

FCC Part 15C Measurement and Test Report

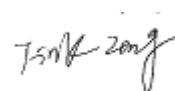

For

Wiimu Information Technology Inc.

YingCui Rd., No. 7, Jiangning Economic and Technological

Development Zone, Nanjing, Jiangsu Province, China

FCC ID: 2AAPP-A28

FCC Rule(s):	<u>FCC Part 15C</u>
Product Description:	<u>Wireless Audio Module</u>
Tested Model:	<u>A28</u>
Report No.:	<u>STR16058186I</u>
Tested Date:	<u>2016-05-19 to 2016-06-12</u>
Issued Date:	<u>2016-06-12</u>
Tested By:	<u>Tink Zeng / Engineer</u> 
Reviewed By:	<u>Silin Chen / EMC Manager</u> 
Approved & Authorized By:	<u>Jandy so / PSQ Manager</u> 
Prepared By:	

Shenzhen SEM.Test Technology Co., Ltd.
1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road,
Bao'an District, Shenzhen, P.R.C. (518101)
Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

TABLE OF CONTENTS

1. GENERAL INFORMATION	3
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
1.2 TEST STANDARDS	4
1.3 TEST METHODOLOGY	4
1.4 TEST FACILITY	4
1.5 EUT SETUP AND TEST MODE	5
1.6 MEASUREMENT UNCERTAINTY	5
1.7 TEST EQUIPMENT LIST AND DETAILS	6
2. SUMMARY OF TEST RESULTS	7
3. RF EXPOSURE	8
3.1 STANDARD APPLICABLE	8
3.2 TEST RESULT	8
4. ANTENNA REQUIREMENT	9
4.1 STANDARD APPLICABLE	9
4.2 EVALUATION INFORMATION	9
5. POWER SPECTRAL DENSITY	10
5.1 STANDARD APPLICABLE	10
5.2 TEST PROCEDURE	10
5.3 ENVIRONMENTAL CONDITIONS	10
5.4 SUMMARY OF TEST RESULTS/PLOTS	11
6. 6DB BANDWIDTH	24
6.1 STANDARD APPLICABLE	24
6.2 TEST PROCEDURE	24
6.3 ENVIRONMENTAL CONDITIONS	24
6.4 SUMMARY OF TEST RESULTS/PLOTS	24
7. RF OUTPUT POWER	38
7.1 STANDARD APPLICABLE	38
7.2 TEST PROCEDURE	38
7.3 ENVIRONMENTAL CONDITIONS	38
7.4 SUMMARY OF TEST RESULTS/PLOTS	39
8. FIELD STRENGTH OF SPURIOUS EMISSIONS	52
8.1 MEASUREMENT UNCERTAINTY	52
8.2 STANDARD APPLICABLE	52
8.3 TEST PROCEDURE	52
8.4 CORRECTED AMPLITUDE & MARGIN CALCULATION	54
8.5 ENVIRONMENTAL CONDITIONS	54
8.6 SUMMARY OF TEST RESULTS/PLOTS	54
9. OUT OF BAND EMISSIONS	83
9.1 STANDARD APPLICABLE	83
9.2 TEST PROCEDURE	83
9.3 ENVIRONMENTAL CONDITIONS	84
9.4 SUMMARY OF TEST RESULTS/PLOTS	84
10. CONDUCTED EMISSIONS	116
10.1 MEASUREMENT UNCERTAINTY	116
10.2 TEST PROCEDURE	116
10.3 BASIC TEST SETUP BLOCK DIAGRAM	116
10.4 ENVIRONMENTAL CONDITIONS	116
10.5 TEST RECEIVER SETUP	117
10.6 SUMMARY OF TEST RESULTS/PLOTS	117
10.7 CONDUCTED EMISSIONS TEST DATA	117

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Wiimu Information Technology Inc.
Address of applicant: YingCui Rd., No. 7, Jiangning Economic and Technological Development Zone, Nanjing, Jiangsu Province, China

Manufacturer: Wiimu Information Technology Inc.
Address of manufacturer: YingCui Rd., No. 7, Jiangning Economic and Technological Development Zone, Nanjing, Jiangsu Province, China

General Description of EUT	
Product Name:	Wireless Audio Module
Trade Name:	Linkplay
Model No.:	A28
Adding Model(s):	/
Rated Voltage:	DC 3.5-5.5V
Power Adapter Model:	HKL-0500100 I/P: AC100-240V 50/60Hz 150mA; O/P: DC 5V/1A
<i>Note: The test data is gathered from a production sample provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2462MHz for 802.11b/g/n(HT20) 2422-2452MHz for 802.11n(HT40)
RF Output Power:	20.56 dBm (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 300Mbps
Quantity of Channels:	11 for 802.11b/g/n(HT20); 7 for 802.11n(HT40)
Channel Separation:	5MHz
Type of Antenna:	Integral Antenna
Antenna Gain:	1.27 dBi
Lowest Internal Frequency of EUT:	40MHz

1.2 Test Standards

The following report is prepared on behalf of the Wiimu Information Technology Inc. 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 C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices, and ANSI C63.4-2014, 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 V03r05 for digital transmission systems and KDB 662911 D01 Multiple Transmitter Output v02r01 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, 2437MHz, 2462MHz
TM2	802.11g	2412MHz, 2437MHz, 2462MHz
TM3	802.11n-HT20	2412MHz, 2437MHz, 2462MHz
TM4	802.11n-HT40	2422MHz, 2437MHz, 2452MHz

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB Cable	1.0	Unshielded	Without Ferrite

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
RJ45 Cable	1.5	Unshielded	Without Ferrite

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

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	$\pm 0.42\text{dB}$
Occupied Bandwidth	Conducted	$\pm 1.5\%$
Power Spectral Density	Conducted	$\pm 1.8\text{dB}$
Conducted Spurious Emission	Conducted	$\pm 2.17\text{dB}$
Conducted Emissions	Conducted	$\pm 2.88\text{dB}$
Transmitter Spurious Emissions	Radiated	$\pm 5.1\text{dB}$

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2015-06-17	2016-06-16
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2015-06-17	2016-06-16
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2015-06-17	2016-06-16
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2015-06-17	2016-06-16
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2015-06-17	2016-06-16
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2015-06-17	2016-06-16
SEMT-1042	Horn Antenna	ETS	3117	00086197	2015-06-17	2016-06-16
SEMT-1121	Horn Antenna	ETS	3116B	00088203	2015-06-17	2016-06-16
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2015-06-17	2016-06-16
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2015-06-17	2016-06-16
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2015-06-17	2016-06-16
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2015-06-17	2016-06-16

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
§15.205	Restricted Band of Operation	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 § 2.1091, the mobile 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 Procedure

According to the KDB 558074 D01 V03r05, 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: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d) Set VBW $\geq 3 \times \text{RBW}$.
- e) Detector = power averaging (RMS) or sample detector (when RMS not available).
- f) Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span}/\text{RBW}$.
- 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).

5.3 Environmental Conditions

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

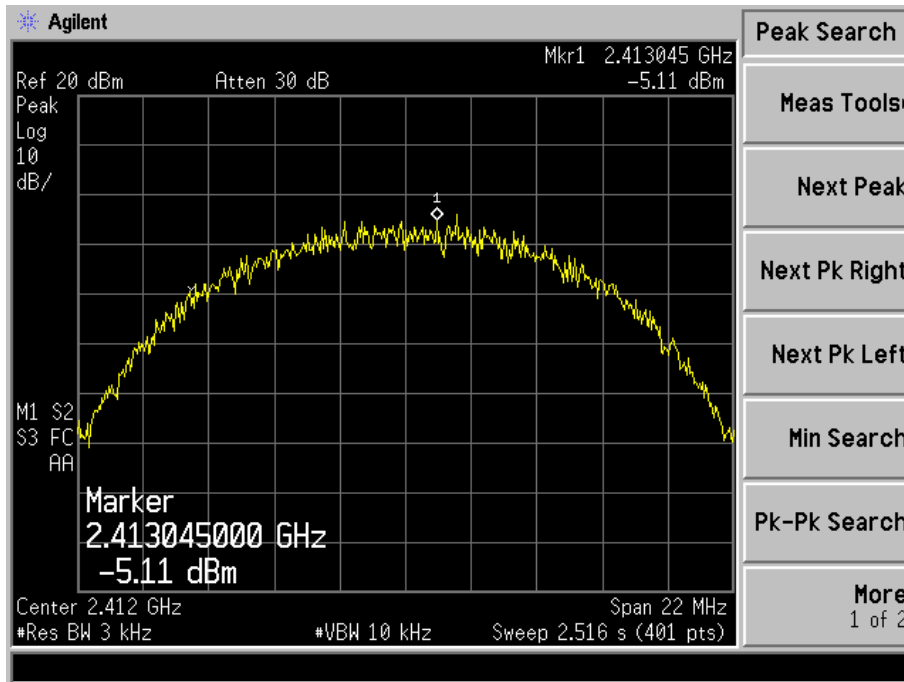
5.4 Summary of Test Results/Plots

Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz			Limit dBm/3kHz
		Chain 1	Chain 2	Total	
802.11b	2412	-5.110	-4.056	-1.540	8
	2437	-4.862	-4.659	-1.750	8
	2462	-4.478	-4.708	-1.580	8
802.11g	2412	-9.918	-10.830	-7.340	8
	2437	-10.840	-10.350	-7.580	8
	2462	-10.470	-11.440	-7.920	8
802.11n HT20	2412	-9.534	-8.043	-5.710	8
	2437	-9.080	-10.250	-6.620	8
	2462	-10.310	-8.877	-6.520	8
802.11n HT40	2422	-14.830	-15.440	-12.110	8
	2437	-14.940	-15.670	-12.280	8
	2452	-16.020	-16.550	-13.270	8

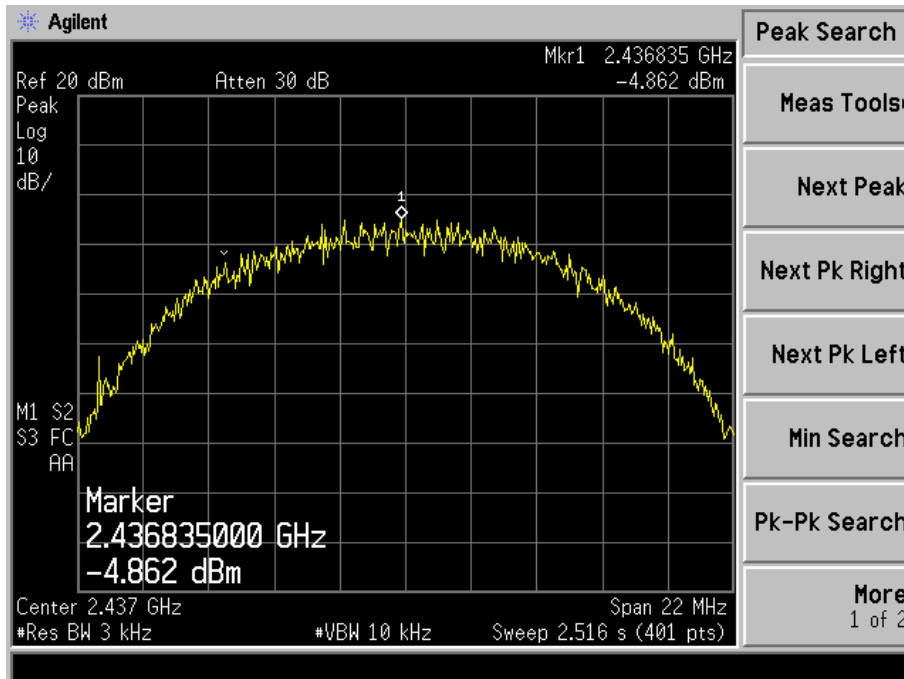
Please refer to the following test plots:

Antenna 1

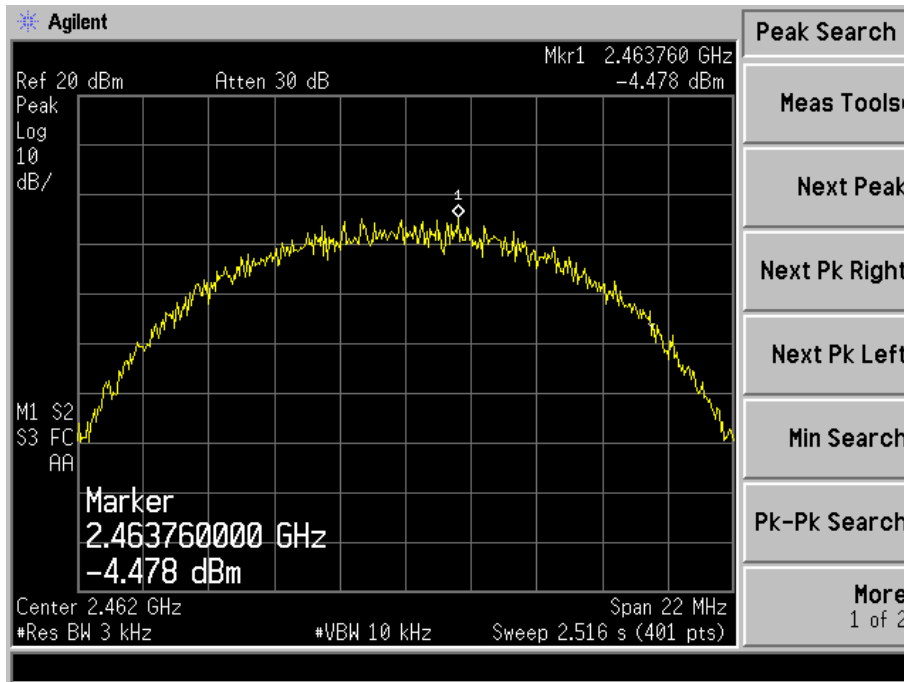
802.11b-Low Channel



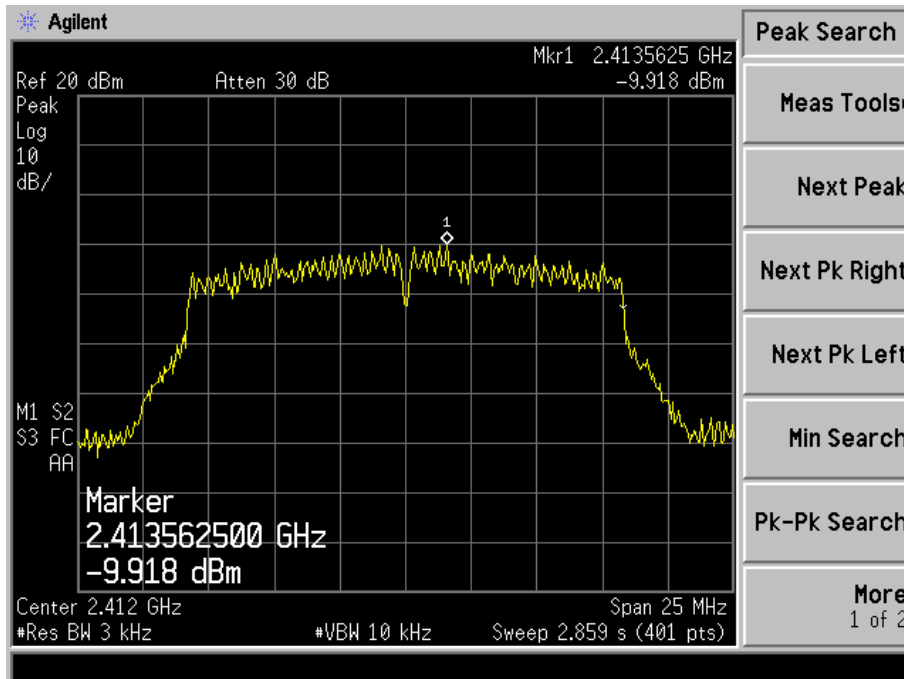
802.11b-Middle Channel



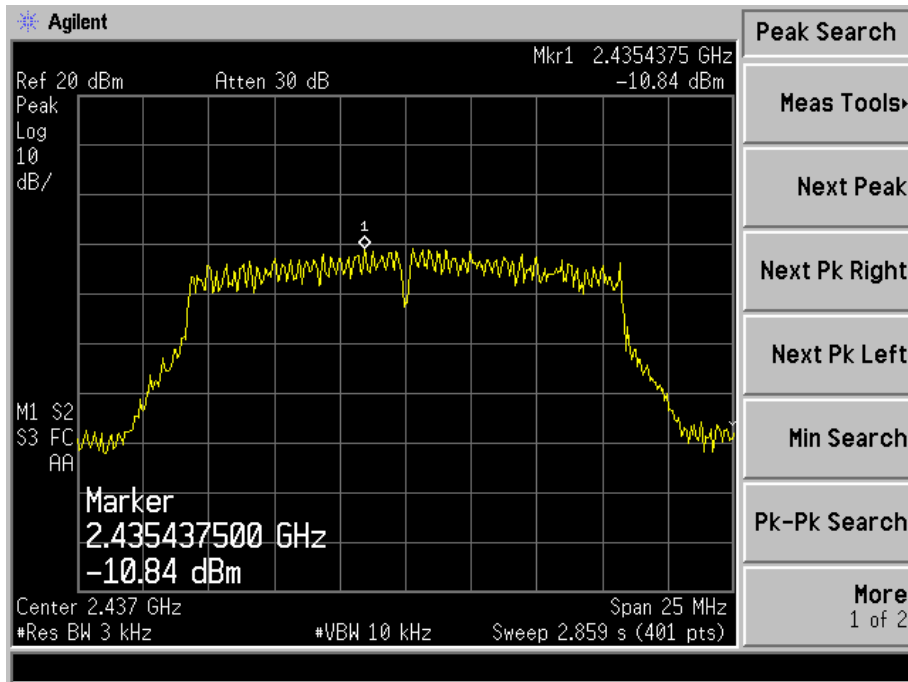
802.11b-High Channel



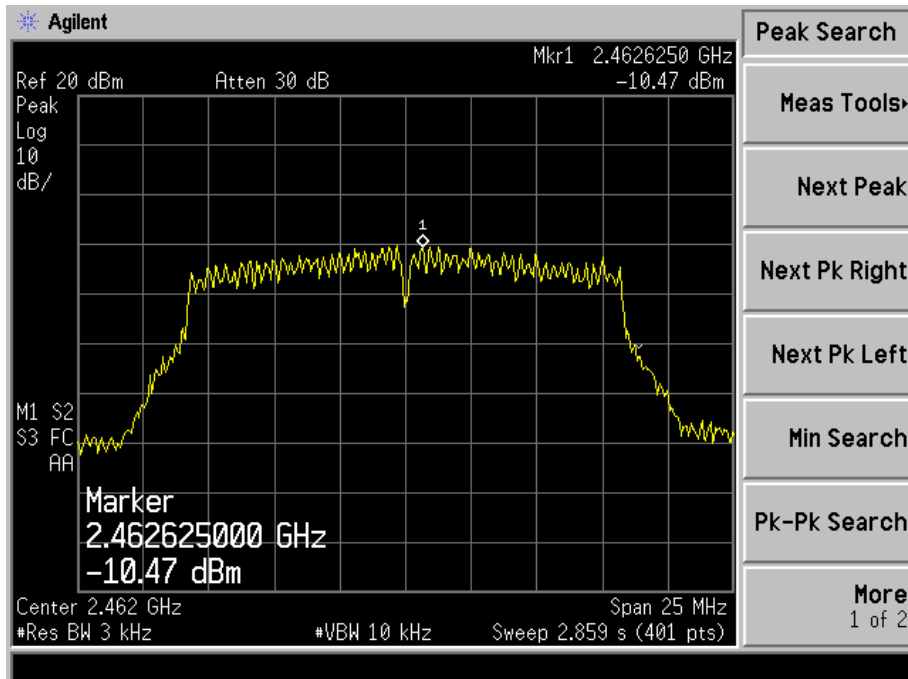
802.11g-Low Channel



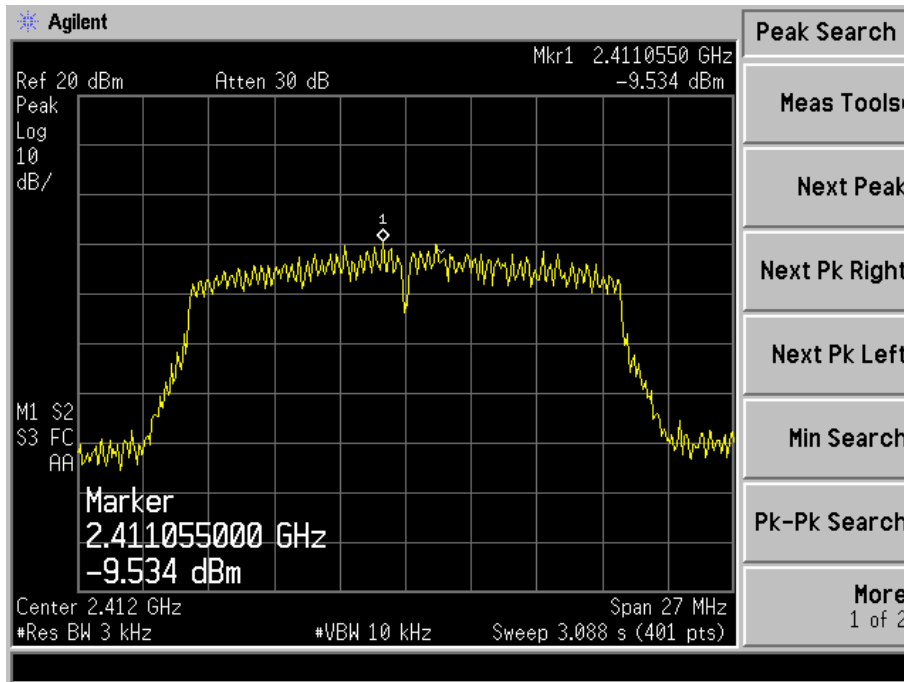
802.11g-Middle Channel



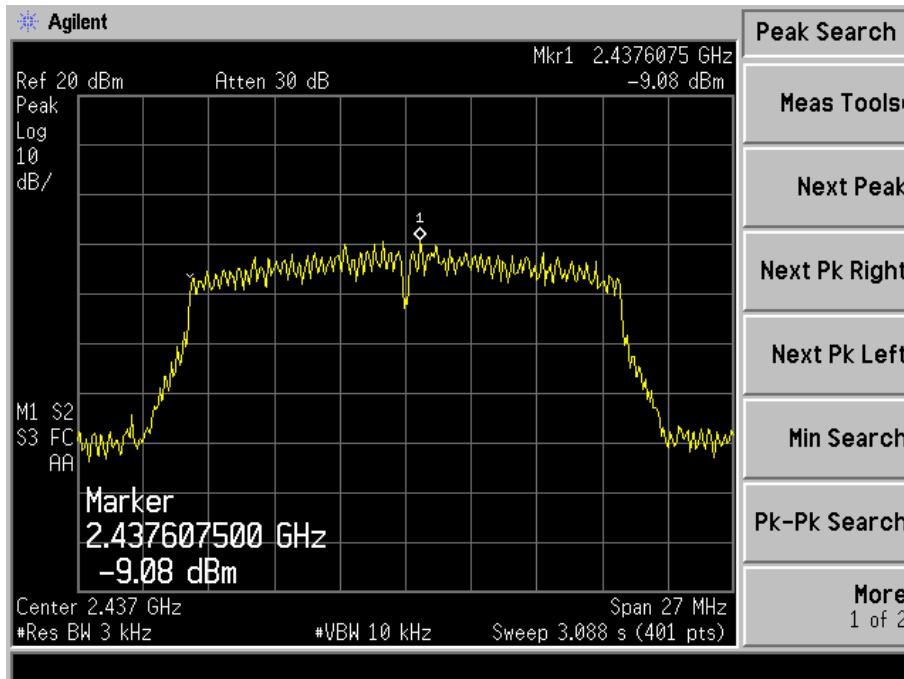
802.11g-High Channel



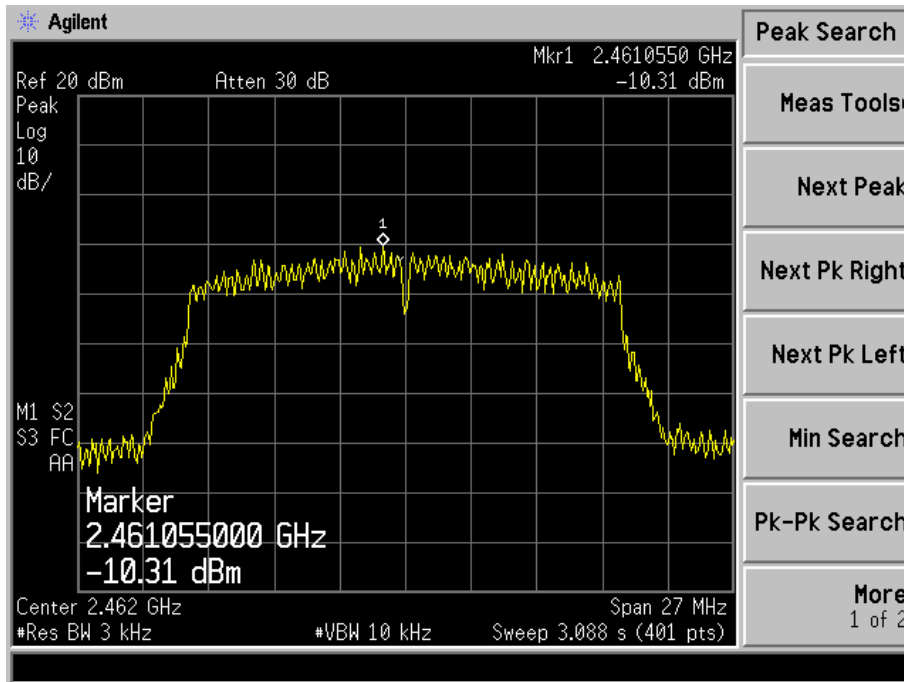
802.11n-HT20-Low Channel



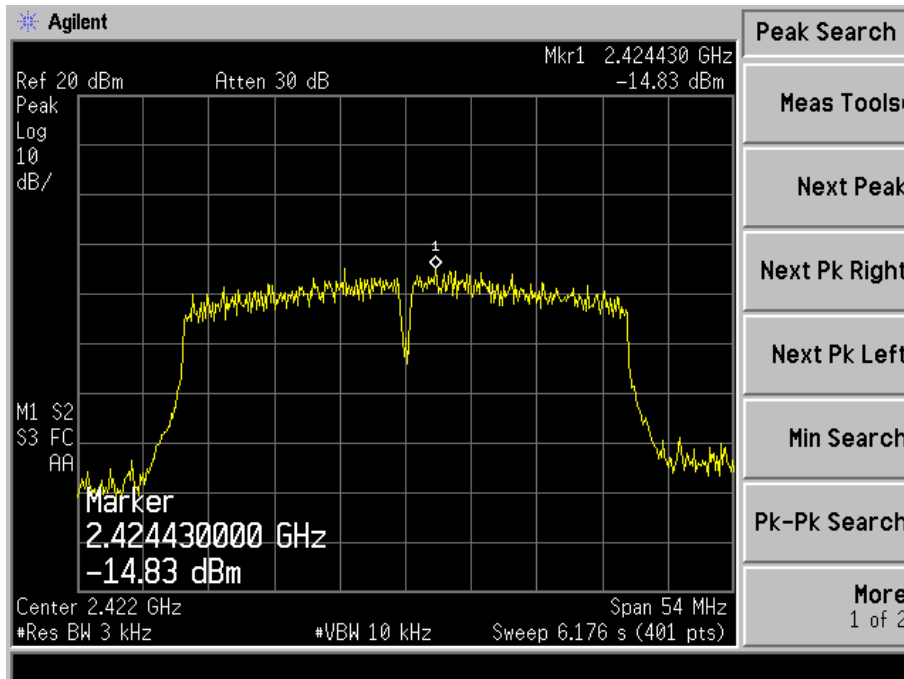
802.11n-HT20-Middle Channel



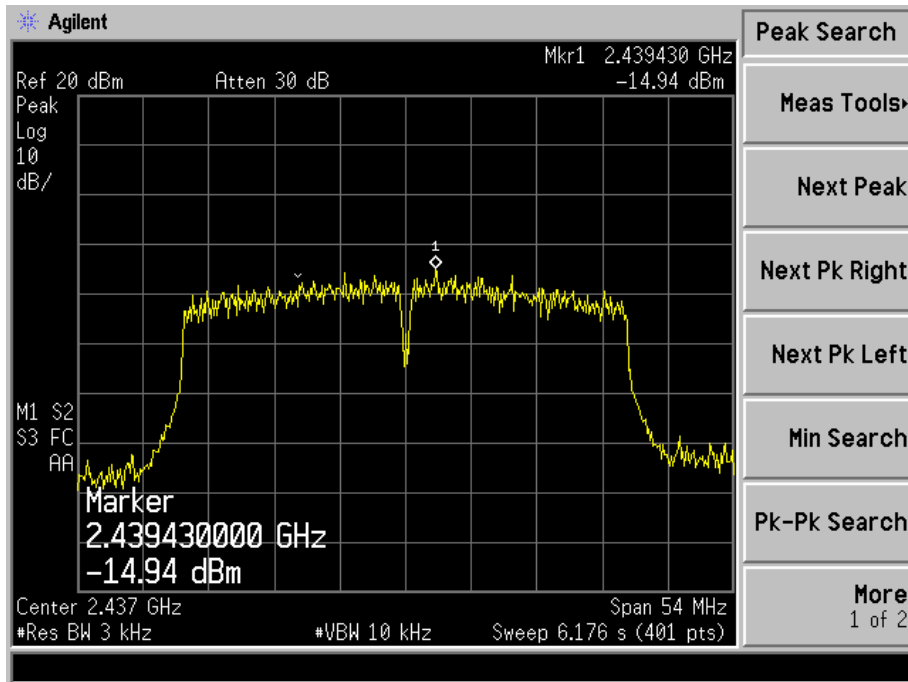
802.11n-HT20-High Channel



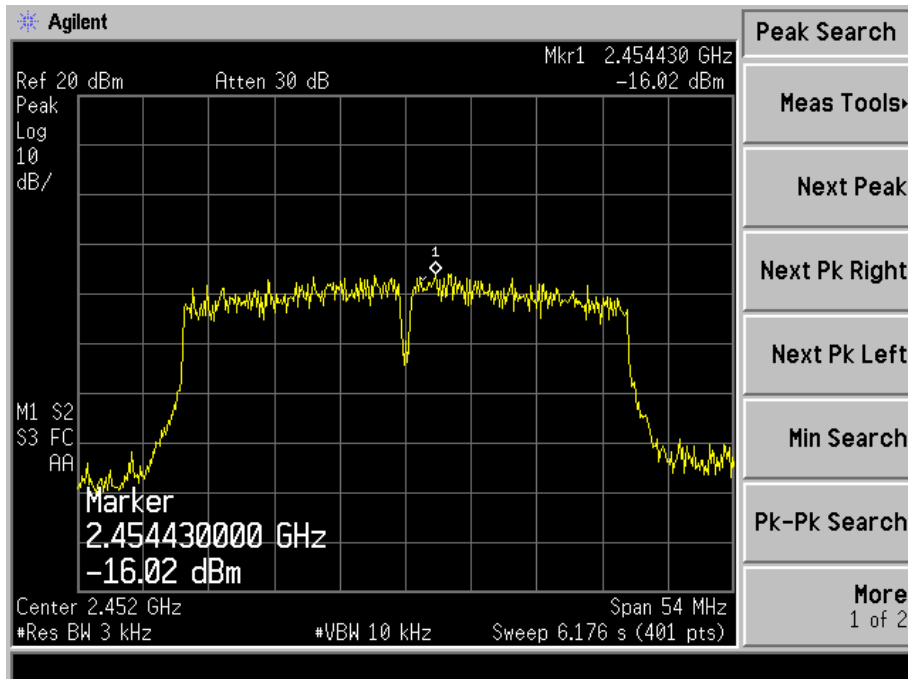
802.11n-HT40-Low Channel



802.11n-HT40-Middle Channel

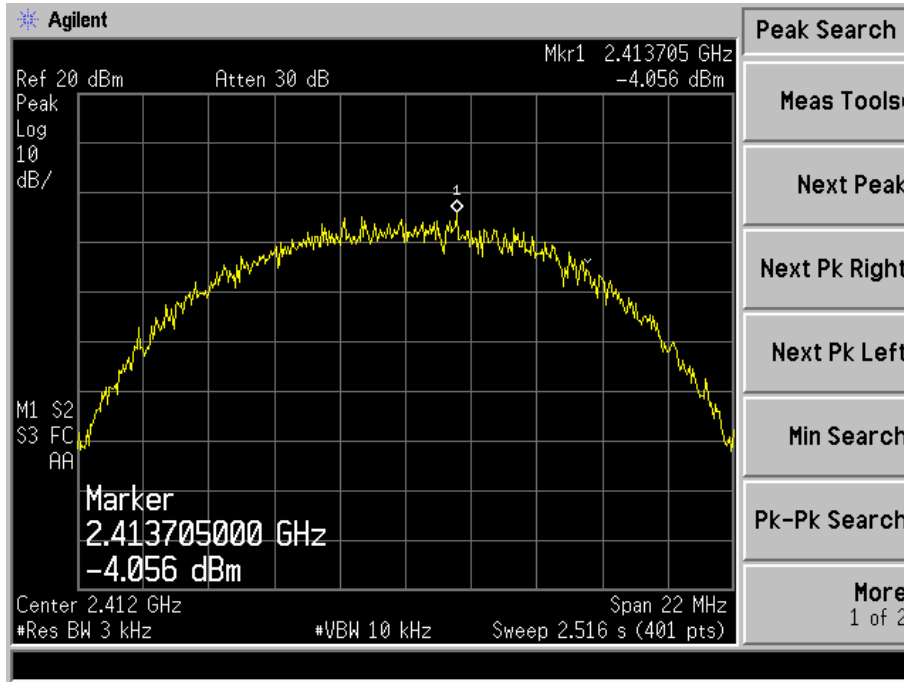


802.11n-HT40-High Channel

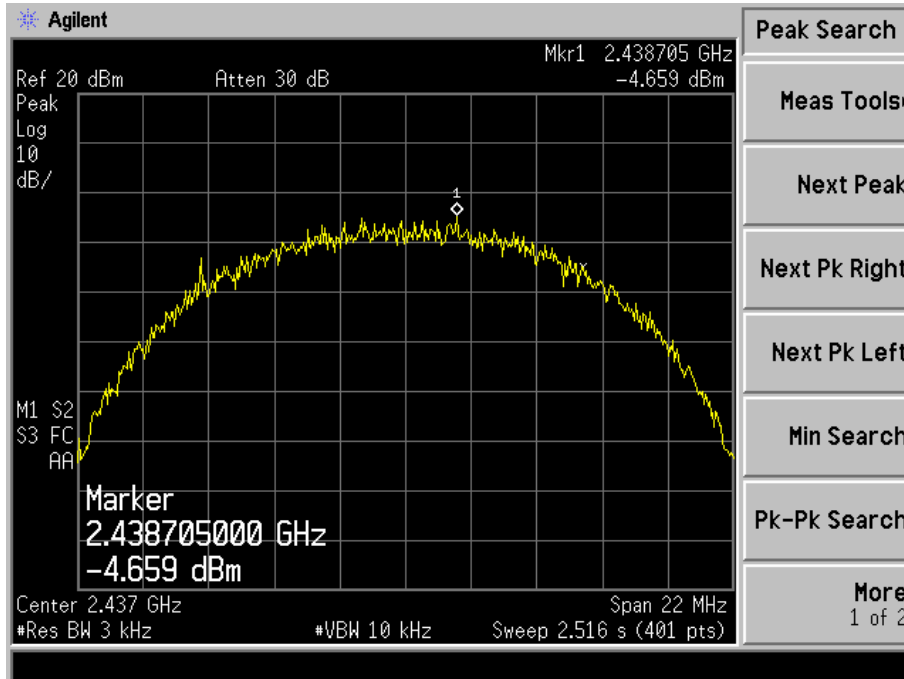


Antenna 2

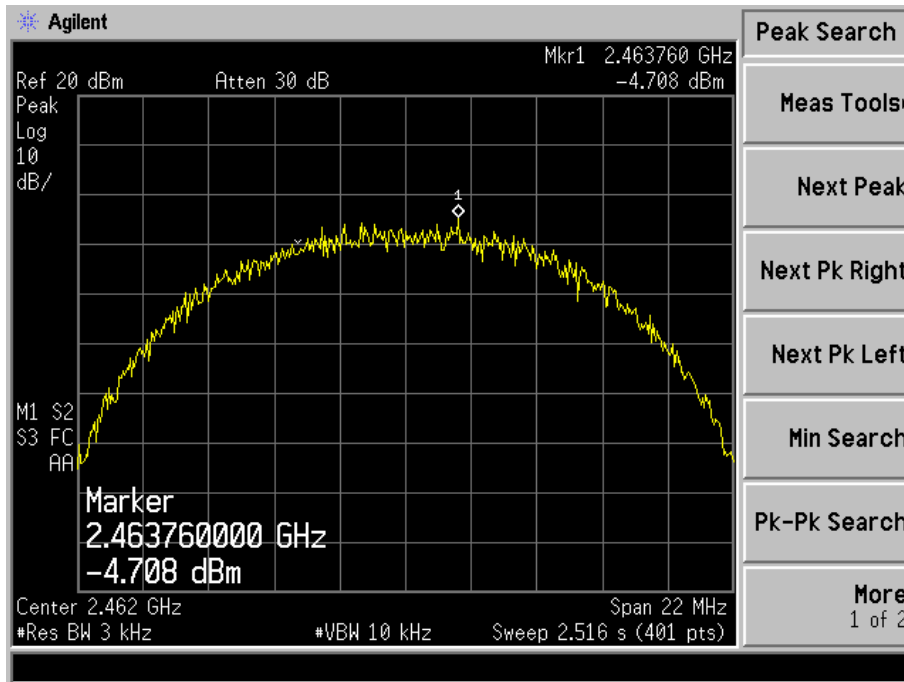
802.11b-Low Channel



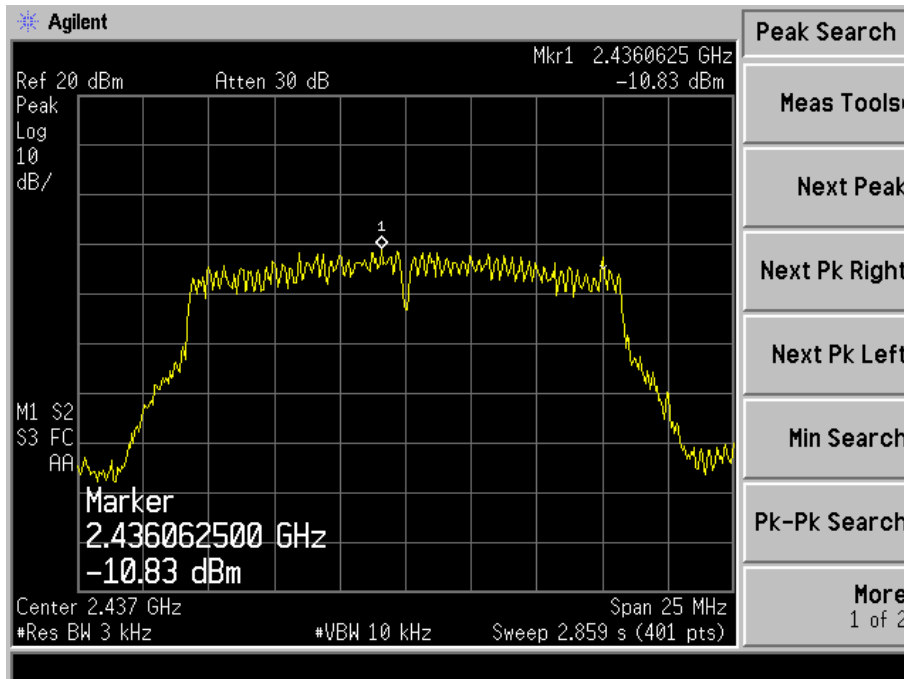
802.11b-Middle Channel



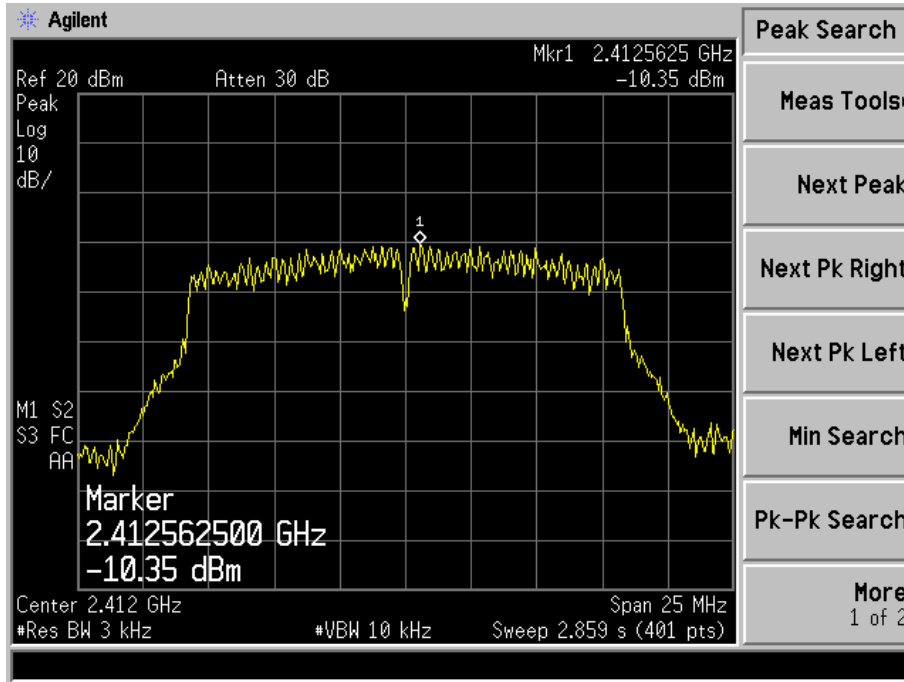
802.11b-High Channel



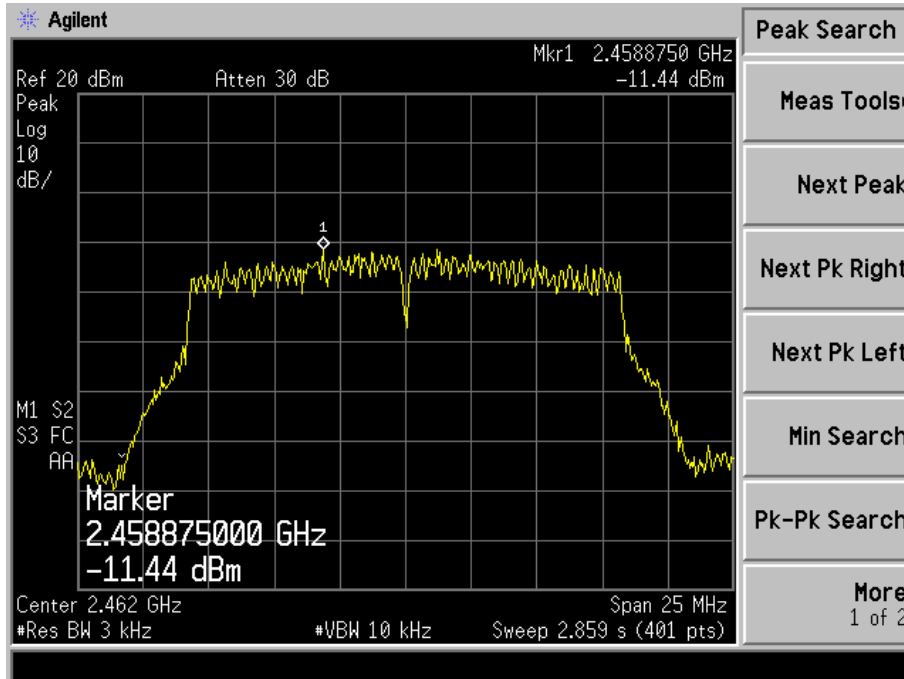
802.11g-Low Channel



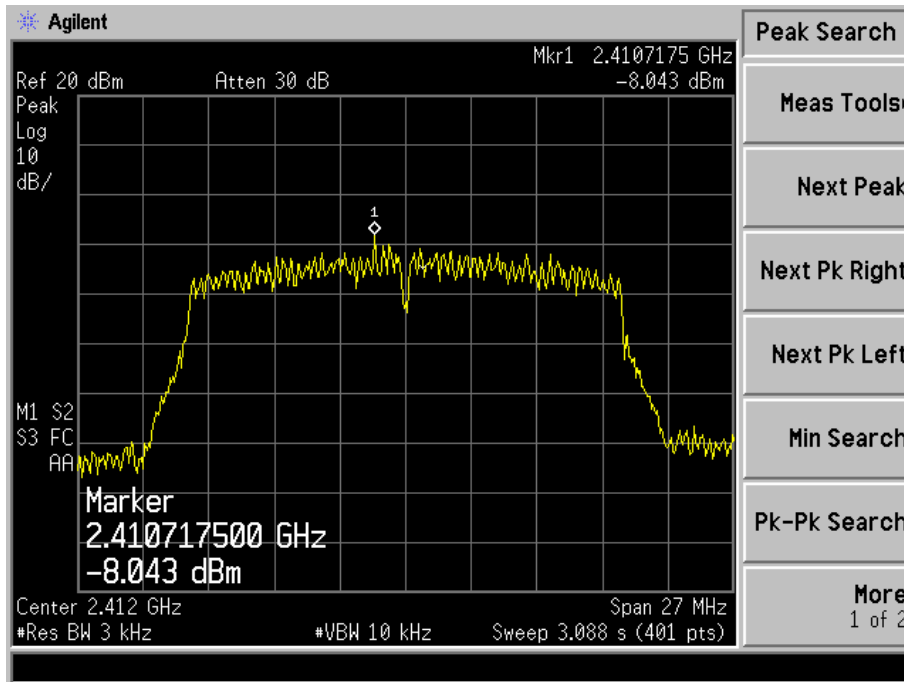
802.11g-Middle Channel



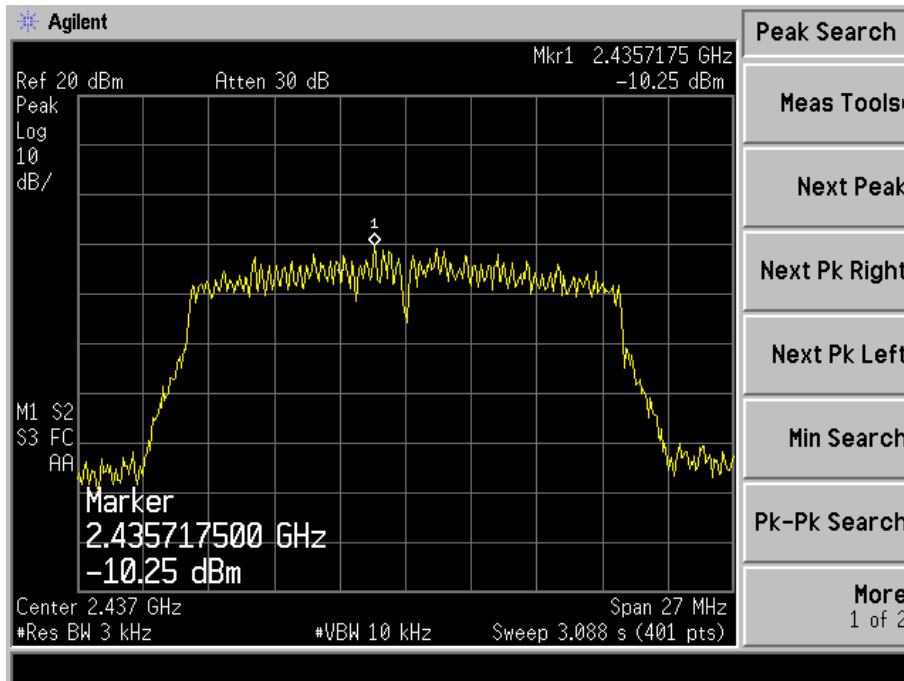
802.11g-High Channel



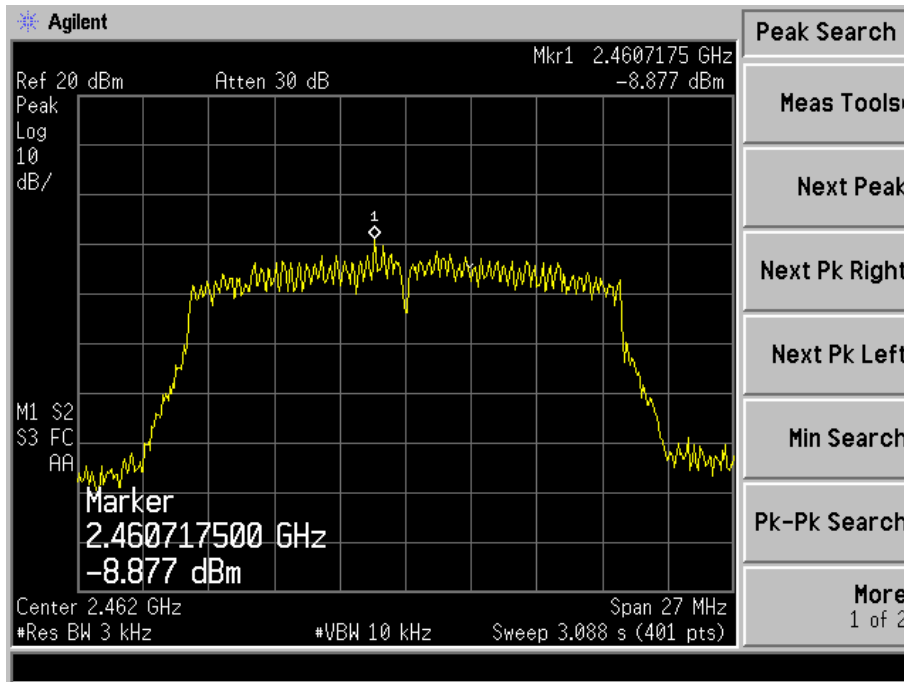
802.11n-HT20-Low Channel



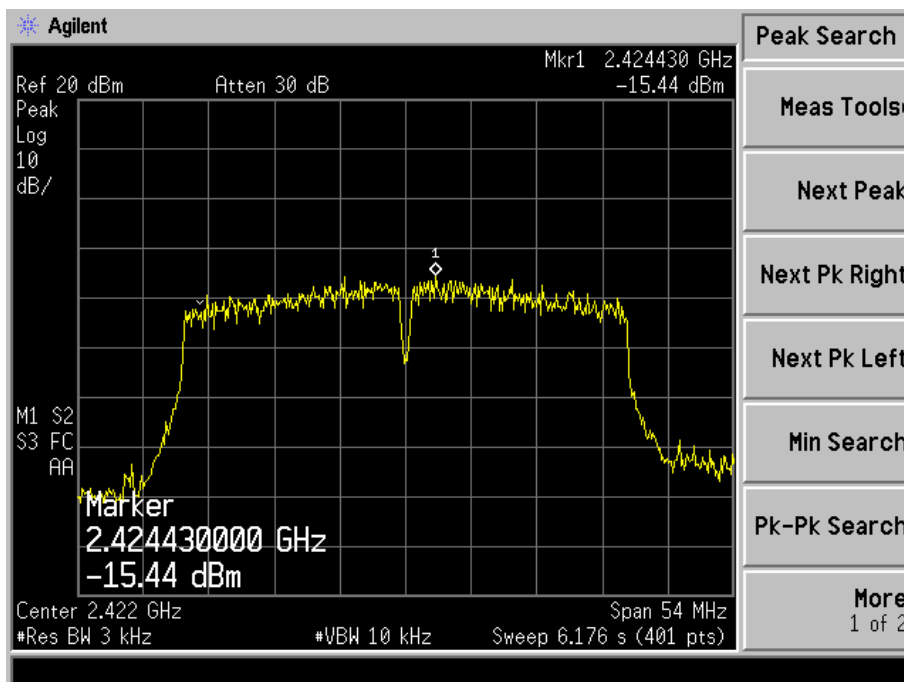
802.11n-HT20-Middle Channel



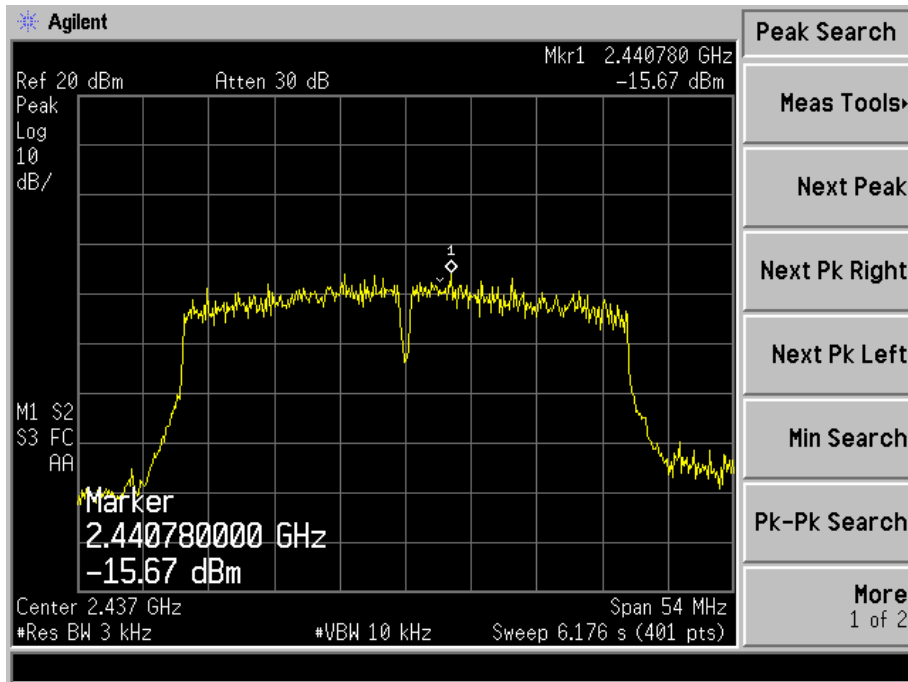
802.11n-HT20-High Channel



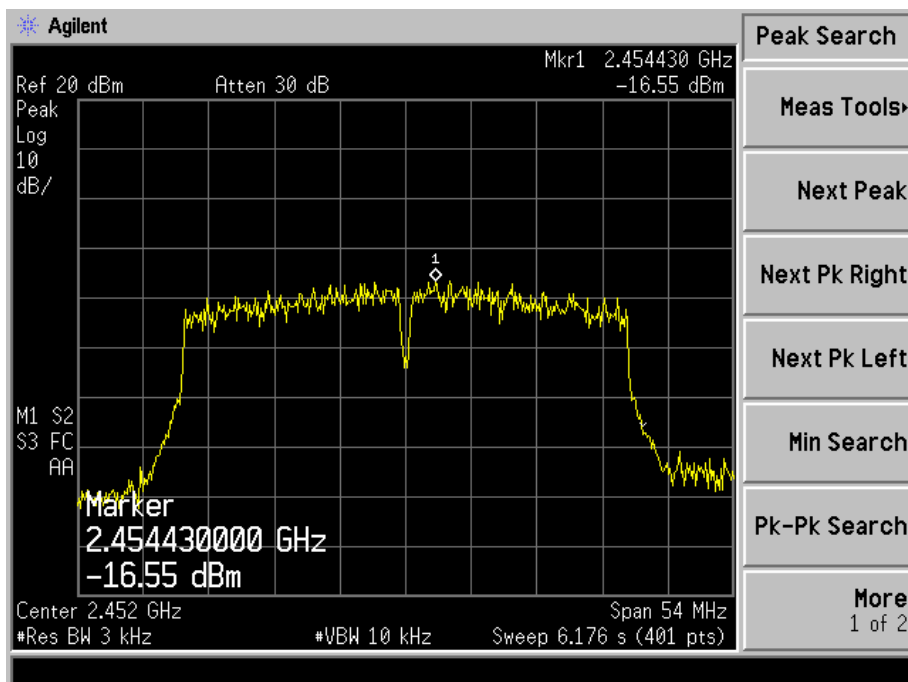
802.11n-HT40-Low Channel



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 Procedure

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ 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.

6.3 Environmental Conditions

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

6.4 Summary of Test Results/Plots

Antenna 1

Test Mode	Test Channel MHz	6 dB Bandwidth MHz	99% Bandwidth MHz	Limit kHz
802.11b	2412	8.650	14.0972	≥500
	2437	9.420	14.2870	≥500
	2462	9.090	14.1466	≥500
802.11g	2412	15.185	16.3059	≥500
	2437	15.033	16.3387	≥500
	2462	15.210	16.2838	≥500
802.11n-HT20	2412	15.779	17.4358	≥500
	2437	15.177	17.4364	≥500
	2462	16.027	17.4512	≥500
802.11n-HT40	2422	35.080	35.5796	≥500
	2437	35.093	35.7043	≥500
	2452	35.165	35.6865	≥500

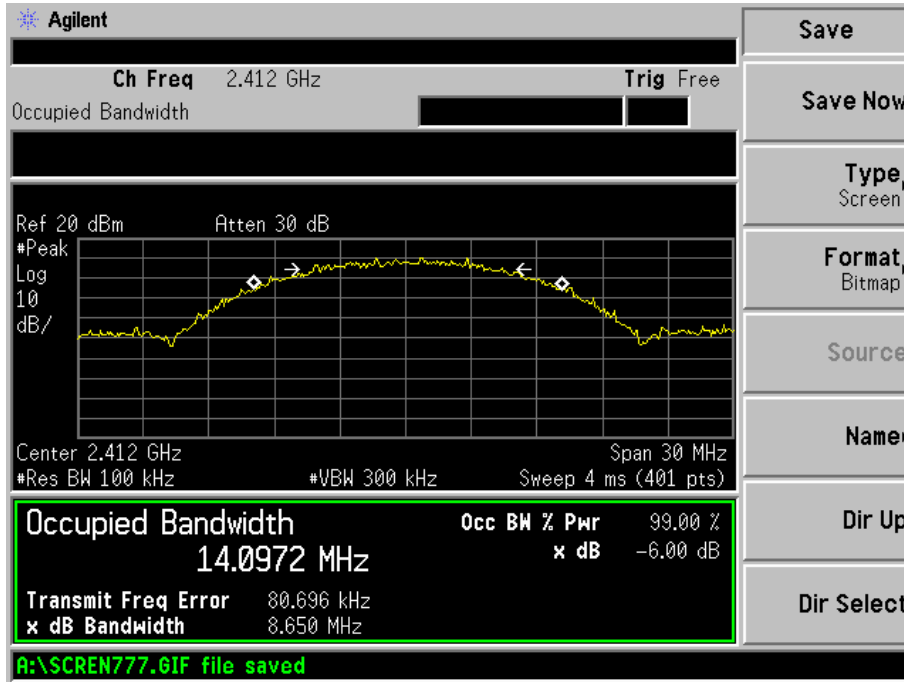
Antenna 2

Test Mode	Test Channel MHz	6 dB Bandwidth MHz	99% Bandwidth MHz	Limit kHz
802.11b	2412	8.409	14.2527	≥500
	2437	7.953	14.0896	≥500
	2462	8.968	14.2260	≥500
802.11g	2412	15.377	16.2601	≥500
	2437	15.187	16.2637	≥500
	2462	15.324	16.2589	≥500
802.11n-HT20	2412	15.407	17.4572	≥500
	2437	15.186	17.4537	≥500
	2462	15.169	17.4415	≥500
802.11n-HT40	2422	35.094	35.6780	≥500
	2437	35.155	35.6861	≥500
	2452	35.148	35.6919	≥500

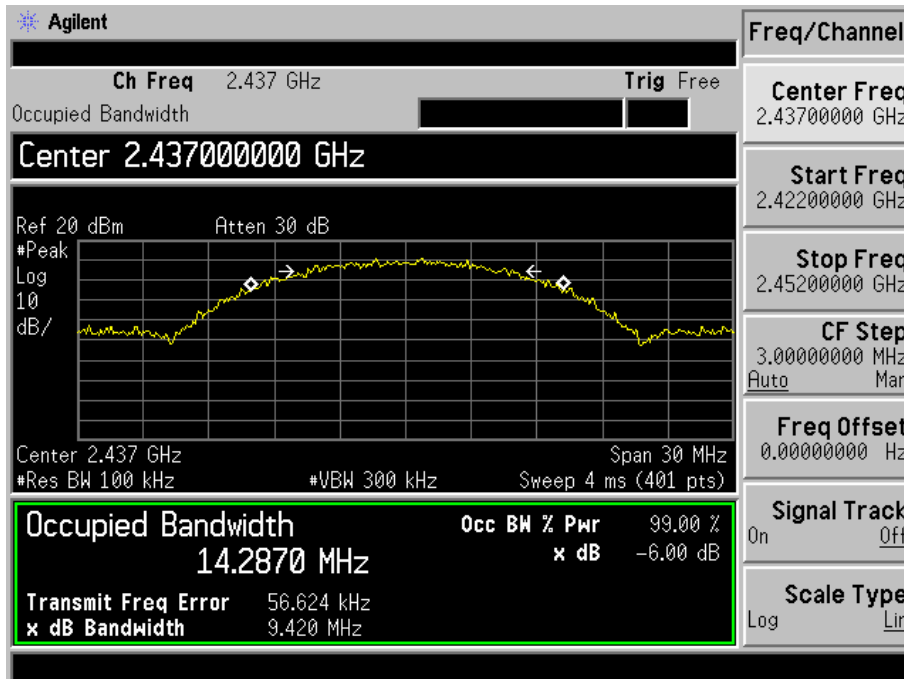
Please refer to the following test plots:

Antenna 1

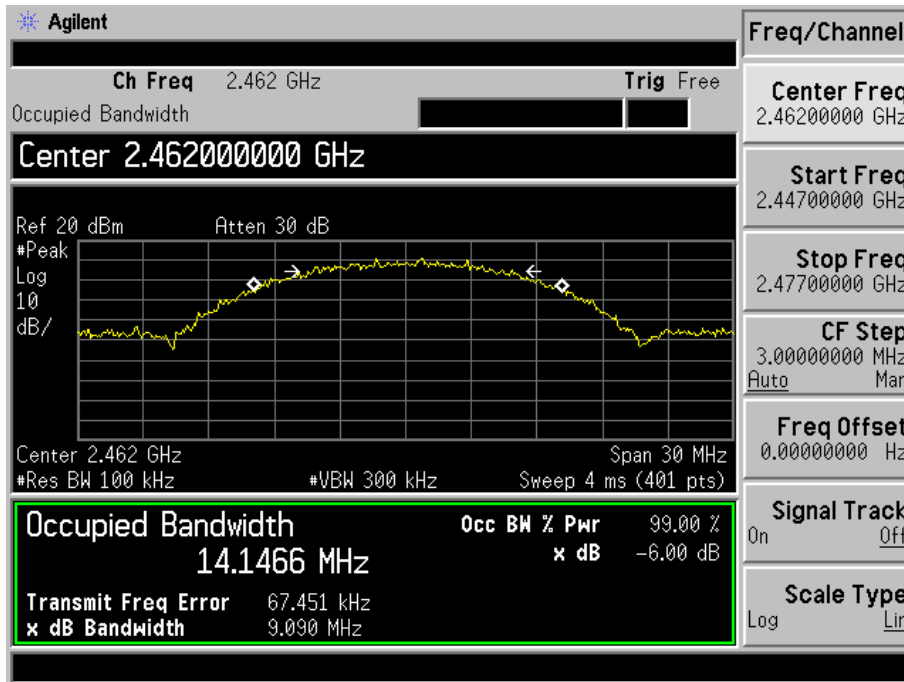
802.11b-Low Channel



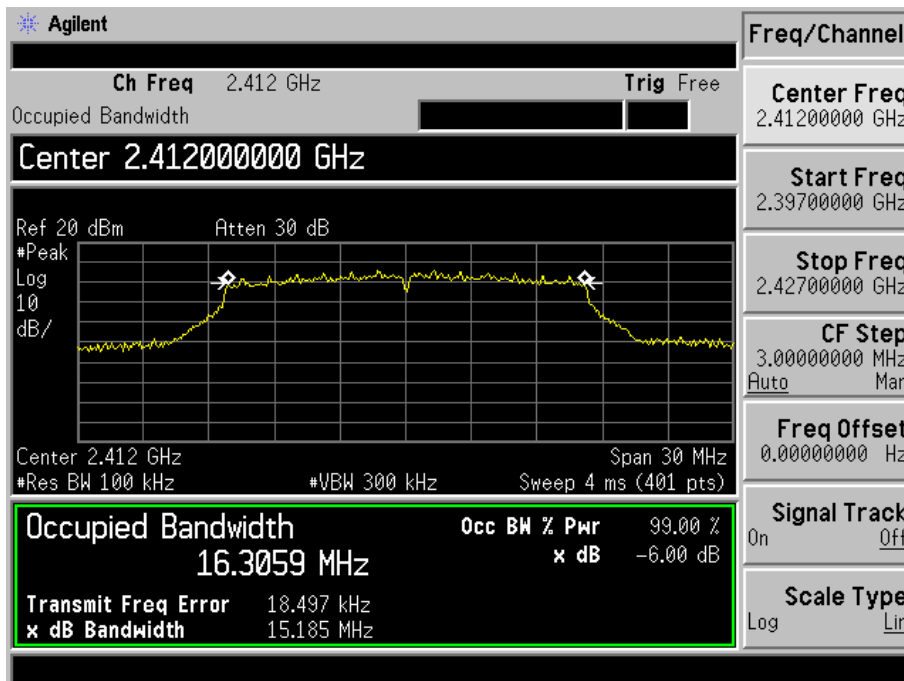
802.11b-Middle Channel



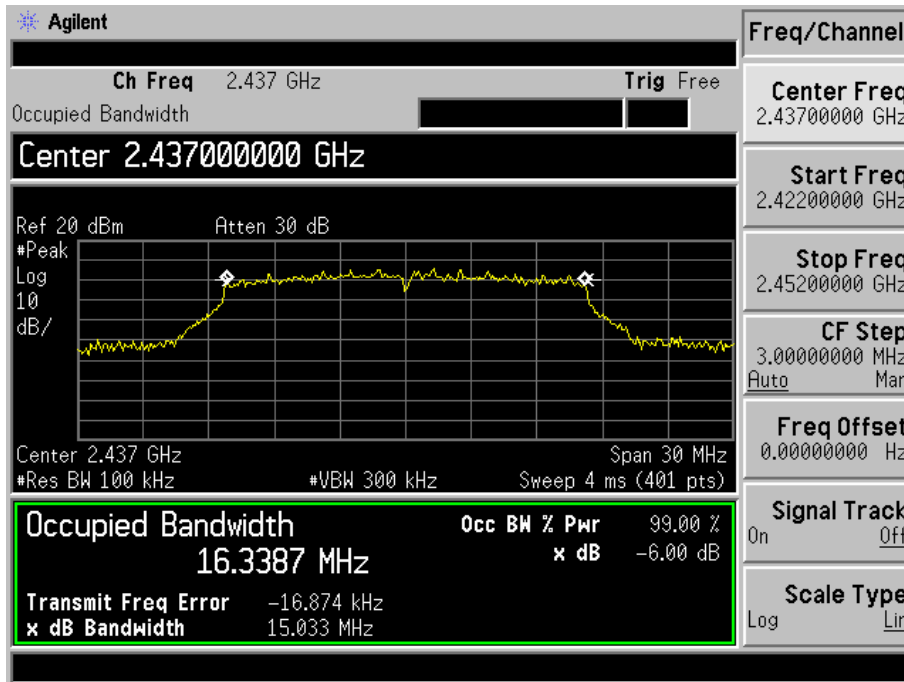
802.11b-High Channel



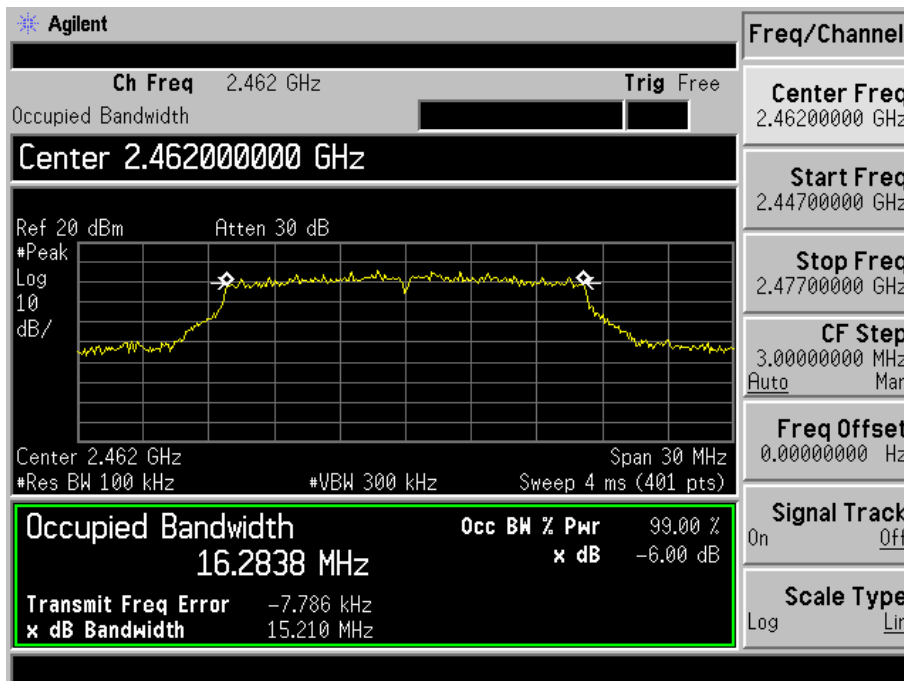
802.11g-Low Channel



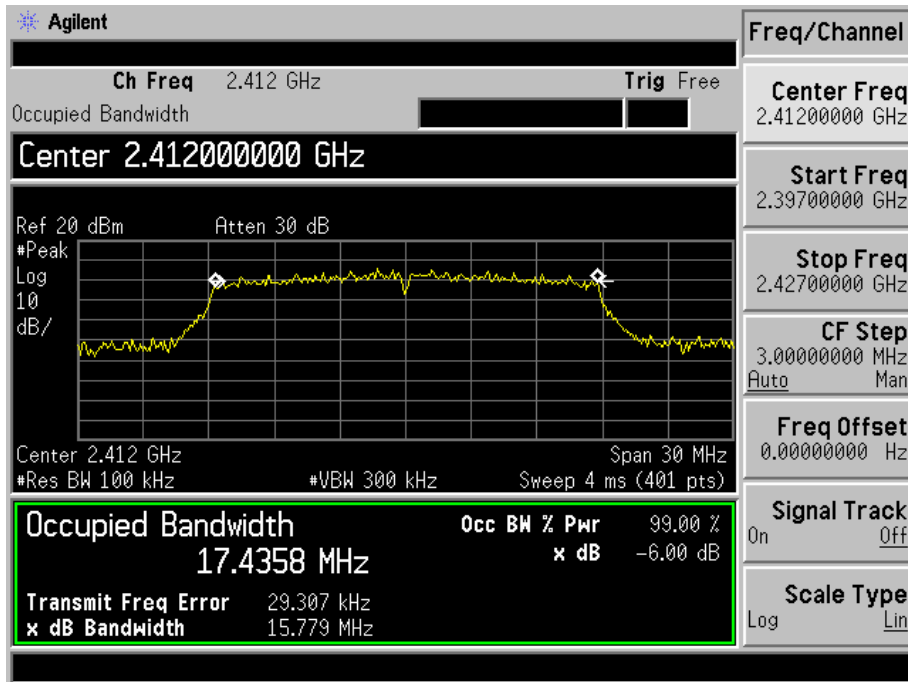
802.11g-Middle Channel



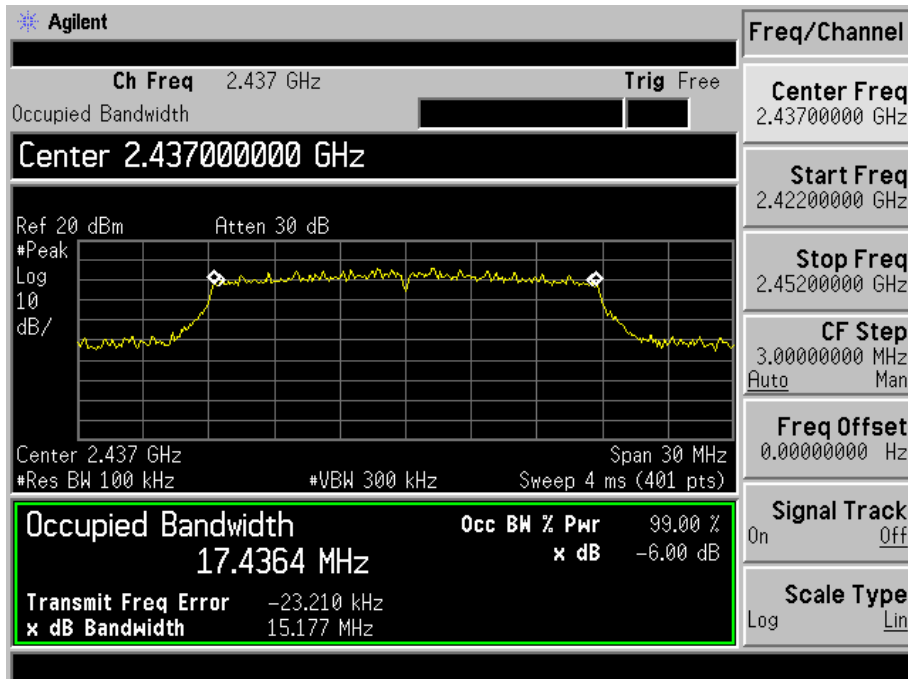
802.11g-High Channel



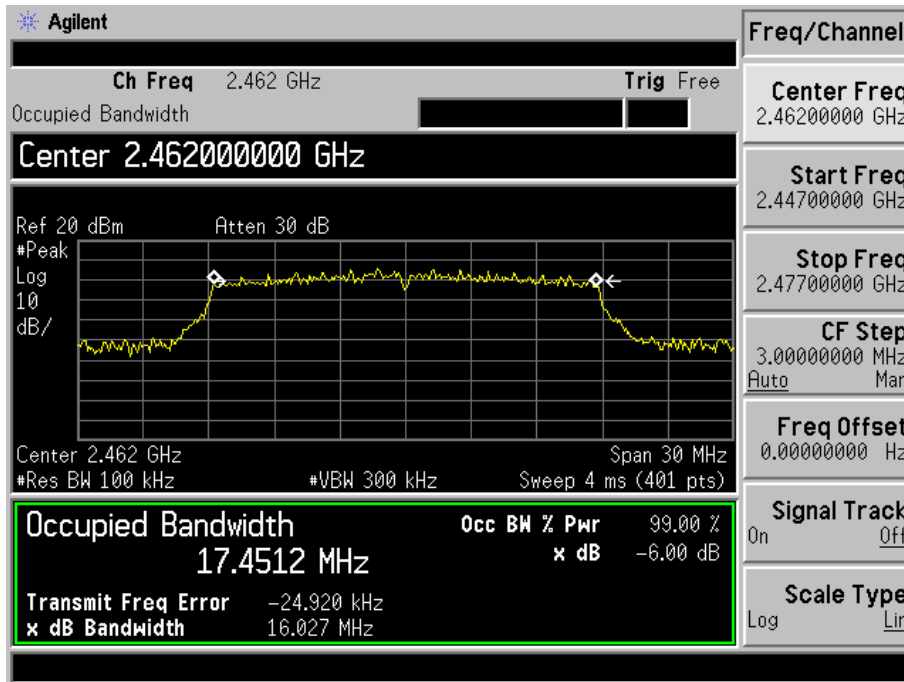
802.11n-HT20-Low Channel



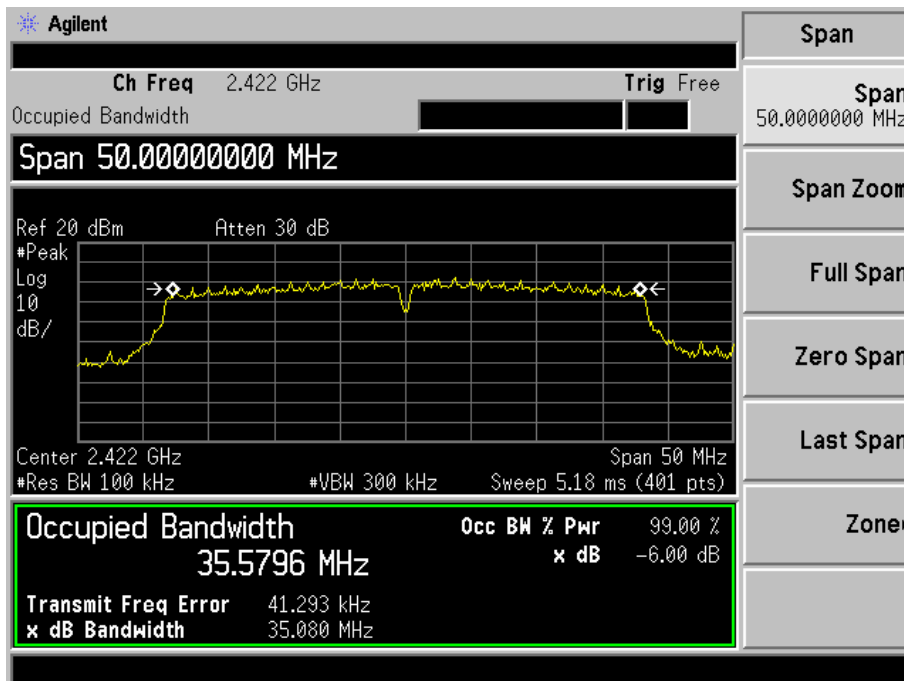
802.11n-HT20-Middle Channel



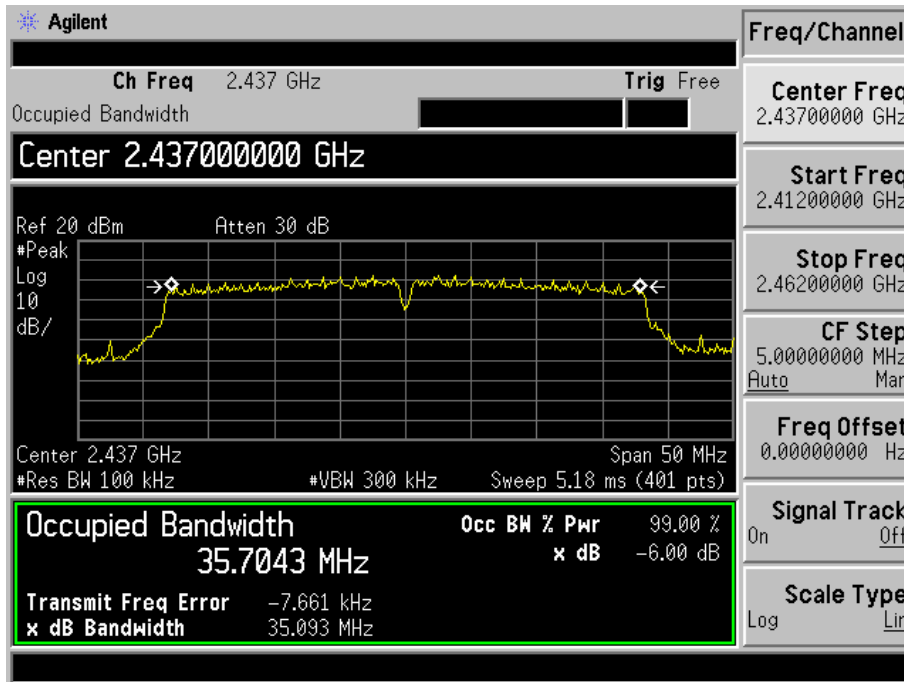
802.11n-HT20-High Channel



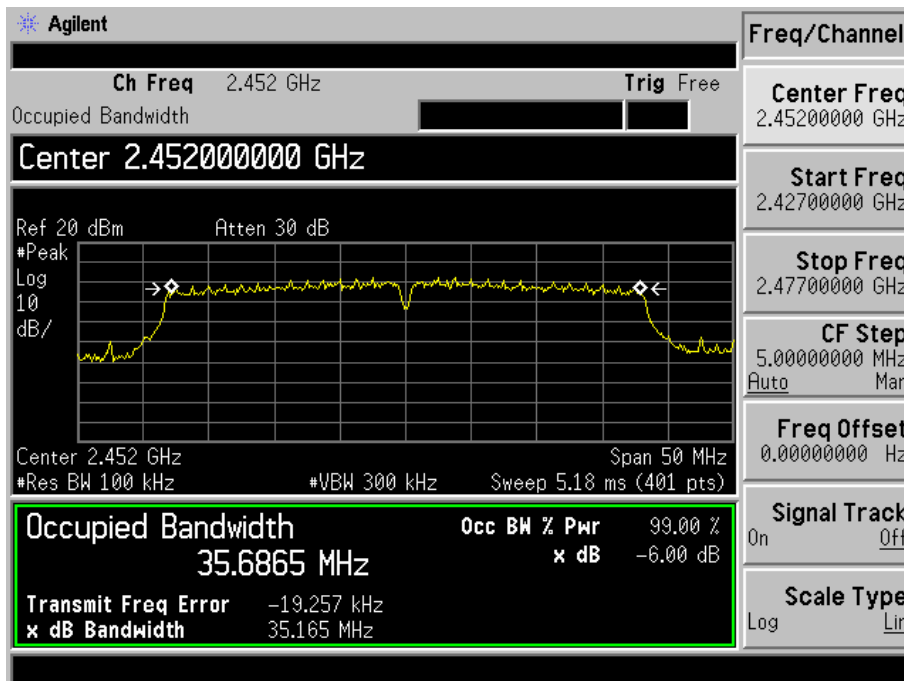
802.11n-HT40-Low Channel



802.11n-HT40-Middle Channel

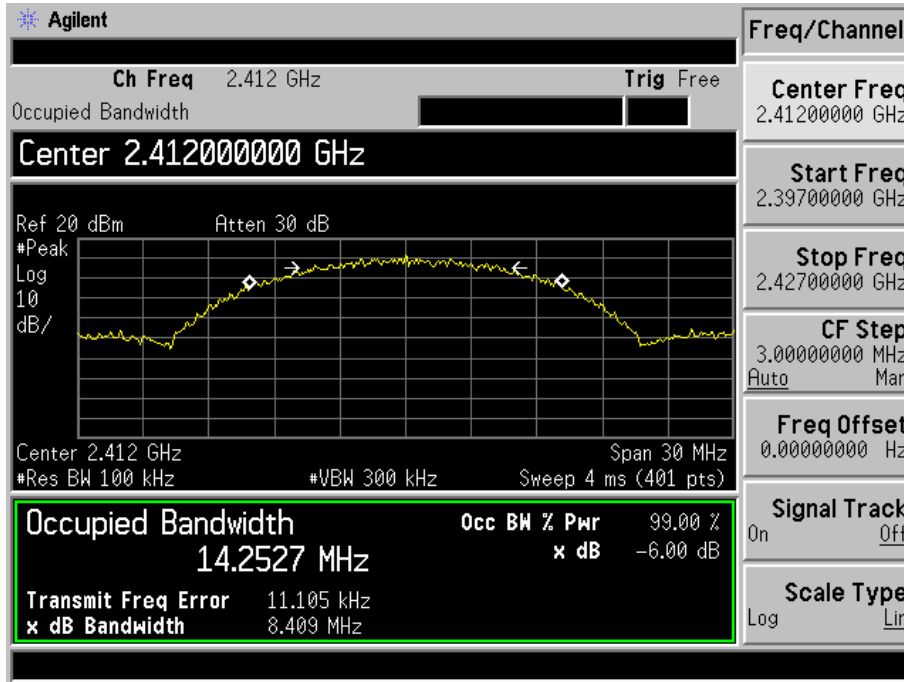


802.11n-HT40-High Channel

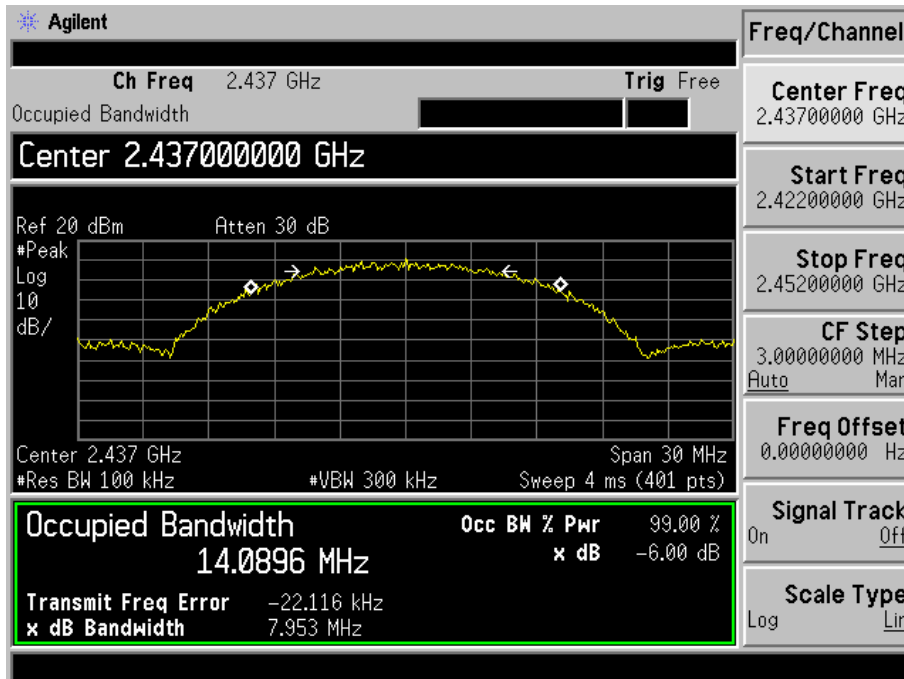


Antenna 2

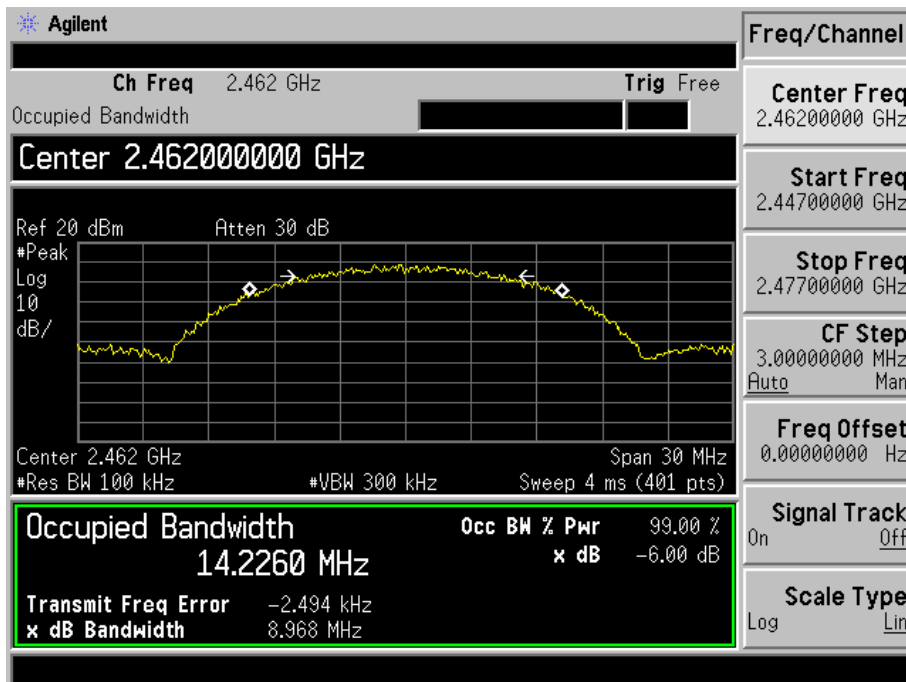
802.11b-Low Channel



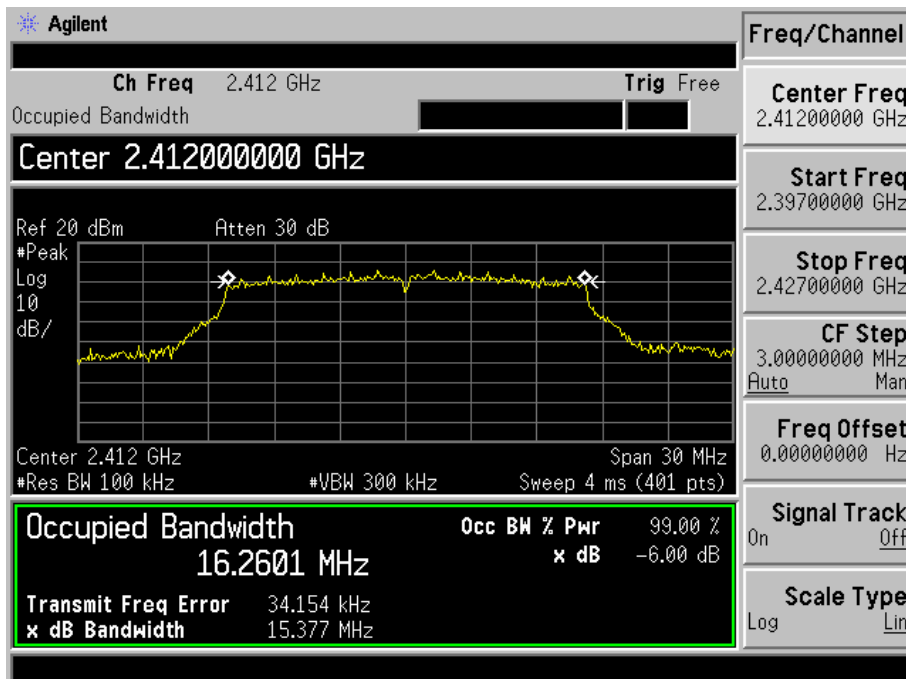
802.11b-Middle Channel



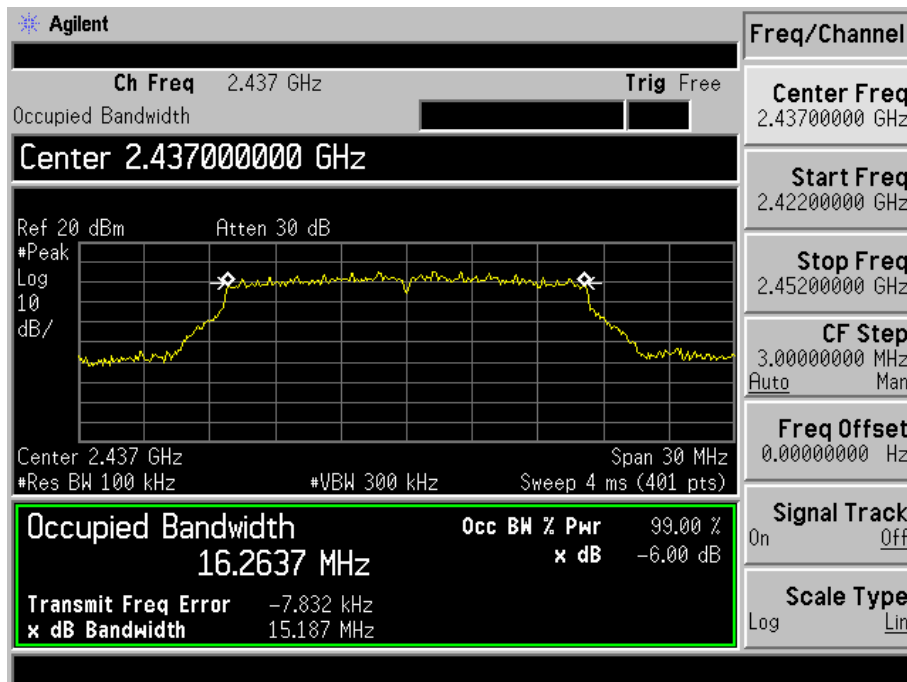
802.11b-High Channel



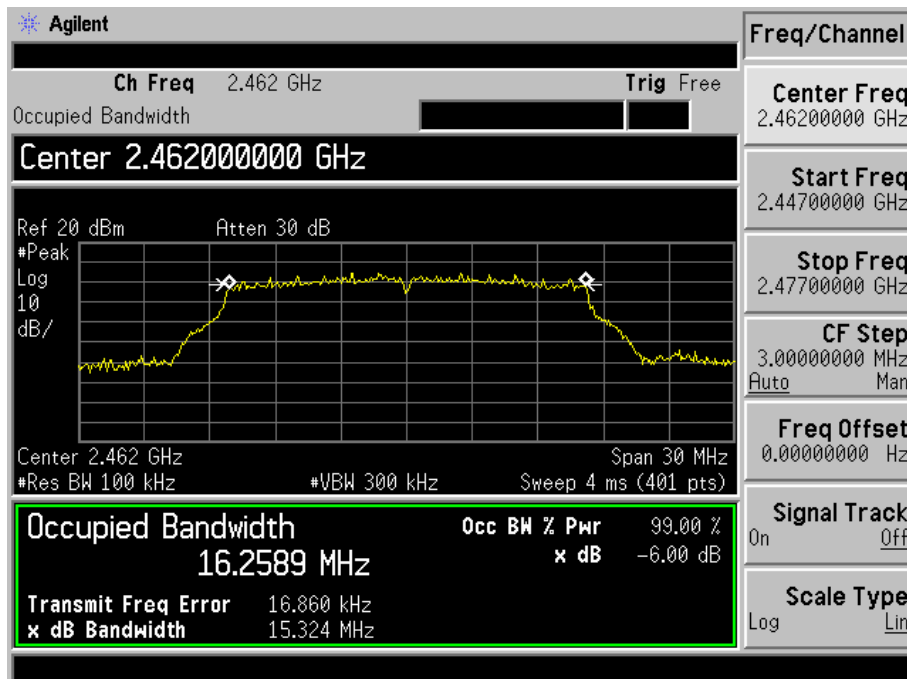
802.11g-Low Channel



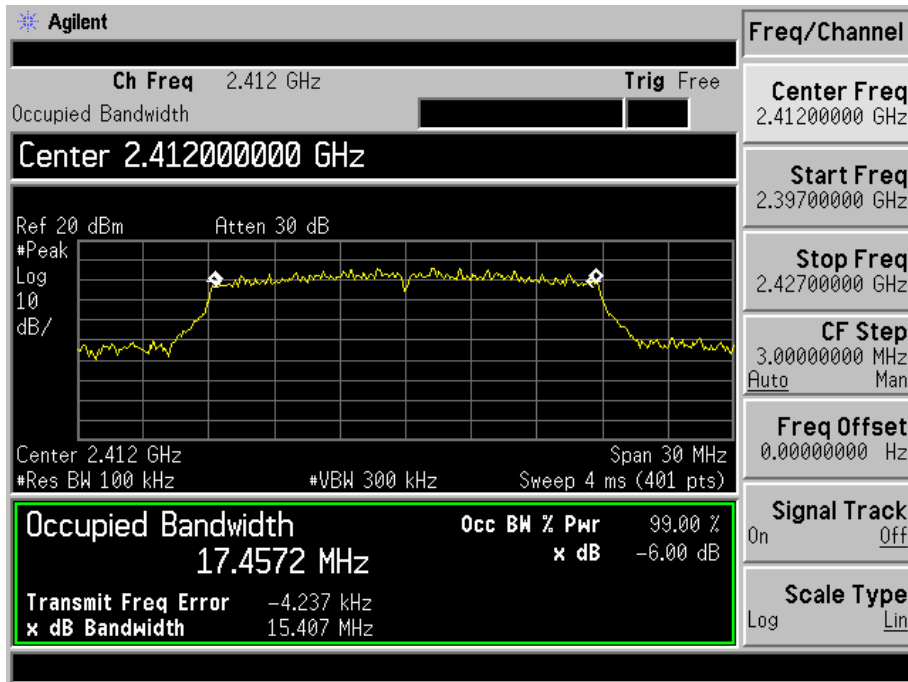
802.11g-Middle Channel



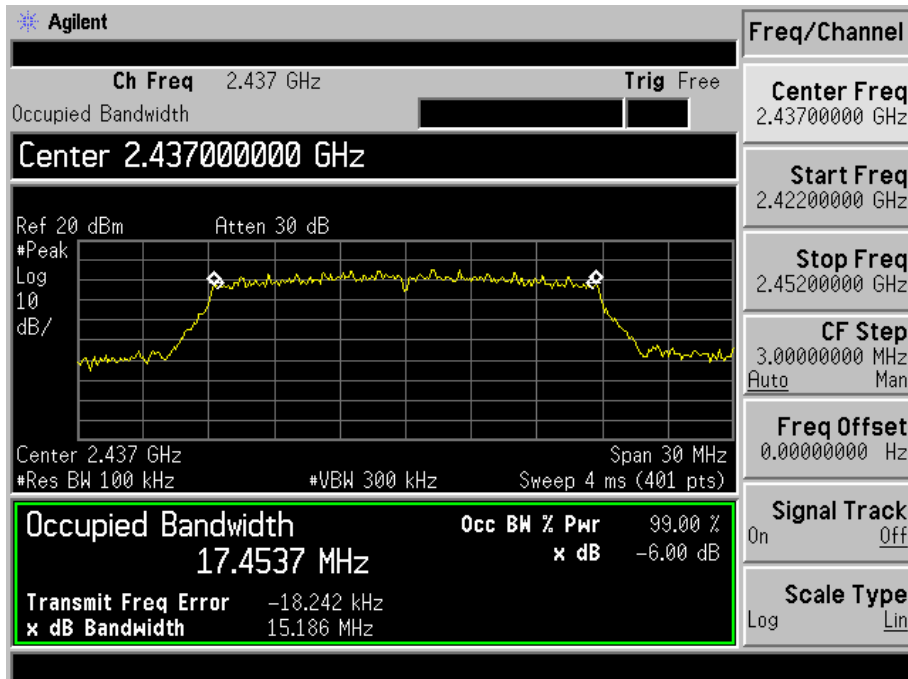
802.11g-High Channel



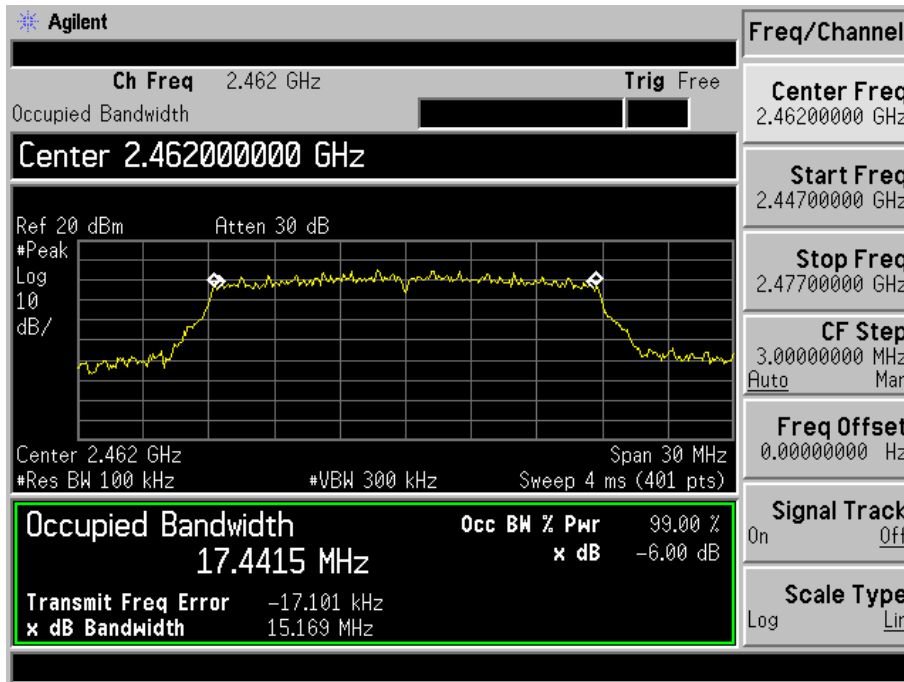
802.11n-HT20-Low Channel



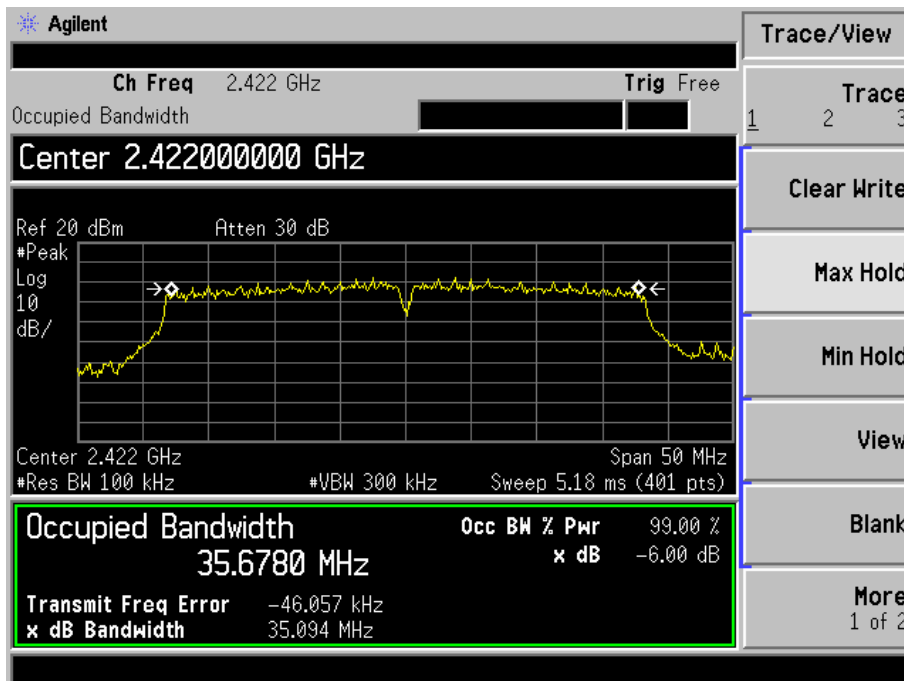
802.11n-HT20-Middle Channel



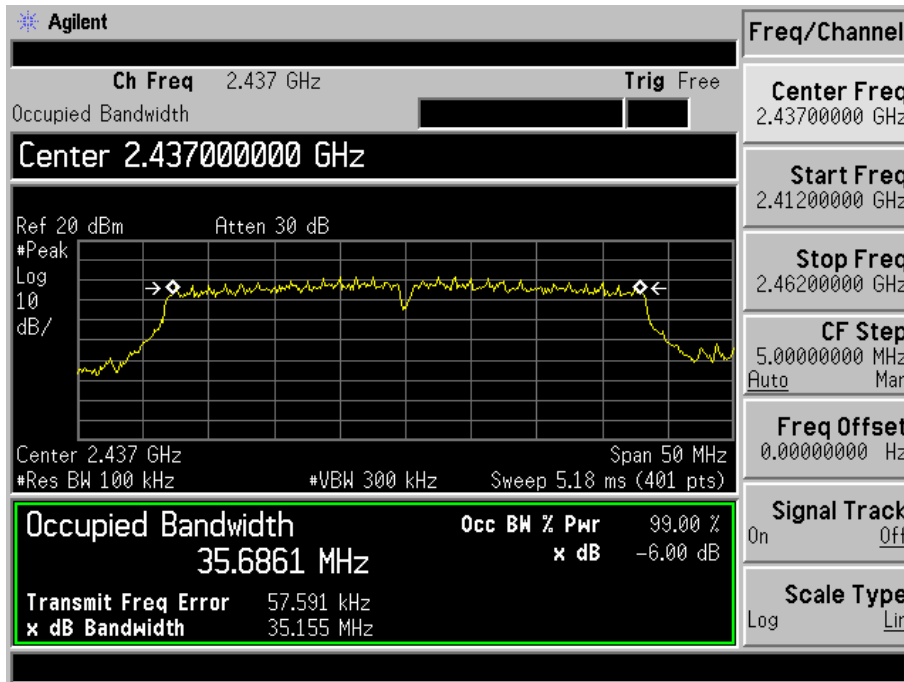
802.11n-HT20-High Channel



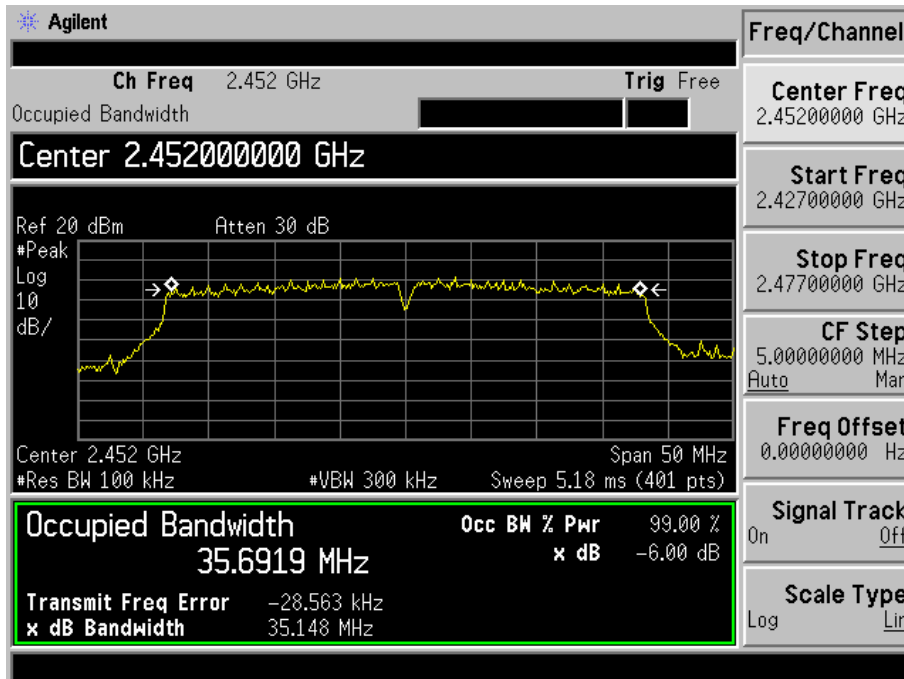
802.11n-HT40-Low Channel



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 Procedure

According to KDB-558074 D01 V03r05, (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 $\geq 3 \times$ RBW.
- d) Number of points in sweep $\geq 2 \times$ span / RBW. (This gives bin-to-bin spacing \leq 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 $\geq 98 \%$, 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.

7.3 Environmental Conditions

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

7.4 Summary of Test Results/Plots

Test Mode	Frequency MHz	Power 1 dBm	Power 2 dBm	Total Power dBm	Output Power mW	Limit mW
802.11b_11Mbps	2412	17.23	17.27	20.26	106.18	1000
	2437	18.00	17.05	20.56	113.79	1000
	2462	17.75	16.16	20.04	100.87	1000
802.11g_54Mbps	2412	10.93	11.67	14.33	27.08	1000
	2437	12.10	11.32	14.74	29.77	1000
	2462	12.40	11.29	14.89	30.84	1000
802.11n HT20_MCS7	2412	11.05	11.73	14.41	27.63	1000
	2437	12.20	10.62	14.49	28.13	1000
	2462	11.57	11.05	14.33	27.09	1000
802.11n HT40_MCS7	2422	8.03	8.52	11.29	13.47	1000
	2437	8.91	8.51	11.72	14.88	1000
	2452	7.89	8.65	11.30	13.48	1000

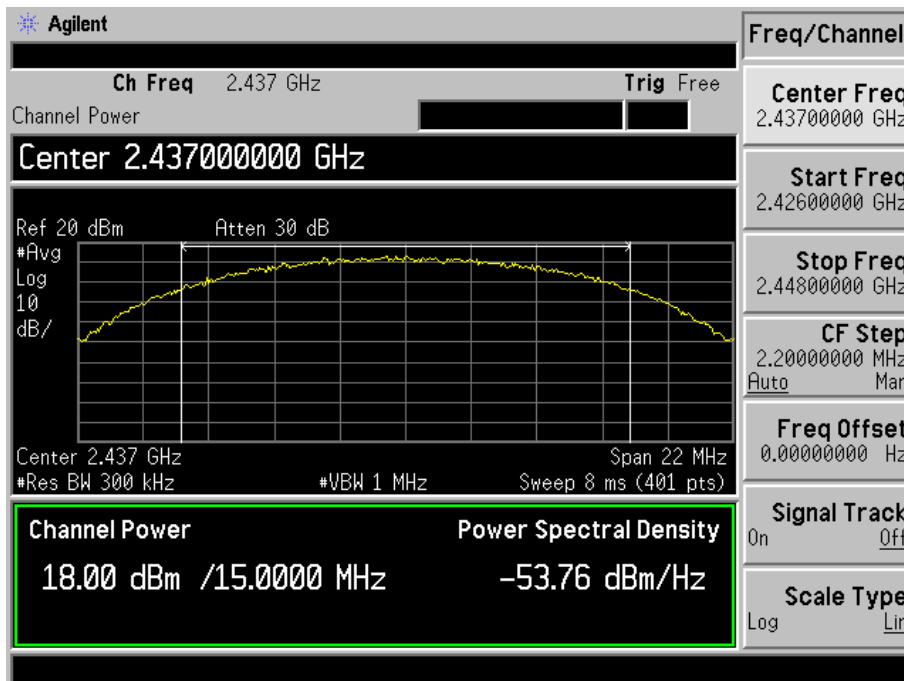
Please refer to the following test plots:

Antenna 1

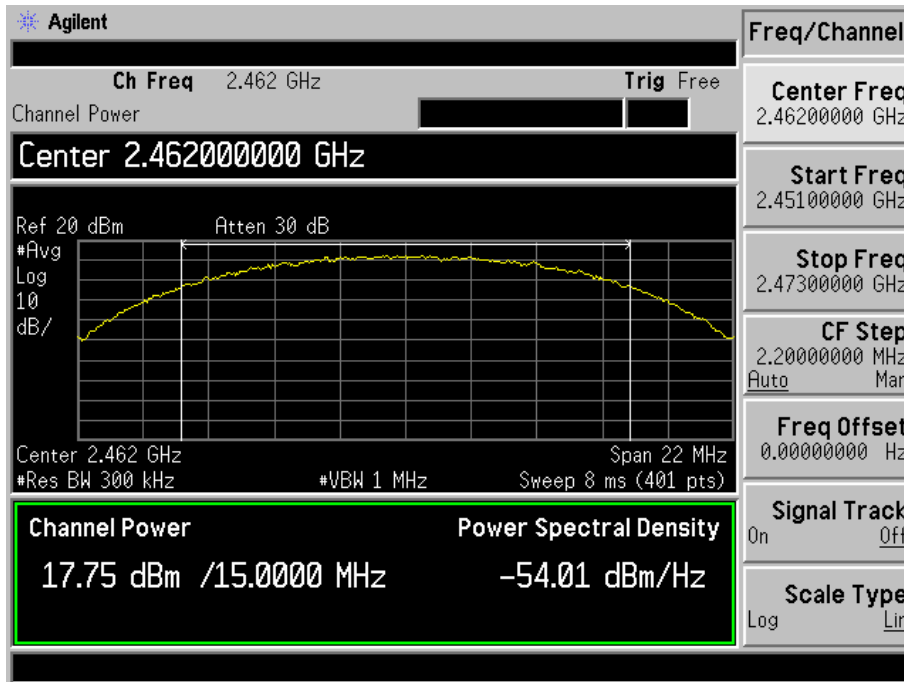
802.11b-11Mbps-Low Channel



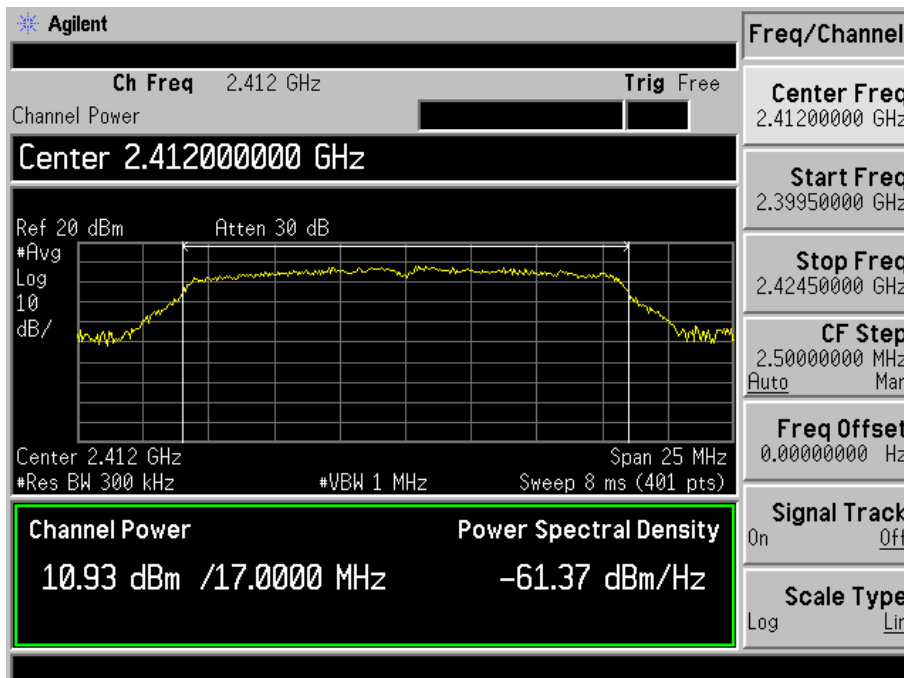
802.11b -11Mbps-Middle Channel



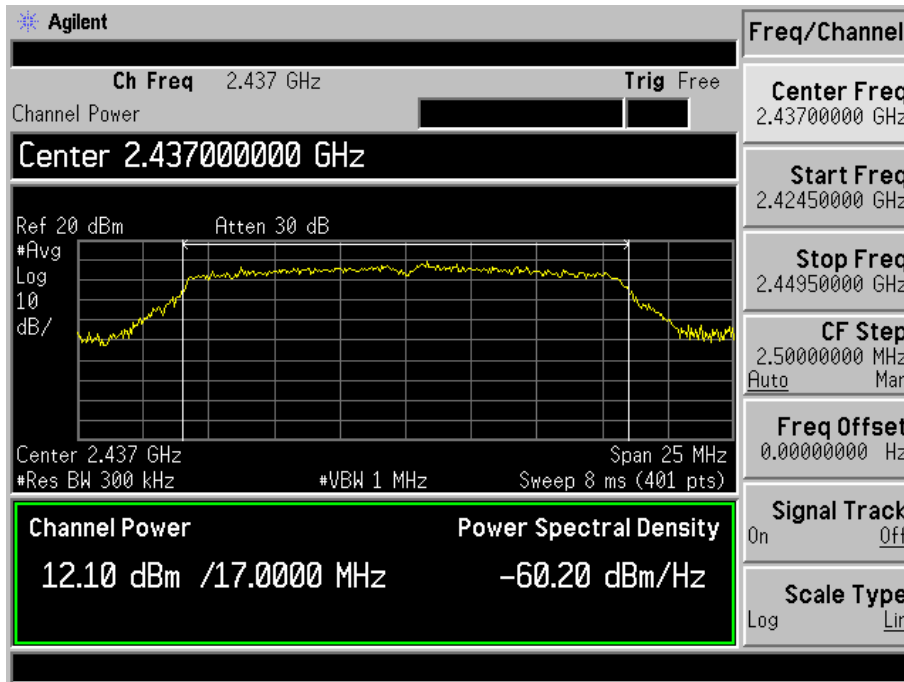
802.11b -11Mbps-High Channel



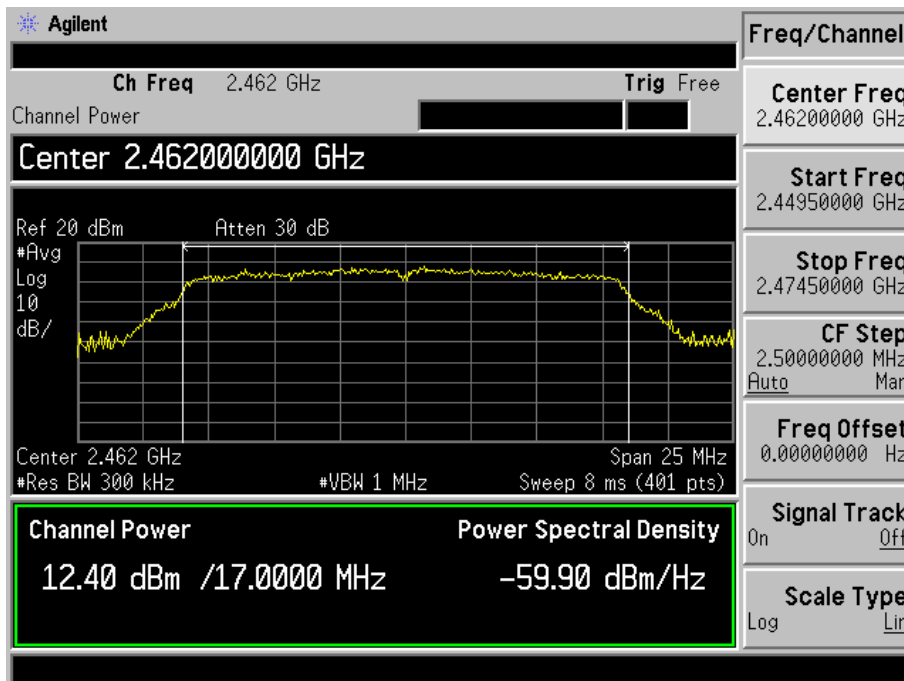
802.11g-54Mbps-Low Channel



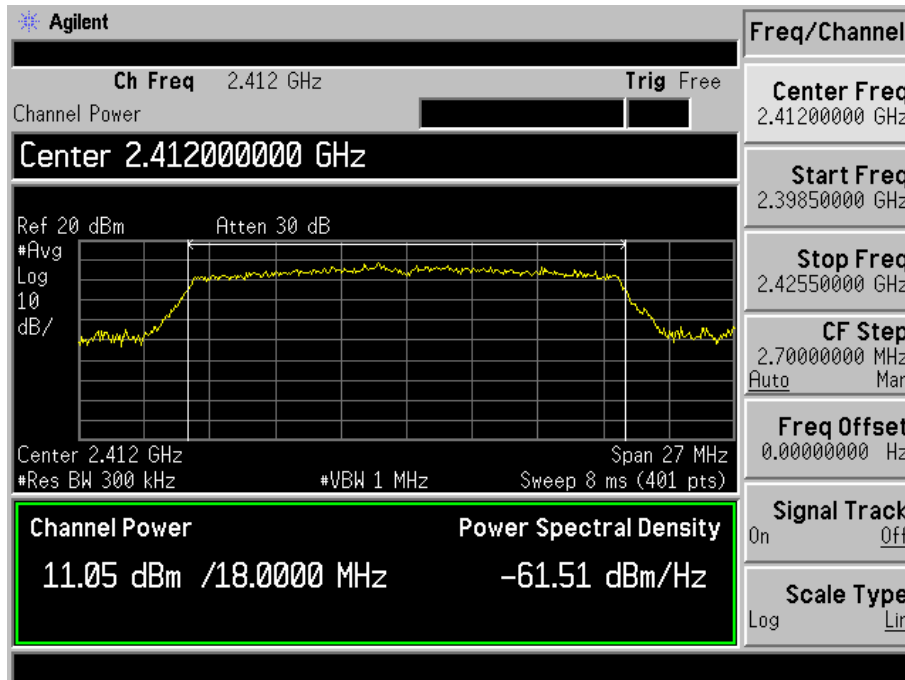
802.11g-54Mbps-Middle Channel



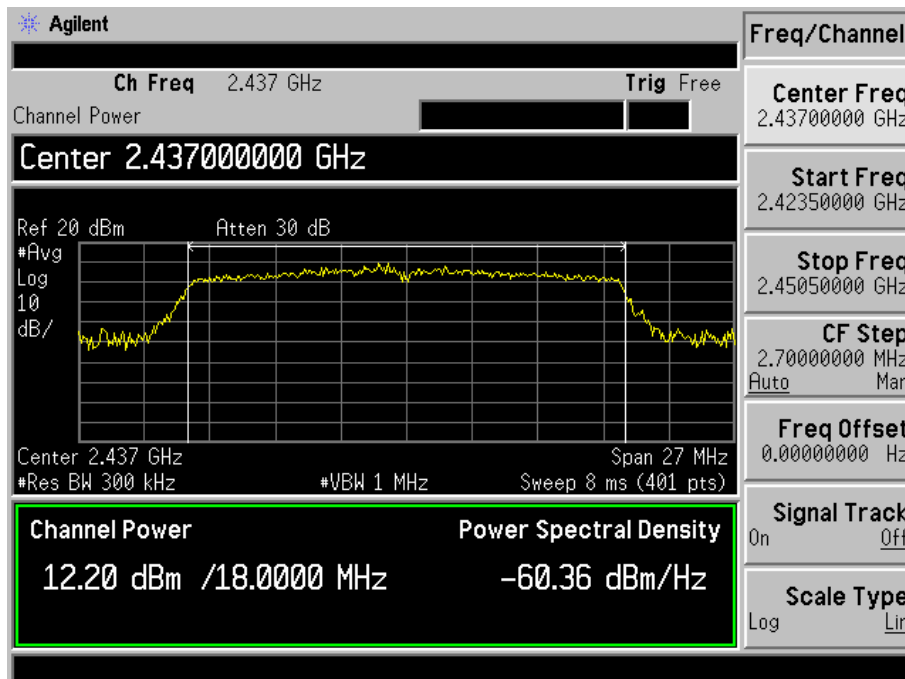
802.11g-54Mbps-High Channel



802.11n-HT20-MCS7-Low Channel



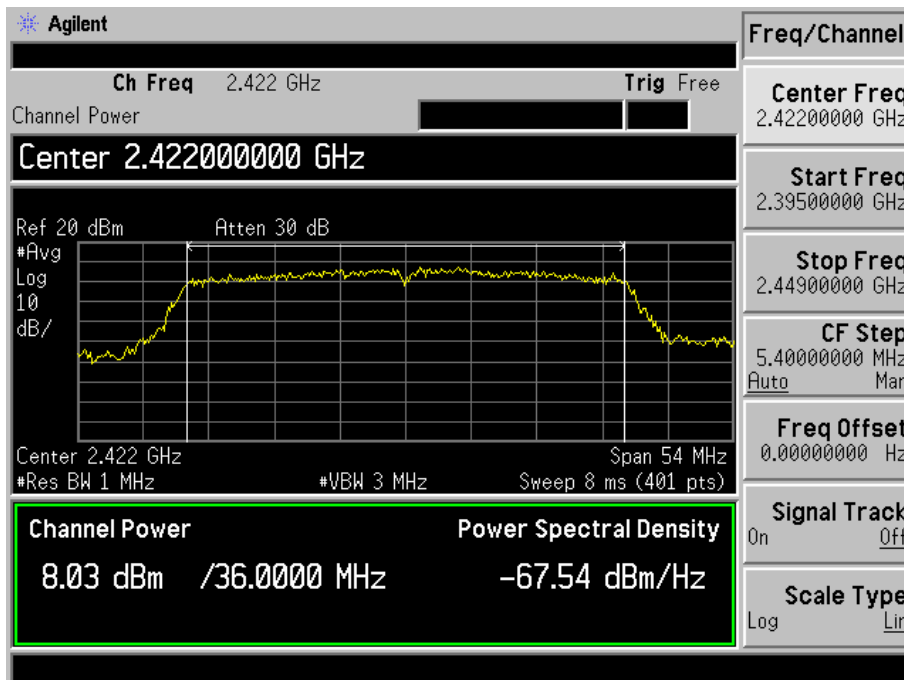
802.11n-HT20-MCS7-Middle Channel



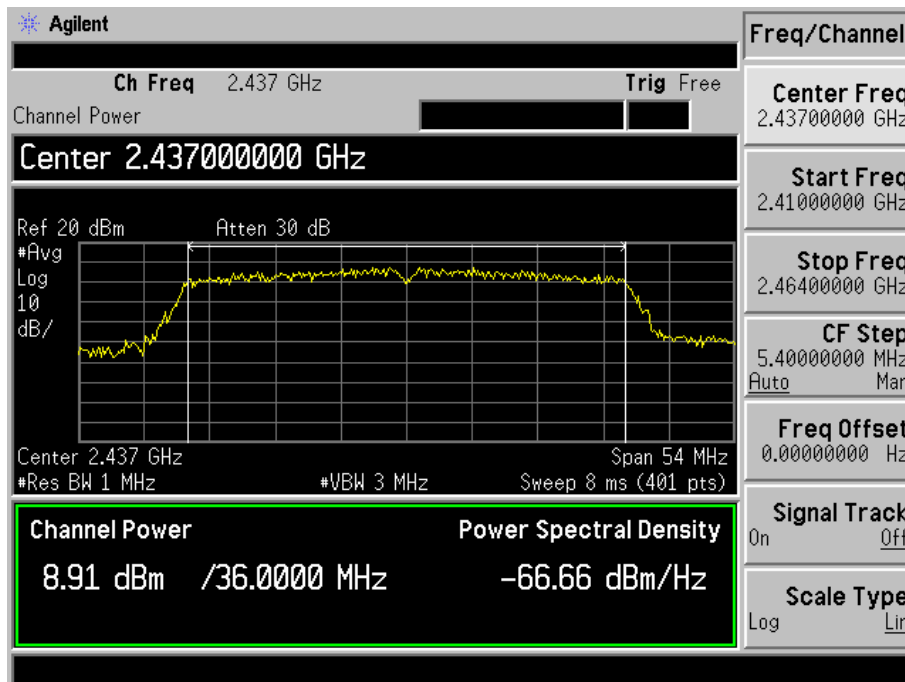
802.11n-HT20-MCS7-High Channel



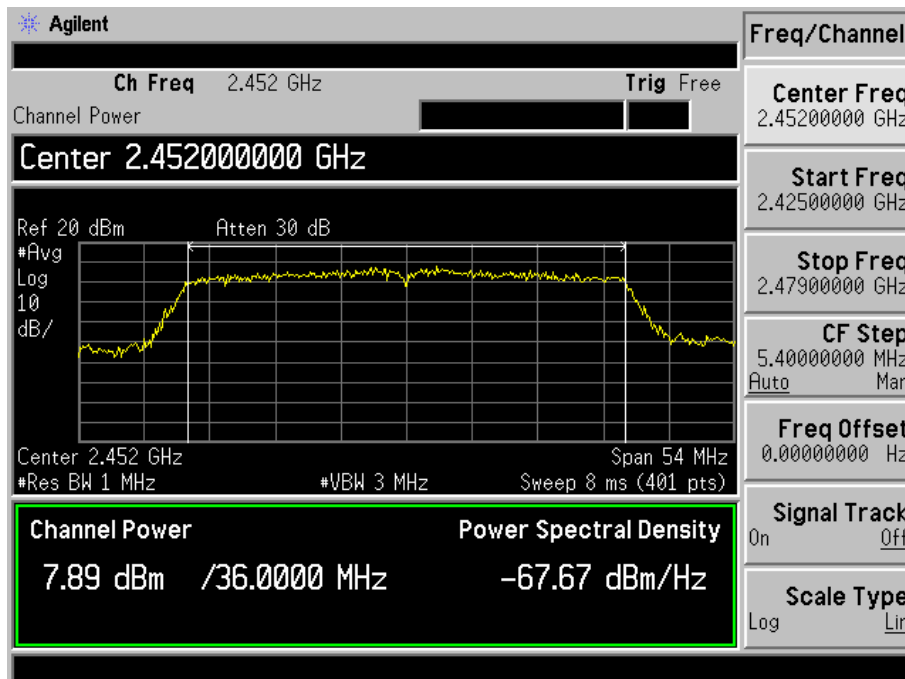
802.11n-HT40-MCS7-Low Channel



802.11n-HT40-MCS7-Middle Channel

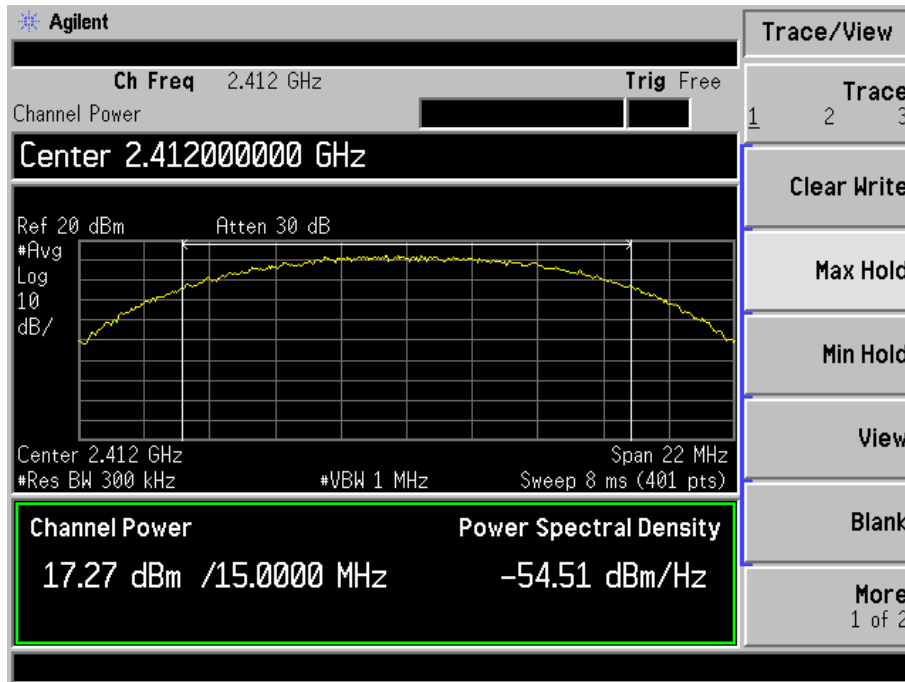


802.11n-HT40-MCS7-High Channel

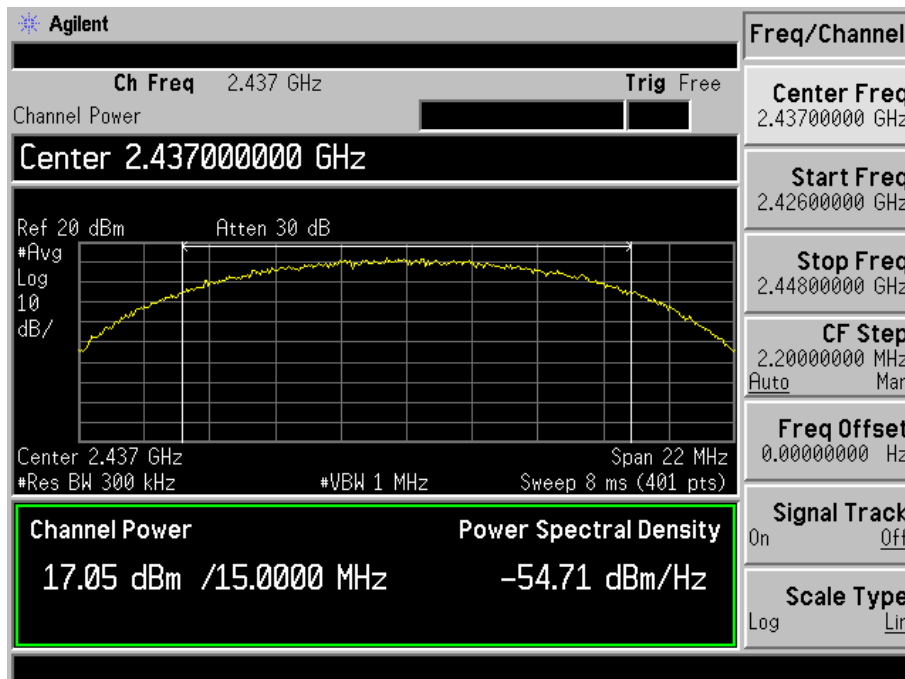


Antenna 2

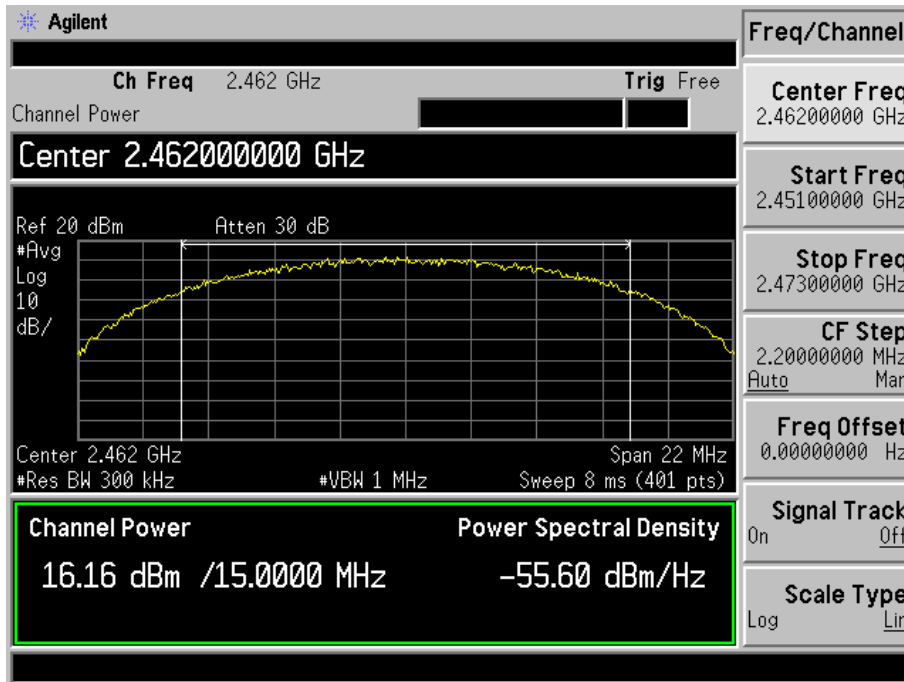
802.11b-11Mbps-Low Channel



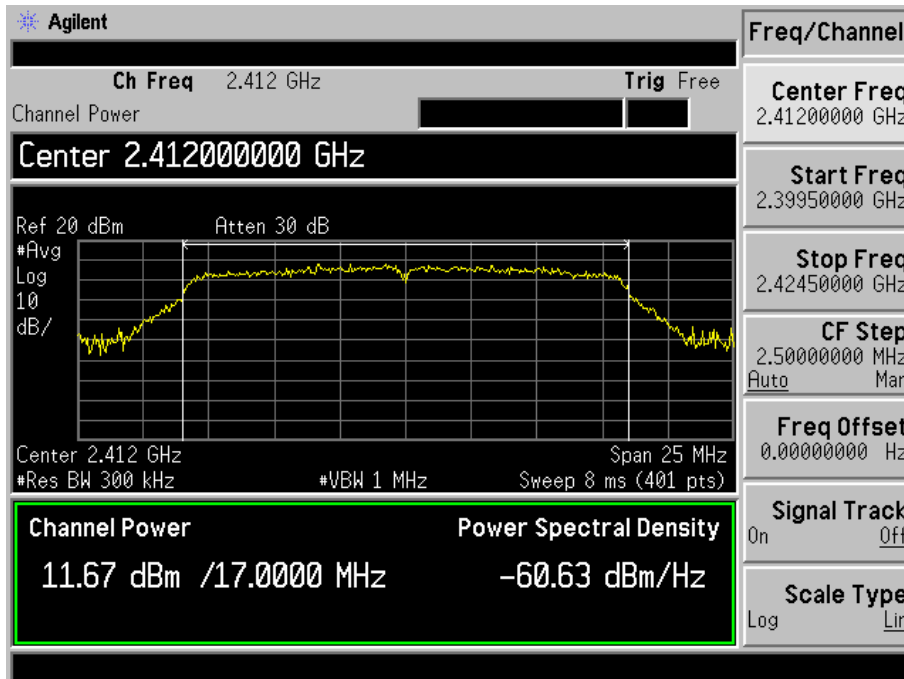
802.11b -11Mbps-Middle Channel



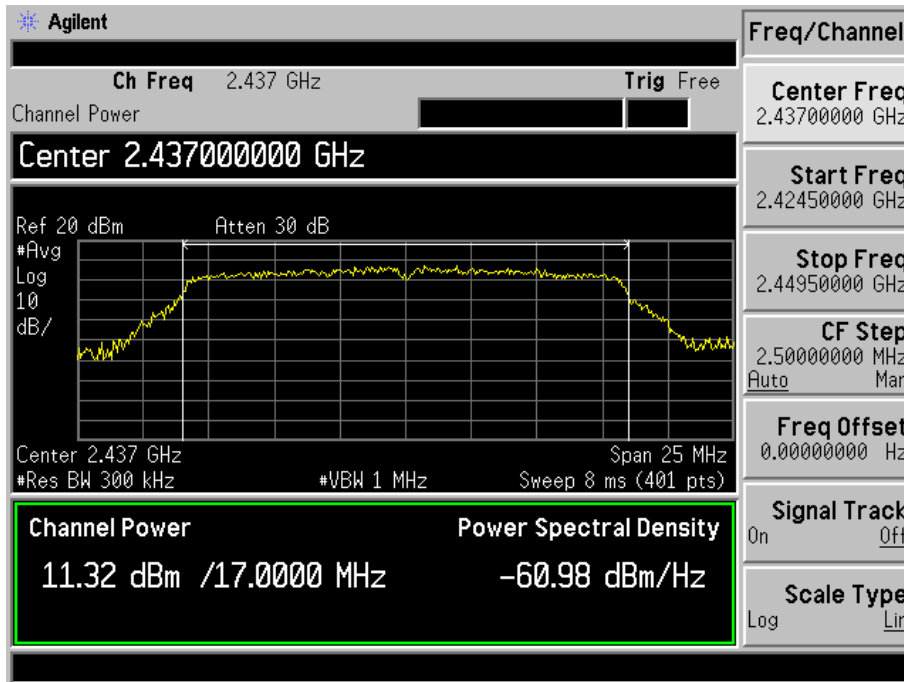
802.11b -11Mbps-High Channel



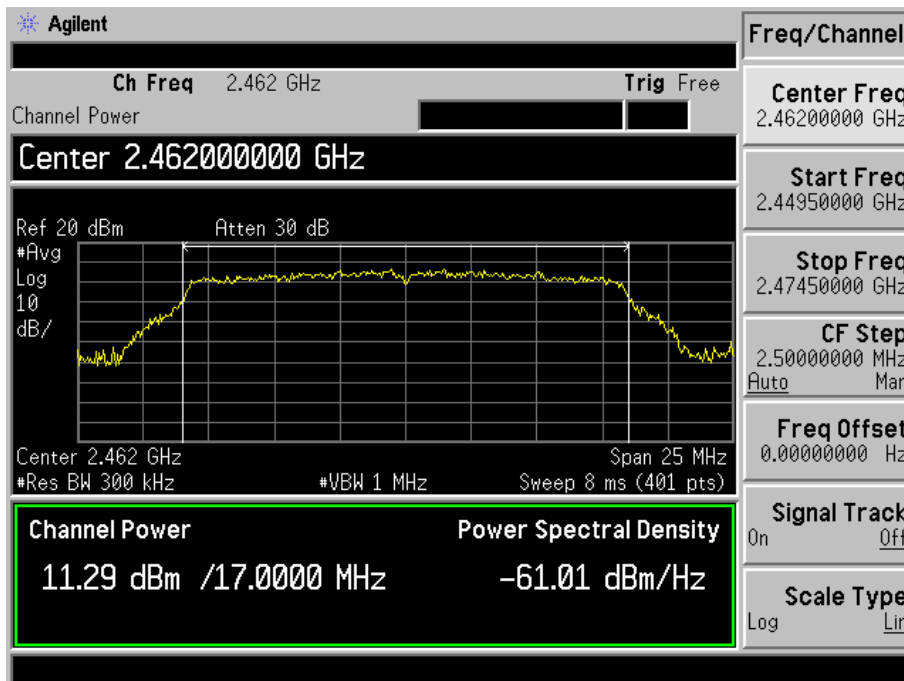
802.11g-54Mbps-Low Channel



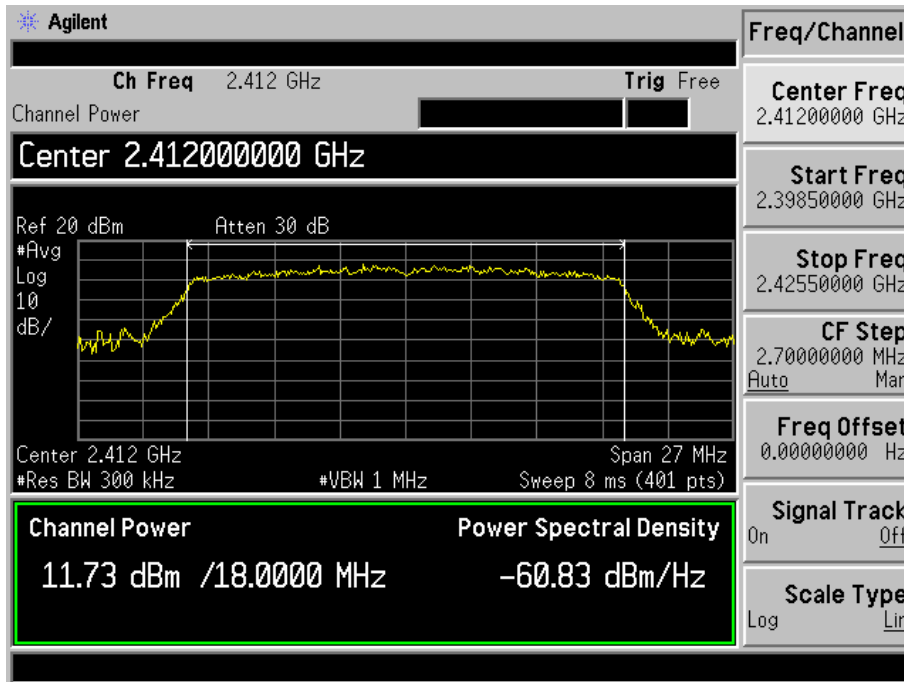
802.11g-54Mbps-Middle Channel



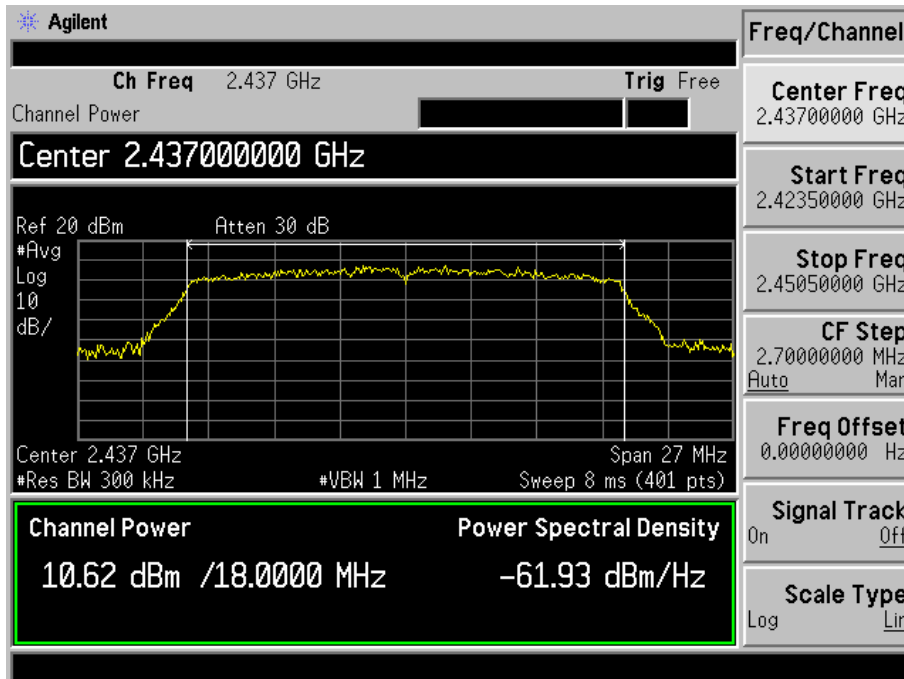
802.11g-54Mbps-High Channel



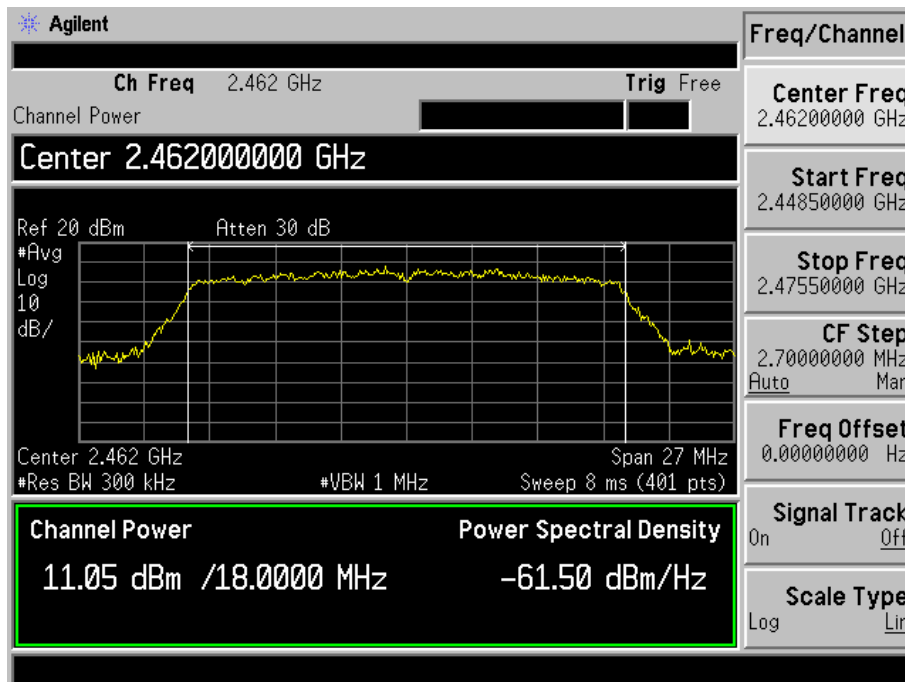
802.11n-HT20-MCS7-Low Channel



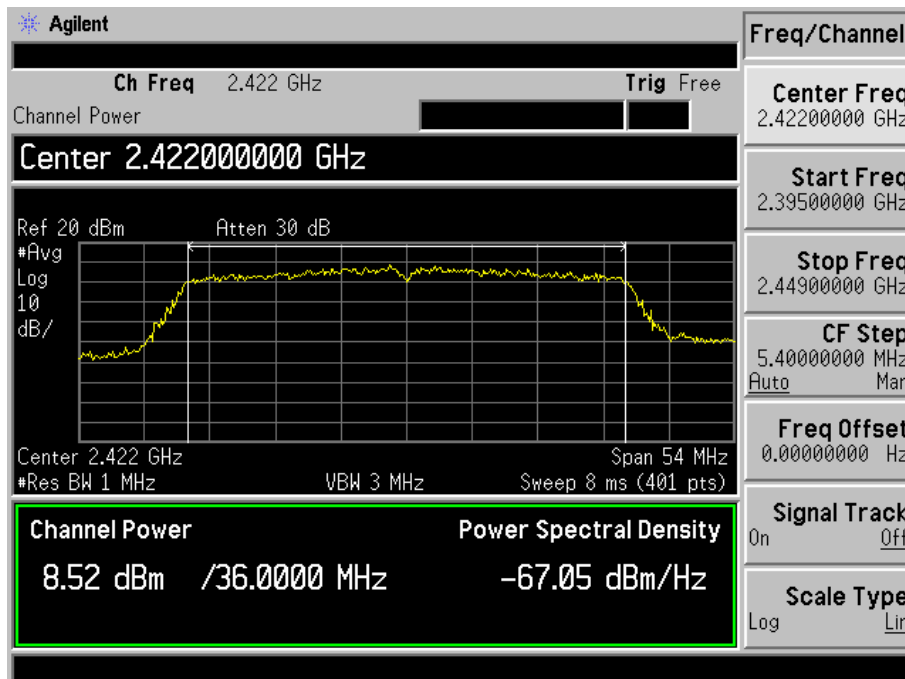
802.11n-HT20-MCS7-Middle Channel



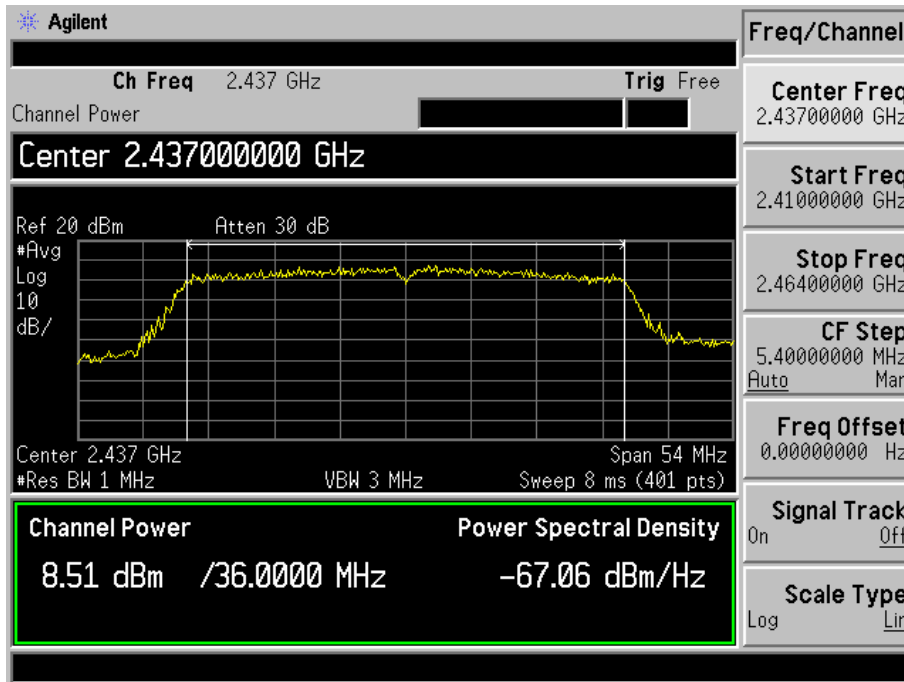
802.11n-HT20-MCS7-High Channel



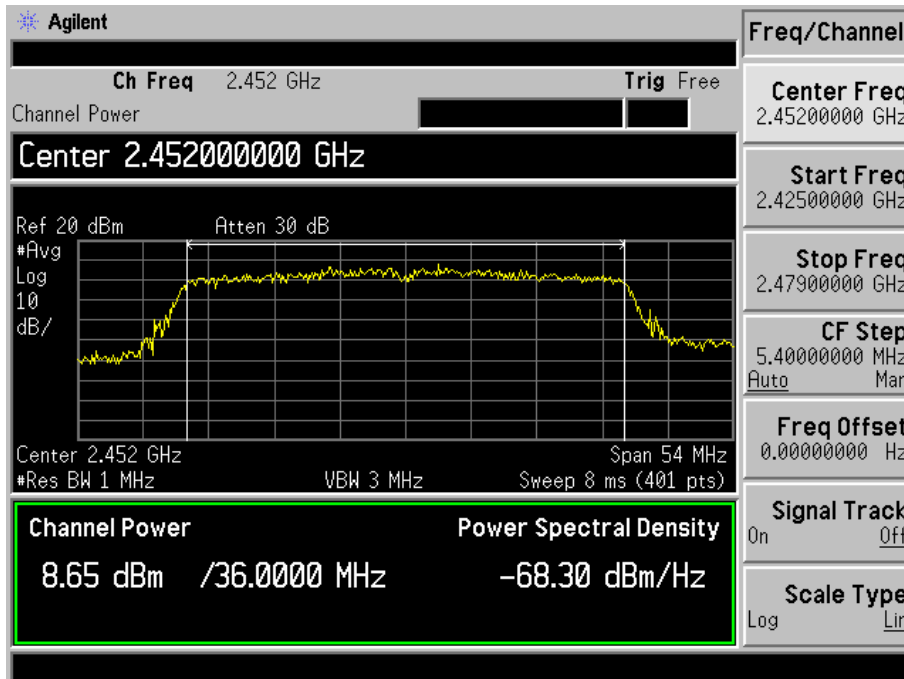
802.11n-HT40-MCS7-Low Channel



802.11n-HT40-MCS7-Middle Channel



802.11n-HT40-MCS7-High Channel



8. Field Strength of Spurious Emissions

8.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ± 5.10 dB.

8.2 Standard Applicable

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

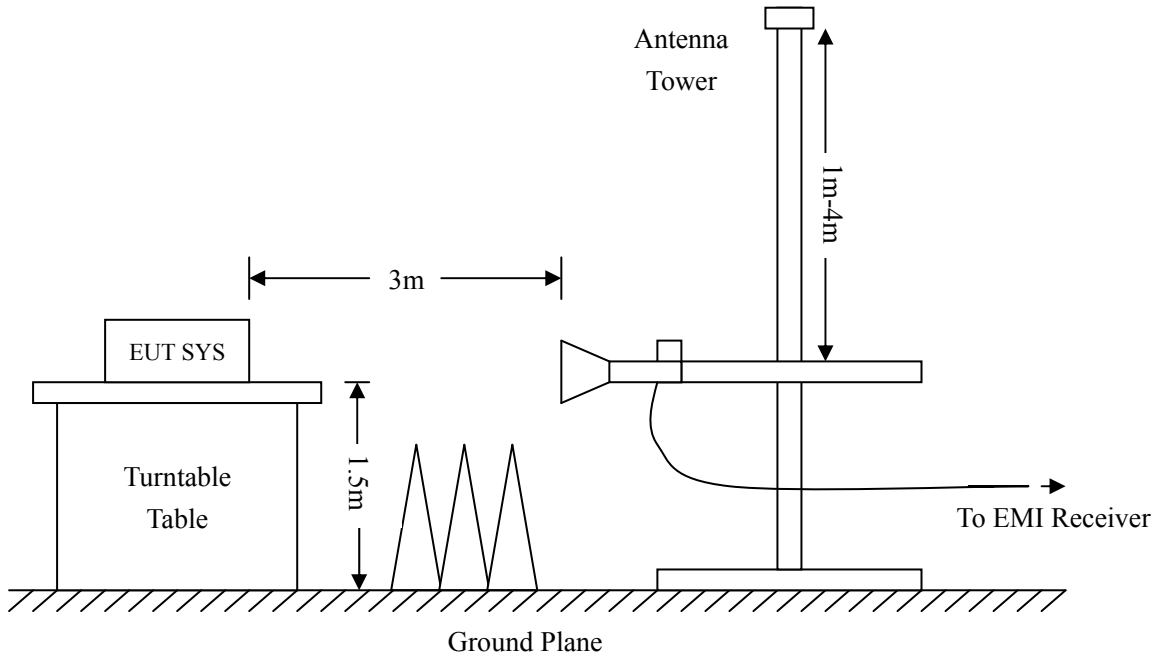
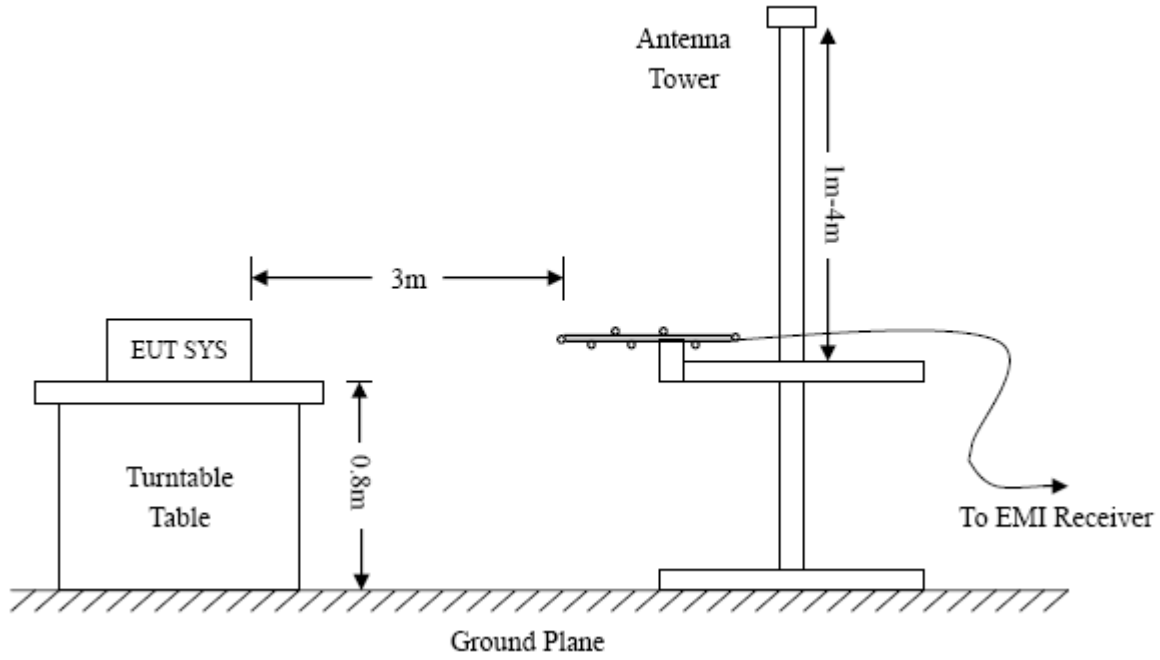
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

8.3 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 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
 RBW=10KHz,
 VBW =30KHz
 Sweep time= Auto
 Trace = max hold
 Detector function = peak

Frequency :30MHz-1GHz
 RBW=120KHz,
 VBW=300KHz
 Sweep time= Auto
 Trace = max hold
 Detector function = peak, QP

Frequency :Above 1GHz
 RBW=1MHz,
 VBW=3MHz(Peak), 10Hz(AV)
 Sweep time= Auto
 Trace = max hold
 Detector function = peak, AV

8.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

8.5 Environmental Conditions

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

8.6 Summary of Test Results/Plots

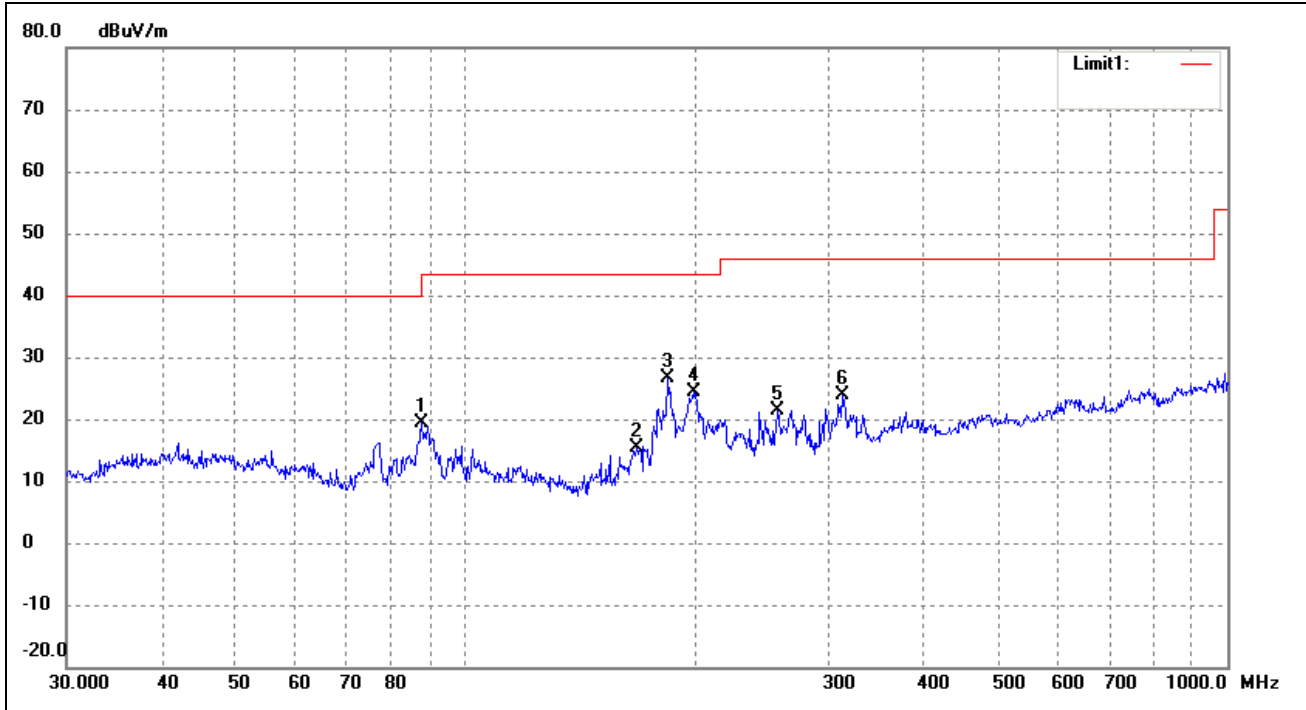
According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst cases:

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)

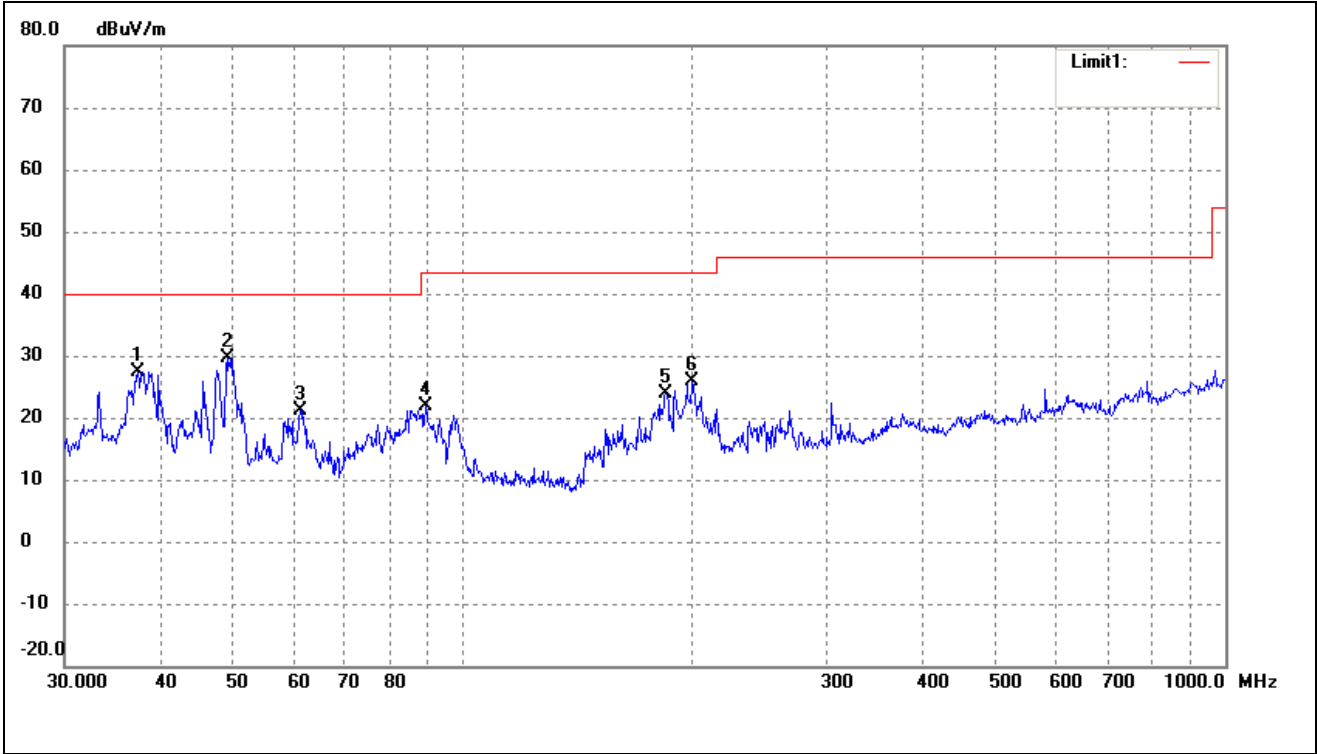
EUT: *Wireless Audio Module*
 Tested Model: *A28*
 Operating Condition: *802.11b Transmitting Low Channel-2412MHz*
 Comment: *Adapter DC 5V*

Test Specification: *Horizontal*



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	87.7248	32.10	-12.73	19.37	40.00	-20.63	254	100	peak
2	167.8243	27.18	-11.91	15.27	43.50	-28.23	100	100	peak
3	184.4898	37.43	-10.75	26.68	43.50	-16.82	284	100	peak
4	199.2855	33.05	-8.75	24.30	43.50	-19.20	23	108	peak
5	257.4222	28.47	-7.13	21.34	46.00	-24.66	360	200	peak
6	312.1794	28.98	-5.03	23.95	46.00	-22.05	341	100	peak

Test Specification: Vertical

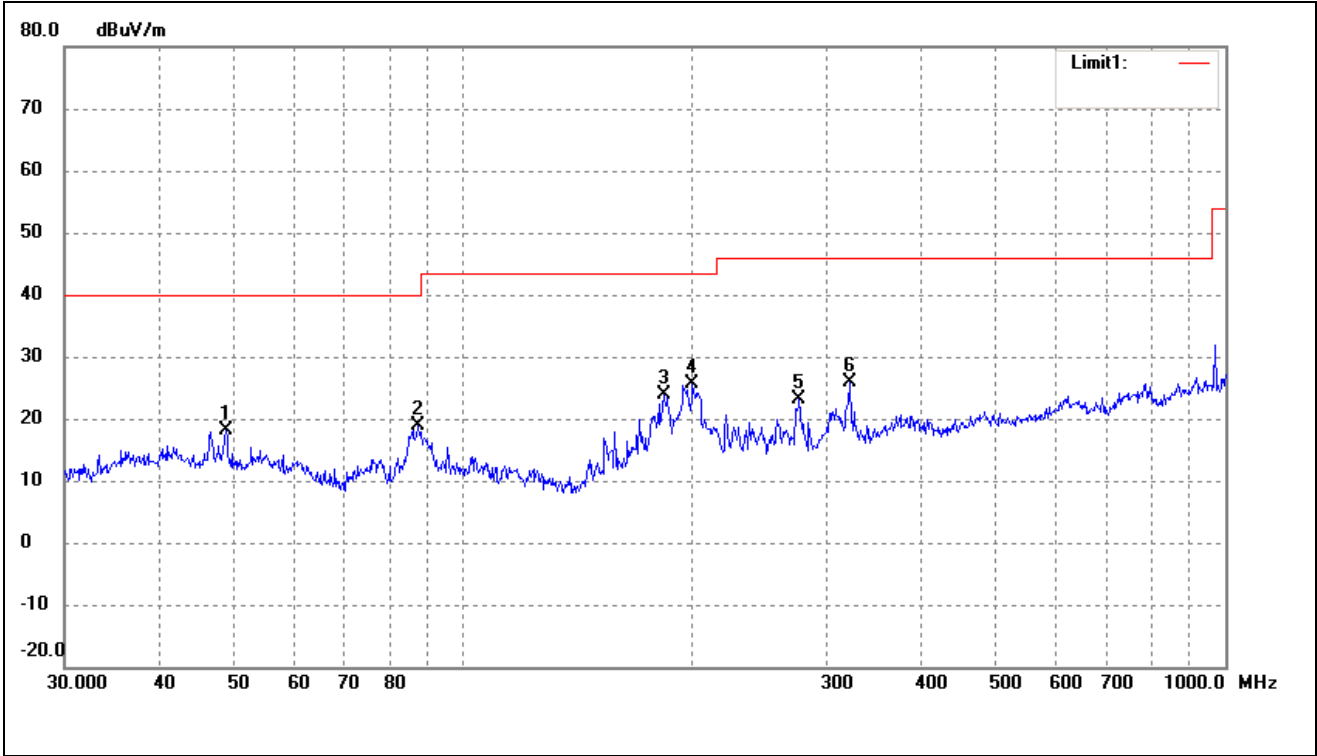


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.4165	35.72	-8.37	27.35	40.00	-12.65	108	100	peak
2	49.0145	37.93	-8.26	29.67	40.00	-10.33	300	100	peak
3	61.1316	31.14	-9.94	21.20	40.00	-18.80	360	100	peak
4	89.2764	34.66	-12.87	21.79	43.50	-21.71	49	100	peak
5	184.4898	34.68	-10.75	23.93	43.50	-19.57	342	100	peak
6	199.9856	34.53	-8.65	25.88	43.50	-17.62	251	100	peak

Operating Condition: 802.11b Transmitting Middle Channel-2437MHz

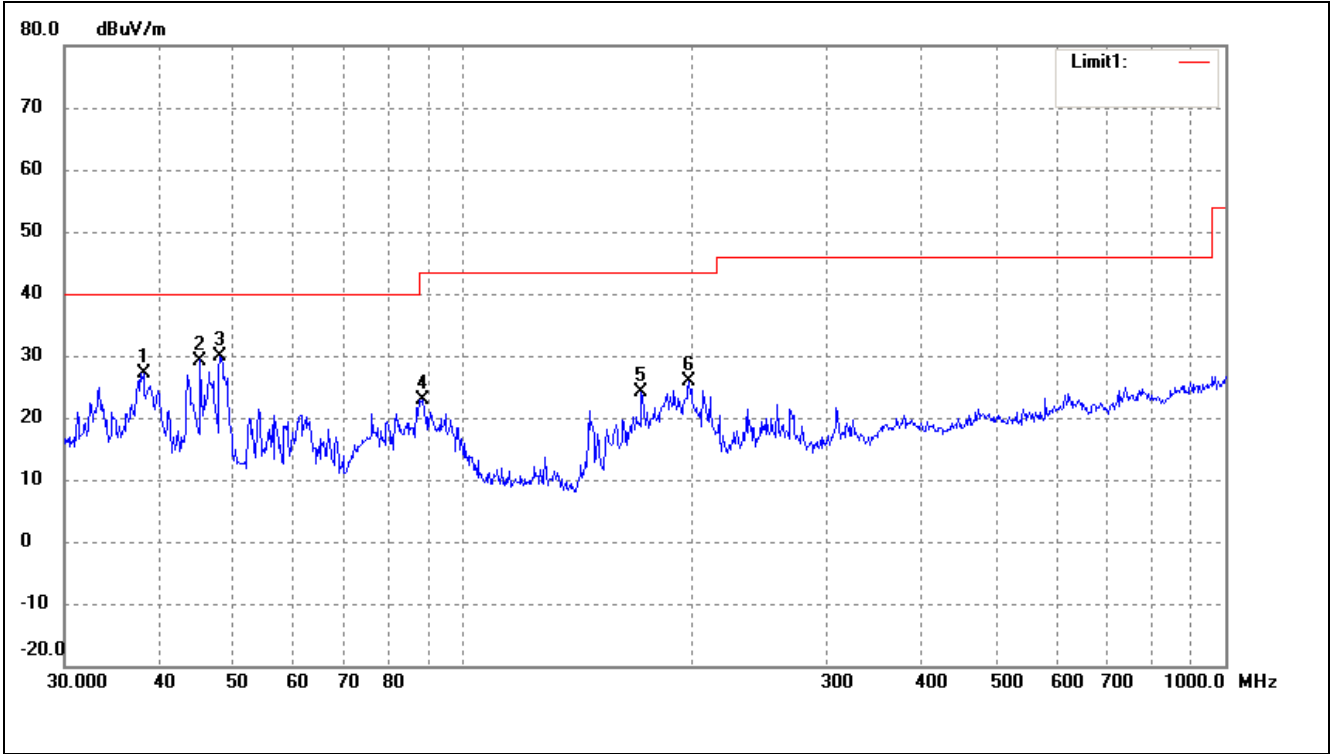
Comment: Adapter DC 5V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	48.8429	26.30	-8.25	18.05	40.00	-21.95	231	100	peak
2	87.4177	31.69	-12.70	18.99	40.00	-21.01	247	100	peak
3	183.2005	34.76	-10.93	23.83	43.50	-19.67	103	100	peak
4	199.9856	34.21	-8.65	25.56	43.50	-17.94	63	100	peak
5	276.1236	29.49	-6.26	23.23	46.00	-22.77	360	100	peak
6	321.0608	30.58	-4.64	25.94	46.00	-20.06	108	100	peak

Test Specification: Vertical

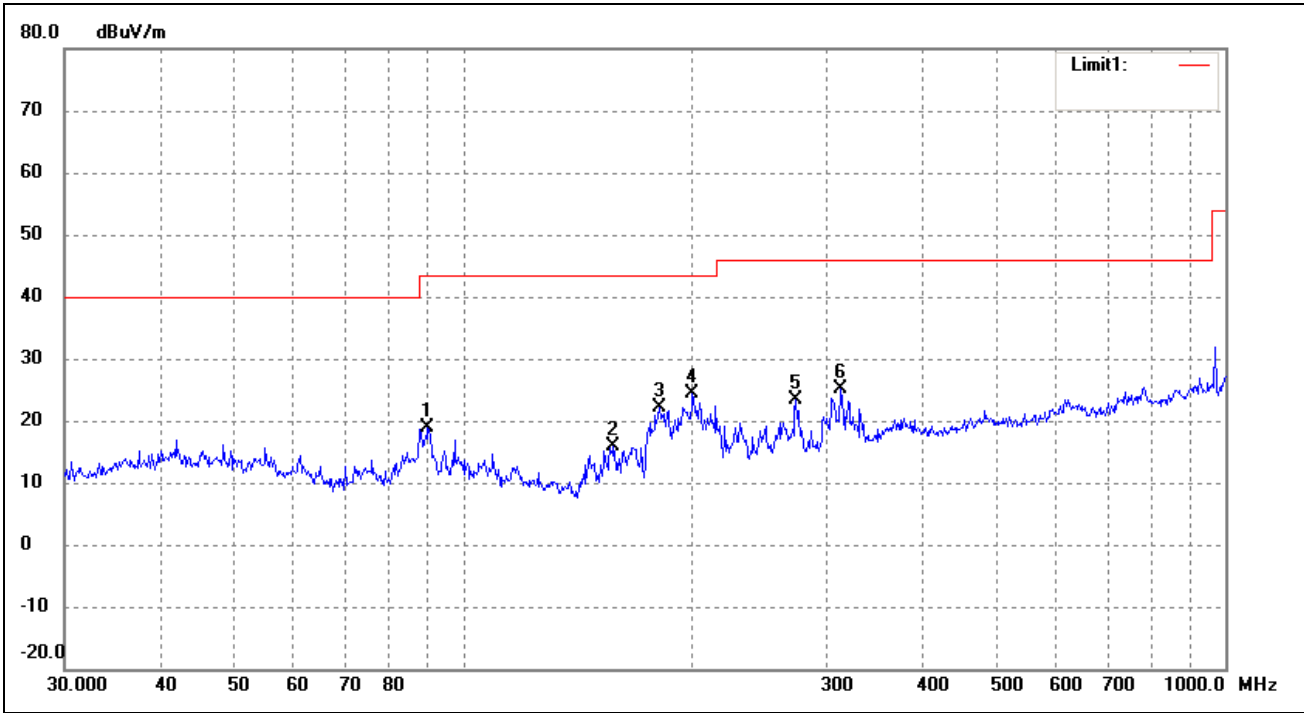


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	38.0783	35.33	-8.20	27.13	40.00	-12.87	256	100	peak
2	45.2166	37.26	-8.01	29.25	40.00	-10.75	360	100	peak
3	47.9940	38.00	-8.19	29.81	40.00	-10.19	360	100	peak
4	88.6525	35.68	-12.82	22.86	43.50	-20.64	143	100	peak
5	171.3926	35.98	-11.75	24.23	43.50	-19.27	186	100	peak
6	197.8928	34.94	-8.94	26.00	43.50	-17.50	249	100	peak

Operating Condition: 802.11b Transmitting High Channel-2462MHz

Comment: Adapter DC 5V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	89.9047	31.90	-12.93	18.97	43.50	-24.53	176	100	peak
2	157.5589	28.27	-12.31	15.96	43.50	-27.54	255	100	peak
3	180.6488	33.46	-11.28	22.18	43.50	-21.32	360	100	peak
4	199.9856	33.08	-8.65	24.43	43.50	-19.07	13	100	peak
5	273.2341	29.72	-6.40	23.32	46.00	-22.68	269	100	peak
6	312.1794	30.20	-5.03	25.17	46.00	-20.83	308	100	peak

Test Specification: Vertical

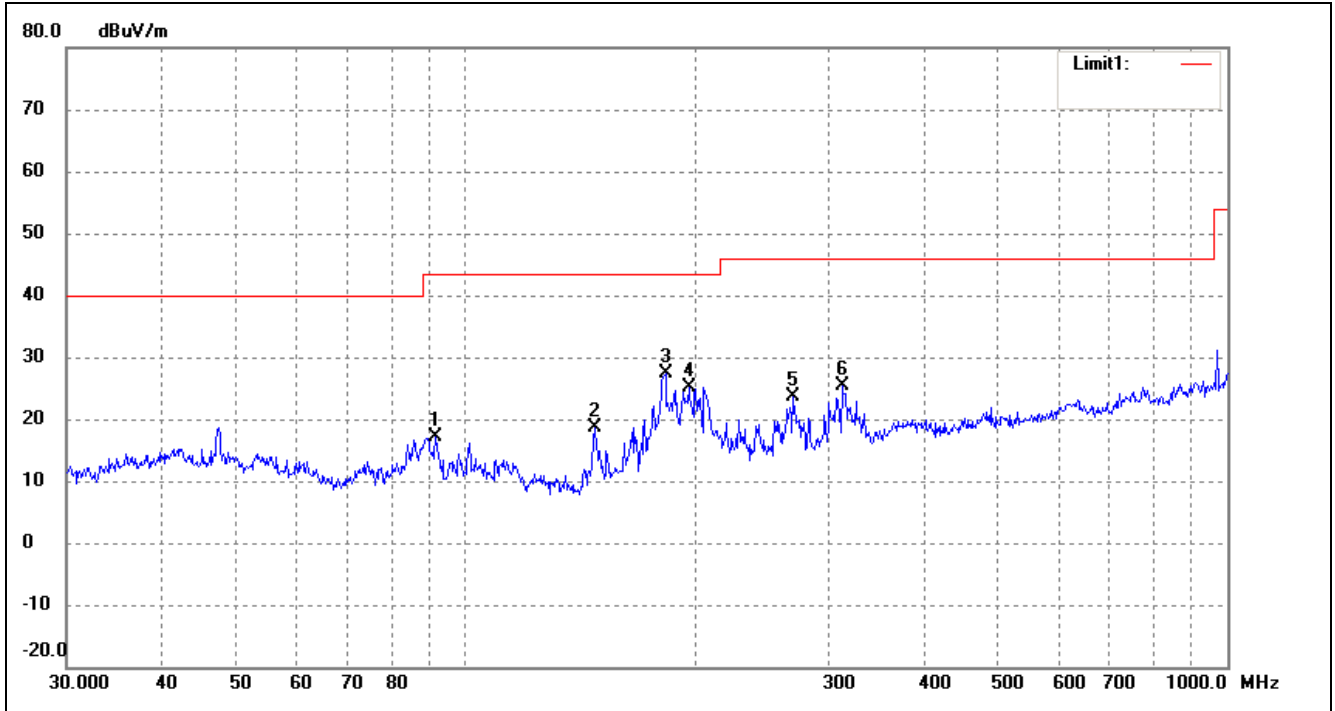


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	38.0783	36.83	-8.20	28.63	40.00	-11.37	360	100	peak
2	39.5757	36.63	-7.78	28.85	40.00	-11.15	225	100	peak
3	48.1626	37.78	-8.20	29.58	40.00	-10.42	160	100	peak
4	49.8814	38.26	-8.31	29.95	40.00	-10.05	41	100	peak
5	86.5029	35.67	-12.62	23.05	40.00	-16.95	342	100	peak
6	197.8928	37.55	-8.94	28.61	43.50	-14.89	179	100	peak

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

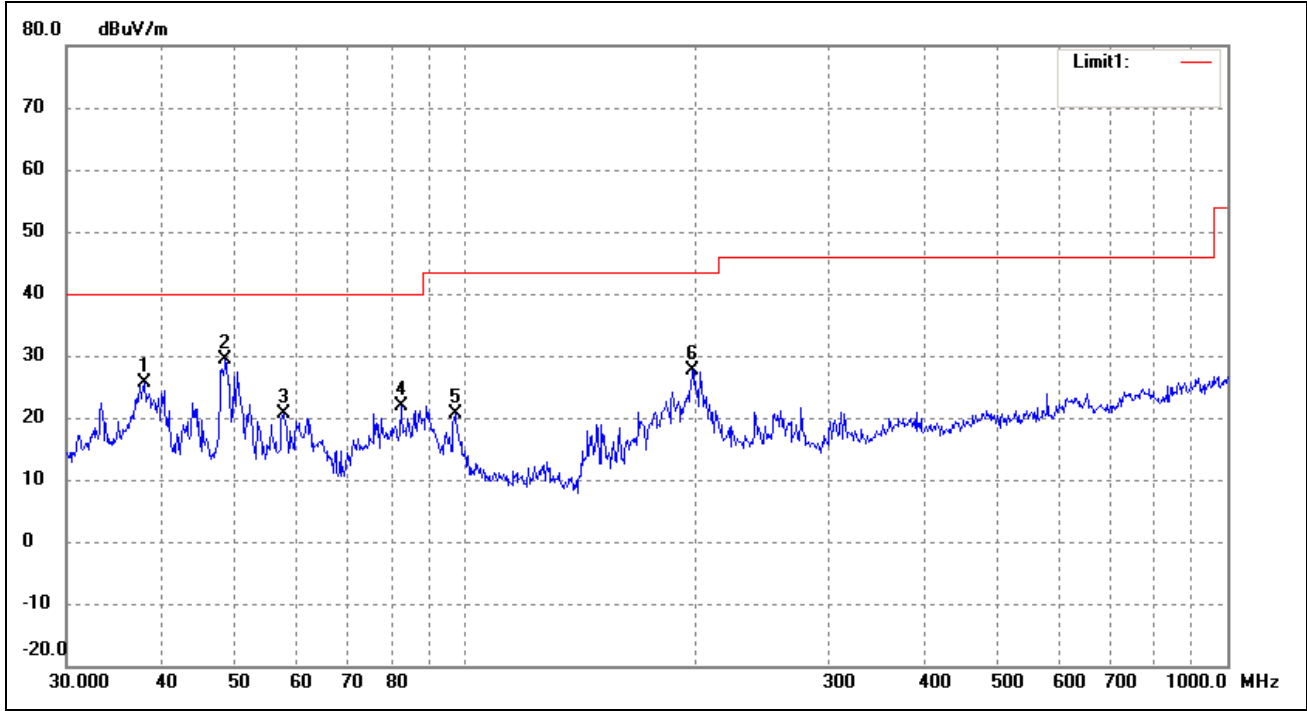
EUT: *Wireless Audio Module*
 Tested Model: *A28*
 Operating Condition: *802.11g Transmitting Low Channel-2412MHz*
 Comment: *Adapter DC 5V*

Test Specification: *Horizontal*



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	91.4949	29.85	-12.64	17.21	43.50	-26.29	100	100	peak
2	147.9214	31.06	-12.45	18.61	43.50	-24.89	160	100	peak
3	183.2005	38.34	-10.93	27.41	43.50	-16.09	320	100	peak
4	196.5098	34.29	-9.12	25.17	43.50	-18.33	138	100	peak
5	269.4284	30.22	-6.55	23.67	46.00	-22.33	64	100	peak
6	312.1794	30.44	-5.03	25.41	46.00	-20.59	317	100	peak

