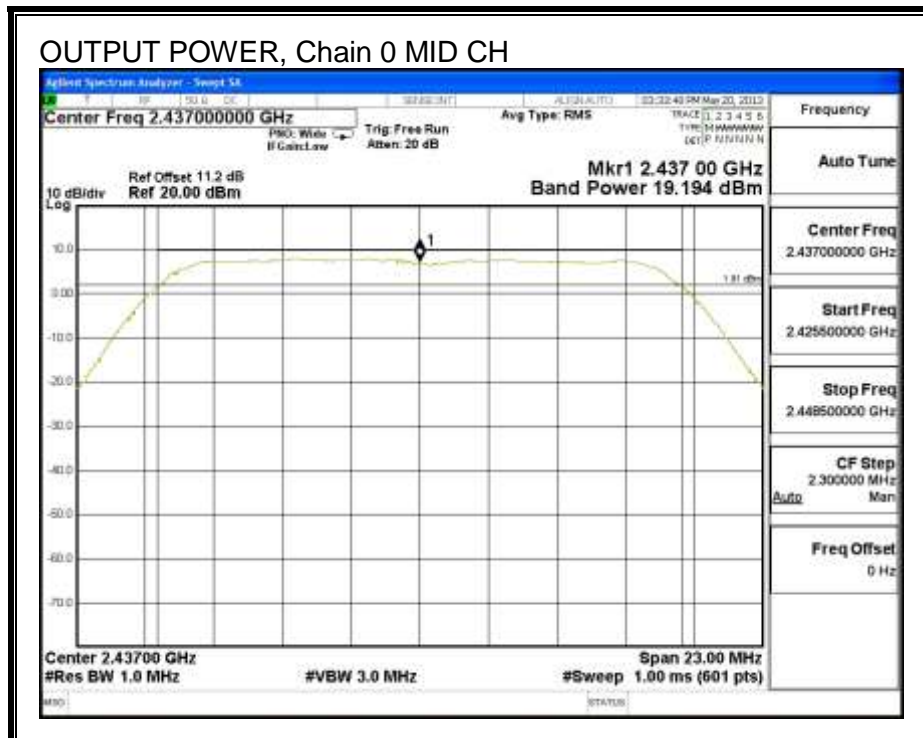
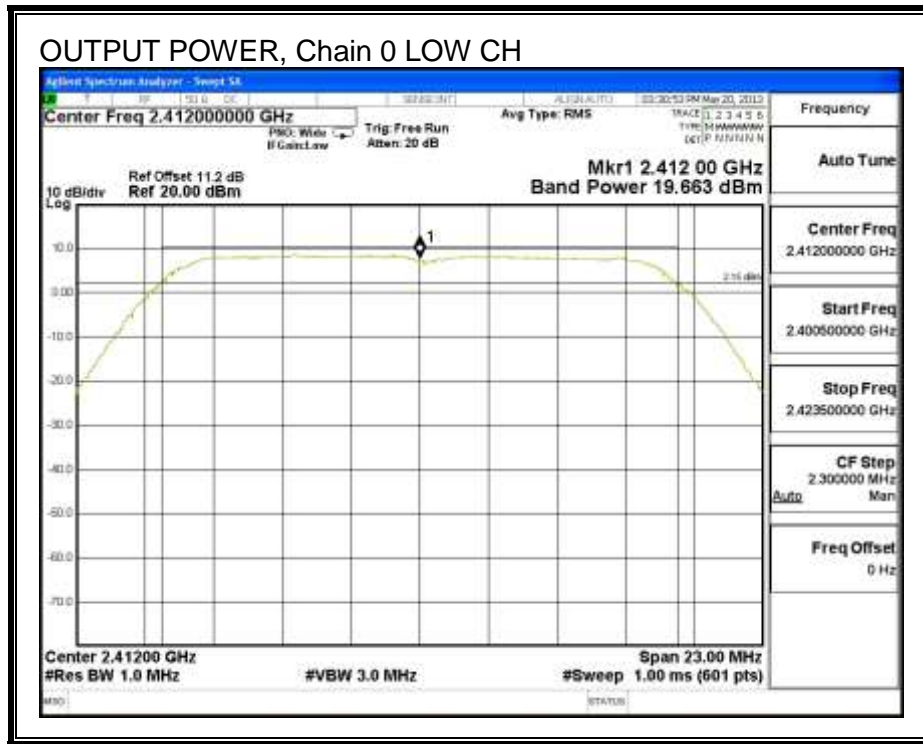
**Limits**

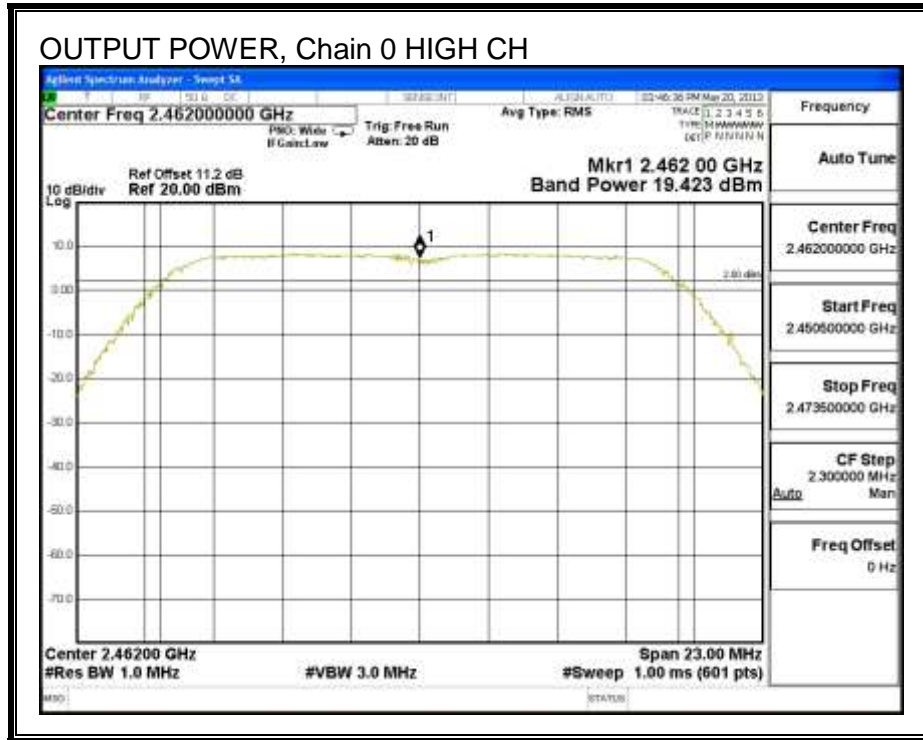
Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	1.00	30.00	30	36	30.00
Mid	2437	1.00	30.00	30	36	30.00
High	2462	1.00	30.00	30	36	30.00

**Results**

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	19.66	19.66	30.00	-10.34
Mid	2437	19.19	19.19	30.00	-10.81
High	2462	19.42	19.42	30.00	-10.58

**OUTPUT POWER, Chain 0**





### 9.2.5. PSD

#### LIMITS

FCC §15.247

IC RSS-210 A8.2

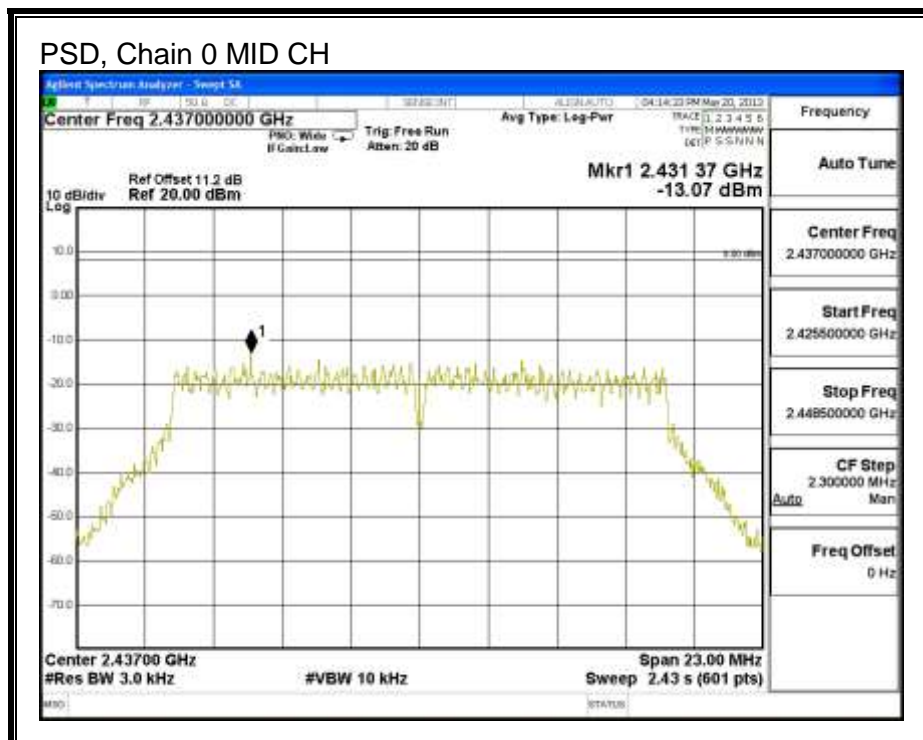
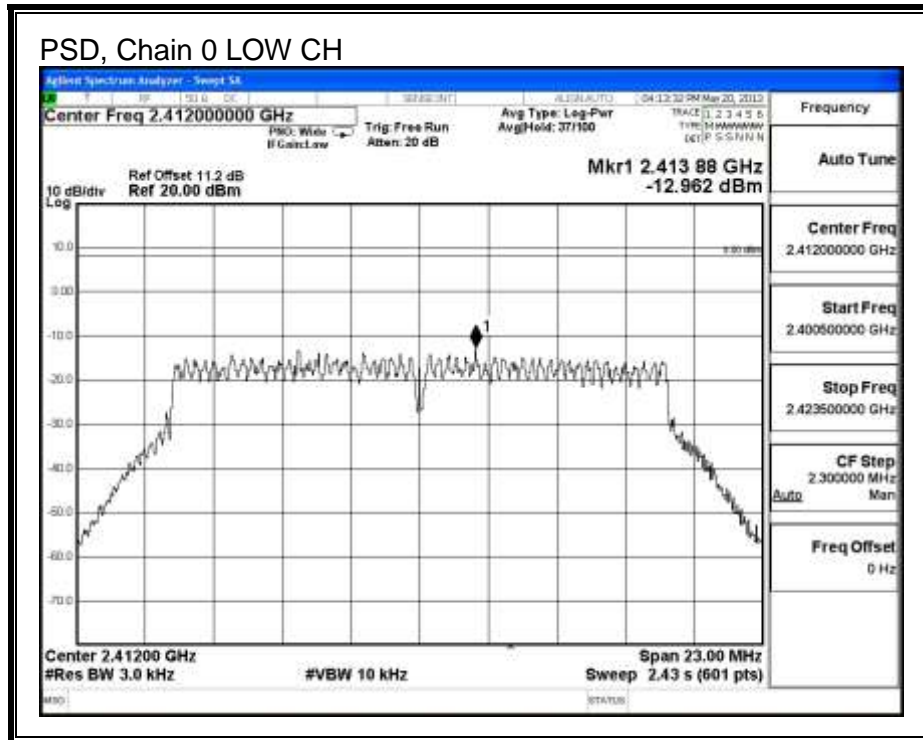
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

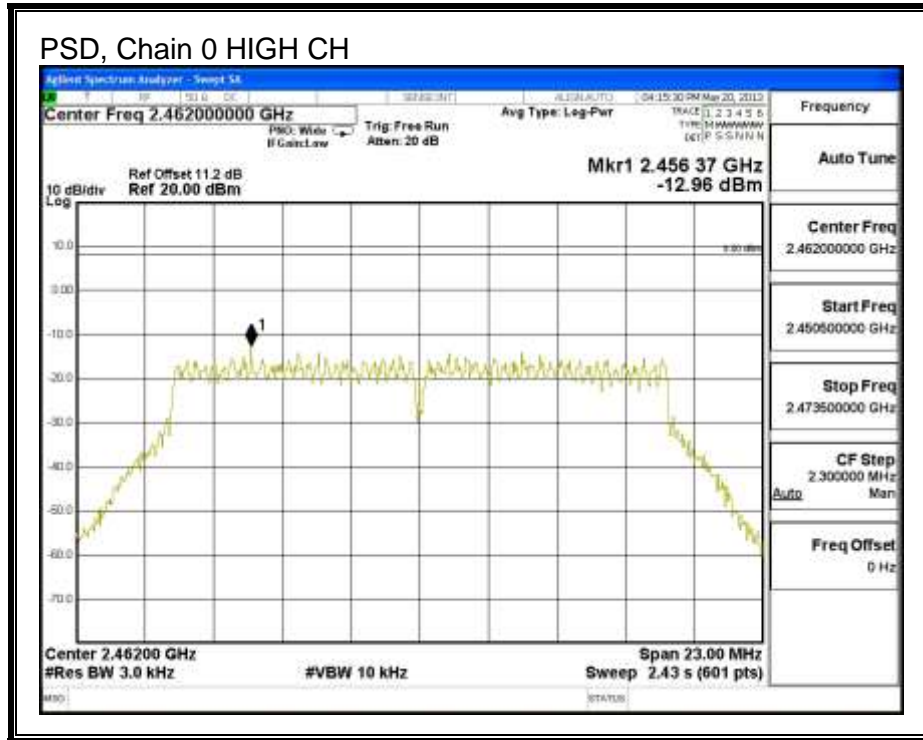
#### RESULTS

##### PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-12.96	8.0	-21.0
Mid	2437	-13.07	8.0	-21.1
High	2462	-12.96	8.0	-21.0

**PSD, Chain 0**







## 9.2.6. OUT-OF-BAND EMISSIONS

### LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

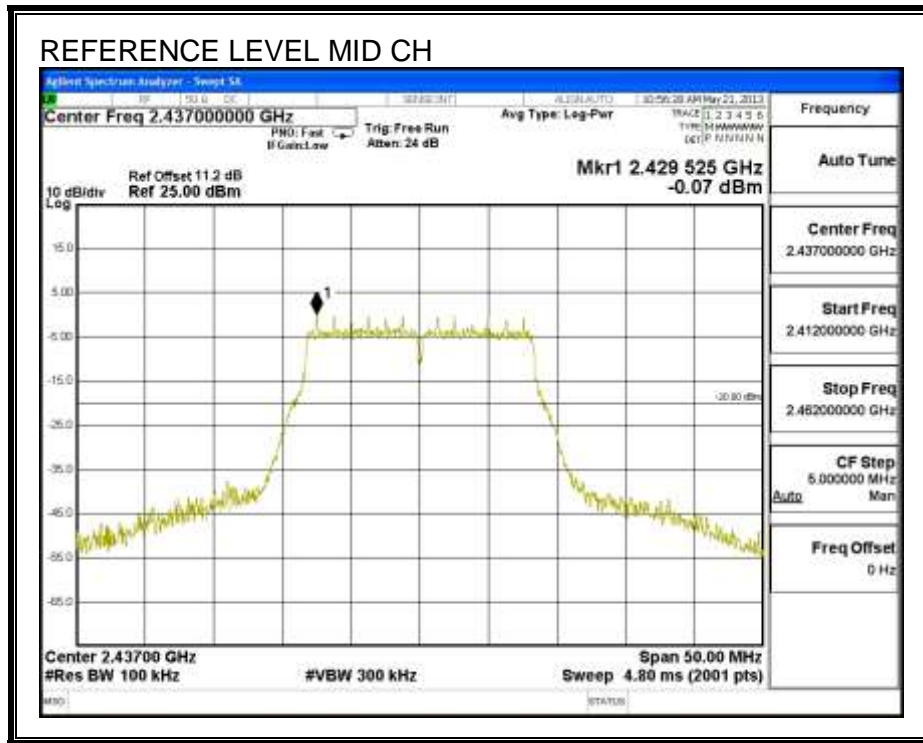
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

### TEST PROCEDURE

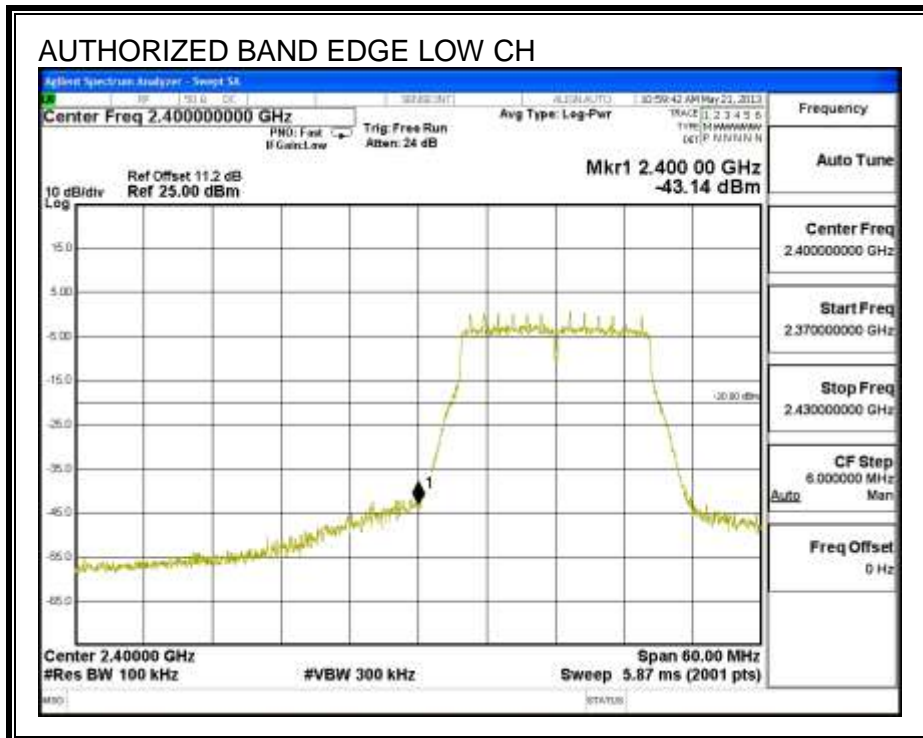
The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

**RESULTS**

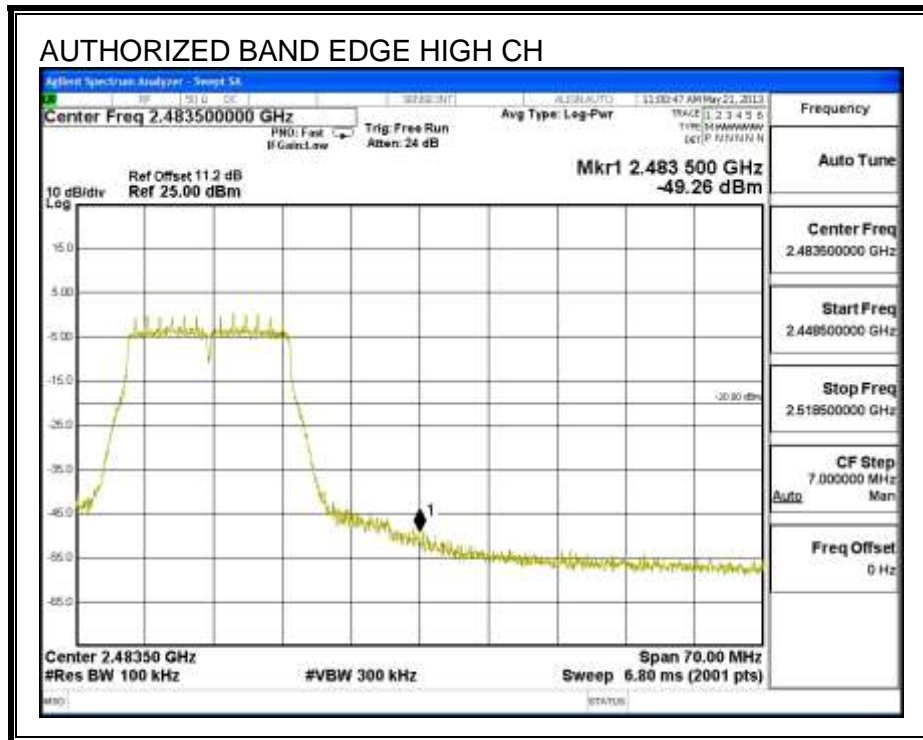
**IN-BAND REFERENCE LEVEL**



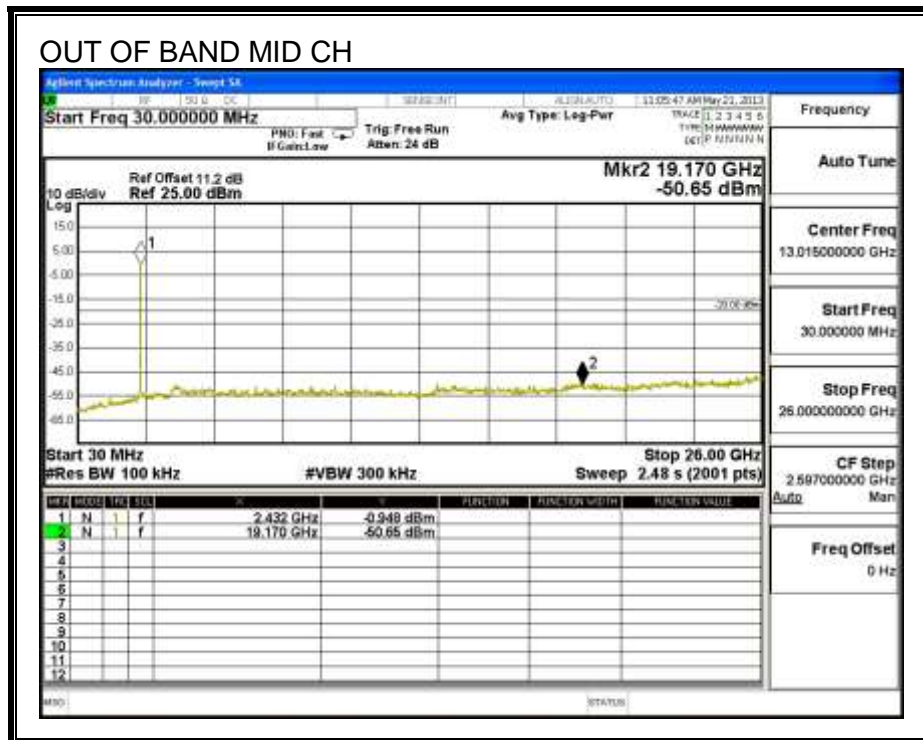
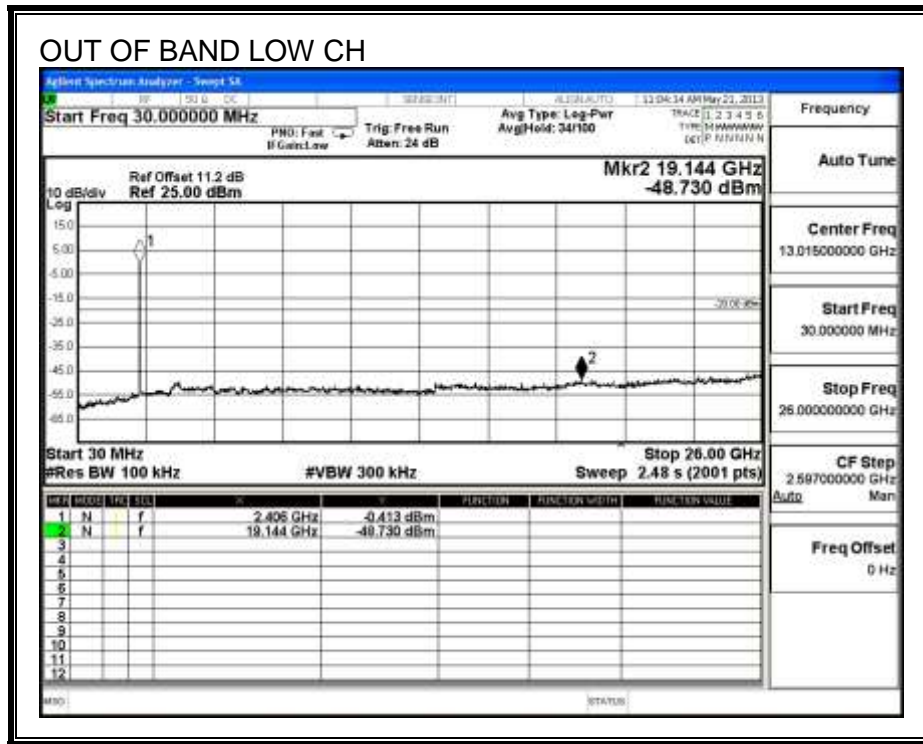
**LOW CHANNEL BANDEDGE**

