

FCC Part 15C

Measurement and Test Report

For

Matsunichi Communication Holdings R&D (Shenzhen) Co., Ltd

43B/F, Internal Chamber Of Commerce Tower, Fuhua RD3 CBD, Futian

District, Shenzhen, China

FCC ID: XAJT706

Report Concerns: Original Report	Equipment Type: PDA-PC
Model:	<u>T706</u>
Report No.:	<u>STR09058108I</u>
Test/Witness Engineer:	<i>Lahm peng</i>
Test Date:	<u>2009-05-26 to 2009-06-10</u>
Issue Date:	<u>2009-06-17</u>
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:	<i>Jandy So</i> <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.

TABLE OF CONTENTS

1. GENERAL INFORMATION.....	4
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	4
1.2 TEST STANDARDS.....	4
1.3 RELATED SUBMITTAL(S)/GRANT(S)	4
1.4 TEST METHODOLOGY	5
1.5 TEST FACILITY	5
1.6 EUT EXERCISE SOFTWARE	5
1.7 ACCESSORIES EQUIPMENT LIST AND DETAILS	5
1.8 EUT CABLE LIST AND DETAILS	5
2. SUMMARY OF TEST RESULTS	6
3. CONDUCTED EMISSIONS	7
3.1 MEASUREMENT UNCERTAINTY	7
3.2 TEST EQUIPMENT LIST AND DETAILS	7
3.3 TEST PROCEDURE.....	7
3.4 BASIC TEST SETUP BLOCK DIAGRAM.....	7
3.5 ENVIRONMENTAL CONDITIONS	8
3.6 SUMMARY OF TEST RESULTS/PLOTS	8
3.7 CONDUCTED EMISSIONS TEST DATA.....	8
4. §15.203 - ANTENNA REQUIREMENT.....	11
4.1 STANDARD APPLICABLE.....	11
4.2 TEST RESULT.....	11
5. MAXIMUM PERMISSIBLE EXPOSURE (MPE)	12
5.1 STANDARD APPLICABLE.....	12
5.2 MPE CALCULATION METHOD.....	12
5.3 MPE CALCULATION RESULT.....	13
6. POWER SPECTRAL DENSITY	14
6.1 STANDARD APPLICABLE.....	14
6.2 TEST EQUIPMENT LIST AND DETAILS	14
6.3 TEST PROCEDURE.....	14
6.4 ENVIRONMENTAL CONDITIONS	14
6.5 SUMMARY OF TEST RESULTS/PLOTS	15
7. 6-DB BANDWIDTH.....	19
7.1 STANDARD APPLICABLE.....	19
7.2 TEST EQUIPMENT LIST AND DETAILS	19
7.3 TEST PROCEDURE.....	19
7.4 ENVIRONMENTAL CONDITIONS	19
7.5 SUMMARY OF TEST RESULTS/PLOTS	19
8. POWER OUTPUT.....	23
8.1 STANDARD APPLICABLE.....	23
8.2 TEST EQUIPMENT LIST AND DETAILS	23
8.3 TEST PROCEDURE.....	23
8.4 ENVIRONMENTAL CONDITIONS	23
8.5 SUMMARY OF TEST RESULTS/PLOTS	23
9. FIELD STRENGTH OF SPURIOUS EMISSIONS	27
9.1 MEASUREMENT UNCERTAINTY	27
9.2 STANDARD APPLICABLE.....	27
9.3 TEST EQUIPMENT LIST AND DETAILS	27
9.4 TEST PROCEDURE.....	27
9.5 CORRECTED AMPLITUDE & MARGIN CALCULATION.....	28
9.6 ENVIRONMENTAL CONDITIONS	28
9.7 SUMMARY OF TEST RESULTS/PLOTS	28
10. OUT OF BAND EMISSIONS.....	43
10.1 STANDARD APPLICABLE.....	43
10.2 TEST EQUIPMENT LIST AND DETAILS	43

10.3 TEST PROCEDURE.....43

10.4 ENVIRONMENTAL CONDITIONS43

10.5 SUMMARY OF TEST RESULTS/PLOTS44

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Matsunichi Communication Holdings R&D (Shenzhen) Co., Ltd.

Address of applicant: 43B/F, Internal Chamber Of Commerce Tower, Fuhua RD3 CBD, Futian District, Shenzhen, China

Manufacturer: Guangzhou Singulargold Electronics Co., Ltd.

Address of manufacturer: No.6, Lianhua Yan Road, Science City, Guangzhou Hi-Tech Industrial Development Zone, Guangzhou, China

General Description of E.U.T

Items	Description
EUT Description:	PDA-PC
Trade Name:	O-Digital
Model No.:	T706, PC706
Rated Voltage:	DC 7.4V Battery with 9V adapter
Max. Output Power	25mW
Frequency range:	2412MHz~2462MHz
Number of channels:	11
Channel Separation:	5MHz
Type of Antenna:	Integral Antenna
Size:	21.6x15.0x2.7 cm

Note: The test data gathered are from a production sample provided by the manufacturer. The other model listed in the report has different appearance only of T706 without circuit and electronic construction changed, declared by the manufacturer

1.2 Test Standards

The following report is prepared on behalf of the Matsunichi Communication Holdings R&D (Shenzhen) Co., Ltd. in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

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

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

1.3 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	Mouse	M-UAG120	810-000404
/	/	/	/

1.8 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
DC Power Cable	1.7	Unshielded	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 ± 0.5 dB.

3.2 Test Equipment List and Details

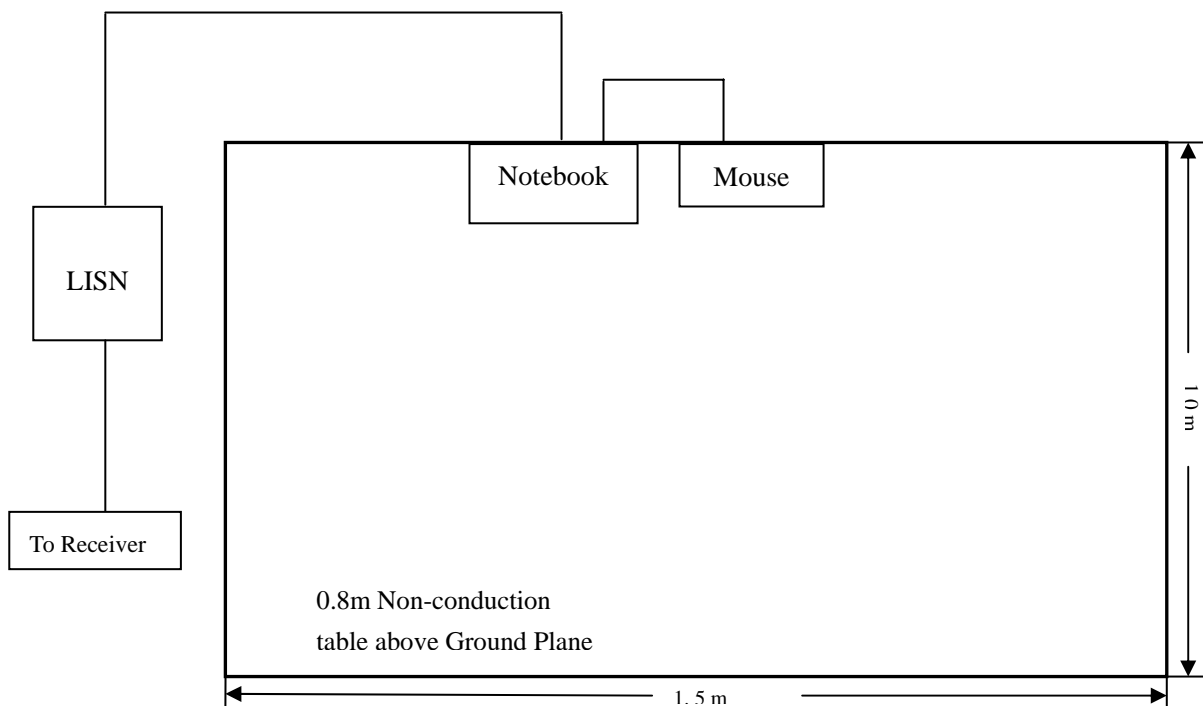
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2008-07-08	2009-07-07
Puls Limiter	Rohde & Schwarz	ESH3-Z2	100911	2008-07-08	2009-07-07
L.I.S.N.	SCHWARZBECK	NSLK8126	8126-224	2008-07-08	2009-07-07
L.I.S.N.	EMCO	3825/2	11967C	2008-07-08	2009-07-07

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:

-5.9 dB μ V at 0.450 MHz in the **Line** mode, **Ave** Detector, XSS Power Adaptor, 0.15-30MHz

3.7 Conducted Emissions Test Data

LINE CONDUCTED EMISSIONS				FCC 15.207	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dB μ V	QP/Ave/Pk	Line/Neutral	dB μ V	dB
0.450	41.01	Ave	Line	46.88	-5.9
0.450	50.73	Pk	Line	56.88	-6.1
2.206	49.43	Pk	Neutral	56	-6.6
2.302	48.96	Pk	Line	56	-7.0
0.310	42.69	Ave	Line	49.97	-7.3
1.210	48.60	Pk	Line	56	-7.4
0.802	48.55	Pk	Neutral	56	-7.5
2.302	38.19	Ave	Line	46	-7.8
1.210	37.97	Ave	Line	46	-8.0
1.790	47.79	Pk	Neutral	56	-8.2
0.310	50.17	Pk	Line	59.97	-9.8
0.306	49.62	Pk	Neutral	60.08	-10.5
6.330	38.52	Ave	Line	50	-11.5
4.246	34.40	Ave	Neutral	46	-11.6
0.306	37.93	Ave	Neutral	50.08	-12.1
0.522	33.56	Ave	Neutral	46	-12.4
1.774	33.64	Ave	Neutral	46	-12.4
5.258	47.48	Pk	Line	60	-12.5
5.370	46.15	Pk	Neutral	60	-13.9
5.302	33.98	Ave	Neutral	50	-16.0
12.446	31.98	Ave	Line	50	-18.0
12.446	41.81	Pk	Line	60	-18.2

Plot of Conducted Emissions Test Data

Conducted Disturbance

EUT: PDA-PC

M/N: T706

Operating Condition: Transmitting

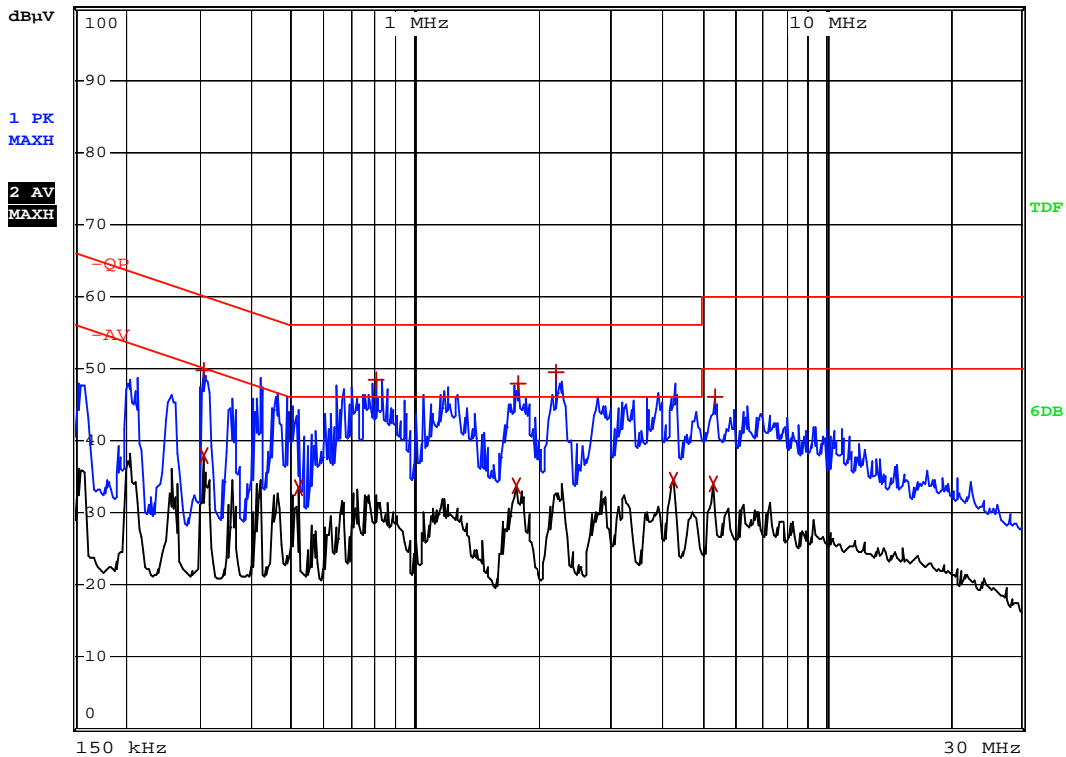
Test Specification: N

Comment: AC 120V/60Hz Adapter DC 9V



RBW 9 kHz
MT 5 ms

Att 10 dB AUTO



Date: 8.JUN.2009 11:19:51

Plot of Conducted Emissions Test Data

Conducted Disturbance

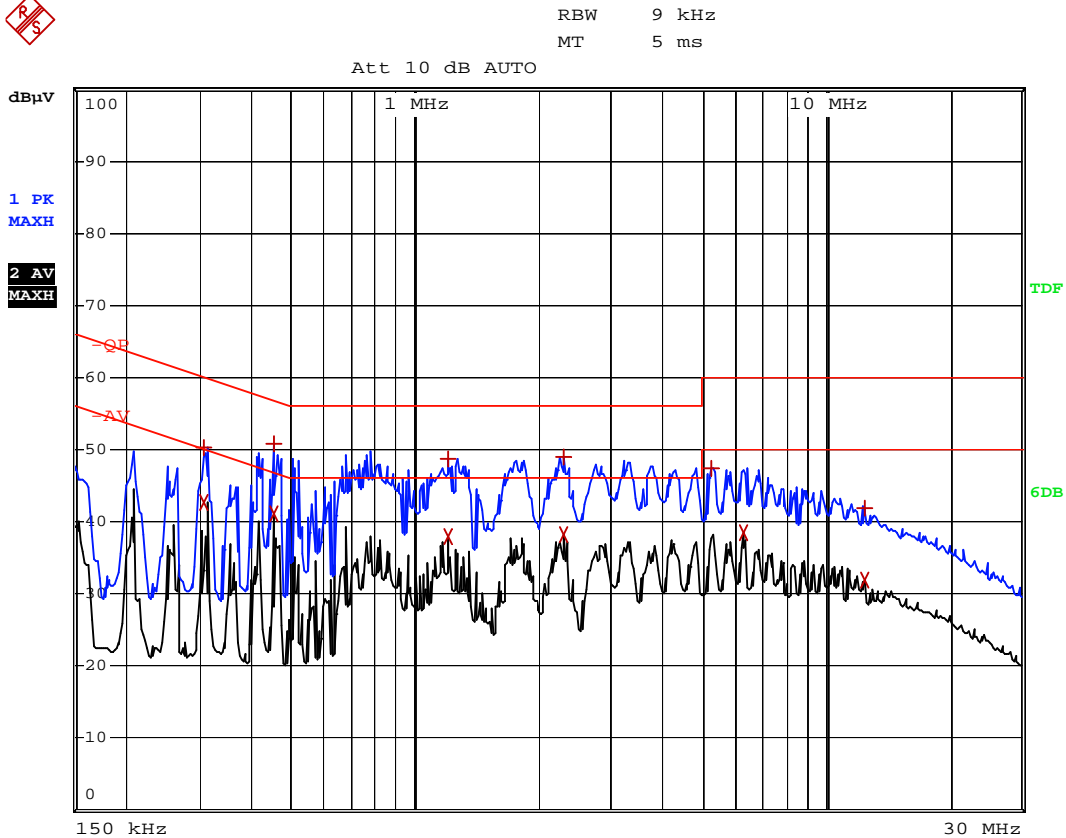
EUT: PDA-PC

M/N: T706

Operating Condition: Transmitting

Test Specification: L

Comment: AC 120V/60Hz Adapter DC 9V



Date: 8.JUN.2009 11:21:12

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 integral antenna, and the ceramic antenna was installed in the lower right corner of the main PCB, 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

