FCC Part 15C

Measurement And Test Report

For

Shenzhen Smart-eye Digital Electronics Co., Ltd

#6 Northern Zone, Shangxue S&T City, Bantian, Longgang District, Shenzhen, China.

Model: NCB-543W, NCB-542W, NC543W, NC542W

Jun 09, 2011

This Report Concerns:	**Equipment Type:**
☒ Original Report	IP Camera

Report Number:	MTI110525002RF
Test Engineer:	Bill Chen
Reviewed By:	Jason zheng
Approved & Authorized By:	Hebe Lee
Test Date:	May 26- Jun. 08,2011
Prepared By:	**MTI Technology Laboratory Ltd.** 10F, Yinxing Business Hotel, Xixiang Road, Bao'an District, Shenzhen, P,R.China. Tel: +86-755-8885 0135 Fax: +86-755-8885 0136

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of MTI Technology Laboratory Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	Shenzhen Smart-eye Digital Electronics Co.,Ltd
Address of applicant:	#6 Northern Zone, Shangxue S&T City, Bantian, Longgang District, Shenzhen, China
Manufacturer:	Shenzhen Smart-eye Digital Electronics Co.,Ltd
Address of manufacturer:	#6 Northern Zone, Shangxue S&T City, Bantian, Longgang District, Shenzhen, China
Equipment Under Test:	IP Camera
Tested Model No.:	NCB-543W
Supplementary Models No:	NCB-542W, NC543W, NC542W
	Remark: supplementary models are only different in exterior with tested Model and with the same circuit construction
FCC ID:	**ZCBHYIPC-543W**
Type of Modulation:	CCK, OFDM
Frequency Band:	2412~2462 MHz for 802.11b/g, 802.11n/HT20;
	2422~2452 MHz for 802.11n/HT40
Number of Channels:	11 for 802.11b/g, 802.11n/HT20; 9 for 802.11n/HT40
Channel Separation:	5MHz
EIRP Power:	16.95 dBm
Power Supply:	120V/60Hz

Remark: * *The test data gathered are from the production sample provided by the manufacturer.*

1.2 Related Submittal(s) / Grant (s)

This submittal(s) is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2003.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.207, and 15.247 rules.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in 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. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

All measurement required was performed at laboratory of Global United Technology Service Co., Ltd at 2nd Floor, Block No.2, Laodong Industrial Zone,Xixiang Road Baoan Distric,China Shenzhen.

The test facility is recognized, certified, or accredited by the following organizations:

FCC – Registration No.: 600491

Global United Technology Service 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. Registration 600491, July 20, 2010.

2. SYSTEM TEST CONFIGURATION

The tests documented in this report were performed in accordance with ANSI C63.4-2003 and FCC CFR 47 Part 15 Subpart C.

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

2.3 General Test Procedures

Conducted Emissions The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 7.1 of ANSI C63.4-2003.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

Radiated Emissions The EUT is a placed on as turntable, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4-2003.

2.4 List of Measuring Equipments Used

Items	Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
1	EMI Test Receiver	ROHDE & SCHWARZ	ESI 26	100079	2011/6	1 year
2	Horn Antenna	R/S	CH14-H052	1091698	2011/6	1 year
3	3m Semi- Anechoic Chamber	ETS	N/A	N/A	2011/6	1 year
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100038	2010/11	1 year
2	EMI Test Receiver	ROHDE & SCHWARZ	ESI 26	100009	2010/11	1 year
3	Receiver/ Spectrum Analyzer	ROHDE & SCHWARZ	ESCI	100106	2010/11	1 year
4	Spectrum Analyzer	Agilent	E7405A	US41160415	2010/11	1 year
5	Artificial Mains	ROHDE & SCHWARZ	ESH2-Z5	100028	2010/11	1 year
6	Pulse Limiter	ROHDE & SCHWARZ	ESHSZ2	100044	2010/11	1 year
7	LISN	COM Power	LI-200	12212	2010/11	1 year
8	LISN	COM Power	LI-200	12019	2010/11	1 year
9	3m/5m Semi-Anechoic Chamber	ETS	N/A	N/A	2010/11	1 year
10	Ultra-Broadband Antenna	R/S	HL562	100015	2010/11	1 year
11	Horn Antenna	R/S	HF906	100039	2010/11	1 year
12	RF Test Panel	R/S	TS / RSP	335015/ 0017	N/A	N/A
13	Turntable	ETS	2088	2149	N/A	N/A
14	Antenna Mast	ETS	2075	2346	N/A	N/A

3. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
15.203/15.247(b)/(c)	Antenna Requirement	Pass
15.207	AC Power Line Conducted Emission	Pass
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System	Pass
15.247(e)	Power Spectral Density	Pass
15.247(b)(1)	Maximum Peak Output Power	Pass
15.247(d)	Band Edges Emission	Pass
15.247(d)	Radiated Emission	Pass

4. ANTENNA REQUIREMENT

4.1 Standard Applicable

Section 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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Section 15.247(b)/(c):

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

If the intentional radiator is used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

4.2 Antenna Connected Construction

The antennas used in this product are PIFA. PIFA antenna with WNC connector, The maximum Gain of the antenna is 2.50dBi.

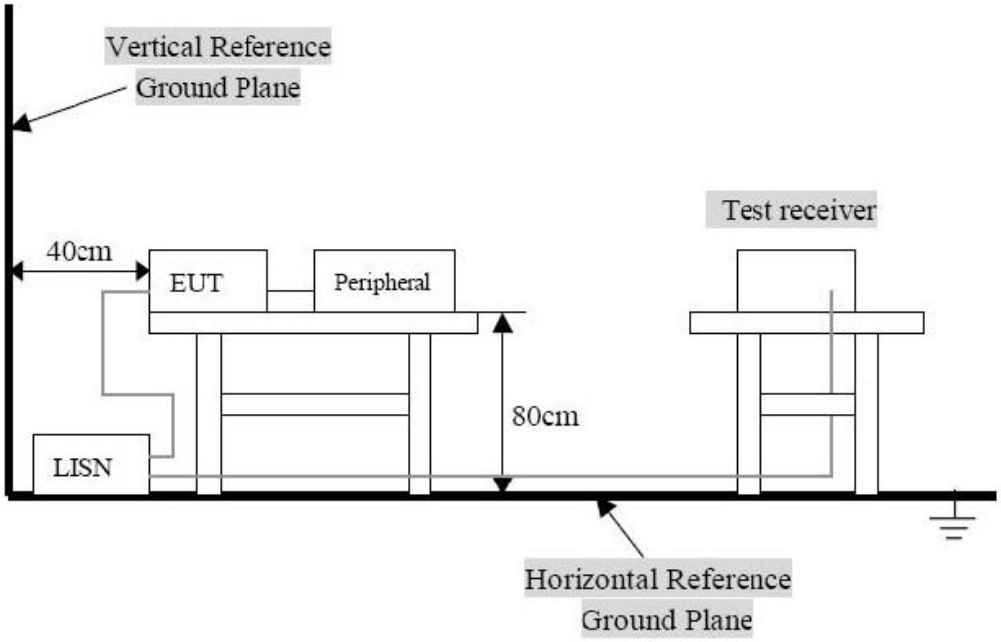
5. CONDUCTED EMISSION Measurement

5.1 Limits of Conducted Emission

Section 15.207: For a Low-power Radio-frequency Device is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150～0.500	66～56	56～46
0.500～5.000	56	46
5.000～30.00	60	50

5.2 Test Setup Diagram



5.3 Instrument Setting

The test receiver was set with the following configurations:

Test Receiver Setting:

Frequency Range……150 KHz to 30 MHz
Detector……Peak & Quasi-Peak & Average
Sweep Speed……Auto

IF Band Width……..9 KHz

5.4 Test Equipment List and Details

See section 2.4 of this report.

5.5 Test Procedure

1. Configure the EUT according to ANSI C63.4.

2. The EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.

3. Connect EUT to the power mains through a line impedance stabilization network (LISN)

4. All the support units are connected to the other LISN. The LISN should provide 50uH/50ohms coupling impedance.

5. The frequency range from 150 KHz to 30 MHz was searched.

6. Use the Channel & Power Controlling software to make the EUT working on selected channel and expected output power, then use the "H" Patter Generator software to make the supporting equipments stay on working condition.

7. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

8. The measurement has to be done between each power line and ground at the power terminal for each RF channel. Only one RF channel has to be investigated since this test is independent with the RF channel selection.

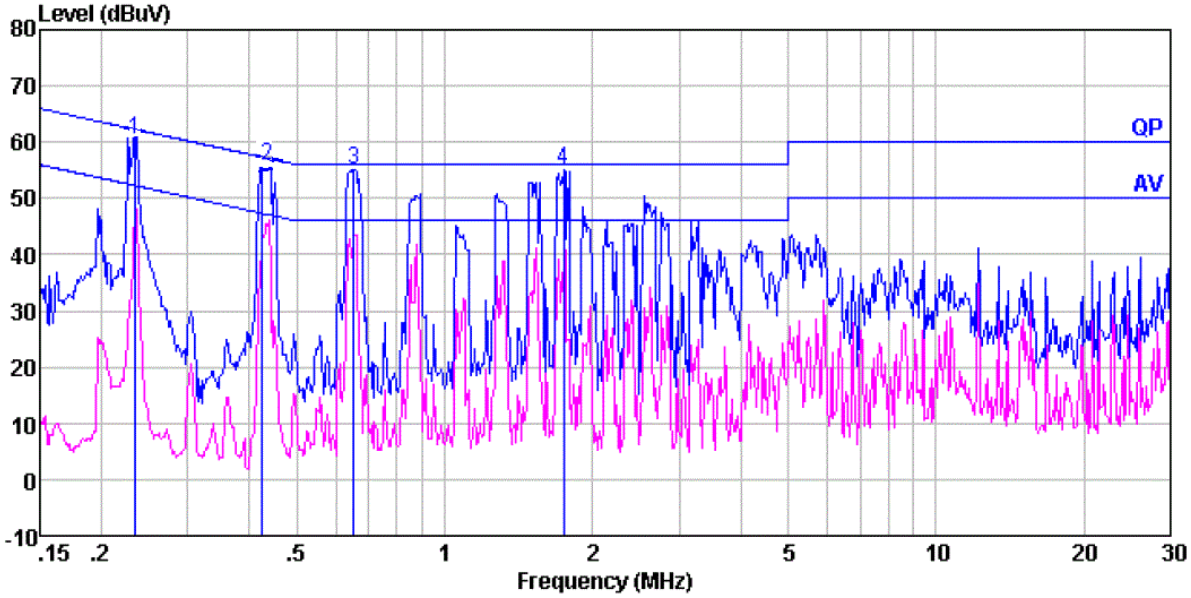
5.6 Test Result

Detailed information please refers to the following page.

According to the data in this section, the EUT complied with the FCC 15.207 Conducted margin for a Class B device, with the worst margin reading of:

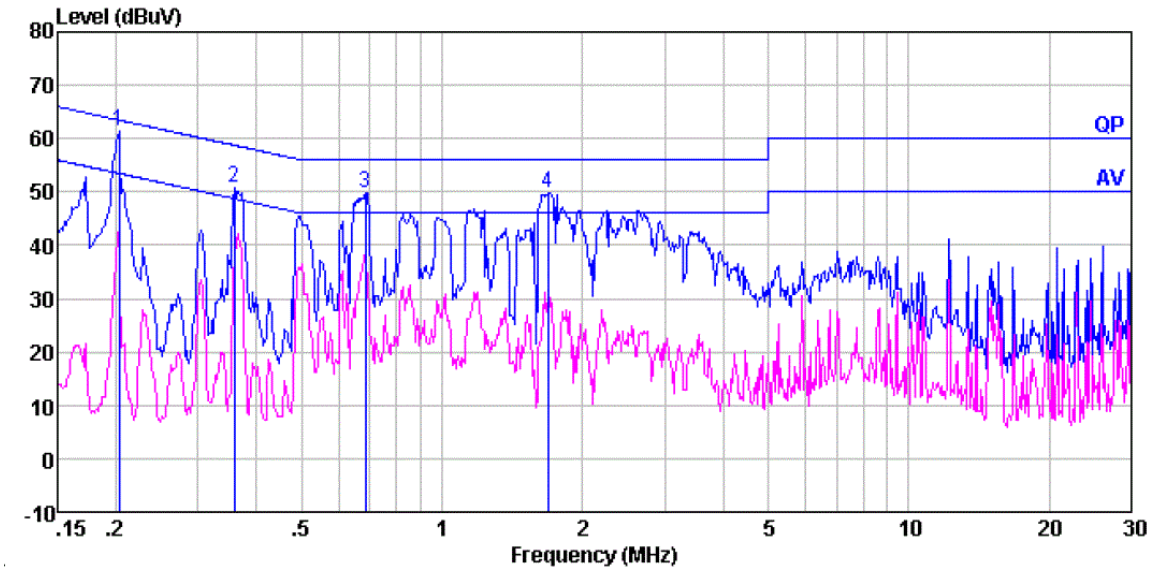
-0.63 dBμV at 0.234 MHz in the **Line** mode**, QP** detector, **0.15-30MHz**

EUT: IP Camera
M/N: NCB-543W
Operator: Amy
Test Specification: L



	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.234	62.19	0.64	0.10	62.93	62.30	-0.63	QP
2	0.426	57.67	0.57	0.10	58.34	57.33	-1.01	QP
3	0.654	54.55	0.52	0.10	55.17	56.00	-0.83	Peak
4	1.744	54.42	0.42	0.10	54.94	56.00	-1.06	Peak

EUT: IP Camera
M/N: NCB-543W
Operator: Amy
Test Specification: N



	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.203	60.71	0.65	0.10	61.46	63.49	-2.03	Peak
2	0.360	50.17	0.59	0.10	50.86	58.74	-7.88	Peak
3	0.686	49.26	0.52	0.10	49.88	56.00	-6.12	Peak
4	1.689	49.36	0.42	0.10	49.88	56.00	-6.12	Peak

6. 6dB Bandwidth Measurement

6.1 Limits of 6dB Bandwidth Measurement

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 EUT Setup

Spectrum

6.3 Test Equipment List and Details

See section 2.4.

6.4 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=100 KHz (1 % of Bandwidth.), Sweep=auto

4. Mark the peak frequency and –6dB (upper and lower) frequency.

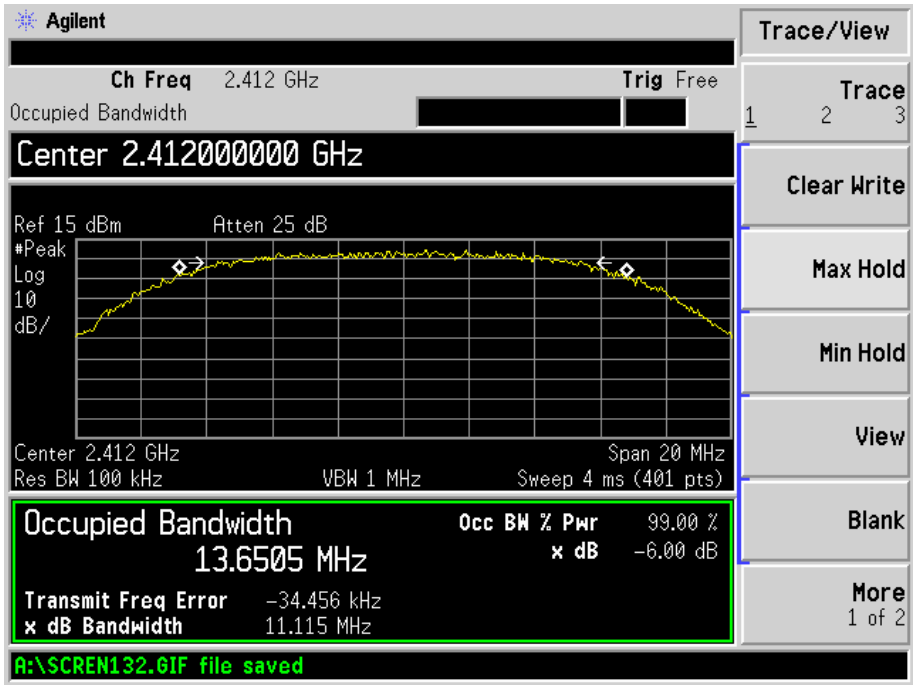
6.5 Test Result

PASS

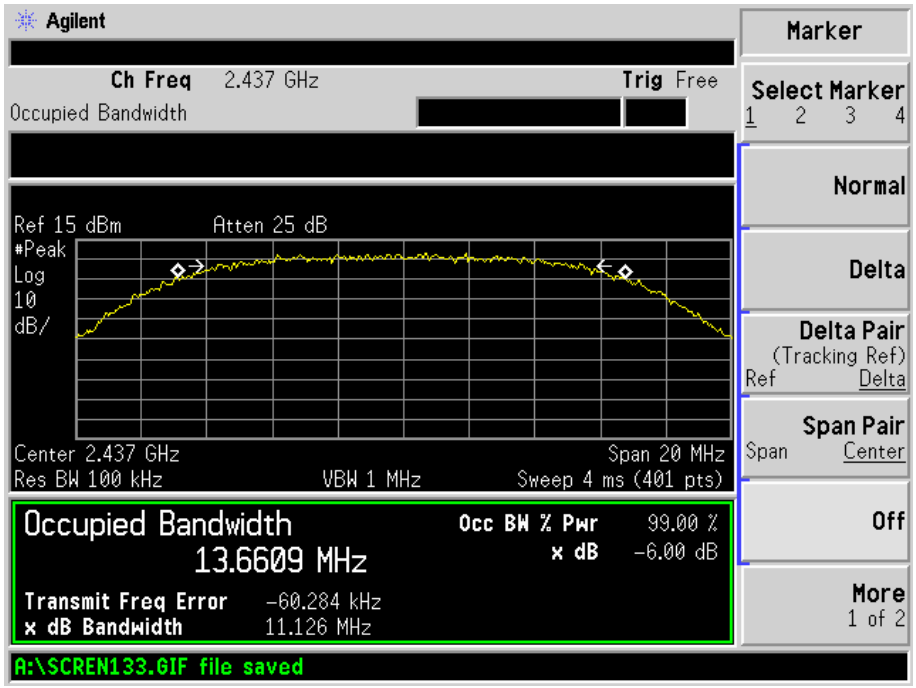
Detailed information, Please refer to the following pages.

