

FCC Part 15C

Measurement and Test Report

For

Pismolabs Technology Limited

**Room 1703A, 17/F, Park Building, 476 Castle Peak Road, Cheung Sha Wan,
Kowloon, HongKong**

FCC ID: U8G-P1625

Report Concerns: Original Report	Equipment Type: Pepwave Wireless Product
Model:	<u>Pismo 525</u>
Report No.:	<u>STR11048093I</u>
Test Date:	<u>2011-04-08 to 2011-05-17</u>
Issue Date:	<u>2011-05-31</u>
Tested By:	<u>Galy He / Engineer</u> <i>Galy He</i>
Reviewed By:	<u>Lahm Peng / EMC Manager</u> <i>Lahm peng</i>
Approved & Authorized By:	<u>Jandy so / PSQ Manager</u> <i>Jandyso</i>
Prepared By:	<p>SEM.Test Compliance Service Co., Ltd 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: www.semtest.com.cn</p>

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: Pismolabs Technology Limited
 Address of applicant: Room 1703A, 17/F, Park Building, 476 Castle Peak Road, Cheung Sha Wan, Kowloon, HongKong

Manufacturer: Pismolabs Technology Limited
 Address of manufacturer: Room 1703A, 17/F, Park Building, 476 Castle Peak Road, Cheung Sha Wan, Kowloon, HongKong

General Description of E.U.T

Items	Description
EUT Description:	Pepwave Wireless Product
Trade Name:	Pepwave
Model No.:	Pismo 525
Add Model:	Surf series, PolePoint Series, AP series, Mesh Connector series, MAX series, Air Series
Rated Voltage:	DC 12V
RF Output Power	Max. 19.26 dBm (Conducted)
Antenna Gain:	8dBi
Modulation Type	CCK, OFDM
Frequency range:	2412MHz~2462MHz
Number of channels:	11
Channel Separation:	5MHz
Type of Antenna:	Detachable Antenna
Size:	37.0X29.0X7.5cm

Note: The test data is gathered from a production sample, provided by the manufacture. Test is carried out with Pismo 525 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 Pismolabs Technology Limited 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	XR55	/

1.7 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
Adapter Cable	1.5	Unshielded	With Core
RJ45	0.8	Unshielded	Without 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 ± 2.88 dB.

3.2 Test Equipment List and Details

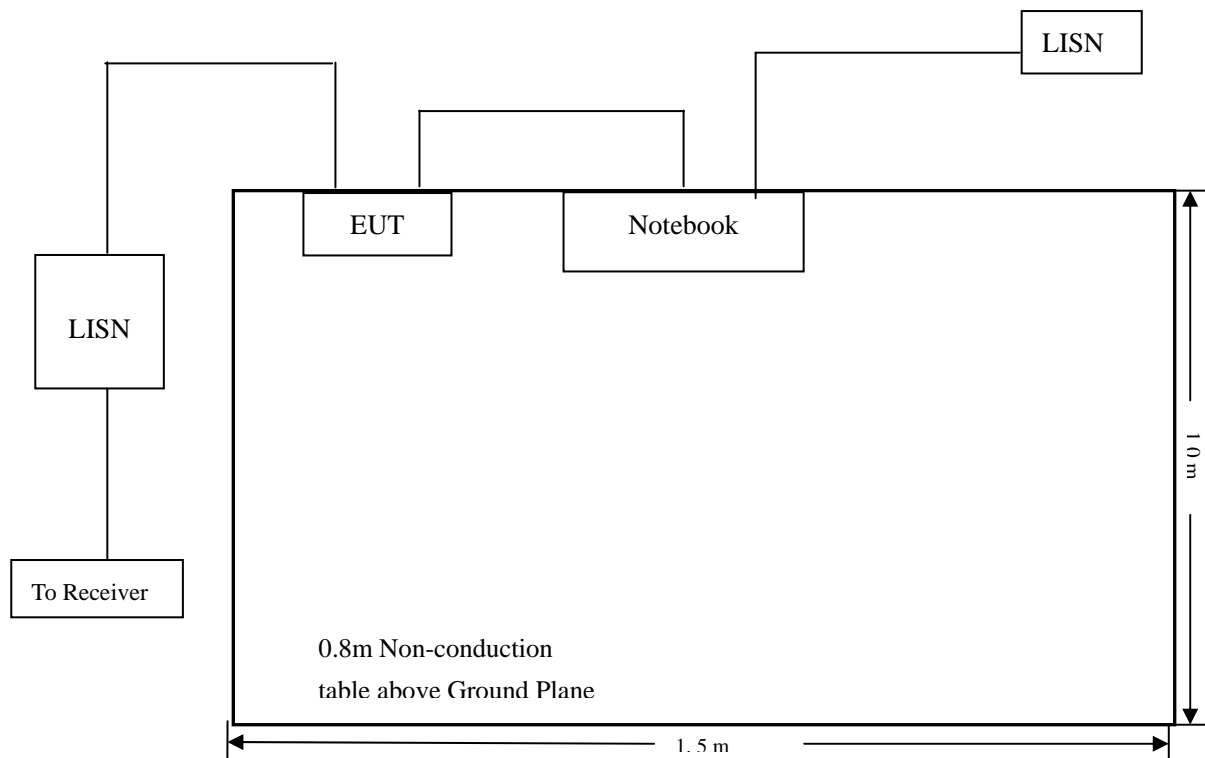
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2010-12-20	2011-12-19
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2010-12-20	2011-12-19
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2010-12-20	2011-12-19

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

-5.47 dB μ V at 4.758 MHz in the Neutral, Ave Detector, 0.15-30MHz

3.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

Conducted Disturbance

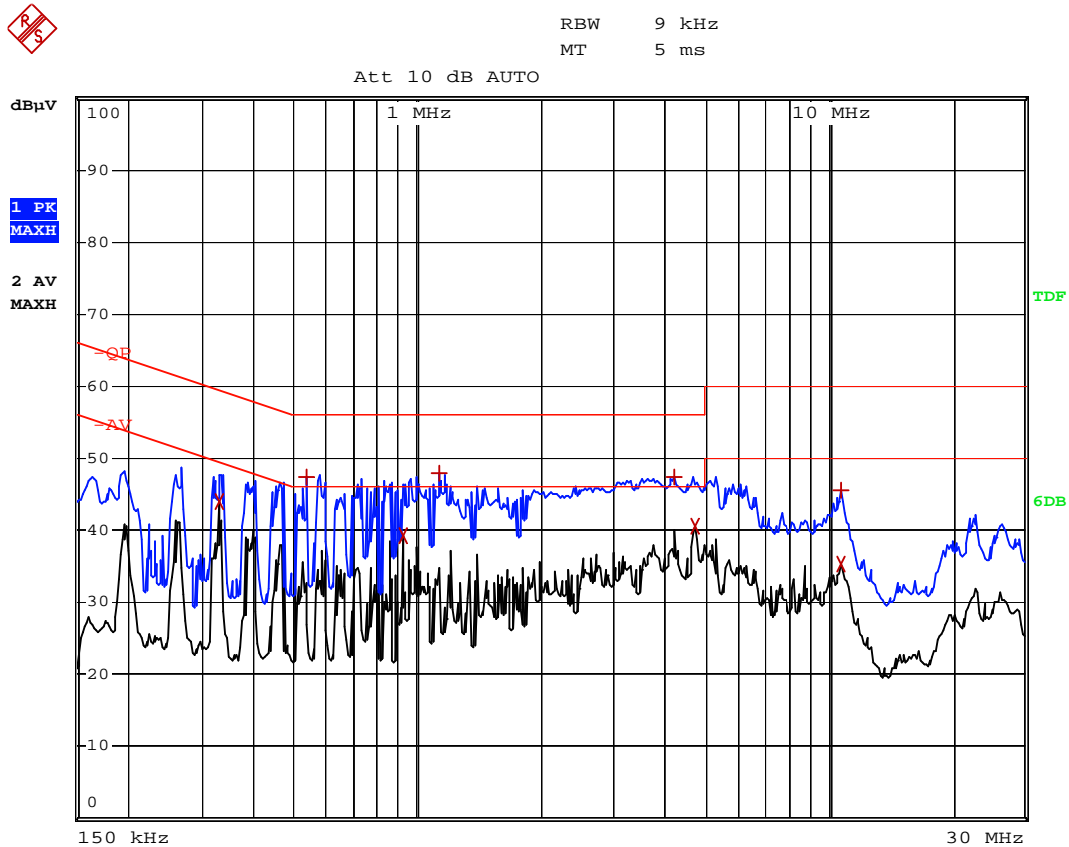
EUT: Pepwave Wireless Product

M/N: Pismo 525

Operating Condition: Operating

Test Specification: N

Comment: AC 120V/60Hz



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
2 Average	330 kHz	43.85	-5.59
1 Max Peak	538 kHz	47.27	-8.72
2 Average	922 kHz	39.19	-6.80
1 Max Peak	1.126 MHz	47.92	-8.07
1 Max Peak	4.21 MHz	47.32	-8.67
2 Average	4.758 MHz	40.52	-5.47
1 Max Peak	10.682 MHz	45.60	-14.39
2 Average	10.742 MHz	35.32	-14.67

Plot of Conducted Emissions Test Data

Conducted Disturbance

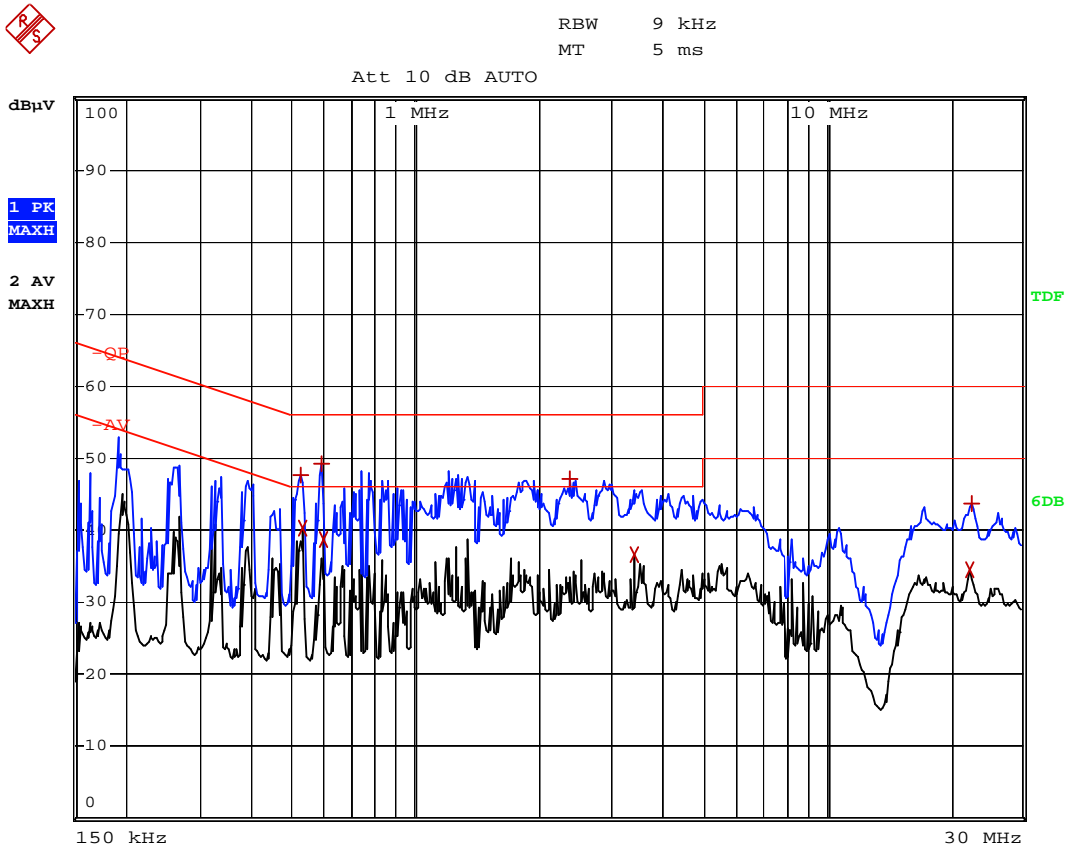
EUT: Pepwave Wireless Product

M/N: Pismo 525

Operating Condition: Operating

Test Specification: L

Comment: AC 120V/60Hz



EDIT PEAK LIST (Prescan Results)				
Trace1:		-QP		
Trace2:		-AV		
Trace3:		---		
TRACE		FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1	Max Peak	526 kHz	47.61	-8.38
2	Average	530 kHz	40.18	-5.81
1	Max Peak	590 kHz	49.26	-6.73
2	Average	598 kHz	38.63	-7.36
1	Max Peak	2.386 MHz	47.24	-8.75
2	Average	3.418 MHz	36.64	-9.35
2	Average	22.302 MHz	34.41	-15.58
1	Max Peak	22.514 MHz	43.64	-16.35

4. §15.203 - ANTENNA REQUIREMENT

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 detachable 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.

