FCC Part 15C
Measurement and Test Report

For

Power Quotient International Co., Ltd

8F., No49., Sec.4, Jhongyang Rd., Tu Cheng Dist., New Taipei City 23675,

Taiwan

FCC ID: A4S-6W51

FCC Rules:	FCC Part 15C
Product Description:	Air pen express
Tested Model:	A500
Report No.:	STR12128154I
Tested Date:	2012-10-16 to 2012-12-10
Issued Date:	2012-12-27
Tested By:	Silin Chen / Engineer
Reviewed By:	Lahm Peng / EMC Manager
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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	Power Quotient International Co., Ltd
Address of applicant:	8F., No49., Sec.4, Jhongyang Rd., Tu Cheng Dist., New Taipei City 23675 Taiwan
Manufacturer:	Power Quotient International Co., Ltd
Address of manufacturer:	8F., No49., Sec.4, Jhongyang Rd., Tu Cheng Dist., New Taipei City 23675 Taiwan

General Description of EUT	
Product Name:	Air pen express
Trade Name:	/
Model No.:	A500
Adding Model(s):	/
Rated Voltage:	USB DC 5V
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:	11b/g/n(HT20): 2412-2462MHz 11n(HT40): 2422-2452MHz
RF Output Power:	12.07dBm (Conducted)
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Modulation:	CCK, BPSK, QPSK, 16QAM, 64QAM
Quantity of Channels:	11 for 11b/g/n(HT20), 7 for 11n(HT40)
Channel Separation:	5MHz
Antenna Type:	Integral Antenna
Antenna Gain:	1.24 dBi
Lowest Internal Frequency of EUT:	40MHz
Device Category:	Portable Device

1.2 Test Standards

The following report is prepared on behalf of the Power Quotient International 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
/	/	/	/

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(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. Antenna Requirement

3.1 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.

3.2 Evaluation Information

This product has an integral antenna, fulfill the requirement of this section.

4. Power Spectral Density

4.1 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.

4.2 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

4.3 Test Procedure

According to the KDB 558074, the test method of option 1(section 9.1) 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 spectrum analyzer as RBW=3 kHz, VBW=10 kHz.
5. Detector = peak, Sweep time = auto, Trace mode = max hold, allow trace to fully stabilize.
6. Use the peak marker function to determine the maximum amplitude level.
7. Repeat above procedures until all frequency measured was complete.

4.4 Environmental Conditions

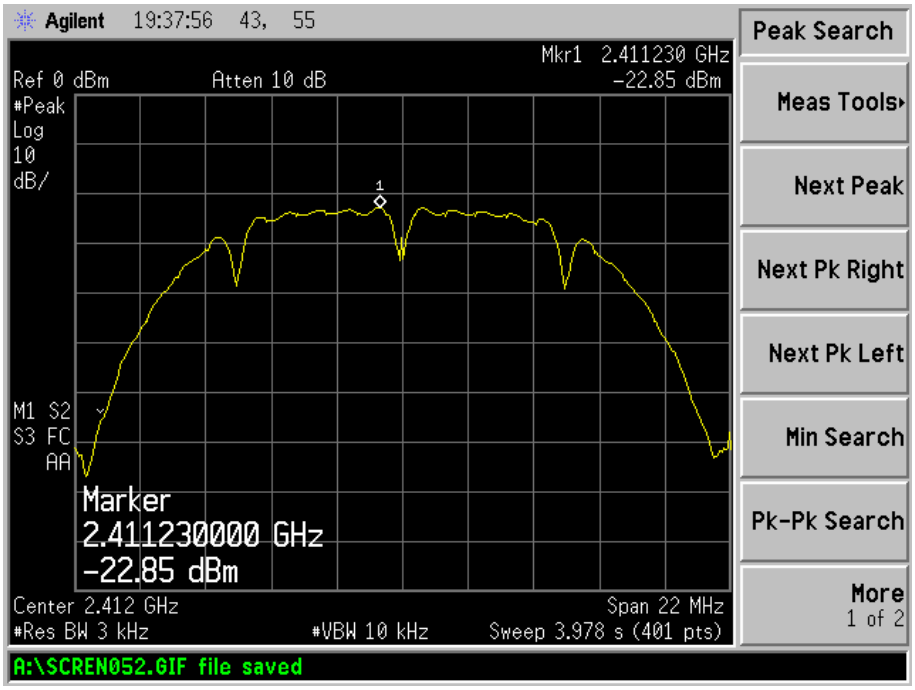
Temperature:	20° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

4.5 Summary of Test Results/Plots

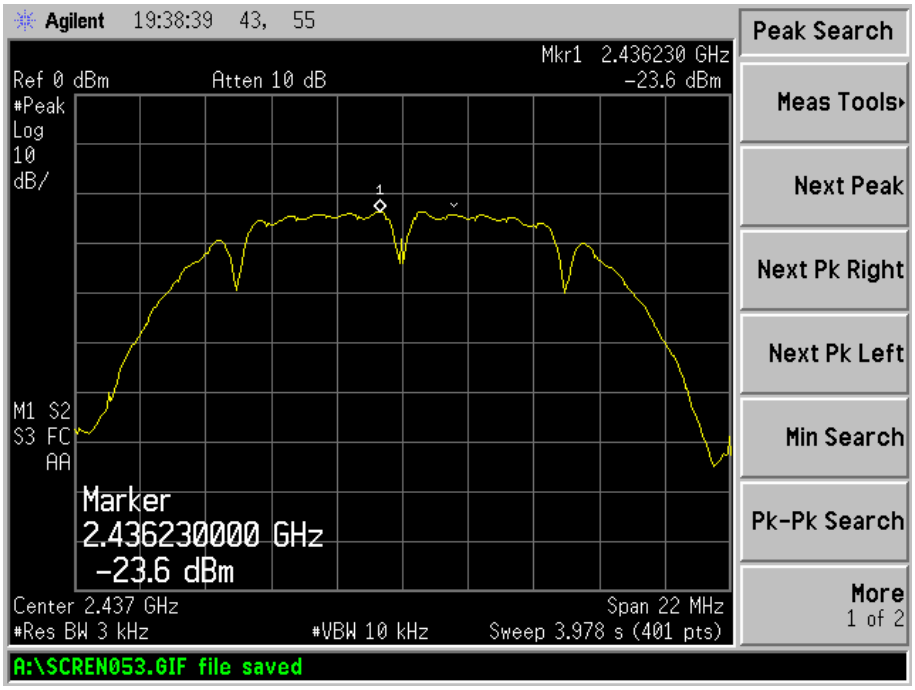
Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
802.11b	2412	-22.85	8
	2437	-23.60	8
	2462	-23.29	8
802.11g	2412	-26.12	8
	2437	-26.88	8
	2462	-26.68	8
802.11n HT20	2412	-26.72	8
	2437	-27.38	8
	2462	-26.98	8
802.11n HT40	2422	-29.84	8
	2437	-30.36	8
	2452	-31.20	8

Please refer to the following test plots:

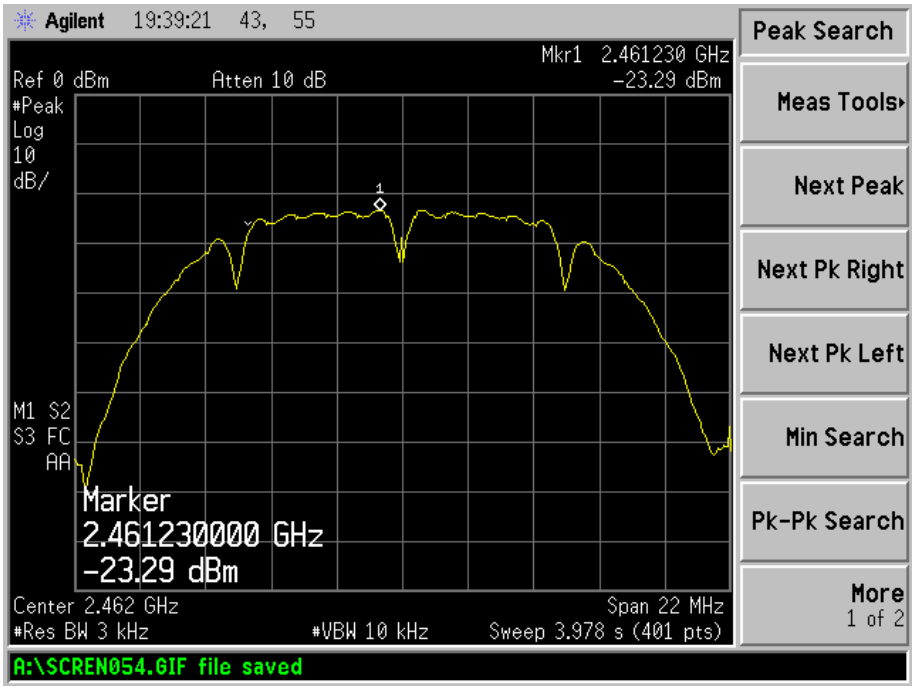
802.11b-Low Channel



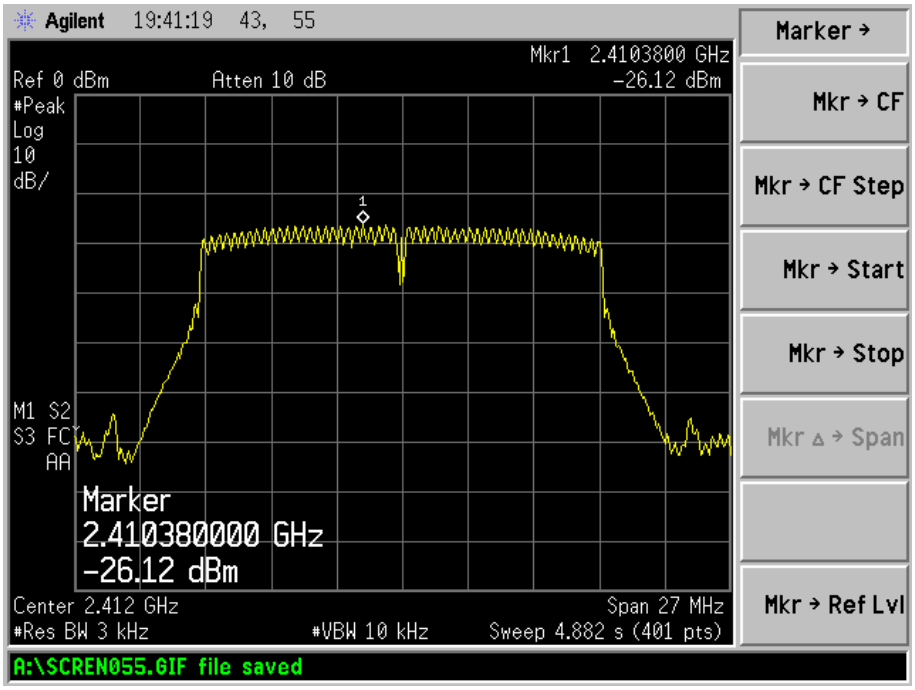
802.11b-Middle Channel



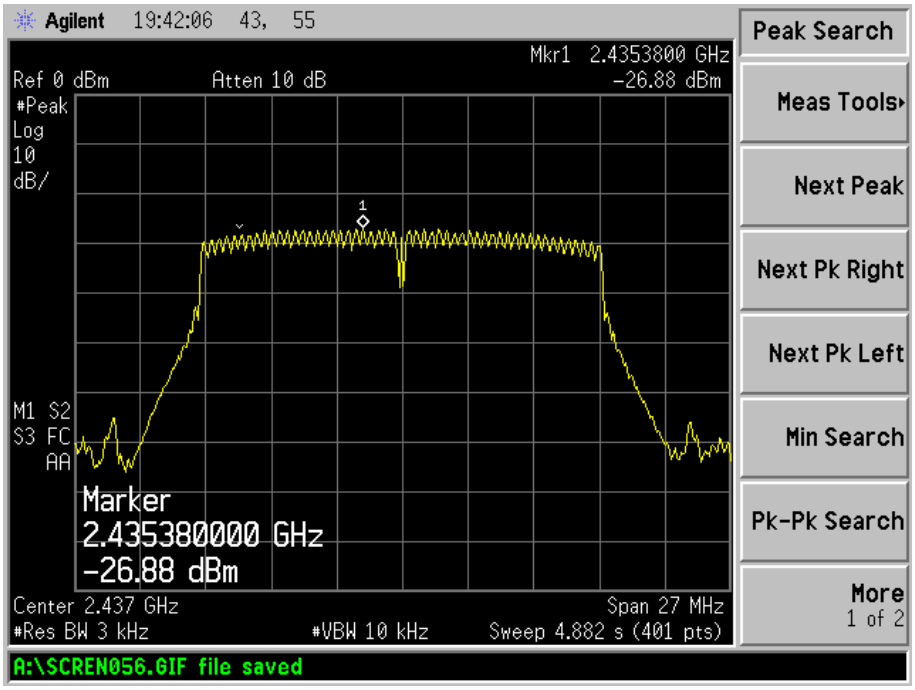
802.11b-High Channel



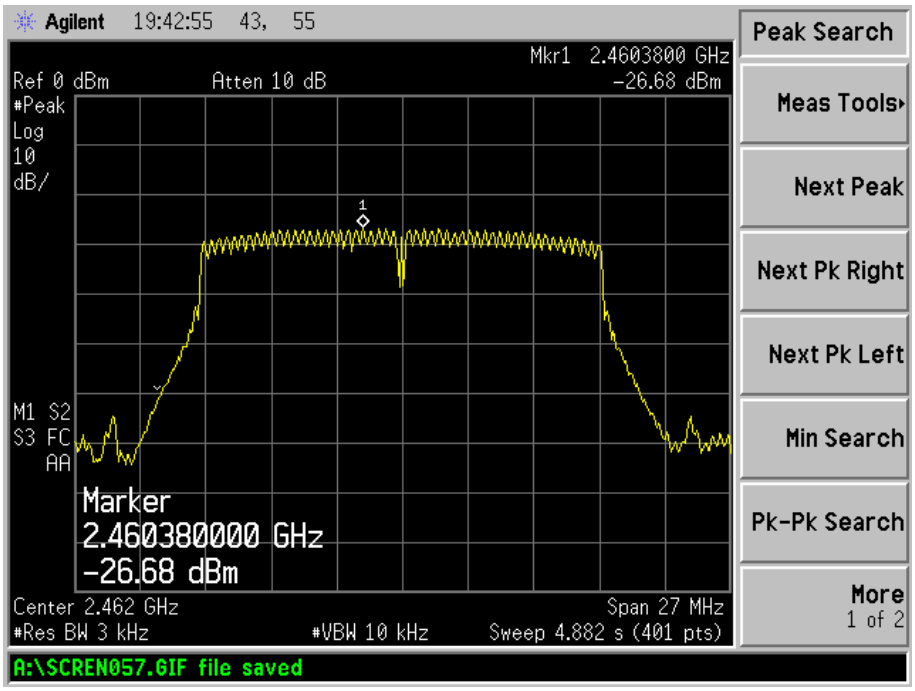
802.11g-Low Channel



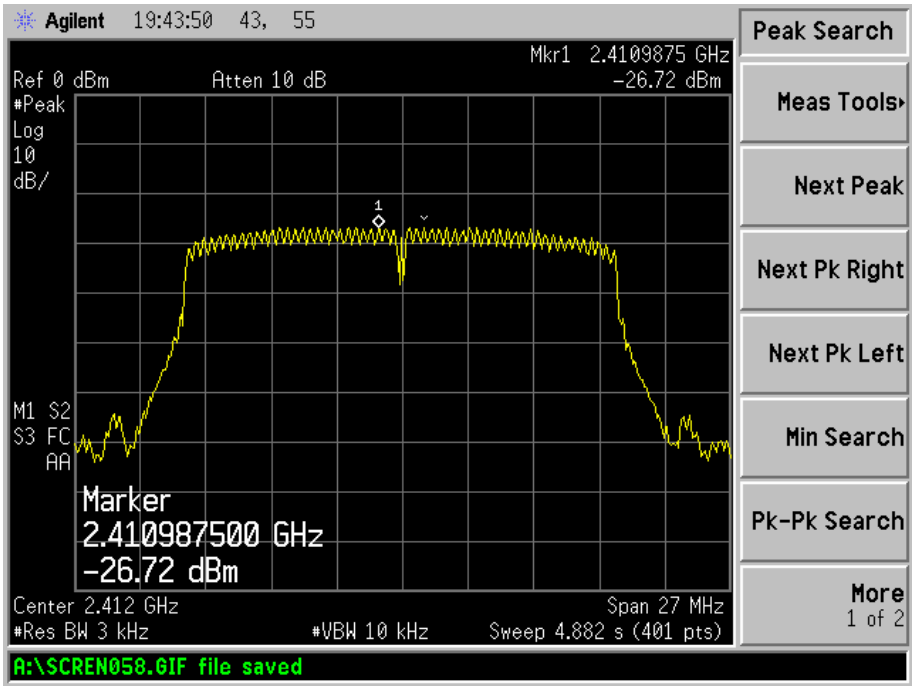
802.11g-Middle Channel



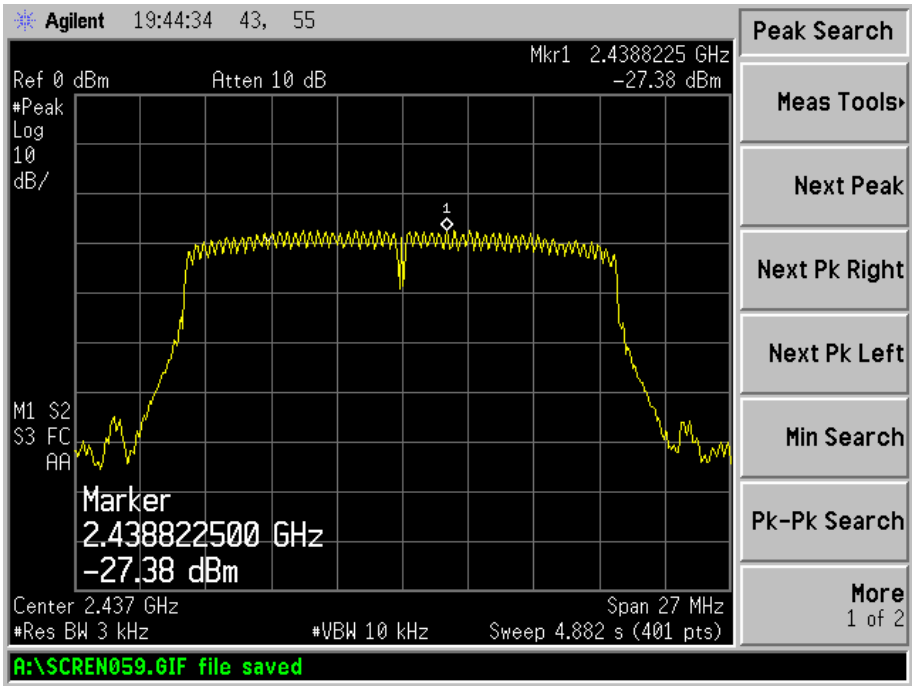
802.11g-High Channel



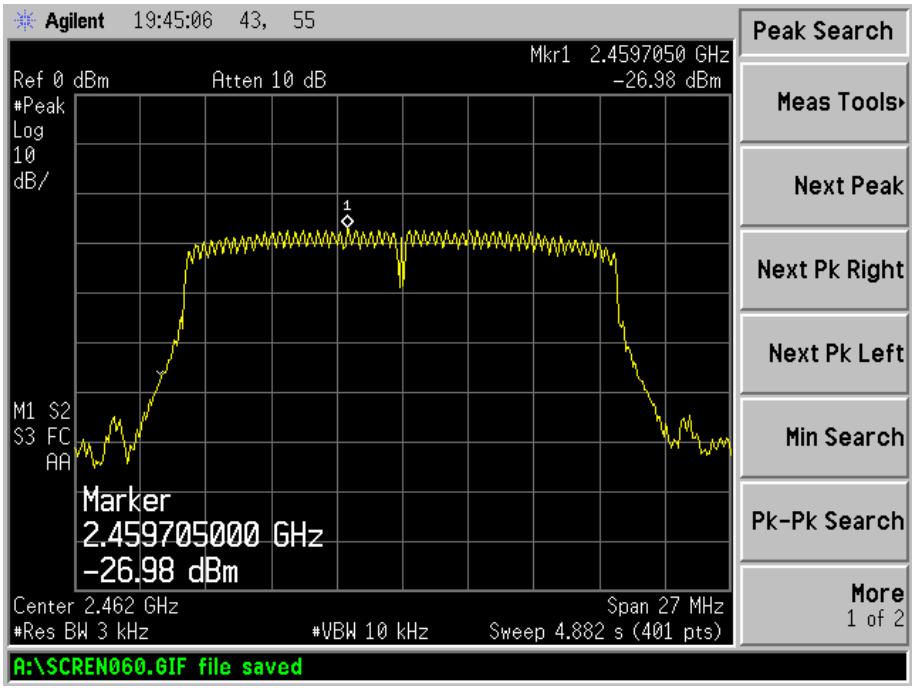
802.11n-HT20-Low Channel



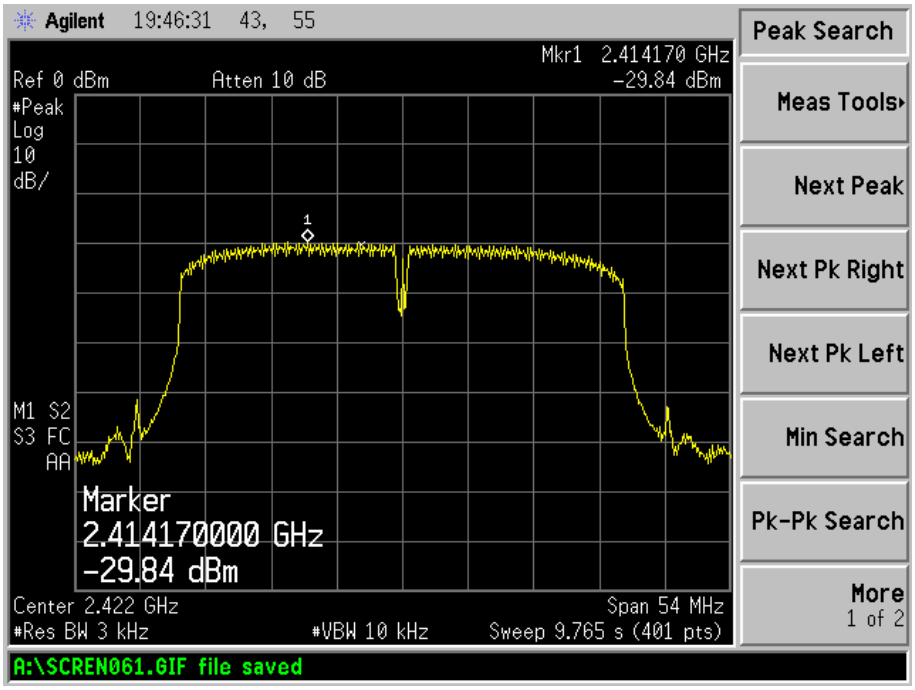
802.11n-HT20-Middle Channel



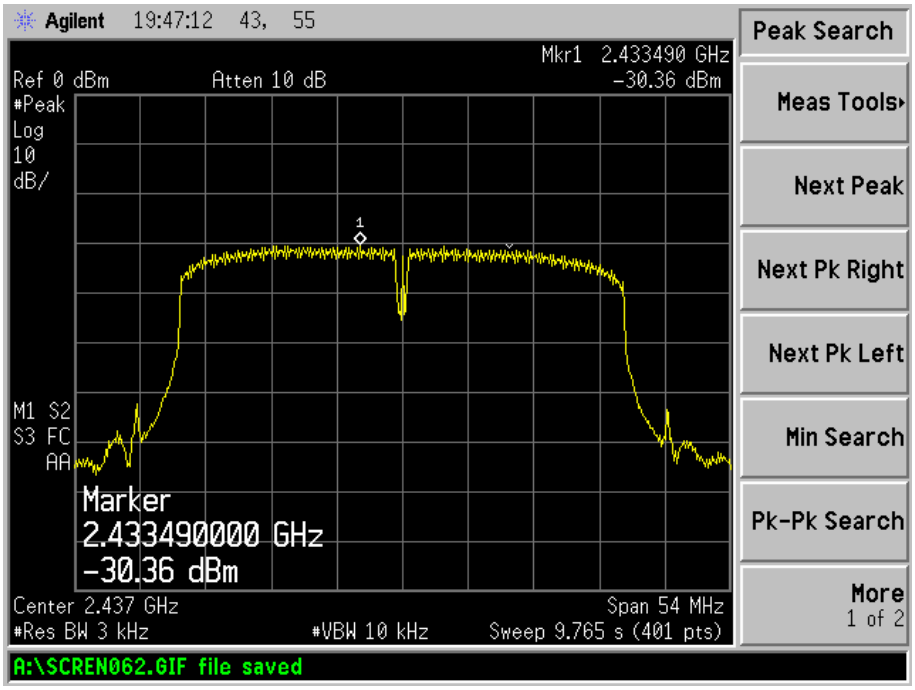
802.11n-HT20-High Channel



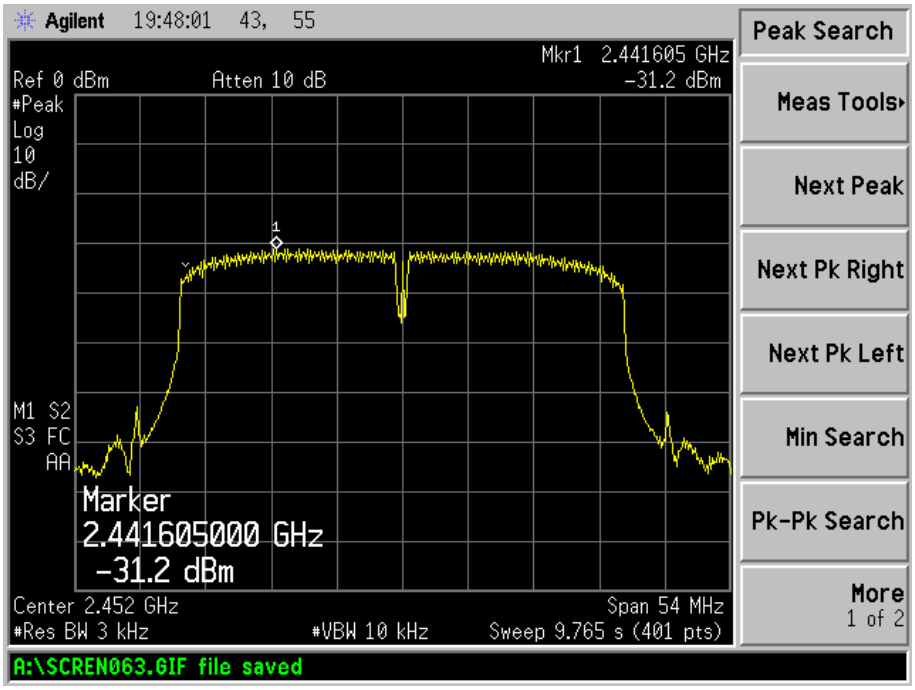
802.11n-HT40-Low Channel



802.11n-HT40-Middle Channel



802.11n-HT40-High Channel



5. 6dB Bandwidth

5.1 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.

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

5.3 Test Procedure

According to the KDB 558074, the test method of option 1 (section 7.1) of emission bandwidth 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 center frequency of spectrum analyzer = operating frequency.
3. Set the spectrum analyzer as RBW = 100kHz (1-5% of Bandwidth.), VBW>= 3 x RBW.
4. Set Detector = Peak, Trace mode = Max hold, Sweep time = Auto, allow the trace to stabilize.
5. 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.

5.4 Environmental Conditions

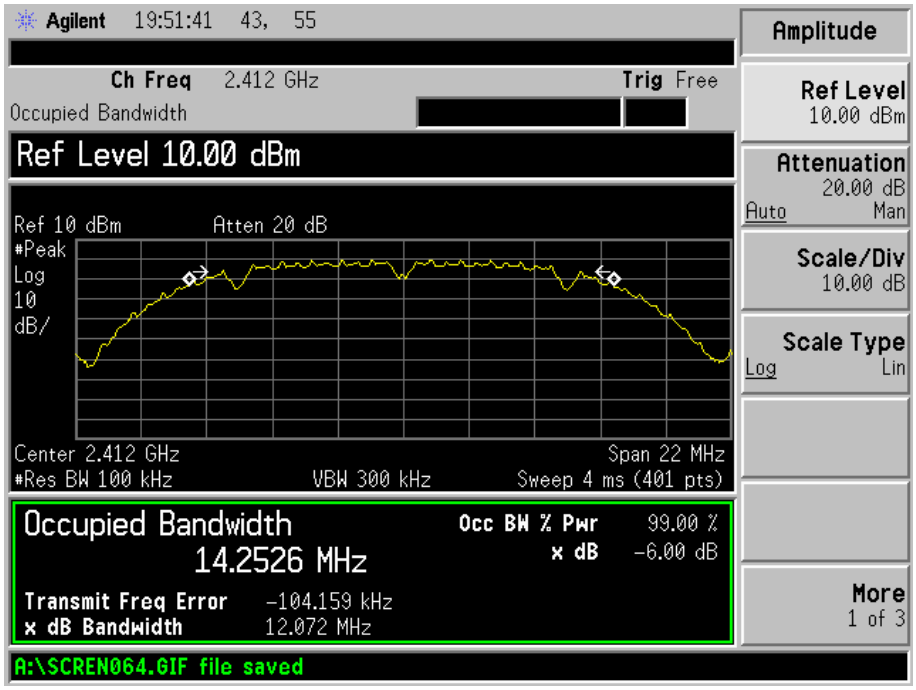
Temperature:	24° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

5.5 Summary of Test Results/Plots

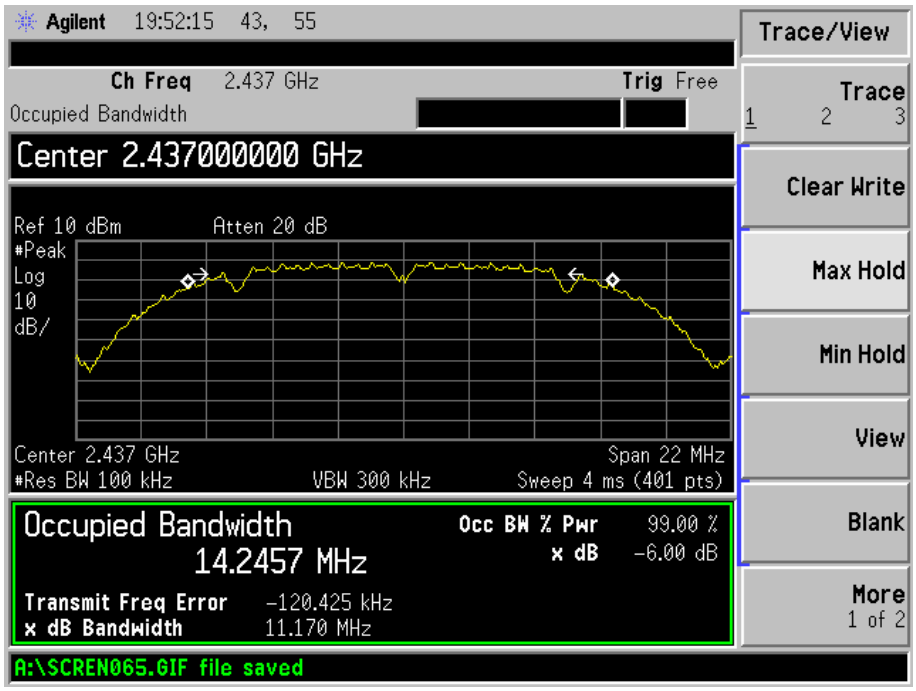
Test Mode	Test Channel MHz	6 dB Bandwidth kHz	Limit kHz
802.11b	2412	12072	500
	2437	11170	500
	2462	11117	500
802.11g	2412	16396	500
	2437	16396	500
	2462	16381	500
802.11n-HT20	2412	17328	500
	2437	17313	500
	2462	17292	500
802.11n-HT40	2422	35392	500
	2437	35293	500
	2452	35227	500

Please refer to the following test plots:

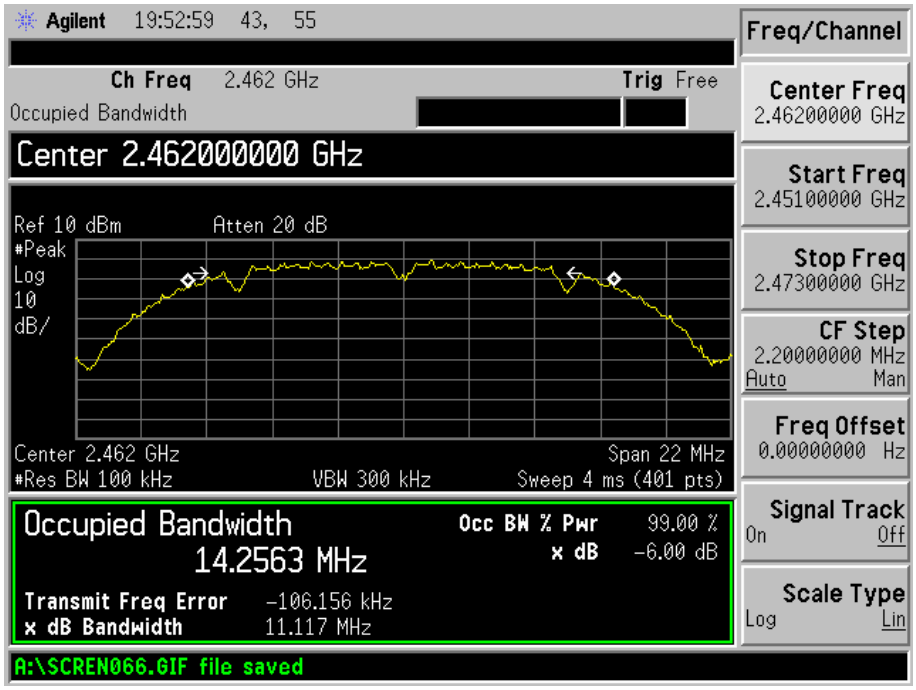
802.11b-Low Channel



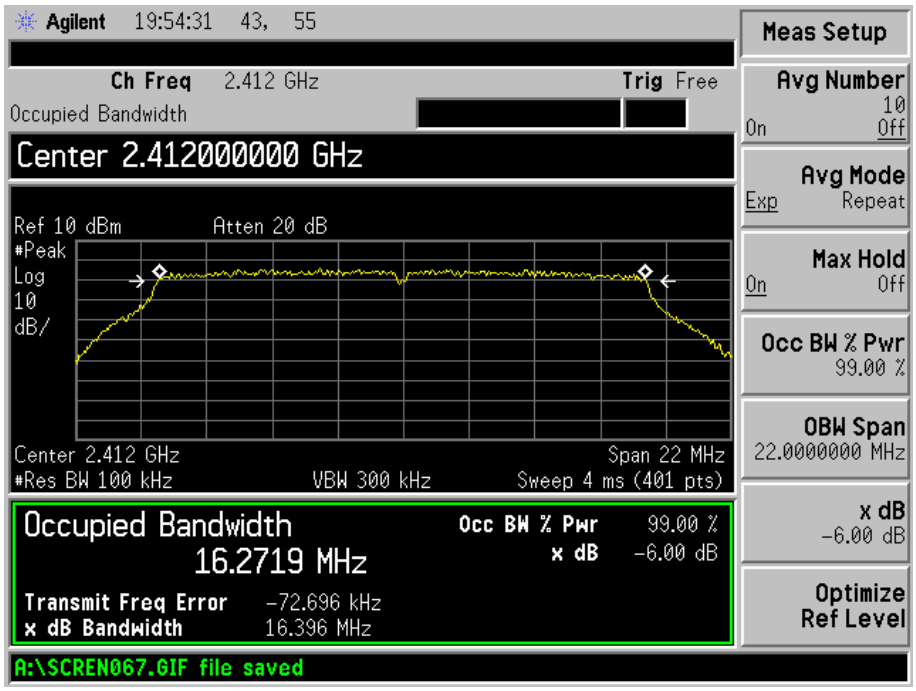
802.11b-Middle Channel



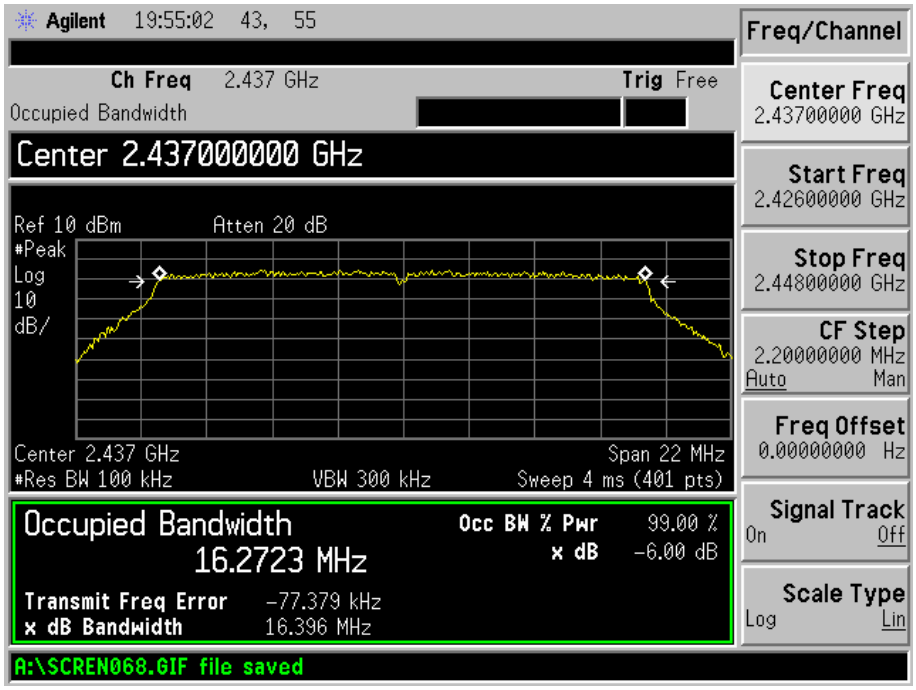
802.11b-High Channel



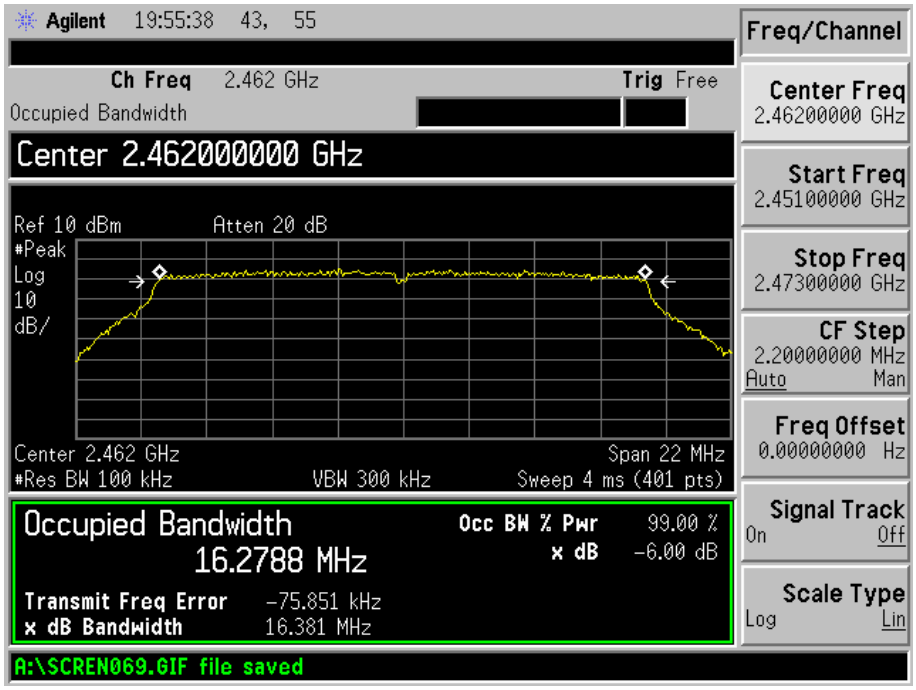
802.11g-Low Channel



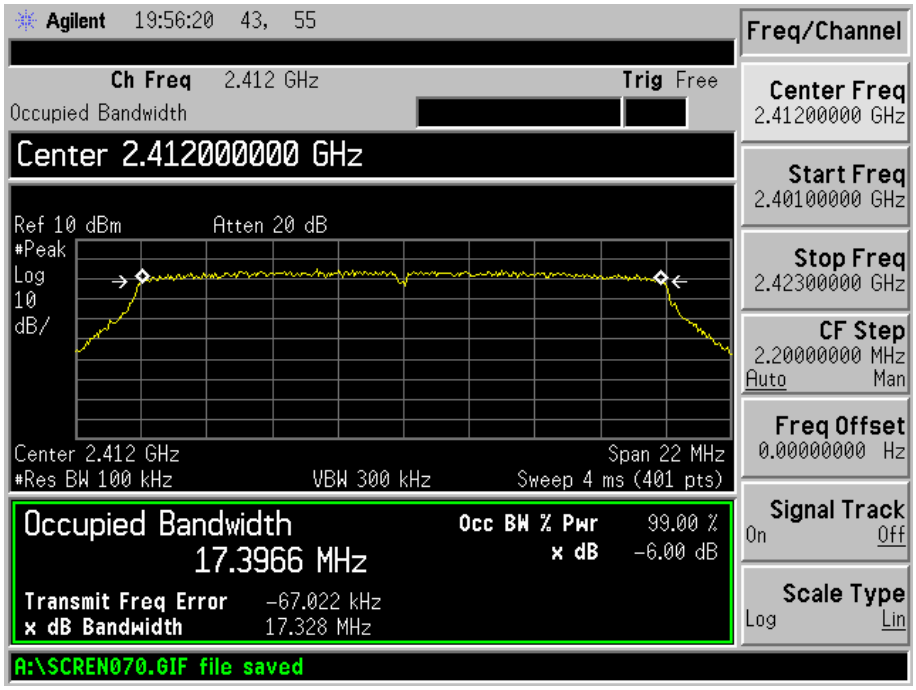
802.11g-Middle Channel



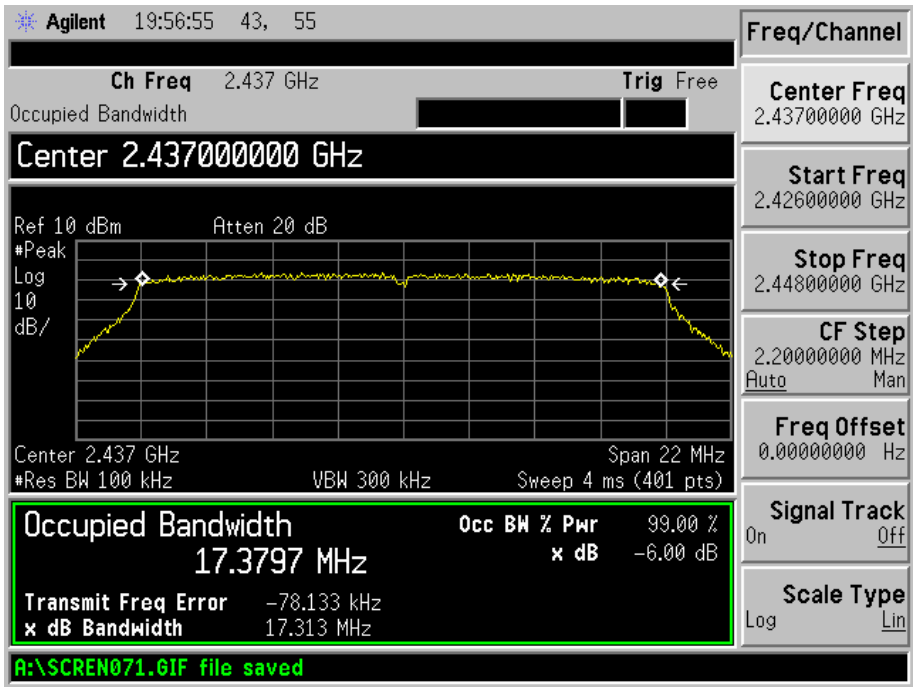
802.11g-High Channel



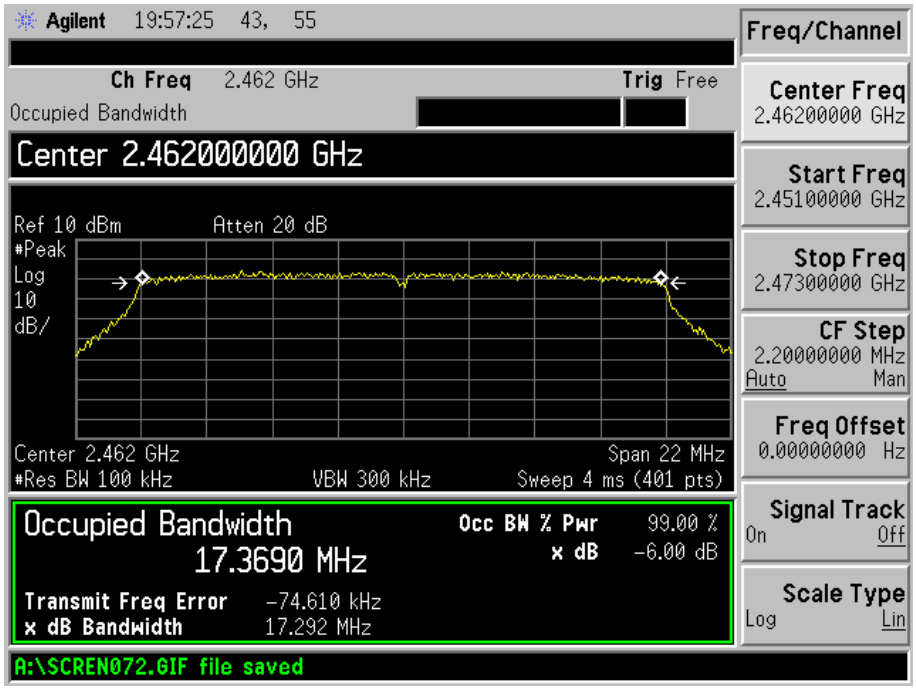
802.11n-HT20-Low Channel



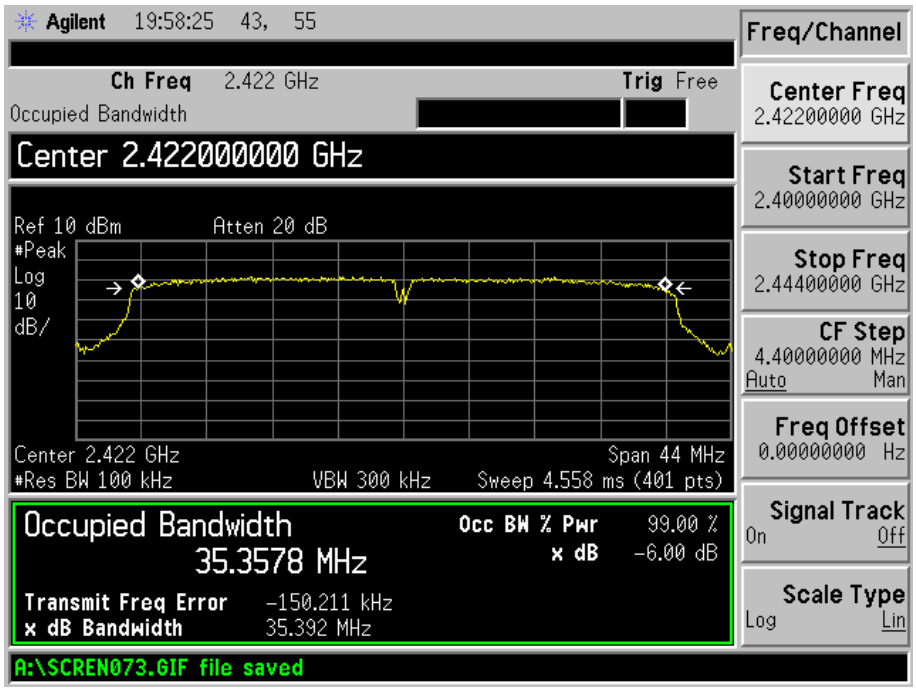
802.11n-HT20-Middle Channel



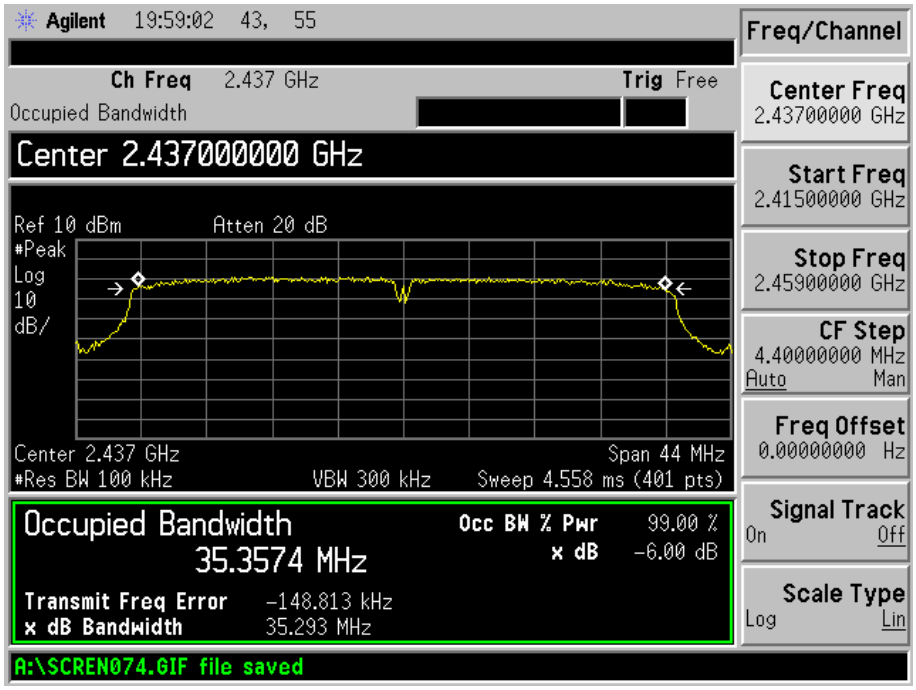
802.11n-HT20-High Channel



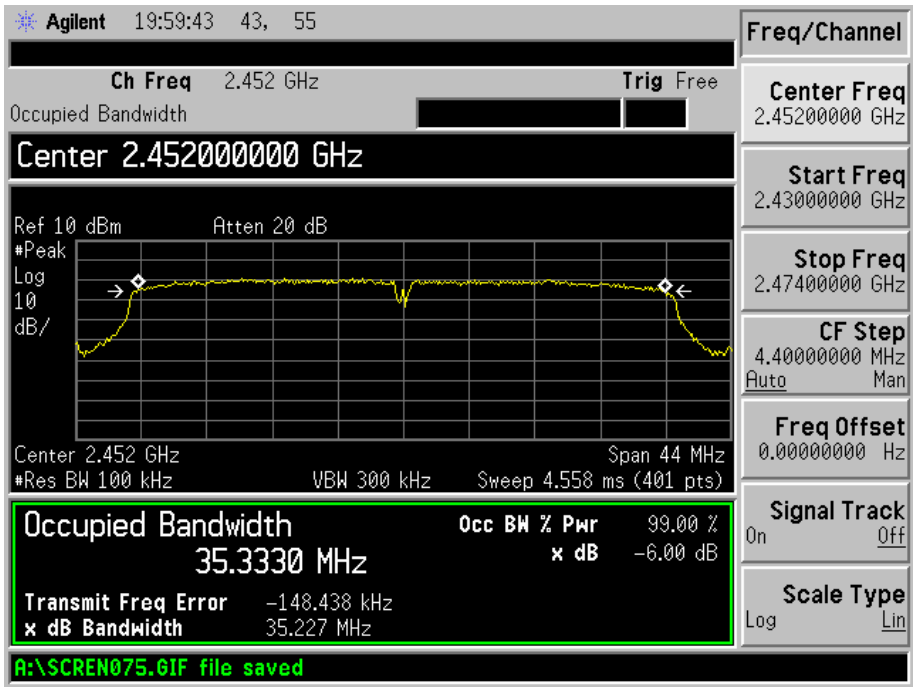
802.11n-HT40-Low Channel



802.11n-HT40-Middle Channel



802.11n-HT40-High Channel



6. RF Output Power

6.1 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.

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

6.3 Test Procedure

According to the KDB 558074, the test method of option 2 (section 8.1.2) of maximum peak conducted output power 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 the RBW = 1 MHz.
3. Set the VBW = 3 MHz.
4. Set the span to fully encompass the DTS bandwidth.
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 band/channel power measurement function with band limits set equal to the DTS bandwidth edges (for some analyzers, this may require a manual override to ensure use of peak detector).

6.4 Environmental Conditions

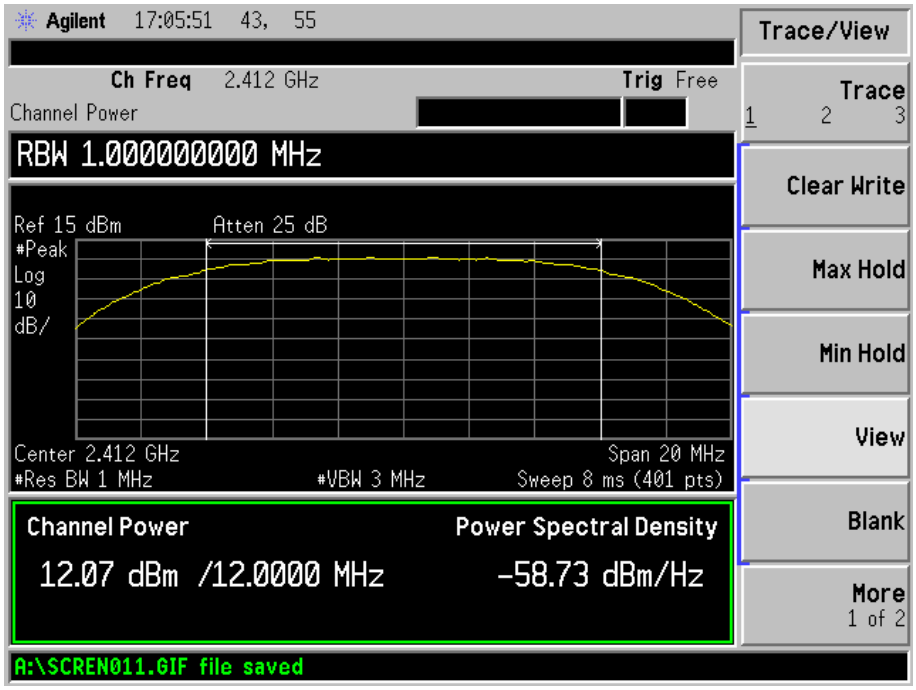
Temperature:	21° C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

6.5 Summary of Test Results/Plots

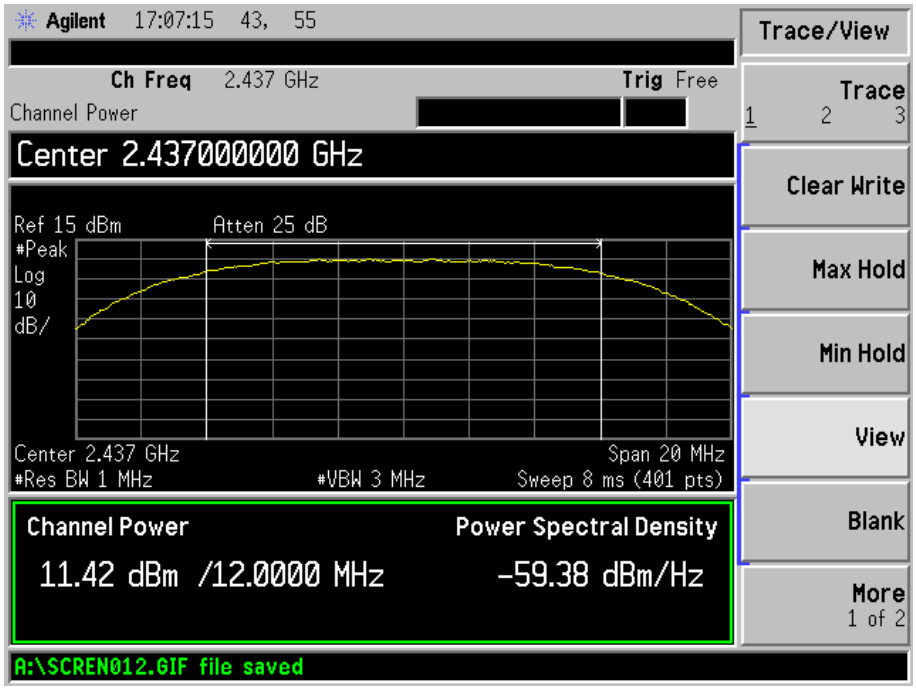
Test Mode	Frequency MHz	Reading dBm	Output Power mW	Limit mW
802.11b _1Mbps	2412	12.07	16.11	1000
	2437	11.42	13.87	1000
	2462	9.83	9.62	1000
802.11b _11Mbps	2412	11.83	15.24	1000
	2437	11.20	13.18	1000
	2462	10.10	10.23	1000
802.11g_6Mbps	2412	7.79	6.01	1000
	2437	7.05	5.07	1000
	2462	6.56	4.53	1000
802.11g_54Mbps	2412	7.99	6.30	1000
	2437	6.81	4.80	1000
	2462	6.54	4.51	1000
802.11n HT20_MCS0	2412	8.04	6.37	1000
	2437	6.96	4.96	1000
	2462	6.86	4.85	1000
802.11n HT20_MCS7	2412	7.83	6.07	1000
	2437	7.04	5.06	1000
	2462	6.79	4.78	1000
802.11n HT40_MCS0	2422	7.06	5.08	1000
	2437	6.79	4.78	1000
	2452	6.08	4.06	1000
802.11n HT40_MCS7	2422	7.79	6.01	1000
	2437	6.41	4.38	1000
	2452	6.18	4.15	1000

Please refer to the following test plots:

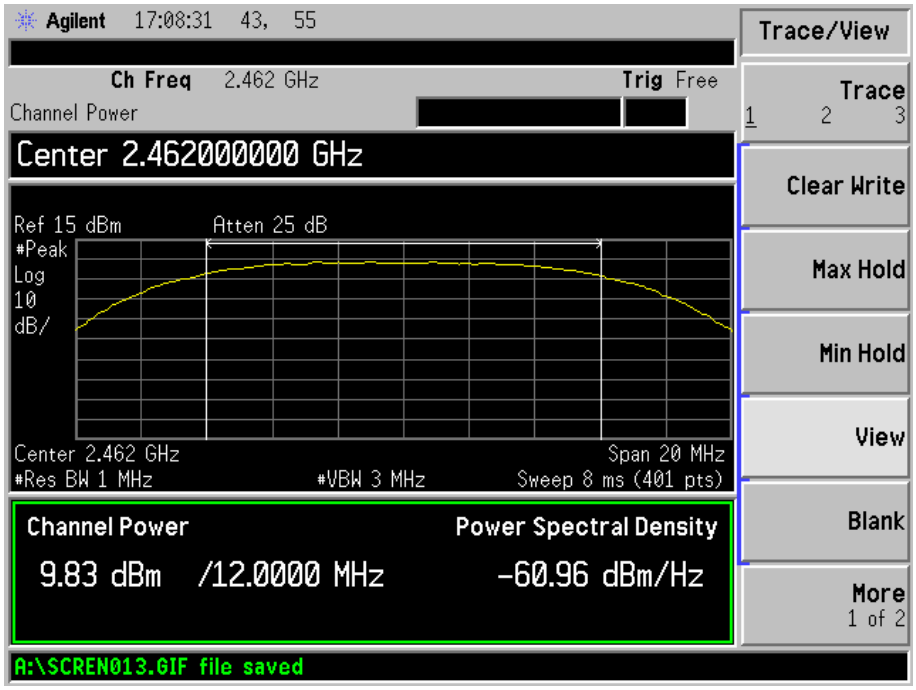
802.11b-1Mbps-Low Channel



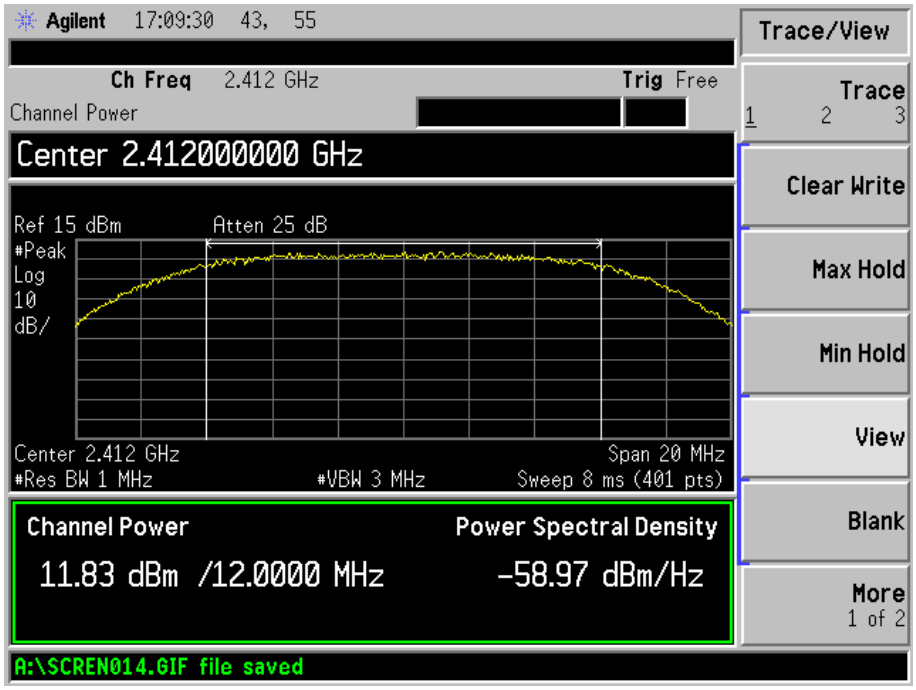
802.11b-1Mbps-Middle Channel



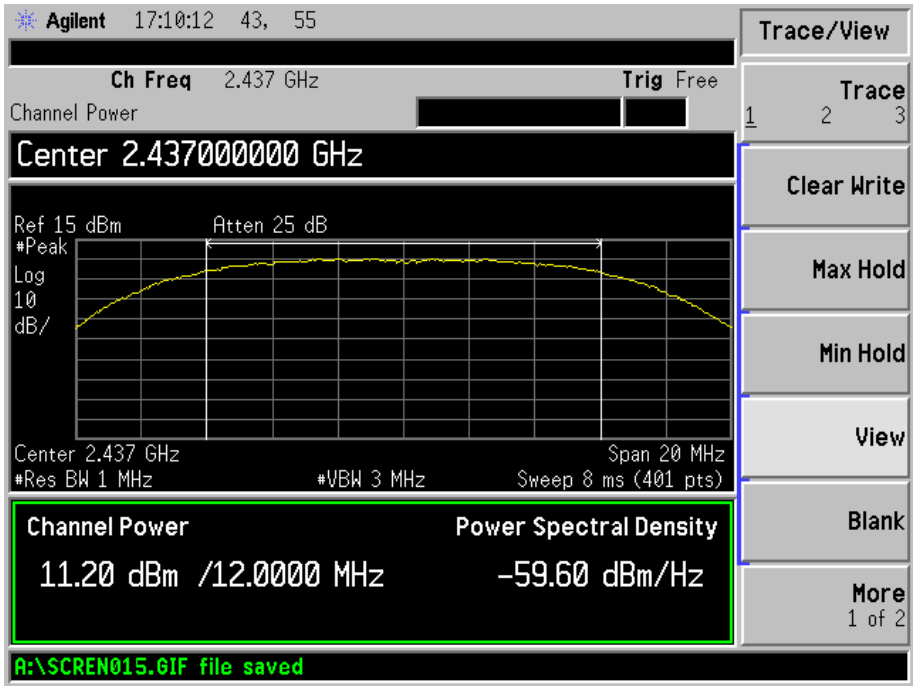
802.11b-1Mpbs-High Channel



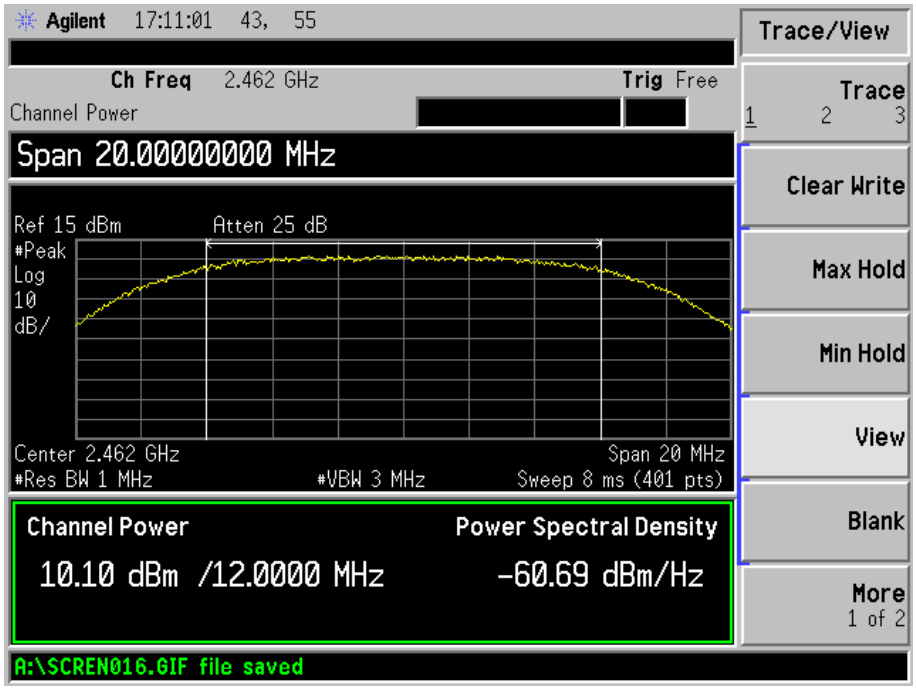
802.11b- 11Mbps-Low Channel



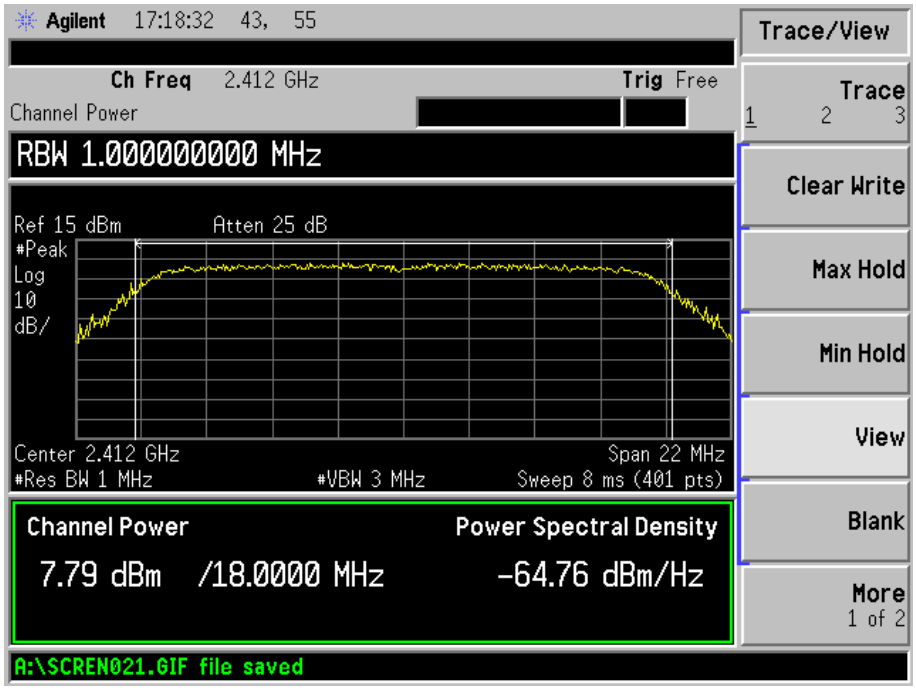
802.11b-11Mbps-Middle Channel



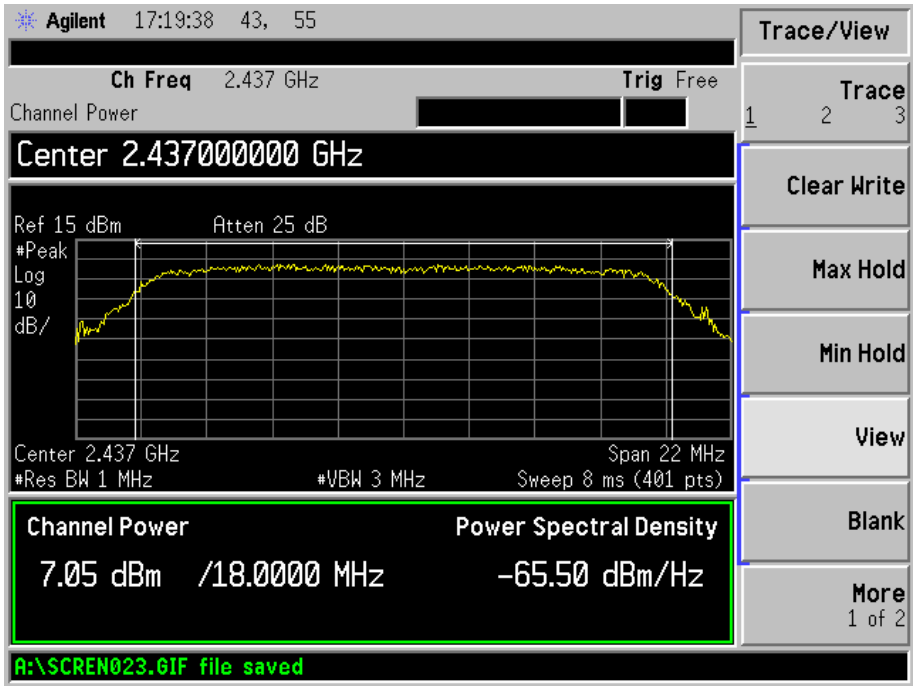
802.11b-11Mpbs-High Channel



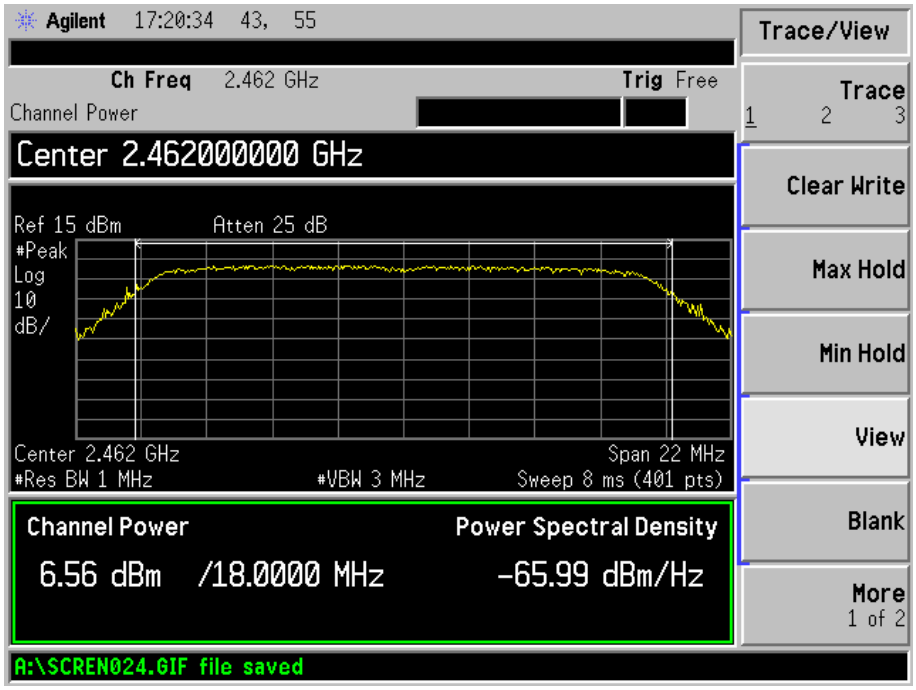
802.11g-6Mbps-Low Channel



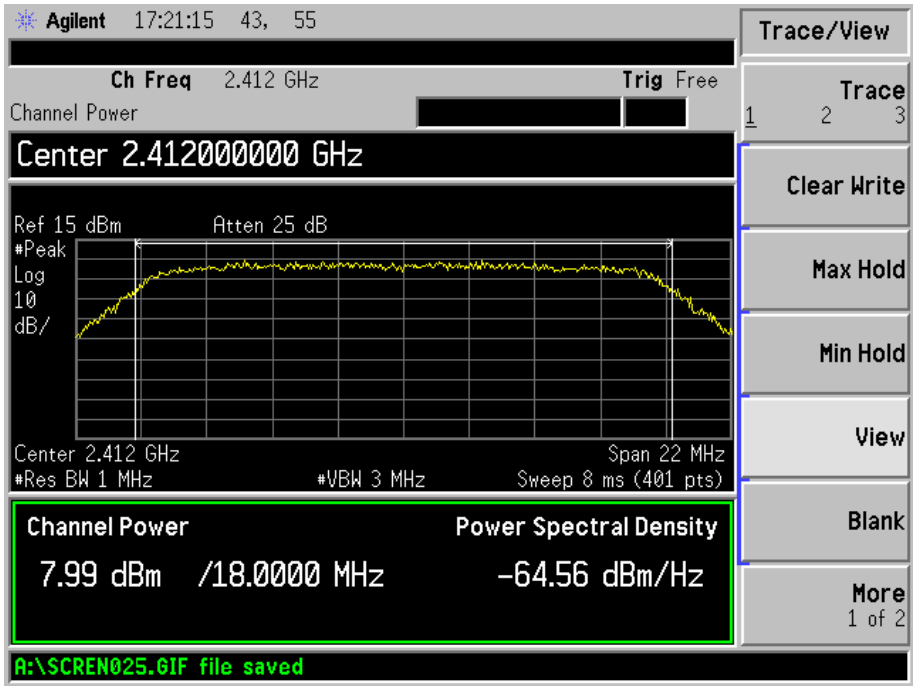
802.11g-6Mbps-Middle Channel



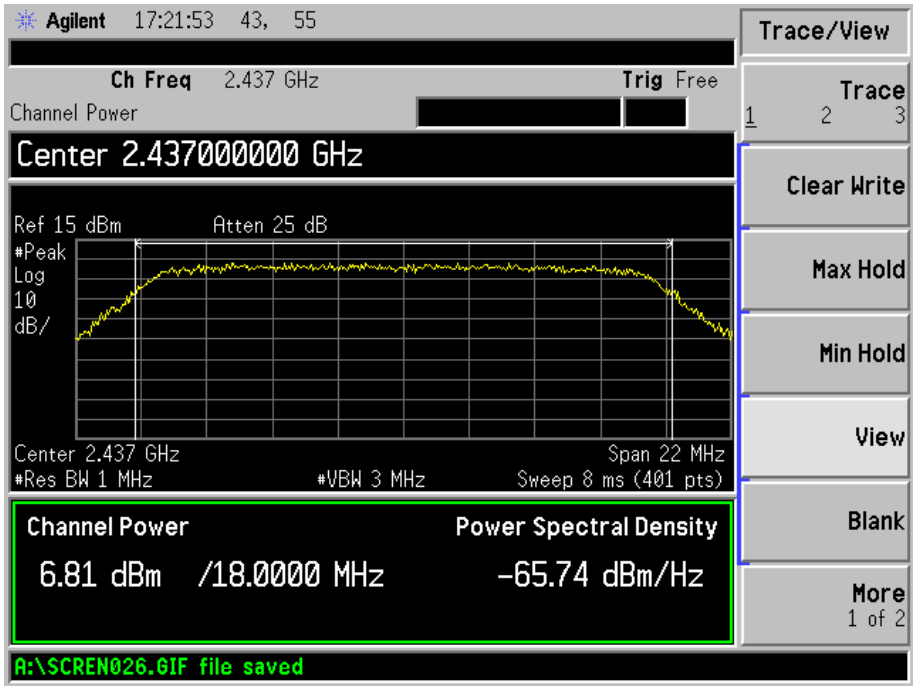
802.11g-6Mpbs-High Channel



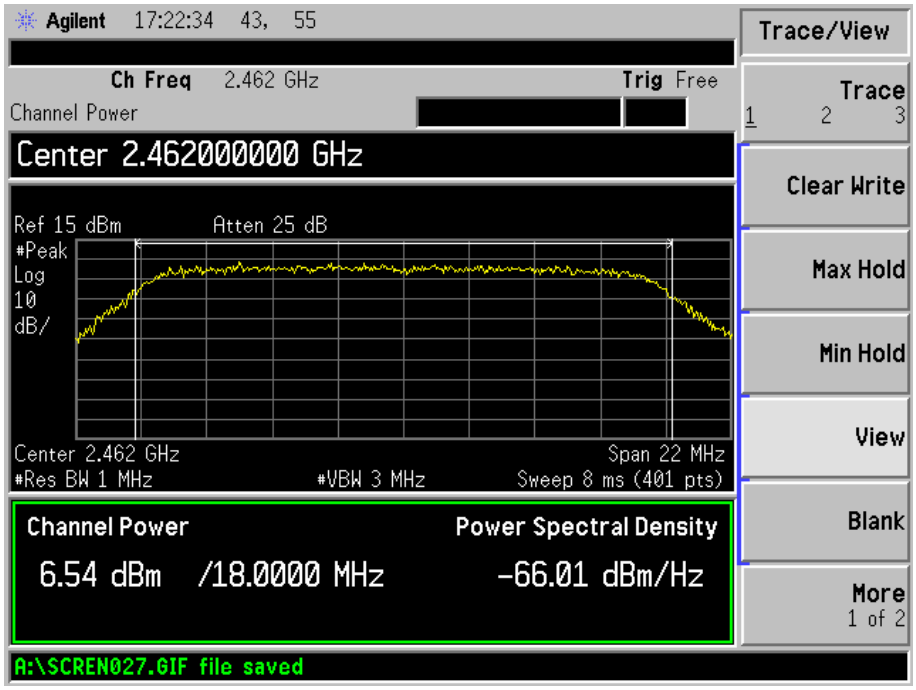
802.11g-54Mpbs-Low Channel



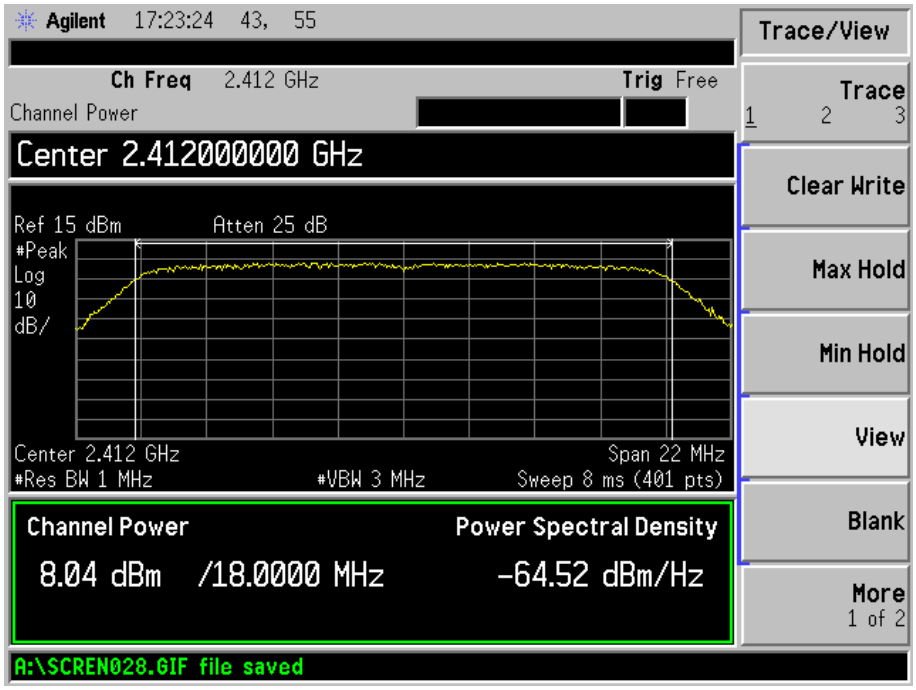
802.11g-54Mpbs-Middle Channel



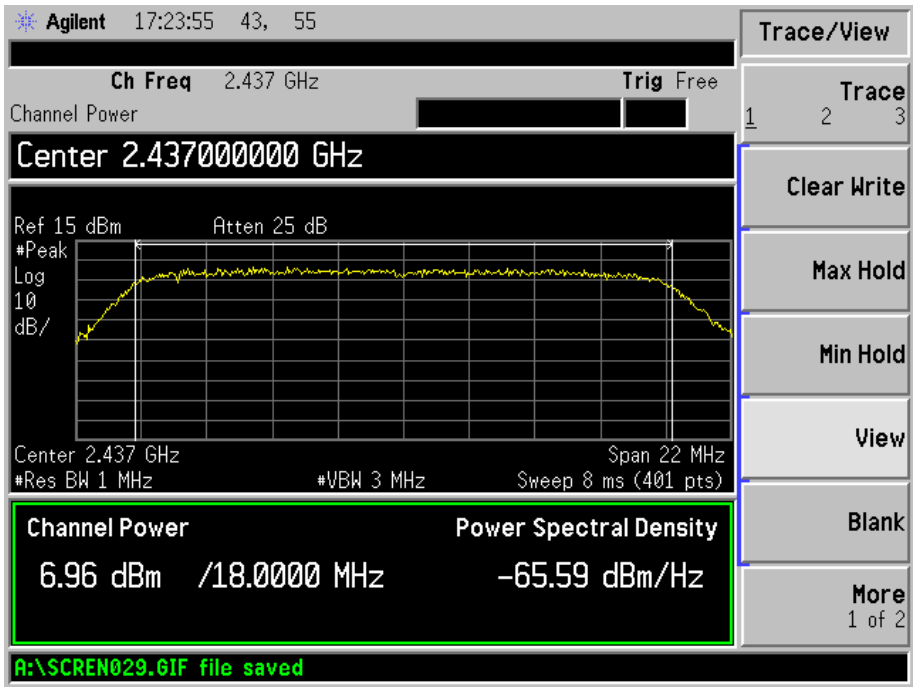
802.11g-54Mpbs-High Channel



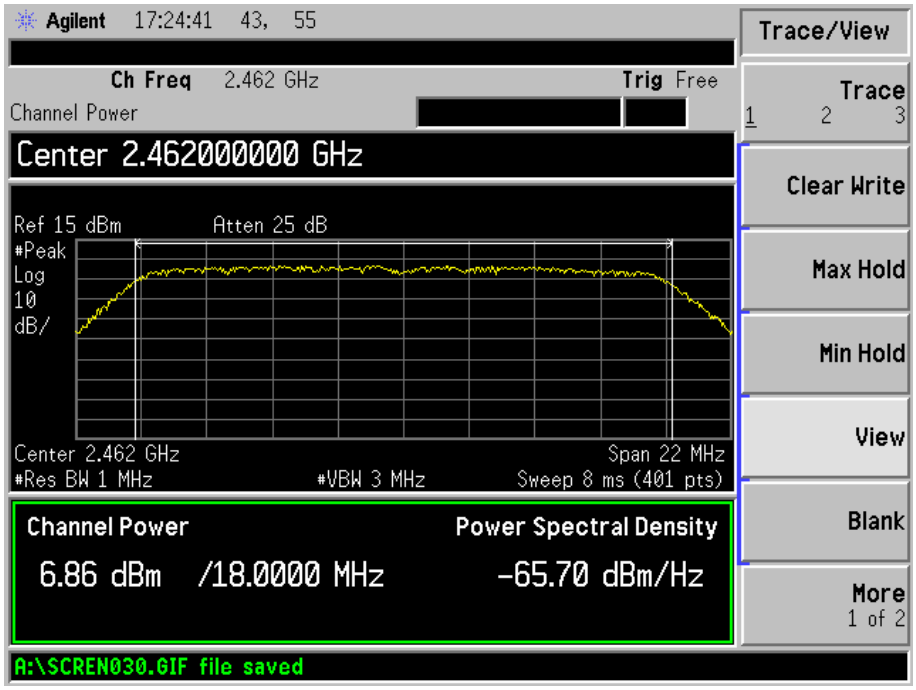
802.11n-HT20-MCS0-Low Channel



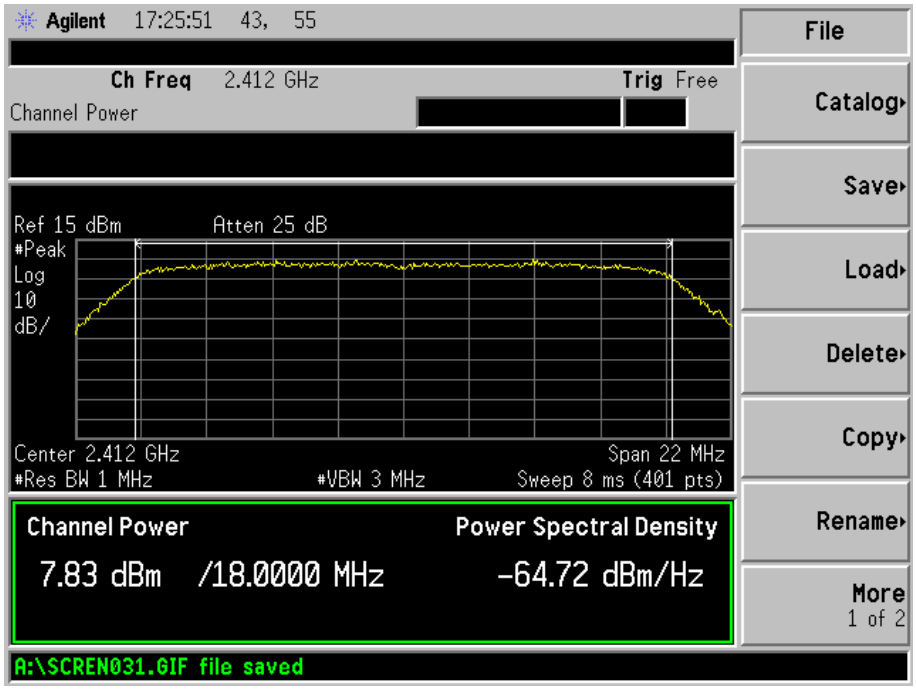
802.11n-HT20-MCS0-Middle Channel



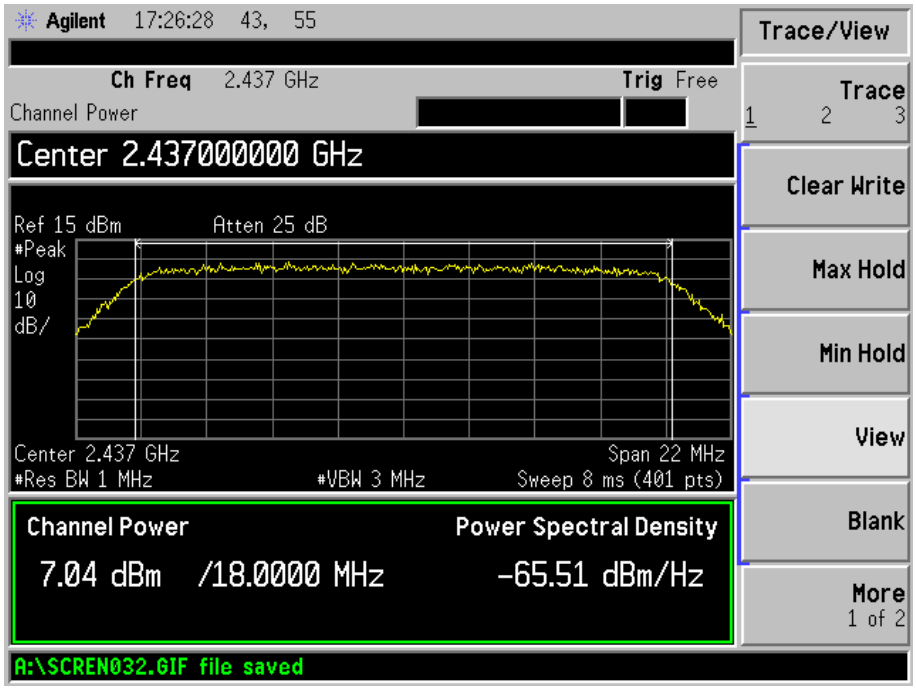
802.11n-HT20-MCS0-High Channel



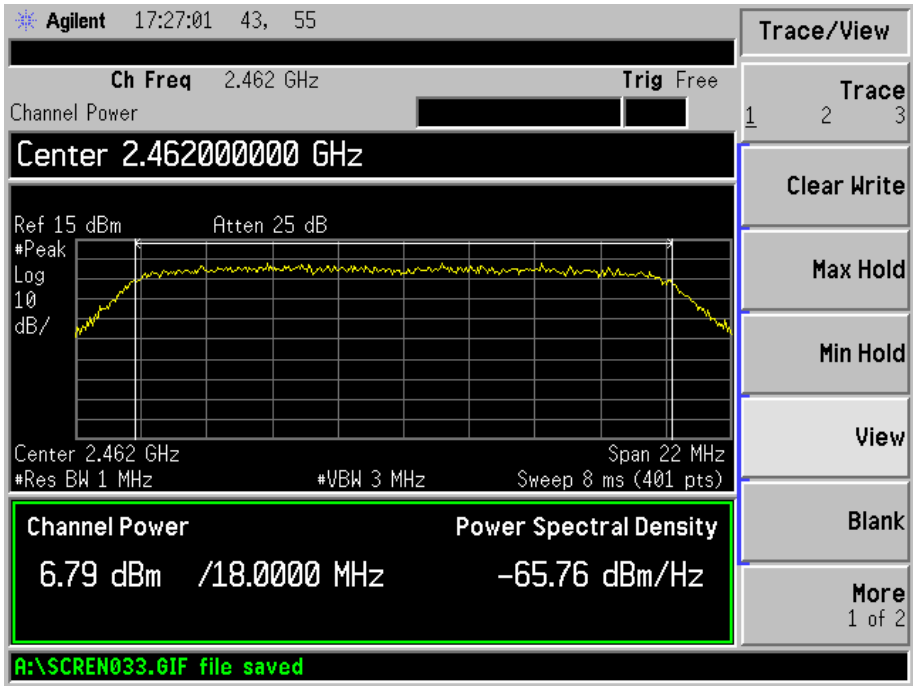
802.11n-HT20-MCS7-Low Channel



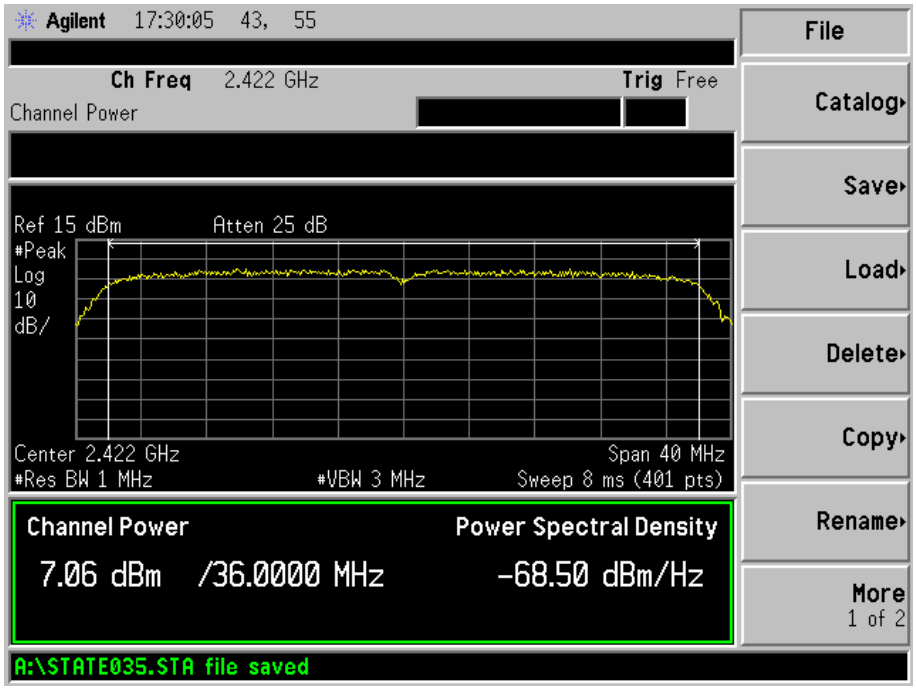
802.11n-HT20-MCS7-Middle Channel



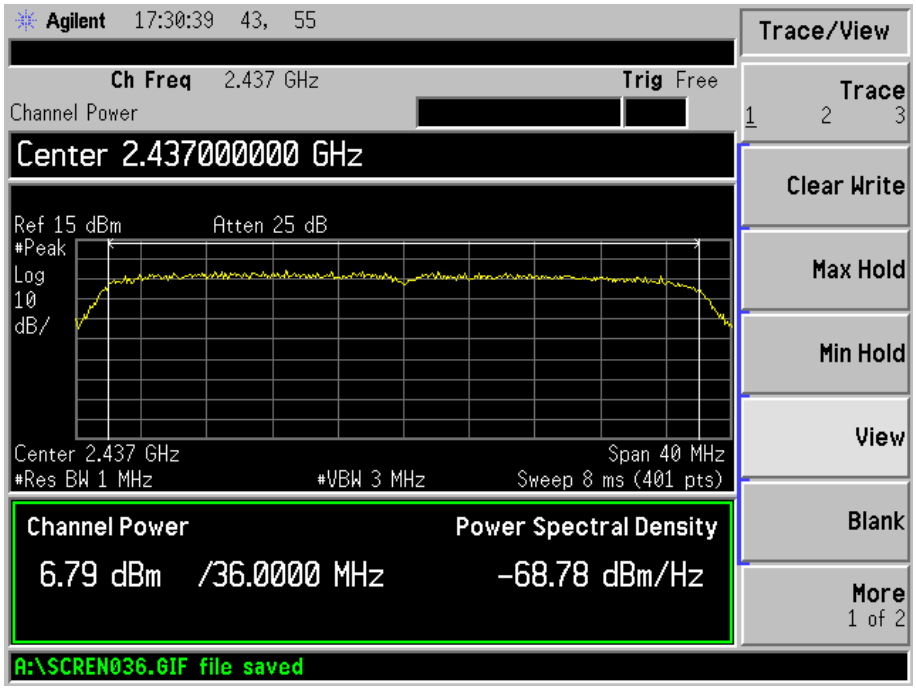
802.11n-HT20-MCS7-High Channel



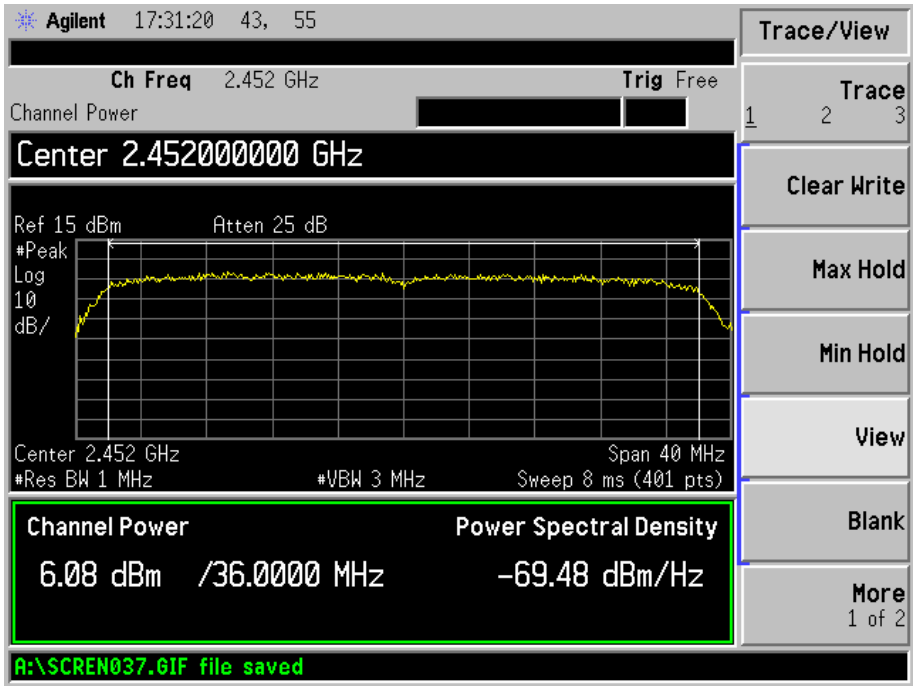
802.11n-HT40-MCS0-Low Channel



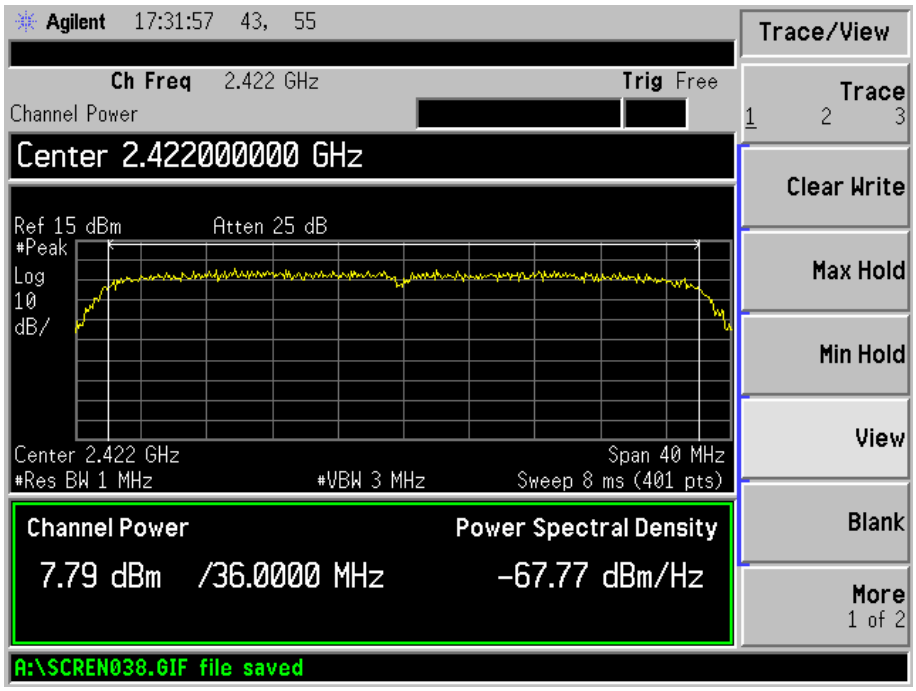
802.11n-HT40-MCS0-Middle Channel



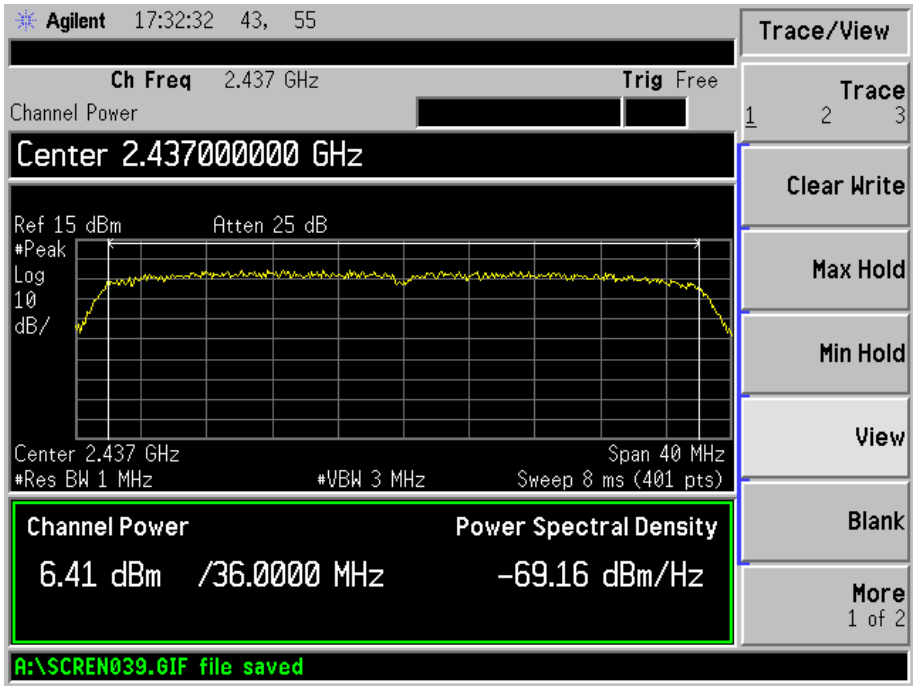
802.11n-HT40-MCS0-High Channel



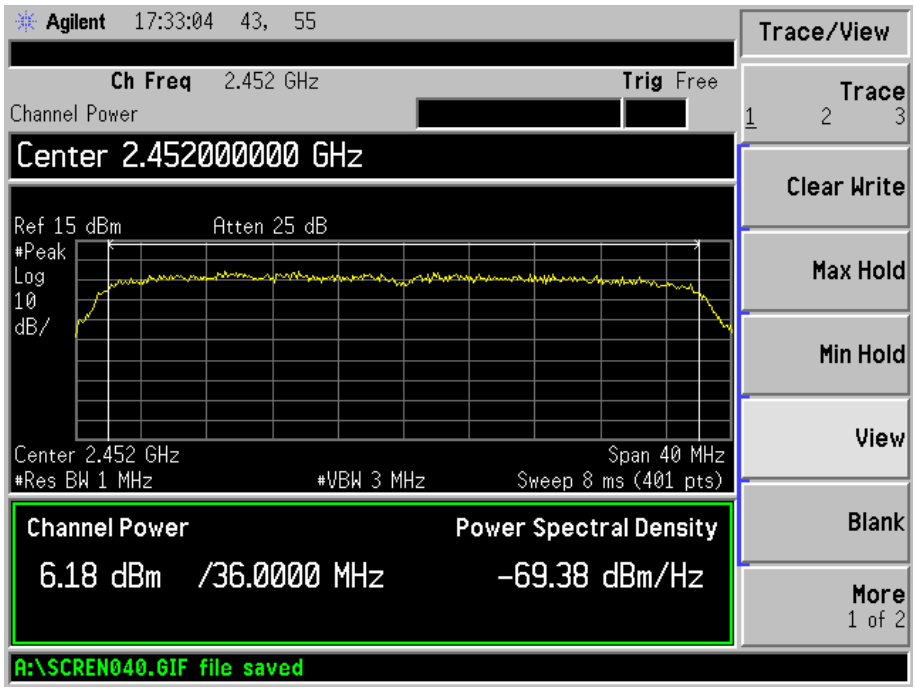
802.11n-HT40-MCS7-Low Channel



802.11n-HT40-MCS7-Middle Channel



802.11n-HT40-MCS7-High Channel



7. Field Strength of Spurious Emissions

7.1 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.

7.2 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).

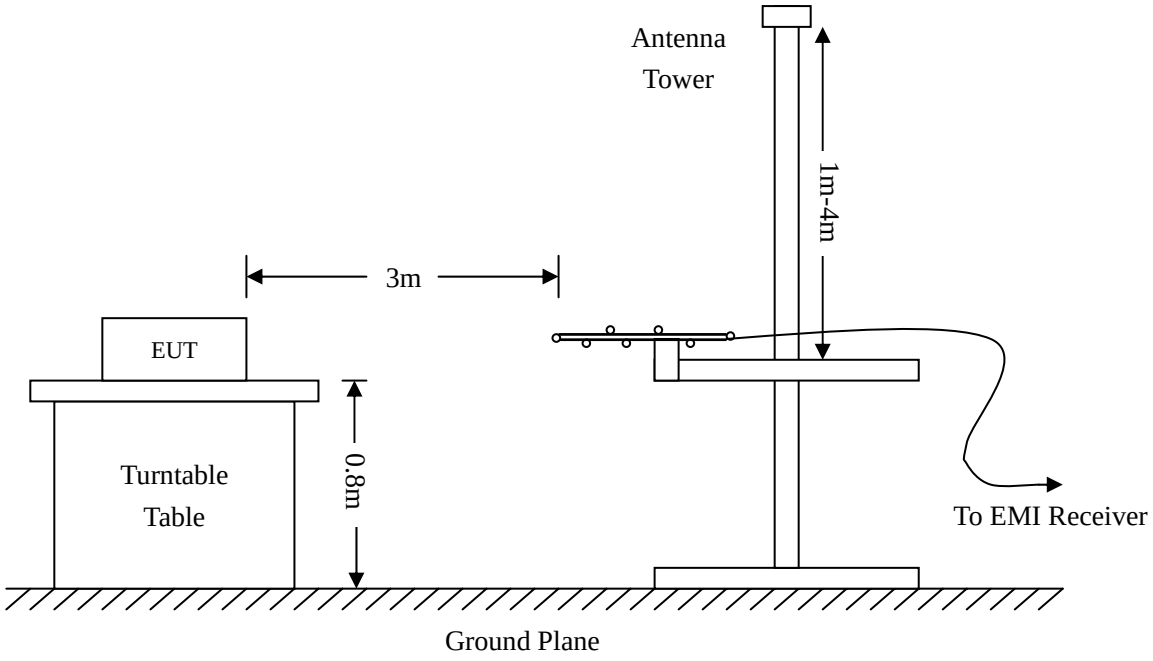
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

7.3 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	2012-02-25	2013-02-24
Horn Antenna	ETS	3117	00086197	2012-02-25	2013-02-24
Horn Antenna	ETS	3116B	00088203	2012-02-25	2013-02-24
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2012-02-25	2013-02-24

7.4 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.



