

FCC Part 15C Measurement and Test Report

For

Shenzhen Anbash Technology CO., LTD.

Area B, 4/FL, Block G, Heng Chang Rong Xinghui Technology Park, West Hua
Ning Road, Da Lang Community, Bao'an District, Shenzhen, P.R.C

FCC ID: Z6BNC213W

Report Concerns: Original Report	Equipment Type: Network Camera
Model:	<u>NC213W</u>
Report No.:	<u>STR12038237I</u>
Test Date:	<u>2012-03-29 to 2012-04-15</u>
Issue Date:	<u>2012-04-17</u>
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Approved & Authorized By:	<u>Jandy so / PSQ Manager</u> <i>Jandyso</i>
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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: Shenzhen Anbash Technology CO., LTD.
 Address of applicant: Area B, 4/FL, Block G, Heng Chang Rong Xinghui Technology Park, West Hua Ning Road, Da Lang Community, Bao'an District, Shenzhen, P.R.C

Manufacturer: Shenzhen Anbash Technology CO., LTD.
 Address of manufacturer: Area B, 4/FL, Block G, Heng Chang Rong Xinghui Technology Park, West Hua Ning Road, Da Lang Community, Bao'an District, Shenzhen, P.R.C

General Description of E.U.T

Items	Description
EUT Description:	Network Camera
Trade Name:	Anbash
Model No.:	NC213W
Adding Model:	NC212W
Rated Voltage:	DC 12V
RF Output Power	Max. 12.35dBm (Conducted)
Antenna Gain:	4.5 dBi
Frequency range:	2412-2462MHz
Number of channels:	11
Channel Separation:	5MHz
Type of Antenna:	Integral Antenna

Note: The test data is gathered from a production sample, provided by the manufacture. The others models listed in the report have different appearance only of NC213W without circuit and electronic construction changed, declared by the manufacturer.

1.2 Test Standards

The following report is prepared on behalf of the Shenzhen Anbash Technology CO., LTD. in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

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

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

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted with Low Channel, Middle Channel and High Channel, accordingly in reference to the Operating Instructions.

1.4 Test Facility

- **FCC – Registration No.: 994117**

SEM.Test Compliance Services Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 994117.

- **Industry Canada (IC) Registration No.: 7673A**

The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

- **CNAS Registration No.: L4062**

Shenzhen SEM.Test Electronics Service Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C (518101)

1.5 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components.

1.6 Accessories Equipment List and Details

Description	Manufacturer	Model	Serial Number
Notebook	Sansung	NP-R20	124V93FP30082V
/	/	/	/

1.7 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
Power Cable	1.5	Unshielded	Without Core
Network Cable	2	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

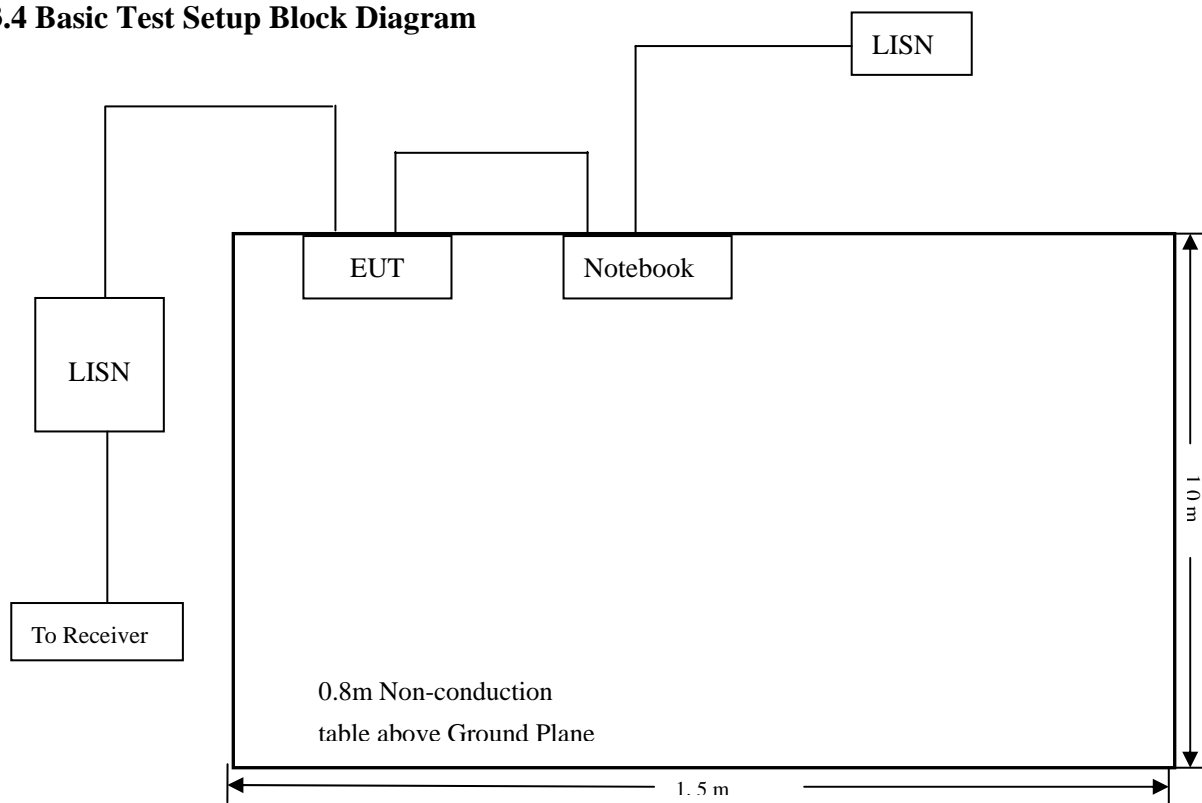
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2012-03-28	2013-03-27
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2012-03-28	2013-03-27
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2012-03-28	2013-03-27

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 C63.4-2009, 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 Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

-3.45 dB μ V at 0.162 MHz in the Line Pk Detector, 0.15-30MHz

3.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

Conducted Disturbance

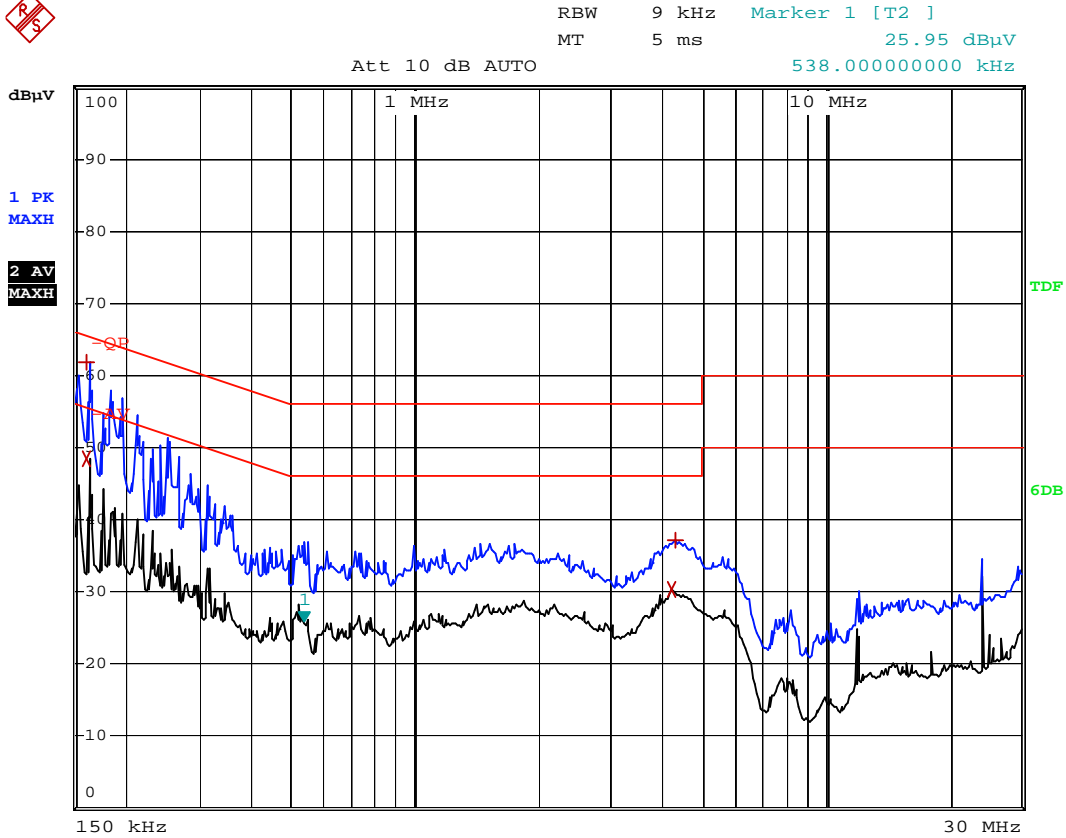
EUT: Network Camera

M/N: NC213W

Operating Condition: Transmitting

Test Specification: L

Comment: AC 120V/60Hz/Adapter 12V



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Max Peak	162 kHz	61.90	-3.45
2 Average	162 kHz	48.31	-7.04
2 Average	4.23 MHz	30.27	-15.72
1 Max Peak	4.318 MHz	37.05	-18.94

Plot of Conducted Emissions Test Data

Conducted Disturbance

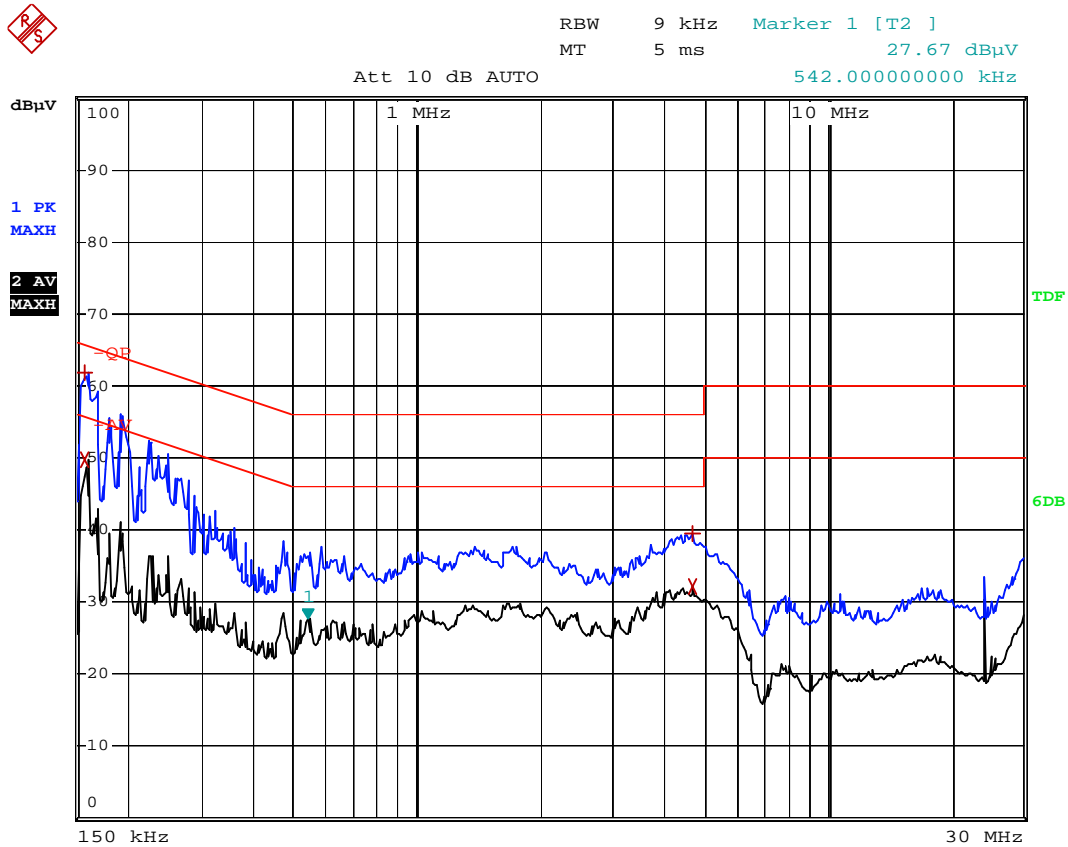
EUT: Network Camera

M/N: NC213W

Operating Condition: Transmitting

Test Specification: N

Comment: AC 120V/60Hz/Adapter 12V



EDIT PEAK LIST (Prescan Results)			
Trace1:		-QP	
Trace2:		-AV	
Trace3:		---	
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Max Peak	158 kHz	61.88	-3.68
2 Average	158 kHz	49.81	-5.75
1 Max Peak	4.706 MHz	39.54	-16.45
2 Average	4.706 MHz	32.19	-13.80

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	2012-03-28	2013-03-27
Attenuator	ATTEN	ATS100-4-20	/	2012-03-28	2013-03-27

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

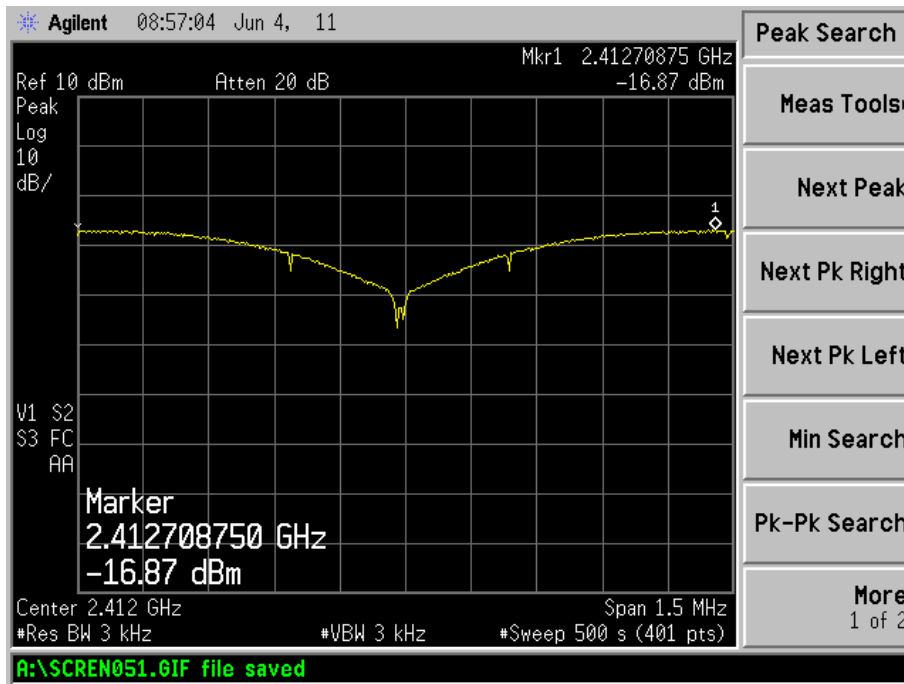
Temperature:	20° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.5 Summary of Test Results/Plots

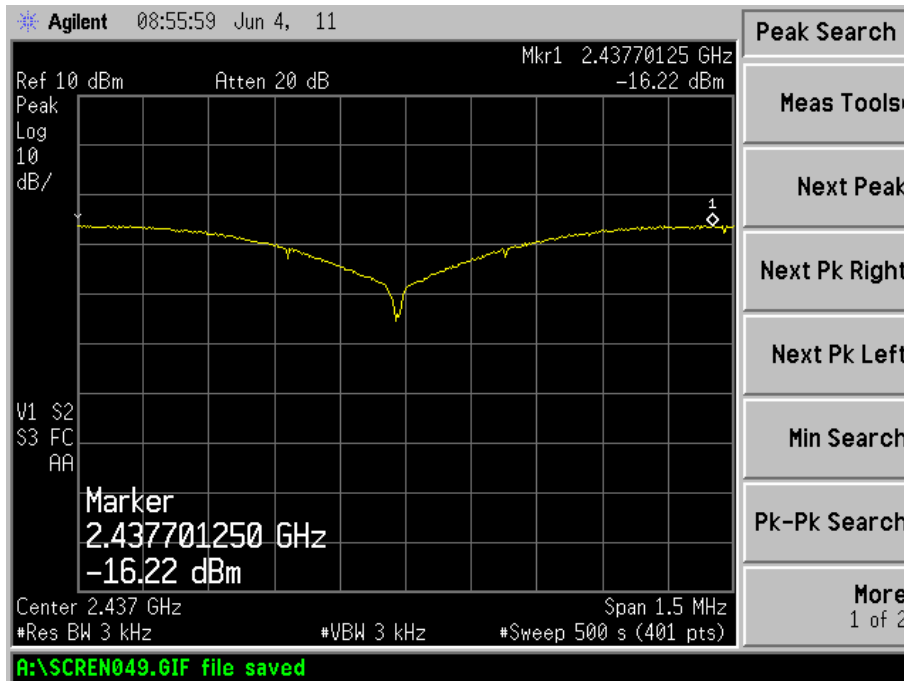
Test mode	Test channel	Reading dBm/3kHz	Limit dBm/3kHz
802.11b	Low channel (2412MHz)	-16.87	8
	Middle channel (2437MHz)	-16.22	8
	High channel (2462MHz)	-16.97	8
802.11g	Low channel (2412MHz)	-21.25	8
	Middle channel (2437MHz)	-21.29	8
	High channel (2462MHz)	-21.13	8

