

FCC Part 15C for Wi-Fi Portion Measurement and Test Report

For

Verykool USA Inc

4350 Executive Dr. #100, San Diego

FCC ID: WA6R800

Report Concerns: Original Report	Equipment Type: Panel Computer
Model:	<u>R800C</u>
Report No.:	<u>STR11118292I-2</u>
Test Date:	<u>2011-11-28 to 2011-12-15</u>
Issue Date:	<u>2011-12-20</u>
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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: Verykool USA Inc
Address of applicant: 4350 Executive Dr. #100, San Diego

Manufacturer: Verykool Wireless Technology Ltd.
Address of manufacturer: Room 1701, Reward Building C, No.203, 2nd Section of WangJing, Li Ze Zhong Yuan, ChaoYang District, Beijing, P.R. of China 100102

General Description of E.U.T

Items	Description
EUT Description:	Panel computer
Trade Name:	Verykool
Model No.:	R800C
Rated Voltage:	3.7V DC
RF Output Power	Max. 15.52dBm
Frequency range:	2412MHz~2462MHz
Number of channels:	11
Channel Separation:	5MHz
Antenna Gain:	Max. -3.52dBi for 2.4GHz
Type of Antenna:	Integral Antenna

Note: The test data is gathered from a production sample, provided by the manufacture.

1.2 Test Standards

The following report is prepared on behalf of the Verykool USA Inc 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
/	/	/	/
/	/	/	/

1.7 EUT Cable List and Details

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

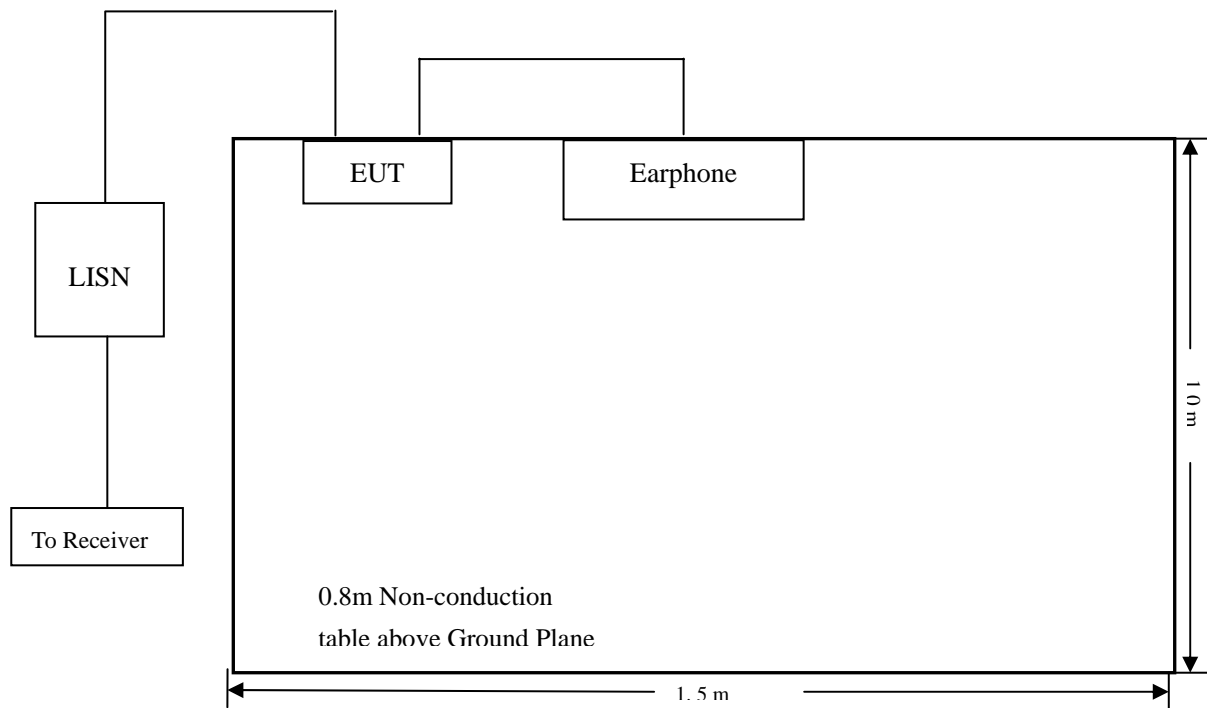
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2010-12-20	2011-12-19
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2010-12-20	2011-12-19
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2010-12-20	2011-12-19

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:

-3.63 dB μ V at 0.198 MHz in the Line Peak Detector, 0.15-30MHz

3.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

Conducted Disturbance

EUT: Panel computer

M/N: R800C

Operating Condition: Transmitting and charging

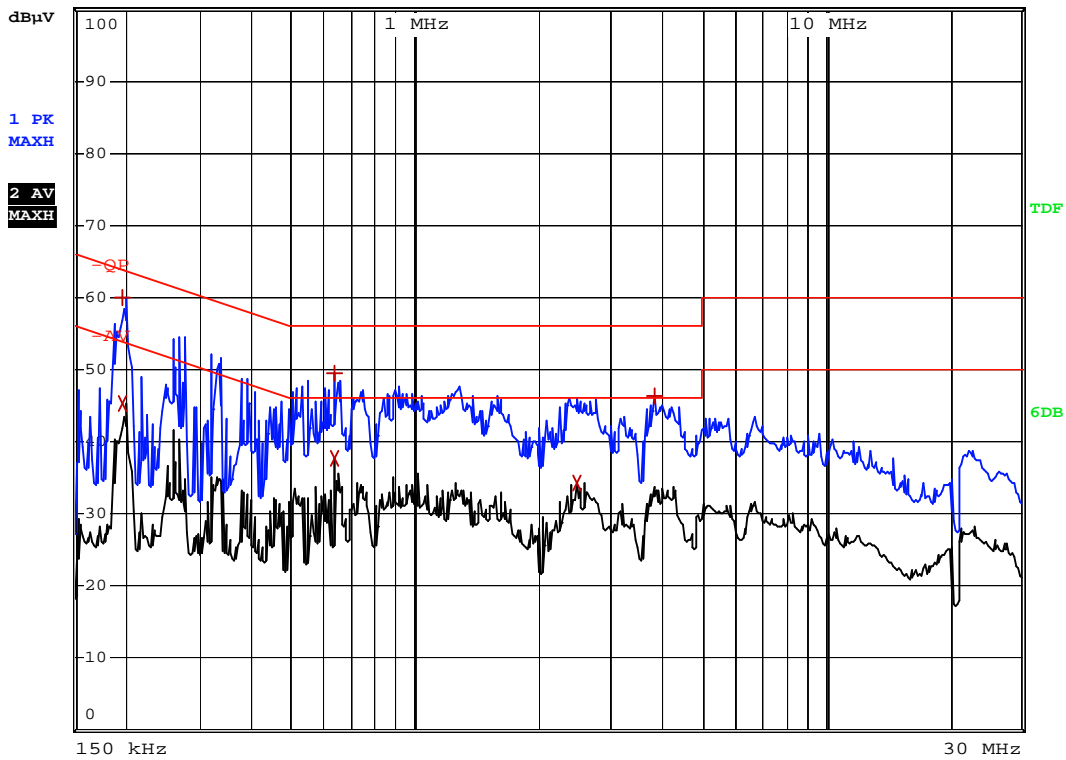
Test Specification: L

Comment: AC 120V/60Hz/Adapter 5V



RBW 9 kHz
MT 5 ms

Att 10 dB AUTO



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Max Peak	198 kHz	60.06	-3.63
2 Average	198 kHz	45.18	-8.50
1 Max Peak	634 kHz	49.50	-6.49
2 Average	634 kHz	37.54	-8.45
2 Average	2.482 MHz	34.26	-11.73
1 Max Peak	3.842 MHz	46.35	-9.64

Plot of Conducted Emissions Test Data

Conducted Disturbance

EUT: Panel computer

M/N: R800C

Operating Condition: Transmitting and charging

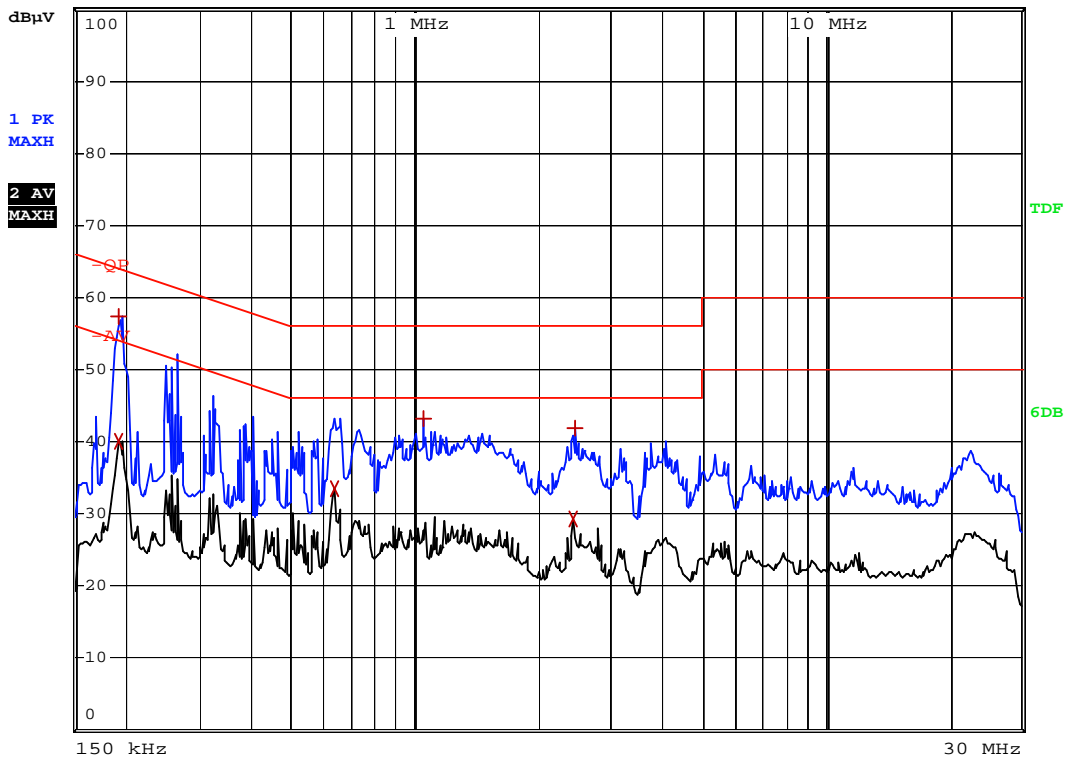
Test Specification: N

Comment: AC 120V/60Hz/Adapter 5V



RBW 9 kHz
MT 5 ms

Att 10 dB AUTO



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Max Peak	194 kHz	57.41	-6.45
2 Average	194 kHz	39.94	-13.91
2 Average	638 kHz	33.34	-12.65
1 Max Peak	1.046 MHz	43.21	-12.78
2 Average	2.442 MHz	29.18	-16.82
1 Max Peak	2.466 MHz	41.80	-14.19

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, 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

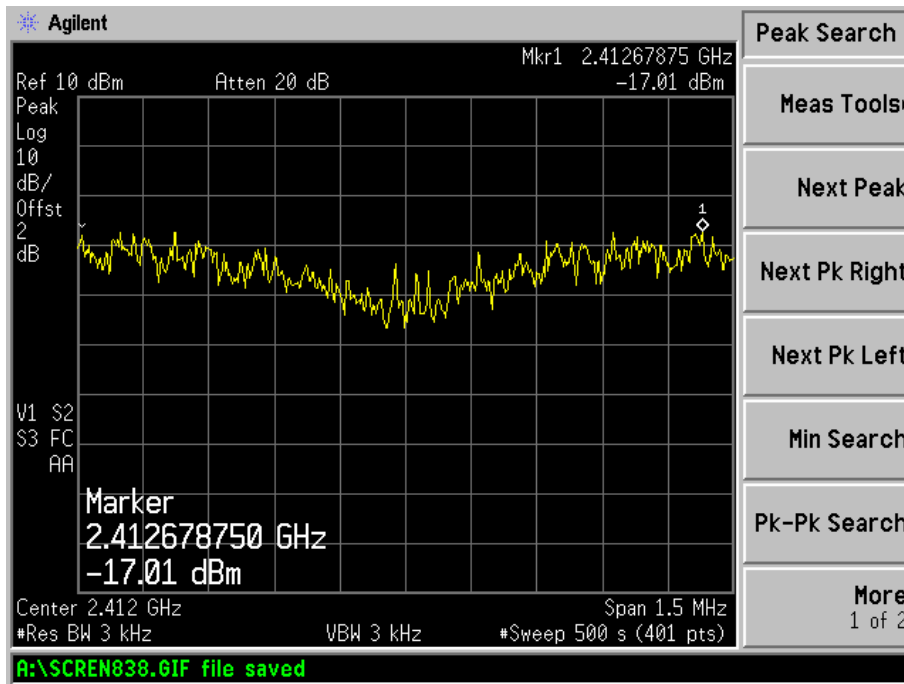
Temperature:	20° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.5 Summary of Test Results/Plots

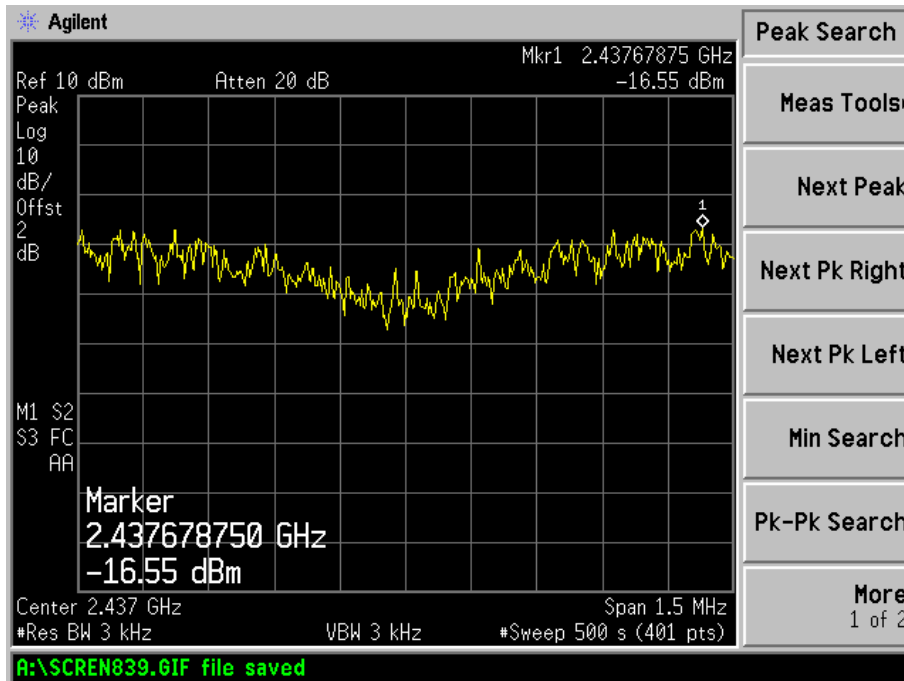
Test mode	Test channel	Reading dBm/3kHz	Limit dBm/3kHz
802.11b	Low channel (2412MHz)	-17.01	8
	Middle channel (2437MHz)	-16.55	8
	High channel (2462MHz)	-16.65	8
802.11g	Low channel (2412MHz)	-20.33	8
	Middle channel (2437MHz)	-18.14	8
	High channel (2462MHz)	-18.11	8

