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: TKZAWM002

FCC Rules:	FCC Part 15C
Product Description:	WiFi AP Router Module
Tested Model:	AWM002
Report No.:	STR13038470I
Tested Date:	2013-03-18 to 2013-03-27
Issued Date:	2013-04-22
Tested By:	Jack Li / Engineer
Reviewed By:	Lahm Peng / EMC Manager
Approved & Authorized By:	Jandy so / PSQ Manager

Prepared By:

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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 AP Router Module
Trade Name:	ASIARF, WIODATA
Model No.:	AWM002
Adding Model(s):	/
Rated Voltage:	3.3V DC
Power Adaptor Model:	/
Note: The test data is gathered from a production sample, provided by the manufacturer.	

Technical Characteristics of EUT	
Support Standards:	802.11b/g/n
Frequency Range:	2412-2462MHz, 2422-2452MHz
RF Output Power:	14.63 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:	PCB Antenna
Antenna Gain:	2.0 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
USB Cable	1.0	Shielded	Wihtout Ferrite
RJ45 Cable	2.0	Unshielded	Without Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Notebook	ASUS	X81	/
WiFi IP Camera & Storage AP Router	Veritek	AWAPN2411	/

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 ≥ 3 x 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

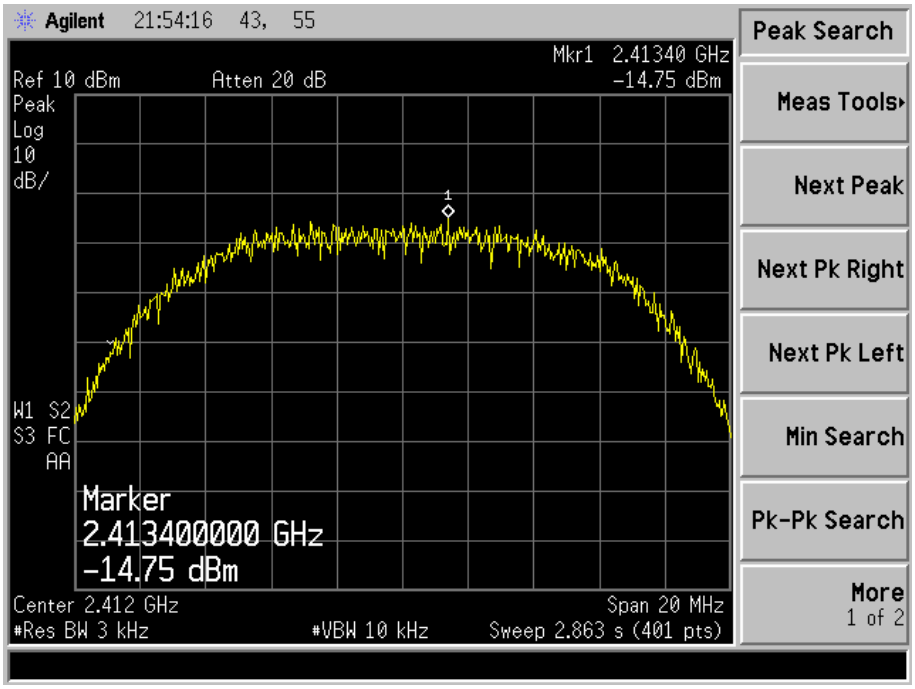
Temperature:	20° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.5 Summary of Test Results/Plots

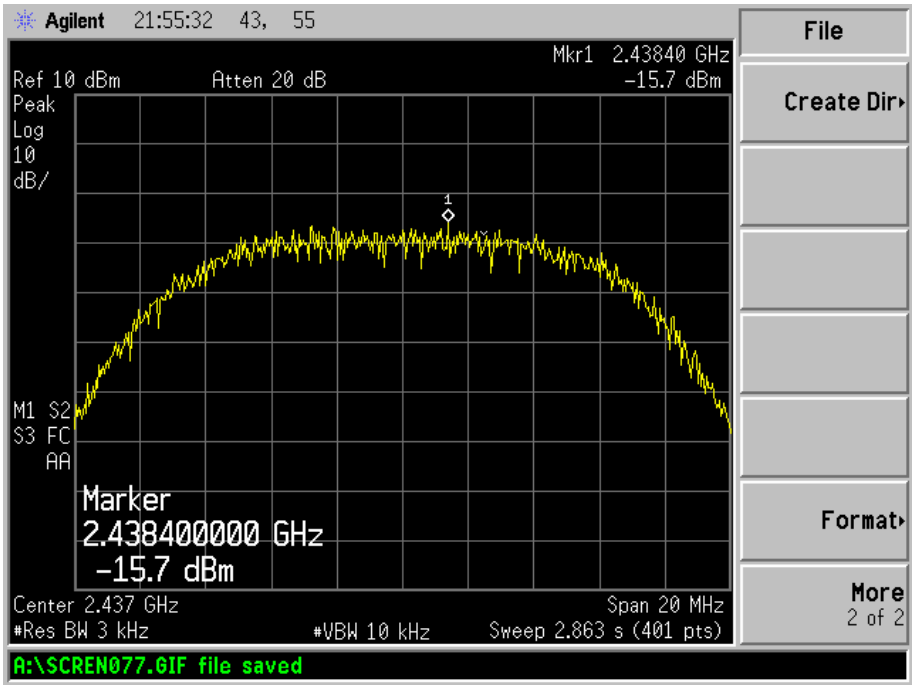
Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
802.11b	2412	-14.75	8
	2437	-15.70	8
	2462	-16.03	8
802.11g	2412	-19.50	8
	2437	-19.75	8
	2462	-19.76	8
802.11n HT20	2412	-19.38	8
	2437	-19.97	8
	2462	-19.92	8
802.11n HT40	2422	-20.55	8
	2437	-21.01	8
	2452	-21.03	8

Please refer to the following test plots:

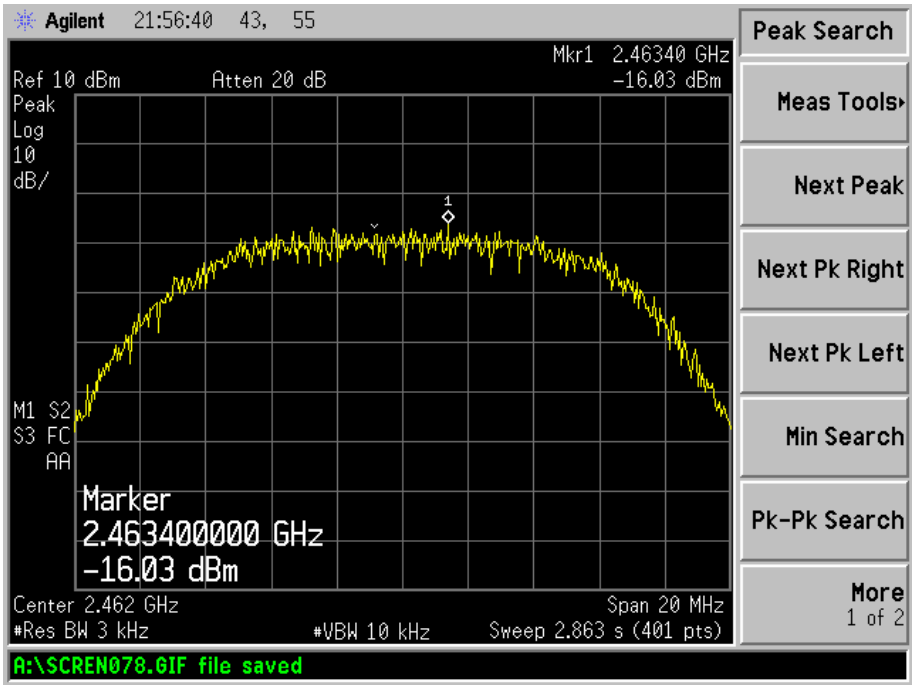
802.11b-Low Channel



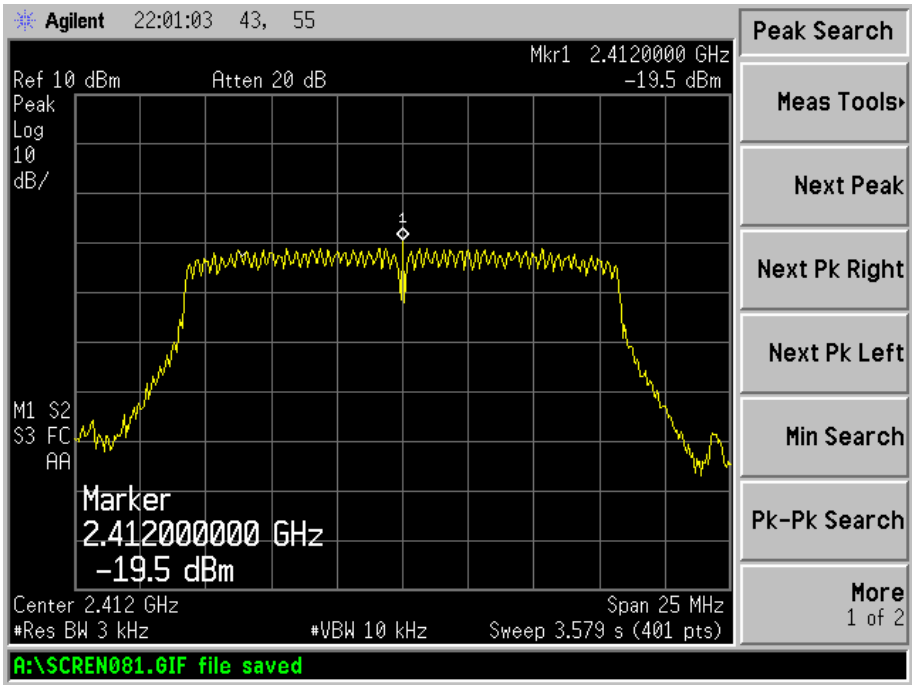
802.11b-Middle Channel



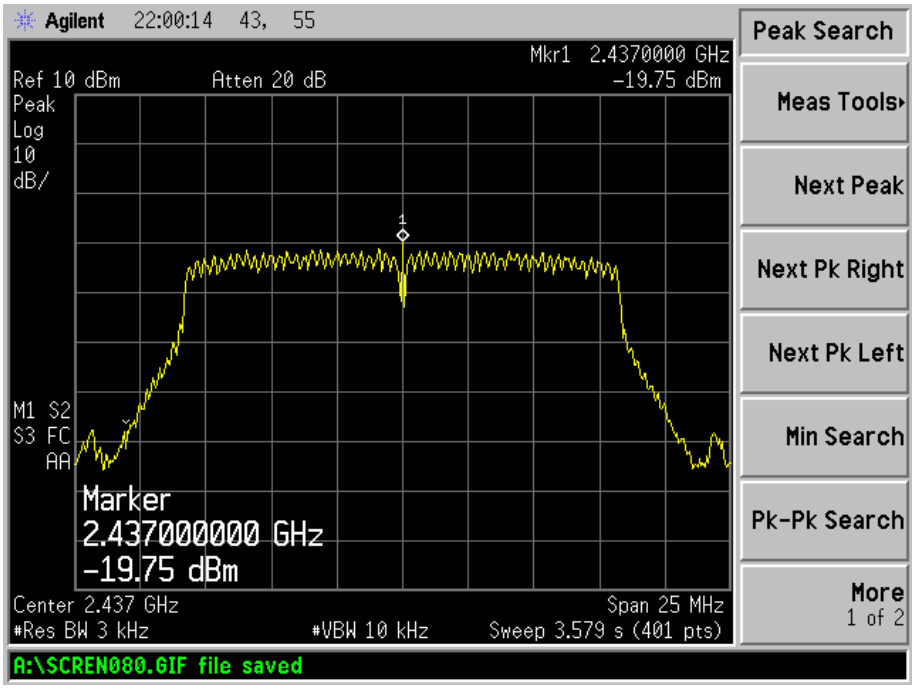
802.11b-High Channel



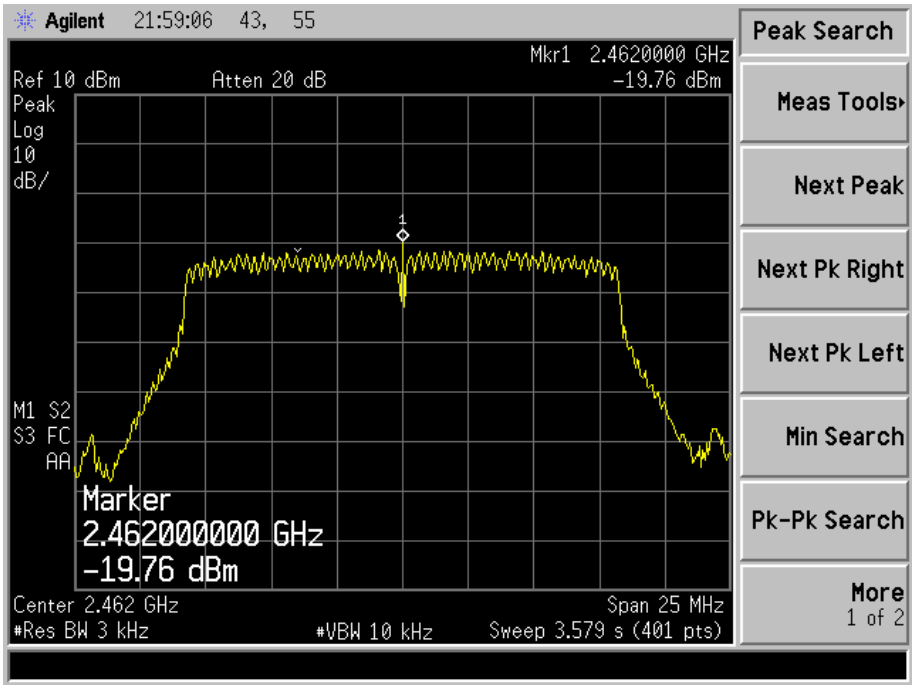
802.11g-Low Channel



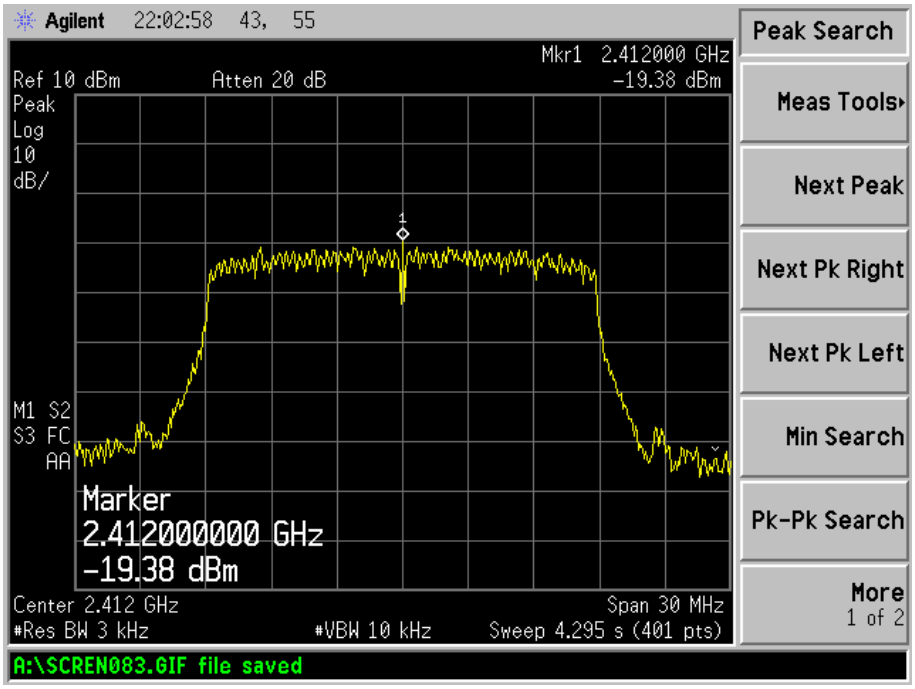
802.11g-Middle Channel



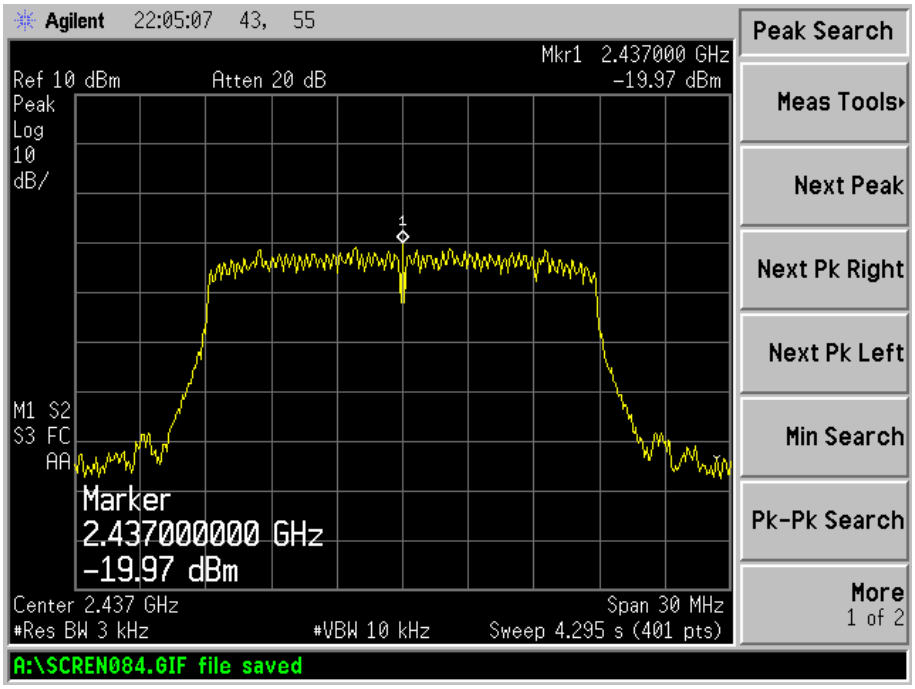
802.11g-High Channel



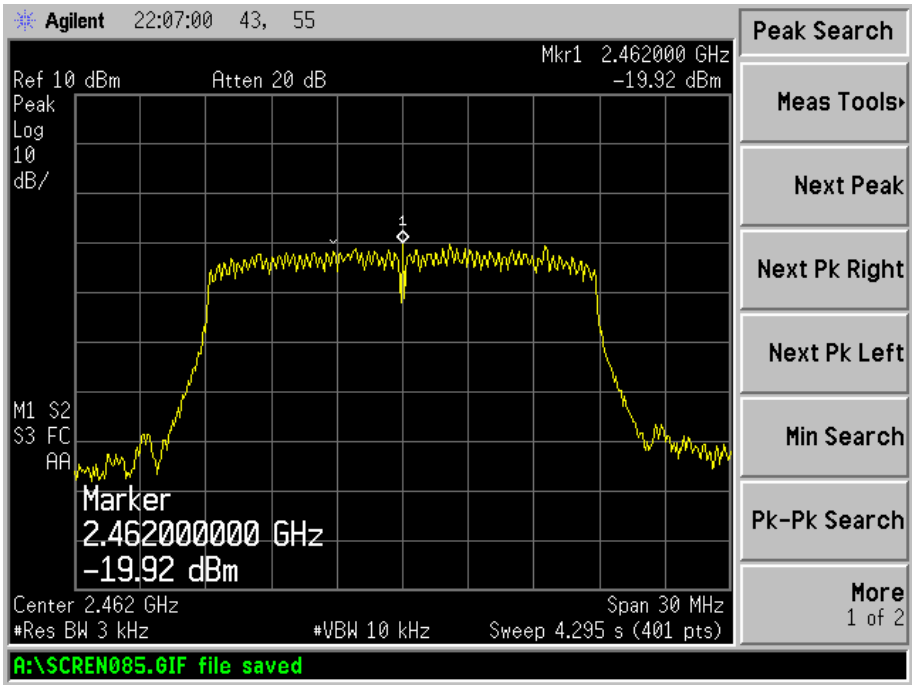
802.11n-HT20-Low Channel



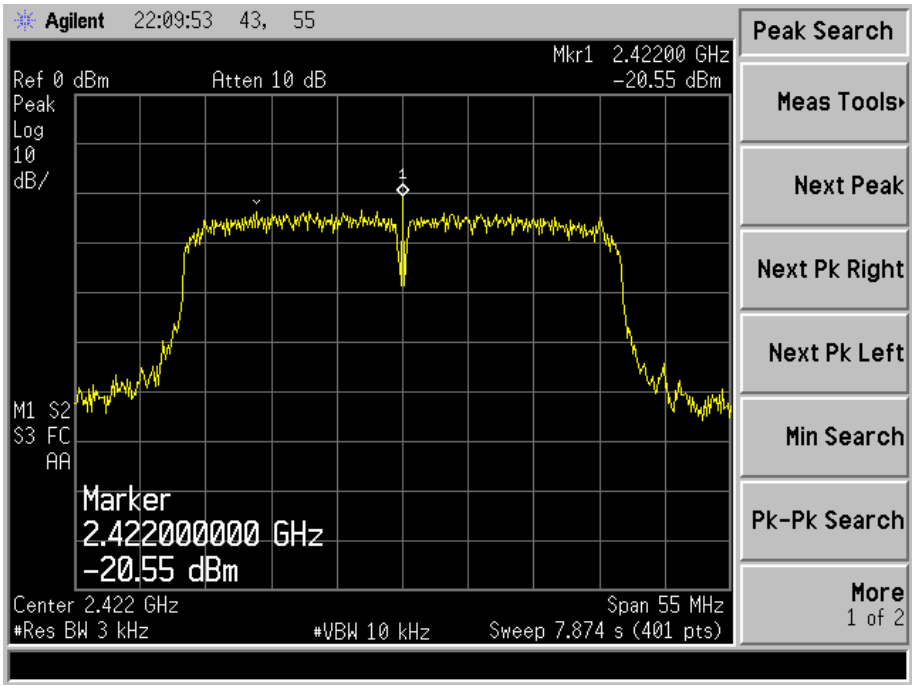
802.11n-HT20-Middle Channel



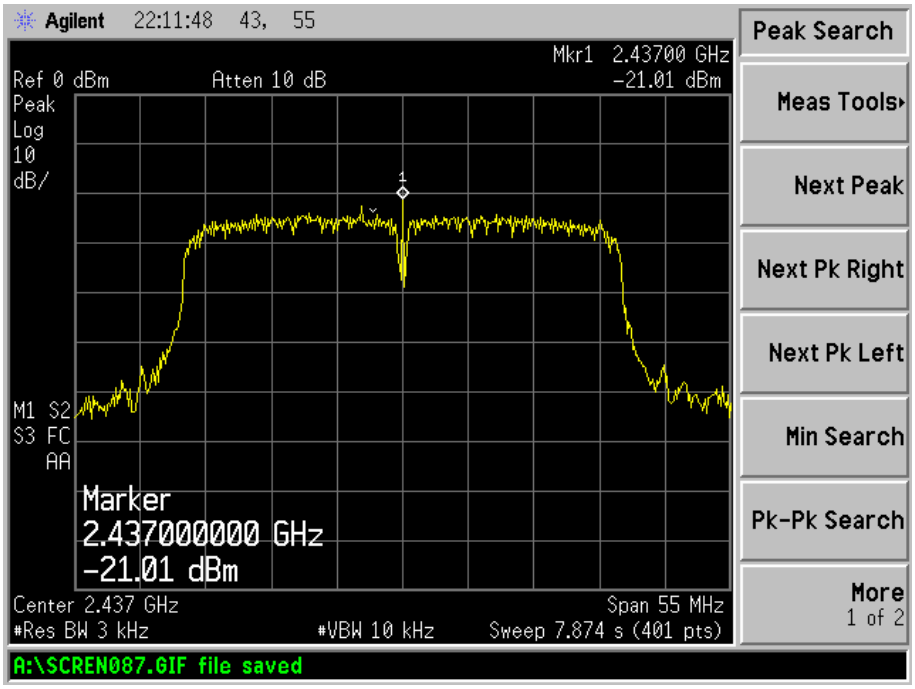
802.11n-HT20-High Channel



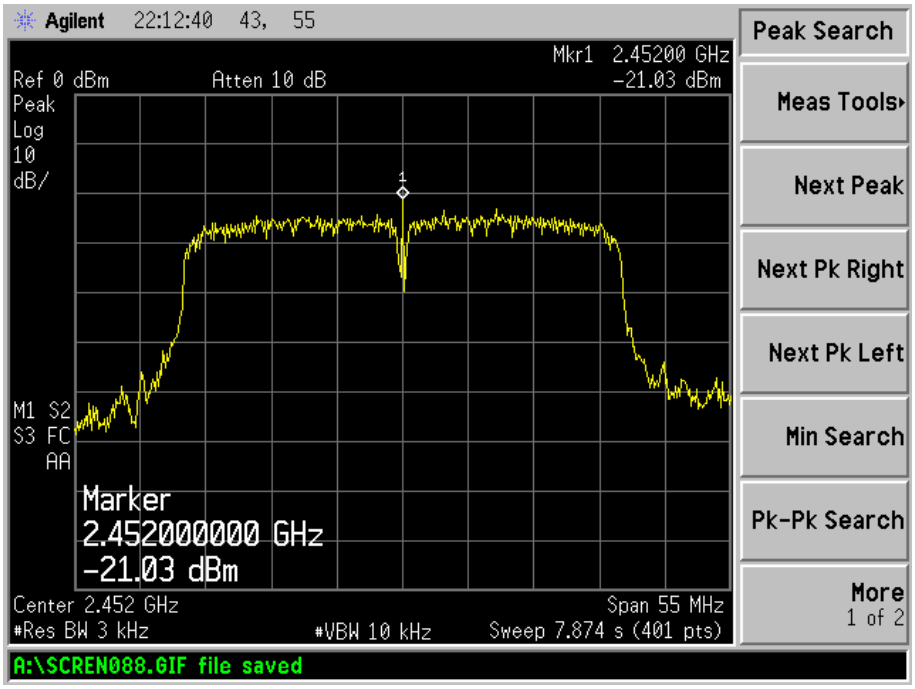
802.11n-HT40-Low Channel



802.11n-HT40-Middle Channel



802.11n-HT40-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) ≥ 3 x 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

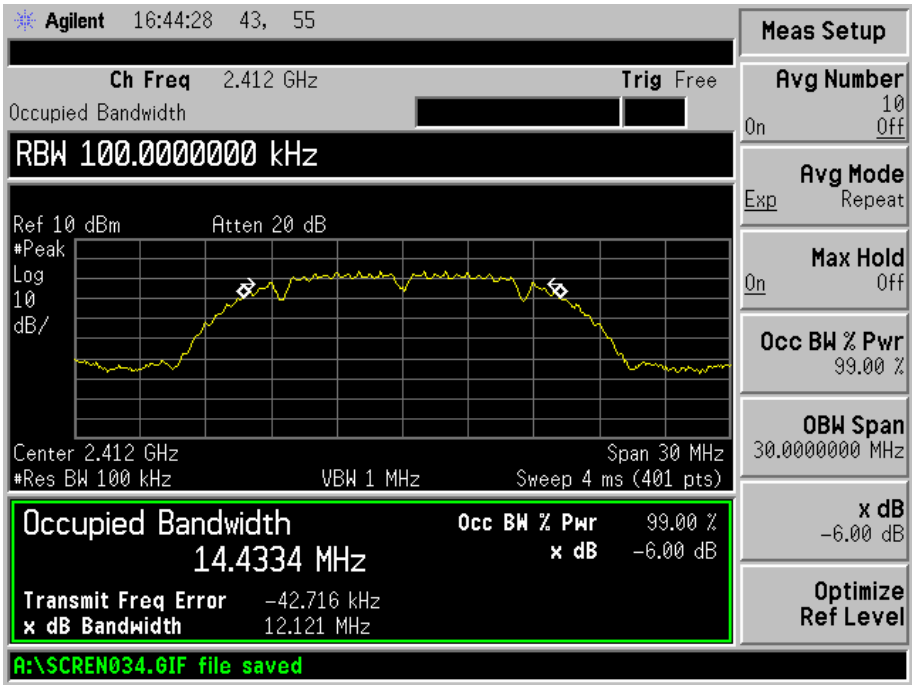
Temperature:	24° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.5 Summary of Test Results/Plots

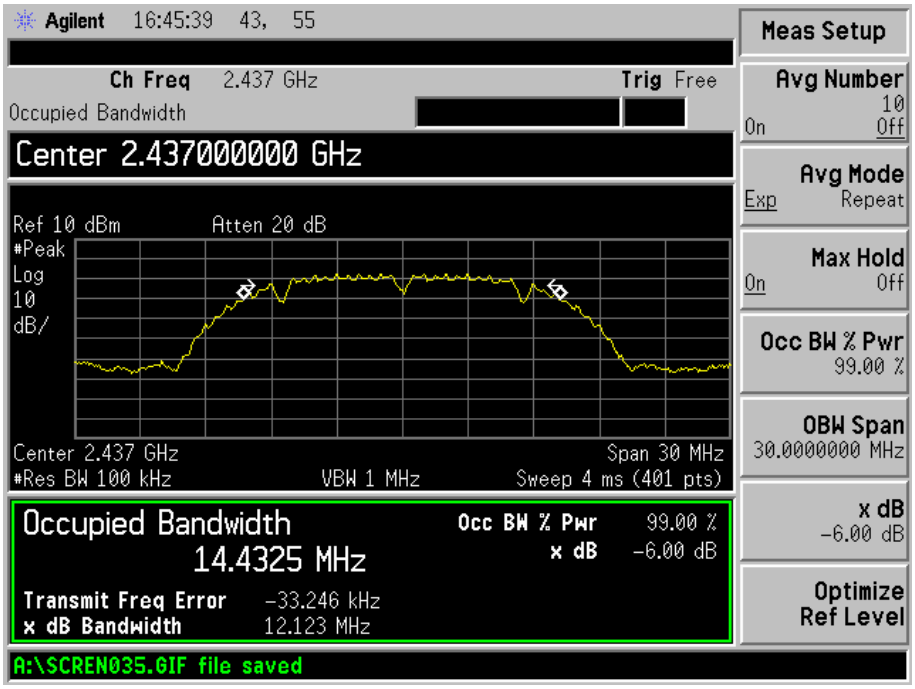
Test Mode	Test Channel MHz	6 dB Bandwidth MHz	Limit kHz
802.11b	2412	12.121	500
	2437	12.123	500
	2462	12.118	500
802.11g	2412	16.503	500
	2437	16.478	500
	2462	16.508	500
802.11n-HT20	2412	17.426	500
	2437	17.491	500
	2462	17.333	500
802.11n-HT40	2422	36.012	500
	2437	35.834	500
	2452	35.882	500

Please refer to the following test plots:

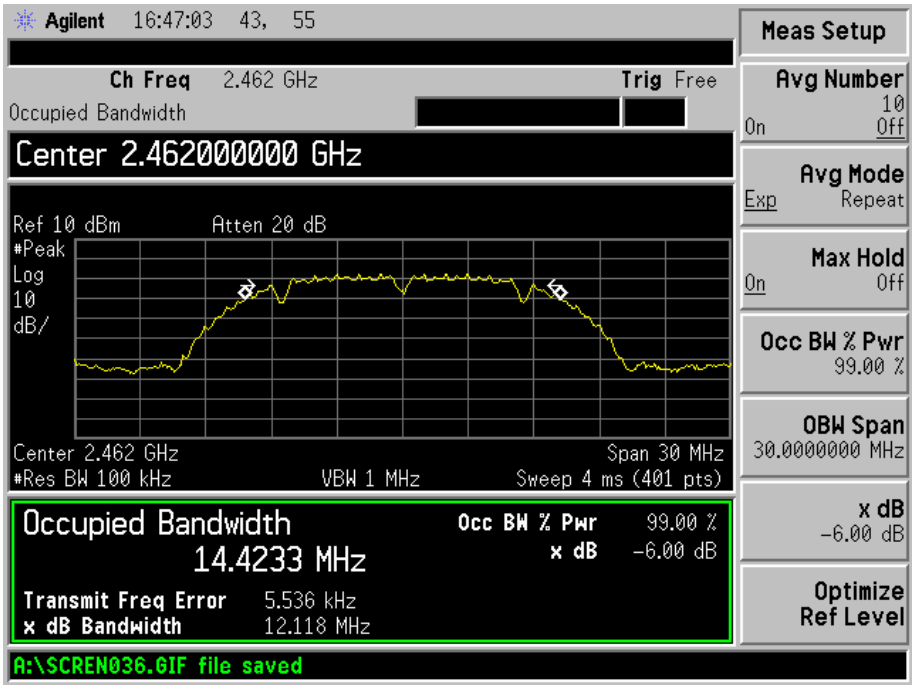
802.11b-Low Channel



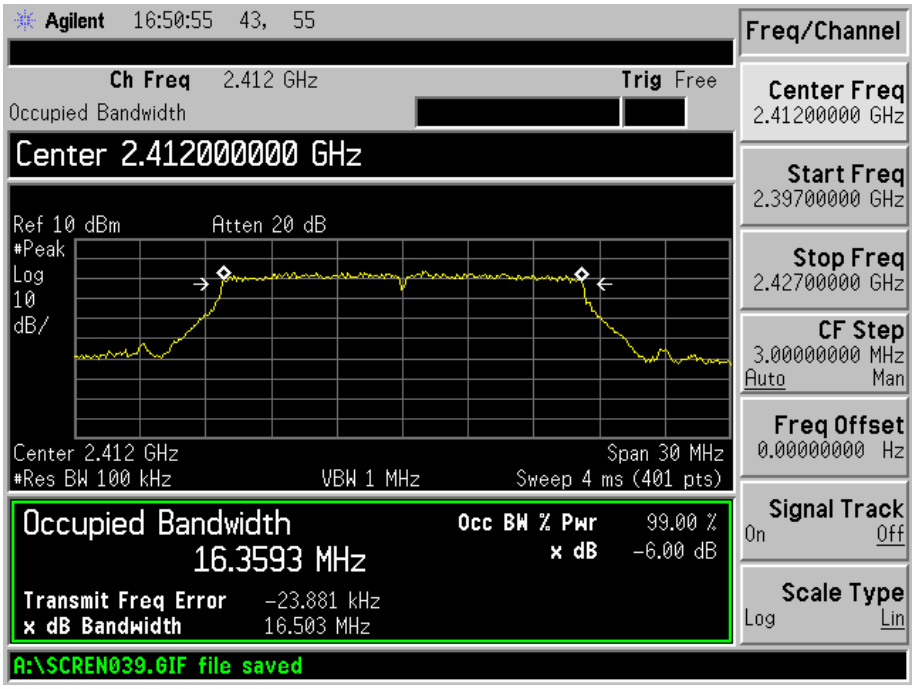
802.11b-Middle Channel



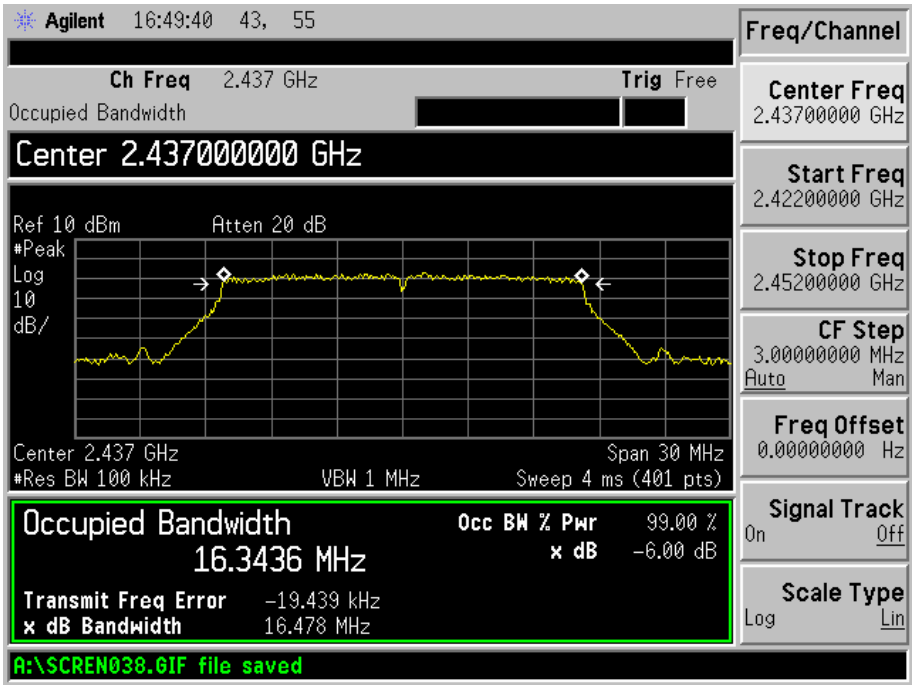
802.11b-High Channel



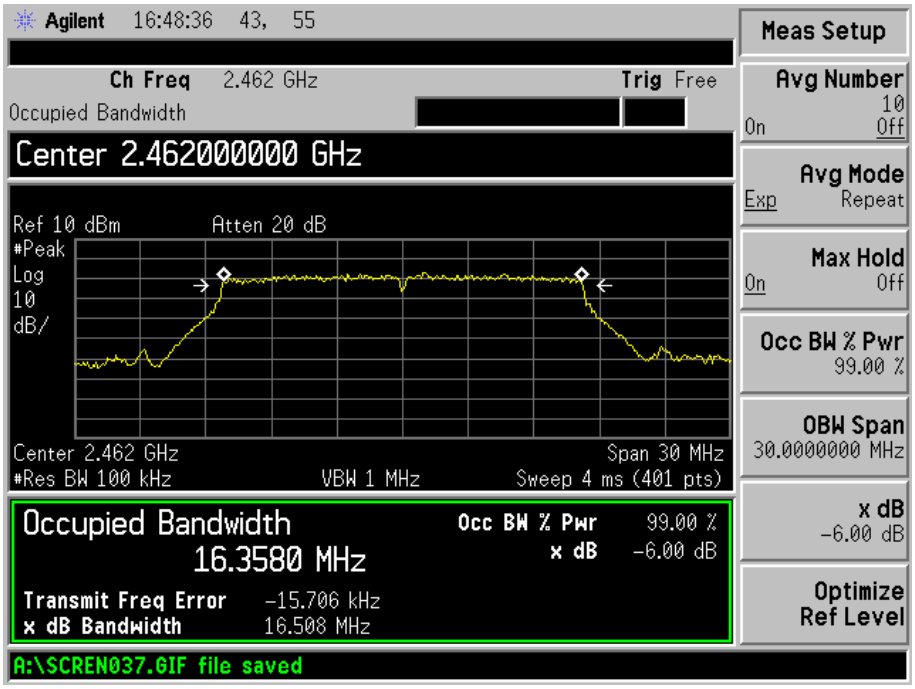
802.11g-Low Channel



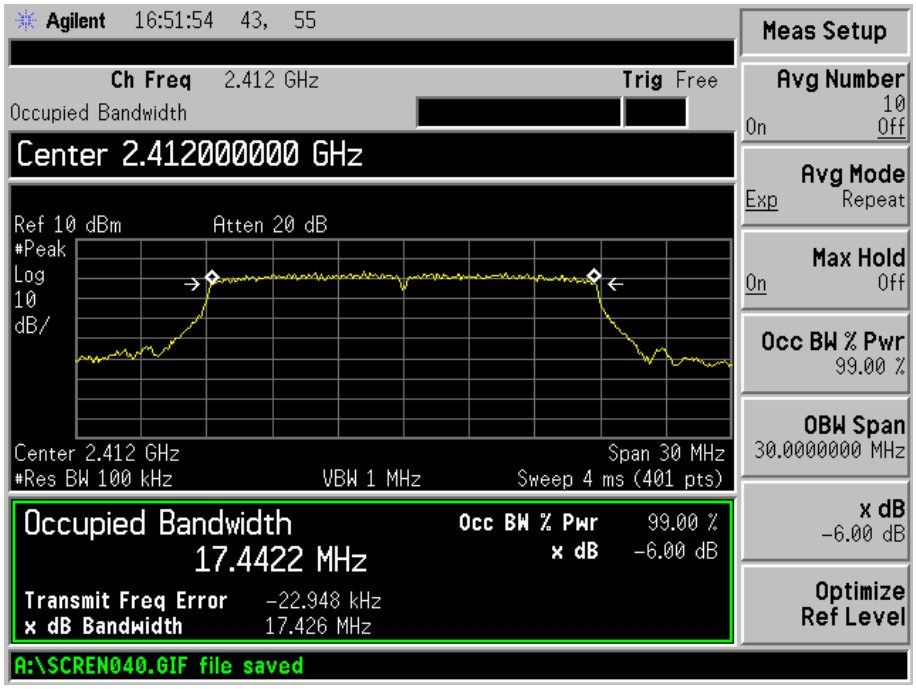
802.11g-Middle Channel



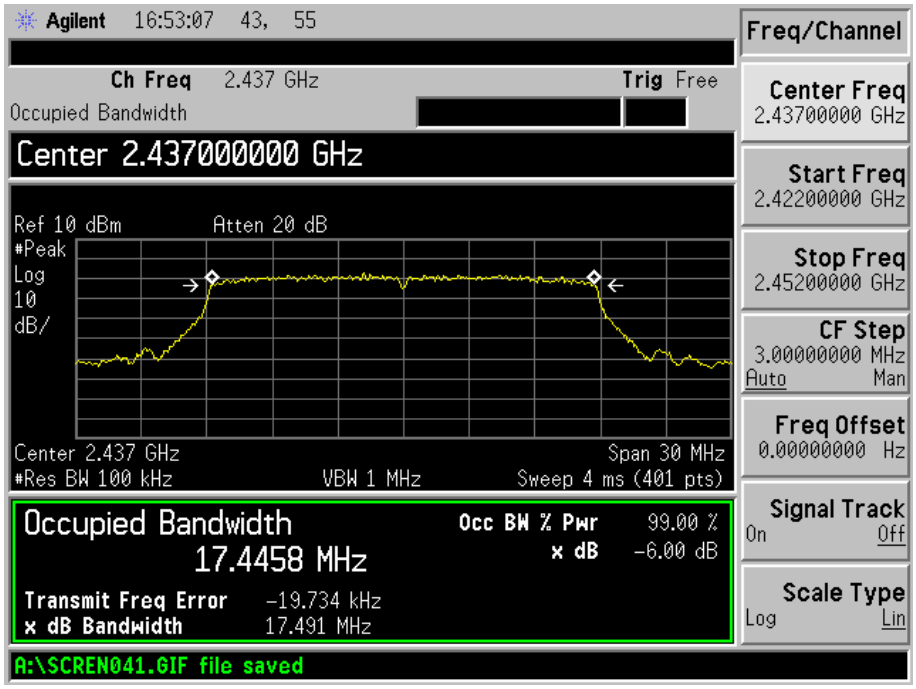
802.11g-High Channel



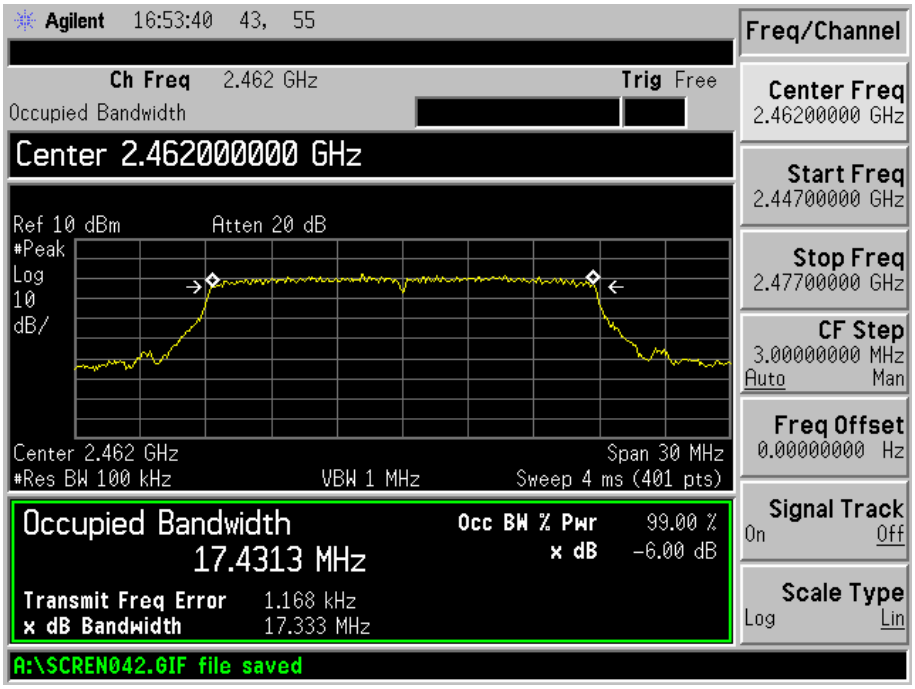
802.11n-HT20-Low Channel



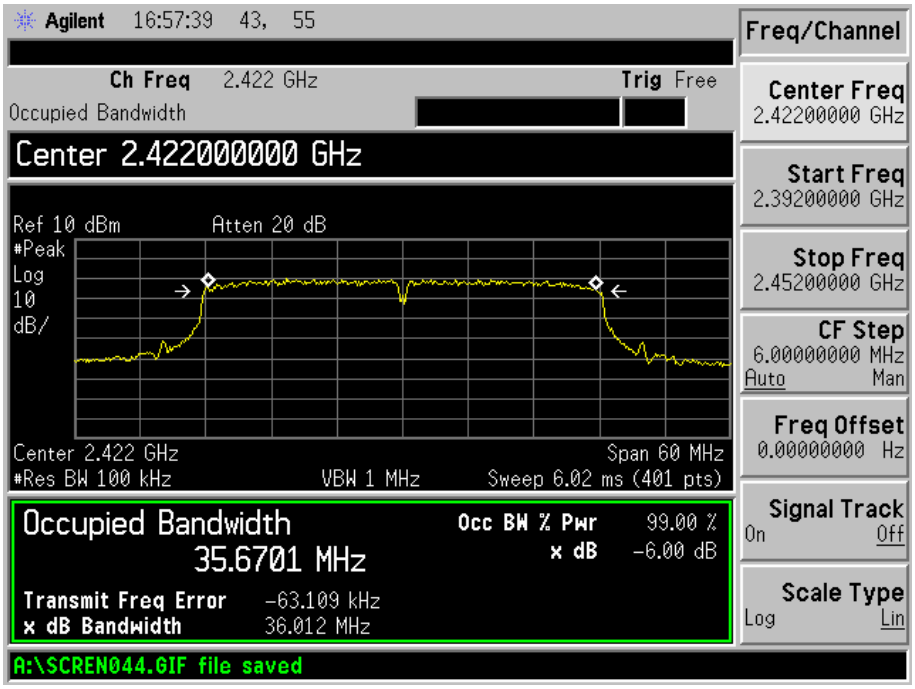
802.11n-HT20-Middle Channel



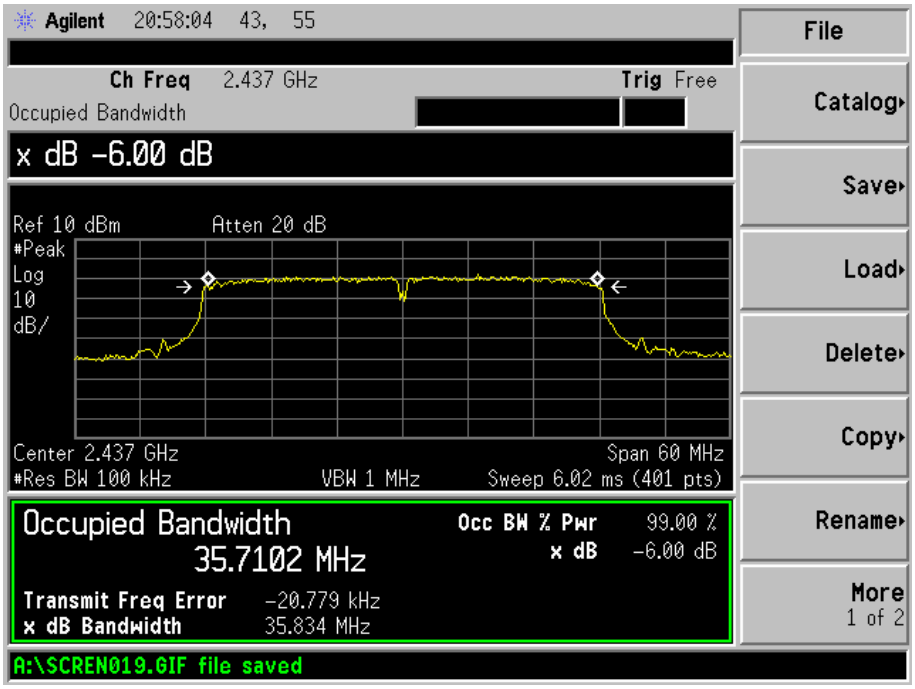
802.11n-HT20-High Channel



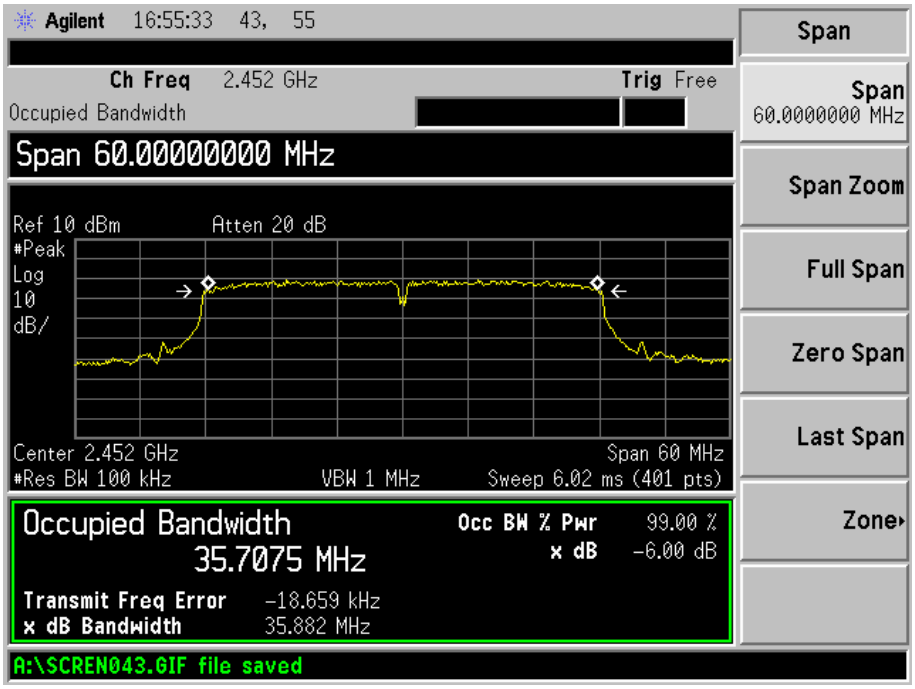
802.11n-HT40-Low Channel



802.11n-HT40-Middle Channel



802.11n-HT40-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

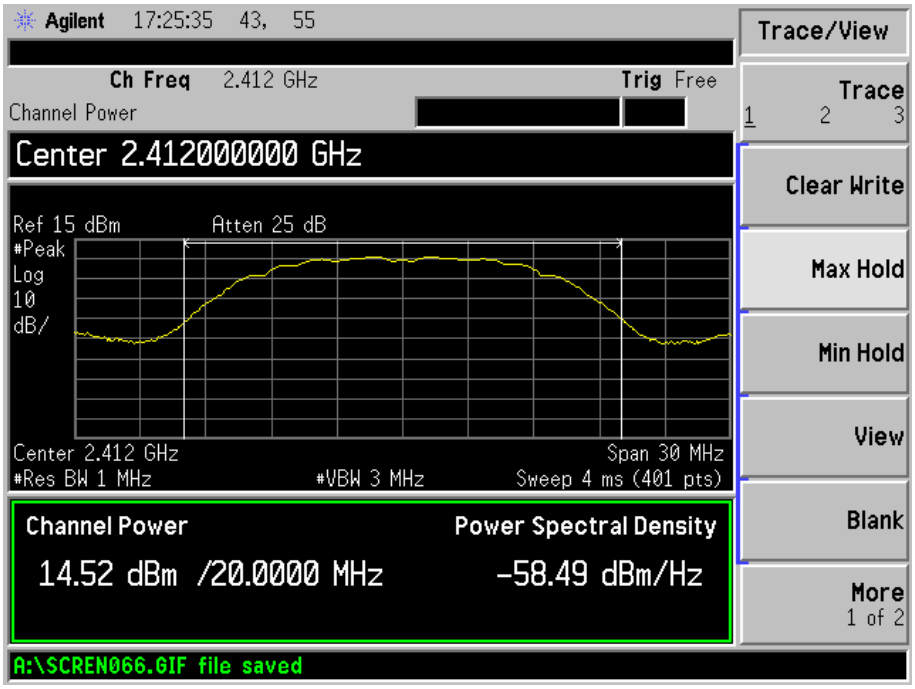
Temperature:	21° C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

7.5 Summary of Test Results/Plots

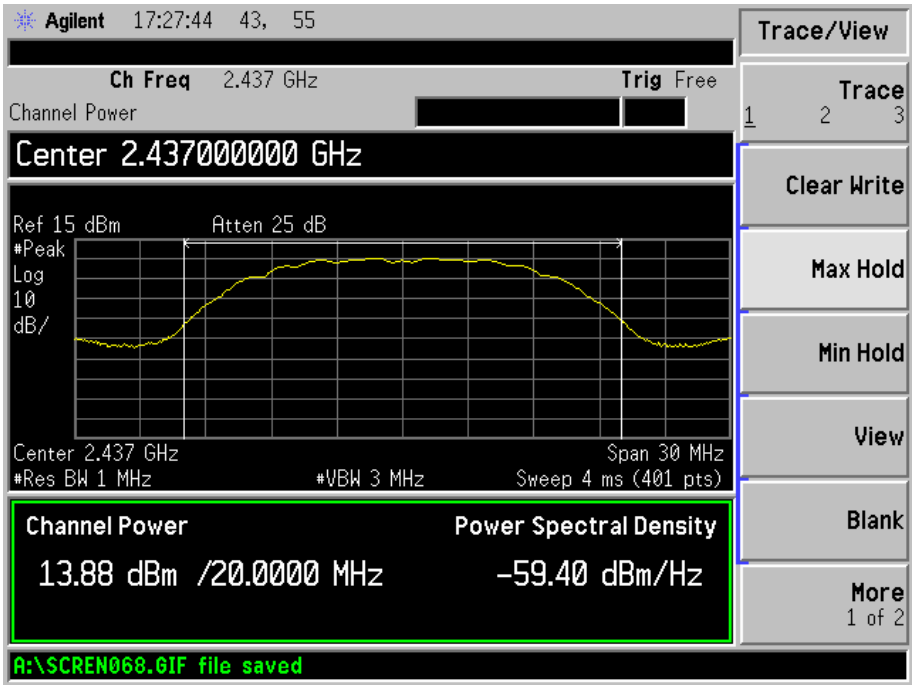
Test Mode	Frequency MHz	Reading dBm	Output Power mW	Limit mW
802.11b_long_1Mbps	2412	14.52	28.3139	1000
	2437	13.88	24.4343	1000
	2462	13.93	24.7172	1000
802.11b_long_11Mbps	2412	14.63	29.0402	1000
	2437	14.04	25.3513	1000
	2462	14.10	25.7040	1000
802.11g_6Mbps	2412	11.00	12.5893	1000
	2437	10.33	10.7895	1000
	2462	10.07	10.1625	1000
802.11g_54Mbps	2412	11.48	14.0605	1000
	2437	11.00	12.5893	1000
	2462	10.55	11.3501	1000
802.11n HT20_MCS0	2412	11.22	13.2434	1000
	2437	10.70	11.7490	1000
	2462	10.03	10.0693	1000
802.11n HT20_MCS7	2412	11.07	12.7938	1000
	2437	10.43	11.0408	1000
	2462	10.31	10.7399	1000
802.11n HT40_MCS0	2422	10.55	11.3501	1000
	2437	10.23	10.5439	1000
	2452	10.10	10.2329	1000
802.11n HT40_MCS7	2422	10.95	12.4451	1000
	2437	10.59	11.4551	1000
	2452	10.31	10.7399	1000

Please refer to the following test plots:

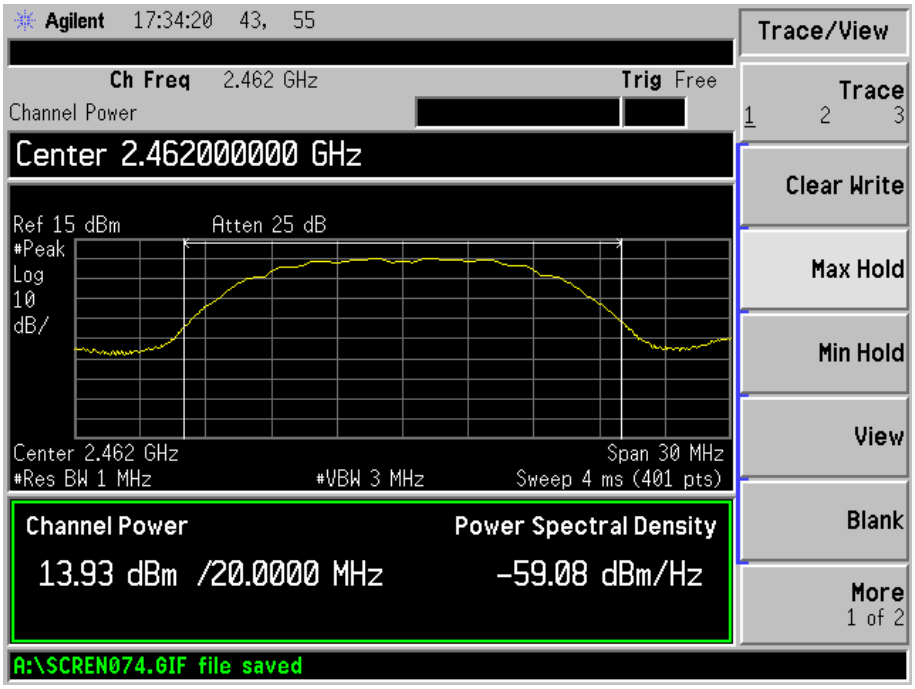
802.11b-long-1Mbps-Low Channel



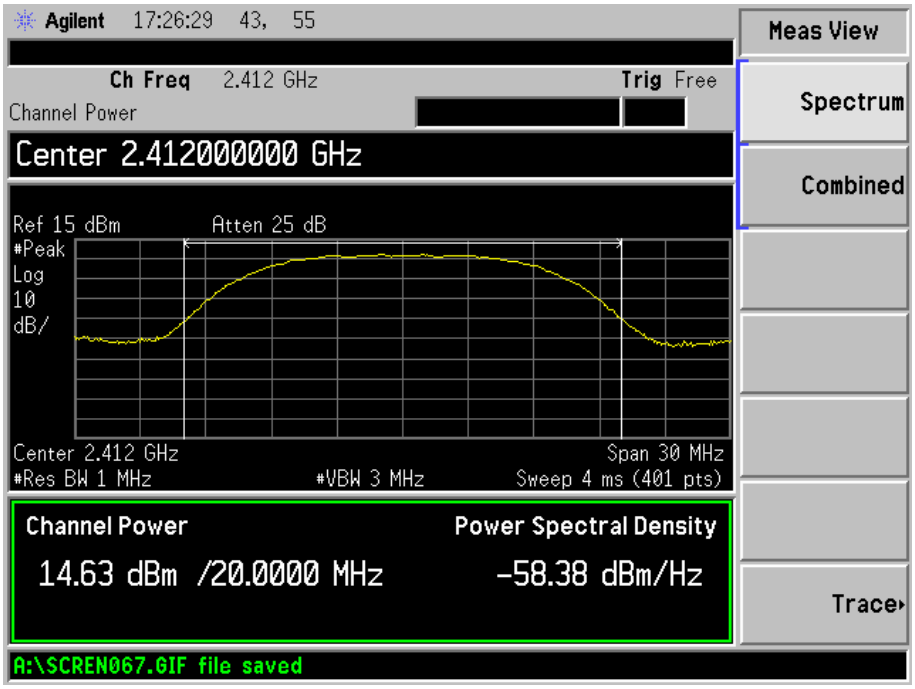
802.11b-long-1Mbps-Middle Channel



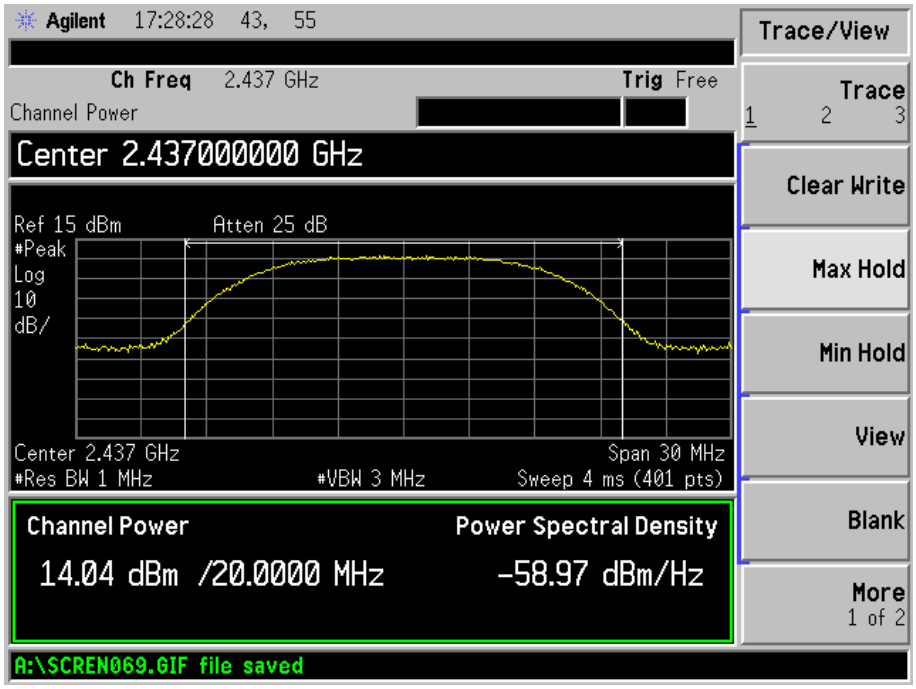
802.11b-long-1Mpbs-High Channel



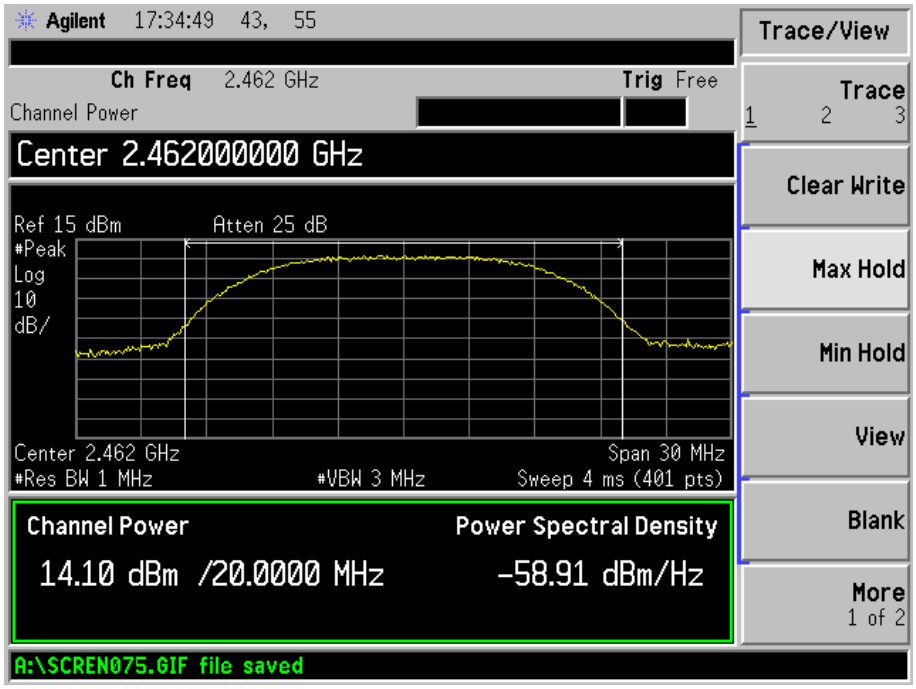
802.11b-long-11Mbps-Low Channel



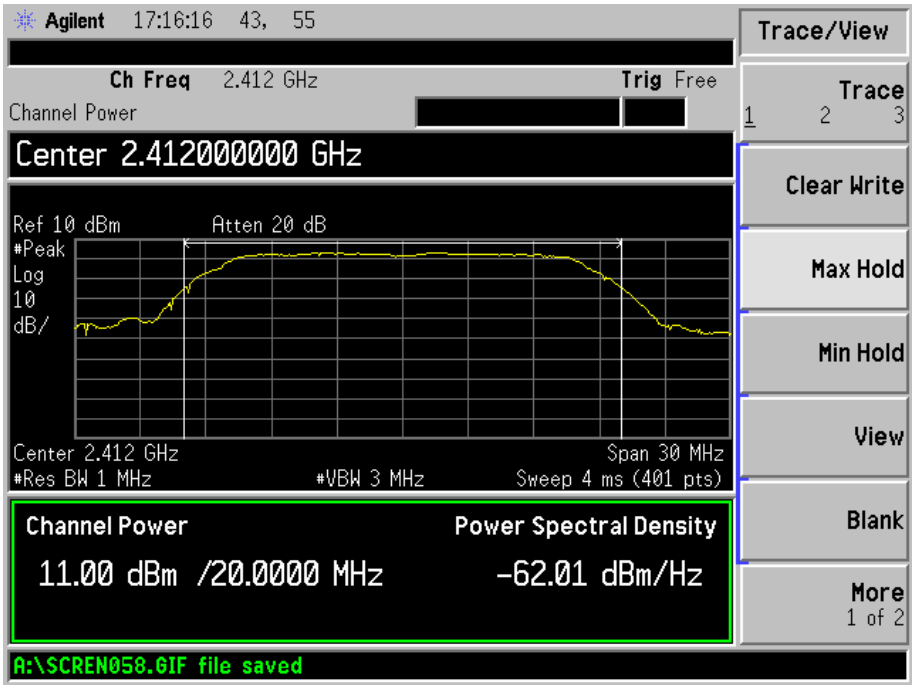
802.11b-long-11Mbps-Middle Channel



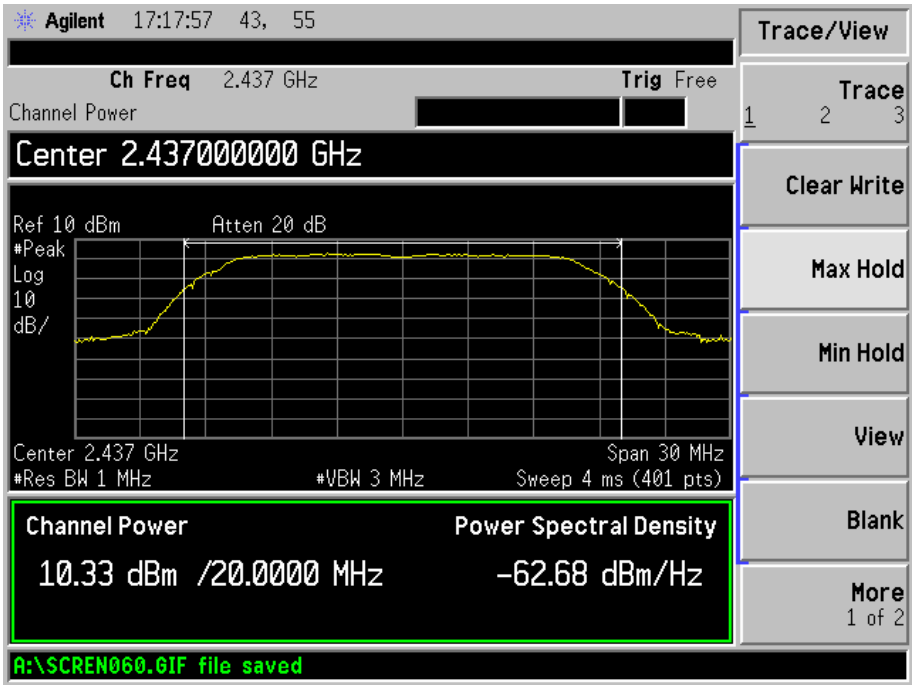
802.11b-long-11Mpbs-High Channel



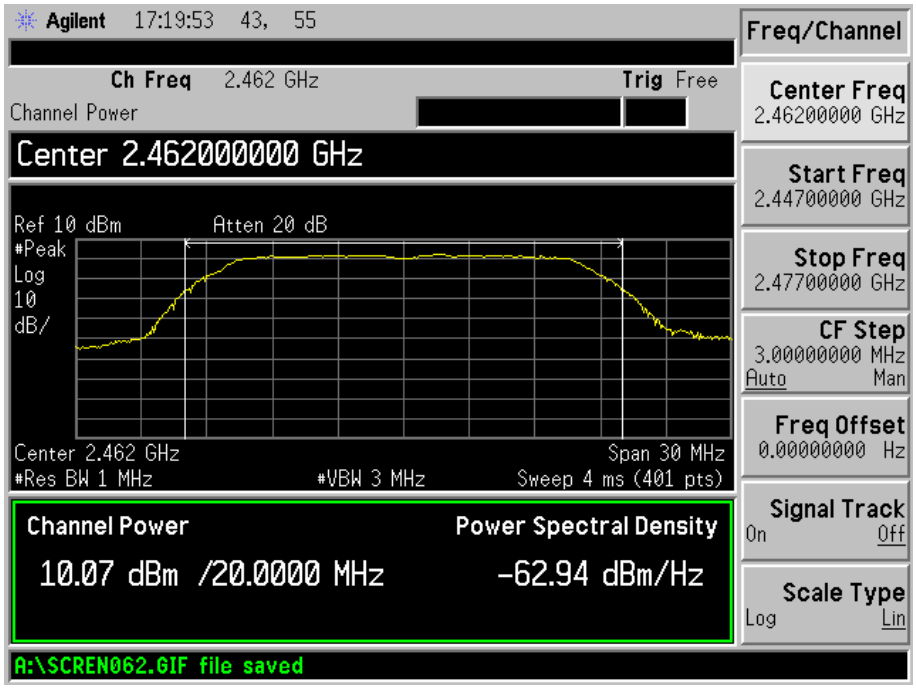
802.11g-6Mbps-Low Channel



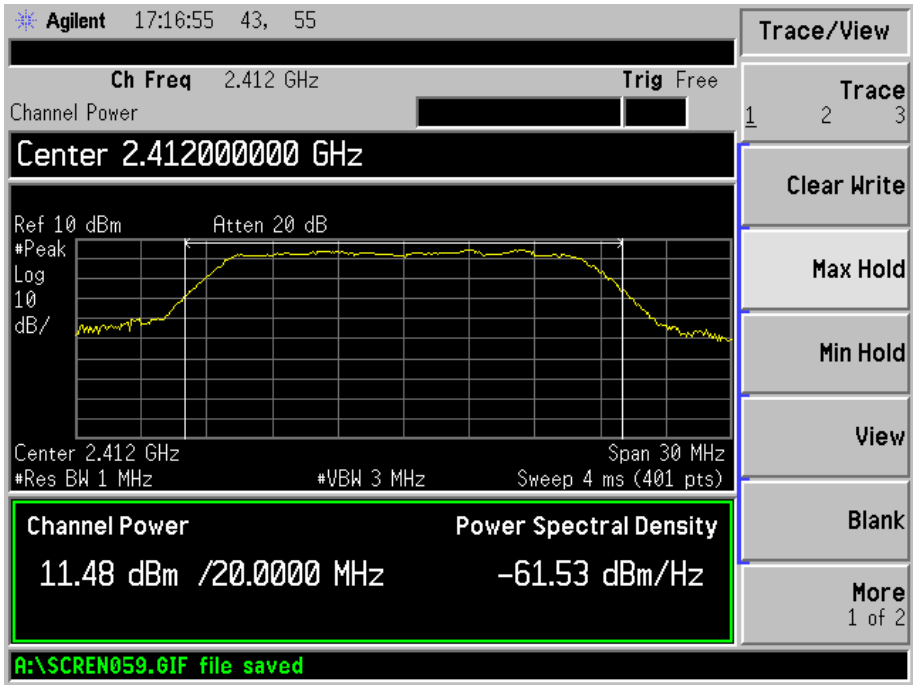
802.11g-6Mbps-Middle Channel



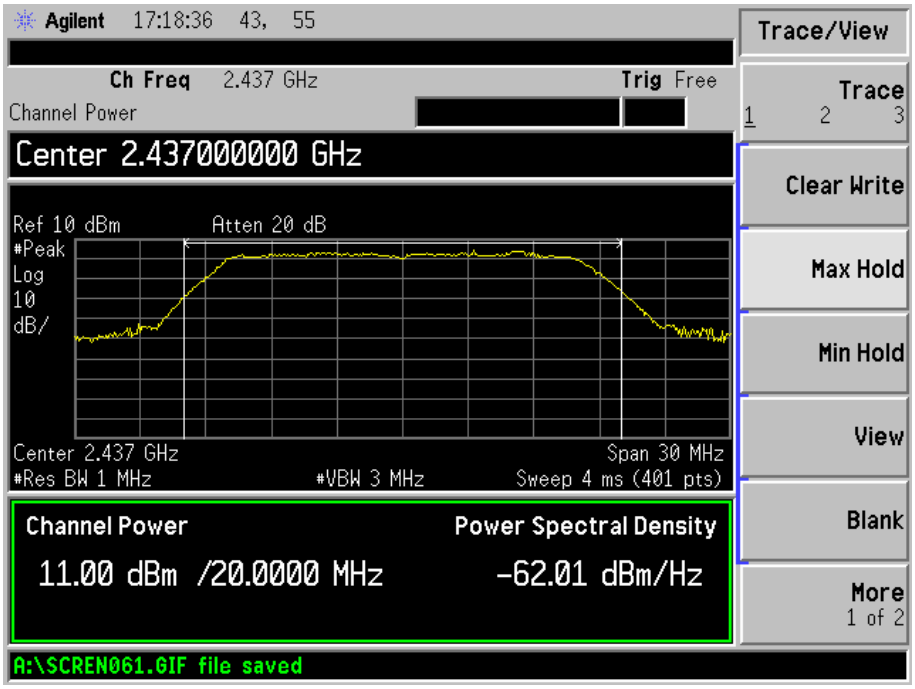
802.11g-6Mpbs-High Channel



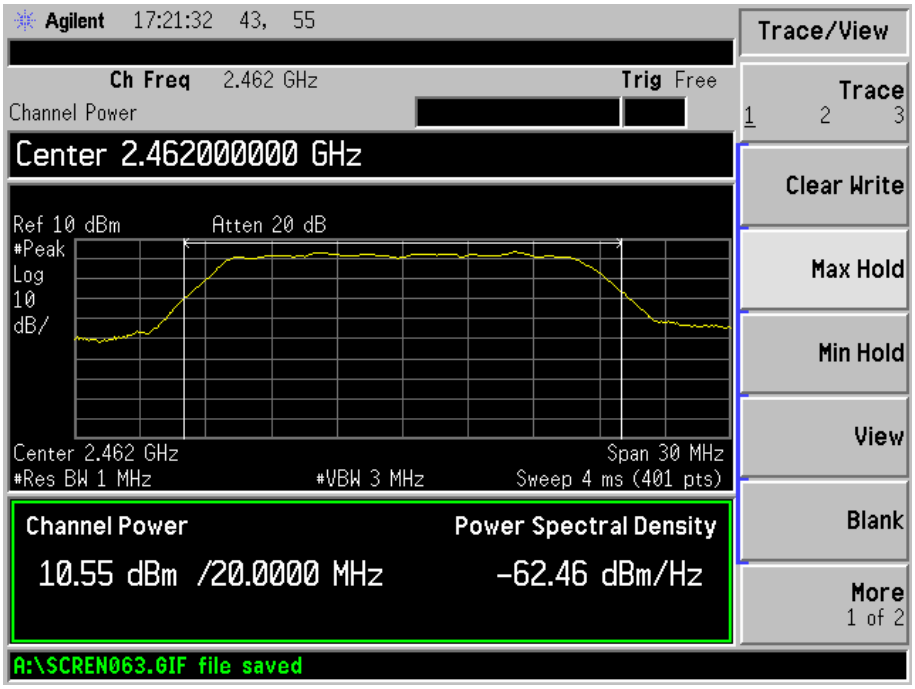
802.11g-54Mpbs -Low Channel



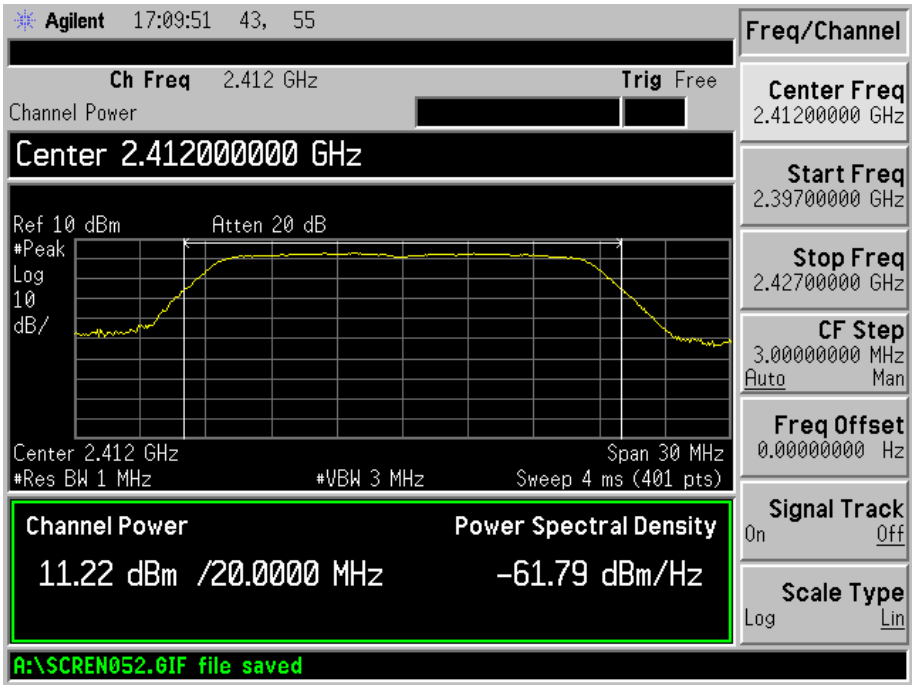
802.11g-54Mpbs -Middle Channel



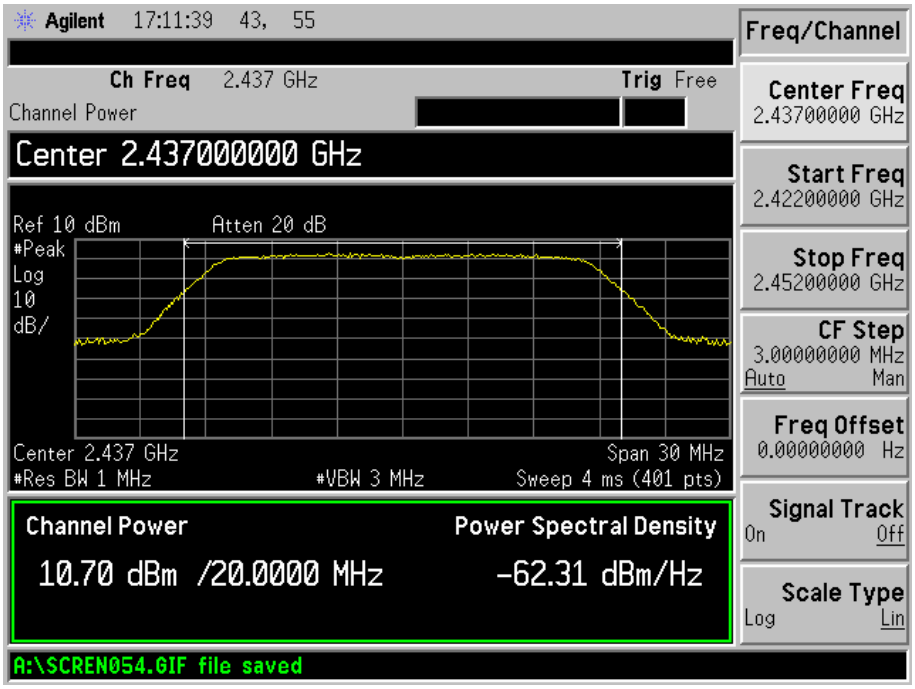
802.11g-54Mpbs -High Channel



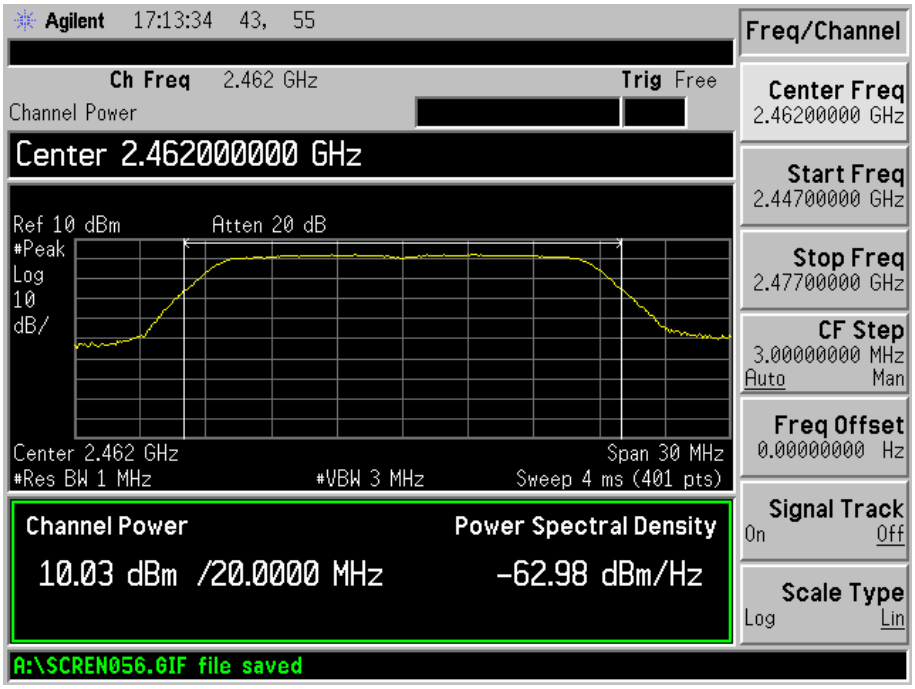
802.11n-HT20-MCS0-Low Channel



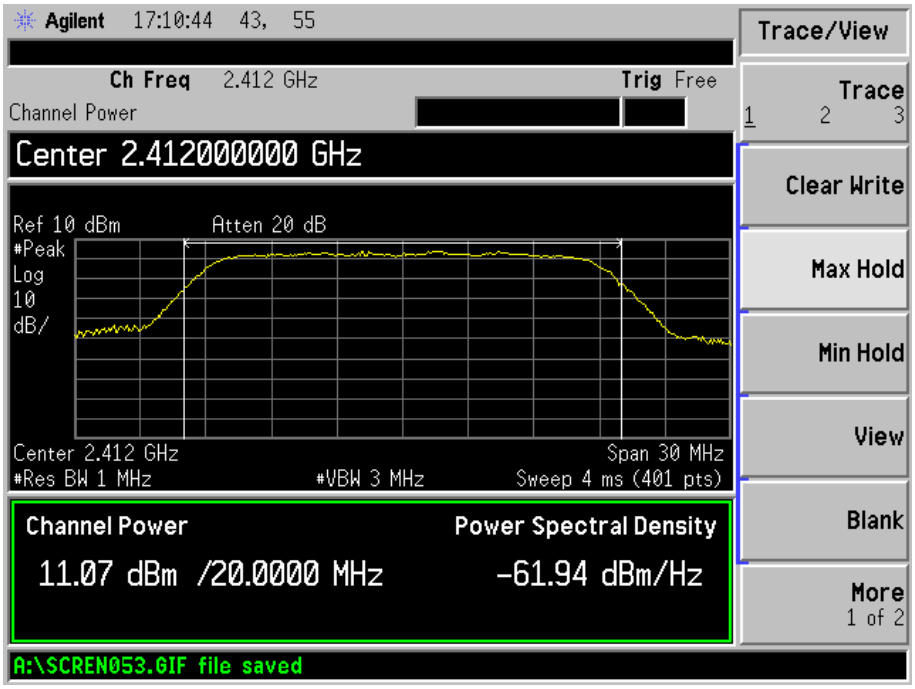
802.11n-HT20-MCS0-Middle Channel



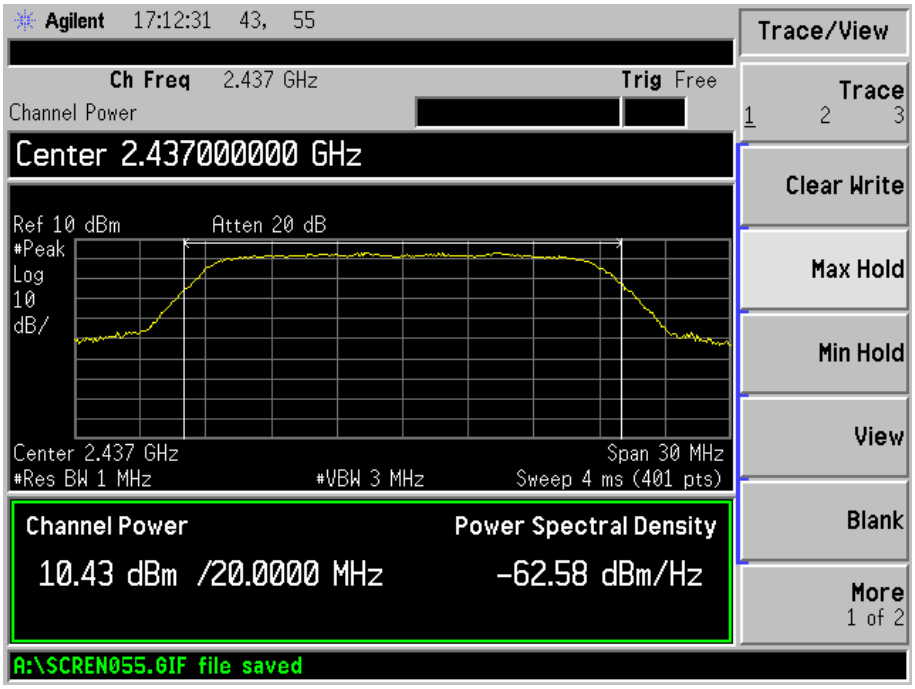
802.11n-HT20-MCS0-High Channel



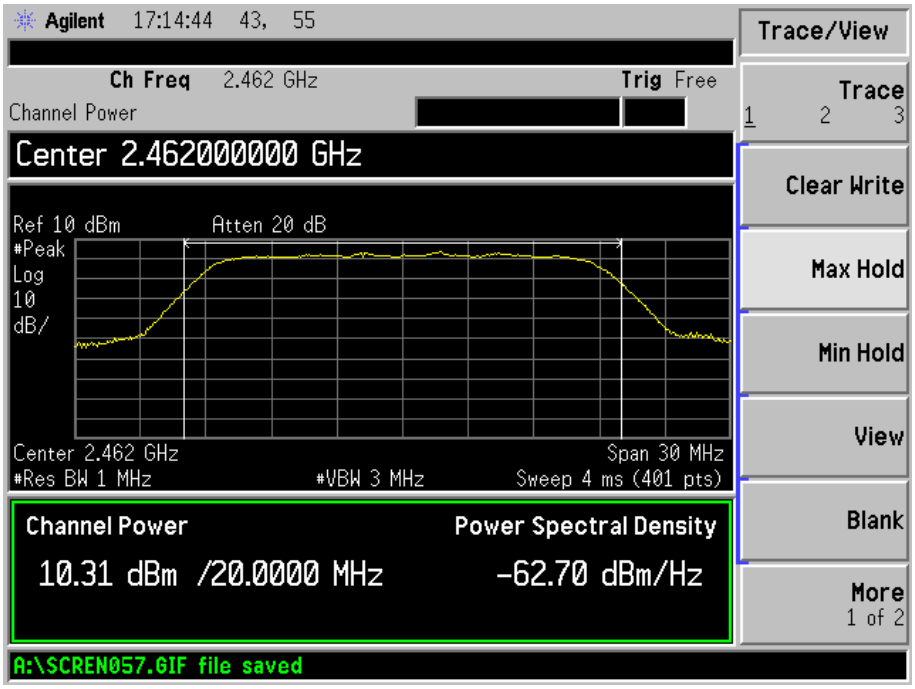
802.11n-HT20-MCS7-Low Channel



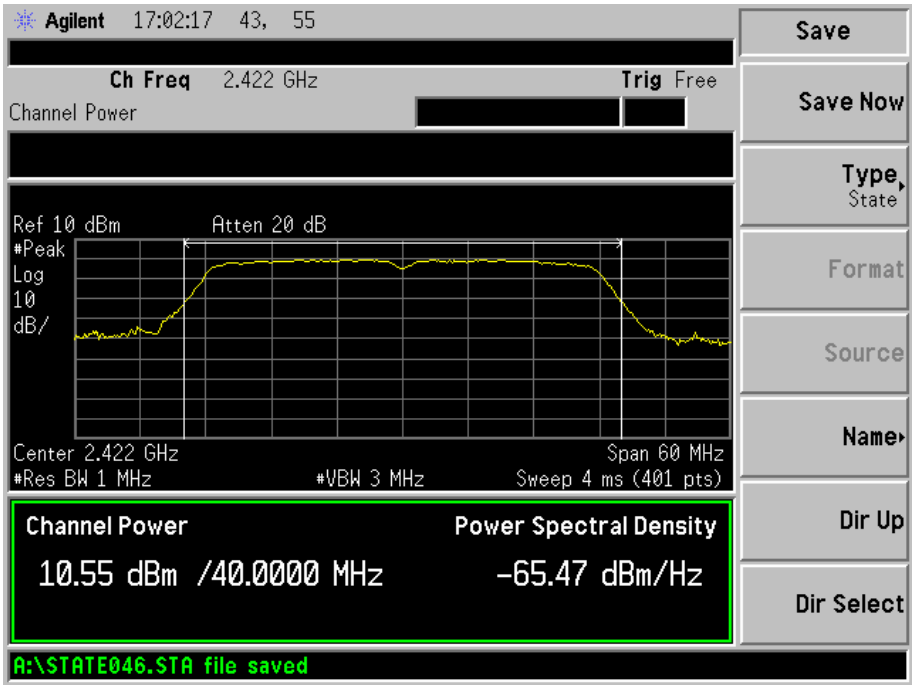
802.11n-HT20-MCS7-Middle Channel



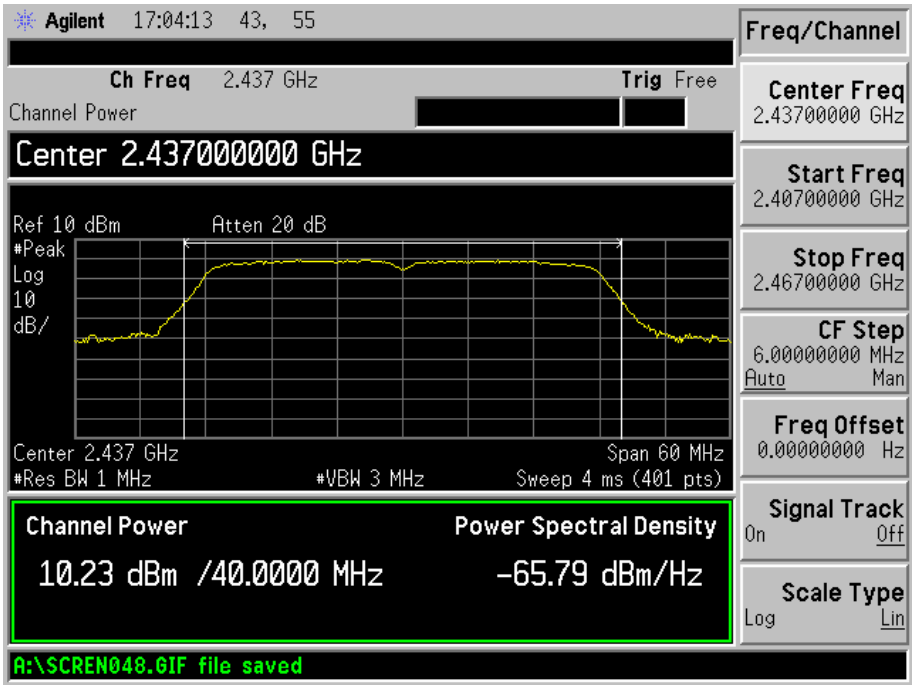
802.11n-HT20-MCS7-High Channel



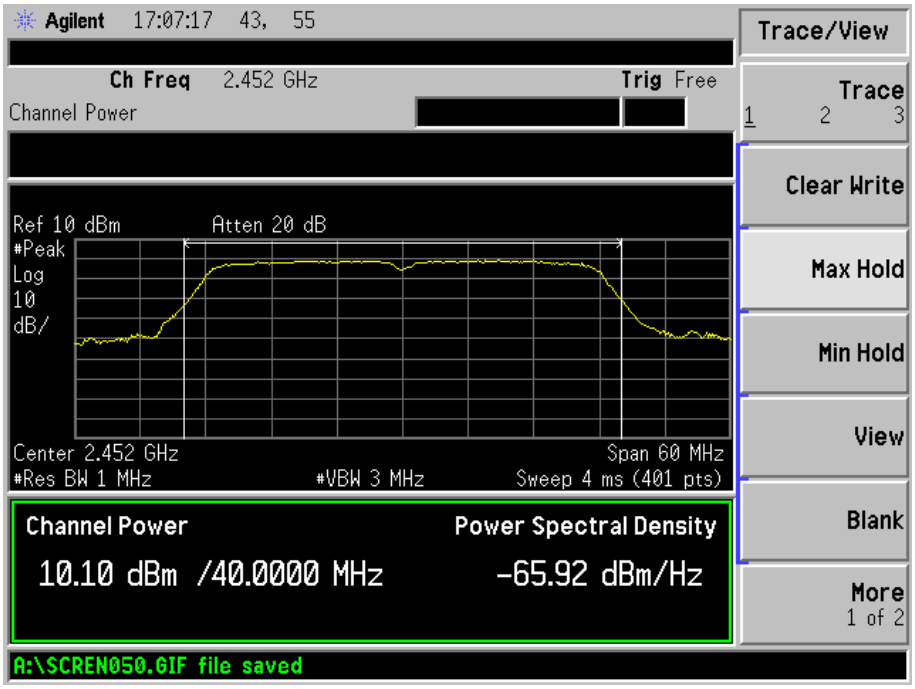
802.11n-HT40-MCS0-Low Channel



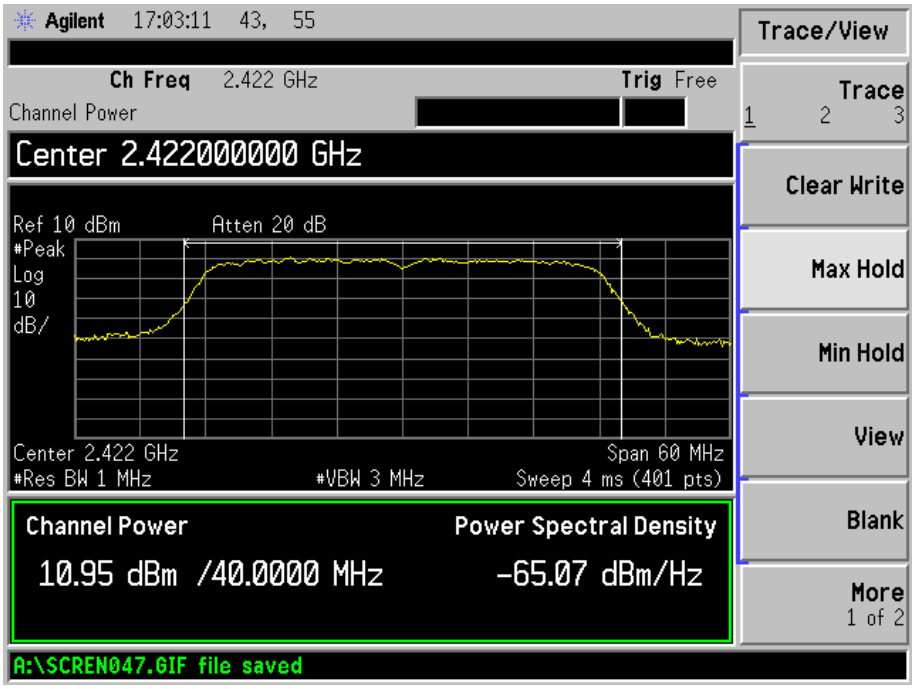
802.11n-HT40-MCS0-Middle Channel



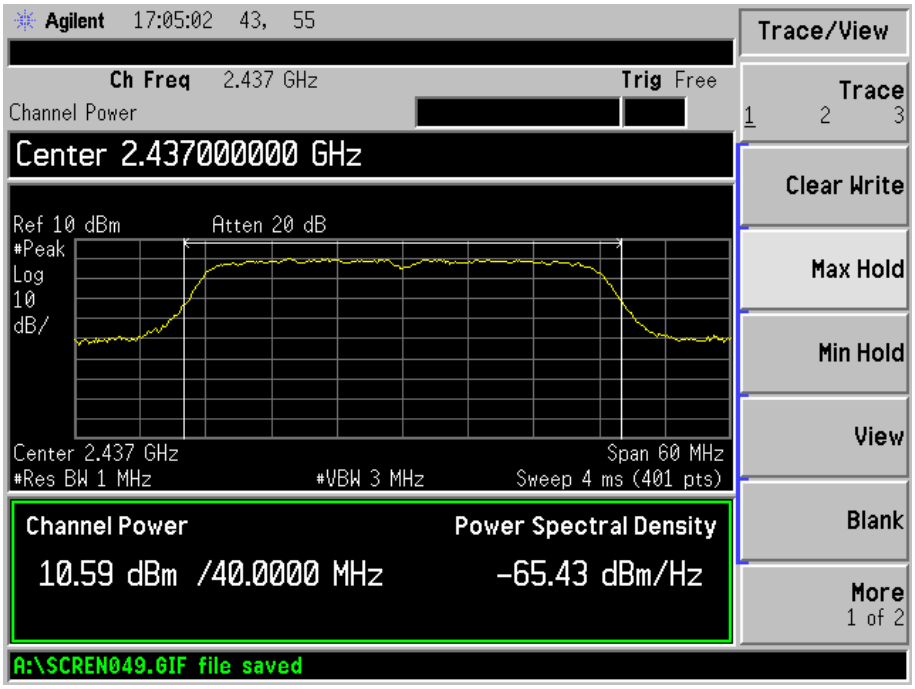
802.11n-HT40-MCS0-High Channel



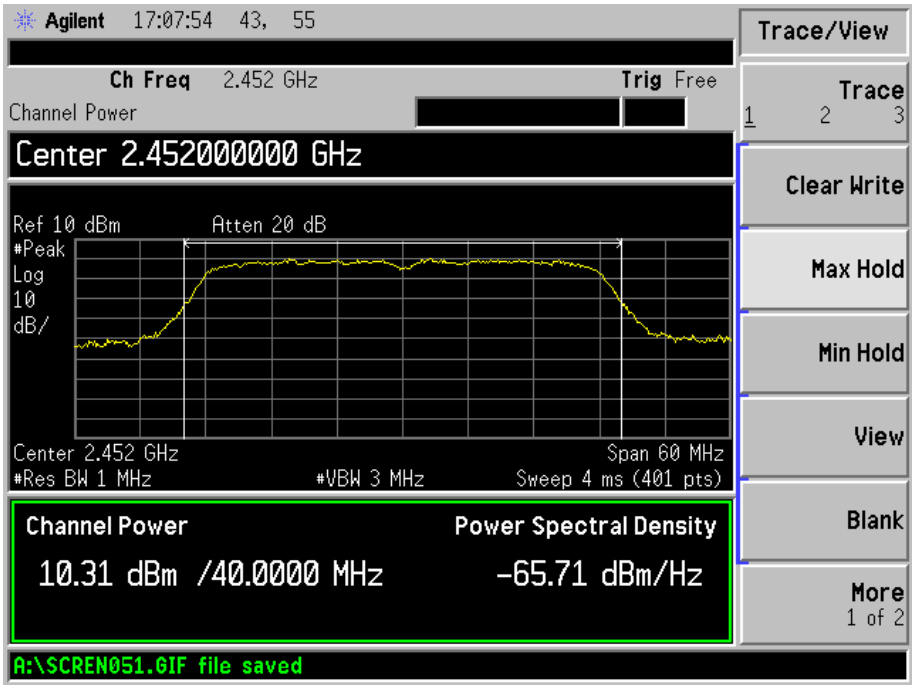
802.11n-HT40-MCS7-Low Channel



802.11n-HT40-MCS7-Middle Channel



802.11n-HT40-MCS7-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.

