FCC Part 15C
Measurement and Test Report

For

GL Technologies (Hong Kong) Limited

Unit 210D, 2/F, Enterprise Place Hong Kong Science Park, Shatin, N.T.

HongKong

FCC ID: 2AFIW-B1300

FCC Rule(s):	FCC Part 15C
Product Description:	**GL.iNet 1300M Home AC Router**
Tested Model:	**GL-B1300**
Report No.:	HCT17JR291E-1
Sample Receipt Date:	September 28, 2017
Tested Date:	November 12~ November 30, 2017
Issued Date:	December 1, 2017
Tested By:	Jason Su/ Engineer
Reviewed By:	Silin Chen / EMC Manager
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information	
Applicant:	**GL Technologies (Hong Kong) Limited**
Address of applicant:	Unit 210D, 2/F, Enterprise Place Hong Kong Science Park, Shatin, N.T. Hong Kong
Manufacturer:	**GL Technologies (Hong Kong) Limited**
Address of manufacturer:	Unit 210D, 2/F, Enterprise Place Hong Kong Science Park, Shatin, N.T. Hong Kong

General Description of EUT	
Product Name:	GL.iNet 1300M Home AC Router
Trade Name:	GL·iNet
Model No.:	GL-B1300
Adding Model(s):	/
Hardware Version:	GL-B1300-V1.3
Software Version:	V2.264
Rated Voltage:	Input: AC 100-240V, 50/60Hz; Output: DC 12V 1.5A
Power Adapter Model:	/
Note: The test data is gathered from a production sample provided by the manufacturer.	

Technical Characteristics of EUT	
Frequency Range:	IEEE 802.11b: 2412MHz~2462MHz IEEE 802.11g: 2412MHz~2462MHz IEEE802.11nHT20: 2412MHz~2462MHz, IEEE802.11nHT40: 2422MHz~2452MHz,
RF Output Power:	19.78dBm (Conducted)
Data Rate:	maximum of 400Mbps
Modulation:	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)
Quantity of Channels:	11 for 802.11b/g/n(HT20); 7 for 802.11n(HT40)
Type of Antenna:	PCB Antenna
Antenna Gain:	Antenna 1: 2.1dBi Antenna 2: 2.1dBi

1.2 Test Standards

The following report is prepared on behalf of the **GL Technologies (Hong Kong) Limited** 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 Commission 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 Commission 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 V04 for digital transmission systems and KDB 662911 D01 Multiple Transmitter Output v02r01 shall be performed also.

1.4 Test Facility

FCC – Registration No.: 125990

Shenzhen SEM Test Technology Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration of Conformity (DOC). The Designation Number is CN5010, and Test Firm Registration Number is 125990.

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.

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
Note: All test modes (different data rate and different modulation) are performed, but only the worst case is recorded in this report.		

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Core
Adapter Cable	1.45	Non-Shielded	Without Core

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
Cable	0.80	Non-Shielded	Without Ferrite
USB cable	0.80	Non-Shielded	Without Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Notebook PC	Lenovo Beijing co. LTD	Lenovo	Lenovo G50-45

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	±0.42dB
Occupied Bandwidth	Conducted	±1.5%
Power Spectral Density	Conducted	±1.8dB
Conducted Spurious Emission	Conducted	±2.17dB
Conducted Emissions	Conducted	±2.88dB
Transmitter Spurious Emissions	Radiated	±5.1dB

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2017-06-12	2018-06-11
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2017-06-12	2018-06-11
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2017-06-12	2018-06-11
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2017-06-12	2018-06-11
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2017-06-12	2018-06-11
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2017-06-08	2018-06-07
SEMT-1042	Horn Antenna	ETS	3117	00086197	2017-06-08	2018-06-07
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2017-06-08	2018-06-07
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2017-06-08	2018-06-07
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2017-06-12	2018-06-11
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2017-06-12	2018-06-11
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2017-06-12	2018-06-11

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 MPE 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 PCB Antenna, fulfill the requirement of this section.

5. Power Spectral Density

5.1 Standard Applicable

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

5.2 Test Procedure

According to the KDB 558074 D01 V04, 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).

5.3 Environmental Conditions

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

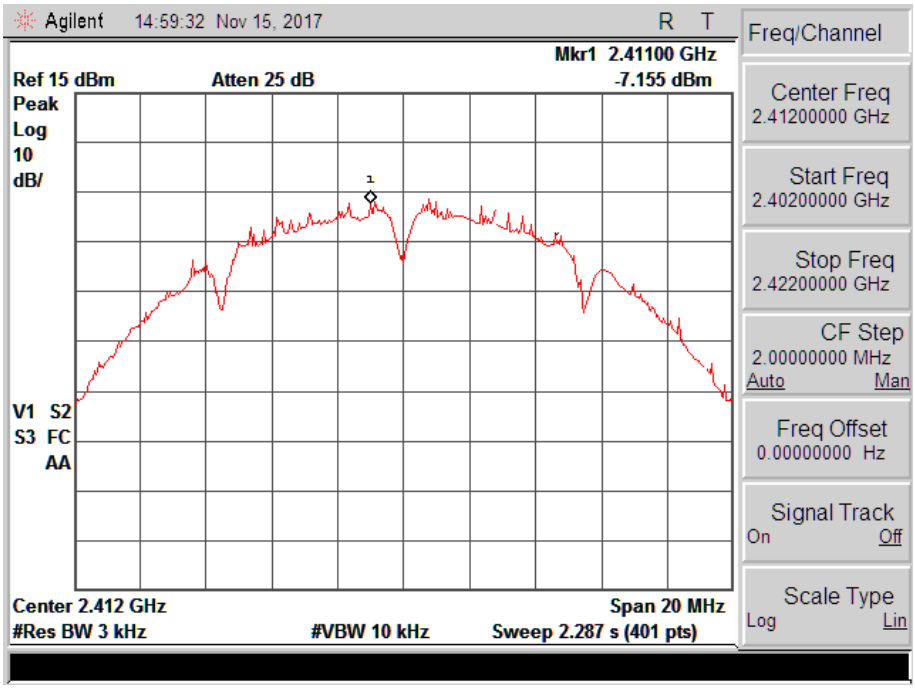
5.4 Summary of Test Results/Plots

Test Mode	Test Channel MHz	Power Spectral Density dBm/100kHz			Limit dBm/3kHz
		Chain 1	Chain 2	Total	
802.11b	2412	-7.155	-6.065	-3.566	8
	2437	-7.863	-7.769	-4.805	8
	2462	-5.776	-6.144	-2.946	8
802.11g	2412	-6.831	-9.078	-4.800	8
	2437	-8.557	-8.031	-5.276	8
	2462	-8.169	-8.624	-5.380	8
802.11n HT20	2412	-7.904	-8.512	-5.187	8
	2437	-6.524	-8.640	-.4.444	8
	2462	-6.482	-8.320	-4.294	8
802.11n HT40	2422	-10.940	-10.000	-7.434	8
	2437	-9.820	-9.749	-6.774	8
	2452	-9.861	-11.730	-7.685	8

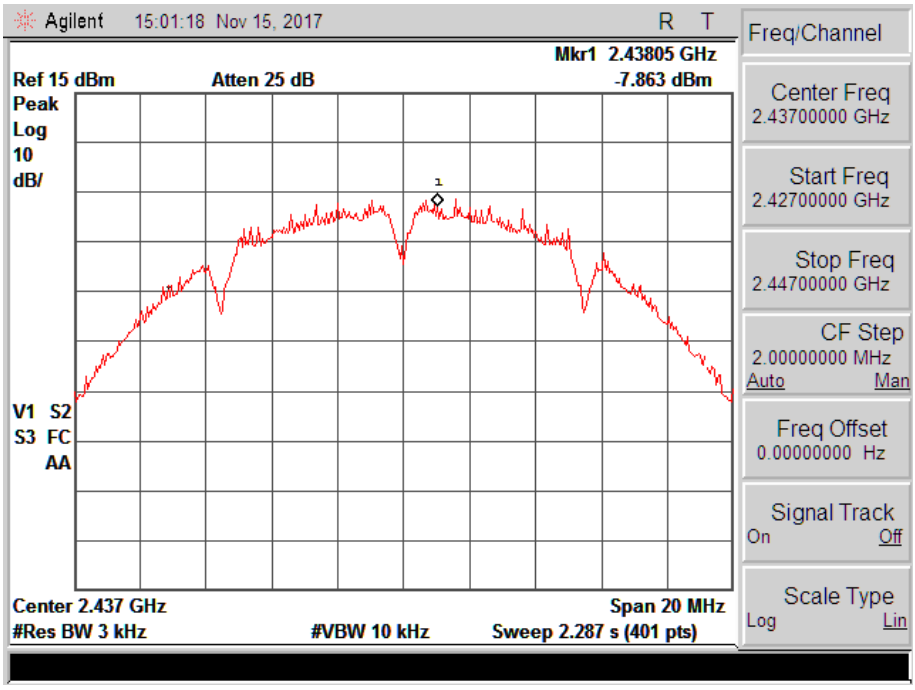
Please refer to the following test plots:

Antenna 1

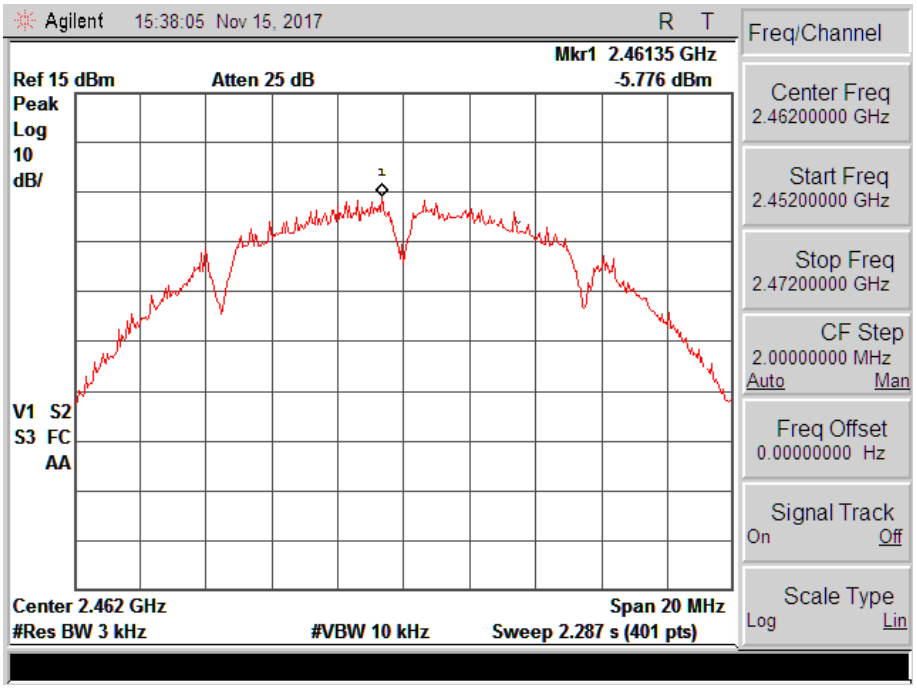
802.11b-Low Channel



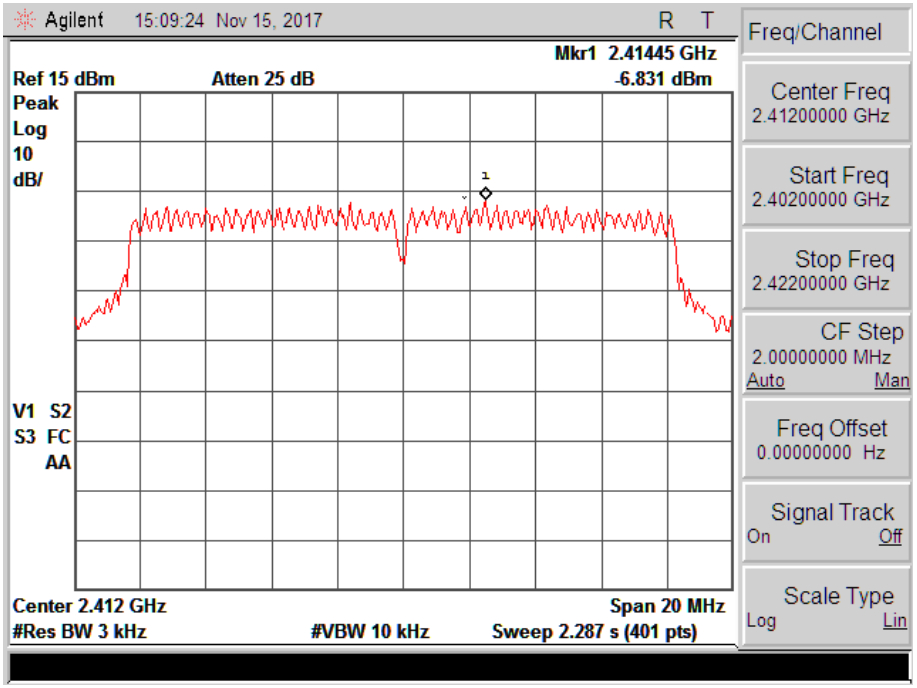
802.11b-Middle Channel



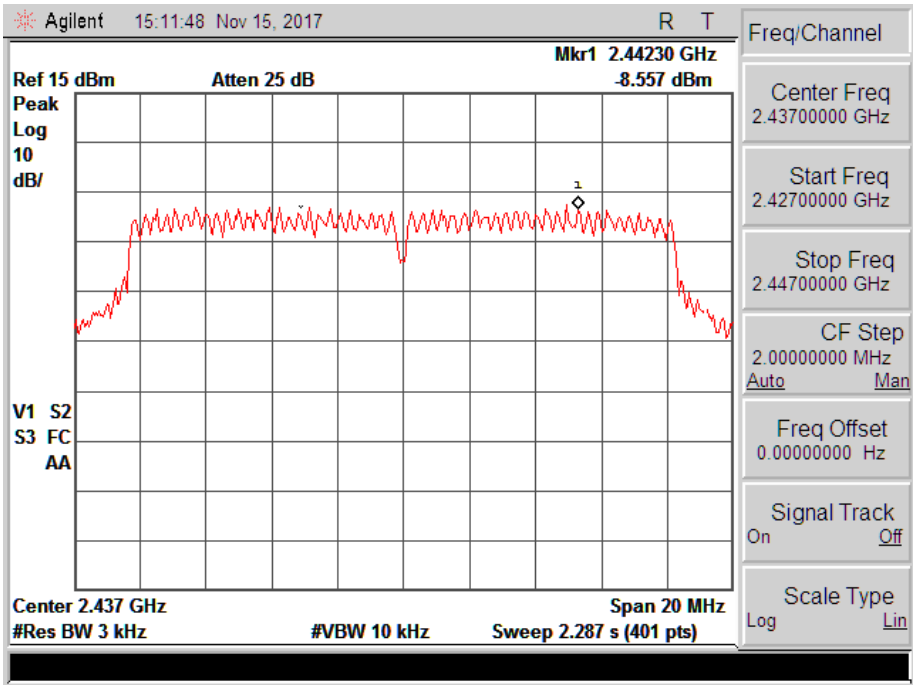
802.11b-High Channel



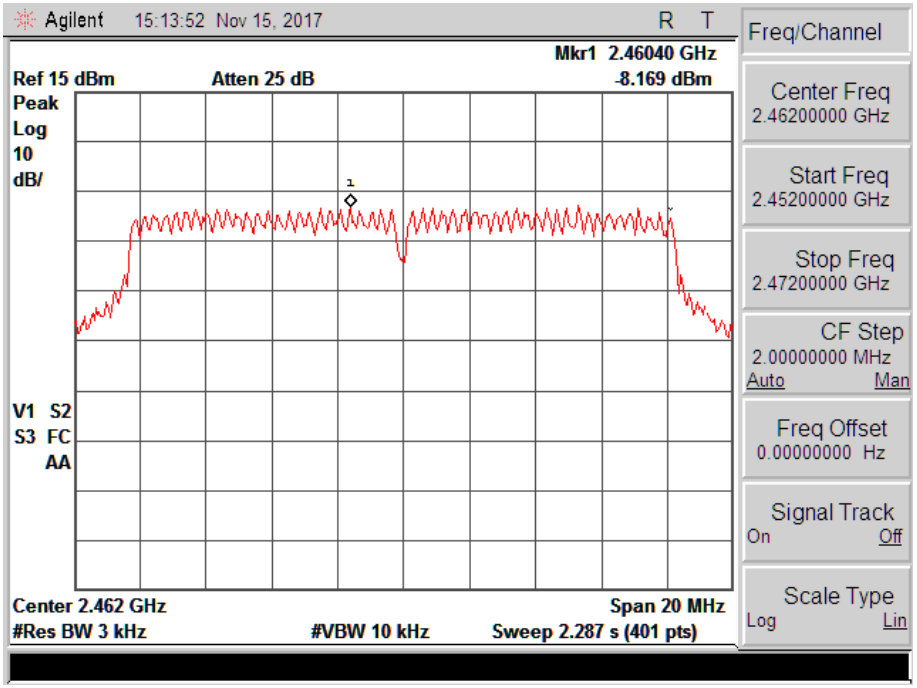
802.11g-Low Channel



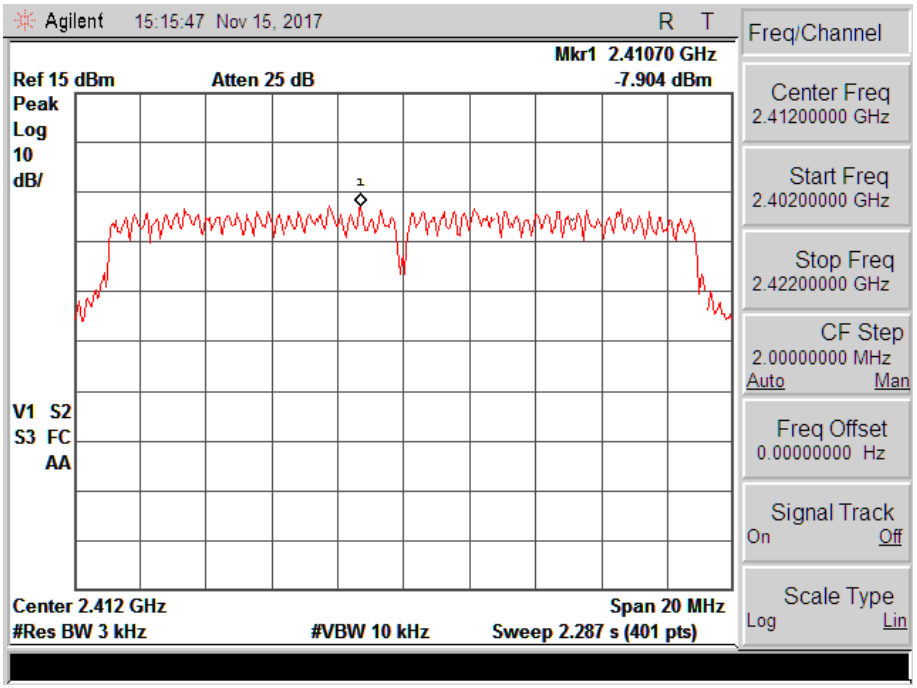
802.11g-Middle Channel



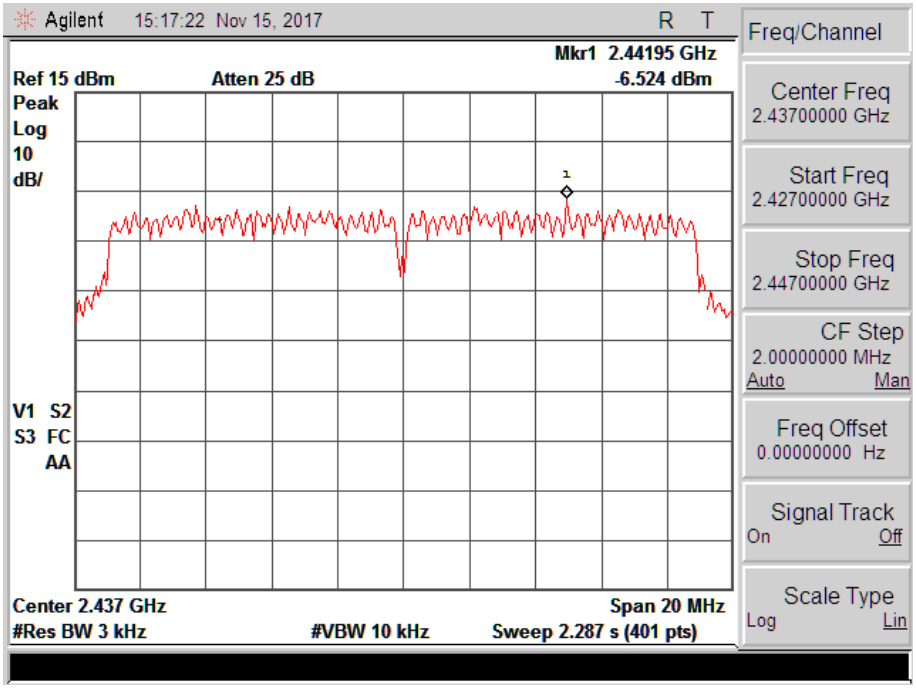
802.11g-High Channel



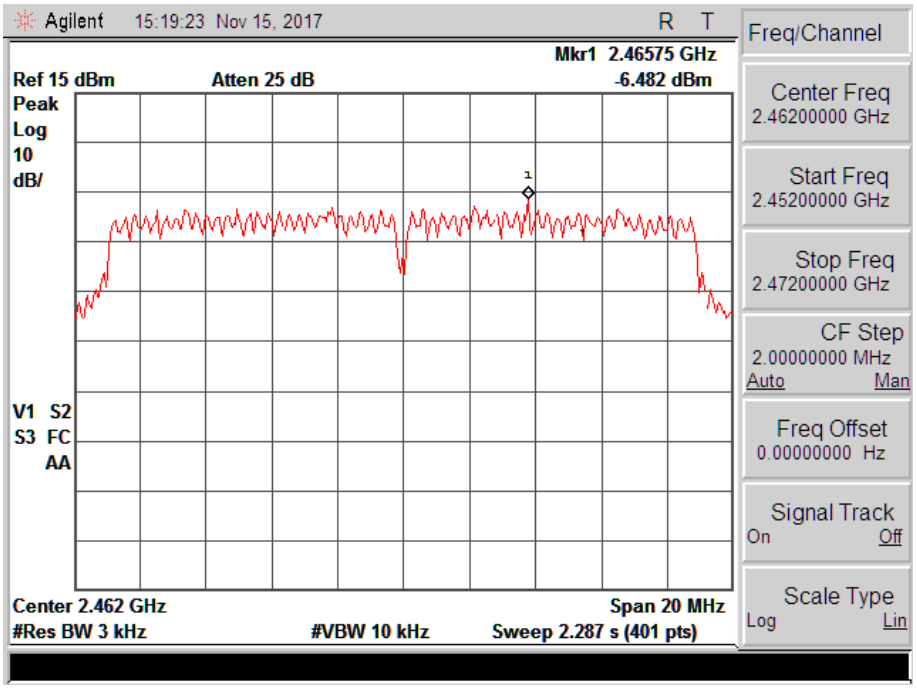
802.11n-HT20-Low Channel



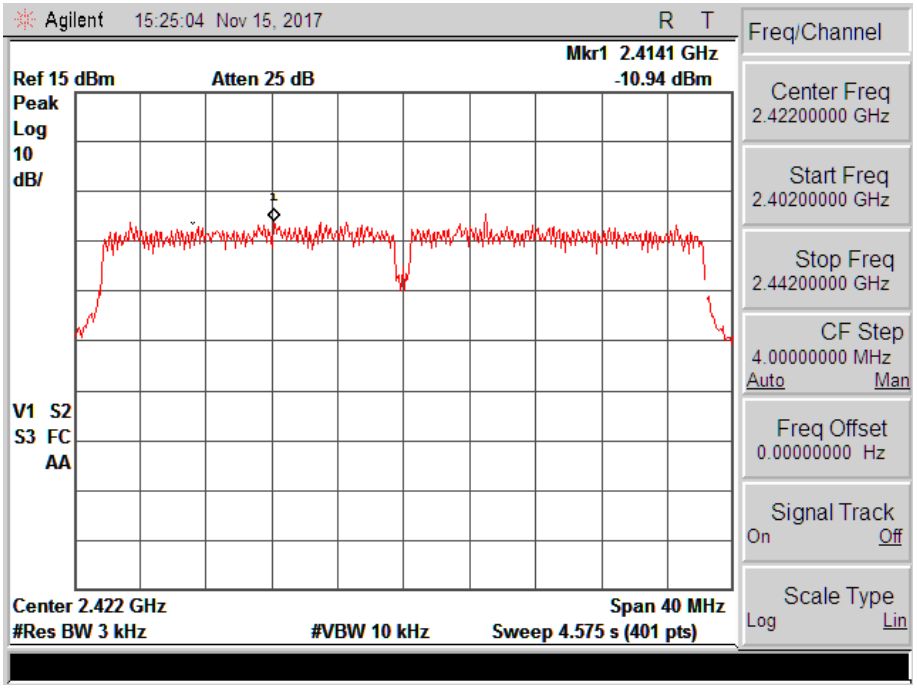
802.11n-HT20-Middle Channel



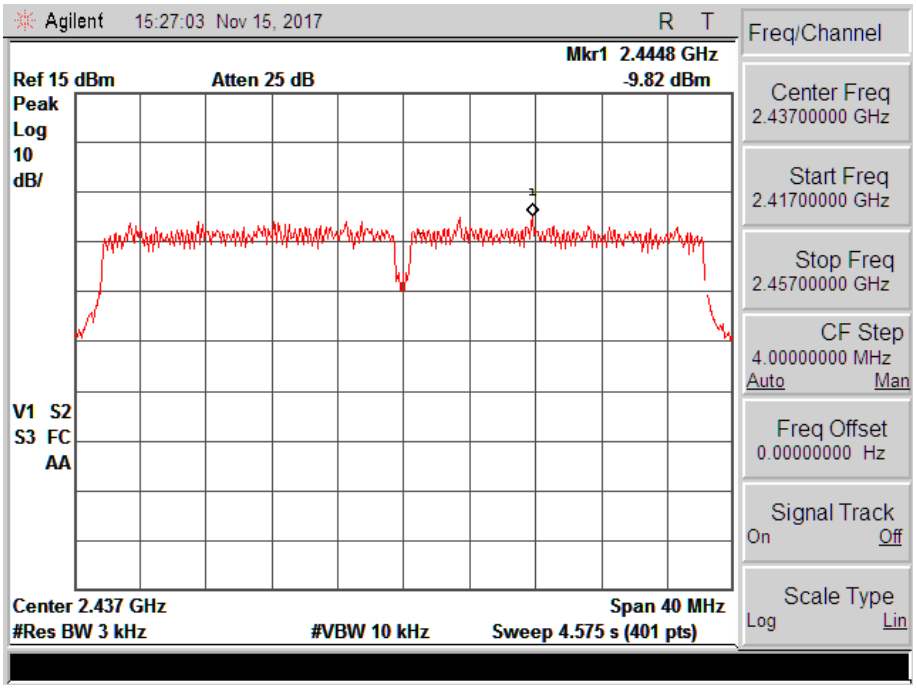