Test mode	Frequency MHz	6 dB Bandwidth kHz	Limit kHz
802.11b	2412	11115	500
	2437	11126	500
	2462	11126	500
802.11g	2412	16436	500
	2437	16486	500
	2462	16489	500
802.11n/HT20	2412	17615	500
	2437	17594	500
	2462	17617	500
802.11n/HT40	2422	35681	500
	2437	35508	500
	2452	35685	500

For 802.11b
Low Channel



Middle Channel



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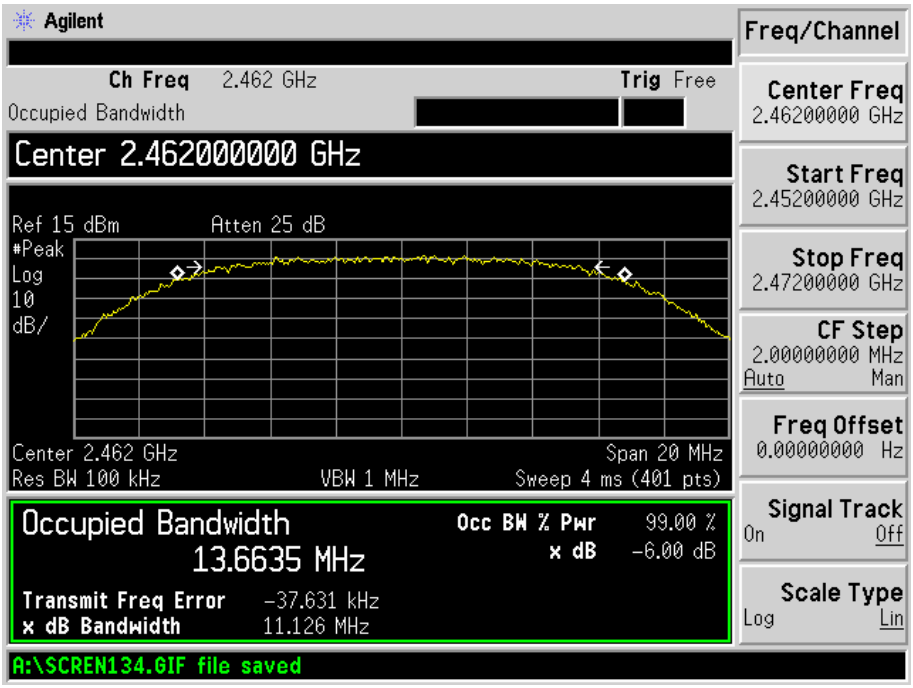
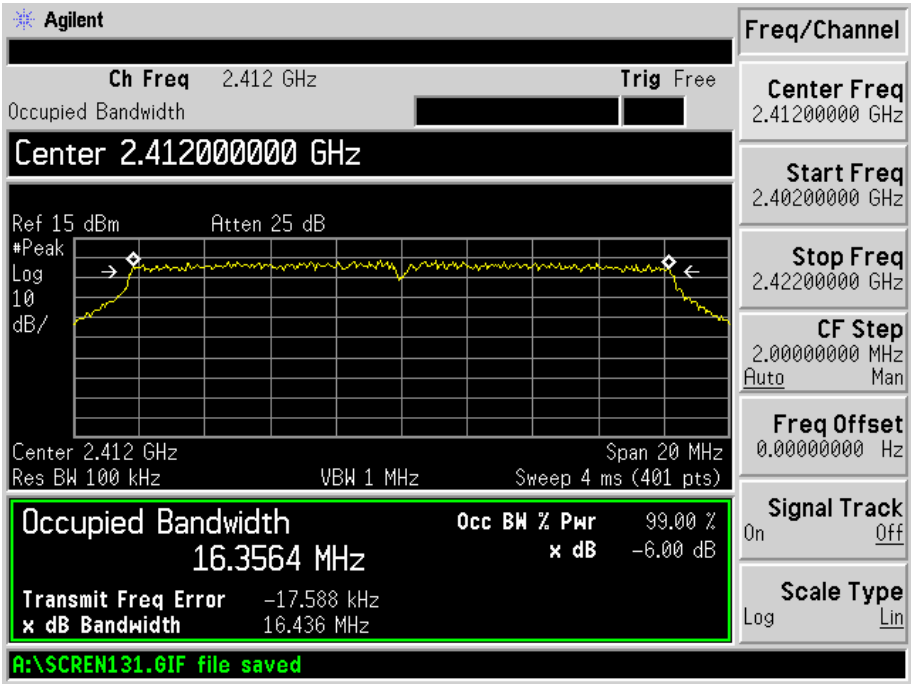


For 802.11g
Low Channel



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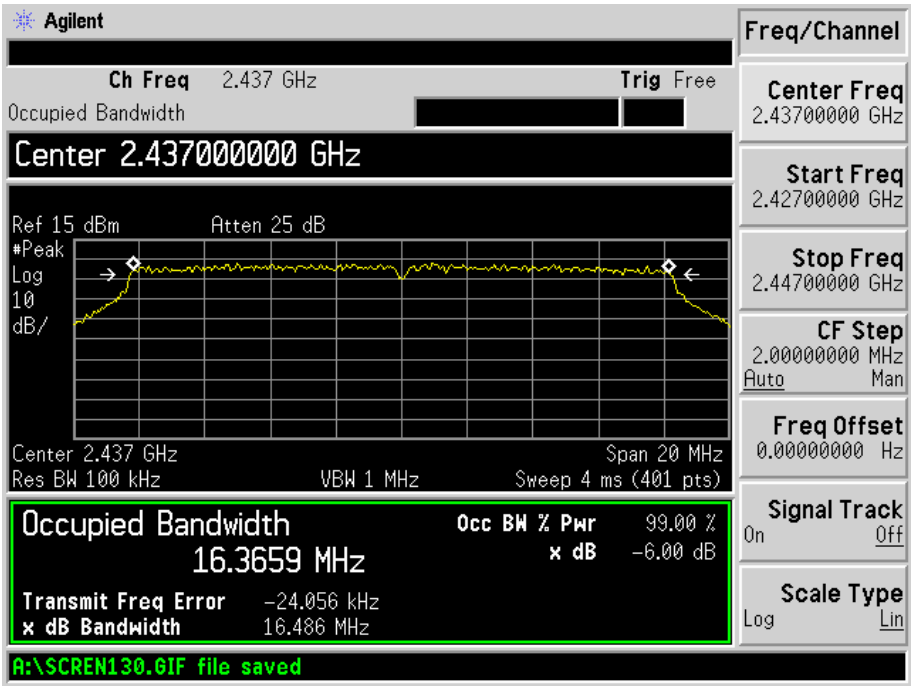

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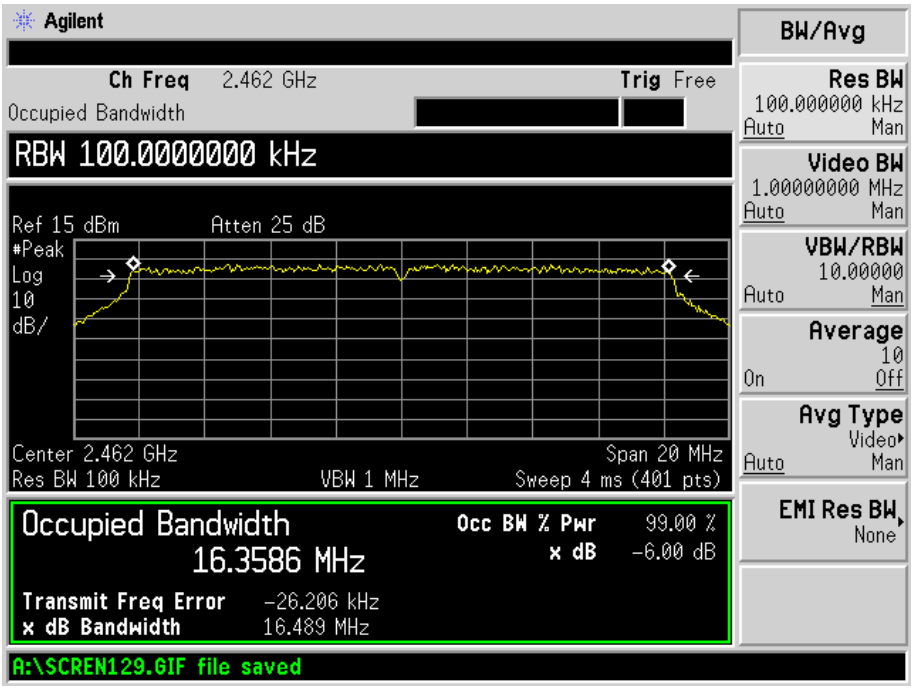
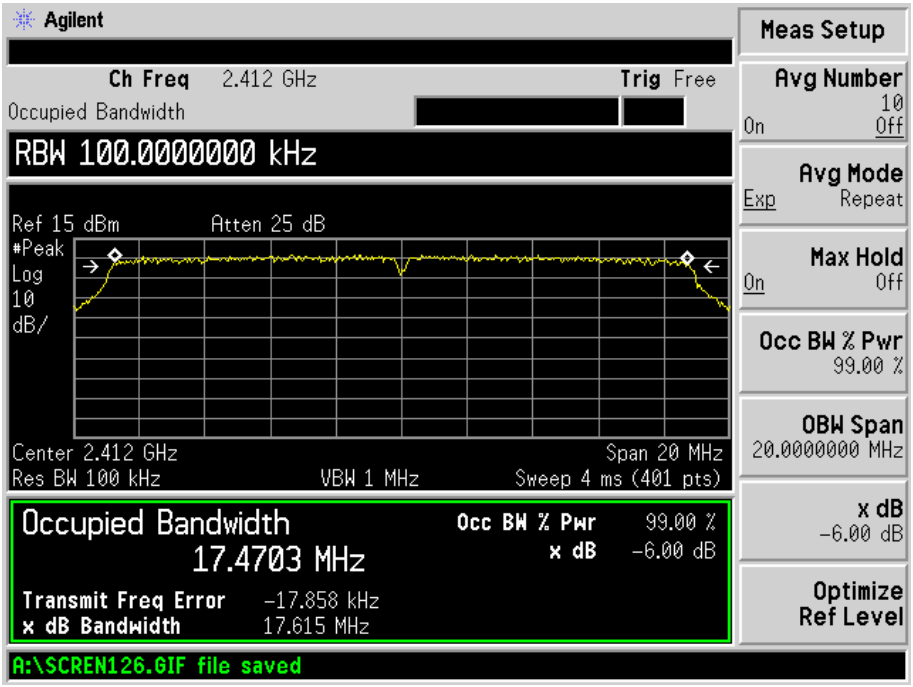


For 802.11n/HT20
Low Channel



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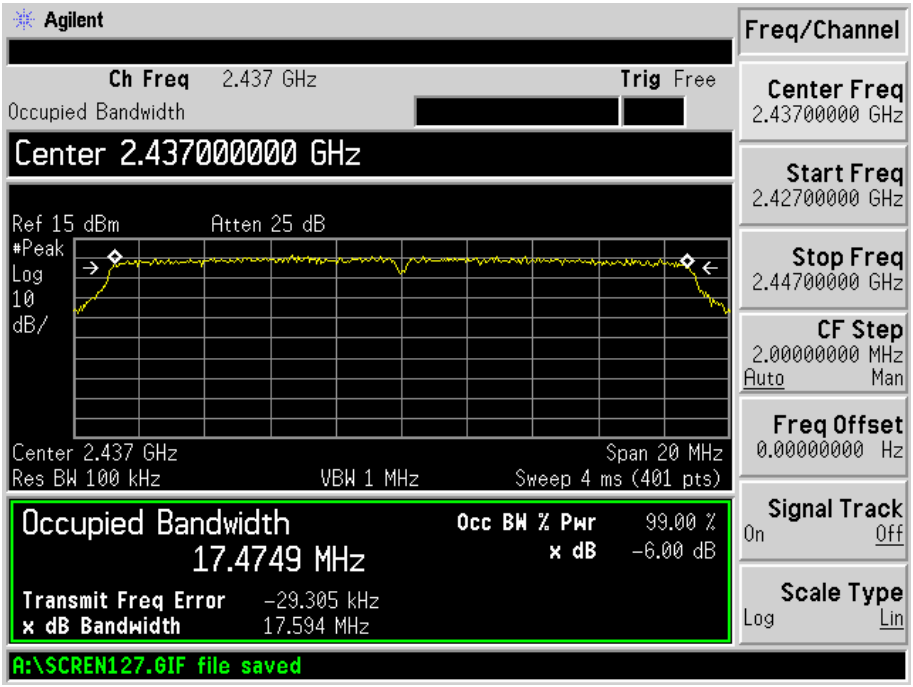
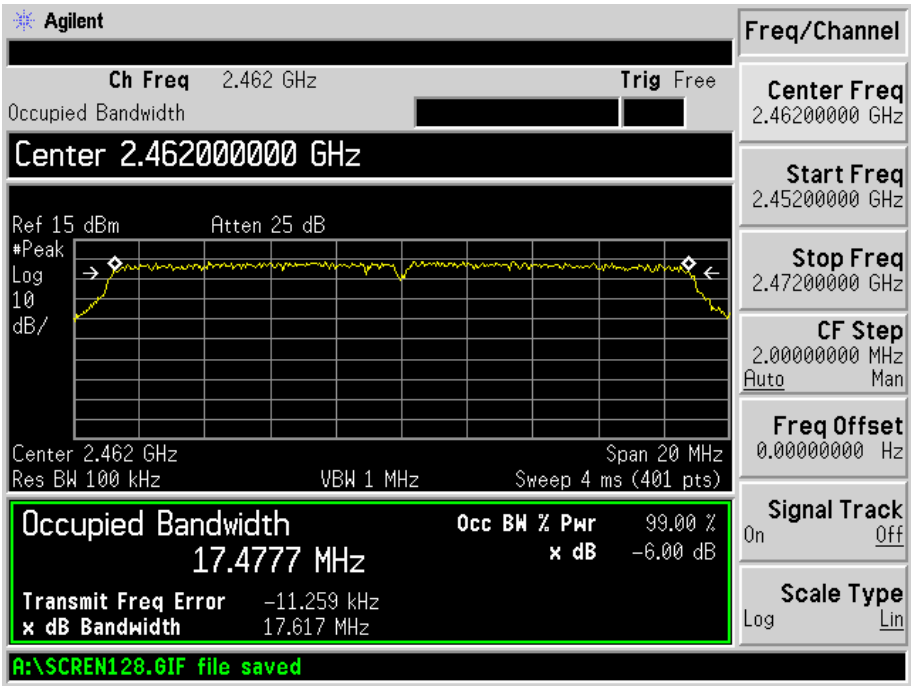
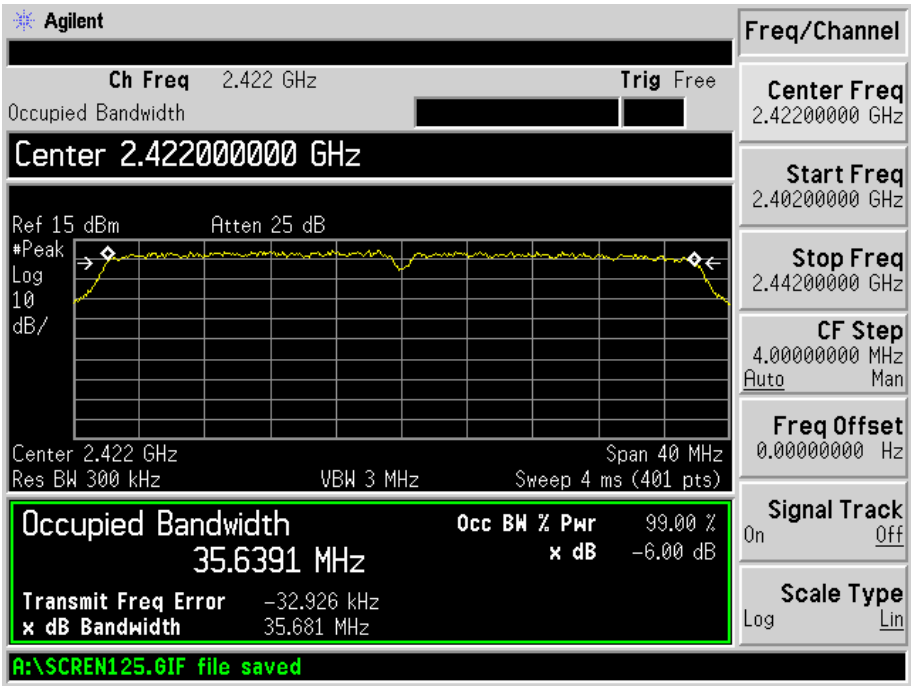


High Channel:



For 802.11n/HT40
Low Channel



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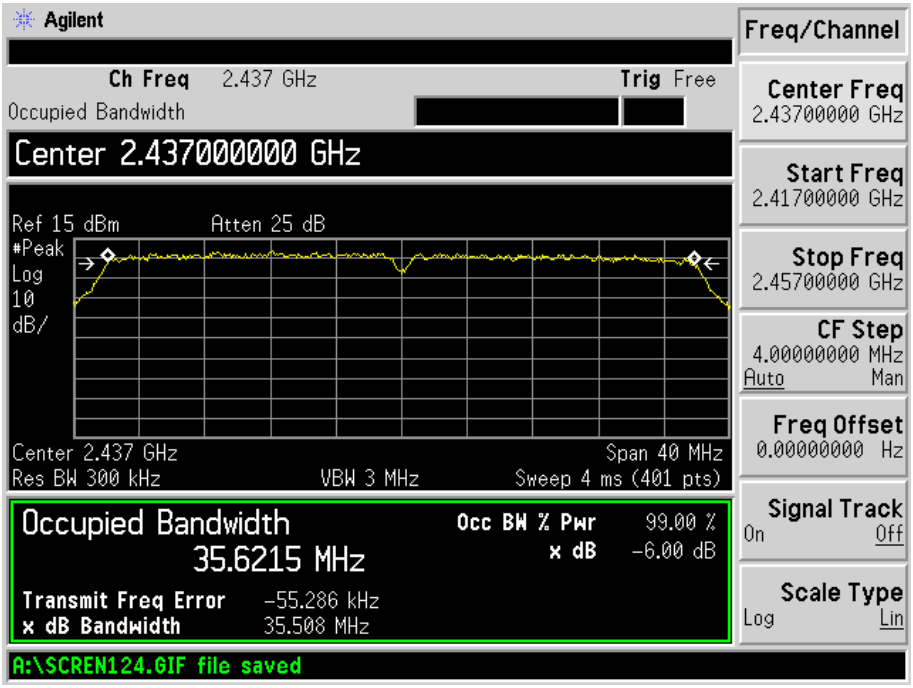

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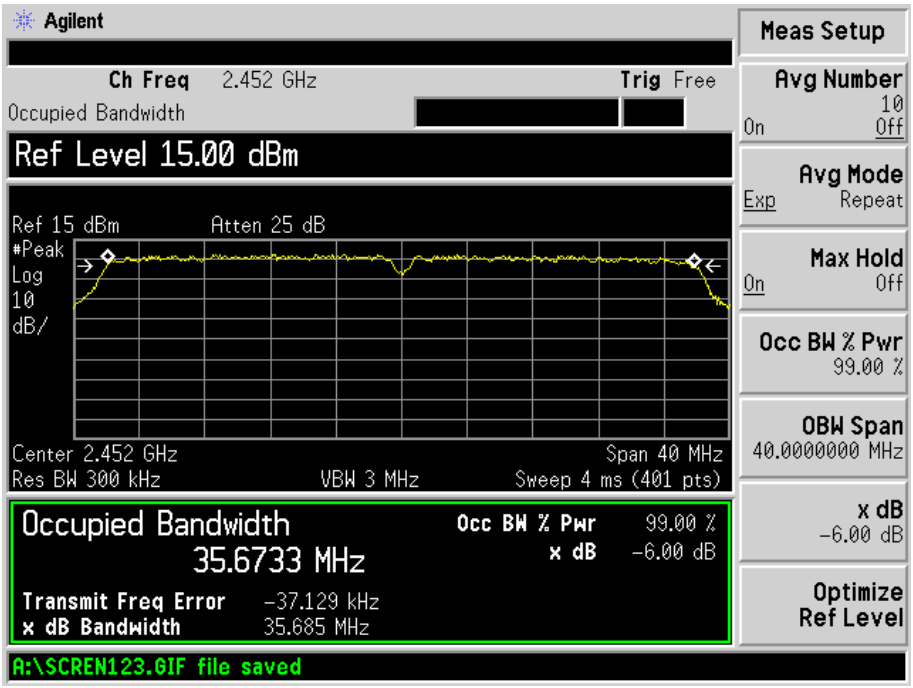


7. Maximum Peak Output Power

7.1 Limits of Maximum Peak Output Power Measurement

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 EUT Setup

7.3 Test Equipment List and Details

See section 2.4.

7.4 Test Procedure

1. A detector was used on the output port of the EUT. An oscilloscope was used to read the response of the detector.

2. Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.

