

# FCC Part 15C

## Measurement and Test Report

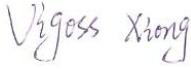
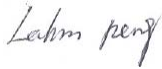

For

**Vigorhood Photoelectric Shenzhen Co., Ltd**

**F Building, Hongfa Tech Industrial Park, Songbai Rd. Shiyan Town, Baoan**

**District, Shenzhen, China**

**FCC ID: XWBCY08**

<b>Report Concerns:</b> Original Report	<b>Equipment Type:</b> Chumby 8"
<b>Model:</b>	<u>CY08</u>
<b>Report No.:</b>	<u>STR11088014I</u>
<b>Test Date:</b>	<u>2011-08-01 to 2011-08-22</u>
<b>Issue Date:</b>	<u>2011-08-26</u>
<b>Tested By:</b>	<u>Vigoss Xiong / Engineer</u> 
<b>Reviewed By:</b>	<u>Lahm Peng / EMC Manager</u> 
<b>Approved &amp; Authorized By:</b>	<u>Jandy so / PSQ Manager</u> 
<b>Prepared By:</b>	<b>SEM.Test Compliance Service Co., Ltd</b> 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C. (518101) Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: <a href="http://www.semtest.com.cn">www.semtest.com.cn</a>

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd.

**TABLE OF CONTENTS**

<b>1. GENERAL INFORMATION.....</b>	<b>3</b>
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	3
1.2 TEST STANDARDS.....	3
1.3 TEST METHODOLOGY.....	4
1.4 TEST FACILITY.....	4
1.5 EUT EXERCISE SOFTWARE.....	4
1.6 ACCESSORIES EQUIPMENT LIST AND DETAILS.....	4
1.7 EUT CABLE LIST AND DETAILS.....	4
<b>2. SUMMARY OF TEST RESULTS.....</b>	<b>5</b>
<b>3. CONDUCTED EMISSIONS.....</b>	<b>6</b>
3.1 MEASUREMENT UNCERTAINTY.....	6
3.2 TEST EQUIPMENT LIST AND DETAILS.....	6
3.3 TEST PROCEDURE.....	6
3.4 BASIC TEST SETUP BLOCK DIAGRAM.....	6
3.5 ENVIRONMENTAL CONDITIONS.....	7
3.6 SUMMARY OF TEST RESULTS/PLOTS.....	7
3.7 CONDUCTED EMISSIONS TEST DATA.....	7
<b>4. §15.203 - ANTENNA REQUIREMENT.....</b>	<b>10</b>
4.1 STANDARD APPLICABLE.....	10
4.2 TEST RESULT.....	10
<b>5. POWER SPECTRAL DENSITY.....</b>	<b>11</b>
5.1 STANDARD APPLICABLE.....	11
5.2 TEST EQUIPMENT LIST AND DETAILS.....	11
5.3 TEST PROCEDURE.....	11
5.4 ENVIRONMENTAL CONDITIONS.....	11
5.5 SUMMARY OF TEST RESULTS/PLOTS.....	12
<b>6. 6-DB BANDWIDTH.....</b>	<b>16</b>
6.1 STANDARD APPLICABLE.....	16
6.2 TEST EQUIPMENT LIST AND DETAILS.....	16
6.3 TEST PROCEDURE.....	16
6.4 ENVIRONMENTAL CONDITIONS.....	16
6.5 SUMMARY OF TEST RESULTS/PLOTS.....	16
<b>7. POWER OUTPUT.....</b>	<b>20</b>
7.1 STANDARD APPLICABLE.....	20
7.2 TEST EQUIPMENT LIST AND DETAILS.....	20
7.3 TEST PROCEDURE.....	20
7.4 ENVIRONMENTAL CONDITIONS.....	20
7.5 SUMMARY OF TEST RESULTS/PLOTS.....	21
<b>8. FIELD STRENGTH OF SPURIOUS EMISSIONS.....</b>	<b>25</b>
8.1 MEASUREMENT UNCERTAINTY.....	25
8.2 STANDARD APPLICABLE.....	25
8.3 TEST EQUIPMENT LIST AND DETAILS.....	25
8.4 TEST PROCEDURE.....	25
8.5 CORRECTED AMPLITUDE & MARGIN CALCULATION.....	26
8.6 ENVIRONMENTAL CONDITIONS.....	26
8.7 SUMMARY OF TEST RESULTS/PLOTS.....	26
<b>9. OUT OF BAND EMISSIONS.....</b>	<b>41</b>
9.1 STANDARD APPLICABLE.....	41
9.2 TEST EQUIPMENT LIST AND DETAILS.....	41
9.3 TEST PROCEDURE.....	41
9.4 ENVIRONMENTAL CONDITIONS.....	41
9.5 SUMMARY OF TEST RESULTS/PLOTS.....	42

## 1. GENERAL INFORMATION

### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Applicant: Vigorhood Photoelectric Shenzhen Co., Ltd  
Address of applicant: F Building, Hongfa Tech Industrial Park, Songbai Rd.  
Shiyan Town, Baoan District, Shenzhen, China

Manufacturer: Vigorhood Photoelectric Shenzhen Co., Ltd  
Address of manufacturer: F Building, Hongfa Tech Industrial Park, Songbai Rd.  
Shiyan Town, Baoan District, Shenzhen, China

#### General Description of E.U.T

Items	Description
EUT Description:	Chumby 8"
Trade Name:	ATiger
Model No.:	CY08
Add Model:	/
Rated Voltage:	DC 5.0V
RF Output Power	Max. 11.65dBm (Conducted)
Antenna Gain:	2.0dBi
Frequency range:	2412MHz~2462MHz
Number of channels:	11
Channel Separation:	5MHz
Type of Antenna:	Integral Antenna

*Note: The test data is gathered from a production sample, provided by the manufacture. The others models listed in the report have different appearance only of CY08 without circuit and electronic construction changed, declared by the manufacturer.*

### 1.2 Test Standards

The following report is prepared on behalf of the Vigorhood Photoelectric Shenzhen Co., Ltd in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

**Maintenance of compliance** is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

### 1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted with Low Channel, Middle Channel and High Channel, accordingly in reference to the Operating Instructions.

### 1.4 Test Facility

- **FCC – Registration No.: 994117**

SEM.Test Compliance Services Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 994117.

- **Industry Canada (IC) Registration No.: 7673A**

The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

- **CNAS Registration No.: L4062**

Shenzhen SEM.Test Electronics Service Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C (518101)

### 1.5 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components.

### 1.6 Accessories Equipment List and Details

Description	Manufacturer	Model	Serial Number
Notebook	ASUS	X50R	74NOAS297138
/	/	/	/

### 1.7 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
Power Cable	1.5	Unshielded	With Core
/	/	/	/

## 2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 15.203; § 15.247(c)(1)(i)	Antenna Requirement	Compliant
§ 15.207	Conducted Emission	Compliant
§ 15.247(e)	Power Spectral Density	Compliant
§ 15.247(a)(2)	6 dB Bandwidth	Compliant
§ 15.247(b)(3)	Power Output	Compliant
§ 15.209(a)(d)	Radiated Emission	Compliant
§ 15.247(d)	Band edge	Compliant

### 3. CONDUCTED EMISSIONS

#### 3.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is  $\pm 2.88$  dB.

#### 3.2 Test Equipment List and Details

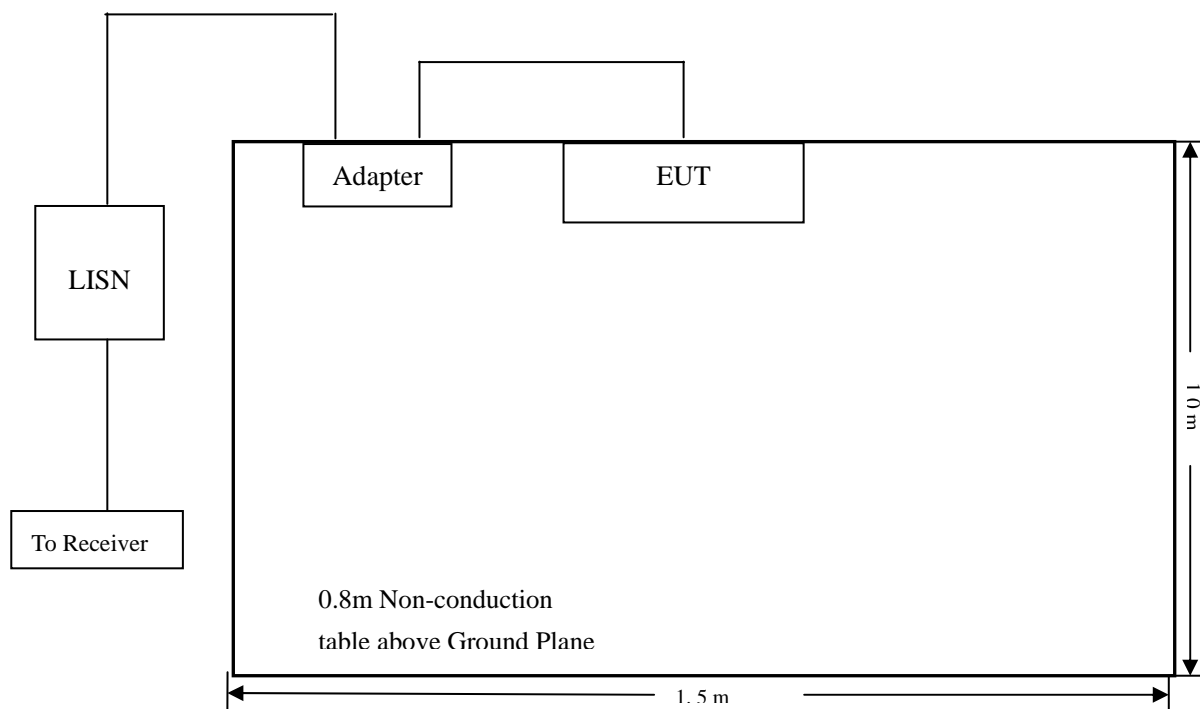
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2010-12-20	2011-12-19
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2010-12-20	2011-12-19
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2010-12-20	2011-12-19

**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

#### 3.3 Test Procedure

Test is conducting under the description of ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

#### 3.4 Basic Test Setup Block Diagram



### 3.5 Environmental Conditions

Temperature:	20° C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

### 3.6 Summary of Test Results/Plots

According to the data in section 3.7, the EUT complied with the FCC Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

**-3.38 dB $\mu$ V at 4.938 MHz** in the **Neutral, Ave** Detector, 0.15-30MHz

### 3.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

Conducted Disturbance

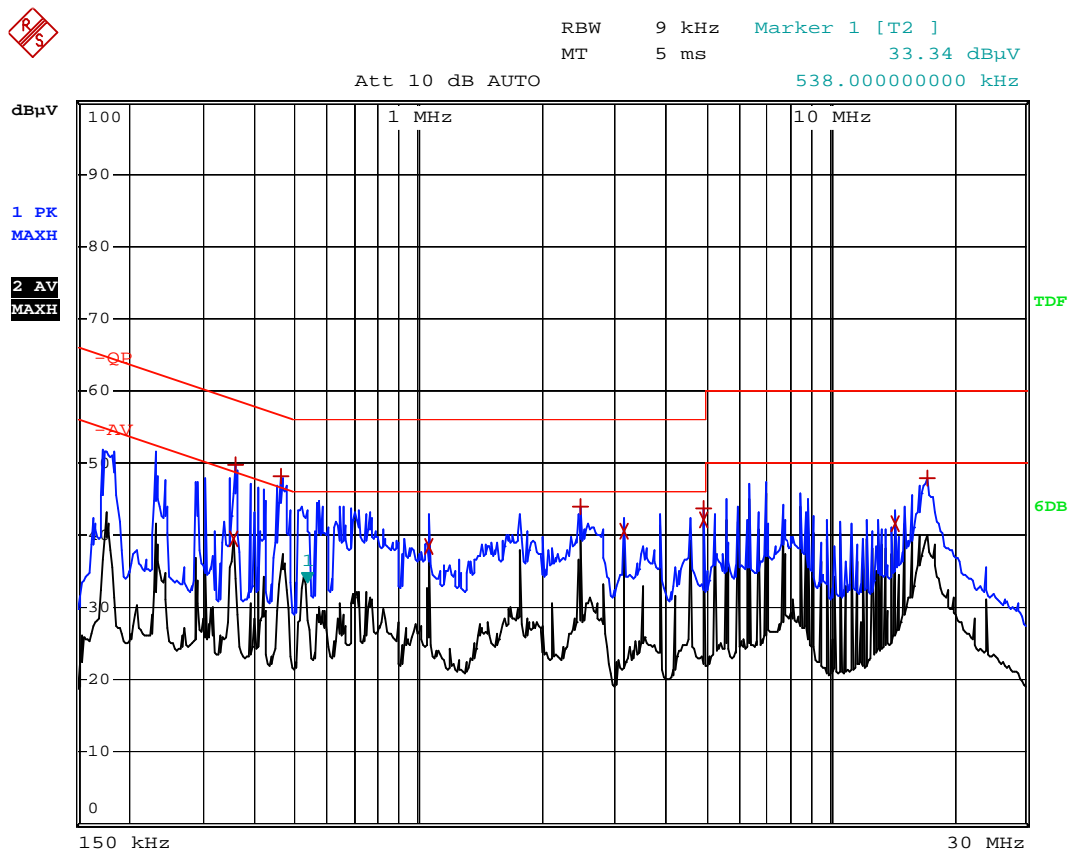
EUT: Chumby

M/N: CY08

Operating Condition: Transmitting

Test Specification: L

Comment: AC 120V/60Hz/Adapter 5V



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
2 Average	354 kHz	39.59	-9.27
1 Max Peak	358 kHz	49.64	-9.12
1 Max Peak	462 kHz	48.07	-8.58
2 Average	1.058 MHz	38.38	-7.62
1 Max Peak	2.47 MHz	43.88	-12.12
2 Average	3.174 MHz	40.43	-5.56
1 Max Peak	4.938 MHz	43.83	-12.16
2 Average	4.938 MHz	42.08	-3.91
2 Average	14.466 MHz	41.62	-8.37
1 Max Peak	17.29 MHz	47.89	-12.10





## **4. §15.203 - ANTENNA REQUIREMENT**

---

### **4.1 Standard Applicable**

According to FCC Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

### **4.2 Test Result**

This product has a integral antenna, fulfill the requirement of this section.

## 5. POWER SPECTRAL DENSITY

### 5.1 Standard Applicable

According to 15.247(a)(1)(iii), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### 5.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2010-12-20	2011-12-19
Attenuator	ATTEN	ATS100-4-20	/	2010-12-20	2011-12-19

**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

### 5.3 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set center frequency of spectrum analyzer = operating frequency.
3. Set the spectrum analyzer as RBW, VBW=3KHz, Span = 20MHz.
4. Repeat above procedures until all frequency measured was complete.