802.11n-HT20-High Channel



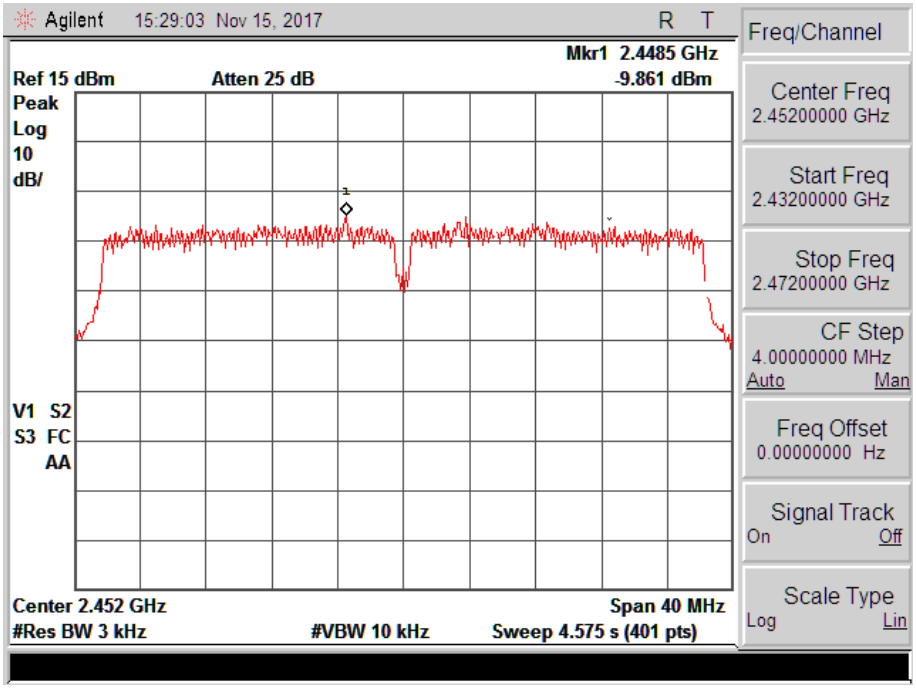
802.11n-HT40-Low Channel



802.11n-HT40-Middle Channel

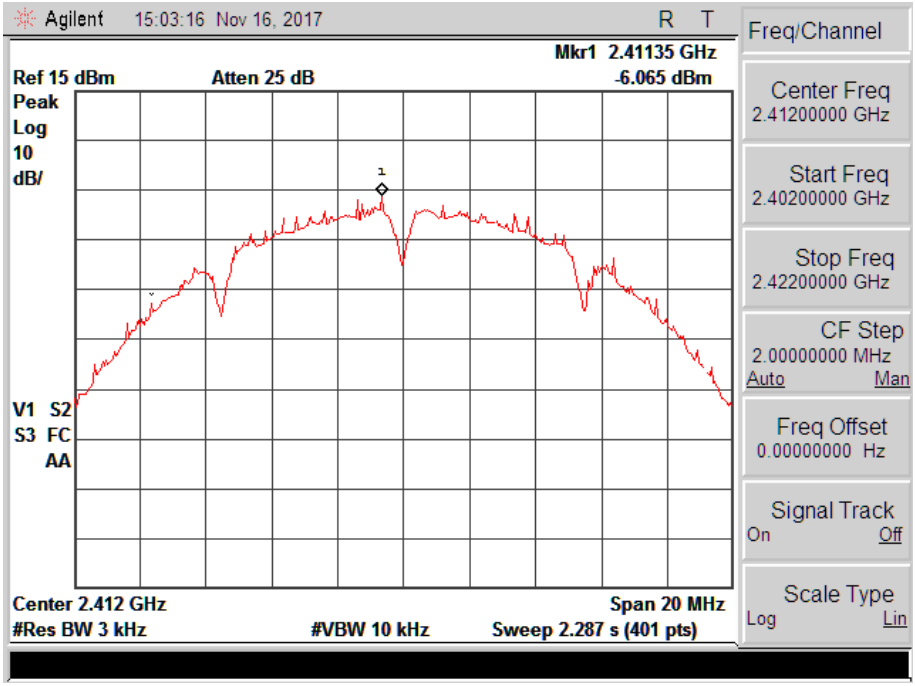


802.11n-HT40-High Channel

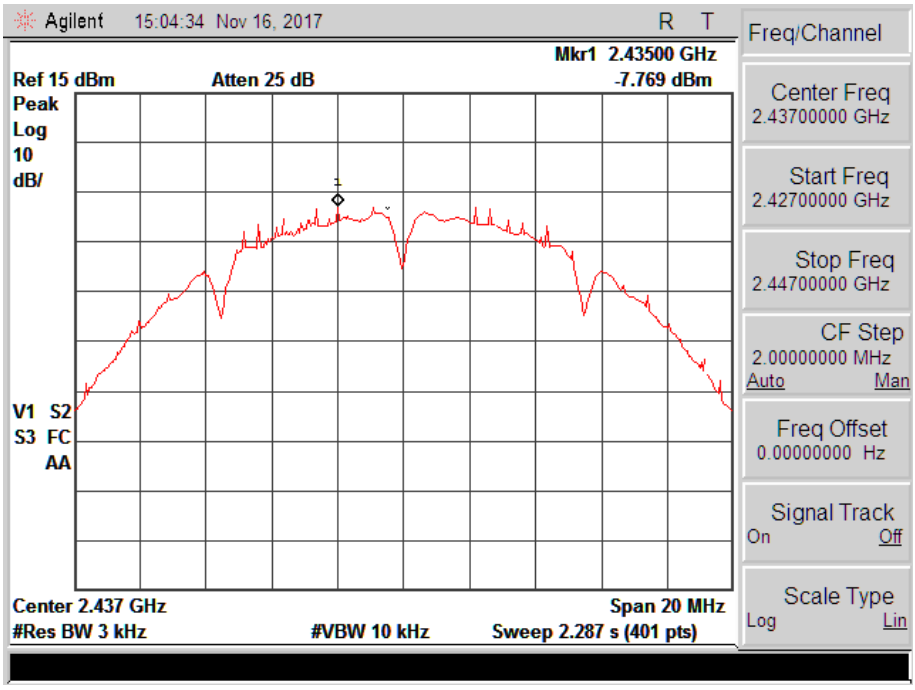


Antenna 2

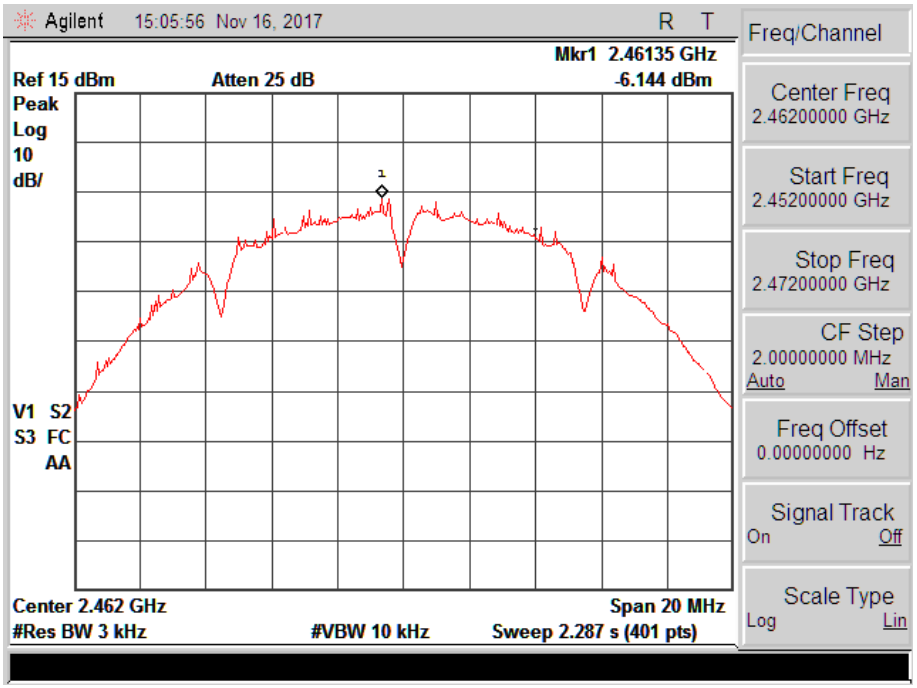
802.11b-Low Channel



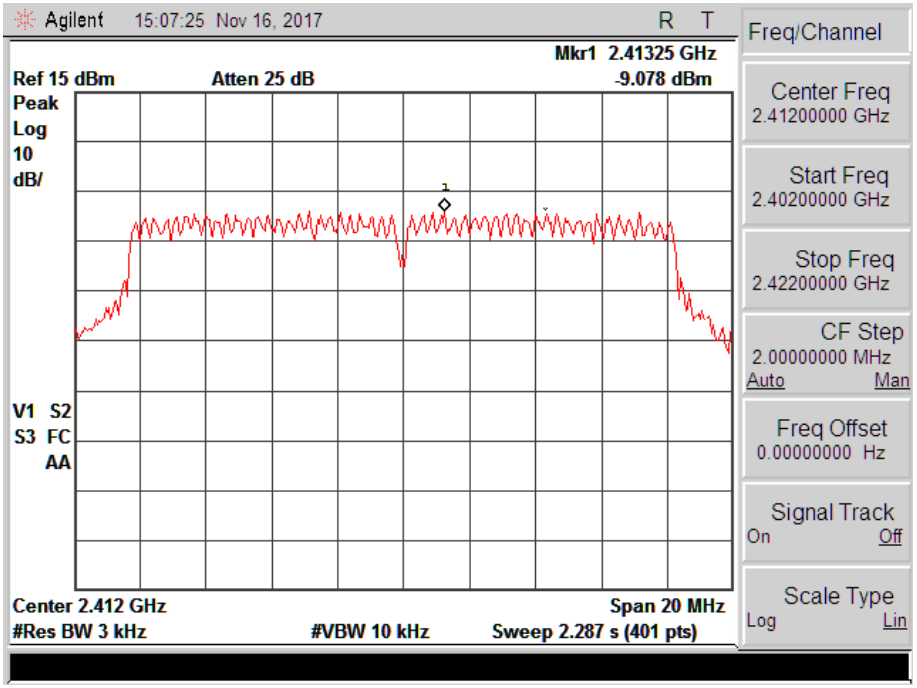
802.11b-Middle Channel



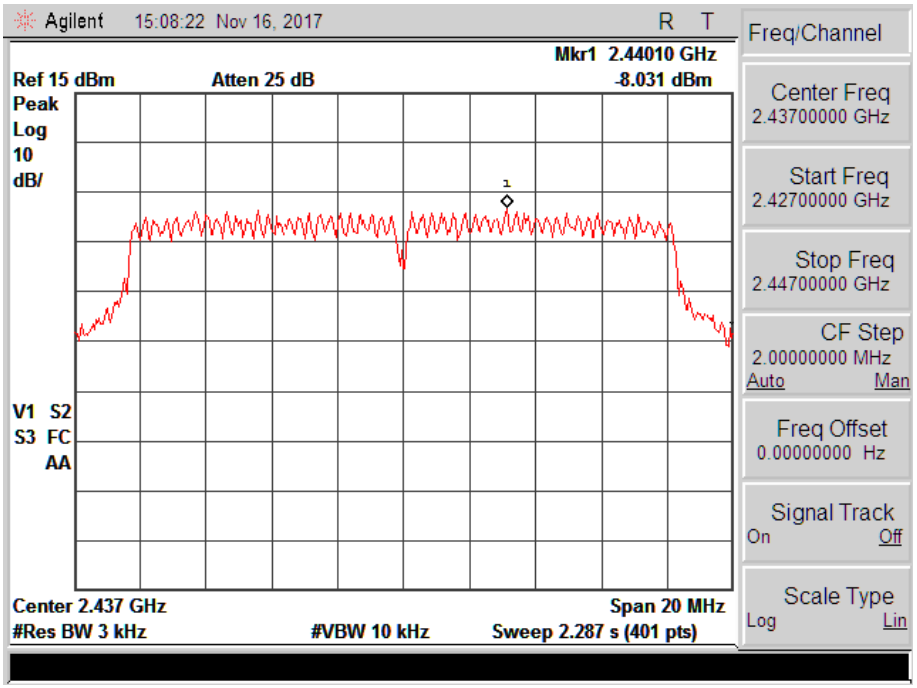
802.11b-High Channel



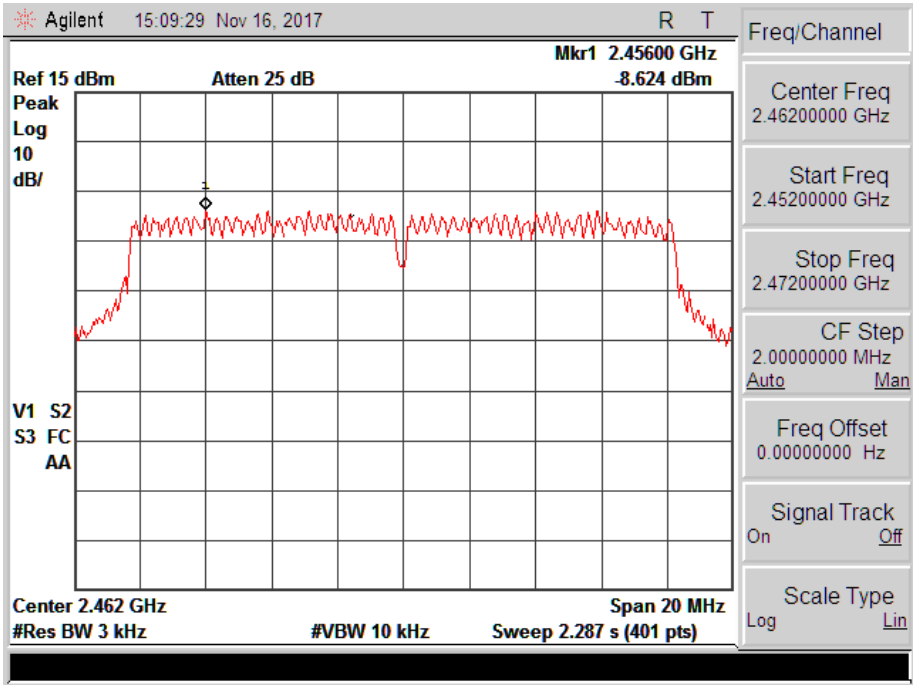
802.11g-Low Channel



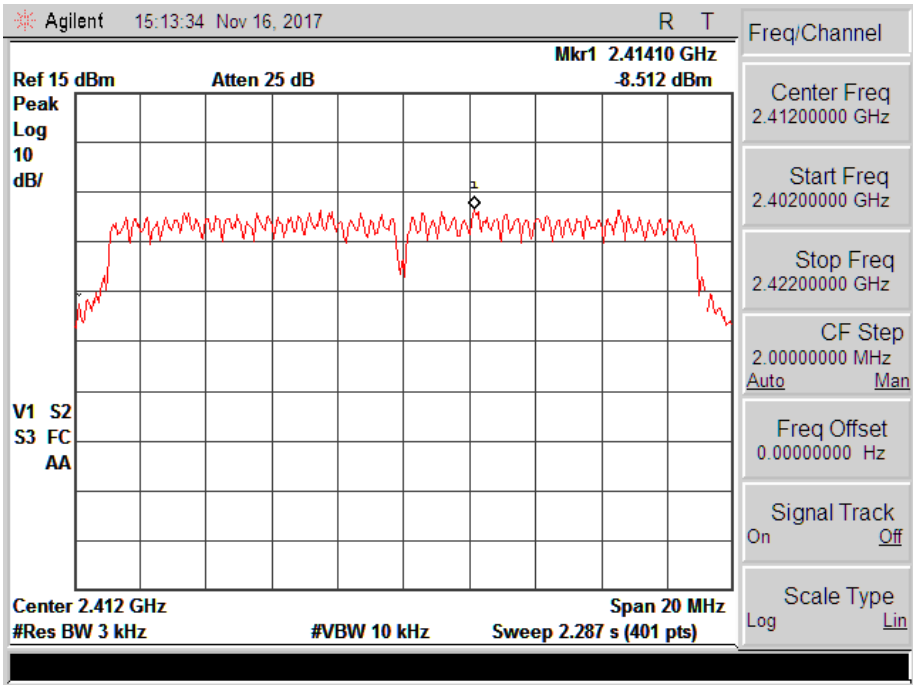
802.11g-Middle Channel



