

# FCC Part 15C

## Measurement and Test Report



For

**Sun Rise Electronic Factory**

**Xian Xi Industry District, Chang An Town, Dong Guan City, Guang Dong**

**Province, China**

**FCC ID: XONSR806000**

<b>Report Concerns:</b> Original Report	<b>Equipment Type:</b> 802.11b/g Wireless Adapter
<b>Model:</b>	<u>SR806XXXX</u>
<b>Report No.:</b>	<u>STR09088059I</u>
<b>Test/Witness Engineer:</b>	
<b>Test Date:</b>	<u>2009-08-15 to 2009-08-19</u>
<b>Issue Date:</b>	<u>2009-08-28</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)
<b>Approved &amp; Authorized By:</b>	 Jandy So / PSQ Manager

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.

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## 1. GENERAL INFORMATION

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

#### Client Information

Applicant: Sun Rise Electronic Factory  
Address of applicant: Xian Xi Industry District, Chang An Town, Dong Guan City,  
Guang Dong Province, China

Manufacturer: Sun Rise Electronic Factory  
Address of manufacturer: Xian Xi Industry District, Chang An Town, Dong Guan City,  
Guang Dong Province, China

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

Items	Description
EUT Description:	802.11b/g Wirelesss Adapter
Trade Name:	/
Model No.:	SR806XXXX,(X=0-9,A-Z,a-z, or Blank)
Rated Voltage:	USB 5V
RF Output Power	< 14 dBm
Frequency range:	2412-2462MHz
Number of channels:	11
Channel Separation:	5MHz
Type of Antenna:	Integral Antenna
Size:	4.0x1.5x0.3cm
For more information refer to the circuit diagram form and the user's manual.	

*Note: The test data is gathered from a production sample, provided by the manufacturer. Test is carried out with SR806XXXX,(X=0-9,A-Z,a-z, or Blank) since the other models listed in this report are different appearance without circuit and electronic construction changed, declared by the manufacture.*

### 1.2 Test Standards

The following report is prepared on behalf of the Sun Rise Electronic Factory 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 Related Submittal(s)/Grant(s)

No Related Submittal(s).

## 1.4 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.

## 1.5 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.

## 1.6 EUT Exercise Software

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

## 1.7 Accessories Equipment List and Details

Manufacturer	Description	Model	Serial Number
IBM	Notebook	T22	LV14893
Gi-Link	Router	RG2415	/
Lenovo	Printer	3110	OD65133711480

## 1.8 EUT Cable List and Details

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

## 2. SUMMARY OF TEST RESULTS

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FCC RULES	DESCRIPTION OF TEST	RESULT
§ 15.203; § 15.247(c)(1)(i)	Antenna Requirement	Compliant
§ 1.1307(b)	Maximum Permissible Exposure	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  $\pm 0.5$  dB.

#### 3.2 Test Equipment List and Details

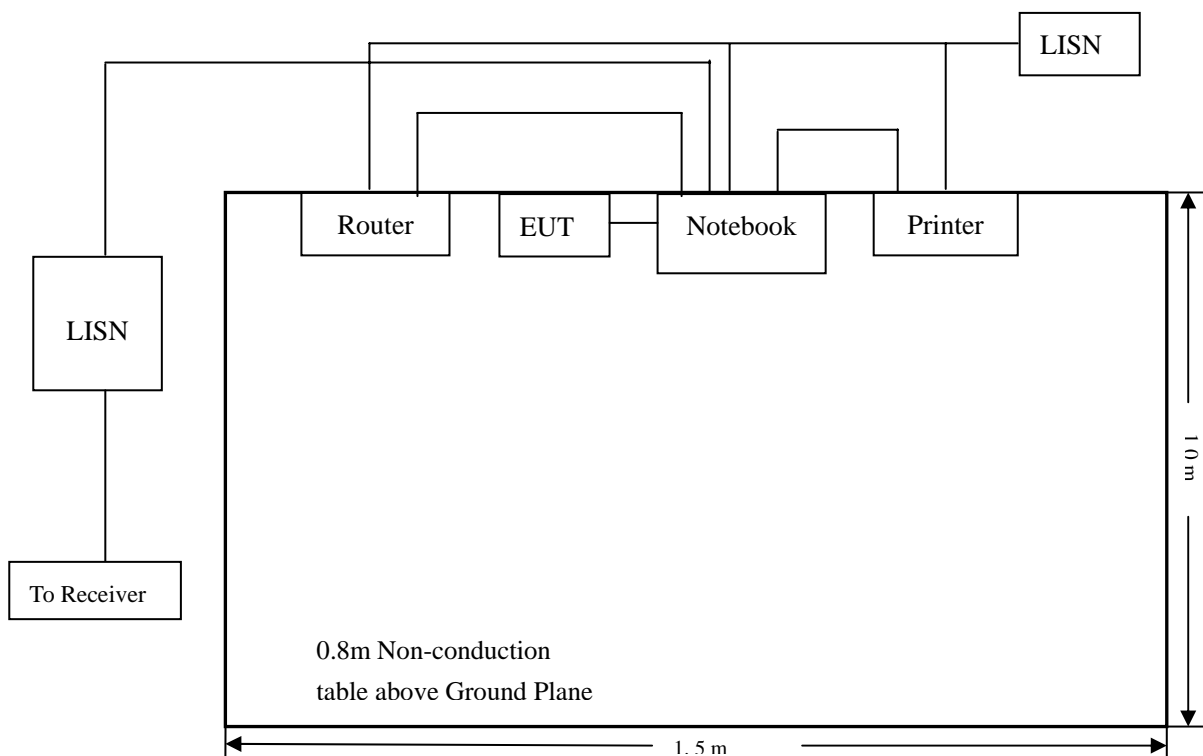
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2009-08-12	2010-08-11
Puls Limiter	Rohde & Schwarz	ESH3-Z2	100911	2009-08-12	2010-08-11
L.I.S.N.	SCHWARZBECK	NSLK8126	8126-224	2009-08-12	2010-08-11
L.I.S.N.	EMCO	3825/2	11967C	2009-08-12	2010-08-11

**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 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

**-7.9 dB $\mu$ V at 4.218 MHz in the Neutral QP Detector, 0.15-30MHz**

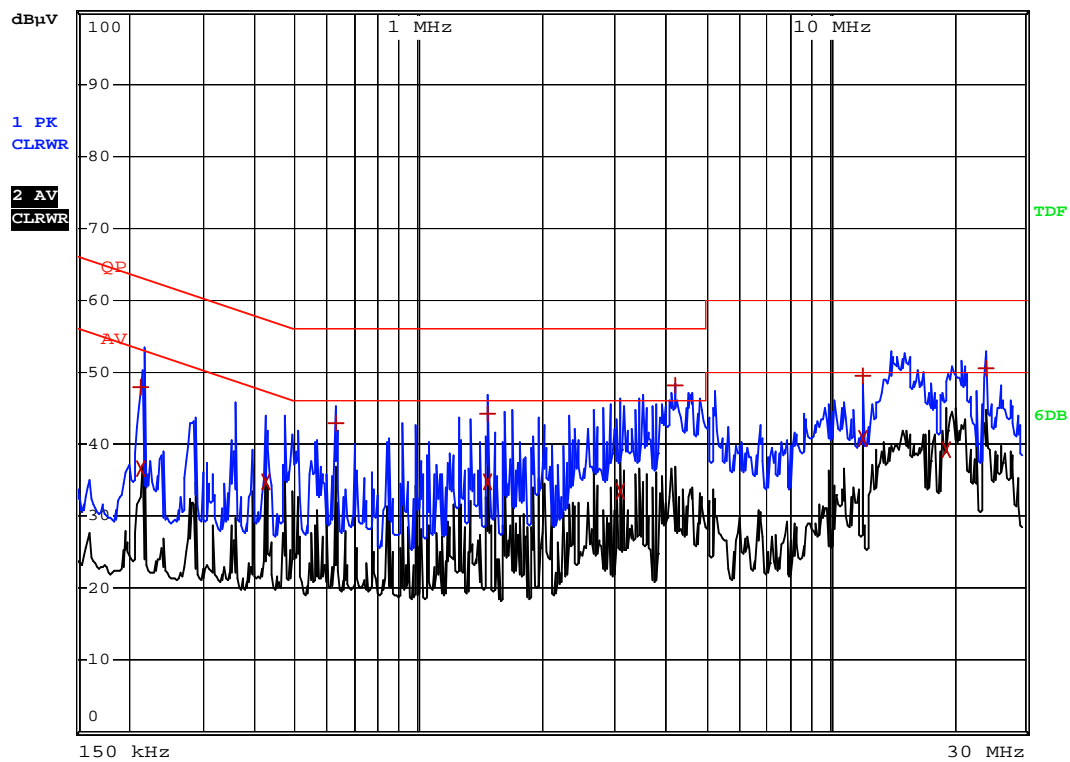
### 3.7 Conducted Emissions Test Data

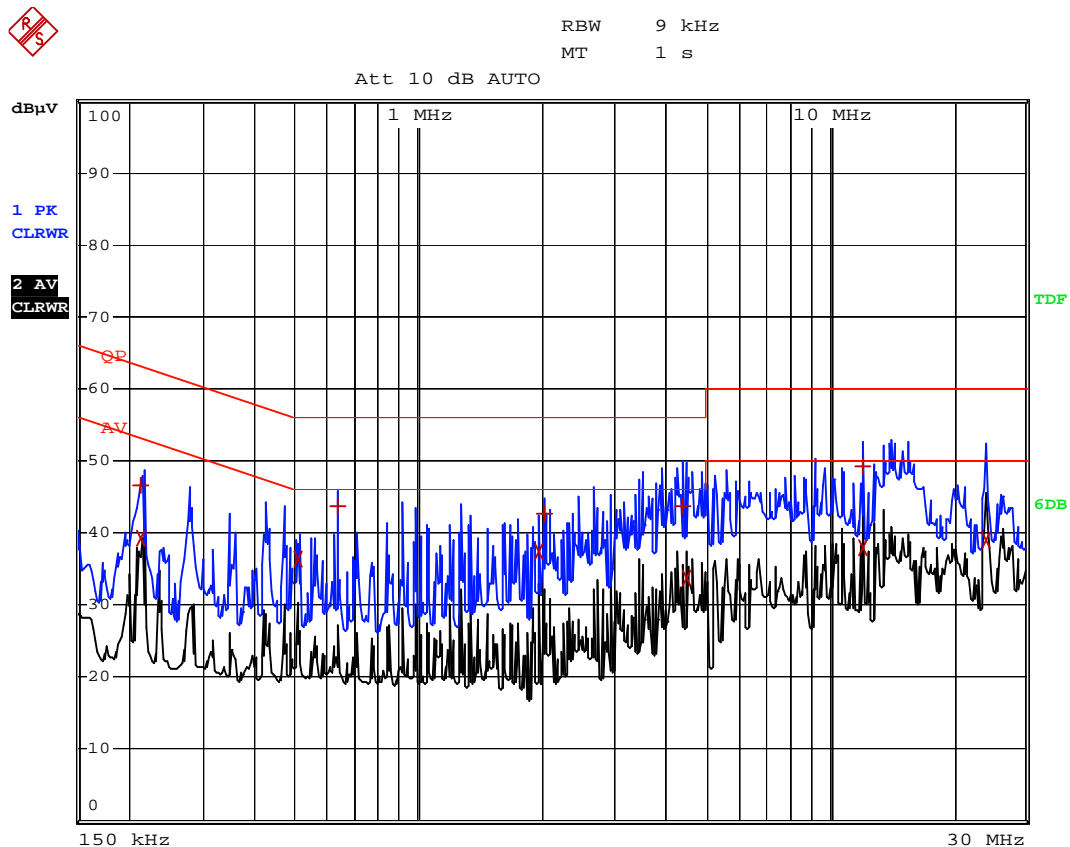
LINE CONDUCTED EMISSIONS				FCC 15.207	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dB $\mu$ V	QP/Ave/Pk	Line/Neutral	dB $\mu$ V	dB
4.218	48.15	QP	Neutral	56	-7.9
1.966	37.47	Ave	Line	46	-8.5
12.012	40.82	Ave	Neutral	50	-9.2
23.902	50.64	QP	Neutral	60	-9.4
0.510	36.47	Ave	Line	46	-9.5
19.318	39.33	Ave	Neutral	50	-10.7
12.002	49.30	QP	Line	60	-10.7
1.474	34.87	Ave	Neutral	46	-11.1
24.006	38.86	Ave	Line	50	-11.1
1.474	44.27	QP	Neutral	56	-11.7
4.422	43.76	QP	Line	56	-12.2
12.002	37.85	Ave	Line	50	-12.2
4.494	33.71	Ave	Line	46	-12.3
0.634	43.61	QP	Line	56	-12.4
12.102	47.47	QP	Neutral	60	-12.5
3.094	33.54	Ave	Neutral	46	-12.5
0.422	34.82	Ave	Neutral	47.41	-12.6
0.630	43.01	QP	Neutral	56	-13.0
2.034	42.52	QP	Line	56	-13.5
0.214	39.25	Ave	Line	53.05	-13.8
0.214	48.03	QP	Neutral	63.05	-15.0
0.214	36.70	Ave	Neutral	53.05	-16.3
0.214	46.68	QP	Line	63.05	-16.4



**Plot of Conducted Emissions Test Data***Conducted Disturbance**EUT: 802.11b/g Wireless Adapter**M/N: SR806XXXX,(X=0-9,A-Z,a-z, or Blank)**Operating Condition: Wireless Transmitting**Test Specification: L**Comment: AC 120V/60Hz/USB5V*RBW 9 kHz  
MT 100 ms

Att 10 dB AUTO



**Plot of Conducted Emissions Test Data***Conducted Disturbance**EUT: 802.11b/g Wireless Adapter**M/N: SR806XXXX,(X=0-9,A-Z,a-z, or Blank)**Operating Condition: Wireless Transmitting**Test Specification: N**Comment: AC 120V/60Hz/USB5V*

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

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### **4.1 Standard Applicable**

According to FCC 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 unique and integral antenna, fulfill the requirement of this section.

## 5. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

### 5.1 Standard Applicable

According to § 1.1307(b)(1), system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

#### (a) Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100000			5	6

#### (b) Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100000			1	30

Note: f = frequency in MHz: \* = Plane-wave equivalents power density

### 5.2 MPE Calculation Method

$$S = (P \cdot G) / (4 \cdot \pi \cdot R^2)$$

S = power density (in appropriate units, e.g., mW/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

### 5.3 MPE Calculation Result

Maximum peak output power at antenna input terminal: 11.76 (dBm)

Maximum peak output power at antenna input terminal: 14.996848 (mW)

Prediction distance: 2.5 (cm)

Prediction frequency: 2437 (MHz)

Antenna gain (typical): 0 (dBi)

Antenna gain (numeric): 1 (numeric)

The worst case is power density at prediction frequency at 20cm: 0.190946 (mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm<sup>2</sup>)

$$0.190946(\text{mw}/\text{cm}^2) < 1 (\text{mw}/\text{cm}^2)$$

Result: Pass

## 6. POWER SPECTRAL DENSITY

### 6.1 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.

### 6.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2009-08-12	2010-08-11
RF Limiter	Agilent	11867A	MY42241685	2009-08-12	2010-08-11
RMS/PEAK Voltmeter	Rohde & Schwarz	URE3	826135/008	2009-08-12	2010-08-11

**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. Set the spectrum analyzer as RBW, VBW=3KHz, Span = 20MHz.
4. Repeat above procedures until all frequency measured was complete.