3. Adjusted the power to have the same reading on oscilloscope. Record the power level.

7.5 Test Result

PASS

802.11b:

Channel No.	Frequency (MHz)	PEAK POWEROUTPUT (dBm)	PEAK POWEROUTPUT (W)	PEAK POWER LIMIT (W)	PASS/FAIL
LOW	2412	16.95	0.0495	1	PASS
Mid	2437	16.69	0.0467	1	PASS
High	2462	16.04	0.0402	1	PASS

802.11g:

Channel No.	Frequency (MHz)	PEAK POWEROUTPUT (dBm)	PEAK POWEROUTPUT (W)	PEAK POWER LIMIT (W)	PASS/FAIL
LOW	2412	15.31	0.0340	1	PASS
Mid	2437	15.21	0.0332	1	PASS
High	2462	15.27	0.0336	1	PASS

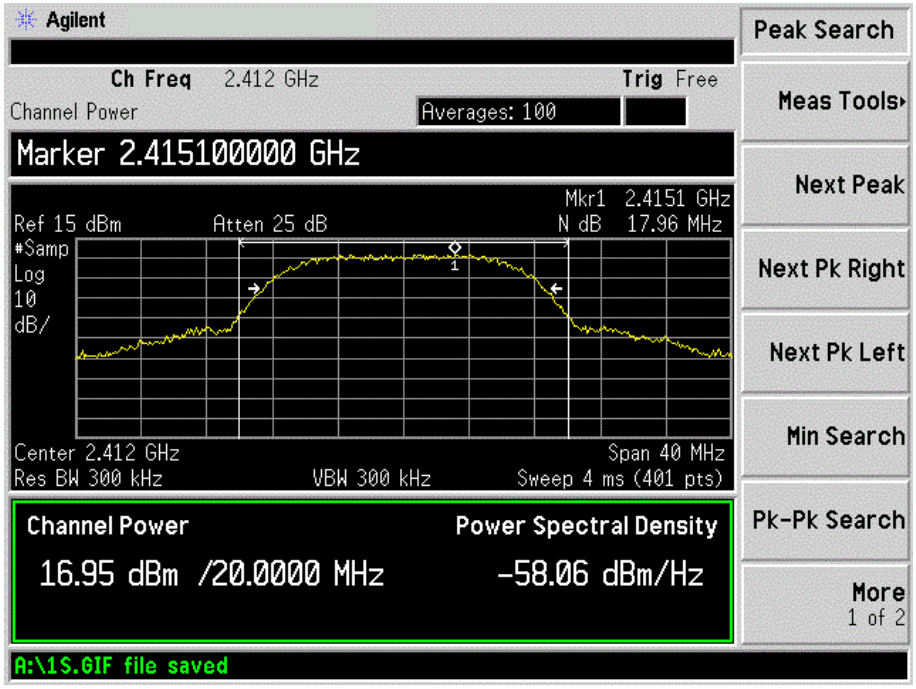
802.11n/HT20

Channel No.	Frequency (MHz)	PEAK POWEROUTPUT (dBm)	PEAK POWEROUTPUT (W)	PEAK POWER LIMIT (W)	PASS/FAIL
LOW	2412	12.30	0.0170	1	PASS
Mid	2437	12.89	0.0194	1	PASS
High	2462	12.72	0.0187	1	PASS

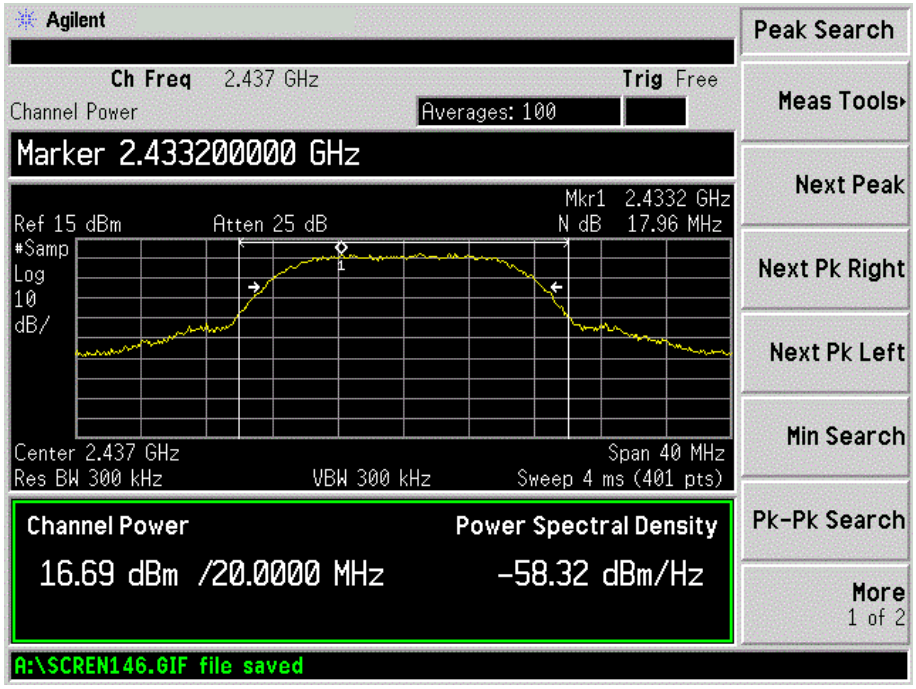
802.11n/HT40

Channel No.	Frequency (MHz)	PEAK POWEROUTPUT (dBm)	PEAK POWEROUTPUT (W)	PEAK POWER LIMIT (W)	PASS/FAIL
LOW	2422	12.58	0.0181	1	PASS
Mid	2437	12.38	0.0173	1	PASS
High	2452	12.24	0.0167	1	PASS

For 802.11b
Low Channel



Middle Channel



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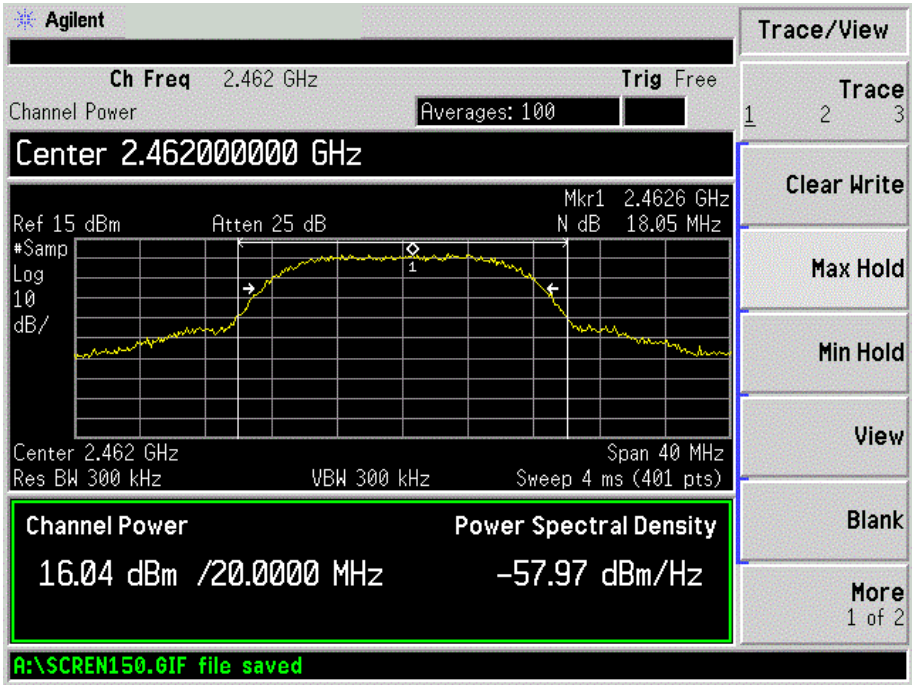
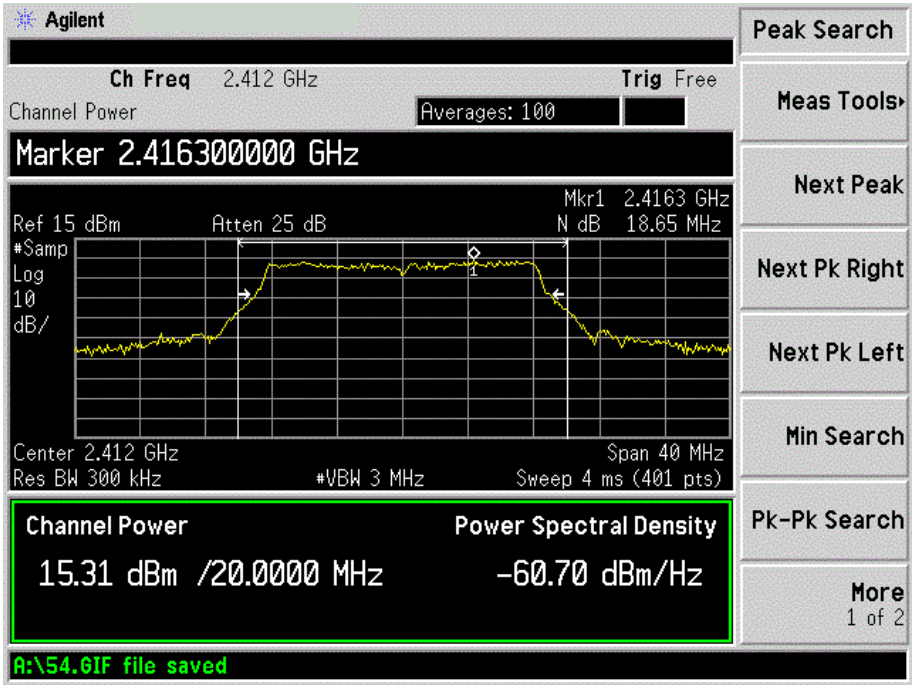
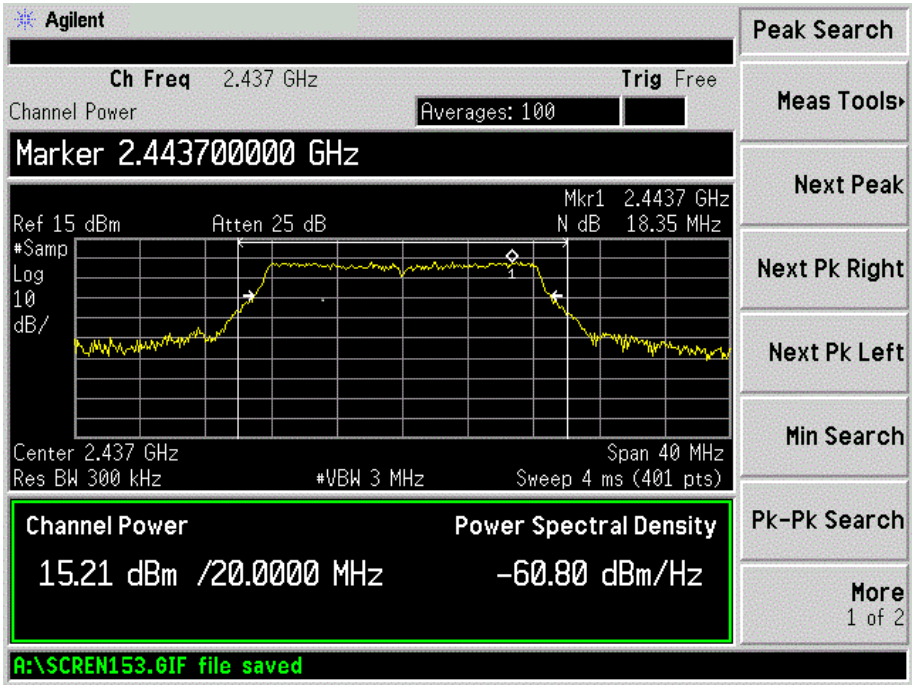


For 802.11g
Low Channel



Middle Channel



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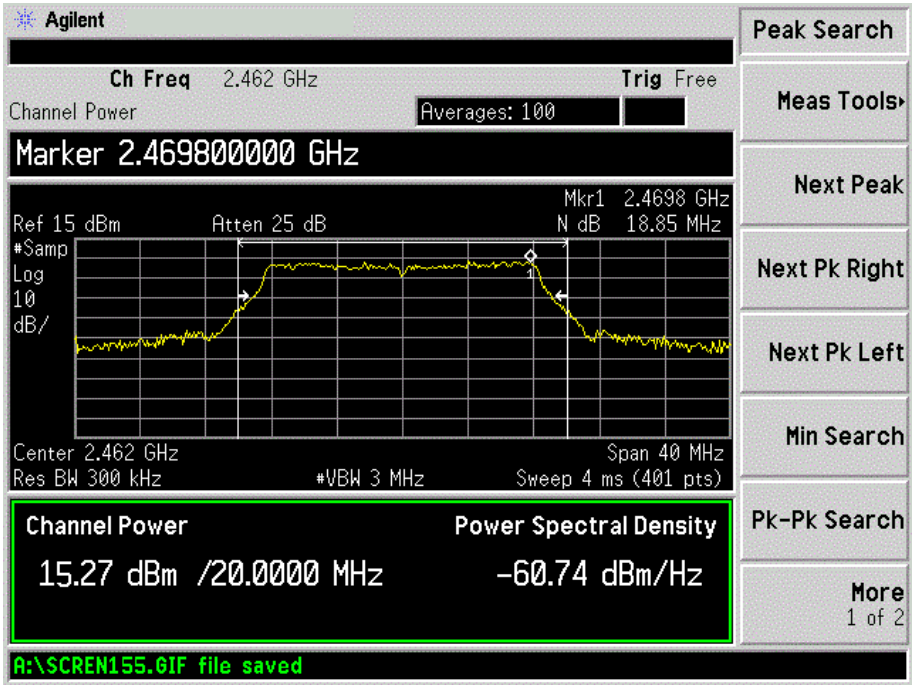
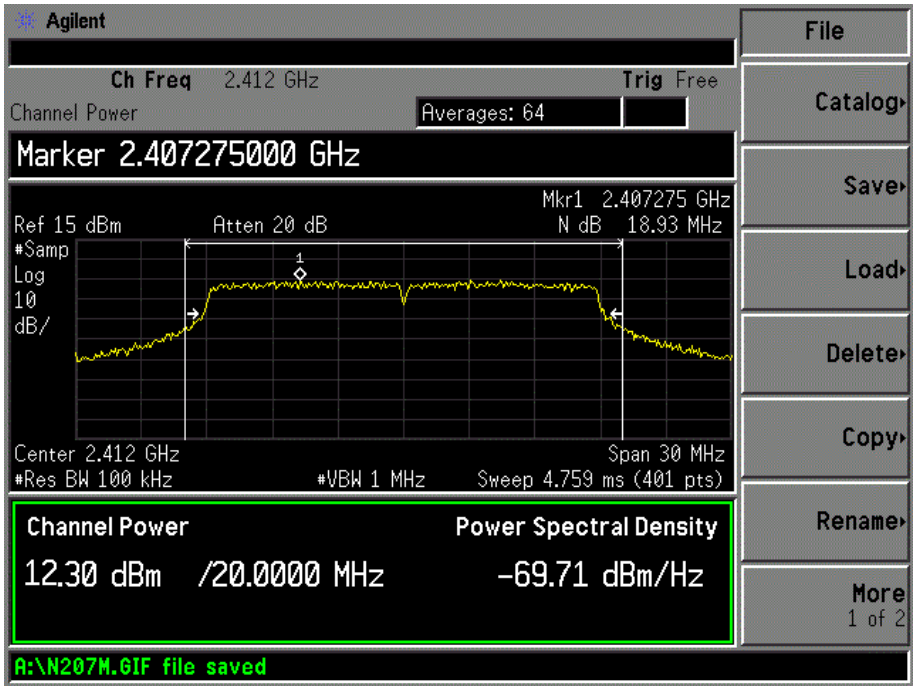
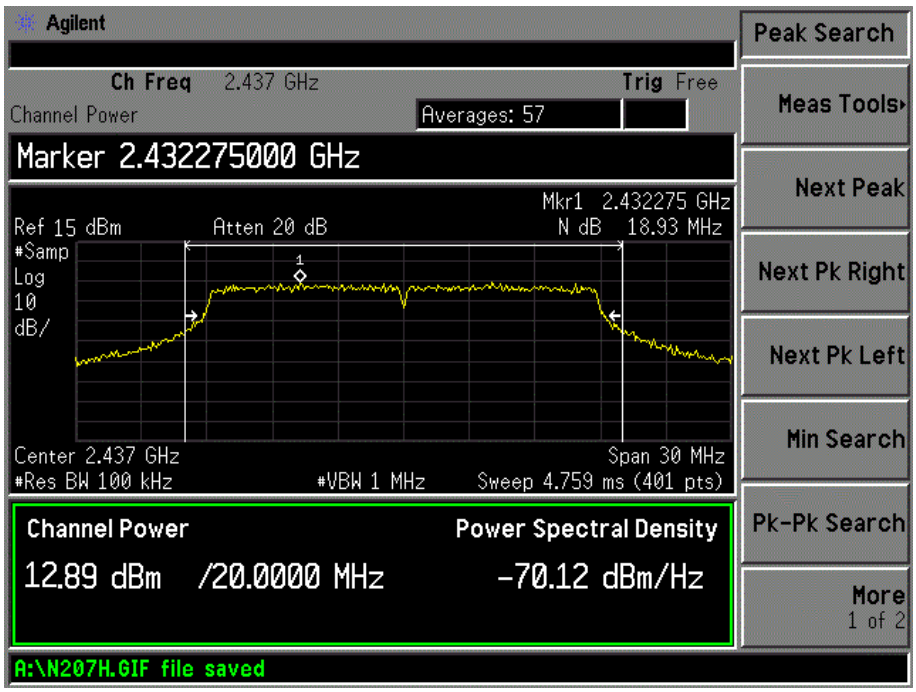