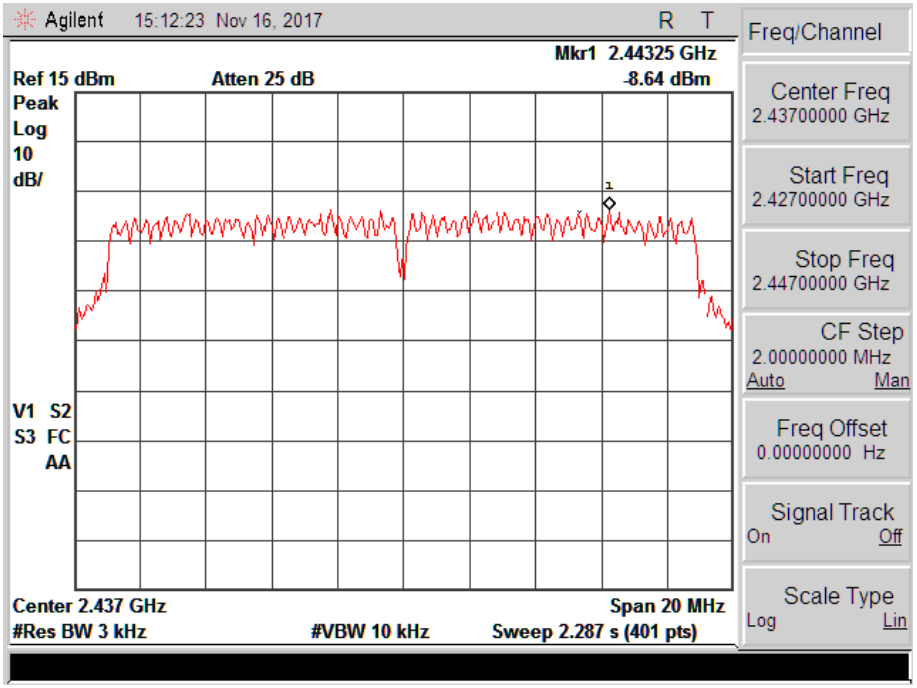
802.11g-High Channel



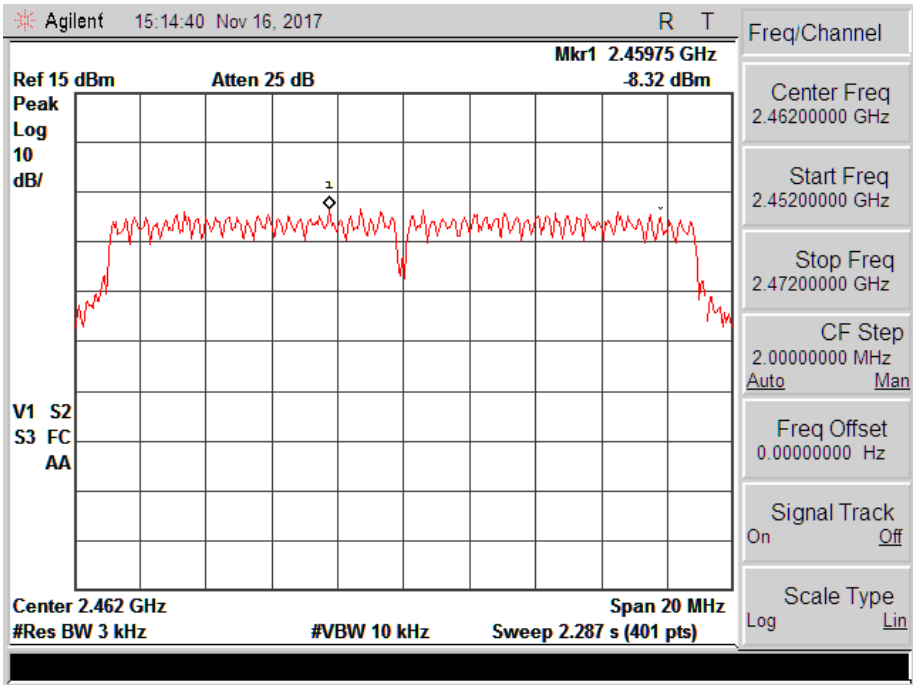
802.11n-HT20-Low Channel



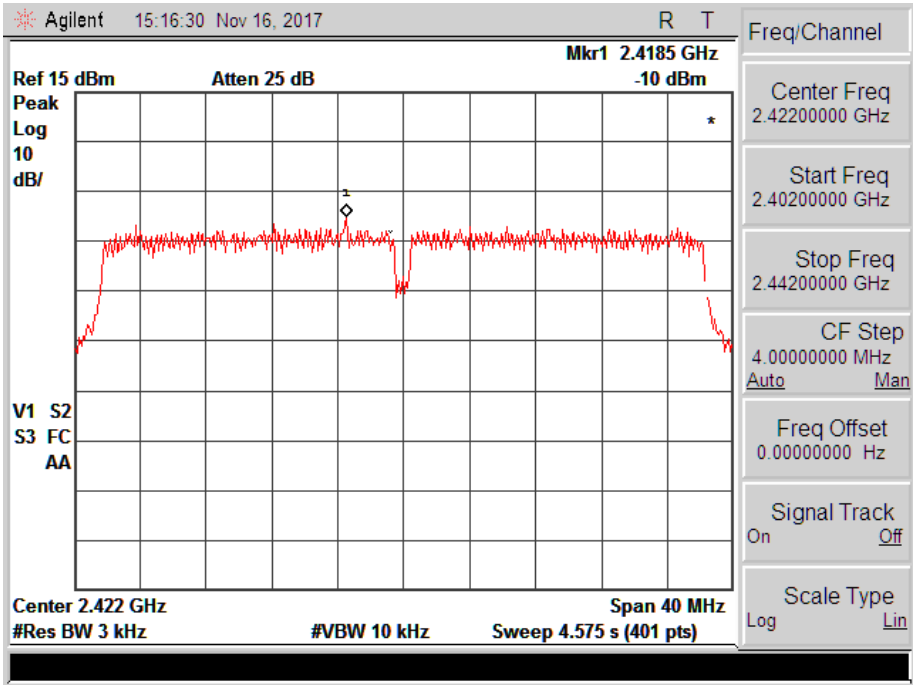
802.11n-HT20-Middle Channel



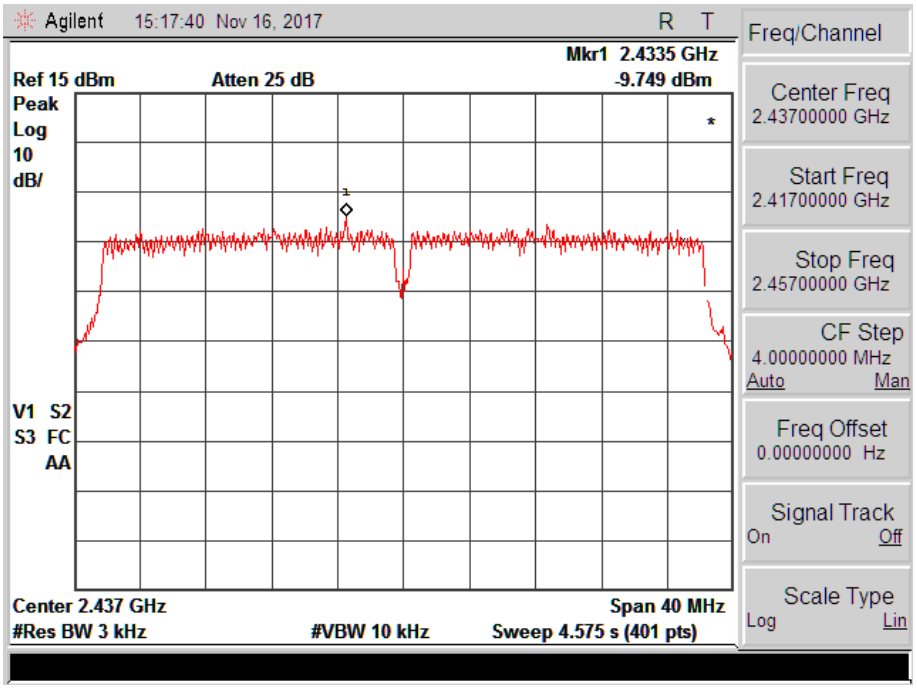
802.11n-HT20-High Channel



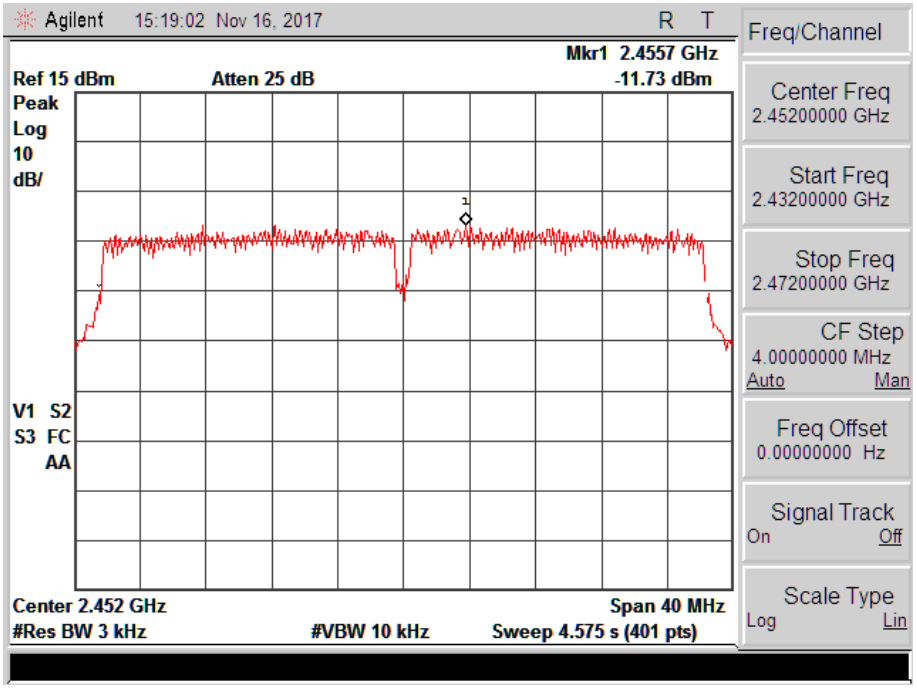
802.11n-HT40-Low Channel



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) ≥ 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.

6.3 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	Limit kHz
802.11b	2412	8.00	≥500
	2437	8.00	≥500
	2462	8.00	≥500
802.11g	2412	16.40	≥500