For 802.11b

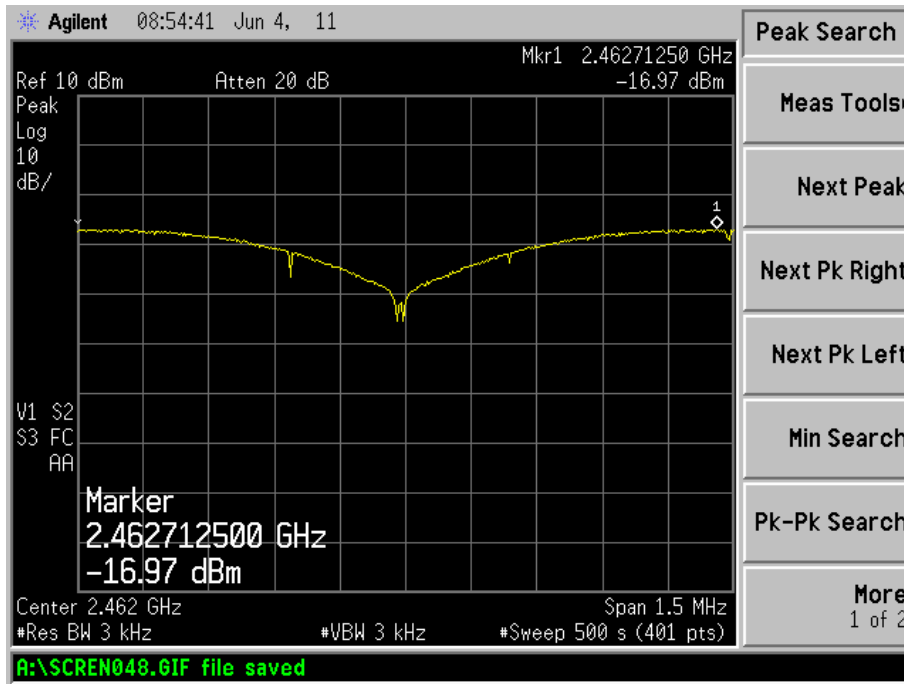
Low Channel:



Middle Channel:

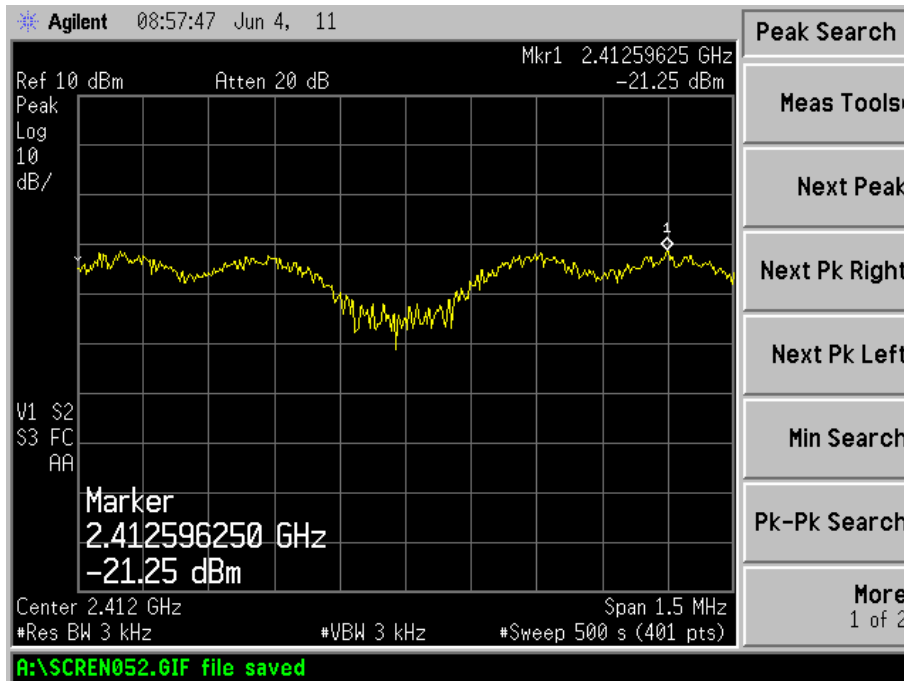


High Channel:

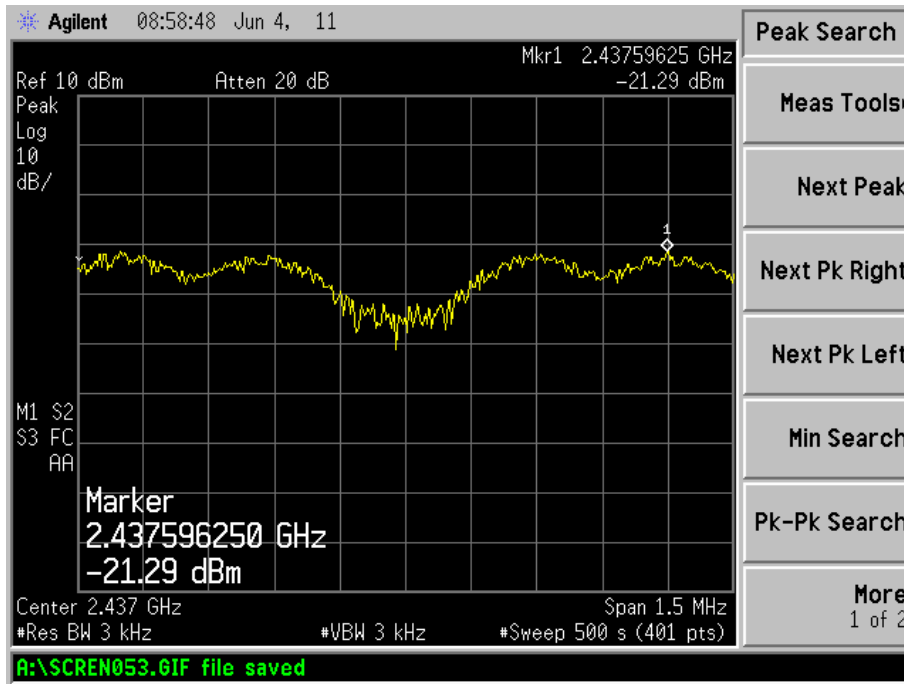


For 802.11g

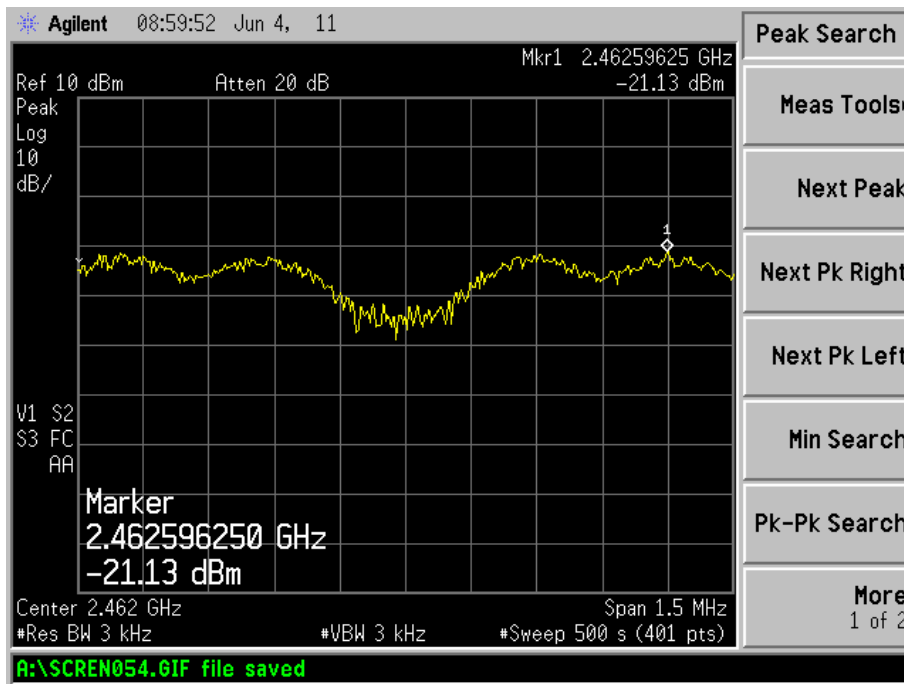
Low Channel:



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	2012-03-28	2013-03-27
Attenuator	ATTEN	ATS100-4-20	/	2012-03-28	2013-03-27

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

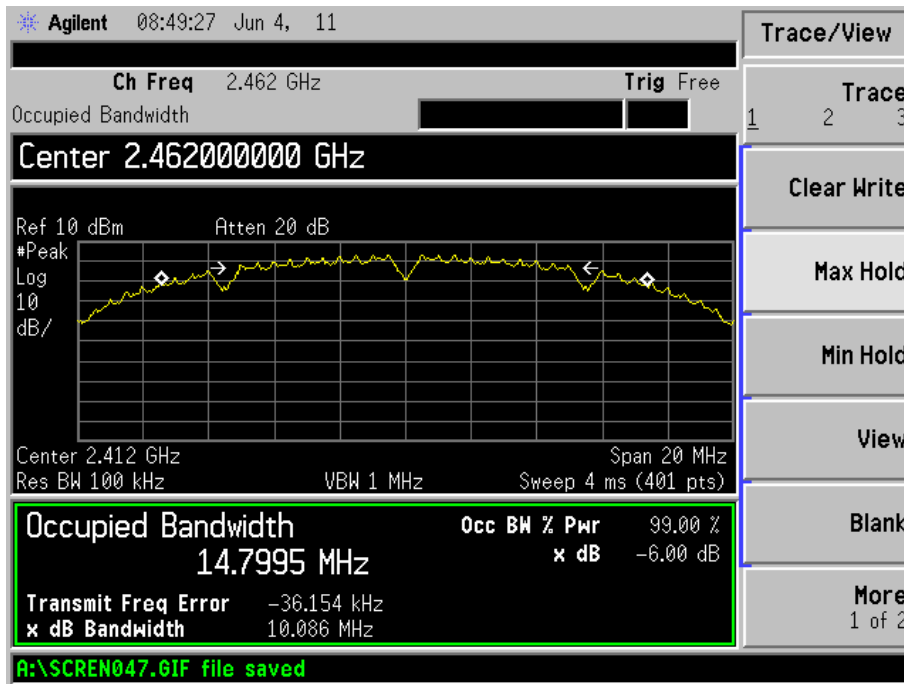
Temperature:	24° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.5 Summary of Test Results/Plots

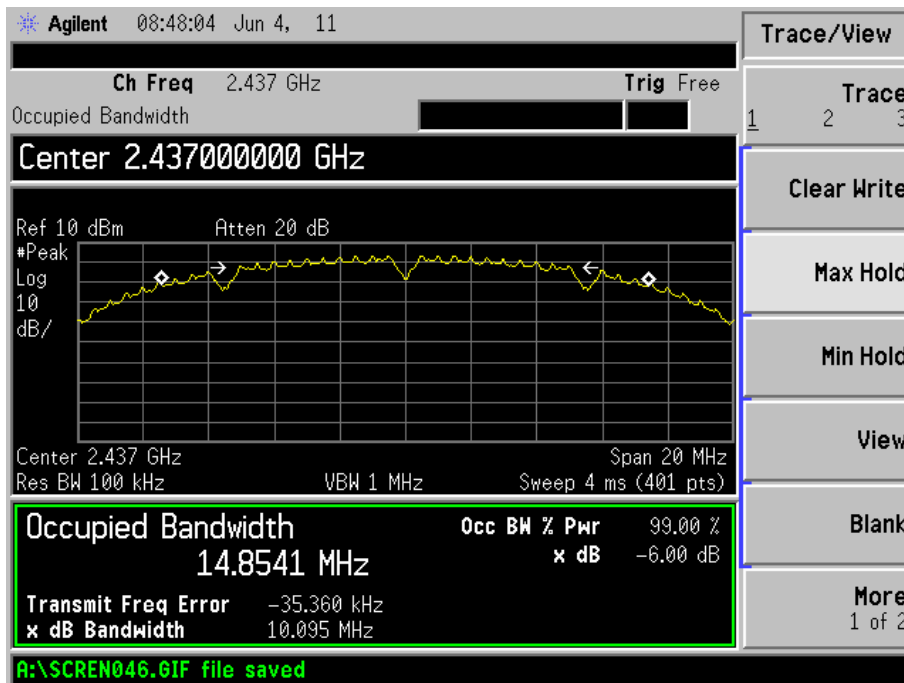
Test mode	Frequency	6 dB Bandwidth	Limit
	MHz	kHz	kHz
802.11b	2412	10086	500
	2437	10095	500
	2462	10092	500
802.11g	2412	16467	500
	2437	16508	500
	2462	16488	500

For 802.11b

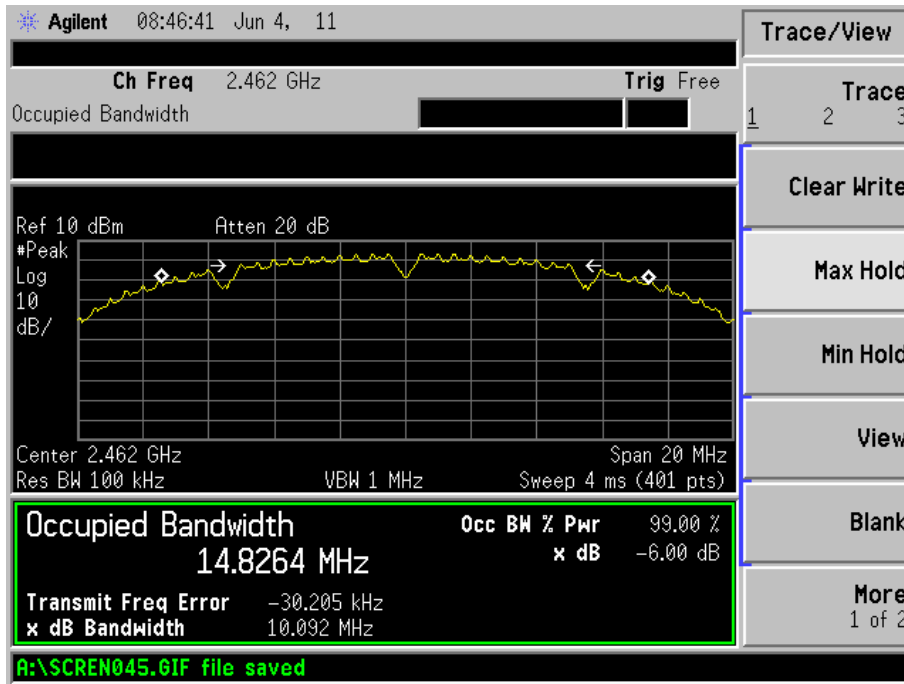
Low Channel:



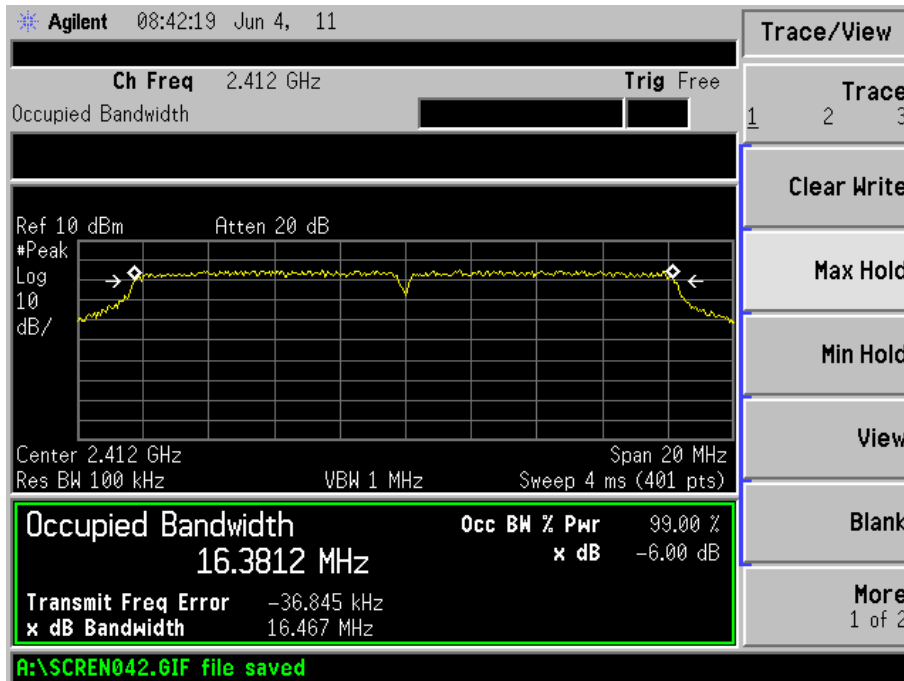
Mid Channel:



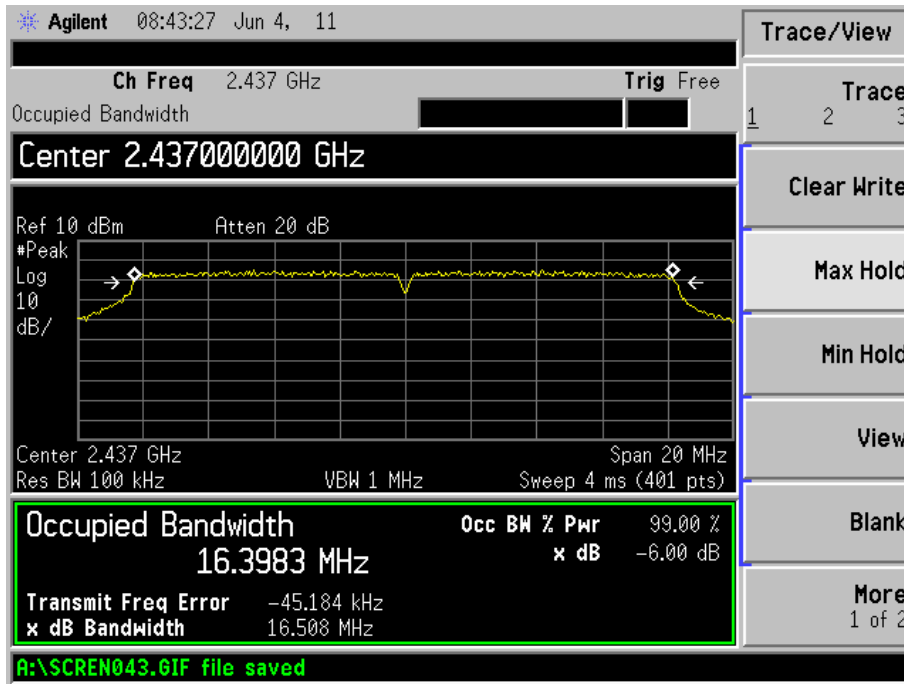
High Channel:



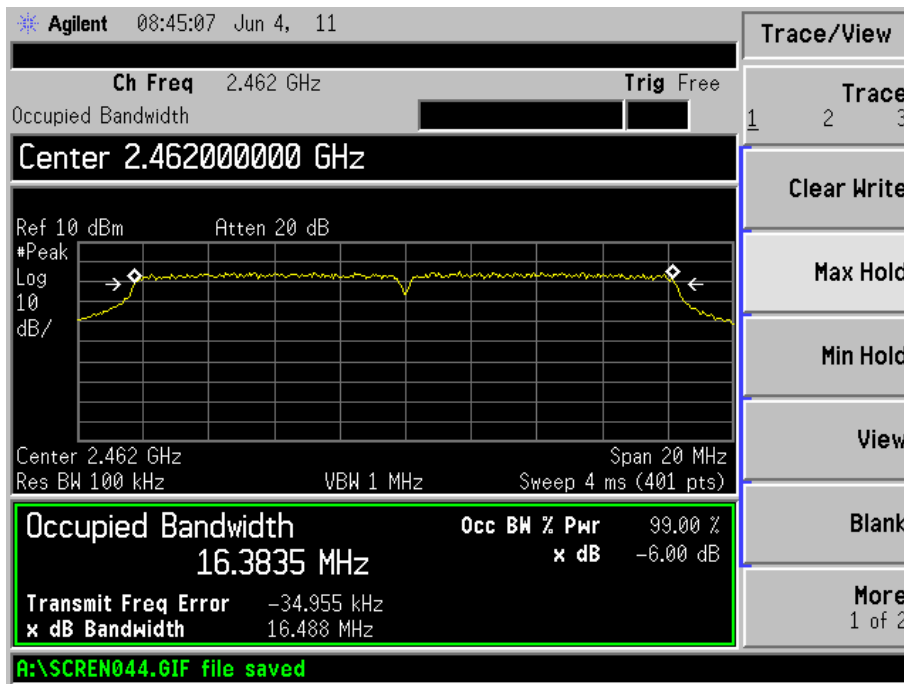
For 802.11g
Low Channel:



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	2012-03-28	2013-03-27
Attenuator	ATTEN	ATS100-4-20	/	2012-03-28	2013-03-27

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

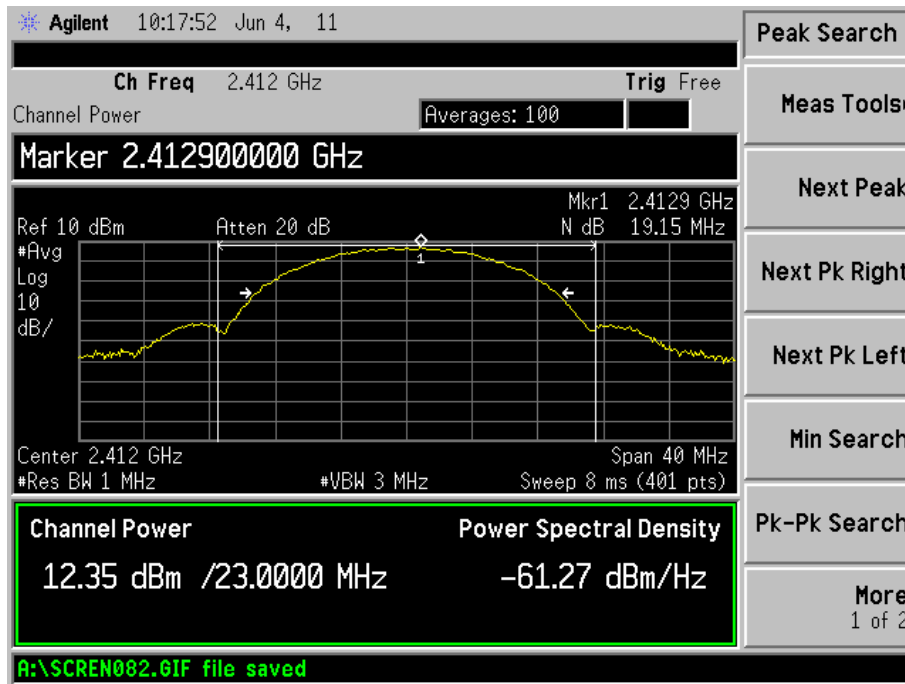
Temperature:	21° C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

7.5 Summary of Test Results/Plots

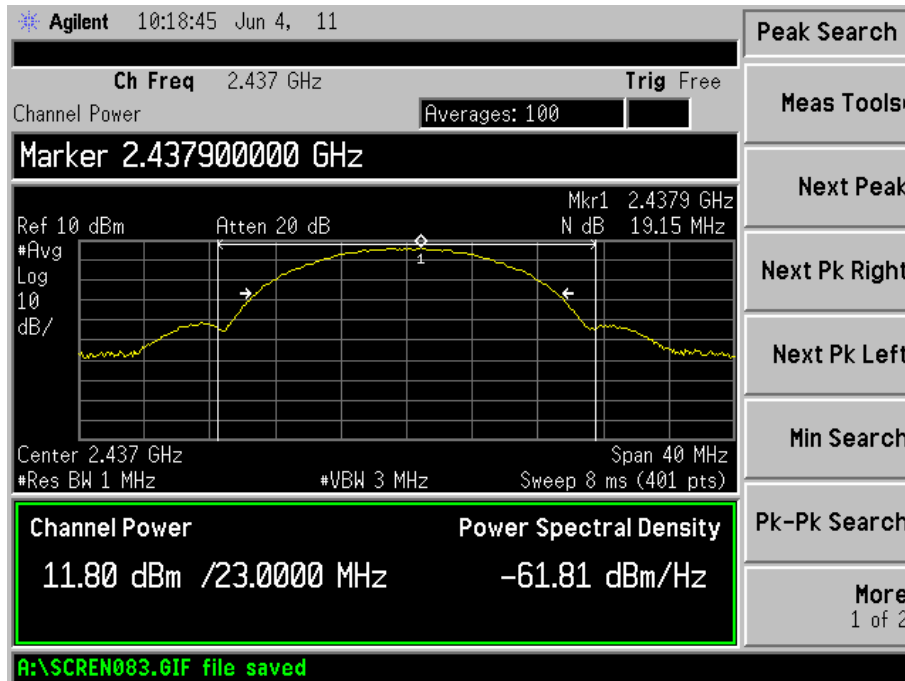
Test mode	Frequency MHz	Reading dBm	Output power W	Limit W
802.11b (1M)	2412	12.35	0.017179	1
	2437	11.80	0.015135	1
	2462	11.71	0.014825	1
802.11b (11M)	2412	11.82	0.015205	1
	2437	11.97	0.015739	1
	2462	12.12	0.016292	1
802.11g (6M)	2412	8.03	0.006353	1
	2437	8.20	0.006606	1
	2462	8.11	0.006471	1
802.11g (54M)	2412	8.15	0.006531	1
	2437	7.50	0.005623	1
	2462	7.51	0.005636	1

For 802.11b_1M rate

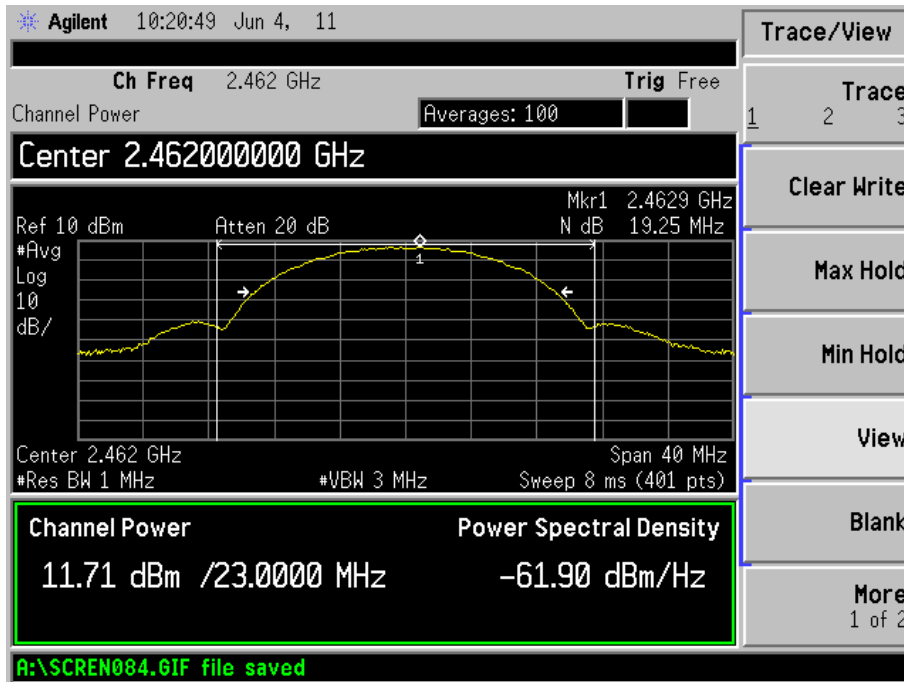
Low Channel:



Middle Channel:

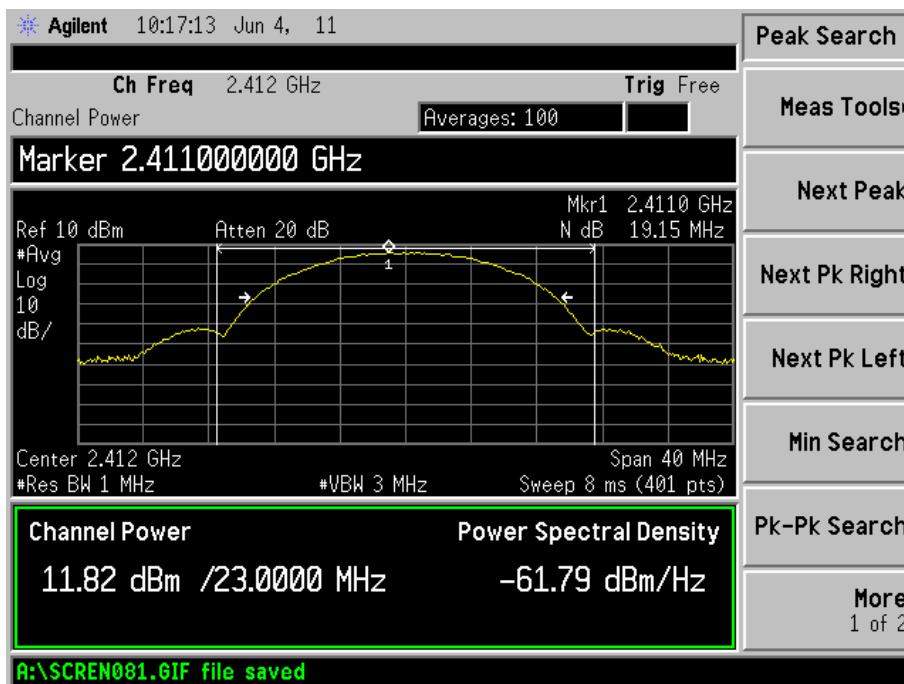


High Channel:

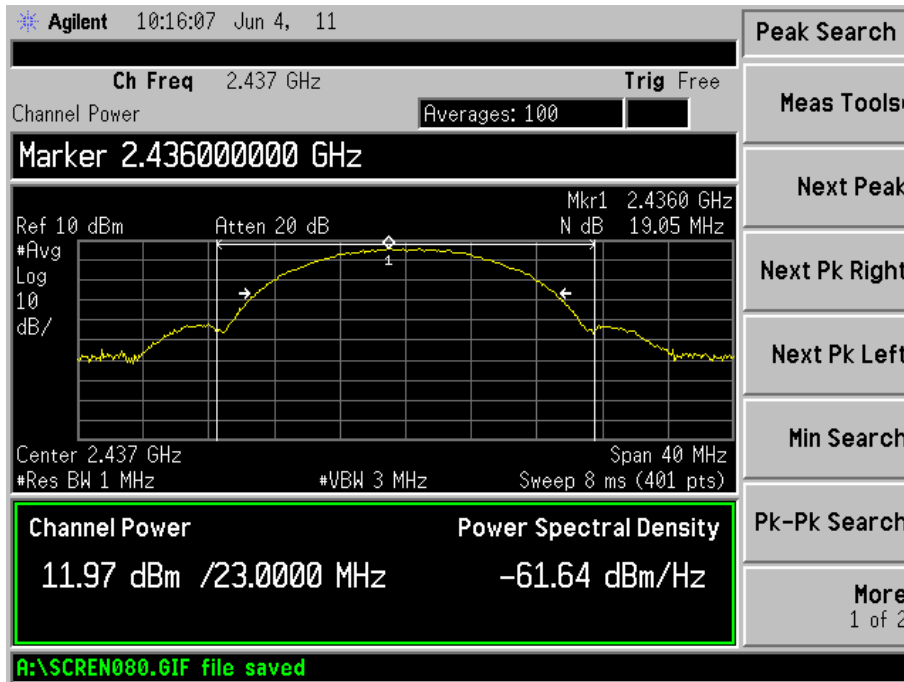


For 802.11b_11M rate

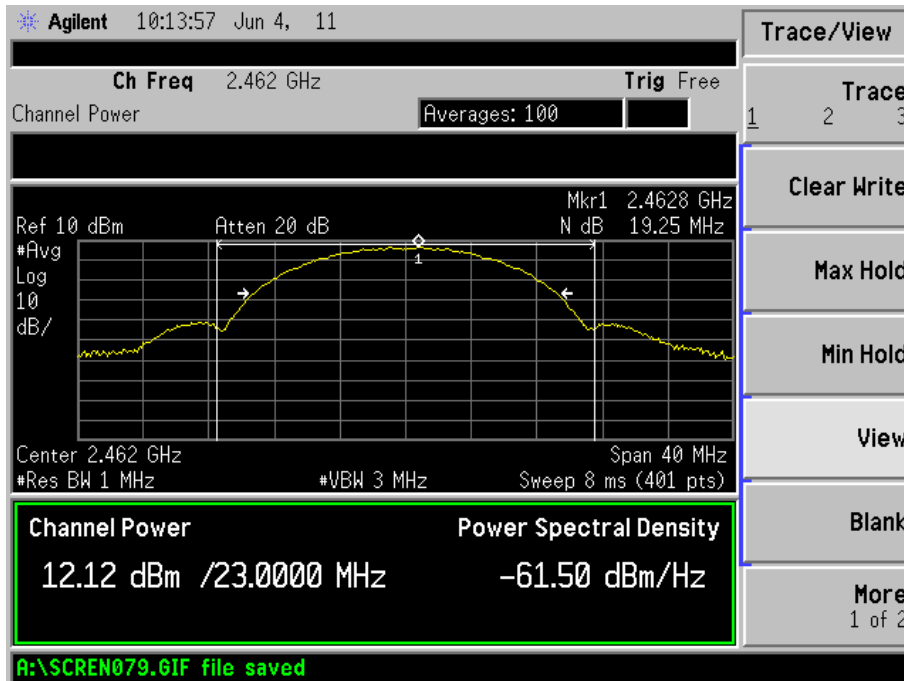
Low Channel:



Middle Channel:

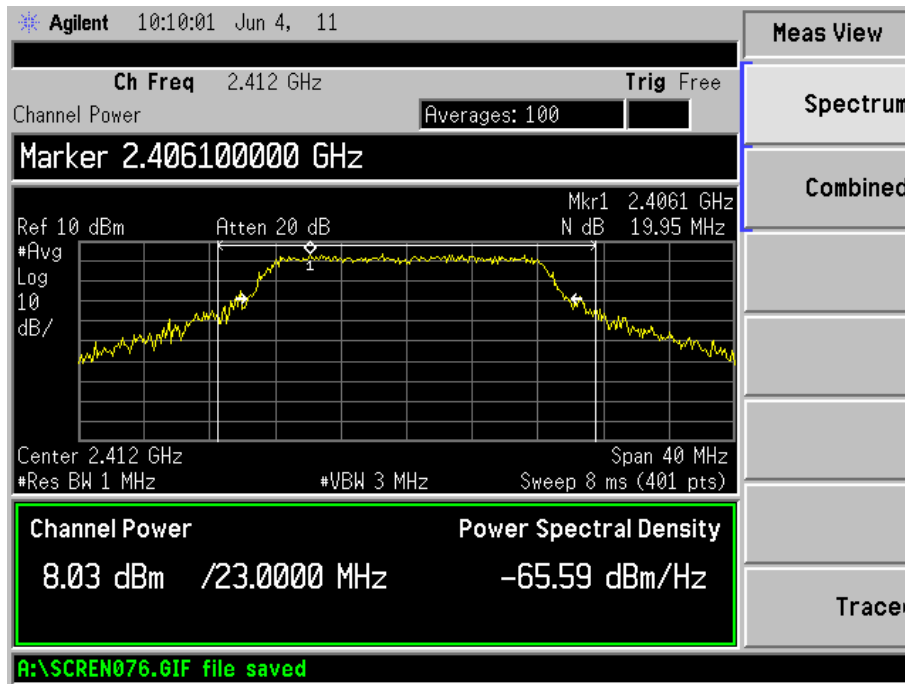


High Channel:

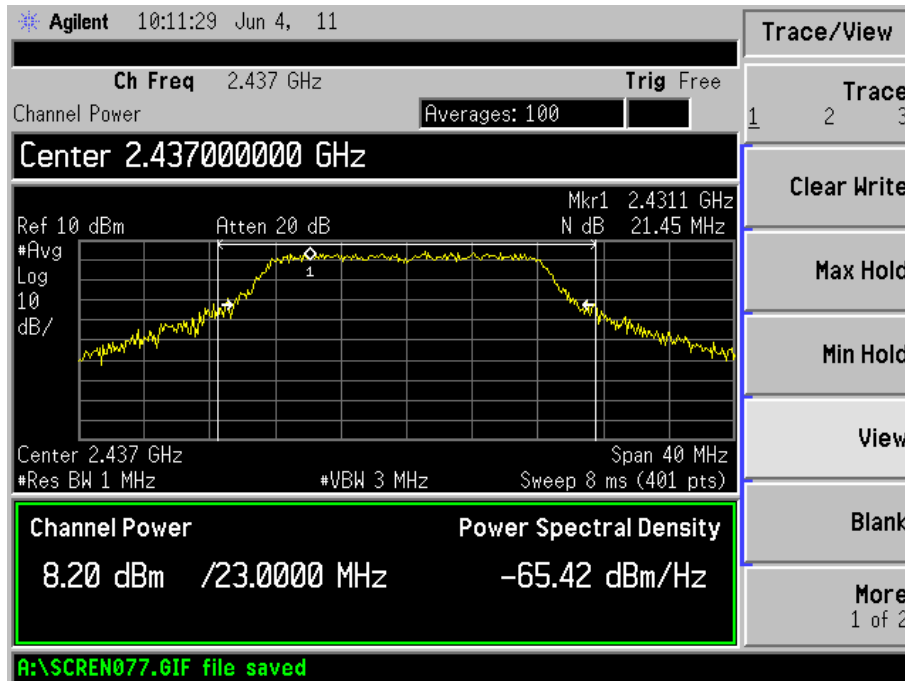


For 802.11g_6M rate

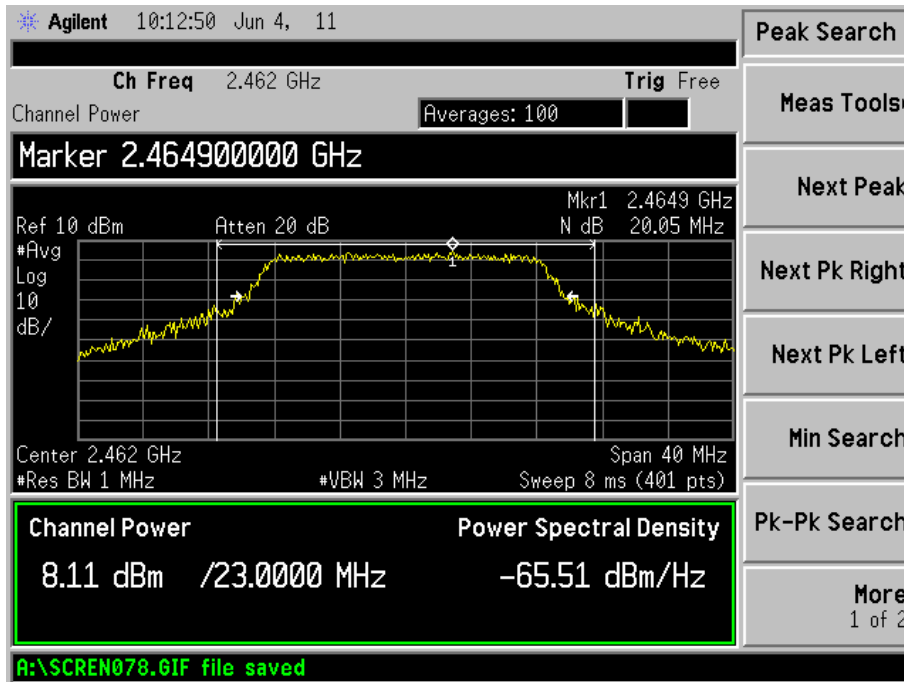
Low Channel:



Middle Channel:

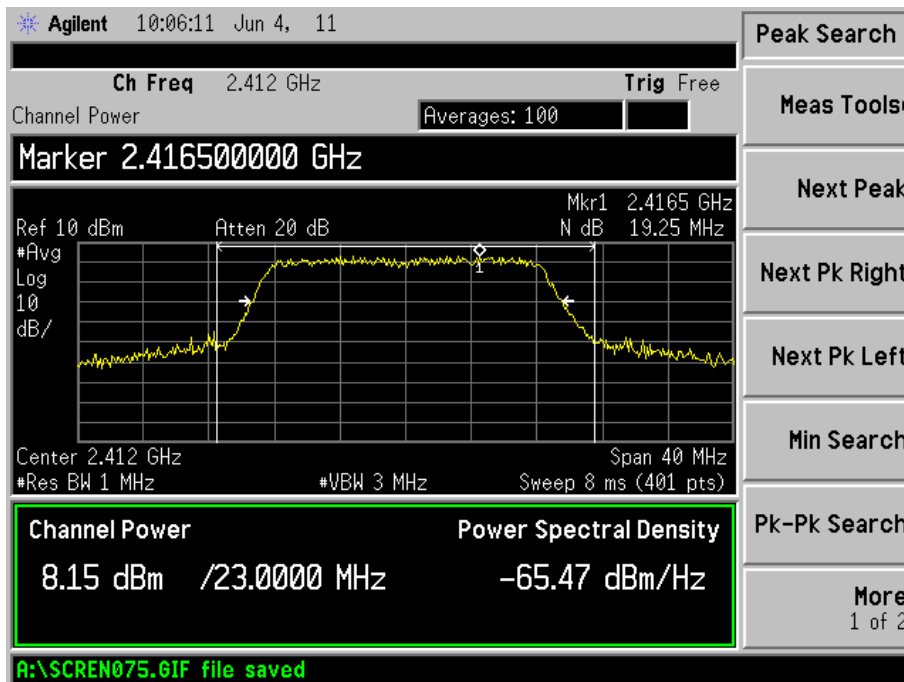


High Channel:

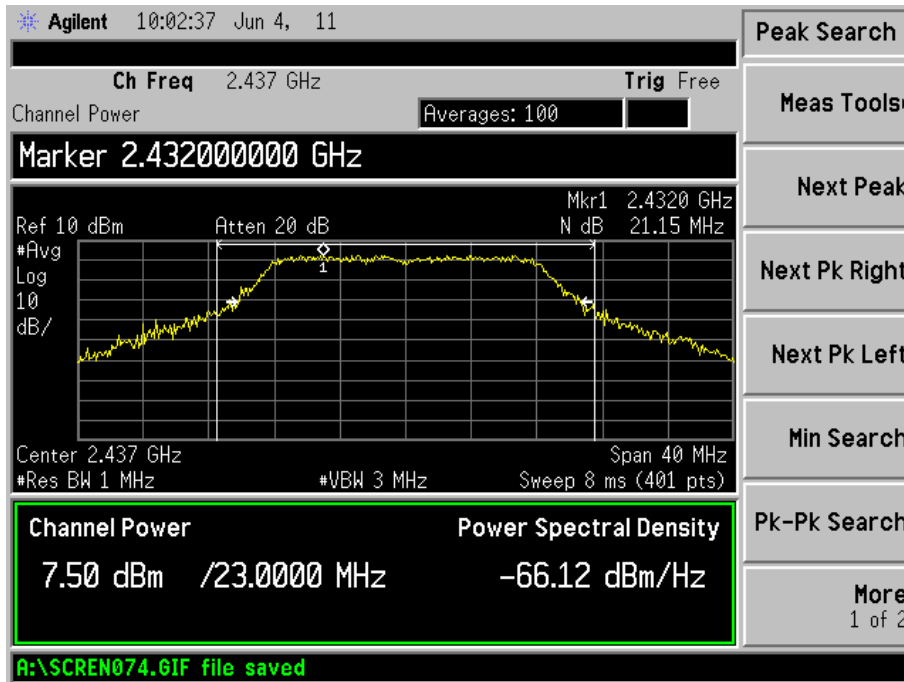


For 802.11g_54M rate

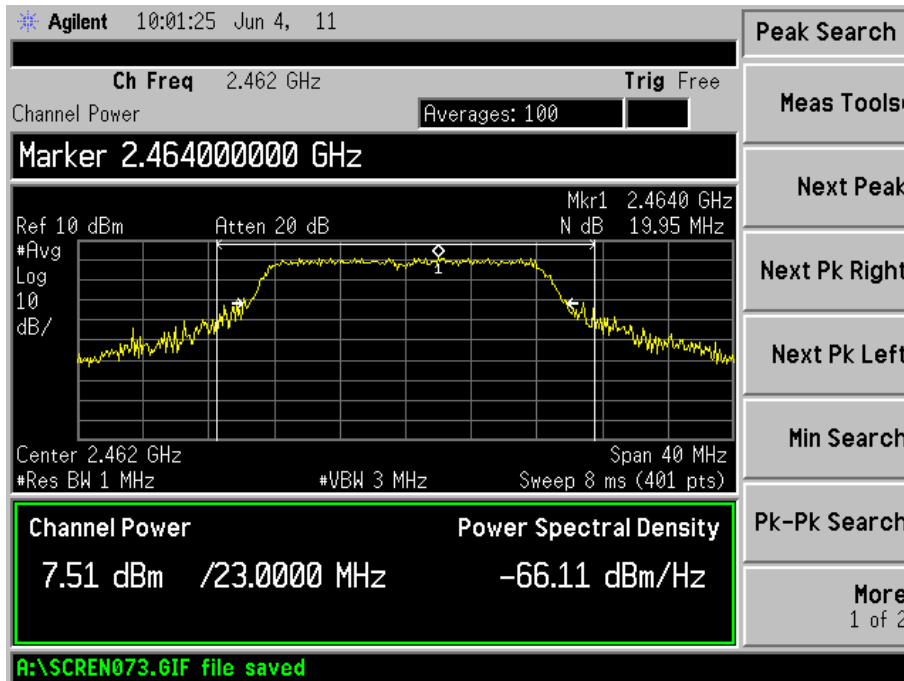
Low Channel:



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(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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

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.