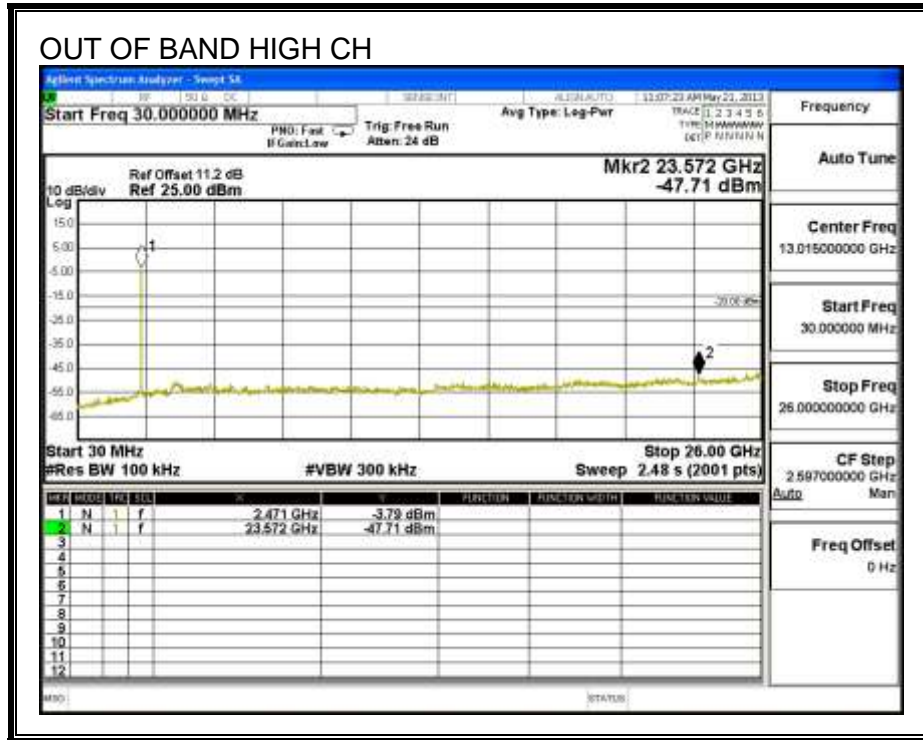


**HIGH CHANNEL BANDEDGE**



**OUT-OF-BAND EMISSIONS**





### 9.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

#### 9.3.1. 6 dB BANDWIDTH

##### LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

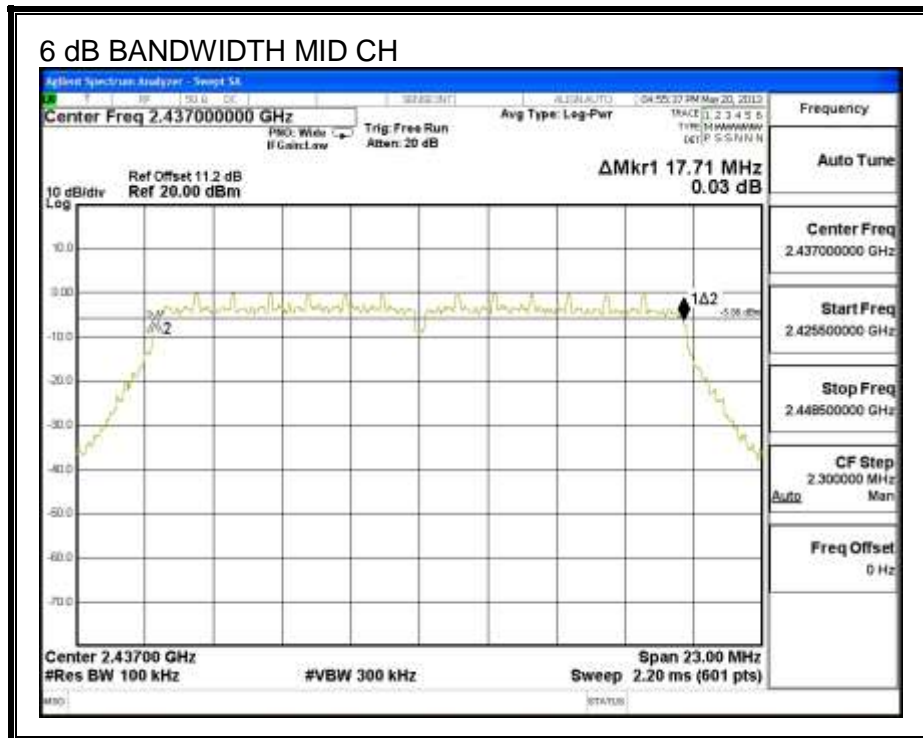
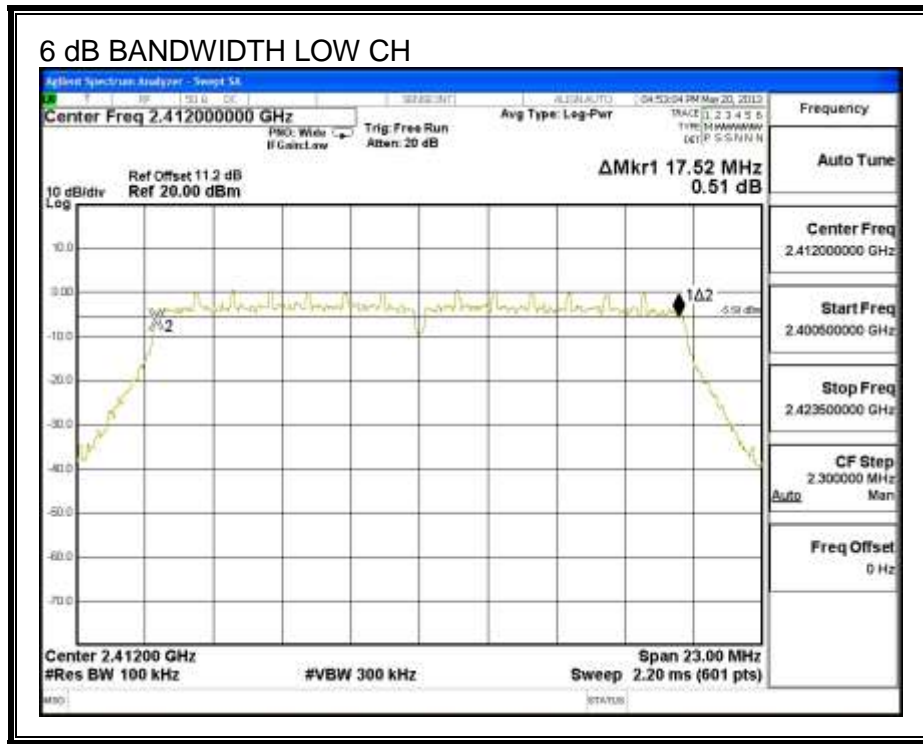
##### TEST PROCEDURE

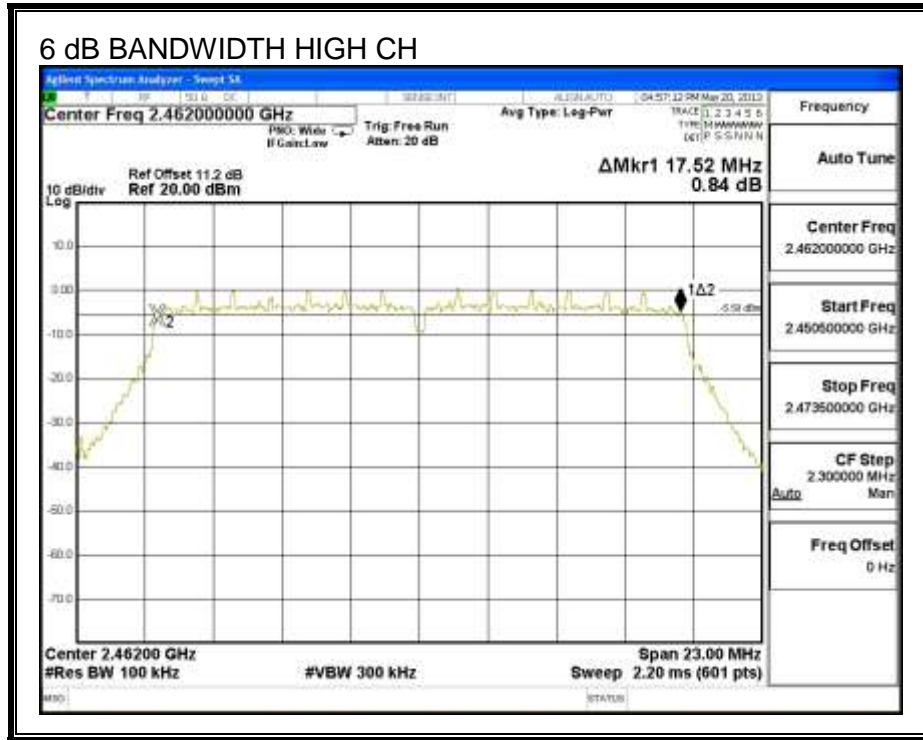
The transmitter output is connected to a spectrum analyzer with the RBW set between 1% and 5% of the EBW, the VBW  $\geq 3 \times$  RBW, peak detector and max hold.

##### RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	17.520	0.5
Mid	2437	17.710	0.5
High	2462	17.520	0.5

**6 dB BANDWIDTH**







### 9.3.2. 99% BANDWIDTH

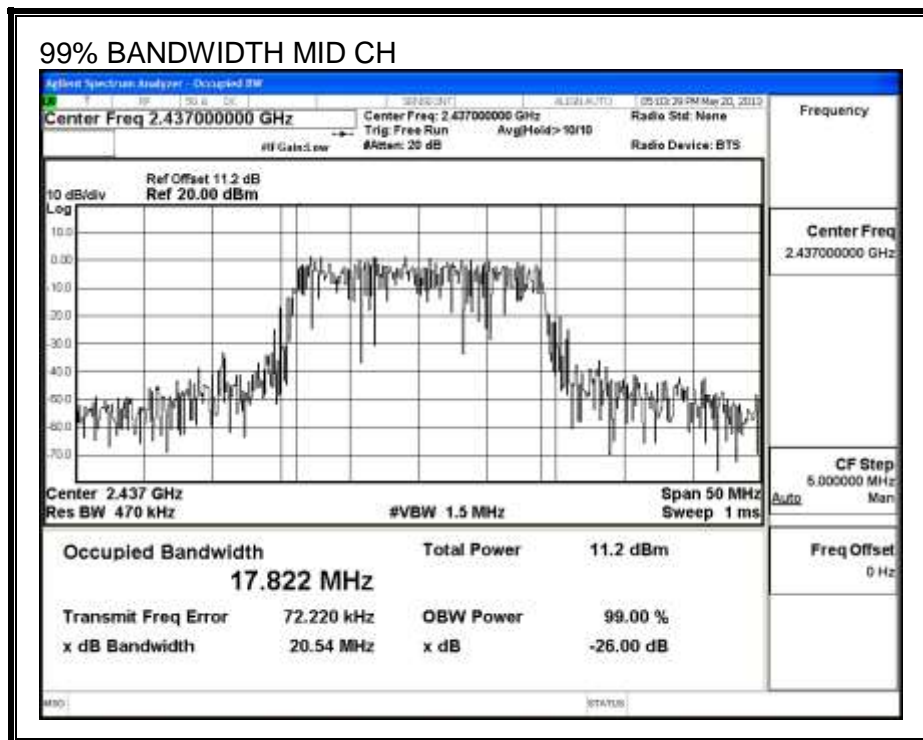
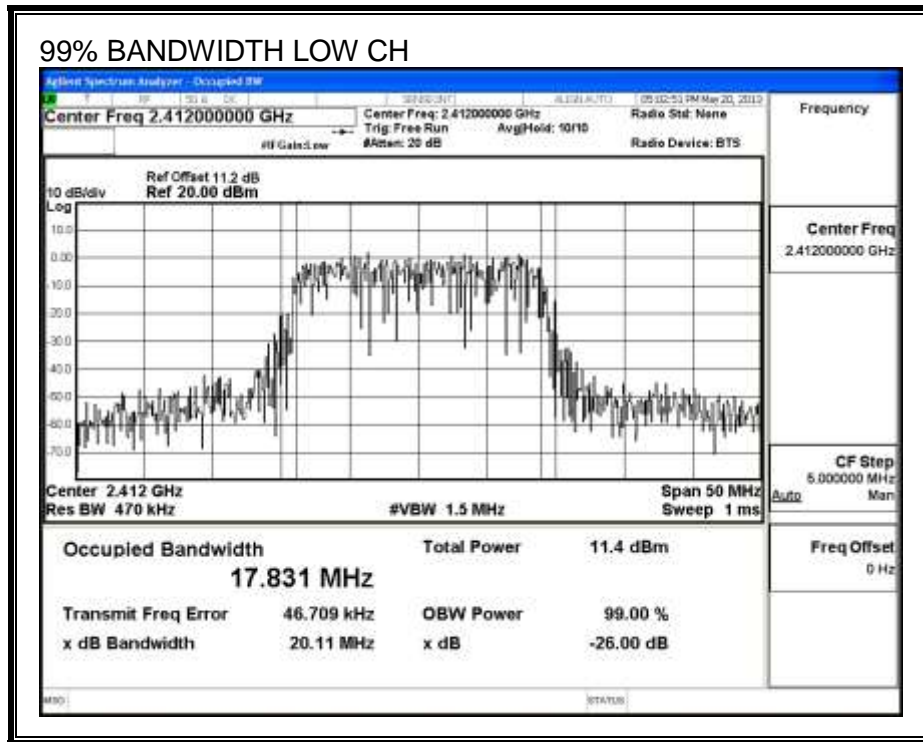
#### LIMITS

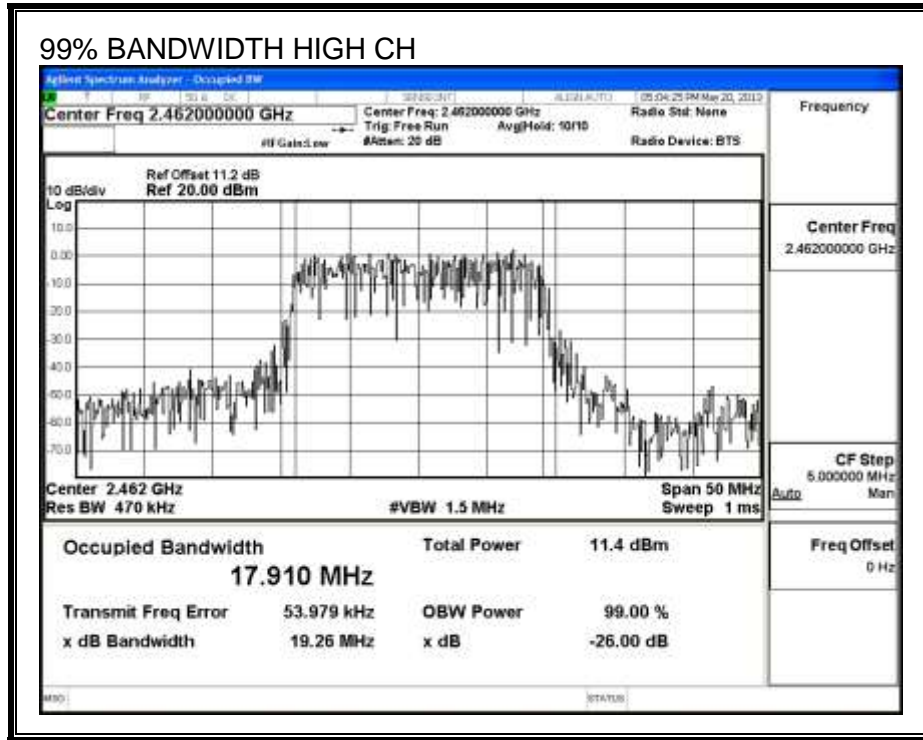
None; for reporting purposes only.

#### RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.8310
Mid	2437	17.8220
High	2462	17.9100

**99% BANDWIDTH**





### 9.3.3. AVERAGE POWER

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	2412	11.73
Mid	2437	11.48
High	2462	11.67

### **9.3.4. OUTPUT POWER**

#### **LIMITS**

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### **DIRECTIONAL ANTENNA GAIN**

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

**RESULTS**

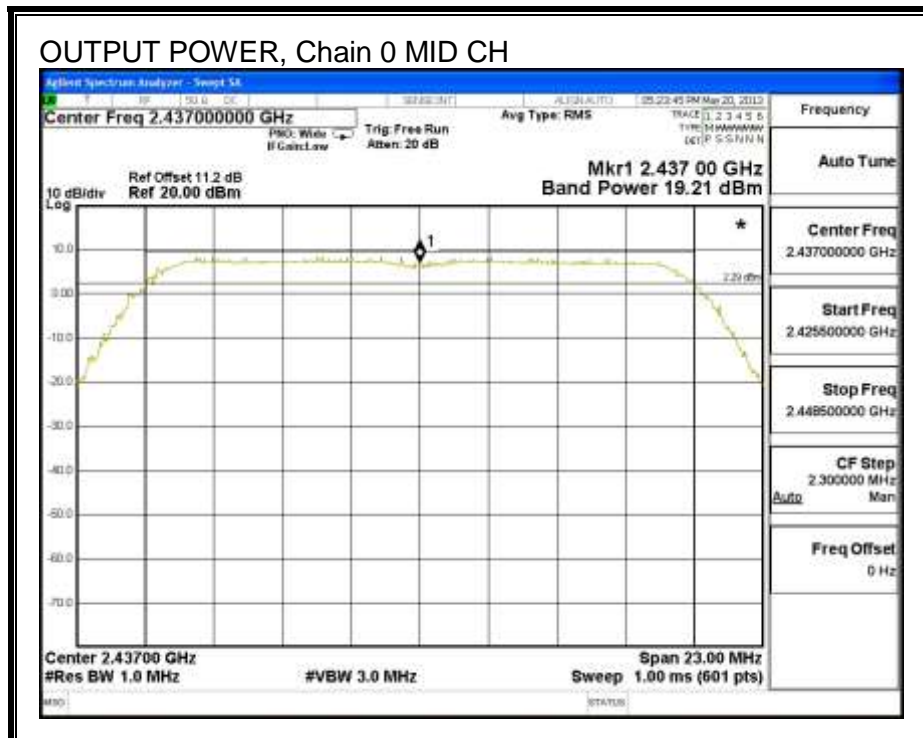
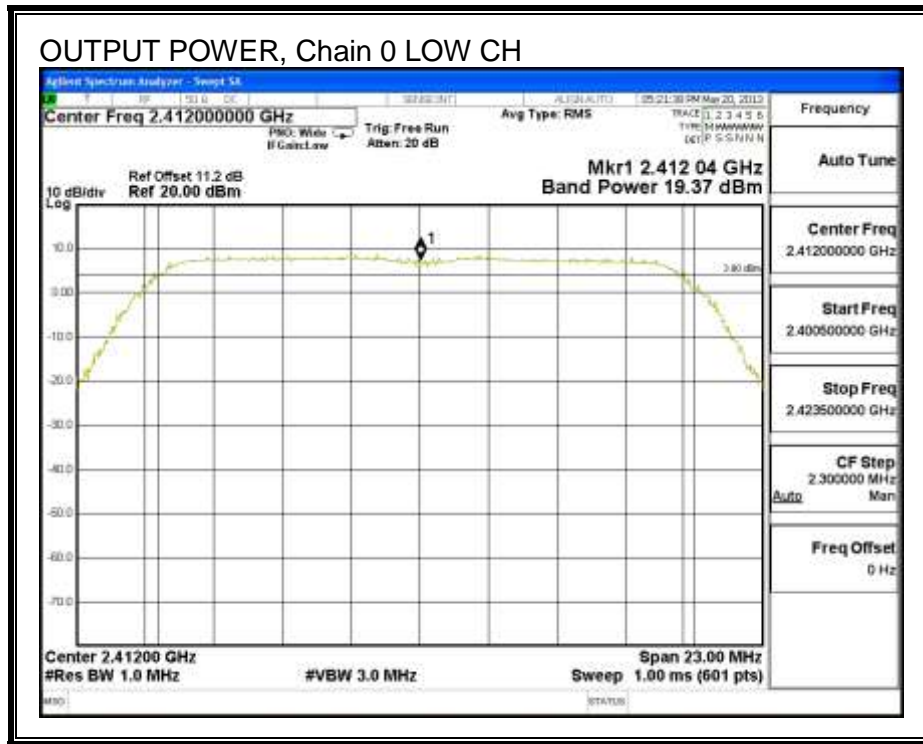
**Limits**

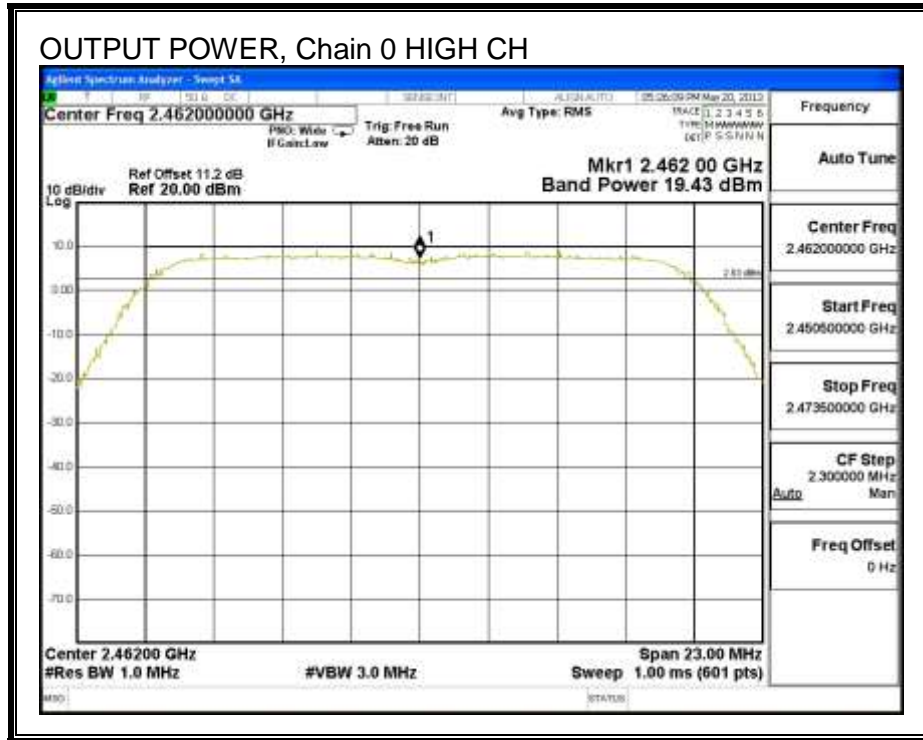
Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	1.00	30.00	30	36	30.00
Mid	2437	1.00	30.00	30	36	30.00
High	2462	1.00	30.00	30	36	30.00

**Results**

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	19.37	19.37	30.00	-10.63
Mid	2437	19.21	19.21	30.00	-10.79
High	2462	19.43	19.43	30.00	-10.57

**OUTPUT POWER, Chain 0**







### 9.3.5. PSD

#### LIMITS

FCC §15.247

IC RSS-210 A8.2

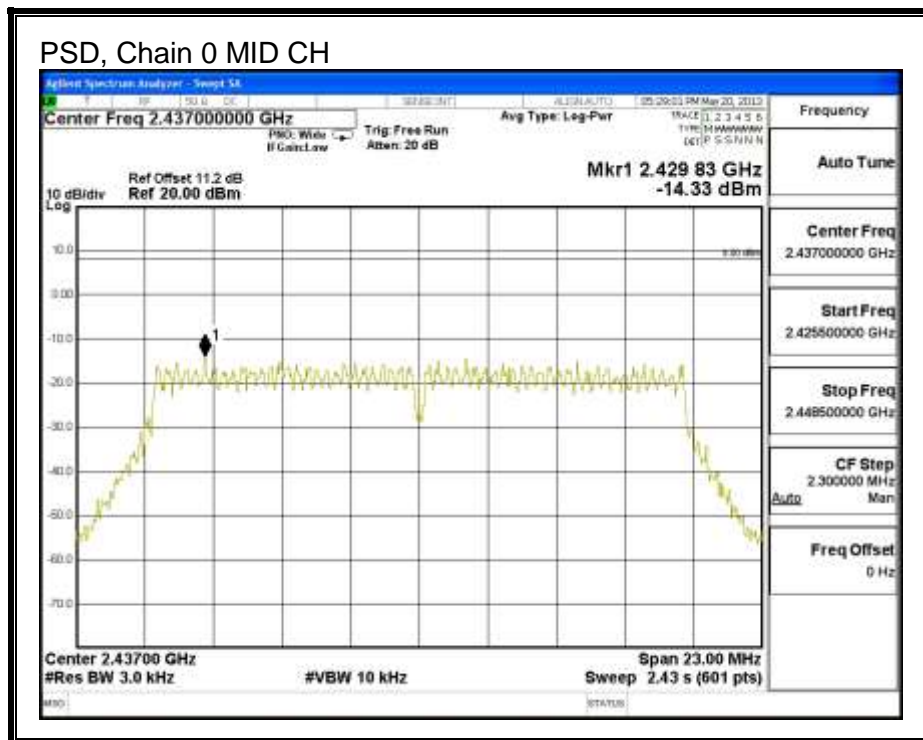
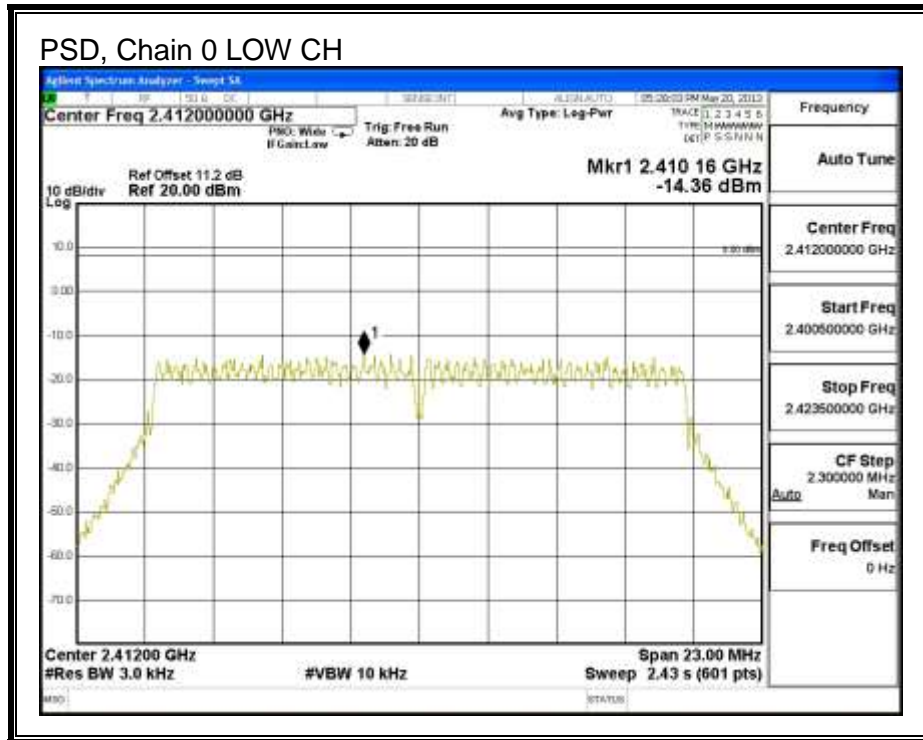
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

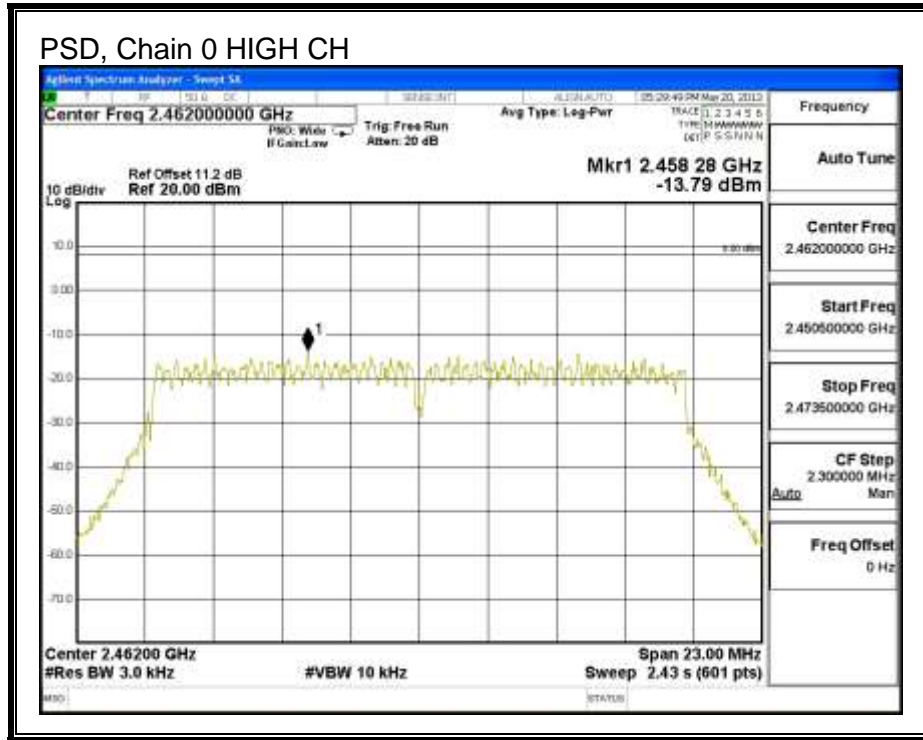
#### RESULTS

##### PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-14.36	8.0	-22.4
Mid	2437	-14.33	8.0	-22.3
High	2462	-13.79	8.0	-21.8

**PSD, Chain 0**





### **9.3.6. OUT-OF-BAND EMISSIONS**

#### **LIMITS**

FCC §15.247 (d)