Test Specification: Vertical

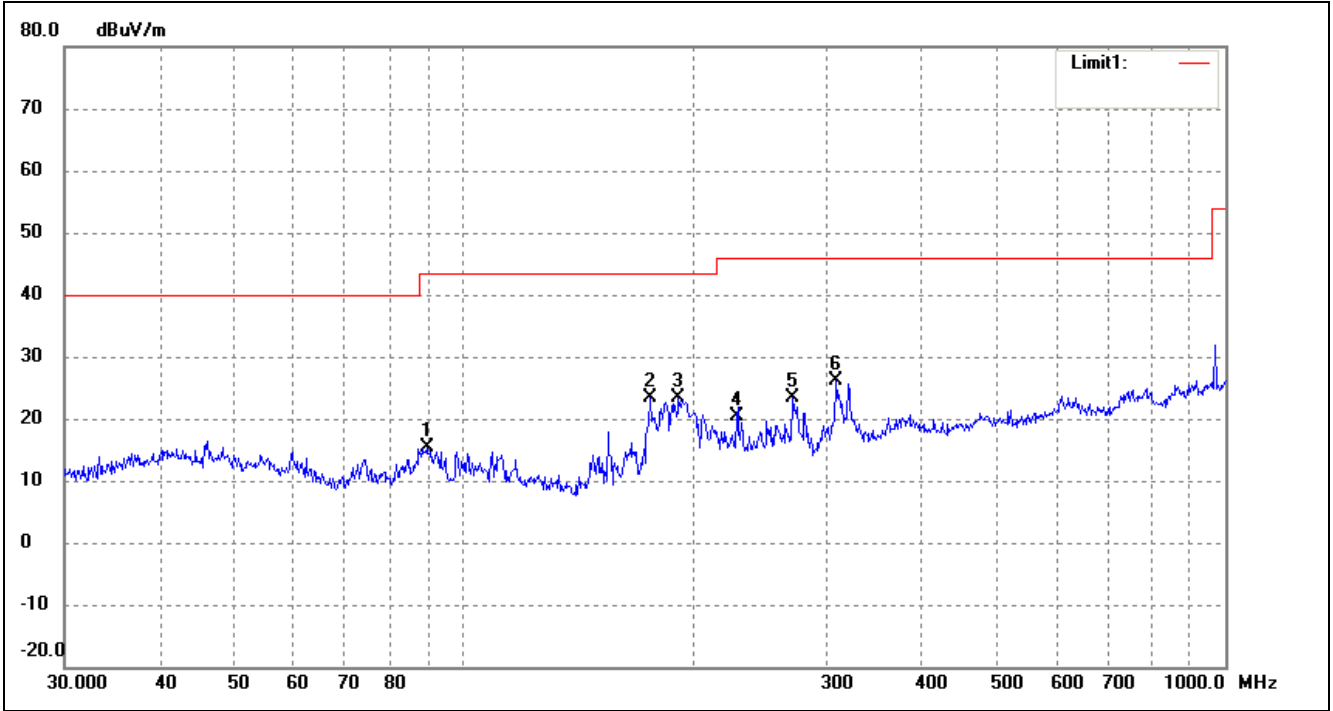


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.9450	33.79	-8.23	25.56	40.00	-14.44	100	100	peak
2	48.5016	37.60	-8.22	29.38	40.00	-10.62	100	100	peak
3	57.7962	30.02	-9.31	20.71	40.00	-19.29	336	100	peak
4	82.3589	34.09	-12.21	21.88	40.00	-18.12	342	100	peak
5	97.1148	32.24	-11.49	20.75	43.50	-22.75	46	100	peak
6	198.5880	36.57	-8.85	27.72	43.50	-15.78	234	100	peak

Operating Condition: 802.11g Transmitting Middle Channel-2437MHz

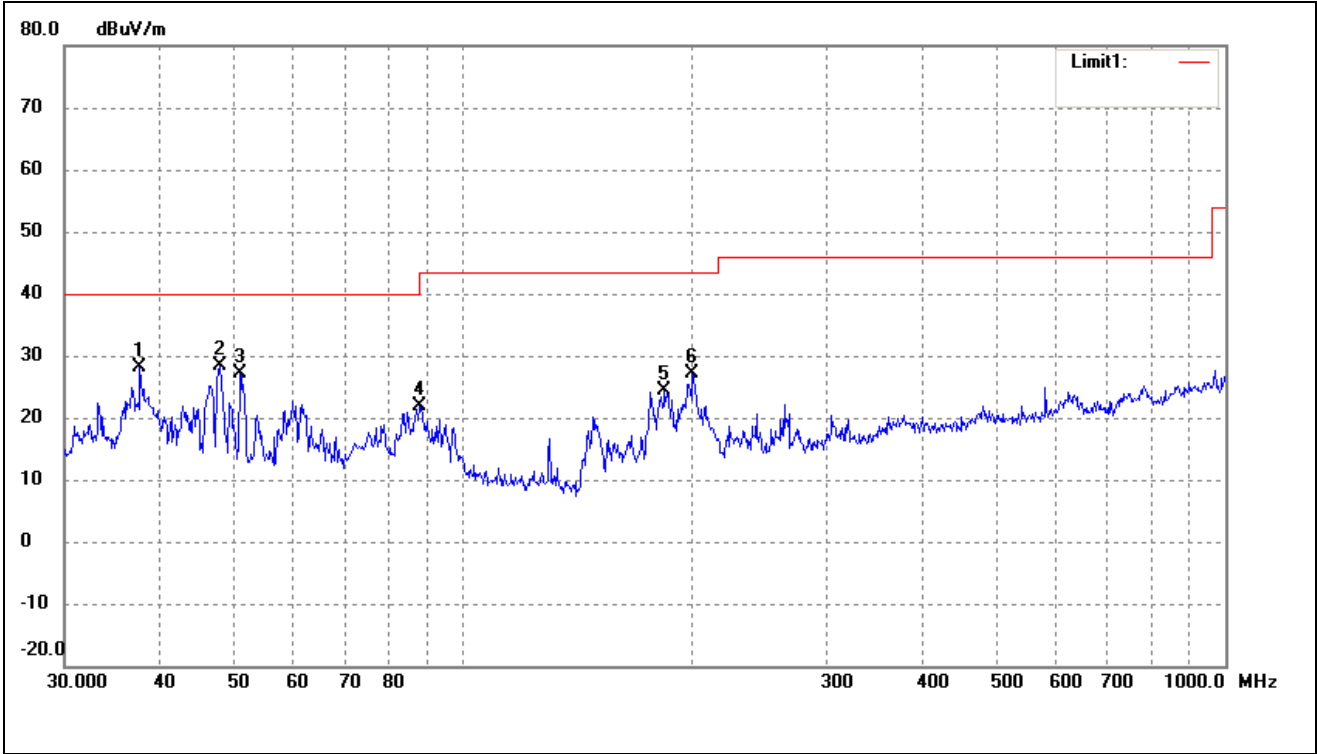
Comment: Adapter DC 5V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	89.5900	28.24	-12.90	15.34	43.50	-28.16	270	100	peak
2	175.6516	35.00	-11.56	23.44	43.50	-20.06	100	100	peak
3	191.7450	33.16	-9.77	23.39	43.50	-20.11	228	200	peak
4	228.4904	29.11	-8.63	20.48	46.00	-25.52	155	100	peak
5	270.3748	29.97	-6.51	23.46	46.00	-22.54	23	100	peak
6	308.9126	31.25	-5.19	26.06	46.00	-19.94	194	200	peak

Test Specification: Vertical

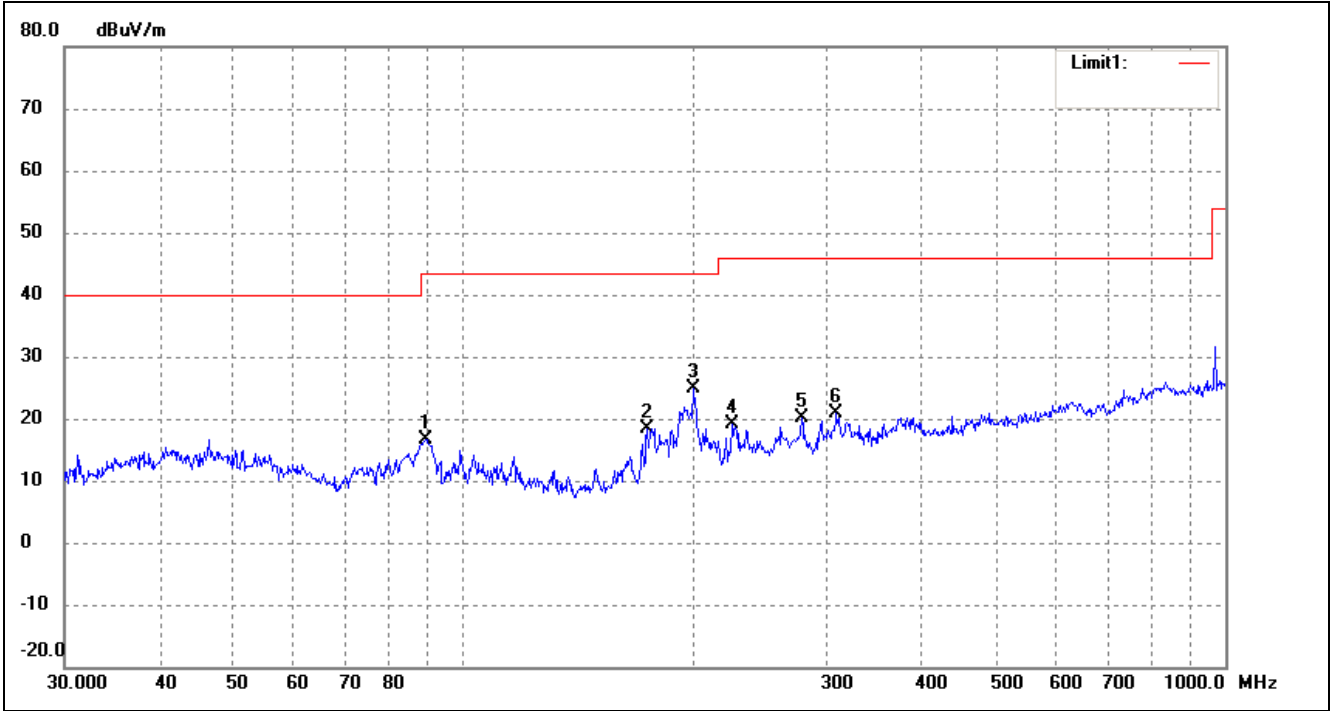


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.6798	36.46	-8.30	28.16	40.00	-11.84	360	100	peak
2	47.9940	36.49	-8.19	28.30	40.00	-11.70	100	100	peak
3	50.9420	35.57	-8.44	27.13	40.00	-12.87	100	100	peak
4	87.7248	34.70	-12.73	21.97	40.00	-18.03	146	100	peak
5	183.8440	35.22	-10.84	24.38	43.50	-19.12	358	100	peak
6	199.9856	35.86	-8.65	27.21	43.50	-16.29	244	100	peak

Operating Condition: 802.11g Transmitting High Channel-2462MHz

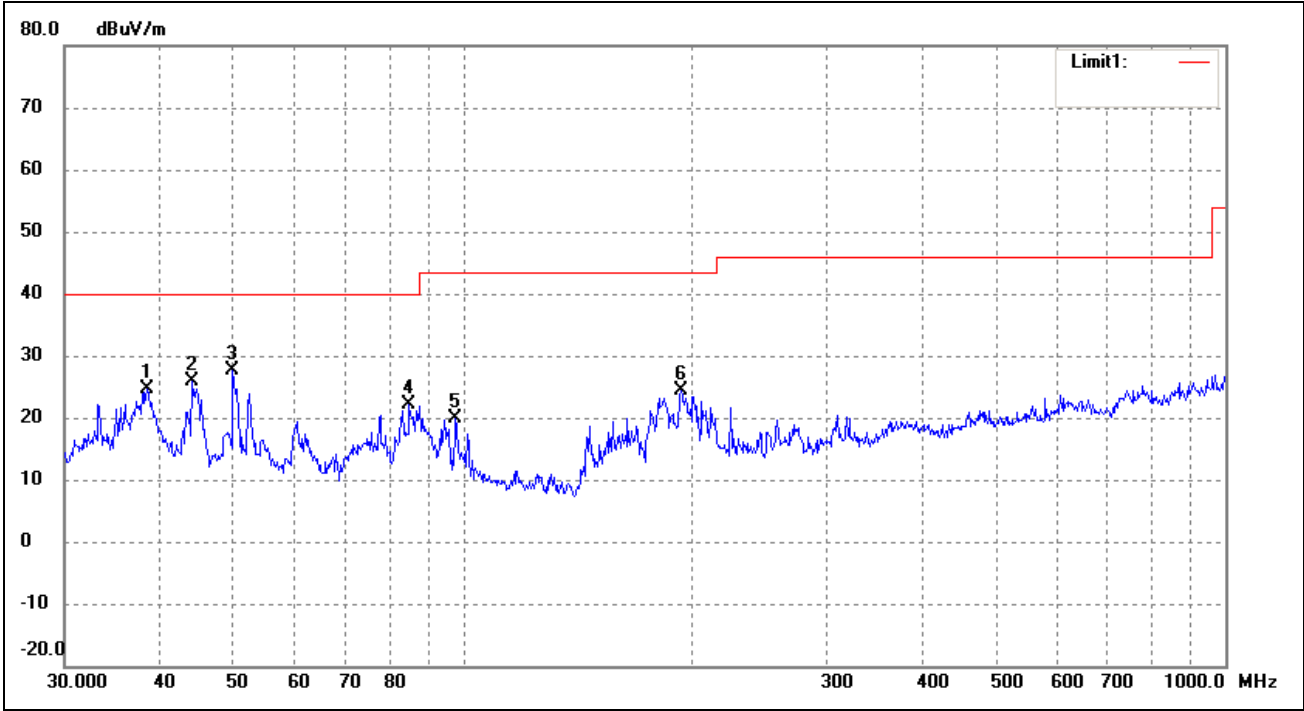
Comment: Adapter DC 5V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	89.2764	29.52	-12.87	16.65	43.50	-26.85	270	100	peak
2	174.4241	30.05	-11.61	18.44	43.50	-25.06	100	200	peak
3	200.6881	33.61	-8.66	24.95	43.50	-18.55	100	200	peak
4	225.3080	27.79	-8.71	19.08	46.00	-26.92	134	100	peak
5	278.0669	26.35	-6.18	20.17	46.00	-25.83	243	100	peak
6	308.9126	26.12	-5.19	20.93	46.00	-25.07	360	100	peak

Test Specification: Vertical

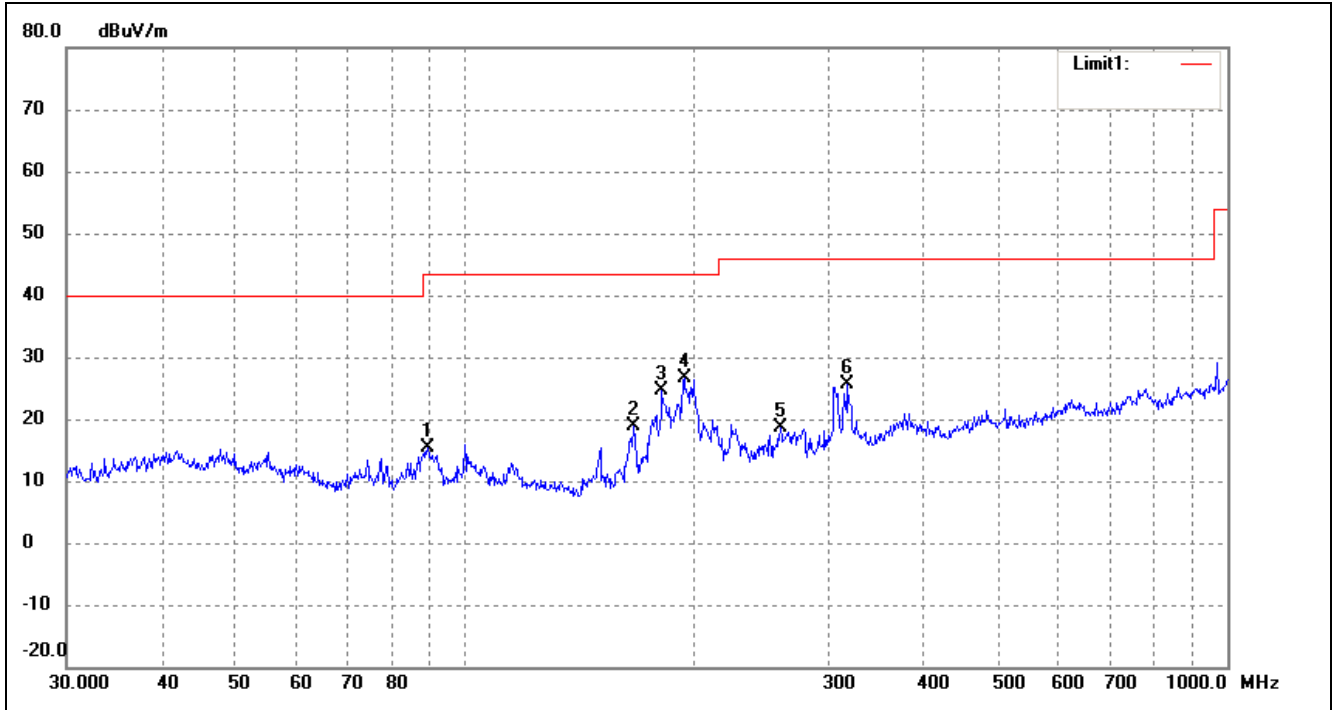


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	38.4809	32.61	-8.08	24.53	40.00	-15.47	360	100	peak
2	44.1202	33.90	-7.94	25.96	40.00	-14.04	100	100	peak
3	49.8814	35.94	-8.31	27.63	40.00	-12.37	100	100	peak
4	84.9995	34.63	-12.47	22.16	40.00	-17.84	42	100	peak
5	97.7983	31.15	-11.35	19.80	43.50	-23.70	153	100	peak
6	193.0945	33.86	-9.59	24.27	43.50	-19.23	342	100	peak

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

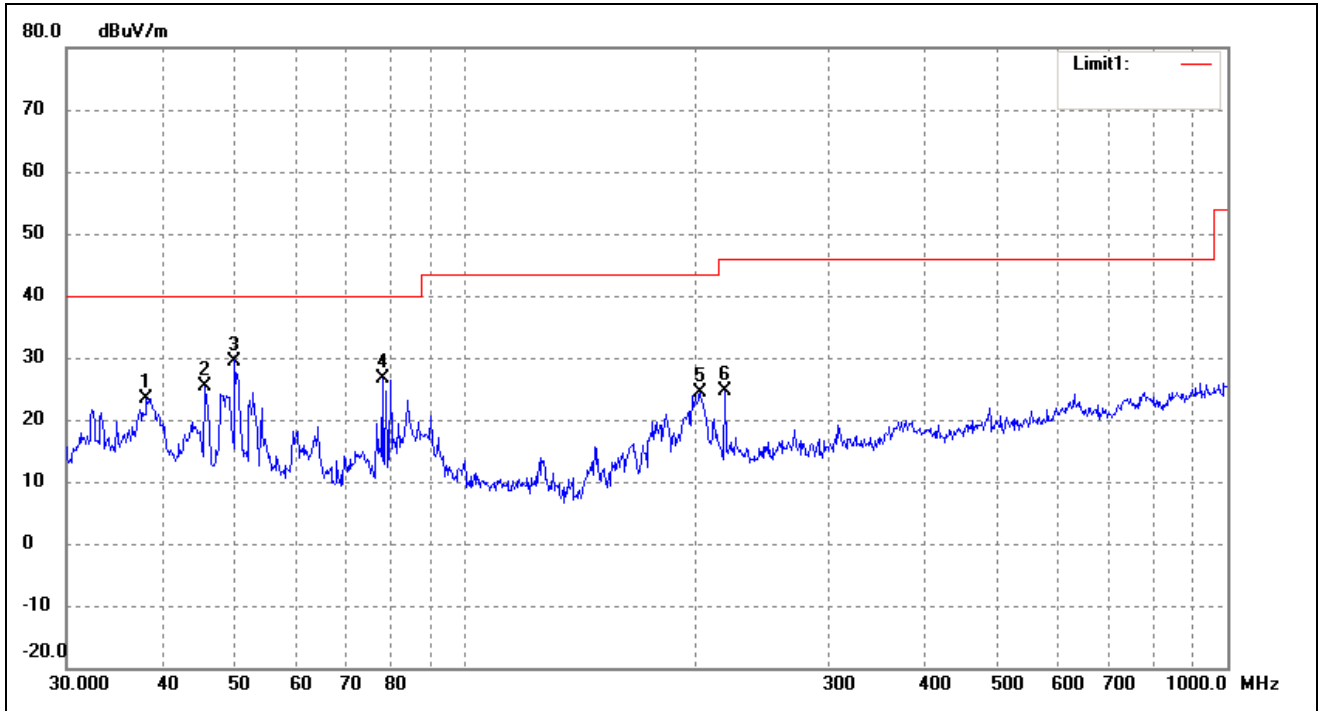
EUT: *Wireless Audio Module*
 Tested Model: *A28*
 Operating Condition: *802.11n-HT20 Transmitting Low Channel-2412MHz*
 Comment: *Adapter DC 5V*

Test Specification: *Horizontal*



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	89.2764	28.15	-12.87	15.28	43.50	-28.22	260	100	peak
2	166.6514	30.86	-11.97	18.89	43.50	-24.61	100	200	peak
3	181.2834	35.81	-11.18	24.63	43.50	-18.87	285	200	peak
4	193.7728	36.18	-9.48	26.70	43.50	-16.80	47	100	peak
5	259.2338	25.53	-7.00	18.53	46.00	-27.47	351	200	peak
6	317.7011	30.47	-4.74	25.73	46.00	-20.27	360	200	peak

Test Specification: Vertical

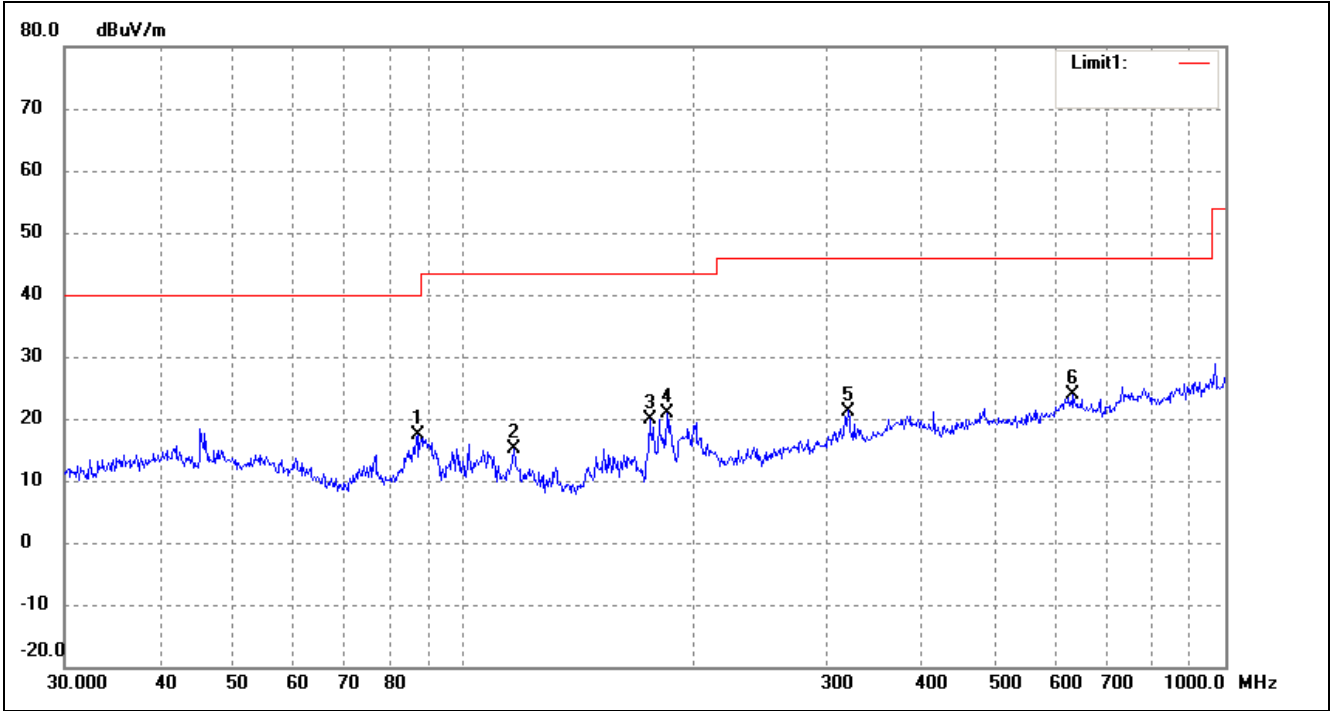


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	38.2120	31.50	-8.16	23.34	40.00	-16.66	155	100	peak
2	45.5348	33.46	-8.03	25.43	40.00	-14.57	100	100	peak
3	49.8814	37.81	-8.31	29.50	40.00	-10.50	100	100	peak
4	77.8654	38.71	-12.17	26.54	40.00	-13.46	360	100	peak
5	203.5228	33.05	-8.68	24.37	43.50	-19.13	246	100	peak
6	219.0753	33.57	-8.83	24.74	46.00	-21.26	29	100	peak

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

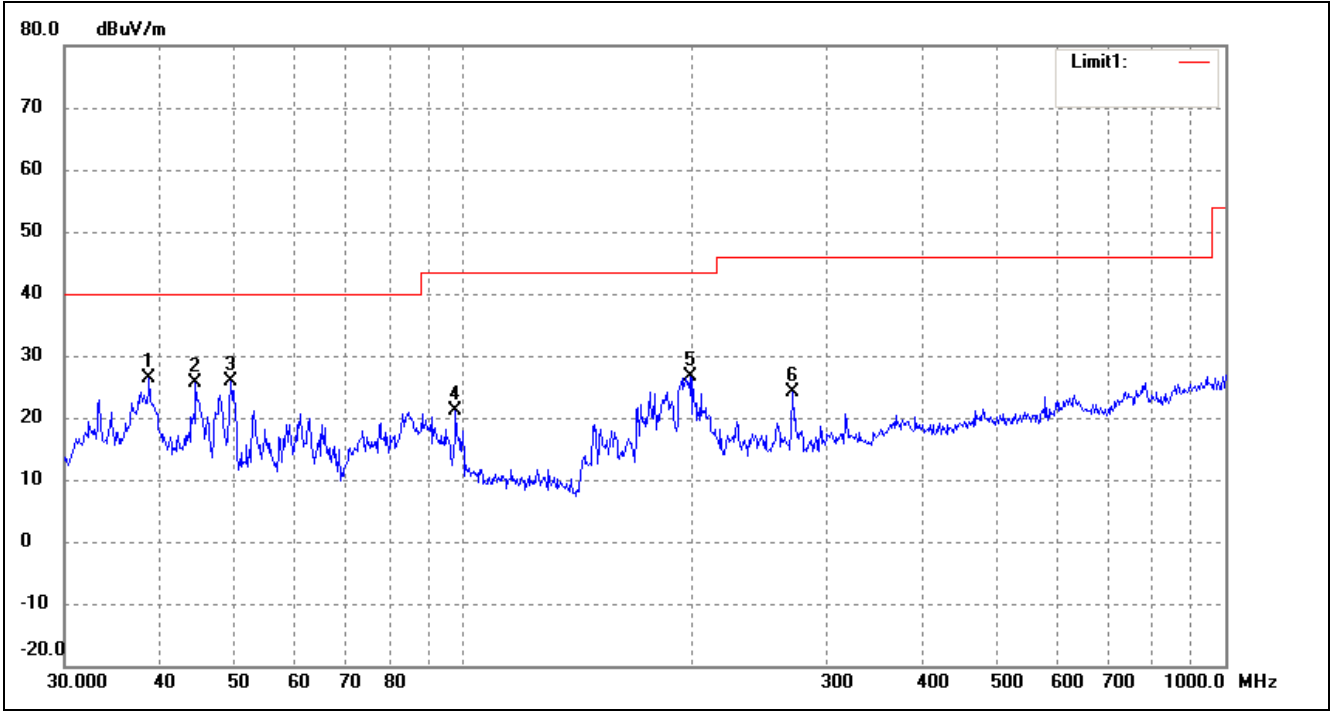
Comment: Adapter DC 5V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	87.1117	29.99	-12.67	17.32	40.00	-22.68	274	100	peak
2	116.5401	26.53	-11.34	15.19	43.50	-28.31	116	100	peak
3	175.6516	31.45	-11.56	19.89	43.50	-23.61	100	100	peak
4	185.1379	31.60	-10.66	20.94	43.50	-22.56	345	100	peak
5	319.9370	25.87	-4.62	21.25	46.00	-24.75	147	100	peak
6	631.6884	22.86	0.93	23.79	46.00	-22.21	360	100	peak

Test Specification: Vertical

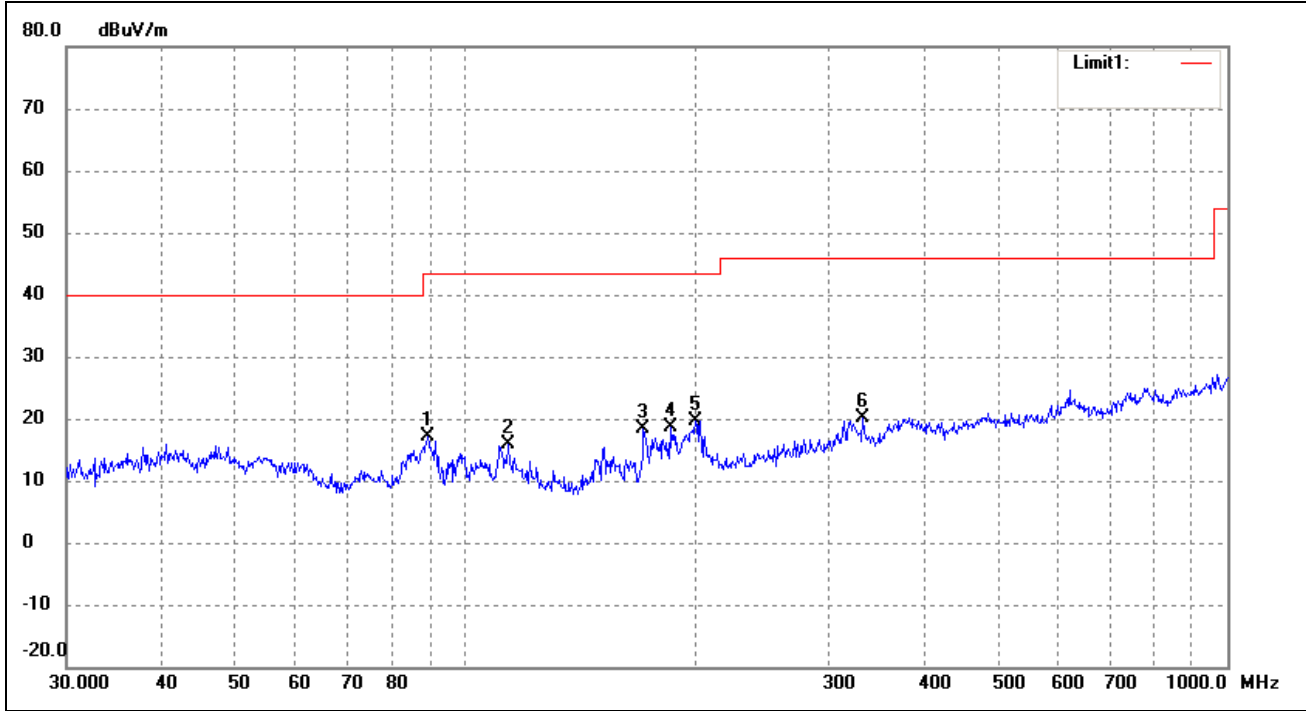


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	38.7518	34.38	-8.00	26.38	40.00	-13.62	108	100	peak
2	44.5868	33.72	-7.97	25.75	40.00	-14.25	360	100	peak
3	49.5328	34.26	-8.29	25.97	40.00	-14.03	100	100	peak
4	97.7983	32.53	-11.35	21.18	43.50	-22.32	143	100	peak
5	198.5880	35.60	-8.85	26.75	43.50	-16.75	194	100	peak
6	270.3748	30.59	-6.51	24.08	46.00	-21.92	344	100	peak

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

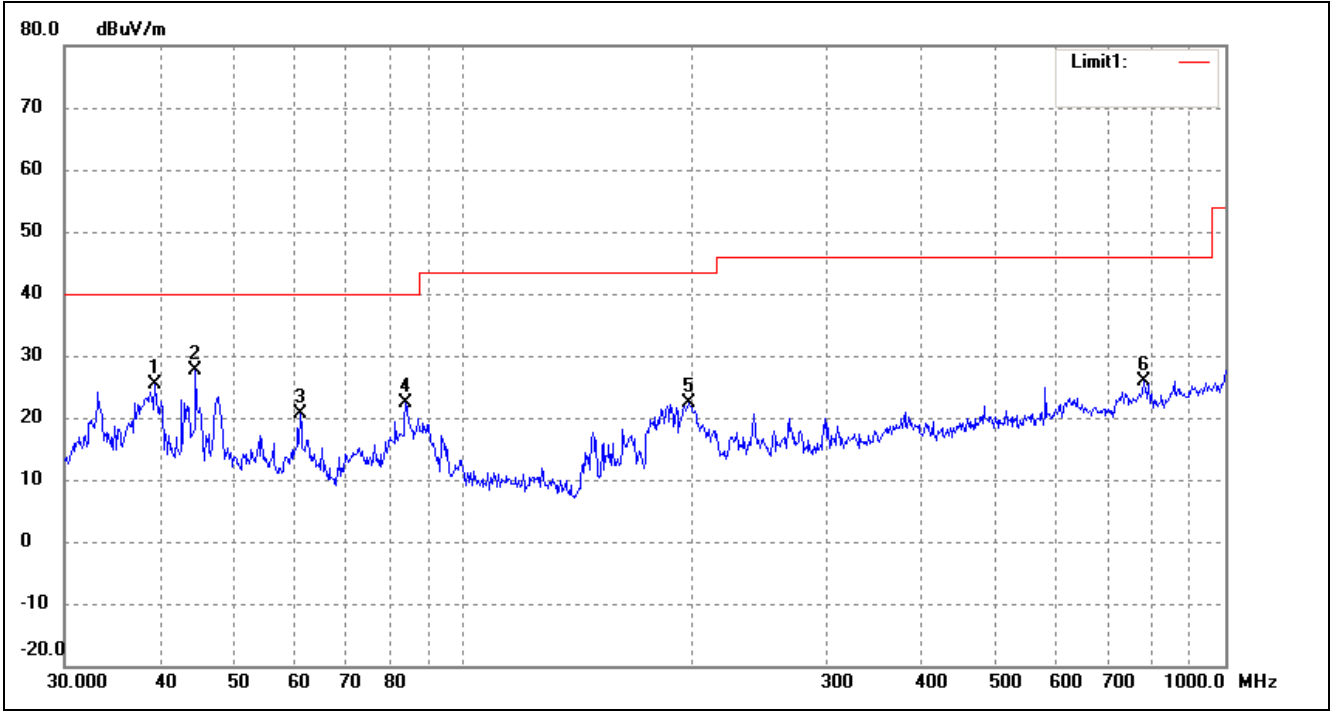
Comment: Adapter DC 5V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	89.2764	29.98	-12.87	17.11	43.50	-26.39	360	100	peak
2	114.1138	27.12	-11.28	15.84	43.50	-27.66	100	100	peak
3	171.3926	30.02	-11.75	18.27	43.50	-25.23	107	200	peak
4	185.7882	29.15	-10.58	18.57	43.50	-24.93	134	100	peak
5	200.6881	28.29	-8.66	19.63	43.50	-23.87	359	100	peak
6	332.5187	25.02	-4.86	20.16	46.00	-25.84	45	200	peak

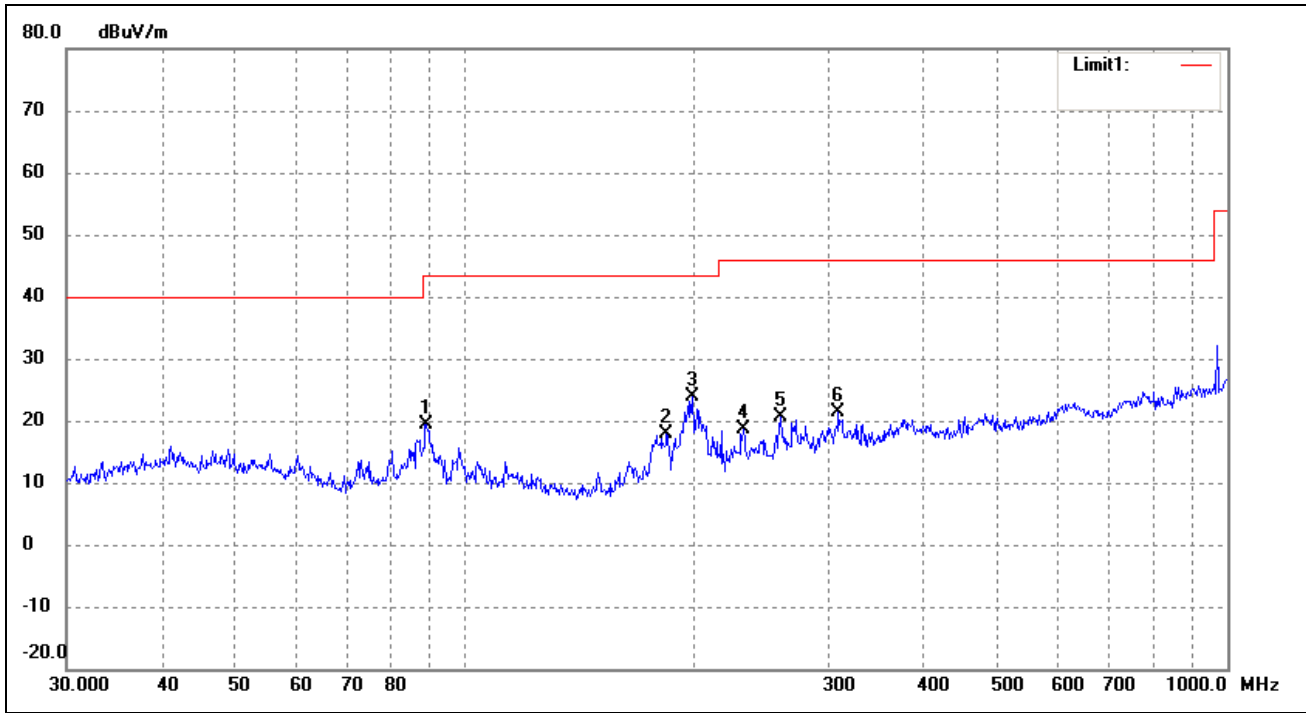
Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	39.4372	33.14	-7.82	25.32	40.00	-14.68	184	100	peak
2	44.5868	35.55	-7.97	27.58	40.00	-12.42	100	100	peak
3	61.1316	30.55	-9.94	20.61	40.00	-19.39	360	100	peak
4	84.1100	34.81	-12.38	22.43	40.00	-17.57	275	100	peak
5	197.8928	31.37	-8.94	22.43	43.50	-21.07	41	100	peak
6	782.3453	23.14	2.78	25.92	46.00	-20.08	37	100	peak

EUT: *Wireless Audio Module*
 Tested Model: *A28*
 Operating Condition: *802.11n-HT40 Transmitting Low Channel-2422MHz*
 Comment: *Adapter DC 5V*

Test Specification: *Horizontal*



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	88.9639	32.30	-12.85	19.45	43.50	-24.05	267	100	peak
2	183.8440	28.67	-10.84	17.83	43.50	-25.67	100	200	peak
3	198.5880	32.67	-8.85	23.82	43.50	-19.68	140	200	peak
4	231.7179	27.22	-8.54	18.68	46.00	-27.32	63	100	peak
5	259.2338	27.51	-7.00	20.51	46.00	-25.49	189	200	peak
6	308.9126	26.58	-5.19	21.39	46.00	-24.61	347	200	peak

Test Specification: Vertical

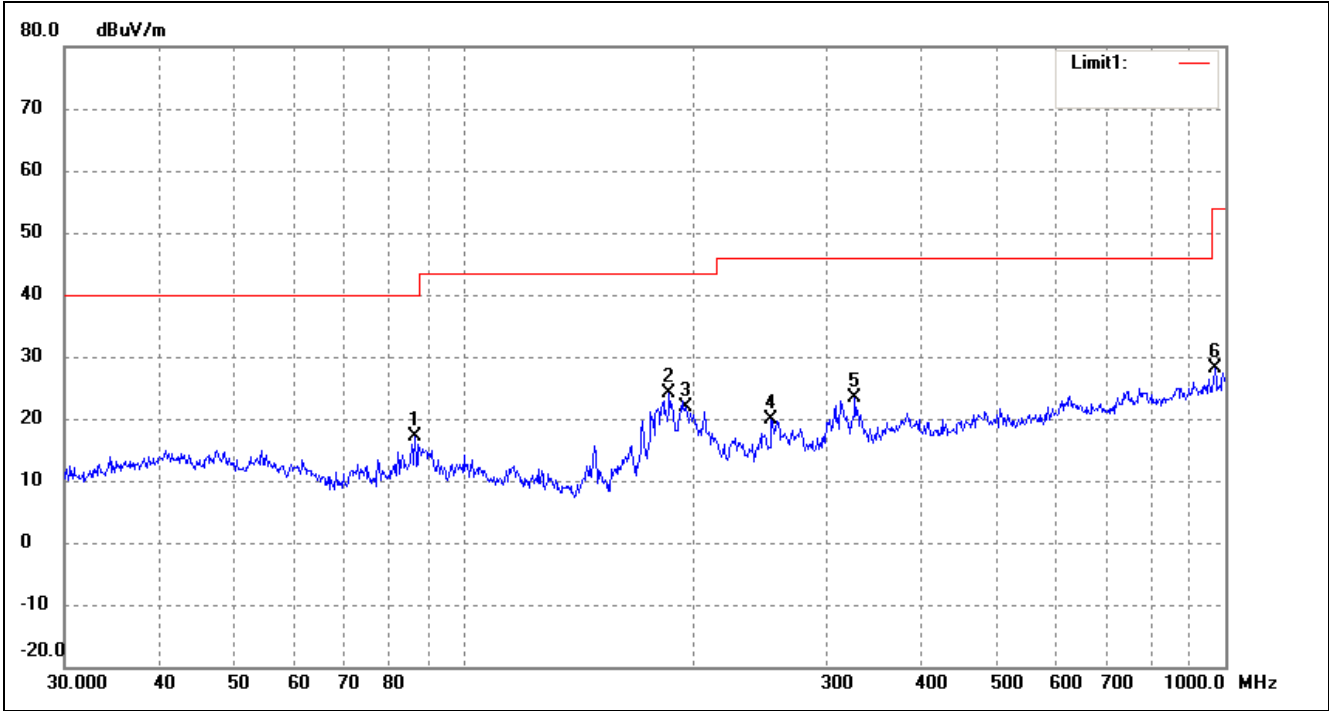


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.3279	33.73	-9.46	24.27	40.00	-15.73	360	100	peak
2	38.4809	34.41	-8.08	26.33	40.00	-13.67	258	100	peak
3	50.2325	31.56	-8.35	23.21	40.00	-16.79	347	100	peak
4	59.2325	31.53	-9.48	22.05	40.00	-17.95	141	100	peak
5	87.7248	34.54	-12.73	21.81	40.00	-18.19	3	100	peak
6	186.4409	37.64	-10.48	27.16	43.50	-16.34	44	100	peak

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

Comment: Adapter DC 5V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	86.5029	29.74	-12.62	17.12	40.00	-22.88	251	100	peak
2	186.4409	34.50	-10.48	24.02	43.50	-19.48	174	100	peak
3	195.8220	31.01	-9.22	21.79	43.50	-21.71	100	100	peak
4	253.8367	27.15	-7.37	19.78	46.00	-26.22	145	100	peak
5	326.7395	28.04	-4.74	23.30	46.00	-22.70	237	100	peak
6	968.9338	24.39	3.72	28.11	54.00	-25.89	360	100	peak

Test Specification: Vertical

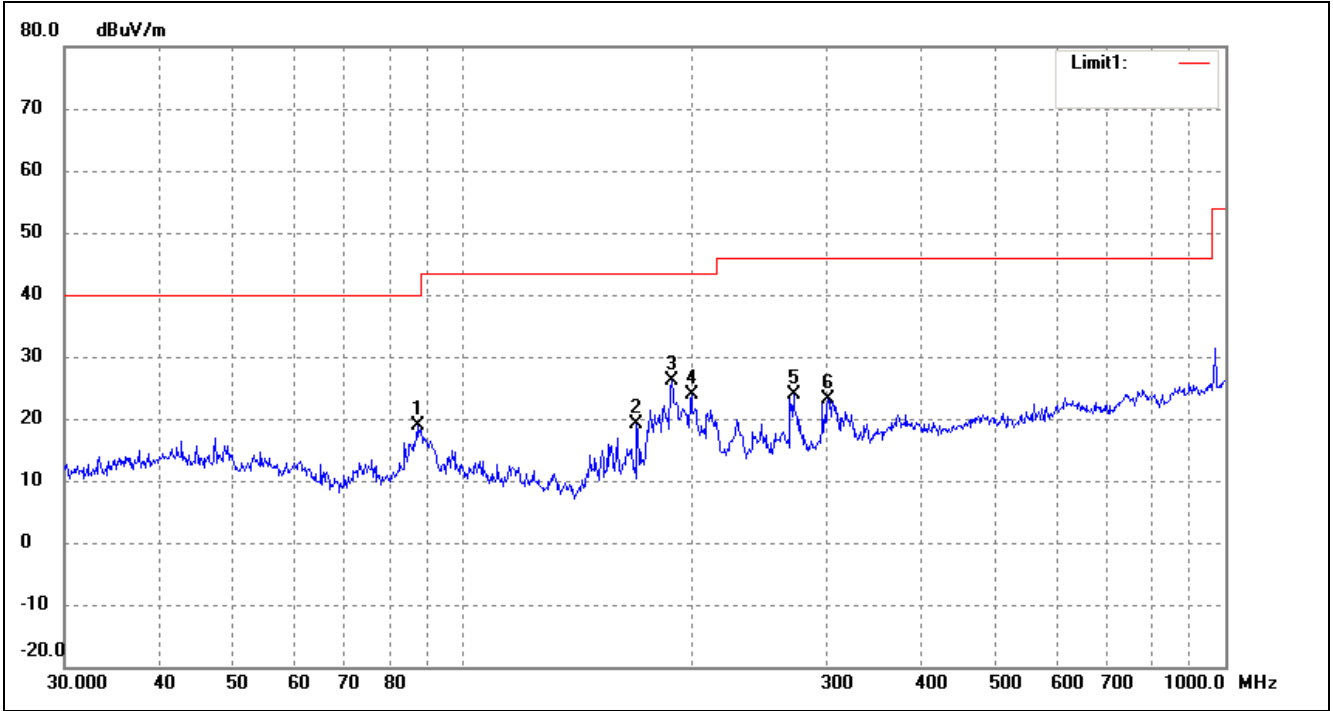


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	38.3462	30.91	-8.12	22.79	40.00	-17.21	275	100	peak
2	48.6719	35.43	-8.23	27.20	40.00	-12.80	14	100	peak
3	52.3913	35.52	-8.63	26.89	40.00	-13.11	315	100	peak
4	84.9995	37.40	-12.47	24.93	40.00	-15.07	45	100	peak
5	183.2005	32.77	-10.93	21.84	43.50	-21.66	243	100	peak
6	201.3930	34.26	-8.66	25.60	43.50	-17.90	217	100	peak

