

# FCC Part 15C

## Measurement and Test Report

For

**Shenzhen WideTell Technology Co., Ltd.**

**Room 2907-2908, East Tower, Nanshan Software Park, Shenzhen City, China**

**FCC ID: WABWTUSB2070**

<b>Report Concerns:</b> Original Report	<b>Equipment Type:</b> Wireless USB Adapter
<b>Model:</b>	<u>WT-USB-2070</u>
<b>Report No.:</b>	<u>STR10048185I</u>
<b>Test/Witness Engineer:</b>	<i>Susan Su</i>
<b>Test Date:</b>	<u>2010-04-30 to 2010-05-10</u>
<b>Issue Date:</b>	<u>2010-05-19</u>
<b>Prepared By:</b>	<p><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)</p>
<b>Approved &amp; Authorized By:</b>	 <hr/> 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: Shenzhen WideTell Technology Co., Ltd.  
 Address of applicant: Room 2907-2908, East Tower, Nanshan Software Park,  
 Shenzhen City, China

Manufacturer: Shenzhen WideTell Technology Co., Ltd.  
 Address of manufacturer: Room 2907-2908, East Tower, Nanshan Software Park,  
 Shenzhen City, China

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

Items	Description
EUT Description:	Wireless USB Adapter
Trade Name:	/
Model No.:	WT-USB-2070
Rated Voltage:	USB 5V
Max. Output Power	Max. 13.65dBm(Conducted)
Antenna Gain:	0dBi
Frequency range:	2412~2462MHz
Number of channels:	11
Channel Separation:	5MHz
Type of Antenna:	Integral Antenna
Size:	5.8x1.5x0.4 cm

*Note: The test data gathered are from a production sample provided by the manufacturer.*

### 1.2 Test Standards

The following report is prepared on behalf of the Shenzhen WideTell Technology 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 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
ASUS	Notebook	X50R	/

## 1.8 EUT Cable List and Details

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

## 2. SUMMARY OF TEST RESULTS

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

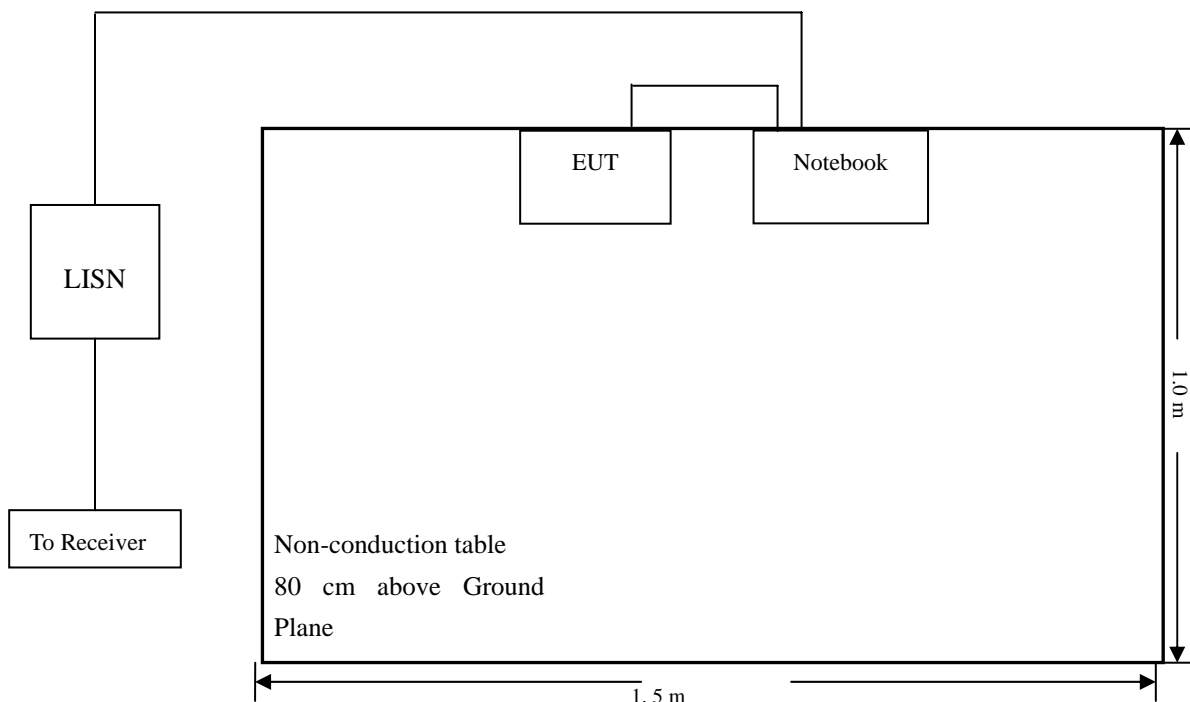
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2009-08-12	2010-08-11
Puls Limiter	Rohde & Schwarz	ESH3-Z2	100911	2009-08-12	2010-08-11
L.I.S.N.	SCHWARZBECK	NSLK8126	8126-224	2009-08-12	2010-08-11
L.I.S.N.	EMCO	3825/2	11967C	2009-08-12	2010-08-11

**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:	24 °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:

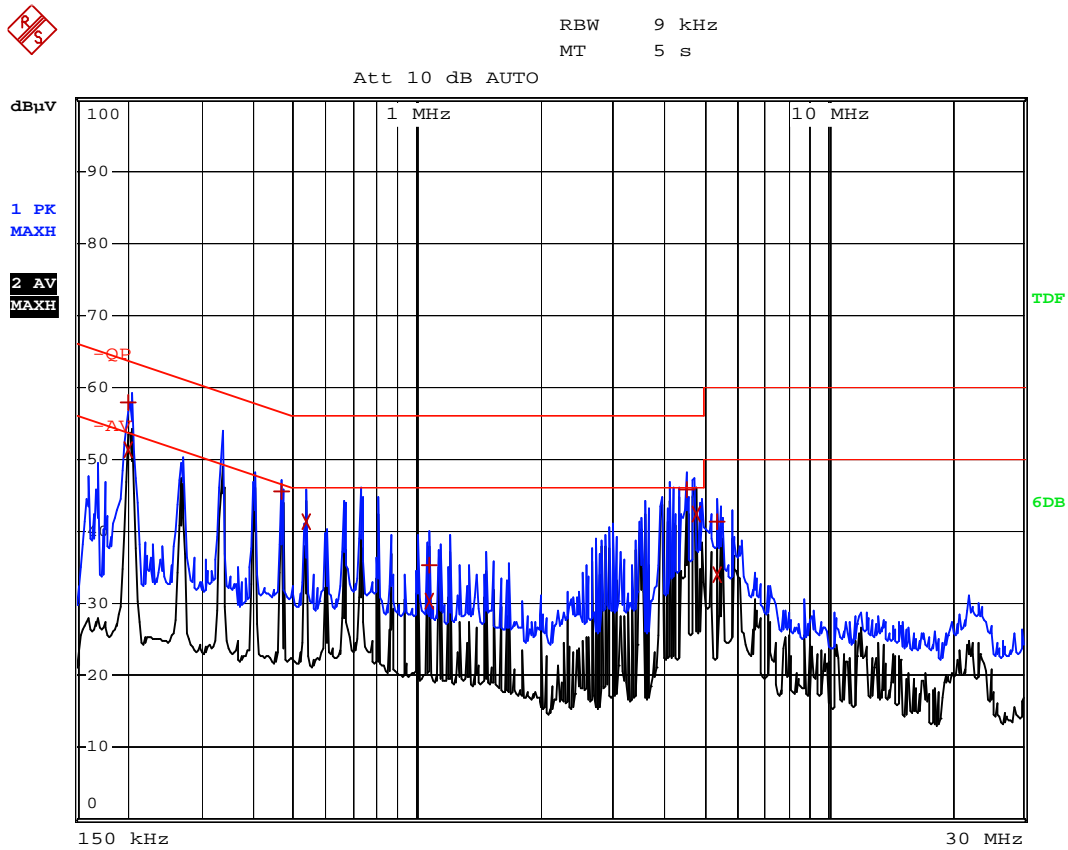
**-2.30 dB $\mu$ V at 0.202 MHz in the Line, Ave detector, 0.15-30MHz**

### 3.7 Conducted Emissions Test Data/Plots

*Operating Condition: Operating*

*Test Specification: N*

*Comment: 120V/60Hz; USB 5V*



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1 Quasi Peak	202 kHz	57.79	-5.73
2 Average	202 kHz	51.22	-2.30
1 Quasi Peak	466 kHz	45.41	-11.16
2 Average	534 kHz	41.27	-4.72
1 Quasi Peak	1.07 MHz	35.35	-20.65
2 Average	1.07 MHz	30.42	-15.57
1 Quasi Peak	4.542 MHz	45.78	-10.21
2 Average	4.81 MHz	42.32	-3.67
1 Quasi Peak	5.41 MHz	41.23	-18.76
2 Average	5.41 MHz	34.03	-15.96



Operating Condition: Operating

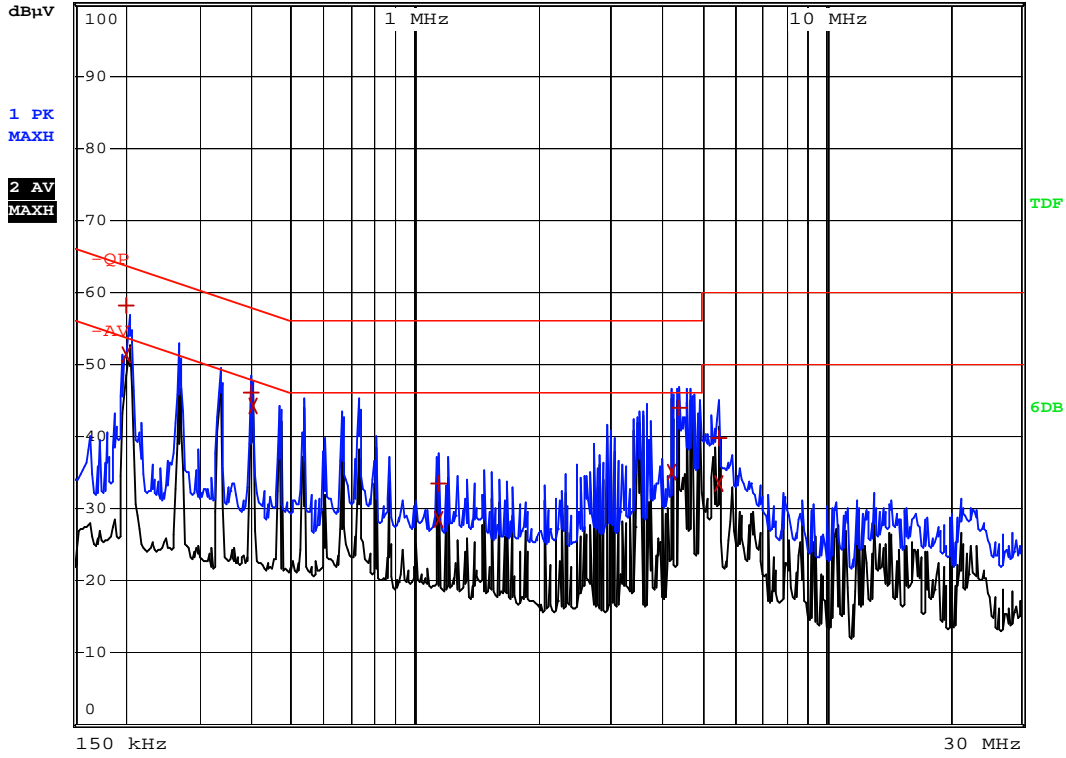
Test Specification: L

Comment: 120V/60Hz; USB 5V



RBW 9 kHz  
MT 5 s

Att 10 dB AUTO



EDIT PEAK LIST (Final Measurement Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1 Quasi Peak	202 kHz	58.02	-5.50
2 Average	202 kHz	51.22	-2.30
1 Quasi Peak	398 kHz	46.01	-11.87
2 Average	402 kHz	44.32	-3.48
1 Quasi Peak	1.138 MHz	33.43	-22.56
2 Average	1.138 MHz	28.52	-17.47
2 Average	4.206 MHz	35.06	-10.93
1 Quasi Peak	4.41 MHz	43.88	-12.11
1 Quasi Peak	5.478 MHz	39.64	-20.35
2 Average	5.478 MHz	33.45	-16.54

## **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. 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	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.

### 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=3kHz, VBW  $\geq$  RBW , Span =300kHz.
4. Repeat above procedures until all frequency measured was complete.

### 6.4 Environmental Conditions

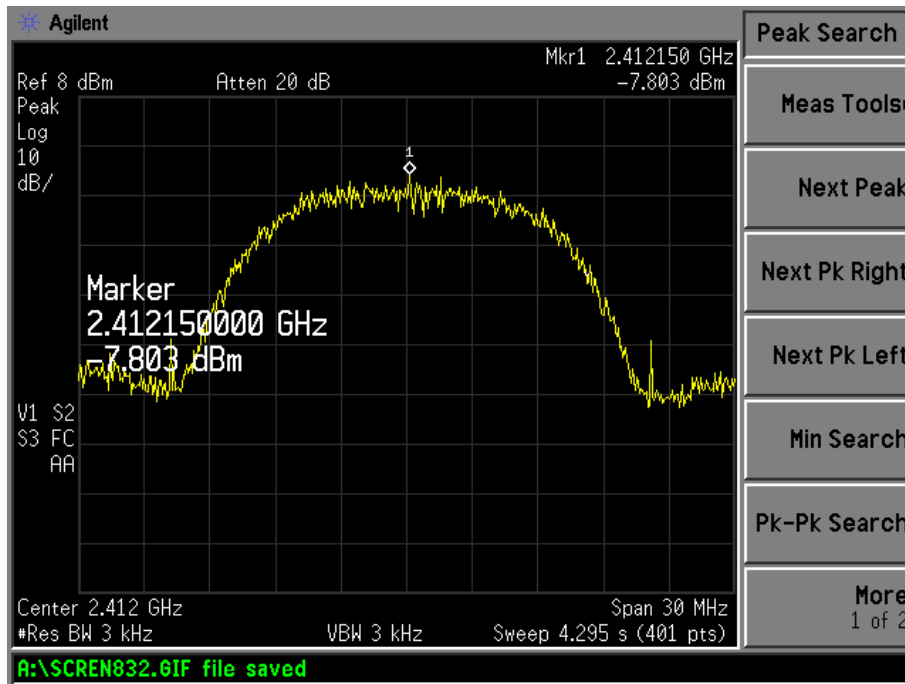
Temperature:	24 °C
Relative Humidity:	56 %
ATM Pressure:	1011 mbar

## 5.5 Summary of Test Results/Plots

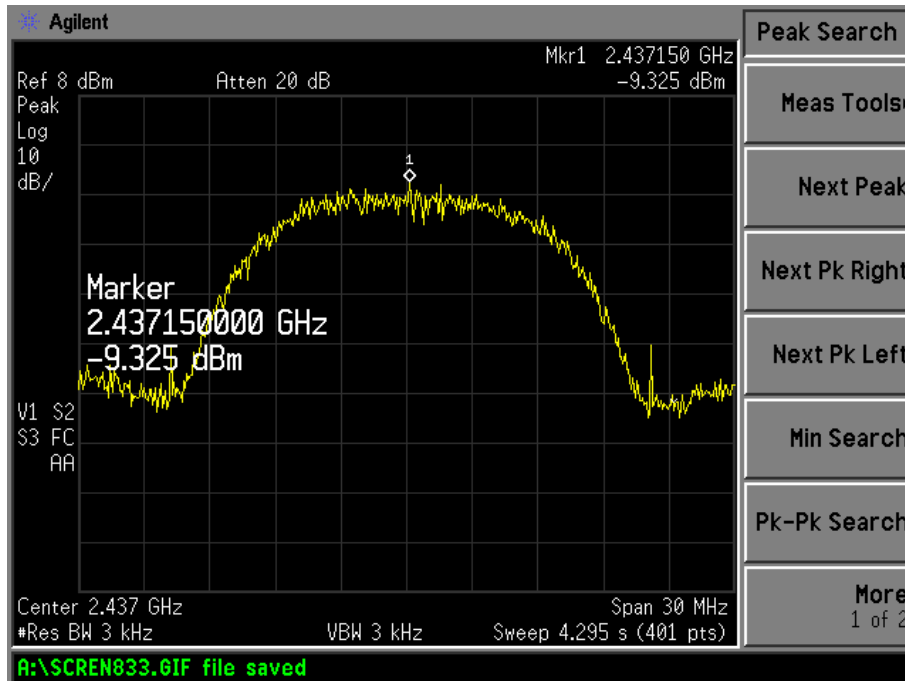
Test mode	Test channel	Reading dBm/3kHz	Limit dBm/3kHz
802.11b	Low channel (2412MHz)	-7.803	8
	Middle channel (2437MHz)	-9.325	8
	High channel (2462MHz)	-10.180	8
802.11g	Low channel (2412MHz)	-10.170	8
	Middle channel (2437MHz)	-11.740	8
	High channel (2462MHz)	-13.070	8