For 802.11b

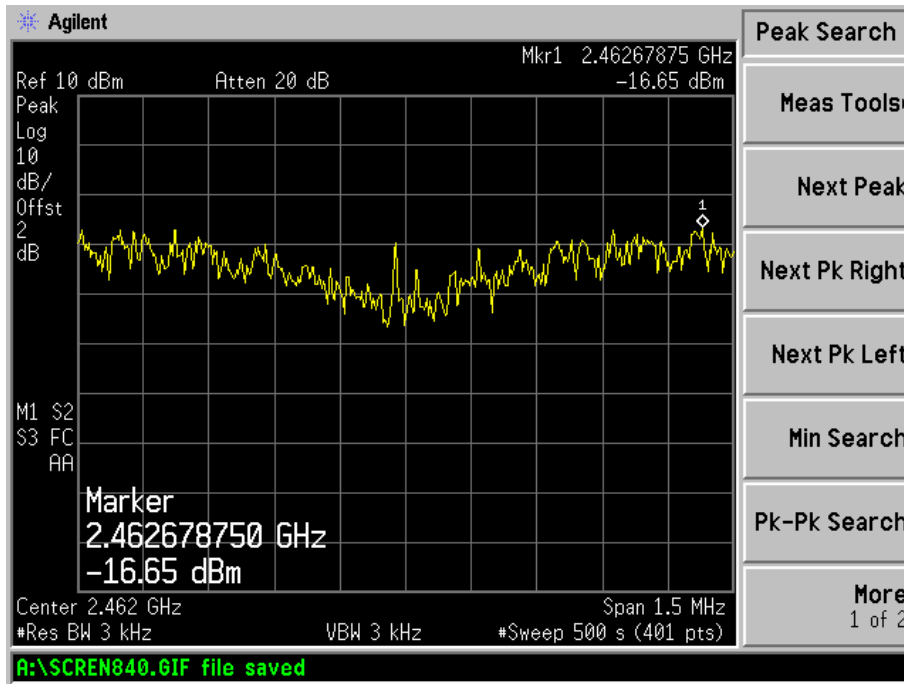
Low Channel:



Middle Channel:

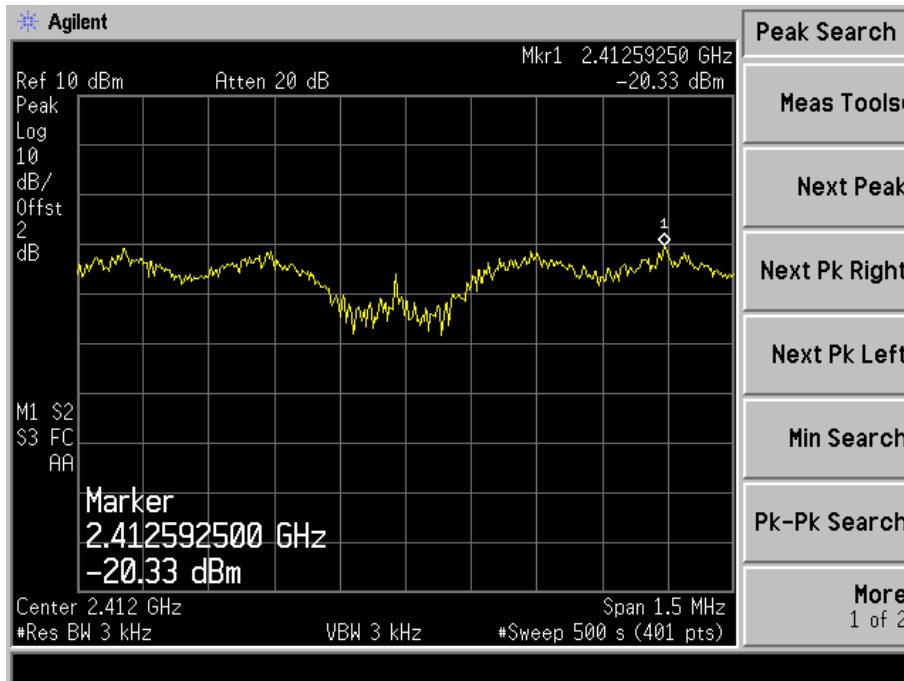


High Channel:

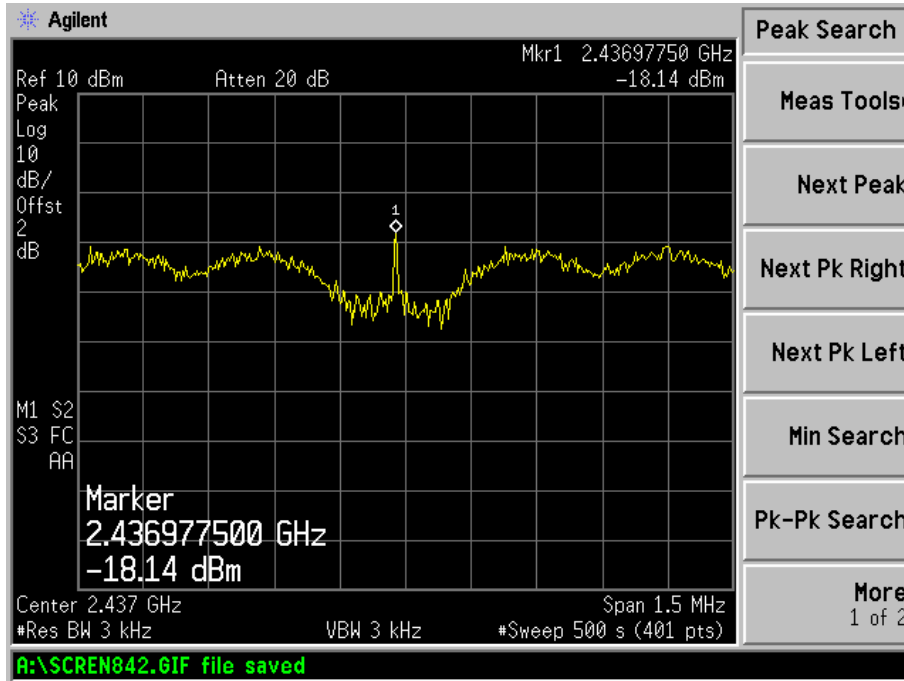


For 802.11g

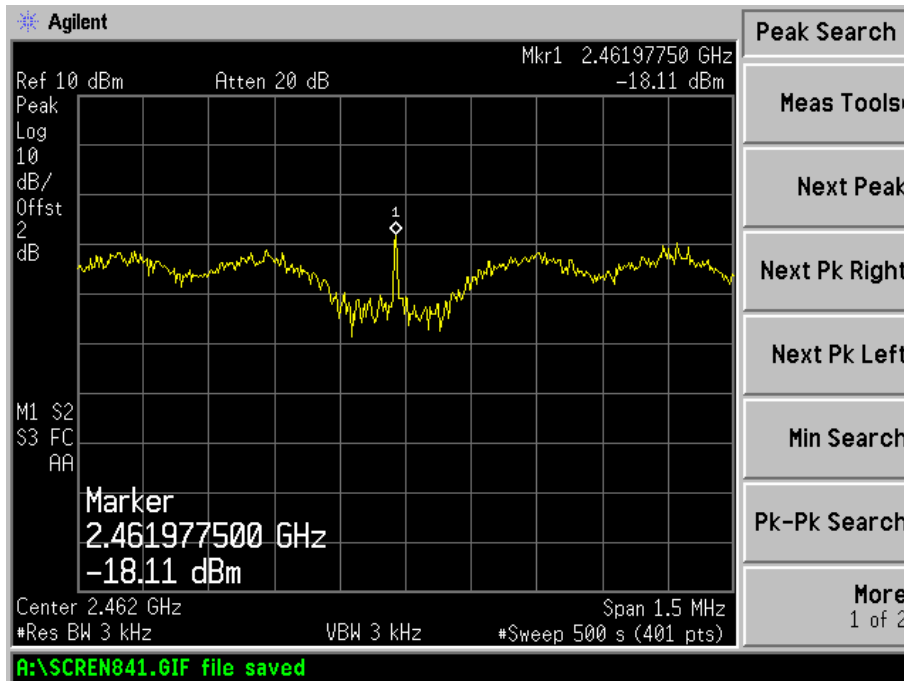
Low Channel:



Middle Channel:



High Channel:



6. 6-dB BANDWIDTH

6.1 Standard Applicable

According to 15.247(a)(2). Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

6.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	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

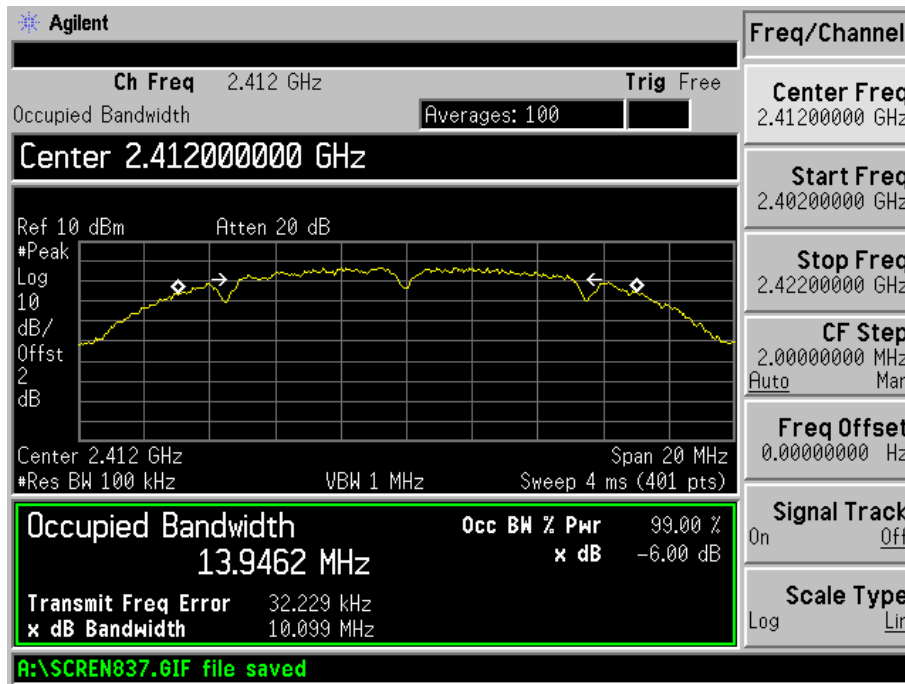
Temperature:	24° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.5 Summary of Test Results/Plots

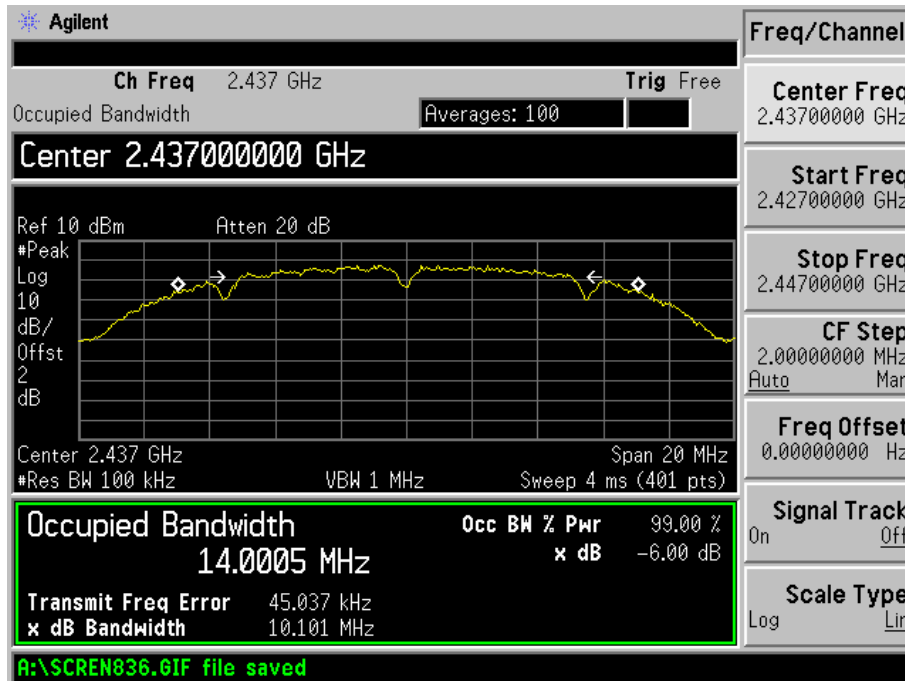
Test mode	Frequency MHz	6 dB Bandwidth kHz	Limit kHz
802.11b	2412	10099	500
	2437	10101	500
	2462	10135	500
802.11g	2412	16341	500
	2437	16337	500
	2462	16336	500

For 802.11b

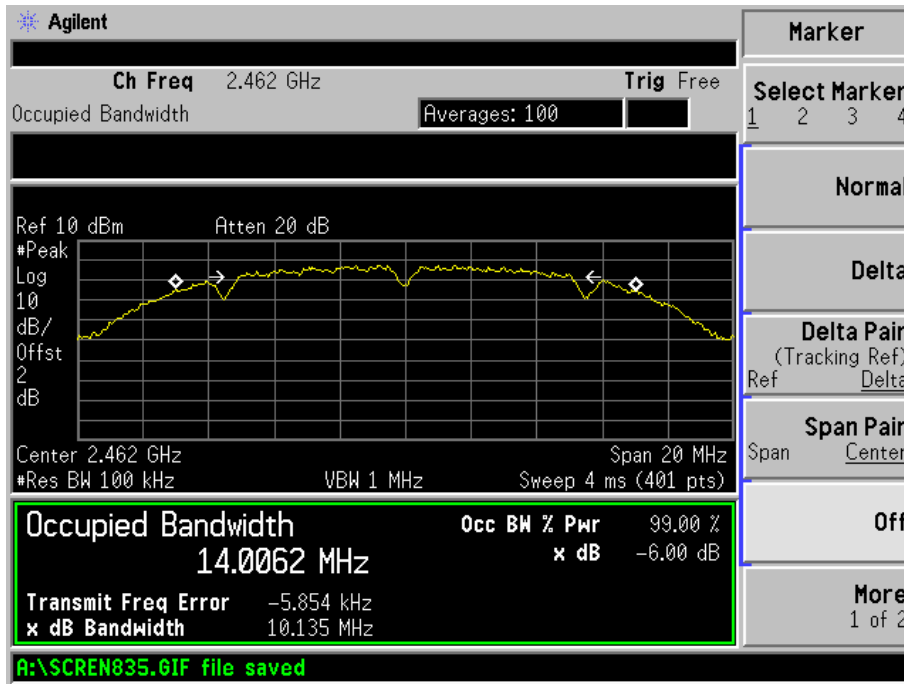
Low Channel:



Mid Channel:

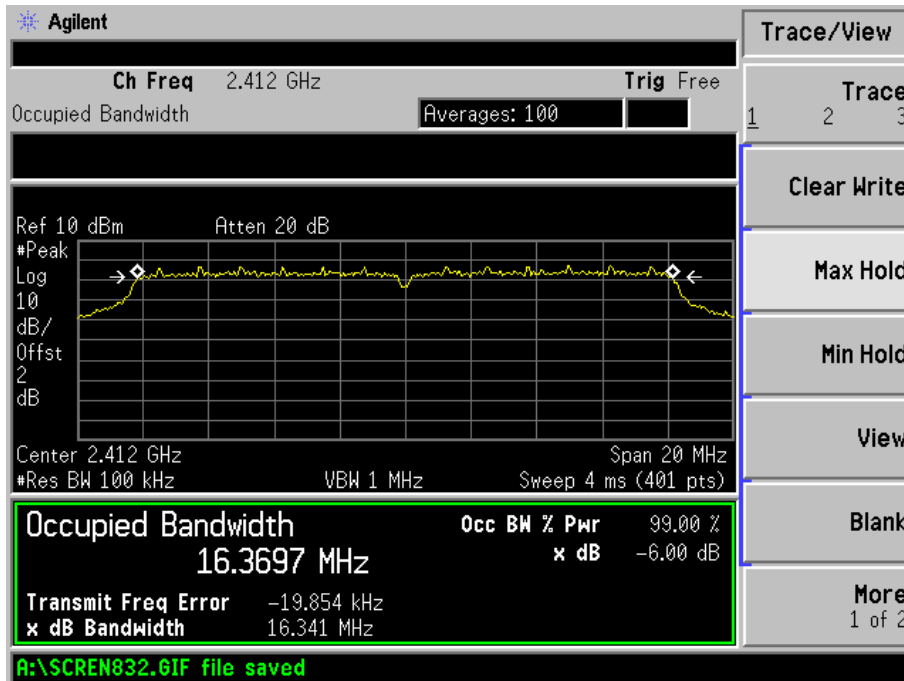


High Channel:

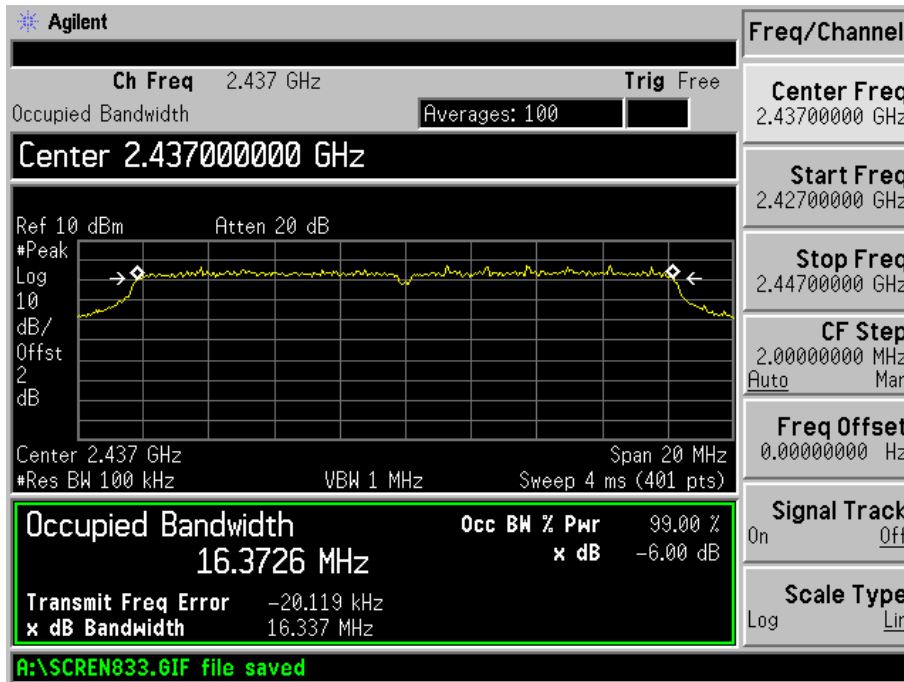


For 802.11g

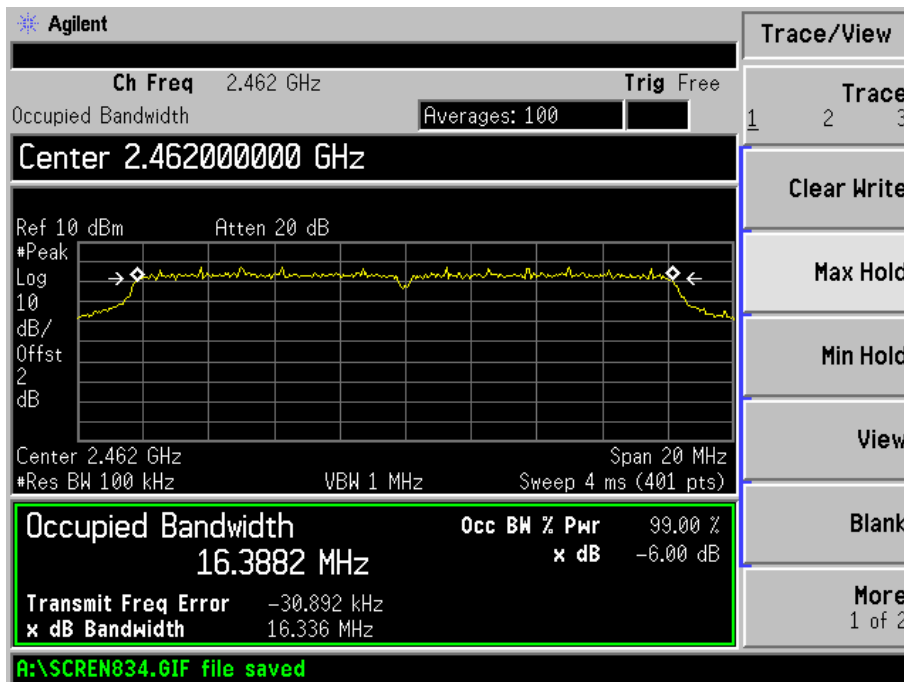
Low Channel:



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

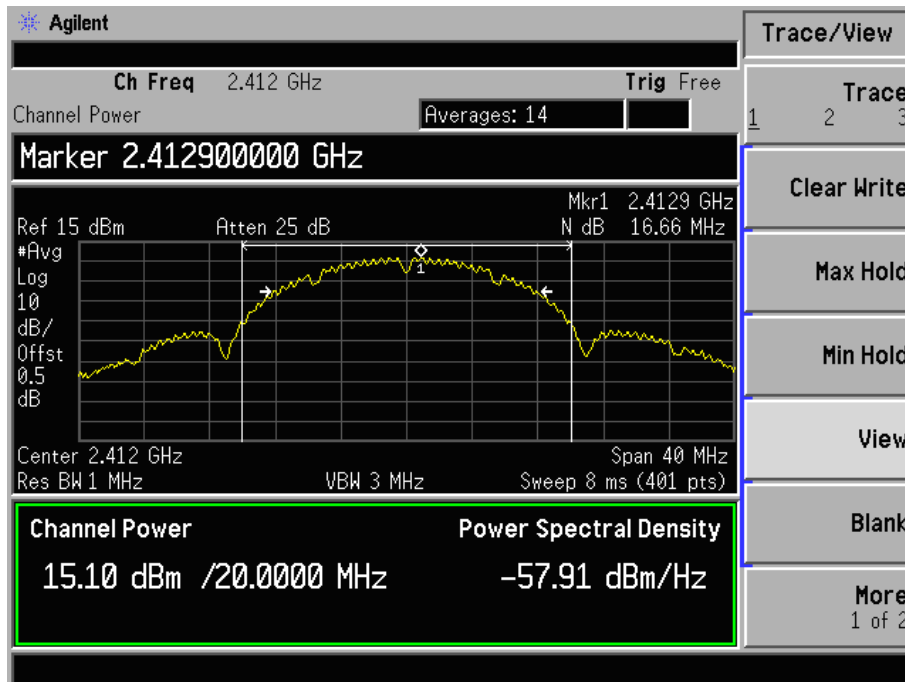
Temperature:	21° C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

7.5 Summary of Test Results/Plots

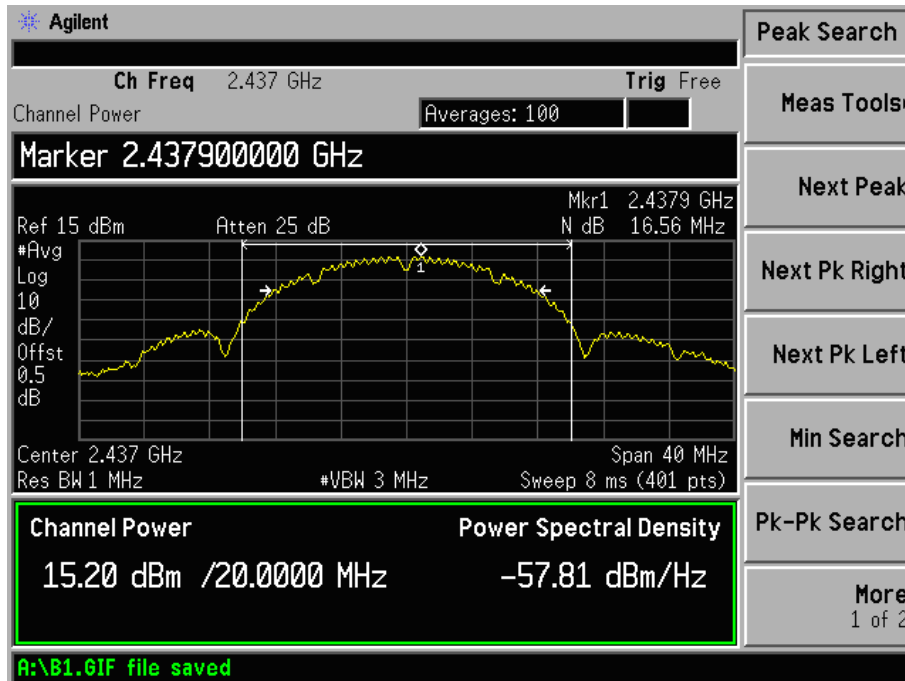
Test mode	Frequency MHz	Reading dBm	Output power W	Limit W
802.11b 1M	2412	15.10	0.032359	1
	2437	15.20	0.033113	1
	2462	15.06	0.032063	1
802.11b 11M	2412	15.25	0.033497	1
	2437	15.21	0.033189	1
	2462	15.52	0.035645	1
802.11g (6M)	2412	14.01	0.025177	1
	2437	13.98	0.025003	1
	2462	14.06	0.025468	1
802.11g (54M)	2412	14.03	0.025293	1
	2437	14.13	0.025882	1
	2462	14.14	0.025942	1

For 802.11b_1M rate

Low Channel:



Middle Channel:

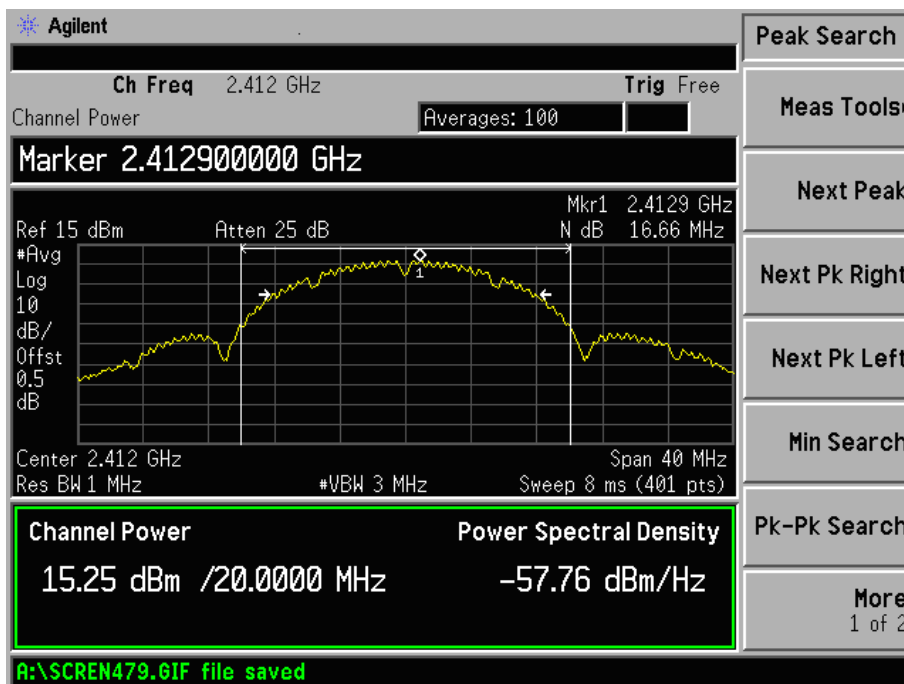


High Channel:

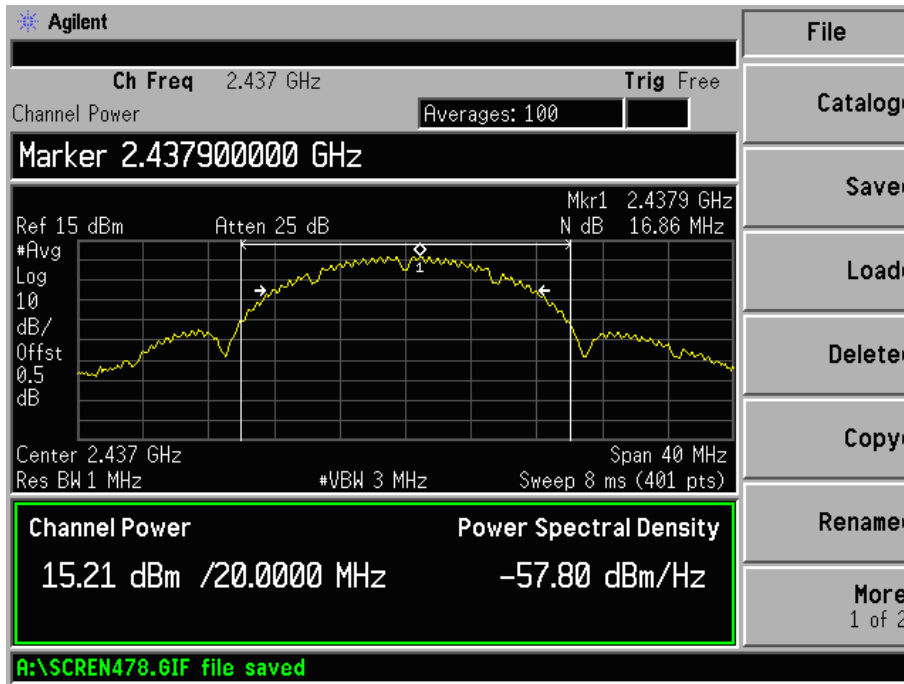


For 802.11b_11M rate

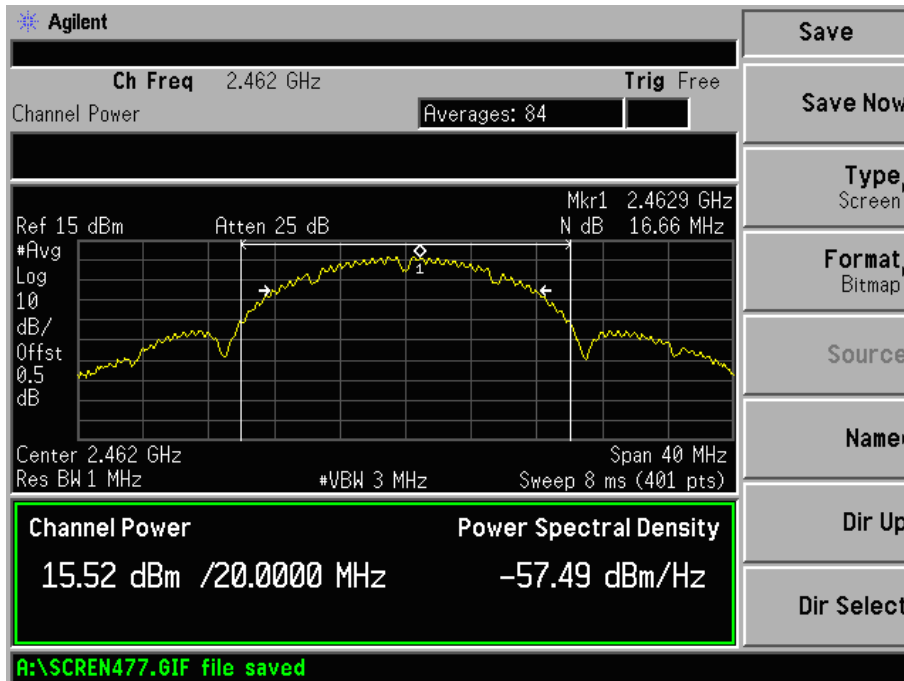
Low Channel:



Middle Channel:

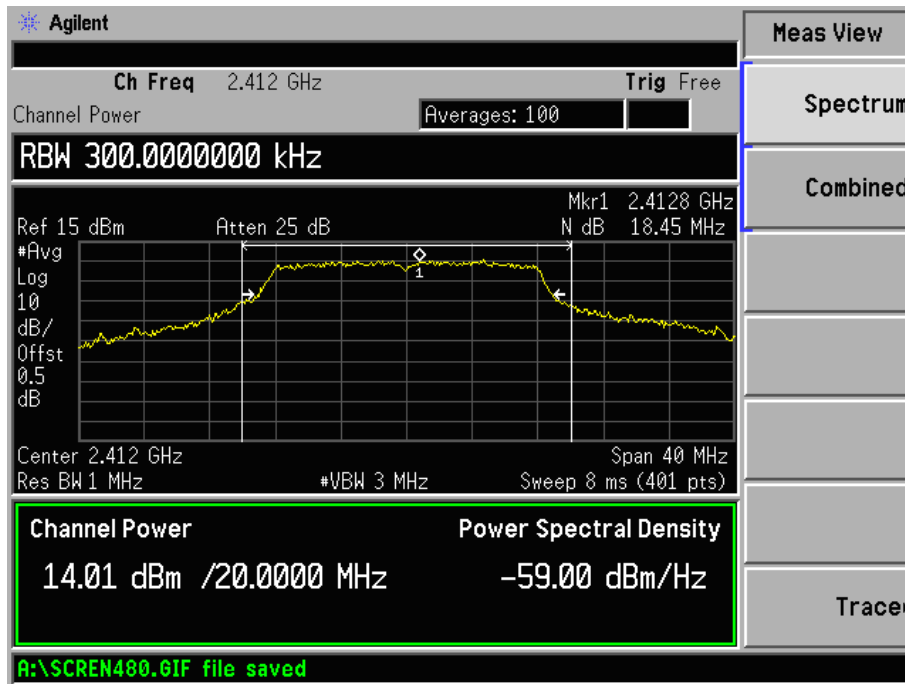


High Channel:

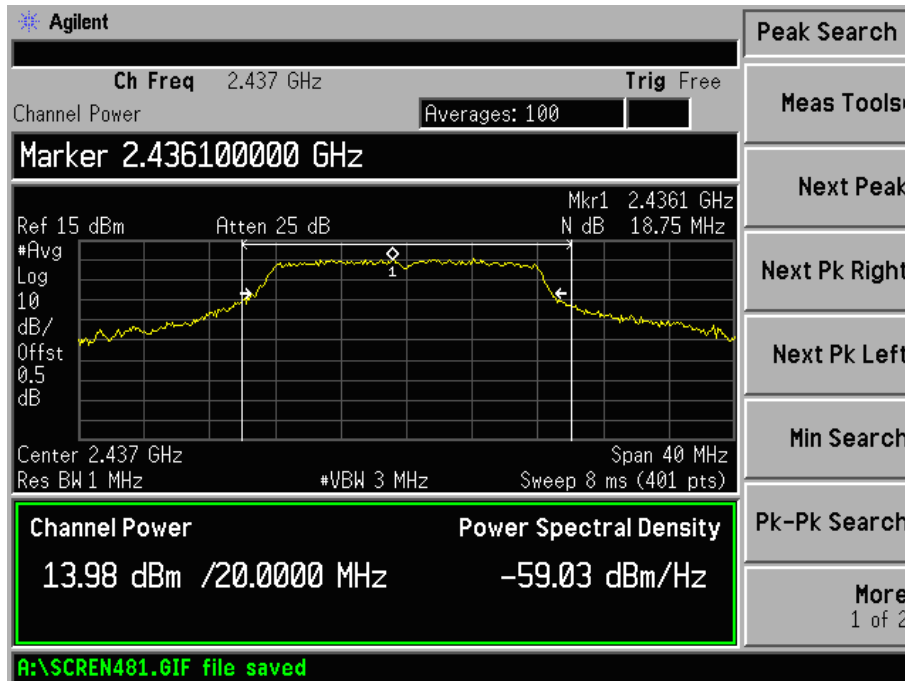


For 802.11g_6M rate

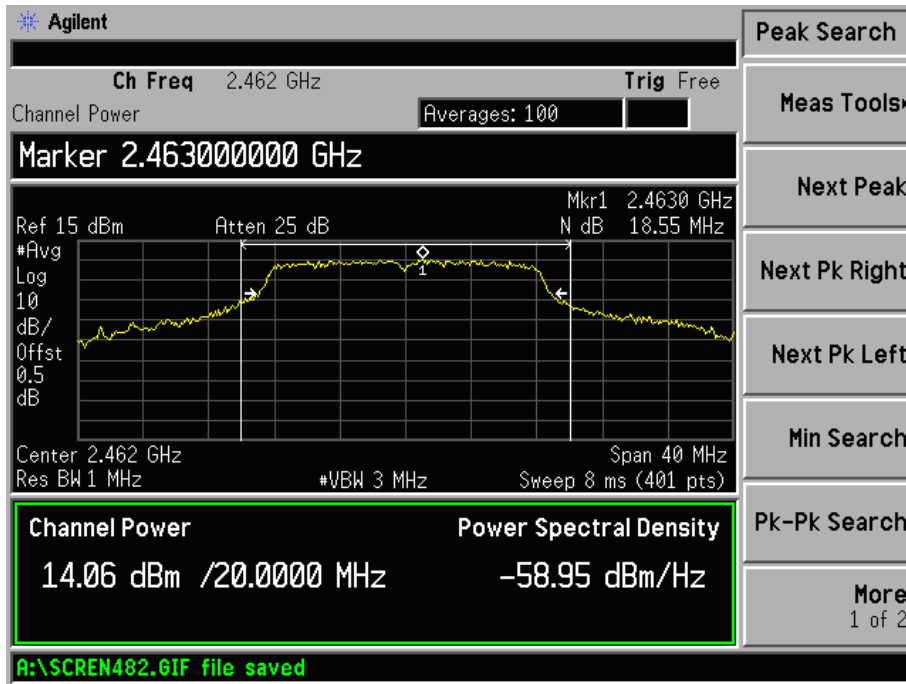
Low Channel:



Middle Channel:

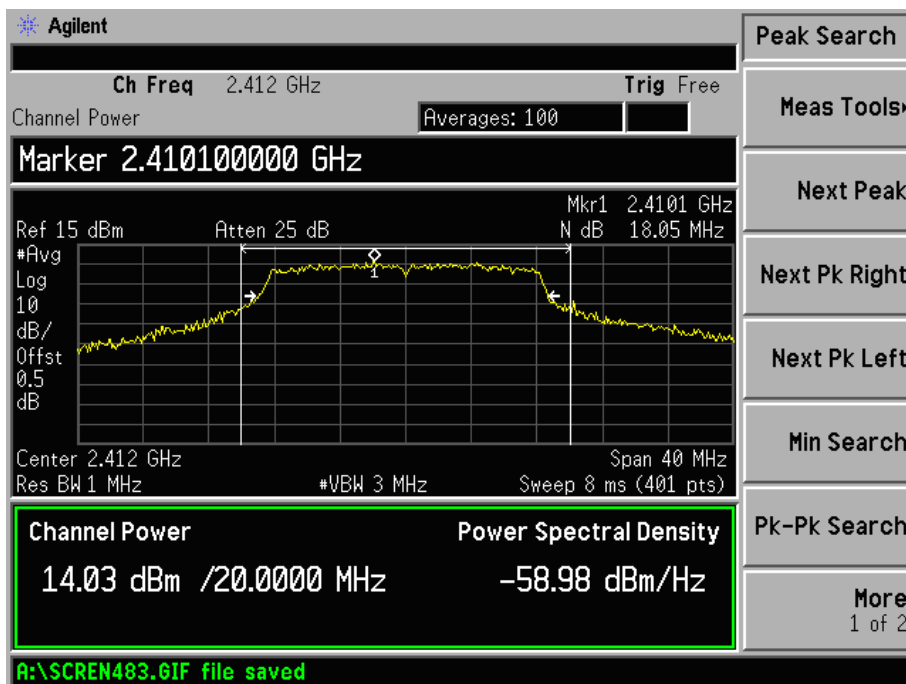


High Channel:



For 802.11g_54M rate

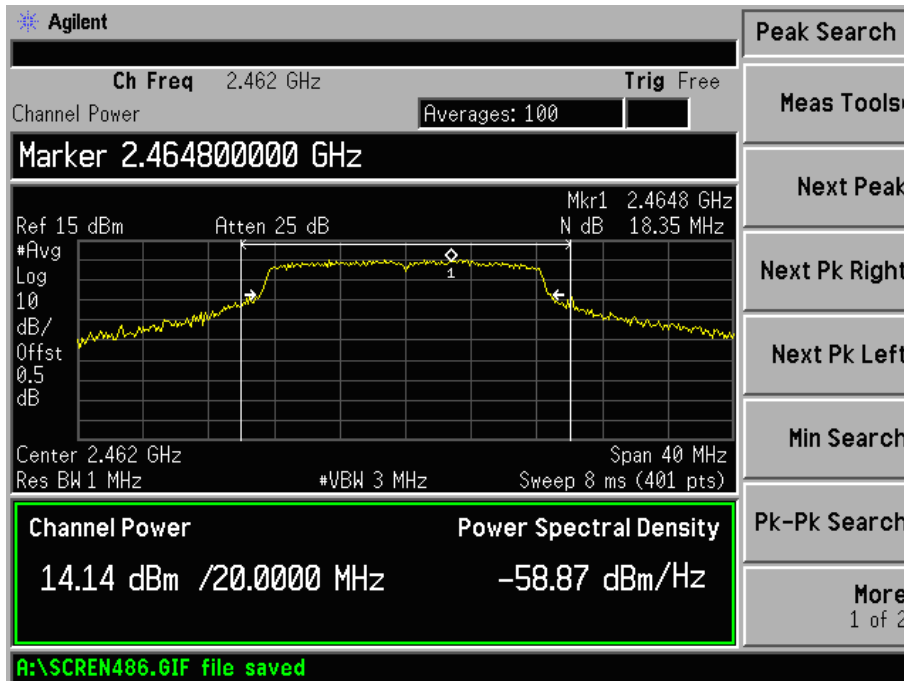
Low Channel:



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. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

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

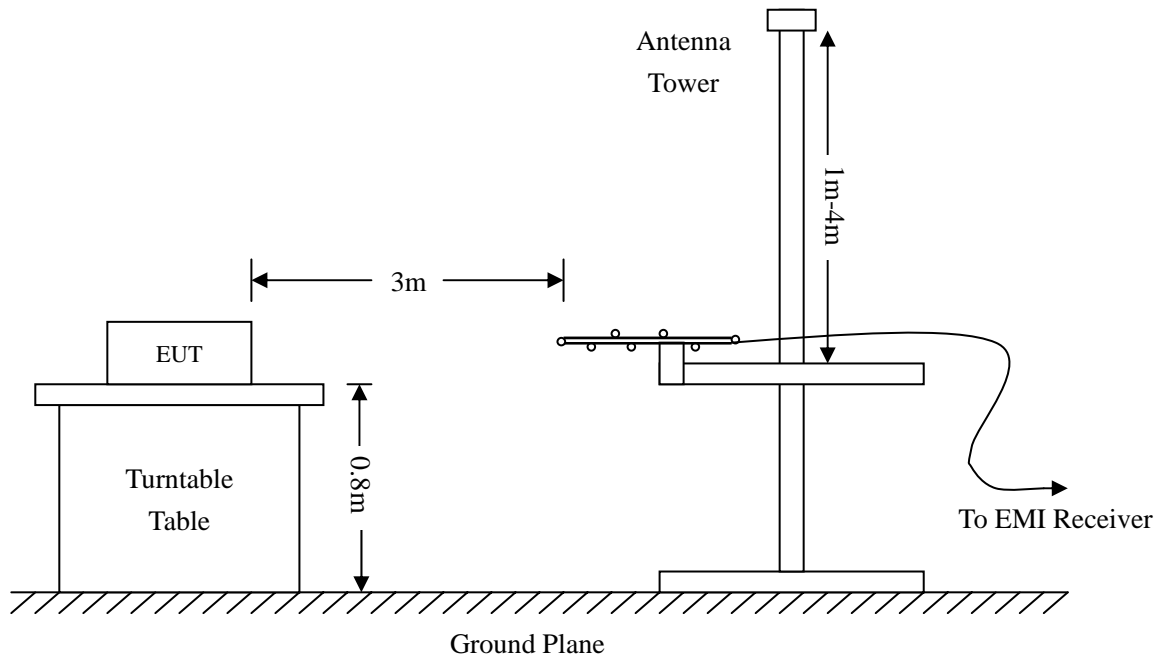
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2010-12-20	2011-12-19
EMI Test Receiver	R&S	ESVB	825471/005	2010-12-20	2011-12-19
Positioning Controller	C&C	CC-C-1F	N/A	2010-12-20	2011-12-19
RF Switch	EM	EMSW18	SW060023	2010-12-20	2011-12-19
Pre-amplifier	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
Loop Antenna	SCHWARZECK	HFRA 5165	9365	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:

-1.39dB μ V at 925.7563MHz in the Vertical polarization, Transmitting 802.11b Middle Channel test mode with, 9 kHz to 25 GHz, 3Meters

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

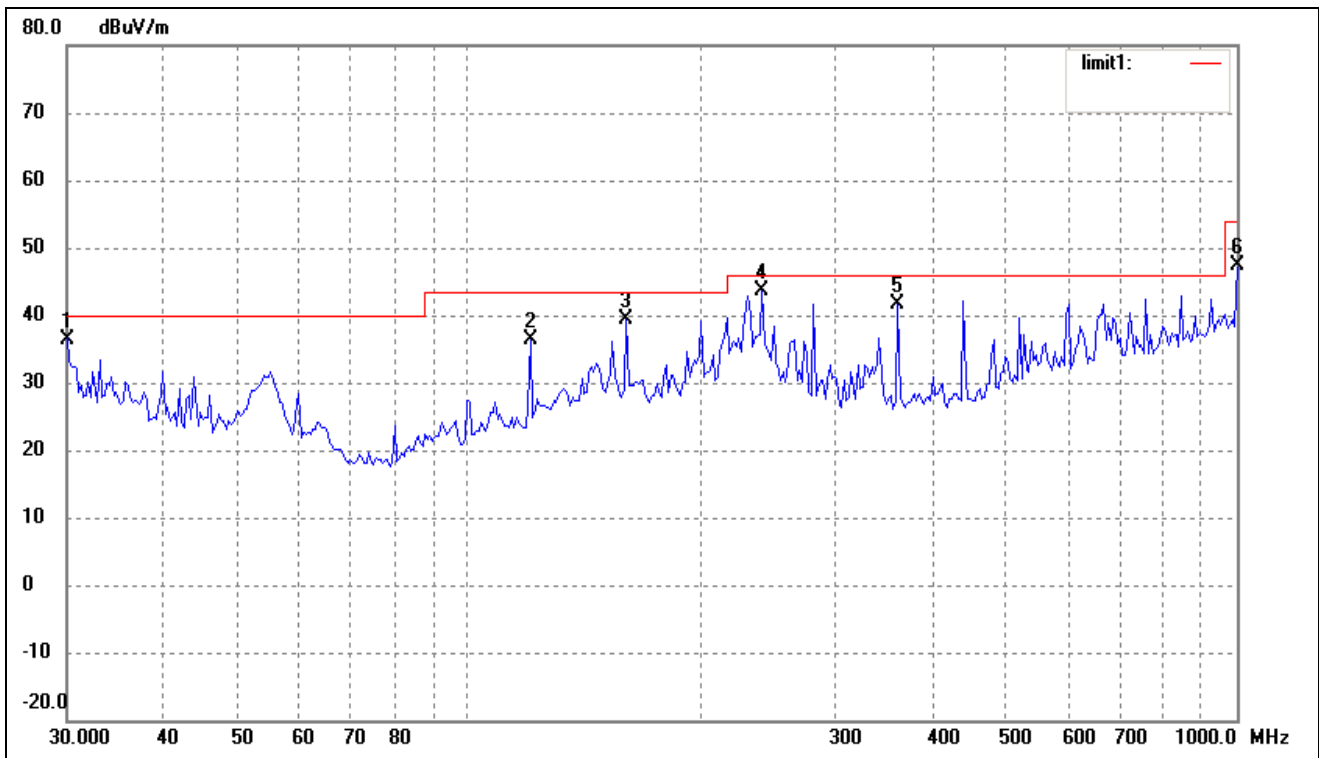
Test Result/Plots:

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11b) Low Channel

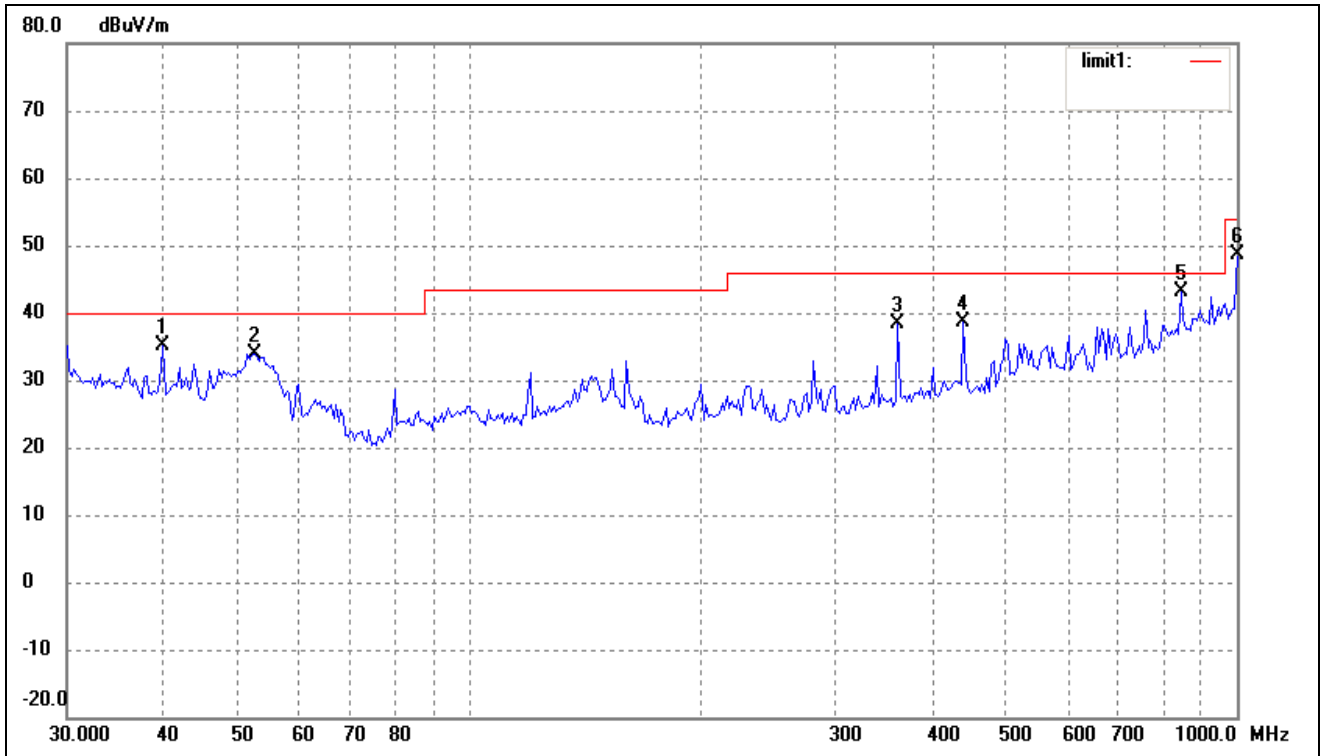
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	30.0000	29.73	6.77	36.50	40.00	-3.50	325	200	QP
2	120.2766	30.46	5.91	36.37	43.50	-7.13	0	200	peak
3	160.3457	34.71	4.55	39.26	43.50	-4.24	236	120	QP
4	240.8304	35.09	8.45	43.54	46.00	-2.46	22	100	QP
5	361.7139	30.76	10.91	41.67	46.00	-4.33	162	120	QP
6	1000.0000	24.62	22.74	47.36	54.00	-6.64	360	200	peak

Vertical



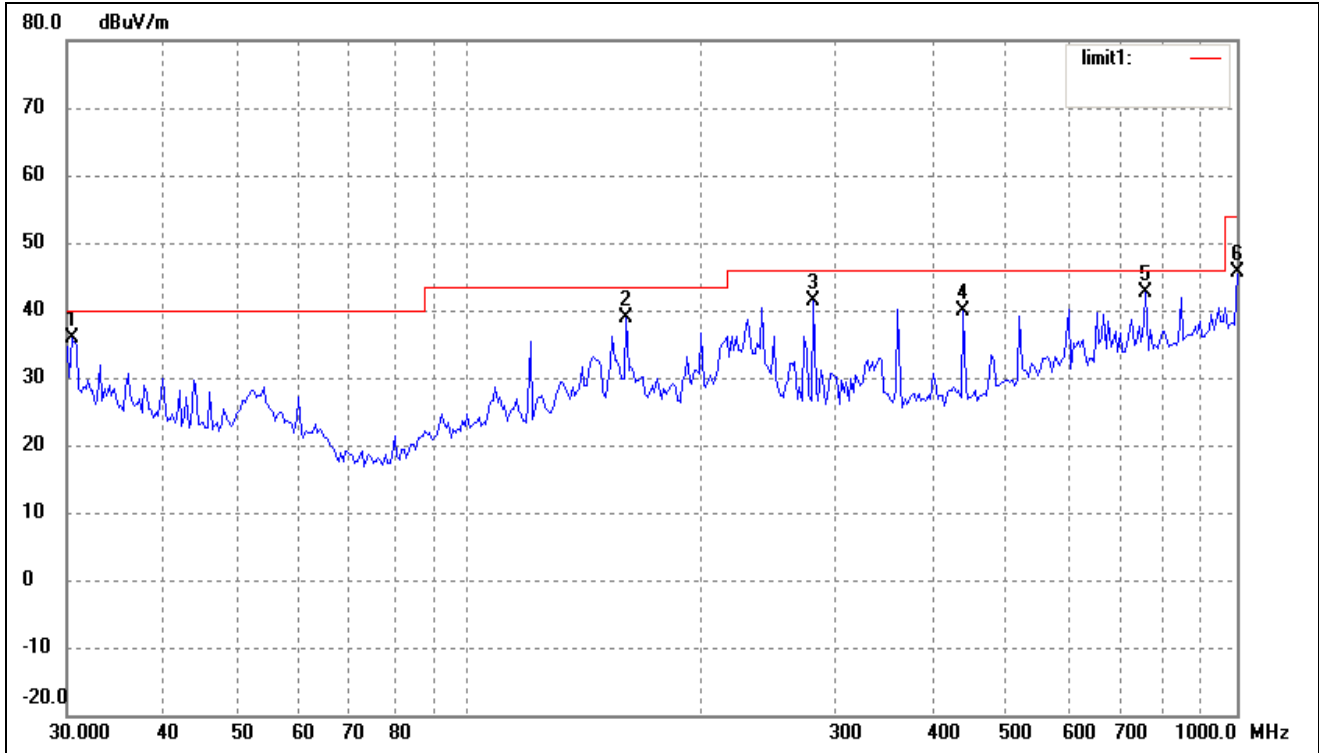
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	39.9942	27.07	8.14	35.21	40.00	-4.79	326	129	QP
2	52.5753	26.11	7.87	33.98	40.00	-6.02	0	200	peak
3	361.7139	27.49	10.91	38.40	46.00	-7.60	0	200	peak
4	440.1963	26.34	12.18	38.52	46.00	-7.48	360	100	peak
5	845.0878	23.34	19.86	43.20	46.00	-2.80	323	150	QP
6	1000.0000	25.93	22.74	48.67	54.00	-5.33	21	140	QP

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11b) Middle Channel

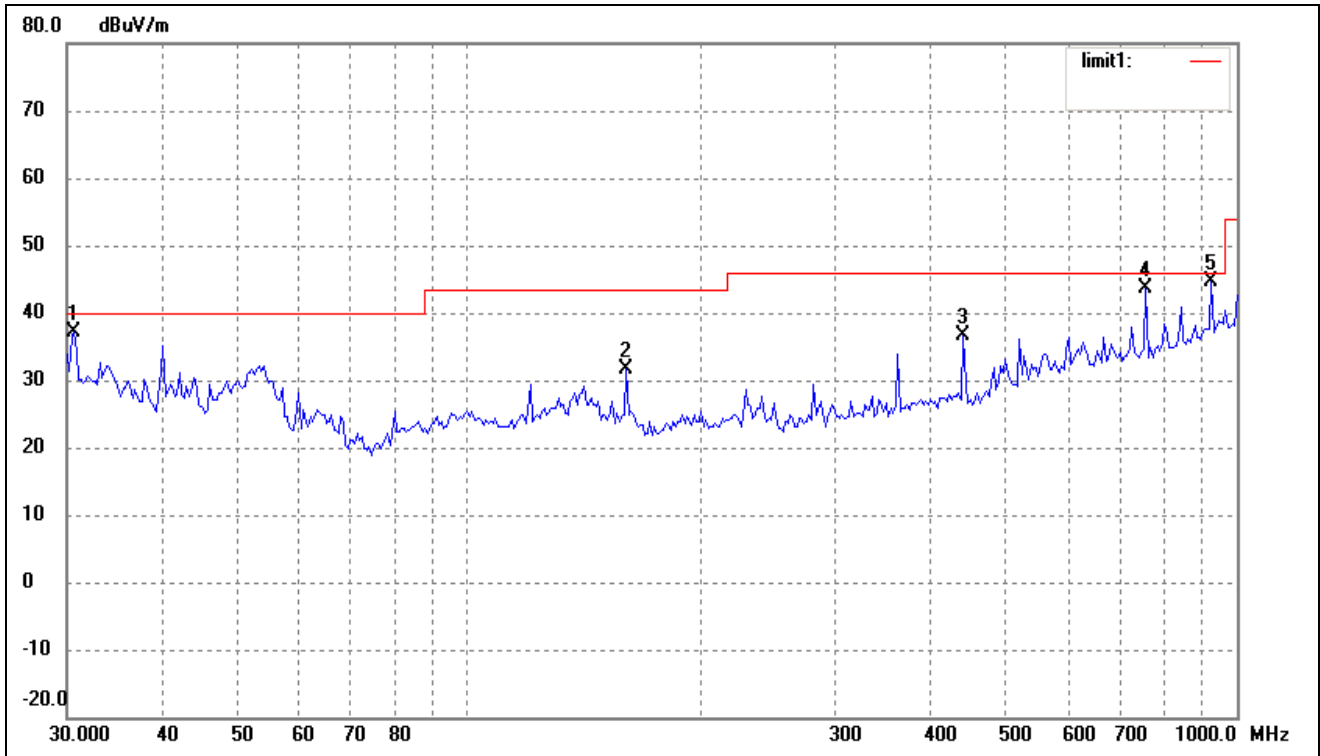
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	30.4238	29.07	6.77	35.84	40.00	-4.16	326	150	QP
2	160.3457	34.28	4.55	38.83	43.50	-4.67	56	200	QP
3	281.0075	31.73	9.53	41.26	46.00	-4.74	331	200	QP
4	440.1963	27.69	12.18	39.87	46.00	-6.13	0	100	peak
5	760.7036	24.21	18.42	42.63	46.00	-3.37	26	125	QP
6	1000.0000	22.93	22.74	45.67	54.00	-8.33	360	200	peak

Vertical



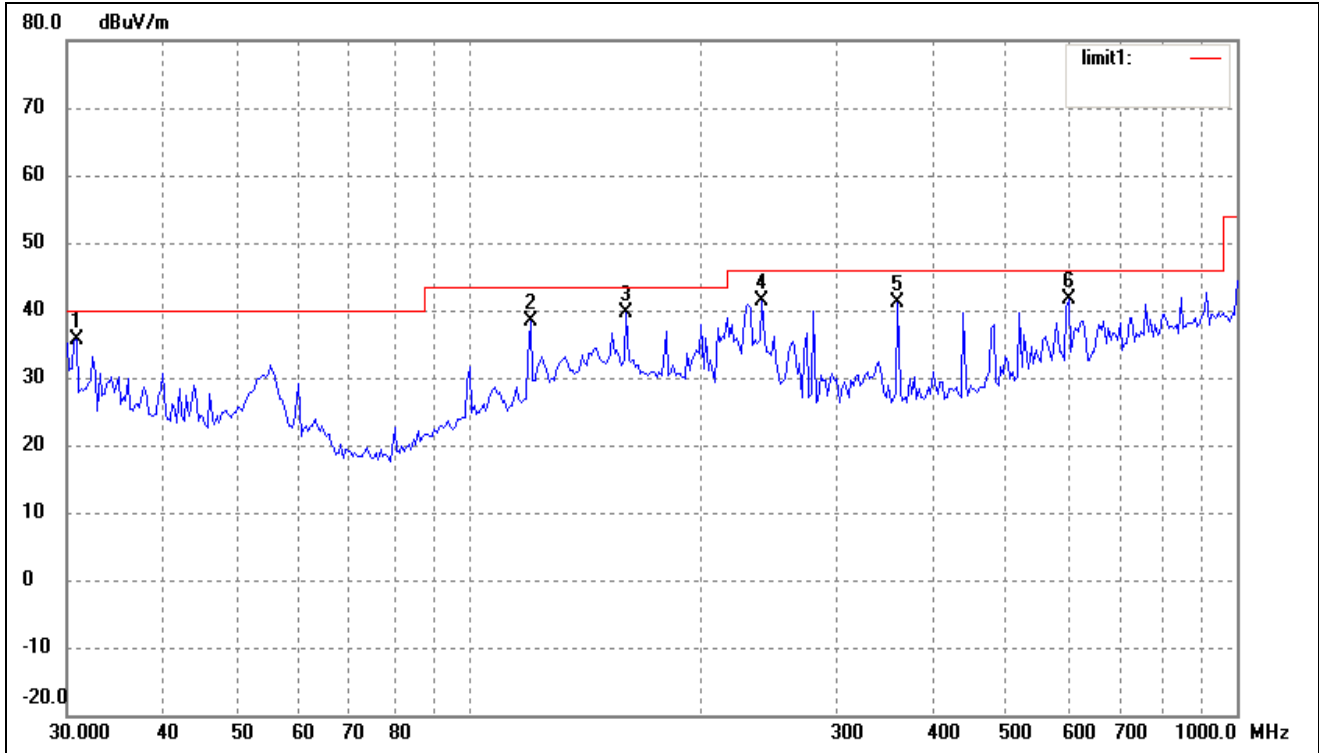
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	30.6379	30.41	6.77	37.18	40.00	-2.82	64	124	QP
2	160.3457	26.96	4.55	31.51	43.50	-11.99	360	200	peak
3	440.1963	24.37	12.18	36.55	46.00	-9.45	0	200	peak
4	760.7036	25.13	18.42	43.55	46.00	-2.45	213	166	QP
5	925.7563	23.23	21.38	44.61	46.00	-1.39	229	150	QP

