FCC Part 15C

Measurement and Test Report

For

Pismo Labs Technology Limited

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

Kowloon, Hong Kong

FCC ID: U8G-P1208

Report Concerns: Original Report	**Equipment Type:** Pepwave 200mW Platform

Model:	PSM-103
Report No.:	STR09108065I
Test/Witness Engineer:	Seven Song
Test Date:	2009-10-25 to 2009-11-07
Issue Date:	2009-11-14
Prepared By:	**SEM.Test Compliance Service Co., Ltd** 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C.（518101）
Approved & Authorized By:	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:	Pismo Labs Technology Limited
Address of applicant:	Room 1703A, 17/F, Park Building, 476 Castle Peak Road, Cheung Sha Wan, Kowloon, Hong Kong

General Description of E.U.T

Items	Description
EUT Description:	Pepwave 200mW Platform
Trade Name:	Pepwave
Model No.:	PSM-103
Rated Voltage:	DC 12V
Max. Output Power	25.07dBm
Antenna Gain:	5dBi
Frequency range:	2412MHz~2462MHz
Number of channels:	11
Channel Separation:	5MHz
Type of Antenna:	Extra Antenna
Size:	9.0x9.0x2.5 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 Pismo Labs 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 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	Modem	RG2415	/
Lenovo	Printer	3110	OD65133711480

1.8 EUT Cable List and Details

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

2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 15.203; § 15.247(c)(1)(i)	Antenna Requirement	Compliant
§ 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 ± 0.5 dB.

3.2 Test Equipment List and Details

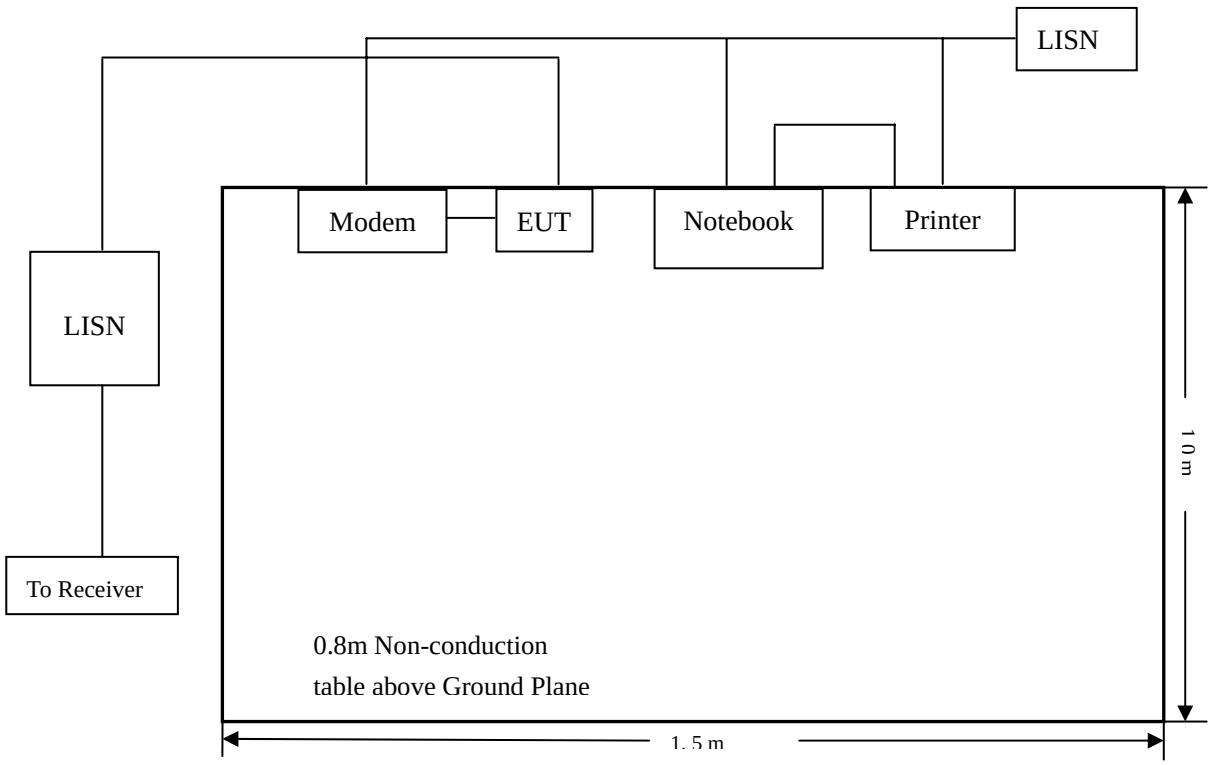
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2009-08-12	2010-08-11
Puls Limiter	Rohde & Schwarz	ESH3-Z2	100911	2009-08-12	2010-08-11
L.I.S.N.	SCHWARZBECK	NSLK8126	8126-224	2009-08-12	2010-08-11
L.I.S.N.	EMCO	3825/2	11967C	2009-08-12	2010-08-11

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:

-2.5 dBμV at **0.446 MHz** in the **Line Pk** Detector, 0.15-30MHz

3.7 Conducted Emissions Test Data

LINE CONDUCTED EMISSIONS				FCC 15.207	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dBμV	QP/Ave/Pk	Line/Neutral	dBμV	dB
0.446	54.49	Pk	Line	56.95	-2.5
0.442	53.17	Pk	Neutral	57.02	-3.9
0.342	52.63	Pk	Line	59.15	-6.5
2.110	47.69	Pk	Neutral	56.00	-8.3
0.338	50.89	Pk	Neutral	59.25	-8.4
1.198	47.52	Pk	Line	56.00	-8.5
0.326	40.99	Ave	Line	49.55	-8.6
2.286	46.57	Pk	Neutral	56.00	-9.4
0.518	36.48	Ave	Line	46.00	-9.5
0.458	37.08	Ave	Neutral	46.73	-9.6
2.038	32.03	Ave	Neutral	46.00	-14.0
0.338	34.44	Ave	Neutral	49.25	-14.8
2.838	31.13	Ave	Neutral	46.00	-14.9
9.650	42.50	Pk	Neutral	60.00	-17.5

Plot of Conducted Emissions Test Data

Conducted Disturbance

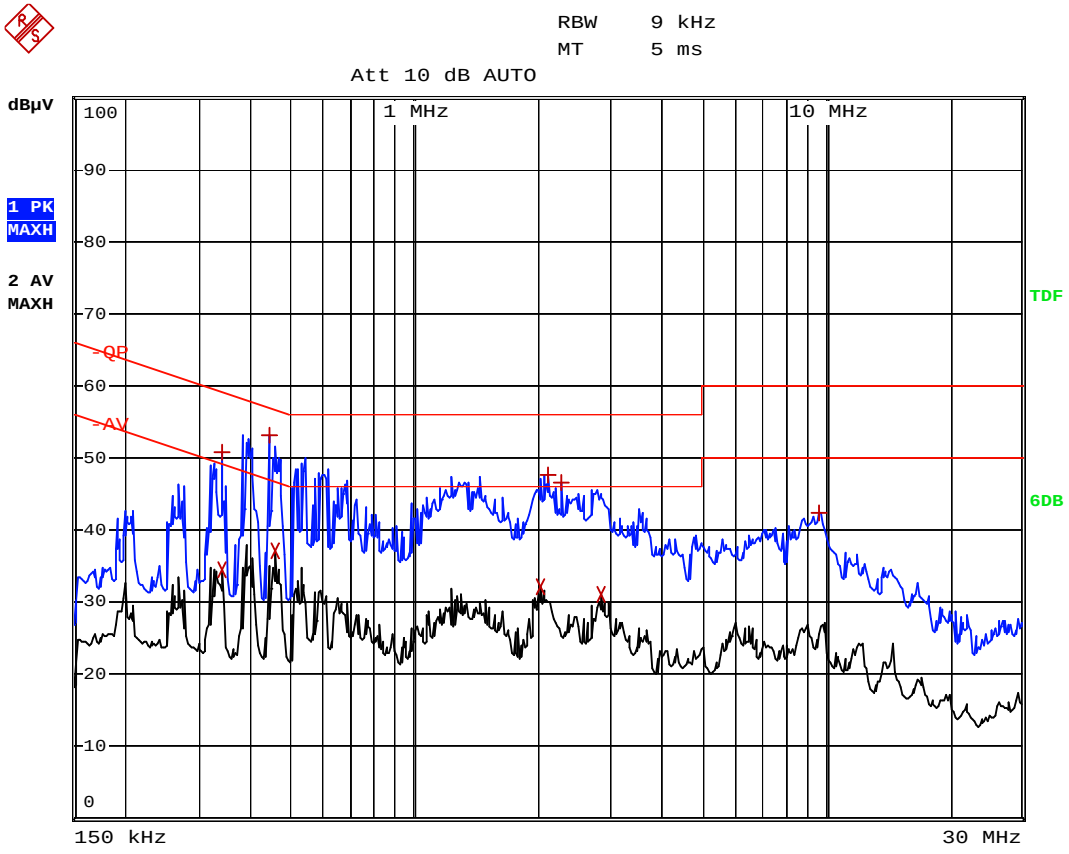
EUT: Pepwave 200mW Platform

M/N: PSM-103

Operating Condition: Operating

Test Specification: N

Comment:



Plot of Conducted Emissions Test Data

Conducted Disturbance

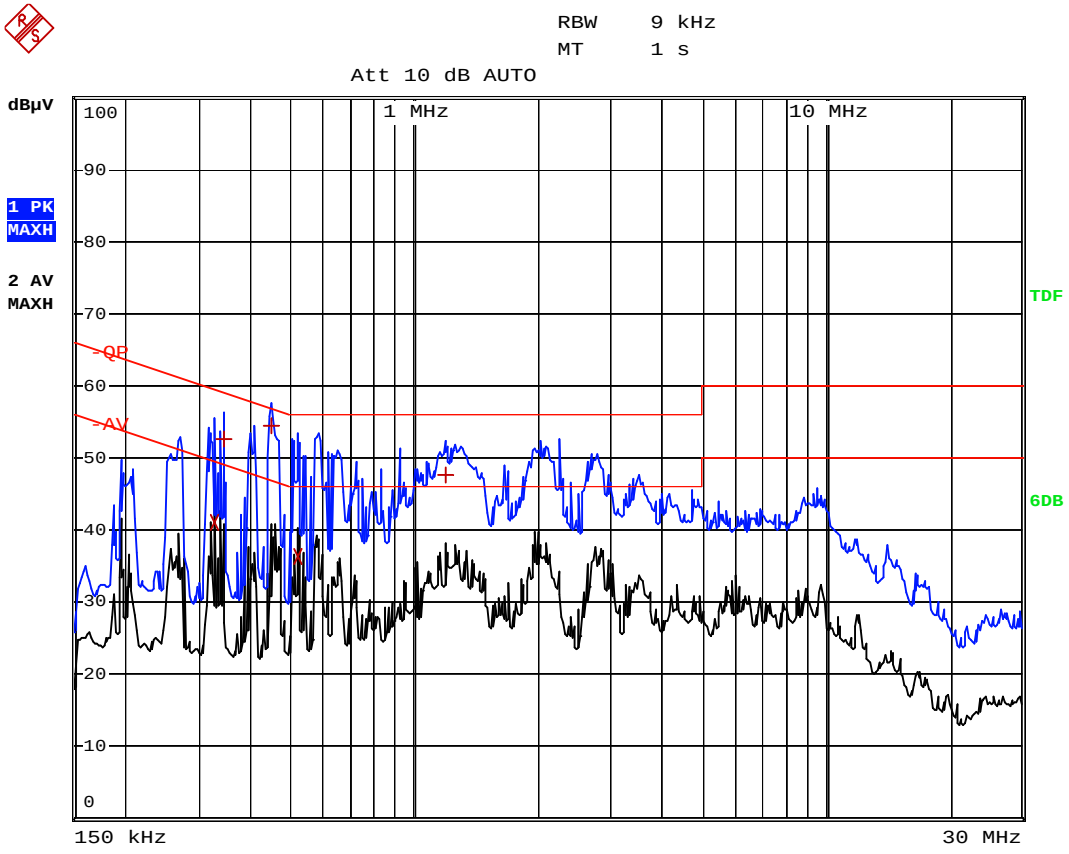
EUT: Pepwave 200mW Platform

M/N: PSM-103

Operating Condition: Operating

Test Specification: L

Comment:



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 antenna with a reverse SMA(female type) connector, 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^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ 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^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ 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

$S = (P*G) / (4*\Pi*R^2)$

S = power density (in appropriate units, e.g., mw/cm^2)

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: 25.07(dBm)
Maximum peak output power at antenna input terminal: 321.366(mW)
Prediction distance: 20 (cm)
Prediction frequency: 2462 (MHz)
Antenna gain (typical): 5 (dBi)
Antenna gain (numeric): 3.1623 (numeric)
The worst case is power density at prediction frequency at 20cm: 0.20228(mw/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

0.20228 (mw/cm^2) < 1 (mw/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

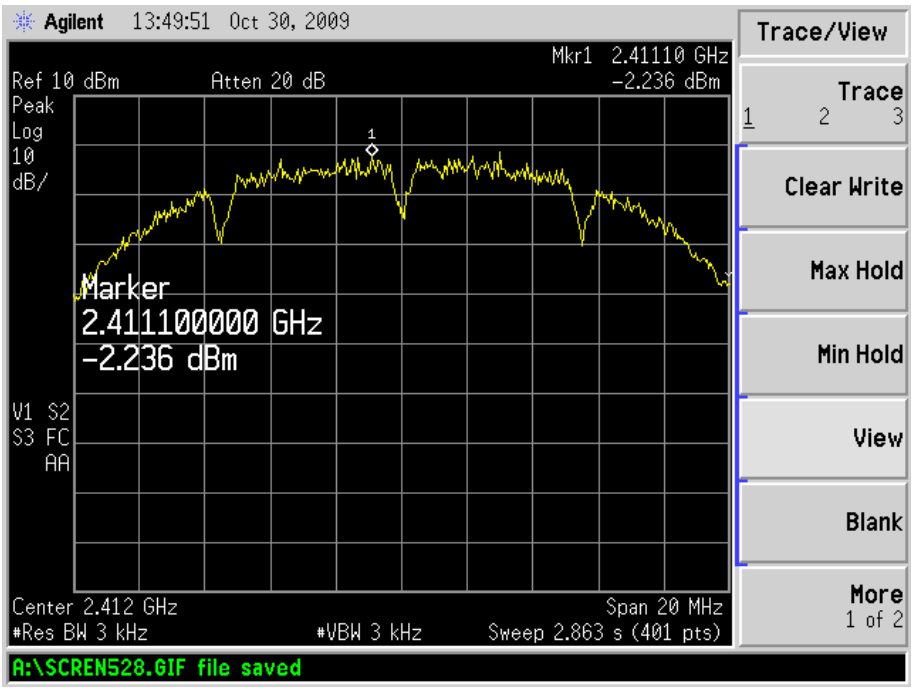
Temperature:	20° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