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

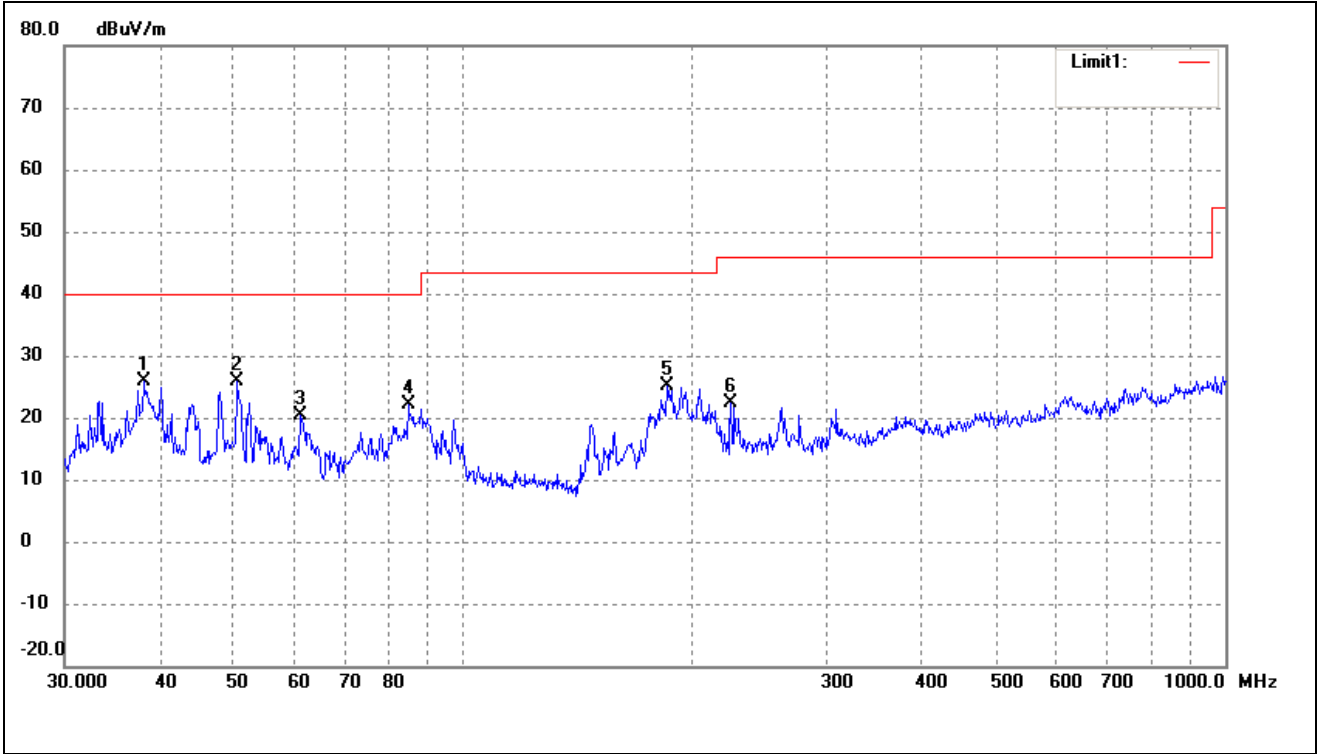
Comment: Adapter DC 5V

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	87.1117	31.59	-12.67	18.92	40.00	-21.08	360	100	peak
2	169.0054	31.10	-11.86	19.24	43.50	-24.26	287	100	peak
3	187.7530	36.43	-10.31	26.12	43.50	-17.38	168	100	peak
4	199.2855	32.53	-8.75	23.78	43.50	-19.72	360	100	peak
5	271.3246	30.32	-6.47	23.85	46.00	-22.15	48	100	peak
6	301.4224	28.76	-5.57	23.19	46.00	-22.81	146	100	peak

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	38.0783	34.18	-8.20	25.98	40.00	-14.02	100	100	peak
2	50.5860	34.38	-8.40	25.98	40.00	-14.02	136	100	peak
3	61.1316	30.20	-9.94	20.26	40.00	-19.74	284	100	peak
4	84.7019	34.53	-12.44	22.09	40.00	-17.91	236	100	peak
5	185.1379	35.78	-10.66	25.12	43.50	-18.38	298	100	peak
6	224.5193	31.03	-8.72	22.31	46.00	-23.69	84	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-2437MHz							
4874.000	54.74	-3.74	51.00	74.00	-23.00	H	PK
4874.000	39.99	-3.74	36.25	54.00	-17.75	H	AV
7311.000	47.77	1.47	49.24	74.00	-24.76	H	PK
7311.000	33.10	1.47	34.57	54.00	-19.43	H	AV
4874.000	53.97	-3.74	50.23	74.00	-23.77	V	PK
4874.000	40.89	-3.74	37.15	54.00	-16.85	V	AV
7311.000	47.98	1.47	49.45	74.00	-24.55	V	PK
7311.000	34.08	1.47	35.55	54.00	-18.45	V	AV
High Channel-2462MHz							
4924.000	55.82	-3.59	52.23	74.00	-21.77	H	PK
4924.000	41.76	-3.59	38.17	54.00	-15.83	H	AV
7386.000	46.38	1.79	48.17	74.00	-25.83	H	PK
7386.000	34.83	1.79	36.62	54.00	-17.38	H	AV
4924.000	54.94	-3.59	51.35	74.00	-22.65	V	PK
4924.000	42.04	-3.59	38.45	54.00	-15.55	V	AV
7386.000	47.99	1.79	49.78	74.00	-24.22	V	PK
7386.000	35.18	1.79	36.97	54.00	-17.03	V	AV

Test Mode: 802.11g

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	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-2437MHz							
4874.000	55.10	-3.74	51.36	74.00	-22.64	H	PK
4874.000	43.28	-3.74	39.54	54.00	-14.46	H	AV
7311.000	47.38	1.47	48.85	74.00	-25.15	H	PK
7311.000	35.27	1.47	36.74	54.00	-17.26	H	AV
4874.000	57.07	-3.74	53.33	74.00	-20.67	V	PK
4874.000	43.86	-3.74	40.12	54.00	-13.88	V	AV
7311.000	48.40	1.47	49.87	74.00	-24.13	V	PK
7311.000	35.33	1.47	36.80	54.00	-17.20	V	AV
High Channel-2462MHz							
4924.000	54.00	-3.59	50.41	74.00	-23.59	H	PK
4924.000	40.75	-3.59	37.16	54.00	-16.84	H	AV
7386.000	47.18	1.79	48.97	74.00	-25.03	H	PK
7386.000	34.73	1.79	36.52	54.00	-17.48	H	AV
4924.000	56.11	-3.59	52.52	74.00	-21.48	V	PK
4924.000	42.69	-3.59	39.10	54.00	-14.90	V	AV
7386.000	48.58	1.79	50.37	74.00	-23.63	V	PK
7386.000	35.95	1.79	37.74	54.00	-16.26	V	AV

Test Mode: 802.11n-HT20

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	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-2437MHz							
4874.000	54.16	-3.74	50.42	74.00	-23.58	H	PK
4874.000	42.48	-3.74	38.74	54.00	-15.26	H	AV
7311.000	48.74	1.47	50.21	74.00	-23.79	H	PK
7311.000	33.10	1.47	34.57	54.00	-19.43	H	AV
4874.000	54.92	-3.74	51.18	74.00	-22.82	V	PK
4874.000	42.62	-3.74	38.88	54.00	-15.12	V	AV
7311.000	48.49	1.47	49.96	74.00	-24.04	V	PK
7311.000	35.20	1.47	36.67	54.00	-17.33	V	AV
High Channel-2462MHz							
4924.000	53.90	-3.59	50.31	74.00	-23.69	H	PK
4924.000	43.23	-3.59	39.64	54.00	-14.36	H	AV
7386.000	48.31	1.79	50.10	74.00	-23.90	H	PK
7386.000	36.10	1.79	37.89	54.00	-16.11	H	AV
4924.000	55.70	-3.59	52.11	74.00	-21.89	V	PK
4924.000	41.48	-3.59	37.89	54.00	-16.11	V	AV
7386.000	48.55	1.79	50.34	74.00	-23.66	V	PK
7386.000	35.36	1.79	37.15	54.00	-16.85	V	AV

Test Mode: 802.11n-HT40

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2422MHz							
4844.000	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-2437MHz							
4874.000	52.53	-3.74	48.79	74.00	-25.21	H	PK
4874.000	37.88	-3.74	34.14	54.00	-19.86	H	AV
7311.000	44.88	1.47	46.35	74.00	-27.65	H	PK
7311.000	32.03	1.47	33.50	54.00	-20.50	H	AV
4874.000	53.74	-3.74	50.00	74.00	-24.00	V	PK
4874.000	39.95	-3.74	36.21	54.00	-17.79	V	AV
7311.000	45.78	1.47	47.25	74.00	-26.75	V	PK
7311.000	34.00	1.47	35.47	54.00	-18.53	V	AV
High Channel-2452MHz							
4904.000	52.65	-3.63	49.02	74.00	-24.98	H	PK
4904.000	39.37	-3.63	35.74	54.00	-18.26	H	AV
7356.000	45.63	1.62	47.25	74.00	-26.75	H	PK
7356.000	30.73	1.62	32.35	54.00	-21.65	H	AV
4904.000	54.84	-3.63	51.21	74.00	-22.79	V	PK
4904.000	40.83	-3.63	37.20	54.00	-16.80	V	AV
7356.000	48.18	1.62	49.80	74.00	-24.20	V	PK
7356.000	35.12	1.62	36.74	54.00	-17.26	V	AV

Note: Testing is carried out with frequency rang 30MHz 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.

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 Procedure

According to the KDB 558074D01 v03r05, 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 V03r05, 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 \geq 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.

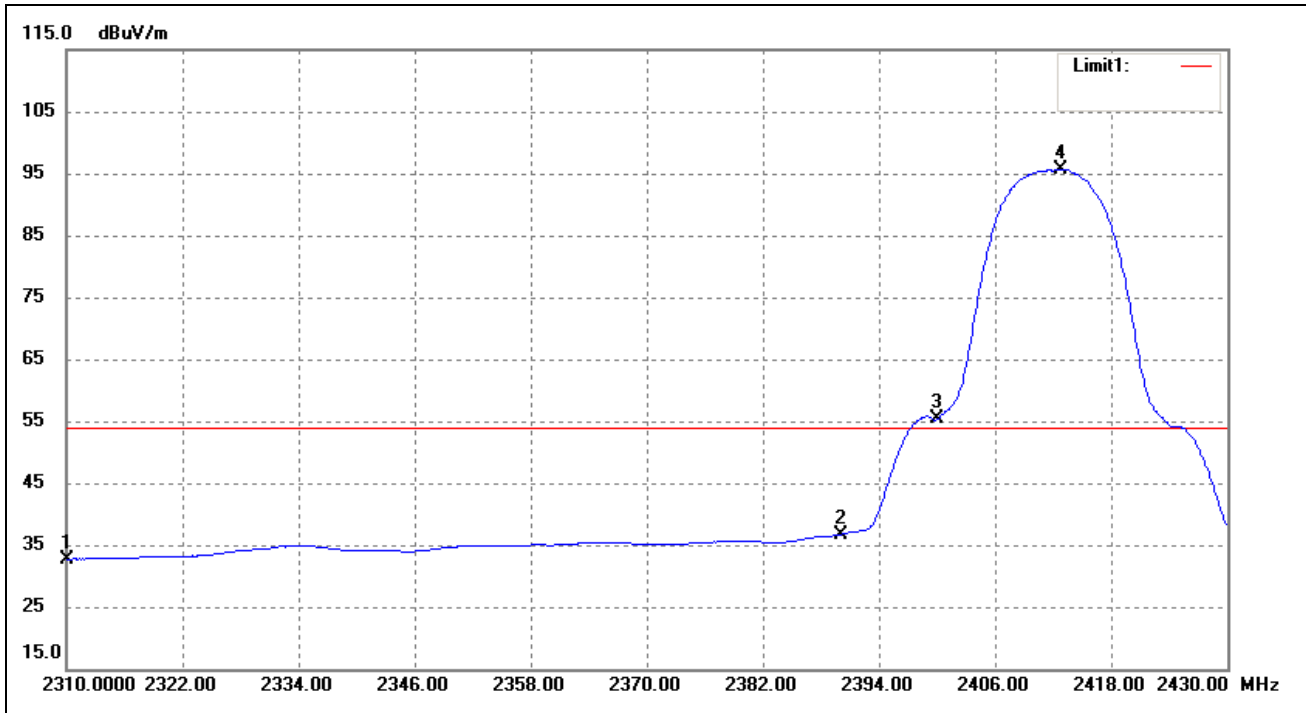
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in section 8.1. Report the three highest emissions relative to the limit.

9.3 Environmental Conditions

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

9.4 Summary of Test Results/Plots

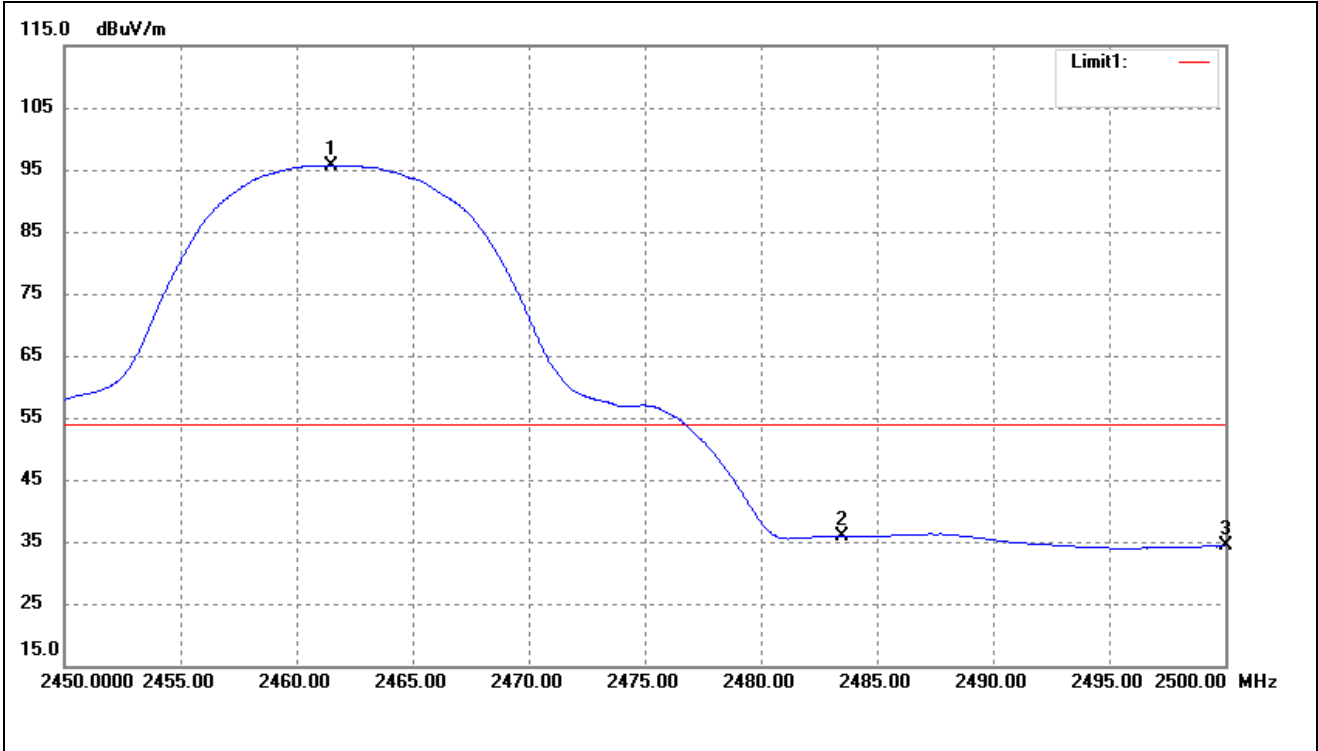
802.11b-Lowest Bandedge
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	37.11	-4.42	32.69	54.00	-21.31	Average Detector
		48.35	-4.42	43.93	74.00	-30.07	Peak Detector
2	2390.000	40.46	-3.72	36.74	54.00	-17.26	Average Detector
		51.22	-3.72	47.50	74.00	-26.50	Peak Detector
3	2400.000	58.94	-3.64	55.30	Delta=40.33dBc		Average Detector
4	2412.720	99.17	-3.54	95.63			Average Detector

802.11b-Highest Bandedge

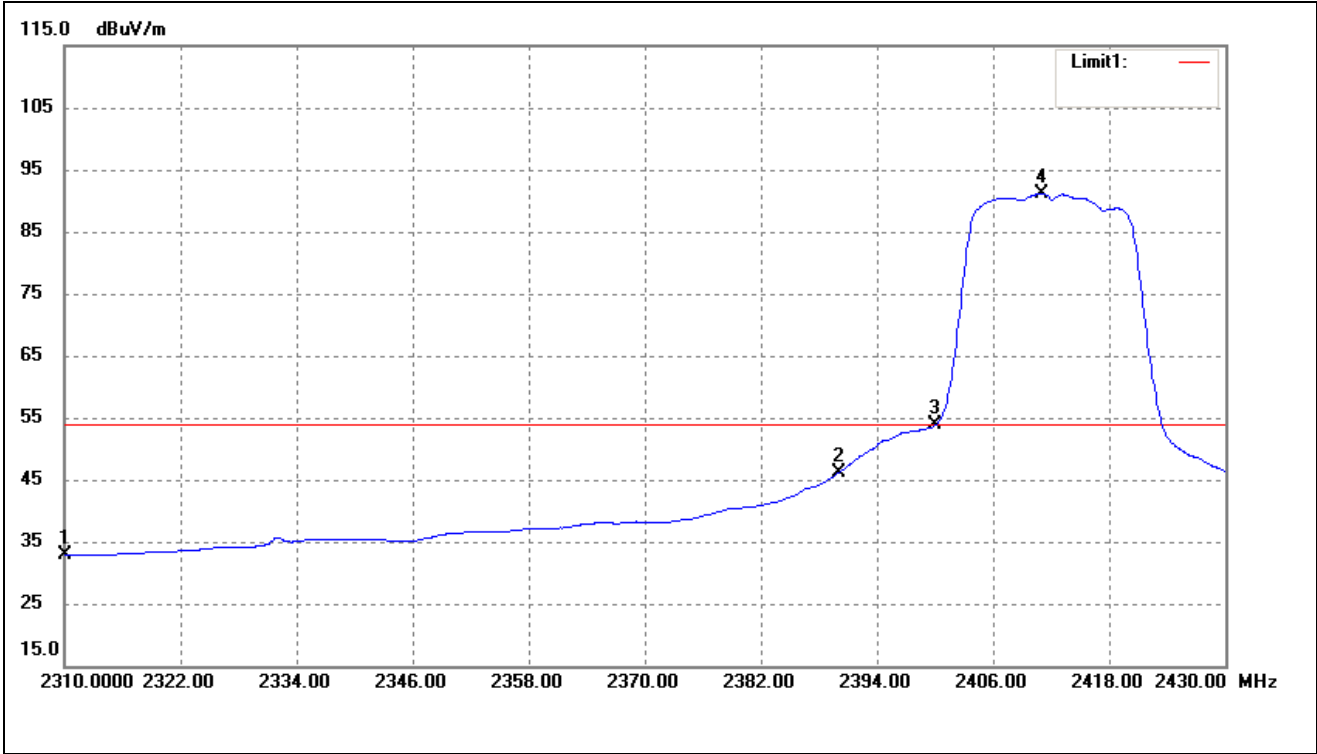
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2461.500	98.88	-3.17	95.71	/	/	Average Detector
	2463.300	106.95	-3.16	103.79	/	/	Peak Detector
2	2483.500	Delta = 59.79dBc		35.92	54.00	-18.08	Average Detector
	2483.500			44.0	74.00	-30	Peak Detector
3	2500.000	37.14	-2.88	34.26	54.00	-19.74	Average Detector
	2500.000	48.76	-2.88	45.88	74.00	-28.12	Peak Detector

802.11g-Lowest Bandedge

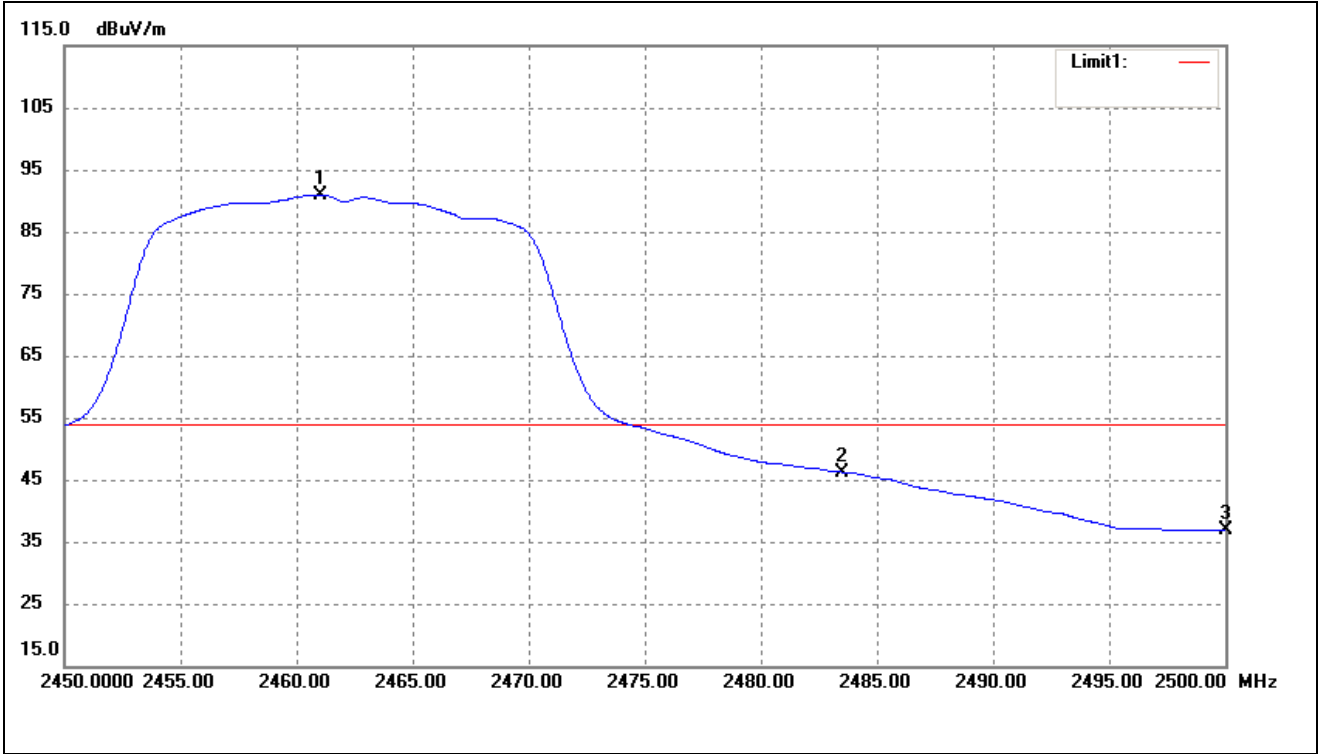
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	37.18	-4.42	32.76	54.00	-21.24	Average Detector
		48.48	-4.42	44.06	74.00	-29.94	Peak Detector
2	2390.000	49.89	-3.72	46.17	54.00	-7.83	Average Detector
		67.68	-3.72	63.96	74.00	-10.04	Peak Detector
3	2400.000	57.41	-3.64	53.77	Delta=37.34dBc	Average Detector	
4	2411.040	94.67	-3.56	91.11		Average Detector	

802.11g-Highest Bandedge

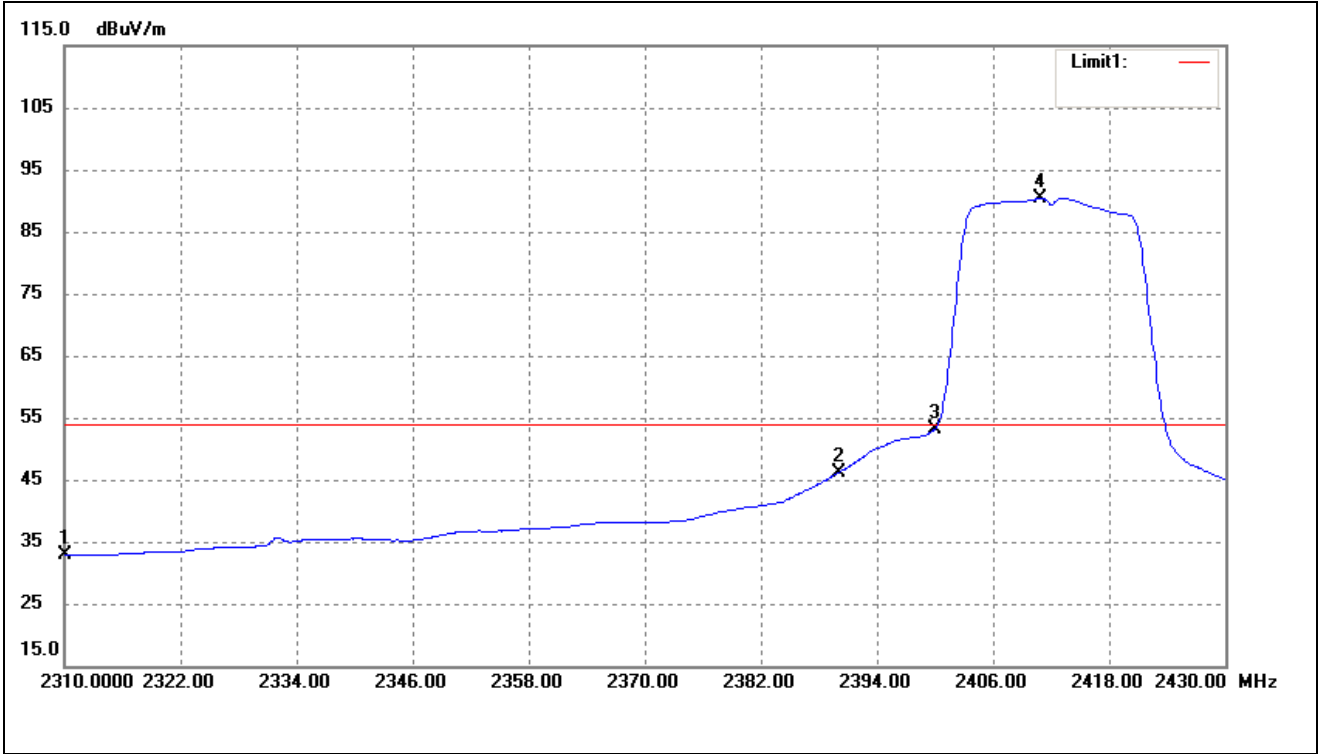
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2461.000	94.15	-3.18	90.97	/	/	Average Detector
	2463.650	105.46	-3.16	102.30	/	/	Peak Detector
2	2483.500	Delta = 44.73dBc		46.24	54.00	-7.76	Average Detector
	2483.500			57.57	74.00	-16.43	Peak Detector
3	2500.000	39.68	-2.88	36.80	54.00	-17.20	Average Detector
	2500.000	53.89	-2.88	51.01	74.00	-22.99	Peak Detector

802.11n-HT20-Lowest Bandedge

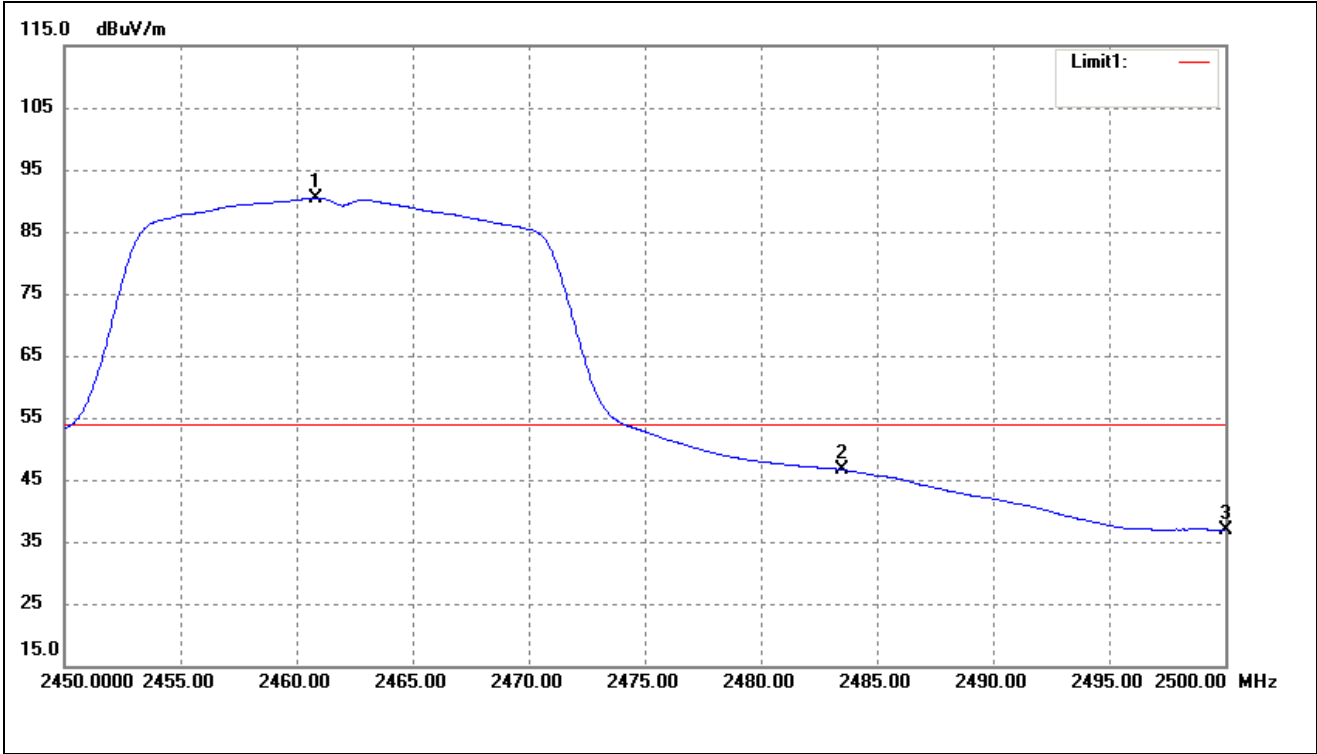
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	37.22	-4.42	32.80	54.00	-21.20	Average Detector
		49.92	-4.42	45.50	74.00	-28.50	Peak Detector
2	2390.000	49.92	-3.72	46.20	54.00	-7.80	Average Detector
		69.13	-3.72	65.41	74.00	-8.59	Peak Detector
3	2400.000	56.85	-3.64	53.21	Delta=37.26dBc		Average Detector
4	2410.920	94.03	-3.56	90.47			Average Detector

802.11n-HT20-Highest Bandedge

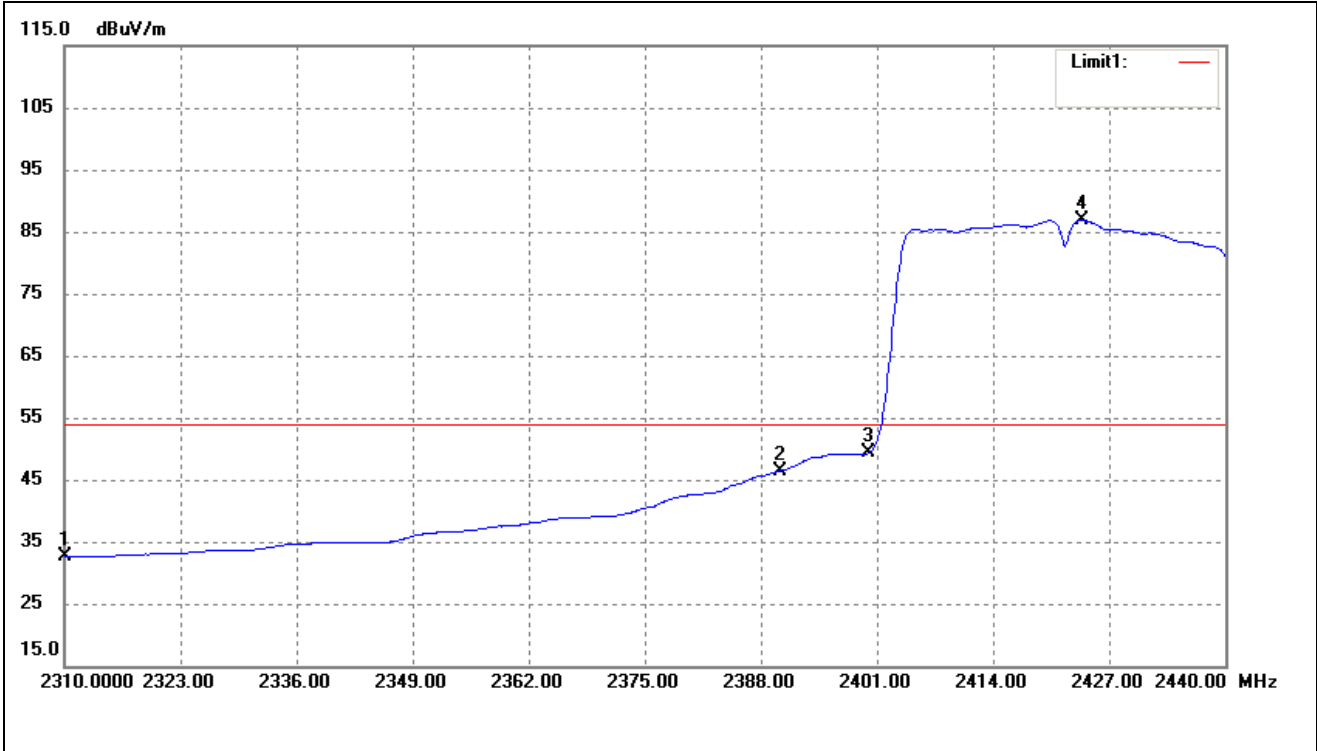
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2460.850	93.66	-3.18	90.48	/	/	Average Detector
	2461.450	105.03	-3.17	101.86	/	/	Peak Detector
2	2483.500	Delta = 43.84dBc		46.64	54.00	-7.36	Average Detector
	2483.500			58.02	74.00	-15.98	Peak Detector
3	2500.000	39.78	-2.88	36.90	54.00	-17.10	Average Detector
	2500.000	55.48	-2.88	52.60	74.00	-21.40	Peak Detector

802.11n-HT40-Lowest Bandedge

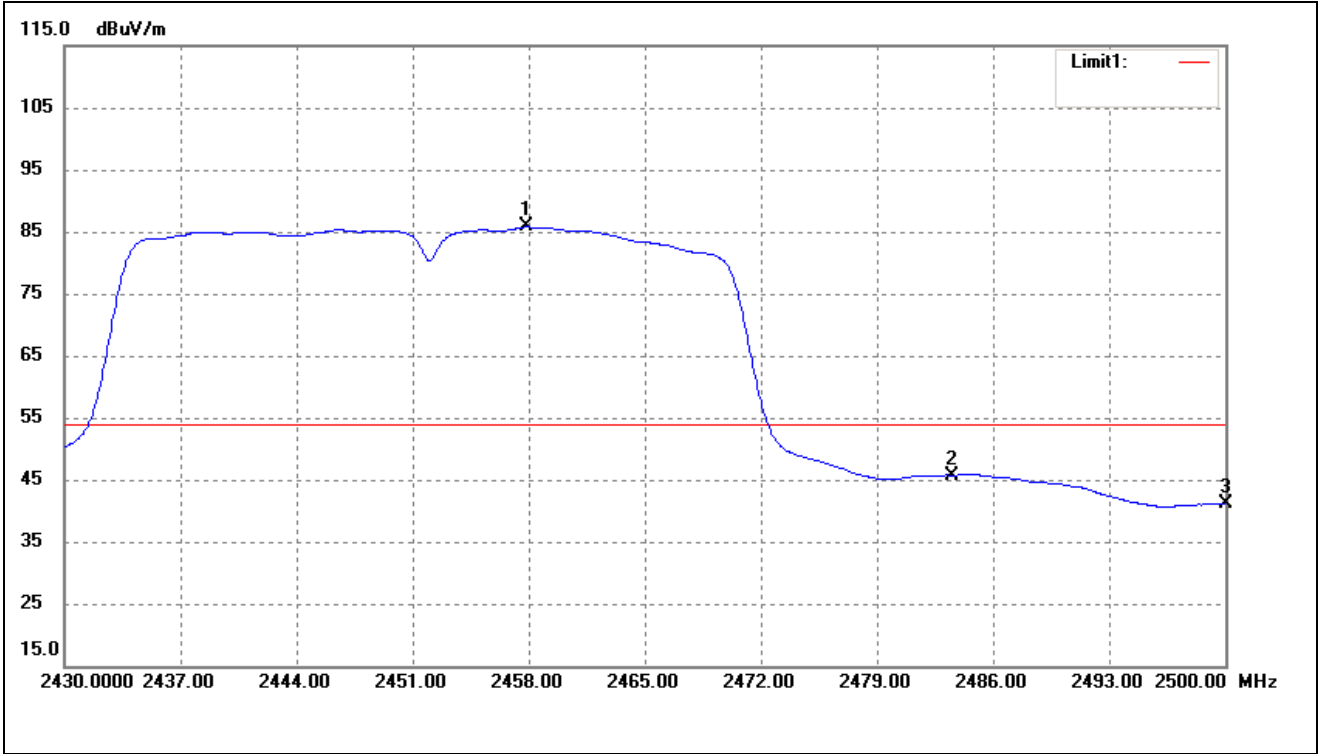
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	37.06	-4.42	32.64	54.00	-21.36	Average Detector
		47.96	-4.42	43.54	74.00	-30.46	Peak Detector
2	2390.000	50.17	-3.72	46.45	54.00	-7.55	Average Detector
		68.25	-3.72	64.53	74.00	-9.47	Peak Detector
3	2400.000	53.06	-3.64	49.42	Delta=37.44dBc		Average Detector
4	2423.880	90.32	-3.46	86.86			Average Detector

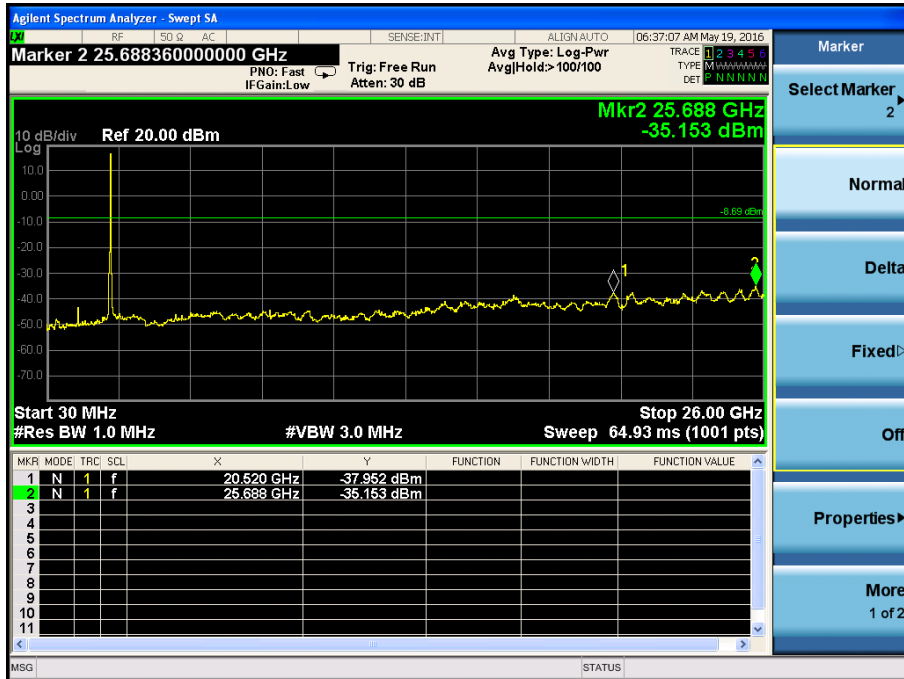
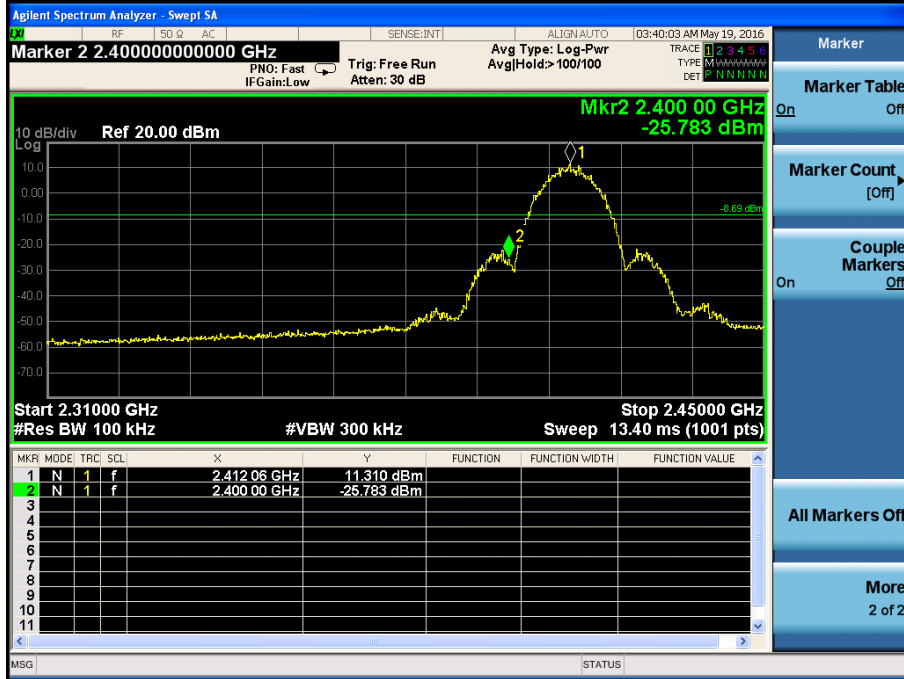
802.11n-HT40-Highest Bandedge

Vertical (Worst case)

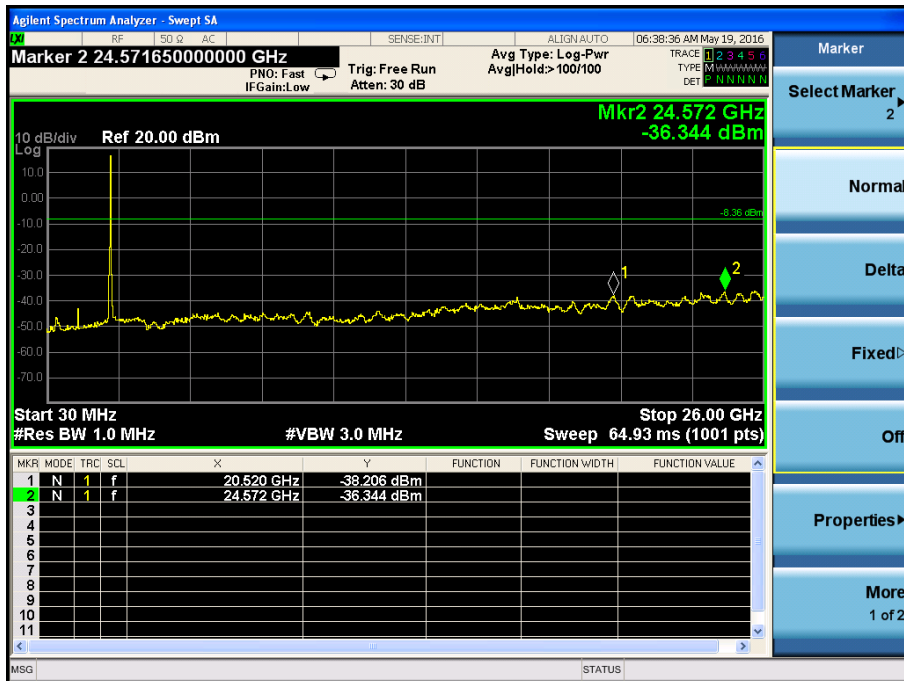
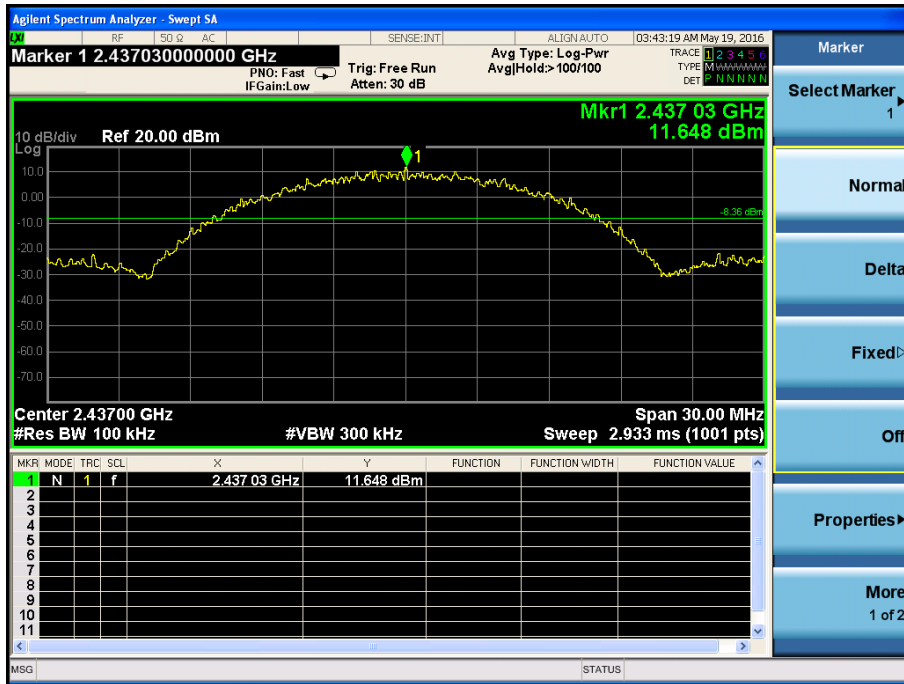