7.5 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

7.6 Environmental Conditions

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

7.7 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:

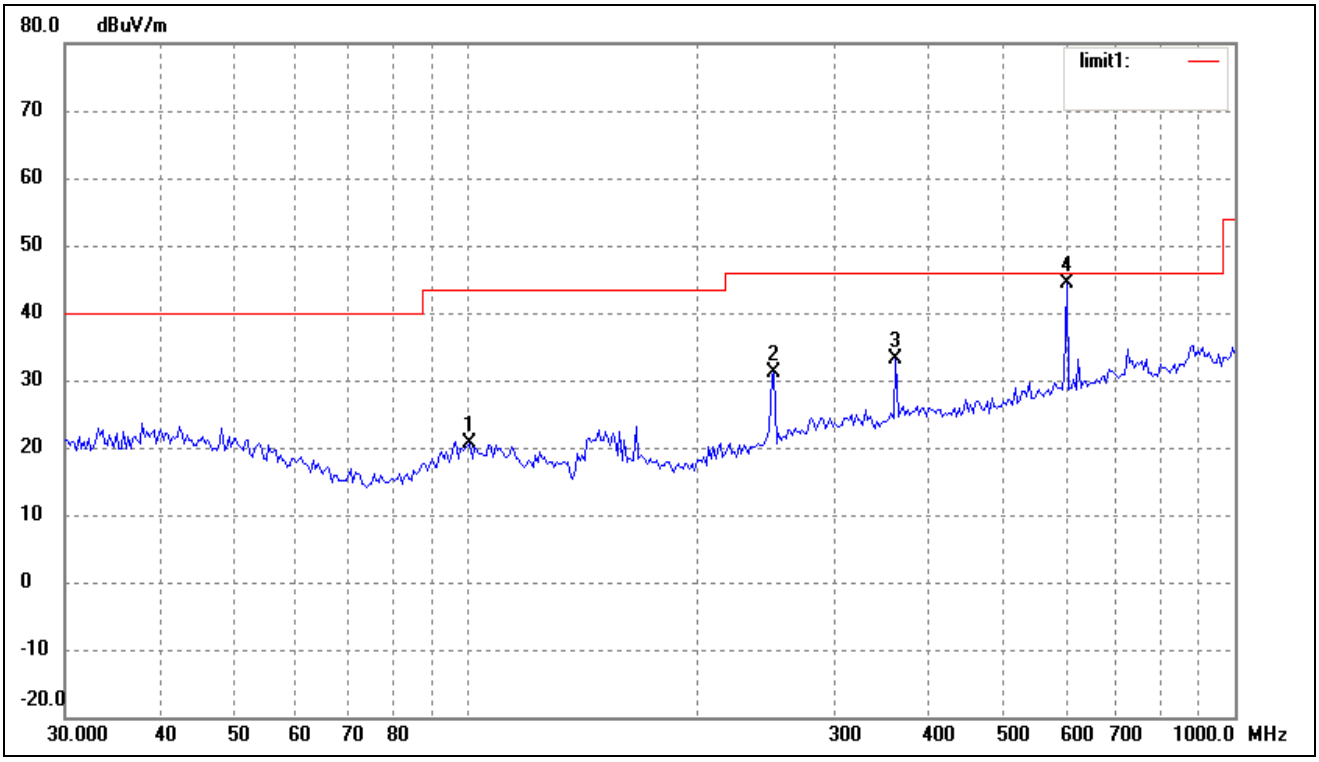
-1.71 dB at **603.5392 MHz** in the **Horizontal** polarization for **802.11b Low Channel** mode,
9kHz to **25 GHz**, **3 Meters**

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)

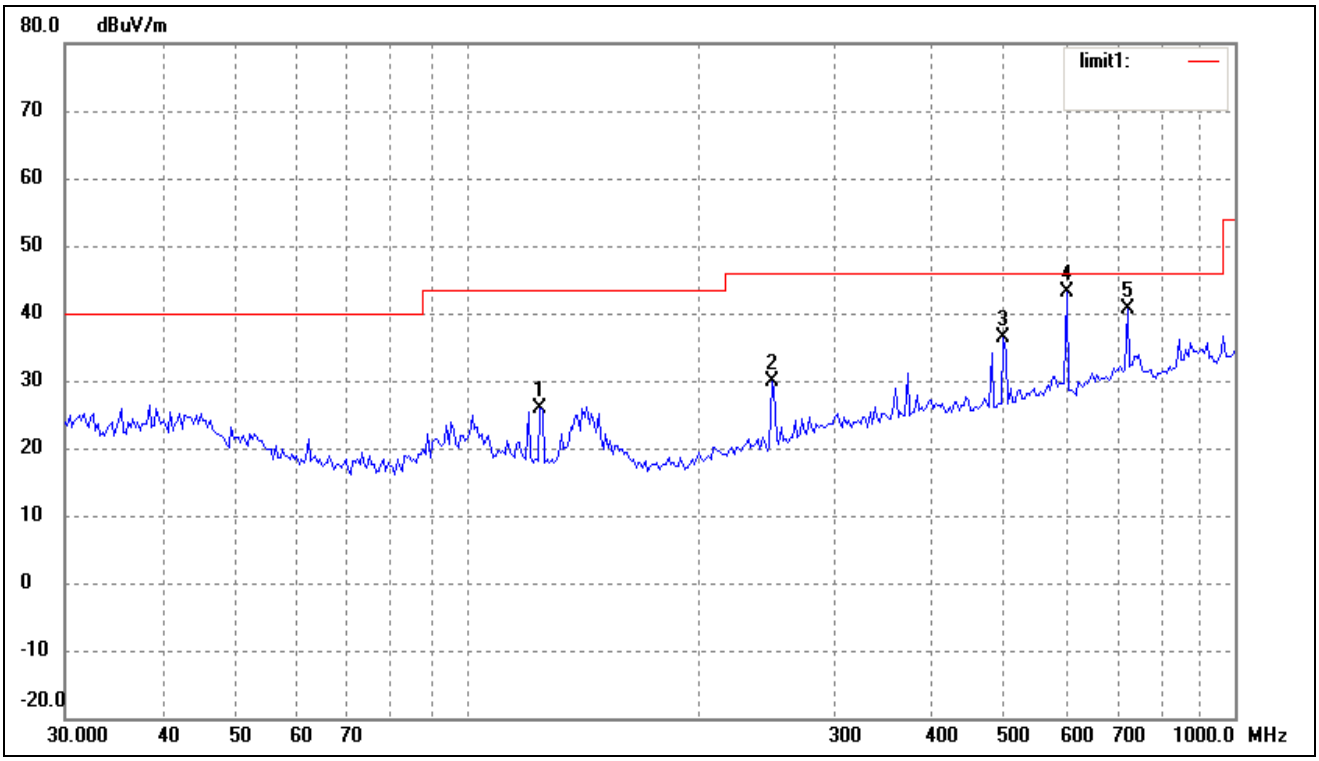
EUT: *Air pen express*
Tested Model: *A500*
Operating Condition: *Transmitting*
Comment: *802.11b Low Channel-2412MHz*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	100.9340	13.93	6.75	20.68	43.50	-22.82	360	100	peak
2	251.1804	23.68	7.34	31.02	46.00	-14.98	360	100	peak
3	361.7139	22.53	10.69	33.22	46.00	-12.78	360	100	peak
4	603.5392	29.67	14.62	44.29	46.00	-1.71	360	100	peak
1	100.9340	13.93	6.75	20.68	43.50	-22.82	360	100	peak

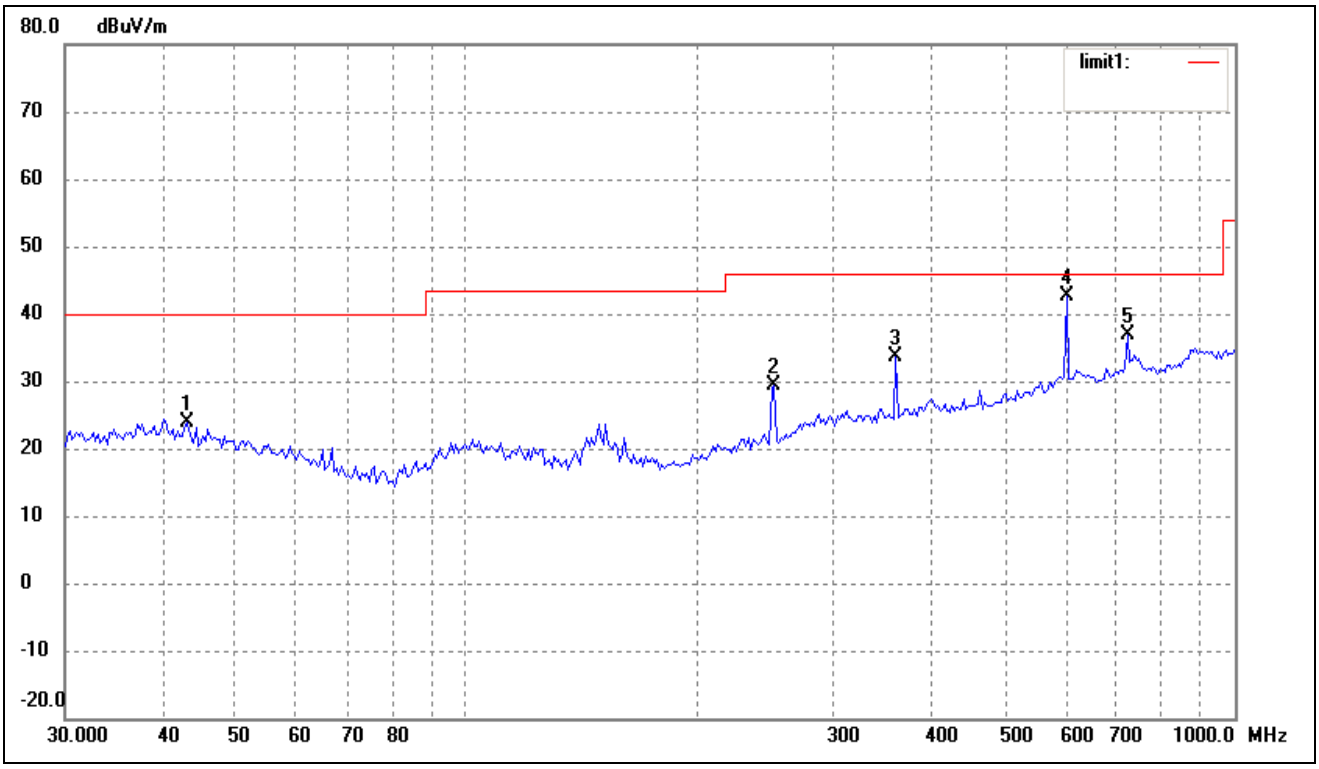
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	124.5690	21.42	4.53	25.95	43.50	-17.55	360	100	peak
2	249.4250	22.56	7.27	29.83	46.00	-16.17	360	100	peak
3	499.4247	24.21	12.18	36.39	46.00	-9.61	360	100	peak
4	603.5392	28.60	14.62	43.22	46.00	-2.78	360	100	peak
5	724.2611	23.78	16.93	40.71	46.00	-5.29	360	100	peak

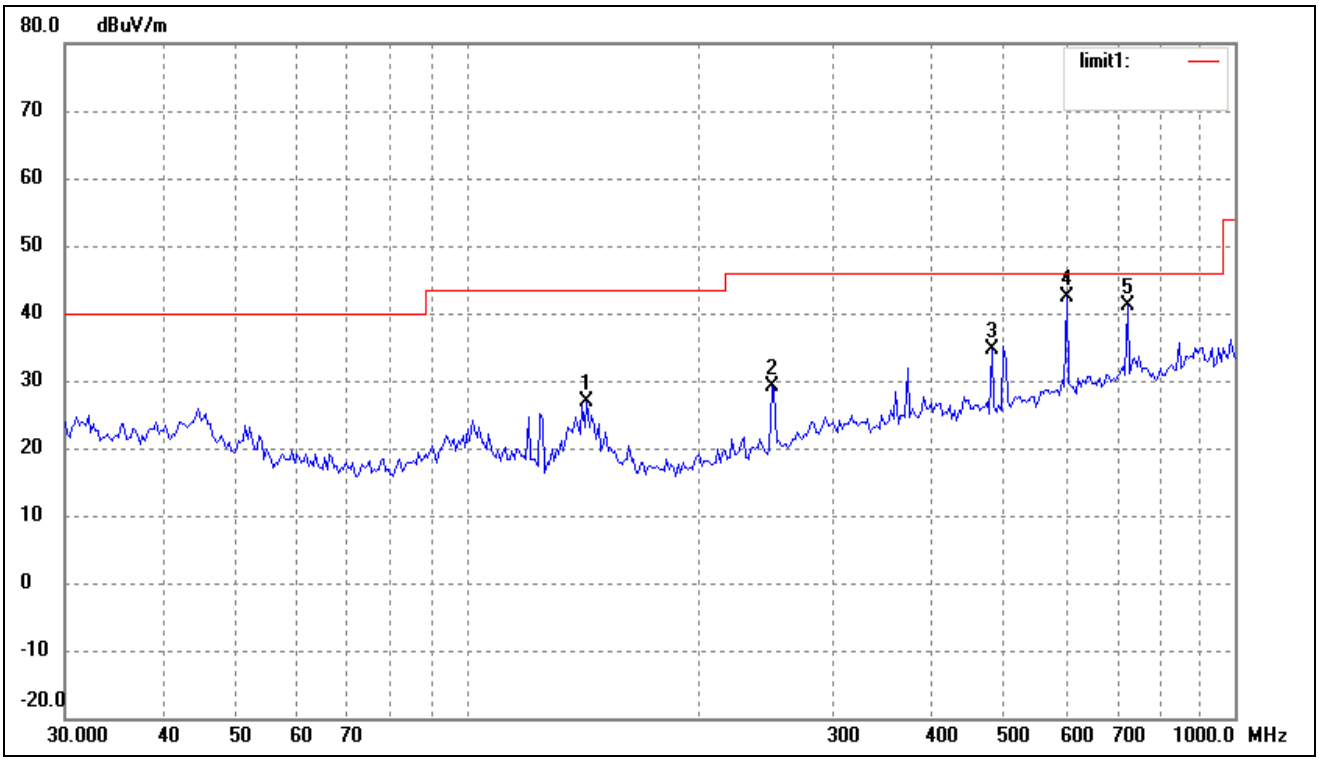
Operating Condition: *Transmitting*
Comment: *802.11b Middle Channel-2437MHz*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	43.2017	15.07	8.70	23.77	40.00	-16.23	360	100	peak
2	251.1804	21.95	7.34	29.29	46.00	-16.71	360	100	peak
3	361.7139	22.84	10.69	33.53	46.00	-12.47	360	100	peak
4	603.5392	28.11	14.62	42.73	46.00	-3.27	360	100	peak
5	724.2611	19.94	16.93	36.87	46.00	-9.13	360	100	peak

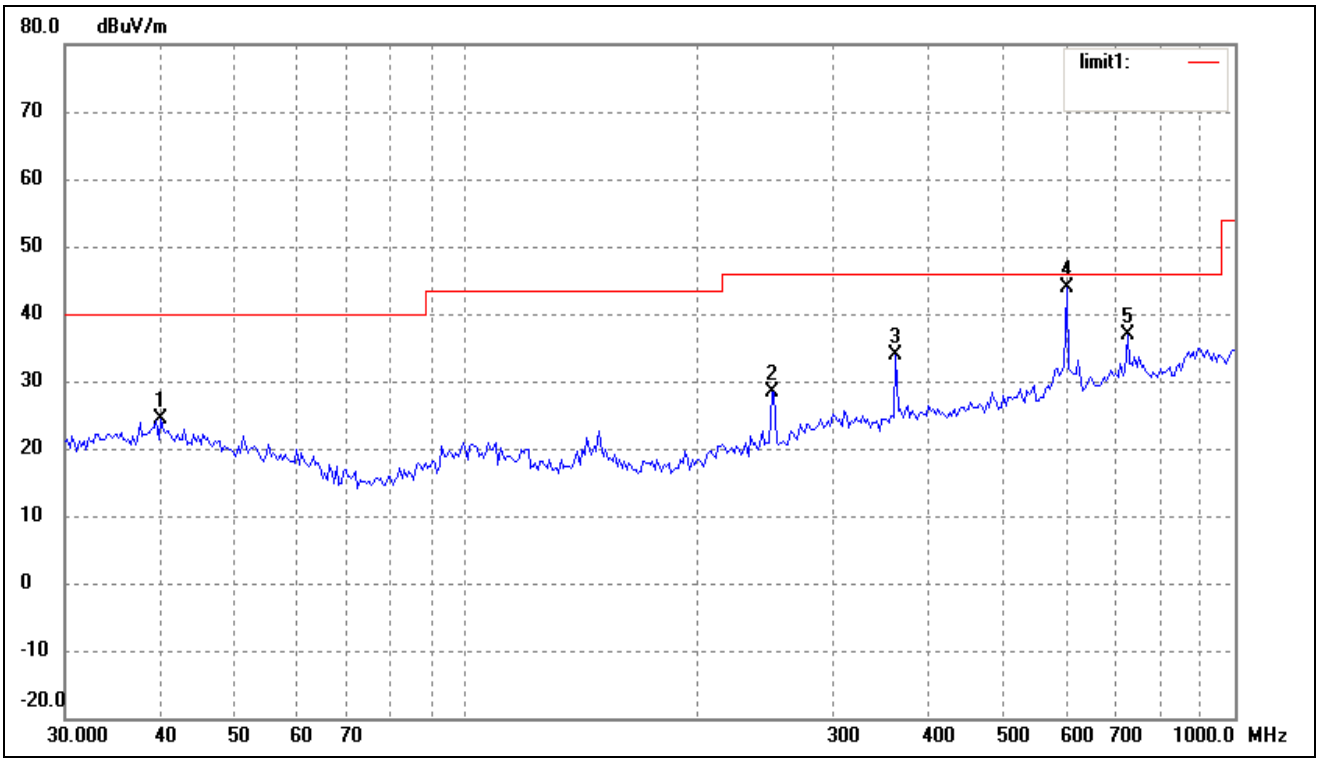
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	143.3261	23.40	3.45	26.85	43.50	-16.65	360	100	peak
2	249.4250	21.83	7.27	29.10	46.00	-16.90	360	100	peak
3	482.2156	23.07	11.49	34.56	46.00	-11.44	360	100	peak
4	603.5392	27.86	14.62	42.48	46.00	-3.52	360	100	peak
5	724.2611	24.15	16.93	41.08	46.00	-4.92	360	100	peak

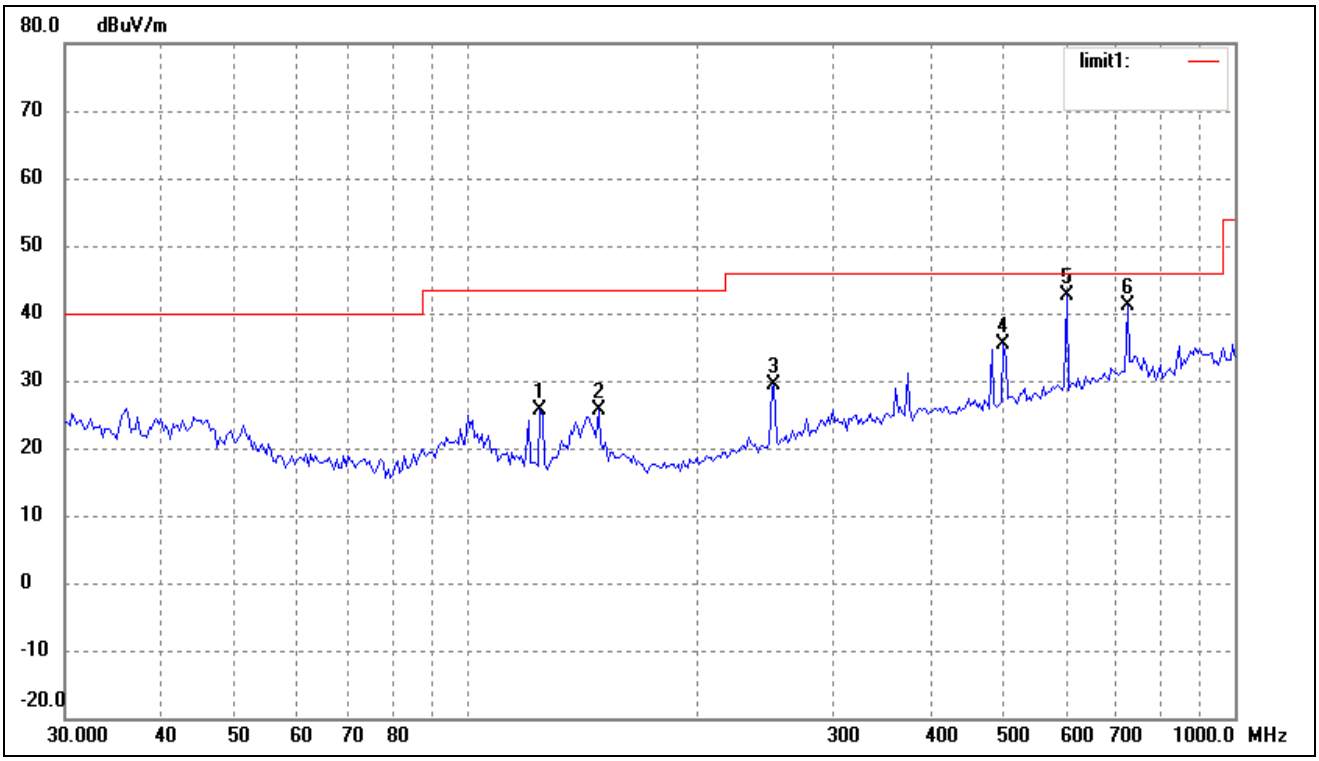
Operating Condition: *Transmitting*
Comment: *802.11b High Channel-2462MHz*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	39.9942	14.63	9.68	24.31	40.00	-15.69	360	100	peak
2	249.4250	21.23	7.27	28.50	46.00	-17.50	360	100	peak
3	361.7139	23.15	10.69	33.84	46.00	-12.16	360	100	peak
4	603.5392	29.25	14.62	43.87	46.00	-2.13	360	100	peak
5	724.2611	19.83	16.93	36.76	46.00	-9.24	360	100	peak

Test Specification: *Vertical*

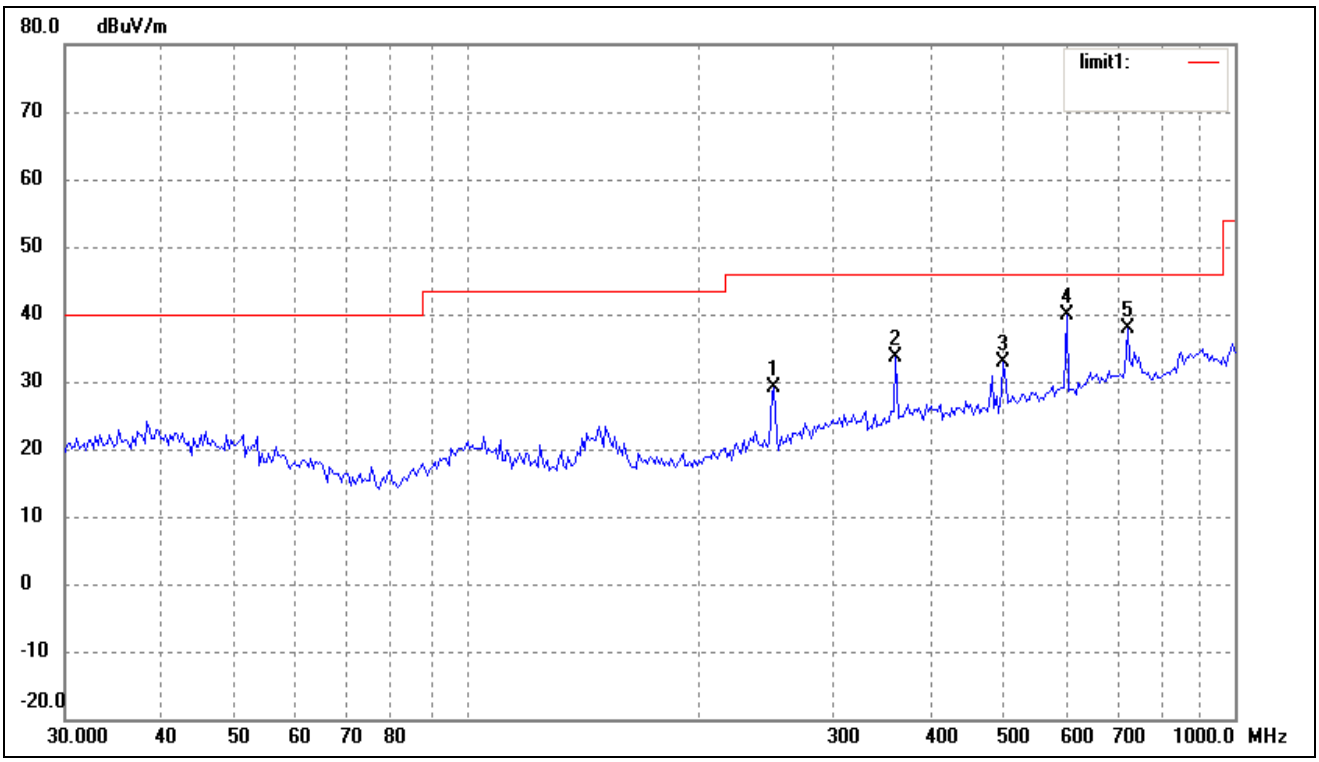


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	124.5690	21.12	4.53	25.65	43.50	-17.85	360	100	peak
2	148.4410	22.04	3.53	25.57	43.50	-17.93	360	100	peak
3	251.1804	21.98	7.34	29.32	46.00	-16.68	360	100	peak
4	499.4247	23.22	12.18	35.40	46.00	-10.60	360	100	peak
5	603.5392	28.01	14.62	42.63	46.00	-3.37	360	100	peak
6	724.2611	24.30	16.93	41.23	46.00	-4.77	360	100	peak

Plot of Radiated Emissions Test Data (30MHz to 1GHz)

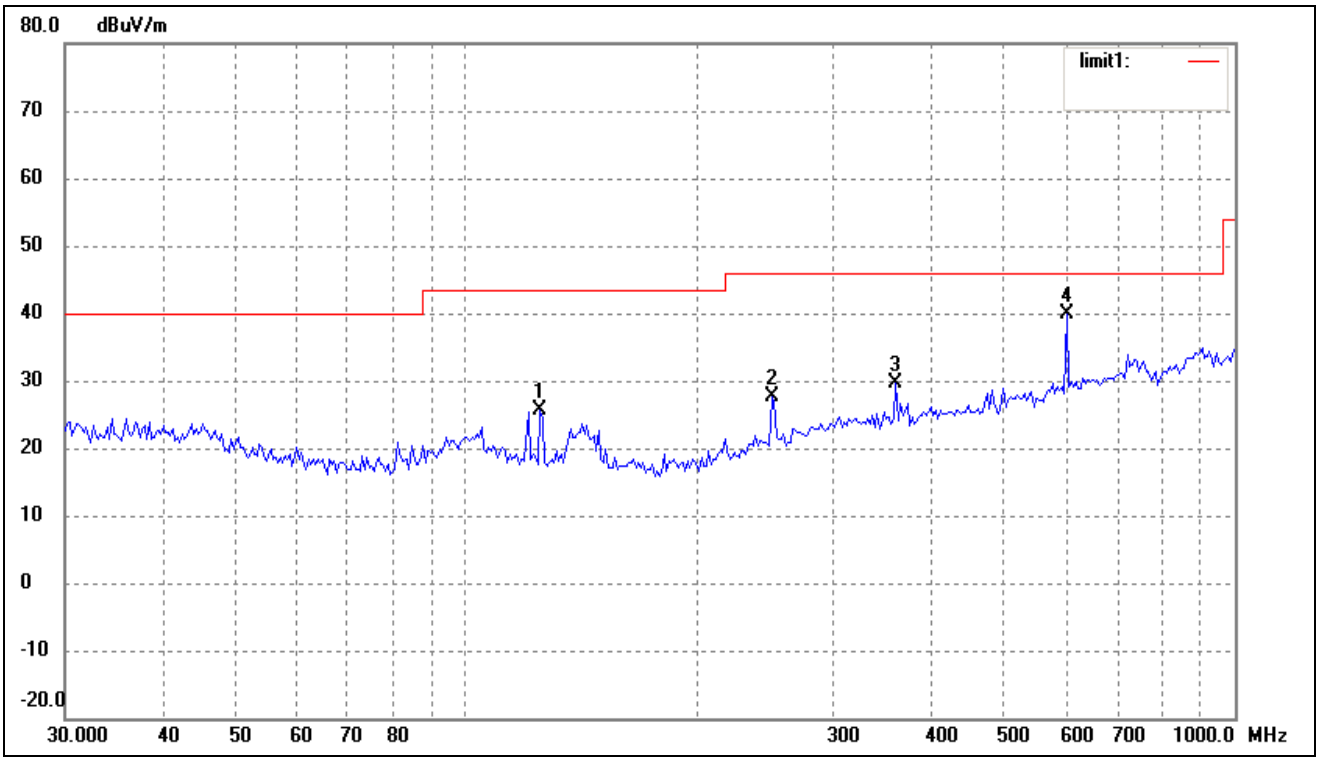
EUT: *Wireless Pocket Router*
Tested Model: *WS-437-1*
Operating Condition: *Transmitting*
Comment: *802.11g Low Channel-2412MHz*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	251.1804	21.73	7.34	29.07	46.00	-16.93	360	100	peak
2	361.7139	22.99	10.69	33.68	46.00	-12.32	360	100	peak
3	499.4247	20.72	12.18	32.90	46.00	-13.10	360	100	peak
4	603.5392	25.37	14.62	39.99	46.00	-6.01	360	100	peak
5	724.2611	20.84	16.93	37.77	46.00	-8.23	360	100	peak

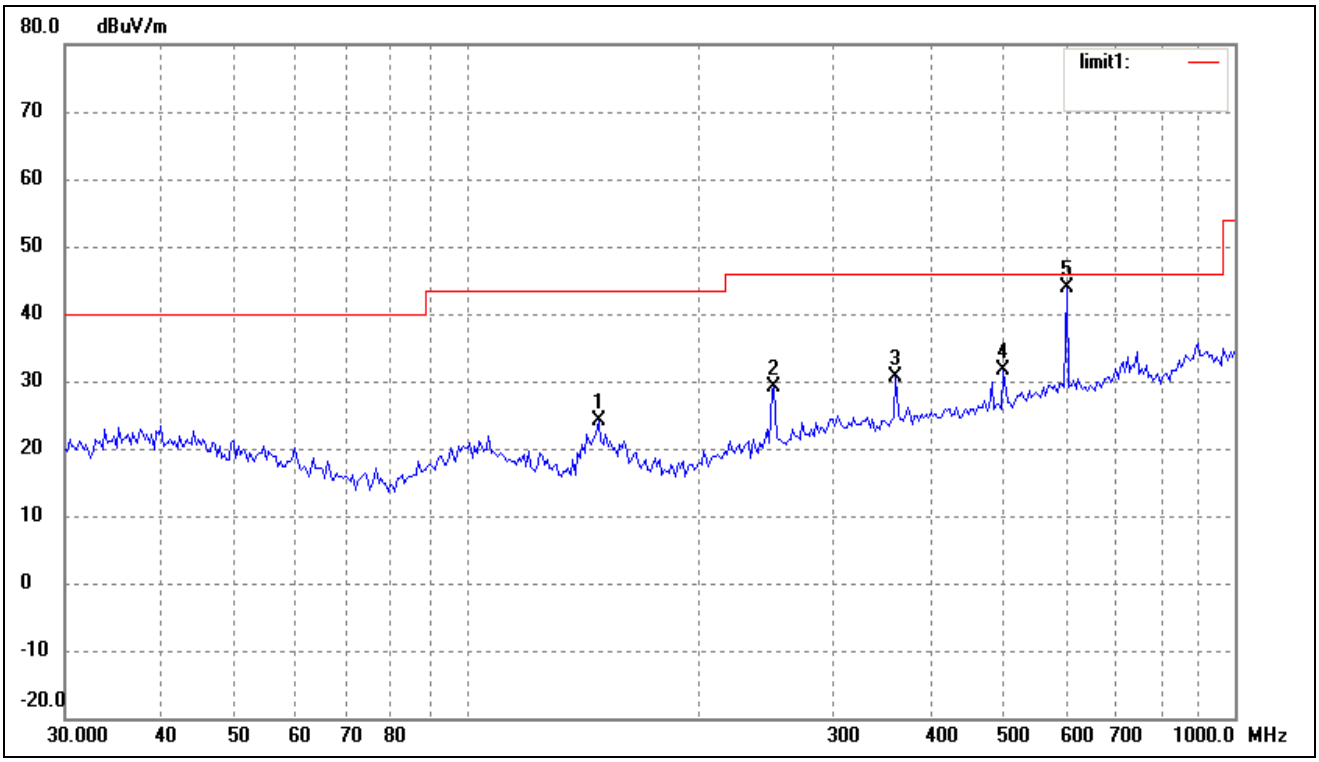
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	124.5690	21.19	4.53	25.72	43.50	-17.78	360	100	peak
2	249.4250	20.24	7.27	27.51	46.00	-18.49	360	100	peak
3	361.7139	19.01	10.69	29.70	46.00	-16.30	360	100	peak
4	603.5392	25.21	14.62	39.83	46.00	-6.17	360	100	peak

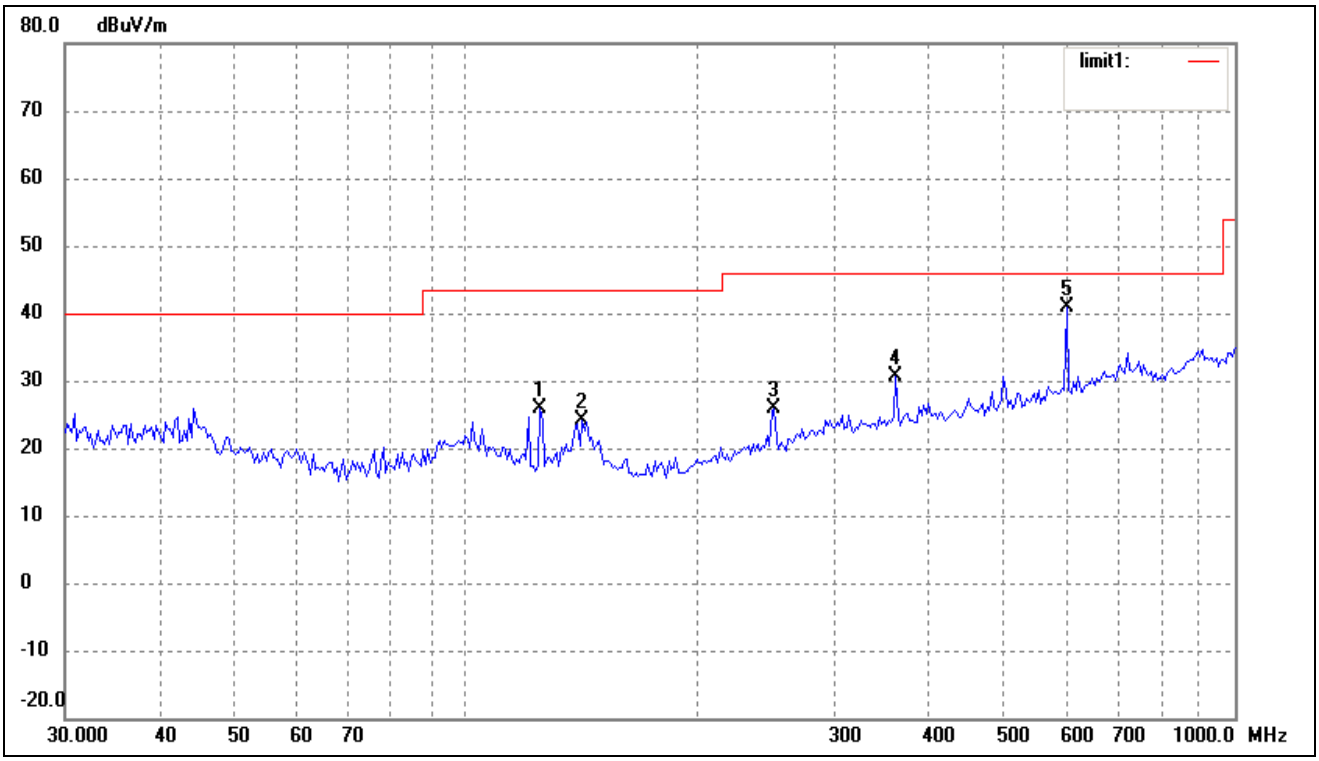
Operating Condition: *Transmitting*
Comment: *802.11g Middle Channel-2437MHz*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	148.4410	20.67	3.53	24.20	43.50	-19.30	360	100	peak
2	251.1804	21.67	7.34	29.01	46.00	-16.99	360	100	peak
3	361.7139	20.04	10.69	30.73	46.00	-15.27	360	100	peak
4	499.4247	19.38	12.18	31.56	46.00	-14.44	360	100	peak
5	603.5392	29.19	14.62	43.81	46.00	-2.19	360	100	peak