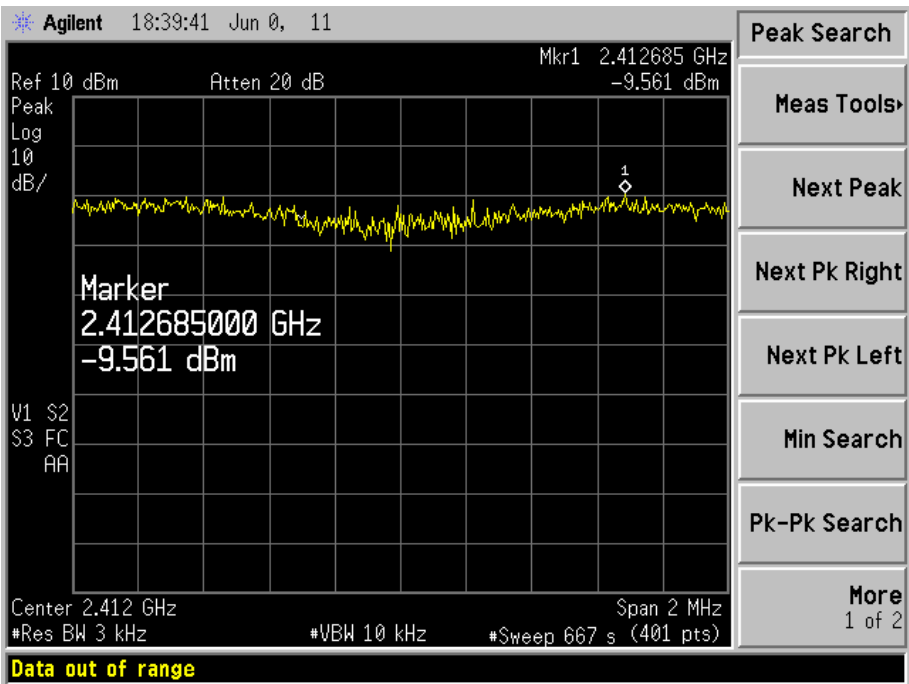
### 5.4 Environmental Conditions

Temperature:	20° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

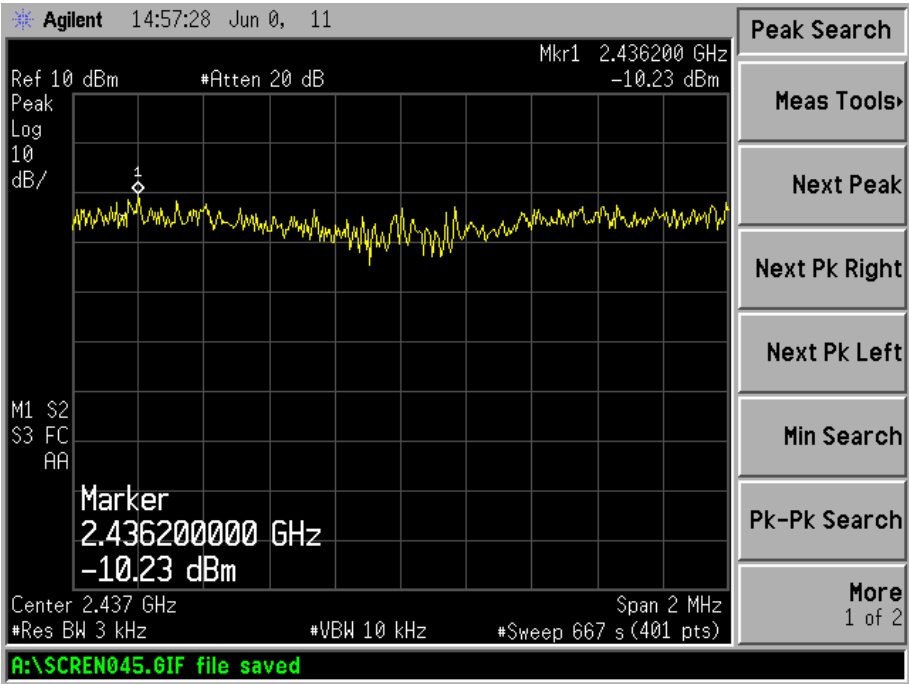
### 5.5 Summary of Test Results/Plots

Test mode	Test channel	Reading dBm/3kHz	Limit dBm/3kHz
802.11b	Low channel (2412MHz)	-9.561	8
	Middle channel (2437MHz)	-10.23	8
	High channel (2462MHz)	-13.63	8
802.11g	Low channel (2412MHz)	-9.40	8
	Middle channel (2437MHz)	-10.49	8
	High channel (2462MHz)	-7.881	8

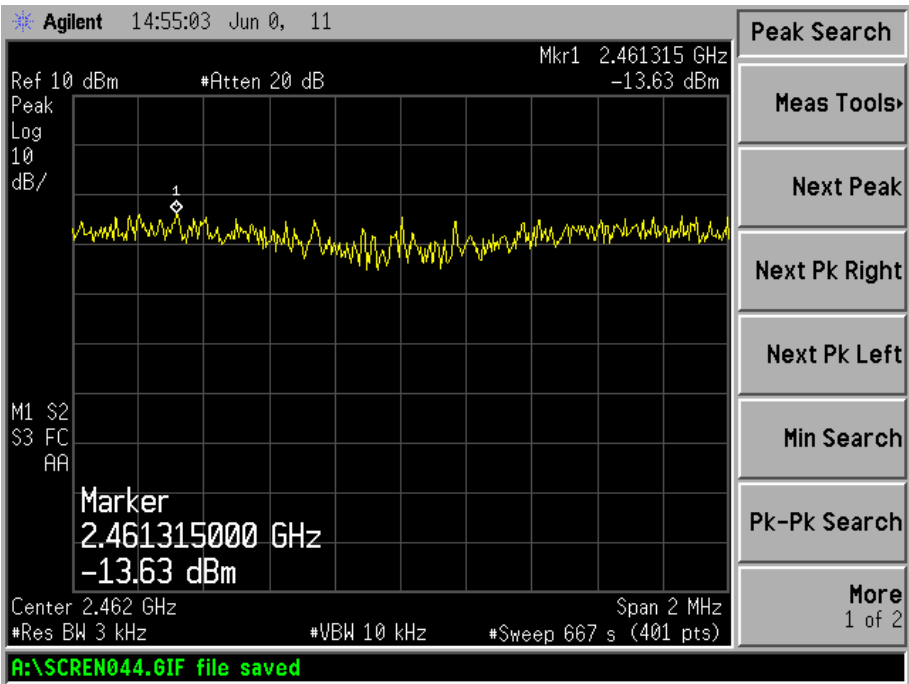
For 802.11b  
Low Channel:



Middle Channel:

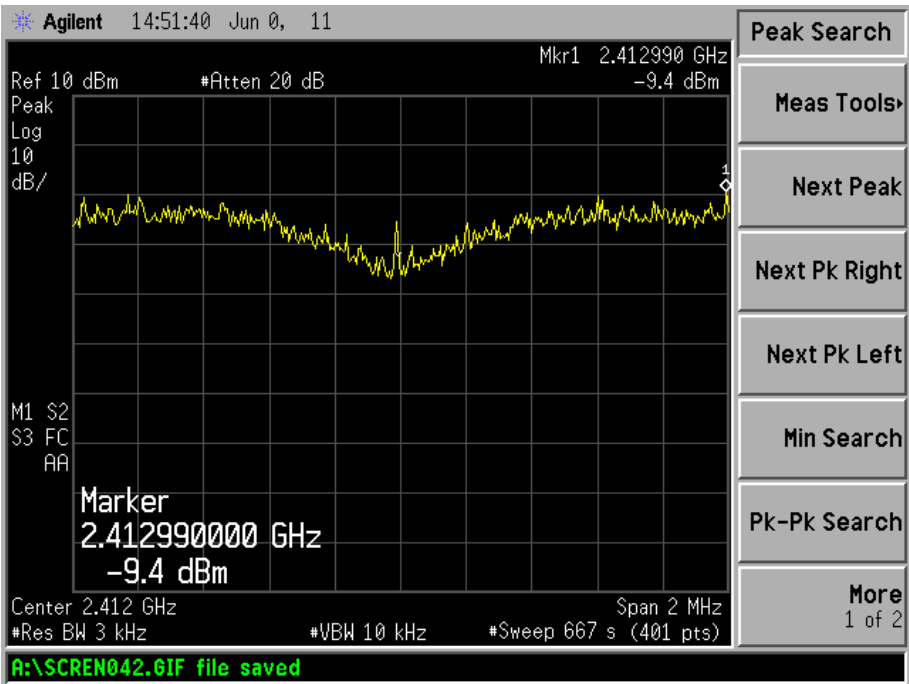


High Channel:

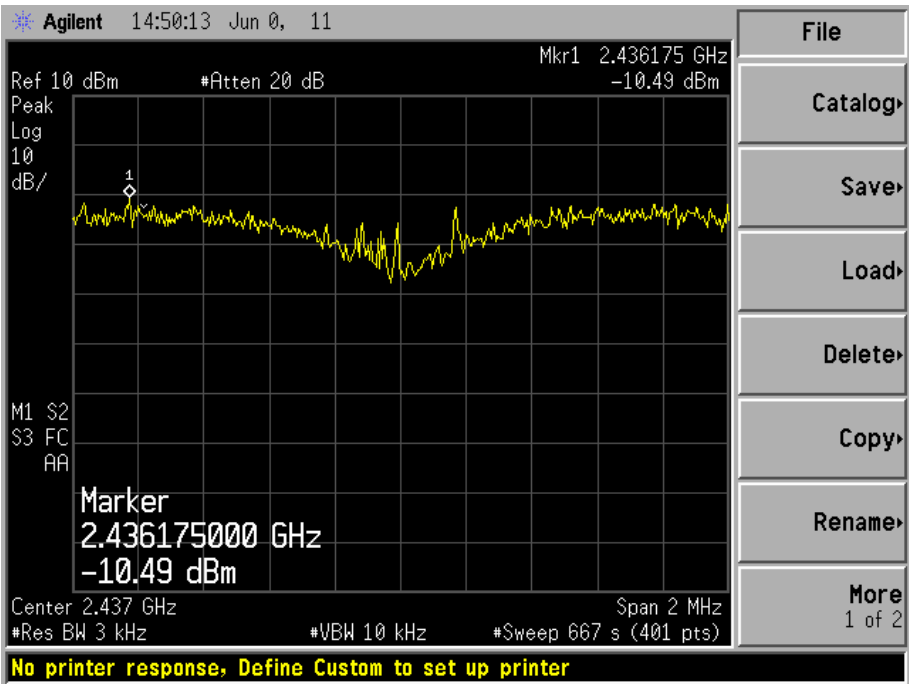


For 802.11g

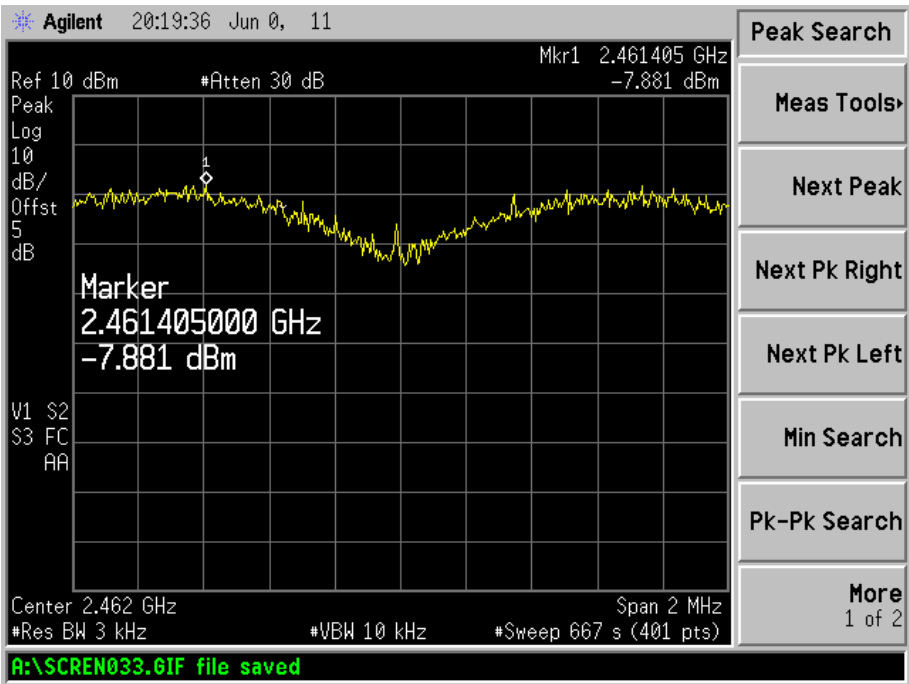
Low Channel:



Middle Channel:



High Channel:



## 6. 6-dB BANDWIDTH

### 6.1 Standard Applicable

According to 15.247(a)(2). Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

### 6.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2010-12-20	2011-12-19
Attenuator	ATTEN	ATS100-4-20	/	2010-12-20	2011-12-19

**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

### 6.3 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set center frequency of spectrum analyzer = operating frequency.
3. The spectrum analyzer as RBW=100KHz (1 % of Bandwidth.), Sweep=auto
4. Mark the peak frequency and –6dB (upper and lower) frequency.

### 6.4 Environmental Conditions

Temperature:	24° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

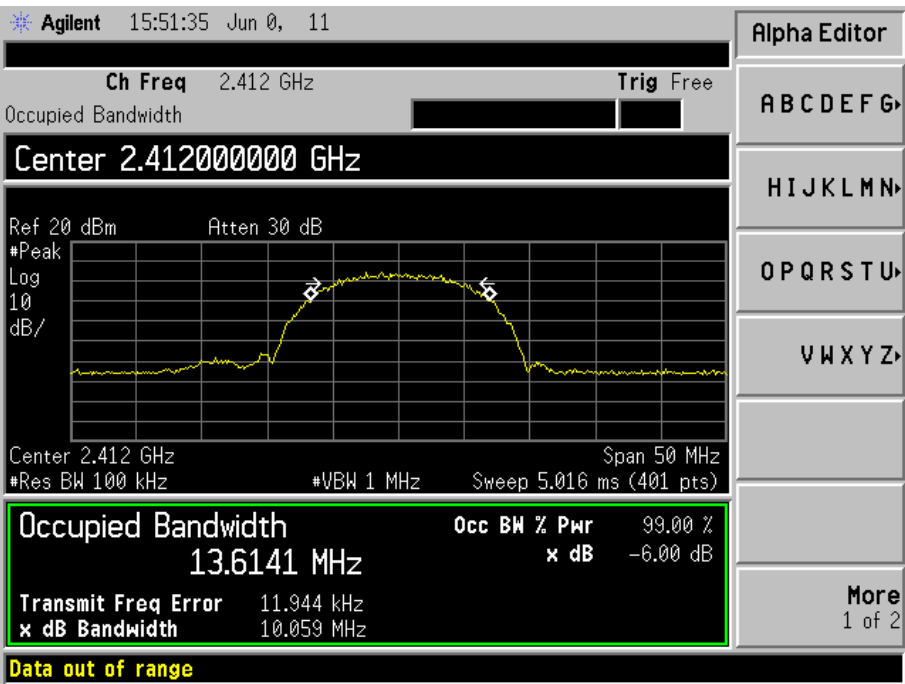
### 6.5 Summary of Test Results/Plots

Test mode	Frequency MHz	6 dB Bandwidth kHz	Limit kHz
802.11b	2412	10059	500
	2437	10115	500
	2462	10288	500
802.11g	2412	14855	500
	2437	10196	500
	2462	12573	500