IC RSS-210 A8.5

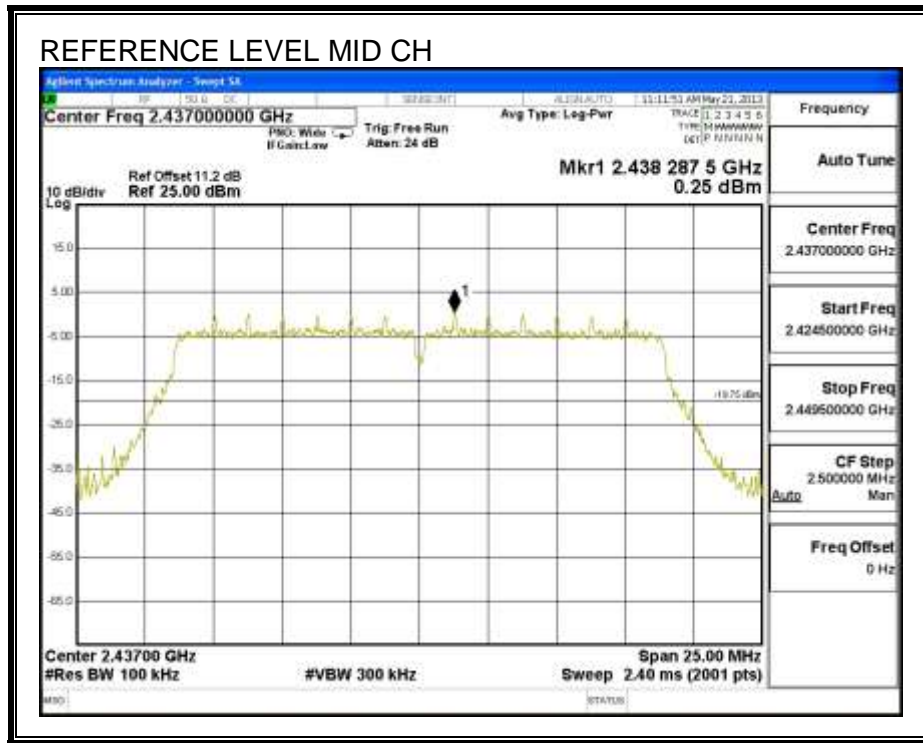
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

#### **TEST PROCEDURE**

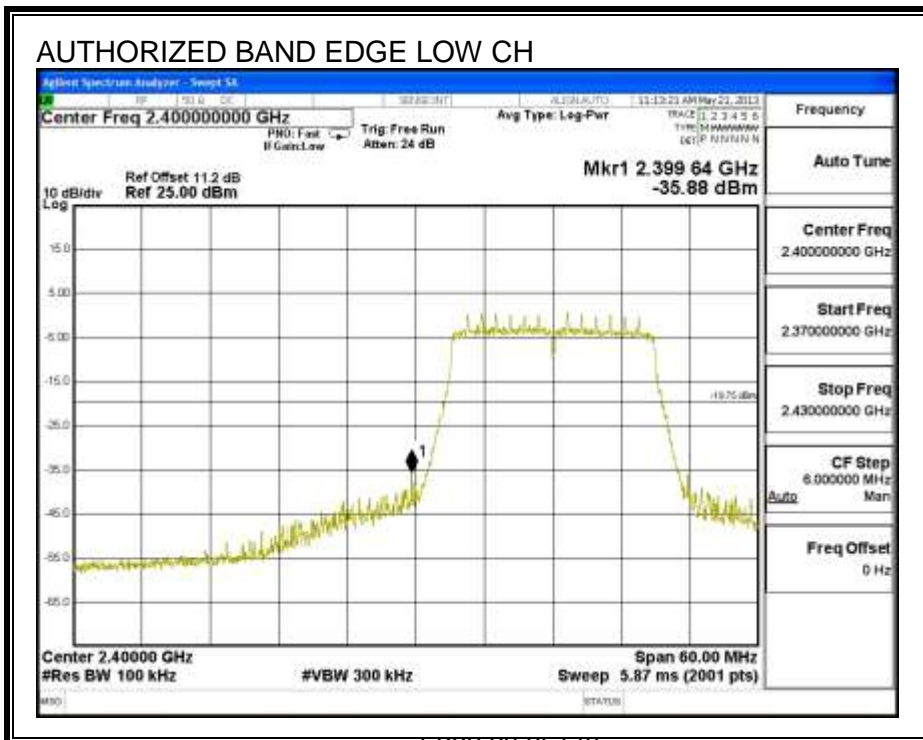
The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

## RESULTS

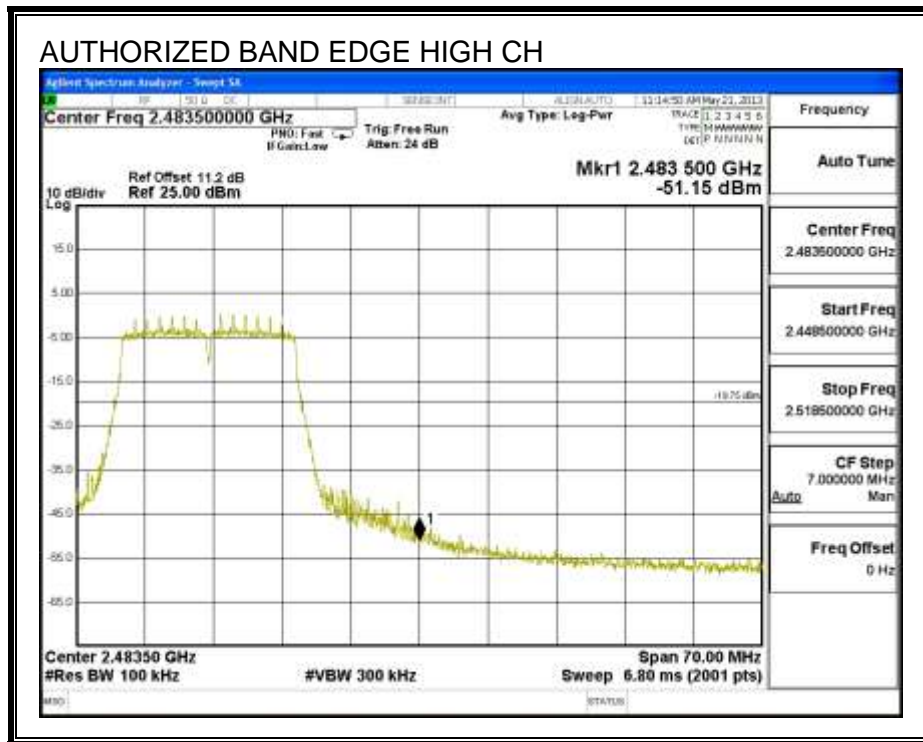
### IN-BAND REFERENCE LEVEL



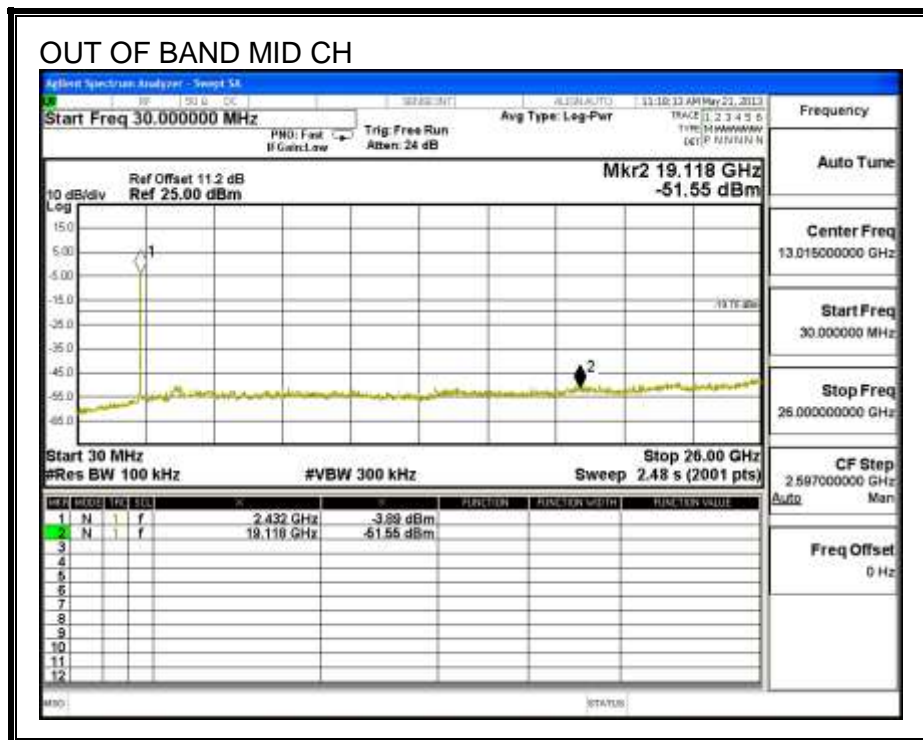
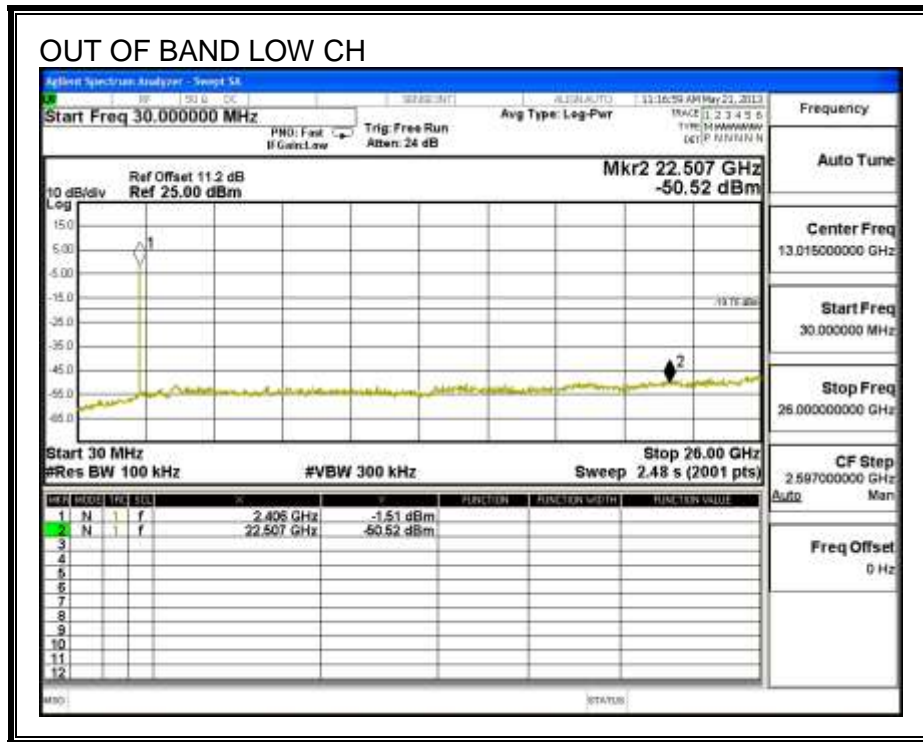
### LOW CHANNEL BANDEDGE

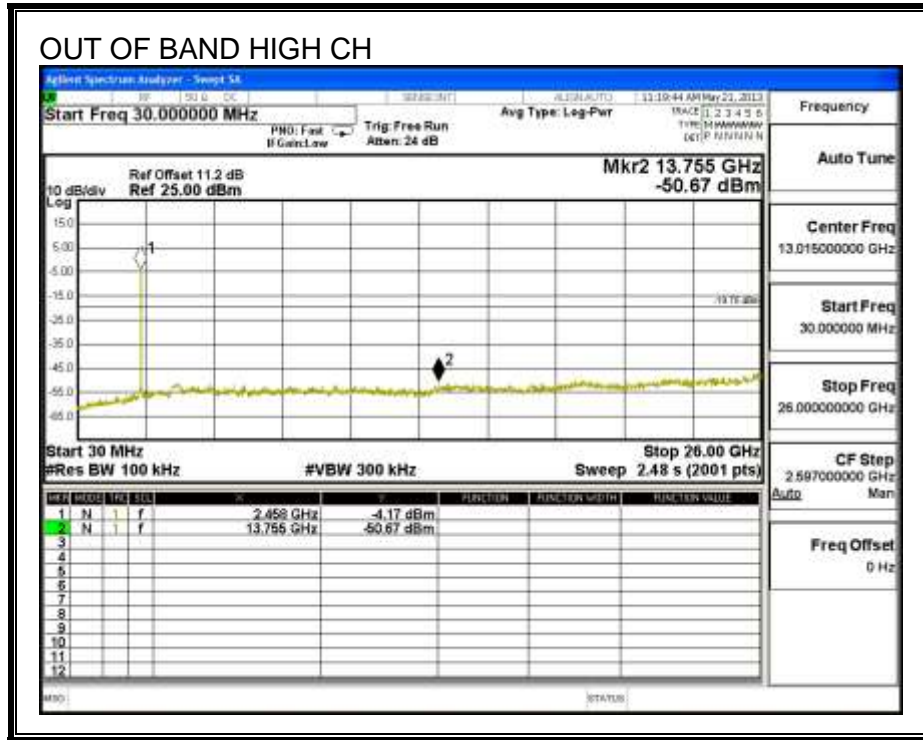


**HIGH CHANNEL BANDEDGE**



**OUT-OF-BAND EMISSIONS**







## 9.4. 802.11ac HT20 MODE IN THE 2.4 GHz BAND

### 9.4.1. AVERAGE POWER

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	2412	11.79
Mid	2437	11.56
High	2462	11.20

## 9.4.2. OUTPUT POWER

### LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### DIRECTIONAL ANTENNA GAIN

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

**RESULTS**

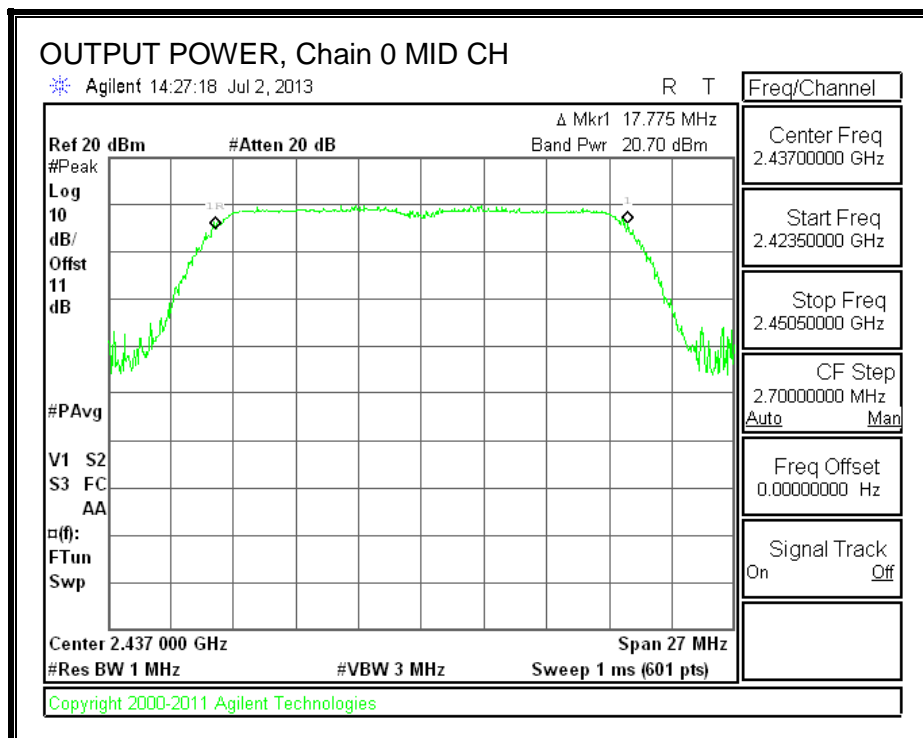
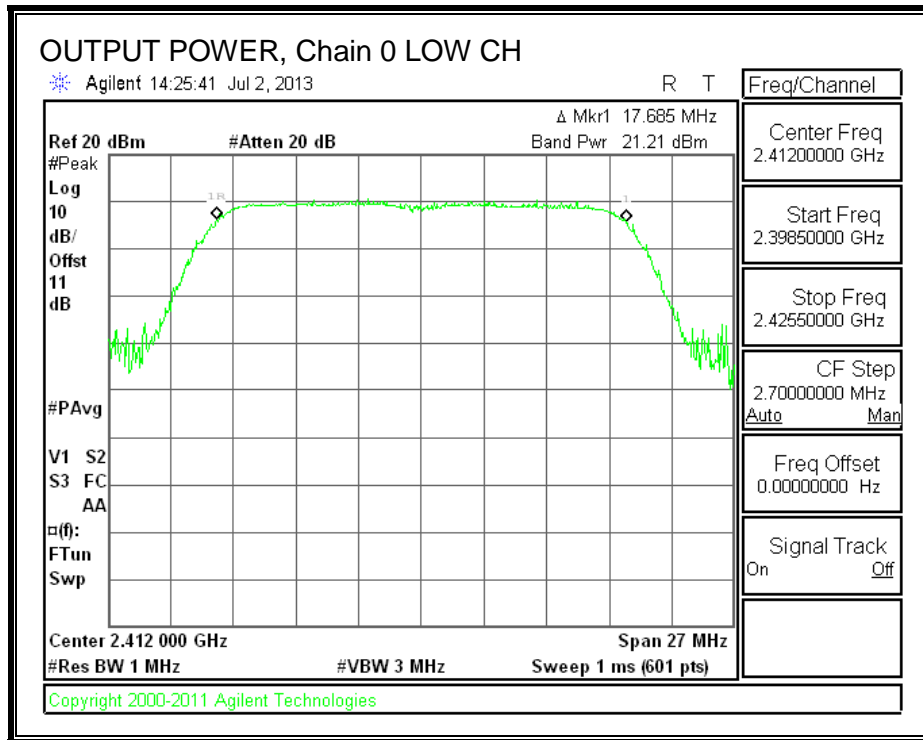
**Limits**

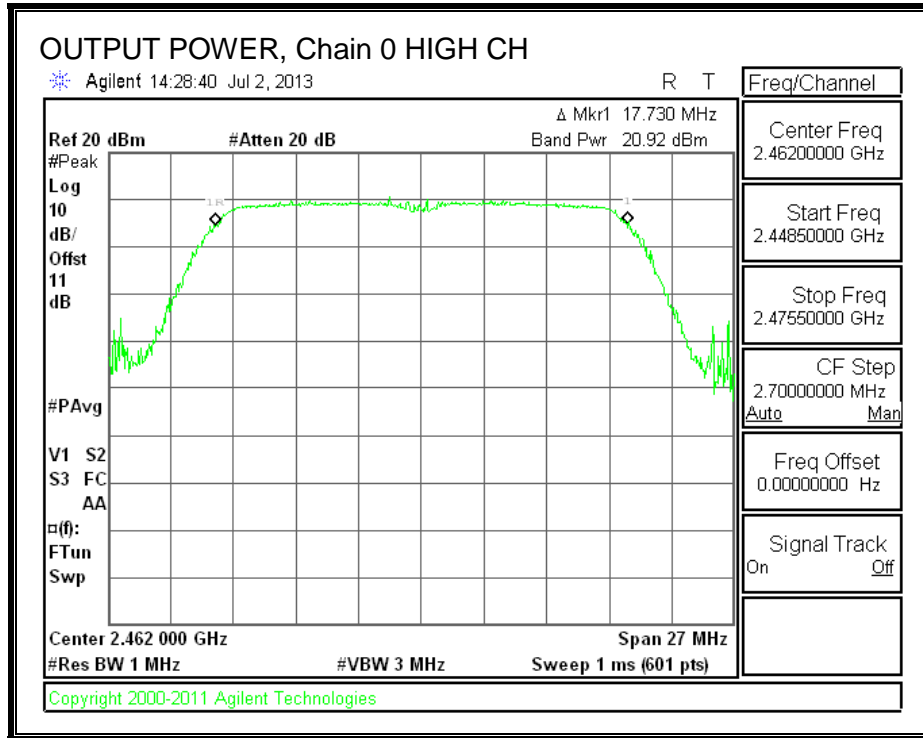
Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	1.00	30.00	30	36	30.00
Mid	2437	1.00	30.00	30	36	30.00
High	2462	1.00	30.00	30	36	30.00

**Results**

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	21.21	21.21	30.00	-8.79
Mid	2437	20.70	20.70	30.00	-9.30
High	2462	20.92	20.92	30.00	-9.08

**OUTPUT POWER, Chain 0**





## 10. RADIATED TEST RESULTS

### 10.1. 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.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

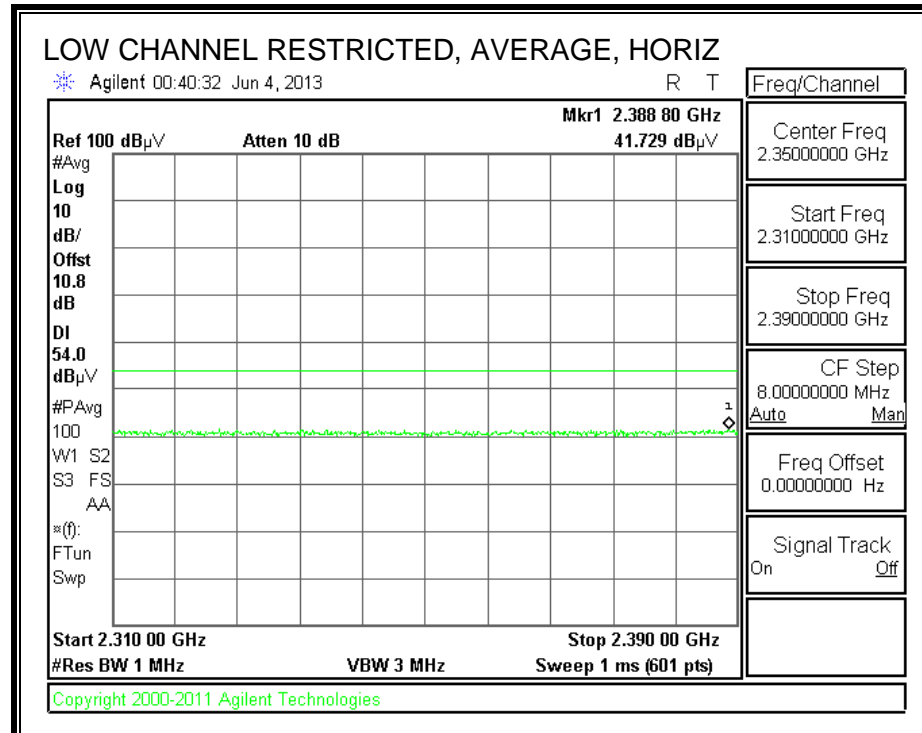
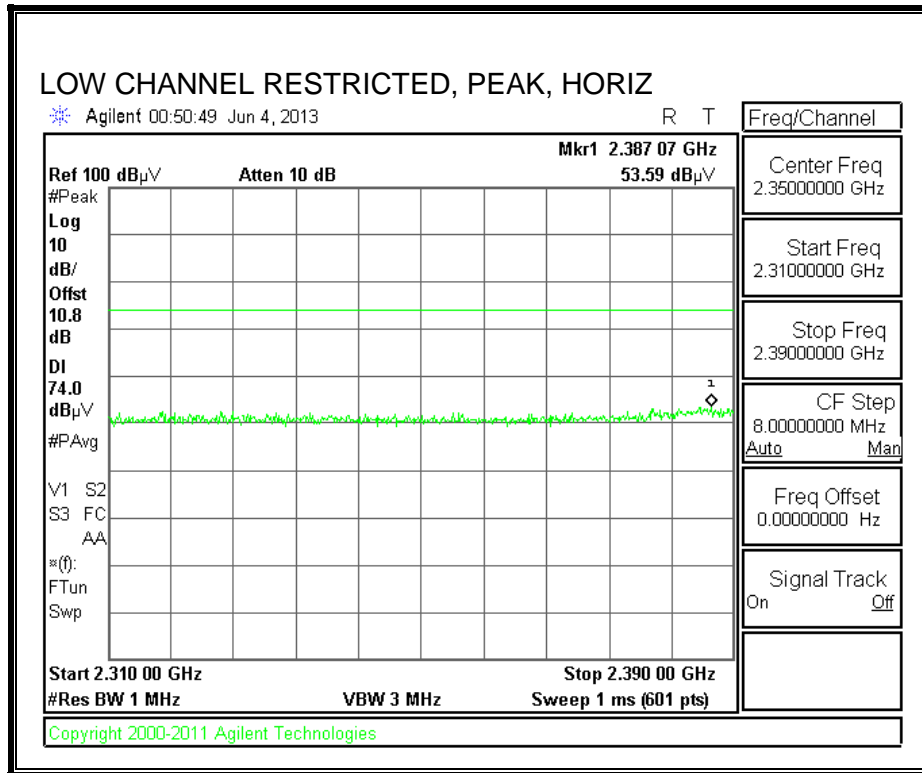
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 1 MHz for peak measurements and as applicable for average measurements.

