



**FCC CFR47 PART 15 SUBPART C**

**CERTIFICATION TEST REPORT**

**FOR**

**7 INCH TABLET PC GSM/GPRS1900 + 802.11bgn + BT3.0+HS**

**MODEL NUMBER: GT-P3108**

**FCC ID: A3LGTP3108**

**REPORT NUMBER: 12114352-2A**

**ISSUE DATE: May 29, 2012**

*Prepared for*

**SAMSUNG ELECTRONICS CO., LTD.  
416, MAETAN 3-DONG, YEONGTONG-GU  
SUWON CITY, GYEONGGI-DO 443-742  
SOUTH KOREA**

*Prepared by*

**COMPLIANCE CERTIFICATION SERVICES (UL CCS)  
47173 BENICIA STREET  
FREMONT, CA 94538, U.S.A.  
TEL: (510) 771-1000  
FAX: (510) 661-0888**



**NVLAP LAB CODE 200065-0**

---

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	04/23/12	Initial Issue	T. LEE
	05/29/12	Added Conducted 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
5.2. <i>RATIONAL FOR TESTING</i> .....	7
5.3. <i>MAXIMUM OUTPUT POWER</i> .....	7
5.4. <i>DESCRIPTION OF AVAILABLE ANTENNAS</i> .....	7
5.5. <i>SOFTWARE AND FIRMWARE</i> .....	7
5.6. <i>WORST-CASE CONFIGURATION AND MODE</i> .....	8
5.7. <i>DESCRIPTION OF TEST SETUP</i> .....	9
<b>6. TEST AND MEASUREMENT EQUIPMENT</b> .....	<b>11</b>
<b>7. ANTENNA PORT TEST RESULTS</b> .....	<b>12</b>
7.1. <i>802.11b MODE IN THE 2.4 GHz BAND</i> .....	12
7.1.1. <i>6 dB BANDWIDTH</i> .....	12
7.1.2. <i>OUTPUT POWER</i> .....	16
7.1.3. <i>AVERAGE POWER</i> .....	20
7.1.4. <i>POWER SPECTRAL DENSITY</i> .....	21
7.1.5. <i>CONDUCTED SPURIOUS EMISSIONS</i> .....	25
7.2. <i>802.11g MODE IN THE 2.4 GHz BAND</i> .....	32
7.2.1. <i>6 dB BANDWIDTH</i> .....	32
7.2.2. <i>OUTPUT POWER</i> .....	36
7.2.3. <i>AVERAGE POWER</i> .....	40
7.2.4. <i>POWER SPECTRAL DENSITY</i> .....	41
7.2.5. <i>CONDUCTED SPURIOUS EMISSIONS</i> .....	45
7.3. <i>802.11n HT20 MODE IN THE 2.4 GHz BAND</i> .....	52
7.3.1. <i>6 dB BANDWIDTH</i> .....	52
7.3.2. <i>OUTPUT POWER</i> .....	56
7.3.3. <i>AVERAGE POWER</i> .....	60
7.3.4. <i>POWER SPECTRAL DENSITY</i> .....	61
7.3.5. <i>CONDUCTED SPURIOUS EMISSIONS</i> .....	65
<b>8. RADIATED TEST RESULTS</b> .....	<b>72</b>
8.1. <i>LIMITS AND PROCEDURE</i> .....	72

---

8.2.	<i>TRANSMITTER ABOVE 1 GHz</i> .....	73
8.2.1.	TX ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND .....	73
8.2.2.	TX ABOVE 1 GHz FOR 802.11g MODE IN THE 2.4 GHz BAND .....	78
8.2.3.	TX ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 2.4 GHz BAND .....	83
8.3.	<i>WORST-CASE BELOW 1 GHz</i> .....	88
9.	<b>AC POWER LINE CONDUCTED EMISSIONS</b> .....	<b>91</b>
10.	<b>SETUP PHOTOS</b> .....	<b>95</b>

# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD  
416, MAETAN 3-DONG, YEONGTONG-GU  
SUWON CITY, GYEONGGI-DO 443-742, SOUTH KOREA

**EUT DESCRIPTION:** 7 INCH TABLET PC GSM/GPRS1900 + 802.11bgn + BT3.0+HS

**MODEL:** GT-P3108

**SERIAL NUMBER:** 02004

**DATE TESTED:** APRIL 21-23, 2012

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	PASS

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:

Tested By:



TIM LEE  
STAFF ENGINEER  
UL CCS

CHIN PANG  
EMC TECHNICIAN  
UL CCS

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, and FCC CFR 47 Part 15.

## 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 7 Inch tablet PC GSM/GPRS1900 + 802.11bgn + BT3.0+HS

### 5.2. RATIONAL FOR TESTING

Radio module used in this report is identical module used in other models. Therefore, only radiated testing was conducted on this product. Data for conducted testing is leveraged from identical module of other report.

### 5.3. MAXIMUM OUTPUT POWER

The measured average power values were within  $\pm 0.5$  dB of the original values. Refer to report number "12I14206-2 FCC IC DTS WLAN Report" for exact output power values and for all antenna port results

### 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an 802.11 b/g/n and a Bluetooth antenna, with a maximum gain as stated in the table below:

No.	Contents	Standards			Unit	Condition	Remarks
		Min.	Avg.	Max.			
1	Gain of BT/WIFI	-6.4	-	-1.4	dBi	Based on Max. Gain in H-Plane.	
2	VSWR of BT/WIFI	1.2	1.7	2.2	-	2213 MHz	Jig Data
		1.2	1.7	2.2	-	2233 MHz	

### 5.5. SOFTWARE AND FIRMWARE

Bluetooth firmware - BCM4330B1\_002.001.003.0634.0678.hcd

Wi-Fi Firmware Rev 5.90.125.1191

EUT driver software version: 3.08-281811

## 5.6. WORST-CASE CONFIGURATION AND MODE

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

For the fundamental investigation, since the EUT is a portable device that has three orientations; therefore X, Y and Z orientations have been investigated, also with AC/DC adapter, and earphone, and the worst case was found to be at X orientation with headset and AC Adapter.

Worst-case data rates were as follows:

802.11b Mode: 1Mbps  
802.11g Mode: 6Mbps  
802.11n HT20 Mode: MCS0

**5.7. DESCRIPTION OF TEST SETUP**

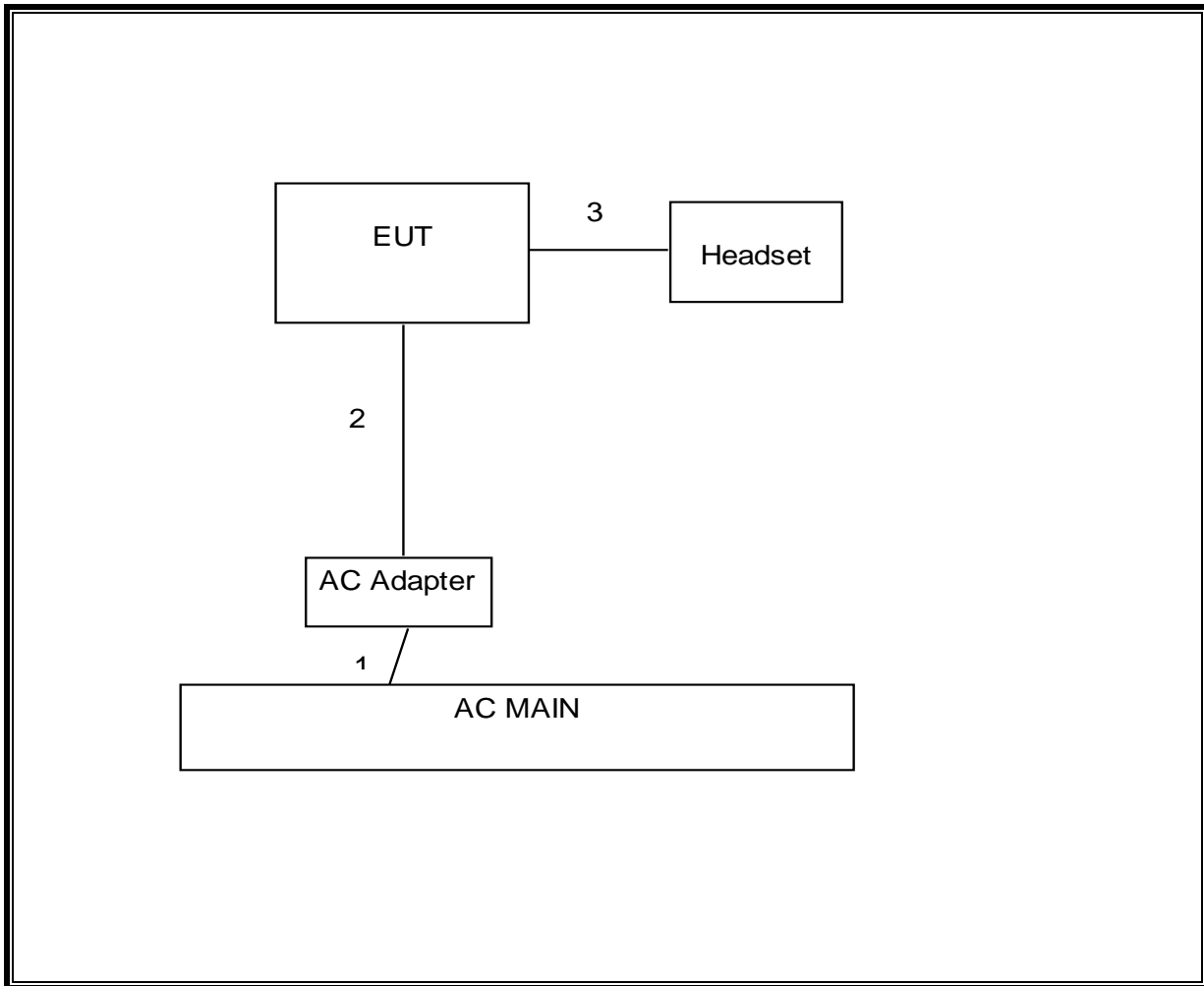
**SUPPORT EQUIPMENT**

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung	ETA-P11X	3046	N/A
Headset	Samsung	EHS64AVFWE	3040	N/A

**I/O CABLES (RADIATED SETUP)**

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	115VAC	1	US115	Unshielded	1m	N/A
2	Mini USB	1	USB	Unshielded	1m	N/A
3	Audio	1	Mini-Jack	Unshielded	1.2 m	Volume control attached

**SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)**



## 6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	08/15/12
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	1000741	07/06/12
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	07/16/12
Antenna, Horn, 18 GHz	EMCO	3115	C00872	06/29/12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	11/11/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	07/18/12
Power Meter	Agilent / HP	437B		07/28/12
Power Sensor, 18 GHz	Agilent / HP	8481A	N02782	07/29/13
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	12/13/12
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	07/28/12

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

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	Asset	Cal Date	Cal Due
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	01/28/11	04/28/12
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	08/15/11	08/15/12
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	1000741	07/06/11	07/06/12
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	07/16/11	07/16/12
Antenna, Horn, 18 GHz	EMCO	3115	C00872	06/29/11	06/29/12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	11/11/11	11/11/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	07/18/11	07/18/12
Power Meter	Agilent / HP	437B		07/28/11	07/28/12
Power Sensor, 18 GHz	Agilent / HP	8481A	N02782	07/29/11	07/29/13
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	12/13/11	12/13/12
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	07/28/11	07/28/12

## 7. ANTENNA PORT TEST RESULTS

### 7.1. 802.11b MODE IN THE 2.4 GHz BAND

#### 7.1.1. 6 dB BANDWIDTH

##### LIMITS

FCC §15.247 (a) (2)

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

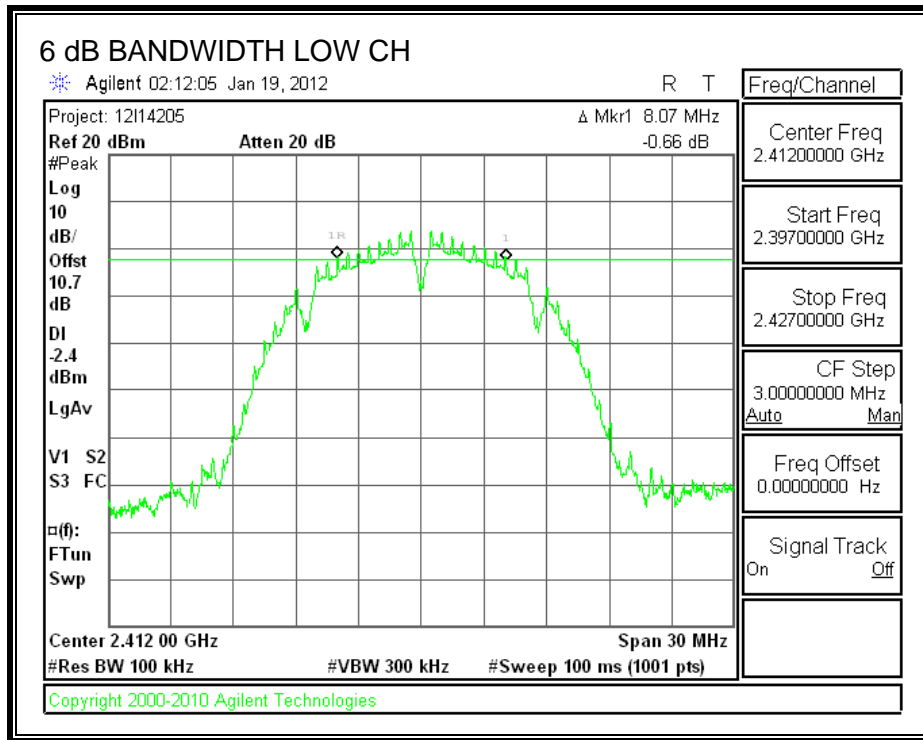
##### TEST PROCEDURE

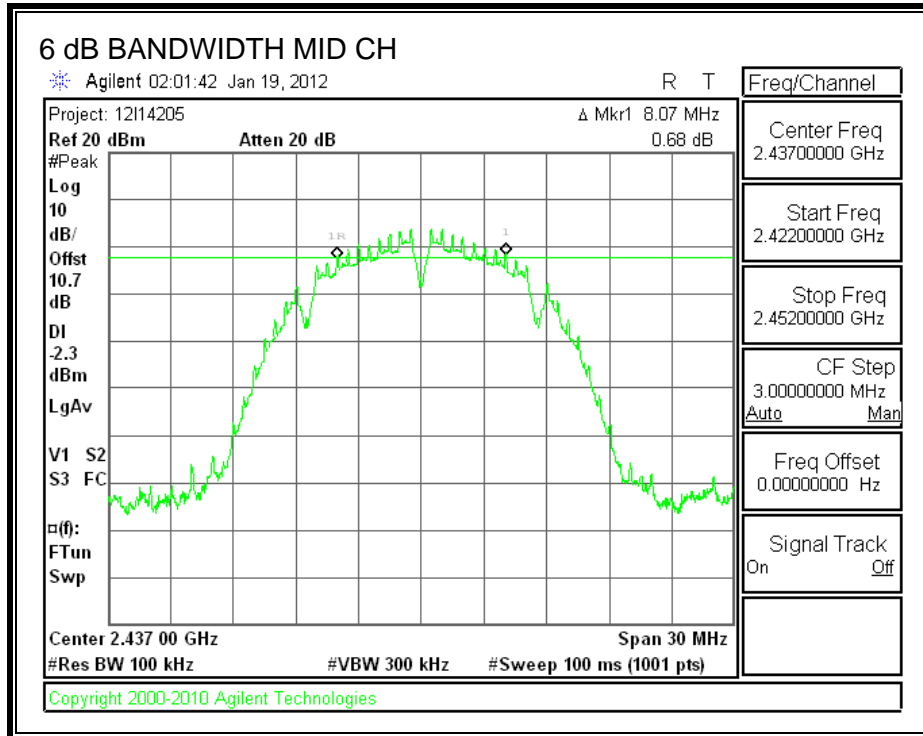
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

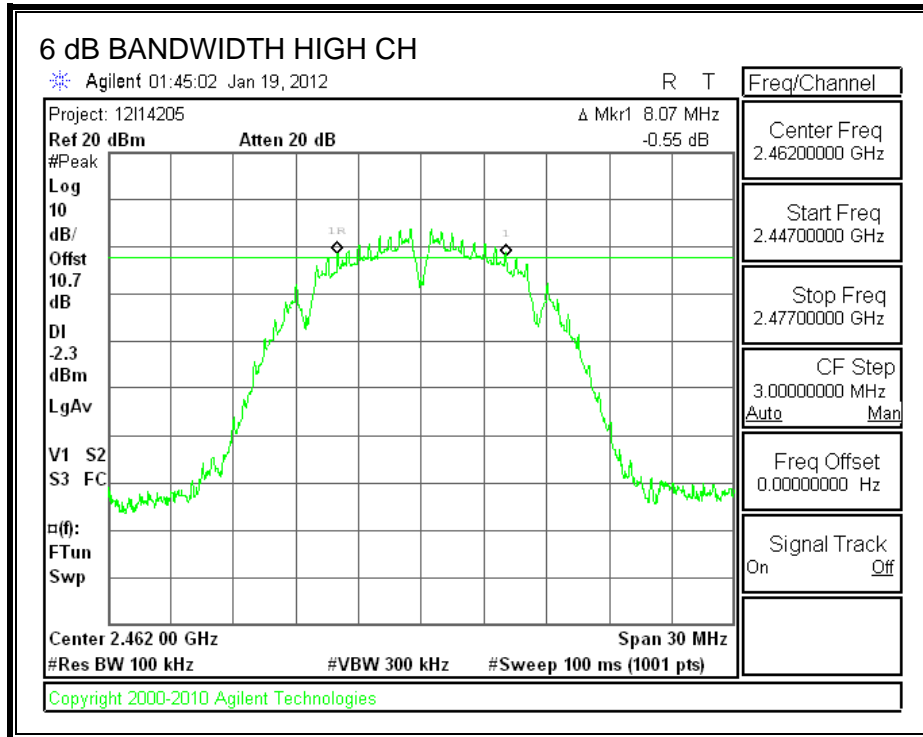
##### RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	8.07	0.5
Middle	2437	8.07	0.5
High	2462	8.07	0.5

**6 dB BANDWIDTH**







## 7.1.2. OUTPUT POWER

### LIMITS

FCC §15.247 (b)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

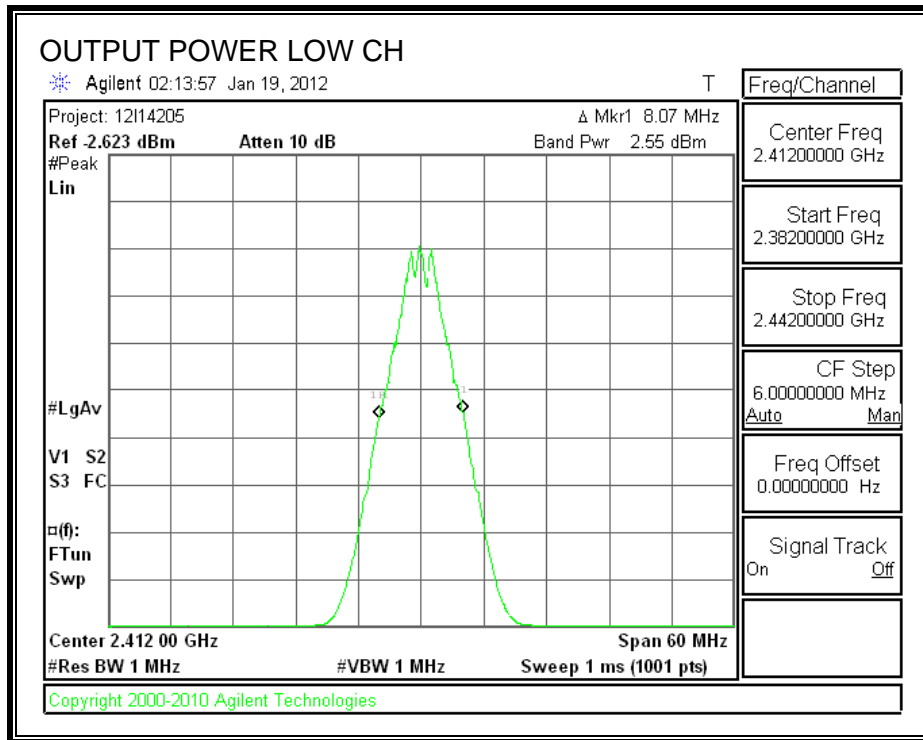
### TEST PROCEDURE

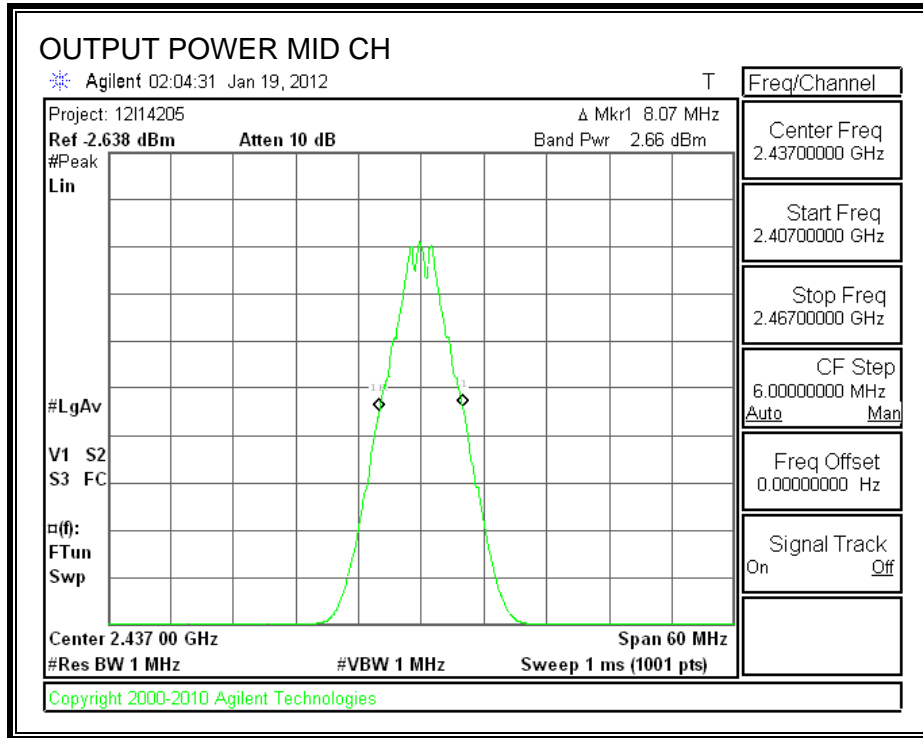
Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

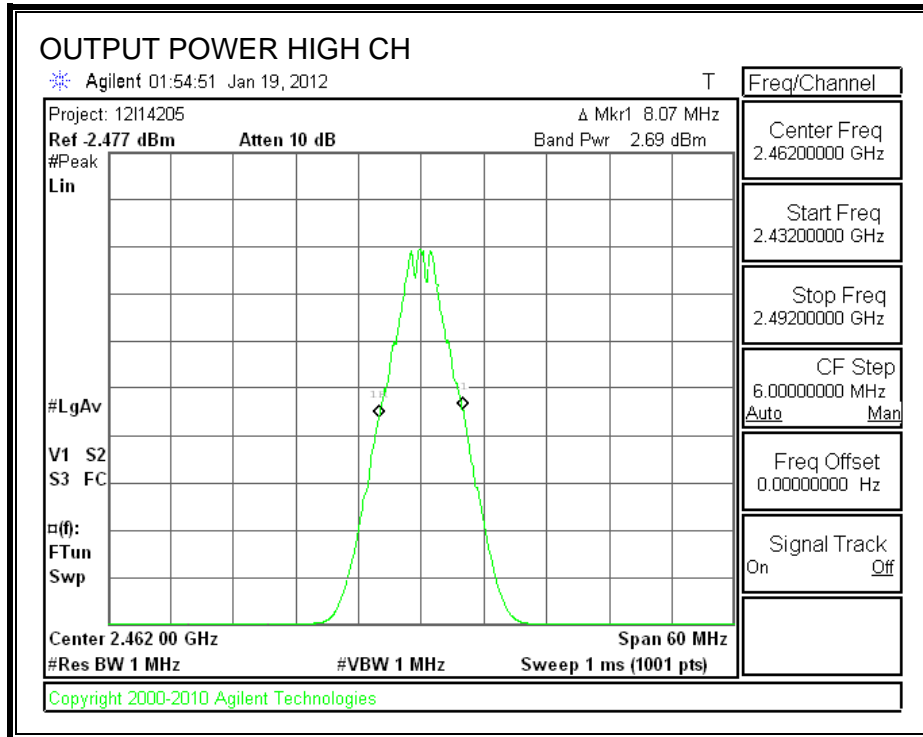
### RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	2.55	10.64	13.19	30	-16.81
Middle	2437	2.66	10.64	13.30	30	-16.70
High	2462	2.69	10.64	13.33	30	-16.67

**OUTPUT POWER**







### 7.1.3. AVERAGE POWER

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

#### RESULTS

The cable assembly insertion loss of 11.88 dB (including 10 dB pad and 1.88 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Frequency (MHz)	Power (dBm)
2412	11.68
2437	11.69
2462	11.66

### 7.1.4. POWER SPECTRAL DENSITY

#### LIMITS

FCC §15.247 (e)

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.