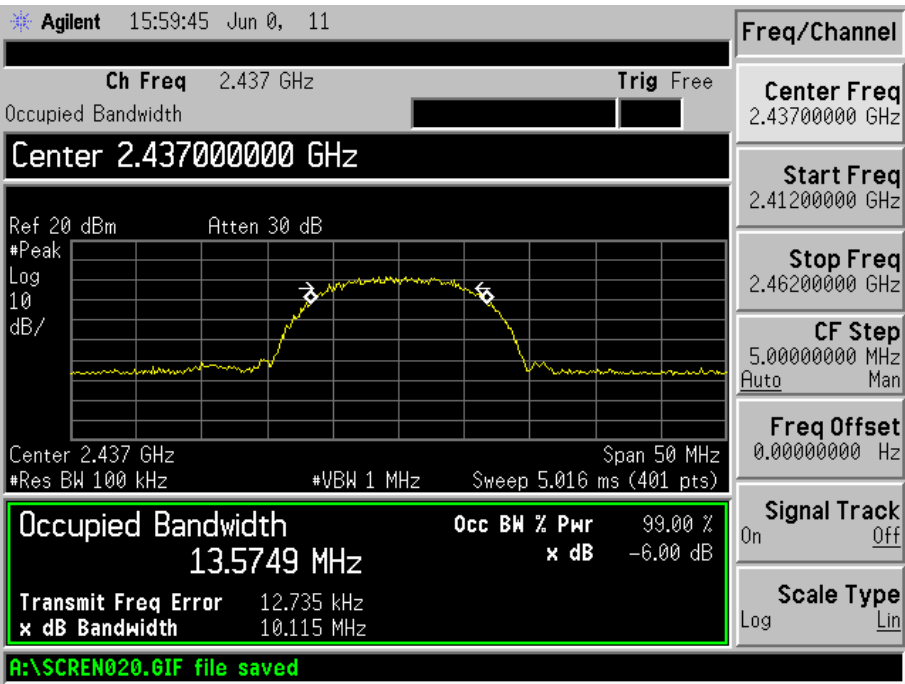


For 802.11b

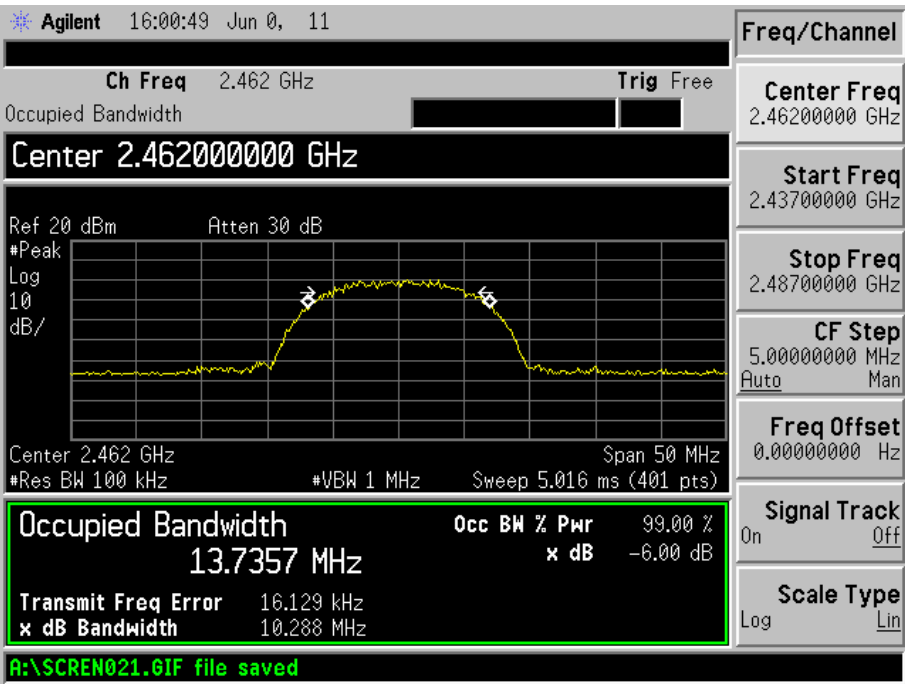
Low Channel:



Mid Channel:

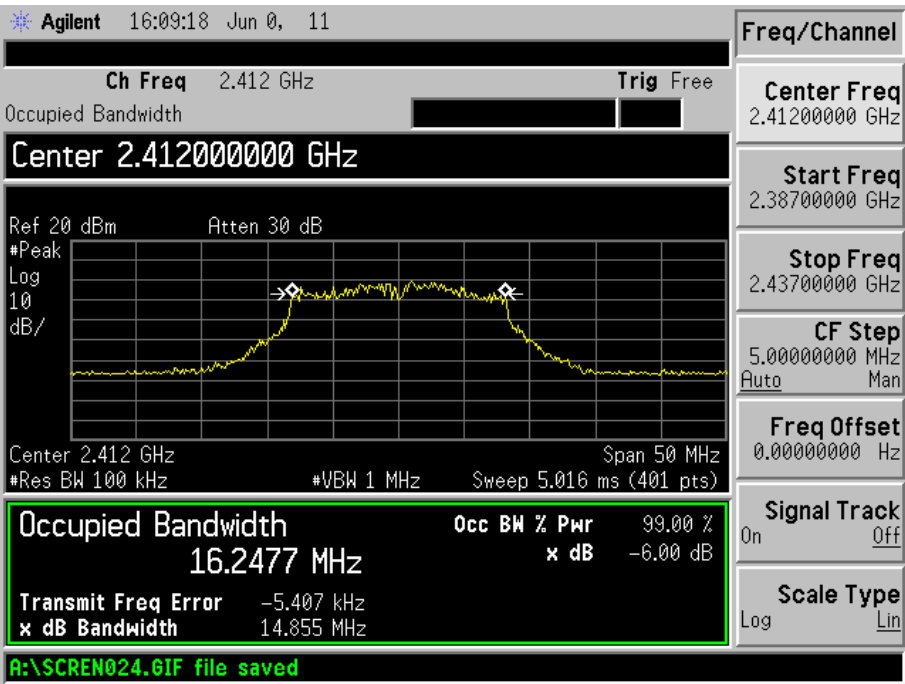


High Channel:

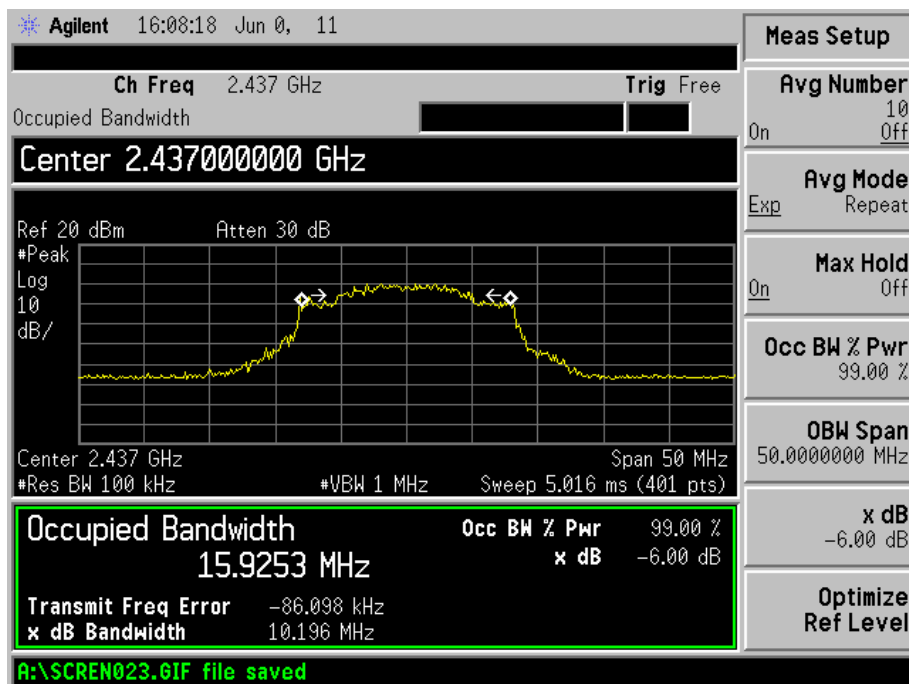


For 802.11g

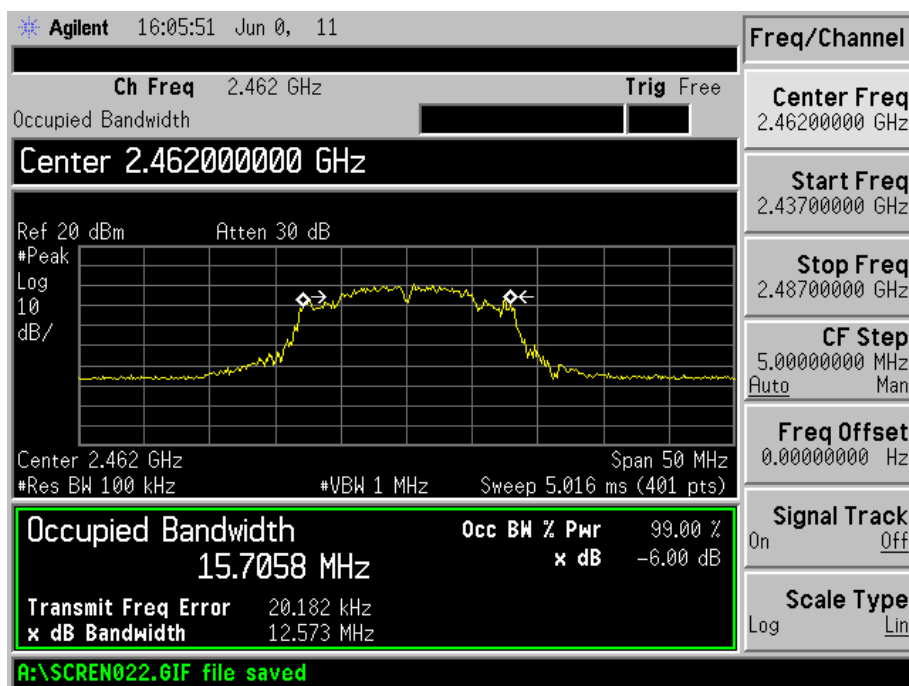
Low Channel:



Mid Channel:



High Channel:



## 7. POWER OUTPUT

### 7.1 Standard Applicable

According to 15.247(b)(3). For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

### 7.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2010-12-20	2011-12-19
Attenuator	ATTEN	ATS100-4-20	/	2010-12-20	2011-12-19

**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

### 7.3 Test Procedure

According to section 15.247(b)-power output of the KDB-558074 (2005), the method #1 of the power output option2 was used, the following is the measurement procedure.

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW  $\geq$  3 MHz.
4. Use sample detector mode if bin width (i.e., span/number of points in spectrum display)  $<$  0.5 RBW. Otherwise use peak detector mode.
5. Use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at full control power for entire sweep of every sweep. If the device transmits continuously, with no off intervals or reduced power intervals, the trigger may be set to “free run”.
6. Trace average 100 traces in power averaging mode.
7. Compute power by integrating the spectrum across the 26 dB EBW of the signal. The integration can be performed using the spectrum analyzer’s band power measurement function with band limits set equal to the EBW band edges.

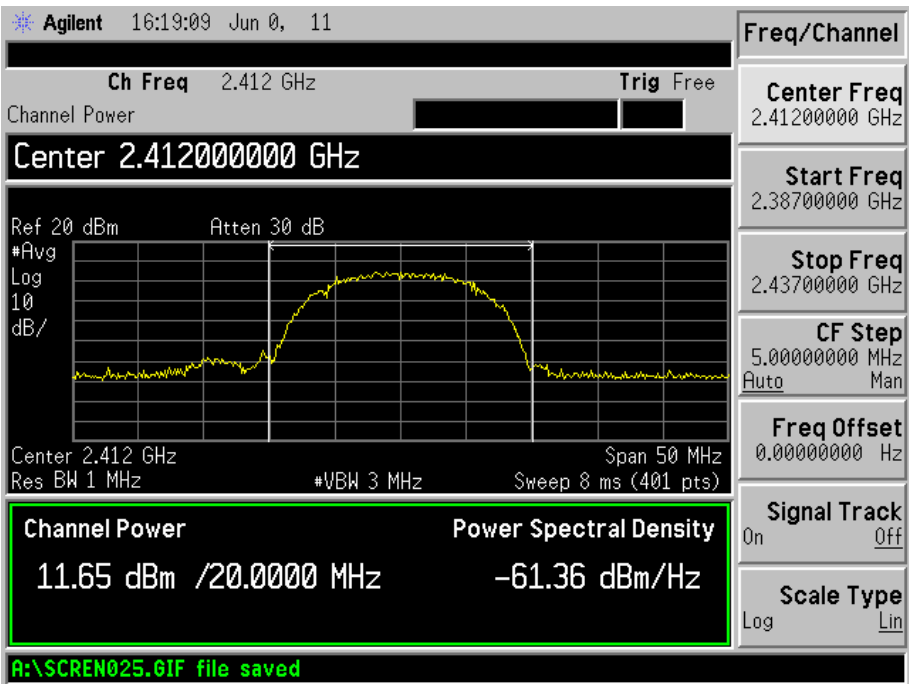
### 7.4 Environmental Conditions

Temperature:	21° C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

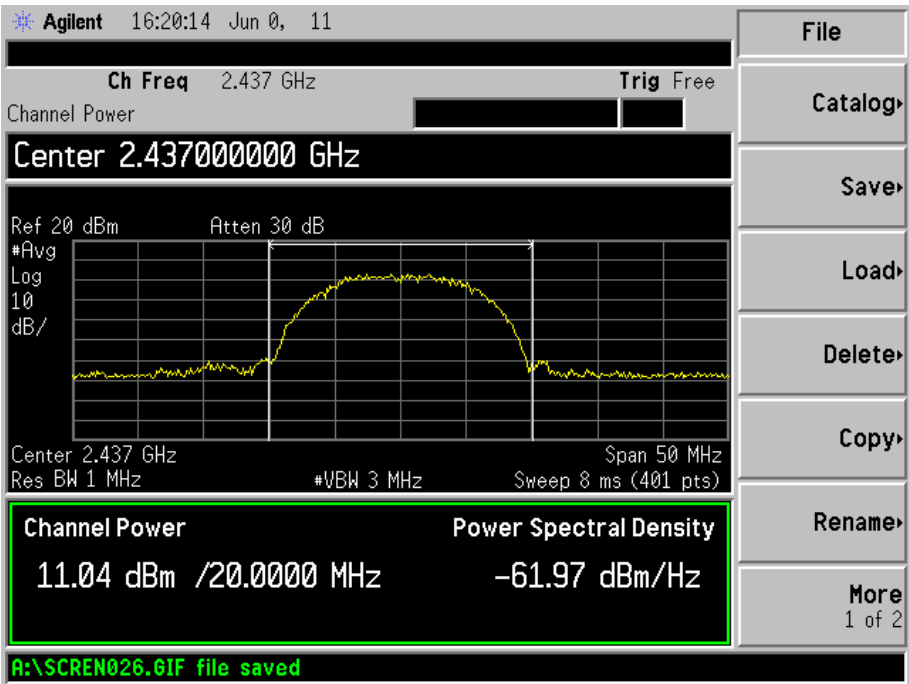
**7.5 Summary of Test Results/Plots**

Test mode	Frequency MHz	Reading dBm	Output power W	Limit W
802.11b	2412	11.65	0.0146	1
	2437	11.04	0.0127	1
	2462	10.22	0.0105	1
802.11g	2412	11.26	0.0134	1
	2437	10.46	0.0111	1
	2462	10.62	0.0115	1