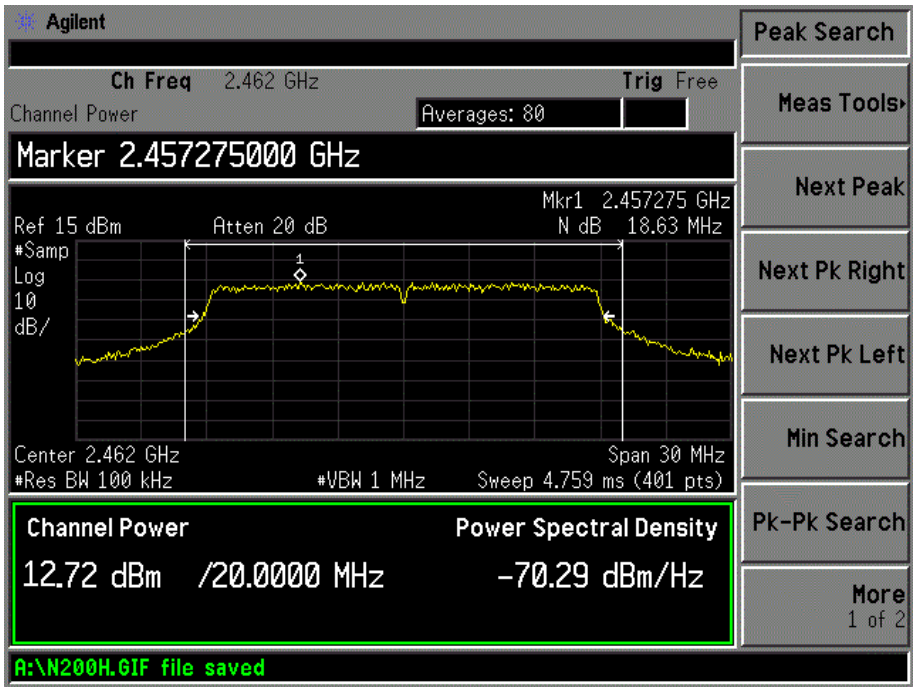
For 802.11n/HT20
Low Channel



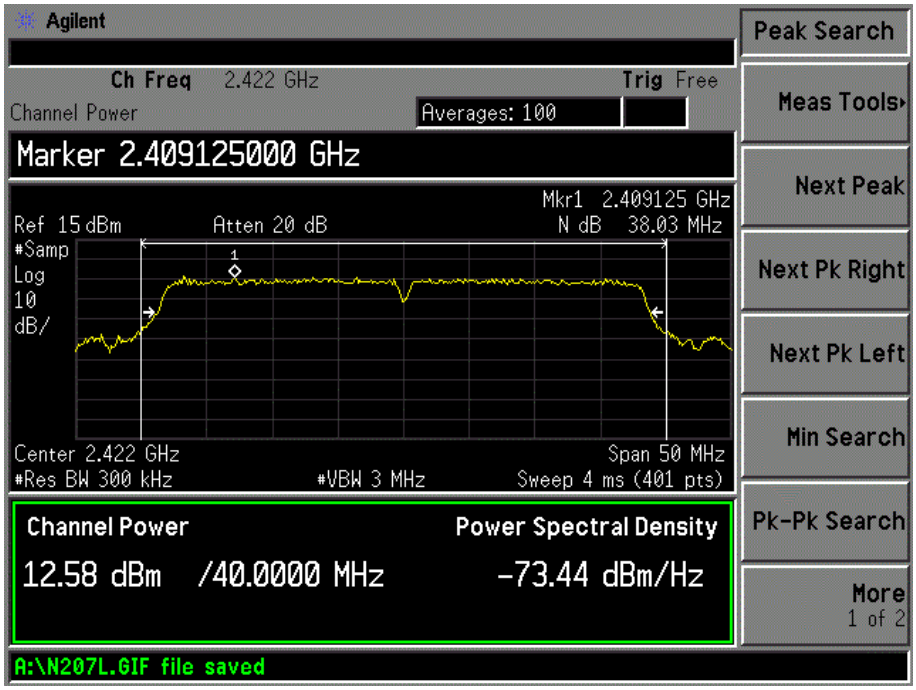
Mid Channel



High Channel



802.11n/HT40
Low Channel



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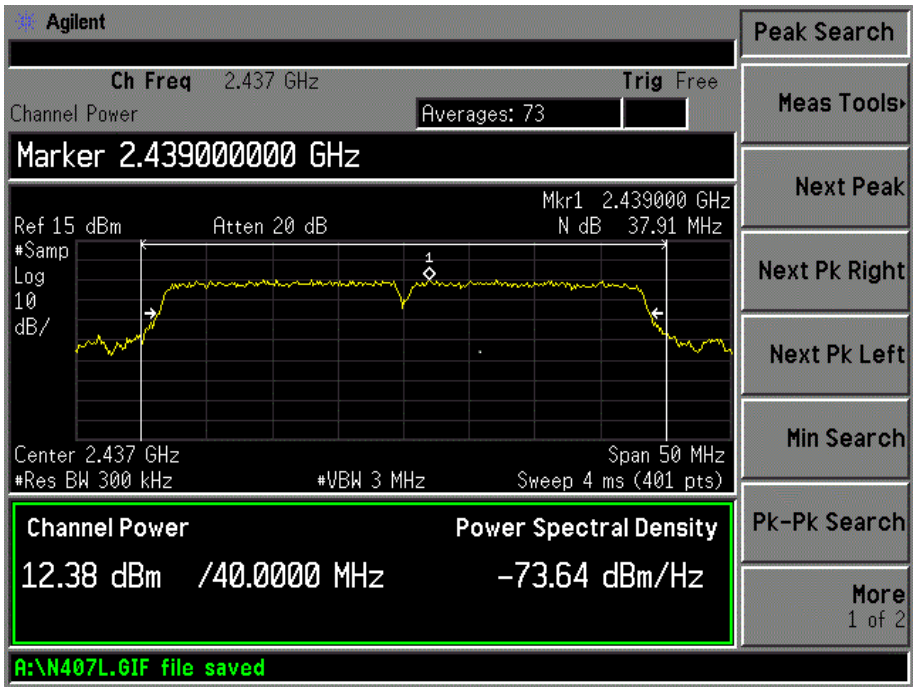
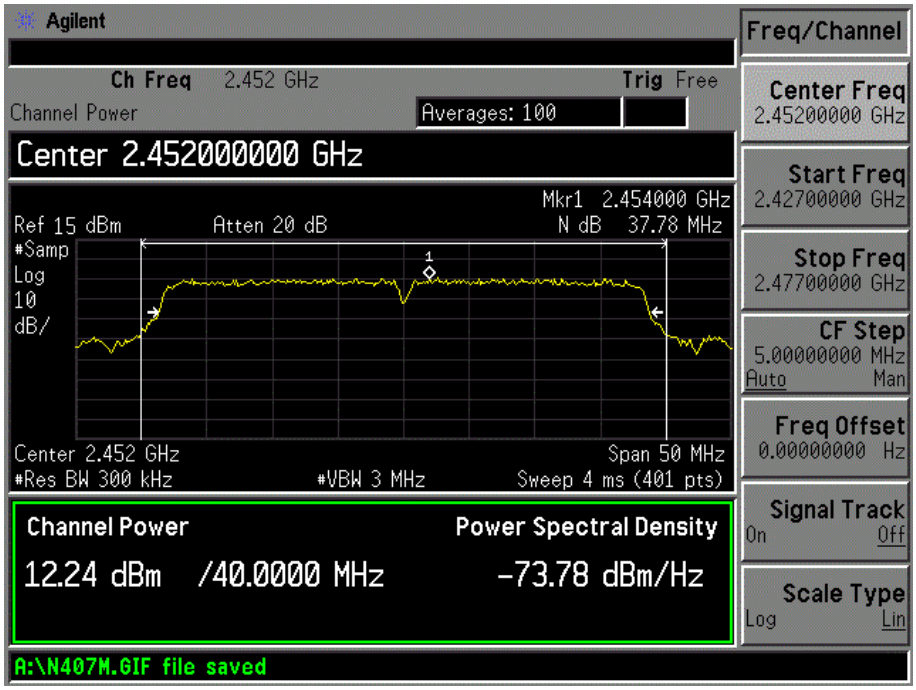


High Channel

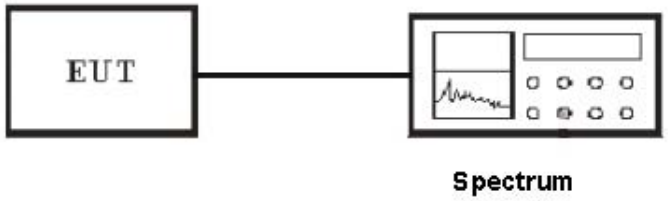


8. Power Spectral Density Measurement

8.1 Limits of Power Spectral Density Measurement

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.

8.2 EUT Setup



8.3 Test Equipment List and Details

See section 2.4.

8.4 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded. The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

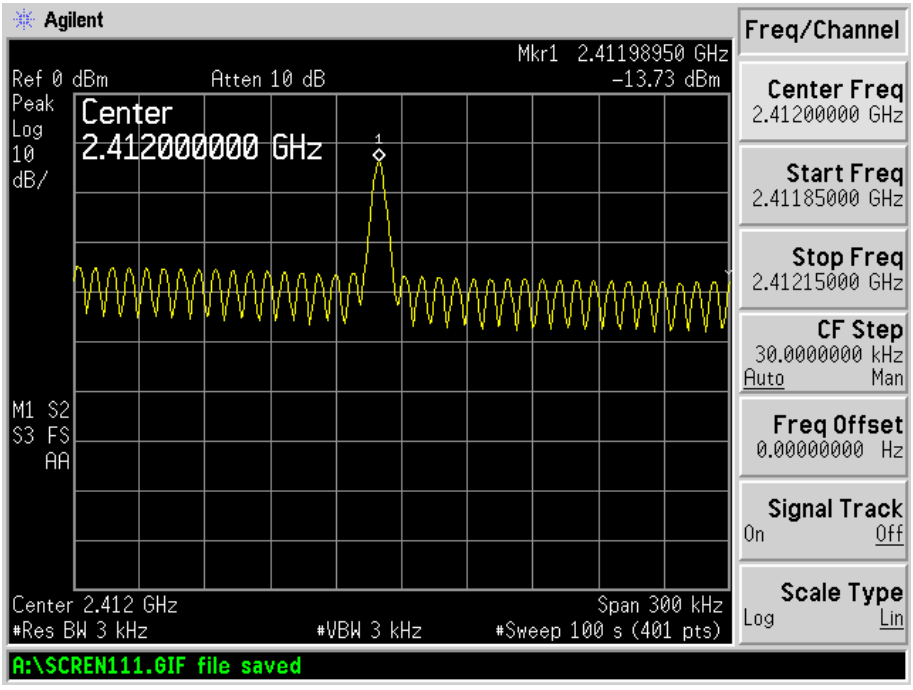
8.5 Test Result

PASS

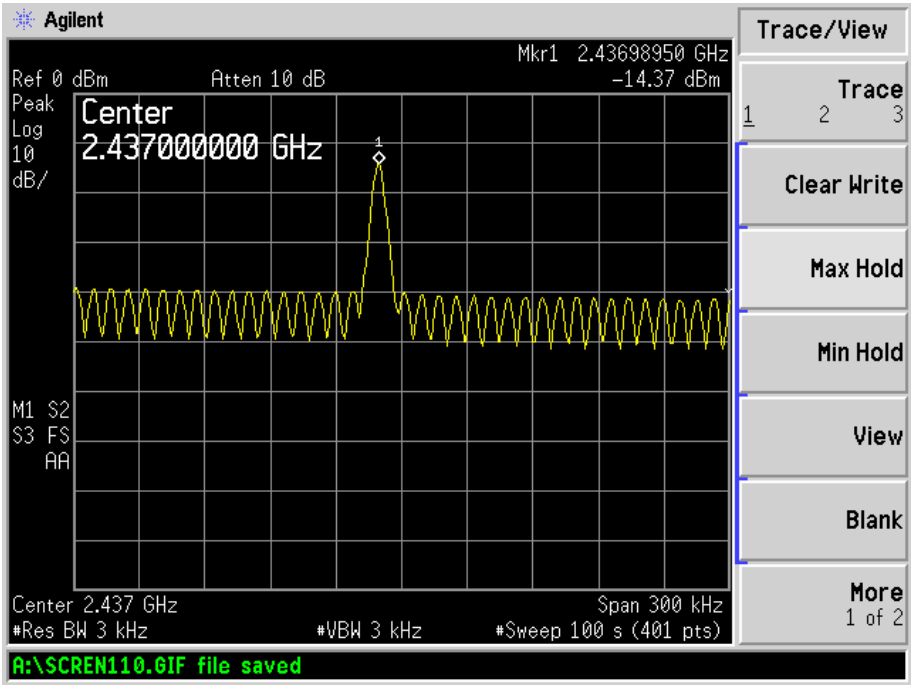
Test mode	Test channel	Reading dBm/3kHz	Limit dBm/3kHz
802.11b	Low channel (2412MHz)	-13.73	8
	Middle channel (2437MHz)	-14.37	8
	High channel (2462MHz)	-14.40	8
802.11g	Low channel (2412MHz)	-14.67	8
	Middle channel (2437MHz)	-15.28	8
	High channel (2462MHz)	-15.83	8
802.11n HT20	Low channel (2412MHz)	-14.34	8
	Middle channel (2437MHz)	-14.96	8
	High channel (2462MHz)	-15.54	8
802.11n HT40	Low channel (2422MHz)	-14.45	8
	Middle channel (2437MHz)	-15.23	8
	High channel (2452MHz)	-15.29	8

IEEE 802.11b

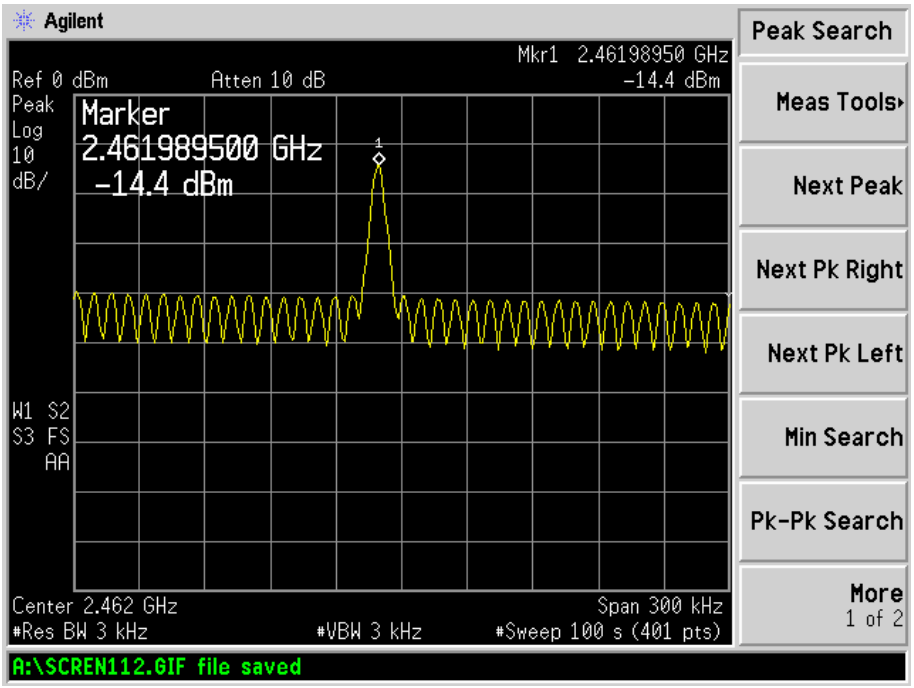
Low Channel:



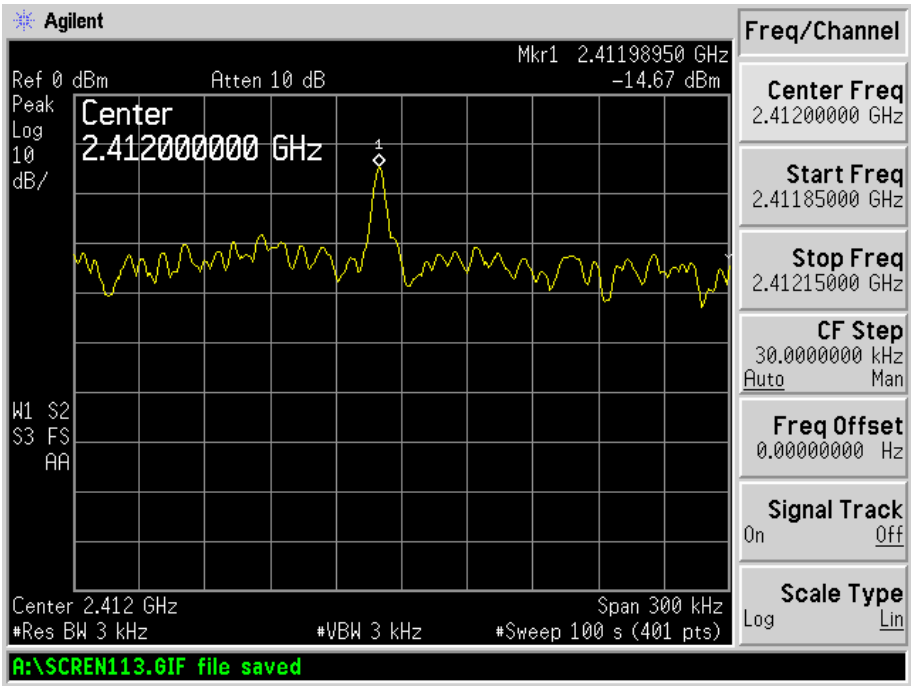
Middle Channel



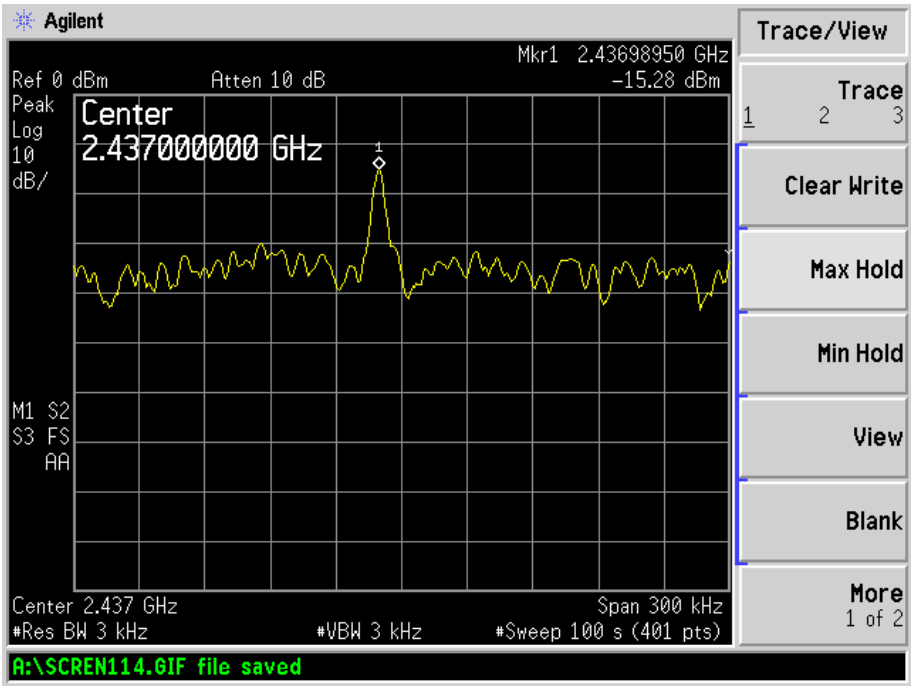
High Channel



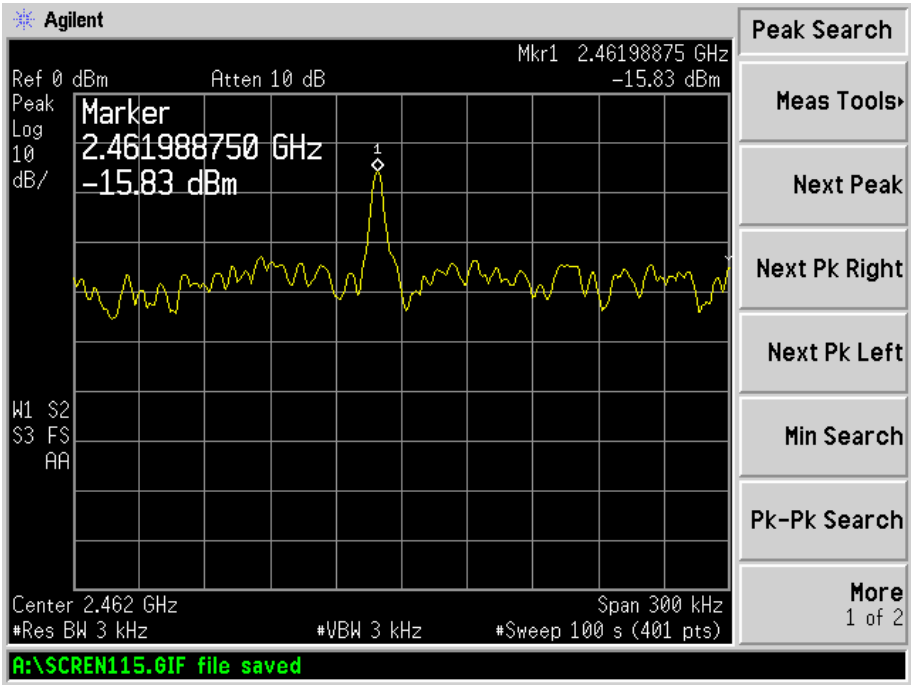
For 802.11g
Low Channel



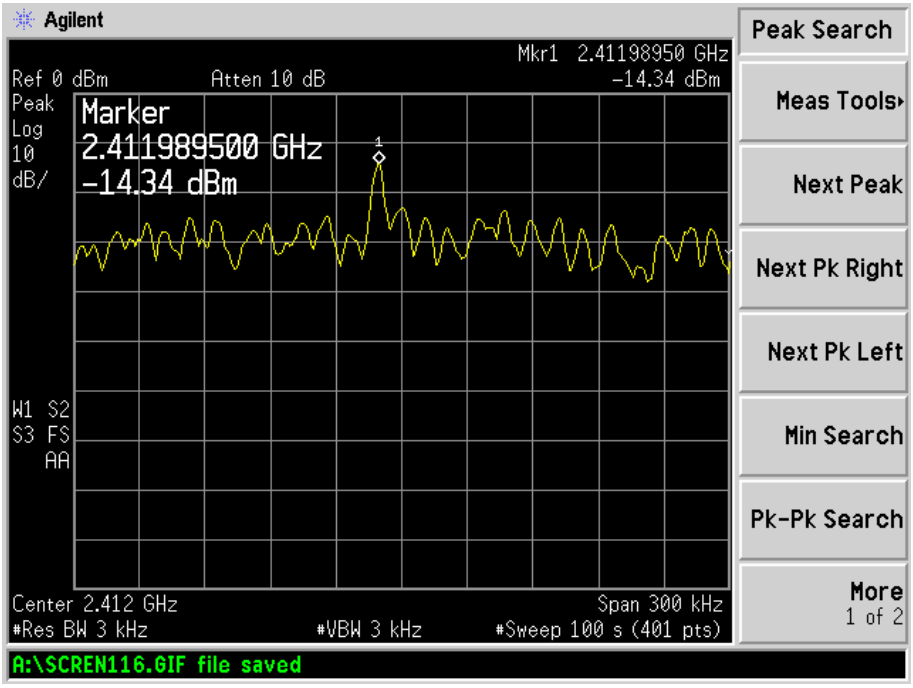
Middle Channel



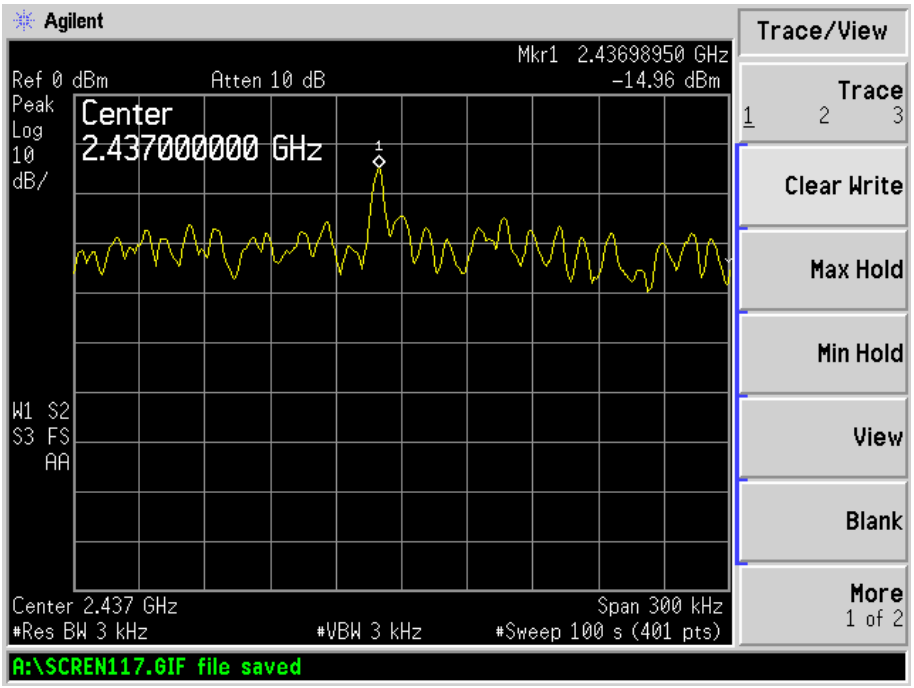
High Channel



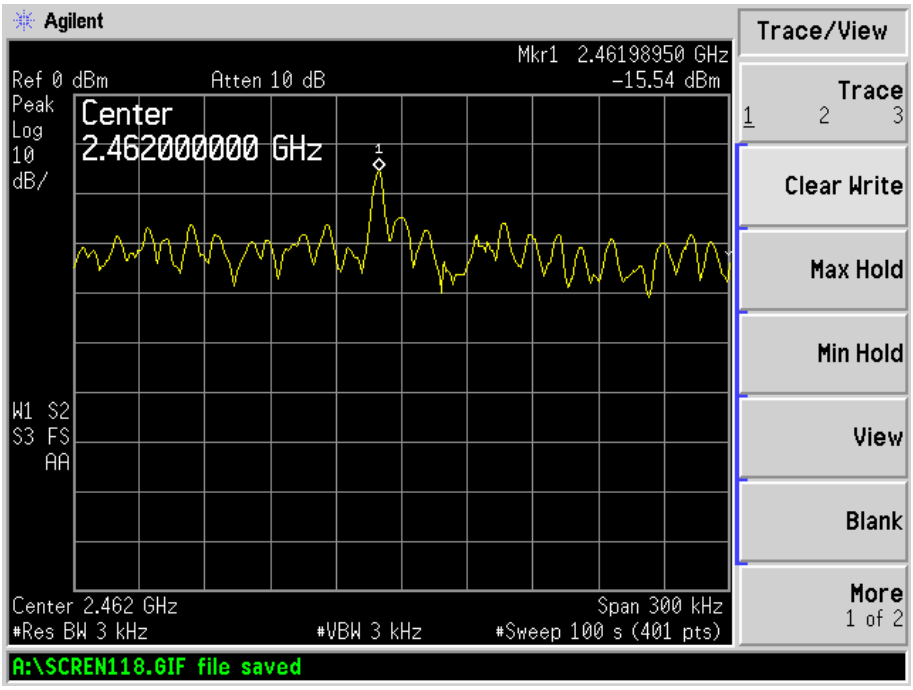
For 802.11n/HT20
Low Channel



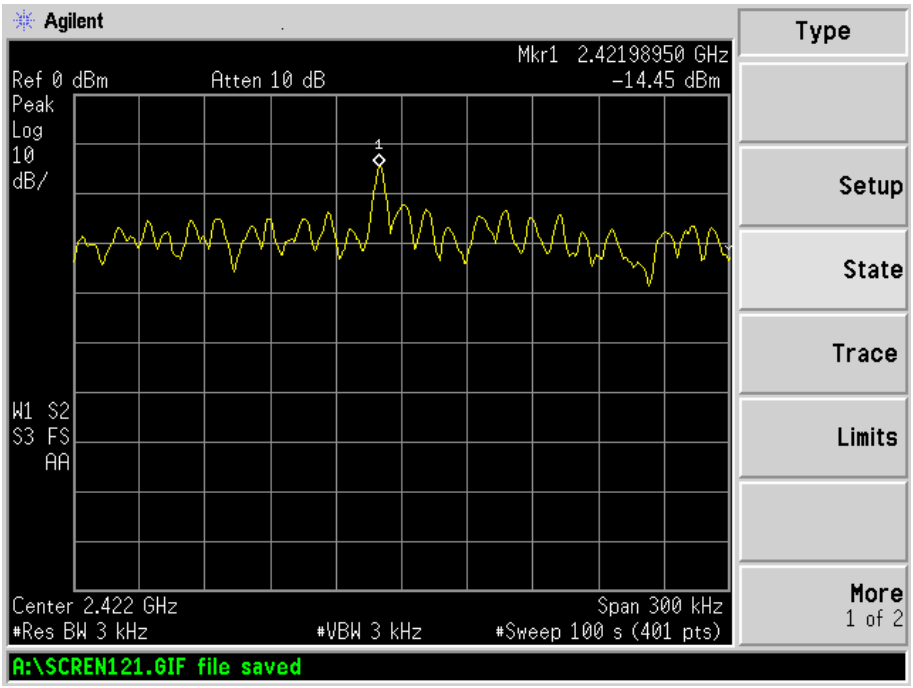
Middle Channel



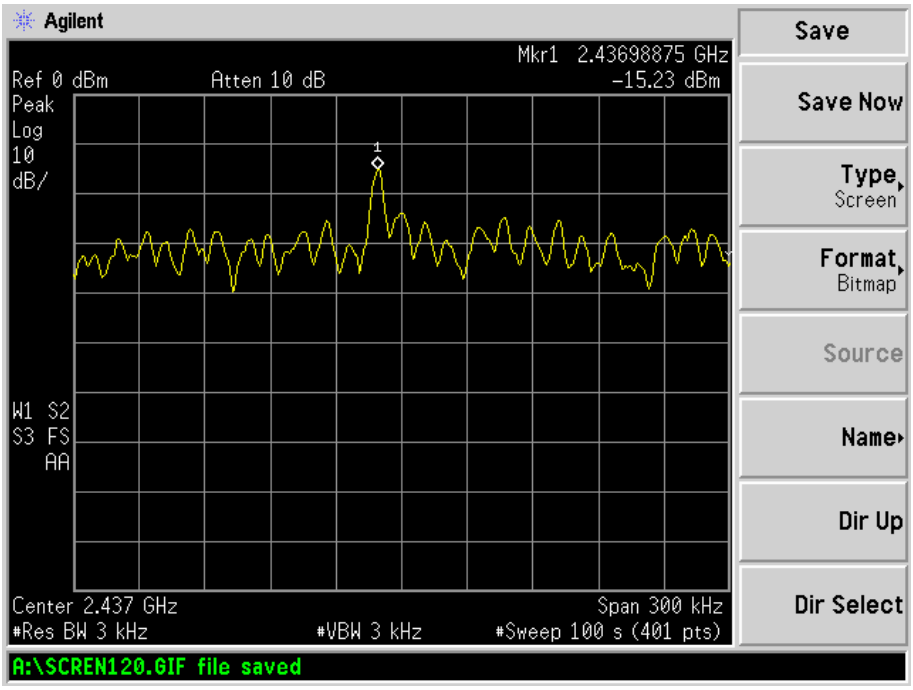
High Channel



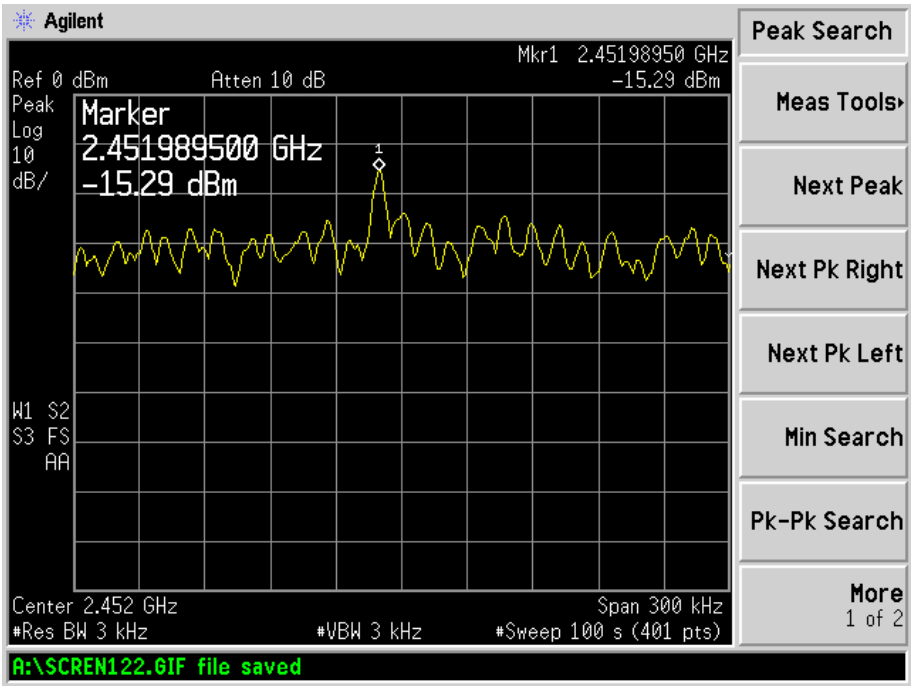
For 802.11n/HT40
Low Channel



Middle Channel



High Channel



9. Band Edges Measurement

9.1 Limits of Band Edges Measurement

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

See section 2.4.

9.3 Test Procedure

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded. The spectrum plots (Peak RBW=VBW=100kHz; Average RBW=1MHz, VBW=10Hz) are attached on the following pages.

9.4 Test Result

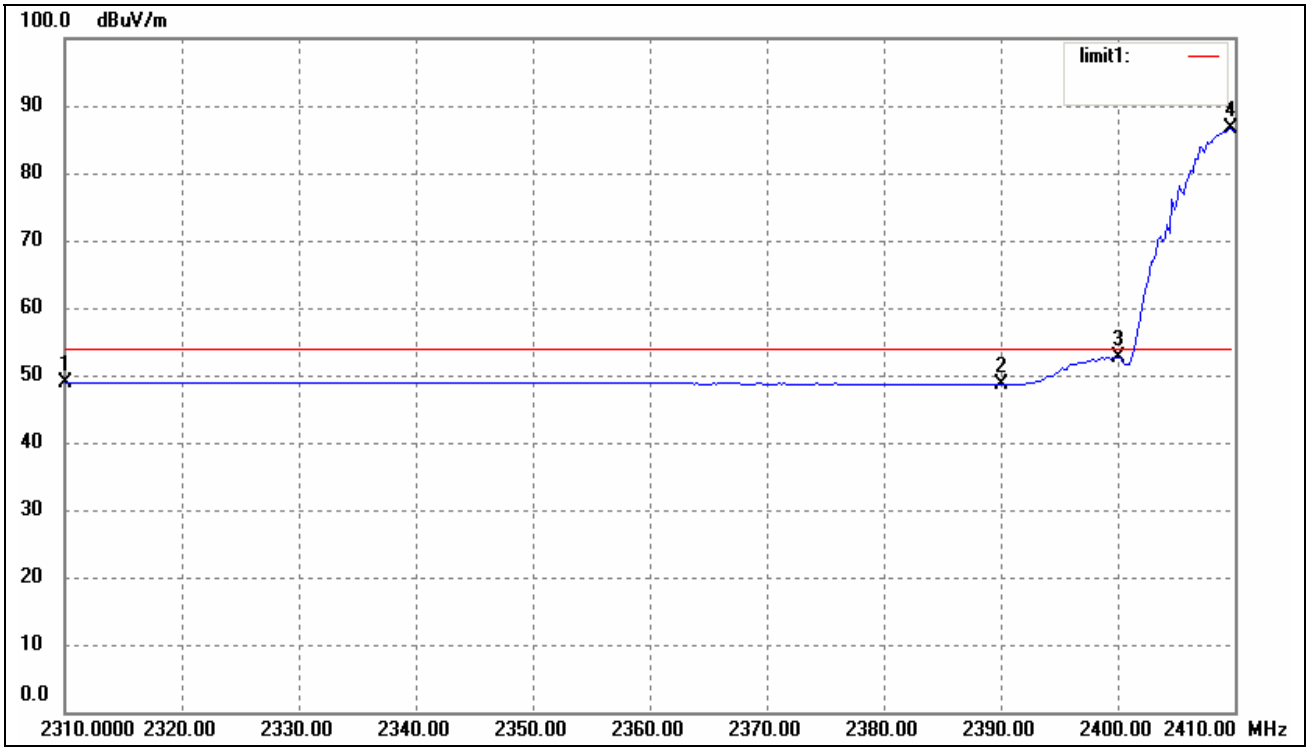
PASS

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
802.11n HT20	2390.00	<54dBuv	Pass
	2400.00	>20dB	Pass
	2483.50	<54dBuv	Pass
802.11n HT40	2390.00	<54dBuv	Pass
	2400.00	>20dB	Pass
	2483.50	<54dBuv	Pass

.

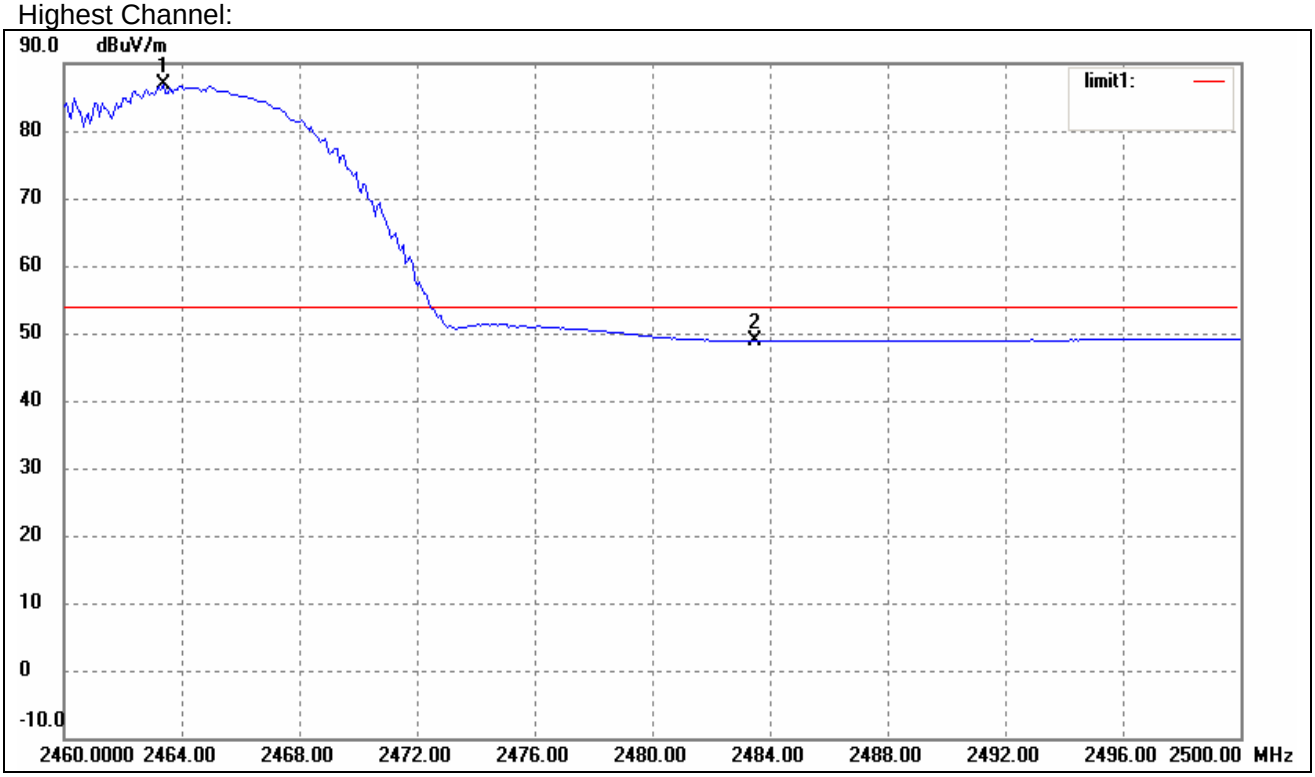
IEEE 802.11b

Lowest channel:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	12.38	36.49	48.87	54.00	-5.13	Average Detector
	2310.000	16.16	36.49	52.65	74.00	-21.35	Peak Detector
2	2390.000	11.99	36.67	48.66	54.00	-5.34	Average Detector
	2390.000	16.37	36.67	53.04	74.00	-20.96	Peak Detector