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

S = power density (in appropriate units, e.g., mW/cm²)

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: 13.46(dBm)

Maximum peak output power at antenna input terminal: 22.182(mW)

Prediction distance: 2.5 (cm)

Prediction frequency: 2412 (MHz)

Antenna gain (typical): 0 (dBi)

Antenna gain (numeric): 1.0 (numeric)

The worst case is power density at prediction frequency at 20cm: 0.28243 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm²)

$0.28243 \text{ (mw/cm}^2\text{)} < 1 \text{ (mw/cm}^2\text{)}$

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	2008-07-08	2009-07-07
RF Limiter	Agilent	11867A	MY42241685	2008-07-08	2009-07-07
RMS/PEAK Voltmeter	Rohde & Schwarz	URE3	826135/008	2008-07-08	2009-07-07

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

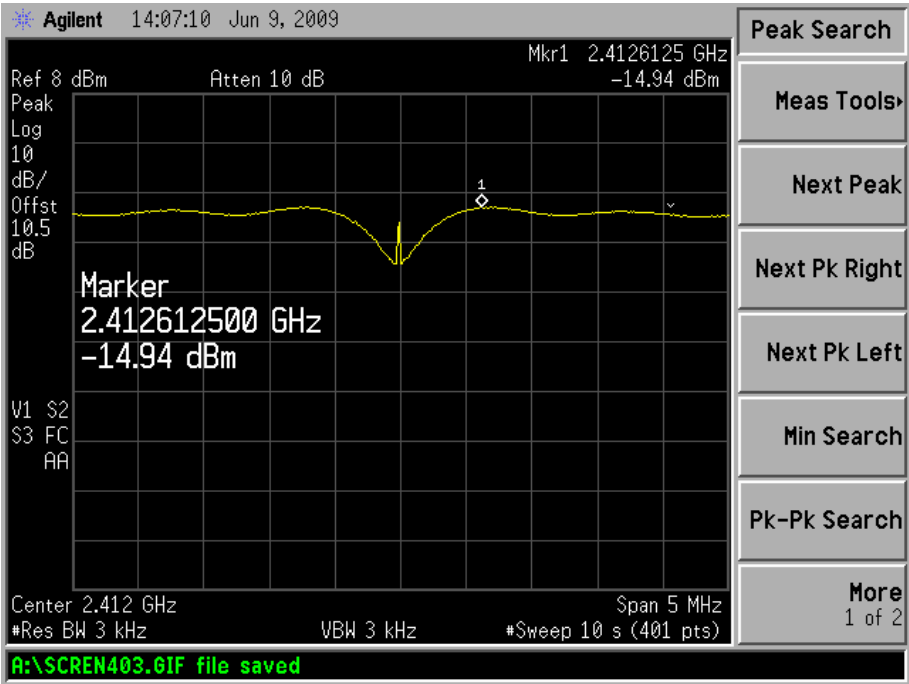
Temperature:	20° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

6.5 Summary of Test Results/Plots

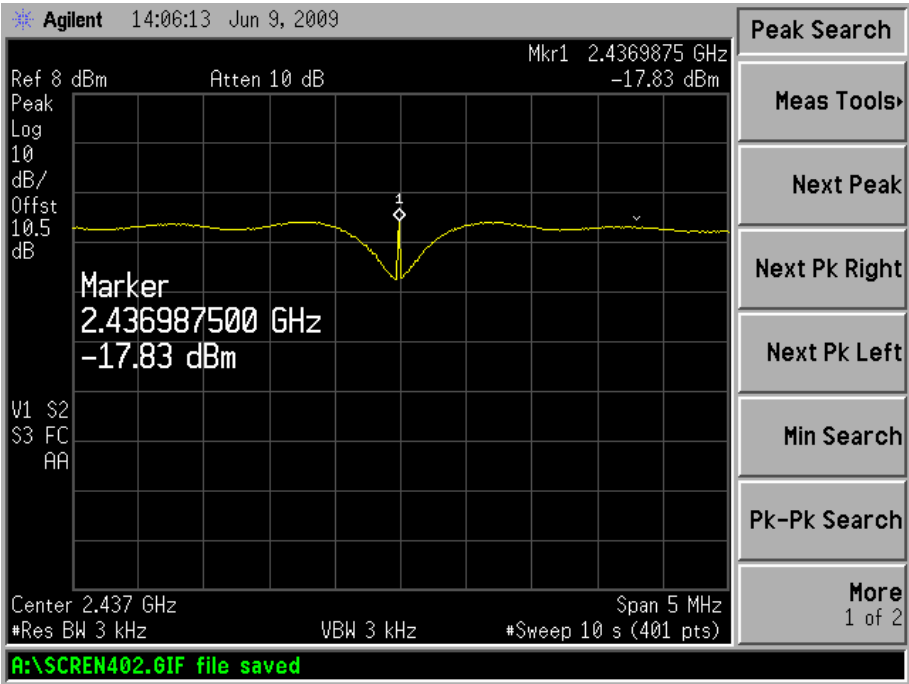
Test mode	Test channel	Reading dBm/3kHz	Limit dBm/3kHz
802.11b	Low channel (2412MHz)	-14.94	8
	Middle channel (2437MHz)	-17.83	8
	High channel (2462MHz)	-20.96	8
802.11g	Low channel (2412MHz)	-14.66	8
	Middle channel (2437MHz)	-16.33	8
	High channel (2462MHz)	-16.48	8

For 802.11b

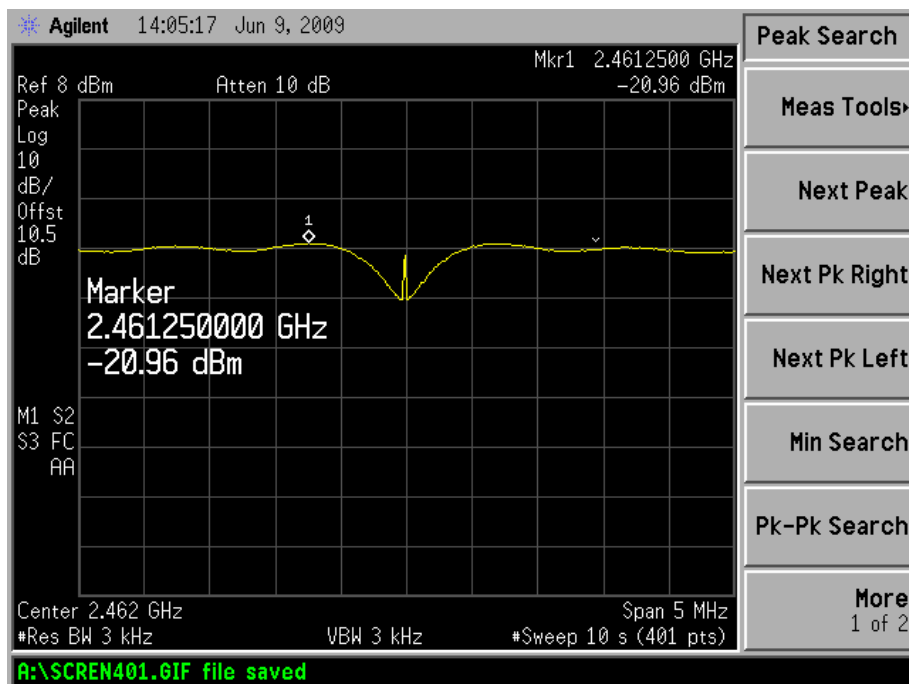
Low Channel:



Middle Channel:

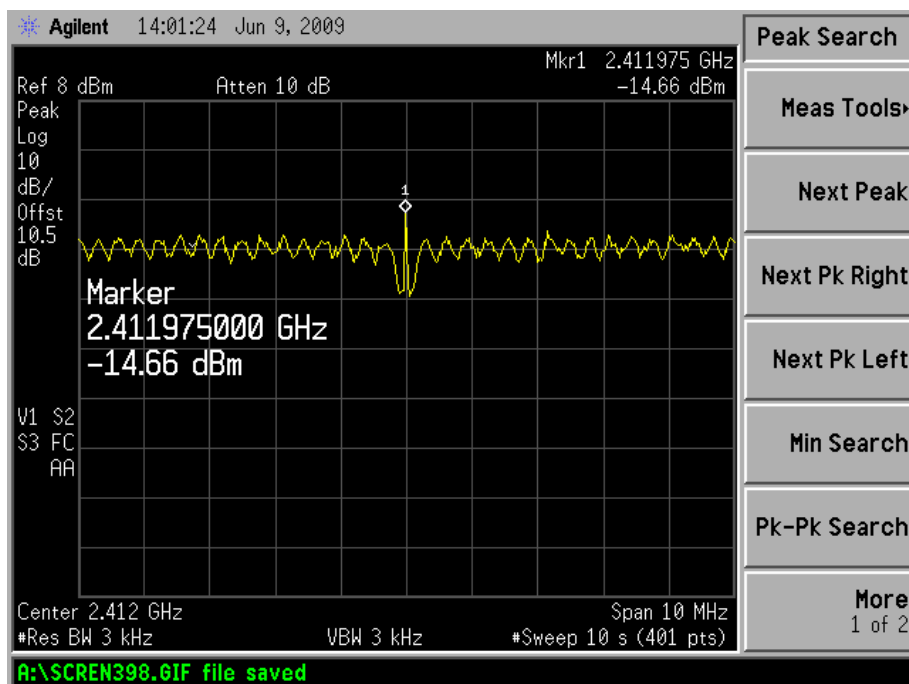


High Channel:

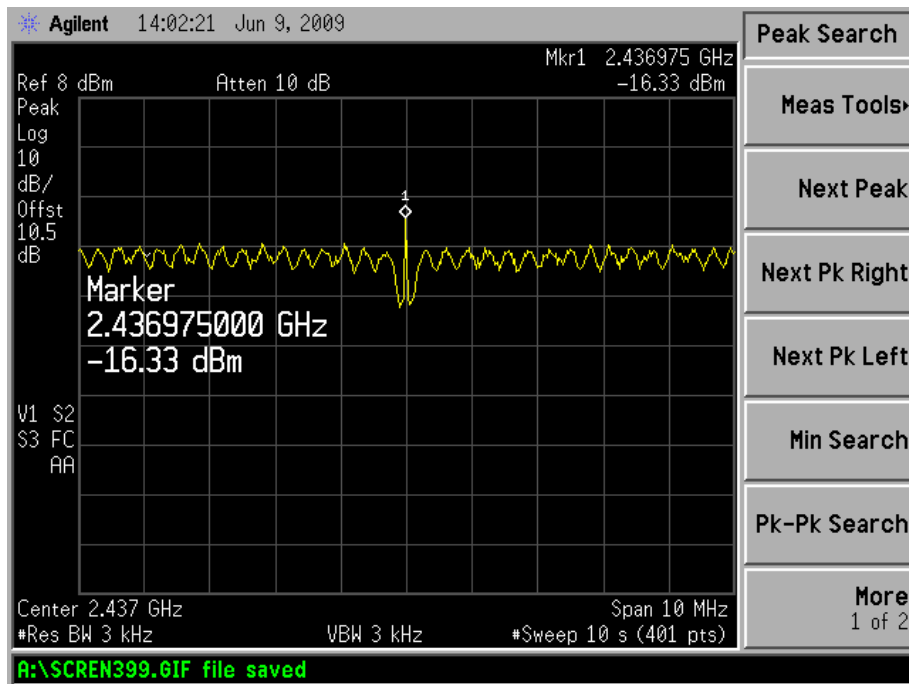


For 802.11g

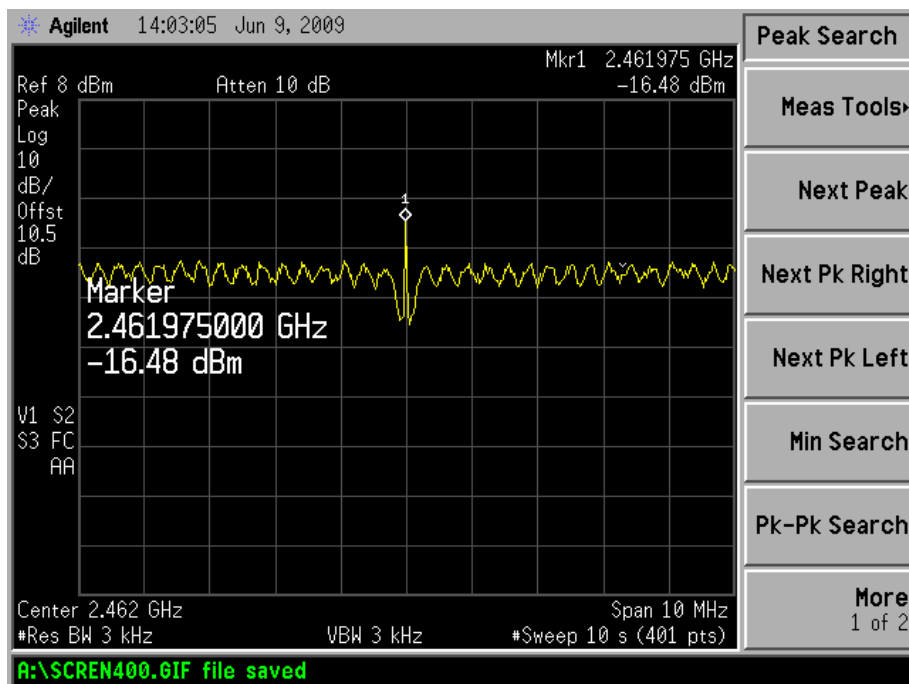
Low Channel:



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	2008-07-08	2009-07-07
RF Limiter	Agilent	11867A	MY42241685	2008-07-08	2009-07-07