6.5 Summary of Test Results/Plots

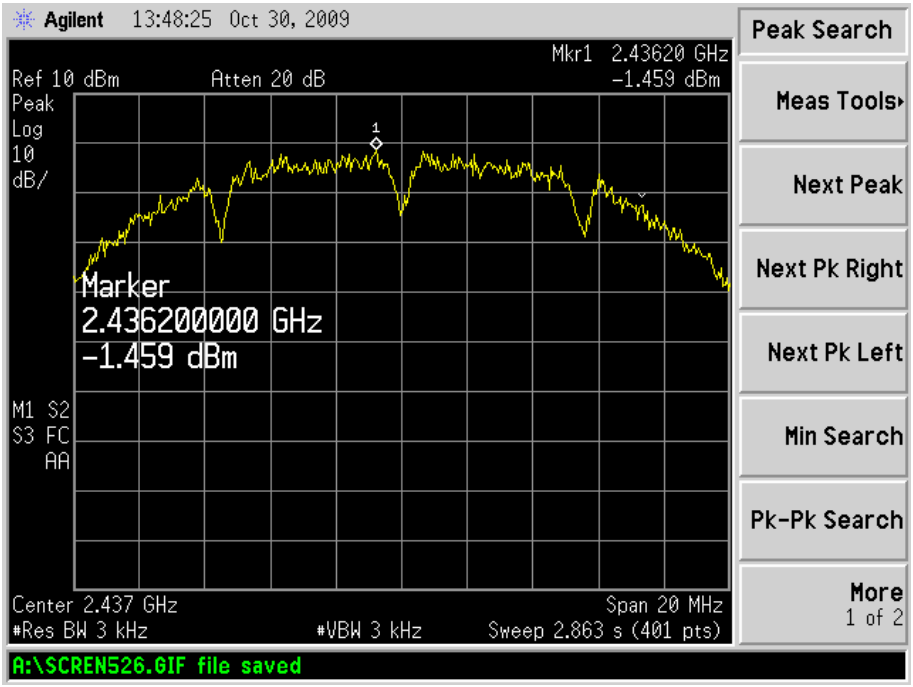
Test mode	Test channel	Reading dBm/3kHz	Limit dBm/3kHz
802.11b	Low channel (2412MHz)	-2.236	8
	Middle channel (2437MHz)	-1.459	8
	High channel (2462MHz)	-1.566	8
802.11g	Low channel (2412MHz)	-2.843	8
	Middle channel (2437MHz)	-3.354	8
	High channel (2462MHz)	-3.477	8

For 802.11b

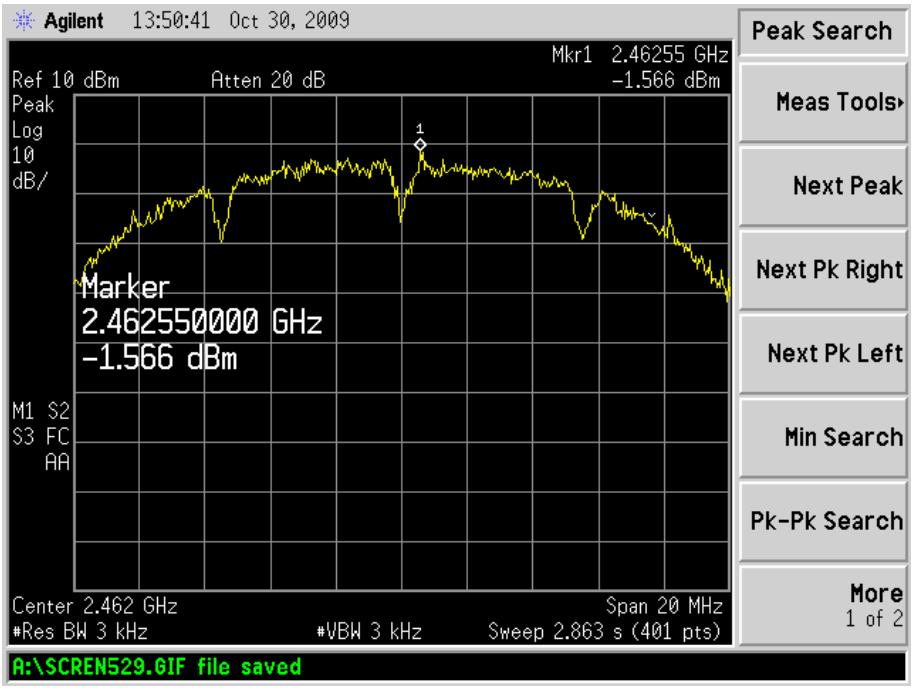
Low Channel:



Middle Channel:

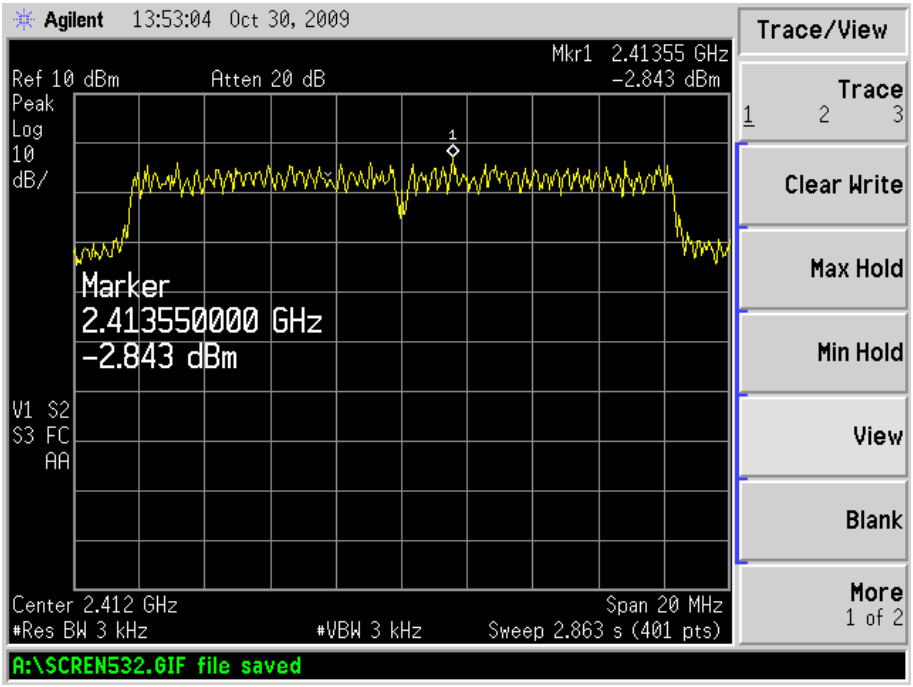


High Channel:

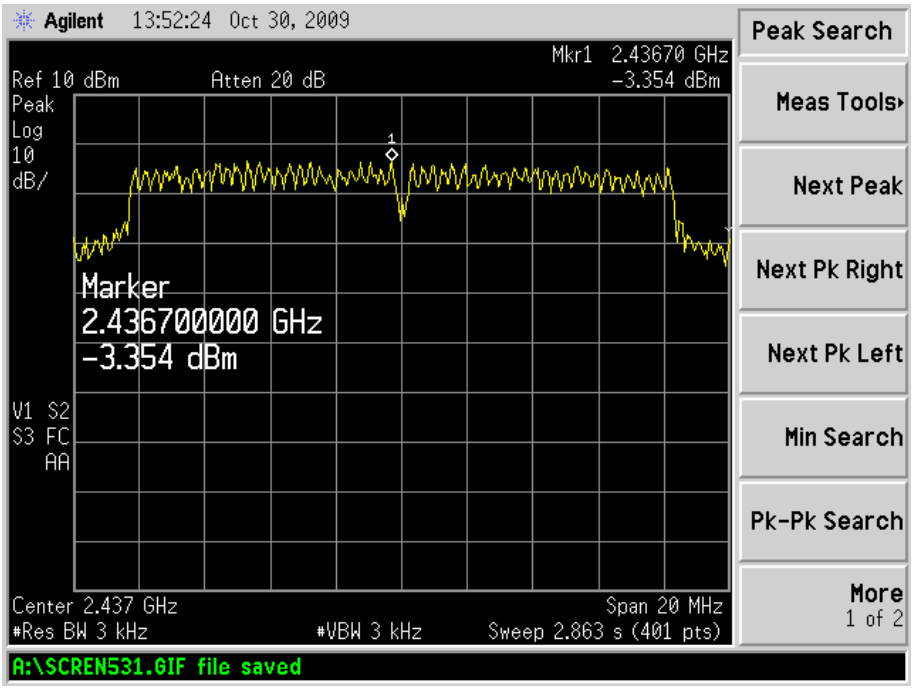


For 802.11g

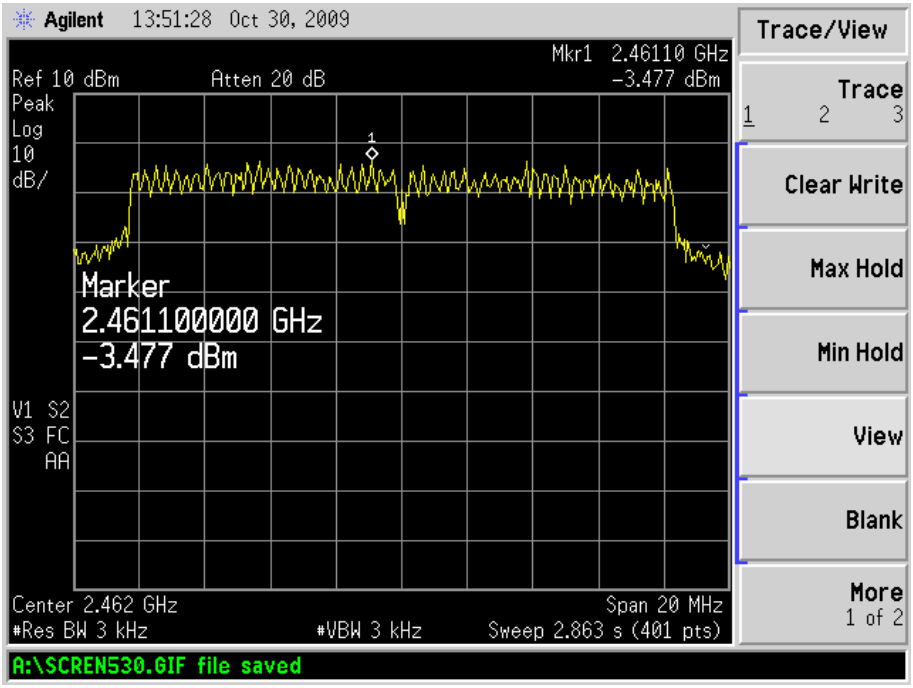
Low Channel:



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

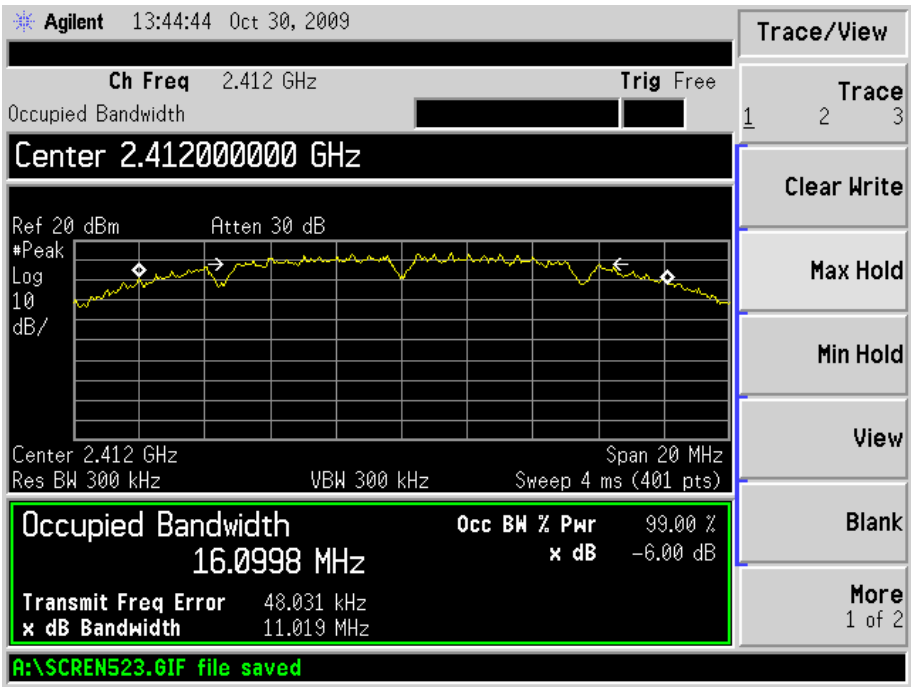
Temperature:	24° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

7.5 Summary of Test Results/Plots

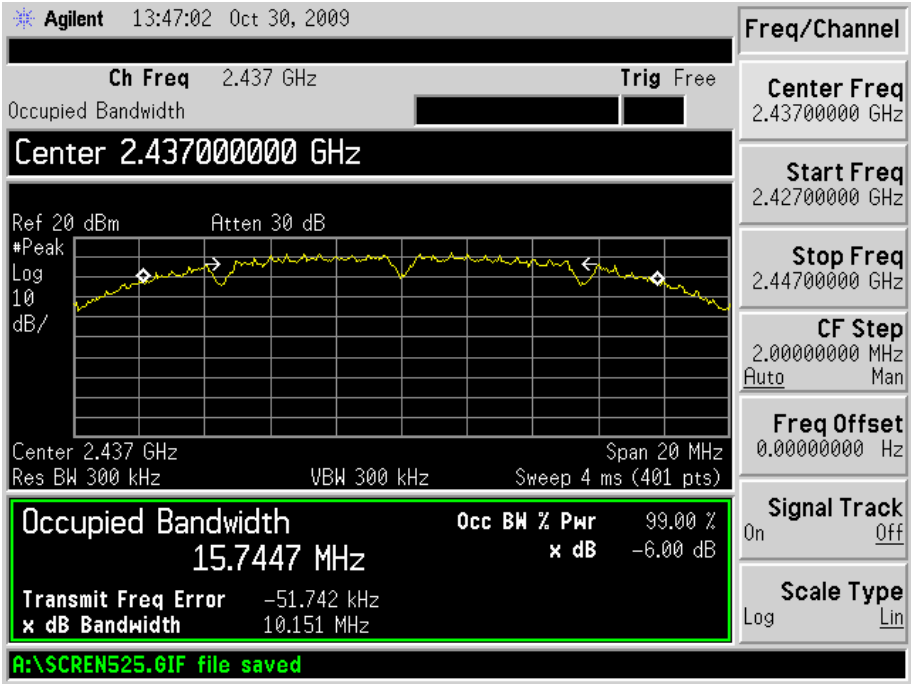
Test mode	Frequency MHz	6 dB Bandwidth kHz	Limit kHz
802.11b	2412	11019	500
	2437	10151	500
	2462	11088	500
802.11g	2412	16489	500
	2437	16489	500
	2462	16510	500