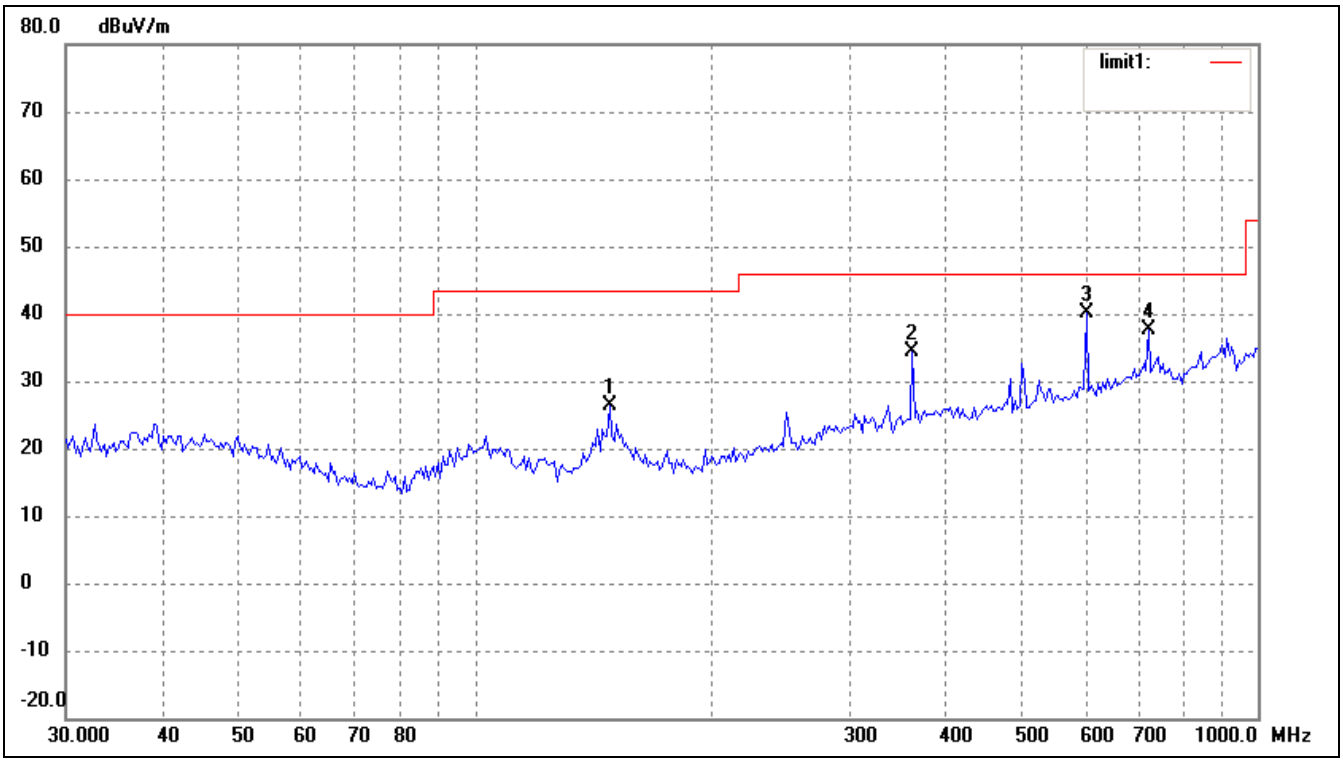
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	124.5690	21.29	4.53	25.82	43.50	-17.68	360	100	peak
2	141.3298	20.82	3.41	24.23	43.50	-19.27	360	100	peak
3	251.1804	18.61	7.34	25.95	46.00	-20.05	360	100	peak
4	361.7139	19.84	10.69	30.53	46.00	-15.47	360	100	peak
5	603.5392	26.36	14.62	40.98	46.00	-5.02	360	100	peak

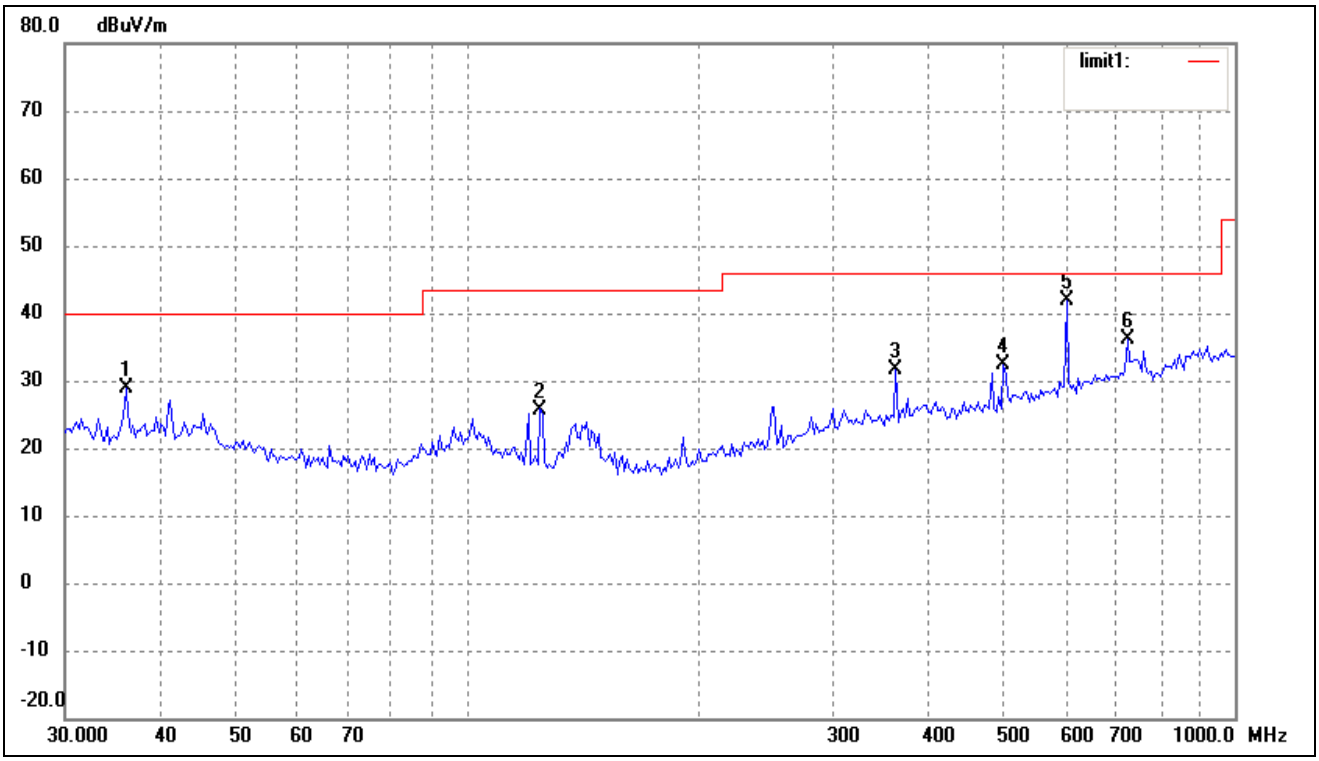
Operating Condition: *Transmitting*
Comment: *802.11g High Channel-2462MHz*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	148.4410	22.75	3.53	26.28	43.50	-17.22	360	100	peak
2	361.7139	23.73	10.69	34.42	46.00	-11.58	360	100	peak
3	603.5392	25.63	14.62	40.25	46.00	-5.75	360	100	peak
4	724.2611	20.63	16.93	37.56	46.00	-8.44	360	100	peak

Test Specification: *Vertical*

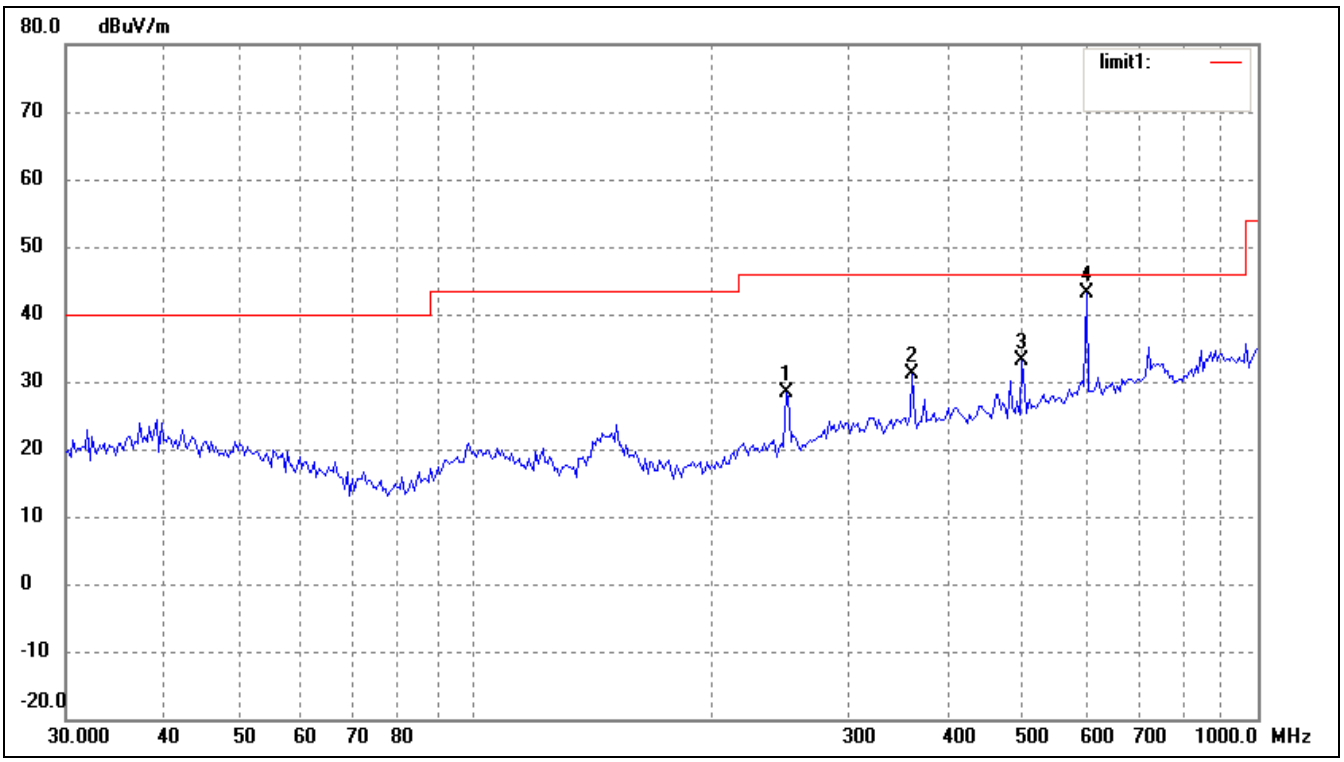


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	36.0007	19.80	9.04	28.84	40.00	-11.16	360	100	peak
2	124.5690	21.22	4.53	25.75	43.50	-17.75	360	100	peak
3	361.7139	21.00	10.69	31.69	46.00	-14.31	360	100	peak
4	499.4247	20.14	12.18	32.32	46.00	-13.68	360	100	peak
5	603.5392	27.19	14.62	41.81	46.00	-4.19	360	100	peak
6	724.2611	19.23	16.93	36.16	46.00	-9.84	360	100	peak

Plot of Radiated Emissions Test Data (30MHz to 1GHz)

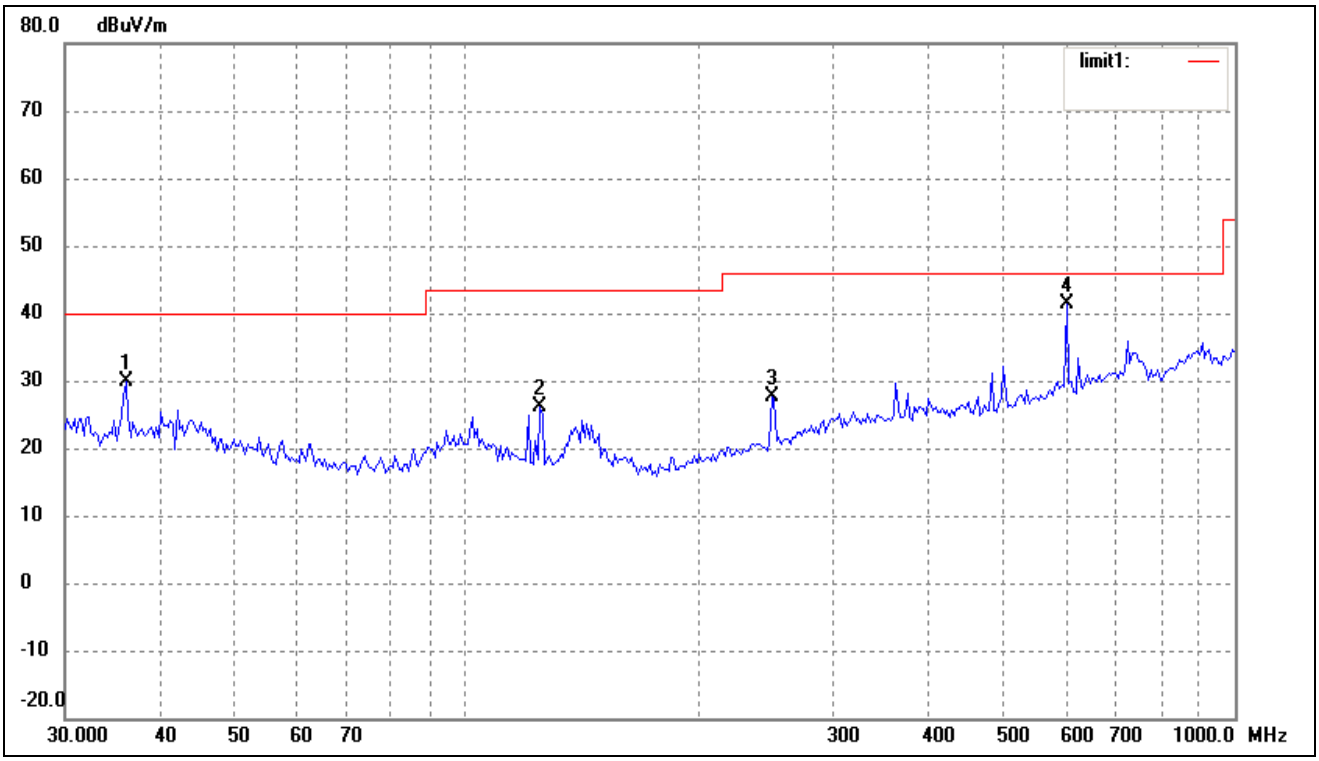
EUT: *Wireless Pocket Router*
Tested Model: *WS-437-1*
Operating Condition: *Transmitting*
Comment: *802.11n-HT20 Low Channel-2412MHz*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	249.4250	21.08	7.27	28.35	46.00	-17.65	360	100	peak
2	361.7139	20.36	10.69	31.05	46.00	-14.95	360	100	peak
3	499.4247	20.93	12.18	33.11	46.00	-12.89	360	100	peak
4	603.5392	28.53	14.62	43.15	46.00	-2.85	360	100	peak

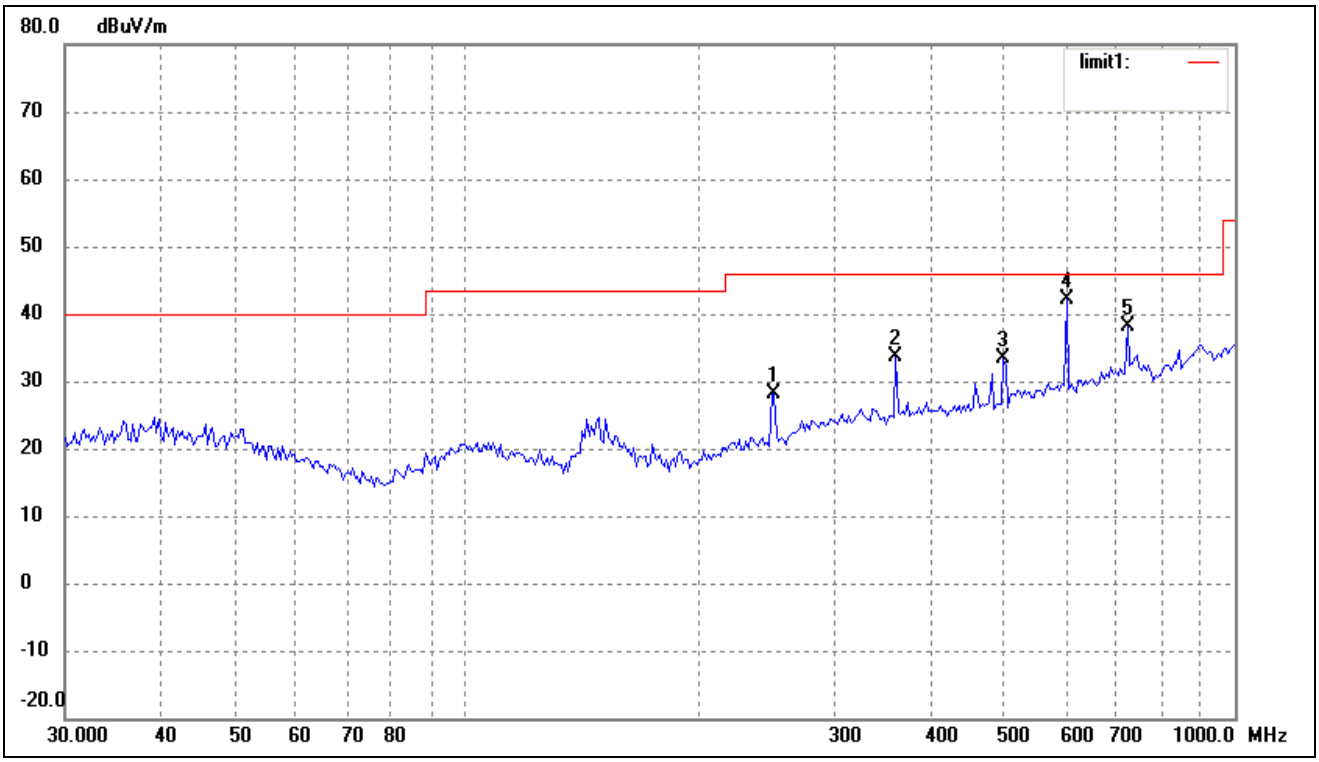
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	36.0007	20.92	9.04	29.96	40.00	-10.04	360	100	peak
2	124.5690	21.57	4.53	26.10	43.50	-17.40	360	100	peak
3	249.4250	20.30	7.27	27.57	46.00	-18.43	360	100	peak
4	603.5392	26.82	14.62	41.44	46.00	-4.56	360	100	peak

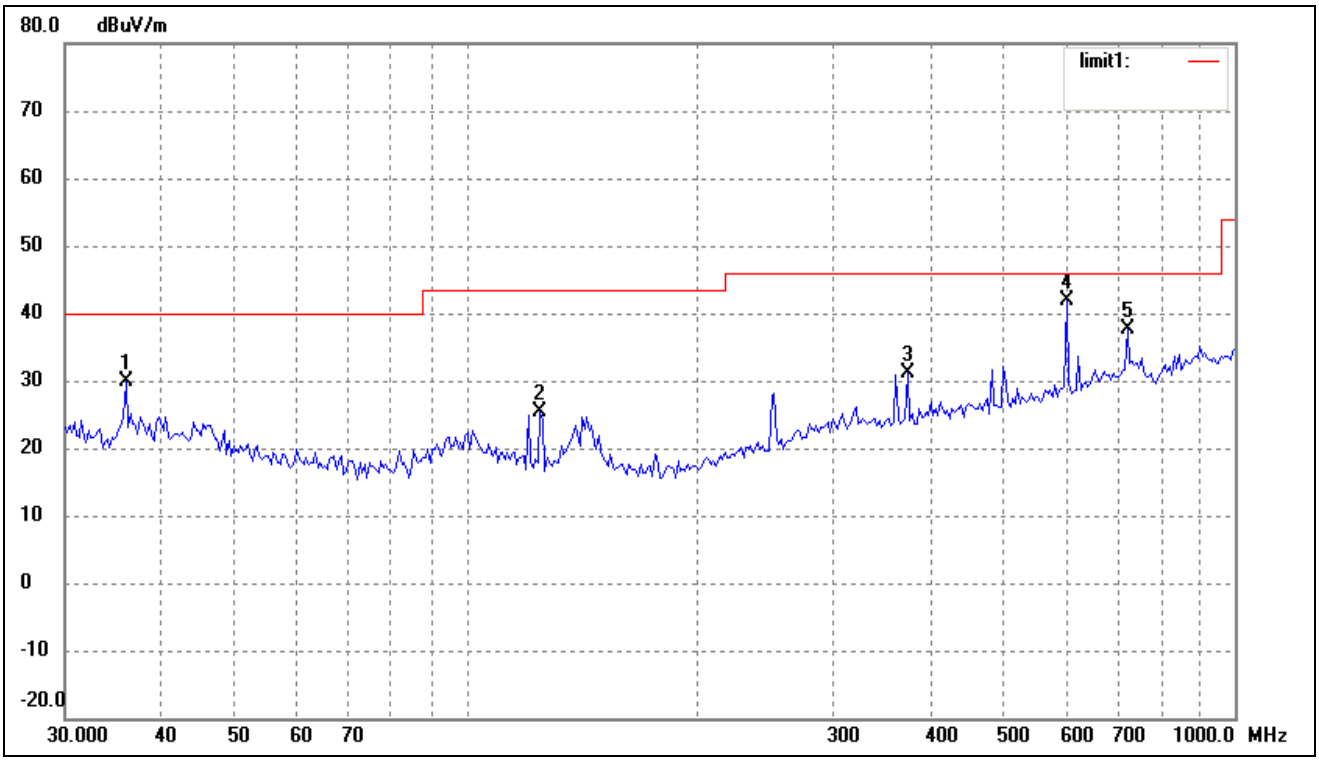
Operating Condition: *Transmitting*
Comment: *802.11n-HT20 Middle Channel-2437MHz*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	251.1804	20.89	7.34	28.23	46.00	-17.77	360	100	peak
2	361.7139	22.88	10.69	33.57	46.00	-12.43	360	100	peak
3	499.4247	21.08	12.18	33.26	46.00	-12.74	360	100	peak
4	603.5392	27.45	14.62	42.07	46.00	-3.93	360	100	peak
5	724.2611	21.27	16.93	38.20	46.00	-7.80	360	100	peak

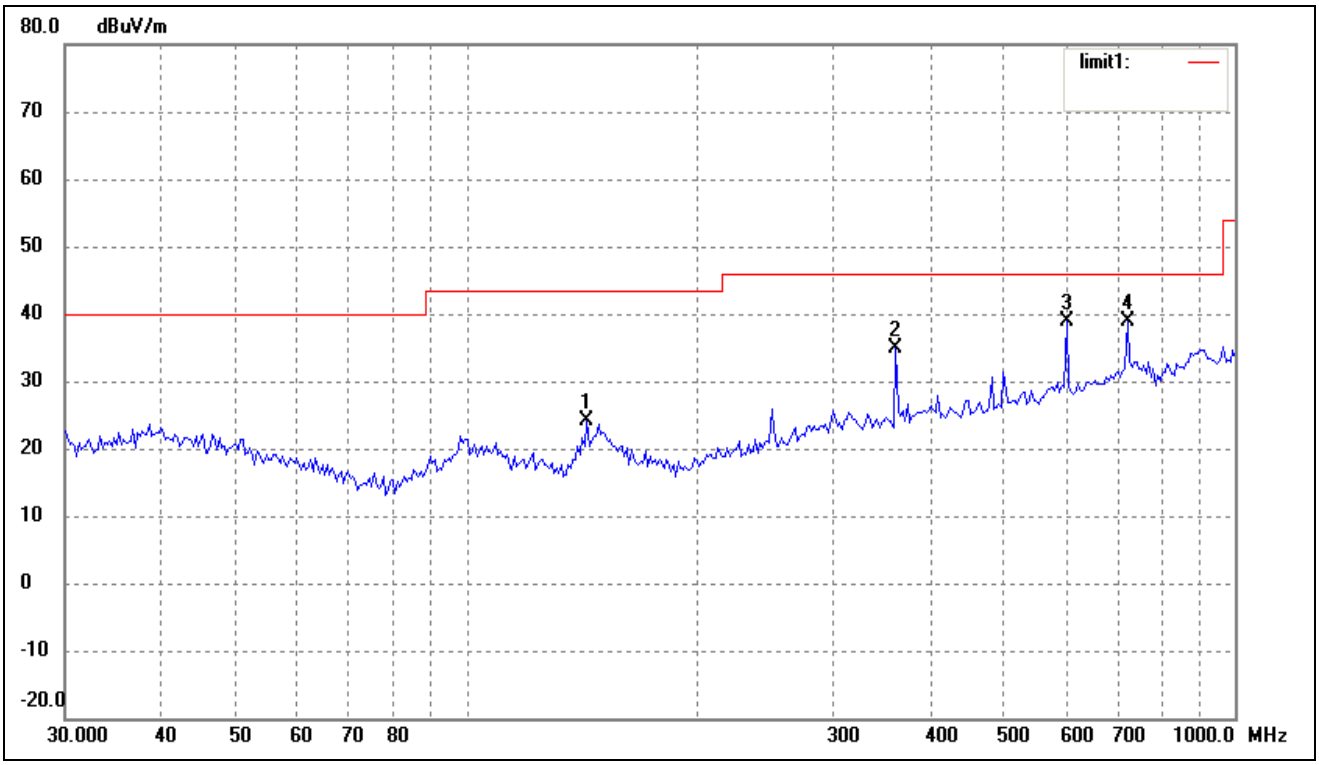
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	36.0007	20.76	9.04	29.80	40.00	-10.20	360	100	peak
2	124.5690	20.90	4.53	25.43	43.50	-18.07	360	100	peak
3	374.6226	20.57	10.63	31.20	46.00	-14.80	360	100	peak
4	603.5392	27.21	14.62	41.83	46.00	-4.17	360	100	peak
5	724.2611	20.69	16.93	37.62	46.00	-8.38	360	100	peak

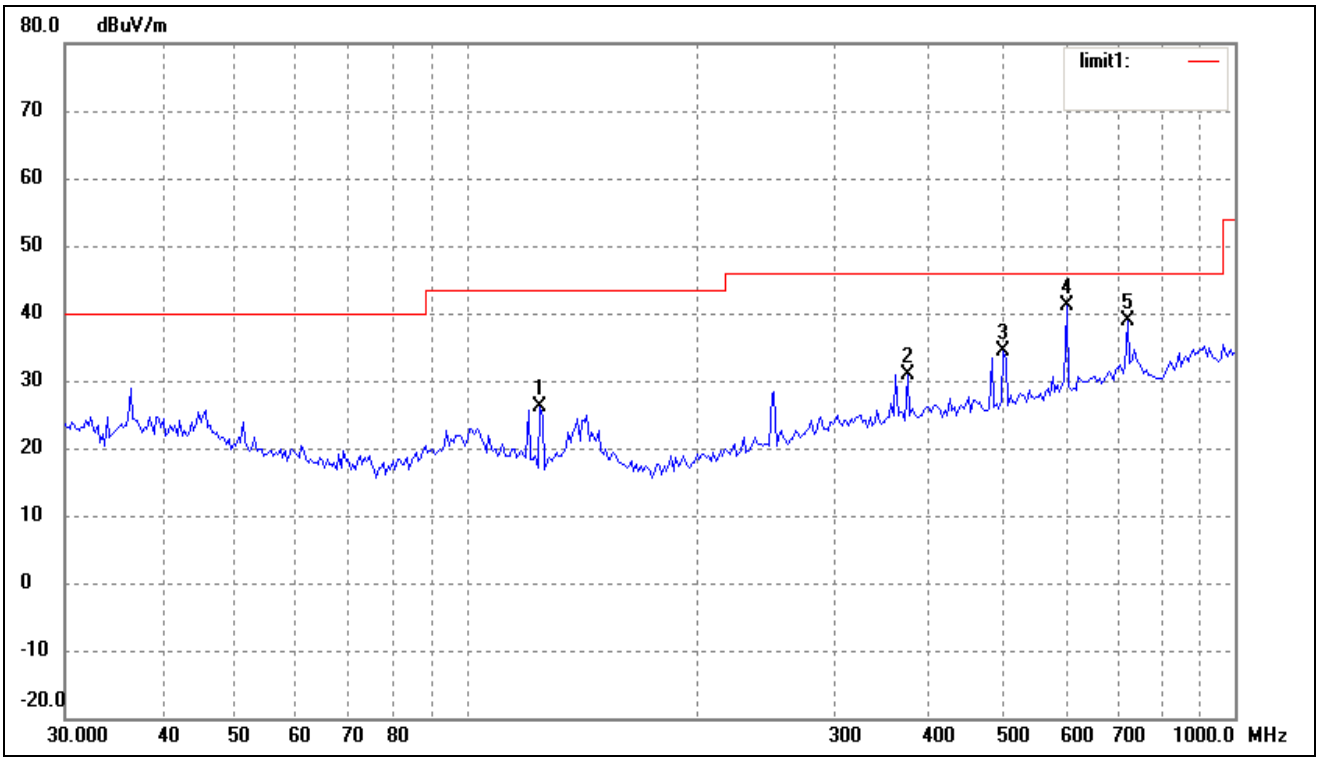
Operating Condition: *Transmitting*
Comment: *802.11n-HT20 High Channel-2462MHz*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	143.3261	20.62	3.45	24.07	43.50	-19.43	360	100	peak
2	361.7139	24.17	10.69	34.86	46.00	-11.14	360	100	peak
3	603.5392	24.37	14.62	38.99	46.00	-7.01	360	100	peak
4	724.2611	21.84	16.93	38.77	46.00	-7.23	360	100	peak

Test Specification: *Vertical*

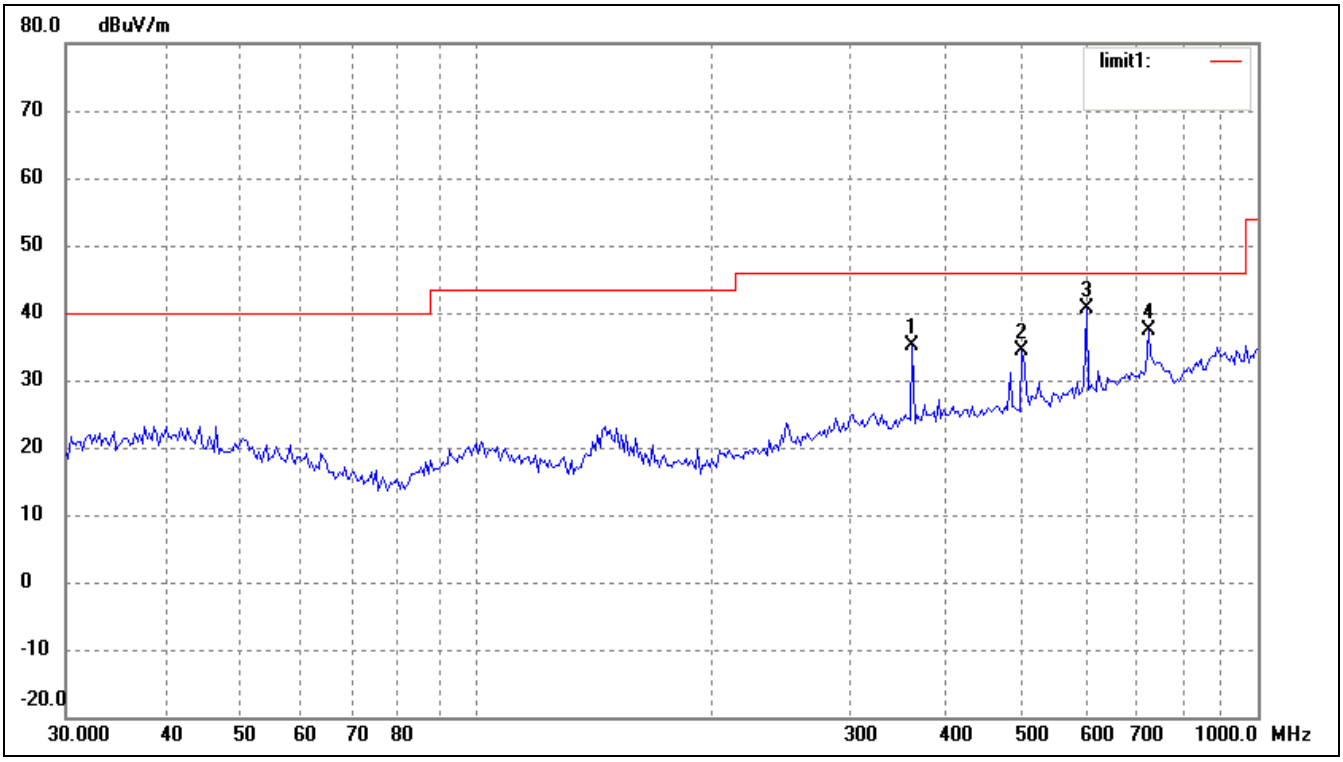


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	124.5690	21.61	4.53	26.14	43.50	-17.36	360	100	peak
2	374.6226	20.30	10.63	30.93	46.00	-15.07	360	100	peak
3	499.4247	22.15	12.18	34.33	46.00	-11.67	360	100	peak
4	603.5392	26.47	14.62	41.09	46.00	-4.91	360	100	peak
5	724.2611	21.95	16.93	38.88	46.00	-7.12	360	100	peak

Plot of Radiated Emissions Test Data (30MHz to 1GHz)

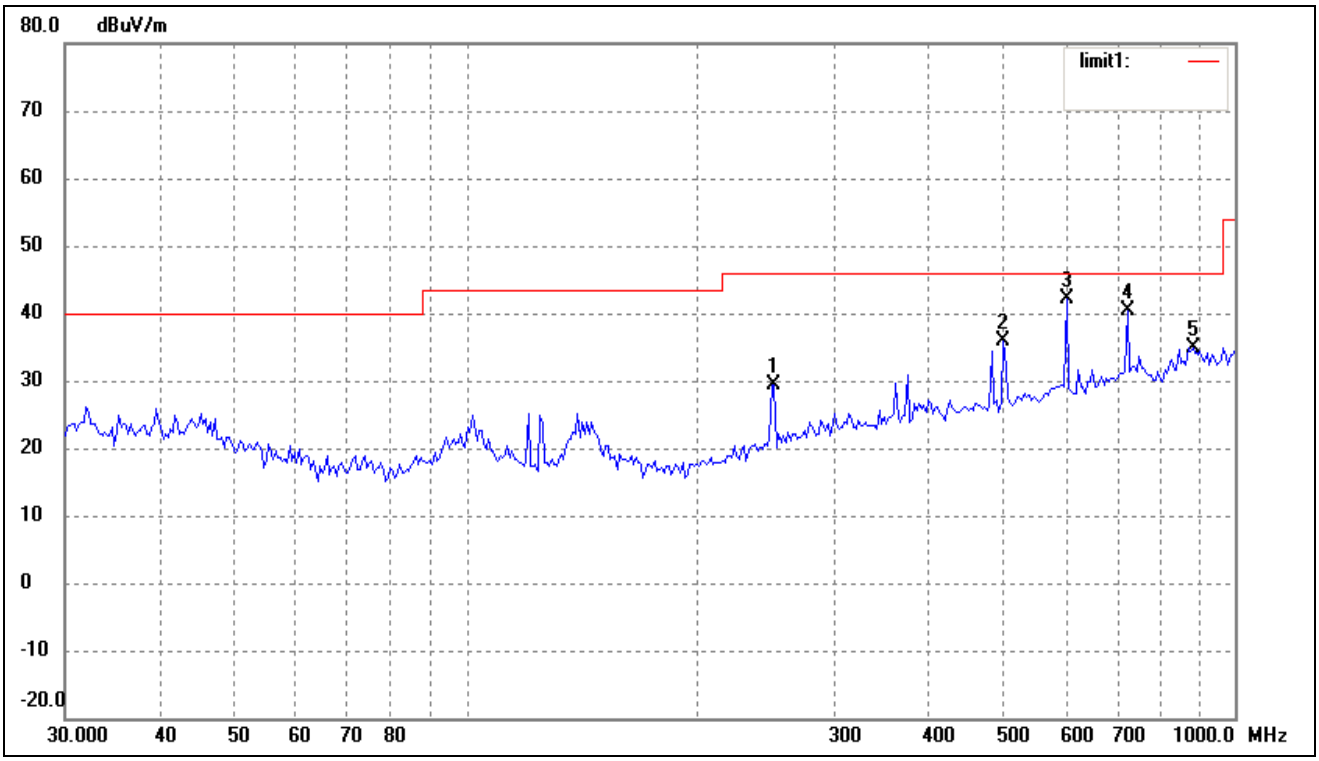
EUT: *Wireless Pocket Router*
Tested Model: *WS-437-1*
Operating Condition: *Transmitting*
Comment: *802.11n-HT40 Low Channel-2422MHz*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	361.7139	24.47	10.69	35.16	46.00	-10.84	360	100	peak
2	499.4247	22.24	12.18	34.42	46.00	-11.58	360	100	peak
3	603.5392	25.98	14.62	40.60	46.00	-5.40	360	100	peak
4	724.2611	20.46	16.93	37.39	46.00	-8.61	360	100	peak