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11b) High Channel

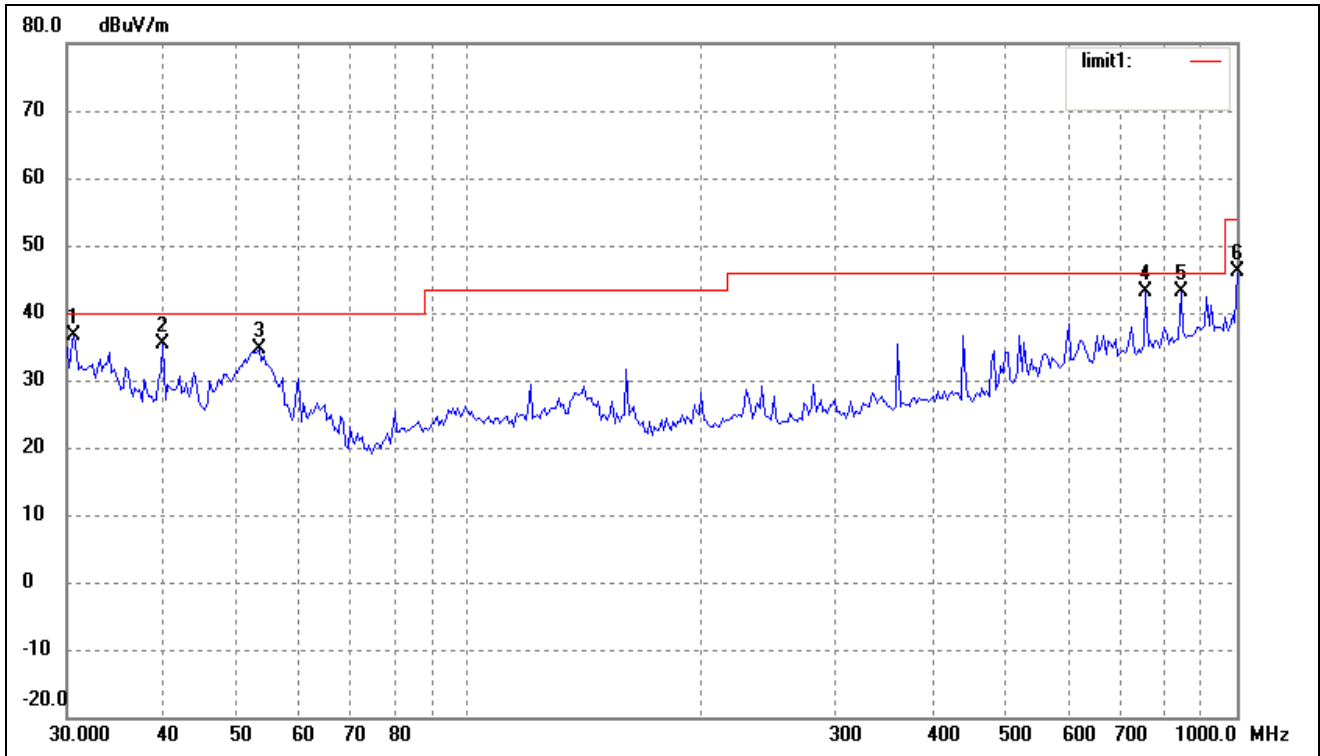
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	30.8535	28.96	6.77	35.73	40.00	-4.27	326	226	QP
2	120.2766	32.35	5.91	38.26	43.50	-5.24	19	100	QP
3	160.3457	34.97	4.55	39.52	43.50	-3.98	33	200	QP
4	240.8304	33.02	8.45	41.47	46.00	-4.53	266	100	QP
5	361.7139	30.17	10.91	41.08	46.00	-4.92	306	120	QP
6	603.5392	24.95	16.70	41.65	46.00	-4.35	229	150	QP

Vertical



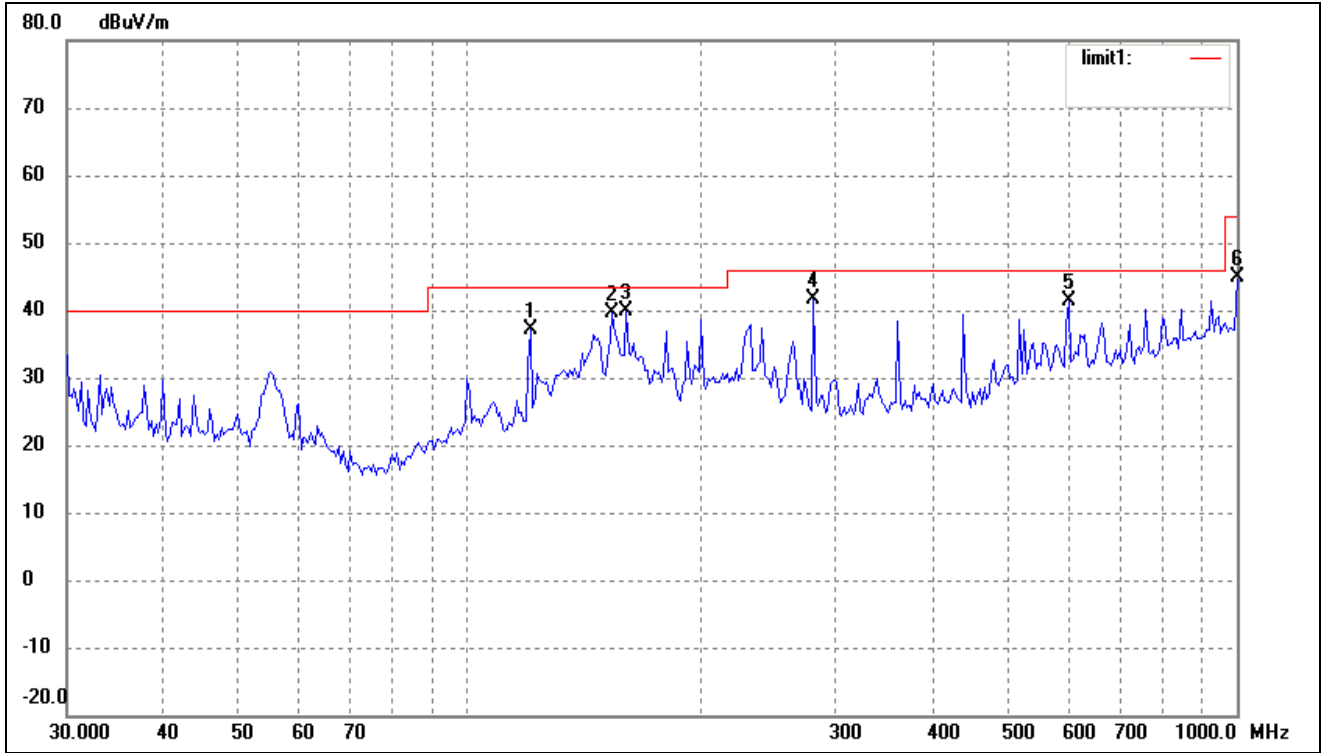
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	30.6379	29.91	6.77	36.68	40.00	-3.32	62	125	QP
2	39.9942	27.25	8.14	35.39	40.00	-4.61	331	141	QP
3	53.3179	26.82	7.84	34.66	40.00	-5.34	264	150	QP
4	760.7036	24.63	18.42	43.05	46.00	-2.95	215	100	QP
5	845.0878	23.34	19.86	43.20	46.00	-2.80	30	212	QP
6	1000.0000	23.49	22.74	46.23	54.00	-7.77	360	200	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g) Low Channel

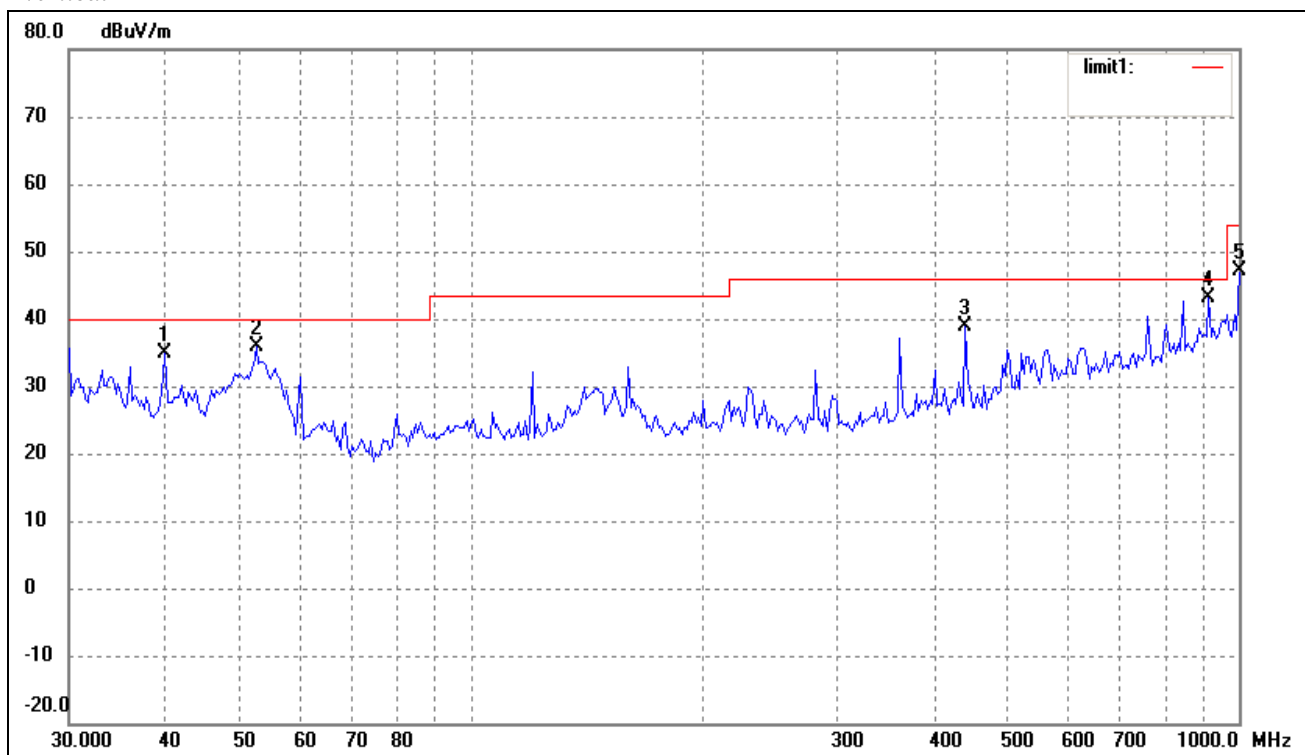
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	120.2766	31.30	5.91	37.21	43.50	-6.29	360	200	peak
2	153.7385	35.31	4.25	39.56	43.50	-3.94	326	152	QP
3	160.3457	35.29	4.55	39.84	43.50	-3.66	152	100	QP
4	281.0075	32.12	9.53	41.65	46.00	-4.35	56	120	QP
5	603.5392	24.76	16.70	41.46	46.00	-4.54	215	150	QP
6	1000.0000	22.21	22.74	44.95	54.00	-9.05	360	200	peak

Vertical



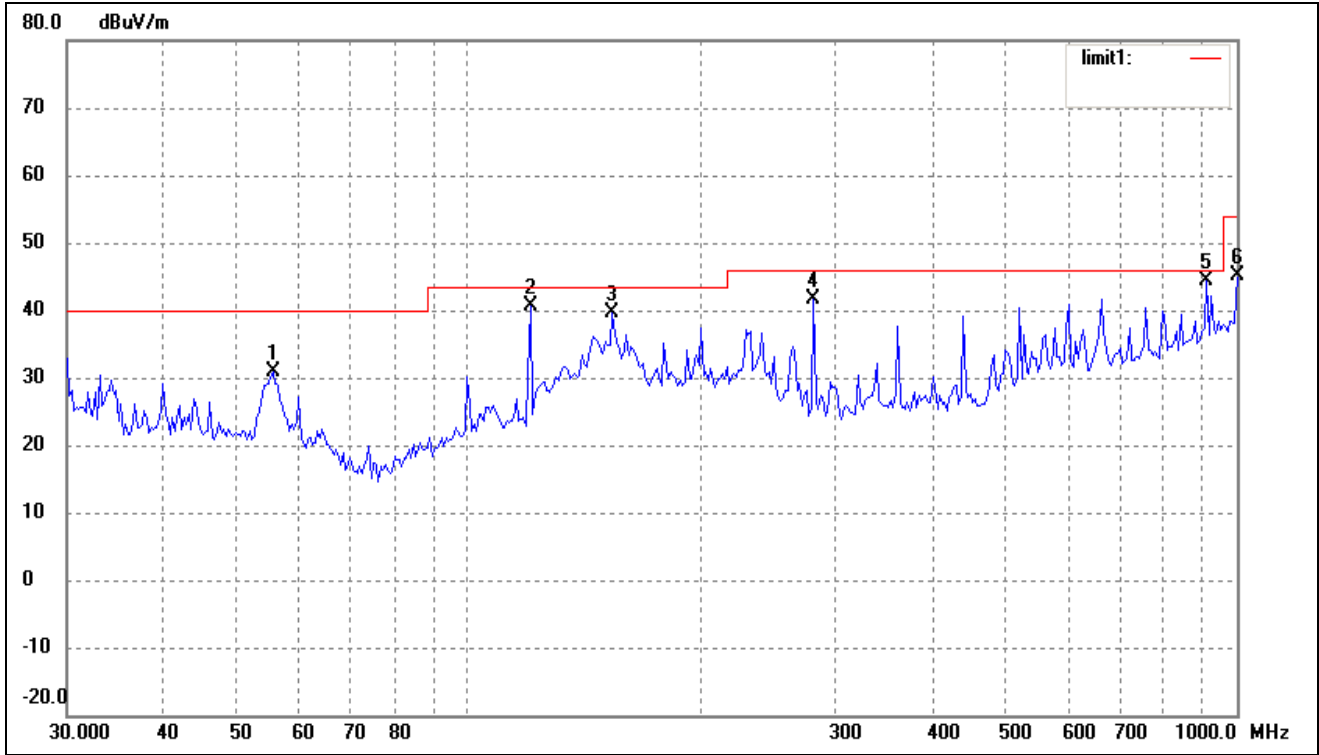
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	39.9942	26.85	8.14	34.99	40.00	-5.01	326	115	QP
2	52.5753	27.94	7.87	35.81	40.00	-4.19	212	161	QP
3	440.1963	26.60	12.18	38.78	46.00	-7.22	360	200	peak
4	912.8620	21.93	21.14	43.07	46.00	-2.93	21	155	QP
5	1000.0000	24.46	22.74	47.20	54.00	-6.80	0	200	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g) Middle Channel