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

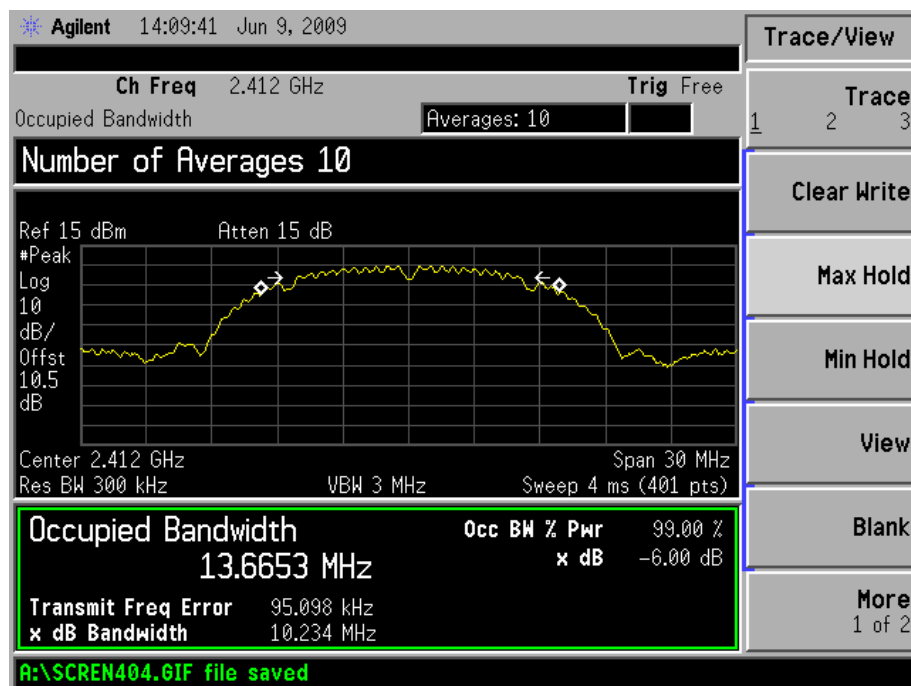
Temperature:	24° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

7.5 Summary of Test Results/Plots

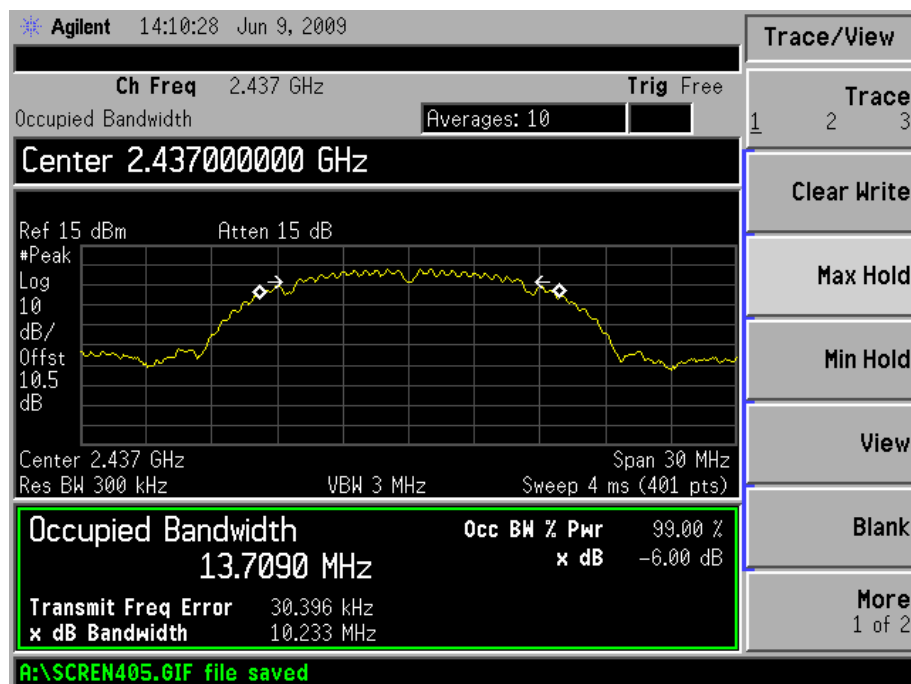
Test mode	Frequency MHz	6 dB Bandwidth kHz	Limit kHz
802.11b	2412	10234	500
	2437	10233	500
	2462	10246	500
802.11g	2412	16582	500
	2437	16532	500
	2462	16599	500

For 802.11b

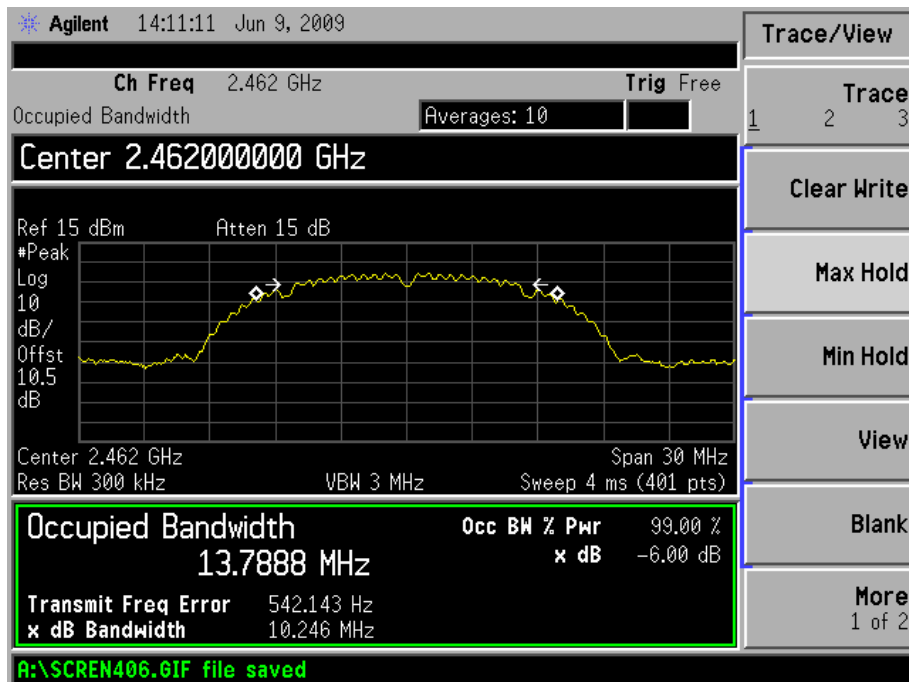
Low Channel:



Mid Channel:

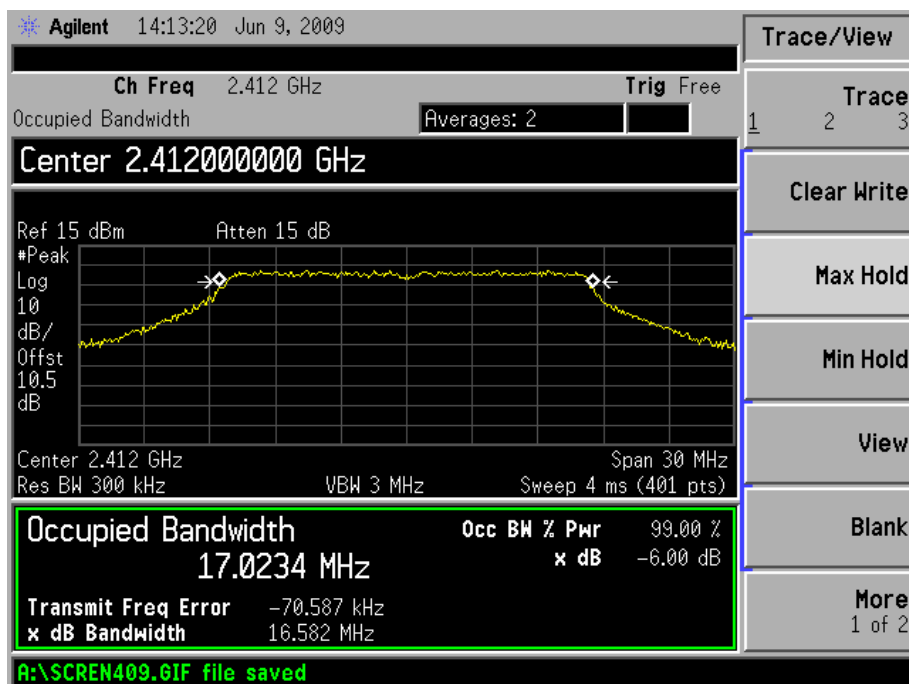


High Channel:

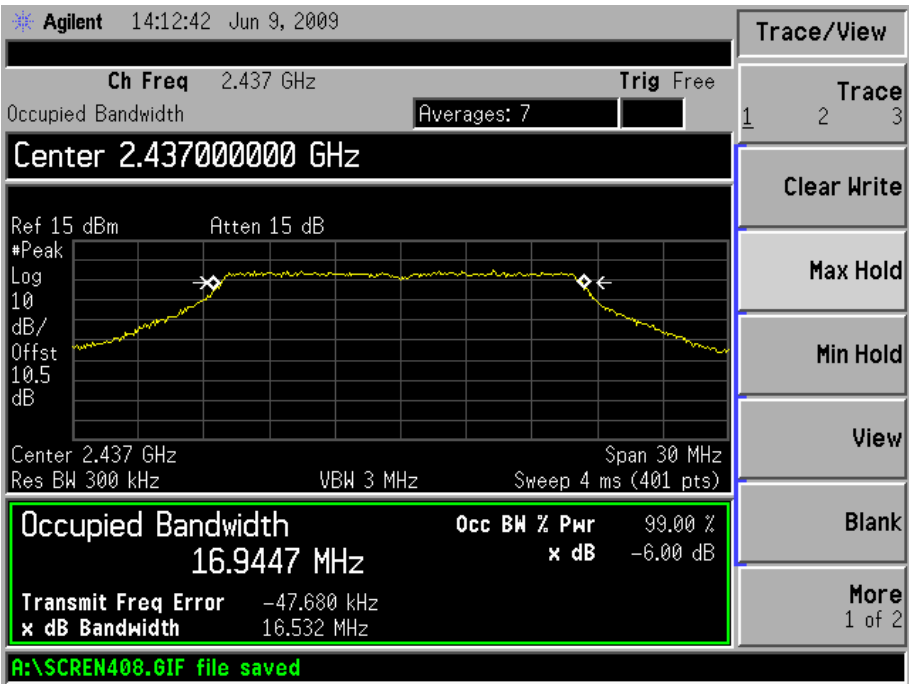


For 802.11g

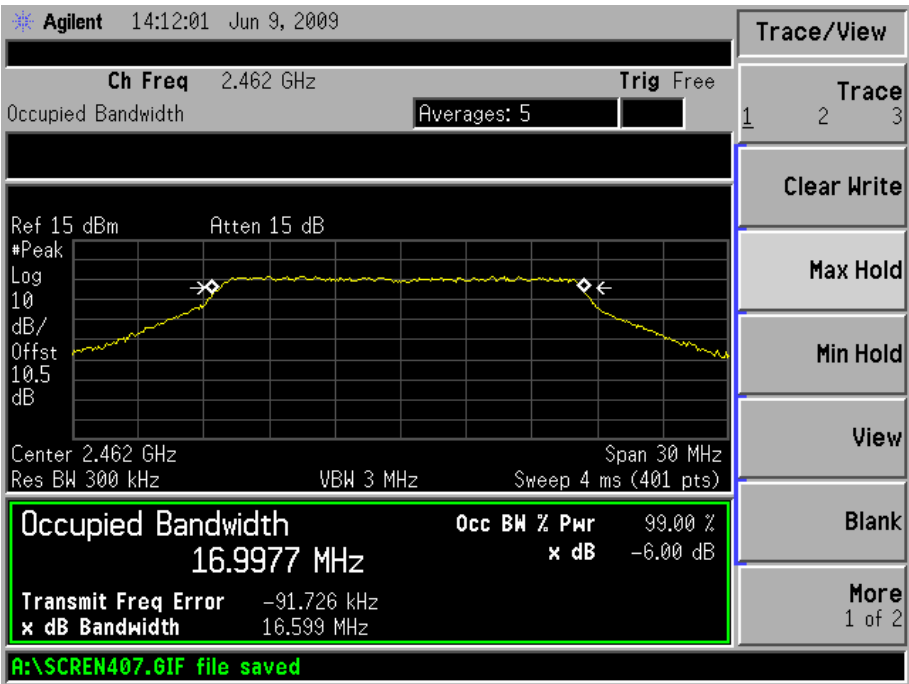
Low Channel:



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	2008-07-08	2009-07-07
RF Limiter	Agilent	11867A	MY42241685	2008-07-08	2009-07-07

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

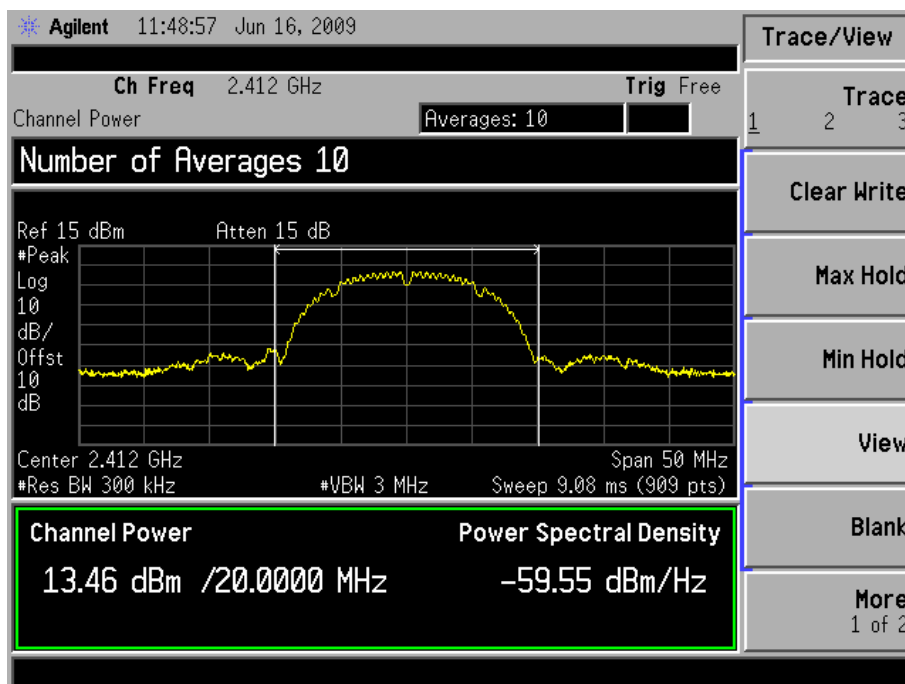
Temperature:	21° C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