	2437	16.40	≥500
	2462	16.45	≥500
802.11n-HT20	2412	17.60	≥500
	2437	17.60	≥500
	2462	17.60	≥500
802.11n-HT40	2422	36.20	≥500
	2437	36.30	≥500
	2452	36.30	≥500

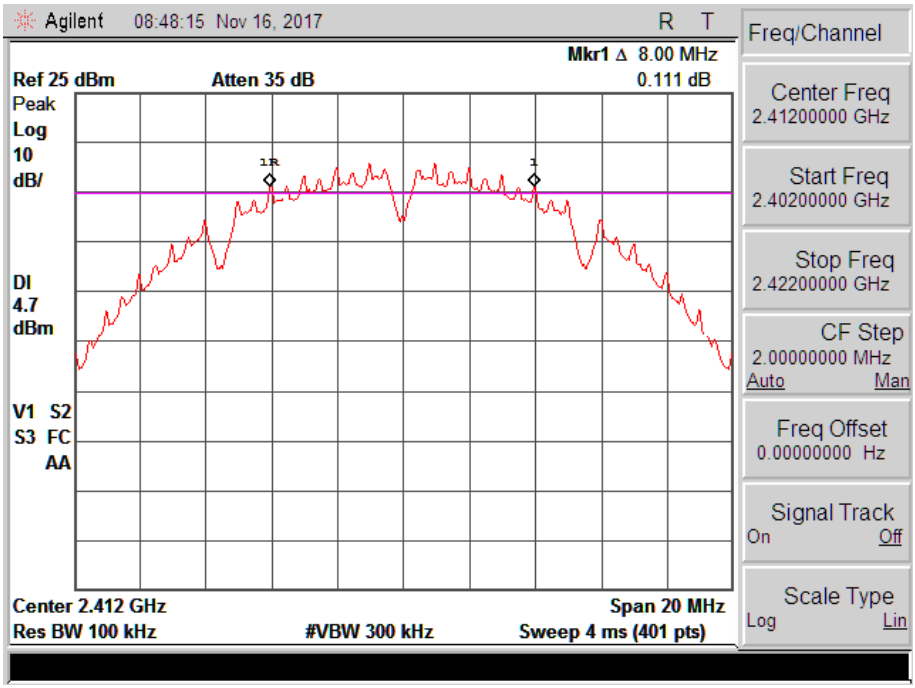
Antenna 2

Test Mode	Test Channel MHz	6 dB Bandwidth MHz	Limit kHz
802.11b	2412	8.00	≥500
	2437	8.00	≥500
	2462	8.05	≥500
802.11g	2412	16.30	≥500
	2437	16.35	≥500
	2462	16.35	≥500
802.11n-HT20	2412	17.60	≥500
	2437	17.60	≥500
	2462	17.50	≥500
802.11n-HT40	2422	36.60	≥500
	2437	36.60	≥500
	2452	36.60	≥500

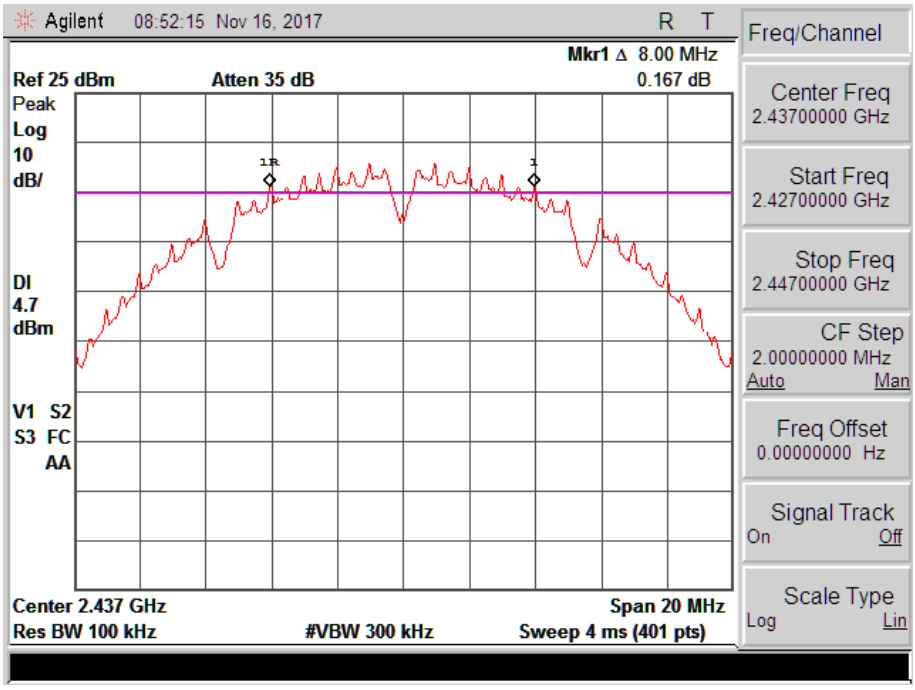
Please refer to the following test plots:

Antenna 1

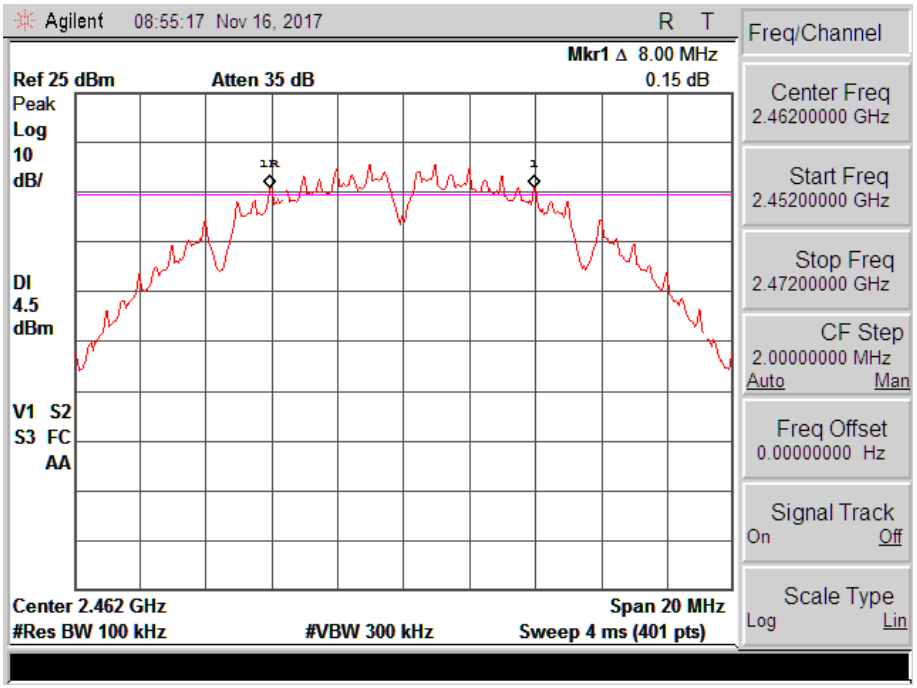
802.11b-Low Channel



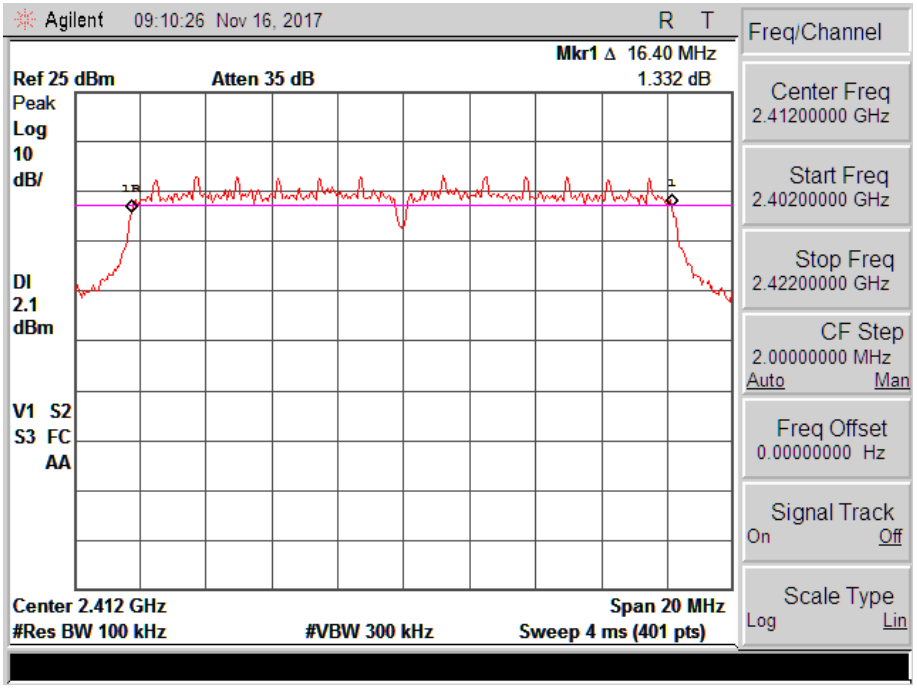
802.11b-Middle Channel



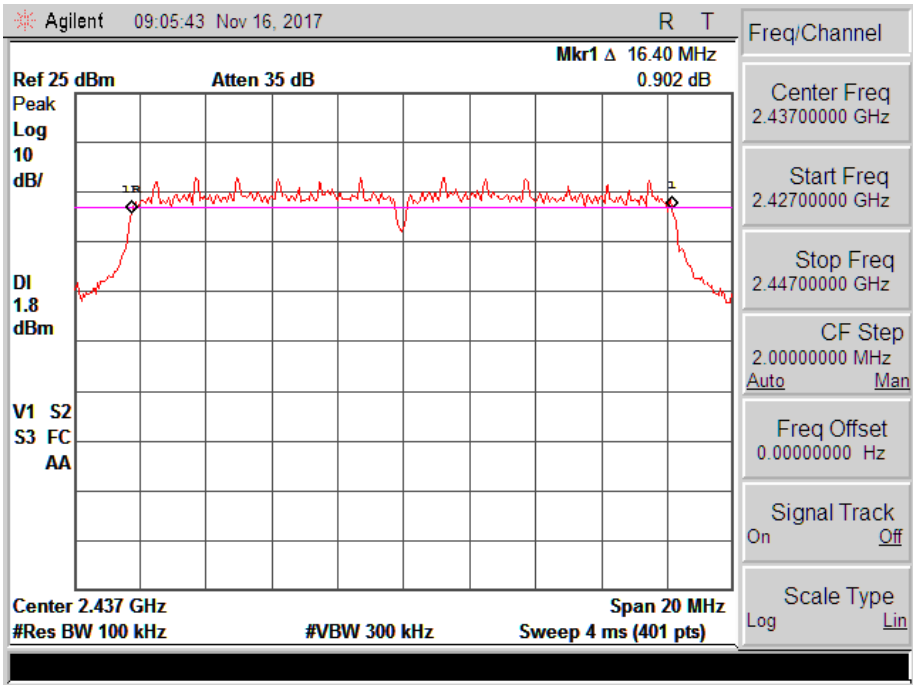
802.11b-High Channel



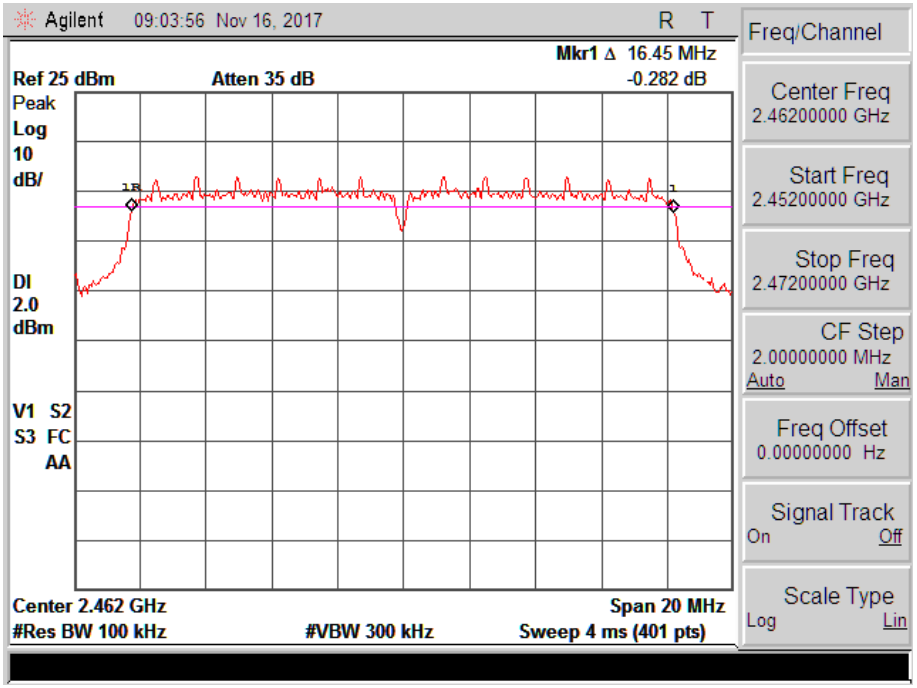
802.11 g-Lows Channel



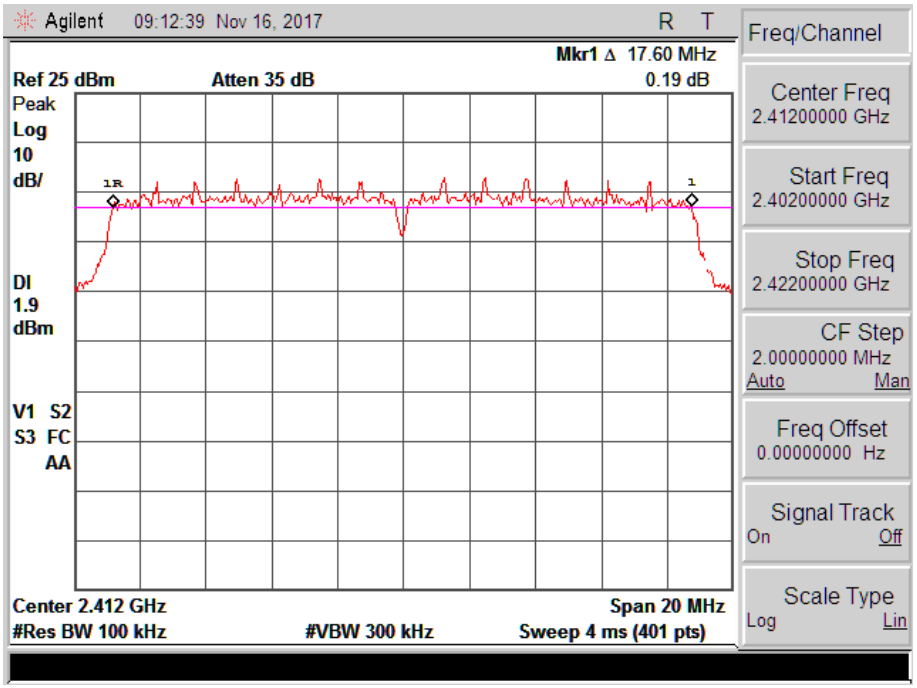
802.11g-Middle Channel



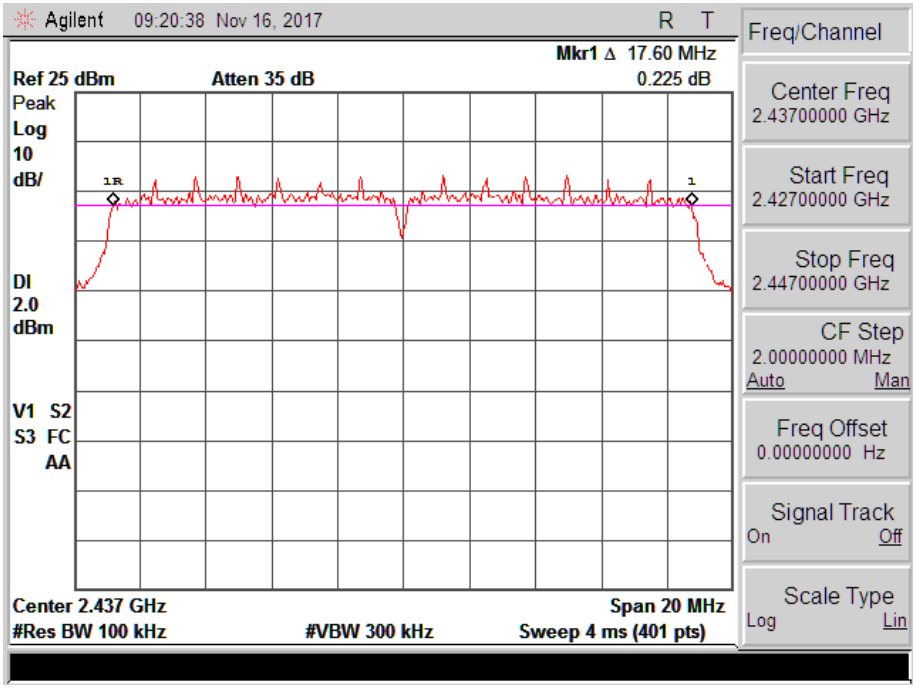
802.11g-High Channel



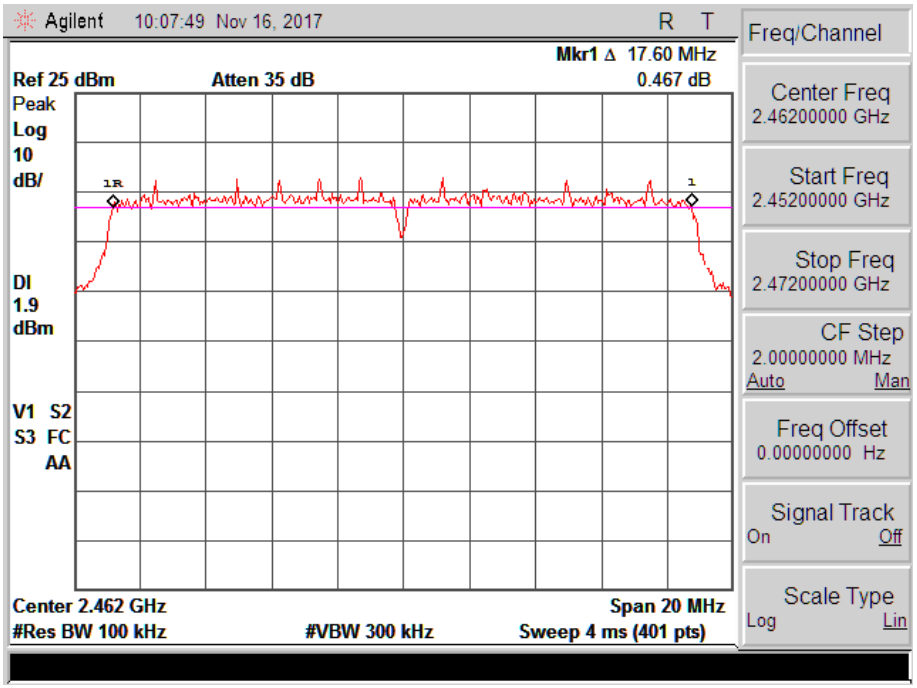
