

FCC Part 15C

Measurement and Test Report

For

SMOOTH YIELD CORPORATION LIMITED

ROOM1602, 16/F, KOWLOONBUILDING, 555NATHANROAD, MONGKOK,

KOWLOON, HONGKON

FCC ID: AFYET-UN677

Report Concerns: Original Report	Equipment Type: USB wireless lan card
Model:	<u>ET-UN677</u>
Report No.:	<u>STR11128411I-1</u>
Test Date:	<u>2011-12-29 to 2012-01-08</u>
Issue Date:	<u>2012-01-14</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: SMOOTH YIELD CORPORATION LIMITED
Address of applicant: ROOM1602, 16/F, KOWLOON BUILDING,
555 NATHAN ROAD, MONGKOK, KOWLOON,
HONGKONG

Manufacturer: Shenzhen Bilian Electronic Limited
Address of manufacturer: No 268, Fuqian Rd, Jutang Community, Guanlan Town,
Baoan District, Shenzhen, 518110, PRC

General Description of E.U.T

Items	Description
EUT Description:	USB wireless lan card
Trade Name:	/
Model No.:	ET-UN677
Add Model:	BL-LW06-1R1
Rated Voltage:	DC 5V
RF Output Power	Max. 12.85dBm (Conducted)
Antenna Gain:	Max. 0.9 dBi for chain A, 3.0 dBi for chain B
Frequency range:	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40)
Number of channels:	11 for 11b/g/n(HT20), 8 for 11n(HT40)
Channel Separation:	5MHz
Type of Antenna:	Integral Antenna

Note: The test data is gathered from a production sample, provided by the manufacture. Test is carried out with ET-UN677 since the others listed in the report have the different appearances only without electronic construction changed, declared by the manufacturer.

1.2 Test Standards

The following report is prepared on behalf of the SMOOTH YIELD CORPORATION LIMITED in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

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

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

1.3 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
ASUS	Notebook	X50R	N/A

1.7 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/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

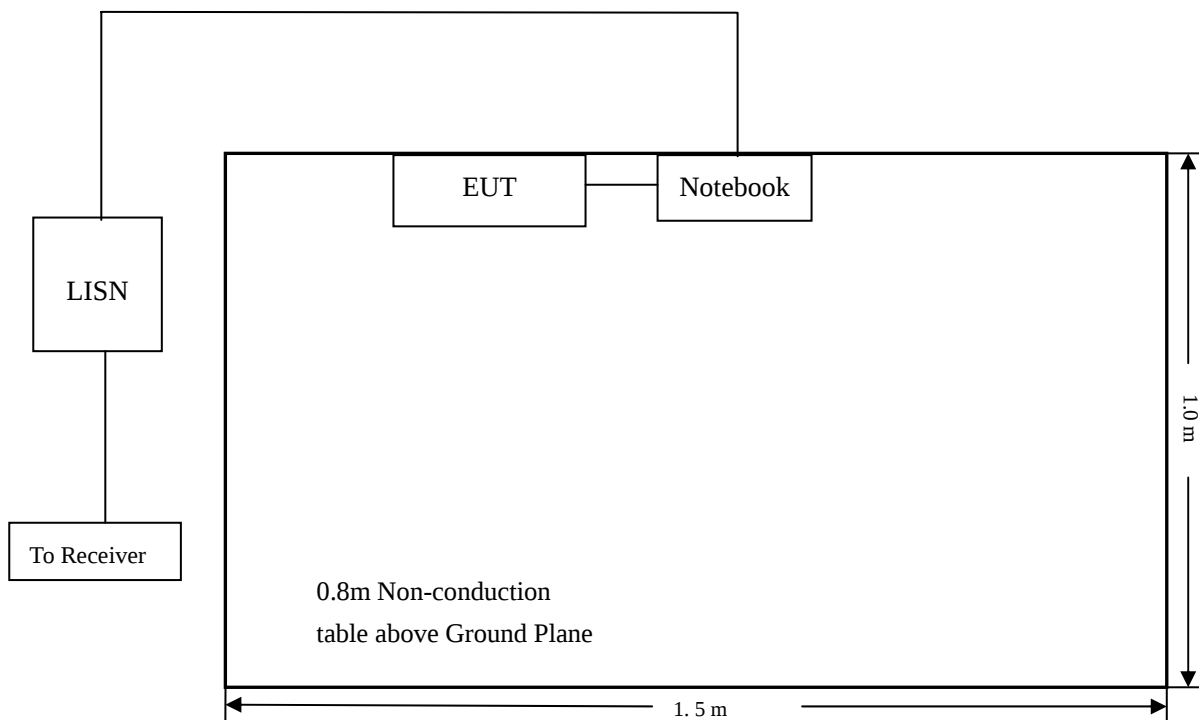
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2011-12-20	2012-12-19
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2011-12-20	2012-12-19
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2011-12-20	2012-12-19

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

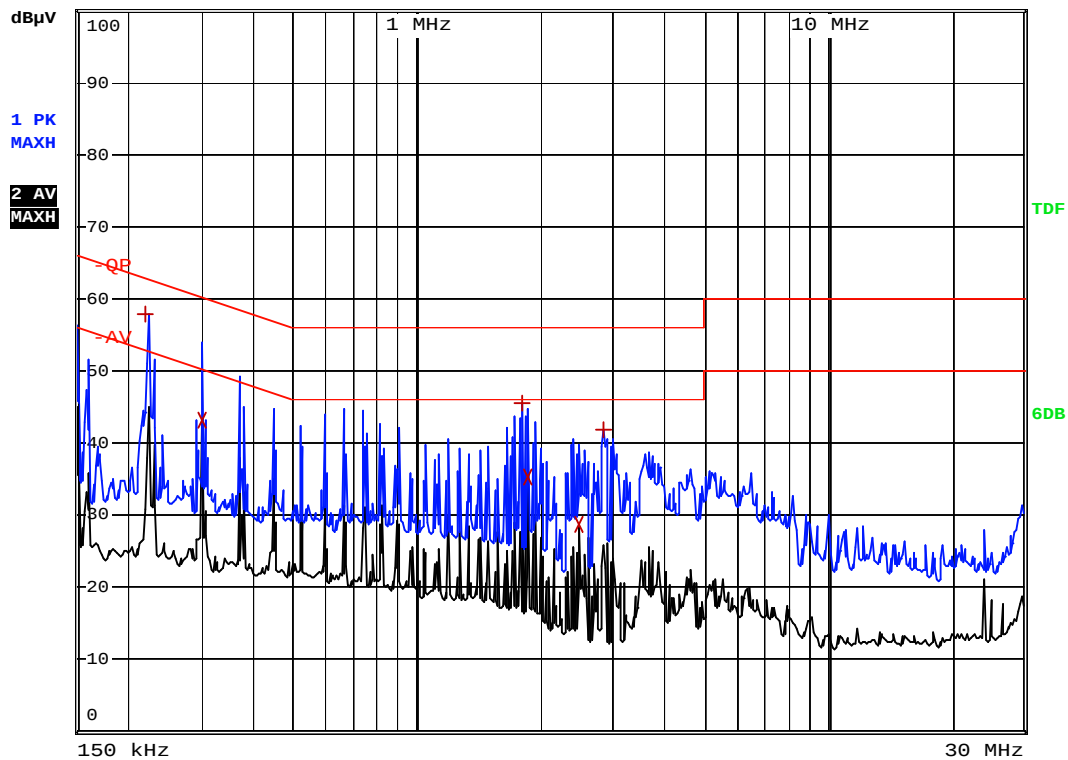
According to the data in section 3.7, the EUT complied with the FCC 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

-4.80 dB μ V at 0.226 MHz in the **Line, Average** detector, 0.15-30MHz

3.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data*Conducted Disturbance**EUT: USB wireless lan card**M/N: ET-UN677**Operating Condition: Transmitting**Test Specification: N**Comment: AC 120V/60Hz; USB 5V*
 RBW 9 kHz
 MT 5 ms

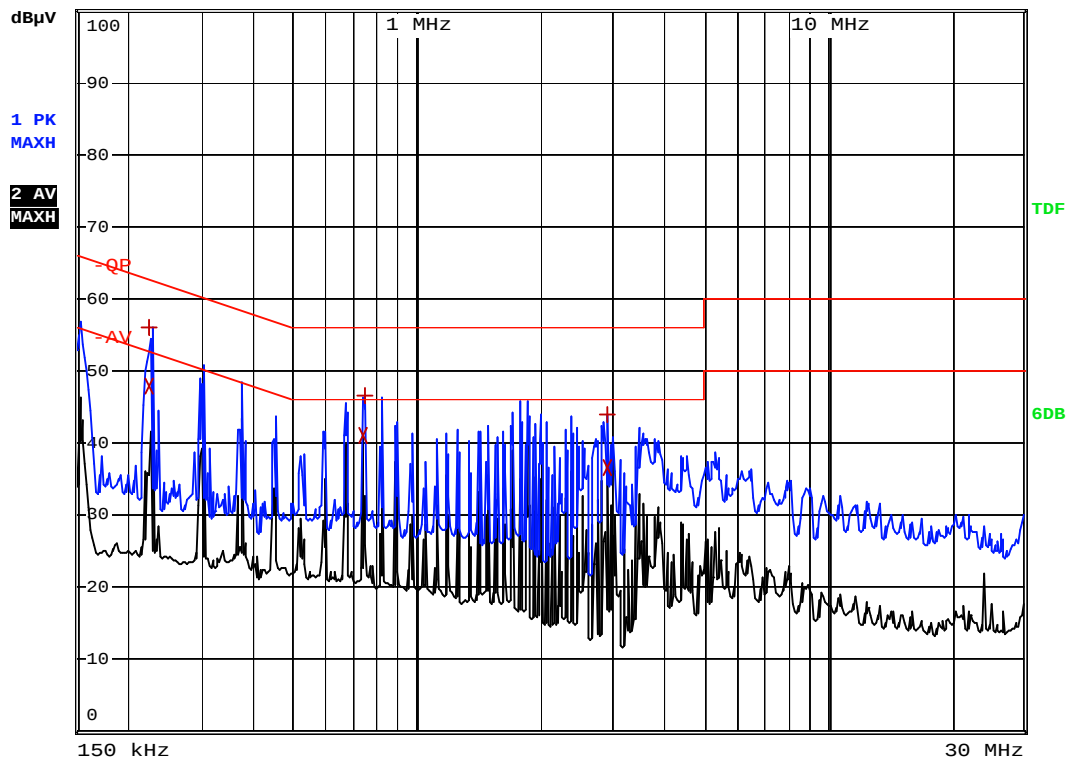
Att 10 dB AUTO



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1 Max Peak	222 kHz	57.87	-4.87
2 Average	298 kHz	43.05	-7.24
1 Max Peak	1.798 MHz	45.64	-10.35
2 Average	1.87 MHz	35.26	-10.73
2 Average	2.47 MHz	28.66	-17.33
1 Max Peak	2.85 MHz	41.91	-14.08

Plot of Conducted Emissions Test Data*Conducted Disturbance**EUT: USB wireless lan card**M/N: ET-UN677**Operating Condition: Transmitting**Test Specification: L**Comment: AC 120V/60Hz; USB 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	226 kHz	56.00	-6.58
2 Average	226 kHz	47.78	-4.80
2 Average	742 kHz	41.17	-4.82
1 Max Peak	750 kHz	46.68	-9.31
2 Average	2.898 MHz	36.58	-9.41
1 Max Peak	2.902 MHz	43.93	-12.06

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 two 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
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2011-12-20	2012-12-19
Attenuator	ATTEN	ATS100-4-20	/	2011-12-20	2012-12-19

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=3 KHz, VBW=10 KHz, Span = 1.5MHz.
4. Repeat above procedures until all frequency measured was complete.

5.4 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	44%
ATM Pressure:	1011 mbar

5.5 Summary of Test Results/Plots

For 802.11b/g

Test mode	Test channel	Chain A Reading dBm/3kHz	Chain B Reading dBm/3kHz	Corrected dBm/3kHz	Limit dBm/3kHz
802.11b	Low channel (2412MHz)	-15.12	-15.75	/	8
	Middle channel (2437MHz)	-14.43	-15.27	/	8
	High channel (2462MHz)	-14.41	-15.51	/	8
802.11g	Low channel (2412MHz)	-15.47	-15.93	/	8
	Middle channel (2437MHz)	-14.91	-15.60	/	8
	High channel (2462MHz)	-14.79	-15.90	/	8

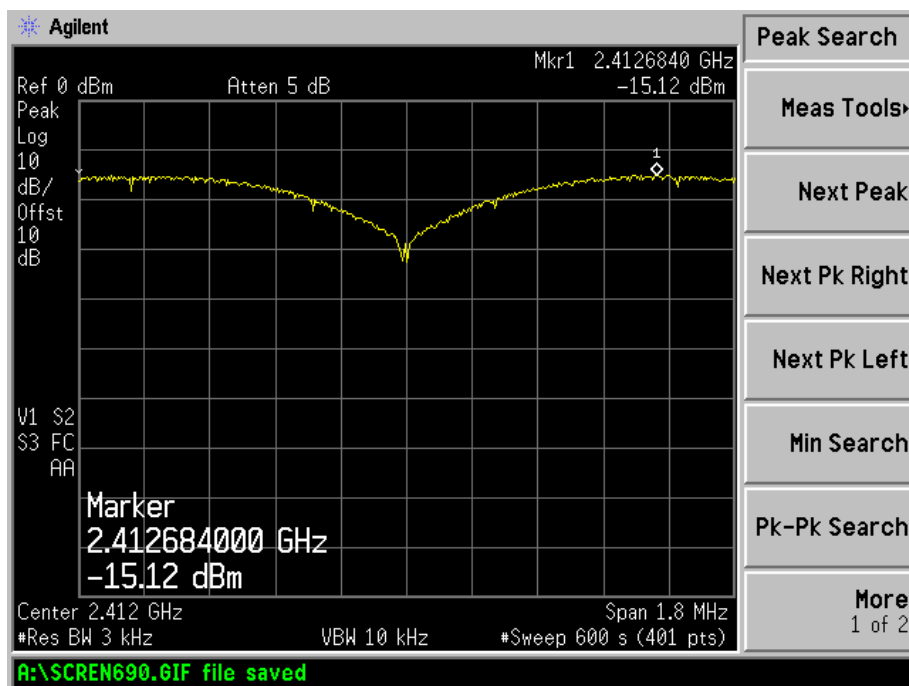
For 802.11n HT20/HT40

Test mode	Test channel	Chain A Reading dBm/3kHz	Chain B Reading dBm/3kHz	Corrected dBm/3kHz	Limit dBm/3kHz
802.11n HT20 (MCS15)	Low channel (2412MHz)	-17.55	-17.70	-14.61	8
	Middle channel (2437MHz)	-17.04	-17.39	-14.20	8
	High channel (2462MHz)	-16.98	-17.69	-14.31	8
802.11n HT40 (MCS15)	Low channel (2422MHz)	-17.33	-21.58	-15.94	8
	Middle channel (2437MHz)	-17.04	-21.34	-15.67	8
	High channel (2452MHz)	-16.79	-21.50	-15.52	8

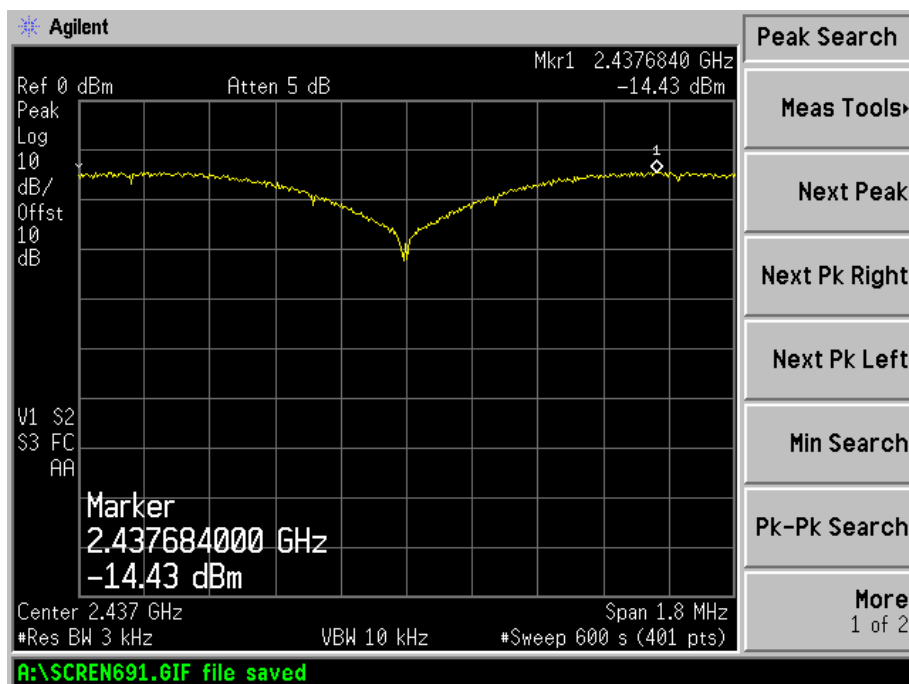
Note: The EUT shall be simultaneous transmission at the chain A and chain B for the MCS15 mode of 802.11n HT20 or HT40, all other mode shall be transmission only single chain (chain A or chain B).

For 802.11b-chain A

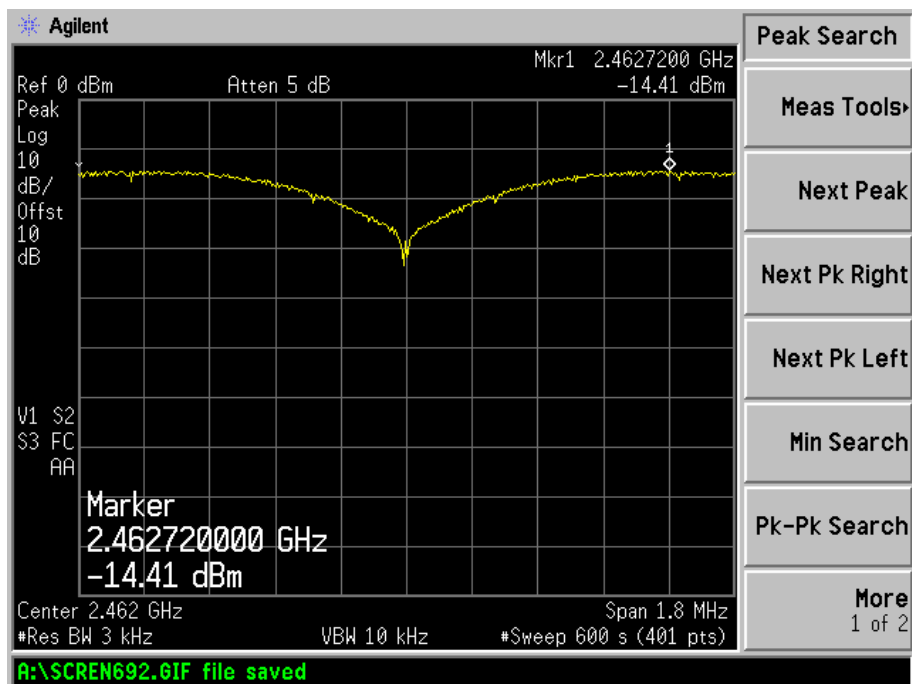
Low Channel:



Middle Channel:

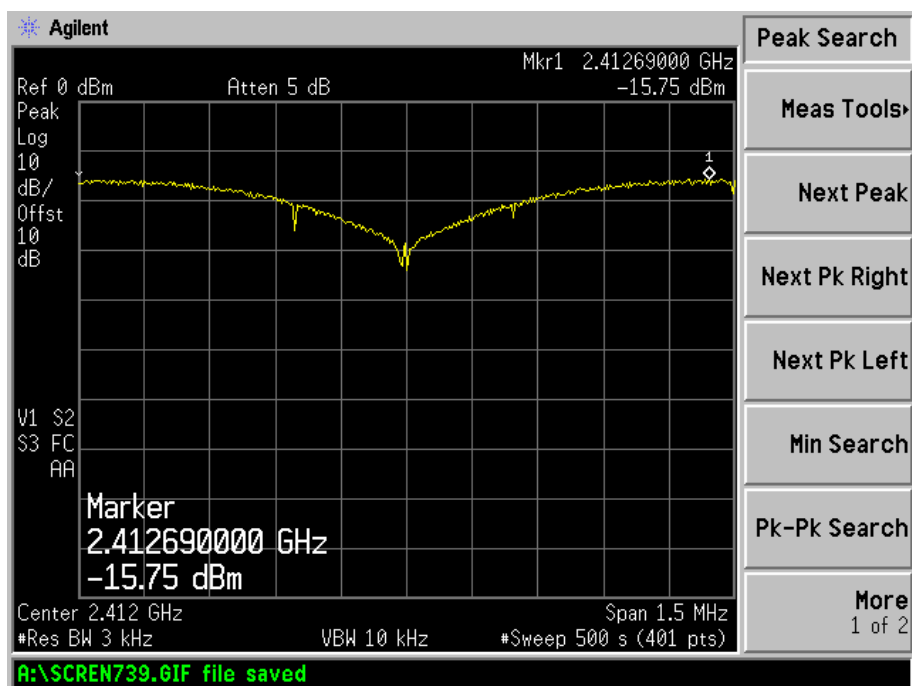


High Channel:

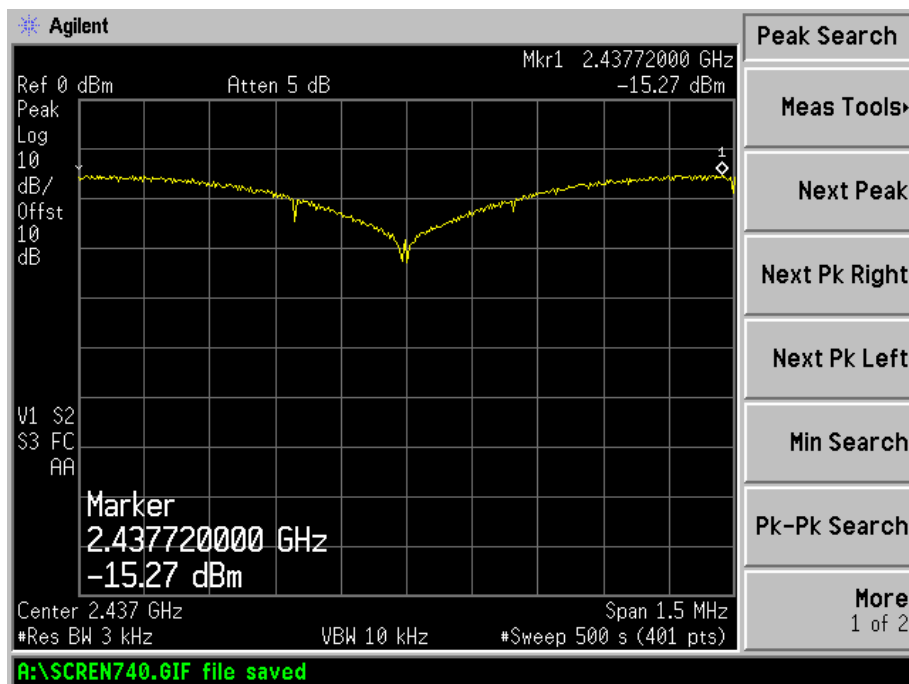


For 802.11b-chain B

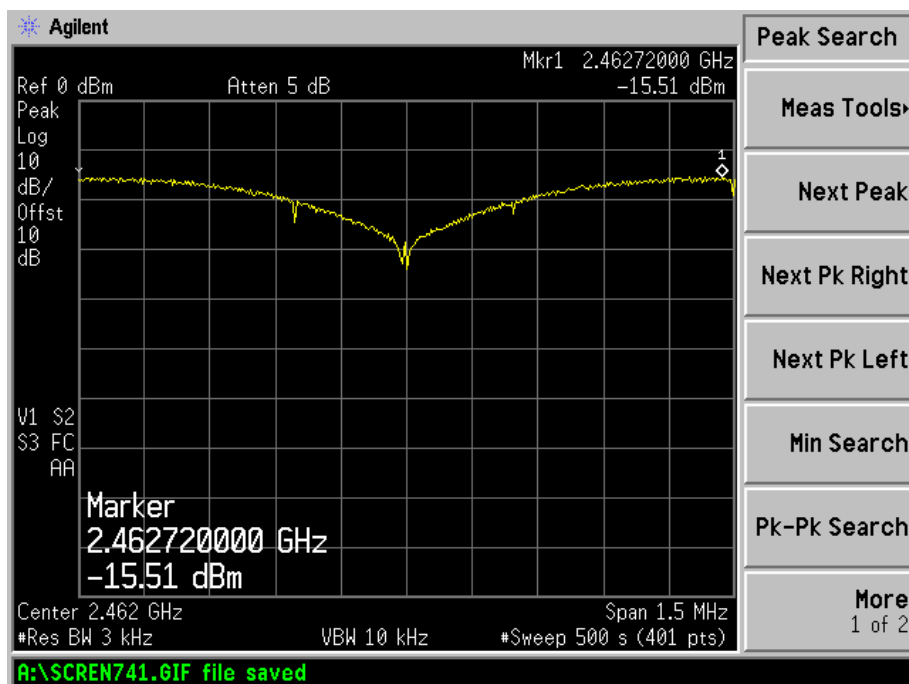
Low Channel



Middle Channel:

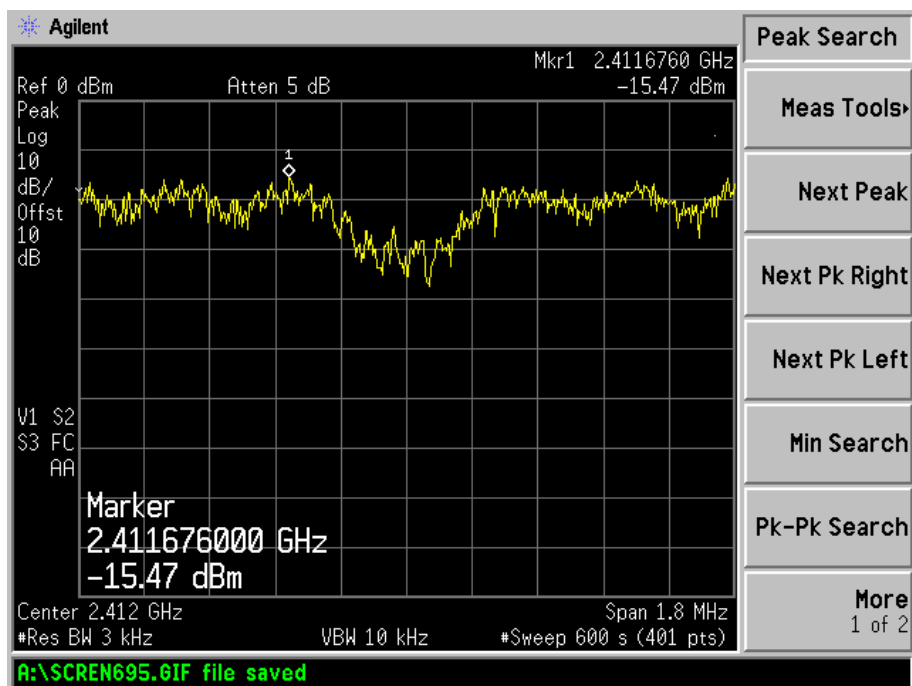


High Channel:

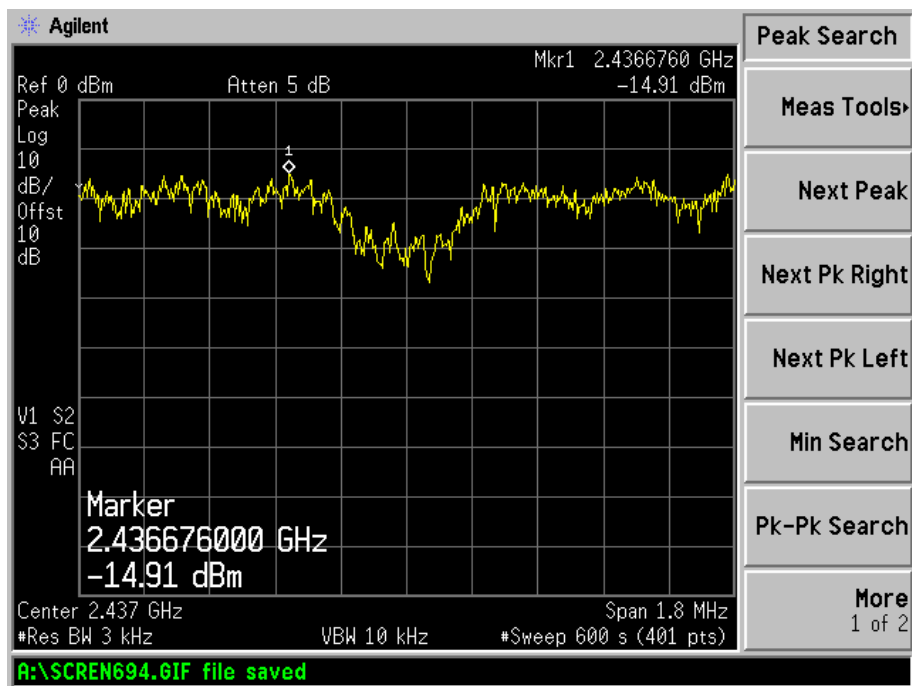


For 802.11g-chain A

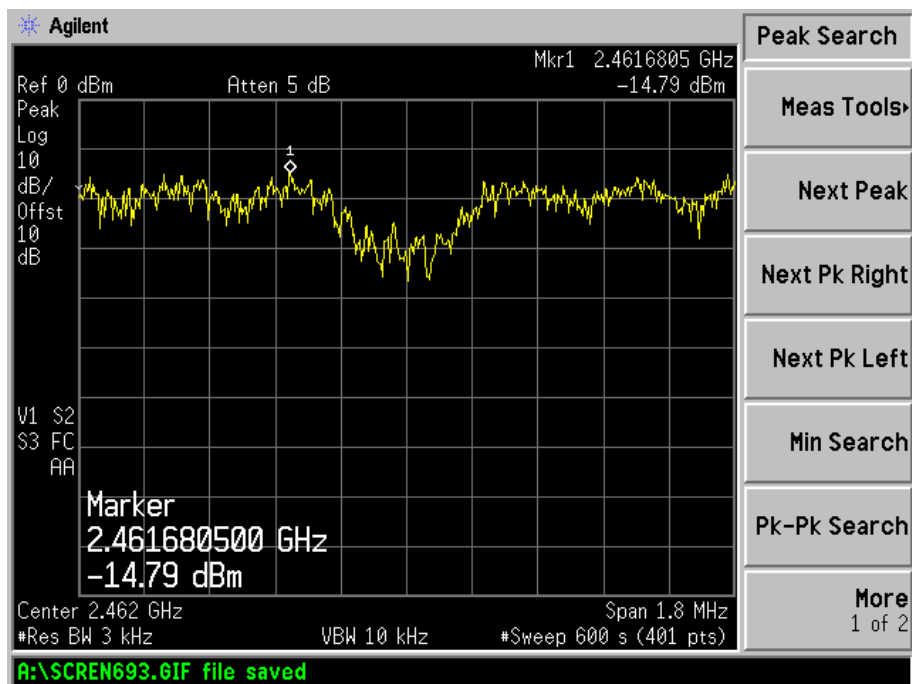
Low Channel:



Middle Channel:

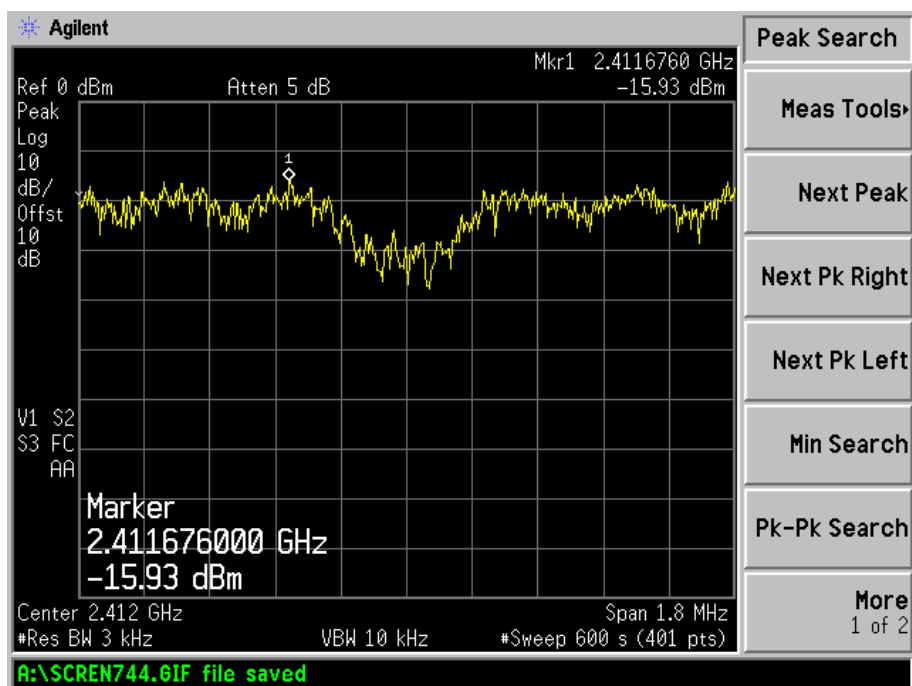


High Channel:

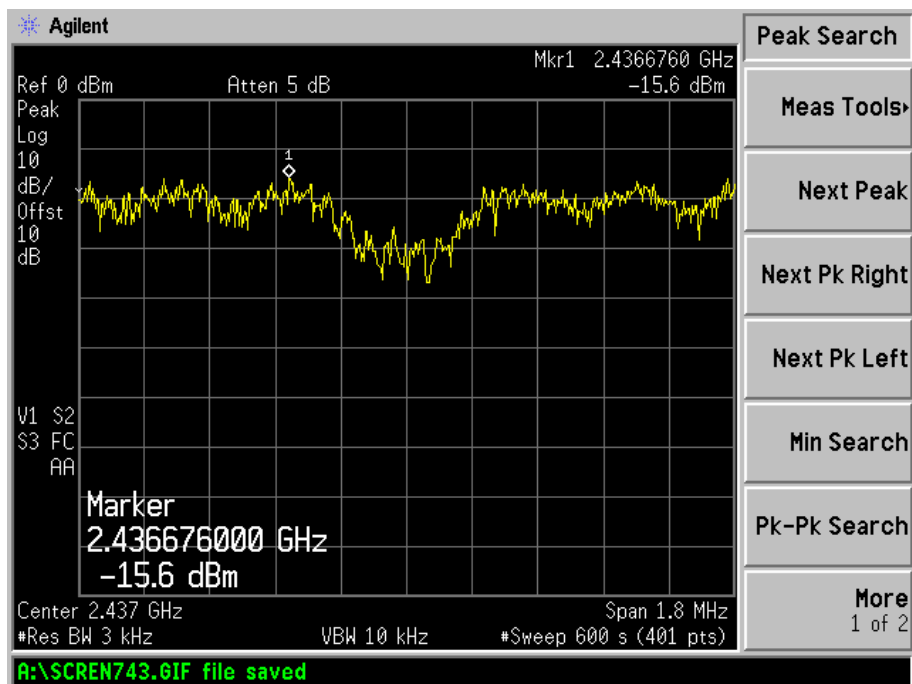


For 802.11g-chain B

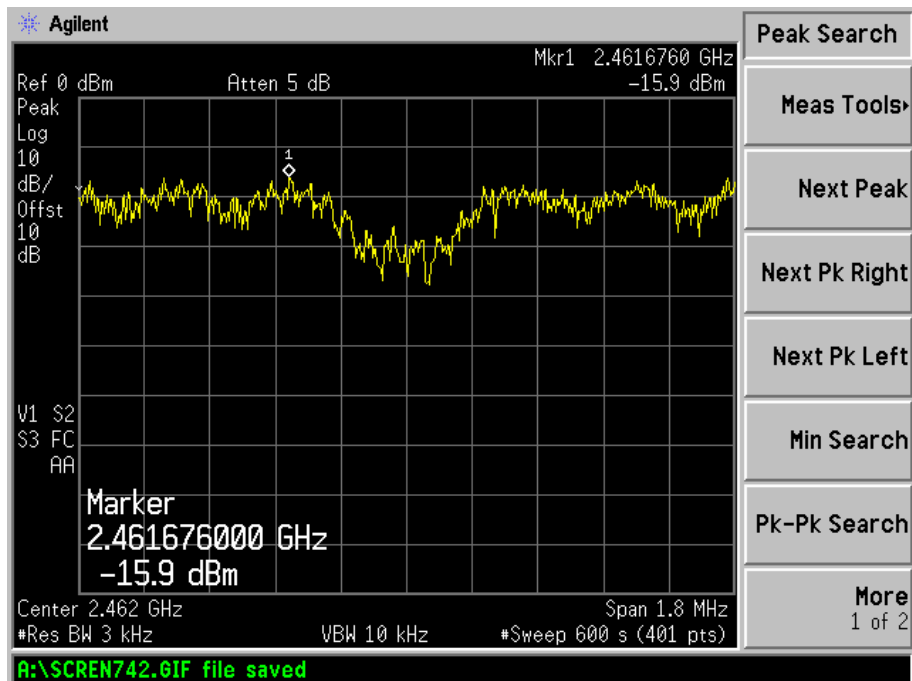
Low Channel:



Middle Channel:

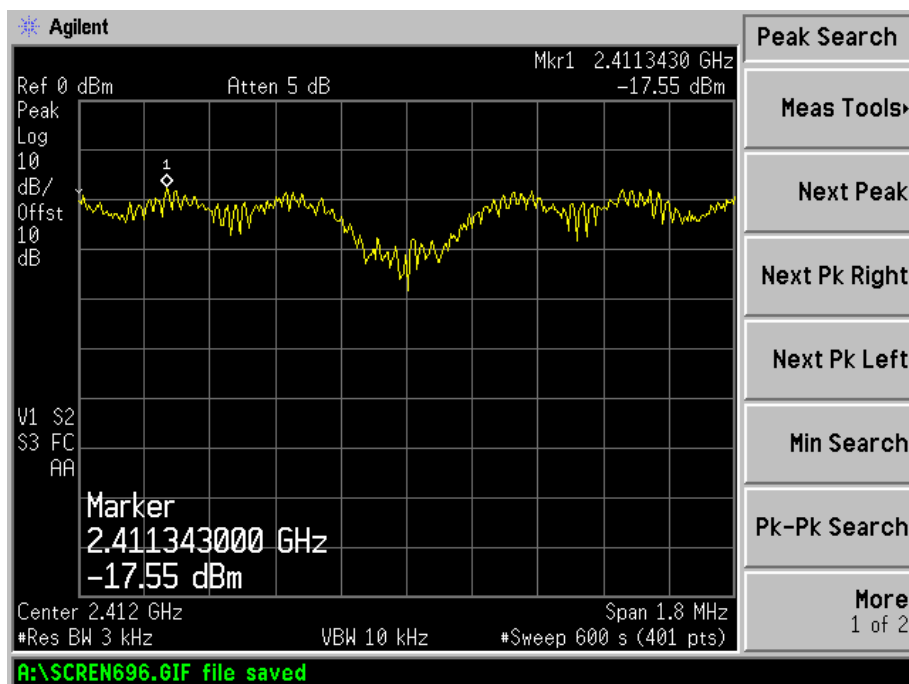


High Channel:

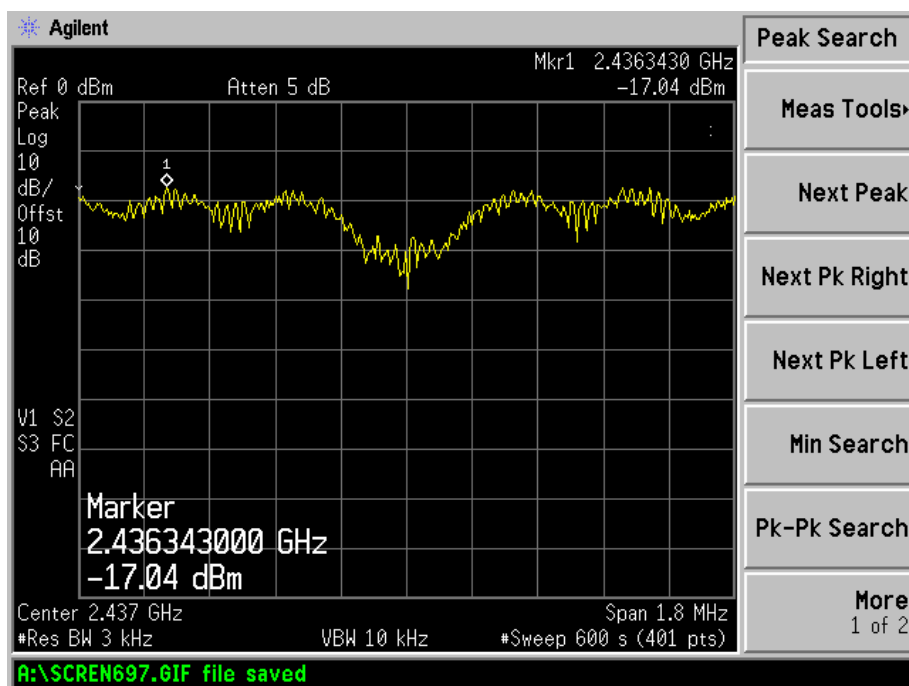


For 802.11n/HT20-chain A

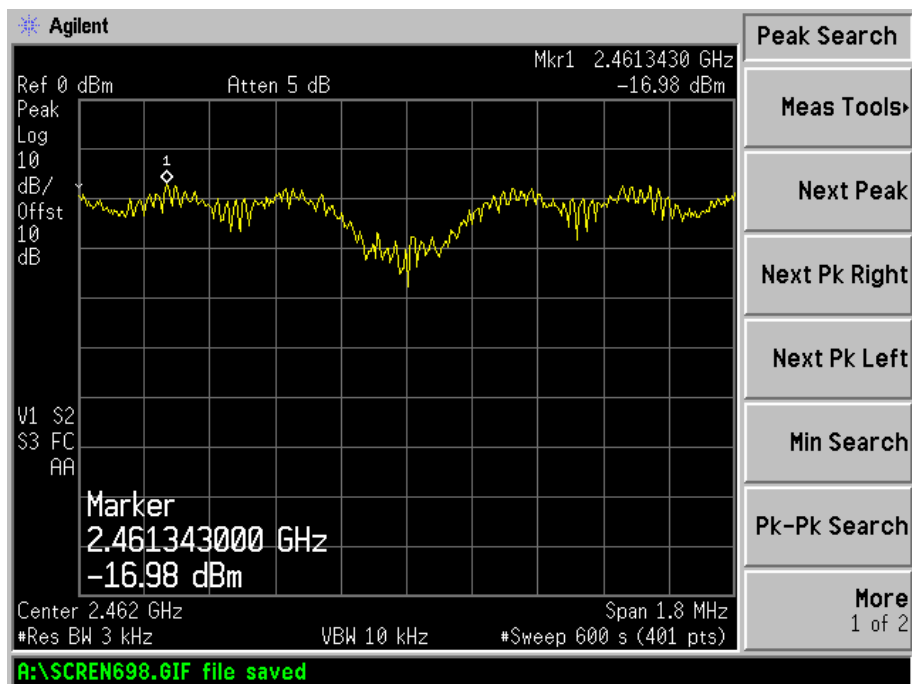
Low Channel:



Middle Channel:

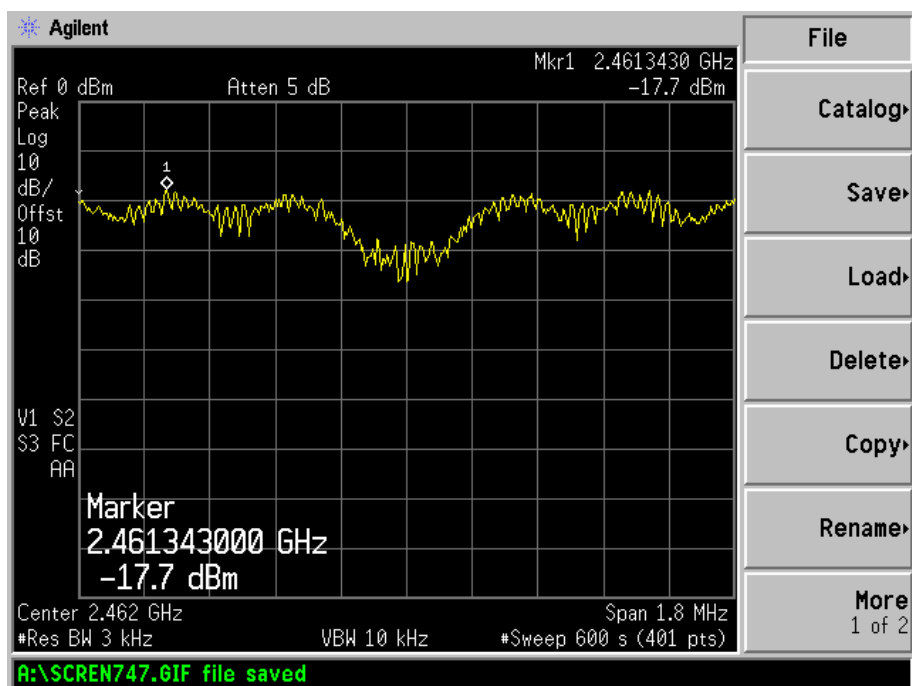


High Channel:

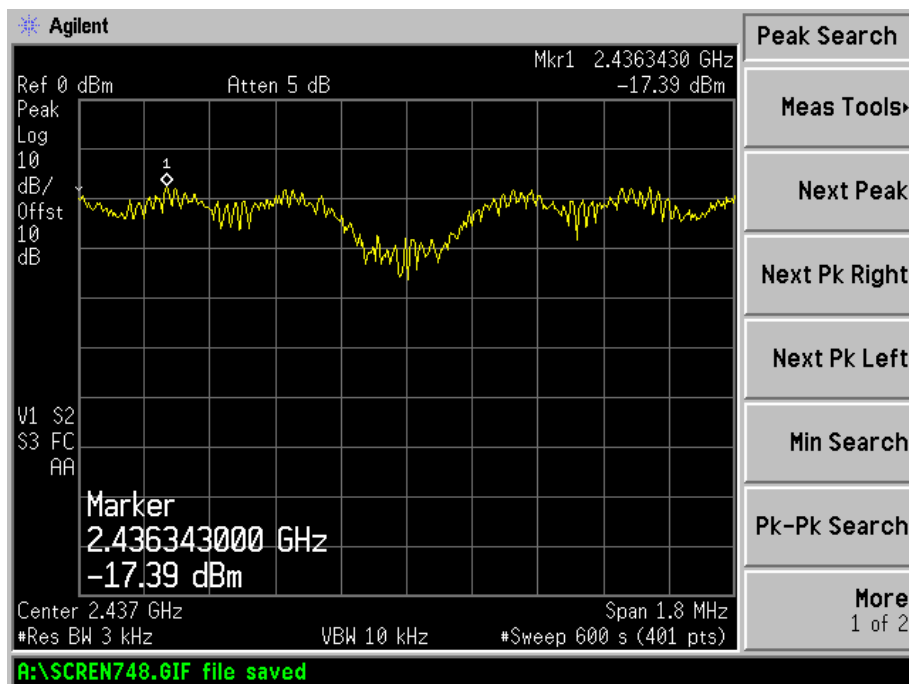


For 802.11n/HT20-chain B

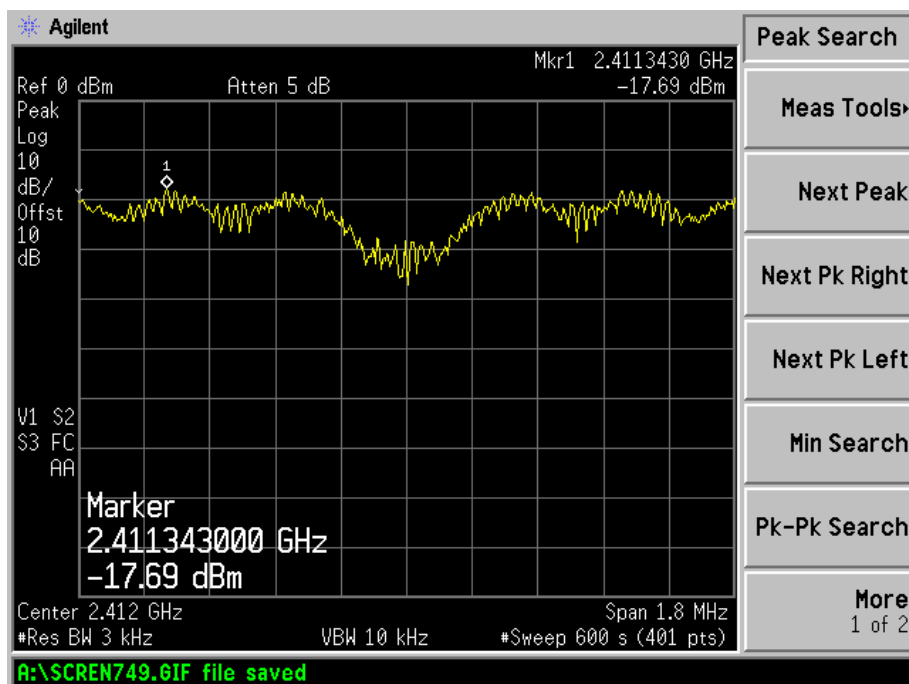
Low Channel:



Middle Channel:

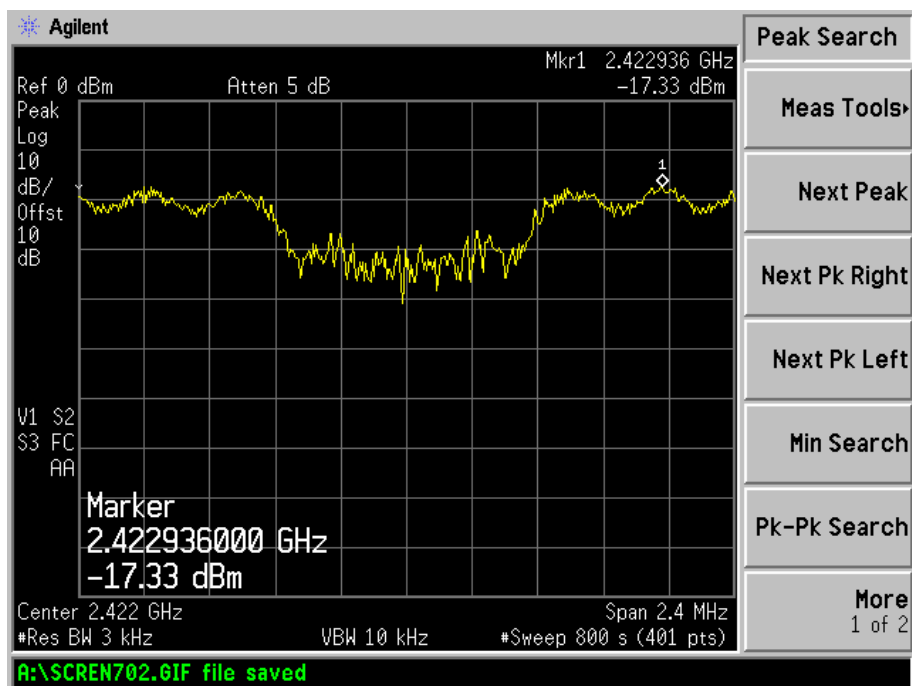


High Channel:

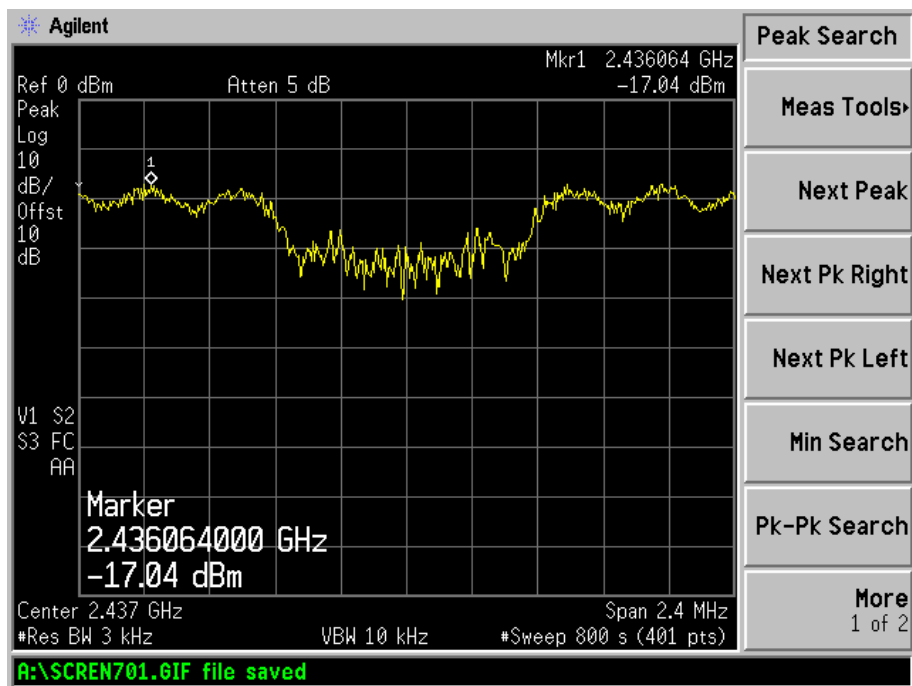


For 802.11n/HT40-chain A

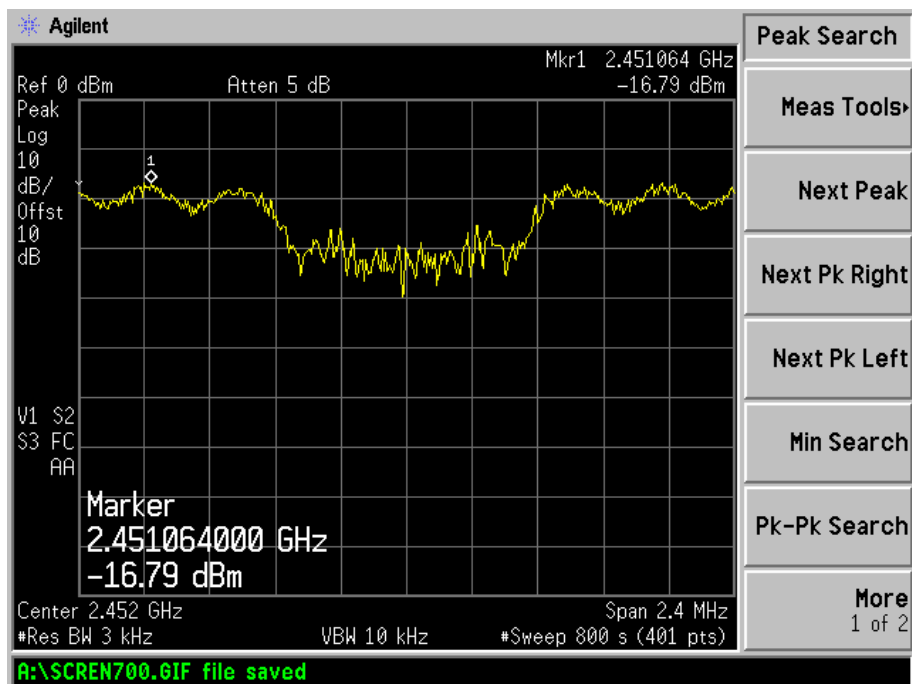
Low Channel:



Middle Channel:

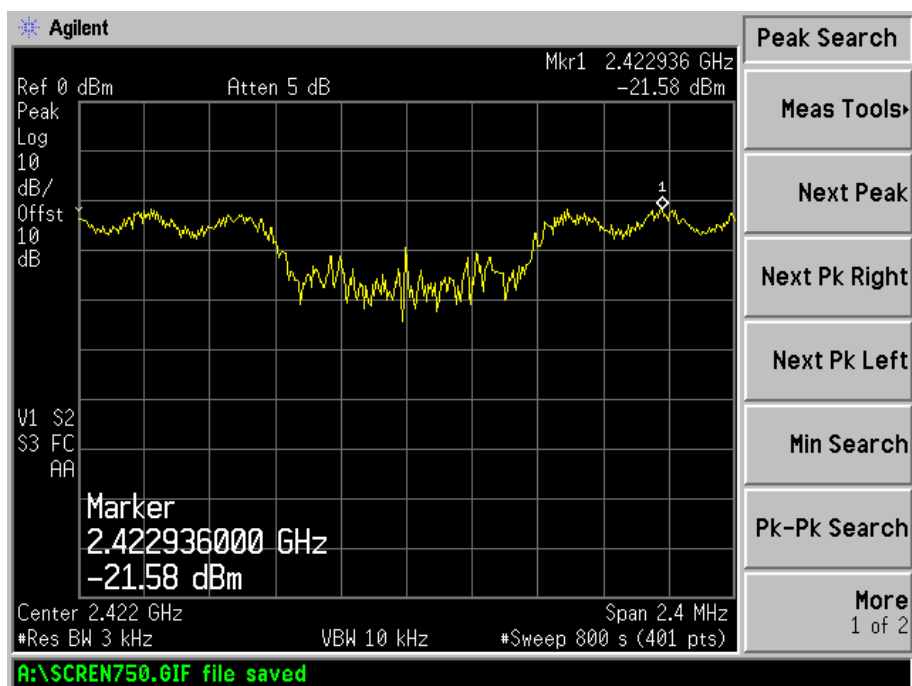


High Channel:

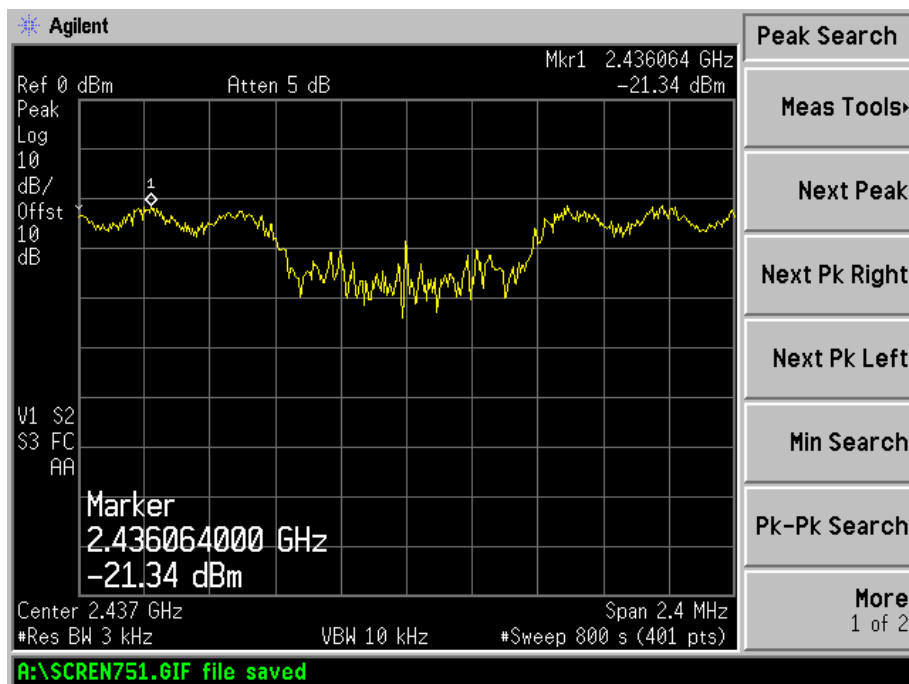


For 802.11n/HT40-chain B

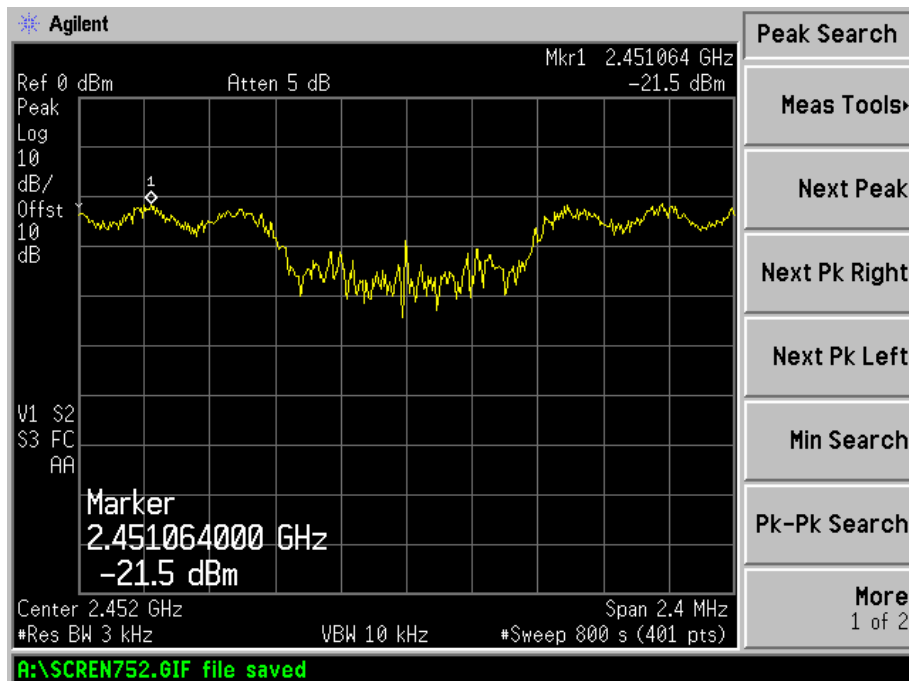
Low Channel:



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
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2011-12-20	2012-12-19
Attenuator	ATTEN	ATS100-4-20	/	2011-12-20	2012-12-19

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:	43%
ATM Pressure:	1013 mbar

6.5 Summary of Test Results/Plots

For 802.11b/g

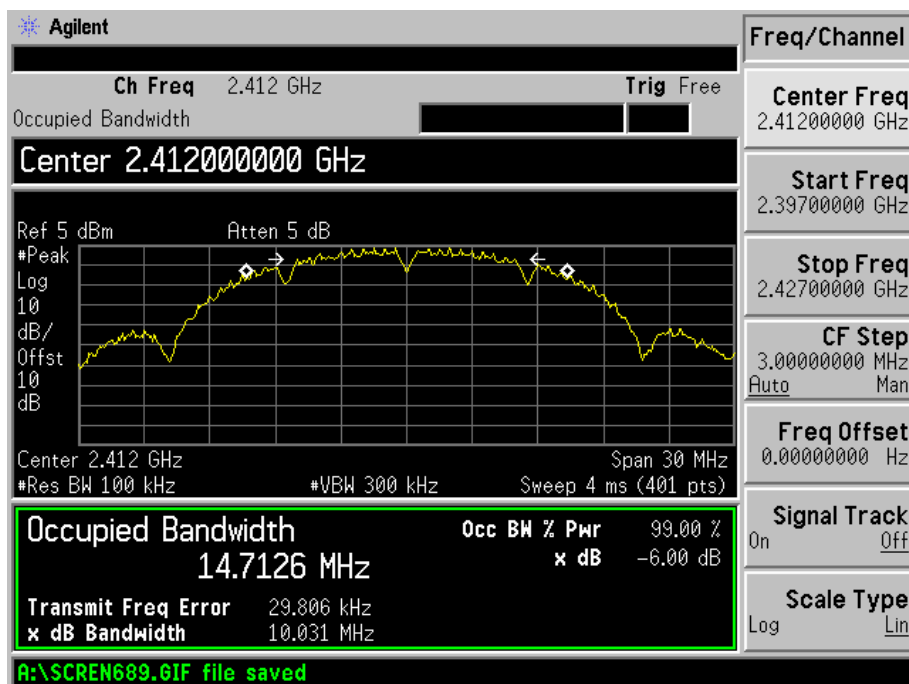
Test mode	Frequency MHz	6 dB Bandwidth Chain A (kHz)	6 dB Bandwidth Chain B (kHz)	Limit kHz
802.11b	2412	10031	10176	500
	2437	10075	10189	500
	2462	91116	10205	500
802.11g	2412	16526	16476	500
	2437	16529	16468	500
	2462	16490	16468	500

For 802.11n HT20/HT40

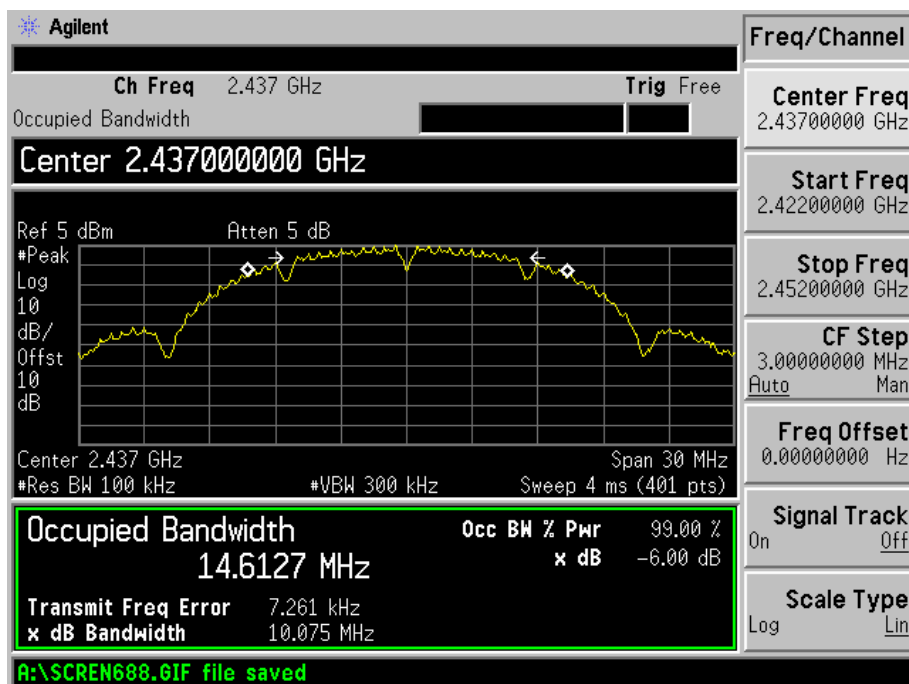
Test mode	Frequency MHz	6 dB Bandwidth Chain A (kHz)	6 dB Bandwidth Chain B (kHz)	Limit kHz
802.11n HT20	2412	17732	17558	500
	2437	17687	17502	500
	2462	17683	17574	500
802.11n HT40	2422	36301	36060	500
	2437	36422	36067	500
	2452	36174	35911	500

For 802.11b-chain A

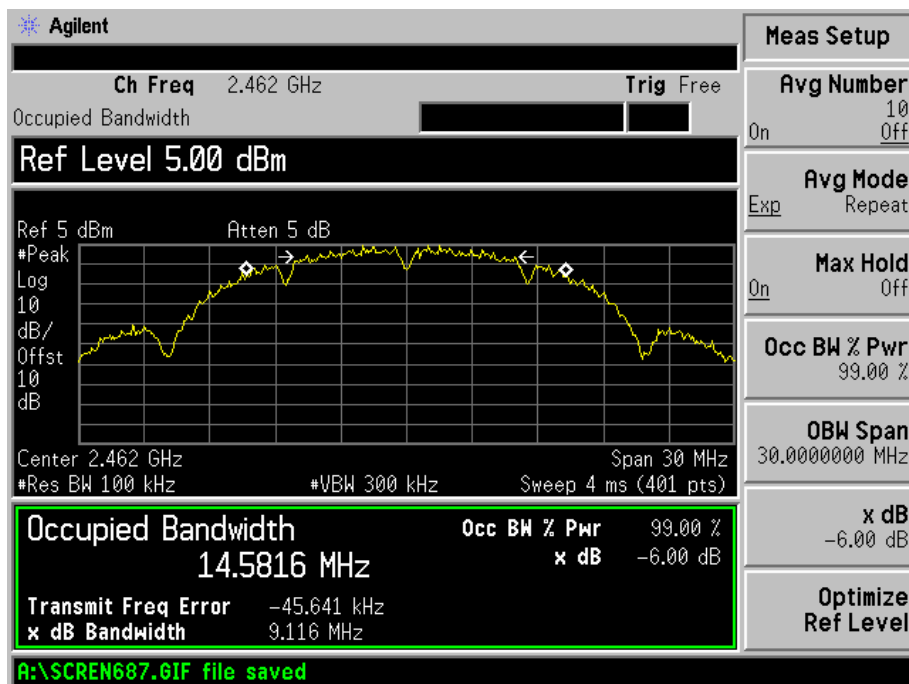
Low Channel:



Mid Channel:

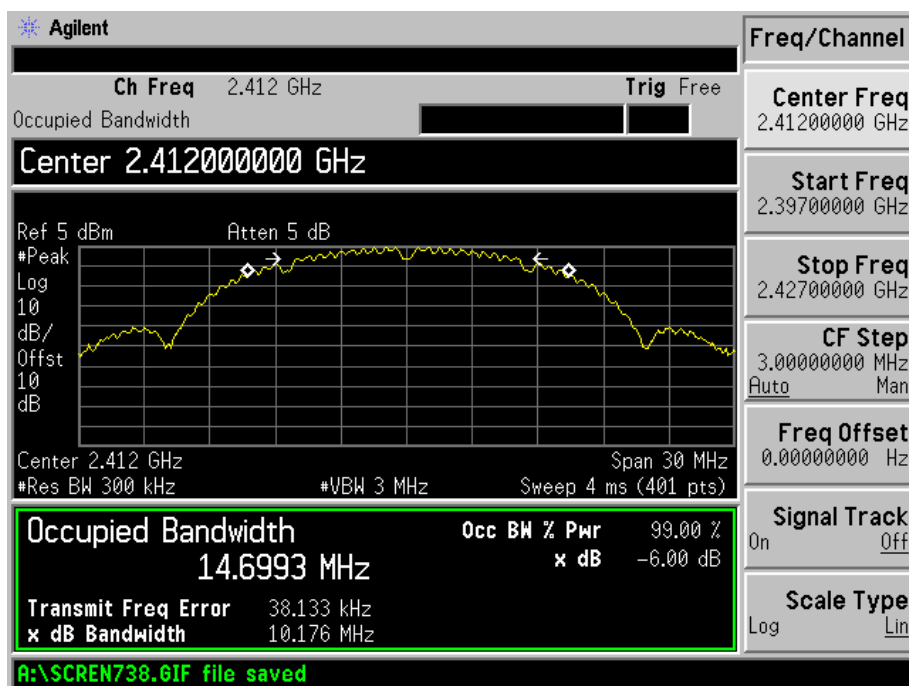


High Channel:

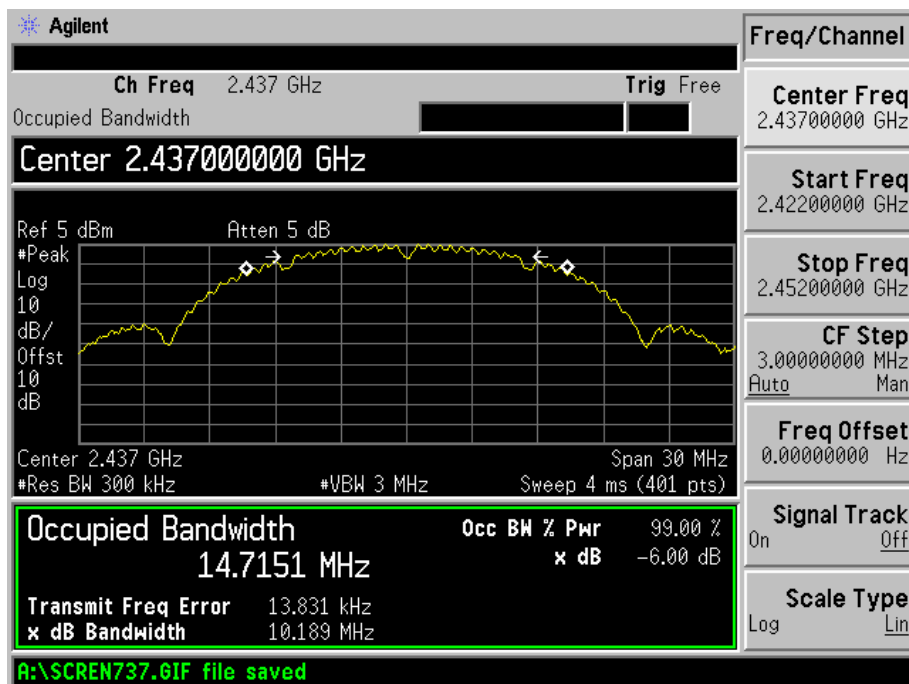


For 802.11b-chain B

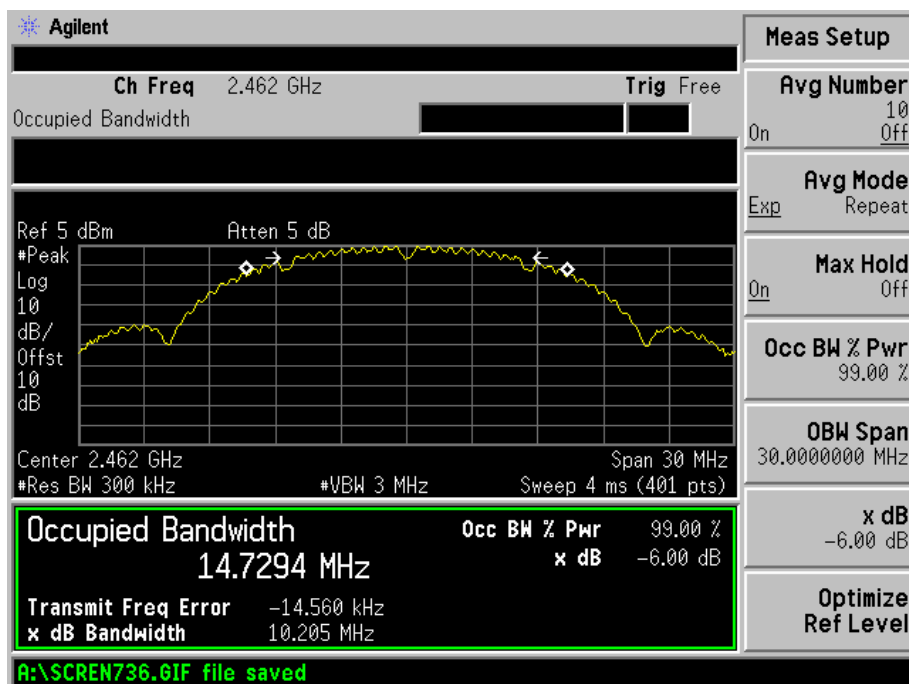
Low Channel:



Middle Channel:

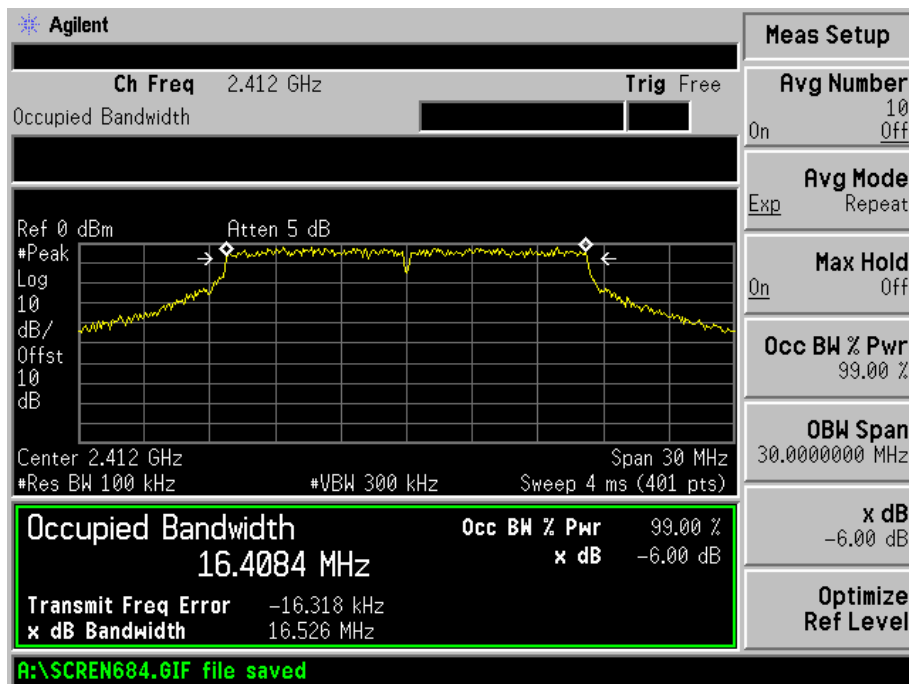


High Channel:

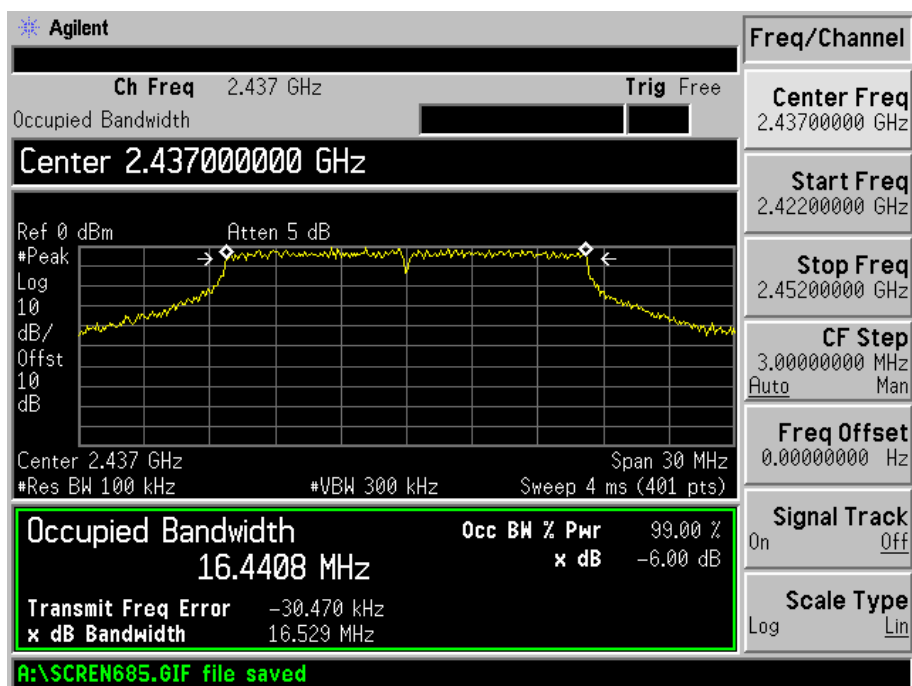


For 802.11g-chain A

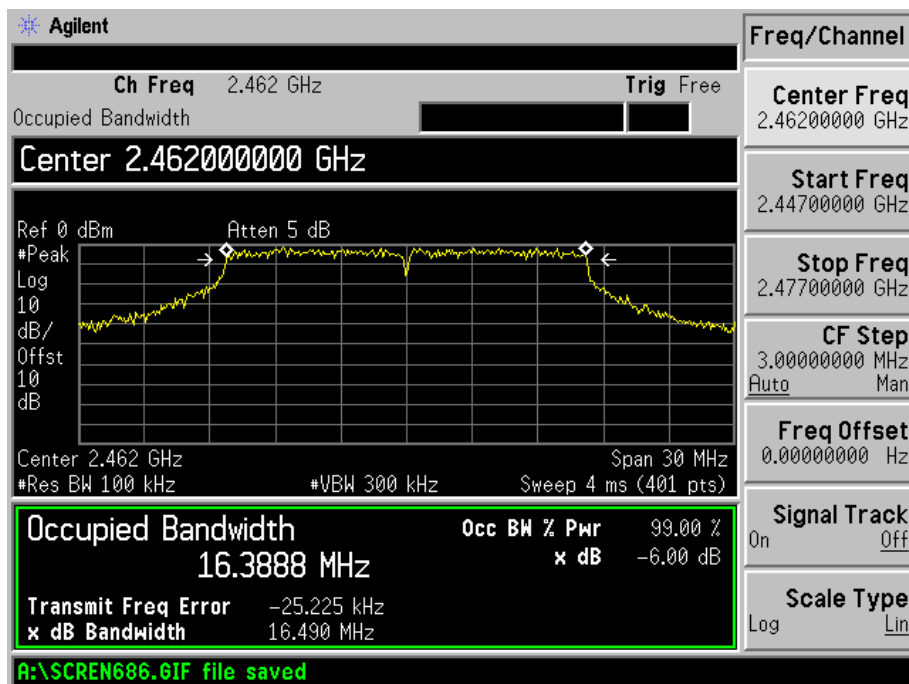
Low Channel:



Mid Channel:

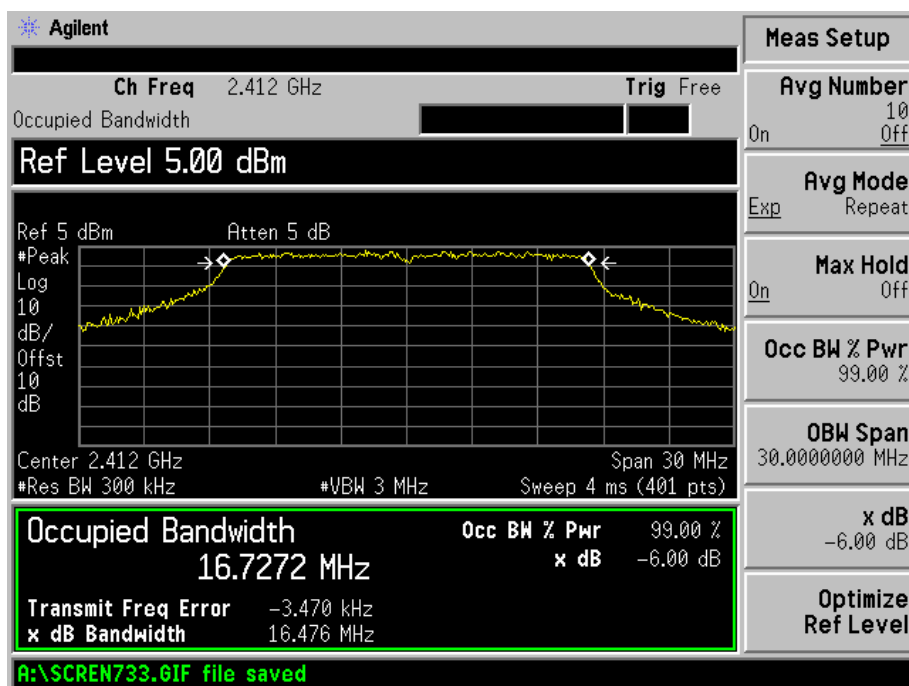


High Channel:

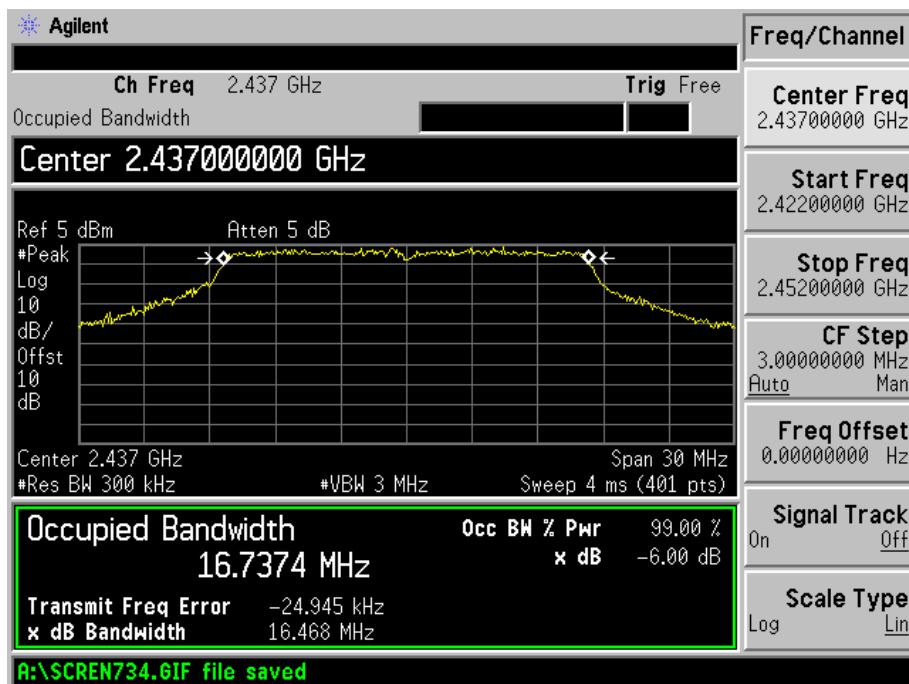


For 802.11g-chain B

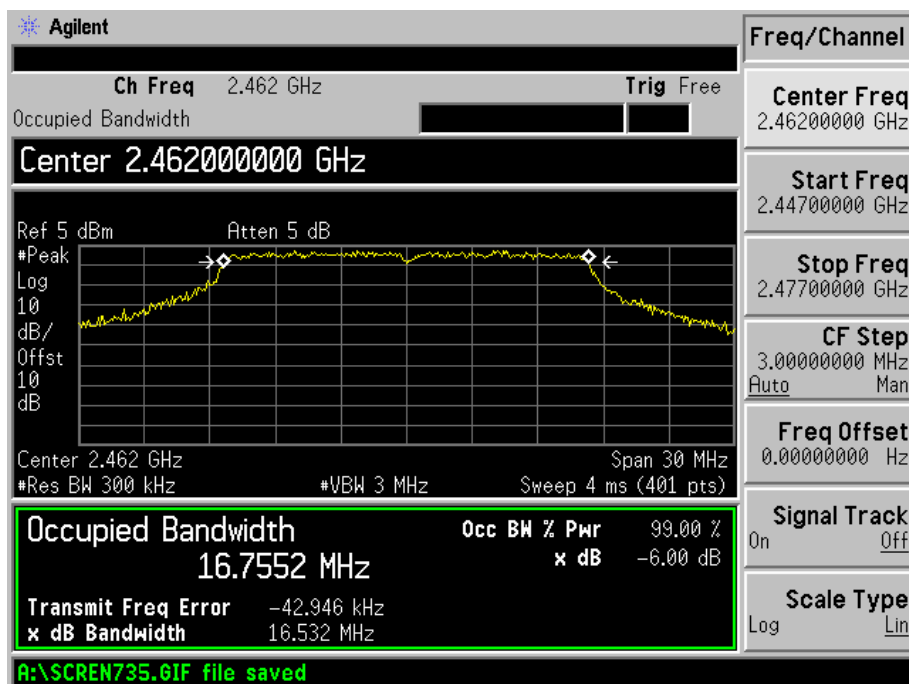
Low Channel:



Middle Channel:

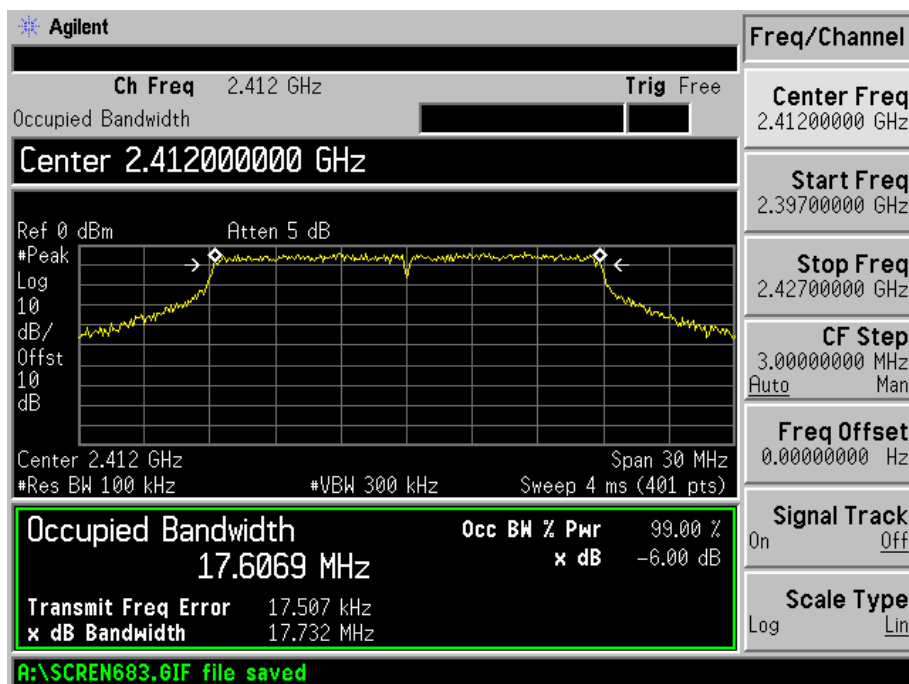


High Channel:

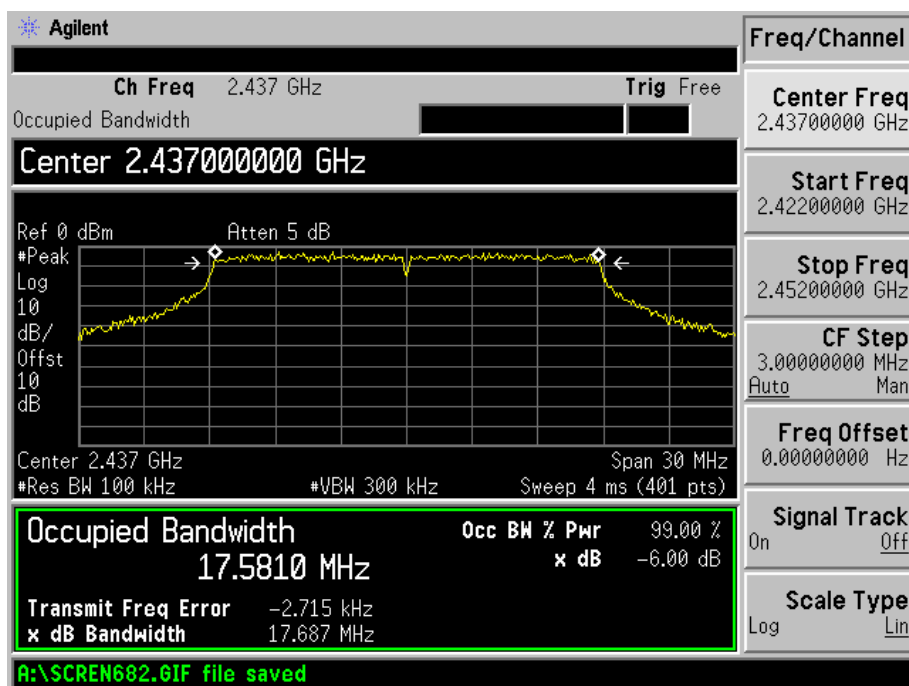


For 802.11n/HT20-chain A

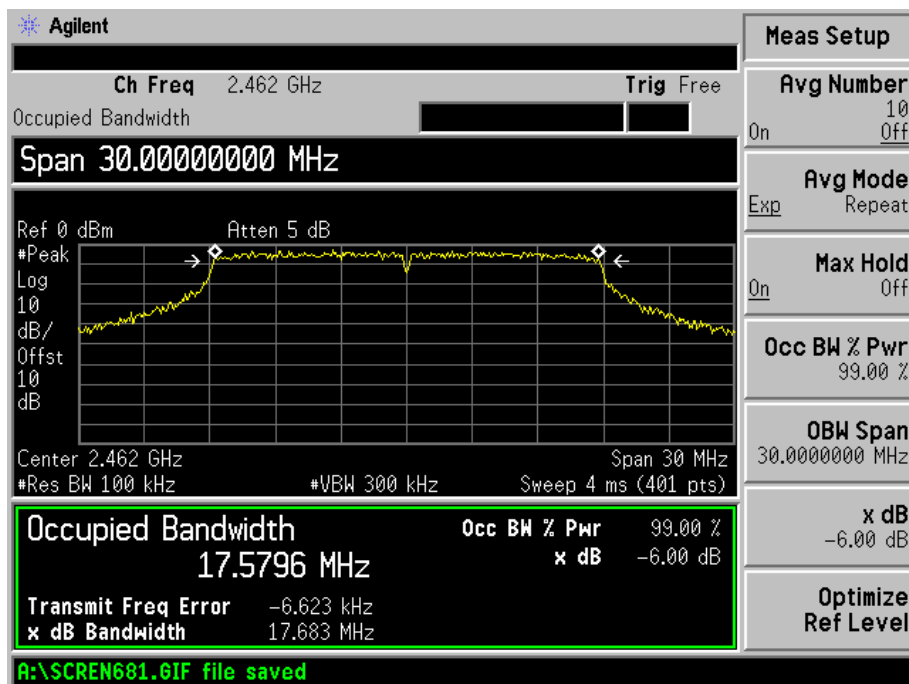
Low Channel:



Middle Channel:

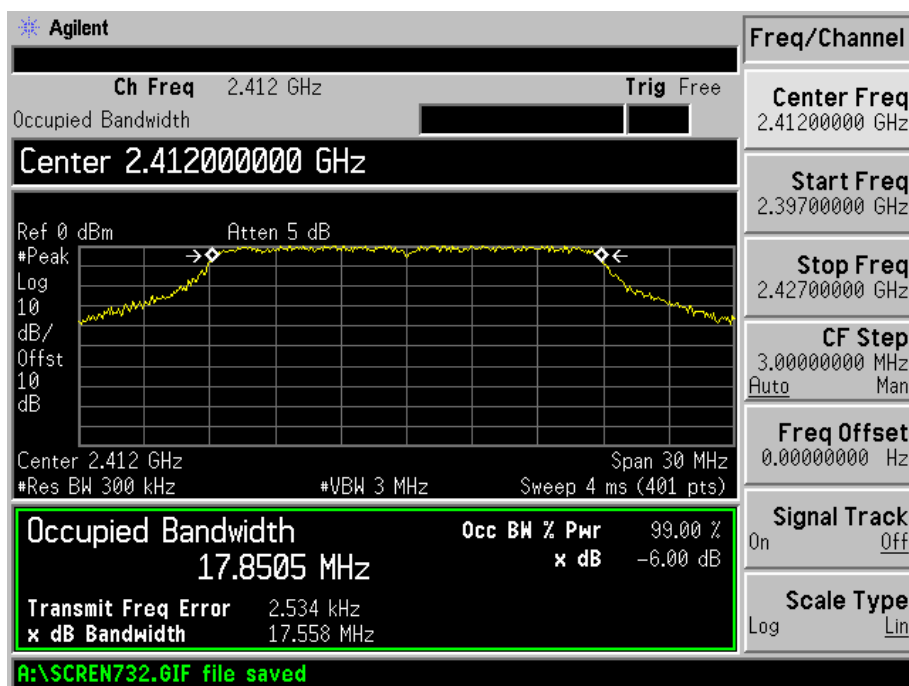


High Channel:

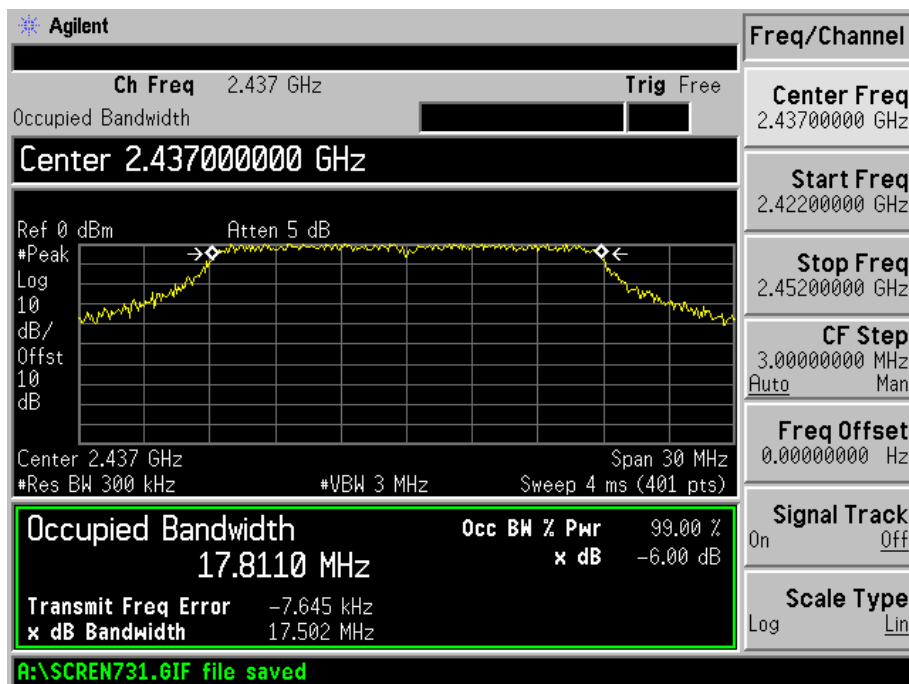


For 802.11n/HT20-chain B

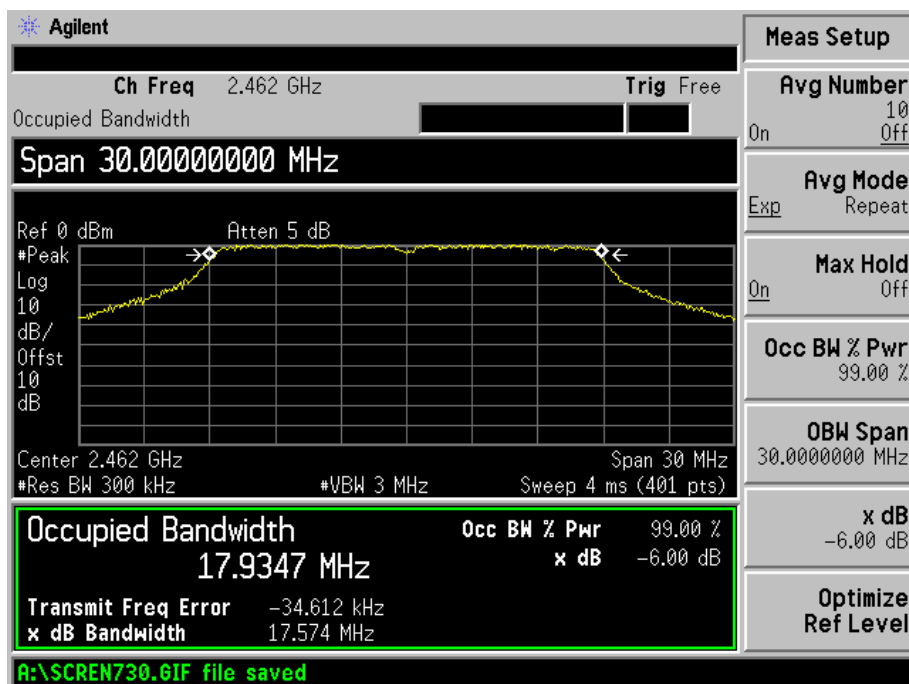
Low Channel:



Middle Channel:

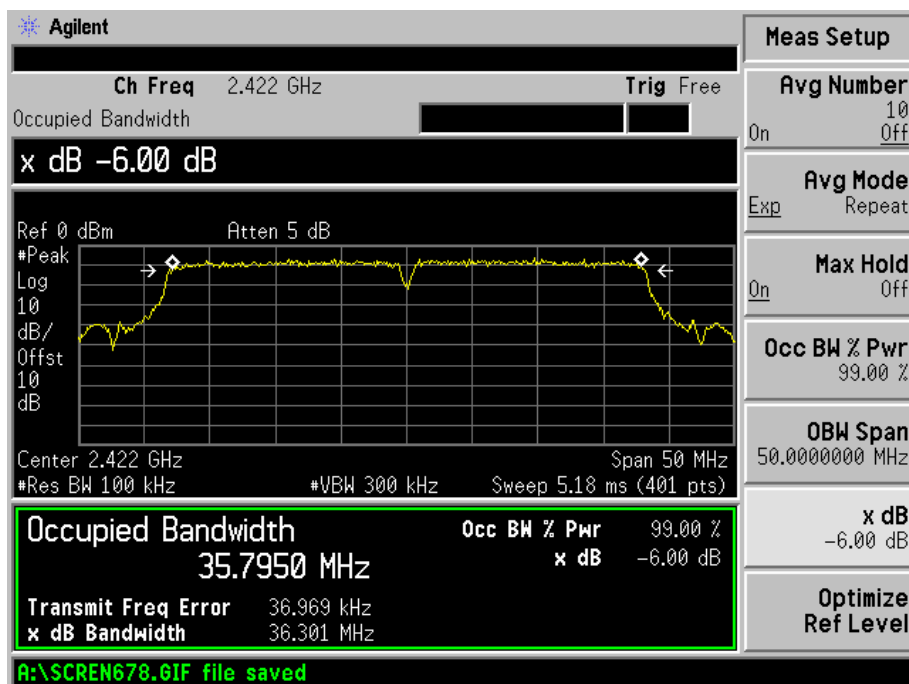


High Channel:

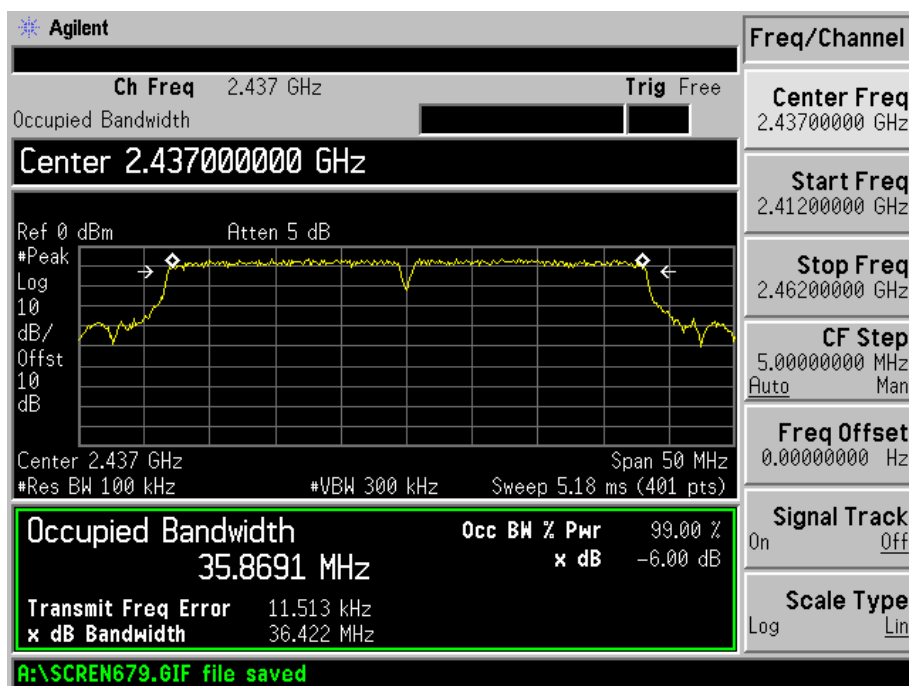


For 802.11n/HT40-chain A

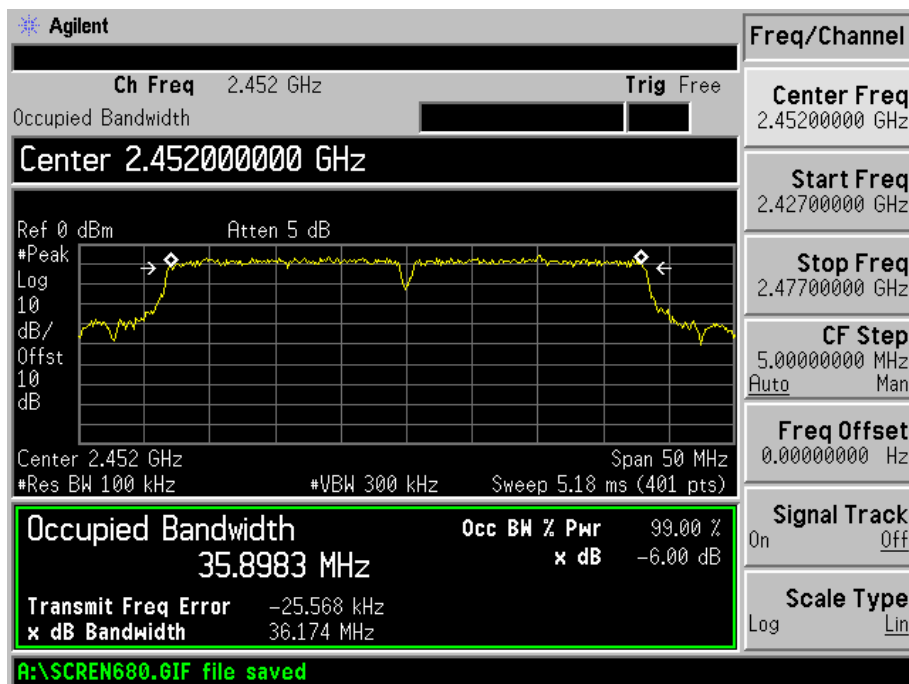
Low Channel:



Middle Channel:

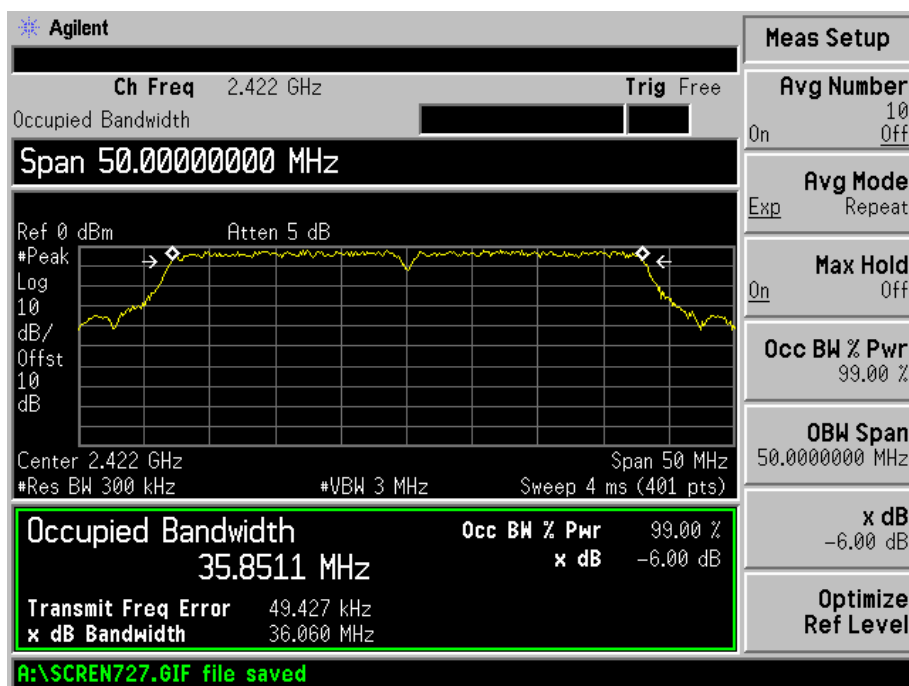


High Channel:

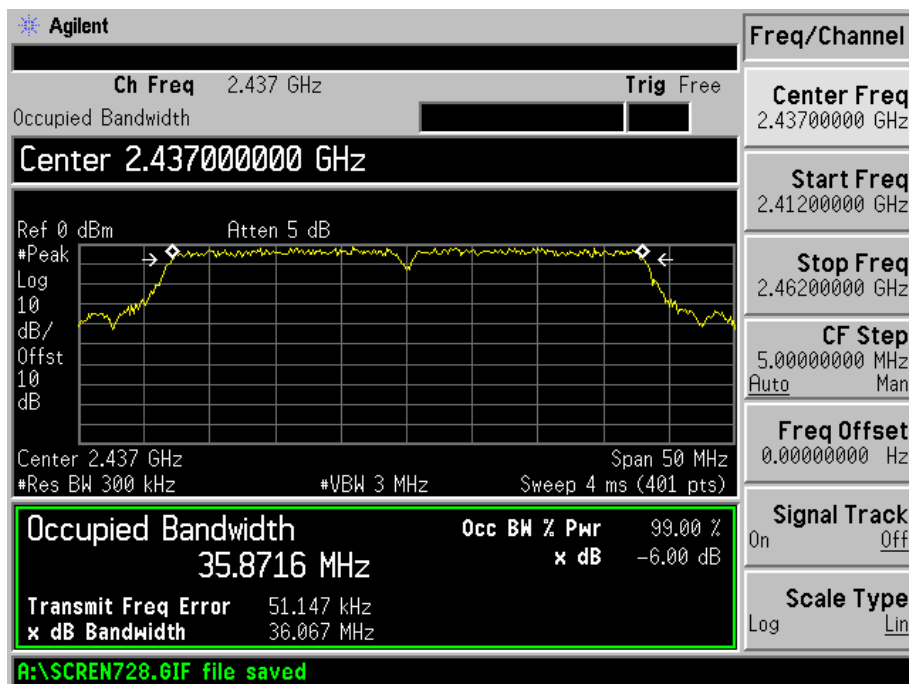


For 802.11n/HT40-chain B

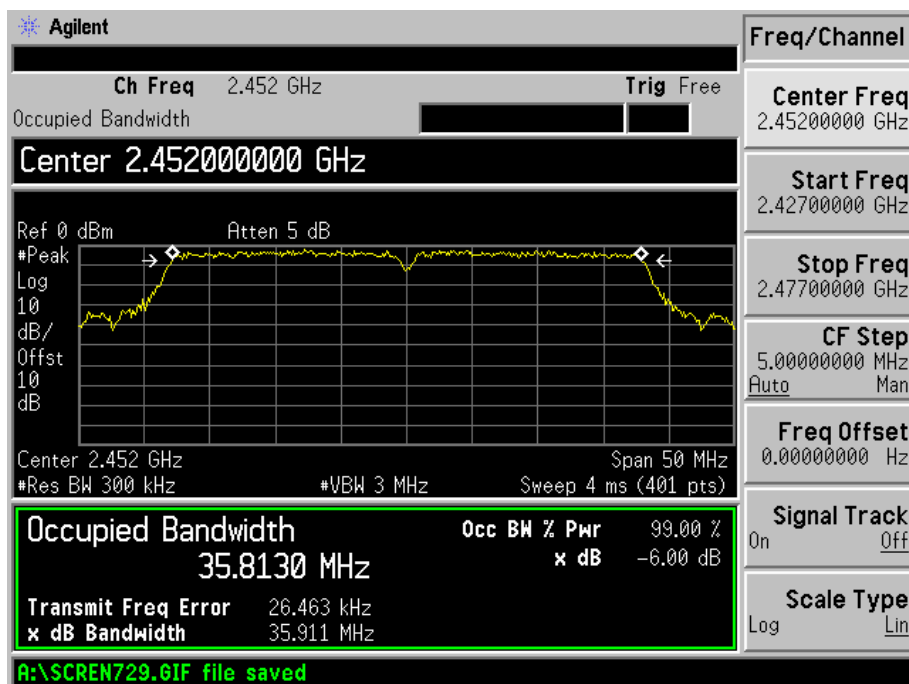
Low Channel:



Middle 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
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2011-12-20	2012-12-19
Attenuator	ATTEN	ATS100-4-20	/	2011-12-20	2012-12-19

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

For 802.11b/g

Test mode	Frequency MHz	Reading chain A (dBm)	Reading chain B (dBm)	Output power chain A (W)	Output power chain B (W)	Total Power (W)	Limit W
802.11b (1M)	2412	12.55	9.52	0.01799	0.00895	/	1
	2437	12.50	9.36	0.01778	0.00863	/	1
	2462	12.76	9.52	0.01888	0.00895	/	1
802.11b (11M)	2412	12.59	9.88	0.01815	0.00973	/	1
	2437	12.85	9.96	0.01928	0.00991	/	1
	2462	12.56	9.87	0.01803	0.00971	/	1
802.11g (6M)	2412	10.67	8.09	0.01167	0.00644	/	1
	2437	11.33	8.85	0.01358	0.00767	/	1
	2462	11.53	8.42	0.01422	0.00695	/	1
802.11g (54M)	2412	10.10	8.56	0.01023	0.00718	/	1
	2437	11.03	8.97	0.01268	0.00789	/	1
	2462	11.10	8.10	0.01288	0.00646	/	1

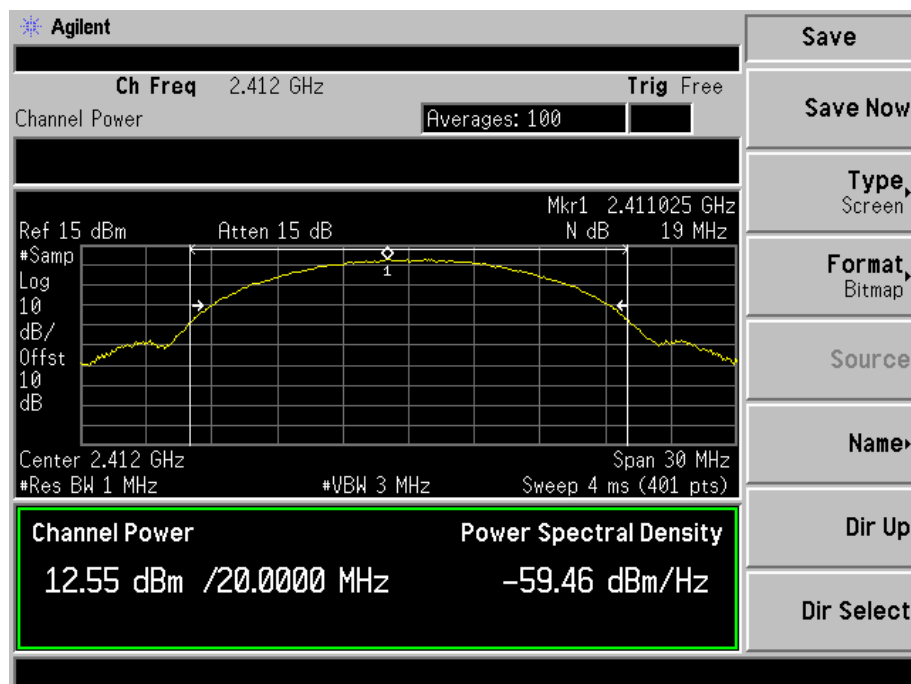
For 802.11n HT20/HT40

Test mode	Frequency MHz	Reading chain A (dBm)	Reading chain B (dBm)	Output power chain A (W)	Output power chain B (W)	Total Power (W)	Limit W
802.11n HT20 (MCS0)	2412	10.49	8.32	0.01119	0.00679	/	1
	2437	9.92	7.67	0.00982	0.00585	/	1
	2462	9.80	7.15	0.00955	0.00519	/	1
802.11n HT20 (MCS15)	2412	9.52	7.21	0.00895	0.00526	0.01421	1
	2437	9.34	7.44	0.00859	0.00555	0.01414	1
	2462	9.05	7.76	0.00804	0.00597	0.01401	1
802.11n HT40 (MCS0)	2422	9.65	7.32	0.00923	0.00540	/	1
	2437	9.34	7.47	0.00859	0.00558	/	1
	2452	9.48	7.46	0.00887	0.00557	/	1
802.11 HT40 (MCS15)	2422	8.26	7.16	0.00670	0.00520	0.01190	1
	2437	9.12	7.56	0.00817	0.00570	0.01387	1
	2452	8.33	7.36	0.00681	0.00545	0.01226	1

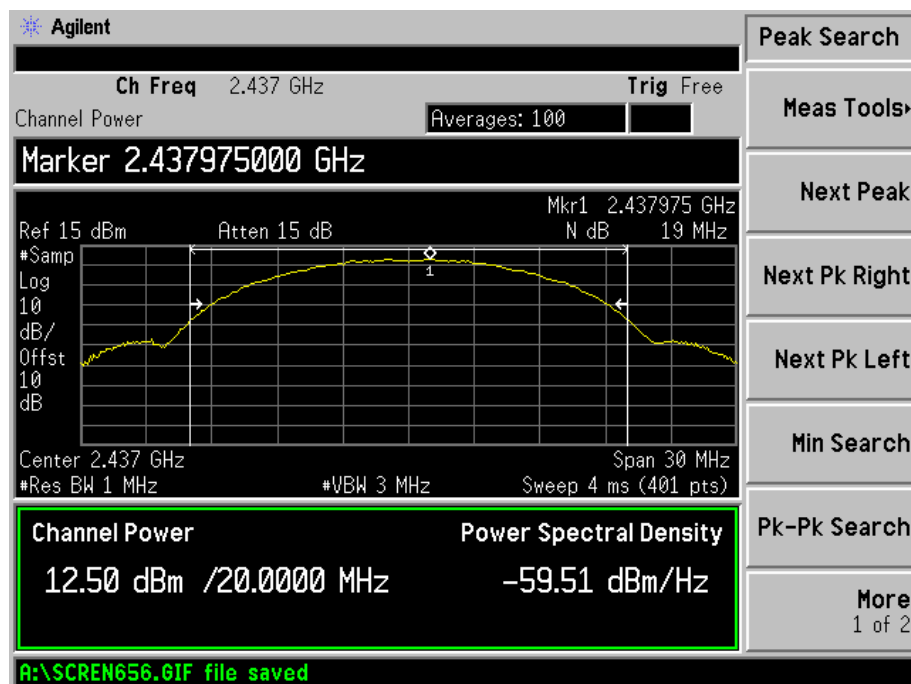
Note: The EUT shall be simultaneous transmission at the chain A and chain B for the MCS15 mode of 802.11n HT20 or HT40, all other mode shall be transmission only single chain (chain A or chain B).

For 802.11b_chain A_1M rate

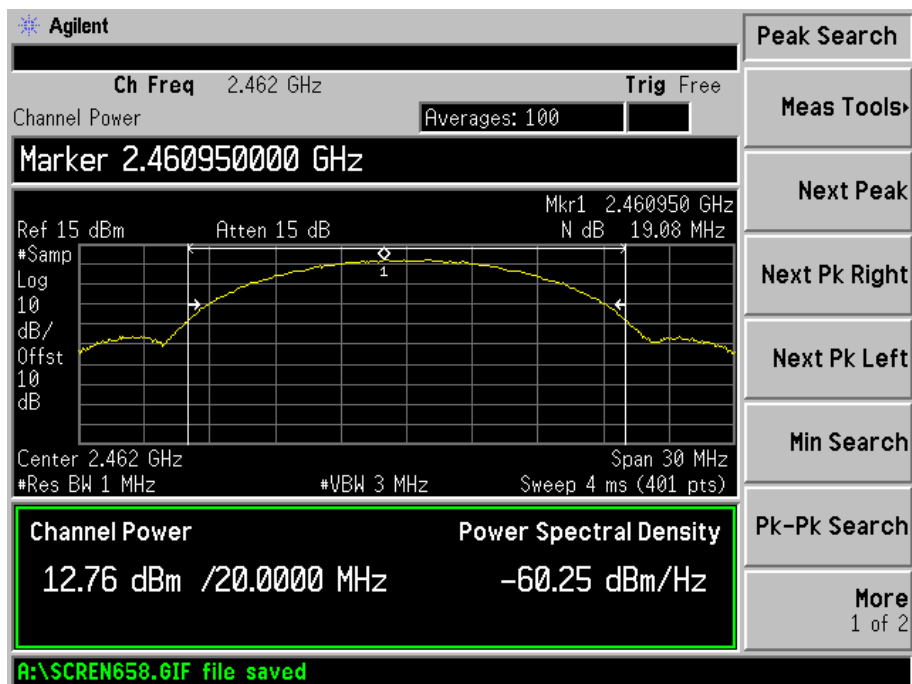
Low Channel:



Middle Channel:

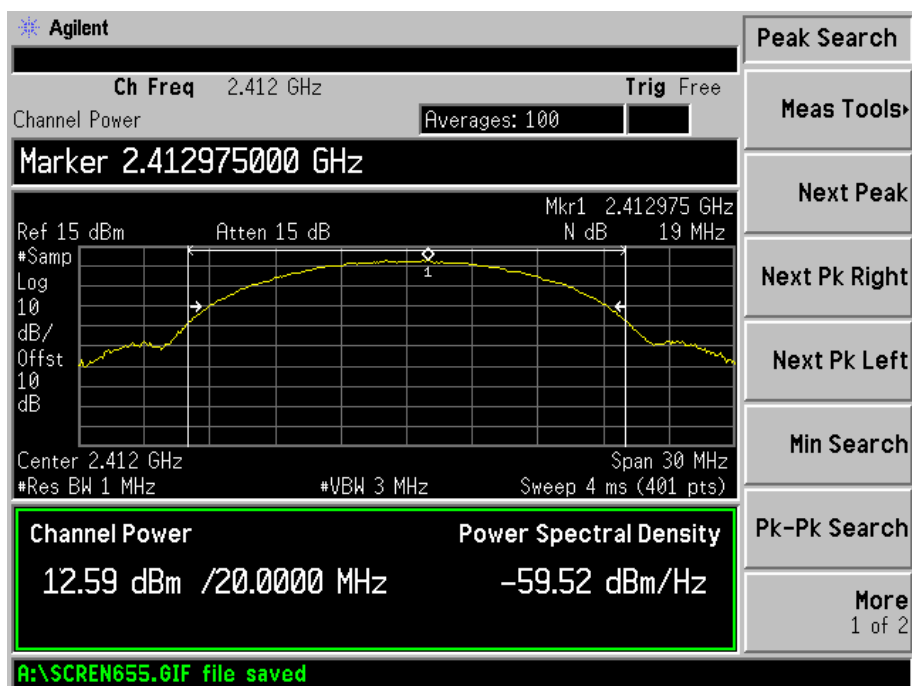


High Channel:

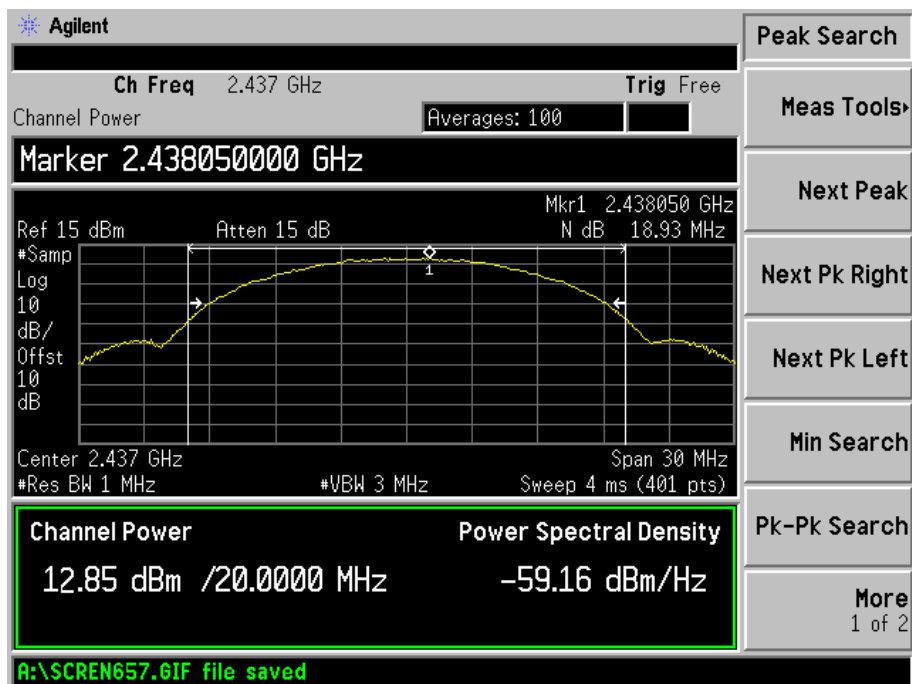


For 802.11b_chain A_11M rate

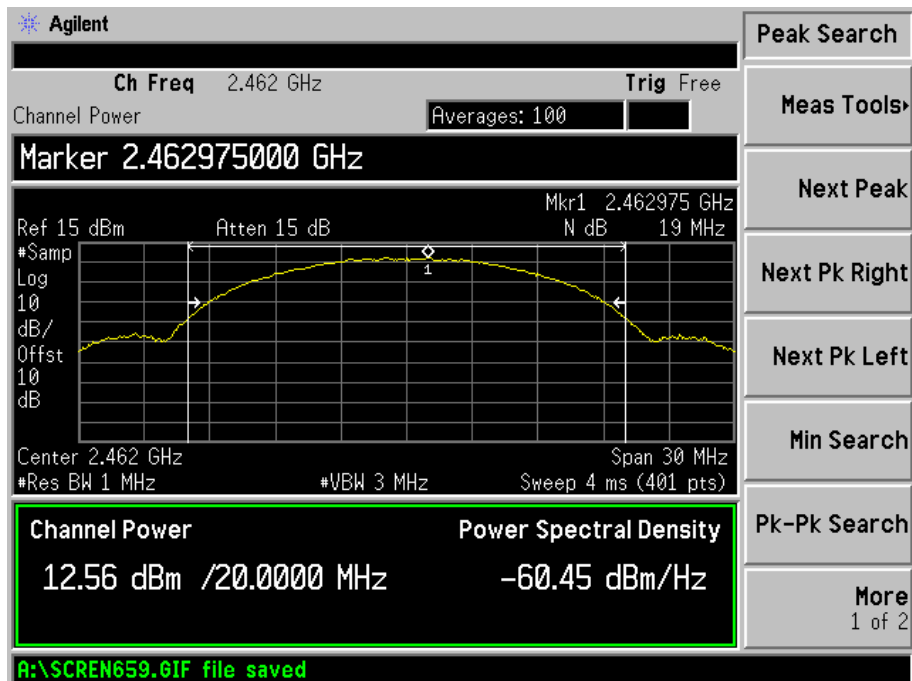
Low Channel:



Middle Channel:

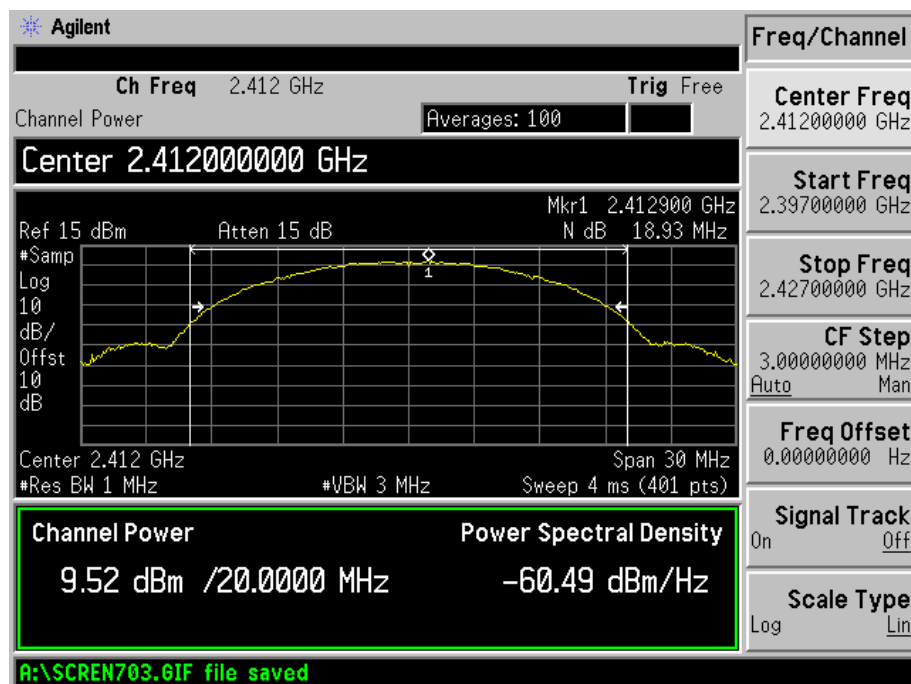


High Channel:

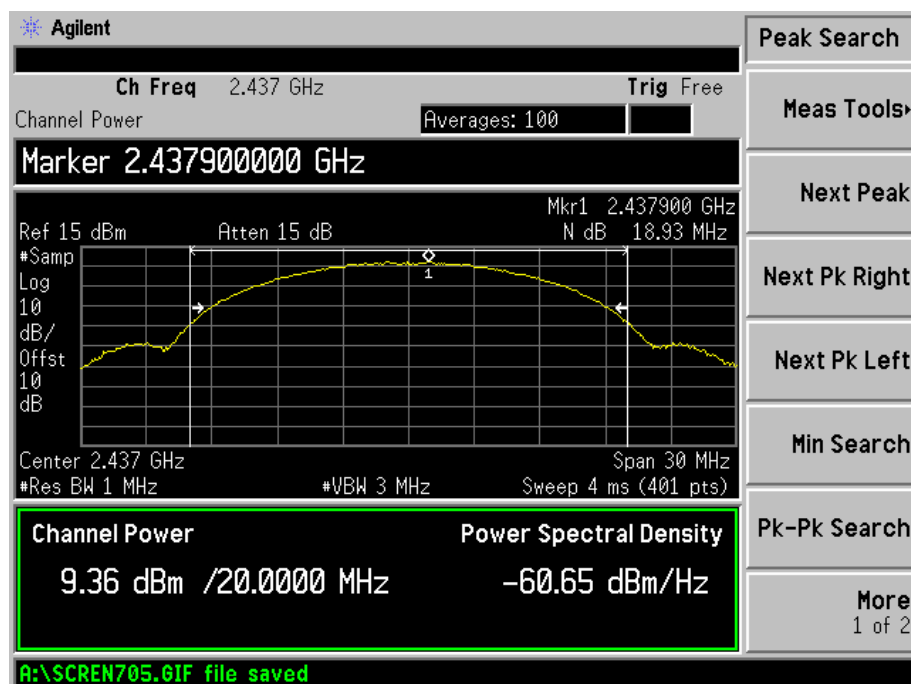


For 802.11b_chain B_1M rate

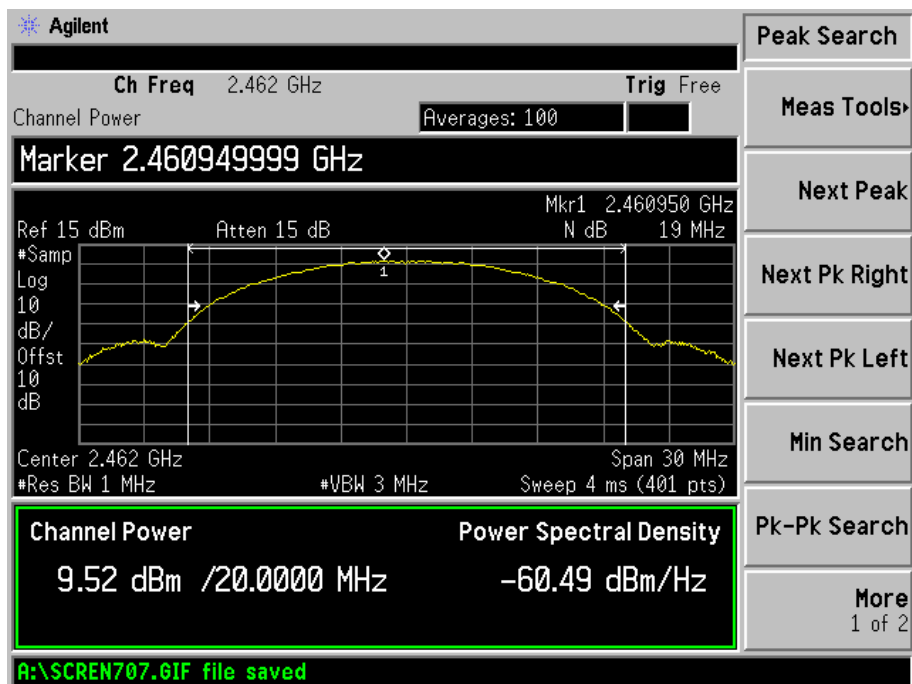
Low Channel:



Middle Channel:

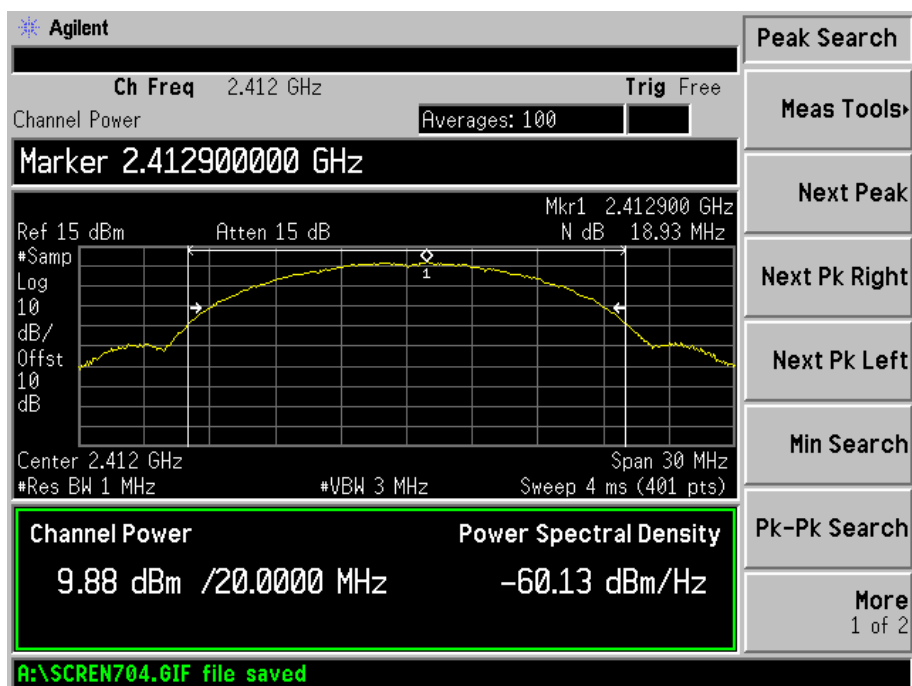


High Channel:

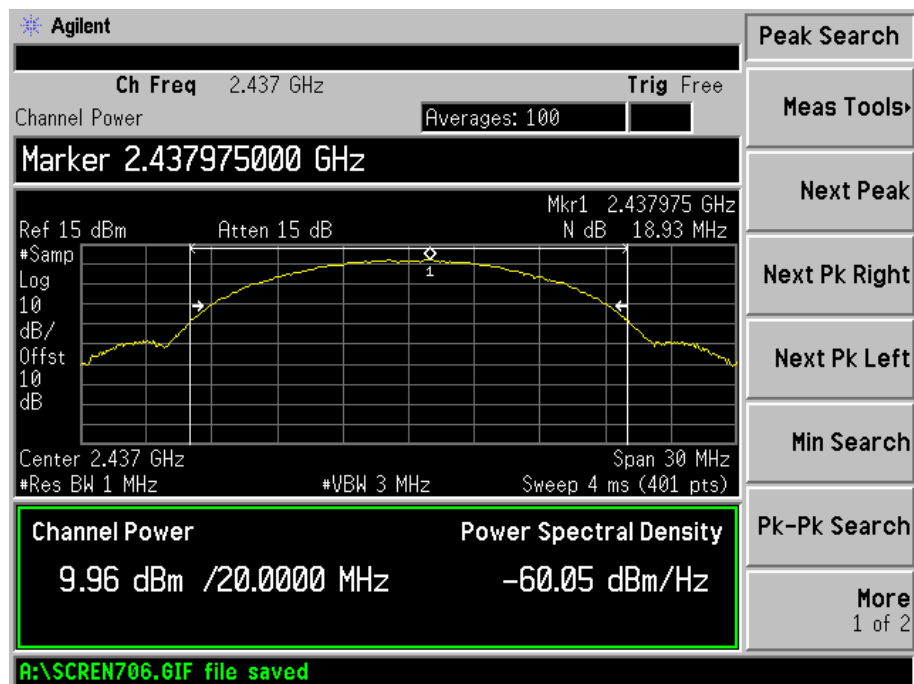


For 802.11b_chain B_11M rate

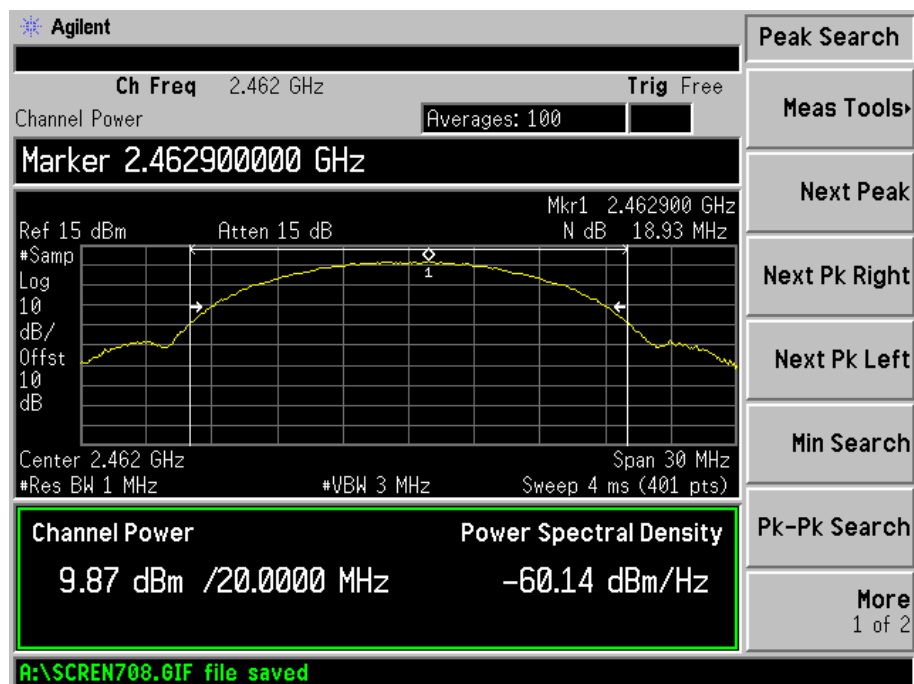
Low Channel:



Middle Channel:

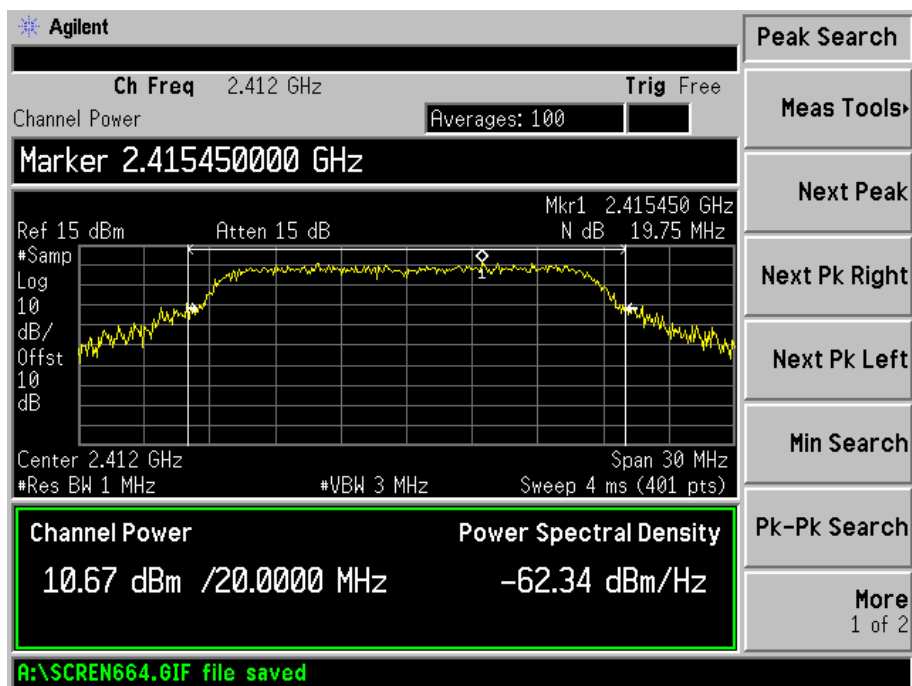


High Channel:

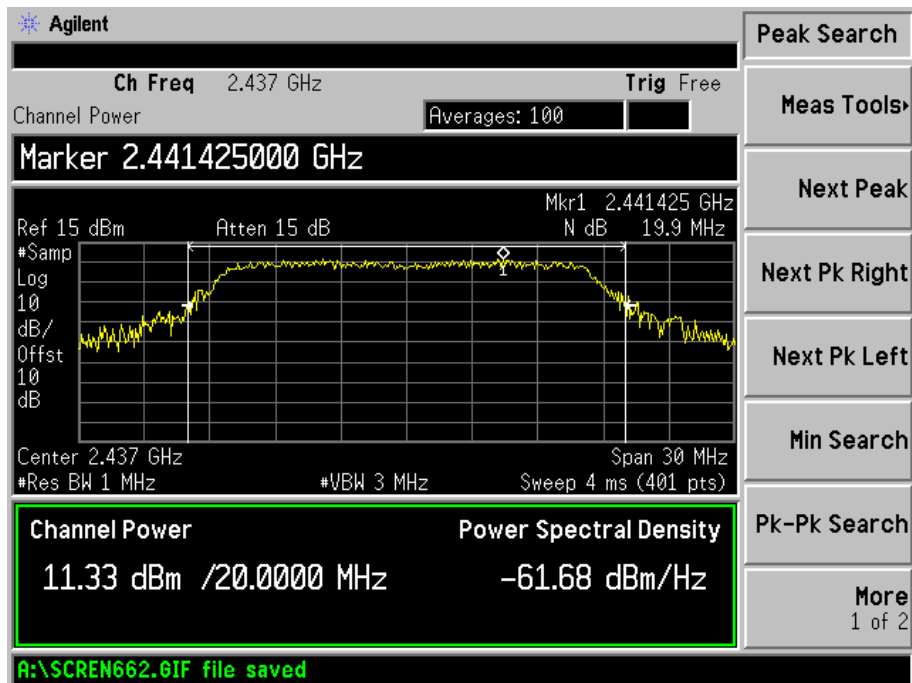


For 802.11g_chain A_6M rate

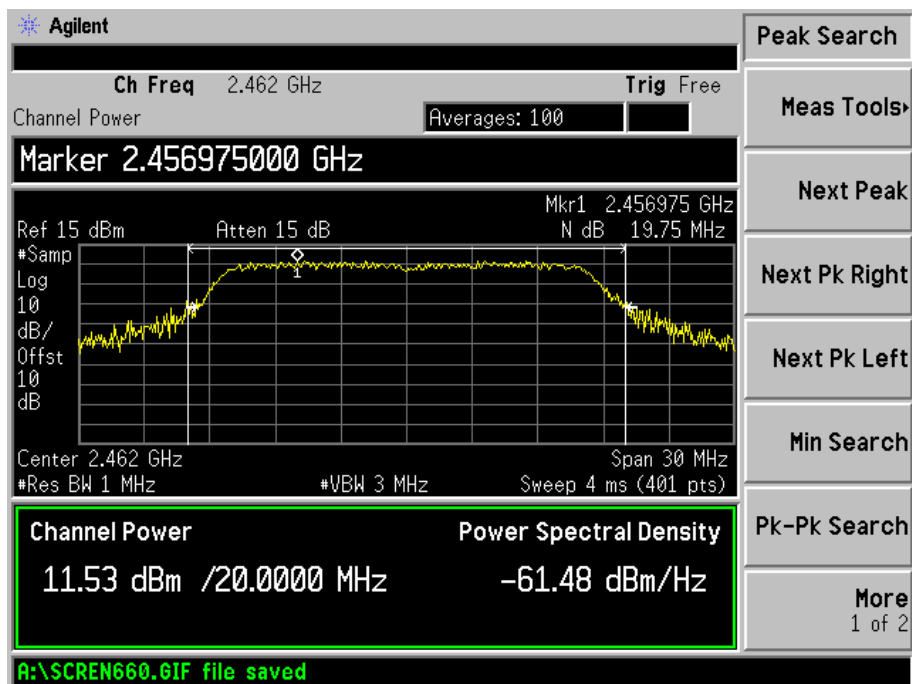
Low Channel:



Middle Channel:

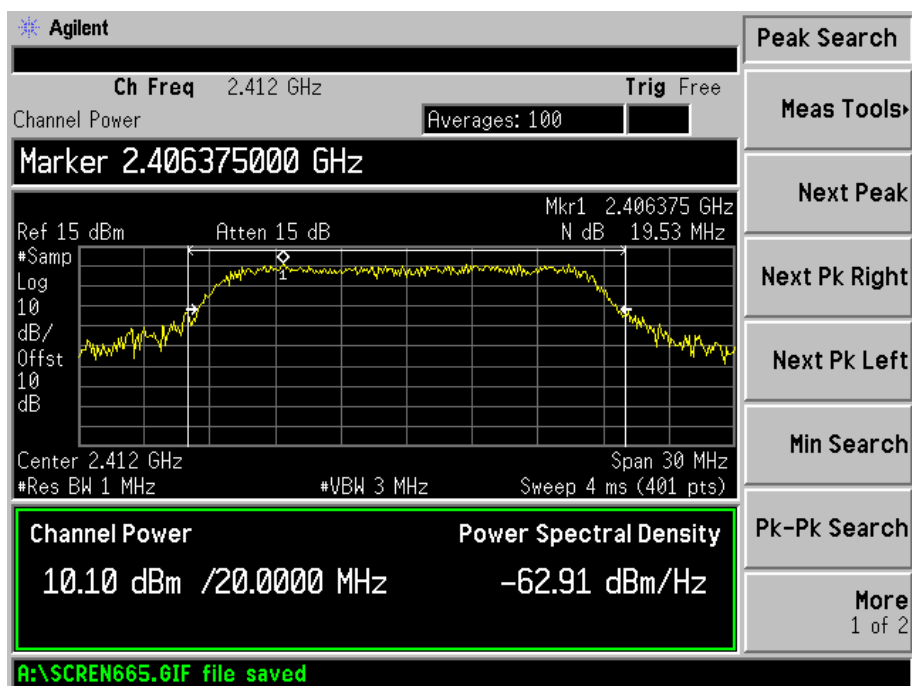


High Channel:

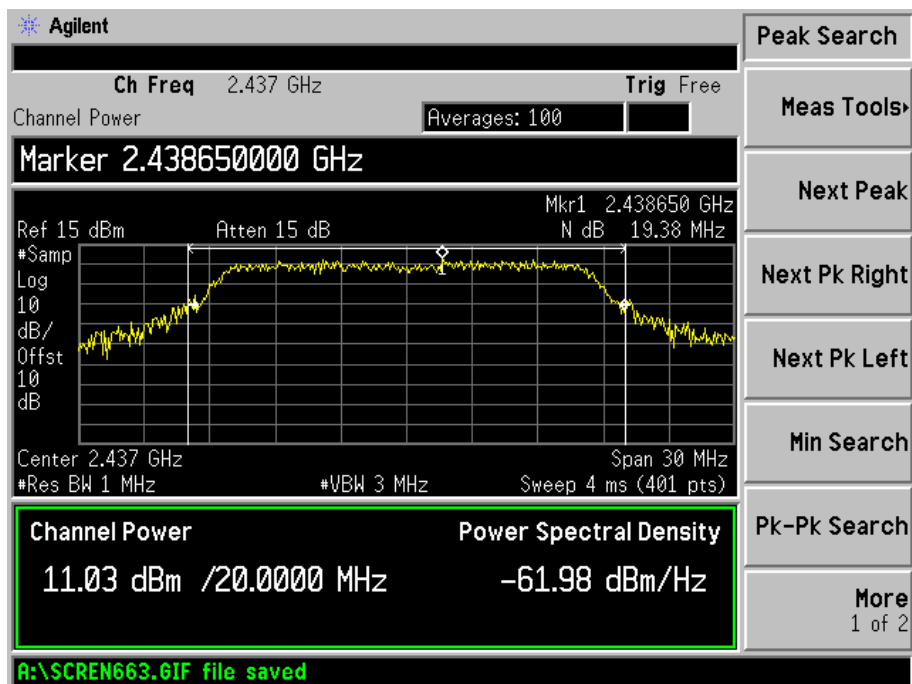


For 802.11g_chain A_54M rate

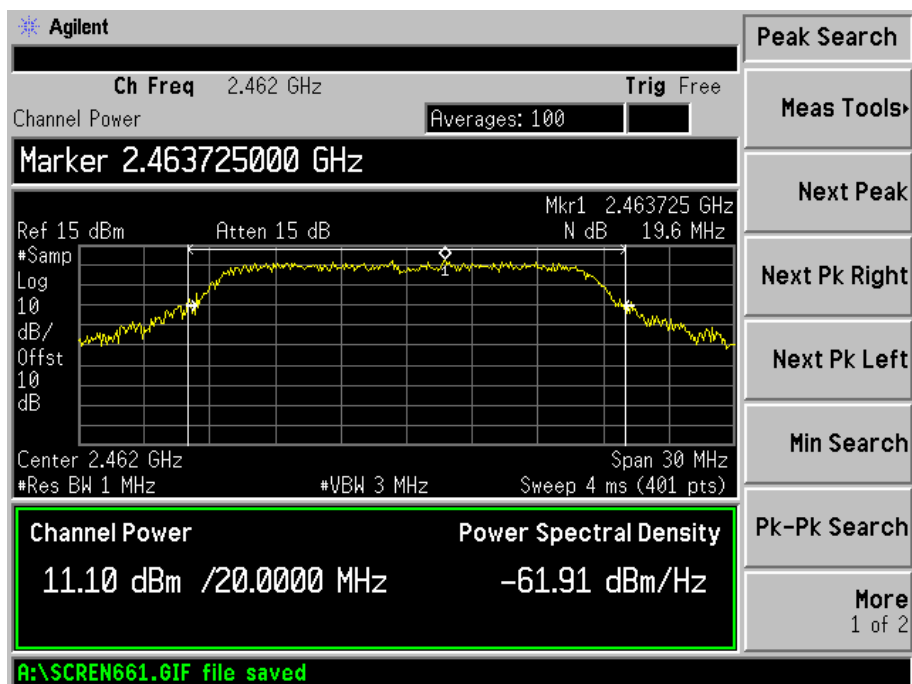
Low Channel:



Middle Channel:

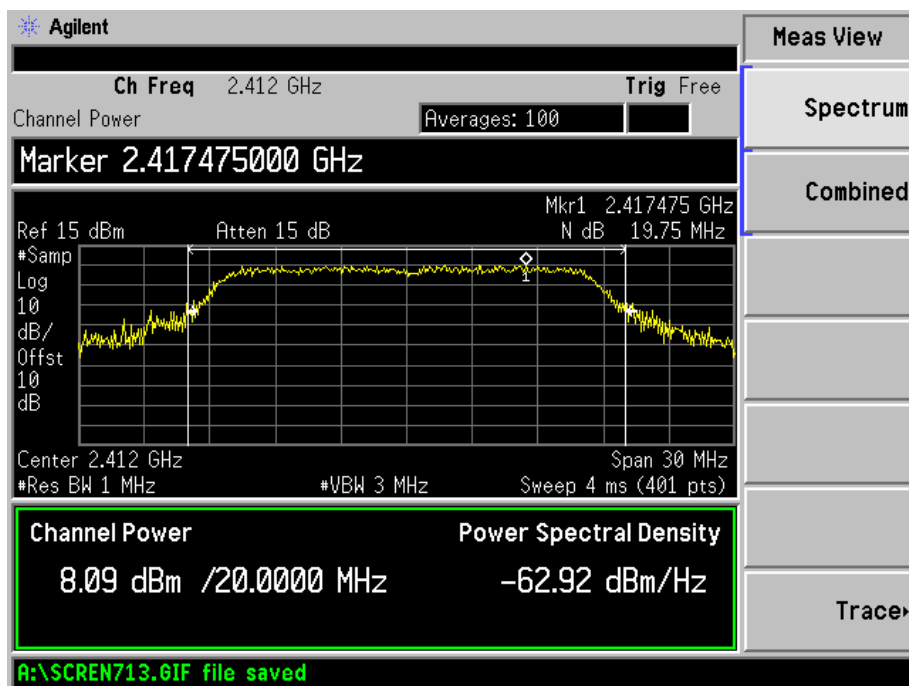


High Channel:

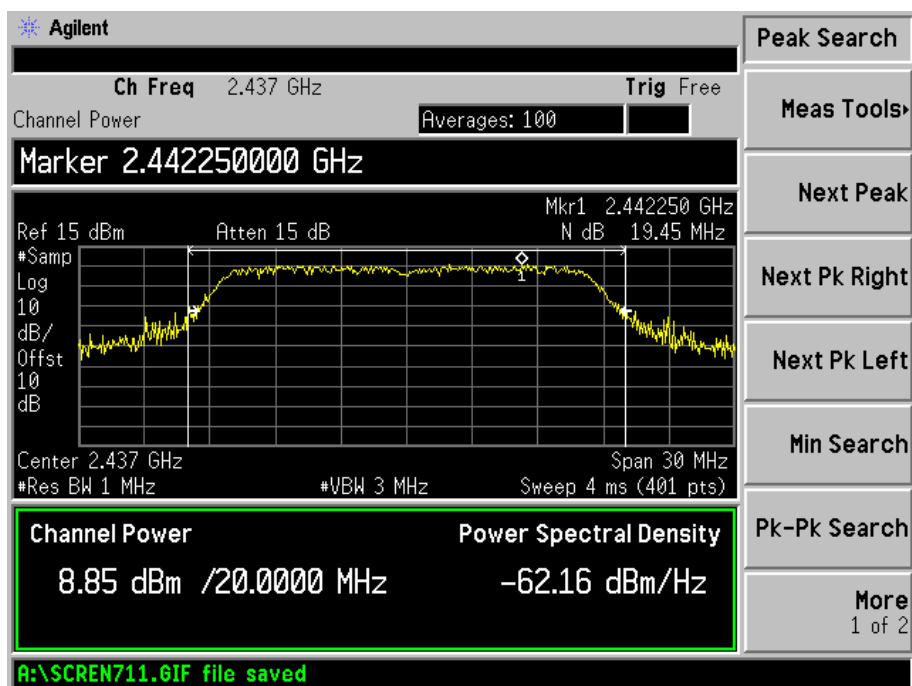


For 802.11g_chain B_6M rate

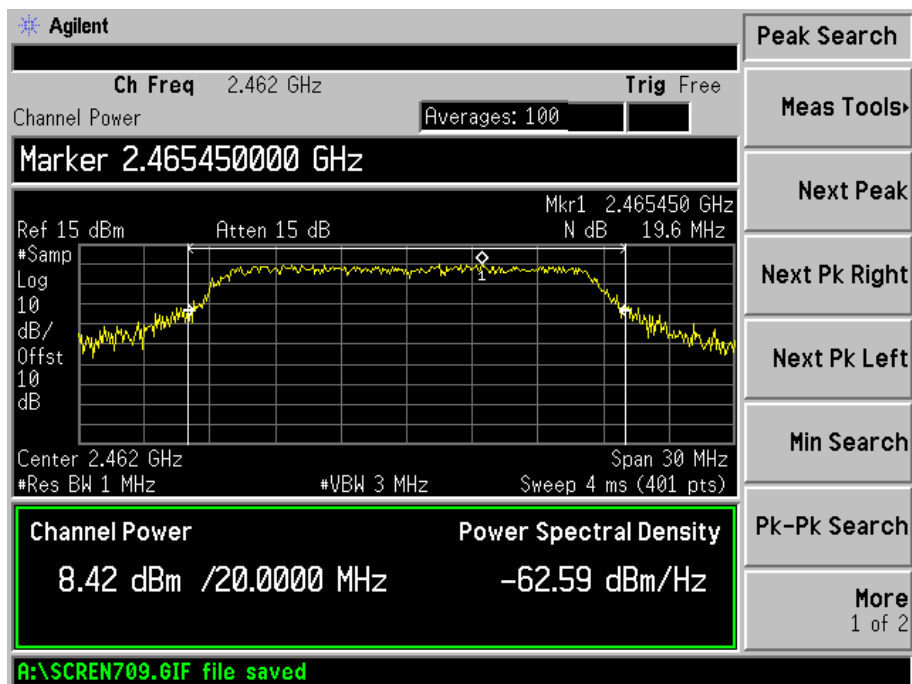
Low Channel:



Middle Channel:

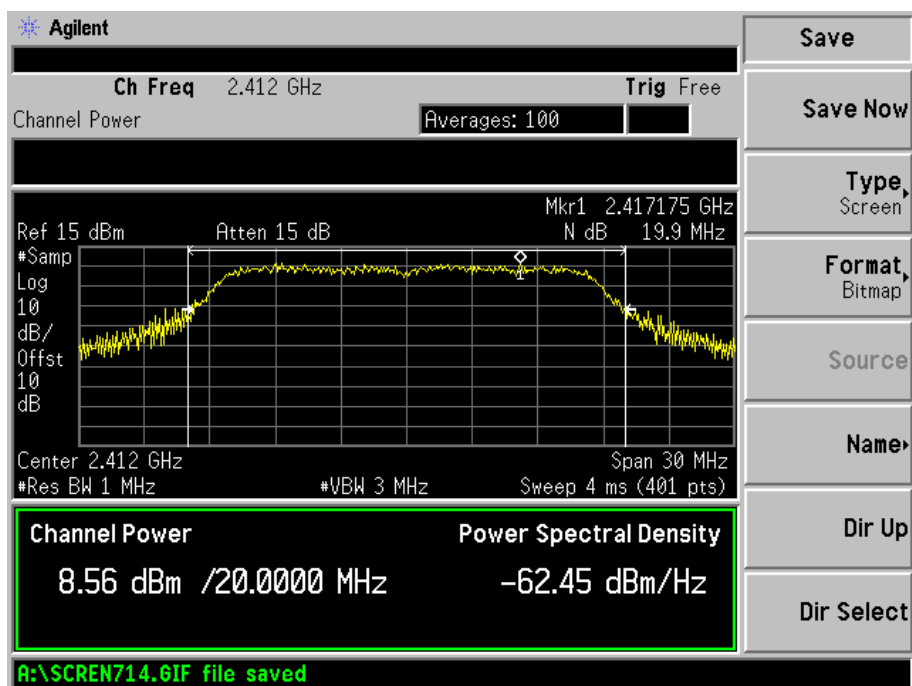


High Channel:

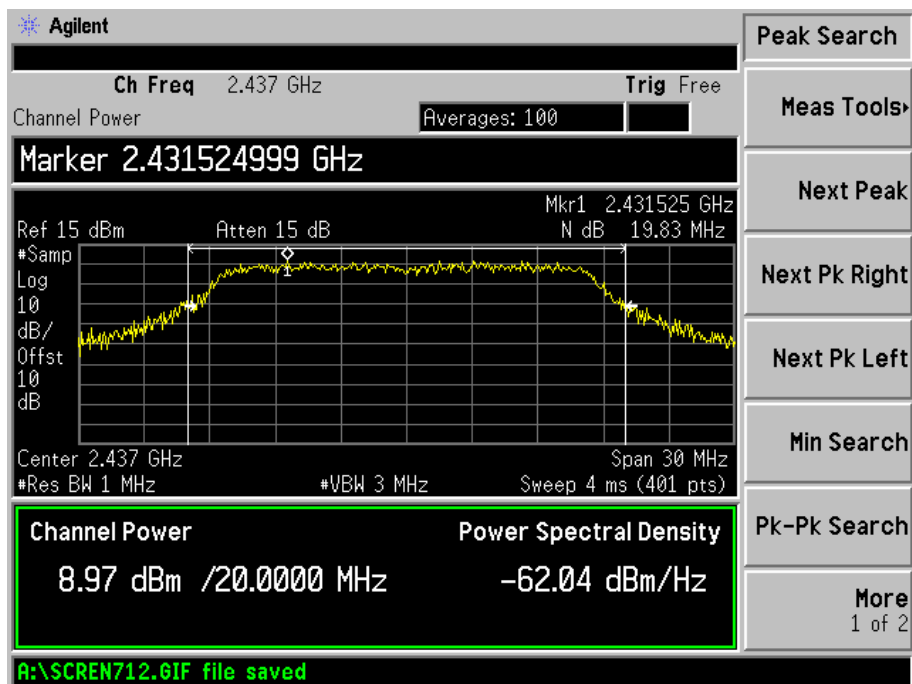


For 802.11g_chain B_54M rate

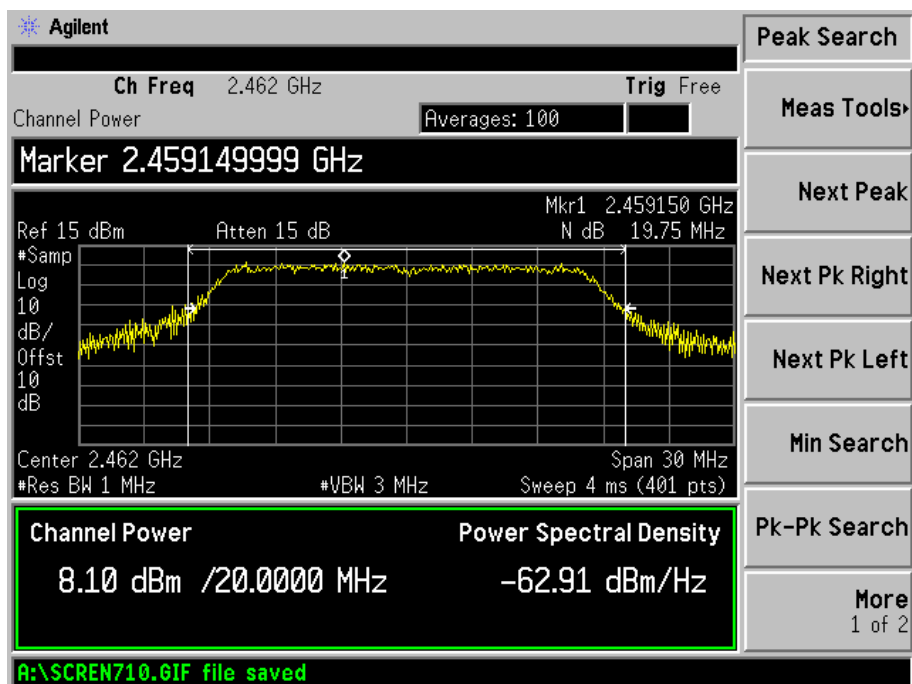
Low Channel:



Middle Channel:

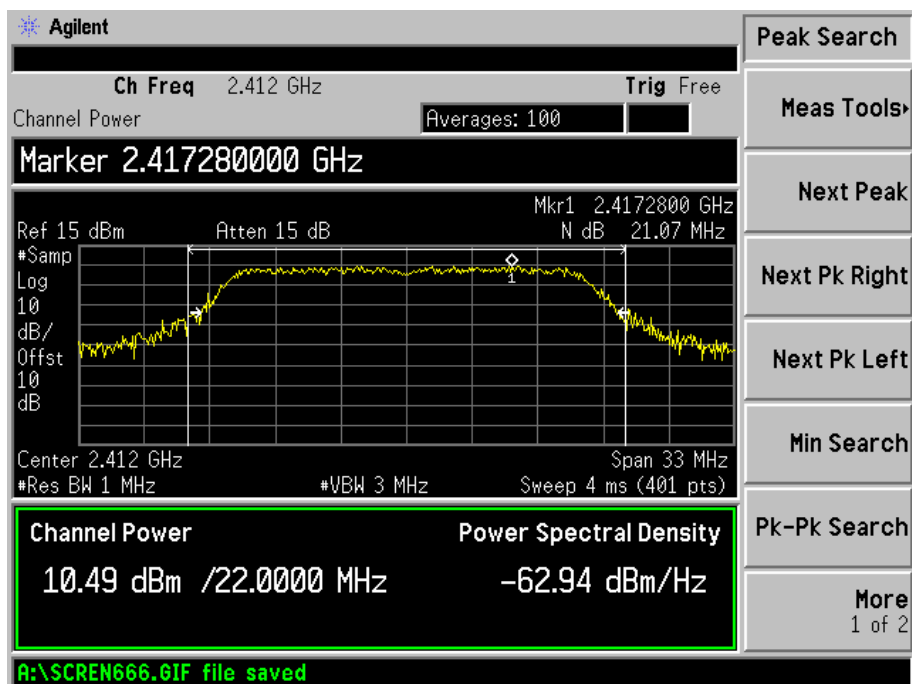


High Channel:

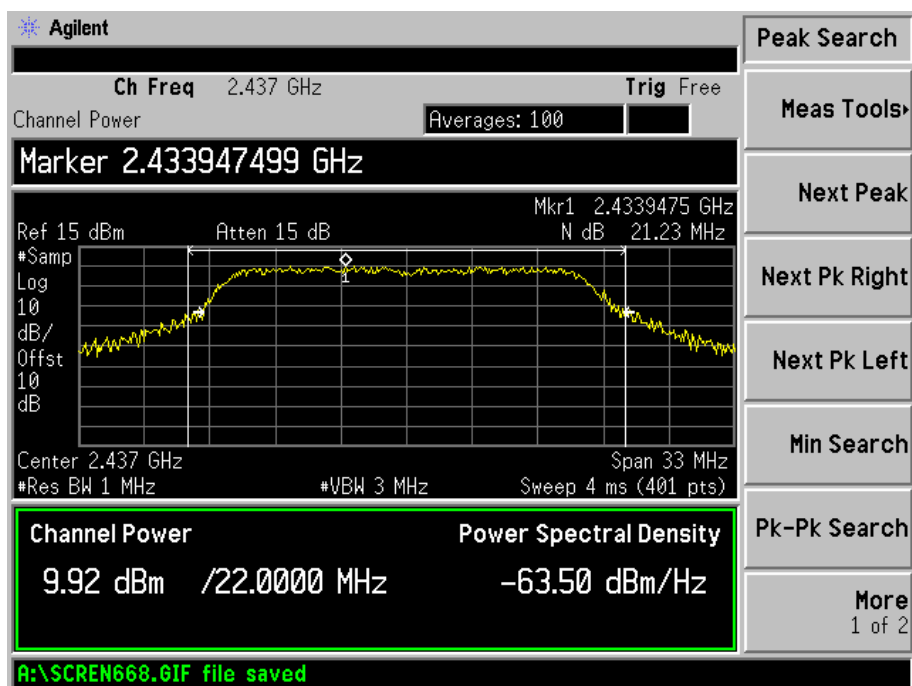


For 802.11n/HT20_chain A_MCS0

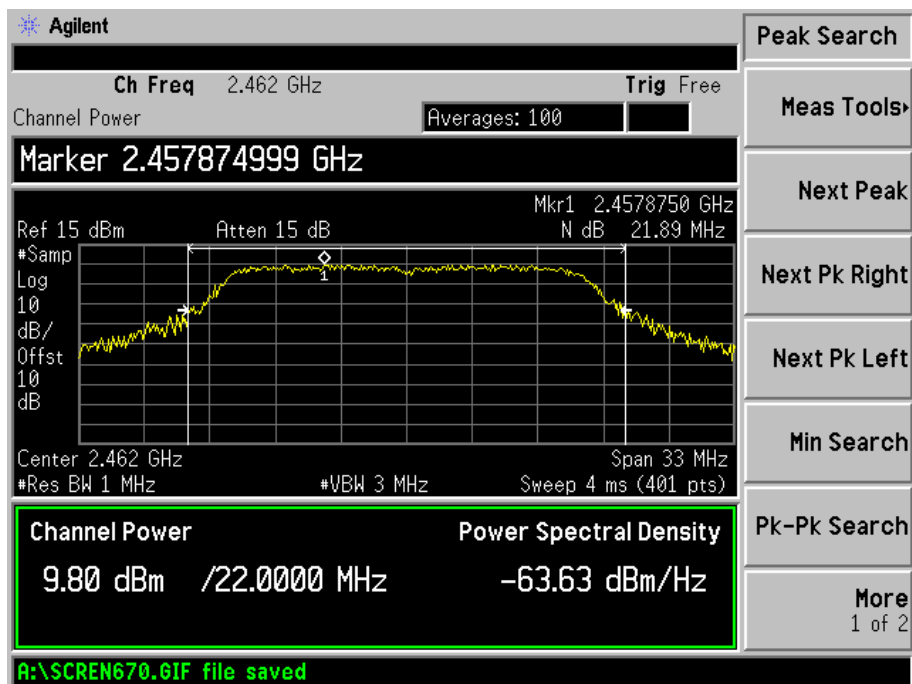
Low Channel:



Middle Channel:

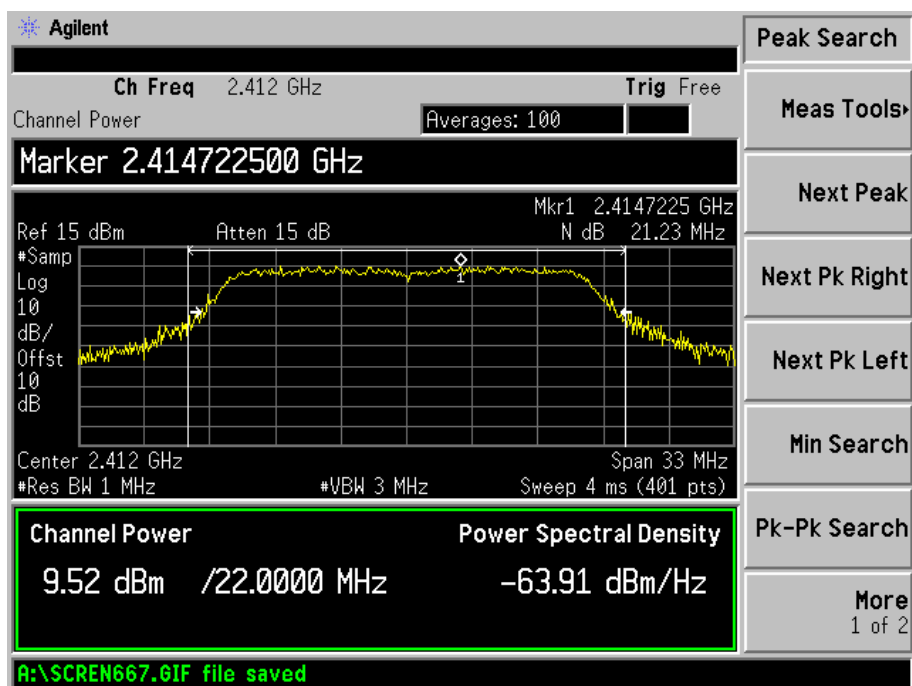


High Channel:

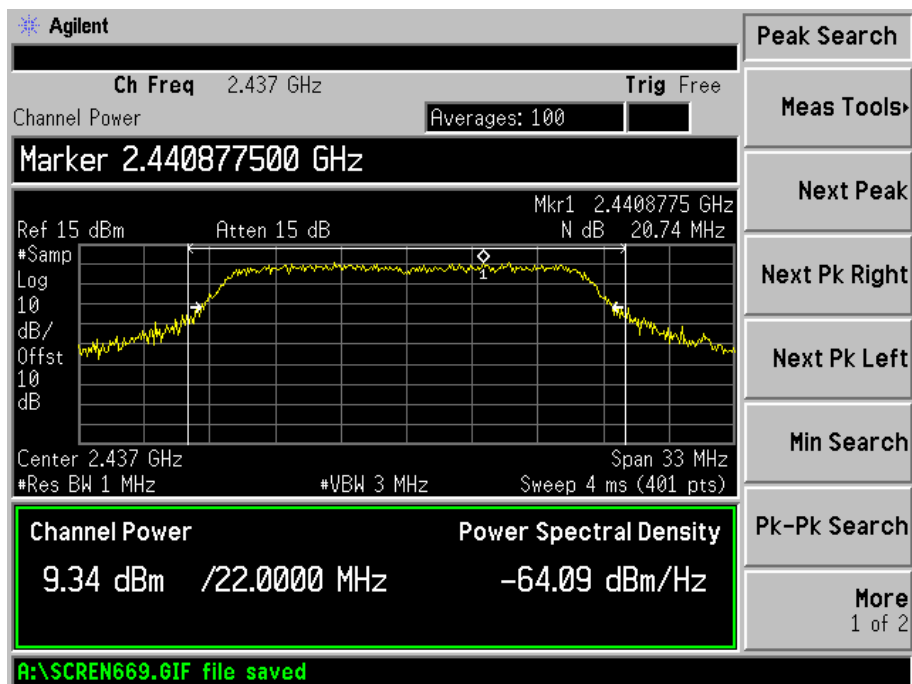


For 802.11n/HT20_chain A_MCS15

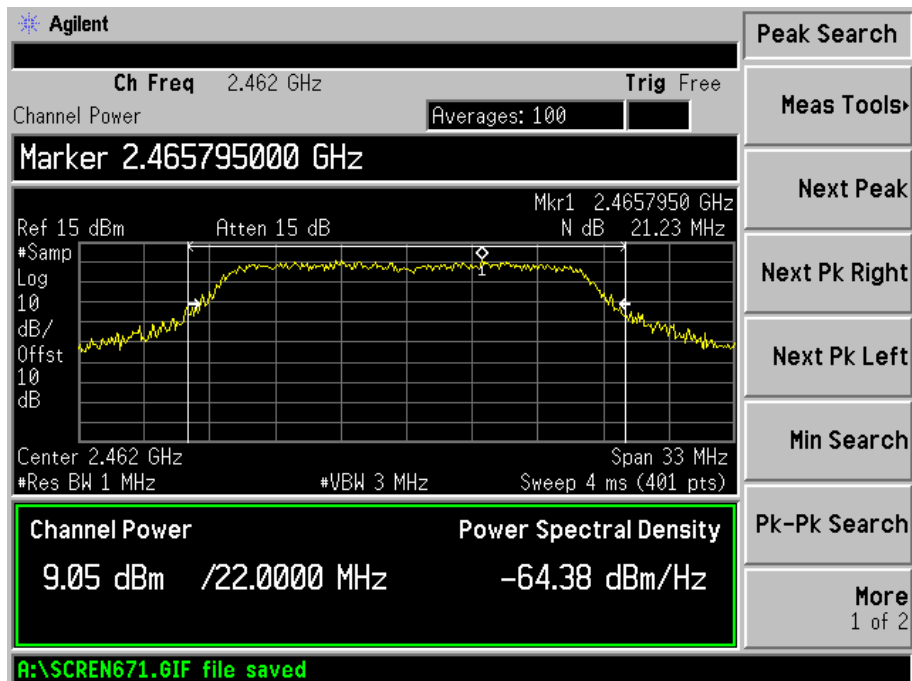
Low Channel:



Middle Channel:

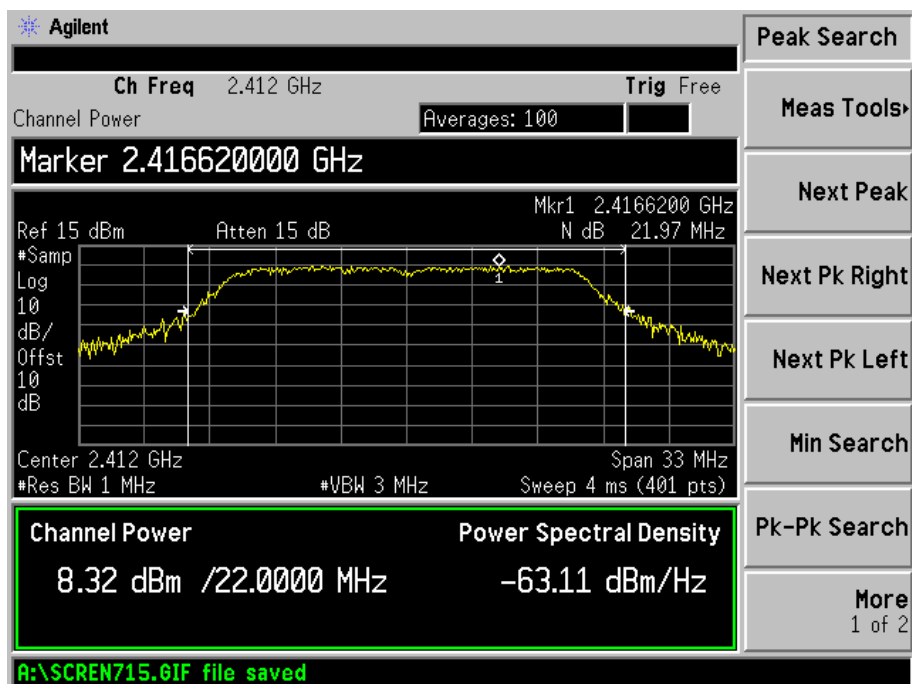


High Channel:

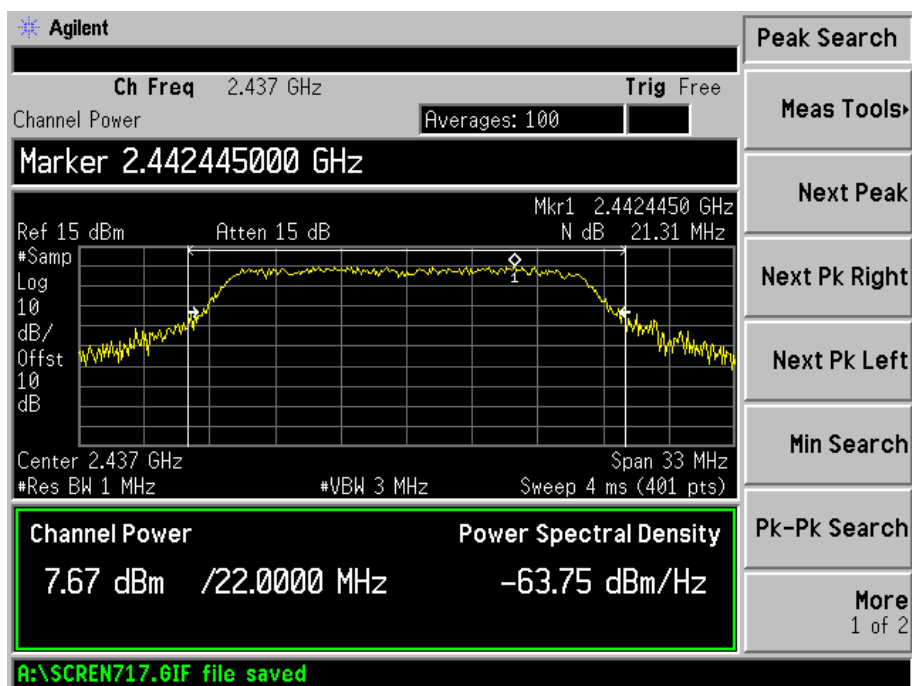


For 802.11n/HT20_chain B_MCS0

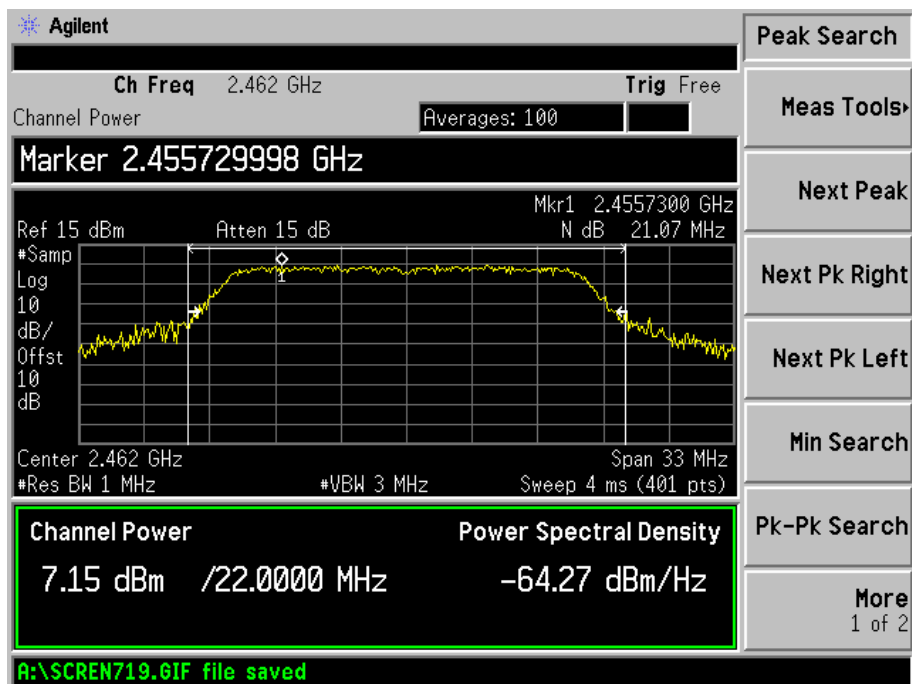
Low Channel:



Middle Channel:

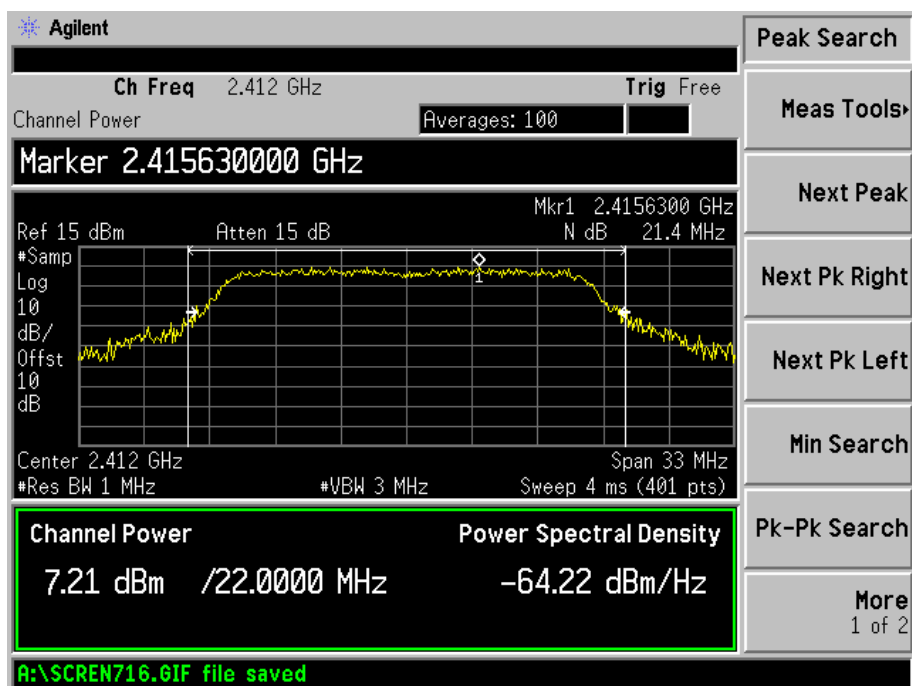


High Channel:

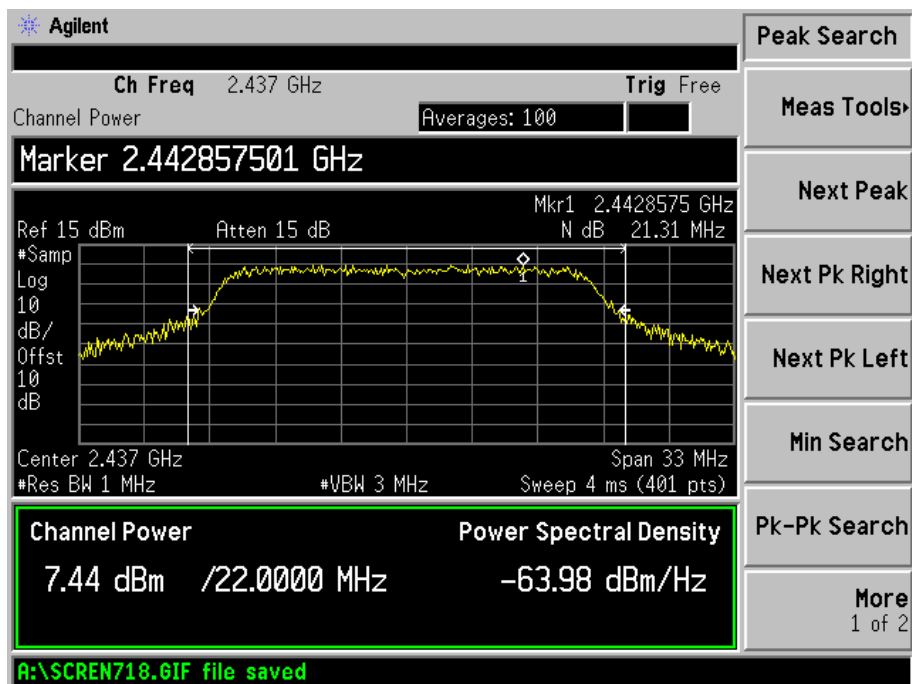


For 802.11n/HT20_chain B_MCS15

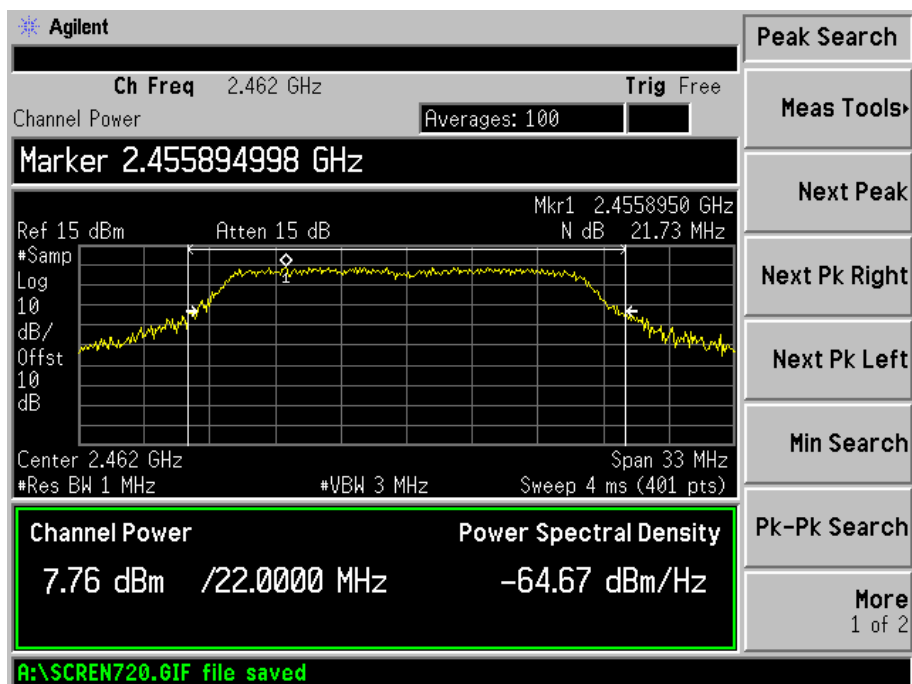
Low Channel:



Middle Channel:

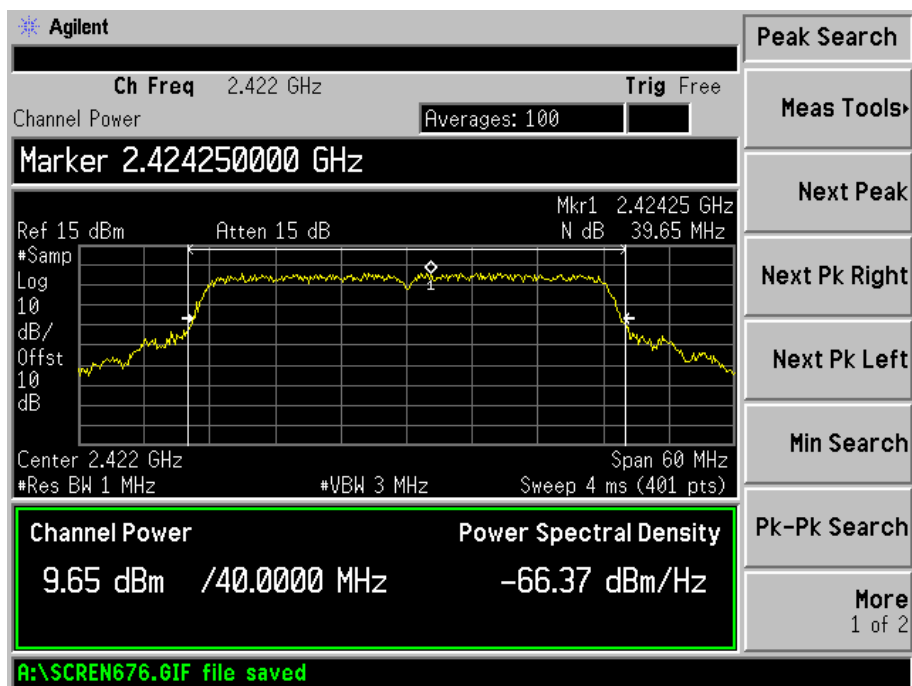


High Channel:

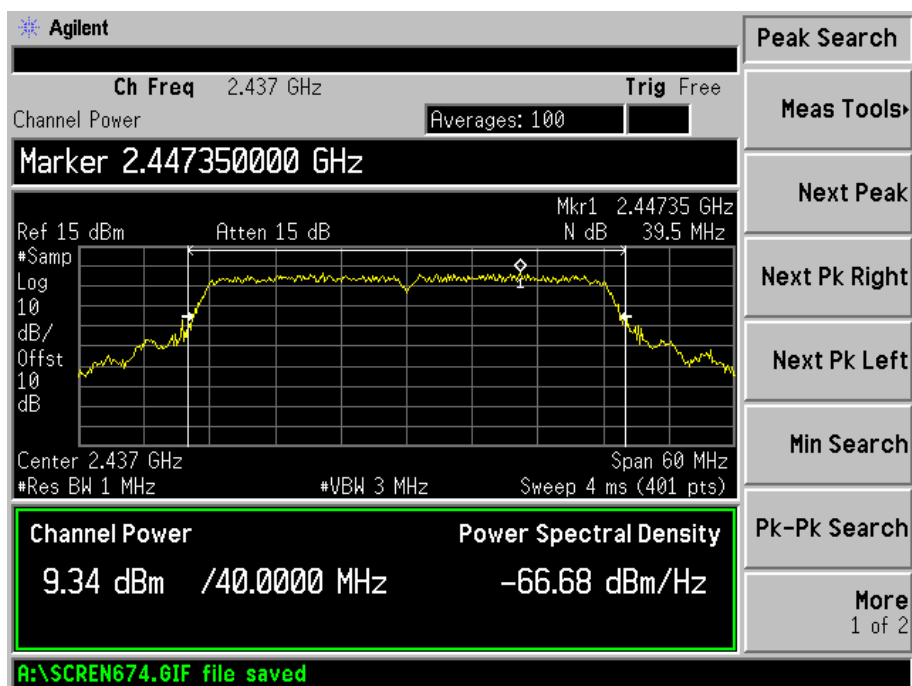


For 802.11n/HT40_chain A_MCS0

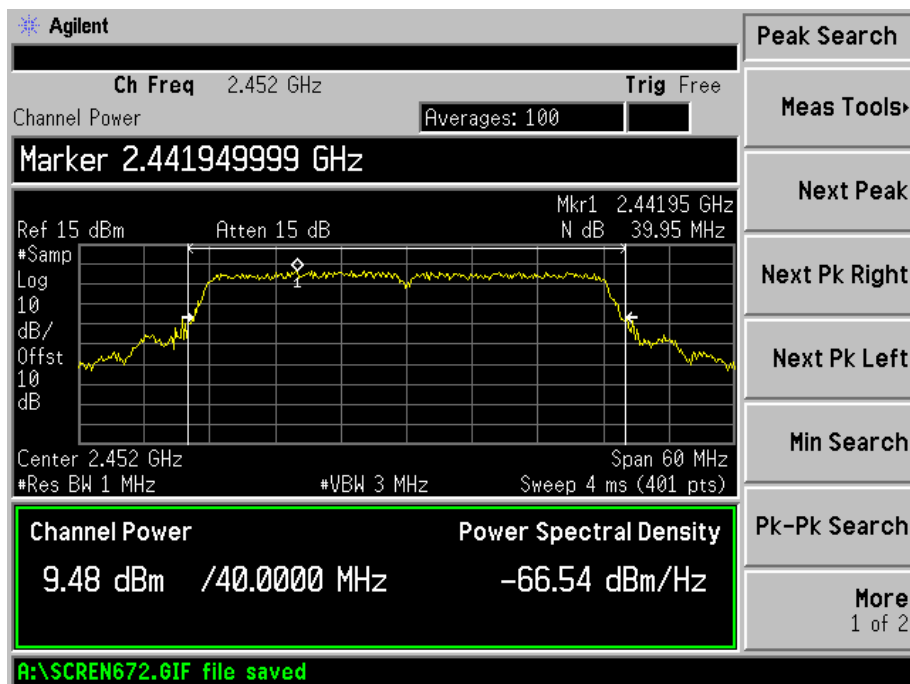
Low Channel:



Middle Channel:

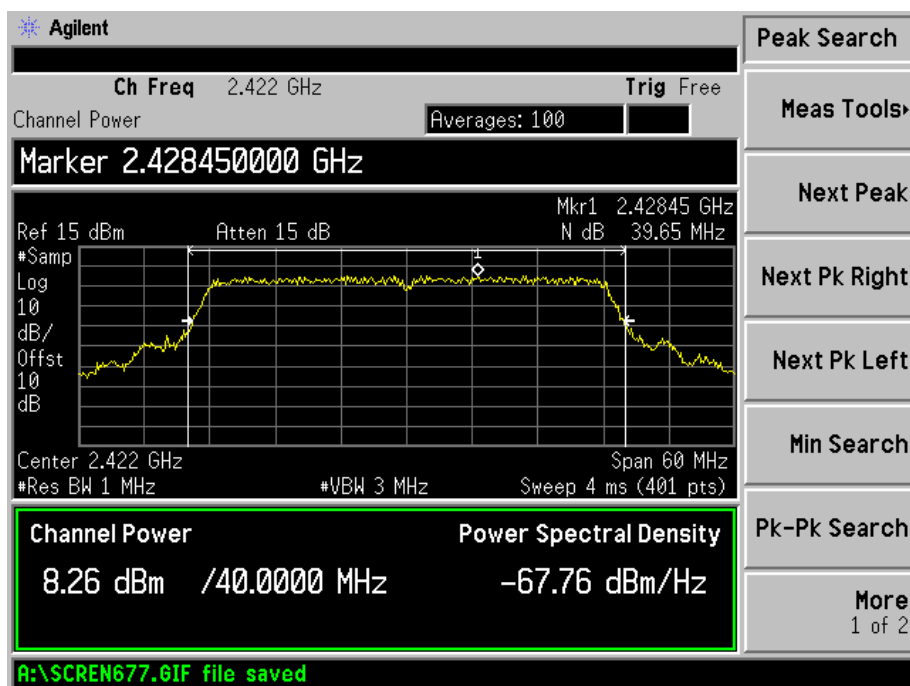


High Channel:

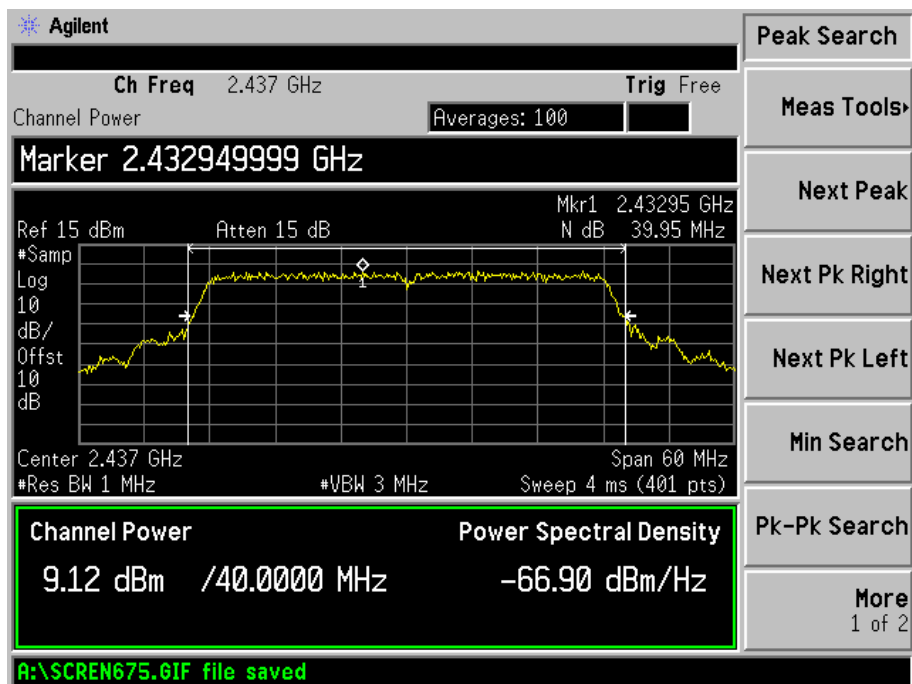


For 802.11n/HT40_chain A_MCS15

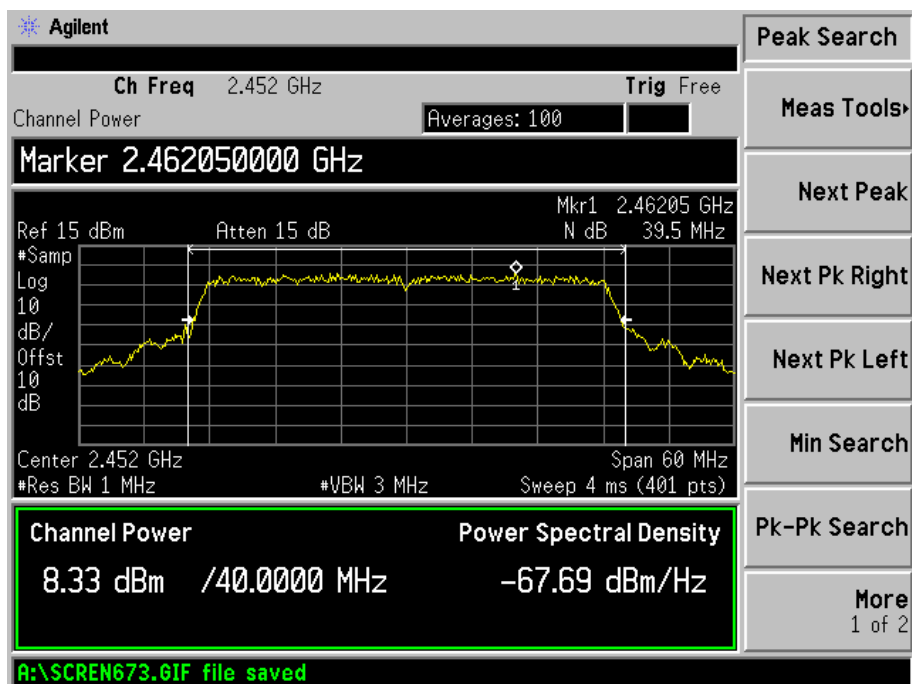
Low Channel:



Middle Channel:

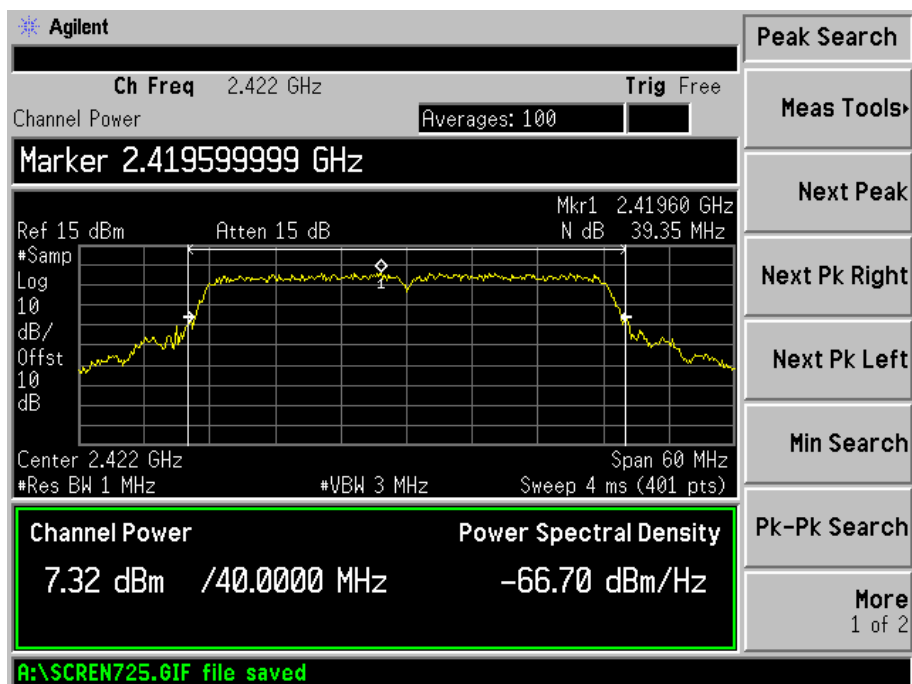


High Channel:

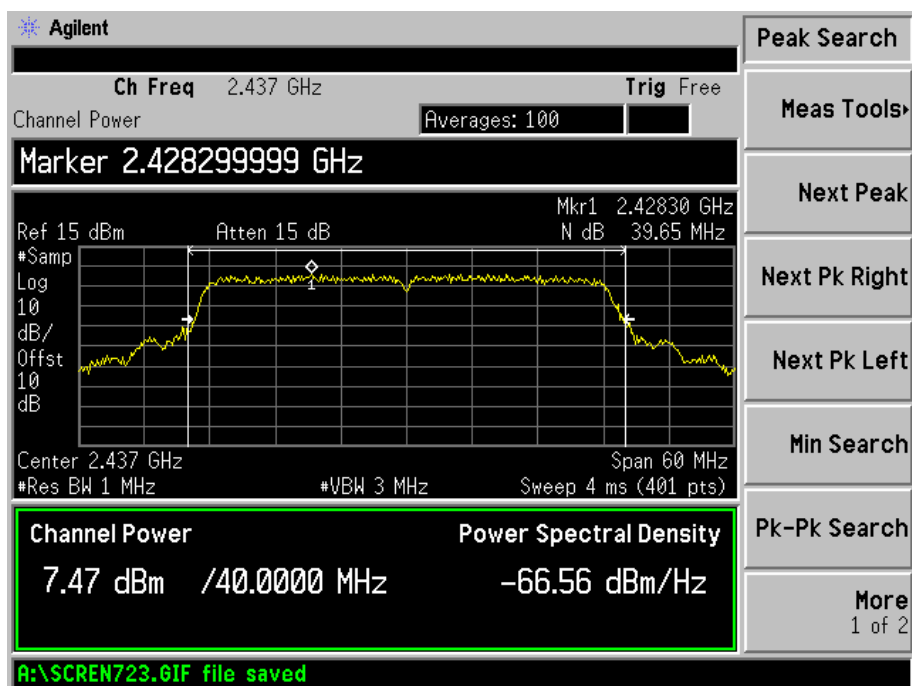


For 802.11n/HT40_chain B_MCS0

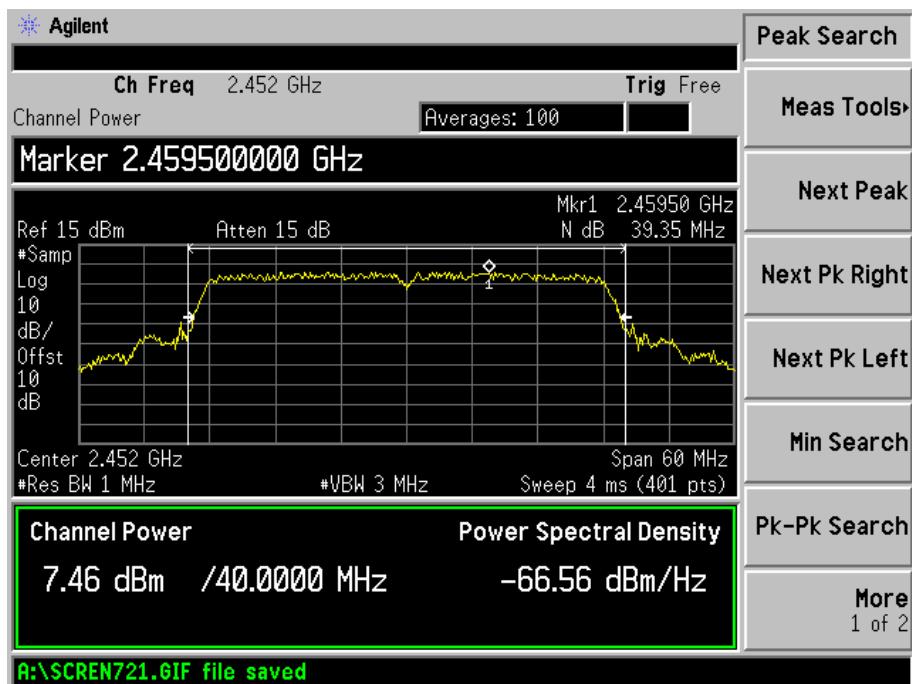
Low Channel:



Middle Channel:

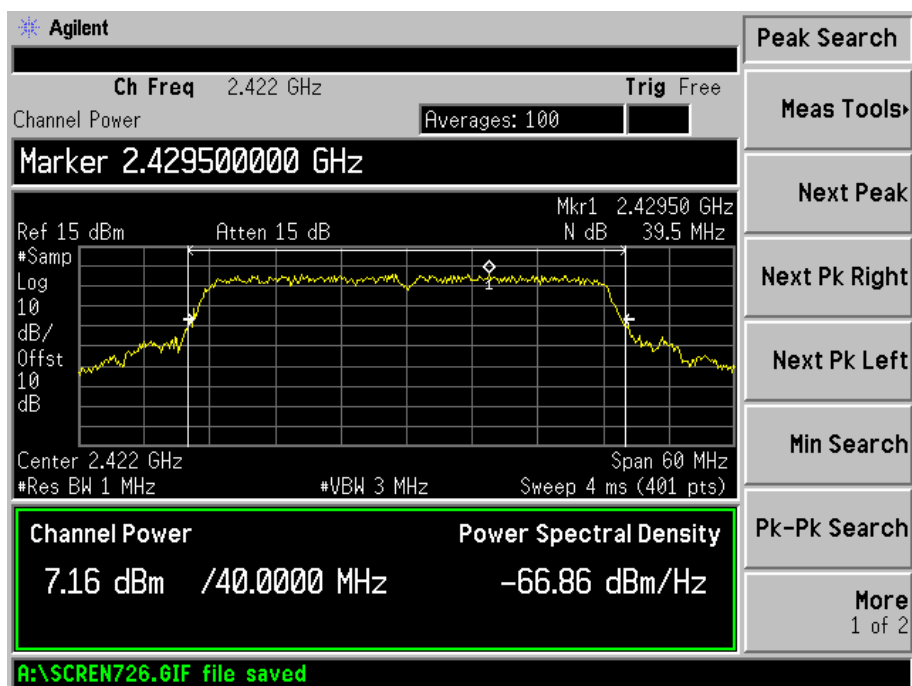


High Channel:

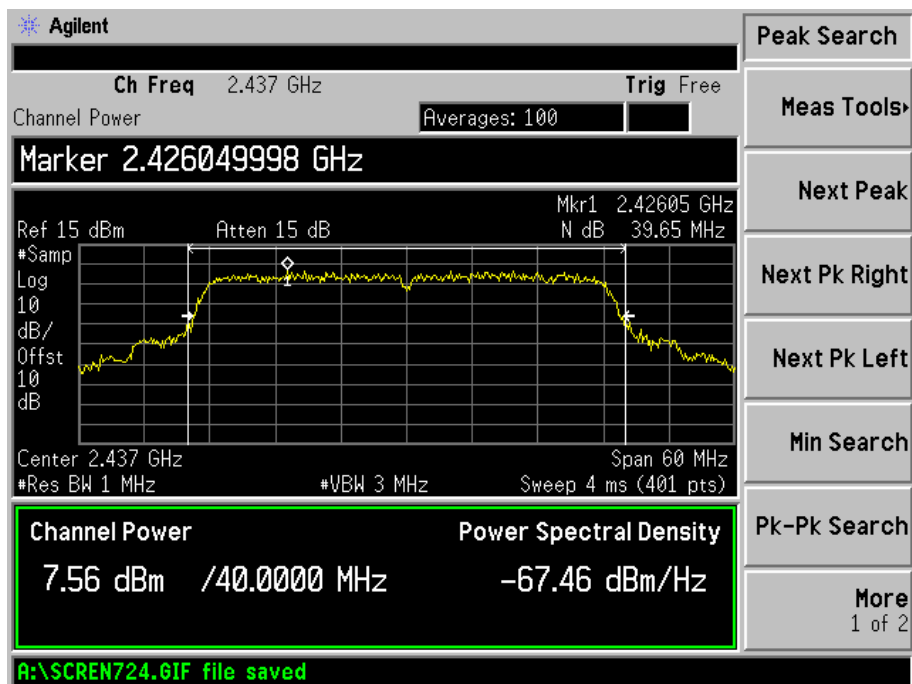


For 802.11n/HT40_chain B_MCS15

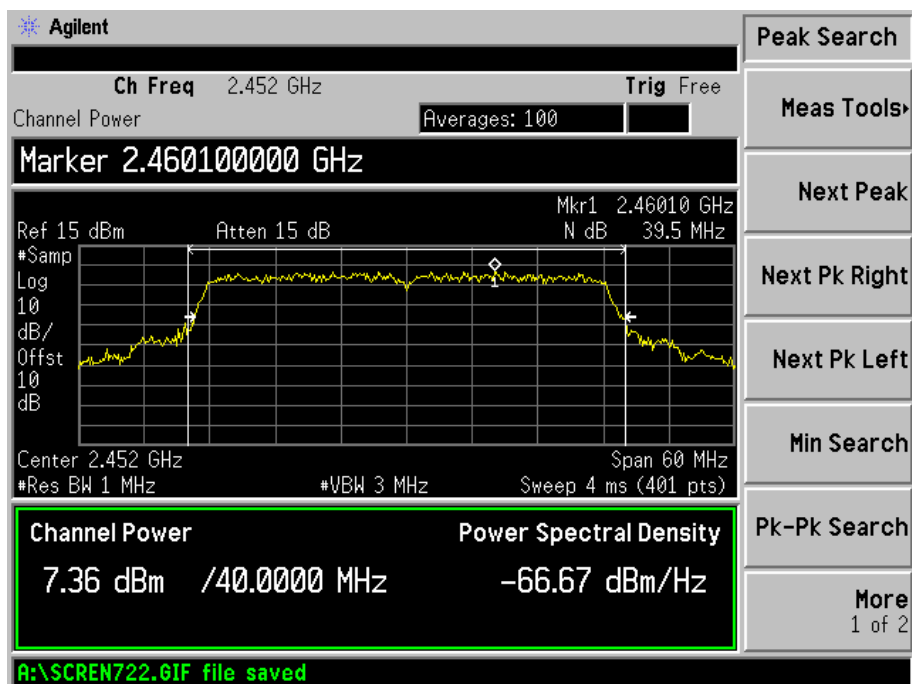
Low Channel:



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

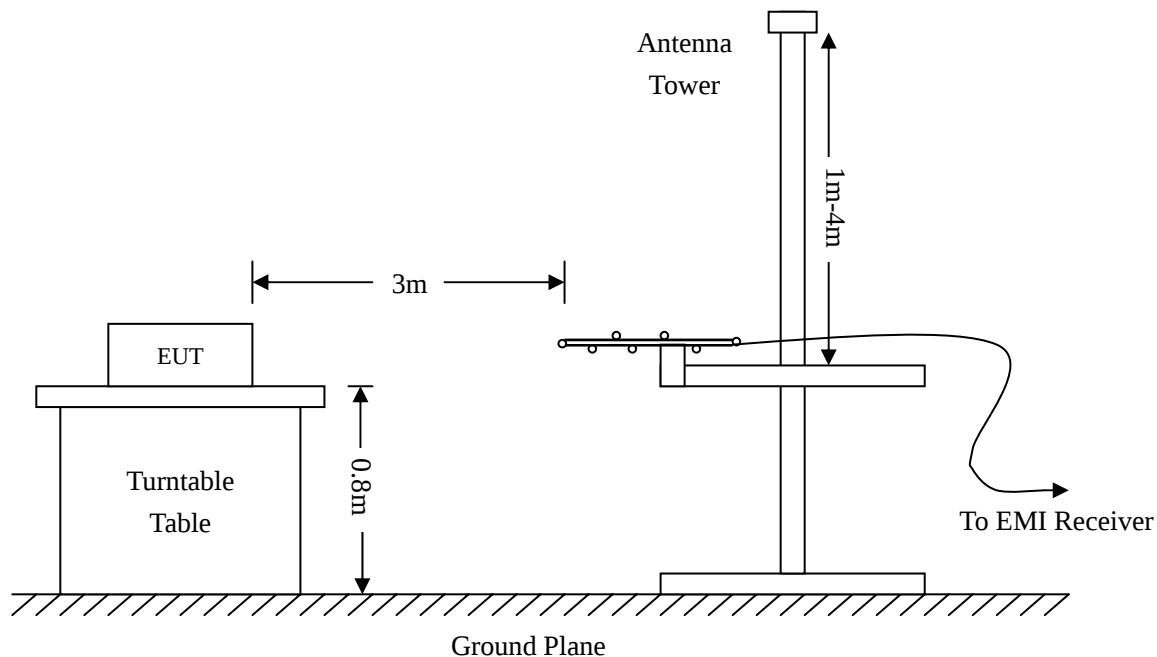
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2011-12-20	2012-12-19
EMI Test Receiver	R&S	ESVB	825471/005	2011-12-20	2012-12-19
Positioning Controller	C&C	CC-C-1F	N/A	2011-12-20	2012-12-19
RF Switch	EM	EMSW18	SW060023	2011-12-20	2012-12-19
Pre-amplifier	Agilent	8447F	3113A06717	2011-12-20	2012-12-19
Pre-amplifier	Compliance Direction	PAP-0118	24002	2011-12-20	2012-12-19
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2011-01-09	2012-01-08
Horn Antenna	ETS	3117	00086197	2011-01-09	2012-01-08

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:	42%
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:

-2.7 dB μ V at 4824.0MHz in the Vertical polarization, Transmitting 802.11b Low 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.