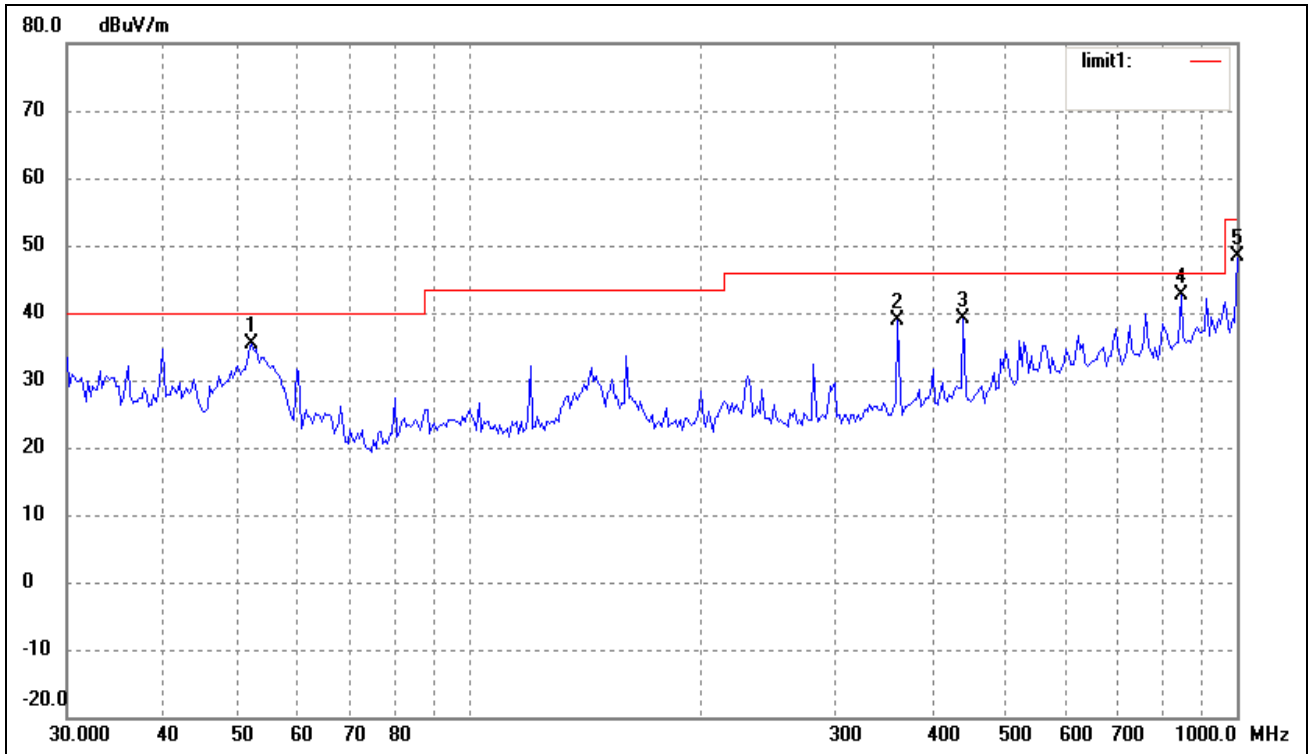
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	55.6094	23.13	7.74	30.87	40.00	-9.13	0	200	peak
2	120.2766	34.77	5.91	40.68	43.50	-2.82	232	119	QP
3	153.7385	35.34	4.25	39.59	43.50	-3.91	152	225	QP
4	281.0075	31.98	9.53	41.51	46.00	-4.49	61	165	QP
5	912.8620	23.34	21.14	44.48	46.00	-1.52	0	231	QP
6	1000.0000	22.31	22.74	45.05	54.00	-8.95	360	200	peak

Vertical



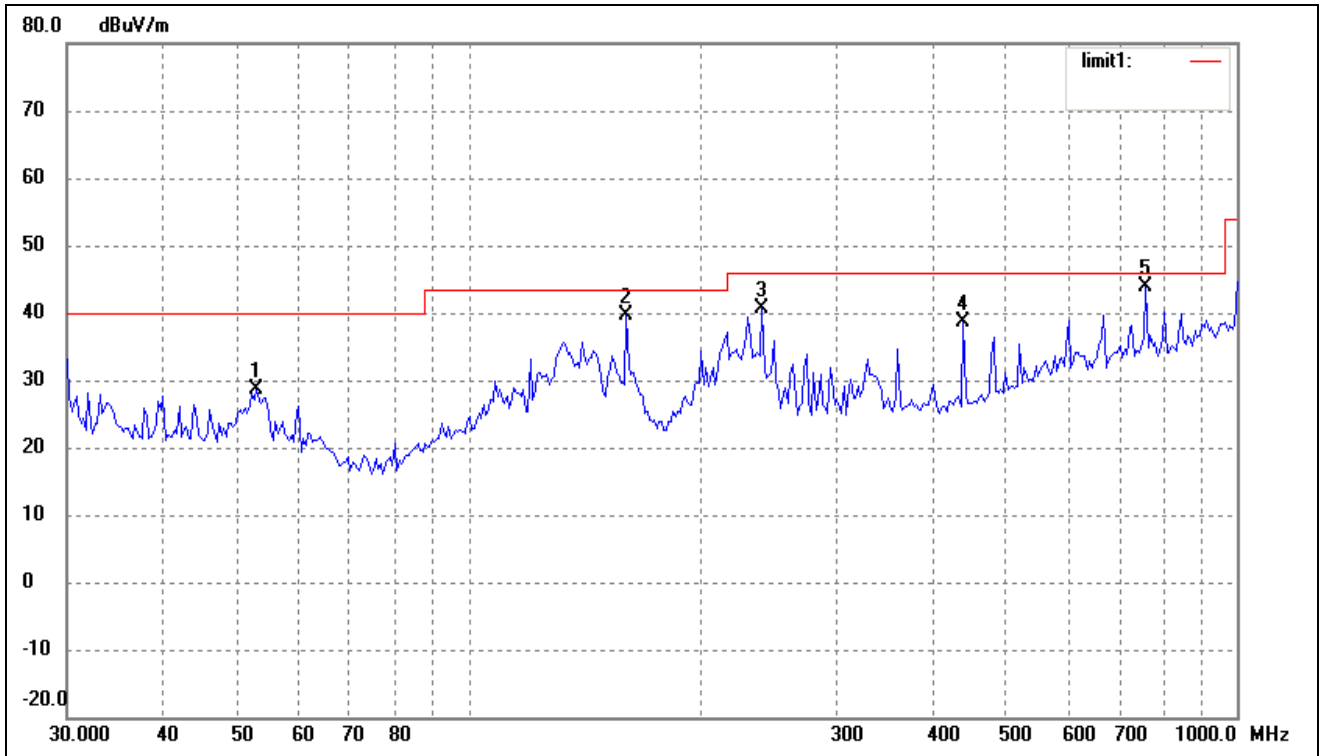
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	52.2079	27.38	7.88	35.26	40.00	-4.74	326	122	QP
2	361.7139	27.85	10.91	38.76	46.00	-7.24	360	100	peak
3	440.1963	26.96	12.18	39.14	46.00	-6.86	0	200	peak
4	845.0878	22.71	19.86	42.57	46.00	-3.43	145	210	QP
5	1000.0000	25.67	22.74	48.41	54.00	-5.59	311	255	QP

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g) High Channel

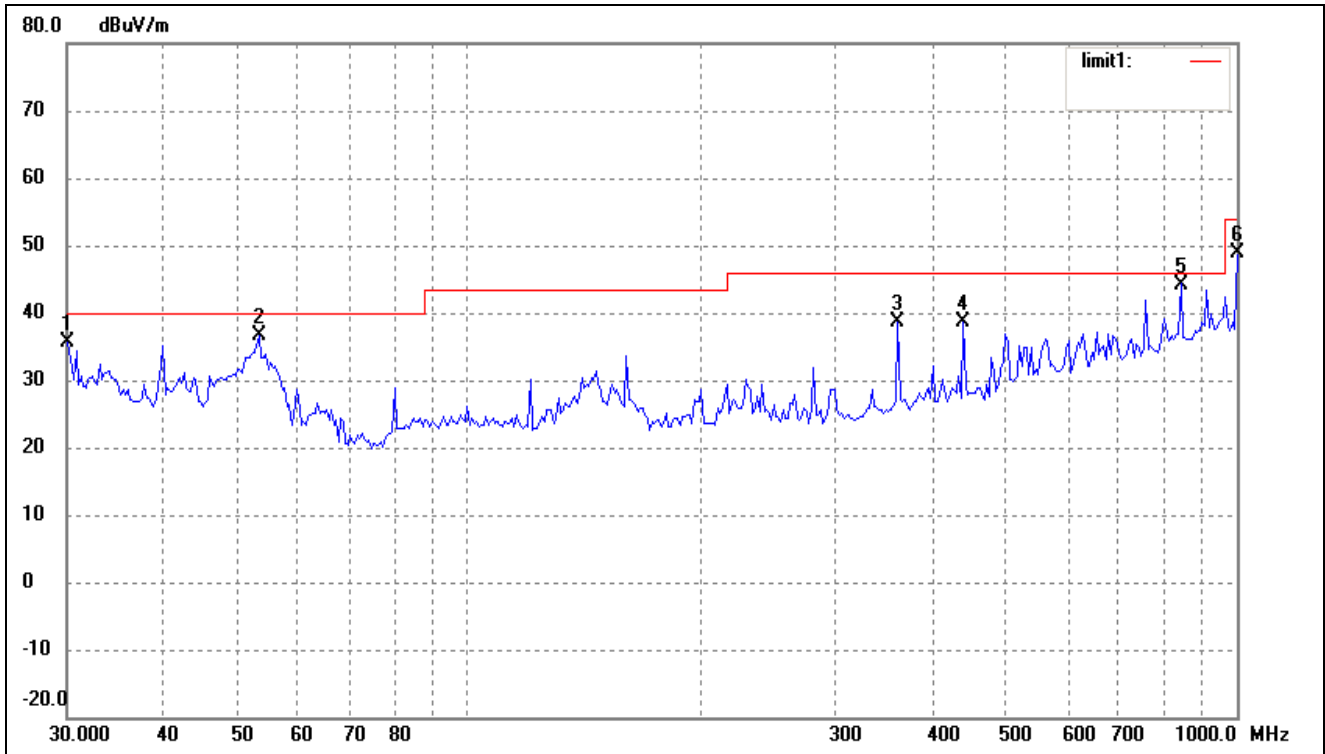
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	52.9453	20.84	7.85	28.69	40.00	-11.31	360	100	peak
2	160.3457	34.99	4.55	39.54	43.50	-3.96	322	115	QP
3	240.8304	32.14	8.45	40.59	46.00	-5.41	52	122	QP
4	440.1963	26.37	12.18	38.55	46.00	-7.45	360	200	peak
5	760.7036	25.40	18.42	43.82	46.00	-2.18	152	215	QP

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	30.0000	28.76	6.77	35.53	40.00	-4.47	22	132	QP
2	53.3179	28.82	7.84	36.66	40.00	-3.34	265	155	QP
3	361.7139	27.62	10.91	38.53	46.00	-7.47	360	100	peak
4	440.1963	26.39	12.18	38.57	46.00	-7.43	0	200	peak
5	845.0878	24.39	19.86	44.25	46.00	-1.75	326	221	QP
6	1000.0000	26.03	22.74	48.77	54.00	-5.23	121	108	QP

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 (2412MHz)										
4824.0	PK	46.38	65	H	34.1	5.2	33.0	52.68	74	-21.32
4824.0	PK	42.18	98	V	34.1	5.2	33.0	48.48	74	-25.52
7236.0	PK	37.32	256	H	37.4	6.1	33.5	47.32	74	-26.68
7236.0	PK	36.26	185	V	37.4	6.1	33.5	46.26	74	-27.74
4824.0	AV	41.86	57	H	34.1	5.2	33.0	48.16	54	-5.84
4824.0	AV	39.96	35	V	34.1	5.2	33.0	46.26	54	-7.74
7236.0	AV	32.31	60	H	37.4	6.1	33.5	42.31	54	-11.69
7236.0	AV	31.02	79	V	37.4	6.1	33.5	41.02	54	-12.98
Middle Channel (2437MHz)										
4874.0	PK	44.96	237	H	34.1	5.2	33.0	51.26	74	-22.74
4874.0	PK	45.97	354	V	34.1	5.2	33.0	52.27	74	-21.73
7311.0	PK	37.2	264	H	37.4	6.1	33.5	47.2	74	-26.8
7311.0	PK	39.26	187	V	37.4	6.1	33.5	49.26	74	-24.74
4874.0	AV	37.95	21	H	34.1	5.2	33.0	44.25	54	-9.75
4874.0	AV	39.89	34	V	34.1	5.2	33.0	46.19	54	-7.81
7311.0	AV	29.36	342	H	37.4	6.1	33.5	39.36	54	-14.64
7311.0	AV	30.21	30	V	37.4	6.1	33.5	40.21	54	-13.79
High Channel (2462MHz)										
4924.0	PK	50.89	270	H	34.1	5.2	33.0	57.19	74	-16.81
4924.0	PK	45.64	45	V	34.1	5.2	33.0	51.94	74	-22.06
7386.0	PK	40.69	180	H	37.4	6.1	33.5	50.69	74	-23.31
7386.0	PK	37.61	45	V	37.4	6.1	33.5	47.61	74	-26.39
4924.0	AV	39.67	90	H	34.1	5.2	33.0	45.97	54	-8.03
4924.0	AV	37.86	270	V	34.1	5.2	33.0	44.16	54	-9.84
7386.0	AV	32.08	60	H	37.4	6.1	33.5	42.08	54	-11.92
7386.0	AV	28.61	60	V	37.4	6.1	33.5	38.61	54	-15.39

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 (2412MHz)										
4824.0	PK	53.01	90	H	34.1	5.2	33	59.31	74	-14.69
4824.0	PK	45.9	270	V	34.1	5.2	33	52.2	74	-21.8
7236.0	PK	41.74	180	H	37.4	6.1	33.5	51.74	74	-22.26
7236.0	PK	40.33	45	V	37.4	6.1	33.5	50.33	74	-23.67
4824.0	AV	40.07	270	H	34.1	5.2	33	46.37	54	-7.63
4824.0	AV	36.88	90	V	34.1	5.2	33	43.18	54	-10.82
7236.0	AV	32.32	45	H	37.4	6.1	33.5	42.32	54	-11.68
7236.0	AV	30.36	60	V	37.4	6.1	33.5	40.36	54	-13.64
Middle Channel (2437MHz)										
4874.0	PK	50.01	45	H	34.1	5.2	33.0	56.31	74	-17.69
4874.0	PK	44.21	270	V	34.1	5.2	33.0	50.51	74	-23.49
7311.0	PK	41.62	45	H	37.4	6.1	33.5	51.62	74	-22.38
7311.0	PK	37.53	180	V	37.4	6.1	33.5	47.53	74	-26.47
4874.0	AV	38.99	270	H	34.1	5.2	33.0	45.29	54	-8.71
4874.0	AV	36.91	90	V	34.1	5.2	33.0	43.21	54	-10.79
7311.0	AV	34.61	60	H	37.4	6.1	33.5	44.61	54	-9.39
7311.0	AV	28.83	45	V	37.4	6.1	33.5	38.83	54	-15.17
High Channel (2462MHz)										
4924.0	PK	56.06	270	H	34.1	5.2	33.0	62.36	74	-11.64
4924.0	PK	54.76	45	V	34.1	5.2	33.0	61.06	74	-12.94
7386.0	PK	50.48	180	H	37.4	6.1	33.5	60.48	74	-13.52
7386.0	PK	49.67	45	V	37.4	6.1	33.5	59.67	74	-14.33
4924.0	AV	41.96	90	H	34.1	5.2	33.0	48.26	54	-5.74
4924.0	AV	40.88	270	V	34.1	5.2	33.0	47.18	54	-6.82
7386.0	AV	36.28	60	H	37.4	6.1	33.5	46.28	54	-7.72
7386.0	AV	35.07	60	V	37.4	6.1	33.5	45.07	54	-8.93

Note: Testing is carried out with frequency rang 9kHz 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.