8.5 Summary of Test Results/Plots

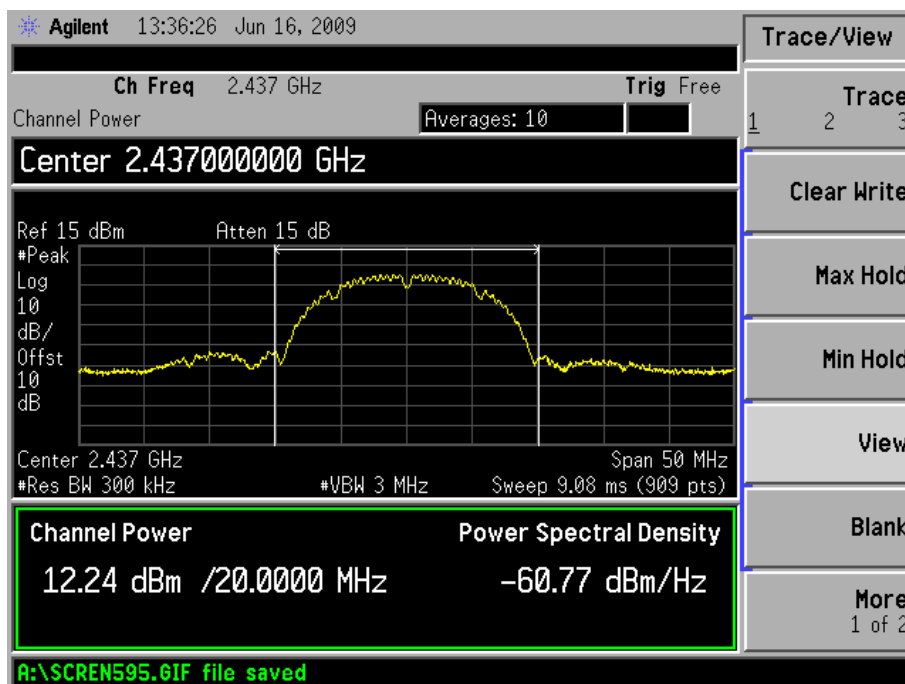
Test mode	Frequency MHz	Reading dBm	Output power W	Limit W
802.11b	2412	13.46	0.022182	1
	2437	12.24	0.016749	1
	2462	11.18	0.013122	1
802.11g	2412	13.22	0.020989	1
	2437	12.18	0.016520	1
	2462	9.76	0.009462	1

For 802.11b

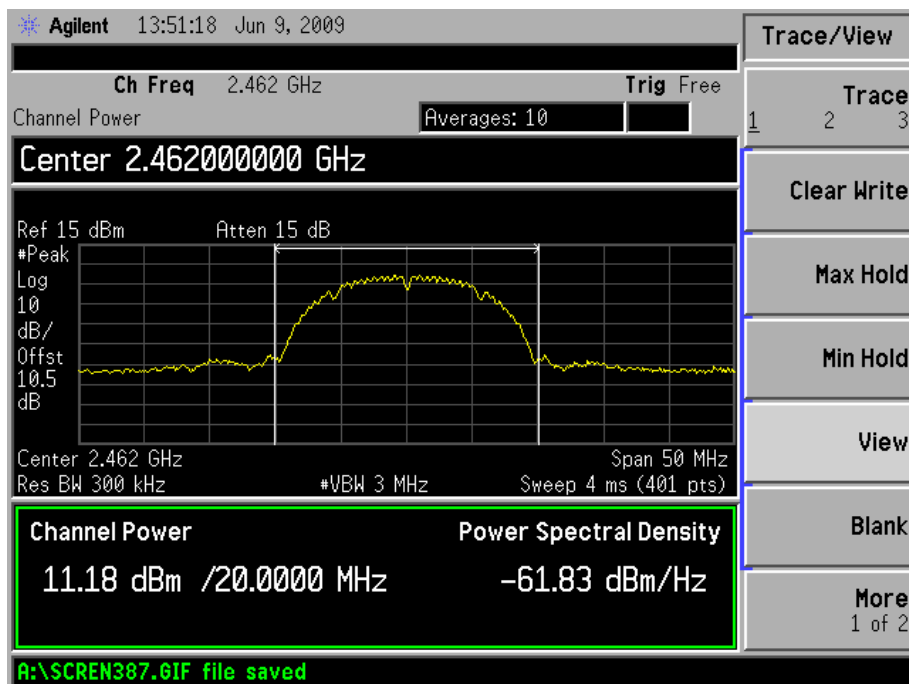
Low Channel:



Middle Channel:

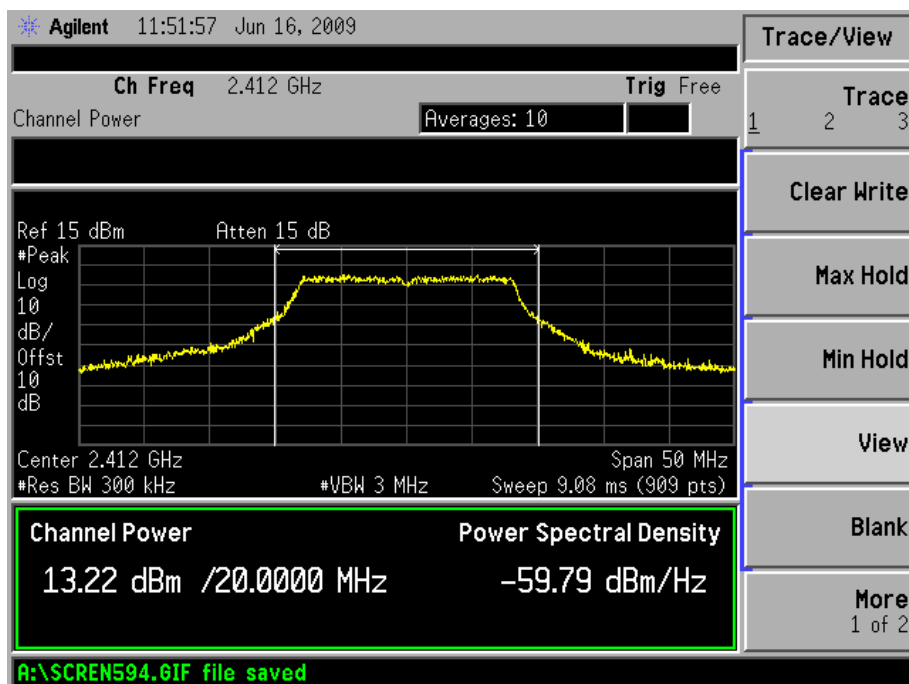


High Channel:

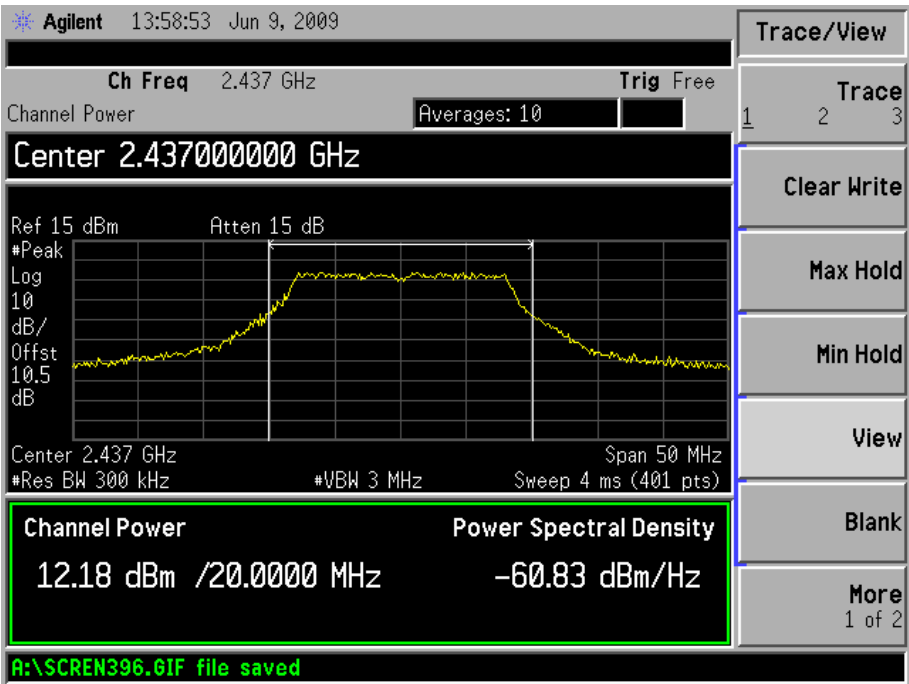


For 802.11g

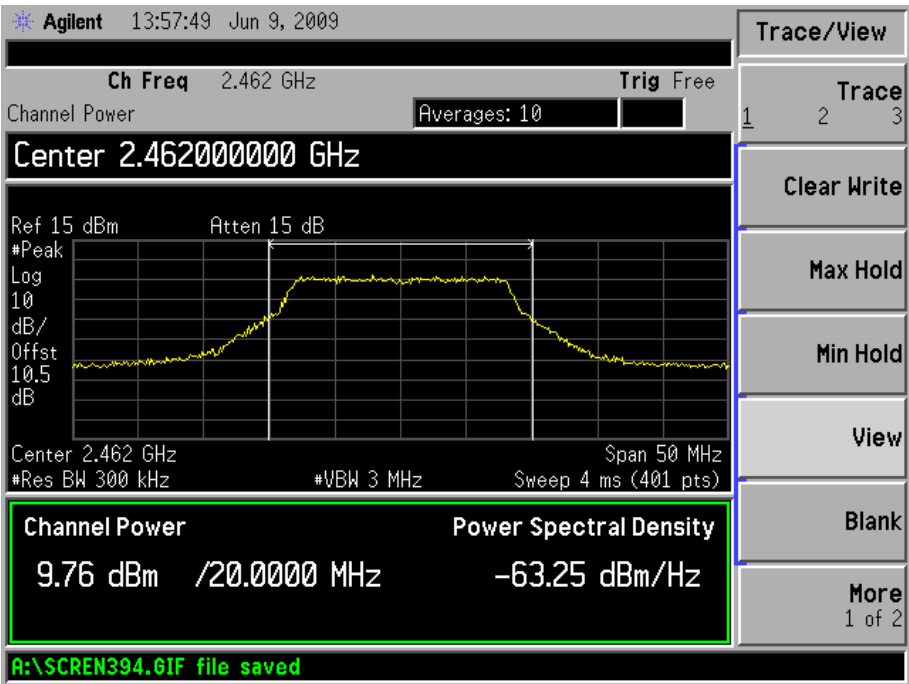
Low Channel:



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

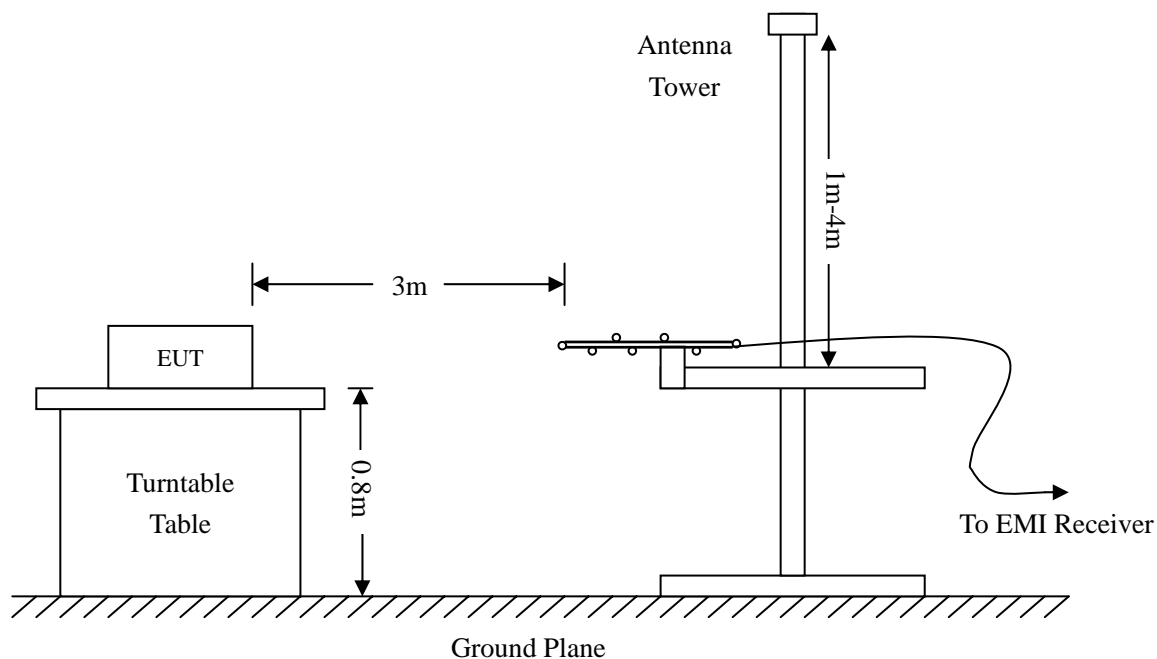
Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2008-07-08	2009-07-07
Positioning Controller	C&C	CC-C-1F	N/A	2008-07-08	2009-07-07
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2008-07-08	2009-07-07
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2008-07-08	2009-07-07
RF Switch	EM	EMSW18	SW060023	2008-07-08	2009-07-07
Amplifier	Agilent	8447F	3113A06717	2008-07-08	2009-07-07
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2008-07-08	2009-07-07
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	25498514	2008-07-08	2009-07-07

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.



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:

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

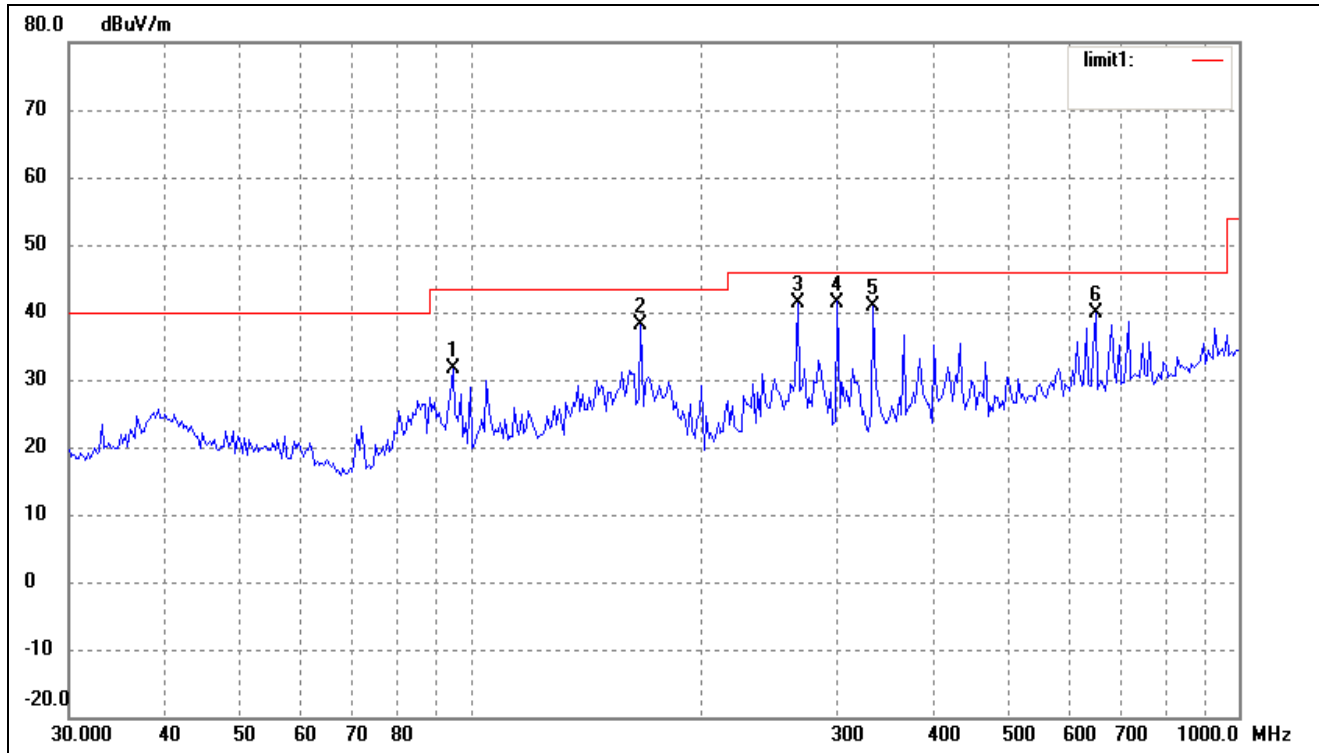
9.6 Environmental Conditions

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

9.7 Summary of Test Results/Plots

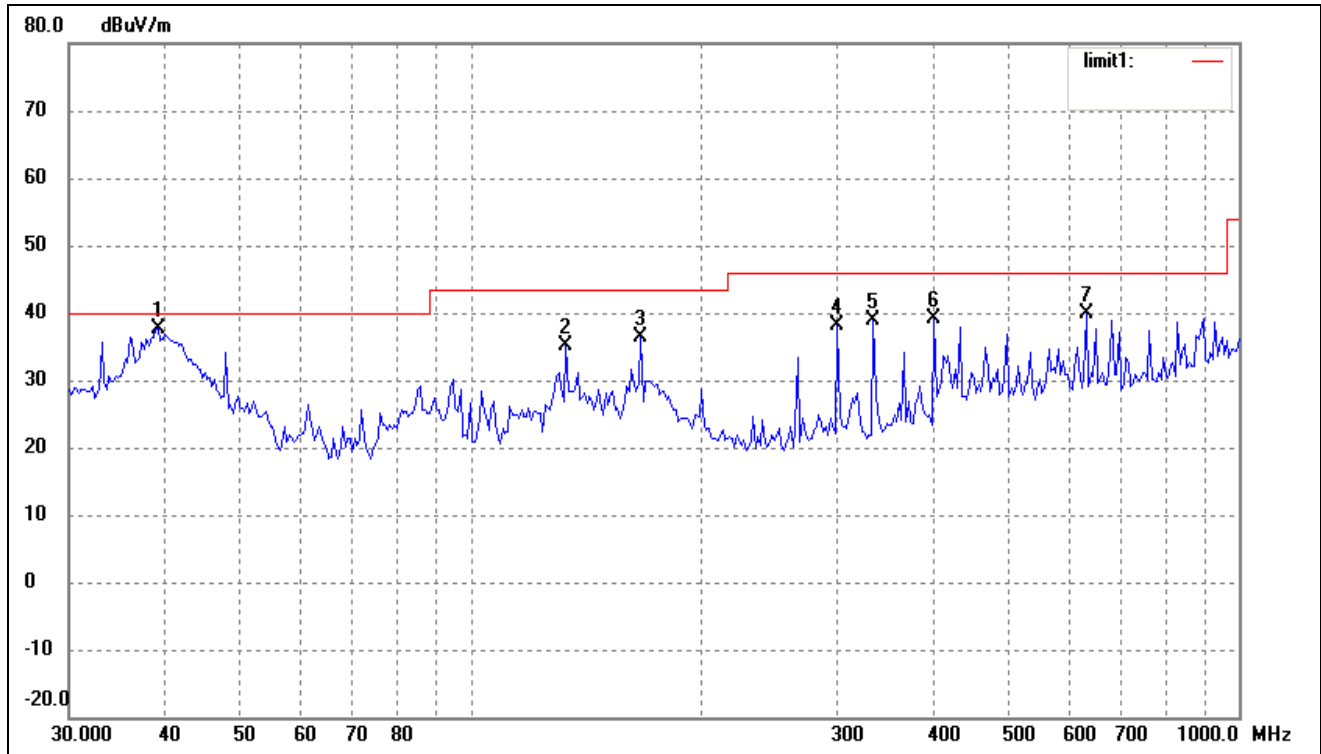
According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst margin of:

-2.03 dBμV at 46.7077 MHz in the Vertical polarization, High CH, 802.11g test mode with TX power adaptor, 30 MHz to 25 GHz, 3Meters

*Test Result/Plots:**Spurious Emission From 30 MHz to 1 GHz**Test mode: 11b-Low Channel**Horizontal*

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	94.9788	24.07	7.47	31.54	43.50	-11.96	360	100	peak
2	166.6385	34.26	3.95	38.21	43.50	-5.29	360	100	peak
3	266.8395	33.23	8.11	41.34	46.00	-4.66	360	100	peak
4	300.6988	32.84	8.66	41.50	46.00	-4.50	360	100	peak
5	334.1255	31.73	9.12	40.85	46.00	-5.15	360	100	peak
6	651.3831	24.40	15.37	39.77	46.00	-6.23	360	100	peak

Vertical

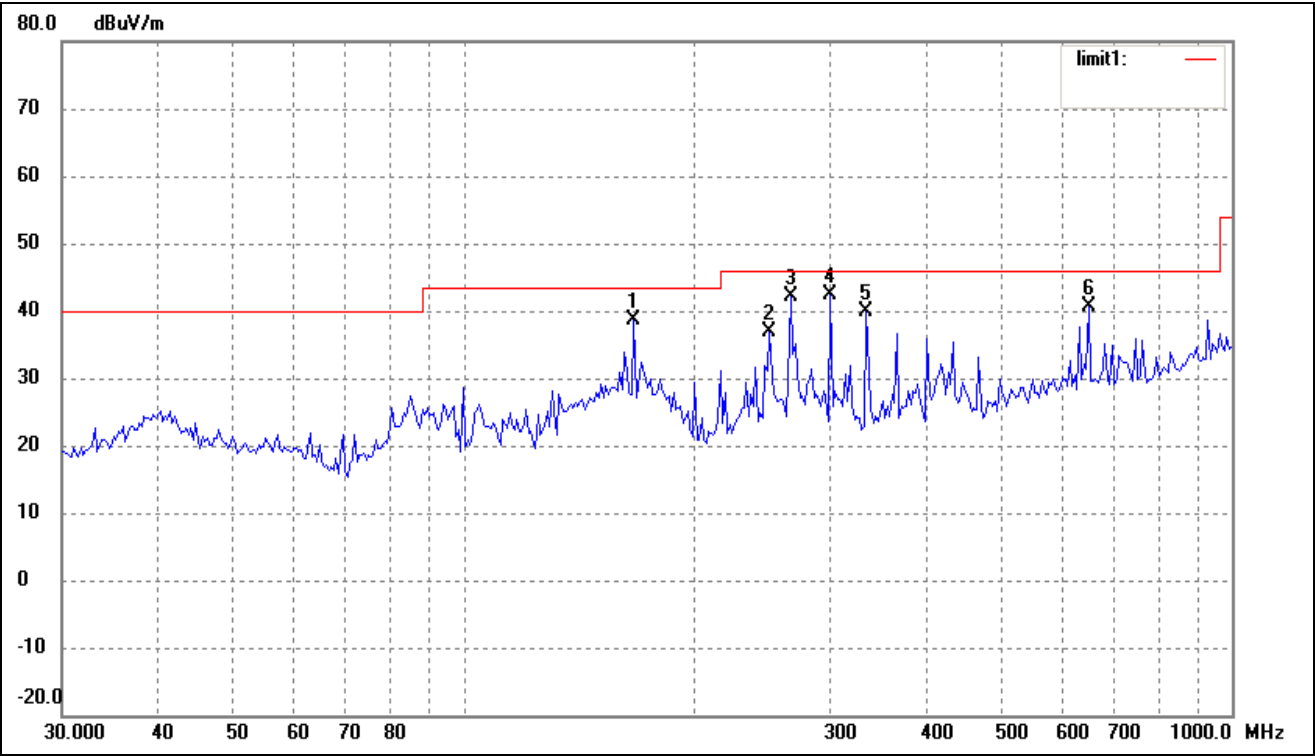


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	39.1825	30.00	7.71	37.71	40.00	-2.29	360	100	peak
2	133.0809	31.44	3.66	35.10	43.50	-8.40	360	100	peak
3	166.6385	32.54	3.95	36.49	43.50	-7.01	360	100	peak
4	300.6988	29.55	8.66	38.21	46.00	-7.79	360	100	peak
5	334.1255	29.75	9.12	38.87	46.00	-7.13	360	100	peak
6	401.1050	29.04	10.08	39.12	46.00	-6.88	360	100	peak
7	633.3285	24.68	15.24	39.92	46.00	-6.08	360	100	peak

Spurious Emission From 30 MHz to 1 GHz

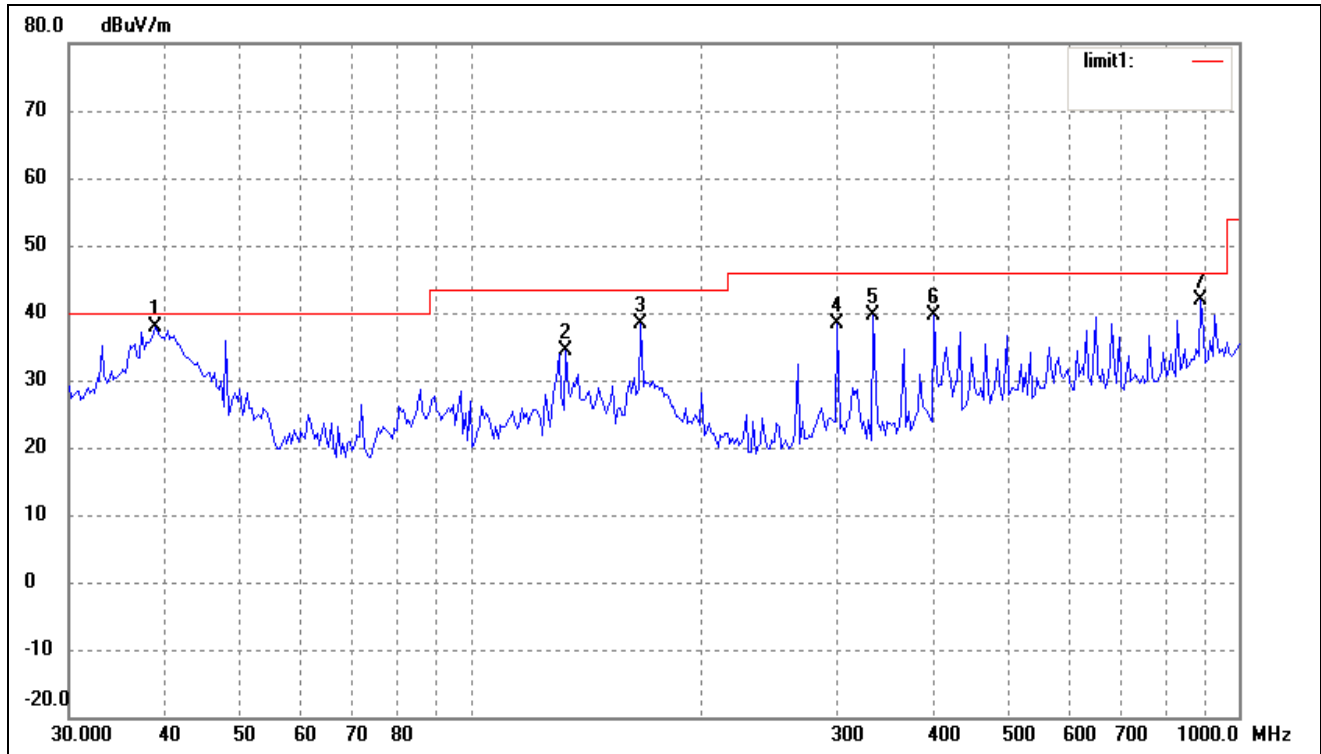
Test mode: 11b-Middle Channel

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	166.6385	34.71	3.95	38.66	43.50	-4.84	360	100	peak
2	250.4859	29.12	7.69	36.81	46.00	-9.19	360	100	peak
3	266.8395	34.11	8.11	42.22	46.00	-3.78	360	100	peak
4	300.6988	33.82	8.66	42.48	46.00	-3.52	360	100	peak
5	334.1255	30.77	9.12	39.89	46.00	-6.11	360	100	peak
6	651.3831	25.25	15.37	40.62	46.00	-5.38	360	100	peak

Vertical

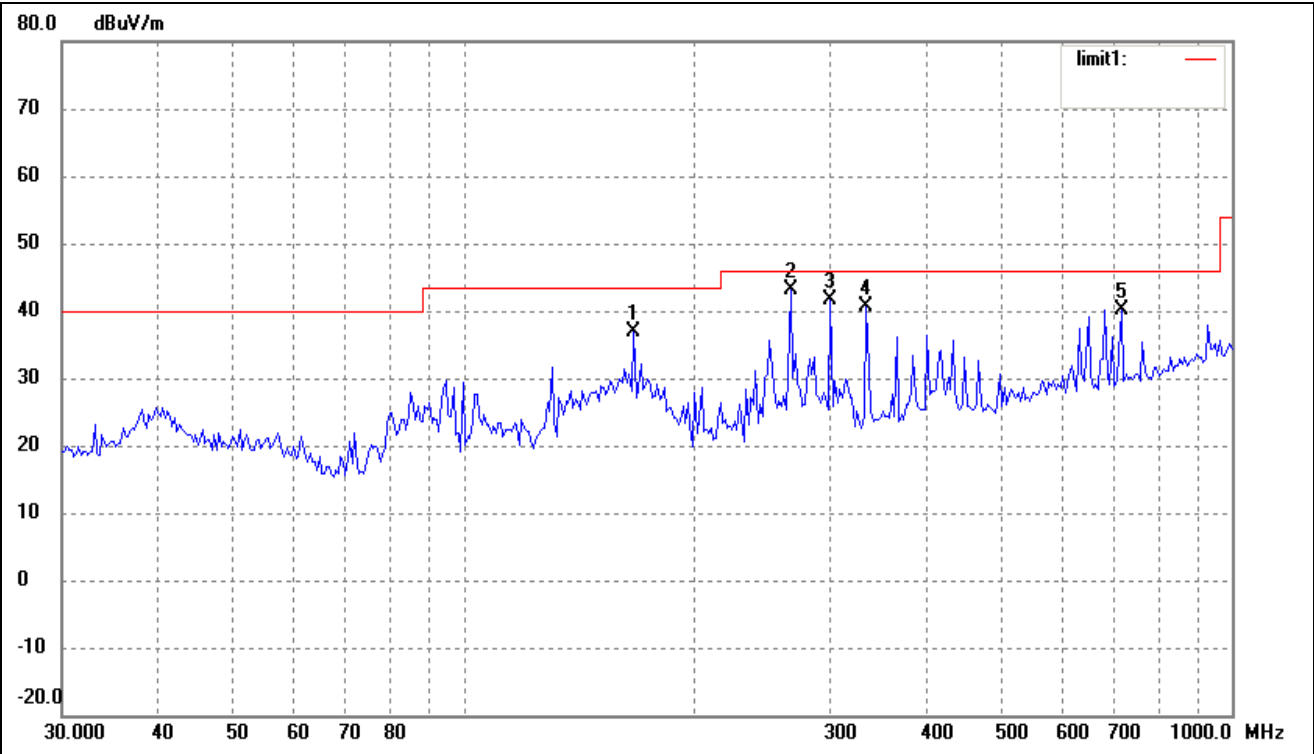


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	38.9081	30.14	7.64	37.78	40.00	-2.22	360	100	peak
2	133.0809	30.83	3.66	34.49	43.50	-9.01	360	100	peak
3	166.6385	34.41	3.95	38.36	43.50	-5.14	360	100	peak
4	300.6988	29.82	8.66	38.48	46.00	-7.52	360	100	peak
5	334.1255	30.39	9.12	39.51	46.00	-6.49	360	100	peak
6	401.1050	29.49	10.08	39.57	46.00	-6.43	360	100	peak
7	893.6557	23.26	18.69	41.95	46.00	-4.05	360	100	peak