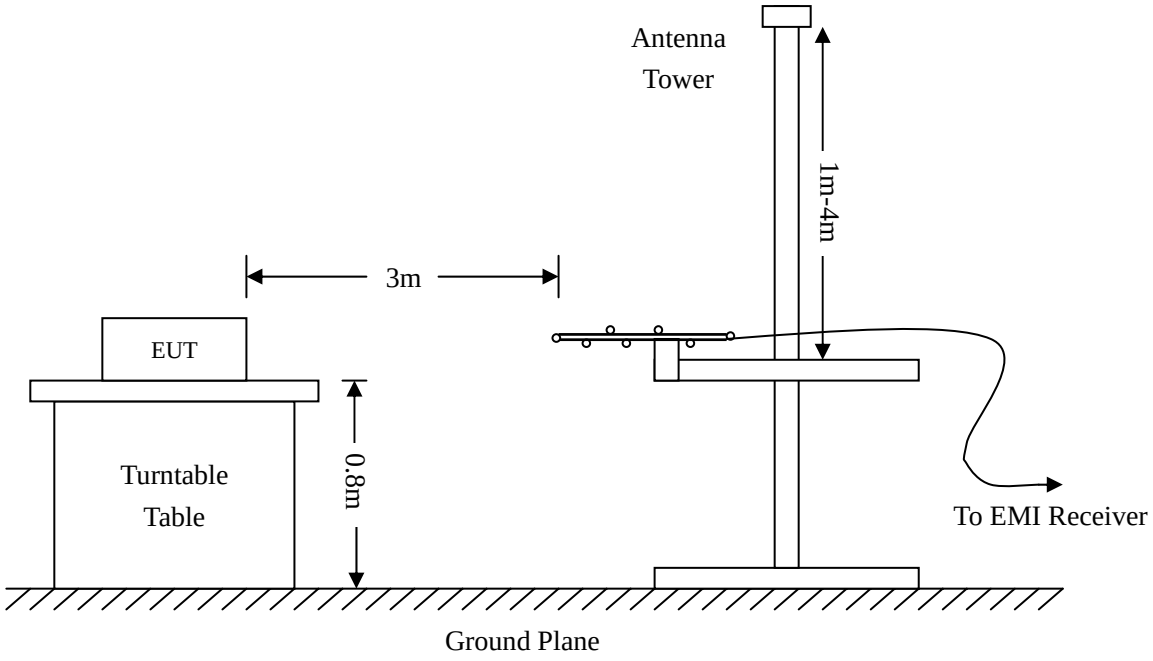
8.3 Test Equipment List and Details

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:

Corr. Ampl. = Indicated Reading + Ant. Factor + Cable Loss – 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:

Margin = Corr. Ampl. – 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:

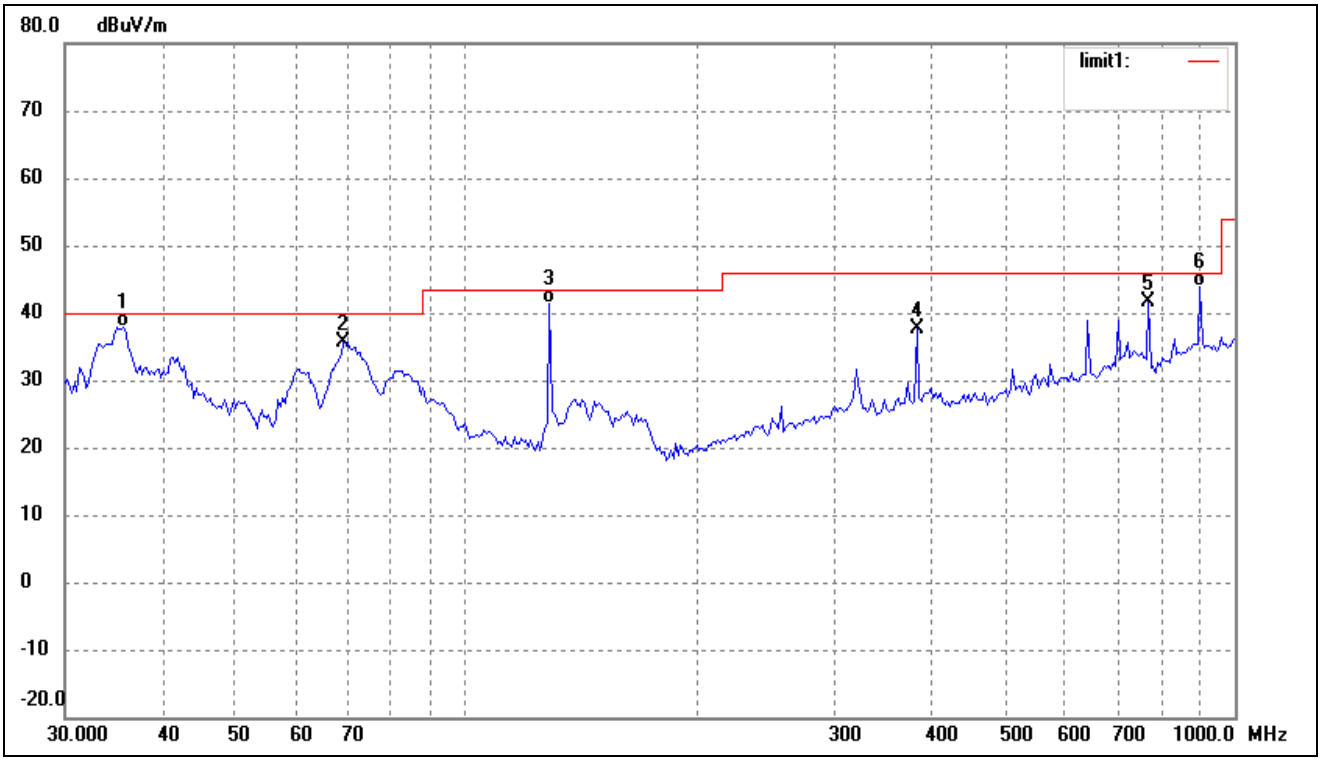
-1.49 dB at **128.1130 MHz** in the **Vertical** polarization for **802.11g Low Channel**, **30MHz** to **25 GHz**, **3 Meters**

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)

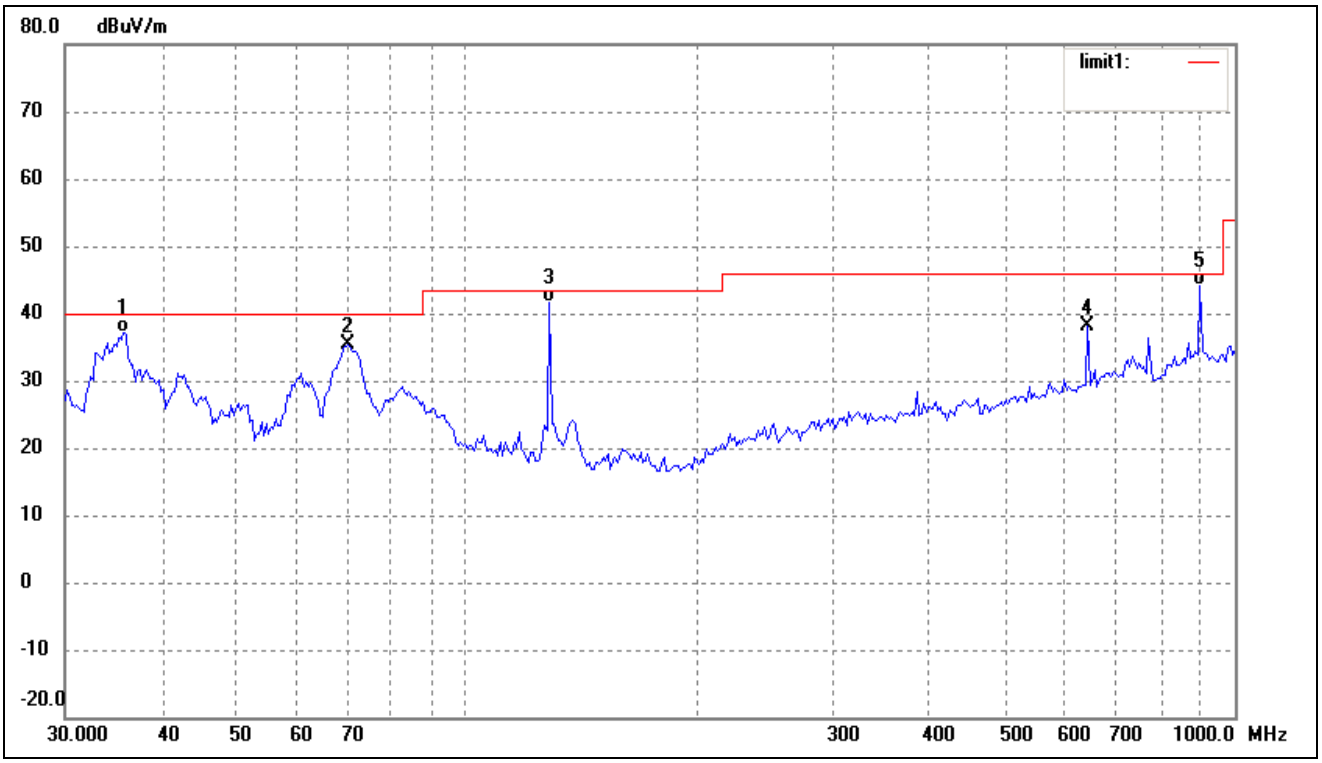
EUT: *WiFi AP Router Module*
Tested Model: *AWM002*
Operating Condition: *802.11b Transmitting Low Channel-2412MHz*
Comment:

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	35.7491	28.87	9.00	37.87	40.00	-2.13	259	100	QP
2	69.1141	32.81	2.80	35.61	40.00	-4.39	360	100	peak
3	128.1130	37.23	4.27	41.50	43.50	-2.00	163	100	QP
4	385.2805	26.74	10.87	37.61	46.00	-8.39	360	100	peak
5	771.4486	25.15	16.37	41.52	46.00	-4.48	360	100	peak
6	900.1474	24.53	19.38	43.91	46.00	-2.09	144	100	QP

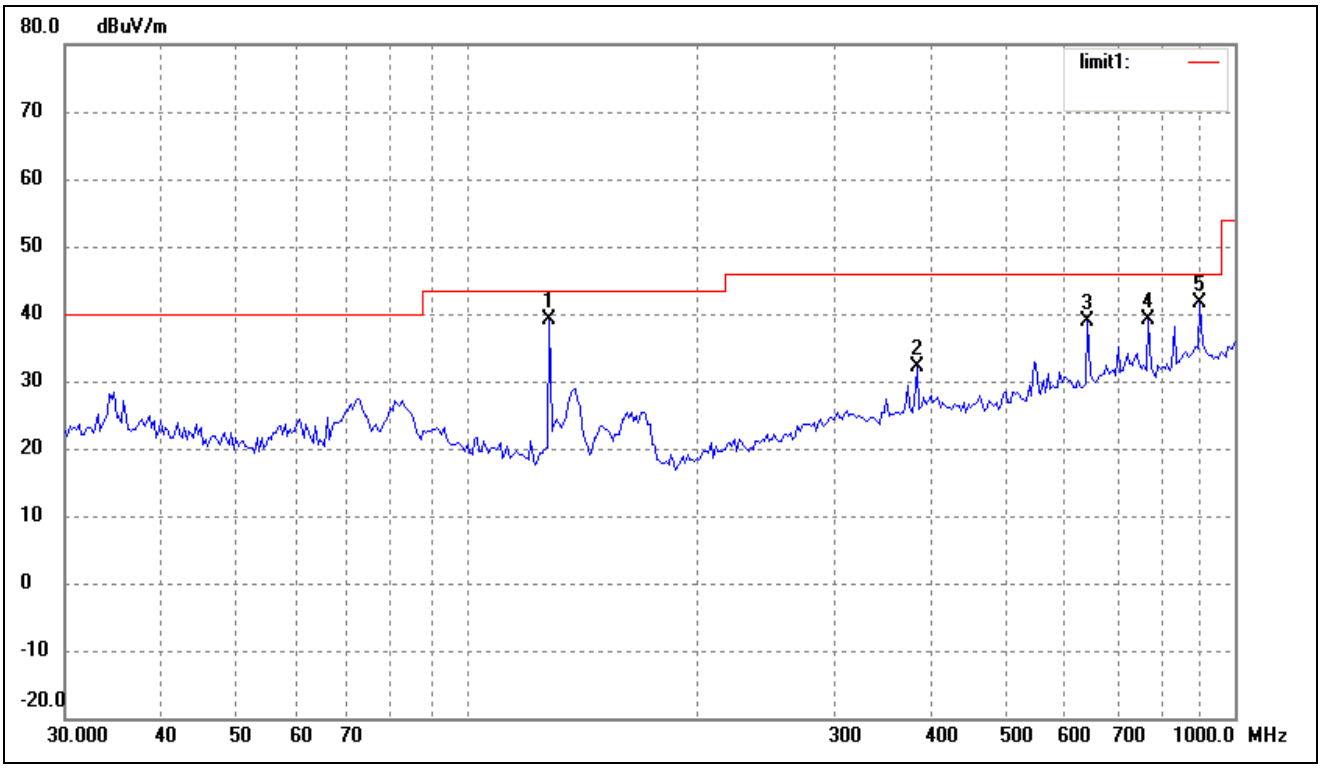
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	35.7491	28.22	9.00	37.22	40.00	-2.78	241	100	QP
2	70.0903	32.80	2.51	35.31	40.00	-4.69	360	100	peak
3	128.1130	37.40	4.27	41.67	43.50	-1.83	102	100	QP
4	642.8613	23.08	15.14	38.22	46.00	-7.78	360	100	peak
5	900.1474	24.78	19.38	44.16	46.00	-1.84	112	100	QP

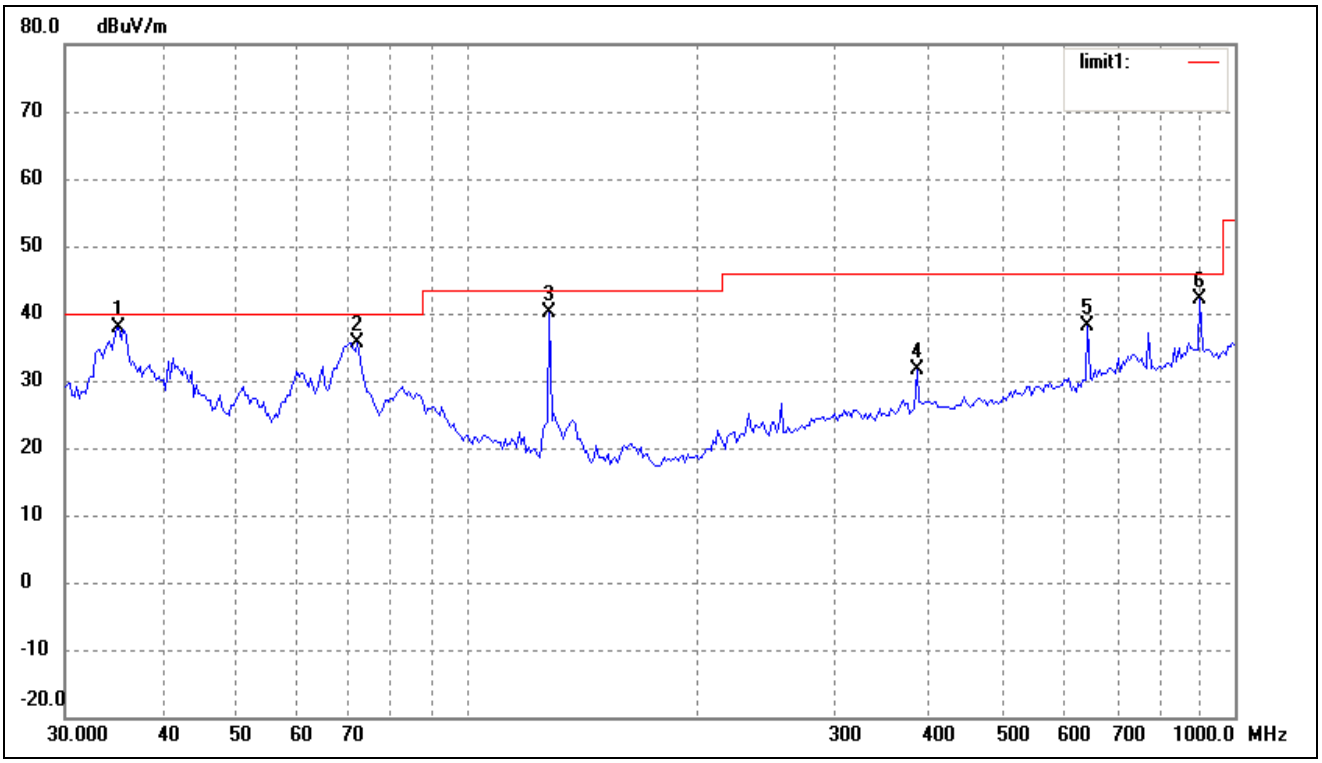
Operating Condition: *802.11b Transmitting Middle Channel-2437MHz*
Comment:

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	34.83	4.27	39.10	43.50	-4.40	360	100	peak
2	385.2805	21.15	10.87	32.02	46.00	-13.98	360	100	peak
3	642.8613	23.66	15.14	38.80	46.00	-7.20	360	100	peak
4	771.4486	22.84	16.37	39.21	46.00	-6.79	360	100	peak
5	900.1474	22.16	19.38	41.54	46.00	-4.46	360	100	peak

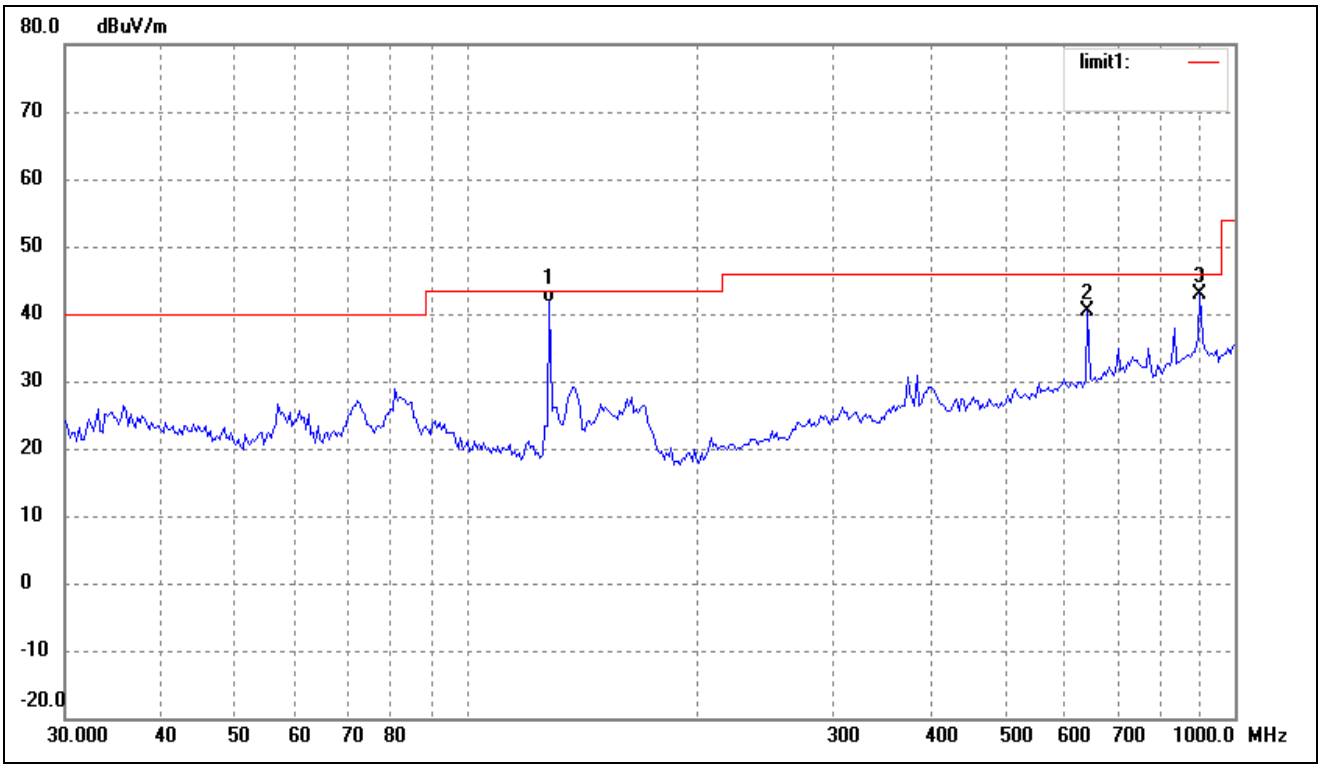
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	35.2512	29.06	8.92	37.98	40.00	-2.02	360	100	peak
2	72.0843	33.46	2.28	35.74	40.00	-4.26	360	100	peak
3	128.1130	35.90	4.27	40.17	43.50	-3.33	360	100	peak
4	385.2805	20.81	10.87	31.68	46.00	-14.32	360	100	peak
5	642.8613	23.08	15.14	38.22	46.00	-7.78	360	100	peak
6	900.1474	22.72	19.38	42.10	46.00	-3.90	360	100	peak

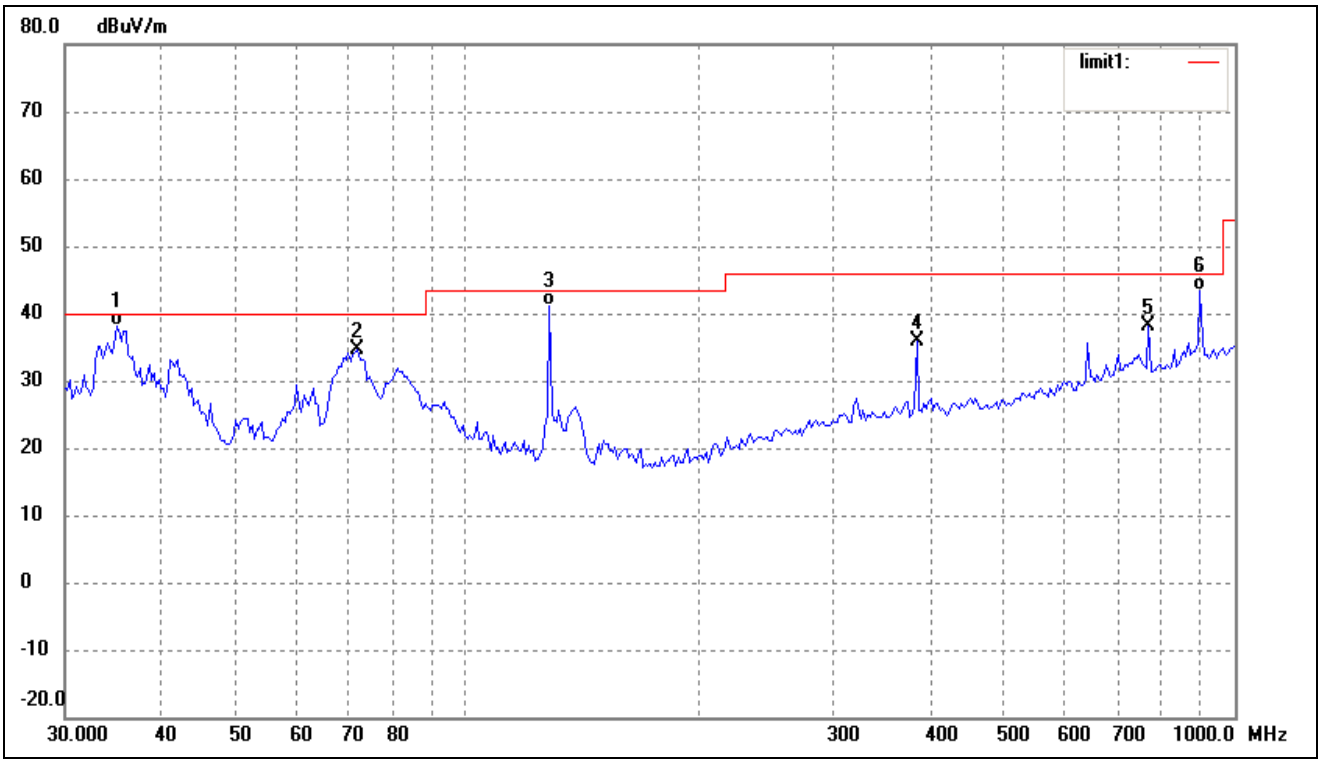
Operating Condition: *802.11b Transmitting High Channel-2462MHz*
Comment:

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	37.48	4.27	41.75	43.50	-1.75	186	100	QP
2	642.8613	25.29	15.14	40.43	46.00	-5.57	360	100	peak
3	900.1474	23.57	19.38	42.95	46.00	-3.05	360	100	peak

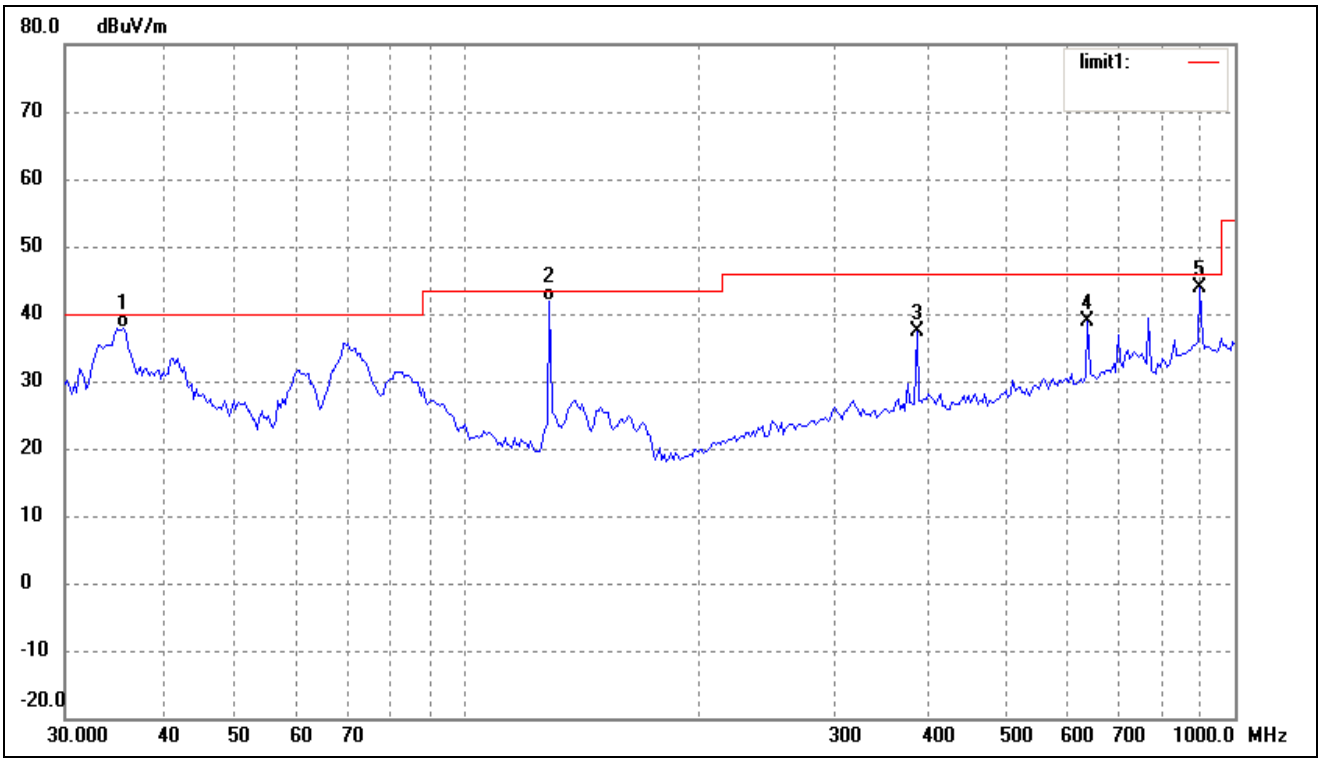
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	35.0048	29.28	8.88	38.16	40.00	-1.84	195	100	QP
2	72.0843	32.35	2.28	34.63	40.00	-5.37	360	100	peak
3	128.1130	36.86	4.27	41.13	43.50	-2.37	162	100	QP
4	385.2805	25.00	10.87	35.87	46.00	-10.13	360	100	peak
5	771.4486	21.68	16.37	38.05	46.00	-7.95	360	100	peak
6	900.1474	23.91	19.38	43.29	46.00	-2.71	127	100	QP

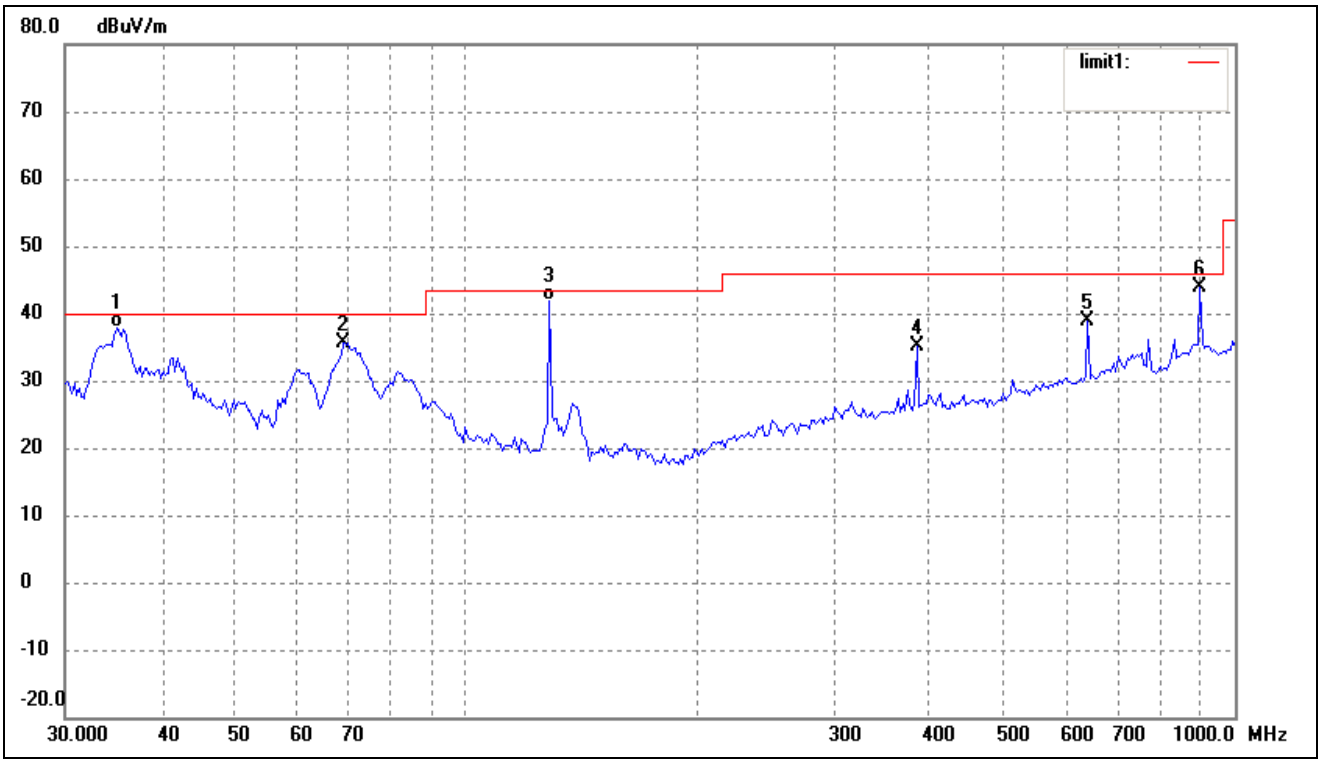
Operating Condition: *802.11g Transmitting Low Channel-2412MHz*
Comment:

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	35.7491	28.87	9.00	37.87	40.00	-2.13	154	100	QP
2	128.1130	37.73	4.27	42.00	43.50	-1.50	132	100	QP
3	385.2805	26.62	10.87	37.49	46.00	-8.51	360	100	peak
4	642.8613	23.66	15.14	38.80	46.00	-7.20	360	100	peak
5	900.1474	24.50	19.38	43.88	46.00	-2.12	360	100	peak

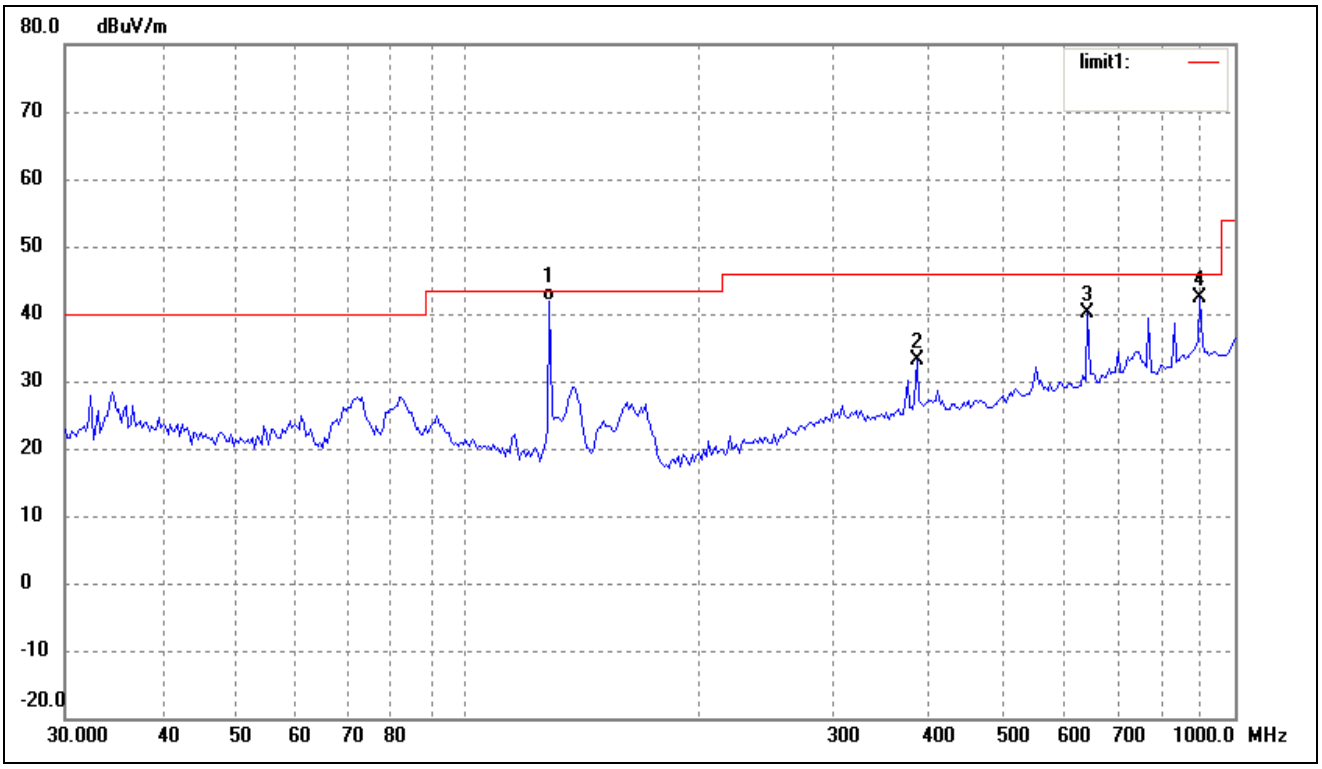
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	35.0048	28.90	8.88	37.78	40.00	-2.22	141	100	QP
2	69.1141	32.81	2.80	35.61	40.00	-4.39	360	100	peak
3	128.1130	37.74	4.27	42.01	43.50	-1.49	123	100	QP
4	385.2805	24.15	10.87	35.02	46.00	-10.98	360	100	peak
5	642.8613	23.66	15.14	38.80	46.00	-7.20	360	100	peak
6	900.1474	24.50	19.38	43.88	46.00	-2.12	360	100	peak

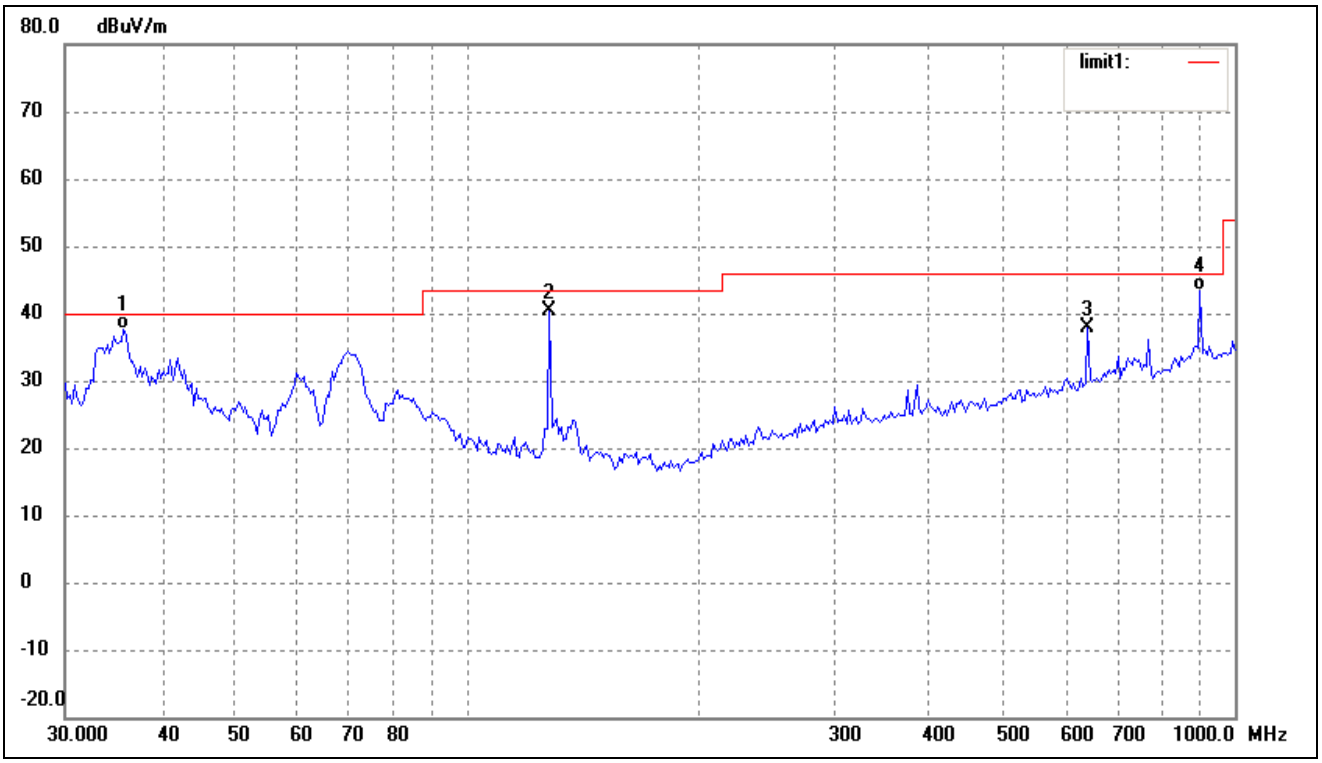
Operating Condition: *802.11g Transmitting Middle Channel-2437MHz*
Comment:

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	37.64	4.27	41.91	43.50	-1.59	135	100	QP
2	385.2805	22.26	10.87	33.13	46.00	-12.87	360	100	peak
3	642.8613	25.04	15.14	40.18	46.00	-5.82	360	100	peak
4	900.1474	23.06	19.38	42.44	46.00	-3.56	360	100	peak

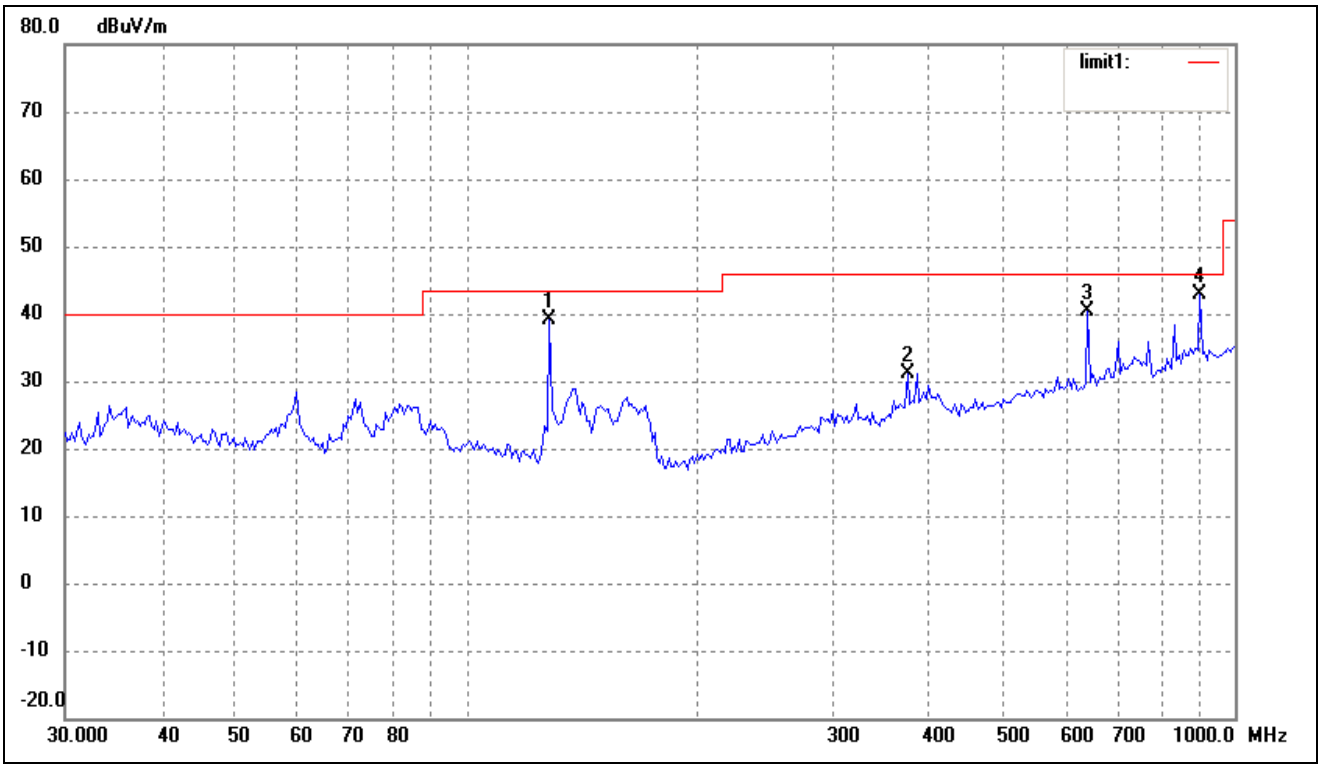
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	35.7491	28.61	9.00	37.61	40.00	-2.39	48	100	QP
2	128.1130	36.23	4.27	40.50	43.50	-3.00	360	100	peak
3	642.8613	22.79	15.14	37.93	46.00	-8.07	360	100	peak
4	900.1474	24.00	19.38	43.38	46.00	-2.62	65	100	QP

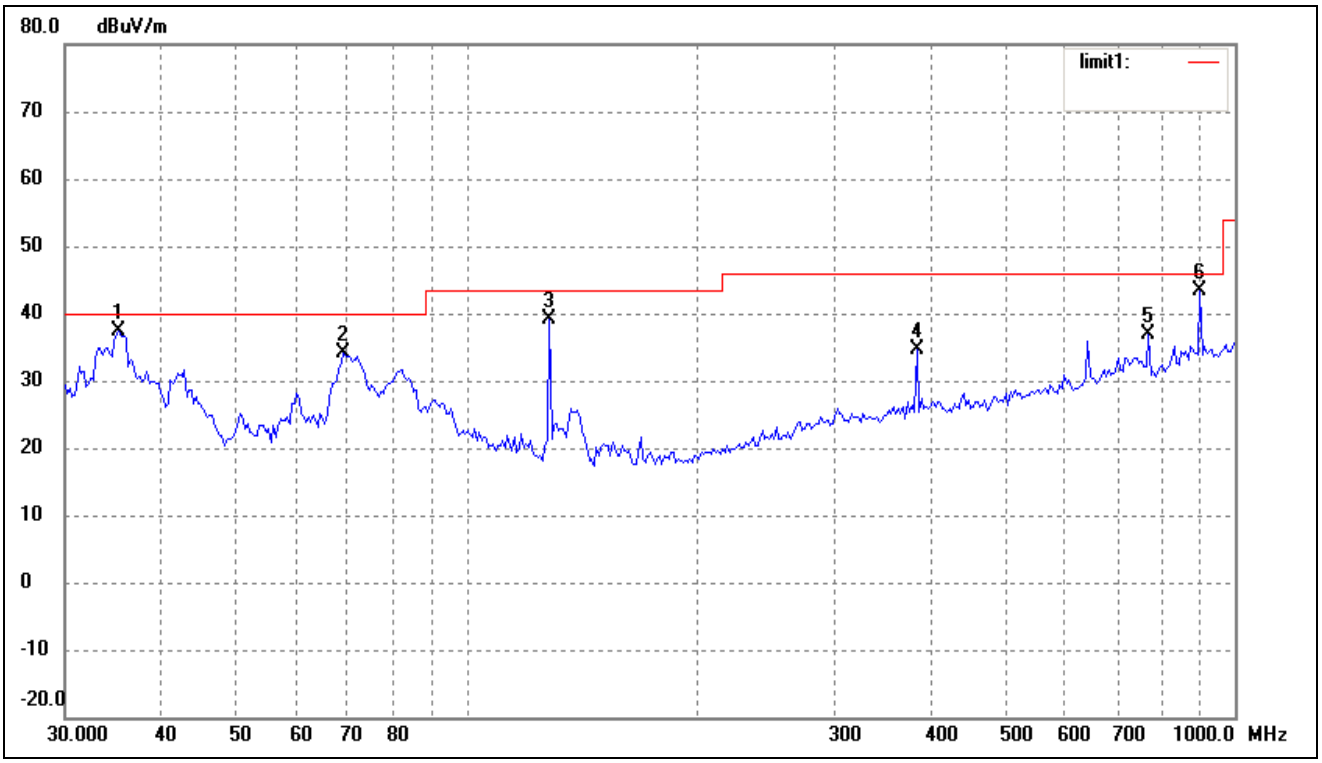
Operating Condition: *802.11g Transmitting High Channel-2462MHz*
Comment:

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	34.79	4.27	39.06	43.50	-4.44	360	100	peak
2	374.6226	20.50	10.63	31.13	46.00	-14.87	360	100	peak
3	642.8613	25.34	15.14	40.48	46.00	-5.52	360	100	peak
4	900.1474	23.52	19.38	42.90	46.00	-3.10	360	100	peak

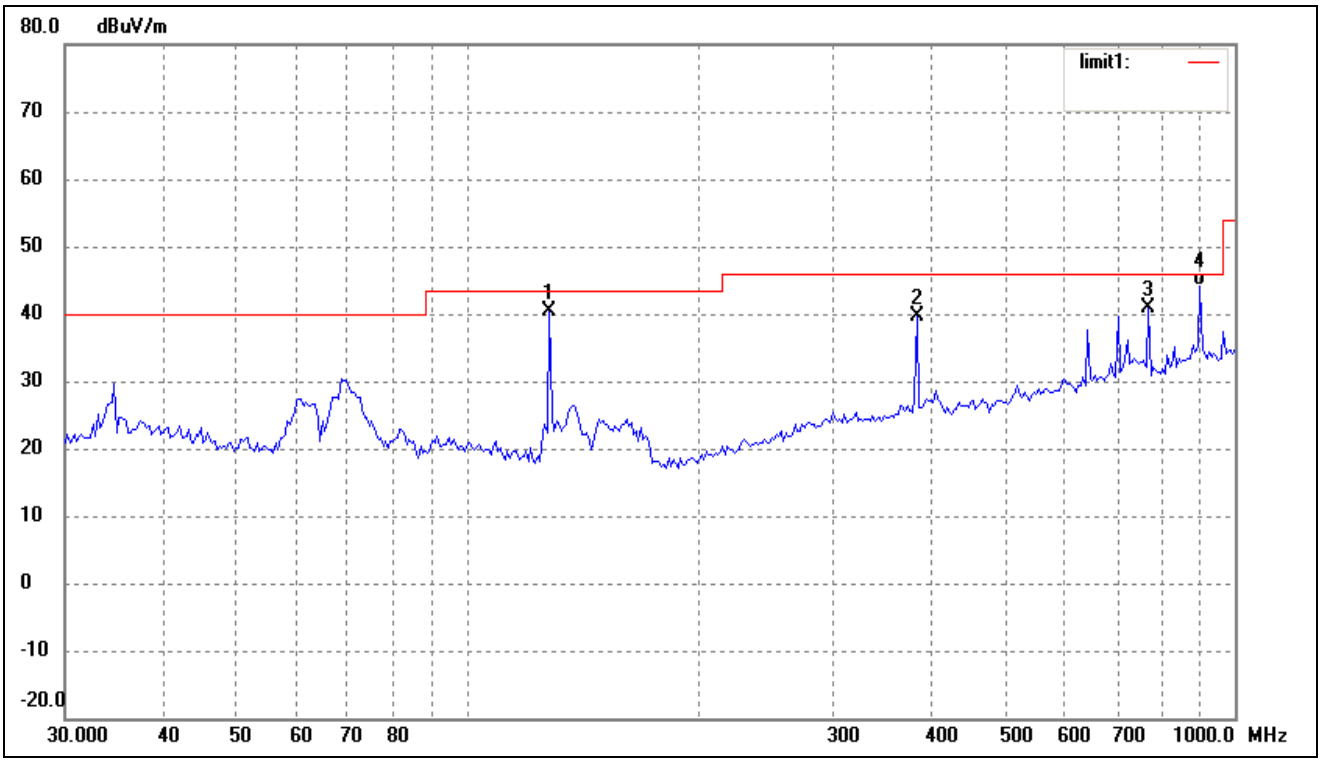
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	35.2512	28.39	8.92	37.31	40.00	-2.69	360	100	peak
2	69.1141	31.26	2.80	34.06	40.00	-5.94	360	100	peak
3	128.1130	34.86	4.27	39.13	43.50	-4.37	360	100	peak
4	385.2805	23.87	10.87	34.74	46.00	-11.26	360	100	peak
5	771.4486	20.42	16.37	36.79	46.00	-9.21	360	100	peak
6	900.1474	23.92	19.38	43.30	46.00	-2.70	360	100	peak

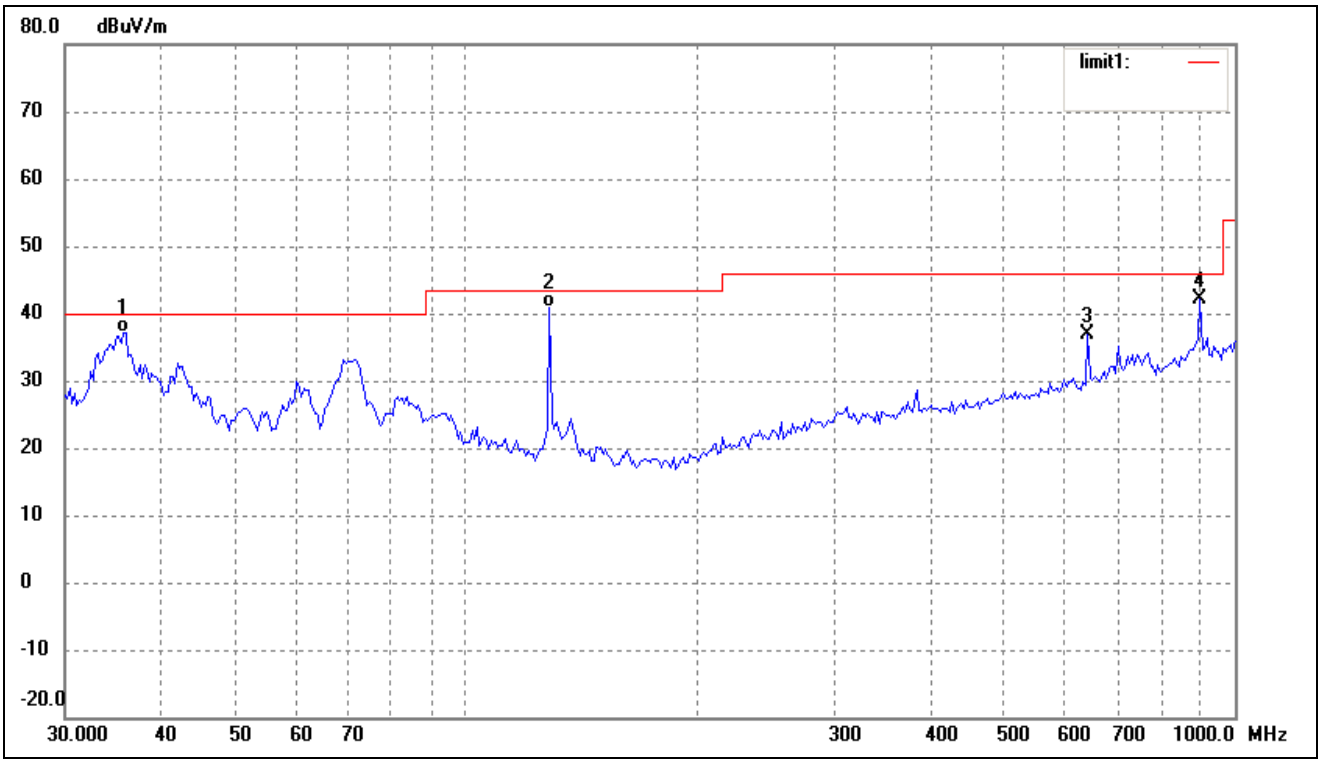
Operating Condition: *802.11n-HT20 Transmitting Low Channel-2412MHz*
Comment:

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	36.20	4.27	40.47	43.50	-3.03	360	100	peak
2	385.2805	28.66	10.87	39.53	46.00	-6.47	360	100	peak
3	771.4486	24.44	16.37	40.81	46.00	-5.19	360	100	peak
4	900.1474	24.71	19.38	44.09	46.00	-1.91	264	100	QP

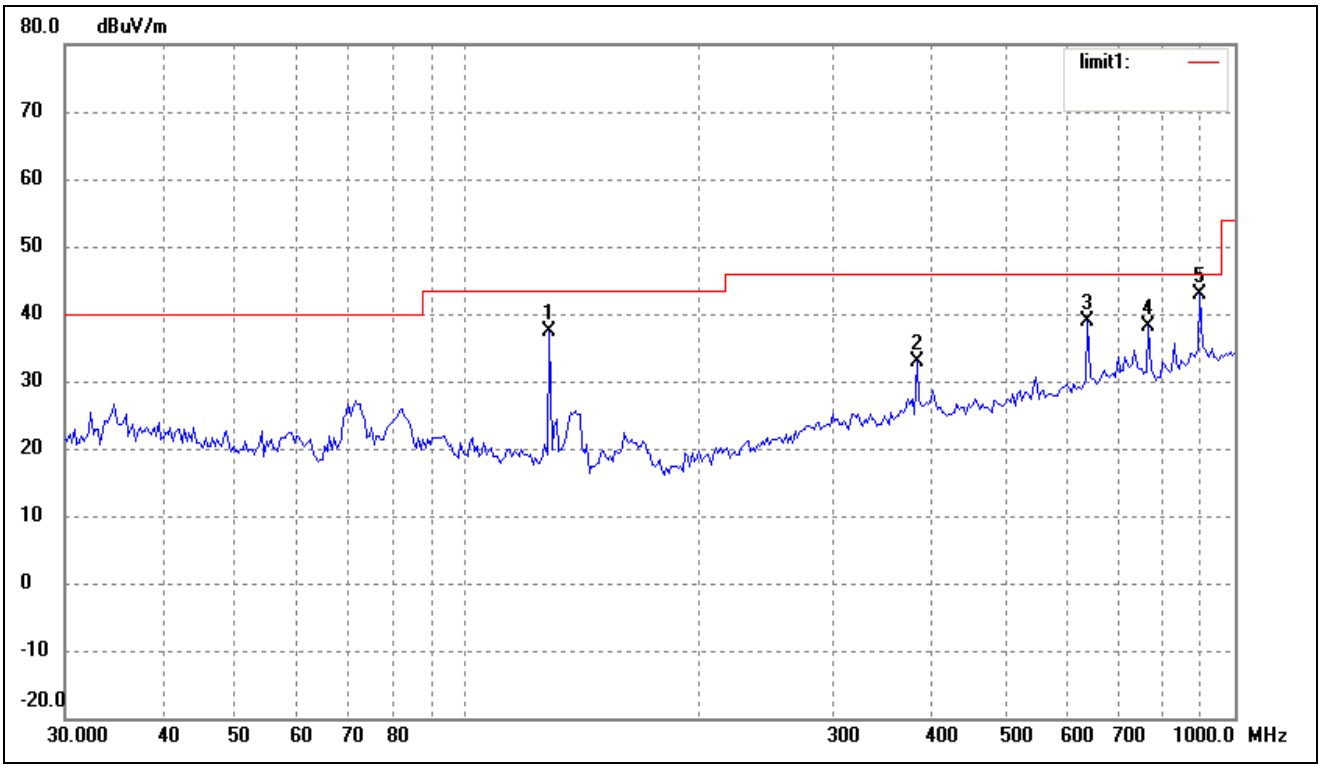
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	35.7491	28.16	9.00	37.16	40.00	-2.84	139	100	QP
2	128.1130	36.73	4.27	41.00	43.50	-2.50	212	100	QP
3	642.8613	21.73	15.14	36.87	46.00	-9.13	360	100	peak
4	900.1474	22.79	19.38	42.17	46.00	-3.83	360	100	peak

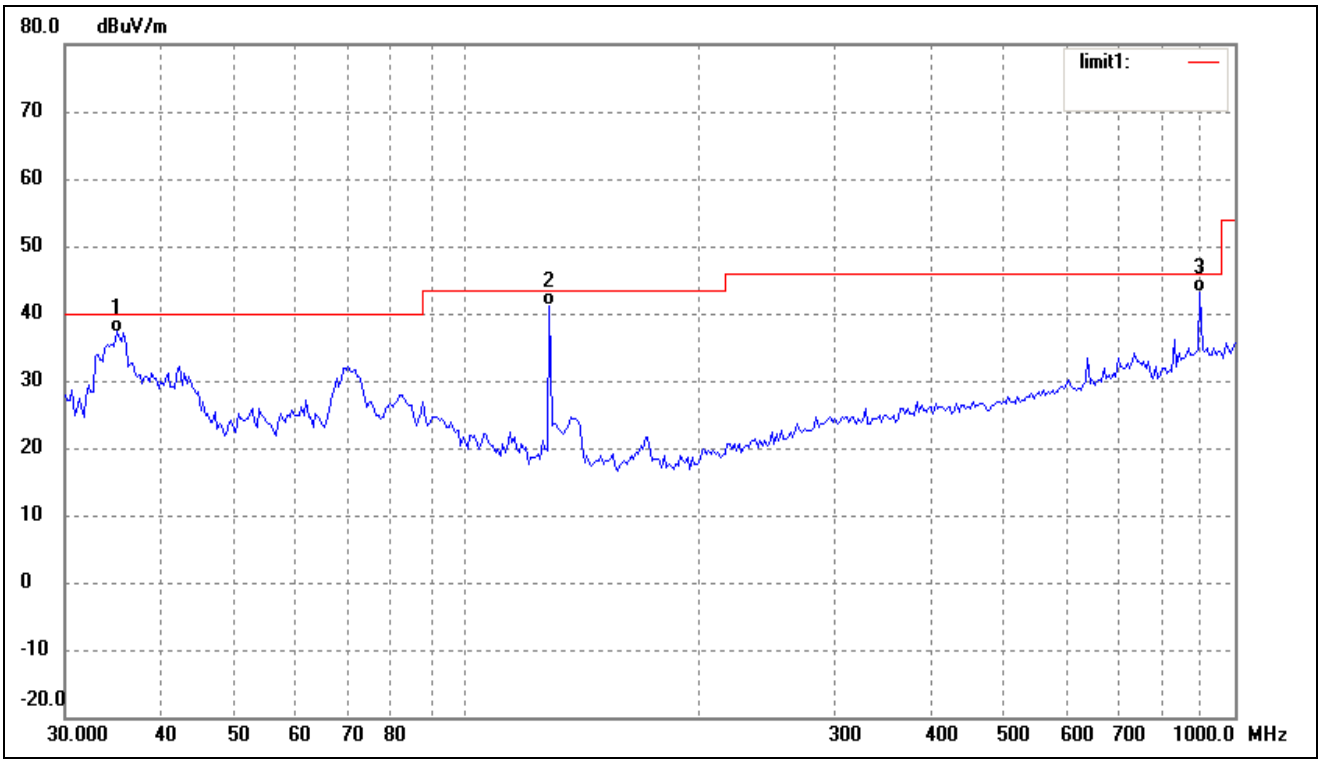
Operating Condition: *802.11n-HT20 Transmitting Middle Channel-2437MHz*
Comment:

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	33.10	4.27	37.37	43.50	-6.13	360	100	peak
2	385.2805	21.90	10.87	32.77	46.00	-13.23	360	100	peak
3	642.8613	23.65	15.14	38.79	46.00	-7.21	360	100	peak
4	771.4486	21.75	16.37	38.12	46.00	-7.88	360	100	peak
5	900.1474	23.52	19.38	42.90	46.00	-3.10	360	100	peak

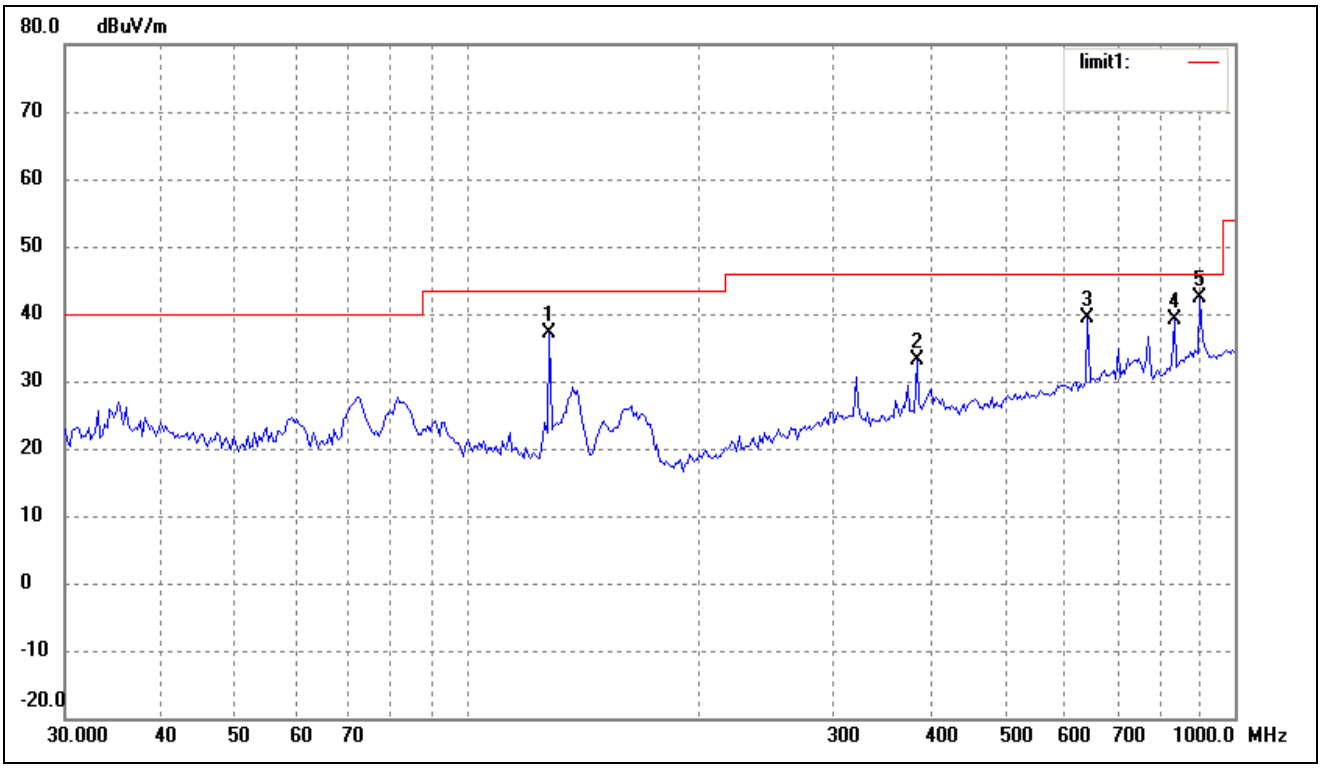
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	35.0048	28.37	8.88	37.25	40.00	-2.75	50	100	QP
2	128.1130	36.96	4.27	41.23	43.50	-2.27	136	100	QP
3	900.1474	23.83	19.38	43.21	46.00	-2.79	158	100	QP

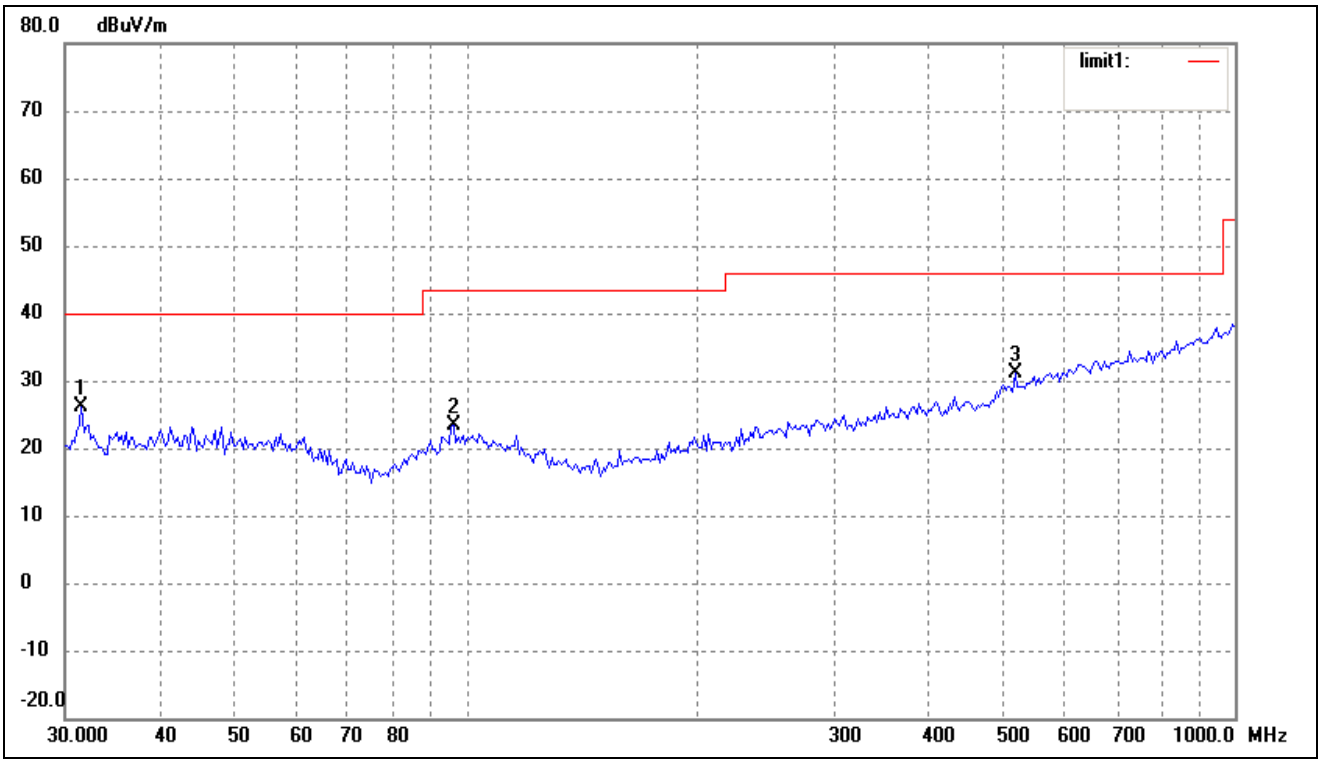
Operating Condition: *802.11n-HT20 Transmitting High Channel-2462MHz*
Comment:

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	32.87	4.27	37.14	43.50	-6.36	360	100	peak
2	385.2805	22.34	10.87	33.21	46.00	-12.79	360	100	peak
3	642.8613	24.27	15.14	39.41	46.00	-6.59	360	100	peak
4	833.3171	21.95	17.14	39.09	46.00	-6.91	360	(cm)	peak
5	900.1474	23.10	19.38	42.48	46.00	-3.52	360	100	peak

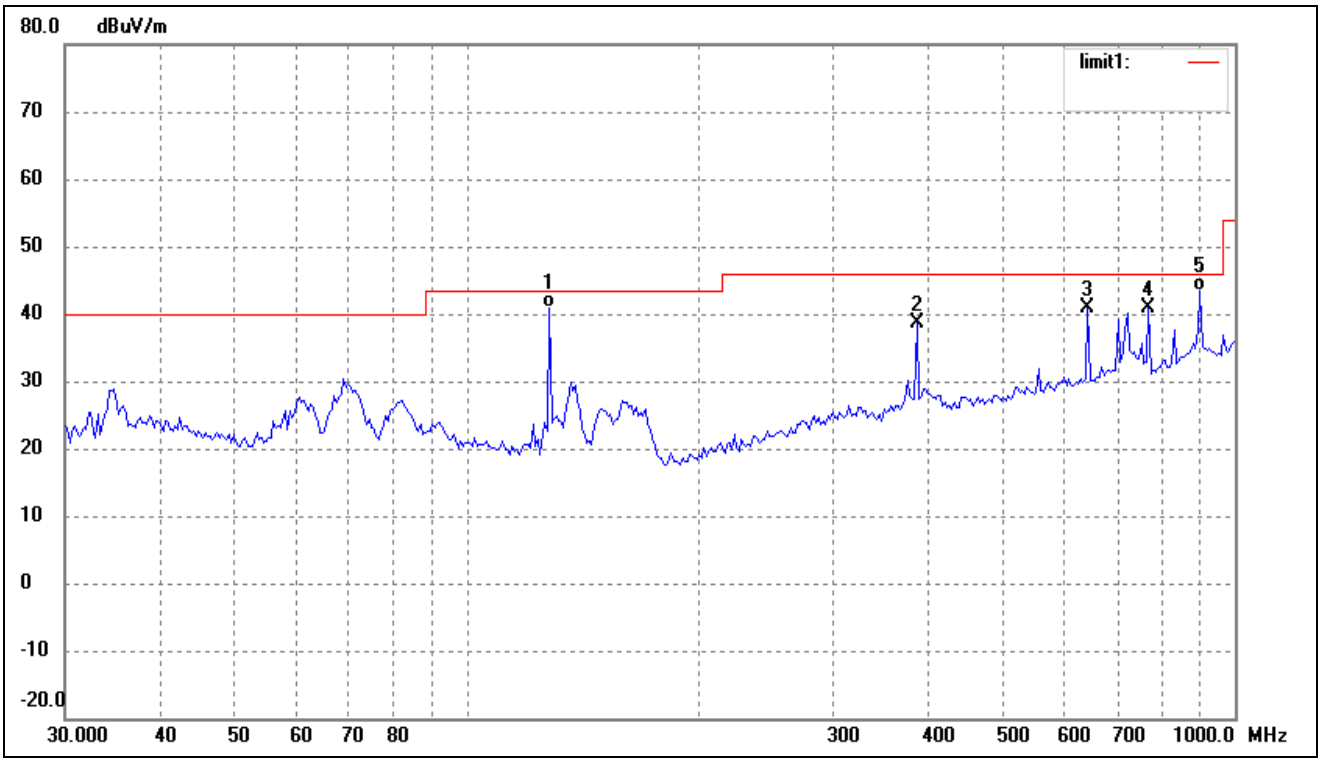
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	31.5095	19.46	6.77	26.23	40.00	-13.77	240	100	peak
2	96.0986	15.12	8.14	23.26	43.50	-20.24	187	100	peak
3	517.2480	16.25	14.80	31.05	46.00	-14.95	220	100	peak