8.3 Test Equipment List and Details

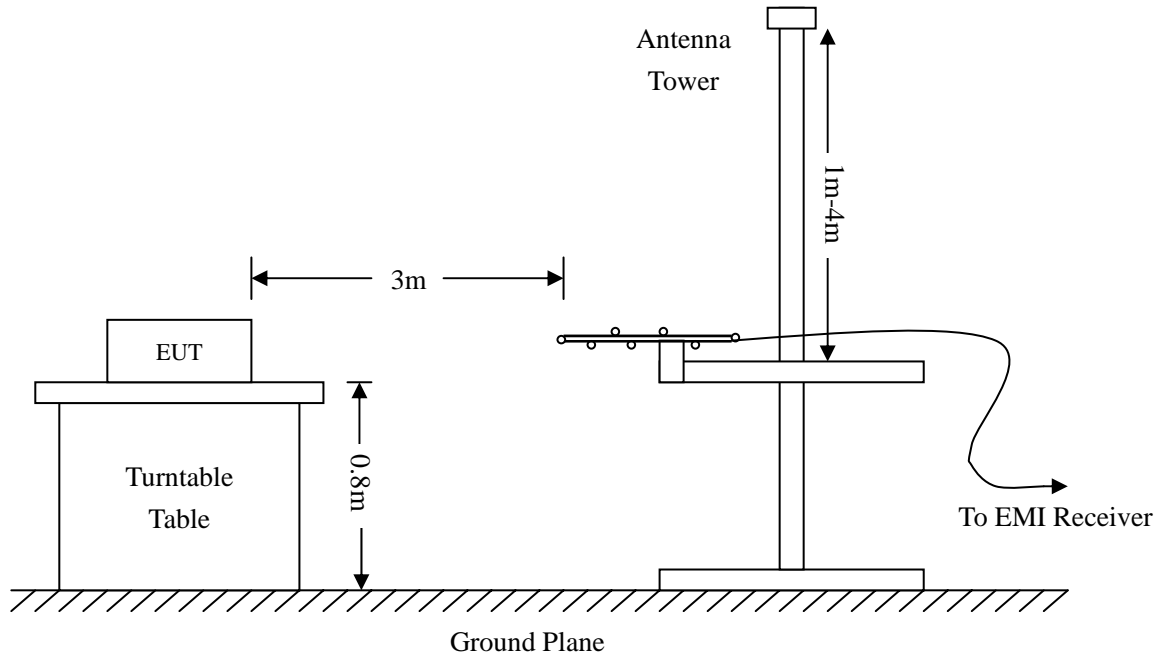
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2012-03-28	2013-03-27
EMI Test Receiver	R&S	ESVB	825471/005	2012-03-28	2013-03-27
Positioning Controller	C&C	CC-C-1F	N/A	2012-03-28	2013-03-27
RF Switch	EM	EMSW18	SW060023	2012-03-28	2013-03-27
Pre-amplifier	Agilent	8447F	3113A06717	2012-03-28	2013-03-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2012-03-28	2013-03-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2012-02-25	2013-02-24
Horn Antenna	ETS	3117	00086197	2012-02-25	2013-02-24
Horn Antenna	ETS	3116B	00088203	2012-02-25	2013-02-24
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2012-02-25	2013-02-24

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:

-2.72 dB μ V at 374.6225MHz in the Horizontal polarization, Transmitting 802.11b High 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.

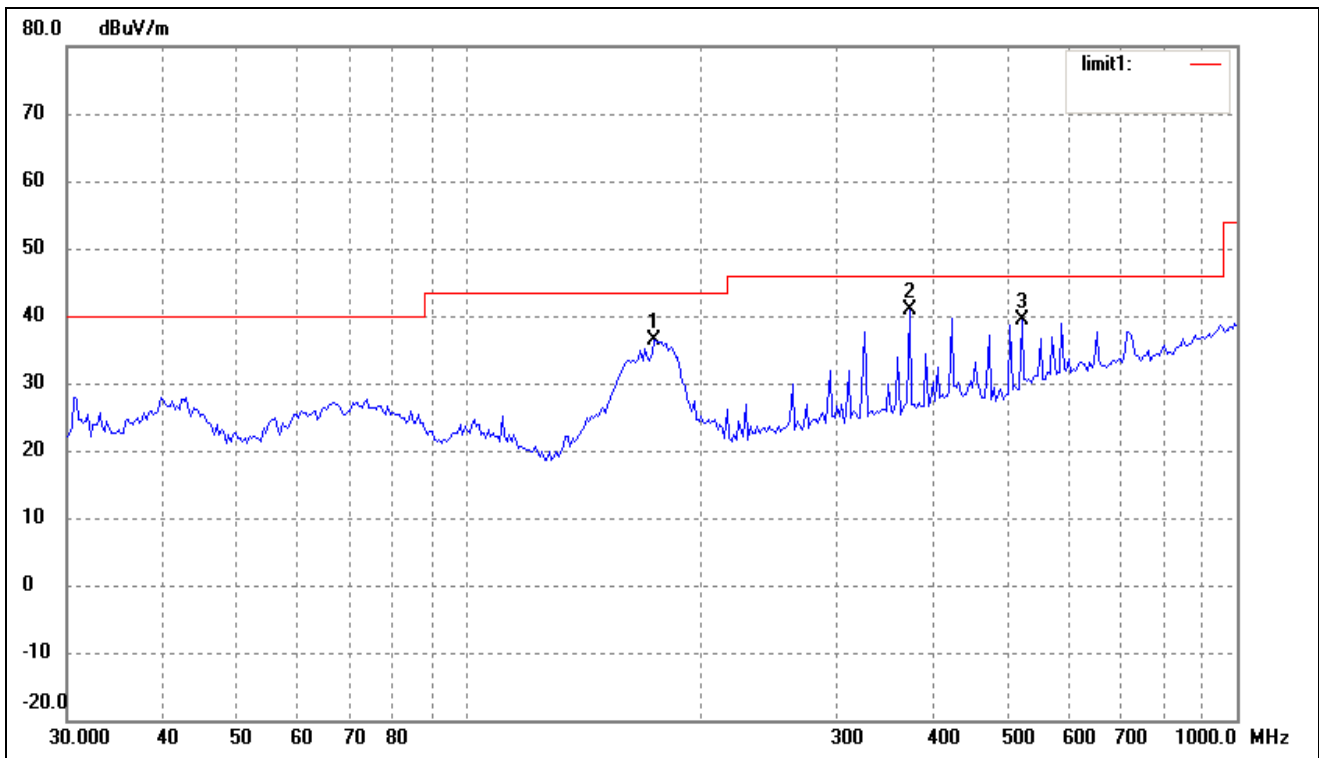
Test Result/Plots:

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11b) Low Channel

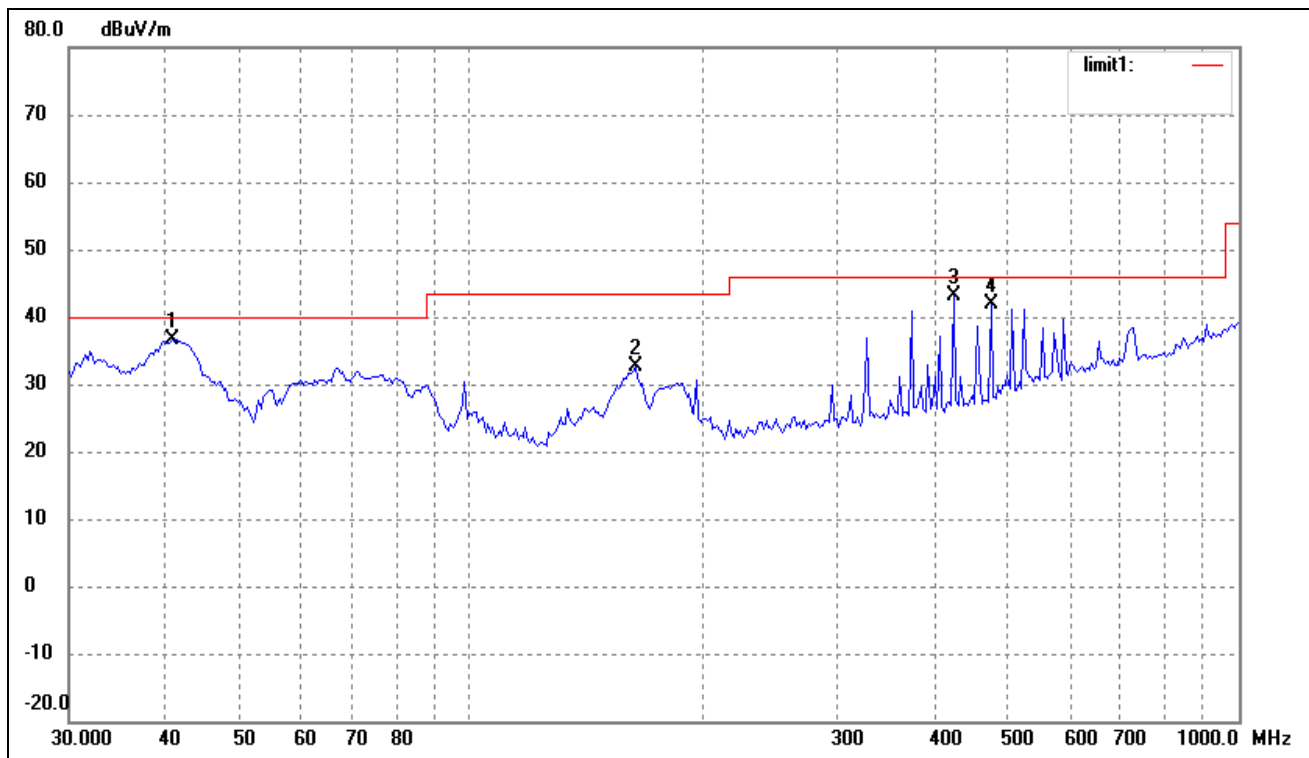
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	174.4241	31.06	5.22	36.28	43.50	-7.22	360	100	peak
2	374.6226	29.65	11.11	40.76	46.00	-5.24	231	110	QP
3	524.5541	24.40	14.97	39.37	46.00	-6.63	0	200	peak

Vertical



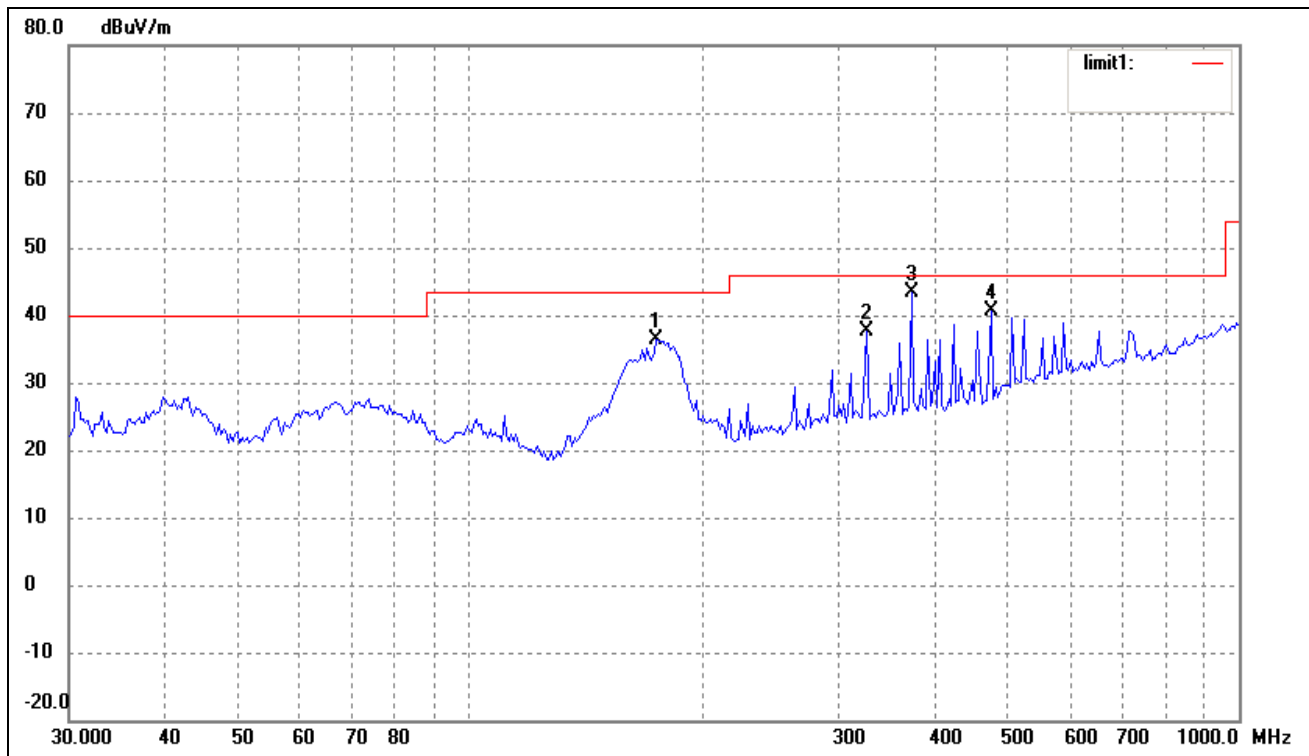
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	40.8446	28.42	8.16	36.58	40.00	-3.42	228	140	QP
2	163.7550	28.07	4.67	32.74	43.50	-10.76	360	200	peak
3	425.0280	31.67	11.57	43.24	46.00	-2.76	125	112	QP
4	475.4991	29.49	12.30	41.79	46.00	-4.21	204	105	QP

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11b) Middle Channel

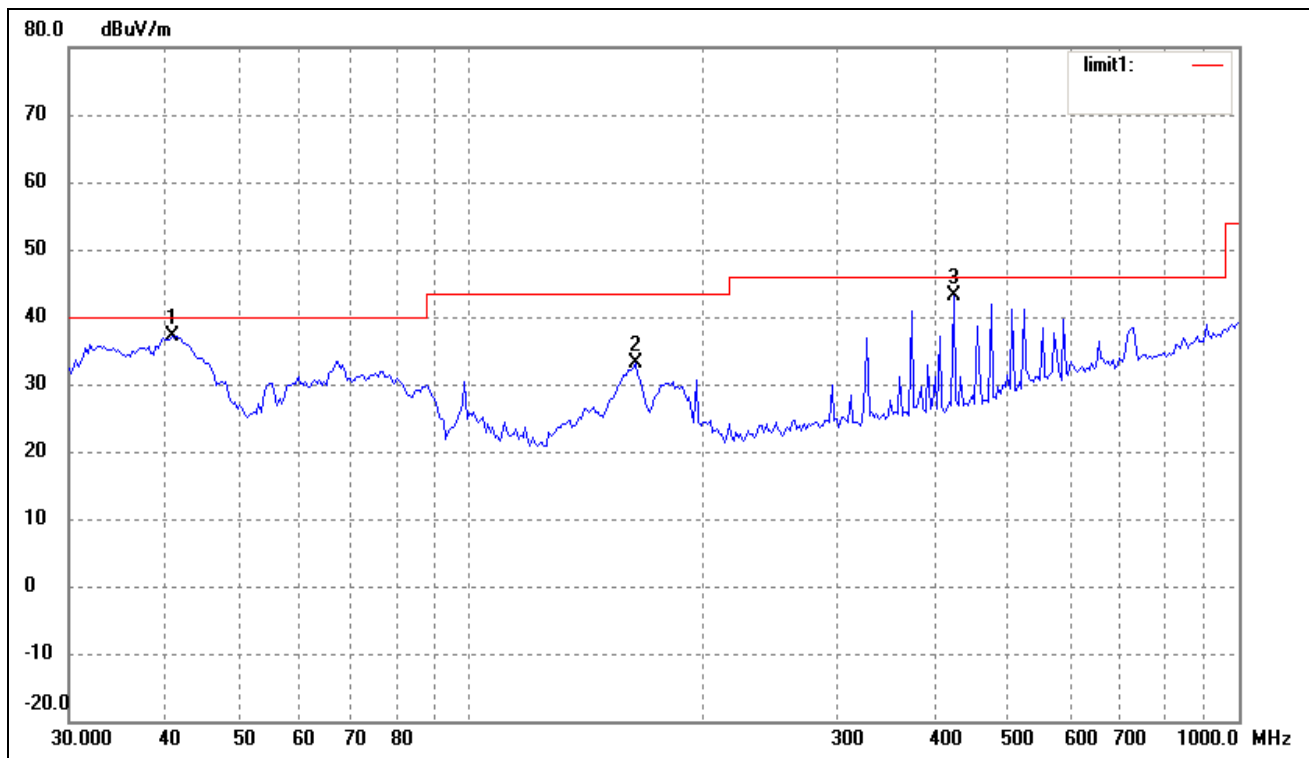
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	174.4241	31.06	5.22	36.28	43.50	-7.22	360	200	peak
2	327.8872	27.47	10.17	37.64	46.00	-8.36	0	100	peak
3	374.6225	32.15	11.11	43.26	46.00	-2.74	223	102	QP
4	475.4990	28.24	12.30	40.54	46.00	-5.46	108	115	QP