**For 802.11b**

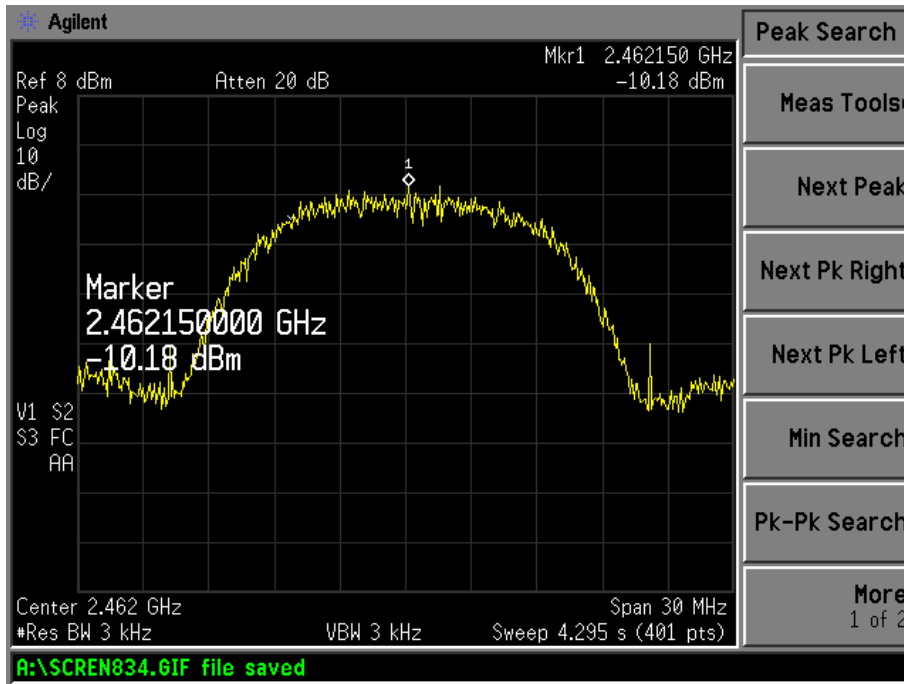
Low Channel:



Middle Channel:

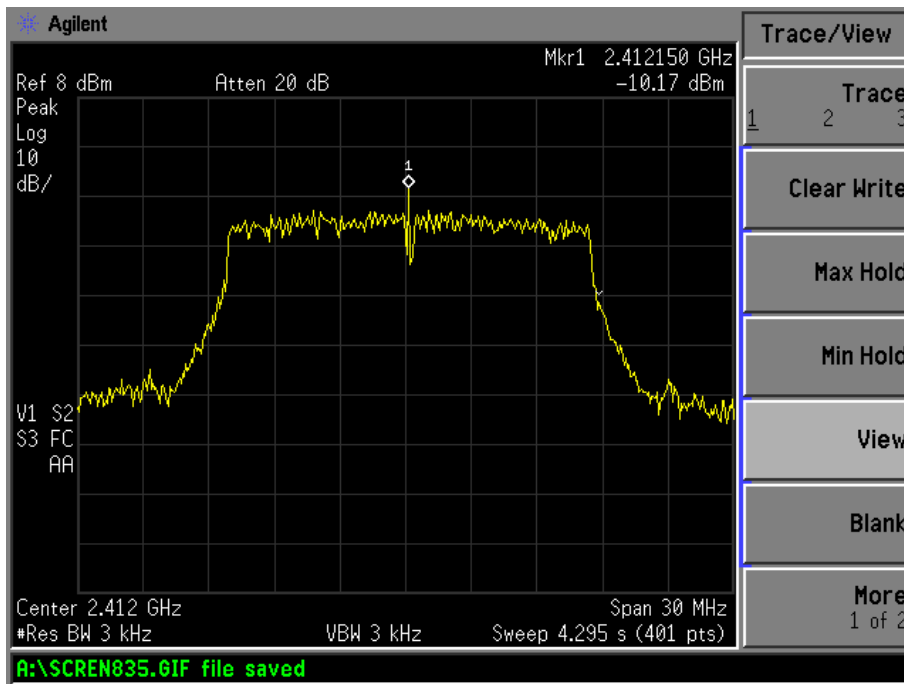


High Channel:

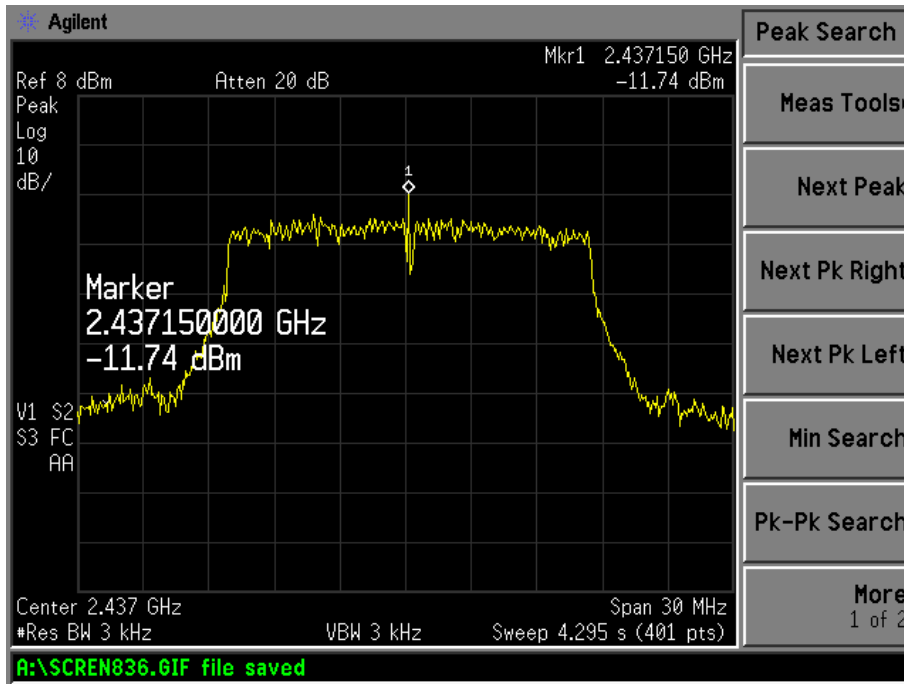


For 802.11g

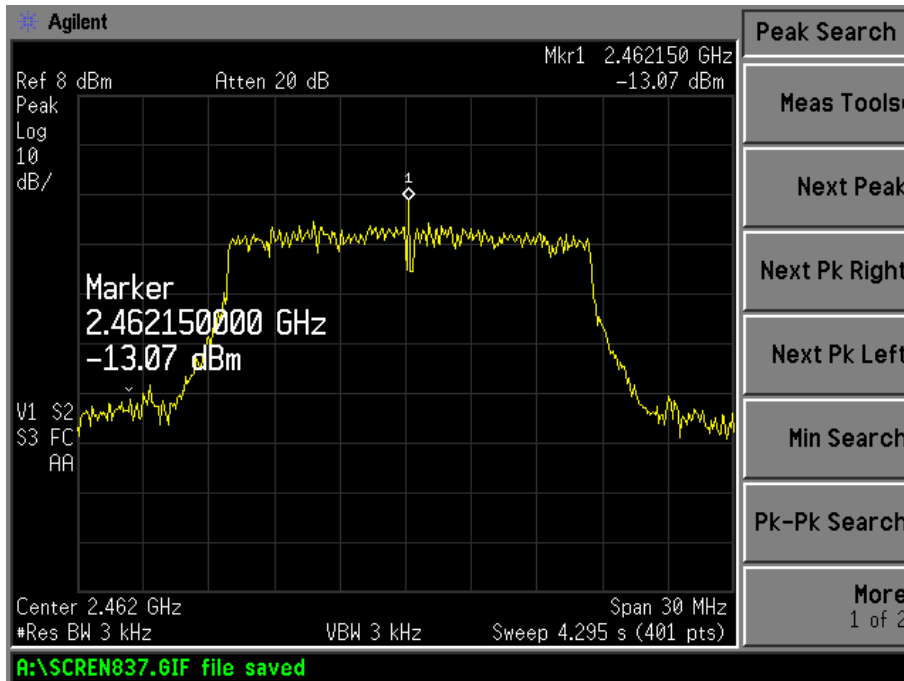
Low Channel:



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	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.

### 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 VBW $\geq$ RBW, Sweep=auto
4. Mark the peak frequency and –6dB (upper and lower) frequency.

### 6.4 Environmental Conditions

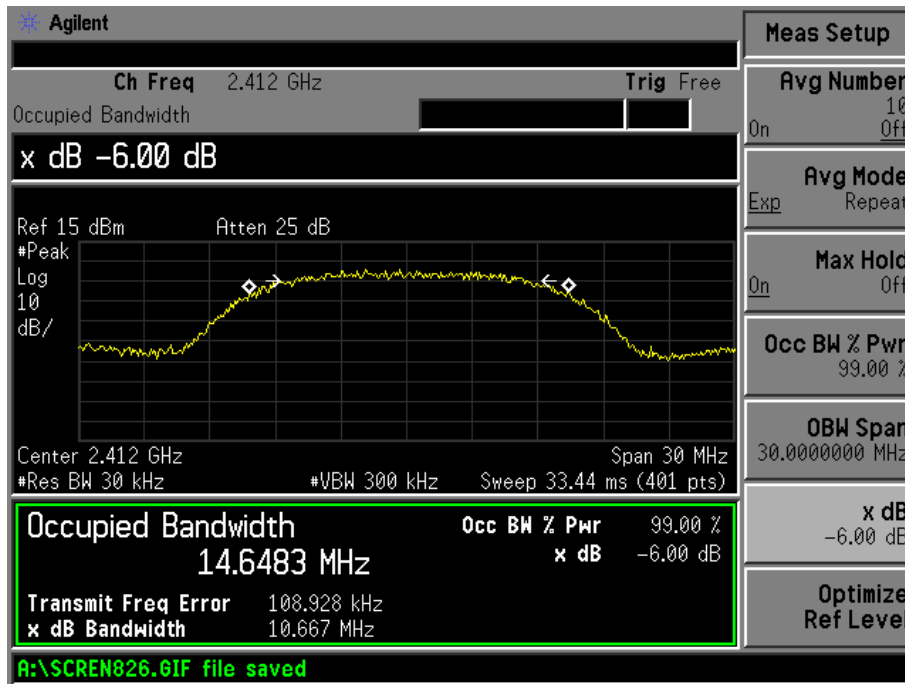
Temperature:	24 °C
Relative Humidity:	56 %
ATM Pressure:	1012 mbar

**6.5 Summary of Test Results/Plots**

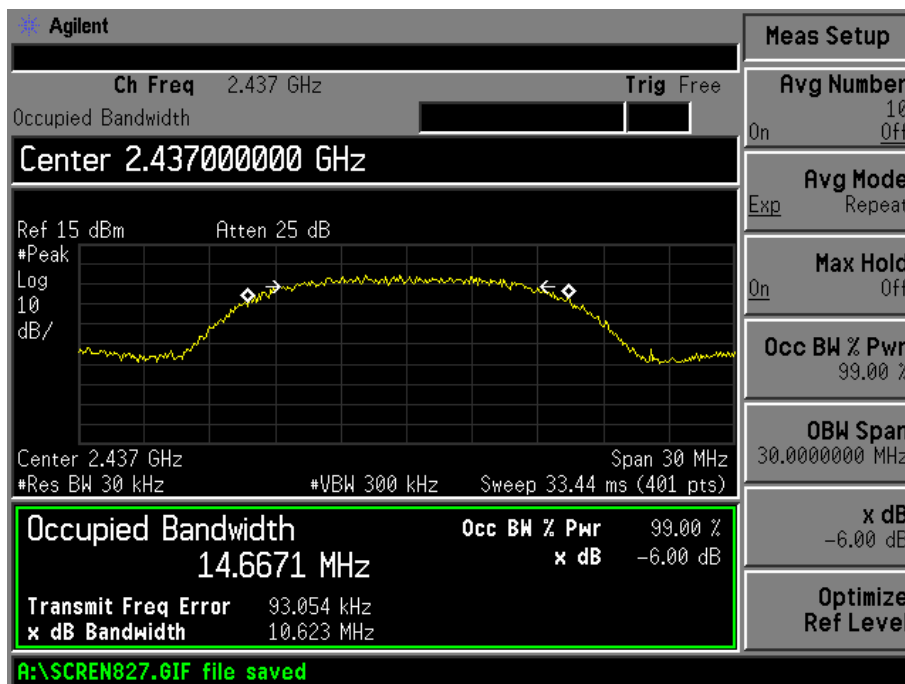
Test mode	Frequency MHz	6 dB Bandwidth kHz	Limit kHz
802.11b	2412	10667	500
	2437	10623	500
	2462	10642	500
802.11g	2412	16490	500
	2437	16495	500
	2462	16535	500

**For 802.11b**

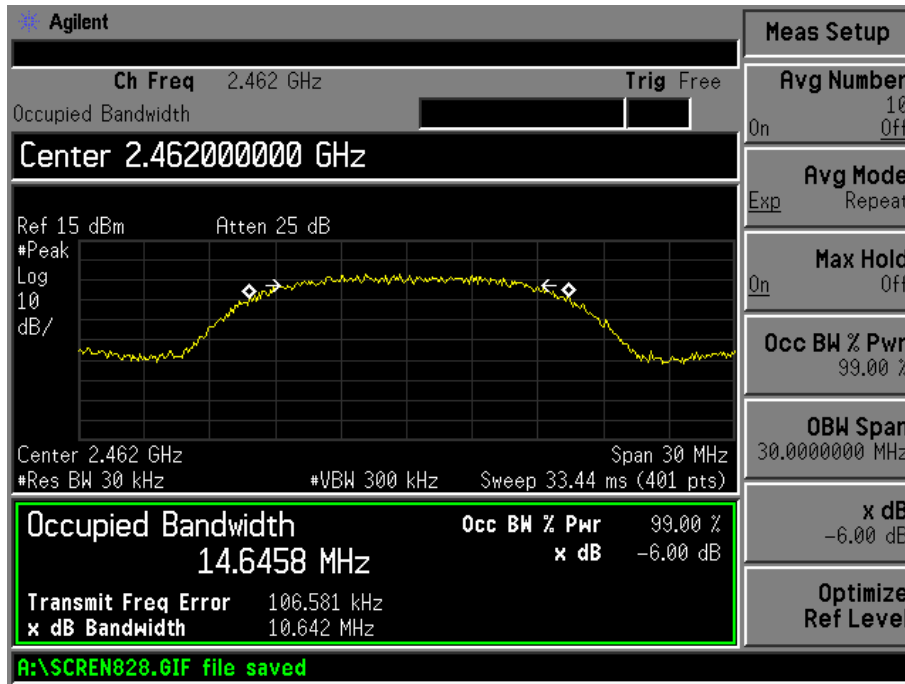
Low Channel:



Mid Channel:

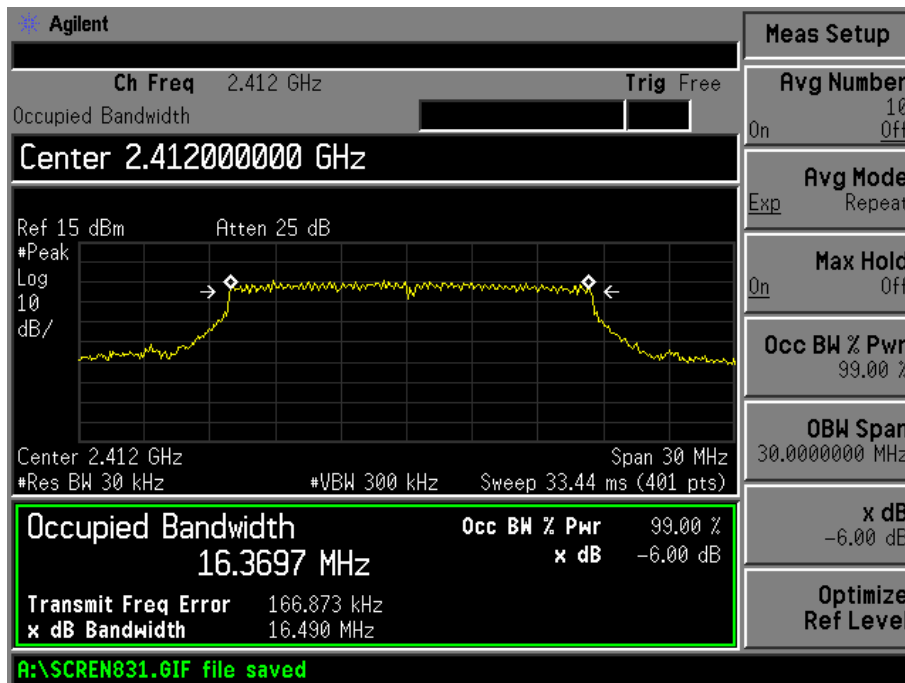


High Channel:

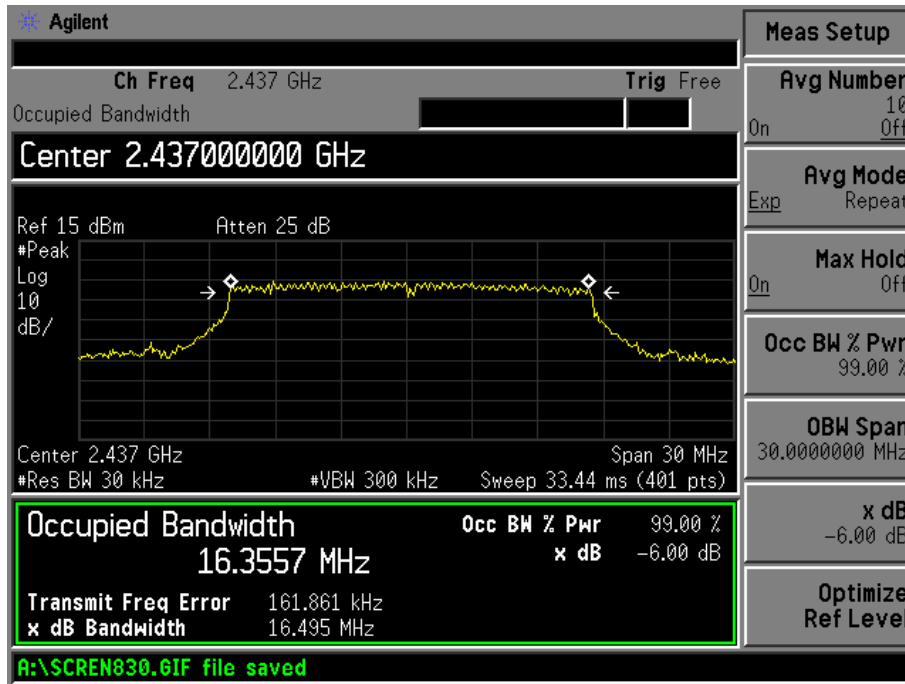


For 802.11g

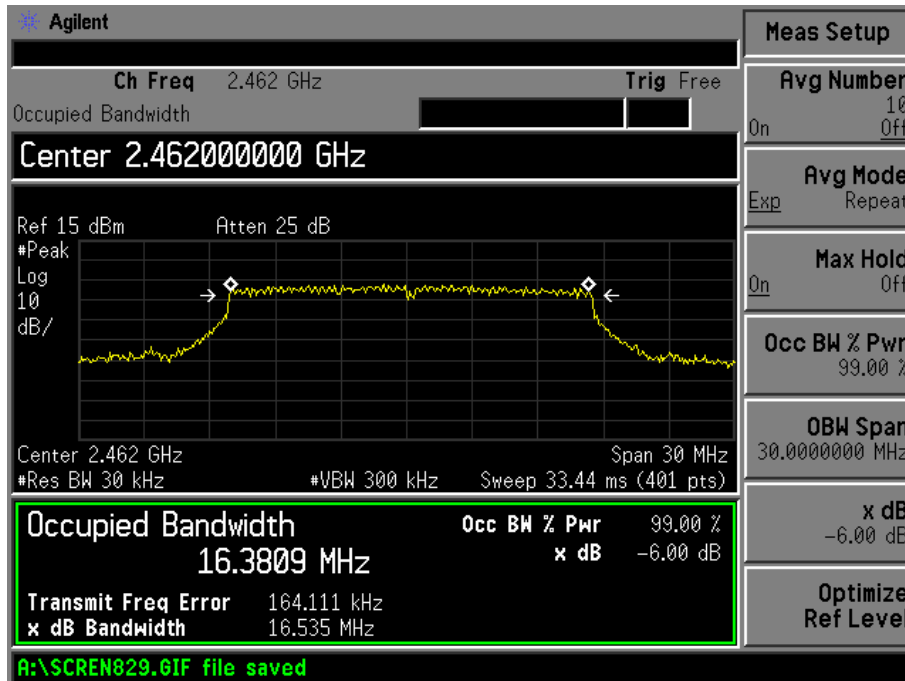
Low Channel:



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

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.

### 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:	24 °C
Relative Humidity:	54 %
ATM Pressure:	1013 mbar

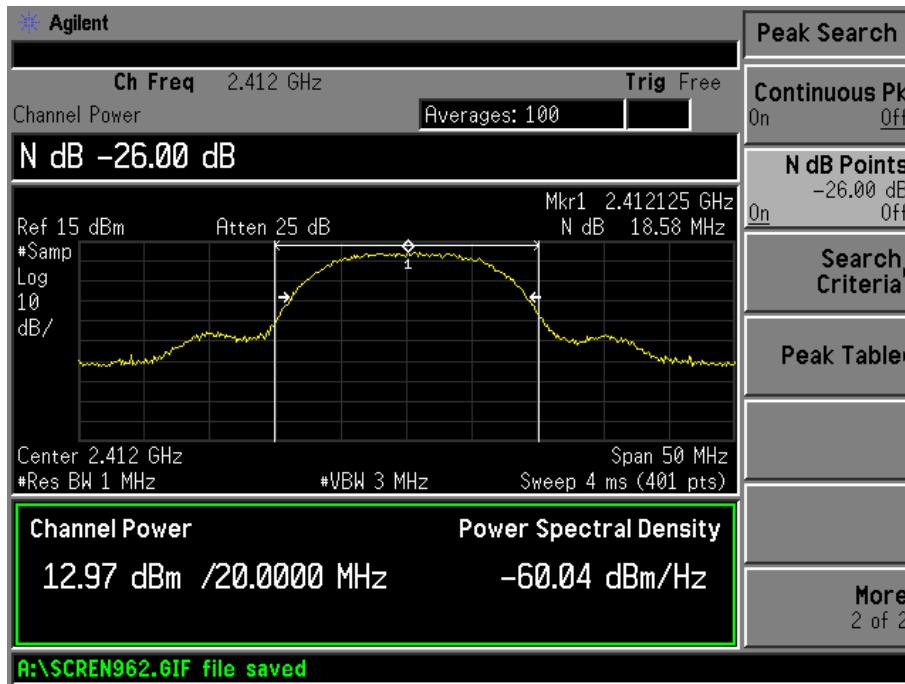
## 7.5 Summary of Test Results/Plots

*Transmitting Mode: Transmits continuously*

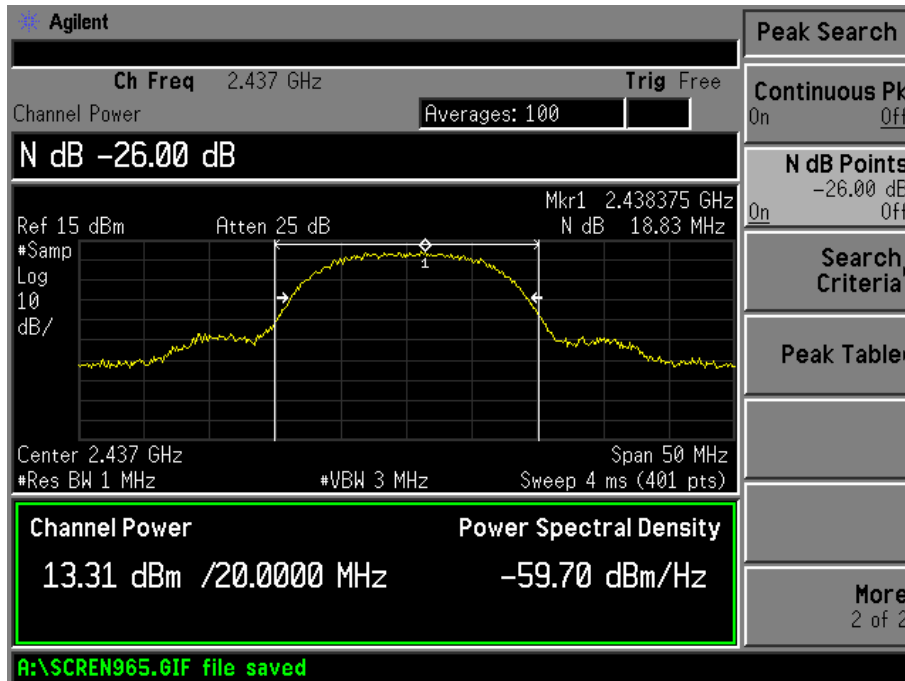
Test mode	Frequency MHz	Output Power dBm	Outpput Power mW	Limit mW
11b_long_1Mbps	2412	12.97	19.81527	1000
	2437	13.31	21.42891	1000
	2462	13.17	20.74914	1000
11b_long_11Mbps	2412	13.48	22.28435	1000
	2437	13.59	22.85599	1000
	2462	12.94	19.67886	1000
11b_short_1Mbps	2412	13.65	23.17395	1000
	2437	13.51	22.43882	1000
	2462	13.11	20.46445	1000
11b_short_11Mbps	2412	13.63	23.06747	1000
	2437	13.06	20.23019	1000
	2462	13.34	21.57744	1000
11g_6Mbps	2412	10.82	12.07814	1000
	2437	10.53	11.29796	1000
	2462	10.01	10.02305	1000
11g_54Mbps	2412	10.75	11.88502	1000
	2437	10.57	11.4025	1000
	2462	10.25	10.59254	1000

For 802.11b\_long\_1Mbps

Low Channel:

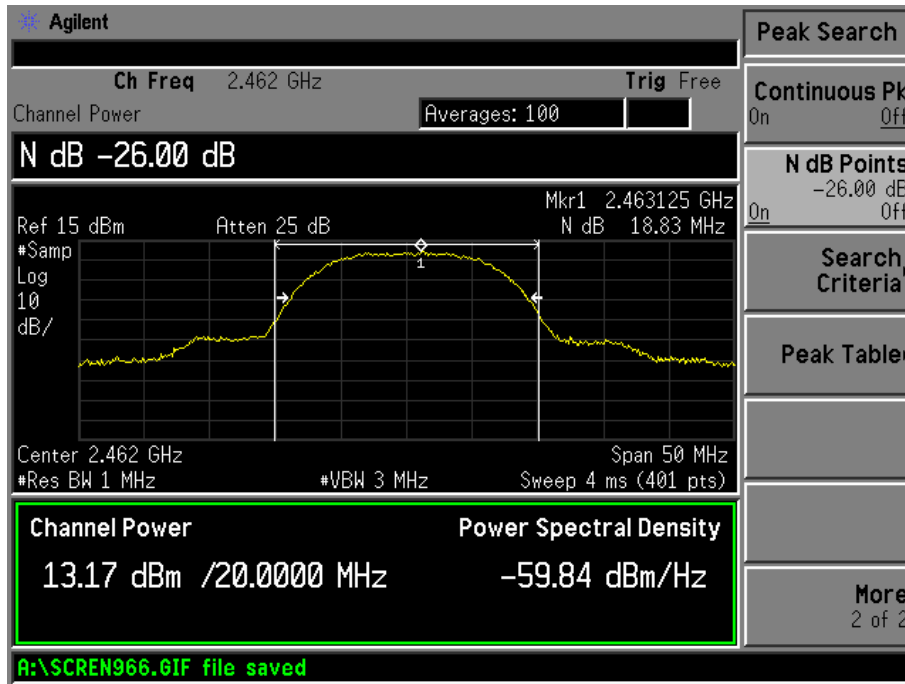


Middle Channel:



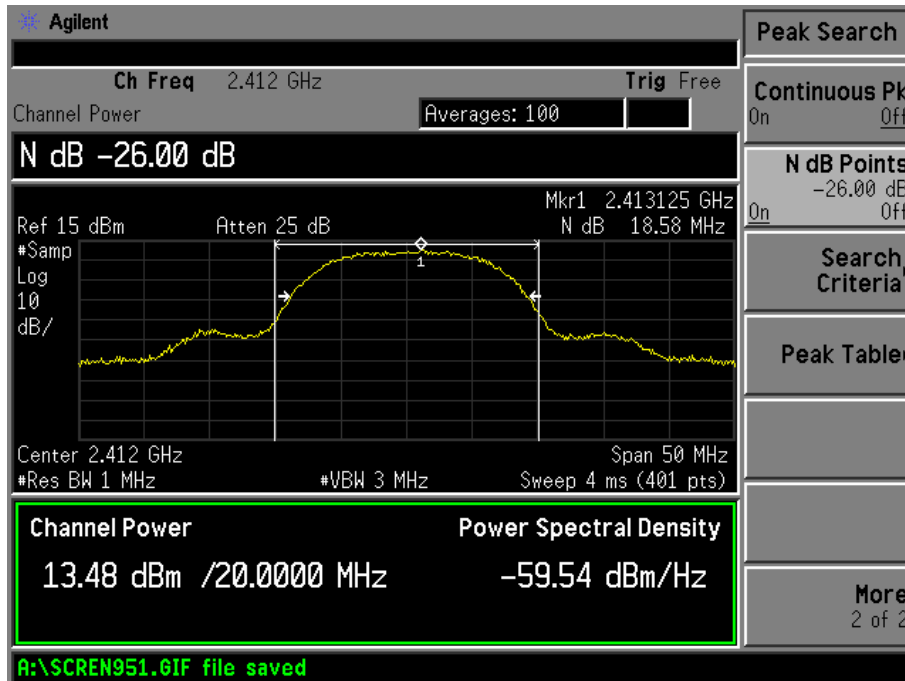


High Channel:

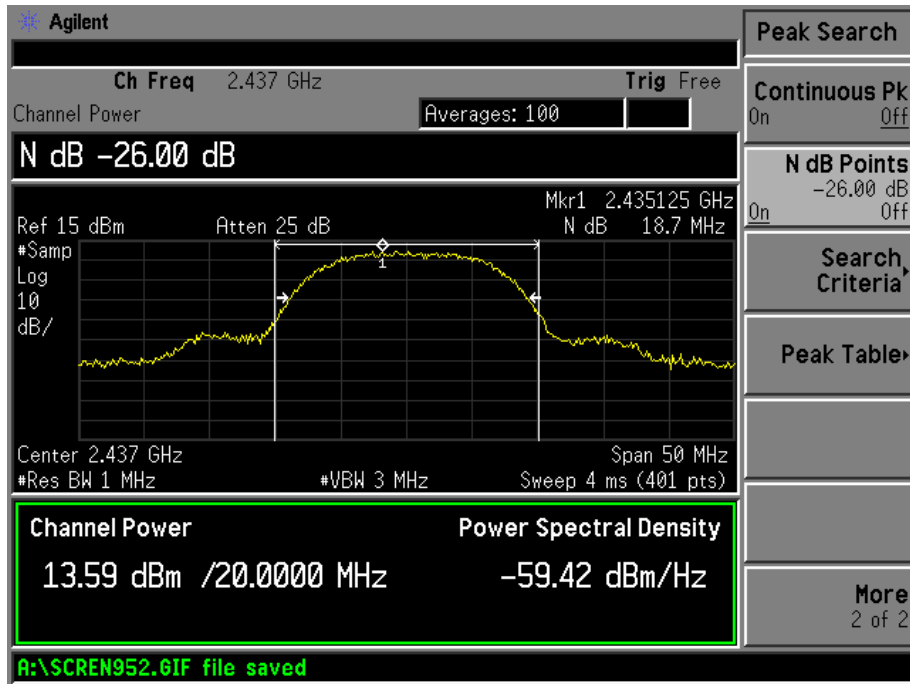


For 802.11b\_long\_11Mbps

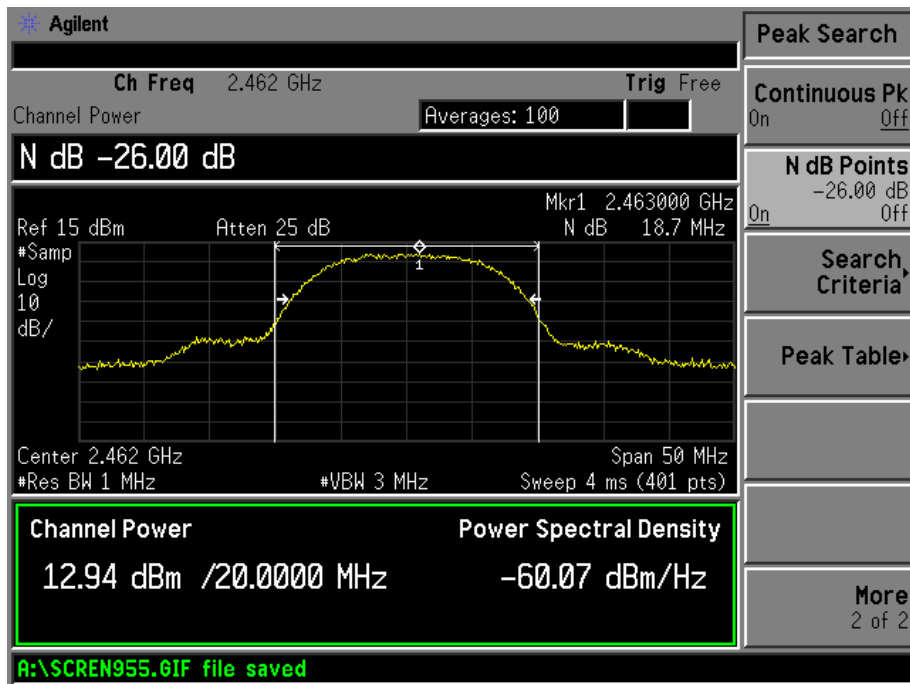
Low Channel:



Middle Channel:

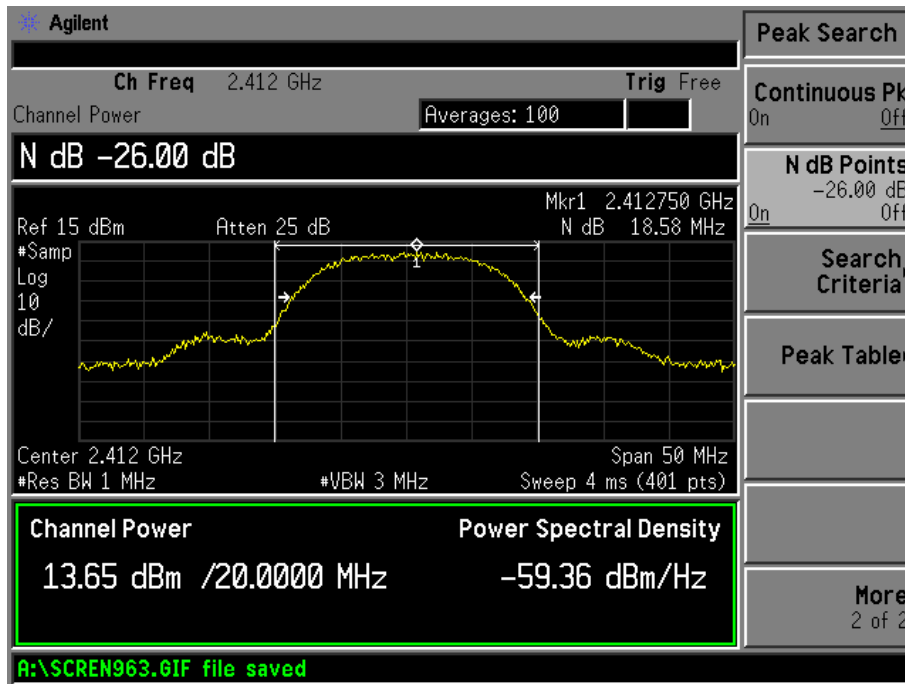


High Channel:

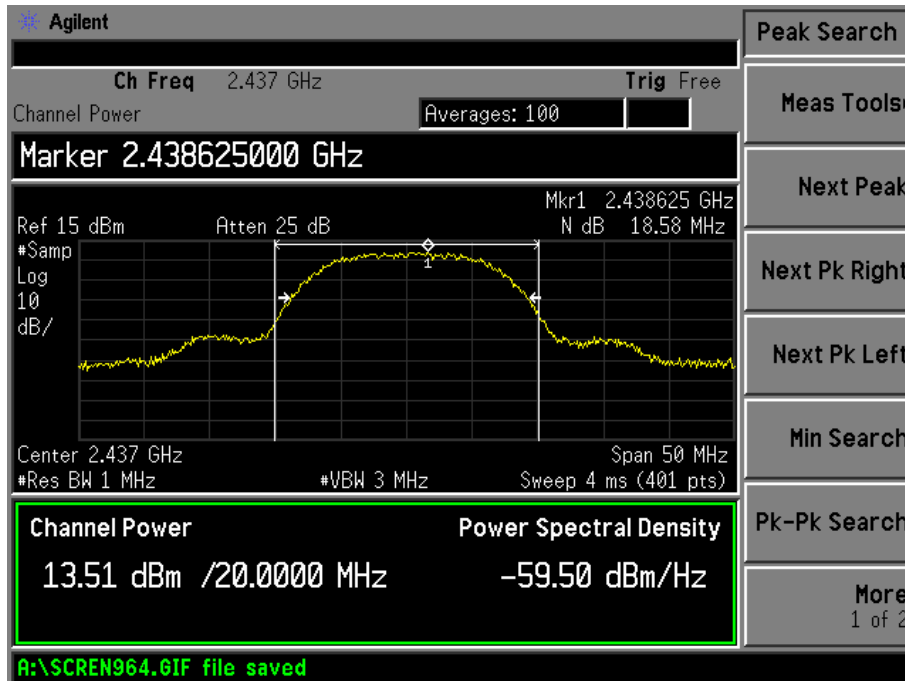


For 802.11b\_short\_1Mbps

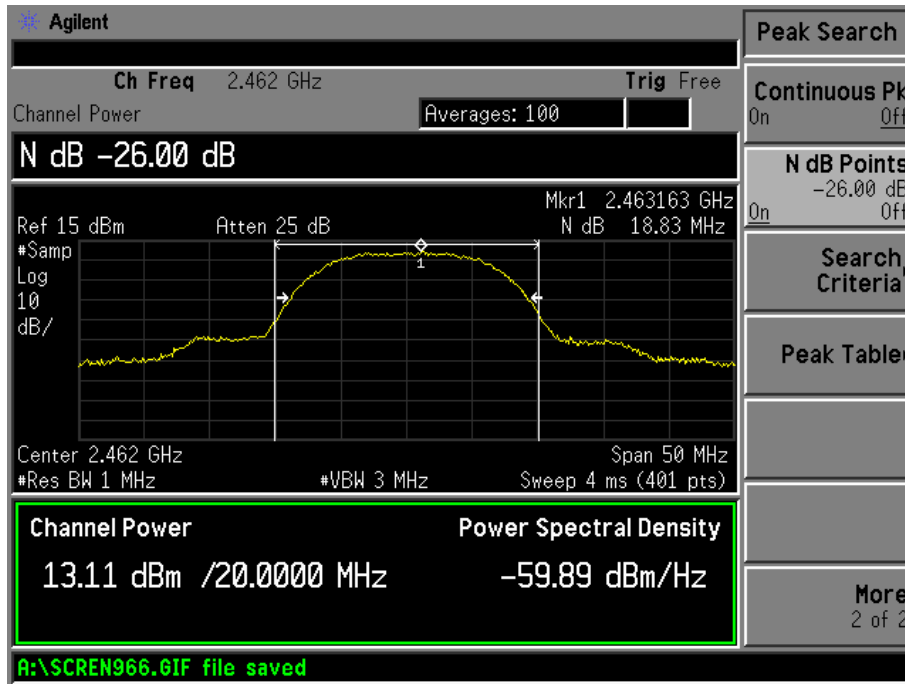
Low Channel:



Middle Channel:

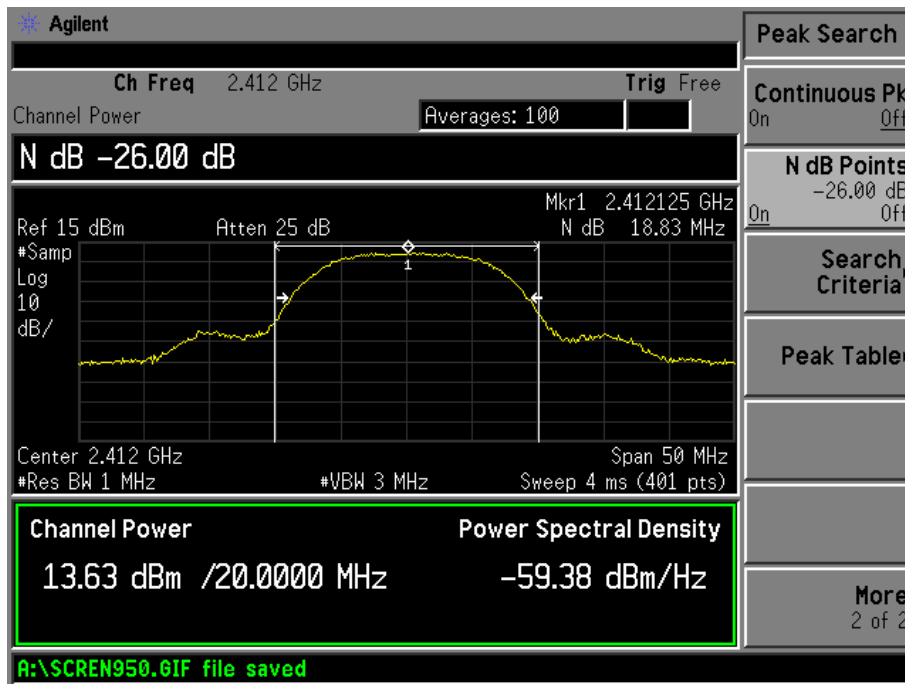


High Channel:

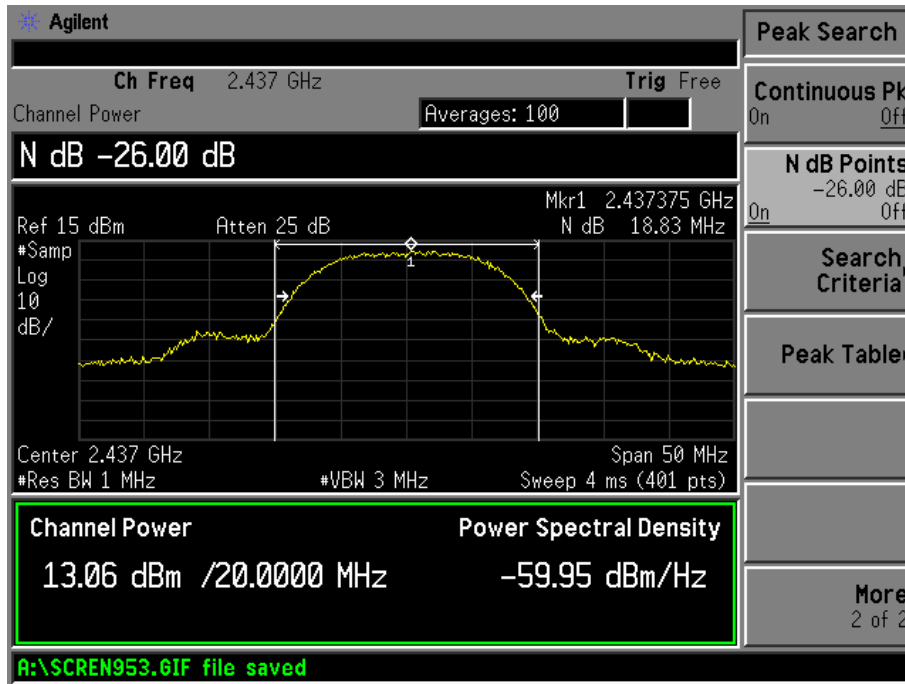


For 802.11b\_long\_11Mbps

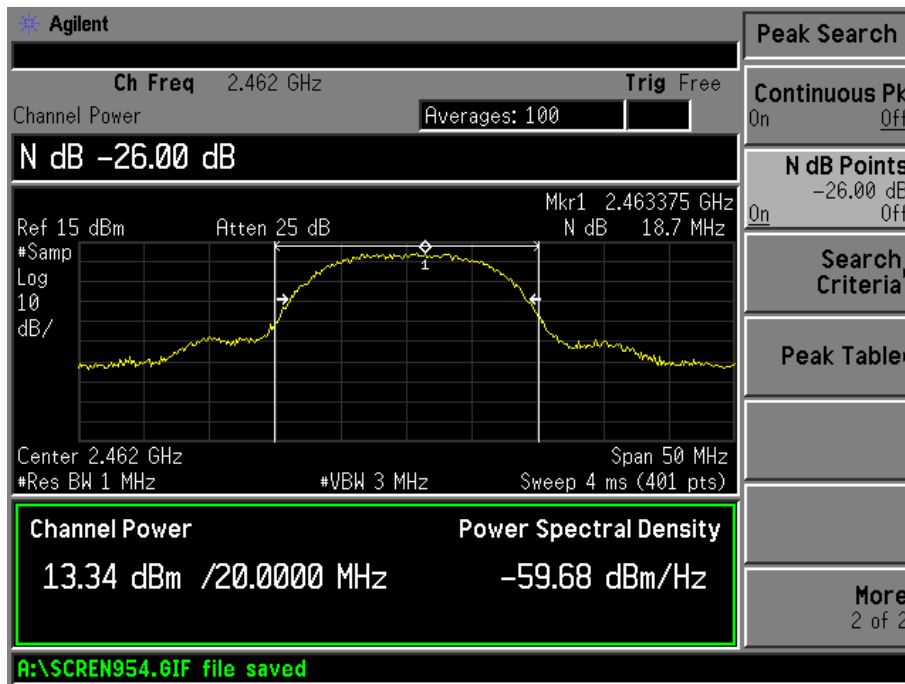
Low Channel:



Middle Channel:

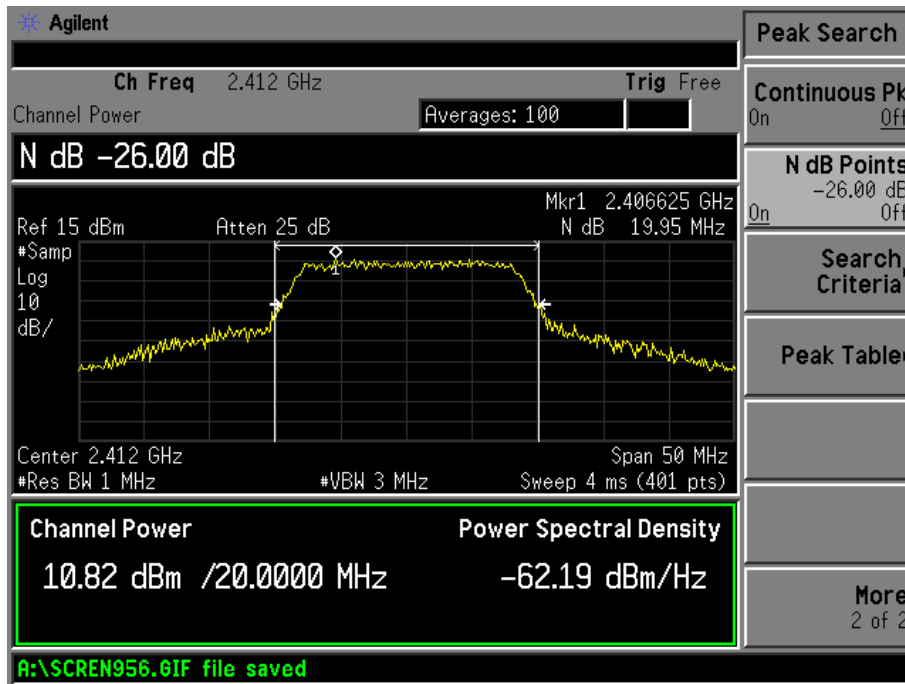


High Channel:

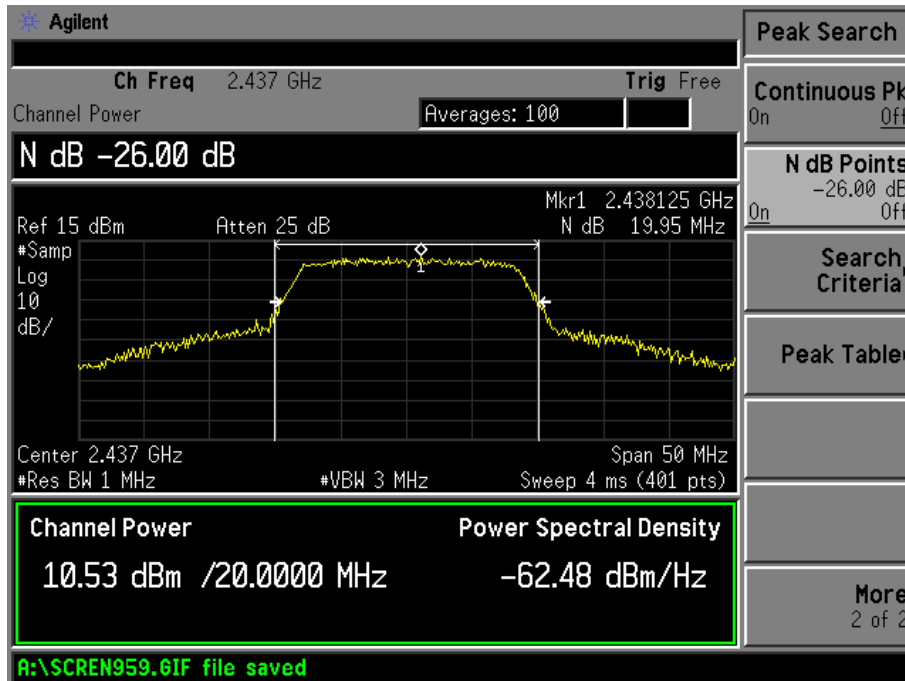


For 802.11g\_6Mbps

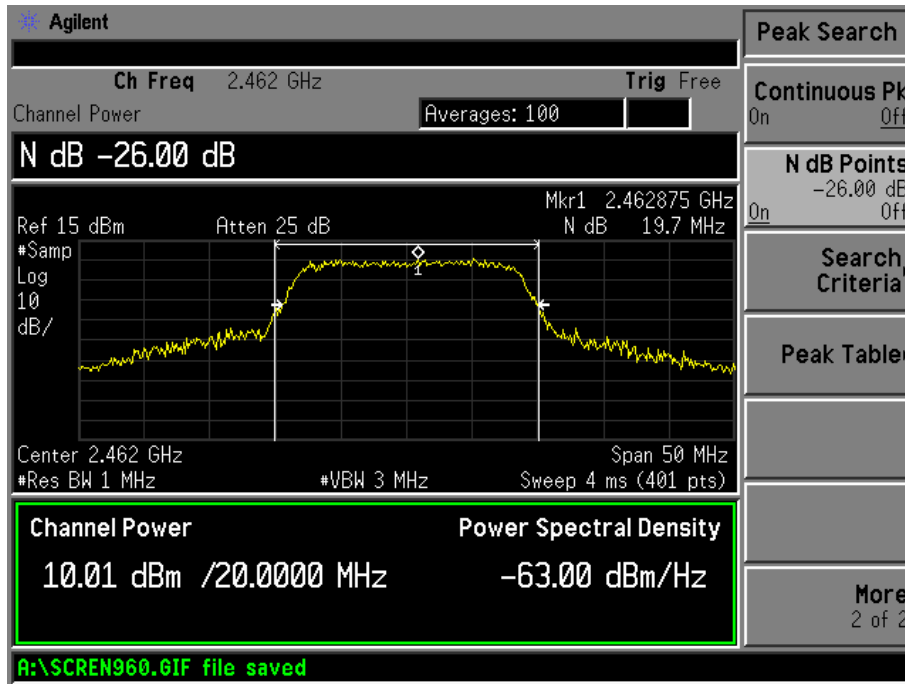
Low Channel:



Middle Channel:

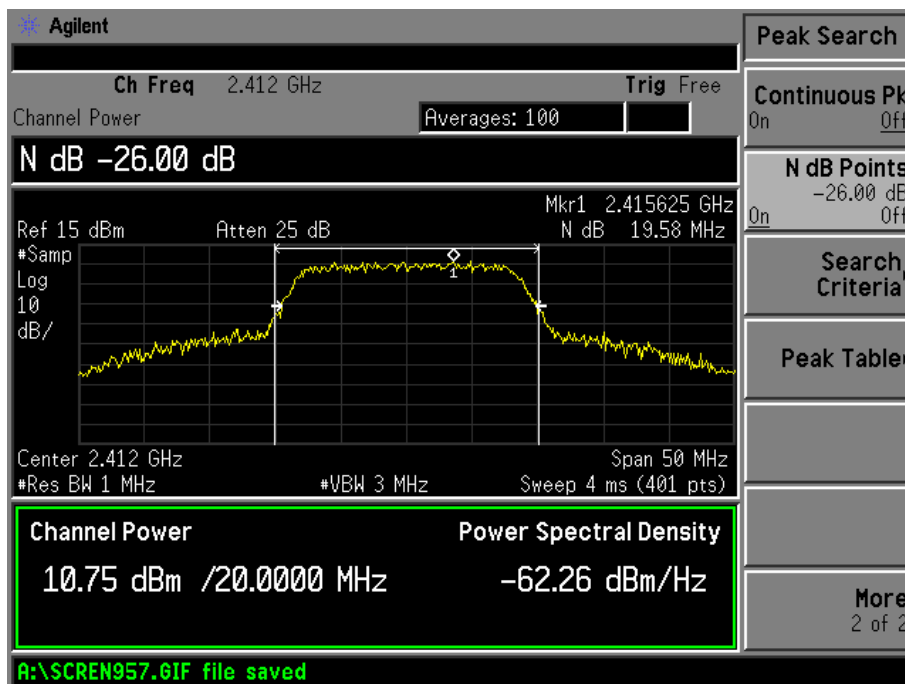


High Channel:

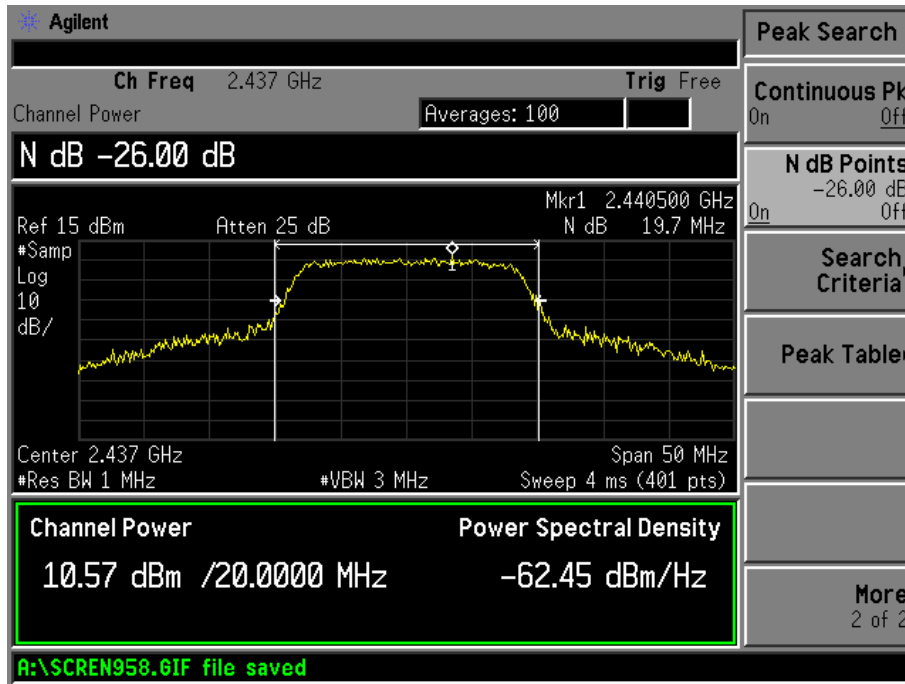


For 802.11g\_54Mbps

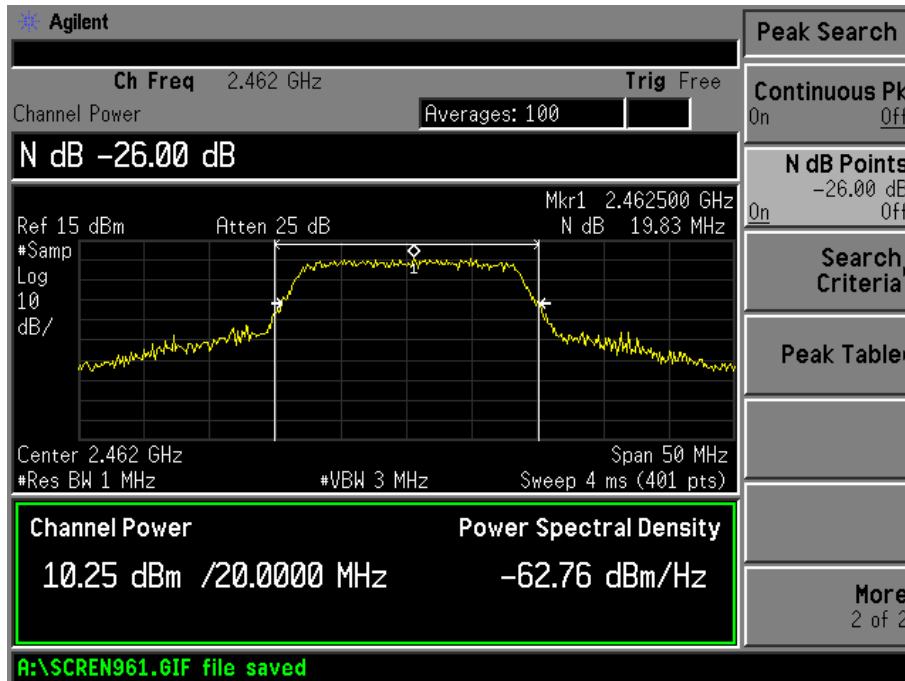
Low Channel:



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  $\pm 3.0$  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

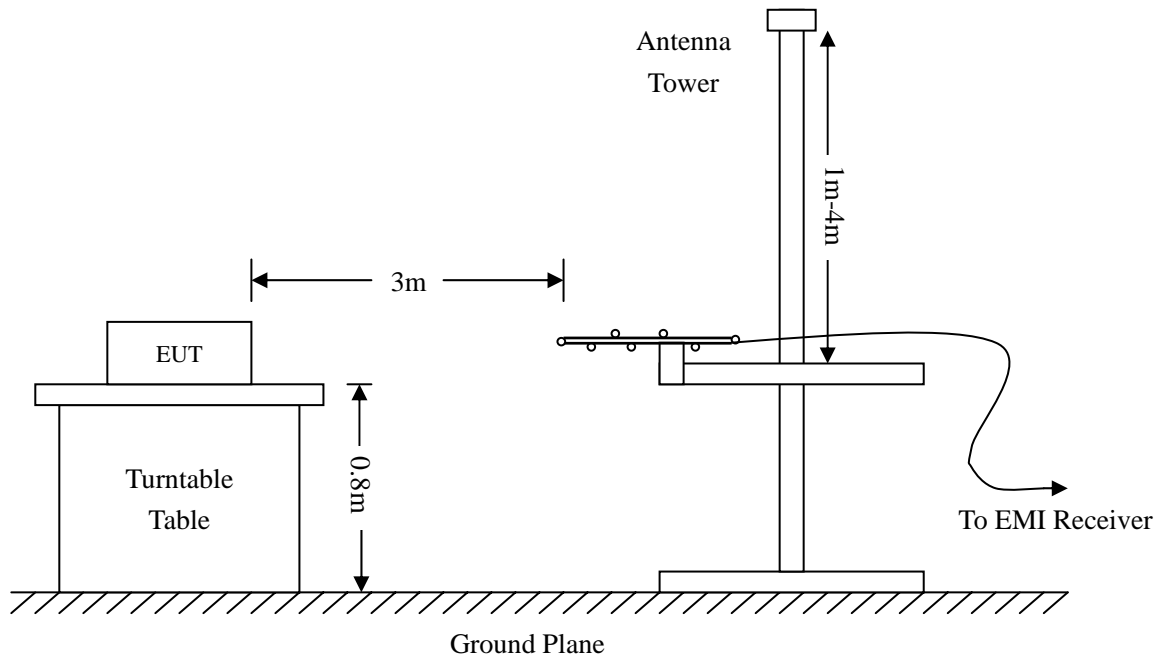
Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2009-08-12	2010-08-11
Positioning Controller	C&C	CC-C-1F	N/A	2009-08-12	2010-08-11
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2009-07-21	2010-07-20
Horn Antenna	SCHWARZBECK	BBHX 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

### 8.4 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.



### 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:	25 °C
Relative Humidity:	49 %
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:

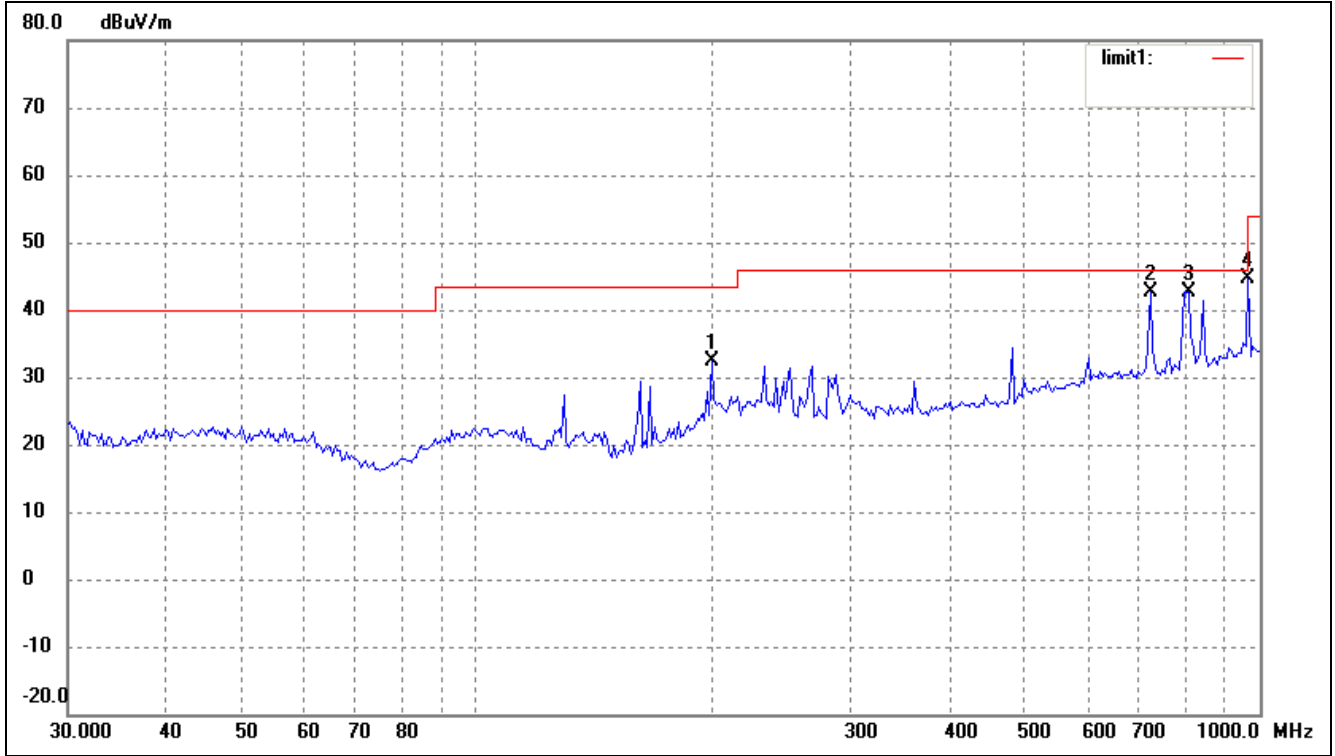
**-1.2 dBμV at 7311 MHz in the Horizontal polarization, Transmitting 802.11b test mode, 30 MHz to 25 GHz, 3Meters**

Test Result/Plots:

Spurious Emission From 30 MHz to 1 GHz

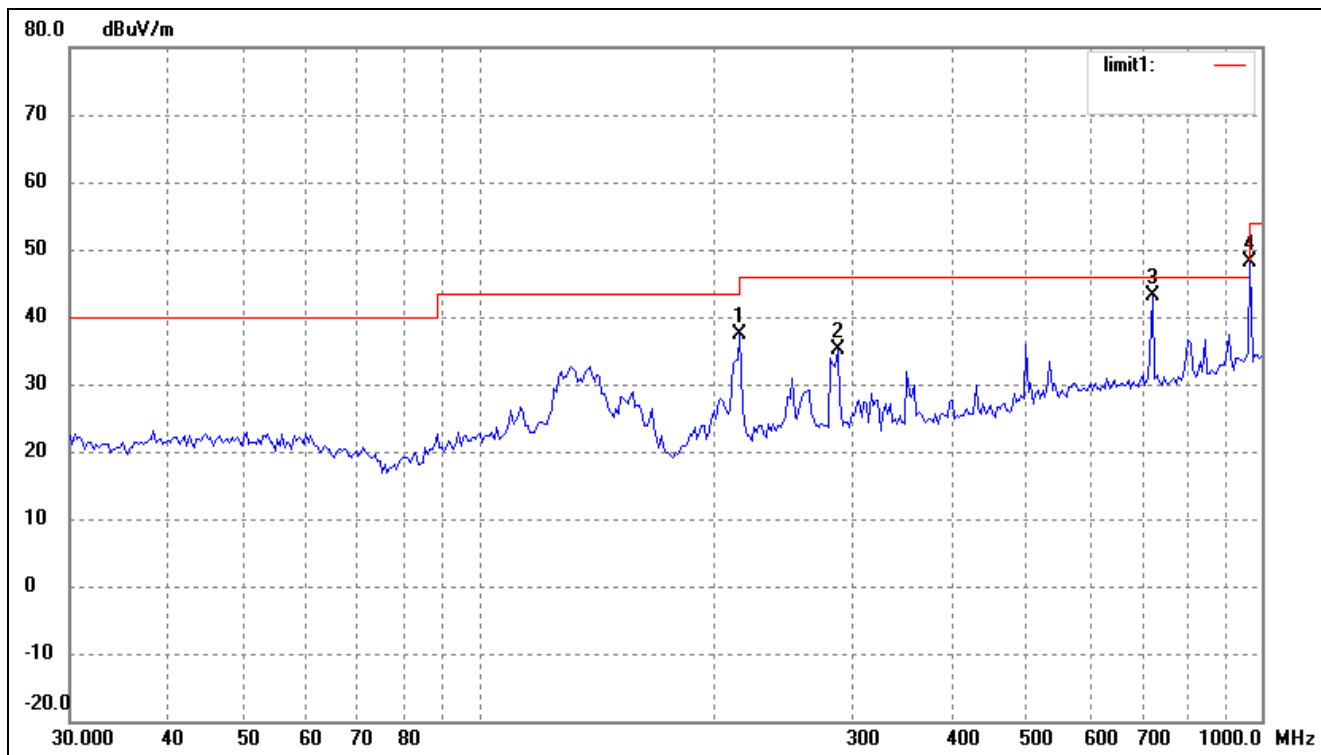
Test mode: Transmitting (802.11b Low Channel)

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( ° )	Height (cm)	Remark
1	199.2855	26.63	5.68	32.31	43.50	-11.19	148	100	peak
2	724.2611	27.99	14.74	42.73	46.00	-3.27	26	100	QP
3	810.2654	26.96	15.65	42.61	46.00	-3.39	99	100	QP
4	965.5421	26.88	17.78	44.66	54.00	-9.34	152	100	peak

Vertical

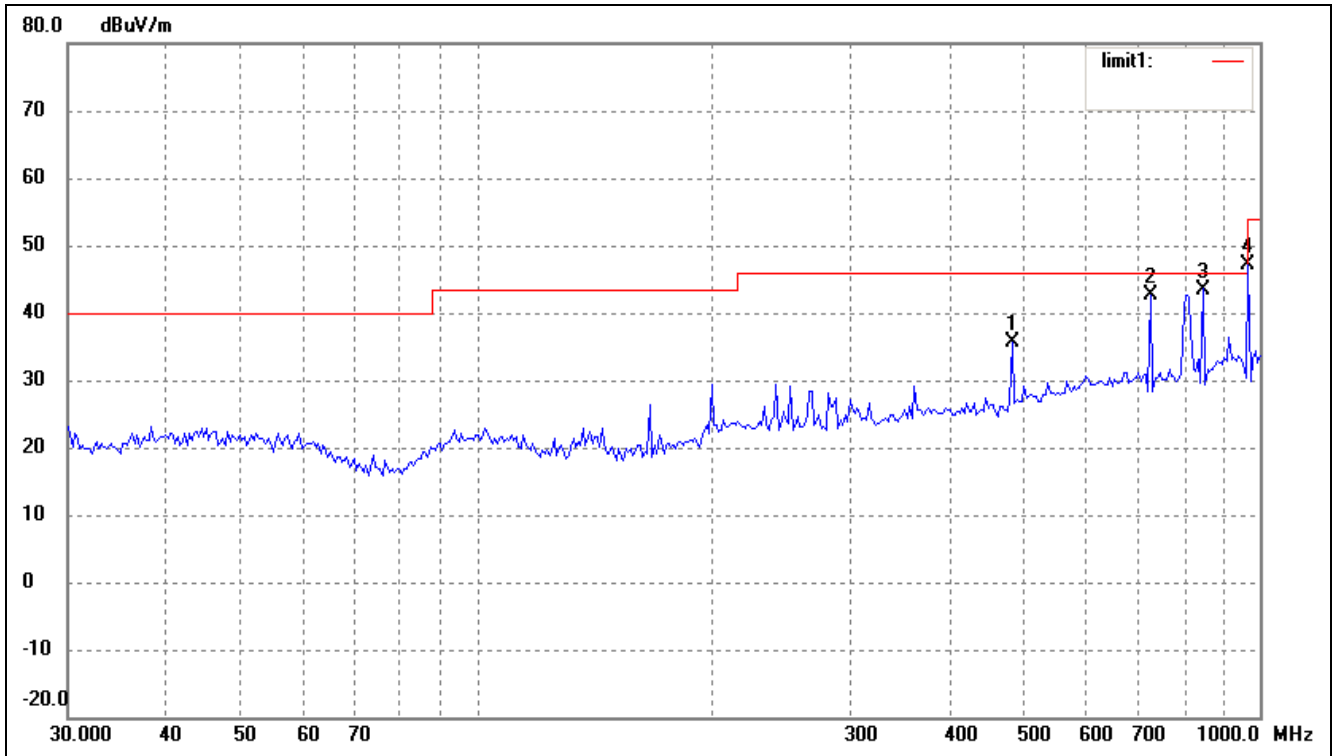


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	215.2678	31.18	6.18	37.36	43.50	-6.14	143	100	peak
2	286.9823	26.69	8.52	35.21	46.00	-10.79	69	200	peak
3	724.2611	28.44	14.74	43.18	46.00	-2.82	57	100	QP
4	965.5421	30.35	17.78	48.13	54.00	-5.87	287	100	QP