Spurious Emission From 30 MHz to 1 GHz

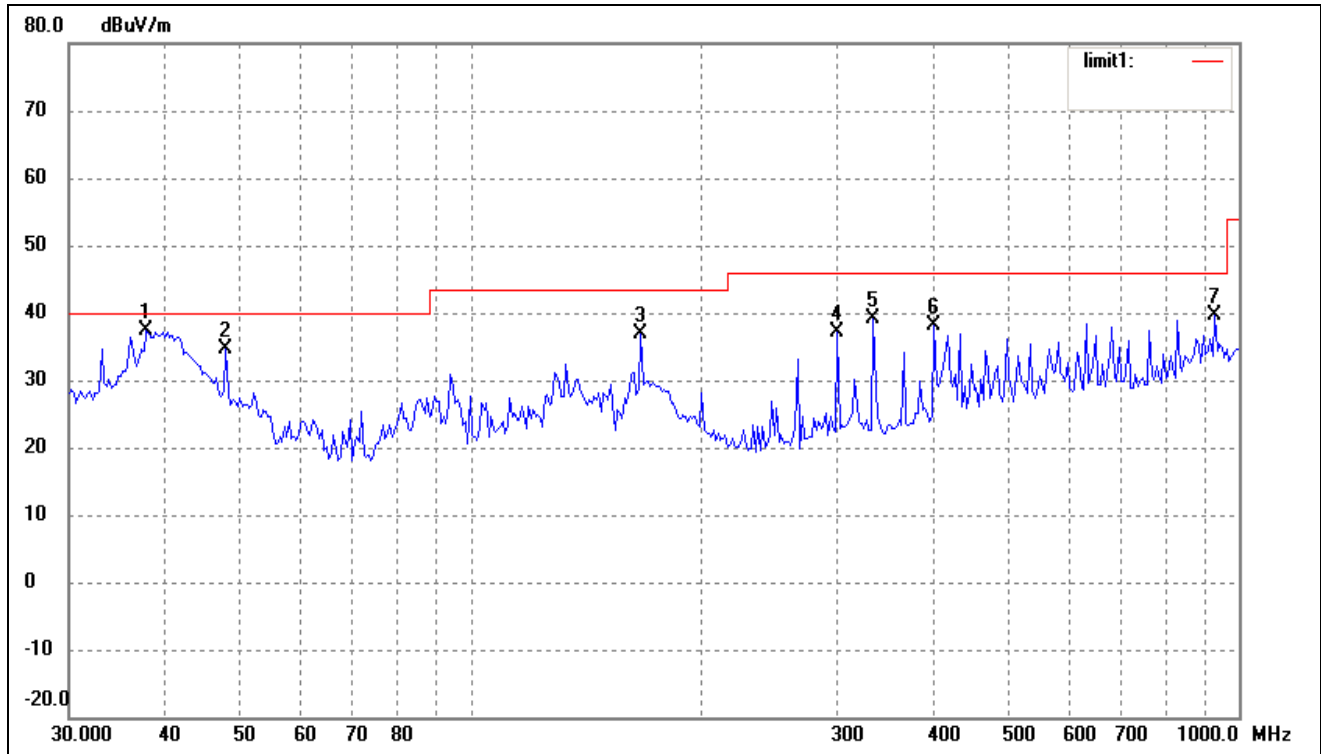
Test mode: 11b High Channel

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	166.6385	32.84	3.95	36.79	43.50	-6.71	360	100	peak
2	266.8395	35.03	8.11	43.14	46.00	-2.86	360	100	peak
3	300.6988	32.85	8.66	41.51	46.00	-4.49	360	100	peak
4	334.1255	31.43	9.12	40.55	46.00	-5.45	360	100	peak
5	718.7246	24.27	15.96	40.23	46.00	-5.77	360	100	peak

Vertical

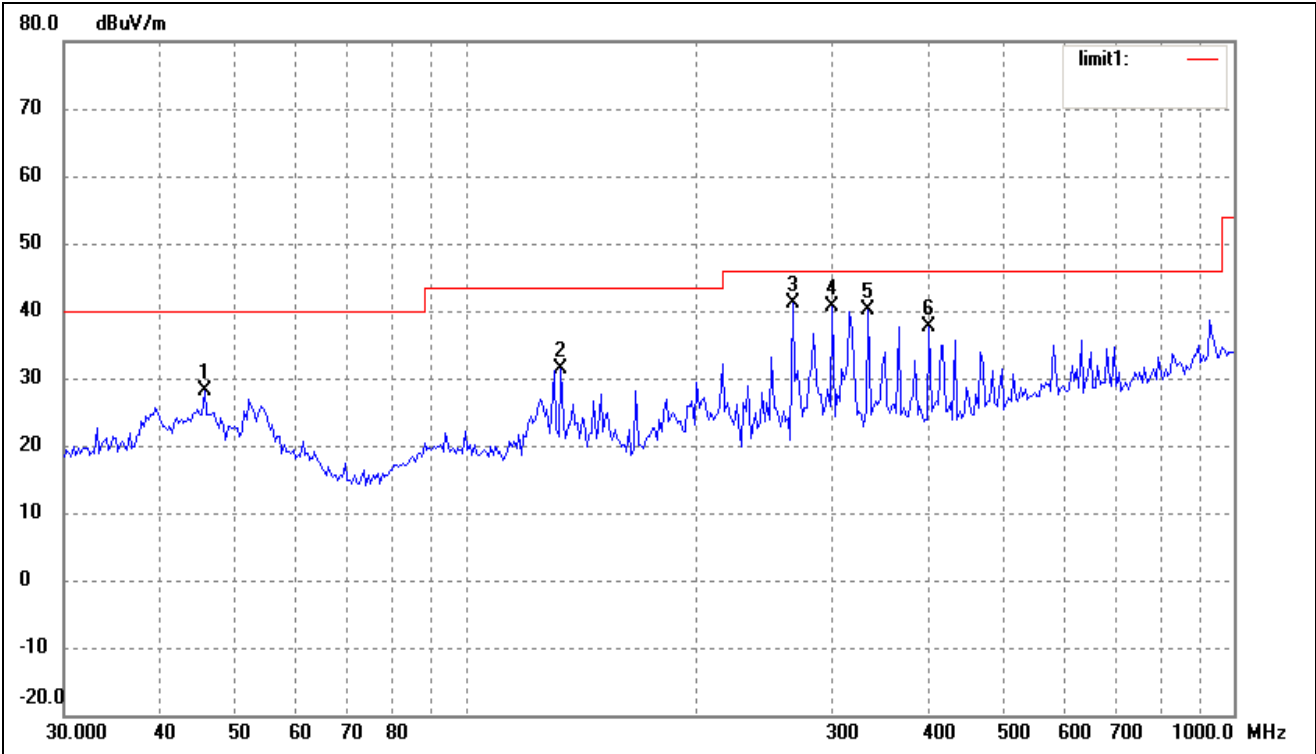


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.8297	30.13	7.35	37.48	40.00	-2.52	360	100	peak
2	48.0392	26.81	7.81	34.62	40.00	-5.38	360	100	peak
3	166.6385	32.86	3.95	36.81	43.50	-6.69	360	100	peak
4	300.6988	28.59	8.66	37.25	46.00	-8.75	360	100	peak
5	334.1255	30.04	9.12	39.16	46.00	-6.84	360	100	peak
6	401.1050	28.14	10.08	38.22	46.00	-7.78	360	100	peak
7	932.1405	20.20	19.35	39.55	46.00	-6.45	360	100	peak

Spurious Emission From 30 MHz to 1 GHz

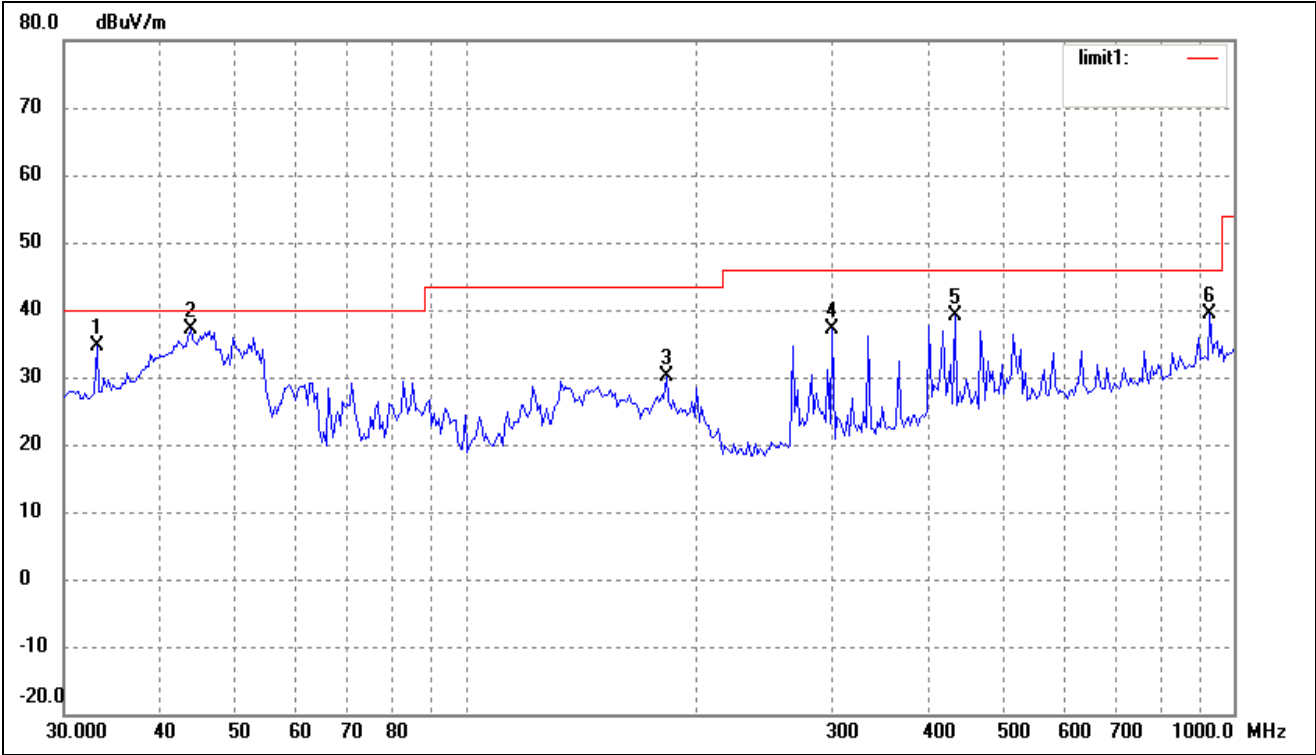
Test mode: 11g Low Channel

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	45.7333	20.14	7.95	28.09	40.00	-11.91	360	100	peak
2	133.0809	27.65	3.66	31.31	43.50	-12.19	360	100	peak
3	266.8395	32.94	8.11	41.05	46.00	-4.95	360	100	peak
4	300.6988	31.96	8.66	40.62	46.00	-5.38	360	100	peak
5	334.1255	30.90	9.11	40.01	46.00	-5.99	360	100	peak
6	401.1050	27.49	10.08	37.57	46.00	-8.43	360	100	peak

Vertical

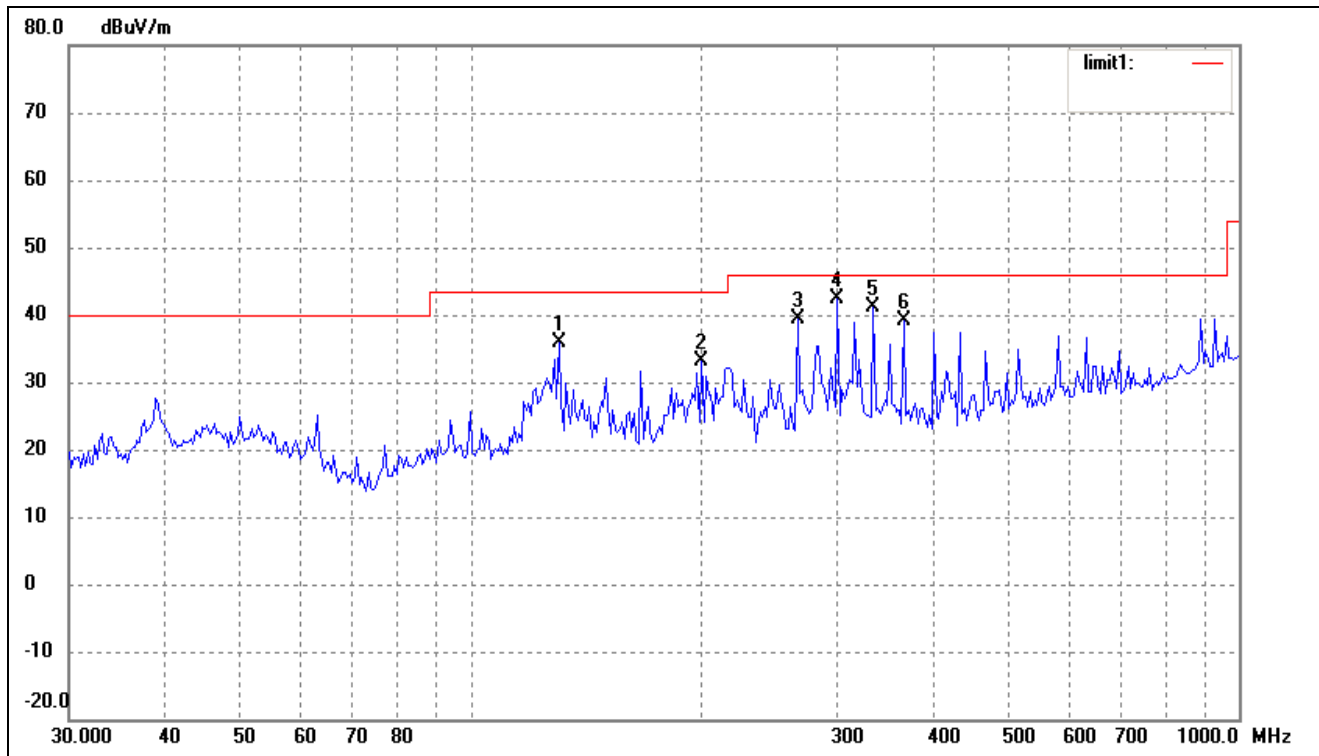


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	33.1015	28.09	6.61	34.70	40.00	-5.30	360	100	peak
2	43.8452	29.11	7.98	37.09	40.00	-2.91	360	100	peak
3	182.5785	25.11	5.01	30.12	43.50	-13.38	360	100	peak
4	300.6988	28.40	8.66	37.06	46.00	-8.94	360	100	peak
5	433.3397	28.53	10.54	39.07	46.00	-6.93	360	100	peak
6	932.1405	20.10	19.35	39.45	46.00	-6.55	360	100	peak