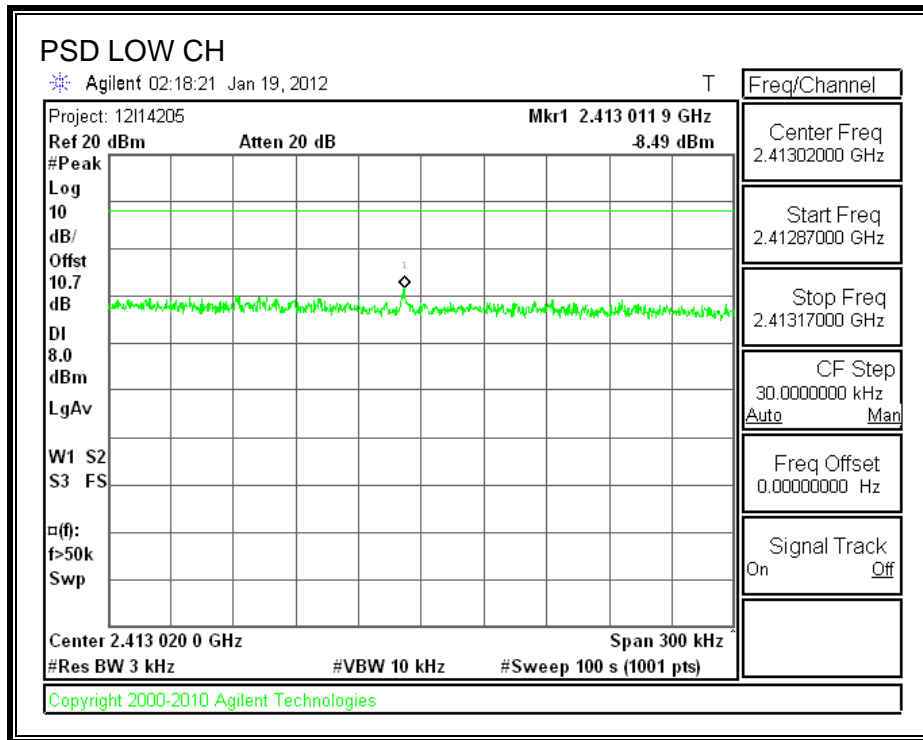
#### TEST PROCEDURE

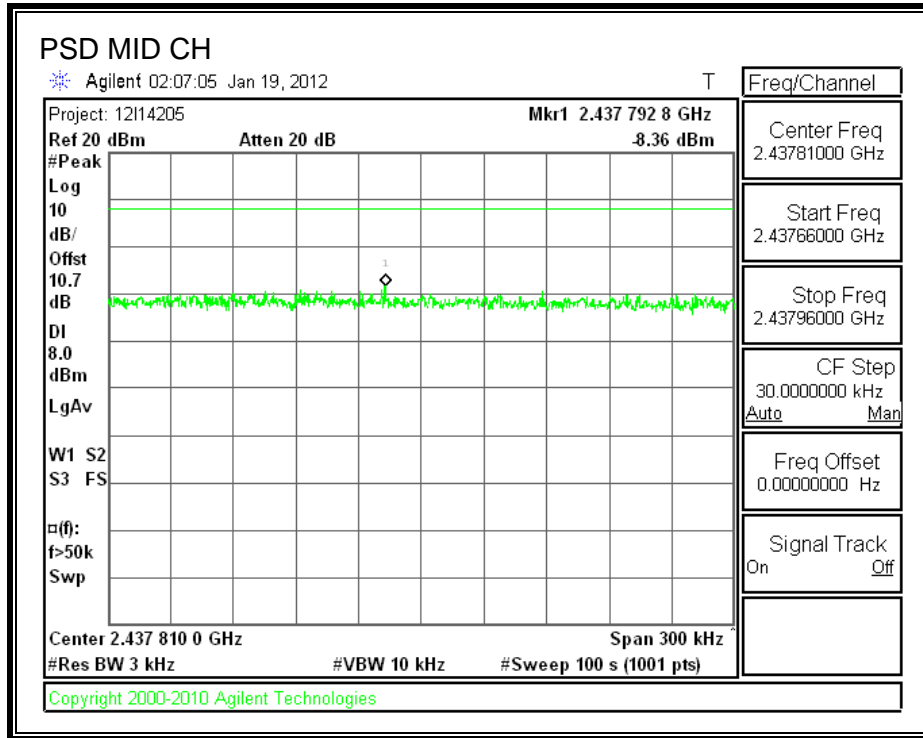
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

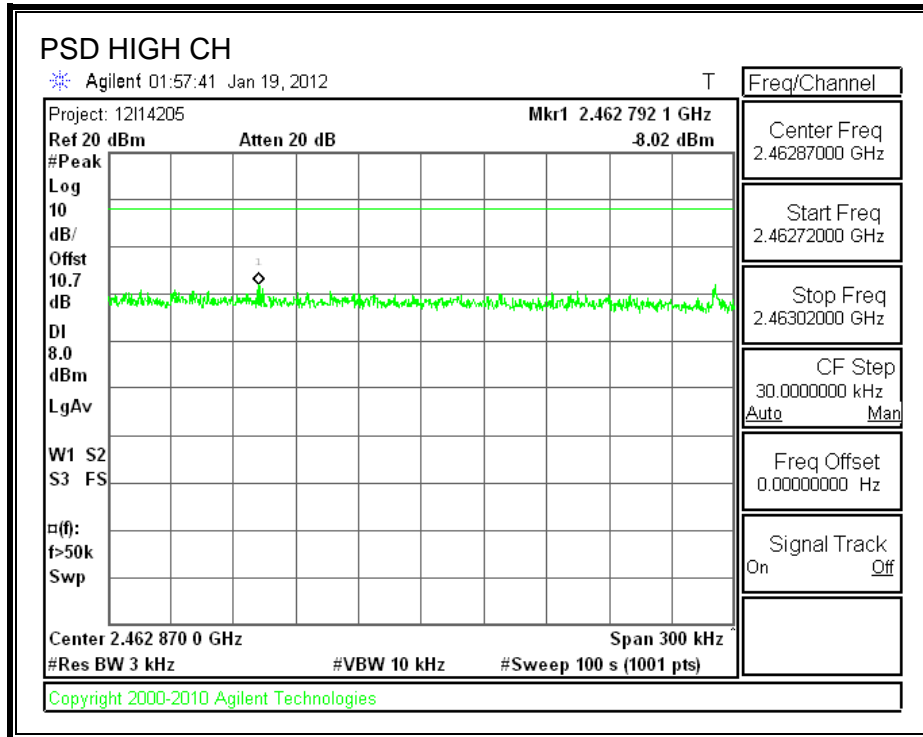
#### RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-8.49	8	-16.49
Middle	2437	-8.36	8	-16.36
High	2462	-8.02	8	-16.02

**POWER SPECTRAL DENSITY**







## **7.1.5. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

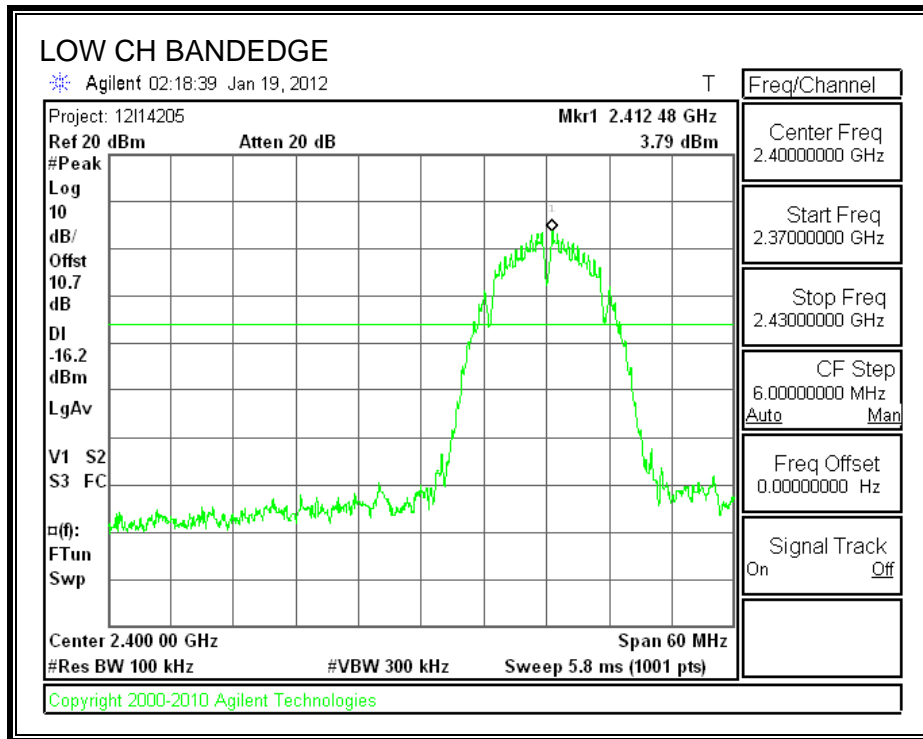
### **TEST PROCEDURE**

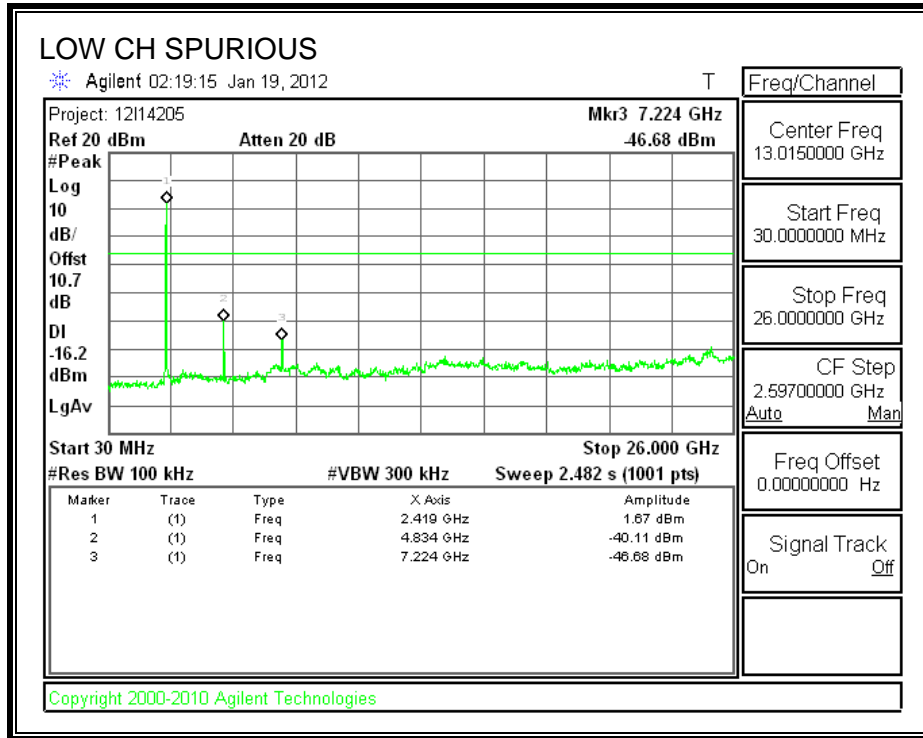
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

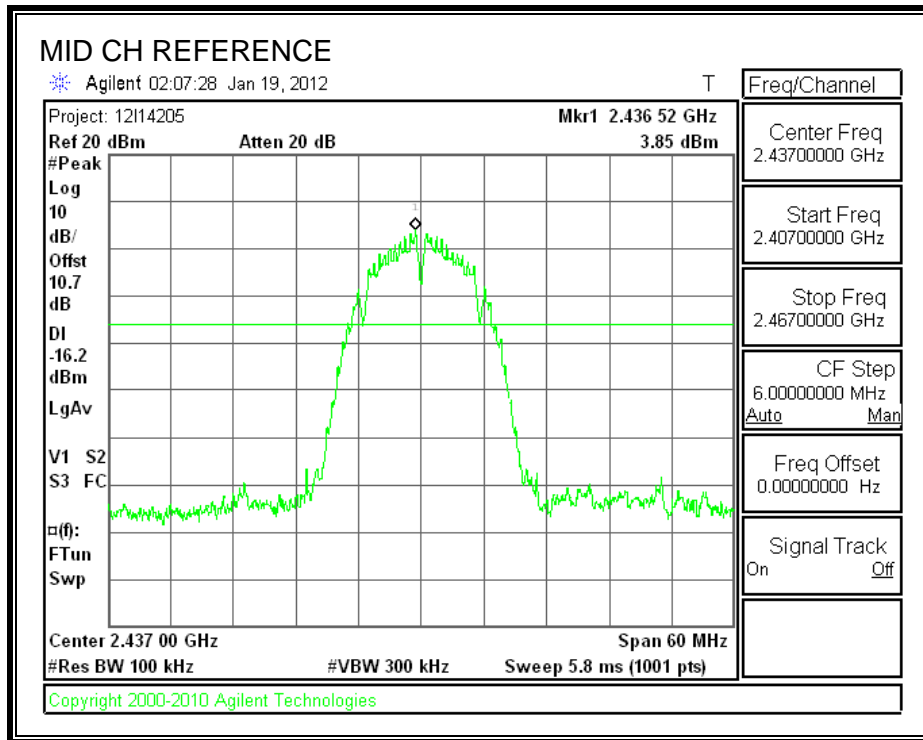
**RESULTS**

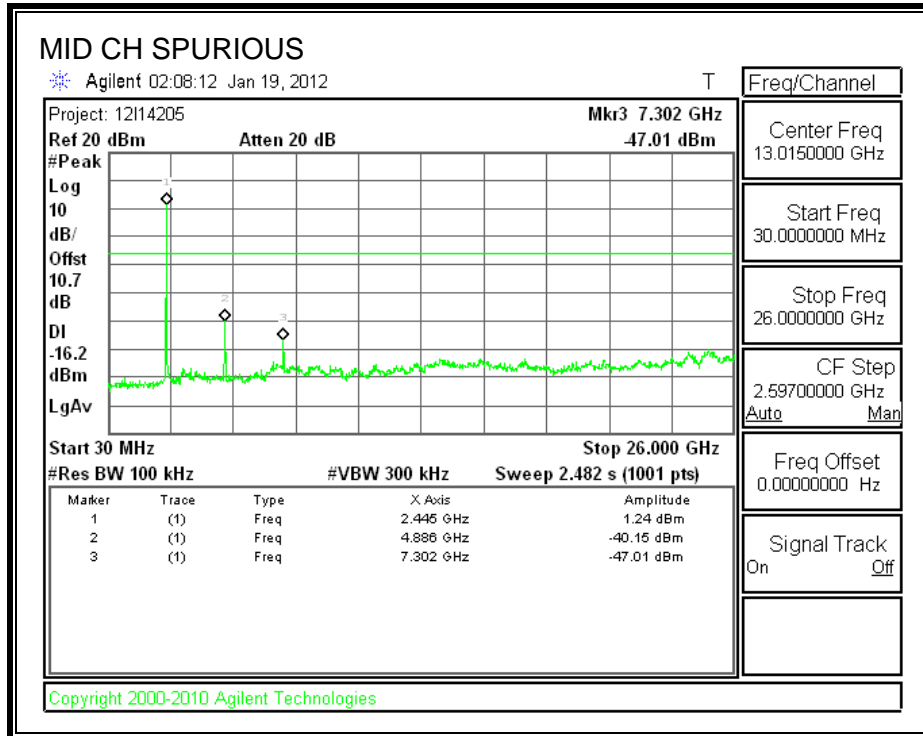
**SPURIOUS EMISSIONS, LOW CHANNEL**



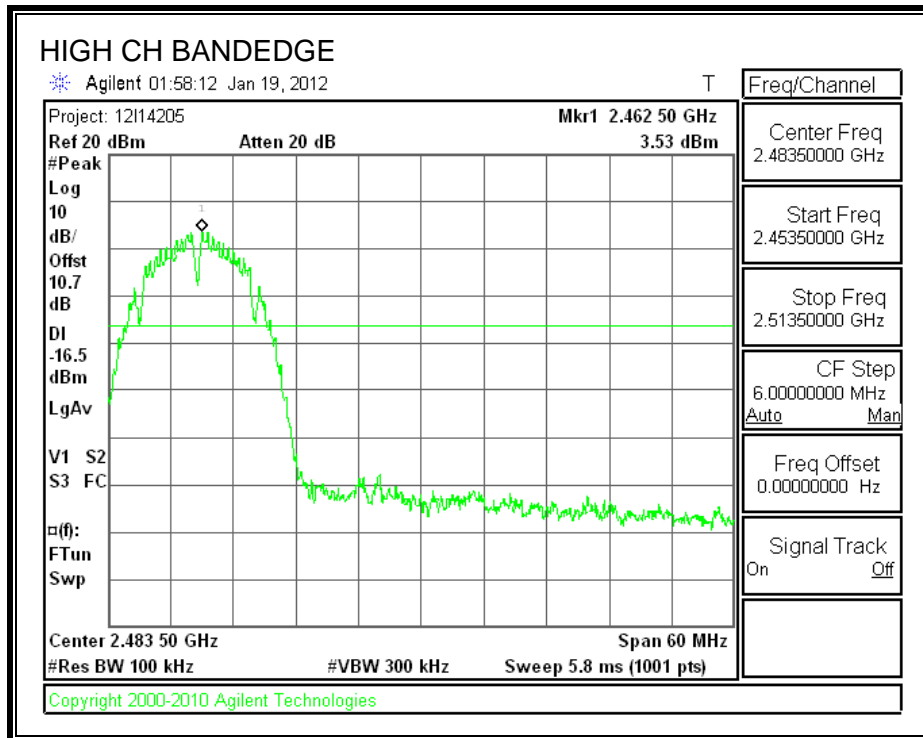


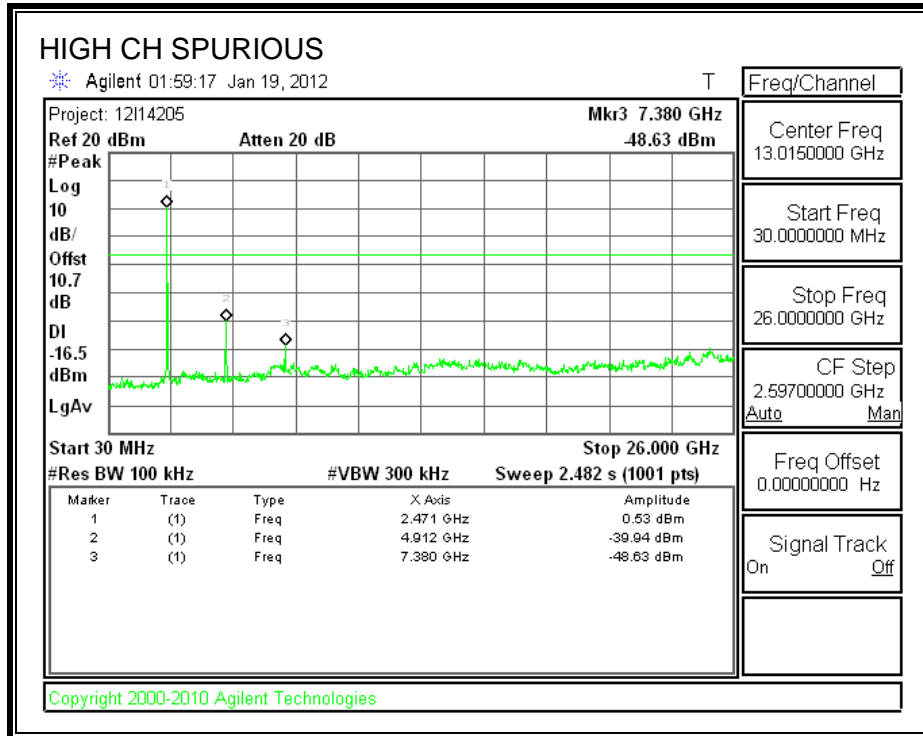
**SPURIOUS EMISSIONS, MID CHANNEL**





**SPURIOUS EMISSIONS, HIGH CHANNEL**





---

## 7.2. 802.11g MODE IN THE 2.4 GHz BAND

### 7.2.1. 6 dB BANDWIDTH

#### LIMITS

FCC §15.247 (a) (2)

