

FCC Part 15C Measurement and Test Report

For

AsiaRF Co., Ltd.

3F, No.176, Yongzhen Road, Yonghe District, New Taipei City 234, Taiwan

FCC ID: TKZAWAPN2403

FCC Rules: FCC Part 15C

Product Description: WiFi Router

Tested Model: AWAPN2403

Report No.: STR13038472I-1

Tested Date: 2013-03-18 to 2013-03-27

Issued Date: 2013-04-22

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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: AsiaRF Co., Ltd.
Address of applicant: 3F, No.176, Yongzhen Road, Yonghe District, New Taipei City 234, Taiwan
Manufacturer: AsiaRF Co., Ltd.
Address of manufacturer: 3F, No.176, Yongzhen Road, Yonghe District, New Taipei City 234, Taiwan

General Description of EUT	
Product Name:	WiFi Router
Trade Name:	ASIARF, WIODATA
Model No.:	AWAPN2403
Adding Model(s):	/
Rated Voltage:	5V DC
Power Adaptor Model:	MLF-012W0502000
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Support Standards:	802.11b/g/n
Frequency Range:	2412-2462MHz, 2422-2452MHz
RF Output Power:	17.34 dBm (Conducted)
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Modulation:	CCK, BPSK, QPSK, 16QAM, 64QAM
Quantity of Channels:	11/7
Channel Separation:	5MHz
Antenna Type:	Integral Antenna
Antenna Gain:	1.0 dBi
Lowest Internal Frequency of EUT:	40MHz
Device Category:	Mobile Device

1.2 Test Standards

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

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

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

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. The public notice KDB 558074 for digital transmission systems shall be performed also.

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 Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	802.11b	2412MHz, 2437MHz, 2462MHz
TM2	802.11g	2412MHz, 2437MHz, 2462MHz
TM3	802.11n-HT20	2412MHz, 2437MHz, 2462MHz
TM4	802.11n-HT40	2422MHz, 2437MHz, 2452MHz

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
DC Line	1.5	Unshielded	Without Core

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 15.203; § 15.247(b)(4)(i)	Antenna Requirement	Compliant
§ 15.207(a)	Conducted Emission	Compliant
§ 15.247(i) ; § 1.1307(b)(1); § 2.1093	RF Exposure	Compliant
§ 15.247(e)	Power Spectral Density	Compliant
§ 15.247(a)(2)	6 dB Bandwidth	Compliant
§ 15.247(b)(3)	RF Output Power	Compliant
§ 15.209(a)(d)	Radiated Emission	Compliant
§ 15.247(d)	Band Edge (Out of Band Emissions)	Compliant

N/A: not applicable

3. RF Exposure

3.1 Standard Applicable

According to Part 15.247(i), 1.1307(b)(1), and 2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the RF Exposure report.

4. Antenna Requirement

4.1 Standard Applicable

According to FCC Part 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 Evaluation Information

This product has a permanent antenna, fulfill the requirement of this section.

5. Power Spectral Density

5.1 Standard Applicable

According to 15.247(a)(1)(iii), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

5.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2012-03-28	2013-03-27
Attenuator	ATTEN	ATS100-4-20	/	2012-03-28	2013-03-27

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

5.3 Test Procedure

According to the KDB 558074, the test method of power spectral density as below:

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 analyzer center frequency to DTS channel center frequency.
3. Set the span to 1.5 times the DTS channel bandwidth.
4. Set the RBW ≥ 3 kHz.
5. Set the VBW $\geq 3 \times$ RBW.
6. Detector = peak.
7. Sweep time = auto couple.
8. Trace mode = max hold.
9. Allow trace to fully stabilize.
10. Use the peak marker function to determine the maximum amplitude level.
11. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.4 Environmental Conditions

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

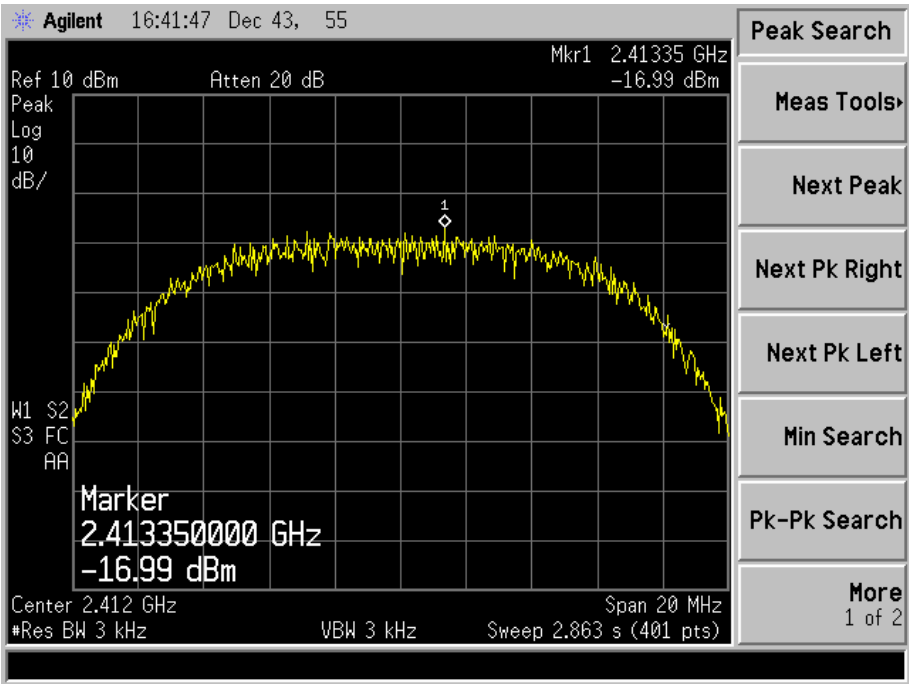
5.5 Summary of Test Results/Plots

Test mode	Test channel	Chain 0 Reading dBm/3kHz	Chain 1 Reading dBm/3kHz	Corrected dBm/3kHz	Limit dBm/3kHz
802.11b	Low channel (2412MHz)	-16.99	-16.73	-13.85	8
	Middle channel (2437MHz)	-16.82	-16.93	-13.87	8
	High channel (2462MHz)	-17.31	-15.82	-13.49	8
802.11g	Low channel (2412MHz)	-10.90	-10.78	-7.83	8
	Middle channel (2437MHz)	-10.15	-11.47	-7.75	8
	High channel (2462MHz)	-11.11	-11.41	-8.25	8
802.11n HT20 (MCS15)	Low channel (2412MHz)	-11.41	-10.69	-8.02	8
	Middle channel (2437MHz)	-12.27	-11.24	-7.95	8
	High channel (2462MHz)	-12.41	-12.39	-9.39	8
802.11n HT40 (MCS15)	Low channel (2422MHz)	-12.46	-11.96	-9.69	8
	Middle channel (2437MHz)	-12.34	-12.58	-9.45	8
	High channel (2452MHz)	-13.49	-12.84	-10.14	8

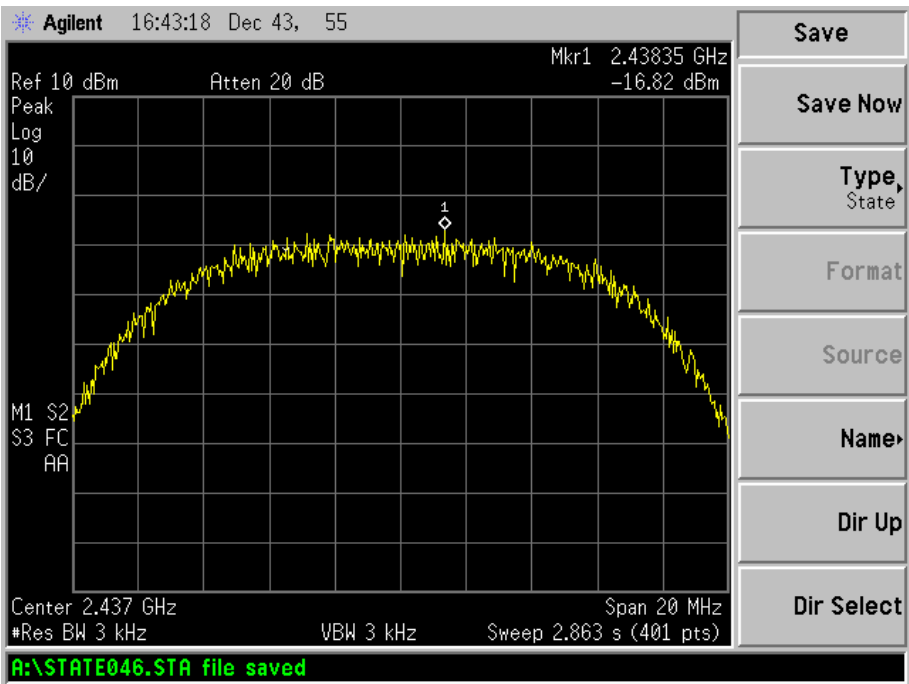
Please refer to the following test plots:

For 802.11b-chain 0

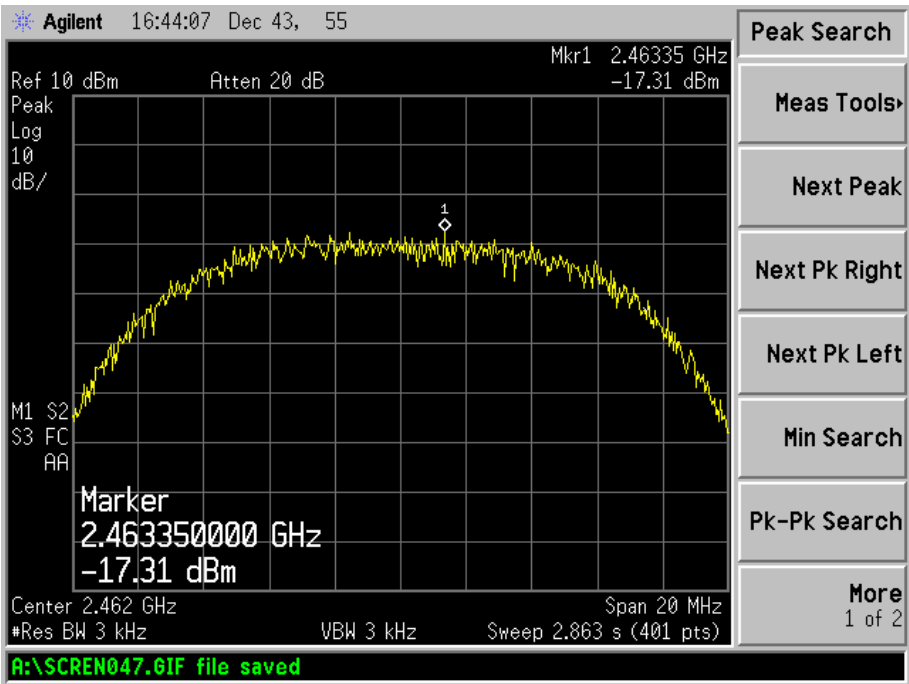
Low Channel:



Middle Channel:

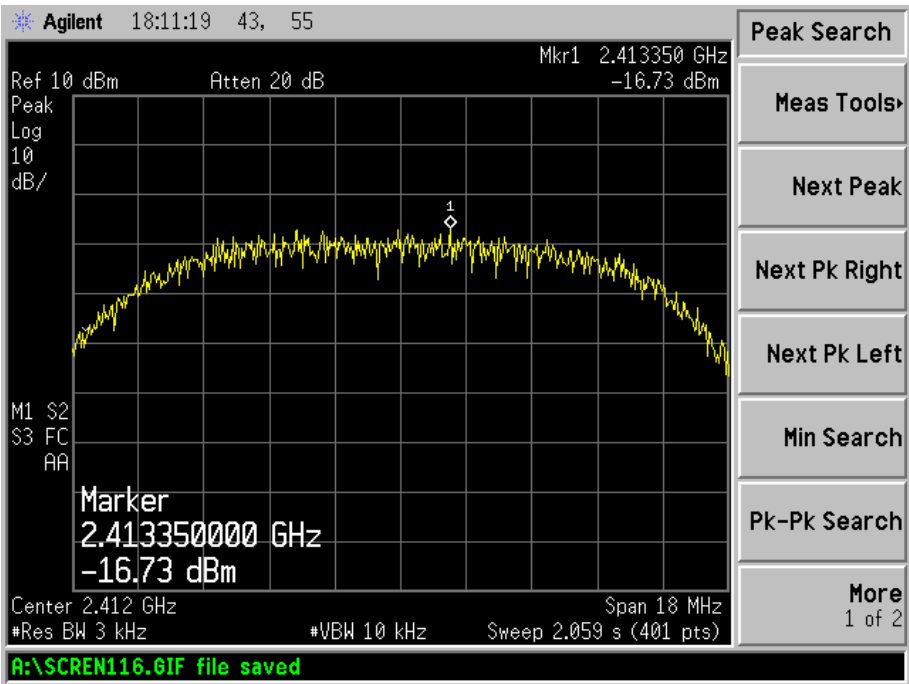


High Channel:

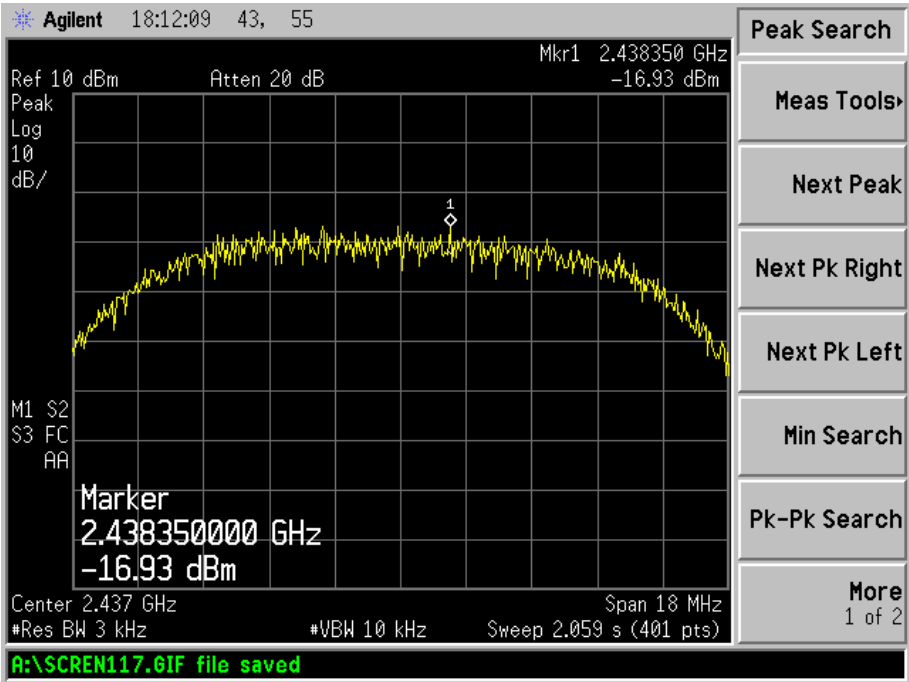


For 802.11b-chain 1

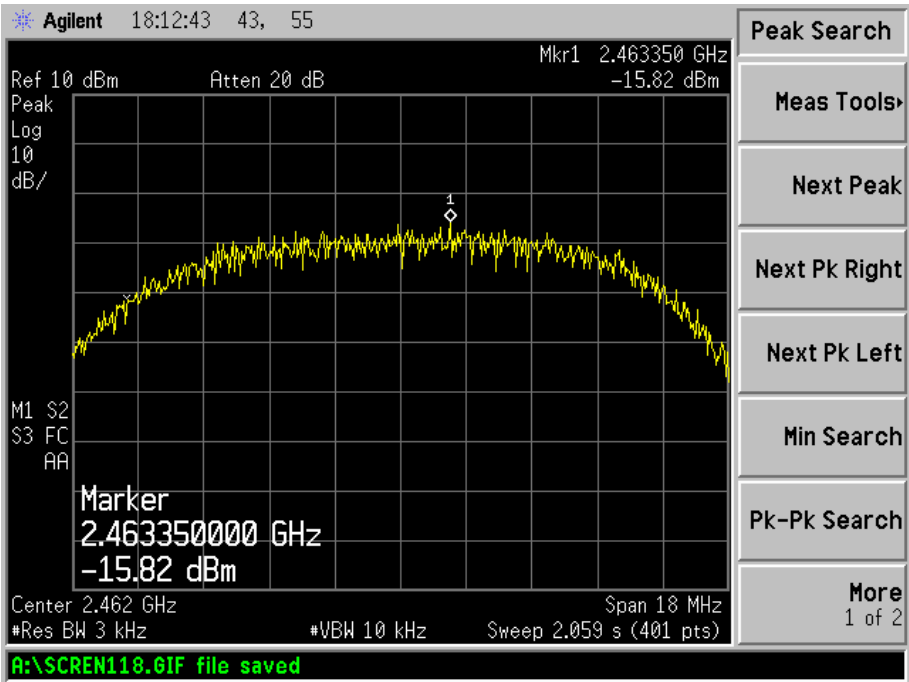
Low Channel



Middle Channel:

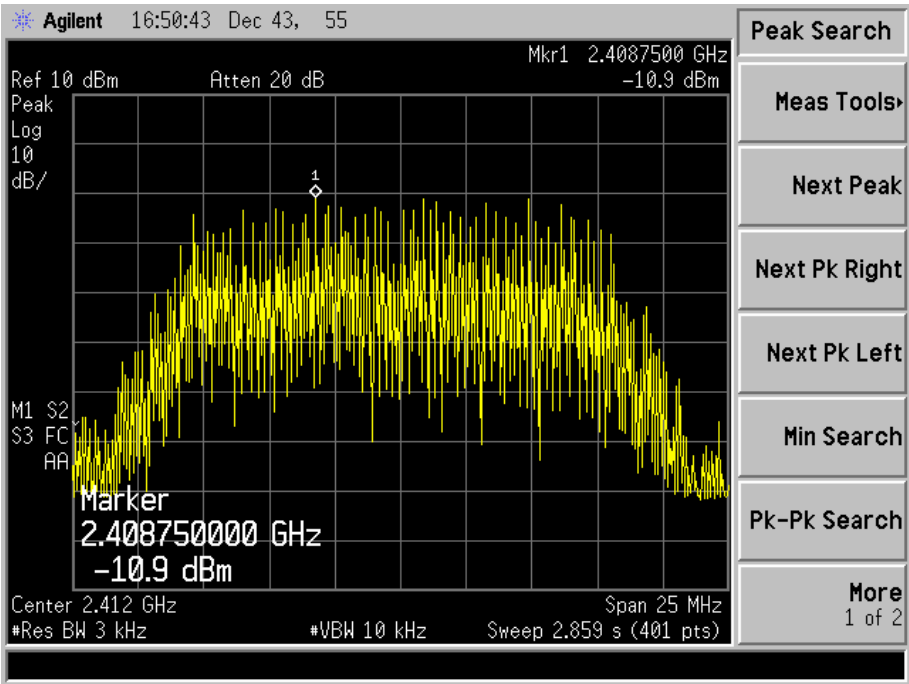


High Channel:

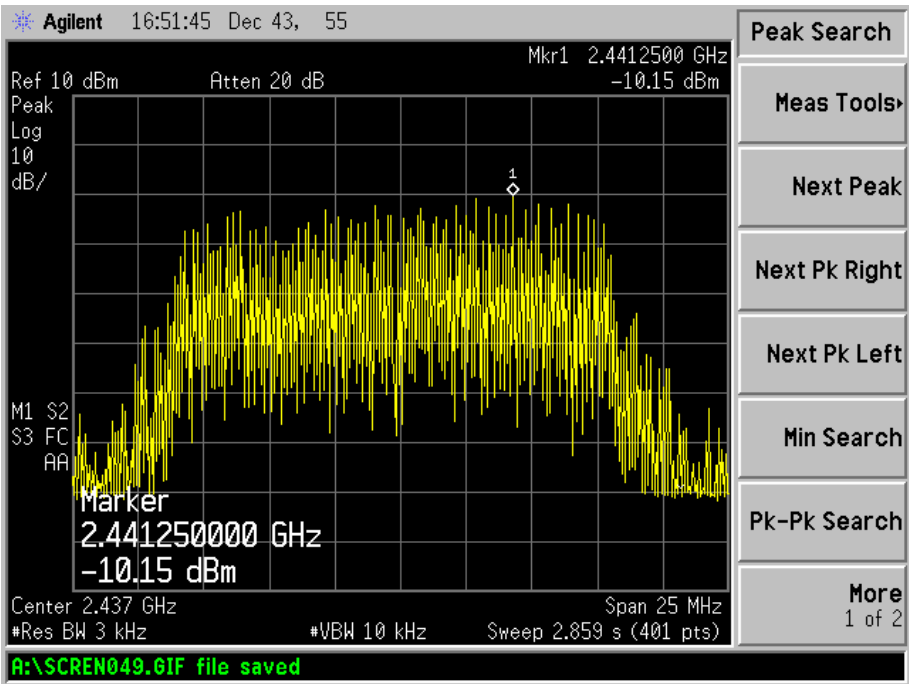


For 802.11g-chain 0

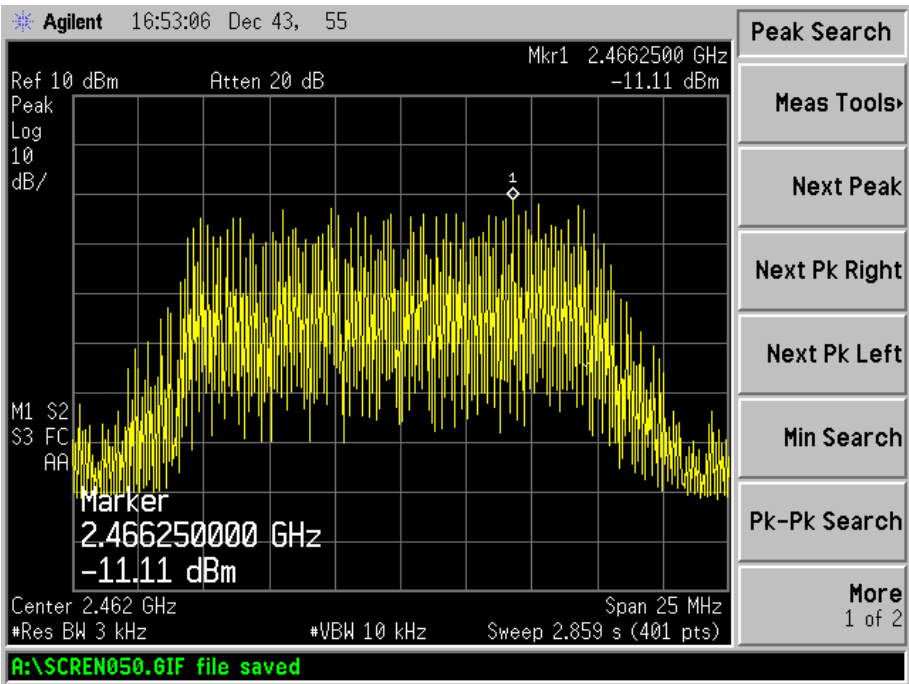
Low Channel:



Middle Channel:

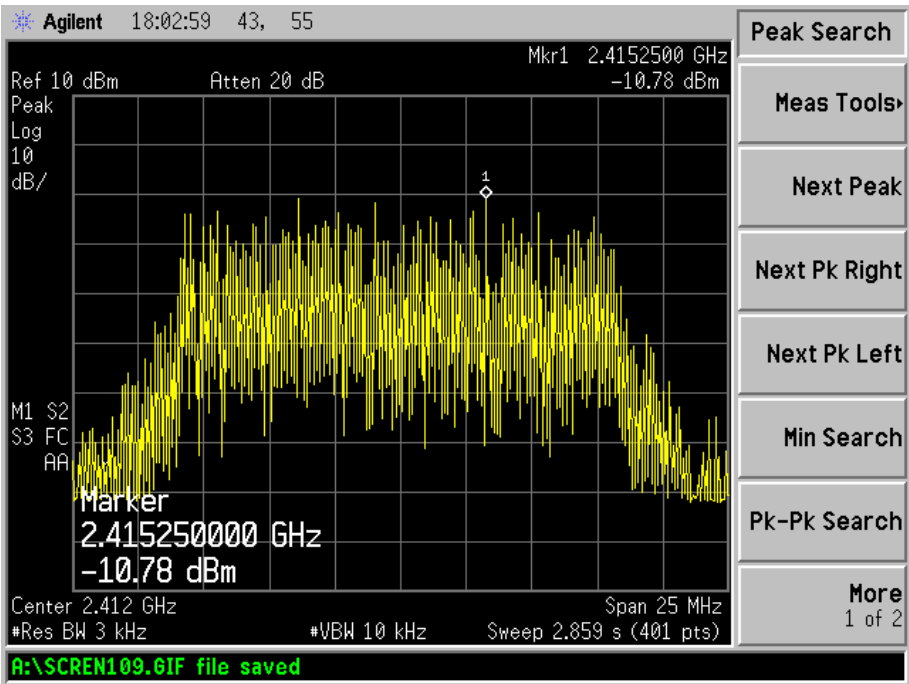


High Channel:

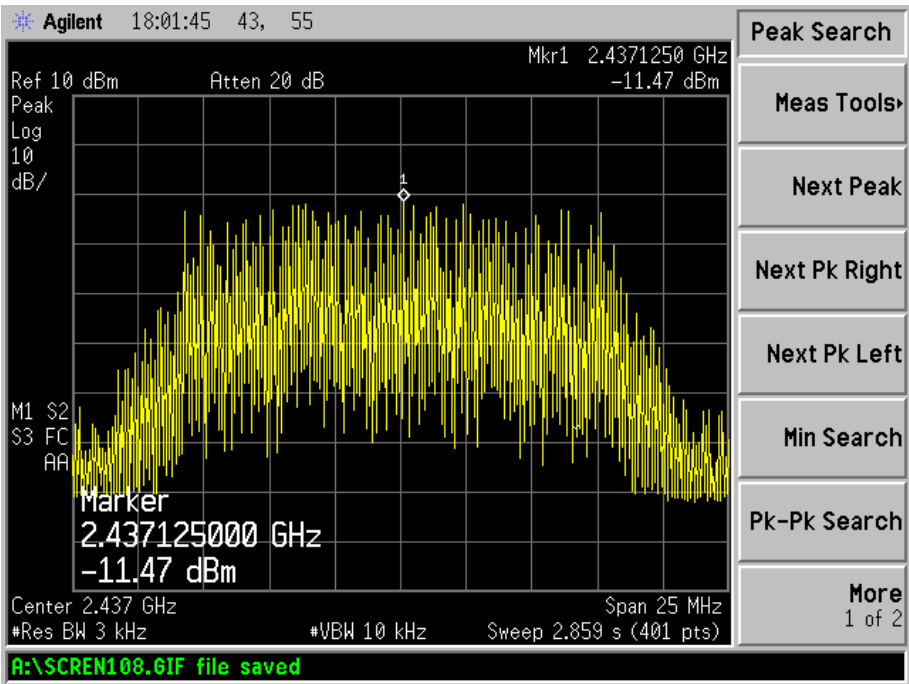


For 802.11g-chain 1

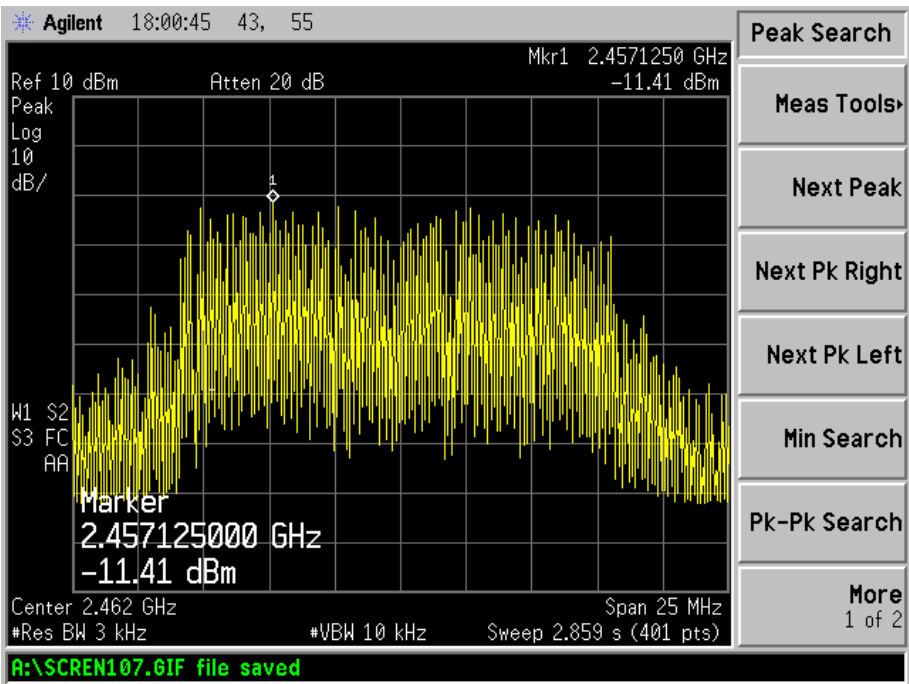
Low Channel:



Middle Channel:

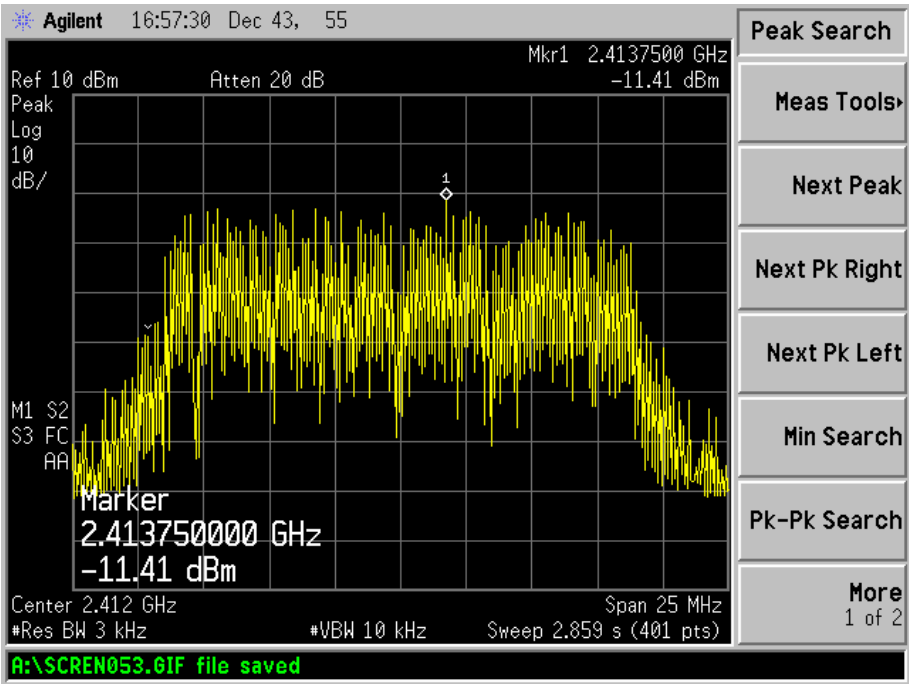


High Channel:

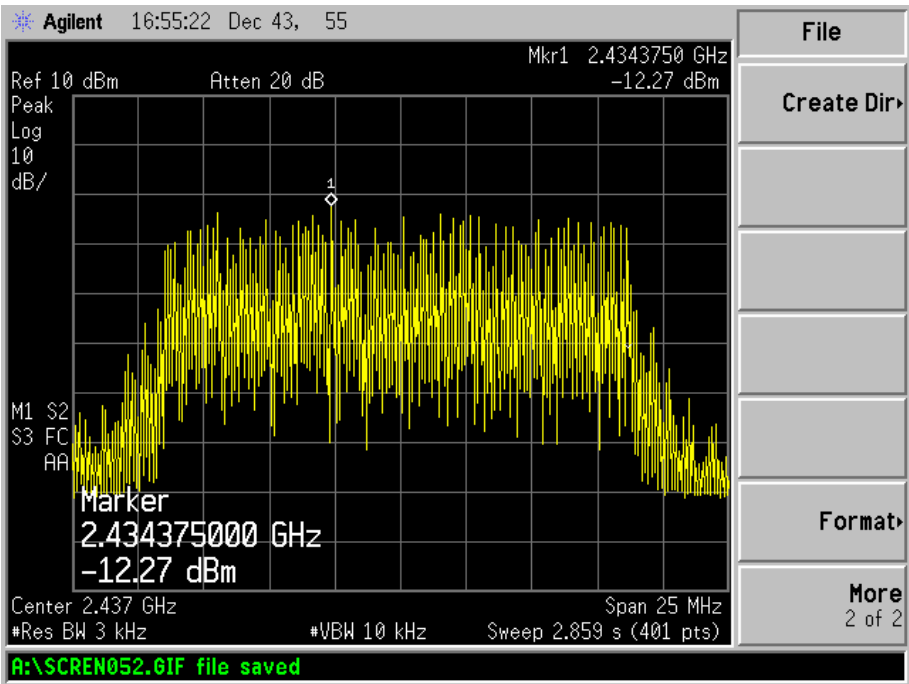


For 802.11n/HT20-chain 0

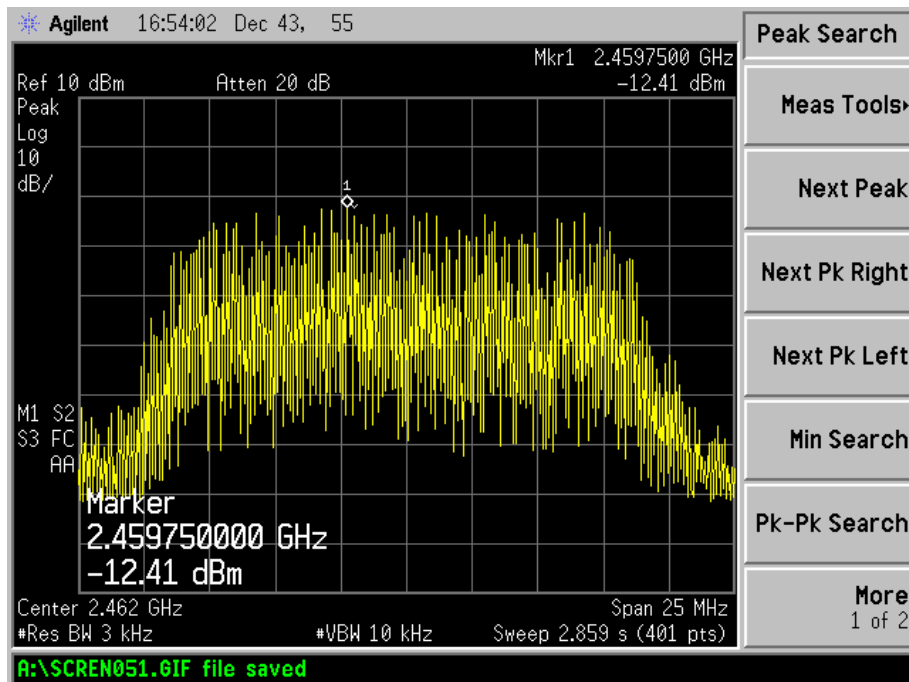
Low Channel:



Middle Channel:

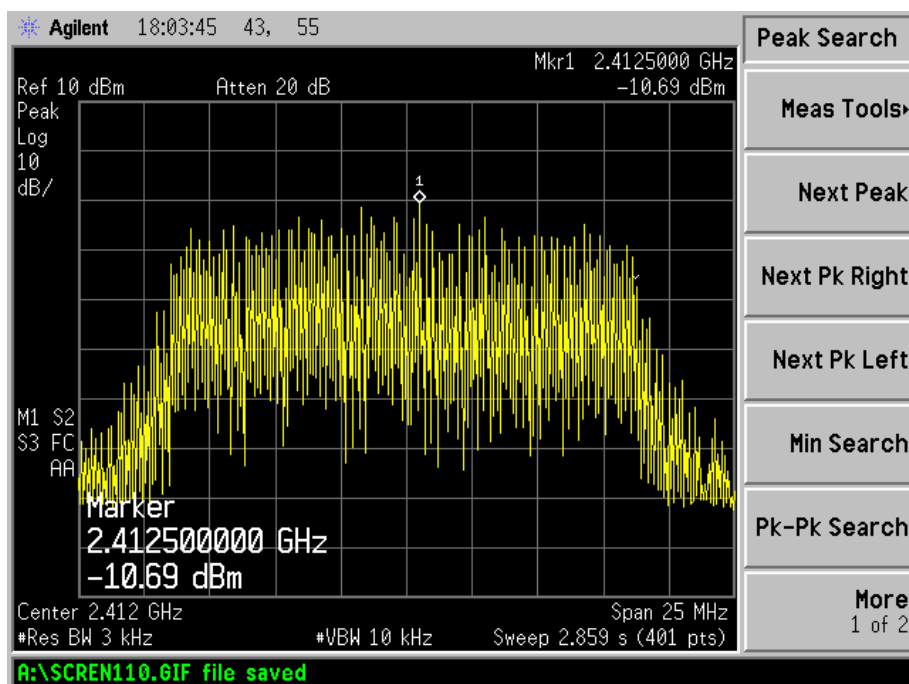


High Channel:

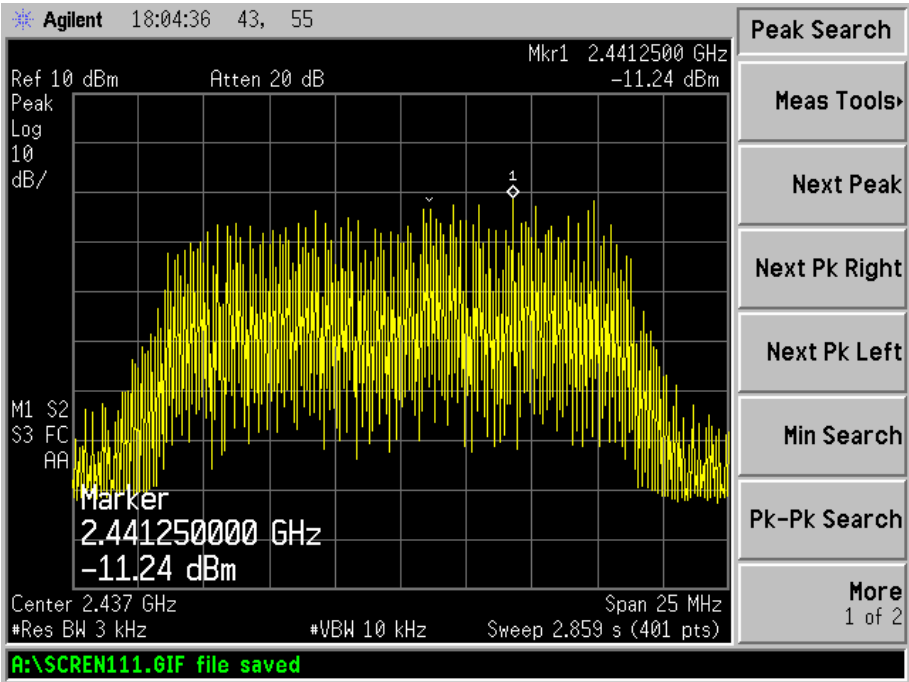


For 802.11n/HT20-chain 1

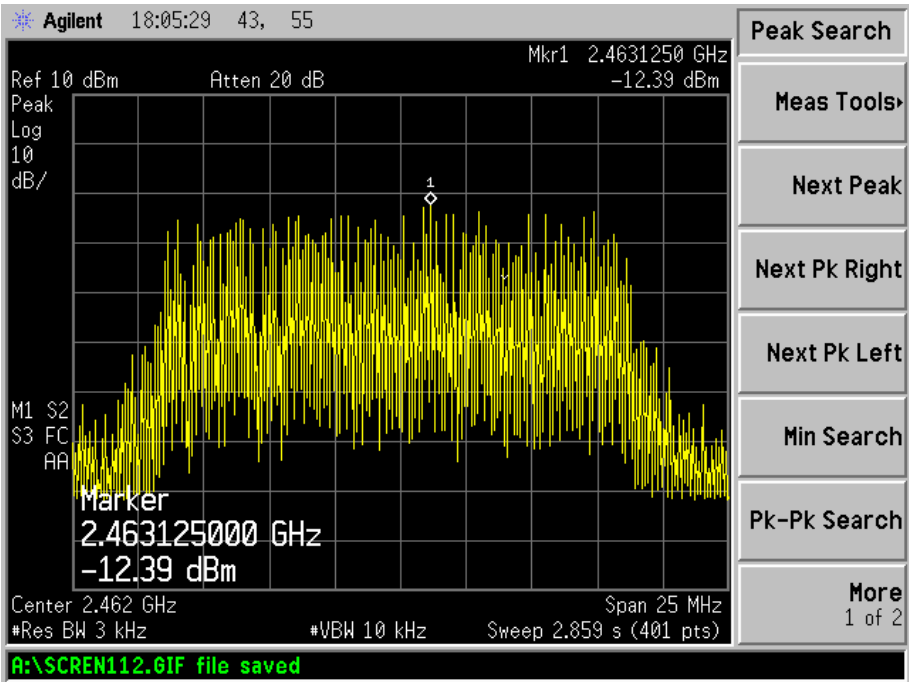
Low Channel:



Middle Channel:

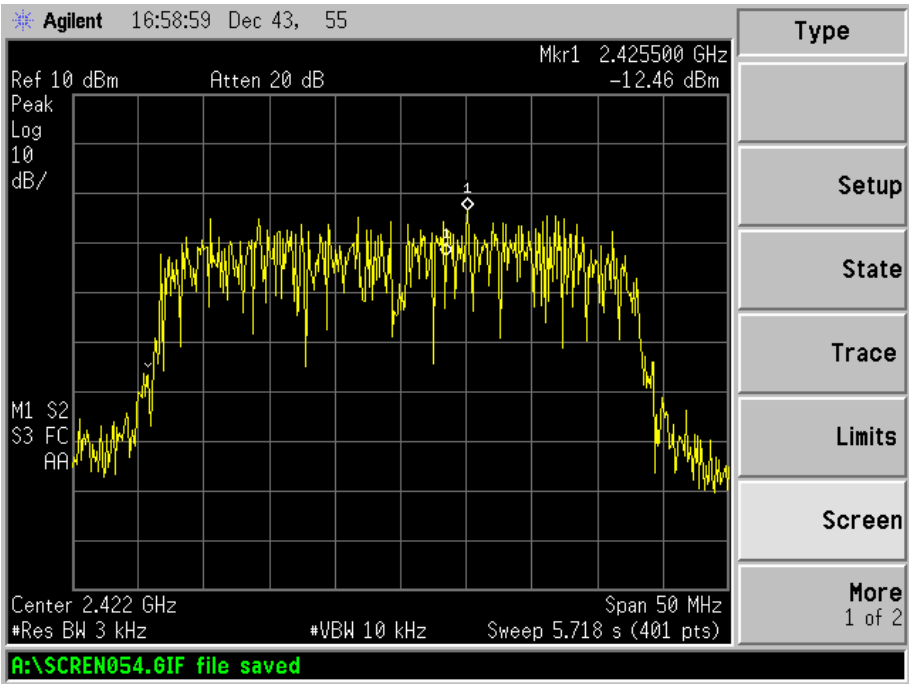


High Channel:

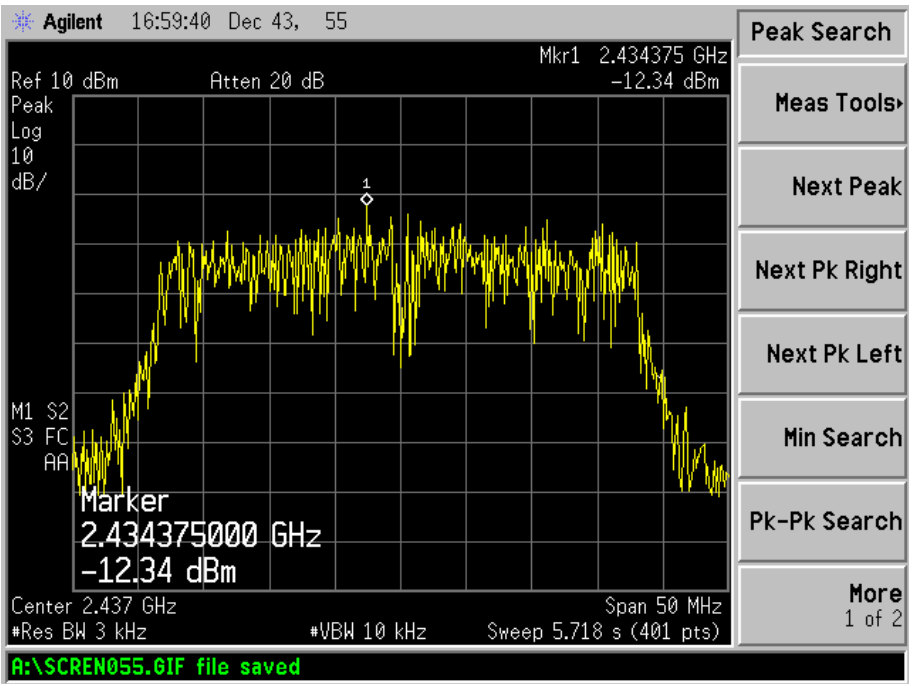


For 802.11n/HT40-chain 0

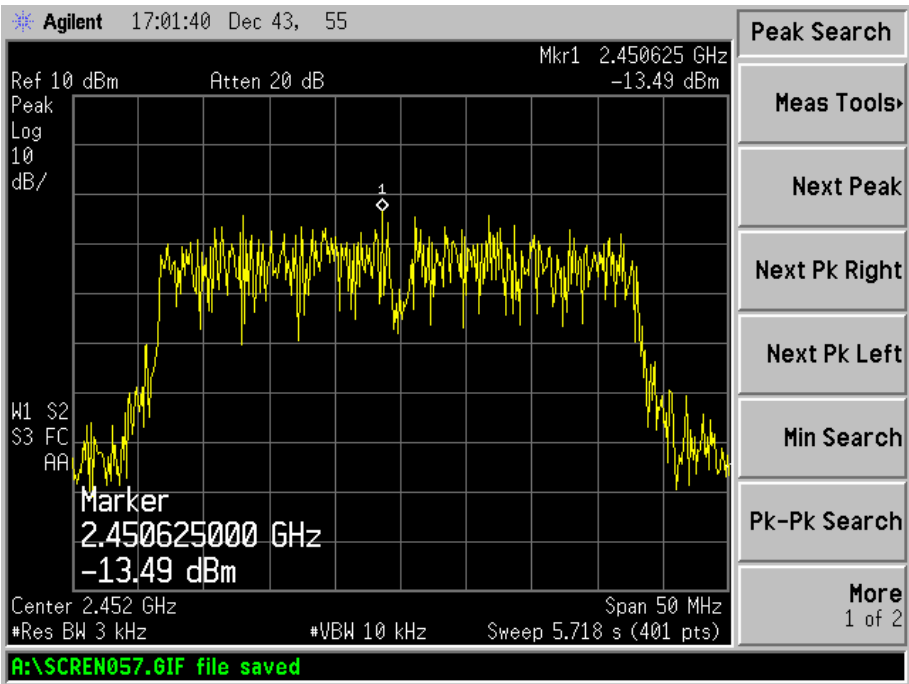
Low Channel:



Middle Channel:

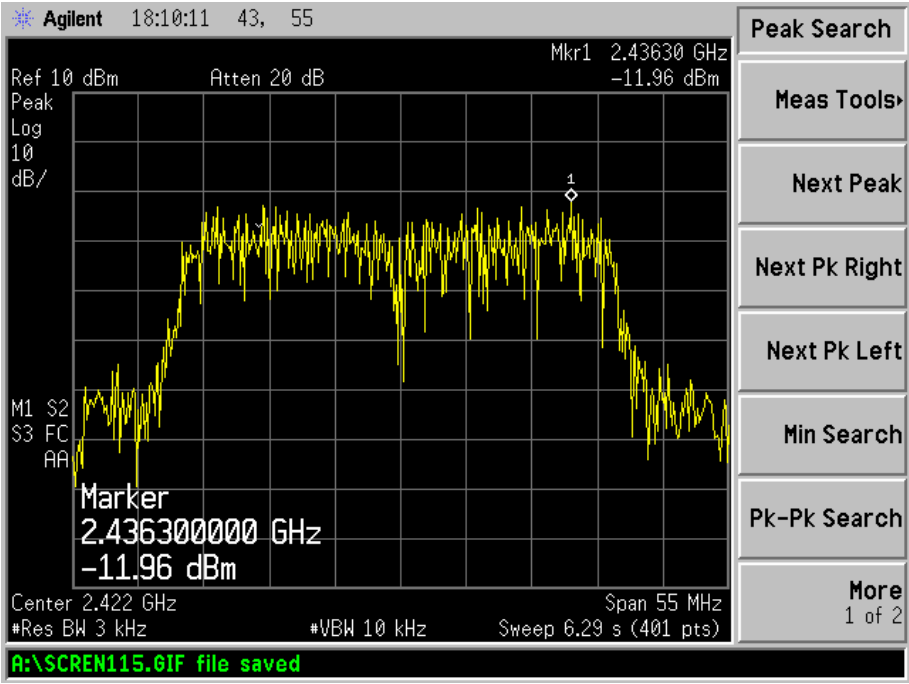


High Channel:

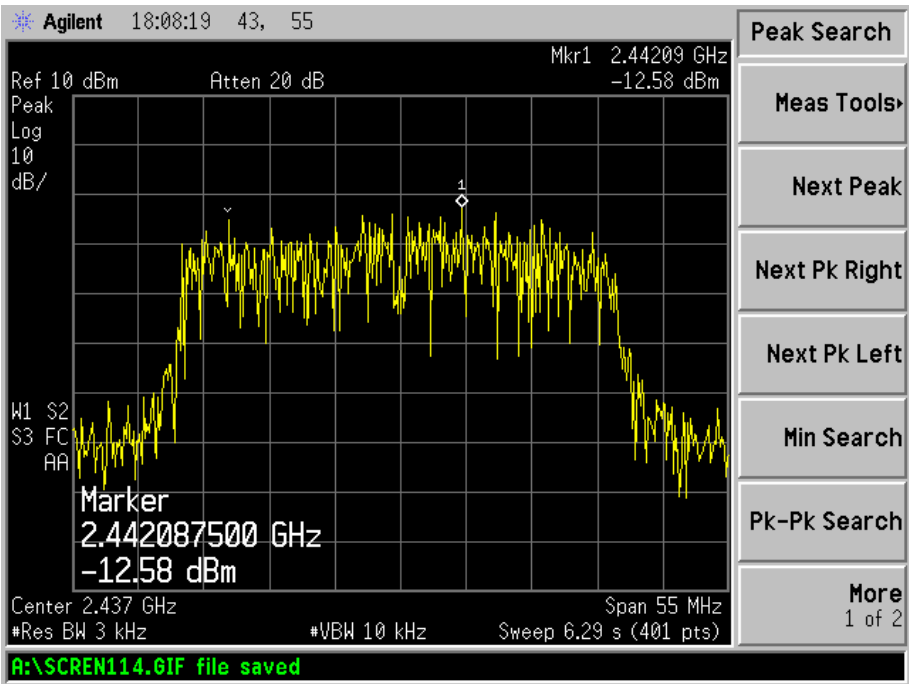


For 802.11n/HT40-chain 1

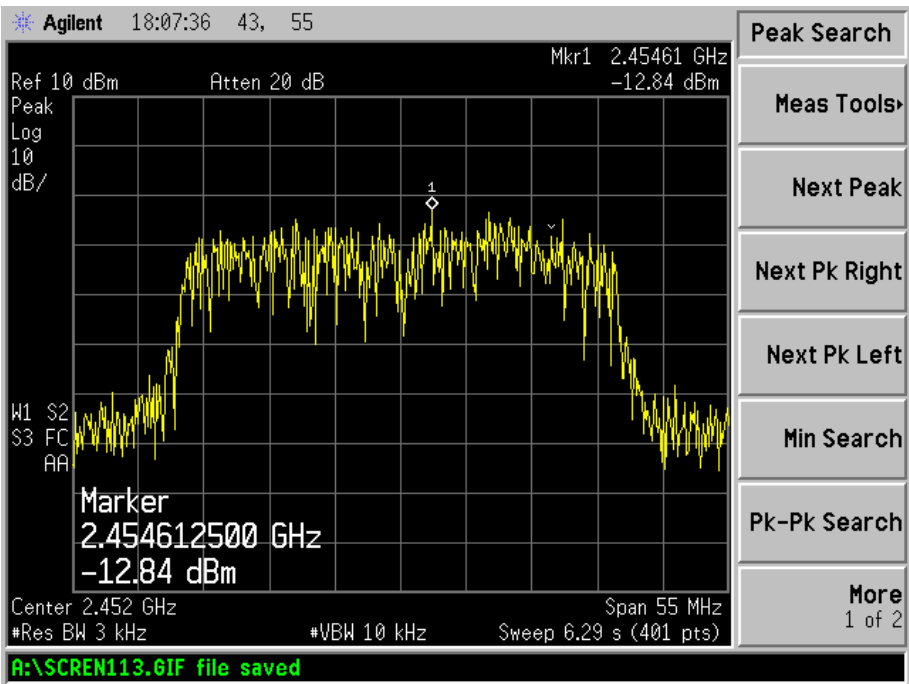
Low Channel:



Middle Channel:



High Channel:



6. 6dB Bandwidth

6.1 Standard Applicable

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

6.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2012-03-28	2013-03-27
Attenuator	ATTEN	ATS100-4-20	/	2012-03-28	2013-03-27

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

6.3 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set resolution bandwidth (RBW) = 1-5% or DTS BW, not to exceed 100 kHz.
3. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission..