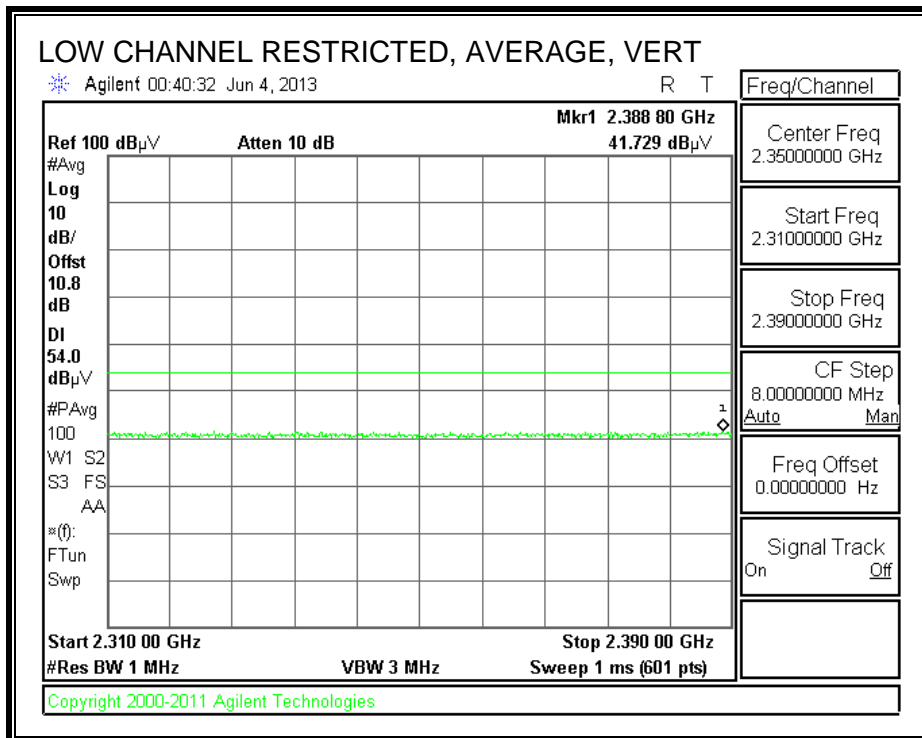
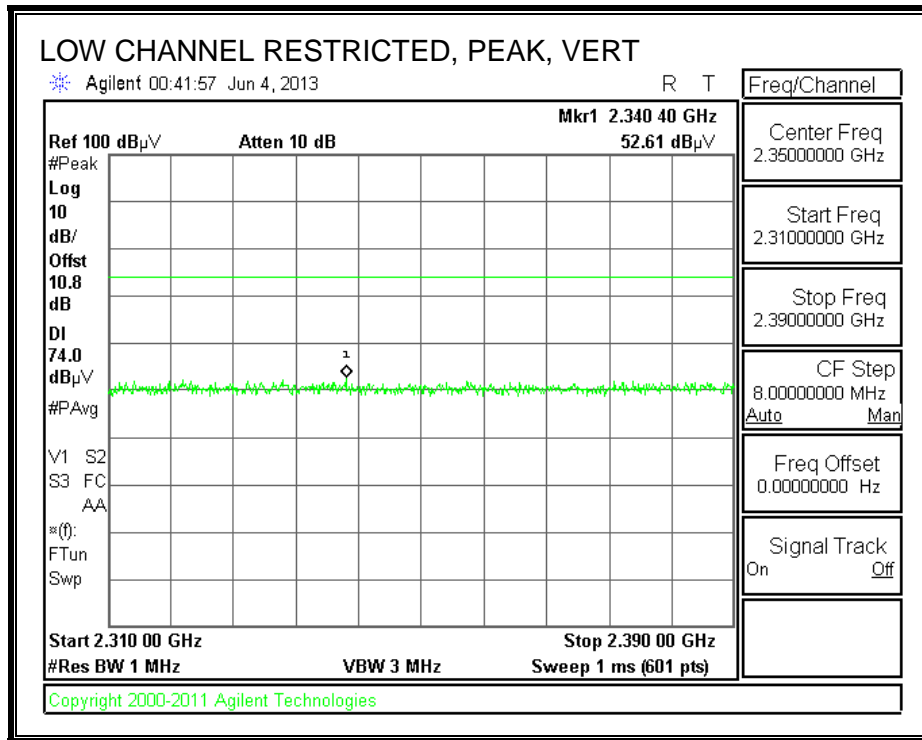
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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

## 10.2. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND

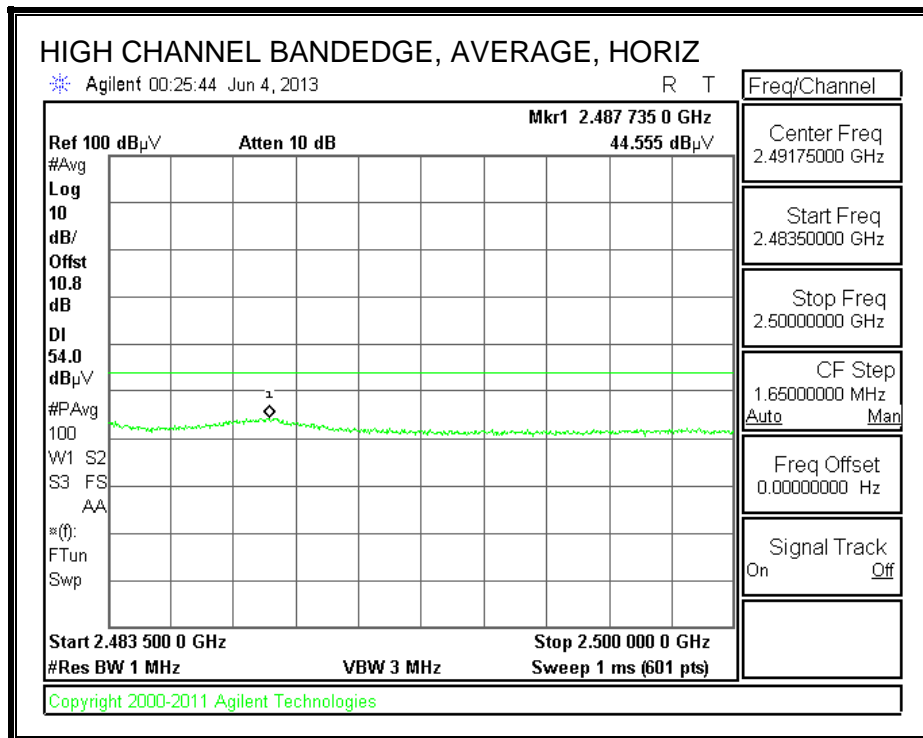
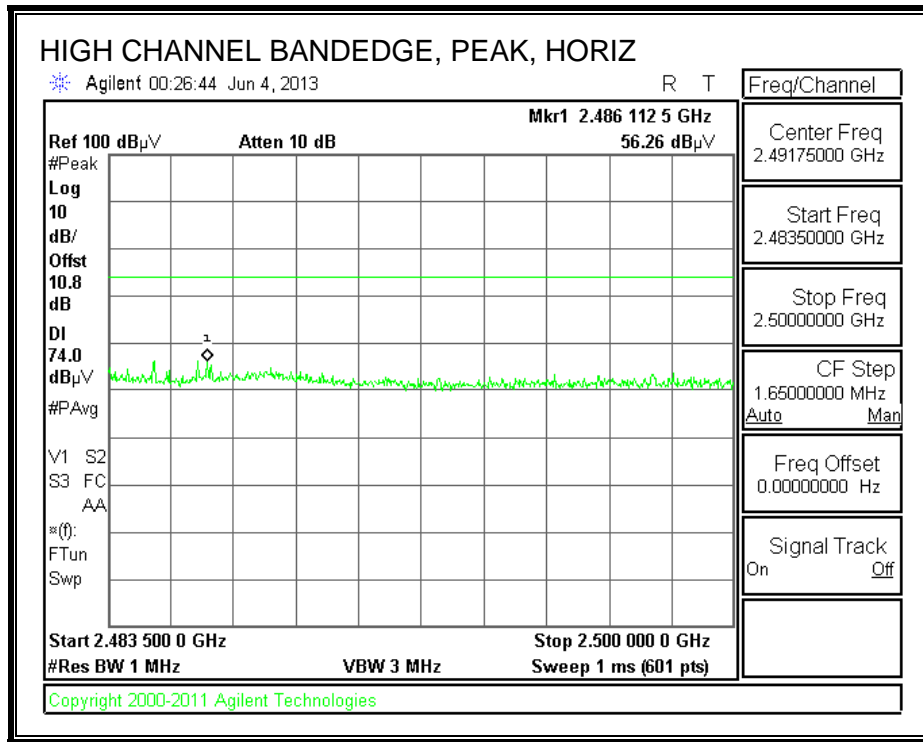
### RESTRICTED BANDEDGE (LOW CHANNEL)

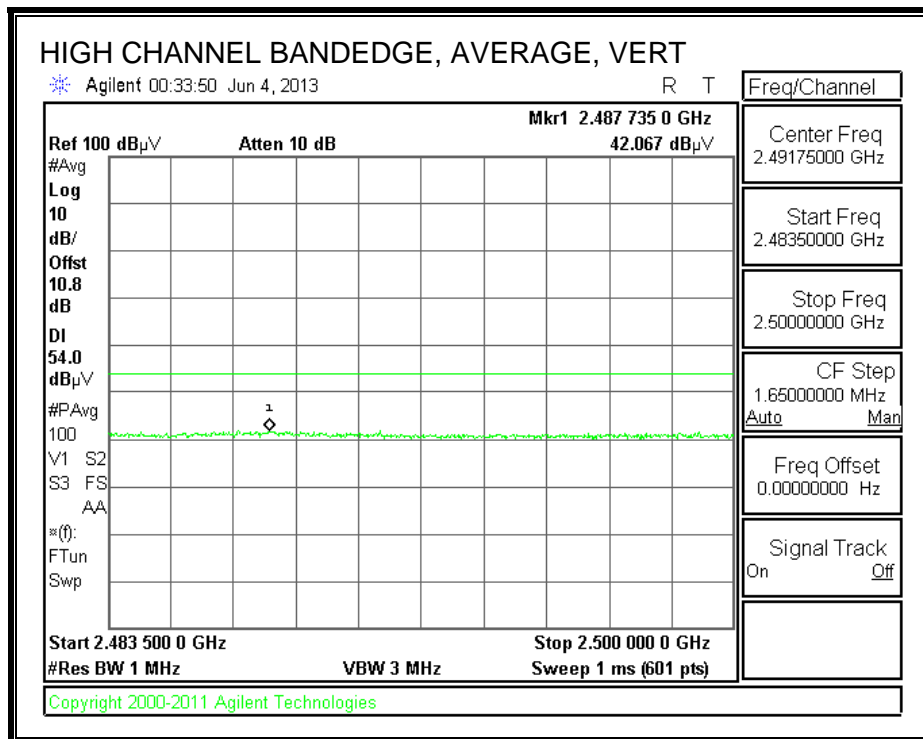
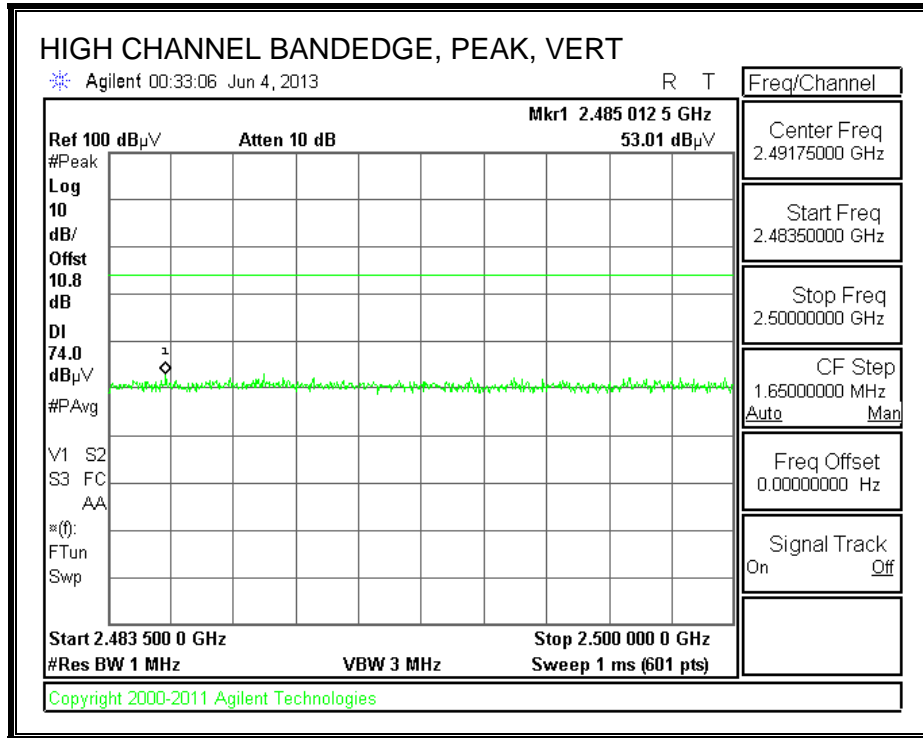






**RESTRICTED BANDEDGE (HIGH CHANNEL)**



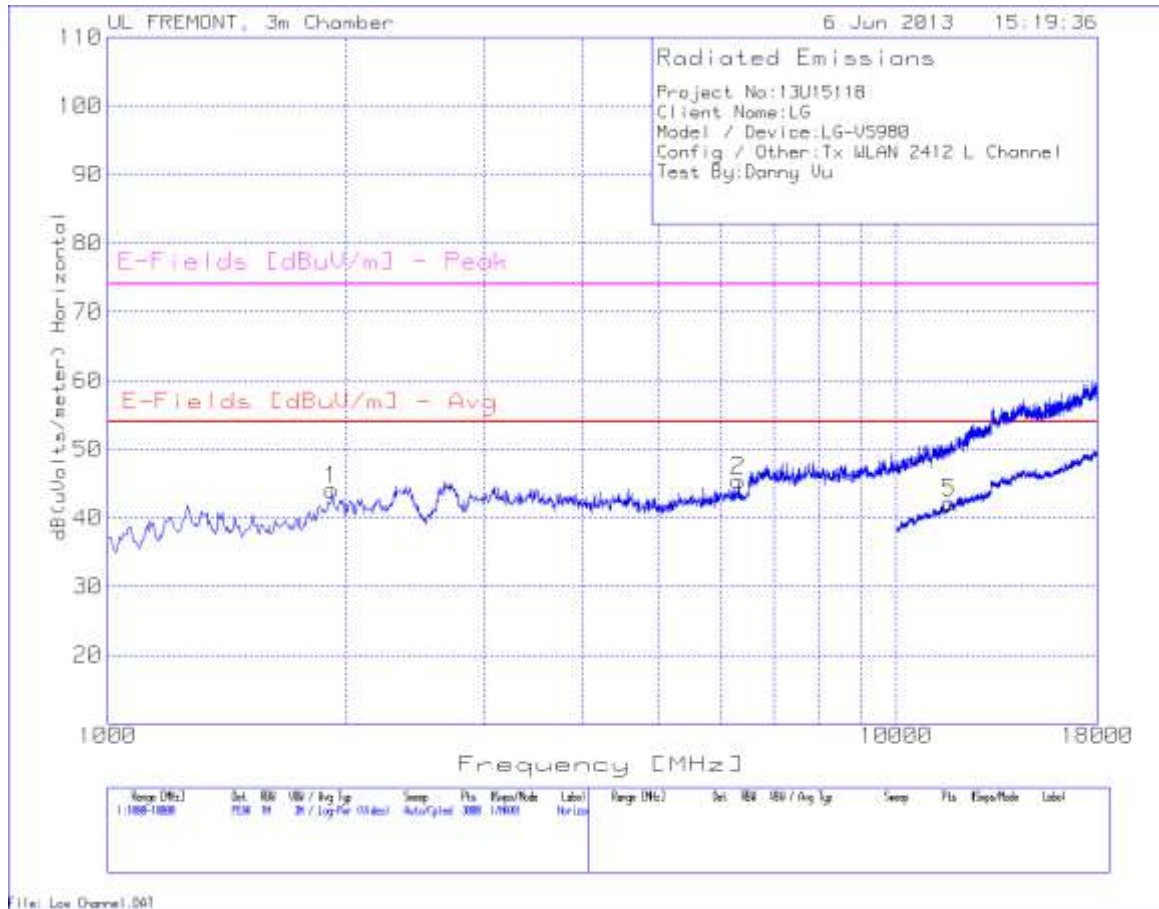


**HARMONICS AND SPURIOUS EMISSIONS**

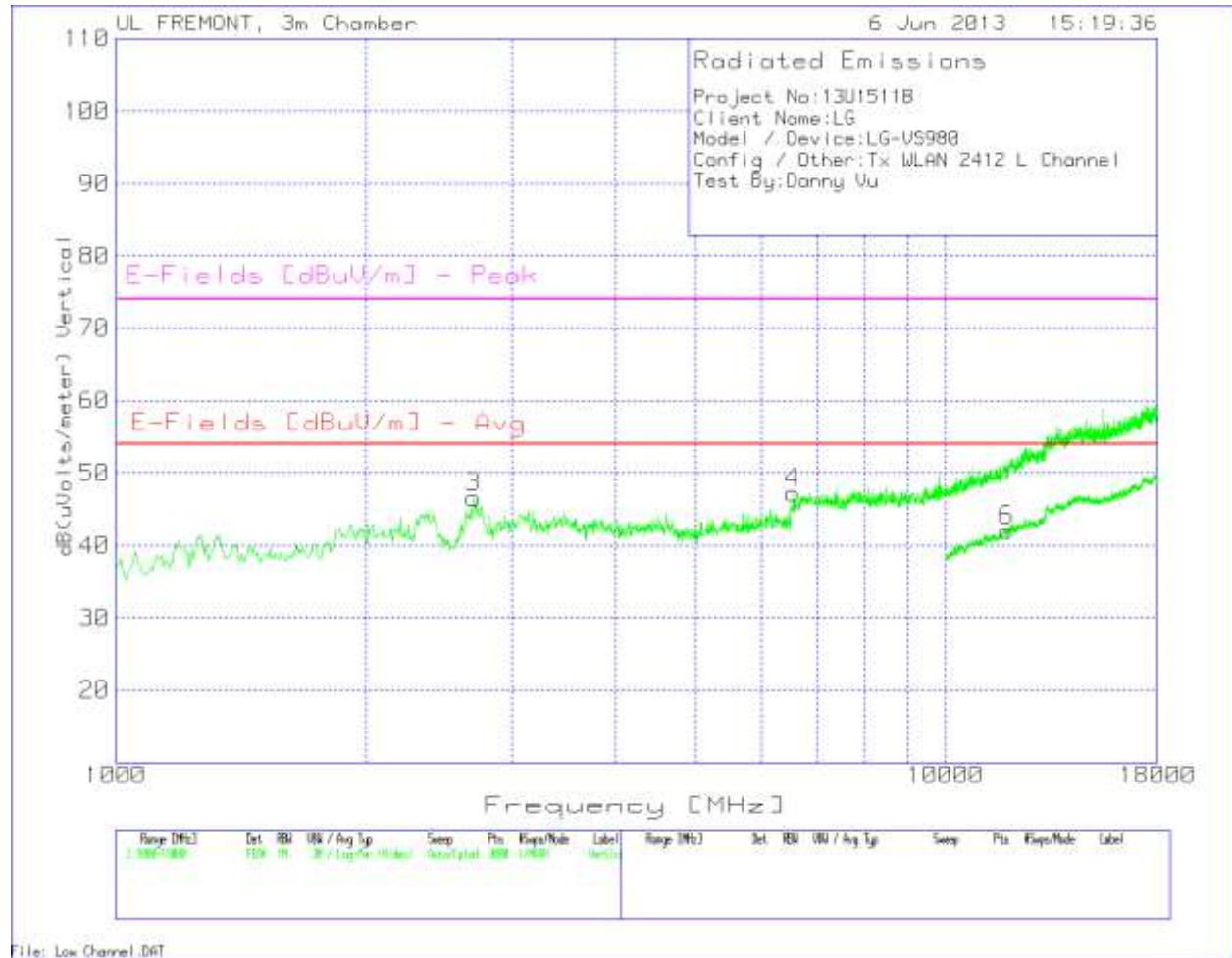
**LOW CH**

Project No:13U15118													
Client Name:LG													
Model / Device:LG-VS980													
Config / Other:Tx WLAN b Mode 2412 L Channel													
Test By:Danny Vu													
<b>Horizontal 1000 - 18000MHz</b>													
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)	Height [cm]	Polarity
1	1923.051	42.66	PK	31.3	-30.8	0.9	44.06	53.97	-9.91	74	-29.94		
2	6311.792	33.52	PK	35.4	-23.7	0.2	45.42	53.97	-8.55	74	-28.58		
<b>Vertical 1000 - 18000MHz</b>													
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)	Height [cm]	Polarity
3	2693.205	42.1	PK	32.6	-29	0.9	46.6	53.97	-7.37	74	-27.4		
4	6549.634	34.91	PK	35.6	-23.5	0.2	47.21	53.97	-6.76	74	-26.79		
<b>Horizontal 10000 - 18000MHz</b>													
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)	Height [cm]	Polarity
5	11679.16	22.45	PK	38.6	-19.3	0.5	42.25	53.97	-11.72	74	-31.75		
<b>Vertical 10000 - 18000MHz</b>													
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)	Height [cm]	Polarity
6	11839.08	21.54	PK	38.9	-19	0.6	42.04	53.97	-11.93	74	-31.96		
PK - Peak detector													
Av - Average detector													

### HORIZONTAL PLOT



**VERTICAL PLOT**

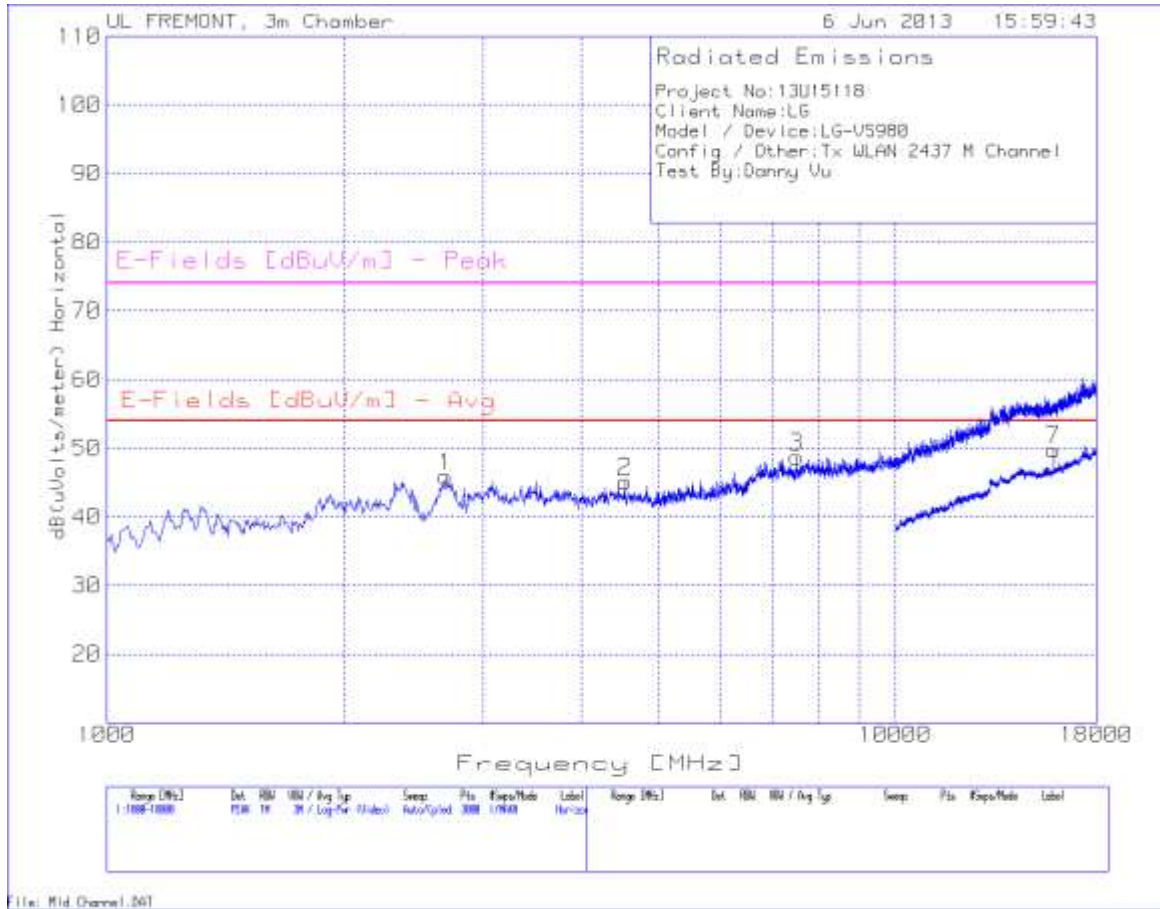


**HARMONICS AND SPURIOUS EMISSIONS**

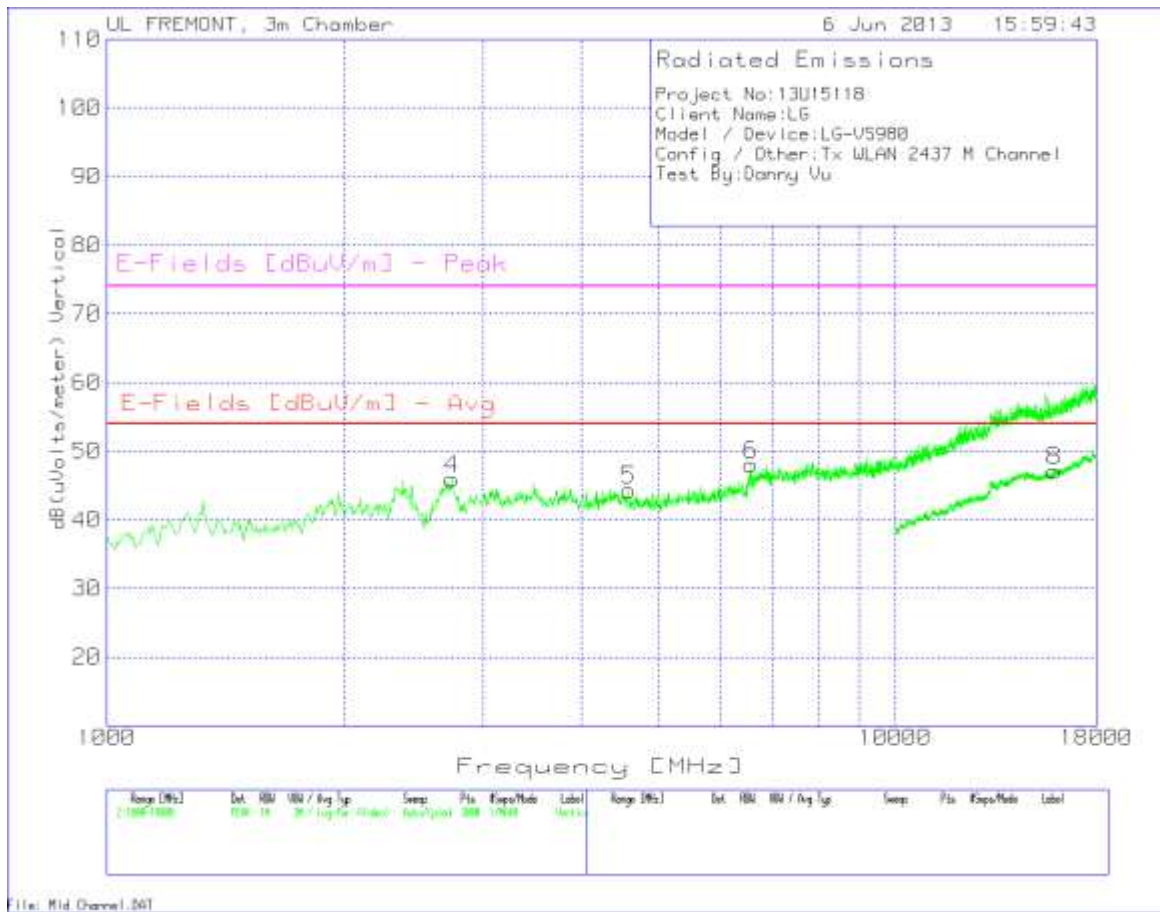
**MID CH**

Project No:13U15118											
Client Name:LG											
Model / Device:LG-V5980											
Config / Other:Tx WLAN b Mode 2437 M Channel											
Test By:Danny Vu											
Horizontal 1000 - 18000MHz											
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)
1	2687.542	41.38	PK	32.6	-29	0.9	45.88	53.97	-8.09	74	-28.12
2	4539.307	36.46	PK	34	-25.5	0.2	45.16	53.97	-8.81	74	-28.84
3	7489.674	35.61	PK	35.7	-22.9	0.3	48.71	53.97	-5.26	74	-25.29
Vertical 1000 - 18000MHz											
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)
4	2738.508	41.25	PK	32.7	-28.9	0.9	45.95	53.97	-8.02	74	-28.05
5	4595.936	35.5	PK	34	-25.4	0.3	44.4	53.97	-9.57	74	-29.6
6	6555.296	35.63	PK	35.6	-23.5	0.3	48.03	53.97	-5.94	74	-25.97
Horizontal 10000 - 18000MHz											
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)
7	15873.063	25.37	PK	40.5	-16.4	0.3	49.77	53.97	-4.2	74	-24.23
Vertical 10000 - 18000MHz											
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uV/s/meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)
8	15925.037	22.65	PK	40.5	-16.3	0.3	47.15	53.97	-6.82	74	-26.85
PK - Peak detector											
Av - Average detector											

