FCC Part 15C
Measurement and Test Report

For

Nanjing IOT Sensor Technology Co., Ltd.

NO.12, Mozhou East Road, Nanjing, PRC.

FCC ID: 2ADLSWLGW-G11002

FCC Rule(s):	FCC Part 15C
Product Description:	Gateway
Tested Model:	WL-ZGWMDPB-G110-02
Report No.:	STR14118109I-1
Tested Date:	2014-11-11 to 2014-12-09
Issued Date:	2014-12-09
Tested By:	Jason Su / 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:	Nanjing IOT Sensor Technology Co., Ltd.
Address of applicant:	NO.12, Mozhou East Road, Nanjing, PRC.
Manufacturer:	Nanjing IOT Sensor Technology Co., Ltd.
Address of manufacturer:	NO.12, Mozhou East Road, Nanjing, PRC.

General Description of EUT	
Product Name:	Gateway
Trade Name:	Wulian
Model No.:	WL-ZGWMDPB-G110-02
Adding Model(s):	WL-ZGWMDPB-G110-xx ; WL-ZGWMDPW-G110-02 WL-ZGWMDPW-G110-xx (xx denotes 80~99)
Rated Voltage:	Adapter：DC5V
Power Adapter Model:	WEF0500200A1BA
Note: The test data is gathered from a production sample provided by the manufacturer. The appearance of others models listed in the report is different from main-test model WL-ZGWMDPB-G110-02, but the circuit and the electronic construction do not change, declared by the manufacturer.	

Technical Characteristics of EUT	
Support Standards:	802.11b, 802.11g, 802.11n-HT20, 802.11n-HT40
Frequency Range:	2412-2472MHz for 802.11b/g/n-HT20 2422-2462MHz for 802.11n-HT40
RF Output Power:	16.90dBm (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Quantity of Channels:	13 for 802.11b/g/n-HT20; 11 for 802.11n-HT40
Channel Separation:	5MHz
Type of Antenna:	Internal Antenna
Antenna Gain:	3.3dBi
Lowest Internal Frequency	32.768kHz

1.2 Test Standards

The following report is prepared on behalf of the Nanjing IOT Sensor Technology 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 measurement guide KDB 558074 D01 V03r02 for digital transmission systems shall be performed also.

1.4 Test Facility

FCC – Registration No.: 934118

Shenzhen SEM.Test Technology 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 934118.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology 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 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd 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, 2442MHz, 2472MHz
TM2	802.11g	2412MHz, 2442MHz, 2472MHz
TM3	802.11n-HT20	2412MHz, 2442MHz, 2472MHz
TM4	802.11n-HT40	2422MHz, 2442MHz, 2462MHz

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
RJ45	2.85	Unshielded	Without Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Router	BILLION	BiPAC 7300NX R3	/
Notebook	ASUS	X42J	/

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 2.1093	RF Exposure	Compliant
§ 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)	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 § 1.1307 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 two integral antennas, 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	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27

5.3 Test Procedure

According to the KDB 558074 D01 V03r02, such specifications require that the same method as used to determine the conducted output power shall also be used to determine the power spectral density. The test method of power spectral density as below:

a) Set instrument center frequency to DTS channel center frequency.
b) Set span to at least 1.5 times the OBW.
c) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz. .
d) Set VBW ≥3 x RBW.
e) Detector = power averaging (RMS) or sample detector (when RMS not available).
f) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g) Sweep time = auto couple.
h) Employ trace averaging (RMS) mode over a minimum of 100 traces.
i) Use the peak marker function to determine the maximum amplitude level.
j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span in order to meet the minimum measurement point requirement as the RBW is reduced).

5.4 Environmental Conditions

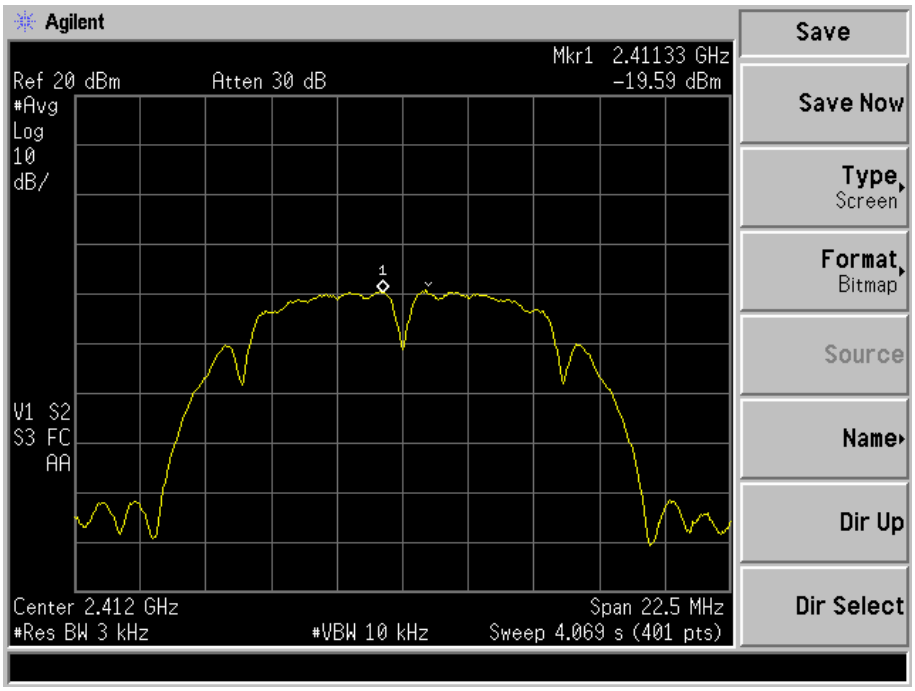
Temperature:	26° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.5 Summary of Test Results/Plots

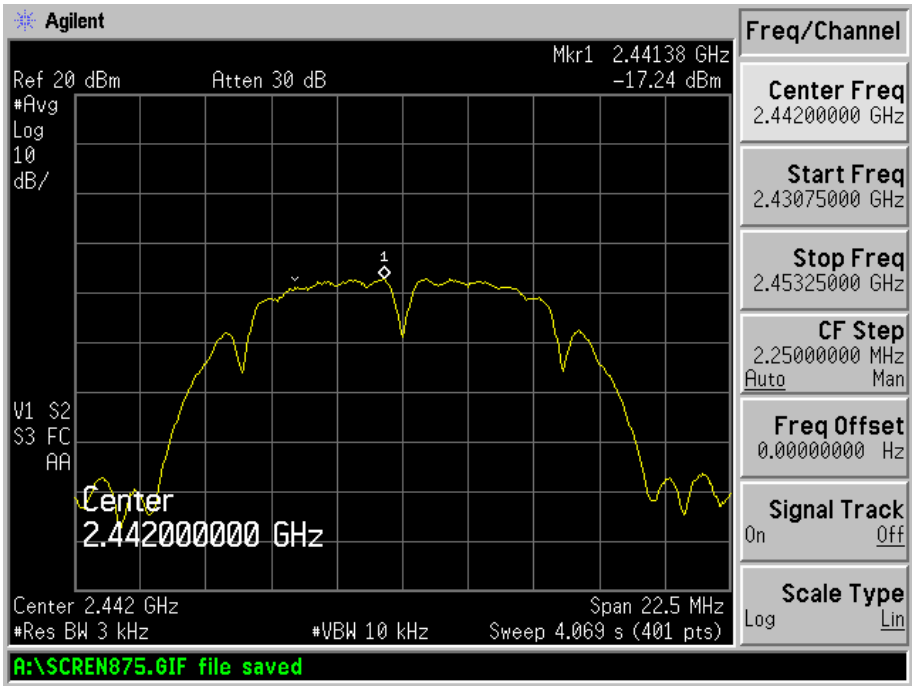
Test Mode	Test Channel MHz	PSD 1 dBm/3kHz	PSD 2 dBm/3kHz	Total PSD dBm/3kHz	Limit dBm/3kHz
802.11b	2412	-19.59	-19.60	-16.58	8
	2442	-17.24	-17.36	-14.29	8
	2472	-17.00	-16.51	-13.74	8
802.11g	2412	-21.16	-19.29	-17.11	8
	2442	-20.97	-20.41	-17.67	8
	2472	-21.03	-19.19	-17.00	8
802.11n HT20	2412	-21.35	-19.92	-17.57	8
	2442	-20.97	-19.77	-17.32	8
	2472	-19.89	-20.04	-17.50	8
802.11n HT40	2422	-24.38	-25.00	-21.67	8
	2442	-24.11	-24.35	-21.22	8
	2462	-24.96	-25.57	-22.24	8

Please refer to the following test plots:

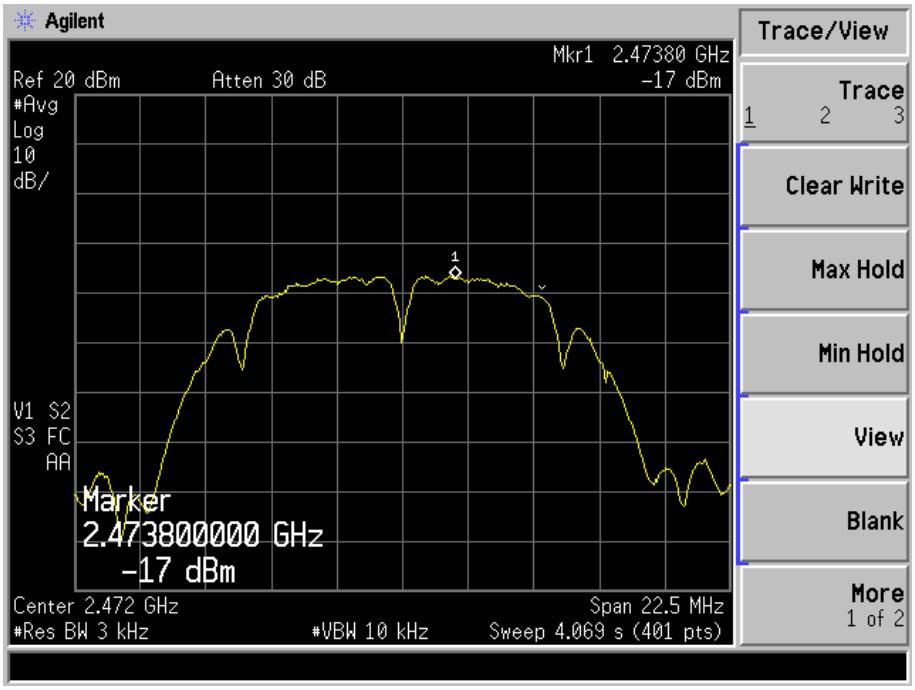
Antenna One
802.11b-Low Channel



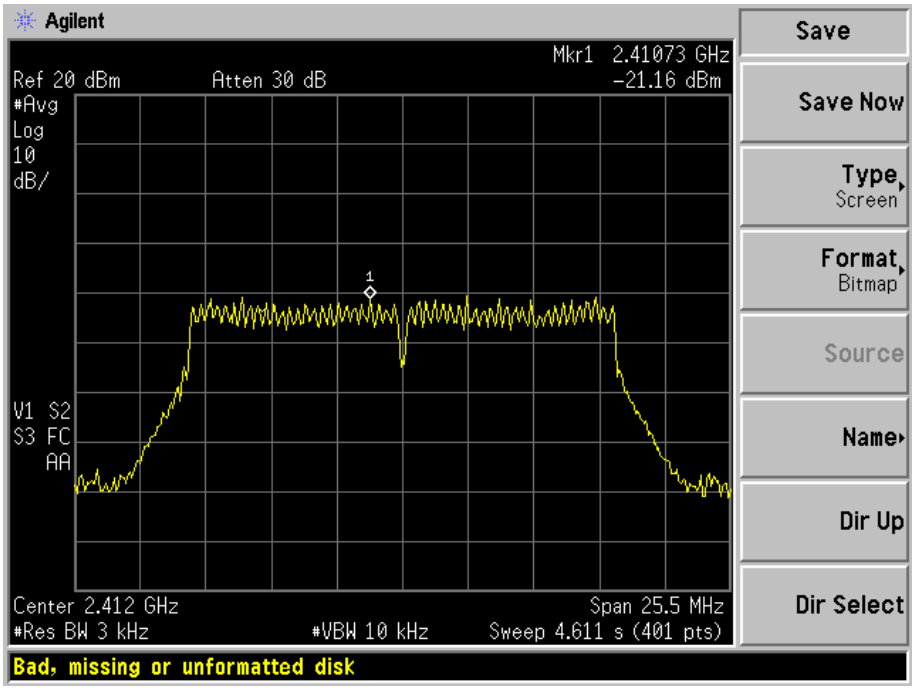
802.11b-Middle Channel



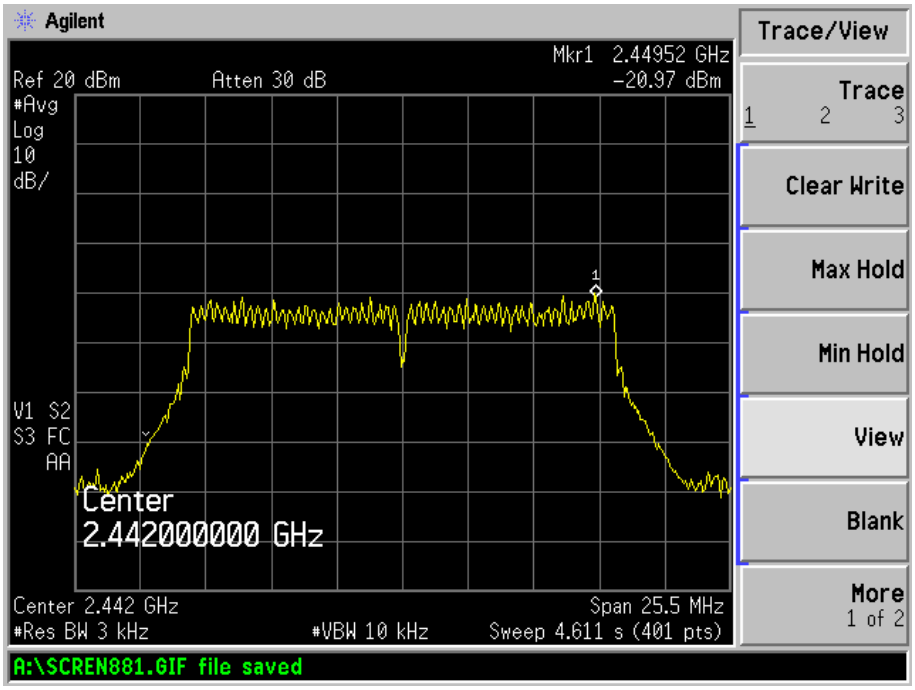
802.11b-High Channel



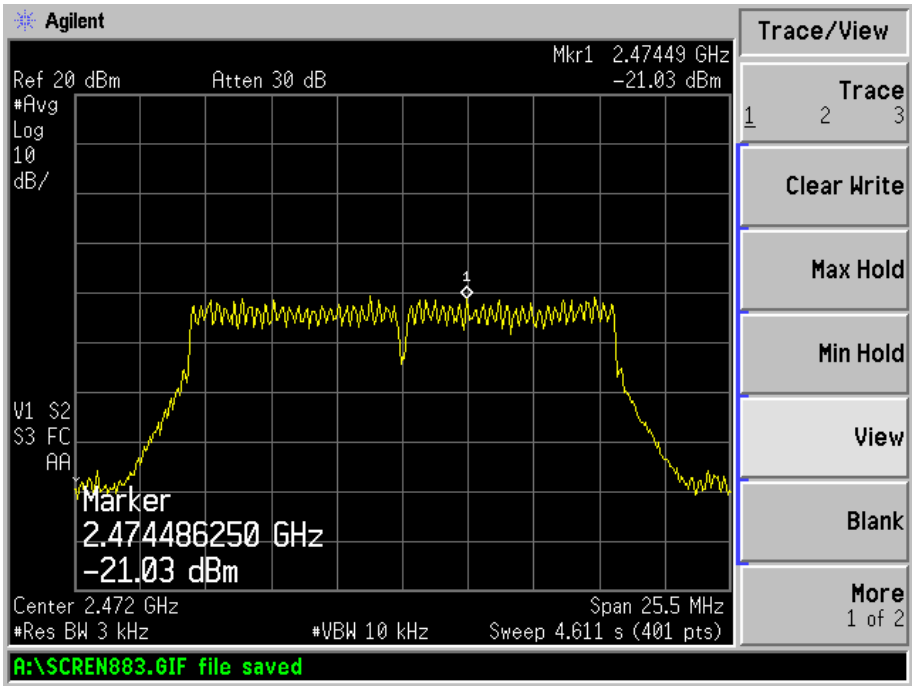
802.11g-Low Channel



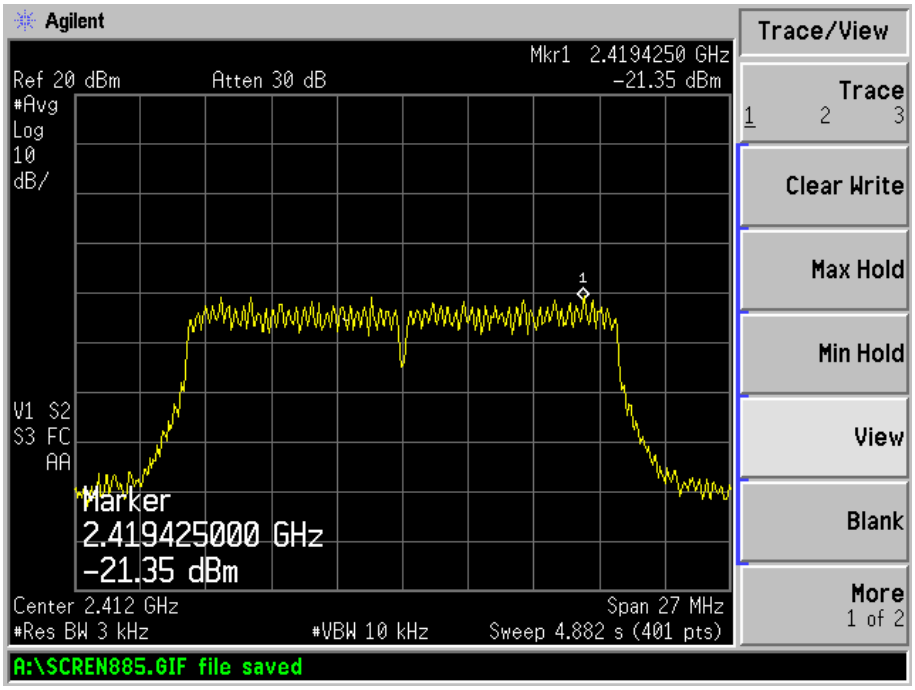
802.11g-Middle Channel



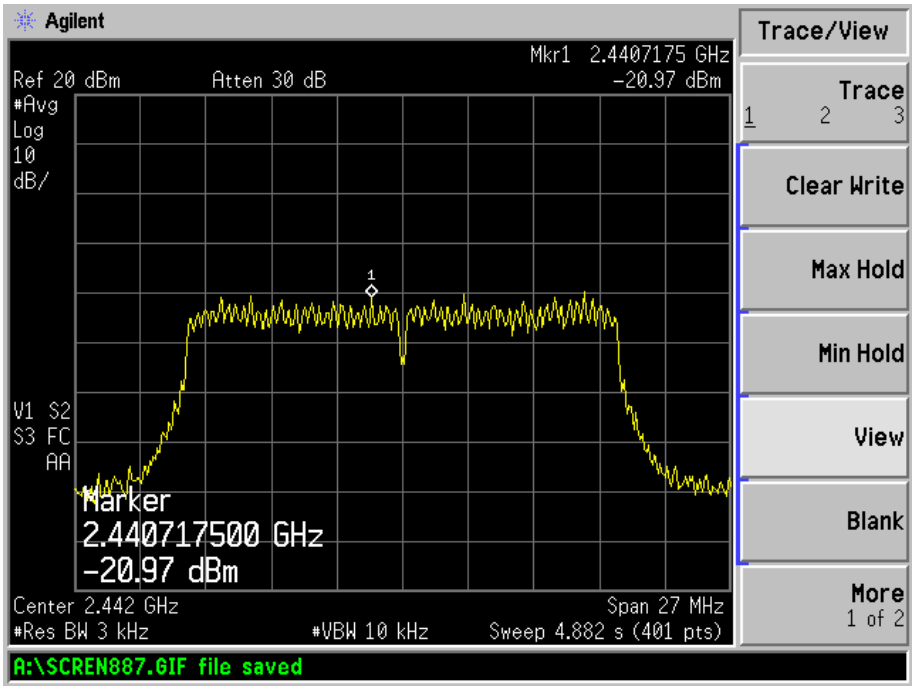
802.11g-High Channel



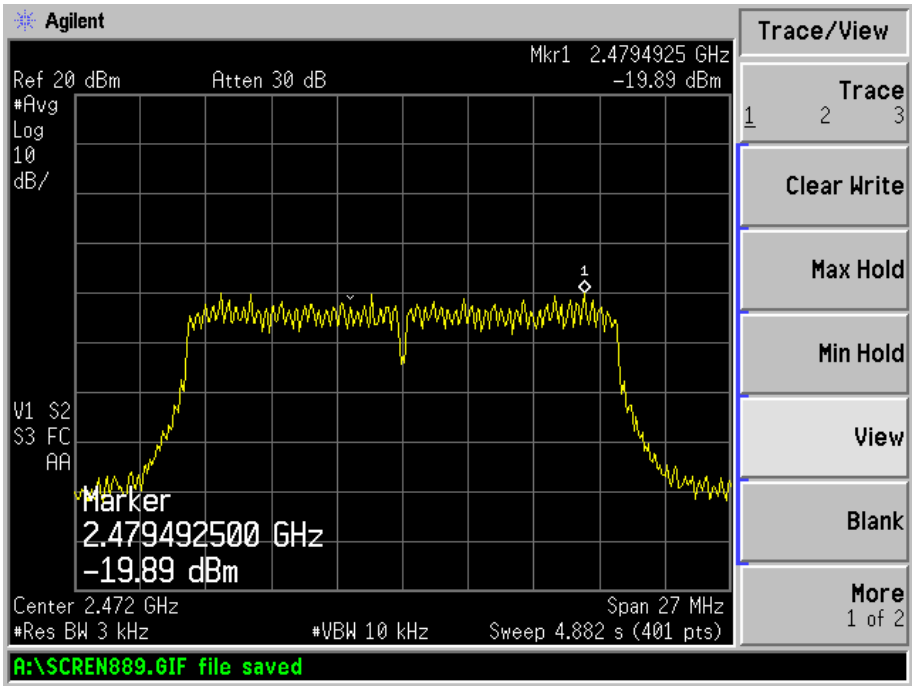
802.11n-HT20-Low Channel



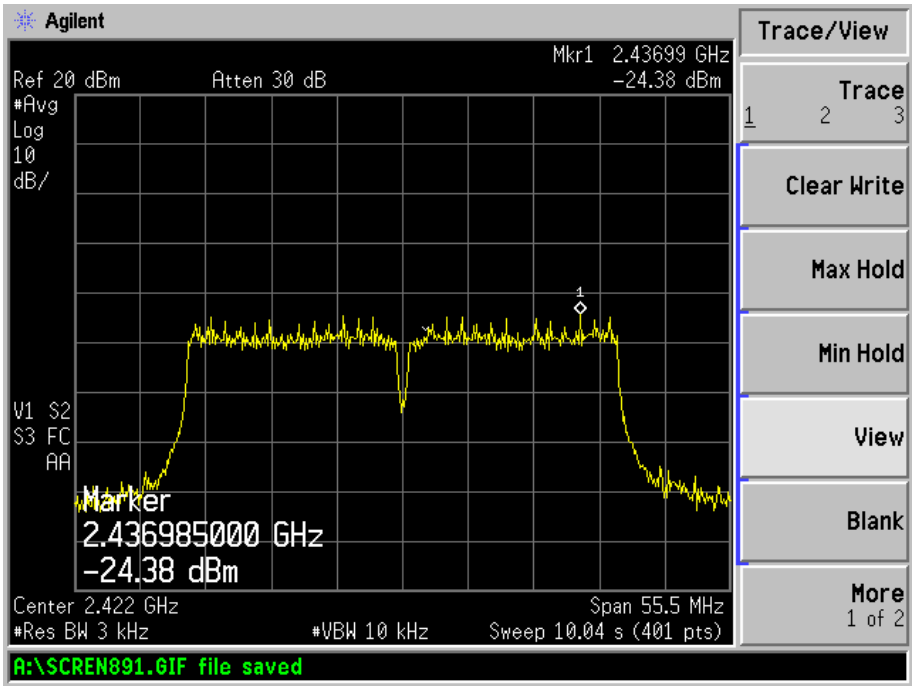
802.11n-HT20-Middle Channel



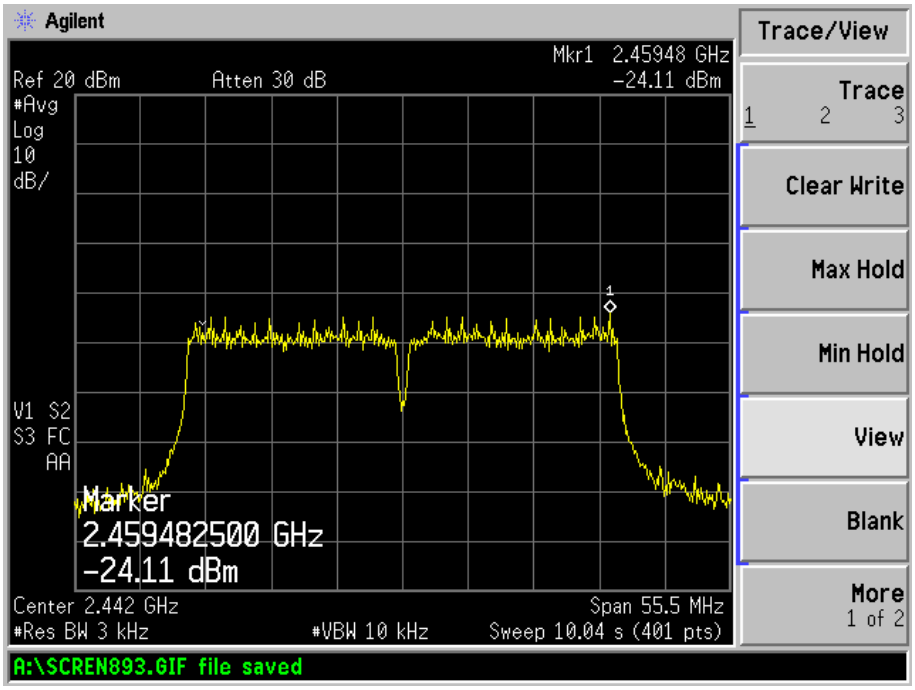
802.11n-HT20-High Channel



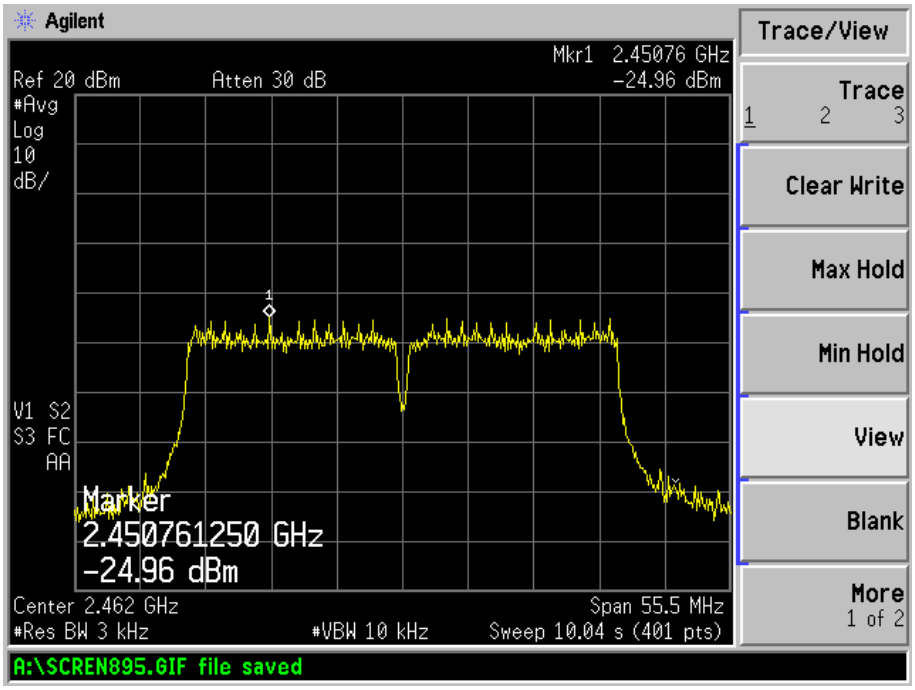
802.11n-HT40-Low Channel



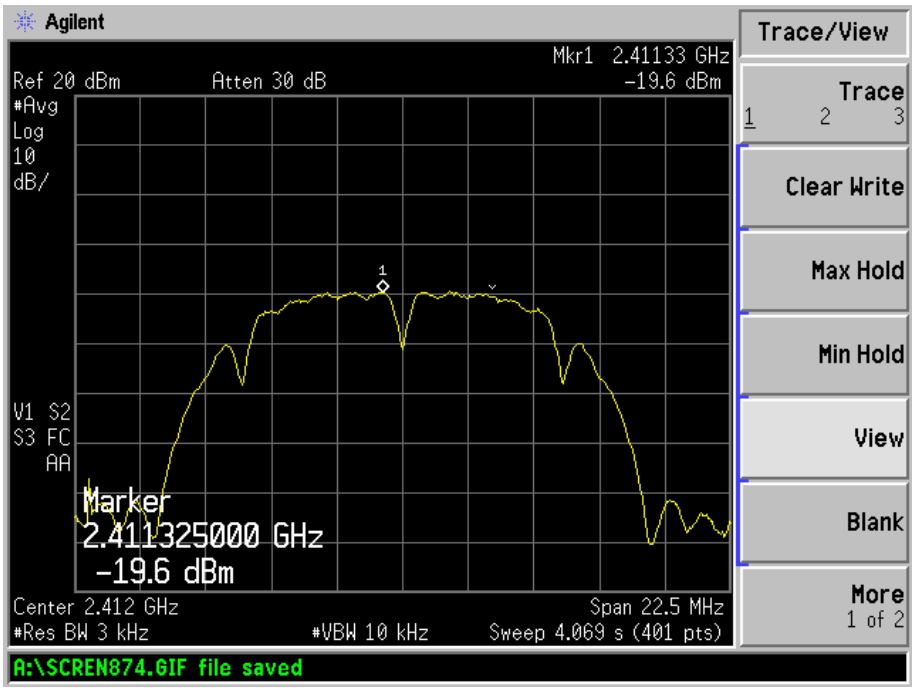
802.11n-HT40-Middle Channel



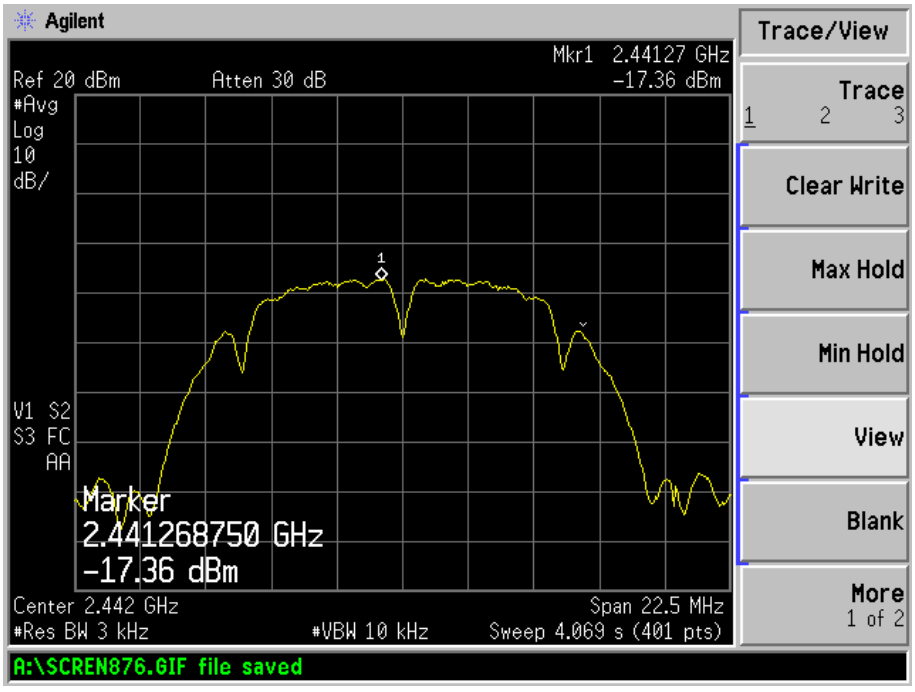
802.11n-HT40-High Channel



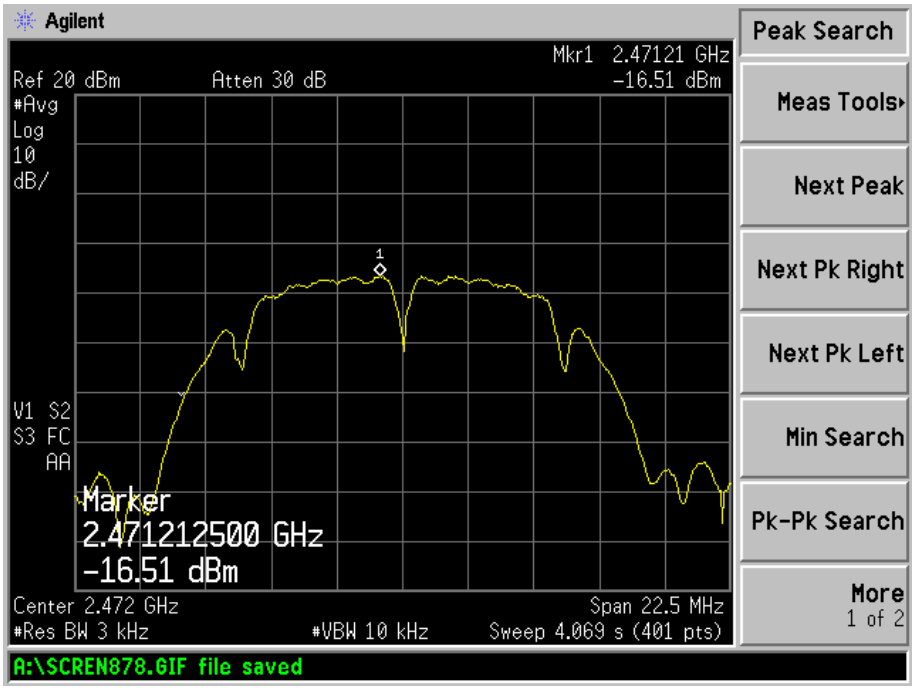
Antenna Two
802.11b-Low Channel



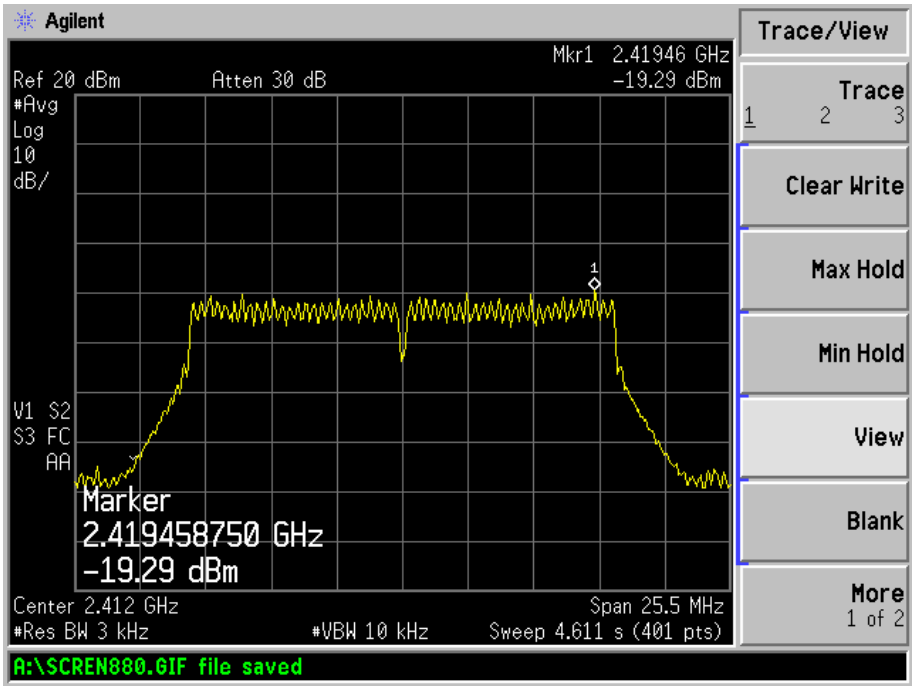
802.11b-Middle Channel



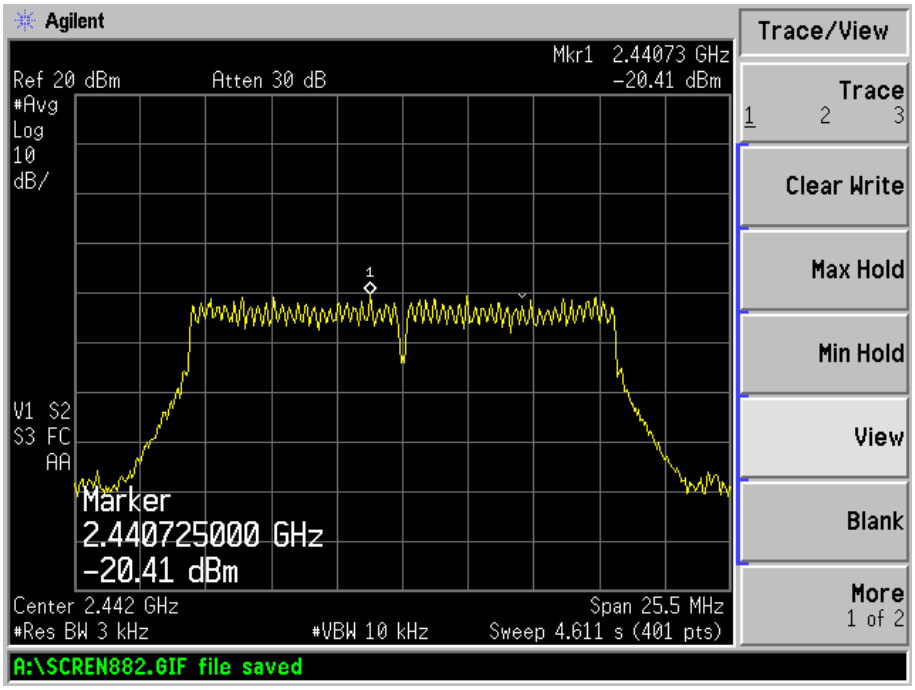
802.11b-High Channel



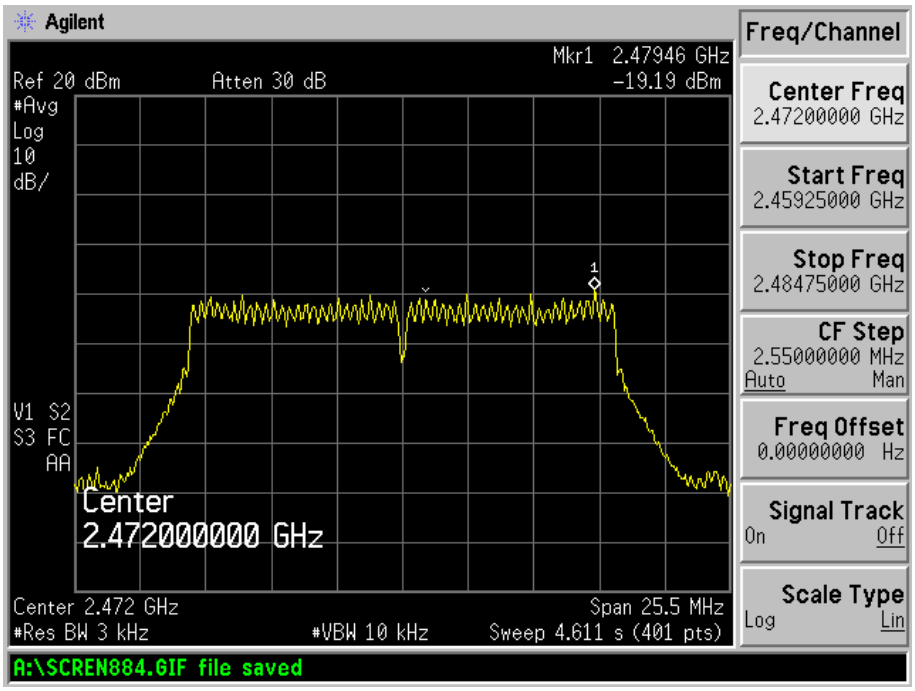
802.11g-Low Channel



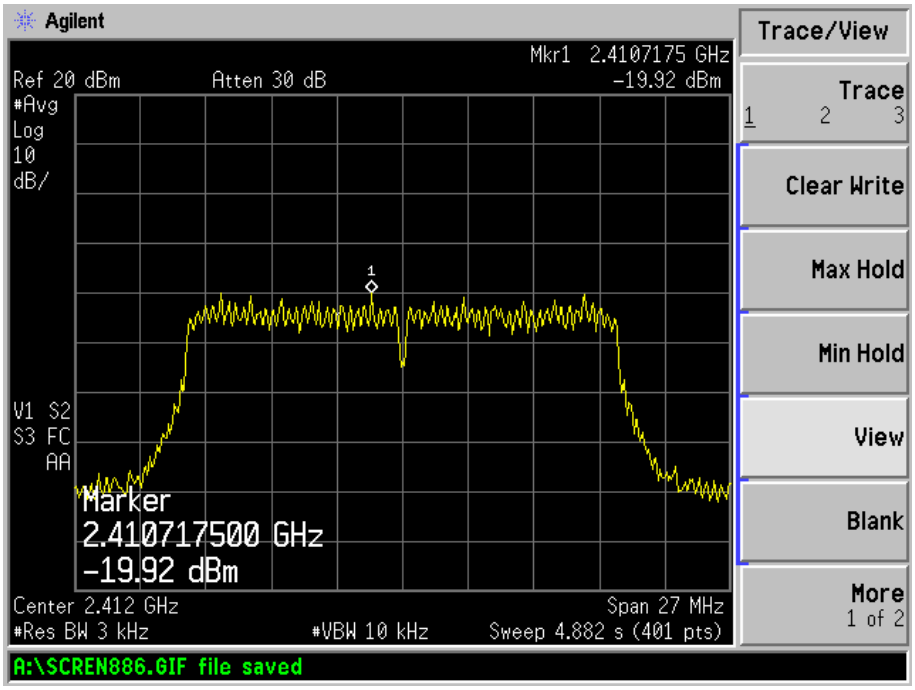
802.11g-Middle Channel



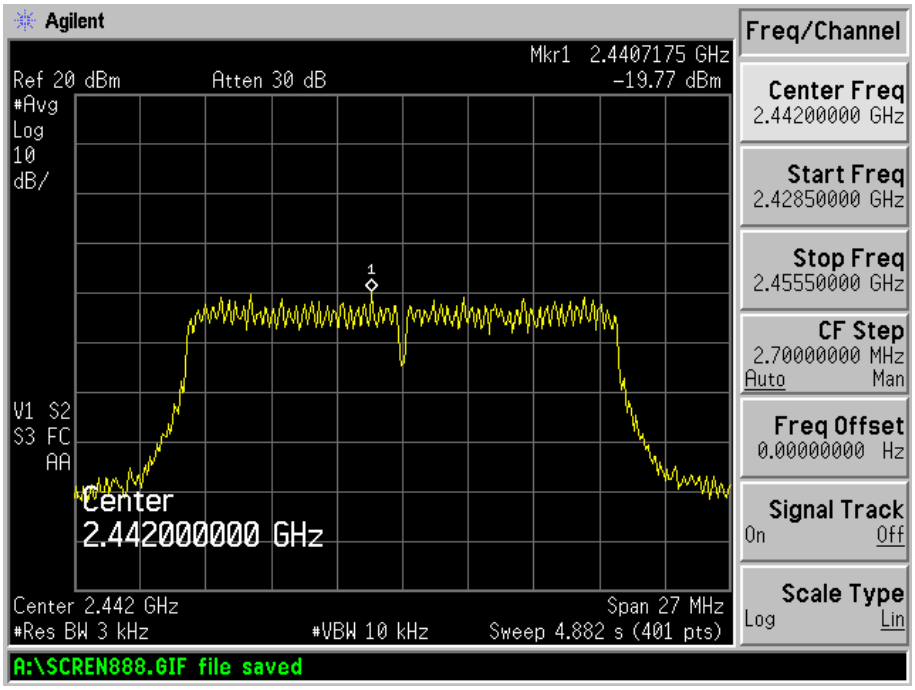
802.11g-High Channel



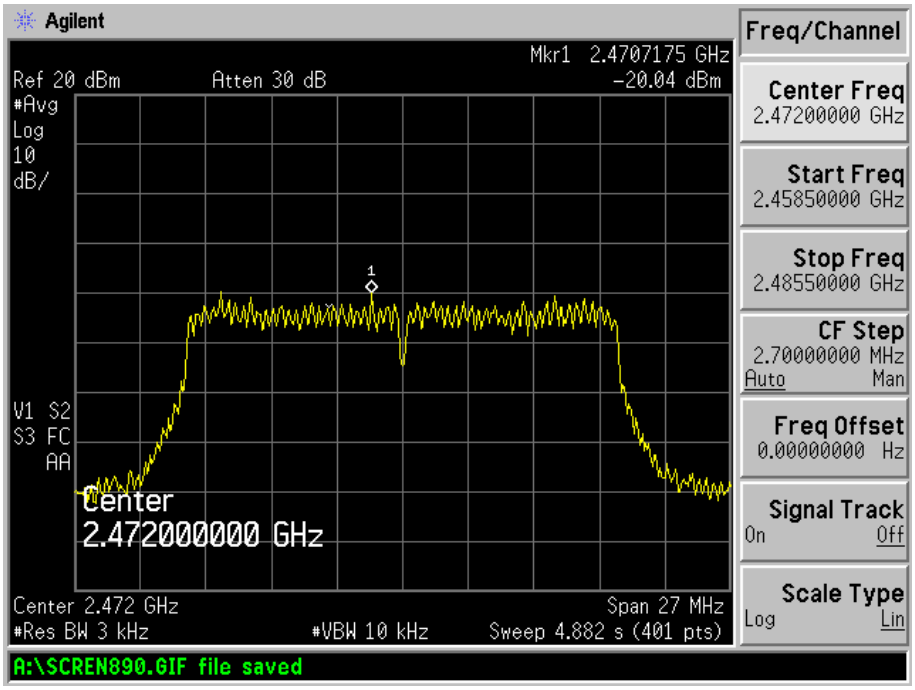
802.11n-HT20-Low Channel



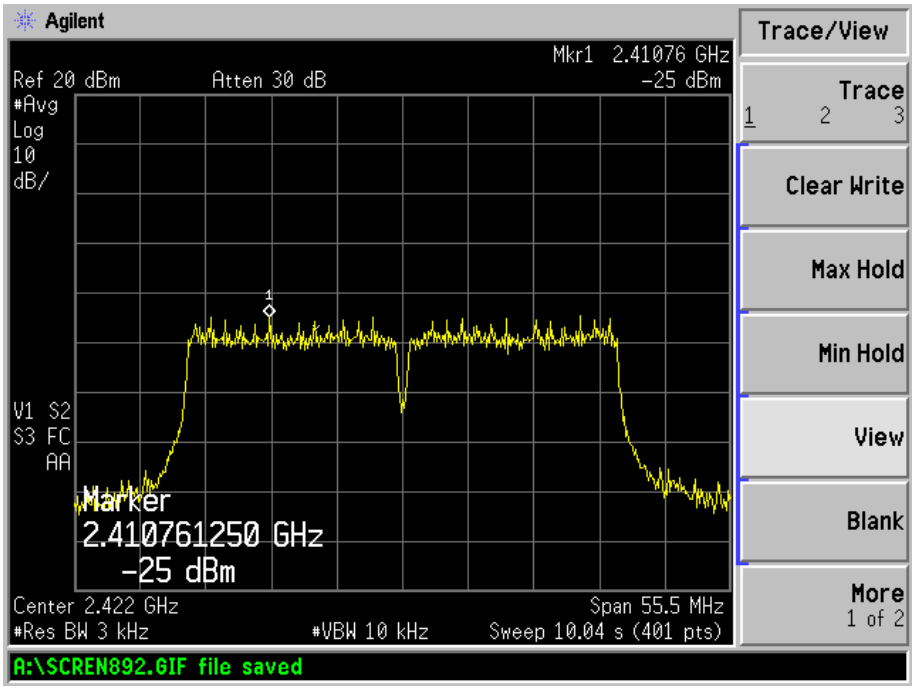
802.11n-HT20-Middle Channel



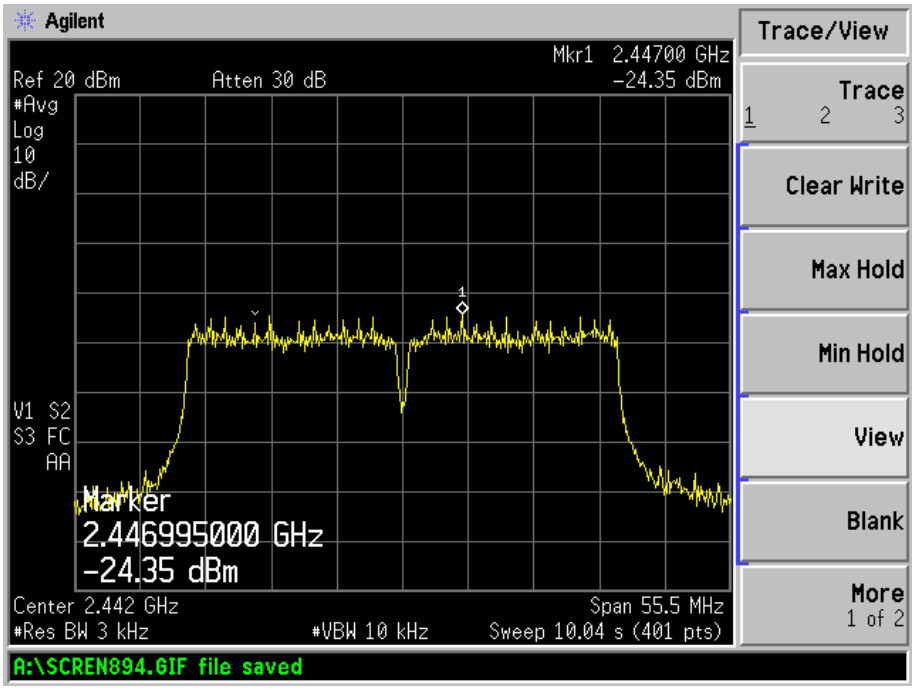
802.11n-HT20-High Channel



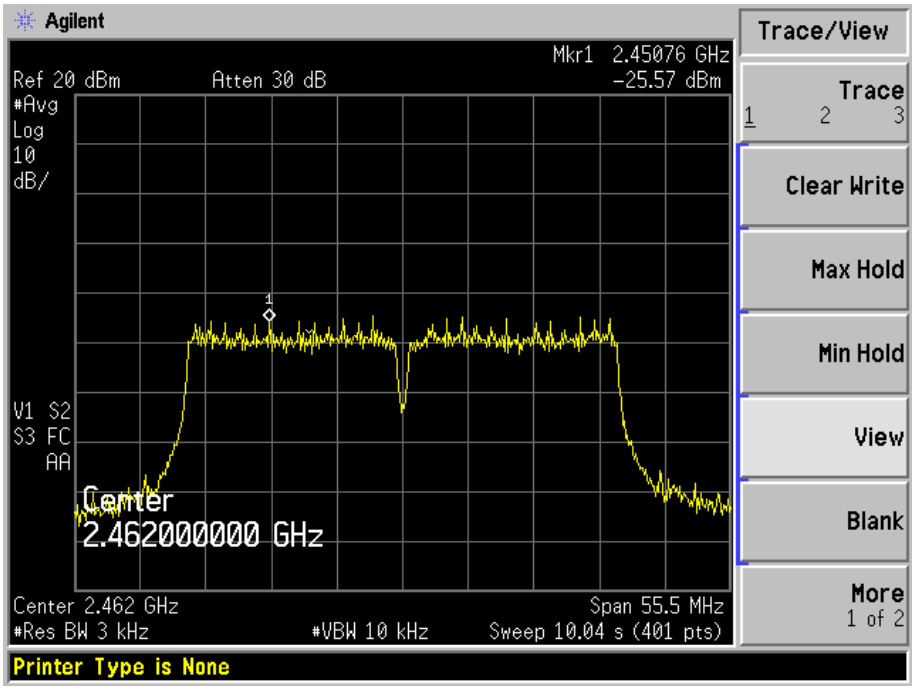
802.11n-HT40-Low Channel



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	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27

6.3 Test Procedure

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.4 Environmental Conditions

Temperature:	25° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.5 Summary of Test Results/Plots

Antenna One

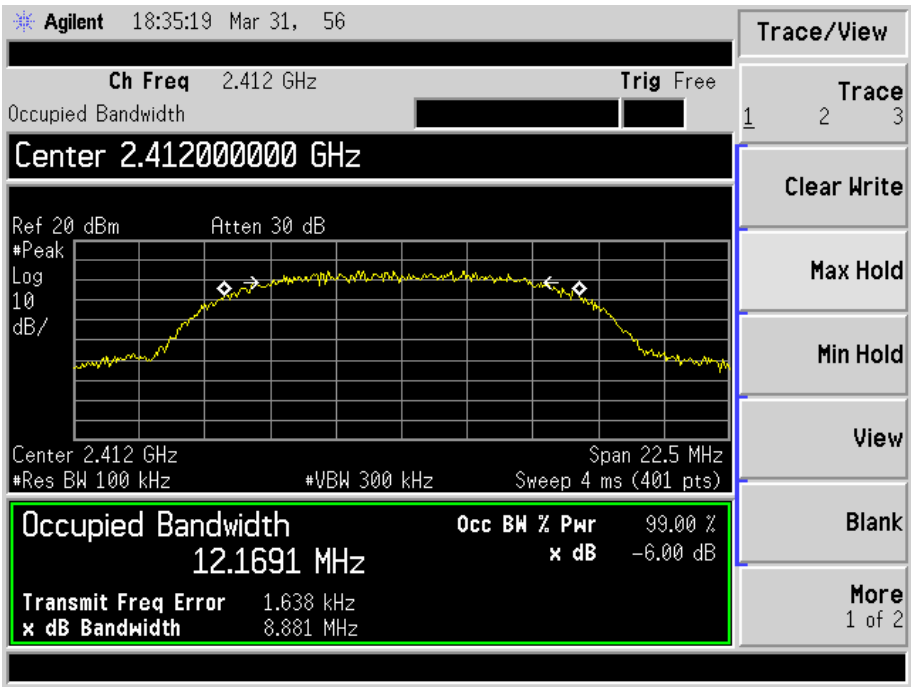
Test Mode	Test Channel MHz	6 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz
802.11b	2412	8881	12169.1	500
	2442	9774	12134.6	500
	2472	9674	12152.3	500
802.11g	2412	16543	16455.4	500
	2442	16505	16443.2	500
	2472	16487	16455.5	500
802.11n-HT20	2412	17544	17546.0	500
	2442	17535	17551.0	500
	2472	17325	17523.5	500
802.11n-HT40	2422	36423	36075.9	500
	2442	36343	36062.4	500
	2462	36262	36041.7	500

Antenna Two

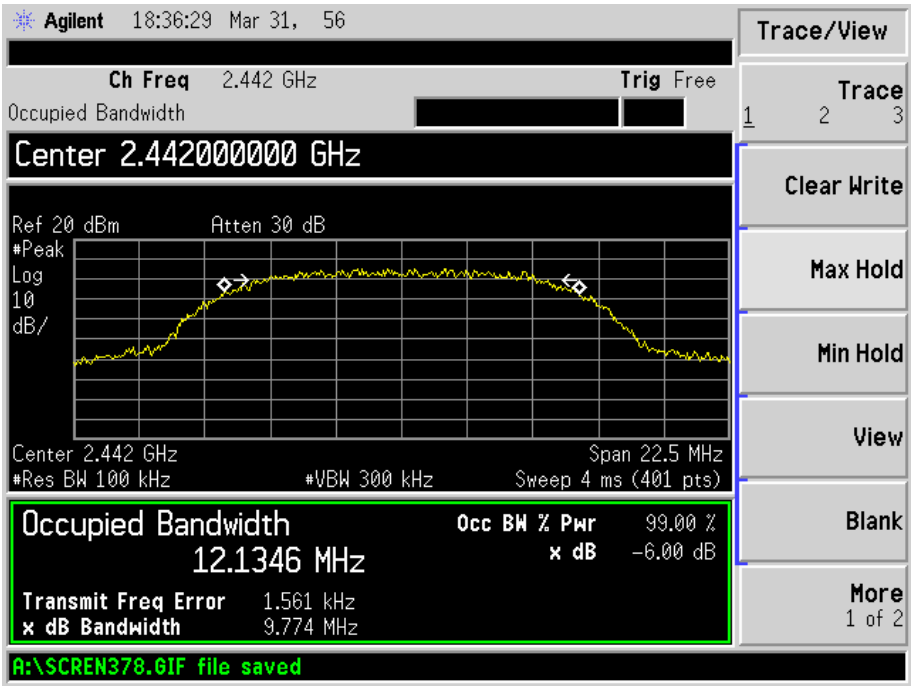
Test Mode	Test Channel MHz	6 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz
802.11b	2412	9023	12044.7	500
	2442	8986	12116.6	500
	2472	9668	12088.0	500
802.11g	2412	16470	16447.8	500
	2442	16495	164700	500
	2472	16481	16454.3	500
802.11n-HT20	2412	17234	17523.4	500
	2442	17180	17533.7	500
	2472	17213	17538.5	500
802.11n-HT40	2422	36159	36060.7	500
	2442	36254	36016.0	500
	2462	36435	36141.7	500

Please refer to the following test plots:

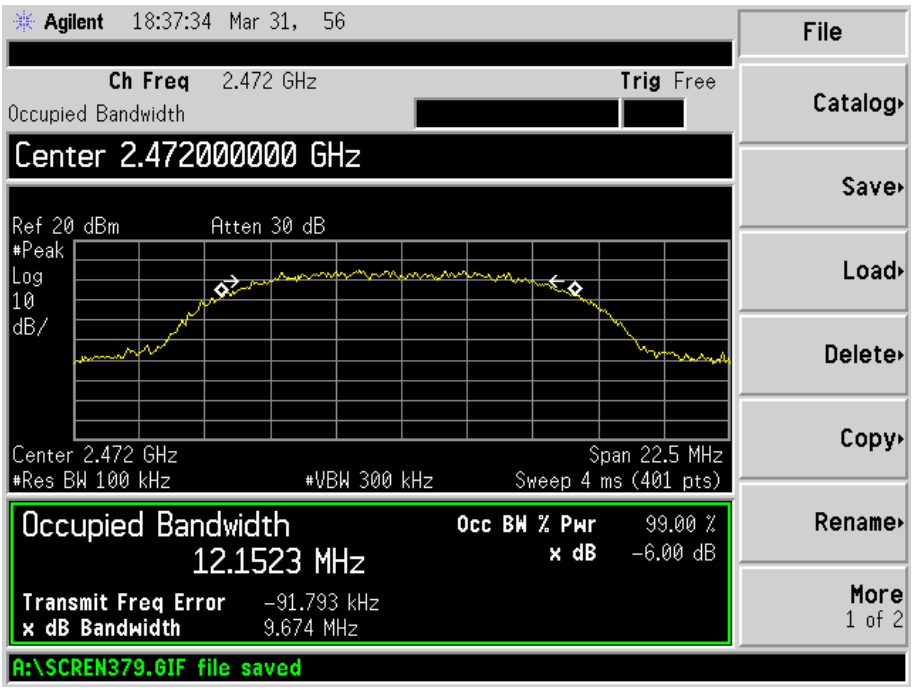
Antenna One
802.11b-Low Channel



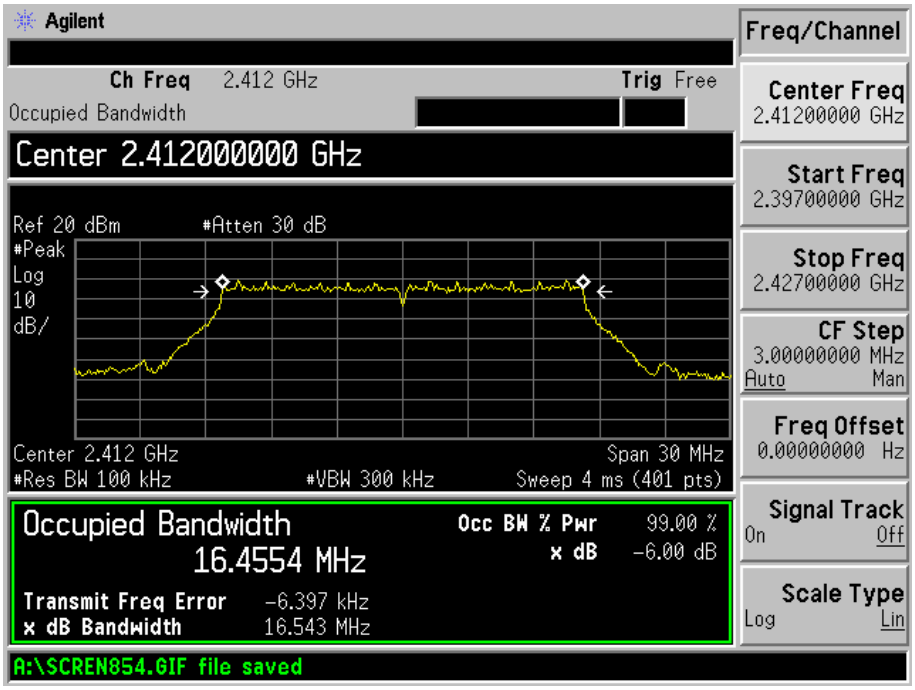
802.11b-Middle Channel



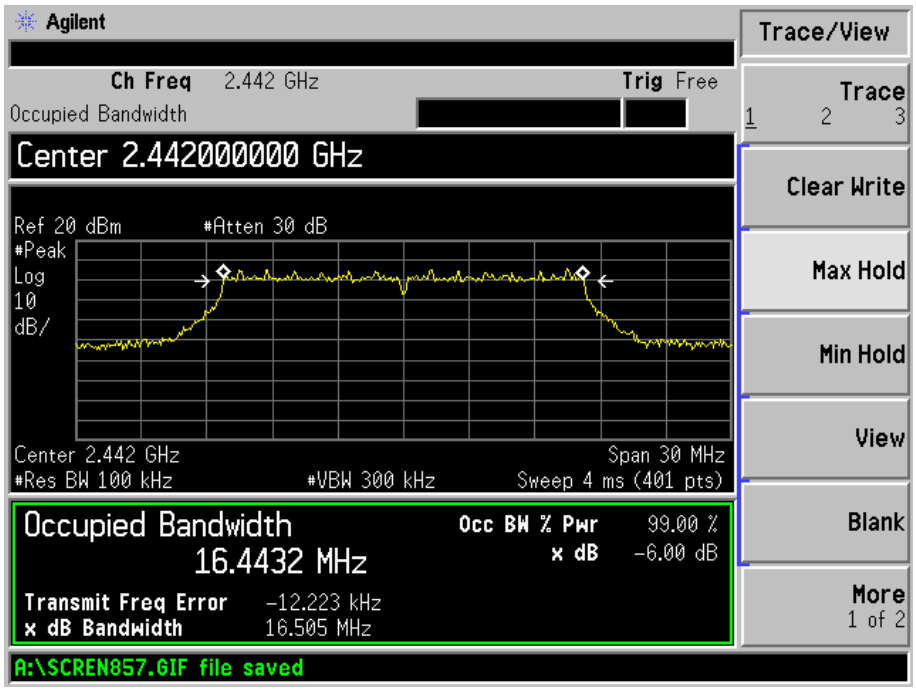
802.11b-High Channel



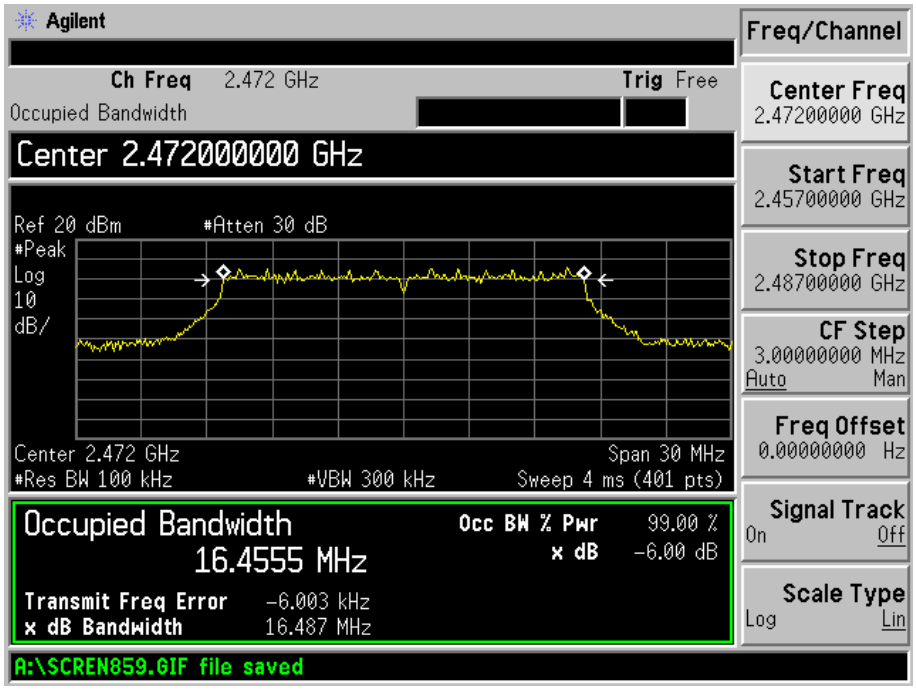
802.11g-Low Channel



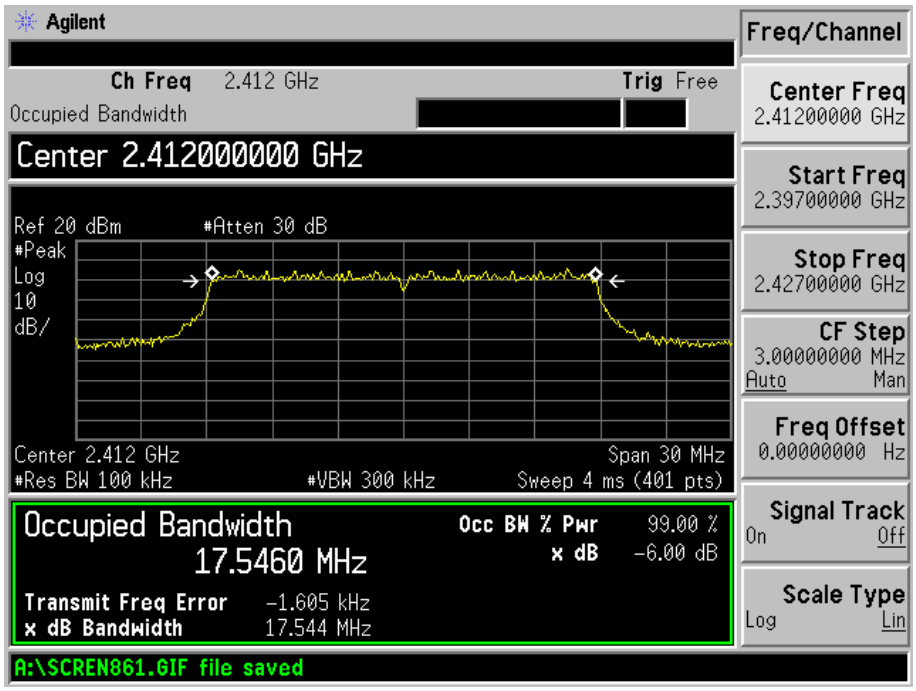
802.11g-Middle Channel



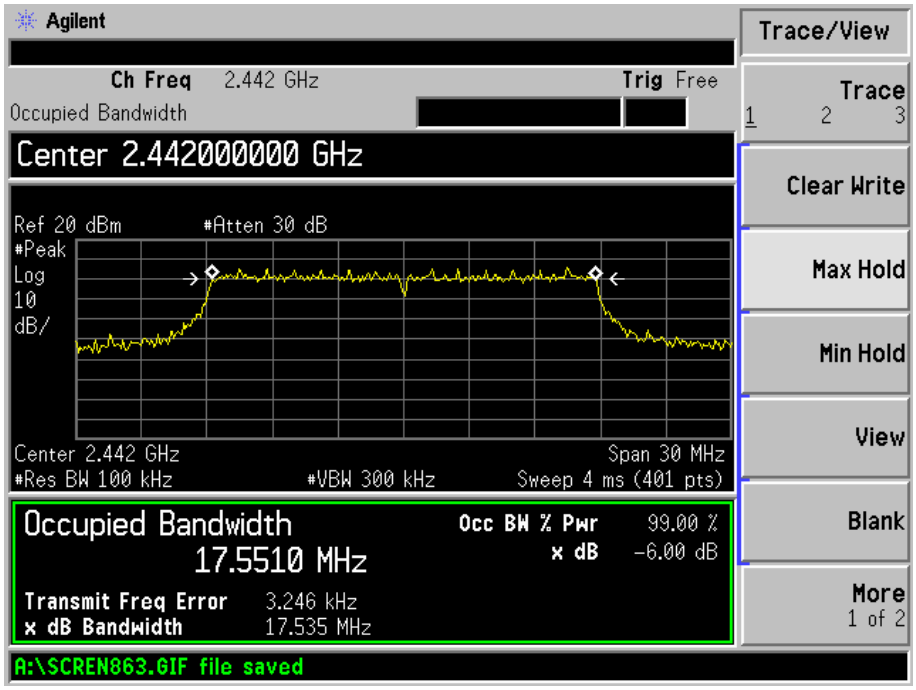
802.11g-High Channel



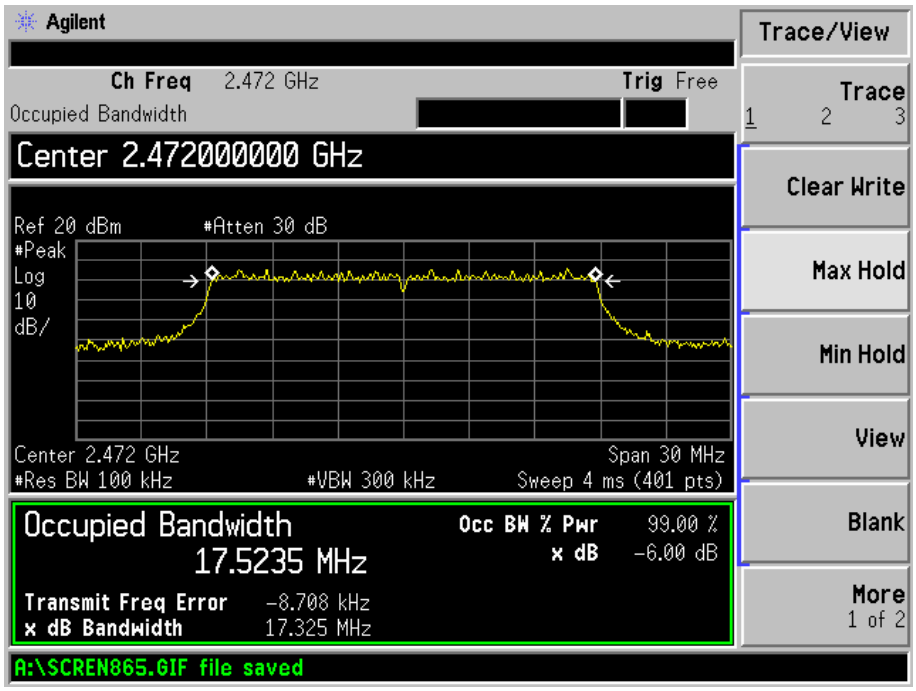
802.11n-HT20-Low Channel



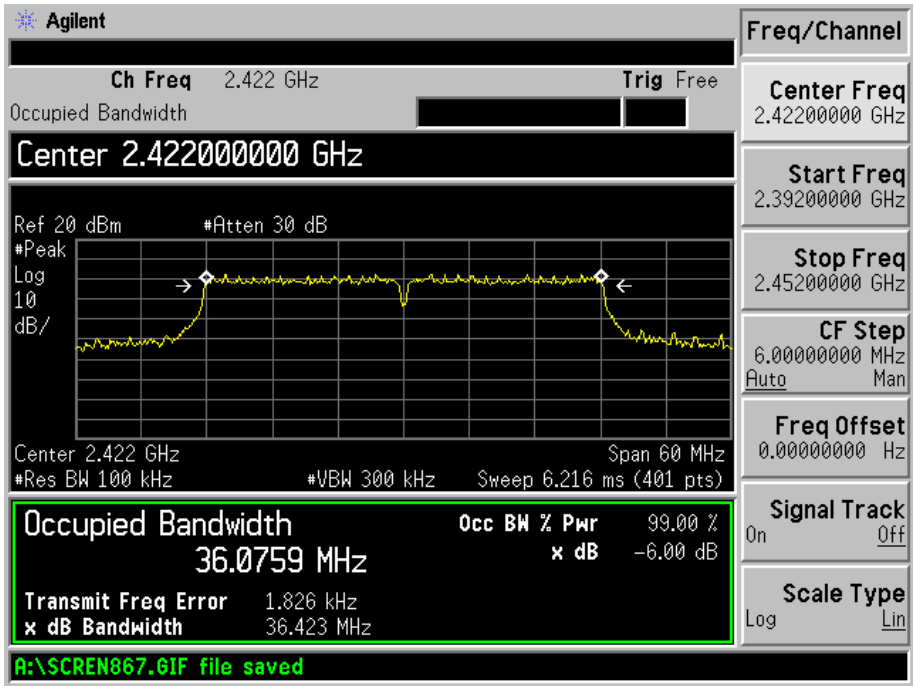
802.11n-HT20-Middle Channel



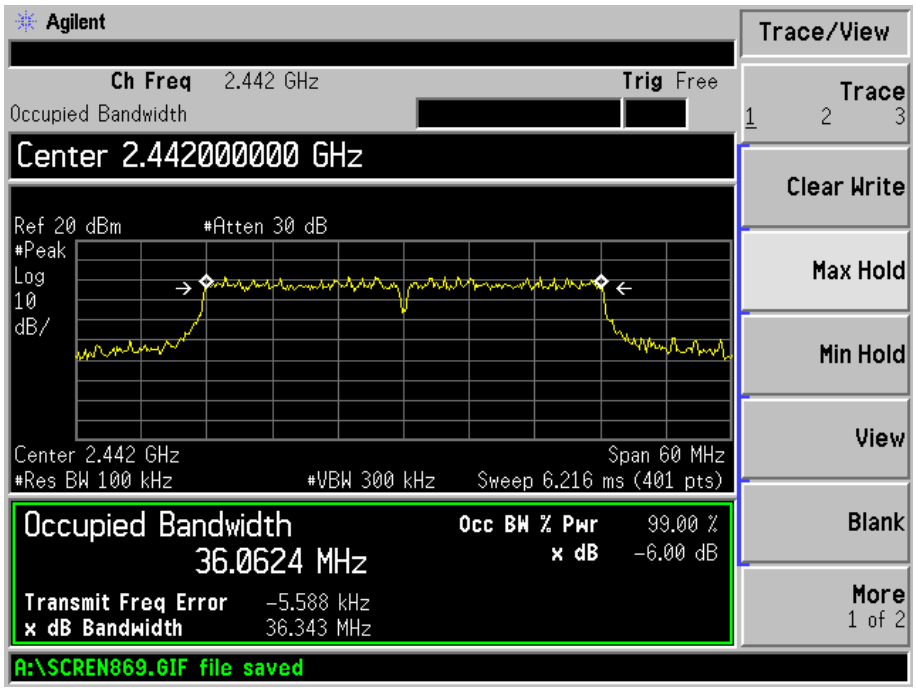
802.11n-HT20-High Channel



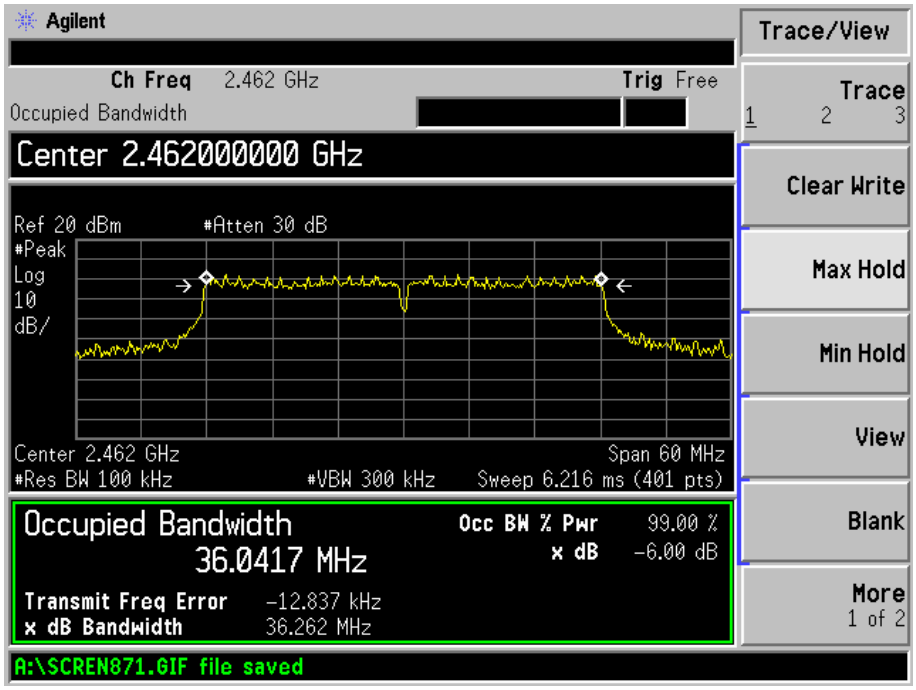
802.11n-HT40-Low Channel



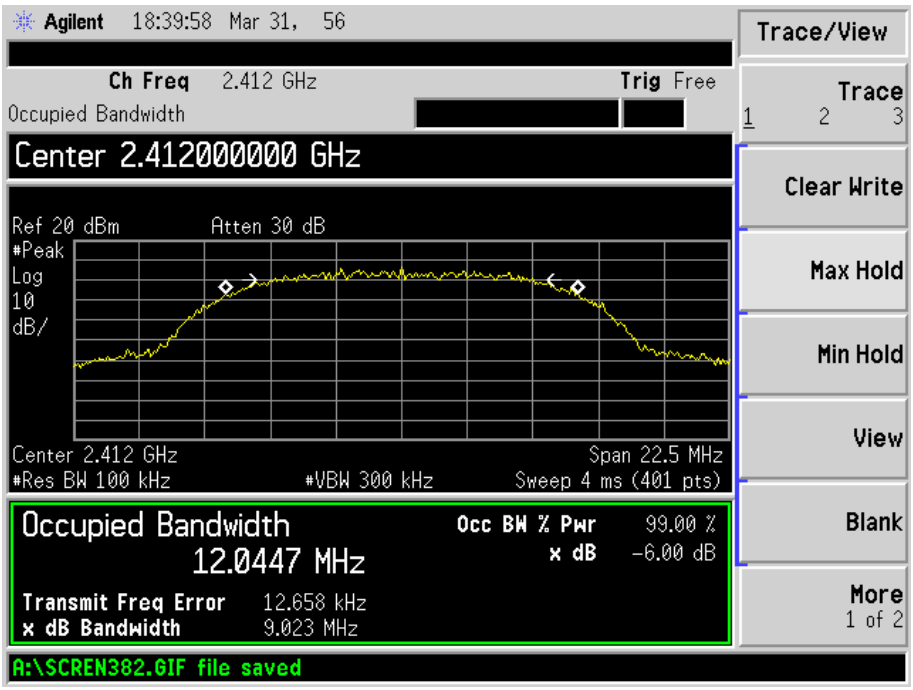
802.11n-HT40-Middle Channel



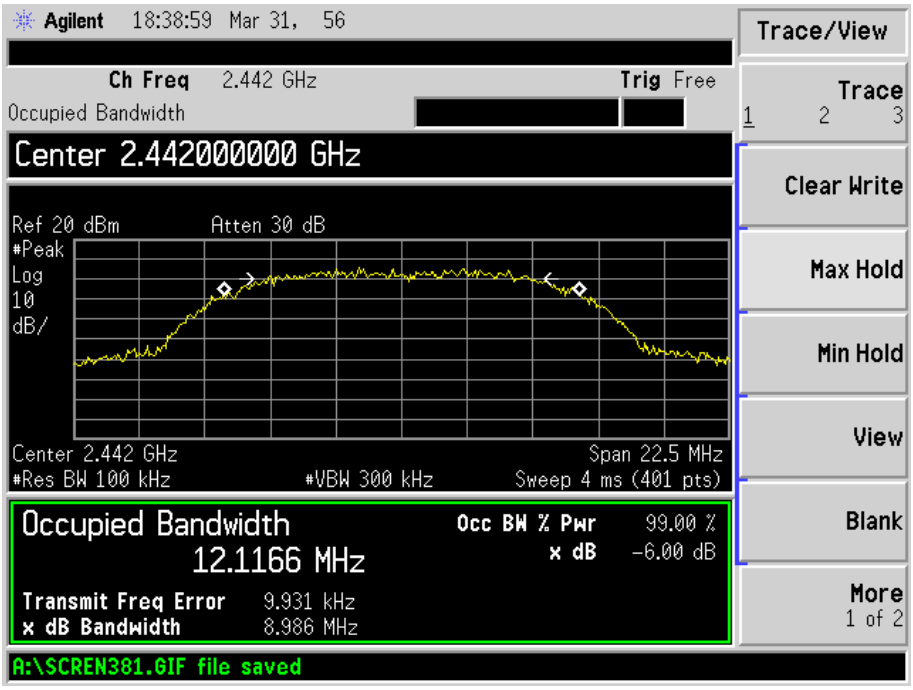
802.11n-HT40-High Channel



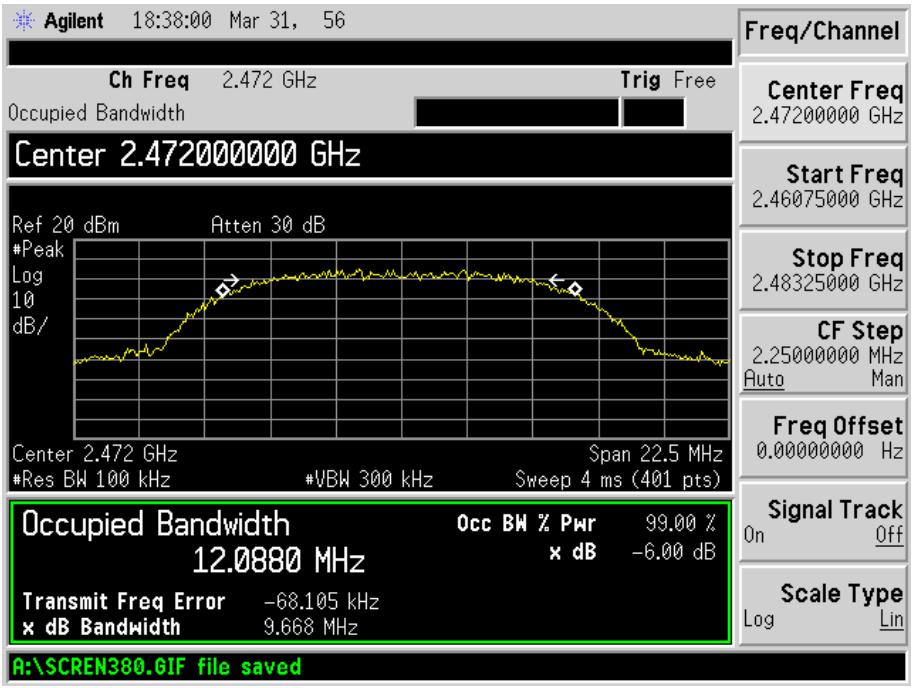
Antenna Two
802.11b-Low Channel



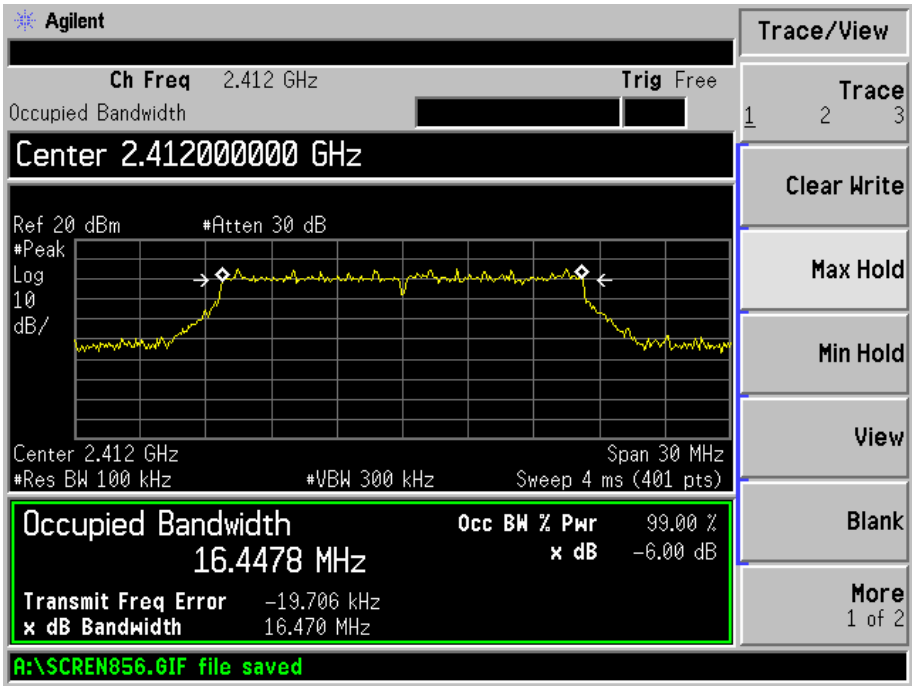
802.11b-Middle Channel



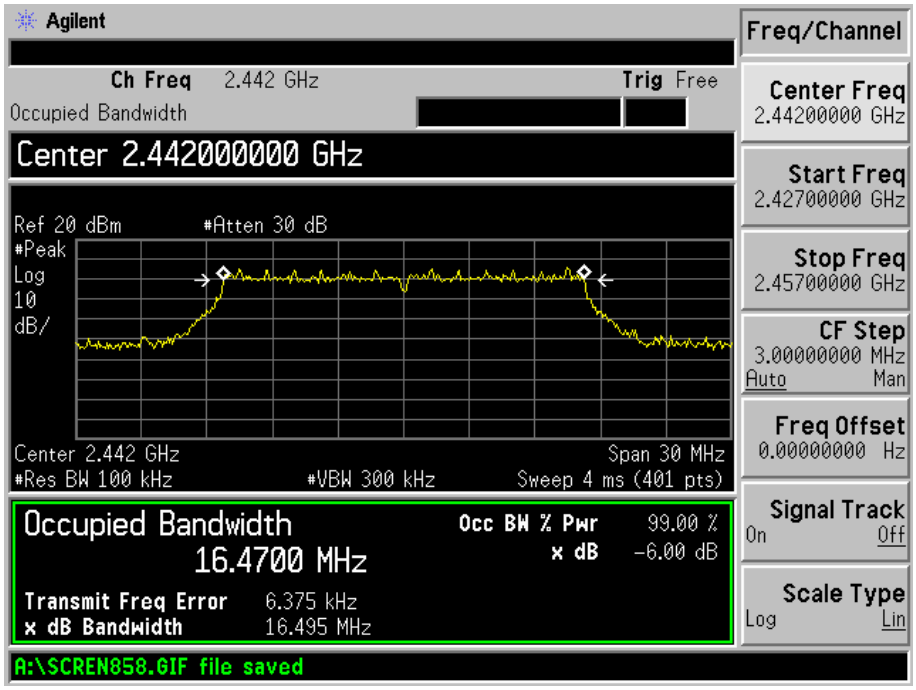
802.11b-High Channel



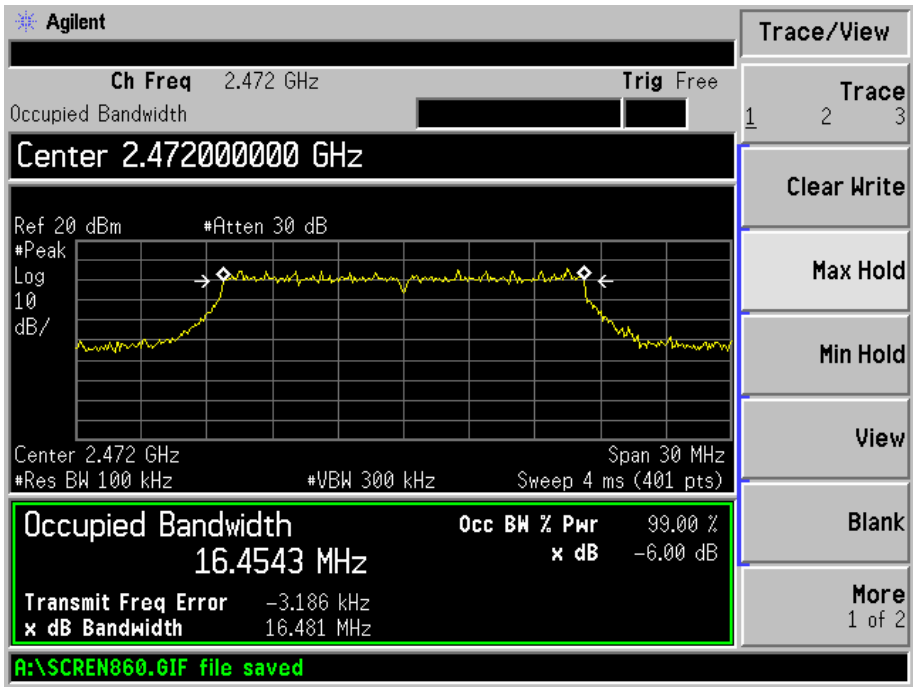
802.11g-Low Channel



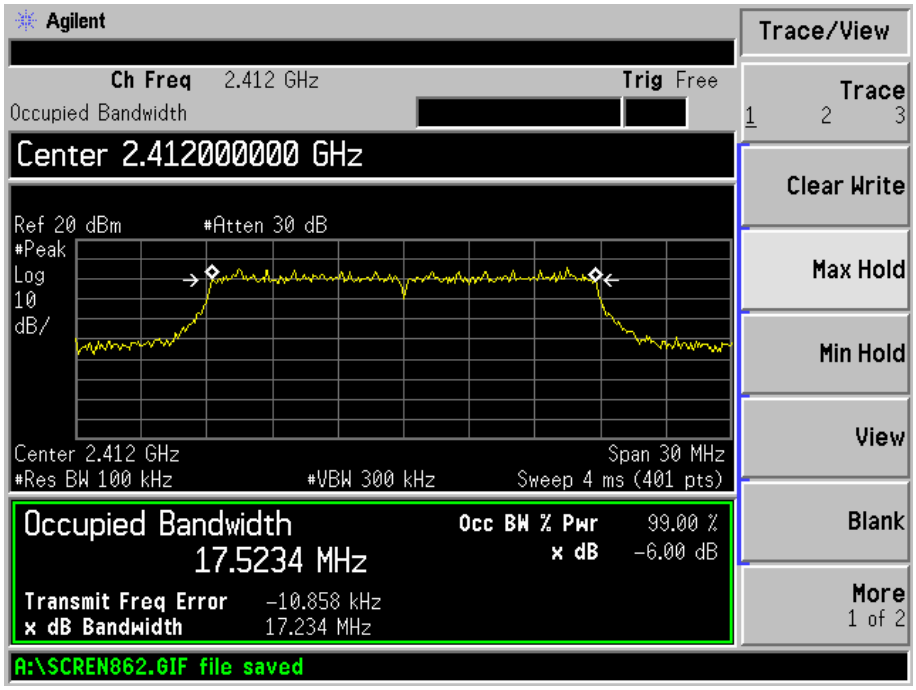
802.11g-Middle Channel



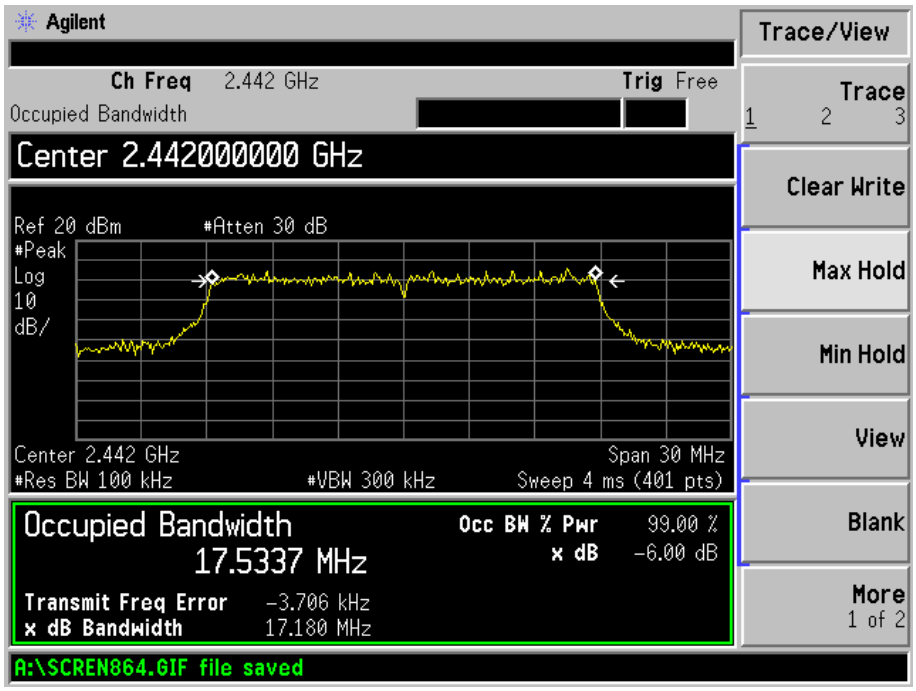
802.11g-High Channel



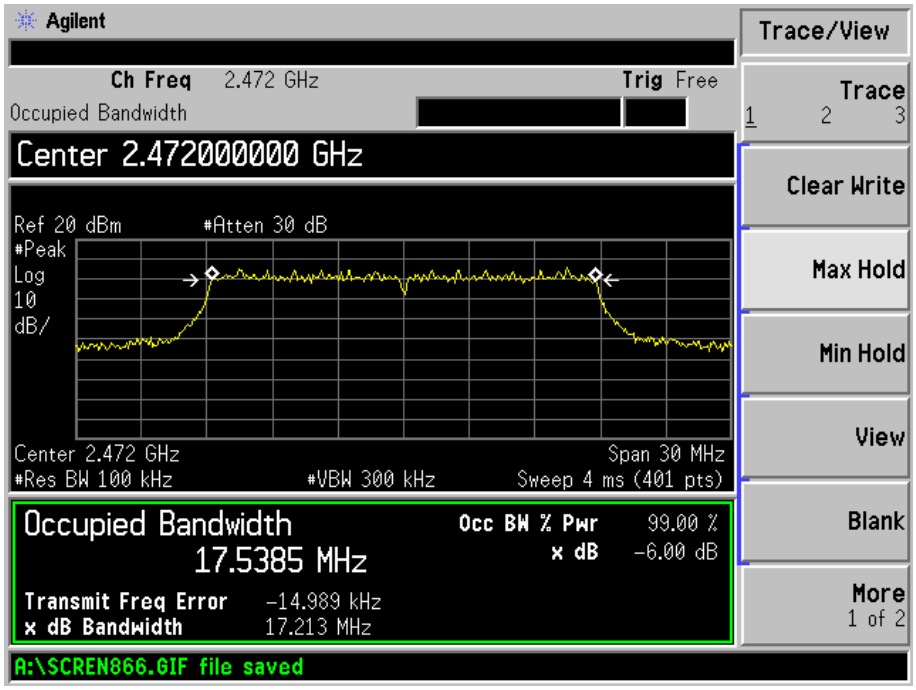
802.11n-HT20-Low Channel



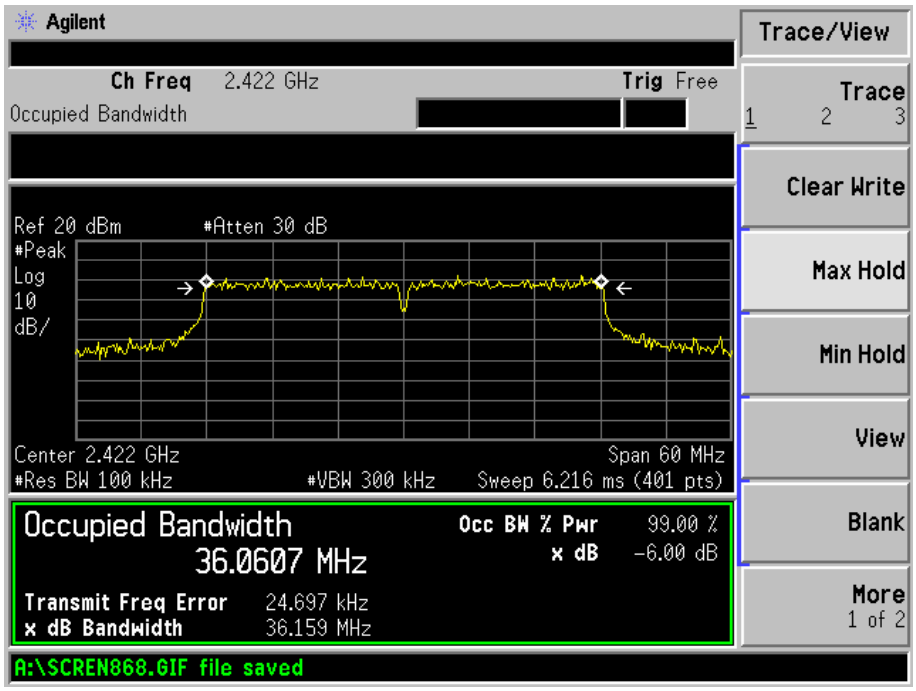
802.11n-HT20-Middle Channel



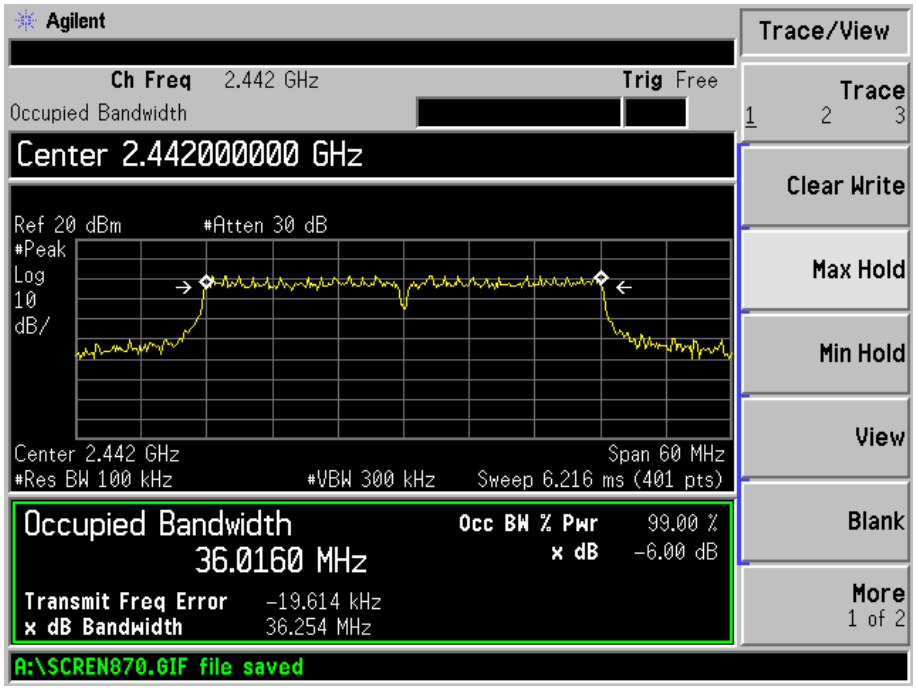
802.11n-HT20-High Channel



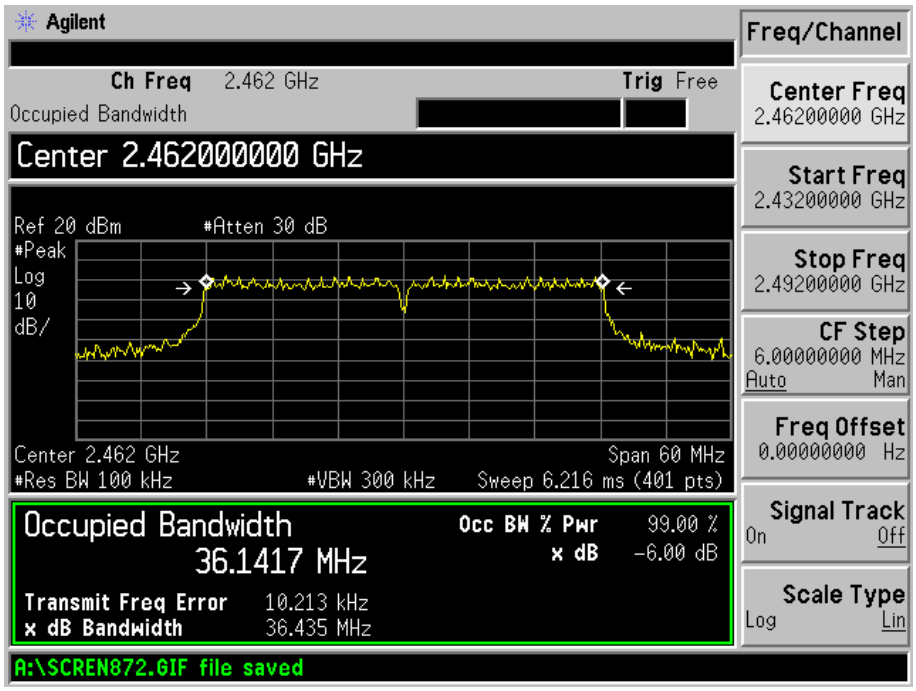
802.11n-HT40-Low Channel



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	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27

7.3 Test Procedure

According to section 15.247(b)-power output of the KDB-558074 D01 V03r02, 9.2.2.2 (channel integration method) When this option is exercised, the measured power is to be referenced to the OBW rather than the DTS bandwidth

a) Set span to at least 1.5 times the OBW.
b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
c) Set VBW ≥ 3 x RBW.
d) Number of points in sweep ≥ 2 × span / RBW. (This gives bin-to-bin spacing ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
e) Sweep time = auto.
f) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
g) If transmit duty cycle < 98 %, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 %, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".
h) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
i) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

7.4 Environmental Conditions

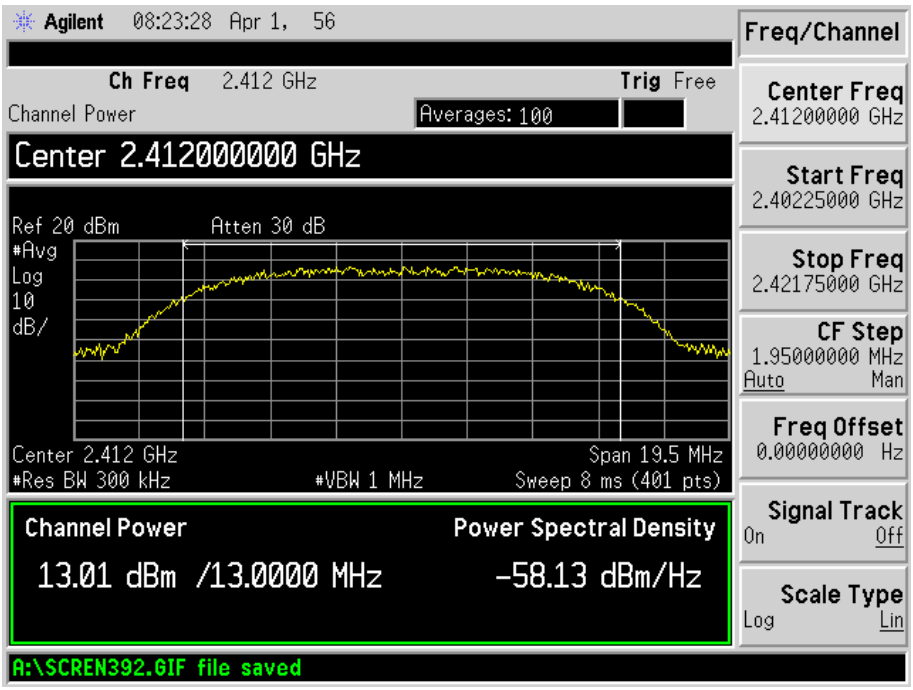
Temperature:	26° C
Relative Humidity:	57%
ATM Pressure:	1011 mbar

7.5 Summary of Test Results/Plots

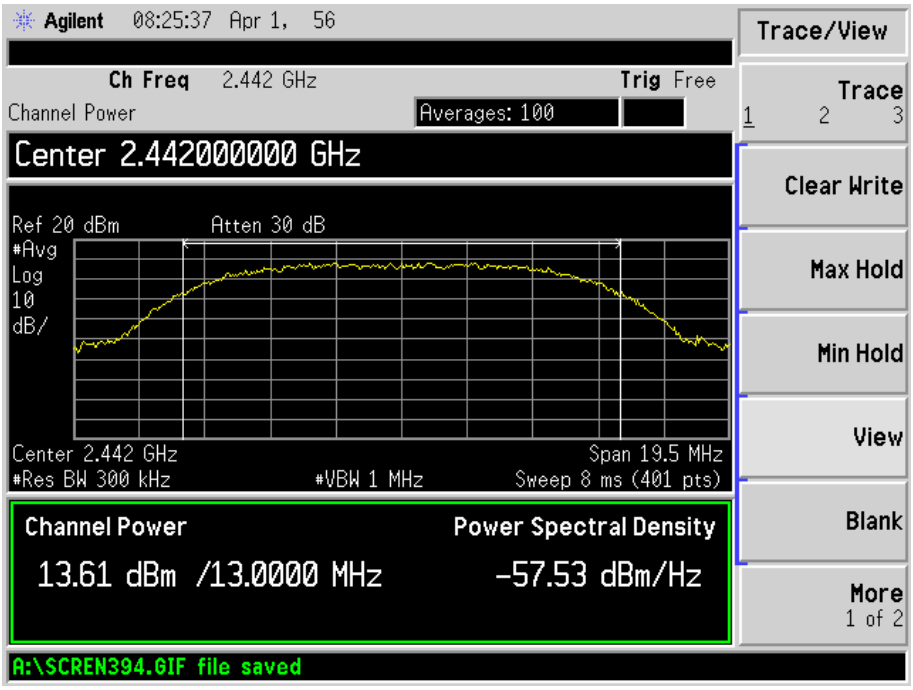
Test Mode	Frequency MHz	Reading dBm Ant.1	Reading dBm Ant.2	Output Power mW	Limit mW
802.11b _ 11Mbps	2412	13.01	13.23	16.13	1000
	2442	13.61	14.16	16.90	1000
	2472	13.13	13.26	16.21	1000
802.11g_54Mbps	2412	11.97	12.00	15.00	1000
	2442	12.03	11.98	15.02	1000
	2472	12.03	12.03	15.04	1000
802.11n HT20_MCS7	2412	11.84	11.87	14.87	1000
	2442	11.97	11.97	14.98	1000
	2472	12.03	12.03	15.04	1000
802.11n HT40_MCS7	2422	11.36	11.64	14.51	1000
	2442	11.63	11.73	14.69	1000
	2462	11.73	10.59	14.21	1000

Please refer to the following test plots:

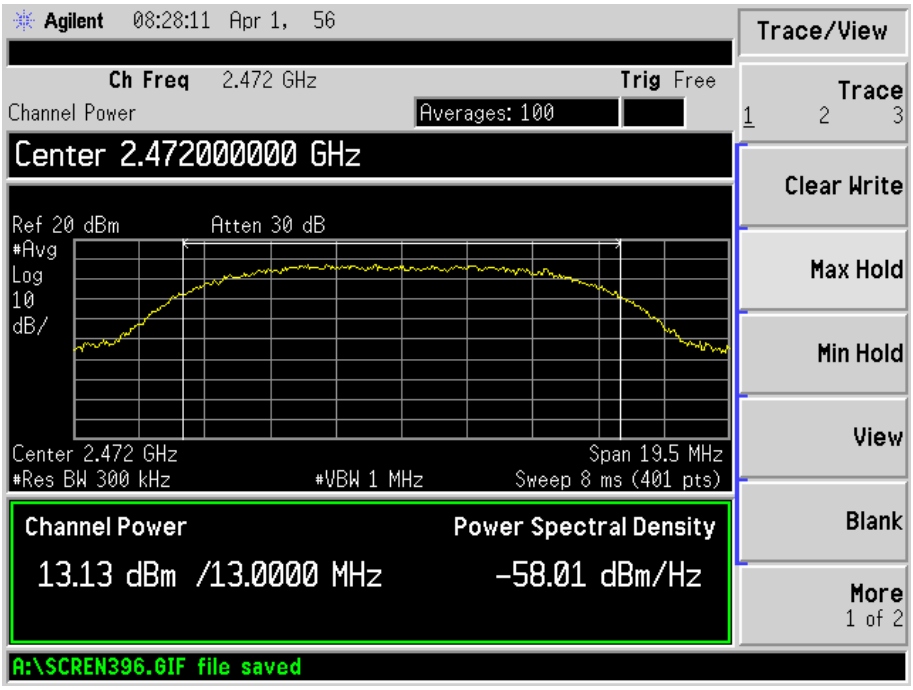
Antenna One
802.11b-1Mbps-Low Channel



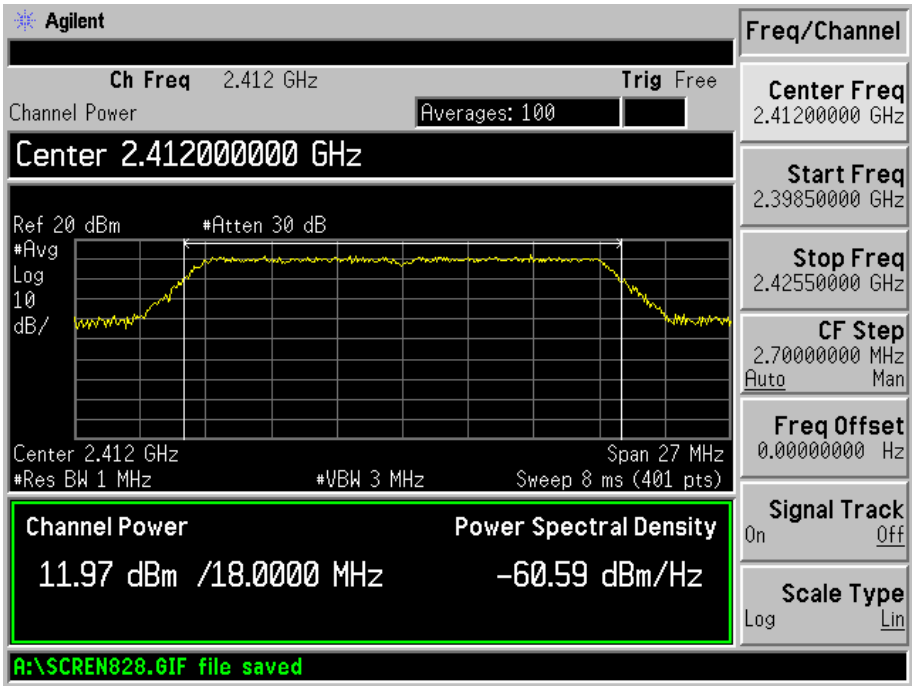
802.11b -1Mbps-Middle Channel



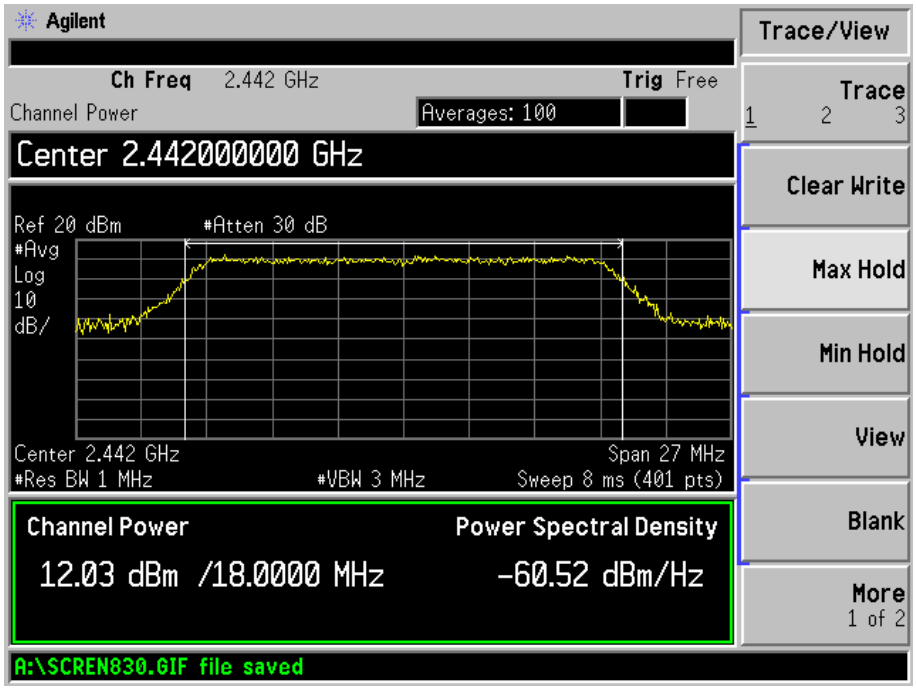
802.11b -1Mpbs-High Channel



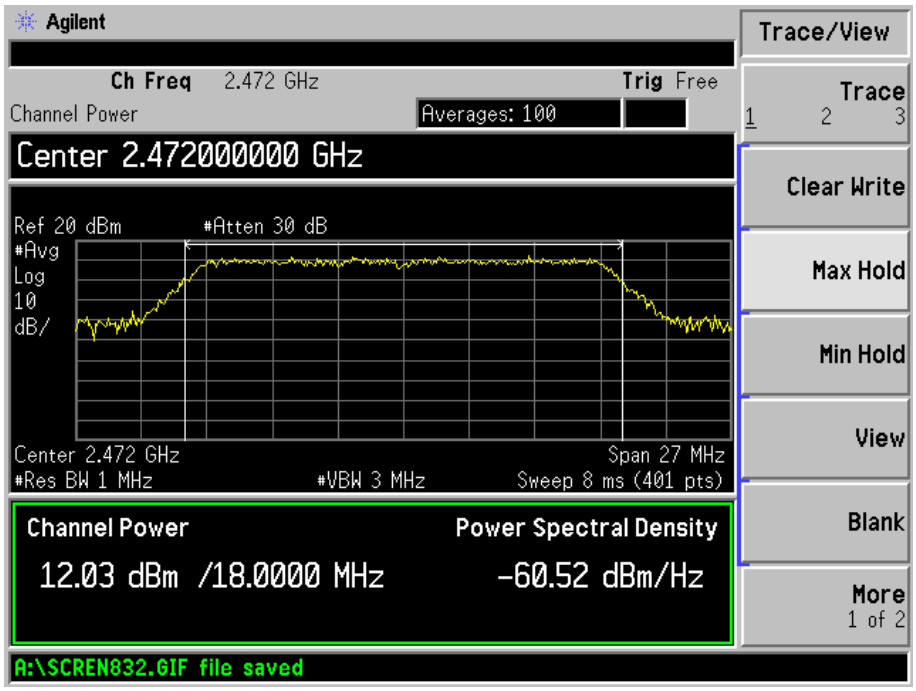
802.11g-6Mbps-Low Channel



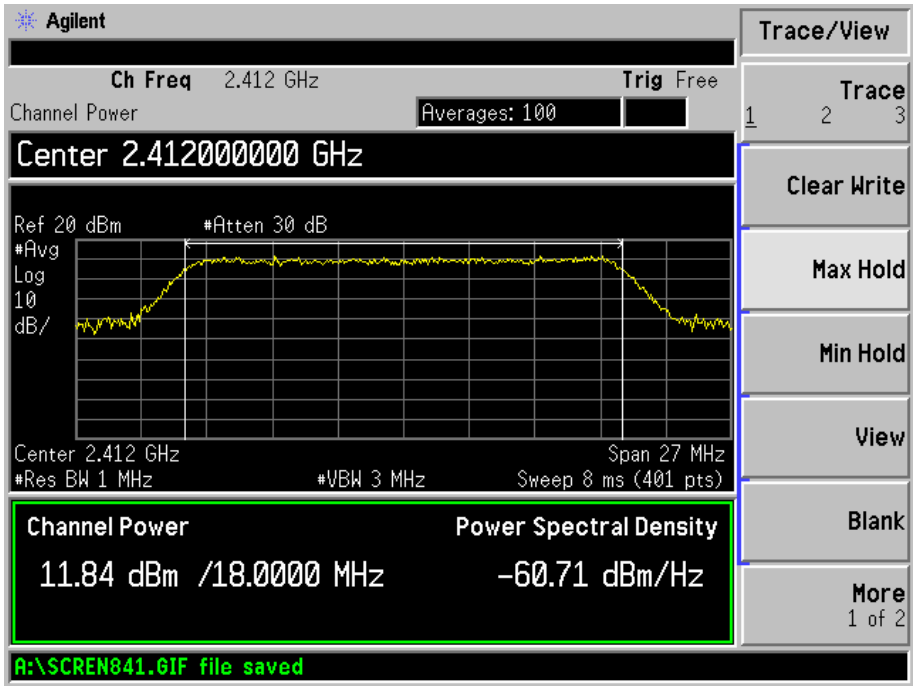
802.11g-6Mbps-Middle Channel



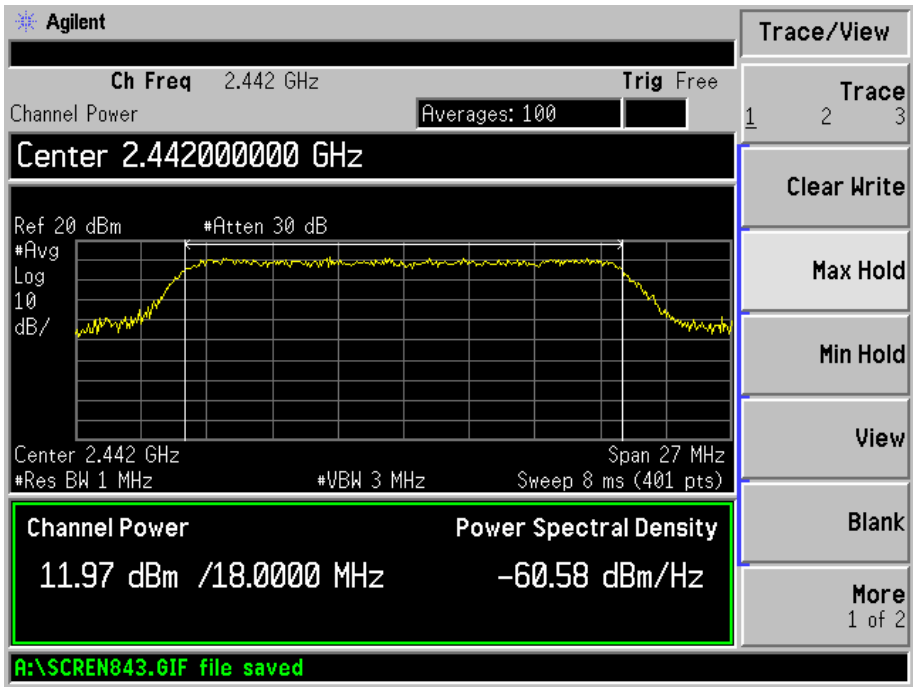
802.11g-6Mpbs-High Channel



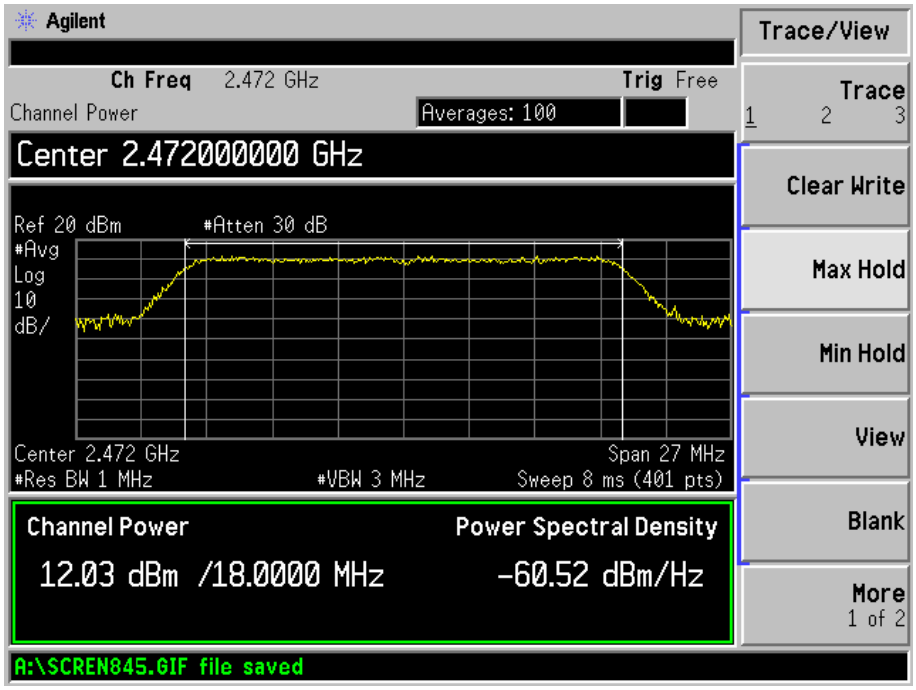
802.11n-HT20-MCS0-Low Channel



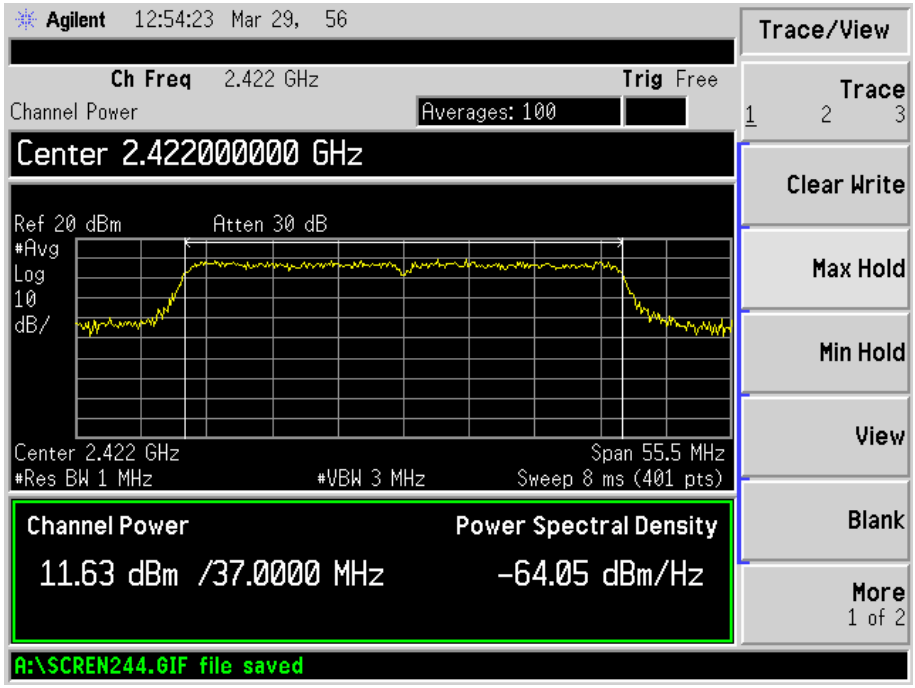
802.11n-HT20-MCS0-Middle Channel



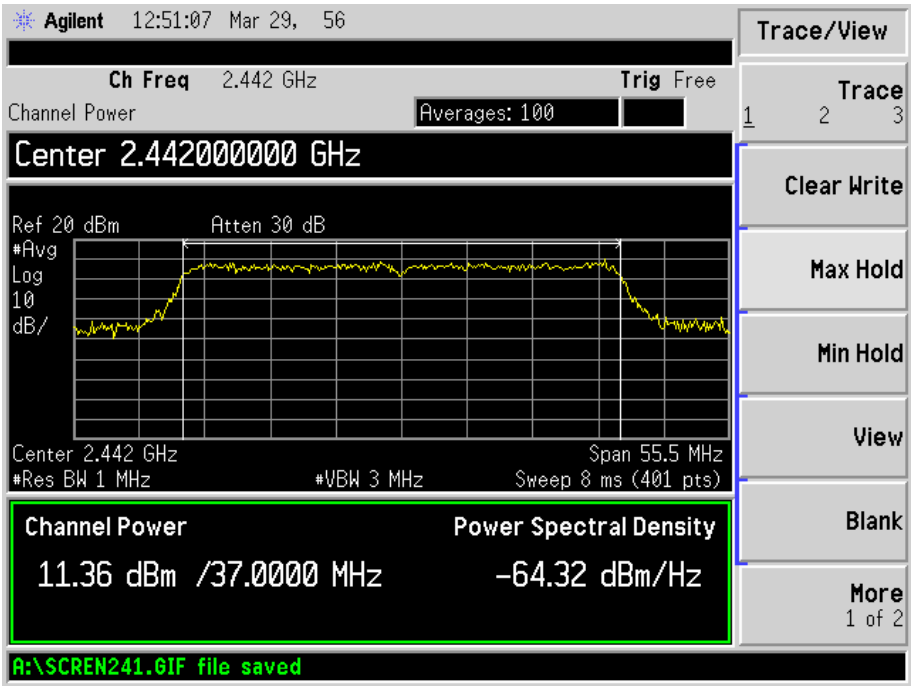
802.11n-HT20-MCS0-High Channel



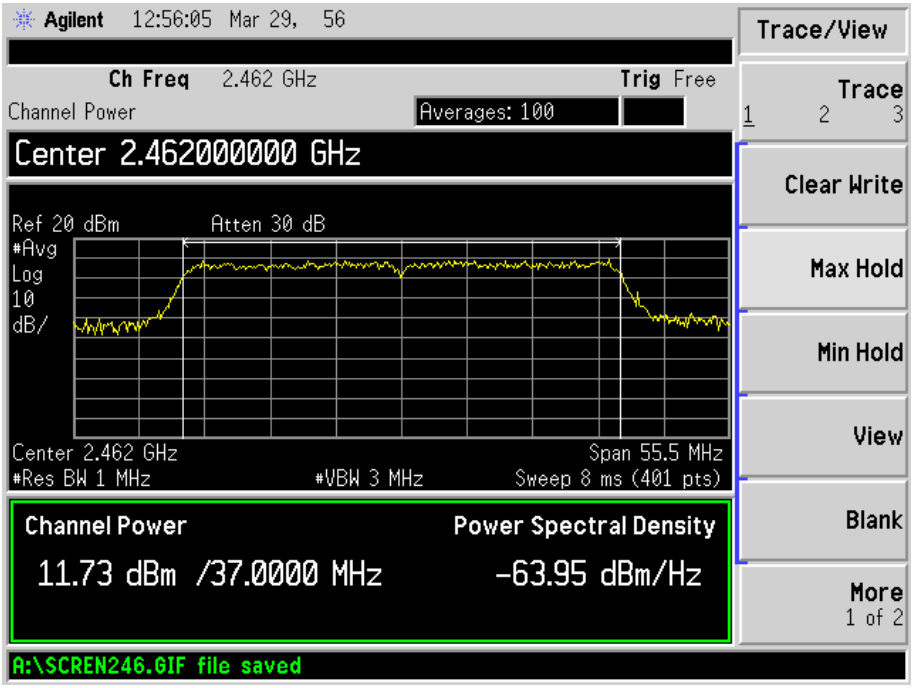
802.11n-HT40-MCS0-Low Channel



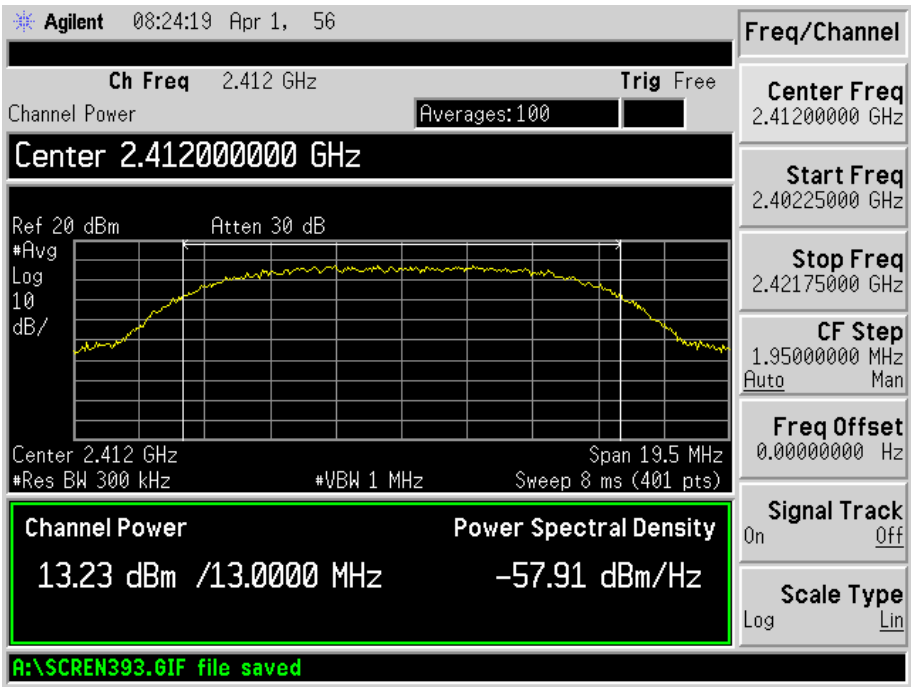
802.11n-HT40-MCS0-Middle Channel



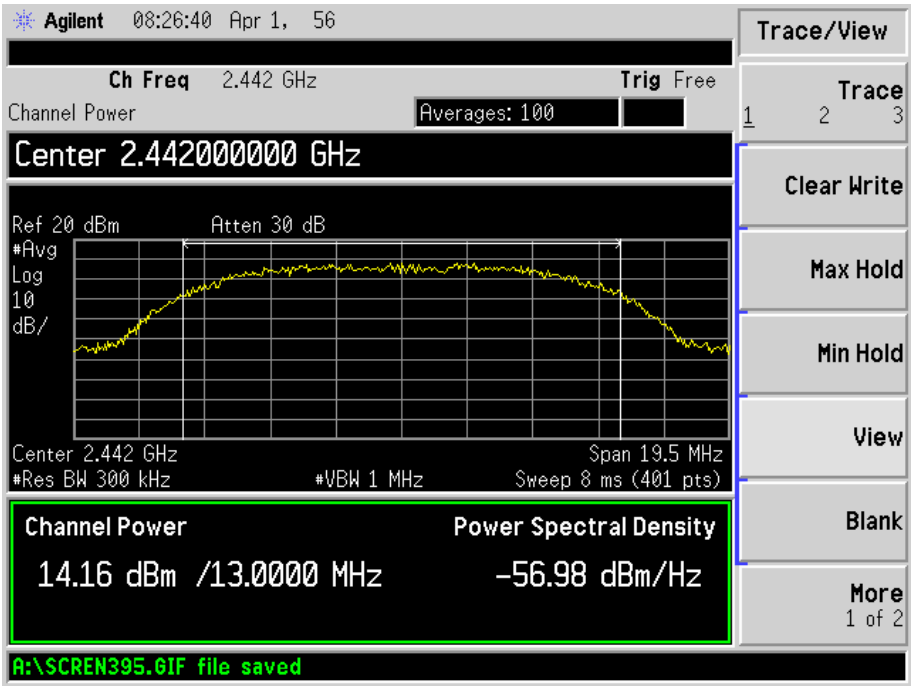
802.11n-HT40-MCS0-High Channel



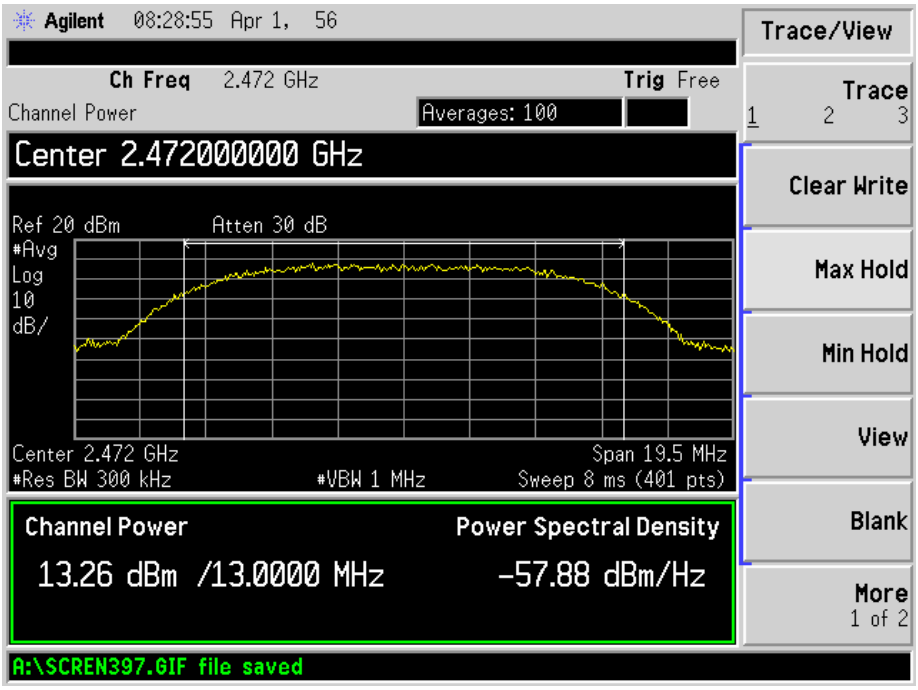
Antenna Two
802.11b-1Mbps-Low Channel



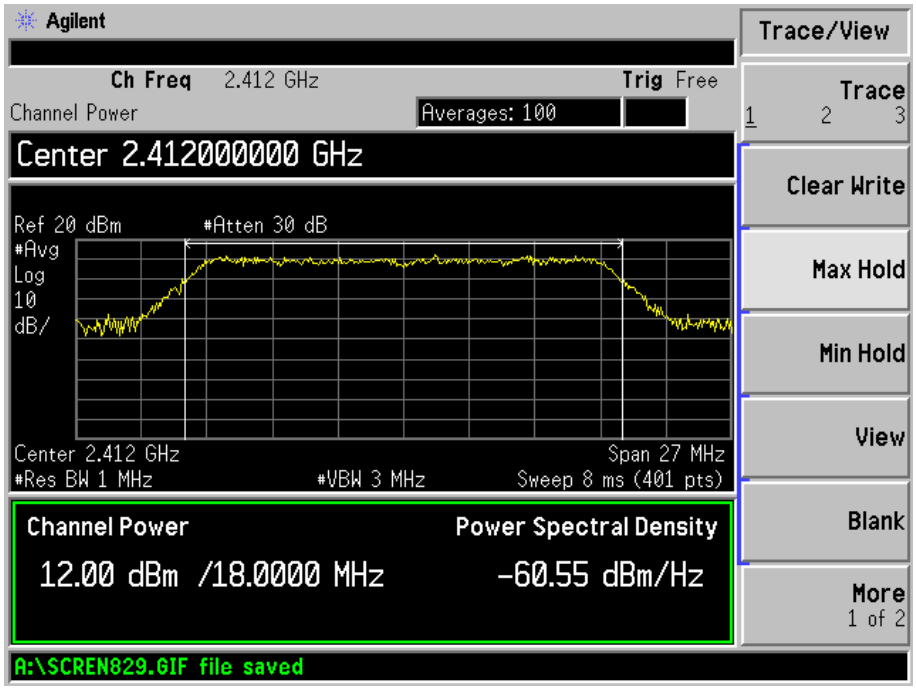
802.11b -1Mbps-Middle Channel



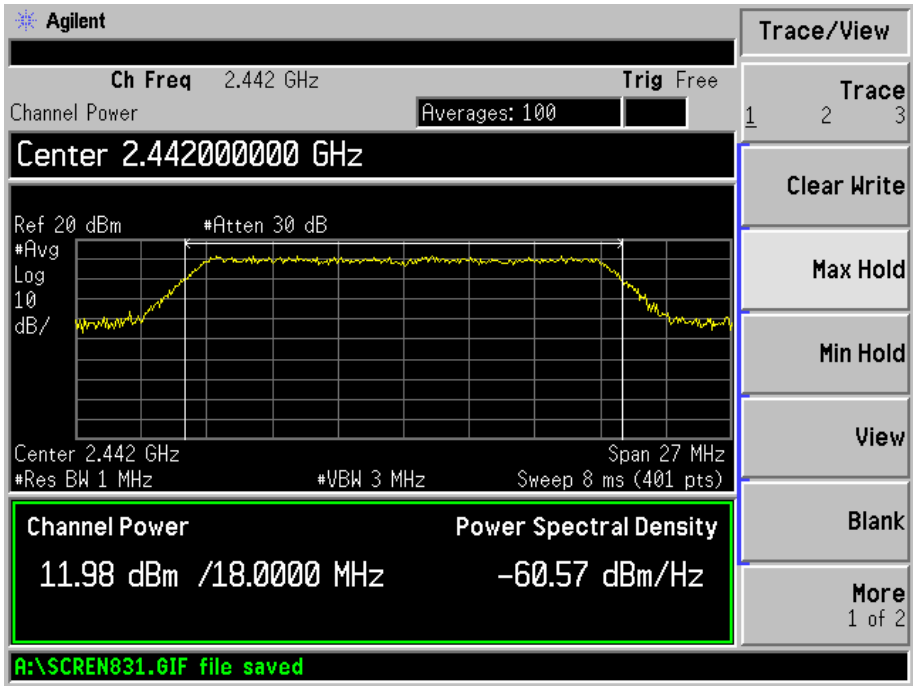
802.11b -1Mpbs-High Channel



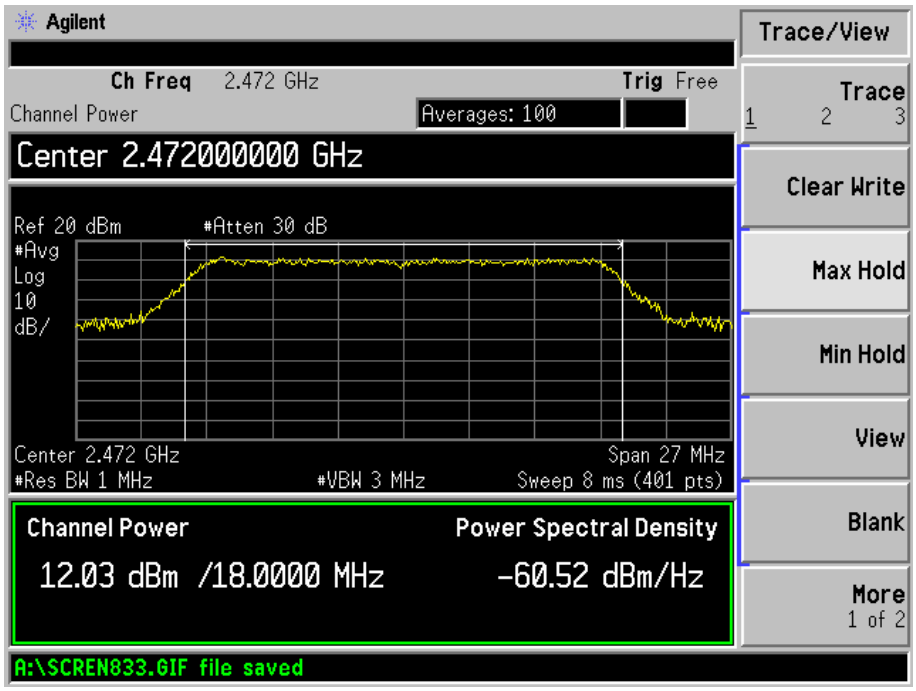
802.11g-6Mbps-Low Channel



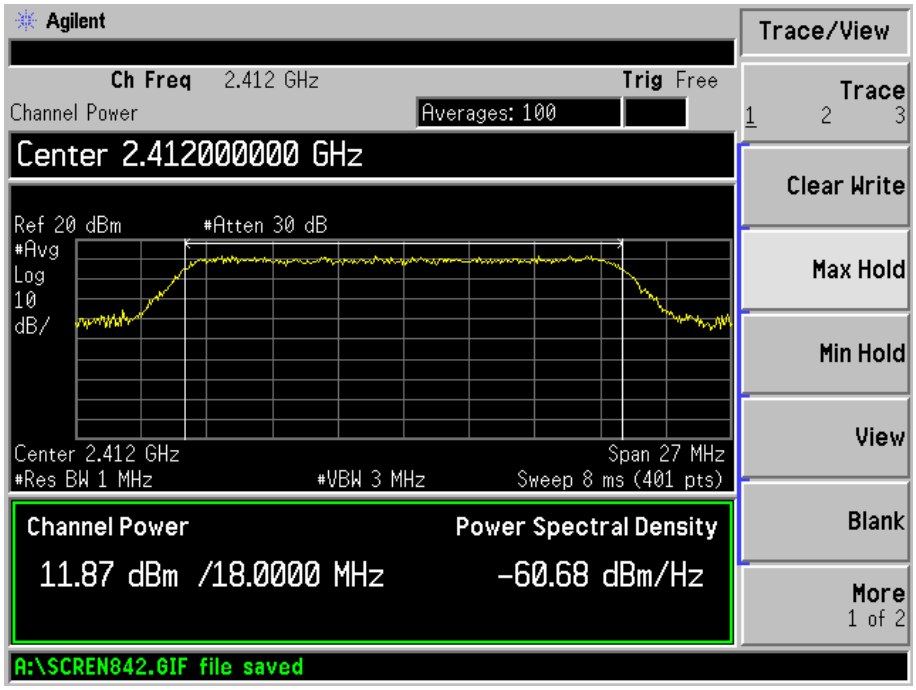
802.11g-6Mbps-Middle Channel



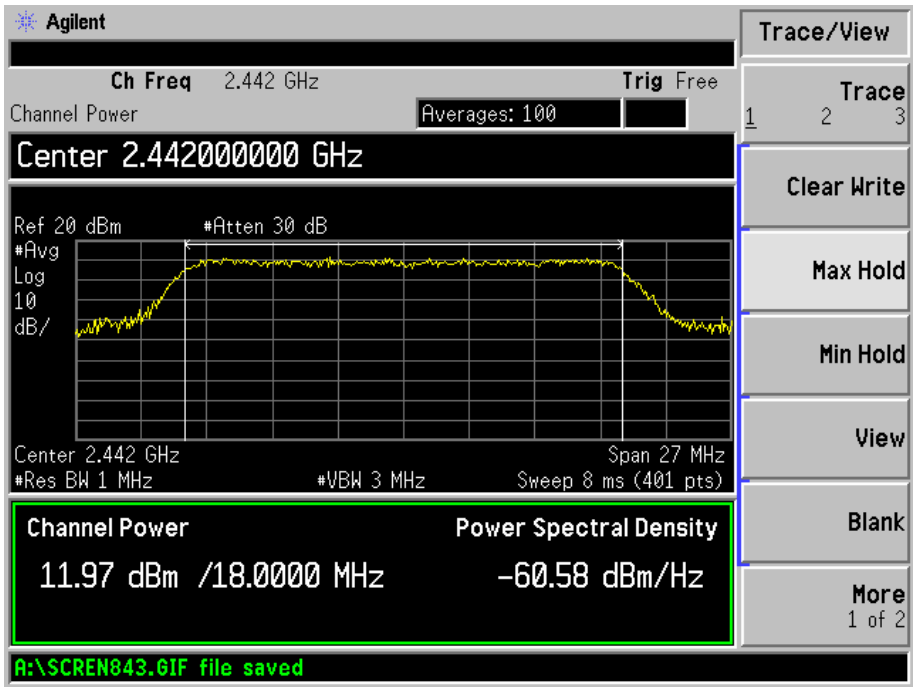
802.11g-6Mpbs-High Channel



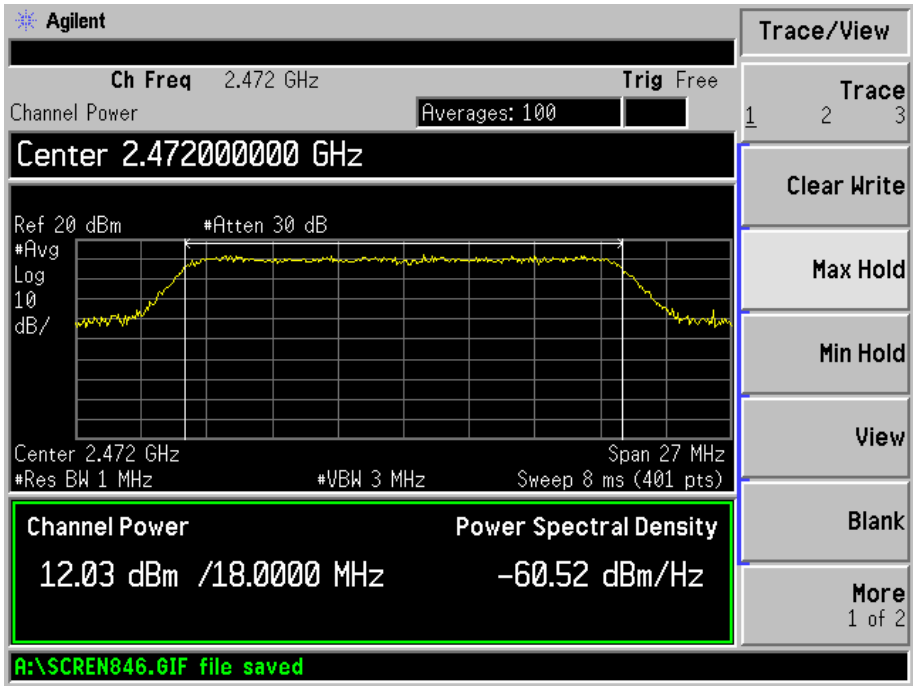
802.11n-HT20-MCS0-Low Channel



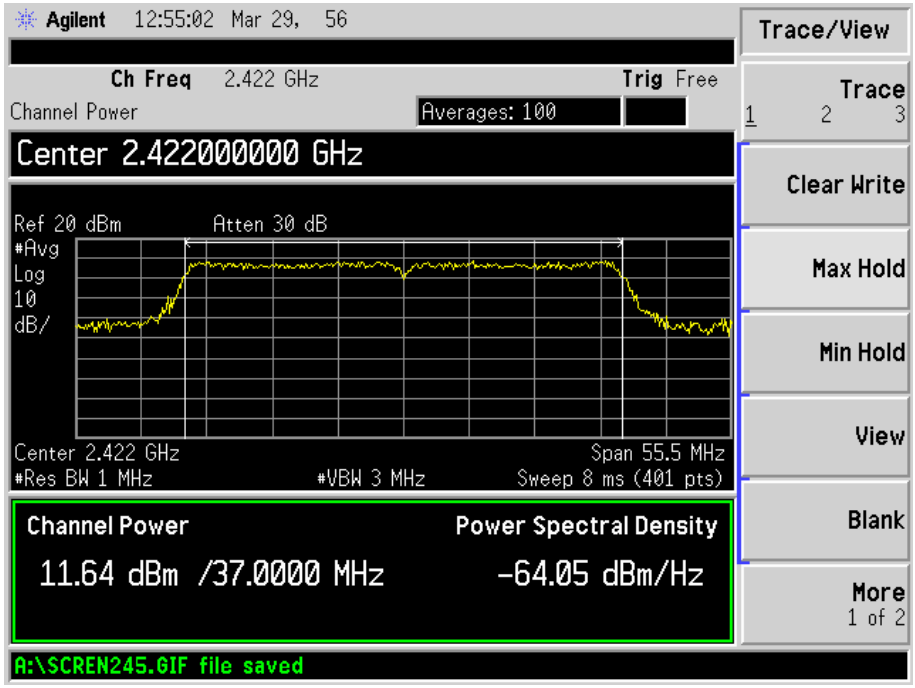
802.11n-HT20-MCS0-Middle Channel



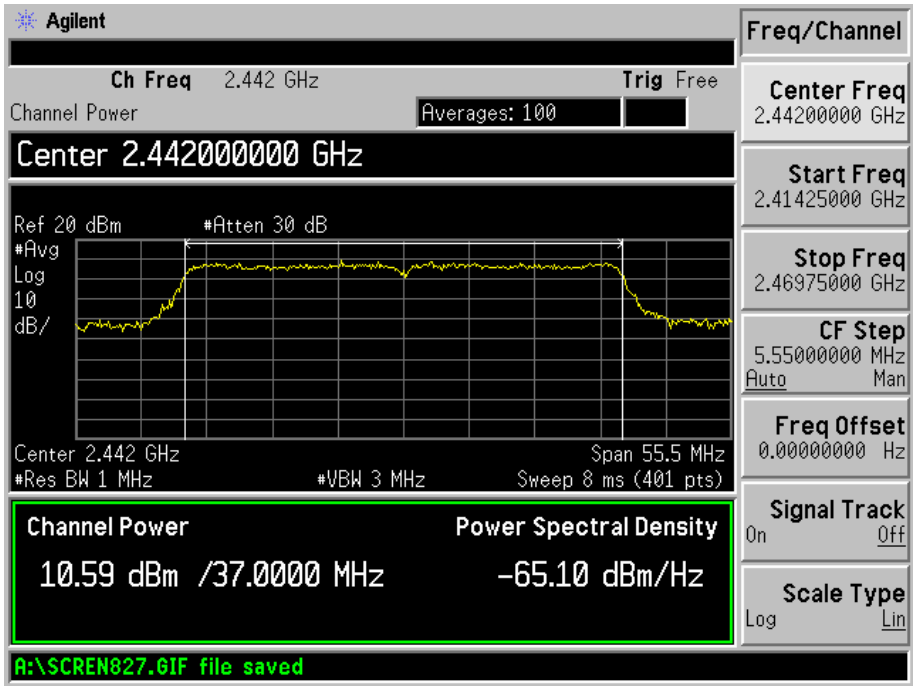
802.11n-HT20-MCS0-High Channel



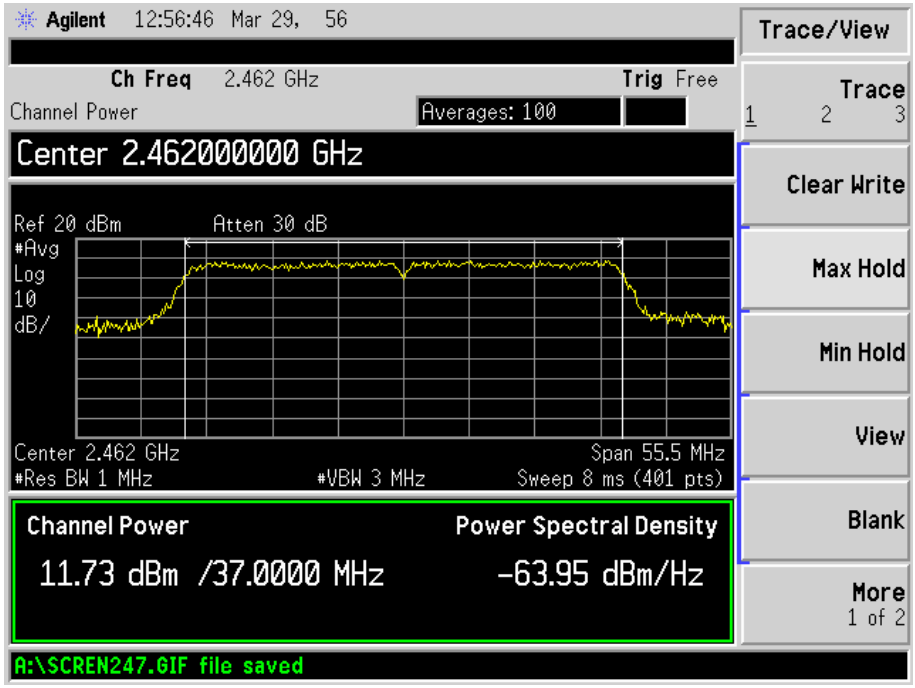
802.11n-HT40-MCS0-Low Channel



802.11n-HT40-MCS0-Middle Channel



802.11n-HT40-MCS0-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).

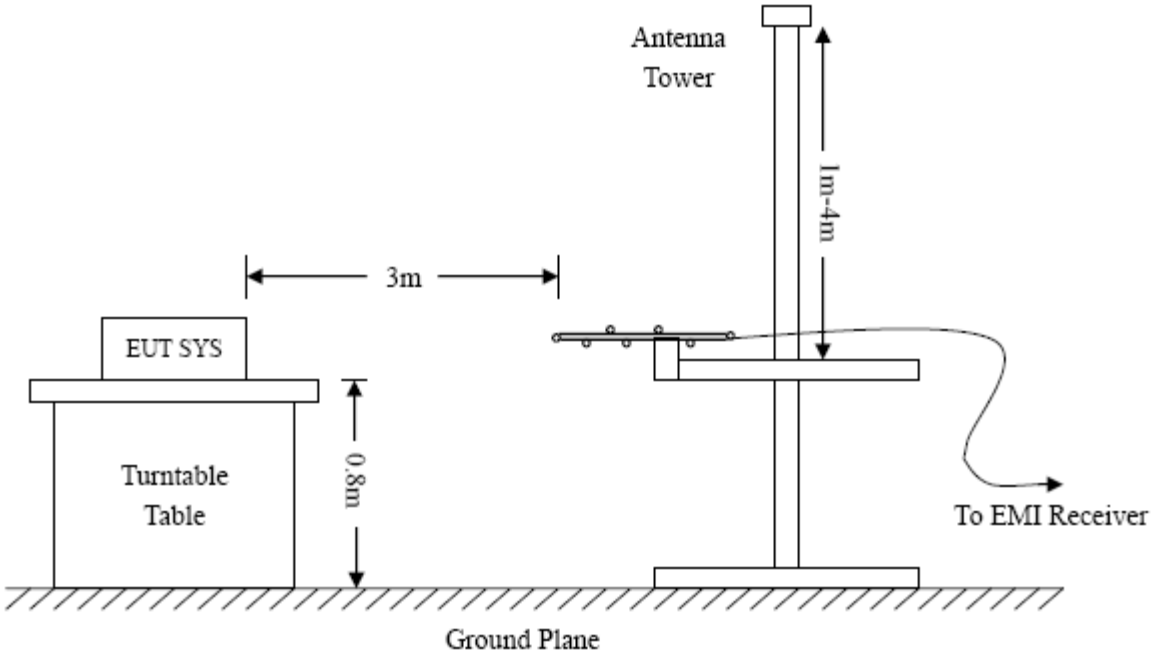
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

8.3 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2014-05-28	2015-05-27
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-28	2015-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-28	2015-05-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-28	2015-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-05-24	2015-05-23
Horn Antenna	ETS	3117	00086197	2014-05-24	2015-05-23
Horn Antenna	ETS	3116B	00088203	2014-05-24	2015-05-23
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2014-05-24	2015-05-23

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.



Frequency :9kHz-30MHz	Frequency :30MHz-1GHz	Frequency :Above 1GHz
RBW=10KHz,	RBW=120KHz,	RBW=1MHz,
VBW =30KHz	VBW=300KHz	VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto	Sweep time= Auto	Sweep time= Auto