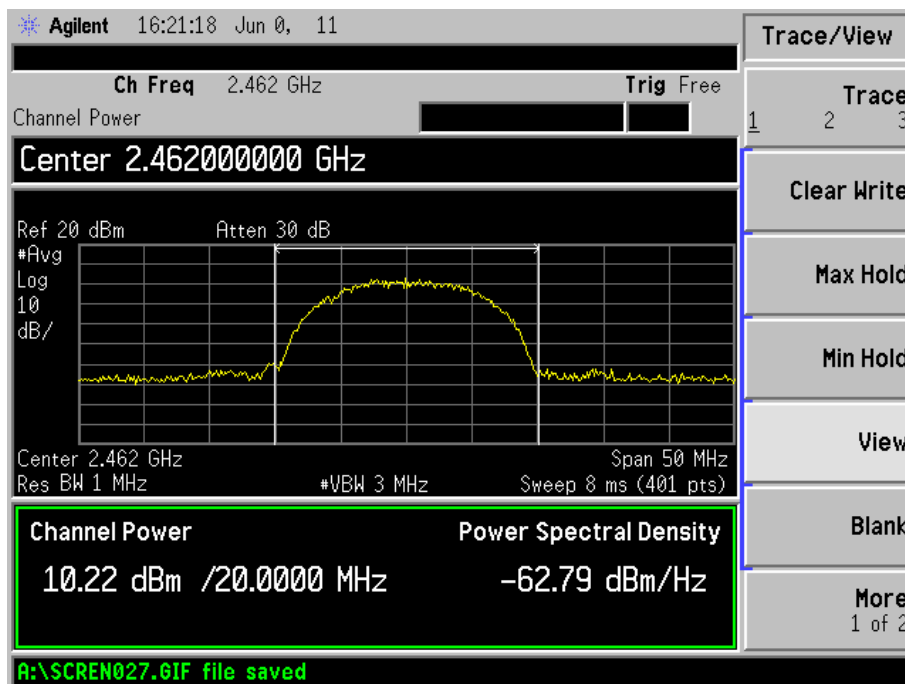
For 802.11b rate  
Low Channel:



Middle Channel:

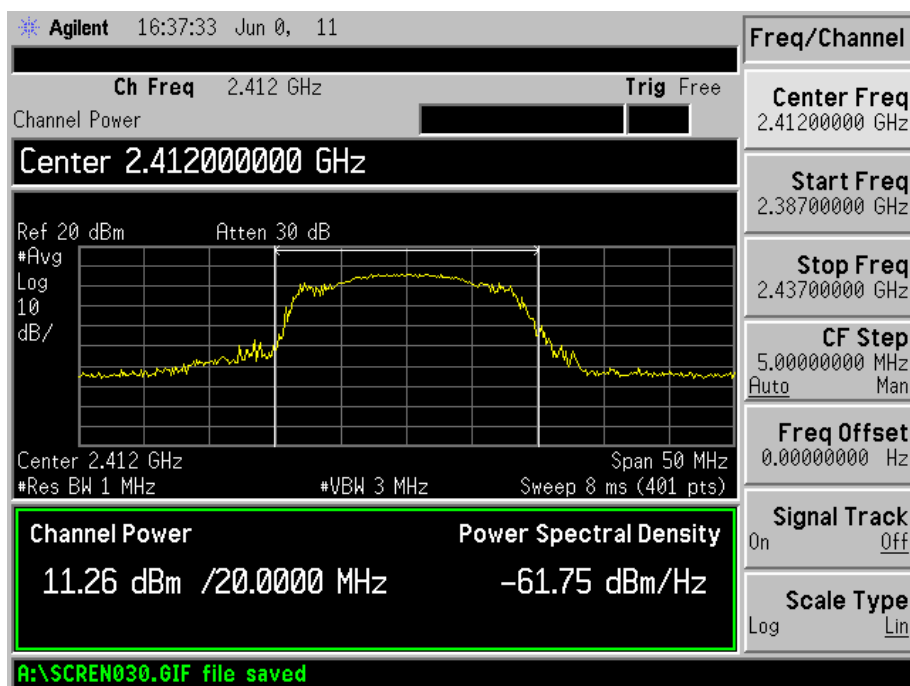


High Channel:

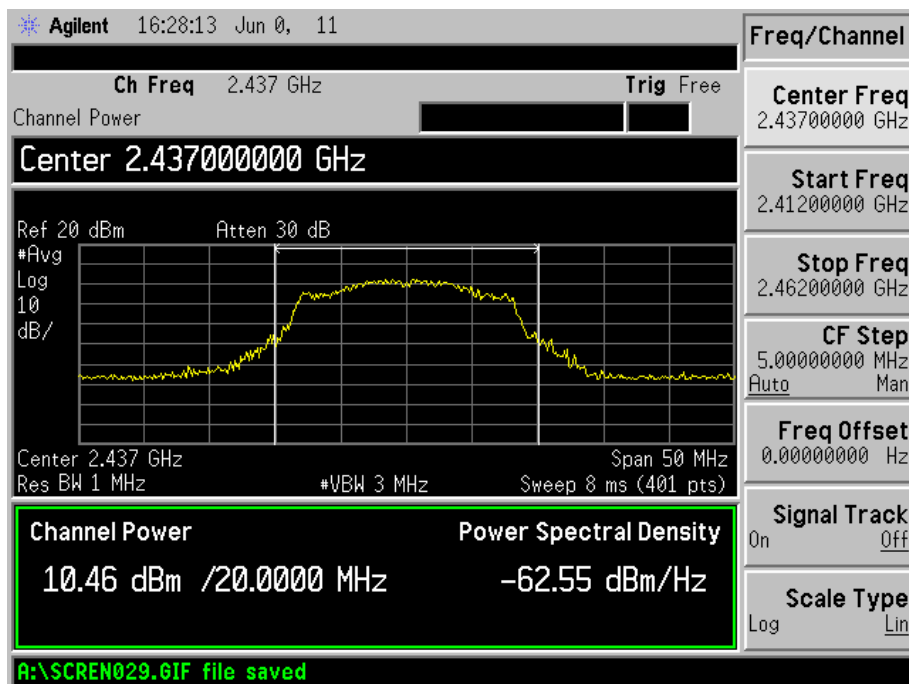


For 802.11g rate

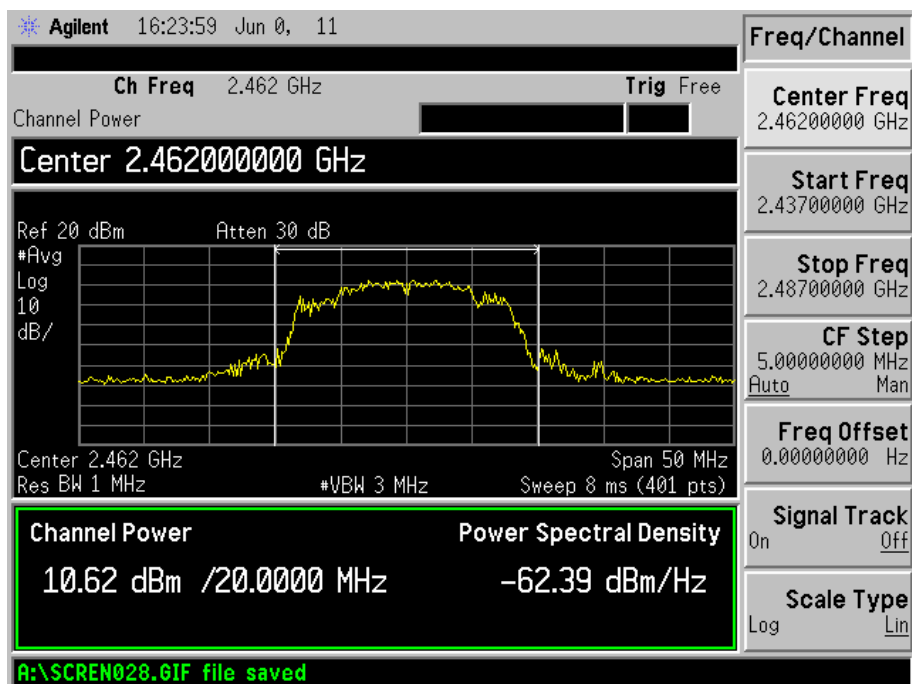
Low Channel:



Middle Channel:



High Channel:





## 8. FIELD STRENGTH OF SPURIOUS EMISSIONS

### 8.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is  $\pm 5.10$  dB.

### 8.2 Standard Applicable

According to §15.247(c), 15.205 15.209(b) & 15.35 (b), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Section 15.209:

30 - 88 MHz 40 dBuV/m @3M

88 -216 MHz 43.5 dBuV/m @3M

216 -960 MHz 46 dBuV/m @3M

Above 960 MHz 54dBuV/m @3M

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

### 8.3 Test Equipment List and Details

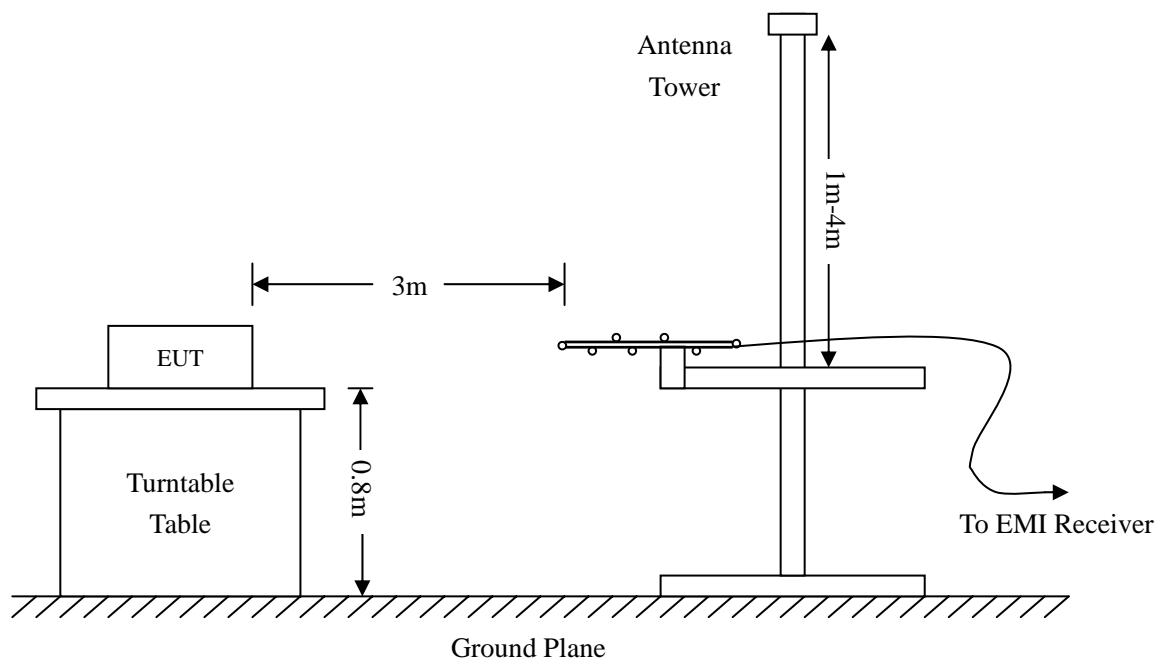
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2010-12-20	2011-12-19
EMI Test Receiver	R&S	ESVB	825471/005	2010-12-20	2011-12-19
Positioning Controller	C&C	CC-C-1F	N/A	2010-12-20	2011-12-19
RF Switch	EM	EMSW18	SW060023	2010-12-20	2011-12-19
Pre-amplifier	Agilent	8447F	3113A06717	2010-12-20	2011-12-19
Pre-amplifier	Compliance Direction	PAP-0118	24002	2010-12-20	2011-12-19
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2011-01-09	2012-01-08
Horn Antenna	ETS	3117	00086197	2011-01-09	2012-01-08

### 8.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



## 8.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

## 8.6 Environmental Conditions

Temperature:	22° C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

## 8.7 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst margin of:

**-1.15dBμV at 44.4308MHz in the Vertical polarization, Transmitting 802.11b Middle Channel test mode with, 30 MHz to 25 GHz, 3Meters**

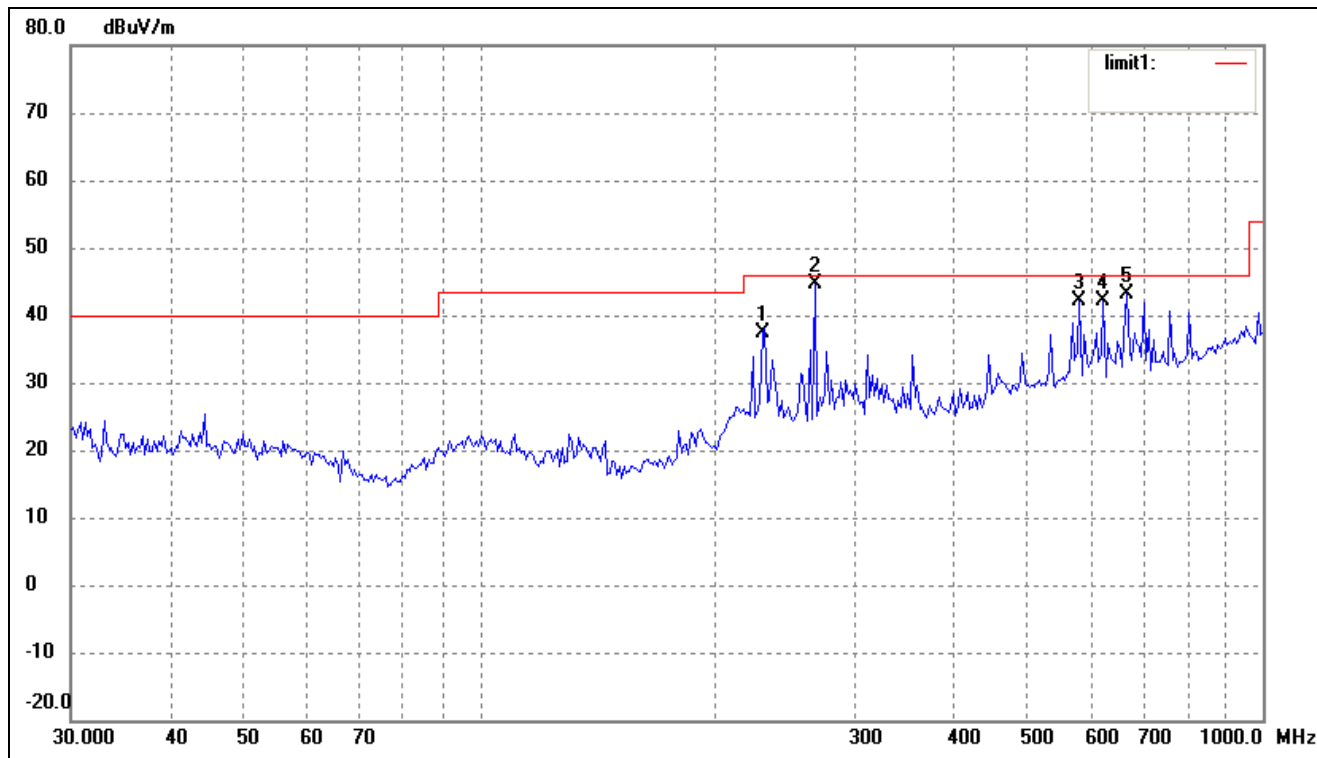
*Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11b) Low Channel