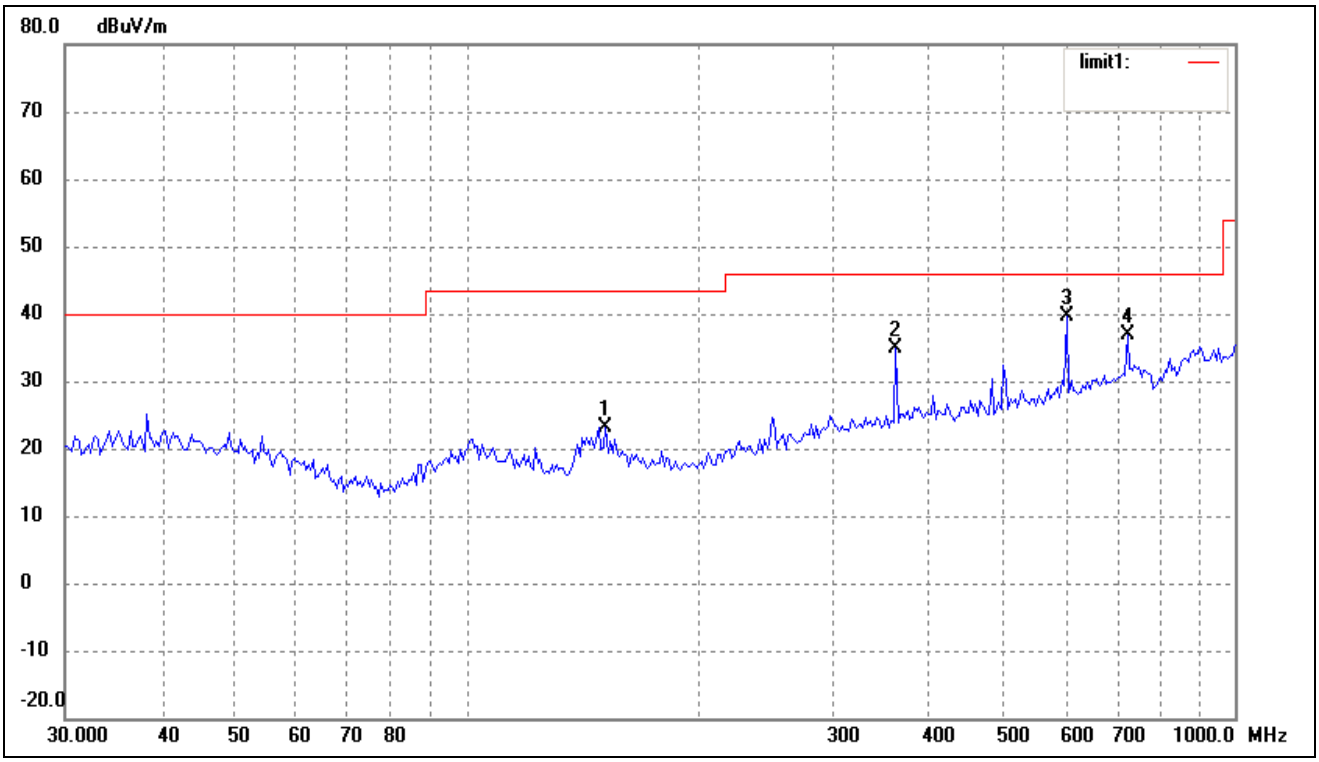
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	251.1804	22.03	7.34	29.37	46.00	-16.63	360	100	peak
2	499.4247	23.80	12.18	35.98	46.00	-10.02	360	100	peak
3	603.5392	27.62	14.62	42.24	46.00	-3.76	360	100	peak
4	724.2611	23.50	16.93	40.43	46.00	-5.57	360	100	peak
5	881.4067	15.91	19.03	34.94	46.00	-11.06	360	100	peak

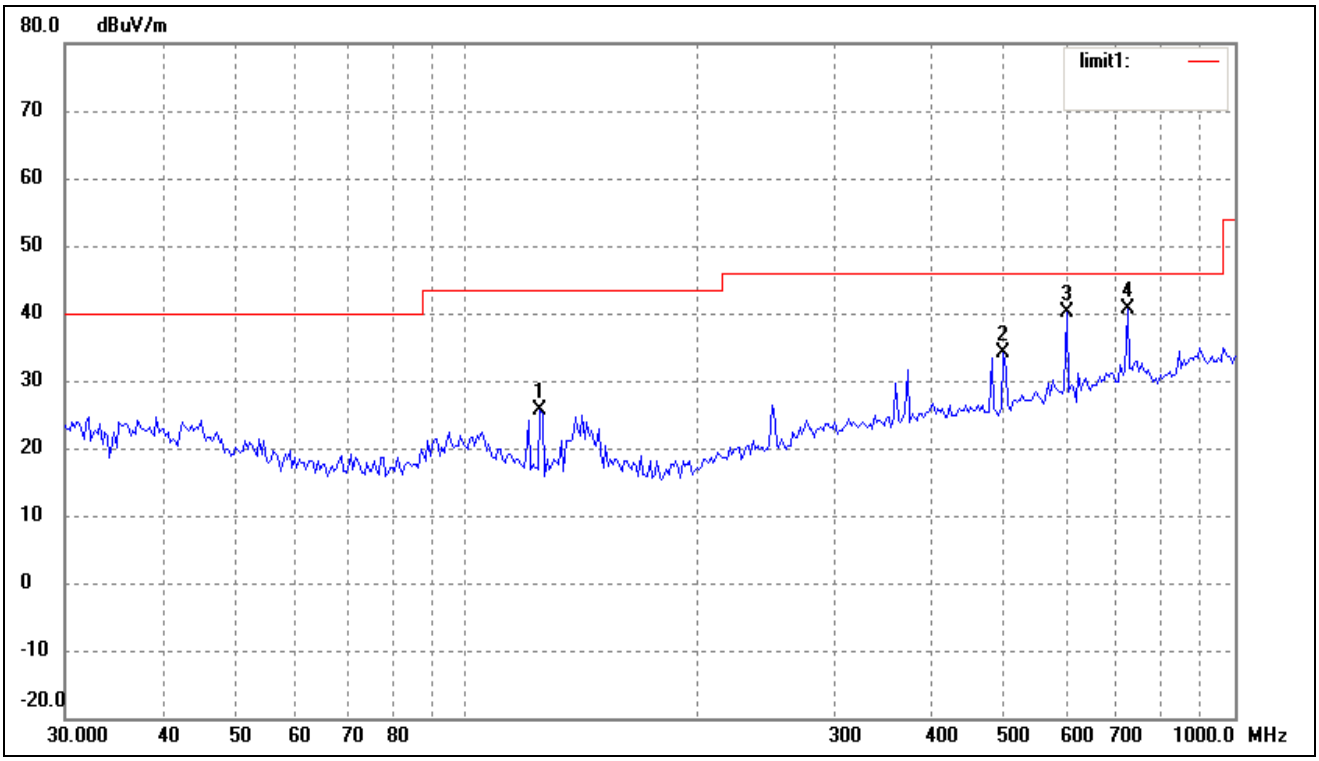
Operating Condition: *Transmitting*
Comment: *802.11n-HT40 Middle Channel-2437MHz*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	151.5972	19.58	3.57	23.15	43.50	-20.35	360	100	peak
2	361.7139	24.19	10.69	34.88	46.00	-11.12	360	100	peak
3	603.5392	25.13	14.62	39.75	46.00	-6.25	360	100	peak
4	724.2611	19.99	16.93	36.92	46.00	-9.08	360	100	peak

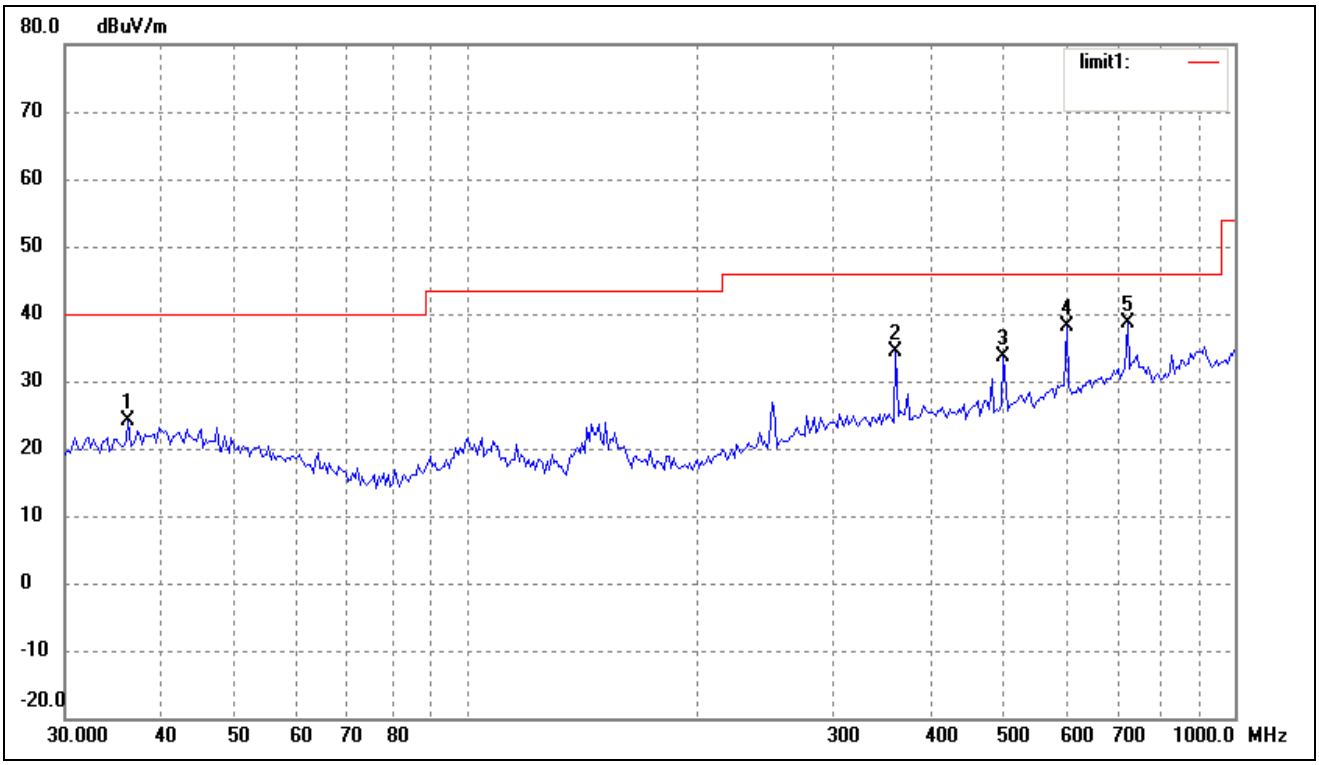
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	124.5690	21.12	4.53	25.65	43.50	-17.85	360	100	peak
2	499.4247	22.02	12.18	34.20	46.00	-11.80	360	100	peak
3	603.5392	25.57	14.62	40.19	46.00	-5.81	360	100	peak
4	724.2611	23.70	16.93	40.63	46.00	-5.37	360	100	peak

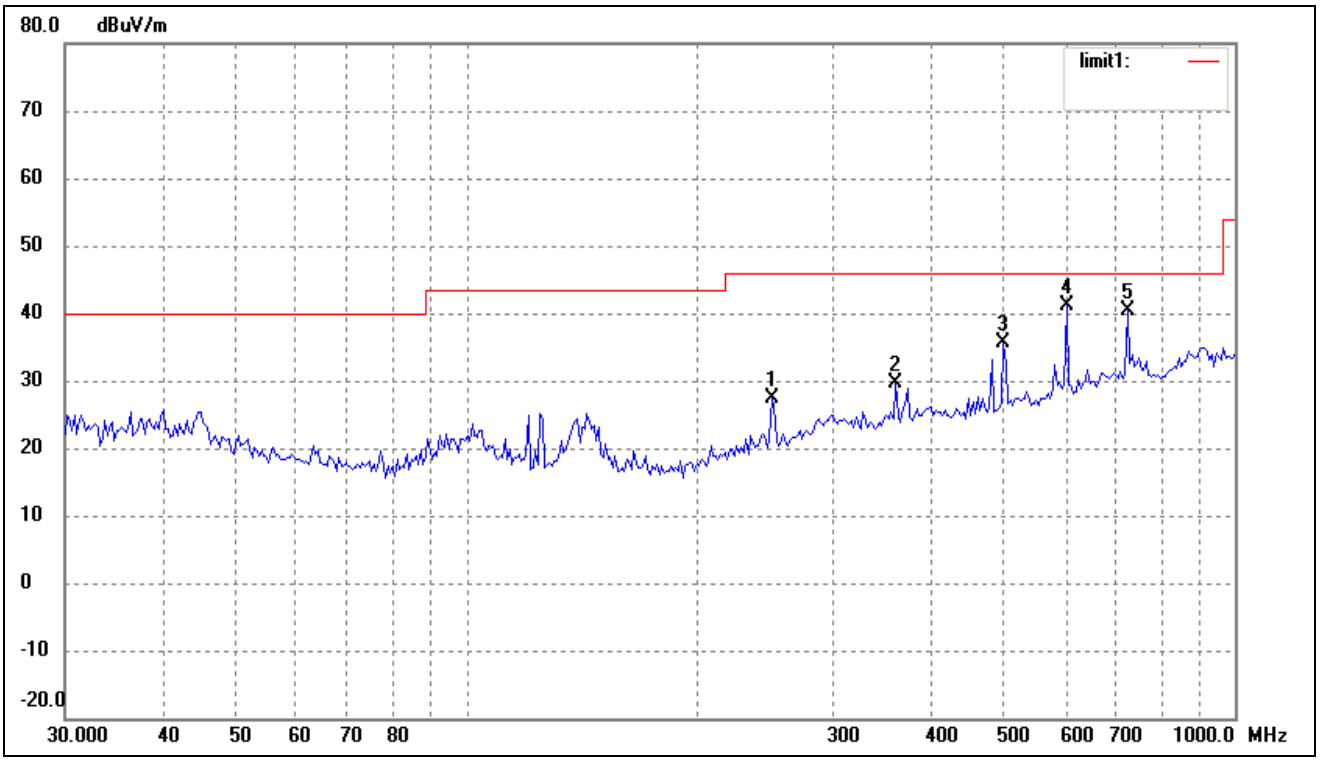
Operating Condition: *Transmitting*
Comment: *802.11n-HT40 High Channel-2452MHz*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	36.2541	15.06	9.09	24.15	40.00	-15.85	360	100	peak
2	361.7139	23.78	10.69	34.47	46.00	-11.53	360	100	peak
3	499.4247	21.41	12.18	33.59	46.00	-12.41	360	100	peak
4	603.5392	23.63	14.62	38.25	46.00	-7.75	360	100	peak
5	724.2611	21.72	16.93	38.65	46.00	-7.35	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	249.4250	20.00	7.27	27.27	46.00	-18.73	360	100	peak
2	361.7139	18.85	10.69	29.54	46.00	-16.46	360	100	peak
3	499.4247	23.33	12.18	35.51	46.00	-10.49	360	100	peak
4	603.5392	26.42	14.62	41.04	46.00	-4.96	360	100	peak
5	724.2611	23.35	16.93	40.28	46.00	-5.72	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	54.71	-3.87	50.84	74.00	-23.16	H	PK
4824	39.78	-3.87	35.91	54.00	-18.09	H	AV
7236	47.22	-1.31	45.91	74.00	-28.09	H	PK
7236	35.61	-1.31	34.30	54.00	-19.70	H	AV
4824	49.39	-3.87	45.52	74.00	-28.48	V	PK
4824	36.86	-3.87	32.99	54.00	-21.01	V	AV
7236	49.01	0.22	49.23	74.00	47.74	V	PK
7236	36.85	0.22	37.07	54.00	35.49	V	AV
Middle Channel-2437MHz							
4874	49.71	-3.74	45.97	74.00	-28.03	H	PK
4874	37.9	-3.74	34.16	54.00	-19.84	H	AV
7311	48.93	-1.07	47.86	74.00	-26.14	H	PK
7311	38.04	-1.07	36.97	54.00	-17.03	H	AV
4874	48.73	-3.62	45.11	74.00	-28.89	V	PK
4874	36.51	-3.62	32.89	54.00	-21.11	V	AV
7311	45.5	0.49	45.99	74.00	-28.01	V	PK
7311	34.85	0.49	35.34	54.00	-18.66	V	AV
High Channel-2462MHz							
4924	48.69	-3.03	45.66	74.00	-28.34	H	PK
4924	35.43	-3.03	32.40	54.00	-21.60	H	AV
7386	47.92	-0.68	47.24	74.00	-26.76	H	PK
7386	35.44	-0.68	34.76	54.00	-19.24	H	AV
4924	35.32	-2.62	32.70	54.00	-21.30	V	PK
4924	47.36	-2.62	44.74	74.00	-29.26	V	AV
7386	45.54	0.78	46.32	74.00	-27.68	V	PK
7386	34.26	0.78	35.04	54.00	-18.96	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	52.3	-3.87	48.43	74.00	-25.57	H	PK
4824	38.84	-3.87	34.97	54.00	-19.03	H	AV
7236	36.68	-1.31	35.37	54.00	-18.63	H	PK
7236	49.19	-1.31	47.88	74.00	-26.12	H	AV
4824	37.18	-3.87	33.31	54.00	-20.69	V	PK
4824	48.94	-3.87	45.07	74.00	-28.93	V	AV
7236	47.25	0.22	47.47	74.00	-26.53	V	PK
7236	35.54	0.22	35.76	54.00	-18.24	V	AV
Middle Channel-2437MHz							
4874	52.38	-3.74	48.64	74.00	-25.36	H	PK
4874	37.34	-3.74	33.60	54.00	-20.40	H	AV
7311	36.67	-1.07	35.60	54.00	-18.40	H	PK
7311	47.94	-1.07	46.87	74.00	-27.13	H	AV
4874	49.31	-3.62	45.69	74.00	-28.31	V	PK
4874	36.63	-3.62	33.01	54.00	-20.99	V	AV
7311	46.82	0.49	47.31	74.00	-26.69	V	PK
7311	35.63	0.49	36.12	54.00	-17.88	V	AV
High Channel-2462MHz							
4924	46.71	-3.03	43.68	74.00	-30.32	H	PK
4924	36.52	-3.03	33.49	54.00	-20.51	H	AV
7386	46.85	-0.68	46.17	74.00	-27.83	H	PK
7386	35.67	-0.68	34.99	54.00	-19.01	H	AV
4924	47.23	-2.62	44.61	74.00	-29.39	V	PK
4924	35.38	-2.62	32.76	54.00	-21.24	V	AV
7386	47.35	0.78	48.13	74.00	-25.87	V	PK
7386	36.4	0.78	37.18	54.00	-16.82	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	50.76	-3.87	46.89	74.00	-27.11	H	PK
4824	37.92	-3.87	34.05	54.00	-19.95	H	AV
7236	48.09	-1.31	46.78	74.00	-27.22	H	PK
7236	35.64	-1.31	34.33	54.00	-19.67	H	AV
4824	48.91	-3.87	45.04	74.00	-28.96	V	PK
4824	37.36	-3.87	33.49	54.00	-20.51	V	AV
7236	37.33	0.22	37.55	54.00	-16.45	V	PK
7236	48.87	0.22	49.09	74.00	-24.91	V	AV
Middle Channel-2437MHz							
4874	49.25	-3.74	45.51	74.00	-28.49	H	PK
4874	37.08	-3.74	33.34	54.00	-20.66	H	AV
7311	48.58	-1.07	47.51	74.00	-26.49	H	PK
7311	36.46	-1.07	35.39	54.00	-18.61	H	AV
4874	47.88	-3.62	44.26	74.00	-29.74	V	PK
4874	37.29	-3.62	33.67	54.00	-20.33	V	AV
7311	46.92	0.49	47.41	74.00	-26.59	V	PK
7311	36.76	0.49	37.25	54.00	-16.75	V	AV
High Channel-2462MHz							
4924	48.18	-3.03	45.15	74.00	-28.85	H	PK
4924	35.4	-3.03	32.37	54.00	-21.63	H	AV
7386	49.12	-0.68	48.44	74.00	-25.56	H	PK
7386	37.96	-0.68	37.28	54.00	-16.72	H	AV
4924	47.83	-2.62	45.21	74.00	-28.79	V	PK
4924	36.28	-2.62	33.66	54.00	-20.34	V	AV
7386	36.7	0.78	37.48	54.00	-16.52	V	PK
7386	47.93	0.78	48.71	74.00	-25.29	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							
4824	38.69	-3.87	34.82	54.00	-19.18	H	PK
4824	51.08	-3.87	47.21	74.00	-26.79	H	AV
7236	49.71	-1.31	48.40	74.00	-25.60	H	PK
7236	38.85	-1.31	37.54	54.00	-16.46	H	AV
4824	48.22	-3.87	44.35	74.00	-29.65	V	PK
4824	36.73	-3.87	32.86	54.00	-21.14	V	AV
7236	47.58	0.22	47.80	74.00	-26.20	V	PK
7236	35.43	0.22	35.65	54.00	-18.35	V	AV
Middle Channel-2437MHz							
4874	48.81	-3.74	45.07	74.00	-28.93	H	PK
4874	37.44	-3.74	33.70	54.00	-20.30	H	AV
7311	49.41	-1.07	48.34	74.00	-25.66	H	PK
7311	38.65	-1.07	37.58	54.00	-16.42	H	AV
4874	47.1	-3.62	43.48	74.00	-30.52	V	PK
4874	35.98	-3.62	32.36	54.00	-21.64	V	AV
7311	46.51	0.49	47.00	74.00	-27.00	V	PK
7311	36.74	0.49	37.23	54.00	-16.77	V	AV
High Channel-2452MHz							
4924	48.5	-3.03	45.47	74.00	-28.53	H	PK
4924	36.97	-3.03	33.94	54.00	-20.06	H	AV
7386	49.31	-0.68	48.63	74.00	-25.37	H	PK
7386	38.07	-0.68	37.39	54.00	-16.61	H	AV
4924	46.93	-2.62	44.31	74.00	-29.69	V	PK
4924	35.21	-2.62	32.59	54.00	-21.41	V	AV
7386	36.61	0.78	37.39	54.00	-16.61	V	PK
7386	48.99	0.78	49.77	74.00	-24.23	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 5th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
The measurements greater than 20dB below the limit from 9kHz to 30MHz.

8. Out of Band Emissions

8.1 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).

8.2 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	2012-02-25	2013-02-24
Horn Antenna	ETS	3117	00086197	2012-02-25	2013-02-24

8.3 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.

8.4 Environmental Conditions

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

8.5 Summary of Test Results/Plots

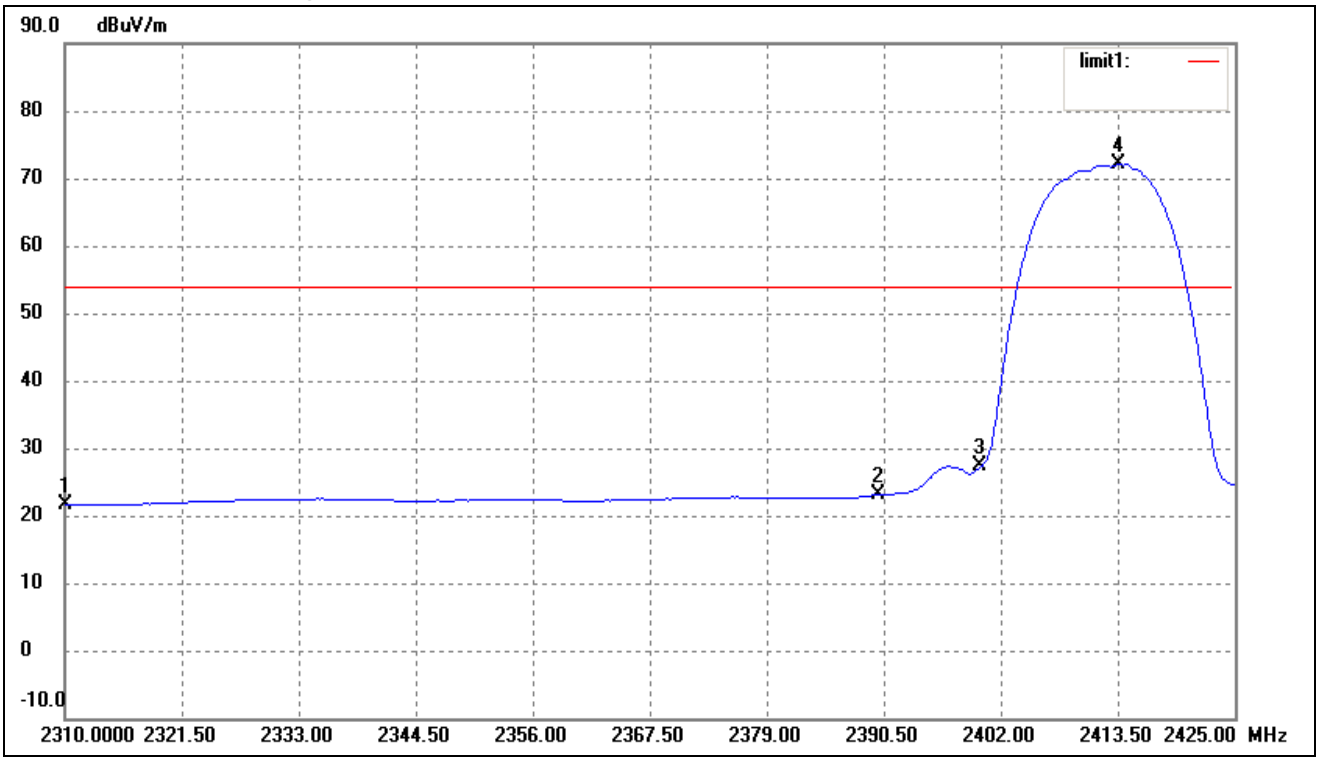
Test Mode	Test Frequency MHz	Limit dBuV / dBc	Result
802.11b	2310.00	<54 dBuV	Pass
	2390.00	<54 dBuV	Pass
	2400.00	>20dBc	Pass
	2483.50	<54 dBuV	Pass
802.11g	2310.00	<54 dBuV	Pass
	2390.00	<54 dBuV	Pass
	2400.00	>20dBc	Pass
	2483.50	<54 dBuV	Pass
802.11n-HT20	2310.00	<54 dBuV	Pass
	2390.00	<54 dBuV	Pass
	2400.00	>20dBc	Pass
	2483.50	<54 dBuV	Pass
802.11n-HT40	2310.00	<54 dBuV	Pass
	2390.00	<54 dBuV	Pass
	2396.94	<54 dBuV	Pass
	2400.00	>20dBc	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.

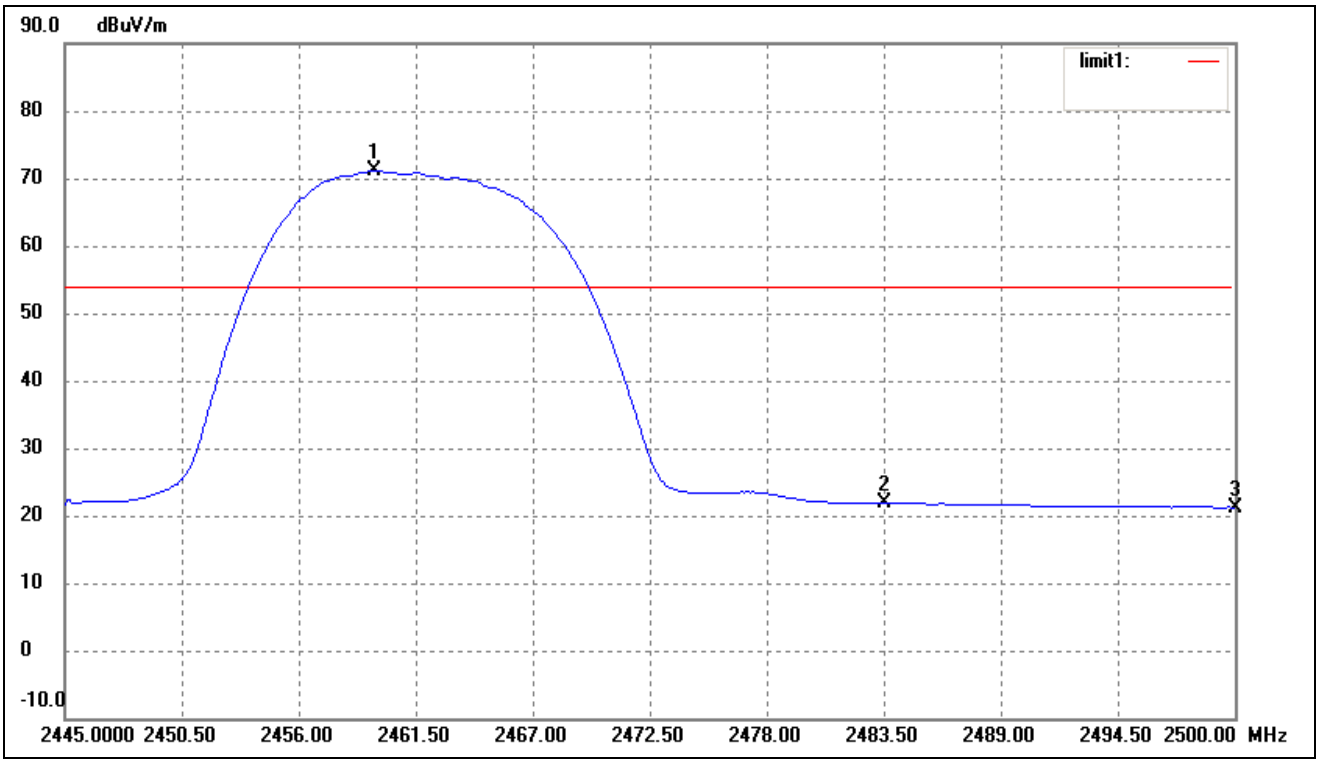
Bandedge (Radiated)

802.11b-Lowest Bandedge



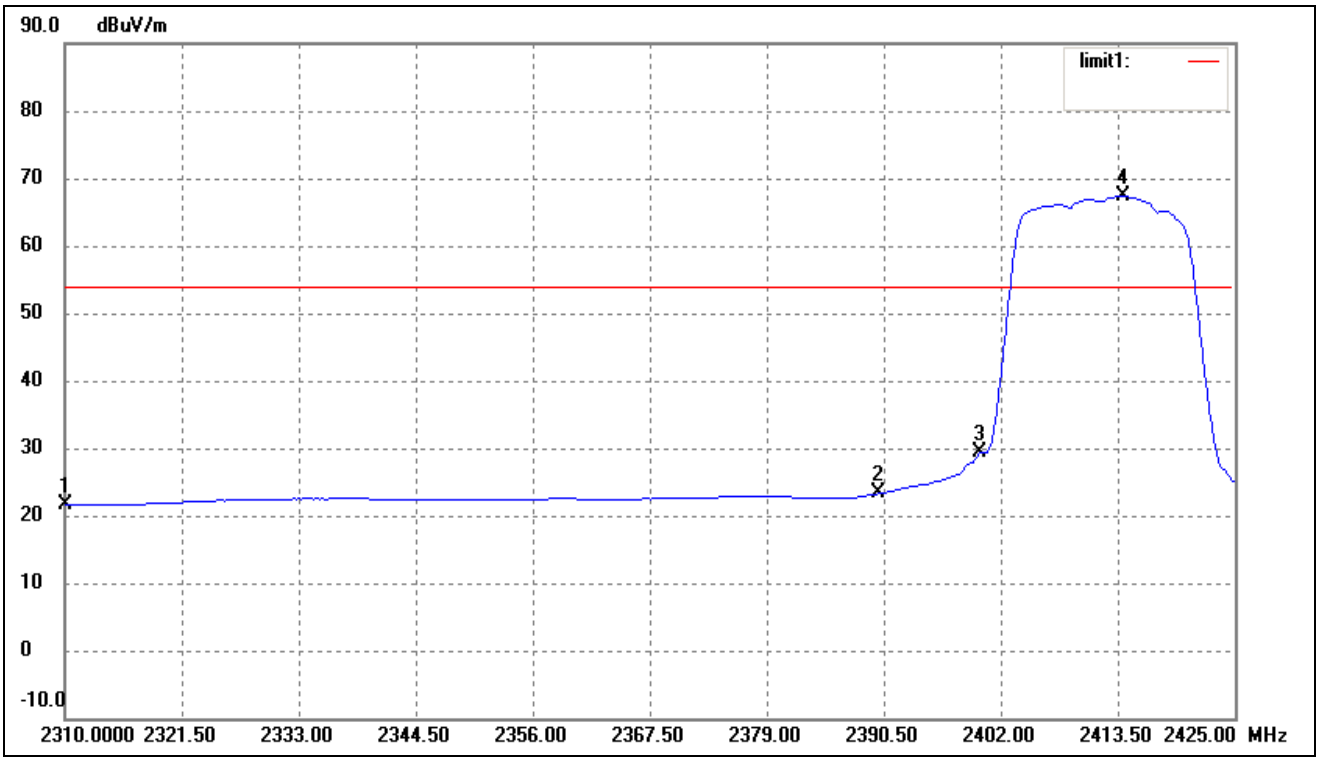
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	33.29	-11.72	21.57	54.00	-32.43	Ave
	2310.000	47.32	-11.72	35.60	74.00	-38.40	peak
2	2390.000	34.87	-11.75	23.12	54.00	-30.88	Ave
	2390.000	49.85	-11.75	38.10	74.00	-35.90	peak
3	2400.000	39.16	-11.75	27.41	Delta = 44.62 dBc		Ave
4	2413.500	83.79	-11.76	72.03	/	/	Ave

802.11b-Highest Bandedge



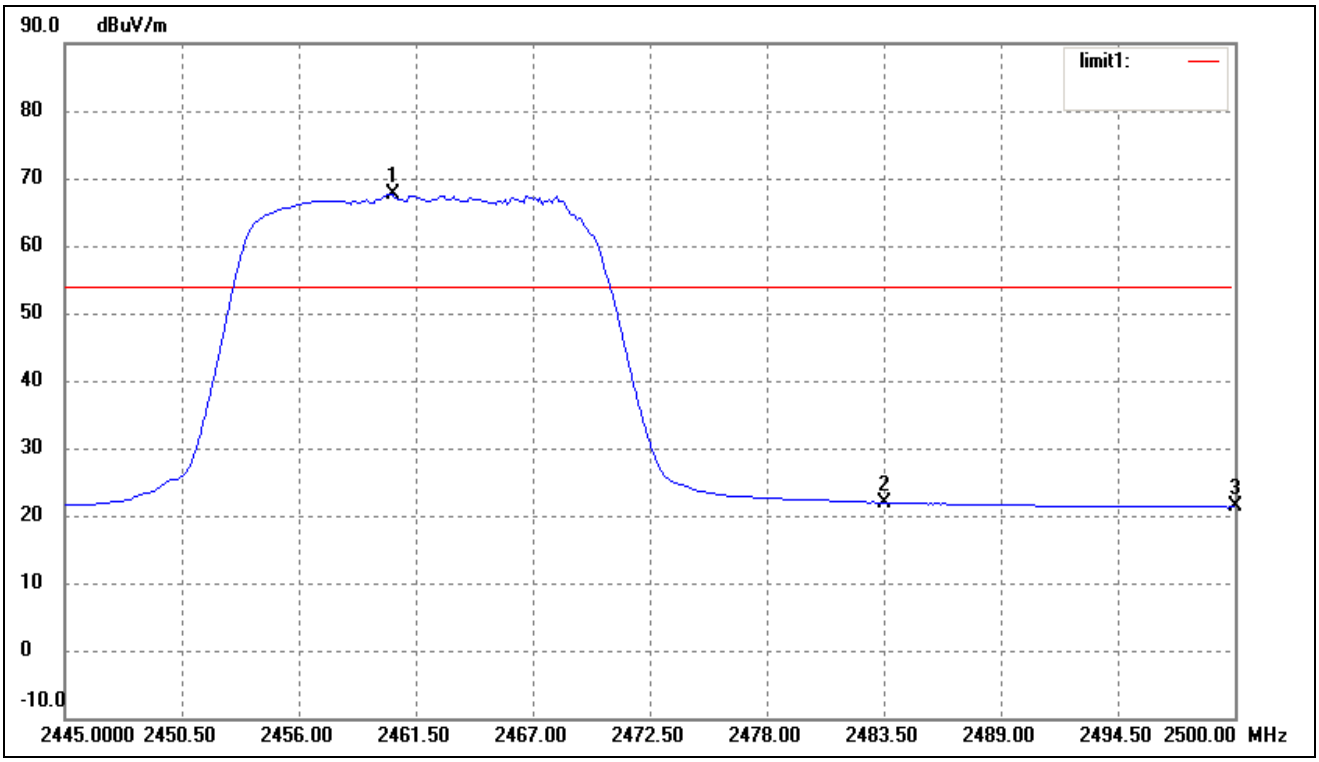
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2459.520	82.90	-11.77	71.13	/	/	Ave
	2459.520	97.30	-11.77	85.53	/	/	peak
2	2483.500	Delta = 50.29 dBc		20.84	54.00	-33.16	Ave
	2483.500			35.24	74.00	-38.76	peak
3	2500.000	33.01	-11.78	21.23	54.00	-32.77	Ave
	2500.000	46.91	-11.78	35.13	74.00	-38.87	peak