Vertical



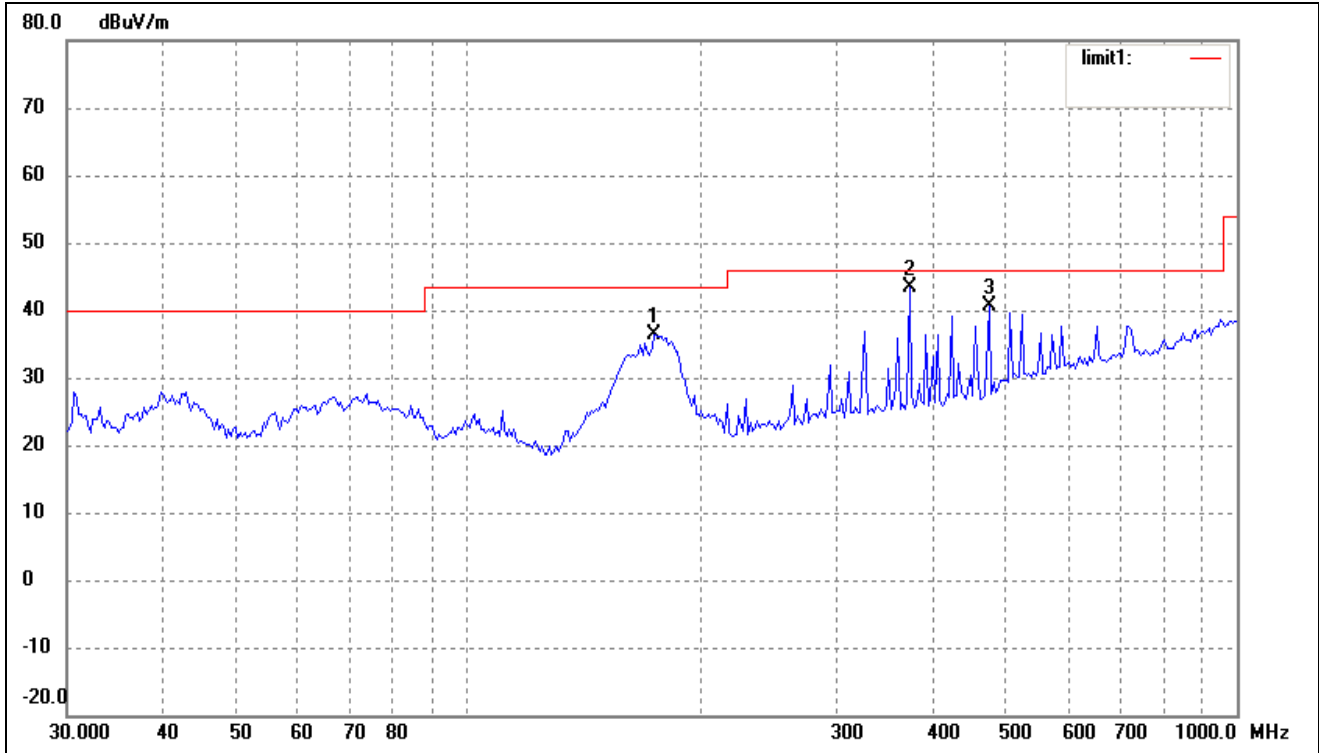
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	40.8445	28.93	8.15	37.08	40.00	-2.92	216	210	QP
2	163.7549	28.57	4.67	33.24	43.50	-10.26	360	100	peak
3	425.0280	31.67	11.57	43.24	46.00	-2.76	261	105	QP

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11b) High Channel

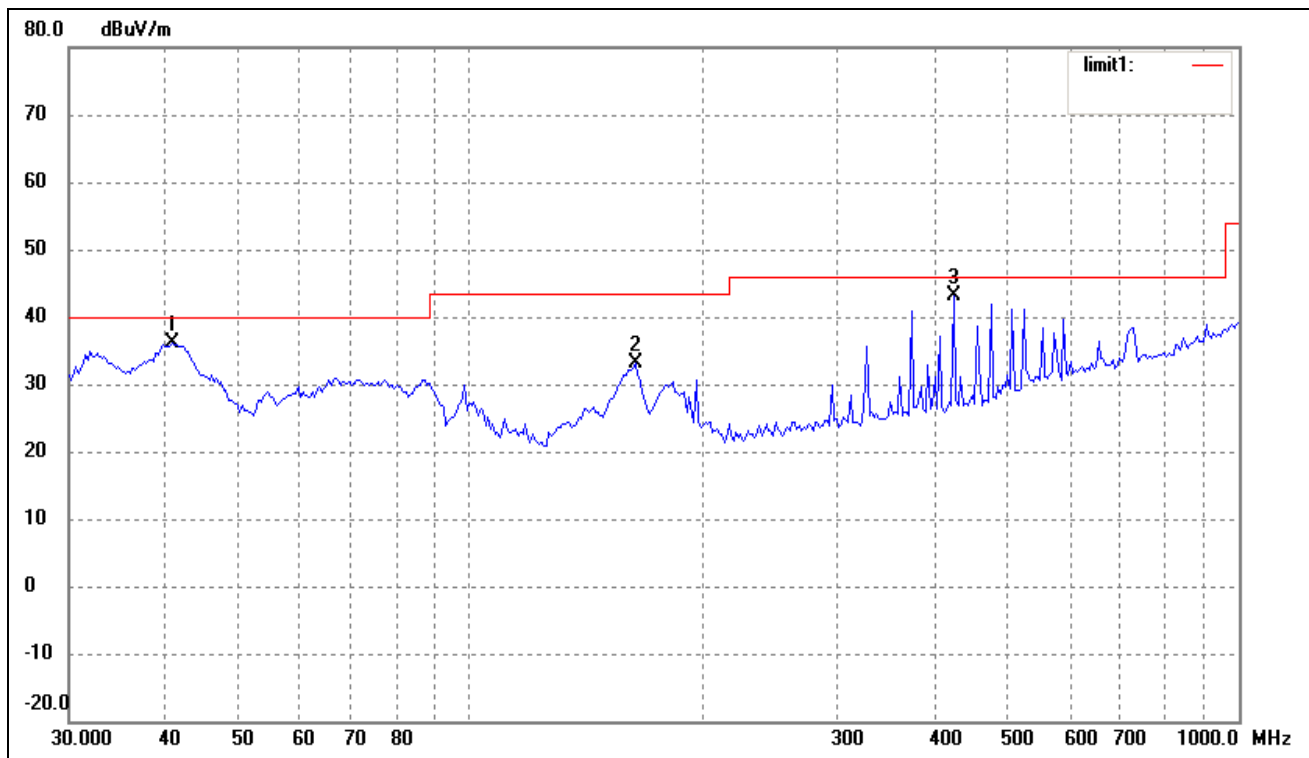
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	174.4241	31.09	5.22	36.28	43.50	-7.19	360	200	peak
2	374.6225	32.17	11.11	43.28	46.00	-2.72	223	210	QP
3	475.4990	28.21	12.30	40.51	46.00	-5.49	130	120	QP

Vertical



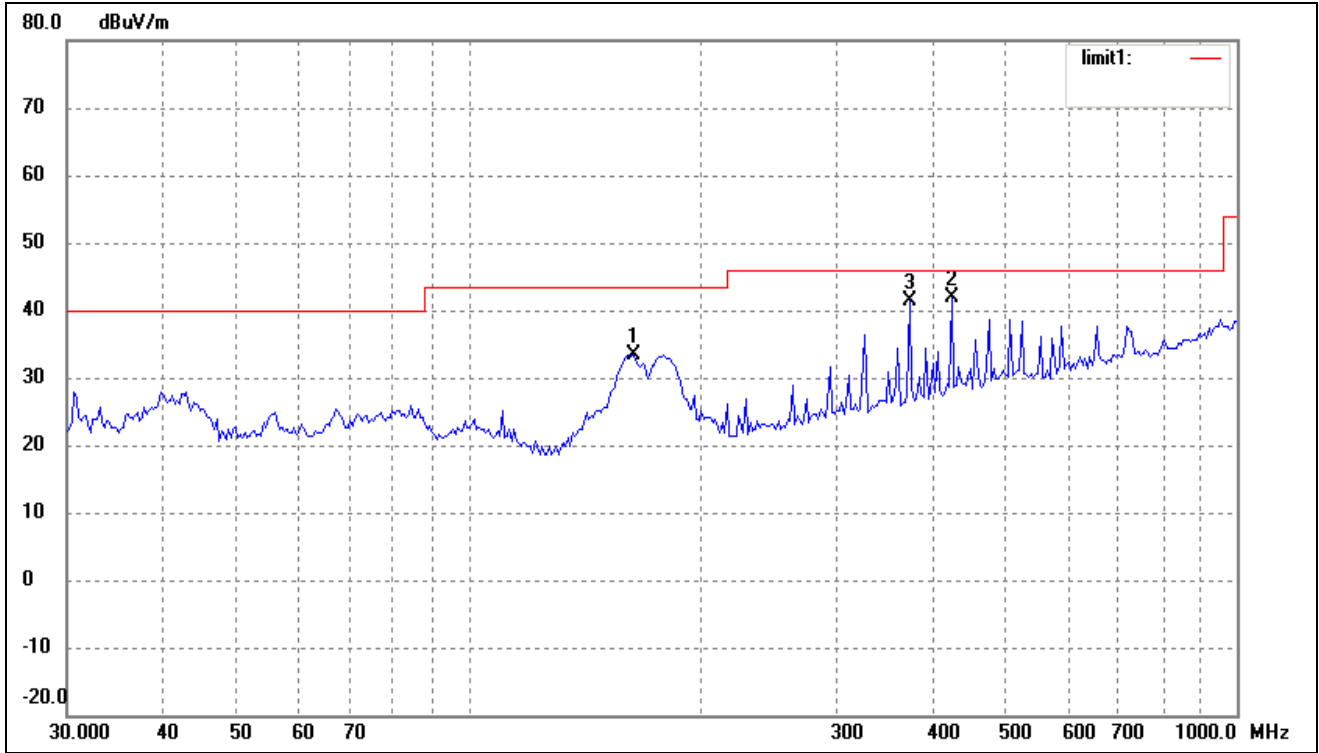
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	40.8445	27.93	8.15	36.08	40.00	-3.92	235	124	QP
2	163.7549	28.53	4.67	33.20	43.50	-10.30	360	200	peak
3	425.0280	31.64	11.57	43.21	46.00	-2.79	223	203	QP

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g) Low Channel

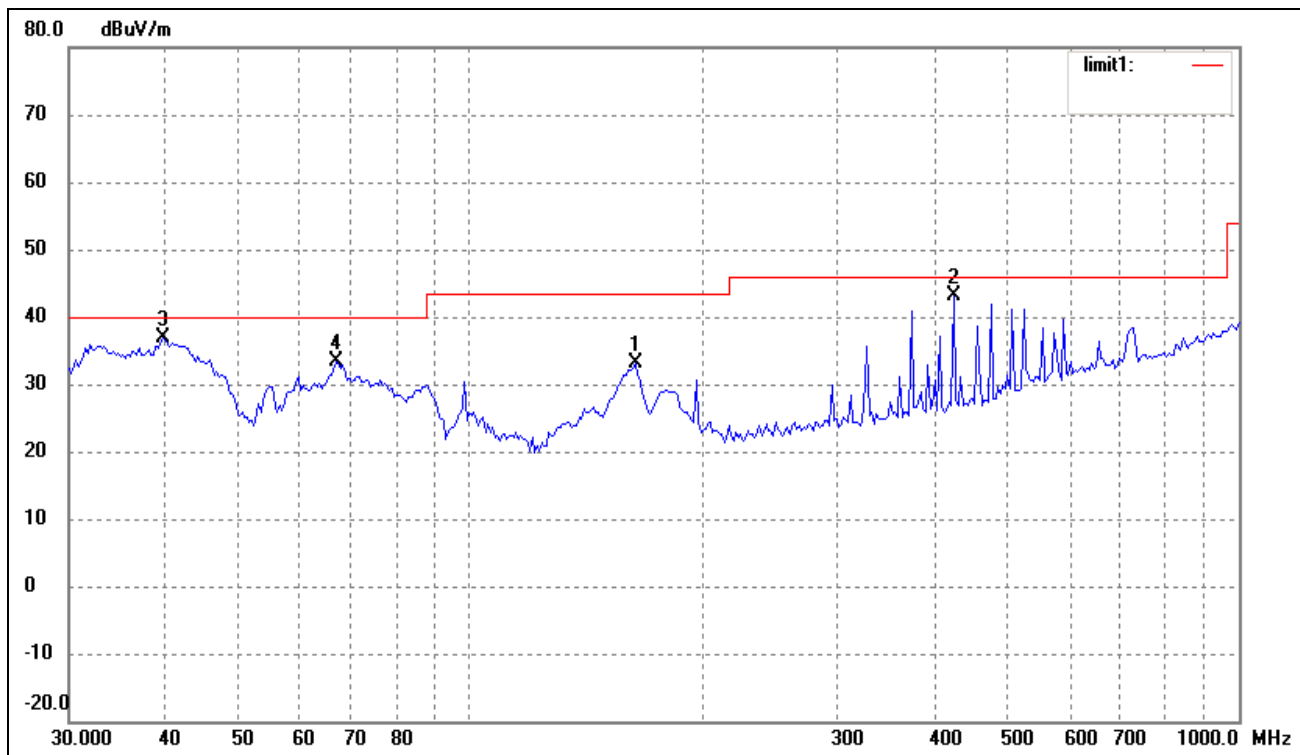
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	163.7549	28.81	4.67	33.48	43.50	-10.02	360	100	peak
2	425.0280	30.30	11.57	41.87	46.00	-4.13	223	120	QP
3	374.6225	30.15	11.11	41.26	46.00	-4.74	106	115	QP

Vertical



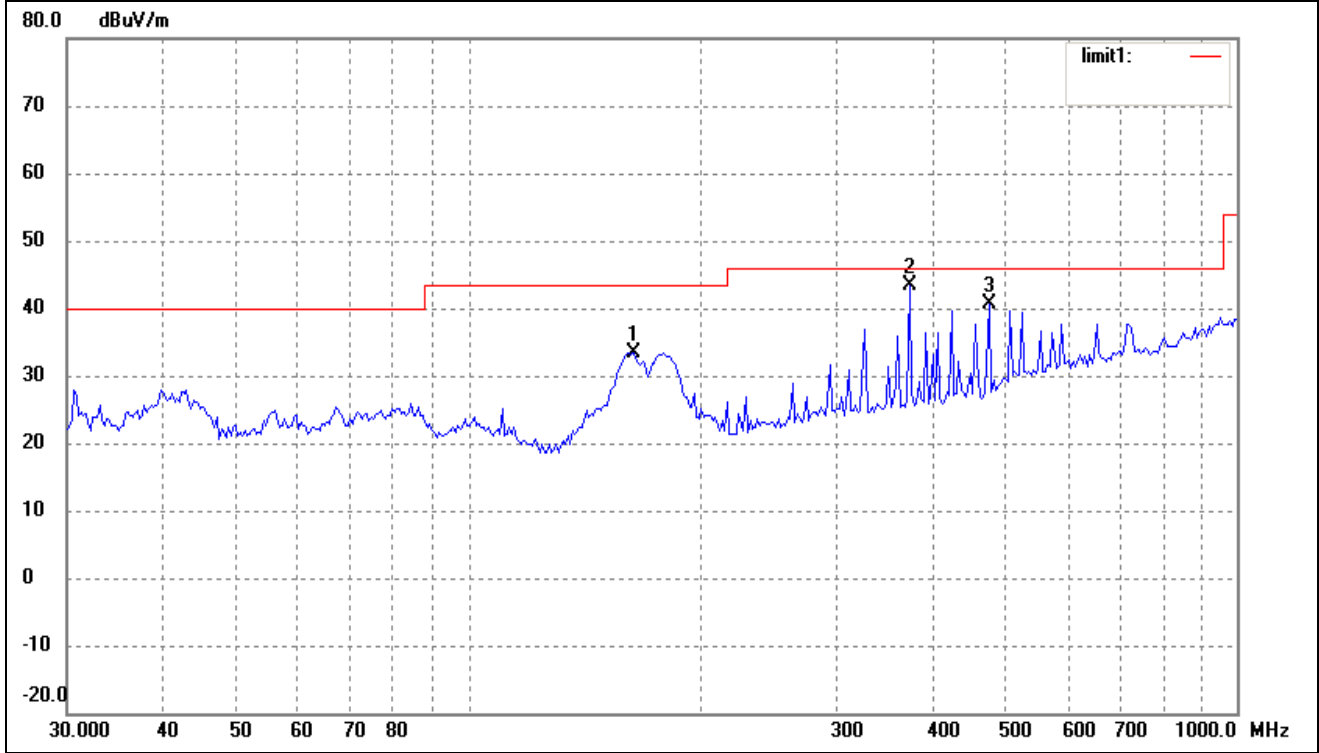
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	163.7549	28.57	4.67	33.24	43.50	-10.26	0	100	peak
2	425.0280	31.67	11.57	43.24	46.00	-2.76	234	118	QP
3	39.7147	28.81	8.07	36.88	40.00	-3.12	226	125	QP
4	66.7325	28.48	4.90	33.38	40.00	-6.62	0	200	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g) Middle Channel