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2457.860	88.98	-3.20	85.78	/	/	Average Detector
	2459.190	100.06	-3.19	96.87	/	/	Peak Detector
2	2483.500	Delta = 40.04dBc		45.74	54.00	-8.26	Average Detector
	2483.500			56.83	74.00	-17.17	Peak Detector
3	2500.000	43.97	-2.88	41.09	54.00	-12.91	Average Detector
	2500.000	59.04	-2.88	56.16	74.00	-17.84	Peak Detector

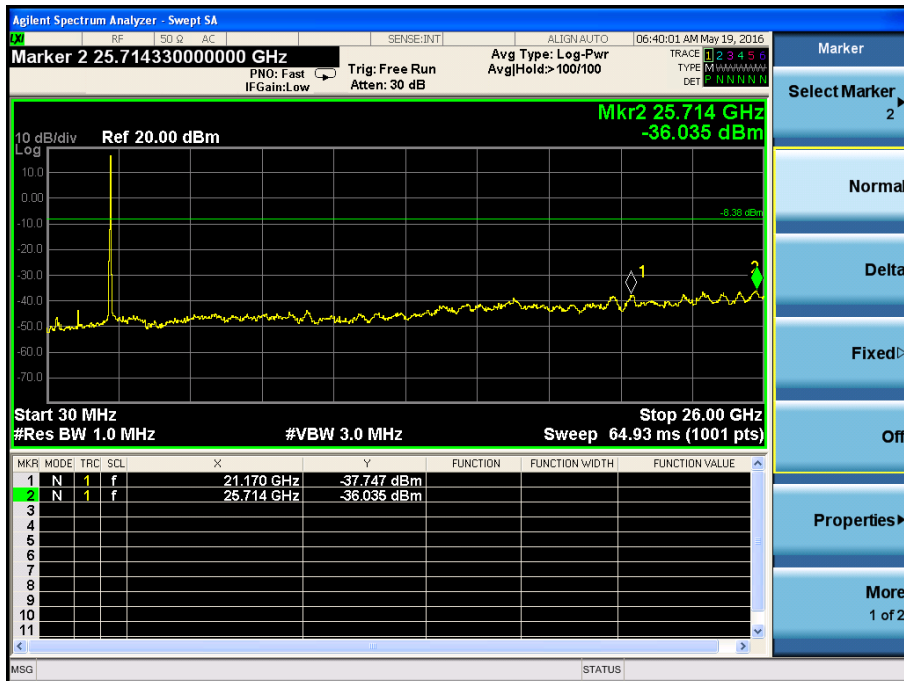
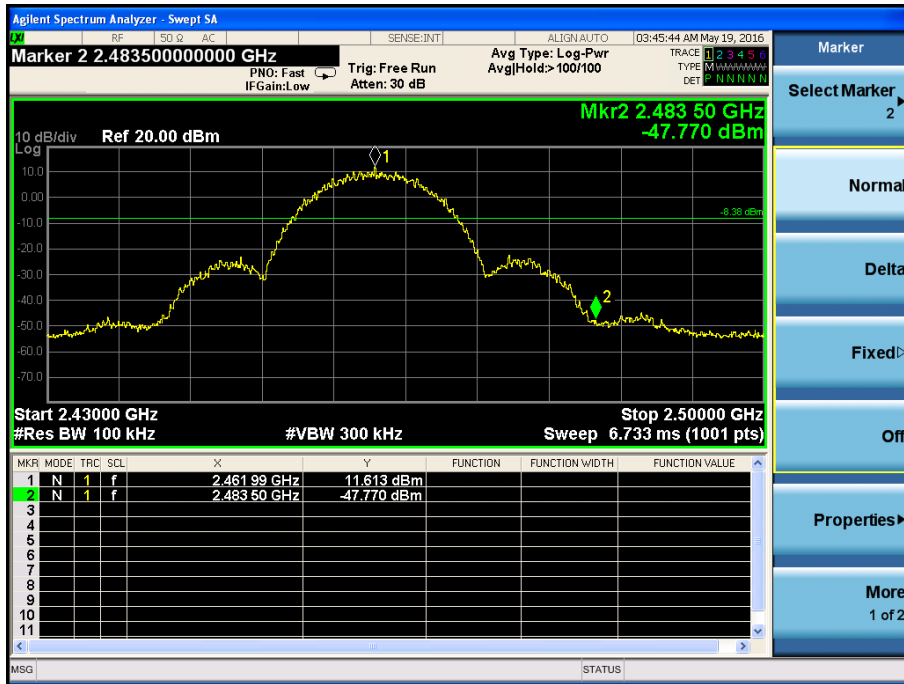
Ant. 1
 Out-of-Band and Spurious Emission (Conducted)
 802.11b
 Low Channel



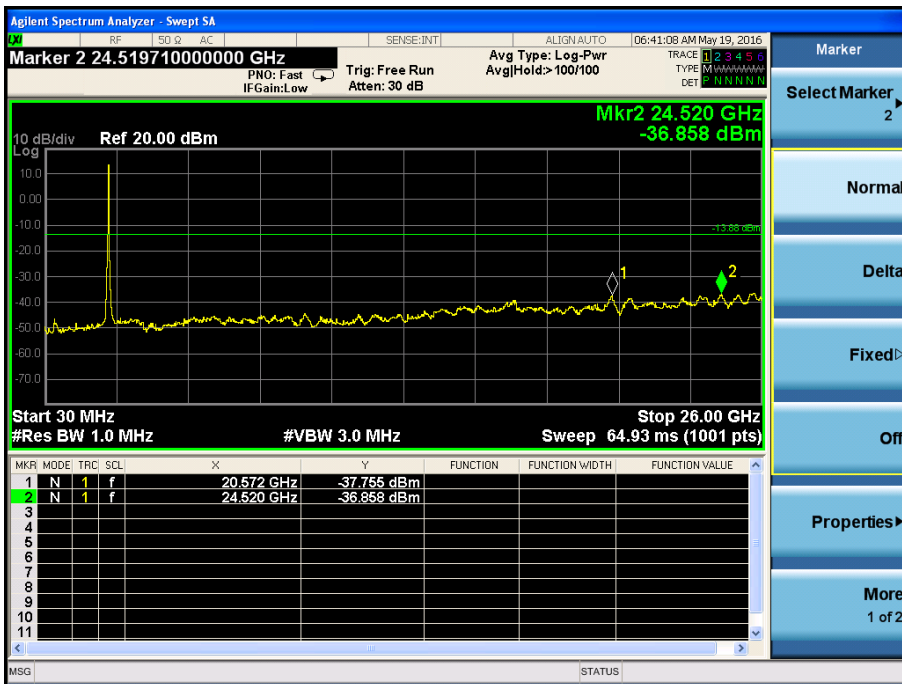
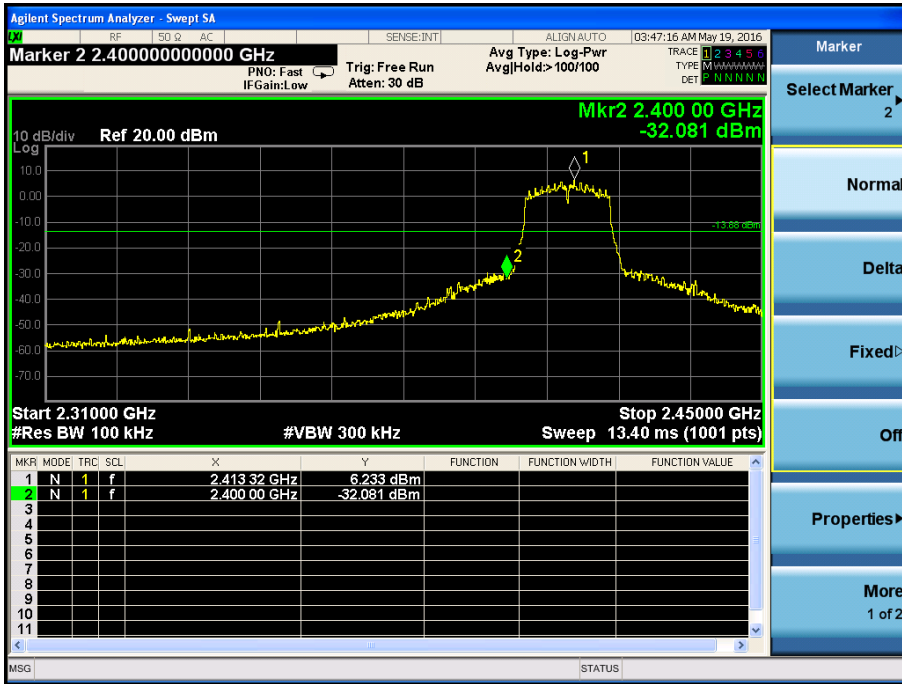
Middle Channel



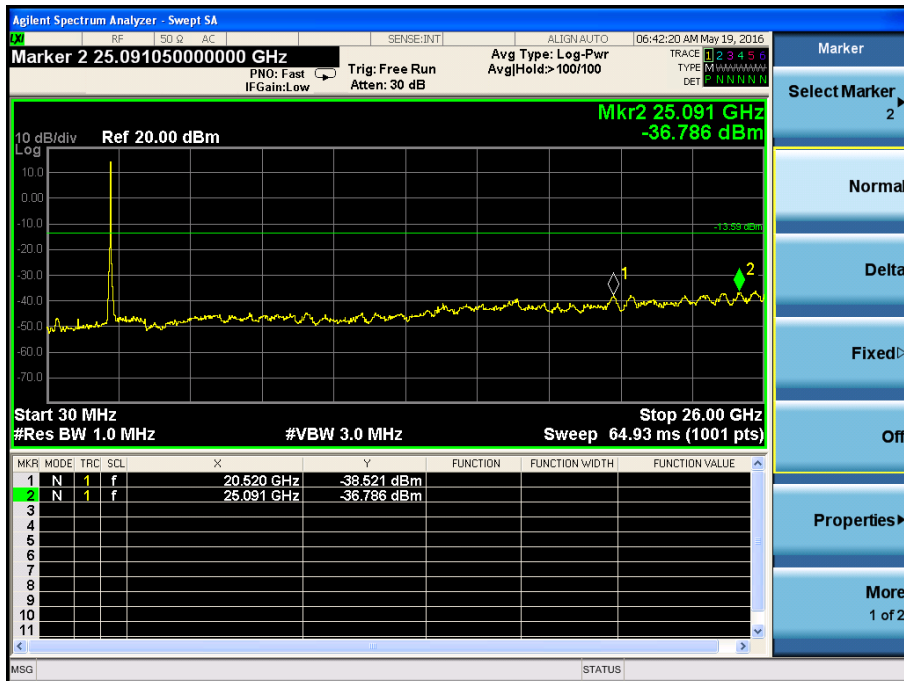
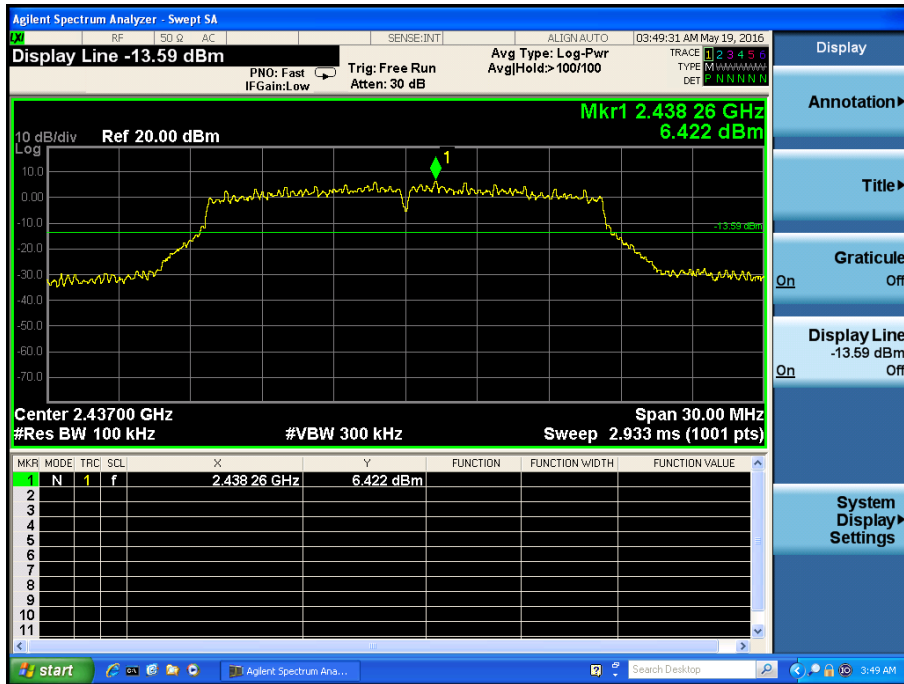
High Channel



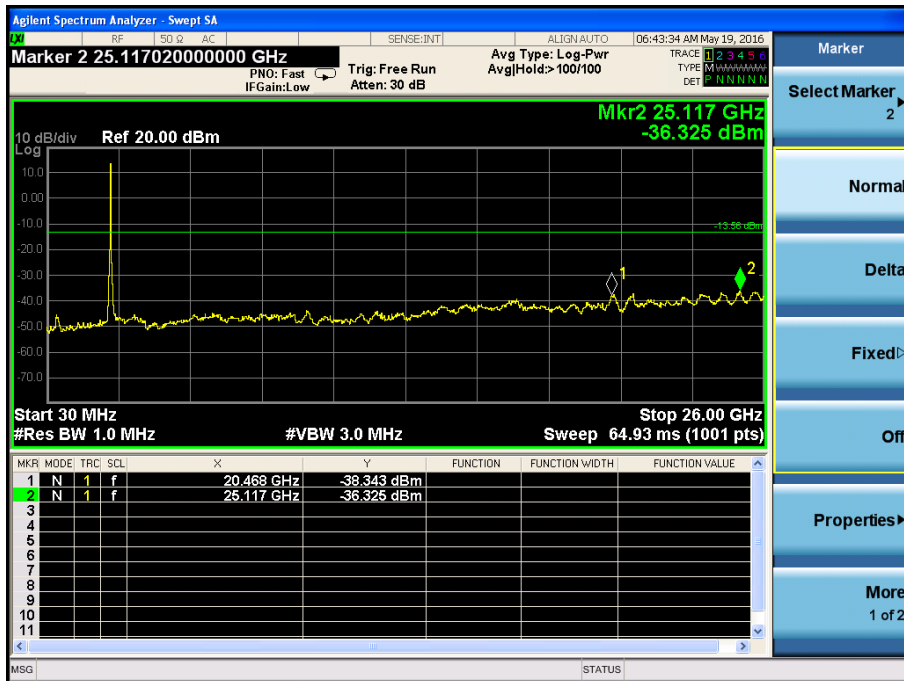
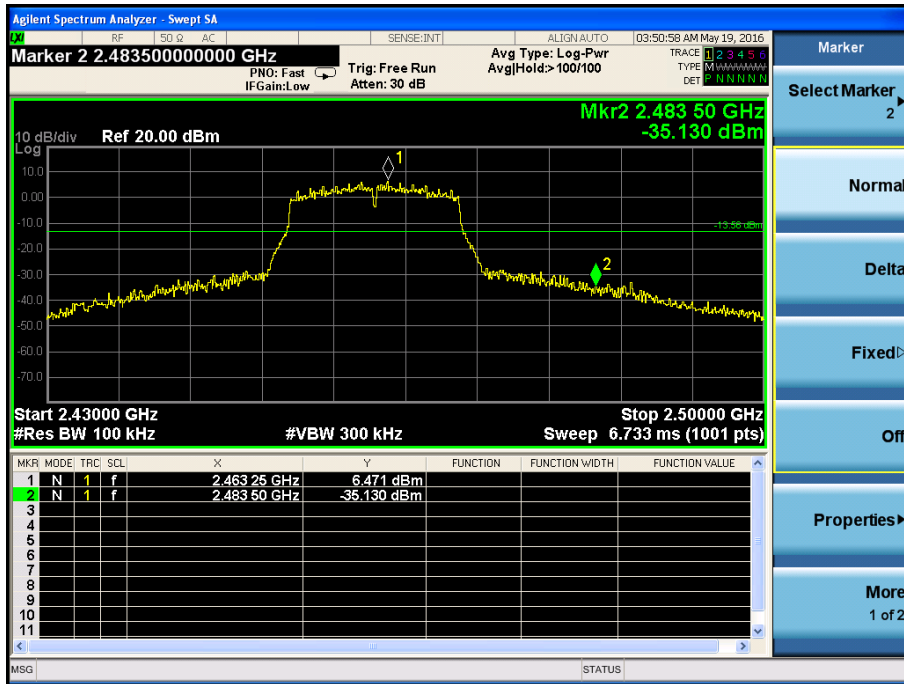
802.11g
Low Channel



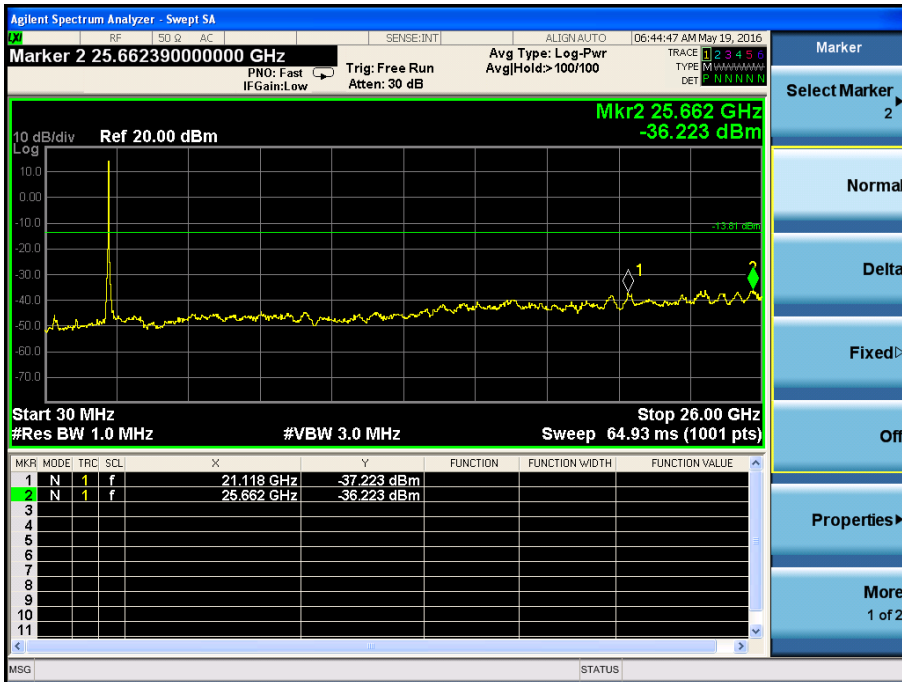
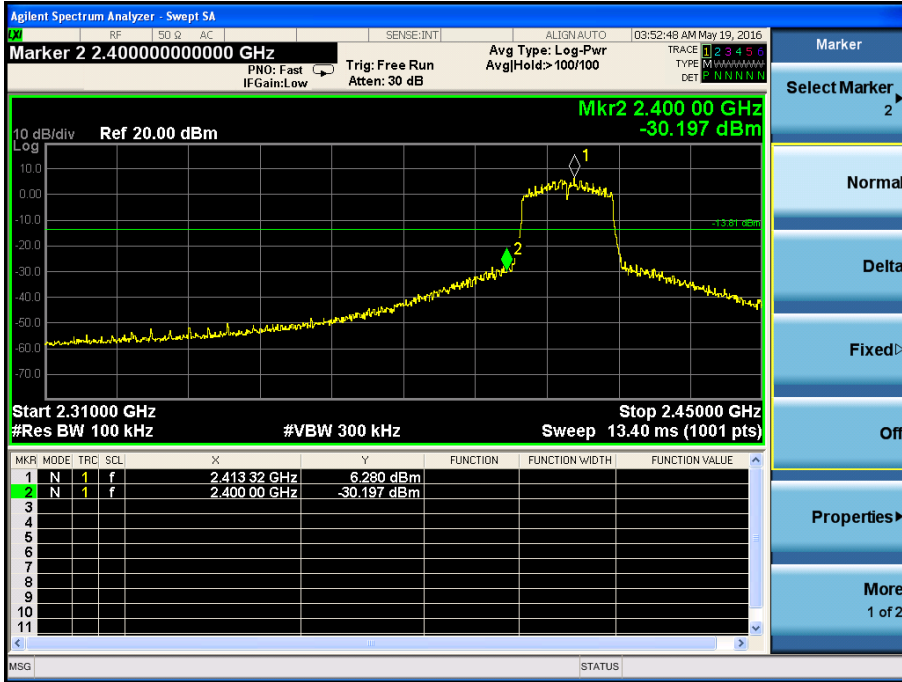
Middle Channel



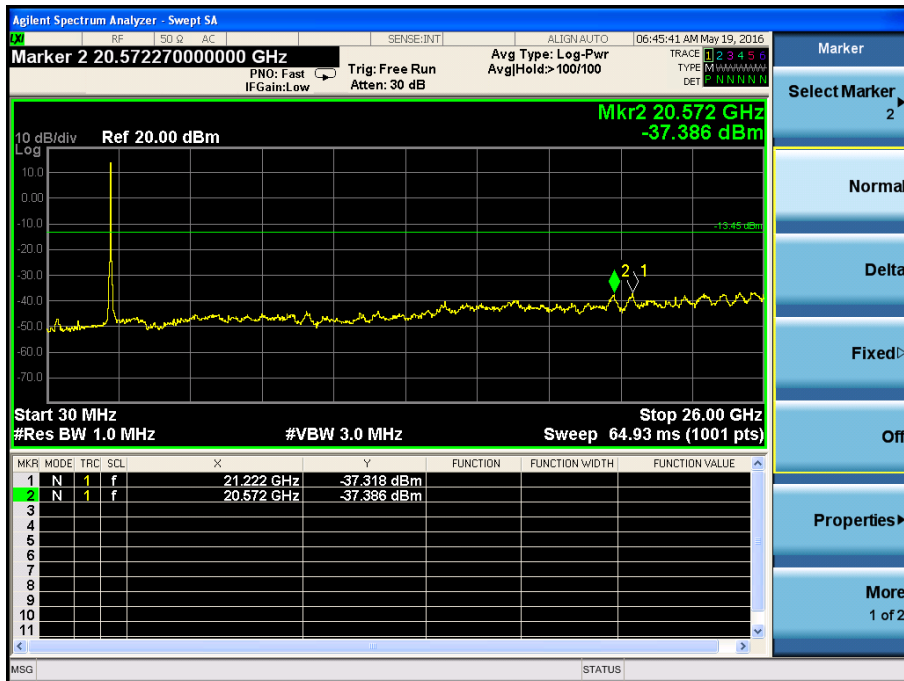
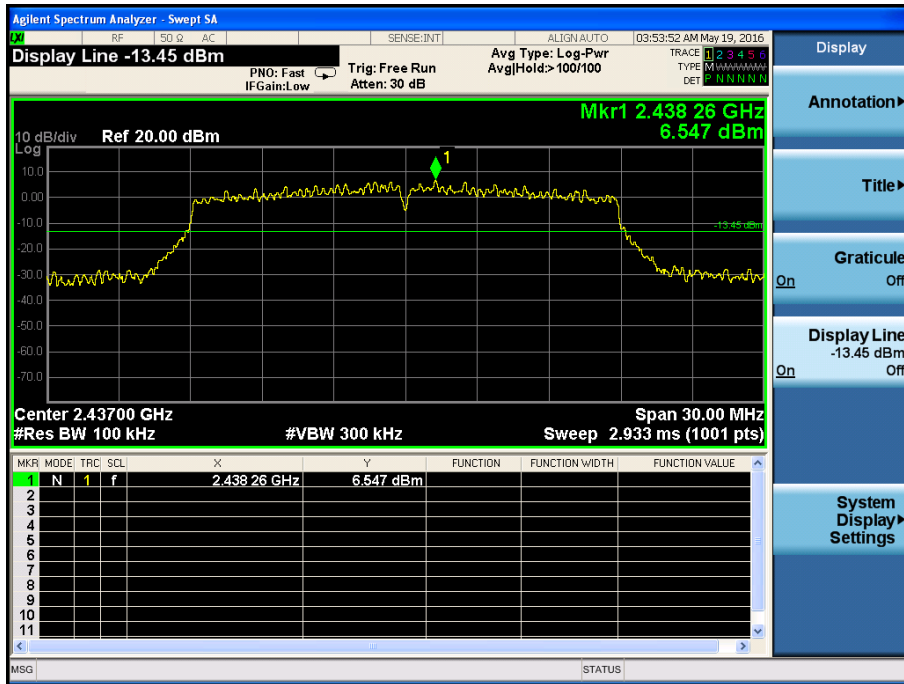
High Channel



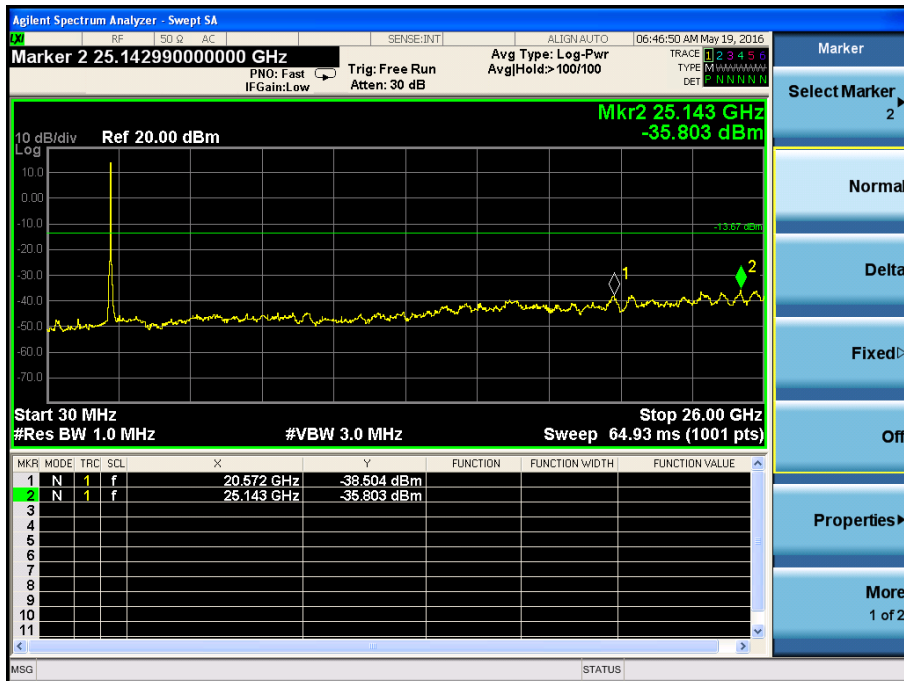
11n-HT20
Low Channel



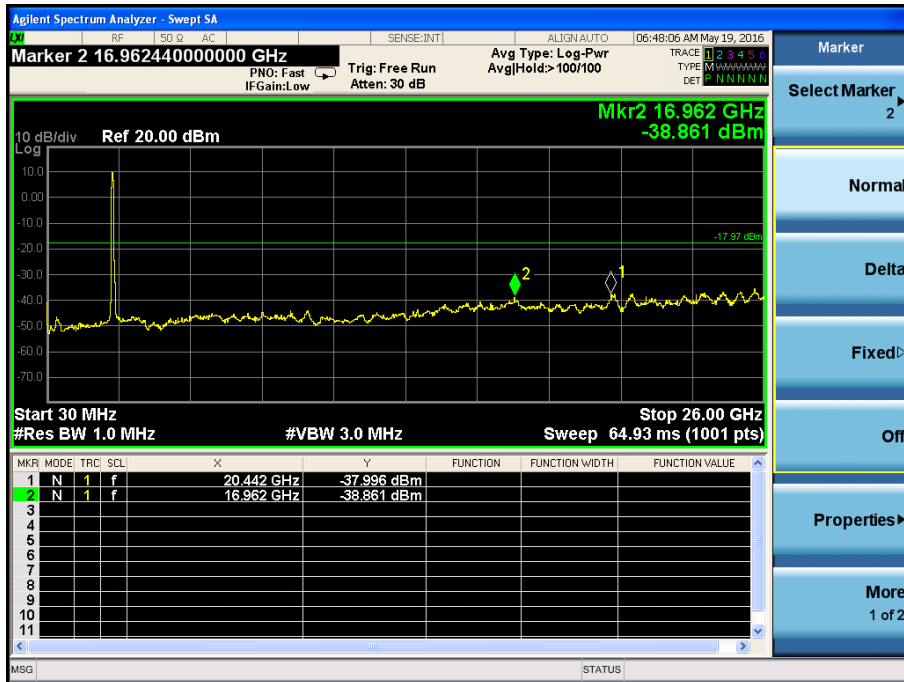
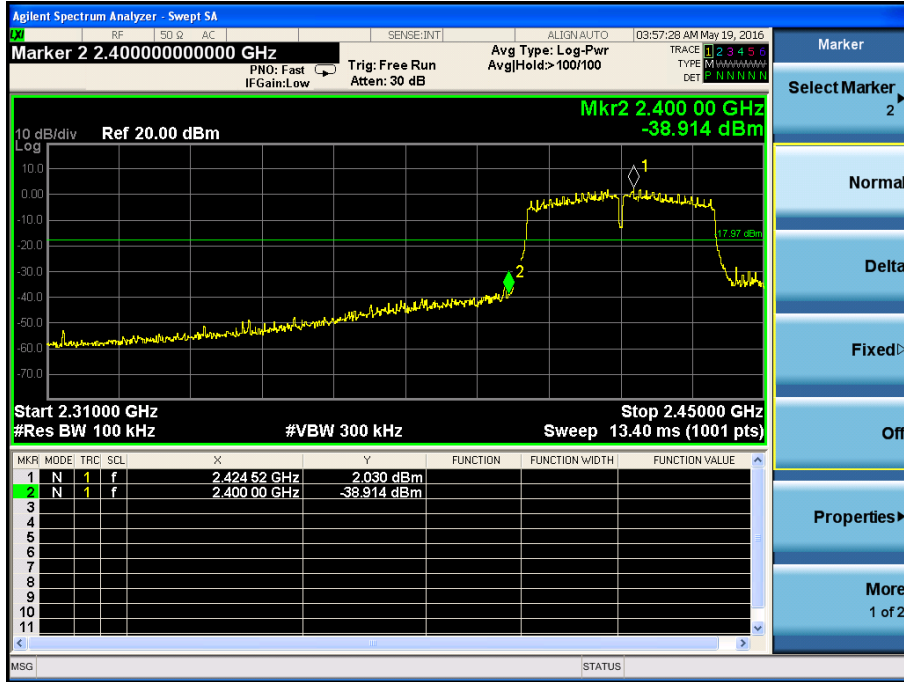
Middle Channel



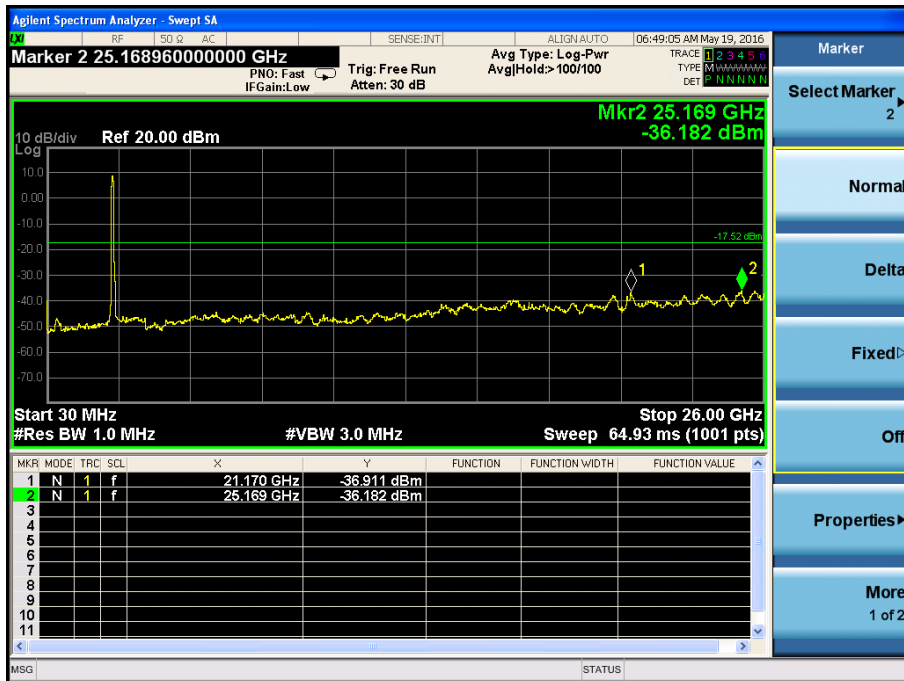
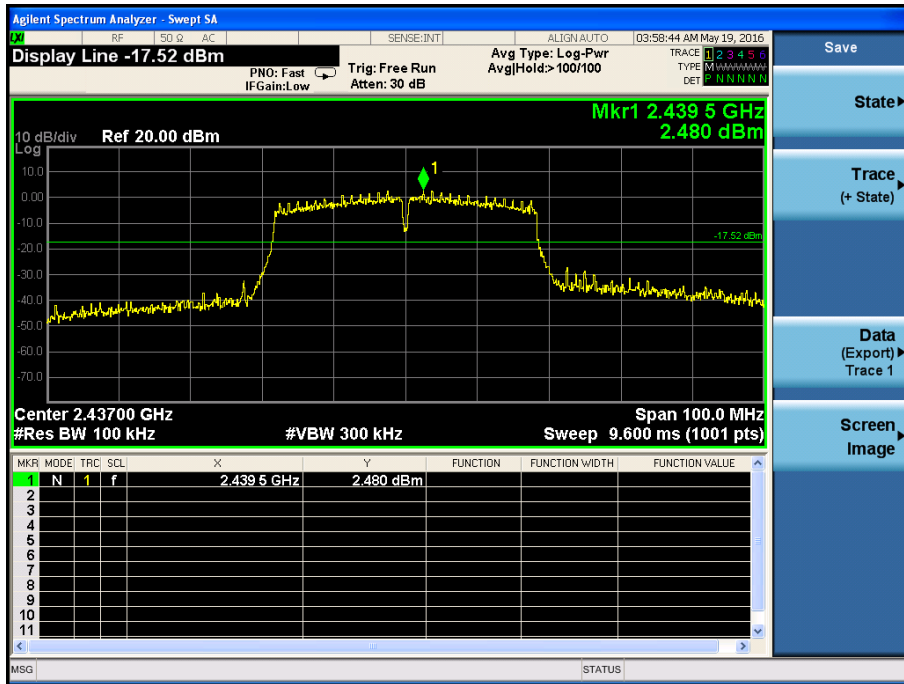
High Channel



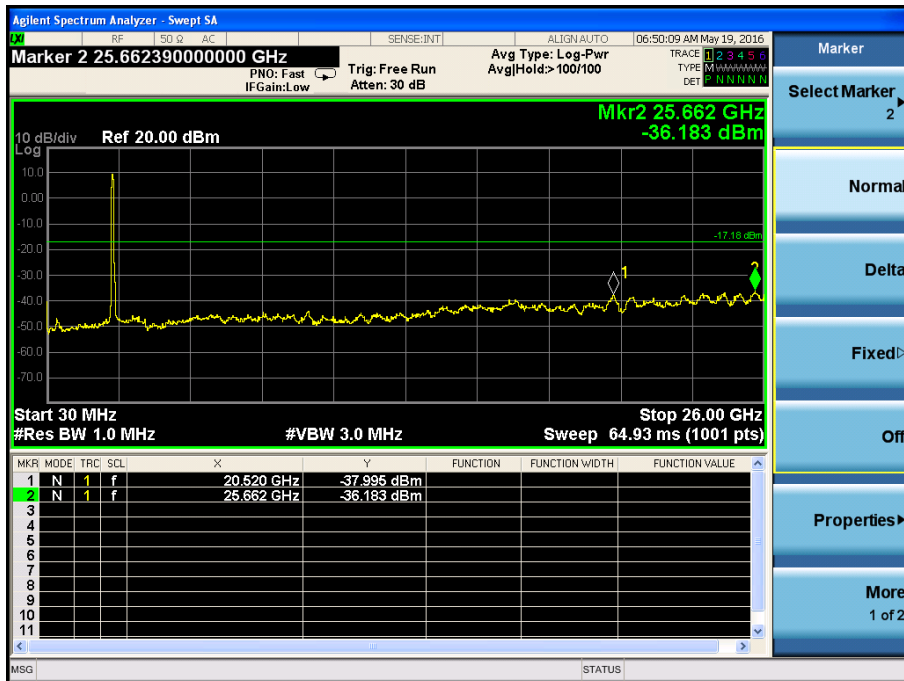
11n-HT40
Low Channel



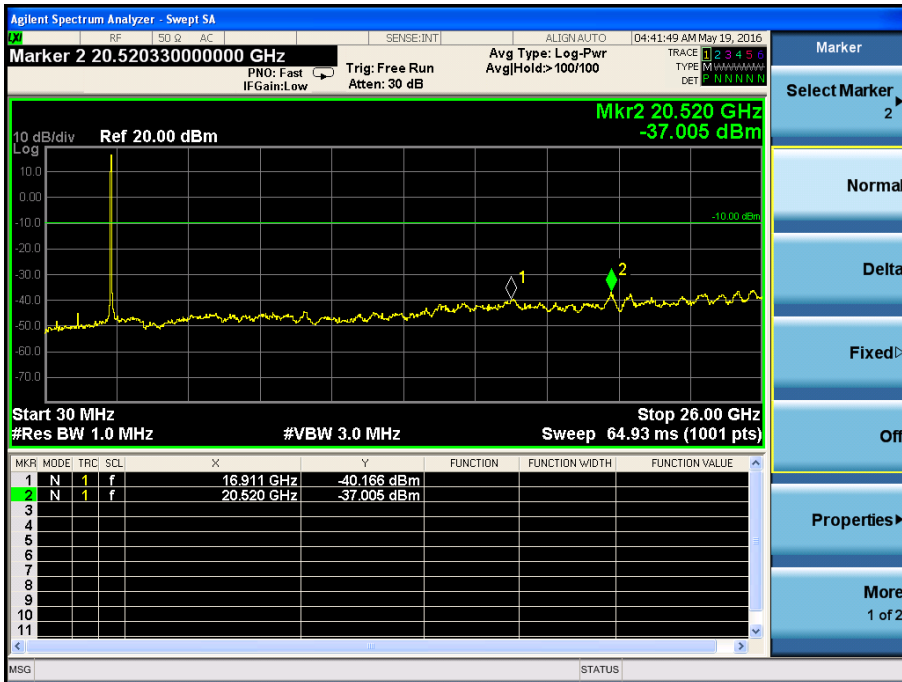
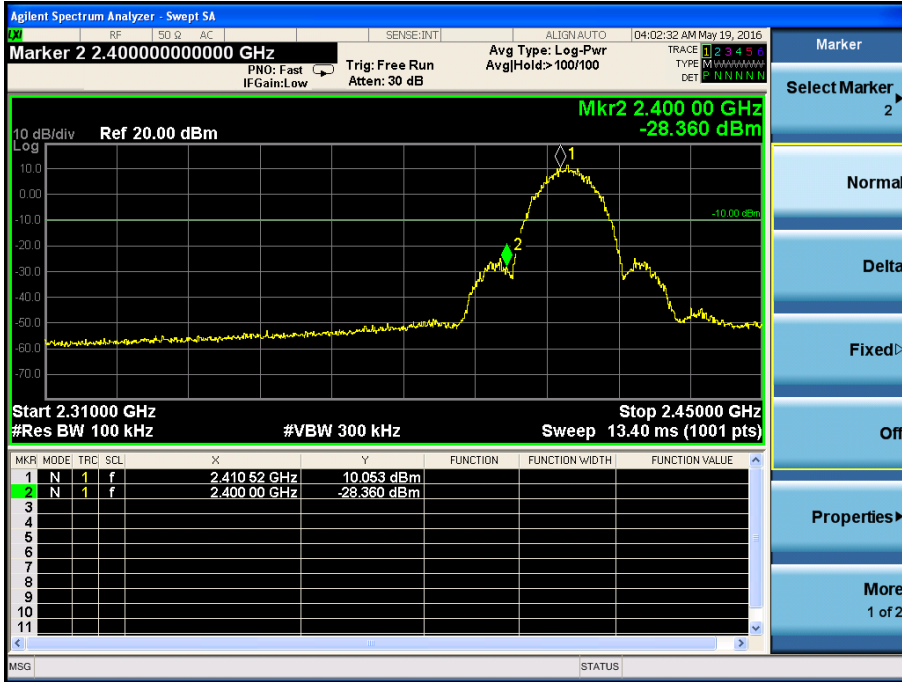
Middle Channel



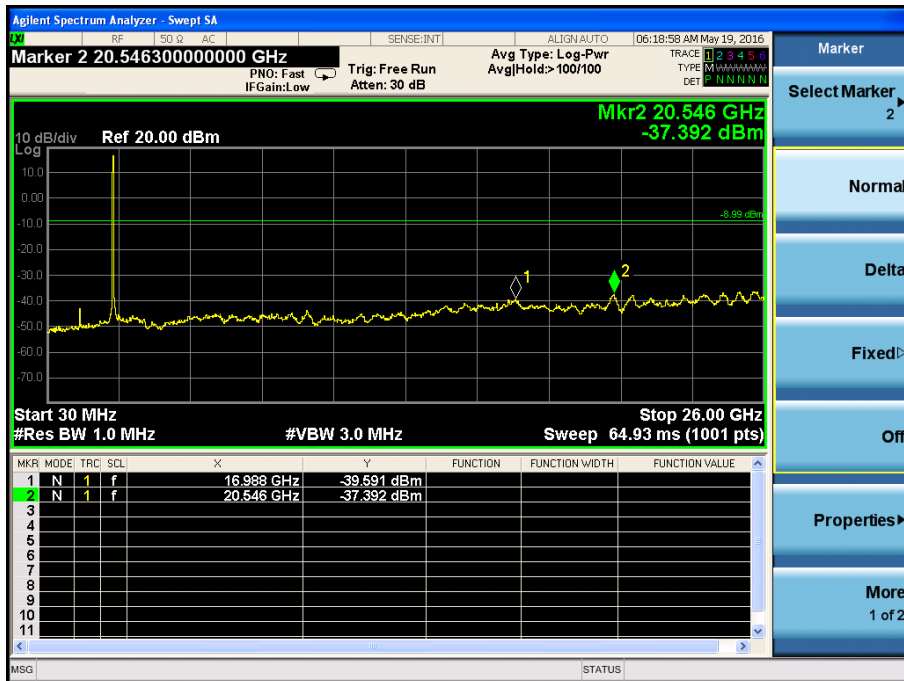
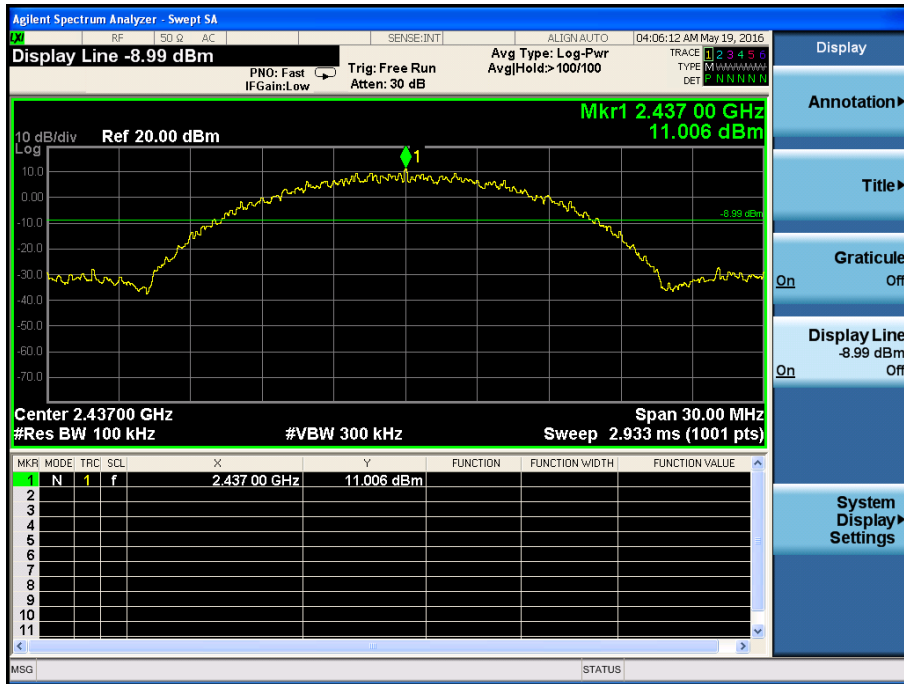
High Channel