For 802.11b

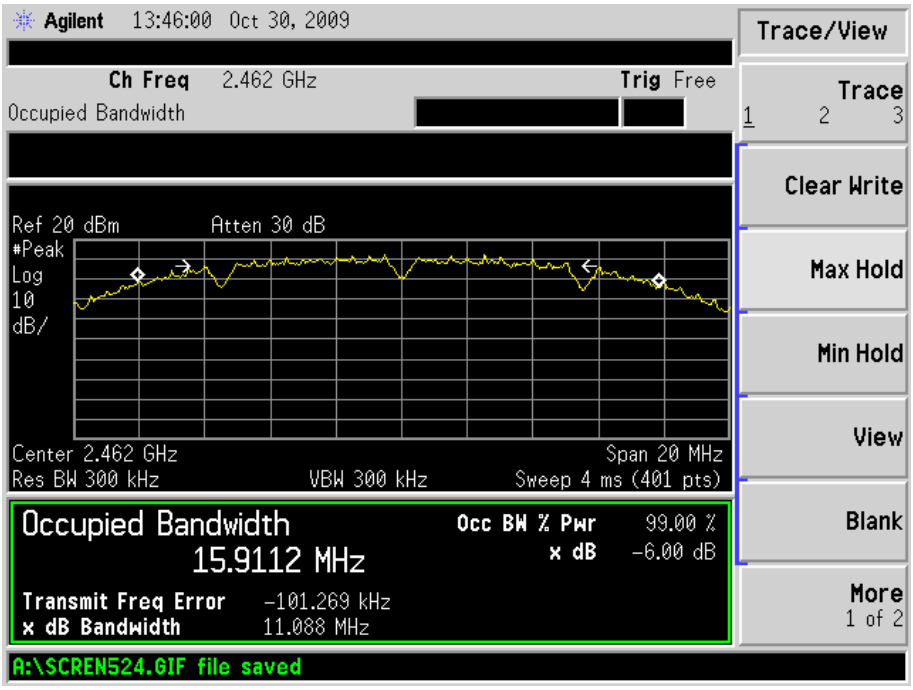
Low Channel:



Mid Channel:

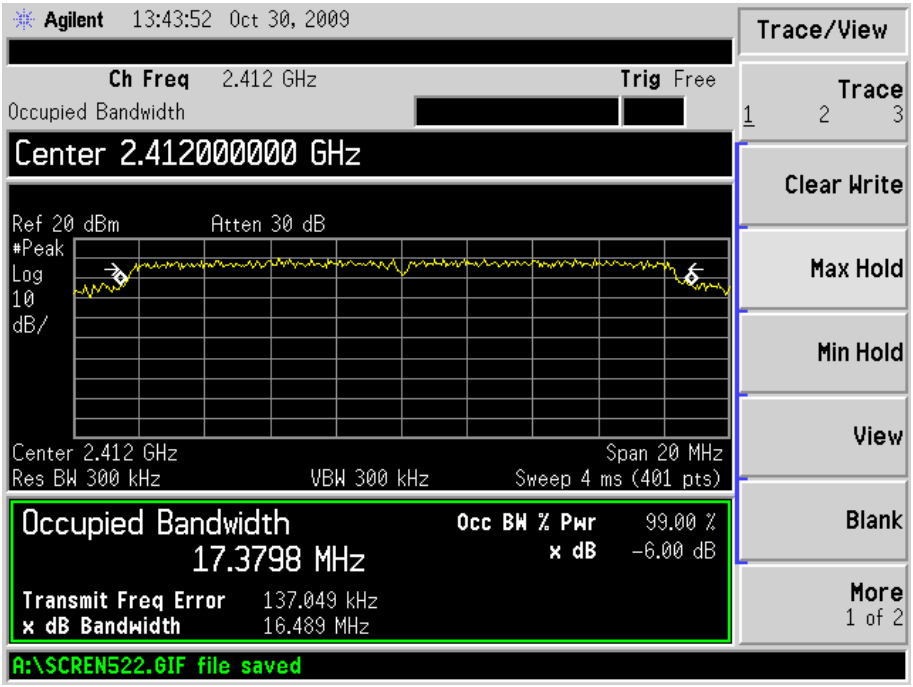


High Channel:

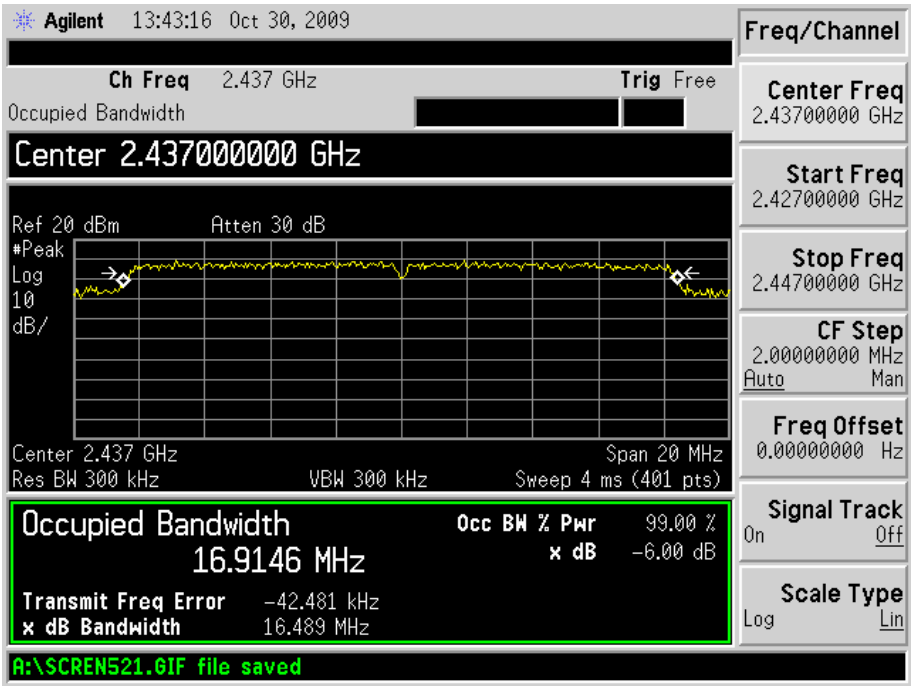


For 802.11g

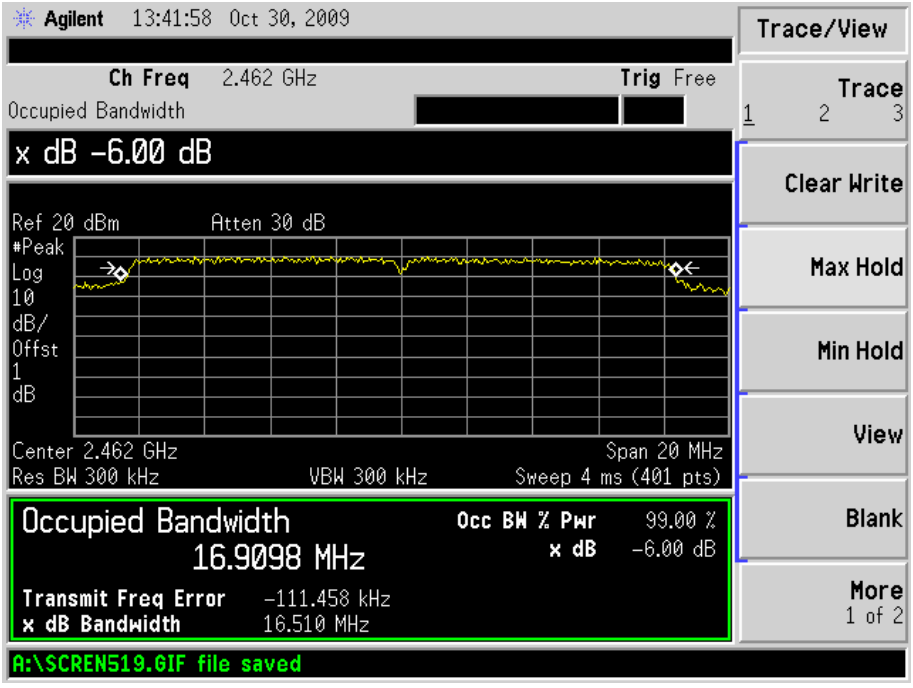
Low Channel:



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

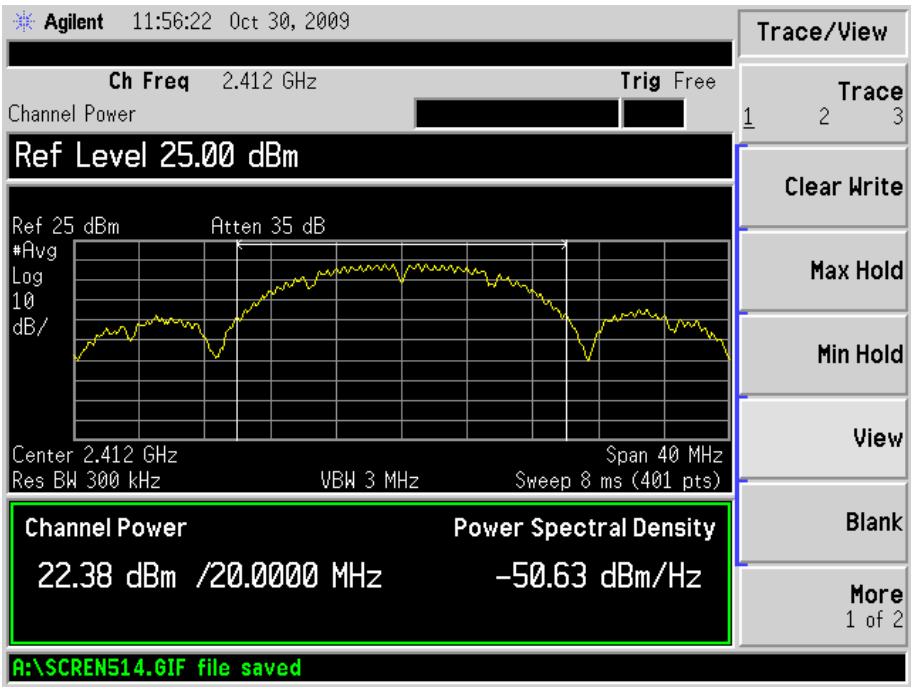
Temperature:	21° C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

8.5 Summary of Test Results/Plots

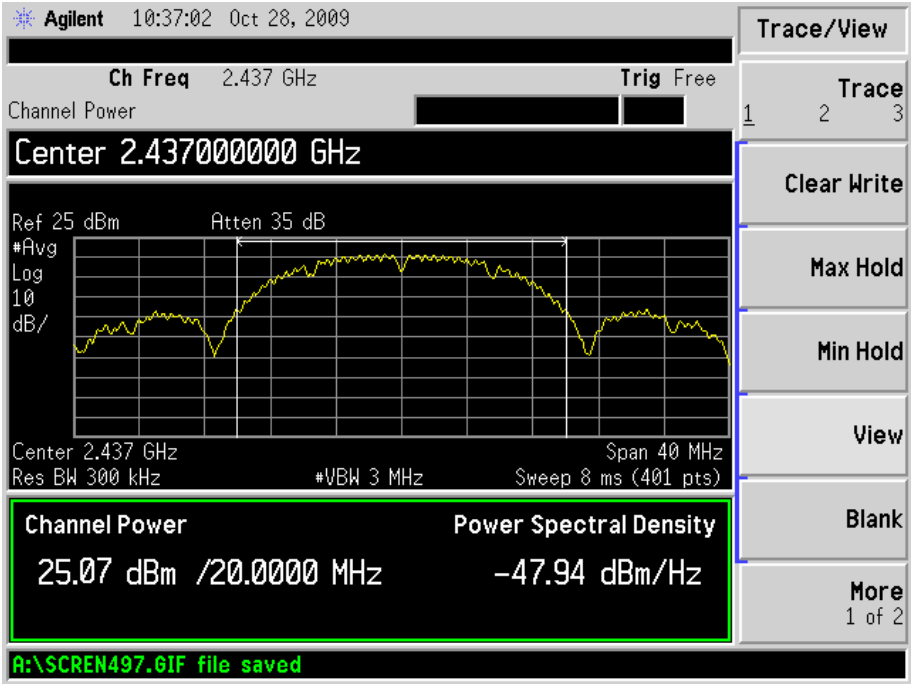
Test mode	Frequency MHz	Reading dBm	Output power W	Limit W
802.11b	2412	22.38	0.1730	1
	2437	25.07	0.3214	1
	2462	22.81	0.1910	1
802.11g	2412	22.47	0.1766	1
	2437	24.17	0.2612	1
	2462	23.07	0.2028	1

For 802.11b

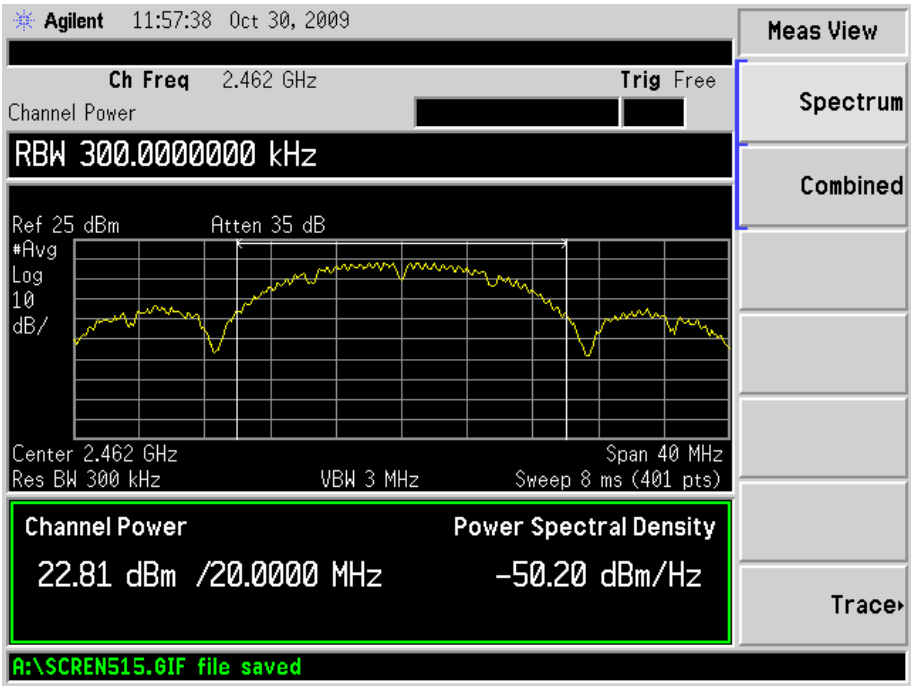
Low Channel:



Middle Channel:

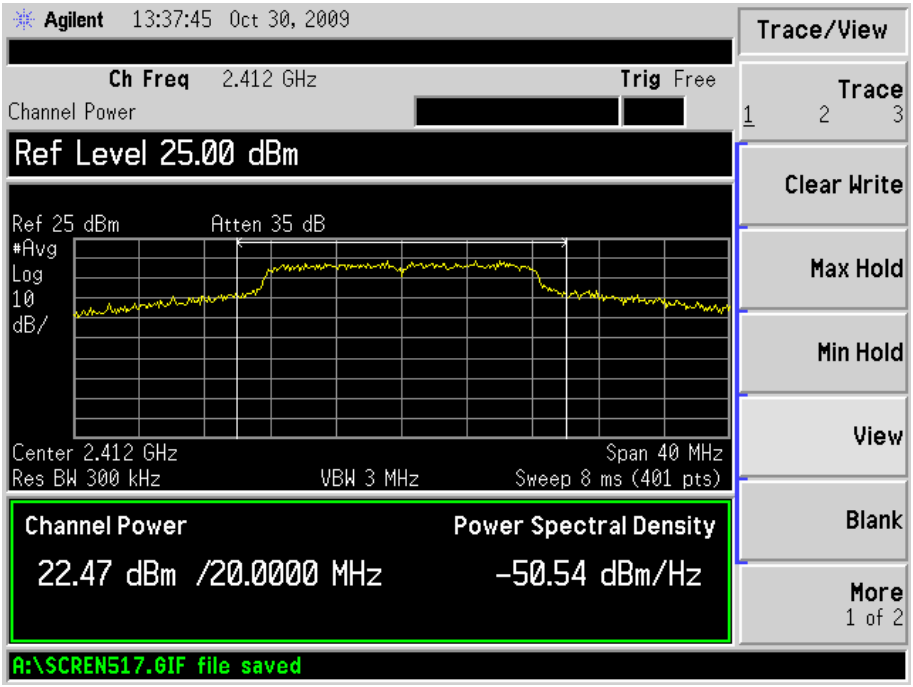


High Channel:

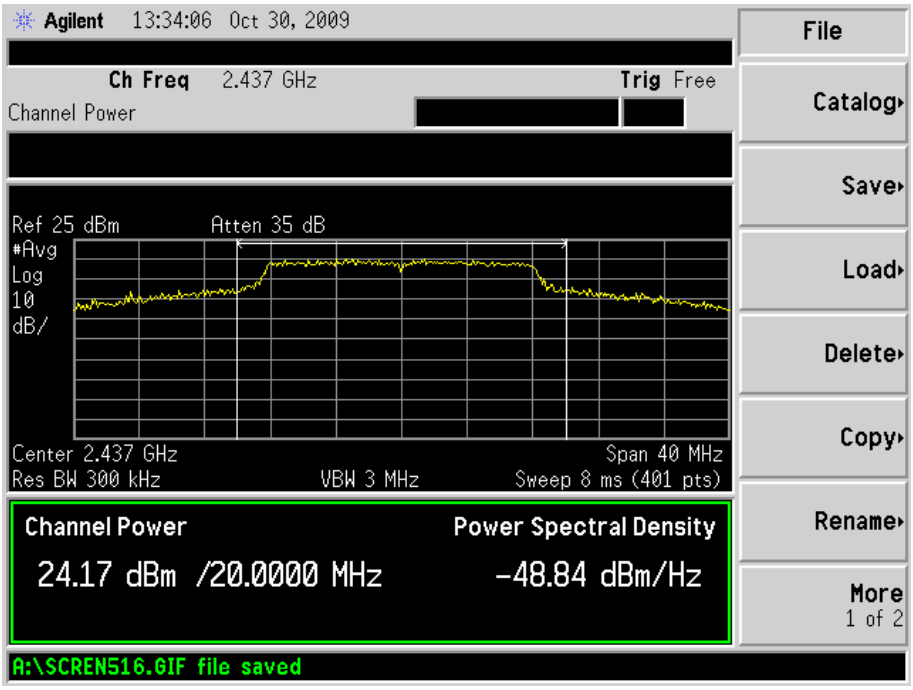


For 802.11g

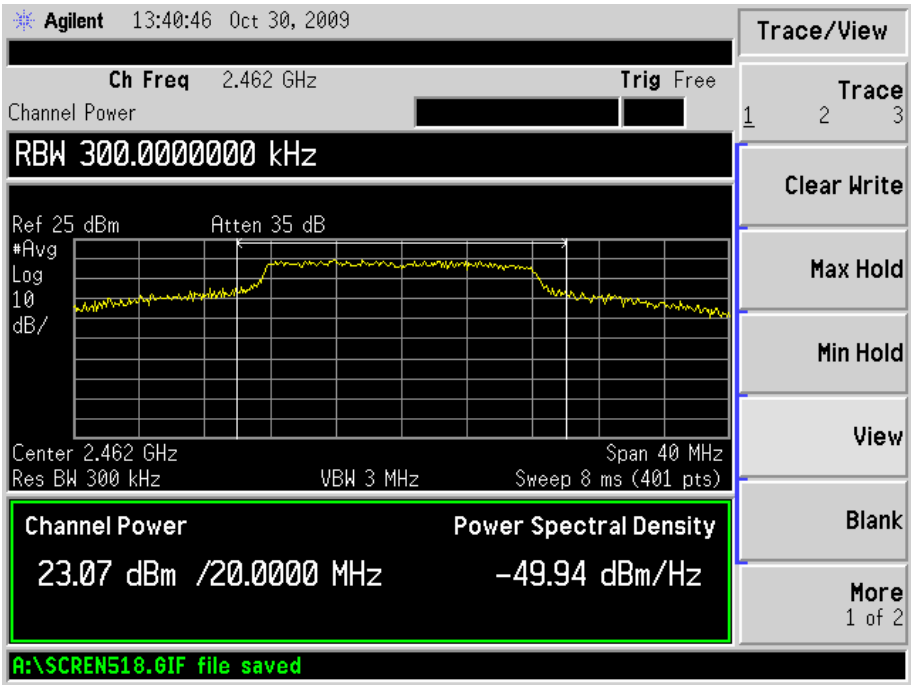
Low Channel:



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 ±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.

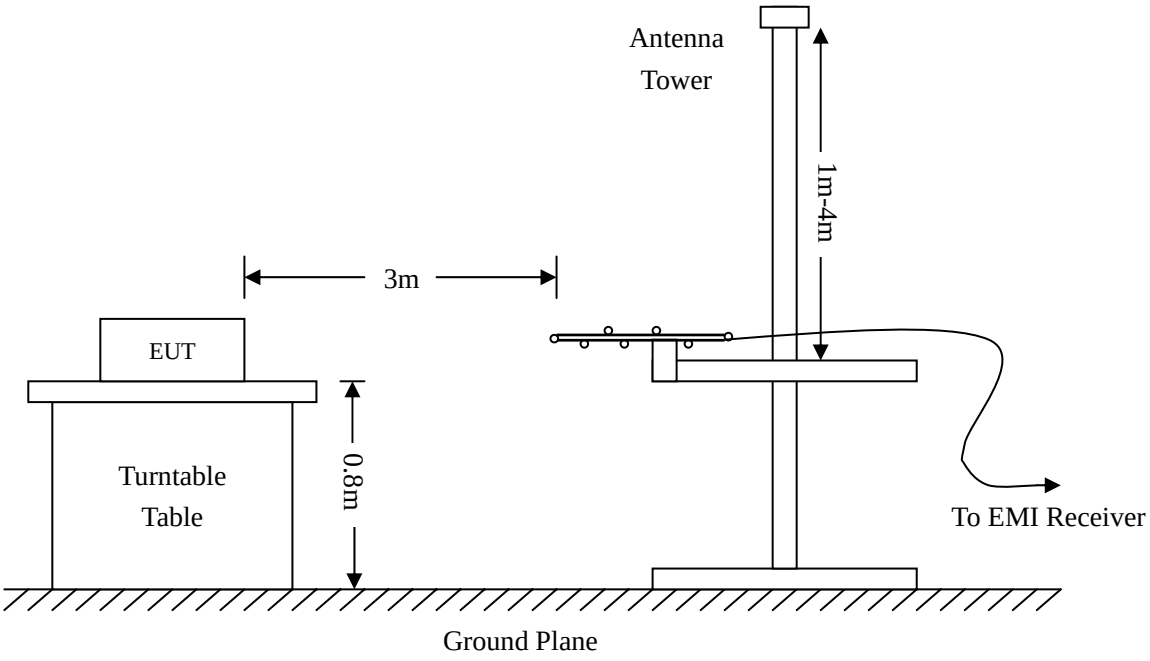
Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

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:

Corr. Ampl. = Indicated Reading + Ant. Factor + Cable Loss – 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:

Margin = Corr. Ampl. – 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:

-2.20 dBμV at **251.1804 MHz** in the **Vertical** polarization, **Transmitting 802.11b (High Channel)** test mode , **30 MHz to 25 GHz, 3Meters**

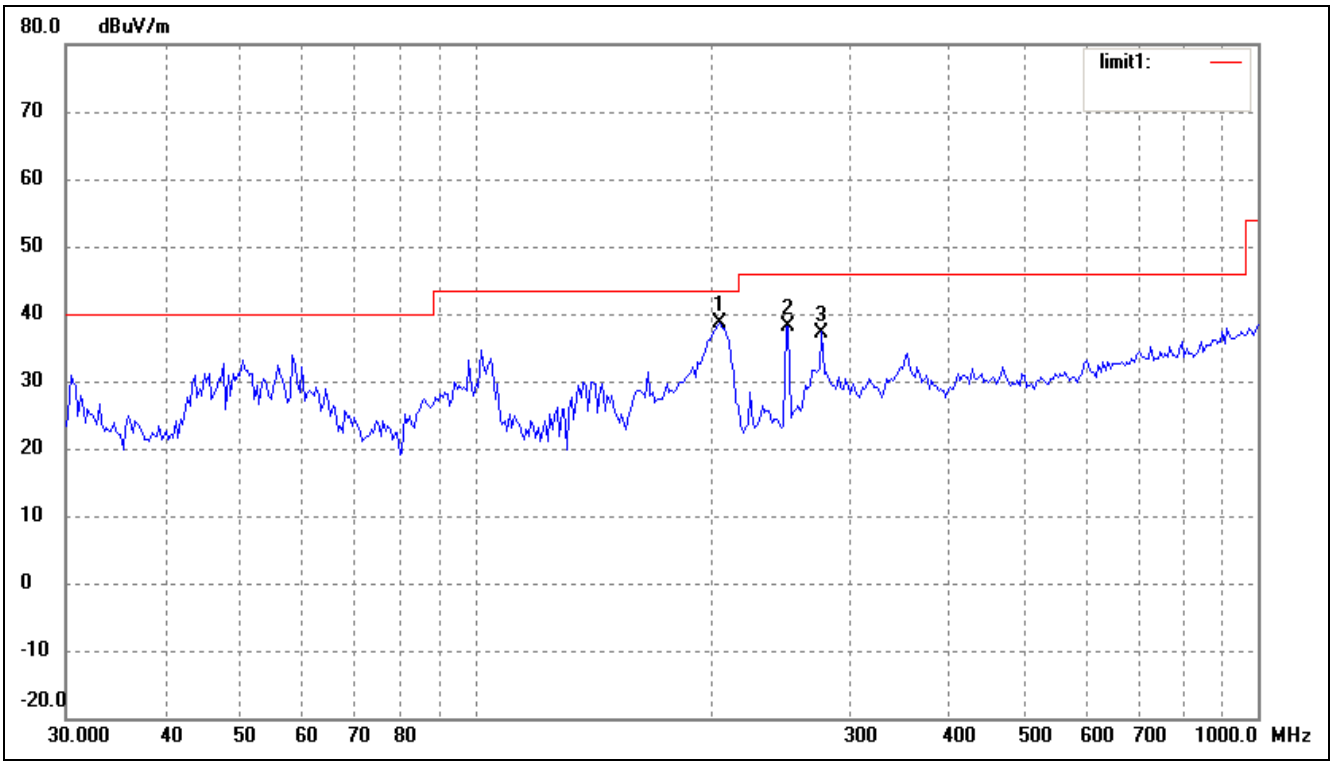
Test Result/Plots:

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11b)