Trace = max hold	Trace = max hold	Trace = max hold
Detector function = peak	Detector function = peak, QP	Detector function = peak, AV

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 cases:

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)

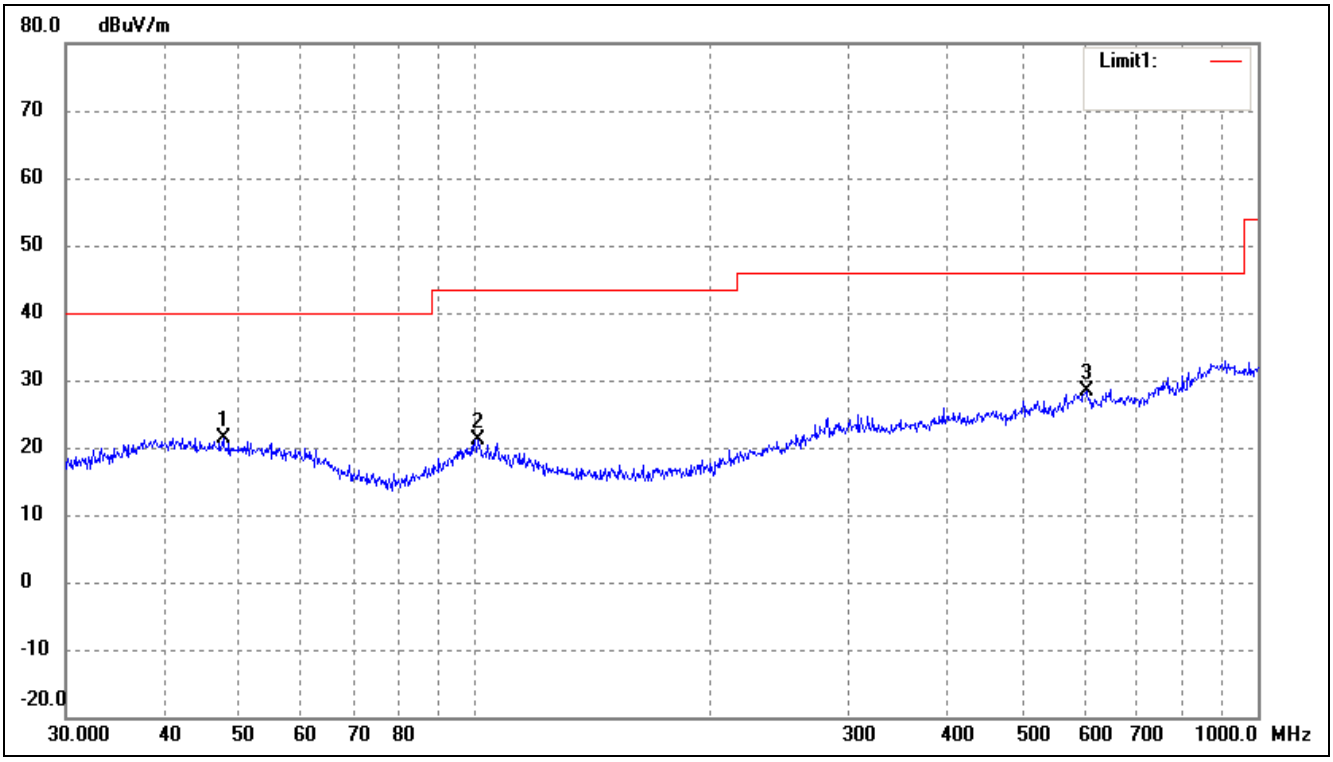
EUT: *Gateway*

Tested Model: *WL-ZGWMDPB-G110-02*

Operating Condition: *802.11b Transmitting Low Channel-2412MHz*

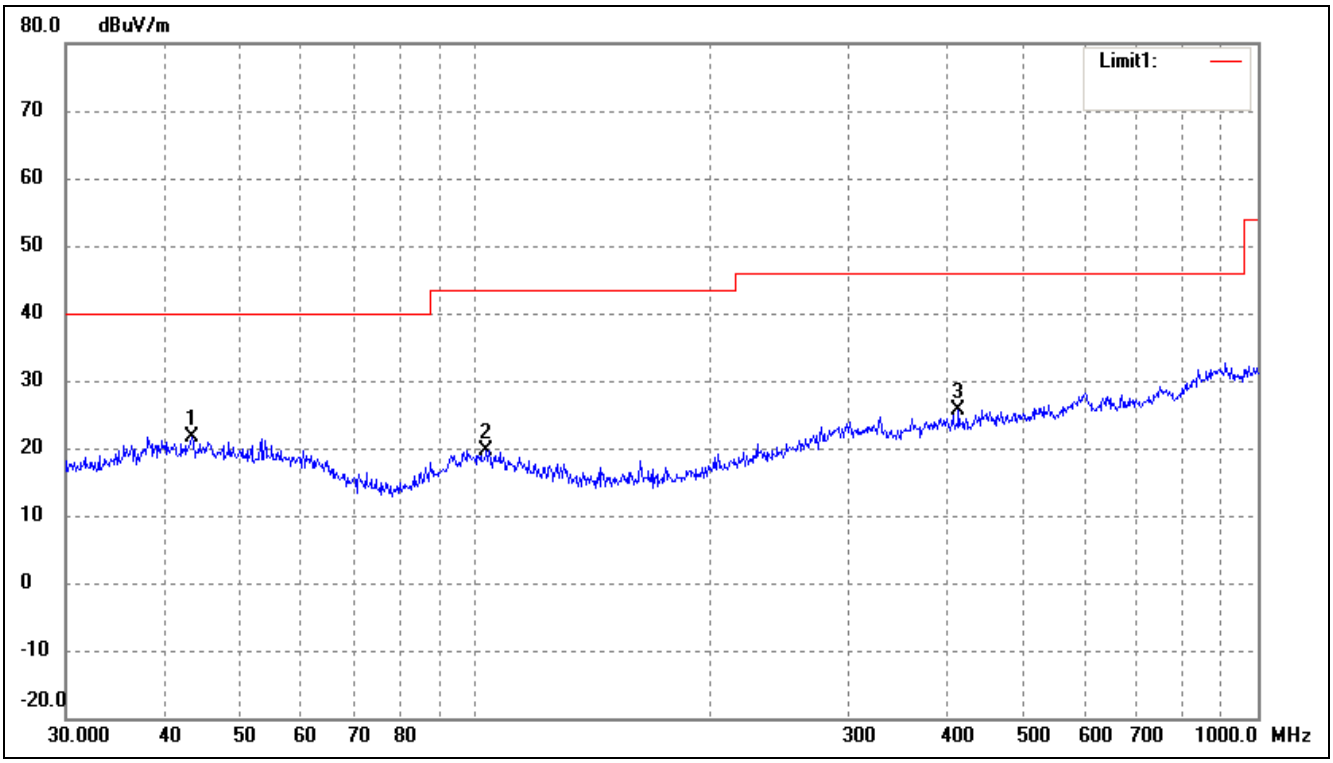
Comment: *Adapte:DC5V*

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	47.6586	14.79	6.49	21.28	40.00	-18.72	168	100	peak
2	100.9340	15.16	6.03	21.19	43.50	-22.31	201	100	peak
3	603.5392	15.28	13.06	28.34	46.00	-17.66	98	100	peak

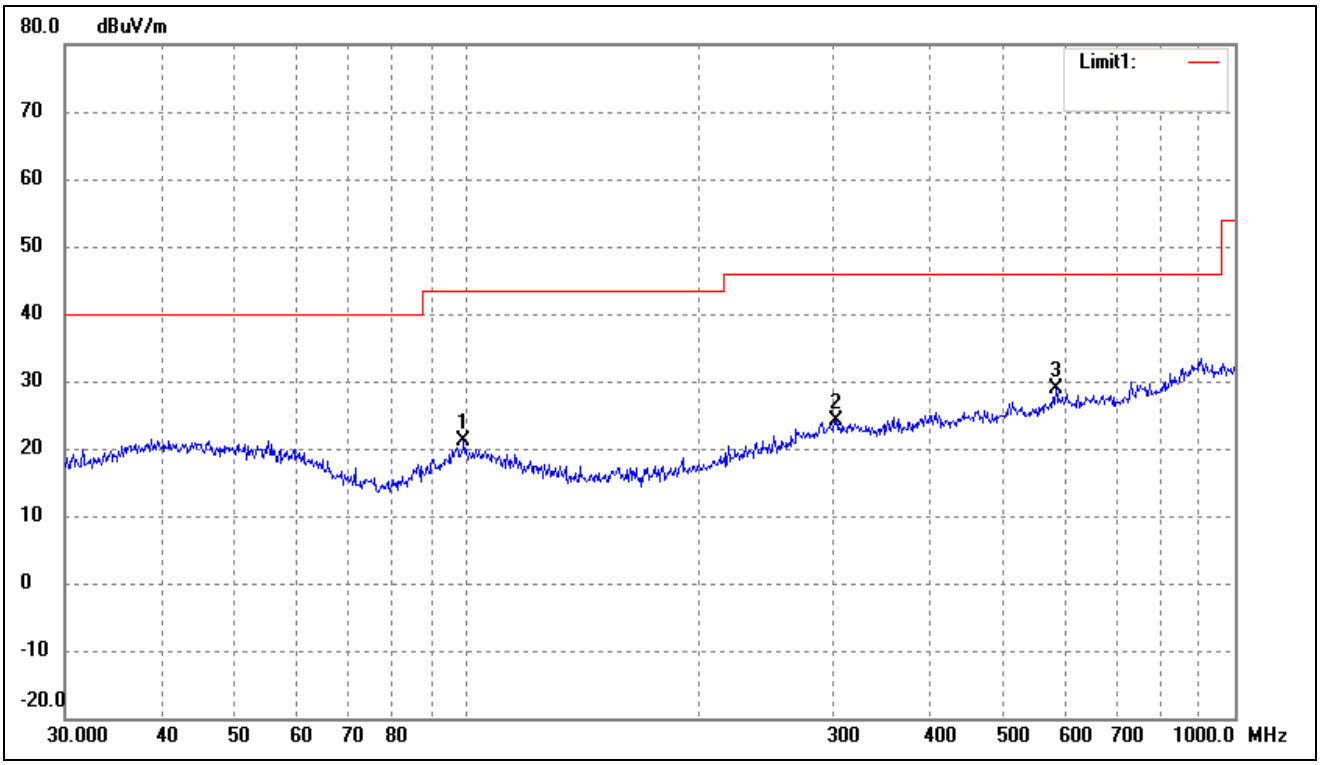
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	43.5057	13.42	8.20	21.62	40.00	-18.38	91	100	peak
2	103.4421	13.96	5.77	19.73	43.50	-23.77	135	100	peak
3	414.7223	16.00	9.58	25.58	46.00	-20.42	235	100	peak

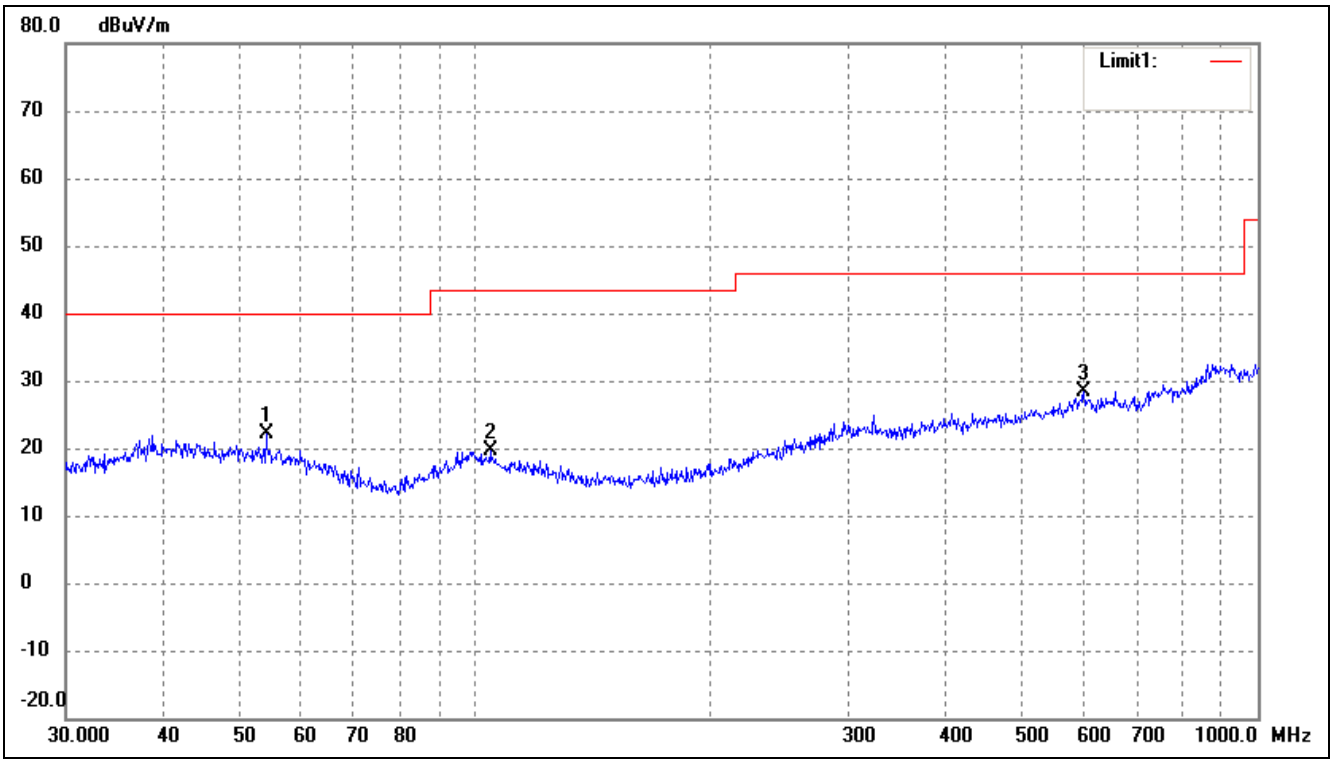
Operating Condition: *802.11b Transmitting Middle Channel-2442MHz*
Comment: *Adapte:DC5V*

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	99.1797	15.10	5.92	21.02	43.50	-22.48	86	100	peak
2	302.4812	14.90	9.19	24.09	46.00	-21.91	135	100	peak
3	584.7895	16.08	12.75	28.83	46.00	-17.17	45	100	peak

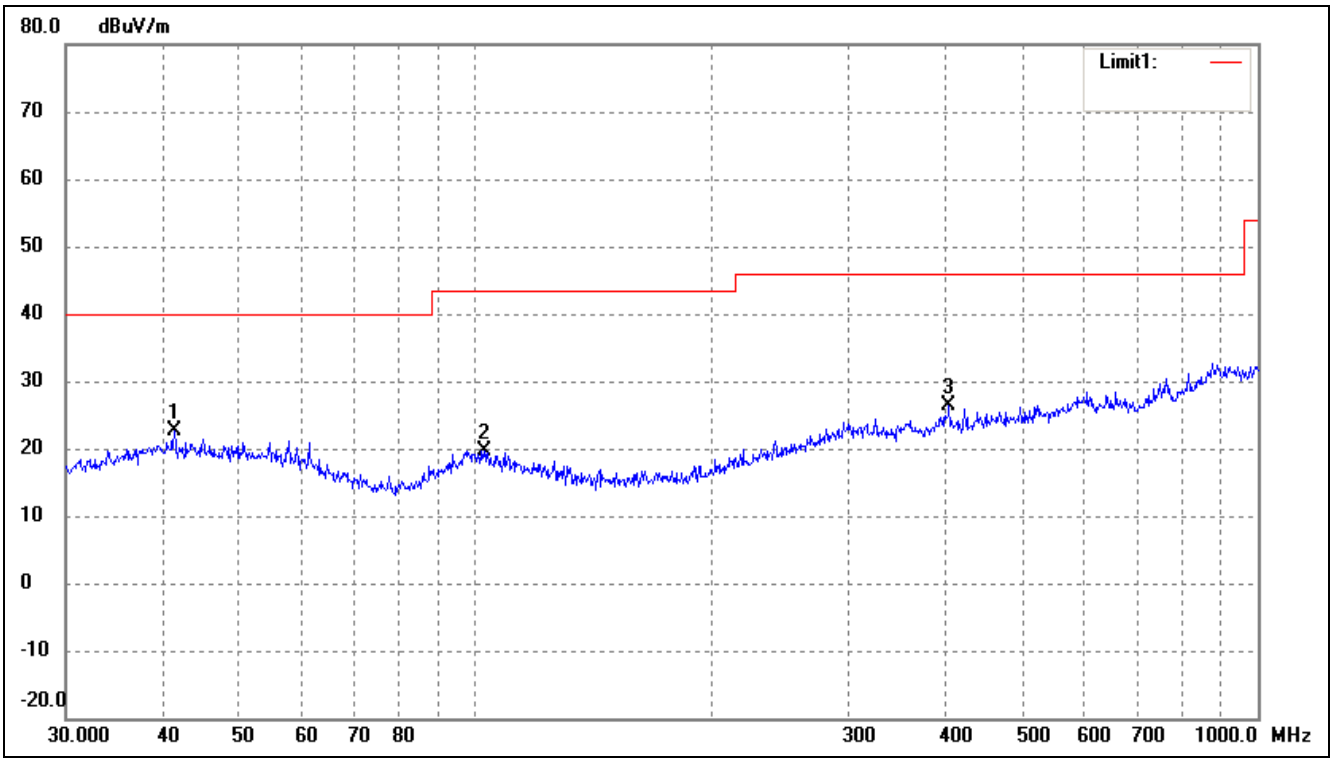
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	54.0711	16.15	5.90	22.05	40.00	-17.95	135	100	peak
2	104.5361	14.01	5.65	19.66	43.50	-23.84	231	100	peak
3	599.3213	15.19	13.30	28.49	46.00	-17.51	89	100	peak

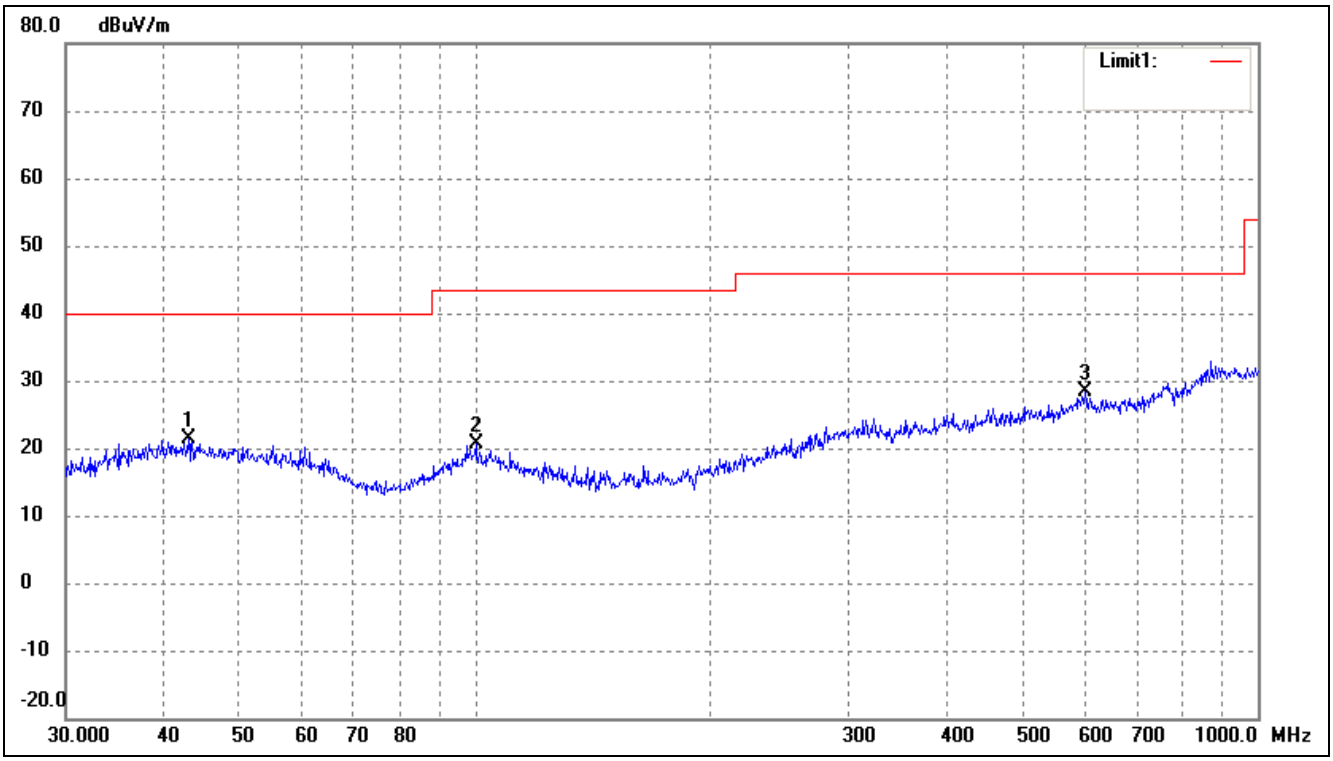
Operating Condition: *802.11b Transmitting High Channel-2472MHz*
Comment: *Adapter:DC5V*

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	41.2765	15.52	7.12	22.64	40.00	-17.36	89	100	peak
2	102.7192	13.75	5.85	19.60	43.50	-23.90	135	100	peak
3	403.2500	16.34	10.01	26.35	46.00	-19.65	212	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	43.0505	14.42	6.94	21.36	40.00	-18.64	65	100	peak
2	100.2286	14.59	6.10	20.69	43.50	-22.81	212	100	peak
3	601.4265	15.08	13.22	28.30	46.00	-17.70	314	100	peak

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

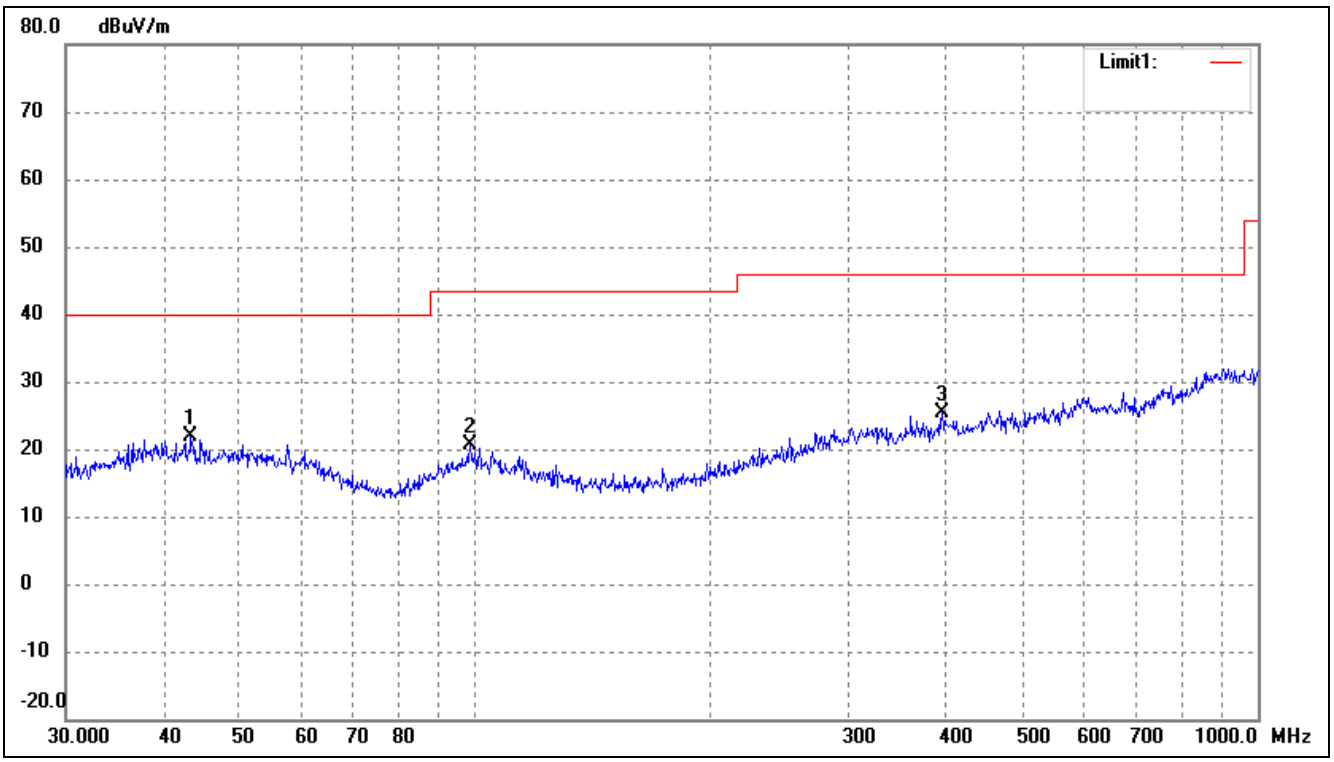
EUT: *Gateway*

Tested Model: *WL-ZGWMDPB-G110-02*

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

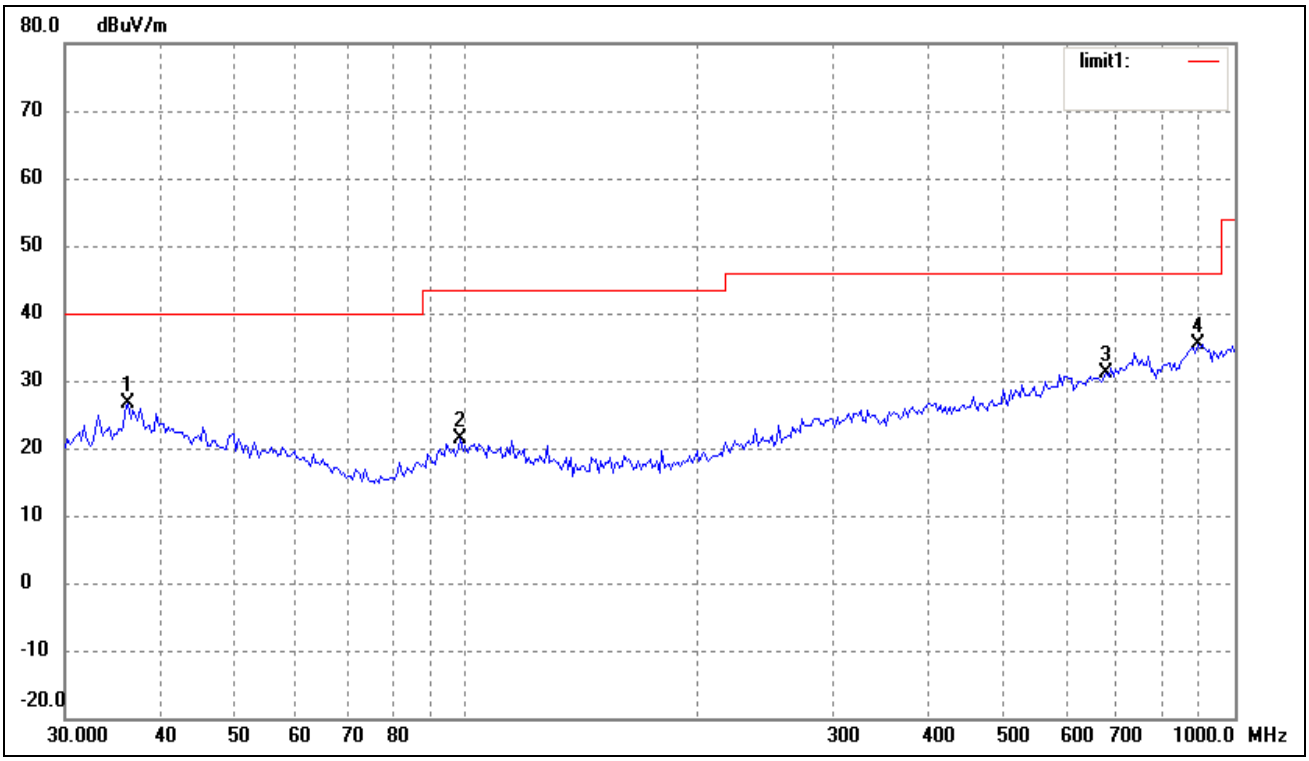
Comment: *Adapter: DC 5V*

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	43.3534	15.08	6.91	21.99	40.00	-18.01	89	100	peak
2	98.4866	14.80	5.75	20.55	43.50	-22.95	125	100	peak
3	394.8545	15.56	9.90	25.46	46.00	-20.54	35	100	peak