6.4 Environmental Conditions

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

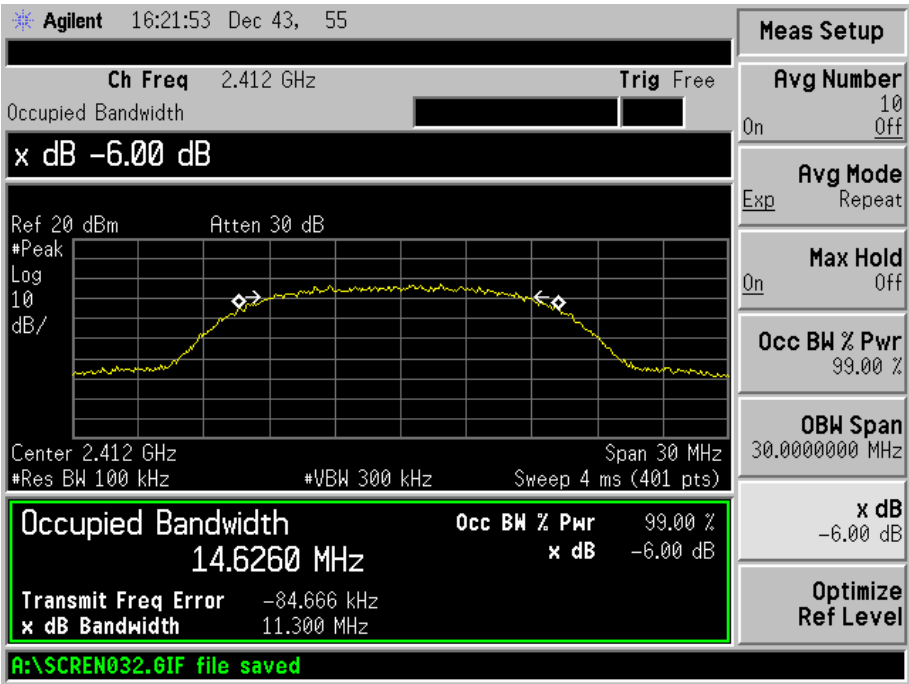
6.5 Summary of Test Results/Plots

Test mode	Frequency MHz	6 dB Bandwidth Chain 0 (kHz)	6 dB Bandwidth Chain 1 (kHz)	Limit kHz
802.11b	2412	11300	11556	500
	2437	11862	11192	500
	2462	11309	11976	500
802.11g	2412	14281	15975	500
	2437	16142	15339	500
	2462	14873	15267	500
802.11n HT20	2412	17083	15444	500
	2437	16188	15620	500
	2462	16475	16725	500
802.11n HT40	2422	34876	34195	500
	2437	33752	33234	500
	2452	32315	34124	500

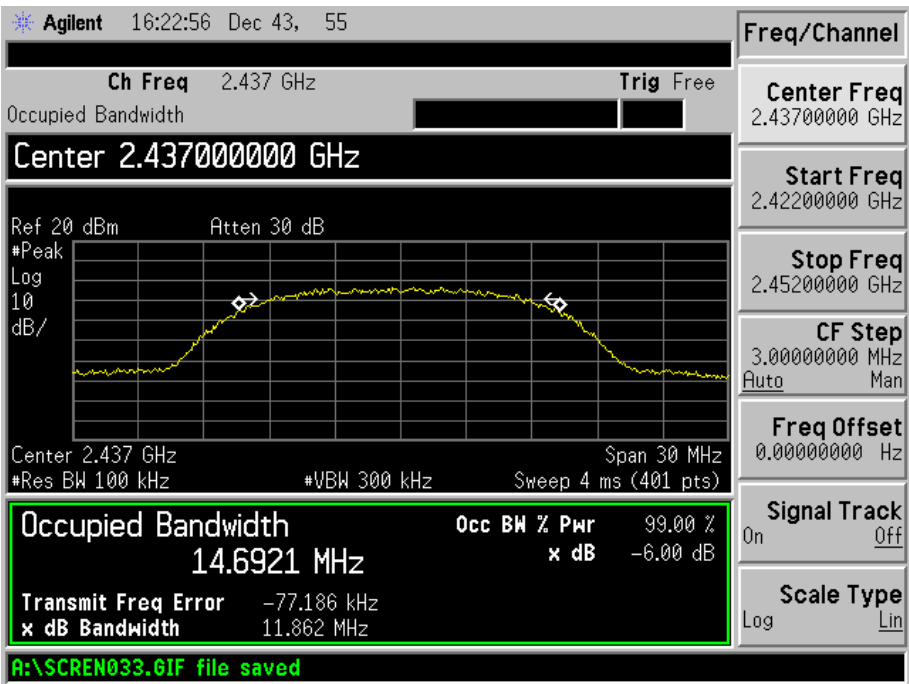
Please refer to the following test plots:

For 802.11b-chain 0

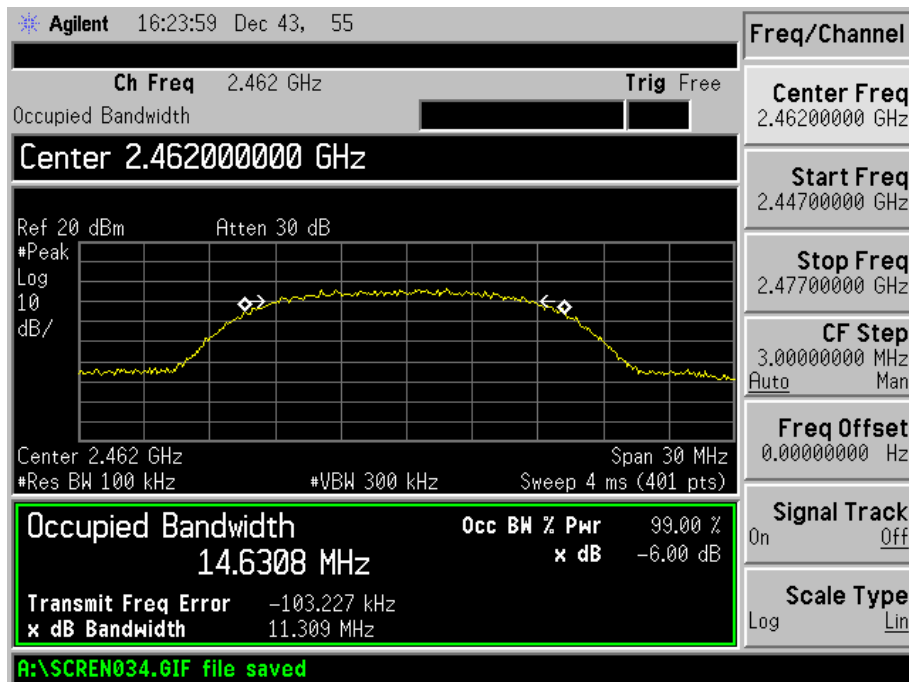
Low Channel:



Mid Channel:

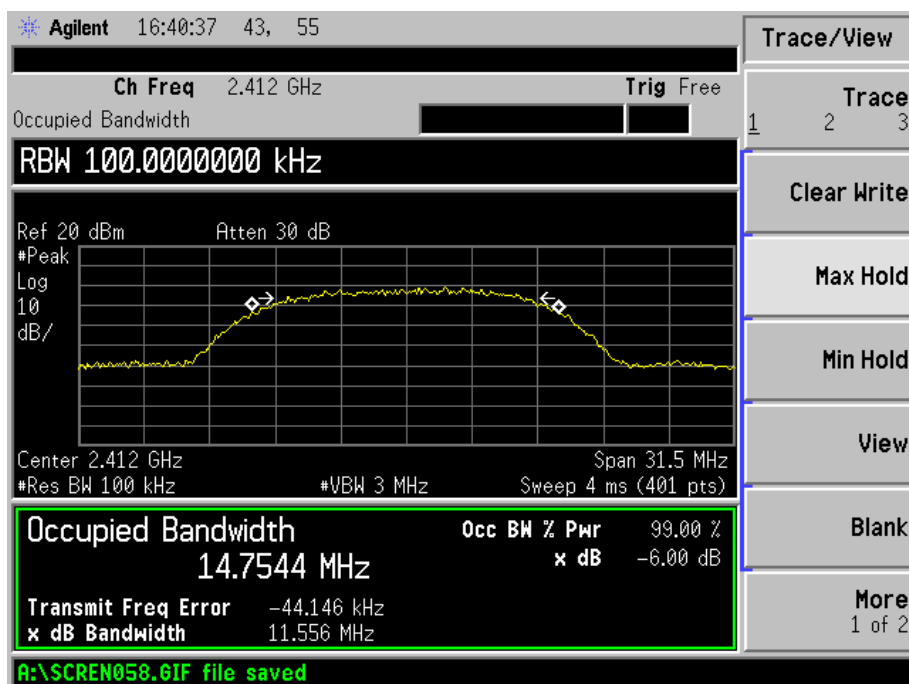


High Channel:

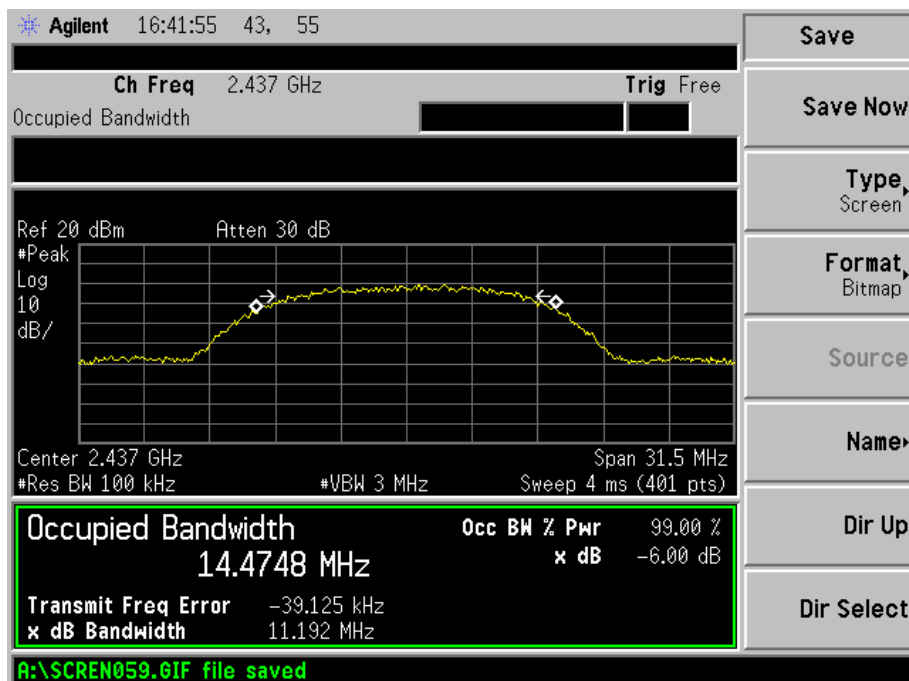


For 802.11b-chain 1

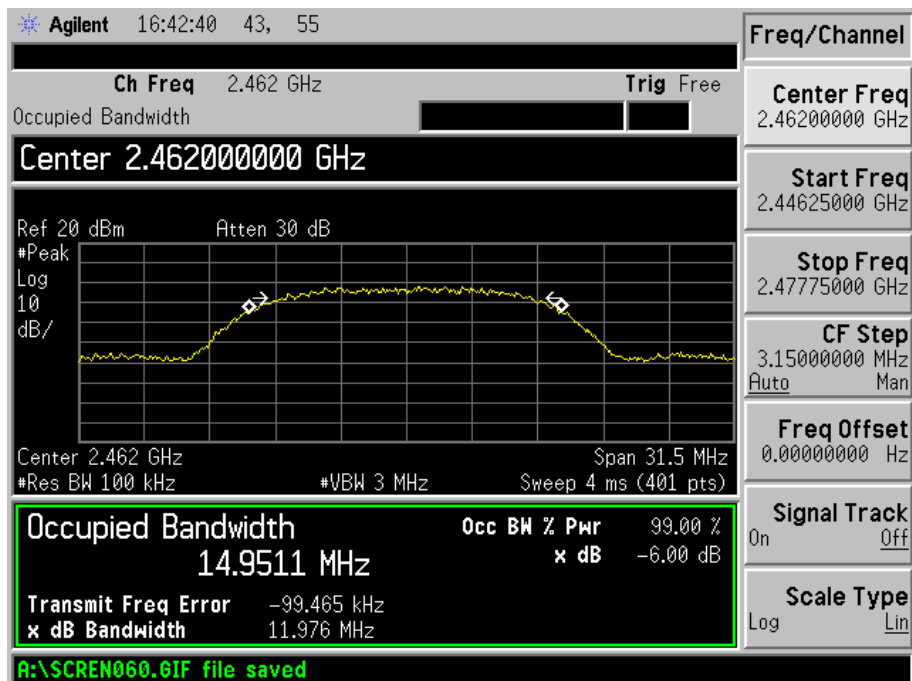
Low Channel:



Middle Channel:

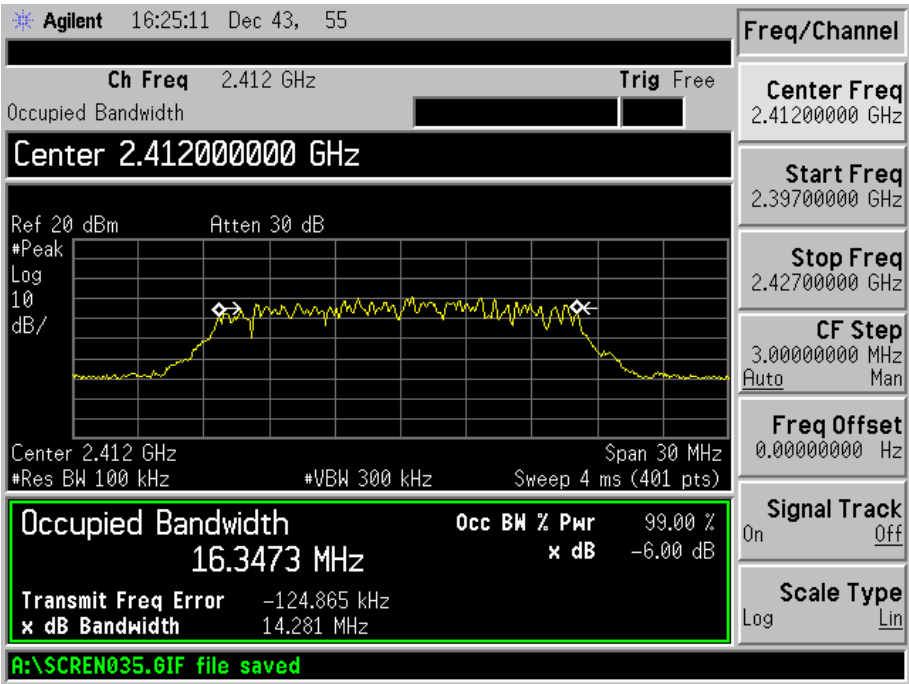


High Channel:

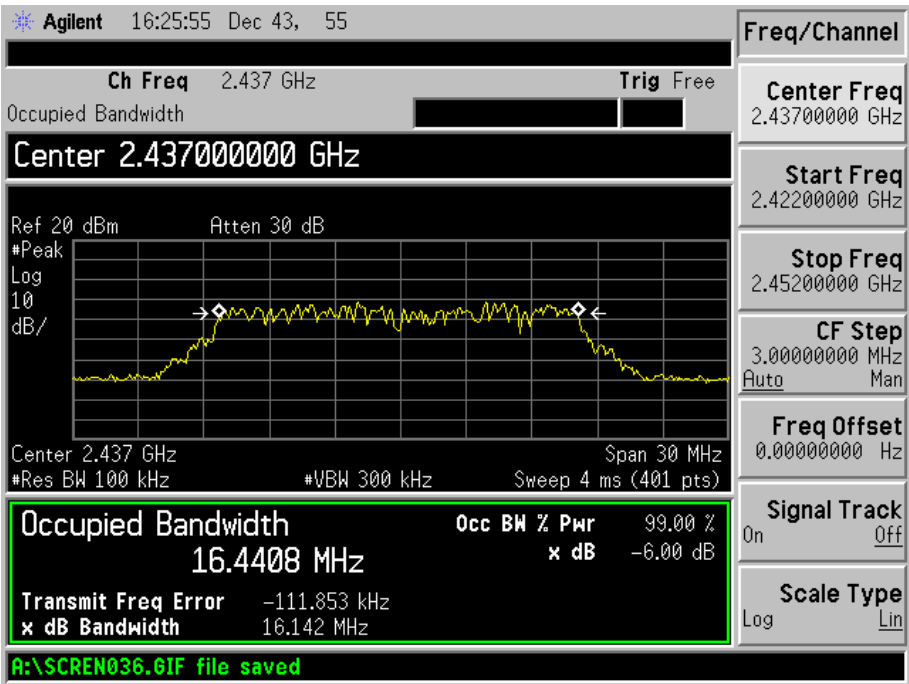


For 802.11g-chain 0

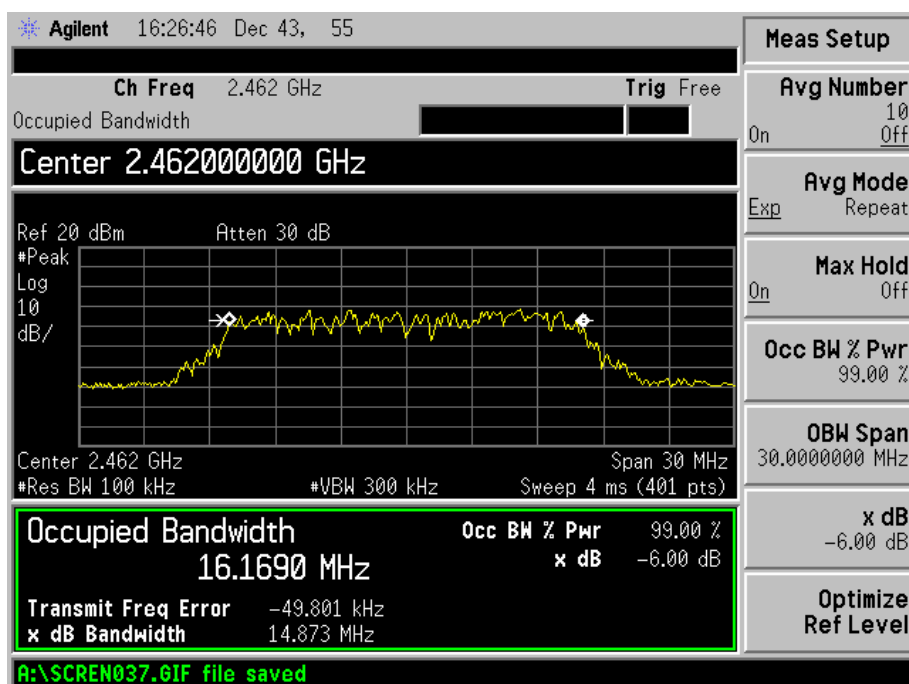
Low Channel:



Mid Channel:

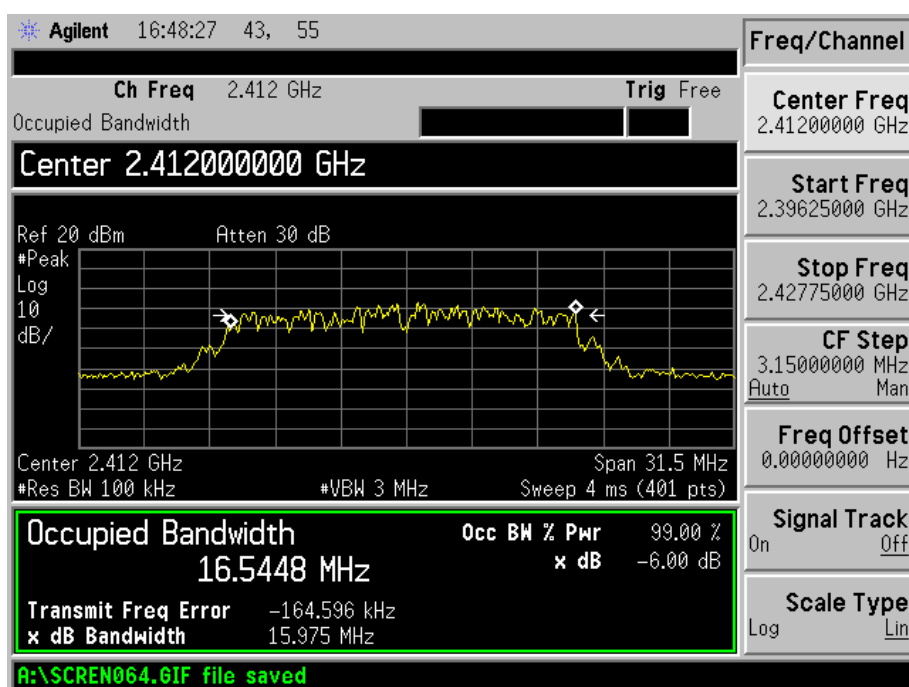


High Channel:

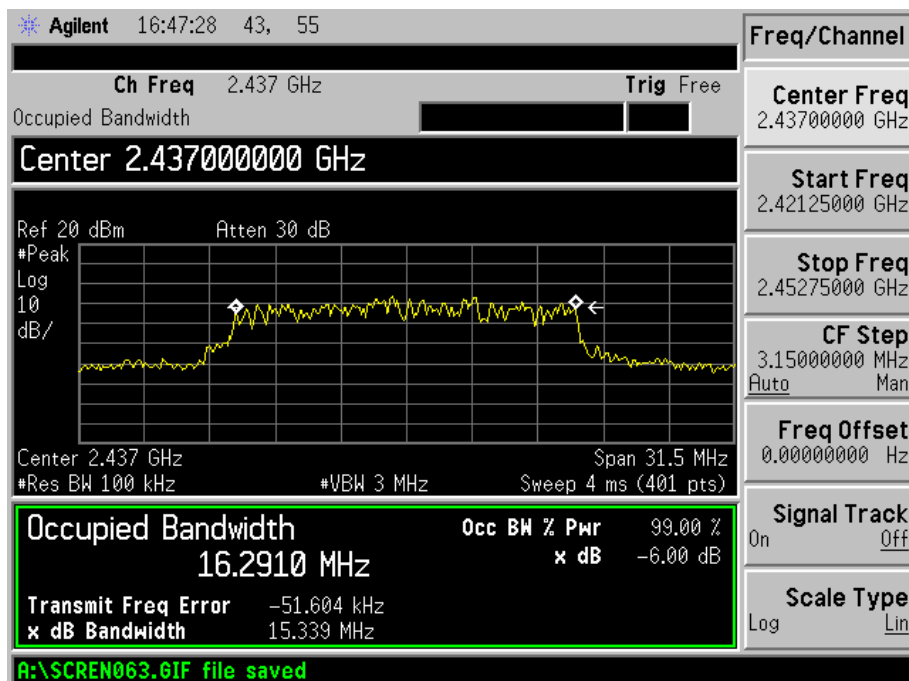


For 802.11g-chain 1

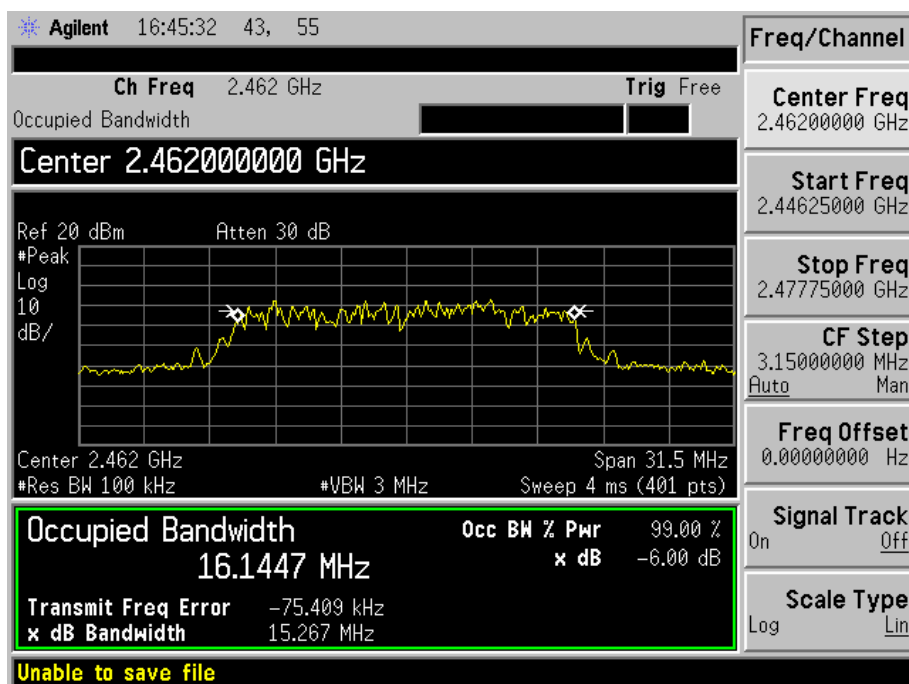
Low Channel:



Middle Channel:

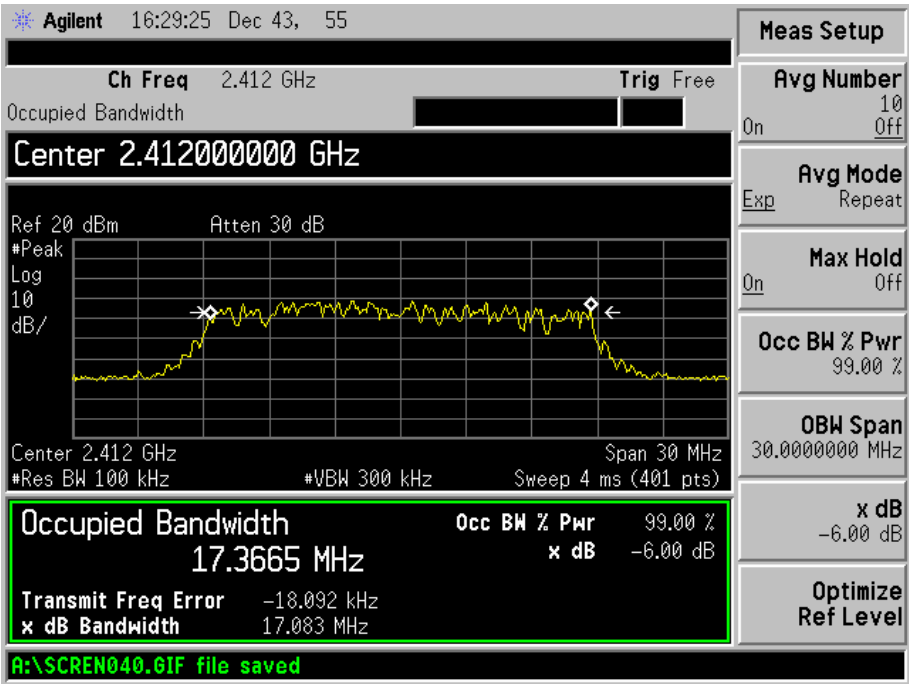


High Channel:

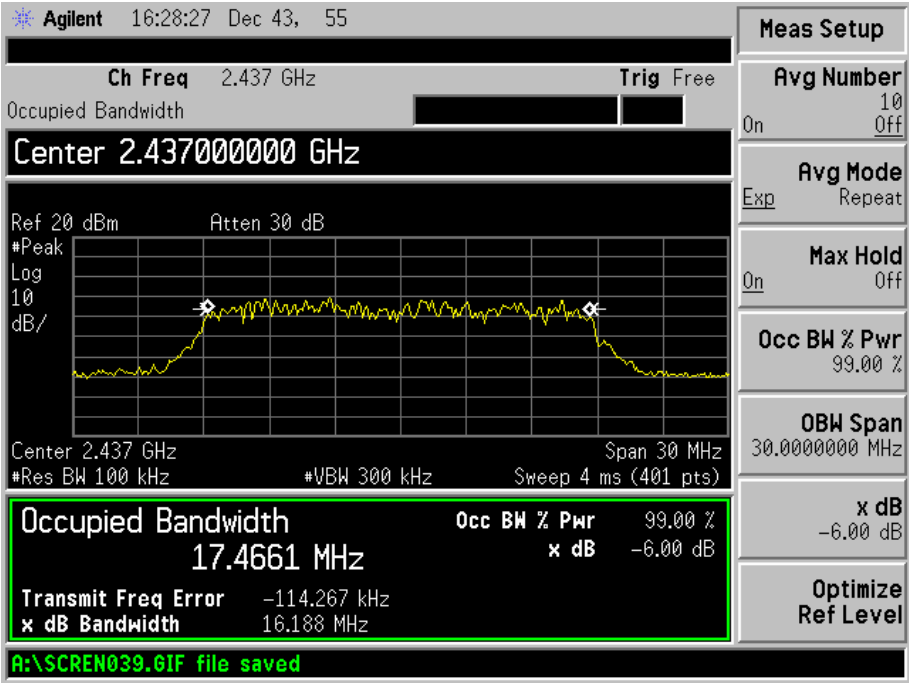


For 802.11n/HT20-chain 0

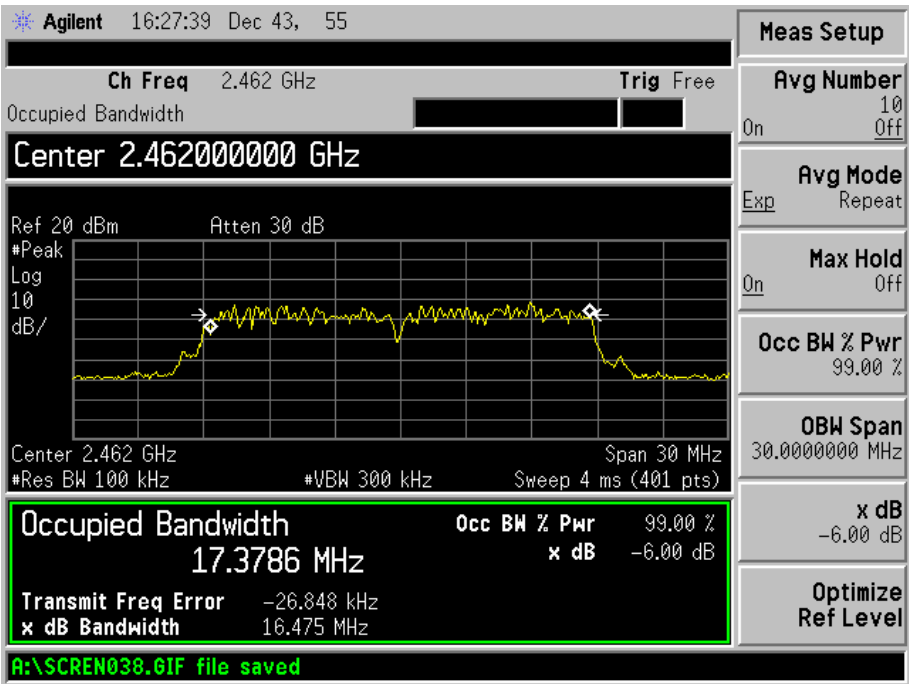
Low Channel:



Middle Channel:

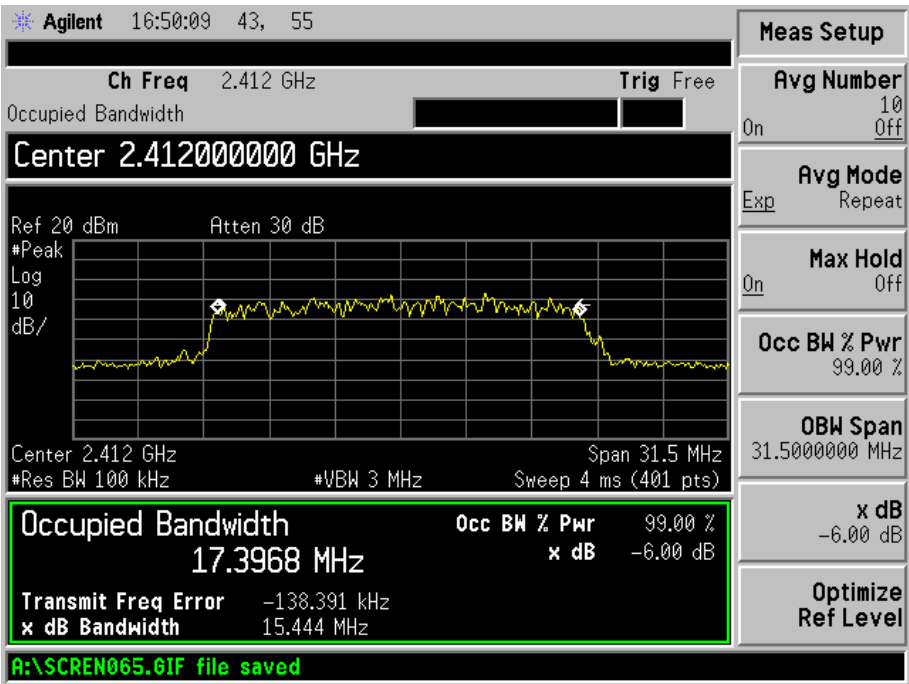


High Channel:

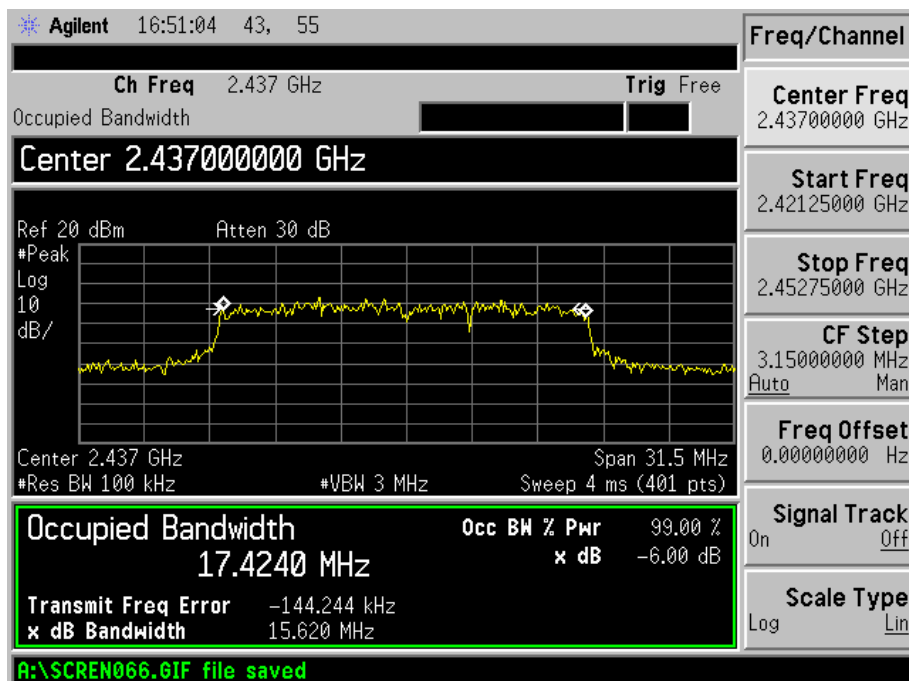


For 802.11n/HT20-chain 1

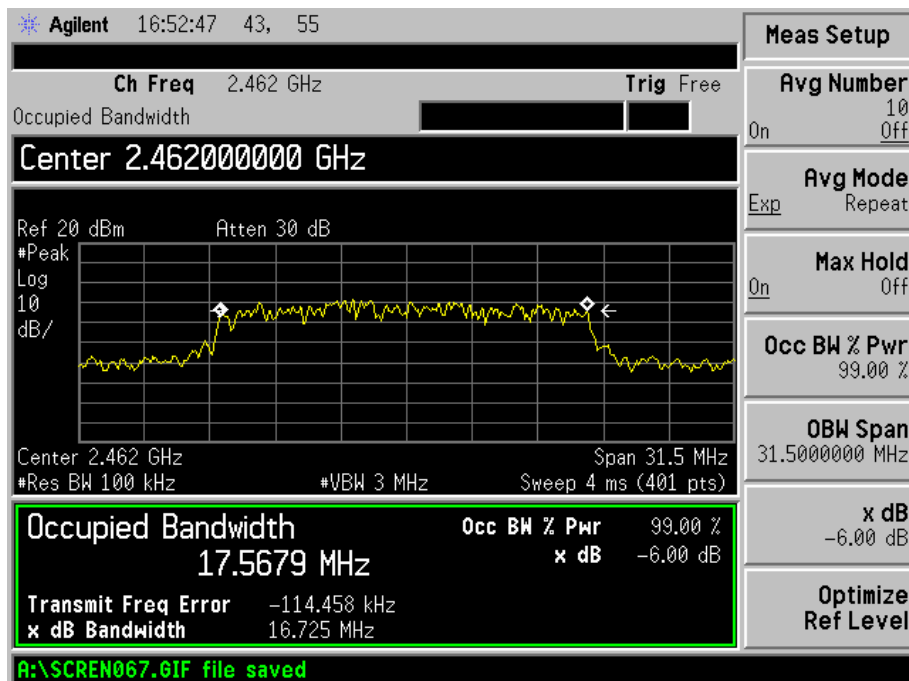
Low Channel:



Middle Channel:

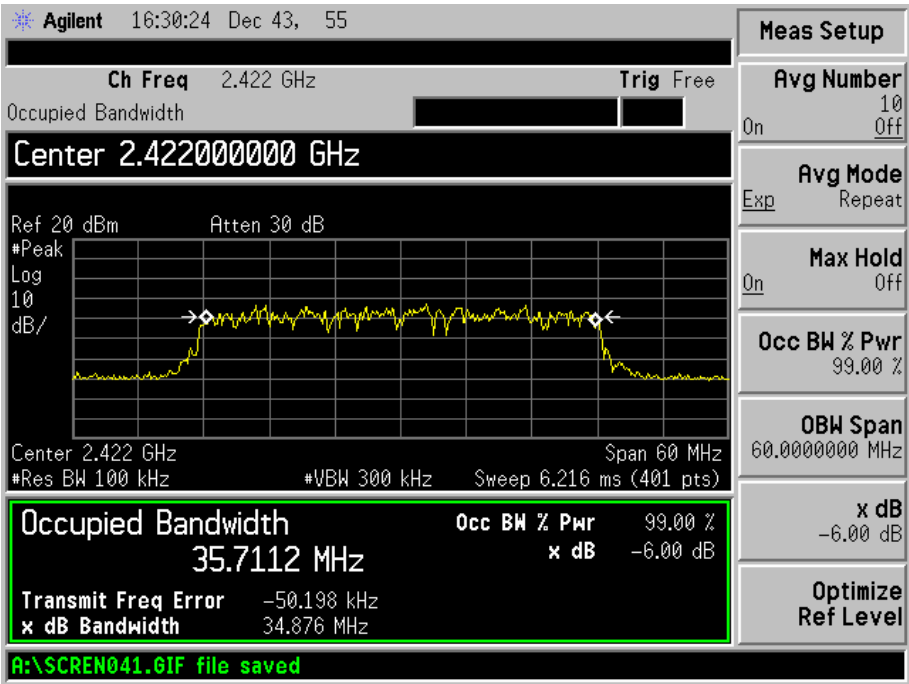


High Channel:

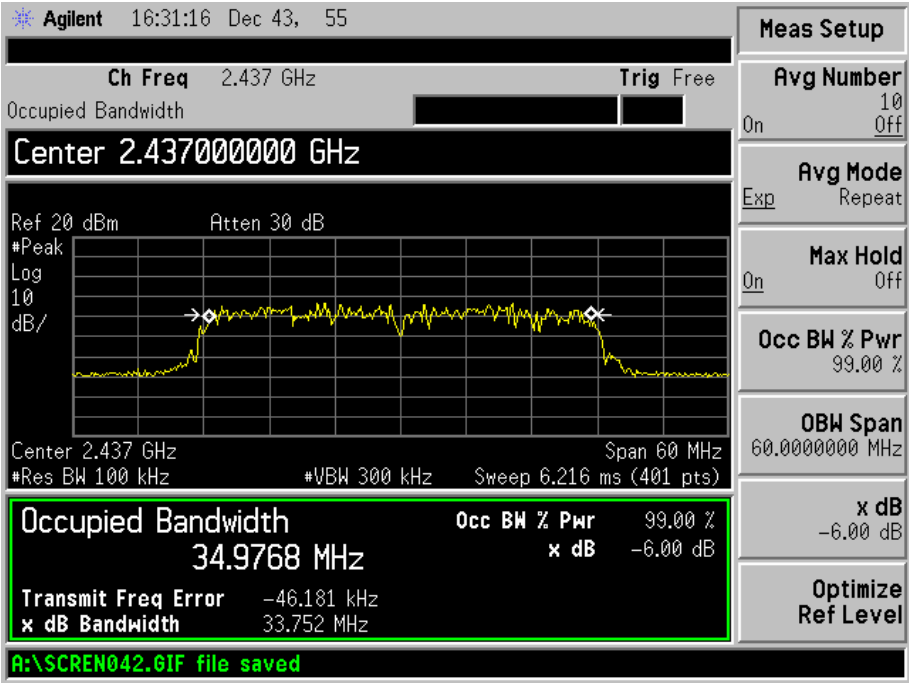


For 802.11n/HT40-chain 0

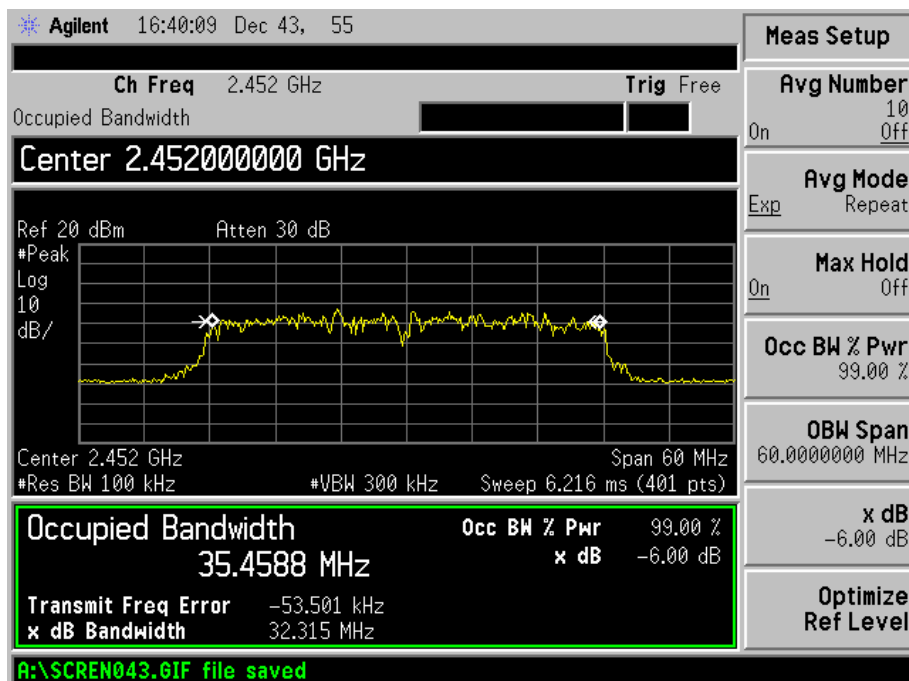
Low Channel:



Middle Channel:

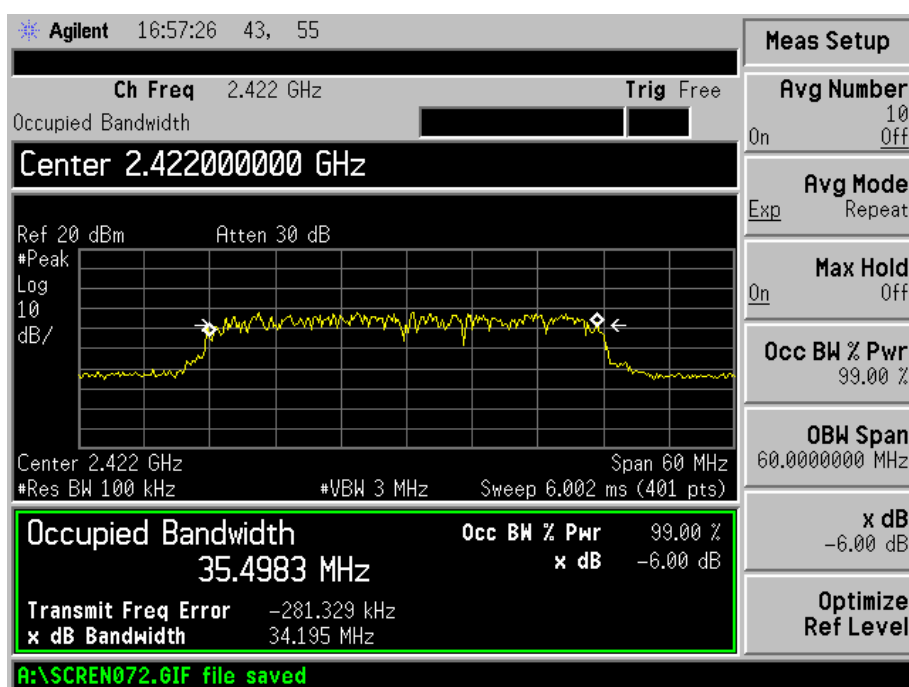


High Channel:

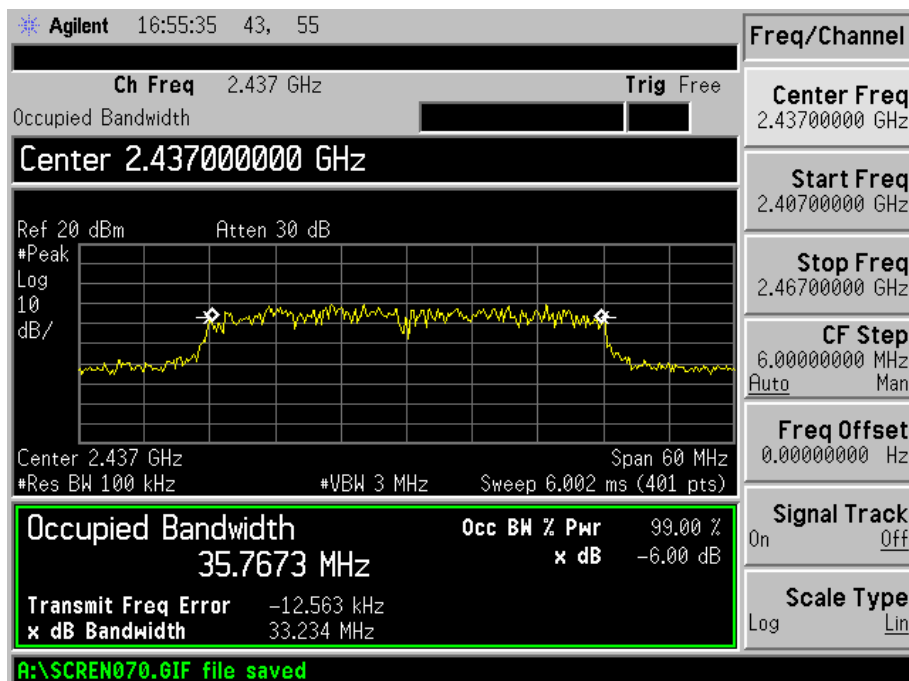


For 802.11n/HT40-chain 1

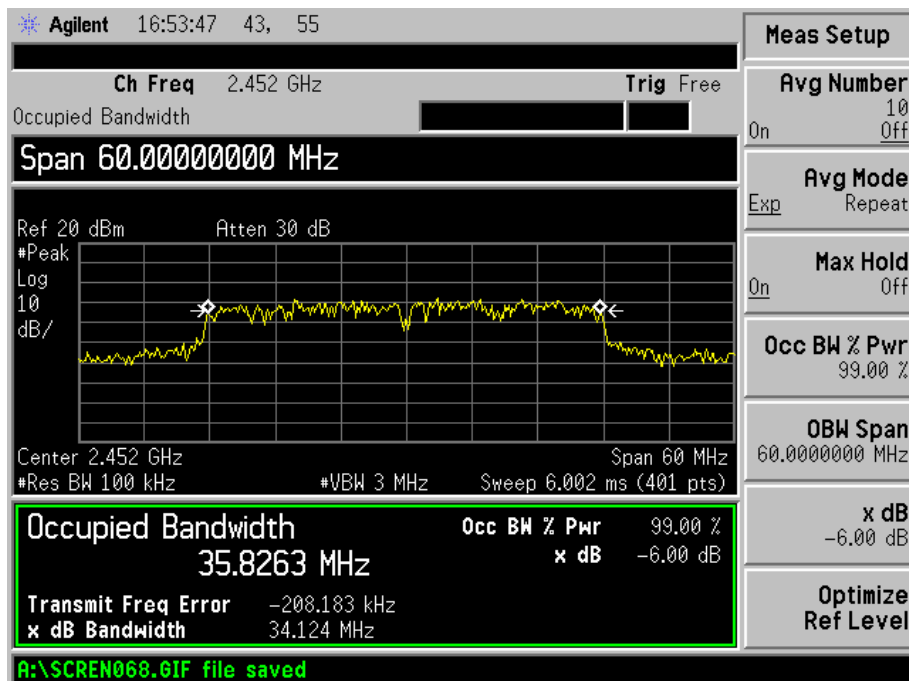
Low Channel:



Middle Channel:



High Channel:



7. RF Output Power

7.1 Standard Applicable

According to 15.247(b)(3). For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

7.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2012-03-28	2013-03-27
Attenuator	ATTEN	ATS100-4-20	/	2012-03-28	2013-03-27

Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

7.3 Test Procedure

According to section 15.247(b)-power output of the KDB-558074 (2012),

1. This procedure provides an integrated measurement alternative when the maximum available RBW < EBW.
2. Set the RBW = 1 MHz.
3. Set the VBW = 3 MHz.
4. Set the span to a value that is 5-30 % greater than the EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges (for some analyzers, this may require a manual override to ensure use of peak detector). If the spectrum analyzer does not have a band power function, sum the spectrum levels (in linear power units) at 1 MHz intervals extending across the EBW of the spectrum.

7.4 Environmental Conditions

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

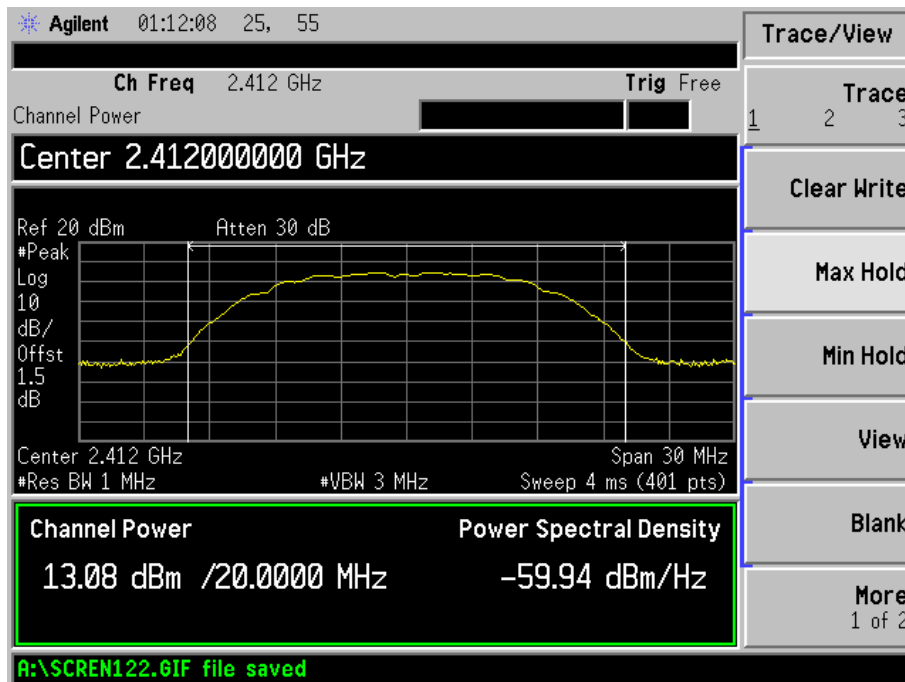
7.5 Summary of Test Results/Plots

Test mode	Frequency MHz	Reading chain 0 (dBm)	Reading chain 1 (dBm)	Output power chain 0 (mW)	Output power chain 1 (mW)	Total Power (mW)	Limit mW
802.11b (1M)	2412	13.08	13.41	20.3236	21.9280	42.2516	1000
	2437	12.75	12.75	18.8365	18.8365	34.6730	1000
	2462	12.01	12.09	15.8855	16.1808	32.0663	1000
802.11b (11M)	2412	14.54	14.11	28.4446	25.7632	54.2078	1000
	2437	14.12	13.16	25.8226	20.7014	46.5240	1000
	2462	13.47	12.31	22.2331	17.0216	39.2547	1000
802.11g (6M)	2412	11.34	9.13	13.6144	8.1846	21.7990	1000
	2437	10.85	8.86	12.1619	7.6913	19.8532	1000
	2462	9.60	7.89	9.1201	6.1518	15.2719	1000
802.11g (54M)	2412	11.82	8.45	15.2055	6.9984	22.2039	1000
	2437	11.61	9.33	14.4877	8.5704	23.0581	1000
	2462	9.95	8.68	9.8855	7.3790	17.2645	1000
802.11n HT20 (MCS0)	2412	11.13	7.32	12.9718	5.3951	18.3669	1000
	2437	10.85	8.87	12.1619	7.7090	19.8709	1000
	2462	9.75	9.80	9.4406	9.5499	18.9905	1000
802.11n HT20 (MCS15)	2412	11.62	8.67	14.5211	7.3621	21.8832	1000
	2437	10.90	8.62	12.3027	7.2778	19.5805	1000
	2462	9.87	8.20	9.7051	6.6069	16.3141	1000
802.11n HT40 (MCS0)	2422	11.01	9.12	12.6183	8.1658	20.7841	1000
	2437	10.43	7.88	11.0408	6.1376	17.1784	1000
	2452	9.90	8.40	9.7724	6.9183	16.6907	1000
802.11 HT40 (MCS15)	2422	11.41	9.55	13.8357	9.0157	22.8514	1000
	2437	10.62	8.58	11.5345	7.2111	18.7456	1000
	2452	10.13	8.08	10.3039	6.4269	16.7308	1000

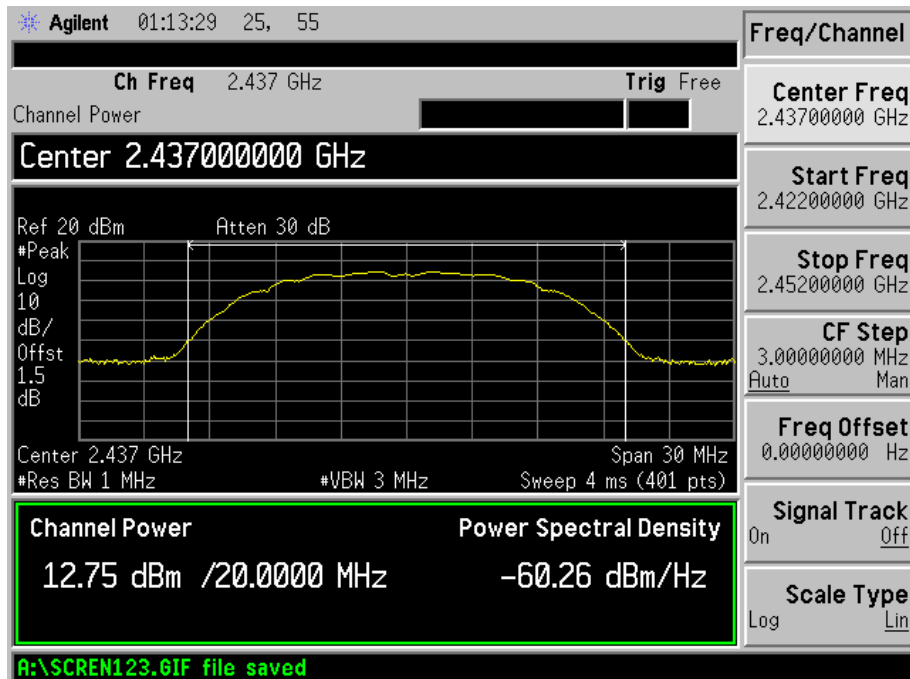
Please refer to the following test plots:

For 802.11b_chain 0_1M rate

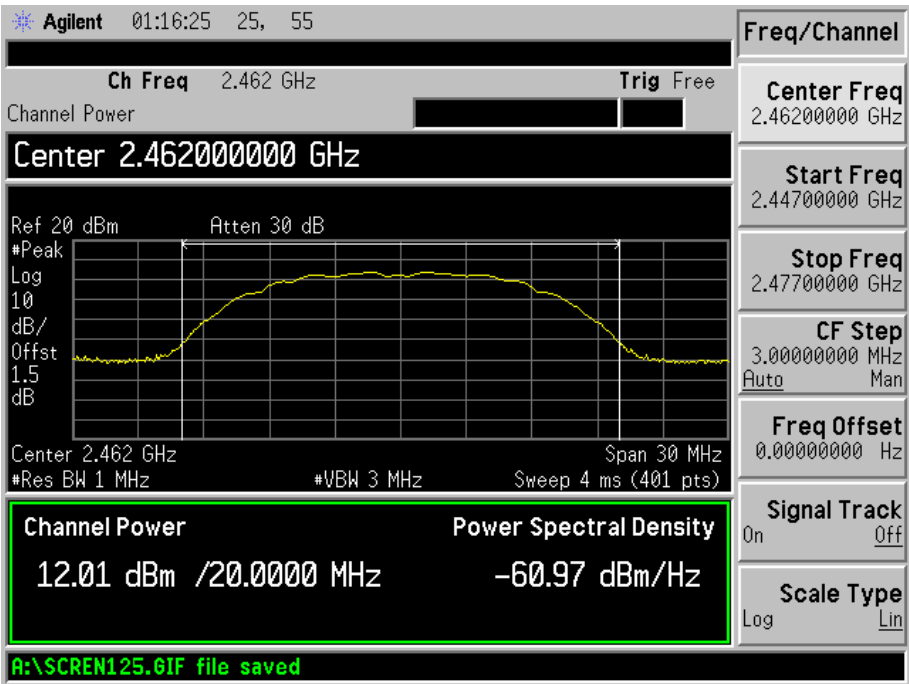
Low Channel:



Middle Channel:

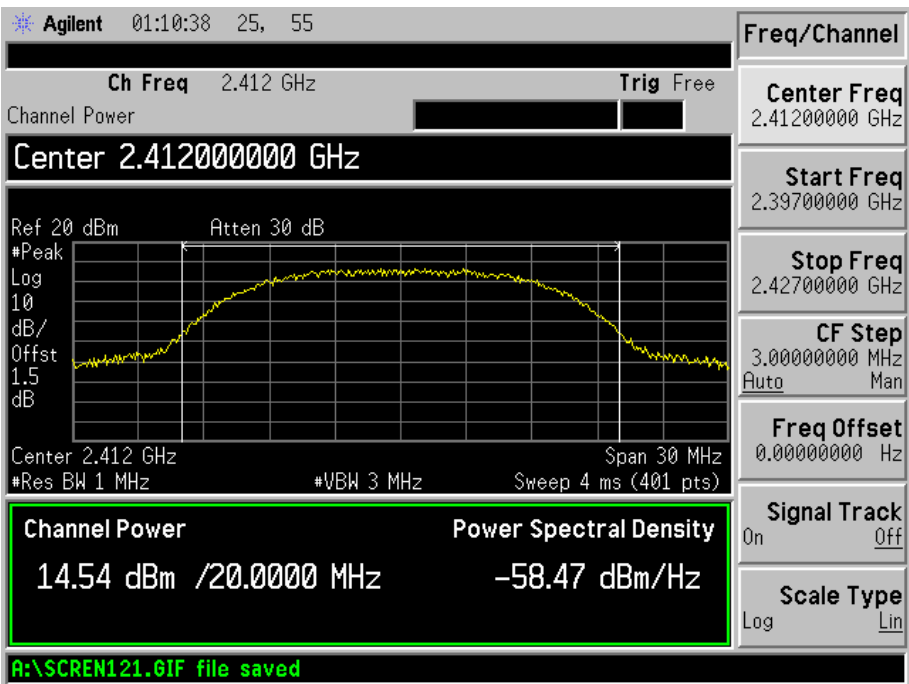


High Channel:

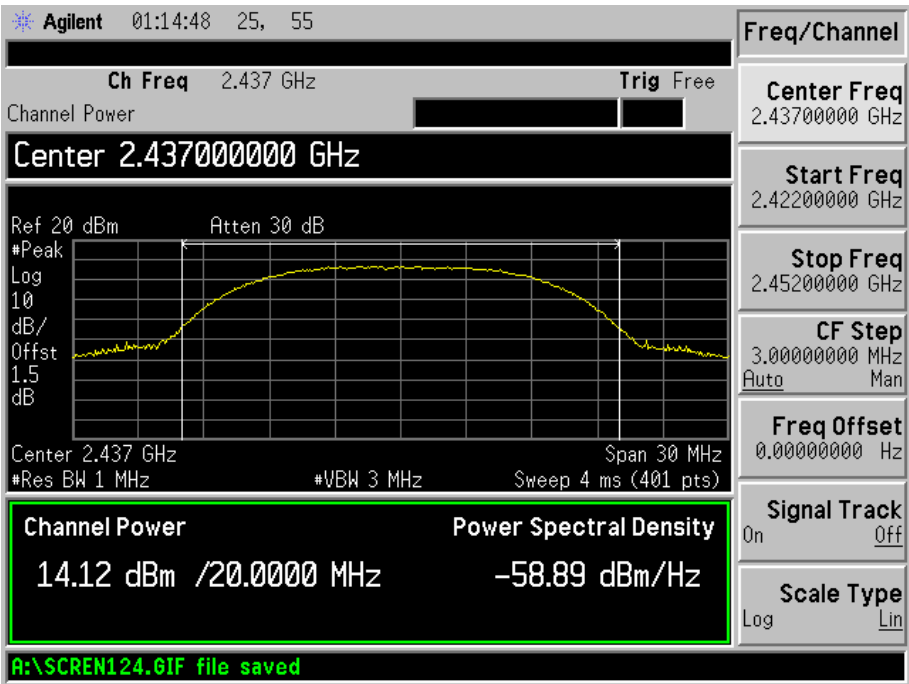


For 802.11b_chain 0_11M rate

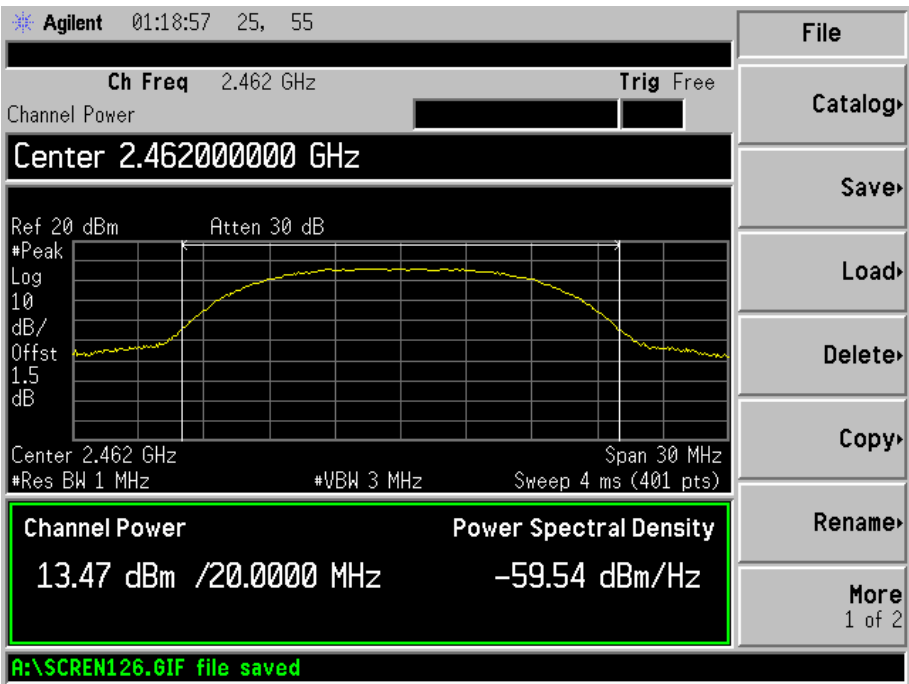
Low Channel:



Middle Channel:

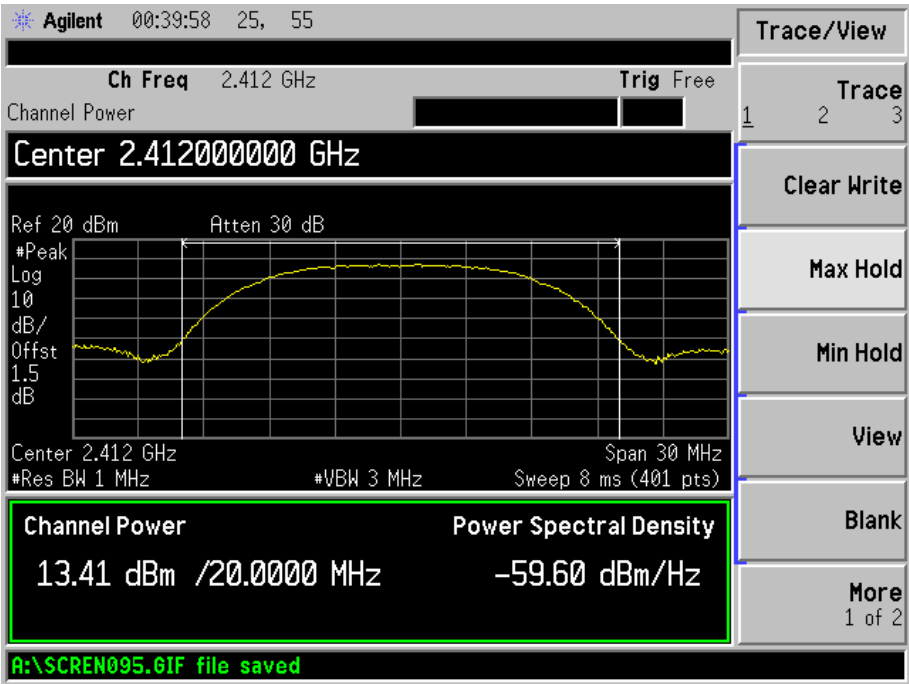


High Channel:

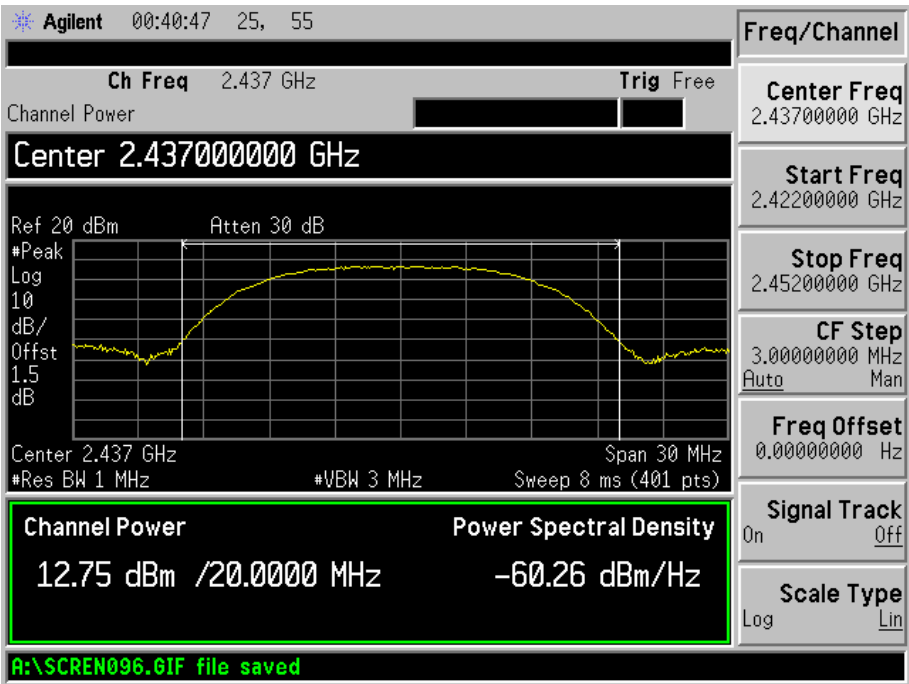


For 802.11b_chain 1_1M rate

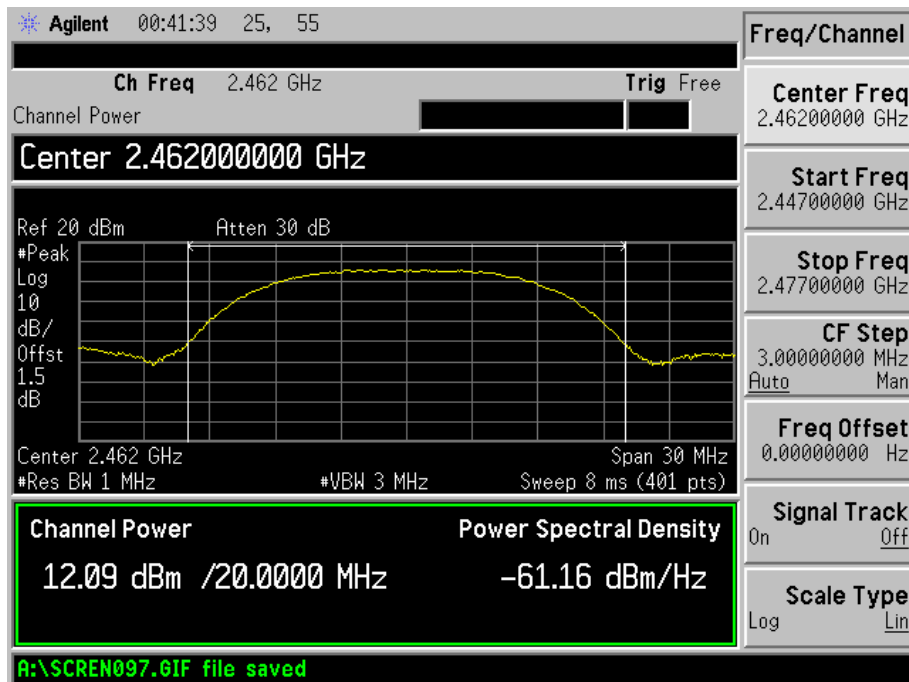
Low Channel:



Middle Channel:

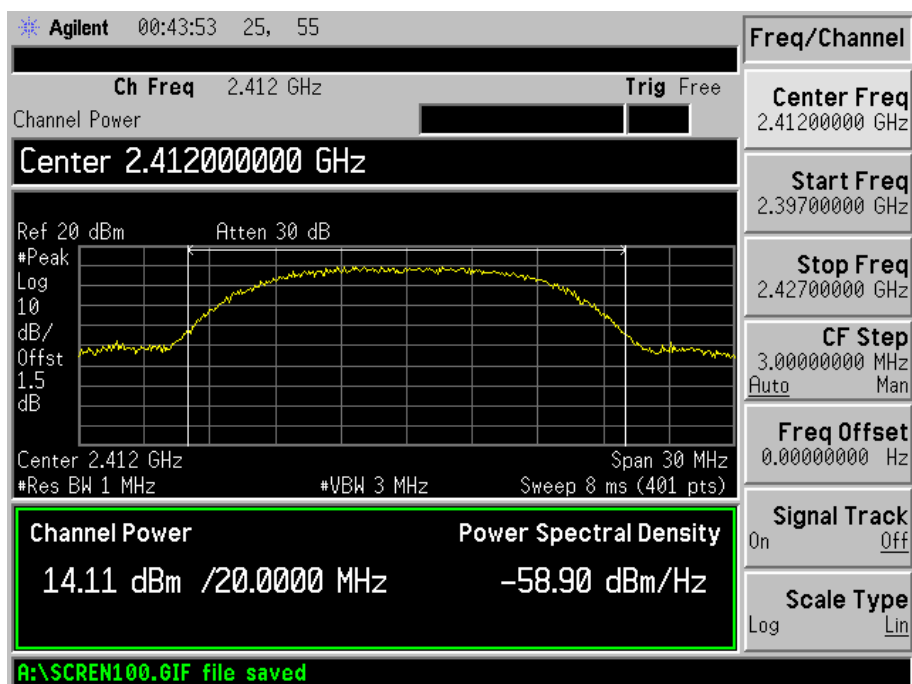


High Channel:

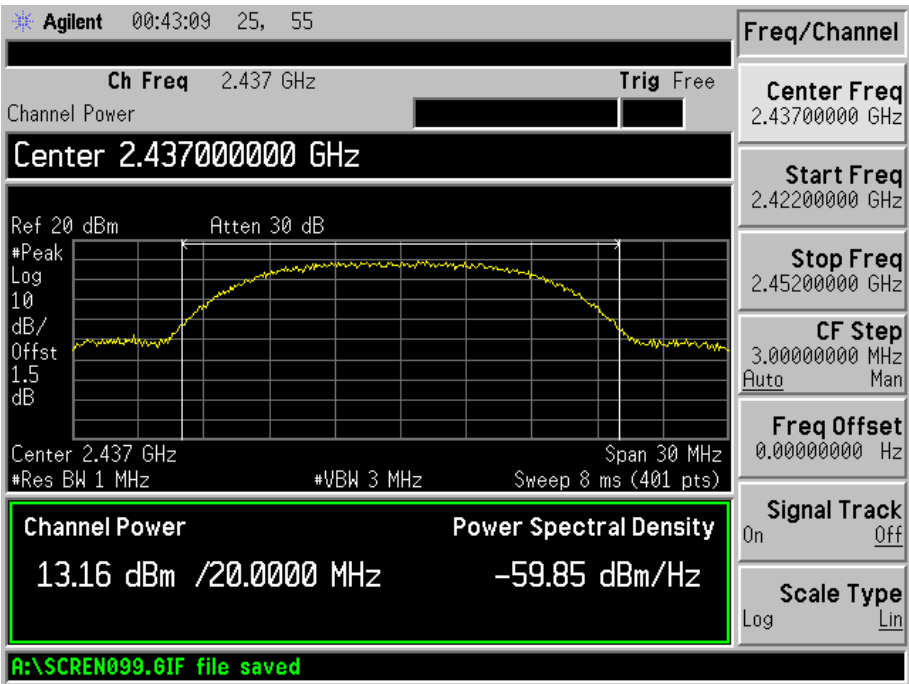


For 802.11b_chain 1_11M rate

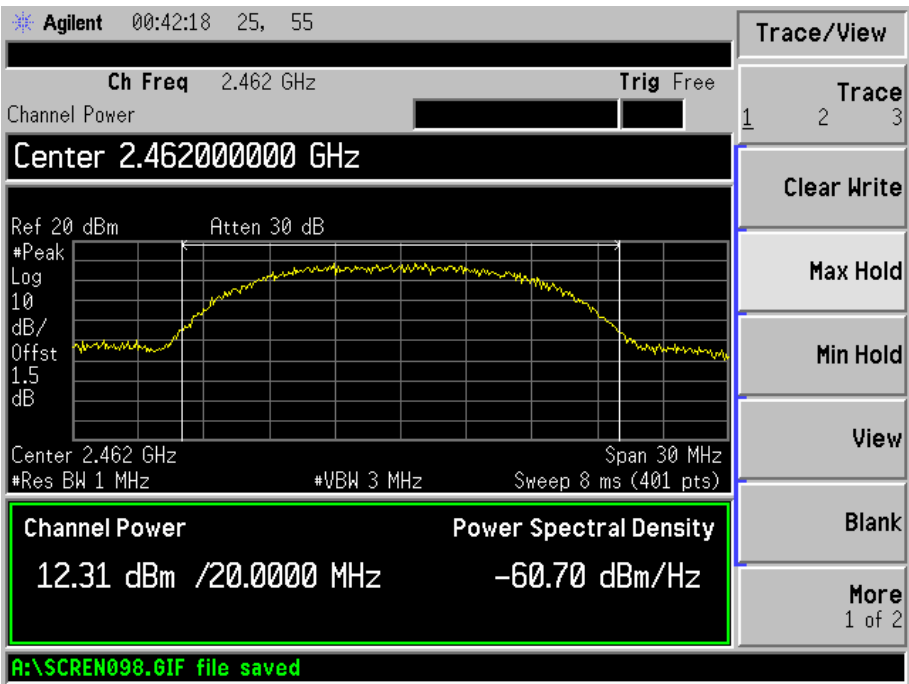
Low Channel:



Middle Channel:

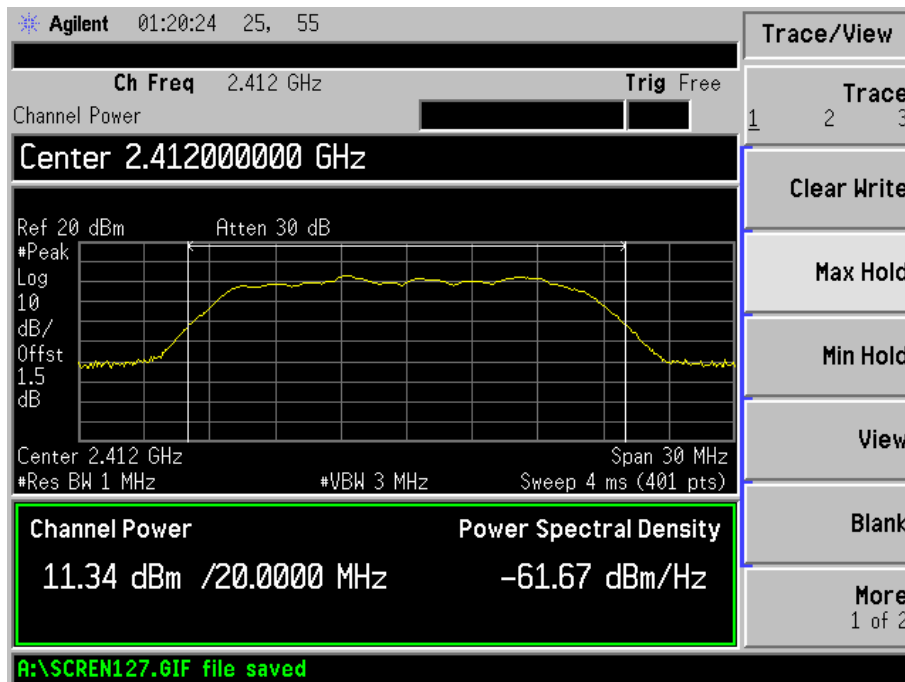


High Channel:

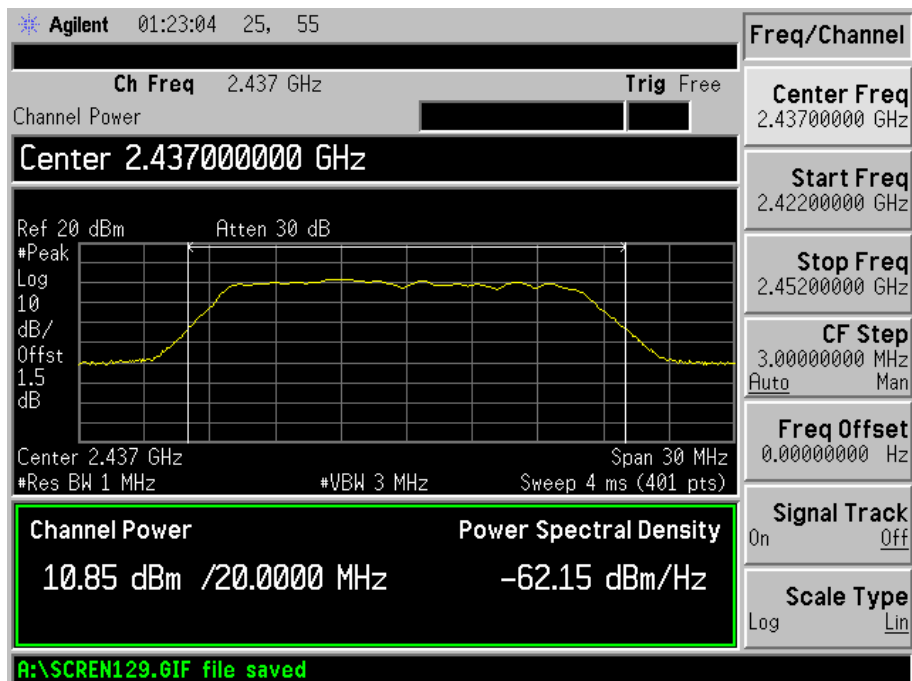


For 802.11g_chain 0_6M rate

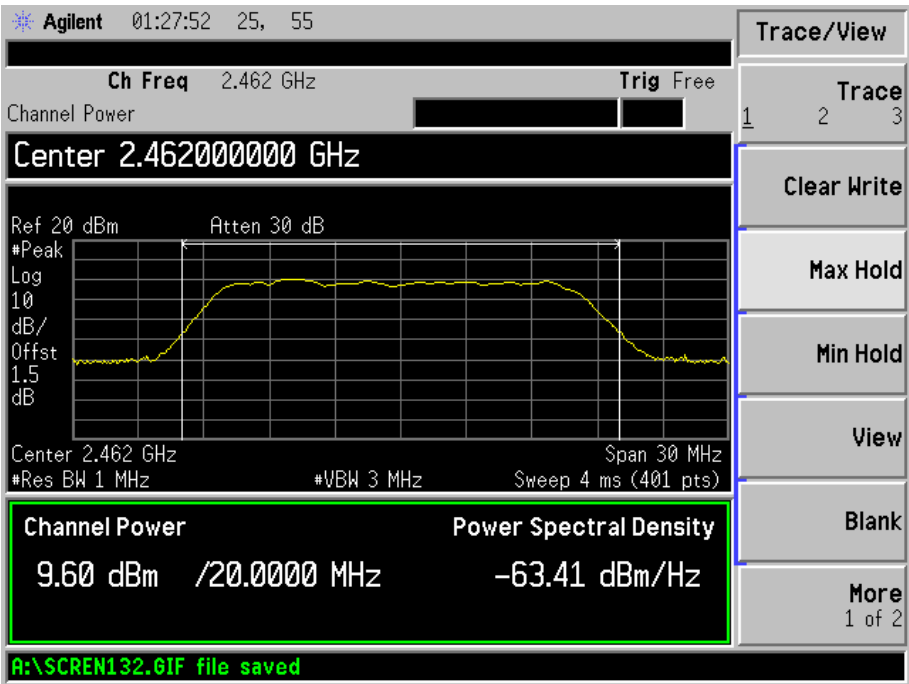
Low Channel:



Middle Channel:

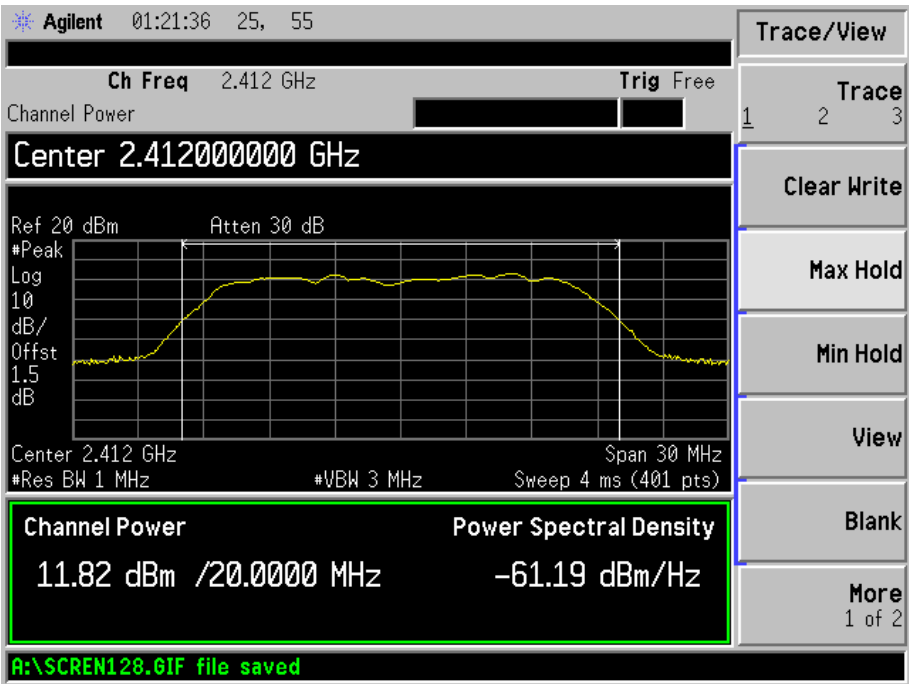


High Channel:

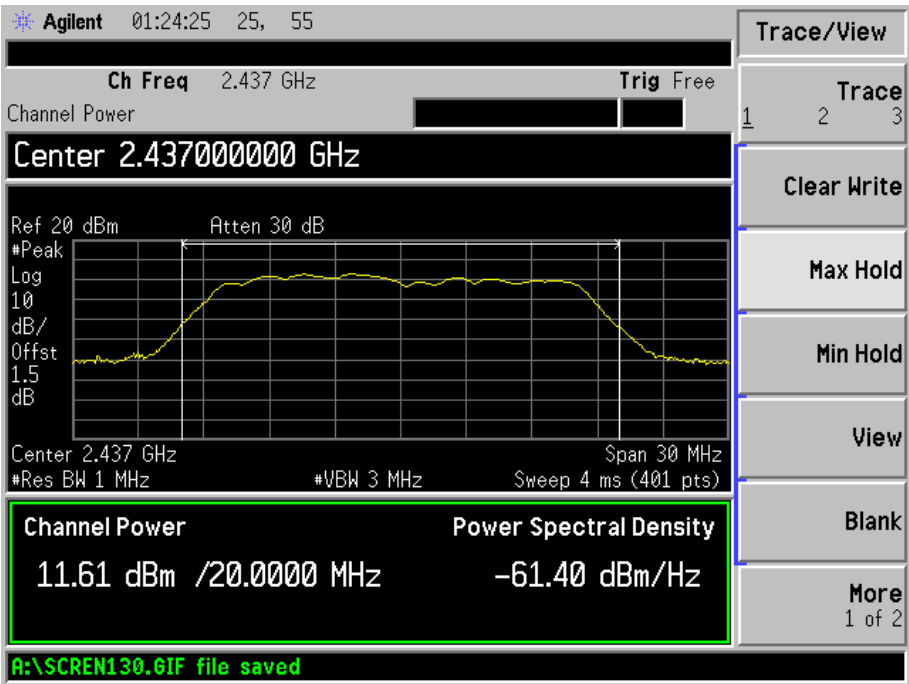


For 802.11g_chain 0_54M rate

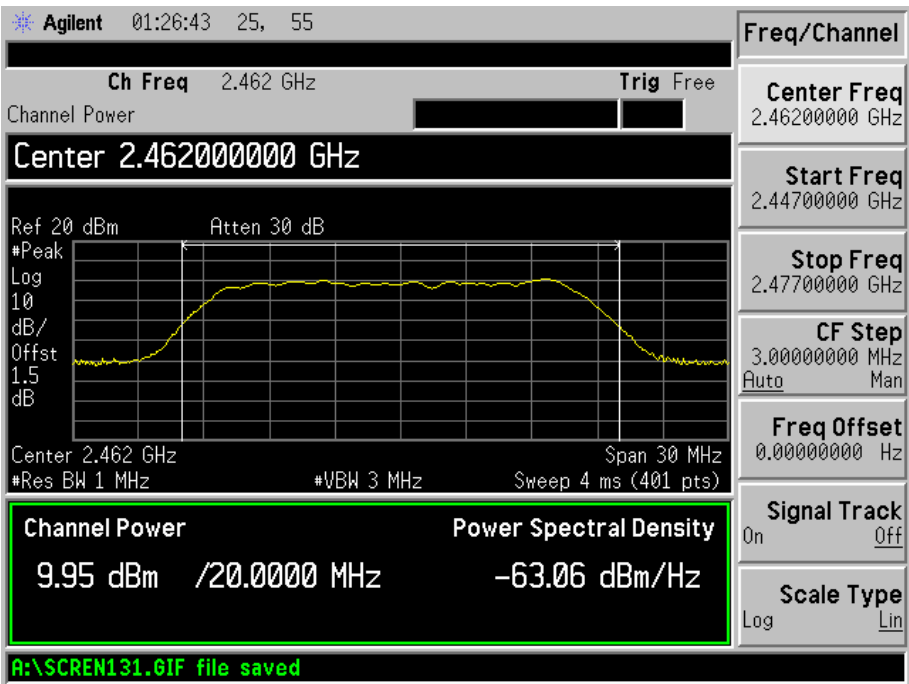
Low Channel:



Middle Channel:

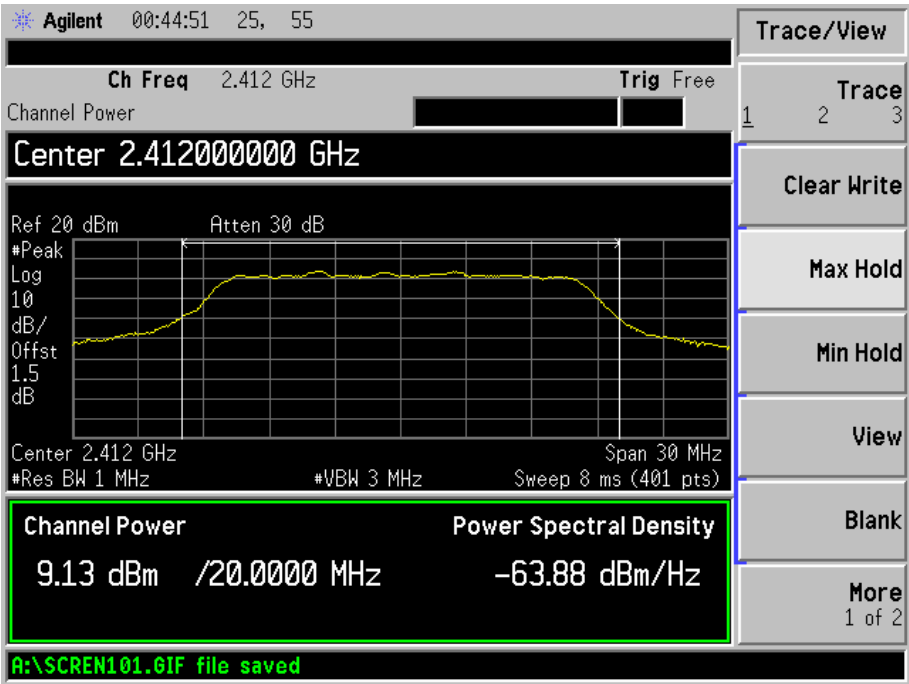


High Channel:

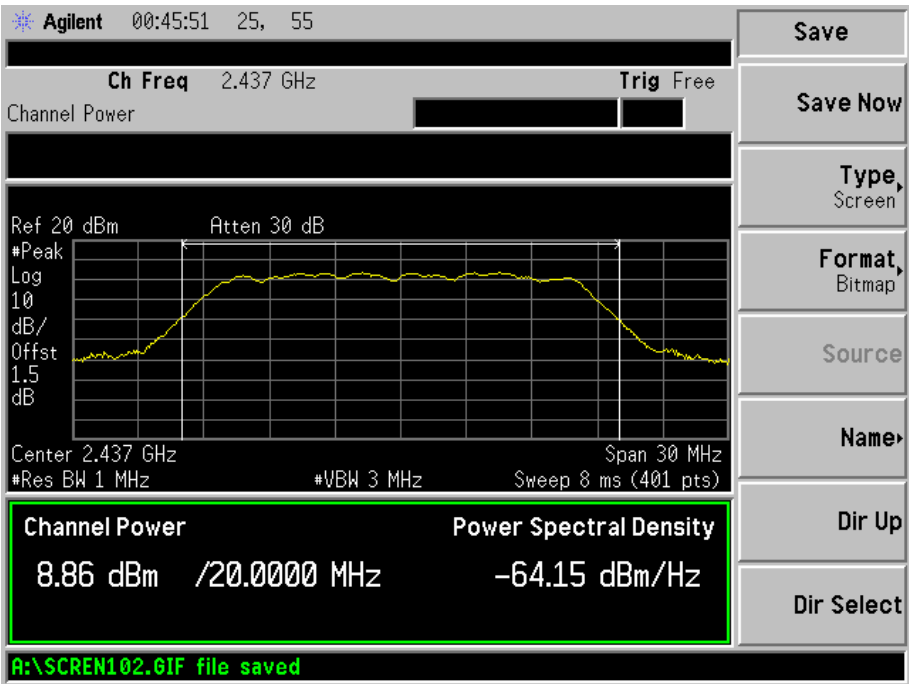


For 802.11g_chain 1_6M rate

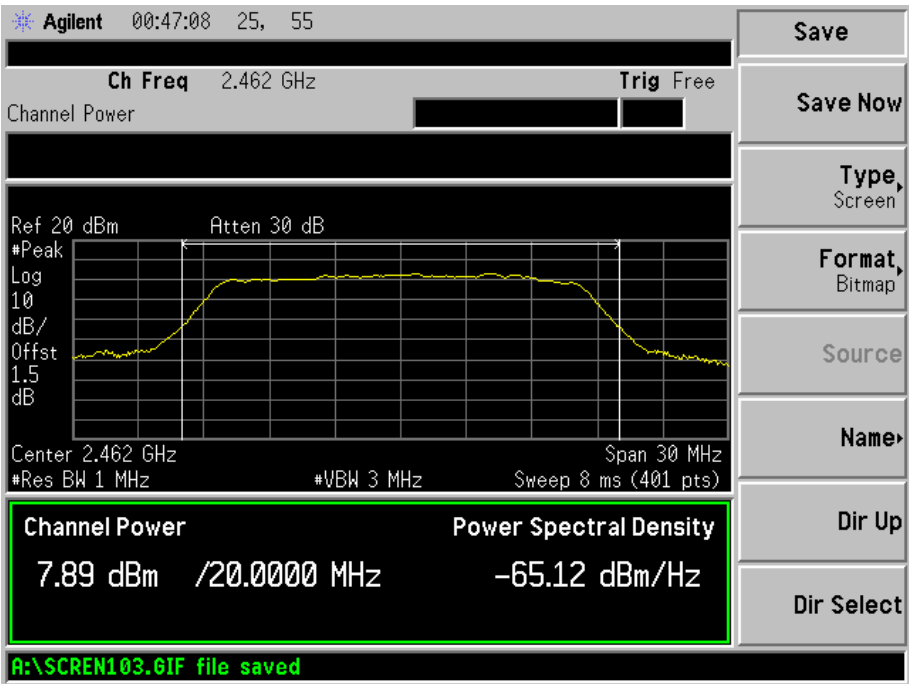
Low Channel:



Middle Channel:

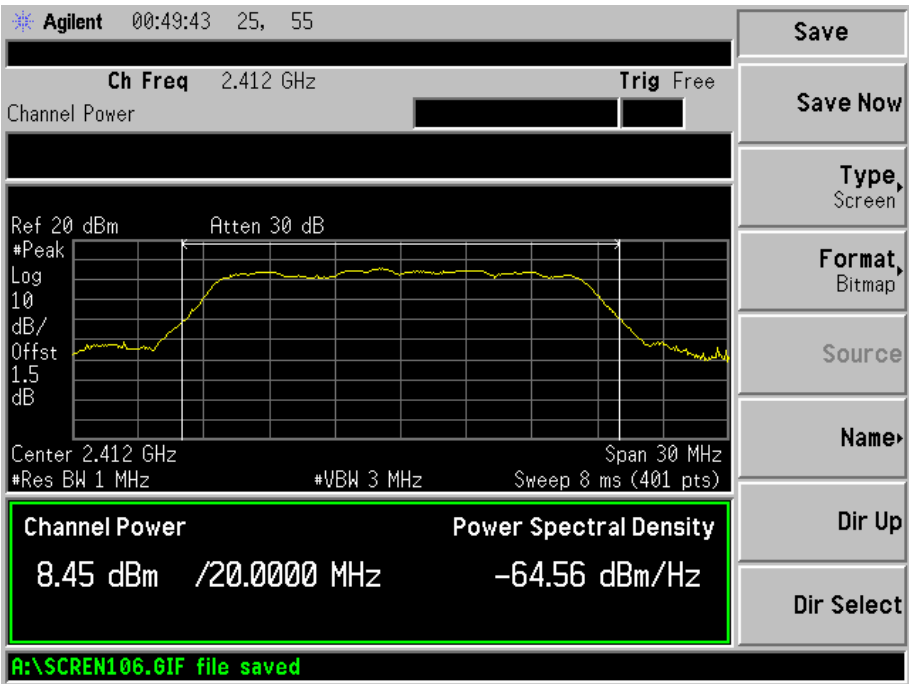


High Channel:

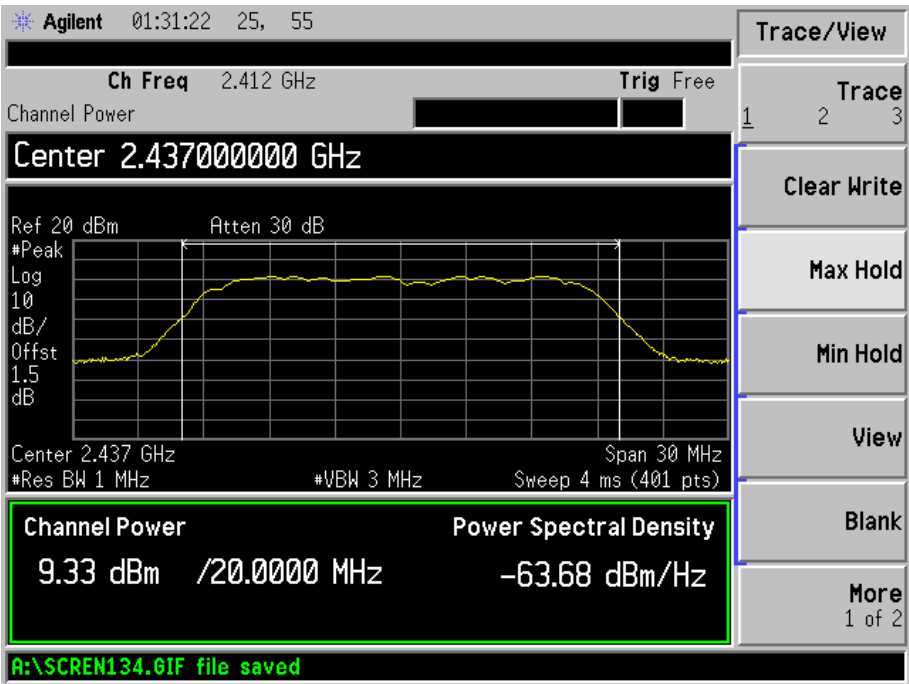


For 802.11g_chain 1_54M rate

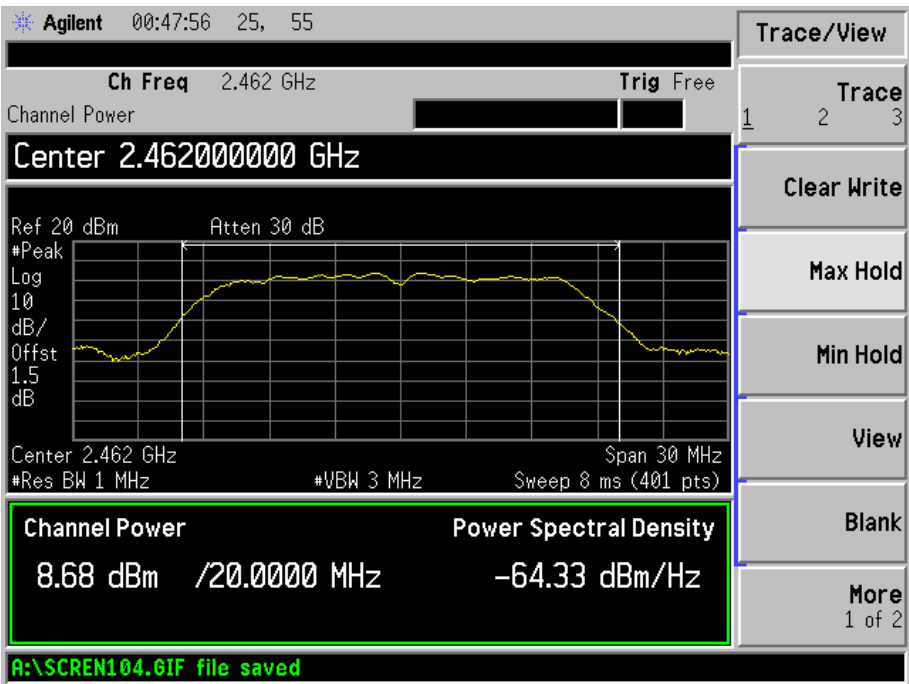
Low Channel:



Middle Channel:

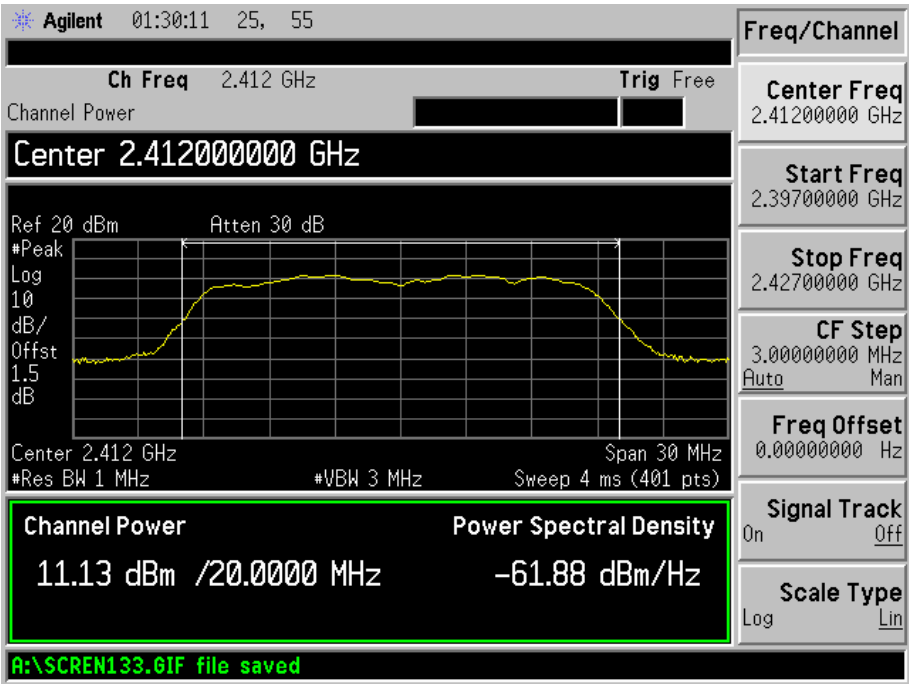


High Channel:

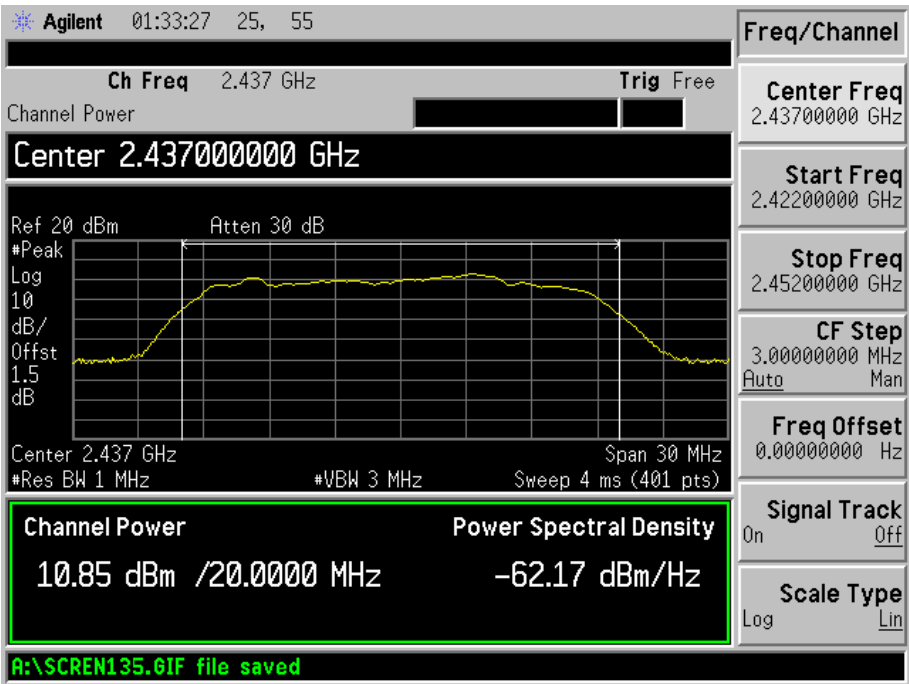


For 802.11n/HT20_chain 0_MCS0

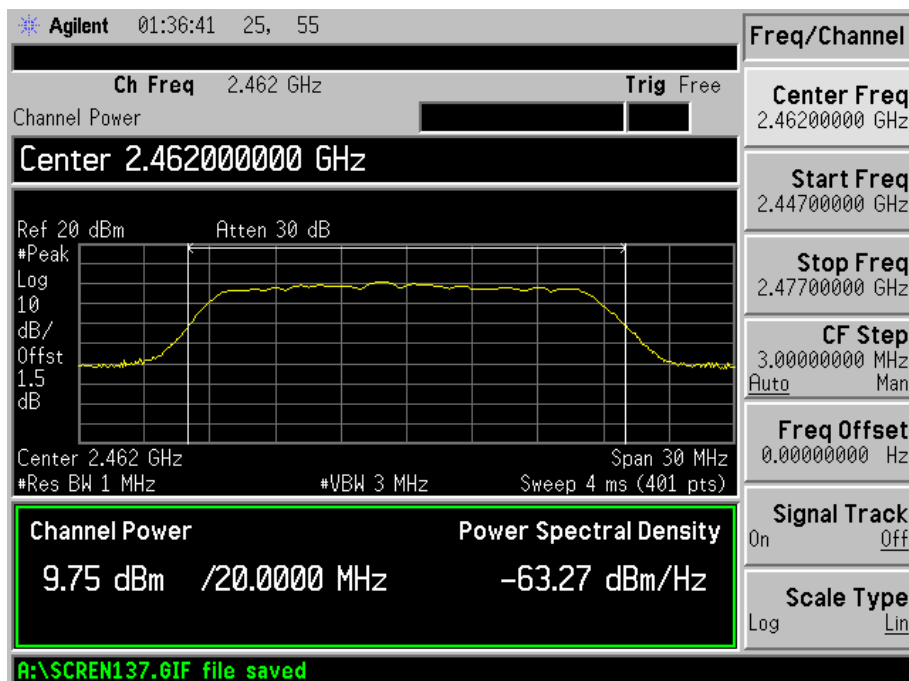
Low Channel:



Middle Channel:

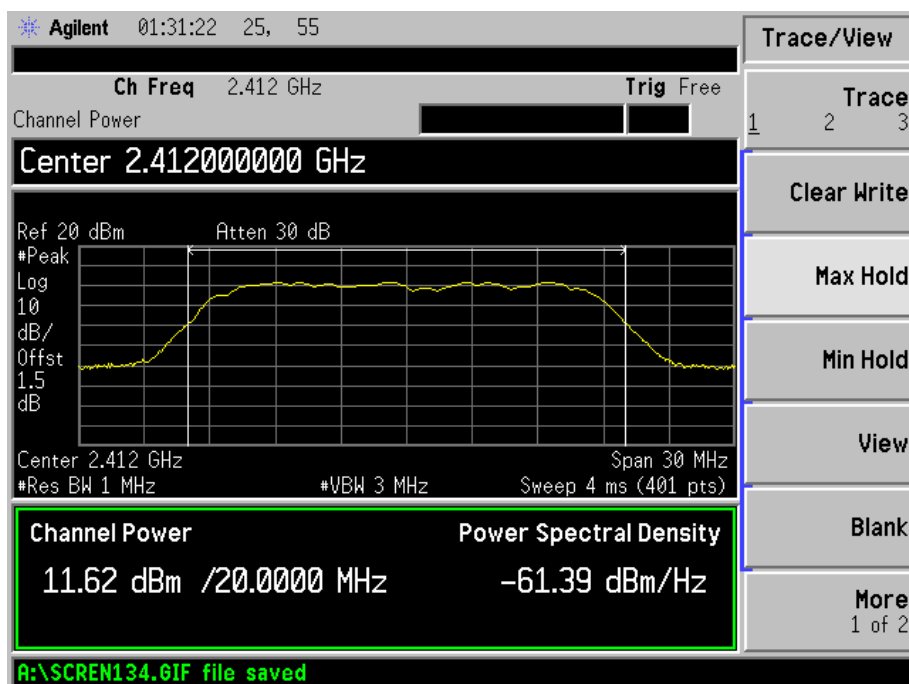


High Channel:

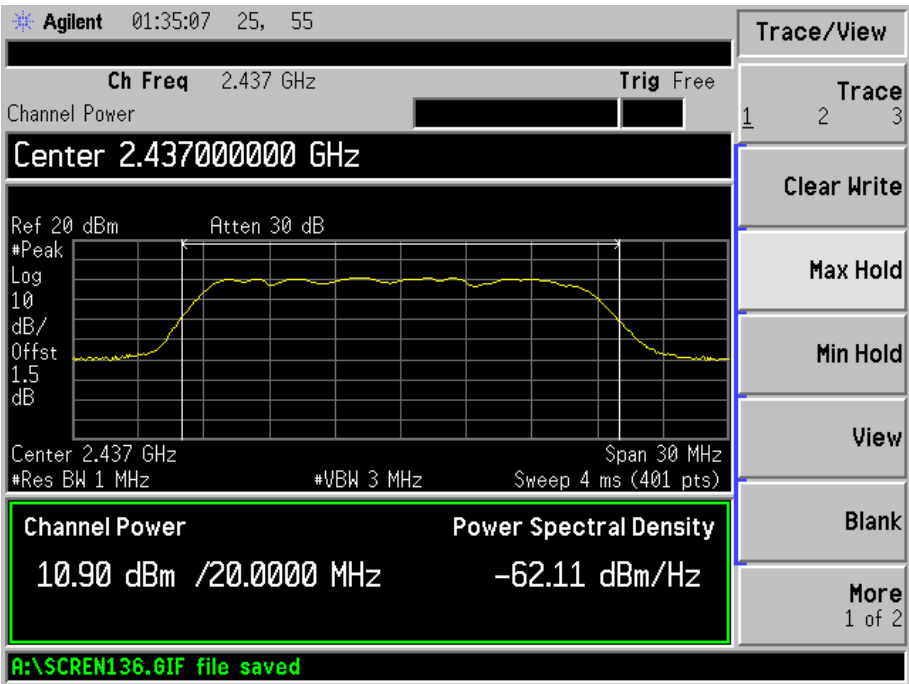


For 802.11n/HT20_chain 0_MCS15

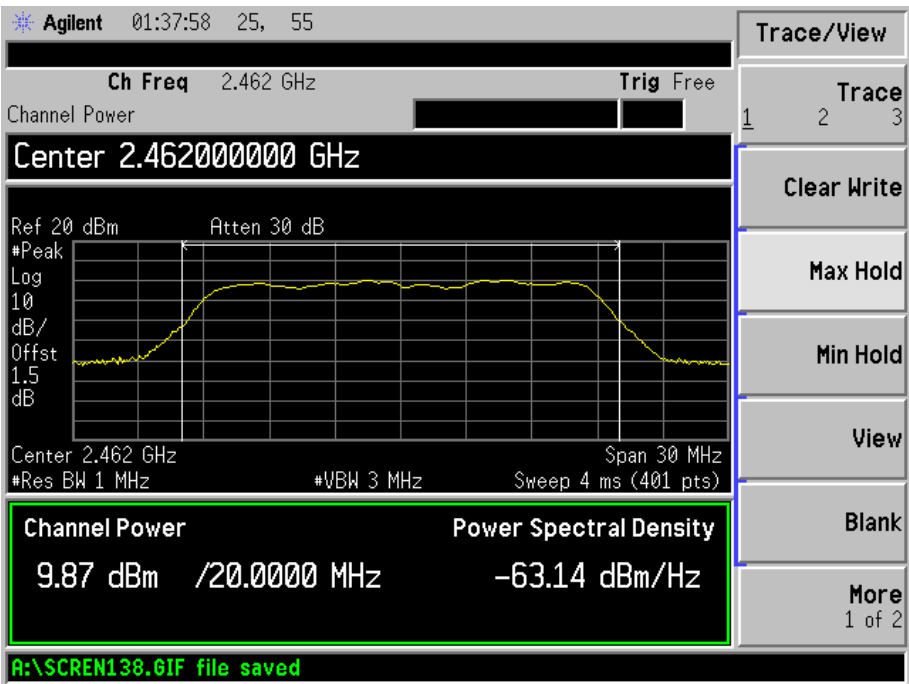
Low Channel:



Middle Channel:

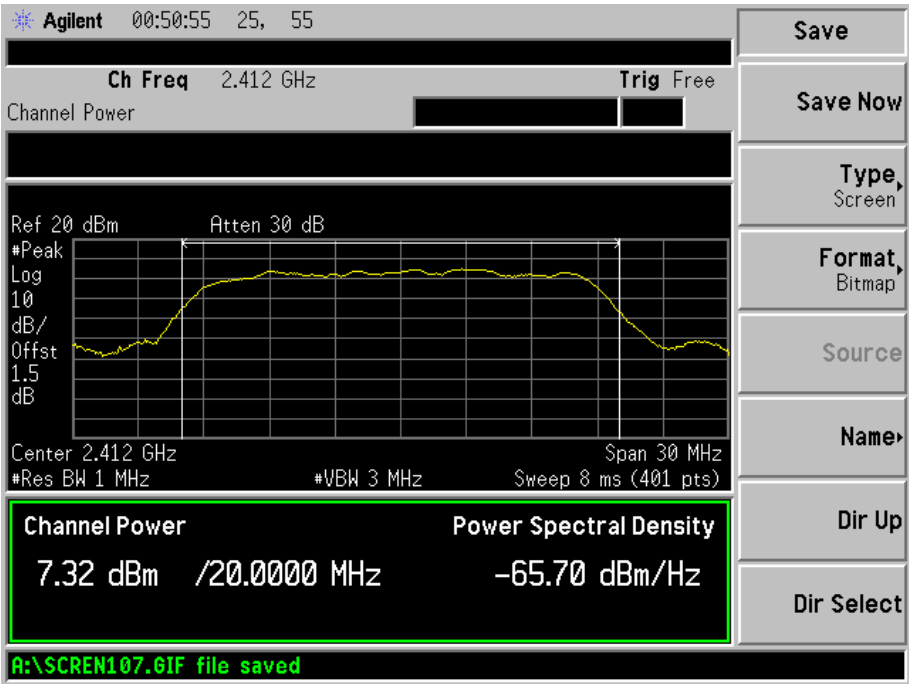


High Channel:

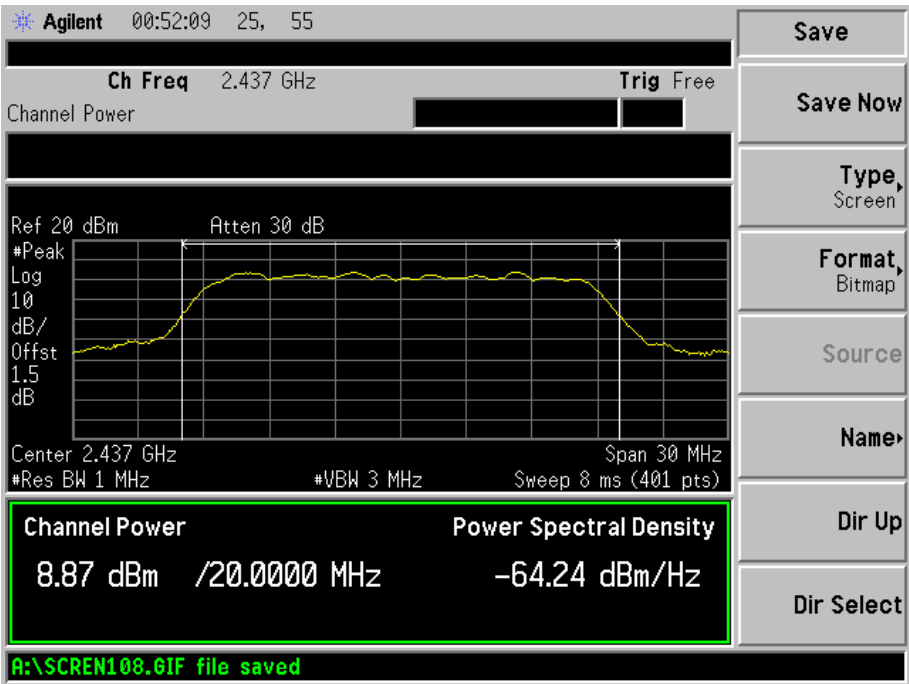


For 802.11n/HT20_chain 1_MCS0

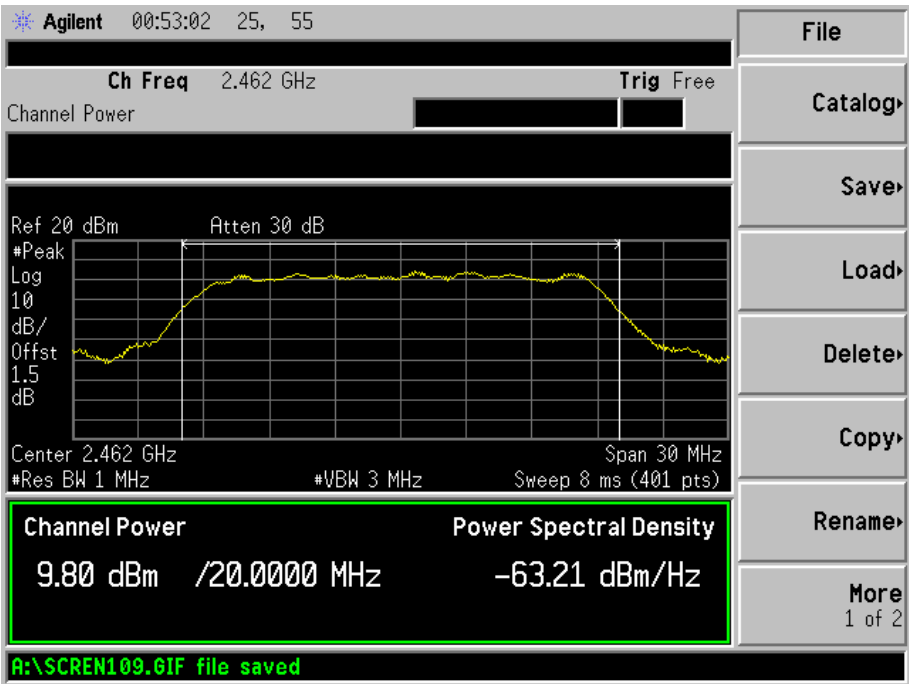
Low Channel:



Middle Channel:

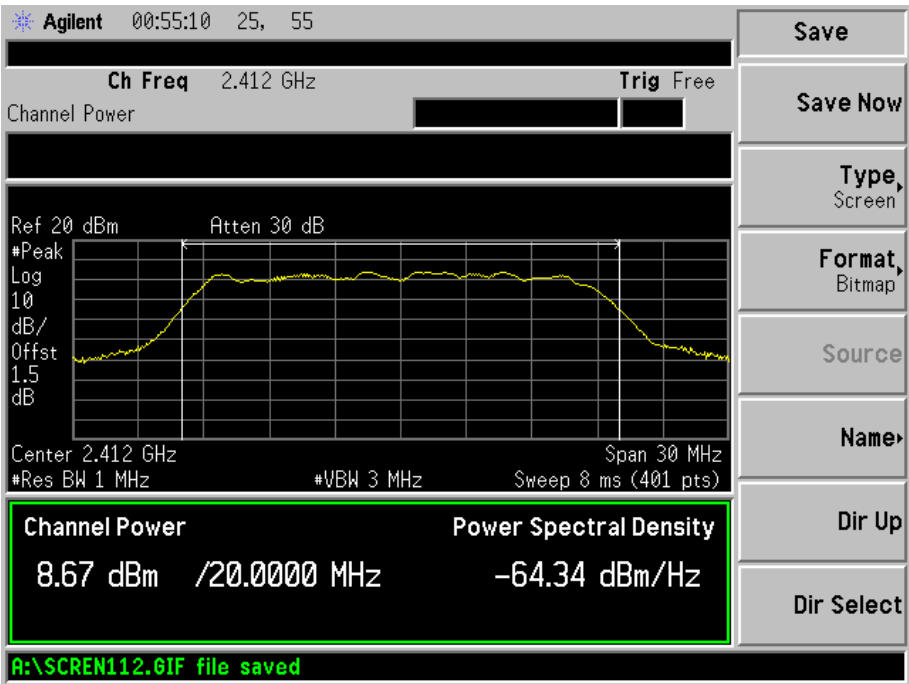


High Channel:

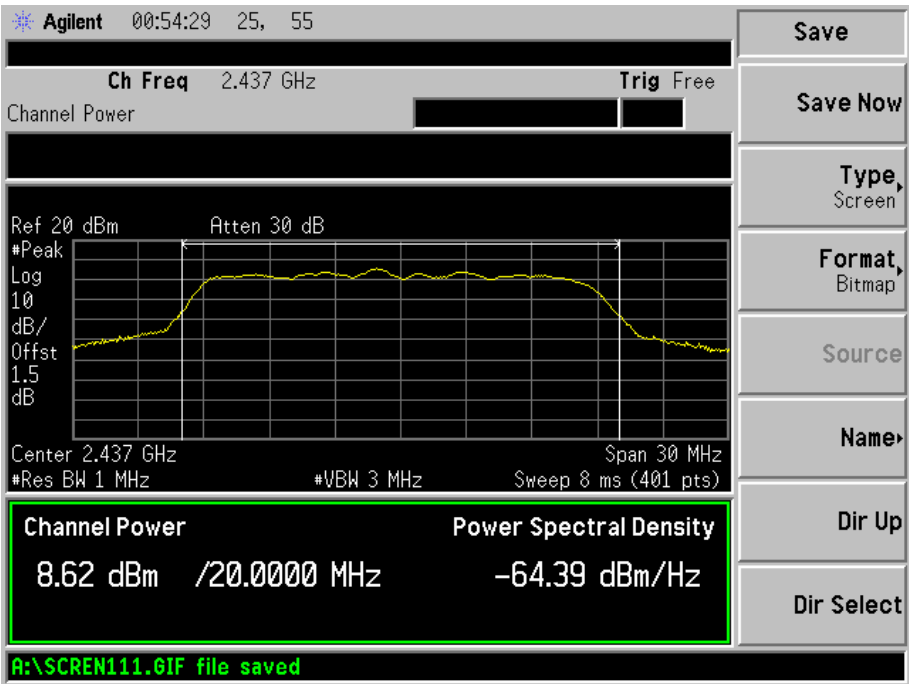


For 802.11n/HT20_chain 1_MCS15

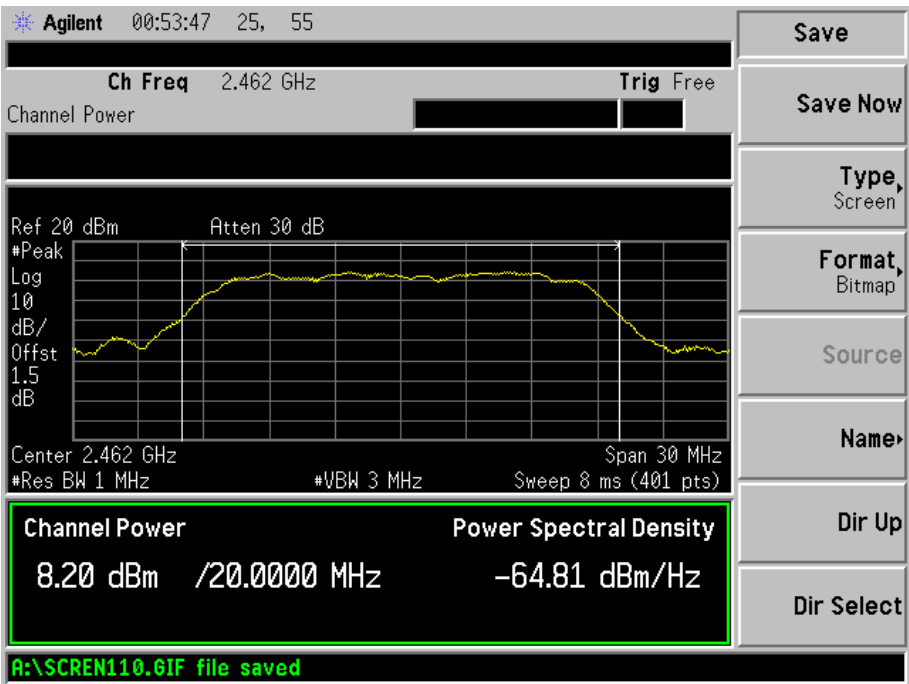
Low Channel:



Middle Channel:

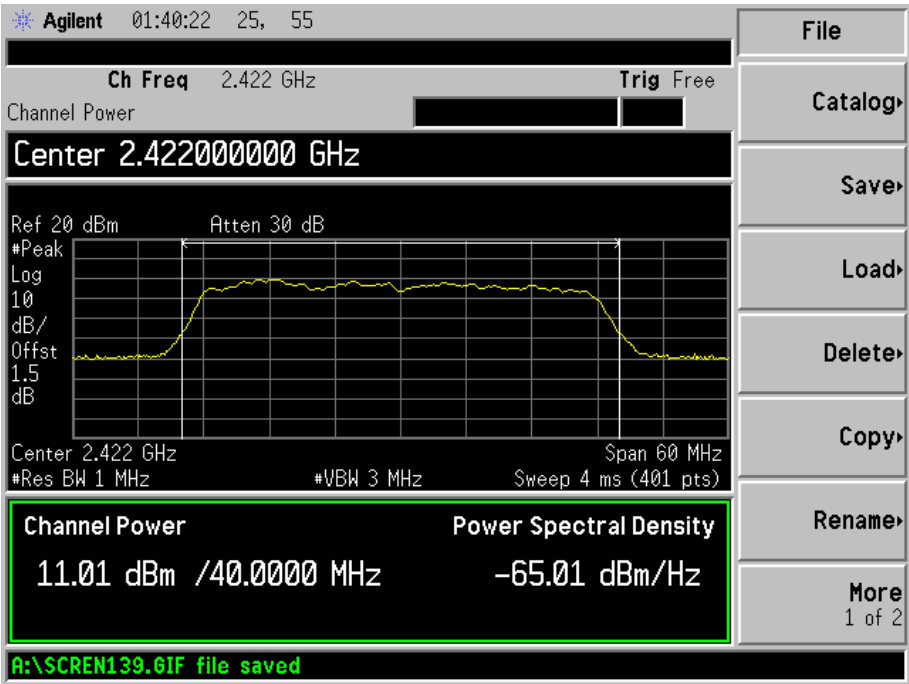


High Channel:

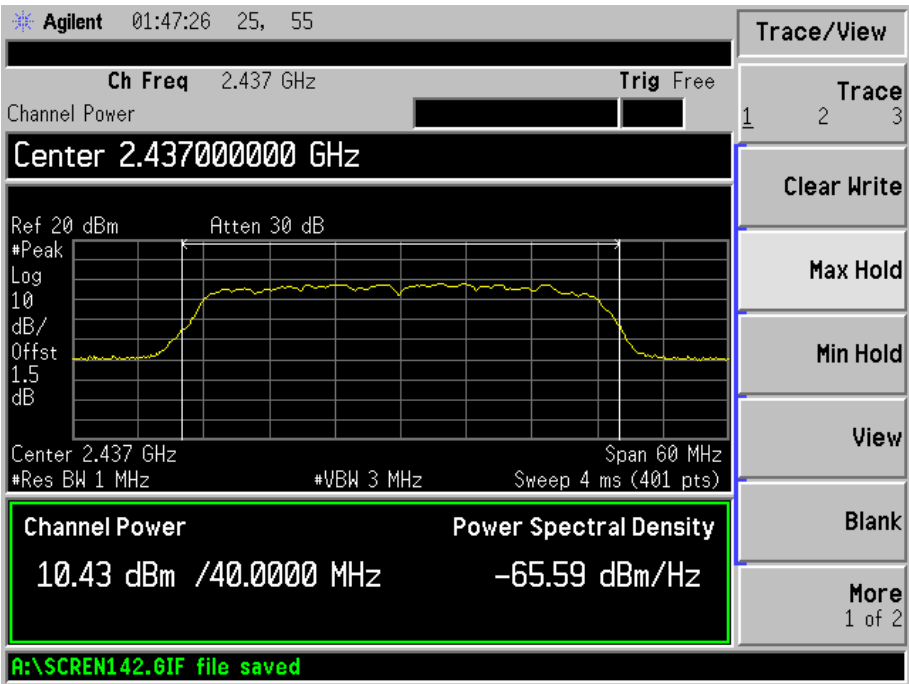


For 802.11n/HT40_chain 0_MCS0

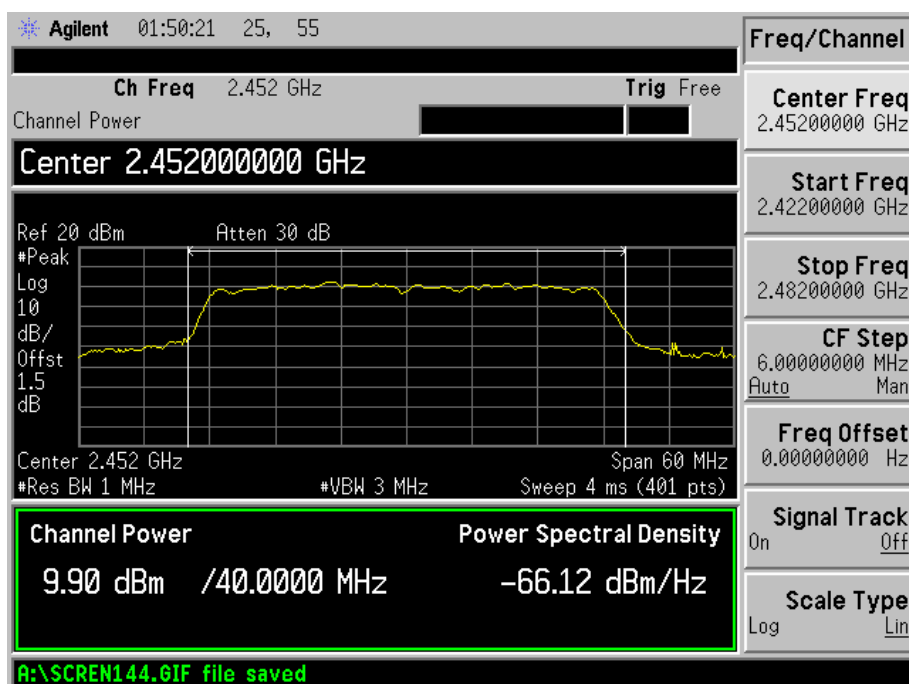
Low Channel:



Middle Channel:

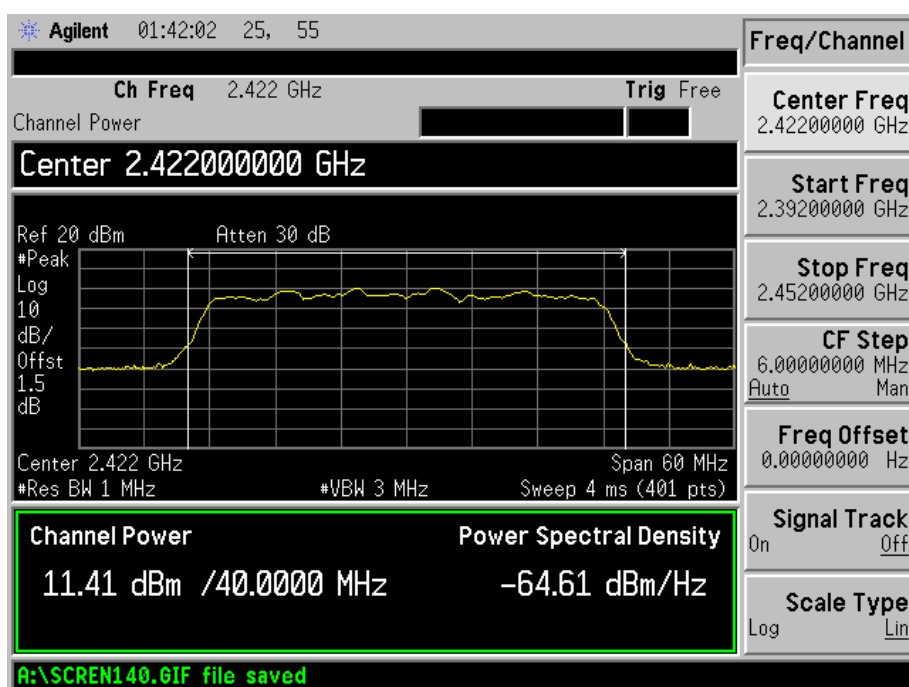


High Channel:

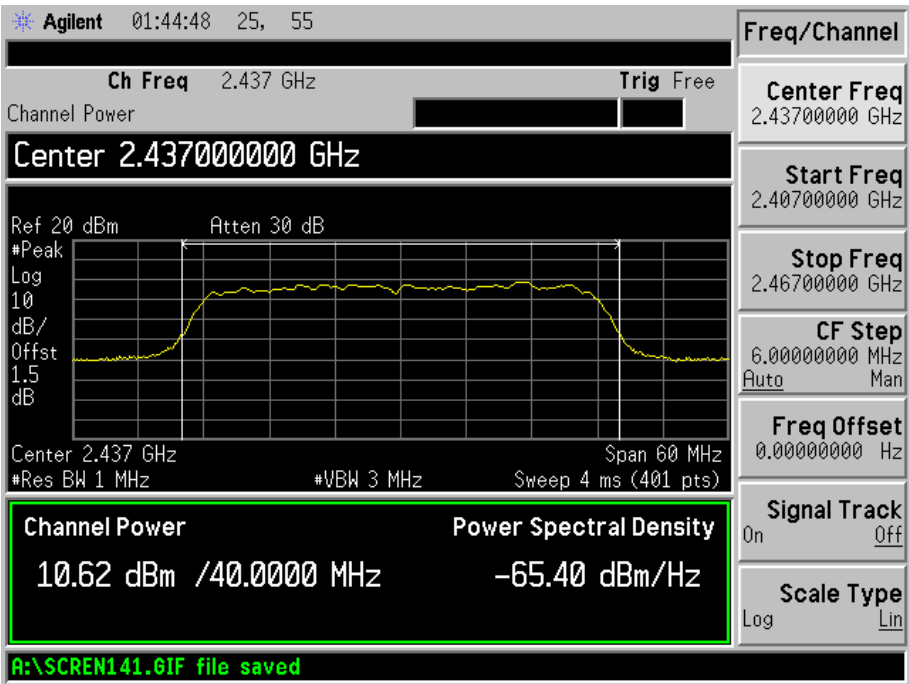


For 802.11n/HT40 chain 0 MCS15

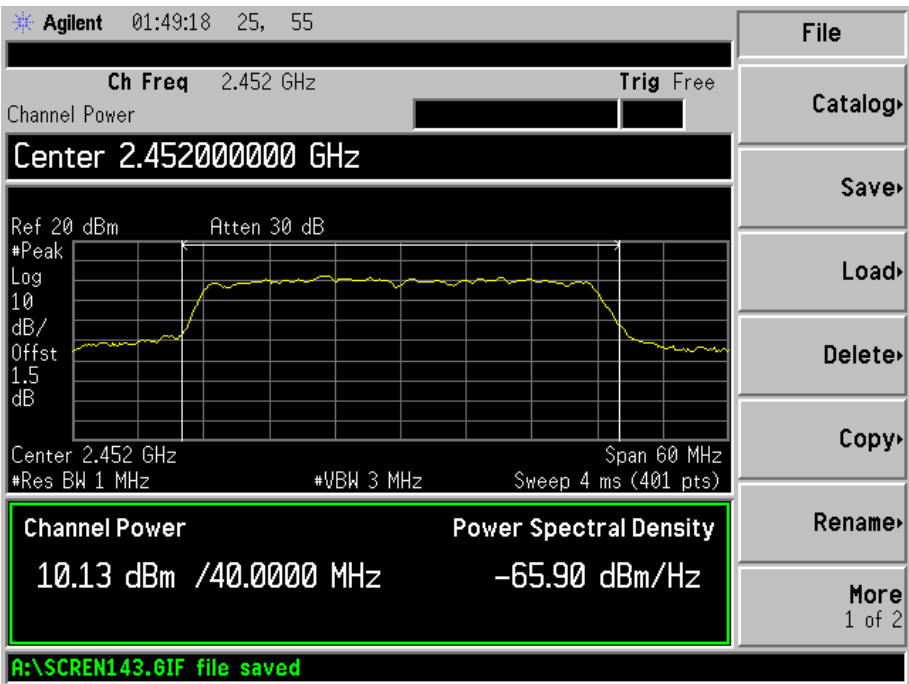
Low Channel:



Middle Channel:

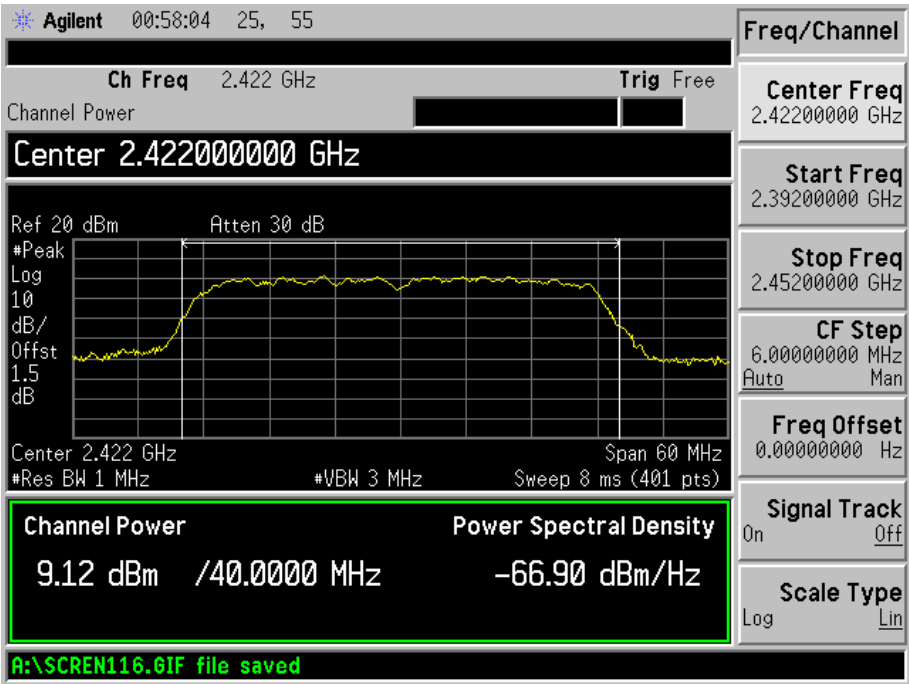


High Channel:

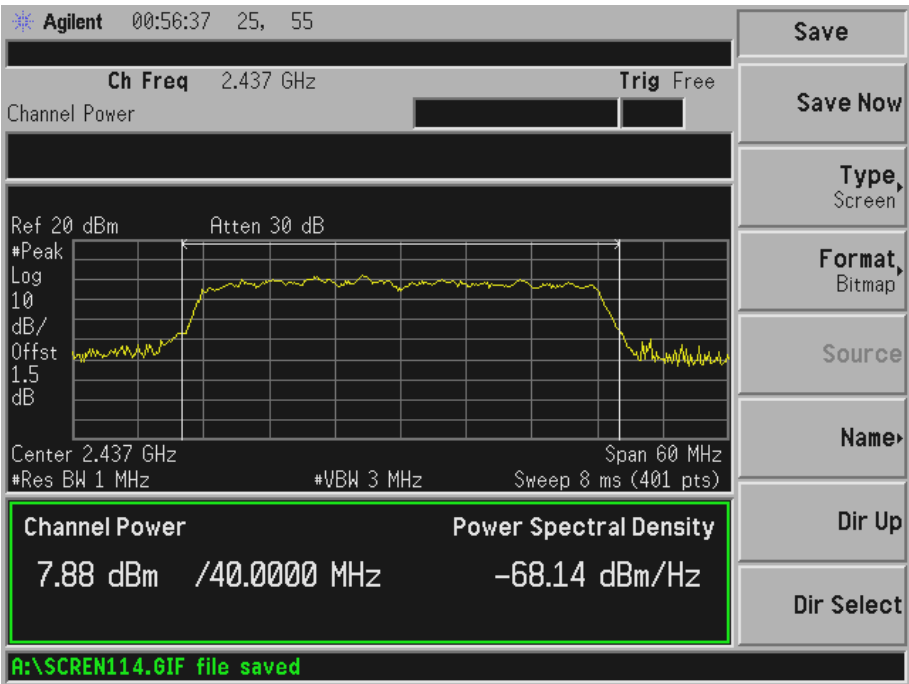


For 802.11n/HT40_chain 1_MCS0

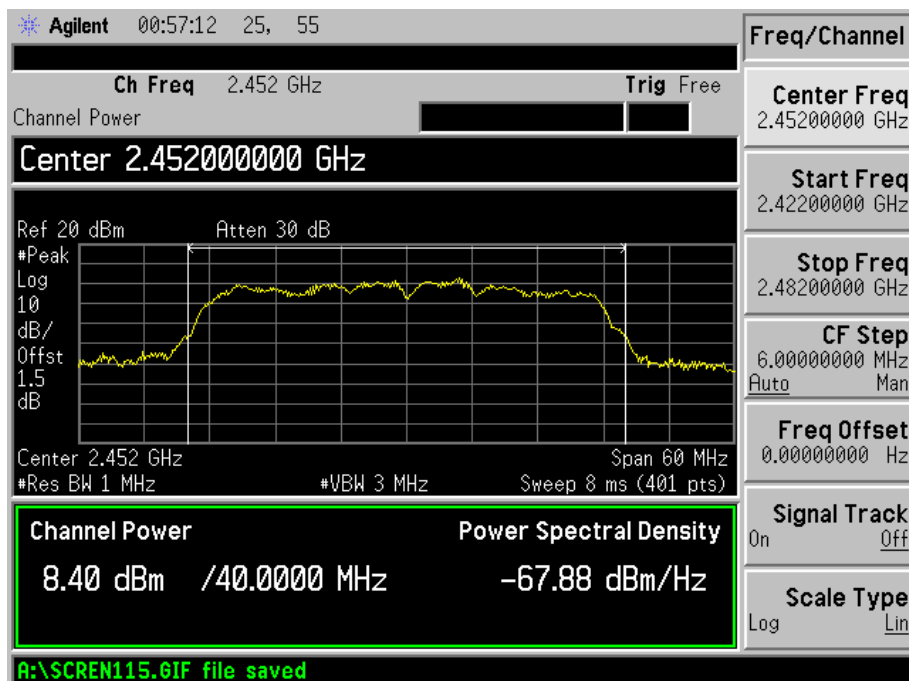
Low Channel:



Middle Channel:

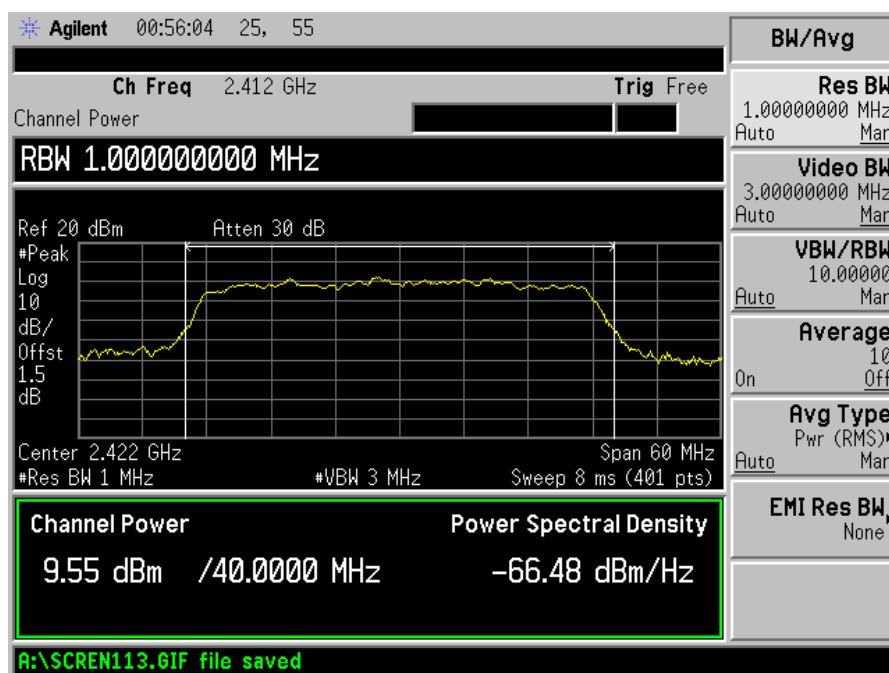


High Channel:

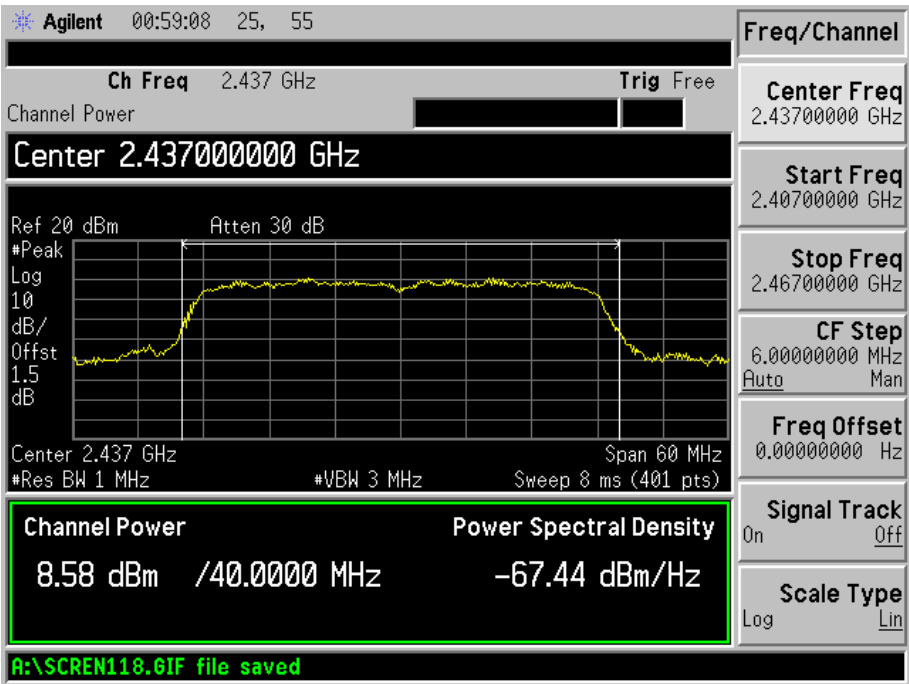


For 802.11n/HT40_chain 1_MCS15

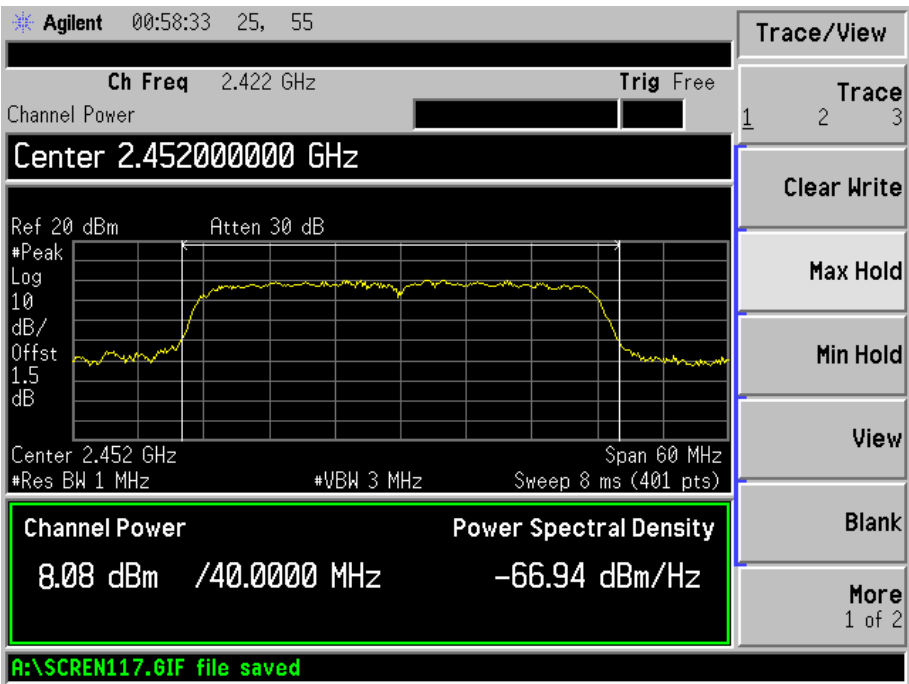
Low Channel:



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(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

8.3 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2012-03-28	2013-03-27
EMI Test Receiver	R&S	ESVB	825471/005	2012-03-28	2013-03-27
Pre-amplifier	Agilent	8447F	3113A06717	2012-03-28	2013-03-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2012-03-28	2013-03-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2013-02-25	2014-02-24
Horn Antenna	ETS	3117	00086197	2013-02-25	2014-02-24
Horn Antenna	ETS	3116B	00088203	2013-02-25	2014-02-24
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2013-02-25	2014-02-24

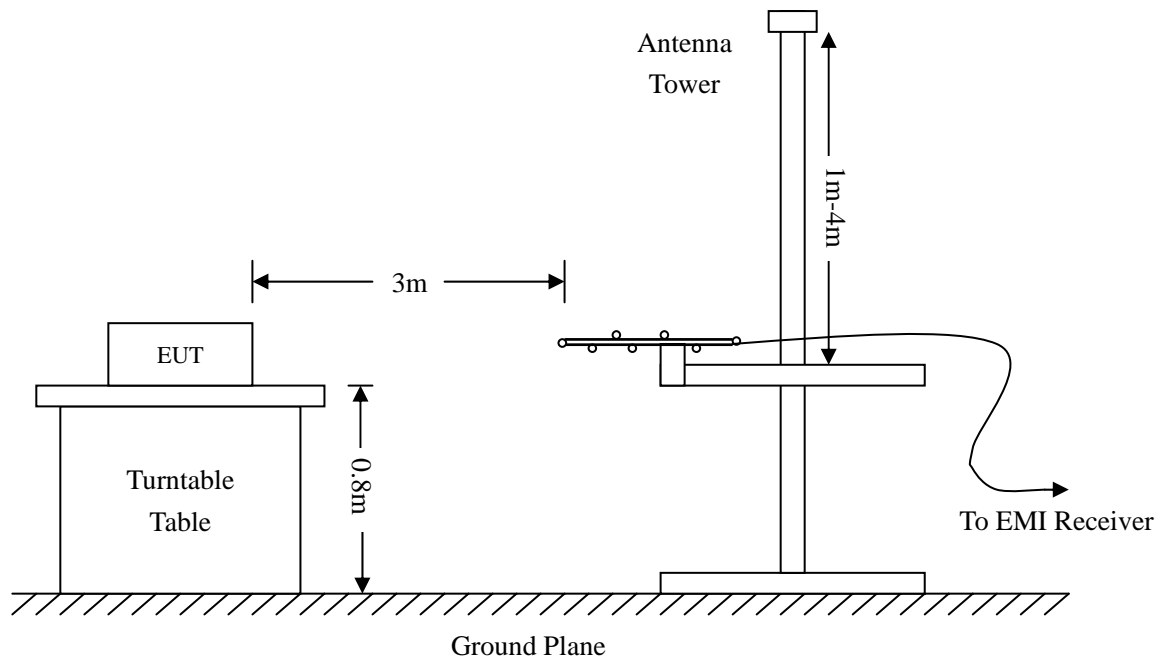
Statement of Traceability: All calibrations have been performed per the NVLAP requirements traceable to the NIST.

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 by 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

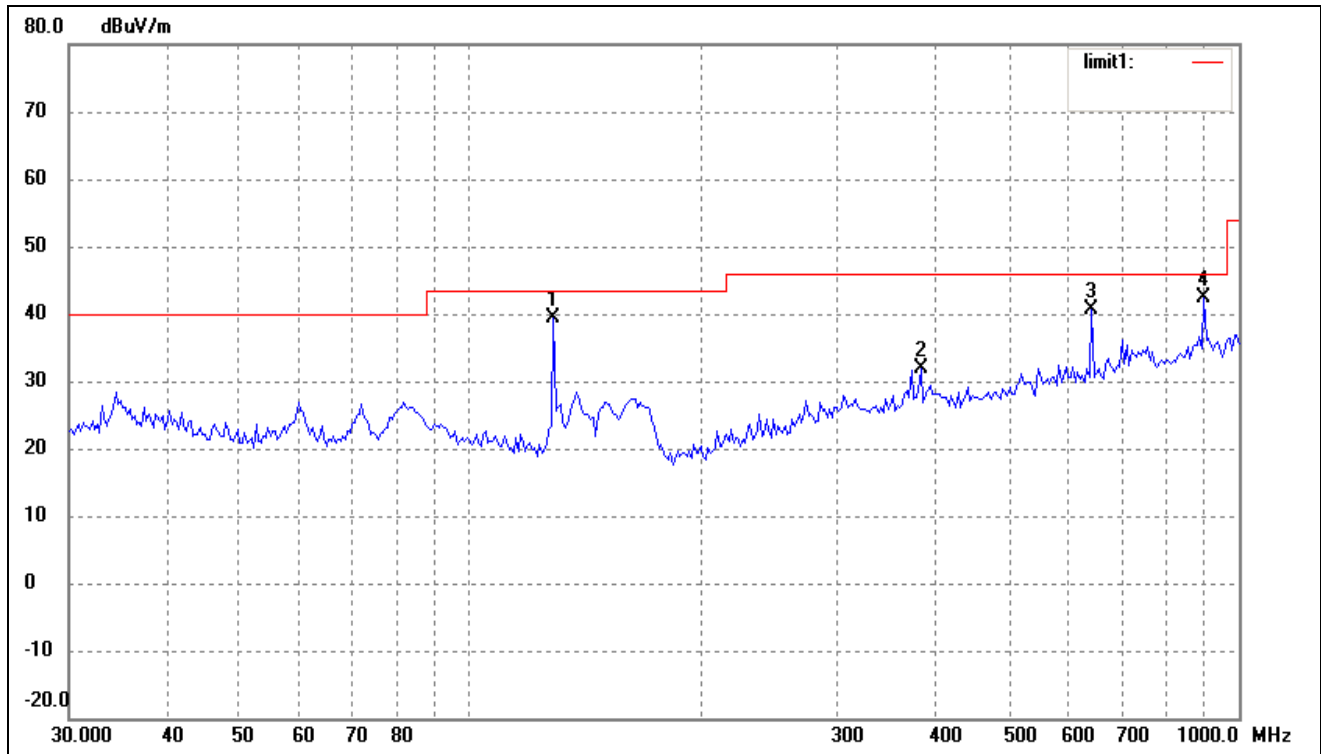
Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

8.7 Summary of Test Results/Plots

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

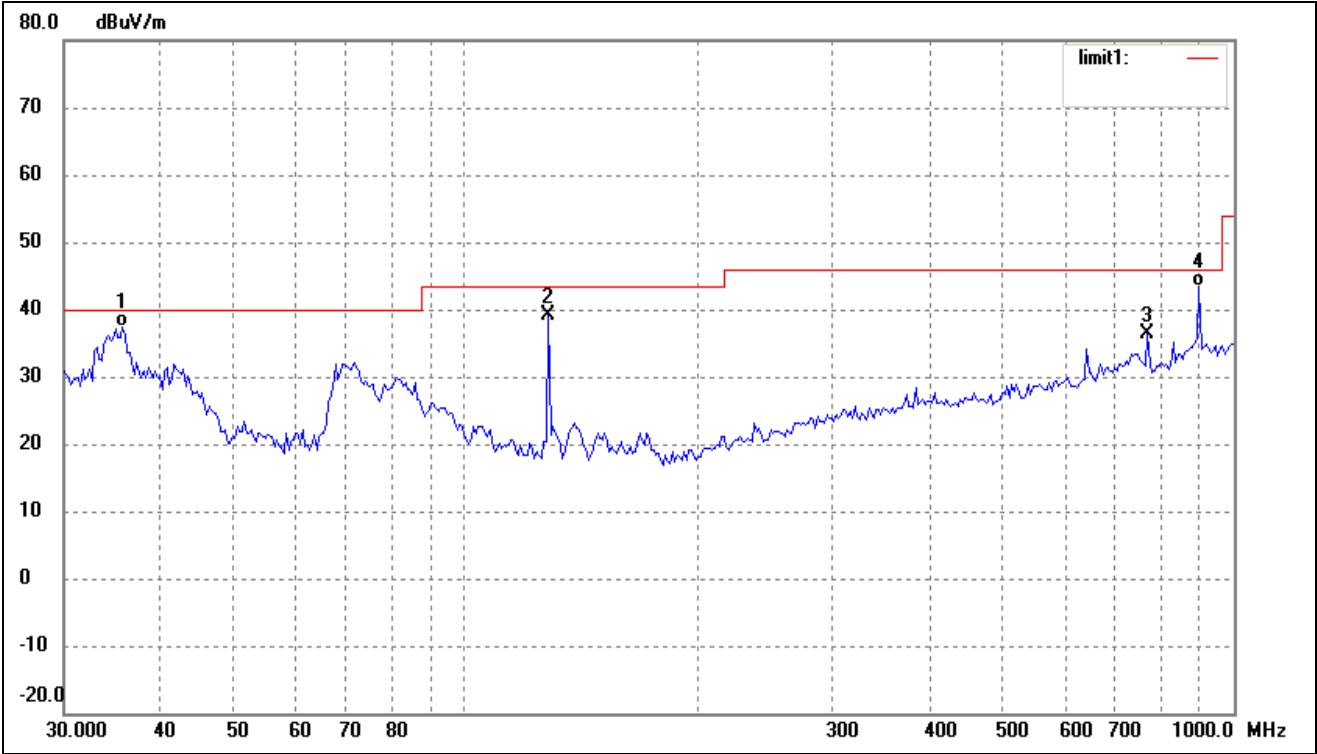
-1.51 dB at 900.1474 MHz in the Horizontal polarization for 802.11n-HT40 Middle Channel, 30MHz to 25 GHz, 3 Meters

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

Plot of Radiated Emissions Test Data (30MHz to 1GHz)*EUT:* WiFi Router*Tested Model:* AWAPN2403*Operating Condition:* 802.11b Transmitting Low Channel-2412MHz*Comment:**Test Specification:* Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	128.1130	35.06	4.27	39.33	43.50	-4.17	360	100	peak
2	385.2805	21.05	10.87	31.92	46.00	-14.08	360	100	peak
3	642.8613	25.39	15.14	40.53	46.00	-5.47	360	100	peak
4	900.1474	23.08	19.38	42.46	46.00	-3.54	360	100	peak

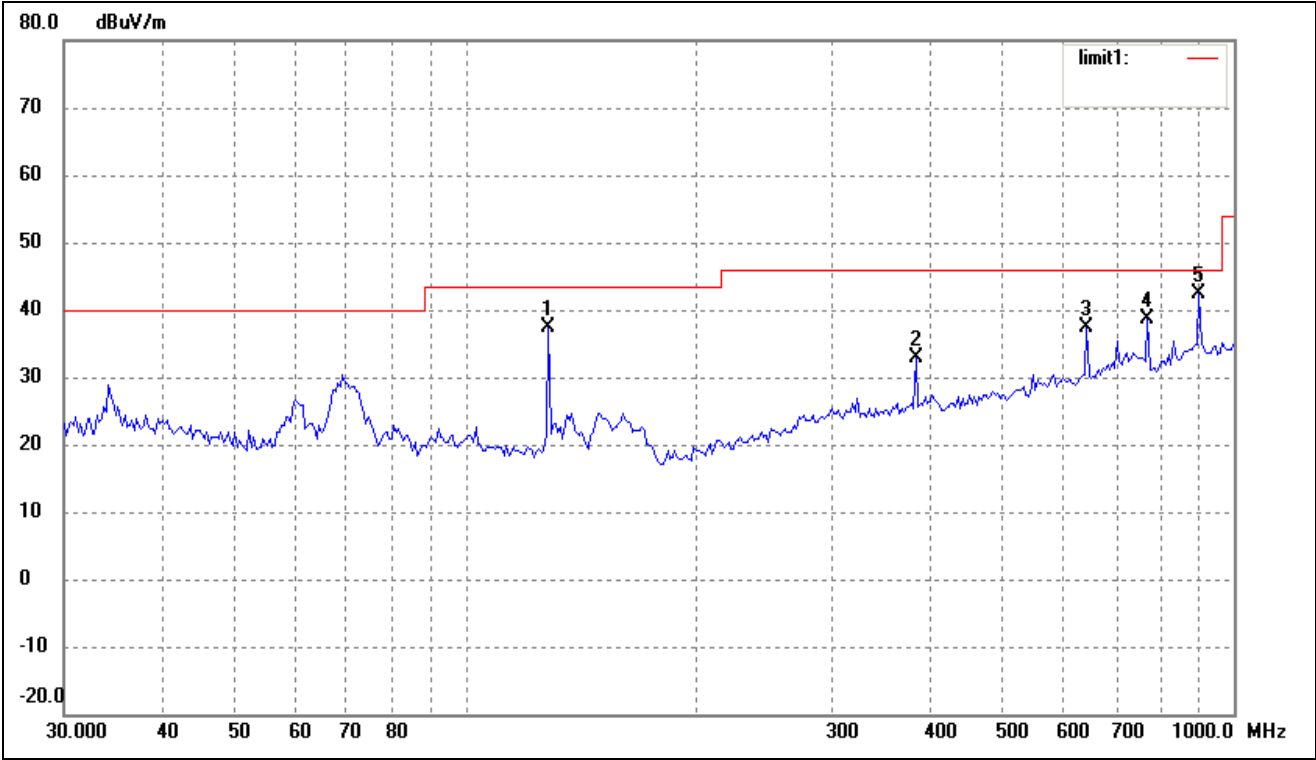
Test Specification: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	35.7491	28.29	9.00	37.29	40.00	-2.71	138	100	QP
2	128.1130	34.80	4.27	39.07	43.50	-4.43	360	100	peak
3	771.4486	20.05	16.37	36.42	46.00	-9.58	360	100	peak
4	900.1474	23.88	19.38	43.26	46.00	-2.74	64	100	QP

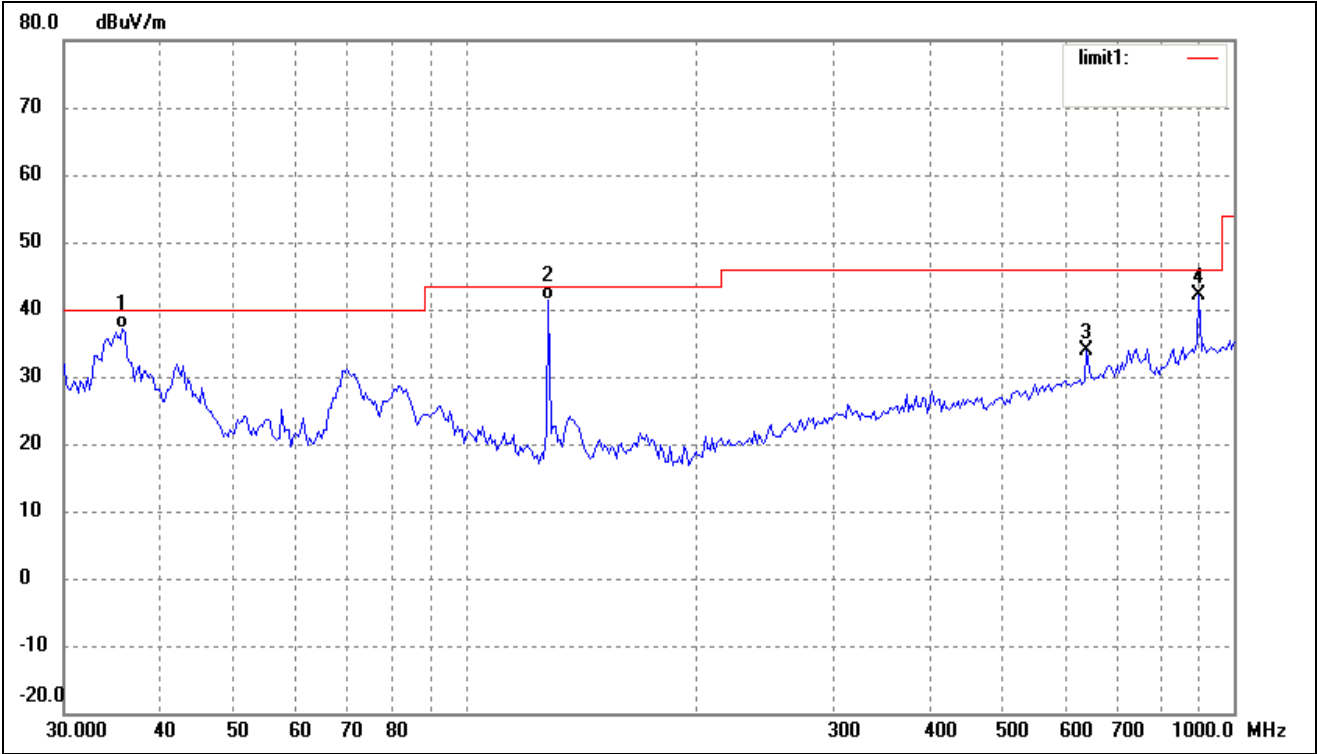
Operating Condition: 802.11b Transmitting Middle Channel-2437MHz
Comment:

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	128.1130	33.15	4.27	37.42	43.50	-6.08	360	100	peak
2	385.2805	22.07	10.87	32.94	46.00	-13.06	360	100	peak
3	642.8613	22.27	15.14	37.41	46.00	-8.59	360	100	peak
4	771.4486	22.34	16.37	38.71	46.00	-7.29	360	100	peak
5	900.1474	23.02	19.38	42.40	46.00	-3.60	360	100	peak

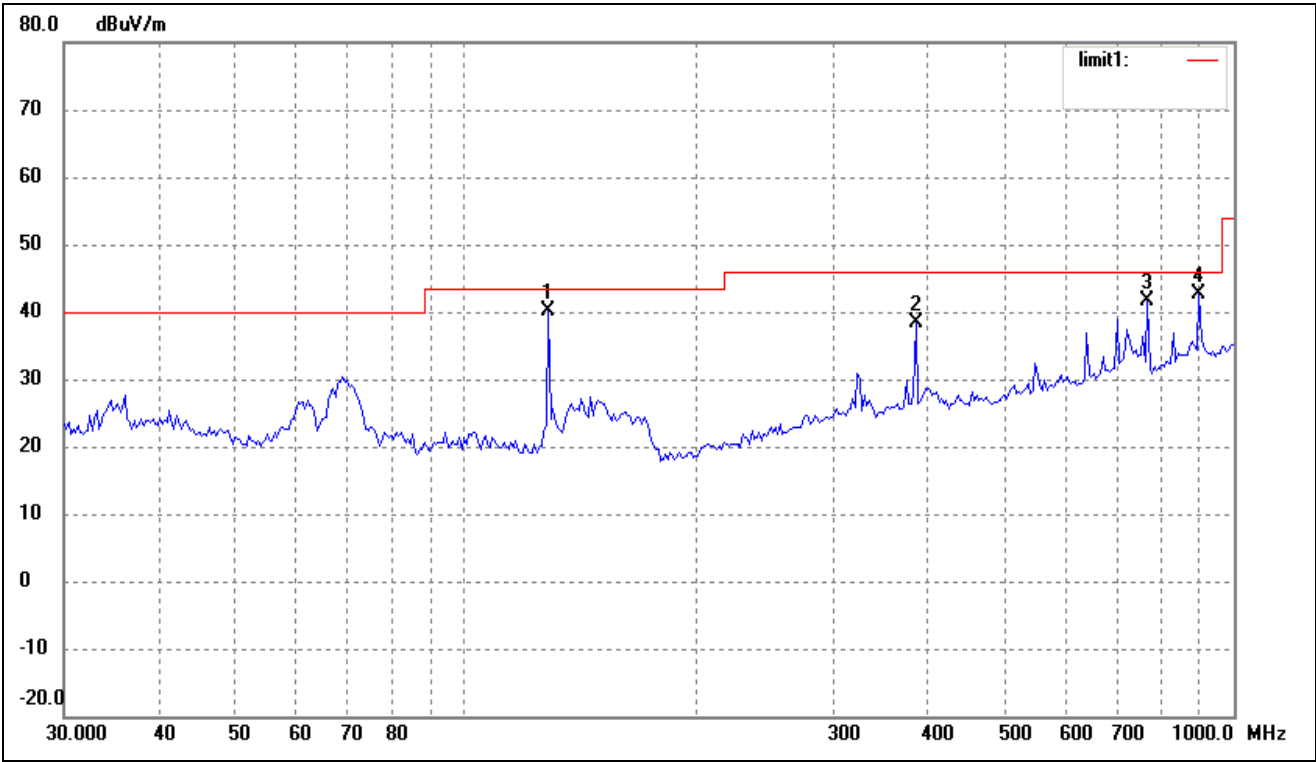
Test Specification: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	35.7491	28.12	9.00	37.12	40.00	-2.88	193	100	QP
2	128.1130	37.12	4.27	41.39	43.50	-2.11	264	100	QP
3	642.8613	18.79	15.14	33.93	46.00	-12.07	360	100	peak
4	900.1474	22.68	19.38	42.06	46.00	-3.94	360	100	peak

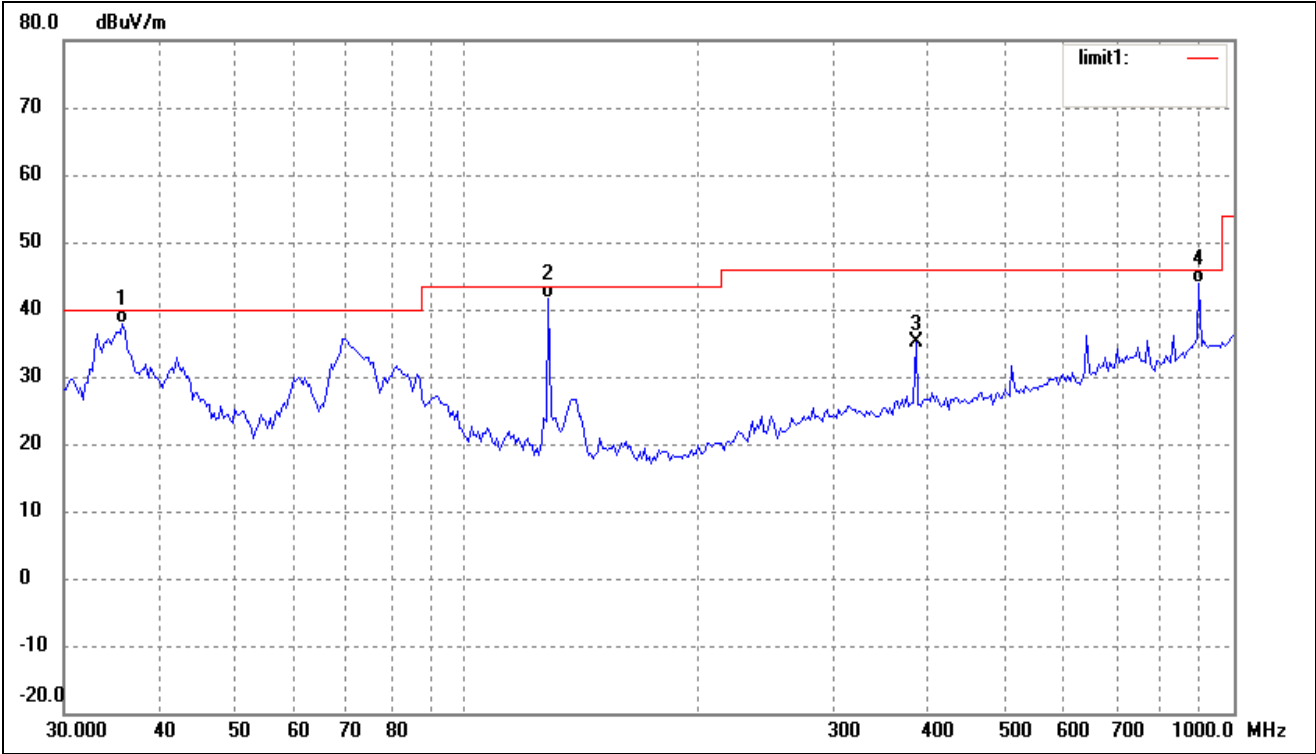
Operating Condition: 802.11b Transmitting High Channel-2462MHz
Comment:

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	128.1130	35.83	4.27	40.10	43.50	-3.40	360	100	peak
2	385.2805	27.63	10.87	38.50	46.00	-7.50	360	100	peak
3	771.4486	25.33	16.37	41.70	46.00	-4.30	360	100	peak
4	900.1474	23.26	19.38	42.64	46.00	-3.36	360	100	peak

Test Specification: Vertical

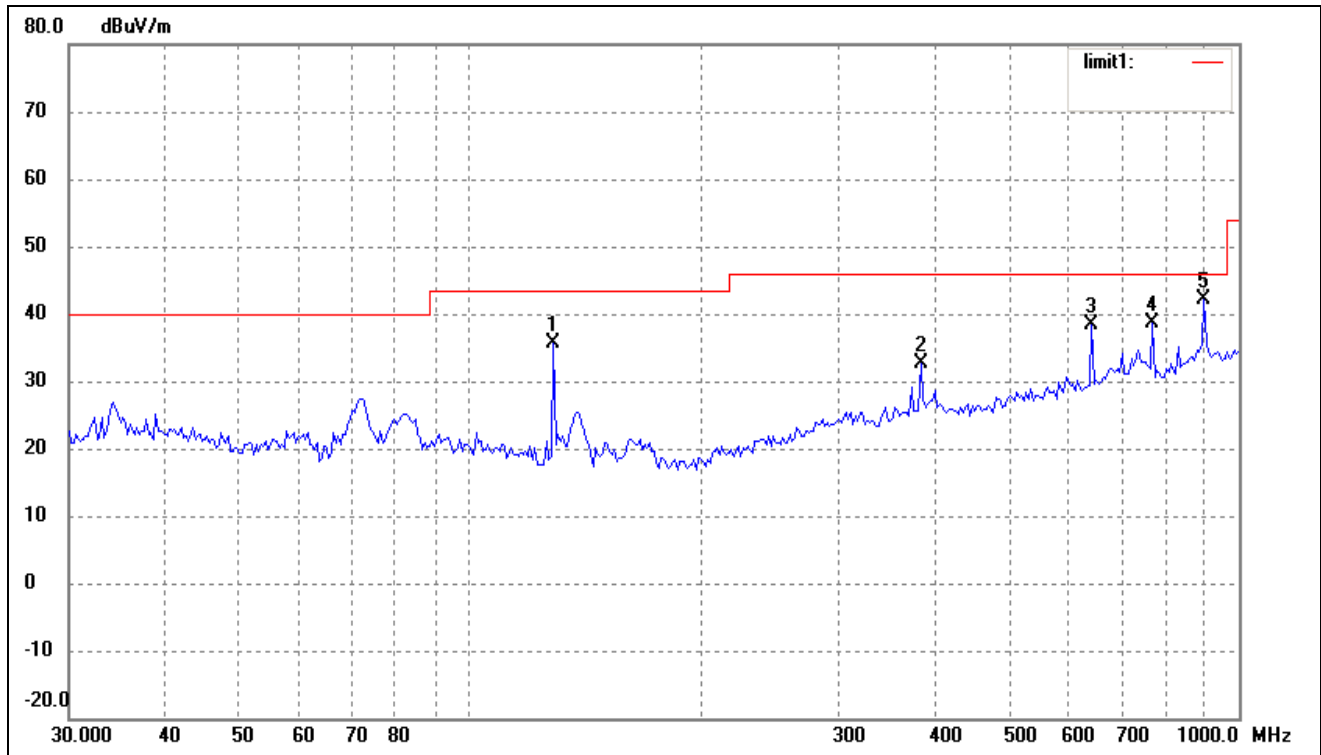


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	35.7491	28.83	9.00	37.83	40.00	-2.17	65	100	QP
2	128.1130	37.39	4.27	41.66	43.50	-1.84	184	100	QP
3	385.2805	24.27	10.87	35.14	46.00	-10.86	360	100	peak
4	900.1474	24.53	19.38	43.91	46.00	-2.09	135	100	QP

Operating Condition: 802.11g Transmitting Low Channel-2412MHz

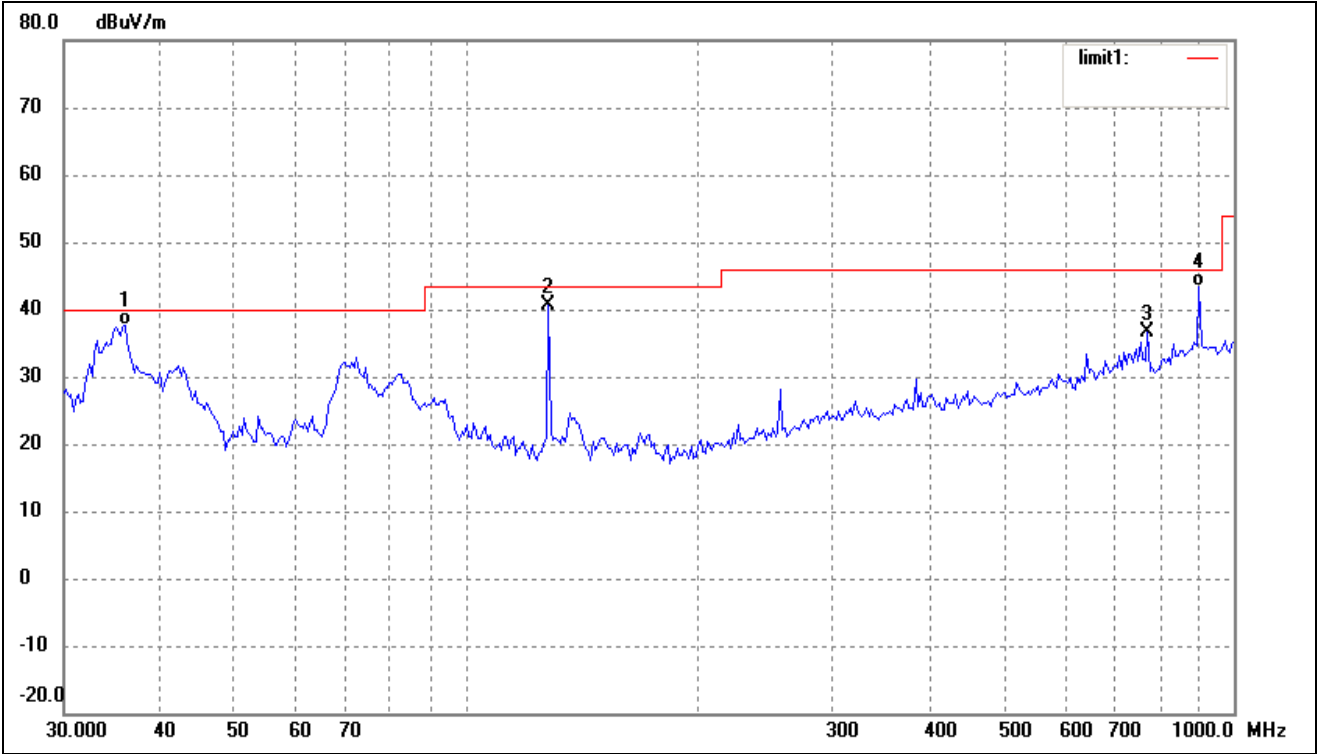
Comment:

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	128.1130	31.36	4.27	35.63	43.50	-7.87	360	100	peak
2	385.2805	21.81	10.87	32.68	46.00	-13.32	360	100	peak
3	642.8613	23.26	15.14	38.40	46.00	-7.60	360	100	peak
4	771.4486	22.23	16.37	38.60	46.00	-7.40	360	100	peak
5	900.1474	22.72	19.38	42.10	46.00	-3.90	360	100	peak

Test Specification: Vertical

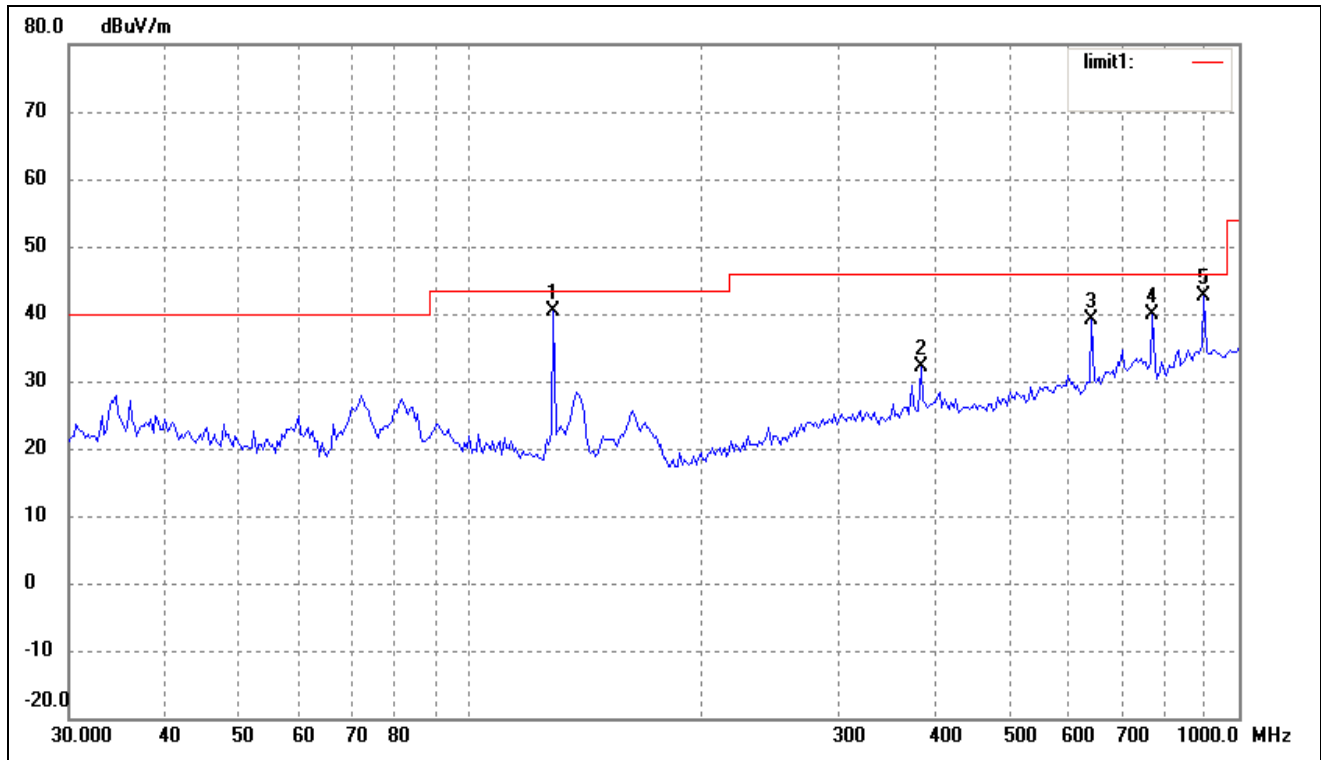


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	36.0007	28.64	9.04	37.68	40.00	-2.32	184	100	QP
2	128.1130	36.33	4.27	40.60	43.50	-2.90	360	100	peak
3	771.4486	20.33	16.37	36.70	46.00	-9.30	360	100	peak
4	900.1474	23.88	19.38	43.26	46.00	-2.74	162	100	QP