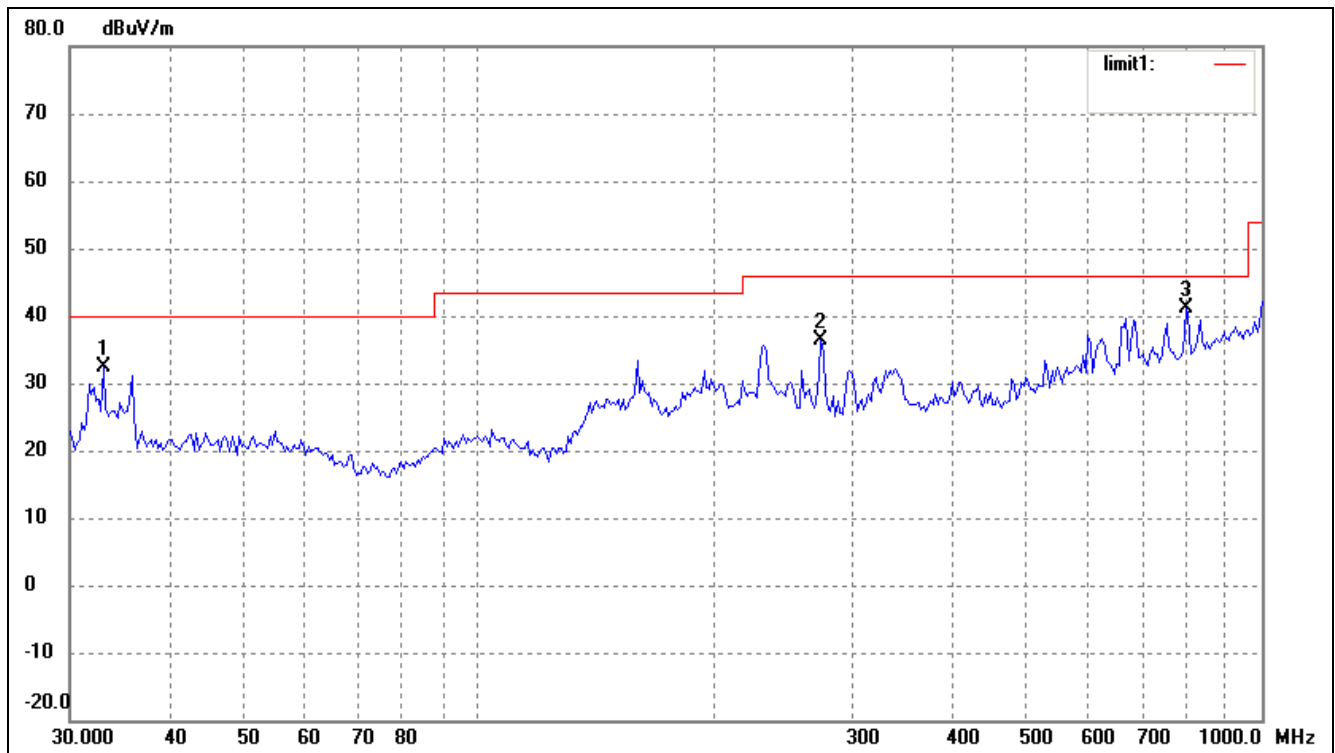
Test Result/Plots:

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11b) Low Channel

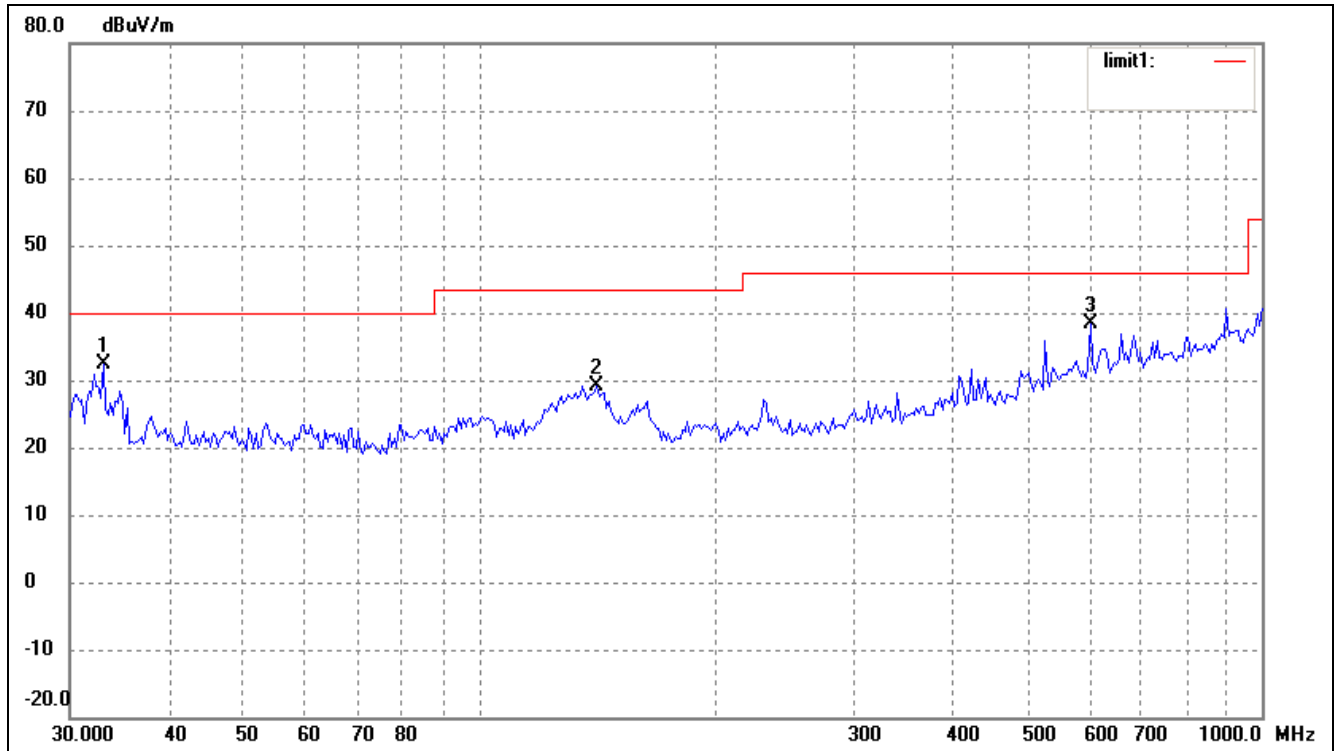
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	25.70	6.77	32.47	40.00	-7.53	300	100	peak
2	273.2341	26.96	9.33	36.29	46.00	-9.71	24	100	peak
3	798.9797	22.02	18.99	41.01	46.00	-4.99	17	100	peak

Vertical



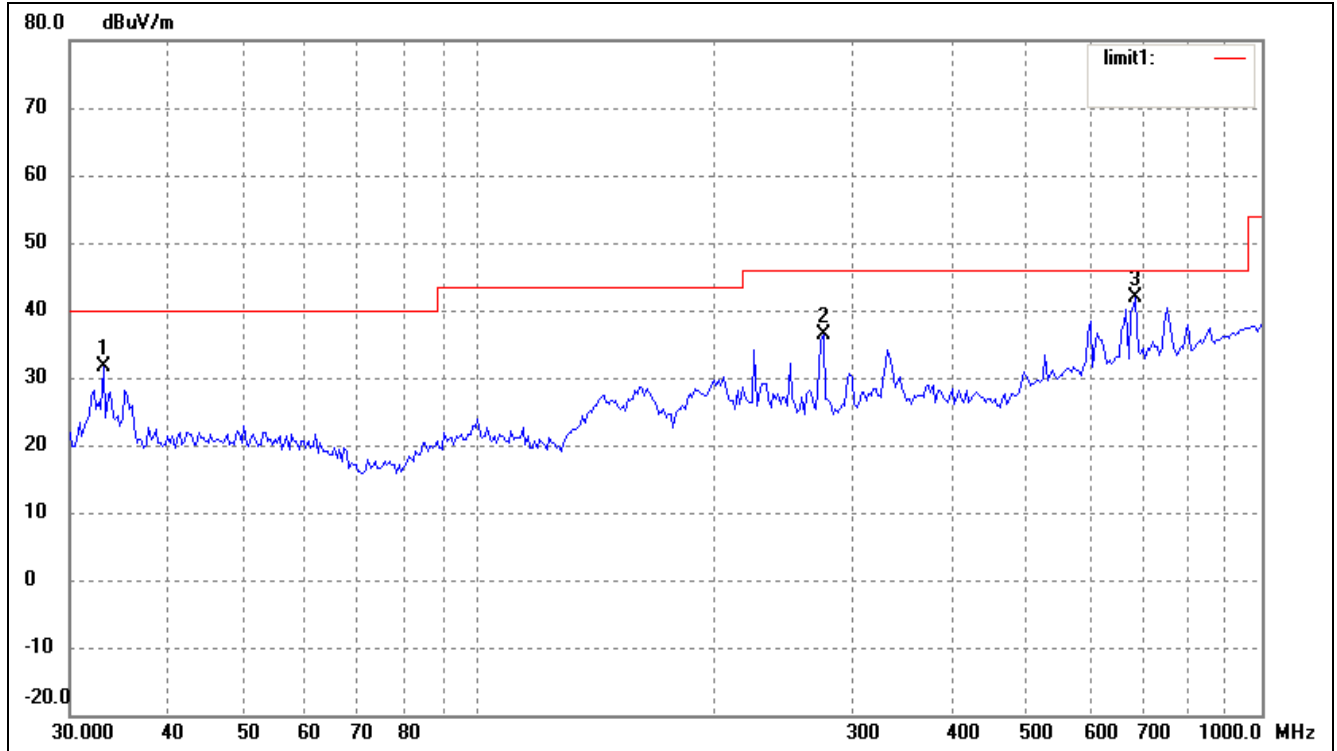
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	25.53	6.77	32.30	40.00	-7.70	206	100	peak
2	141.3298	25.23	3.97	29.20	43.50	-14.30	77	100	peak
3	603.5392	21.72	16.70	38.42	46.00	-7.58	21	100	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11b) Middle Channel

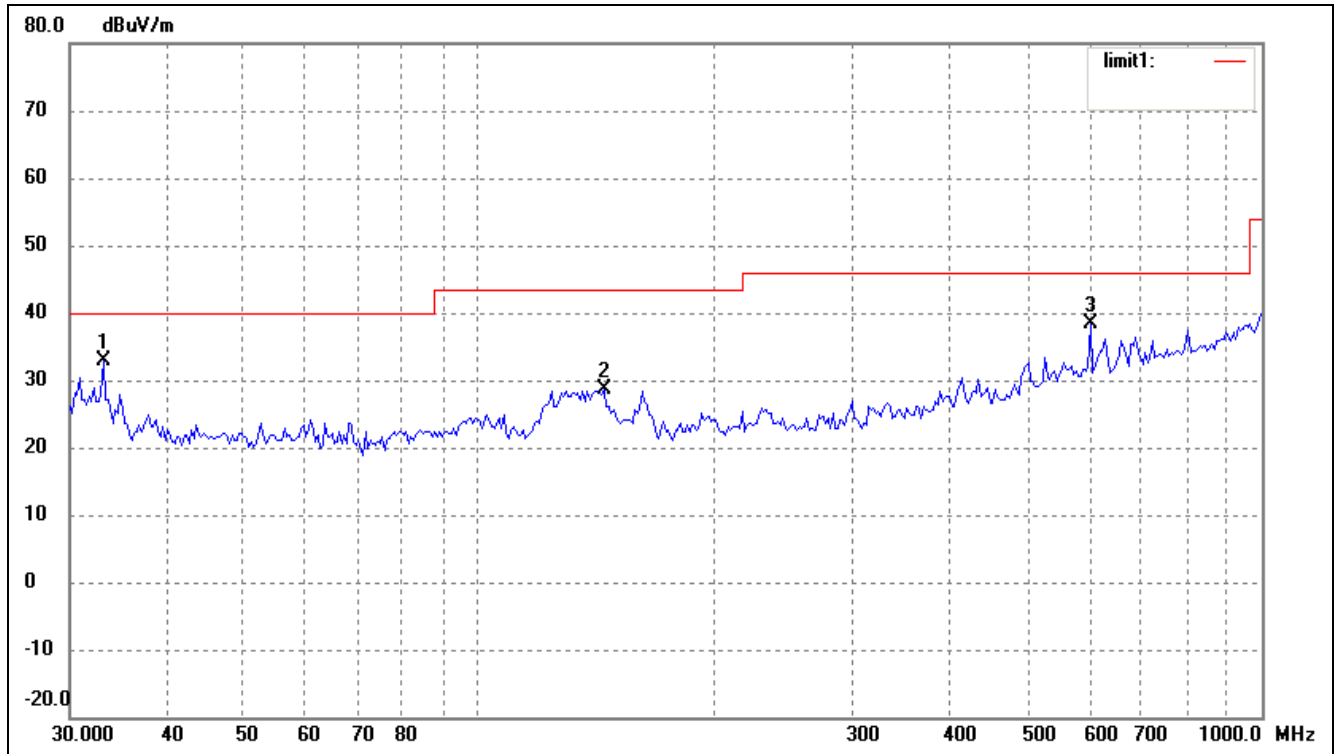
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	24.83	6.77	31.60	40.00	-8.40	305	100	peak
2	275.1570	27.05	9.38	36.43	46.00	-9.57	14	100	peak
3	689.5644	24.45	17.41	41.86	46.00	-4.14	6	100	peak

Vertical



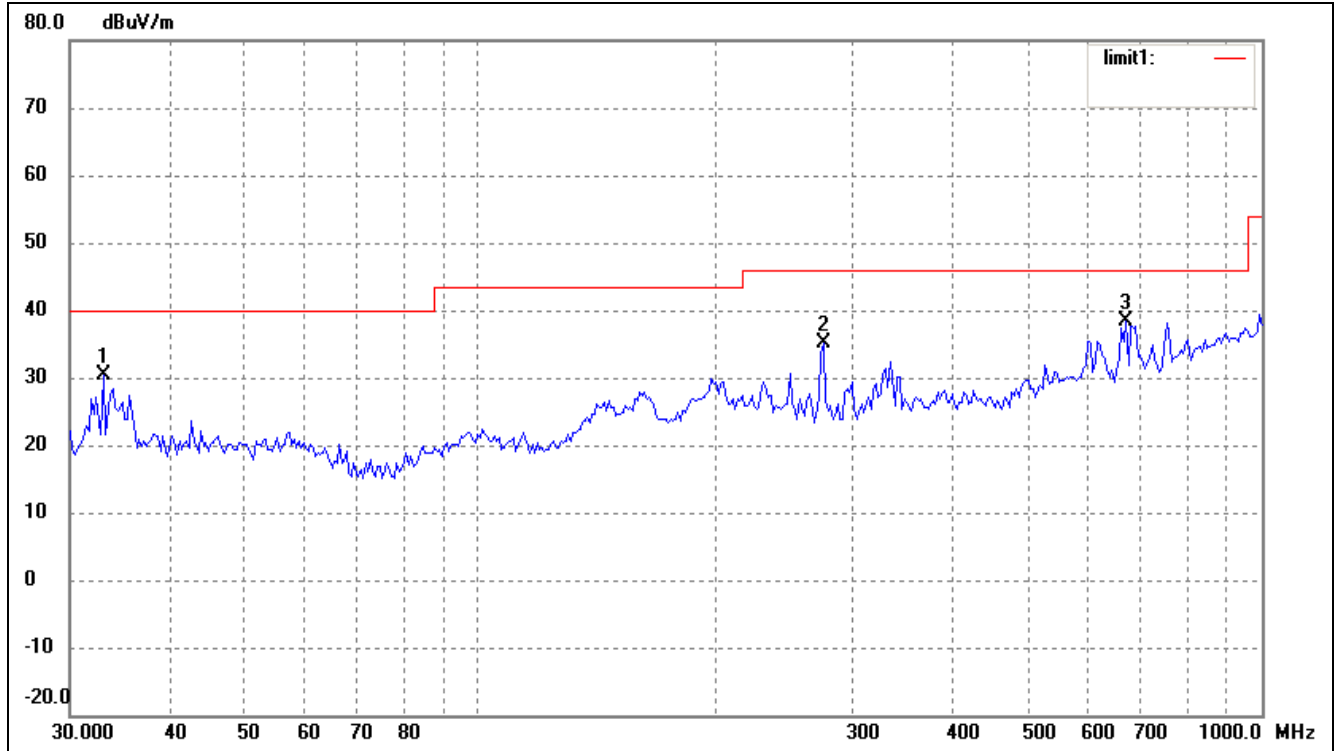
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	33.0950	26.09	6.77	32.86	40.00	-7.14	17	100	peak
2	144.3348	24.72	4.01	28.73	43.50	-14.77	20	100	peak
3	603.5392	21.78	16.70	38.48	46.00	-7.52	0	100	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11b) High Channel

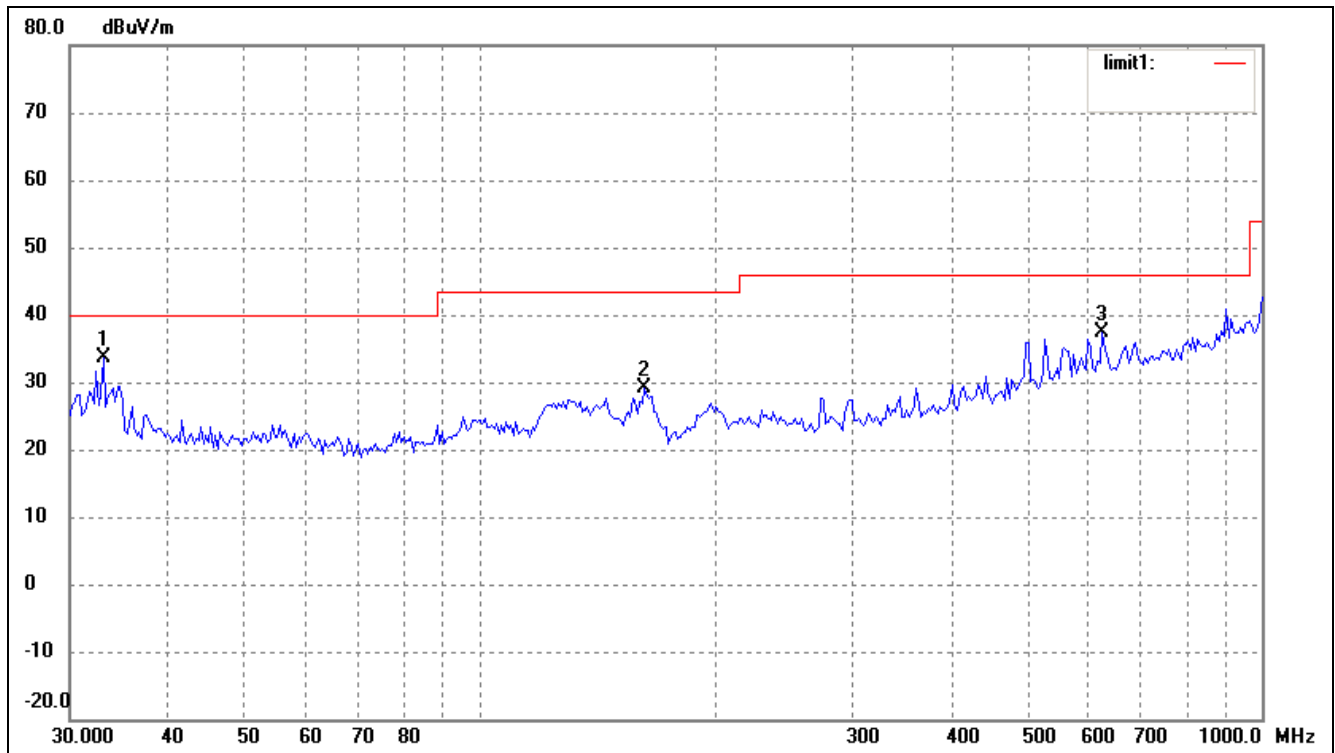
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	23.73	6.77	30.50	40.00	-9.50	85	100	peak
2	275.1570	25.64	9.38	35.02	46.00	-10.98	0	100	peak
3	670.4893	21.09	17.26	38.35	46.00	-7.65	5	100	peak

Vertical



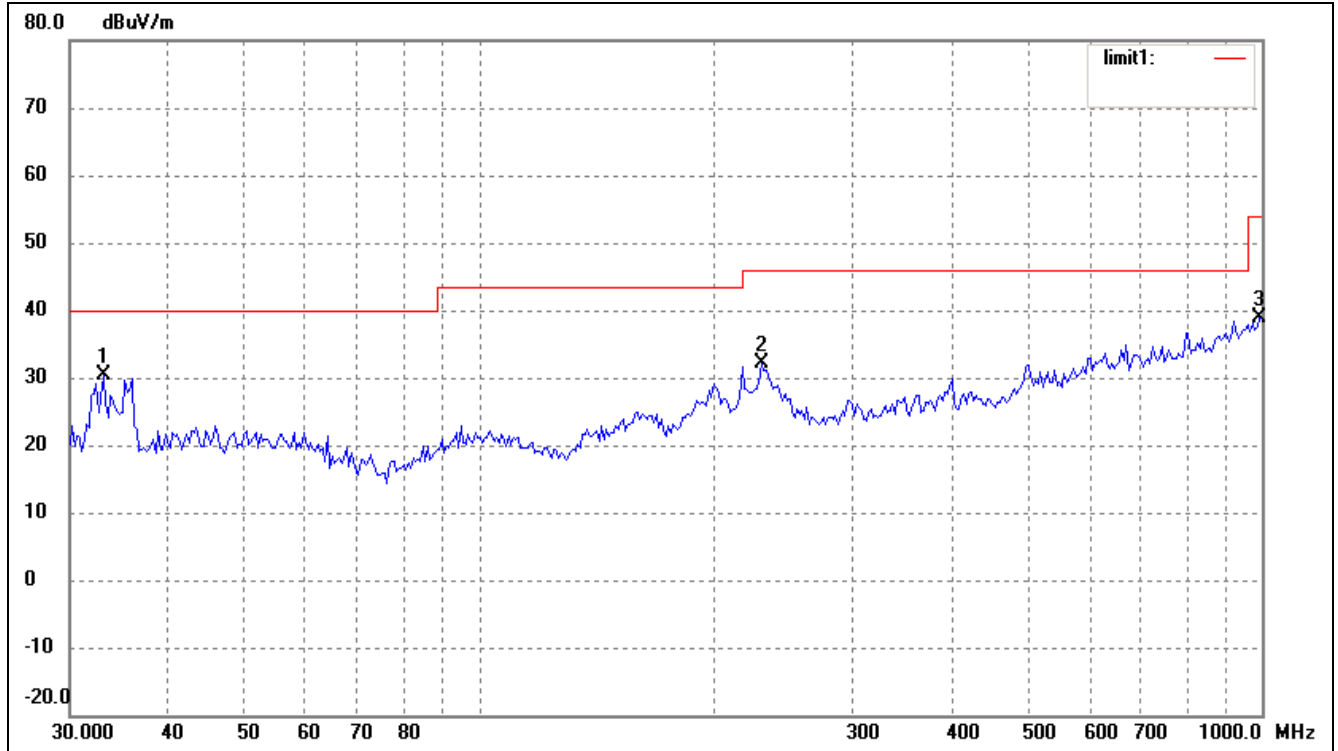
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	26.74	6.77	33.51	40.00	-6.49	72	100	peak
2	162.6106	24.46	4.63	29.09	43.50	-14.41	126	100	peak
3	625.0780	20.45	16.88	37.33	46.00	-8.67	22	100	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g) Low Channel

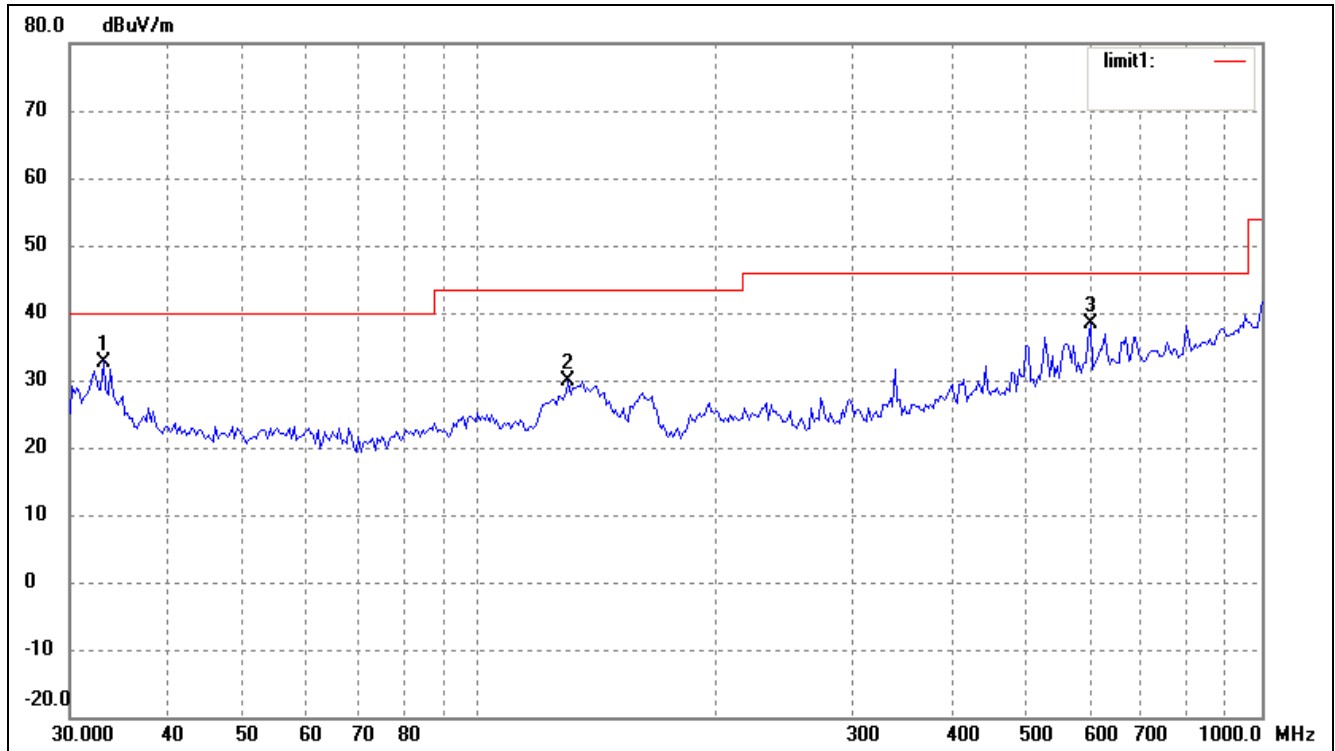
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	23.71	6.77	30.48	40.00	-9.52	77	100	peak
2	229.2931	24.40	7.82	32.22	46.00	-13.78	51	100	peak
3	993.0114	16.31	22.61	38.92	54.00	-15.08	255	100	peak

Vertical



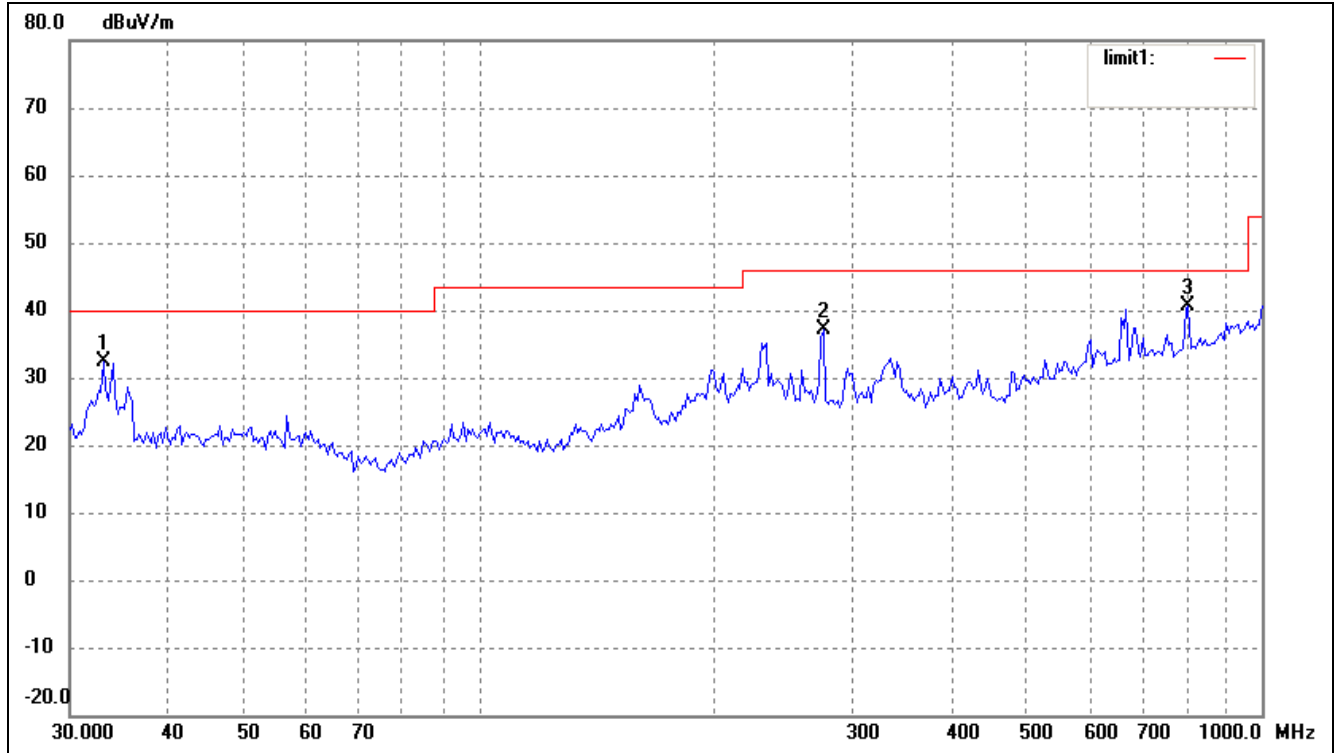
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	25.98	6.77	32.75	40.00	-7.25	74	100	peak
2	129.9226	25.35	4.57	29.92	43.50	-13.58	81	100	peak
3	603.5392	21.64	16.70	38.34	46.00	-7.66	209	100	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g) Middle Channel

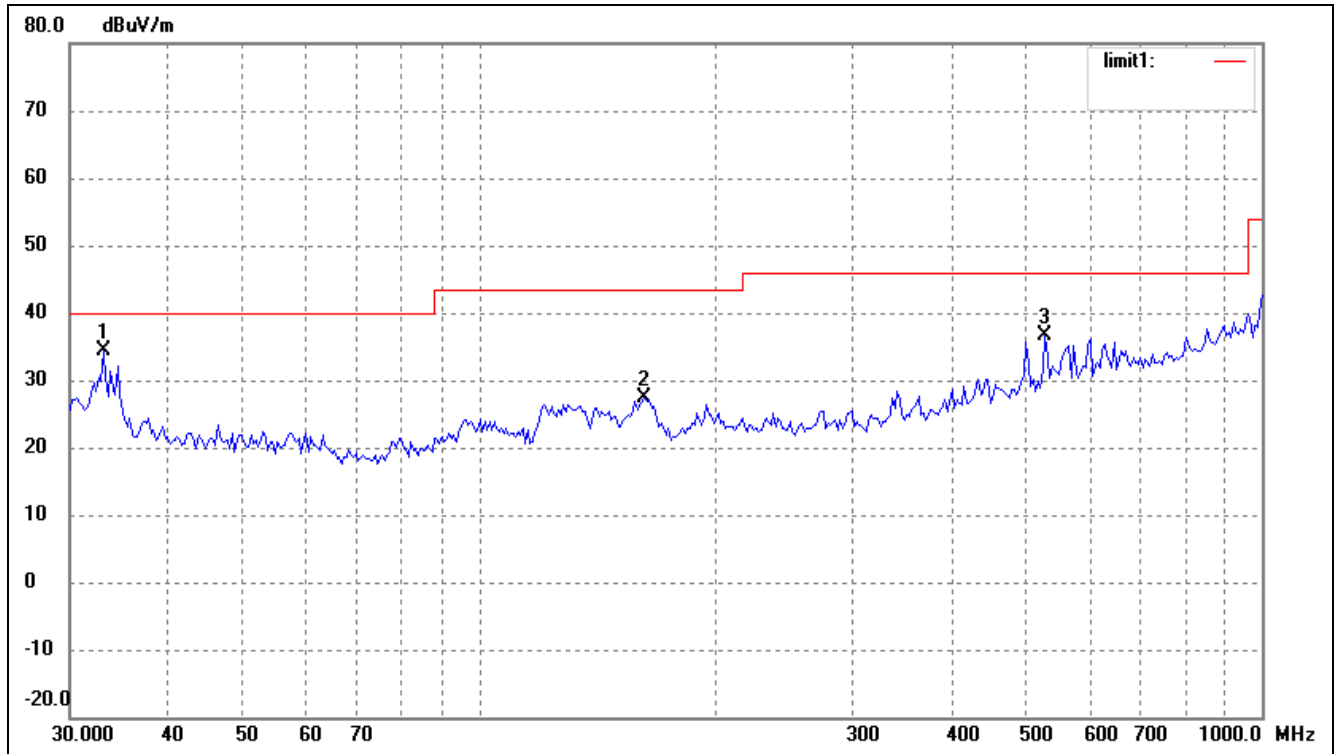
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	25.58	6.77	32.35	40.00	-7.65	356	100	peak
2	275.1570	27.80	9.38	37.18	46.00	-8.82	24	100	peak
3	804.6028	21.53	19.10	40.63	46.00	-5.37	11	100	peak

Vertical



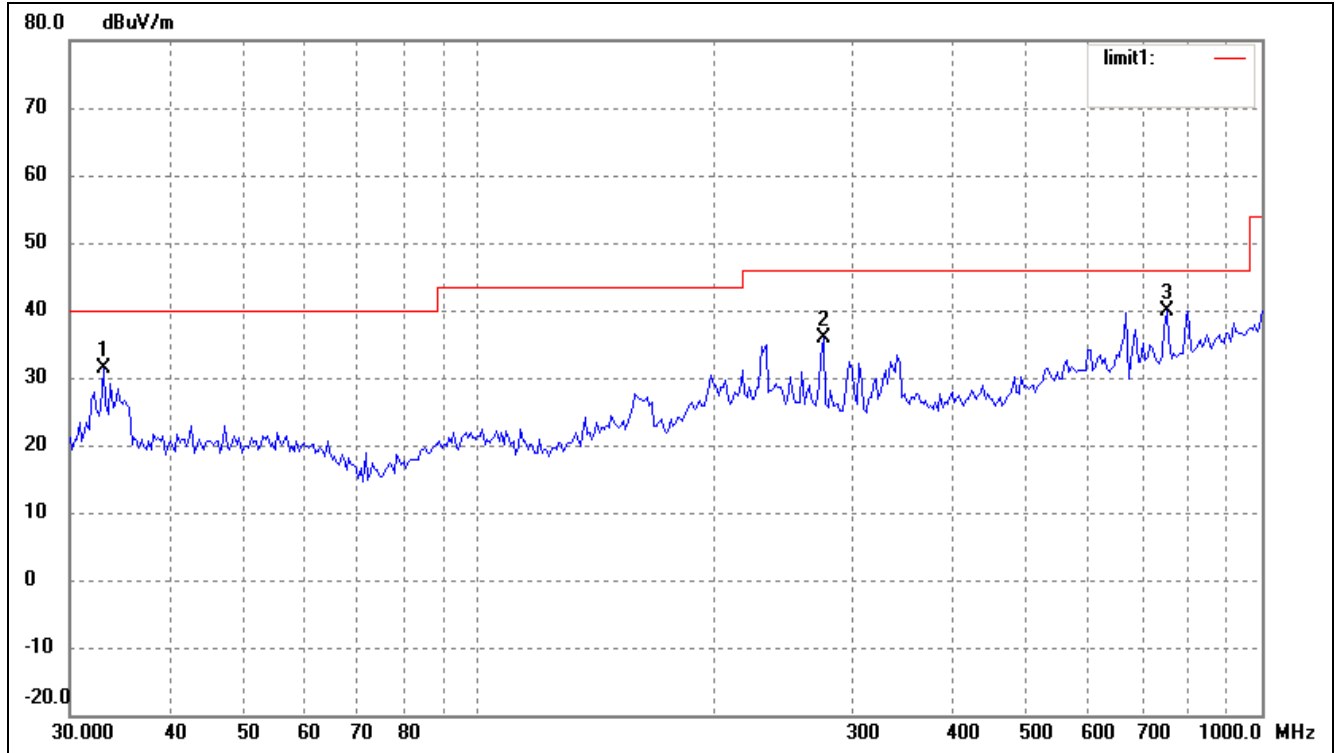
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	33.0950	27.51	6.77	34.28	40.00	-5.72	77	100	peak
2	162.6106	22.72	4.63	27.35	43.50	-16.15	26	100	peak
3	528.2458	21.69	15.06	36.75	46.00	-9.25	210	100	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g) High Channel

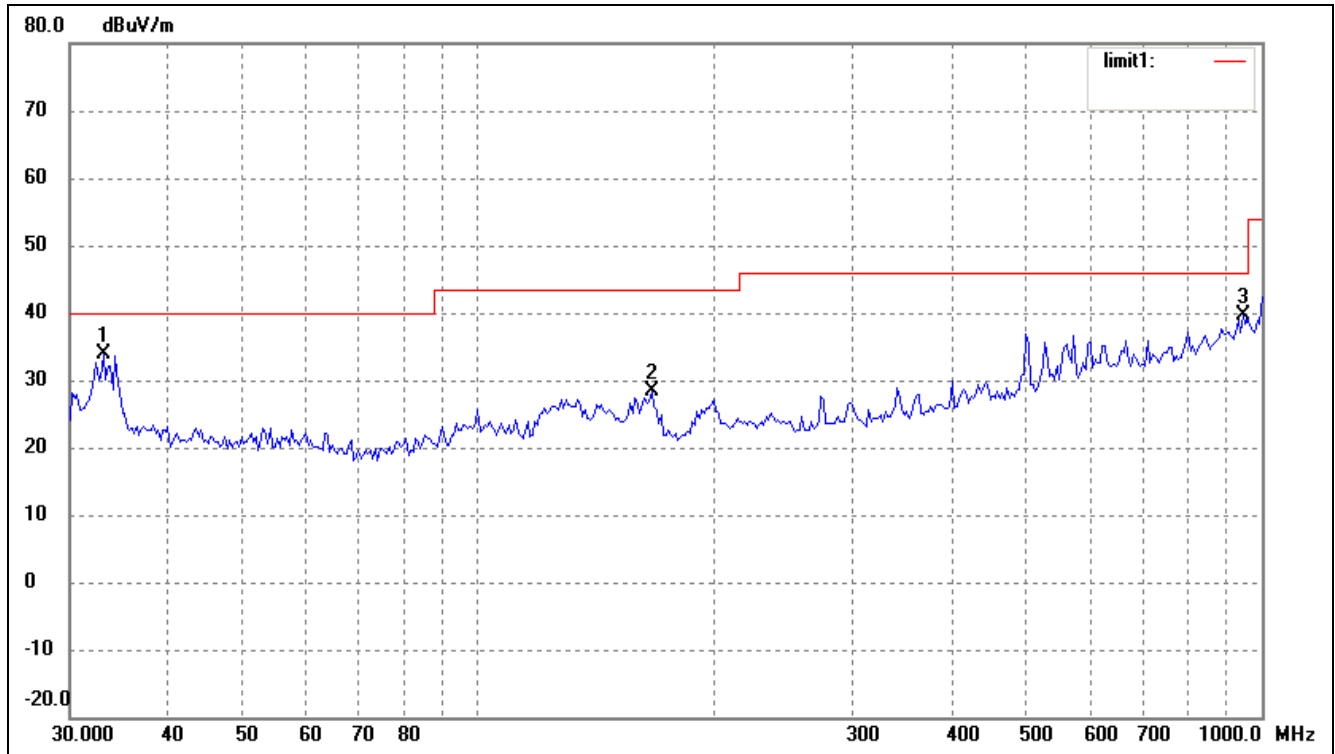
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	24.67	6.77	31.44	40.00	-8.56	205	100	peak
2	275.1570	26.47	9.38	35.85	46.00	-10.15	34	100	peak
3	755.3873	21.48	18.34	39.82	46.00	-6.18	14	100	peak

Vertical



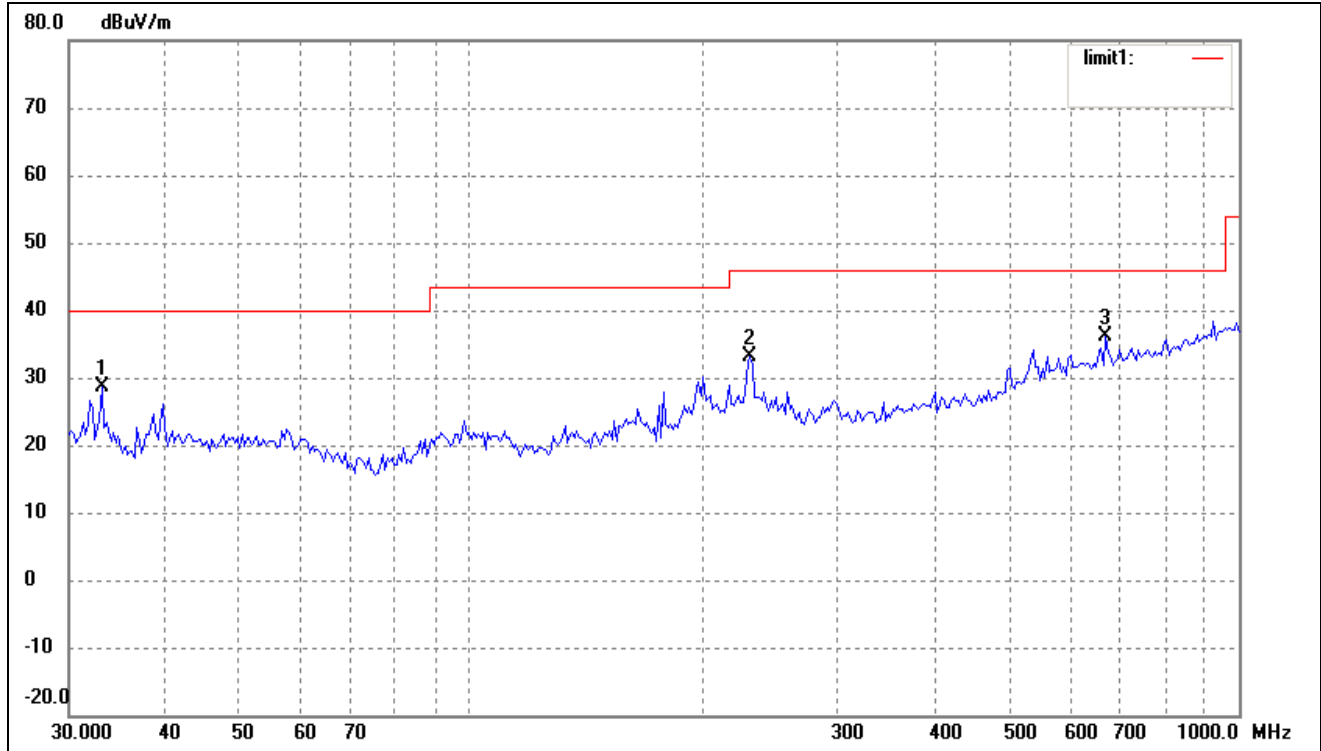
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	33.0950	27.01	6.77	33.78	40.00	-6.22	205	100	peak
2	166.0680	23.56	4.75	28.31	43.50	-15.19	33	100	peak
3	945.4399	17.92	21.73	39.65	46.00	-6.35	70	100	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11n/HT20) Low Channel