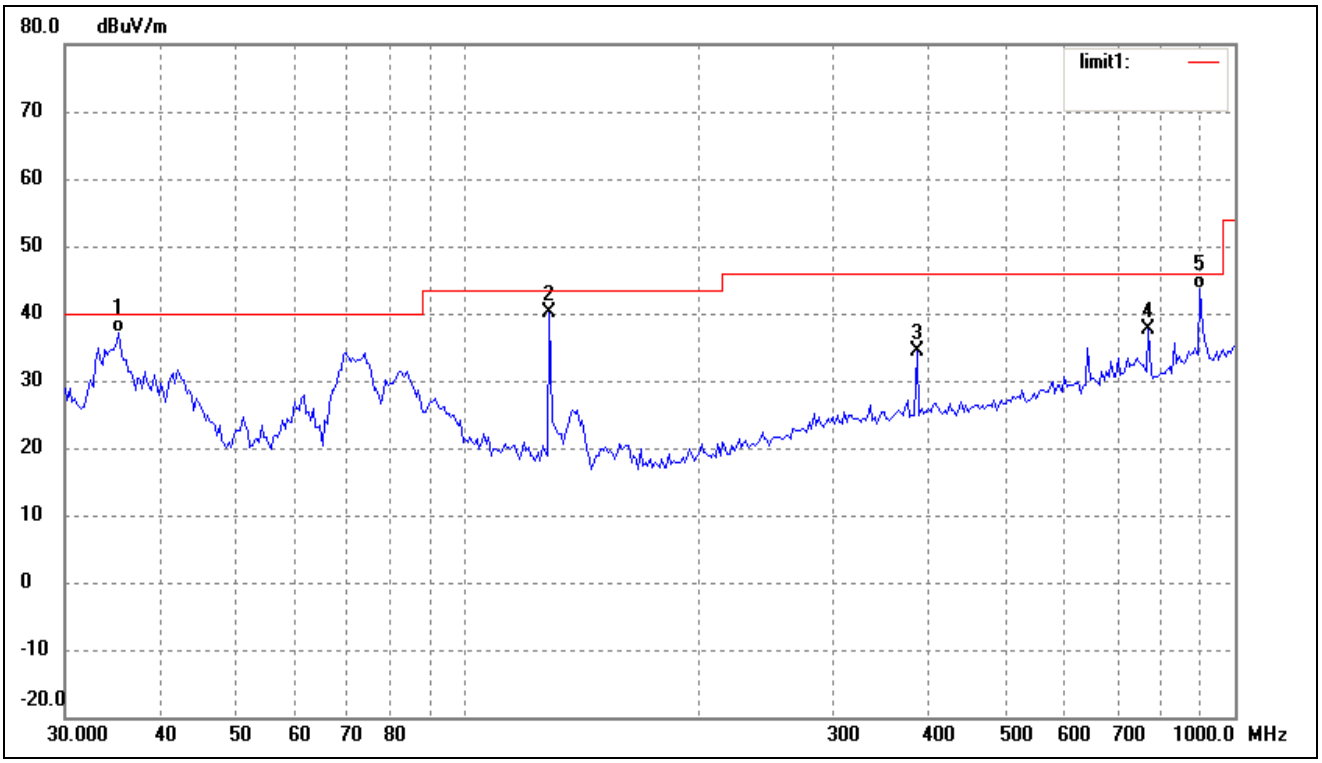
Operating Condition: *802.11n-HT40 Transmitting Low Channel-2422MHz*
Comment:

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	36.63	4.27	40.90	43.50	-2.60	241	100	QP
2	385.2805	27.85	10.87	38.72	46.00	-7.28	360	100	peak
3	642.8613	25.78	15.14	40.92	46.00	-5.08	360	100	peak
4	771.4486	24.49	16.37	40.86	46.00	-5.14	360	100	peak
5	900.1474	24.11	19.38	43.49	46.00	-2.51	154	100	QP

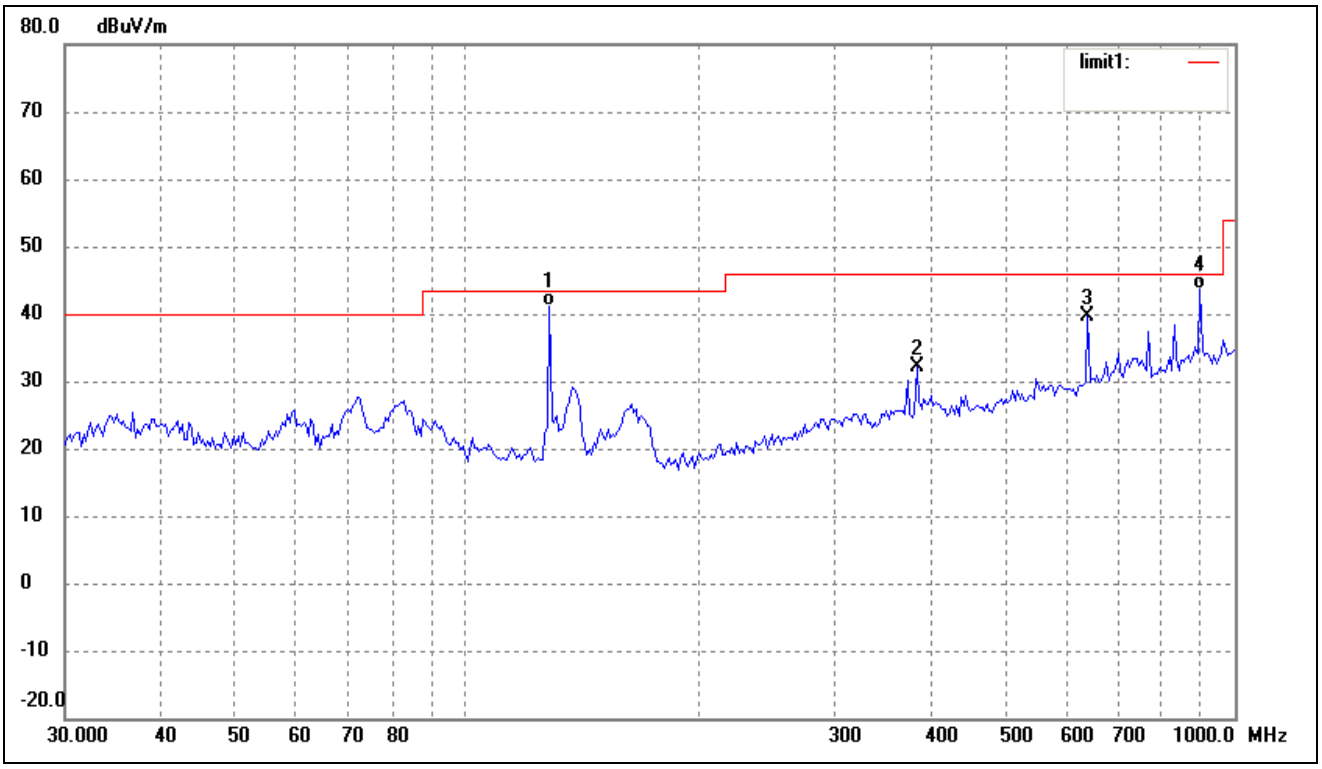
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	35.2512	28.18	8.92	37.10	40.00	-2.90	147	100	QP
2	128.1130	35.79	4.27	40.06	43.50	-3.44	360	100	peak
3	385.2805	23.55	10.87	34.42	46.00	-11.58	360	100	peak
4	771.4486	21.26	16.37	37.63	46.00	-8.37	360	100	peak
5	900.1474	24.19	19.38	43.57	46.00	-2.43	125	100	QP

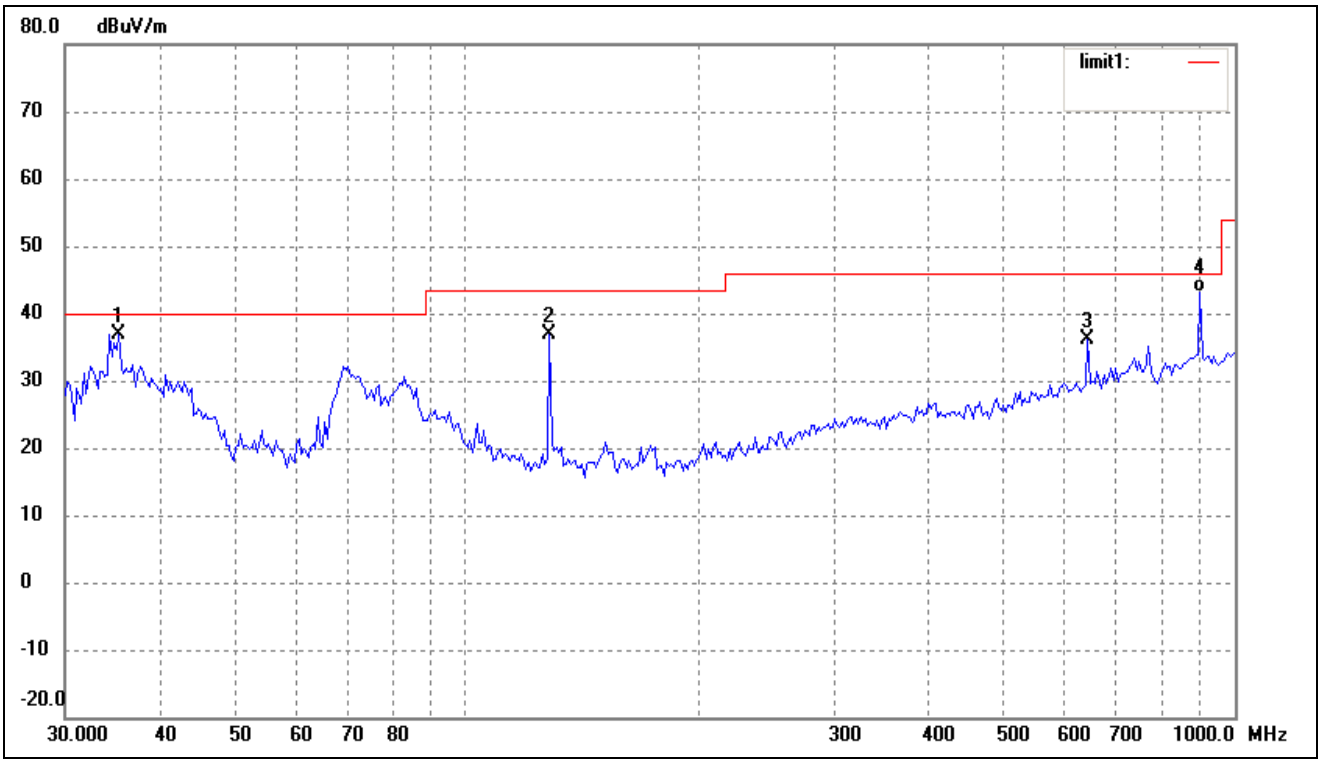
Operating Condition: *802.11n-HT40 Transmitting Middle Channel-2437MHz*
Comment:

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	36.78	4.27	41.05	43.50	-2.45	147	100	QP
2	385.2805	21.24	10.87	32.11	46.00	-13.89	360	100	peak
3	642.8613	24.60	15.14	39.74	46.00	-6.26	360	100	peak
4	900.1474	24.25	19.38	43.63	46.00	-2.37	156	100	QP

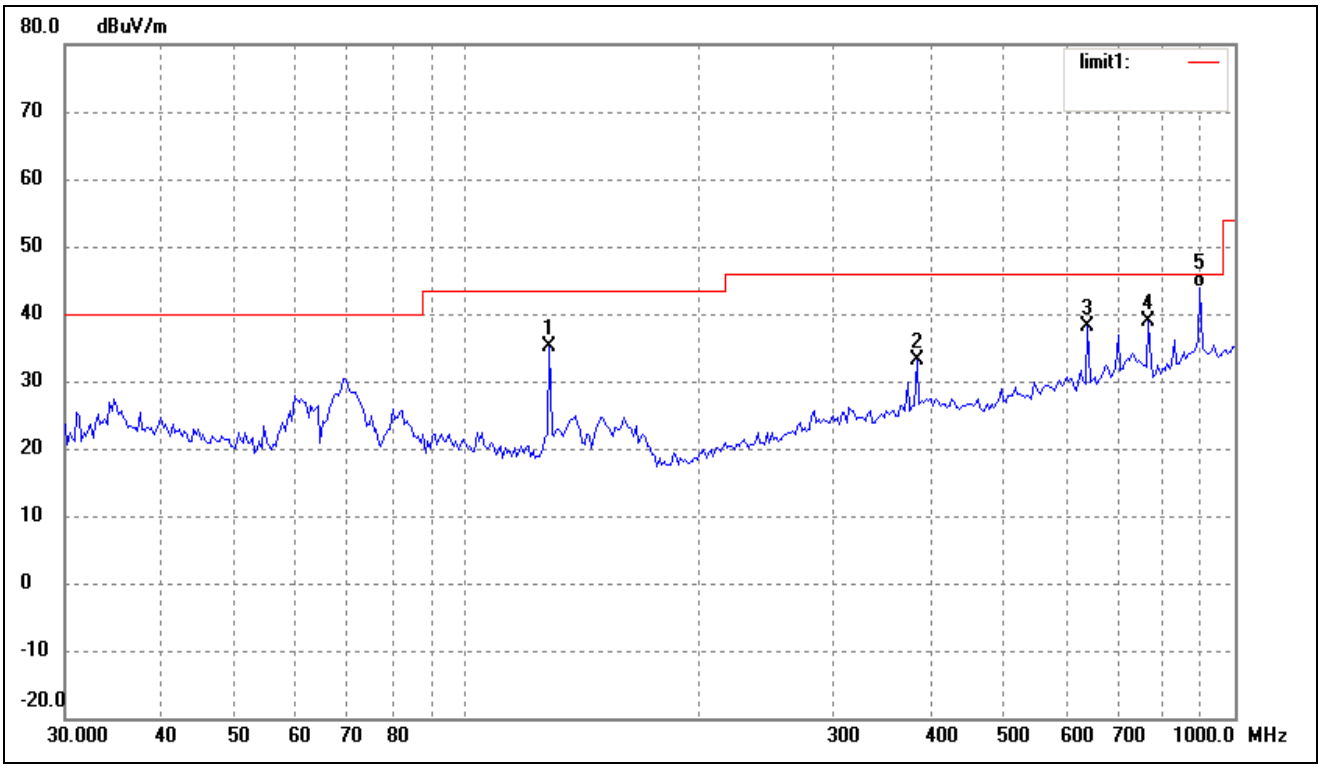
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	35.2512	28.04	8.92	36.96	40.00	-3.04	360	100	peak
2	128.1130	32.61	4.27	36.88	43.50	-6.62	360	100	peak
3	642.8613	20.96	15.14	36.10	46.00	-9.90	360	100	peak
4	900.1474	23.74	19.38	43.12	46.00	-2.88	185	100	QP

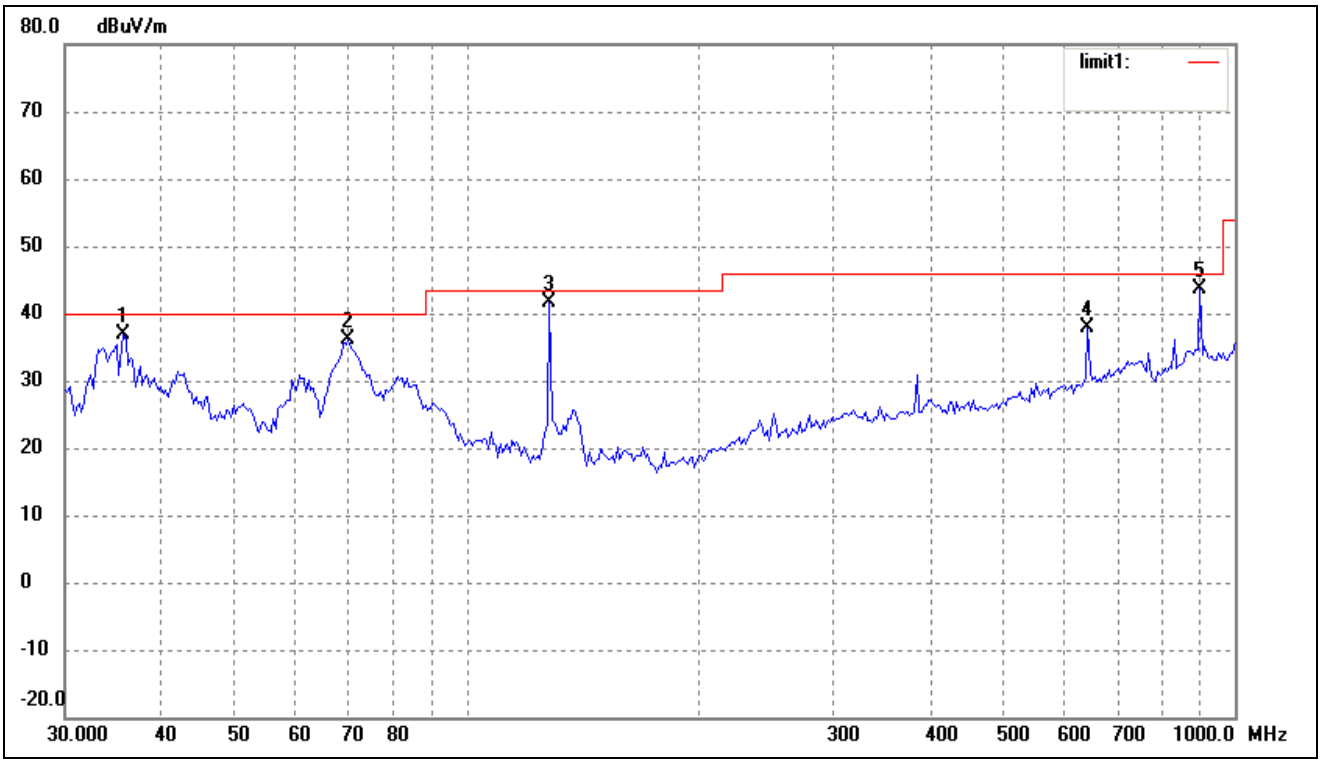
Operating Condition: *802.11n-HT40 Transmitting High Channel-2452MHz*
Comment:

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	30.92	4.27	35.19	43.50	-8.31	360	100	peak
2	385.2805	22.14	10.87	33.01	46.00	-12.99	360	100	peak
3	642.8613	22.99	15.14	38.13	46.00	-7.87	360	100	peak
4	771.4486	22.55	16.37	38.92	46.00	-7.08	360	100	peak
5	900.1474	24.49	19.38	43.87	46.00	-2.13	298	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	35.7491	27.84	9.00	36.84	40.00	-3.16	360	100	peak
2	70.0903	33.63	2.51	36.14	40.00	-3.86	360	100	peak
3	128.1130	37.31	4.27	41.58	43.50	-1.92	360	100	peak
4	642.8613	22.77	15.14	37.91	46.00	-8.09	360	100	peak
5	900.1474	24.15	19.38	43.53	46.00	-2.47	360	100	peak

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	48.21	0.57	48.78	74.00	-25.22	H	PK
4824.000	34.82	0.57	35.39	54.00	-18.61	H	AV
7236.000	42.32	3.69	46.01	74.00	-27.99	H	PK
7236.000	30.93	3.69	34.62	54.00	-19.38	H	AV
4824.000	54.82	0.57	55.39	74.00	-18.61	V	PK
4824.000	38.67	0.57	39.24	54.00	-14.76	V	AV
7236.000	42.89	3.69	46.58	74.00	-27.42	V	PK
7236.000	31.07	3.69	34.76	54.00	-19.24	V	AV
Middle Channel-2437MHz							
4874.000	50.78	0.64	51.42	74.00	-22.58	H	PK
4874.000	38.70	0.64	39.34	54.00	-14.66	H	AV
7311.000	43.12	3.75	46.87	74.00	-27.13	H	PK
7311.000	31.58	3.75	35.33	54.00	-18.67	H	AV
4874.000	53.27	0.64	53.91	74.00	-20.09	V	PK
4874.000	39.84	0.64	40.48	54.00	-13.52	V	AV
7311.000	42.73	3.75	46.48	74.00	-27.52	V	PK
7311.000	31.57	3.75	35.32	54.00	-18.68	V	AV
High Channel-2462MHz							
4924.000	50.19	0.72	50.91	74.00	-23.09	H	PK
4924.000	37.84	0.72	38.56	54.00	-15.44	H	AV
7386.000	43.91	3.81	47.72	74.00	-26.28	H	PK
7386.000	31.84	3.81	35.65	54.00	-18.35	H	AV
4924.000	50.75	0.72	51.47	74.00	-22.53	V	PK
4924.000	37.63	0.72	38.35	54.00	-15.65	V	AV
7386.000	43.63	3.81	47.44	74.00	-26.56	V	PK
7386.000	31.88	3.81	35.69	54.00	-18.31	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	44.16	0.57	44.73	74.00	-29.27	H	PK
4824.000	33.21	0.57	33.78	54.00	-20.22	H	AV
7236.000	42.47	3.69	46.16	74.00	-27.84	H	PK
7236.000	31.06	3.69	34.75	54.00	-19.25	H	AV
4824.000	50.45	0.57	51.02	74.00	-22.98	V	PK
4824.000	35.95	0.57	36.52	54.00	-17.48	V	AV
7236.000	42.93	3.69	46.62	74.00	-27.38	V	PK
7236.000	31.22	3.69	34.91	54.00	-19.09	V	AV
Middle Channel-2437MHz							
4874.000	45.23	0.64	45.87	74.00	-28.13	H	PK
4874.000	34.02	0.64	34.66	54.00	-19.34	H	AV
7311.000	42.52	3.75	46.27	74.00	-27.73	H	PK
7311.000	31.55	3.75	35.30	54.00	-18.70	H	AV
4874.000	57.02	0.64	57.66	74.00	-16.34	V	PK
4874.000	42.33	0.64	42.97	54.00	-11.03	V	AV
7311.000	45.59	3.75	49.34	74.00	-24.66	V	PK
7311.000	31.31	3.75	35.06	54.00	-18.94	V	AV
High Channel-2462MHz							
4924.000	45.12	0.72	45.84	74.00	-28.16	H	PK
4924.000	33.29	0.72	34.01	54.00	-19.99	H	AV
7386.000	42.83	3.81	46.64	74.00	-27.36	H	PK
7386.000	31.53	3.81	35.34	54.00	-18.66	H	AV
4924.000	52.45	0.72	53.17	74.00	-20.83	V	PK
4924.000	40.15	0.72	40.87	54.00	-13.13	V	AV
7386.000	43.28	3.81	47.09	74.00	-26.91	V	PK
7386.000	31.47	3.81	35.28	54.00	-18.72	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	44.05	0.57	44.62	74.00	-29.38	H	PK
4824.000	32.53	0.57	33.10	54.00	-20.90	H	AV
7236.000	42.07	3.69	45.76	74.00	-28.24	H	PK
7236.000	30.98	3.69	34.67	54.00	-19.33	H	AV
4824.000	49.67	0.57	50.24	74.00	-23.76	V	PK
4824.000	36.05	0.57	36.62	54.00	-17.38	V	AV
7236.000	42.16	3.69	45.85	74.00	-28.15	V	PK
7236.000	31.08	3.69	34.77	54.00	-19.23	V	AV
Middle Channel-2437MHz							
4874.000	45.90	0.64	46.54	74.00	-27.46	H	PK
4874.000	34.07	0.64	34.71	54.00	-19.29	H	AV
7311.000	43.55	3.75	47.30	74.00	-26.70	H	PK
7311.000	31.47	3.75	35.22	54.00	-18.78	H	AV
4874.000	55.12	0.64	55.76	74.00	-18.24	V	PK
4874.000	42.49	0.64	43.13	54.00	-10.87	V	AV
7311.000	43.42	3.75	47.17	74.00	-26.83	V	PK
7311.000	31.50	3.75	35.25	54.00	-18.75	V	AV
High Channel-2462MHz							
4924.000	43.99	0.72	44.71	74.00	-29.29	H	PK
4924.000	33.07	0.72	33.79	54.00	-20.21	H	AV
7386.000	43.12	3.81	46.93	74.00	-27.07	H	PK
7386.000	31.63	3.81	35.44	54.00	-18.56	H	AV
4924.000	50.33	0.72	51.05	74.00	-22.95	V	PK
4924.000	39.26	0.72	39.98	54.00	-14.02	V	AV
7386.000	43.72	3.81	47.53	74.00	-26.47	V	PK
7386.000	31.42	3.81	35.23	54.00	-18.77	V	AV

Test Mode: 802.11n-HT40

Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel-2422MHz							
4844.000	43.40	0.60	44.00	74.00	-30.00	H	PK
4844.000	32.53	0.60	33.13	54.00	-20.87	H	AV
7266.000	42.54	3.72	46.26	74.00	-27.74	H	PK
7266.000	30.92	3.72	34.64	54.00	-19.36	H	AV
4844.000	51.04	0.60	51.64	74.00	-22.36	V	PK
4844.000	36.28	0.60	36.88	54.00	-17.12	V	AV
7266.000	42.09	3.72	45.81	74.00	-28.19	V	PK
7266.000	31.06	3.72	34.78	54.00	-19.22	V	AV
Middle Channel-2437MHz							
4874.000	45.08	0.64	45.72	74.00	-28.28	H	PK
4874.000	33.56	0.64	34.20	54.00	-19.80	H	AV
7311.000	42.85	3.75	46.60	74.00	-27.40	H	PK
7311.000	31.54	3.75	35.29	54.00	-18.71	H	AV
4874.000	52.02	0.64	52.66	74.00	-21.34	V	PK
4874.000	40.06	0.64	40.70	54.00	-13.30	V	AV
7311.000	44.62	3.75	48.37	74.00	-25.63	V	PK
7311.000	31.40	3.75	35.15	54.00	-18.85	V	AV
High Channel-2452MHz							
4904.000	44.56	0.68	45.24	74.00	-28.76	H	PK
4904.000	32.42	0.68	33.10	54.00	-20.90	H	AV
7356.000	42.94	3.79	46.73	74.00	-27.27	H	PK
7356.000	31.42	3.79	35.21	54.00	-18.79	H	AV
4904.000	50.68	0.68	51.36	74.00	-22.64	V	PK
4904.000	39.66	0.68	40.34	54.00	-13.66	V	AV
7356.000	42.34	3.79	46.13	74.00	-27.87	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 5^{th} 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 porduct 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 porduct 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

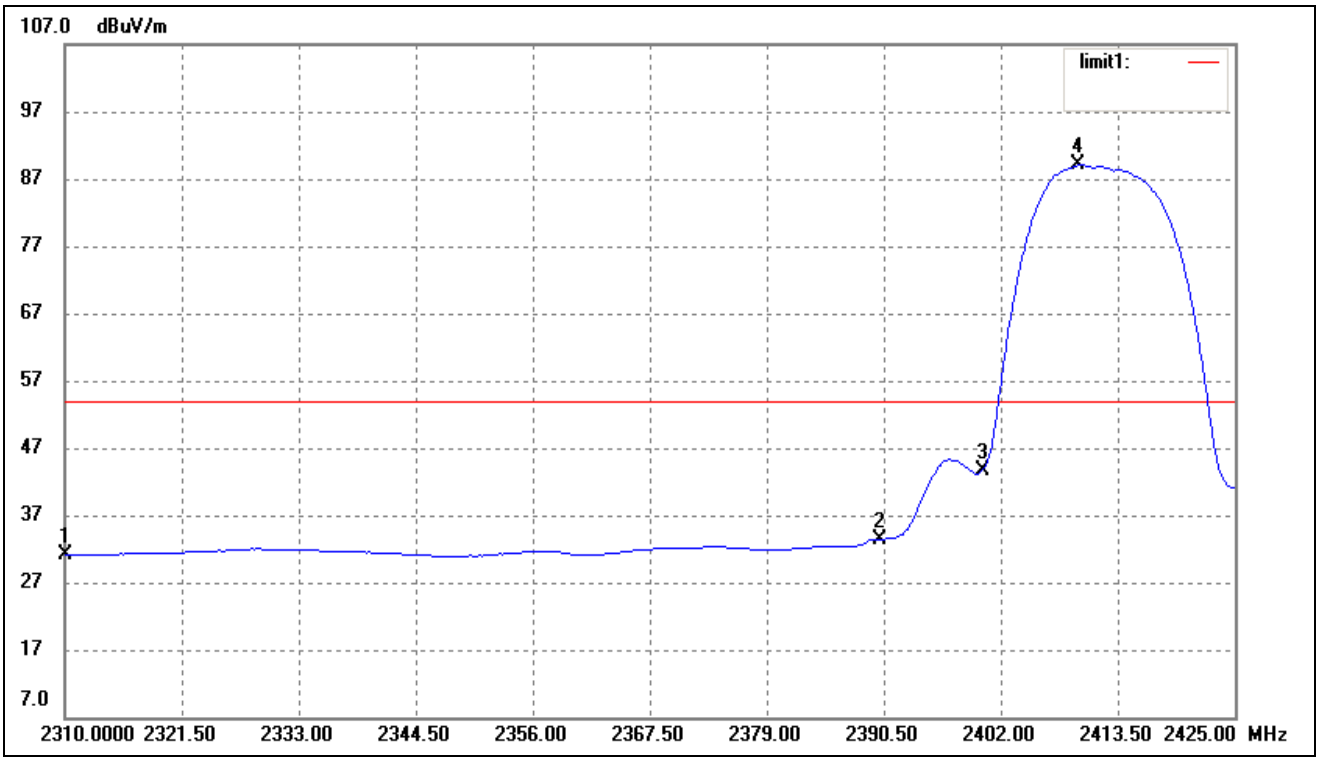
9.5 Summary of Test Results/Plots

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.

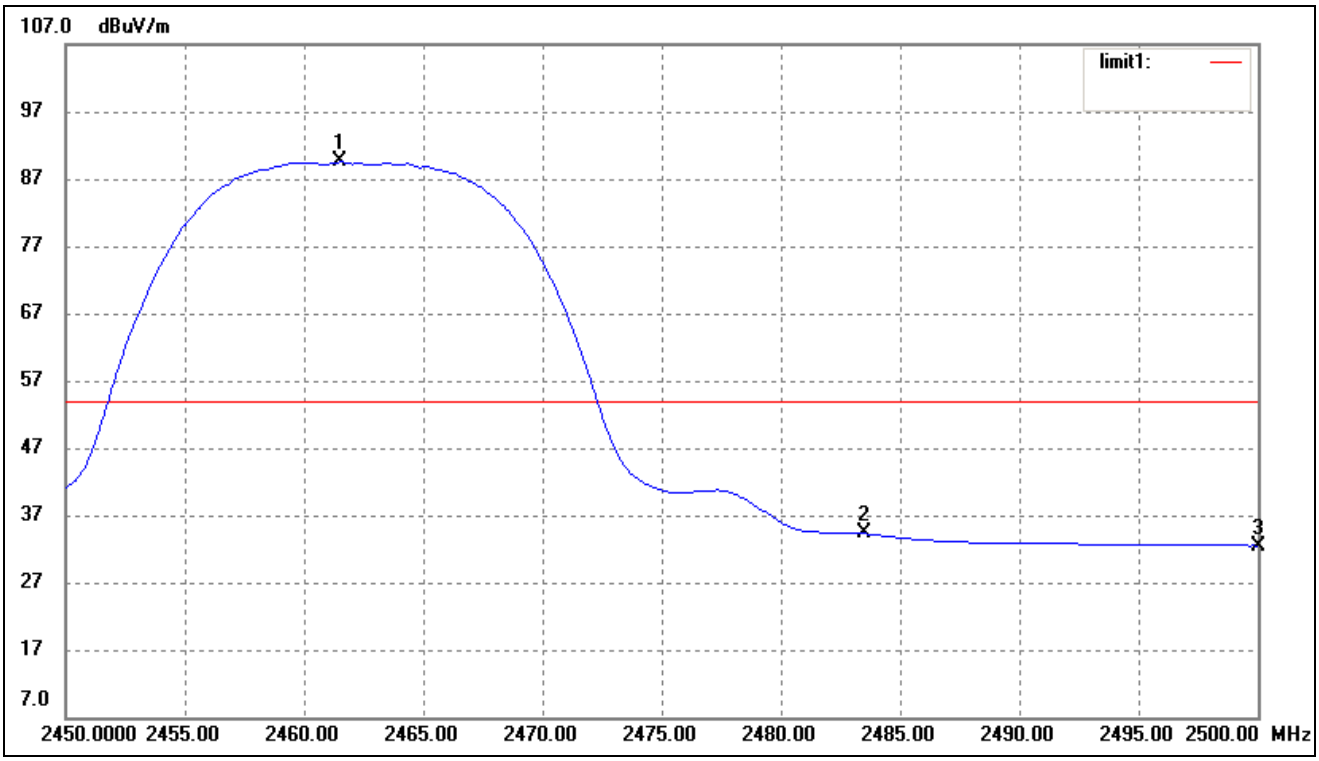
Please refer to the test plots as below.