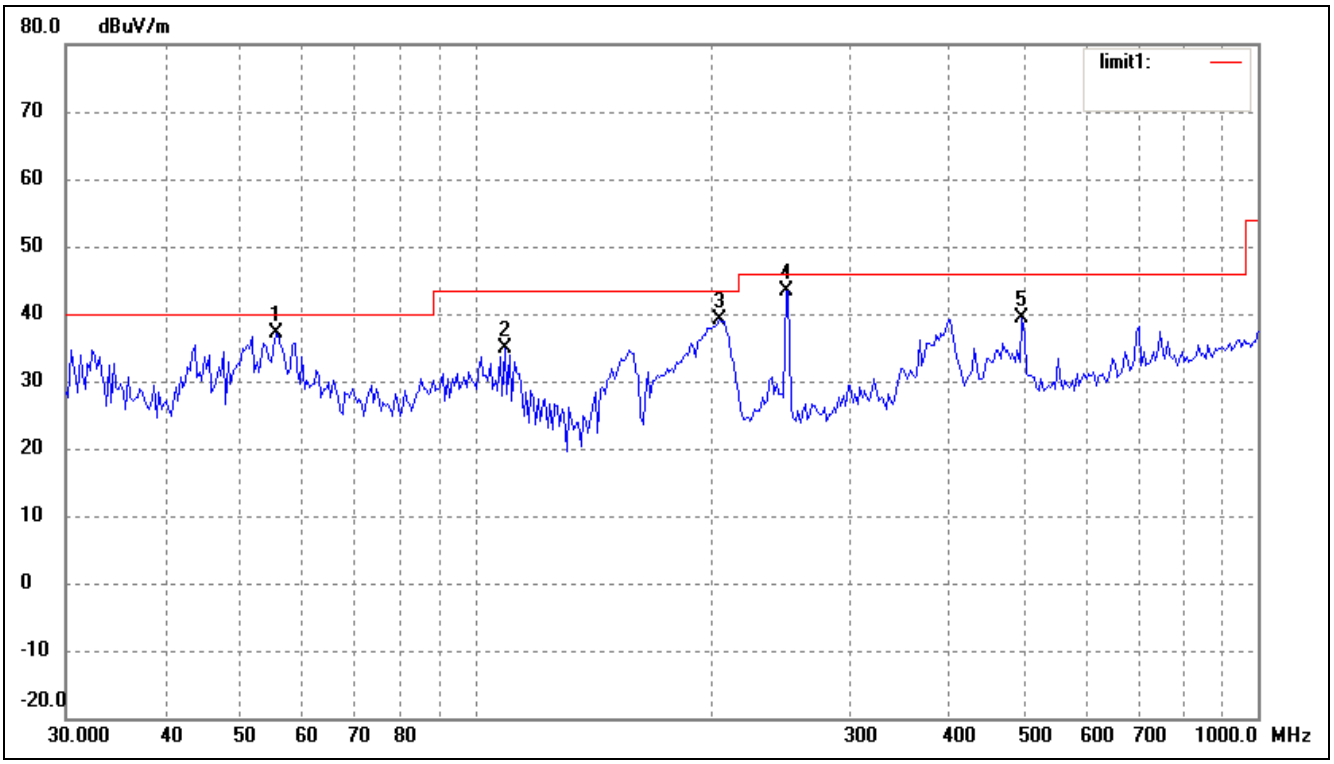
Comment: Low Channel

Horizontal



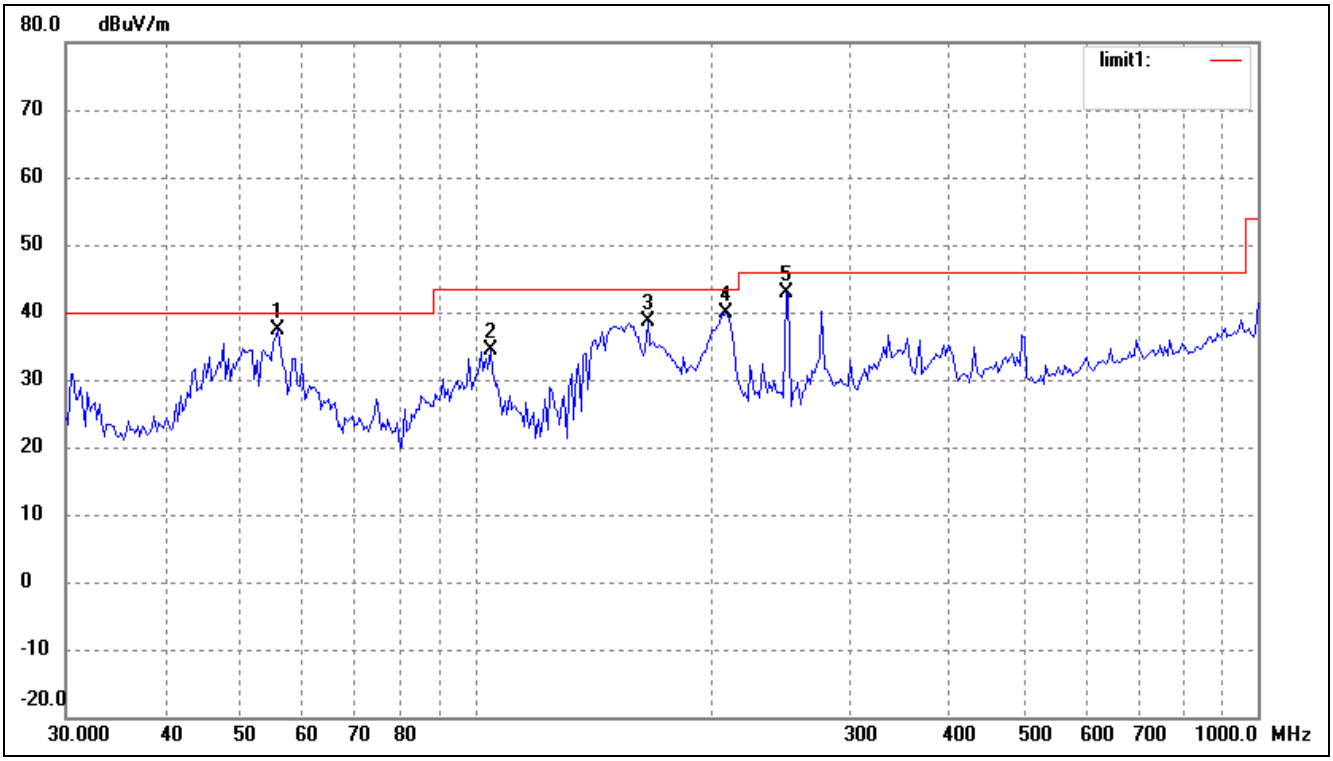
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	204.9551	31.59	7.08	38.67	43.50	-4.83	118	109	QP
2	251.1804	29.30	8.90	38.20	46.00	-7.80	281	100	peak
3	277.0935	27.39	9.86	37.25	46.00	-8.75	92	200	peak

Vertical



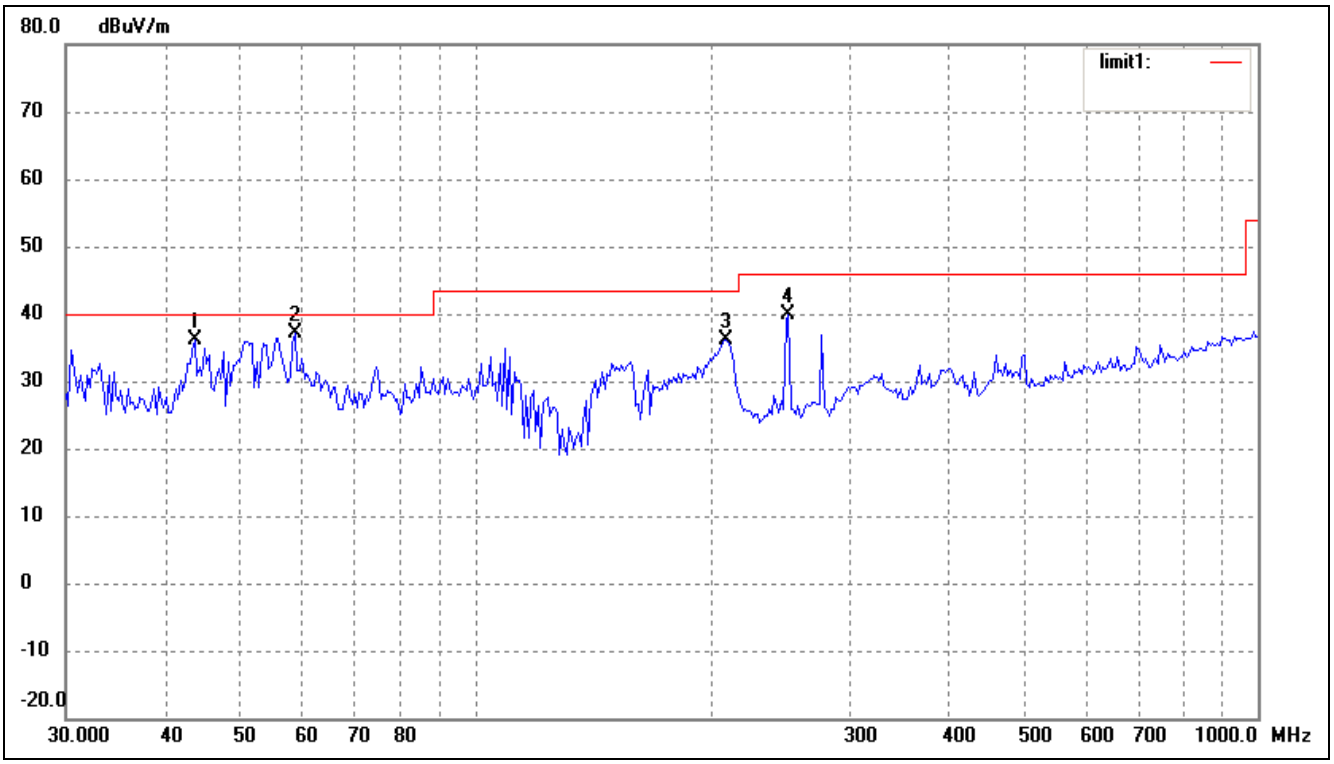
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	55.6094	29.40	7.74	37.14	40.00	-2.86	72	119	QP
2	109.0286	27.12	7.68	34.80	43.50	-8.70	331	100	peak
3	204.9551	32.07	7.08	39.15	43.50	-4.35	280	127	QP
4	249.4250	34.55	8.89	43.44	46.00	-2.56	109	152	QP
5	499.4247	25.34	14.09	39.43	46.00	-6.57	192	100	peak

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



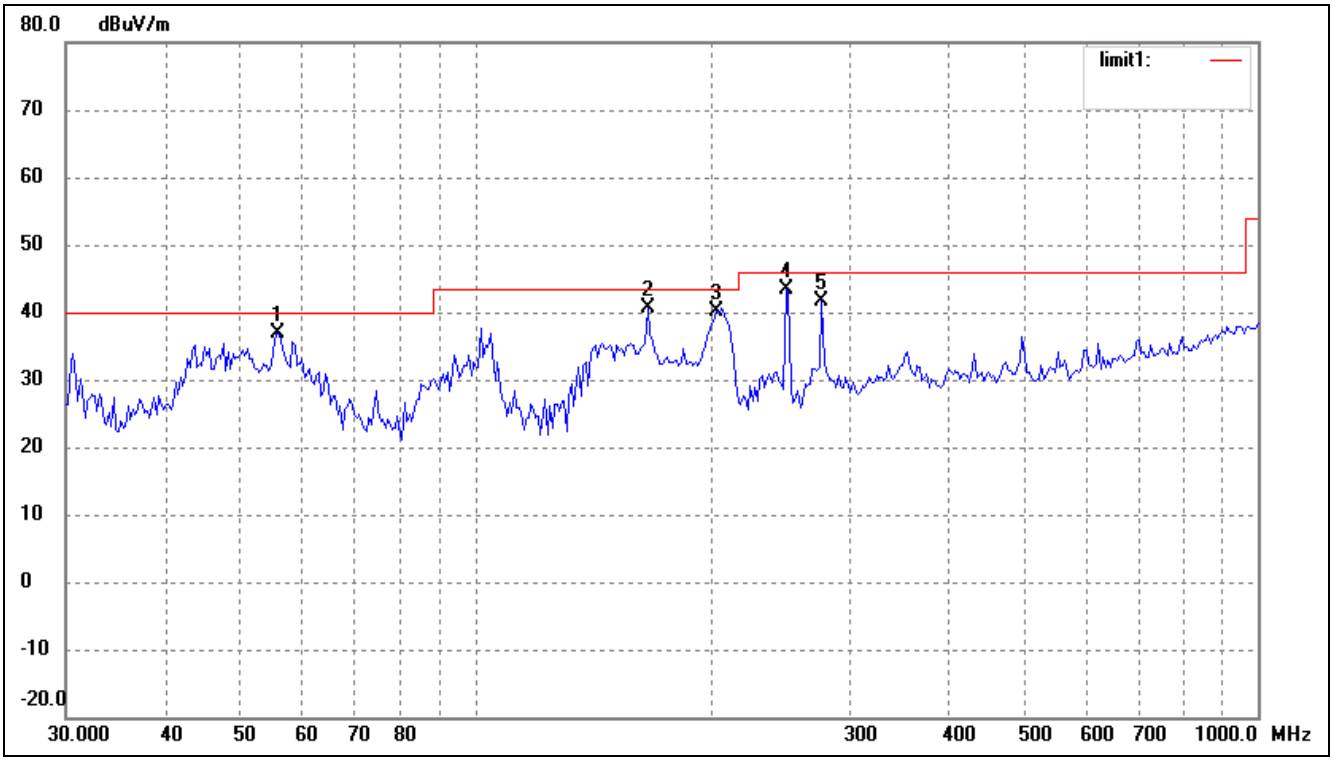
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	56.0007	29.56	7.73	37.29	40.00	-2.71	112	112	QP
2	104.5361	26.31	8.04	34.35	43.50	-9.15	328	100	peak
3	166.0680	33.89	4.75	38.64	43.50	-4.86	37	117	QP
4	209.3129	32.74	7.26	40.00	43.50	-3.50	227	123	QP
5	249.4250	33.90	8.89	42.79	46.00	-3.21	90	104	QP

Vertical



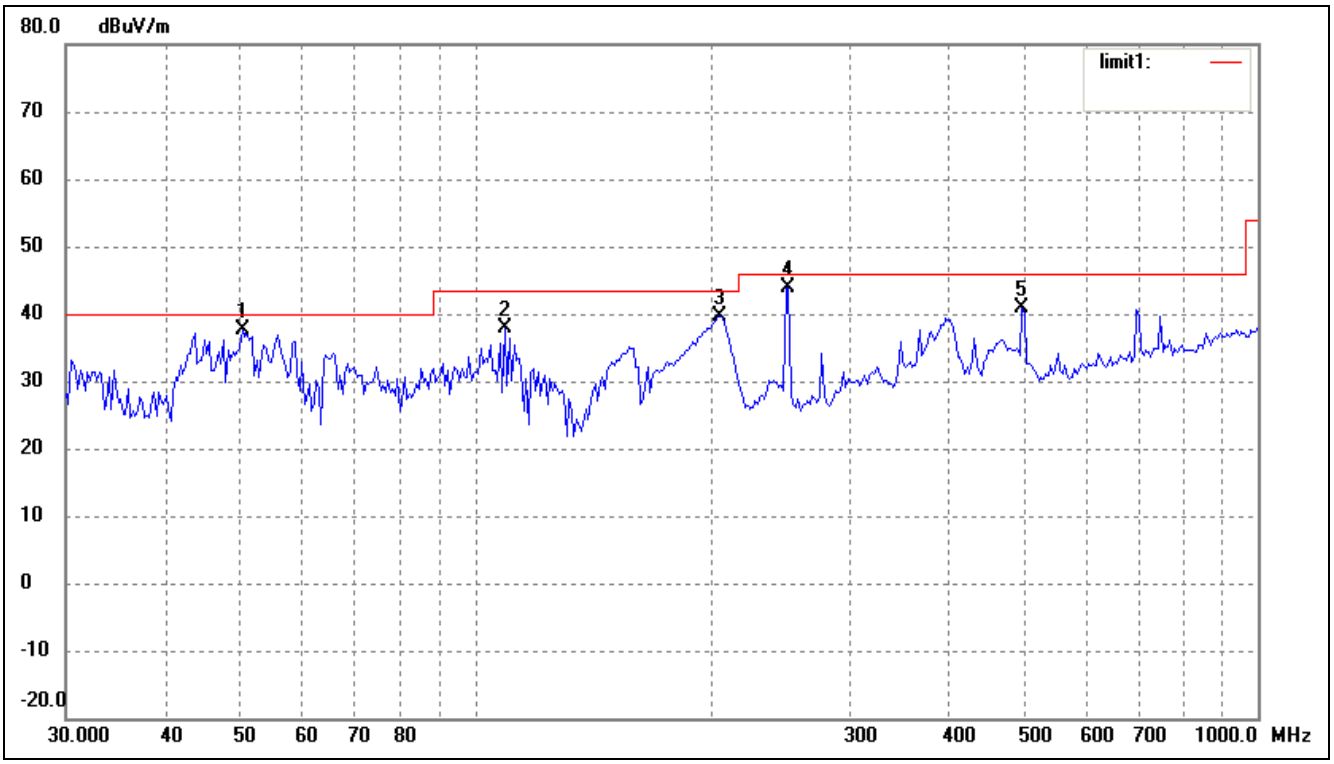
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	43.8119	28.12	7.91	36.03	40.00	-3.97	62	125	QP
2	58.8185	29.64	7.59	37.23	40.00	-2.77	37	112	QP
3	209.3129	28.92	7.26	36.18	43.50	-7.32	103	100	peak
4	251.1804	31.08	8.90	39.98	46.00	-6.02	193	200	peak