### 6.4 Environmental Conditions

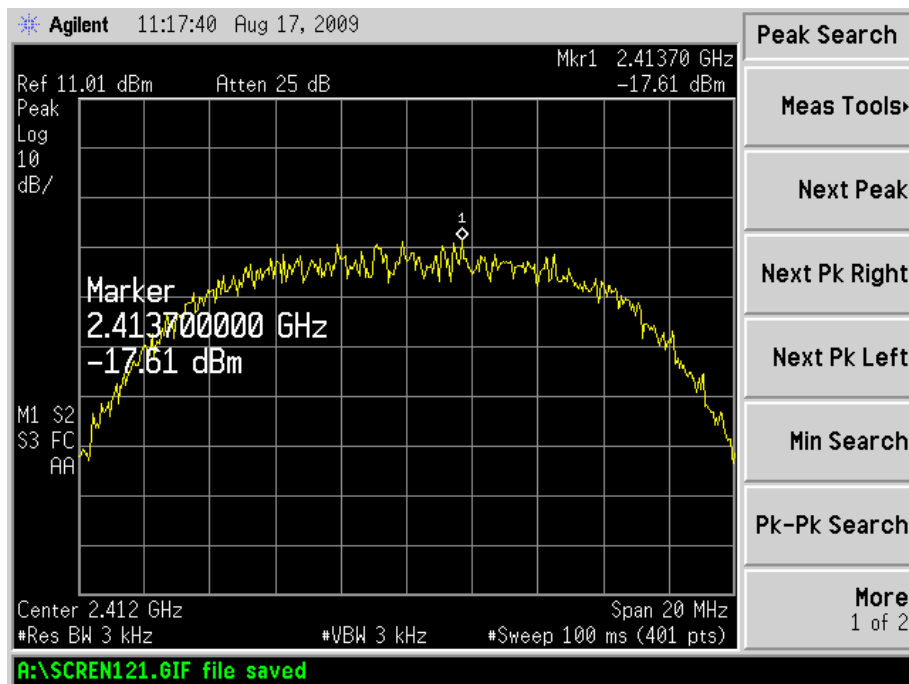
Temperature:	20° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

**6.5 Summary of Test Results/Plots**

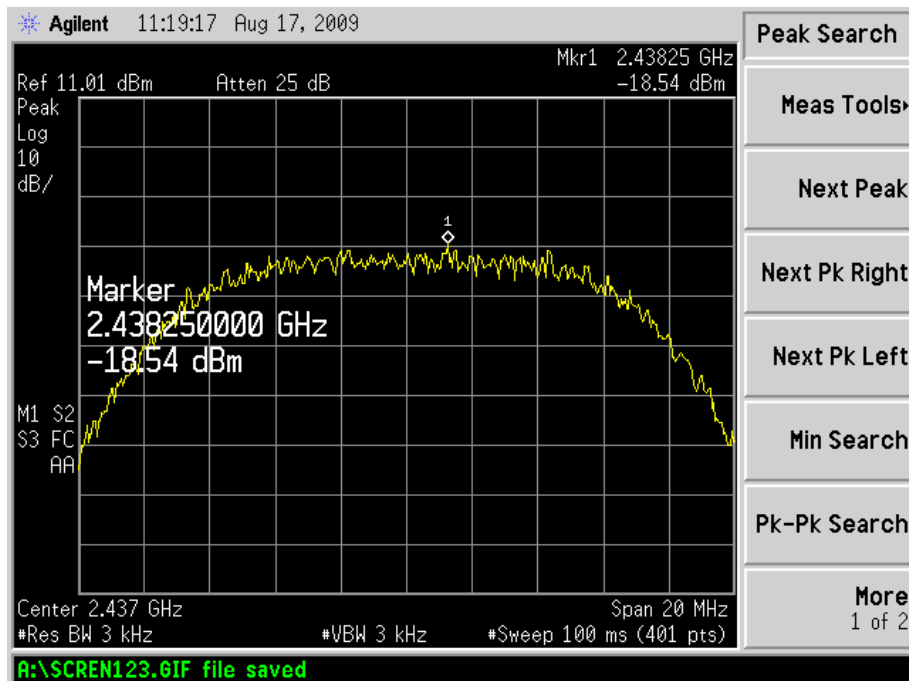
Test mode	Test channel	Reading dBm/3kHz	Limit dBm/3kHz
802.11b	Low channel (2412MHz)	-17.61	8
	Middle channel (2437MHz)	-18.54	8
	High channel (2462MHz)	-17.88	8
802.11g	Low channel (2412MHz)	-23.44	8
	Middle channel (2437MHz)	-22.77	8
	High channel (2462MHz)	-22.30	8

**For 802.11b**

Low Channel:

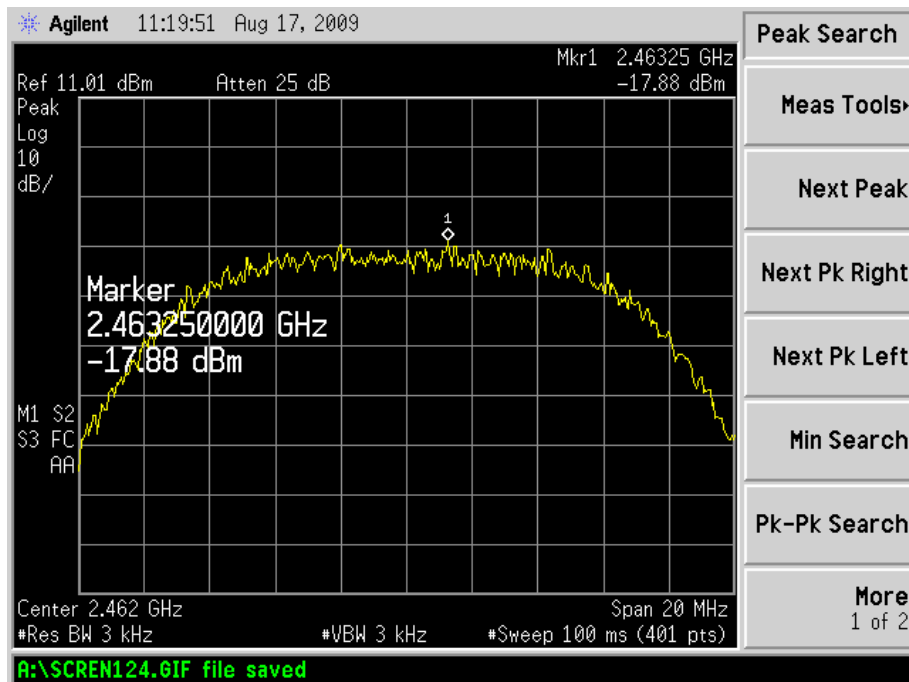


Middle Channel:



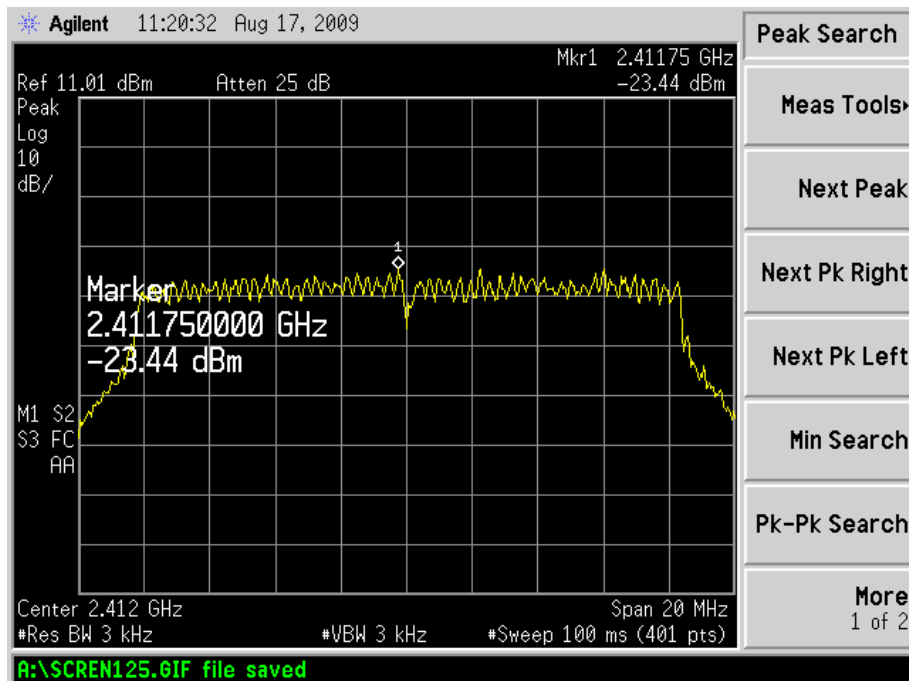


High Channel:

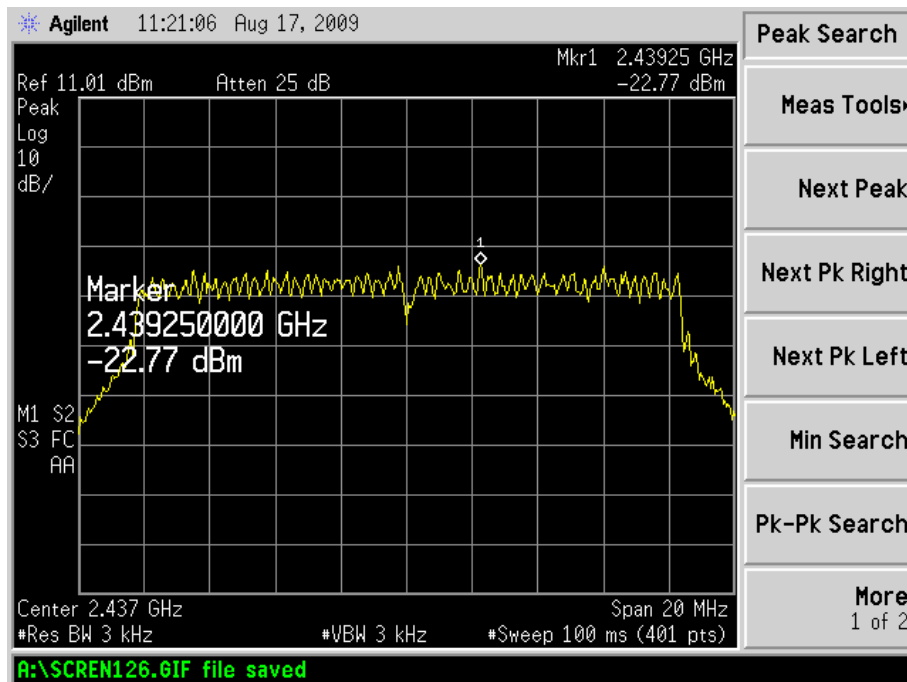


For 802.11g

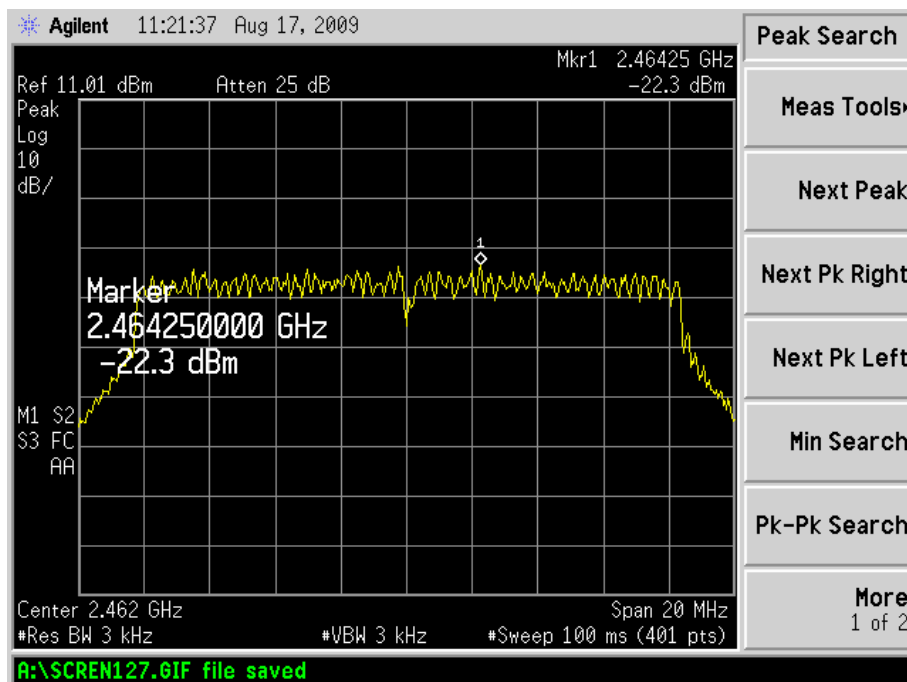
Low Channel:



Middle Channel:



High Channel:



## 7. 6-dB BANDWIDTH

### 7.1 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.

### 7.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2009-08-12	2010-08-11
RF Limiter	Agilent	11867A	MY42241685	2009-08-12	2010-08-11

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

### 7.3 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=300KHz (1 % of Bandwidth.), Sweep=auto
4. Mark the peak frequency and –6dB (upper and lower) frequency.