802.11b-Lowest Bandedge



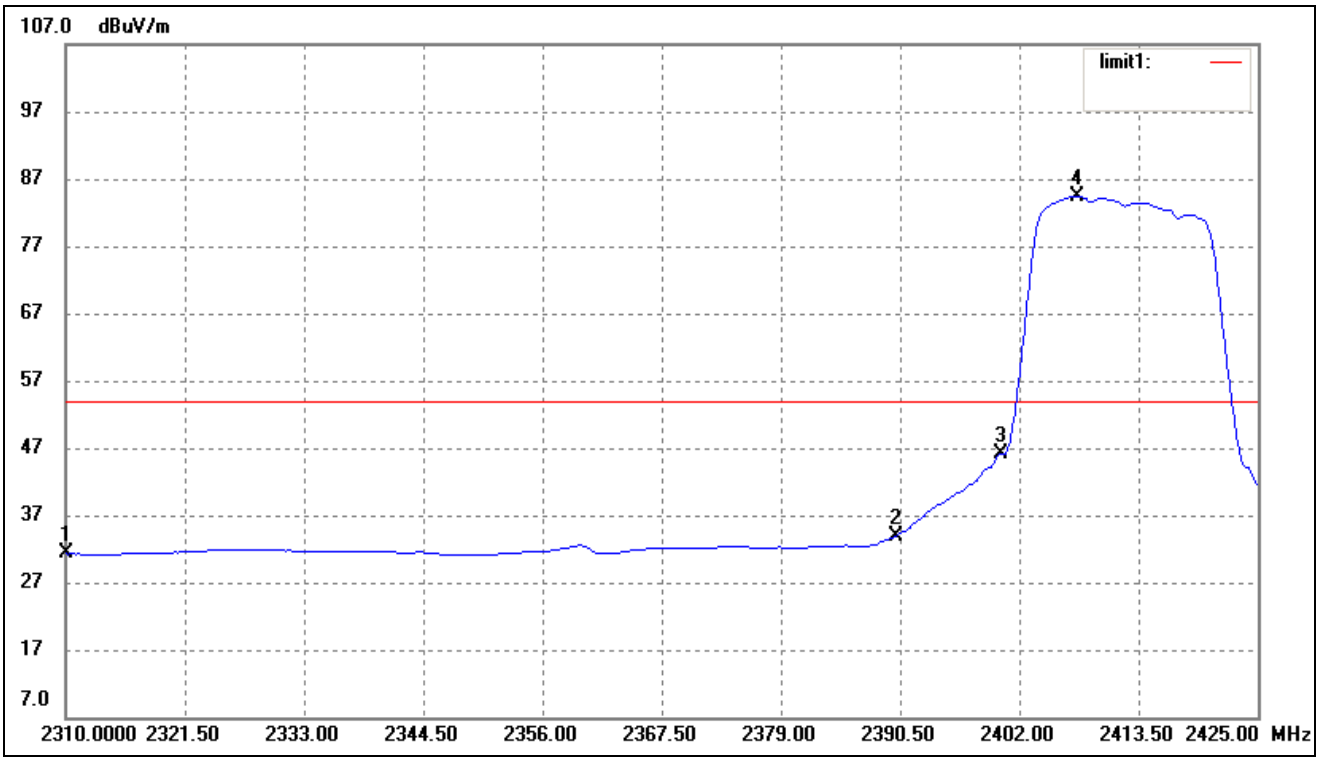
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	34.93	-3.71	31.22	54.00	-22.78	Average Detector
	2310.000	48.24	-3.71	44.53	74.00	-29.47	Peak Detector
2	2390.000	36.93	-3.54	33.39	54.00	-20.61	Average Detector
	2390.000	50.45	-3.54	46.91	74.00	-27.09	Peak Detector
3	2400.000	47.26	-3.51	43.75	Delta = 45.33 dBc		Average Detector
4	2409.590	92.56	-3.48	89.08			Average Detector

802.11b-Highest Bandedge



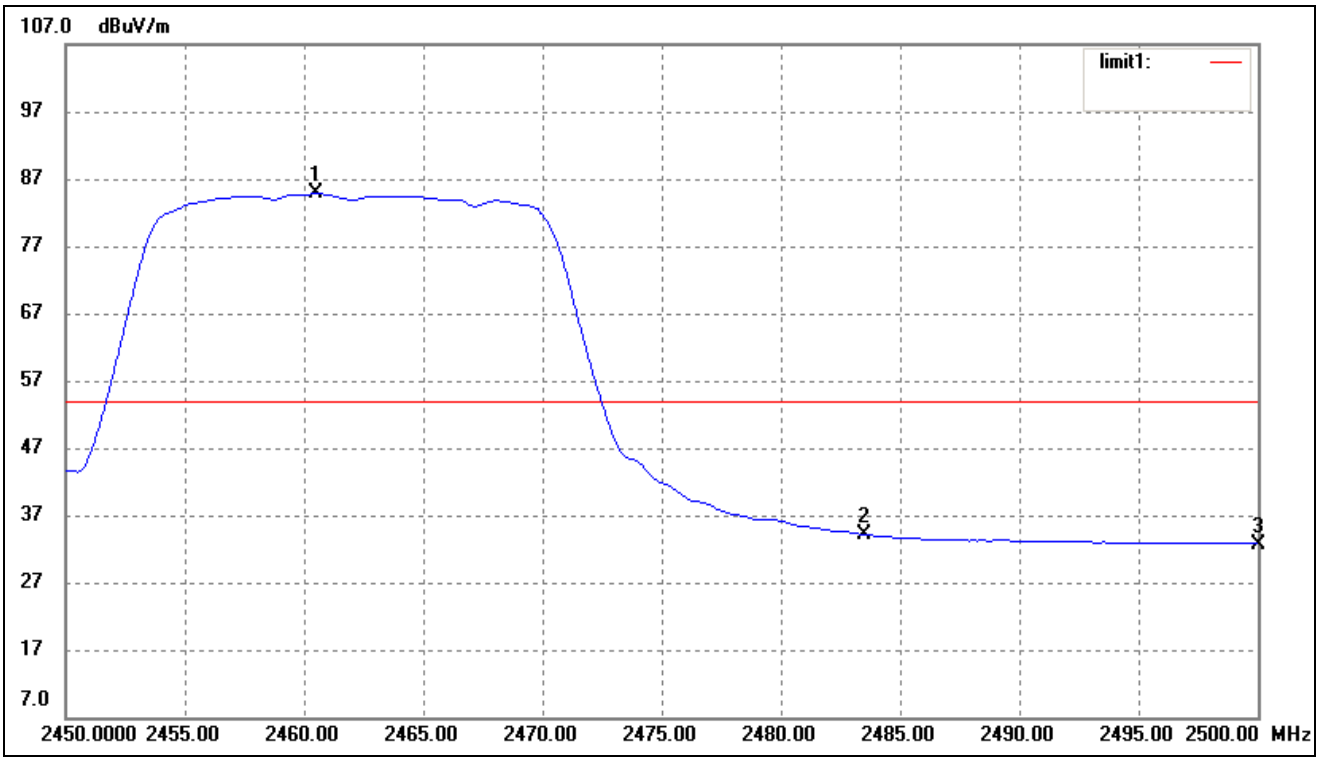
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2461.500	92.88	-3.37	89.51	/	/	Average Detector
	2462.900	101.08	-3.37	97.71	/	/	Peak Detector
2	2483.500	Delta = 50.26 dBc		39.25	54.00	-14.75	Average Detector
	2483.500			47.45	74.00	-26.55	Peak Detector
3	2500.000	35.73	-3.28	32.45	54.00	-21.55	Average Detector
	2500.000	49.20	-3.28	45.92	74.00	-28.08	Peak Detector

802.11g-Lowest Bandedge



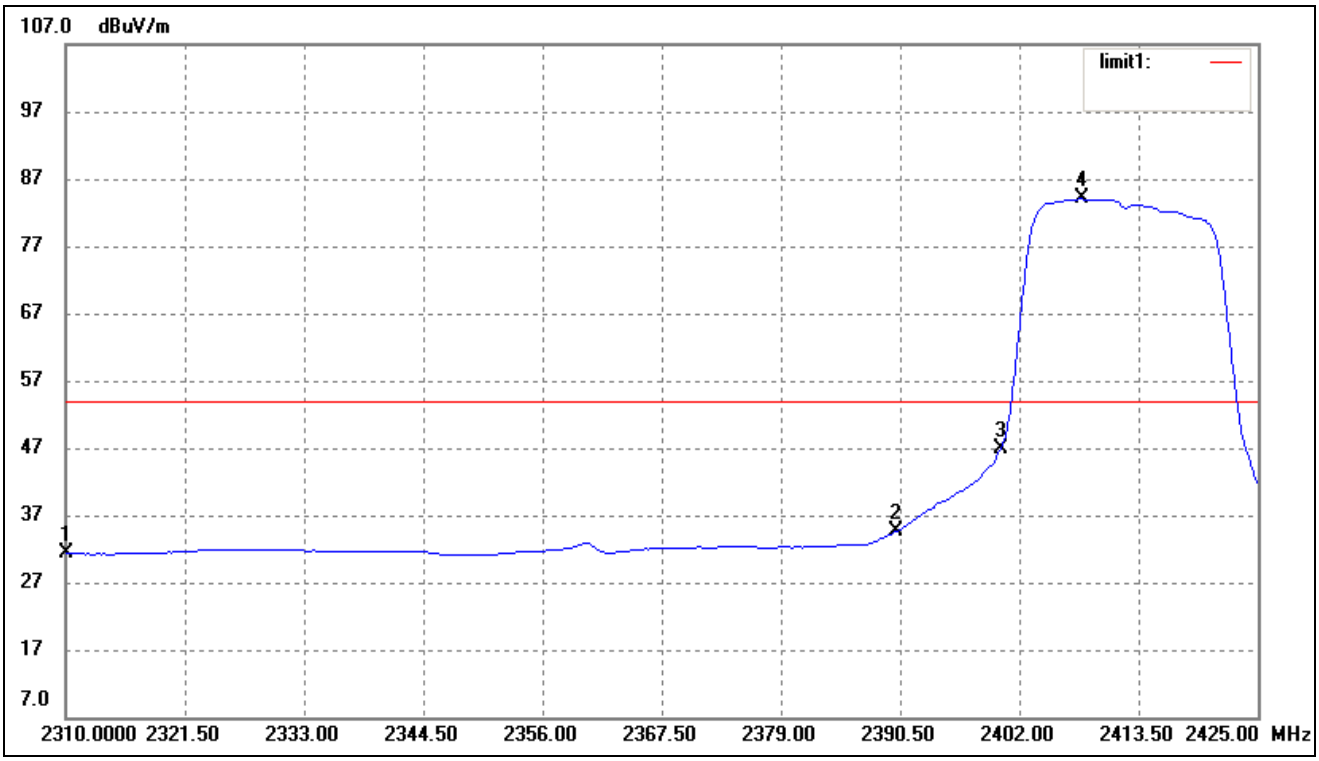
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	34.99	-3.71	31.28	54.00	-22.72	Average Detector
	2310.000	48.02	-3.71	44.31	74.00	-29.69	Peak Detector
2	2390.000	37.47	-3.54	33.93	54.00	-20.07	Average Detector
	2390.000	54.53	-3.54	50.99	74.00	-23.01	Peak Detector
3	2400.000	49.66	-3.51	46.15	Delta = 38.29 dBc		Average Detector
4	2407.520	87.93	-3.49	84.44			Average Detector

802.11g-Highest Bandedge



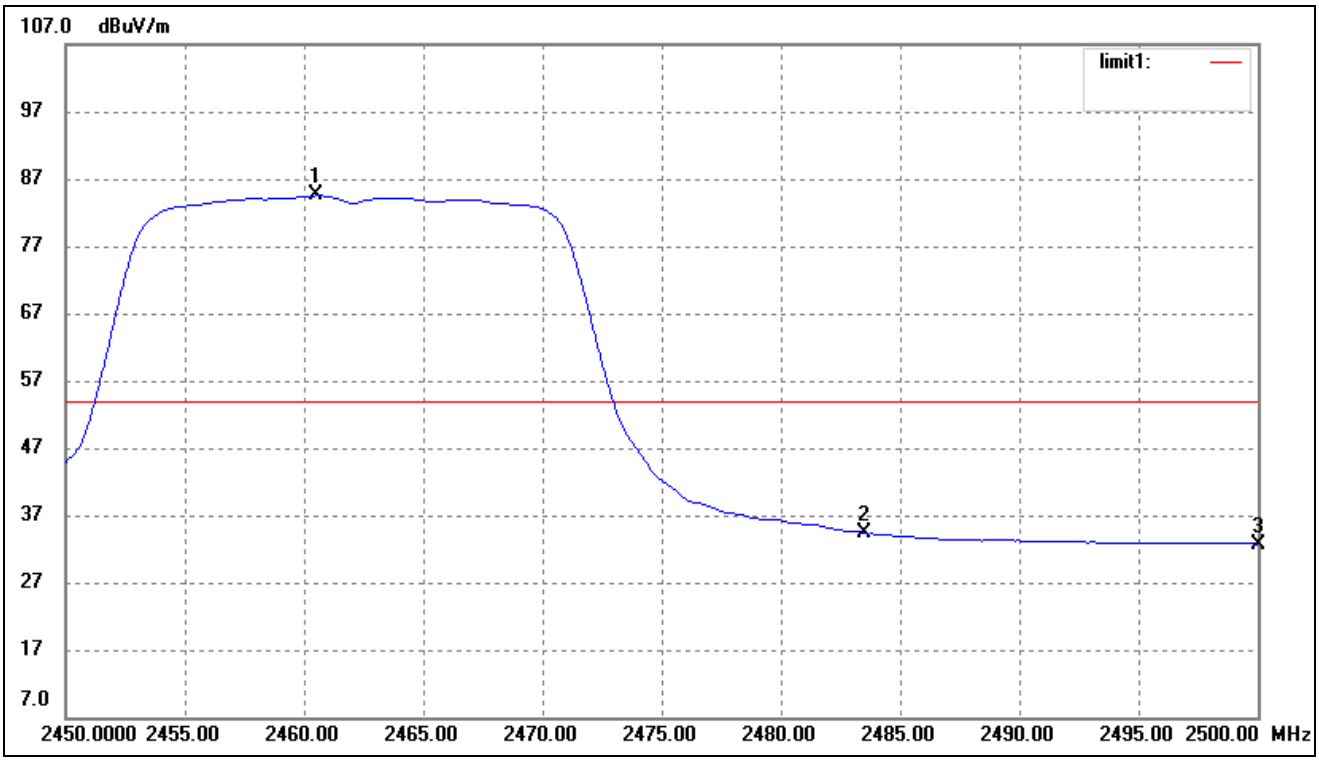
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2460.500	88.14	-3.37	84.77	/	/	Average Detector
	2465.000	100.00	-3.36	96.64	/	/	Peak Detector
2	2483.500	Delta = 47.15 dBc		37.62	54.00	-16.38	Average Detector
	2483.500			49.49	74.00	-24.51	Peak Detector
3	2500.000	36.03	-3.28	32.75	54.00	-21.25	Average Detector
	2500.000	49.45	-3.28	46.17	74.00	-27.83	Peak Detector

802.11n-HT20-Lowest Bandedge



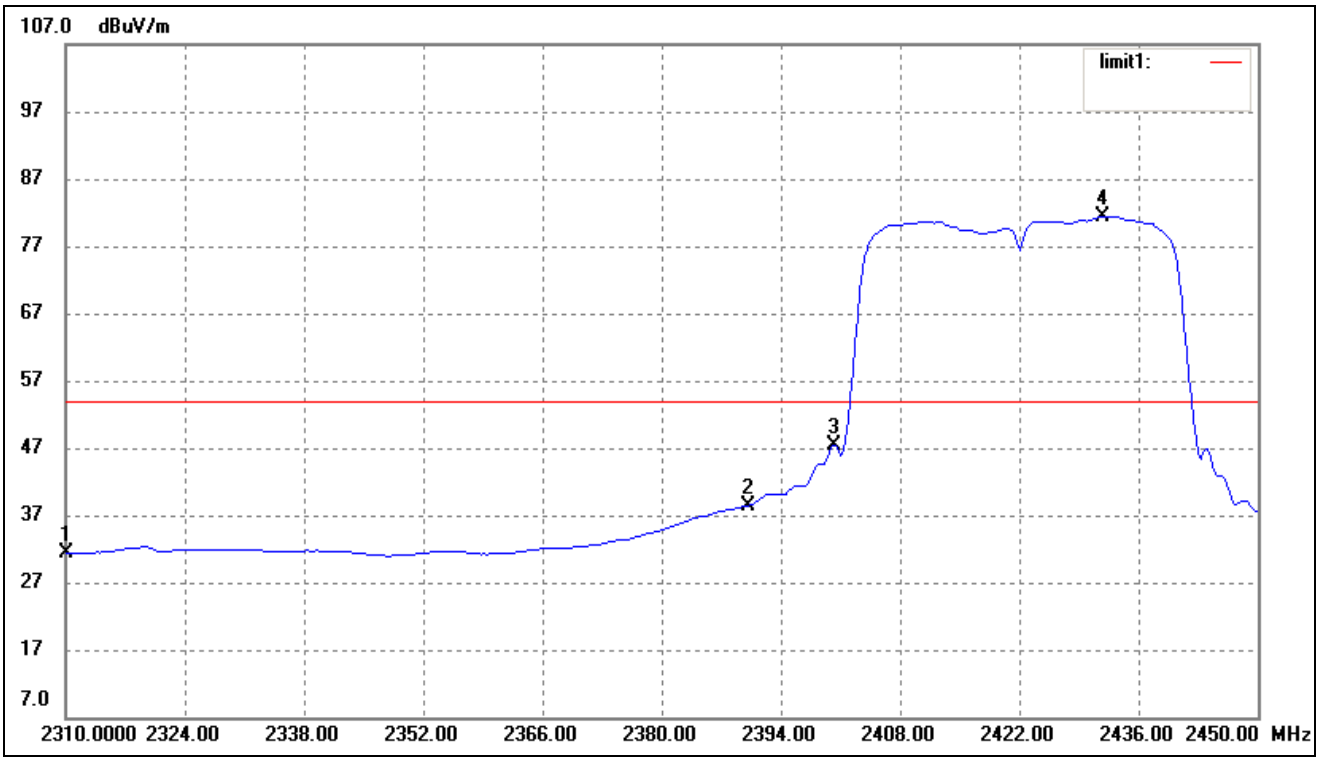
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	34.99	-3.71	31.28	54.00	-22.72	Average Detector
	2310.000	48.56	-3.71	44.85	74.00	-29.15	Peak Detector
2	2390.000	38.05	-3.54	34.51	54.00	-19.49	Average Detector
	2390.000	57.33	-3.54	53.79	74.00	-20.21	Peak Detector
3	2400.000	50.49	-3.51	46.98	Delta = 37.04 dBc		Average Detector
4	2407.980	87.51	-3.49	84.02			Average Detector

802.11n-HT20-Highest Bandedge



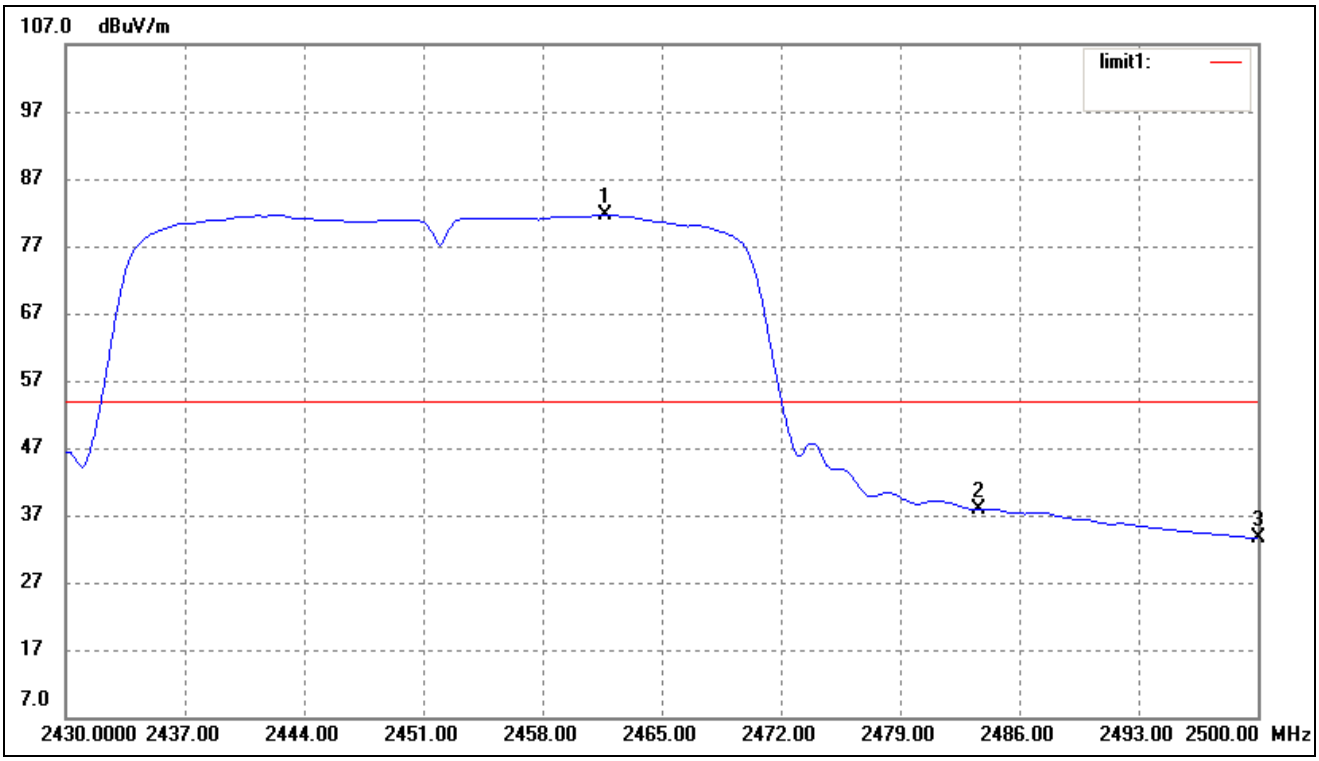
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2460.500	87.88	-3.37	84.51	/	/	Average Detector
	2463.600	99.72	-3.36	96.36	/	/	Peak Detector
2	2483.500	Delta = 44.97 dBc		39.54	54.00	-14.46	Average Detector
	2483.500			51.39	74.00	-22.61	Peak Detector
3	2500.000	38.26	-11.78	26.48	54.00	-27.52	Average Detector
	2500.000	52.14	-11.78	40.36	74.00	-33.64	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	35.09	-3.71	31.38	54.00	-22.62	Average Detector
	2310.000	48.14	-3.71	44.43	74.00	-29.57	Peak Detector
2	2390.000	42.01	-3.54	38.47	54.00	-15.53	Average Detector
	2390.000	58.77	-3.54	55.23	74.00	-18.77	Peak Detector
3	2400.000	50.94	-3.51	47.43	Delta = 34.01dBc		Average Detector
4	2431.800	84.88	-3.44	81.44			Average Detector

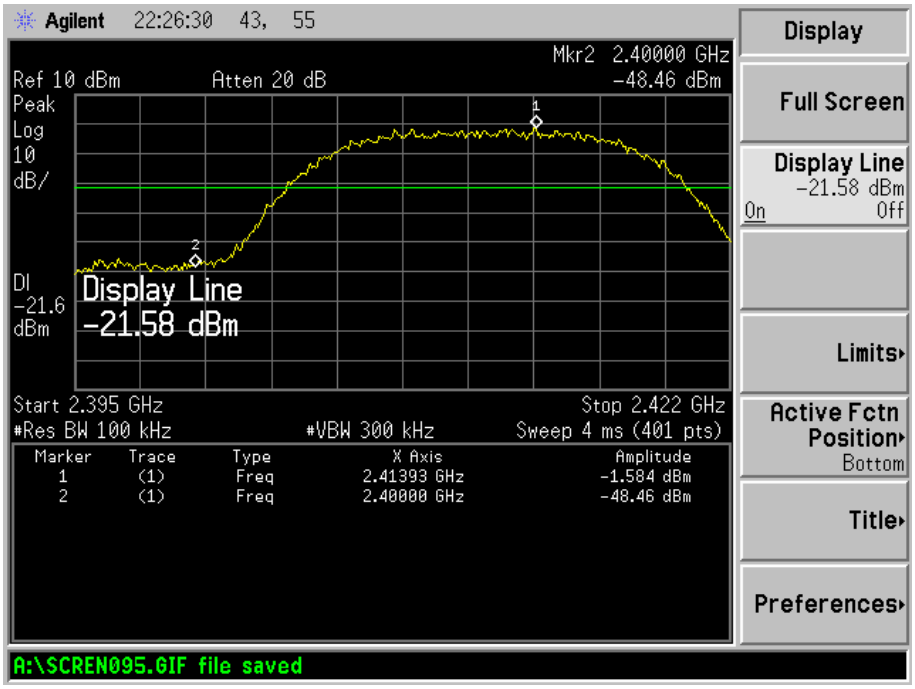
802.11n-HT40-Highest Bandedge



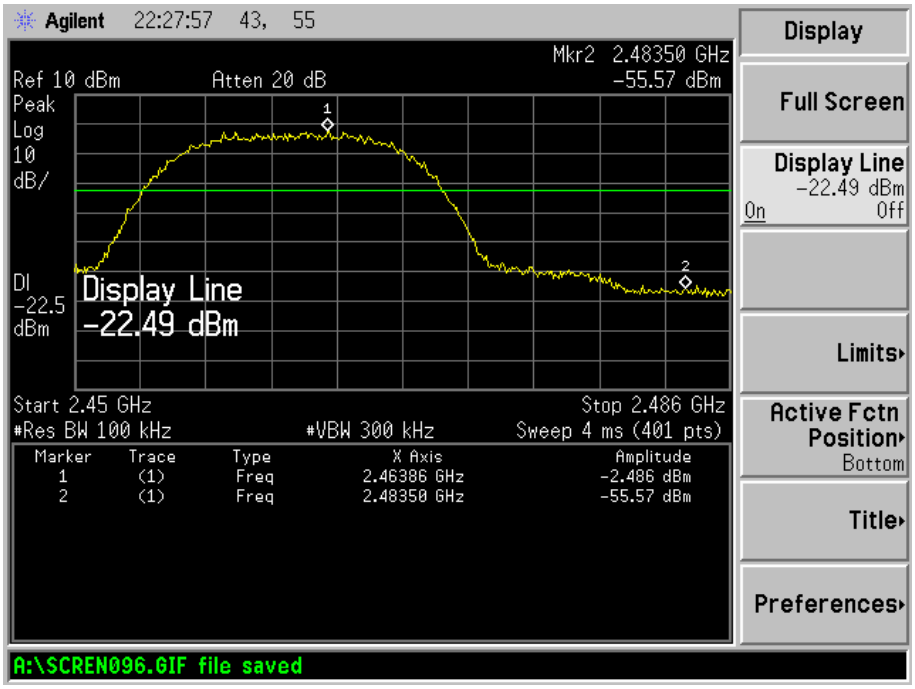
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2461.640	85.08	-3.37	81.71	/	/	Average Detector
	2441.480	96.80	-3.41	93.39	/	/	Peak Detector
1	2483.500	Delta = 38.55 dBc		43.16	54.00	-10.84	Average Detector
	2483.500			54.84	74.00	-19.16	Peak Detector
2	2500.000	36.84	-3.28	33.56	54.00	-20.44	Average Detector
	2500.000	52.14	-11.78	40.36	74.00	-33.64	Peak Detector

Bandedge (Conducted)