Spurious Emission From 30 MHz to 1 GHz

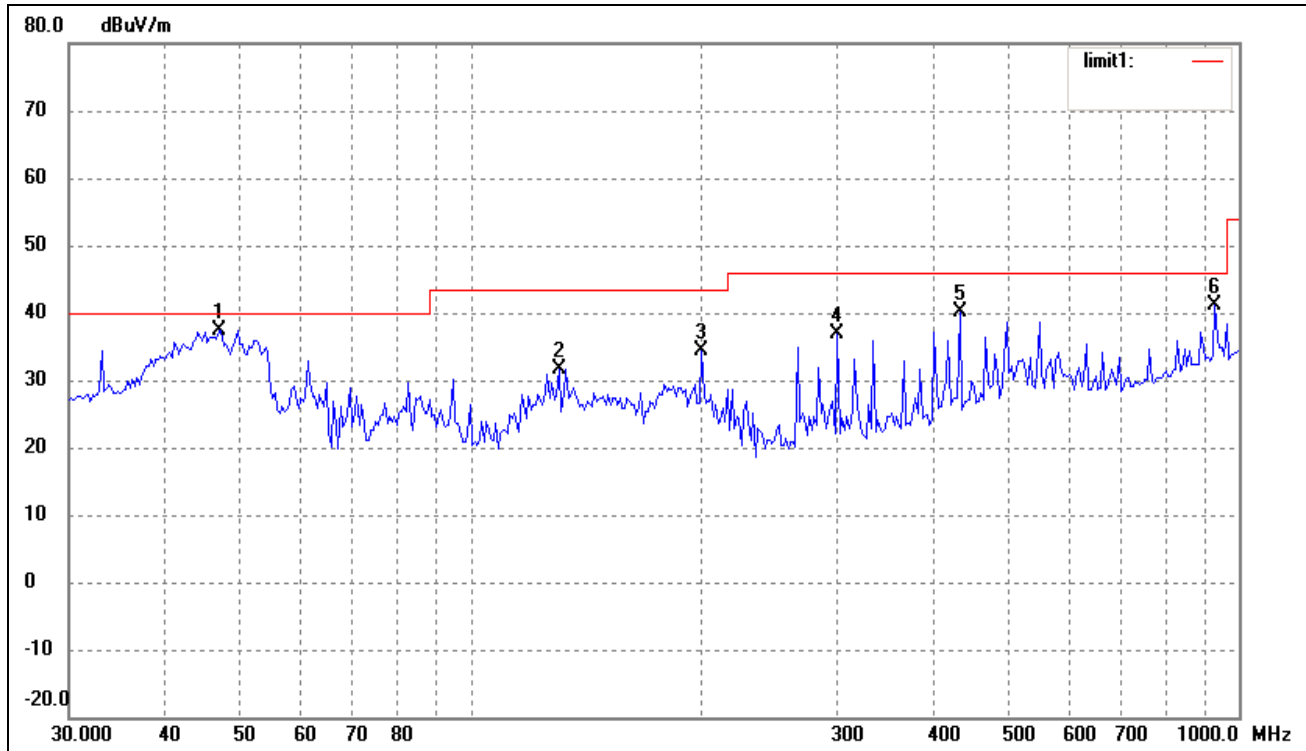
Test mode: 11g Middle Channel

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	130.3048	32.04	3.83	35.87	43.50	-7.63	360	100	peak
2	200.0432	27.38	5.68	33.06	43.50	-10.44	360	100	peak
3	266.8395	31.38	8.11	39.49	46.00	-6.51	360	100	peak
4	300.6988	33.79	8.66	42.45	46.00	-3.55	360	100	peak
5	334.1255	32.09	9.11	41.20	46.00	-4.80	360	100	peak
6	366.0866	29.44	9.73	39.17	46.00	-6.83	360	100	peak

Vertical

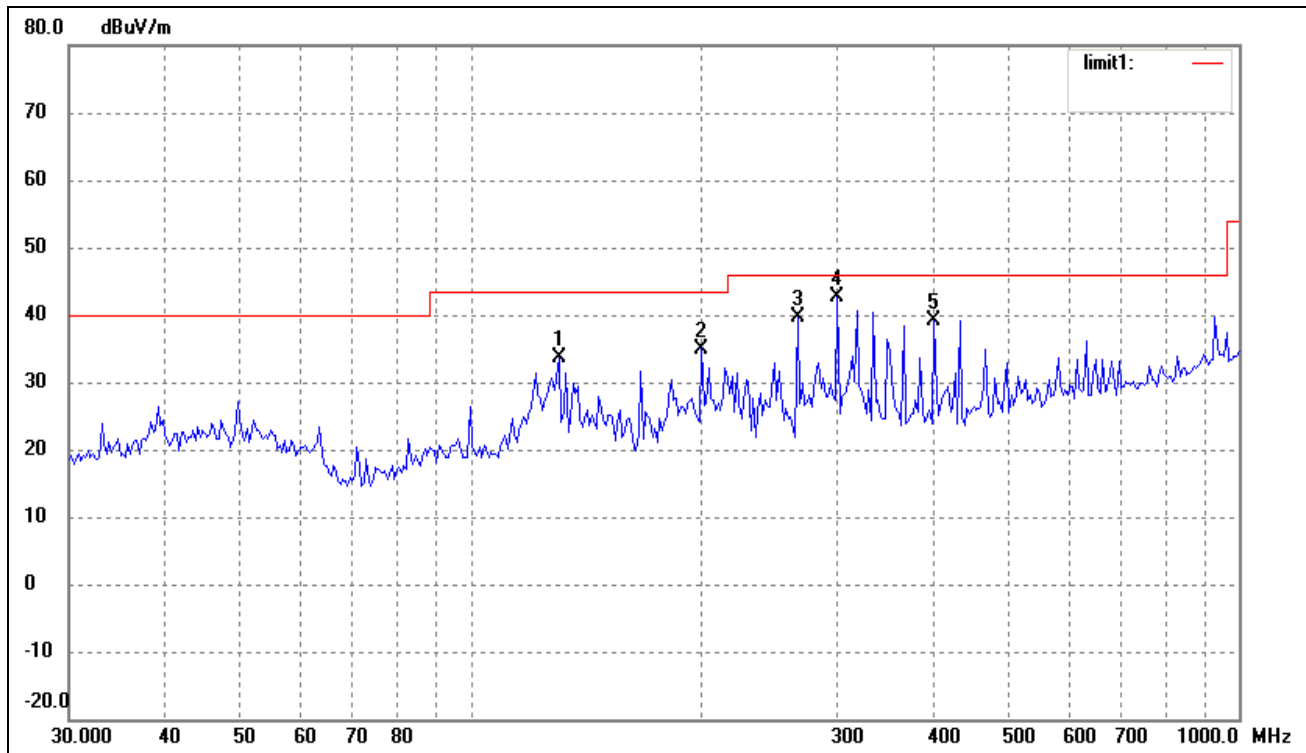


No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	47.0371	29.62	7.87	37.49	40.00	-2.51	360	100	peak
2	130.3048	27.83	3.83	31.66	43.50	-11.84	360	100	peak
3	200.0432	28.61	5.68	34.29	43.50	-9.21	360	100	peak
4	300.6988	28.20	8.66	36.86	46.00	-9.14	360	100	peak
5	433.3397	29.50	10.54	40.04	46.00	-5.96	360	100	peak
6	932.1405	21.90	19.35	41.25	46.00	-4.75	360	100	peak

Spurious Emission From 30 MHz to 1 GHz

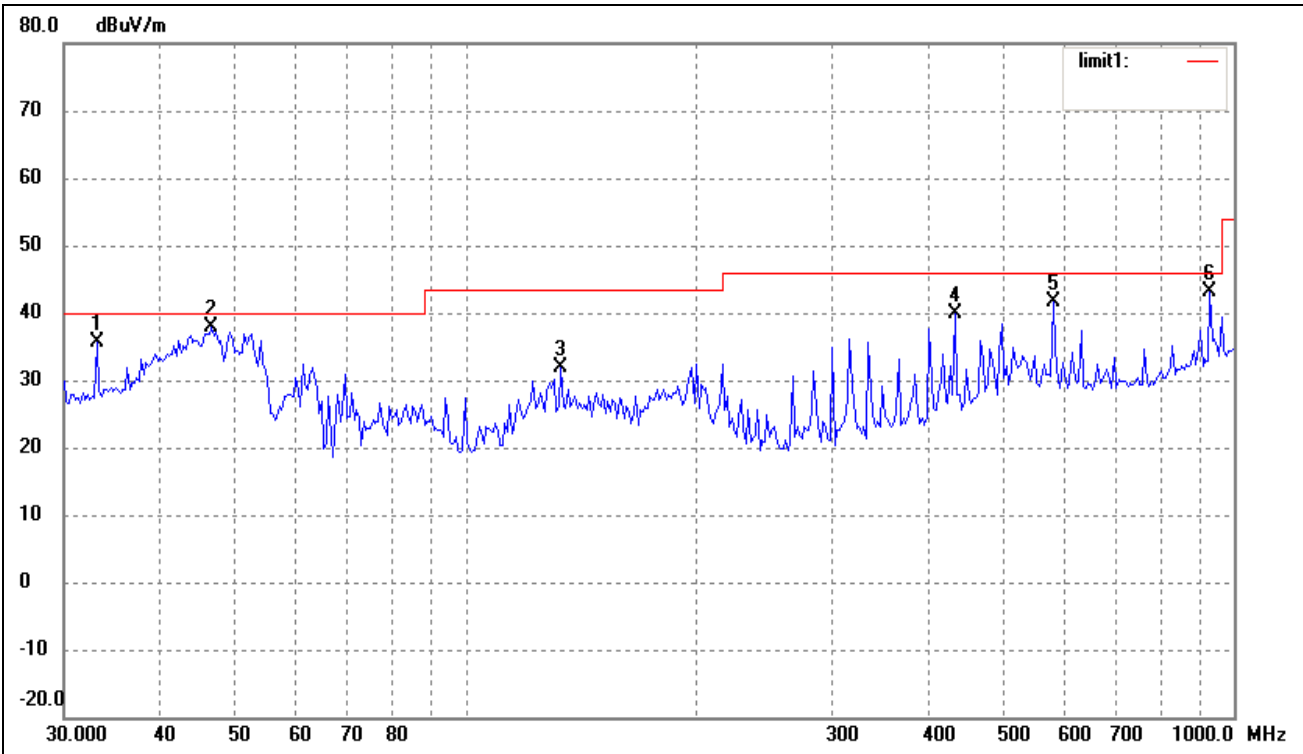
Test mode: 11g High Channel

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	130.3048	29.69	3.83	33.52	43.50	-9.98	360	100	peak
2	200.0432	29.32	5.68	35.00	43.50	-8.50	360	100	peak
3	266.8395	31.50	8.11	39.61	46.00	-6.39	360	100	peak
4	300.6988	33.99	8.66	42.65	46.00	-3.35	360	100	peak
5	401.1050	29.14	10.08	39.22	46.00	-6.78	360	100	peak

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	33.1015	29.07	6.61	35.68	40.00	-4.32	360	100	peak
2	46.7077	30.08	7.89	37.97	40.00	-2.03	360	100	peak
3	133.0809	28.20	3.66	31.86	43.50	-11.64	360	100	peak
4	433.3397	29.23	10.54	39.77	46.00	-6.23	360	100	peak
5	582.1122	26.89	14.64	41.53	46.00	-4.47	360	100	peak
6	932.1405	23.68	19.35	43.03	46.00	-2.97	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	56.2	90	V	34.1	5.2	33.0	62.5	74	-11.5
7236.0	PK	50.2	270	V	37.4	6.1	33.5	60.2	74	-13.8
7236.0	PK	50.1	180	H	37.4	6.1	33.5	60.1	74	-13.9
4824.0	PK	57.5	45	H	34.1	5.2	33.0	63.8	74	-10.2
4824.0	AV	44.0	270	V	34.1	5.2	33.0	50.3	54	-3.7
7236.0	AV	38.4	90	V	37.4	6.1	33.5	48.4	54	-5.6
7236.0	AV	39.2	45	H	37.4	6.1	33.5	49.2	54	-4.8
4824.0	AV	44.4	60	H	34.1	5.2	33.0	50.7	54	-3.3
Middle Channel (1G to 25GHz)										
7311.0	PK	48.1	45	V	37.4	6.1	33.5	58.1	74	-15.9
4874.0	PK	55.0	270	V	34.1	5.2	33.0	61.3	74	-12.7
7311.0	PK	47.6	45	H	37.4	6.1	33.5	57.6	74	-16.4
4874.0	PK	55.9	180	H	34.1	5.2	33.0	62.2	74	-11.8
7311.0	AV	37.6	270	V	37.4	6.1	33.5	47.6	54	-6.4
4874.0	AV	43.4	90	V	34.1	5.2	33.0	49.7	54	-4.3
7311.0	AV	38.2	60	H	37.4	6.1	33.5	48.2	54	-5.8
4874.0	AV	44.3	45	H	34.1	5.2	33.0	50.6	54	-3.4
4924.0	PK	52.1	270	V	34.1	5.2	33.0	58.4	74	-15.6
7386.0	PK	45.5	45	V	37.4	6.1	33.5	55.5	74	-18.5
4924.0	PK	52.8	180	H	34.1	5.2	33.0	59.1	74	-14.9
7386.0	PK	46.7	45	H	37.4	6.1	33.5	56.7	74	-17.3
4924.0	AV	42.5	90	V	34.1	5.2	33.0	48.8	54	-5.2
7386.0	AV	35.8	270	V	37.4	6.1	33.5	45.8	54	-8.2
4924.0	AV	43.0	60	H	34.1	5.2	33.0	49.3	54	-4.7
7386.0	AV	36.7	60	H	37.4	6.1	33.5	46.7	54	-7.3

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	54.8	90	V	34.1	5.2	33.0	61.1	74	-12.9
7236.0	PK	48.1	270	V	37.4	6.1	33.5	58.1	74	-15.9
7236.0	PK	48.5	180	H	37.4	6.1	33.5	58.5	74	-15.5
4824.0	PK	55.4	45	H	34.1	5.2	33.0	61.7	74	-12.3
4824.0	AV	43.5	270	V	34.1	5.2	33.0	49.8	54	-4.2
7236.0	AV	37.2	90	V	37.4	6.1	33.5	47.2	54	-6.8
7236.0	AV	38.3	45	H	37.4	6.1	33.5	48.3	54	-5.7
4824.0	AV	44.1	60	H	34.1	5.2	33.0	50.4	54	-3.6
Middle Channel (1G to 25GHz)										
7311.0	PK	46.1	45	V	37.4	6.1	33.5	56.1	74	-17.9
4874.0	PK	52.1	270	V	34.1	5.2	33.0	58.4	74	-15.6
7311.0	PK	47.5	45	H	37.4	6.1	33.5	57.5	74	-16.5
4874.0	PK	52.6	180	H	34.1	5.2	33.0	58.9	74	-15.1
7311.0	AV	35.3	270	V	37.4	6.1	33.5	45.3	54	-8.7
4874.0	AV	41.4	90	V	34.1	5.2	33.0	47.7	54	-6.3
7311.0	AV	35.7	60	H	37.4	6.1	33.5	45.7	54	-8.3
4874.0	AV	41.5	45	H	34.1	5.2	33.0	47.8	54	-6.2
4924.0	PK	50.8	270	V	34.1	5.2	33.0	57.1	74	-16.9
7386.0	PK	44.7	45	V	37.4	6.1	33.5	54.7	74	-19.3
4924.0	PK	51.1	180	H	34.1	5.2	33.0	57.4	74	-16.6
7386.0	PK	44.5	45	H	37.4	6.1	33.5	54.5	74	-19.5
4924.0	AV	40.5	90	V	34.1	5.2	33.0	46.8	54	-7.2
7386.0	AV	34.2	270	V	37.4	6.1	33.5	44.2	54	-9.8
4924.0	AV	41.3	60	H	34.1	5.2	33.0	47.6	54	-6.4
7386.0	AV	35.5	60	H	37.4	6.1	33.5	45.5	54	-8.5