Operating Condition: 802.11g Transmitting Middle Channel-2437MHz

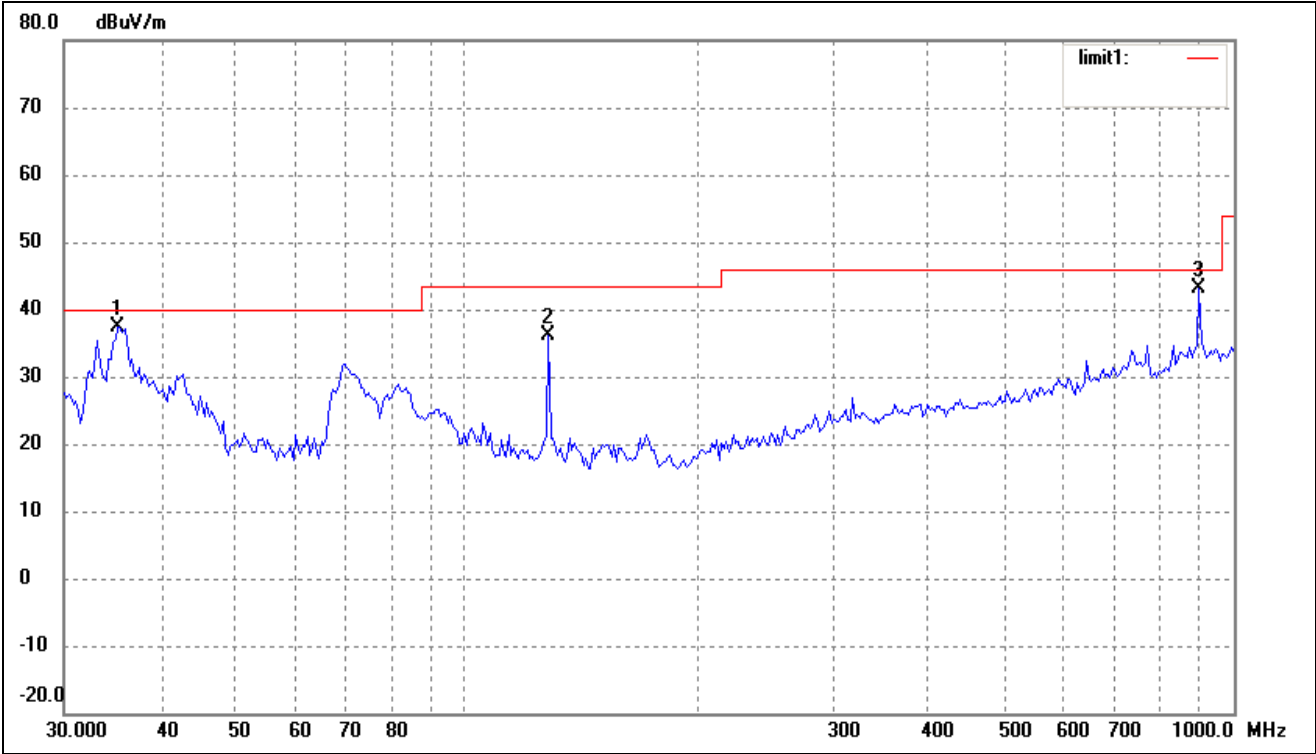
Comment:

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	128.1130	36.01	4.27	40.28	43.50	-3.22	360	100	peak
2	385.2805	21.24	10.87	32.11	46.00	-13.89	360	100	peak
3	642.8613	23.98	15.14	39.12	46.00	-6.88	360	100	peak
4	771.4486	23.46	16.37	39.83	46.00	-6.17	360	100	peak
5	900.1474	23.28	19.38	42.66	46.00	-3.34	360	100	peak

Test Specification: Vertical

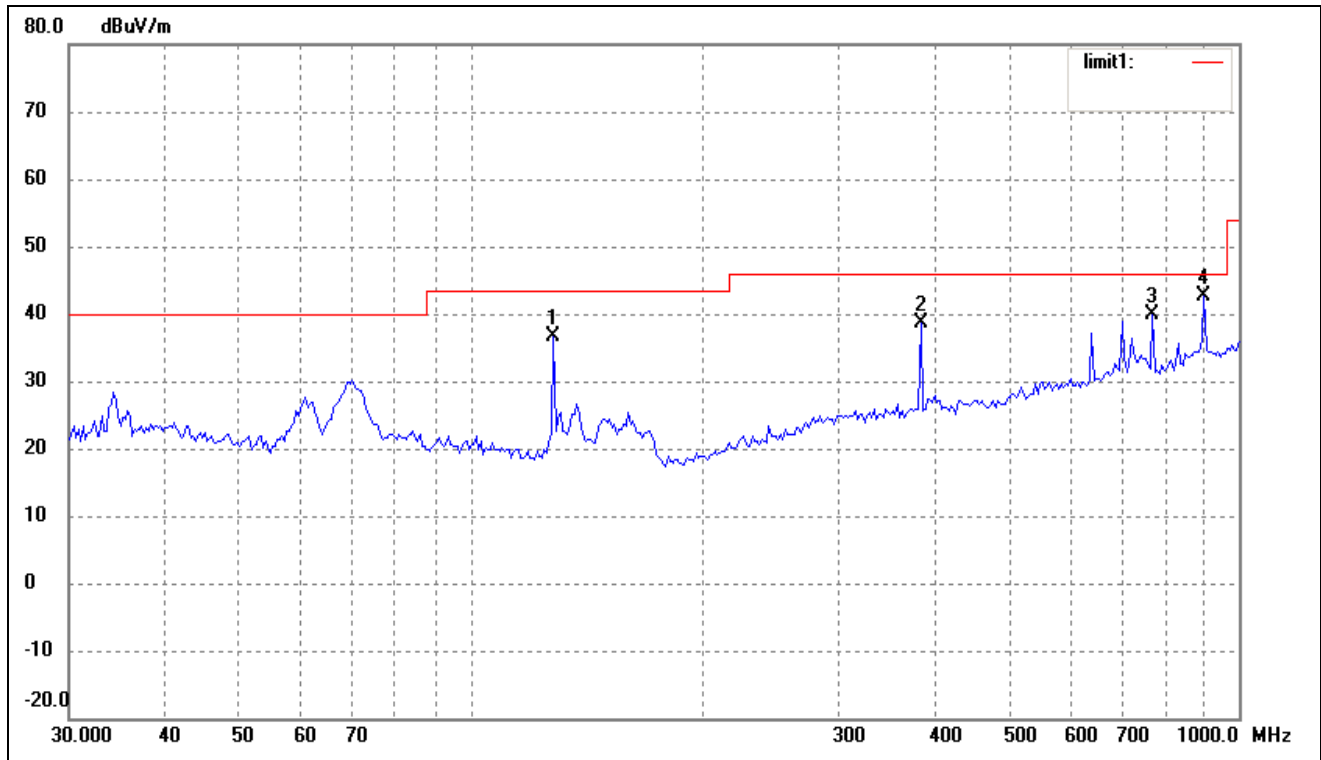


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	35.2512	28.52	8.92	37.44	40.00	-2.56	360	100	peak
2	128.1130	31.76	4.27	36.03	43.50	-7.47	360	100	peak
3	900.1474	23.84	19.38	43.22	46.00	-2.78	360	100	peak

Operating Condition: 802.11g Transmitting High Channel-2462MHz

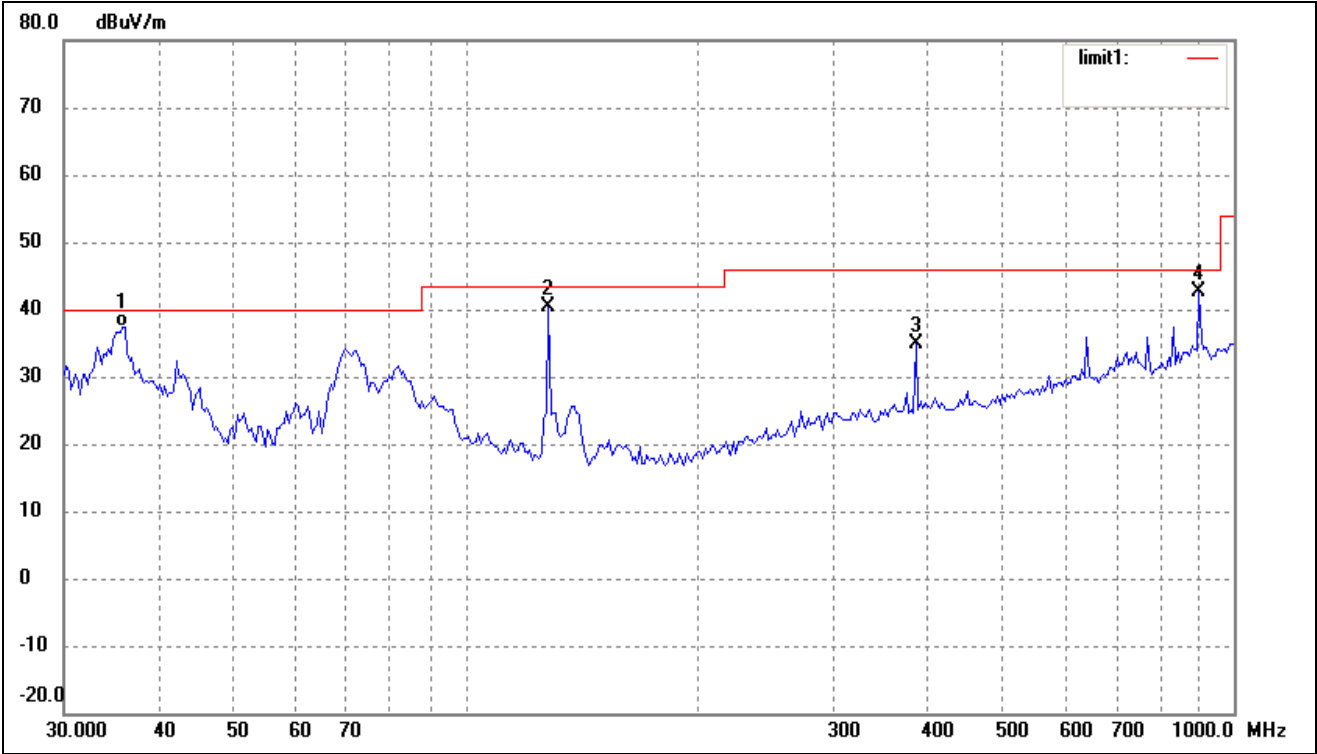
Comment:

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	128.1130	32.46	4.27	36.73	43.50	-6.77	360	100	peak
2	385.2805	27.76	10.87	38.63	46.00	-7.37	360	100	peak
3	771.4486	23.50	16.37	39.87	46.00	-6.13	360	100	peak
4	900.1474	23.23	19.38	42.61	46.00	-3.39	360	100	peak

Test Specification: Vertical

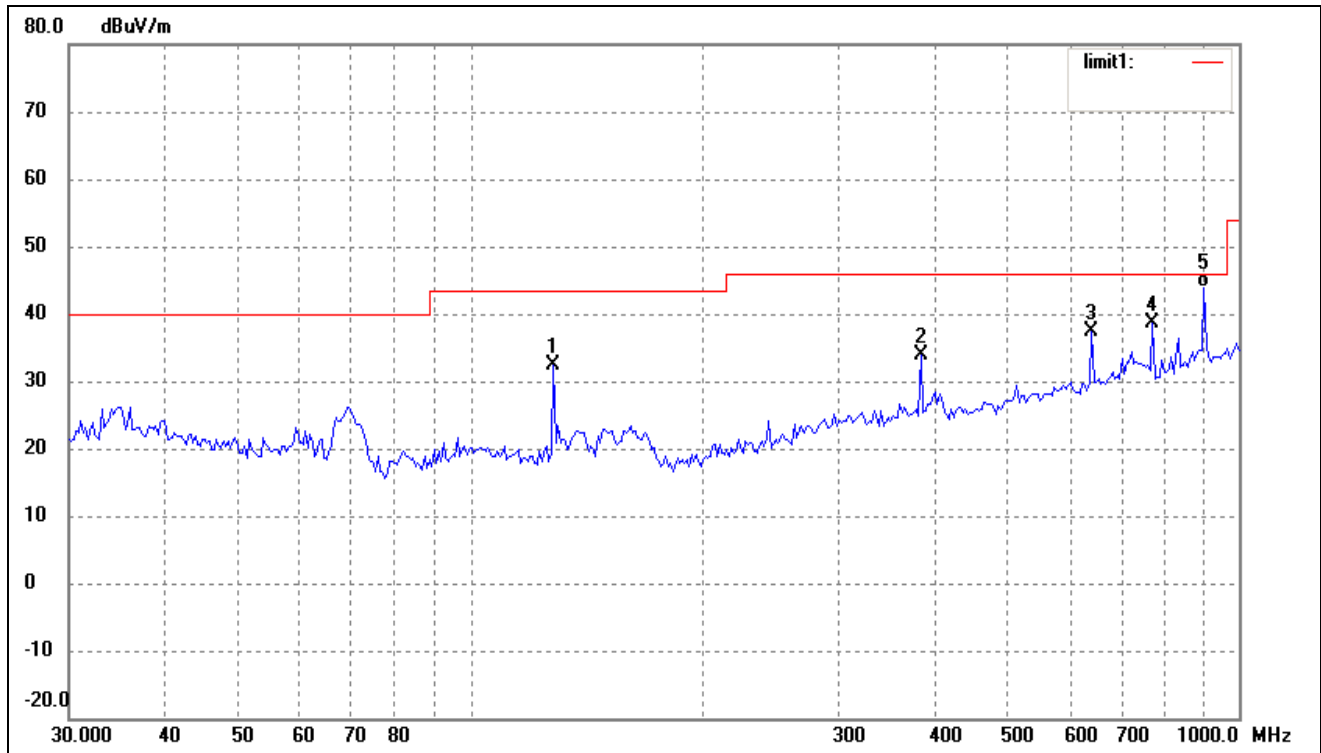


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	35.7491	28.47	9.00	37.47	40.00	-2.53	162	100	QP
2	128.1130	36.12	4.27	40.39	43.50	-3.11	360	100	peak
3	385.2805	24.08	10.87	34.95	46.00	-11.05	360	100	peak
4	900.1474	23.31	19.38	42.69	46.00	-3.31	360	100	peak

Operating Condition: 802.11n-HT20 Transmitting Low Channel-2412MHz

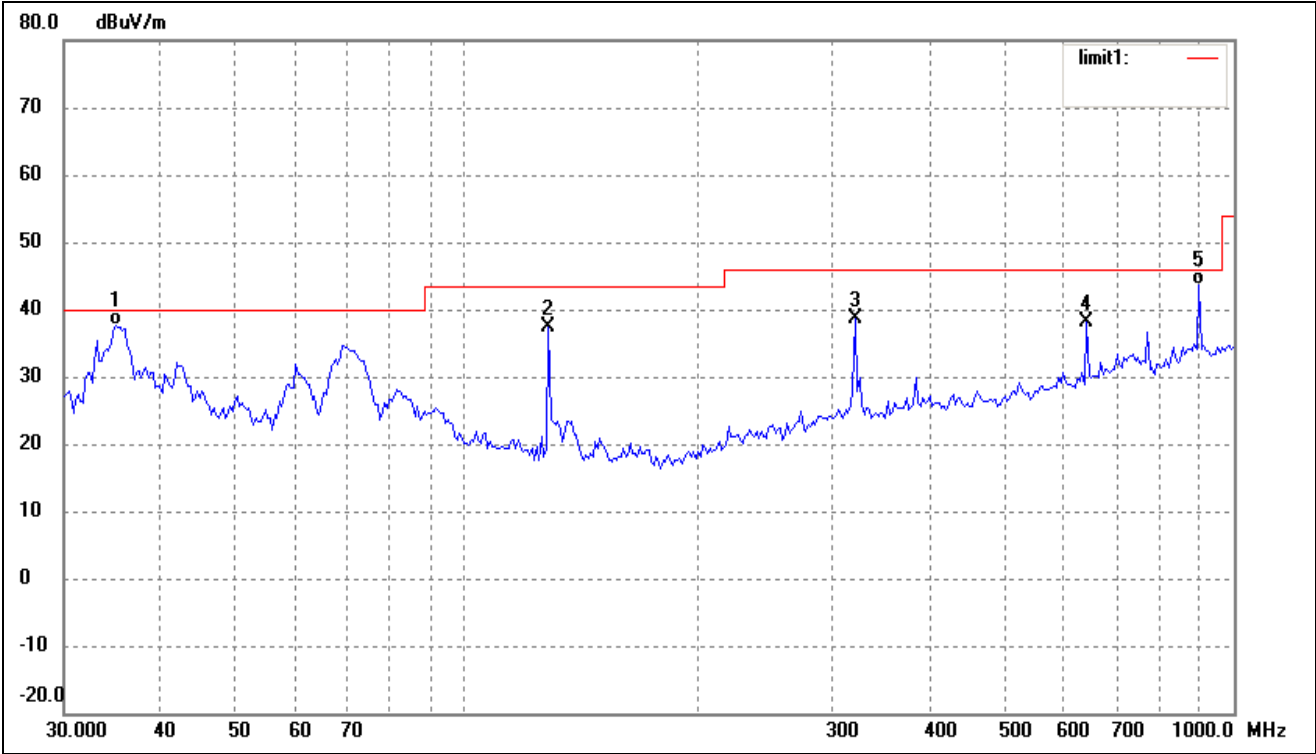
Comment:

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	128.1130	28.05	4.27	32.32	43.50	-11.18	360	100	peak
2	385.2805	22.96	10.87	33.83	46.00	-12.17	360	100	peak
3	642.8613	22.35	15.14	37.49	46.00	-8.51	360	100	peak
4	771.4486	22.34	16.37	38.71	46.00	-7.29	360	100	peak
5	900.1474	24.38	19.38	43.76	46.00	-2.24	168	100	QP

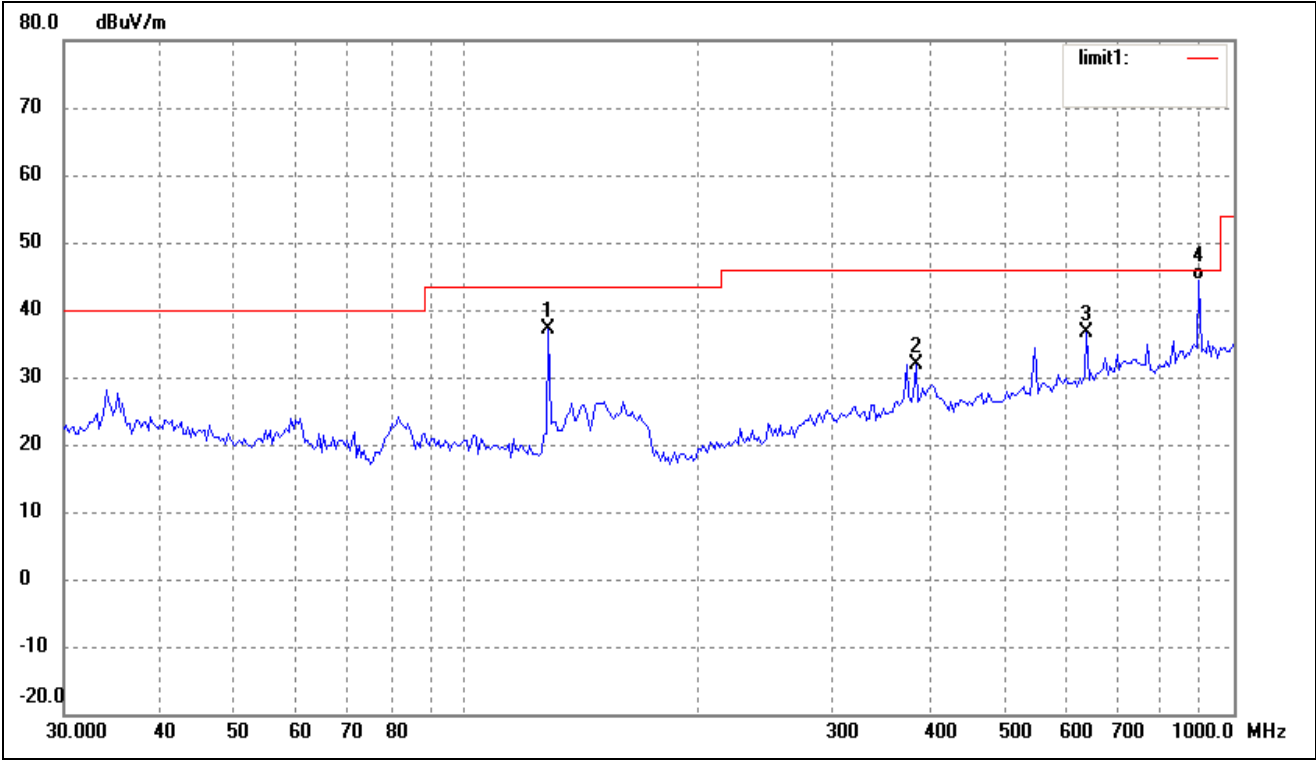
Test Specification: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	35.0048	28.67	8.88	37.55	40.00	-2.45	154	100	QP
2	128.1130	33.09	4.27	37.36	43.50	-6.14	360	100	peak
3	321.0608	28.13	10.46	38.59	46.00	-7.41	360	100	peak
4	642.8613	23.09	15.14	38.23	46.00	-7.77	360	100	peak
5	900.1474	24.13	19.38	43.51	46.00	-2.49	138	100	QP

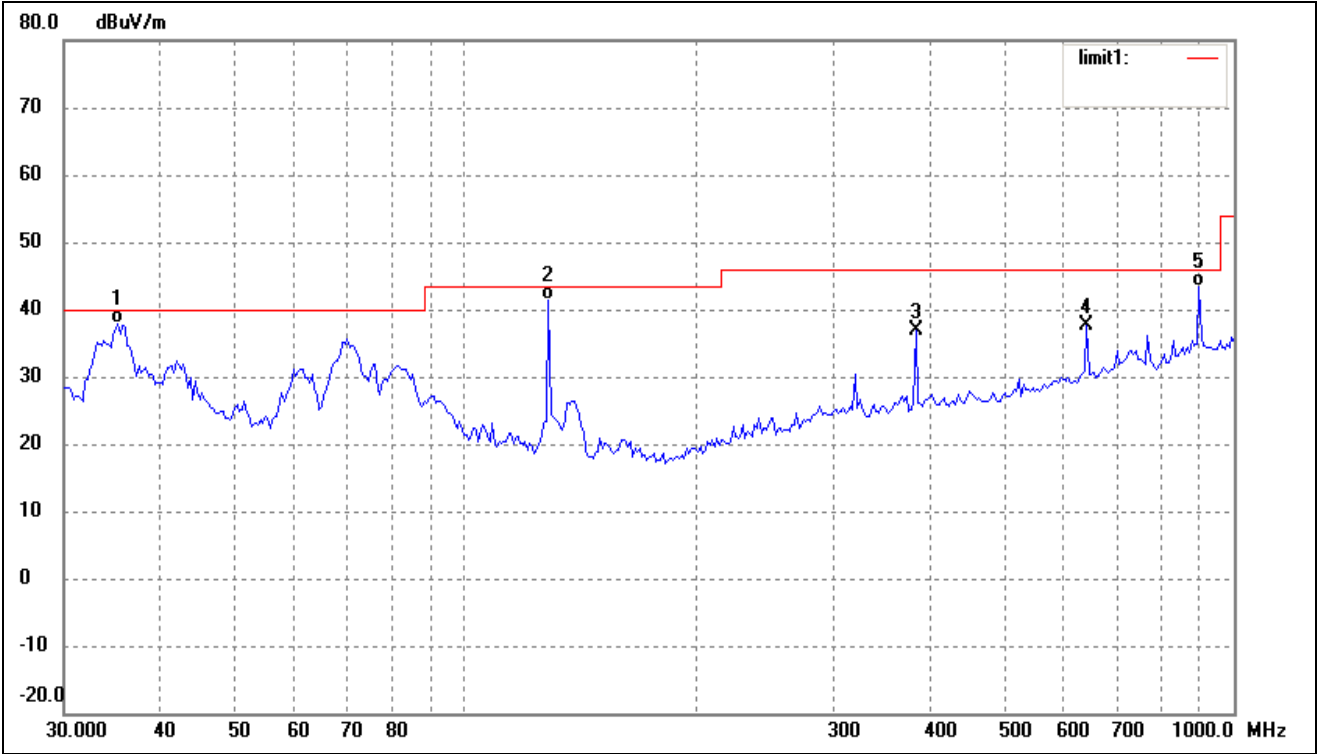
Operating Condition: 802.11n-HT20 Transmitting Middle Channel-2437MHz
Comment:

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	128.1130	32.82	4.27	37.09	43.50	-6.41	360	100	peak
2	385.2805	21.11	10.87	31.98	46.00	-14.02	360	100	peak
3	642.8613	21.45	15.14	36.59	46.00	-9.41	360	100	peak
4	900.1474	25.11	19.38	44.49	46.00	-1.51	140	100	QP

Test Specification: Vertical

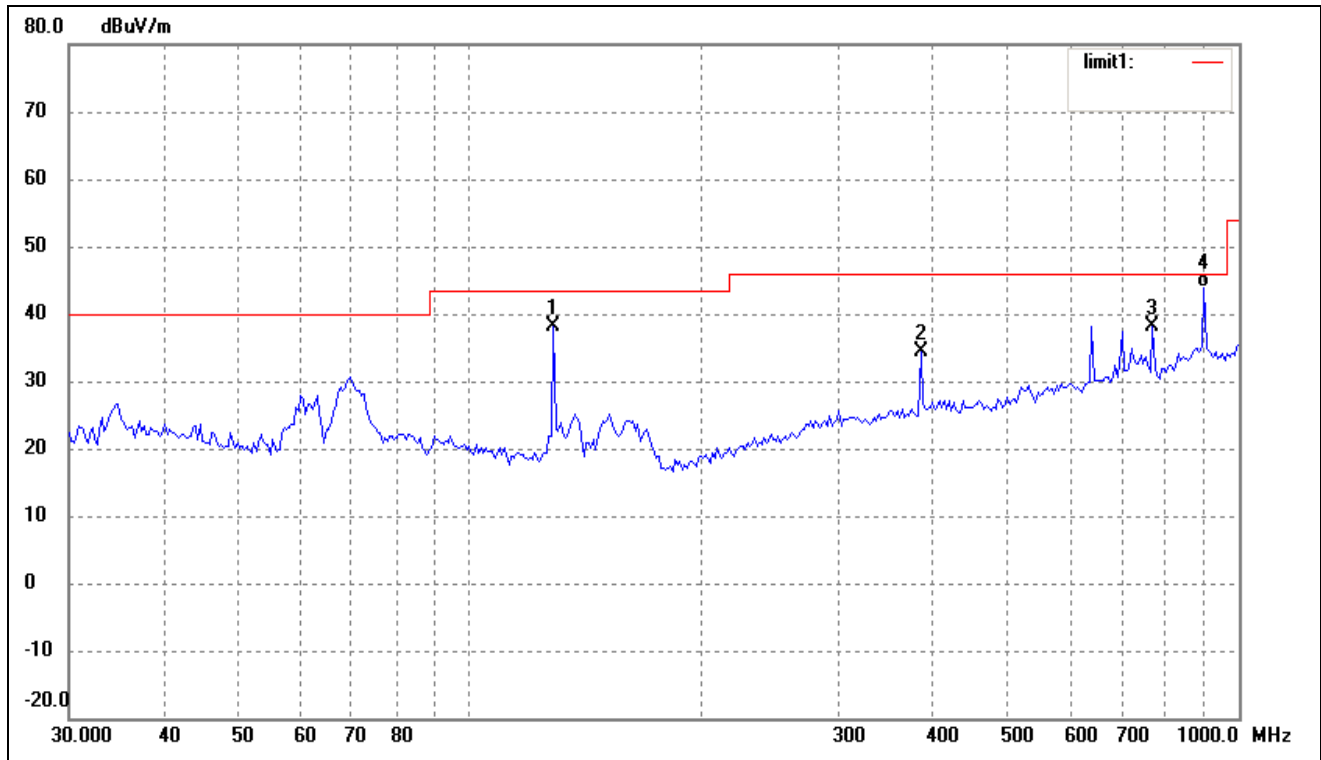


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	35.2512	28.90	8.92	37.82	40.00	-2.18	113	100	QP
2	128.1130	37.03	4.27	41.30	43.50	-2.20	128	100	QP
3	385.2805	26.08	10.87	36.95	46.00	-9.05	360	100	peak
4	642.8613	22.61	15.14	37.75	46.00	-8.25	360	100	peak
5	900.1474	24.03	19.38	43.41	46.00	-2.59	196	100	QP

Operating Condition: 802.11n-HT20 Transmitting High Channel-2462MHz

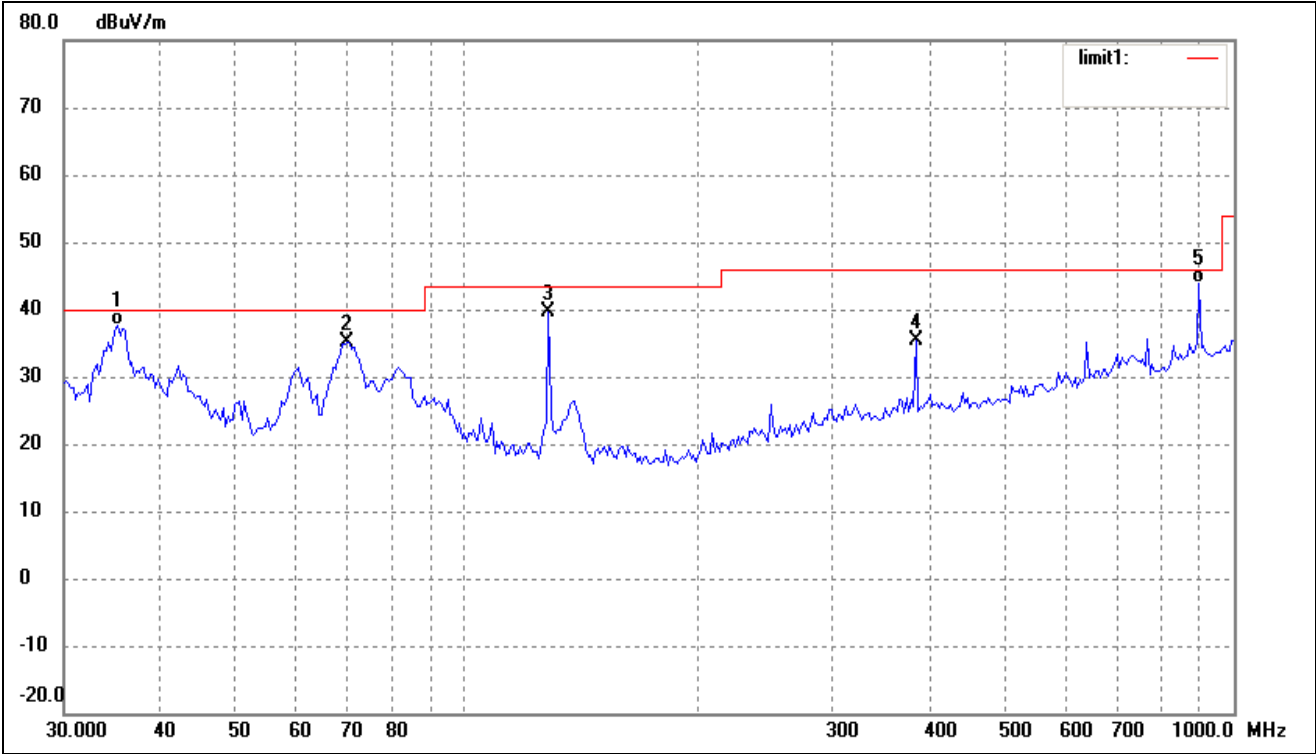
Comment:

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	128.1130	33.81	4.27	38.08	43.50	-5.42	360	100	peak
2	385.2805	23.58	10.87	34.45	46.00	-11.55	360	100	peak
3	771.4486	21.72	16.37	38.09	46.00	-7.91	360	100	peak
4	900.1474	24.44	19.38	43.82	46.00	-2.18	84	100	QP

Test Specification: Vertical

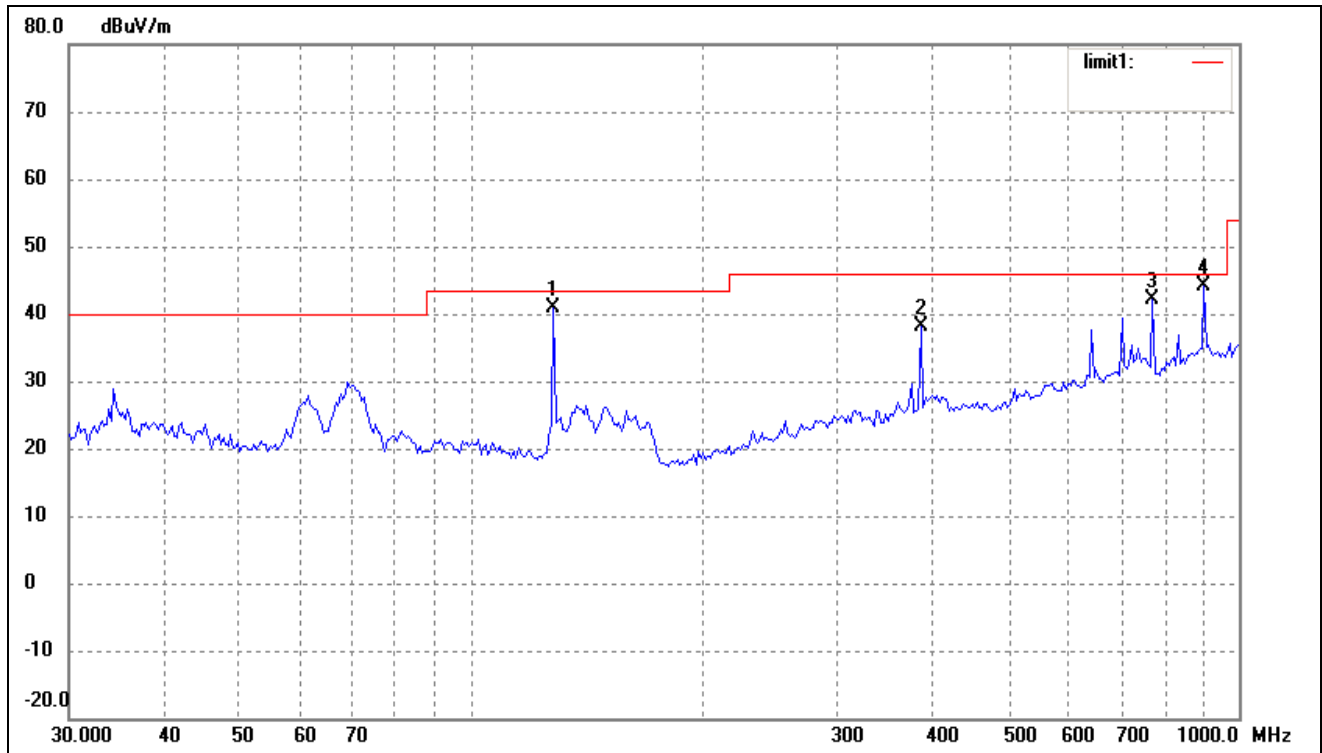


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	35.2512	28.80	8.92	37.72	40.00	-2.28	167	100	QP
2	70.0903	32.63	2.51	35.14	40.00	-4.86	360	100	peak
3	128.1130	35.47	4.27	39.74	43.50	-3.76	360	100	peak
4	385.2805	24.53	10.87	35.40	46.00	-10.60	360	100	peak
5	900.1474	24.55	19.38	43.93	46.00	-2.07	102	100	QP

Operating Condition: 802.11n-HT40 Transmitting Low Channel-2422MHz

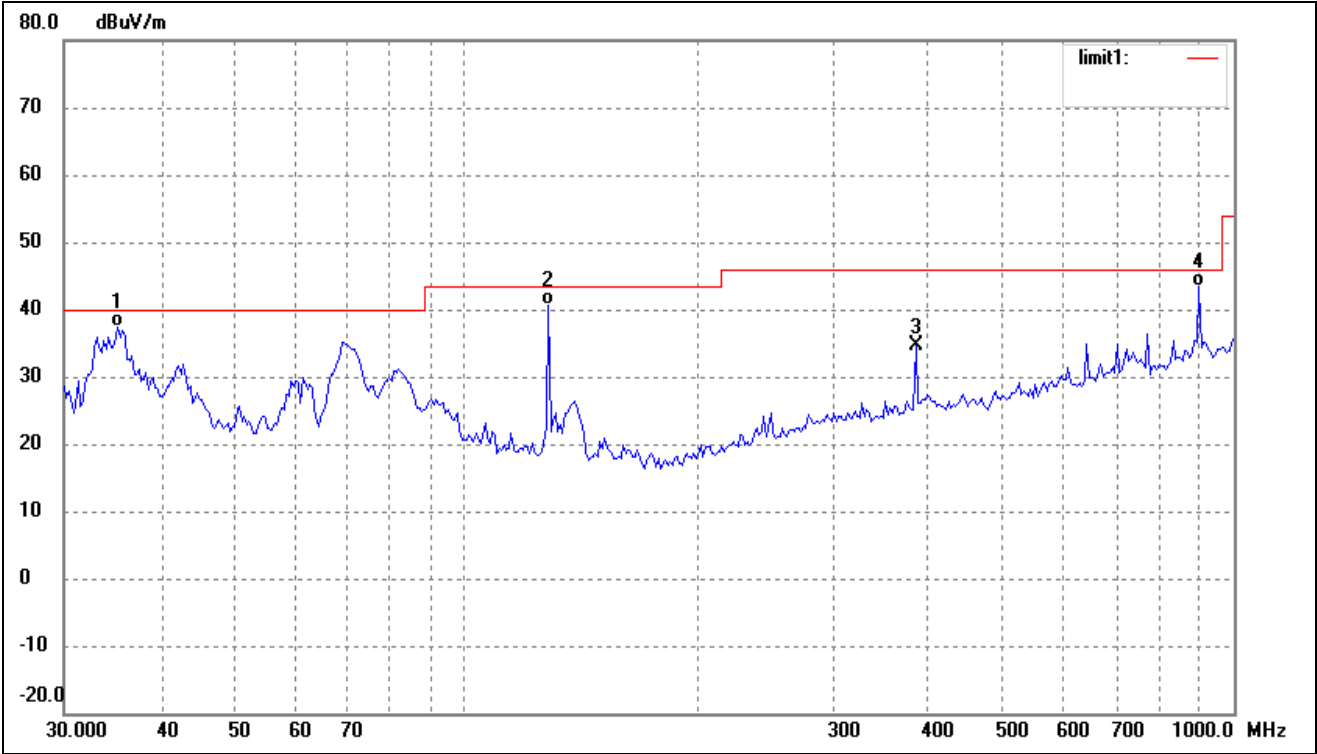
Comment:

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	128.1130	36.72	4.27	40.99	43.50	-2.51	360	100	peak
2	385.2805	27.20	10.87	38.07	46.00	-7.93	360	100	peak
3	771.4486	25.88	16.37	42.25	46.00	-3.75	360	100	peak
4	900.1474	24.73	19.38	44.11	46.00	-1.89	360	100	peak

Test Specification: Vertical

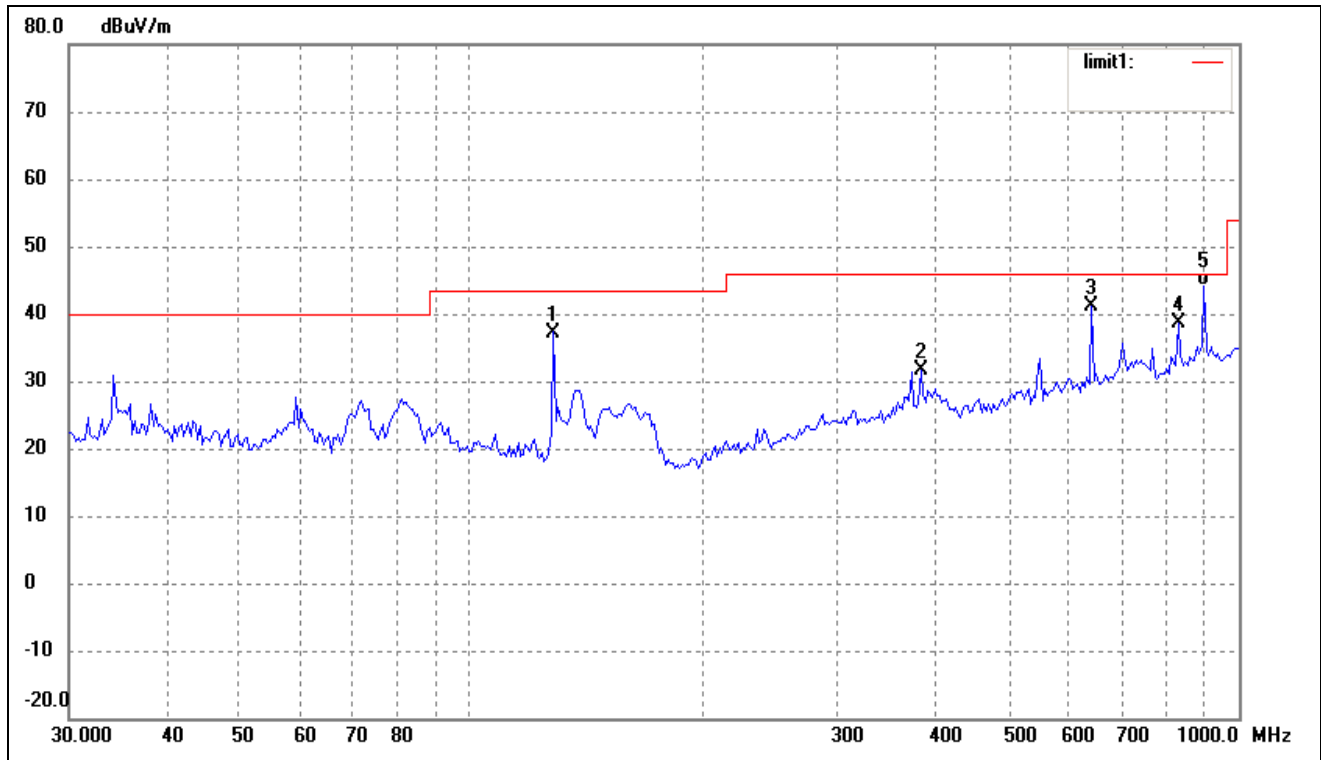


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	35.2512	28.57	8.92	37.49	40.00	-2.51	108	100	QP
2	128.1130	36.47	4.27	40.74	43.50	-2.76	239	100	QP
3	385.2805	23.79	10.87	34.66	46.00	-11.34	360	100	peak
4	900.1474	23.89	19.38	43.27	46.00	-2.73	324	100	QP

Operating Condition: 802.11n-HT40 Transmitting Middle Channel-2437MHz

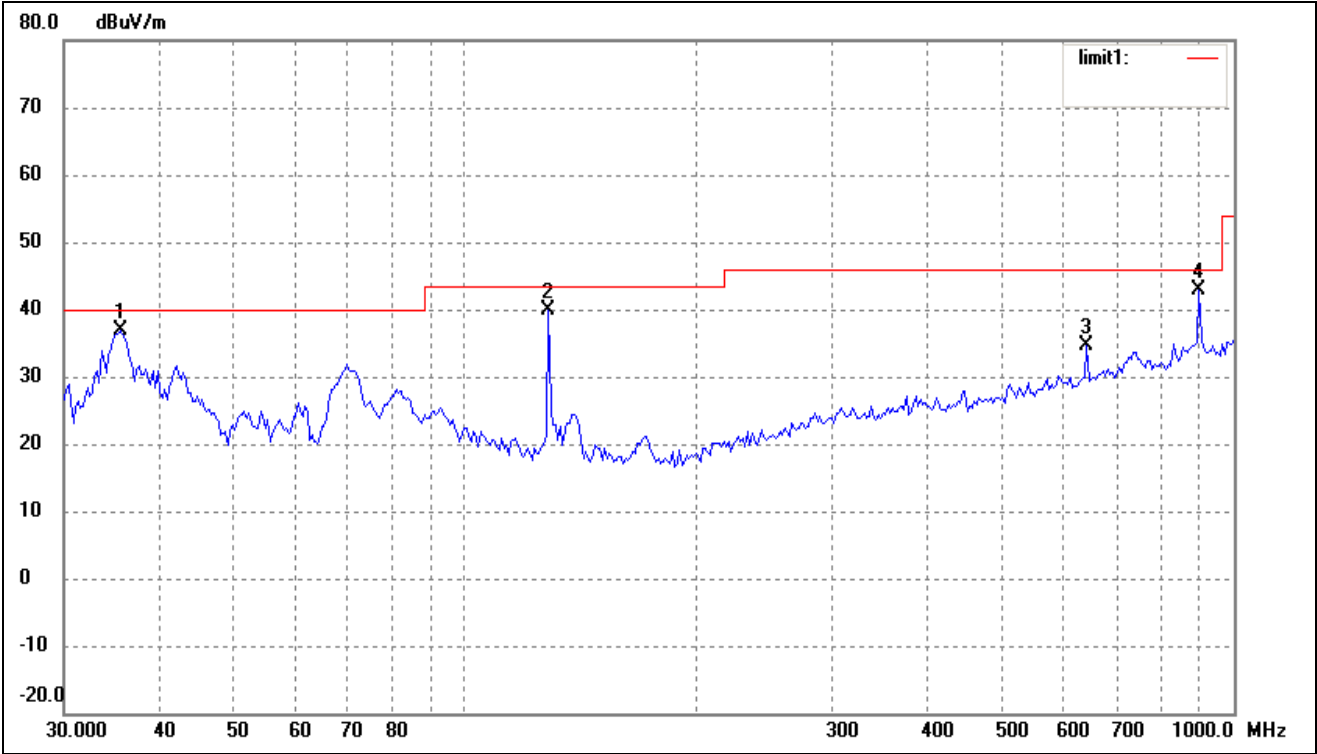
Comment:

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	128.1130	32.98	4.27	37.25	43.50	-6.25	360	100	peak
2	385.2805	20.68	10.87	31.55	46.00	-14.45	360	100	peak
3	642.8613	25.87	15.14	41.01	46.00	-4.99	360	100	peak
4	833.3171	21.38	17.14	38.52	46.00	-7.48	360	100	peak
5	900.1474	24.71	19.38	44.09	46.00	-1.91	312	100	QP