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

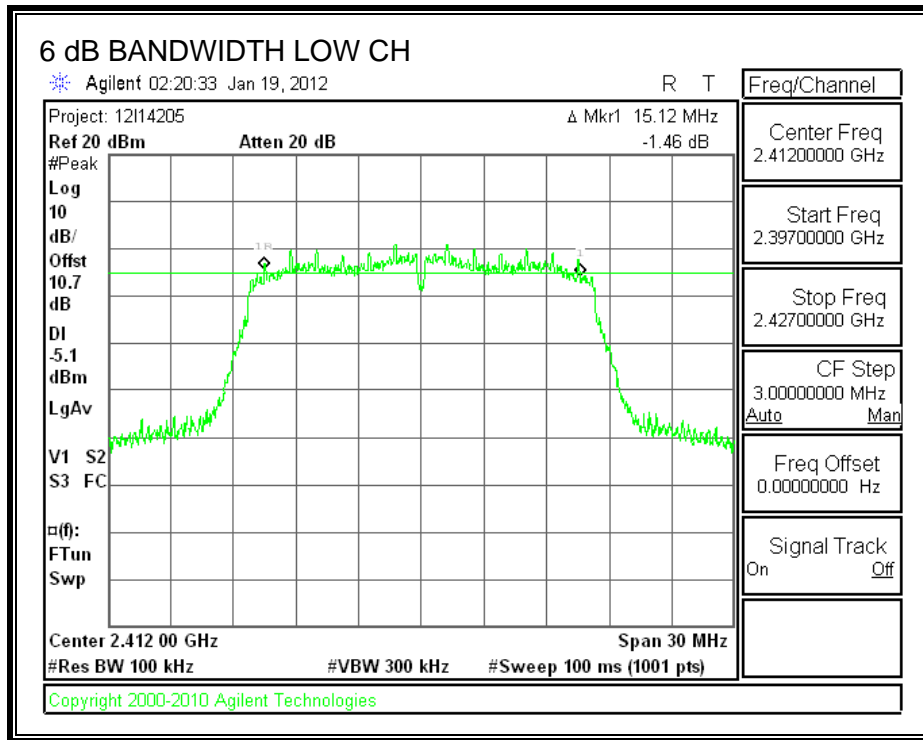
#### TEST PROCEDURE

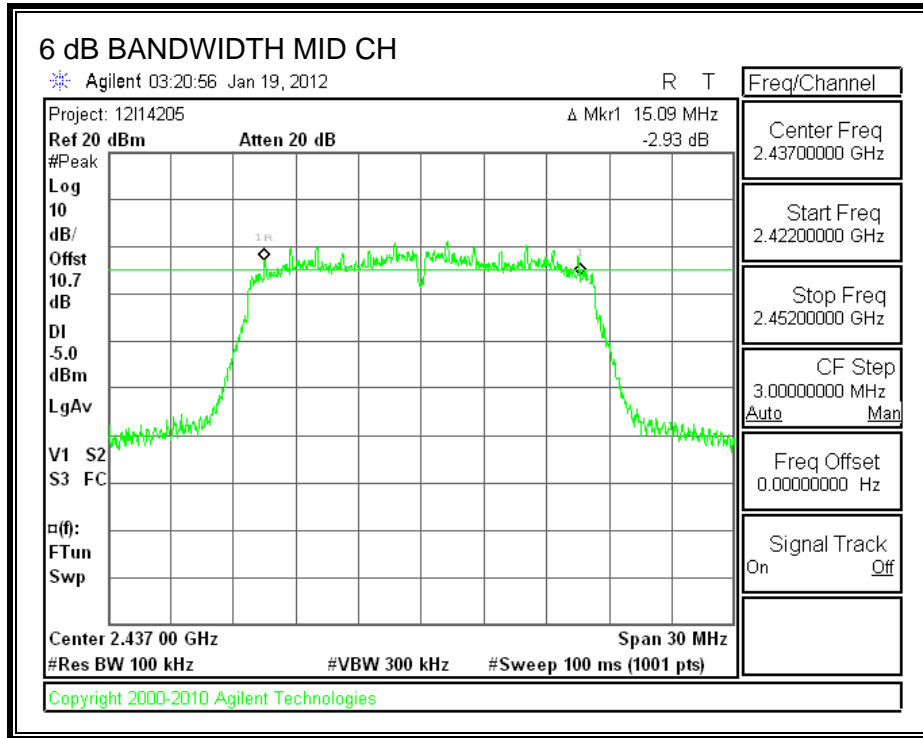
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

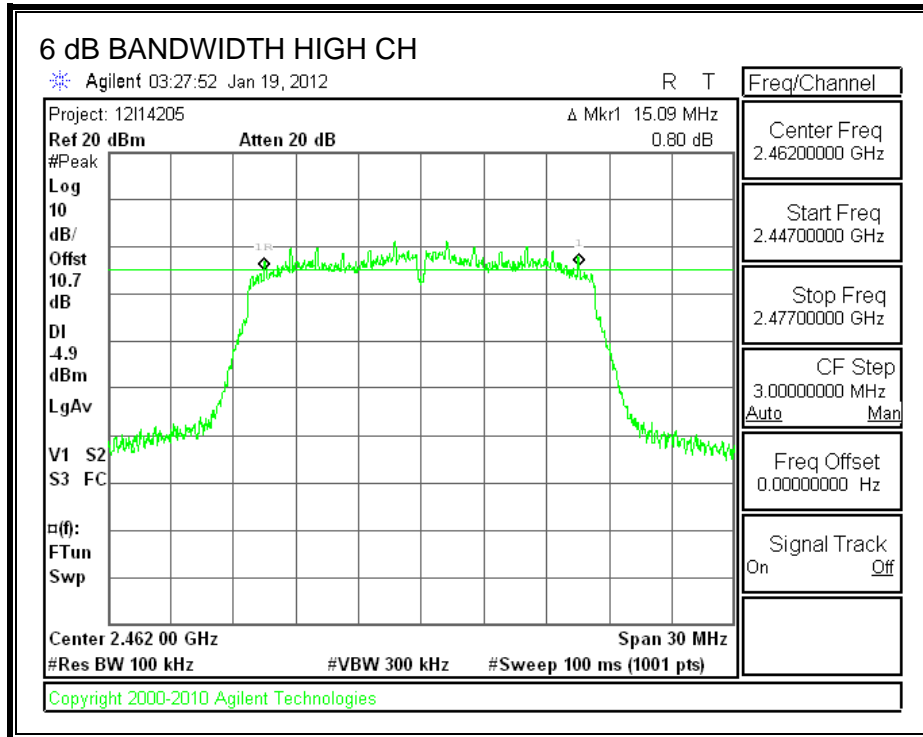
#### RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	15.12	0.5
Middle	2437	15.09	0.5
High	2462	15.09	0.5

**6 dB BANDWIDTH**







## 7.2.2. OUTPUT POWER

### LIMITS

FCC §15.247 (b)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

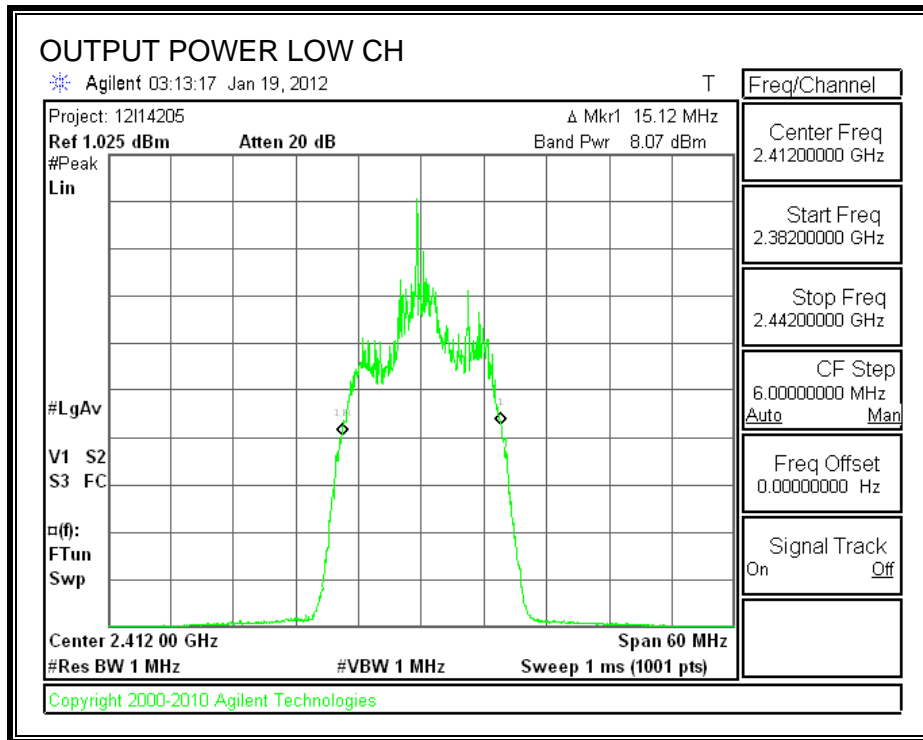
### TEST PROCEDURE

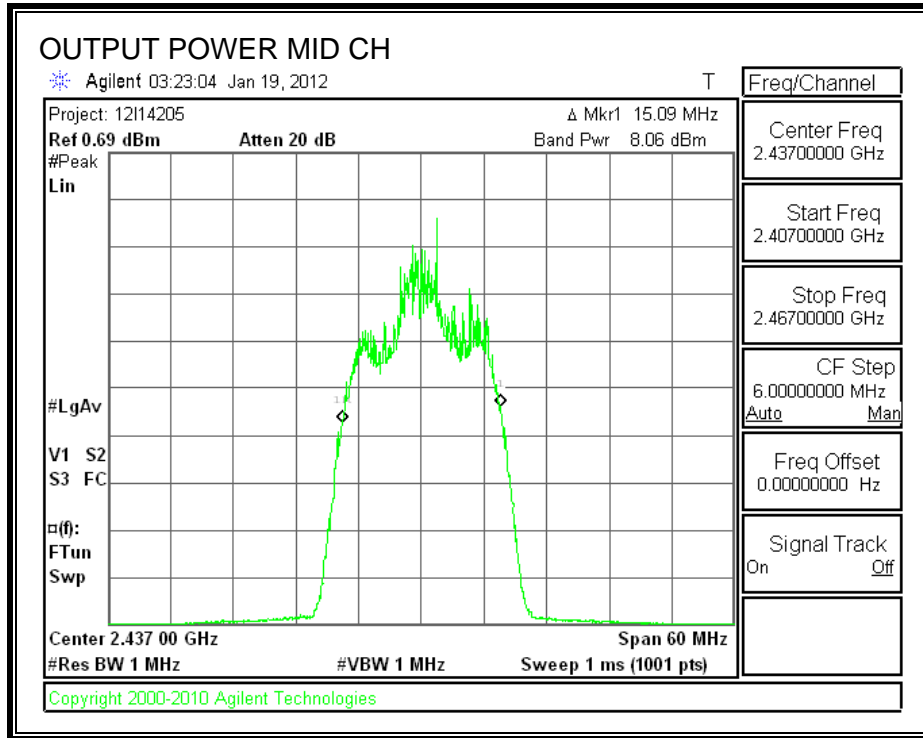
Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

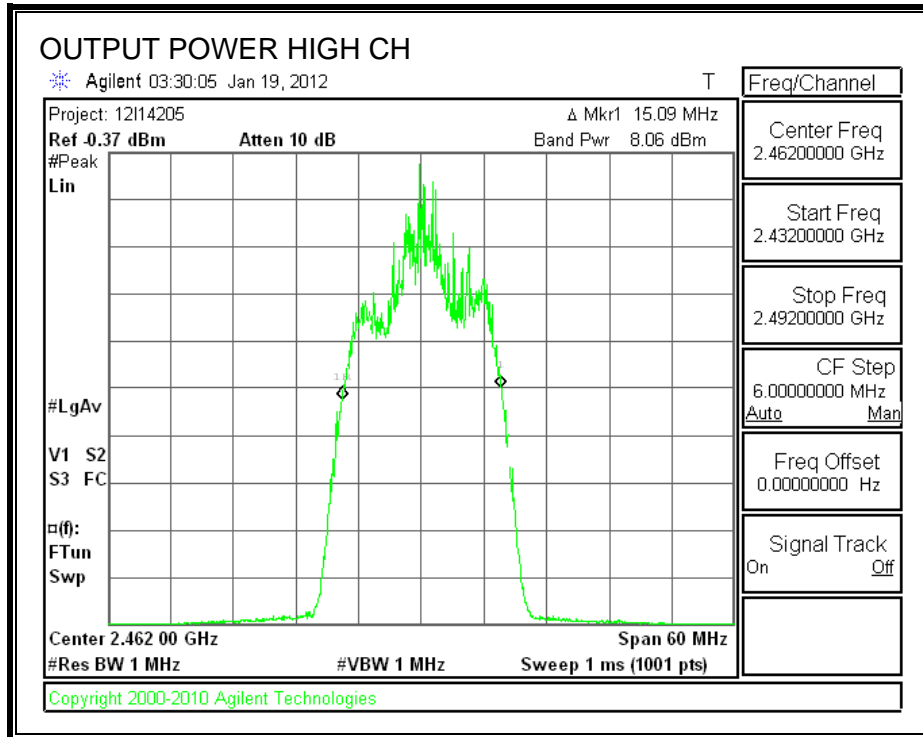
### RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	8.07	10.64	18.71	30	-11.29
Middle	2437	8.06	10.64	18.70	30	-11.30
High	2462	8.06	10.64	18.70	30	-11.30

**OUTPUT POWER**







### 7.2.3. AVERAGE POWER

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

#### RESULTS

The cable assembly insertion loss of 11.88 dB (including 10 dB pad and 1.88 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Frequency (MHz)	Power (dBm)
2412	11.52
2437	11.67
2462	11.74

## 7.2.4. POWER SPECTRAL DENSITY

### LIMITS

FCC §15.247 (e)

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.

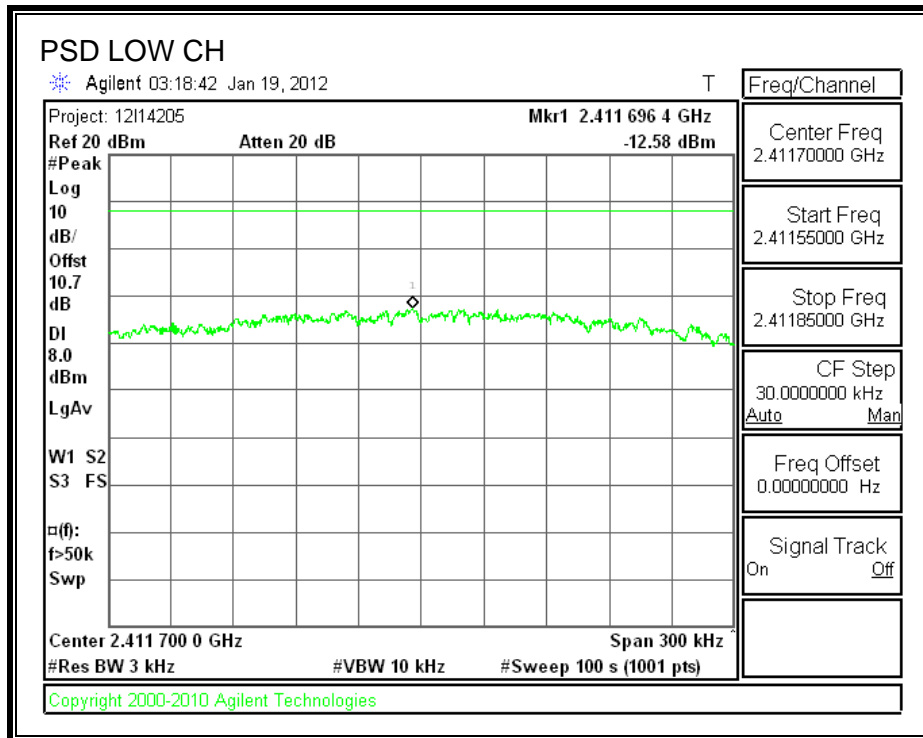
### TEST PROCEDURE

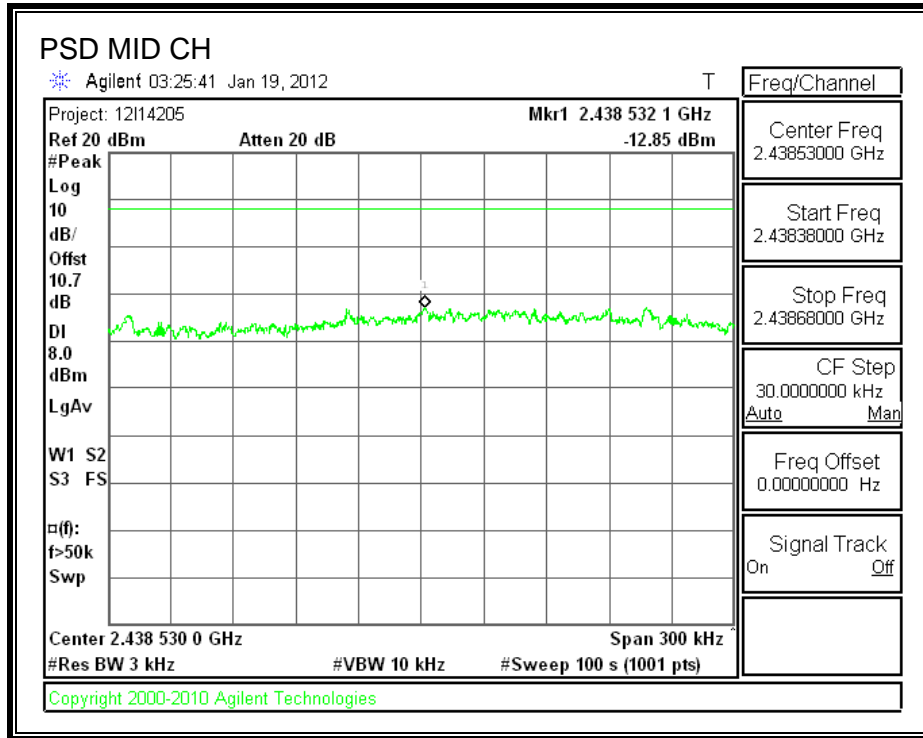
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

### RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-12.58	8	-20.58
Middle	2437	-12.85	8	-20.85
High	2462	-11.65	8	-19.65

**POWER SPECTRAL DENSITY**







## **7.2.5. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

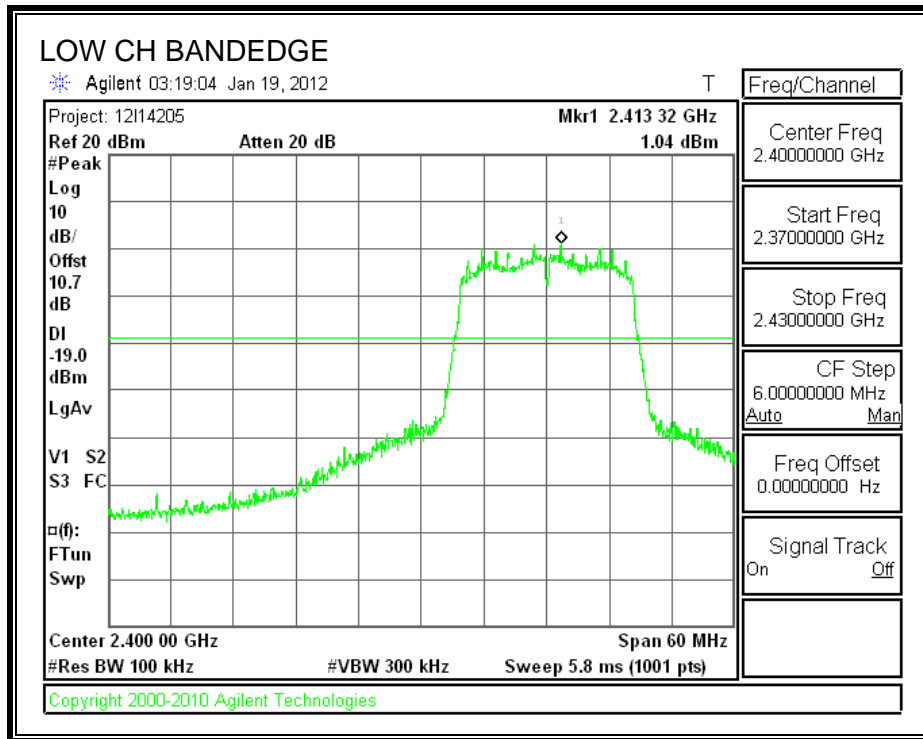
### **TEST PROCEDURE**

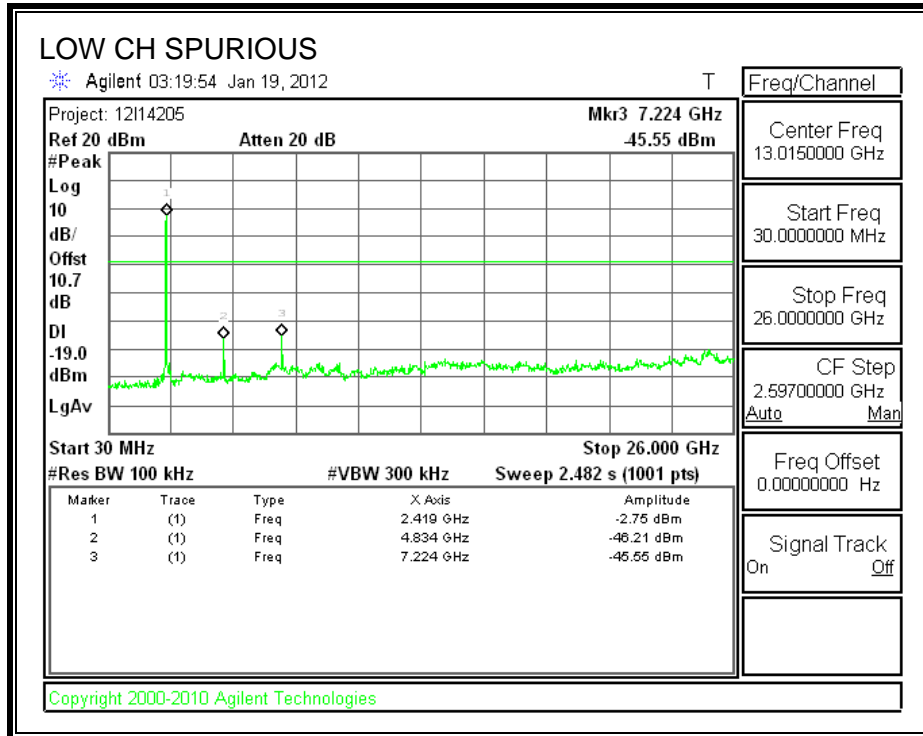
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