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	2008-07-08	2009-07-07
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2008-07-08	2009-07-07
Positioning Controller	C&C	CC-C-1F	N/A	2008-07-08	2009-07-07
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2008-07-08	2009-07-07
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2008-07-08	2009-07-07
RF Switch	EM	EMSW18	SW060023	2008-07-08	2009-07-07
Amplifier	Agilent	8447F	3113A06717	2008-07-08	2009-07-07
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2008-07-08	2009-07-07
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	25498514	2008-07-08	2009-07-07

10.3 Test Procedure

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

10.4 Environmental Conditions

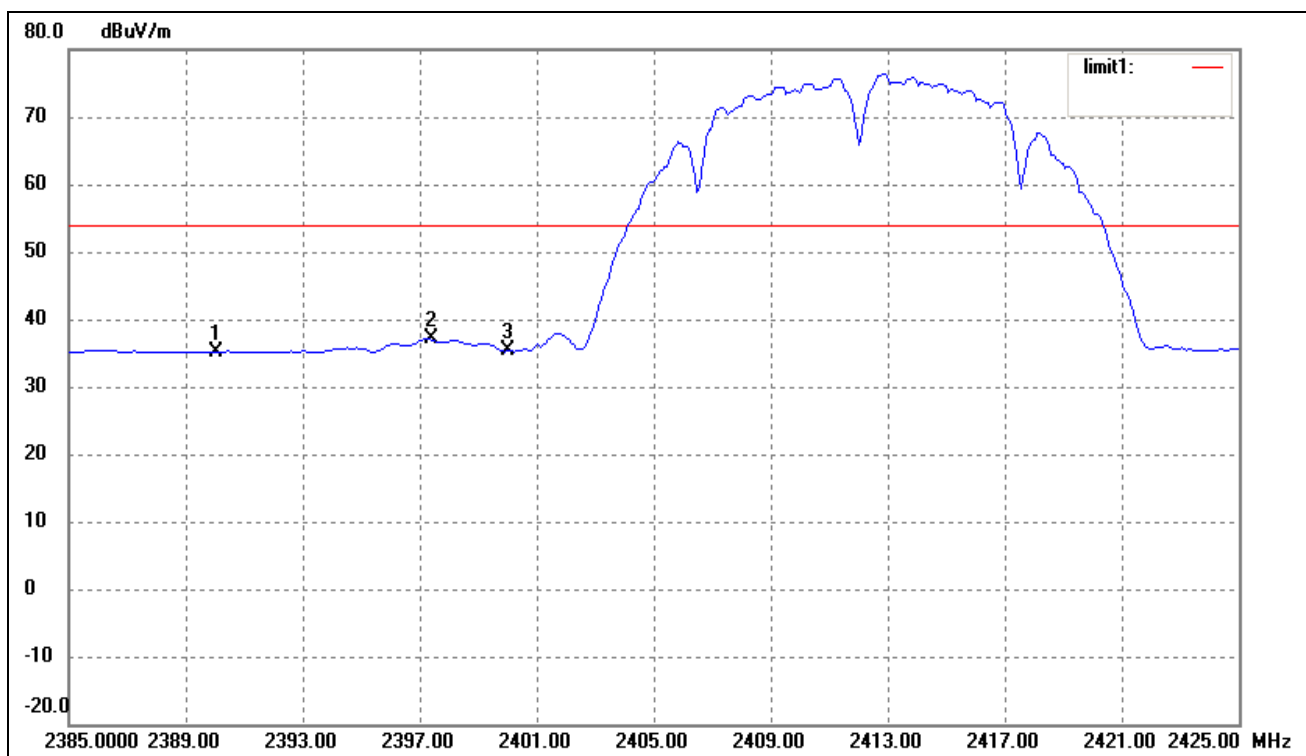
Temperature:	21° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

10.5 Summary of Test Results/Plots

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

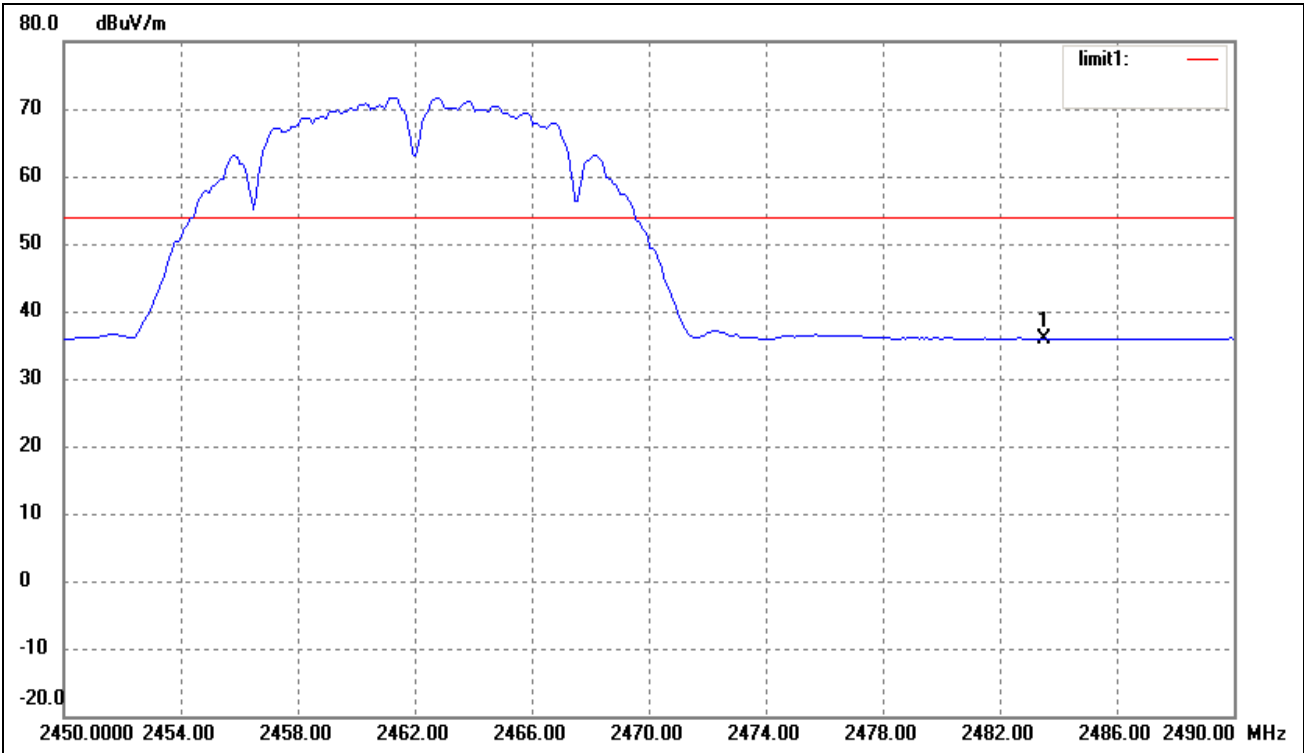
For 802.11b

Lowest Bandedge



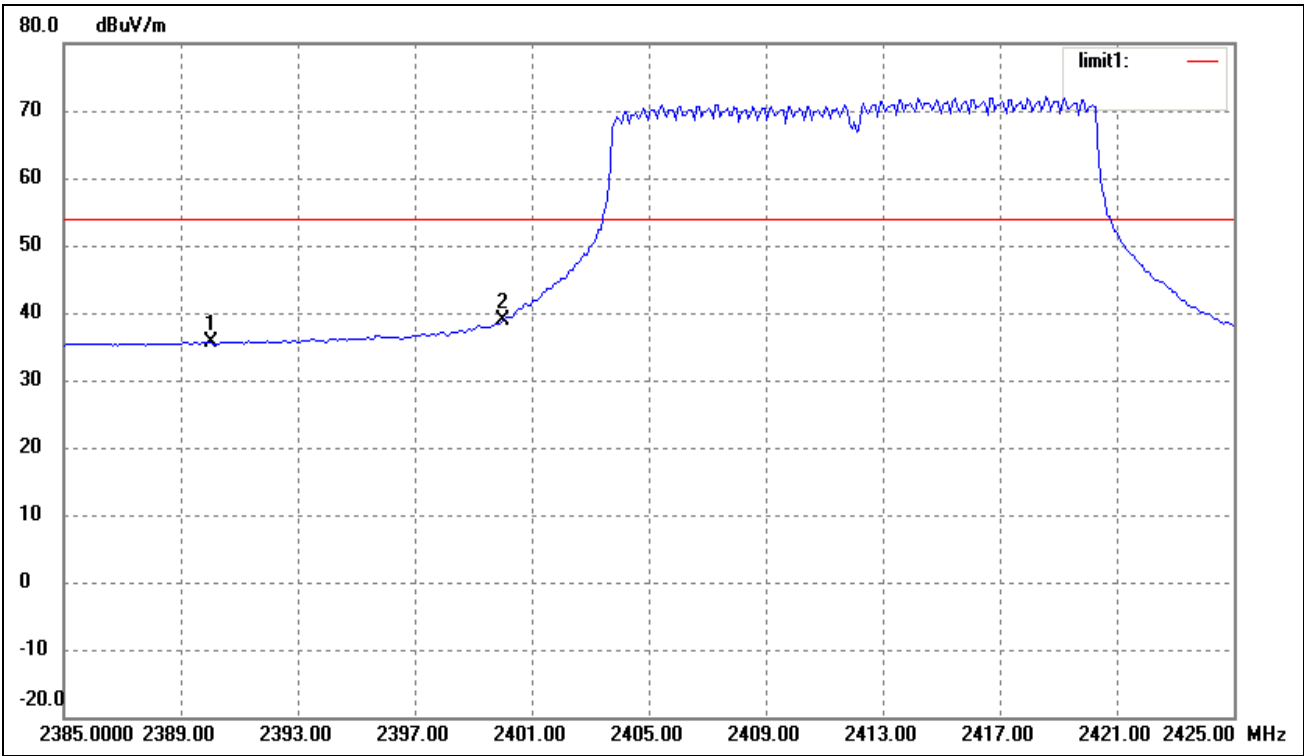
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2390.050	-0.59	35.78	35.19	54.00	-18.81	360	100	Average
	2390.050	10.76	35.78	46.54	74.00	-27.46	360	100	peak
2	2397.345	1.26	35.82	37.08	54.00	-16.92	360	100	Average
3	2399.990	-0.47	35.84	35.37	54.00	-18.63	360	100	Average

Highest Bandedge



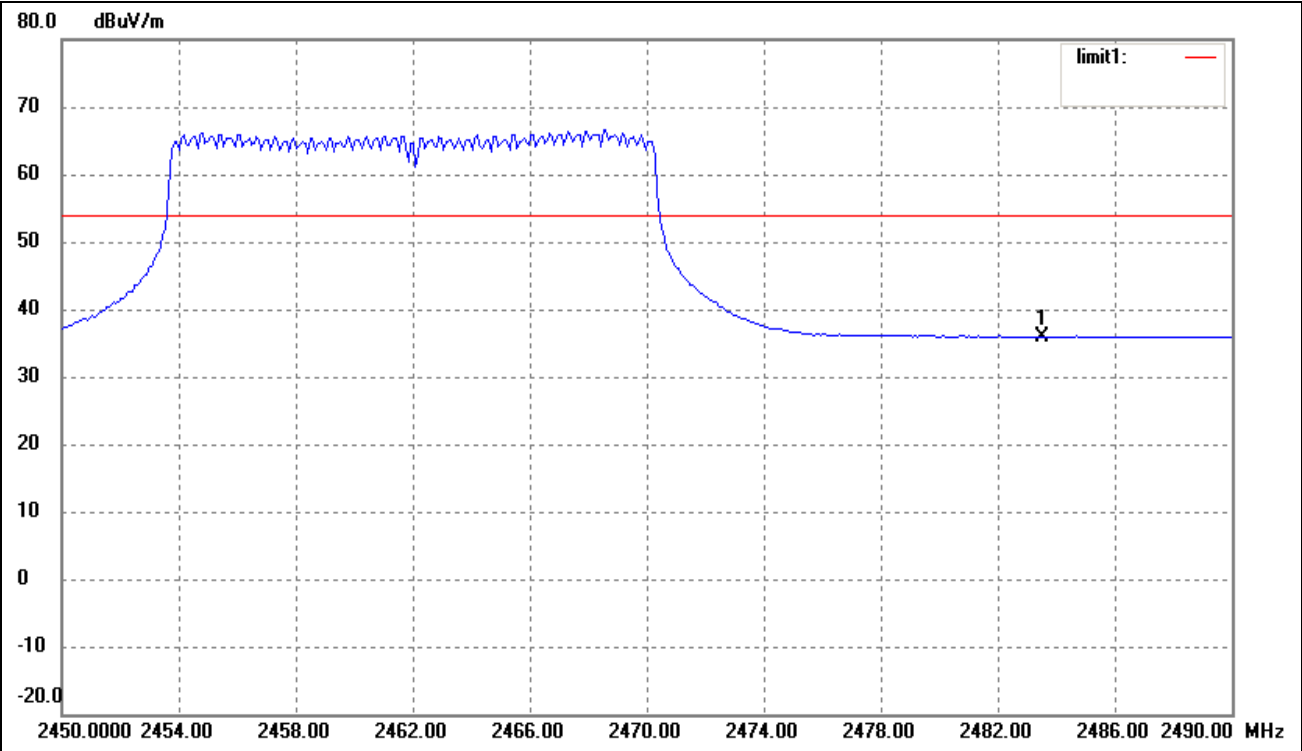
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	2483.427	-0.80	36.69	35.89	54.00	-18.11	360	100	Average
	2483.427	10.14	36.69	46.83	74.00	-27.17	360	100	Peak

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	2390.050	-0.21	35.78	35.57	54.00	-18.43	360	100	Average
	2390.050	11.50	35.78	47.28	74.00	-26.72	360	100	Peak
2	2399.990	3.01	35.84	38.85	54.00	-15.15	360	100	Average

Highest Bandedge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	2483.427	-0.74	36.69	35.95	54.00	-18.05	360	100	Average
	2483.427	9.67	36.69	46.36	74.00	-27.64	360	100	peak