The measurements greater than 20dB below the limit from 9kHz to 30MHz..

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 2483.5MHz, then mark the higher-level emission for comparing with the FCC rules.

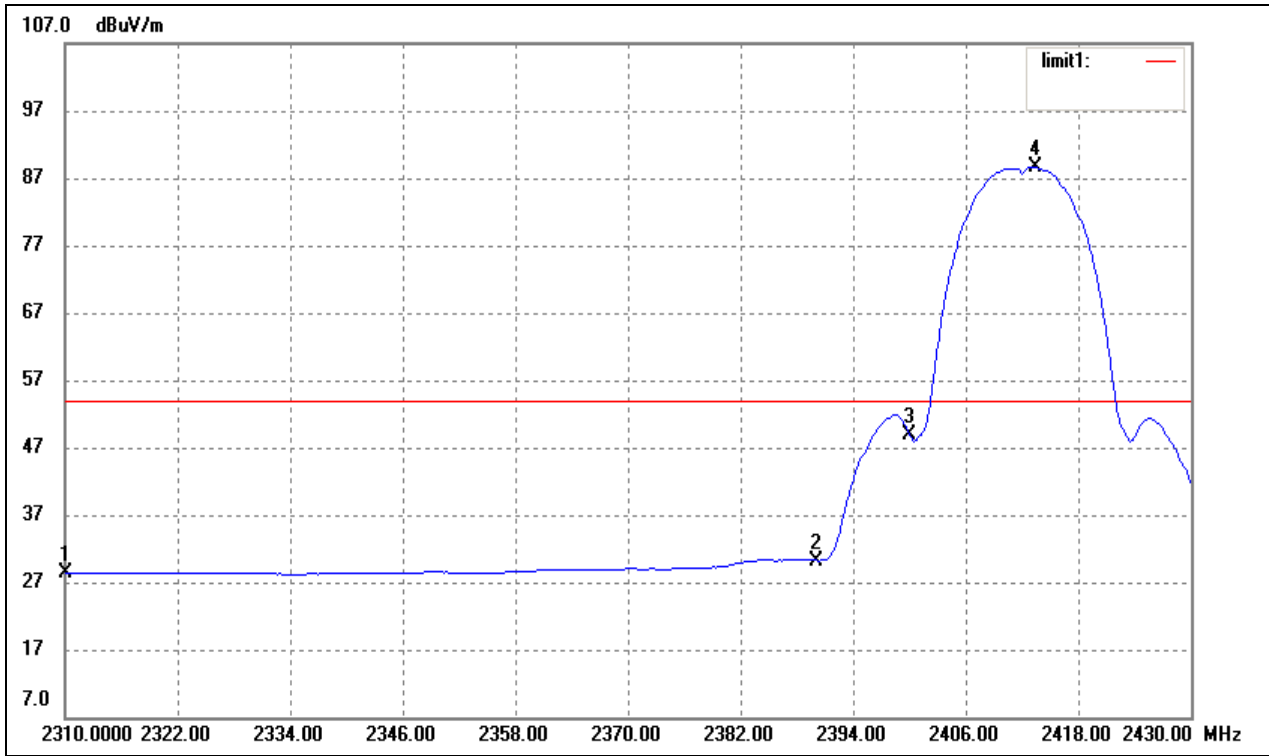
9.4 Environmental Conditions

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

9.5 Summary of Test Results/Plots

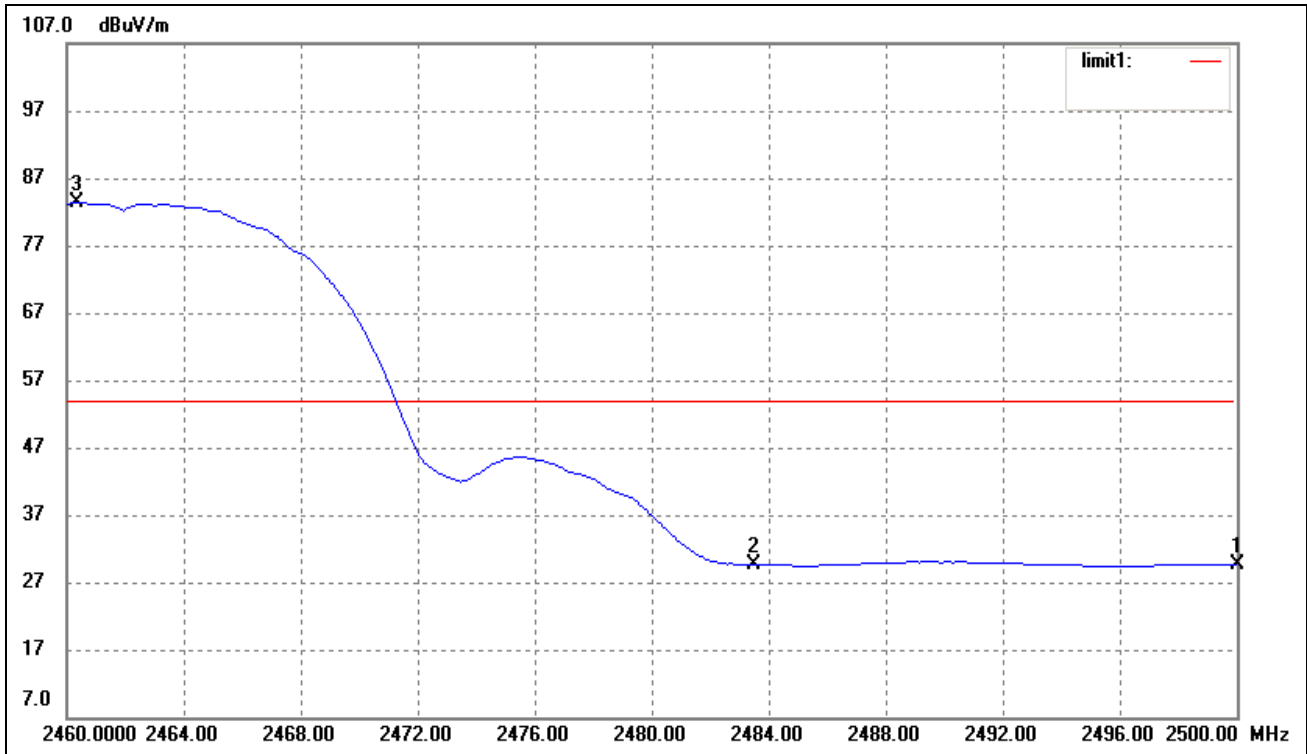
Test mode	Frequency MHz	Limit dBuV /dB	Result
802.11b	2310.00	<54dBuV	Pass
	2390.00	<54dBuV	Pass
	2400.00	>20dB	Pass
	2483.50	<54dBuV	Pass
	2500.00	<54dBuV	Pass
802.11g	2310.00	<54dBuV	Pass
	2390.00	<54dBuV	Pass
	2400.00	>20dB	Pass
	2483.50	<54dBuV	Pass
	2500.00	<54dBuV	Pass

For 802.11b
Lowest Bandedge



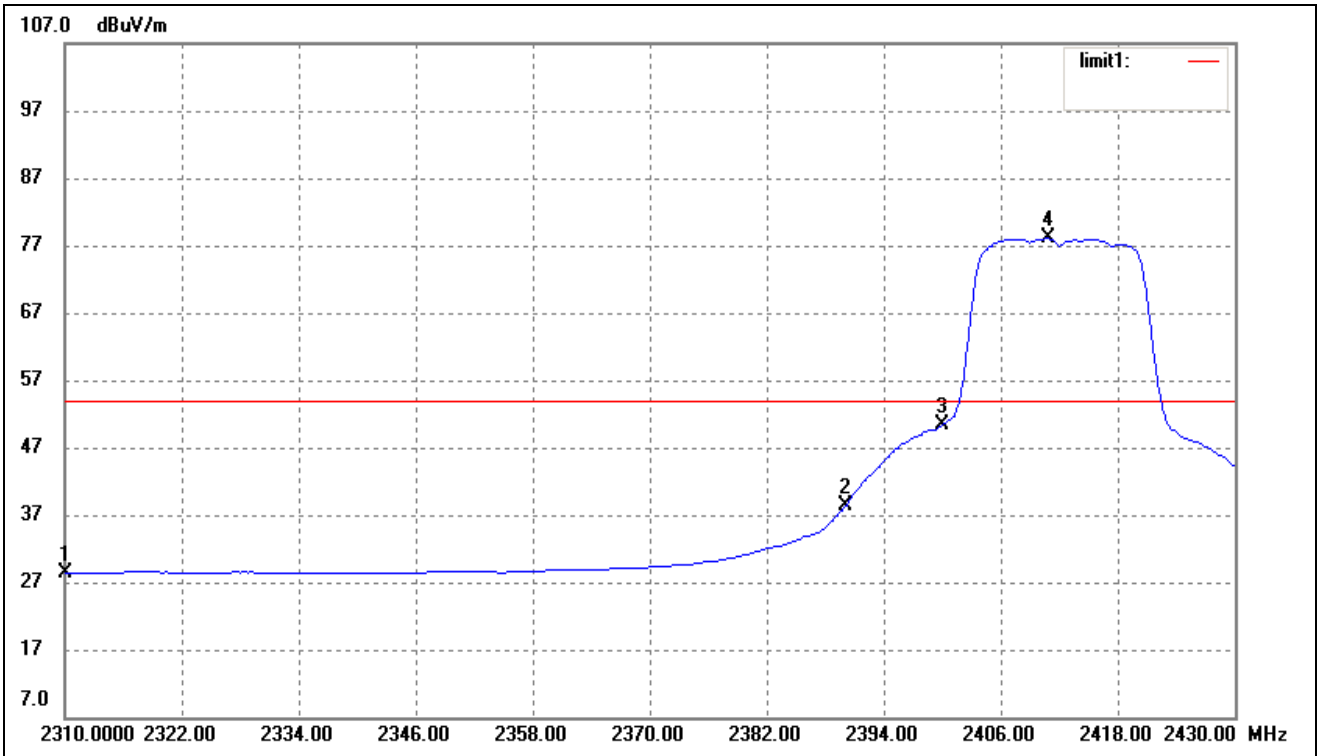
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	35.83	-7.51	28.32	54.00	-25.68	Average Detector
	2310.000	46.64	-7.51	39.13	74.00	-34.87	Peak Detector
2	2390.000	37.56	-7.34	30.22	54.00	-23.78	Average Detector
	2390.000	49.18	-7.34	41.84	74.00	-32.16	Peak Detector
3	2400.000	56.25	-7.31	48.94	/	/	Average Detector
4	2413.440	95.84	-7.28	88.56	/	/	Average Detector

For 802.11b
Highest Bandedge



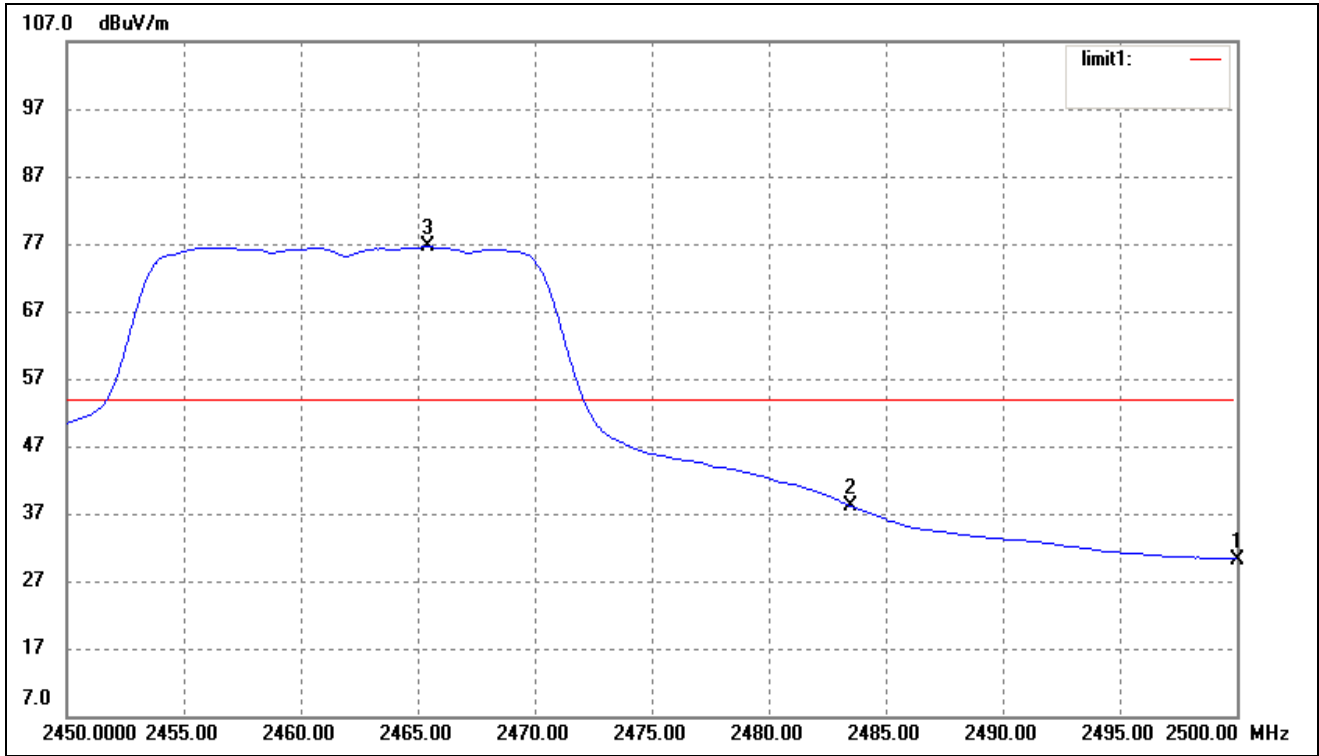
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2500.000	36.61	-7.08	29.53	54.00	-24.47	Average Detector
	2500.000	45.08	-7.08	38.00	74.00	-36.00	Peak Detector
2	2483.500	36.75	-7.13	29.62	54.00	-24.38	Average Detector
	2483.500	49.67	-7.13	42.54	74.00	-31.46	Peak Detector
3	2460.320	90.47	-7.17	83.30	/	/	Average Detector

For 802.11g
Lowest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	35.97	-7.51	28.46	54.00	-25.54	Average Detector
	2310.000	48.67	-7.51	41.16	74.00	-32.84	Peak Detector
2	2390.000	45.79	-7.34	38.45	54.00	-15.55	Average Detector
	2390.000	53.61	-7.34	46.27	74.00	-27.73	Peak Detector
3	2400.000	57.60	-7.31	50.29	/	/	Average Detector
4	2410.800	85.31	-7.28	78.03	/	/	Average Detector

Highest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2500.000	37.26	-7.08	30.18	54.00	-23.82	Average Detector
	2500.000	45.38	-7.08	38.30	74.00	-35.70	Peak Detector
2	2483.500	45.20	-7.13	38.07	54.00	-15.93	Average Detector
	2483.500	51.34	-7.13	44.21	74.00	-29.79	Peak Detector
3	2465.400	83.75	-7.16	76.59	/	/	Average Detector

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