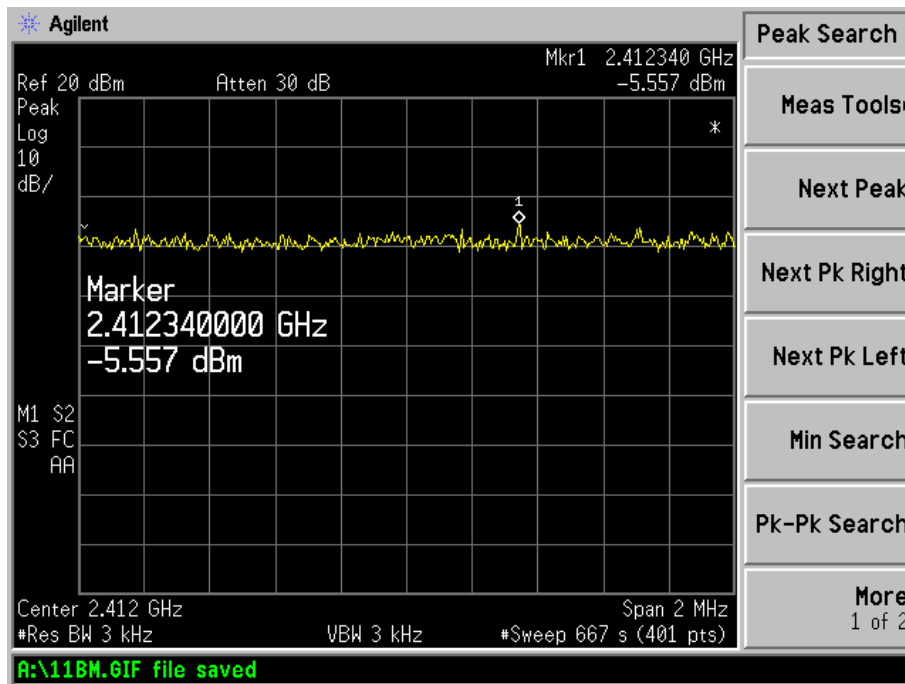
5.4 Environmental Conditions

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

5.5 Summary of Test Results/Plots

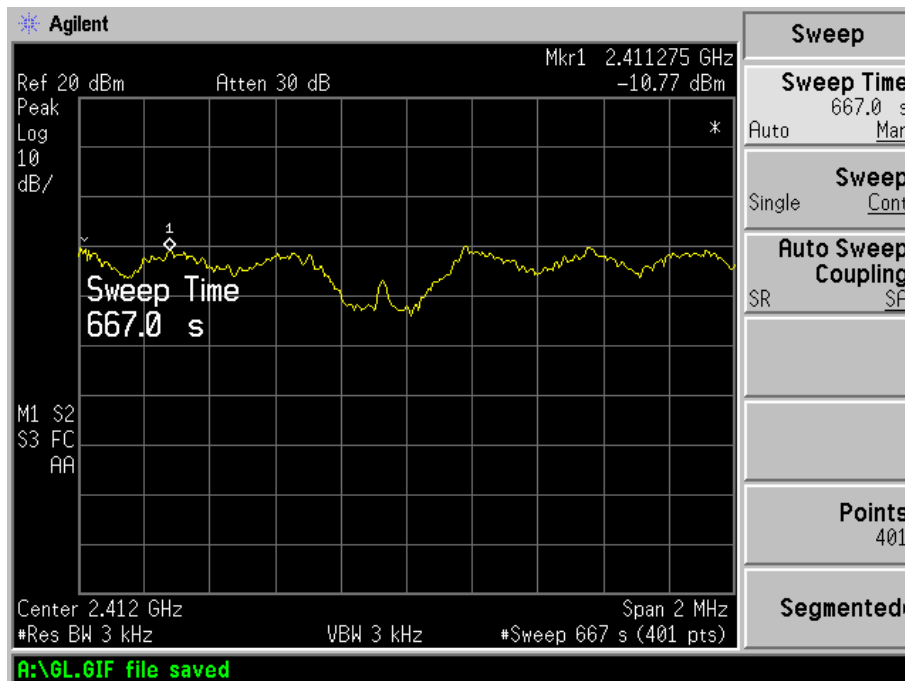
Test mode	Test channel	Reading dBm/3kHz	Limit dBm/3kHz
802.11b	Low channel (2412MHz)	-5.374	8
	Middle channel (2437MHz)	-4.759	8
	High channel (2462MHz)	-5.557	8
802.11g	Low channel (2412MHz)	-10.77	8
	Middle channel (2437MHz)	-7.808	8
	High channel (2462MHz)	-10.30	8

High Channel:



For 802.11g

Low 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

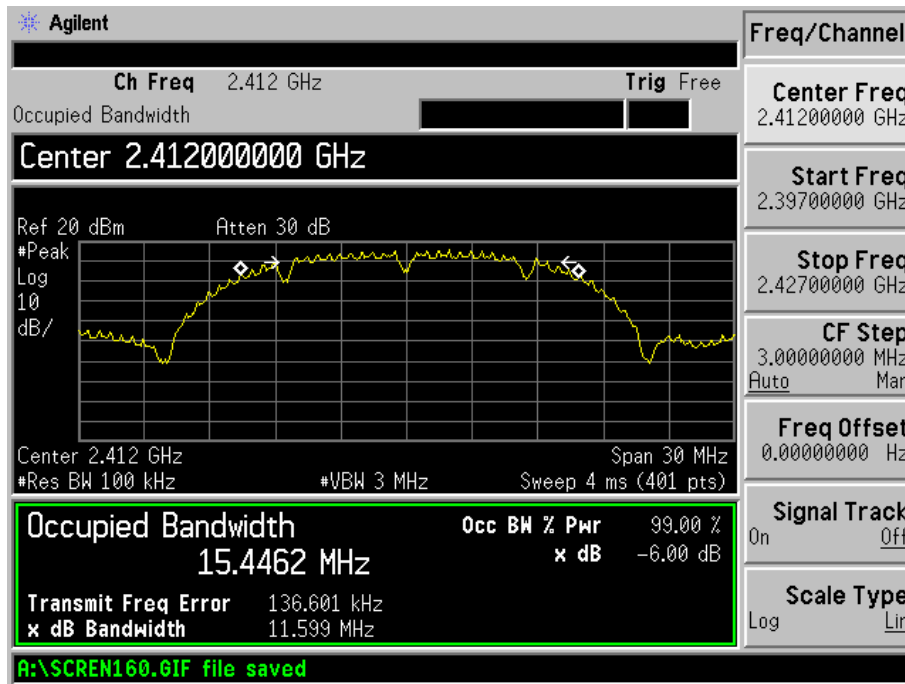
Temperature:	24° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.5 Summary of Test Results/Plots

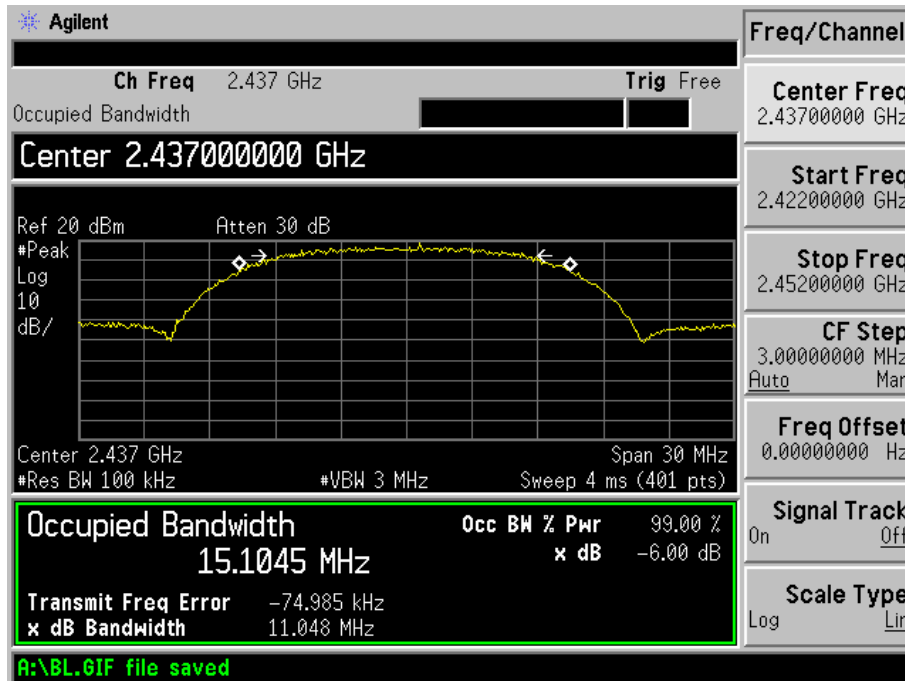
Test mode	Frequency MHz	6 dB Bandwidth kHz	Limit kHz
802.11b	2412	11599	500
	2437	11048	500
	2462	11805	500
802.11g	2412	16566	500
	2437	16478	500
	2462	16522	500

For 802.11b

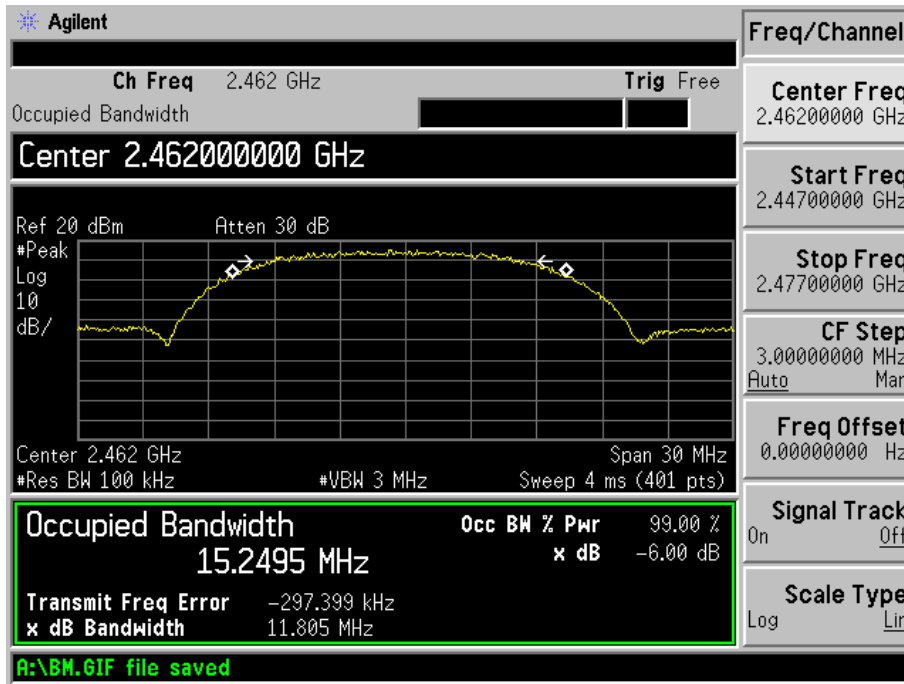
Low Channel:



Mid Channel:

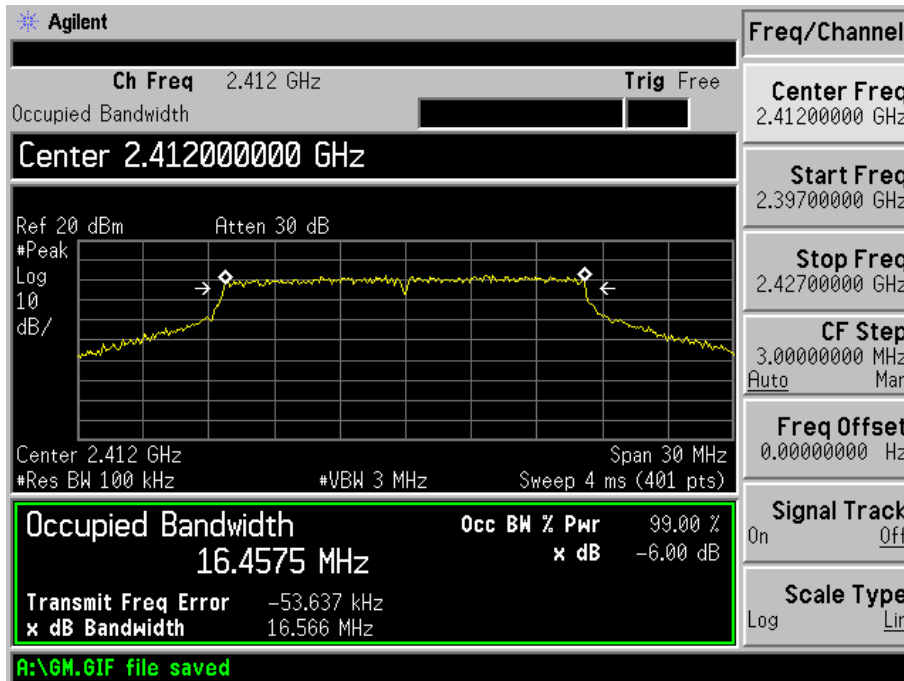


High Channel:

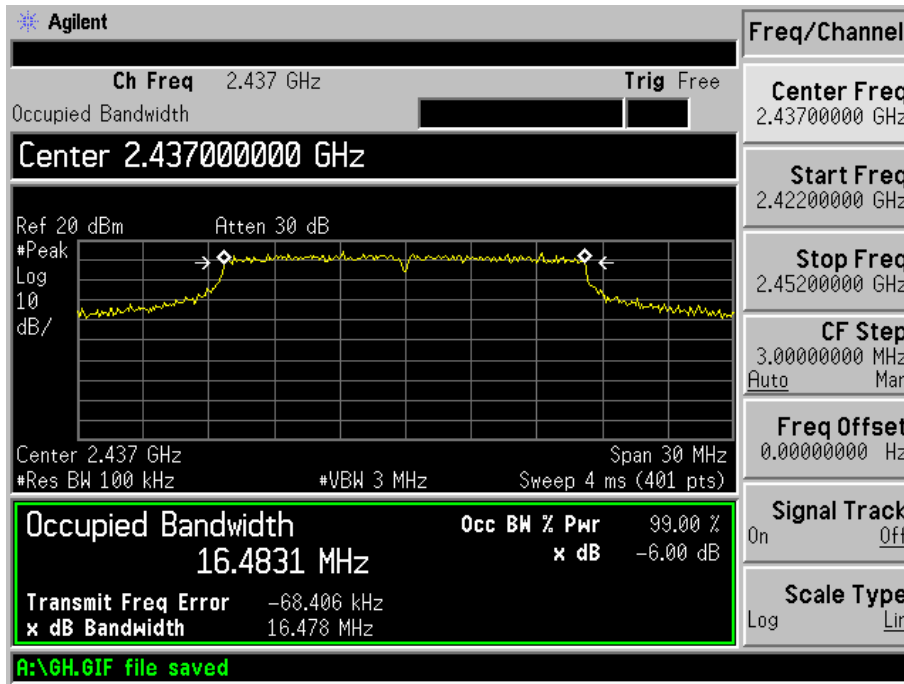


For 802.11g

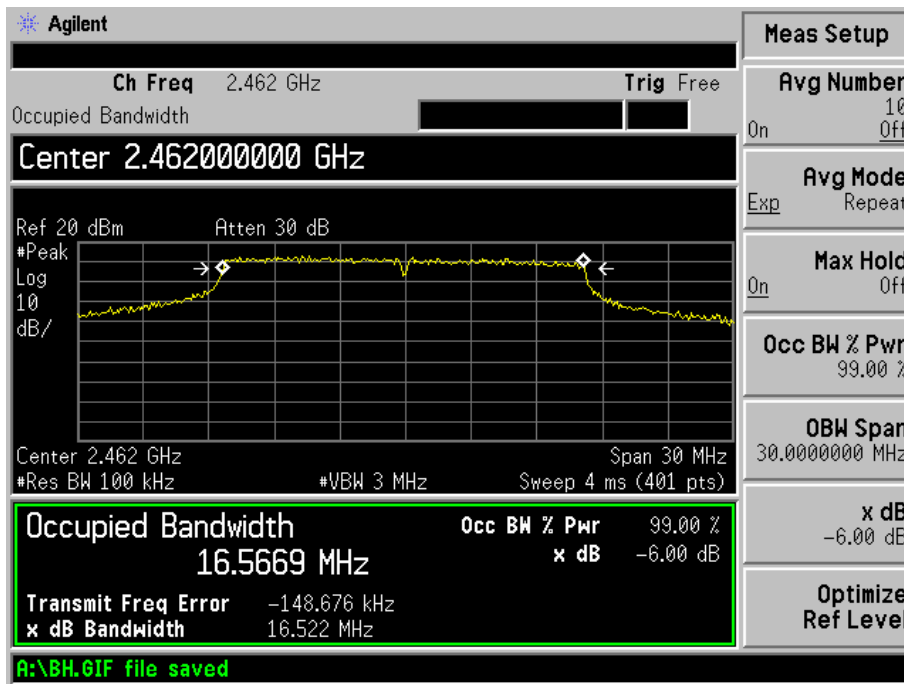
Low Channel:



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

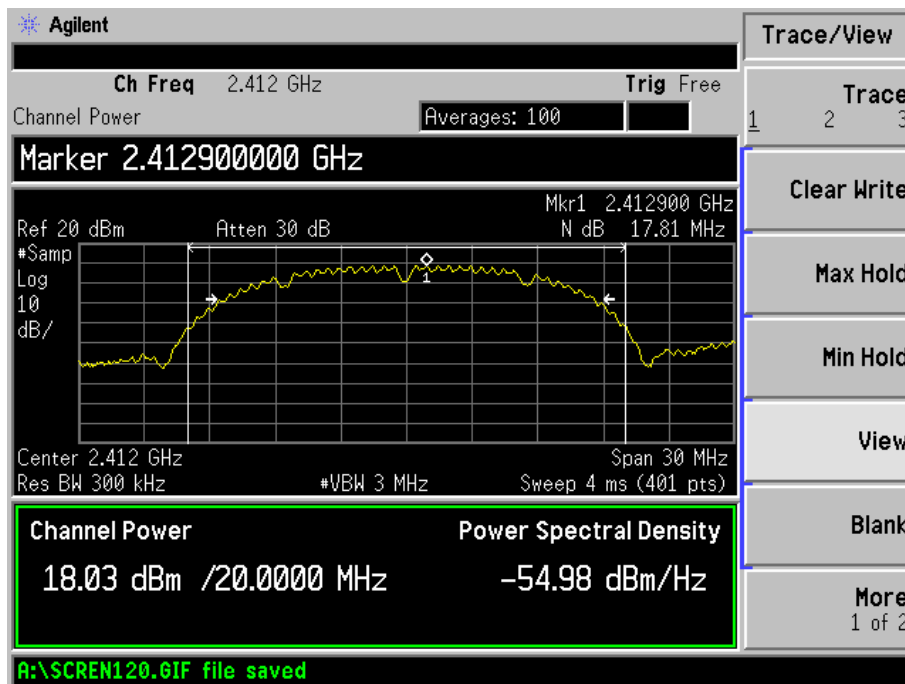
7.5 Summary of Test Results/Plots

Test mode	Frequency MHz	Reading dBm	Output power mW	Limit mW
802.11b (1M)	2412	18.03	63.5331	630.95
	2437	19.26	84.3335	630.95
	2462	16.38	43.4510	630.95
802.11b (11M)	2412	17.45	55.5904	630.95
	2437	18.75	74.9894	630.95
	2462	16.28	42.4620	630.95
802.11g (6M)	2412	15.06	32.0627	630.95
	2437	16.56	45.2898	630.95
	2462	14.39	27.4789	630.95
802.11g (54M)	2412	14.58	28.7078	630.95
	2437	16.87	48.6407	630.95
	2462	14.22	26.4241	630.95

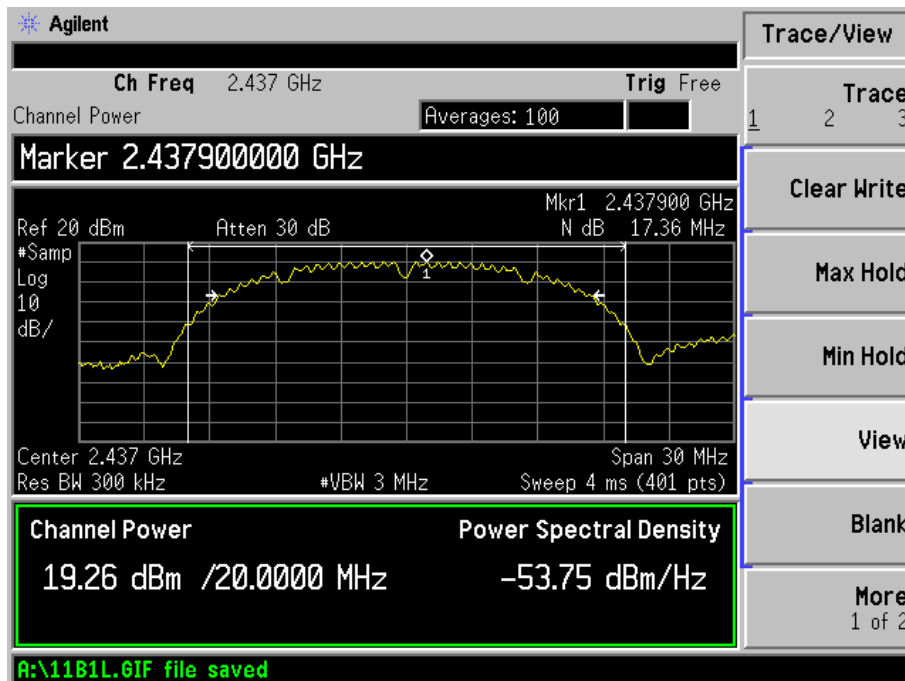
Note: Limit (dBm) = 30dBm – (Antenna Gain – 6dBi); Antenna Gain = 8dBi

For 802.11b_1M rate

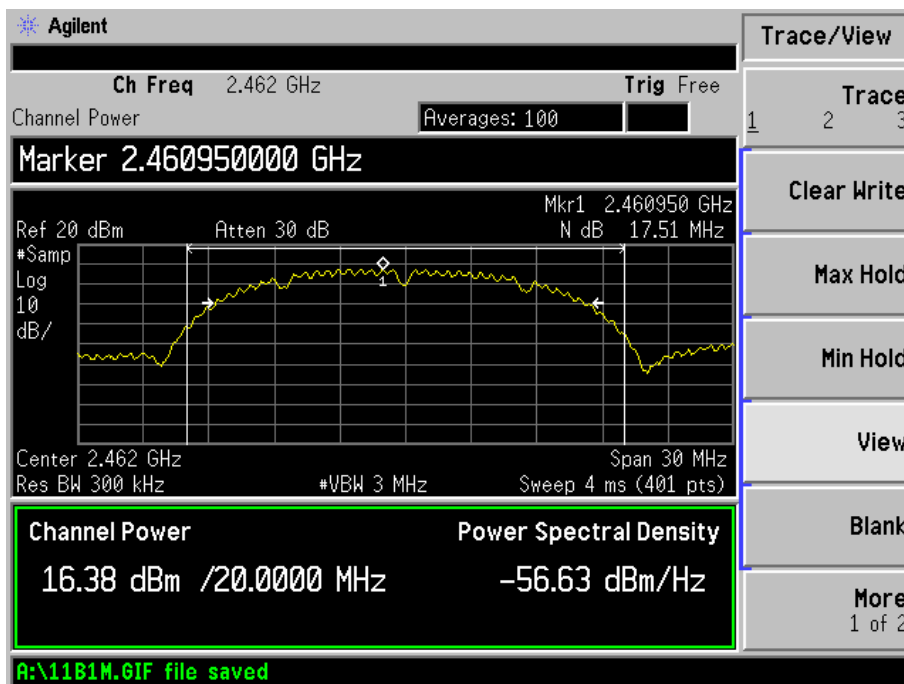
Low Channel:



Middle Channel:

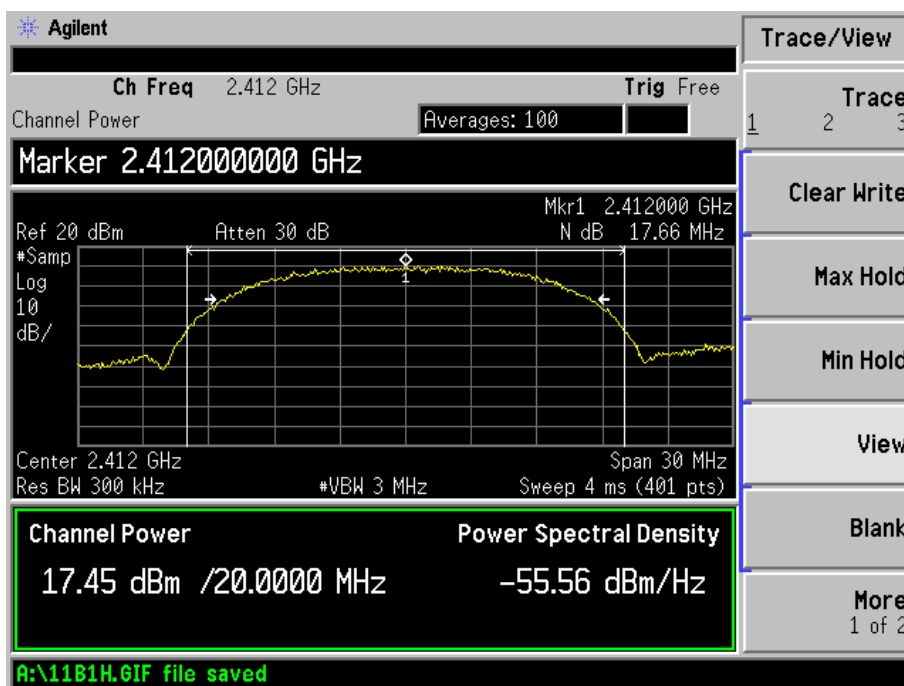


High Channel:

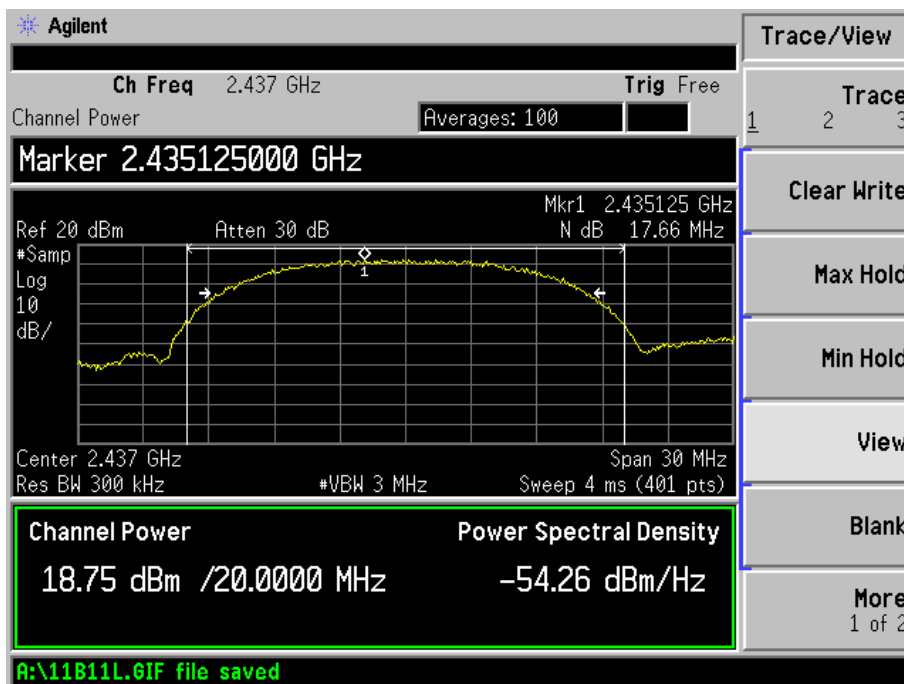


For 802.11b_11M rate

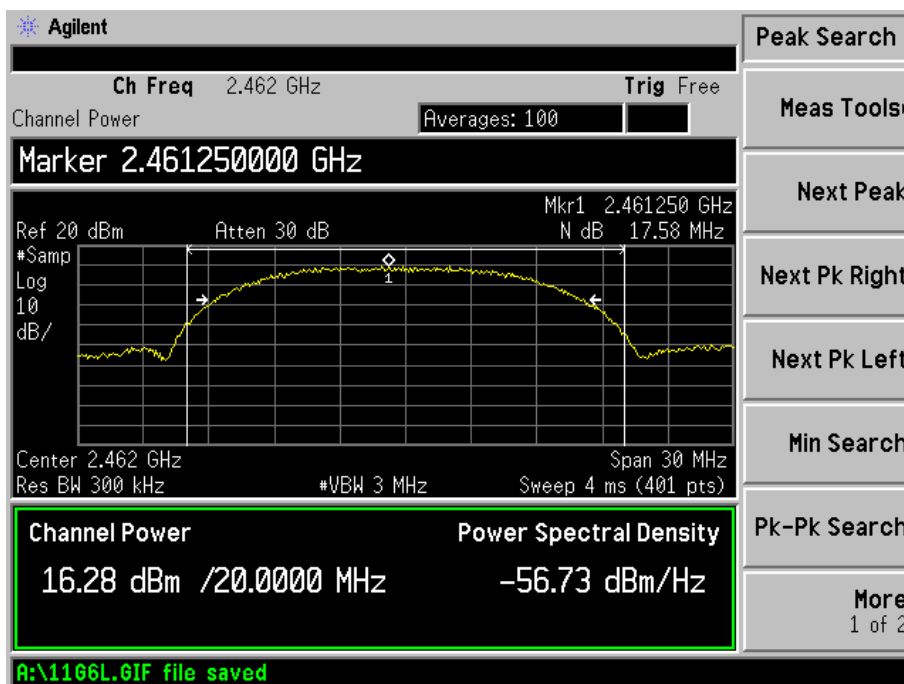
Low Channel:



Middle Channel:

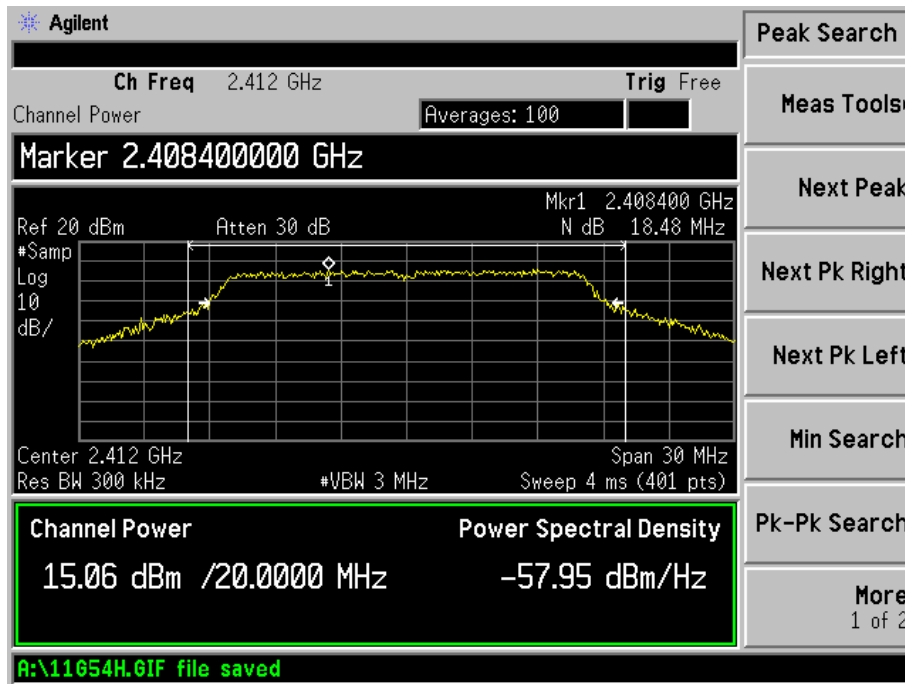


High Channel:

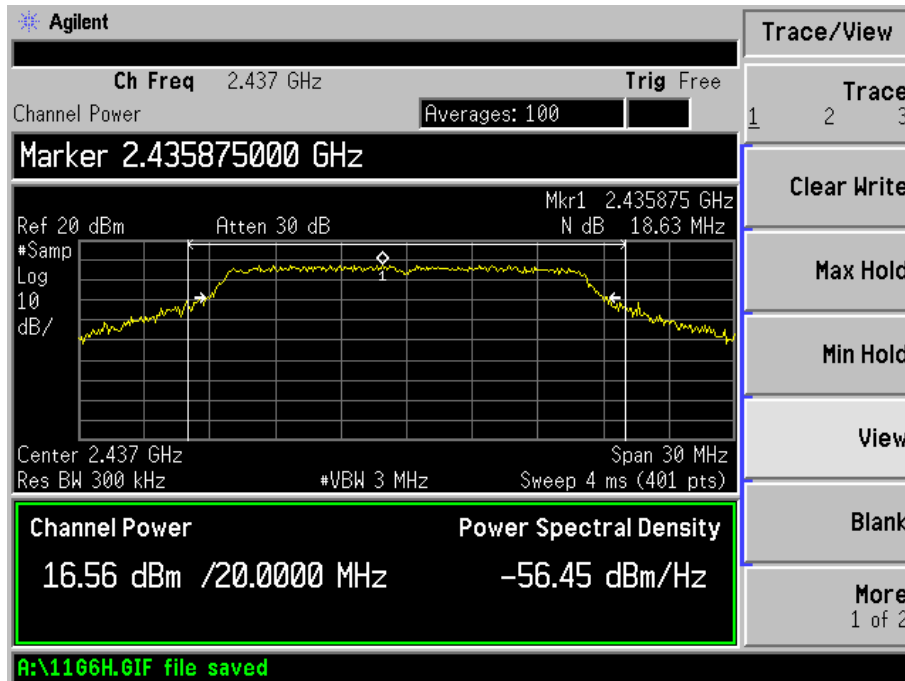


For 802.11g_6M rate

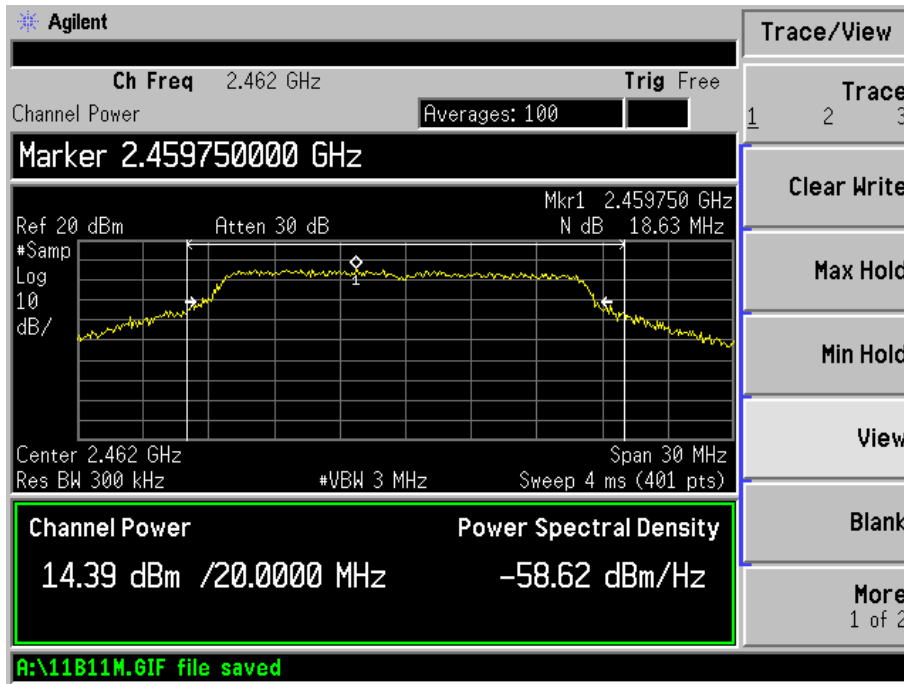
Low Channel:



Middle Channel:

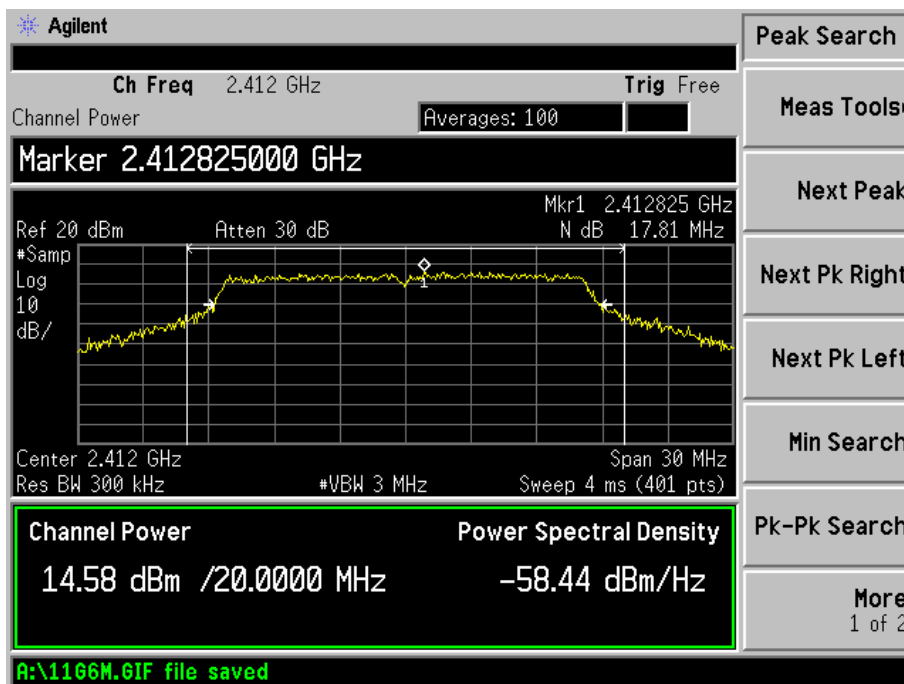


High Channel:

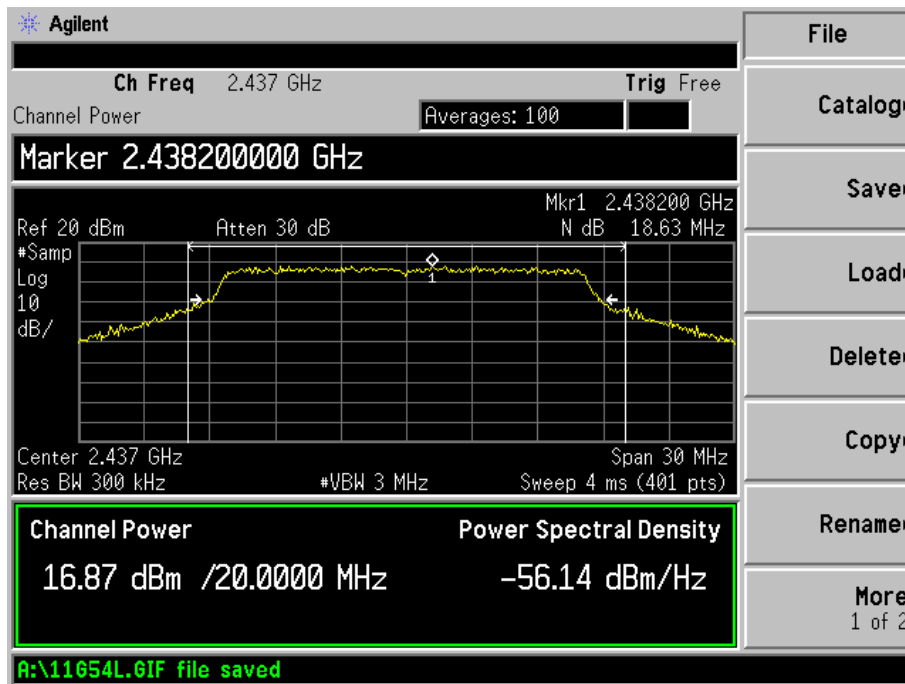


For 802.11g_54M rate

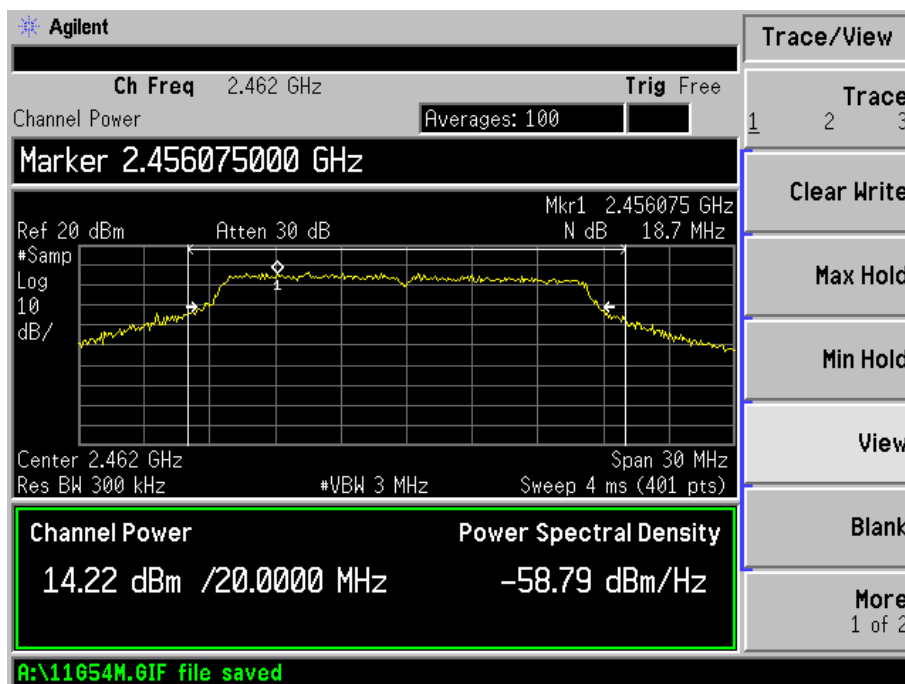
Low Channel:



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 ± 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

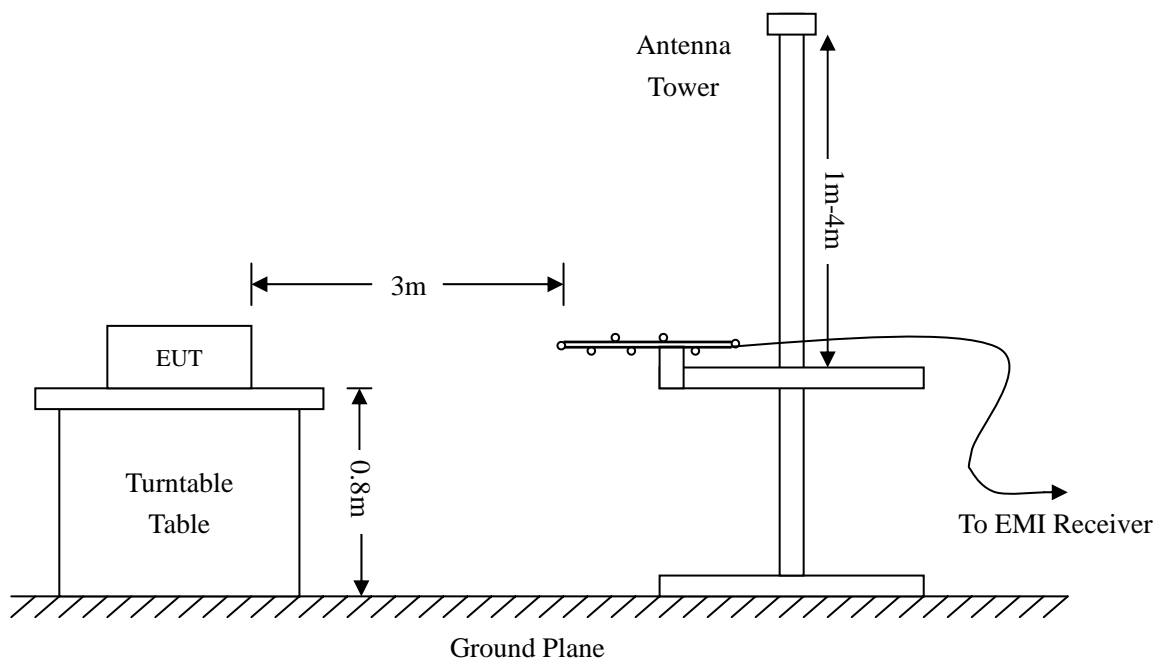
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2010-12-20	2011-12-19
EMI Test Receiver	R&S	ESVB	825471/005	2010-12-20	2011-12-19
Positioning Controller	C&C	CC-C-1F	N/A	2010-12-20	2011-12-19
RF Switch	EM	EMSW18	SW060023	2010-12-20	2011-12-19
Pre-amplifier	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 C63.4-2003 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:	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:

-1.52dBμV at 625.0778 MHz in the Horizontal 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.