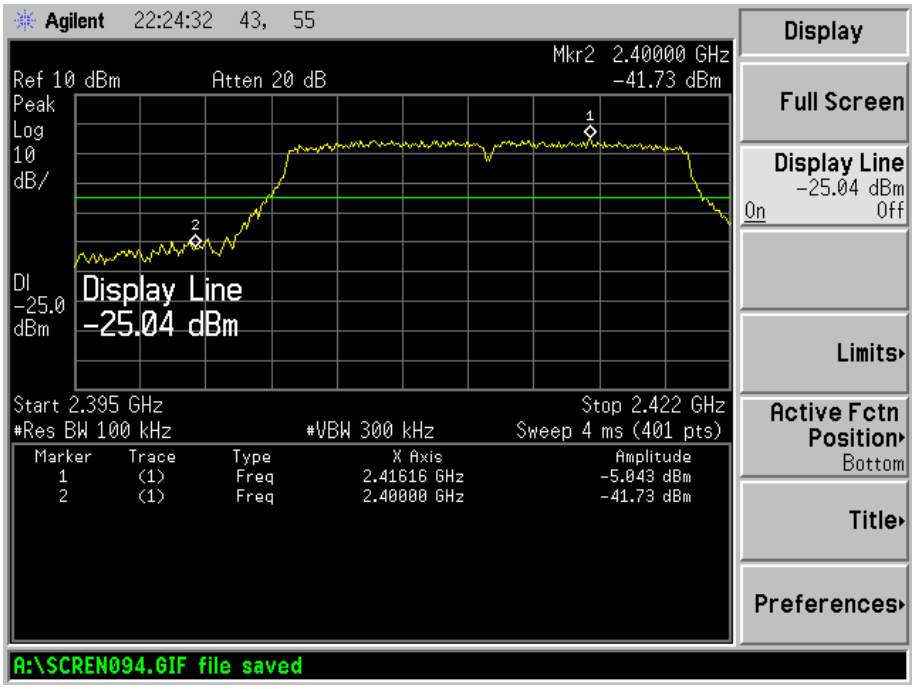
802.11b-Lowest Bandedge



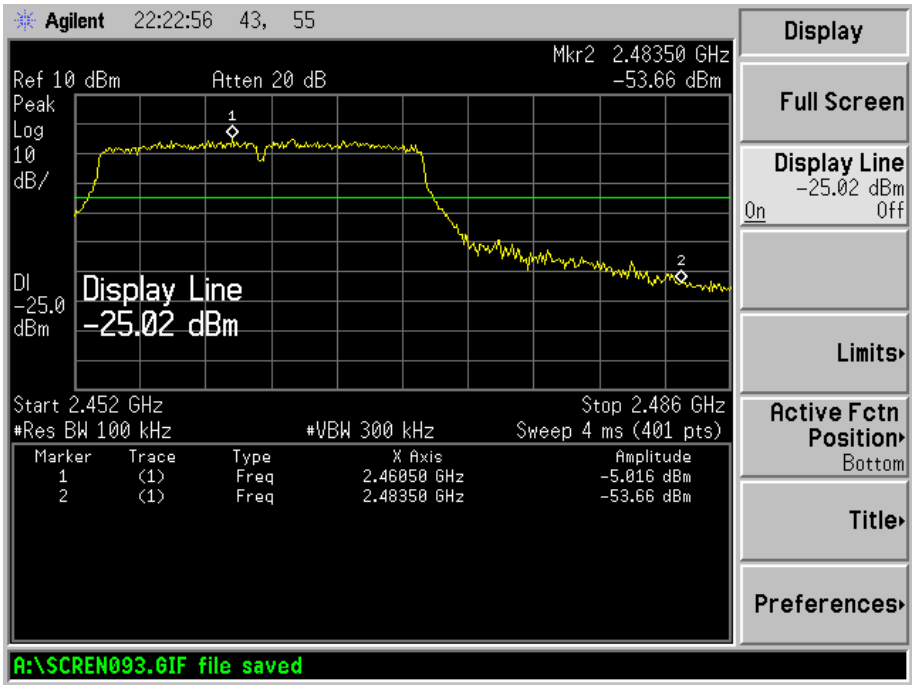
802.11b-Highest Bandedge



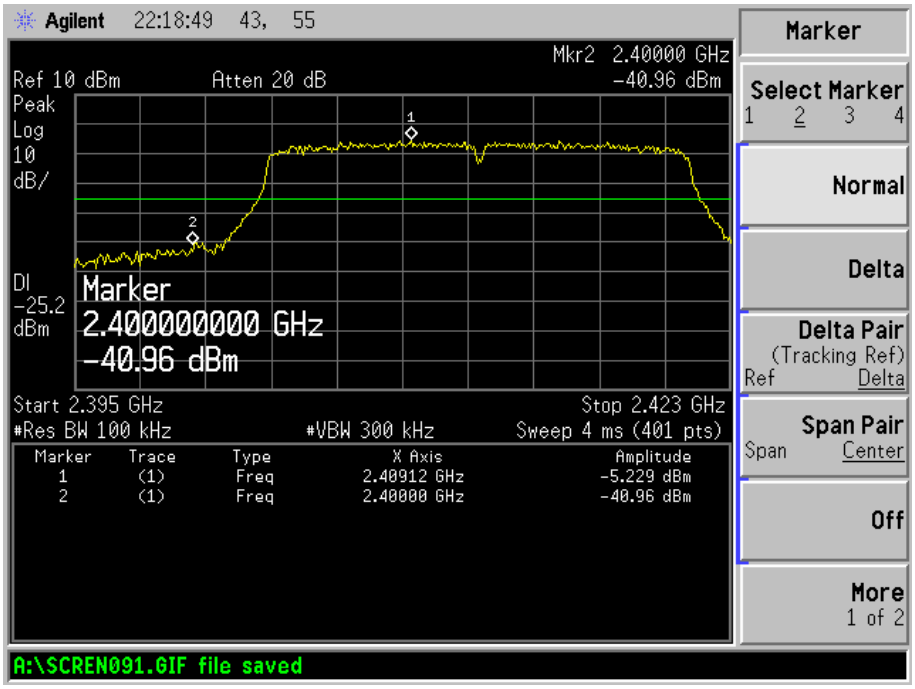
802.11g-Lowest Bandedge



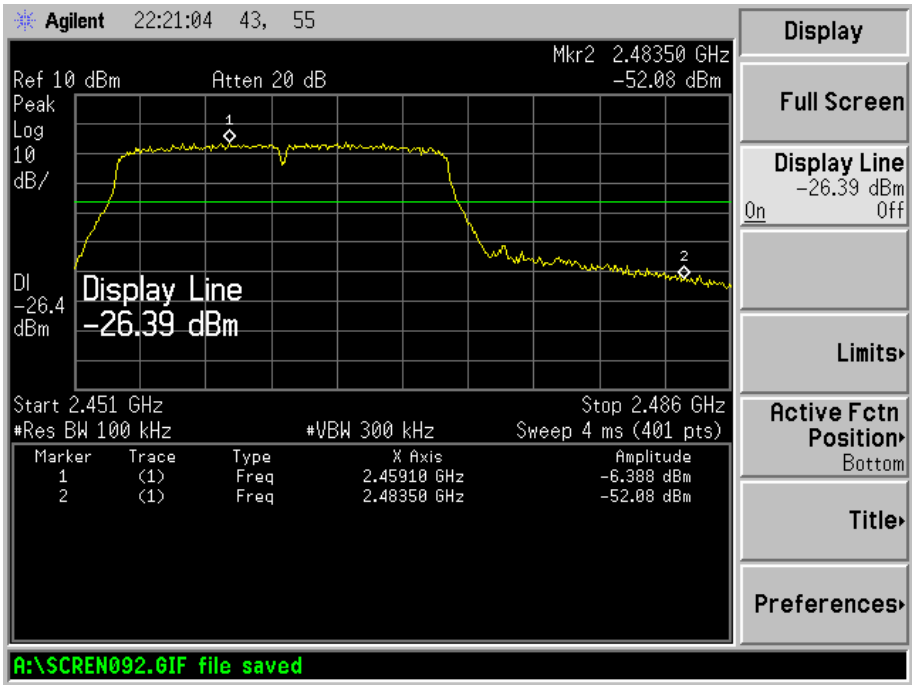
802.11g-Highest Bandedge



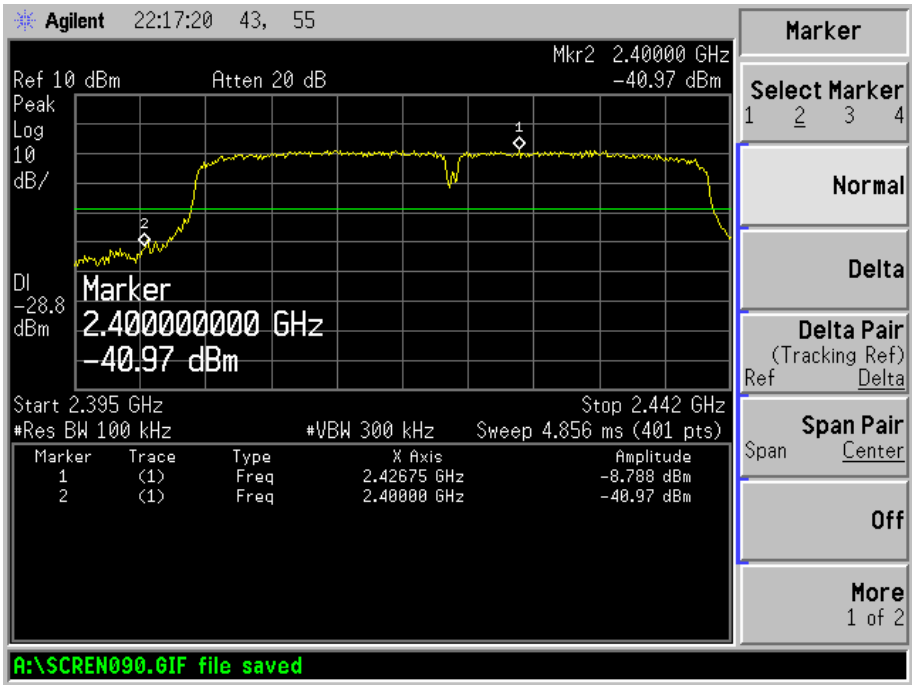
802.11n-HT20-Lowest Bandedge



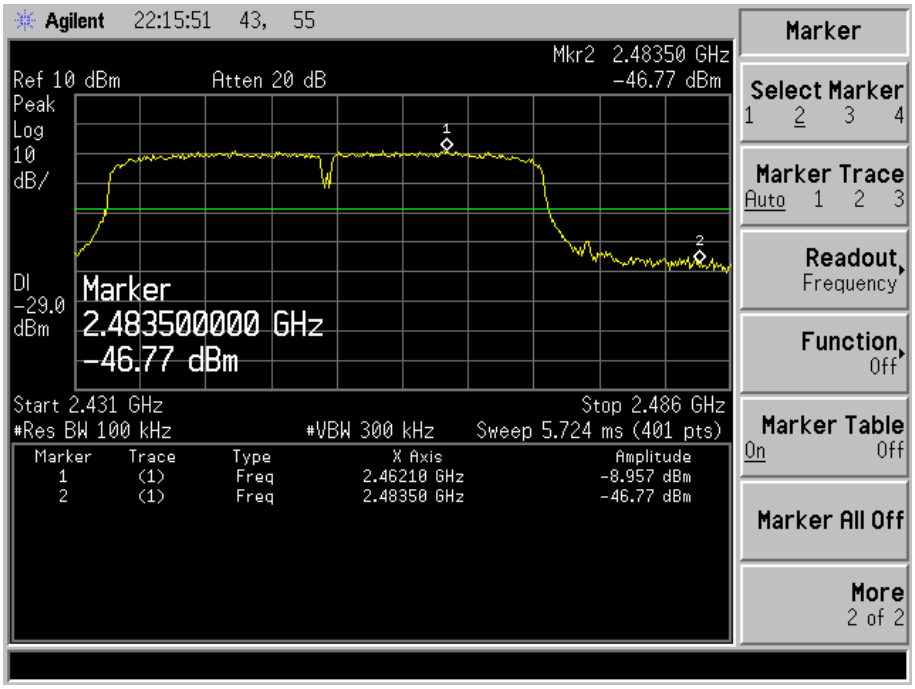
802.11n-HT20-Highest Bandedge



802.11n-HT40-Lowest Bandedge

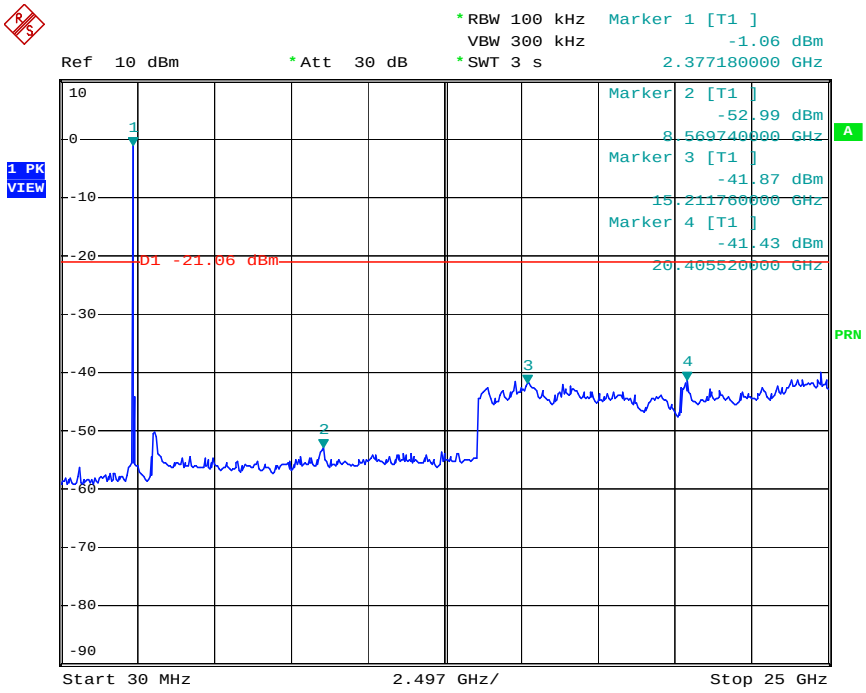


802.11n-HT40-Highest Bandedge

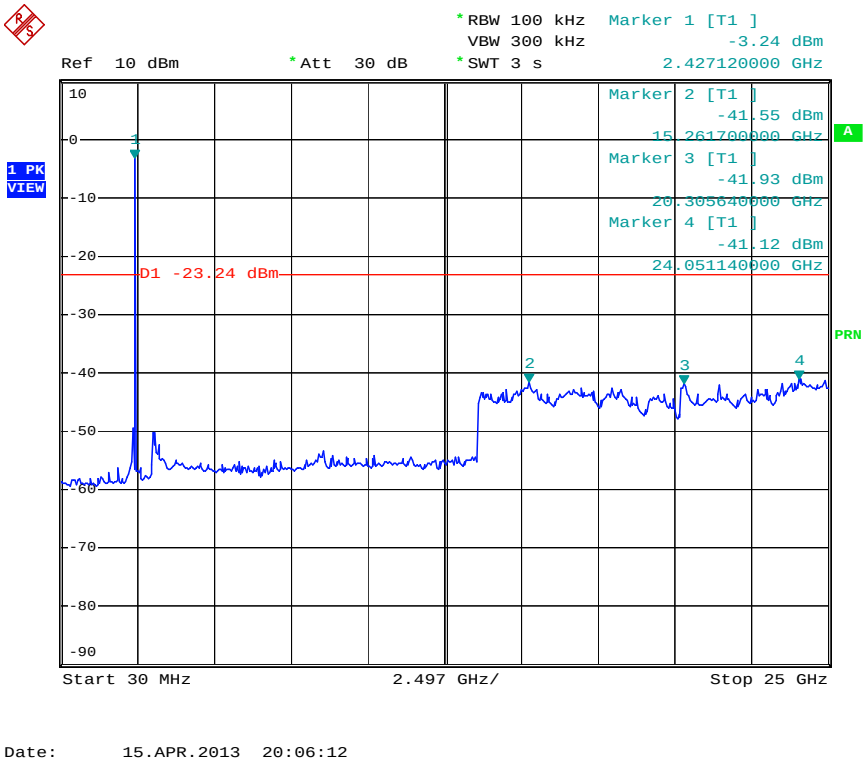


Conducted Spurious Emissions

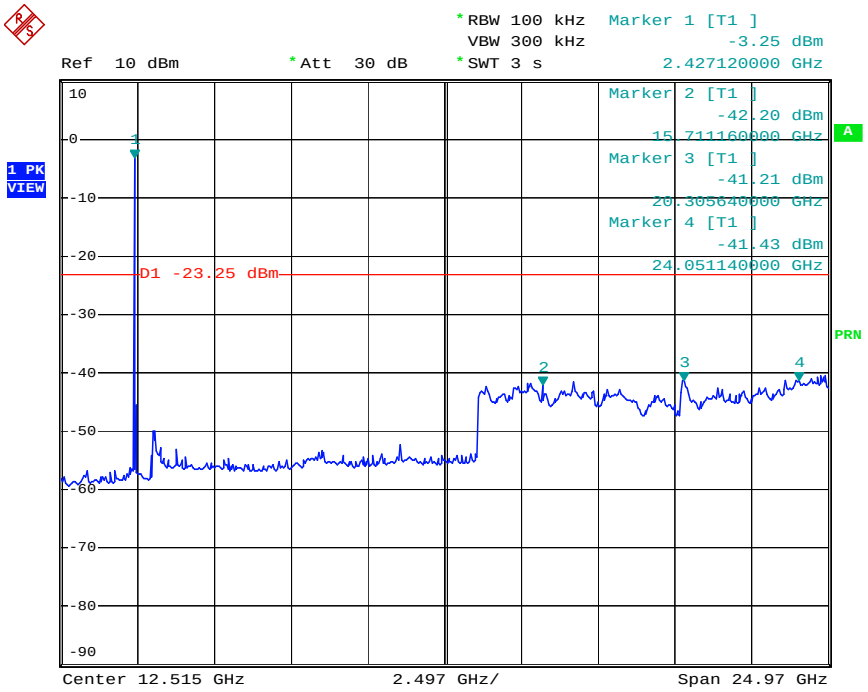
802.11b Low Bandedge



802.11b Middle Bandedge

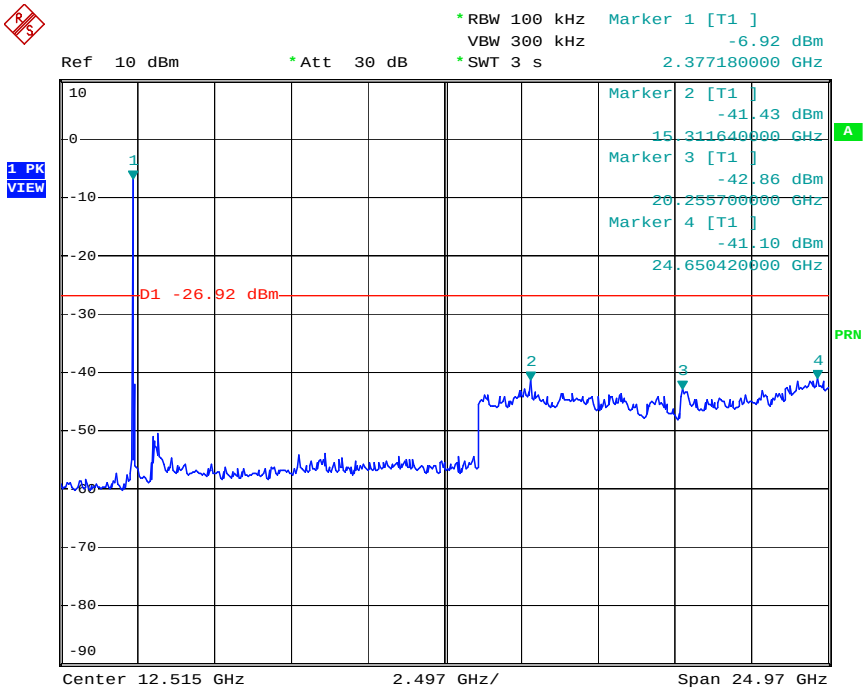


802.11b High Bandedge



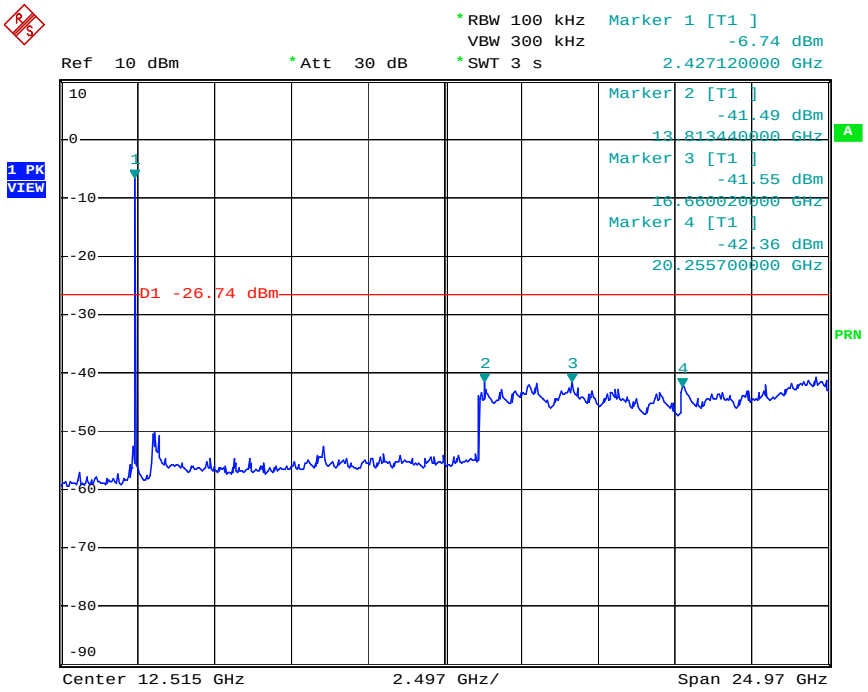
Date: 15.APR.2013 20:09:31

802.11g Low Bandedge



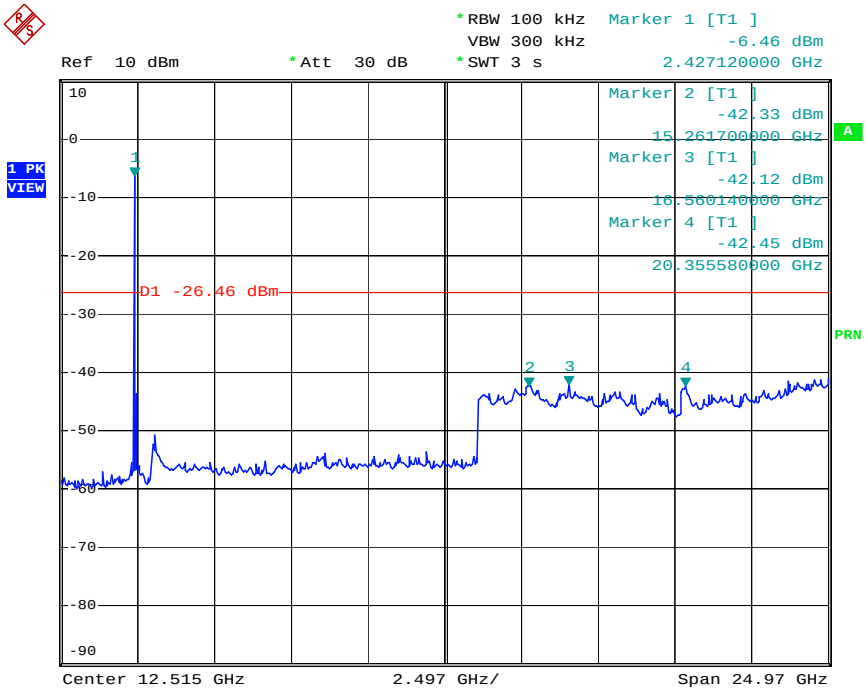
Date: 15.APR.2013 20:11:27

802.11g Middle Bandedge



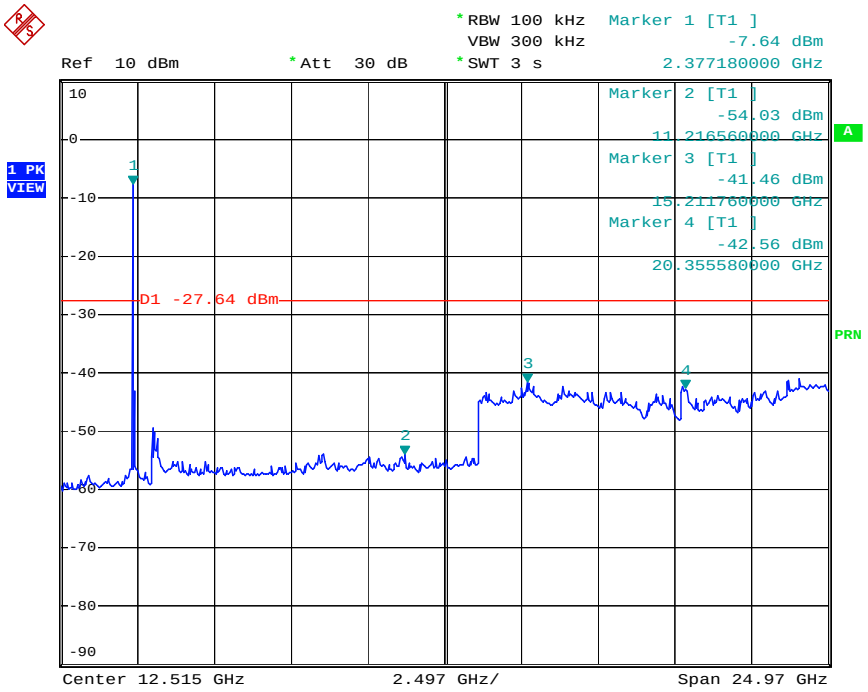
Date: 15.APR.2013 20:13:57

802.11g High Bandedge



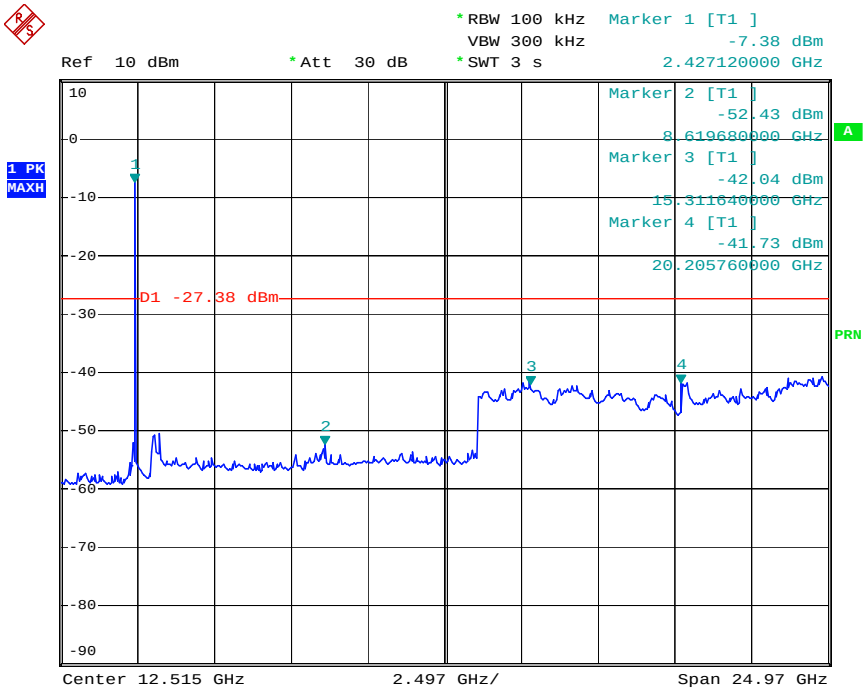
Date: 15.APR.2013 20:16:04

802.11n-HT20 Low Bandedge



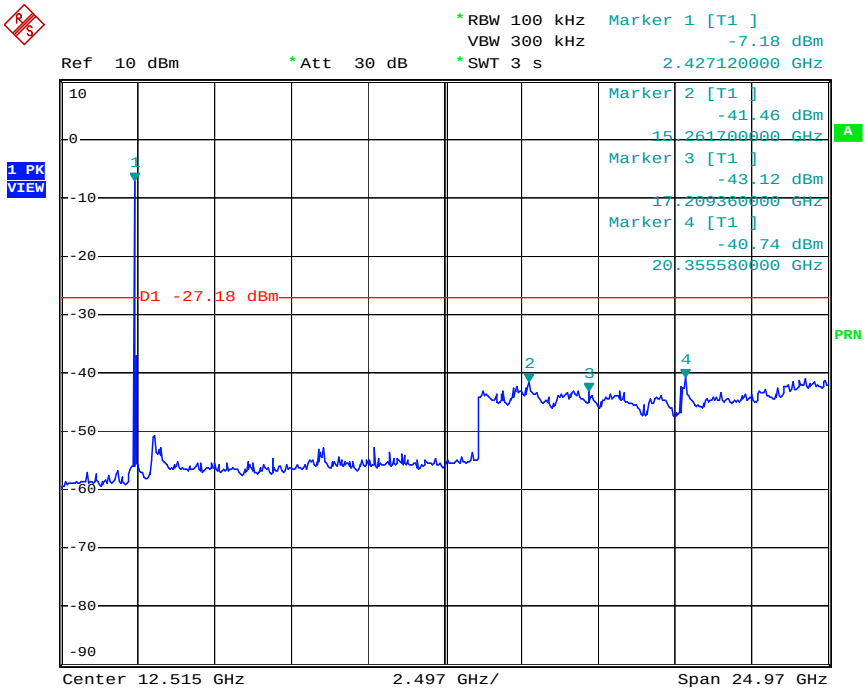
Date: 15.APR.2013 20:23:14

802.11n-HT20 Middle Bandedge



Date: 15.APR.2013 20:21:03

802.11n-HT20 High Bandedge



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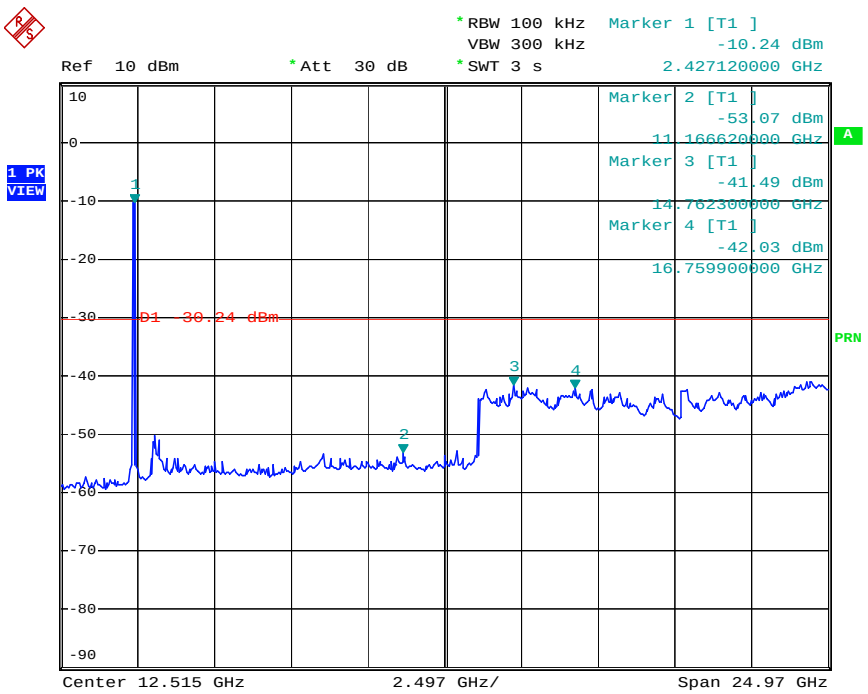
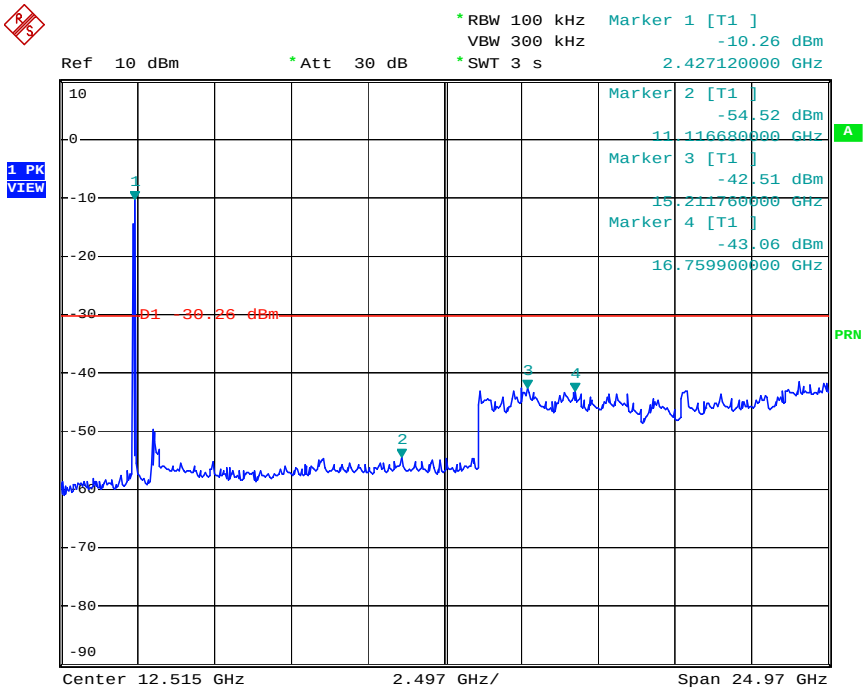
802.11n-HT40 Low Bandedge



Date: 15.APR.2013 20:26:23

802.11n-HT40 Middle Bandedge



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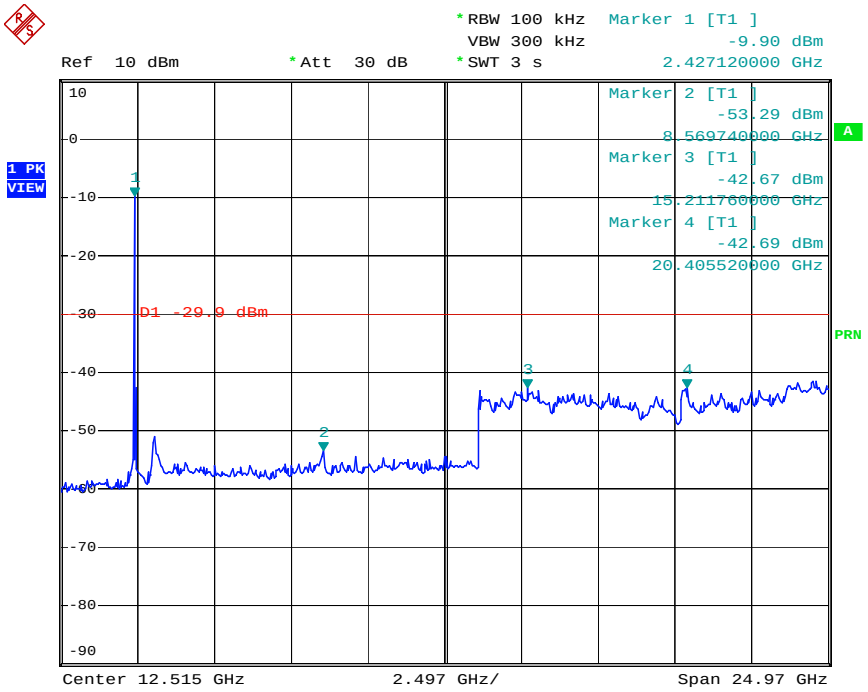
802.11n-HT40 High Bandedge



Date: 15.APR.2013 20:30:28

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.

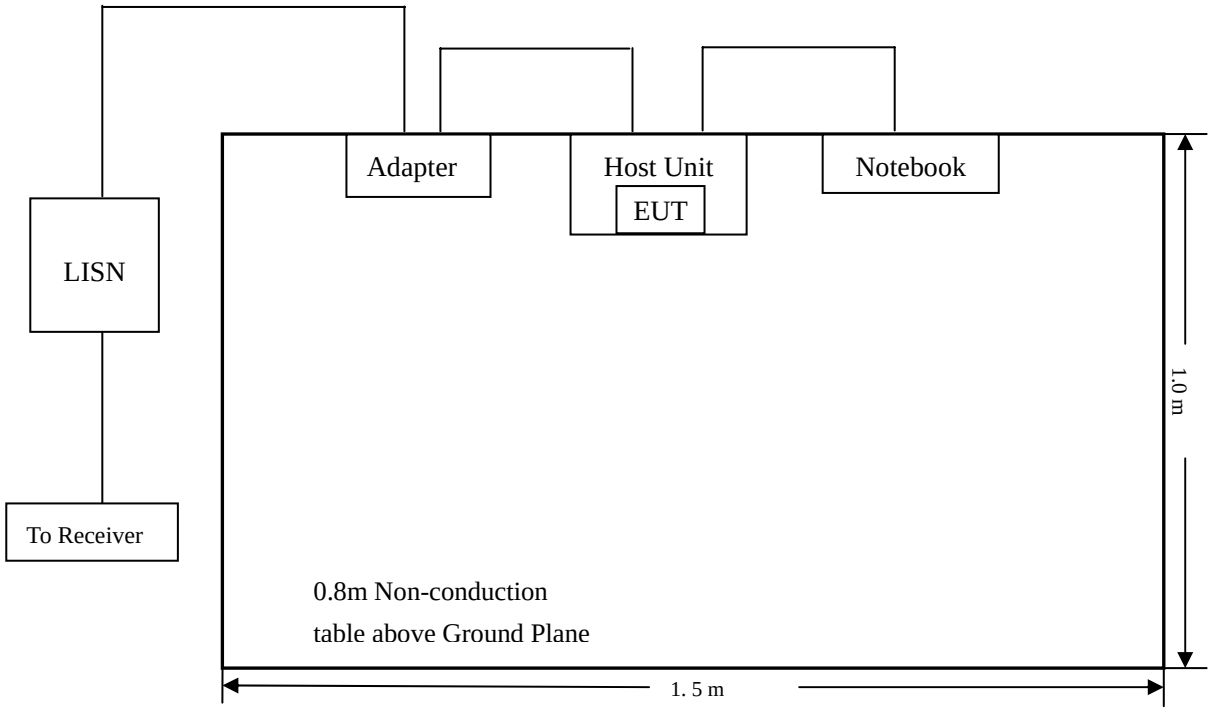
10.2 Test Equipment List and Details

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:

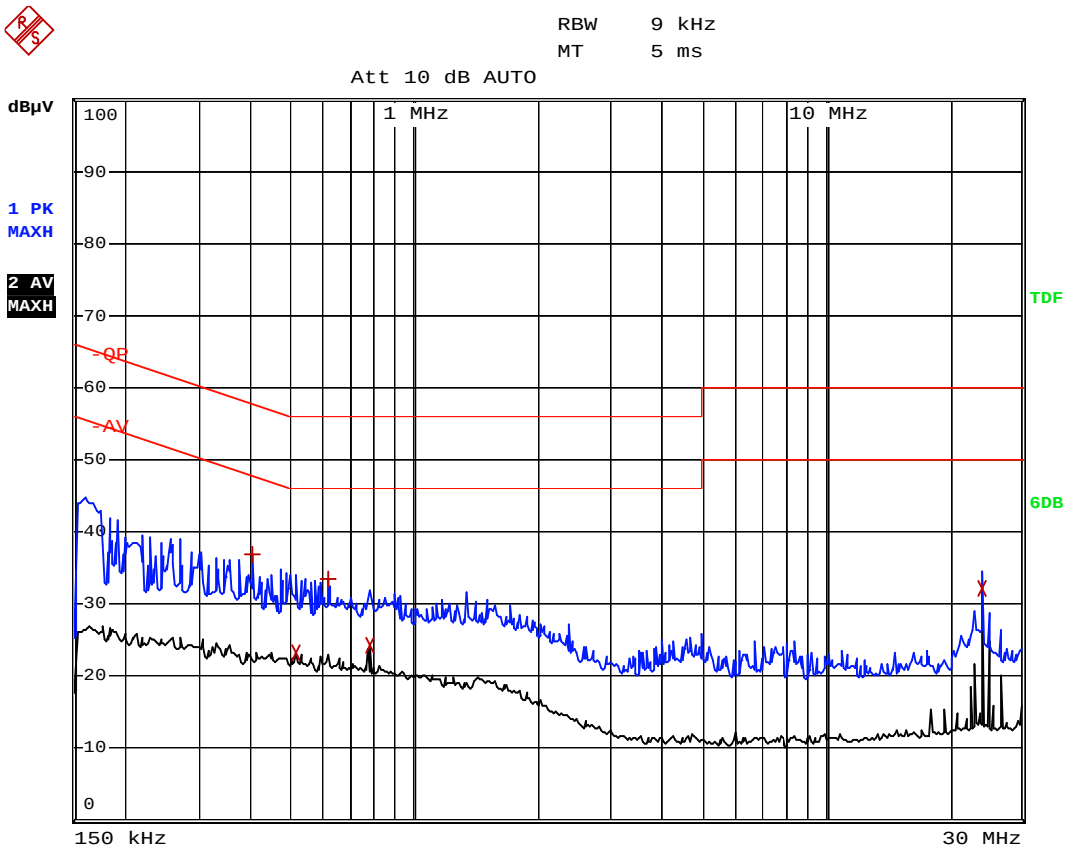
-17.84 dB at 23.986 MHz in the **Neutral** mode**, Ave** detector, **0.15-30MHz**

10.8 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

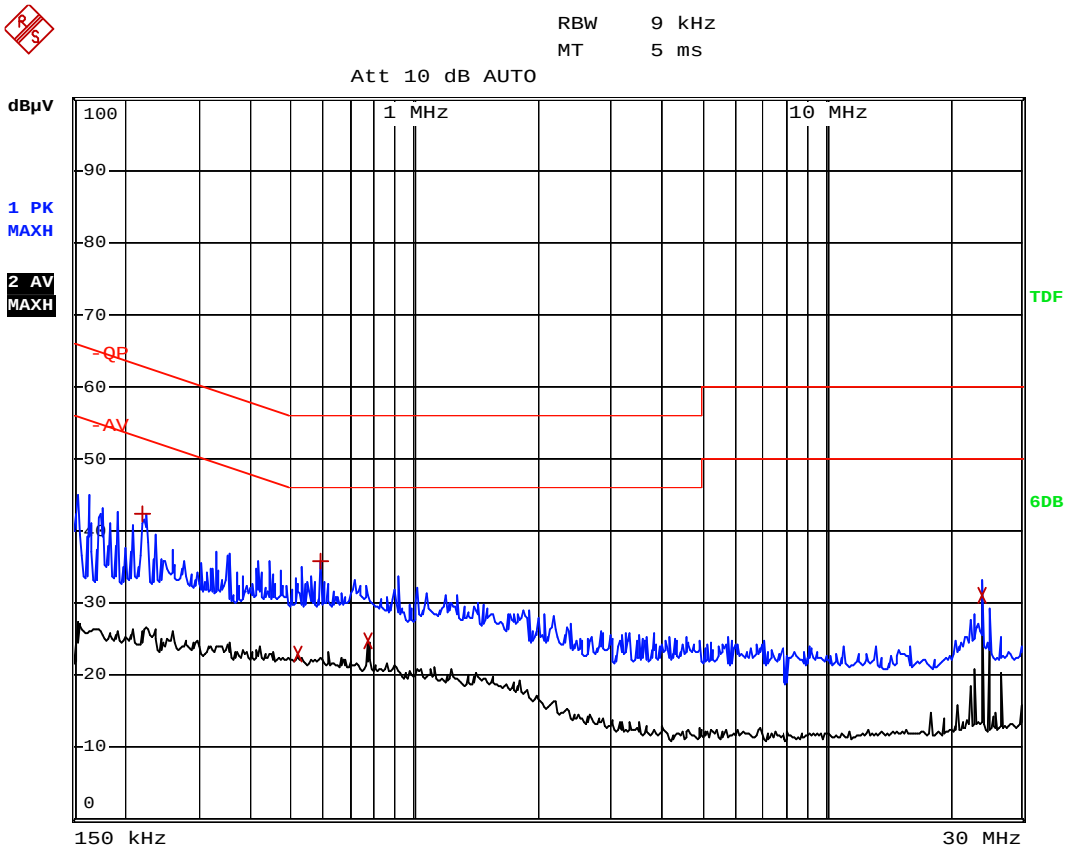
EUT: *WiFi AP Router Module*
Tested Model: *AWM002*
Operating Condition: *Transmitting*
Comment:

Test Specification: *Neutral*



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Max Peak	402 kHz	36.95	-20.85
2 Average	514 kHz	23.29	-22.70
1 Max Peak	618 kHz	33.57	-22.42
2 Average	778 kHz	24.17	-21.82
2 Average	23.986 MHz	32.15	-17.84

Test Specification: *Live*



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Max Peak	222 kHz	42.38	-20.35
2 Average	522 kHz	23.03	-22.96
1 Max Peak	590 kHz	35.80	-20.20
2 Average	774 kHz	24.87	-21.12
2 Average	23.982 MHz	31.16	-18.83

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