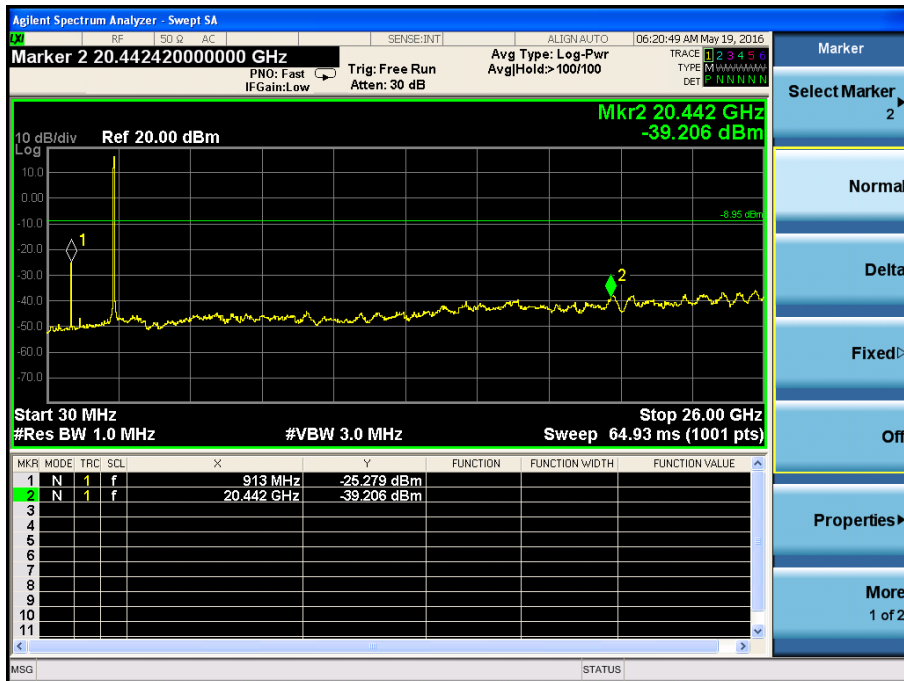
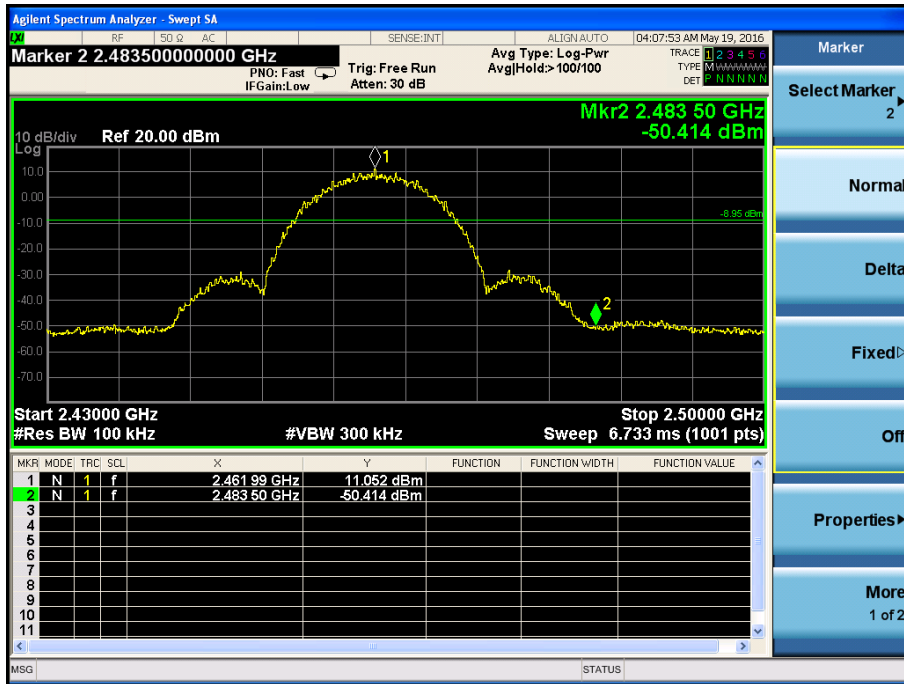
Ant. 2
802.11b
Low Channel



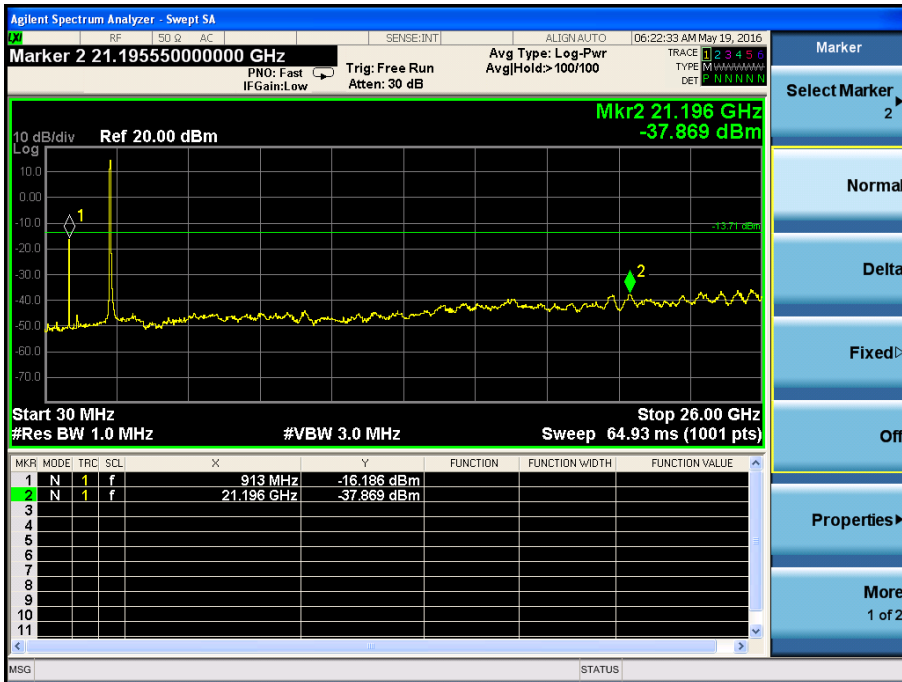
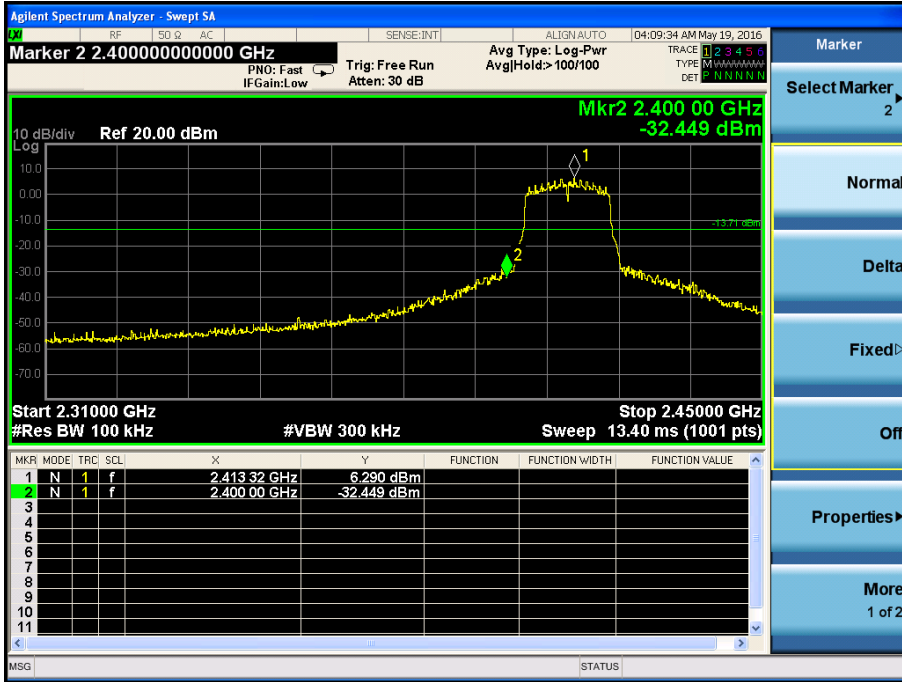
Middle Channel



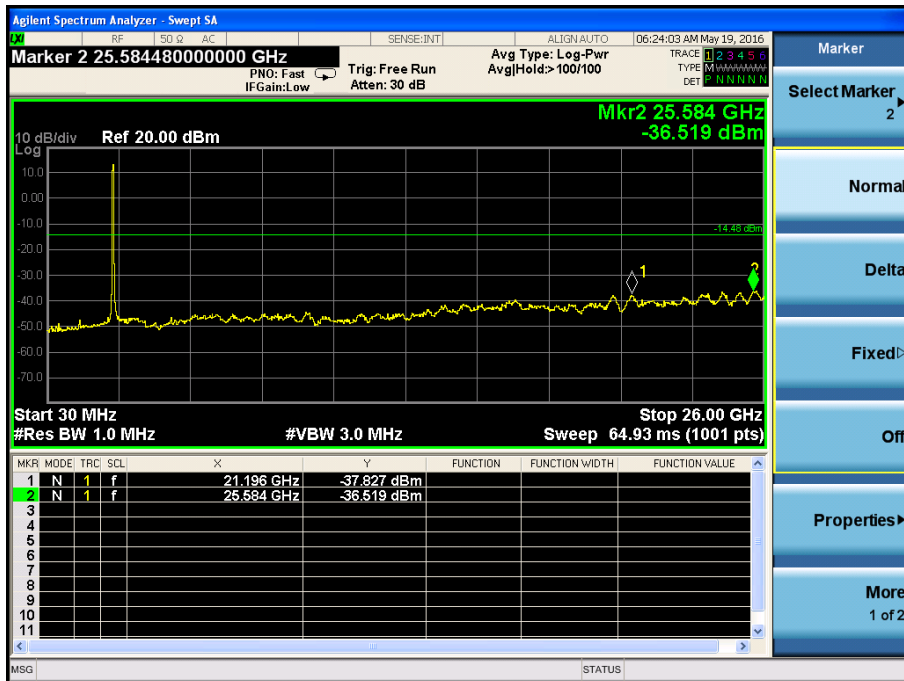
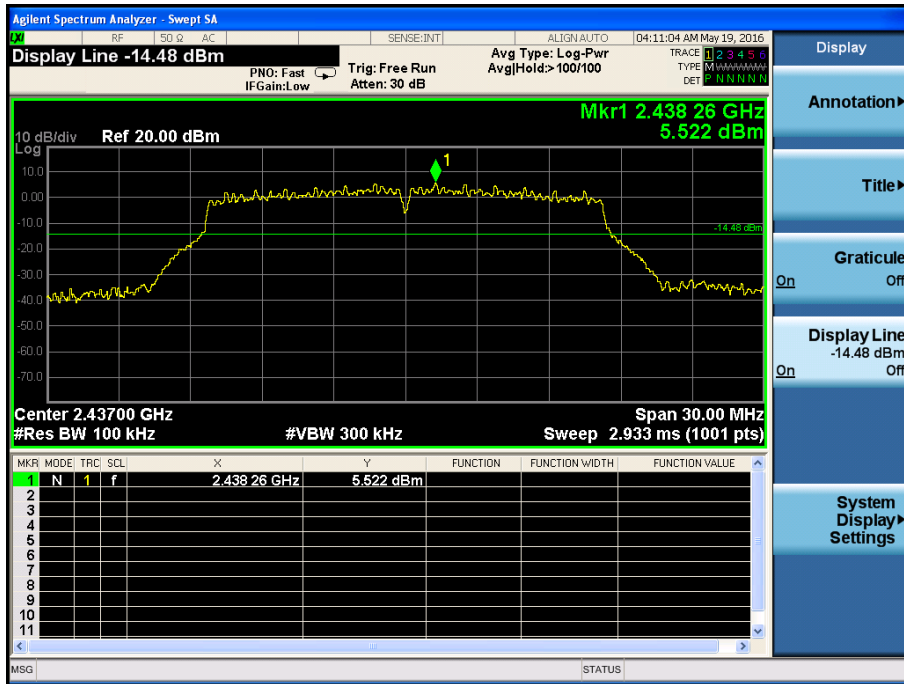
High Channel



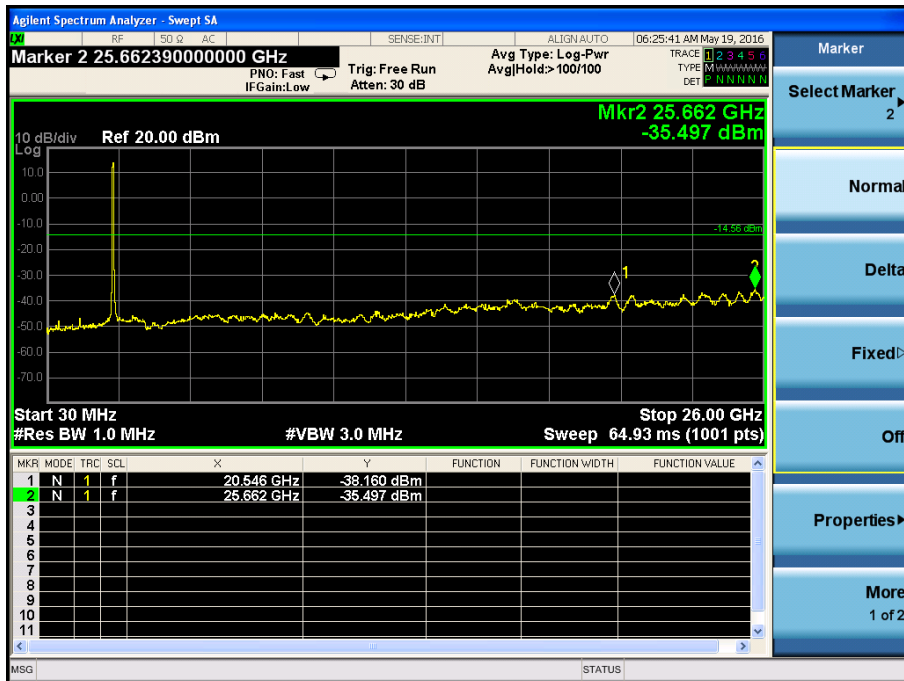
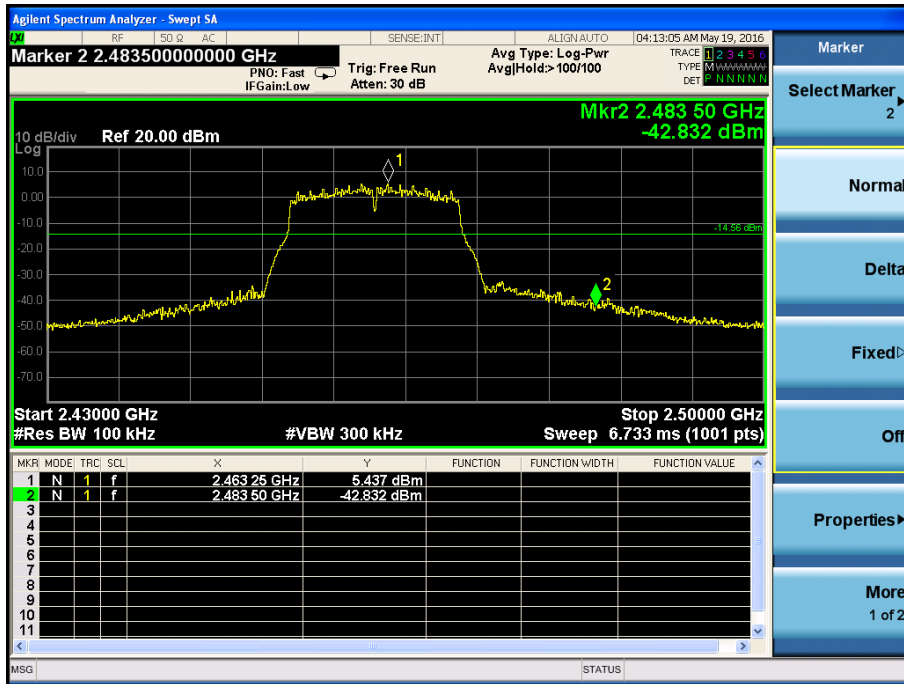
802.11g
Low Channel



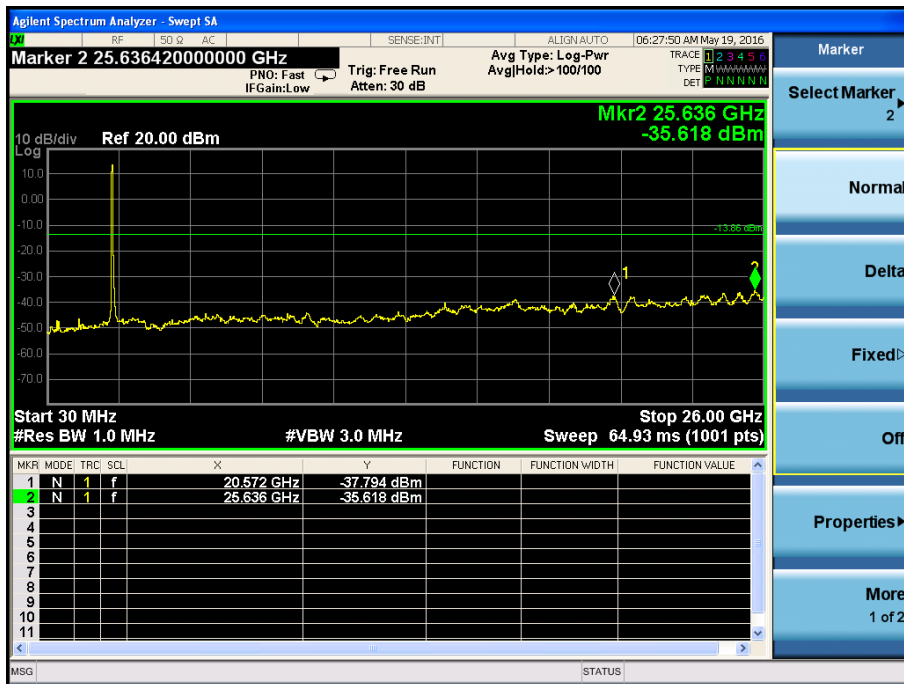
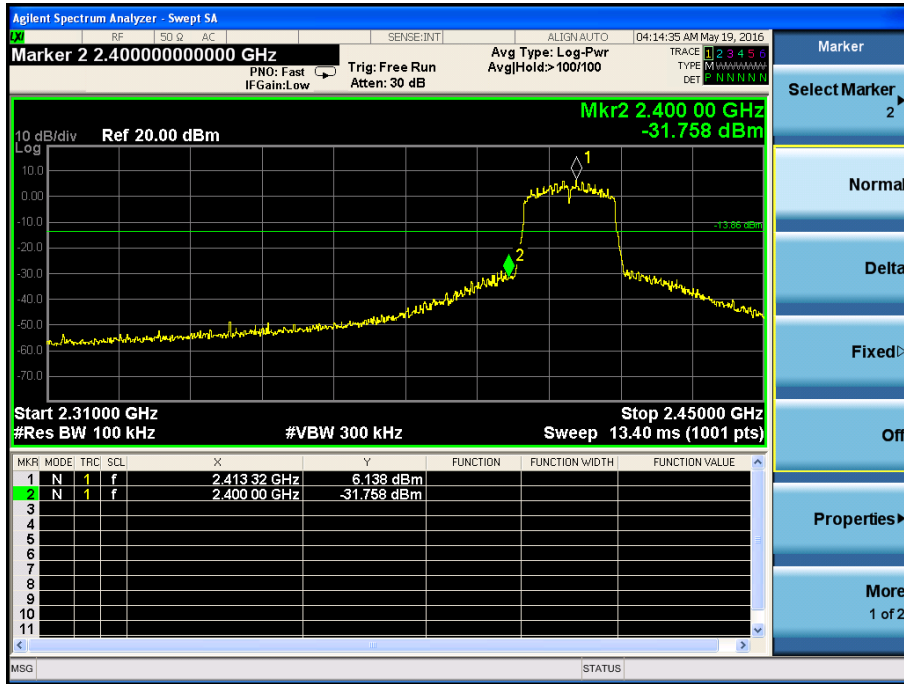
Middle Channel



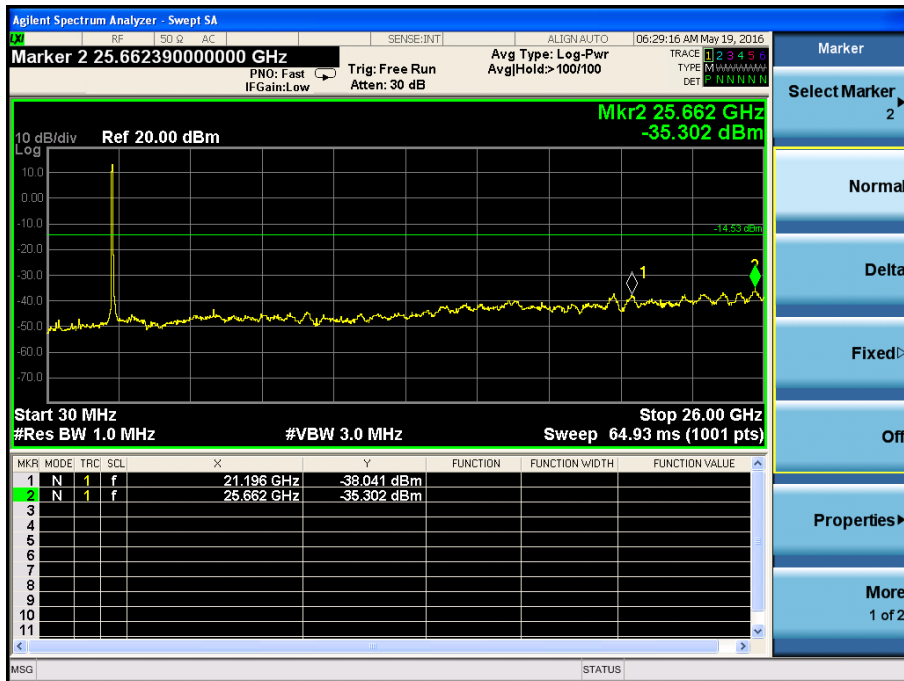
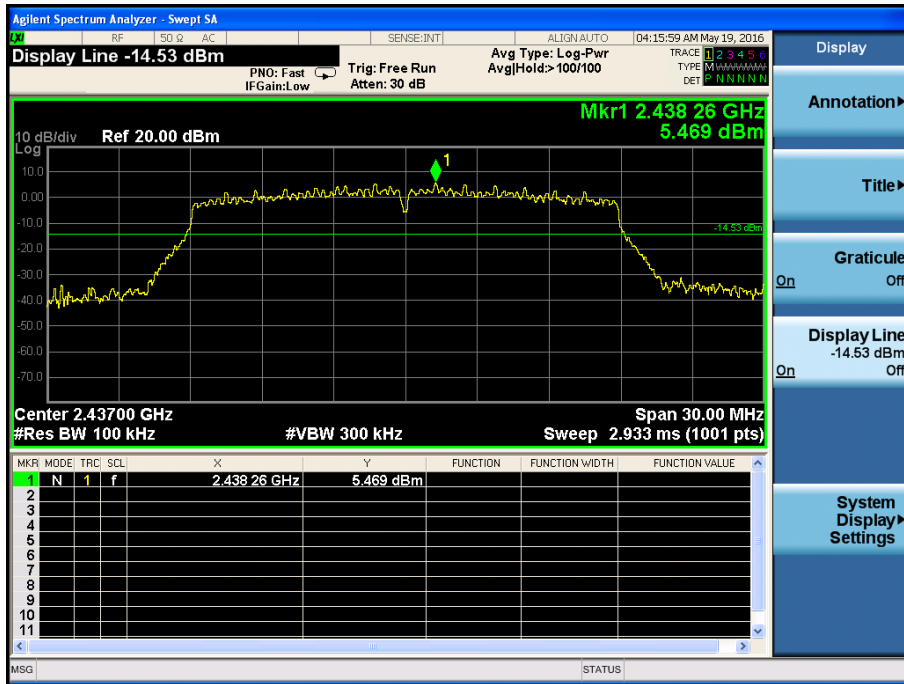
High Channel



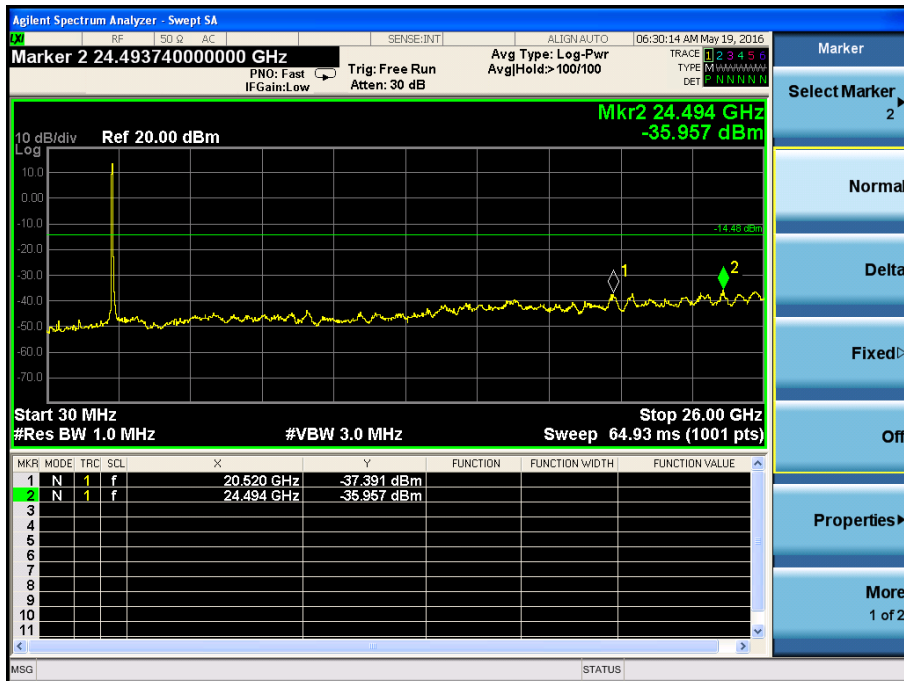
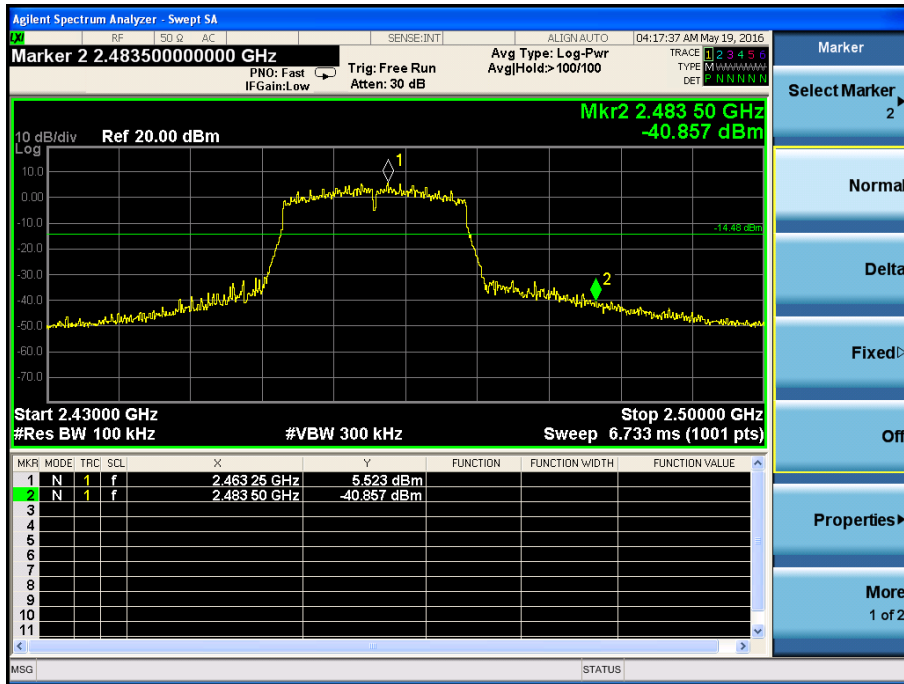
802.11n-HT20
Low Channel



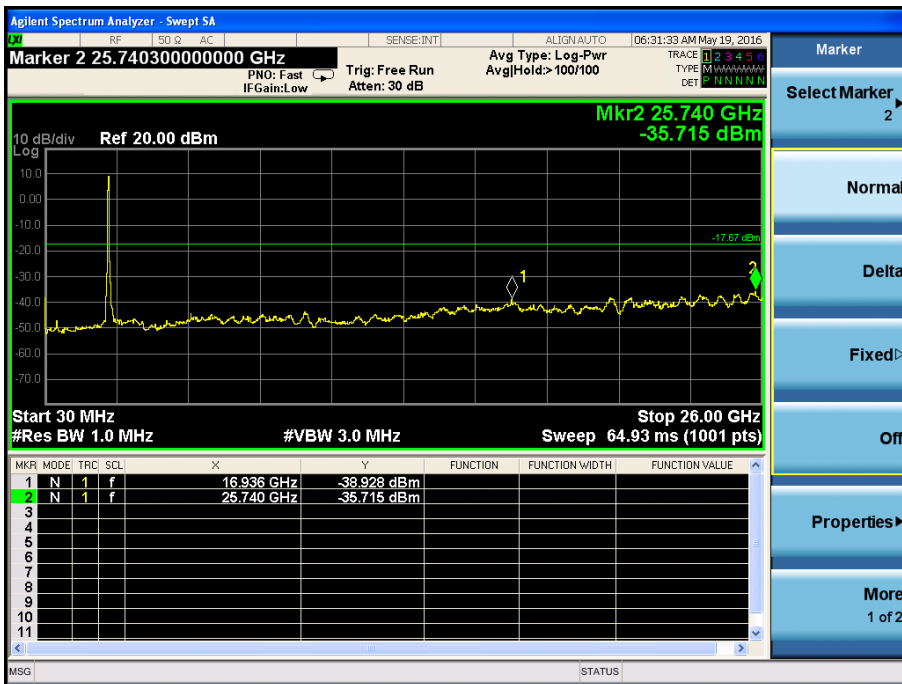
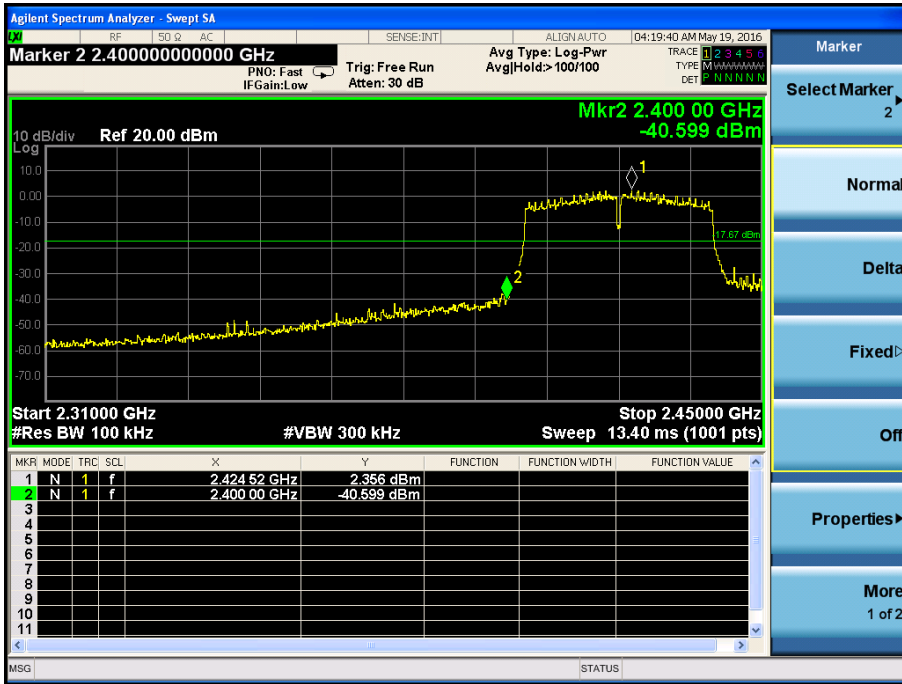
Middle Channel



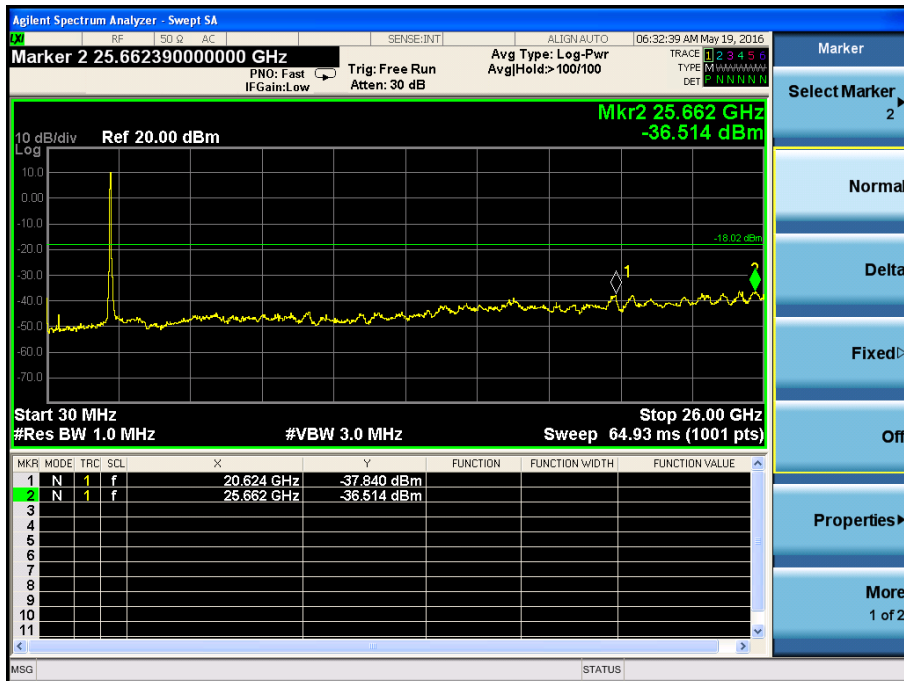
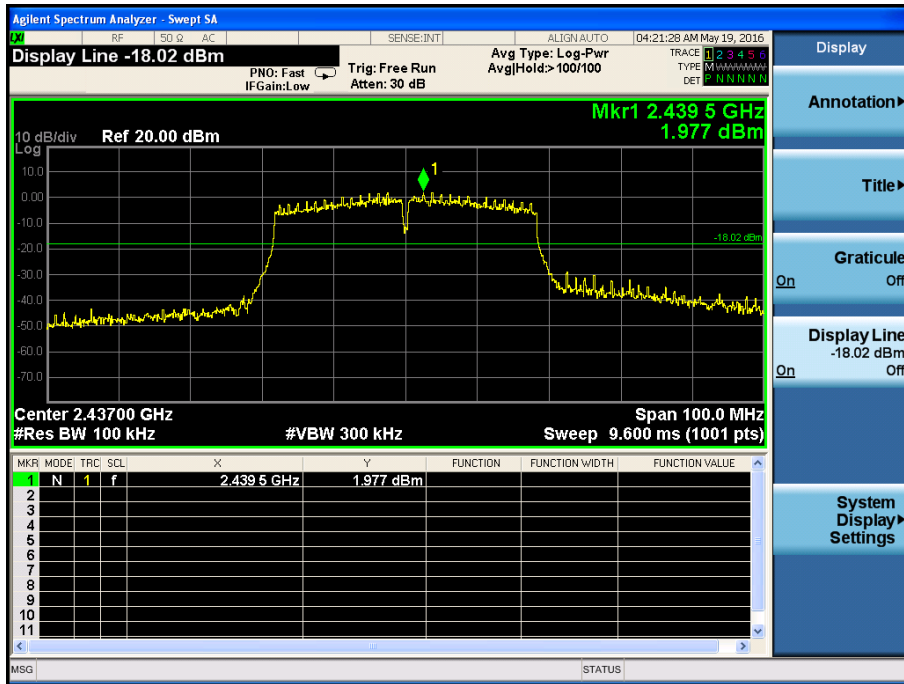
High Channel



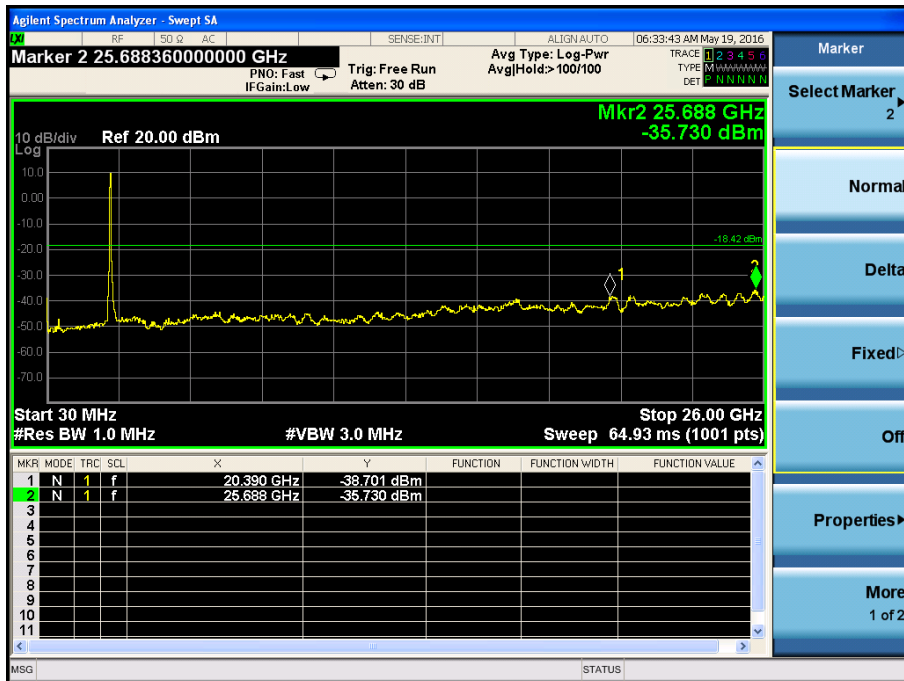
802.11n-HT40
Low Channel



Middle Channel



High Channel



10. Conducted Emissions

10.1 Measurement Uncertainty

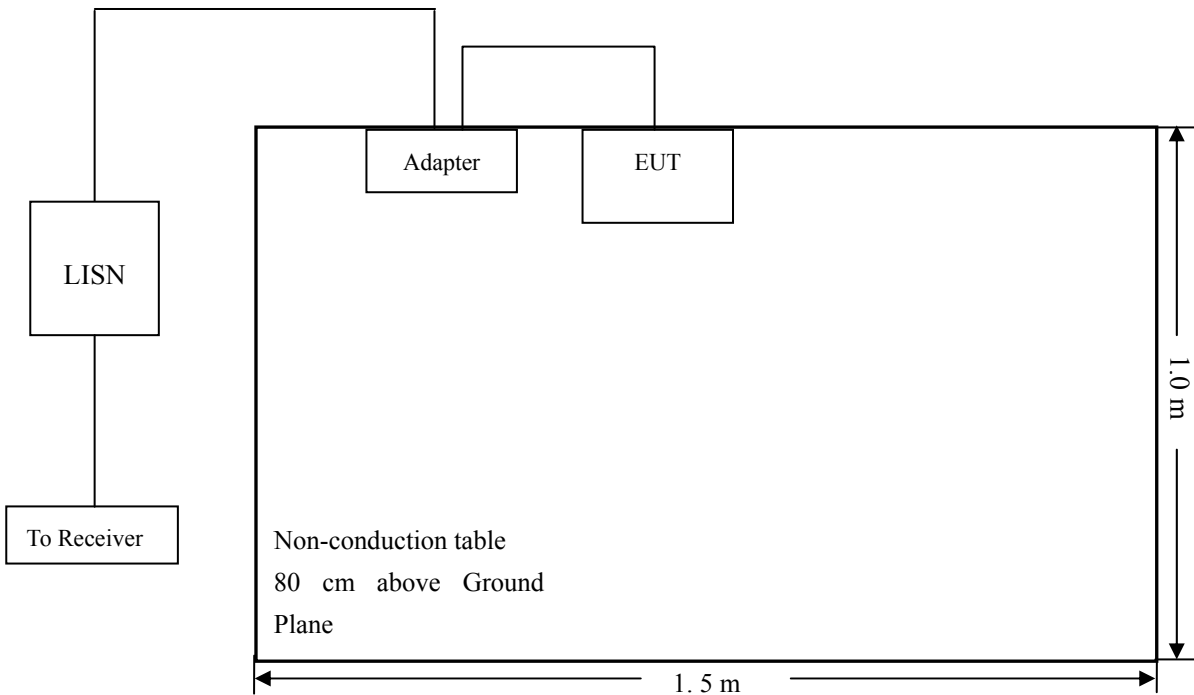
Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

10.2 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 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.

10.3 Basic Test Setup Block Diagram



10.4 Environmental Conditions

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

10.5 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

10.6 Summary of Test Results/Plots

According to the data in section 10.7, the EUT complied with the FCC Part 15.207 Conducted margin for this device, with the *worst* margin reading of:

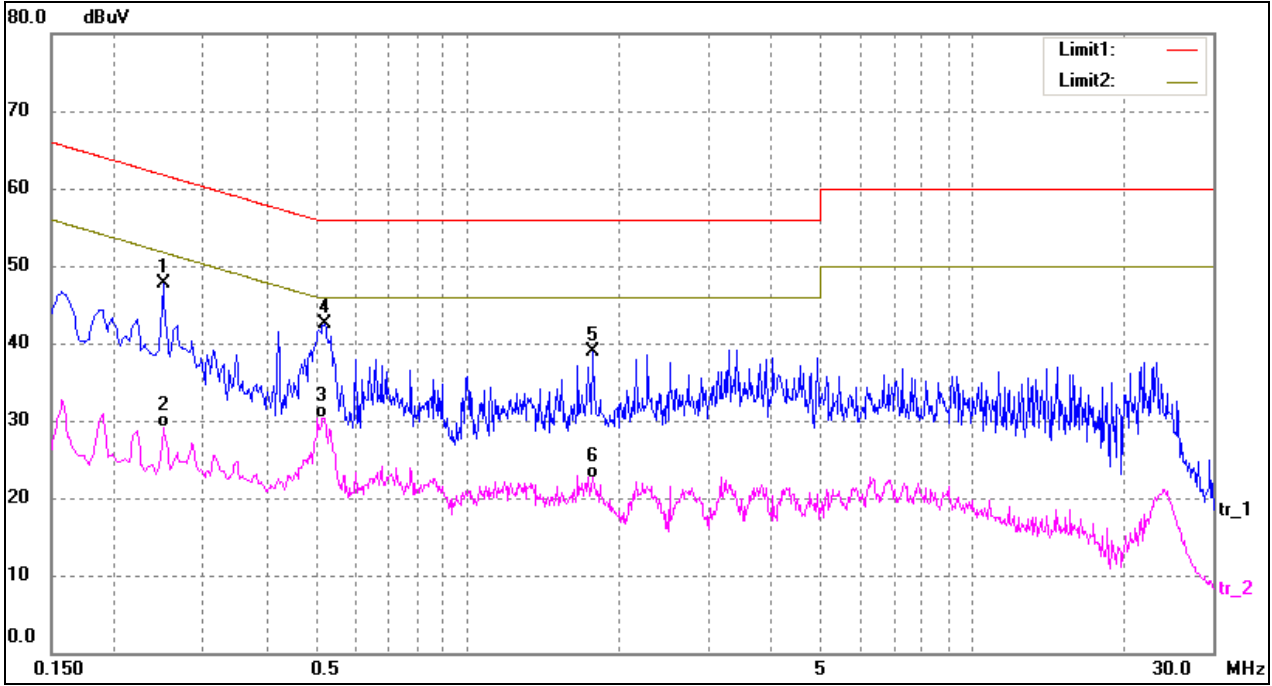
-6.05 dB at 0.5140MHz in the **Line** mode, **Peak** detector, **0.15-30MHz**

10.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

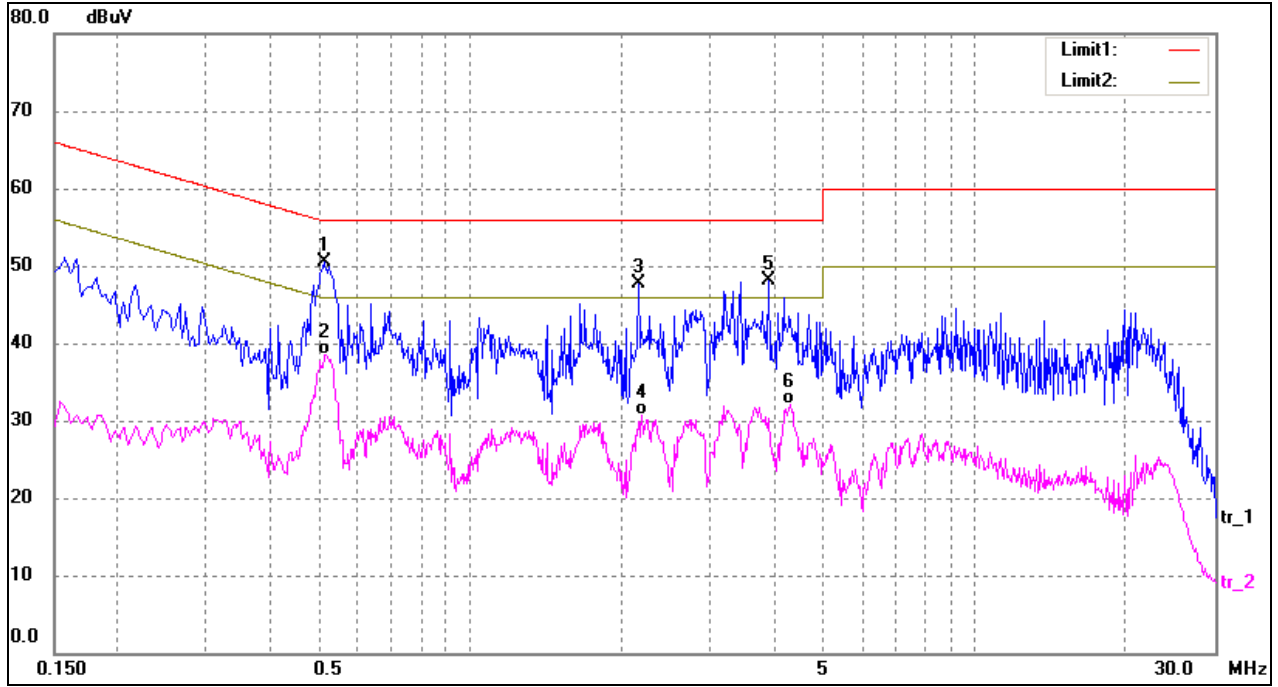
EUT: *Wireless Audio Module*
 Tested Model: *A28*
 Operating Condition: *Transmitting(Wi-Fi)*
 Comment: *AC 120V/60Hz; Adapter DC 5V*

Test Specification: *Neutral*



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2500	38.11	9.50	47.61	61.76	-14.15	peak
2	0.2500	19.57	9.50	29.07	51.76	-22.69	AVG
3	0.5180	20.77	9.56	30.33	46.00	-15.67	AVG
4*	0.5220	32.92	9.57	42.49	56.00	-13.51	peak
5	1.7780	29.07	9.79	38.86	56.00	-17.14	peak
6	1.7780	12.81	9.79	22.60	46.00	-23.40	AVG

Test Specification: Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.5140	40.39	9.56	49.95	56.00	-6.05	peak
2	0.5180	28.92	9.56	38.48	46.00	-7.52	AVG
3	2.1580	37.95	9.84	47.79	56.00	-8.21	peak
4	2.1980	20.93	9.85	30.78	46.00	-15.22	AVG
5	3.9180	37.98	10.09	48.07	56.00	-7.93	peak
6	4.3340	21.96	10.15	32.11	46.00	-13.89	AVG

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