### 7.4 Environmental Conditions

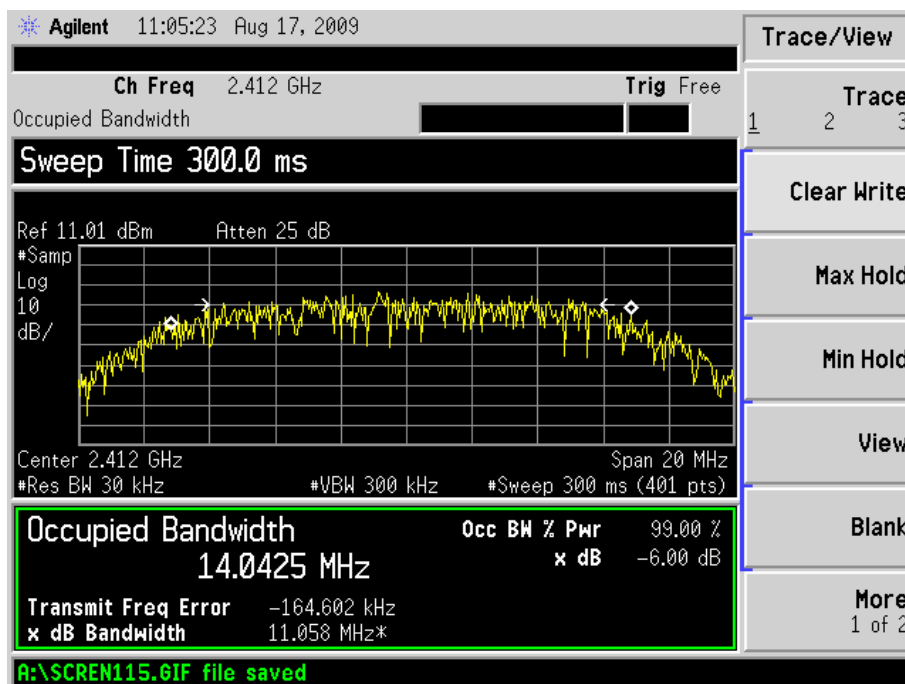
Temperature:	24° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

### 7.5 Summary of Test Results/Plots

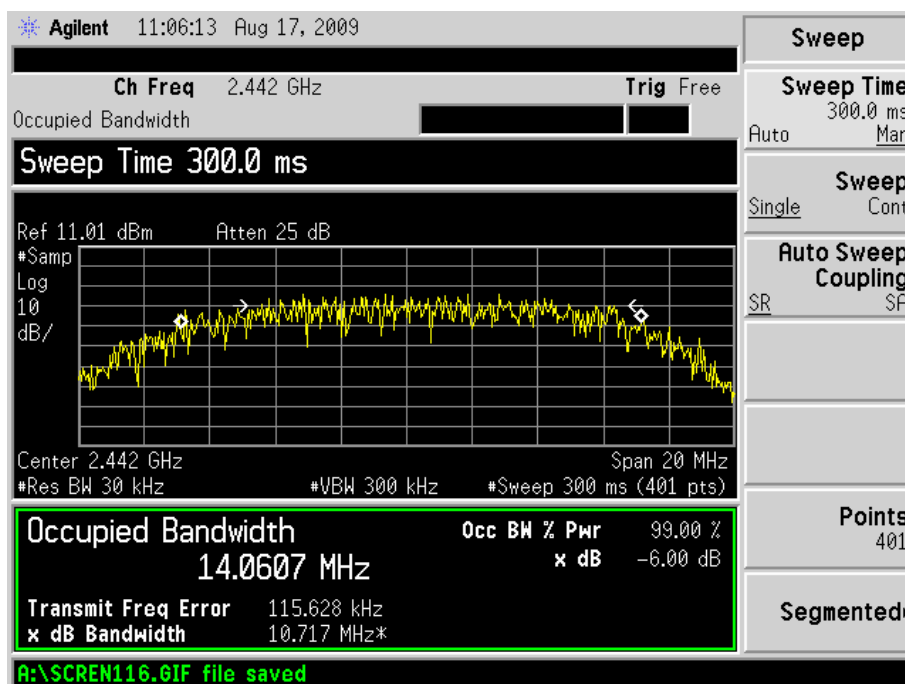
Test mode	Frequency MHz	6 dB Bandwidth kHz	Limit kHz
802.11b	2412	11058.0	>500
	2437	10717.0	>500
	2462	10268.0	>500
802.11g	2412	16203.0	>500
	2437	16174.0	>500
	2462	15692.0	>500

**For 802.11b**

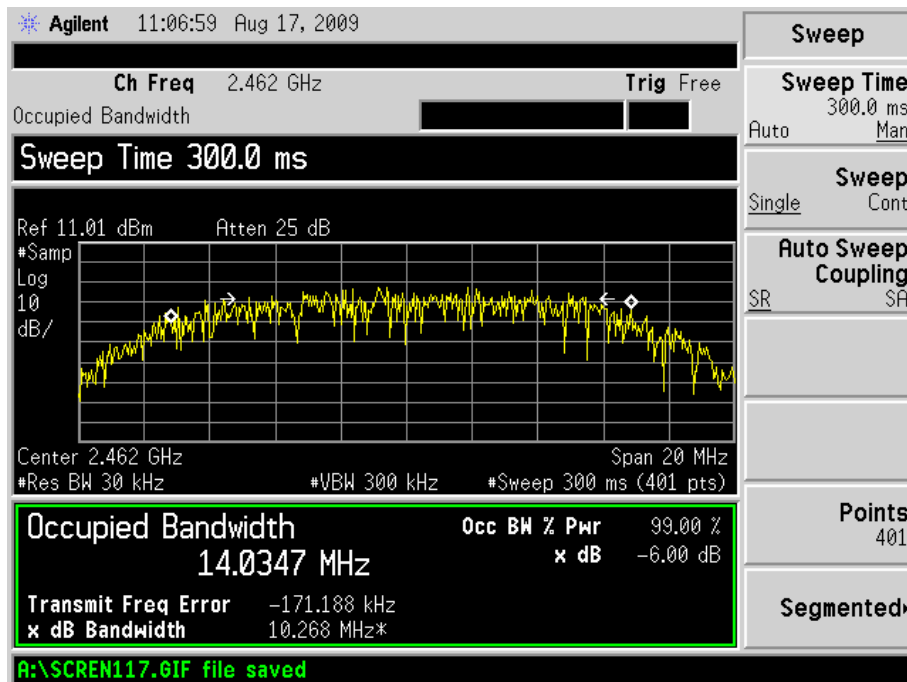
Low Channel:



Mid Channel:

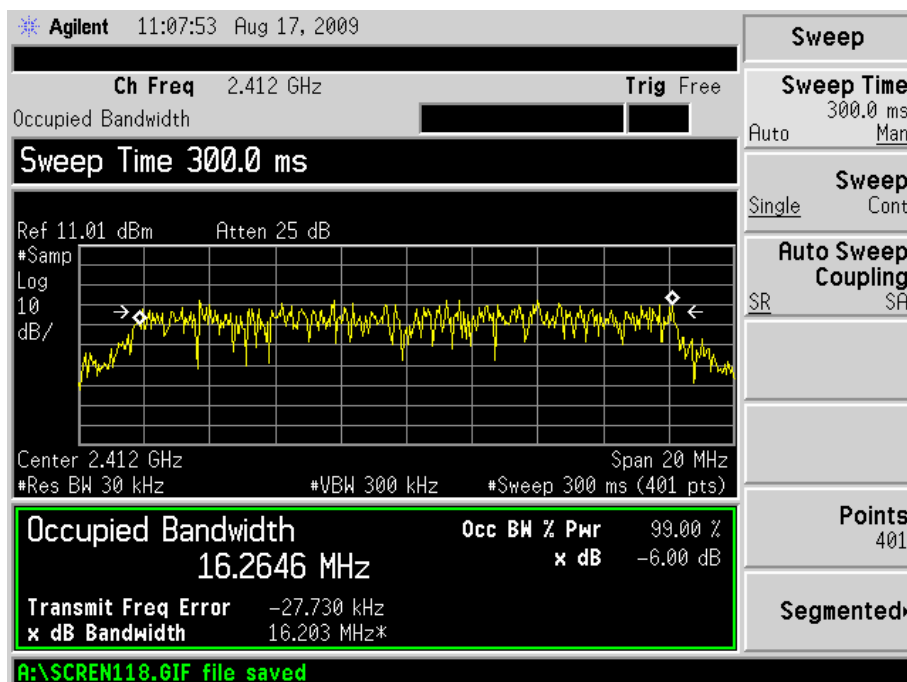


High Channel:

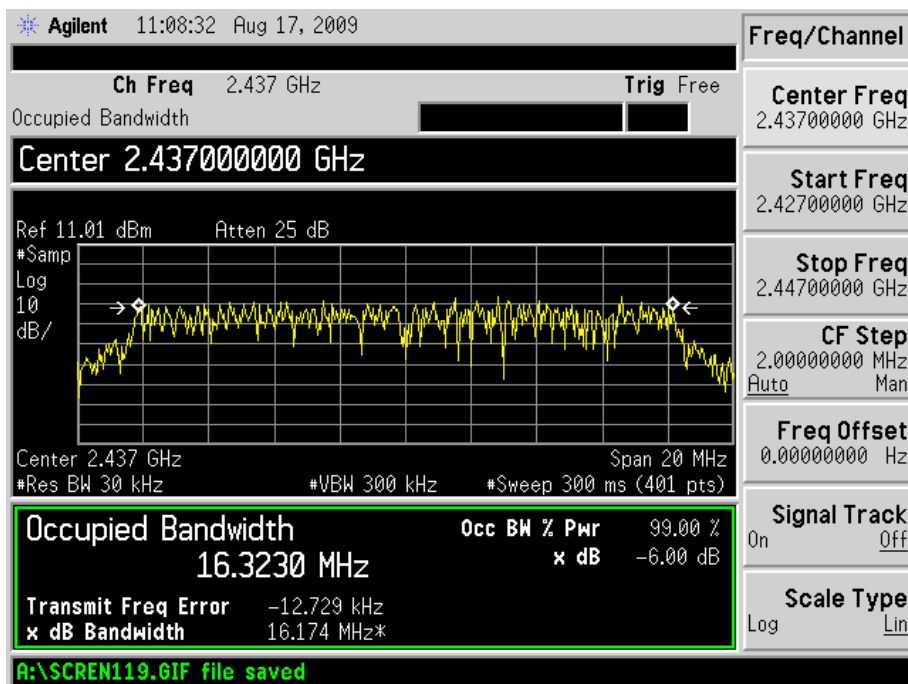


For 802.11g

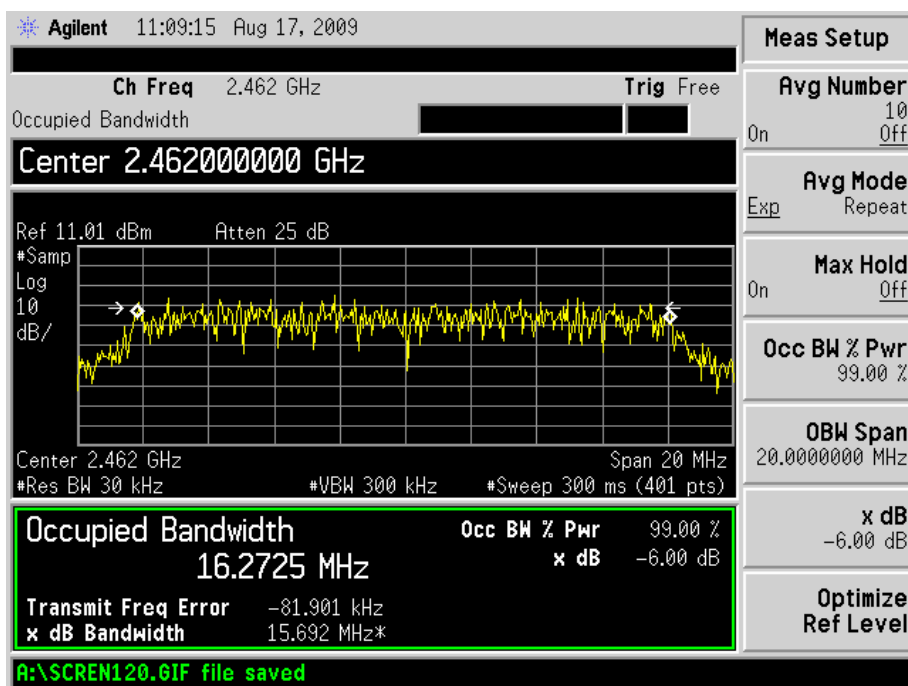
Low Channel:



Mid Channel:



High Channel:



## 8. POWER OUTPUT

### 8.1 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.

### 8.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2009-08-12	2010-08-11
RF Limiter	Agilent	11867A	MY42241685	2009-08-12	2010-08-11

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

### 8.3 Test Procedure

The device under test has an integral antenna and the power was measured on a radiated basis.

### 8.4 Environmental Conditions

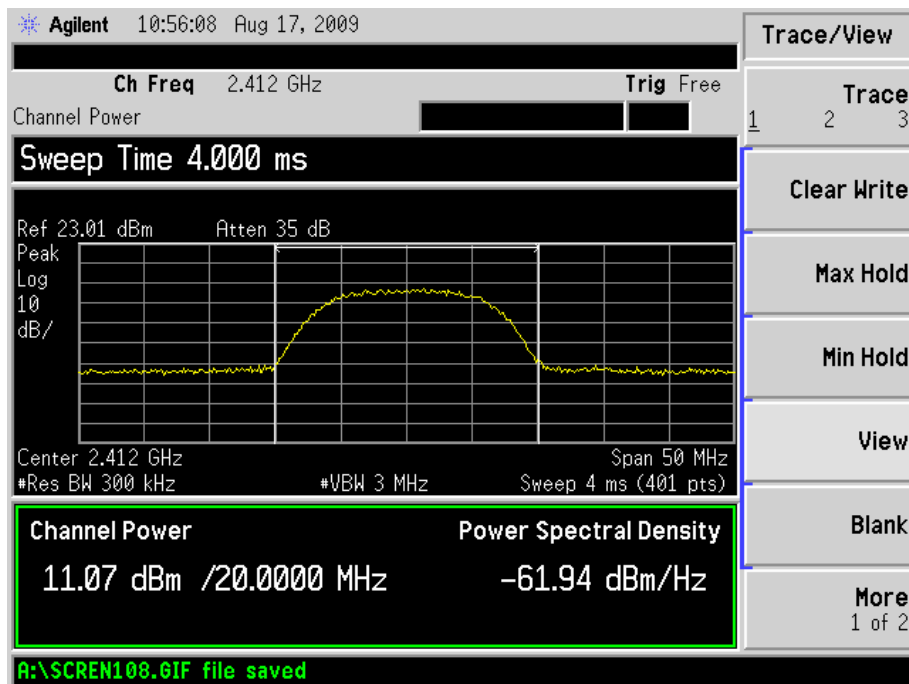
Temperature:	21° C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