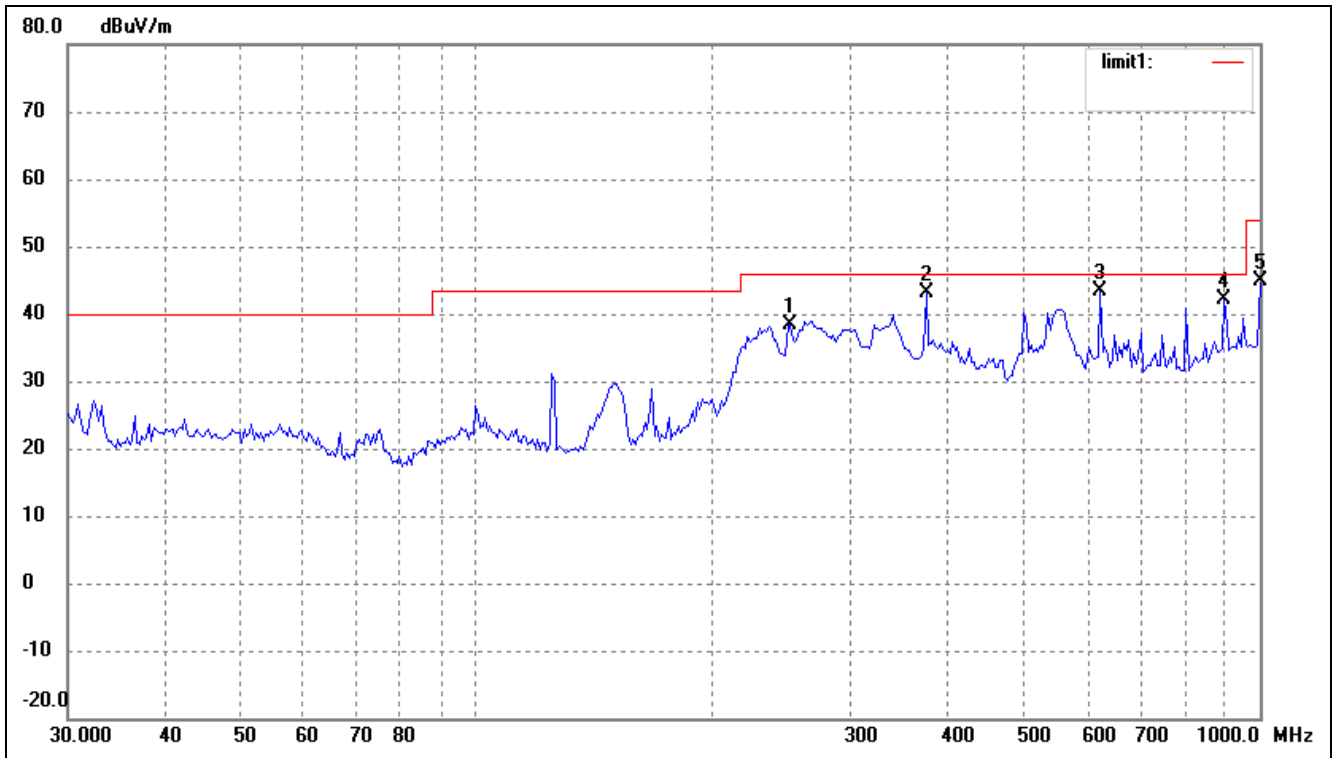
Test Result/Plots:

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11b) Low Channel

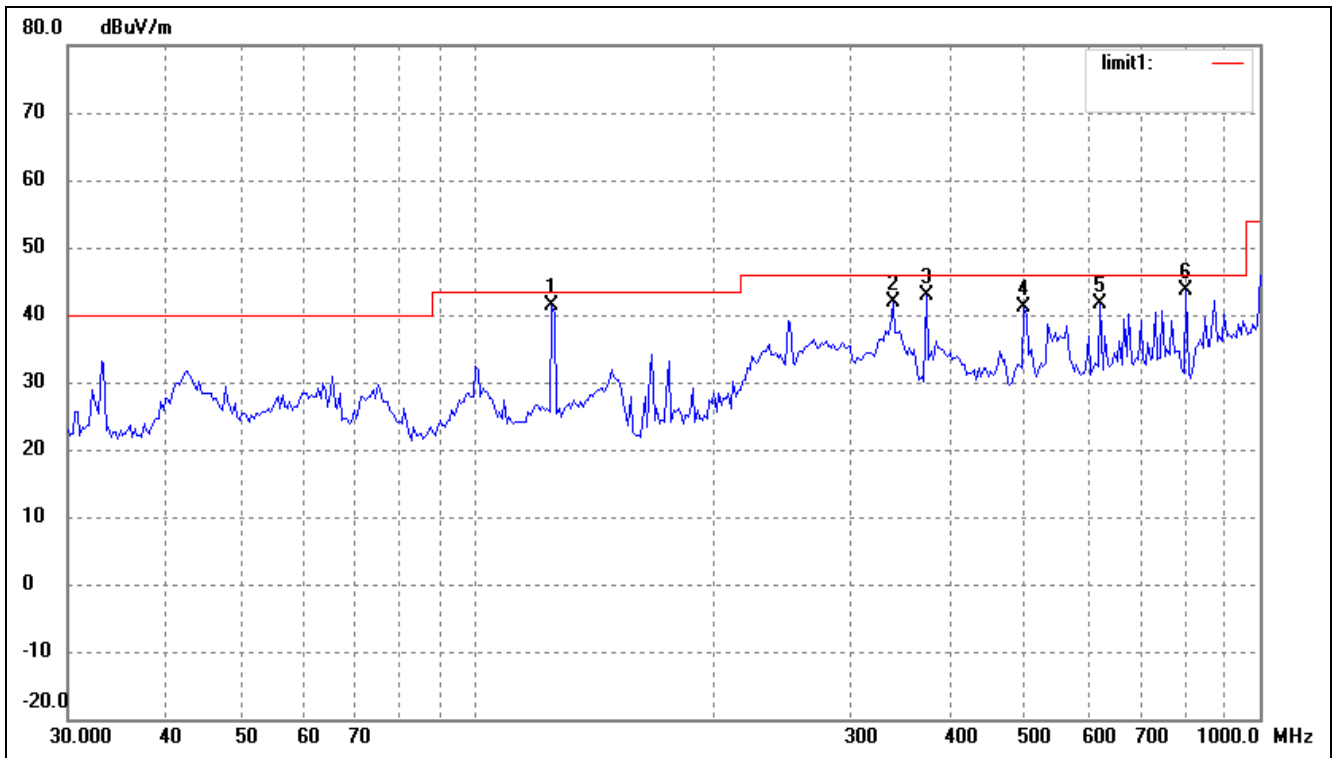
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	251.1803	29.61	8.72	38.33	46.00	-7.67	360	100	peak
2	374.6225	31.93	11.11	43.04	46.00	-2.96	360	100	peak
3	625.0779	26.60	16.88	43.48	46.00	-2.52	360	100	peak
4	900.1473	21.24	20.90	42.14	46.00	-3.86	360	100	peak
5	1000.0000	22.21	22.74	44.95	54.00	-9.05	360	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	124.5690	36.09	5.32	41.41	43.50	-2.09	360	100	peak
2	339.5887	31.40	10.42	41.82	46.00	-4.18	360	100	peak
3	374.6225	31.72	11.11	42.83	46.00	-3.17	360	100	peak
4	499.4246	26.86	14.36	41.22	46.00	-4.78	360	100	peak
5	625.0779	24.86	16.88	41.74	46.00	-4.26	360	100	peak
6	804.6028	24.61	19.10	43.71	46.00	-2.29	360	100	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11b) Middle Channel

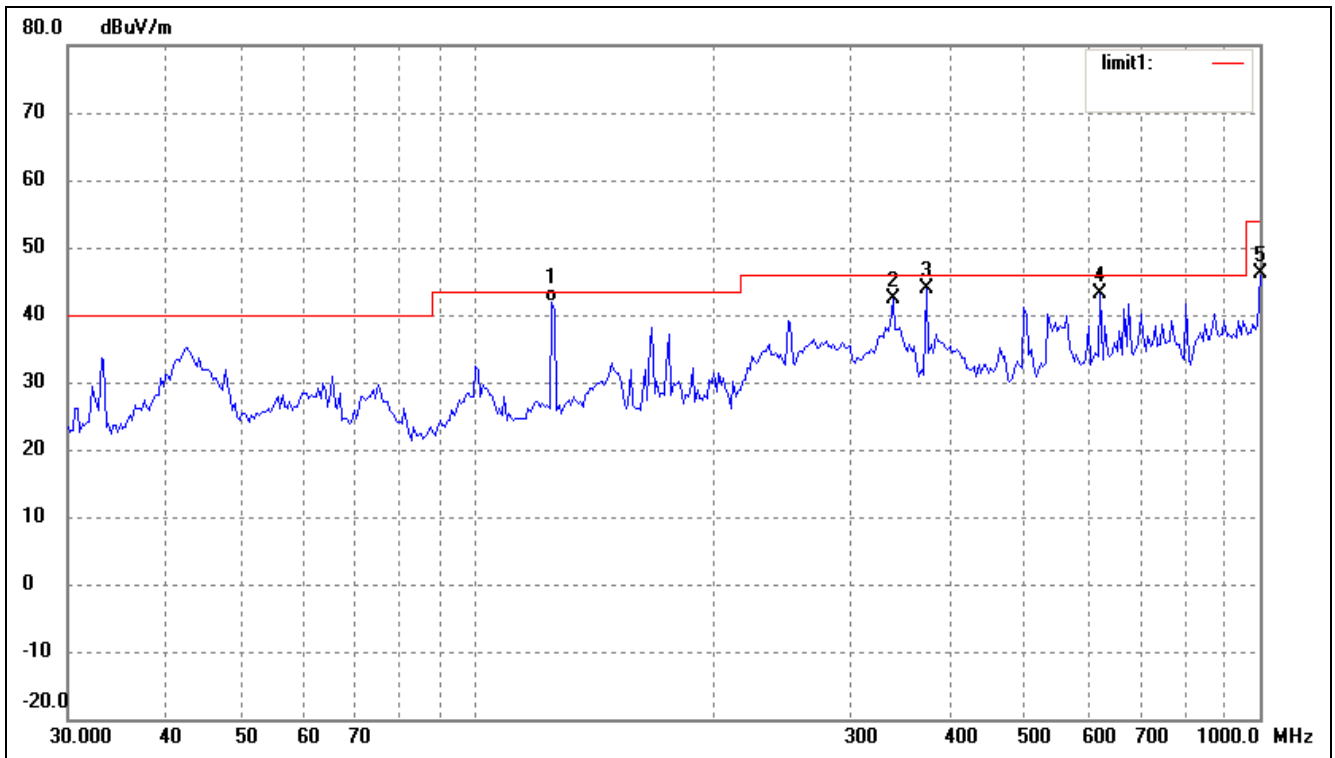
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	235.8163	32.35	8.19	40.54	46.00	-5.46	360	100	peak
2	374.6225	32.93	11.11	44.04	46.00	-1.96	332	200	QP
3	625.0778	27.60	16.88	44.48	46.00	-1.52	297	200	QP
4	900.1472	22.74	20.90	43.64	46.00	-2.36	360	100	peak

Vertical



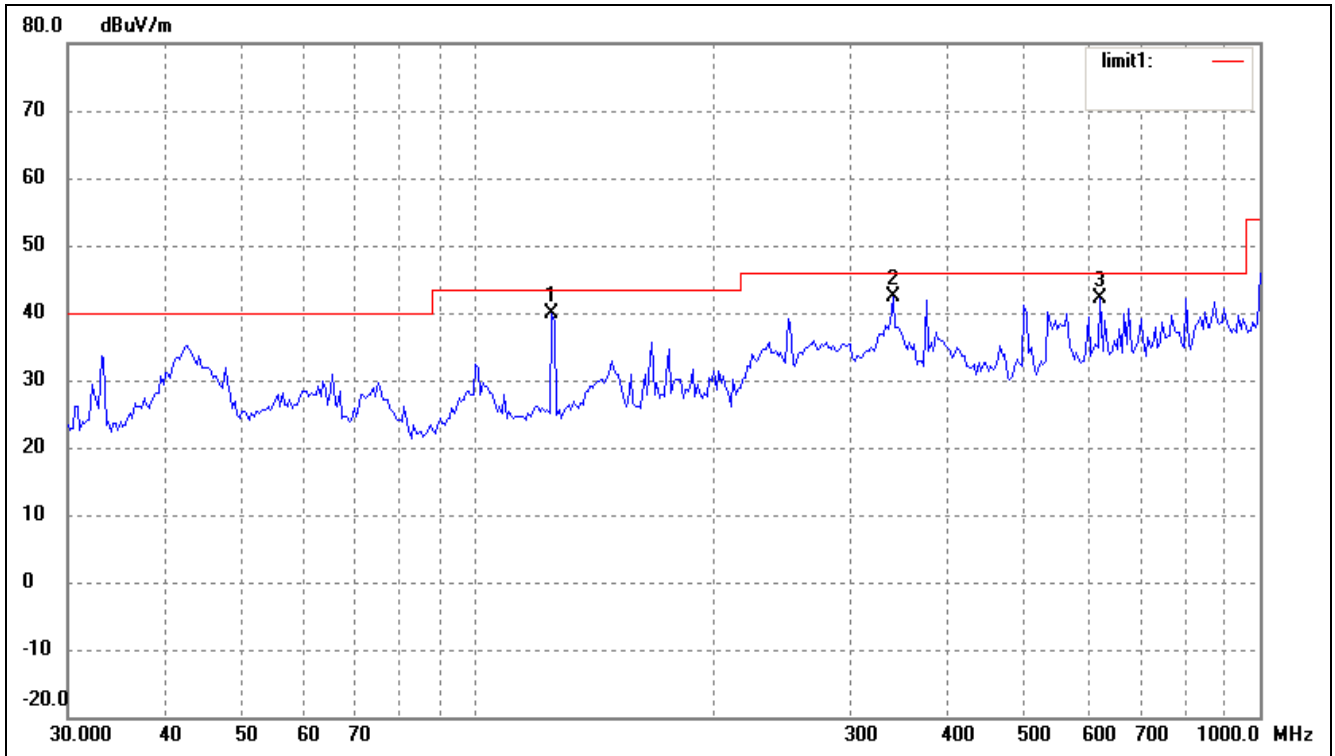
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	124.5690	36.59	5.32	41.91	43.50	-1.59	300	100	QP
2	339.5887	31.90	10.42	42.32	46.00	-3.68	360	100	peak
3	374.6225	32.72	11.11	43.83	46.00	-2.17	360	100	peak
4	625.0779	26.36	16.88	43.24	46.00	-2.76	360	100	peak
5	1000.0000	23.27	22.74	46.01	54.00	-7.99	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	229.2931	33.49	7.82	41.31	46.00	-4.69	360	100	peak
2	374.6225	30.43	11.11	41.54	46.00	-4.46	360	100	peak
3	562.6624	25.18	15.83	41.01	46.00	-4.99	360	100	peak
4	625.0778	26.10	16.88	42.98	46.00	-3.02	360	100	peak
5	900.1472	21.74	20.90	42.64	46.00	-3.36	360	100	peak