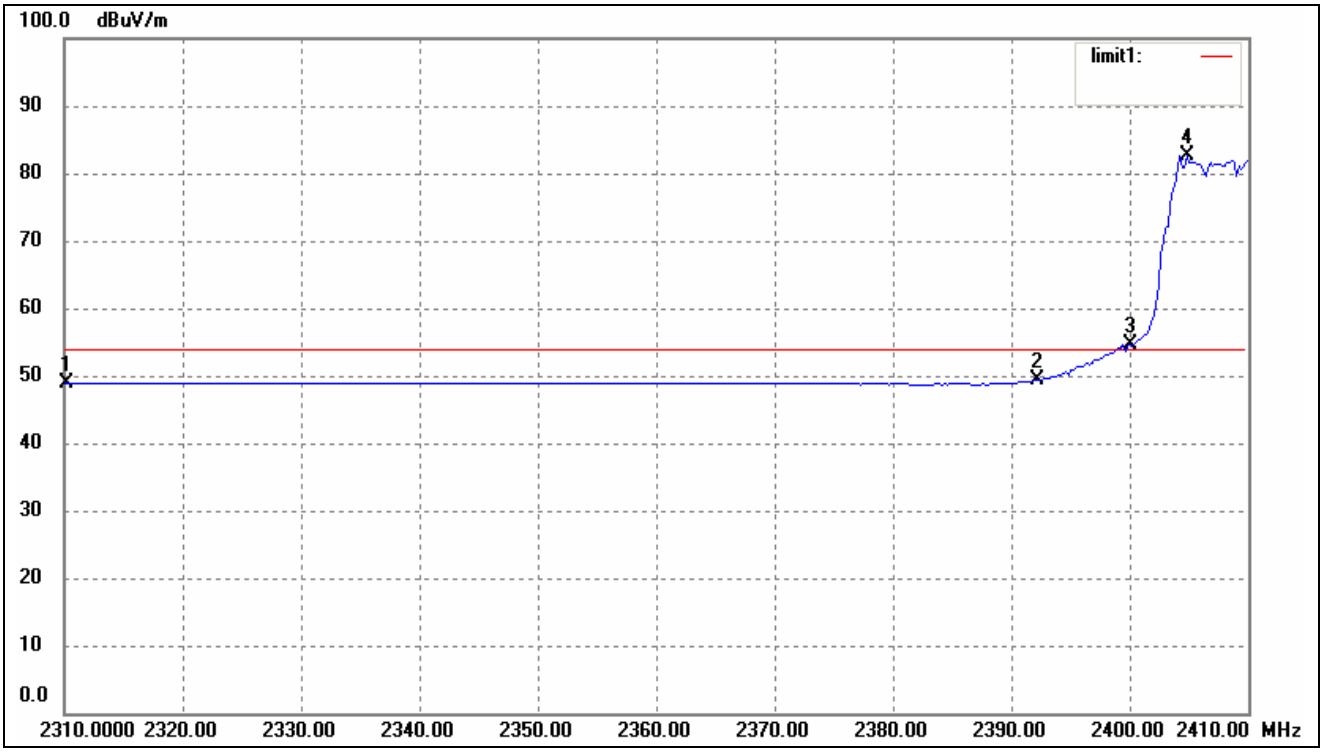
Highest Channel:



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
2	2483.500	12.02	36.88	48.90	54.00	-5.10	Average Detector
	2483.500	16.37	36.88	53.25	74.00	-20.75	Peak Detector

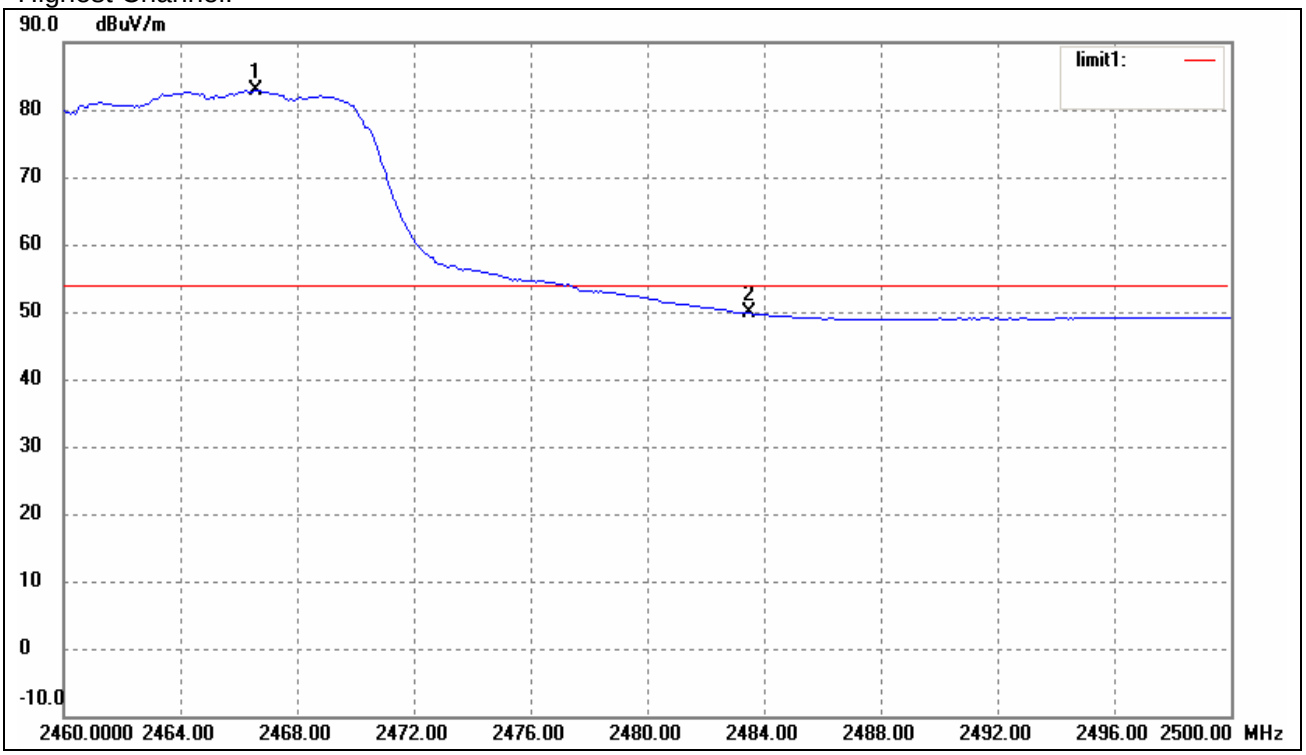
IEEE 802.11g

Lowest Channel:



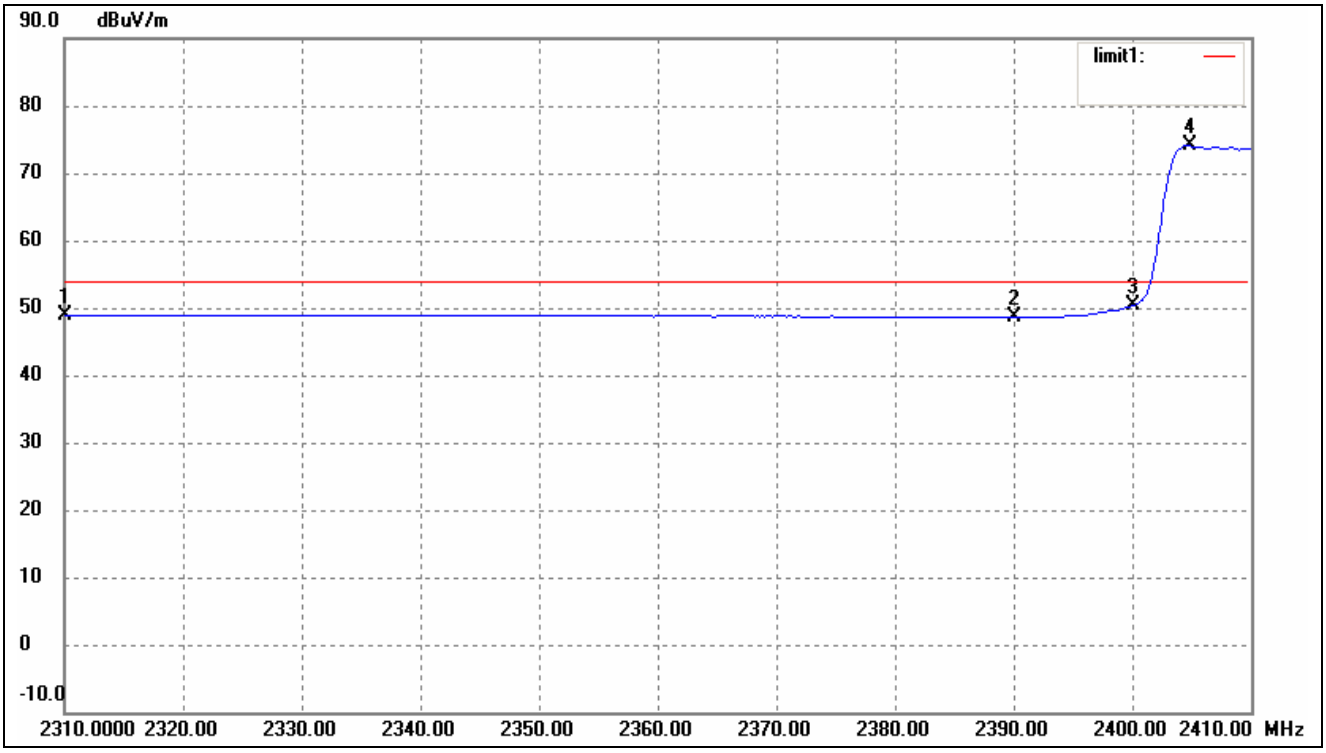
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.200	12.43	36.49	48.92	54.00	-5.08	Average Detector
	2310.200	16.85	36.49	53.34	74.00	-20.66	Peak Detector
2	2392.200	12.68	36.68	49.36	54.00	-4.64	Average Detector
	2392.200	17.00	36.68	53.68	74.00	-20.32	Peak Detector

Highest Channel:



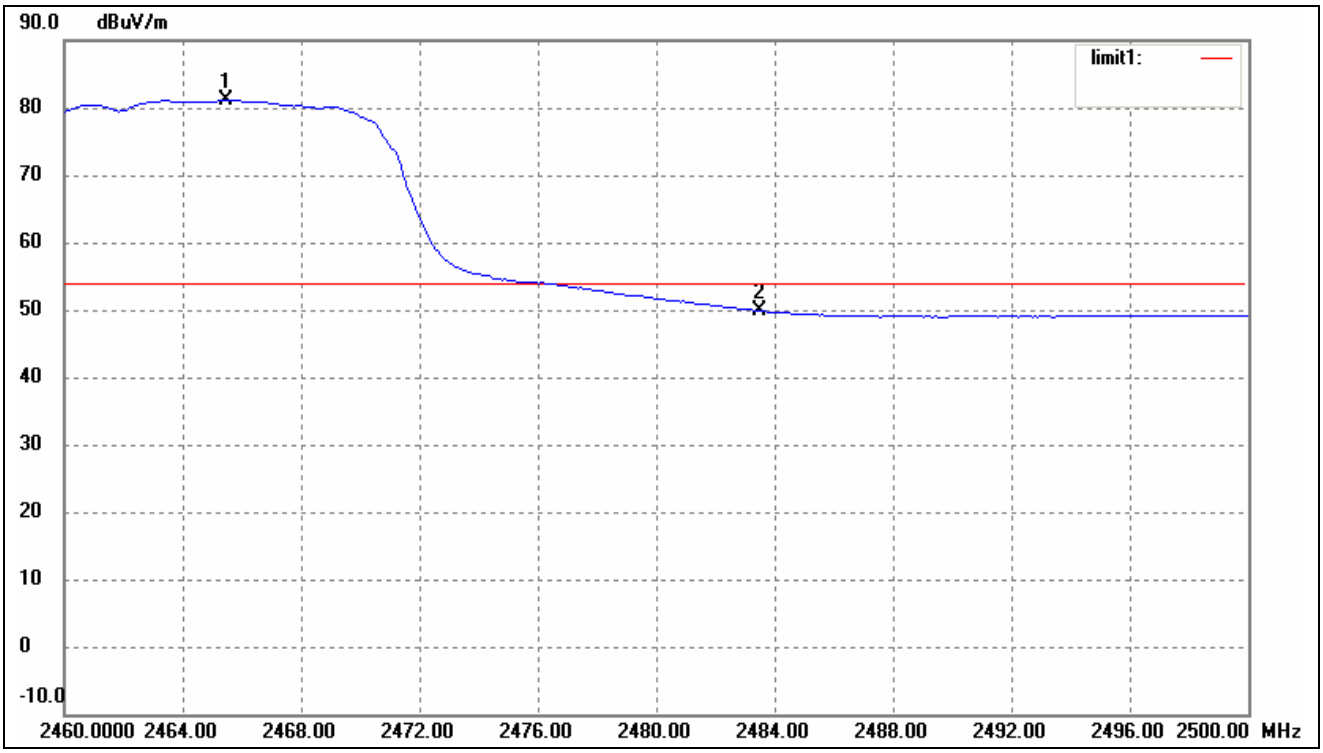
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2	2483.500	12.96	36.88	49.84	54.00	-4.16	Average Detector
	2483.5	17.23	36.88	54.11	74.00	-19.89	Peak Detector

For 802.11n/HT20
Lowest Channel



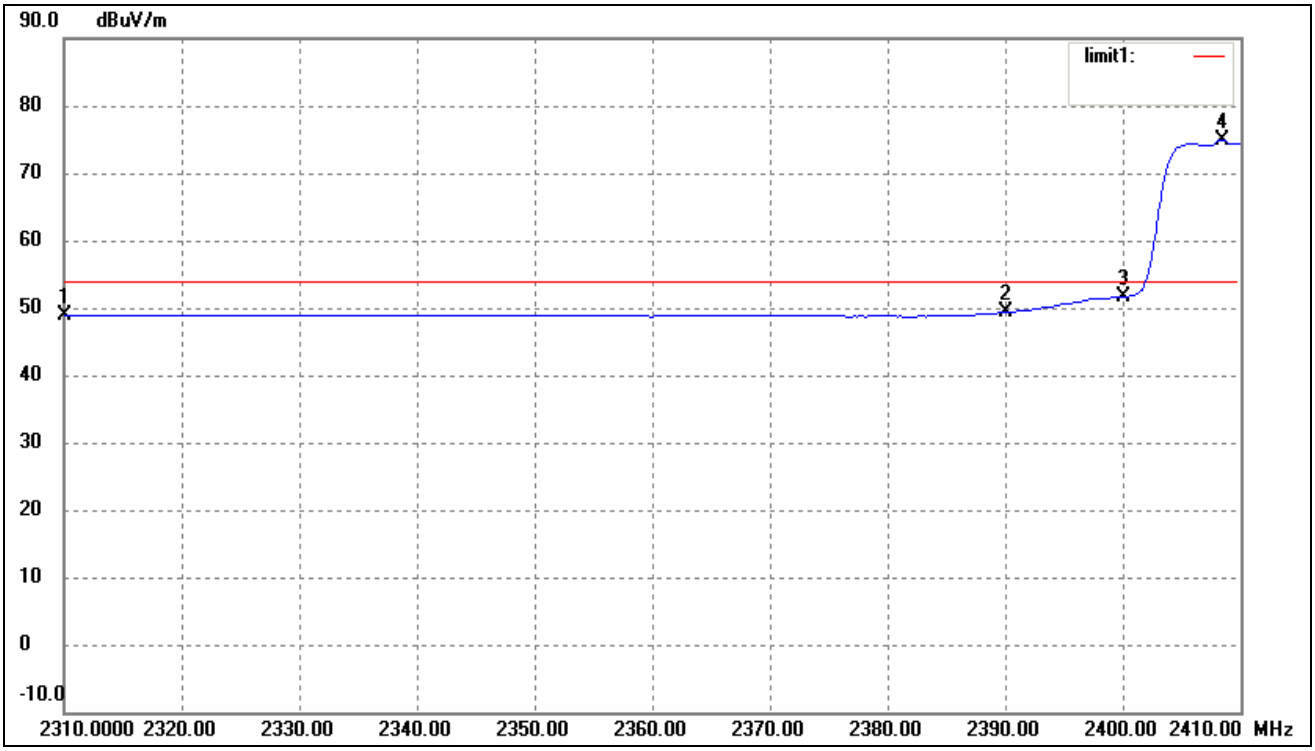
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	12.40	36.49	48.89	54.00	-5.11	Average Detector
	2310.000	16.71	36.49	53.20	74.00	-20.80	Peak Detector
2	2390.000	12.00	36.67	48.67	54.00	-5.33	Average Detector
	2390.000	17.39	36.67	54.06	74.00	-19.94	Peak Detector

Highest channel



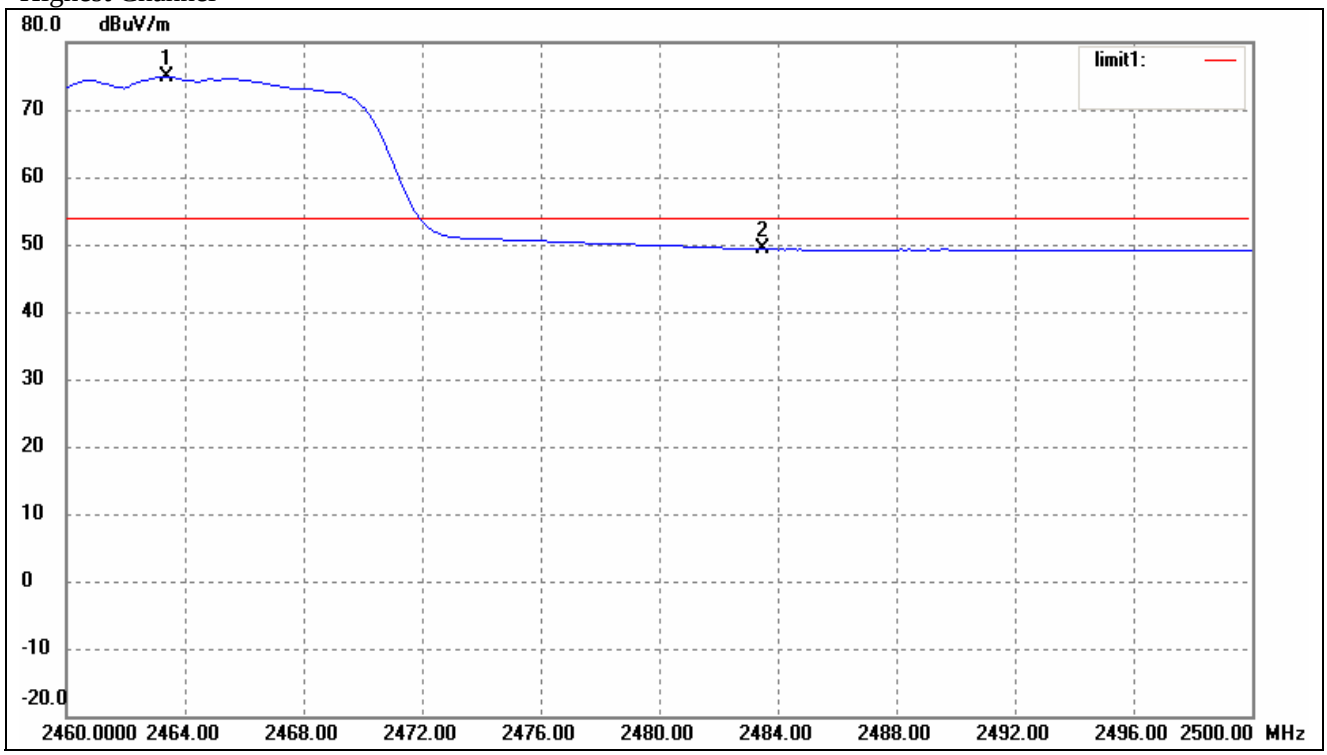
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2	2483.500	12.96	36.88	49.84	54.00	-4.16	Average Detector
	2483.500	17.13	36.88	54.01	74.00	19.99	Peak Detector

For 802.11n/HT40
Lowest Channel



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	12.37	36.49	48.86	54.00	-5.14	Average Detector
	2310.000	17.15	36.49	53.64	74.00	-20.36	Peak Detector
2	2390.000	12.67	36.67	49.34	54.00	-4.66	Average Detector
	2390.000	18.21	36.67	54.88	74.00	-19.12	Peak Detector

Highest Channel



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
2	2483.500	12.46	36.88	49.34	54.00	-4.66	Average Detector
	2483.500	17.50	36.88	54.38	74.00	-19.62	Peak Detector

10. Radiated Emission Measurement

10.1 Limits of Radiated Emission Measurement

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:

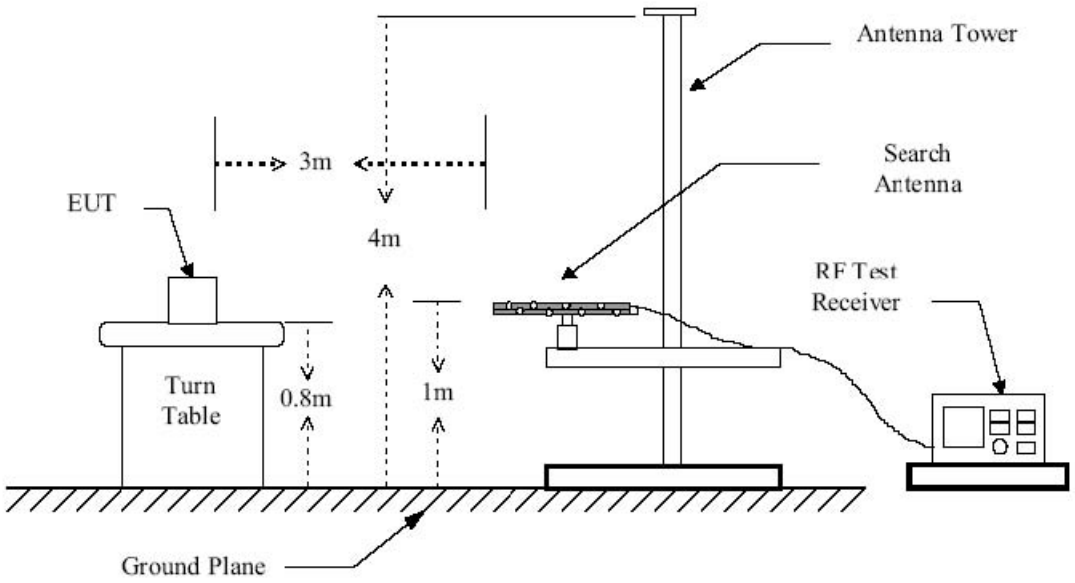
Section 15.209:
30 - 88 MHz 40 dBuV/m @3M
88 -216 MHz 43.5 dBuV/m @3M
216 -960 MHz 46 dBuV/m @3M
Above 960 MHz 54dBuV/m @3M

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.