Test Specification: Vertical

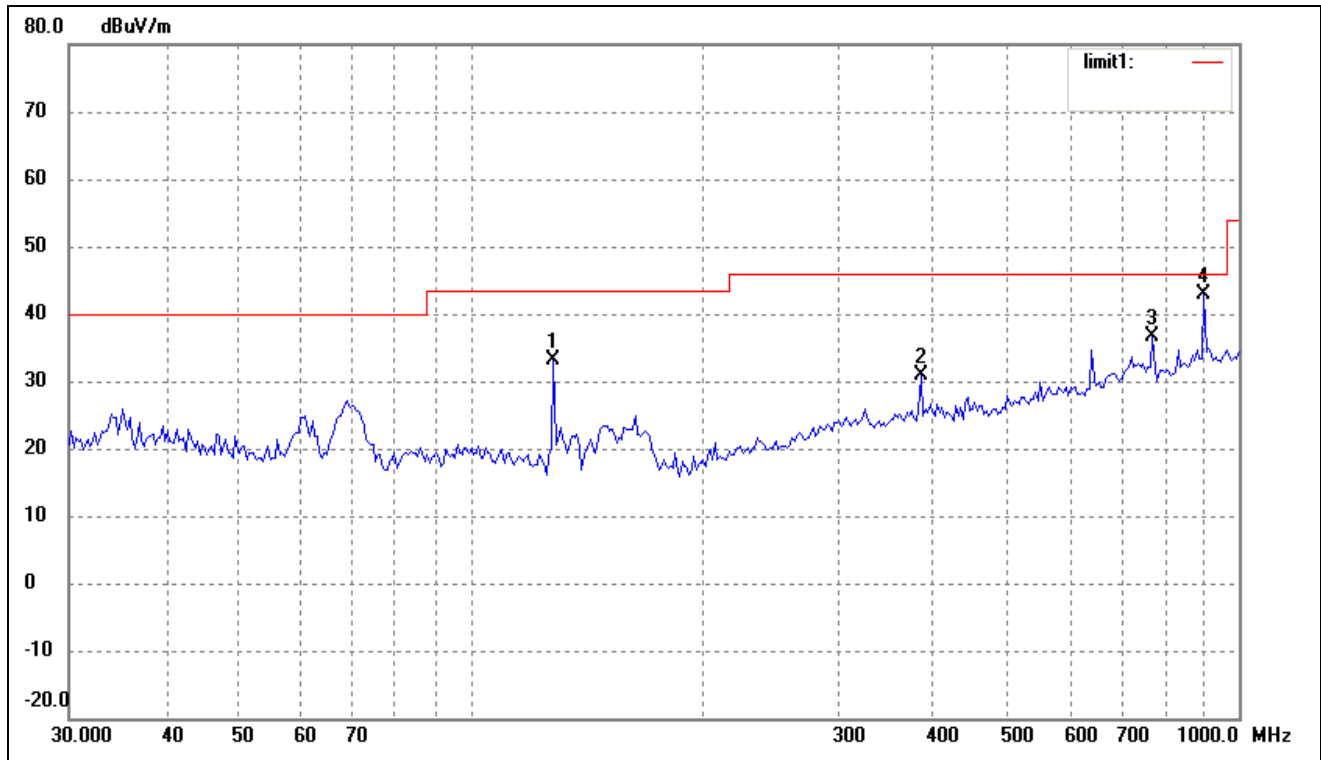


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	35.4993	27.82	8.95	36.77	40.00	-3.23	360	100	peak
2	128.1130	35.59	4.27	39.86	43.50	-3.64	360	100	peak
3	642.8613	19.52	15.14	34.66	46.00	-11.34	360	100	peak
4	900.1474	23.47	19.38	42.85	46.00	-3.15	360	100	peak

Operating Condition: 802.11n-HT40 Transmitting High Channel-2452MHz

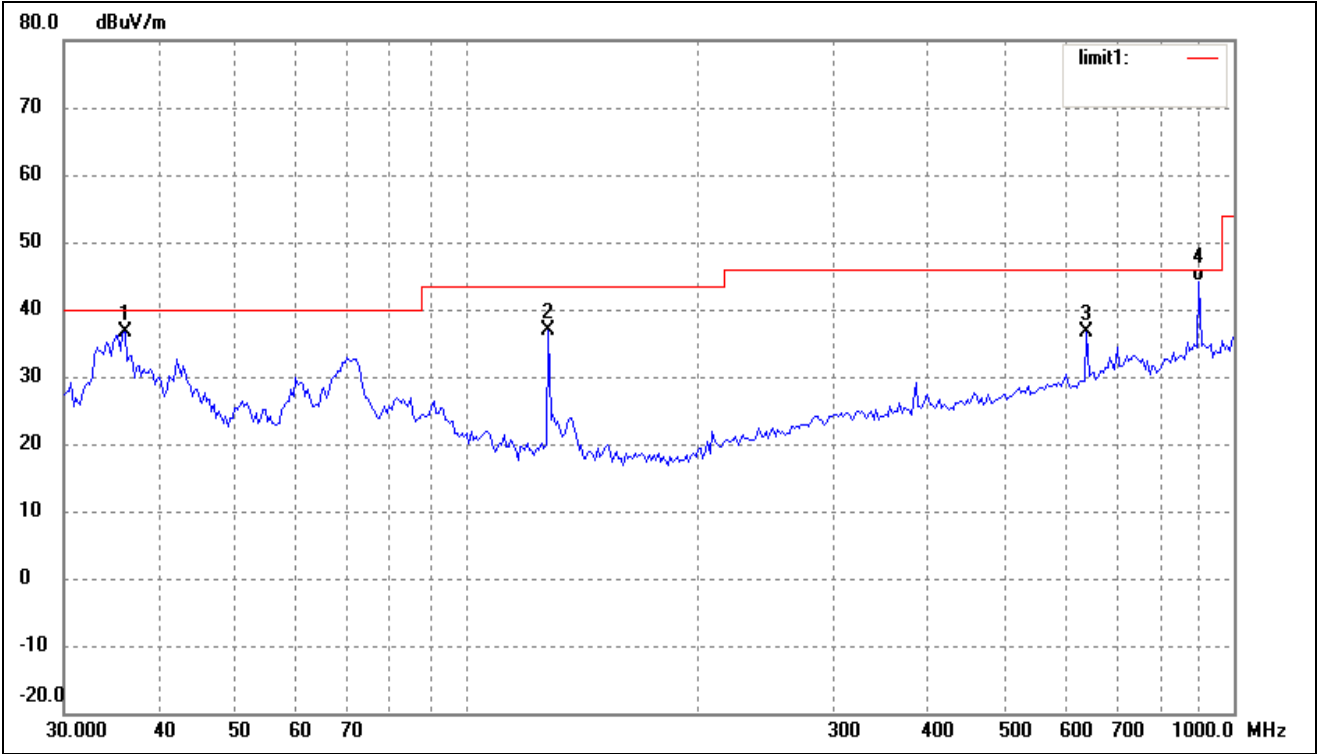
Comment:

Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	128.1130	28.87	4.27	33.14	43.50	-10.36	360	100	peak
2	385.2805	20.09	10.87	30.96	46.00	-15.04	360	100	peak
3	771.4486	20.27	16.37	36.64	46.00	-9.36	360	100	peak
4	900.1474	23.60	19.38	42.98	46.00	-3.02	360	100	peak

Test Specification: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	36.0007	27.53	9.04	36.57	40.00	-3.43	360	100	peak
2	128.1130	32.52	4.27	36.79	43.50	-6.71	360	100	peak
3	642.8613	21.55	15.14	36.69	46.00	-9.31	360	100	peak
4	900.1474	24.78	19.38	44.16	46.00	-1.84	351	100	QP

*Spurious Emissions Above 1GHz**Test Mode: 802.11b*

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	54.06	0.57	54.63	74.00	-19.37	H	PK
4824.000	39.95	0.57	40.52	54.00	-13.48	H	AV
7236.000	42.16	3.69	45.85	74.00	-28.15	H	PK
7236.000	30.92	3.69	34.61	54.00	-19.39	H	AV
4824.000	58.73	0.57	59.30	74.00	-14.70	V	PK
4824.000	42.03	0.57	42.60	54.00	-11.40	V	AV
7236.000	42.42	3.69	46.11	74.00	-27.89	V	PK
7236.000	30.76	3.69	34.45	54.00	-19.55	V	AV
Middle Channel-2437MHz							
4874.000	62.37	0.64	63.01	74.00	-10.99	H	PK
4874.000	47.47	0.64	48.11	54.00	-5.89	H	AV
7311.000	45.73	3.75	49.48	74.00	-24.52	H	PK
7311.000	33.63	3.75	37.38	54.00	-16.62	H	AV
4874.000	55.72	0.64	56.36	74.00	-17.64	V	PK
4874.000	41.31	0.64	41.95	54.00	-12.05	V	AV
7311.000	43.57	3.75	47.32	74.00	-26.68	V	PK
7311.000	31.43	3.75	35.18	54.00	-18.82	V	AV
High Channel-2462MHz							
4924.000	60.18	0.72	60.90	74.00	-13.10	H	PK
4924.000	46.52	0.72	47.24	54.00	-6.76	H	AV
7386.000	44.74	3.81	48.55	74.00	-25.45	H	PK
7386.000	31.33	3.81	35.14	54.00	-18.86	H	AV
4924.000	55.29	0.72	56.01	74.00	-17.99	V	PK
4924.000	41.57	0.72	42.29	54.00	-11.71	V	AV
7386.000	42.36	3.81	46.17	74.00	-27.83	V	PK
7386.000	31.31	3.81	35.12	54.00	-18.88	V	AV

Test Mode: 802.11g

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	51.99	0.57	52.56	74.00	-21.44	H	PK
4824.000	36.31	0.57	36.88	54.00	-17.12	H	AV
7236.000	42.62	3.69	46.31	74.00	-27.69	H	PK
7236.000	30.73	3.69	34.42	54.00	-19.58	H	AV
4824.000	52.16	0.57	52.73	74.00	-21.27	V	PK
4824.000	37.44	0.57	38.01	54.00	-15.99	V	AV
7236.000	42.61	3.69	46.30	74.00	-27.70	V	PK
7236.000	30.70	3.69	34.39	54.00	-19.61	V	AV
Middle Channel-2437MHz							
4874.000	56.13	0.64	56.77	74.00	-17.23	H	PK
4874.000	43.67	0.64	44.31	54.00	-9.69	H	AV
7311.000	43.62	3.75	47.37	74.00	-26.63	H	PK
7311.000	32.05	3.75	35.80	54.00	-18.20	H	AV
4874.000	50.88	0.64	51.52	74.00	-22.48	V	PK
4874.000	38.19	0.64	38.83	54.00	-15.17	V	AV
7311.000	42.61	3.75	46.36	74.00	-27.64	V	PK
7311.000	31.39	3.75	35.14	54.00	-18.86	V	AV
High Channel-2462MHz							
4924.000	54.73	0.72	55.45	74.00	-18.55	H	PK
4924.000	41.03	0.72	41.75	54.00	-12.25	H	AV
7386.000	44.54	3.81	48.35	74.00	-25.65	H	PK
7386.000	31.40	3.81	35.21	54.00	-18.79	H	AV
4924.000	48.67	0.72	49.39	74.00	-24.61	V	PK
4924.000	36.27	0.72	36.99	54.00	-17.01	V	AV
7386.000	43.42	3.81	47.23	74.00	-26.77	V	PK
7386.000	31.37	3.81	35.18	54.00	-18.82	V	AV

Test Mode: 802.11n-HT20

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	49.63	0.57	50.20	74.00	-23.80	H	PK
4824.000	35.80	0.57	36.37	54.00	-17.63	H	AV
7236.000	41.69	3.69	45.38	74.00	-28.62	H	PK
7236.000	30.76	3.69	34.45	54.00	-19.55	H	AV
4824.000	52.45	0.57	53.02	74.00	-20.98	V	PK
4824.000	37.40	0.57	37.97	54.00	-16.03	V	AV
7236.000	41.86	3.69	45.55	74.00	-28.45	V	PK
7236.000	30.75	3.69	34.44	54.00	-19.56	V	AV
Middle Channel-2437MHz							
4874.000	55.44	0.64	56.08	74.00	-17.92	H	PK
4874.000	42.71	0.64	43.35	54.00	-10.65	H	AV
7311.000	43.38	3.75	47.13	74.00	-26.87	H	PK
7311.000	31.88	3.75	35.63	54.00	-18.37	H	AV
4874.000	50.87	0.64	51.51	74.00	-22.49	V	PK
4874.000	38.98	0.64	39.62	54.00	-14.38	V	AV
7311.000	43.40	3.75	47.15	74.00	-26.85	V	PK
7311.000	31.37	3.75	35.12	54.00	-18.88	V	AV
High Channel-2462MHz							
4924.000	52.19	0.72	52.91	74.00	-21.09	H	PK
4924.000	38.64	0.72	39.36	54.00	-14.64	H	AV
7386.000	44.28	3.81	48.09	74.00	-25.91	H	PK
7386.000	31.50	3.81	35.31	54.00	-18.69	H	AV
4924.000	48.76	0.72	49.48	74.00	-24.52	V	PK
4924.000	36.13	0.72	36.85	54.00	-17.15	V	AV
7386.000	43.13	3.81	46.94	74.00	-27.06	V	PK
7386.000	31.33	3.81	35.14	54.00	-18.86	V	AV

Test Mode: 802.11n-HT40

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2422MHz							
4844.000	48.91	0.60	49.51	74.00	-24.49	H	PK
4844.000	37.27	0.60	37.87	54.00	-16.13	H	AV
7266.000	41.70	3.72	45.42	74.00	-28.58	H	PK
7266.000	30.78	3.72	34.50	54.00	-19.50	H	AV
4844.000	48.66	0.60	49.26	74.00	-24.74	V	PK
4844.000	37.54	0.60	38.14	54.00	-15.86	V	AV
7266.000	42.62	3.72	46.34	74.00	-27.66	V	PK
7266.000	30.93	3.72	34.65	54.00	-19.35	V	AV
Middle Channel-2437MHz							
4874.000	51.18	0.64	51.82	74.00	-22.18	H	PK
4874.000	41.02	0.64	41.66	54.00	-12.34	H	AV
7311.000	42.88	3.75	46.63	74.00	-27.37	H	PK
7311.000	31.48	3.75	35.23	54.00	-18.77	H	AV
4874.000	48.16	0.64	48.80	74.00	-25.20	V	PK
4874.000	36.70	0.64	37.34	54.00	-16.66	V	AV
7311.000	42.50	3.75	46.25	74.00	-27.75	V	PK
7311.000	31.37	3.75	35.12	54.00	-18.88	V	AV
High Channel-2452MHz							
4904.000	55.77	0.68	56.45	74.00	-17.55	H	PK
4904.000	45.77	0.68	46.45	54.00	-7.55	H	AV
7356.000	45.15	3.79	48.94	74.00	-25.06	H	PK
7356.000	33.13	3.79	36.92	54.00	-17.08	H	AV
4904.000	51.44	0.68	52.12	74.00	-21.88	V	PK
4904.000	41.09	0.68	41.77	54.00	-12.23	V	AV
7356.000	43.03	3.79	46.82	74.00	-27.18	V	PK
7356.000	31.45	3.79	35.24	54.00	-18.76	V	AV

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

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

9.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2012-03-28	2013-03-27
EMI Test Receiver	R&S	ESVB	825471/005	2012-03-28	2013-03-27
Pre-amplifier	Agilent	8447F	3113A06717	2012-03-28	2013-03-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2012-03-28	2013-03-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2013-02-25	2014-02-24
Horn Antenna	ETS	3117	00086197	2013-02-25	2014-02-24

9.3 Test Procedure

According to the KDB 558074, the band-edge radiated test method as follows:

Set span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation (2310MHz to 2420MHz for low bandedge, 2460MHz to 2500MHz for the high bandedge)

RBW = 1MHz, VBW = 1MHz for peak value measured

RBW = 1MHz, VBW = 10Hz for average value measured

Sweep = auto; Detector function = peak/average; Trace = max hold

All the trace to stabilize, set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. Those emission must comply with the 15.209 limit for fall in the restricted bands listed in section 15.205. Note that the method of measurement KDB publication number: 913591 may be used for the radiated bandedge measurements.

According to the DA 00-705, the band-edge conducted test method as follows:

Set span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation (2380MHz to 2410MHz for low bandedge, 2470MHz to 2500MHz for the high bandedge)

RBW = 100kHz, VBW = 300kHz

Sweep = auto; Detector function = peak; Trace = max hold

All the trace to stabilize, set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. Those emission must comply with the limit specified in this section (at least 20dB attenuation).

9.4 Environmental Conditions

Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

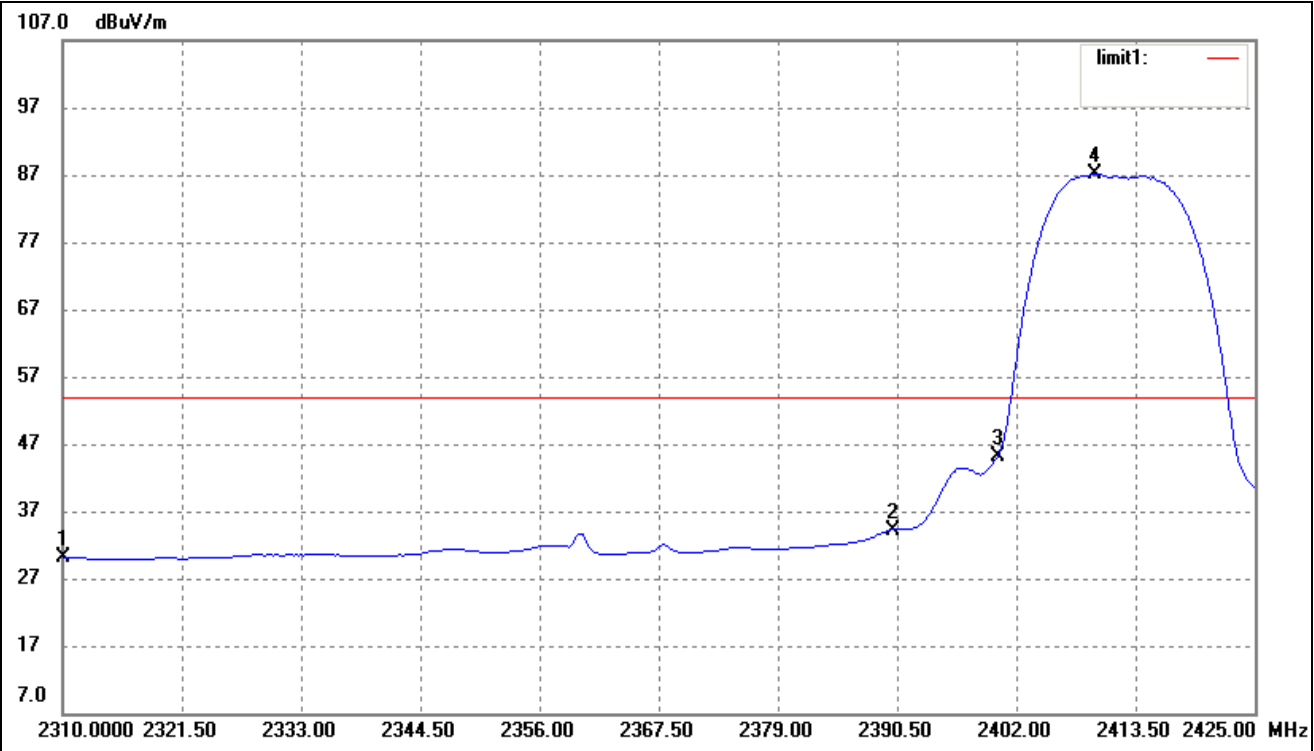
9.5 Summary of Test Results/Plots

Test Mode	Test Frequency MHz	Limit dBuV / dBc	Result
802.11b	2390.00	<54 dBuV	Pass
	2400.00	>20 dBc	Pass
	2483.50	<54 dBuV	Pass
802.11g	2390.00	<54 dBuV	Pass
	2400.00	>20 dBc	Pass
	2483.50	<54 dBuV	Pass
802.11n-HT20	2390.00	<54 dBuV	Pass
	2400.00	>20 dBc	Pass
	2483.50	<54 dBuV	Pass
802.11n-HT40	2390.00	<54 dBuV	Pass
	2400.00	>20 dBc	Pass
	2483.50	<54 dBuV	Pass

The edge emissions are below the FCC 15.209 Limits or complies with the 15.247(d) requirements.

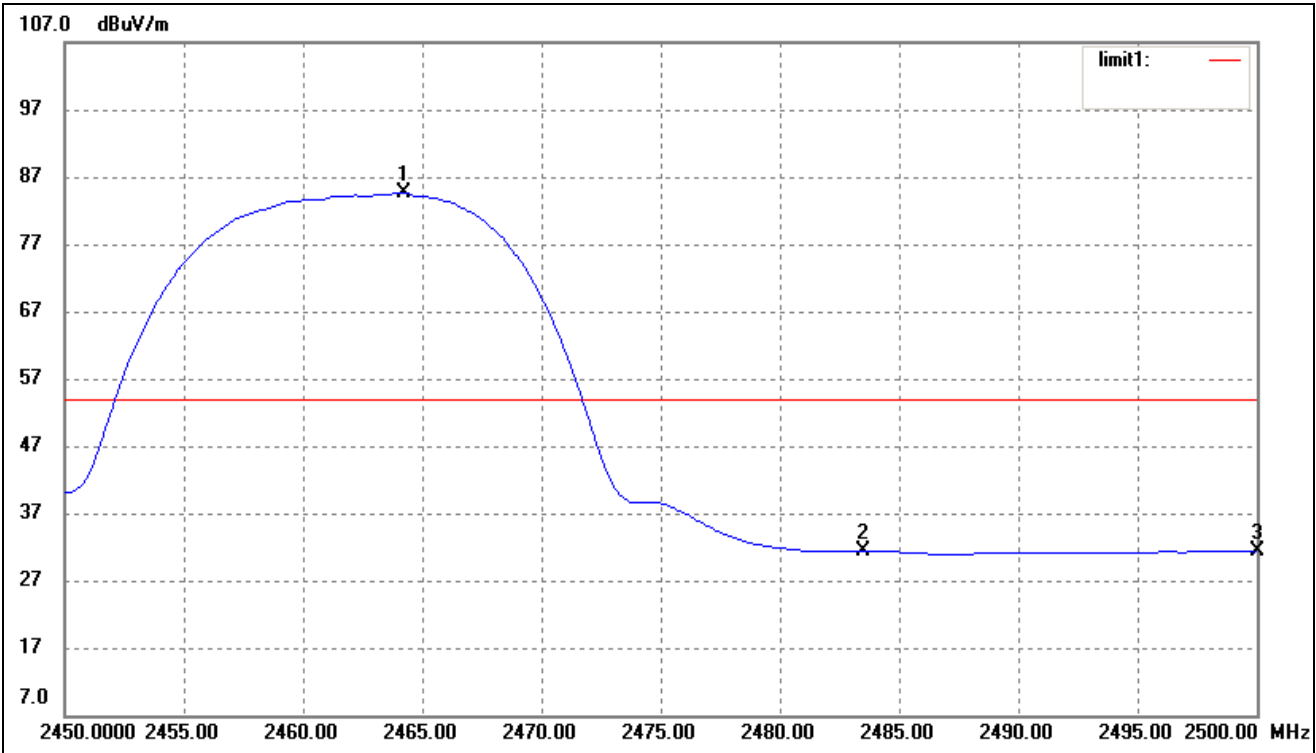
Please refer to the test plots as below.

802.11b-Lowest Bandedge



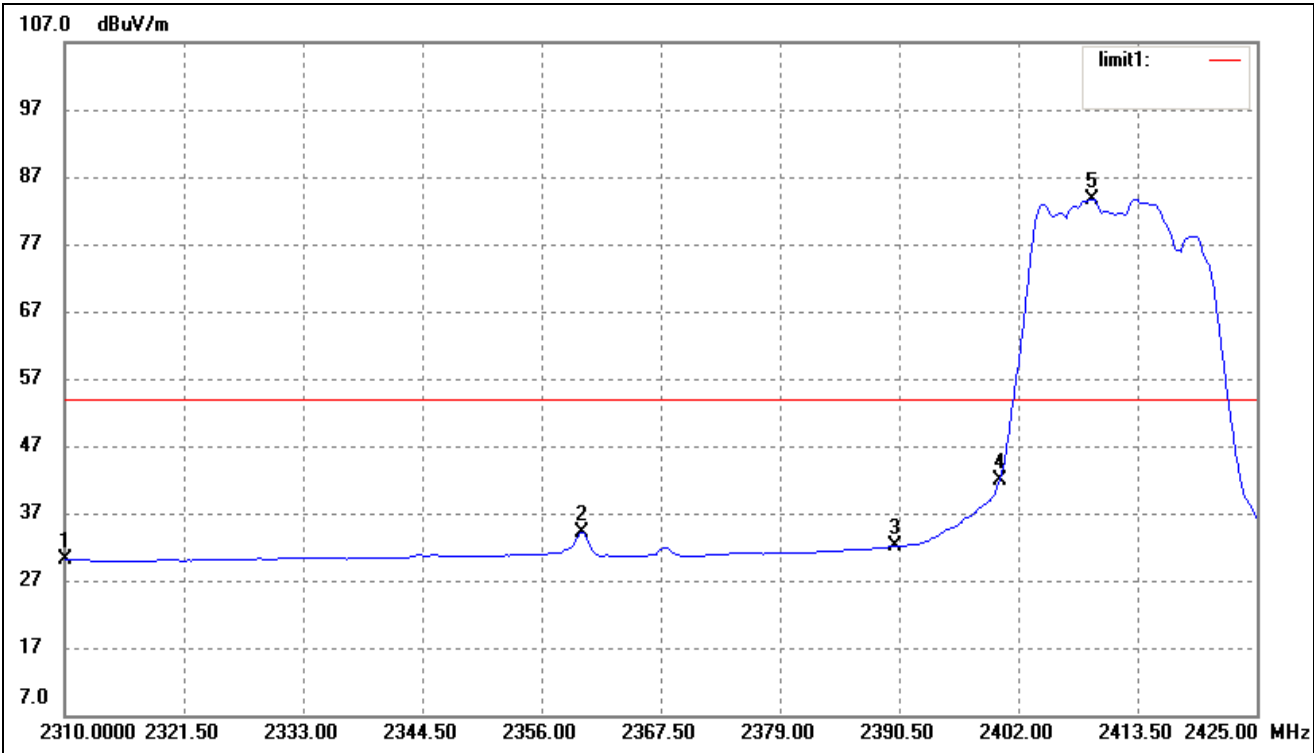
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	33.83	-3.71	30.12	54.00	-23.88	Average Detector
	2310.000	46.59	-3.71	42.88	74.00	-31.12	Peak Detector
2	2390.000	37.79	-3.54	34.25	54.00	-19.75	Average Detector
	2390.000	50.95	-3.54	47.41	74.00	-26.59	Peak Detector
3	2400.000	48.73	-3.51	45.22	Delta = 41.94 dBc		Average Detector
4	2409.590	90.64	-3.48	87.16			Average Detector

802.11b-Highest Bandedge



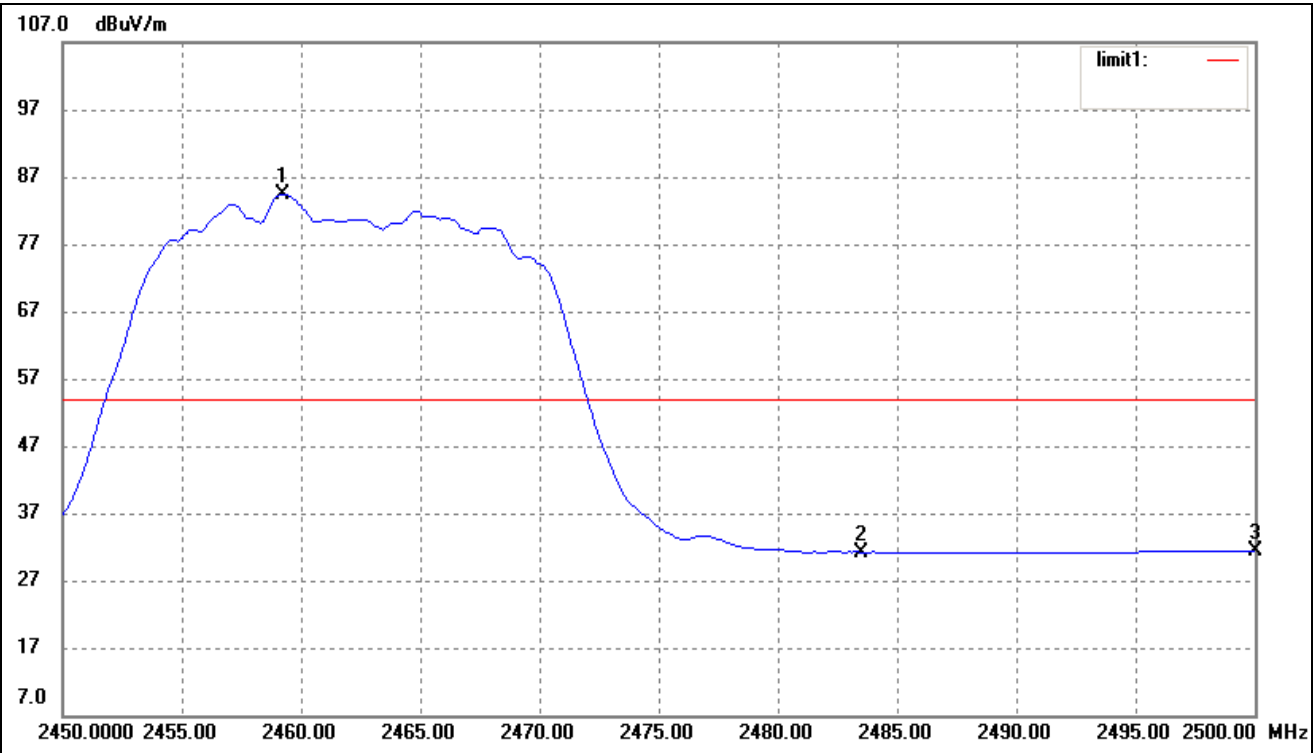
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2464.200	87.96	-3.36	84.60	/	/	Average Detector
	2460.700	102.84	-3.37	99.47	/	/	Peak Detector
2	2483.500	Delta = 52.7 dBc		31.90	54.00	-22.10	Average Detector
	2483.500			46.77	74.00	-27.22	Peak Detector
3	2500.000	34.54	-3.28	31.26	54.00	-22.74	Average Detector
	2500.000	49.32	-3.28	46.04	74.00	-27.96	Peak Detector

802.11g-Lowest Bandedge



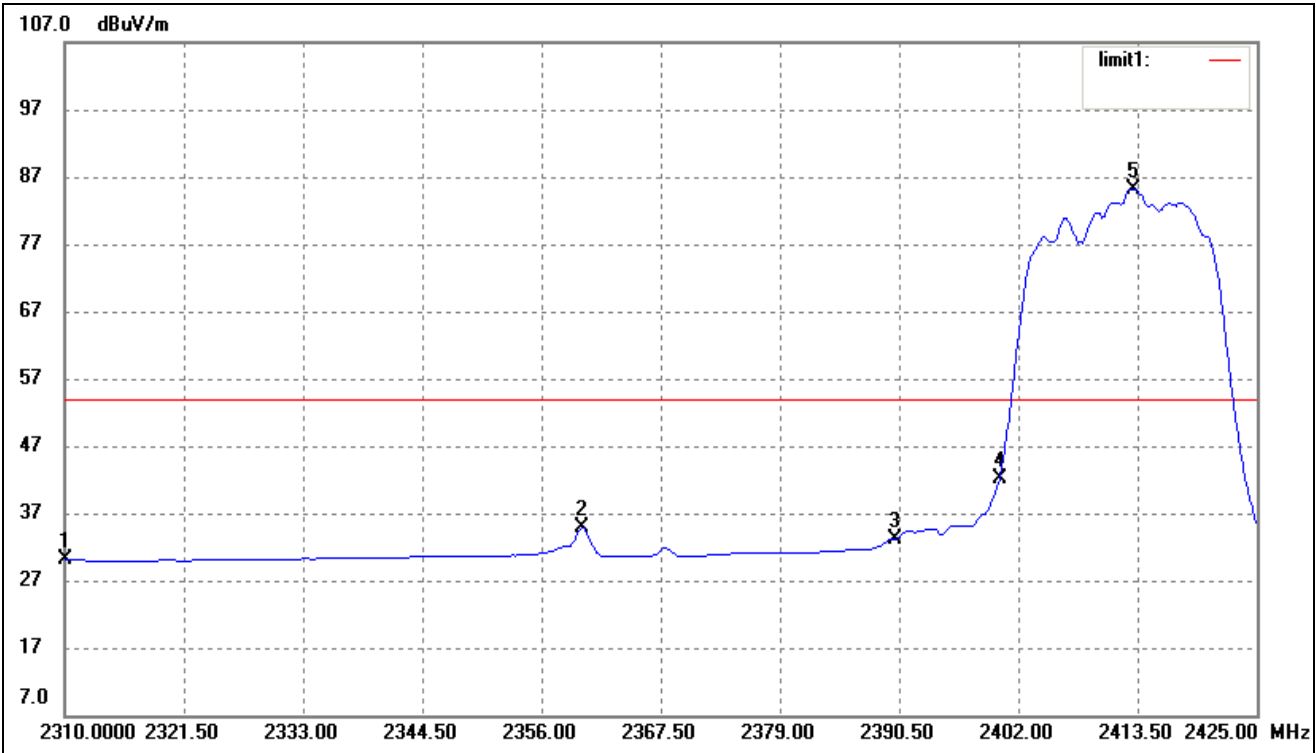
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	33.84	-3.71	30.13	54.00	-23.87	Average Detector
	2310.000	47.22	-3.71	43.51	74.00	-30.49	Peak Detector
2	2359.910	37.75	-3.60	34.15	54.00	-19.85	Average Detector
3	2390.000	35.61	-3.54	32.07	54.00	-21.93	Average Detector
	2390.000	49.44	-3.54	45.90	74.00	-28.10	Peak Detector
4	2400.000	45.40	-3.51	41.89	Delta = 41.85 dBc		Average Detector
5	2409.130	87.23	-3.49	83.74			Average Detector

802.11g-Highest Bandedge



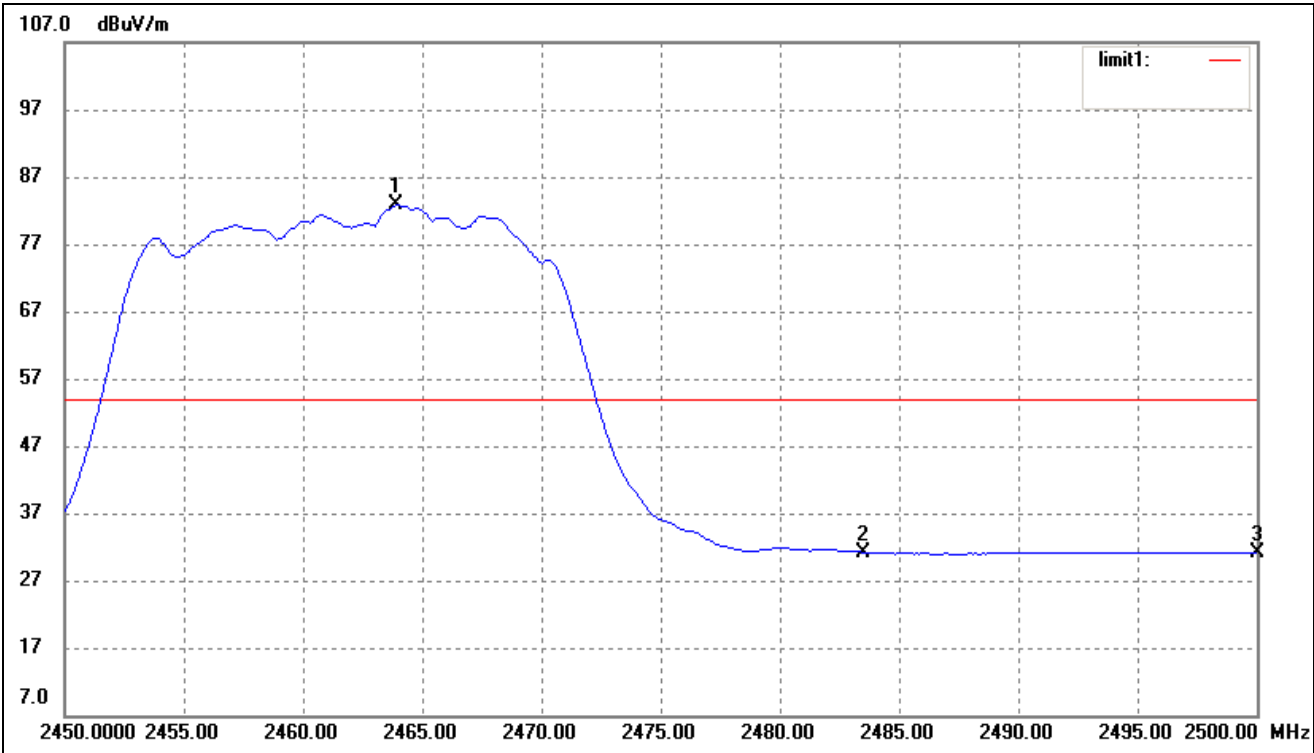
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2459.200	87.71	-3.38	84.33	/	/	Average Detector
	2459.600	95.20	-3.37	91.83	/	/	Peak Detector
2	2483.500	Delta = 46.82 dBc		37.51	54.00	-16.49	Average Detector
	2483.500			45.01	74.00	-28.99	Peak Detector
3	2500.000	34.56	-3.28	31.28	54.00	-22.72	Average Detector
	2500.000	48.55	-3.28	45.27	74.00	-28.73	Peak Detector

802.11n-HT20-Lowest Bandedge



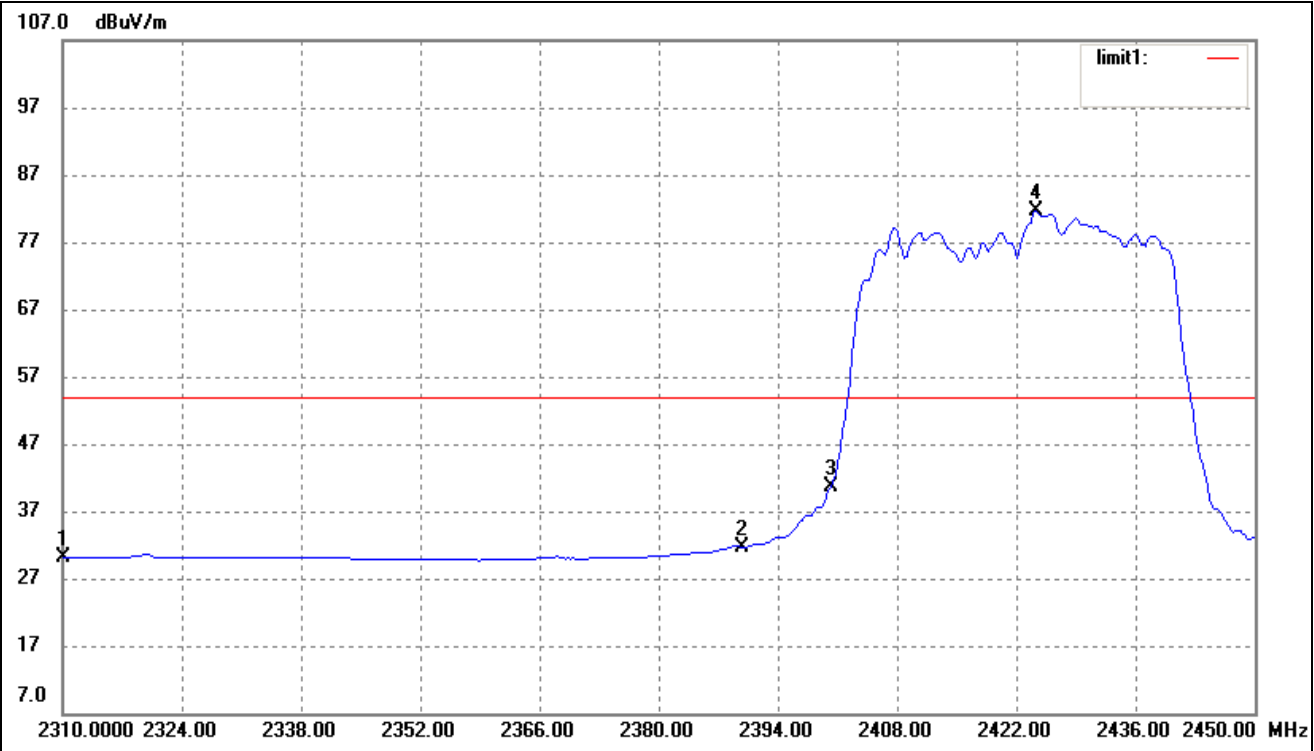
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	33.83	-3.71	30.12	54.00	-23.88	Average Detector
	2310.000	46.45	-3.71	42.74	74.00	-31.26	Peak Detector
2	2359.910	38.40	-3.60	34.80	54.00	-19.20	Average Detector
3	2390.000	36.55	-3.54	33.01	54.00	-20.99	Average Detector
	2390.000	50.21	-3.54	46.67	74.00	-27.33	Peak Detector
4	2400.000	45.61	-3.51	42.10	Delta = 43.14 dBc		Average Detector
5	2413.040	88.72	-3.48	85.24			Average Detector

802.11n-HT20-Highest Bandedge



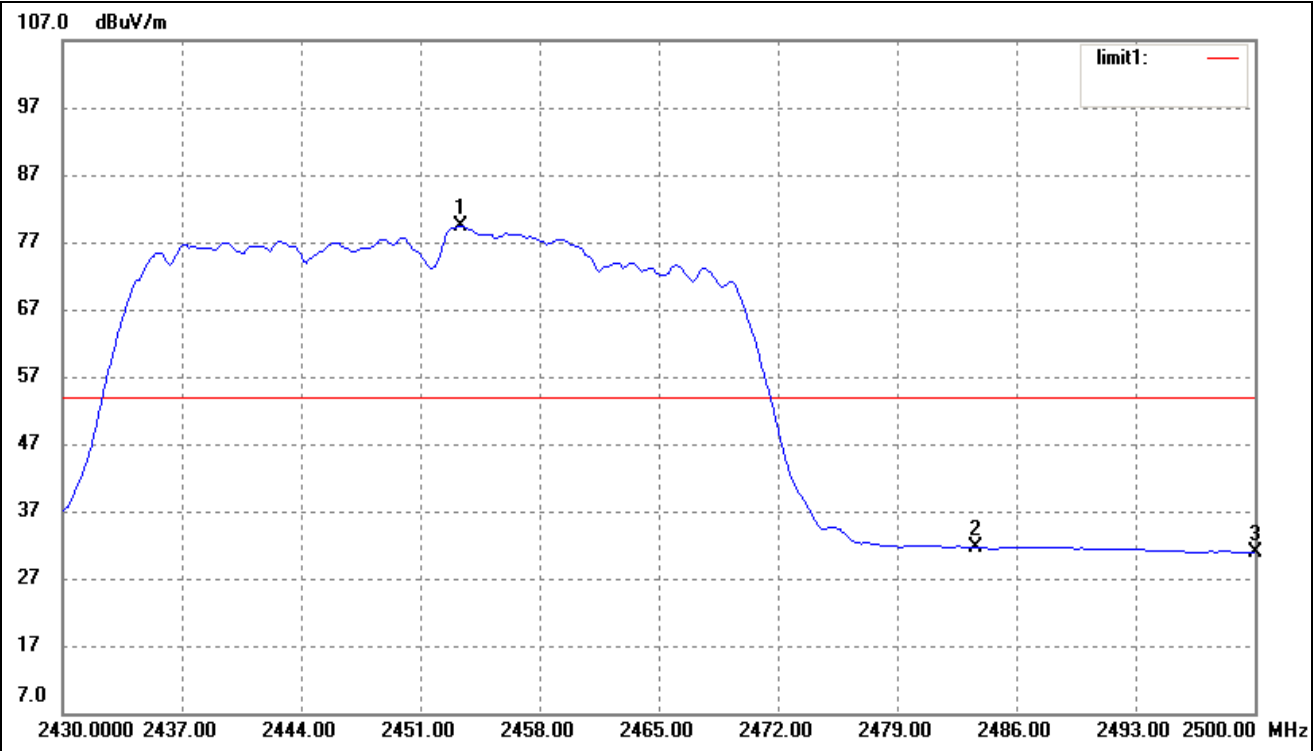
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2463.900	86.14	-3.36	82.78	/	/	Average Detector
	2463.900	95.18	-3.36	91.82	/	/	Peak Detector
2	2483.500	Delta = 45.69 dBc		37.09	54.00	-16.91	Average Detector
	2483.500			45.51	74.00	-28.49	Peak Detector
3	2500.000	34.35	-3.28	31.07	54.00	-22.93	Average Detector
	2500.000	47.99	-3.28	44.71	74.00	-29.29	Peak Detector

802.11n-HT40-Lowest Bandedge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	33.91	-3.71	30.20	54.00	-23.80	Average Detector
	2310.000	46.93	-3.71	43.22	74.00	-30.78	Peak Detector
2	2390.000	35.10	-3.54	31.56	54.00	-22.44	Average Detector
	2390.000	49.46	-3.54	45.92	74.00	-28.08	Peak Detector
3	2400.000	44.22	-3.51	40.71	Delta = 40.92 dBc		Average Detector
4	2424.240	85.08	-3.45	81.63			Average Detector

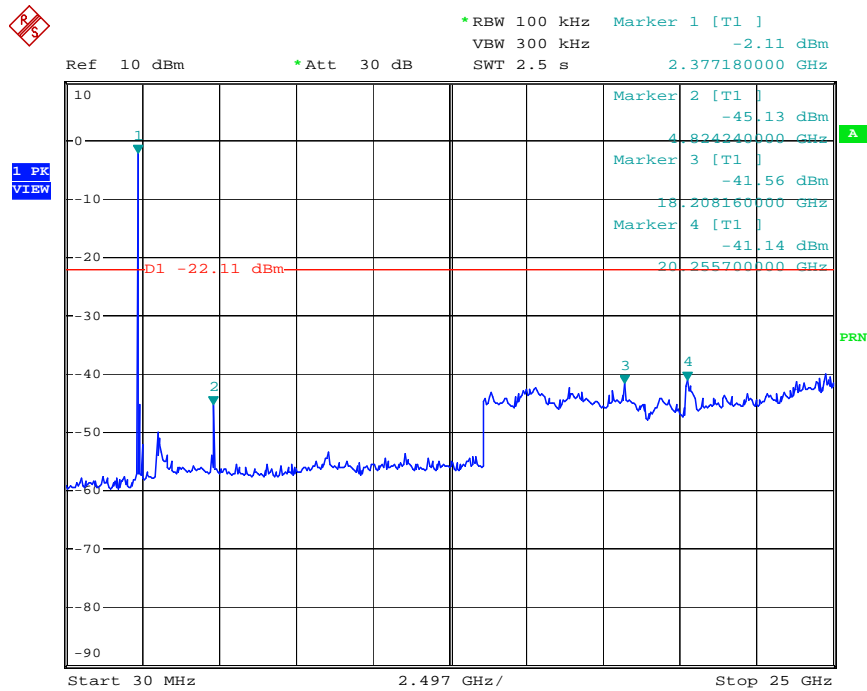
802.11n-HT40-Highest Bandedge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2453.380	82.78	-3.38	79.40	/	/	Average Detector
	2453.660	91.87	-3.38	88.49	/	/	Peak Detector
2	2483.500	Delta = 42.55 dBc		36.85	54.00	-17.15	Average Detector
	2483.500			45.94	74.00	-28.06	Peak Detector
3	2500.000	34.19	-3.28	30.91	54.00	-23.09	Average Detector
	2500.000	48.28	-3.28	45.00	74.00	-29.00	Peak Detector