### HORIZONTAL MID CHANNEL PLOT



**VERTICAL MID CHANNEL PLOT**



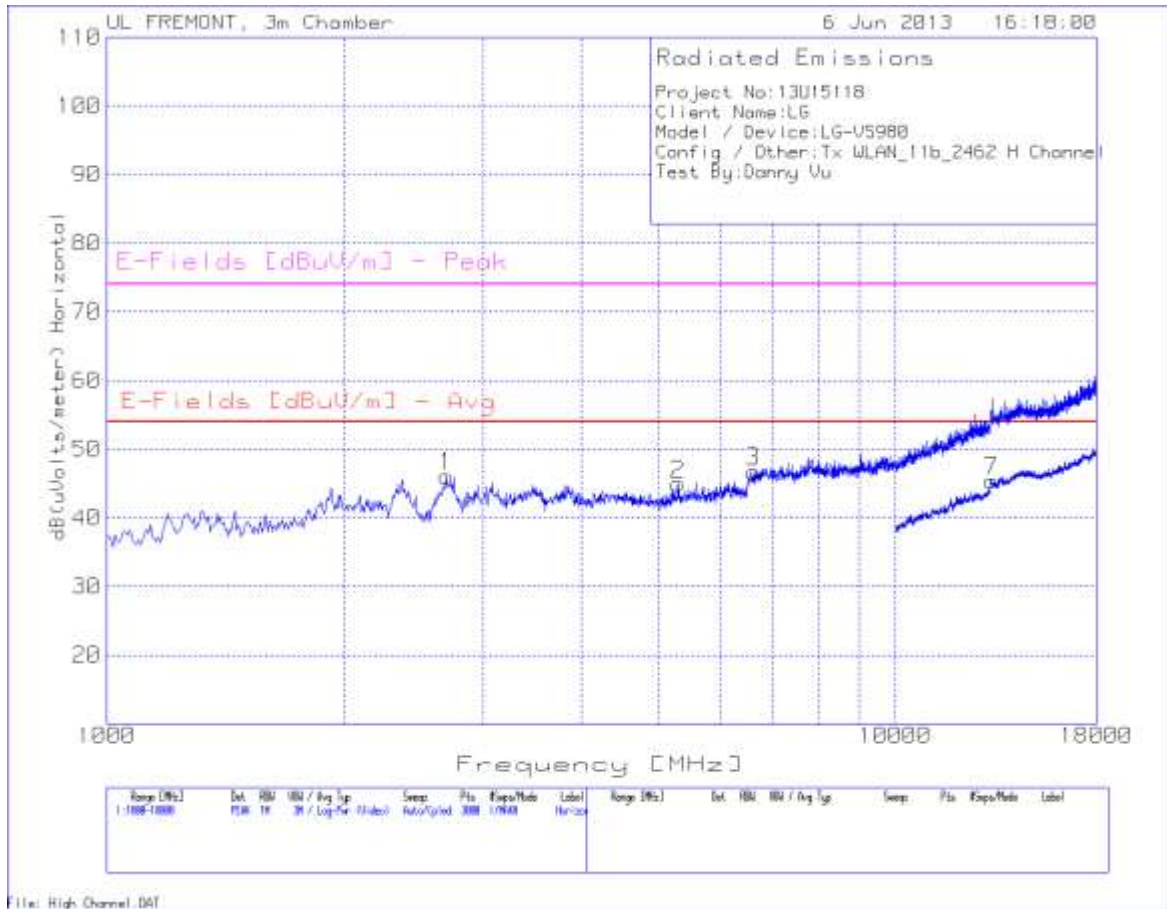


**HARMONICS AND SPURIOUS EMISSIONS**

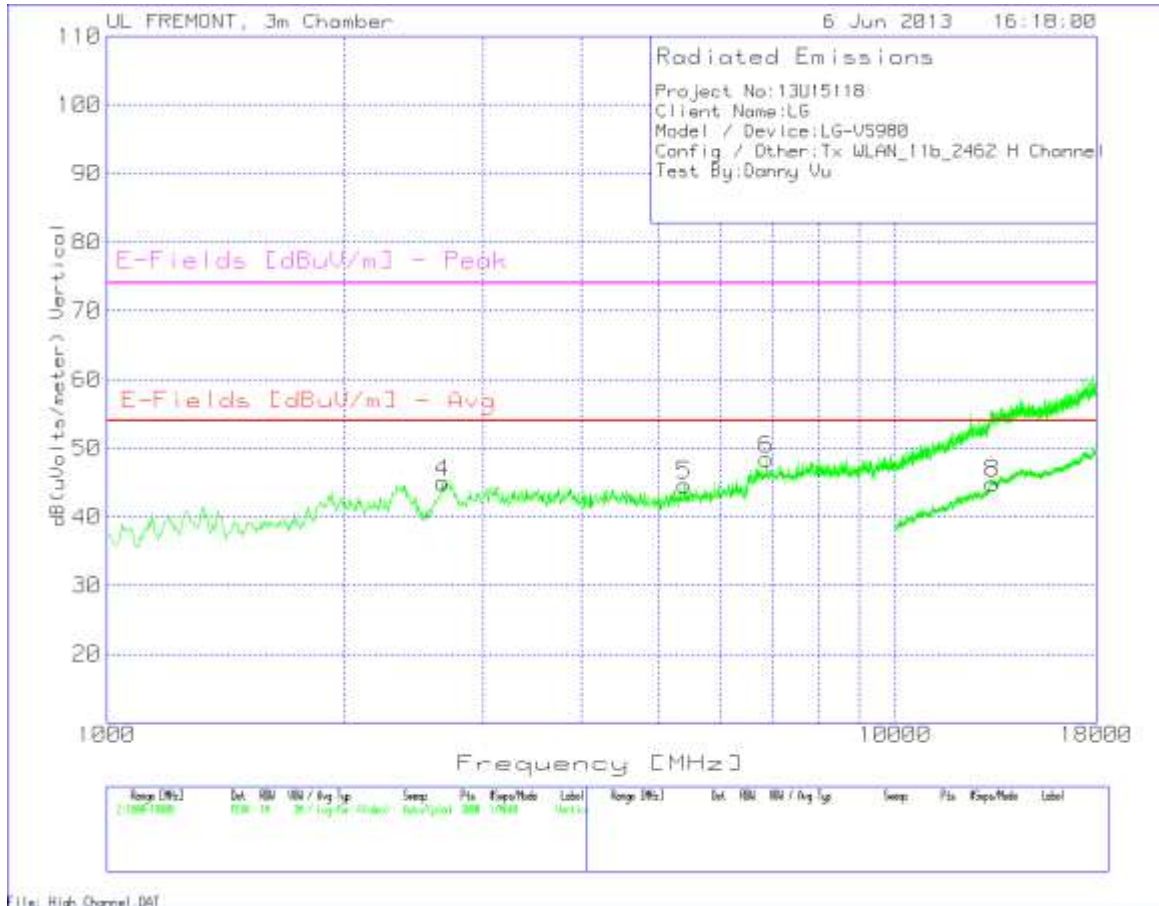
**HIGH CH**

Project No:13U15118													
Client Name:LG													
Model / Device:LG-VS980													
Config / Other:Tx WLAN_11b_2462 H Channel													
Test By: Danny Vu													
<b>Horizontal 1000 - 18000MHz</b>													
Marker No.	Test Frequency (MHz)	Meter Reading (dbuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolt s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)	Height [cm]	Polarity
1	2693.205	41.59	PK	32.6	-29	0.9	46.09	53.97	-7.88	74	-27.91		
2	5309.46	34.94	PK	34.4	-24.6	0.2	44.94	53.97	-9.03	74	-29.06		
3	6606.262	34.41	PK	35.6	-23.5	0.2	46.71	53.97	-7.26	74	-27.29		
<b>Vertical 1000 - 18000MHz</b>													
Marker No.	Test Frequency (MHz)	Meter Reading (dbuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolt s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)	Height [cm]	Polarity
4	2670.553	40.55	PK	32.6	-29.1	0.9	44.95	53.97	-9.02	74	-29.05		
5	5405.73	34.2	PK	34.7	-24.5	0.2	44.6	53.97	-9.37	74	-29.4		
6	6866.755	35.7	PK	35.6	-23.2	0.3	48.4	53.97	-5.57	74	-25.6		
<b>Horizontal 10000 - 18000MHz</b>													
Marker No.	Test Frequency (MHz)	Meter Reading (dbuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolt s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)	Height [cm]	Polarity
7	13246.377	22.59	PK	39.1	-16.7	0.4	45.39	53.97	-8.58	74	-28.61		
<b>Vertical 10000 - 18000MHz</b>													
Marker No.	Test Frequency (MHz)	Meter Reading (dbuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolt s/meter)	E-Fields [dBuV/m] - Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)	Height [cm]	Polarity
8	13278.361	22.12	PK	39.1	-16.7	0.4	44.92	53.97	-9.05	74	-29.08		
<input type="checkbox"/>													
PK - Peak detector													
Av - Average detector													

HORIZONTAL HIGH CHANNEL PLOT



VERTICAL HIGH CHANNEL PLOT

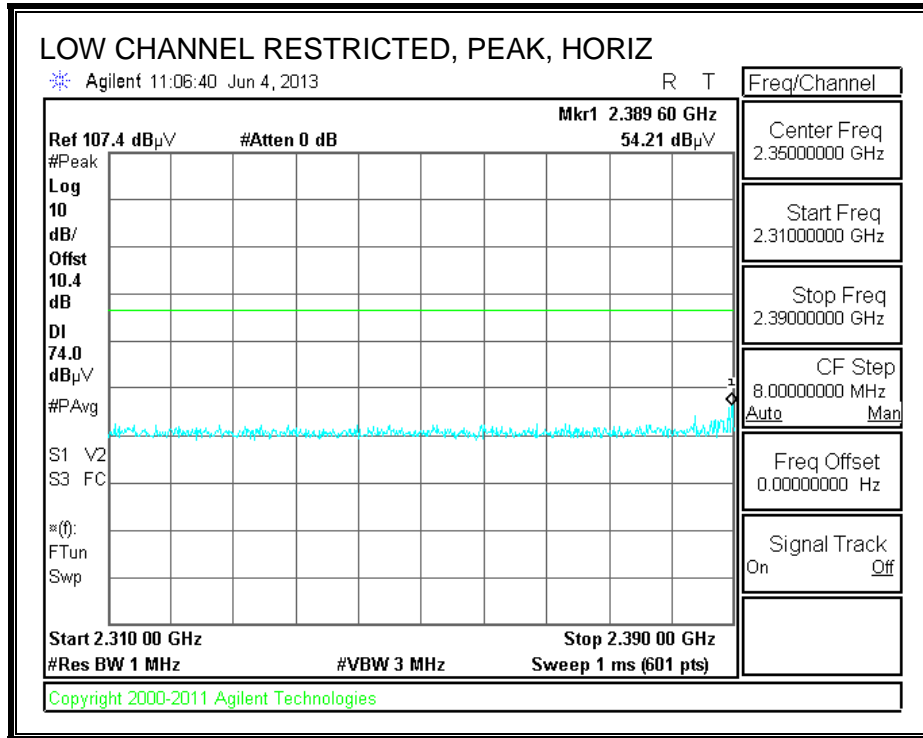


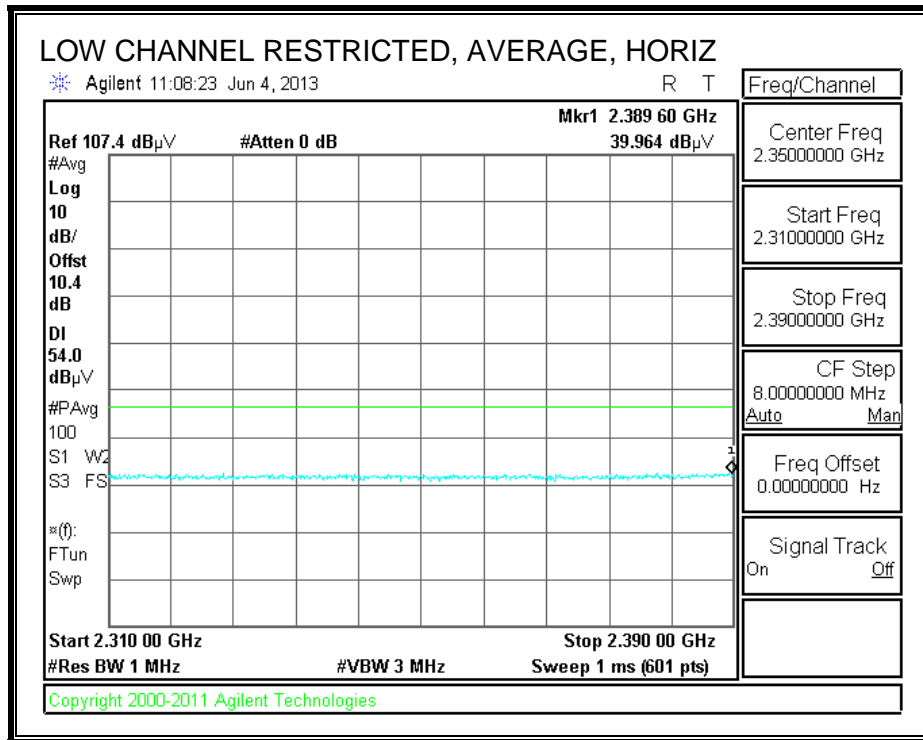
File: High Channel.DAT



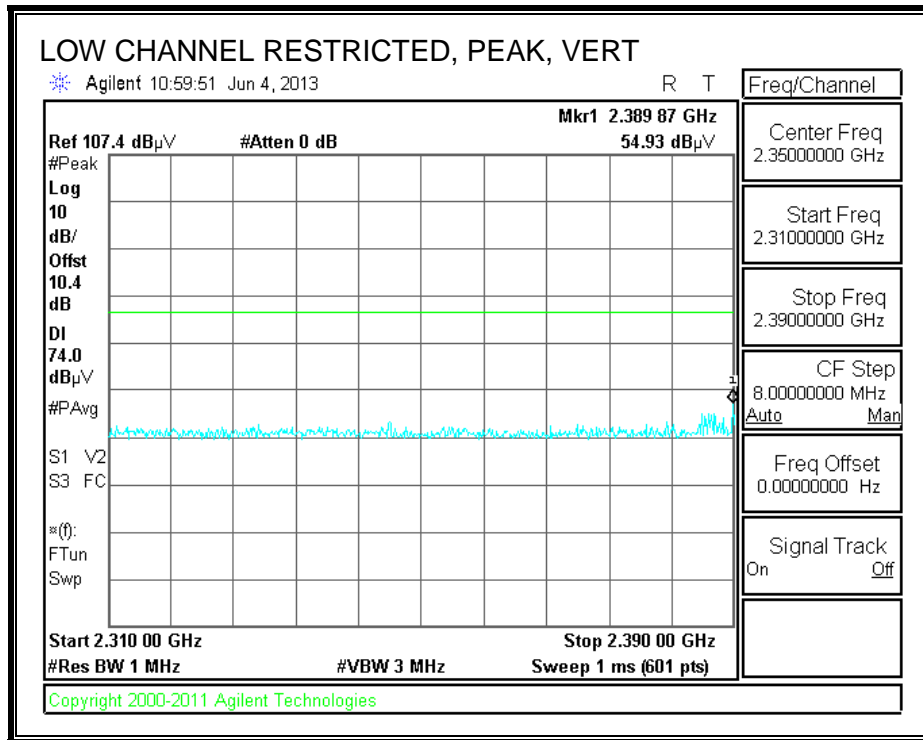
### 10.3. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND

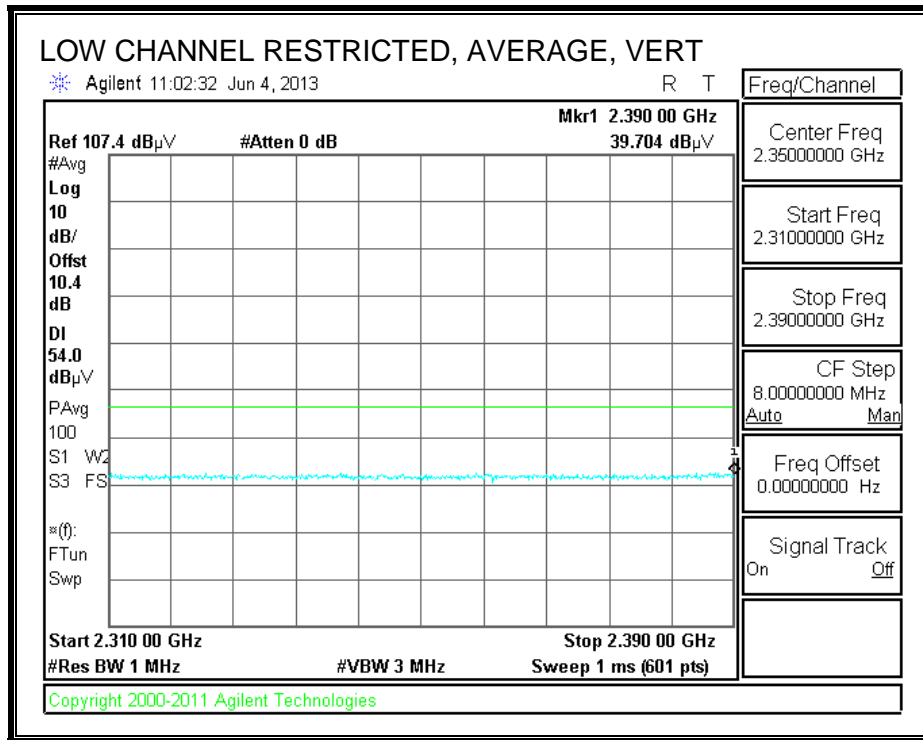
#### RESTRICTED BANDEDGE (LOW CHANNEL)





**Actual Average** = Measured Average + Correction Factor  
 = 50.296 dBuV + 0.22  
 = 50.616 dBuV

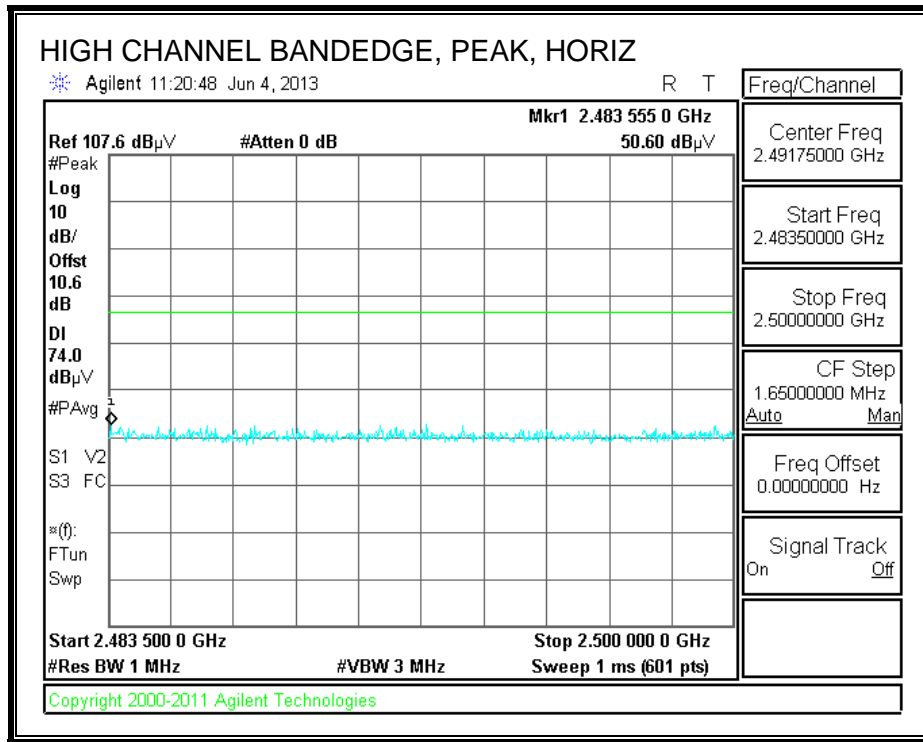


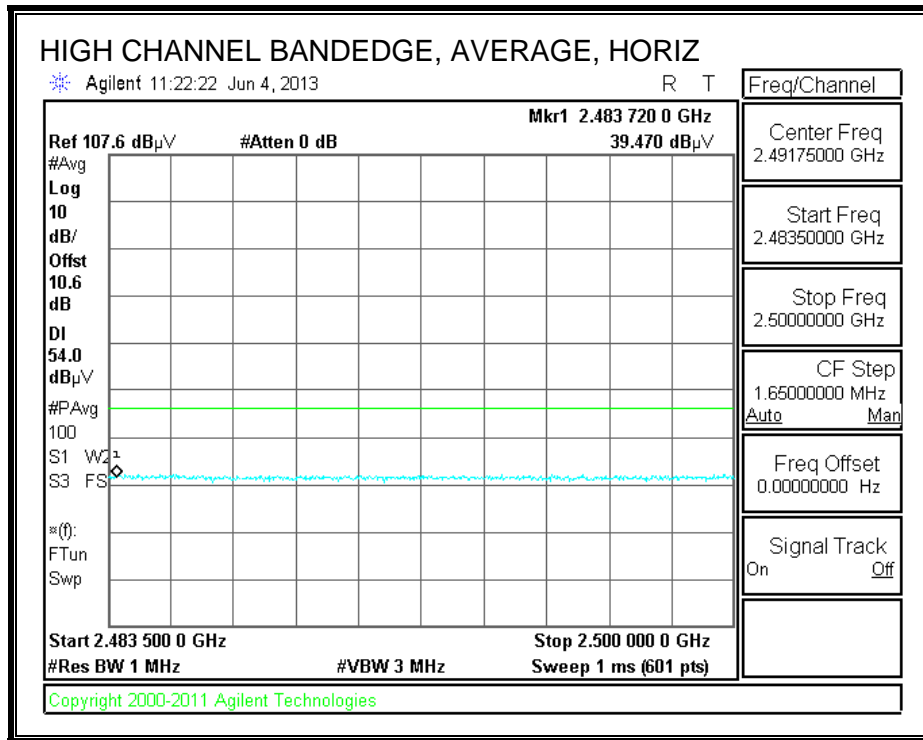


$$\begin{aligned}
 \text{Actual Average} &= \text{Measured Average} + \text{Correction Factor} \\
 &= 49.823 \text{ dBuV} + 0.22 \\
 &= 50.043 \text{ dBuV}
 \end{aligned}$$

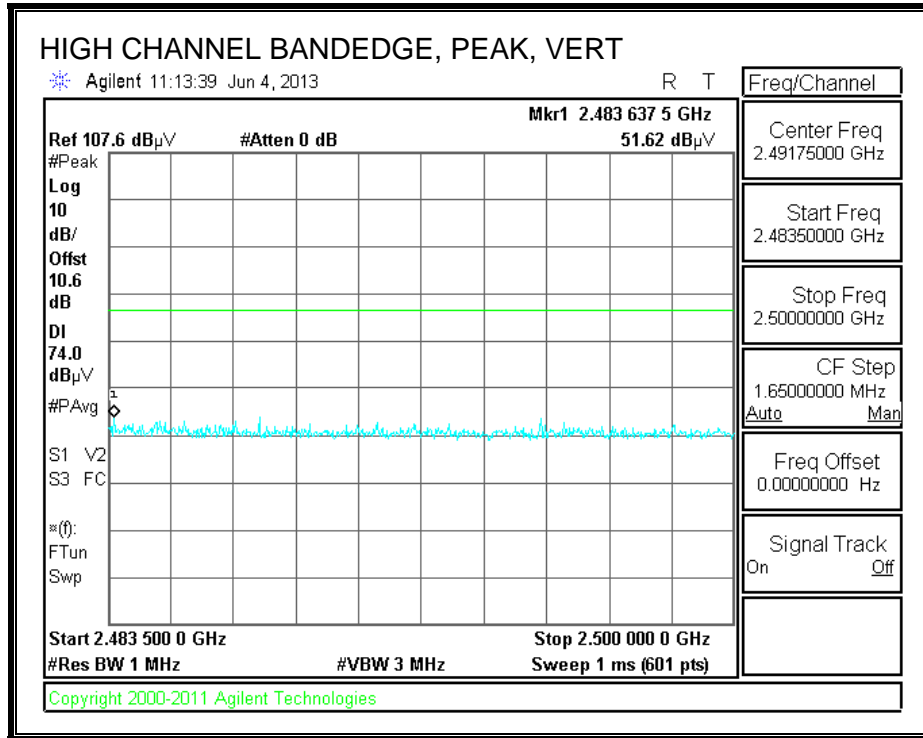


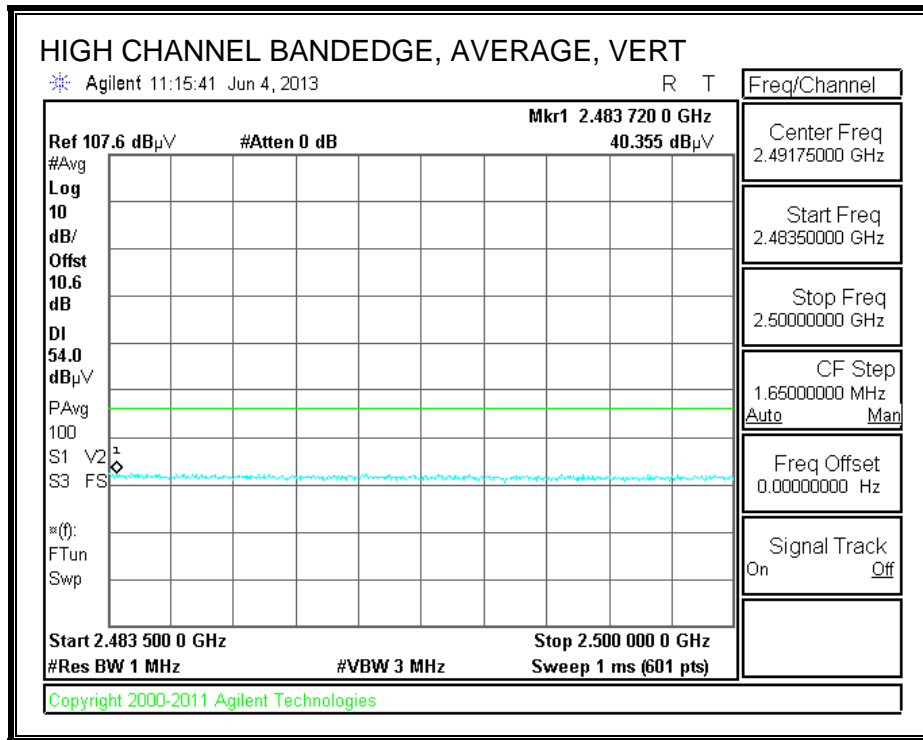
**RESTRICTED BANDEDGE (HIGH CHANNEL)**





$$\begin{aligned}
 \text{Actual Average} &= \text{Measured Average} + \text{Correction Factor} \\
 &= 46.092 \text{ dBuV} + 0.22 \\
 &= 46.312 \text{ dBuV}
 \end{aligned}$$