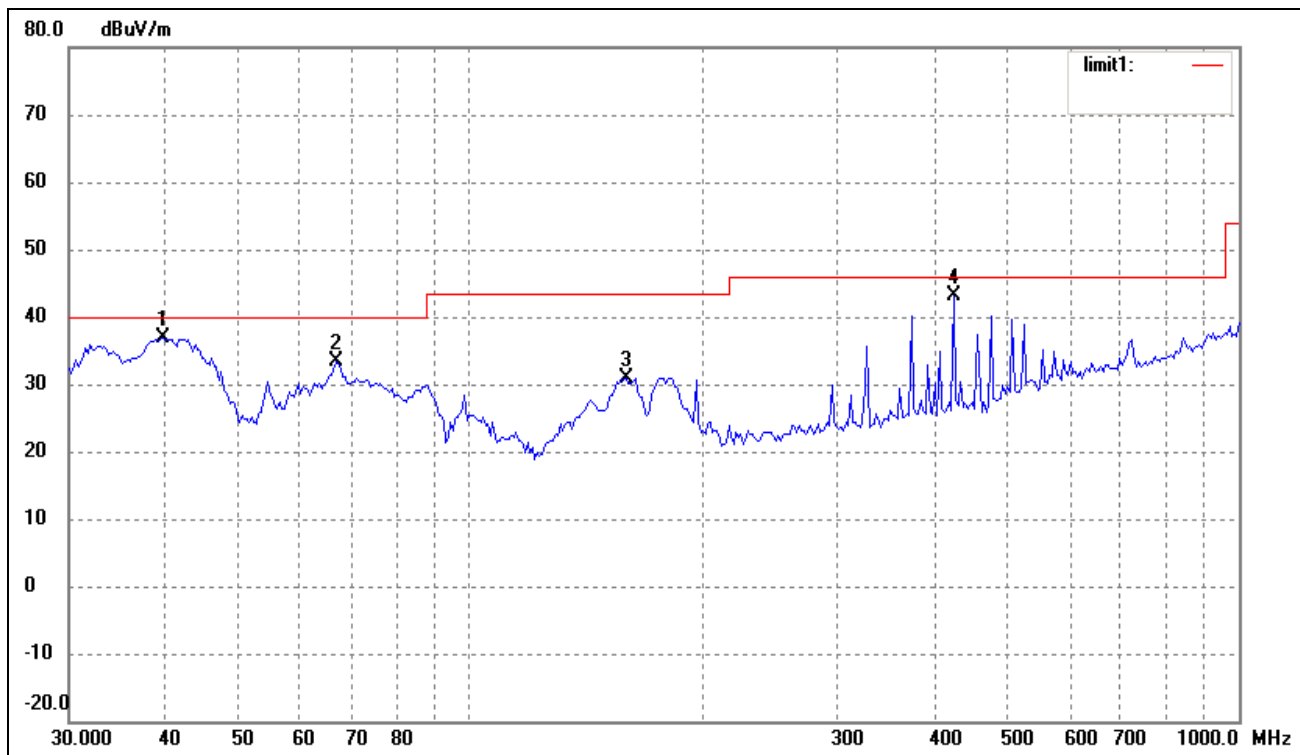
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	163.7549	28.81	4.67	33.48	43.50	-10.02	0	100	peak
2	374.6225	32.15	11.11	43.26	46.00	-2.74	228	125	QP
3	475.4990	28.24	12.30	40.54	46.00	-5.46	306	210	QP

Vertical



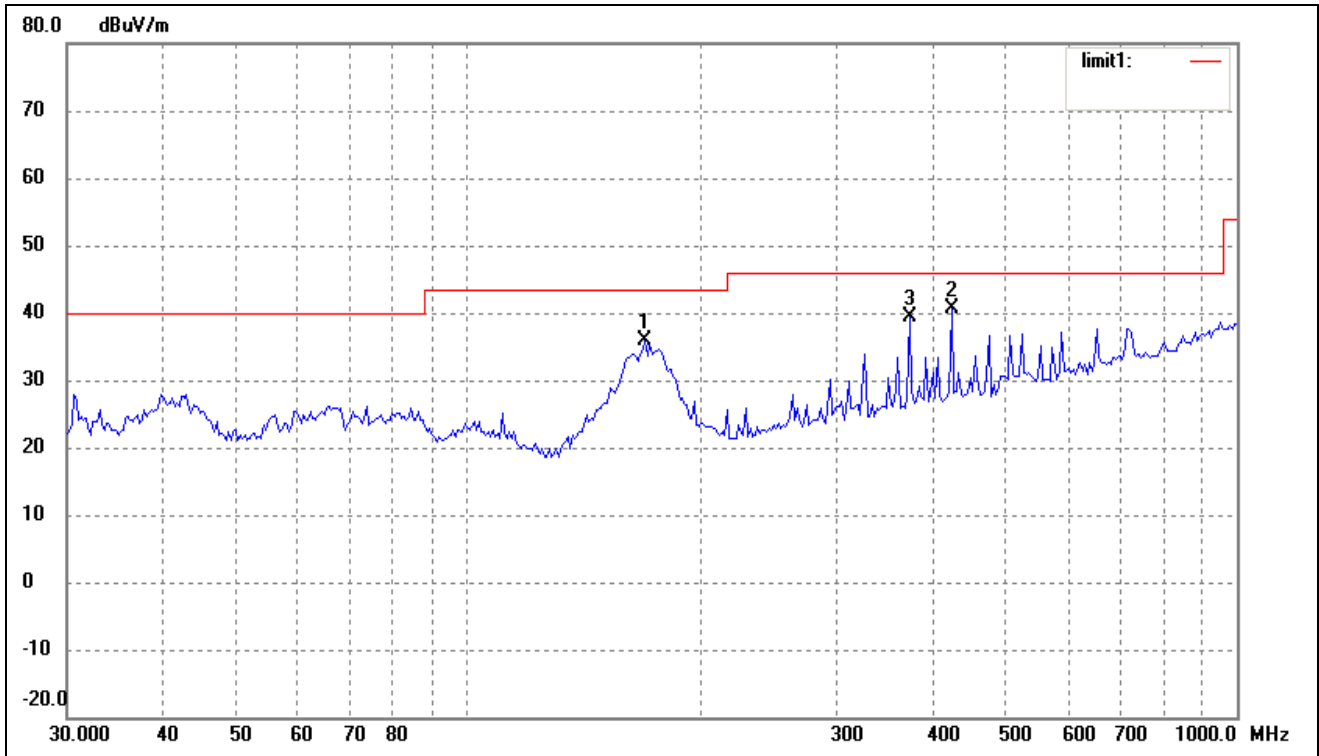
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	39.7147	28.81	8.07	36.88	40.00	-3.12	304	152	QP
2	66.7325	28.48	4.90	33.38	40.00	-6.62	360	200	peak
3	159.2250	26.48	4.51	30.99	43.50	-12.51	0	100	peak
4	425.0280	31.52	11.57	43.09	46.00	-2.91	228	124	QP

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g) High Channel

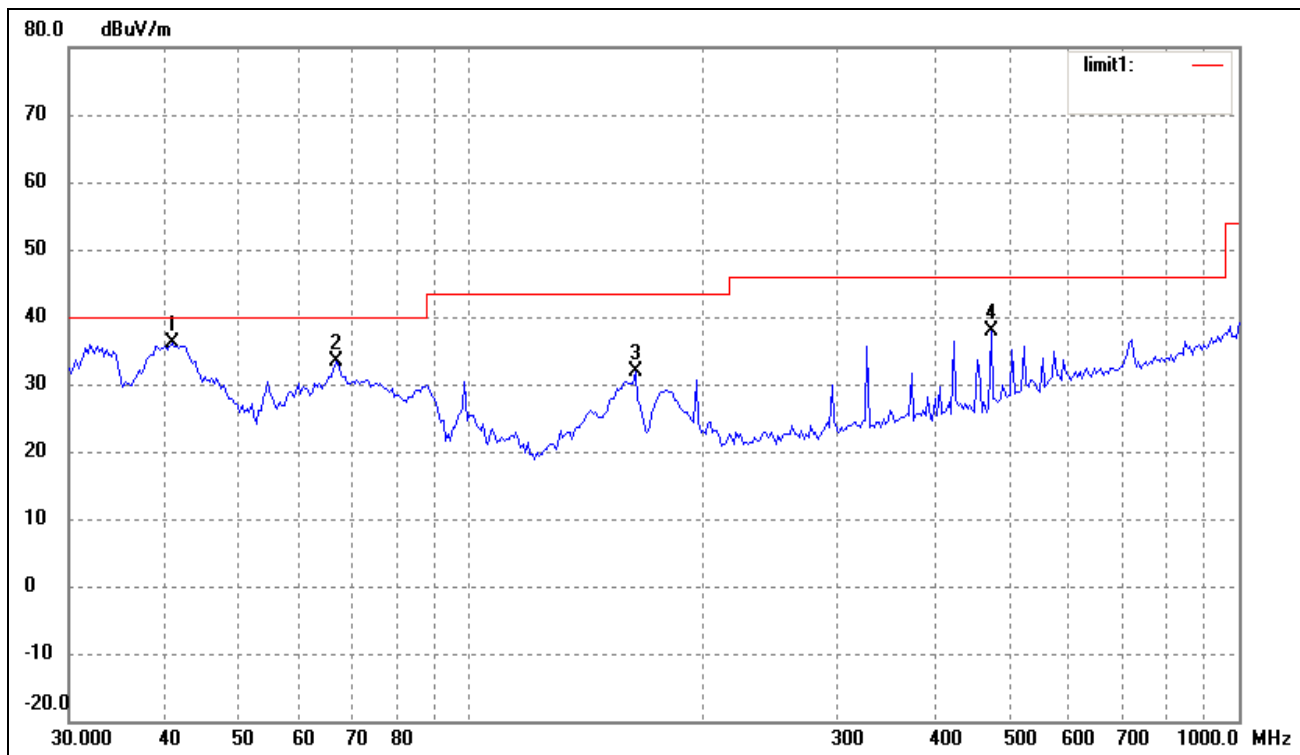
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	169.5989	31.00	4.88	35.88	43.50	-7.62	360	200	peak
2	425.0280	29.08	11.57	40.65	46.00	-5.35	228	112	QP
3	374.6225	28.15	11.11	39.26	46.00	-6.74	0	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	40.8445	27.88	8.15	36.03	40.00	-3.97	323	124	QP
2	66.7325	28.48	4.90	33.38	40.00	-6.62	360	100	peak
3	163.7549	27.11	4.67	31.78	43.50	-11.72	0	200	peak
4	475.4990	25.48	12.30	37.78	46.00	-8.22	0	200	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 (2412MHz)										
4824.0	PK	56.86	90	V	34.1	5.2	33.0	63.16	74	-10.84
4824.0	PK	54.98	270	H	34.1	5.2	33.0	61.28	74	-12.72
7236.0	PK	50.35	180	V	37.4	6.1	33.5	60.35	74	-13.65
7236.0	PK	49.67	45	H	37.4	6.1	33.5	59.67	74	-14.33
4824.0	AV	43.37	270	V	34.1	5.2	33.0	49.67	54	-4.33
4824.0	AV	42.37	90	H	34.1	5.2	33.0	48.67	54	-5.33
7236.0	AV	37.61	45	V	37.4	6.1	33.5	47.61	54	-6.39
7236.0	AV	36.37	60	H	37.4	6.1	33.5	46.37	54	-7.63
Middle Channel (2437MHz)										
4874.0	PK	56.05	45	V	34.1	5.2	33.0	62.35	74	-11.65
4874.0	PK	55.56	270	H	34.1	5.2	33.0	61.86	74	-12.14
7311.0	PK	50.59	45	V	37.4	6.1	33.5	60.59	74	-13.41
7311.0	PK	49.67	180	H	37.4	6.1	33.5	59.67	74	-14.33
4874.0	AV	42.39	270	V	34.1	5.2	33.0	48.69	54	-5.31
4874.0	AV	41.08	90	H	34.1	5.2	33.0	47.38	54	-6.62
7311.0	AV	36.51	60	V	37.4	6.1	33.5	46.51	54	-7.49
7311.0	AV	35.85	45	H	37.4	6.1	33.5	45.85	54	-8.15
High Channel (2462MHz)										
4924.0	PK	55.09	270	V	34.1	5.2	33.0	61.39	74	-12.61
4924.0	PK	54.26	45	H	34.1	5.2	33.0	60.56	74	-13.44
7386.0	PK	49.86	180	V	37.4	6.1	33.5	59.86	74	-14.14
7386.0	PK	47.67	45	H	37.4	6.1	33.5	57.67	74	-16.33
4924.0	AV	41.99	90	V	34.1	5.2	33.0	48.29	54	-5.71
4924.0	AV	41.32	270	H	34.1	5.2	33.0	47.62	54	-6.38
7386.0	AV	35.68	60	V	37.4	6.1	33.5	45.68	54	-8.32
7386.0	AV	34.97	60	H	37.4	6.1	33.5	44.97	54	-9.03

*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	V	34.1	5.2	33.0	59.31	74	-14.69
4824.0	PK	49.9	270	H	34.1	5.2	33.0	56.2	74	-17.8
7236.0	PK	48.74	180	V	37.4	6.1	33.5	58.74	74	-15.26
7236.0	PK	47.33	45	H	37.4	6.1	33.5	57.33	74	-16.67
4824.0	AV	40.07	270	V	34.1	5.2	33.0	46.37	54	-7.63
4824.0	AV	37.88	90	H	34.1	5.2	33.0	44.18	54	-9.82
7236.0	AV	35.32	45	V	37.4	6.1	33.5	45.32	54	-8.68
7236.0	AV	38.36	60	H	37.4	6.1	33.5	48.36	54	-5.64
Middle Channel (2437MHz)										
4874.0	PK	55.05	45	V	34.1	5.2	33.0	61.35	74	-12.65
4874.0	PK	53.16	270	H	34.1	5.2	33.0	59.46	74	-14.54
7311.0	PK	50.38	45	V	37.4	6.1	33.5	60.38	74	-13.62
7311.0	PK	47.19	180	H	37.4	6.1	33.5	57.19	74	-16.81
4874.0	AV	40.99	270	V	34.1	5.2	33.0	47.29	54	-6.71
4874.0	AV	37.31	90	H	34.1	5.2	33.0	43.61	54	-10.39
7311.0	AV	36.39	60	V	37.4	6.1	33.5	46.39	54	-7.61
7311.0	AV	34.37	45	H	37.4	6.1	33.5	44.37	54	-9.63
High Channel (2462MHz)										
4924.0	PK	56.12	270	V	34.1	5.2	33.0	62.42	74	-11.58
4924.0	PK	53.98	45	H	34.1	5.2	33.0	60.28	74	-13.72
7386.0	PK	51.86	180	V	37.4	6.1	33.5	61.86	74	-12.14
7386.0	PK	48.76	45	H	37.4	6.1	33.5	58.76	74	-15.24
4924.0	AV	42.39	90	V	34.1	5.2	33.0	48.69	54	-5.31
4924.0	AV	38.27	270	H	34.1	5.2	33.0	44.57	54	-9.43
7386.0	AV	37.38	60	V	37.4	6.1	33.5	47.38	54	-6.62
7386.0	AV	35.16	60	H	37.4	6.1	33.5	45.16	54	-8.84

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 5th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

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	2012-03-28	2013-03-27
EMI Test Receiver	R&S	ESVB	825471/005	2012-03-28	2013-03-27
Positioning Controller	C&C	CC-C-1F	N/A	2012-03-28	2013-03-27
RF Switch	EM	EMSW18	SW060023	2012-03-28	2013-03-27
Pre-amplifier	Agilent	8447F	3113A06717	2012-03-28	2013-03-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2012-03-28	2013-03-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2012-02-25	2013-02-24
Horn Antenna	ETS	3117	00086197	2012-02-25	2013-02-24

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.