### 8.5 Summary of Test Results/Plots

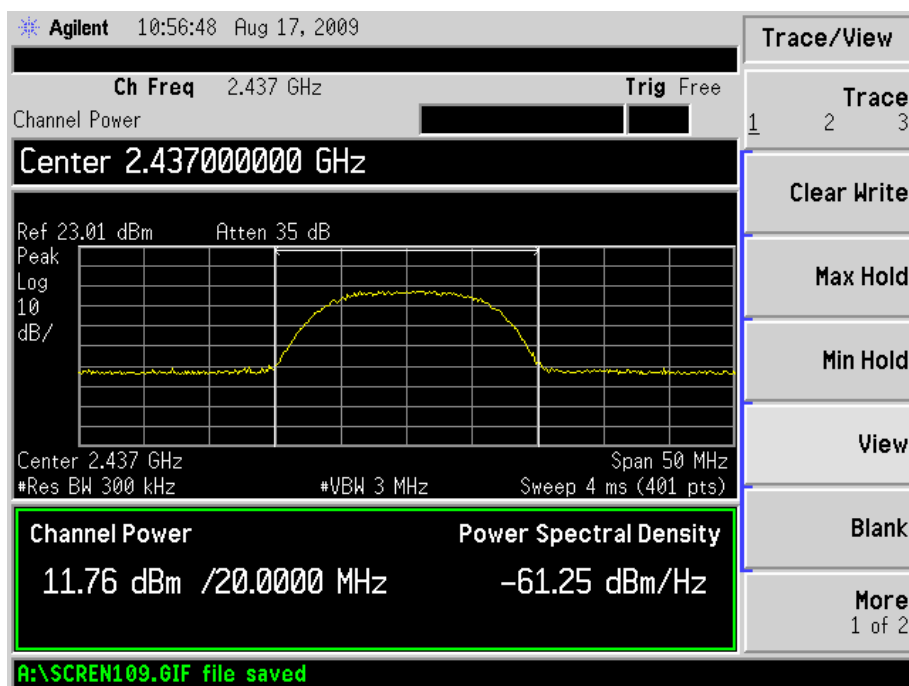
Test mode	Frequency MHz	Reading dBm	Output power W	Limit W
802.11b	2412	11.07	0.012794	1
	2437	11.76	0.014997	1
	2462	11.63	0.014555	1
802.11g	2412	7.32	0.005395	1
	2437	8.39	0.006902	1
	2462	8.42	0.006950	1

**For 802.11b**

Low Channel:

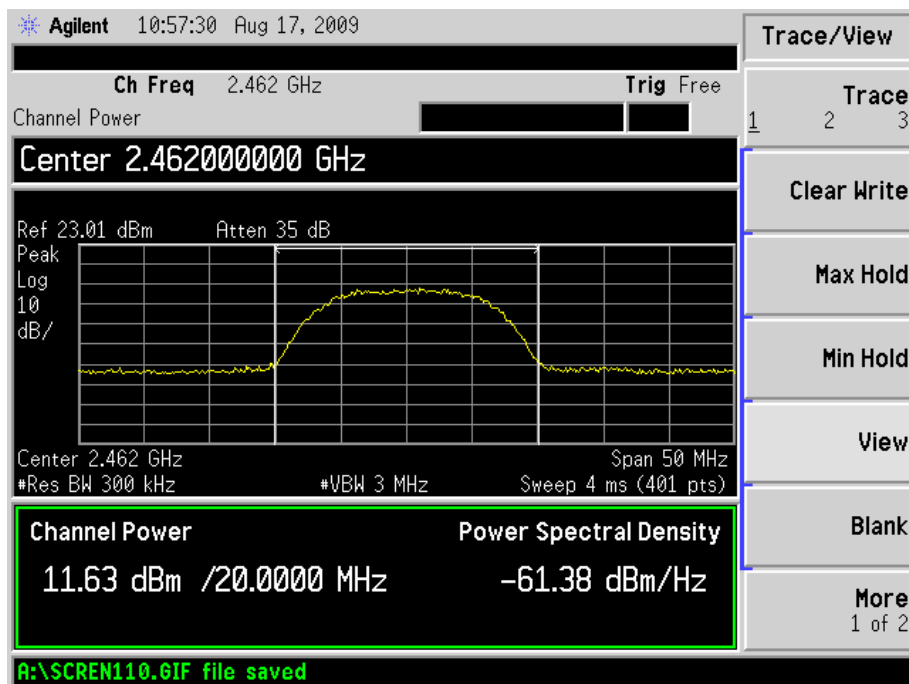


Middle Channel:



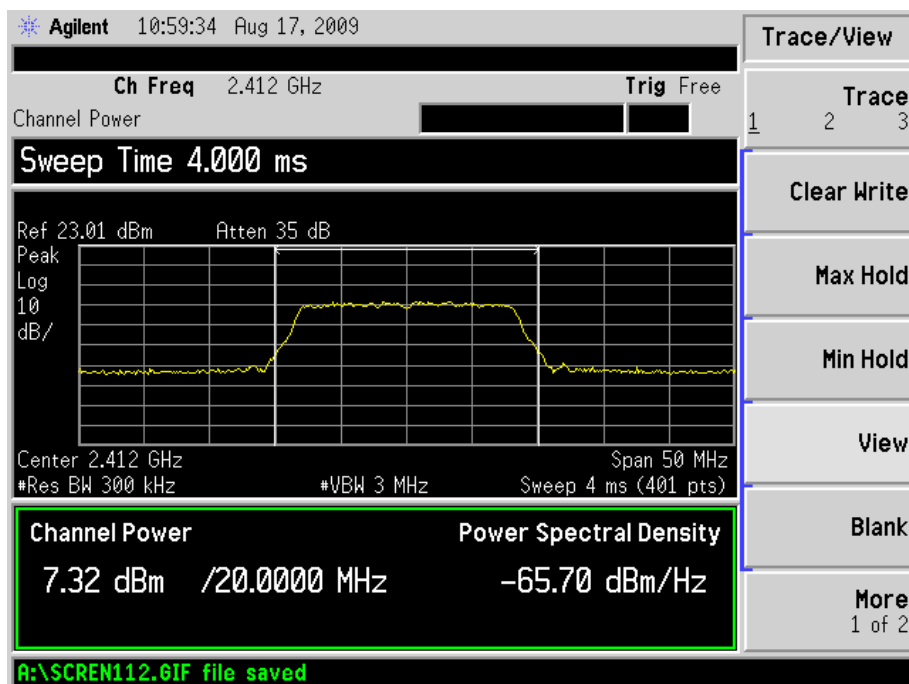


High Channel:

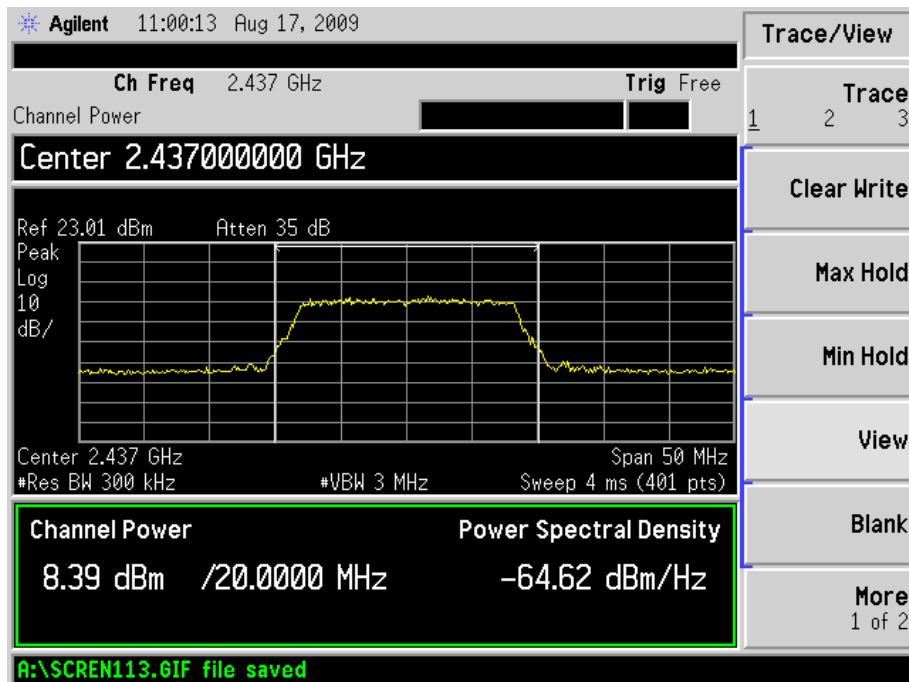


For 802.11g

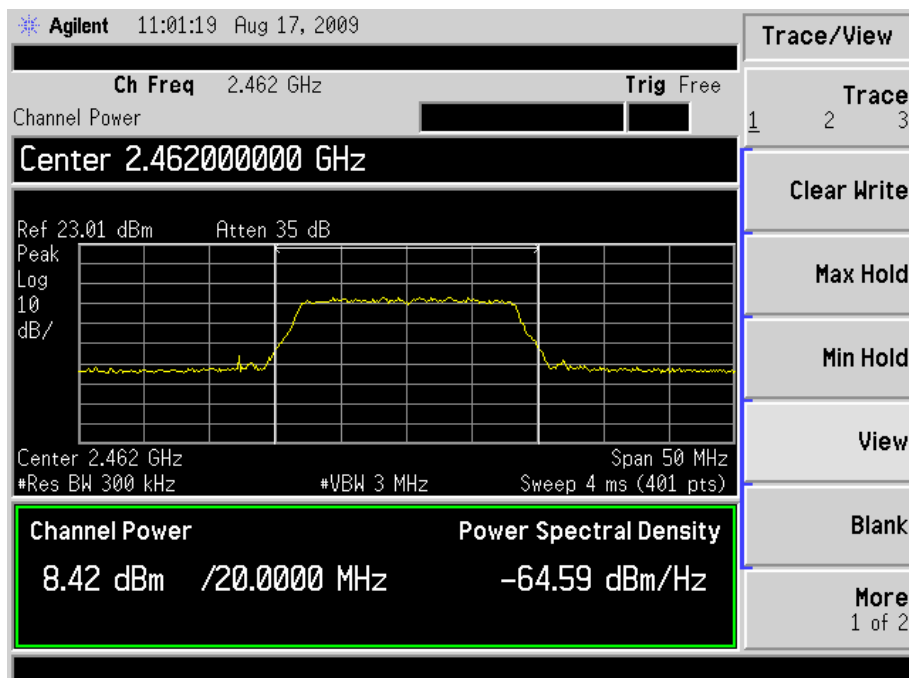
Low Channel:



Middle Channel:



High Channel:



## 9. FIELD STRENGTH OF SPURIOUS EMISSIONS

### 9.1 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  $\pm 3.0$  dB.

### 9.2 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.

### 9.3 Test Equipment List and Details

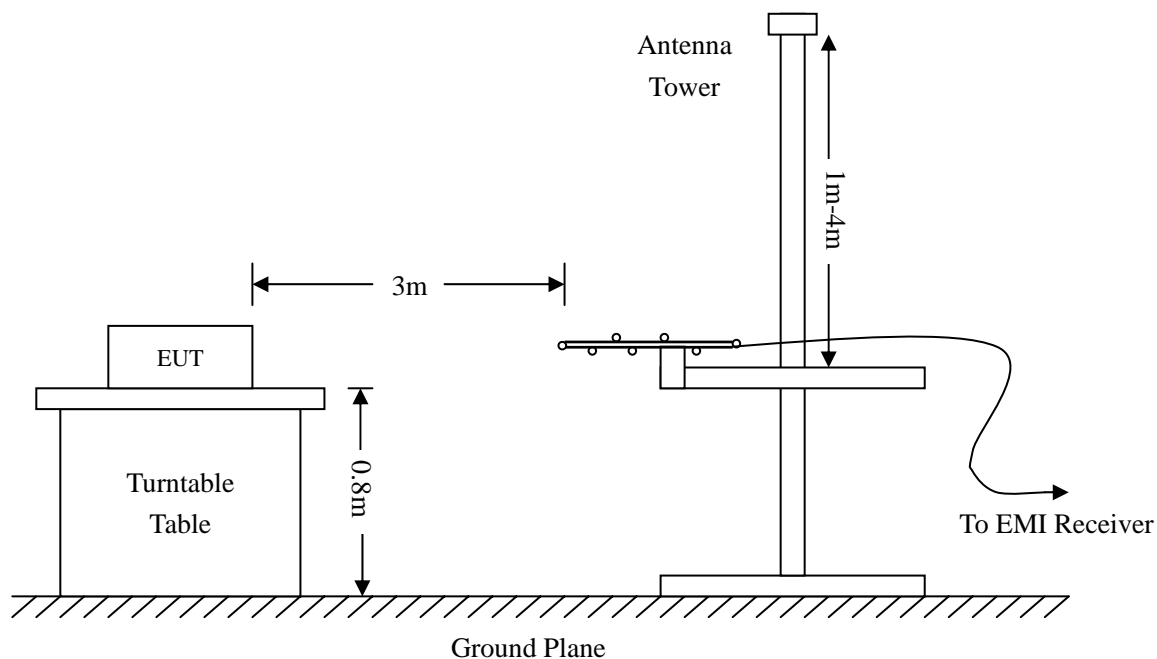
Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2009-08-12	2010-08-11
Positioning Controller	C&C	CC-C-1F	N/A	2009-08-12	2010-08-11
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2009-07-21	2010-07-20
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2009-07-21	2010-07-20
RF Switch	EM	EMSW18	SW060023	2009-08-12	2010-08-11
Amplifier	Agilent	8447F	3113A06717	2009-08-12	2010-08-11
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2009-08-12	2010-08-11
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	25498514	2009-08-12	2010-08-11