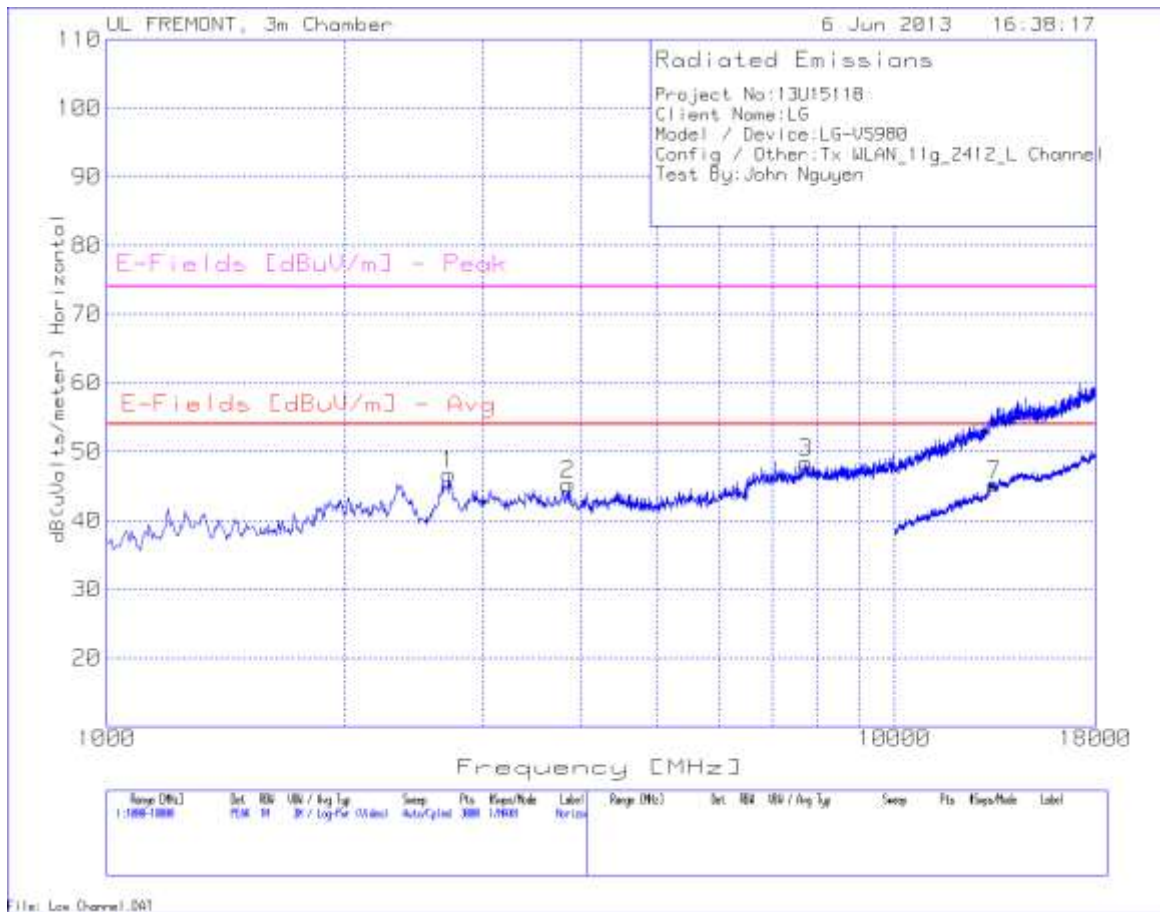
$$\begin{aligned}
 \text{Actual Average} &= \text{Measured Average} + \text{Correction Factor} \\
 &= 46.840 \text{ dBuV} + 0.22 \\
 &= 47.060 \text{ dBuV}
 \end{aligned}$$

**HARMONICS AND SPURIOUS EMISSIONS**

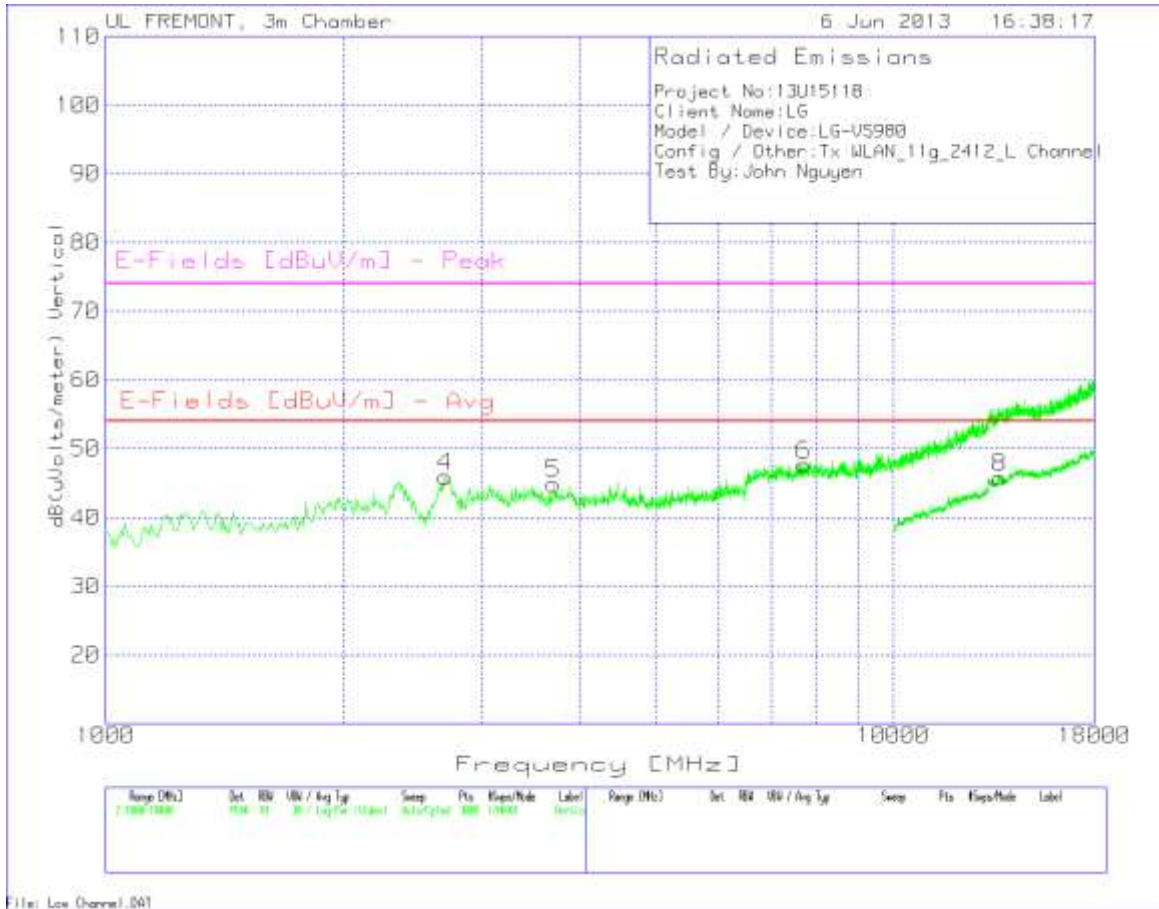
**LOW CH**

Config / Other:Tx WLAN_11g_2412_L Channel											
Test By:John Nguyen											
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts /meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)
<b>Horizontal 1000 - 18000MHz</b>											
1	2715.856	42.27	PK	32.6	-29	0.9	46.77	53.97	-7.2	74	-27.23
2	3848.434	38.22	PK	33.2	-26.5	0.3	45.22	53.97	-8.75	74	-28.78
3	7721.852	35.21	PK	35.8	-22.7	0.2	48.51	53.97	-5.46	74	-25.49
<b>Vertical 1000 - 18000MHz</b>											
4	2693.205	41.49	PK	32.6	-29	0.9	45.99	53.97	-7.98	74	-28.01
5	3701.199	38.07	PK	33.2	-26.7	0.3	44.87	53.97	-9.1	74	-29.13
6	7704.863	34.32	PK	35.8	-22.7	0.3	47.72	53.97	-6.25	74	-26.28
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts /meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)
<b>Horizontal 10000 - 18000MHz</b>											
7	13406.297	22.3	PK	39.1	-16.6	0.4	45.2	53.97	-8.77	74	-28.8
<b>Vertical 10000 - 18000MHz</b>											
8	13654.173	22.73	PK	38.8	-16.1	0.4	45.83	53.97	-8.14	74	-28.17
PK - Peak detector											
Av - Average detector											

### HORIZONTAL PLOT



VERTICAL PLOT



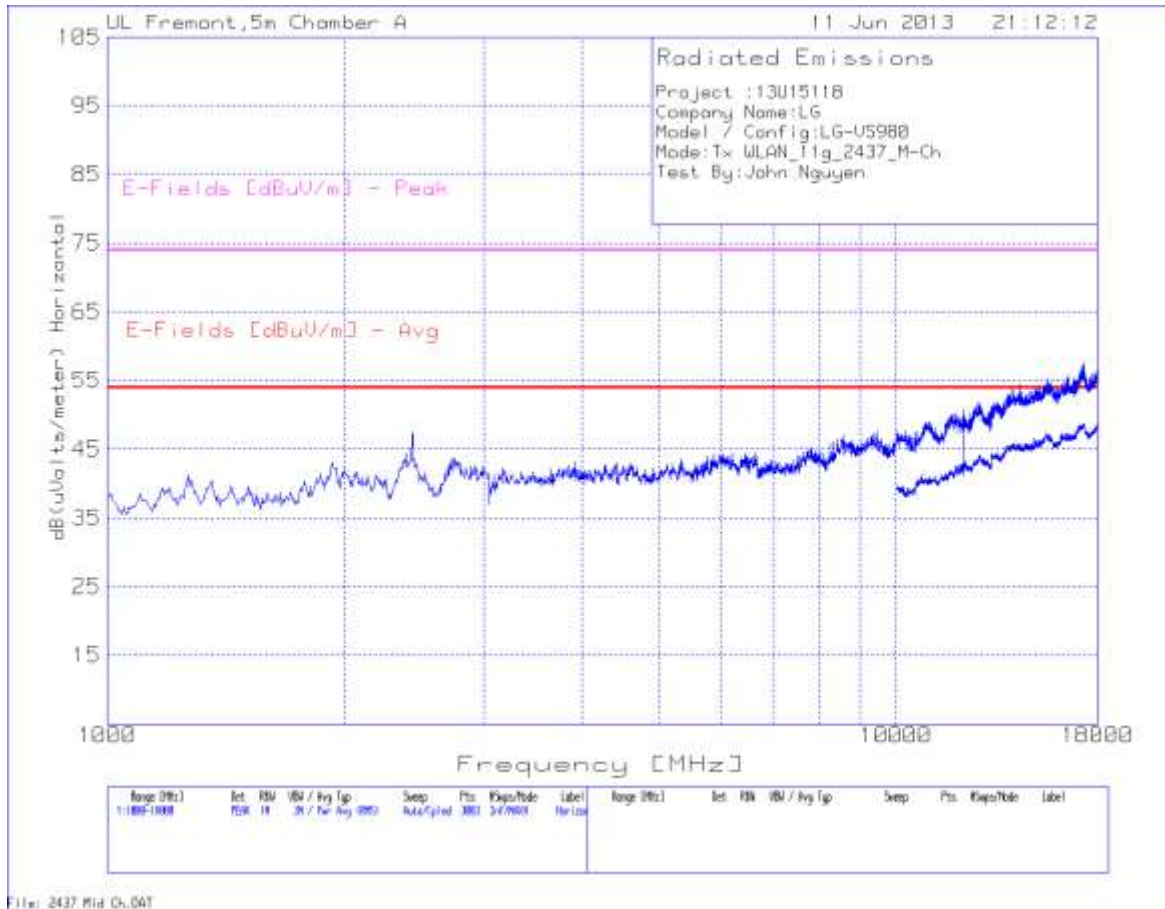




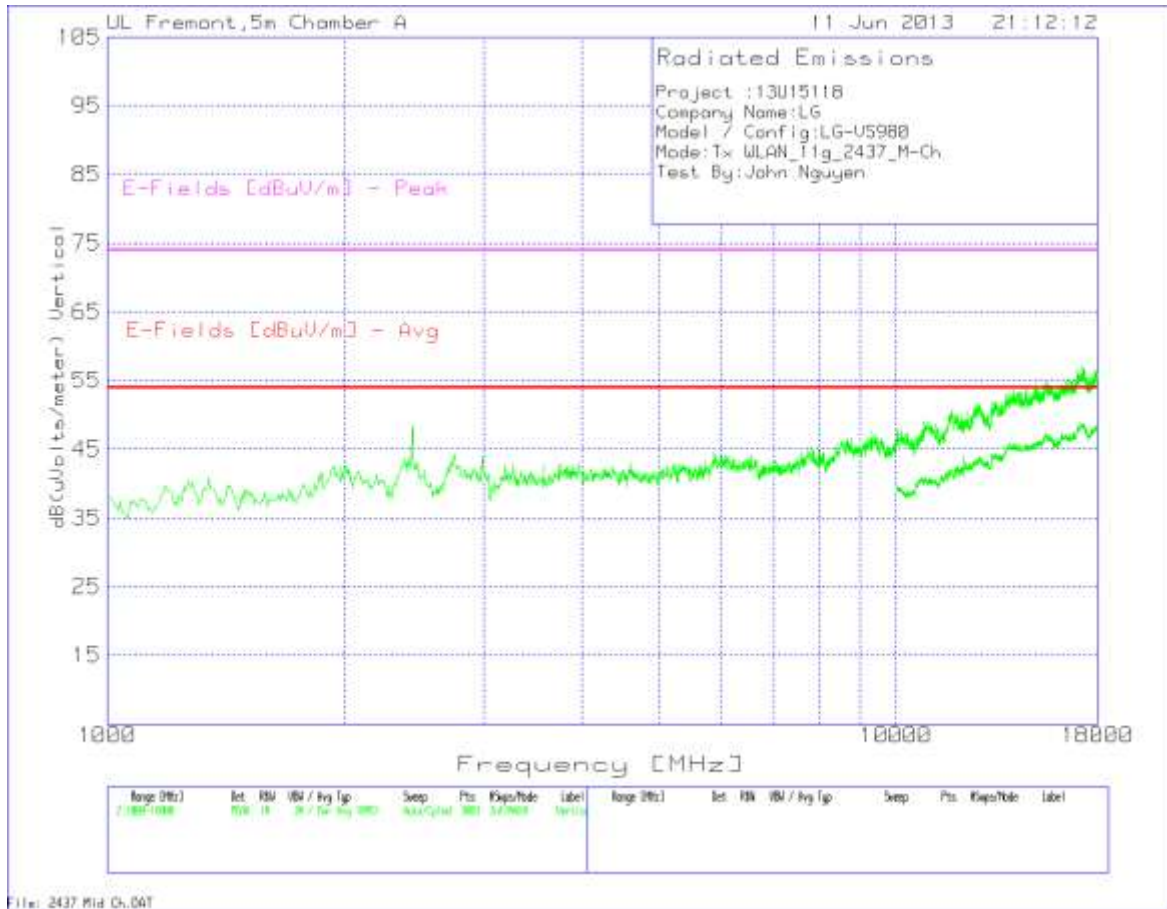
**HARMONICS AND SPURIOUS EMISSIONS**

<b>MID CH</b>											
Project No:13U15118											
Client Name:LG											
Model / Device:LG-VS980											
Config / Other:Tx WLAN_11g_2437_M Channel											
Test By:John Nguyen											
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts /meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)
<b>Horizontal 1000 - 18000MHz</b>											
1	2381.746	42.08	PK	32.1	-29.7	0.9	45.38	53.97	-8.59	74	-28.62
2	3112.258	40.12	PK	33	-28.3	0.6	45.42	53.97	-8.55	74	-28.58
3	6674.217	35.02	PK	35.6	-23.4	0.3	47.52	53.97	-6.45	74	-26.48
<b>Vertical 1000 - 18000MHz</b>											
4	2370.42	42.25	PK	32	-29.7	0.9	45.45	53.97	-8.52	74	-28.55
5	2698.867	40.98	PK	32.6	-29	0.9	45.48	53.97	-8.49	74	-28.52
6	6742.172	34.65	PK	35.6	-23.3	0.3	47.25	53.97	-6.72	74	-26.75
Marker No.	Test Frequency (MHz)	Meter Reading (dBuV)	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts /meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)
<b>Horizontal 10000 - 18000MHz</b>											
7	13610.195	22.71	PK	38.9	-16.1	0.4	45.91	53.97	-8.06	74	-28.09
<b>Vertical 10000 - 18000MHz</b>											
8	13474.263	23.61	PK	39	-16.5	0.4	46.51	53.97	-7.46	74	-27.49
PK - Peak detector											
QP - Quasi-Peak detector											

### HORIZONTAL PLOT



**VERTICAL PLOT**

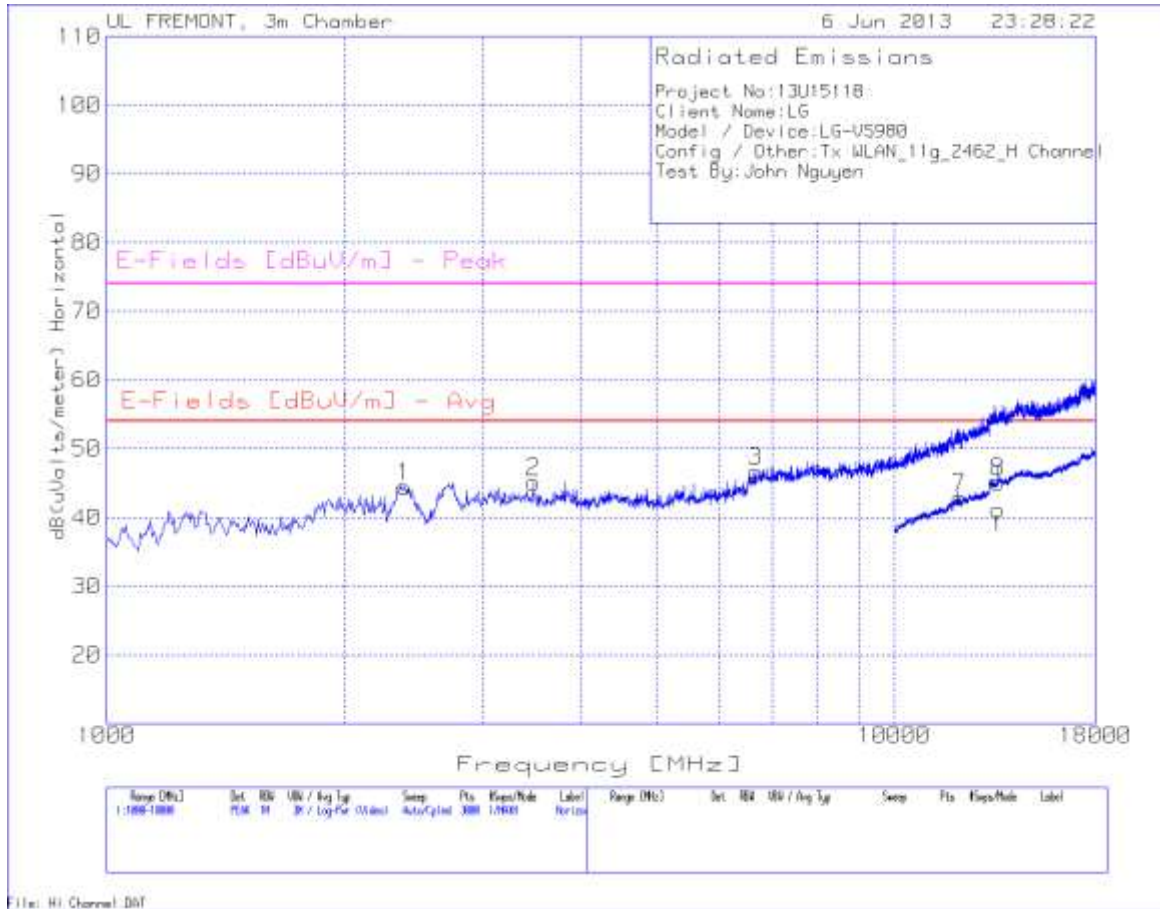




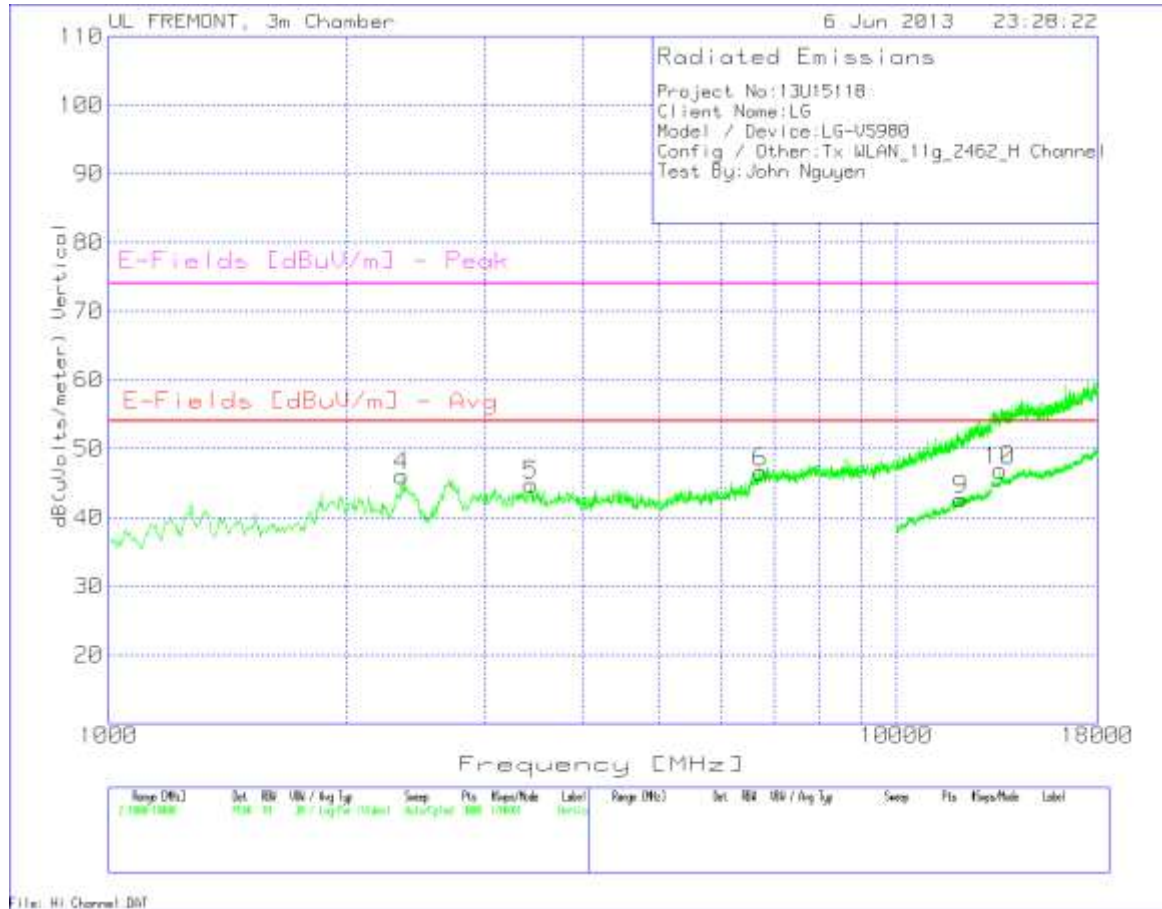
**HARMONICS AND SPURIOUS EMISSIONS**

<b>HIGH CH</b>											
Project No:13U15118											
Client Name:LG											
Model / Device:LG-VS980											
Config / Other:Tx WLAN_11g_2462_H Channel											
Test By:John Nguyen											
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts /meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)
Horizontal 1000 - 18000MHz											
1	2387.408	41.17	PK	32.1	-29.7	0.9	44.47	53.97	-9.5	74	-29.53
2	3480.346	39.04	PK	33	-27.3	0.4	45.14	53.97	-8.83	74	-28.86
3	6674.217	34.21	PK	35.6	-23.4	0.3	46.71	53.97	-7.26	74	-27.29
Vertical 1000 - 18000MHz											
4	2353.431	42.91	PK	32	-29.7	0.9	46.11	53.97	-7.86	74	-27.89
5	3435.043	38.84	PK	32.9	-27.4	0.4	44.74	53.97	-9.23	74	-29.26
6	6719.52	34.08	PK	35.6	-23.4	0.3	46.58	53.97	-7.39	74	-27.42
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts /meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)
Horizontal 10000 - 18000MHz											
7	12090.955	21.92	PK	39.1	-18.9	0.8	42.92	53.97	-11.05	74	-31.08
8	13538.231	22.12	PK	38.9	-16.3	0.4	45.12	53.97	-8.85	74	-28.88
Vertical 10000 - 18000MHz											
9	12066.967	21.98	PK	39.1	-18.9	0.5	42.68	53.97	-11.29	74	-31.32
10	13550.225	23.87	PK	38.9	-16.3	0.4	46.87	53.97	-7.1	74	-27.13
PK - Peak detector											
QP - Quasi-Peak detector											