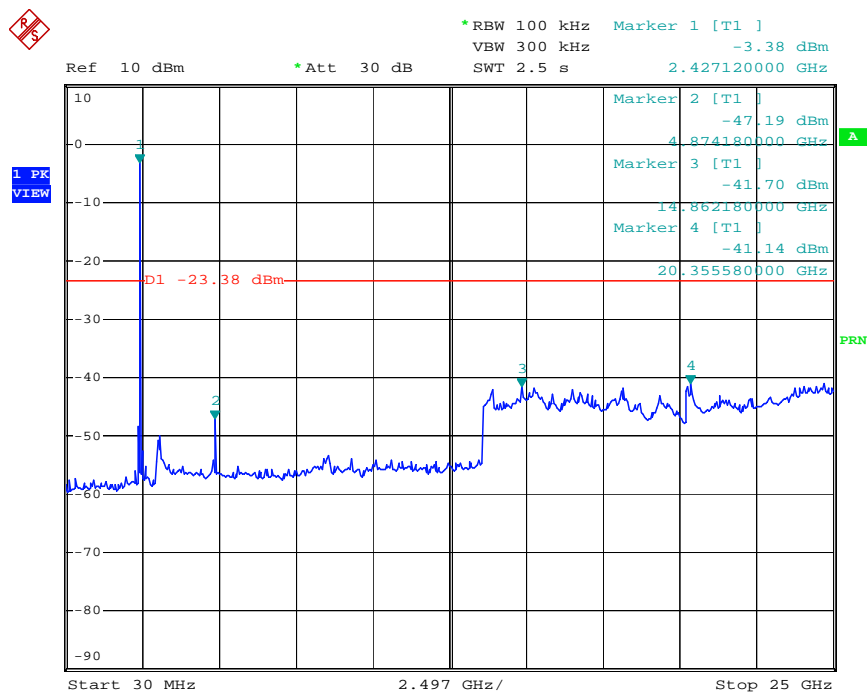
Conducted Spurious Emissions

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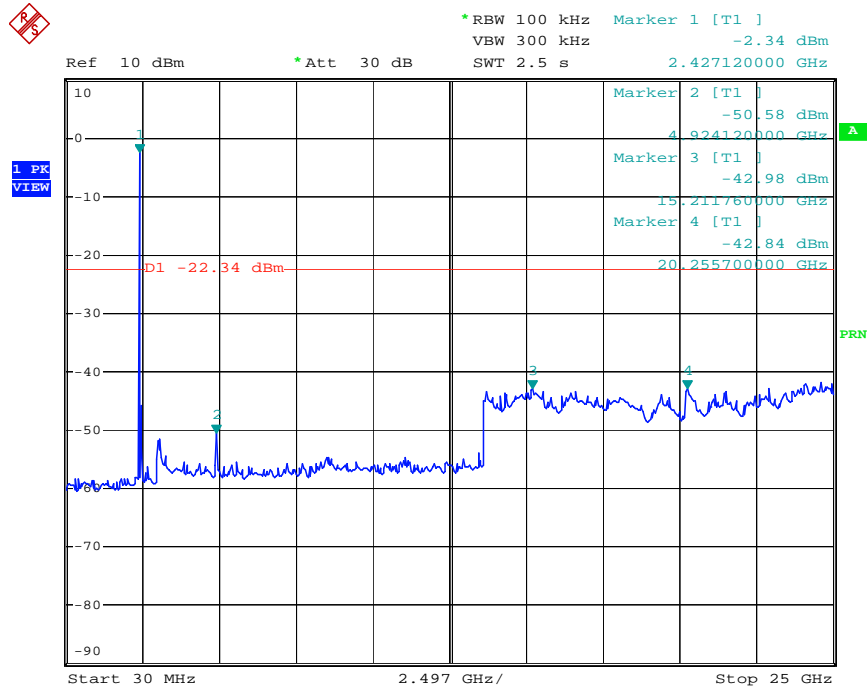
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802.11b Middle Bandedge-chain 0



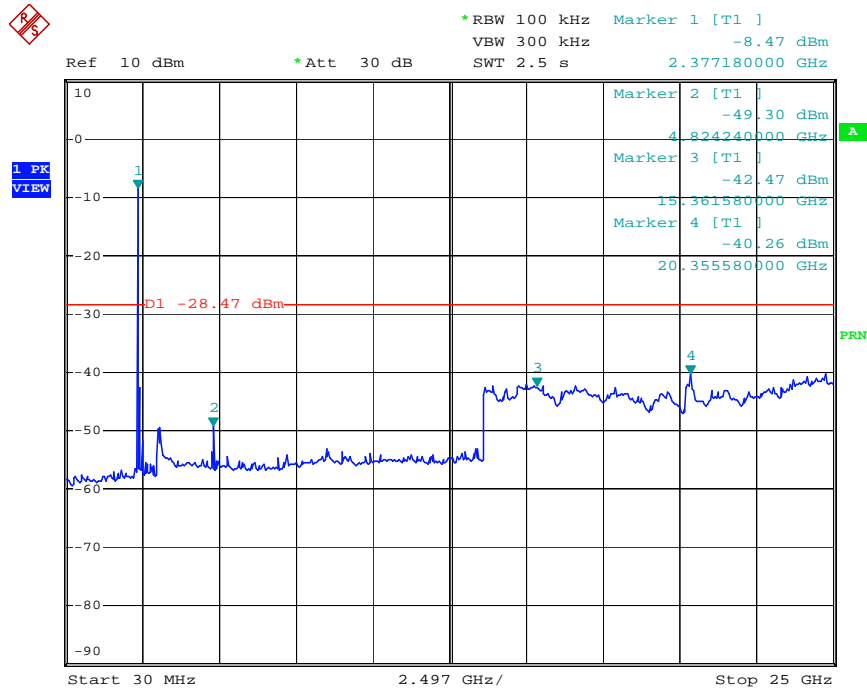
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802.11b High Bandedge-chain 0



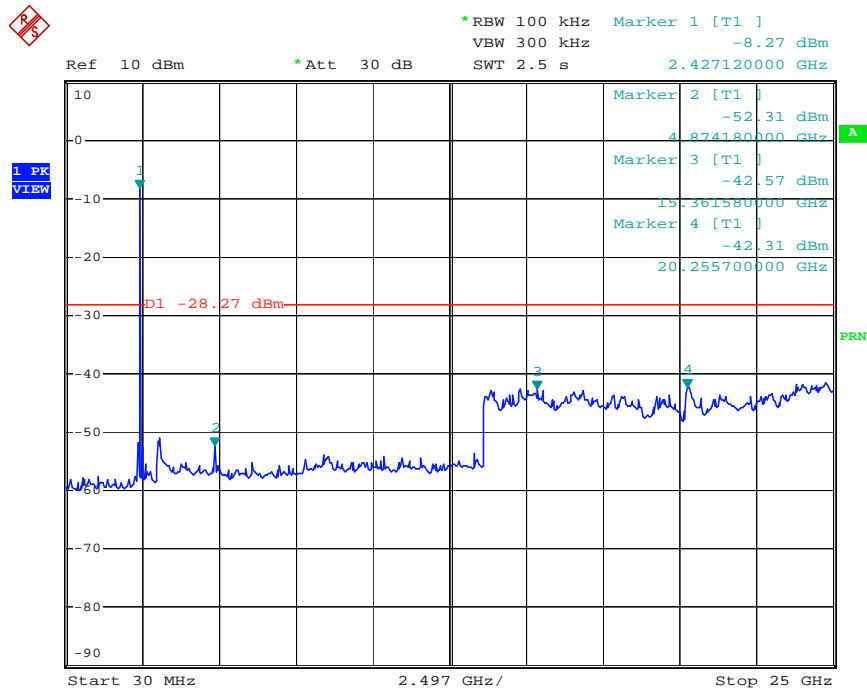
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802.11g Low Bandedge-chain 0

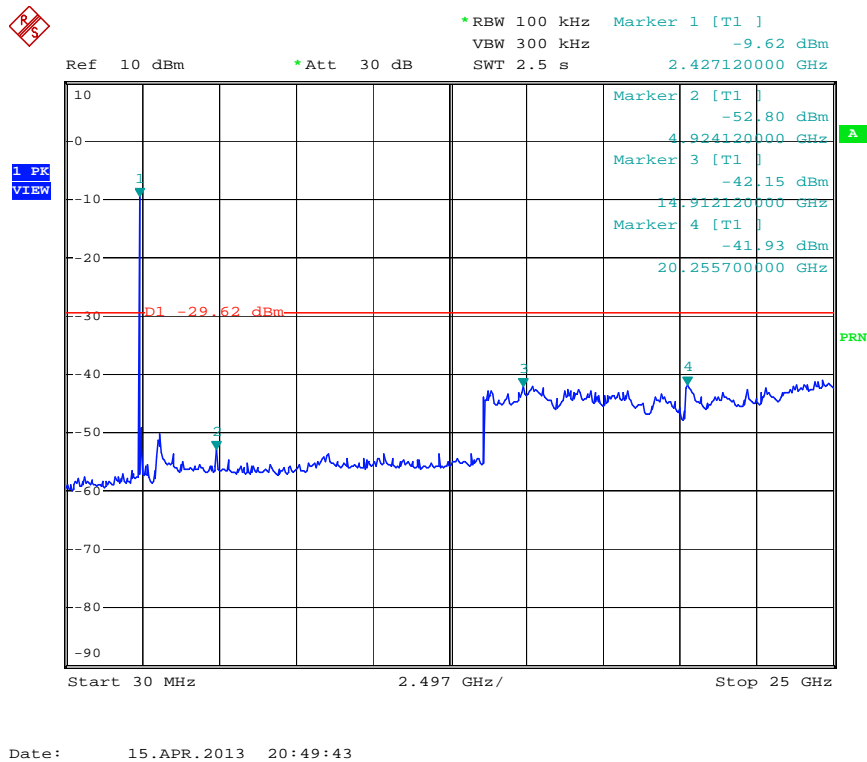


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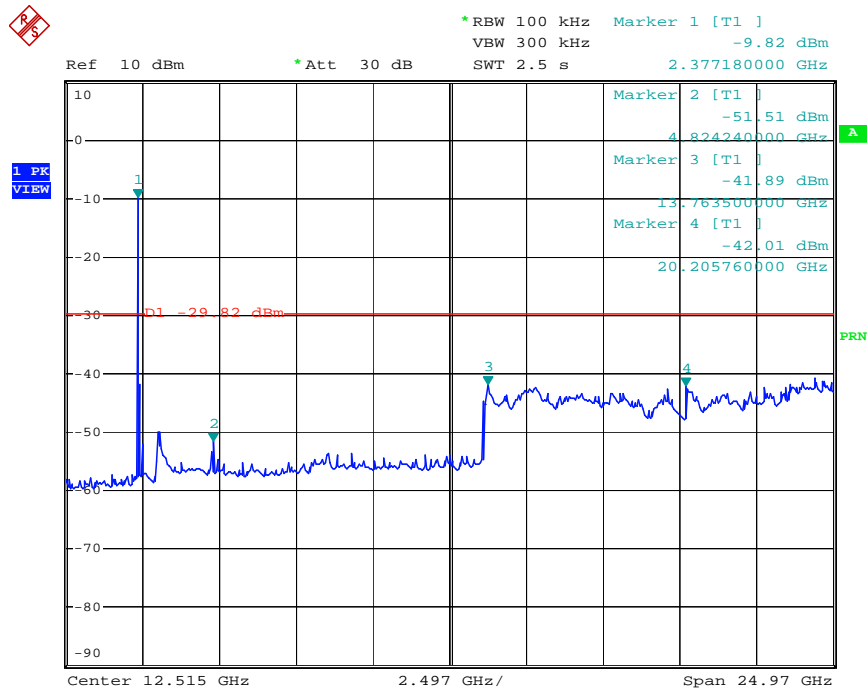
802.11g Middle Bandedge-chain 0



802.11g High Bandedge-chain 0

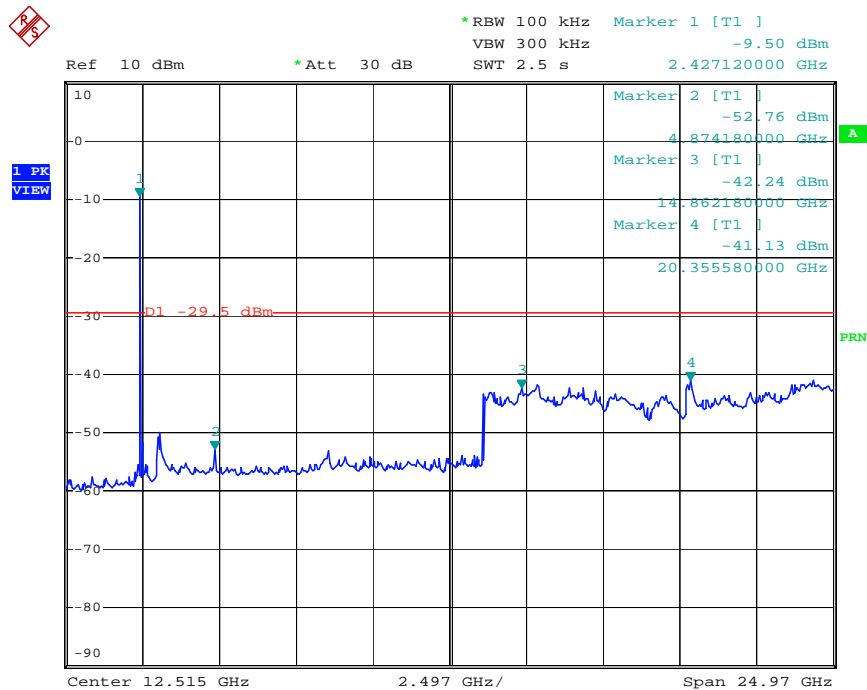


802.11n-HT20 Low Bandedge-chain 0



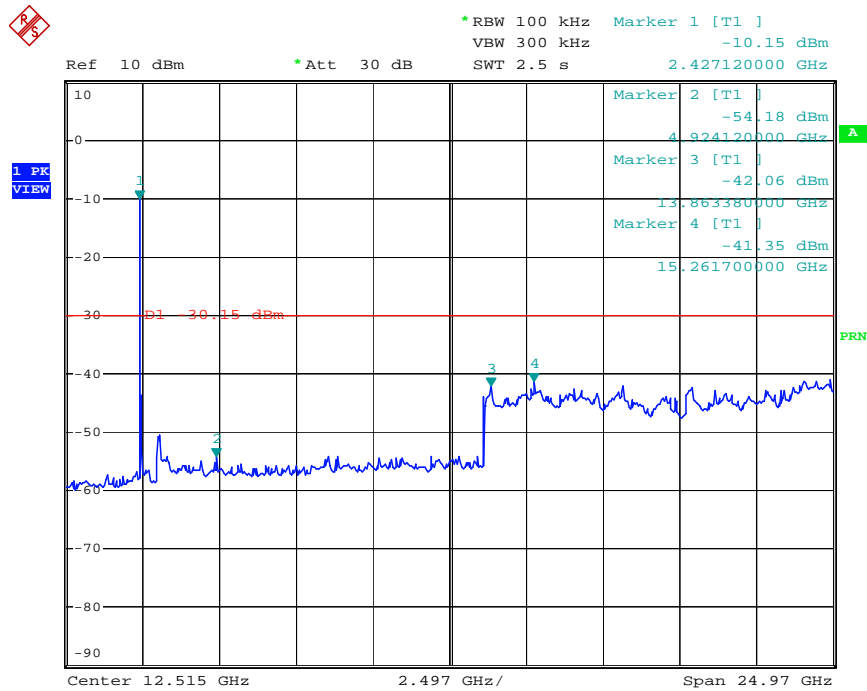
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802.11n-HT20 Middle Bandedge-chain 0



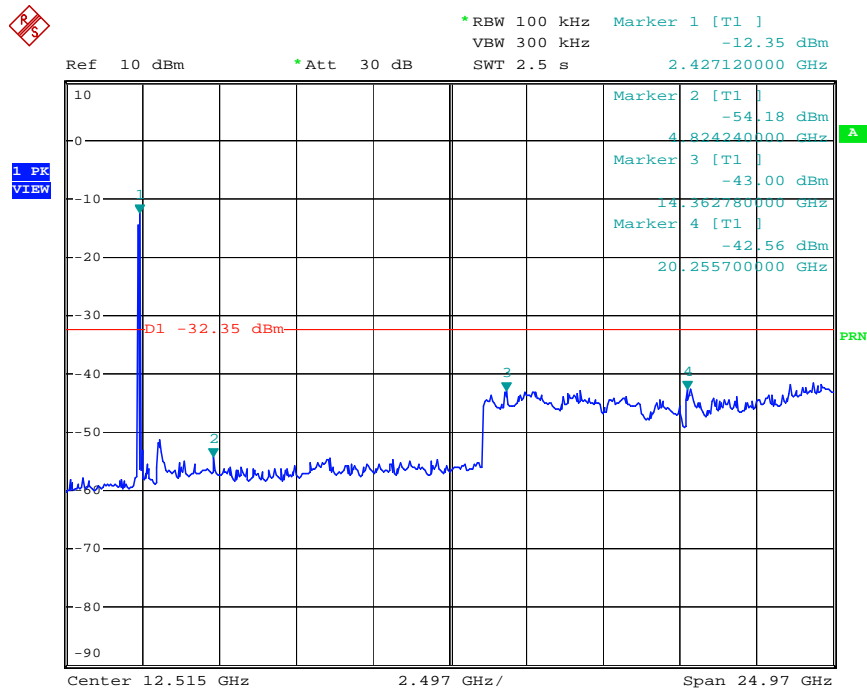
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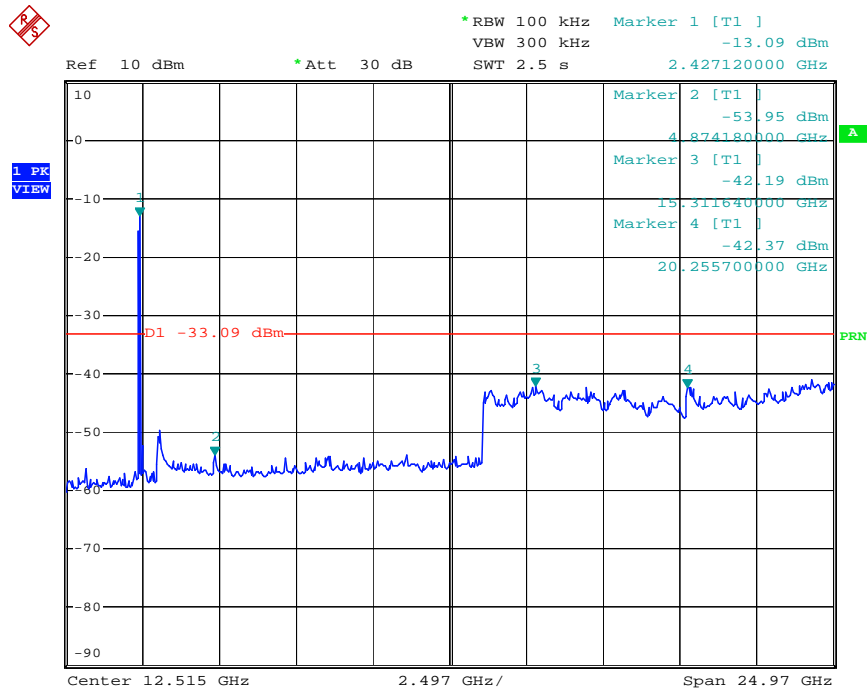
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802.11n-HT40 Low Bandedge-chain 0



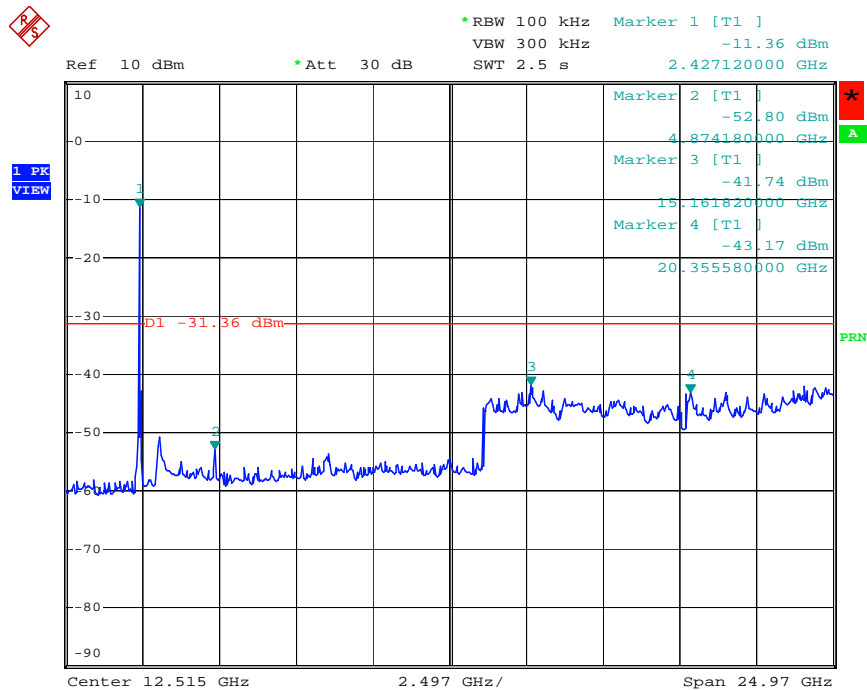
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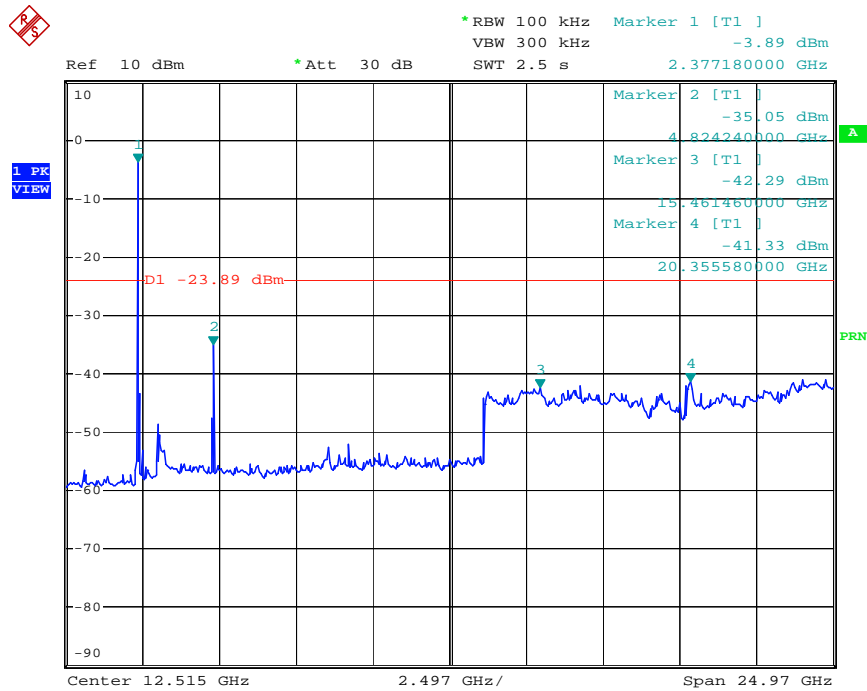
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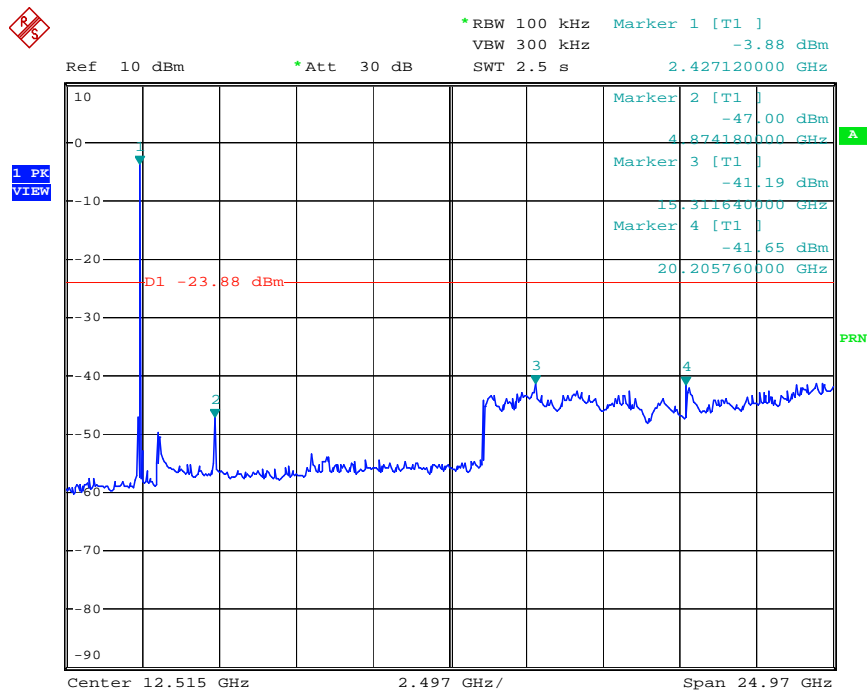
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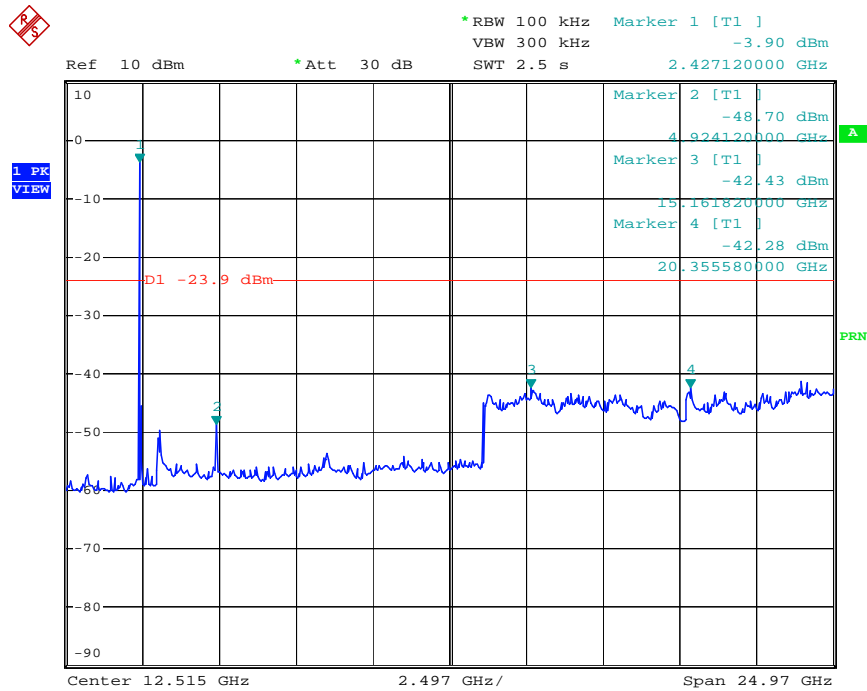
Date: 15.APR.2013 21:15:51

802.11b Middle Bandedge-chain 1



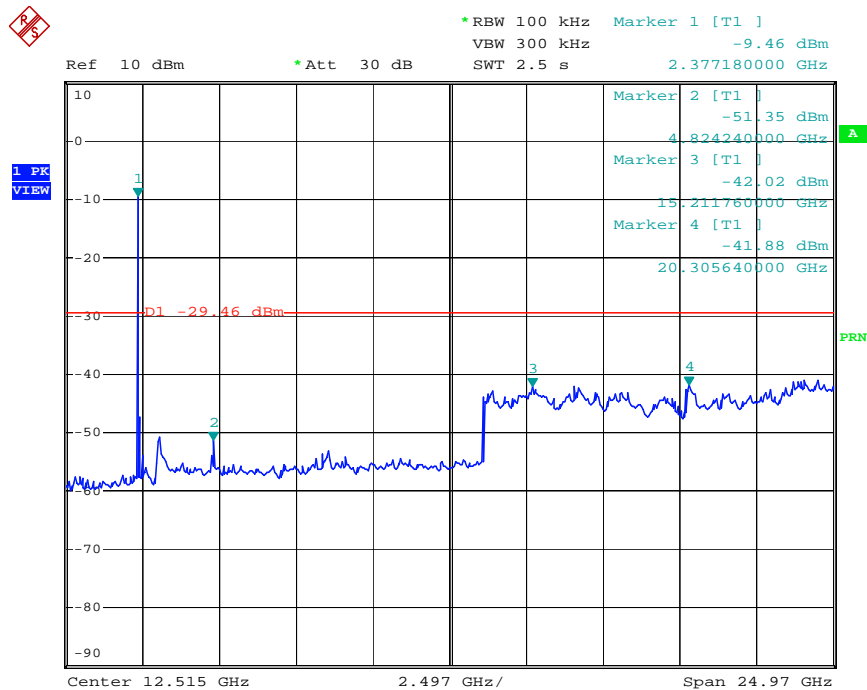
Date: 15.APR.2013 21:17:58

802.11b High Bandedge-chain 1



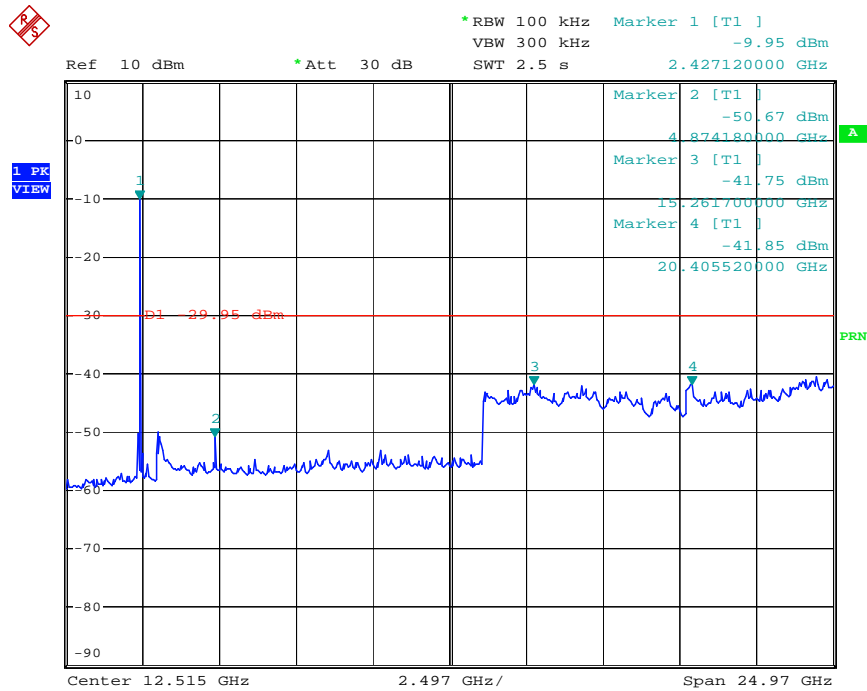
Date: 15.APR.2013 21:19:10

802.11g Low Bandedge-chain 1



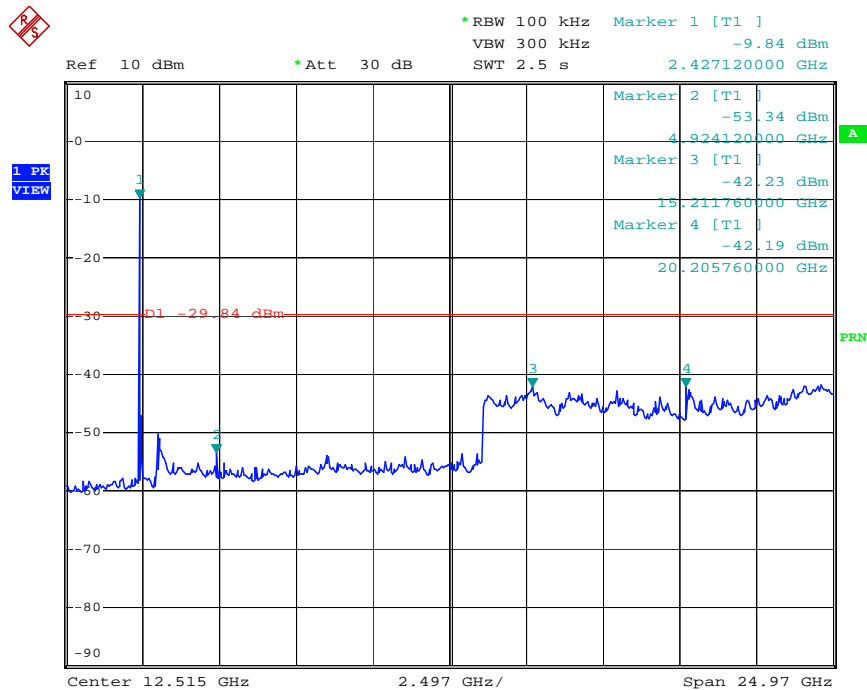
Date: 15.APR.2013 21:20:47

802.11g Middle Bandedge-chain 1



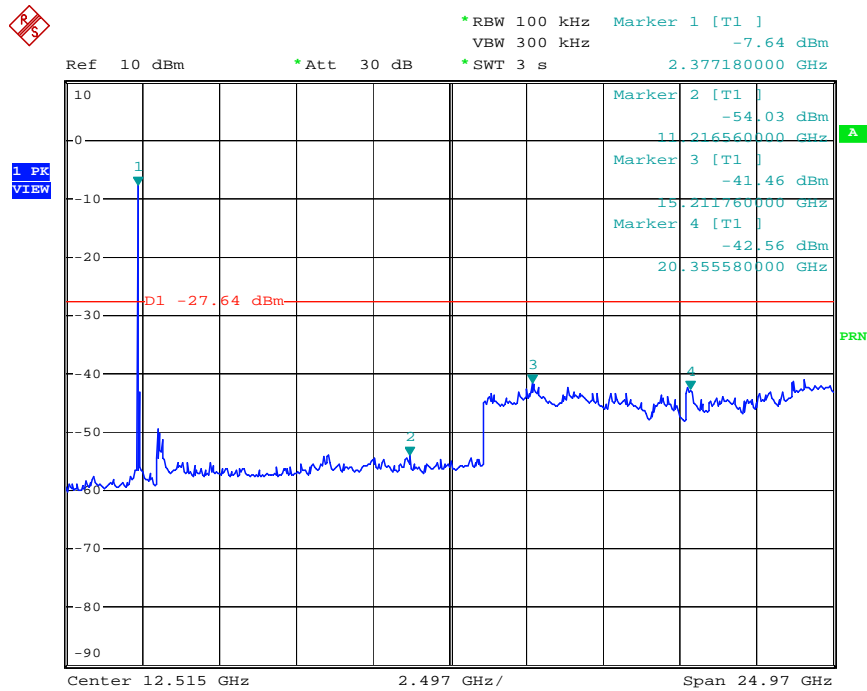
Date: 15.APR.2013 21:23:01

802.11g High Bandedge-chain 1



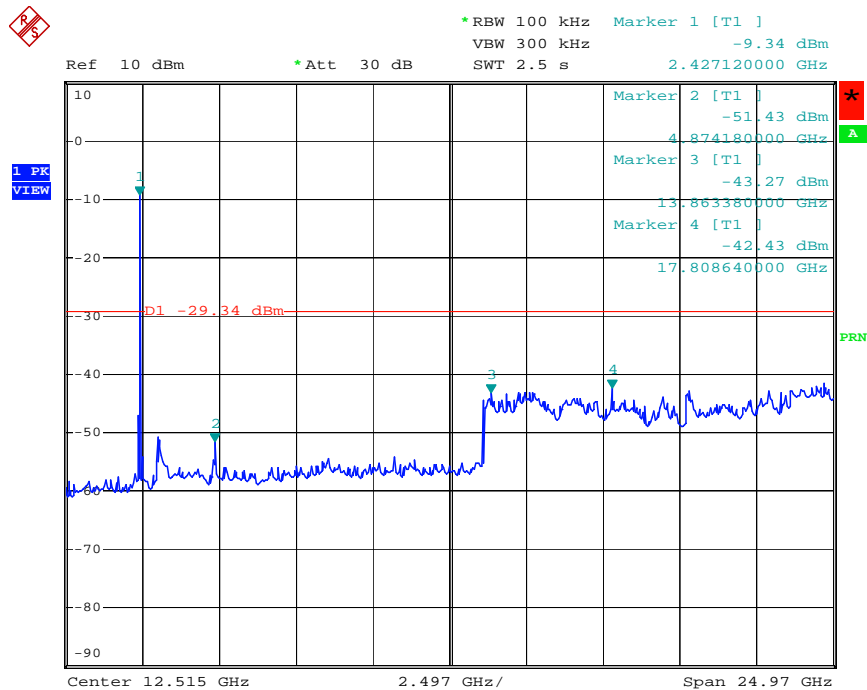
Date: 15.APR.2013 21:24:23

802.11n-HT20 Low Bandedge-chain 1



Date: 15.APR.2013 20:23:14

802.11n-HT20 Middle Bandedge-chain 1

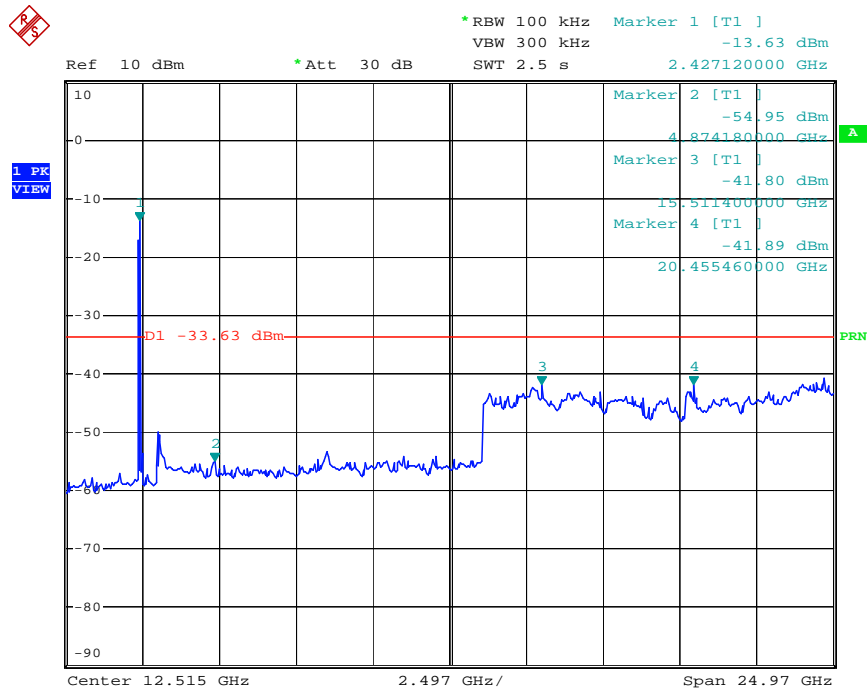


Date: 15.APR.2013 21:27:06

Date: 15.APR.2013 21:25:36

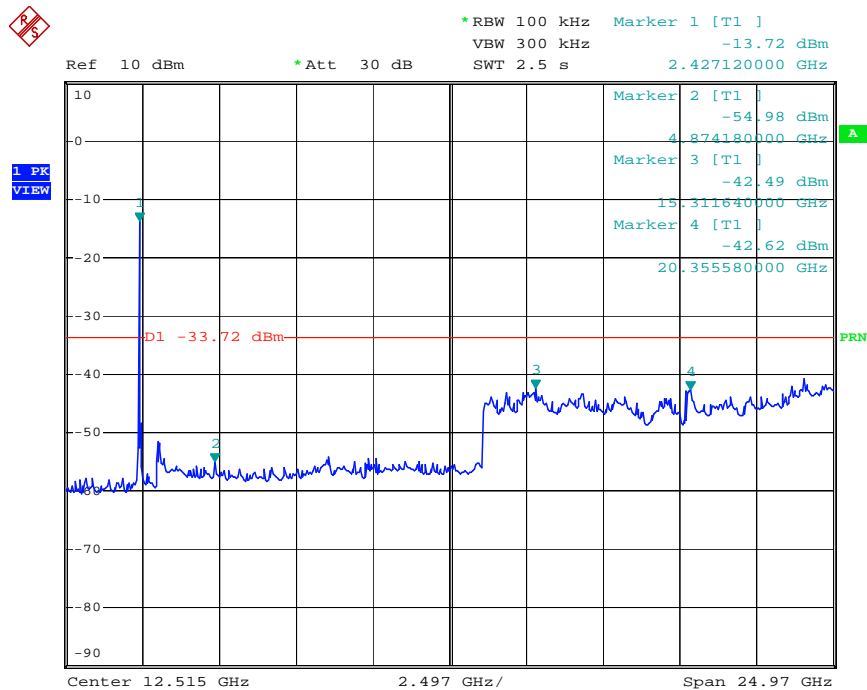
Date: 15.APR.2013 21:30:27

802.11n-HT40 Middle Bandedge-chain 1



Date: 15.APR.2013 21:33:23

802.11n-HT40 High Bandedge-chain 1



Date: 15.APR.2013 21:34:38

10. Conducted Emissions

10.1 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.

10.2 Test Equipment List and Details

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

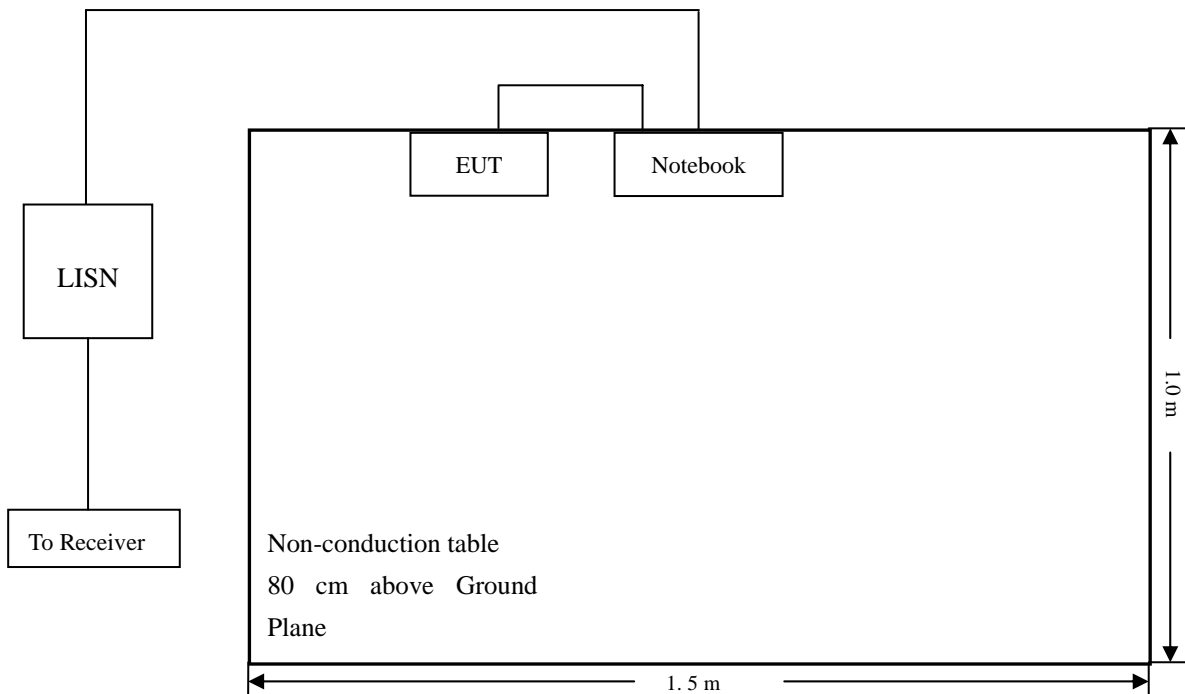
10.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 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.

10.4 Basic Test Setup Block Diagram



10.5 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

10.6 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency 150 kHz
Stop Frequency..... 30 MHz
Sweep Speed Auto
IF Bandwidth..... 10 kHz
Quasi-Peak Adapter Bandwidth 9 kHz
Quasi-Peak Adapter Mode Normal

10.7 Summary of Test Results/Plots

According to the data in section 10.8, the EUT complied with the FCC Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

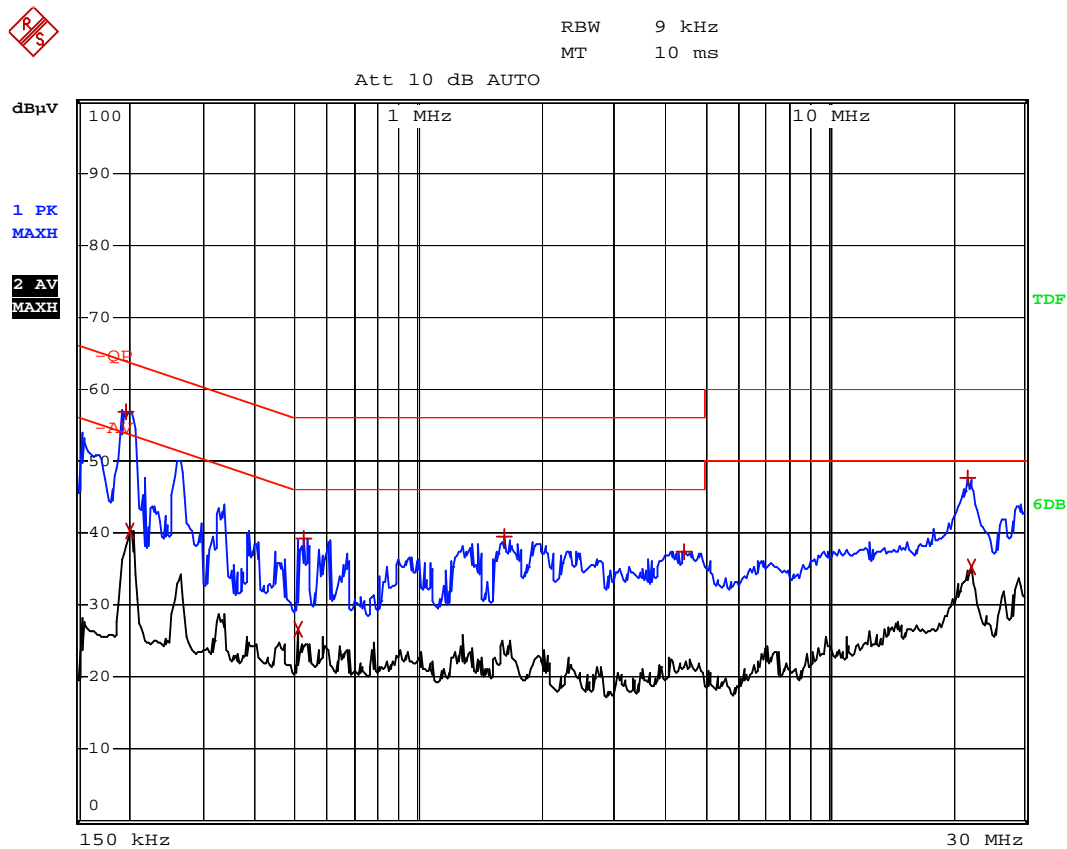
-6.81 dB at 0.190 MHz in the Neutral mode, PK detector, 0.15-30MHz

10.8 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

EUT: WiFi Router
Tested Model: AWAPN2403
Operating Condiation: Operating
Comment: WIFI Connect

Test Specification: Neutral



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1 Max Peak	198 kHz	56.88	-6.81
2 Average	202 kHz	40.35	-13.17
2 Average	510 kHz	26.69	-19.30
1 Max Peak	526 kHz	39.31	-16.68
1 Max Peak	1.63 MHz	39.52	-16.47
1 Max Peak	4.438 MHz	37.49	-18.50
1 Max Peak	21.942 MHz	47.60	-12.39
2 Average	22.278 MHz	35.22	-14.77