Spurious Emission From 30 MHz to 1 GHz

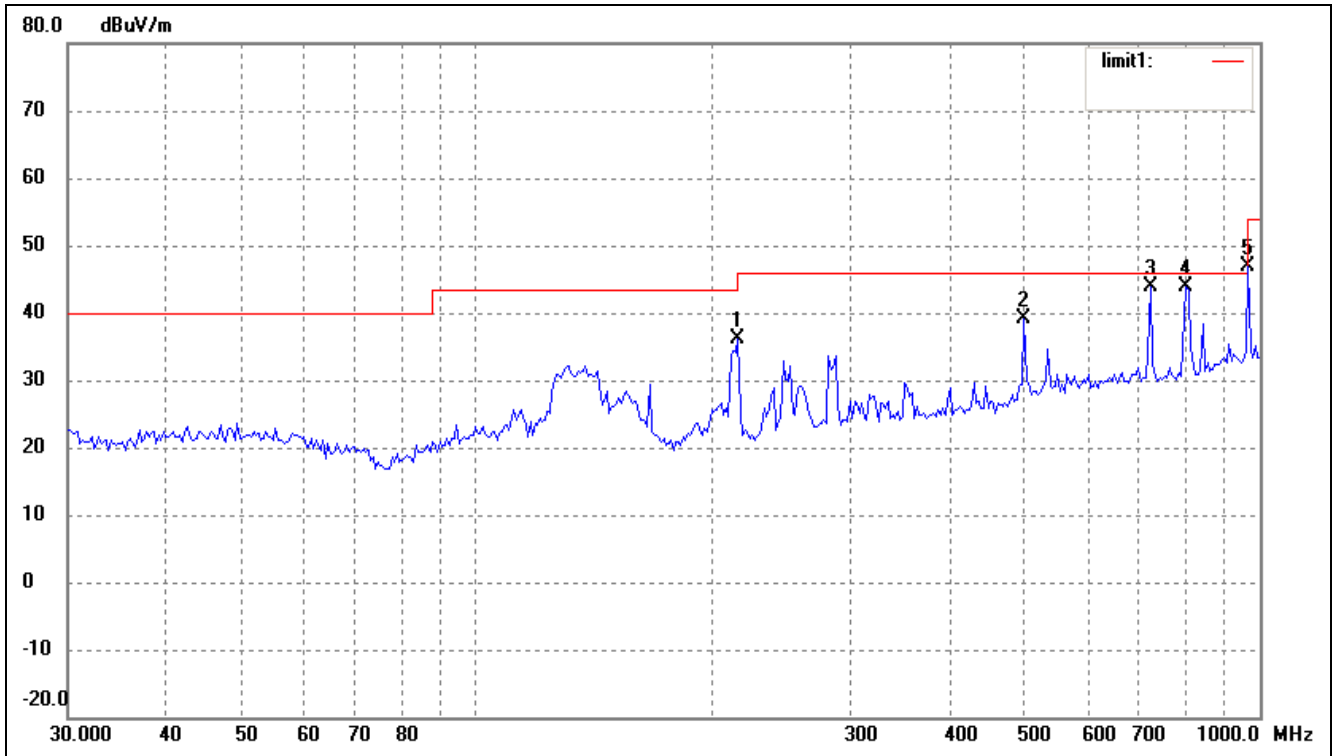
Test mode: Transmitting (802.11b Middel Channel)

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	482.2156	24.58	11.17	35.75	46.00	-10.25	225	100	peak
2	724.2611	27.77	14.74	42.51	46.00	-3.49	163	200	QP
3	845.0878	27.36	16.14	43.50	46.00	-2.50	67	200	QP
4	965.5421	29.31	17.78	47.09	54.00	-6.91	91	100	peak

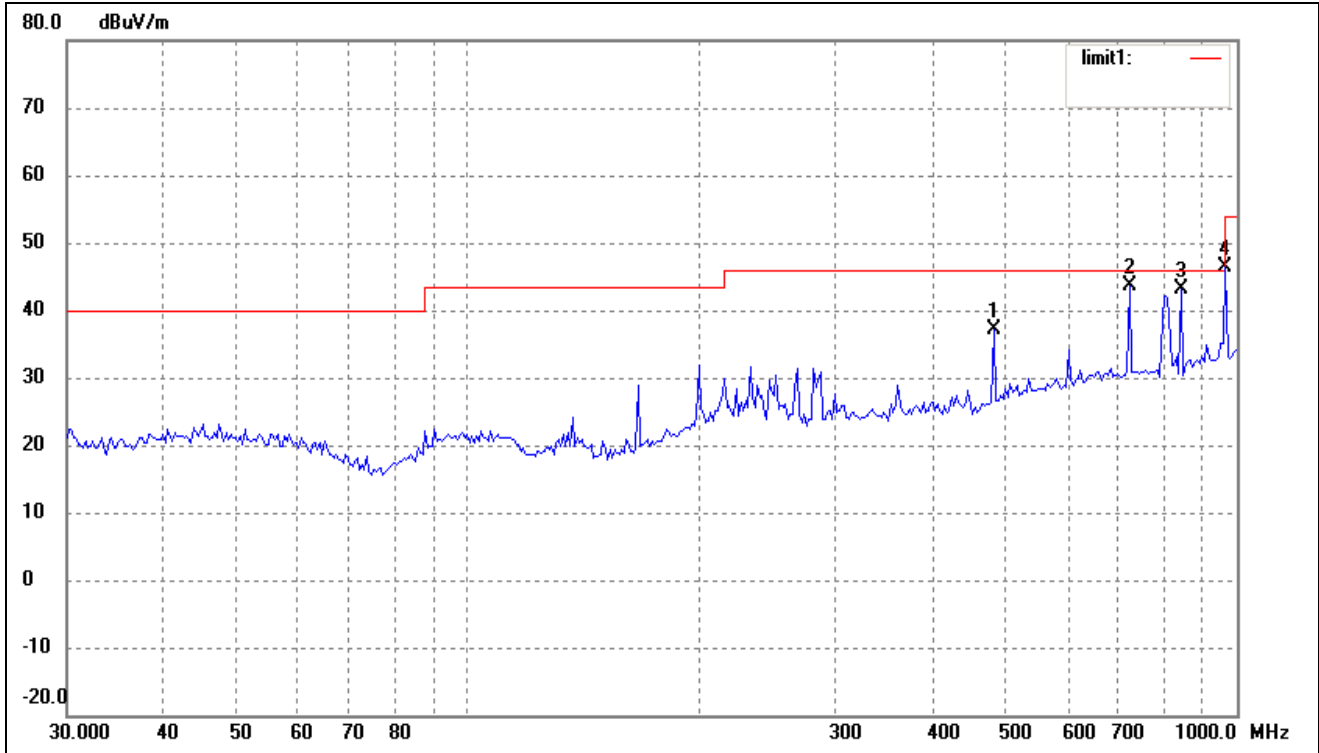
Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	215.2678	30.07	6.18	36.25	43.50	-7.25	136	100	peak
2	499.4247	26.35	12.88	39.23	46.00	-6.77	59	100	peak
3	724.2611	29.26	14.74	44.00	46.00	-2.00	99	100	QP
4	804.6028	28.24	15.57	43.81	46.00	-2.19	87	100	QP
5	965.5421	29.15	17.78	46.93	54.00	-7.07	61	100	peak

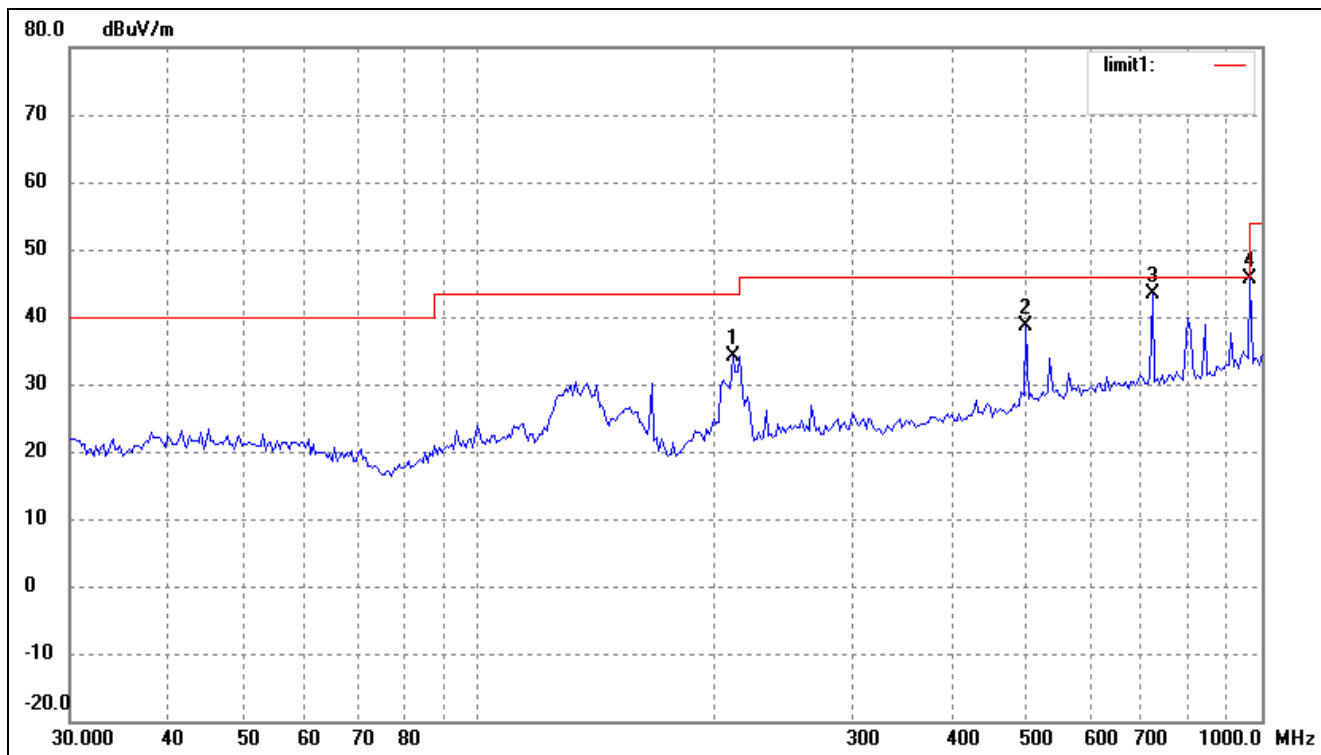
Spurious Emission From 30 MHz to 1 GHz  
 Test mode: Transmitting (802.11b High Channel)

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	482.2156	26.06	11.17	37.23	46.00	-8.77	321	100	peak
2	724.2611	28.98	14.74	43.72	46.00	-2.28	65	130	QP
3	845.0878	26.97	16.14	43.11	46.00	-2.89	91	100	QP
4	965.5421	28.53	17.78	46.31	54.00	-7.69	78	100	peak

Vertical



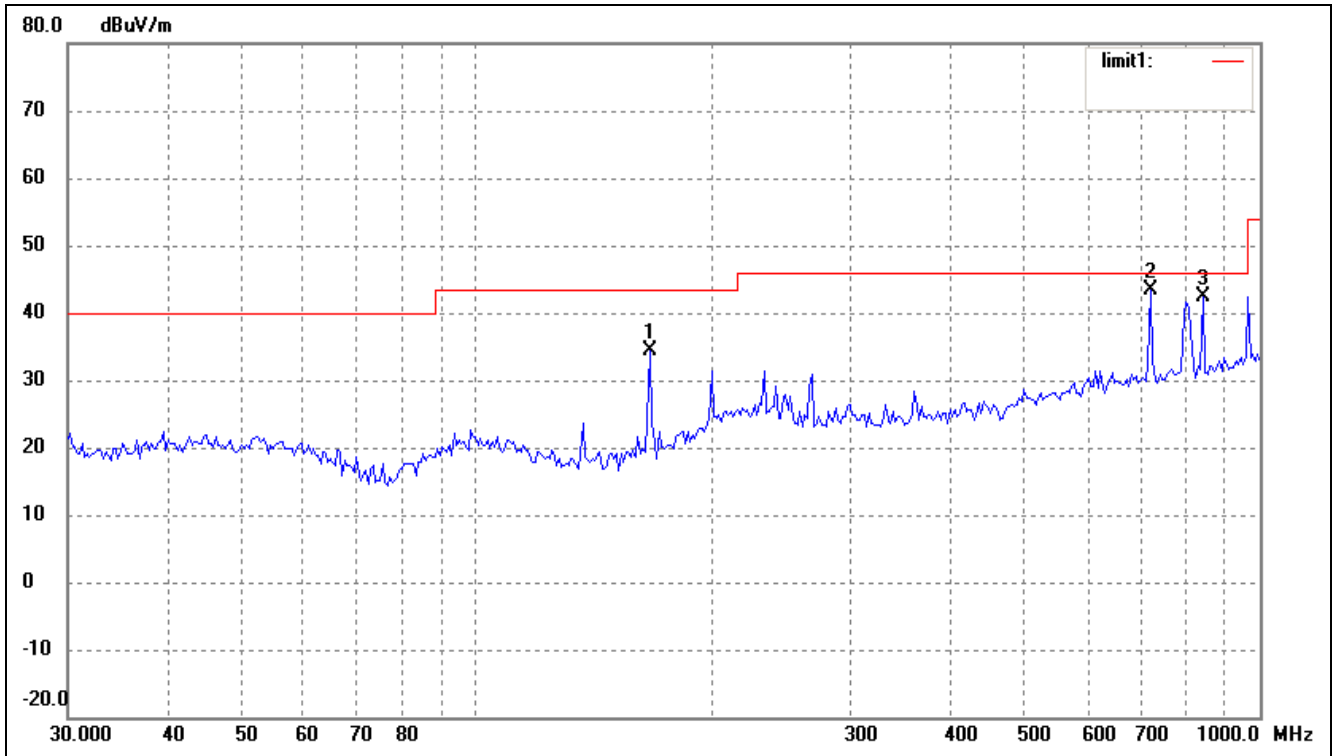
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	210.7860	28.16	6.04	34.20	43.50	-9.30	36	100	peak
2	499.4247	25.68	12.88	38.56	46.00	-7.44	95	100	peak
3	724.2611	28.65	14.74	43.39	46.00	-2.61	50	142	QP
4	965.5421	27.81	17.78	45.59	54.00	-8.41	120	100	peak



Spurious Emission From 30 MHz to 1 GHz

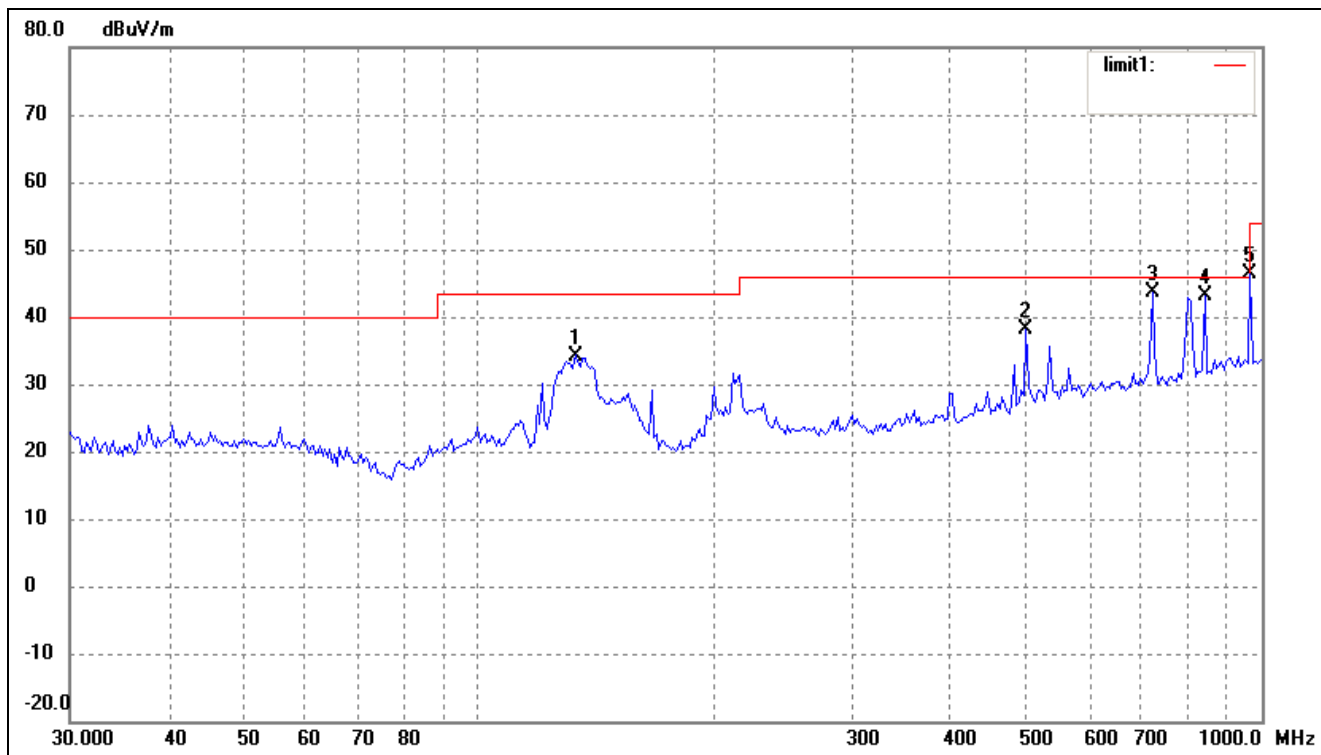
Test mode: Transmitting (802.11g Low Channel)