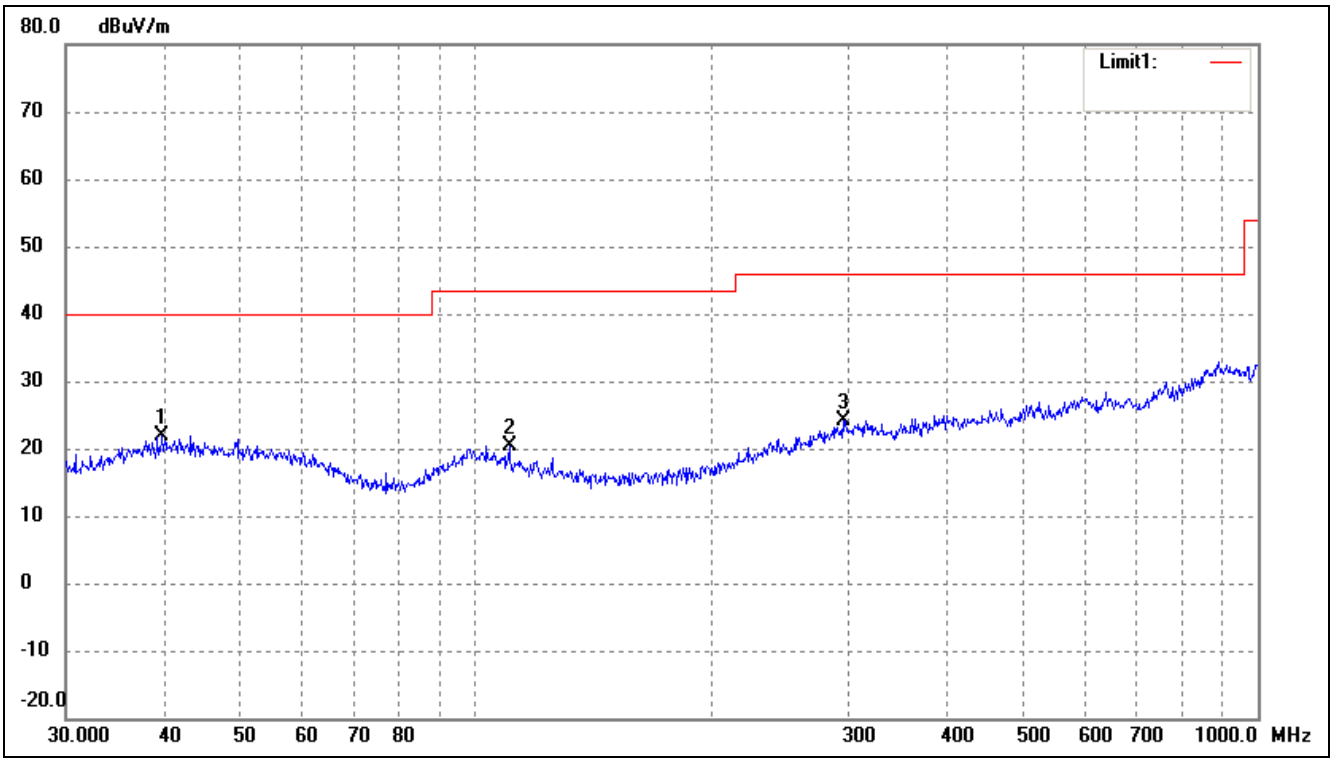
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	46.1780	14.13	7.41	21.54	40.00	-18.46	185	100	peak
2	99.8777	14.45	6.10	20.55	43.50	-22.95	132	100	peak
3	477.1694	16.44	10.16	26.60	46.00	-19.40	201	100	peak

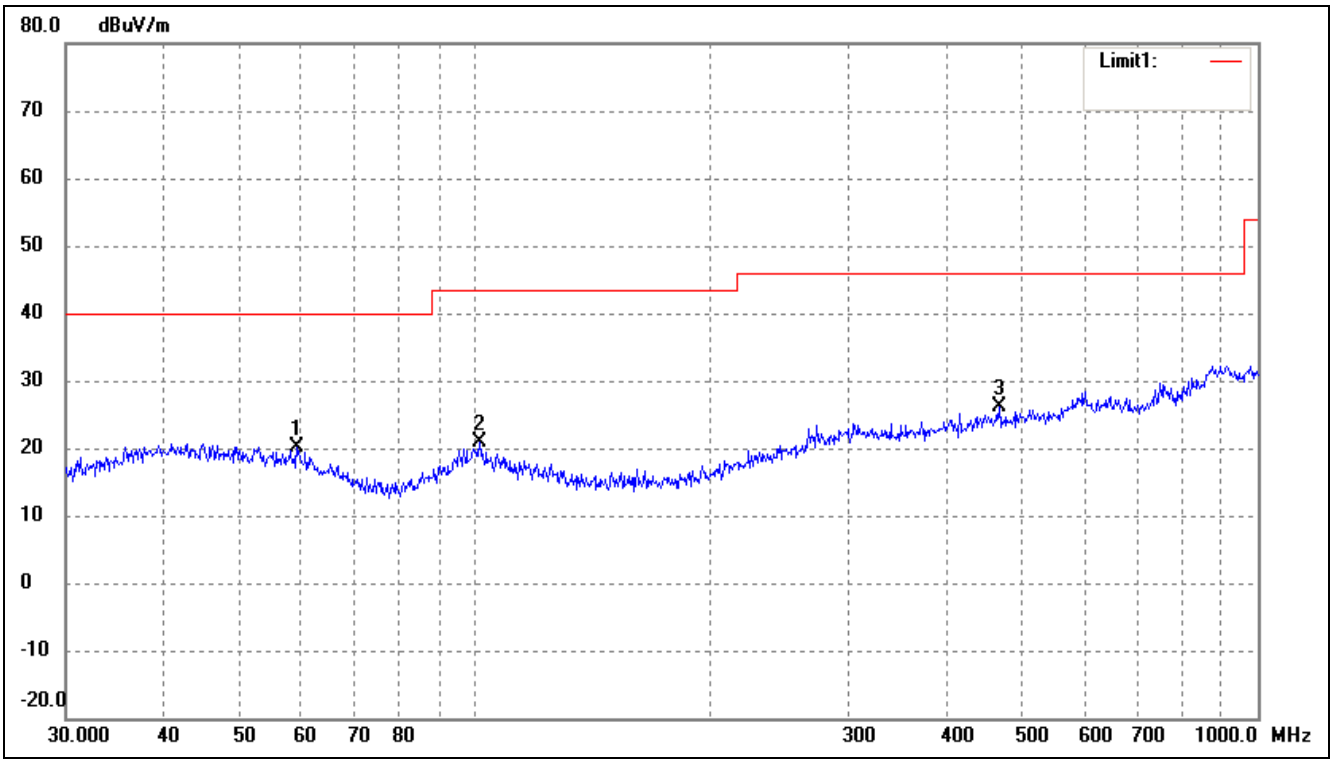
Operating Condition: *802.11g Transmitting Middle Channel-2442MHz*
Comment: *Adapter: DC 5V*

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	39.8542	14.62	7.21	21.83	40.00	-18.17	152	100	peak
2	110.5687	15.39	5.02	20.41	43.50	-23.09	235	100	peak
3	295.1469	15.22	8.99	24.21	46.00	-21.79	189	100	peak

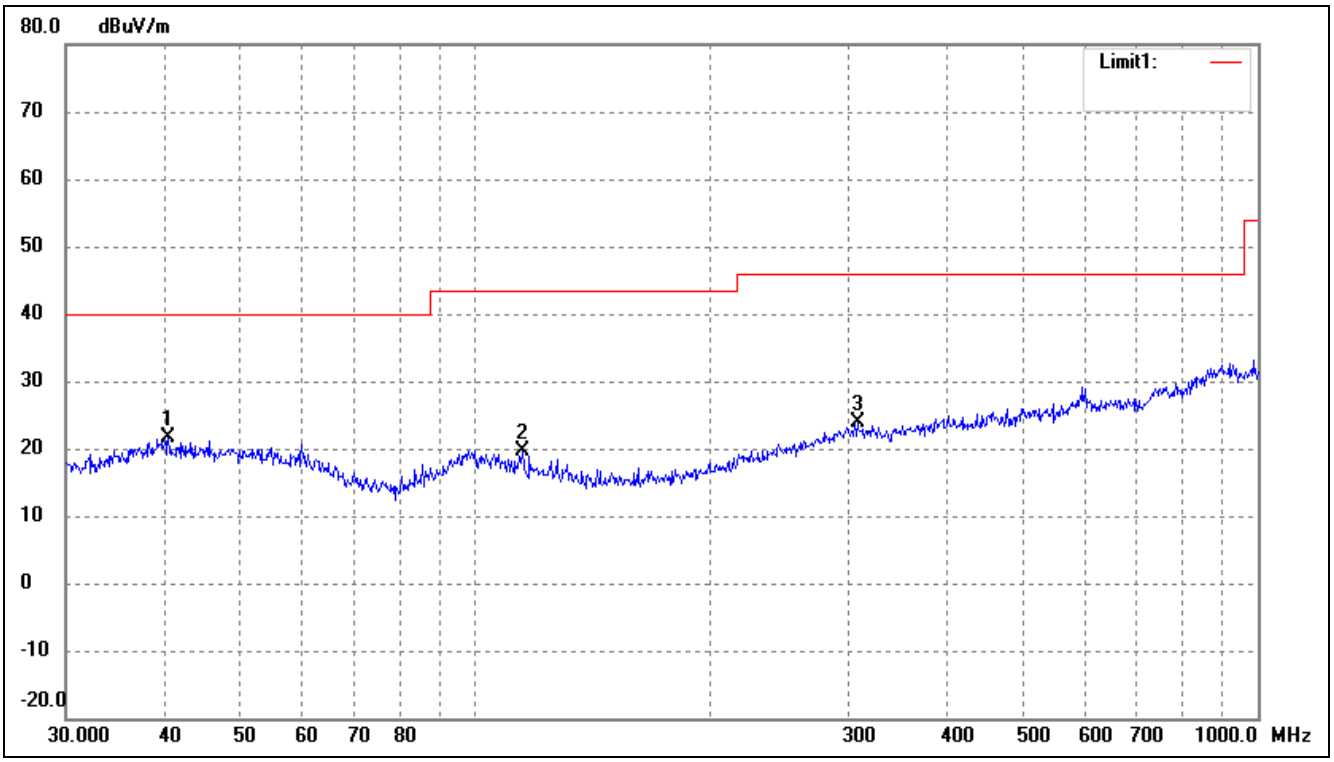
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	59.2325	14.65	5.45	20.10	40.00	-19.90	135	100	peak
2	101.2885	14.83	5.99	20.82	43.50	-22.68	287	100	peak
3	467.2349	15.66	10.39	26.05	46.00	-19.95	245	100	peak

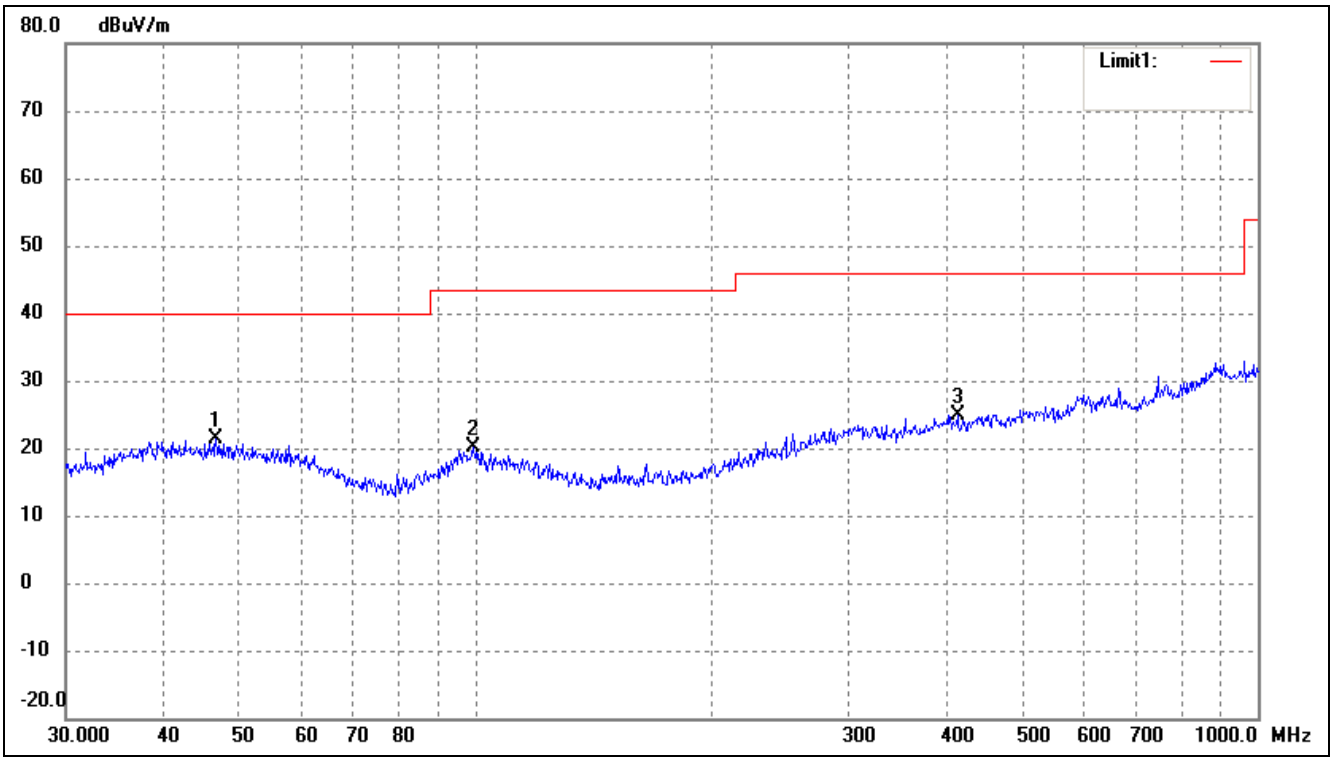
Operating Condition: *802.11g Transmitting High Channel-2472MHz*
Comment: *Adapter: DC 5V*

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	40.5591	14.37	7.19	21.56	40.00	-18.44	89	100	peak
2	114.9169	15.02	4.56	19.58	43.50	-23.92	156	100	peak
3	307.8313	14.62	9.22	23.84	46.00	-22.16	201	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	46.6664	14.11	7.26	21.37	40.00	-18.63	187	100	peak
2	99.5281	14.10	6.01	20.11	43.50	-23.39	110	100	peak
3	413.2706	15.33	9.63	24.96	46.00	-21.04	235	100	peak

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

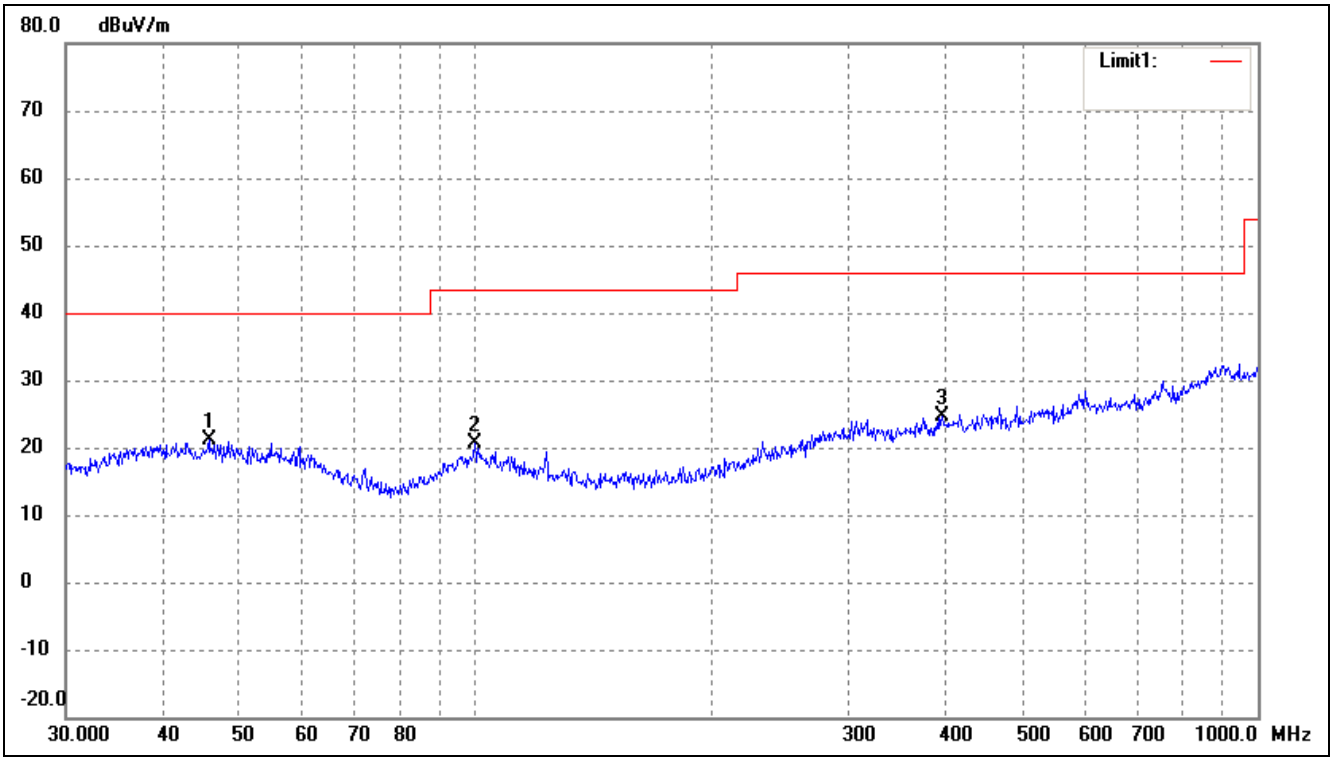
EUT: *Gateway*

Tested Model: *WL-ZGWMDPB-G110-02*

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

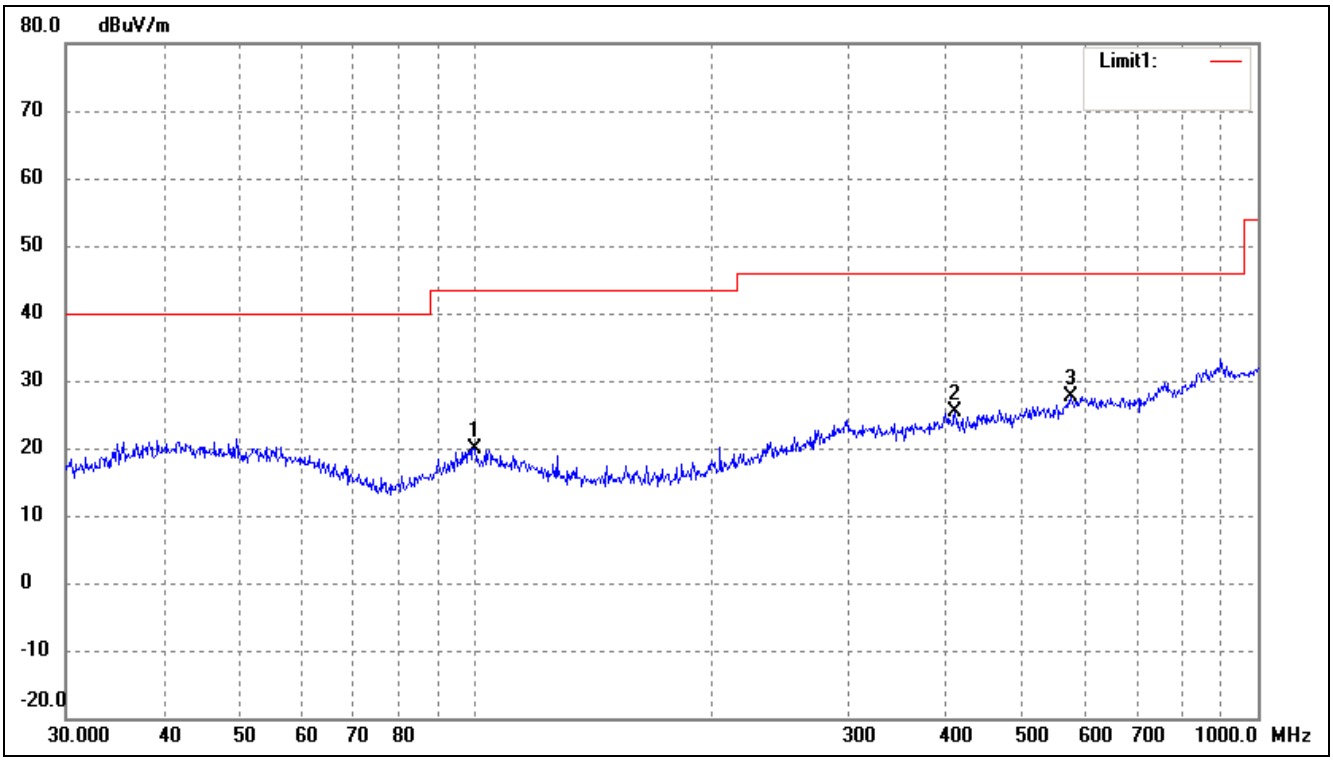
Comment: *Adapter: DC 5V*

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	45.6948	14.36	6.69	21.05	40.00	-18.95	260	100	peak
2	99.8777	14.59	6.10	20.69	43.50	-22.81	131	200	peak
3	394.8545	14.68	9.90	24.58	46.00	-21.42	285	200	peak

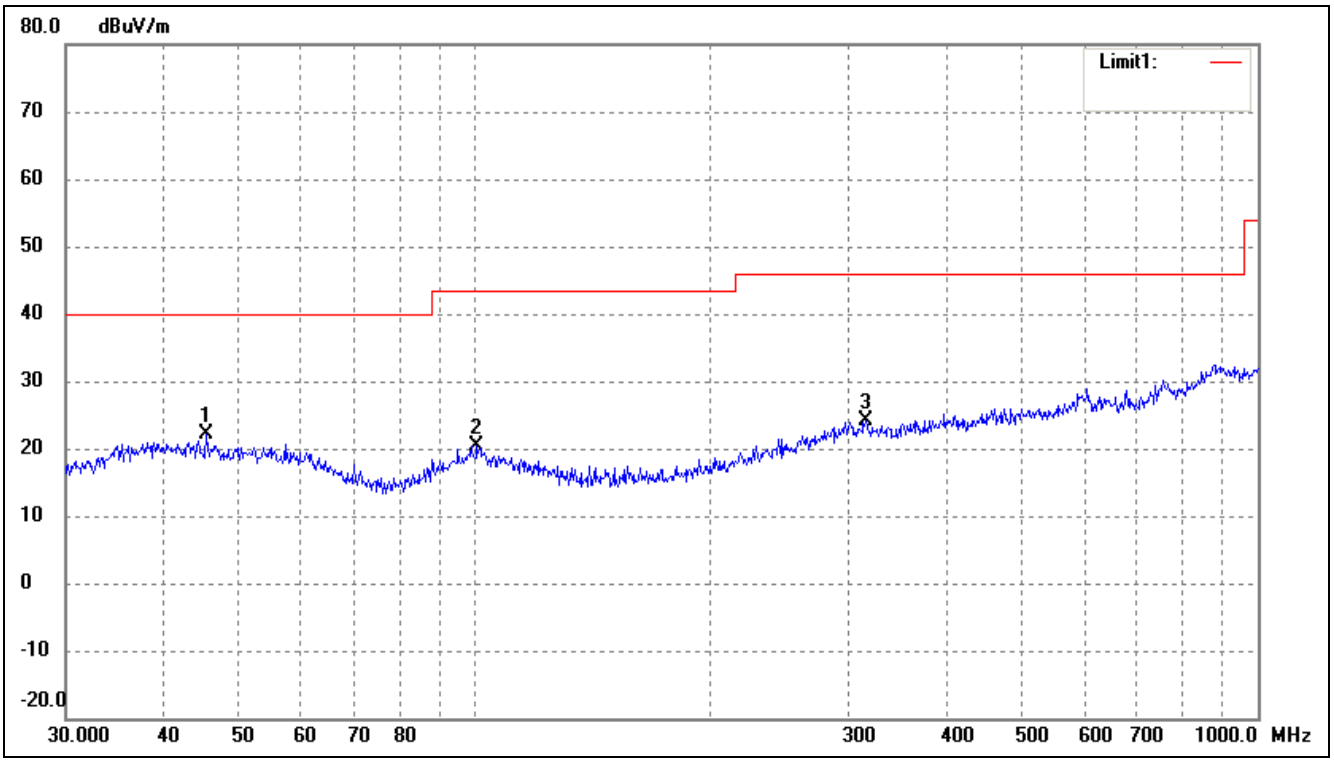
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	99.8777	13.75	6.10	19.85	43.50	-23.65	155	100	peak
2	410.3825	15.60	9.74	25.34	46.00	-20.66	197	100	peak
3	576.6443	15.16	12.40	27.56	46.00	-18.44	310	100	peak

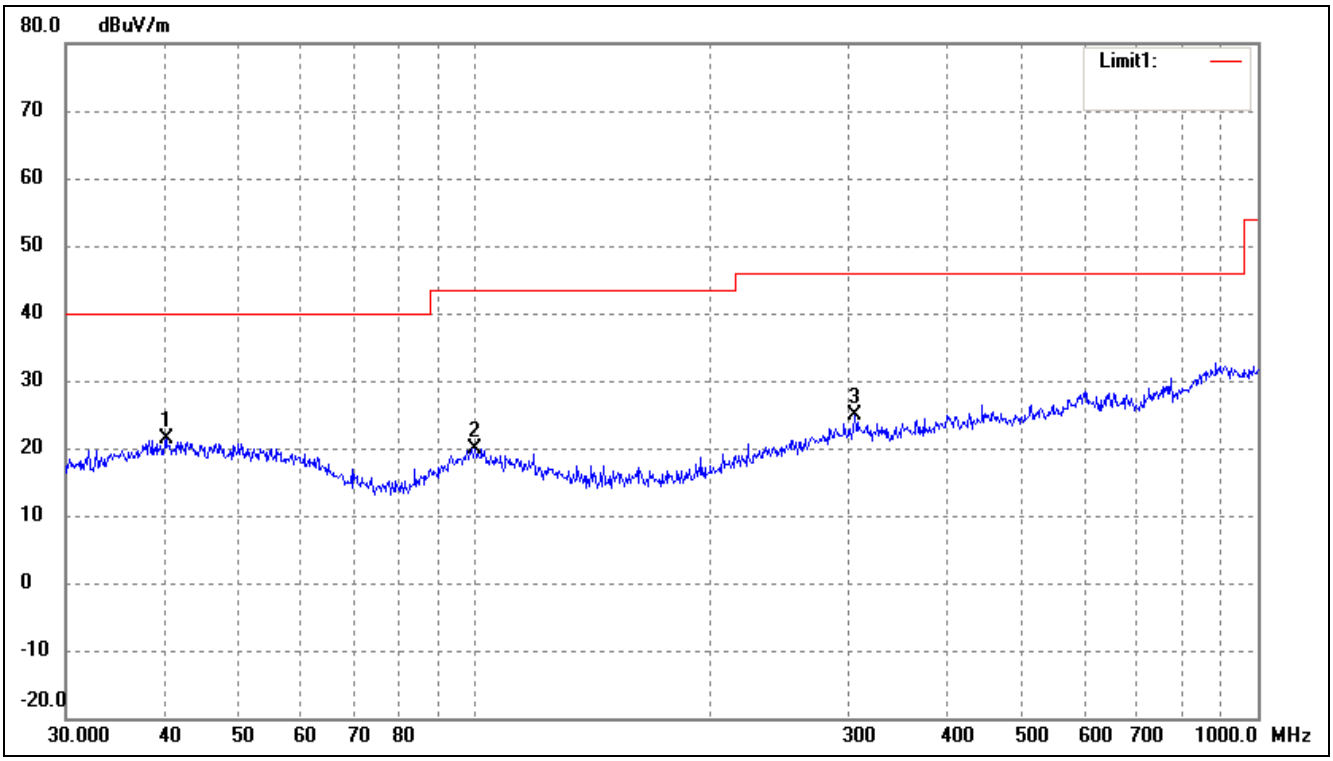
Operating Condition: *802.11n-HT20 Transmitting Middle Channel-2442MHz*
Comment: *Adapter: DC 5V*

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	45.3755	15.46	6.72	22.18	40.00	-17.82	65	100	peak
2	100.5806	14.41	6.07	20.48	43.50	-23.02	197	100	peak
3	315.4808	14.88	9.27	24.15	46.00	-21.85	302	100	peak

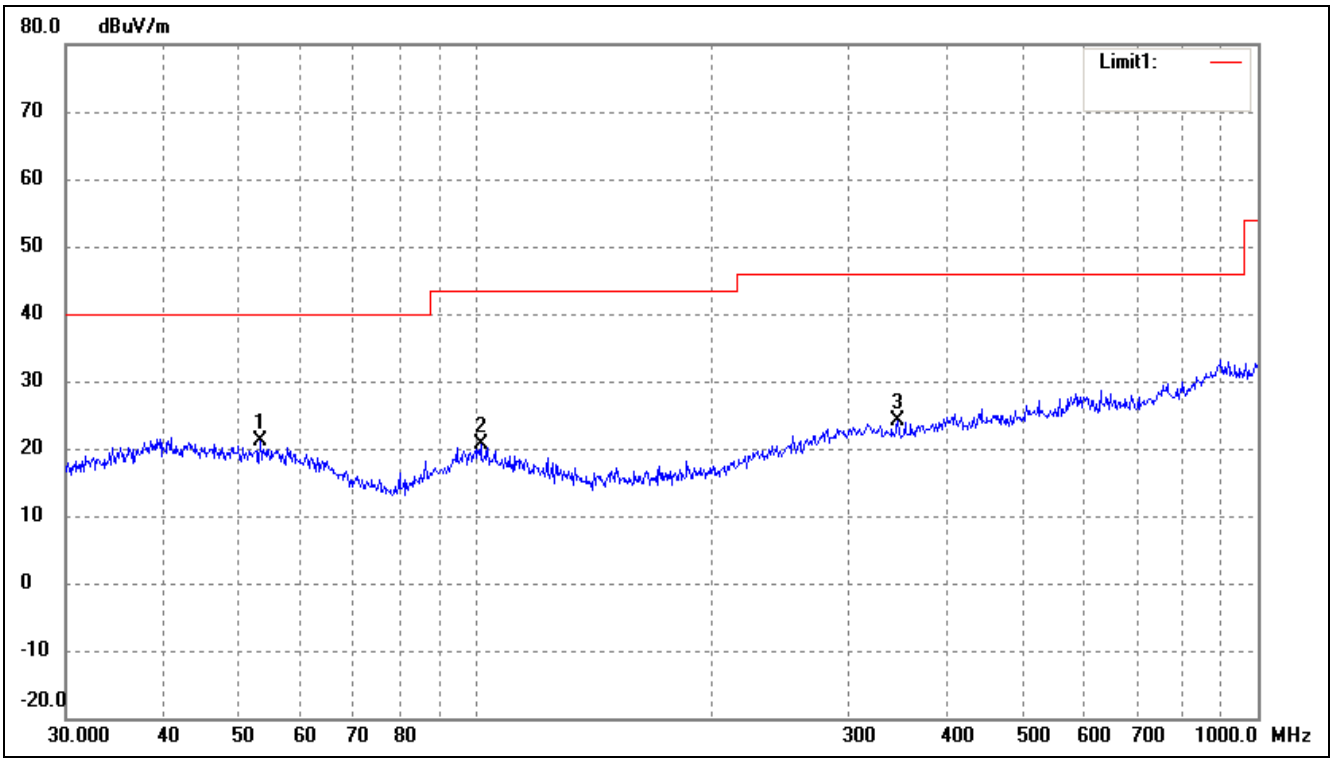
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	40.2757	12.14	9.17	21.31	40.00	-18.69	201	100	peak
2	99.8777	13.84	6.10	19.94	43.50	-23.56	324	100	peak
3	305.6800	15.56	9.21	24.77	46.00	-21.23	289	100	peak

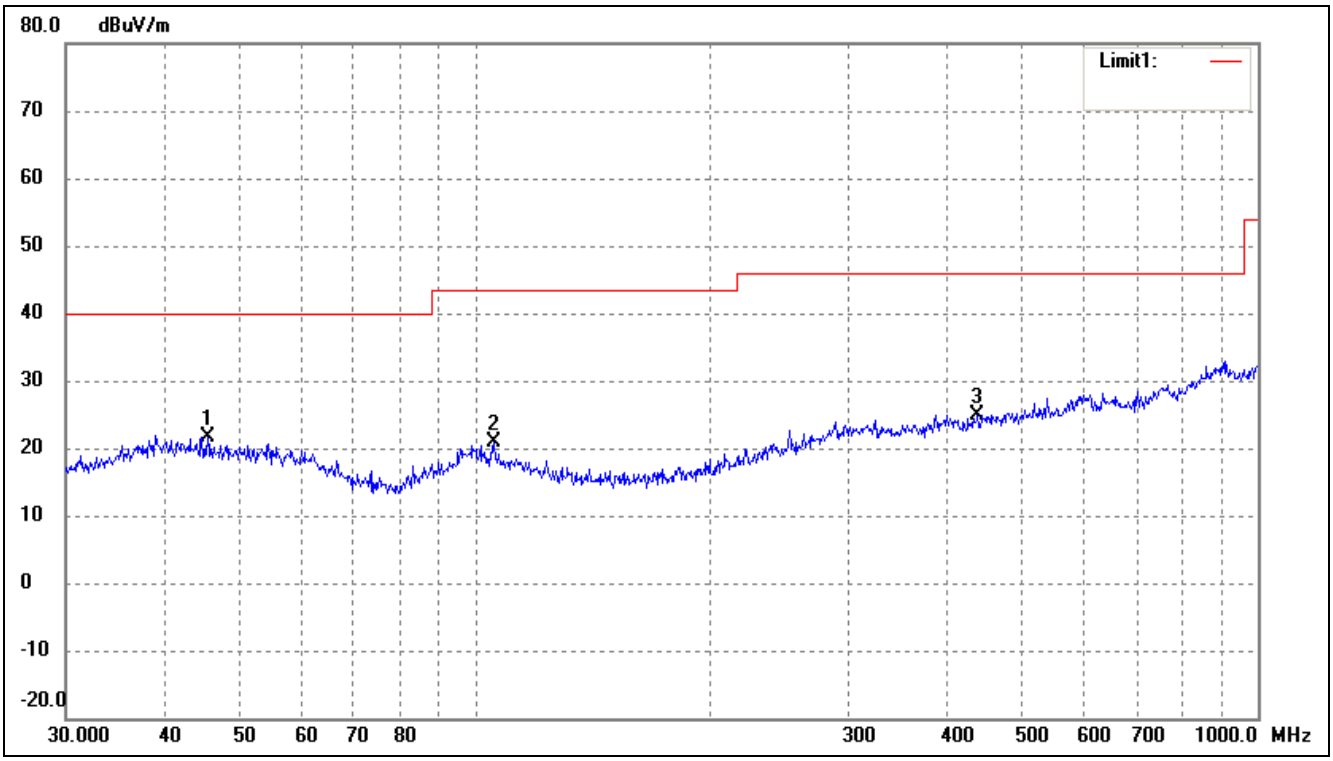
Operating Condition: *802.11n-HT20 Transmitting High Channel-2472MHz*
Comment: *Adapter:DC5V*