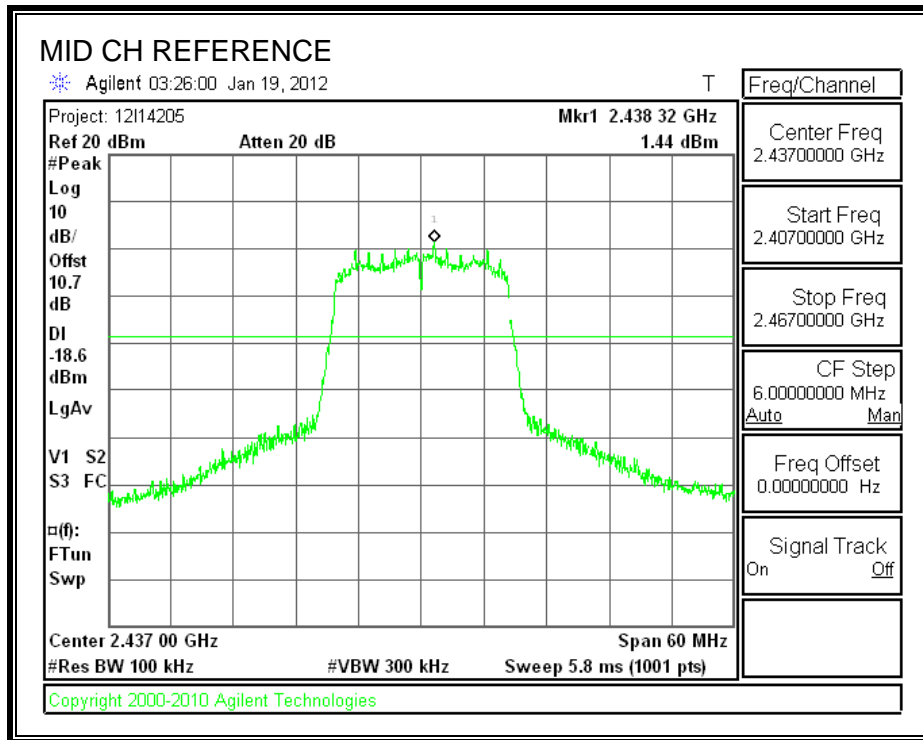
**RESULTS**

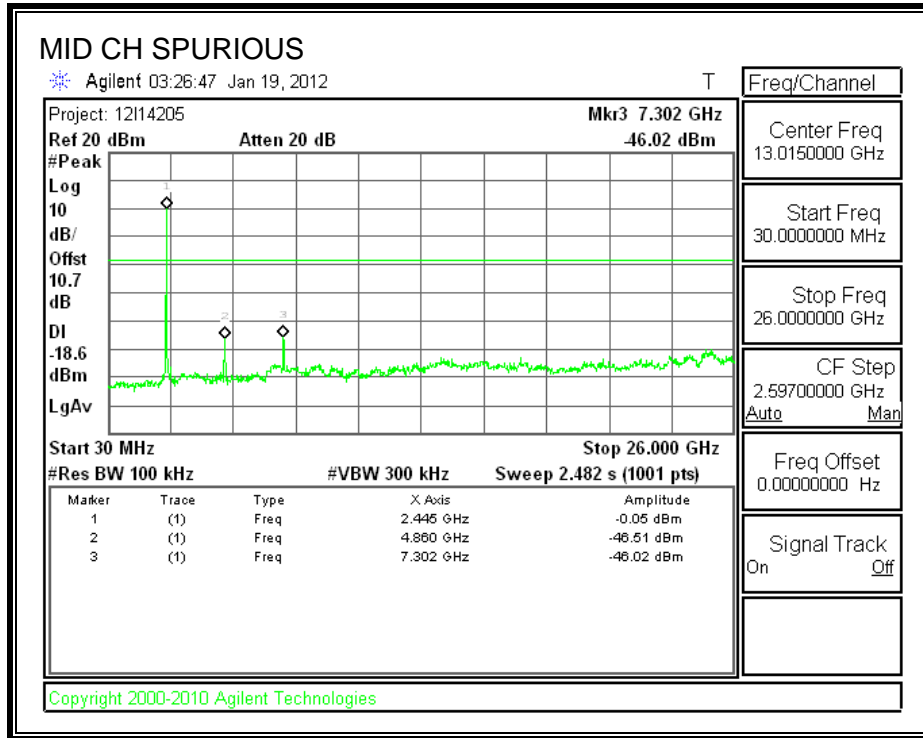
**SPURIOUS EMISSIONS, LOW CHANNEL**



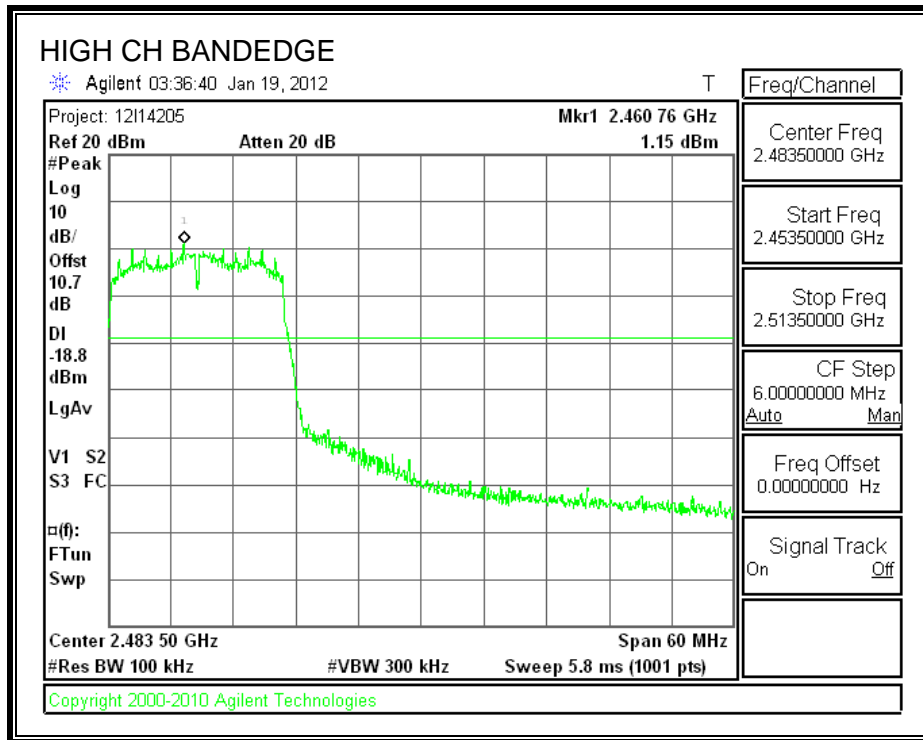


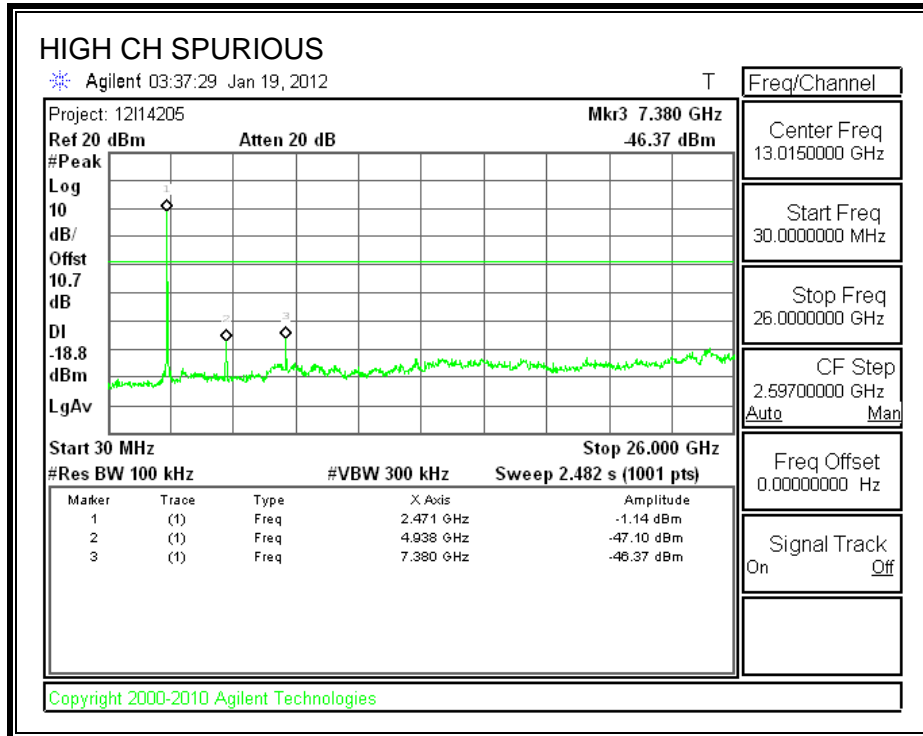
**SPURIOUS EMISSIONS, MID CHANNEL**





**SPURIOUS EMISSIONS, HIGH CHANNEL**





---

### 7.3. 802.11n HT20 MODE IN THE 2.4 GHZ BAND

#### 7.3.1. 6 dB BANDWIDTH

##### LIMITS

FCC §15.247 (a) (2)

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

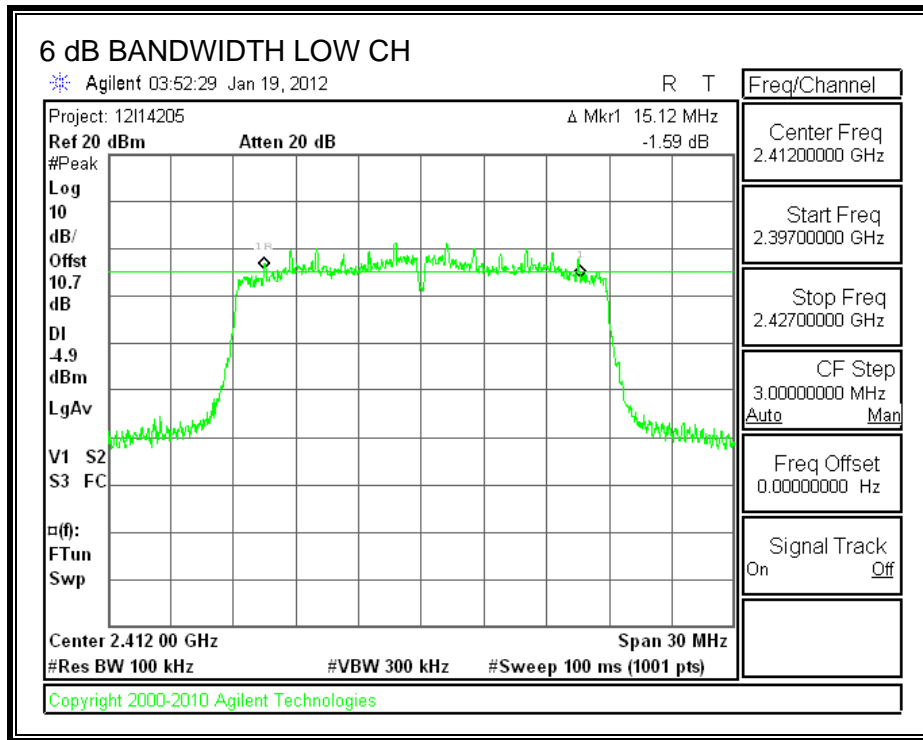
##### TEST PROCEDURE

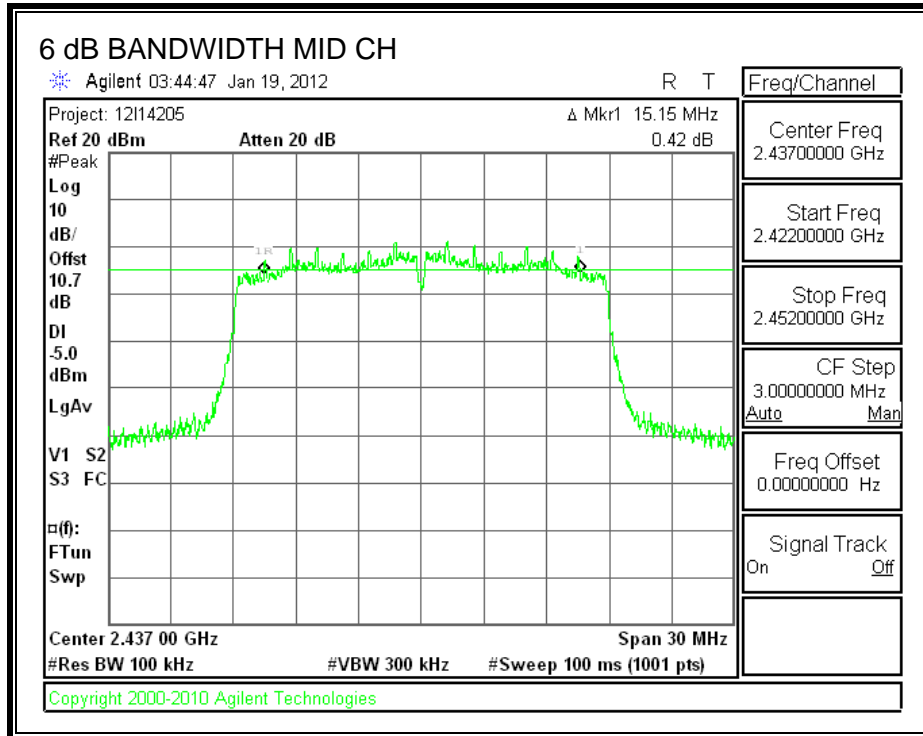
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

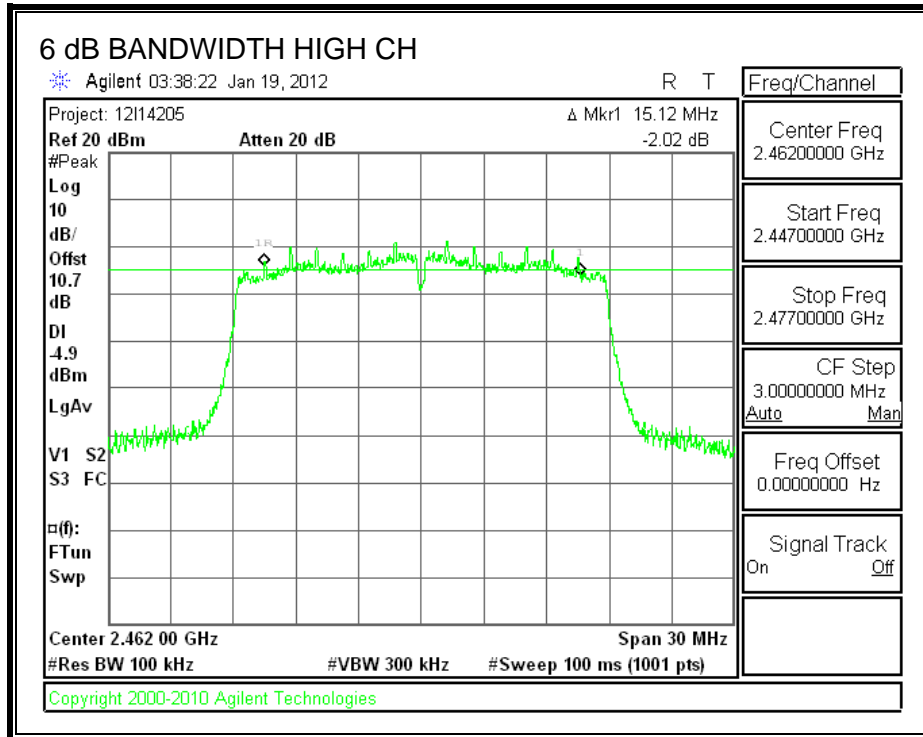
##### RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	15.12	0.5
Middle	2437	15.15	0.5
High	2462	15.12	0.5

**6 dB BANDWIDTH**







### 7.3.2. OUTPUT POWER

#### LIMITS

FCC §15.247 (b)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

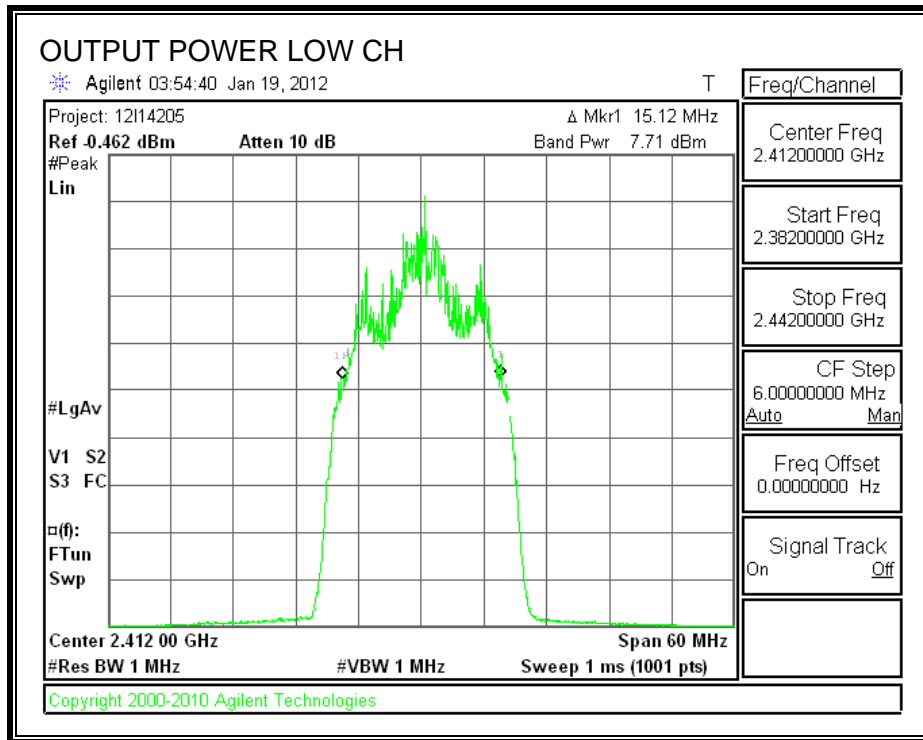
#### TEST PROCEDURE

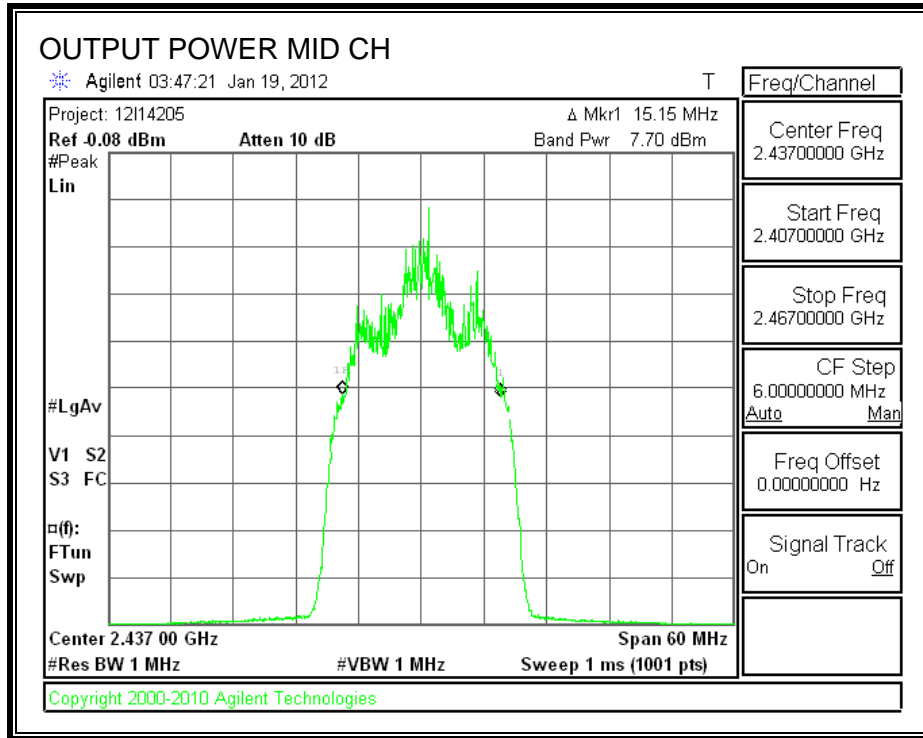
Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

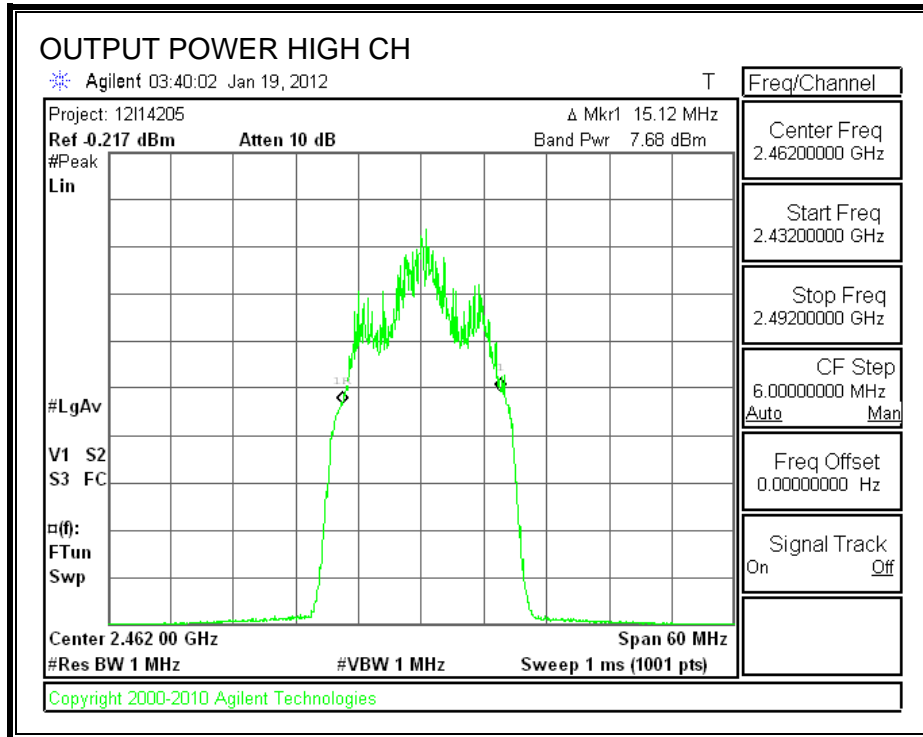
#### RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Attenuator and Cable Offset (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	7.71	10.64	18.35	30	-11.65
Middle	2437	7.70	10.64	18.34	30	-11.66
High	2462	7.68	10.64	18.32	30	-11.68

**OUTPUT POWER**







### 7.3.3. AVERAGE POWER

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

#### RESULTS

The cable assembly insertion loss of 11.88 dB (including 10 dB pad and 1.88 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Frequency (MHz)	Power (dBm)
2412	11.46
2437	11.45
2462	11.46

### 7.3.4. POWER SPECTRAL DENSITY

#### LIMITS

FCC §15.247 (e)

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.