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



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	56.0007	29.22	7.73	36.95	40.00	-3.05	34	102	QP
2	166.0680	35.80	4.75	40.55	43.50	-2.95	27	114	QP
3	203.5228	33.18	7.03	40.21	43.50	-3.29	190	155	QP
4	249.4250	34.45	8.89	43.34	46.00	-2.66	228	138	QP
5	277.0935	31.87	9.86	41.73	46.00	-4.27	320	120	QP

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	50.4089	29.68	7.95	37.63	40.00	-2.37	42	103	QP
2	109.0286	30.19	7.68	37.87	43.50	-5.63	19	100	QP
3	204.9551	32.44	7.08	39.52	43.50	-3.98	290	10	QP
4	251.1804	34.90	8.90	43.80	46.00	-2.20	163	150	QP
5	499.4247	26.87	14.09	40.96	46.00	-5.04	228	129	QP

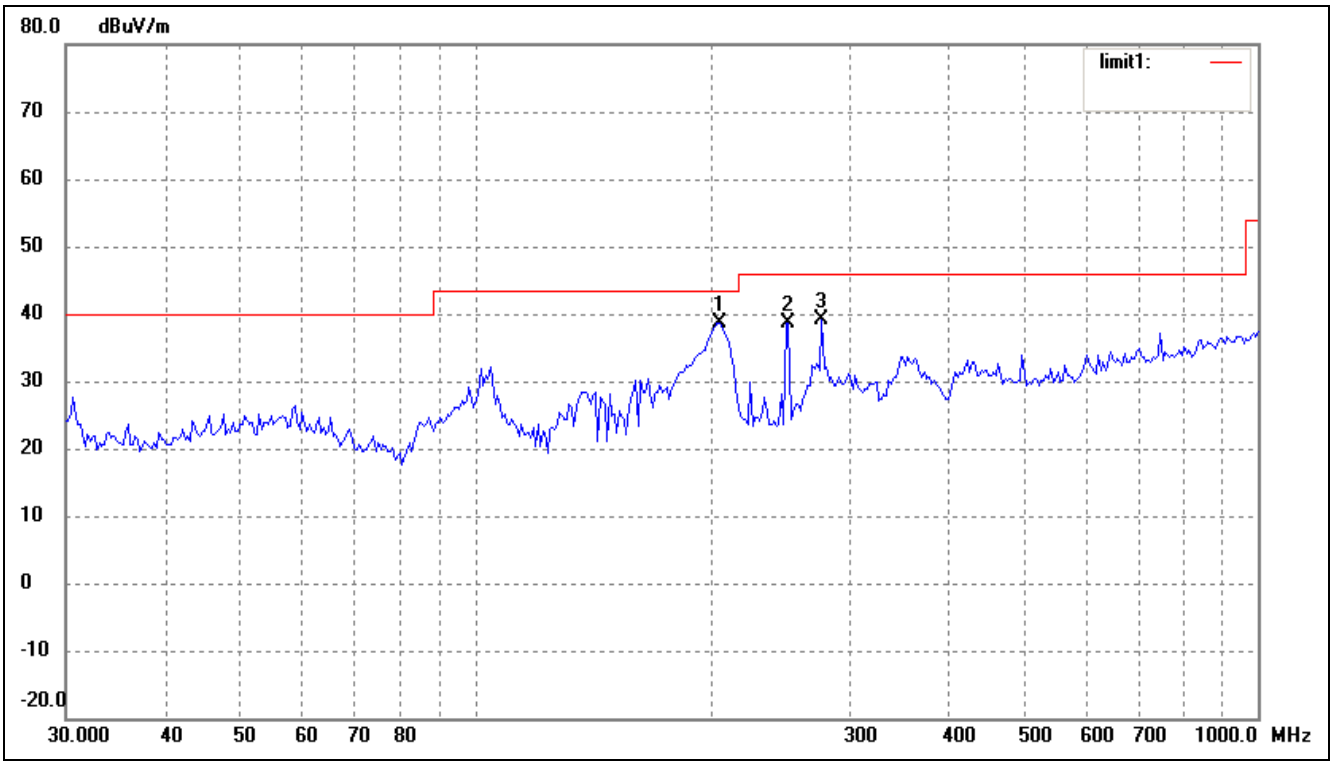
Test Result/Plots:

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g)

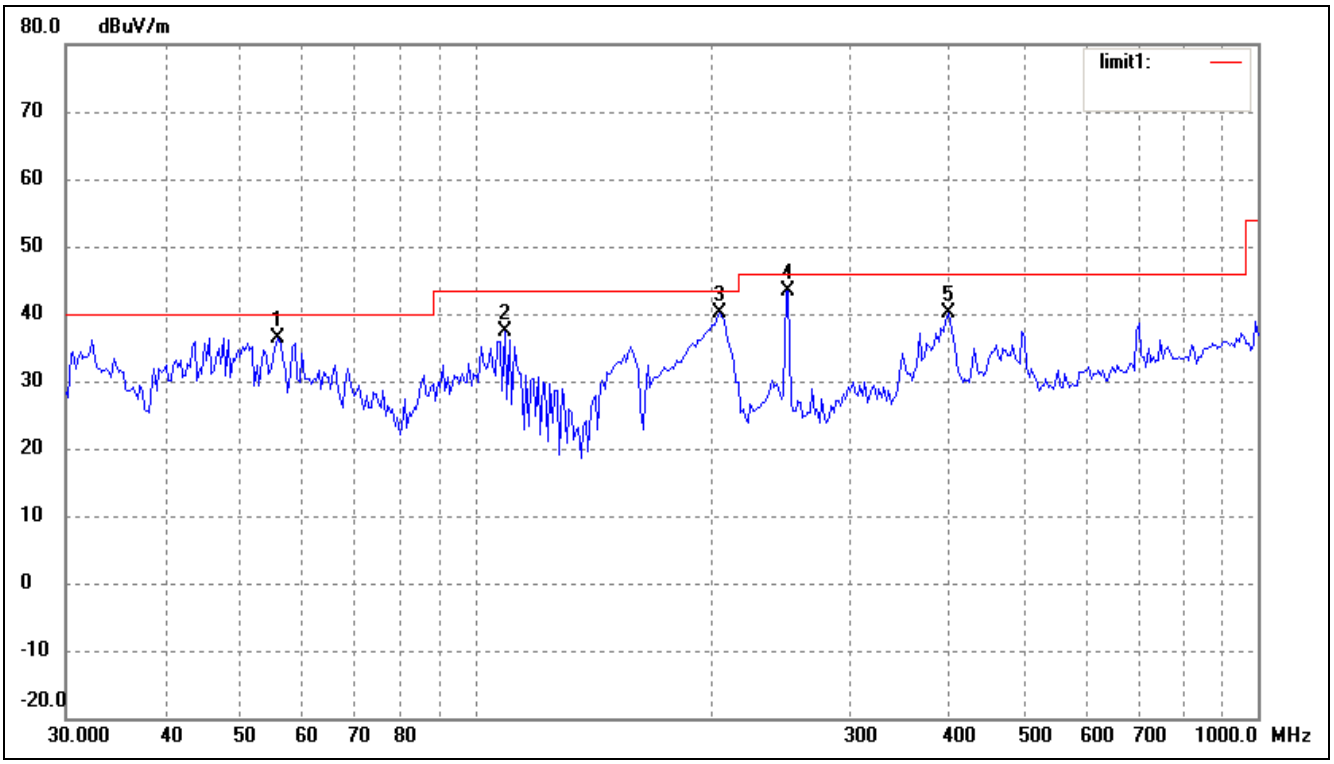
Comment: Low Channel

Horizontal



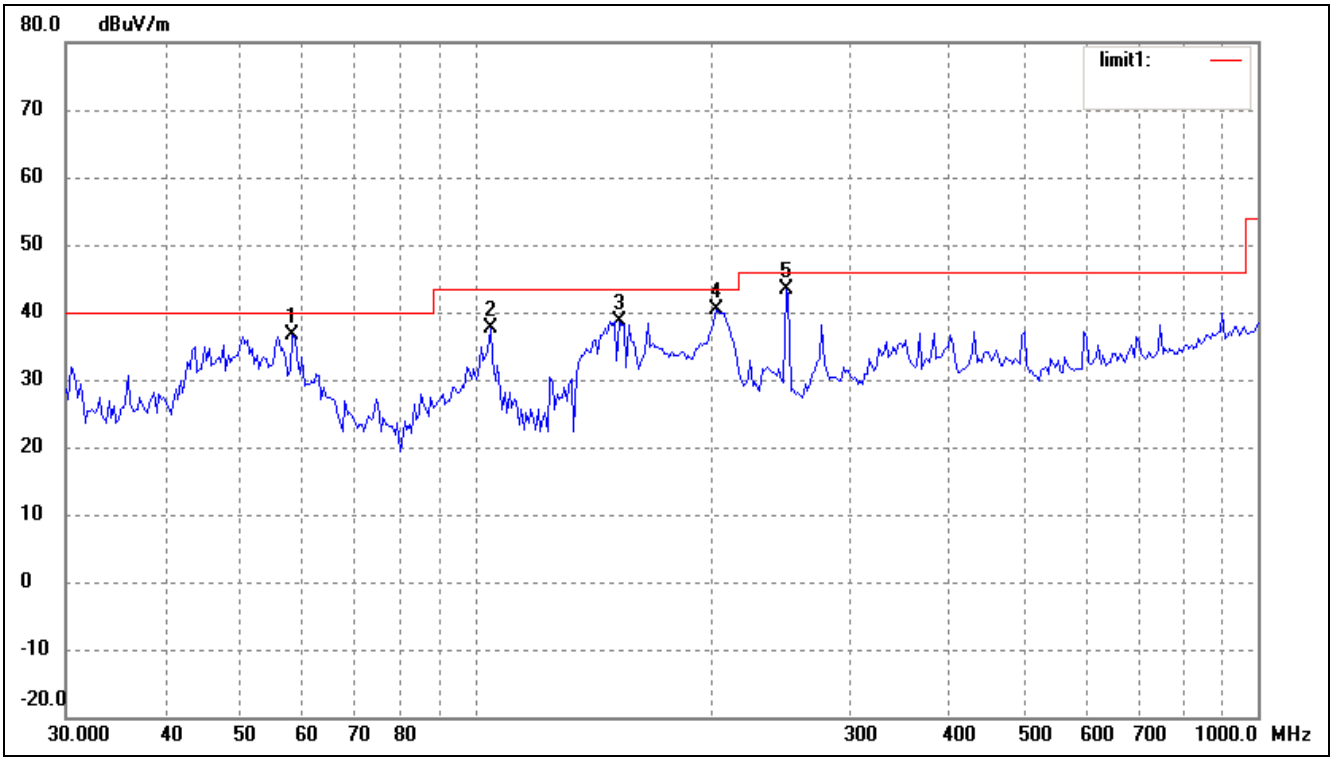
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	204.9551	31.61	7.08	38.69	43.50	-4.81	138	100	QP
2	251.1804	29.68	8.90	38.58	46.00	-7.42	229	108	peak
3	277.0935	29.26	9.86	39.12	46.00	-6.88	41	110	peak

Vertical



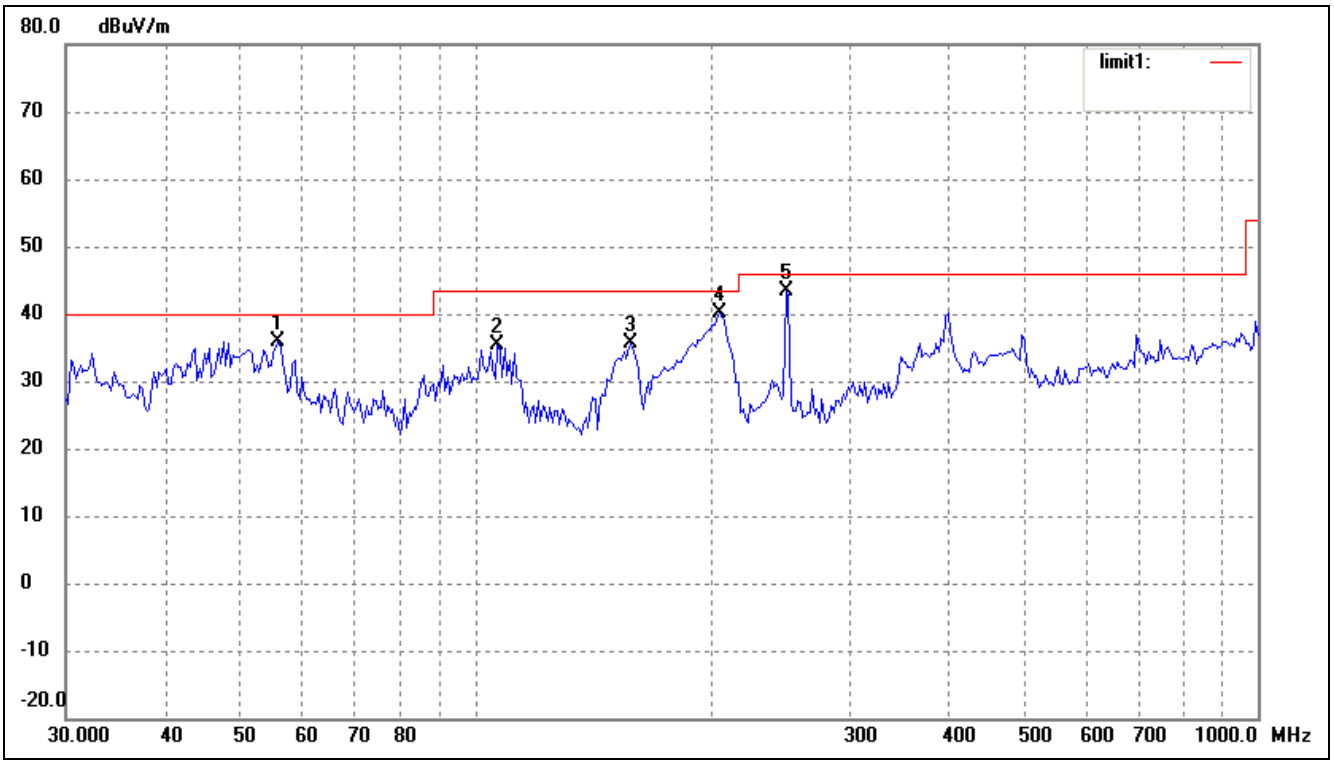
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	56.0007	28.75	7.73	36.48	40.00	-3.52	52	100	QP
2	109.0286	29.65	7.68	37.33	43.50	-6.17	335	100	peak
3	204.9551	32.99	7.08	40.07	43.50	-3.43	319	118	QP
4	251.1804	34.41	8.90	43.31	46.00	-2.69	196	116	QP
5	401.8385	28.08	12.06	40.14	46.00	-5.86	227	106	QP