Vertical



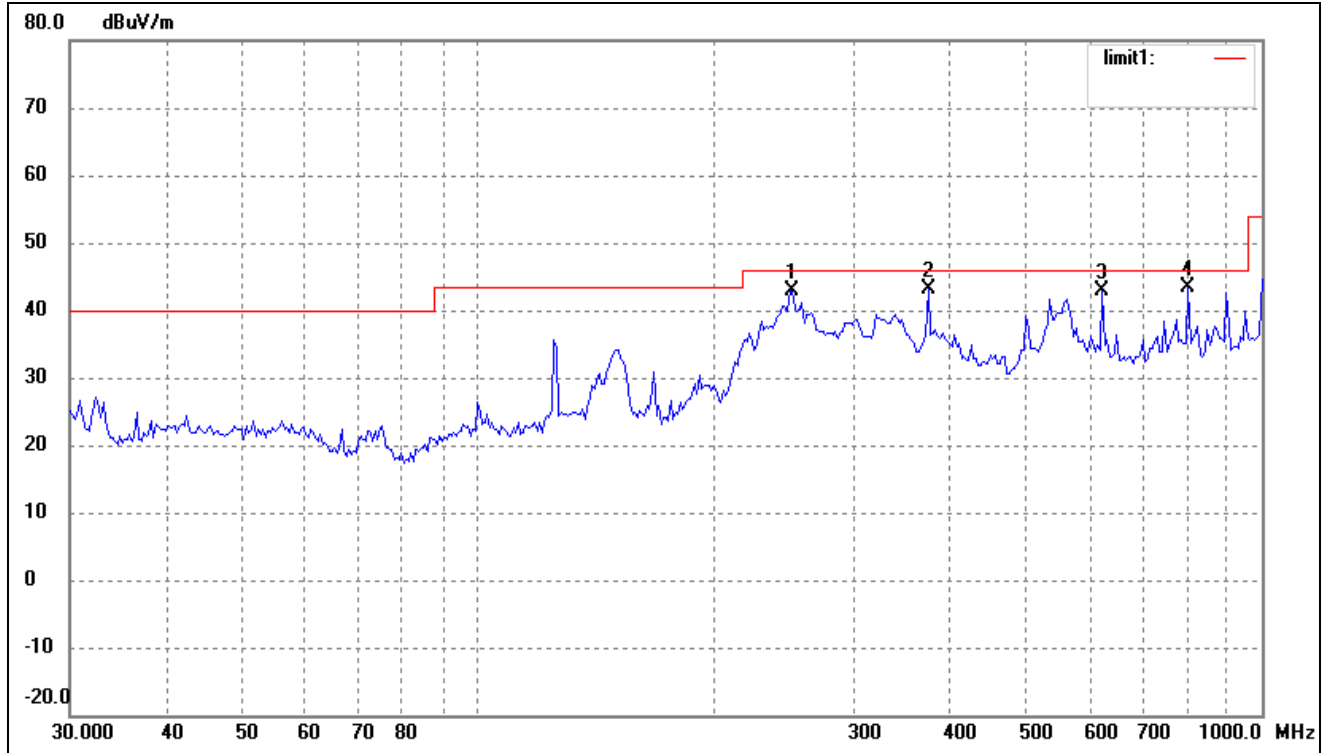
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	124.5690	34.59	5.32	39.91	43.50	-3.59	360	100	peak
2	339.5887	31.90	10.42	42.32	46.00	-3.68	360	100	peak
3	625.0778	25.36	16.88	42.24	46.00	-3.76	360	100	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g) Low Channel

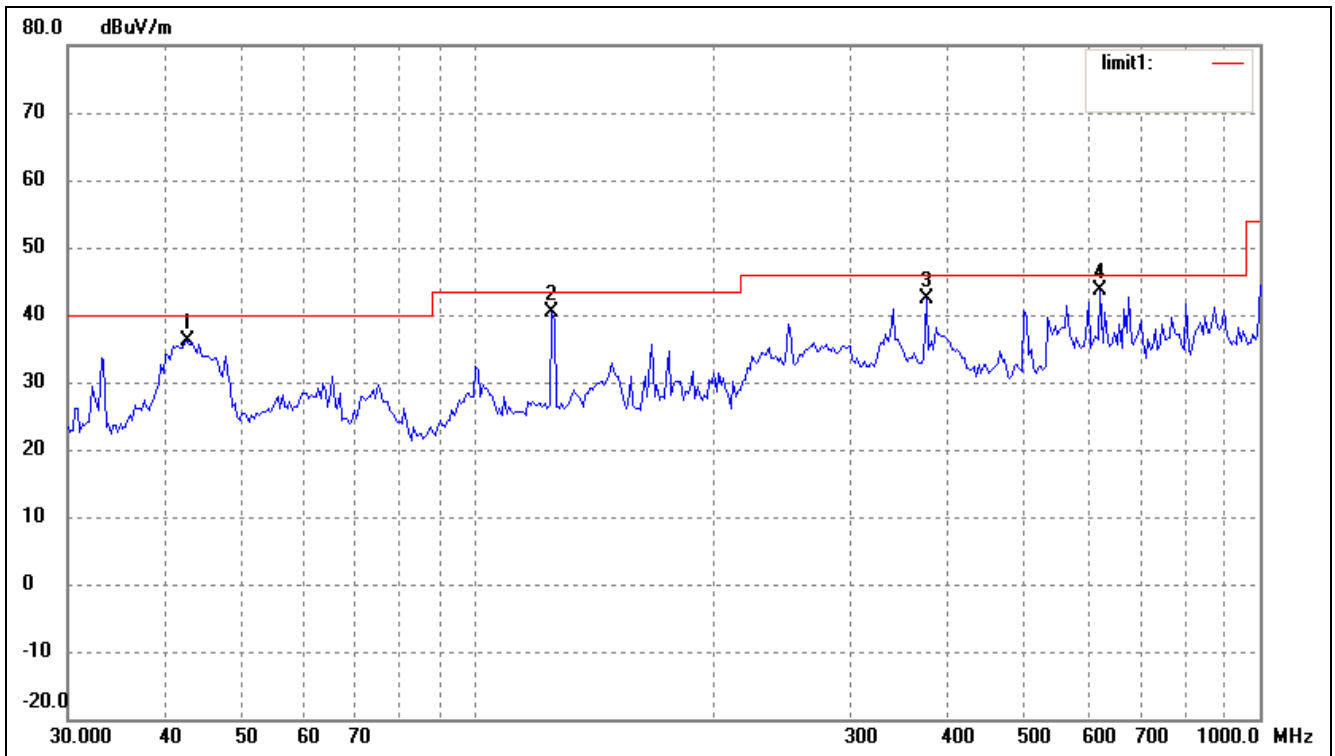
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	251.1802	34.11	8.72	42.83	46.00	-3.17	360	100	peak
2	374.6225	31.93	11.11	43.04	46.00	-2.96	360	100	peak
3	625.0778	26.10	16.88	42.98	46.00	-3.02	360	100	peak
4	804.6028	24.28	19.10	43.38	46.00	-2.62	360	100	peak

Vertical



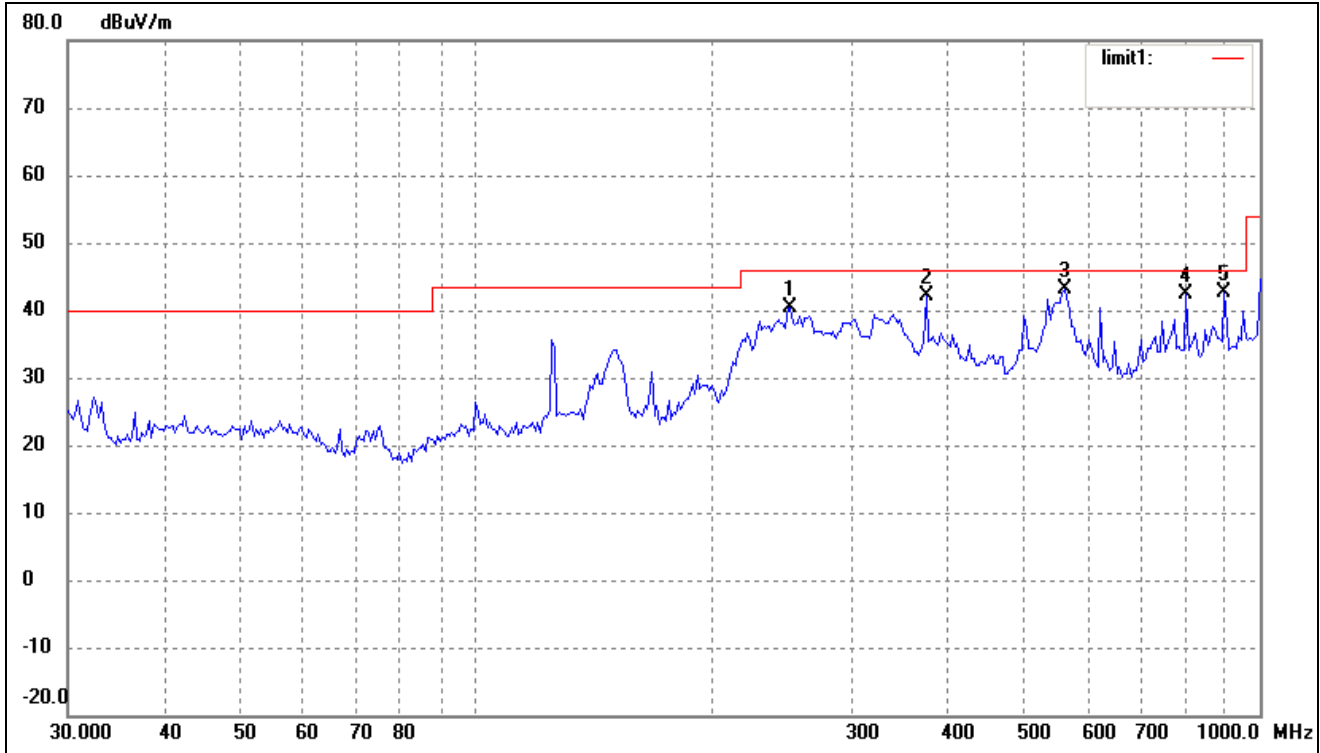
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	42.6000	27.91	8.19	36.10	40.00	-3.90	360	100	peak
2	124.5690	35.09	5.32	40.41	43.50	-3.09	360	100	peak
3	374.6225	31.22	11.11	42.33	46.00	-3.67	360	100	peak
4	625.0778	26.86	16.88	43.74	46.00	-2.26	360	100	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g) Middle Channel

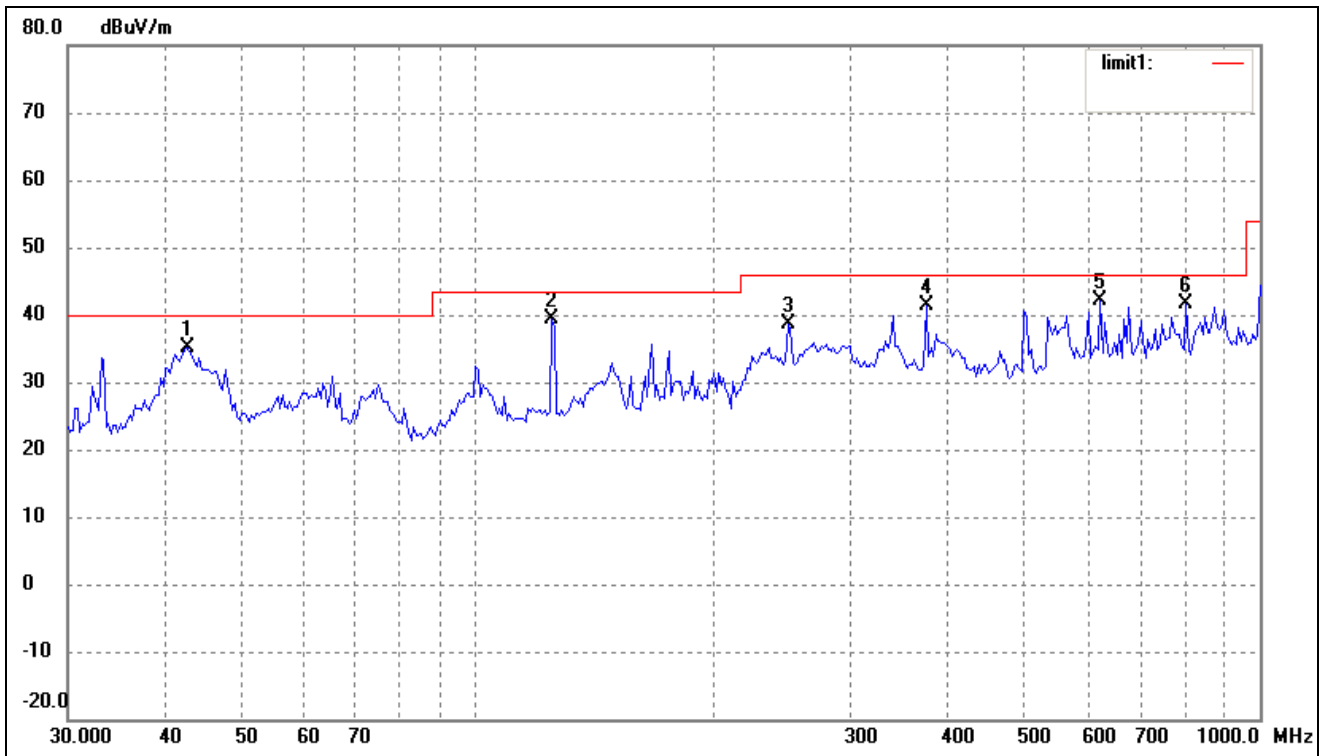
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	251.1802	31.61	8.72	40.33	46.00	-5.67	360	100	peak
2	374.6225	30.93	11.11	42.04	46.00	-3.96	360	100	peak
3	562.6624	27.18	15.83	43.01	46.00	-2.99	360	100	peak
4	804.6028	23.28	19.10	42.38	46.00	-3.62	360	100	peak
5	900.1471	21.74	20.90	42.64	46.00	-3.36	360	100	peak