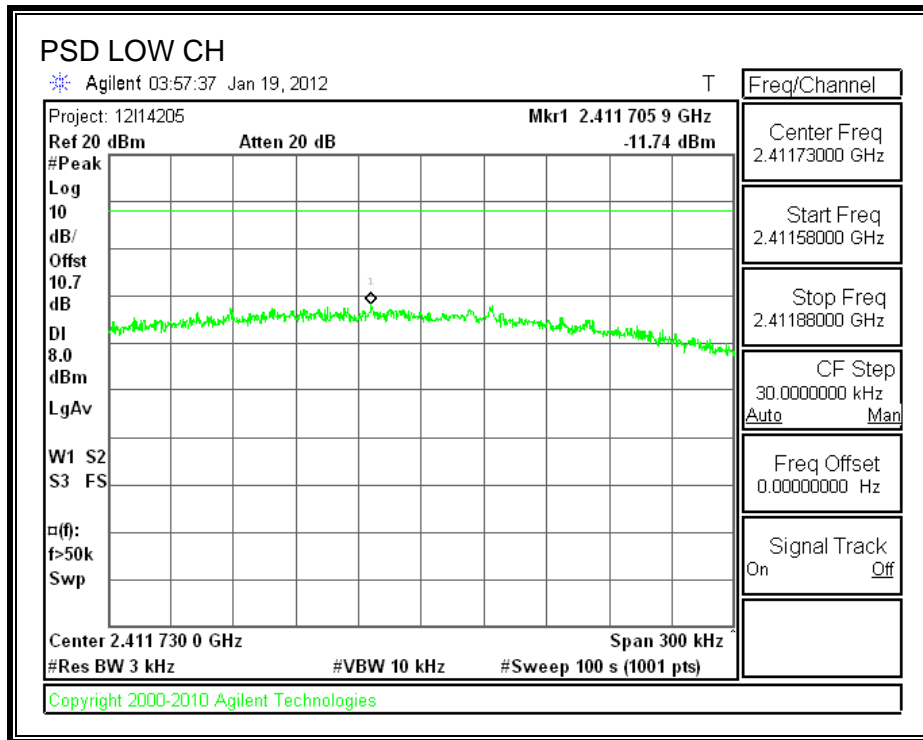
#### TEST PROCEDURE

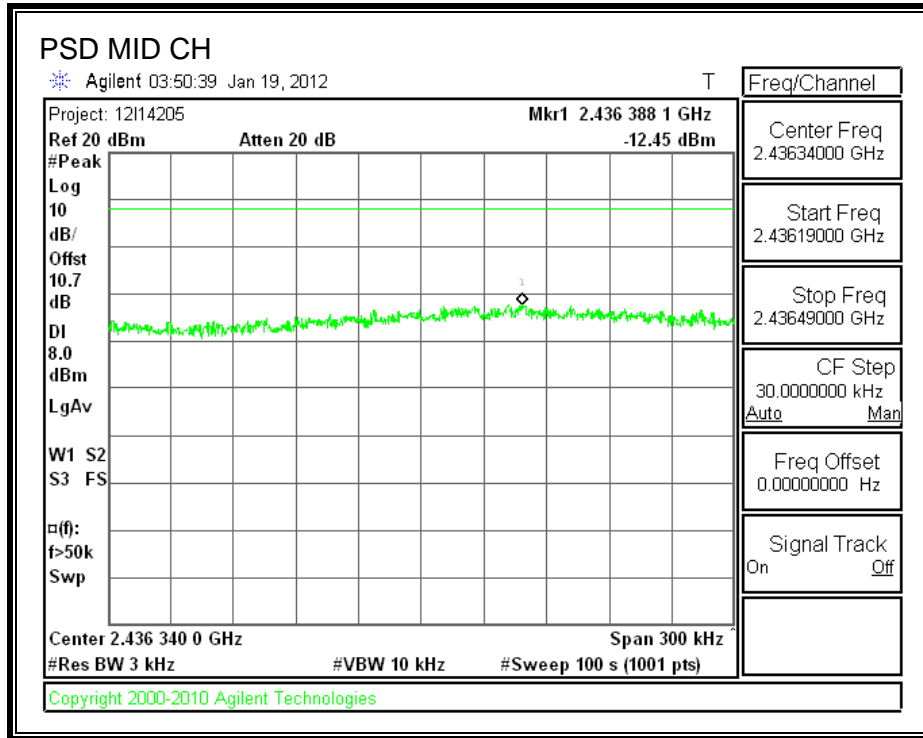
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

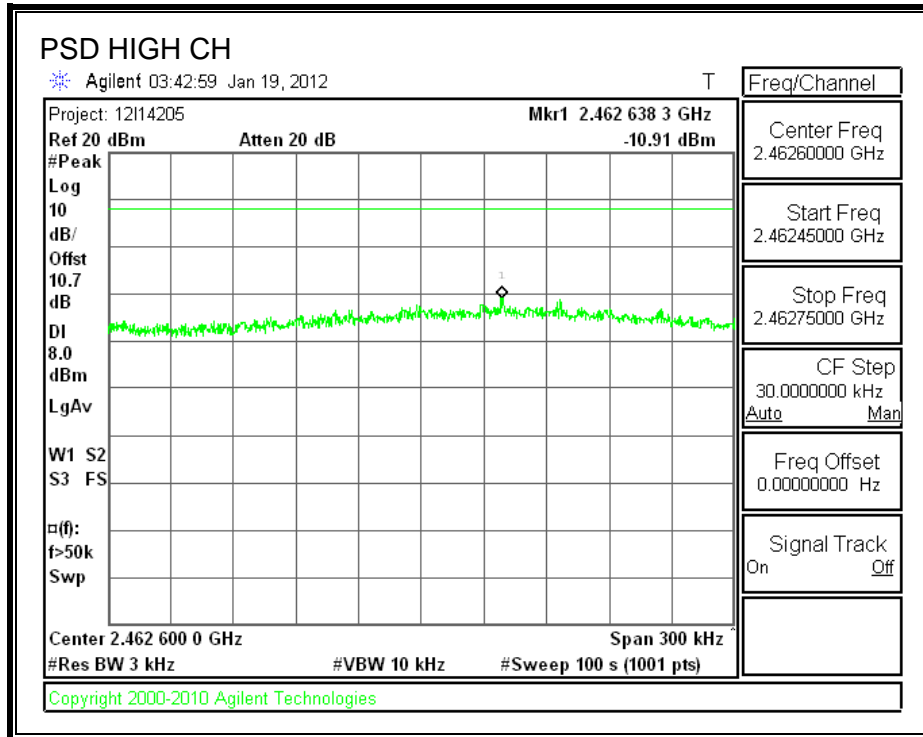
#### RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-11.74	8	-19.74
Middle	2437	-12.45	8	-20.45
High	2462	-10.91	8	-18.91

**POWER SPECTRAL DENSITY**







### **7.3.5. CONDUCTED SPURIOUS EMISSIONS**

#### **LIMITS**

FCC §15.247 (d)

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

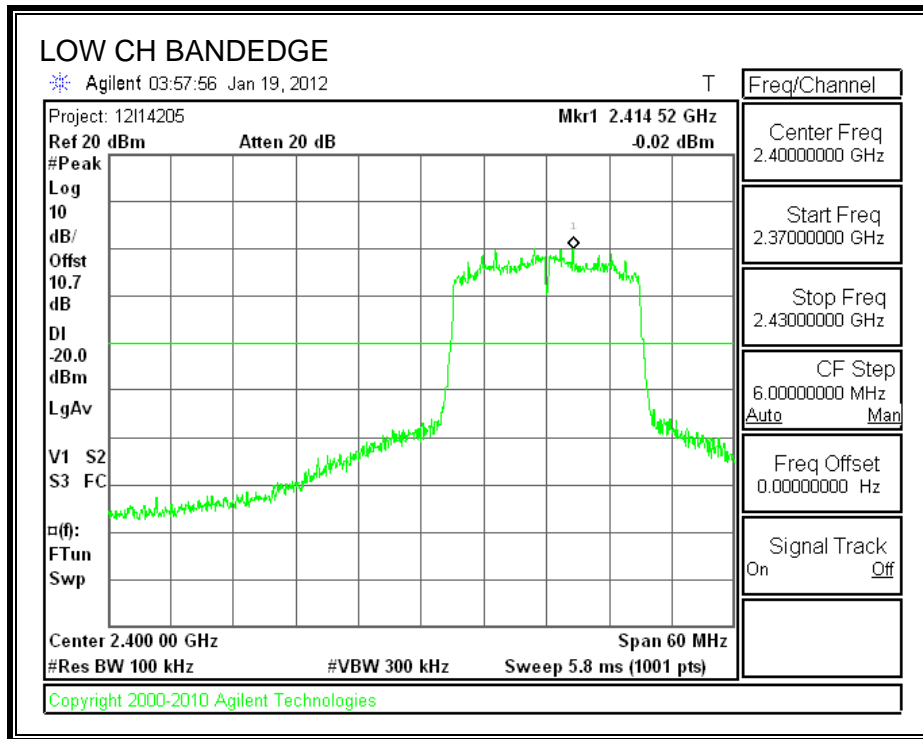
#### **TEST PROCEDURE**

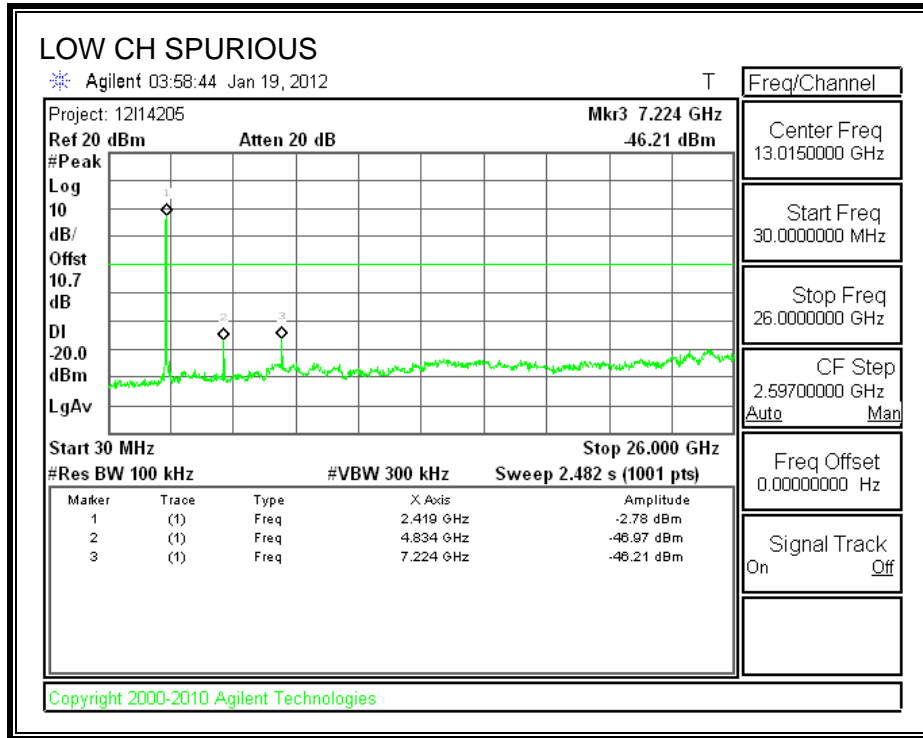
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

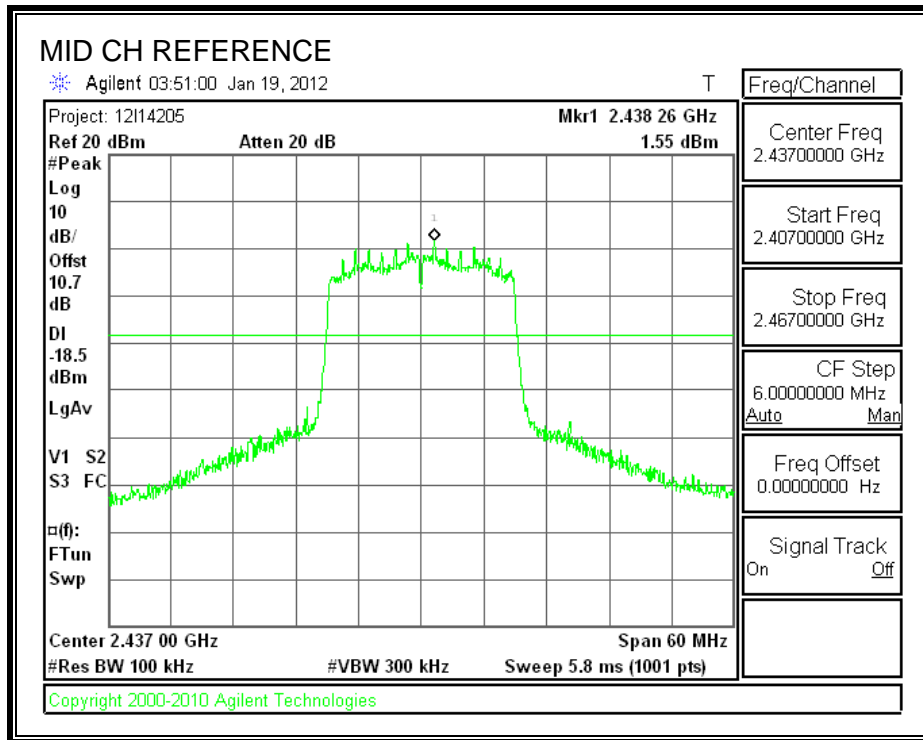
**RESULTS**

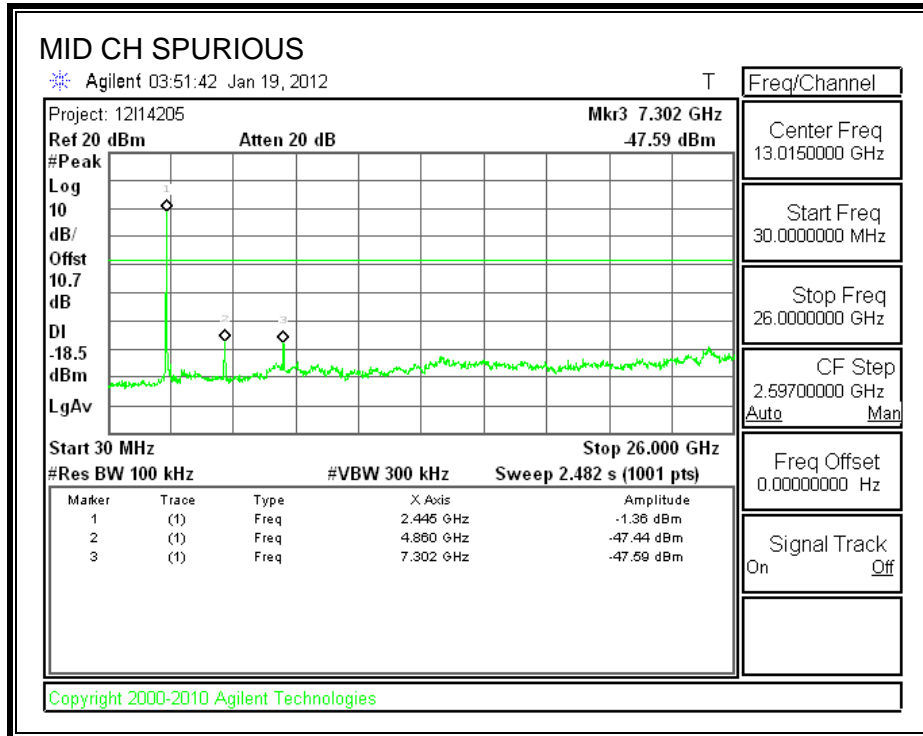
**SPURIOUS EMISSIONS, LOW CHANNEL**



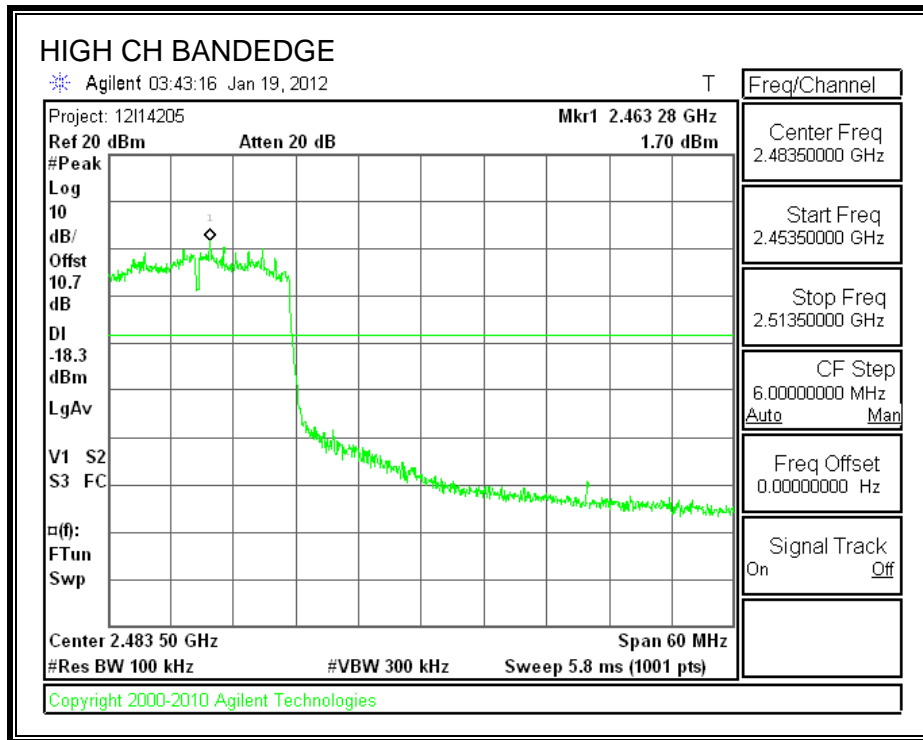


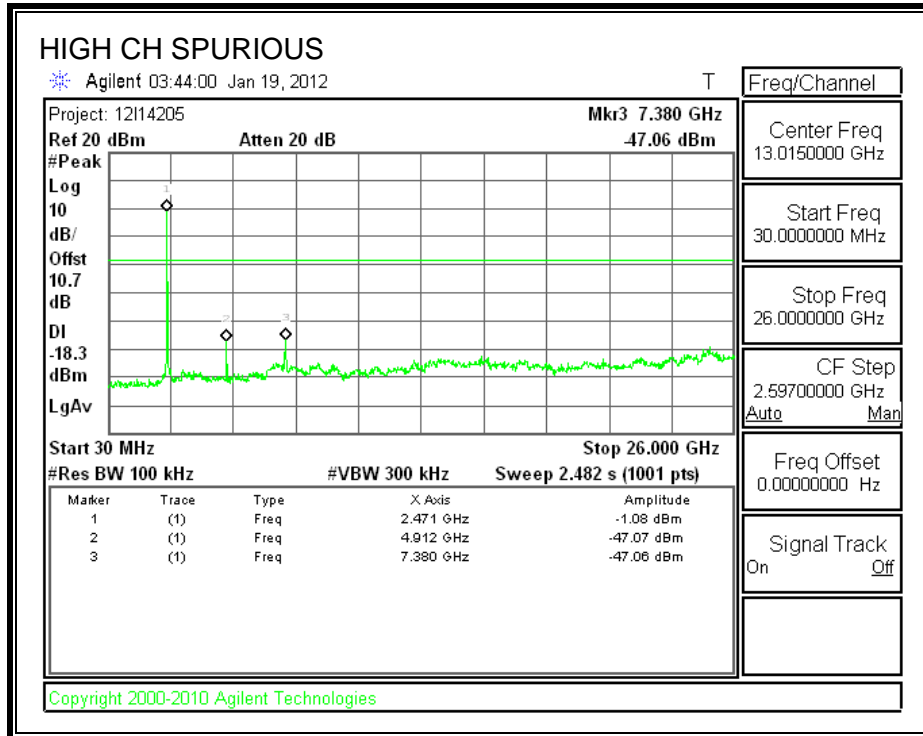
**SPURIOUS EMISSIONS, MID CHANNEL**





**SPURIOUS EMISSIONS, HIGH CHANNEL**





## 8. RADIATED TEST RESULTS

### 8.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

#### TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. 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.

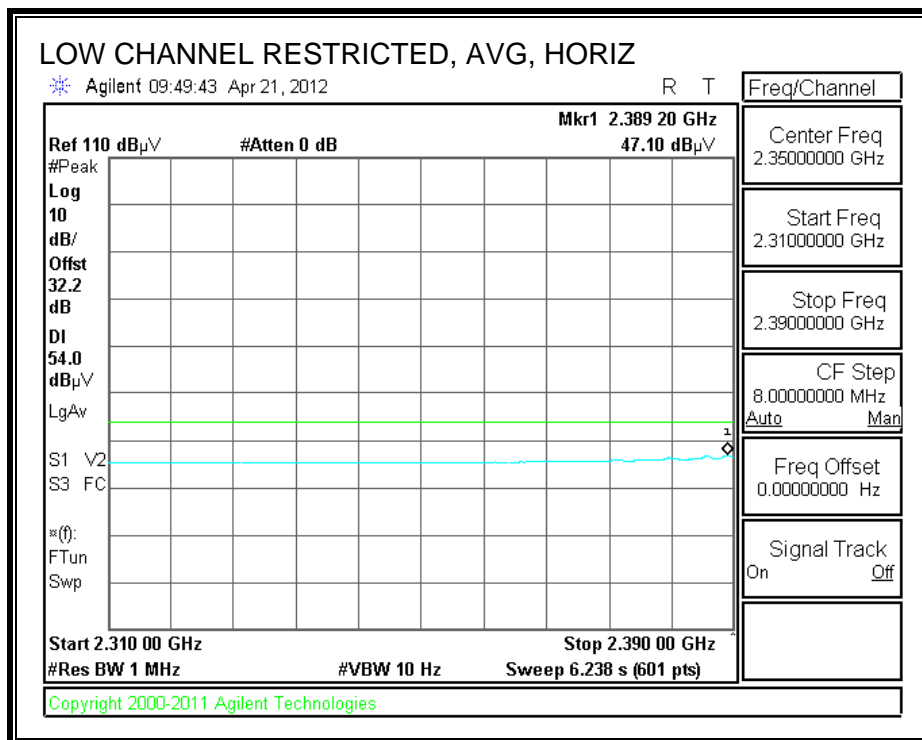
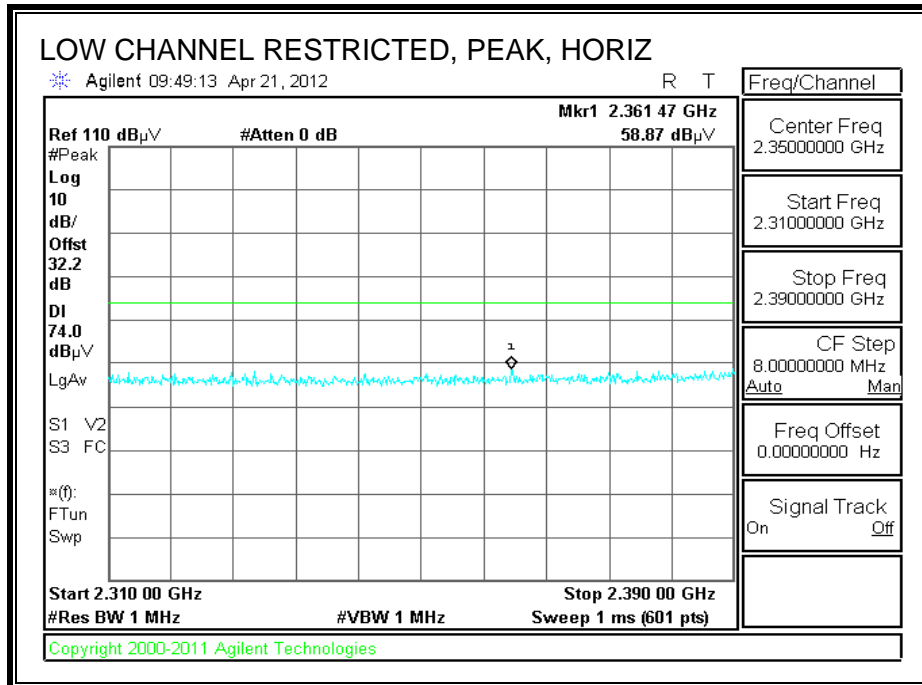
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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.