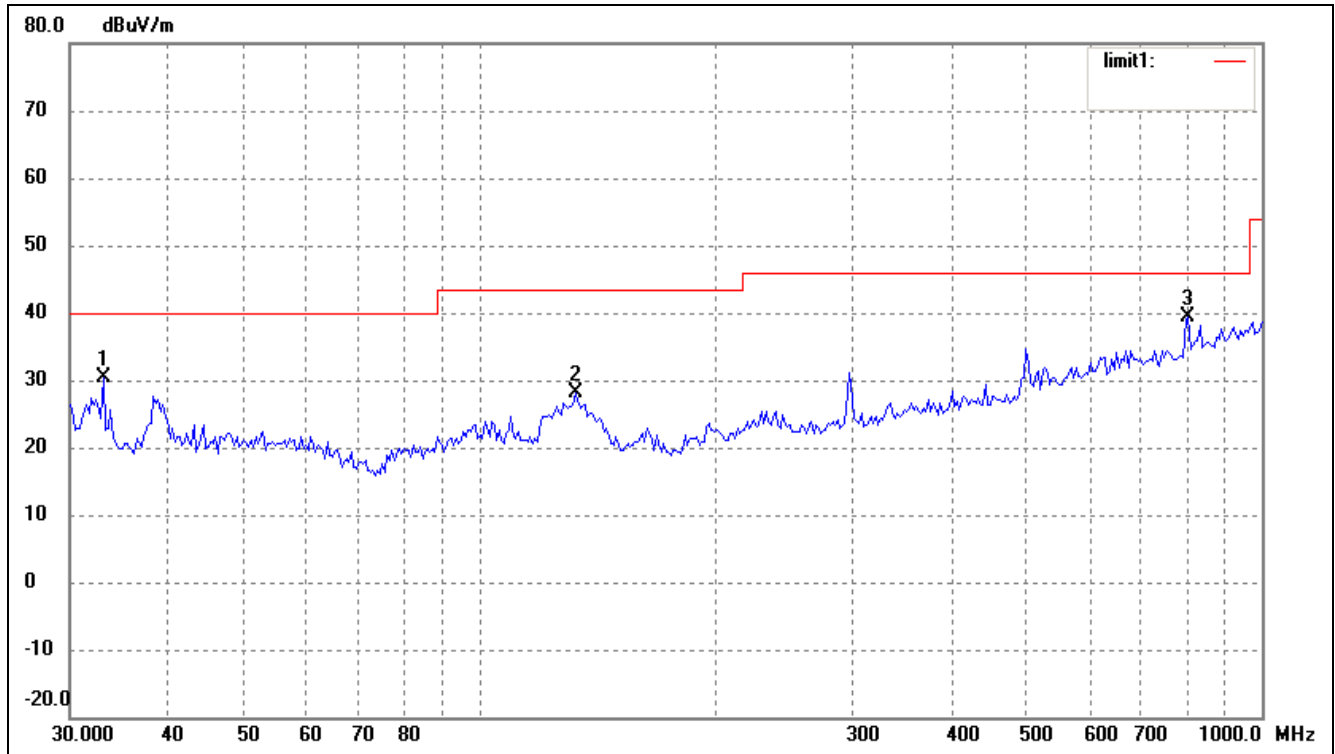
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	21.88	6.77	28.65	40.00	-11.35	24	100	peak
2	230.9068	25.11	7.91	33.02	46.00	-12.98	21	100	peak
3	670.4893	18.82	17.26	36.08	46.00	-9.92	46	100	peak

Vertical



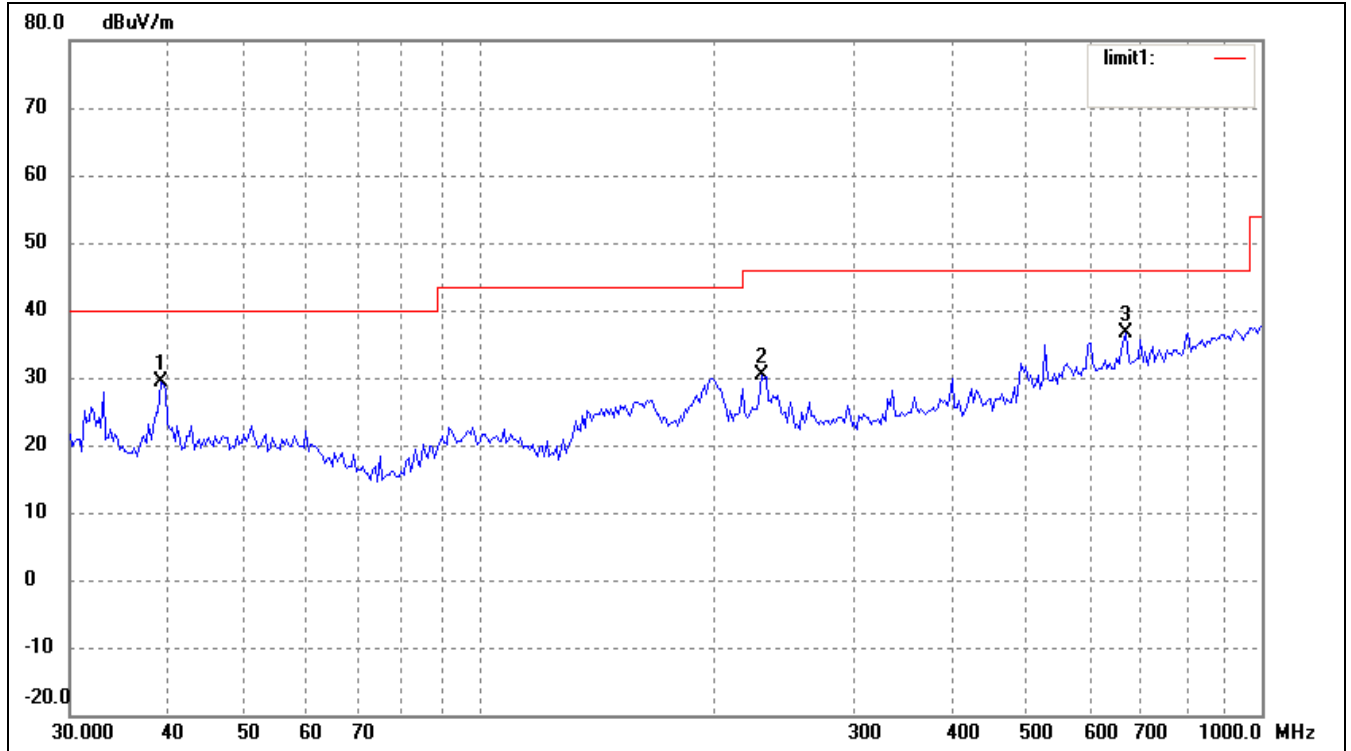
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	33.0950	23.64	6.77	30.41	40.00	-9.59	257	100	peak
2	132.6850	23.65	4.40	28.05	43.50	-15.45	11	100	peak
3	804.6028	20.16	19.10	39.26	46.00	-6.74	89	100	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11n/HT20) Middle Channel

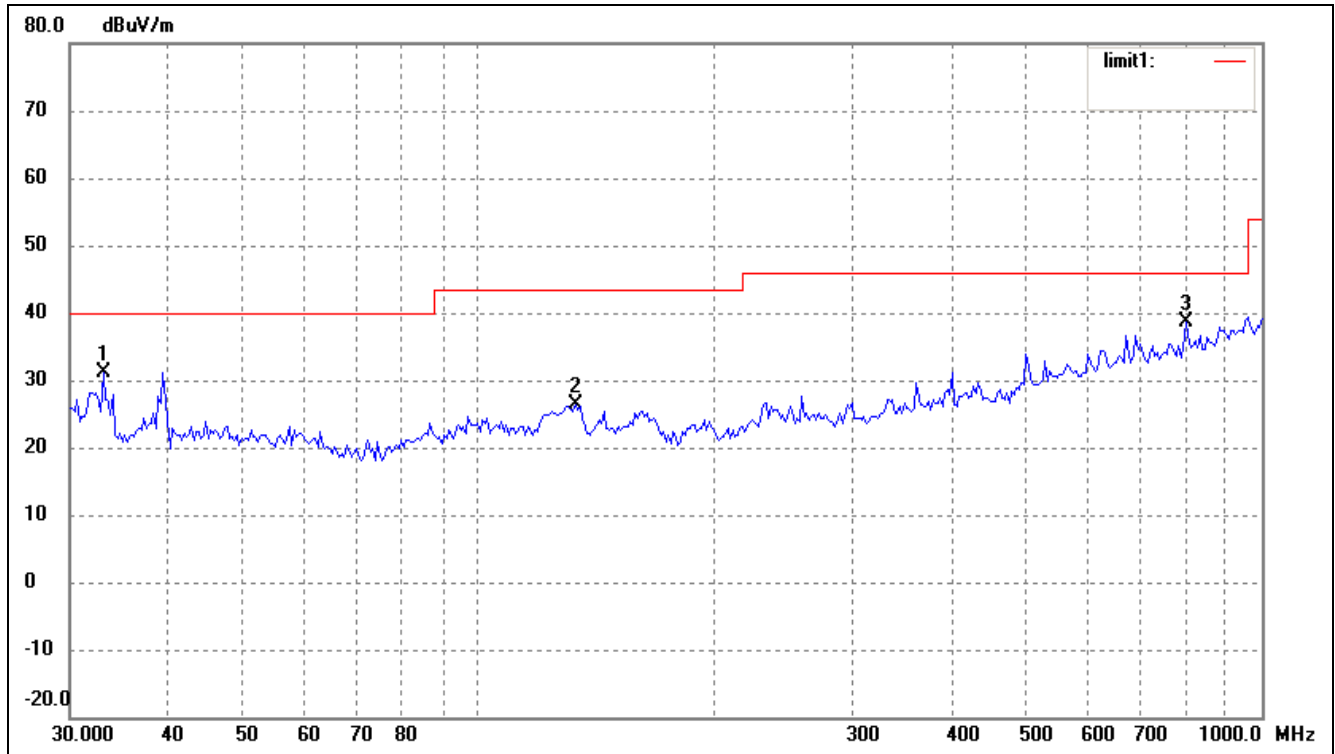
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	39.1616	21.35	7.91	29.26	40.00	-10.74	31	100	peak
2	229.2931	22.65	7.82	30.47	46.00	-15.53	241	100	peak
3	670.4893	19.45	17.26	36.71	46.00	-9.29	25	100	peak

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	24.43	6.77	31.20	40.00	-8.80	55	100	peak
2	132.6850	21.93	4.40	26.33	43.50	-17.17	79	100	peak
3	798.9797	19.54	18.99	38.53	46.00	-7.47	211	100	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11n/HT20) High Channel

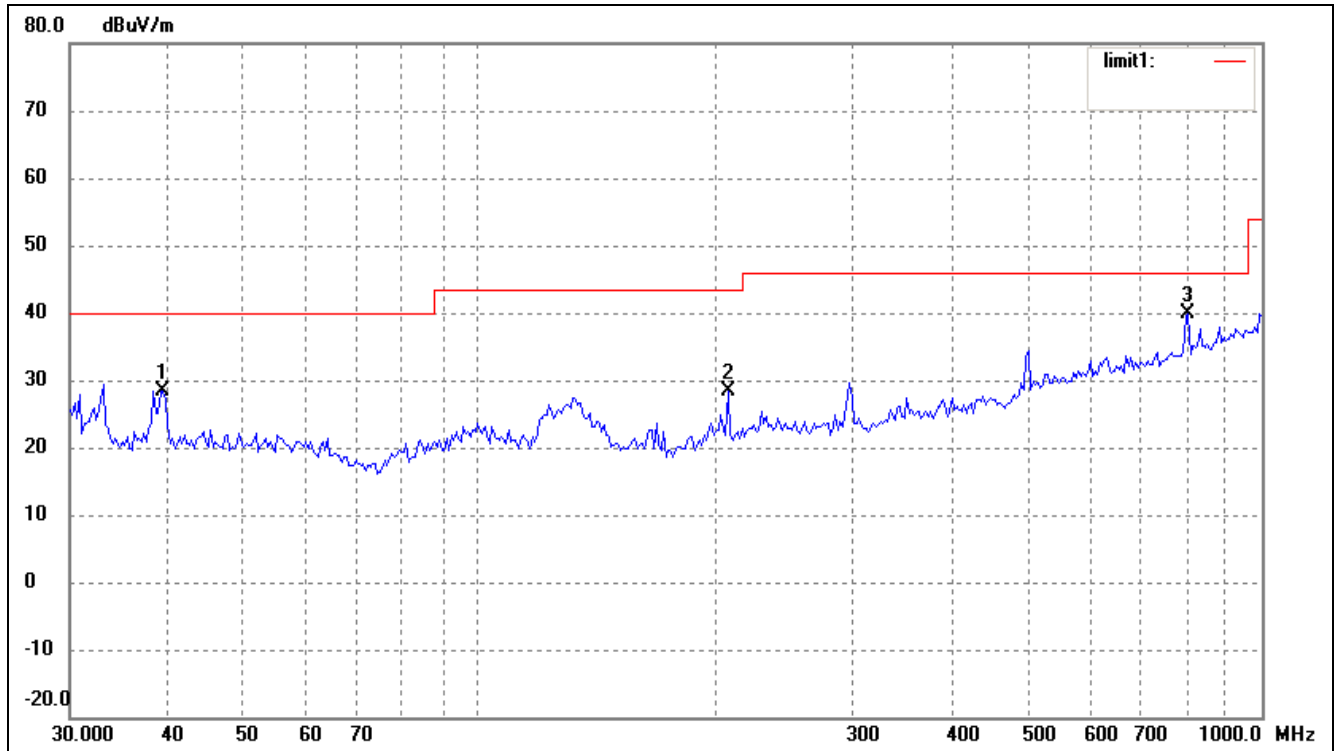
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	22.98	6.77	29.75	40.00	-10.25	0	100	peak
2	229.2931	22.38	7.82	30.20	46.00	-15.80	50	100	peak
3	925.7563	16.63	21.38	38.01	46.00	-7.99	302	100	peak

Vertical



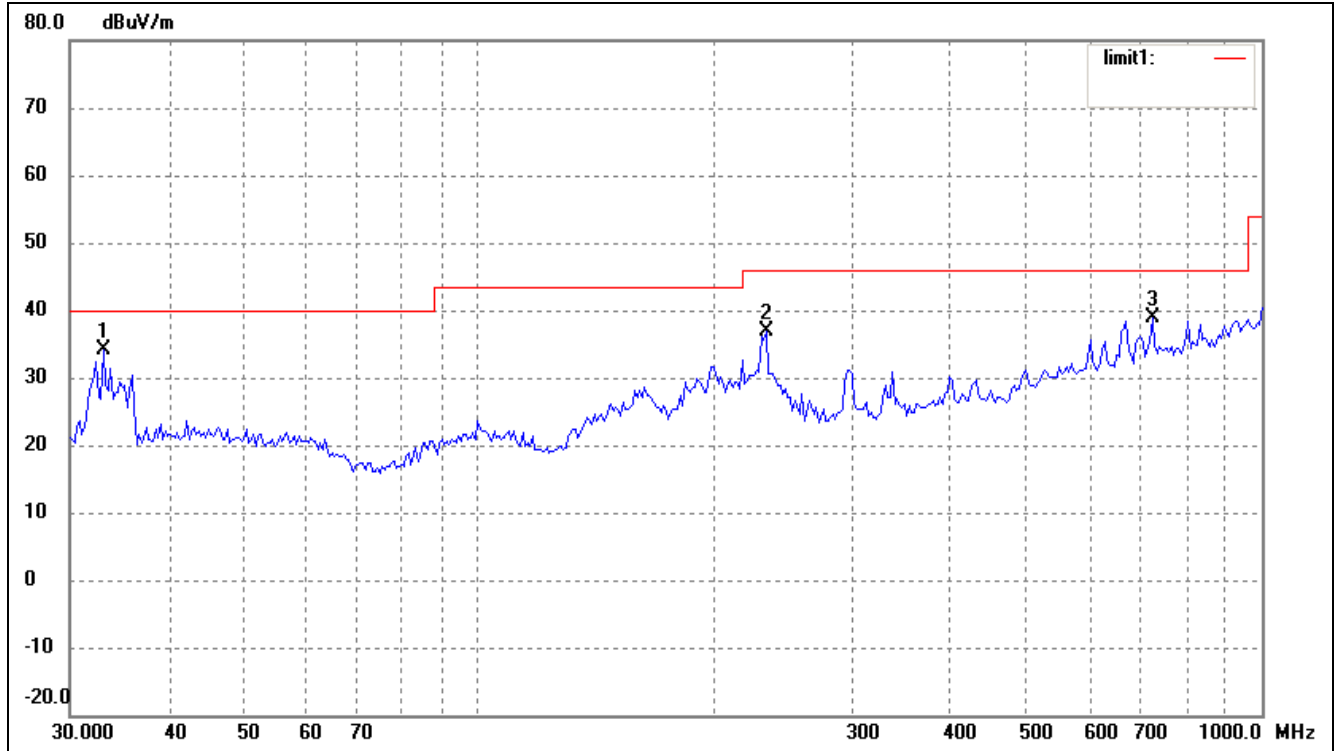
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	39.4372	20.45	7.99	28.44	40.00	-11.56	355	100	peak
2	207.8501	21.48	6.86	28.34	43.50	-15.16	79	100	peak
3	804.6028	20.83	19.10	39.93	46.00	-6.07	360	100	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11n/HT40) Low Channel

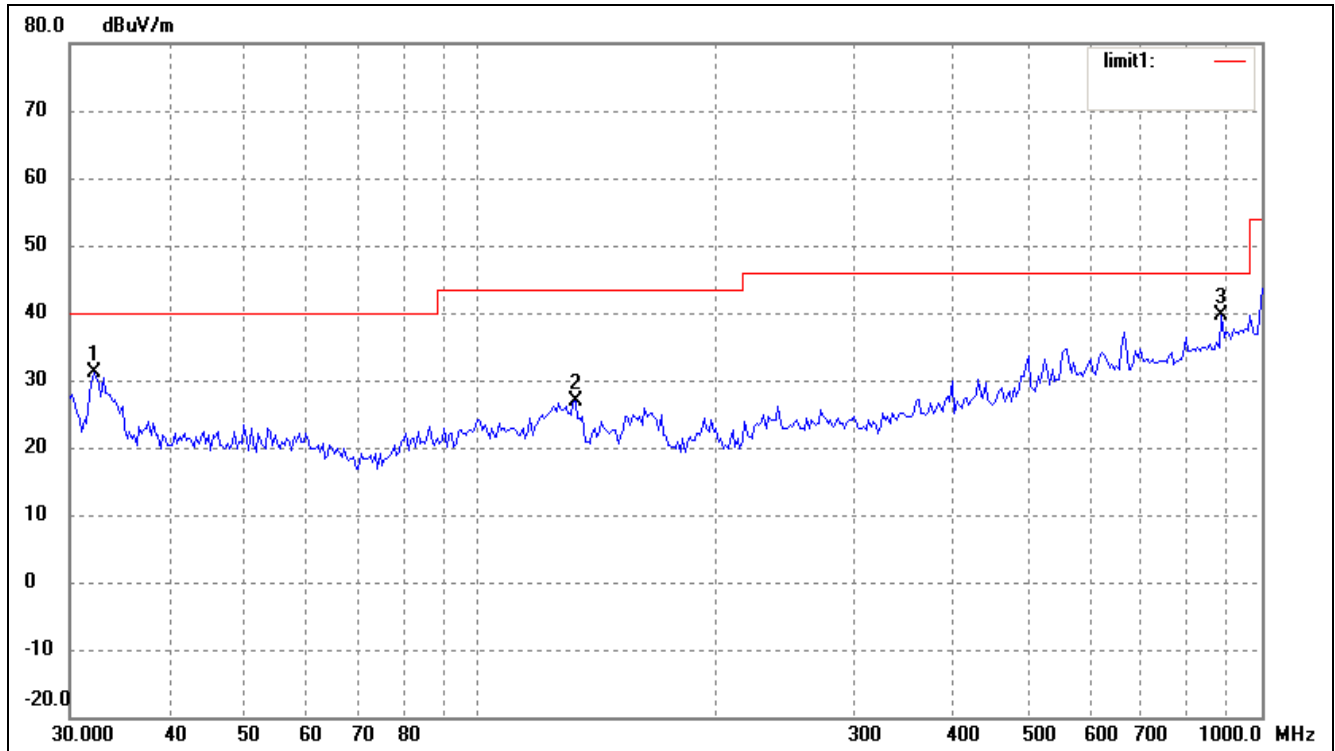
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	27.31	6.77	34.08	40.00	-5.92	203	100	peak
2	232.5318	28.75	8.01	36.76	46.00	-9.24	54	100	peak
3	724.2611	21.00	17.86	38.86	46.00	-7.14	177	100	peak

Vertical



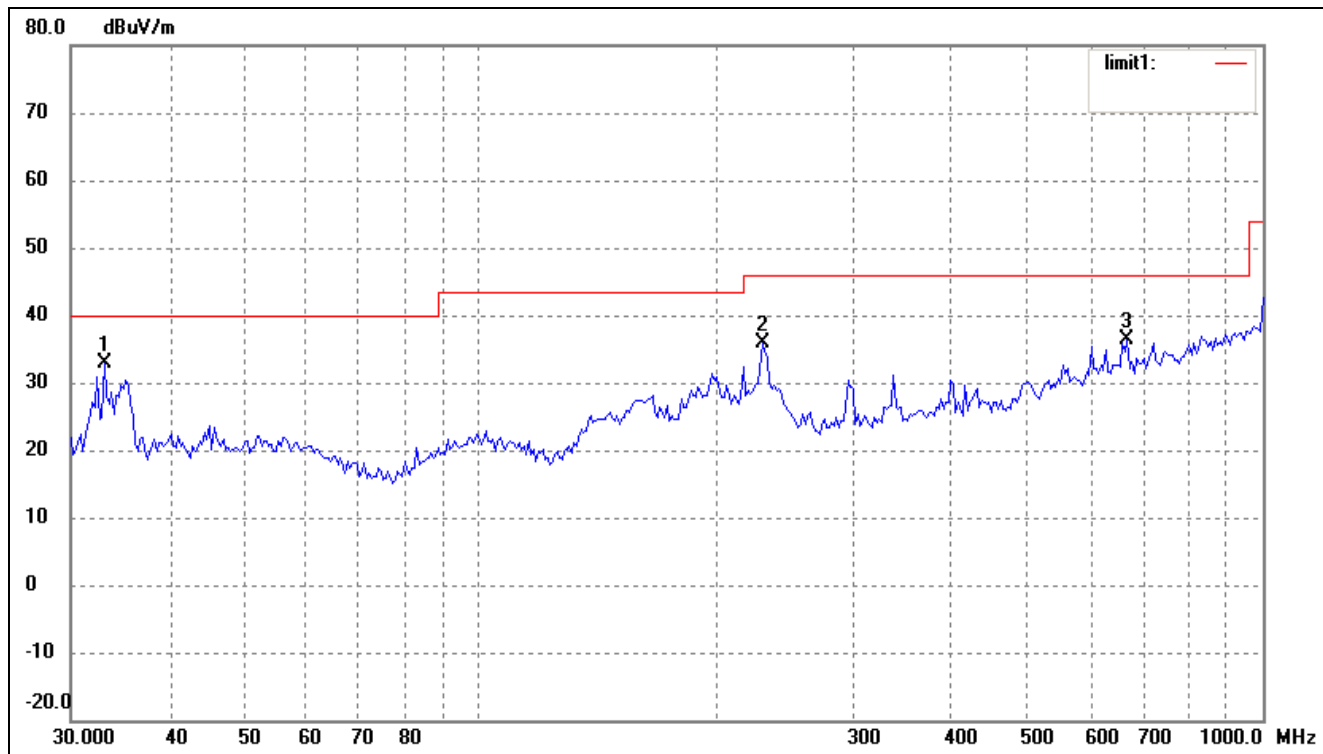
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	32.1795	24.38	6.77	31.15	40.00	-8.85	77	100	peak
2	132.6850	22.48	4.40	26.88	43.50	-16.62	22	100	peak
3	887.6099	18.93	20.67	39.60	46.00	-6.40	15	100	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11n/HT40) Middle Channel

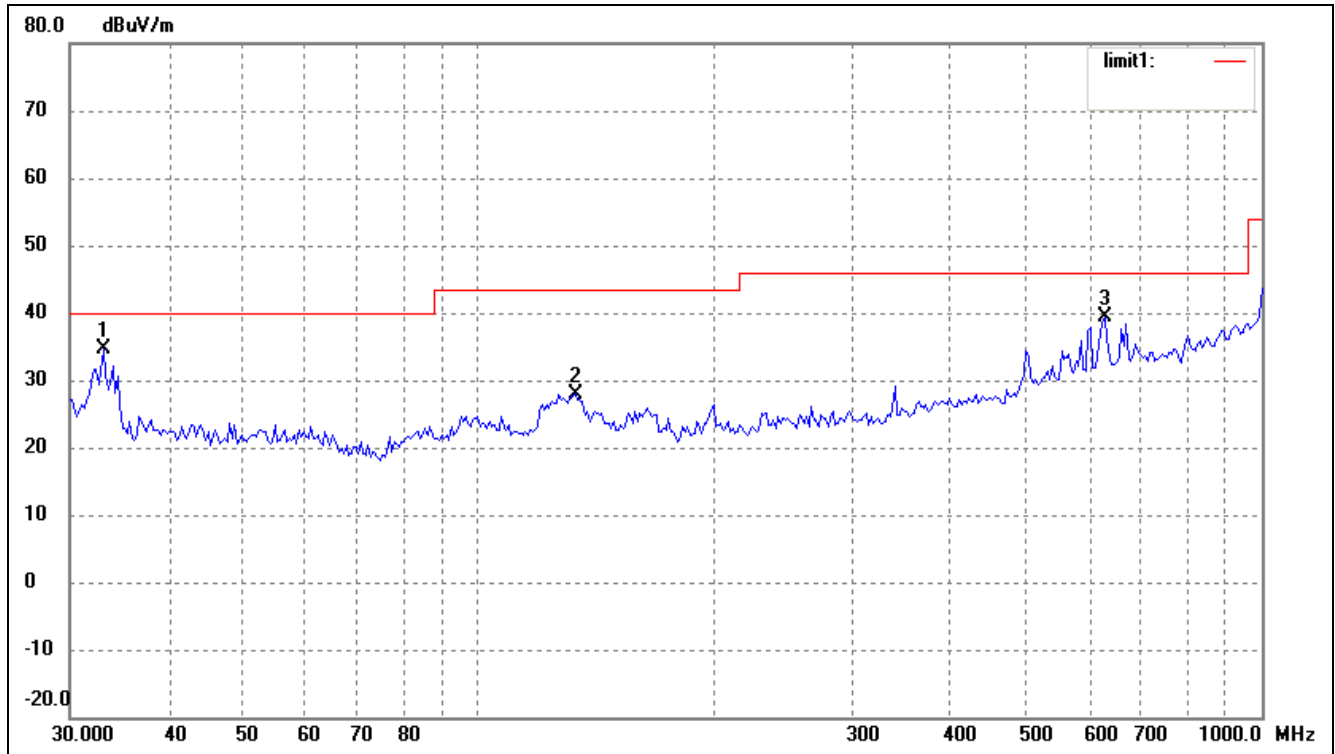
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	26.05	6.77	32.82	40.00	-7.18	201	100	peak
2	229.2931	28.03	7.82	35.85	46.00	-10.15	24	100	peak
3	670.4893	19.01	17.26	36.27	46.00	-9.73	30	100	peak

Vertical



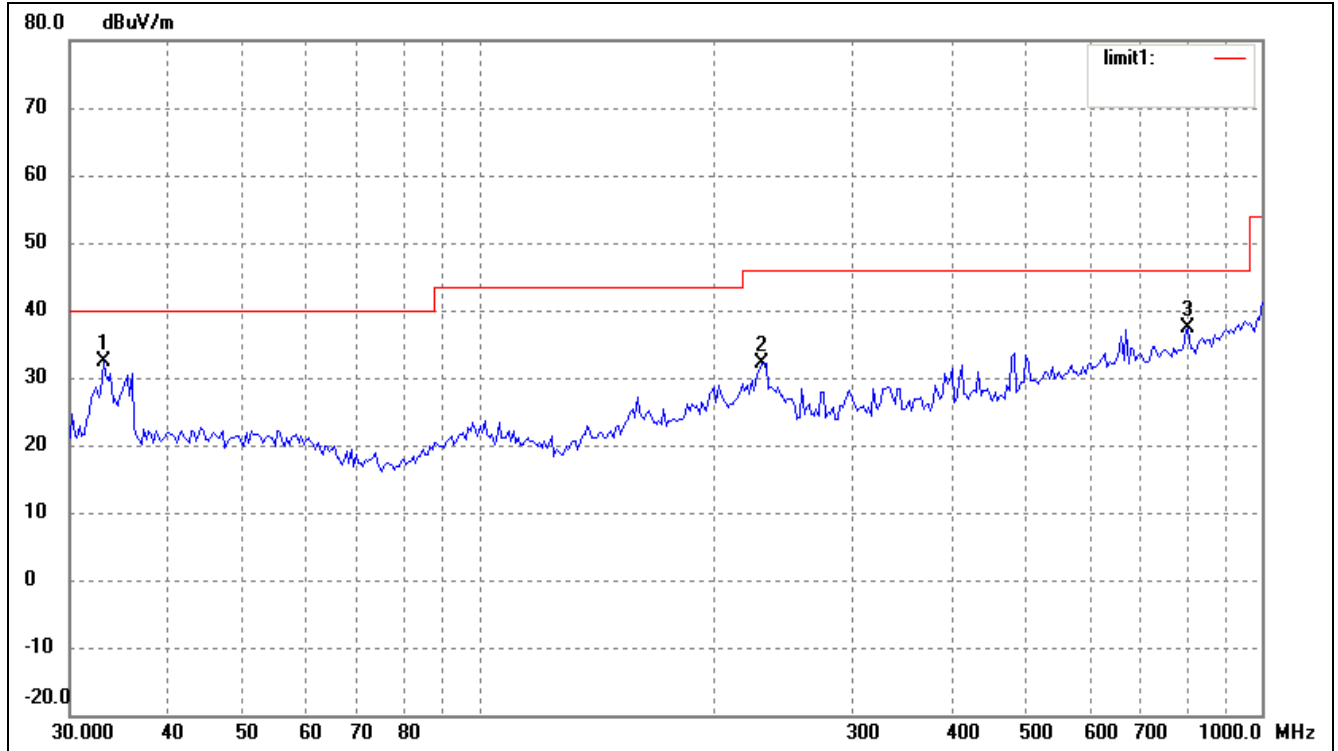
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	27.78	6.77	34.55	40.00	-5.45	33	100	peak
2	132.6850	23.60	4.40	28.00	43.50	-15.50	257	100	peak
3	629.4772	22.58	16.91	39.49	46.00	-6.51	25	100	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11n/HT40) High Channel

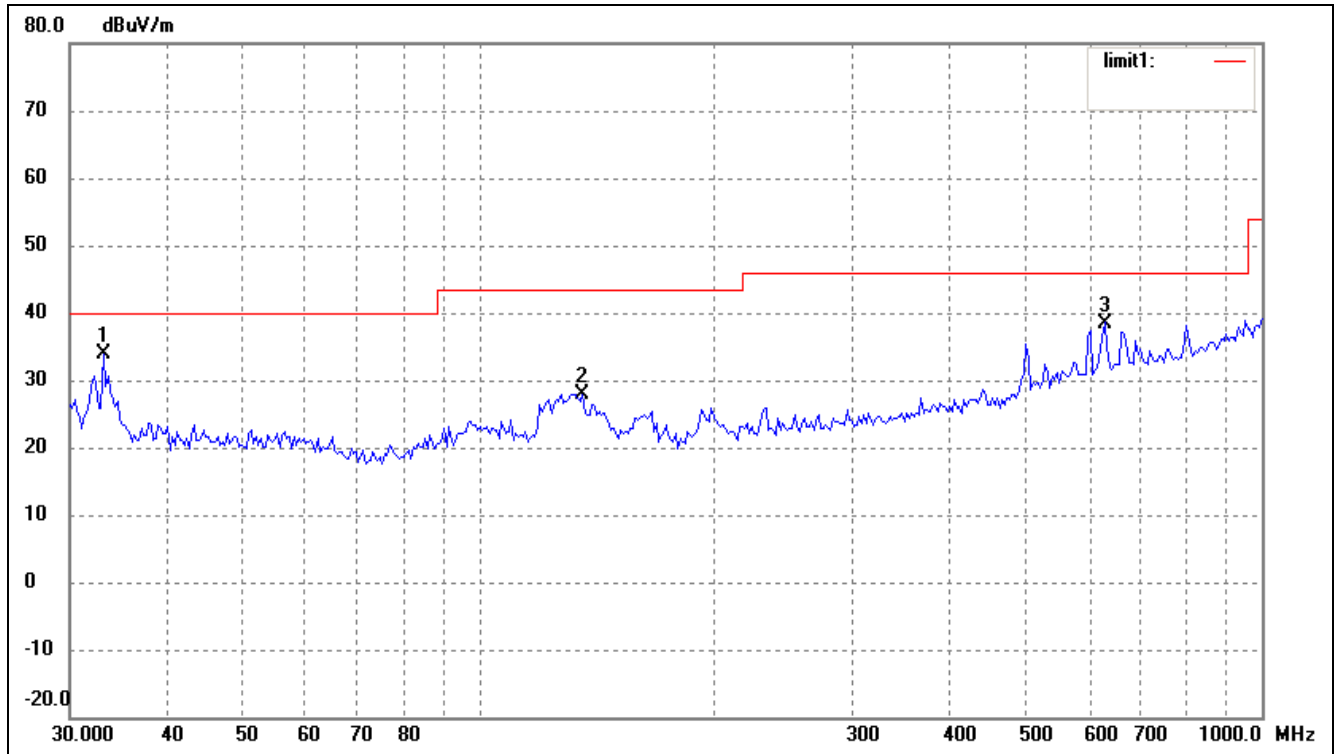
Comment:

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	25.53	6.77	32.30	40.00	-7.70	20	100	peak
2	229.2931	24.39	7.82	32.21	46.00	-13.79	354	100	peak
3	804.6028	18.24	19.10	37.34	46.00	-8.66	15	100	peak

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	27.10	6.77	33.87	40.00	-6.13	214	100	peak
2	135.5062	23.76	4.24	28.00	43.50	-15.50	354	100	peak
3	629.4772	21.59	16.91	38.50	46.00	-7.50	155	100	peak

*Spurious Emission above 1GHz**Test Mode: Transmitting (802.11b)*

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (2412MHz)										
4824.0	PK	48.3	90	V	34.1	5.2	33.0	54.57	74	-19.4
4824.0	PK	40.2	270	H	34.1	5.2	33.0	46.54	74	-27.5
7236.0	PK	42.3	180	V	37.4	6.1	33.5	52.26	74	-21.7
7236.0	PK	33.5	45	H	37.4	6.1	33.5	43.52	74	-30.5
4824.0	AV	45.0	90	V	34.1	5.2	33.0	51.31	54	-2.7
4824.0	AV	34.8	270	H	34.1	5.2	33.0	41.06	54	-12.9
7236.0	AV	39.6	180	V	37.4	6.1	33.5	49.57	54	-4.4
7236.0	AV	28.9	45	H	37.4	6.1	33.5	38.89	54	-15.1
Middle Channel (2437MHz)										
4874.0	PK	48.8	45	V	34.1	5.2	33.0	55.08	74	-18.9
4874.0	PK	42.2	270	H	34.1	5.2	33.0	48.48	74	-25.5
7311.0	PK	42.7	45	V	37.4	6.1	33.5	52.66	74	-21.3
7311.0	PK	36.9	180	H	37.4	6.1	33.5	46.86	74	-27.1
4874.0	AV	44.5	45	V	34.1	5.2	33.0	50.75	54	-3.3
4874.0	AV	36.3	270	H	34.1	5.2	33.0	42.61	54	-11.4
7311.0	AV	41.2	45	V	37.4	6.1	33.5	51.22	54	-2.8
7311.0	AV	32.6	180	H	37.4	6.1	33.5	42.62	54	-11.4
High Channel (2462MHz)										
4924.0	PK	48.5	270	V	34.1	5.2	33.0	54.83	74	-19.2
4924.0	PK	39.5	45	H	34.1	5.2	33.0	45.75	74	-28.3
7386.0	PK	43.0	180	V	37.4	6.1	33.5	52.98	74	-21.0
7386.0	PK	33.8	45	H	37.4	6.1	33.5	43.77	74	-30.2
4924.0	AV	45.8	270	V	34.1	5.2	33.0	52.05	54	-2.0
4924.0	AV	36.4	45	H	34.1	5.2	33.0	42.73	54	-11.3
7386.0	AV	40.2	180	V	37.4	6.1	33.5	50.23	54	-3.8
7386.0	AV	31.7	45	H	37.4	6.1	33.5	41.65	54	-12.4

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

*Spurious Emission Above 1GHz**Test Mode: Transmitting (802.11g)*

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (2412MHz)										
4824.0	PK	46.6	270	V	34.1	5.2	33.0	52.85	74	-21.2
4824.0	PK	37.1	90	H	34.1	5.2	33.0	43.36	74	-30.6
7236.0	PK	42.4	45	V	37.4	6.1	33.5	52.35	74	-21.7
7236.0	PK	33.0	60	H	37.4	6.1	33.5	43.01	74	-31.0
4824.0	AV	44.2	270	V	34.1	5.2	33.0	50.49	54	-3.5
4824.0	AV	35.4	90	H	34.1	5.2	33.0	41.67	54	-12.3
7236.0	AV	39.0	45	V	37.4	6.1	33.5	48.95	54	-5.1
7236.0	AV	30.0	60	H	37.4	6.1	33.5	40.04	54	-14.0
Middle Channel (2437MHz)										
4874.0	PK	47.6	270	V	34.1	5.2	33.0	53.85	74	-20.2
4874.0	PK	36.5	90	H	34.1	5.2	33.0	42.81	74	-31.2
7311.0	PK	43.7	60	V	37.4	6.1	33.5	53.70	74	-20.3
7311.0	PK	34.7	45	H	37.4	6.1	33.5	44.71	74	-29.3
4874.0	AV	45.0	270	V	34.1	5.2	33.0	51.31	54	-2.7
4874.0	AV	36.6	90	H	34.1	5.2	33.0	42.92	54	-11.1
7311.0	AV	39.5	60	V	37.4	6.1	33.5	49.53	54	-4.5
7311.0	AV	30.0	45	H	37.4	6.1	33.5	40.02	54	-14.0
High Channel (2462MHz)										
4924.0	PK	47.1	90	V	34.1	5.2	33.0	53.36	74	-20.6
4924.0	PK	37.3	270	H	34.1	5.2	33.0	43.58	74	-30.4
7386.0	PK	42.7	60	V	37.4	6.1	33.5	52.65	74	-21.4
7386.0	PK	33.4	60	H	37.4	6.1	33.5	43.42	74	-30.6
4924.0	AV	45.4	90	V	34.1	5.2	33.0	51.70	54	-2.3
4924.0	AV	36.3	270	H	34.1	5.2	33.0	42.55	54	-11.5
7386.0	AV	38.8	60	V	37.4	6.1	33.5	48.77	54	-5.2
7386.0	AV	29.5	60	H	37.4	6.1	33.5	39.48	54	-14.5

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.

*Spurious Emission Above 1GHz**Test Mode: Transmitting (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 (2412MHz)										
4824.0	PK	46.4	122	V	34.1	5.2	33.0	52.72	74	-21.3
4824.0	PK	36.2	32	H	34.1	5.2	33.0	42.48	74	-31.5
7236.0	PK	42.5	36	V	37.4	6.1	33.5	52.48	74	-21.5
7236.0	PK	33.1	45	H	37.4	6.1	33.5	43.11	74	-30.9
4824.0	AV	43.7	122	V	34.1	5.2	33.0	50.03	54	-4.0
4824.0	AV	33.7	32	H	34.1	5.2	33.0	39.95	54	-14.1
7236.0	AV	38.4	36	V	37.4	6.1	33.5	48.44	54	-5.6
7236.0	AV	28.8	45	H	37.4	6.1	33.5	38.76	54	-15.2
Middle Channel (2437MHz)										
4874.0	PK	46.4	60	V	34.1	5.2	33.0	52.70	74	-21.3
4874.0	PK	36.2	222	H	34.1	5.2	33.0	42.45	74	-31.6
7311.0	PK	41.7	180	V	37.4	6.1	33.5	51.67	74	-22.3
7311.0	PK	32.4	182	H	37.4	6.1	33.5	42.35	74	-31.7
4874.0	AV	43.6	60	V	34.1	5.2	33.0	49.89	54	-4.1
4874.0	AV	32.9	222	H	34.1	5.2	33.0	39.21	54	-14.8
7311.0	AV	37.2	180	V	37.4	6.1	33.5	47.20	54	-6.8
7311.0	AV	28.1	182	H	37.4	6.1	33.5	38.11	54	-15.9
High Channel (2462MHz)										
4924.0	PK	45.6	272	V	34.1	5.2	33.0	51.89	74	-22.1
4924.0	PK	34.9	43	H	34.1	5.2	33.0	41.20	74	-32.8
7386.0	PK	39.3	90	V	37.4	6.1	33.5	49.33	74	-24.7
7386.0	PK	27.0	221	H	37.4	6.1	33.5	37.01	74	-37.0
4924.0	AV	42.3	272	V	34.1	5.2	33.0	48.58	54	-5.4
4924.0	AV	32.8	43	H	34.1	5.2	33.0	39.10	54	-14.9
7386.0	AV	36.2	90	V	37.4	6.1	33.5	46.22	54	-7.8
7386.0	AV	27.9	221	H	37.4	6.1	33.5	37.88	54	-16.1

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.