### 9.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 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.



## 9.5 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:

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

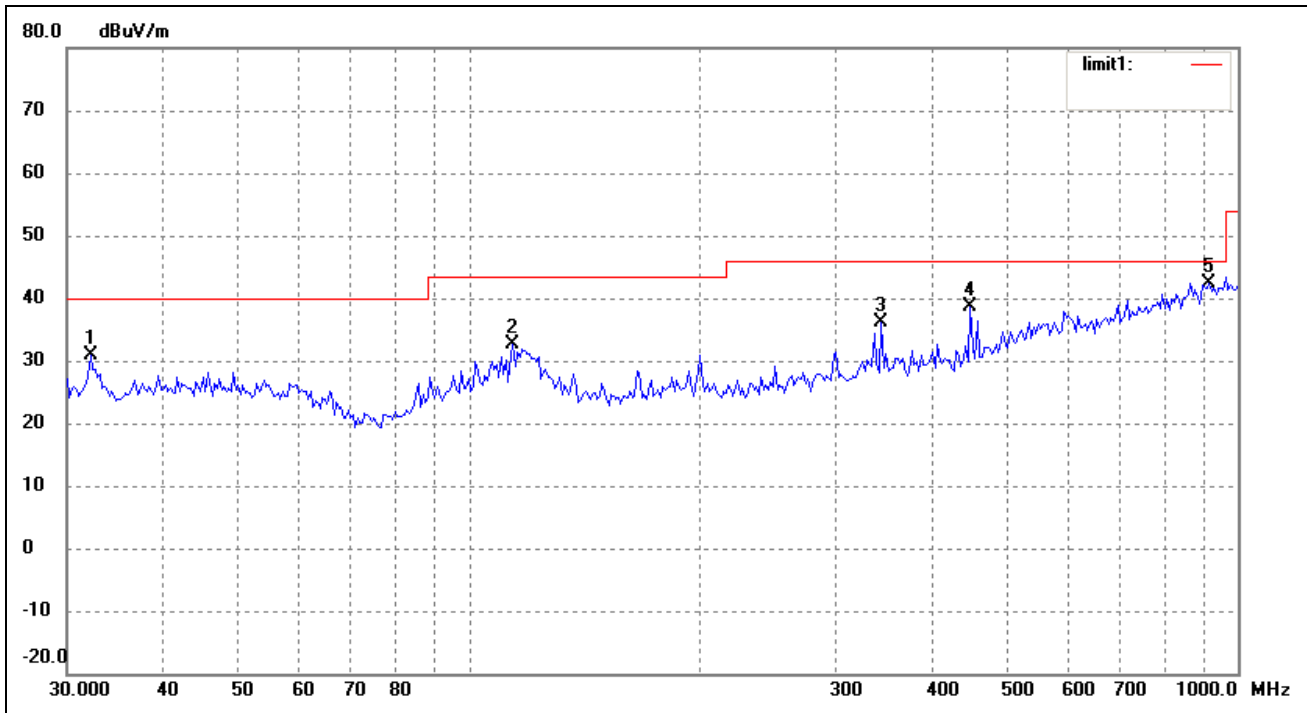
## 9.6 Environmental Conditions

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

## 9.7 Summary of Test Results/Plots

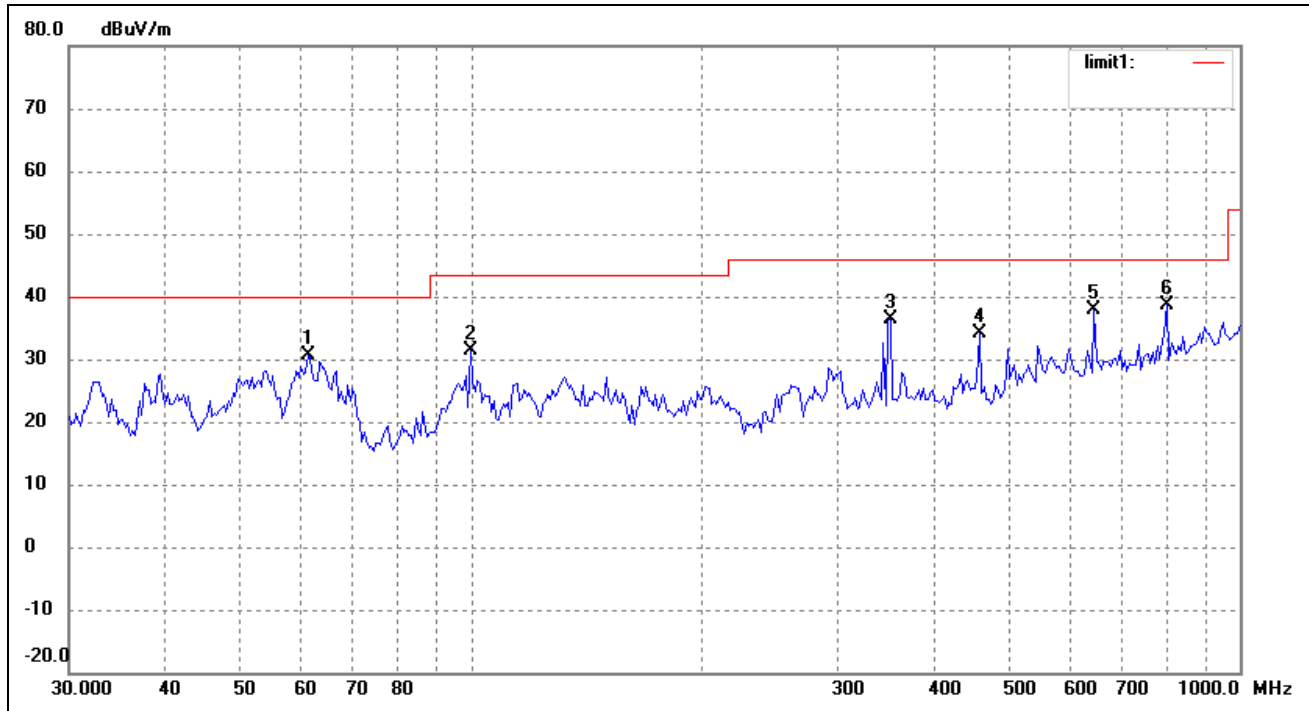
According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst margin of:

**-3.54 dBμV at 919.1315 MHz in the Horizontal polarization, Transmitting 802.11b (Low channel) test mode, 30 MHz to 25 GHz, 3Meters**

*Test Result/Plots:**Spurious Emission From 30 MHz to 1 GHz**Test mode: Transmitting (802.11b) Low 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	32.1840	17.50	13.42	30.92	40.00	-9.08	265	100	Peak
2	114.0184	19.97	12.63	32.60	43.50	-10.90	210	100	Peak
3	343.6506	20.69	15.49	36.18	46.00	-9.82	15	100	Peak
4	448.8361	21.35	17.18	38.53	46.00	-7.47	206	100	Peak
5	919.1315	15.74	26.72	42.46	46.00	-3.54	12	100	QP

## Vertical



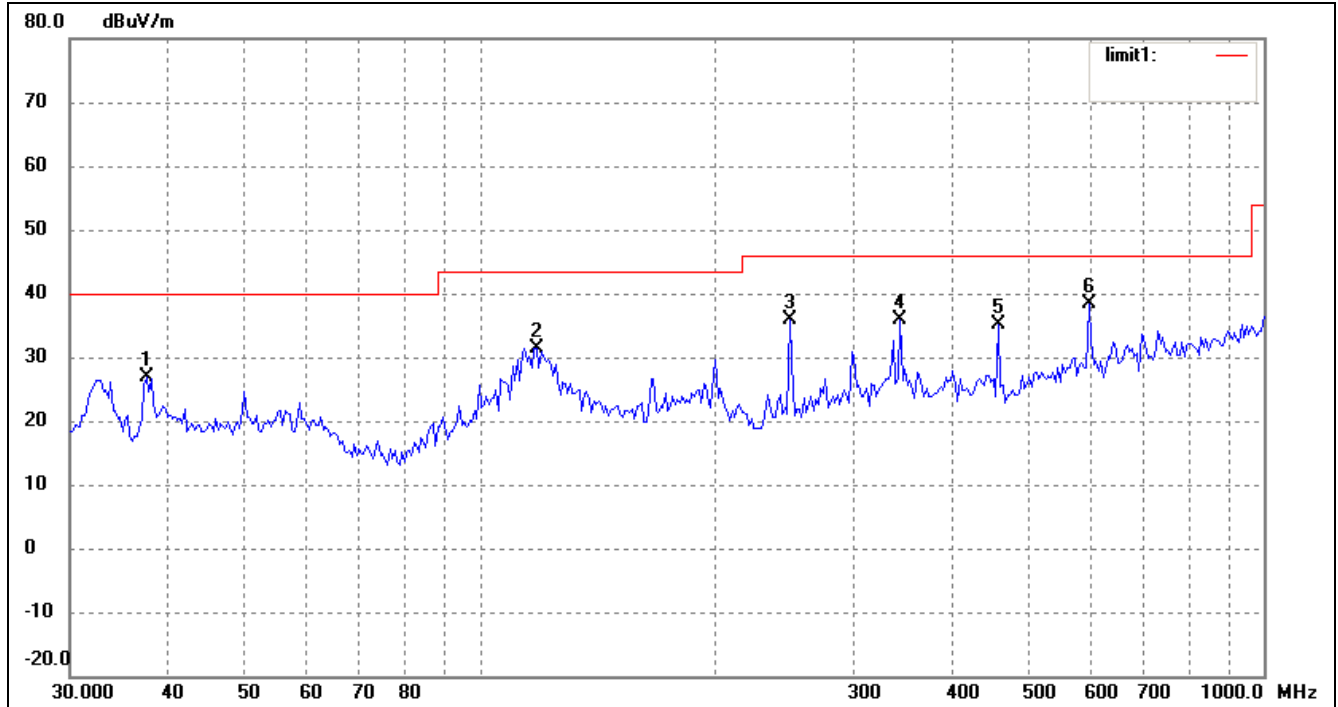
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	61.4343	23.99	6.62	30.61	40.00	-9.39	120	100	Peak
2	99.7676	23.60	7.79	31.39	43.50	-12.11	356	100	Peak
3	350.9722	26.98	9.46	36.44	46.00	-9.56	5	100	Peak
4	458.3987	23.83	10.38	34.21	46.00	-11.79	359	100	Peak
5	646.8217	22.55	15.34	37.89	46.00	-8.11	12	100	Peak
6	804.2523	21.62	17.13	38.75	46.00	-7.25	360	100	Peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11b) Middle Channel

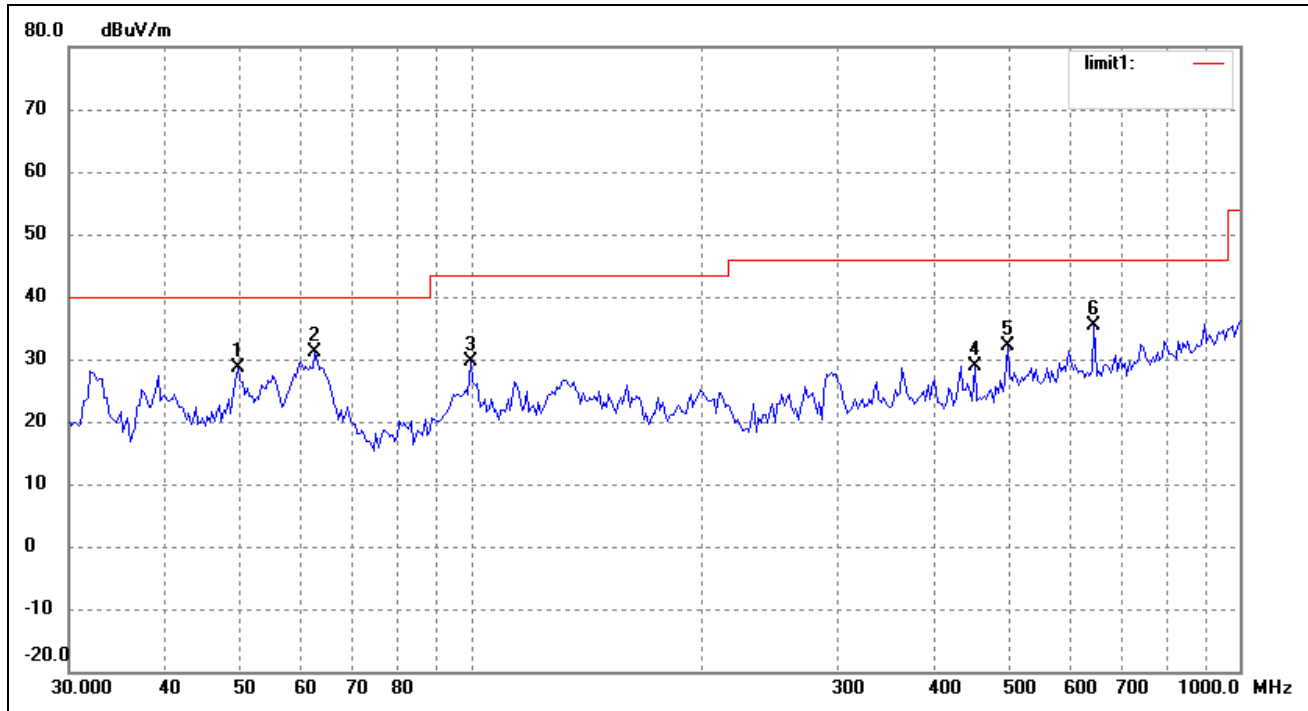
Comment: /

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (° )	Height (cm)	Remark
1	37.5648	19.52	7.29	26.81	40.00	-13.19	10	100	Peak
2	118.0957	25.89	5.59	31.48	43.50	-12.02	28	100	Peak
3	248.7319	28.25	7.65	35.90	46.00	-10.10	45	100	Peak
4	343.6506	26.68	9.31	35.99	46.00	-10.01	200	100	Peak
5	458.3987	24.78	10.38	35.16	46.00	-10.84	355	100	Peak
6	598.7067	23.38	14.99	38.37	46.00	-7.63	360	100	Peak

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	49.7571	20.96	7.70	28.66	40.00	-11.34	273	100	Peak
2	62.7432	24.95	6.10	31.05	40.00	-8.95	32	100	Peak
3	99.7676	21.84	7.79	29.63	43.50	-13.87	342	100	Peak
4	452.0013	18.33	10.52	28.85	46.00	-17.15	179	100	Peak
5	498.7303	19.22	12.80	32.02	46.00	-13.98	360	100	Peak
6	646.8217	20.09	15.34	35.43	46.00	-10.57	102	100	Peak