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	53.1313	15.21	5.99	21.20	40.00	-18.80	125	100	peak
2	101.6443	14.63	5.95	20.58	43.50	-22.92	312	100	peak
3	346.8092	15.25	8.90	24.15	46.00	-21.85	102	100	peak

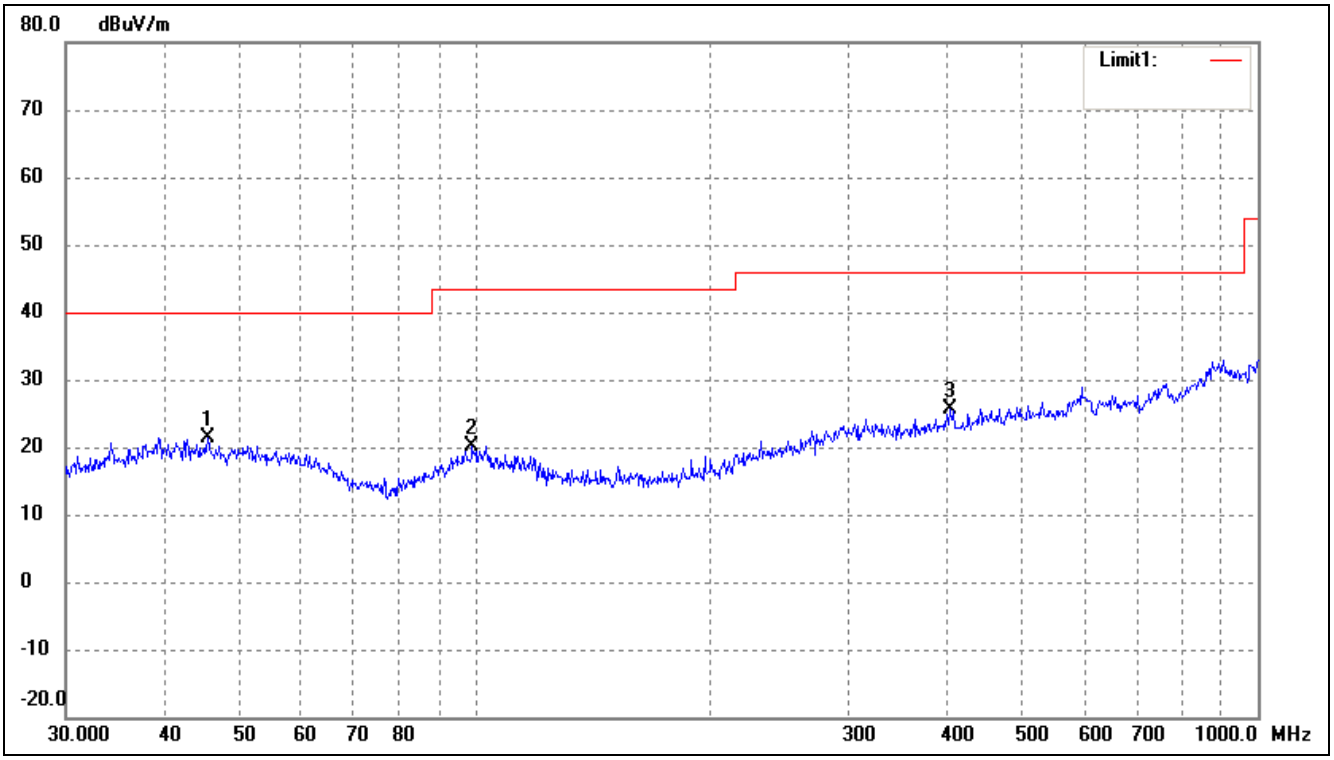
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	45.5348	13.98	7.60	21.58	40.00	-18.42	56	100	peak
2	105.6415	15.30	5.53	20.83	43.50	-22.67	289	100	peak
3	438.6554	15.00	9.98	24.98	46.00	-21.02	135	100	peak

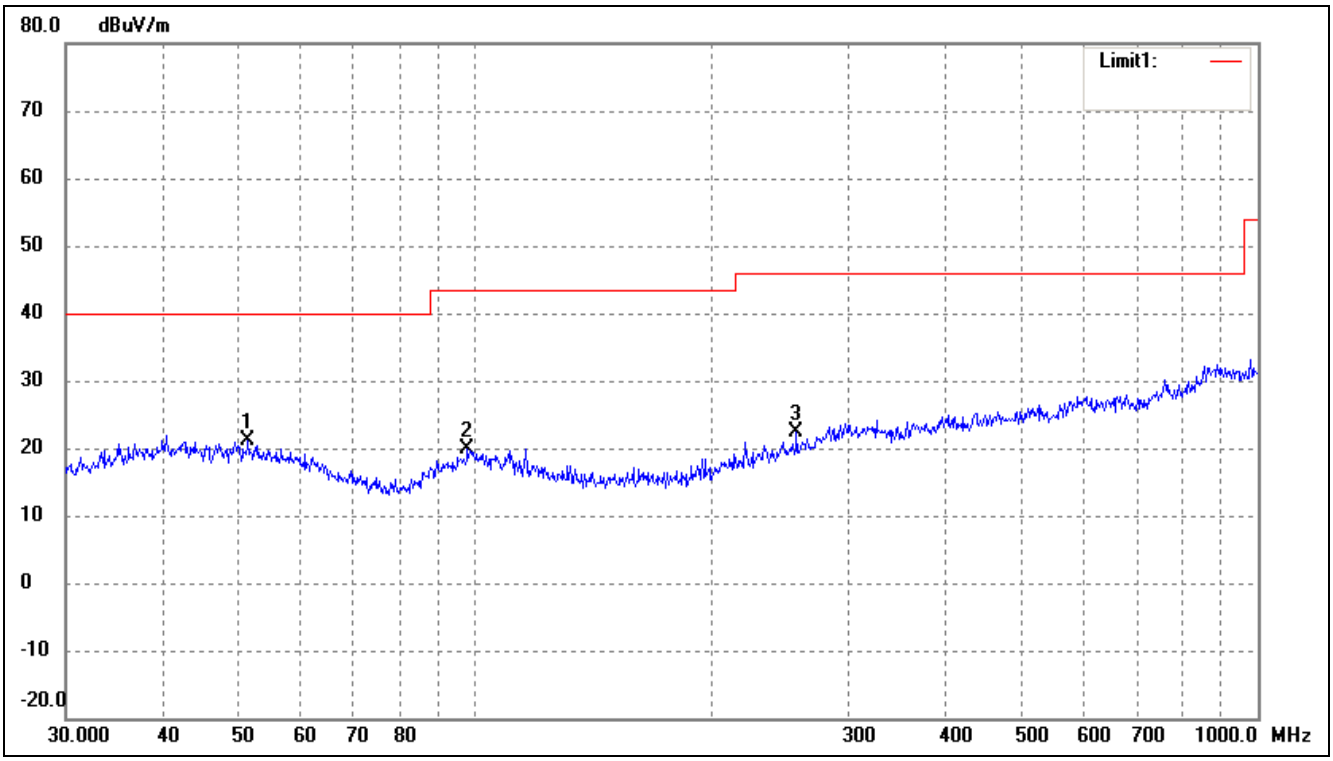
EUT: *Gateway*
Tested Model: *WL-ZGWMDPB-G110-02*
Operating Condition: *802.11n-HT40 Transmitting Low Channel-2422MHz*
Comment: *Adapter:DC5V*

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	45.5348	14.60	6.71	21.31	40.00	-18.69	156	100	peak
2	99.1797	14.18	5.92	20.10	43.50	-23.40	214	100	peak
3	404.6665	15.60	9.96	25.56	46.00	-20.44	89	100	peak

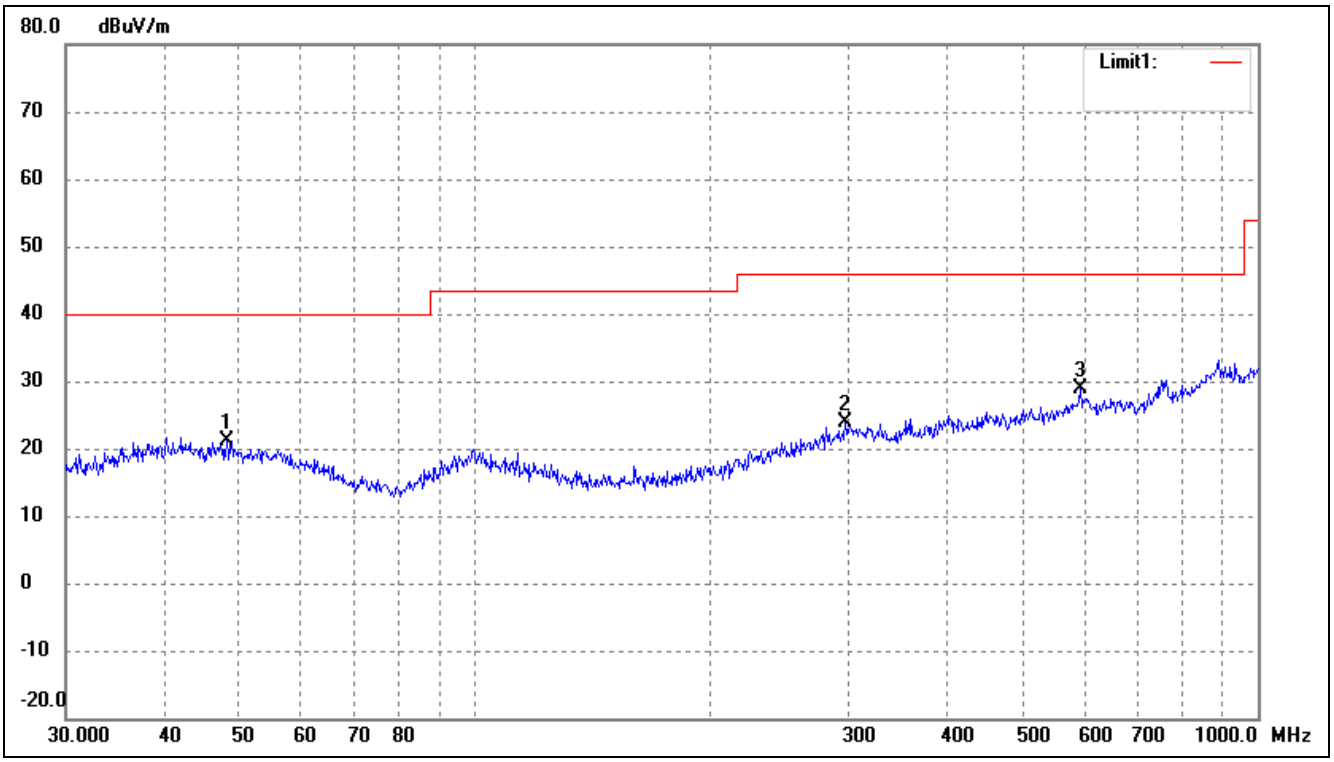
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	51.3005	14.95	6.15	21.10	40.00	-18.90	322	100	peak
2	97.7983	14.31	5.58	19.89	43.50	-23.61	89	100	peak
3	257.4222	15.52	6.95	22.47	46.00	-23.53	135	100	peak

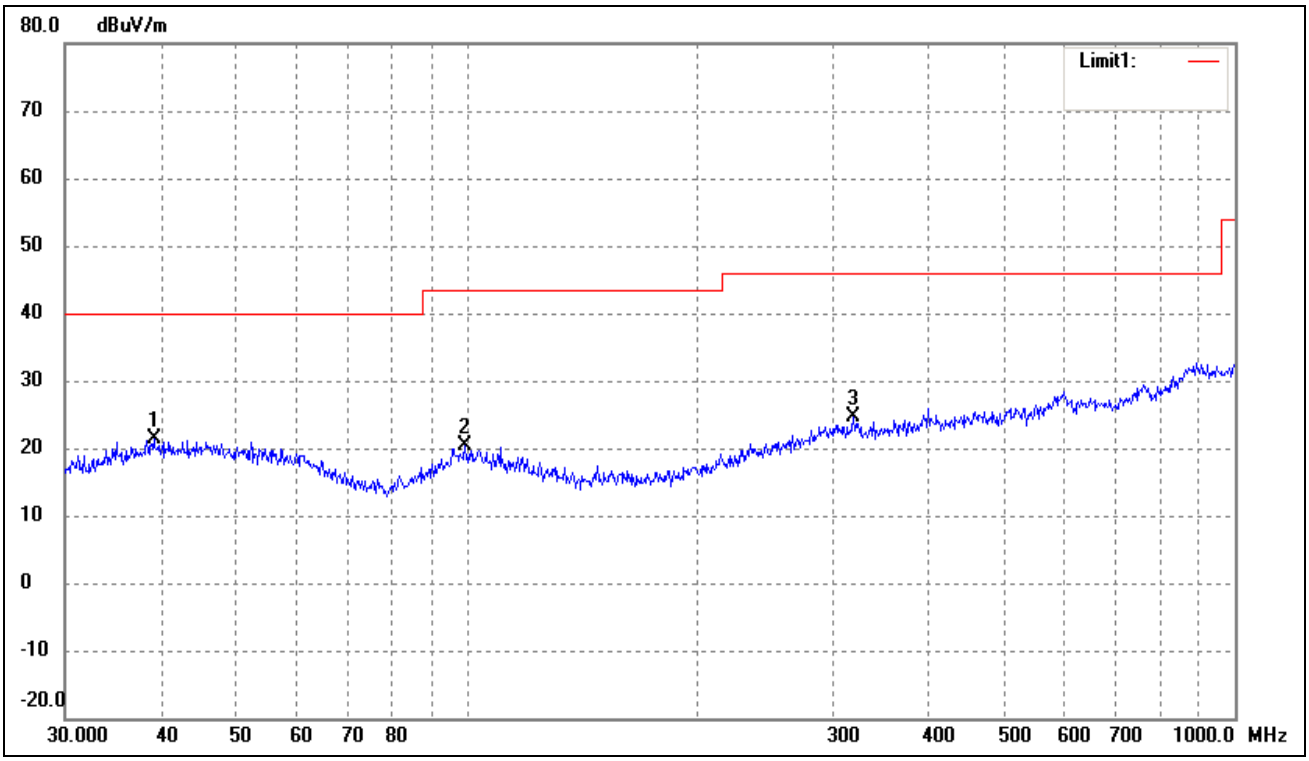
Operating Condition: *802.11n-HT40 Transmitting Middle Channel-2442MHz*
Comment: *Adapter:DC5V*

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	48.1626	14.67	6.44	21.11	40.00	-18.89	251	100	peak
2	297.2241	14.78	9.06	23.84	46.00	-22.16	167	100	peak
3	593.0497	15.74	13.06	28.80	46.00	-17.20	44	100	peak

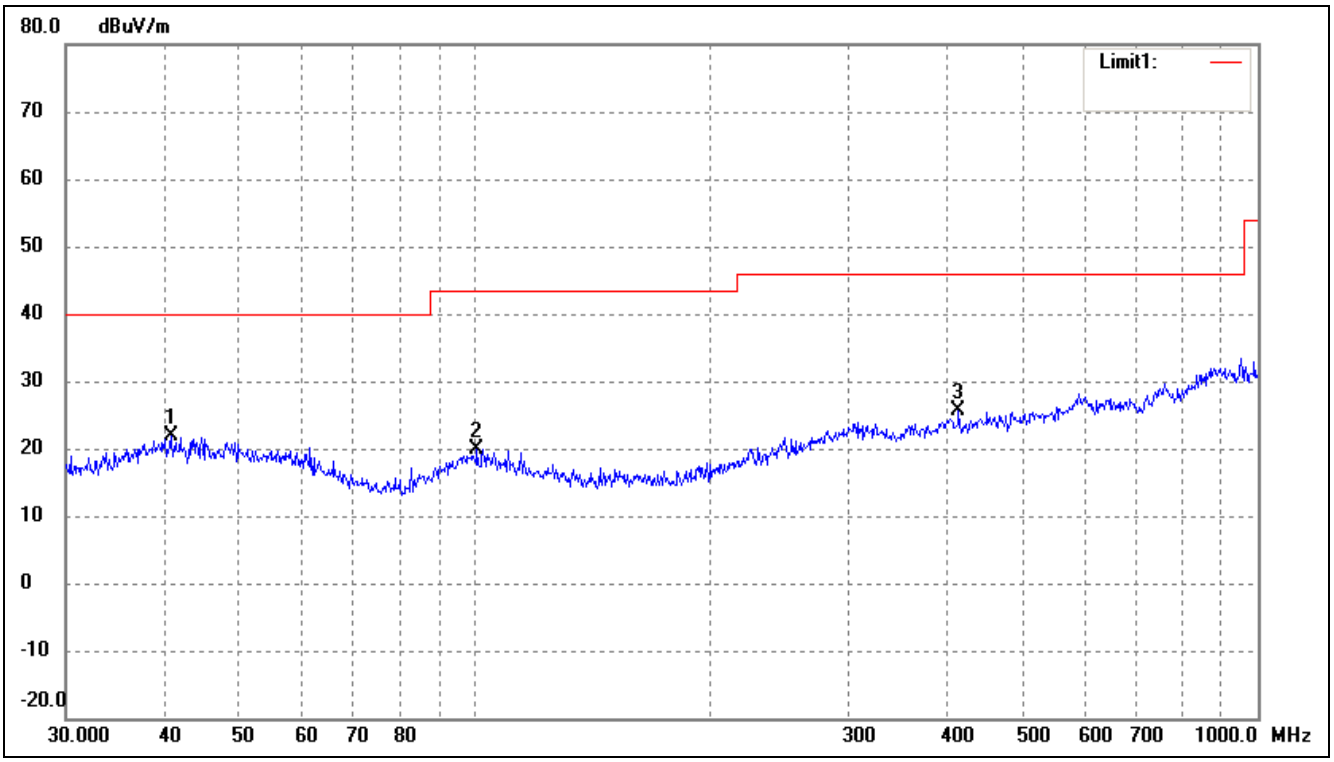
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	39.1616	12.19	9.10	21.29	40.00	-18.71	47	100	peak
2	99.5281	14.45	6.01	20.46	43.50	-23.04	264	100	peak
3	318.8170	15.41	9.28	24.69	46.00	-21.31	225	100	peak

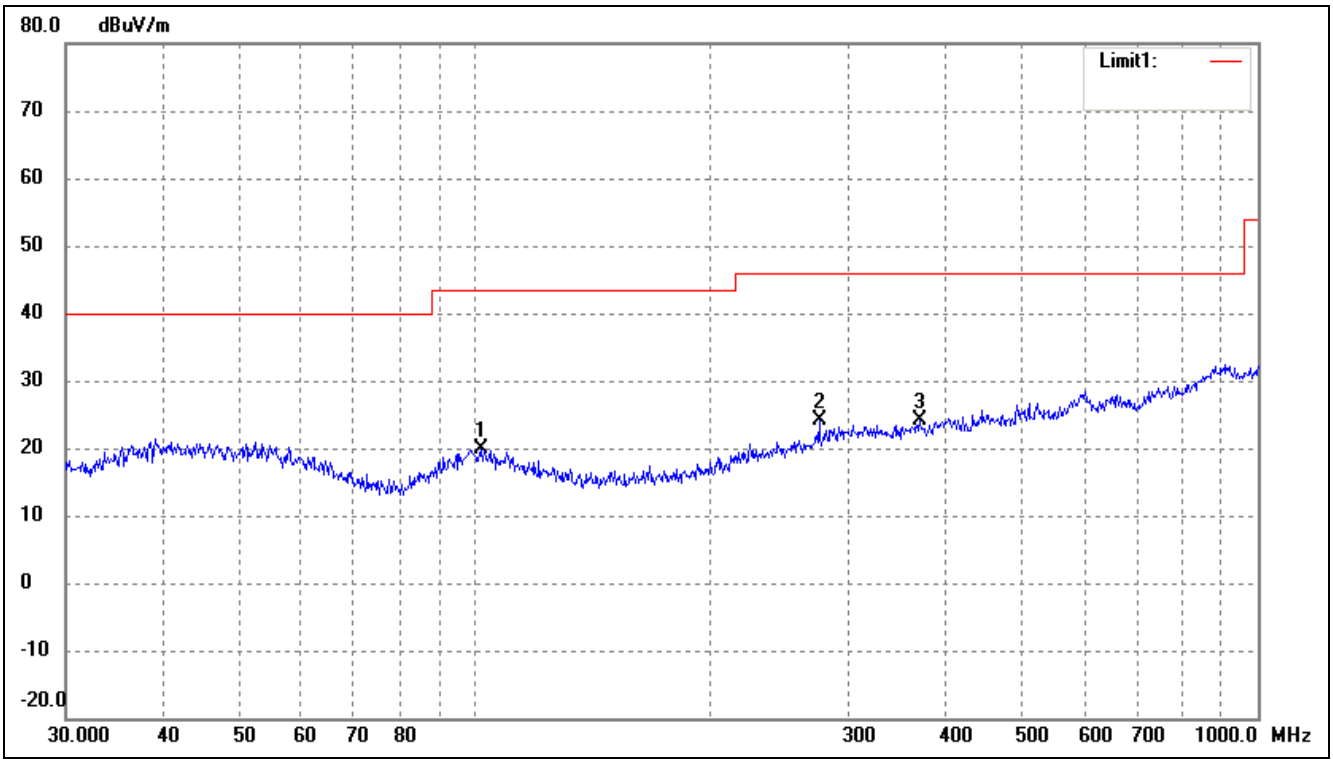
Operating Condition: *802.11n-HT40 Transmitting High Channel-2462MHz*
Comment: *Adapter:DC5V*

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	40.8446	14.71	7.17	21.88	40.00	-18.12	360	100	peak
2	100.5806	13.89	6.07	19.96	43.50	-23.54	287	100	peak
3	414.7223	15.96	9.58	25.54	46.00	-20.46	168	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	102.0014	13.93	5.91	19.84	43.50	-23.66	65	100	peak
2	275.1570	15.98	8.08	24.06	46.00	-21.94	178	100	peak
3	369.4047	14.85	9.23	24.08	46.00	-21.92	214	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	54.09	-3.87	50.22	74.00	-23.78	H	PK
4824.000	38.84	-3.87	34.97	54.00	-19.03	H	AV
7236.000	46.30	1.14	47.44	74.00	-26.56	H	PK
7236.000	34.98	1.19	36.17	54.00	-17.83	H	AV
4824.000	57.31	-3.86	53.45	74.00	-20.55	V	PK
4824.000	40.50	-3.86	36.64	54.00	-17.36	V	AV
7236.000	49.11	1.10	50.21	74.00	-23.79	V	PK
7236.000	37.44	1.10	38.54	54.00	-15.46	V	AV
Middle Channel-2442MHz							
4884.000	54.74	-3.74	51.00	74.00	-23.00	H	PK
4884.000	39.99	-3.74	36.25	54.00	-17.75	H	AV
7326.000	47.77	1.47	49.24	74.00	-24.76	H	PK
7326.000	33.10	1.47	34.57	54.00	-19.43	H	AV
4884.000	53.97	-3.74	50.23	74.00	-23.77	V	PK
4884.000	40.89	-3.74	37.15	54.00	-16.85	V	AV
7326.000	47.98	1.47	49.45	74.00	-24.55	V	PK
7326.000	34.08	1.47	35.55	54.00	-18.45	V	AV
High Channel-2472MHz							
4944.000	55.82	-3.59	52.23	74.00	-21.77	H	PK
4944.000	41.76	-3.59	38.17	54.00	-15.83	H	AV
7416.000	46.38	1.79	48.17	74.00	-25.83	H	PK
7416.000	34.83	1.79	36.62	54.00	-17.38	H	AV
4944.000	54.94	-3.59	51.35	74.00	-22.65	V	PK
4944.000	42.04	-3.59	38.45	54.00	-15.55	V	AV
7416.000	47.99	1.79	49.78	74.00	-24.22	V	PK
7416.000	35.18	1.79	36.97	54.00	-17.03	V	AV

Test Mode: 802.11g

Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel-2412MHz							
4824.000	55.50	-3.86	51.64	74.00	-22.36	H	PK
4824.000	42.23	-3.86	38.37	54.00	-15.63	H	AV
7236.000	48.42	1.10	49.52	74.00	-24.48	H	PK
7236.000	34.40	1.10	35.50	54.00	-18.50	H	AV
4824.000	55.99	-3.86	52.13	74.00	-21.87	V	PK
4824.000	42.65	-3.86	38.79	54.00	-15.21	V	AV
7236.000	49.22	1.10	50.32	74.00	-23.68	V	PK
7236.000	35.54	1.10	36.64	54.00	-17.36	V	AV
Middle Channel-2442MHz							
4884.000	55.10	-3.74	51.36	74.00	-22.64	H	PK
4884.000	43.28	-3.74	39.54	54.00	-14.46	H	AV
7326.000	47.38	1.47	48.85	74.00	-25.15	H	PK
7326.000	35.27	1.47	36.74	54.00	-17.26	H	AV
4884.000	57.07	-3.74	53.33	74.00	-20.67	V	PK
4884.000	43.86	-3.74	40.12	54.00	-13.88	V	AV
7326.000	48.40	1.47	49.87	74.00	-24.13	V	PK
7326.000	35.33	1.47	36.80	54.00	-17.20	V	AV
High Channel-2472MHz							
4944.000	54.00	-3.59	50.41	74.00	-23.59	H	PK
4944.000	40.75	-3.59	37.16	54.00	-16.84	H	AV
7416.000	47.18	1.79	48.97	74.00	-25.03	H	PK
7416.000	34.73	1.79	36.52	54.00	-17.48	H	AV
4944.000	56.11	-3.59	52.52	74.00	-21.48	V	PK
4944.000	42.69	-3.59	39.10	54.00	-14.90	V	AV
7416.000	48.58	1.79	50.37	74.00	-23.63	V	PK
7416.000	35.95	1.79	37.74	54.00	-16.26	V	AV

Test Mode: 802.11n-HT20

Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel-2412MHz							
4824.000	55.60	-3.86	51.74	74.00	-22.26	H	PK
4824.000	40.54	-3.86	36.68	54.00	-17.32	H	AV
7236.000	47.26	1.10	48.36	74.00	-25.64	H	PK
7236.000	34.44	1.10	35.54	54.00	-18.46	H	AV
4824.000	56.71	-3.86	52.85	74.00	-21.15	V	PK
4824.000	43.18	-3.86	39.32	54.00	-14.68	V	AV
7236.000	49.21	1.10	50.31	74.00	-23.69	V	PK
7236.000	35.77	1.10	36.87	54.00	-17.13	V	AV
Middle Channel-2442MHz							
4884.000	54.16	-3.74	50.42	74.00	-23.58	H	PK
4884.000	42.48	-3.74	38.74	54.00	-15.26	H	AV
7326.000	48.74	1.47	50.21	74.00	-23.79	H	PK
7326.000	33.10	1.47	34.57	54.00	-19.43	H	AV
4884.000	54.92	-3.74	51.18	74.00	-22.82	V	PK
4884.000	42.62	-3.74	38.88	54.00	-15.12	V	AV
7326.000	48.49	1.47	49.96	74.00	-24.04	V	PK
7326.000	35.20	1.47	36.67	54.00	-17.33	V	AV
High Channel-2472MHz							
4944.000	53.90	-3.59	50.31	74.00	-23.69	H	PK
4944.000	43.23	-3.59	39.64	54.00	-14.36	H	AV
7416.000	48.31	1.79	50.10	74.00	-23.90	H	PK
7416.000	36.10	1.79	37.89	54.00	-16.11	H	AV
4944.000	55.70	-3.59	52.11	74.00	-21.89	V	PK
4944.000	41.48	-3.59	37.89	54.00	-16.11	V	AV
7416.000	48.55	1.79	50.34	74.00	-23.66	V	PK
7416.000	35.36	1.79	37.15	54.00	-16.85	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	53.25	-3.90	49.35	74.00	-24.65	H	PK
4824.000	38.25	-3.90	34.35	54.00	-19.65	H	AV
7266.000	46.48	1.06	47.54	74.00	-26.46	H	PK
7266.000	32.56	1.06	33.62	54.00	-20.38	H	AV
4844.000	54.22	-3.90	50.32	74.00	-23.68	V	PK
4824.000	39.42	-3.90	35.52	54.00	-18.48	V	AV
7266.000	48.81	1.06	49.87	74.00	-24.13	V	PK
7266.000	34.78	1.06	35.84	54.00	-18.16	V	AV
Middle Channel-2442MHz							
4884.000	52.53	-3.74	48.79	74.00	-25.21	H	PK
4884.000	37.88	-3.74	34.14	54.00	-19.86	H	AV
7326.000	44.88	1.47	46.35	74.00	-27.65	H	PK
7326.000	32.03	1.47	33.50	54.00	-20.50	H	AV
4884.000	53.74	-3.74	50.00	74.00	-24.00	V	PK
4884.000	39.95	-3.74	36.21	54.00	-17.79	V	AV
7326.000	45.78	1.47	47.25	74.00	-26.75	V	PK
7326.000	34.00	1.47	35.47	54.00	-18.53	V	AV
High Channel-2462MHz							
4924.000	52.65	-3.63	49.02	74.00	-24.98	H	PK
4924.000	39.37	-3.63	35.74	54.00	-18.26	H	AV
7386.000	45.63	1.62	47.25	74.00	-26.75	H	PK
7386.000	30.73	1.62	32.35	54.00	-21.65	H	AV
4924.000	54.84	-3.63	51.21	74.00	-22.79	V	PK
4924.000	40.83	-3.63	37.20	54.00	-16.80	V	AV
7386.000	48.18	1.62	49.80	74.00	-24.20	V	PK
7386.000	35.12	1.62	36.74	54.00	-17.26	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 3th 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.

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	2014-05-28	2015-05-27
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-28	2015-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-28	2015-05-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-28	2015-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-05-24	2015-05-23
Horn Antenna	ETS	3117	00086197	2014-05-24	2015-05-23

9.3 Test Procedure

According to the KDB 558074D01 v03r02, the band-edge radiated test method as follows:

Set span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation (2310MHz to 2420MHz for low bandedge, 2460MHz to 2500MHz for the high bandedge)
RBW = 1MHz, VBW = 1MHz for peak value measured
RBW = 1MHz, VBW = 10Hz for average value measured
Sweep = auto; Detector function = peak/average; Trace = max hold

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

According to the KDB 558074 D01 V03r02, the conducted spurious emissions test method as follows:

1. Set start frequency to DTS channel edge frequency.
2. Set stop frequency so as to encompass the spectrum to be examined.
3. Set RBW = 100 kHz.
4. Set VBW ≥ 300 kHz.
5. Detector = peak.
6. Trace Mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize (this may take some time, depending on the extent of the span).
9. Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in section 8.1. Report the three highest emissions relative to the limit.

9.4 Environmental Conditions

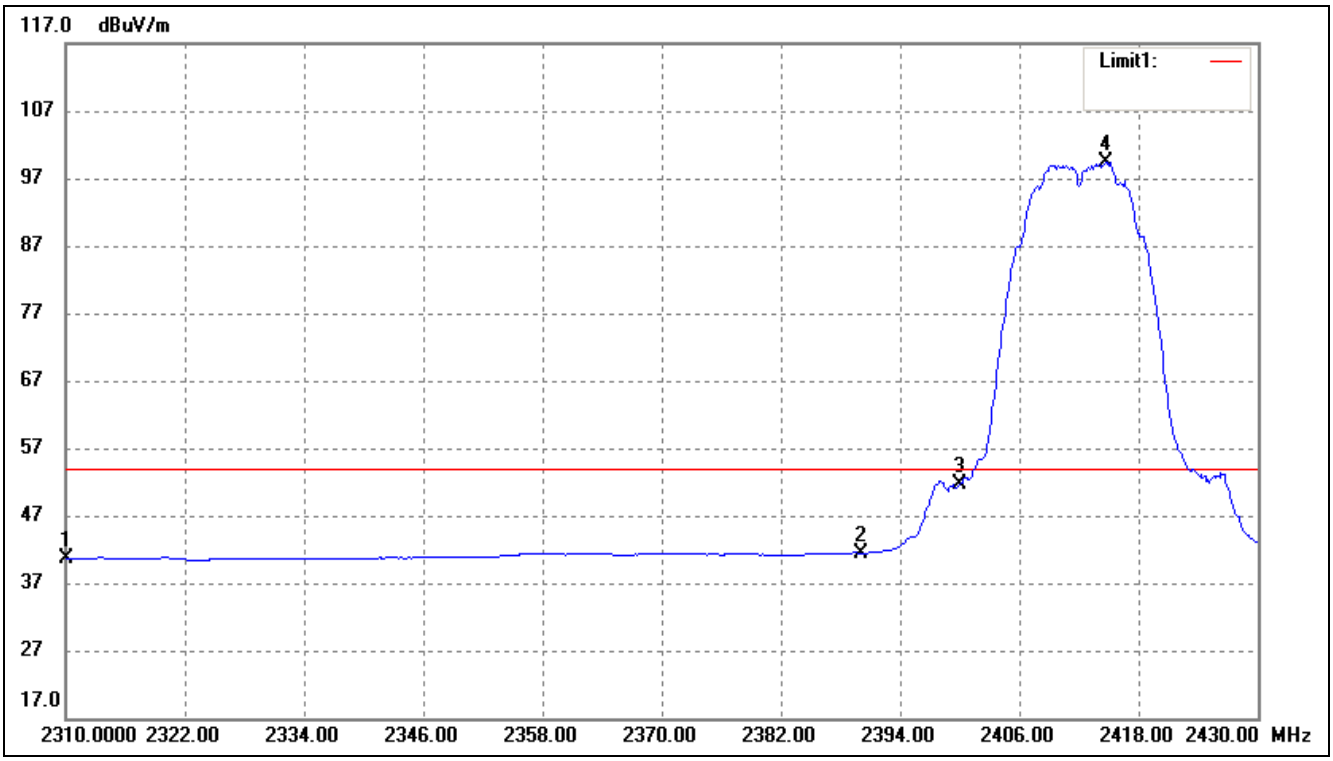
Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

9.5 Summary of Test Results/Plots

Please refer to the test plots as below.