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	166.0680	30.57	3.93	34.50	43.50	-9.00	156	100	peak
2	724.2611	28.73	14.74	43.47	46.00	-2.53	34	100	QP
3	845.0878	26.13	16.14	42.27	46.00	-3.73	117	100	peak

Vertical

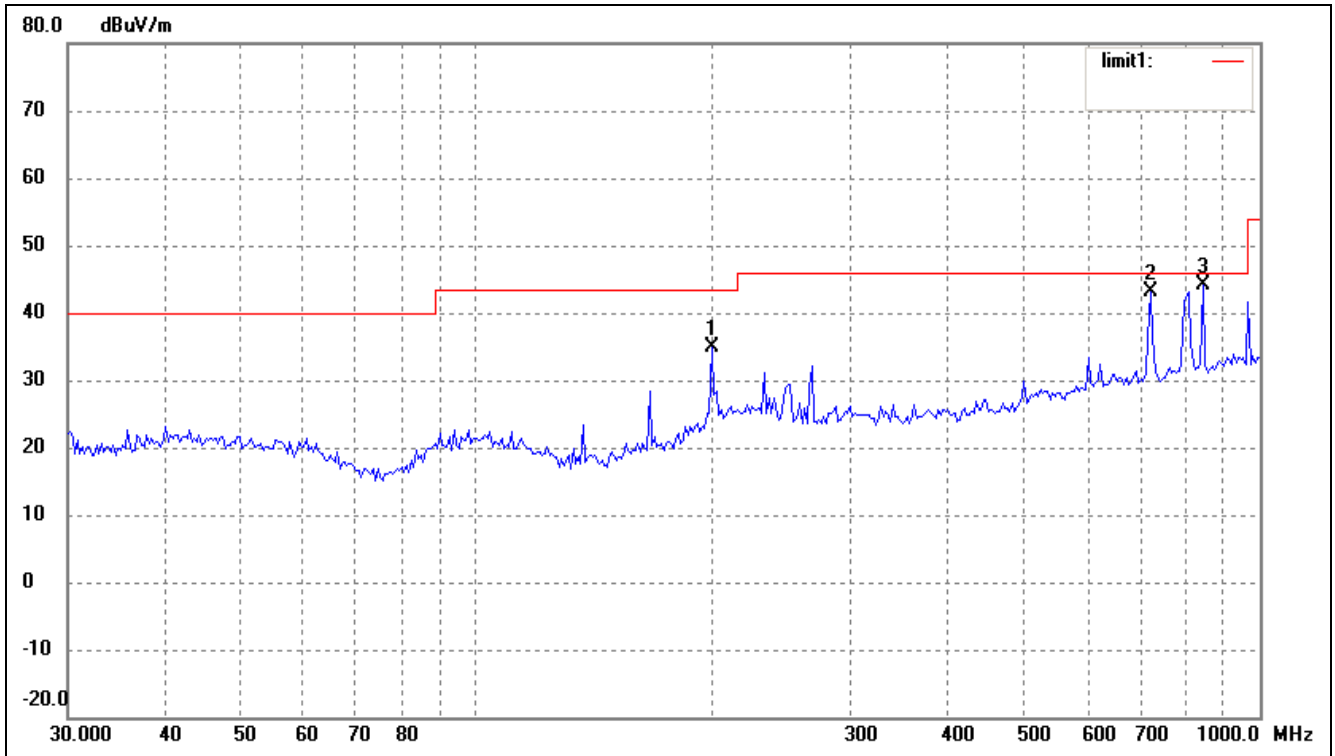


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	132.6850	30.57	3.68	34.25	43.50	-9.25	336	100	peak
2	499.4247	25.24	12.88	38.12	46.00	-7.88	29	100	peak
3	724.2611	29.00	14.74	43.74	46.00	-2.26	99	100	QP
4	845.0878	27.03	16.14	43.17	46.00	-2.83	52	100	QP
5	965.5421	28.64	17.78	46.42	54.00	-7.58	147	100	peak

Spurious Emission From 30 MHz to 1 GHz

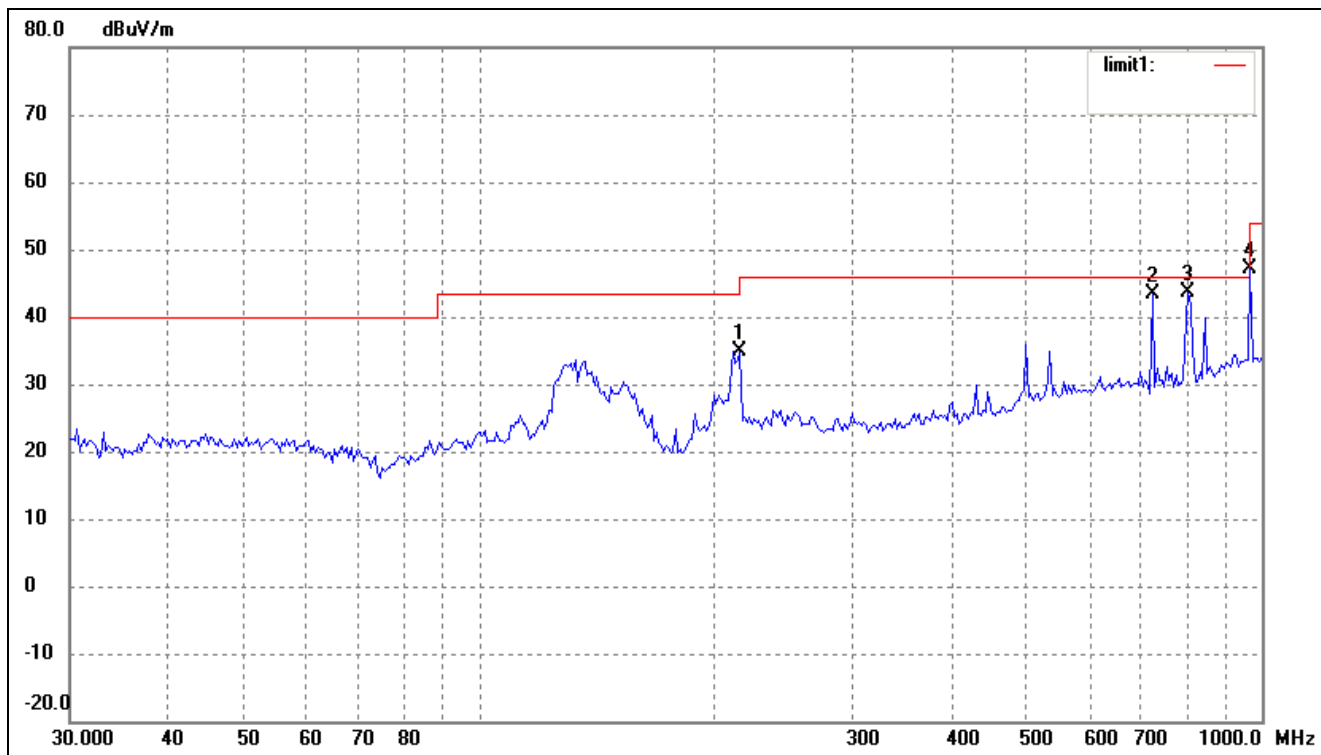
Test mode: Transmitting (802.11g Middle Channel)

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	199.2855	29.11	5.68	34.79	43.50	-8.71	15	100	peak
2	724.2611	28.49	14.74	43.23	46.00	-2.77	87	100	QP
3	845.0878	28.08	16.14	44.22	46.00	-1.78	91	100	QP

Vertical

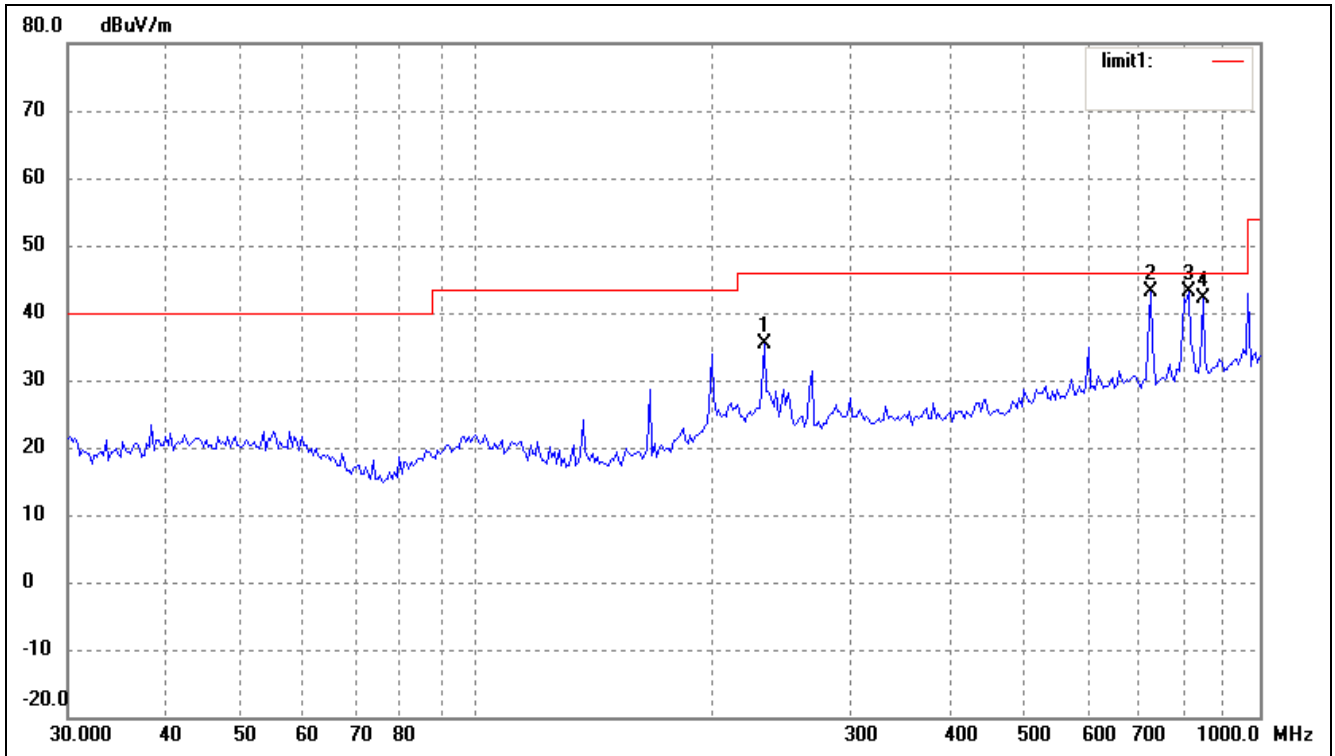


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	215.2678	28.79	6.18	34.97	43.50	-8.53	32	100	peak
2	724.2611	28.56	14.74	43.30	46.00	-2.70	48	100	QP
3	804.6028	27.97	15.57	43.54	46.00	-2.46	59	100	QP
4	965.5421	29.38	17.78	47.16	54.00	-6.84	41	100	peak

Spurious Emission From 30 MHz to 1 GHz

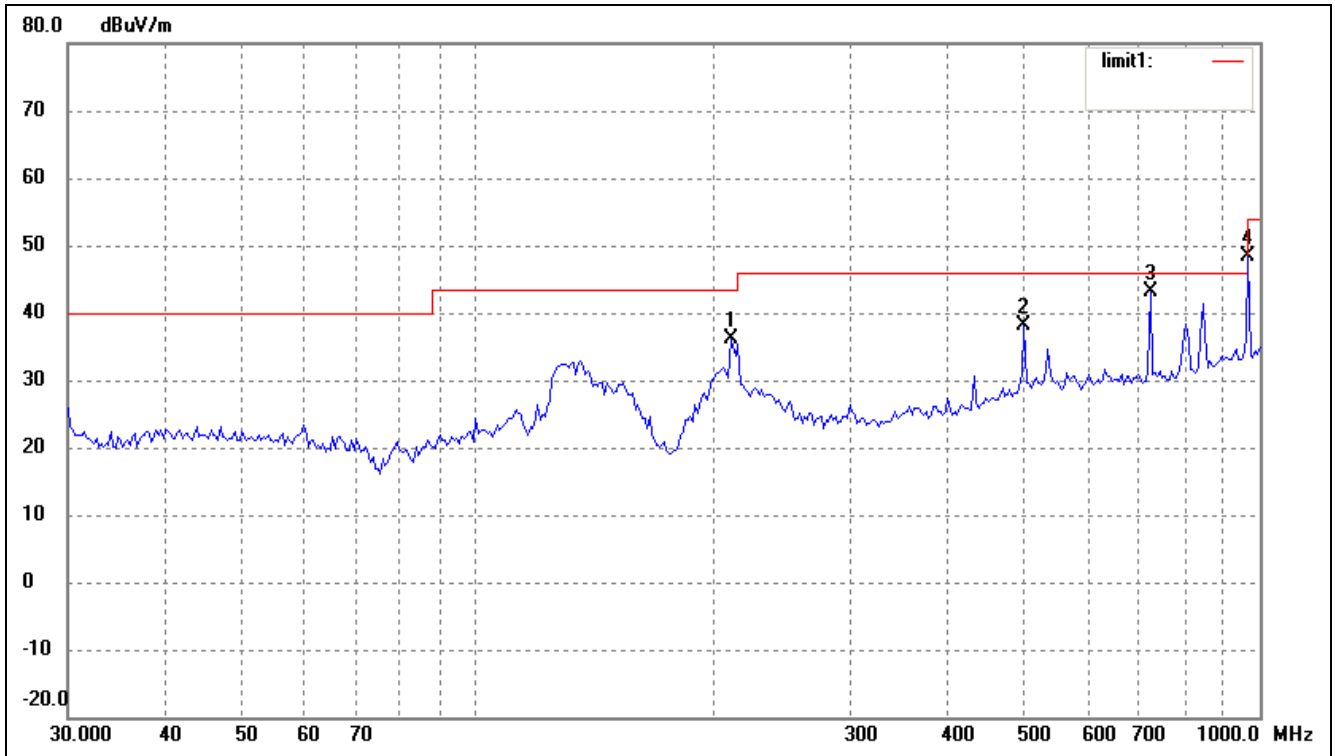
Test mode: Transmitting (802.11g High Channel)

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	232.5318	28.39	7.03	35.42	46.00	-10.58	102	100	peak
2	724.2611	28.48	14.74	43.22	46.00	-2.78	59	100	QP
3	810.2654	27.59	15.65	43.24	46.00	-2.76	74	100	QP
4	845.0878	26.08	16.14	42.22	46.00	-3.78	351	100	QP

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	210.7860	30.03	6.04	36.07	43.50	-7.43	110	100	peak
2	499.4247	25.26	12.88	38.14	46.00	-7.86	26	100	peak
3	724.2611	28.47	14.74	43.21	46.00	-2.79	54	100	QP
4	965.5421	30.58	17.78	48.36	54.00	-5.64	145	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)										
4824.0	PK	53.8	90	V	34.1	5.2	33.0	60.1	74	-13.9
7236.0	PK	52.2	174	V	37.4	6.1	33.5	62.2	74	-11.8
7236.0	PK	53.7	187	H	37.4	6.1	33.5	63.7	74	-10.3
4824.0	PK	56.4	235	H	34.1	5.2	33.0	62.7	74	-11.3
4824.0	AV	44.3	256	V	34.1	5.2	33.0	50.6	54	-3.4
7236.0	AV	40.7	90	V	37.4	6.1	33.5	50.7	54	-3.3
7236.0	AV	42.2	245	H	37.4	6.1	33.5	52.2	54	-1.8
4824.0	AV	44.9	260	H	34.1	5.2	33.0	51.2	54	-2.8
Middle Channel (1G to 25GHz)										
7311.0	PK	52.5	245	V	37.4	6.1	33.5	62.5	74	-11.5
4874.0	PK	53.3	170	V	34.1	5.2	33.0	59.6	74	-14.4
7311.0	PK	54.3	145	H	37.4	6.1	33.5	64.3	74	-9.7
4874.0	PK	55.8	280	H	34.1	5.2	33.0	62.1	74	-11.9
7311.0	AV	42.0	270	V	37.4	6.1	33.5	52.0	54	-2.0
4874.0	AV	42.8	65	V	34.1	5.2	33.0	49.1	54	-4.9
7311.0	AV	42.8	60	H	37.4	6.1	33.5	52.8	54	-1.2
4874.0	AV	45.3	45	H	34.1	5.2	33.0	51.6	54	-2.4
High Channel (1G to 25GHz)										
4924.0	PK	56.8	56	V	34.1	5.2	33.0	63.1	74	-10.9
7386.0	PK	50.3	45	V	37.4	6.1	33.5	60.3	74	-13.7
4924.0	PK	57.7	83	H	34.1	5.2	33.0	64.0	74	-10.0
7386.0	PK	47.4	45	H	37.4	6.1	33.5	57.4	74	-16.6
4924.0	AV	45.3	90	V	34.1	5.2	33.0	51.6	54	-2.4
7386.0	AV	38.8	270	V	37.4	6.1	33.5	48.8	54	-5.2
4924.0	AV	46.2	60	H	34.1	5.2	33.0	52.5	54	-1.5
7386.0	AV	36.9	60	H	37.4	6.1	33.5	46.9	54	-7.1