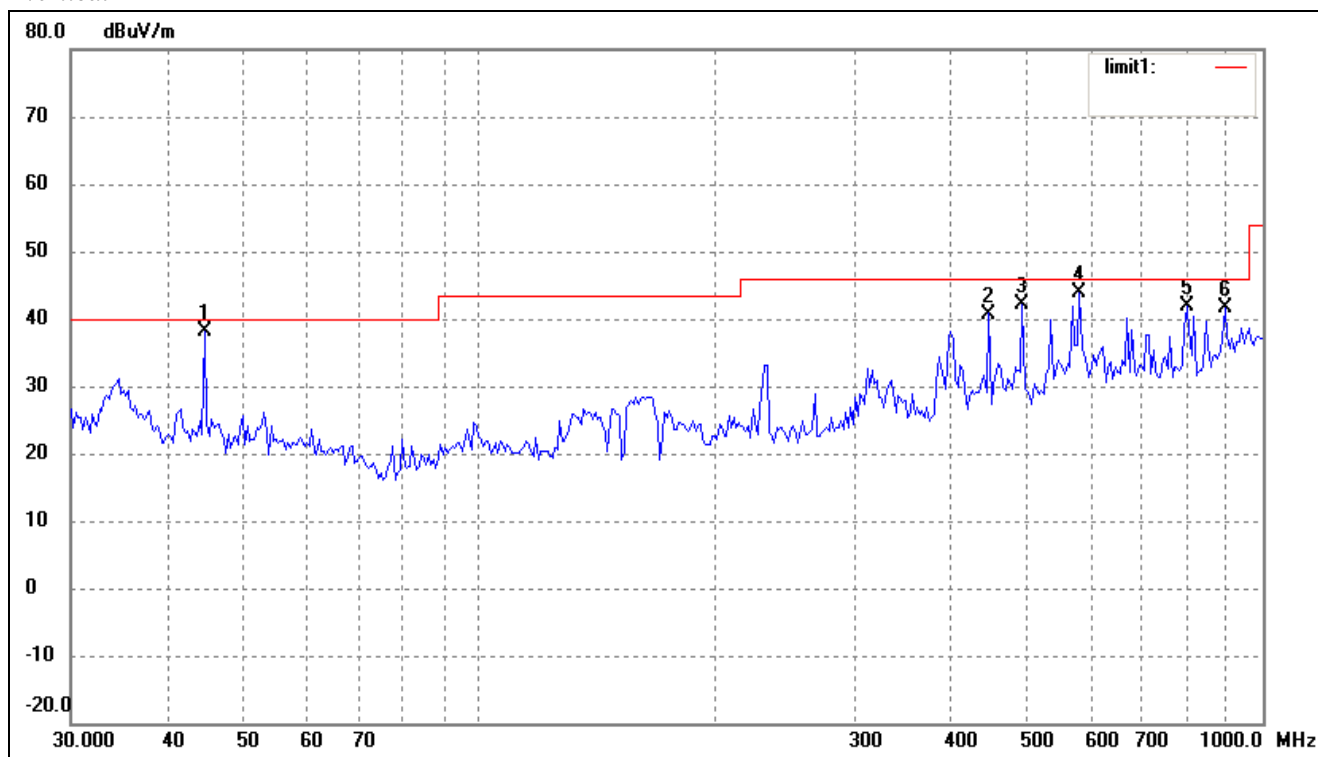
Comment:

Horizontal



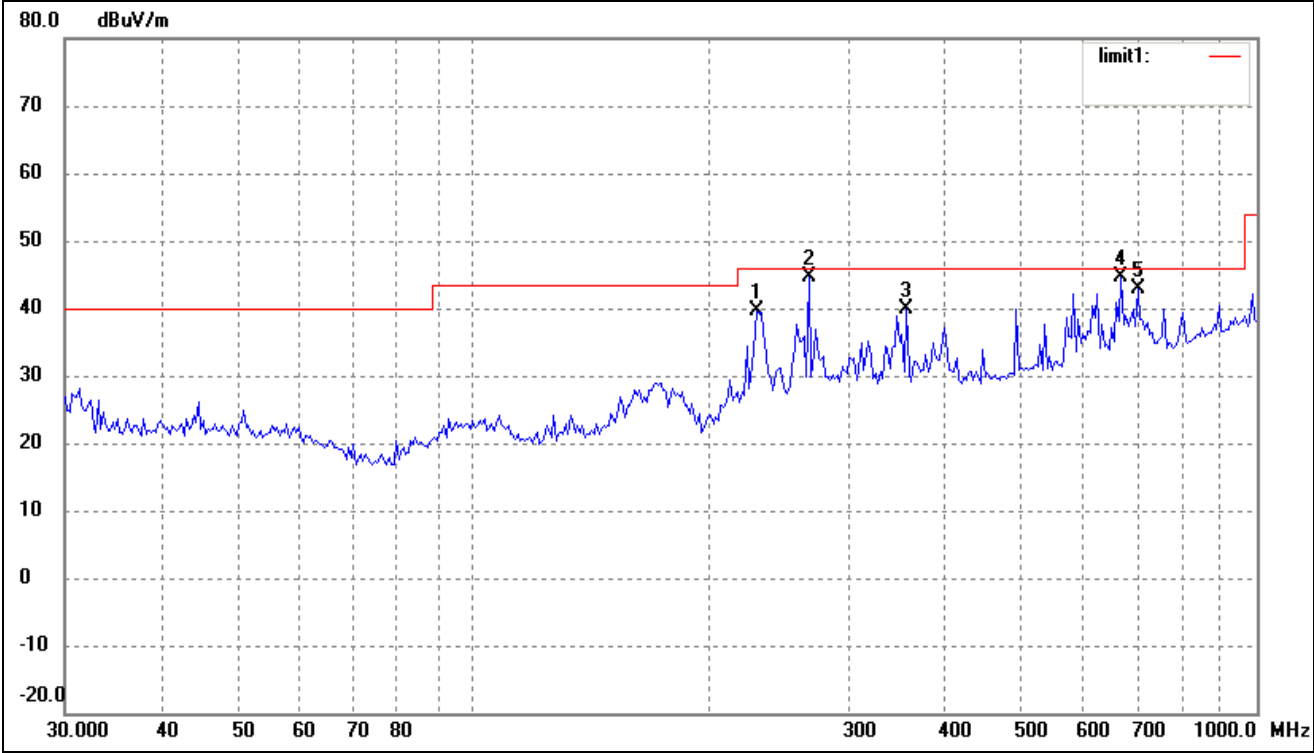
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( ° )	Height (cm)	Remark
1	229.2931	29.67	7.82	37.49	46.00	-8.51	360	100	Peak
2	267.5455	35.36	9.17	44.53	46.00	-1.47	360	100	Peak
3	582.7425	25.96	16.28	42.24	46.00	-3.76	360	100	Peak
4	625.0780	25.37	16.88	42.25	46.00	-3.75	360	100	Peak
5	670.4893	25.89	17.26	43.15	46.00	-2.85	360	100	Peak

Vertical



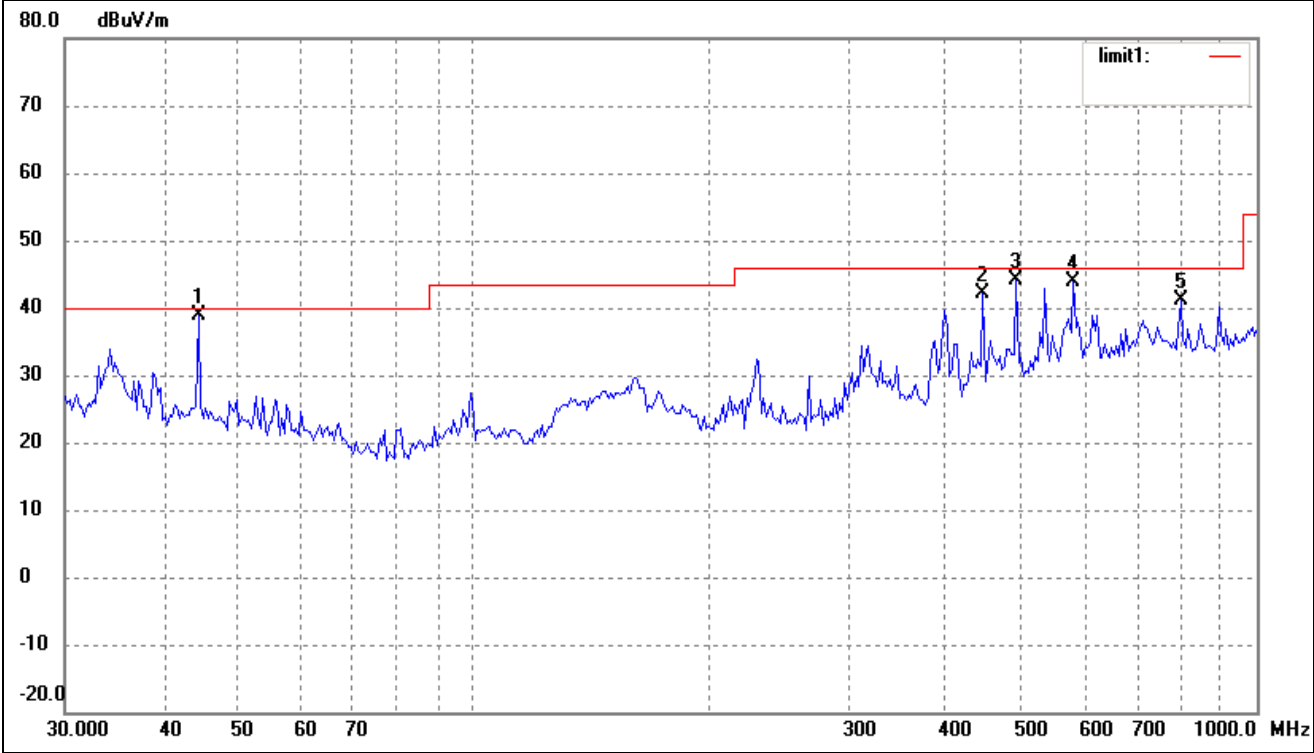
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	44.4308	29.87	8.22	38.09	40.00	-1.91	360	100	peak
2	446.4141	28.70	12.05	40.75	46.00	-5.25	360	100	peak
3	492.4685	28.36	13.67	42.03	46.00	-3.97	360	100	peak
4	582.7425	27.58	16.28	43.86	46.00	-2.14	360	100	peak
5	798.9797	22.96	18.99	41.95	46.00	-4.05	360	100	peak
6	893.8567	20.92	20.78	41.70	46.00	-4.30	360	100	peak

Spurious Emission From 30 MHz to 1 GHz  
Test mode: Transmitting (802.11b) Middle Channel  
Comment:  
Horizontal



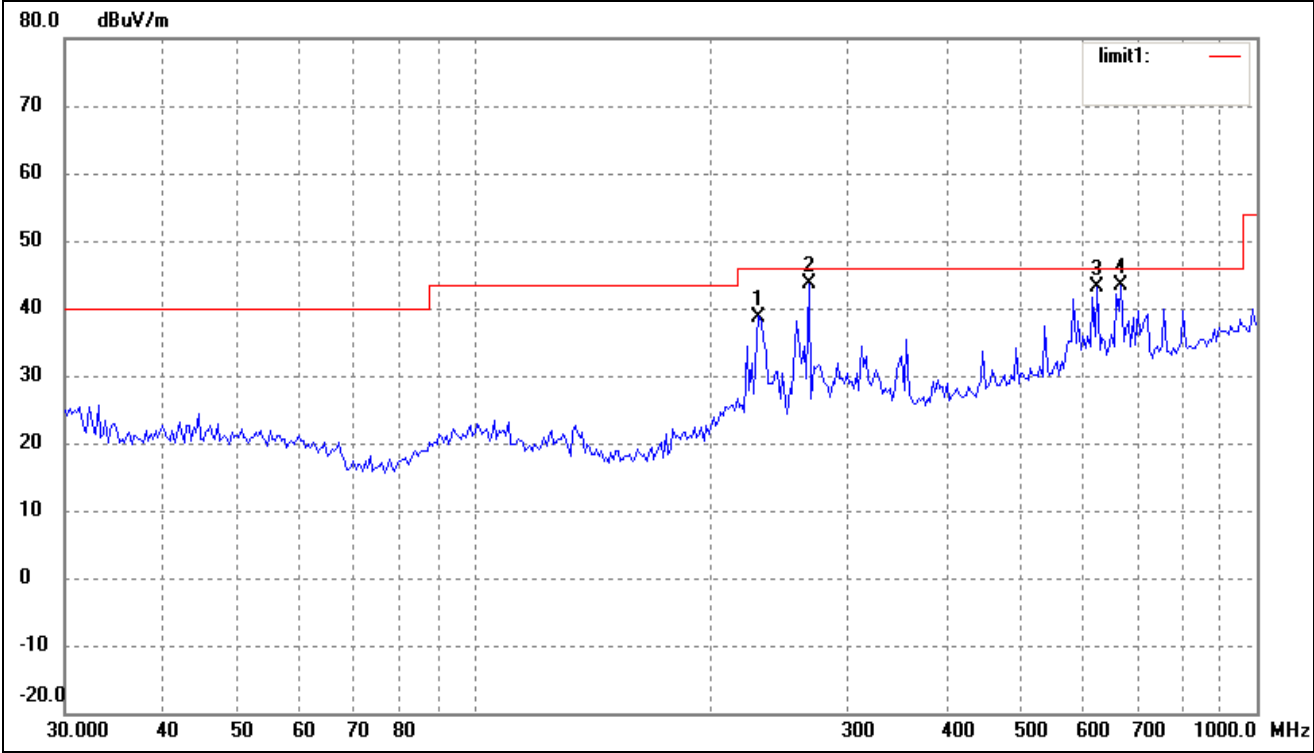
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( ° )	Height (cm)	Remark
1	229.2931	31.89	7.82	39.71	46.00	-6.29	360	100	peak
2	267.5455	35.34	9.17	44.51	46.00	-1.49	360	100	peak
3	356.6758	29.14	10.81	39.95	46.00	-6.05	360	100	peak
4	670.4893	27.39	17.26	44.65	46.00	-1.35	360	100	peak
5	704.2261	25.28	17.56	42.84	46.00	-3.16	360	100	peak