802.11g-Lowest Bandedge



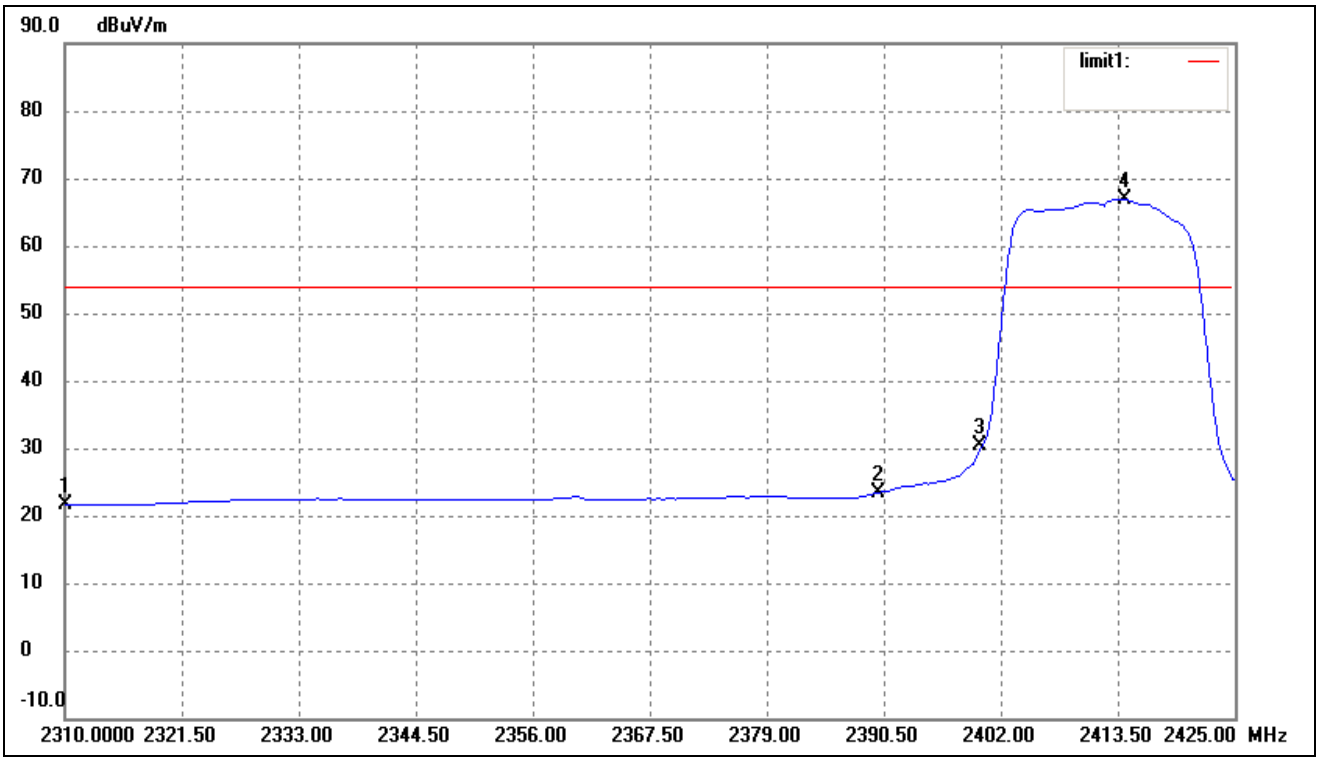
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	33.29	-11.72	21.57	54.00	-32.43	Ave
	2310.000	46.44	-11.72	34.72	74.00	-39.28	peak
2	2390.000	35.04	-11.75	23.29	54.00	-30.71	Ave
	2390.000	48.81	-11.75	37.06	74.00	-36.94	peak
3	2400.000	41.19	-11.75	29.44	Delta = 37.98 dBc		Ave
4	2413.960	79.18	-11.76	67.42	/	/	Ave

802.11g-Highest Bandedge



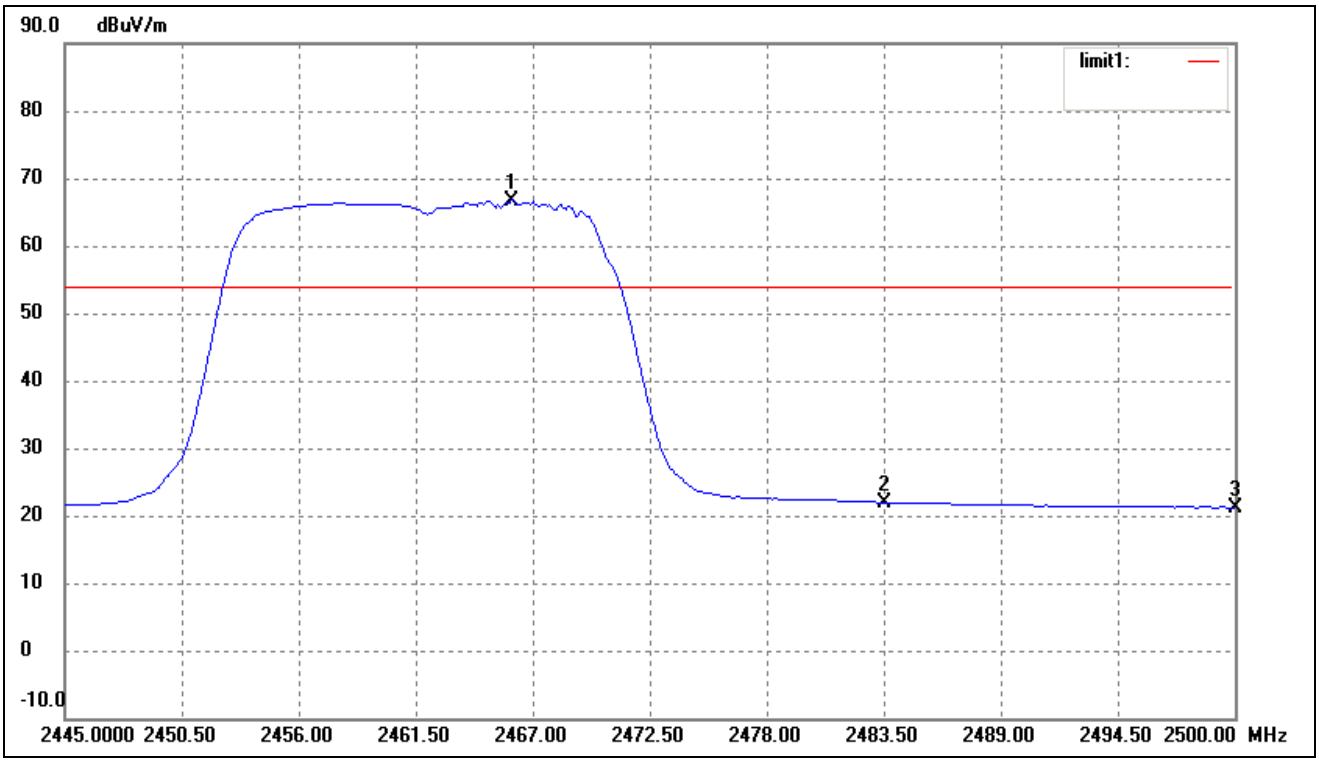
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2460.400	79.32	-11.77	67.55	/	/	Ave
	2460.400	93.60	-11.77	81.83	/	/	peak
2	2483.500	Delta = 46.65 dBc		20.90	54.00	-33.10	Ave
	2483.500			35.18	74.00	-38.82	peak
3	2500.000	33.07	-11.78	21.29	54.00	-32.71	Ave
	2500.000	46.98	-11.78	35.20	74.00	-38.80	peak

802.11n-HT20-Lowest Bandedge



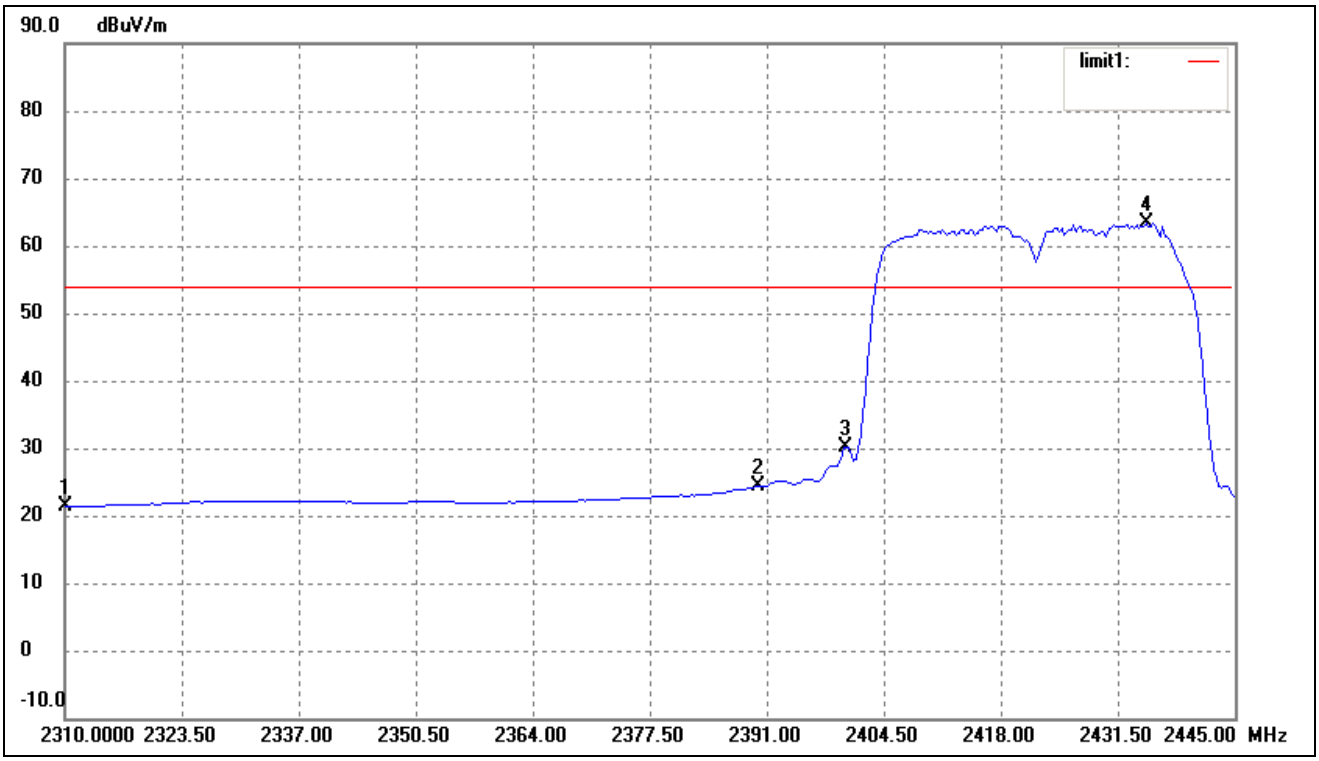
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	33.26	-11.72	21.54	54.00	-32.46	Ave
	2310.000	46.79	-11.72	35.07	74.00	-38.93	peak
2	2390.000	35.17	-11.75	23.42	54.00	-30.58	Ave
	2390.000	52.32	-11.75	40.57	74.00	-33.43	peak
3	2400.000	42.24	-11.75	30.49	Delta = 36.42 dBc		Ave
4	2414.190	78.67	-11.76	66.91	/	/	Ave

802.11n-HT20-Highest Bandedge



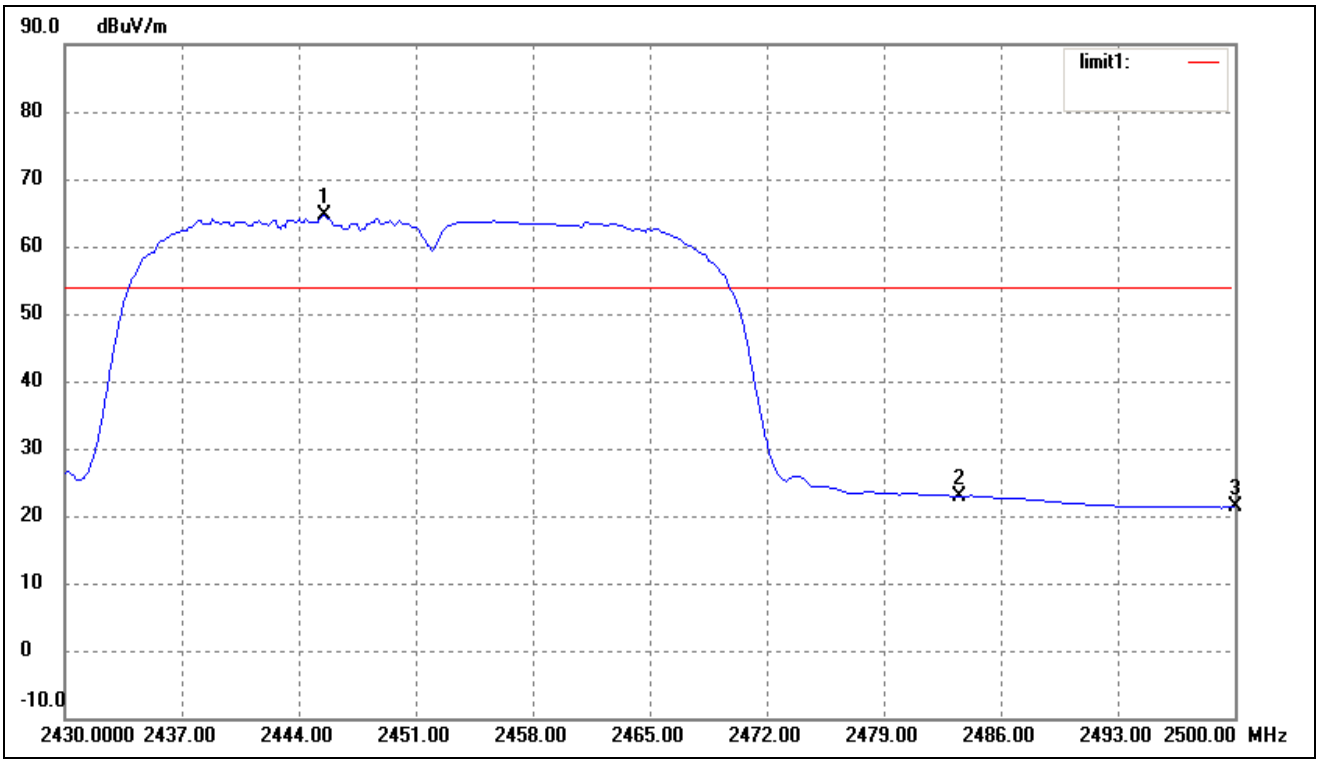
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2466.010	78.52	-11.77	66.75	/	/	Ave
	2466.010	93.47	-11.77	81.70	/	/	peak
2	2483.500	Delta = 45.79 dBc		20.96	54.00	-33.04	Ave
	2483.500			35.91	74.00	-38.09	peak
3	2500.000	33.03	-11.78	21.25	54.00	-32.75	Ave
	2500.000	47.14	-11.78	35.36	74.00	-38.64	peak

802.11n-HT40-Lowest Bandedge



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	33.13	-11.72	21.41	54.00	-32.59	Ave
	2310.000	46.45	-11.72	34.73	74.00	-39.27	peak
2	2390.000	36.20	-11.75	24.45	54.00	-29.55	Ave
	2390.000	55.96	-11.75	44.21	74.00	-29.79	peak
3	2400.000	41.92	-11.75	30.17	Delta = 33.27 dBc		Ave
4	2434.740	75.20	-11.76	63.44	/	/	Ave

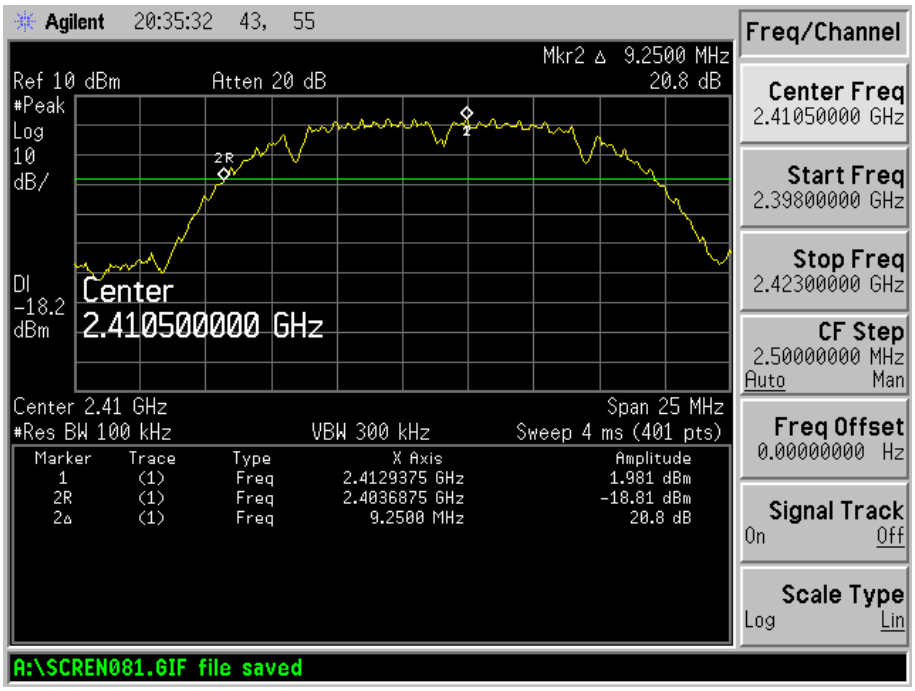
802.11n-HT40-Highest Bandedge



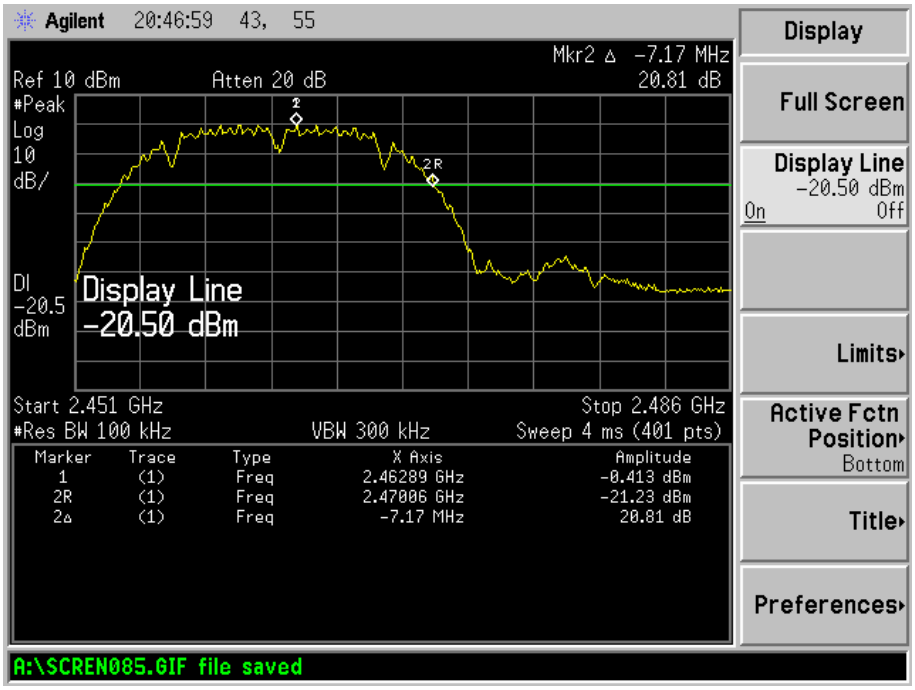
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2445.540	76.36	-11.77	64.59	/	/	Ave
	2445.540	93.68	-11.77	81.91	/	/	peak
2	2483.500	Delta = 43.62 dBc		20.97	54.00	-33.03	Ave
	2483.500			38.29	74.00	-35.71	peak
3	2500.000	33.07	-11.78	21.29	54.00	-32.71	Ave
	2500.000	46.88	-11.78	35.10	74.00	-38.90	peak

Bandedge (Conducted)