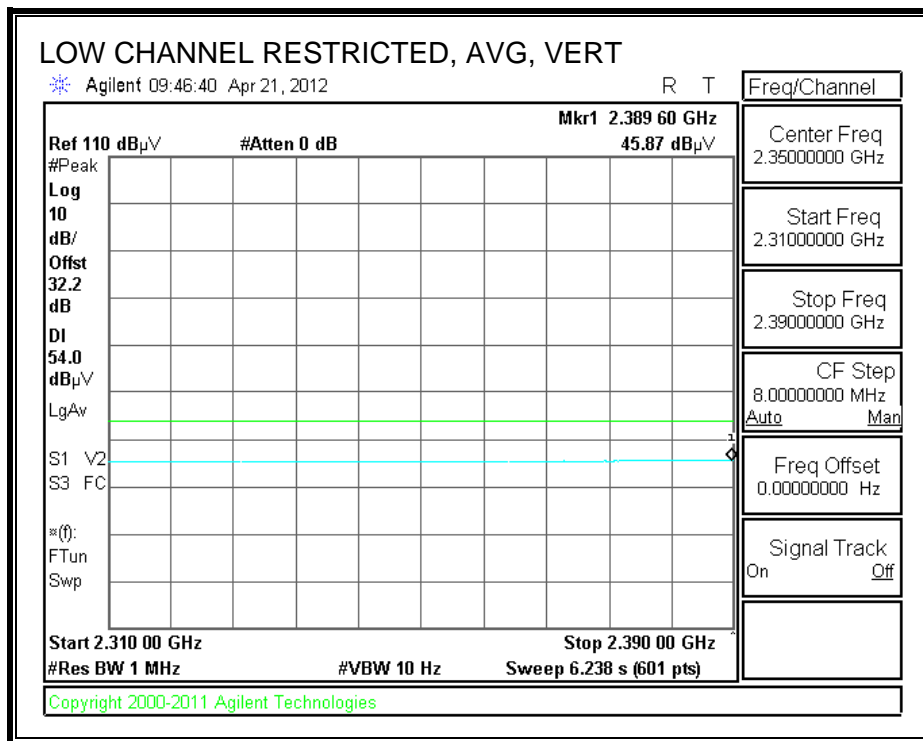
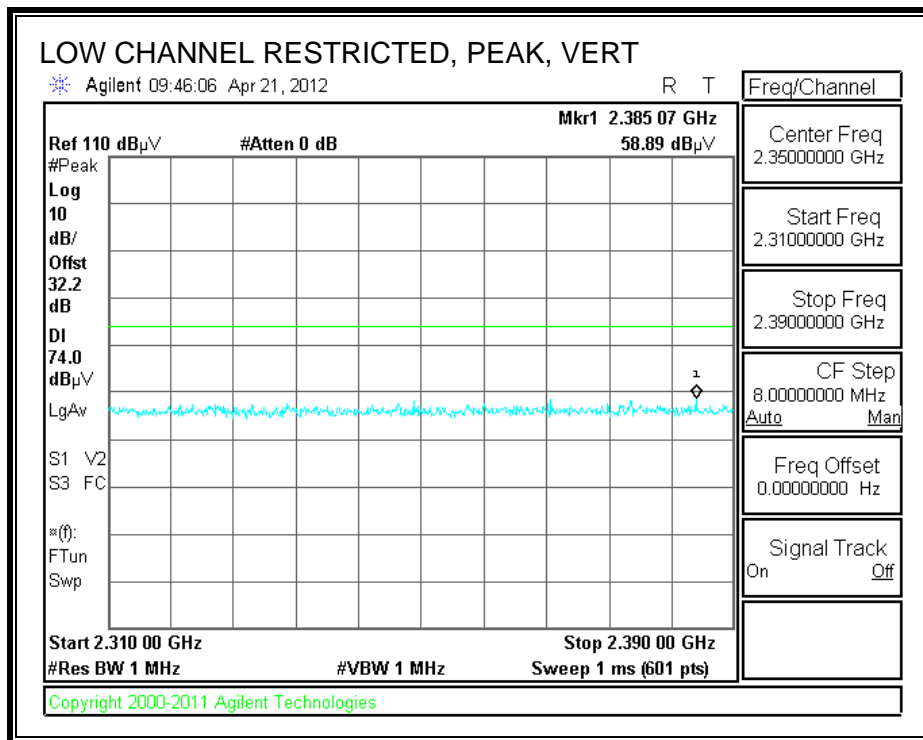
## 8.2. TRANSMITTER ABOVE 1 GHz

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

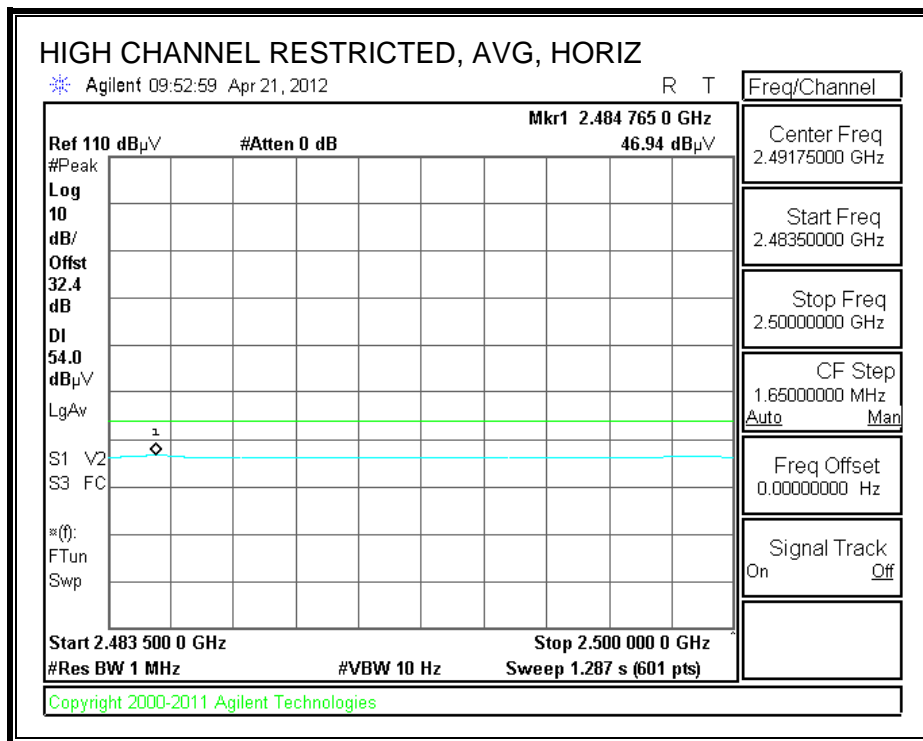
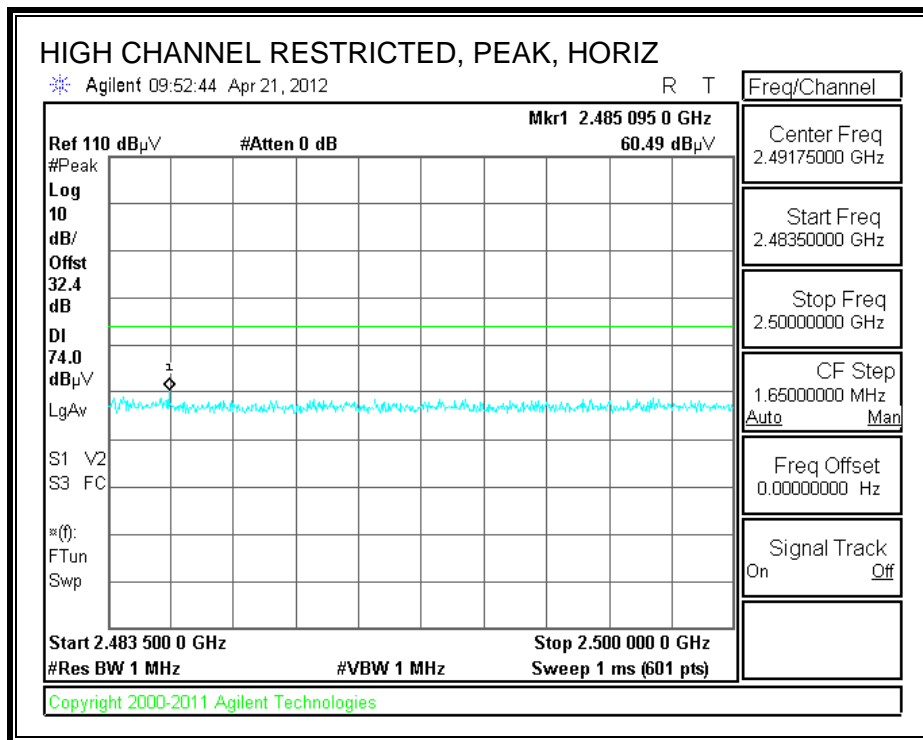
#### RESTRICTED BANDEDG (LOW CHANNEL, HORIZONTAL)



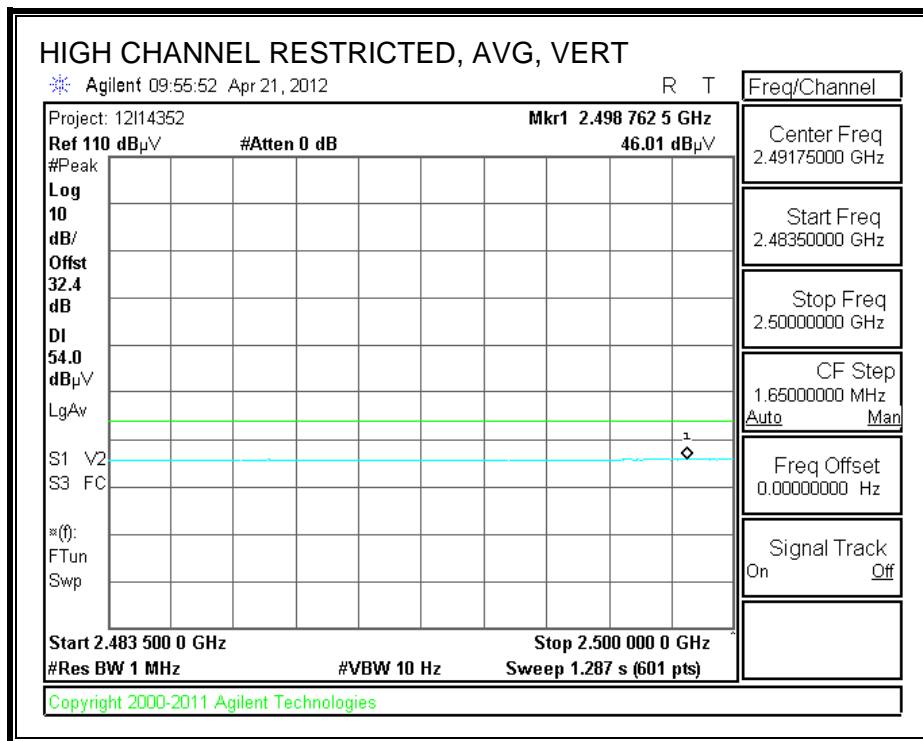
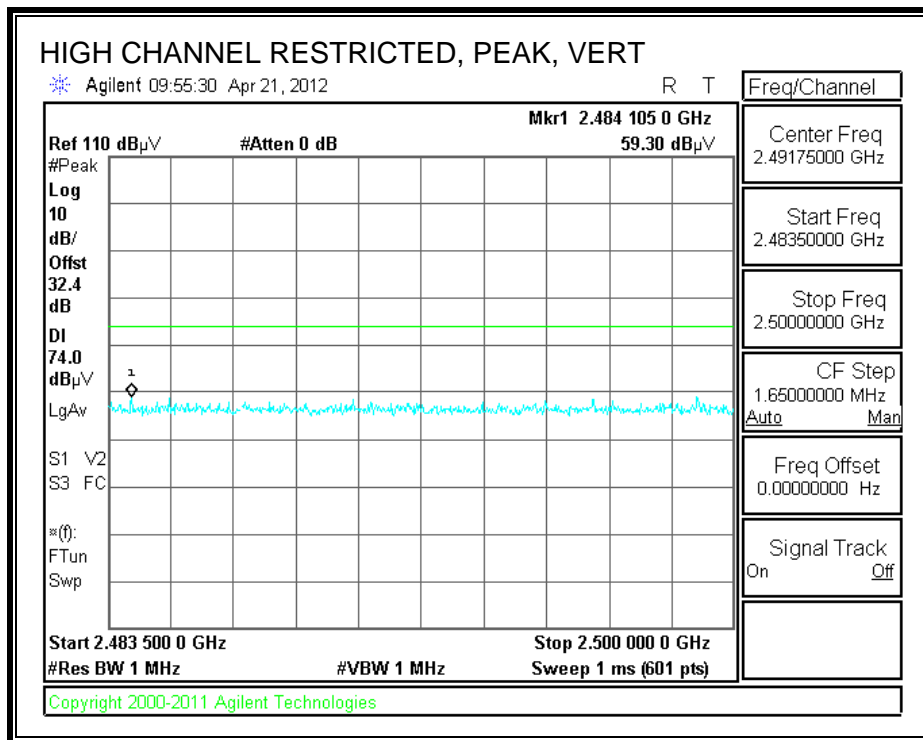
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



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



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

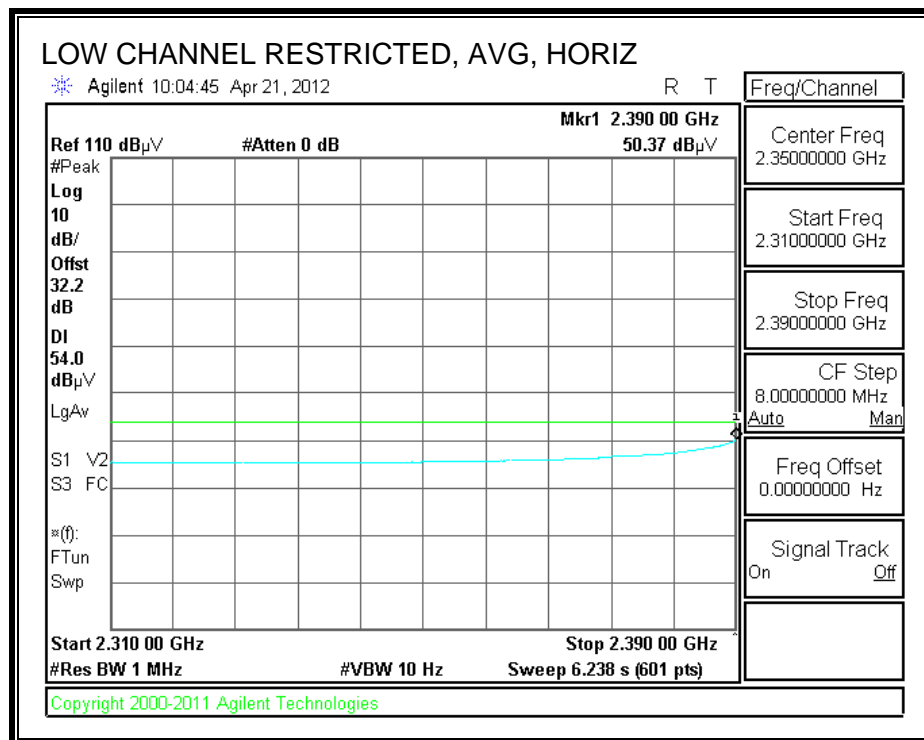
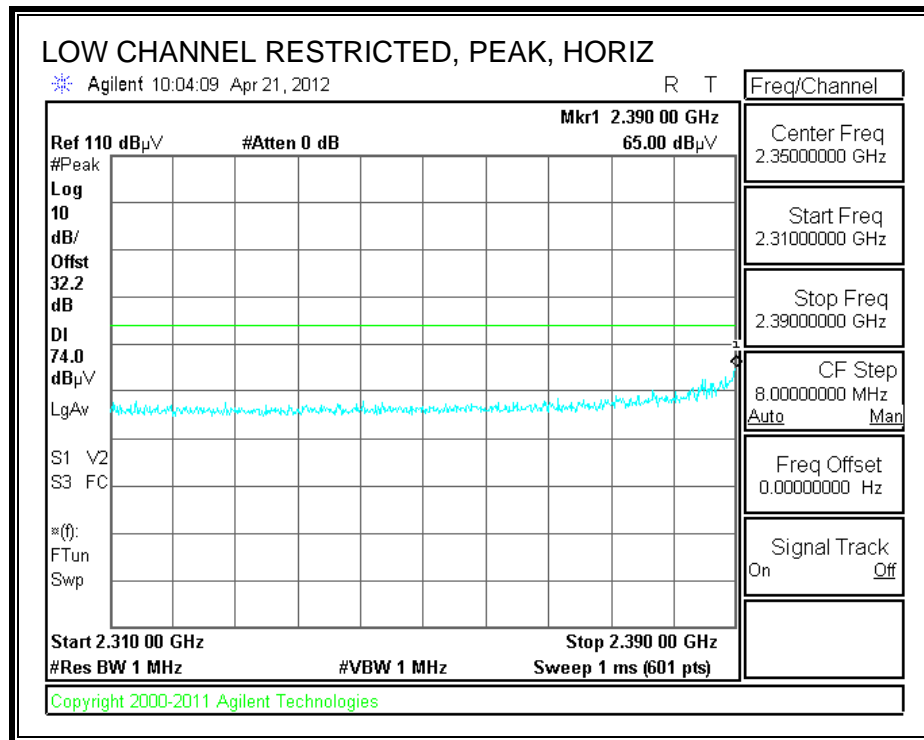


**HARMONICS AND SPURIOUS EMISSIONS**

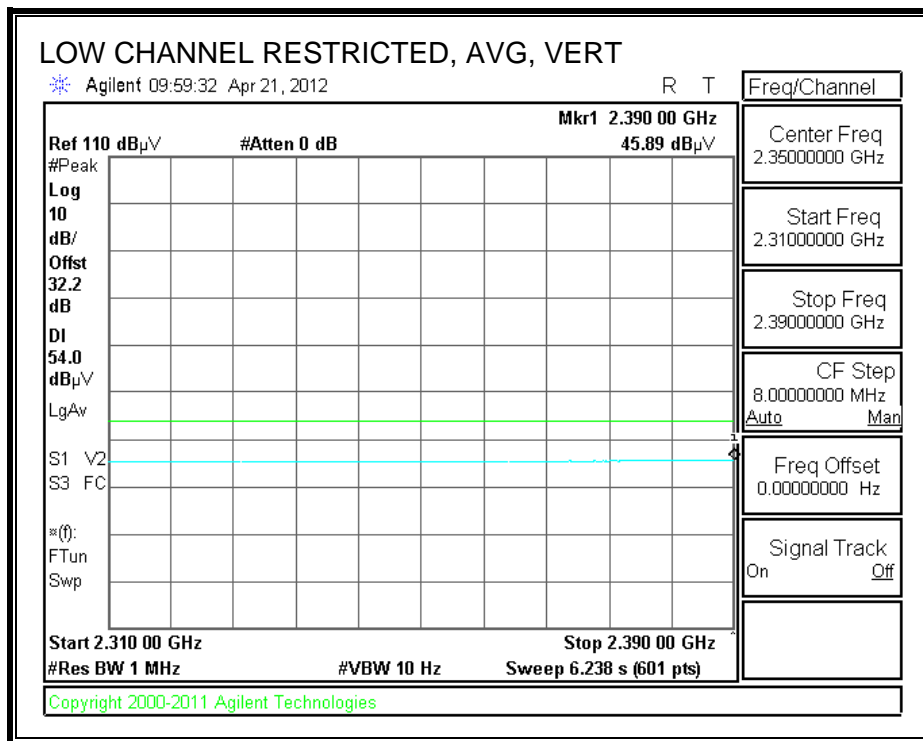
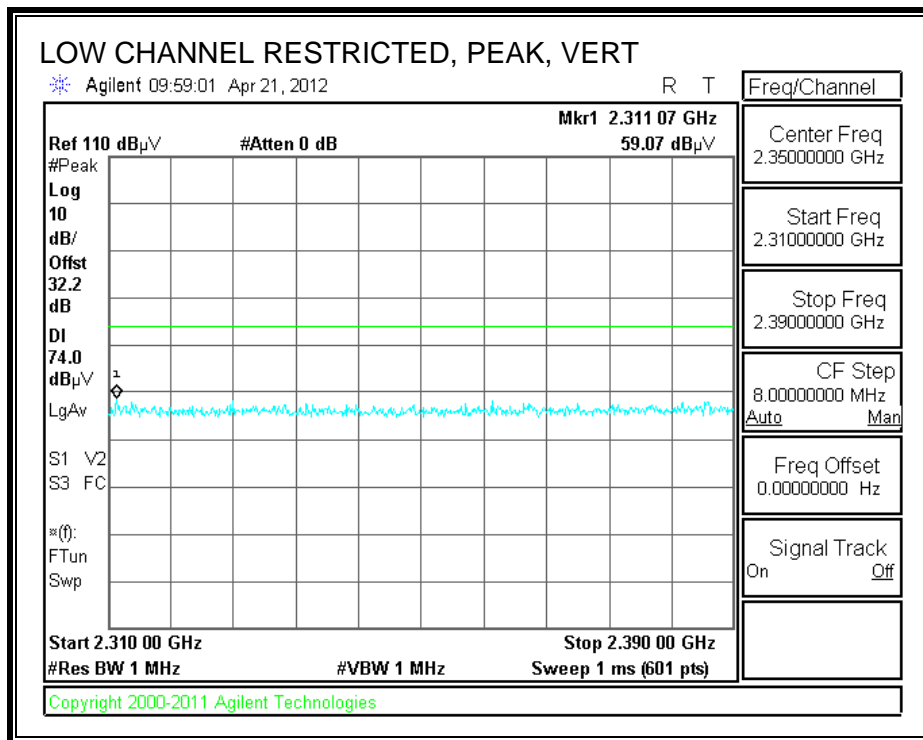
High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Chin Pang											
Date:		04/21/12											
Project #:		12I14352											
Company:		Samsung											
Test Target:		FCC 15.247											
Mode Oper:		b mode, TX											
f	Measurement 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	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
<b>Low Ch, 2412MHz</b>													
4.824	3.0	44.1	33.1	6.3	-34.8	0.0	0.0	48.7	74.0	-25.3	V	P	
4.824	3.0	39.9	33.1	6.3	-34.8	0.0	0.0	44.5	54.0	-9.5	V	A	
4.824	3.0	50.2	33.1	6.3	-34.8	0.0	0.0	54.7	74.0	-19.3	H	P	
4.824	3.0	48.0	33.1	6.3	-34.8	0.0	0.0	52.5	54.0	-1.5	H	A	
<b>Mid Ch, 2437MHz</b>													
4.874	3.0	43.6	33.1	6.3	-34.8	0.0	0.0	48.2	74.0	-25.8	V	P	
4.874	3.0	39.7	33.1	6.3	-34.8	0.0	0.0	44.3	54.0	-9.7	V	A	
7.311	3.0	37.3	35.8	8.5	-34.9	0.0	0.0	46.7	74.0	-27.3	V	P	
7.311	3.0	24.8	35.8	8.5	-34.9	0.0	0.0	34.2	54.0	-19.8	V	A	
4.874	3.0	49.8	33.1	6.3	-34.8	0.0	0.0	54.4	74.0	-19.6	H	P	
4.874	3.0	47.2	33.1	6.3	-34.8	0.0	0.0	51.9	54.0	-2.1	H	A	
7.311	3.0	38.1	35.8	8.5	-34.9	0.0	0.0	47.5	74.0	-26.5	H	P	
7.311	3.0	28.1	35.8	8.5	-34.9	0.0	0.0	37.5	54.0	-16.5	H	A	
<b>High Ch, 2462MHz</b>													
4.924	3.0	44.2	33.2	6.3	-34.8	0.0	0.0	48.9	74.0	-25.1	V	P	
4.924	3.0	40.5	33.2	6.3	-34.8	0.0	0.0	45.2	54.0	-8.8	V	A	
7.386	3.0	37.0	35.9	8.5	-34.9	0.0	0.0	46.5	74.0	-27.5	V	P	
7.386	3.0	25.1	35.9	8.5	-34.9	0.0	0.0	34.7	54.0	-19.3	V	A	
4.924	3.0	51.0	33.2	6.3	-34.8	0.0	0.0	55.7	74.0	-18.3	H	P	
4.924	3.0	48.5	33.2	6.3	-34.8	0.0	0.0	53.2	54.0	-0.8	H	A	
7.386	3.0	37.2	35.9	8.5	-34.9	0.0	0.0	46.7	74.0	-27.3	H	P	
7.386	3.0	26.2	35.9	8.5	-34.9	0.0	0.0	35.8	54.0	-18.2	H	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