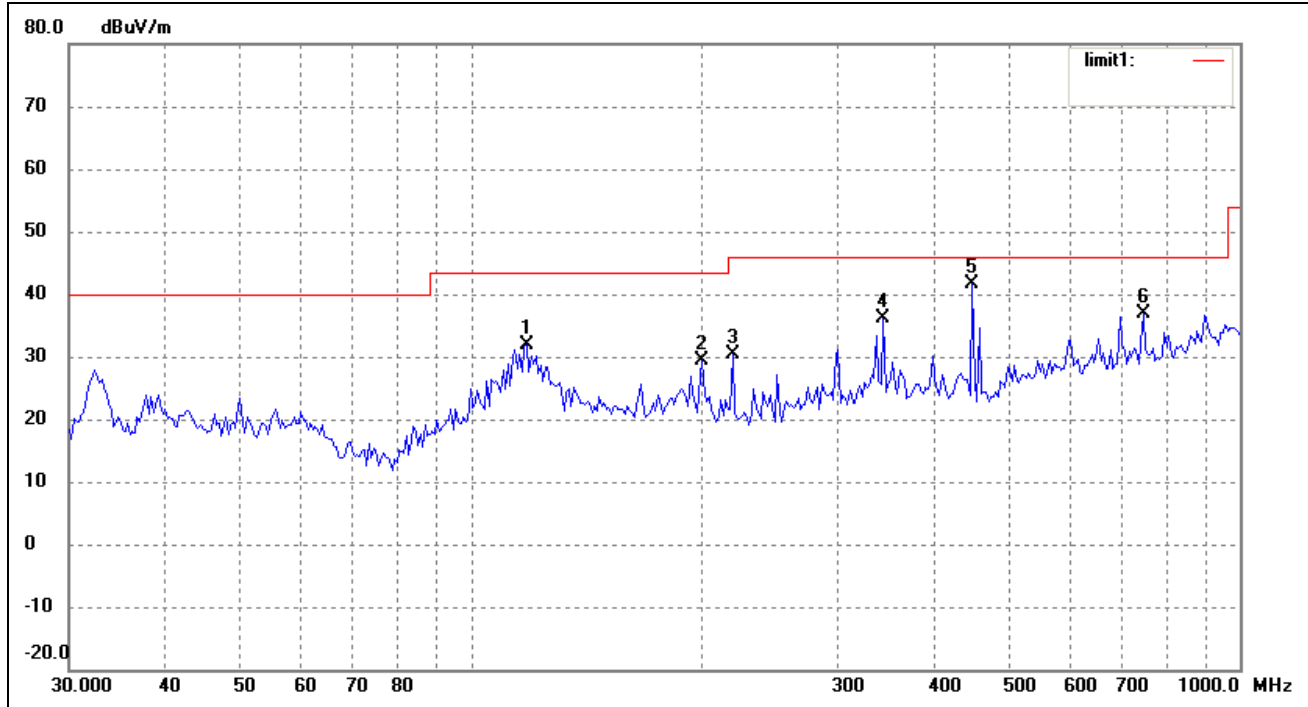


Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11b) High Channel

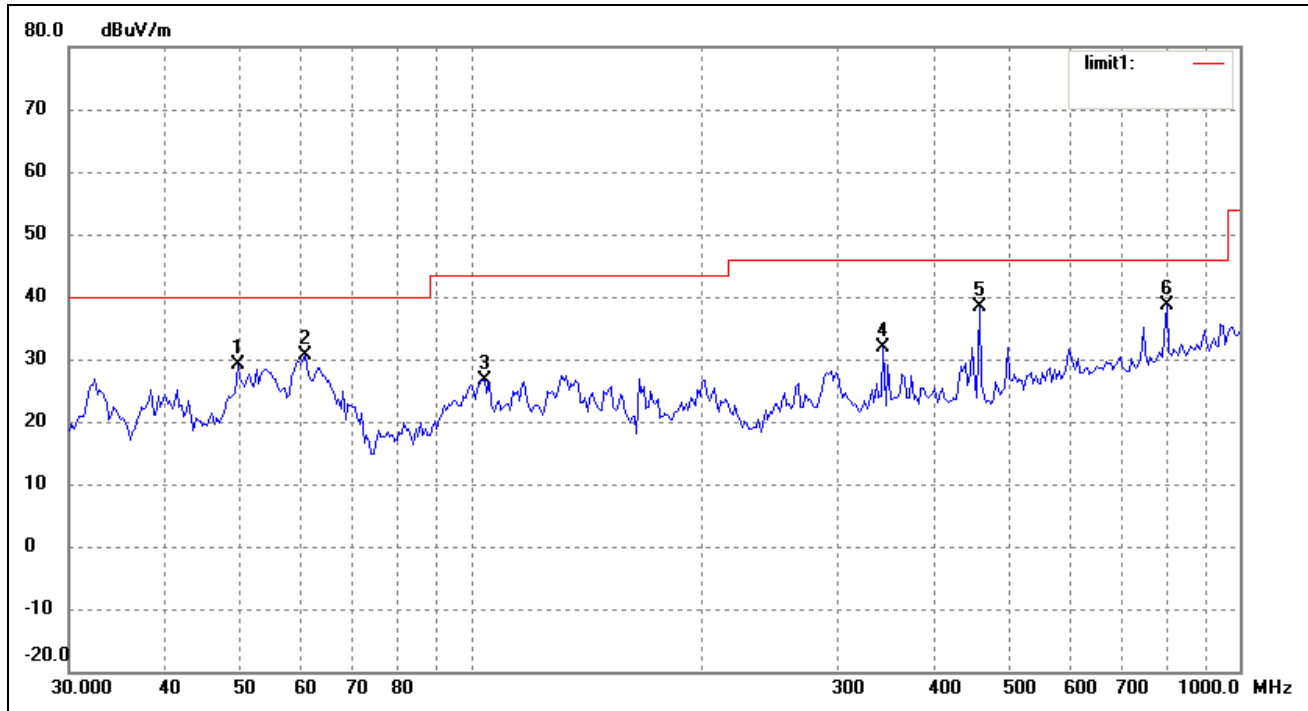
Comment: /

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(° )	(cm)	
1	118.0957	26.40	5.59	31.99	43.50	-11.51	180	100	Peak
2	200.0432	23.64	5.68	29.32	43.50	-14.18	360	100	Peak
3	219.1785	23.99	6.31	30.30	46.00	-15.70	5	100	Peak
4	343.6506	26.83	9.31	36.14	46.00	-9.86	356	100	Peak
5	448.8361	31.00	10.59	41.59	46.00	-4.41	360	100	QP
6	749.6761	20.52	16.37	36.89	46.00	-9.11	350	100	Peak

Vertical



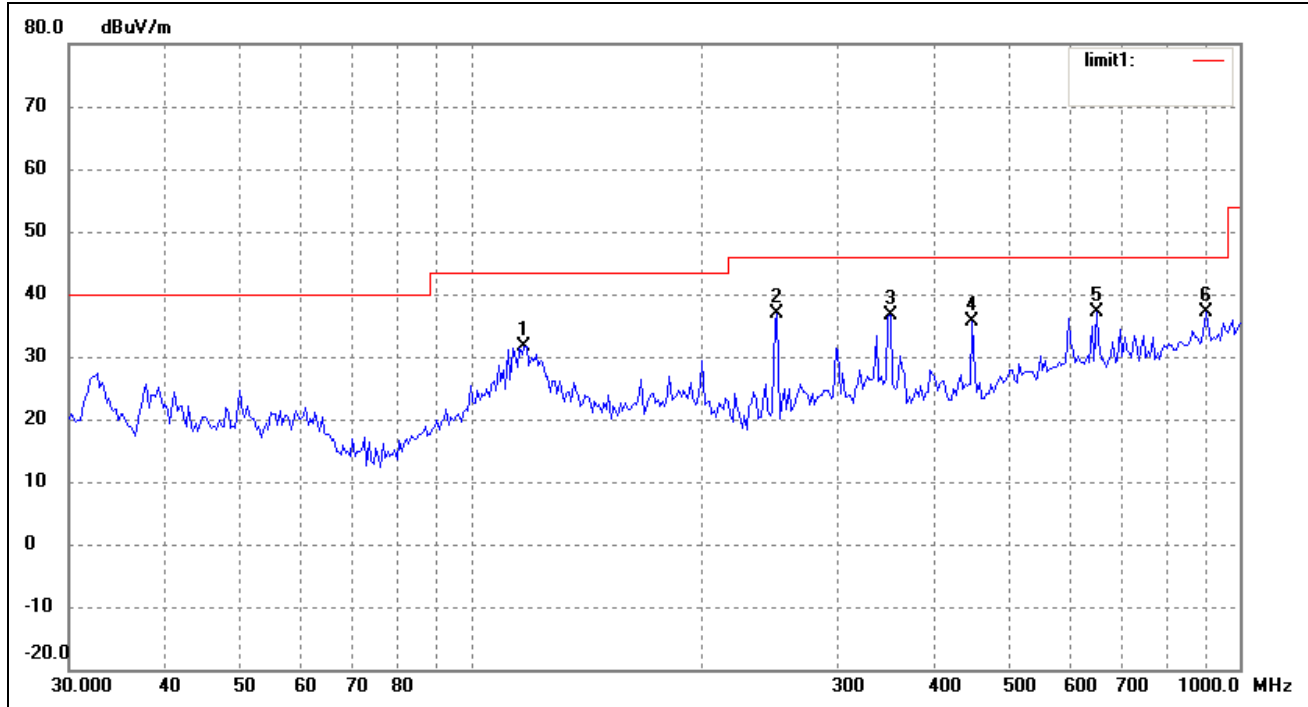
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	49.7571	21.34	7.70	29.04	40.00	-10.96	270	100	Peak
2	61.0041	23.72	6.79	30.51	40.00	-9.49	100	100	Peak
3	104.0640	19.11	7.46	26.57	43.50	-16.93	15	100	Peak
4	343.6506	22.53	9.31	31.84	46.00	-14.16	222	100	Peak
5	458.3987	28.02	10.38	38.40	46.00	-7.60	358	100	Peak
6	804.2523	21.55	17.13	38.68	46.00	-7.32	360	100	Peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g) Low Channel

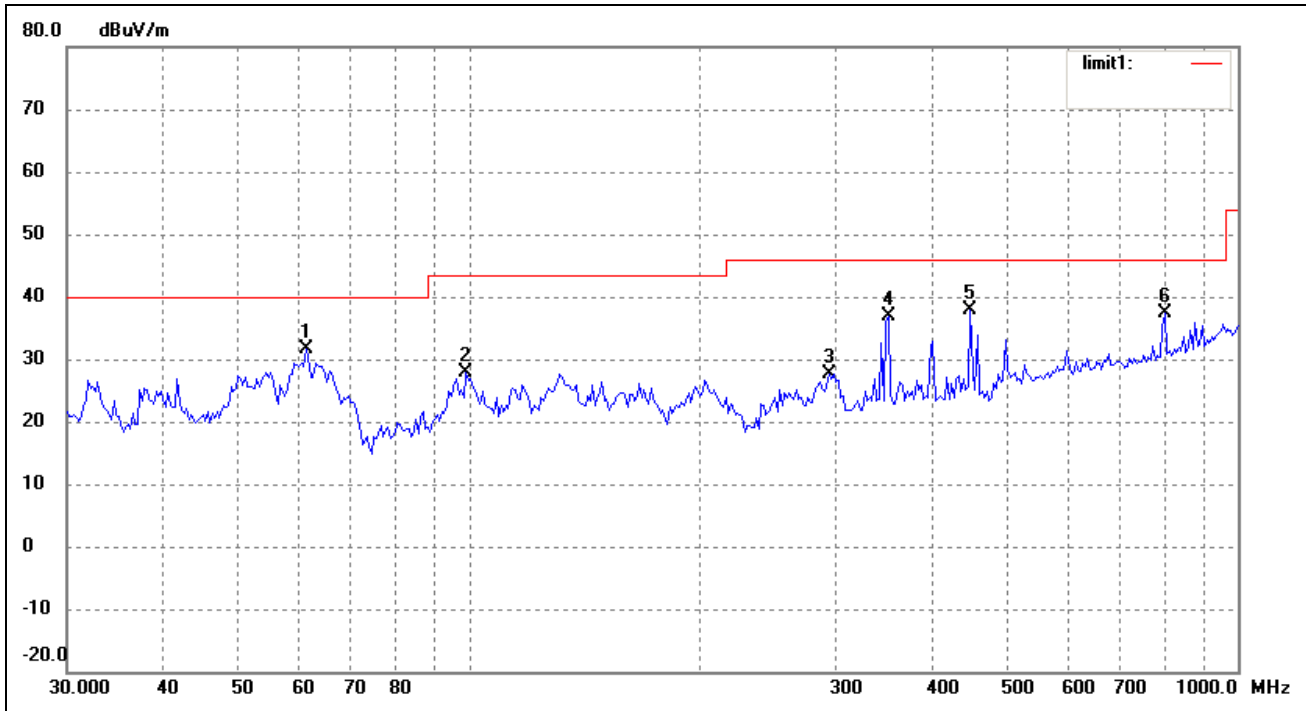
Comment: /

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (° )	Height (cm)	Remark
1	117.2688	25.83	5.72	31.55	43.50	-11.95	210	100	Peak
2	250.4859	29.27	7.69	36.96	46.00	-9.04	125	100	Peak
3	350.9722	27.27	9.46	36.73	46.00	-9.27	0	100	Peak
4	448.8361	25.04	10.59	35.63	46.00	-10.37	45	100	Peak
5	651.3831	21.80	15.37	37.17	46.00	-8.83	65	100	Peak
6	906.3041	18.26	18.90	37.16	46.00	-8.84	63	100	Peak

Vertical



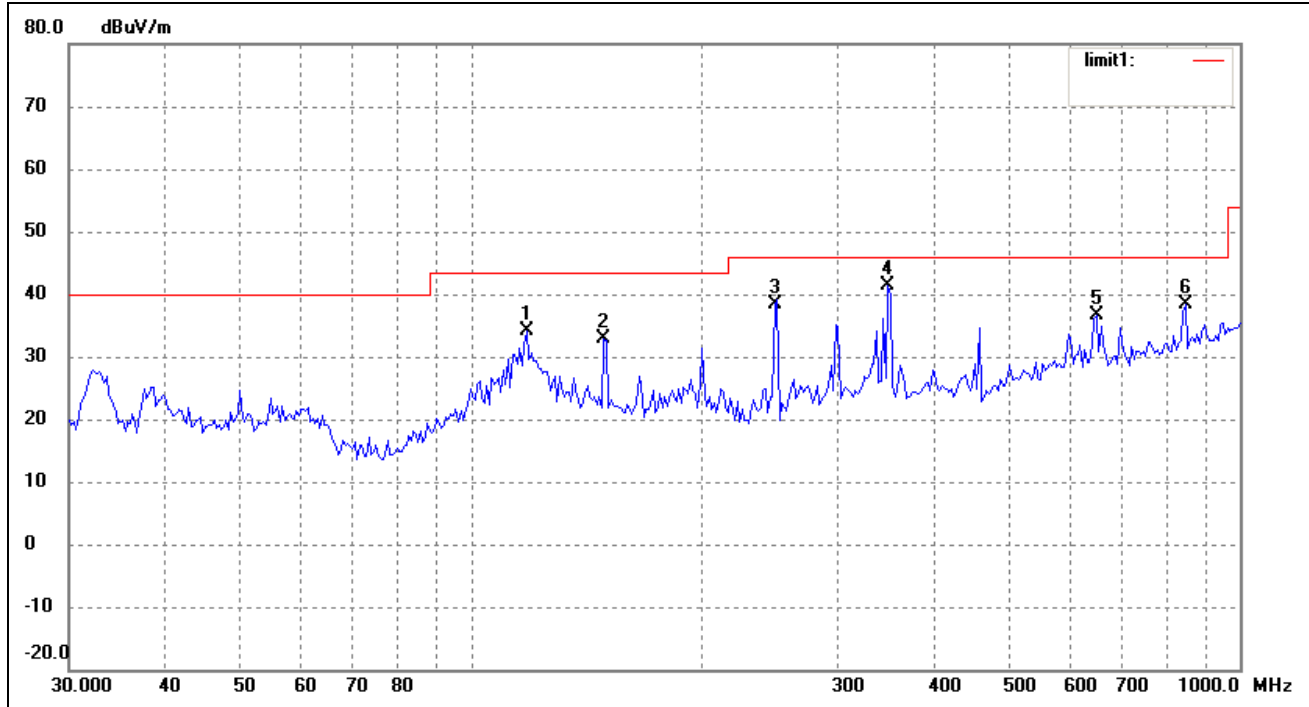
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	61.4343	24.89	6.62	31.51	40.00	-8.49	358	100	Peak
2	99.0690	20.18	7.75	27.93	43.50	-15.57	180	100	Peak
3	294.4260	19.04	8.60	27.64	46.00	-18.36	245	100	Peak
4	350.9722	27.38	9.46	36.84	46.00	-9.16	87	100	Peak
5	448.8361	27.39	10.59	37.98	46.00	-8.02	334	100	Peak
6	804.2523	20.29	17.13	37.42	46.00	-8.58	360	100	Peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g) Middle Channel