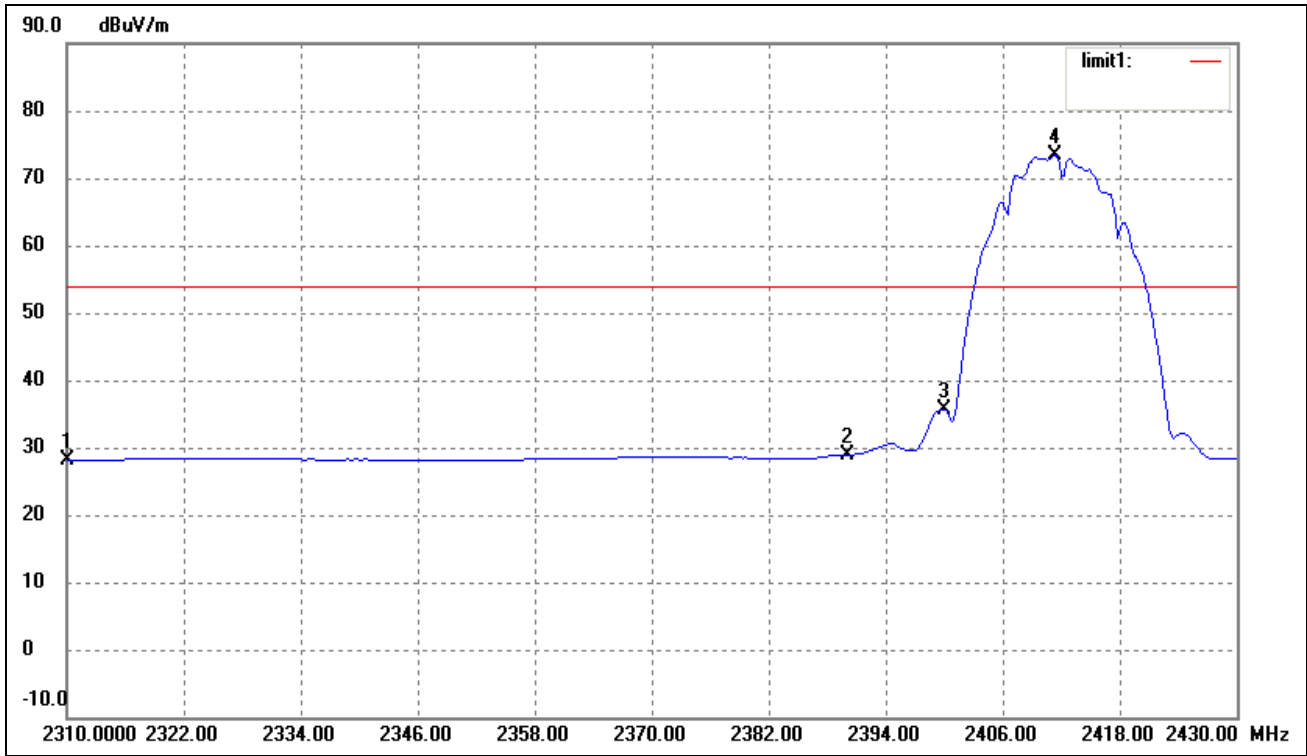
9.4 Environmental Conditions

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

9.5 Summary of Test Results/Plots

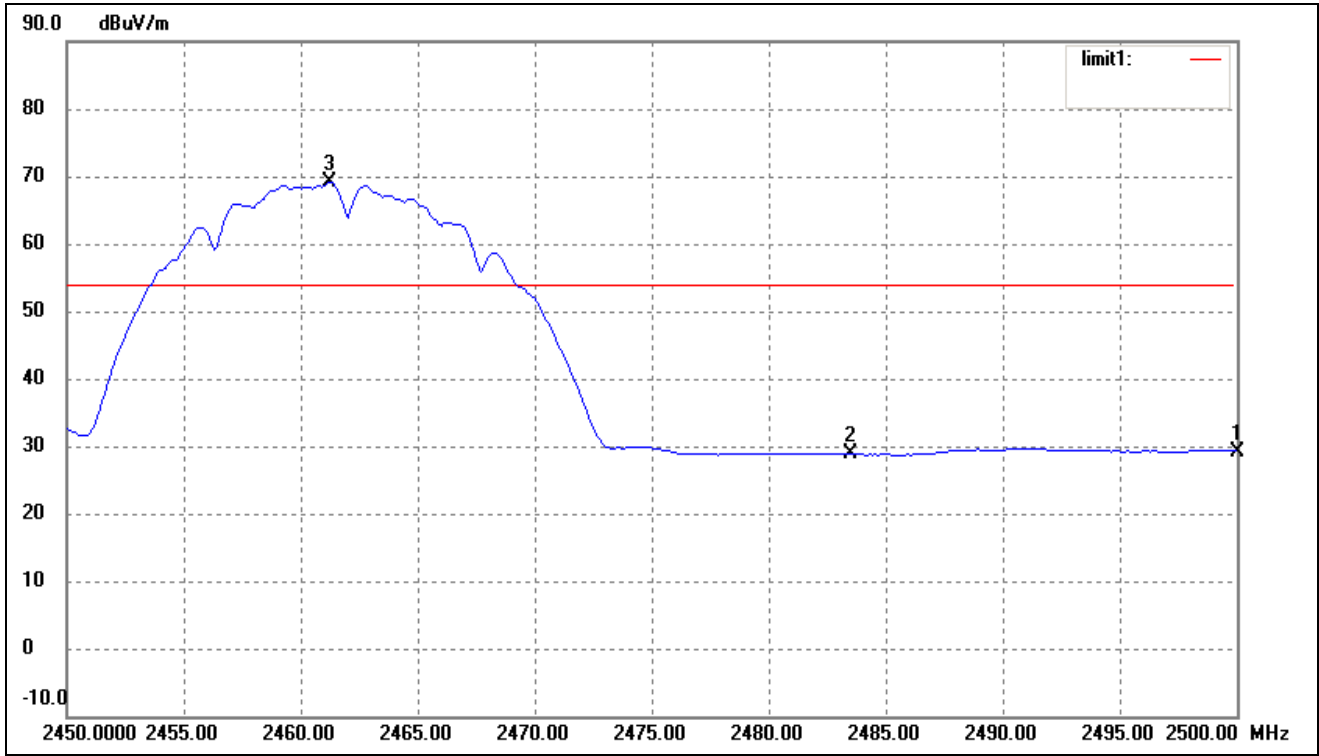
Test mode	Frequency MHz	Limit dBuV /dB	Result
802.11b	2390.00	<54dBuV	Pass
	2400.00	>20dB	Pass
	2483.50	<54dBuV	Pass
802.11g	2390.00	<54dBuV	Pass
	2400.00	>20dB	Pass
	2483.50	<54dBuV	Pass

For 802.11b
Lowest Bandedge



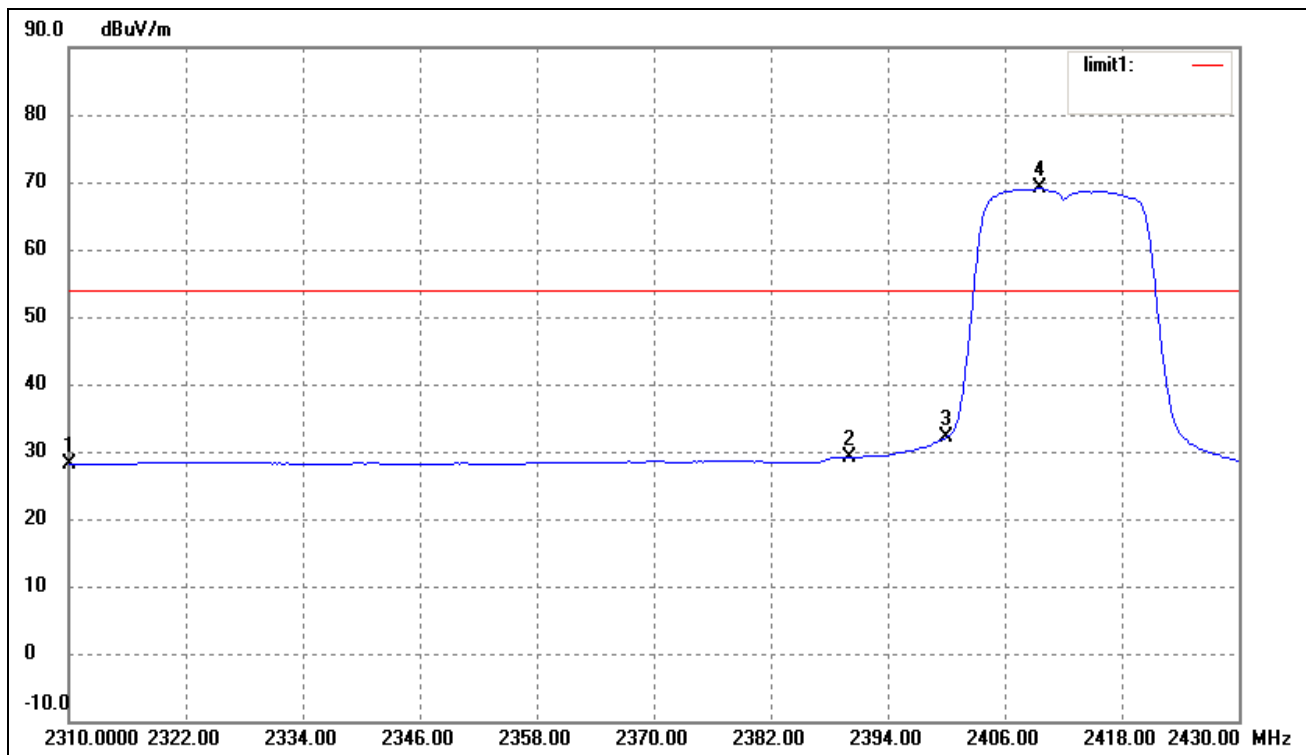
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2310.000	35.61	-7.51	28.10	54.00	-25.90	226	100	Ave
	2310.000	58.26	-7.51	50.75	74.00	-23.25	226	100	peak
2	2390.000	36.24	-7.34	28.90	54.00	-25.10	154	100	Ave
	2390.000	57.26	-7.34	49.92	74.00	-24.08	221	100	peak
3	2400.000	42.98	-7.31	35.67	/	/	/	/	Ave
4	2411.280	80.68	-7.28	73.40	/	/	/	/	Ave

Highest Bandedge



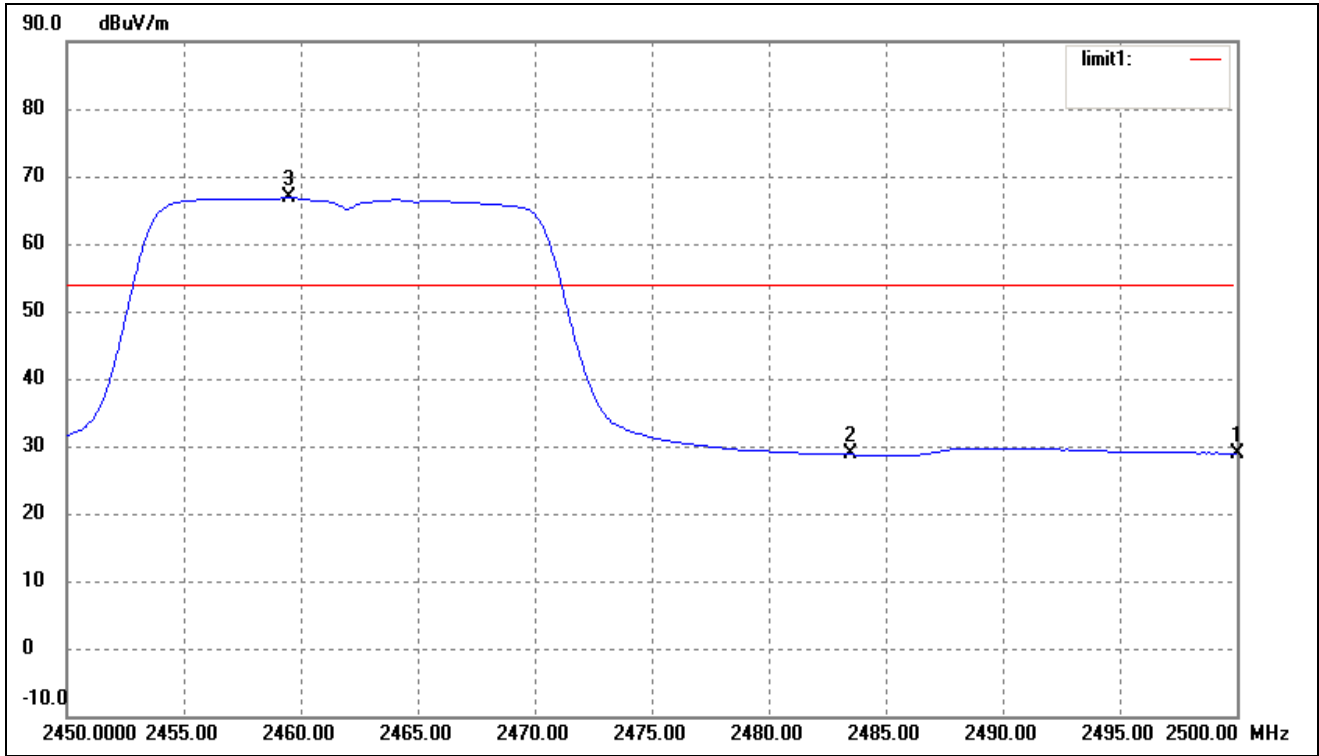
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2500.000	36.30	-7.08	29.22	54.00	-24.78	262	100	Ave
	2500.000	56.29	-7.08	49.21	74.00	-24.79	263	100	peak
2	2483.500	35.93	-7.13	28.80	54.00	-25.20	220	200	Ave
	2483.500	55.19	-7.13	48.06	74.00	-25.94	220	200	peak
3	2461.200	76.22	-7.17	69.05	/	/	/	/	Ave

For 802.11g
Lowest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2310.000	35.62	-7.51	28.11	54.00	-25.89	114	100	Ave
	2310.000	58.67	-7.51	51.16	74.00	-22.84	120	100	peak
2	2390.000	36.53	-7.34	29.19	54.00	-24.81	133	200	Ave
	2390.000	57.36	-7.34	50.02	74.00	-23.98	152	200	peak
3	2400.000	39.45	-7.31	32.14	/	/	/	/	Ave
4	2409.600	76.40	-7.28	69.12	/	/	/	/	Ave

Highest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	2500.000	35.95	-7.08	28.87	54.00	-25.13	203	118	Ave
	2500.000	57.23	-7.08	50.15	74.00	-23.85	360	200	peak
2	2483.500	35.93	-7.13	28.80	54.00	-25.20	231	100	Ave
	2483.500	56.48	-7.13	49.35	74.00	-24.65	109	200	peak
3	2459.500	74.05	-7.17	66.88	/	/	/	/	Ave

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