Vertical



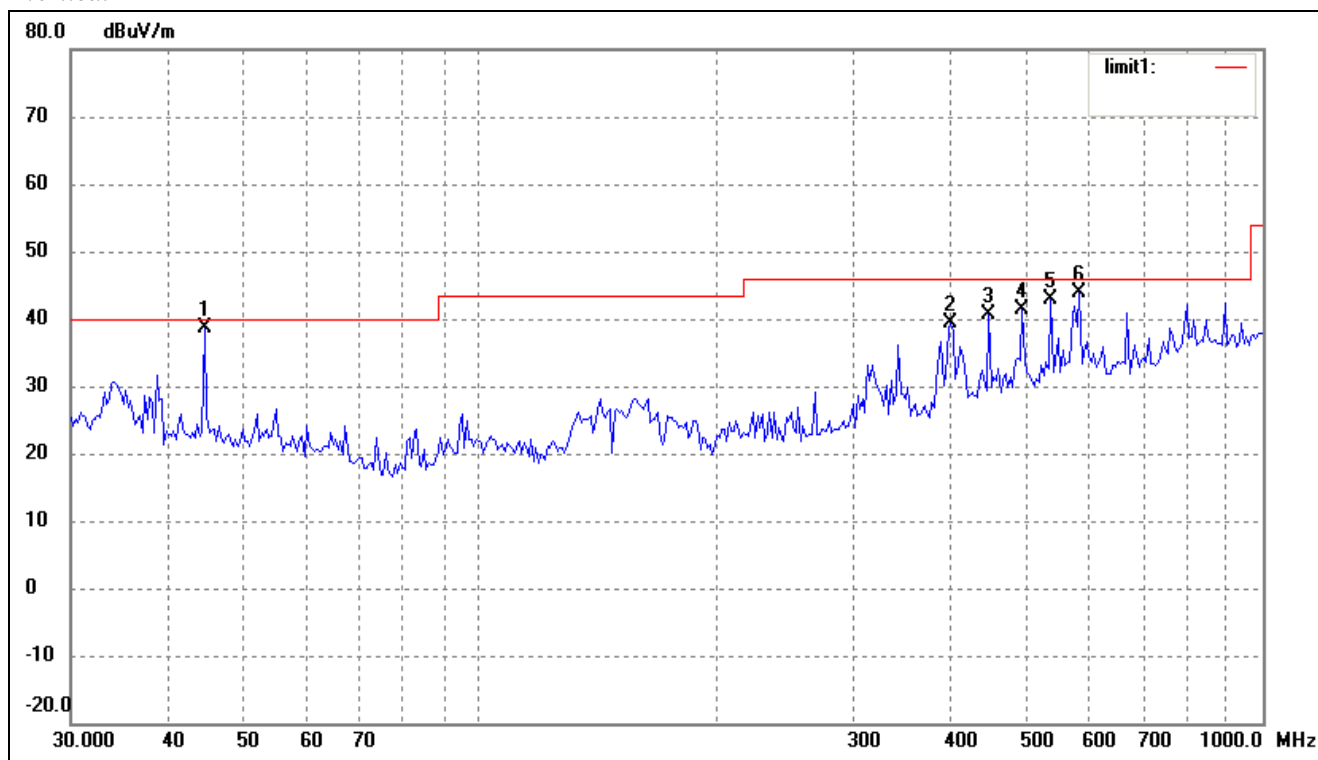
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	44.4308	30.63	8.22	38.85	40.00	-1.15	360	100	peak
2	446.4141	30.10	12.05	42.15	46.00	-3.85	360	100	peak
3	492.4685	30.34	13.67	44.01	46.00	-1.99	360	100	peak
4	582.7425	27.51	16.28	43.79	46.00	-2.21	360	100	peak
5	798.9797	22.03	18.99	41.02	46.00	-4.98	360	100	peak

Spurious Emission From 30 MHz to 1 GHz  
Test mode: Transmitting (802.11b) High Channel  
Comment:  
Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (° )	Height (cm)	Remark
1	230.9068	30.84	7.91	38.75	46.00	-7.25	360	100	peak
2	267.5455	34.43	9.17	43.60	46.00	-2.40	360	100	peak
3	625.0780	26.18	16.88	43.06	46.00	-2.94	360	100	peak
4	670.4893	26.05	17.26	43.31	46.00	-2.69	360	100	peak

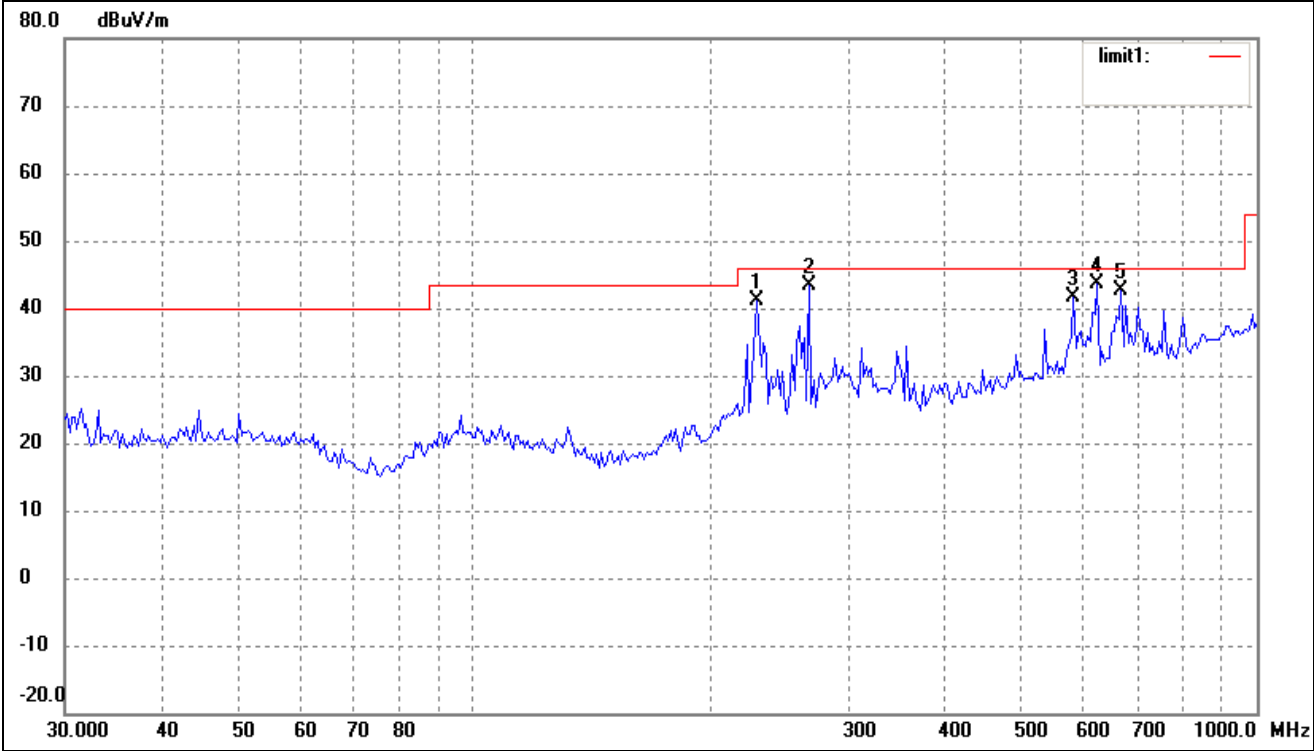
Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	44.4308	30.40	8.22	38.62	40.00	-1.38	360	100	peak
2	399.0302	28.10	11.40	39.50	46.00	-6.50	360	100	peak
3	446.4141	28.65	12.05	40.70	46.00	-5.30	360	100	peak
4	492.4685	27.65	13.67	41.32	46.00	-4.68	360	100	peak
5	535.7073	27.70	15.21	42.91	46.00	-3.09	360	100	peak
6	582.7425	27.56	16.28	43.84	46.00	-2.16	360	100	peak

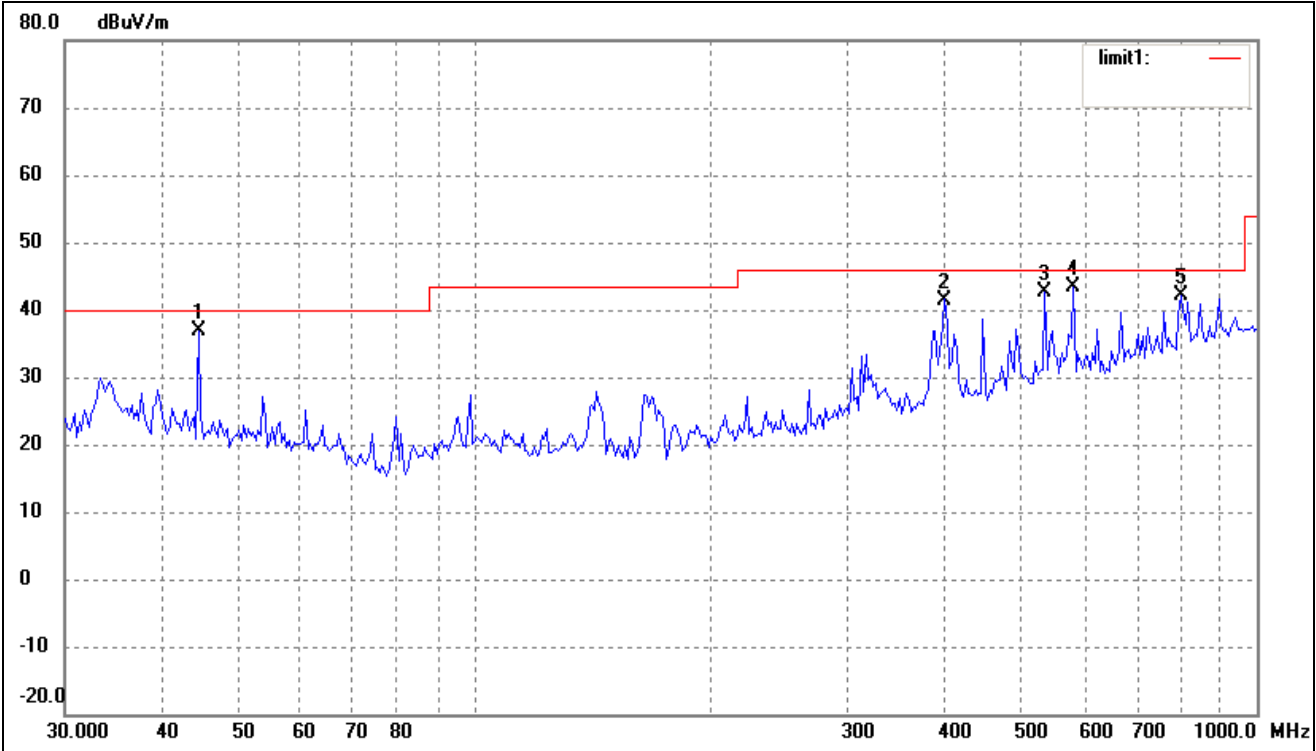


Spurious Emission From 30 MHz to 1 GHz  
Test mode: Transmitting (802.11g) Low Channel  
Comment:  
Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	229.2931	33.31	7.82	41.13	46.00	-4.87	360	100	peak
2	267.5455	34.22	9.17	43.39	46.00	-2.61	360	100	peak
3	582.7425	25.29	16.28	41.57	46.00	-4.43	360	100	peak
4	625.0780	26.83	16.88	43.71	46.00	-2.29	360	100	peak
5	670.4893	25.37	17.26	42.63	46.00	-3.37	360	100	peak

Vertical



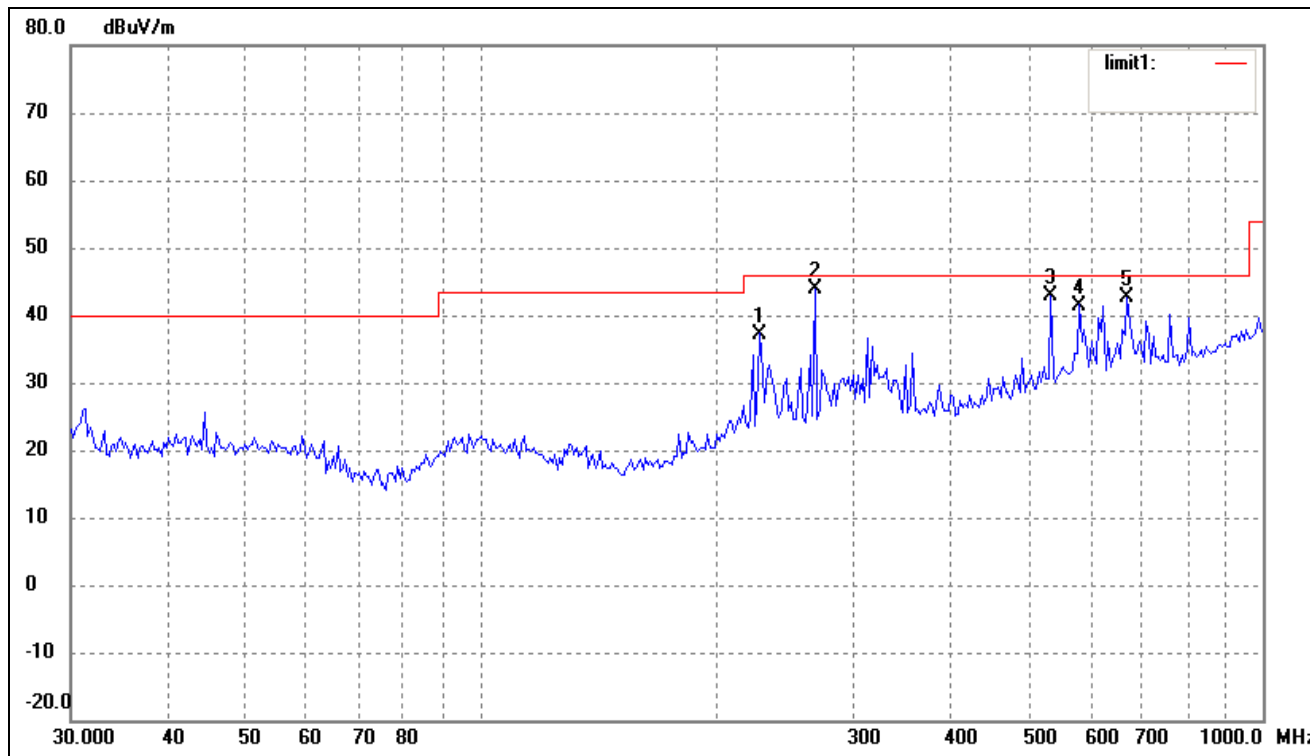
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	44.4308	28.73	8.22	36.95	40.00	-3.05	360	100	peak
2	399.0302	30.10	11.40	41.50	46.00	-4.50	360	100	peak
3	535.7073	27.50	15.21	42.71	46.00	-3.29	360	100	peak
4	582.7425	27.03	16.28	43.31	46.00	-2.69	360	100	peak
5	798.9797	23.11	18.99	42.10	46.00	-3.90	360	100	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g) Middle Channel

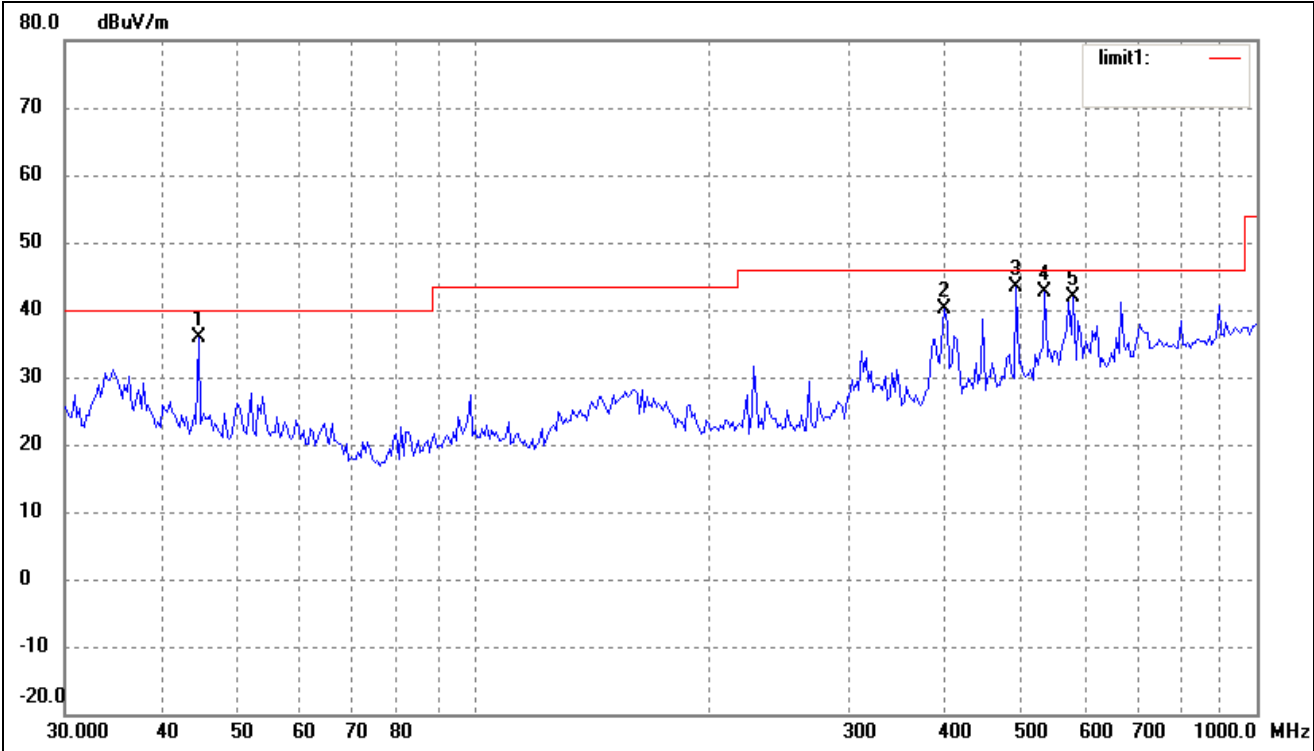
Comment:

Horizontal



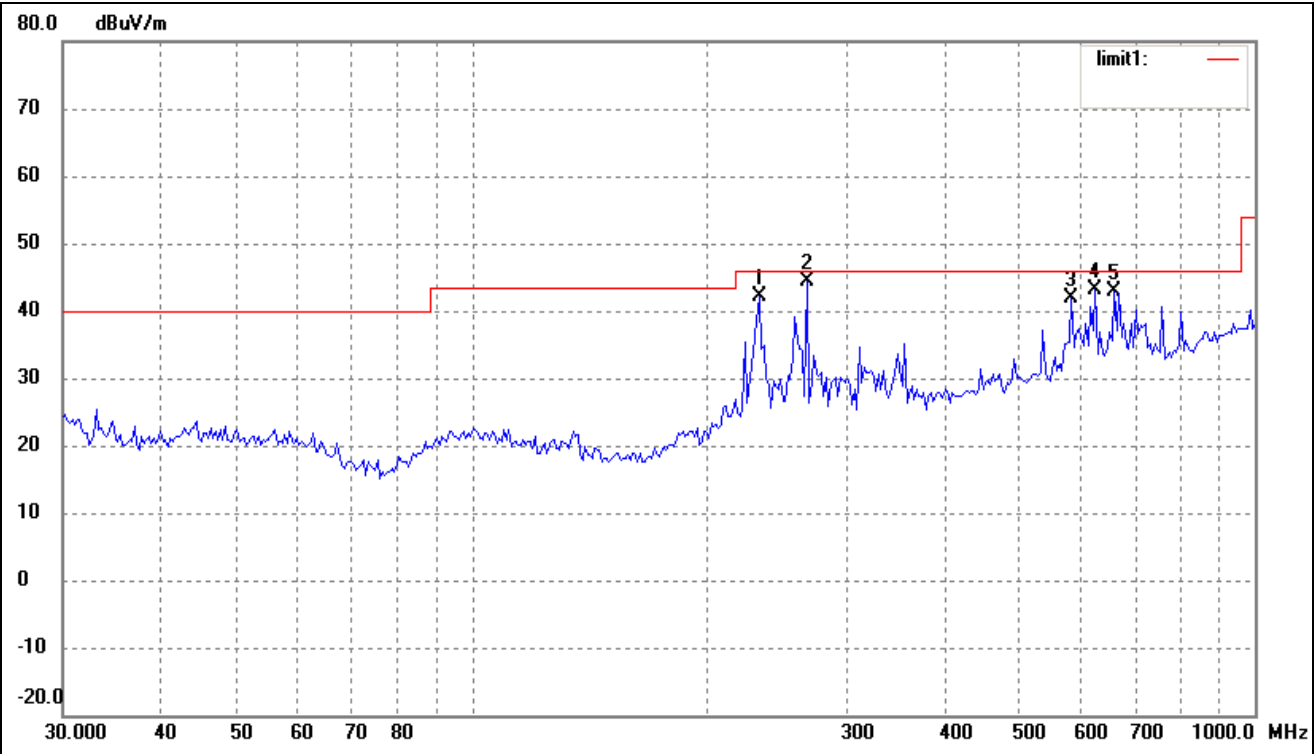
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( ° )	Height (cm)	Remark
1	227.6906	29.51	7.74	37.25	46.00	-8.75	360	100	peak
2	267.5455	34.69	9.17	43.86	46.00	-2.14	0	100	peak
3	535.7073	27.74	15.21	42.95	46.00	-3.05	203	105	QP
4	582.7425	25.22	16.28	41.50	46.00	-4.50	221	114	QP
5	670.4893	25.25	17.26	42.51	46.00	-3.49	360	100	peak

Vertical



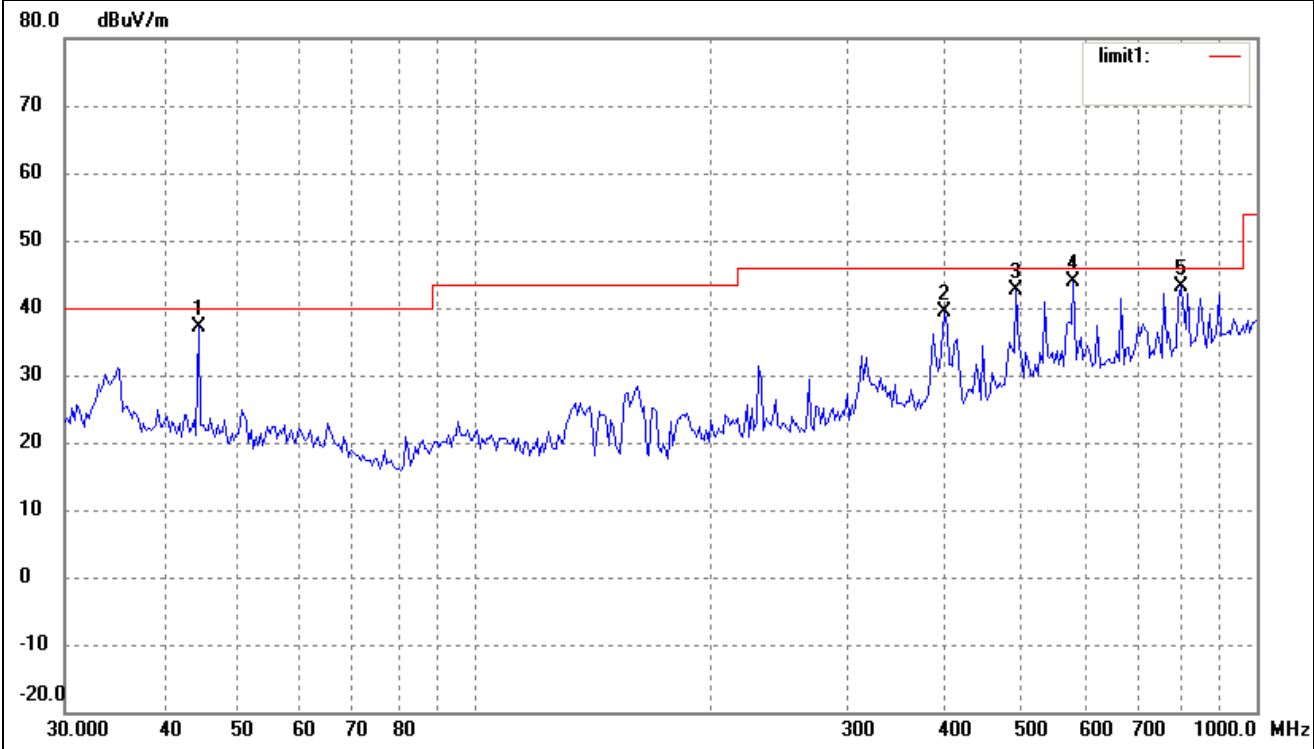
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	44.4308	27.71	8.22	35.93	40.00	-4.07	204	164	QP
2	399.0302	28.65	11.40	40.05	46.00	-5.95	360	200	peak
3	492.4685	29.76	13.67	43.43	46.00	-2.57	221	107	QP
4	535.7073	27.32	15.21	42.53	46.00	-3.47	181	100	QP
5	582.7425	25.66	16.28	41.94	46.00	-4.06	360	100	peak

Spurious Emission From 30 MHz to 1 GHz  
Test mode: Transmitting (802.11g) High Channel  
Comment:  
Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	232.5318	34.23	8.01	42.24	46.00	-3.76	359	200	peak
2	267.5455	35.29	9.17	44.46	46.00	-1.54	359	200	peak
3	582.7425	25.54	16.28	41.82	46.00	-4.18	359	200	peak
4	625.0780	26.30	16.88	43.18	46.00	-2.82	359	150	peak
5	661.1505	25.63	17.18	42.81	46.00	-3.19	359	200	peak

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	44.4308	28.94	8.22	37.16	40.00	-2.84	359	100	peak
2	399.0302	28.10	11.40	39.50	46.00	-6.50	359	100	peak
3	492.4685	28.88	13.67	42.55	46.00	-3.45	359	100	peak
4	582.7425	27.51	16.28	43.79	46.00	-2.21	359	150	peak
5	798.9797	24.17	18.99	43.16	46.00	-2.84	359	200	peak

*Spurious Emission above 1GHz**Test Mode: Transmitting (802.11b)*

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (2412MHz)										
4824.0	PK	46.04	90	V	34.1	5.2	33.0	52.34	74	-21.66
4824.0	PK	49.56	270	H	34.1	5.2	33.0	55.86	74	-18.14
7236.0	PK	36.52	180	V	37.4	6.1	33.5	46.52	74	-27.48
7236.0	PK	37.43	45	H	37.4	6.1	33.5	47.43	74	-26.57
4824.0	AV	28.62	270	V	34.1	5.2	33.0	34.92	54	-19.08
4824.0	AV	31.89	90	H	34.1	5.2	33.0	38.19	54	-15.81
7236.0	AV	25.57	45	V	37.4	6.1	33.5	35.57	54	-18.43
7236.0	AV	25.32	60	H	37.4	6.1	33.5	35.32	54	-18.68
Middle Channel (2437MHz)										
4874.0	PK	50.16	45	V	34.1	5.2	33.0	56.46	74	-17.54
4874.0	PK	40.78	270	H	34.1	5.2	33.0	47.08	74	-26.92
7311.0	PK	37.00	45	V	37.4	6.1	33.5	47.00	74	-27.00
7311.0	PK	37.47	180	H	37.4	6.1	33.5	47.47	74	-26.53
4874.0	AV	32.24	270	V	34.1	5.2	33.0	38.54	54	-15.46
4874.0	AV	27.18	90	H	34.1	5.2	33.0	33.48	54	-20.52
7311.0	AV	25.44	60	V	37.4	6.1	33.5	35.44	54	-18.56
7311.0	AV	25.52	45	H	37.4	6.1	33.5	35.52	54	-18.48
High Channel (2462MHz)										
4924.0	PK	49.67	270	V	34.1	5.2	33.0	55.97	74	-18.03
4924.0	PK	51.11	45	H	34.1	5.2	33.0	57.41	74	-16.59
7386.0	PK	44.99	180	V	37.4	6.1	33.5	54.99	74	-19.01
7386.0	PK	37.26	45	H	37.4	6.1	33.5	47.26	74	-26.74
4924.0	AV	30.33	90	V	34.1	5.2	33.0	36.63	54	-17.37
4924.0	AV	32.57	270	H	34.1	5.2	33.0	38.87	54	-15.13
7386.0	AV	17.05	60	V	37.4	6.1	33.5	27.05	54	-26.95
7386.0	AV	25.64	60	H	37.4	6.1	33.5	35.64	54	-18.36

*Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5<sup>th</sup> Harmonics is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.*

*Spurious Emission Above 1GHz**Test Mode: Transmitting (802.11g)*

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (2412MHz)										
4824.0	PK	37.62	90	V	34.1	5.2	33.0	43.92	74	-30.08
4824.0	PK	37.61	270	H	34.1	5.2	33.0	43.91	74	-30.09
7236.0	PK	37.77	180	V	37.4	6.1	33.5	47.77	74	-26.23
7236.0	PK	37.56	45	H	37.4	6.1	33.5	47.56	74	-26.44
4824.0	AV	25.71	270	V	34.1	5.2	33.0	32.01	54	-21.99
4824.0	AV	26.52	90	H	34.1	5.2	33.0	32.82	54	-21.18
7236.0	AV	25.35	45	V	37.4	6.1	33.5	35.35	54	-18.65
7236.0	AV	25.15	60	H	37.4	6.1	33.5	35.15	54	-18.85
Middle Channel (2437MHz)										
4874.0	PK	41.32	45	V	34.1	5.2	33.0	47.62	74	-26.38
4874.0	PK	40.40	270	H	34.1	5.2	33.0	46.7	74	-27.30
7311.0	PK	37.31	45	V	37.4	6.1	33.5	47.31	74	-26.69
7311.0	PK	37.73	180	H	37.4	6.1	33.5	47.73	74	-26.27
4874.0	AV	26.47	270	V	34.1	5.2	33.0	32.77	54	-21.23
4874.0	AV	26.45	90	H	34.1	5.2	33.0	32.75	54	-21.25
7311.0	AV	25.27	60	V	37.4	6.1	33.5	35.27	54	-18.73
7311.0	AV	25.25	45	H	37.4	6.1	33.5	35.25	54	-18.75
High Channel (2462MHz)										
4924.0	PK	41.35	270	V	34.1	5.2	33.0	47.65	74	-26.35
4924.0	PK	40.24	45	H	34.1	5.2	33.0	46.54	74	-27.46
7386.0	PK	36.85	180	V	37.4	6.1	33.5	46.85	74	-27.15
7386.0	PK	36.97	45	H	37.4	6.1	33.5	46.97	74	-27.03
4924.0	AV	26.49	90	V	34.1	5.2	33.0	32.79	54	-21.21
4924.0	AV	26.52	270	H	34.1	5.2	33.0	32.82	54	-21.18
7386.0	AV	25.43	60	V	37.4	6.1	33.5	35.43	54	-18.57
7386.0	AV	25.38	60	H	37.4	6.1	33.5	35.38	54	-18.62

*Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5<sup>th</sup> Harmonics is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.*



## 9. OUT OF BAND EMISSIONS

### 9.1 Standard Applicable

According to §15.247 (d) 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.

### 9.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2010-12-20	2011-12-19
EMI Test Receiver	R&S	ESVB	825471/005	2010-12-20	2011-12-19
Positioning Controller	C&C	CC-C-1F	N/A	2010-12-20	2011-12-19
RF Switch	EM	EMSW18	SW060023	2010-12-20	2011-12-19
Pre-amplifier	Agilent	8447F	3113A06717	2010-12-20	2011-12-19
Pre-amplifier	Compliance Direction	PAP-0118	24002	2010-12-20	2011-12-19
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2011-01-09	2012-01-08
Horn Antenna	ETS	3117	00086197	2011-01-09	2012-01-08

### 9.3 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW, VBW=100KHz, Span=50MHz, Sweep = auto
3. Set the Lowest and Highest Transmitting Channel, observed the outside band of 2400MHz to 2438.5MHz, then mark the higher-level emission for comparing with the FCC rules.