HORIZONTAL HIGH CHANNEL PLOT

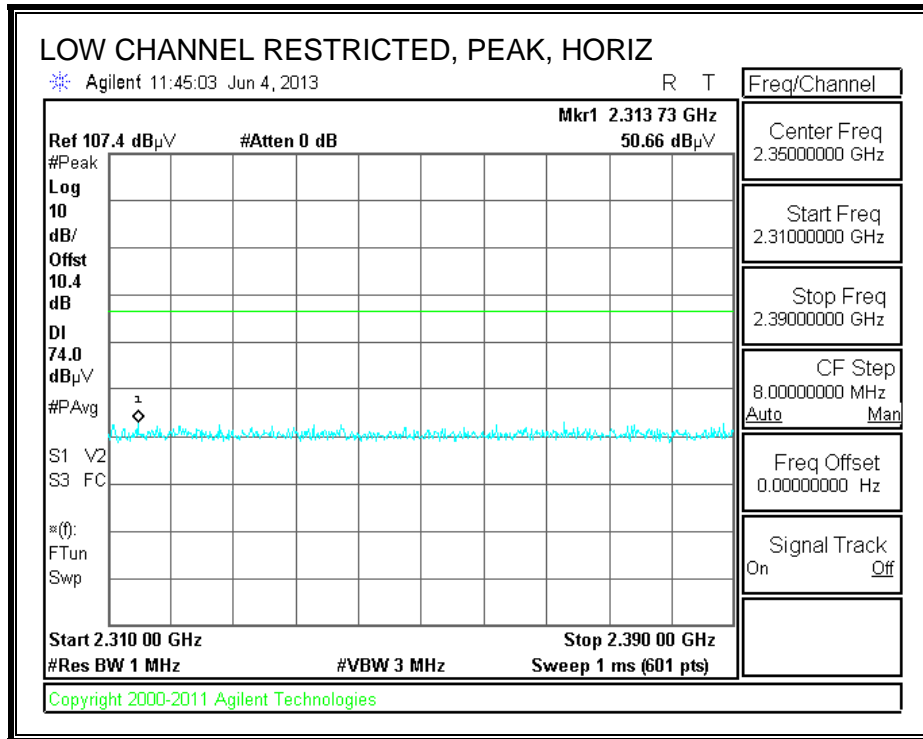


VERTICAL HIGH CHANNEL PLOT

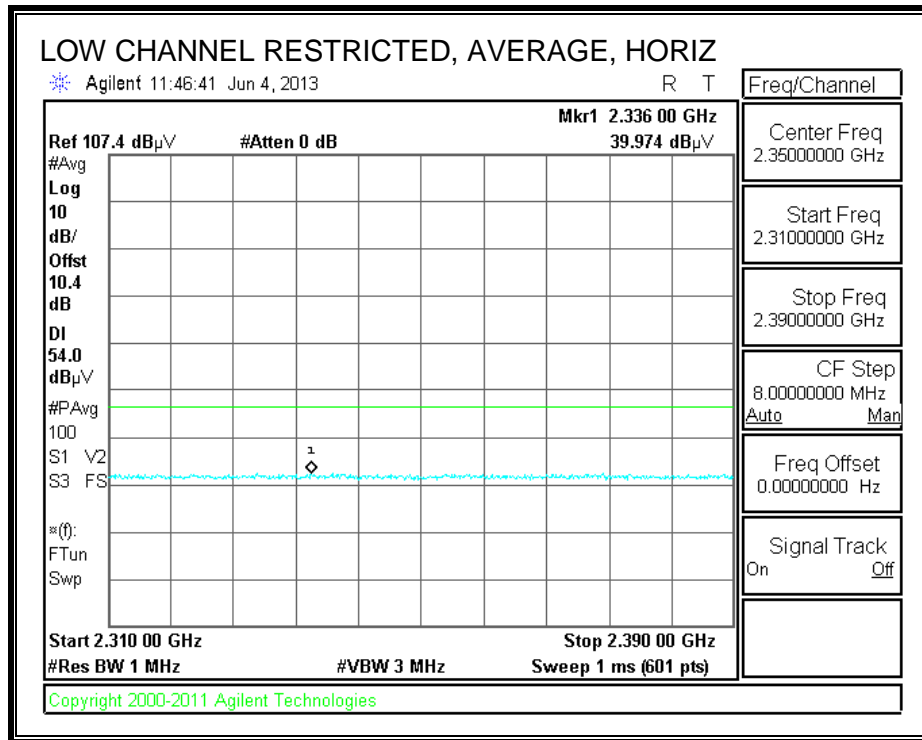


### 10.4. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND

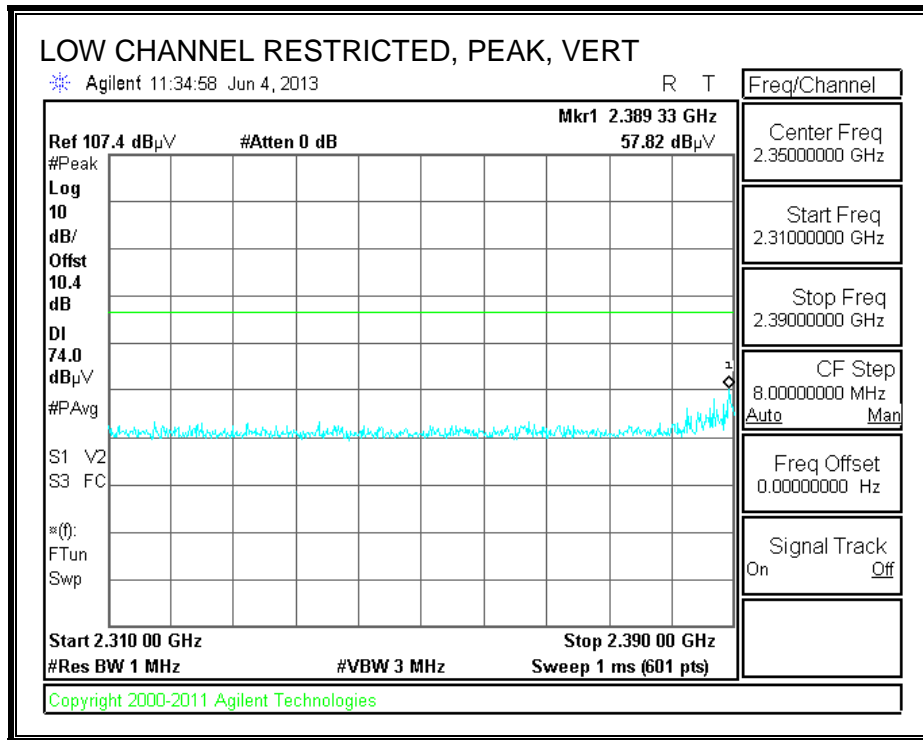
#### RESTRICTED BANDEDGE (LOW CHANNEL)

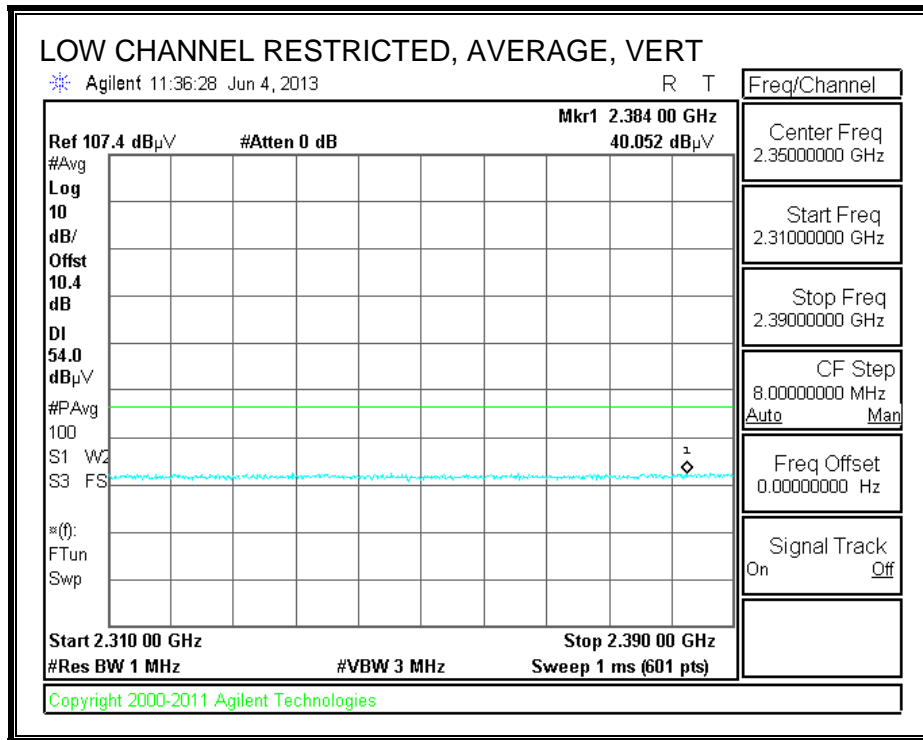






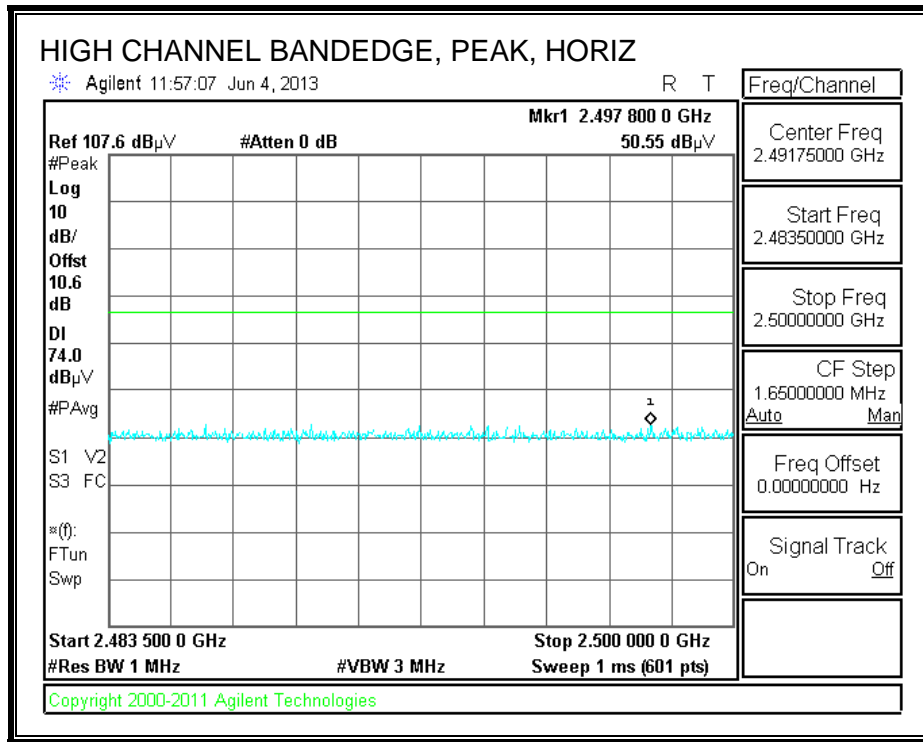
$$\begin{aligned}
 \text{Actual Average} &= \text{Measured Average} + \text{Correction Factor} \\
 &= 45.362 \text{ dBuV} + 0.26 \\
 &= 45.622 \text{ dBuV}
 \end{aligned}$$

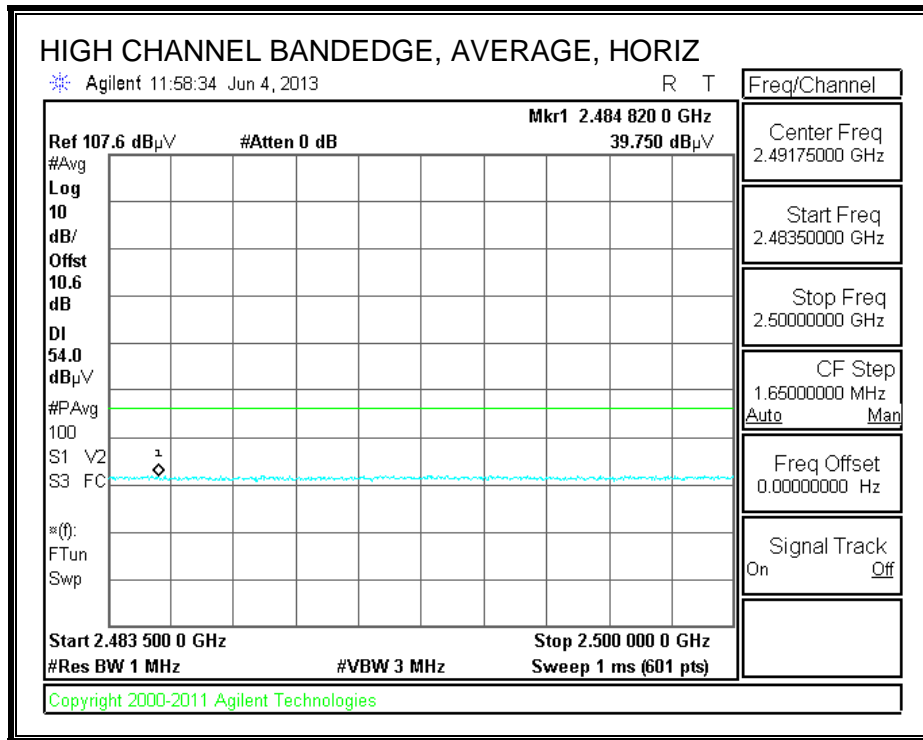




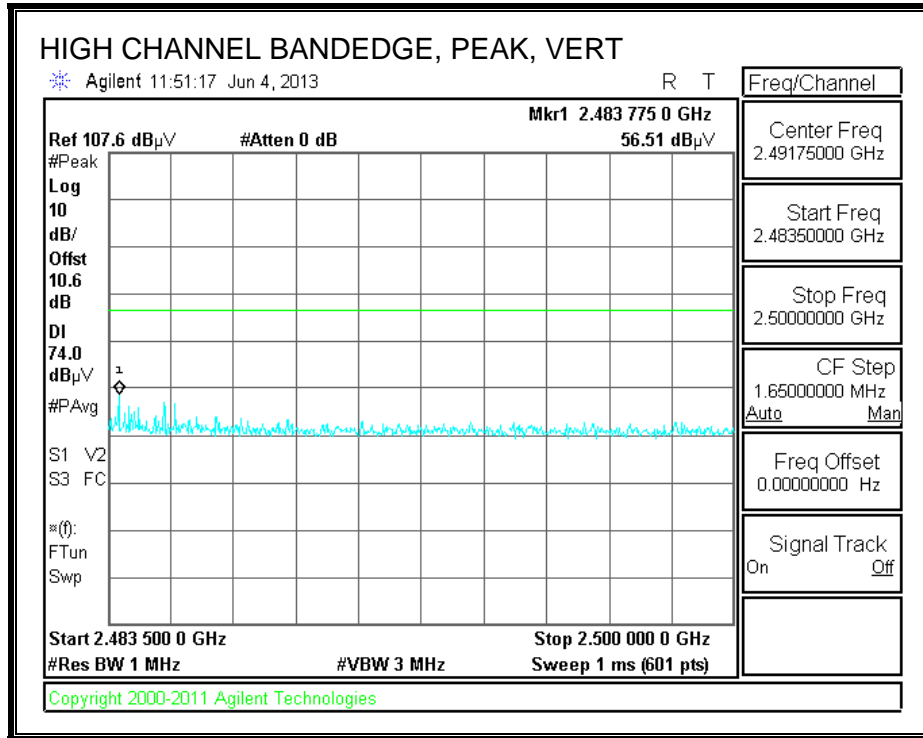
**Actual Average** = Measured Average + Correction Factor  
 = 50.513 dBuV + 0.26  
 = 50.773 dBuV

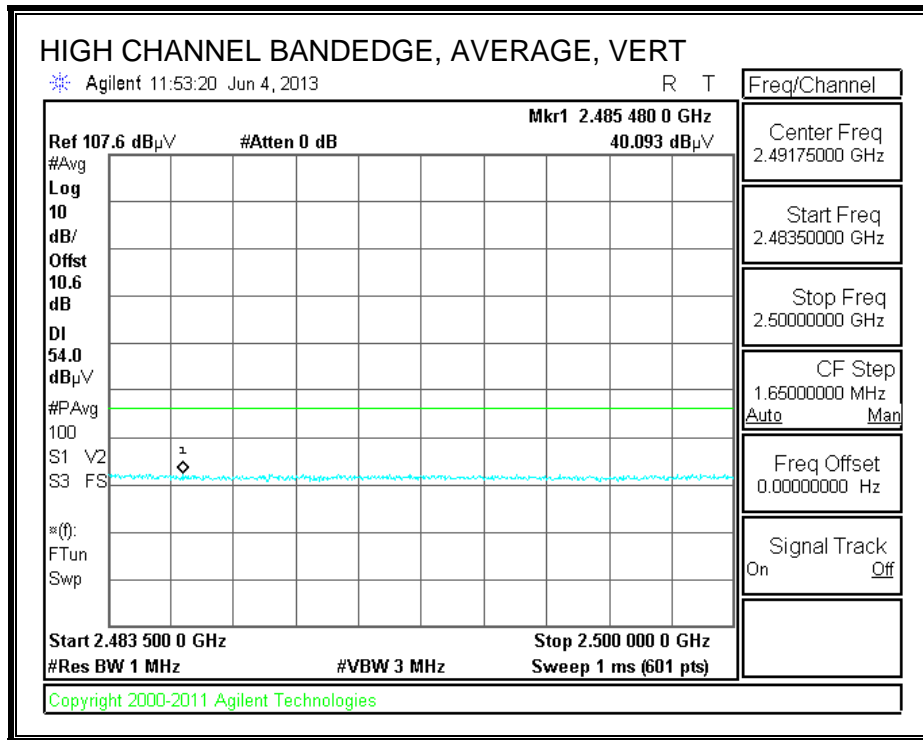
**RESTRICTED BANDEDGE (HIGH CHANNEL)**





$$\begin{aligned}
 \text{Actual Average} &= \text{Measured Average} + \text{Correction Factor} \\
 &= 45.960 \text{ dBuV} + 0.26 \\
 &= 46.220 \text{ dBuV}
 \end{aligned}$$





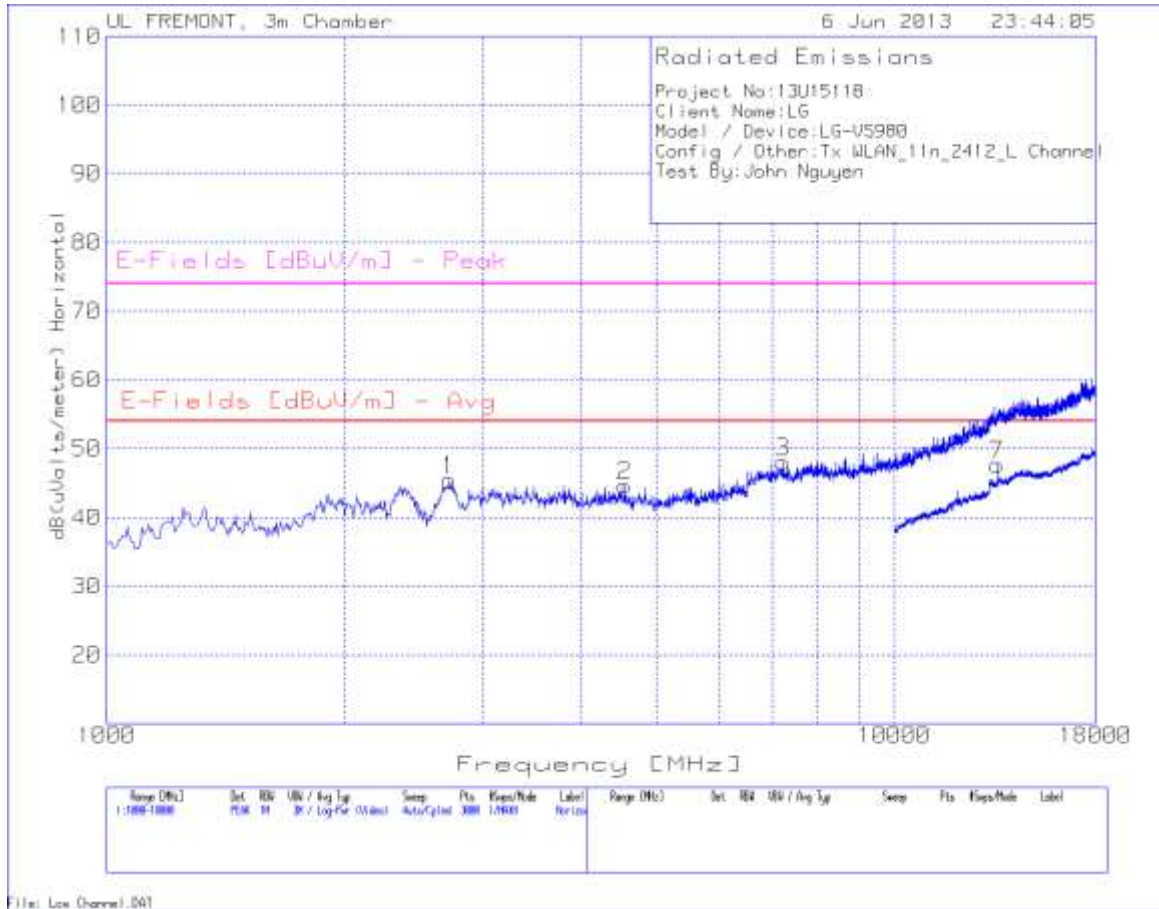
$$\begin{aligned}
 \text{Actual Average} &= \text{Measured Average} + \text{Correction Factor} \\
 &= 46.440 \text{ dBuV} + 0.26 \\
 &= 46.700 \text{ dBuV}
 \end{aligned}$$

**HARMONICS AND SPURIOUS EMISSIONS**

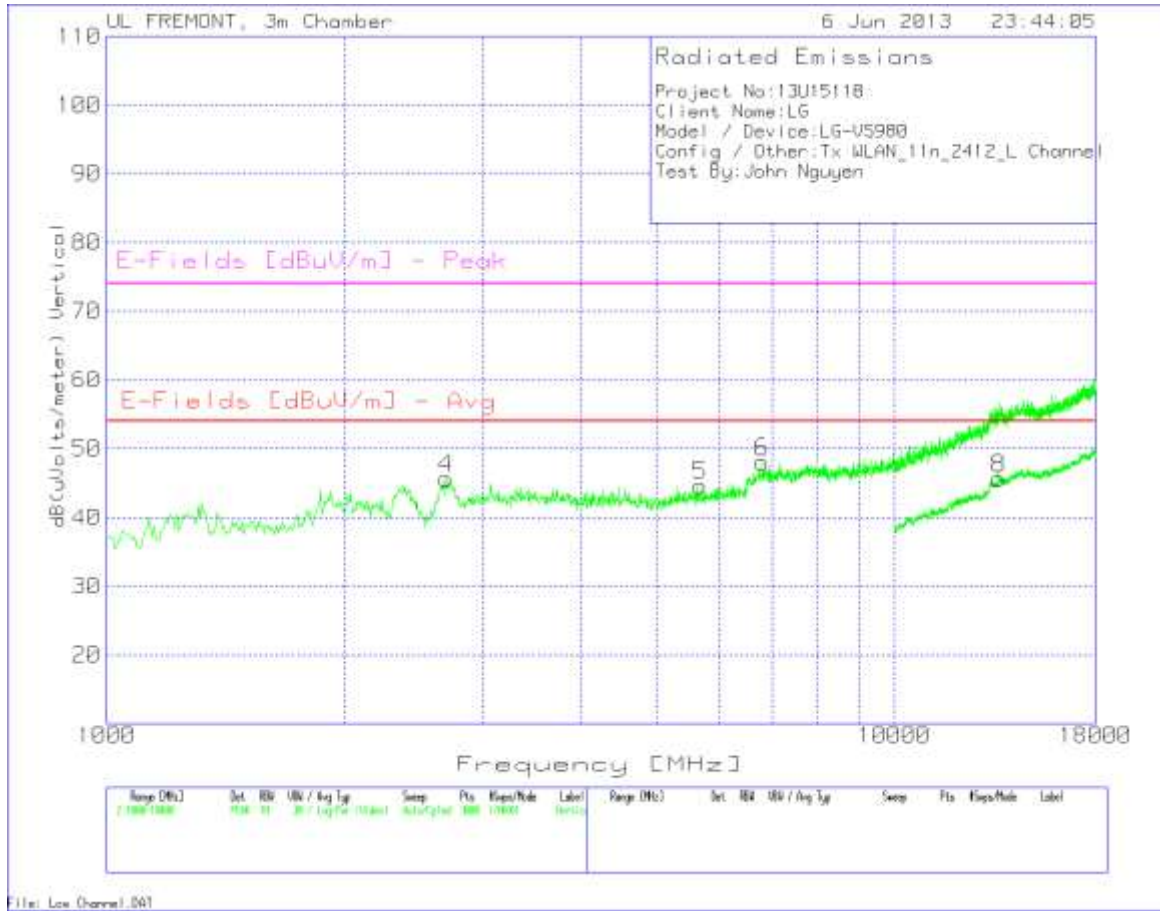
<b>LOW CH</b>											
Project No:13U15118											
Client Name:LG											
Model / Device:LG-VS980											
Config / Other:Tx WLAN_11n_2412_L Channel											
Test By:John Nguyen											
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts /meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)
Horizontal 1000 - 18000MHz											
1	2721.519	40.91	PK	32.6	-29	0.9	45.41	53.97	-8.56	74	-28.59
2	4544.97	35.97	PK	34	-25.5	0.2	44.67	53.97	-9.3	74	-29.33
3	7223.518	35.22	PK	35.6	-23.1	0.3	48.02	53.97	-5.95	74	-25.98
Vertical 1000 - 18000MHz											
4	2693.205	41.13	PK	32.6	-29	0.9	45.63	53.97	-8.34	74	-28.37
5	5671.885	34.06	PK	34.8	-24.4	0.2	44.66	53.97	-9.31	74	-29.34
6	6798.801	35.5	PK	35.6	-23.3	0.3	48.1	53.97	-5.87	74	-25.9
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts /meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)
Horizontal 10000 - 18000MHz											
7	13510.245	24.65	PK	39	-16.4	0.4	47.65	53.97	-6.32	74	-26.35
Vertical 10000 - 18000MHz											
8	13590.205	22.53	PK	38.9	-16.2	0.4	45.63	53.97	-8.34	74	-28.37
PK - Peak detector											
QP - Quasi-Peak detector											