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

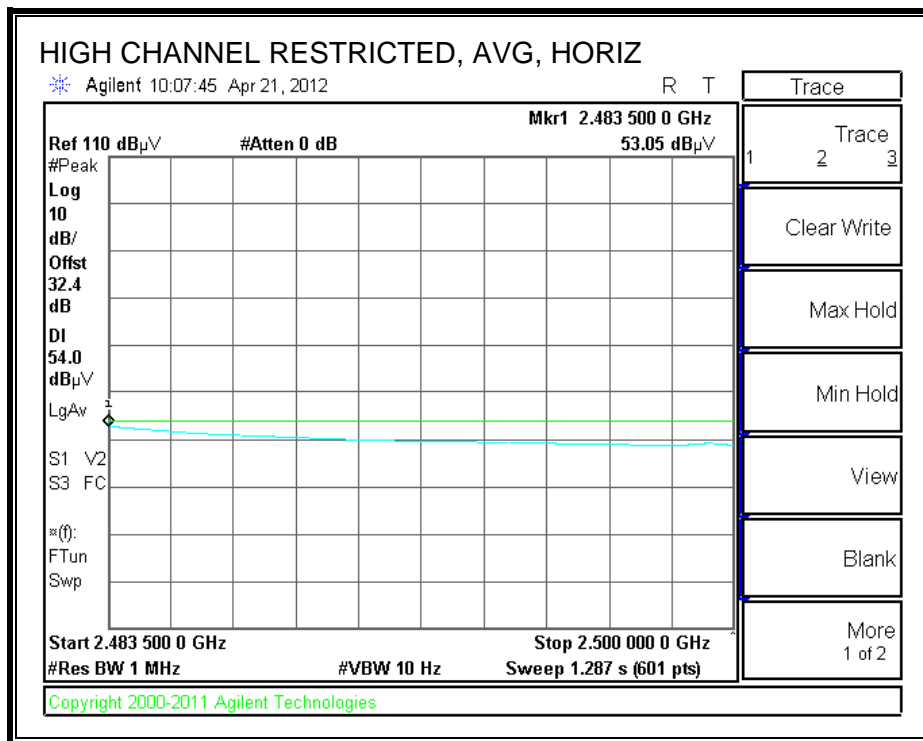
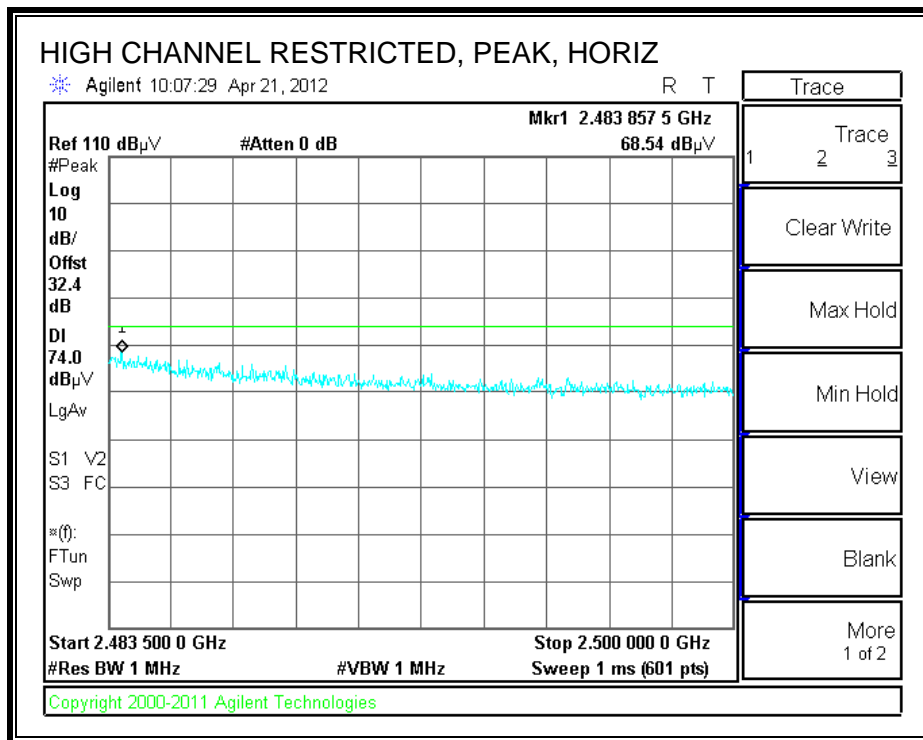
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



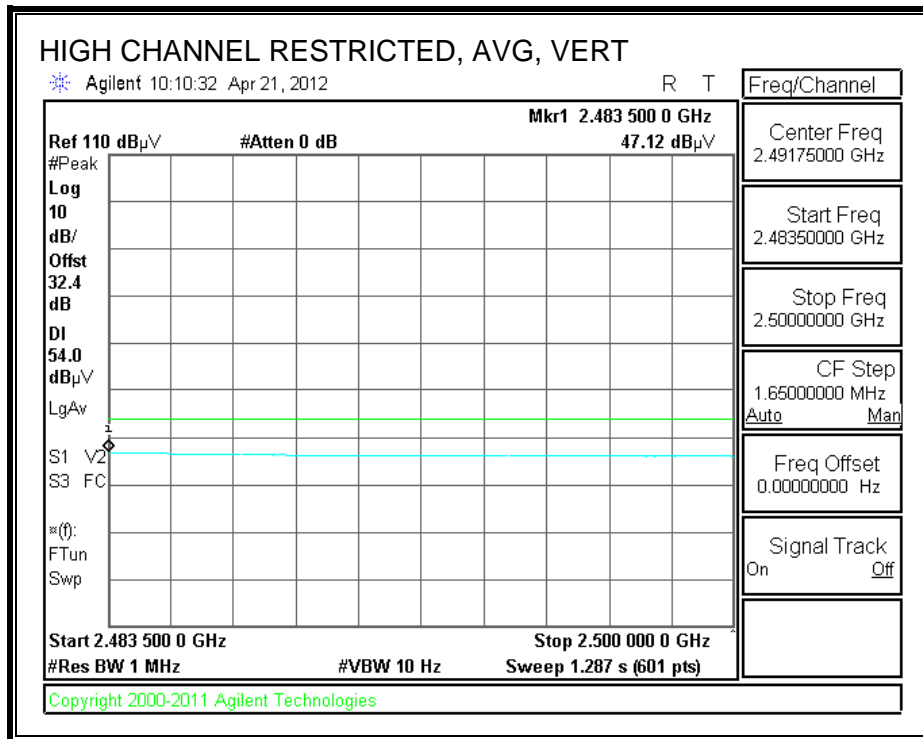
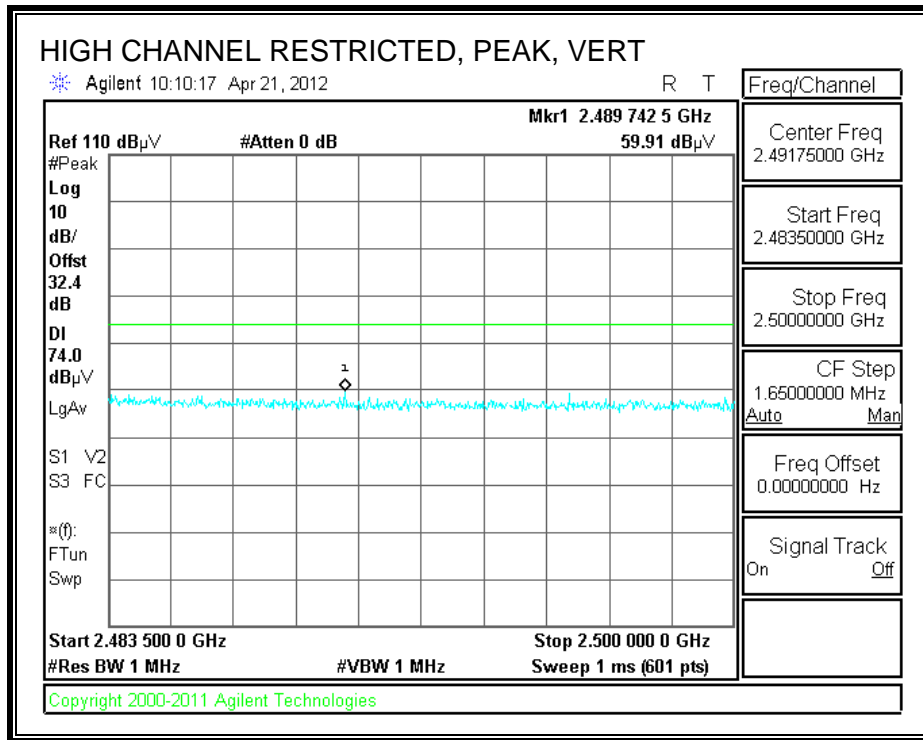
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



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



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

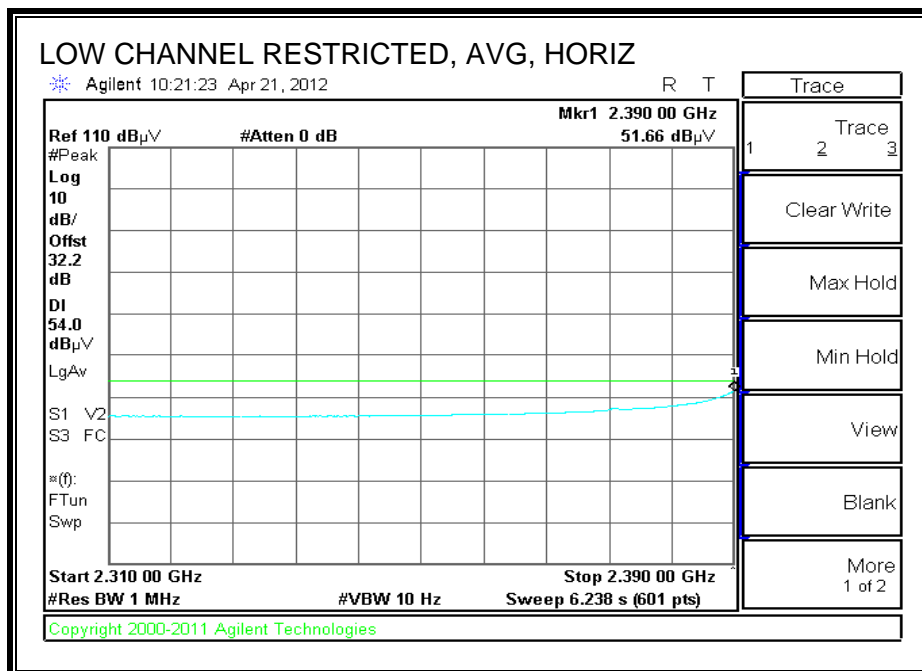
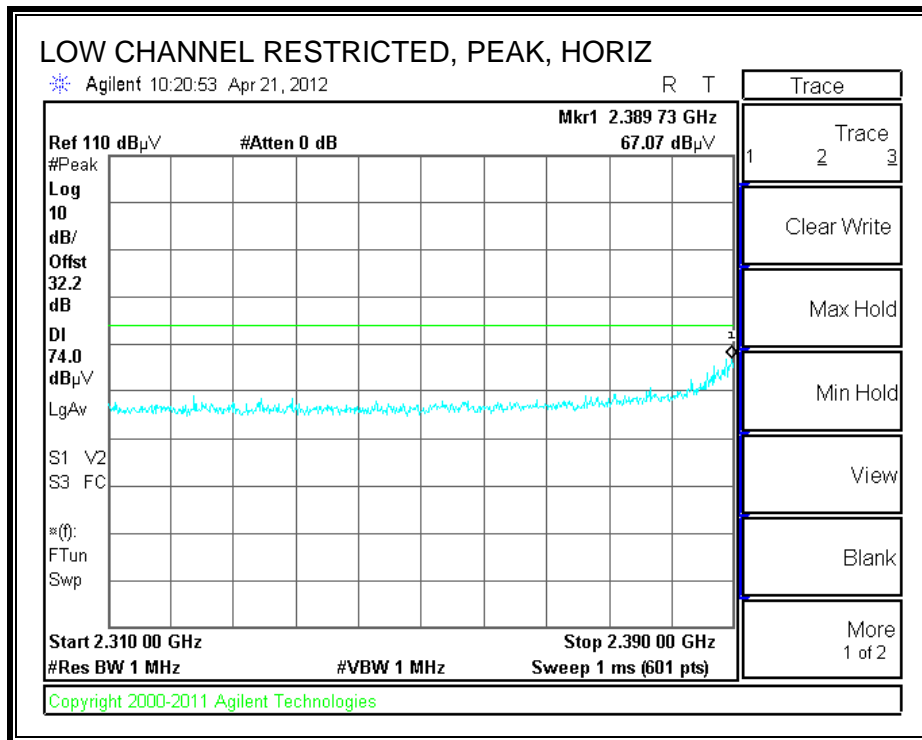


**HARMONICS AND SPURIOUS EMISSIONS**

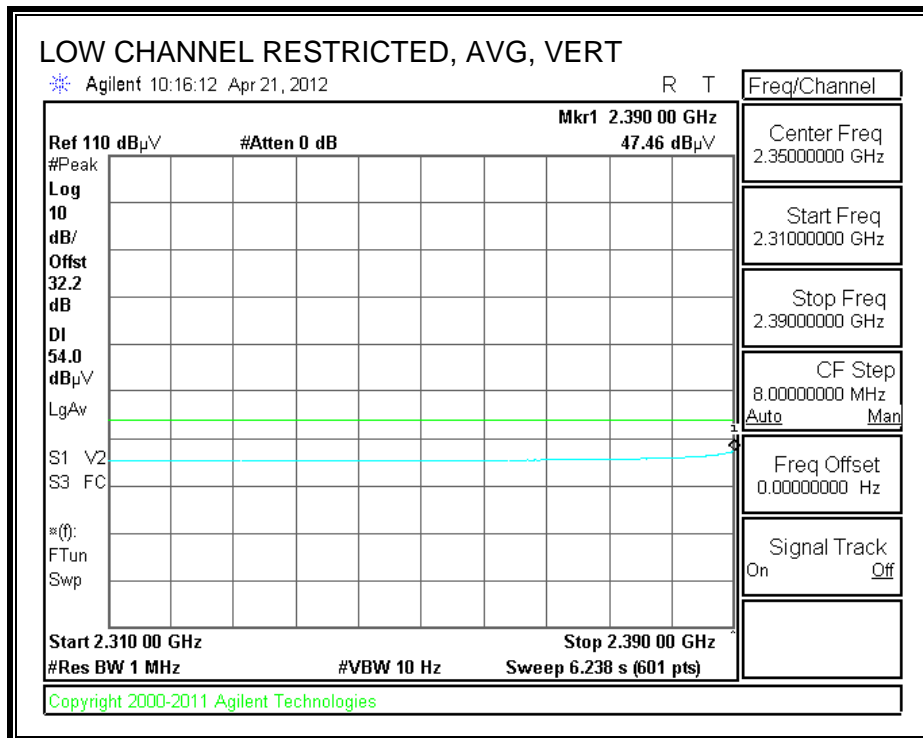
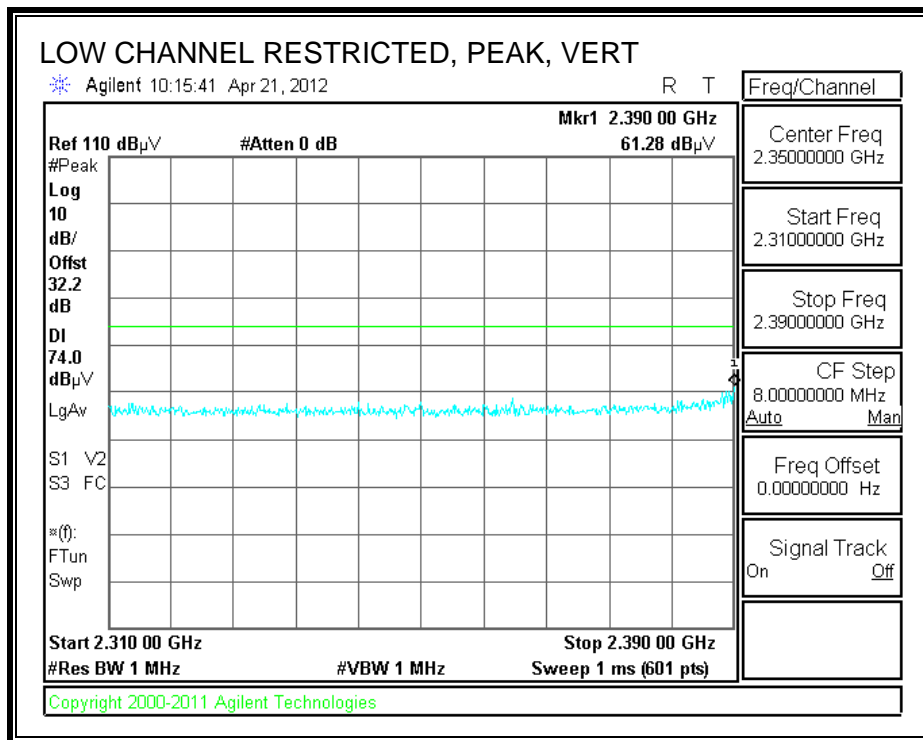
High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Chin Pang											
Date:		04/21/12											
Project #:		12I14352											
Company:		Samsung											
Test Target:		FCC 15.247											
Mode Oper:		g mode, TX											
f	Measurement 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	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
<b>Low Ch, 2412Mhz</b>													
4.824	3.0	51.5	33.1	6.3	-34.8	0.0	0.0	56.1	74.0	-17.9	H	P	
4.824	3.0	37.6	33.1	6.3	-34.8	0.0	0.0	42.1	54.0	-11.9	H	A	
4.824	3.0	42.9	33.1	6.3	-34.8	0.0	0.0	47.4	74.0	-26.6	V	P	
4.824	3.0	30.0	33.1	6.3	-34.8	0.0	0.0	34.6	54.0	-19.4	V	A	
<b>Mid Ch, 2437MHz</b>													
4.874	3.0	52.1	33.1	6.3	-34.8	0.0	0.0	56.7	74.0	-17.3	H	P	
4.874	3.0	38.3	33.1	6.3	-34.8	0.0	0.0	43.0	54.0	-11.0	H	A	
7.311	3.0	39.7	35.8	8.5	-34.9	0.0	0.0	49.1	74.0	-24.9	H	P	
7.311	3.0	26.9	35.8	8.5	-34.9	0.0	0.0	36.3	54.0	-17.7	H	A	
4.874	3.0	43.1	33.1	6.3	-34.8	0.0	0.0	47.8	74.0	-26.2	V	P	
4.874	3.0	30.1	33.1	6.3	-34.8	0.0	0.0	34.8	54.0	-19.2	V	A	
7.311	3.0	39.8	35.8	8.5	-34.9	0.0	0.0	49.2	74.0	-24.8	V	P	
7.311	3.0	26.5	35.8	8.5	-34.9	0.0	0.0	35.9	54.0	-18.1	V	A	
<b>High Ch, 2462MGz</b>													
4.924	3.0	55.4	33.2	6.3	-34.8	0.0	0.0	60.1	74.0	-13.9	H	P	
4.924	3.0	39.6	33.2	6.3	-34.8	0.0	0.0	44.3	54.0	-9.7	H	A	
7.386	3.0	39.3	35.9	8.5	-34.9	0.0	0.0	48.8	74.0	-25.2	H	P	
7.386	3.0	26.4	35.9	8.5	-34.9	0.0	0.0	35.9	54.0	-18.1	H	A	
4.924	3.0	45.4	33.2	6.3	-34.8	0.0	0.0	50.1	74.0	-23.9	V	P	
4.924	3.0	31.9	33.2	6.3	-34.8	0.0	0.0	36.6	54.0	-17.4	V	A	
7.386	3.0	37.6	35.9	8.5	-34.9	0.0	0.0	47.1	74.0	-26.9	V	P	
7.386	3.0	25.2	35.9	8.5	-34.9	0.0	0.0	34.8	54.0	-19.2	V	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

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

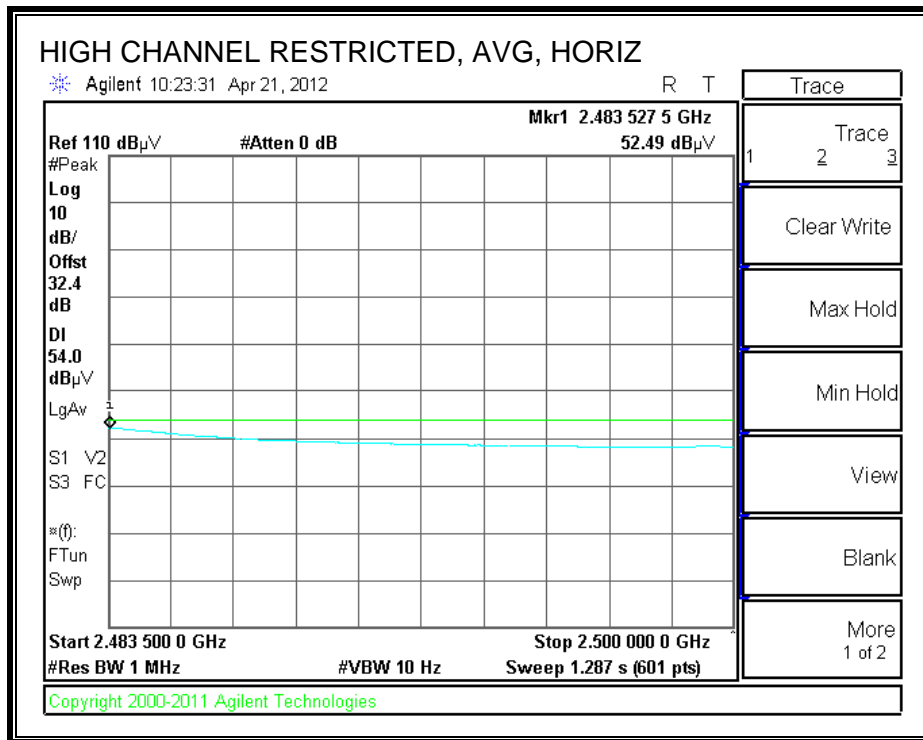
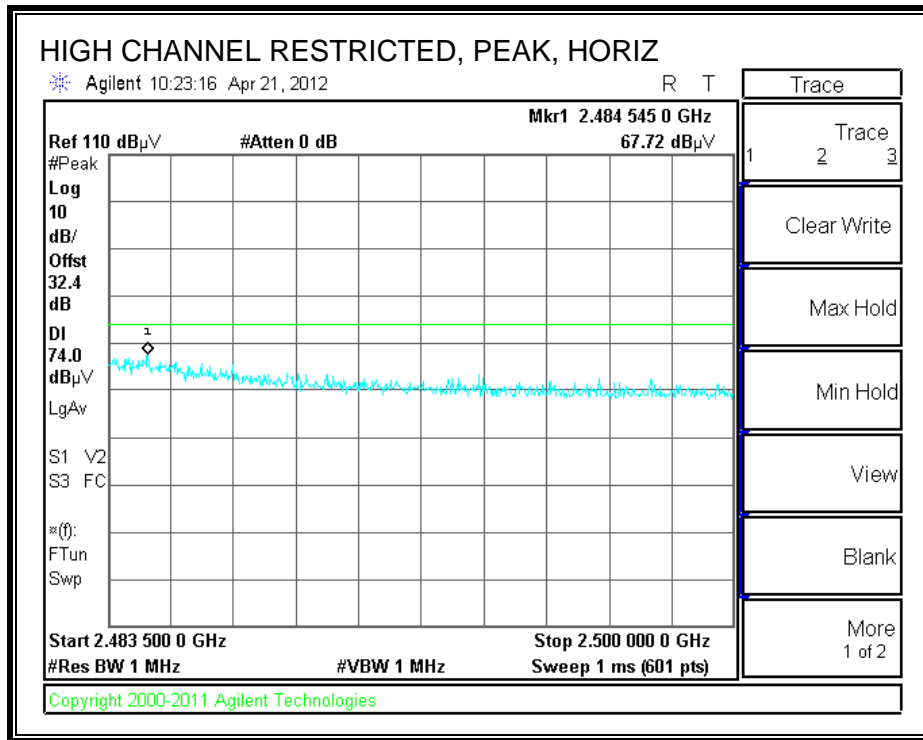
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