Vertical



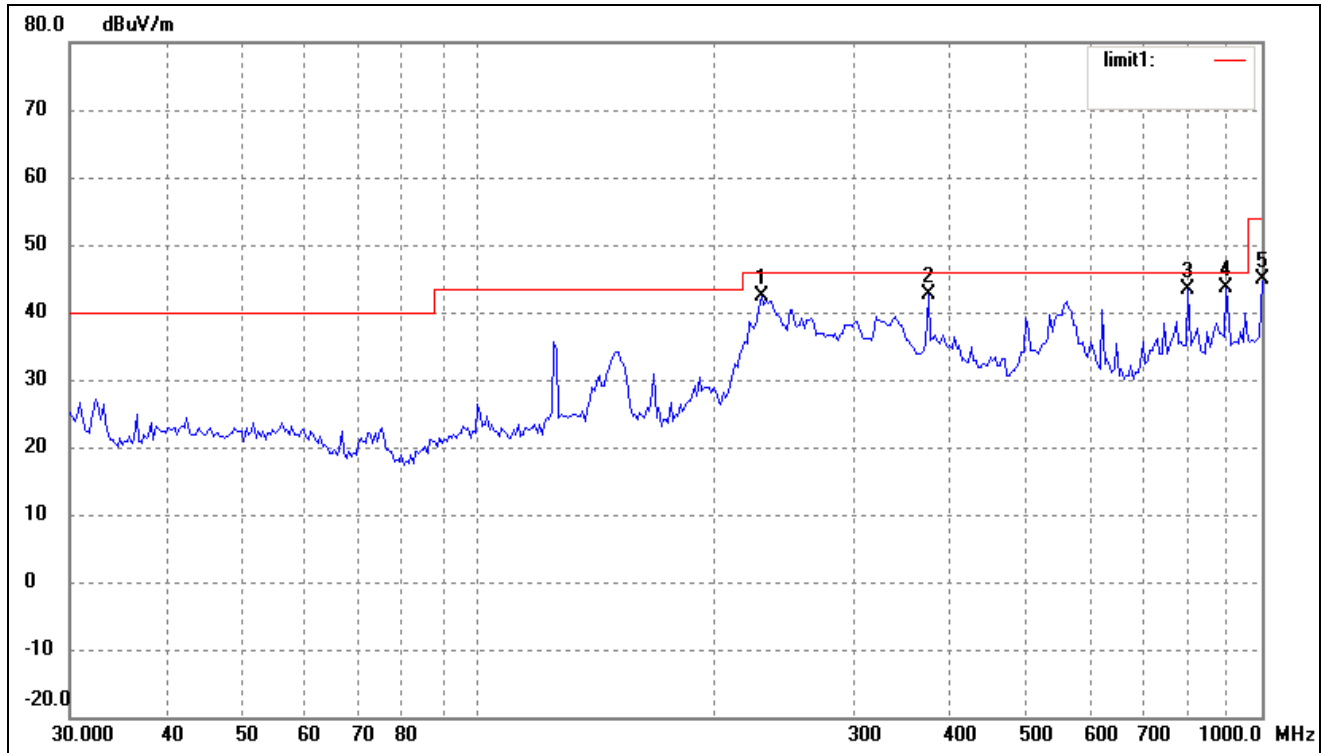
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	42.6000	26.91	8.19	35.10	40.00	-4.90	360	100	peak
2	124.5690	34.09	5.32	39.41	43.50	-4.09	360	100	peak
3	249.4250	30.06	8.68	38.74	46.00	-7.26	360	100	peak
4	374.6225	30.22	11.11	41.33	46.00	-4.67	360	100	peak
5	625.0778	25.36	16.88	42.24	46.00	-3.76	360	100	peak
6	804.6028	22.61	19.10	41.71	46.00	-4.29	360	100	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g) High Channel

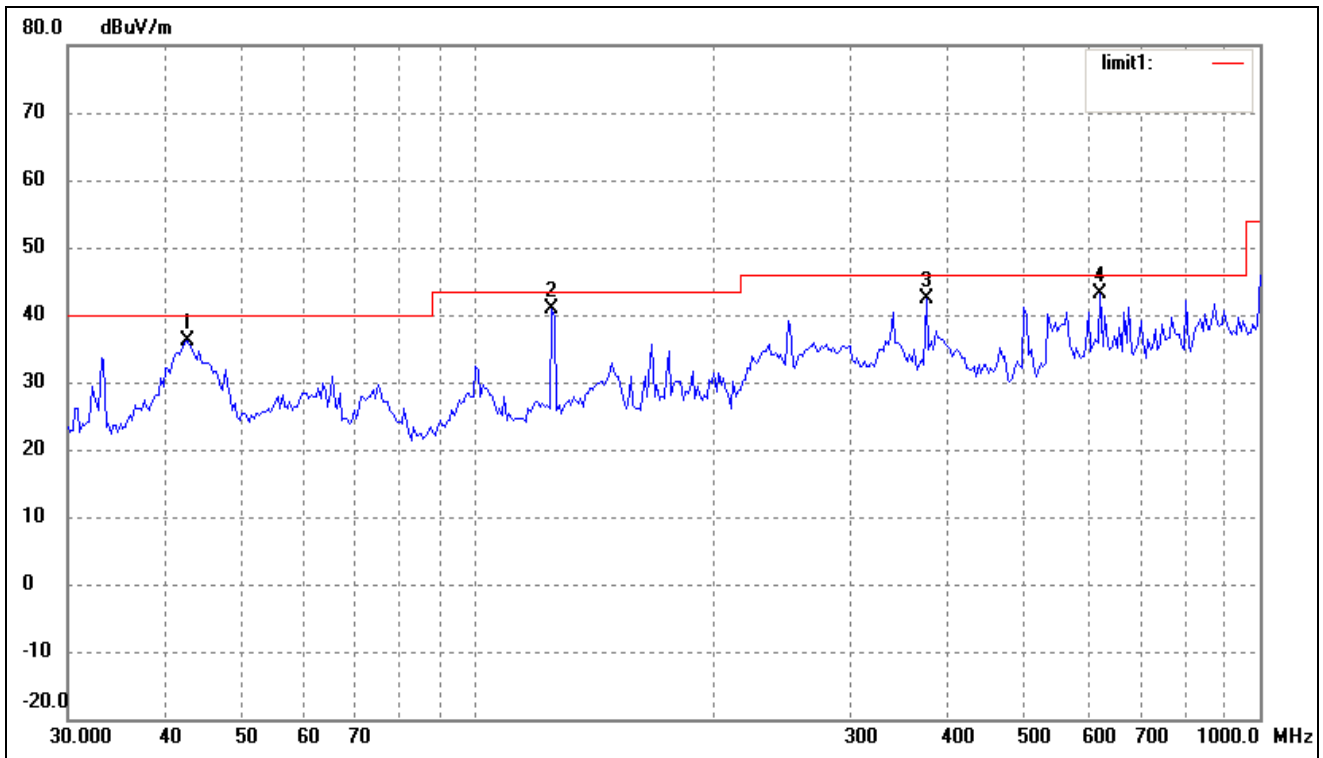
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	229.2931	34.49	7.82	42.31	46.00	-3.69	360	100	peak
2	374.6225	31.43	11.11	42.54	46.00	-3.46	360	100	peak
3	804.6028	24.28	19.10	43.38	46.00	-2.62	360	100	peak
4	900.1471	22.74	20.90	43.64	46.00	-2.36	360	100	peak
5	1000.0000	22.21	22.74	44.95	54.00	-9.05	360	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	42.6000	27.91	8.19	36.10	40.00	-3.90	360	100	peak
2	124.5690	35.59	5.32	40.91	43.50	-2.59	360	100	peak
3	374.6225	31.22	11.11	42.33	46.00	-3.67	360	100	peak
4	625.0778	26.36	16.88	43.24	46.00	-2.76	360	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	50.9	230	V	34.1	5.2	33.0	57.2	74	-16.8
4824.0	PK	50.0	250	H	34.1	5.2	33.0	56.3	74	-17.7
7236.0	PK	43.6	220	V	37.4	6.1	33.5	53.6	74	-20.4
7236.0	PK	42.4	240	H	37.4	6.1	33.5	52.4	74	-21.6
4824.0	AV	42.3	230	V	34.1	5.2	33.0	48.6	54	-5.4
4824.0	AV	41.8	250	H	34.1	5.2	33.0	48.1	54	-5.9
7236.0	AV	37.5	220	V	37.4	6.1	33.5	47.5	54	-6.5
7236.0	AV	34.3	240	H	37.4	6.1	33.5	44.3	54	-9.7
Middle Channel (1G to 25GHz)										
4874.0	PK	53.0	260	V	34.1	5.2	33.0	59.3	74	-14.7
4874.0	PK	52.1	270	H	34.1	5.2	33.0	58.4	74	-15.6
7311.0	PK	46.7	210	V	37.4	6.1	33.5	56.7	74	-17.3
7311.0	PK	46.1	240	H	37.4	6.1	33.5	56.1	74	-17.9
4874.0	AV	42.9	260	V	34.1	5.2	33.0	49.2	54	-4.8
4874.0	AV	42.3	270	H	34.1	5.2	33.0	48.6	54	-5.4
7311.0	AV	34.3	210	V	37.4	6.1	33.5	44.3	54	-9.7
7311.0	AV	34.8	240	H	37.4	6.1	33.5	44.8	54	-9.2
High Channel (1G to 25GHz)										
4924.0	PK	51.9	270	V	34.1	5.2	33.0	58.2	74	-15.8
4924.0	PK	50.6	250	H	34.1	5.2	33.0	56.9	74	-17.1
7386.0	PK	46.4	230	V	37.4	6.1	33.5	56.4	74	-17.6
7386.0	PK	43.7	245	H	37.4	6.1	33.5	53.7	74	-20.3
4924.0	AV	40.2	270	V	34.1	5.2	33.0	46.5	54	-7.5
4924.0	AV	39.6	250	H	34.1	5.2	33.0	45.9	54	-8.1
7386.0	AV	31.2	230	V	37.4	6.1	33.5	41.2	54	-12.8
7386.0	AV	31.0	245	H	37.4	6.1	33.5	41.0	54	-13.0

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5th 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	46.2	230	V	34.1	5.2	33.0	52.5	74	-21.5
4824.0	PK	44.3	250	H	34.1	5.2	33.0	50.6	74	-23.4
7236.0	PK	41.9	220	V	37.4	6.1	33.5	51.9	74	-22.1
7236.0	PK	39.5	240	H	37.4	6.1	33.5	49.5	74	-24.5
4824.0	AV	35.0	230	V	34.1	5.2	33.0	41.3	54	-12.7
4824.0	AV	34.3	250	H	34.1	5.2	33.0	40.6	54	-13.4
7236.0	AV	31.5	220	V	37.4	6.1	33.5	41.5	54	-12.5
7236.0	AV	31.1	240	H	37.4	6.1	33.5	41.1	54	-12.9
Middle Channel (1G to 25GHz)										
4874.0	PK	45.1	260	V	34.1	5.2	33.0	51.4	74	-22.6
4874.0	PK	43.9	270	H	34.1	5.2	33.0	50.2	74	-23.8
7311.0	PK	42.6	210	V	37.4	6.1	33.5	52.6	74	-21.4
7311.0	PK	41.8	240	H	37.4	6.1	33.5	51.8	74	-22.2
4874.0	AV	36.4	260	V	34.1	5.2	33.0	42.7	54	-11.3
4874.0	AV	35.2	270	H	34.1	5.2	33.0	41.5	54	-12.5
7311.0	AV	30.2	210	V	37.4	6.1	33.5	40.2	54	-13.8
7311.0	AV	28.7	240	H	37.4	6.1	33.5	38.7	54	-15.3
High Channel (1G to 25GHz)										
4924.0	PK	44.0	270	V	34.1	5.2	33.0	50.3	74	-23.7
4924.0	PK	43.5	250	H	34.1	5.2	33.0	49.8	74	-24.2
7386.0	PK	40.4	230	V	37.4	6.1	33.5	50.4	74	-23.6
7386.0	PK	38.5	245	H	37.4	6.1	33.5	48.5	74	-25.5
4924.0	AV	34	270	V	34.1	5.2	33.0	40.3	54	-13.7
4924.0	AV	32.2	250	H	34.1	5.2	33.0	38.5	54	-15.5
7386.0	AV	29.6	230	V	37.4	6.1	33.5	39.6	54	-14.4
7386.0	AV	27.4	245	H	37.4	6.1	33.5	37.4	54	-16.6

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5th 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.