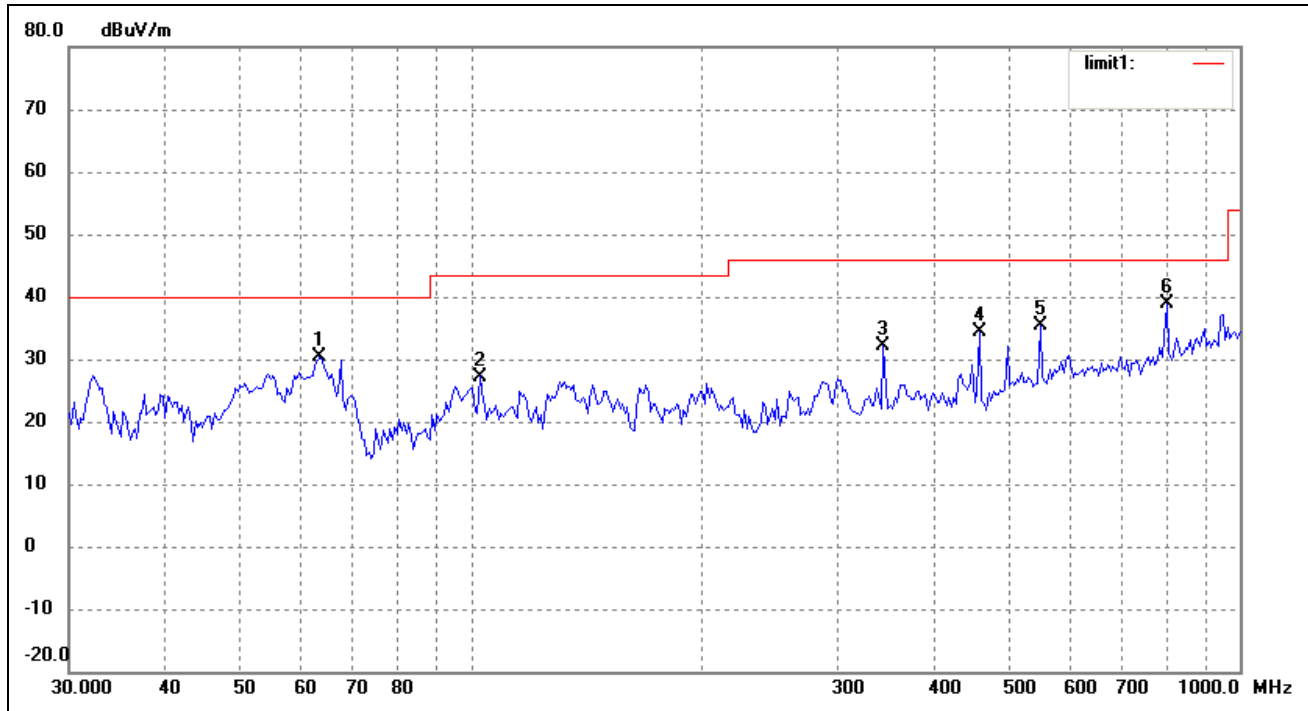
Comment: /

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(° )	(cm)	
1	118.0957	28.53	5.59	34.12	43.50	-9.38	180	100	Peak
2	148.9175	29.67	3.30	32.97	43.50	-10.53	360	100	Peak
3	248.7319	30.82	7.65	38.47	46.00	-7.53	5	100	Peak
4	348.5145	32.02	9.41	41.43	46.00	-4.57	356	100	Peak
5	651.3831	21.31	15.37	36.68	46.00	-9.32	350	100	Peak
6	850.7603	20.35	17.94	38.29	46.00	-7.71	360	100	Peak

Vertical



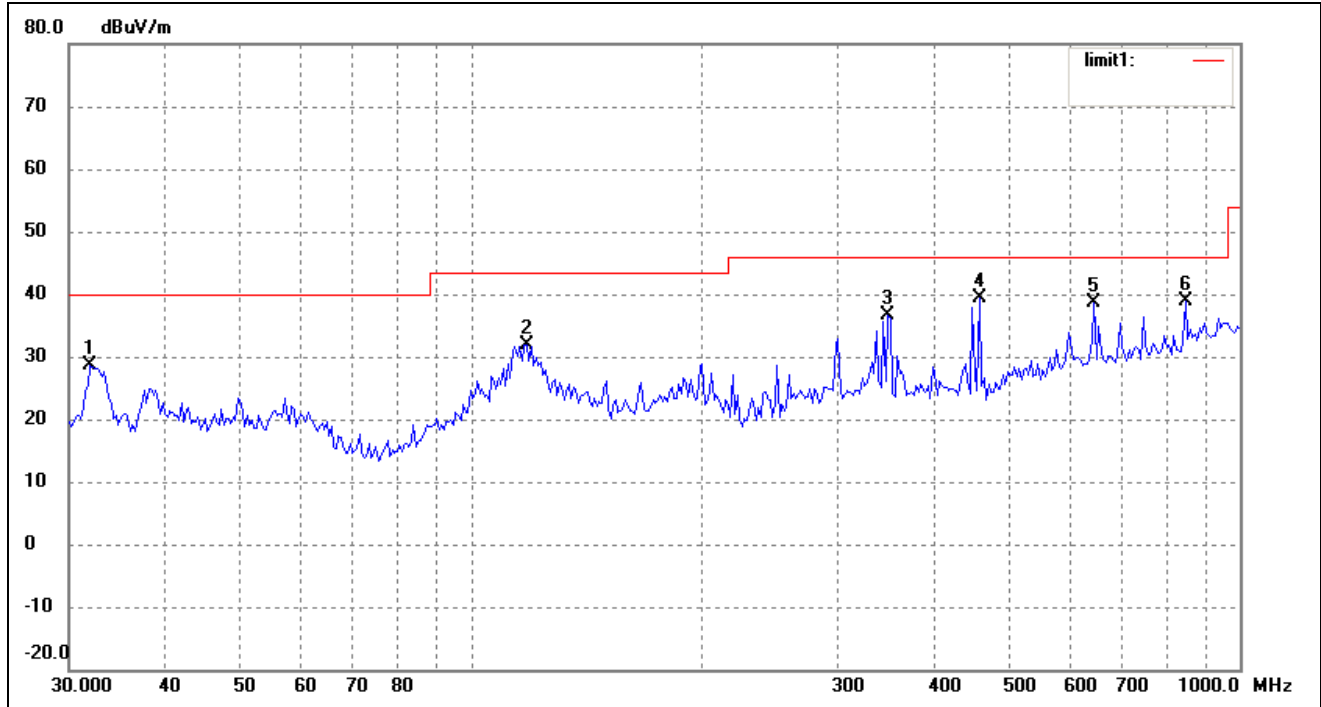
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (° )	Height (cm)	Remark
1	63.6312	24.60	5.74	30.34	40.00	-9.66	270	100	Peak
2	102.6117	19.67	7.58	27.25	43.50	-16.25	100	100	Peak
3	343.6506	22.81	9.31	32.12	46.00	-13.88	15	100	Peak
4	458.3987	23.90	10.38	34.28	46.00	-11.72	222	100	Peak
5	550.2902	21.46	13.98	35.44	46.00	-10.56	358	100	Peak
6	804.2523	21.75	17.13	38.88	46.00	-7.12	23	100	Peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g) High Channel

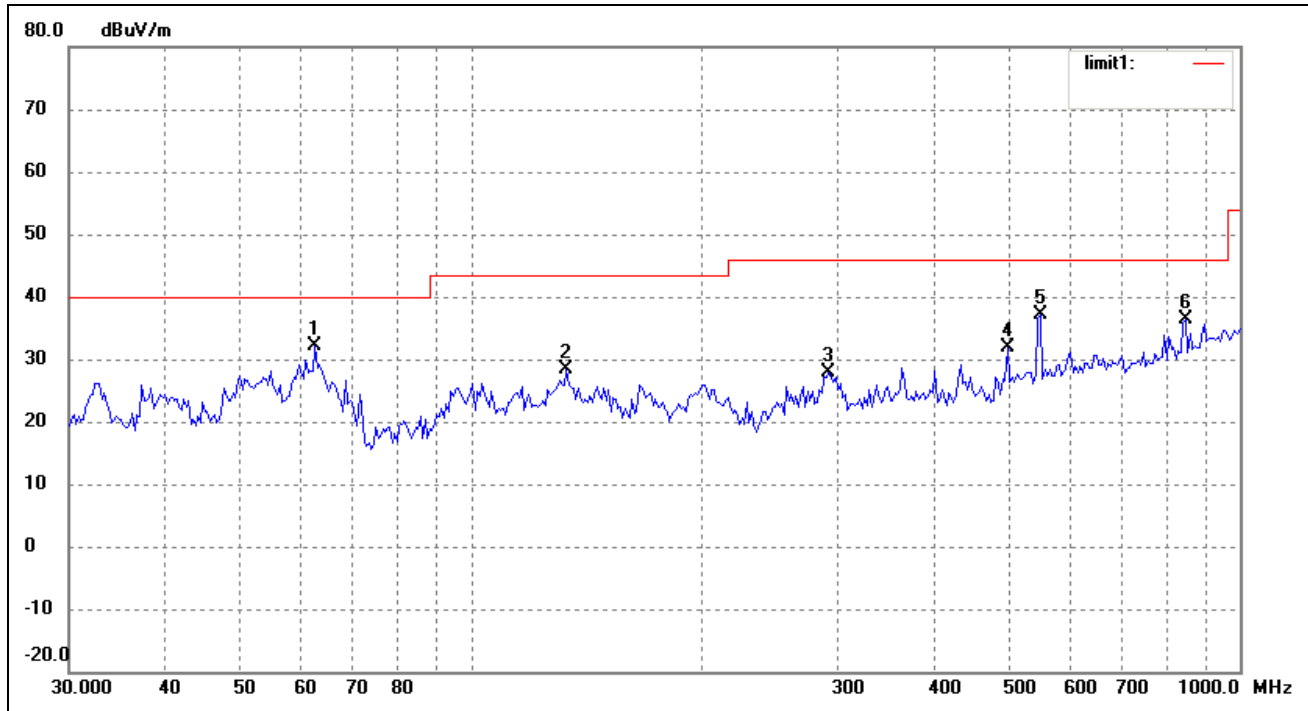
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Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (° )	Height (cm)	Remark
1	31.9586	22.11	6.62	28.73	40.00	-11.27	210	100	Peak
2	118.0957	26.31	5.59	31.90	43.50	-11.60	125	100	Peak
3	348.5145	27.25	9.41	36.66	46.00	-9.34	0	100	Peak
4	458.3987	28.93	10.38	39.31	46.00	-6.69	45	100	Peak
5	646.8217	23.30	15.34	38.64	46.00	-7.36	63	100	Peak
6	850.7603	21.06	17.94	39.00	46.00	-7.00	10	100	Peak

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	62.7432	25.95	6.10	32.05	40.00	-7.95	358	100	Peak
2	133.0809	24.75	3.66	28.41	43.50	-15.09	180	100	Peak
3	292.3643	19.30	8.58	27.88	46.00	-18.12	245	100	Peak
4	498.7303	19.20	12.80	32.00	46.00	-14.00	87	100	Peak
5	550.2902	23.22	13.98	37.20	46.00	-8.80	334	100	Peak
6	850.7603	18.39	17.94	36.33	46.00	-9.67	65	100	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 (1G to 25GHz)										
4824	PK	55.3	90	V	34.1	5.2	33	61.6	74	-12.4
7236	PK	50.6	270	V	37.4	6.1	33.5	60.6	74	-13.4
7236	PK	43.6	180	H	37.4	6.1	33.5	53.6	74	-20.4
4824	PK	52.3	45	H	34.1	5.2	33	58.6	74	-15.4
4824	AV	43.6	270	V	34.1	5.2	33	49.9	54	-4.1
7236	AV	39.2	90	V	37.4	6.1	33.5	49.2	54	-4.8
7236	AV	30.4	45	H	37.4	6.1	33.5	40.4	54	-13.6
4824	AV	40.1	60	H	34.1	5.2	33	46.4	54	-7.6
Middle Channel (1G to 25GHz)										
7311	PK	52.2	45	V	37.4	6.1	33.5	62.2	74	-11.8
4874	PK	53.4	270	V	34.1	5.2	33	59.7	74	-14.3
7311	PK	49.5	45	H	37.4	6.1	33.5	59.5	74	-14.5
4874	PK	51.2	180	H	34.1	5.2	33	57.5	74	-16.5
7311	AV	40.1	270	V	37.4	6.1	33.5	50.1	54	-3.9
4874	AV	42.2	90	V	34.1	5.2	33	48.5	54	-5.5
7311	AV	37.9	60	H	37.4	6.1	33.5	47.9	54	-6.1
4874	AV	39.8	45	H	34.1	5.2	33	46.1	54	-7.9
High Channel(1G to 25GHz)										
4924	PK	54.6	270	V	34.1	5.2	33	60.9	74	-13.1
7386	PK	51.2	45	V	37.4	6.1	33.5	61.2	74	-12.8
4924	PK	51.6	180	H	34.1	5.2	33	57.9	74	-16.1
7386	PK	48.2	45	H	37.4	6.1	33.5	58.2	74	-15.8
4924	AV	43.1	90	V	34.1	5.2	33	49.4	54	-4.6
7386	AV	39.7	270	V	37.4	6.1	33.5	49.7	54	-4.3
4924	AV	42.1	60	H	34.1	5.2	33	48.4	54	-5.6
7386	AV	37.5	60	H	37.4	6.1	33.5	47.5	54	-6.5

*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 (1G to 25GHz)										
4824	PK	54	90	V	34.1	5.2	33	60.3	74	-13.7
7236	PK	48.6	270	V	37.4	6.1	33.5	58.6	74	-15.4
7236	PK	42.6	180	H	37.4	6.1	33.5	52.6	74	-21.4
4824	PK	51.3	45	H	34.1	5.2	33	57.6	74	-16.4
4824	AV	42.6	270	V	34.1	5.2	33	48.9	54	-5.1
7236	AV	38.7	90	V	37.4	6.1	33.5	48.7	54	-5.3
7236	AV	29.6	45	H	37.4	6.1	33.5	39.6	54	-14.4
4824	AV	38.6	60	H	34.1	5.2	33	44.9	54	-9.1
Middle Channel (1G to 25GHz)										
7311	PK	51.7	45	V	37.4	6.1	33.5	61.7	74	-12.3
4874	PK	52.4	270	V	34.1	5.2	33	58.7	74	-15.3
7311	PK	48.7	45	H	37.4	6.1	33.5	58.7	74	-15.3
4874	PK	50.6	180	H	34.1	5.2	33	56.9	74	-17.1
7311	AV	39.6	270	V	37.4	6.1	33.5	49.6	54	-4.4
4874	AV	40.6	90	V	34.1	5.2	33	46.9	54	-7.1
7311	AV	36.1	60	H	37.4	6.1	33.5	46.1	54	-7.9
4874	AV	38.1	45	H	34.1	5.2	33	44.4	54	-9.6
High Channel(1G to 25GHz)										
4924	PK	52.6	270	V	34.1	5.2	33	58.9	74	-15.1
7386	PK	48.1	45	V	37.4	6.1	33.5	58.1	74	-15.9
4924	PK	49.6	180	H	34.1	5.2	33	55.9	74	-18.1
7386	PK	46.3	45	H	37.4	6.1	33.5	56.3	74	-17.7
4924	AV	41.9	90	V	34.1	5.2	33	48.2	54	-5.8
7386	AV	37.6	270	V	37.4	6.1	33.5	47.6	54	-6.4
4924	AV	40.1	60	H	34.1	5.2	33	46.4	54	-7.6
7386	AV	35.2	60	H	37.4	6.1	33.5	45.2	54	-8.8