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



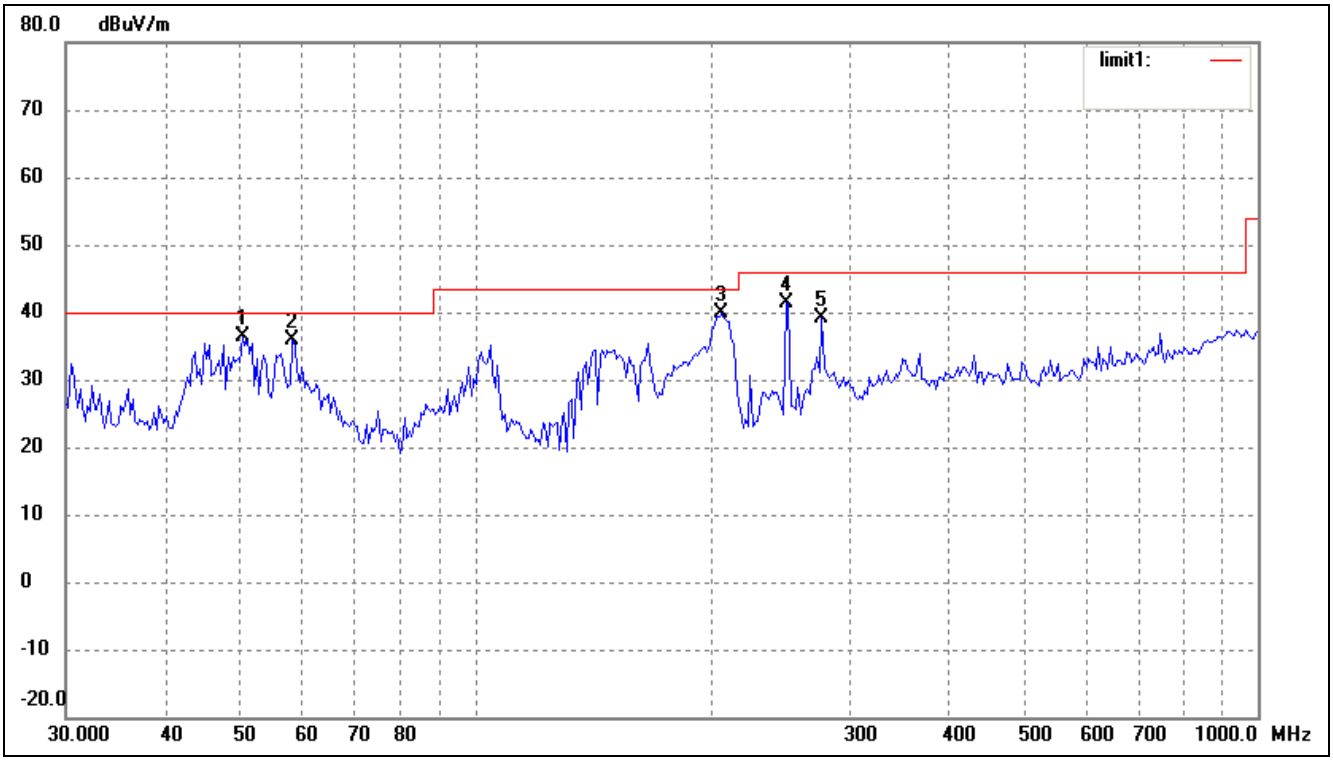
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	58.4074	28.95	7.60	36.55	40.00	-3.45	63	100	QP
2	104.5361	29.62	8.04	37.66	43.50	-5.84	81	142	QP
3	152.6641	34.52	4.20	38.72	43.50	-4.78	123	36	QP
4	203.5228	33.30	7.03	40.33	43.50	-3.17	92	342	QP
5	249.4250	34.60	8.89	43.49	46.00	-2.51	41	76	QP

Vertical



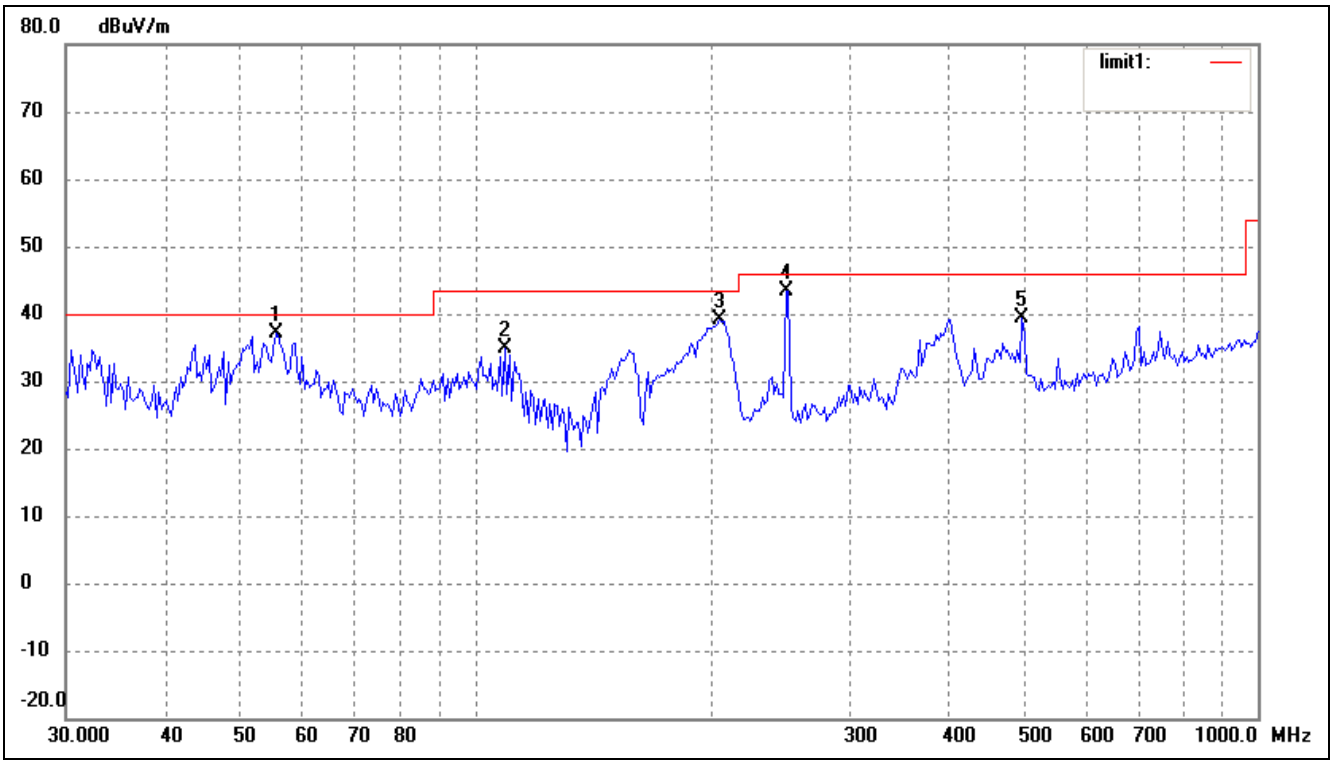
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	56.0007	28.25	7.73	35.98	40.00	-4.02	52	113	QP
2	106.7587	27.42	7.86	35.28	43.50	-8.22	102	100	peak
3	158.1123	31.11	4.45	35.56	43.50	-7.94	331	100	peak
4	204.9551	32.99	7.08	40.07	43.50	-3.43	89	122	QP
5	249.4250	34.40	8.89	43.29	46.00	-2.71	192	109	QP

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



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	50.4089	28.34	7.95	36.29	40.00	-3.71	62	116	QP
2	58.4074	28.34	7.60	35.94	40.00	-4.06	94	108	QP
3	206.3976	32.64	7.14	39.78	43.50	-3.72	26	100	QP
4	249.4250	32.61	8.89	41.50	46.00	-4.50	45	123	QP
5	277.0935	29.24	9.86	39.10	46.00	-6.90	179	100	peak

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	55.6094	29.40	7.74	37.14	40.00	-2.86	142	100	QP
2	109.0286	27.12	7.68	34.80	43.50	-8.70	72	200	peak
3	204.9551	32.07	7.08	39.15	43.50	-4.35	90	110	QP
4	249.4250	34.55	8.89	43.44	46.00	-2.56	133	112	QP
5	499.4247	25.34	14.09	39.43	46.00	-6.57	67	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	AV	44.5	196	V	34.1	5.2	33.0	50.8	54	-3.2
4824.0	AV	43.4	96	H	34.1	5.2	33.0	49.7	54	-4.3
7236.0	AV	39.7	90	V	37.4	6.1	33.5	49.7	54	-4.3
7236.0	AV	37.7	54	H	37.4	6.1	33.5	47.7	54	-6.3
4824.0	PK	55.2	190	V	34.1	5.2	33.0	61.5	74	-12.5
7236.0	PK	50.1	234	V	37.4	6.1	33.5	60.1	74	-13.9
4824.0	PK	50.9	261	H	34.1	5.2	33.0	57.2	74	-16.8
7236.0	PK	45.7	180	H	37.4	6.1	33.5	55.7	74	-18.3
Middle Channel (1G to 25GHz)										
4874.0	AV	45.3	90	V	34.1	5.2	33.0	51.6	54	-2.4
7311.0	AV	40.7	270	V	37.4	6.1	33.5	50.7	54	-3.3
4874.0	AV	43.8	45	H	34.1	5.2	33.0	50.1	54	-3.9
7311.0	AV	39.0	60	H	37.4	6.1	33.5	49.0	54	-5.0
4874.0	PK	59.5	270	V	34.1	5.2	33.0	65.8	74	-8.2
7311.0	PK	54.7	45	V	37.4	6.1	33.5	64.7	74	-9.3
4874.0	PK	53.4	180	H	34.1	5.2	33.0	59.7	74	-14.3
7311.0	PK	45.3	45	H	37.4	6.1	33.5	55.3	74	-18.7
High Channel (1G to 25GHz)										
4924.0	AV	44.3	90	V	34.1	5.2	33.0	50.6	54	-3.4
7386.0	AV	38.6	270	V	37.4	6.1	33.5	48.6	54	-5.4
4924.0	AV	42.2	60	H	34.1	5.2	33.0	48.5	54	-5.5
7386.0	AV	35.9	60	H	37.4	6.1	33.5	45.9	54	-8.1
4924.0	PK	55.8	270	V	34.1	5.2	33.0	62.1	74	-11.9
7386.0	PK	52.1	45	V	37.4	6.1	33.5	62.1	74	-11.9
4924.0	PK	51.4	180	H	34.1	5.2	33.0	57.7	74	-16.3
7386.0	PK	43.6	45	H	37.4	6.1	33.5	53.6	74	-20.4

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	AV	44.0	334	V	34.1	5.2	33.0	50.3	54	-3.7
4824.0	AV	43.2	163	H	34.1	5.2	33.0	49.5	54	-4.5
7236.0	AV	38.8	174	V	37.4	6.1	33.5	48.8	54	-5.2
7236.0	AV	36.2	45	H	37.4	6.1	33.5	46.2	54	-7.8
7236.0	PK	51.8	270	V	37.4	6.1	33.5	61.8	74	-12.2
4824.0	PK	54.8	153	V	34.1	5.2	33.0	61.1	74	-12.9
4824.0	PK	50.2	75	H	34.1	5.2	33.0	56.5	74	-17.5
7236.0	PK	45.5	52	H	37.4	6.1	33.5	55.5	74	-18.5
Middle Channel (1G to 25GHz)										
4874.0	AV	44.5	69	V	34.1	5.2	33.0	50.8	54	-3.2
4874.0	AV	42.7	153	H	34.1	5.2	33.0	49.0	54	-5.0
7311.0	AV	37.6	224	V	37.4	6.1	33.5	47.6	54	-6.4
7311.0	AV	35.8	158	H	37.4	6.1	33.5	45.8	54	-8.2
4874.0	PK	56.9	54	V	34.1	5.2	33.0	63.2	74	-10.8
7311.0	PK	52.1	85	V	37.4	6.1	33.5	62.1	74	-11.9
4874.0	PK	52.1	214	H	34.1	5.2	33.0	58.4	74	-15.6
7311.0	PK	42.6	154	H	37.4	6.1	33.5	52.6	74	-21.4
High Channel (1G to 25GHz)										
7386.0	AV	40.4	270	V	37.4	6.1	33.5	50.4	54	-3.6
7386.0	AV	40.3	254	H	37.4	6.1	33.5	50.3	54	-3.7
4924.0	AV	43.7	84	V	34.1	5.2	33.0	50.0	54	-4.0
4924.0	AV	42.3	134	H	34.1	5.2	33.0	48.6	54	-5.4
4924.0	PK	55.6	196	V	34.1	5.2	33.0	61.9	74	-12.1
7386.0	PK	50.7	112	V	37.4	6.1	33.5	60.7	74	-13.3
4924.0	PK	52.5	115	H	34.1	5.2	33.0	58.8	74	-15.2
7386.0	PK	48.5	86	H	37.4	6.1	33.5	58.5	74	-15.5

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.