*Spurious Emission Above 1GHz**Test Mode: Transmitting (802.11n/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 (2422MHz)										
4844.0	PK	45.4	91	V	34.1	5.2	33.0	51.66	74	-22.3
4844.0	PK	36.1	276	H	34.1	5.2	33.0	42.44	74	-31.6
7266.0	PK	40.3	33	V	37.4	6.1	33.5	50.29	74	-23.7
7266.0	PK	30.2	63	H	37.4	6.1	33.5	40.20	74	-33.8
4844.0	AV	43.0	91	V	34.1	5.2	33.0	49.25	54	-4.8
4844.0	AV	33.8	276	H	34.1	5.2	33.0	40.11	54	-13.9
7266.0	AV	36.1	33	V	37.4	6.1	33.5	46.05	54	-8.0
7266.0	AV	27.9	63	H	37.4	6.1	33.5	37.87	54	-16.1
Middle Channel (2437MHz)										
4874.0	PK	44.0	46	V	34.1	5.2	33.0	50.34	74	-23.7
4874.0	PK	35.8	125	H	34.1	5.2	33.0	42.12	74	-31.9
7311.0	PK	38.3	72	V	37.4	6.1	33.5	48.25	74	-25.8
7311.0	PK	29.6	35	H	37.4	6.1	33.5	39.55	74	-34.5
4874.0	AV	42.2	46	V	34.1	5.2	33.0	48.53	54	-5.5
4874.0	AV	33.7	125	H	34.1	5.2	33.0	40.01	54	-14.0
7311.0	AV	35.7	72	V	37.4	6.1	33.5	45.66	54	-8.3
7311.0	AV	25.4	35	H	37.4	6.1	33.5	35.37	54	-18.6
High Channel (2452MHz)										
4904.0	PK	43.7	11	V	34.1	5.2	33.0	49.96	74	-24.0
4904.0	PK	35.9	56	H	34.1	5.2	33.0	42.17	74	-31.8
7356.0	PK	38.2	26	V	37.4	6.1	33.5	48.19	74	-25.8
7356.0	PK	28.2	115	H	37.4	6.1	33.5	38.20	74	-35.8
4904.0	AV	41.5	11	V	34.1	5.2	33.0	47.77	54	-6.2
4904.0	AV	34.0	56	H	34.1	5.2	33.0	40.33	54	-13.7
7356.0	AV	35.3	26	V	37.4	6.1	33.5	45.34	54	-8.7
7356.0	AV	25.5	115	H	37.4	6.1	33.5	35.46	54	-18.5

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.

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	2011-12-20	2012-12-19
EMI Test Receiver	R&S	ESVB	825471/005	2011-12-20	2012-12-19
Positioning Controller	C&C	CC-C-1F	N/A	2011-12-20	2012-12-19
RF Switch	EM	EMSW18	SW060023	2011-12-20	2012-12-19
Pre-amplifier	Agilent	8447F	3113A06717	2011-12-20	2012-12-19
Pre-amplifier	Compliance Direction	PAP-0118	24002	2011-12-20	2012-12-19
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=1000, VBW=10Hz, Span=50MHz, Sweep = auto
3. Set the Lowest and Highest Transmitting Channel, observed the outside band of 2400MHz to 2438.5MHz, then mark the higher-level emission for comparing with the FCC rules.

9.4 Environmental Conditions

Temperature:	21° C
Relative Humidity:	44%
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
	2500.00	<54dBuv	Pass
802.11g	2390.00	<54dBuv	Pass
	2400.00	>20dB	Pass
	2483.50	<54dBuv	Pass
	2500.00	<54dBuv	Pass
802.11n HT20	2390.00	<54dBuv	Pass
	2400.00	>20dB	Pass
	2483.50	<54dBuv	Pass
	2500.00	<54dBuv	Pass
802.11n HT40	2390.00	<54dBuv	Pass
	2400.00	>20dB	Pass
	2483.50	<54dBuv	Pass
	2500.00	<54dBuv	Pass

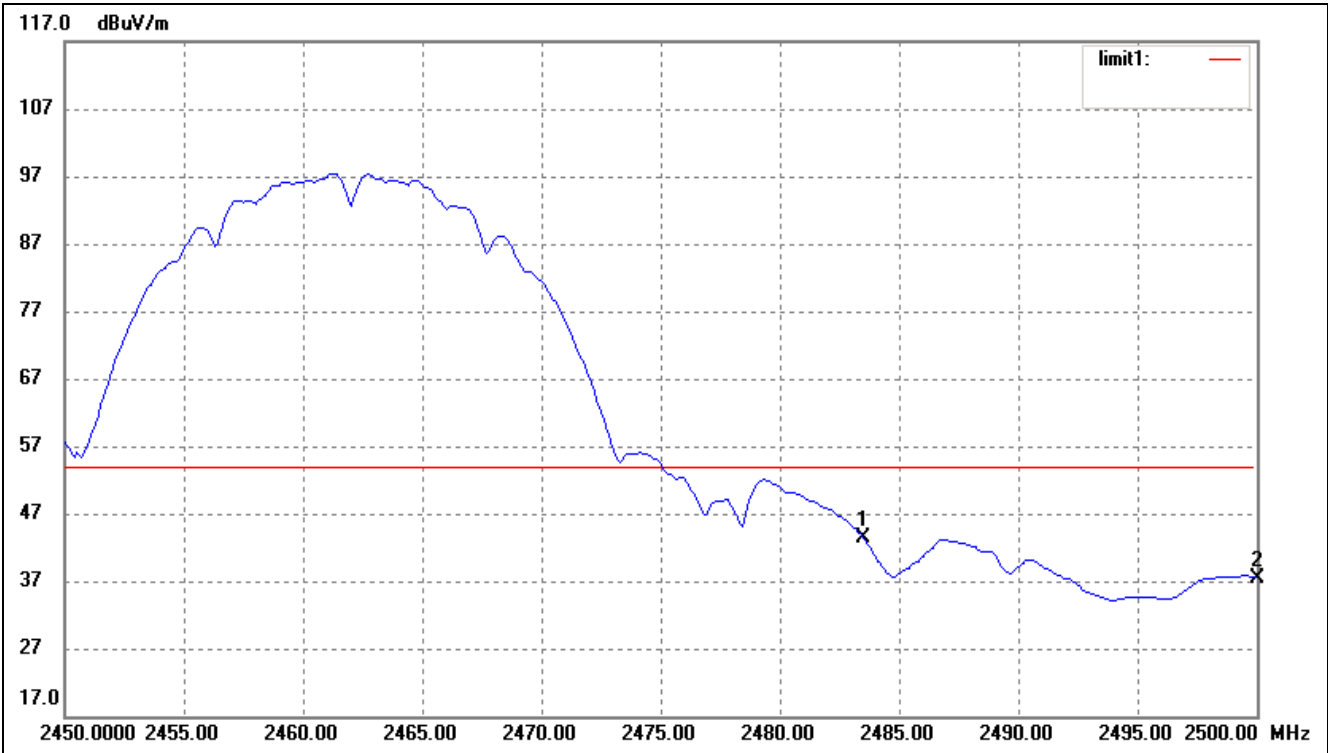
For 802.11b (Chain A)

Lowest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	39.49	-7.51	31.98	54.00	-22.02	Average Detector
	2310.000	52.55	-7.51	45.04	74.00	-28.96	Peak Detector
2	2390.000	39.25	-7.34	31.91	54.00	-22.09	Average Detector
	2390.000	55.99	-7.34	48.65	74.00	-25.35	Peak Detector
3	2400.000	53.74	-7.31	46.43	/	/	Average Detector
4	2414.720	94.85	-7.28	87.57	/	/	Average Detector

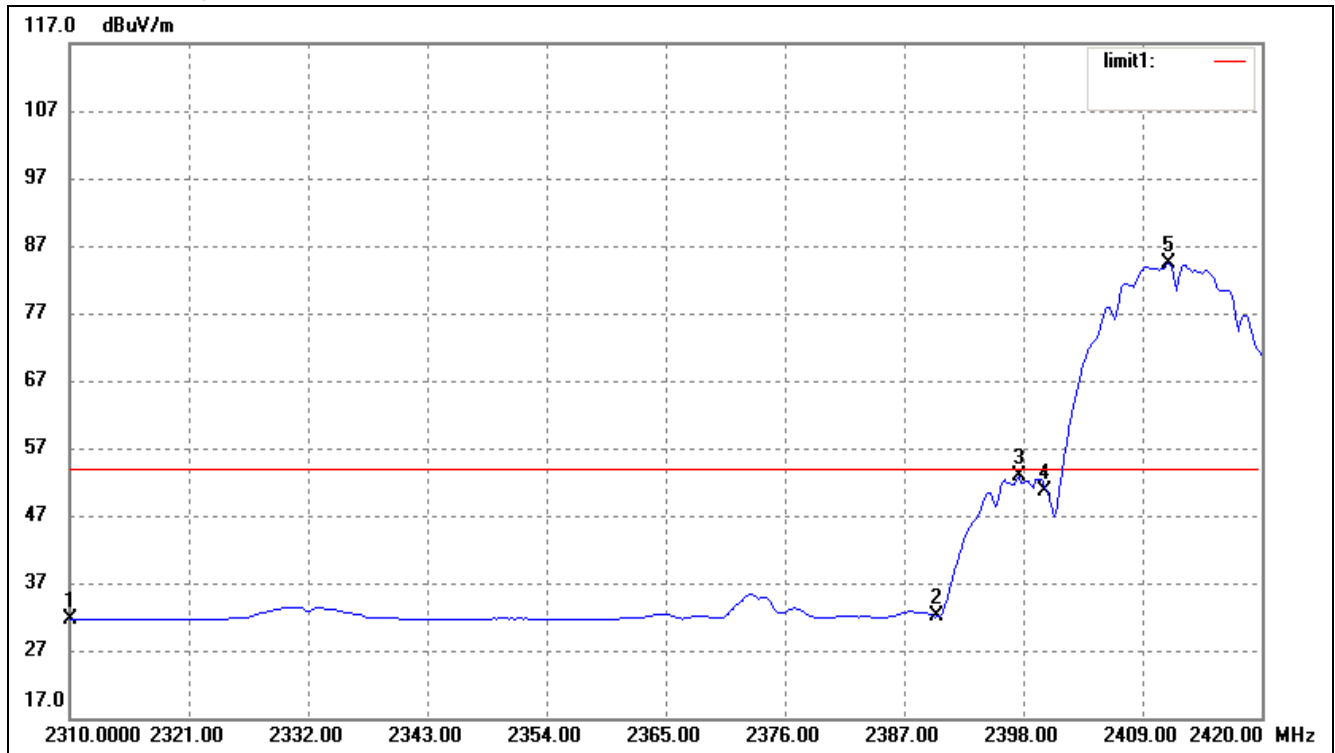
Highest Bandedge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.500	50.46	-7.13	43.33	54.00	-10.67	Average Detector
	2483.500	59.71	-7.13	52.58	74.00	-21.42	Peak Detector
2	2500.000	44.45	-7.08	37.37	54.00	-16.63	Average Detector
	2500.000	56.66	-7.08	49.58	74.00	-24.42	Peak Detector

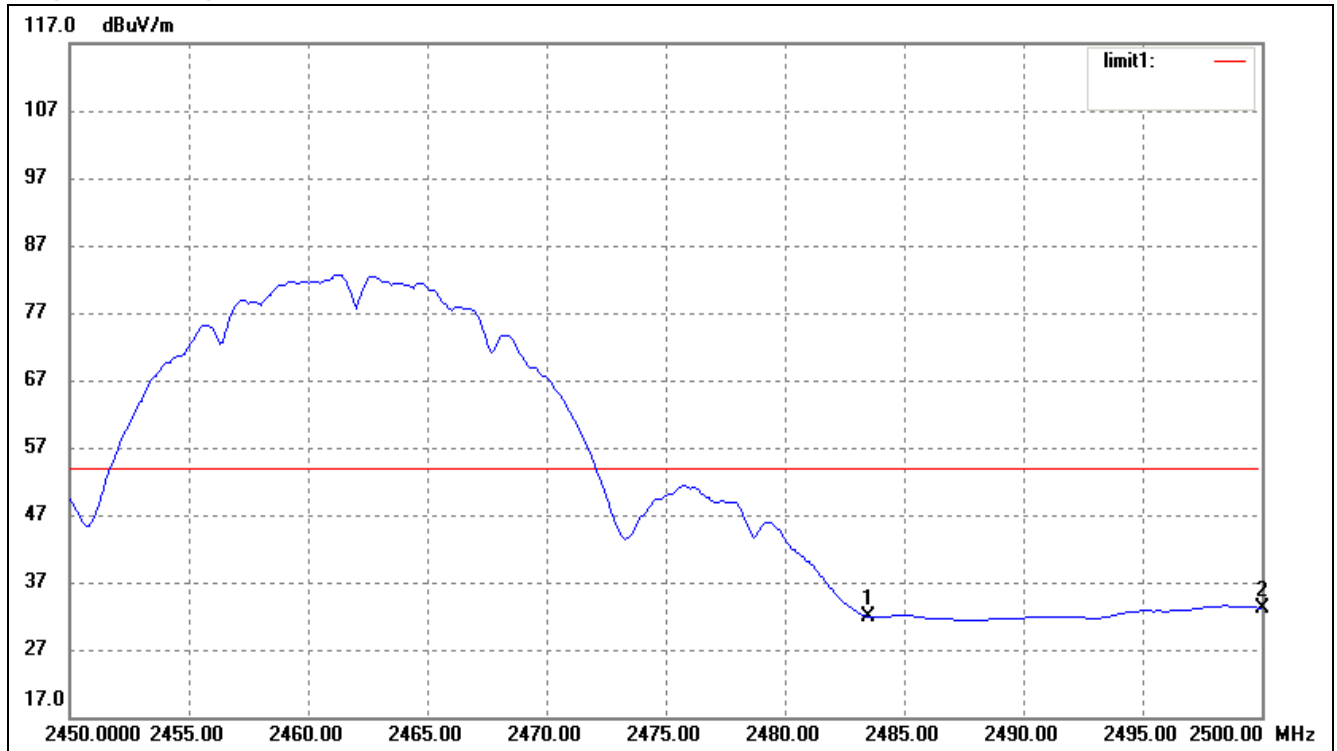
For 802.11b (Chain B)

Lowest Bandedge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	39.12	-7.51	31.61	54.00	-22.39	Average Detector
	2310.000	53.08	-7.51	45.57	74.00	-28.43	Peak Detector
2	2390.000	39.36	-7.34	32.02	54.00	-21.98	Average Detector
	2390.000	53.60	-7.34	46.26	74.00	-27.74	Peak Detector
3	2397.560	60.07	-7.31	52.76	54.00	-1.24	Average Detector
	2397.560	68.42	-7.31	61.11	74.00	-12.89	Peak Detector
4	2400.000	57.87	-7.31	50.56	/	/	Average Detector
5	2411.420	91.59	-7.28	84.31	/	/	Average Detector

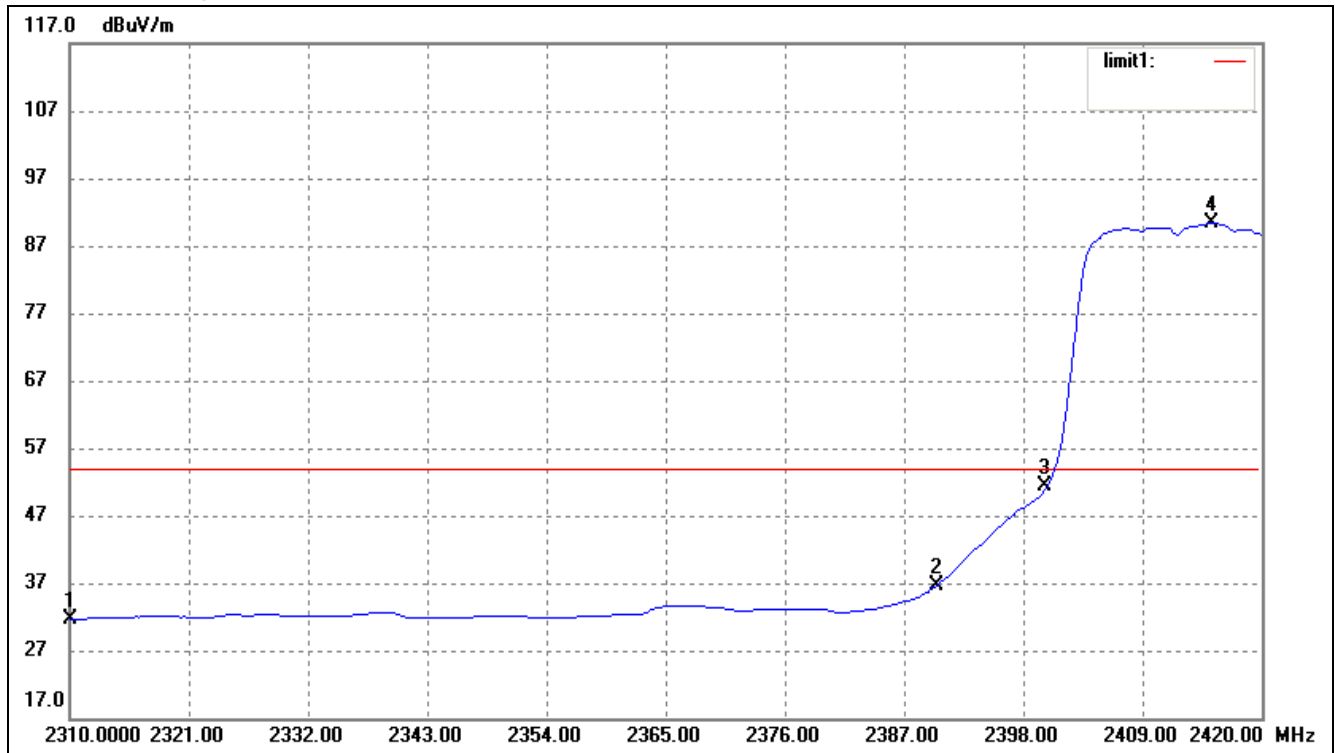
Highest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	39.02	-7.13	31.89	54.00	-22.11	Average Detector
	2483.500	52.16	-7.13	45.03	74.00	-28.97	Peak Detector
2	2500.000	40.16	-7.08	33.08	54.00	-20.92	Average Detector
	2500.000	53.91	-7.08	46.83	74.00	-27.17	Peak Detector

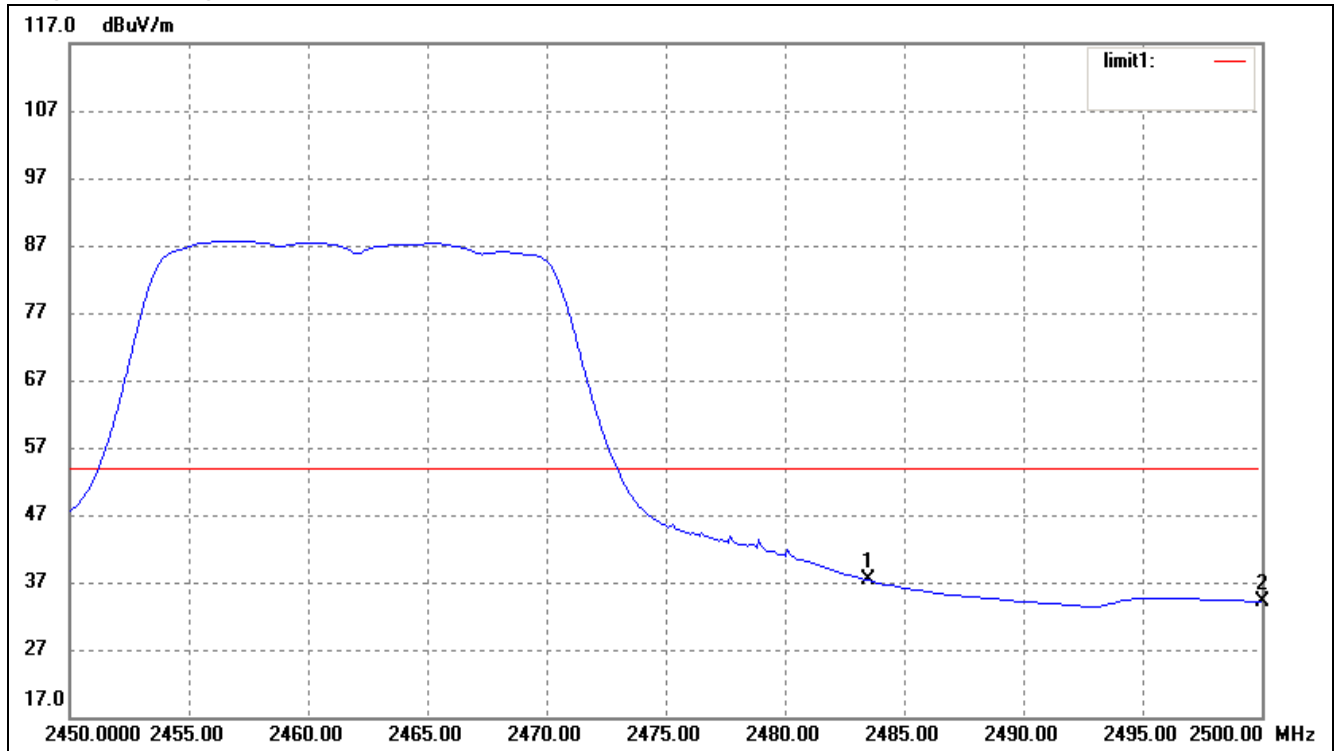
For 802.11g (Chain A)

Lowest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	39.18	-7.51	31.67	54.00	-22.33	Average Detector
	2310.000	50.71	-7.51	43.20	74.00	-30.80	Peak Detector
2	2390.000	44.07	-7.34	36.73	54.00	-17.27	Average Detector
	2390.000	62.97	-7.34	55.63	74.00	-18.37	Peak Detector
3	2400.000	58.64	-7.31	51.33	/	/	Average Detector
4	2415.380	97.67	-7.28	90.39	/	/	Average Detector

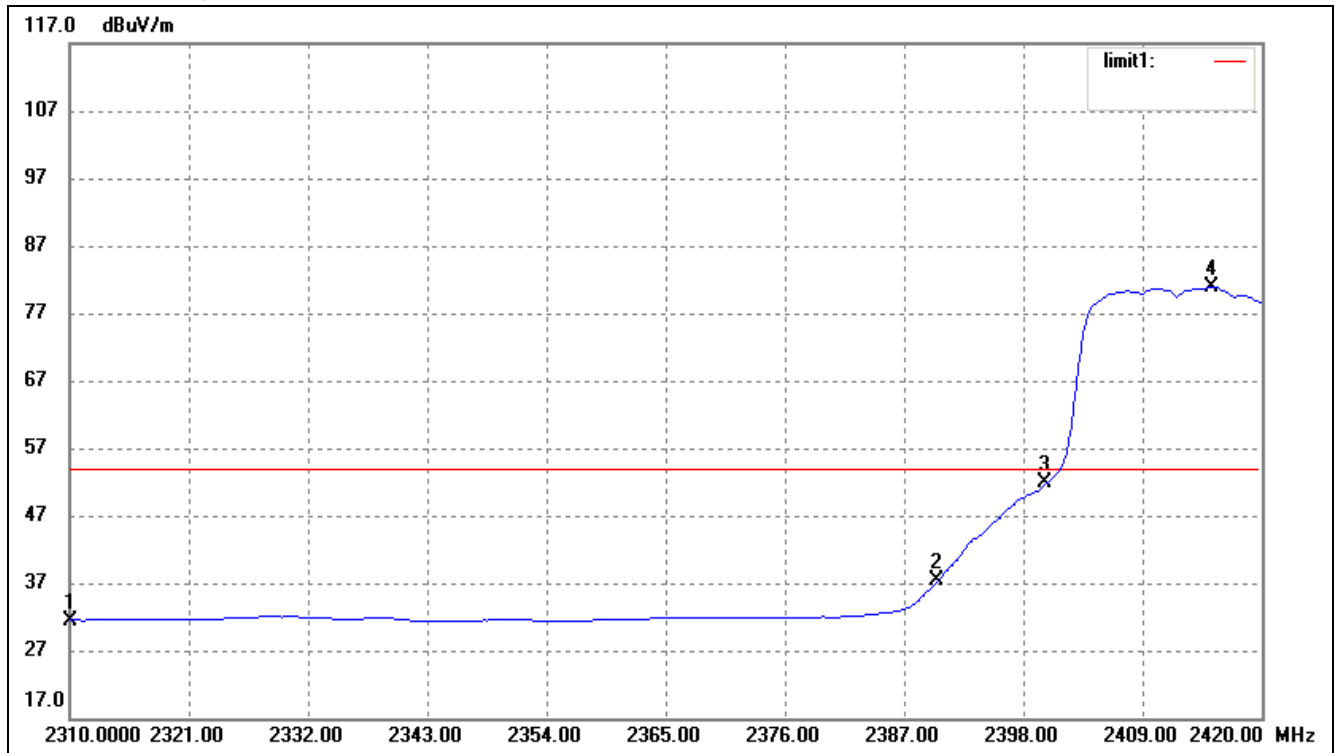
Highest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	44.40	-7.13	37.27	54.00	-16.73	Average Detector
	2483.500	63.10	-7.13	55.97	74.00	-18.03	Peak Detector
2	2500.000	41.30	-7.08	34.22	54.00	-19.78	Average Detector
	2500.000	54.60	-7.08	47.52	74.00	-26.48	Peak Detector

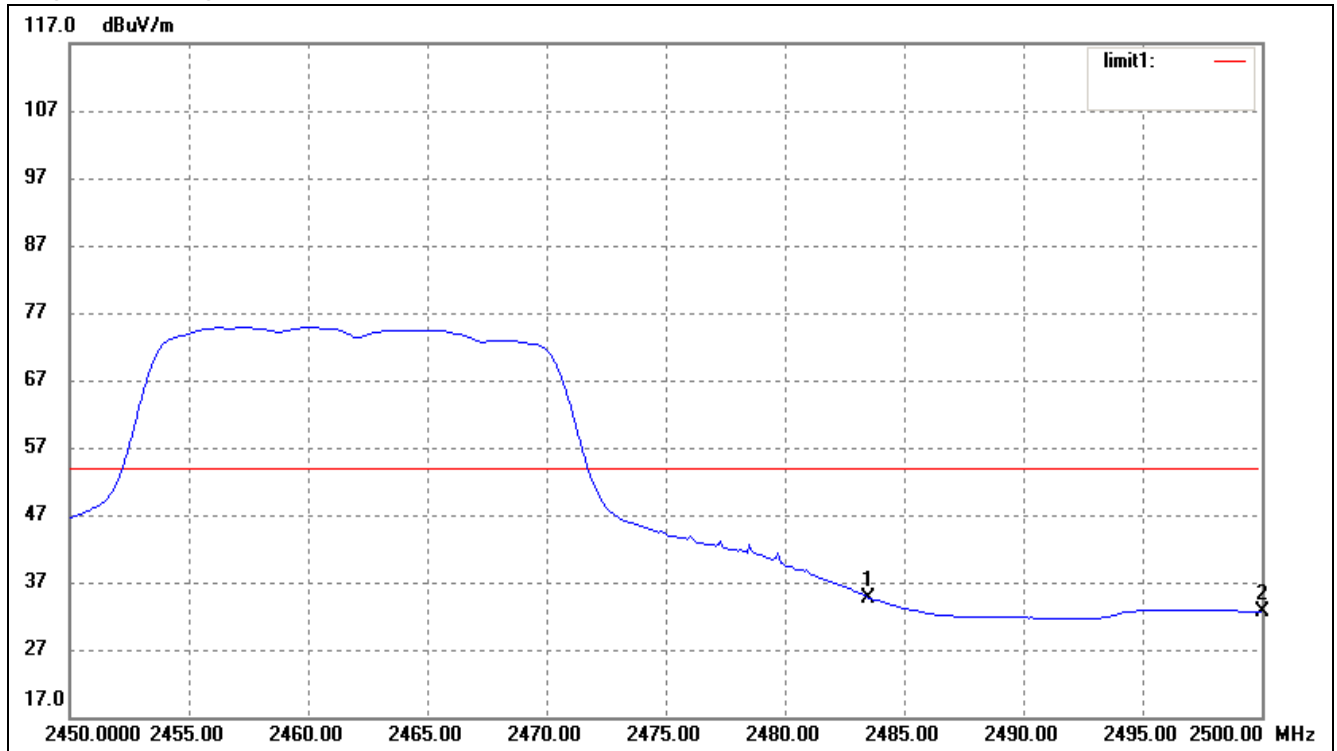
For 802.11g (Chain B)

Lowest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	39.01	-7.51	31.50	54.00	-22.50	Average Detector
	2310.000	52.13	-7.51	44.62	74.00	-29.38	Peak Detector
2	2390.000	44.63	-7.34	37.29	54.00	-16.71	Average Detector
	2390.000	63.94	-7.34	56.60	74.00	-17.40	Peak Detector
3	2400.000	59.25	-7.31	51.94	/	/	Average Detector
4	2415.380	88.17	-7.28	80.89	/	/	Average Detector

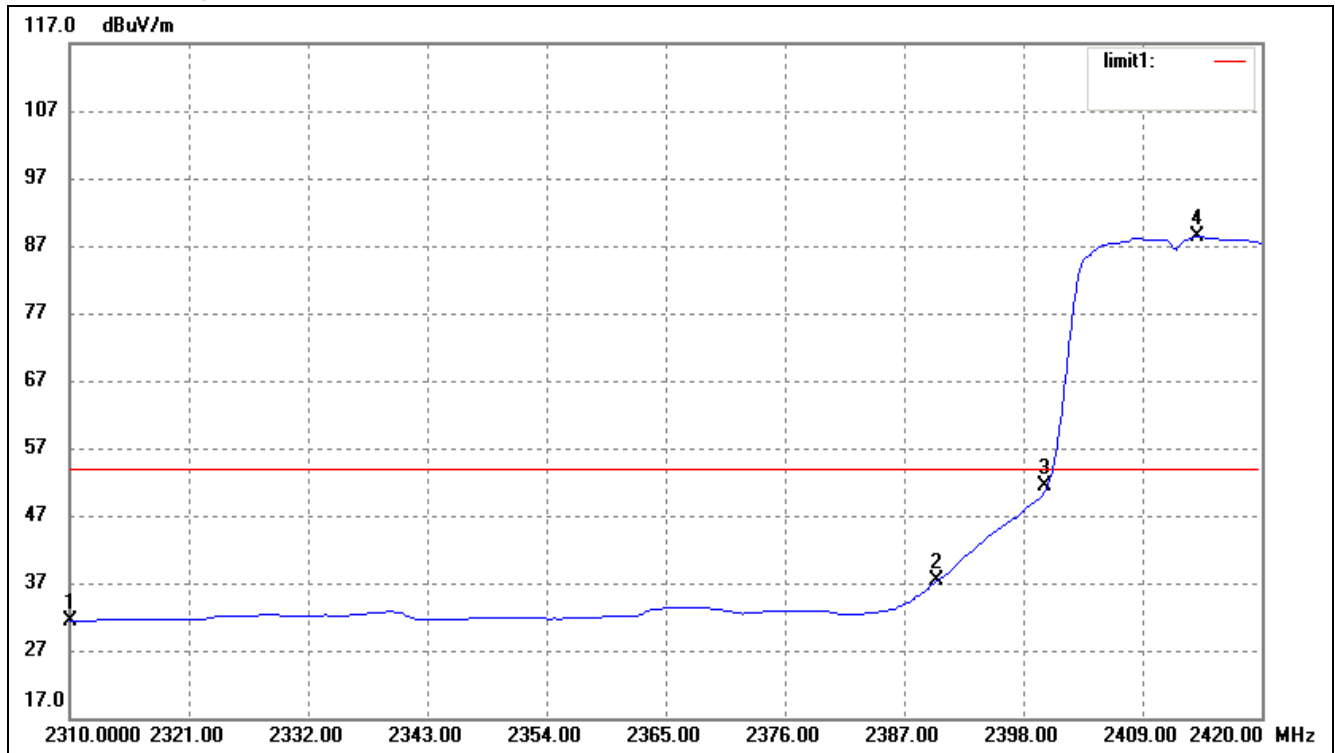
Highest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	41.87	-7.13	34.74	54.00	-19.26	Average Detector
	2483.500	58.35	-7.13	51.22	74.00	-22.78	Peak Detector
2	2500.000	39.60	-7.08	32.52	54.00	-21.48	Average Detector
	2500.000	53.99	-7.08	46.91	74.00	-27.09	Peak Detector

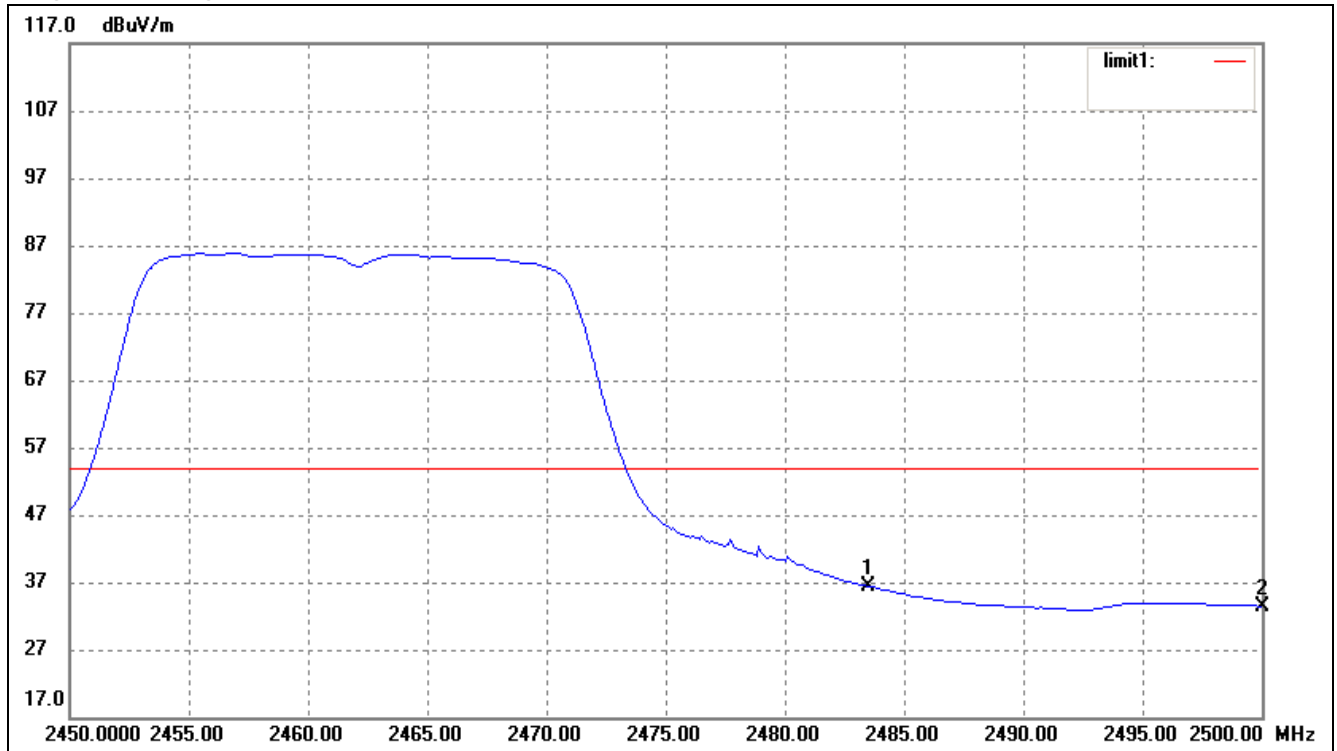
For 802.11n/HT20

Lowest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	38.91	-7.51	31.40	54.00	-22.60	Average Detector
	2310.000	52.27	-7.51	44.76	74.00	-29.24	Peak Detector
2	2390.000	44.80	-7.34	37.46	54.00	-16.54	Average Detector
	2390.000	64.47	-7.34	57.13	74.00	-16.87	Peak Detector
3	2400.000	58.67	-7.31	51.36	/	/	Average Detector
4	2414.060	95.59	-7.28	88.31	/	/	Average Detector

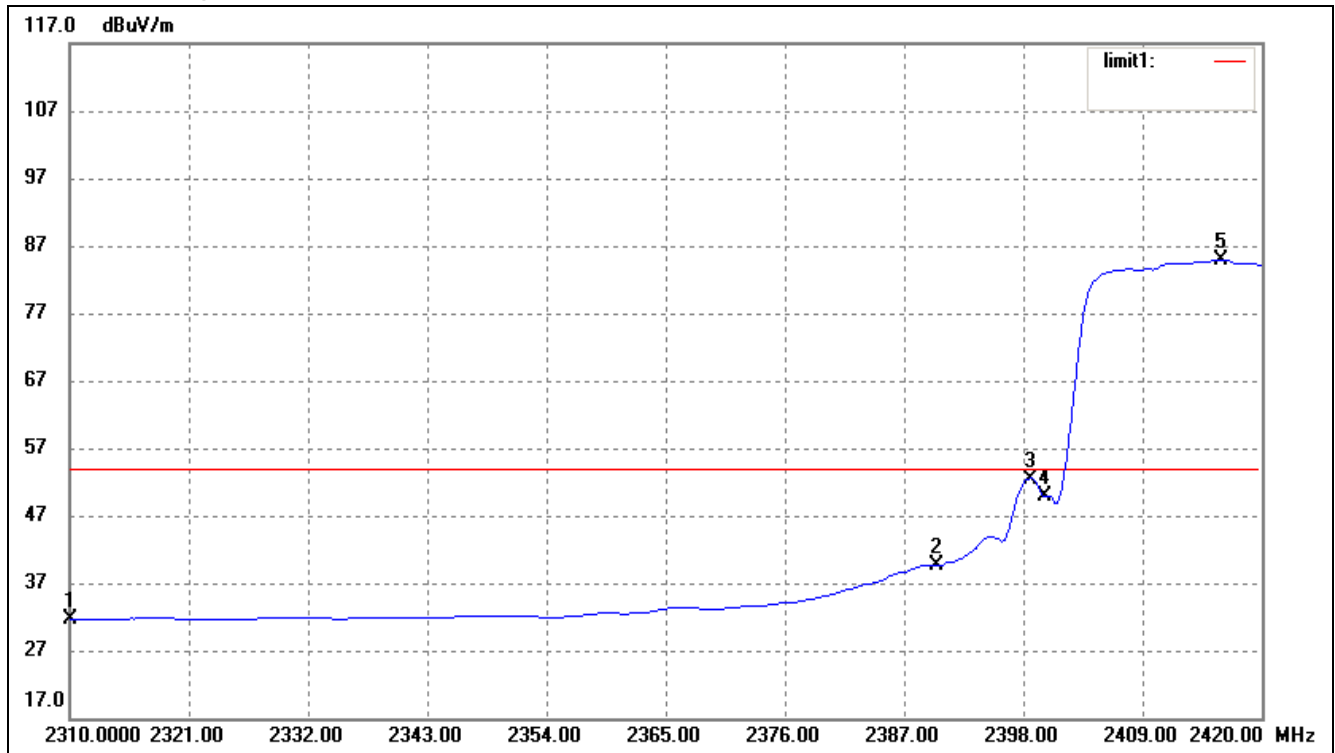
Highest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	43.53	-7.13	36.40	54.00	-17.60	Average Detector
	2483.500	60.79	-7.13	53.66	74.00	-20.34	Peak Detector
2	2500.000	40.54	-7.08	33.46	54.00	-20.54	Average Detector
	2500.000	55.47	-7.08	48.39	74.00	-25.61	Peak Detector

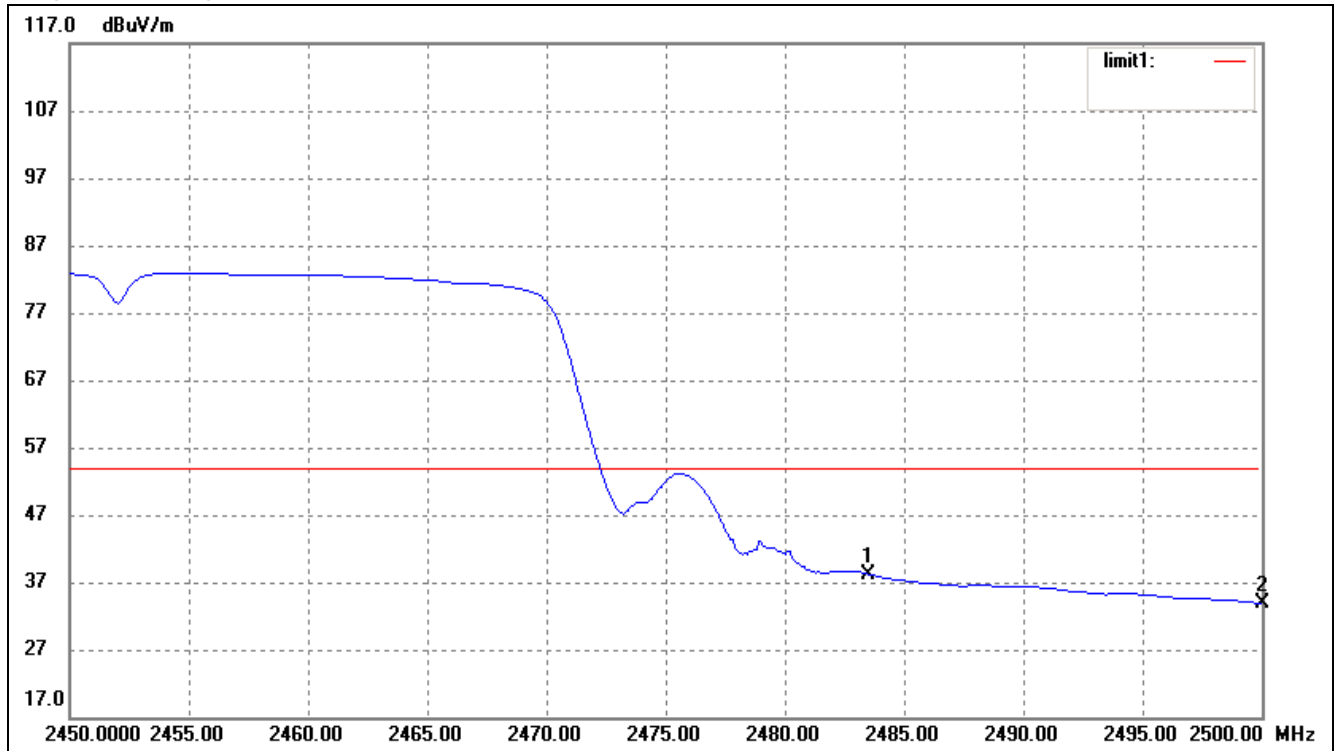
For 802.11n/HT40

Lowest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	39.05	-7.51	31.54	54.00	-22.46	Average Detector
	2310.000	51.85	-7.51	44.34	74.00	-29.66	Peak Detector
2	2390.000	46.91	-7.34	39.57	54.00	-14.43	Average Detector
	2390.000	61.31	-7.34	53.97	74.00	-20.03	Peak Detector
3	2398.660	59.81	-7.31	52.50	54.00	-1.50	Average Detector
	2398.660	71.29	-7.31	63.98	74.00	-10.02	Peak Detector
4	2400.000	57.26	-7.31	49.95	/	/	Average Detector
5	2416.260	92.23	-7.27	84.96	/	/	Average Detector

Highest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	45.33	-7.13	38.20	54.00	-15.80	Average Detector
	2483.500	60.49	-7.13	53.36	74.00	-20.64	Peak Detector
2	2500.000	41.01	-7.08	33.93	54.00	-20.07	Average Detector
	2500.000	53.79	-7.08	46.71	74.00	-27.29	Peak Detector

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