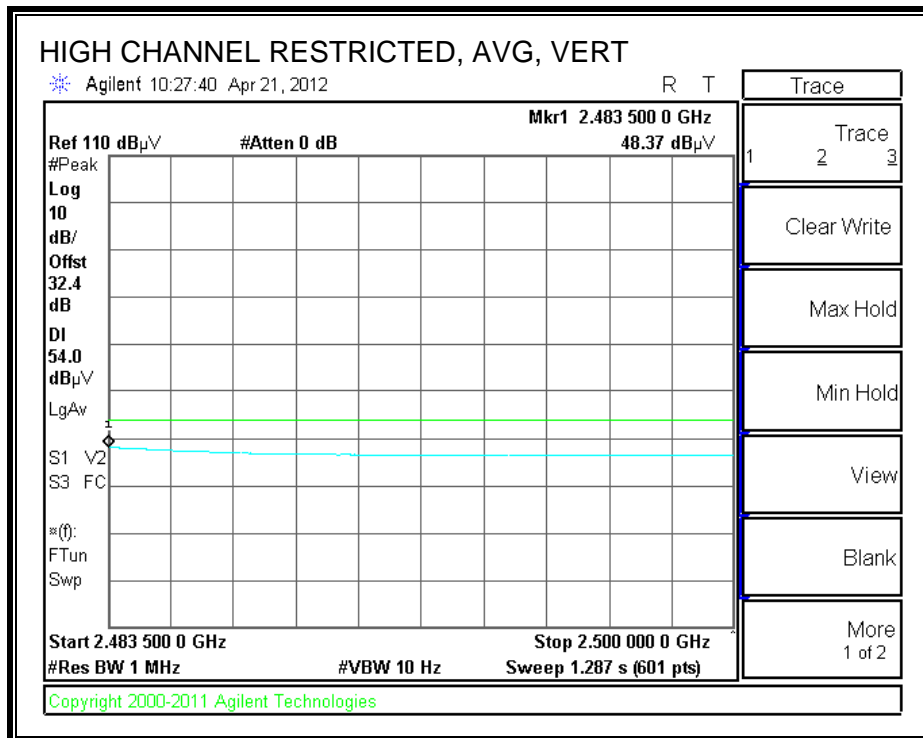
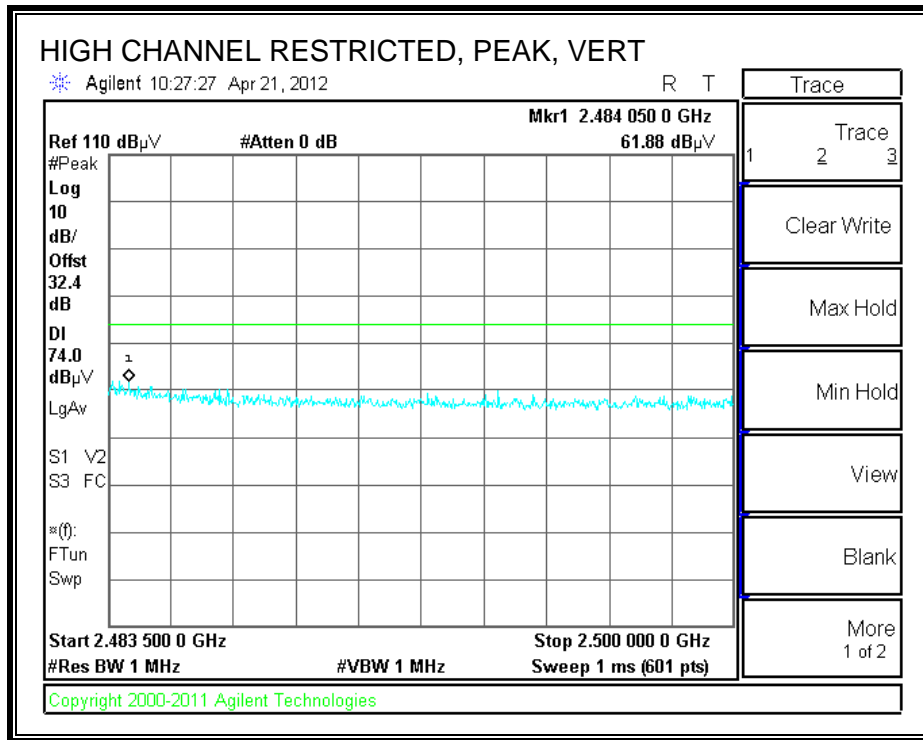
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



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



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

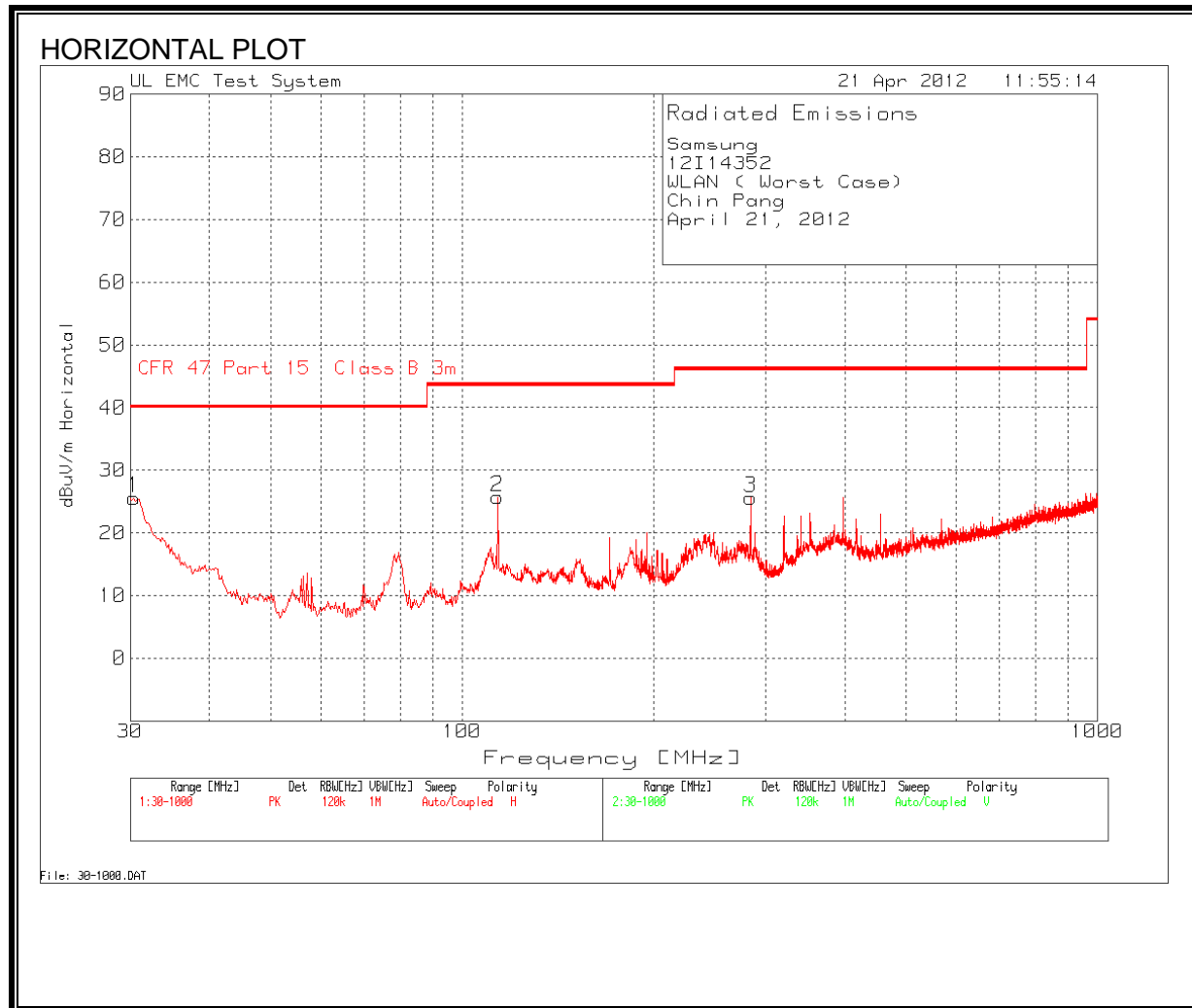


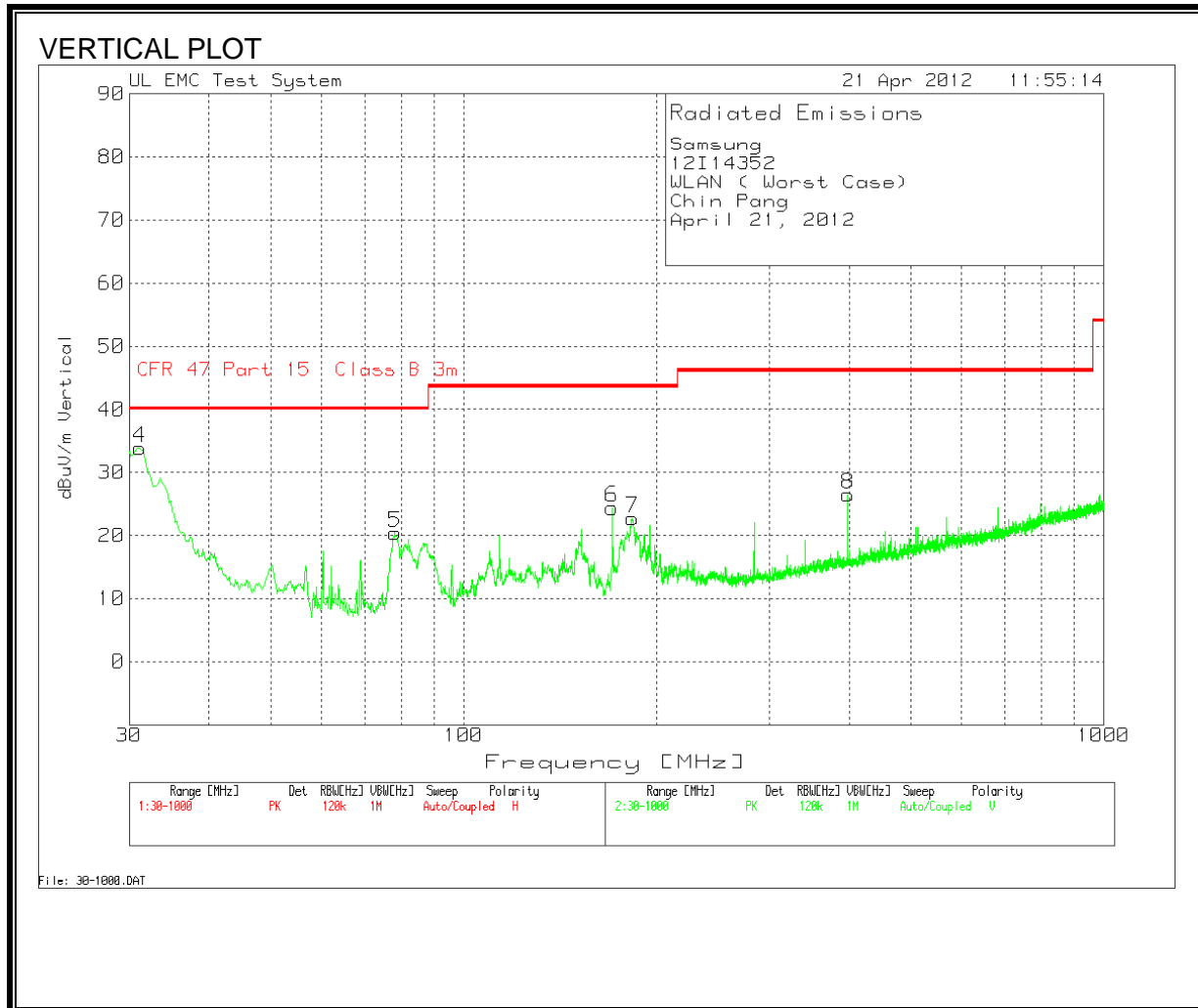
**HARMONICS AND SPURIOUS EMISSIONS**

High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Chin Pang											
Date:		04/21/12											
Project #:		12114352											
Company:		Samsung											
Test Target:		FCC 15.247											
Mode Oper:		HT20, TX											
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	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
<b>Low Ch, 2412MHz</b>													
4.824	3.0	42.3	33.1	6.3	-34.8	0.0	0.0	46.9	74.0	-27.1	V	P	
4.824	3.0	29.7	33.1	6.3	-34.8	0.0	0.0	34.2	54.0	-19.8	V	A	
4.824	3.0	50.4	33.1	6.3	-34.8	0.0	0.0	55.0	74.0	-19.0	H	P	
4.824	3.0	36.9	33.1	6.3	-34.8	0.0	0.0	41.5	54.0	-12.5	H	A	
<b>Mid Ch, 2437MHz</b>													
4.874	3.0	43.2	33.1	6.3	-34.8	0.0	0.0	47.9	74.0	-26.1	V	P	
4.874	3.0	30.3	33.1	6.3	-34.8	0.0	0.0	34.9	54.0	-19.1	V	A	
7.311	3.0	39.7	35.8	8.5	-34.9	0.0	0.0	49.1	74.0	-24.9	V	P	
7.311	3.0	26.3	35.8	8.5	-34.9	0.0	0.0	35.7	54.0	-18.3	V	A	
4.874	3.0	52.8	33.1	6.3	-34.8	0.0	0.0	57.5	74.0	-16.5	H	P	
4.874	3.0	37.9	33.1	6.3	-34.8	0.0	0.0	42.5	54.0	-11.5	H	A	
7.311	3.0	40.4	35.8	8.5	-34.9	0.0	0.0	49.8	74.0	-24.2	H	P	
7.311	3.0	26.8	35.8	8.5	-34.9	0.0	0.0	36.2	54.0	-17.8	H	A	
<b>High Ch, 2462MHz</b>													
4.924	3.0	41.4	33.2	6.3	-34.8	0.0	0.0	46.1	74.0	-27.9	V	P	
4.924	3.0	29.2	33.2	6.3	-34.8	0.0	0.0	34.0	54.0	-20.0	V	A	
7.386	3.0	37.2	35.9	8.5	-34.9	0.0	0.0	46.7	74.0	-27.3	V	P	
7.386	3.0	24.7	35.9	8.5	-34.9	0.0	0.0	34.3	54.0	-19.8	V	A	
4.924	3.0	52.8	33.2	6.3	-34.8	0.0	0.0	57.5	74.0	-16.5	H	P	
4.924	3.0	38.9	33.2	6.3	-34.8	0.0	0.0	43.6	54.0	-10.4	H	A	
7.386	3.0	40.1	35.9	8.5	-34.9	0.0	0.0	49.7	74.0	-24.3	H	P	
7.386	3.0	27.0	35.9	8.5	-34.9	0.0	0.0	36.5	54.0	-17.5	H	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

### 8.3. WORST-CASE BELOW 1 GHz

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





HORIZONTAL AND VERTICAL DATA

Samsung								
12I14352								
WLAN ( Worst Case)								
Chin Pang								
April 21, 2012								
Range 1 30 - 1000MHz								
Frequency	Reading	Detector	Amp [dB]	Ant gain [dB]	dBuV/m	Part 15B 3m	Margin	Polarity
30.3877	34.64	PK	-29.3	20.2	25.54	40	-14.46	Horz
113.741	41.54	PK	-28.4	12.6	25.74	43.5	-17.76	Horz
284.5184	39.73	PK	-26.9	12.8	25.63	46	-20.37	Horz
Range 2 30 - 1000MHz								
Frequency	Reading	Detector	Amp [dB]	Ant gain [dB]	dBuV/m	Part 15B 3m	Margin	Polarity
31.1631	43.35	PK	-29.3	19.8	33.85	40	-6.15	Vert
78.0735	41.56	PK	-28.8	7.7	20.46	40	-19.54	Vert
170.5376	42.13	PK	-27.8	10.1	24.43	43.5	-19.07	Vert
183.3313	39.43	PK	-27.7	11	22.73	43.5	-20.77	Vert
398.1115	38.39	PK	-26.9	15	26.49	46	-19.51	Vert

## 9. 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.

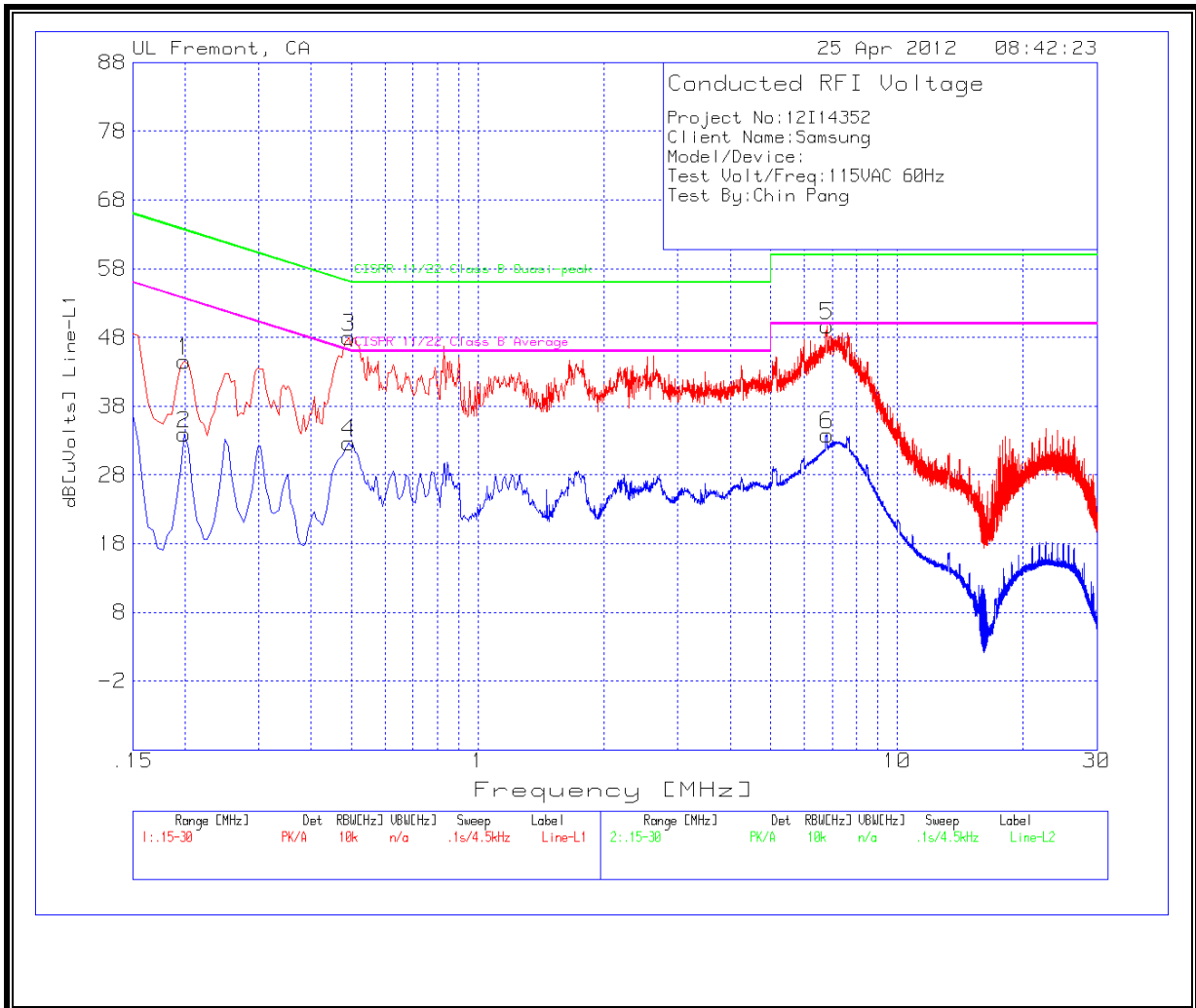
Line conducted data is recorded for both NEUTRAL and HOT lines.

**RESULTS**

**WORST EMISSIONS**

Project No:12I14352								
Client Name:Samsung								
Model/Device:								
Test Volt/Freq:115VAC 60Hz								
Test By:Chin Pang								
Line-L1 .15 - 30MHz								
Frequency	Reading	Detector	cableless loss [dB]	dB[uVolts]	CISPR B Qp	Margin	CISPR B Avg	Margin
0.1995	44.46	PK	0.1	44.56	63.6	-19.04	-	-
0.1995	33.82	Av	0.1	33.92	-	-	53.6	-19.68
0.492	47.98	PK	0.1	48.08	56.1	-8.02	-	-
0.492	32.54	Av	0.1	32.64	-	-	46.1	-13.46
6.819	49.55	PK	0.2	49.75	60	-10.25	-	-
6.819	33.67	Av	0.2	33.87	-	-	50	-16.13
Line-L2 .15 - 30MHz								
Frequency	Reading	Detector	cableless loss [dB]	dB[uVolts]	CISPR B Qp	Margin	CISPR B Avg	Margin
0.249	46.22	PK	0.1	46.32	61.8	-15.48	-	-
0.249	27.9	Av	0.1	28	-	-	51.8	-23.8
0.4965	43.59	PK	0.1	43.69	56.1	-12.41	-	-
0.4965	26.01	Av	0.1	26.11	-	-	46.1	-19.99
7.1745	46.95	PK	0.2	47.15	60	-12.85	-	-
7.1745	29.18	Av	0.2	29.38	-	-	50	-20.62

**LINE 1 RESULTS**



**LINE 2 RESULTS**