802.11b-Lowest Bandedge

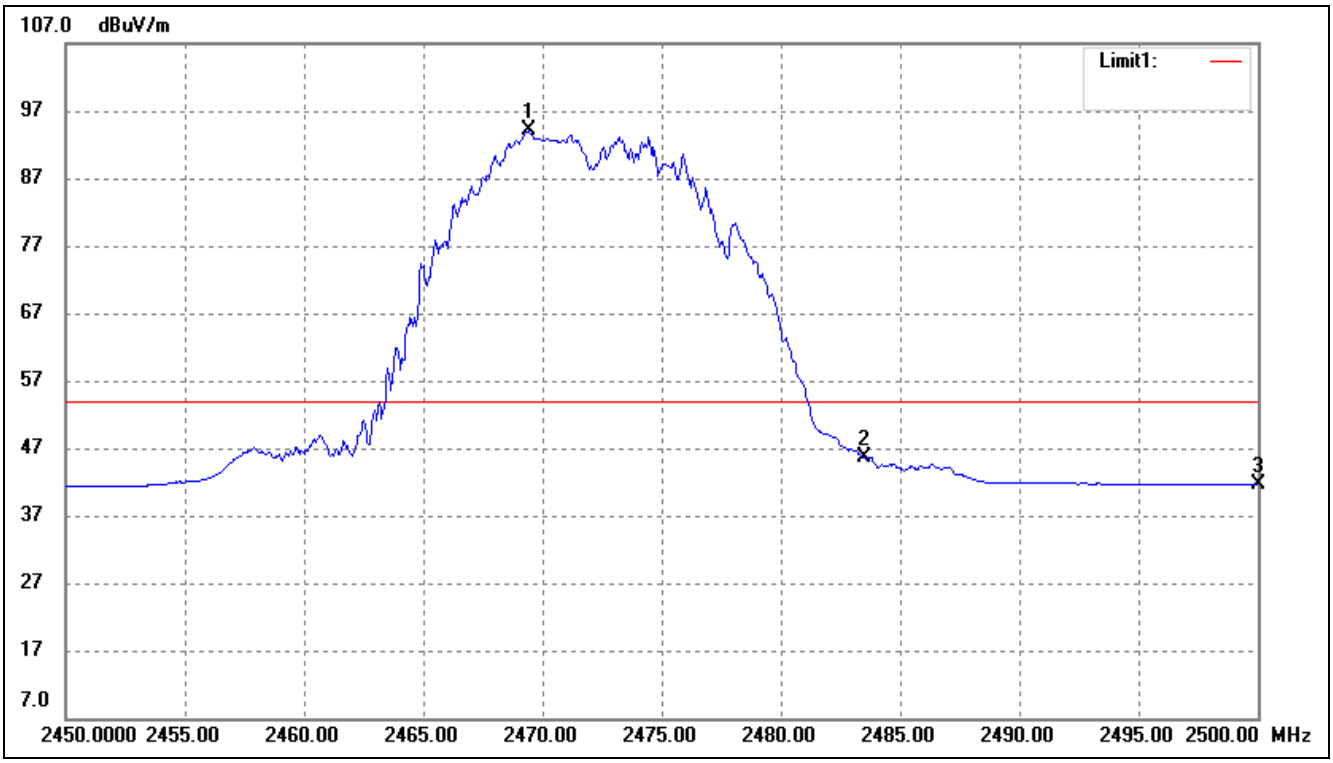
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	24.37	16.34	40.71	54.00	-13.29	Average Detector
	2310.000	39.15	16.34	55.49	74.00	-18.51	Peak Detector
2	2390.000	24.39	17.03	41.42	54.00	-12.58	Average Detector
	2390.000	50.79	17.03	67.82	74.00	-6.18	Peak Detector
3	2400.000	34.56	17.11	51.67	Delta=47.71dBc		Average Detector
4	2414.640	82.16	17.22	99.38			Average Detector

802.11b-Highest Bandedge

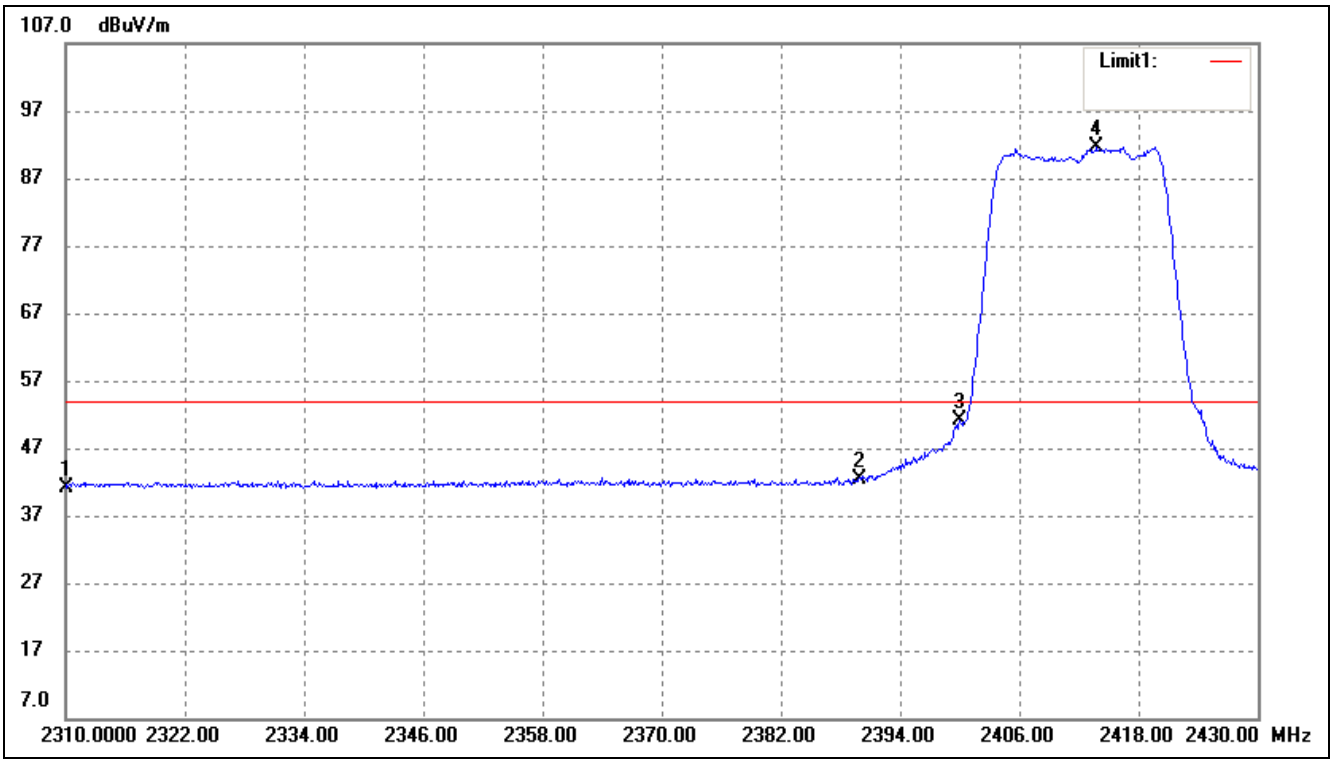
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2469.450	76.42	17.62	94.04	/	/	Average Detector
	2473.800	85.26	17.67	102.93	/	/	Peak Detector
2	2483.500	Delta = 42.68dBc		51.32	54.00	-2.68	Average Detector
	2483.500			60.25	74.00	-13.75	Peak Detector
3	2500.000	23.88	17.85	41.73	54.00	-12.27	Average Detector
	2500.000	44.36	17.86	62.22	74.00	-11.78	Peak Detector

802.11g-Lowest Bandedge

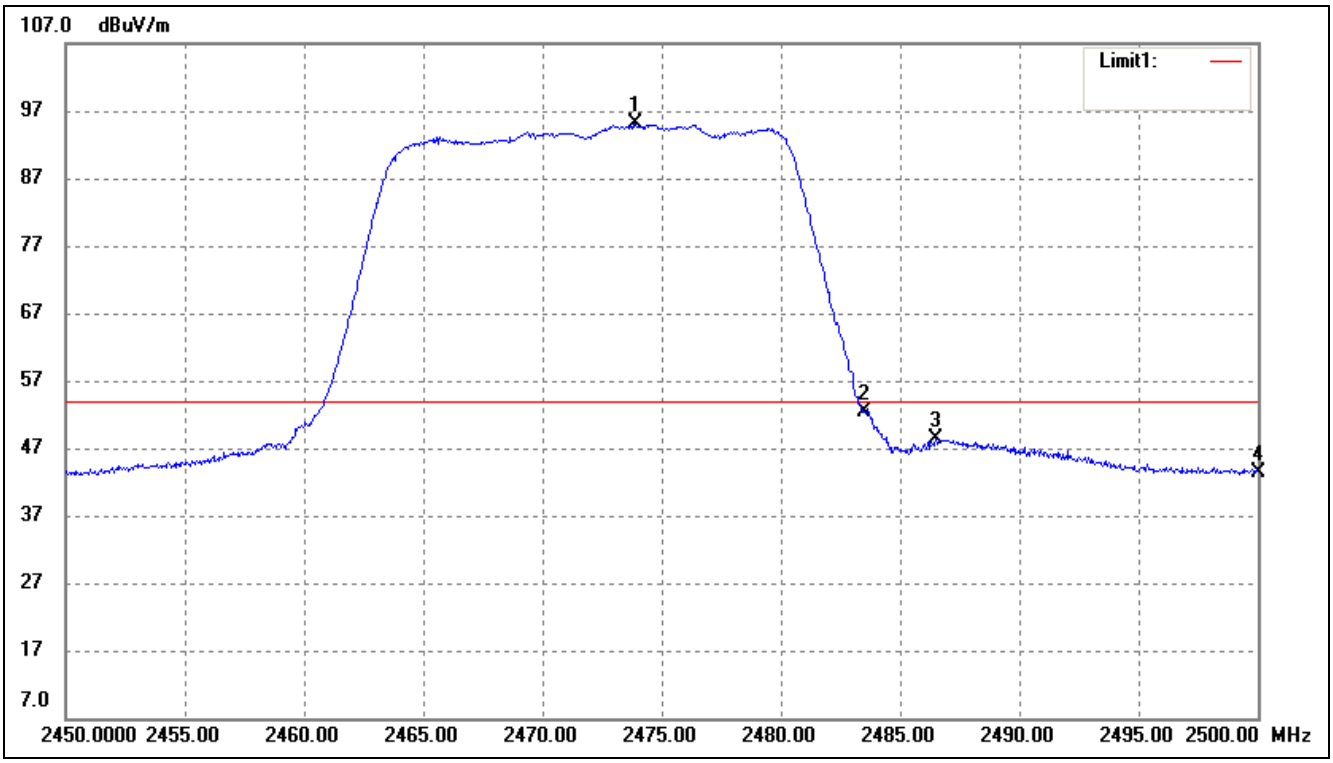
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	24.88	16.34	41.22	54.00	-12.78	Average Detector
	2310.000	36.04	16.34	52.38	74.00	-21.62	Peak Detector
2	2390.000	25.38	17.03	42.41	54.00	-11.59	Average Detector
	2390.000	36.56	17.03	53.59	74.00	-20.41	Peak Detector
3	2400.000	34.08	17.11	51.19	Delta = 40.42dBc		Average Detector
4	2412.000	74.39	17.22	91.61			Average Detector

802.11g-Highest Bandedge

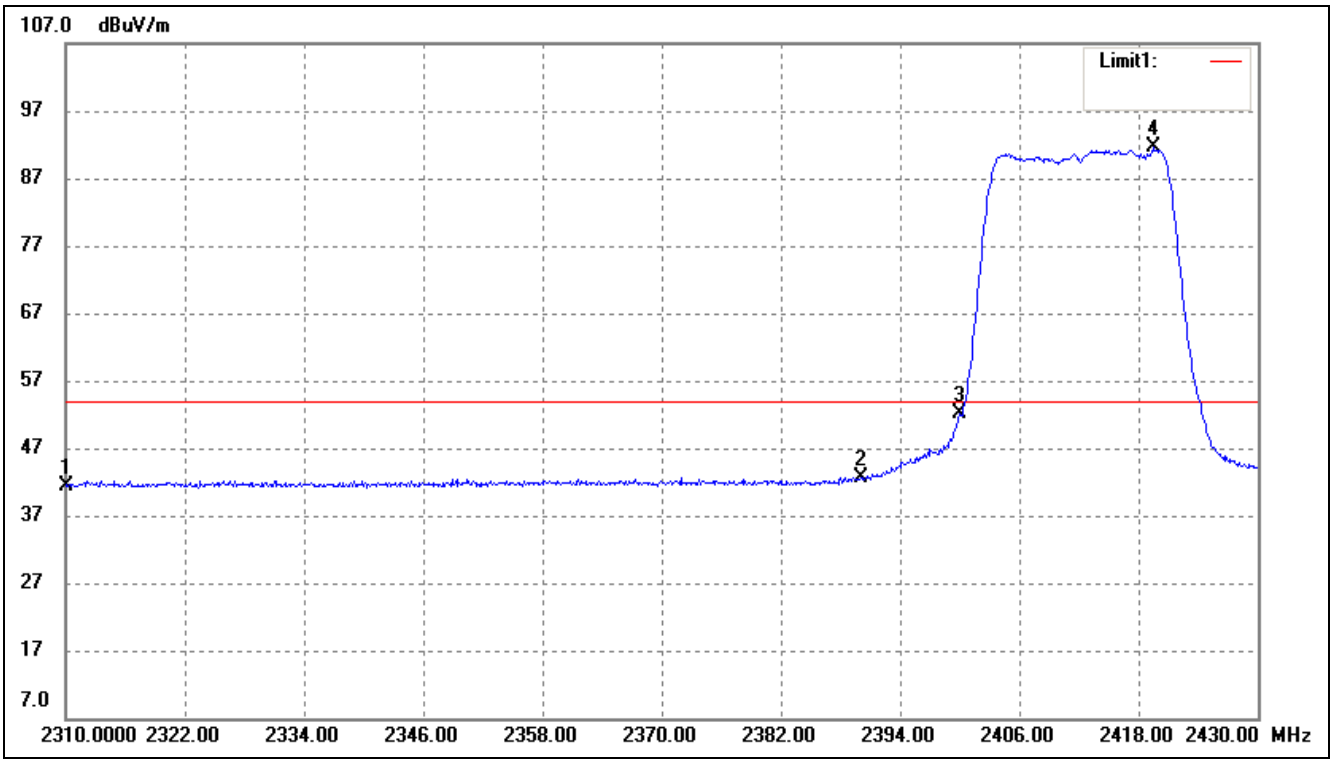
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2473.900	77.49	17.67	94.16	/	/	Average Detector
	2473.550	87.45	17.66	105.11	/	/	Peak Detector
2	2483.500	Delta = 45.75dBc		48.41	54.00	-5.59	Average Detector
	2483.500			59.25	74.00	-14.75	Peak Detector
3	2486.500	30.68	17.75	48.43	54.00	-5.57	Average Detector
	2486.500	42.46	17.75	60.21	74.00	-13.79	Peak Detector
4	2500.000	25.45	17.86	43.31	54.00	-10.69	Average Detector
	2500.000	35.35	17.86	53.21	74.00	-20.79	Peak Detector

802.11n-HT20-Lowest Bandedge

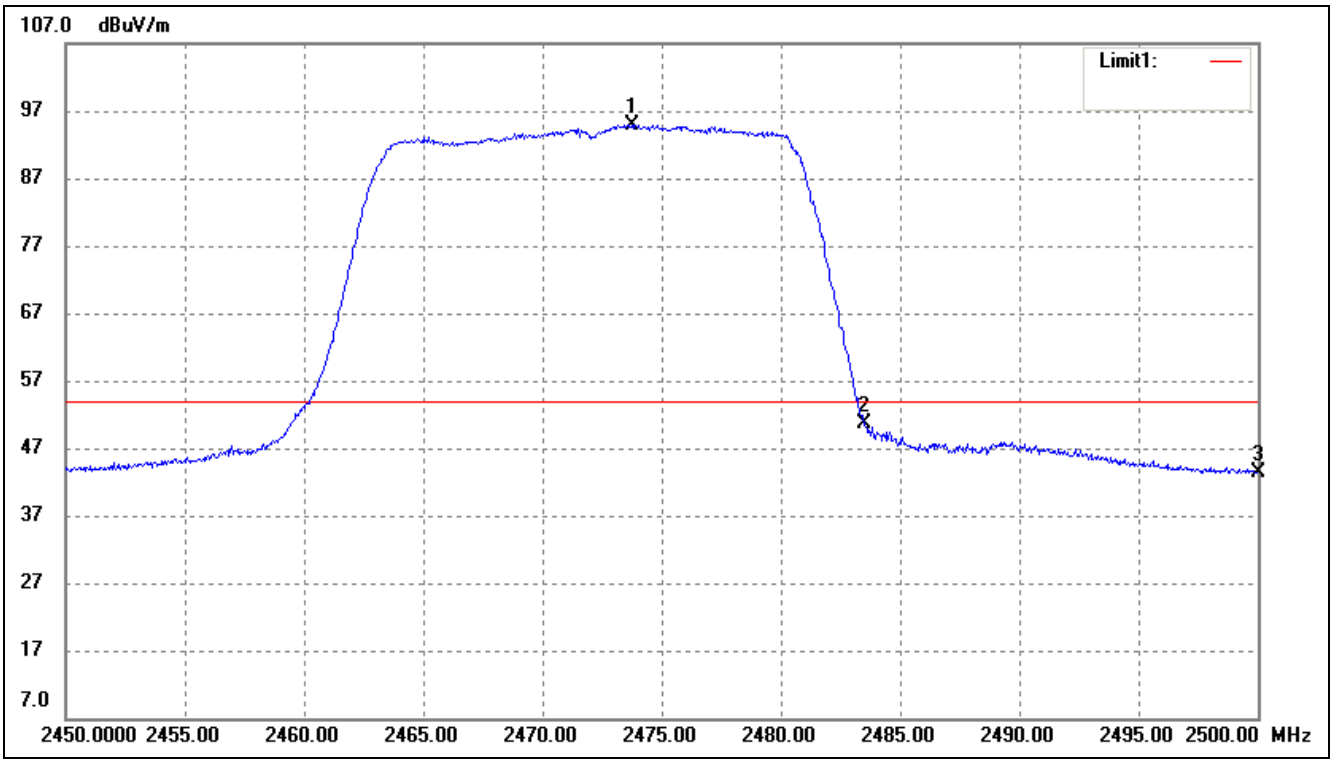
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	25.14	16.34	41.48	54.00	-12.52	Average Detector
	2310.000	34.65	16.34	50.99	74.00	-23.01	Peak Detector
2	2390.000	25.67	17.03	42.70	54.00	-11.30	Average Detector
	2390.000	37.70	17.03	54.73	74.00	-19.27	Peak Detector
3	2400.000	34.96	17.11	52.07	Delta =39.44dBc		Average Detector
4	2419.560	74.25	17.26	91.51			Average Detector

802.11n-HT20-Highest Bandedge

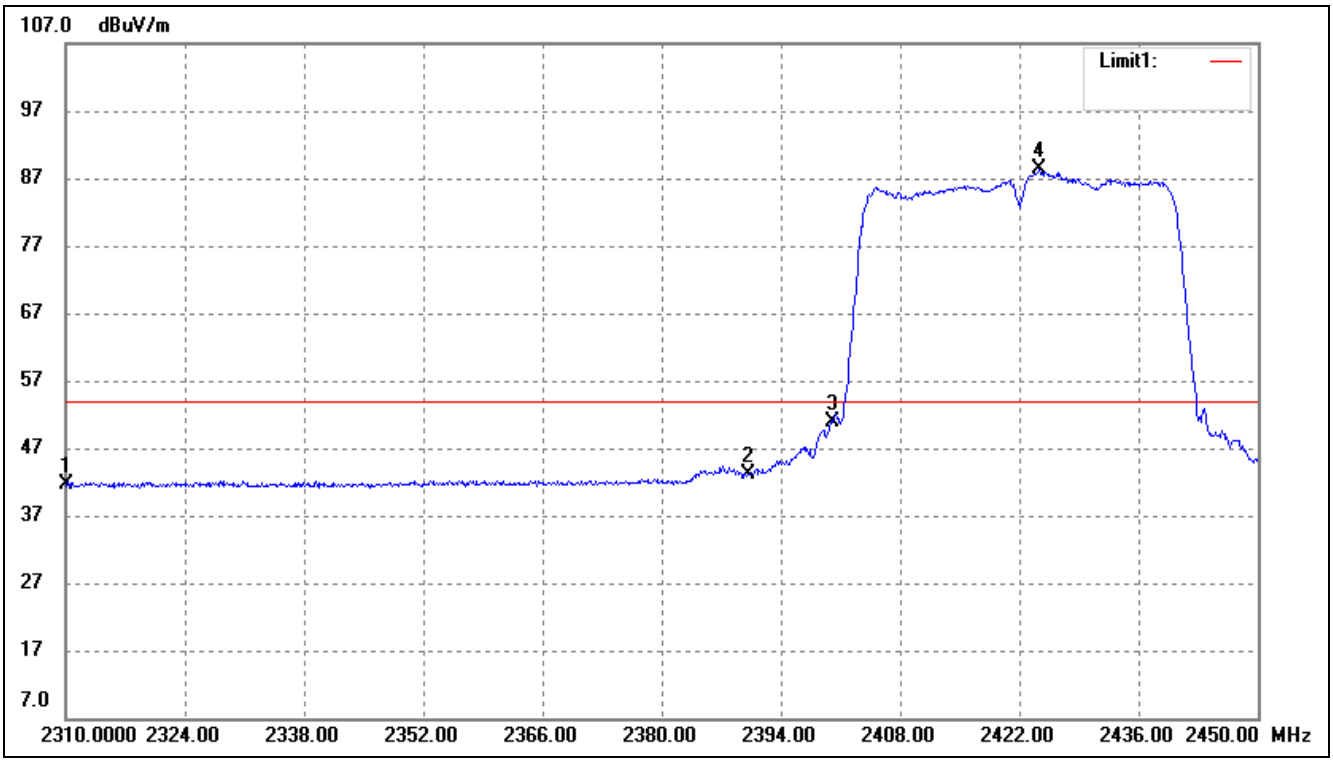
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2473.750	77.23	17.67	94.90	/	/	Average Detector
	2473.050	86.96	17.66	104.62	/	/	Peak Detector
2	2483.500	Delta = 43.90dBc		51.00	54.00	-3.00	Average Detector
	2483.500			60.72	74.00	-13.28	Peak Detector
3	2500.000	25.60	17.85	43.45	54.00	-10.55	Average Detector
	2500.000	36.82	17.86	54.68	74.00	-19.32	Peak Detector

802.11n-HT40-Lowest Bandedge

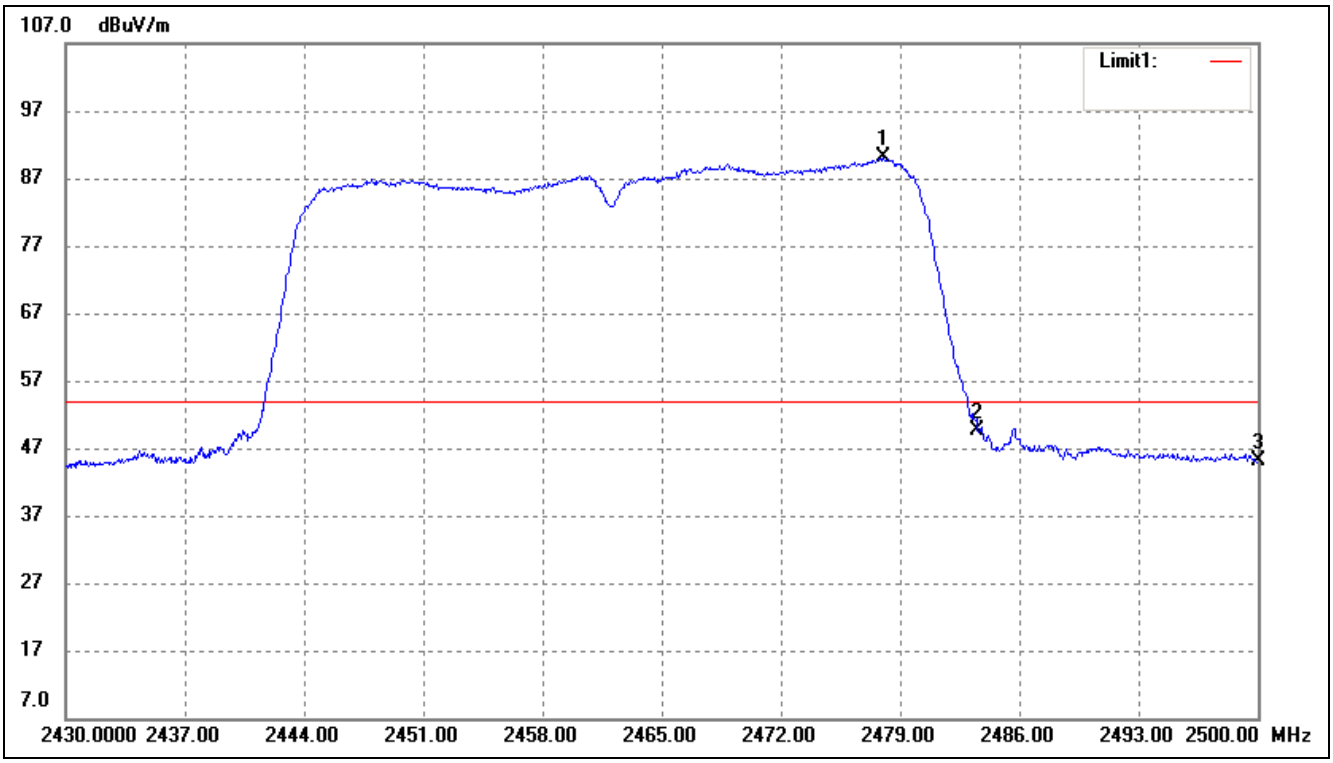
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	25.17	16.34	41.51	54.00	-12.49	Average Detector
	2310.000	35.69	16.34	52.03	74.00	-21.97	Peak Detector
2	2390.000	26.10	17.03	43.13	54.00	-10.87	Average Detector
	2390.000	35.82	17.03	52.85	74.00	-21.15	Peak Detector
3	2400.000	33.73	17.11	50.84	Delta = 37.53dBc		Average Detector
4	2424.380	71.08	17.29	88.37			Average Detector

802.11n-HT40-Highest Bandedge

Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2458.280	72.32	17.69	90.01	/	/	Average Detector
	2458.280	82.53	17.70	100.23	/	/	Peak Detector
2	2483.500	Delta = 40.23dBc		49.78	54.00	-4.22	Average Detector
	2483.500			60.00	74.00	-14.00	Peak Detector
3	2500.000	27.33	17.86	45.19	54.00	-8.81	Average Detector
	2500.000	37.19	17.86	55.05	74.00	-18.95	Peak Detector

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.

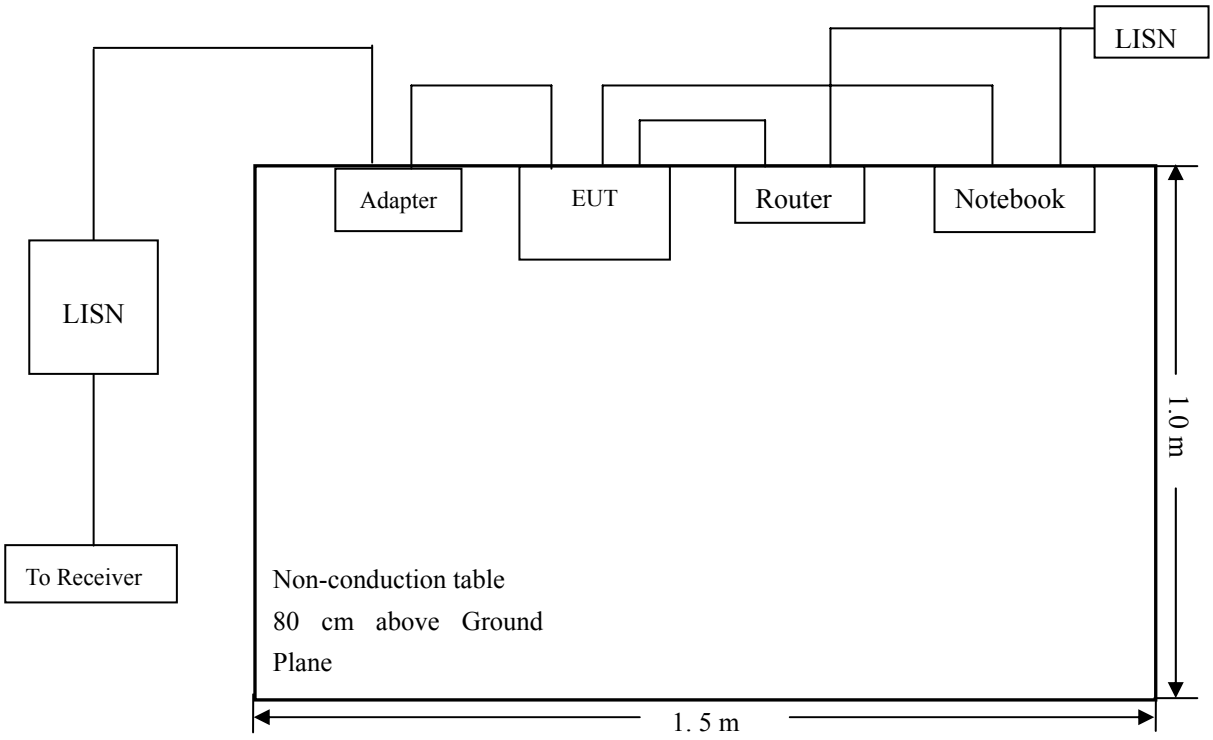
10.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2014-05-28	2015-05-27
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2014-05-28	2015-05-27
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2014-05-28	2015-05-27

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

-16.80 dB at 0.1540 MHz in the **Line** mode**, Peak** detector, **0.15-30MHz**

10.8 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

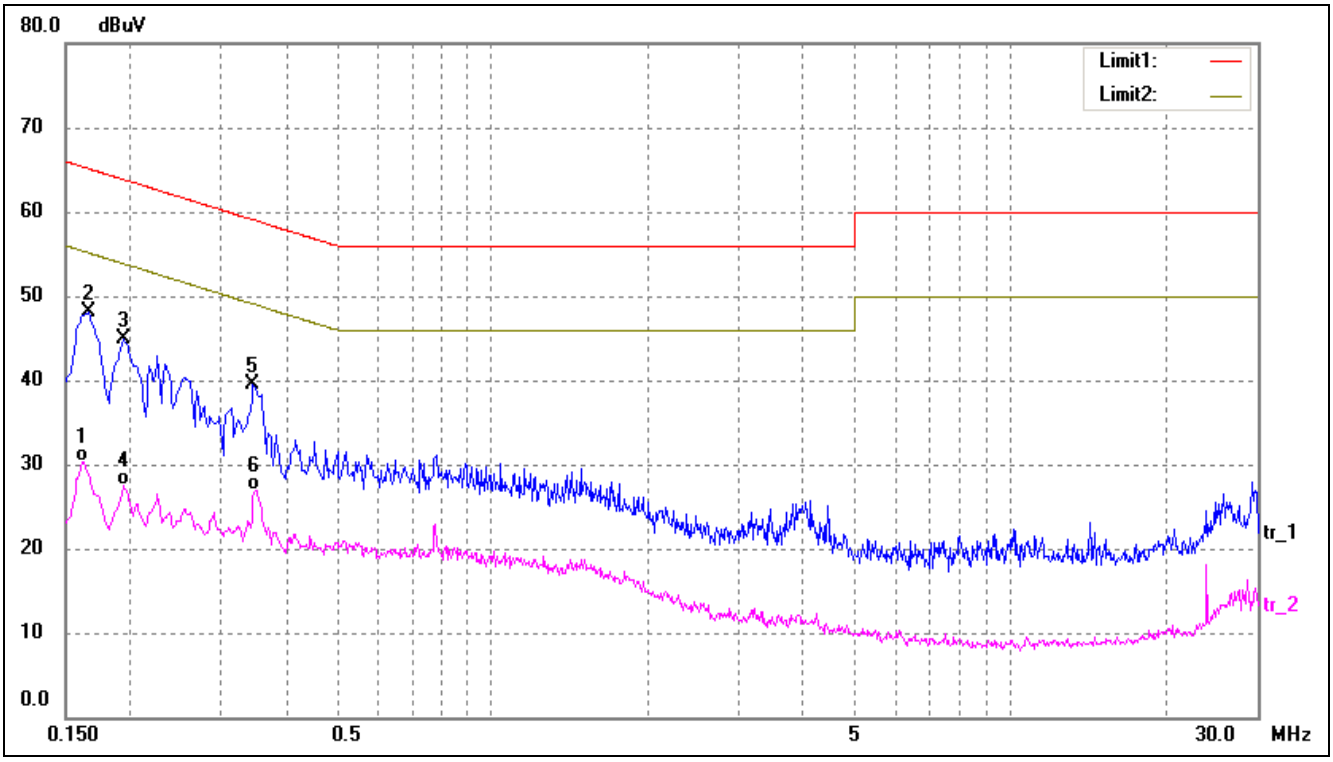
EUT: *Gateway*

Tested Model: *WL-ZGWMDPB-G110-02*

Operating Condition: *Transmitting(Wi-Fi)*

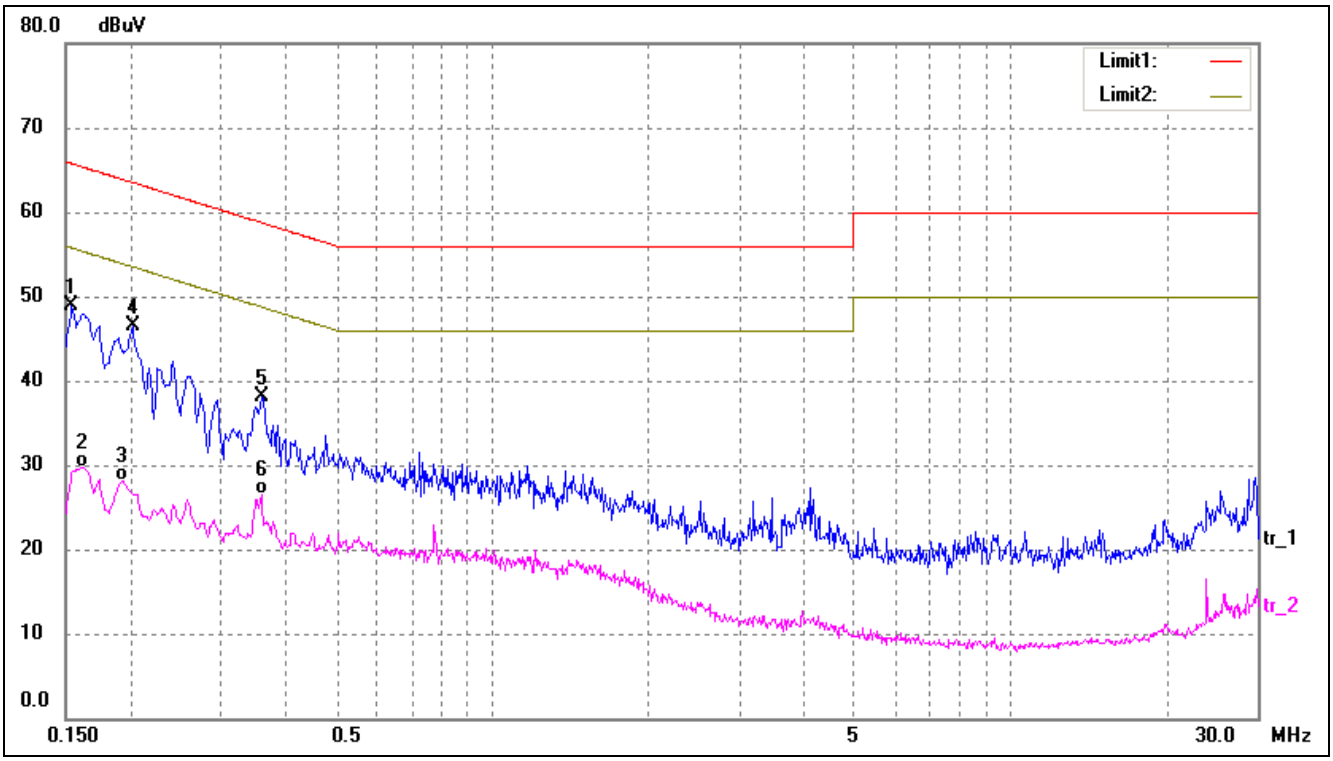
Comment: *Adapter:DC5V*

Test Specification: *Neutral*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.1620	20.88	9.50	30.38	55.36	-24.98	AVG
2	0.1660	38.55	9.50	48.05	65.16	-17.11	peak
3	0.1940	35.49	9.50	44.99	63.86	-18.87	peak
4	0.1940	18.00	9.50	27.50	53.86	-26.36	AVG
5	0.3460	29.91	9.50	39.41	59.06	-19.65	peak
6	0.3500	17.44	9.50	26.94	48.96	-22.02	AVG

Test Specification: *Lime*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.1540	39.48	9.50	48.98	65.78	-16.80	peak
2	0.1620	20.26	9.50	29.76	55.36	-25.60	AVG
3	0.1940	18.66	9.50	28.16	53.86	-25.70	AVG
4	0.2020	37.05	9.50	46.55	63.53	-16.98	peak
5	0.3580	28.62	9.50	38.12	58.77	-20.65	peak
6	0.3580	16.98	9.50	26.48	48.77	-22.29	AVG

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