*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)										
4824.0	PK	54.8	90	V	34.1	5.2	33.0	61.1	74	-12.9
7236.0	PK	52.3	270	V	37.4	6.1	33.5	62.3	74	-11.7
7236.0	PK	53.4	180	H	37.4	6.1	33.5	63.4	74	-10.6
4824.0	PK	57.8	45	H	34.1	5.2	33.0	64.1	74	-9.9
4824.0	AV	43.3	270	V	34.1	5.2	33.0	49.6	54	-4.4
7236.0	AV	40.8	90	V	37.4	6.1	33.5	50.8	54	-3.2
7236.0	AV	41.9	45	H	37.4	6.1	33.5	51.9	54	-2.1
4824.0	AV	46.3	60	H	34.1	5.2	33.0	52.6	54	-1.4
Middle Channel (1G to 25GHz)										
7311.0	PK	51.0	45	V	37.4	6.1	33.5	61.0	74	-13.0
4874.0	PK	53.4	270	V	34.1	5.2	33.0	59.7	74	-14.3
7311.0	PK	53.2	45	H	37.4	6.1	33.5	63.2	74	-10.8
4874.0	PK	55.3	180	H	34.1	5.2	33.0	61.6	74	-12.4
7311.0	AV	39.5	270	V	37.4	6.1	33.5	49.5	54	-4.5
4874.0	AV	41.9	90	V	34.1	5.2	33.0	48.2	54	-5.8
7311.0	AV	41.7	60	H	37.4	6.1	33.5	51.7	54	-2.3
4874.0	AV	43.8	45	H	34.1	5.2	33.0	50.1	54	-3.9
High Channel (1G to 25GHz)										
4924.0	PK	53.5	270	V	34.1	5.2	33.0	59.8	74	-14.2
7386.0	PK	48.9	45	V	37.4	6.1	33.5	58.9	74	-15.1
4924.0	PK	57.9	180	H	34.1	5.2	33.0	64.2	74	-9.8
7386.0	PK	51.8	45	H	37.4	6.1	33.5	61.8	74	-12.2
4924.0	AV	42.0	90	V	34.1	5.2	33.0	48.3	54	-5.7
7386.0	AV	37.4	270	V	37.4	6.1	33.5	47.4	54	-6.6
4924.0	AV	46.4	60	H	34.1	5.2	33.0	52.7	54	-1.3
7386.0	AV	40.3	60	H	37.4	6.1	33.5	50.3	54	-3.7

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

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	2009-07-21	2010-07-20
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2009-07-21	2010-07-20
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2009-08-12	2010-08-11
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

### 9.3 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.

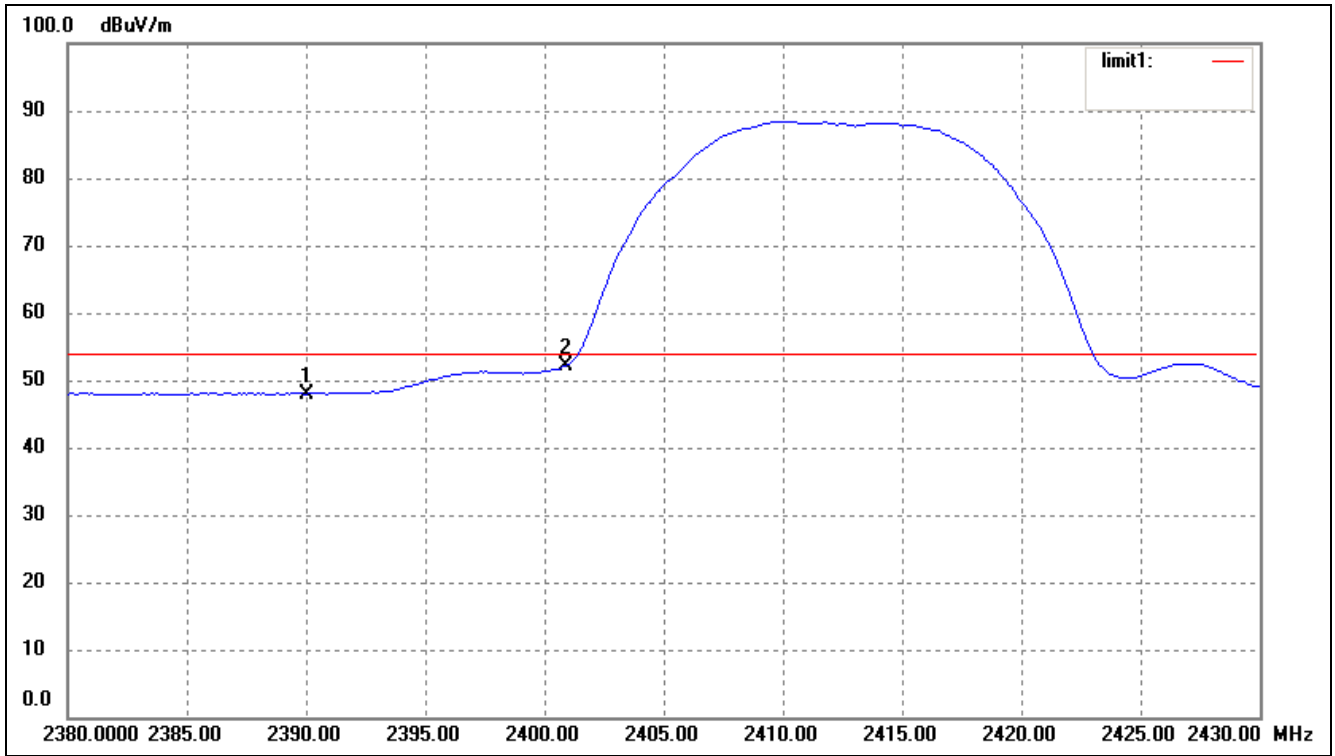
### 9.4 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54 %
ATM Pressure:	1015 mbar

**9.5 Summary of Test Results/Plots**

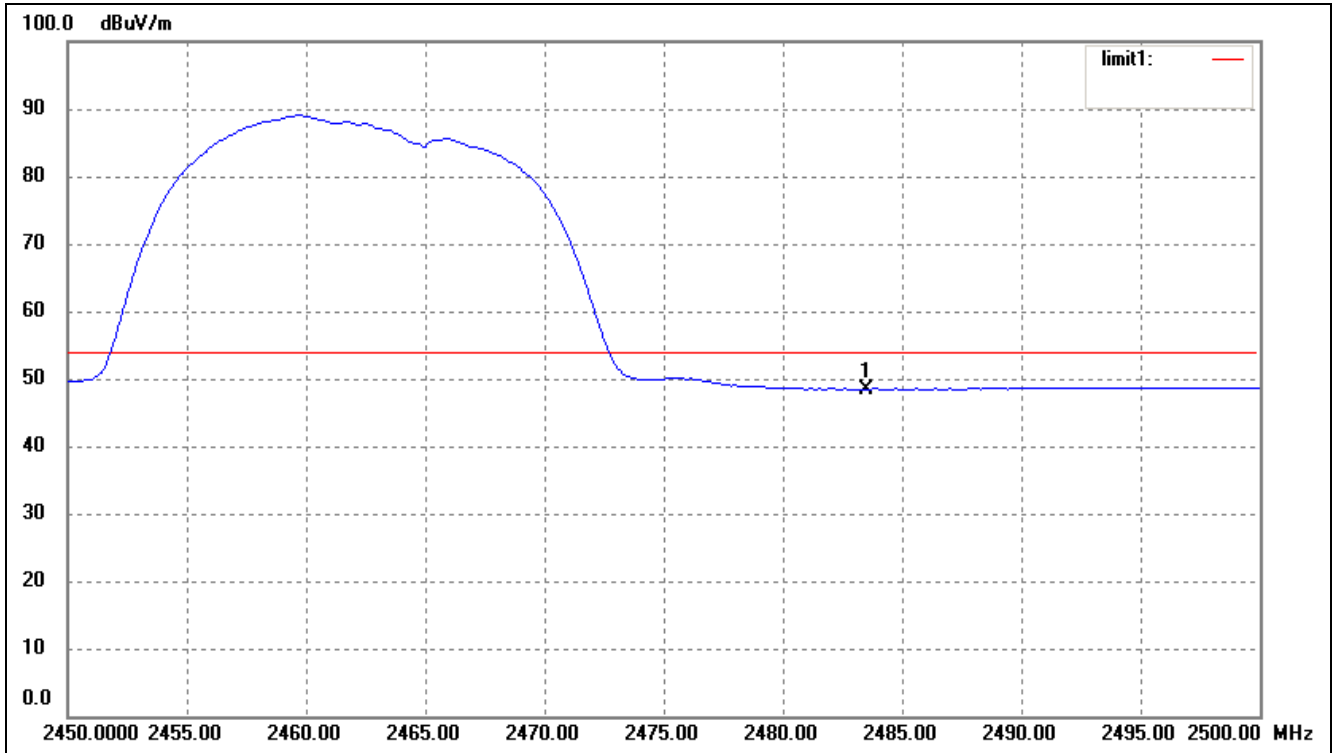
Test mode	Frequency MHz	Limit dBuV /dB	Result
802.11b	2390.000	<54dBuV	Pass
	2400.900	>20dB	Pass
	2483.500	<54dBuV	Pass
802.11g	2390.000	<54dBuV	Pass
	2400.200	>20dB	Pass
	2483.500	<54dBuV	Pass

**For 802.11b**  
Lowest Bandedge



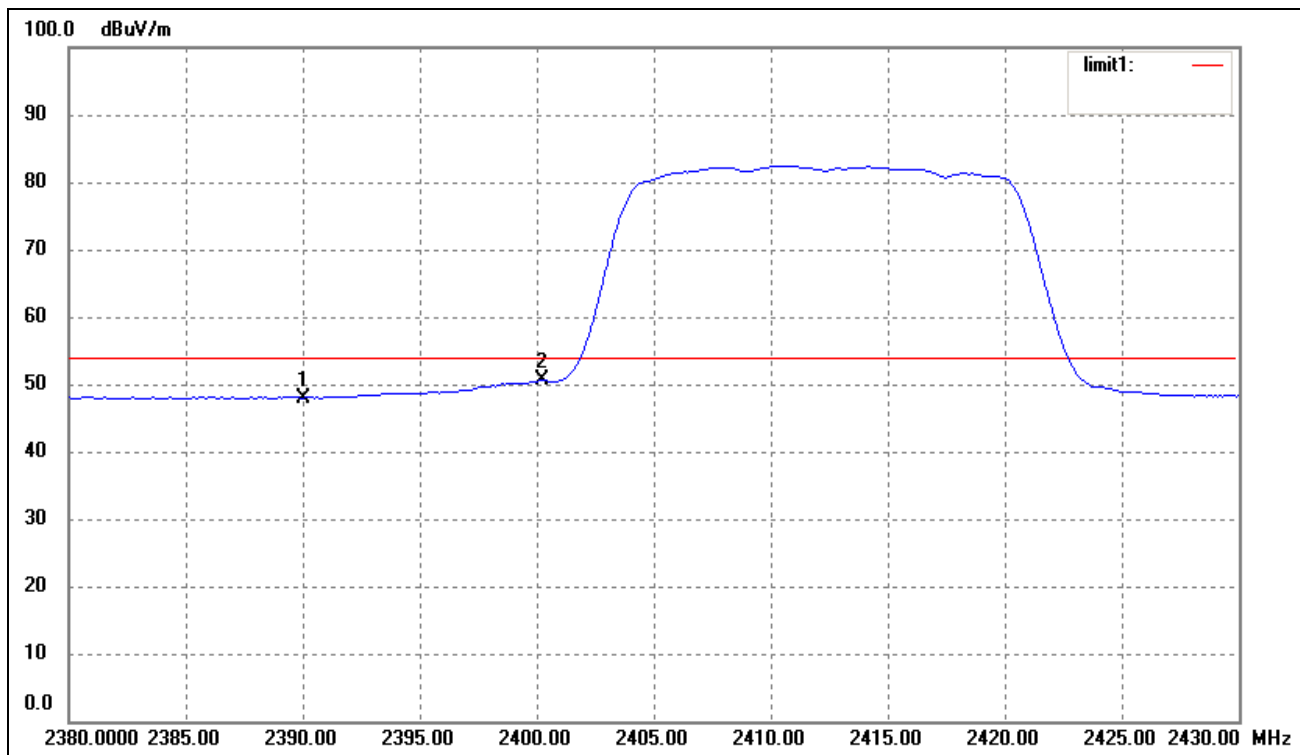
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2390.000	12.41	35.59	48.00	54.00	-6.00	72	100	Ave
	2390.000	23.91	35.59	59.50	74.00	-14.50	72	100	peak
2	2400.900	16.47	35.68	52.15	54.00	-1.85	162	100	Ave
	2400.900	27.97	35.68	63.65	74.00	-10.35	162	100	peak

Highest Bandedge



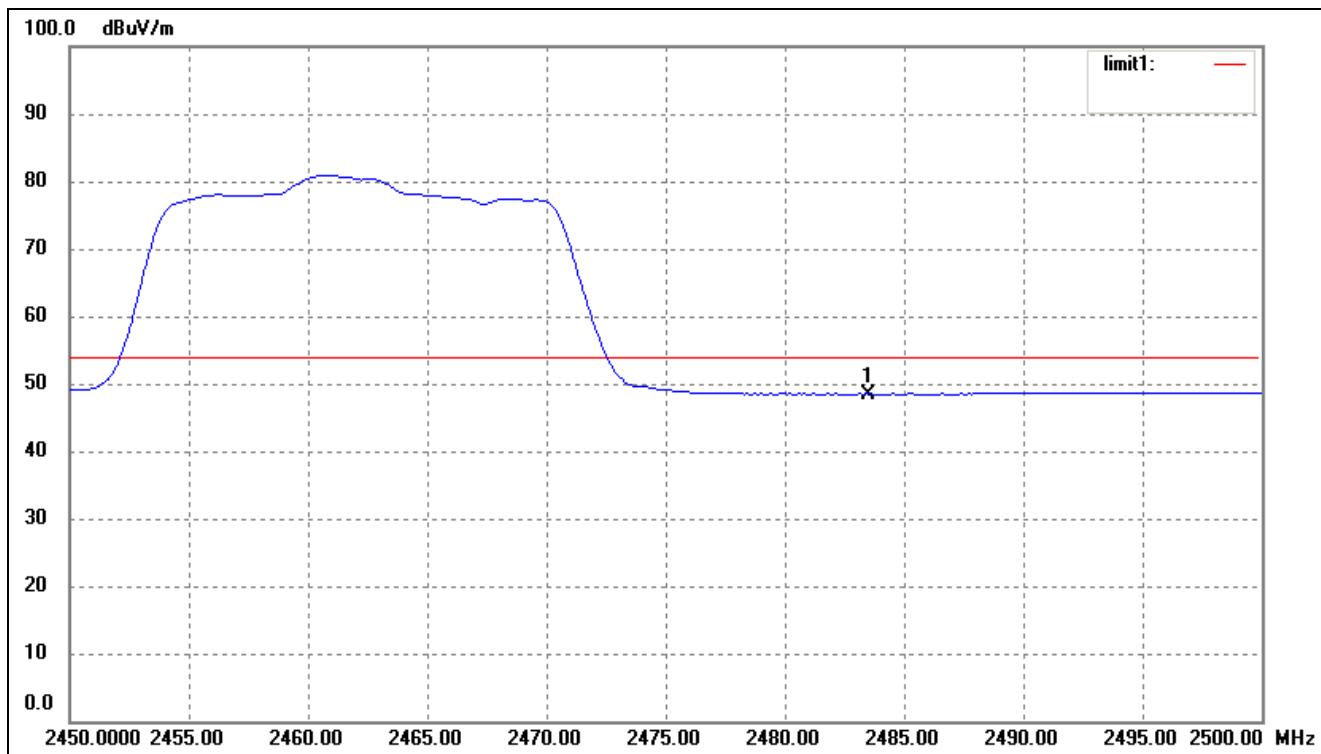
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2483.500	12.52	35.97	48.49	54.00	-5.51	166	200	Ave
	2483.500	24.02	35.97	59.99	74.00	-14.01	166	200	peak

**For 802.11g**  
Lowest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2390.000	12.40	35.59	47.99	54.00	-6.01	0	142	Ave
	2390.000	23.90	35.59	59.49	74.00	-14.51	0	142	peak
2	2400.200	14.89	35.68	50.57	54.00	-3.43	0	142	Ave
	2400.200	27.02	35.68	62.07	74.00	-11.93	0	142	peak

Highest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2483.500	12.50	35.97	48.47	54.00	-5.53	253	100	Ave
	2483.500	24.00	35.97	59.97	74.00	-14.03	253	100	peak

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