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

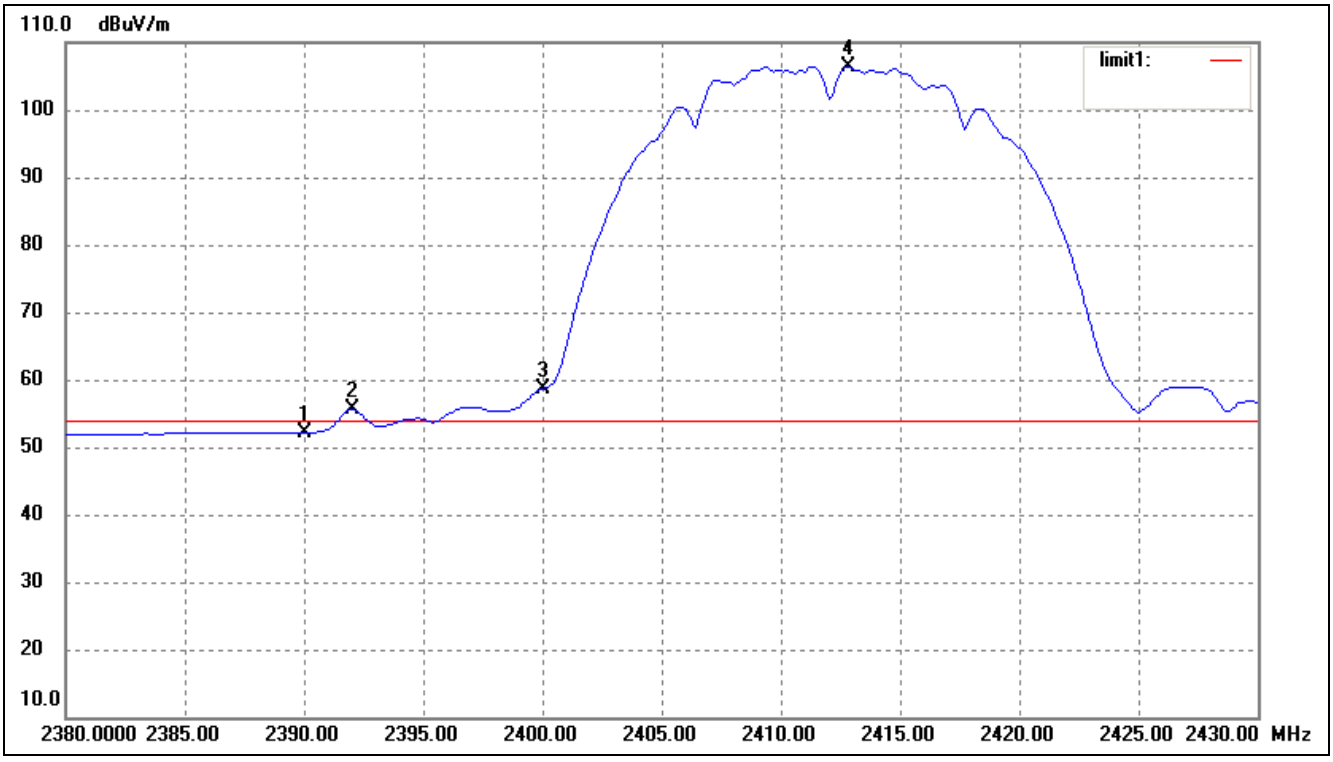
Temperature:	21° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

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
	2487.92	<54dBuv	Pass
802.11g	2390.00	<54dBuv	Pass
	2400.00	>20dB	Pass
	2483.50	<54dBuv	Pass

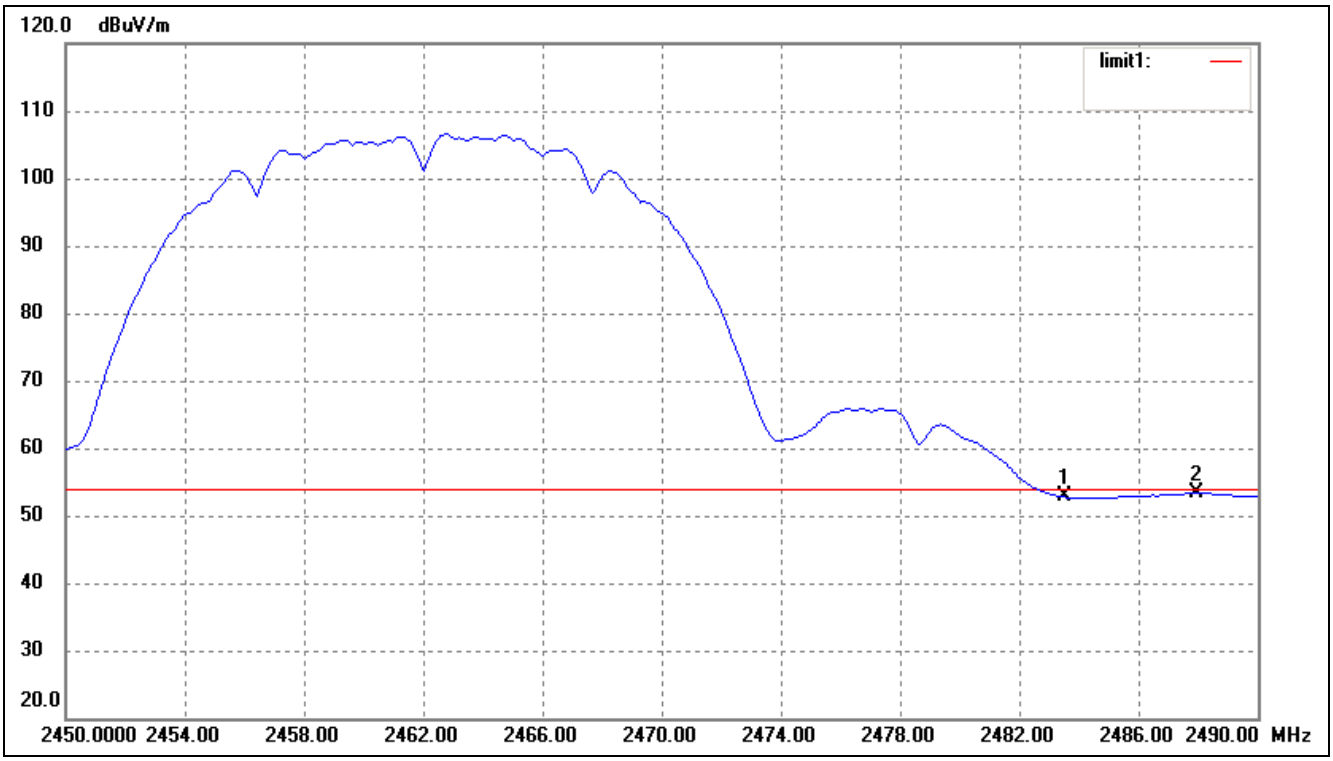
For 802.11b

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	12.39	39.71	52.10	54.00	-1.90	224	149	Ave
	2390.000	24.66	39.71	64.37	74.00	-9.63	332	100	peak
2	2392.000	15.92	39.72	55.64	/	/	159	126	Ave
3	2400.000	18.98	39.76	58.74	/	/	98	120	Ave
4	2412.800	66.58	39.82	106.40	/	/	321	150	Ave

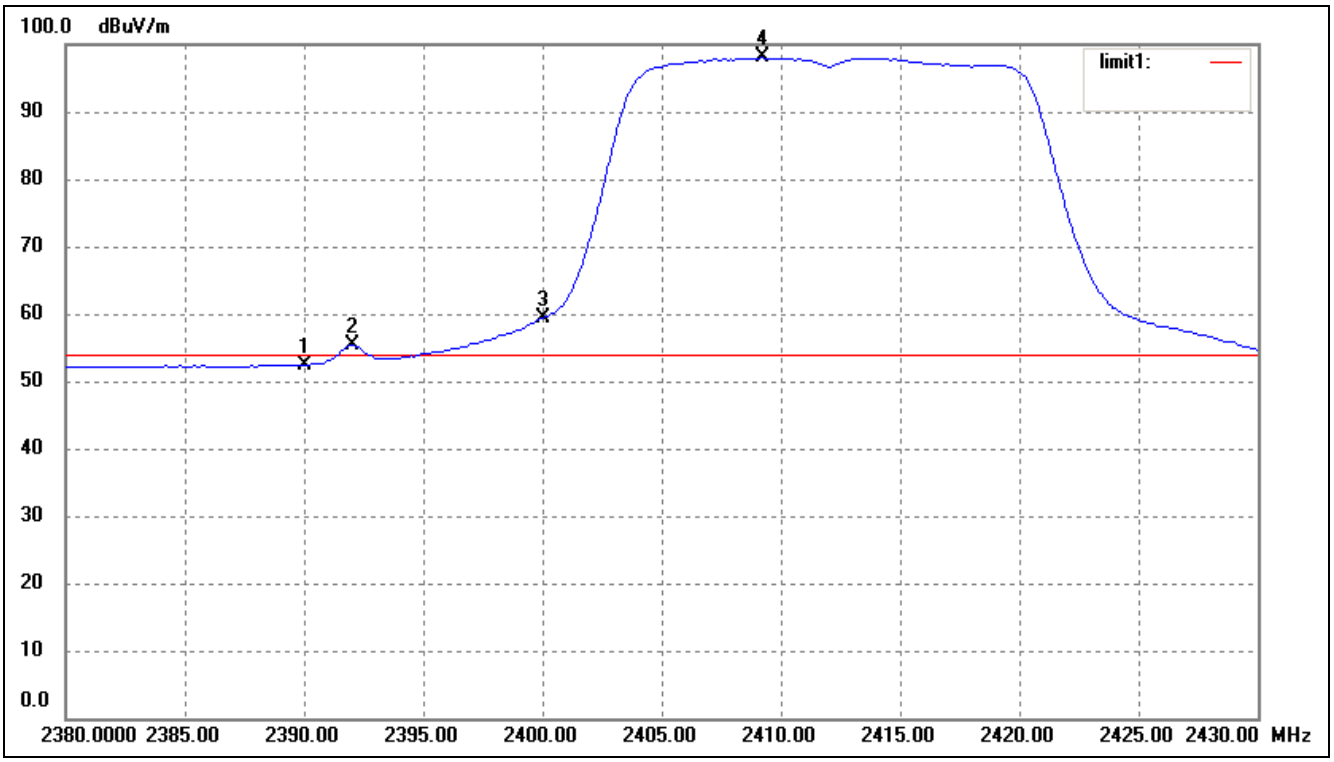
Highest Bandedge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	2483.500	12.61	40.18	52.79	54.00	-1.21	100	144	Ave
	2483.500	23.97	40.18	64.15	74.00	-9.85	100	336	peak
2	2487.920	13.18	40.21	53.39	54.00	-0.61	132	132	Ave
	2487.920	24.71	40.21	64.92	74.00	-9.08	100	21	peak

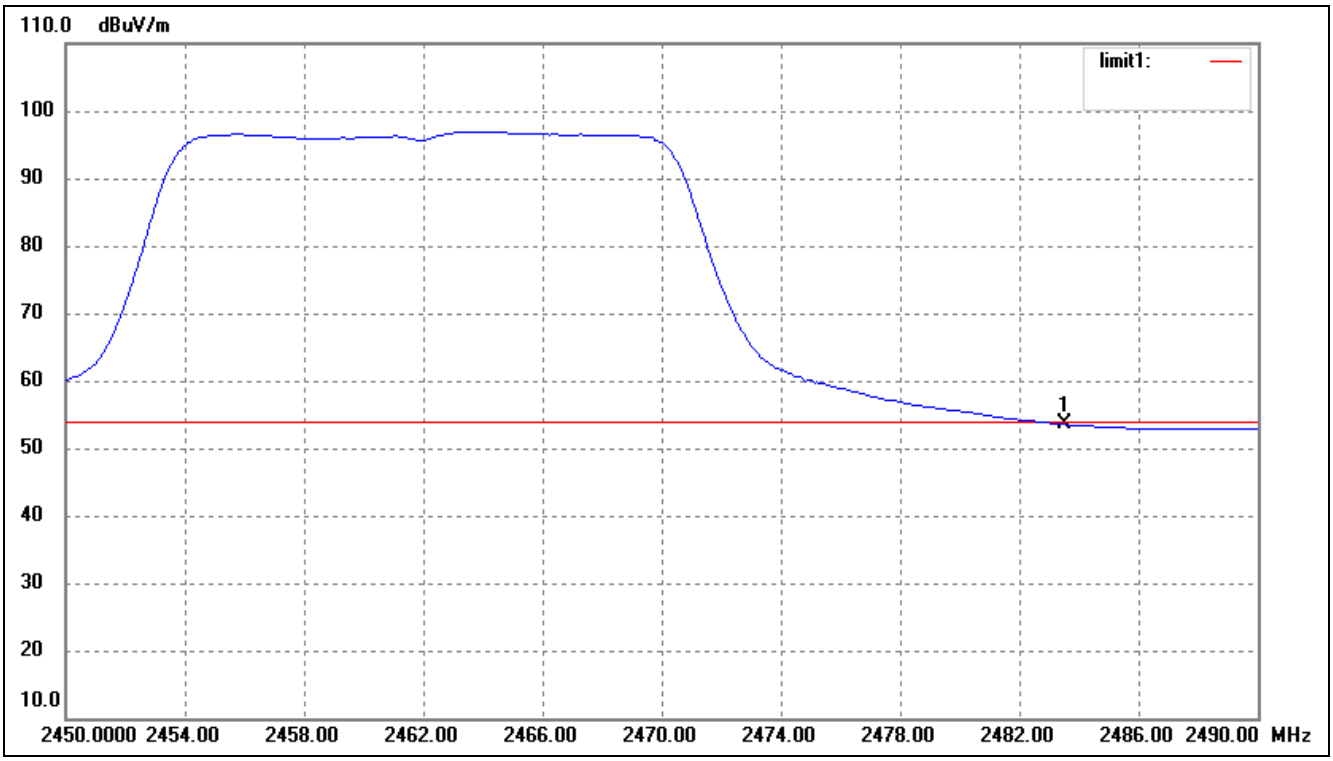
For 802.11g

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	12.74	39.71	52.45	54.00	-1.55	336	100	Ave
	2390.000	24.5	39.71	64.21	74.00	9.79	21	100	peak
2	2392.000	15.59	39.72	55.31	/	/	83	100	Ave
3	2400.000	19.68	39.76	59.44	/	/	222	100	Ave
4	2409.200	58.23	39.80	98.03	/	/	300	100	Ave

Highest Bandedge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	2483.500	13.35	40.18	53.53	54.00	-0.47	17	100	Ave
	2483.500	24.65	36.69	61.34	74.00	-12.66	31	100	peak