802.11n-HT20-Low Channel



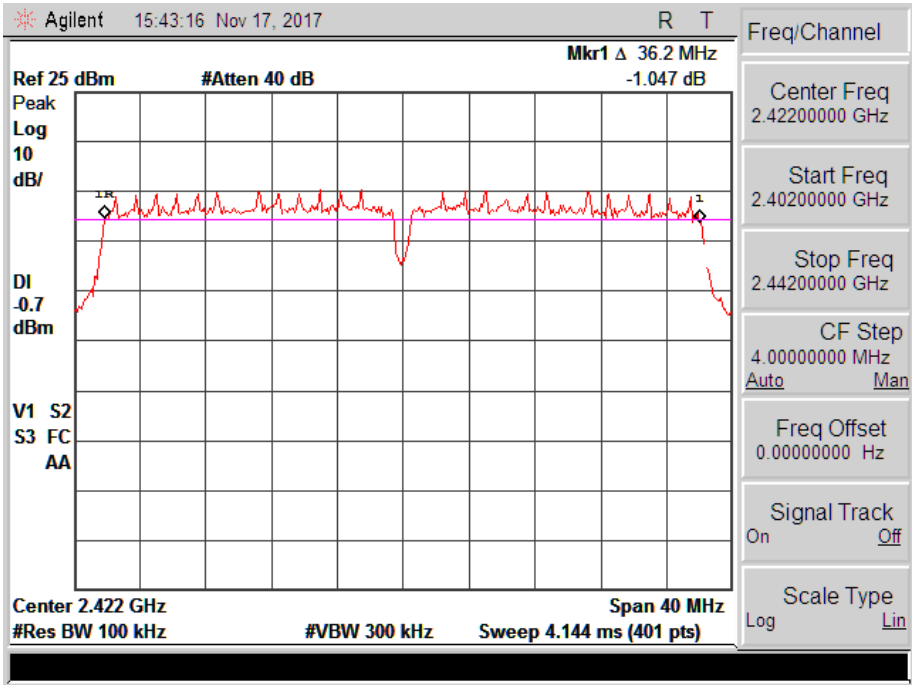
802.11n-HT20-Middle Channel



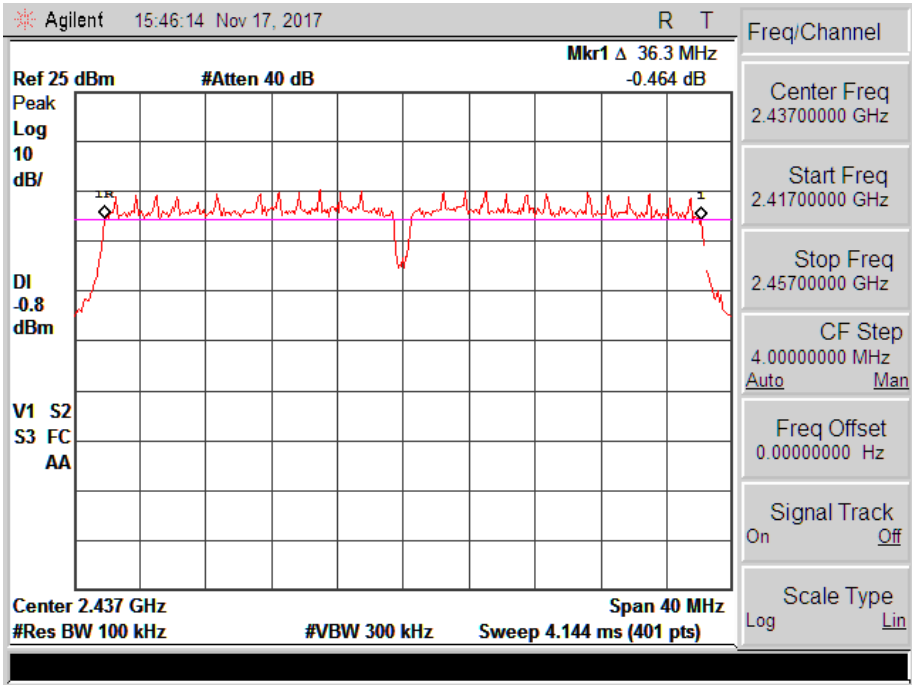
802.11n-HT20-High Channel



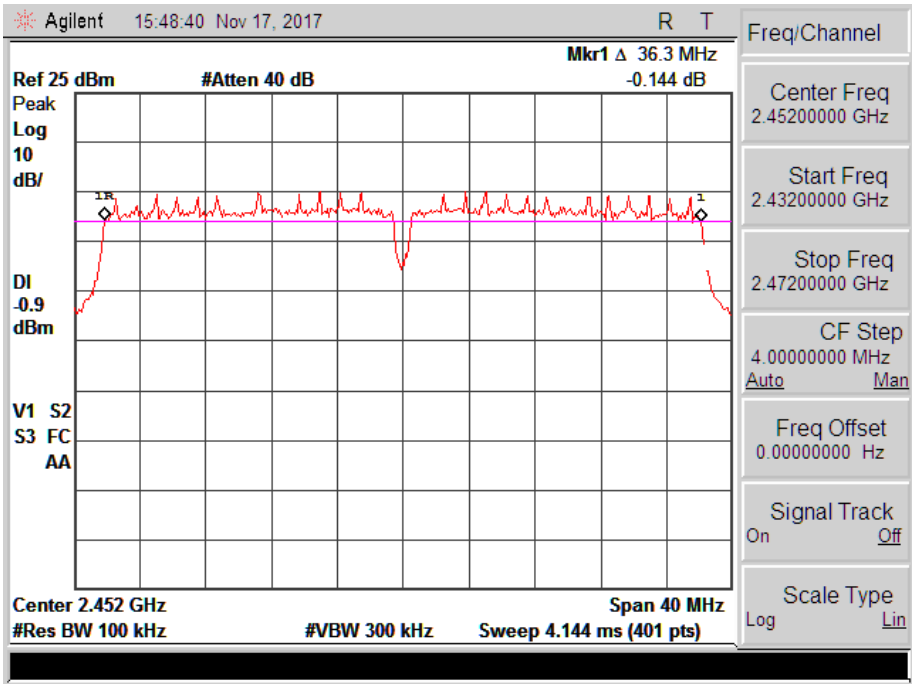
802.11n-HT40-Low Channel



802.11n-HT40-Middle Channel

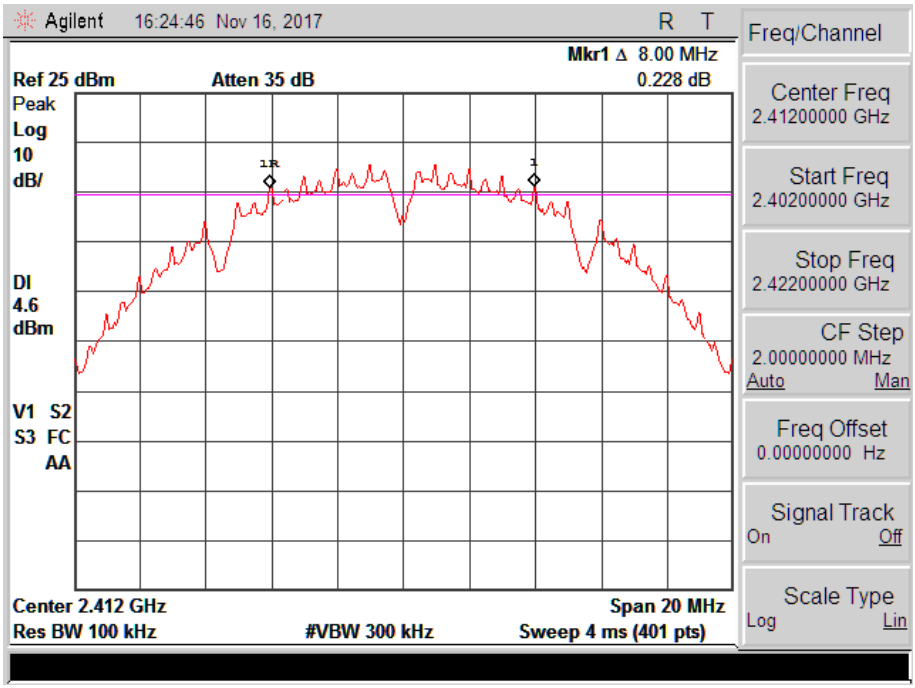


802.11n-HT40-High Channel

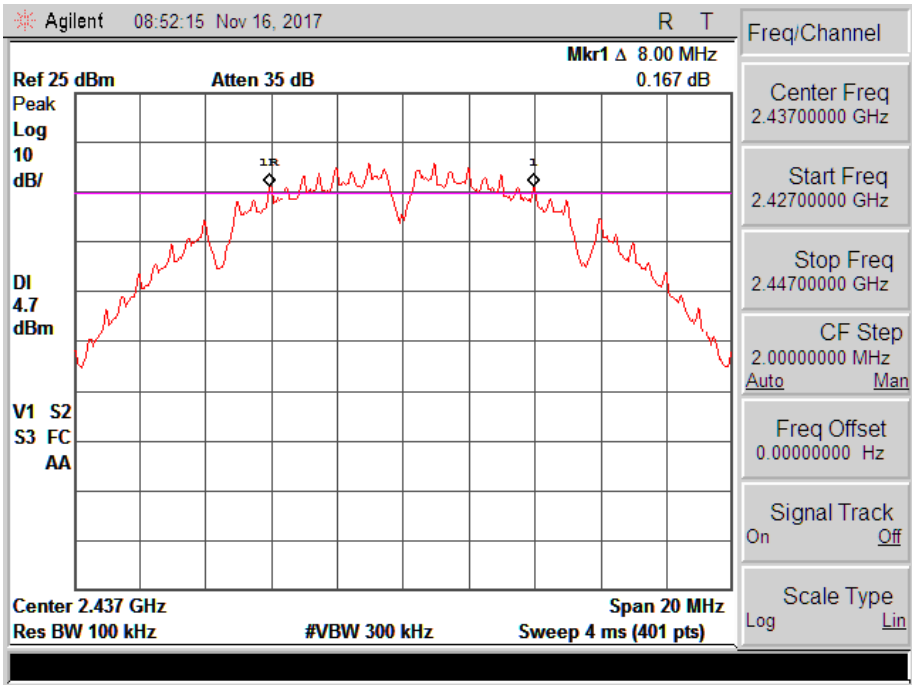


Antenna 2

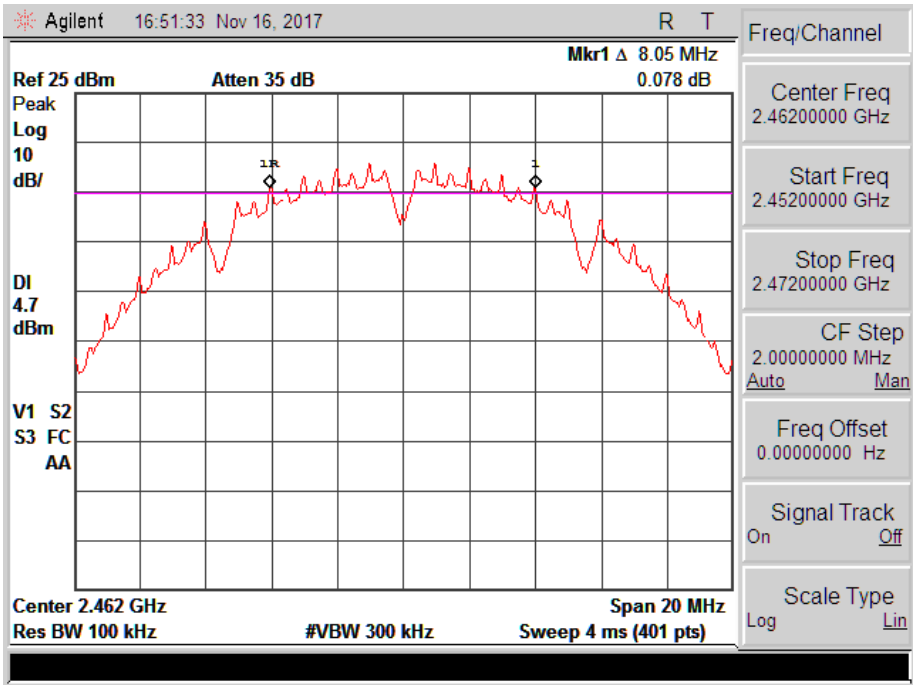