### 9.4 Environmental Conditions

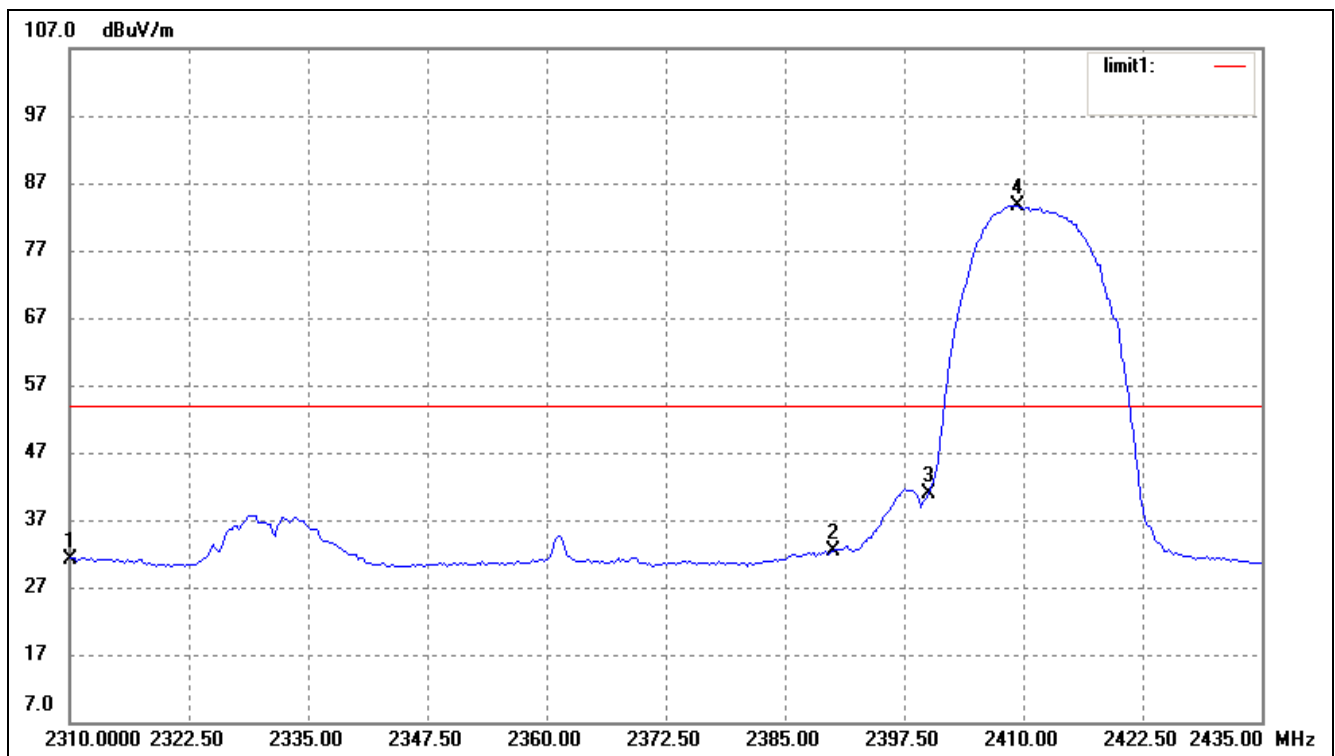
Temperature:	21° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

## 9.5 Summary of Test Results/Plots

Test mode	Frequency MHz	Limit dBuV /dB	Result
802.11b	2390.00	<54dBuV	Pass
	2400.00	>20dB ATT	Pass
	2483.50	<54dBuV	Pass
802.11g	2390.00	<54dBuV	Pass
	2400.00	>20dB ATT	Pass
	2483.50	<54dBuV	Pass

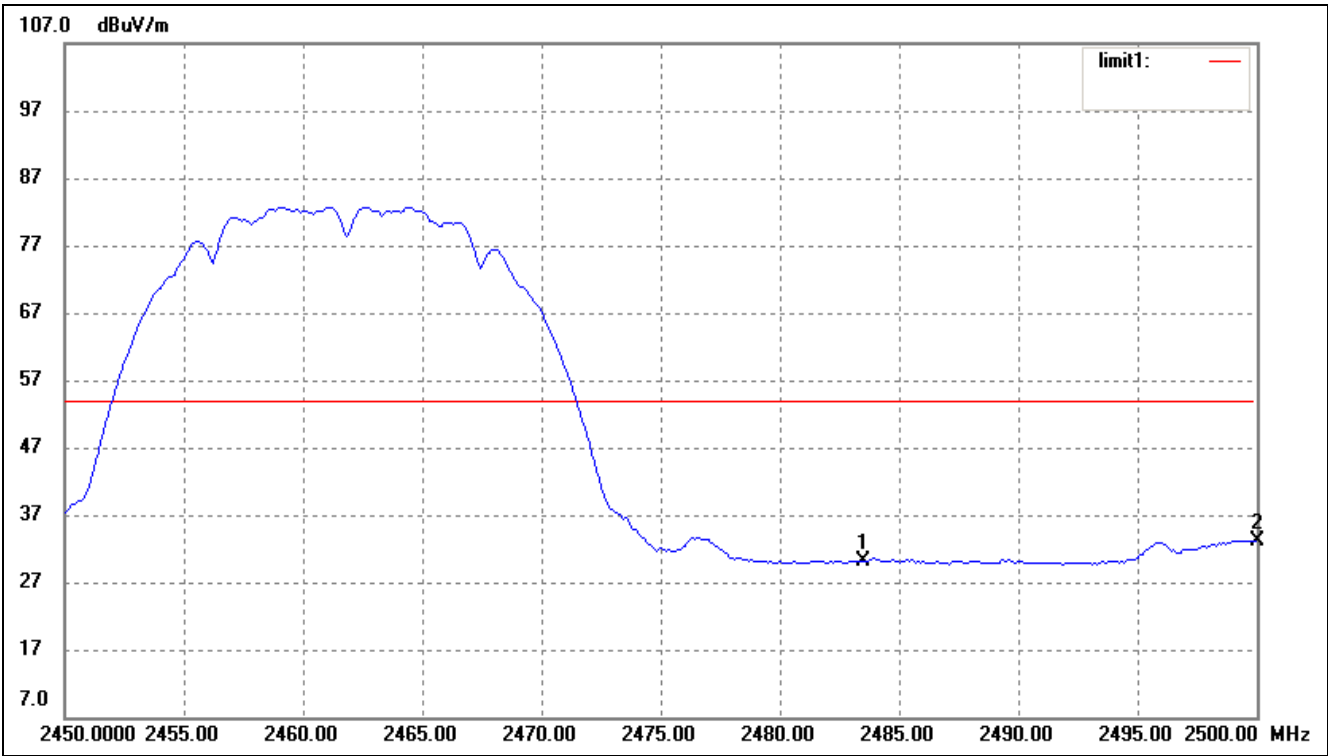
### For 802.11b

Lowest Bandedge



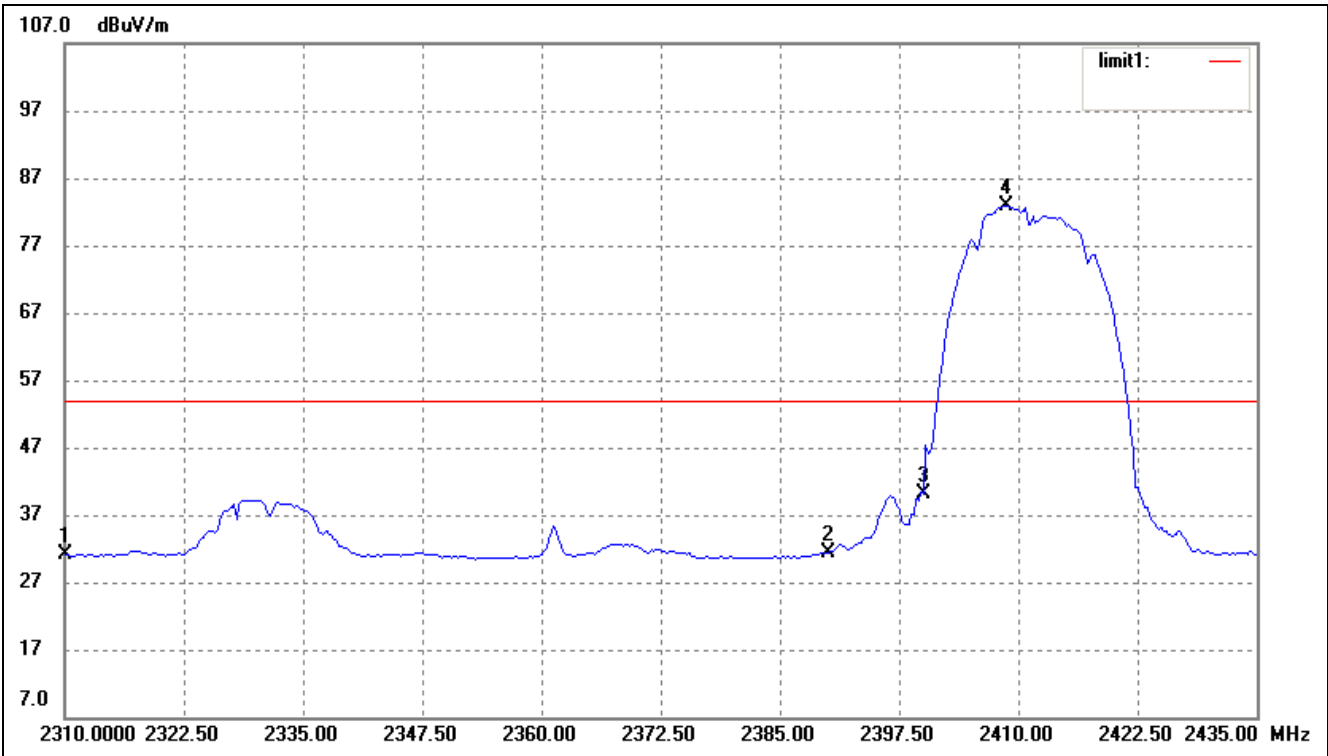
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( ° )	Height (cm)	Remark
1	2310.000	38.67	-7.51	31.16	54.00	-22.84	359	100	Ave
	2310.000	55.89	-7.51	48.38	74.00	-25.62	226	100	peak
2	2390.000	39.76	-7.34	32.42	54.00	-21.58	359	100	Ave
	2390.000	57.67	-7.43	50.24	74.00	-23.76	226	100	peak
3	2400.000	48.25	-7.31	40.94	54.00	-13.06	359	100	Ave
	2400.000	61.53	-7.31	54.22	74.00	-19.78	154	100	peak
4	2409.470	90.90	-7.28	83.62	/	/	/	/	Ave

For 802.11b  
Highest Bandedge



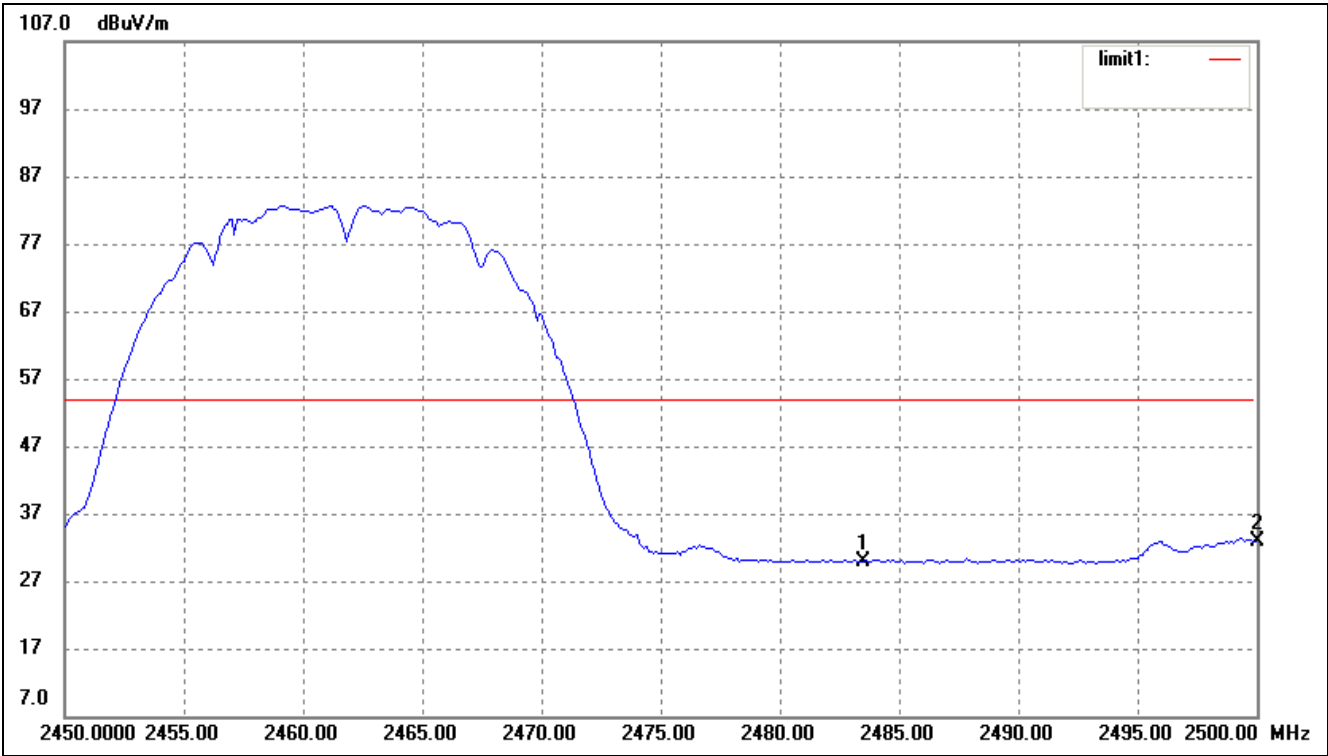
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	2483.500	37.33	-7.13	30.20	54.00	-23.80	359	100	Ave
	2483.500	58.80	-7.13	51.67	74.00	-22.33	55	100	peak
2	2500.000	40.27	-7.08	33.19	54.00	-20.81	359	100	Ave
	2500.000	55.95	-7.08	48.87	74.00	-21.13	359	100	peak

For 802.11g  
Lowest Bandedge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	( ° )	(cm)	
1	2310.000	38.53	-7.51	31.02	54.00	-22.98	360	200	Ave
	2310.000	47.63	-7.51	40.12	74.00	-33.88	360	200	Peak
2	2390.000	38.69	-7.34	31.35	54.00	-22.65	360	200	Ave
	2390.000	60.20	-7.34	52.86	74.00	-21.14	360	200	peak
3	2400.000	47.41	-7.31	40.10	54.00	-13.90	360	100	Ave
	2400.000	66.76	-7.31	59.45	74.00	-14.55	360	100	peak
4	2408.709	90.16	-7.29	82.87	/	/	/	/	Ave

Highest Bandedge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	( ° )	(cm)	
1	2483.500	37.02	-7.13	29.89	54.00	-24.11	360	200	peak
	2483.500	65.90	-7.13	58.77	74.00	-15.23	360	200	
2	2500.000	39.84	-7.08	32.76	54.00	-21.24	360	200	peak
	2500.000	62.56	-7.08	55.48	74.00	-18.52	360	200	

\*\*\*\*\* END OF REPORT \*\*\*\*\*