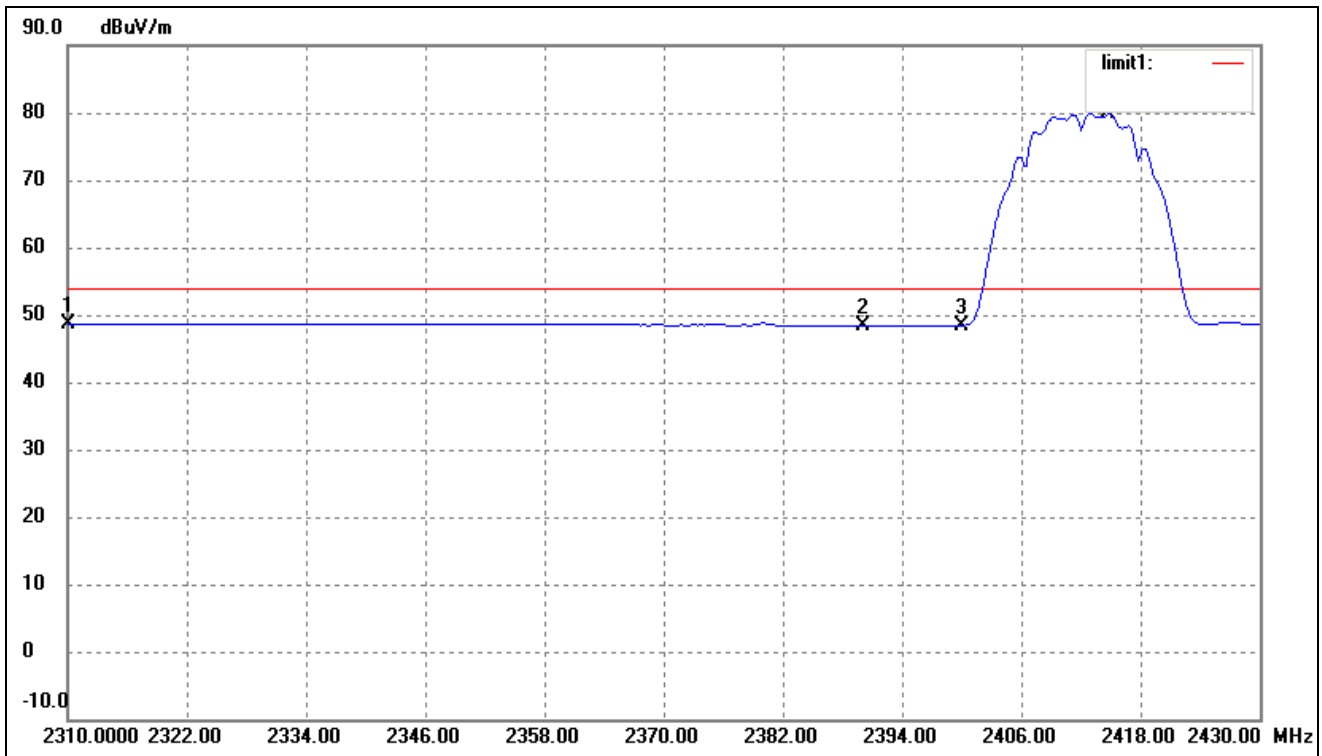
9.4 Environmental Conditions

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

9.5 Summary of Test Results/Plots

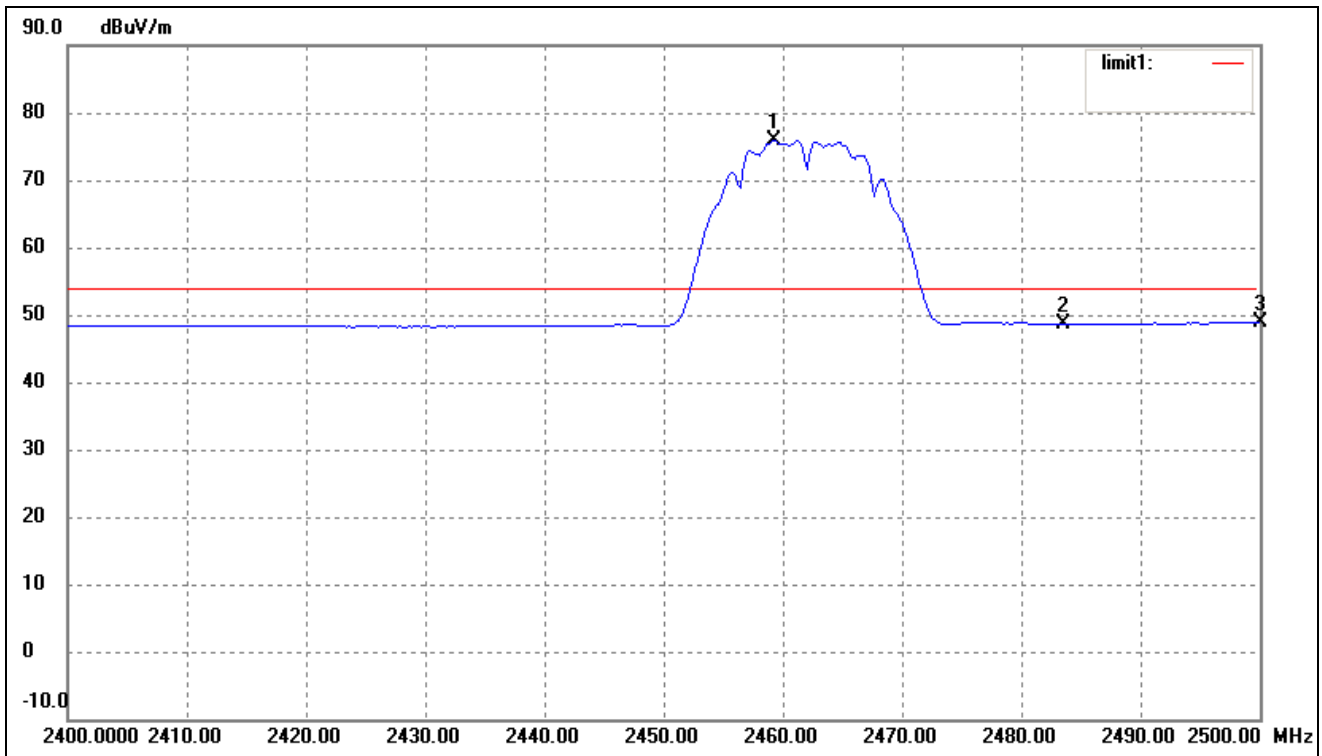
Test mode	Frequency MHz	Limit dBuV /dB	Result
802.11b	2310.00	<54dBuV	Pass
	2390.00	<54dBuV	Pass
	2400.00	>20dB	Pass
	2483.50	<54dBuV	Pass
	2500.00	<54dBuV	Pass
802.11g	2310.00	<54dBuV	Pass
	2390.00	<54dBuV	Pass
	2400.00	>20dB	Pass
	2483.50	<54dBuV	Pass
	2500.00	<54dBuV	Pass

For 802.11b
Lowest Bandedge



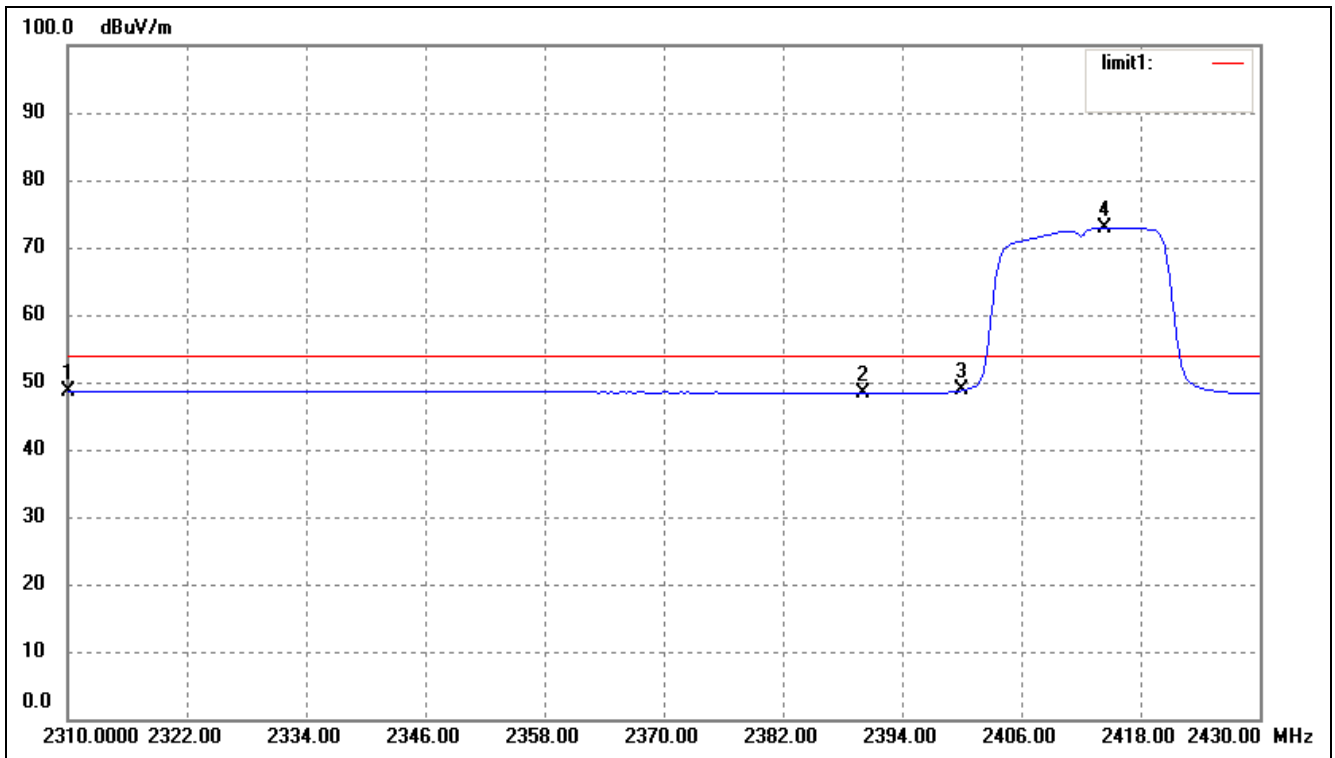
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2310.000	12.30	36.35	48.65	54.00	-5.35	235	150	Ave
	2310.000	21.26	36.35	57.61	74.00	-16.39	235	150	peak
2	2390.000	11.88	36.54	48.42	54.00	-5.58	268	150	Ave
	2390.000	19.47	36.54	56.01	74.00	-17.99	268	150	peak
3	2400.000	11.84	36.57	48.41	/	/	/	/	Ave
4	2414.640	43.27	36.60	79.87	/	/	/	/	Ave

For 802.11b
Highest Bandedge



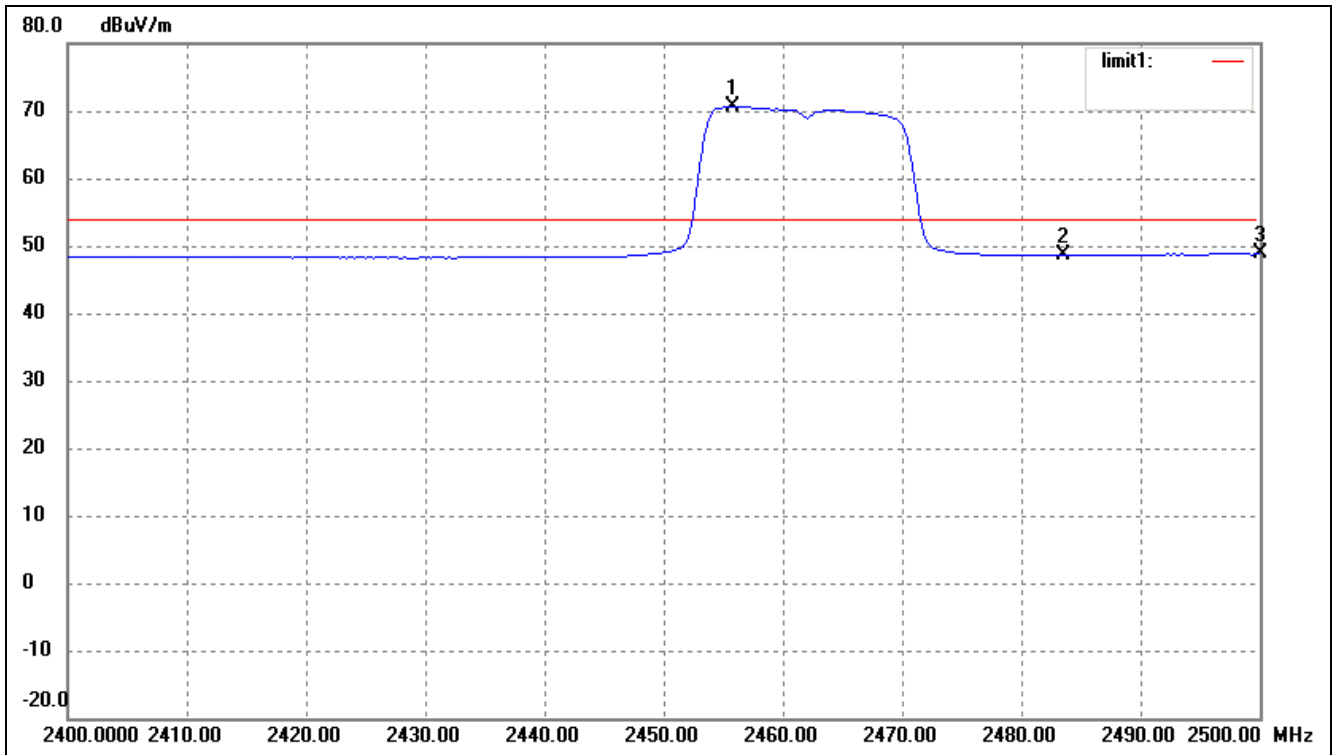
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2459.200	39.17	36.71	75.88	/	/	/	/	Ave
2	2483.500	11.93	36.77	48.70	54.00	-5.30	261	150	Ave
	2483.500	23.57	36.77	60.34	74.00	-13.66	261	150	peak
3	2500.000	11.96	36.82	48.78	54.00	-5.22	225	150	Ave
	2500.000	22.15	36.82	58.97	74.00	-15.03	225	150	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	2310.000	12.24	36.35	48.59	54.00	-5.41	240	150	Ave
	2310.000	23.47	36.35	59.82	74.00	-14.18	240	150	peak
2	2390.000	11.88	36.54	48.42	54.00	-5.58	245	150	Ave
	2390.000	22.95	36.54	59.49	74.00	-14.51	245	150	peak
3	2400.000	12.19	36.57	48.76	/	/	/	/	Ave
4	2414.400	36.33	36.60	72.93	/	/	/	/	Ave

Highest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2455.800	33.92	36.71	70.63	/	/	/	/	Ave
2	2483.500	11.92	36.77	48.69	54.00	-5.31	220	150	Ave
	2483.500	20.38	36.77	57.15	74.00	-16.85	220	150	peak
3	2500.000	11.96	36.82	48.78	54.00	-5.22	235	150	Ave
	2500.000	19.21	36.82	56.03	74.00	-17.97	235	150	peak

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