### HORIZONTAL PLOT



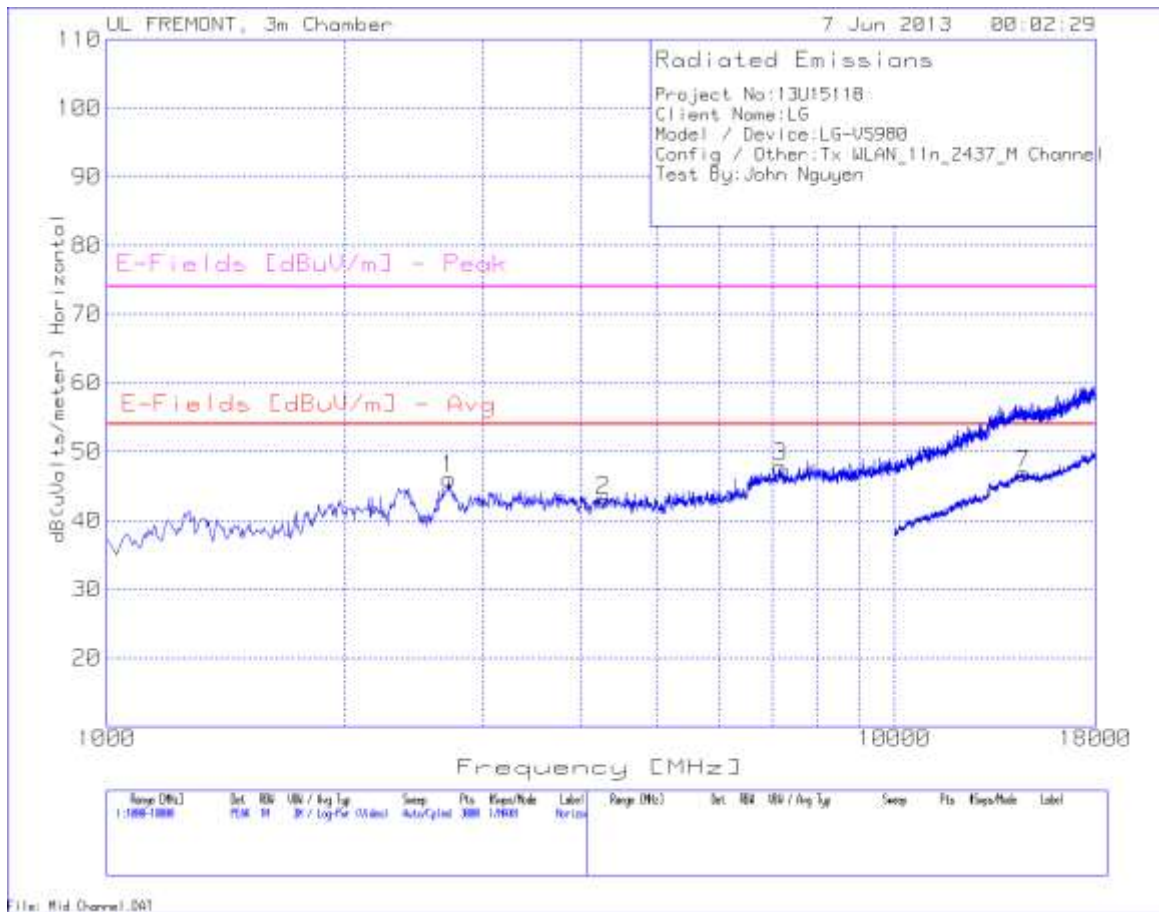
**VERTICAL PLOT**



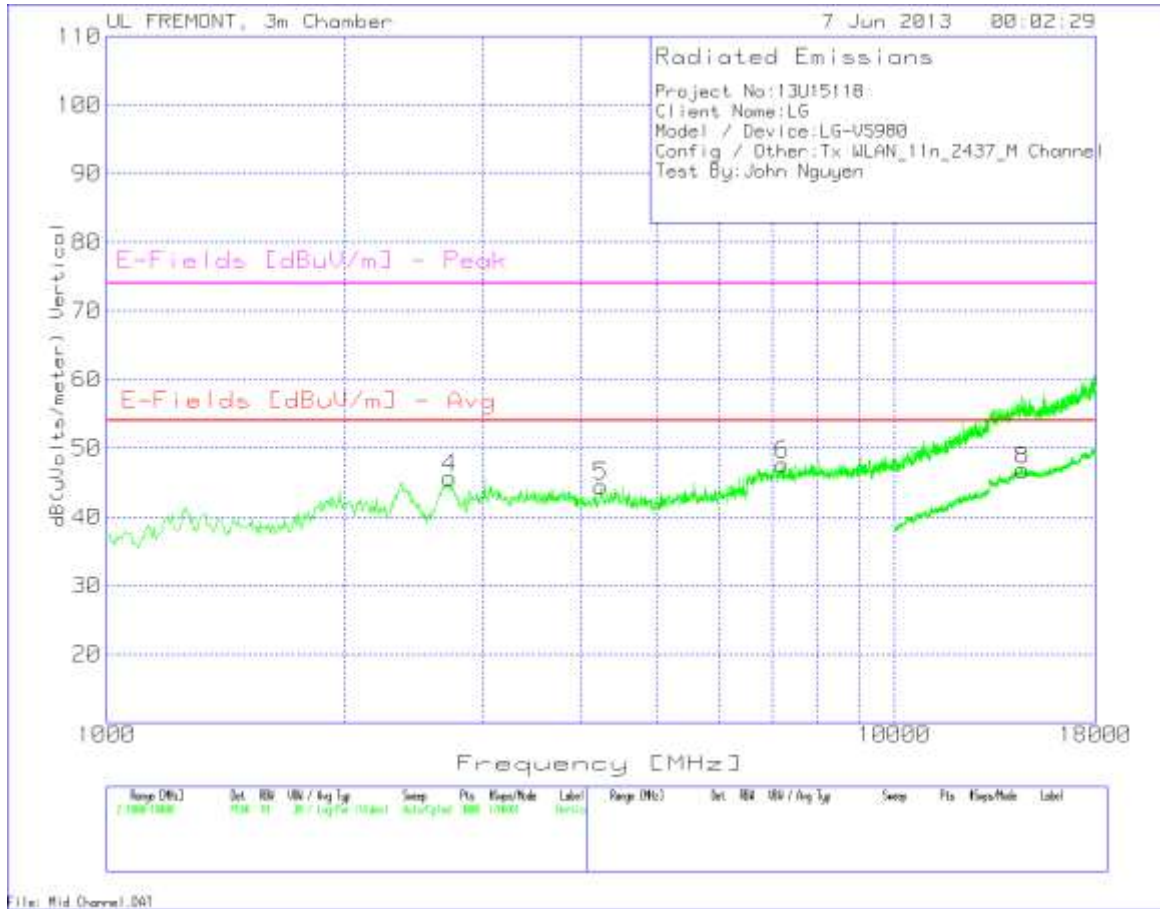
**HARMONICS AND SPURIOUS EMISSIONS**  
**MID CH**

<b>Project No:13U15118</b>											
<b>Client Name:LG</b>											
<b>Model / Device:LG-VS980</b>											
<b>Config / Other:Tx WLAN_11n_2437_M Channel</b>											
<b>Test By:John Nguyen</b>											
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts /meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)
Horizontal 1000 - 18000MHz											
1	2715.856	41.55	PK	32.6	-29	0.9	46.05	53.97	-7.92	74	-27.95
2	4273.151	35.04	PK	33.6	-25.9	0.2	42.94	53.97	-11.03	74	-31.06
3	7166.889	35	PK	35.6	-23.1	0.3	47.8	53.97	-6.17	74	-26.2
Vertical 1000 - 18000MHz											
4	2727.182	41.13	PK	32.6	-29	0.9	45.63	53.97	-8.34	74	-28.37
5	4244.837	36.66	PK	33.5	-25.9	0.2	44.46	53.97	-9.51	74	-29.54
6	7212.192	34.86	PK	35.6	-23.1	0.3	47.66	53.97	-6.31	74	-26.34
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts /meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)
Horizontal 10000 - 18000MHz											
7	14581.709	22.81	PK	39.7	-16.1	0.4	46.81	53.97	-7.16	74	-27.19
Vertical 10000 - 18000MHz											
8	14537.731	22.81	PK	39.6	-16	0.4	46.81	53.97	-7.16	74	-27.19
PK - Peak detector											
QP - Quasi-Peak detector											

### HORIZONTAL MID CHANNEL PLOT



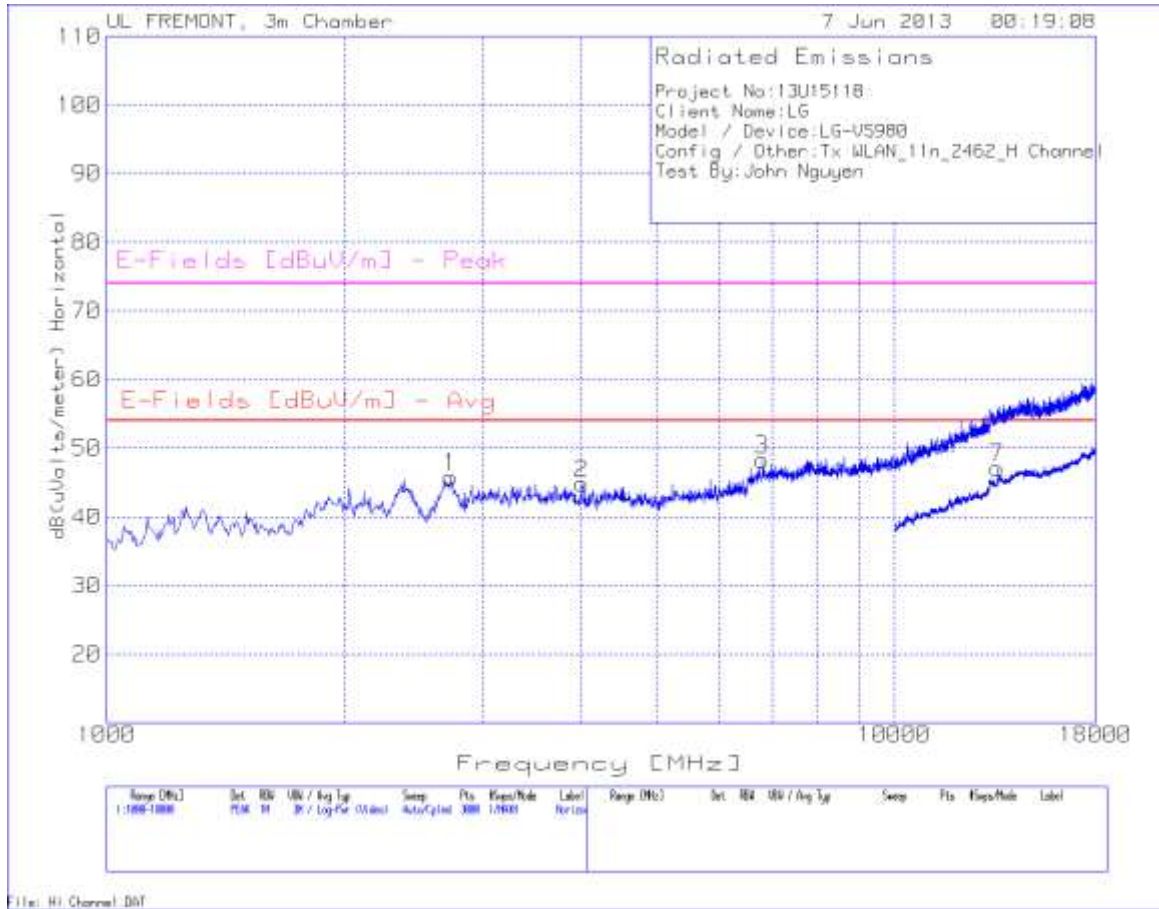
**VERTICAL MID CHANNEL PLOT**



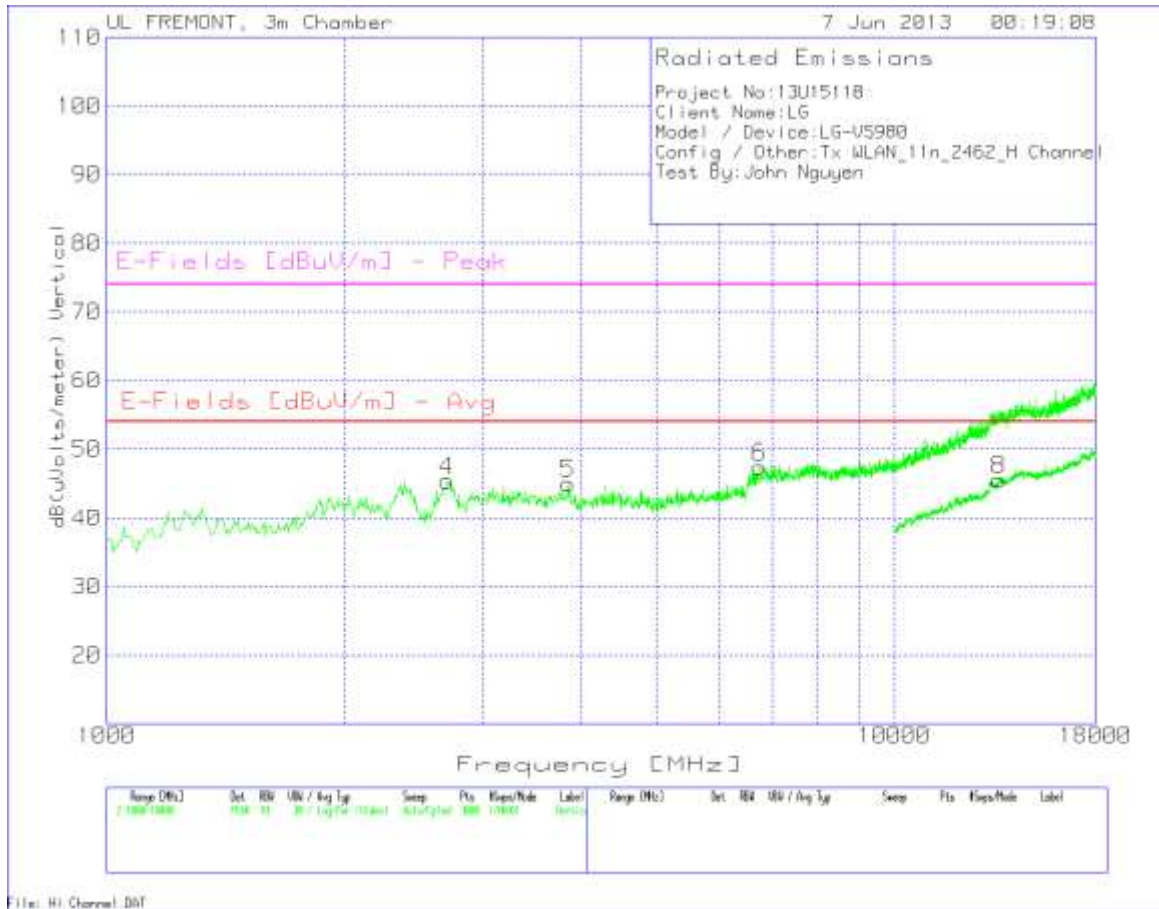
**HARMONICS AND SPURIOUS EMISSIONS**  
**HIGH CH**

Project No:13U15118												
Client Name:LG												
Model / Device:LG-V980												
Config / Other:Tx WLAN_11n_2462_H Channel												
Test By:John Nguyen												
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts /meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)	
Horizontal 1000 - 18000MHz												
1	2732.845	41.16	PK	32.7	-28.9	0.9	45.86	53.97	-8.11	74	-28.14	
2	4012.658	37.52	PK	33.4	-26.3	0.2	44.82	53.97	-9.15	74	-29.18	
3	6798.801	35.69	PK	35.6	-23.3	0.3	48.29	53.97	-5.68	74	-25.71	
Vertical 1000 - 18000MHz												
4	2704.53	40.9	PK	32.6	-29	0.9	45.4	53.97	-8.57	74	-28.6	
5	3848.434	38.05	PK	33.2	-26.5	0.3	45.05	53.97	-8.92	74	-28.95	
6	6736.509	34.8	PK	35.6	-23.3	0.3	47.4	53.97	-6.57	74	-26.6	
Marker No.	Test Frequency	Meter Reading	Detector	T119 Ant Factor [dB/m]	T34 Preamp/ Cable Loss [dB]	T160 BRF [dB]	dB(uVolts /meter)	E-Fields [dBuV/m] Avg	Margin (dB)	E-Fields [dBuV/m] Peak	Margin (dB)	
Horizontal 10000 - 18000MHz												
7	13510.245	24.08	PK	39	-16.4	0.4	47.08	53.97	-6.89	74	-26.92	
Vertical 10000 - 18000MHz												
8	13574.213	22.47	PK	38.9	-16.2	0.4	45.57	53.97	-8.4	74	-28.43	
PK - Peak detector												
QP - Quasi-Peak detector												

### HORIZONTAL HIGH CHANNEL PLOT



**VERTICAL -**



**HIGH CHANNEL PLOT**



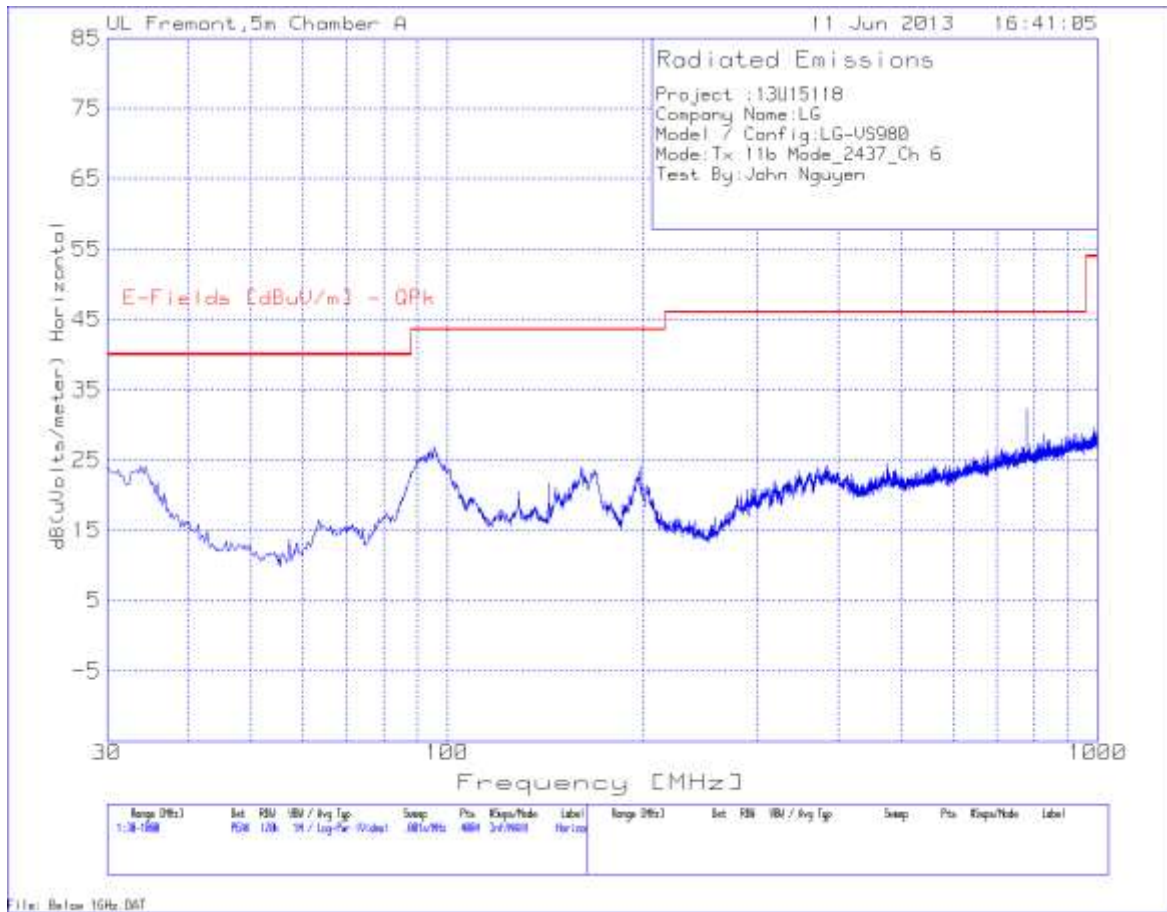


### 10.5. WORST-CASE BELOW 1 GHz

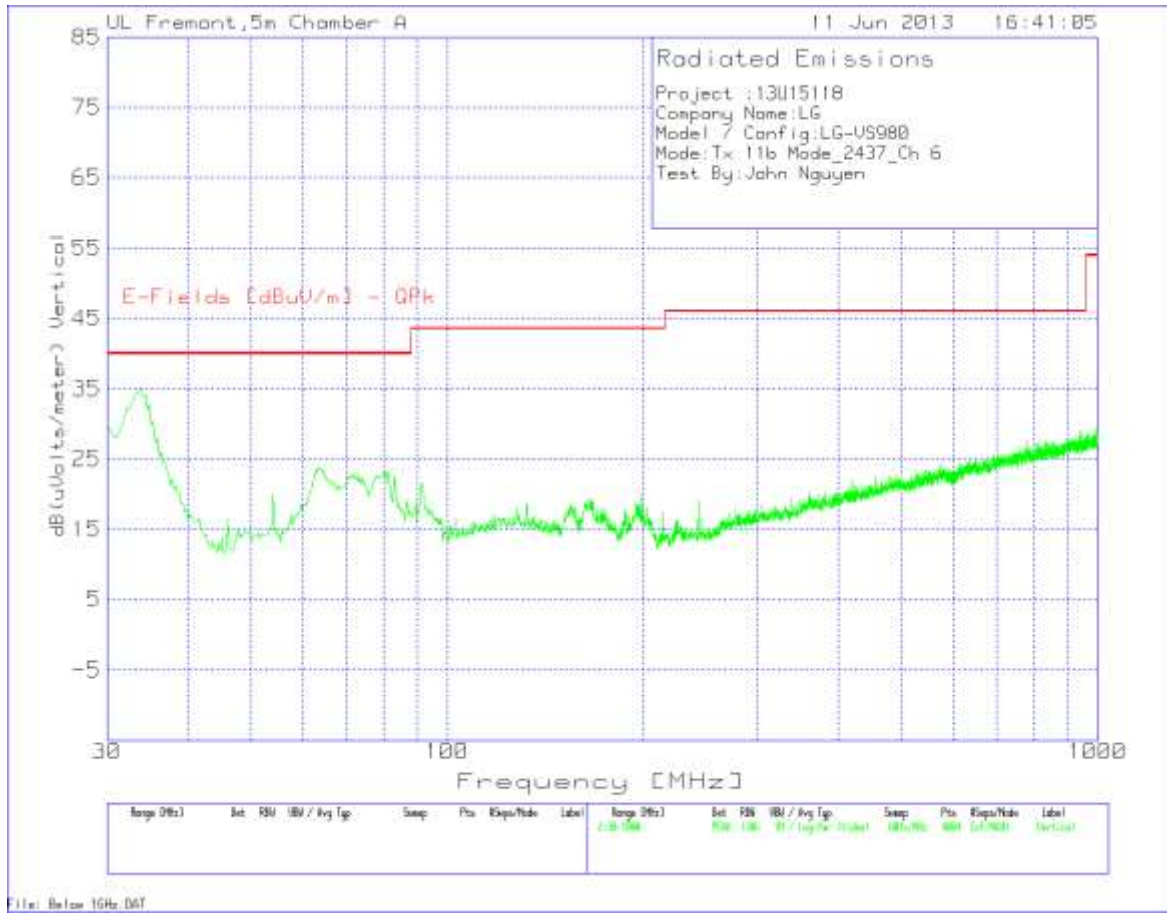
#### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

Project :13U15118										
Company Name:LG										
Model / Config:LG-VS980										
Mode:Tx 11b Mode_2437_Ch 6										
Test By:John Nguyen										
Marker No.	Test Frequency	Meter Reading	Detector	T185 Antenna Factor dB/m	T64 preamp/cable loss [dB]	dB(uVolts /meter)	E-Fields [dBuV/m] QPk	Margin (dB)	Height [cm]	Polarity
Horizontal 30 - 1000MHz										
1	95.4259	45.04	PK	8.9	-27	26.94	43.52	-16.58	200	Horz
2	198.1689	38.31	PK	12	-26.2	24.11	43.52	-19.41	200	Horz
3	778.0365	33.99	PK	21.1	-22.8	32.29	46.02	-13.73	100	Horz
Vertical 30 - 1000MHz										
4	33.8771	44.19	PK	18.3	-27.6	34.89	40	-5.11	200	Vert
5	63.1976	43.82	PK	7.4	-27.3	23.92	40	-16.08	200	Vert
6	780.4597	28.07	PK	21.2	-22.6	26.67	46.02	-19.35	200	Vert
PK - Peak detector										
QP - Quasi-Peak detector										

**HORIZONTAL PLOT**



**VERTICAL PLOT**



## 11. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

\*Decreases with the logarithm of the frequency.

### TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

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

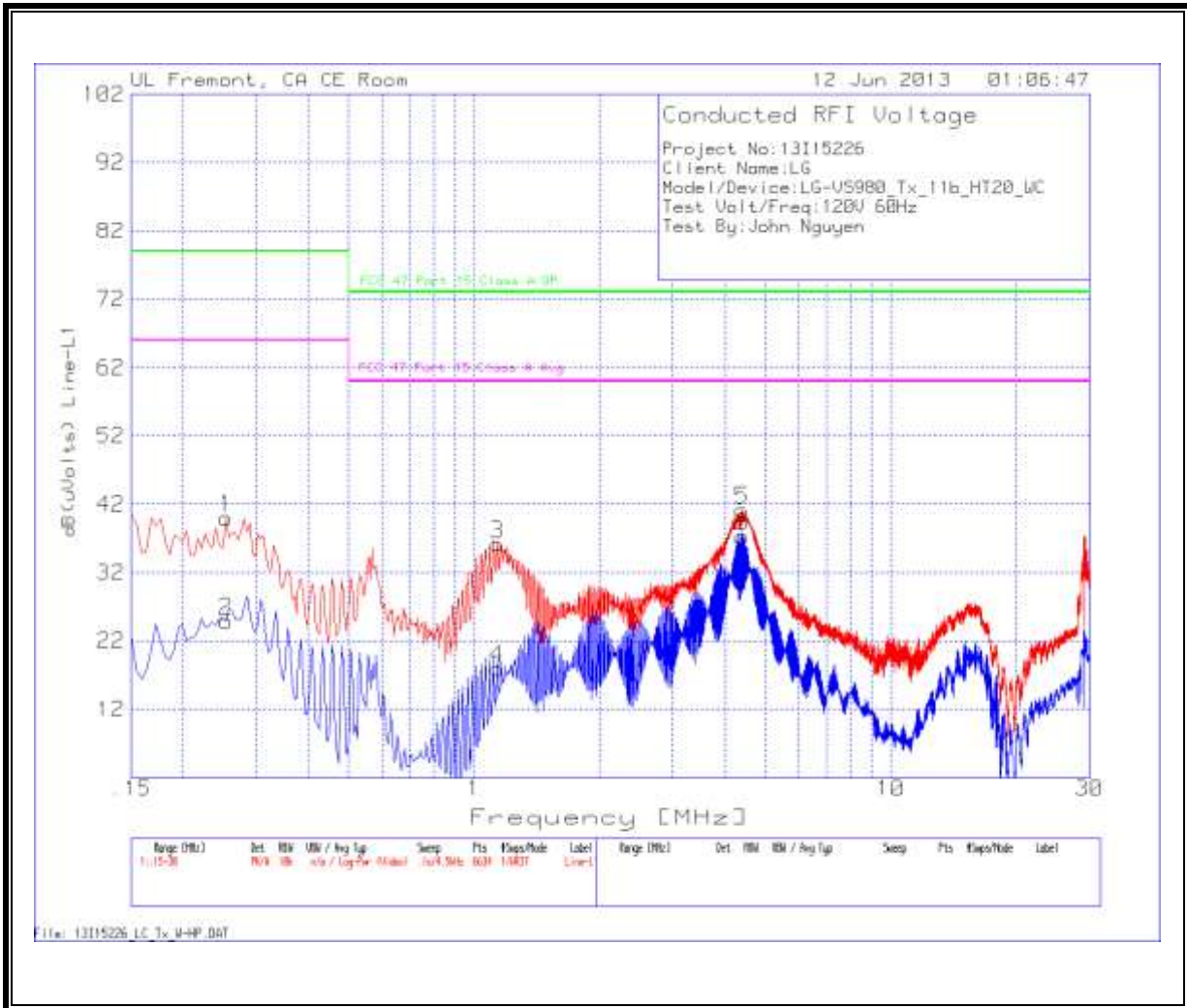
Line conducted data is recorded for both NEUTRAL and HOT lines.

**RESULTS**

**6 WORST EMISSIONS**

Project No:13115226										
Client Name:LG										
Model/Device:LG-VS980_Tx_11b_HT20_W/HP										
Test Volt/Freq:120V 60Hz										
Test By:John Nguyen										
Marker No.	Test Frequency	Meter Reading	Detector	T24 IL L1.TXT	LC Cables 1&3.TXT	dB(uVolts)	FCC 47 Part 15 Class A QP	Margin	FCC 47 Part 15 Class A Avg	Margin
Line-L1 .15 - 30MHz										
1	0.2535	39.86	PK	0.1	0	39.96	79	-39.04	66	-26.04
2	0.2535	24.79	Av	0.1	0	24.89	79	-54.11	66	-41.11
3	1.1355	36.08	PK	0.1	0	36.18	73	-36.82	60	-23.82
4	1.1355	17.82	Av	0.1	0	17.92	73	-55.08	60	-42.08
5	4.3935	40.98	PK	0.1	0.1	41.18	73	-31.82	60	-18.82
6	4.3935	37.13	Av	0.1	0.1	37.33	73	-35.67	60	-22.67
Line-L2 .15 - 30MHz										
7	0.15	55.83	PK	0.1	0	55.93	79	-23.07	66	-10.07
8	0.15	39.3	Av	0.1	0	39.4	79	-39.6	66	-26.6
9	1.05	44.65	PK	0.1	0	44.75	73	-28.25	60	-15.25
10	1.05	25.71	Av	0.1	0	25.81	73	-47.19	60	-34.19
11	12.8805	42.67	PK	0.2	0.2	43.07	73	-29.93	60	-16.93
12	12.8805	26.99	Av	0.2	0.2	27.39	73	-45.61	60	-32.61
PK - Peak detector										
QP - Quasi-Peak detector										

**LINE 1 RESULTS**



**LINE 2 RESULTS**