10.2 EUT Setup

Radiated Measurement Setup



10.3 Test Equipment List and Details

See section 2.4.

10.4 Test Procedure

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the

highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

NOTE:
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.

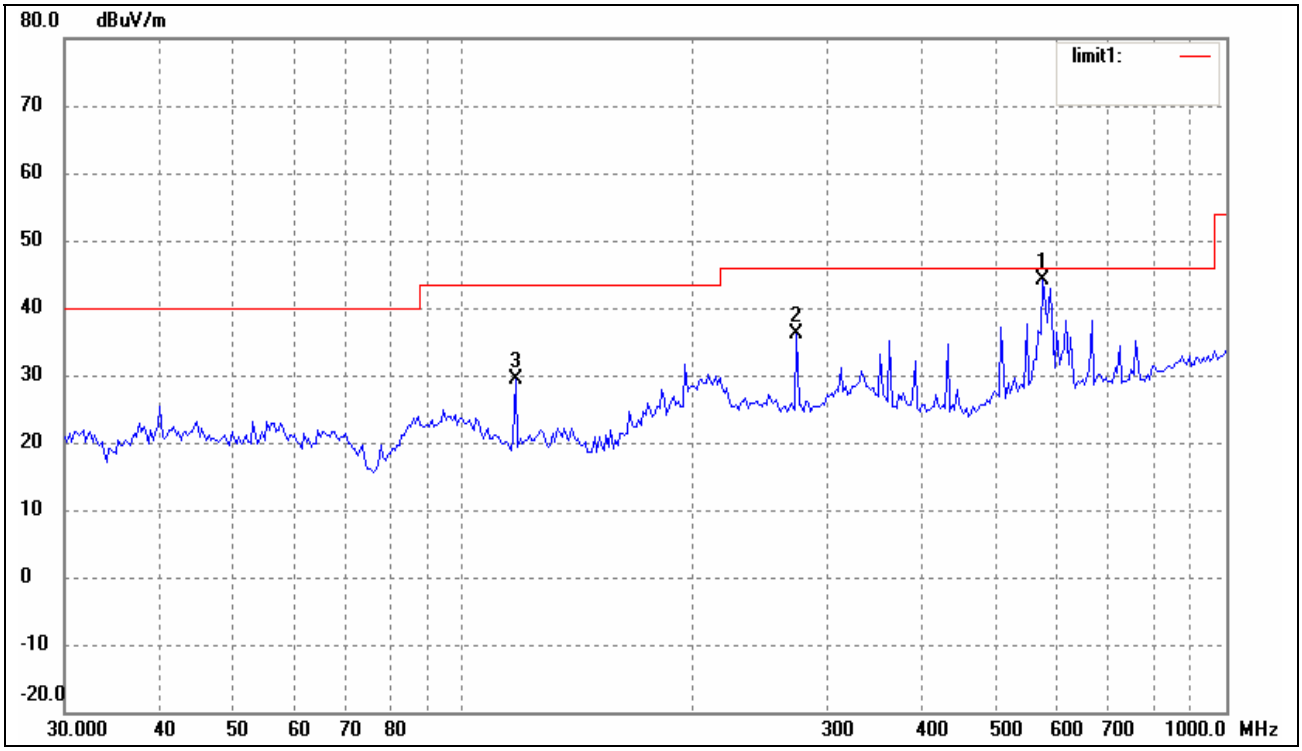
10.5 Test Result

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

-2.0 dBμV at **4874MHz** in the **Vertical** polarization, **Transmitting 802.11b Middle Channel** test mode with, **30 MHz to 25 GHz, 3Meters**

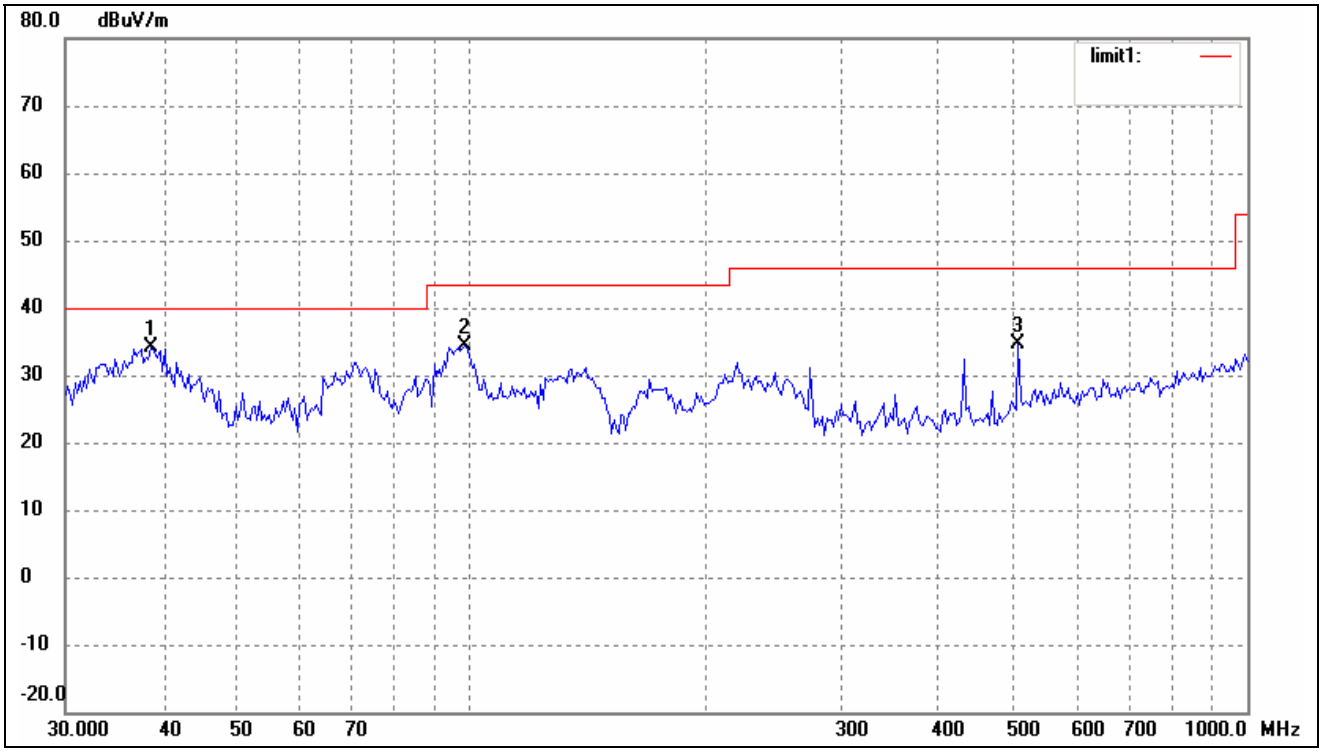
Note: *this EUT was tested in 3 orthogonal positions and the worst case position data was reported*.

Spurious Emission From 30 MHz to 1 GHz
802.11b-Middle CH
Horizontal



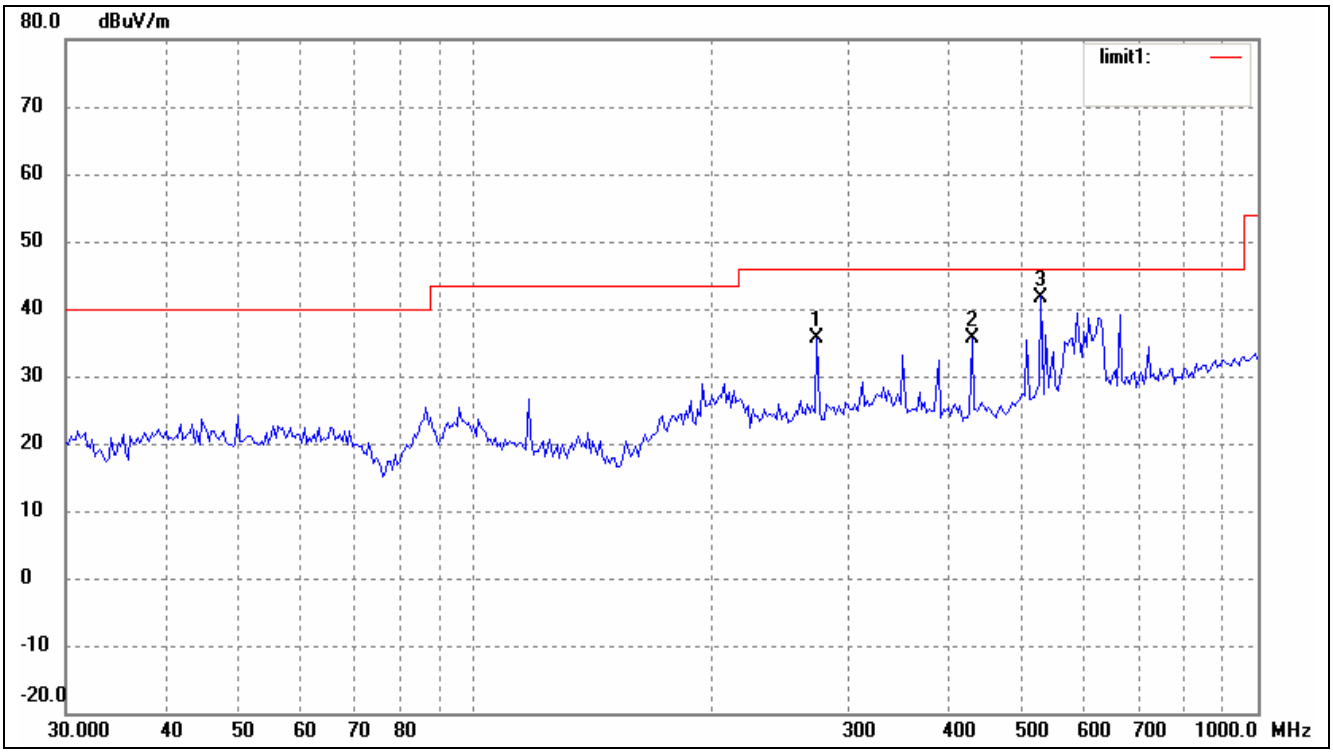
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	574.6258	30.33	13.73	44.06	46.00	-1.94	305	100	peak
2	273.2341	27.78	8.27	36.05	46.00	-9.95	74	100	peak
3	116.9495	23.53	5.78	29.31	43.50	-14.19	48	100	peak

Vertical



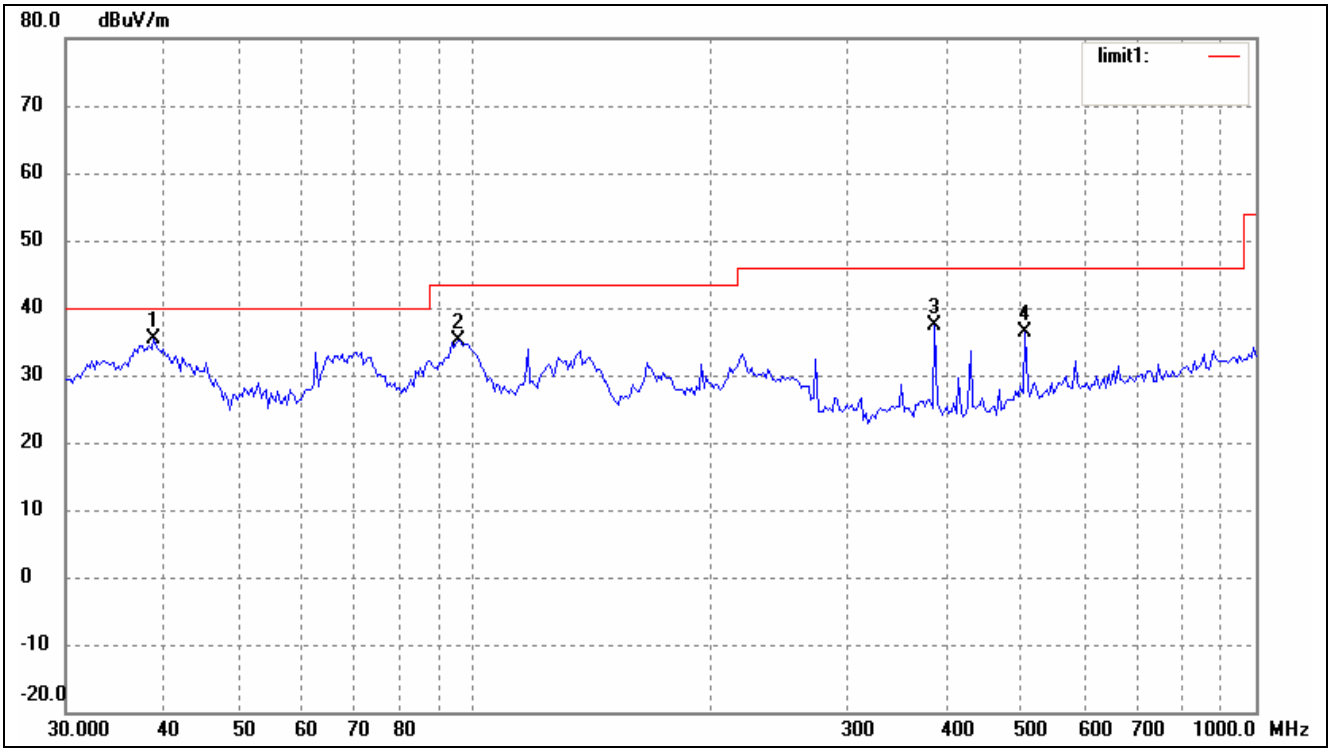
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	38.6161	26.56	7.57	34.13	40.00	-5.87	205	100	peak
2	98.1419	26.59	7.69	34.28	43.50	-9.22	74	100	peak
3	506.4791	21.53	13.01	34.54	46.00	-11.46	67	100	peak

802.11g-Middle CH
Horizontal



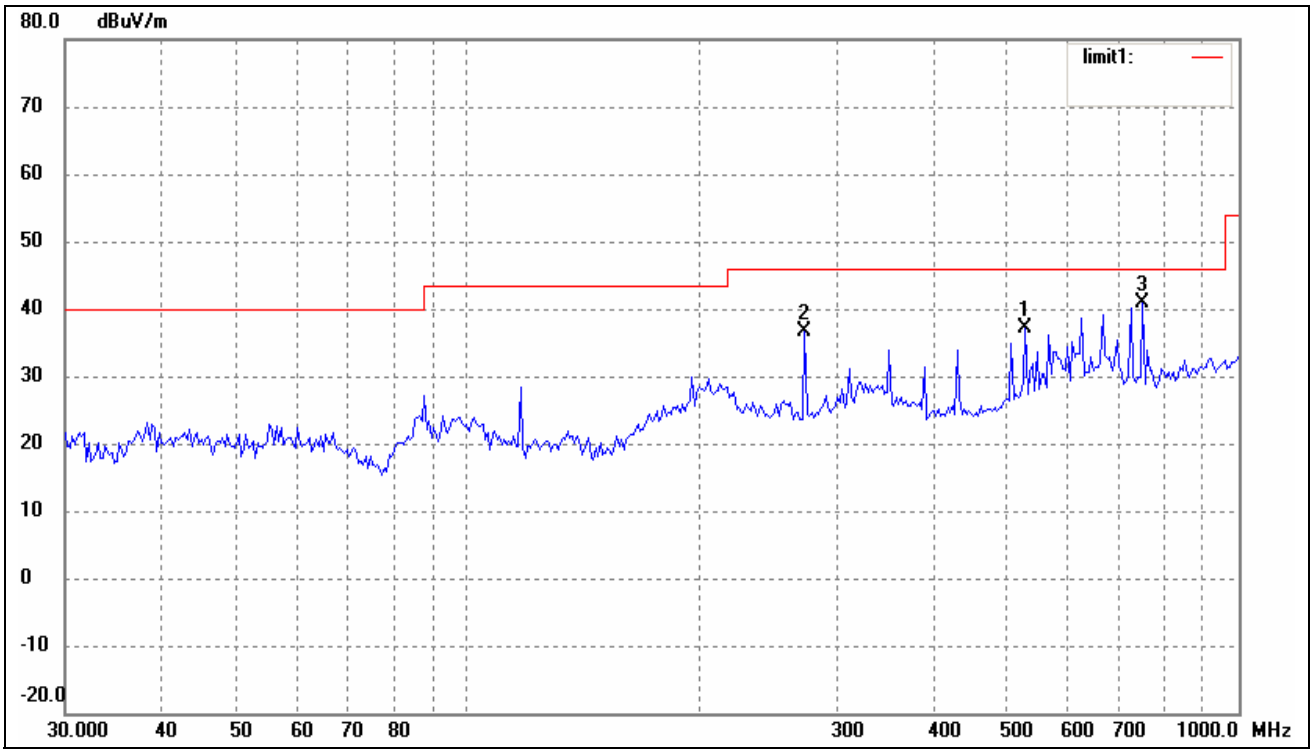
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	273.2341	27.46	8.27	35.73	46.00	-10.27	305	100	peak
2	431.0316	25.22	10.45	35.67	46.00	-10.33	87	100	peak
3	528.2458	28.84	12.91	41.75	46.00	-4.25	11	100	peak