*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.*

## 10. OUT OF BAND EMISSIONS

### 10.1 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.

### 10.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Agilent	Spectrum Analyzer	E4402B	US41192821	2009-08-12	2010-08-11
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2009-08-12	2010-08-11
Positioning Controller	C&C	CC-C-1F	N/A	2009-08-12	2010-08-11
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2009-07-21	2010-07-20
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2009-07-21	2010-07-20
RF Switch	EM	EMSW18	SW060023	2009-08-12	2010-08-11
Amplifier	Agilent	8447F	3113A06717	2009-08-12	2010-08-11
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2009-08-12	2010-08-11
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	25498514	2009-08-12	2010-08-11

### 10.3 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.

### 10.4 Environmental Conditions

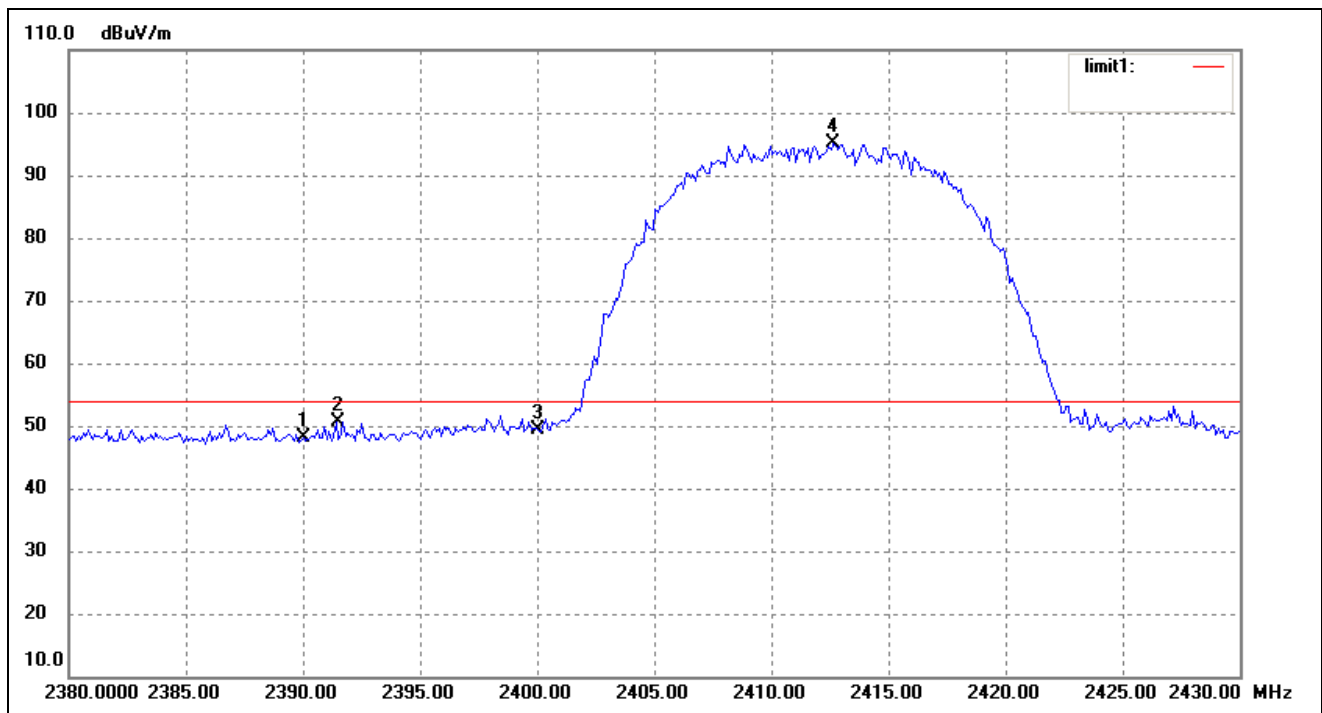
Temperature:	21° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

## 10.5 Summary of Test Results/Plots

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

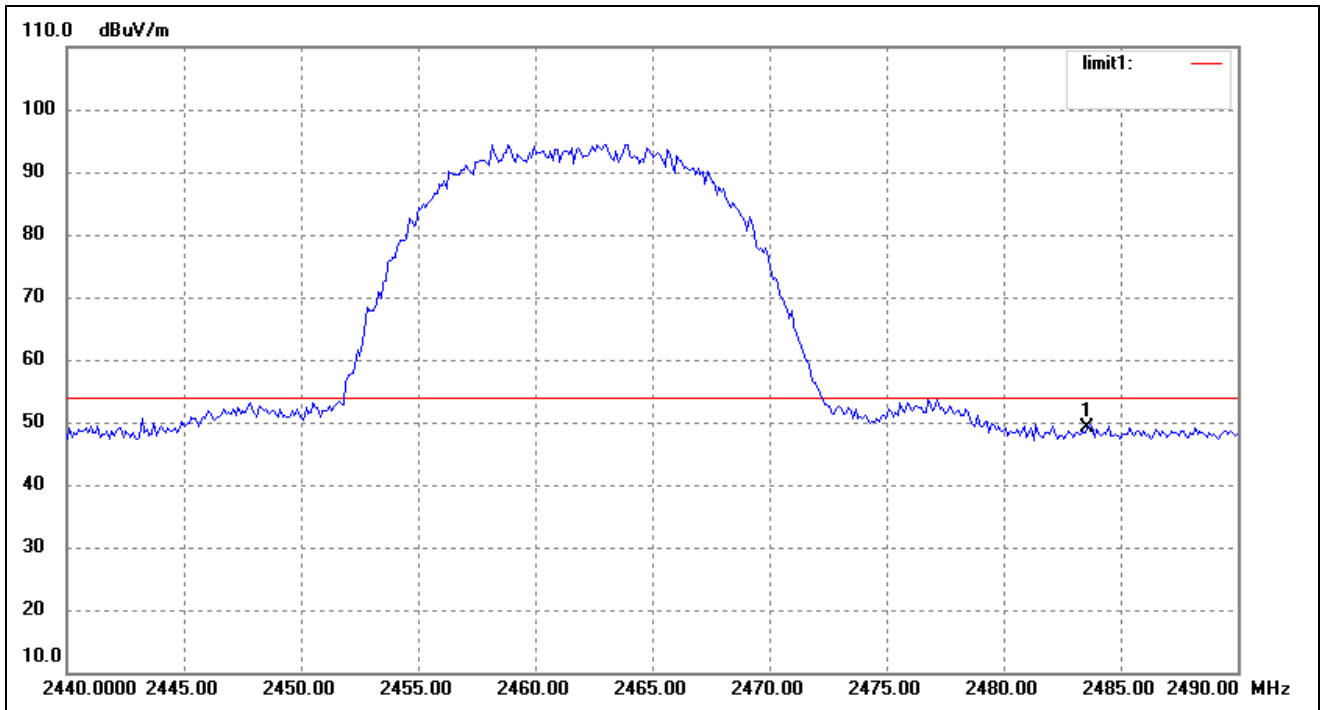
### For 802.11b

Lowest Bandedge



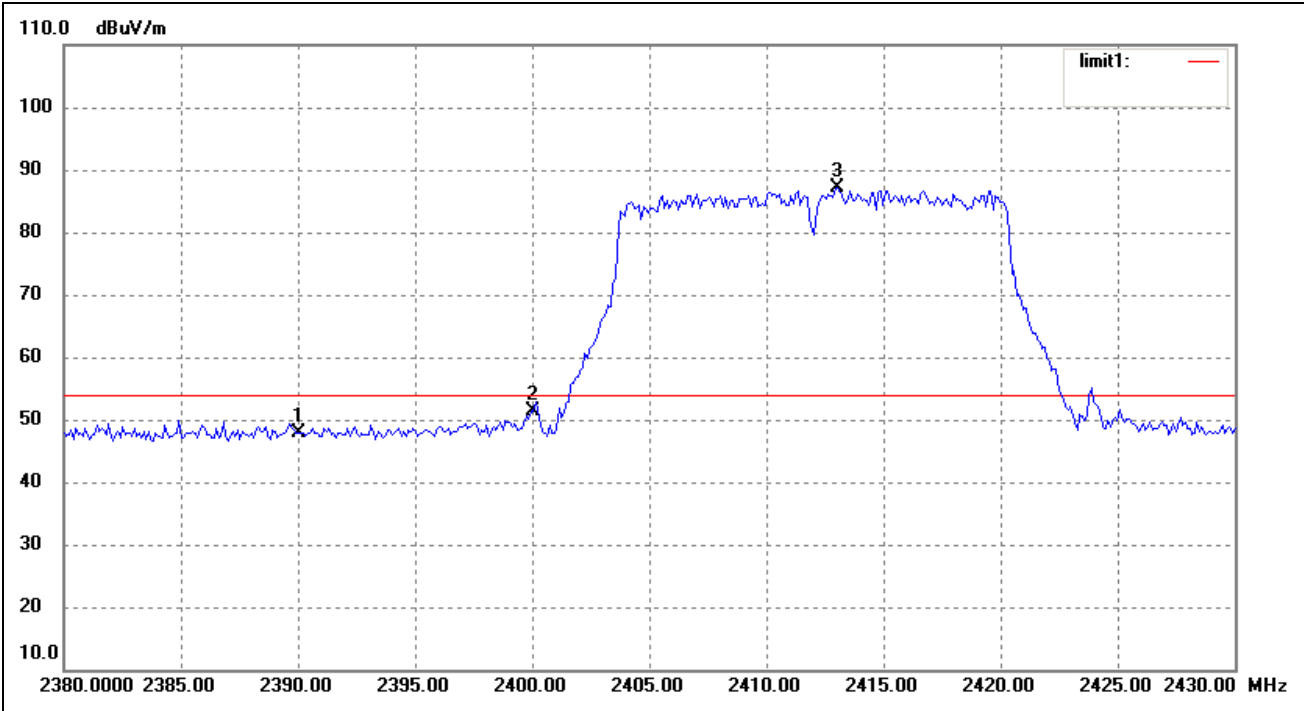
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2390.000	12.42	35.59	48.01	74.00	-25.99	224	149	Peak
	2390.000	6.42	35.59	42.01	54.00	-11.99	224	149	Ave
2	2391.423	15.13	35.61	50.74	74.00	-23.26	159	126	Peak
	2391.423	10.62	35.61	46.23	54.00	-7.77	159	126	Ave
3	2400.000	13.72	35.68	49.40	74.00	-24.60	98	120	Peak
	2400.000	7.11	35.68	42.79	54.00	-11.21	98	120	Ave
4	2412.665	59.36	35.72	95.08	/	/	/	/	Peak

## Highest Bandedge



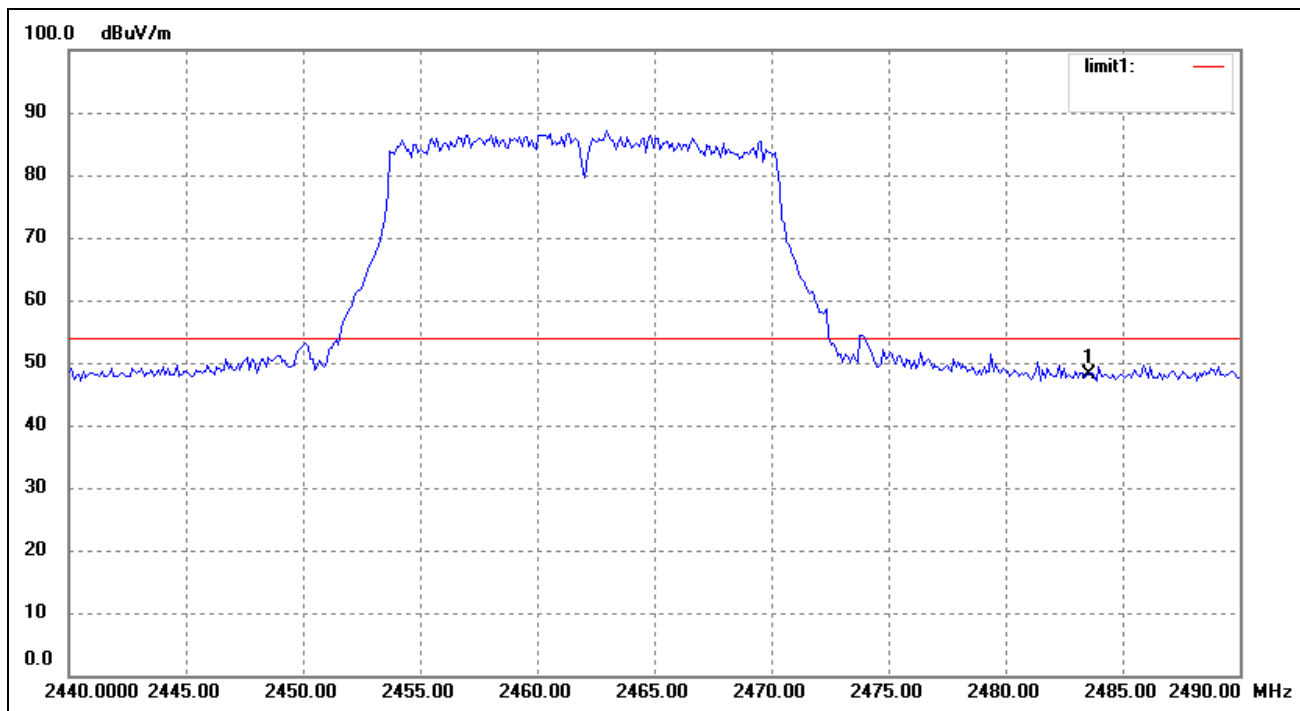
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (° )	Height (cm)	Remark
1	2483.500	13.20	35.97	49.17	74.00	-24.83	100	144	Peak
	2483.500	6.89	35.97	42.86	54.00	-11.14	100	144	Ave

For 802.11g  
Lowest Bandedge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	2390.000	12.19	35.59	47.78	74.00	-26.22	134	110	Peak
	2390.000	8.74	35.59	44.33	54.00	-9.67	134	110	Ave
2	2400.000	15.81	35.68	51.49	74.00	-22.51	159	120	Peak
	2400.000	10.24	35.68	45.92	54.00	-8.08	159	120	Ave
3	2412.966	51.32	35.73	87.05	/	/	/	/	Peak

## Highest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (° )	Height (cm)	Remark
1	2483.500	12.21	35.97	48.18	74.00	-25.82	147	150	Peak
	2483.500	8.44	35.97	44.41	54.00	-9.59	147	150	Ave