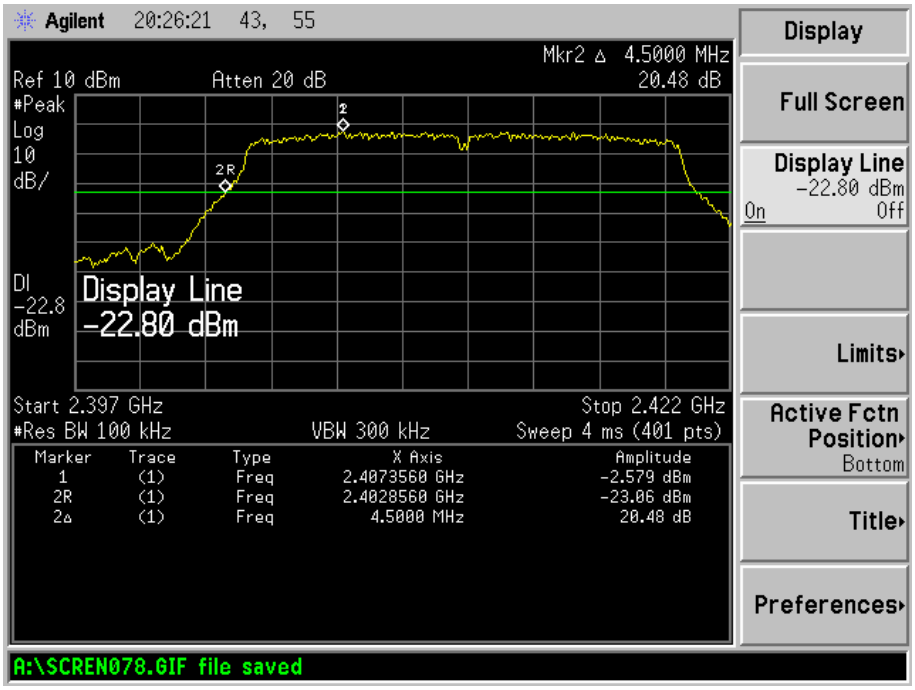
802.11b-Lowest Bandedge



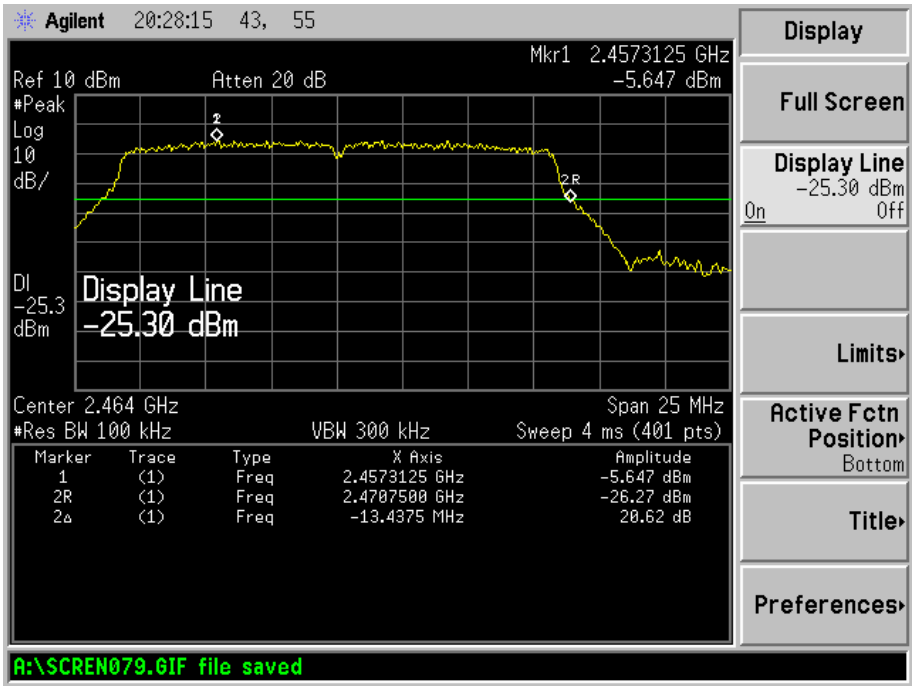
802.11b-Highest Bandedge



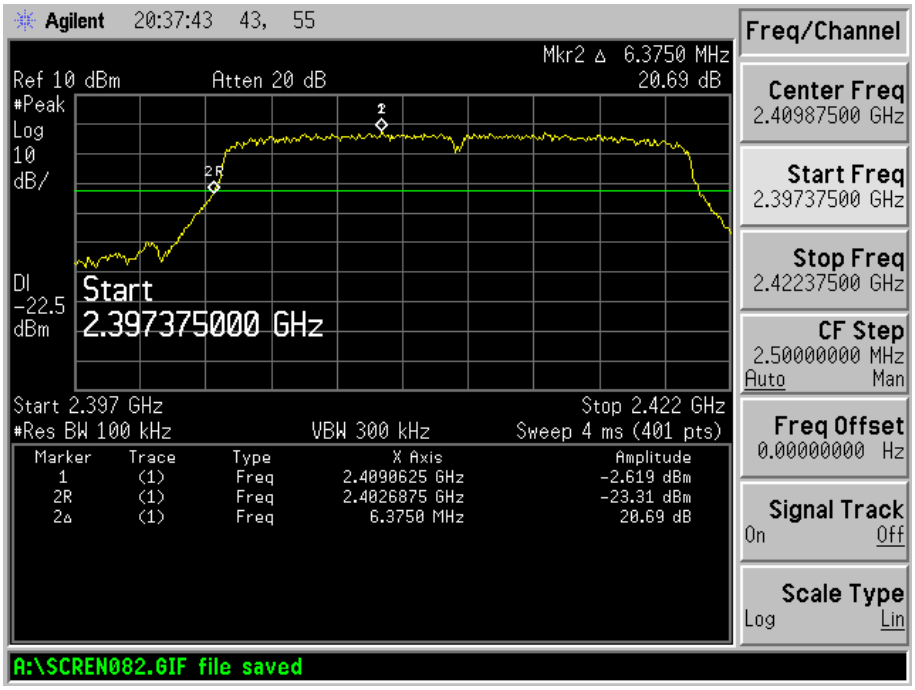
802.11g-Lowest Bandedge



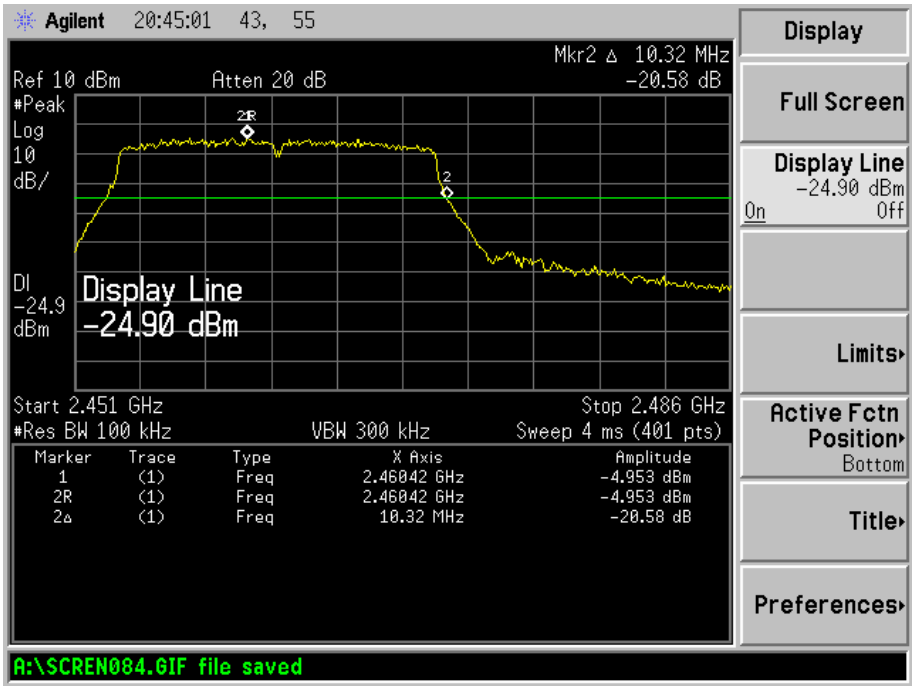
802.11g-Highest Bandedge



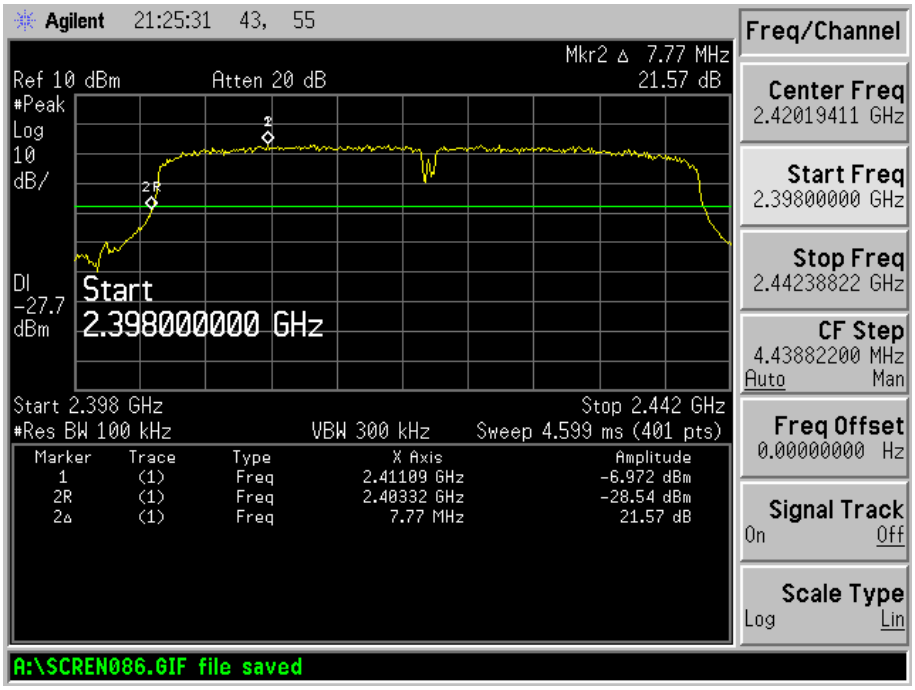
802.11n-HT20-Lowest Bandedge



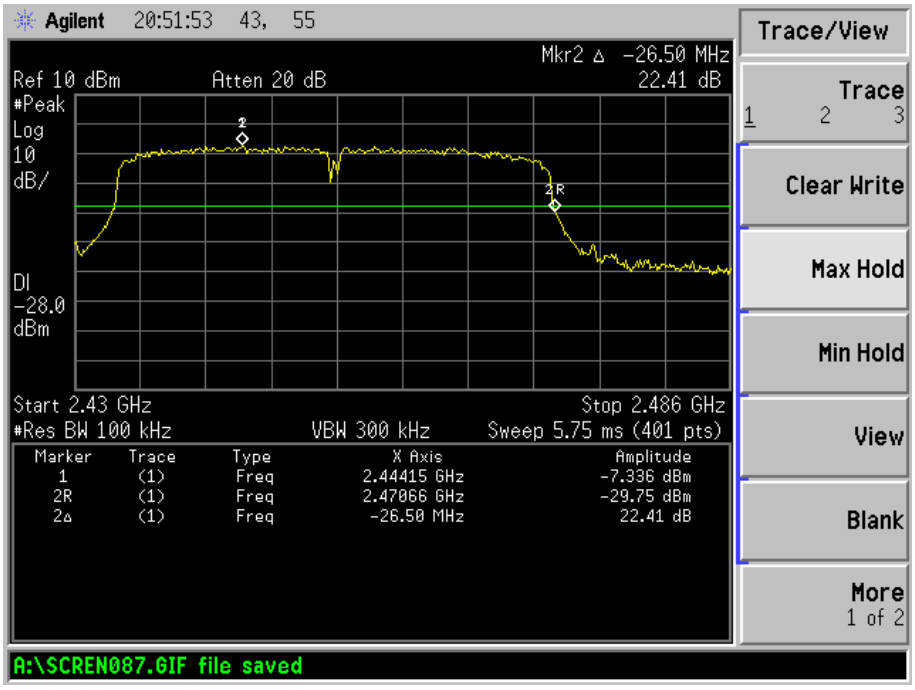
802.11n-HT20-Highest Bandedge



802.11n-HT40-Lowest Bandedge

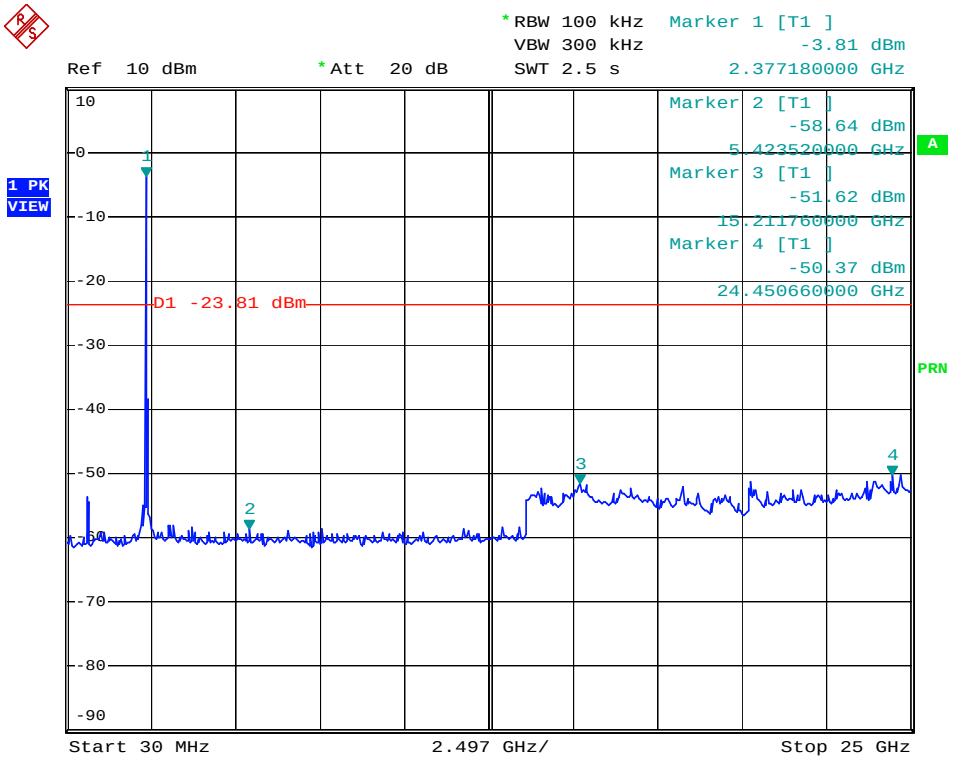


802.11n-HT40-Highest Bandedge

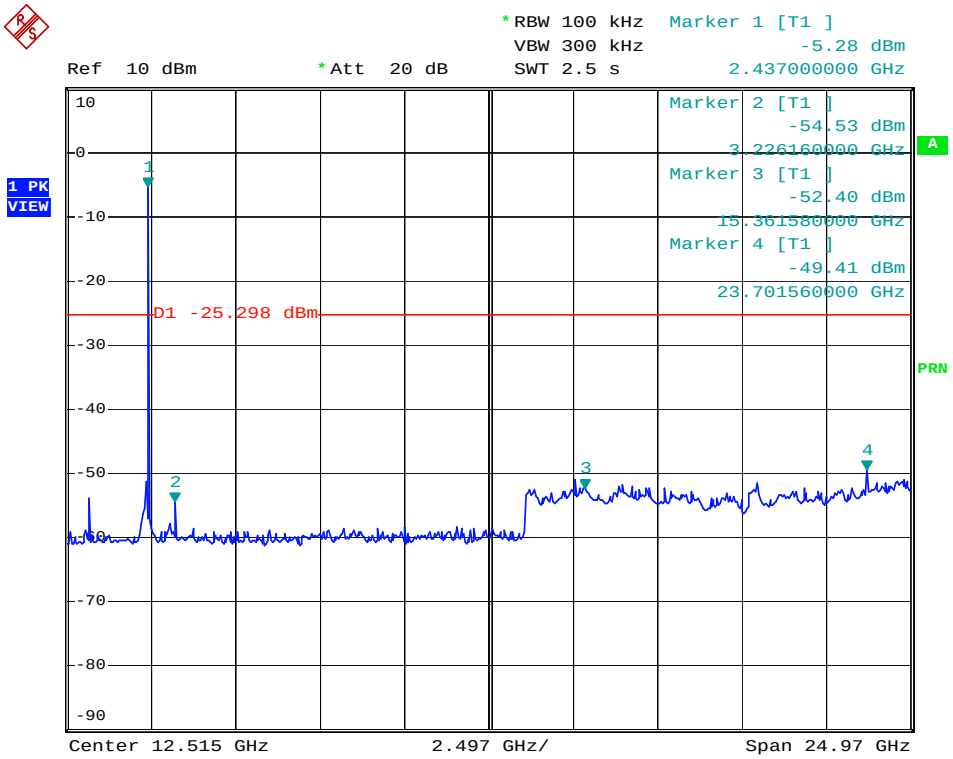


Conducted Spurious Emissions

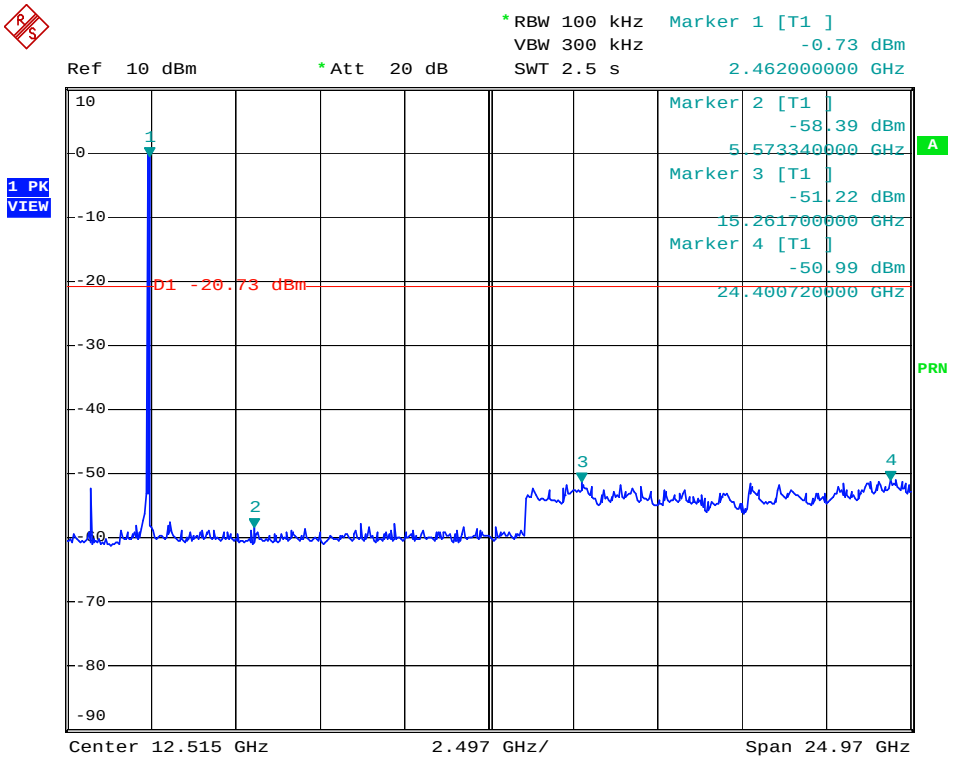
802.11b Low Bandedge



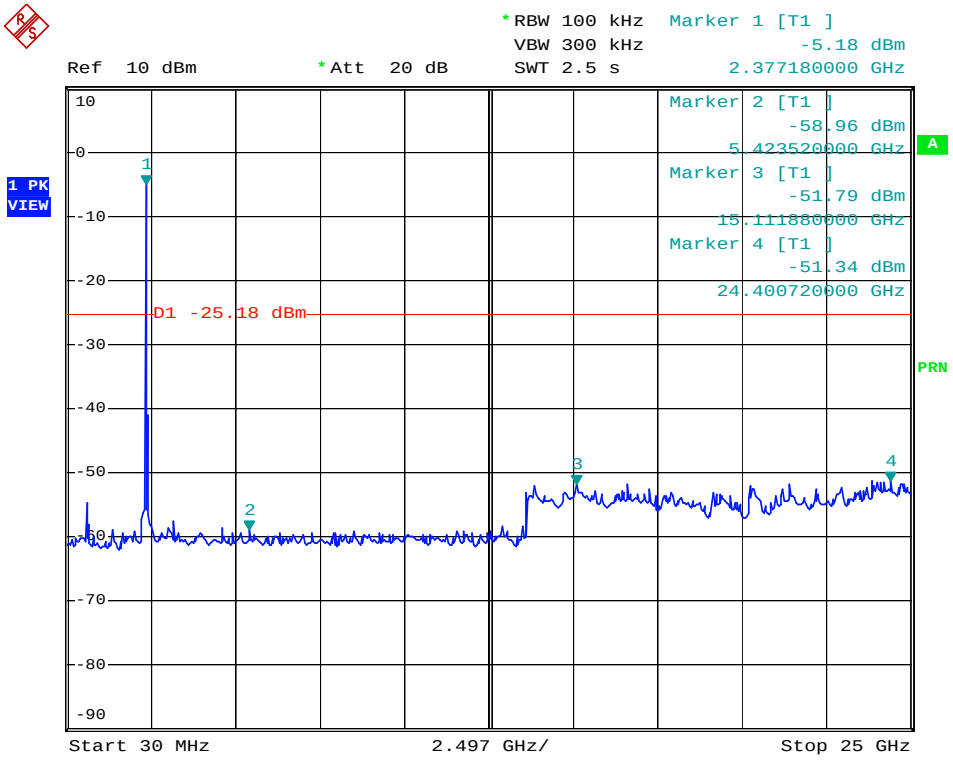
802.11b Middle Bandedge



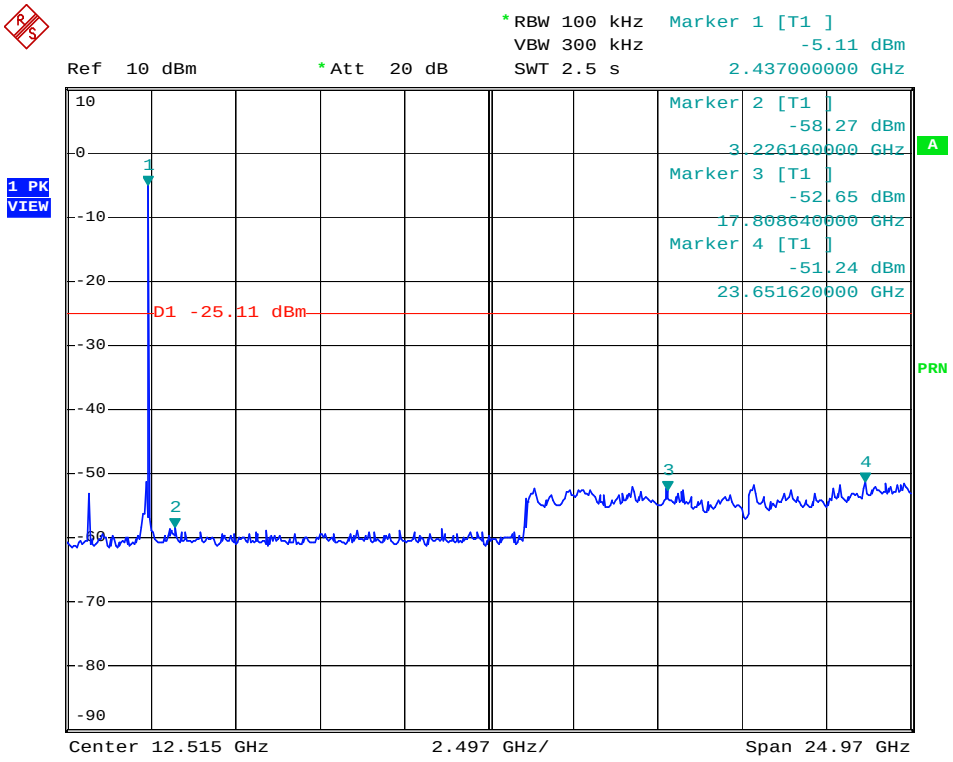
802.11b High Bandedge



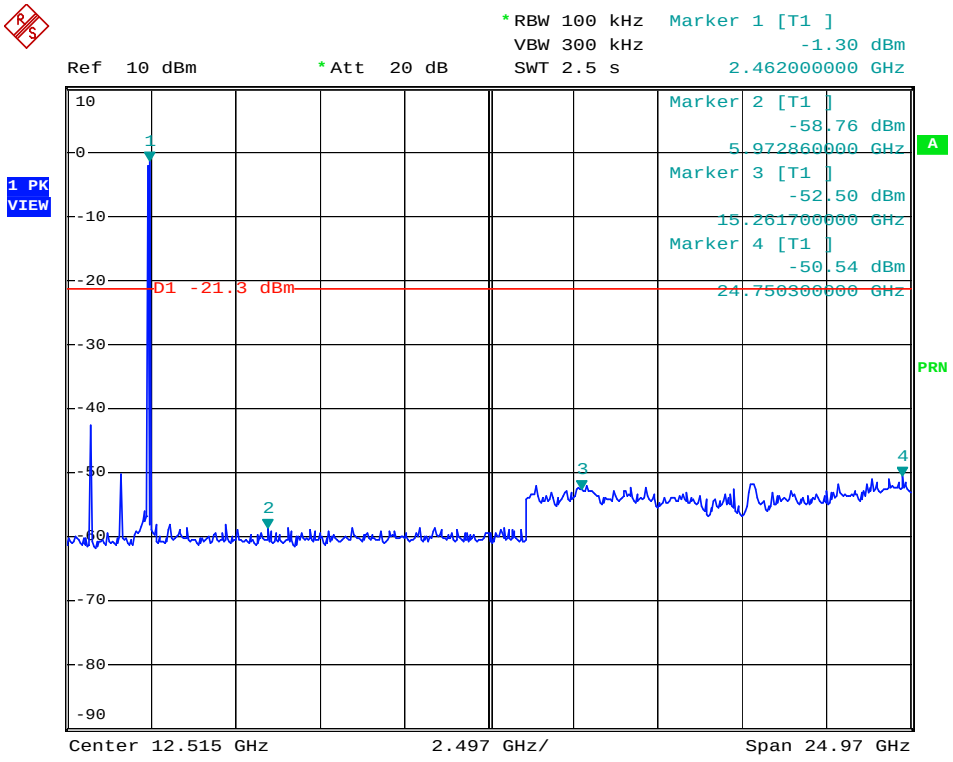
802.11g Low Bandedge



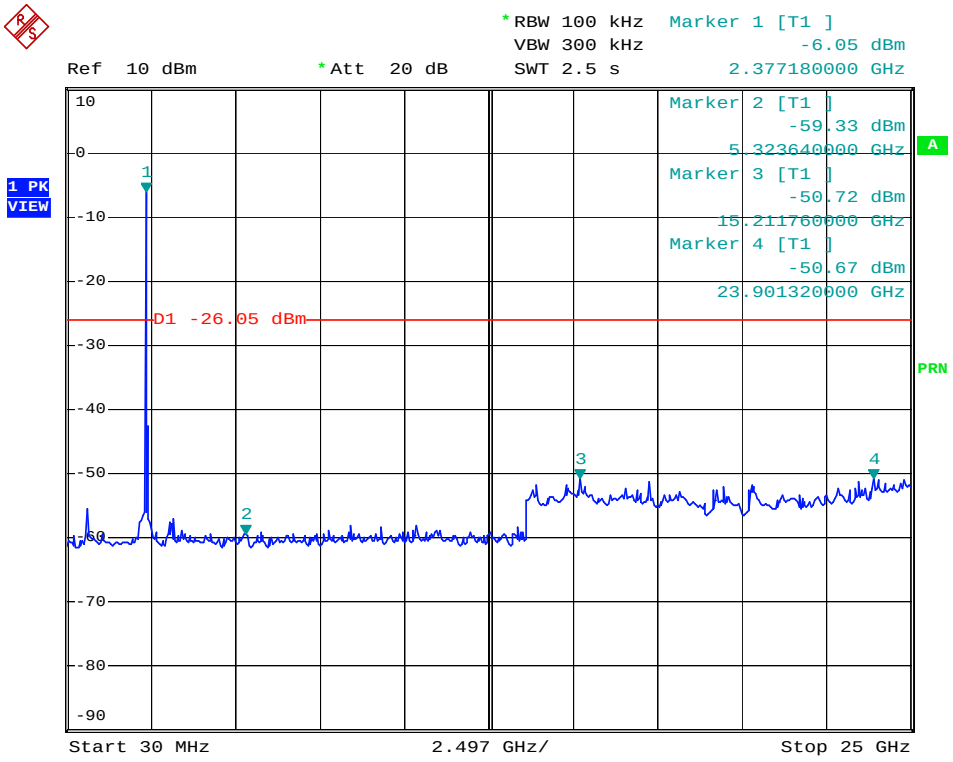
802.11g Middle Bandedge



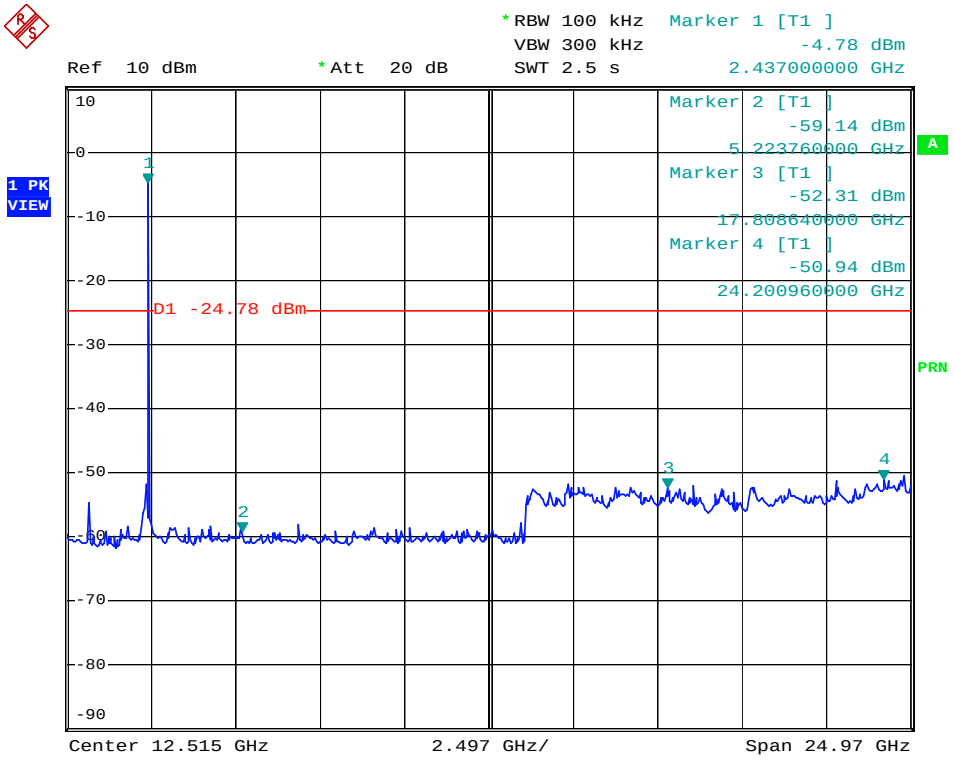
802.11g High Bandedge



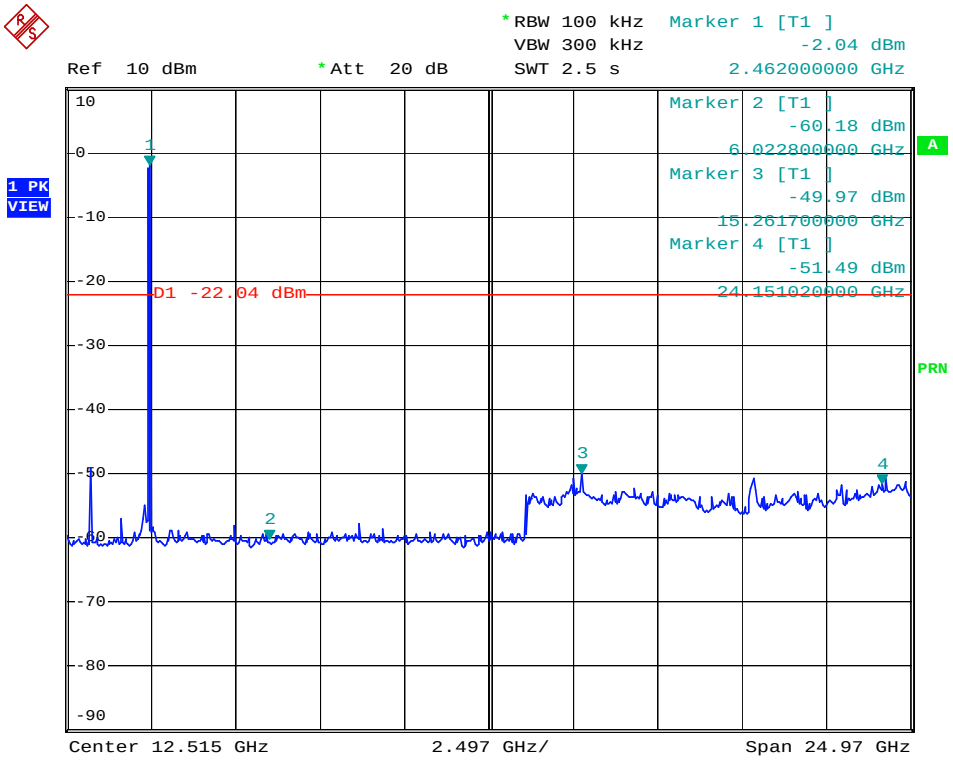
802.11n-HT20 Low Bandedge



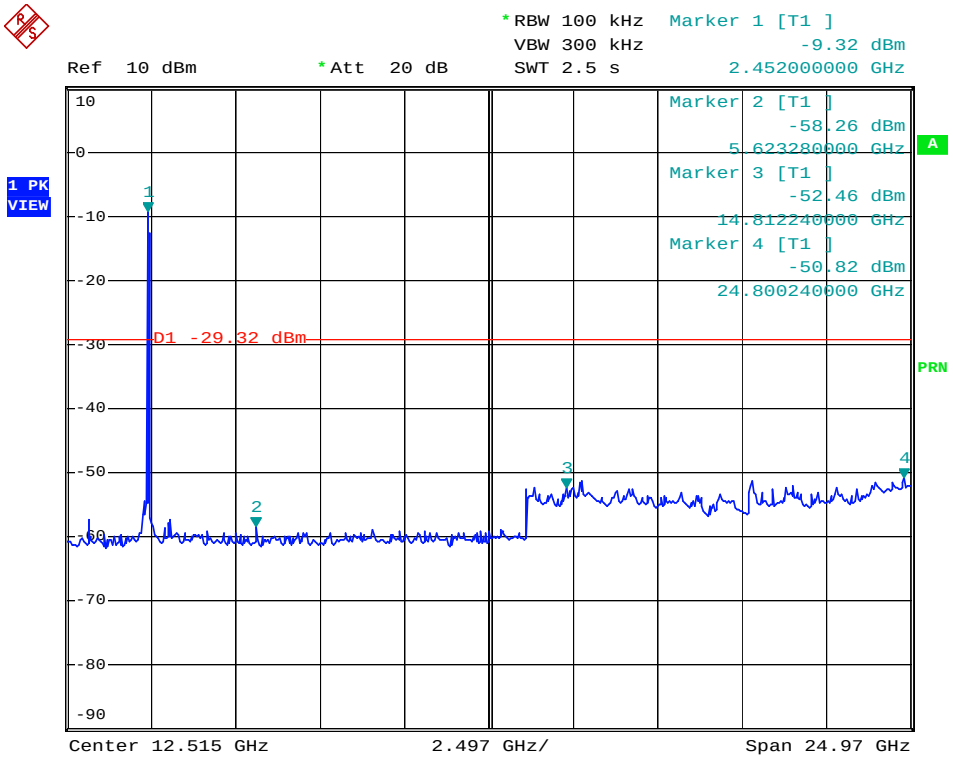
802.11n-HT20 Middle Bandedge



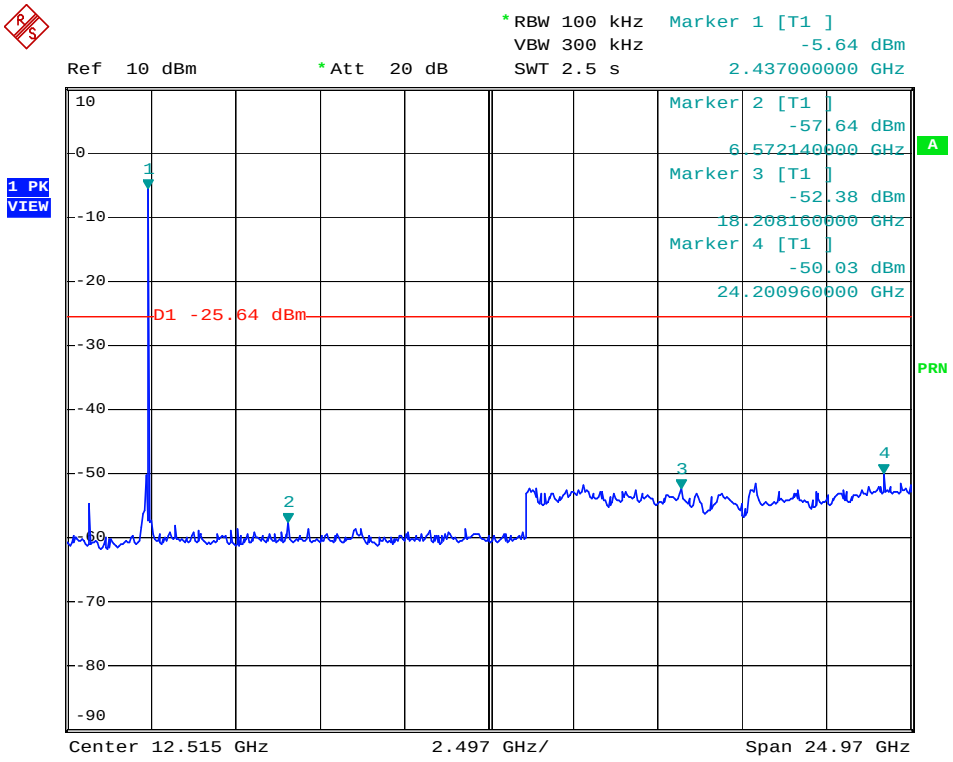
802.11n-HT20 High Bandedge



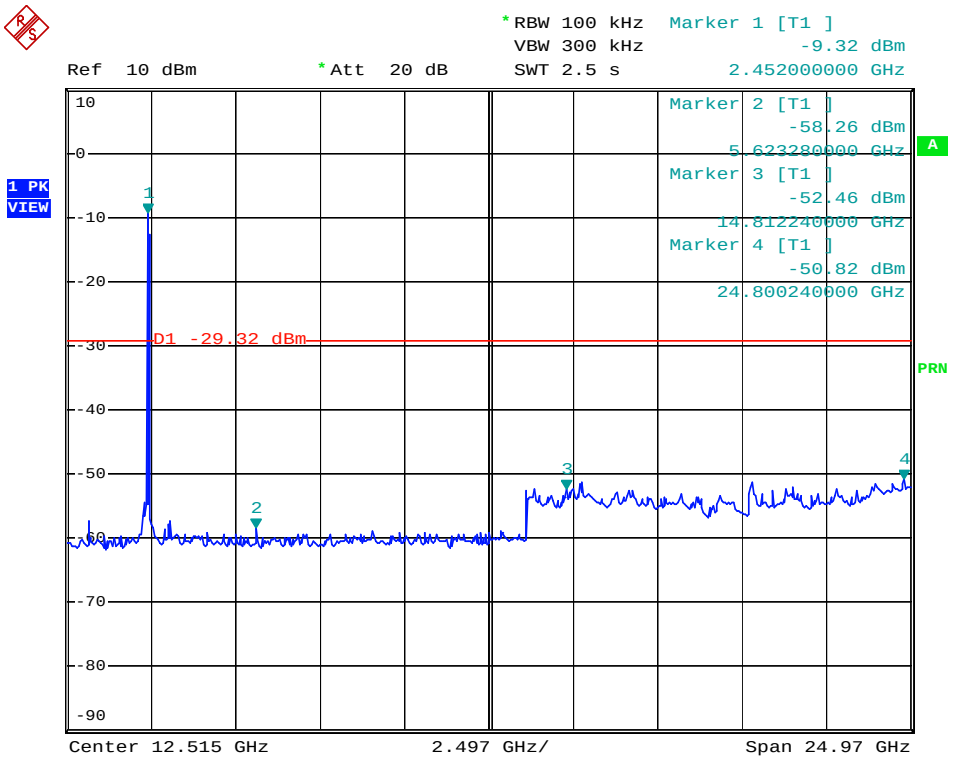
802.11n-HT40 Low Bandedge



802.11n-HT40 Middle Bandedge



802.11n-HT40 High Bandedge



9. Conducted Emissions

9.1 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.

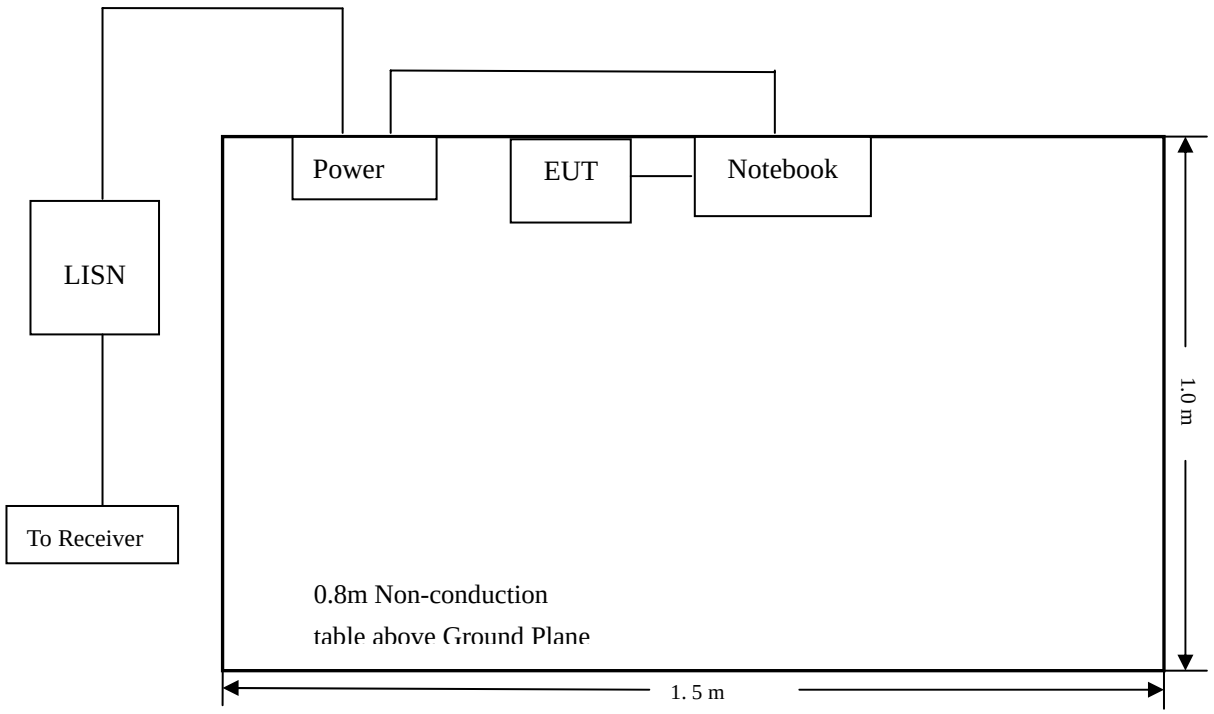
9.2 Test Equipment List and Details

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

9.3 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.

9.4 Basic Test Setup Block Diagram



9.5 Environmental Conditions

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

9.6 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

9.7 Summary of Test Results/Plots

According to the data in section 9.8, the EUT complied with the FCC Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

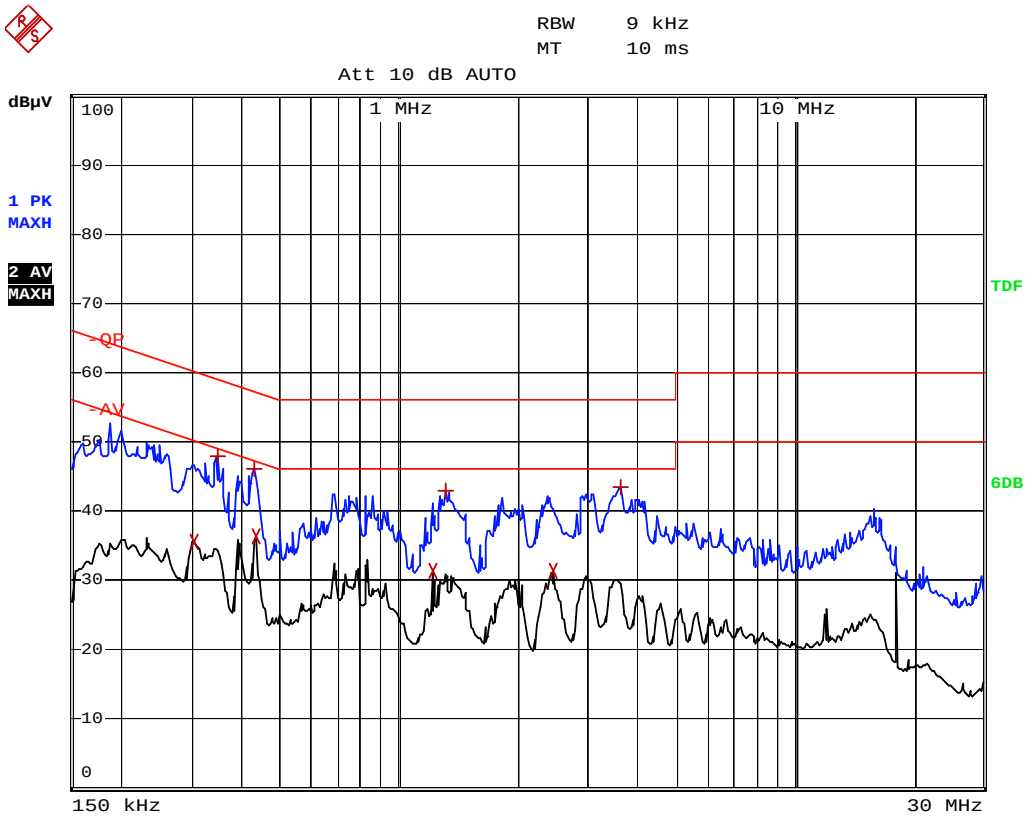
-10.72 dB at 0.434 MHz in the **Neutral** mode**, Average** detector, **0.15-30MHz**

9.8 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

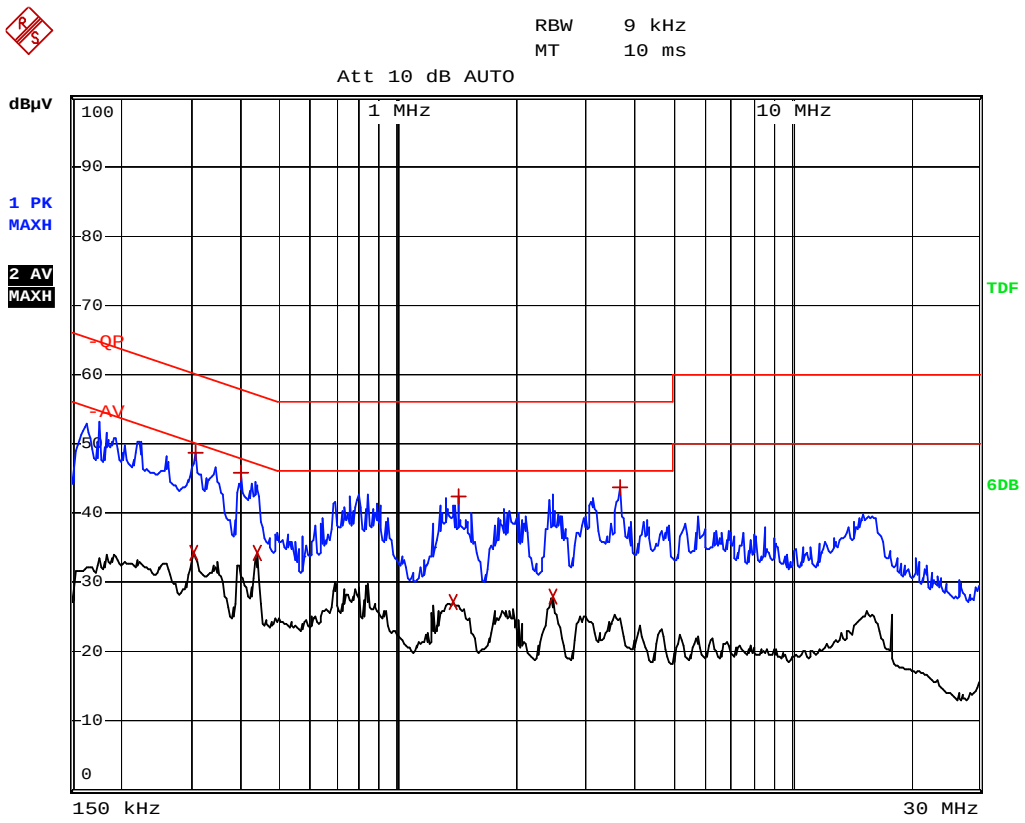
EUT: *Air pen express*
Tested Model: *A500*
Operating Condition: *Transmitting*
Comment: *AC 120V/60Hz, USB 5V*

Test Specification: *Neutral*



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
2 Average	302 kHz	35.68	-14.50
1 Max Peak	346 kHz	47.88	-11.17
1 Max Peak	430 kHz	46.16	-11.08
2 Average	434 kHz	36.45	-10.72
2 Average	1.222 MHz	31.46	-14.53
1 Max Peak	1.31 MHz	42.90	-13.09
2 Average	2.446 MHz	31.35	-14.64
1 Max Peak	3.63 MHz	43.33	-12.66

Test Specification: *Line*



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
2 Average	302 kHz	34.18	-16.00
1 Max Peak	306 kHz	48.70	-11.37
1 Max Peak	398 kHz	45.88	-12.00
2 Average	438 kHz	34.16	-12.93
2 Average	1.378 MHz	27.12	-18.87
1 Max Peak	1.426 MHz	42.41	-13.59
2 Average	2.47 MHz	28.05	-17.94
1 Max Peak	3.662 MHz	43.72	-12.27

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