Vertical



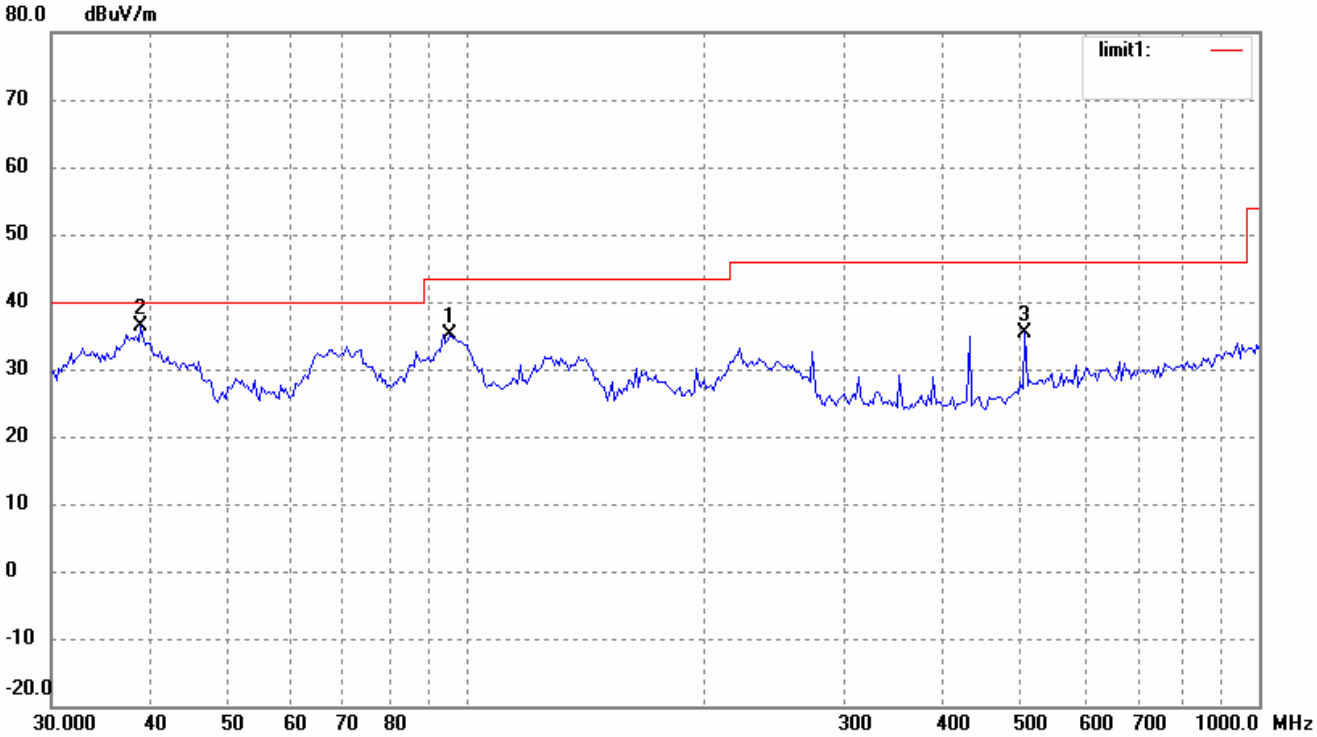
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	38.8879	27.77	7.64	35.41	40.00	-4.59	305	100	peak
2	95.4270	27.67	7.50	35.17	43.50	-8.33	64	100	peak
3	387.9920	27.36	9.99	37.35	46.00	-8.65	74	100	peak
4	506.4791	23.43	13.01	36.44	46.00	-9.56	54	100	peak

802.11n/HT20-Middle CH
Horizontal



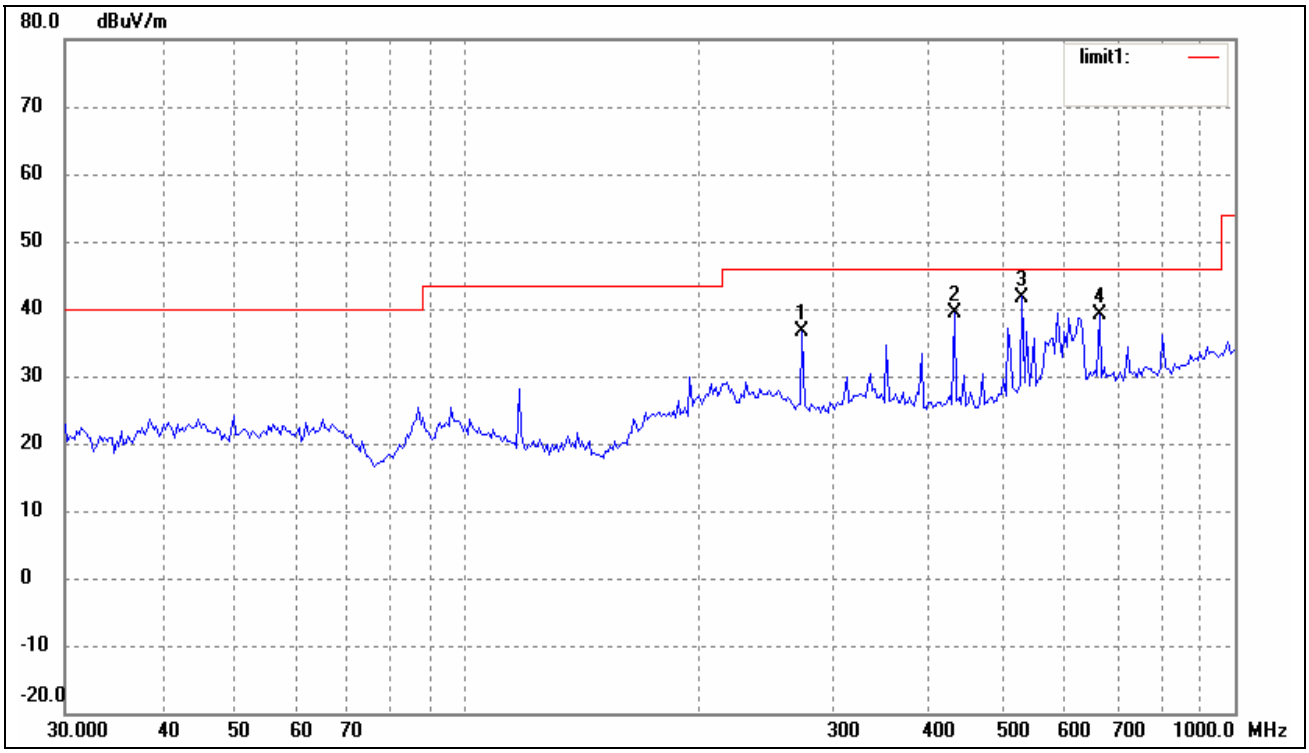
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	528.2458	24.23	12.91	37.14	46.00	-8.86	147	100	peak
2	273.2341	28.25	8.27	36.52	46.00	-9.48	64	100	peak
3	750.1083	25.75	15.01	40.76	46.00	-5.24	65	100	peak

Vertical



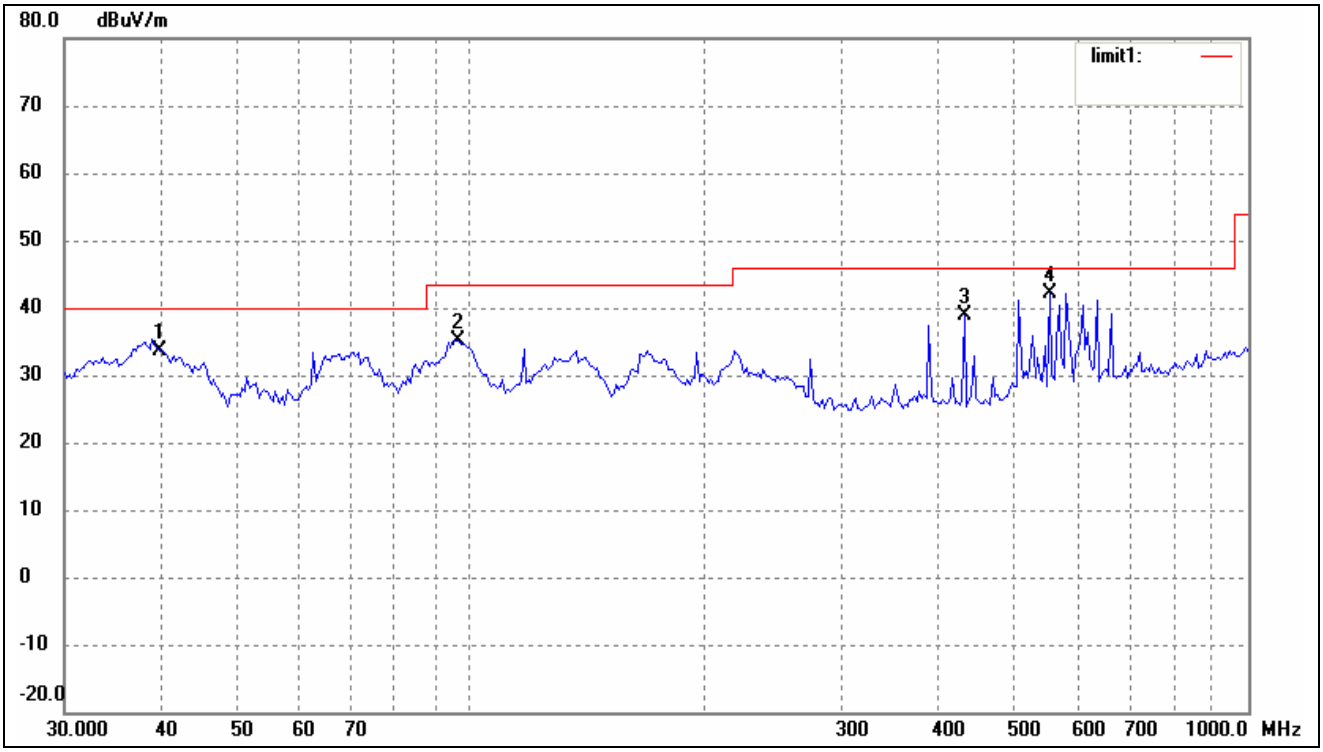
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	95.4270	27.69	7.50	35.19	43.50	-8.31	325	100	peak
2	38.8879	28.71	7.64	36.35	40.00	-3.65	48	100	peak
3	506.4791	22.45	13.01	35.46	46.00	-10.54	25	100	peak

802.11n/HT40-Middle CH
Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	273.2341	28.26	8.27	36.53	46.00	-9.47	36	100	peak
2	431.0316	28.96	10.45	39.41	46.00	-6.59	58	100	peak
3	528.2458	28.84	12.91	41.75	46.00	-4.25	48	100	peak
4	665.8035	24.74	14.39	39.13	46.00	-6.87	157	100	peak

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	39.7147	25.89	7.86	33.75	40.00	-6.25	10	100	peak
2	96.0986	27.64	7.54	35.18	43.50	-8.32	34	100	peak
3	431.0316	28.41	10.45	38.86	46.00	-7.14	154	100	peak
4	554.8254	28.48	13.61	42.09	46.00	-3.91	89	100	peak

Spurious Emission Above 1GHz

For 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	47.5	45	V	34.1	5.2	33.0	53.8	74	-20.2
4824.0	PK	42.9	270	H	34.1	5.2	33.0	49.2	74	-24.8
7236.0	PK	43.3	45	V	37.4	6.1	33.5	53.3	74	-20.7
7236.0	PK	38.0	180	H	37.4	6.1	33.5	48.0	74	-26.0
4824.0	AV	46.1	270	V	34.1	5.2	33.0	51.4	54	-2.6
4824.0	AV	40.4	90	H	34.1	5.2	33.0	46.7	54	-7.3
7236.0	AV	40.6	60	V	37.4	6.1	33.5	50.6	54	-3.4
7236.0	AV	35.7	45	H	37.4	6.1	33.5	45.7	54	-8.3
Middle Channel (1G to 25GHz)										
4874.0	PK	49.1	270	V	34.1	5.2	33.0	55.4	74	-18.6
4874.0	PK	41.9	45	H	34.1	5.2	33.0	48.2	74	-25.8
7311.0	PK	42.7	180	V	37.4	6.1	33.5	52.7	74	-21.3
7311.0	PK	36.3	45	H	37.4	6.1	33.5	46.3	74	-27.7
4874.0	AV	45.7	90	V	34.1	5.2	33.0	52.0	54	-2.0
4874.0	AV	39.5	270	H	34.1	5.2	33.0	45.8	54	-8.2
7311.0	AV	40.5	60	V	37.4	6.1	33.5	50.5	54	-3.5
7311.0	AV	33.8	60	H	37.4	6.1	33.5	43.8	54	-10.2
High Channel (1G to 25GHz)										
4924.0	PK	46.4	90	V	34.1	5.2	33.0	52.7	74	-21.3
4924.0	PK	41.3	270	H	34.1	5.2	33.0	47.6	74	-26.4
7386.0	PK	44.4	180	V	37.4	6.1	33.5	54.4	74	-19.6
7386.0	PK	38.4	45	H	37.4	6.1	33.5	48.4	74	-25.6
4924.0	AV	44.1	270	V	34.1	5.2	33.0	50.4	54	-3.6
4924.0	AV	38.4	90	H	34.1	5.2	33.0	44.7	54	-9.3
7386.0	AV	41.9	45	V	37.4	6.1	33.5	51.9	54	-2.1
7386.0	AV	36.0	60	H	37.4	6.1	33.5	46.0	54	-8.0

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5th Harmonics is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.

For 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	51.9	90	V	34.1	5.2	33.0	58.2	74	-15.8
4824.0	PK	54.7	270	H	34.1	5.2	33.0	61.0	74	-13.0
7236.0	PK	47.2	180	V	37.4	6.1	33.5	57.2	74	-16.8
7236.0	PK	50.9	45	H	37.4	6.1	33.5	60.9	74	-13.1
4824.0	AV	45.0	270	V	34.1	5.2	33.0	51.3	54	-2.7
4824.0	AV	45.0	90	H	34.1	5.2	33.0	51.3	54	-2.7
7236.0	AV	39.6	45	V	37.4	6.1	33.5	49.6	54	-4.4
7236.0	AV	41.0	60	H	37.4	6.1	33.5	51.0	54	-3.0
Middle Channel (1G to 25GHz)										
4874.0	PK	52.7	45	V	34.1	5.2	33.0	59.0	74	-15.0
4874.0	PK	56.0	270	H	34.1	5.2	33.0	62.3	74	-11.7
7311.0	PK	48.5	45	V	37.4	6.1	33.5	58.5	74	-15.5
7311.0	PK	50.6	180	H	37.4	6.1	33.5	60.6	74	-13.4
4874.0	AV	43.9	270	V	34.1	5.2	33.0	50.2	54	-3.8
4874.0	AV	44.7	90	H	34.1	5.2	33.0	51.0	54	-3.0
7311.0	AV	39.6	60	V	37.4	6.1	33.5	49.6	54	-4.4
7311.0	AV	40.7	45	H	37.4	6.1	33.5	50.7	54	-3.3
High Channel (1G to 25GHz)										
4924.0	PK	52.7	45	V	34.1	5.2	33.0	59.0	74	-15.0
4924.0	PK	56.0	270	H	34.1	5.2	33.0	62.3	74	-11.7
7386.0	PK	48.5	45	V	37.4	6.1	33.5	58.5	74	-15.5
7386.0	PK	50.6	180	H	37.4	6.1	33.5	60.6	74	-13.4
4924.0	AV	43.9	270	V	34.1	5.2	33.0	50.2	54	-3.8
4924.0	AV	44.7	90	H	34.1	5.2	33.0	51.0	54	-3.0
7386.0	AV	39.6	60	V	37.4	6.1	33.5	49.6	54	-4.4
7386.0	AV	40.7	45	H	37.4	6.1	33.5	50.7	54	-3.3

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.

For 802.11n/HT20

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	53.3	270	V	34.1	5.2	33.0	59.6	74	-14.4
4824.0	PK	56.1	45	H	34.1	5.2	33.0	62.4	74	-11.6
7236.0	PK	48.7	180	V	37.4	6.1	33.5	58.7	74	-15.3
7236.0	PK	51.4	45	H	37.4	6.1	33.5	61.4	74	-12.6
4824.0	AV	43.9	90	V	34.1	5.2	33.0	50.2	54	-3.8
4824.0	AV	45.7	270	H	34.1	5.2	33.0	52.0	54	-2.0
7236.0	AV	40.4	60	V	37.4	6.1	33.5	50.4	54	-3.6
7236.0	AV	41.5	60	H	37.4	6.1	33.5	51.5	54	-2.5
Middle Channel (1G to 25GHz)										
4874.0	PK	54.0	120	V	34.1	5.2	33.0	60.3	74	-13.7
4874.0	PK	56.2	57	H	34.1	5.2	33.0	62.5	74	-11.5
7311.0	PK	49.4	87	V	37.4	6.1	33.5	59.4	74	-14.6
7311.0	PK	50.5	55	H	37.4	6.1	33.5	60.5	74	-13.5
4874.0	AV	44.4	120	V	34.1	5.2	33.0	50.7	54	-3.3
4874.0	AV	44.9	57	H	34.1	5.2	33.0	51.2	54	-2.8
7311.0	AV	40.6	87	V	37.4	6.1	33.5	50.6	54	-3.4
7311.0	AV	41.7	55	H	37.4	6.1	33.5	51.7	54	-2.3
High Channel (1G to 25GHz)										
4924.0	PK	53.4	45	V	34.1	5.2	33.0	59.7	74	-14.3
4924.0	PK	56.1	270	H	34.1	5.2	33.0	62.4	74	-11.6
7386.0	PK	49.8	45	V	37.4	6.1	33.5	59.8	74	-14.2
7386.0	PK	50.4	180	H	37.4	6.1	33.5	60.4	74	-13.6
4924.0	AV	44.3	270	V	34.1	5.2	33.0	50.6	54	-3.4
4924.0	AV	45.2	90	H	34.1	5.2	33.0	51.5	54	-2.5
7386.0	AV	41.0	60	V	37.4	6.1	33.5	51.0	54	-3.0
7386.0	AV	41.9	45	H	37.4	6.1	33.5	51.9	54	-2.1

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.

For 8021..n/HT40

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)										
4844.0	PK	52.6	90	V	34.1	5.2	33.0	58.9	74	-15.1
4844.0	PK	54.0	270	H	34.1	5.2	33.0	60.3	74	-13.7
7266.0	PK	49.7	180	V	37.4	6.1	33.5	59.7	74	-14.3
7236.0	PK	52.0	45	H	37.4	6.1	33.5	62.0	74	-12.0
4844.0	AV	44.8	270	V	34.1	5.2	33.0	51.1	54	-2.9
4844.0	AV	45.7	90	H	34.1	5.2	33.0	52.0	54	-2.0
7266.0	AV	40.8	45	V	37.4	6.1	33.5	50.8	54	-3.2
7266.0	AV	41.4	60	H	37.4	6.1	33.5	51.4	54	-2.6
Middle Channel (1G to 25GHz)										
4874.0	PK	52.3	270	V	34.1	5.2	33.0	58.6	74	-15.4
4874.0	PK	54.0	45	H	34.1	5.2	33.0	60.3	74	-13.7
7311.0	PK	49.4	180	V	37.4	6.1	33.5	59.4	74	-14.6
7311.0	PK	52.5	45	H	37.4	6.1	33.5	62.5	74	-11.5
4874.0	AV	45.3	90	V	34.1	5.2	33.0	51.6	54	-2.4
4874.0	AV	45.7	270	H	34.1	5.2	33.0	52.0	54	-2.0
7311.0	AV	40.3	60	V	37.4	6.1	33.5	50.3	54	-3.7
7311.0	AV	41.6	60	H	37.4	6.1	33.5	51.6	54	-2.4
High Channel (1G to 25GHz)										
4904.0	PK	52.0	234	V	34.1	5.2	33.0	58.3	74	-15.7
4904.0	PK	54.3	65	H	34.1	5.2	33.0	60.6	74	-13.4
7356.0	PK	49.8	88	V	37.4	6.1	33.5	59.8	74	-14.2
7356.0	PK	51.5	74	H	37.4	6.1	33.5	61.5	74	-12.5
4904.0	AV	43.7	234	V	34.1	5.2	33.0	50.0	54	-4.0
4904.0	AV	45.4	65	H	34.1	5.2	33.0	51.7	54	-2.3
7356.0	AV	41.1	88	V	37.4	6.1	33.5	51.1	54	-2.9
7356.0	AV	41.5	74	H	37.4	6.1	33.5	51.5	54	-2.5

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.