802.11b-Low Channel



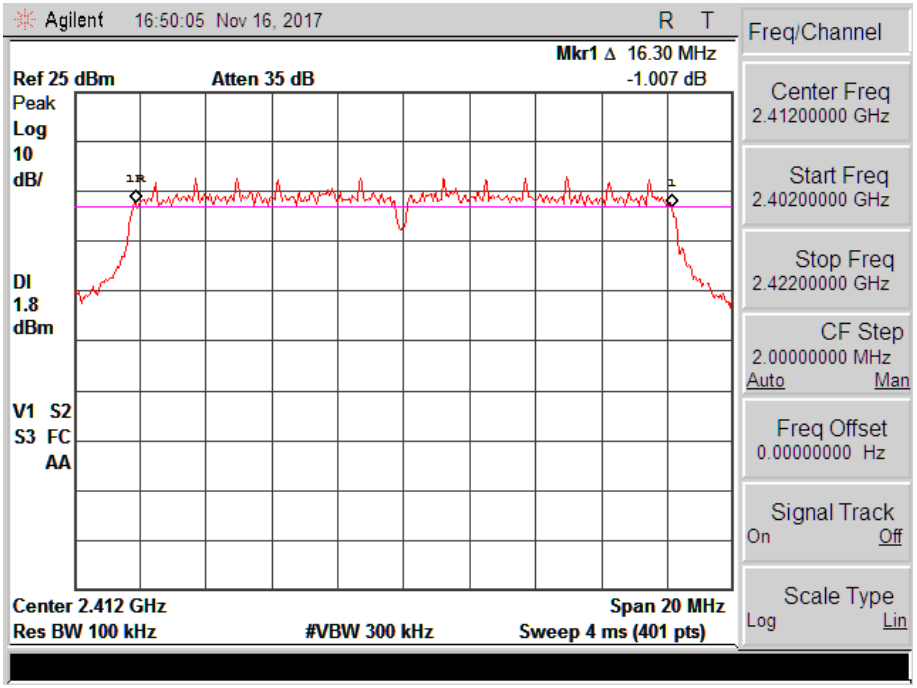
802.11b-Middle Channel



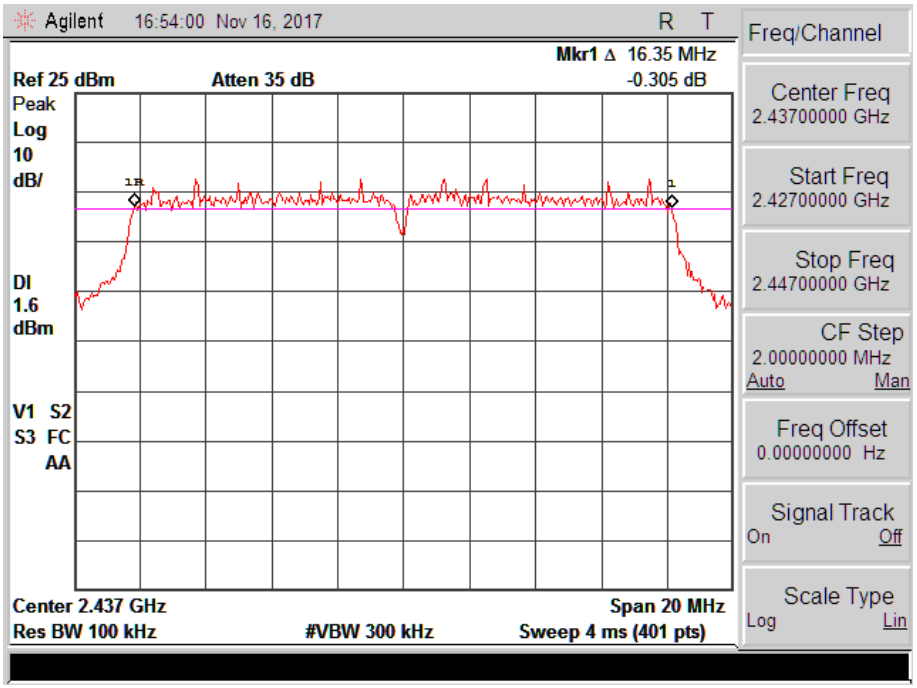
802.11b-High Channel



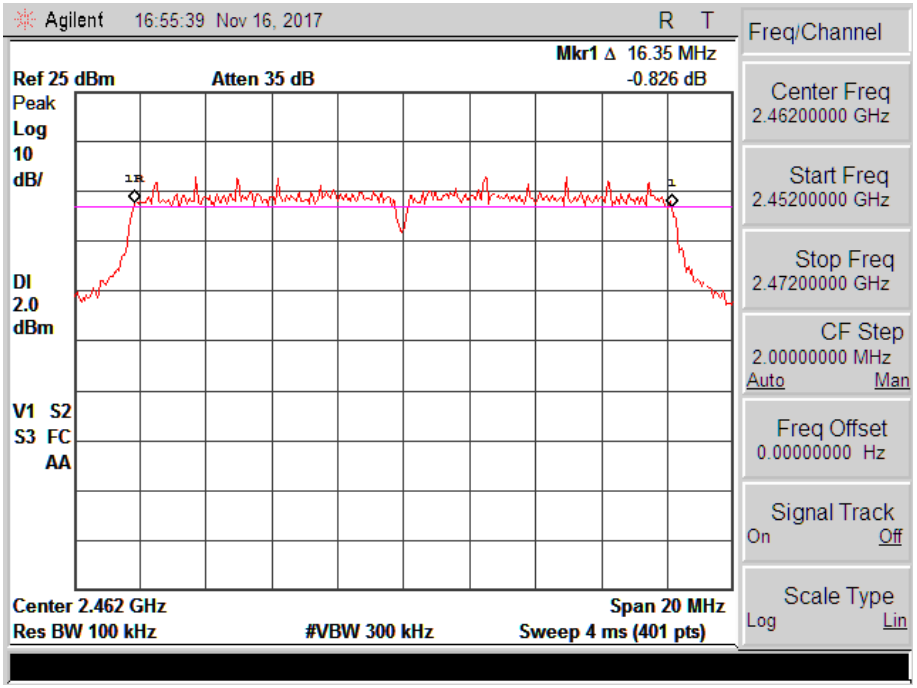
802.11g-Low Channel



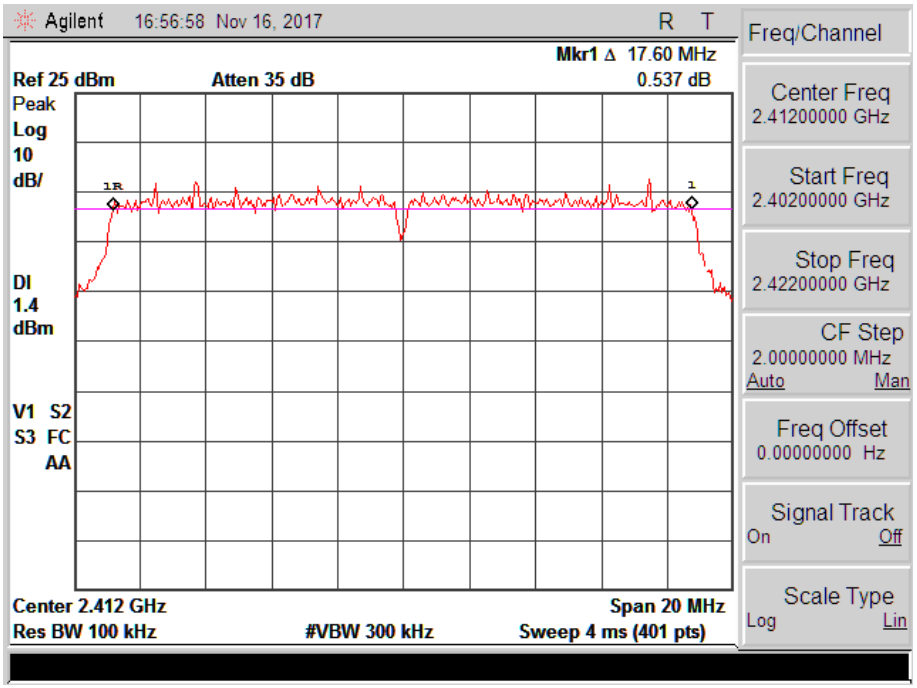
802.11g-Middle Channel



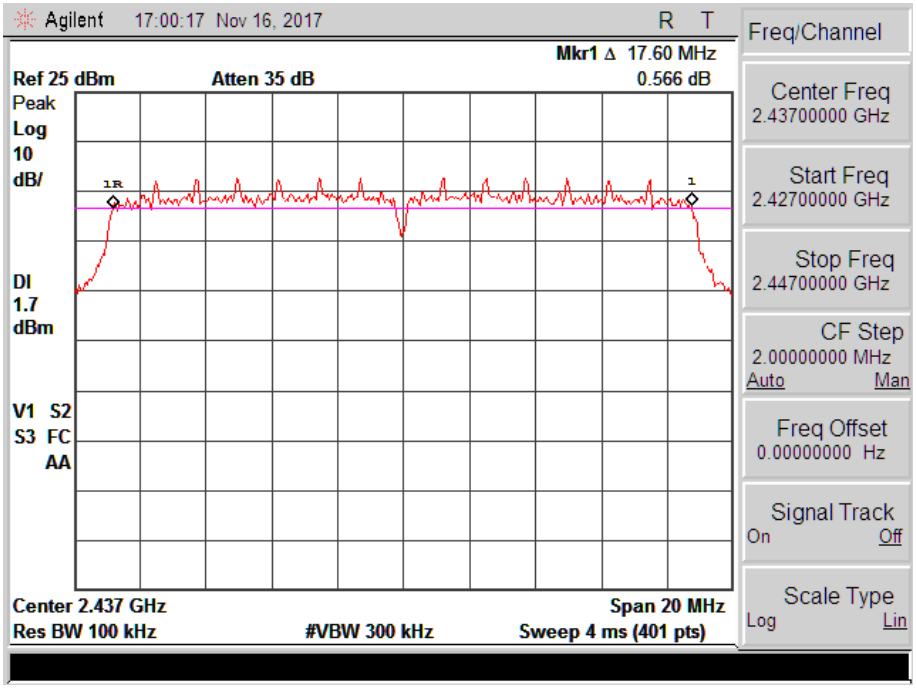
802.11g-High Channel



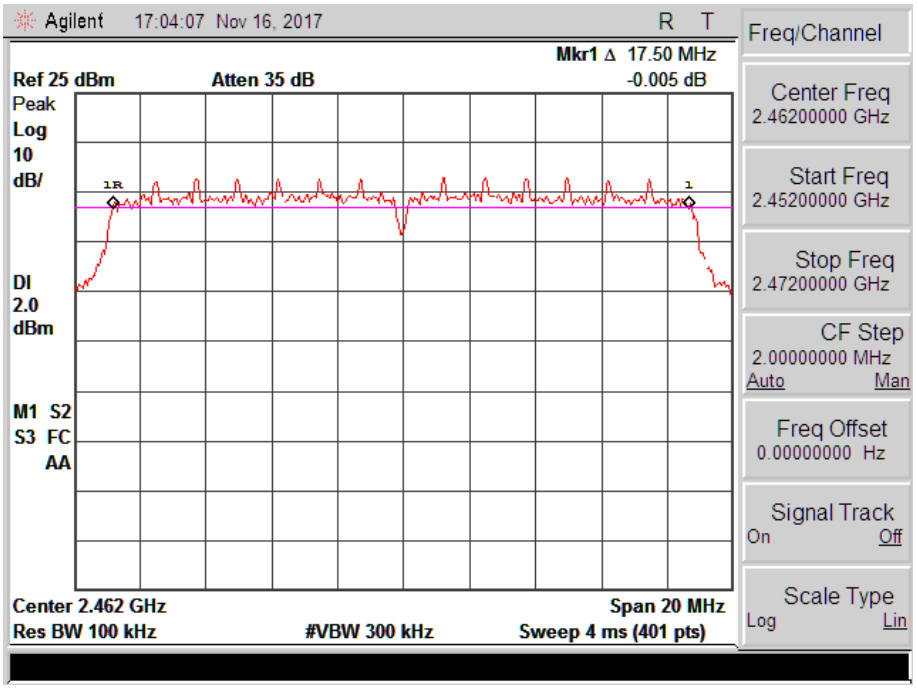
802.11n-HT20-Low Channel



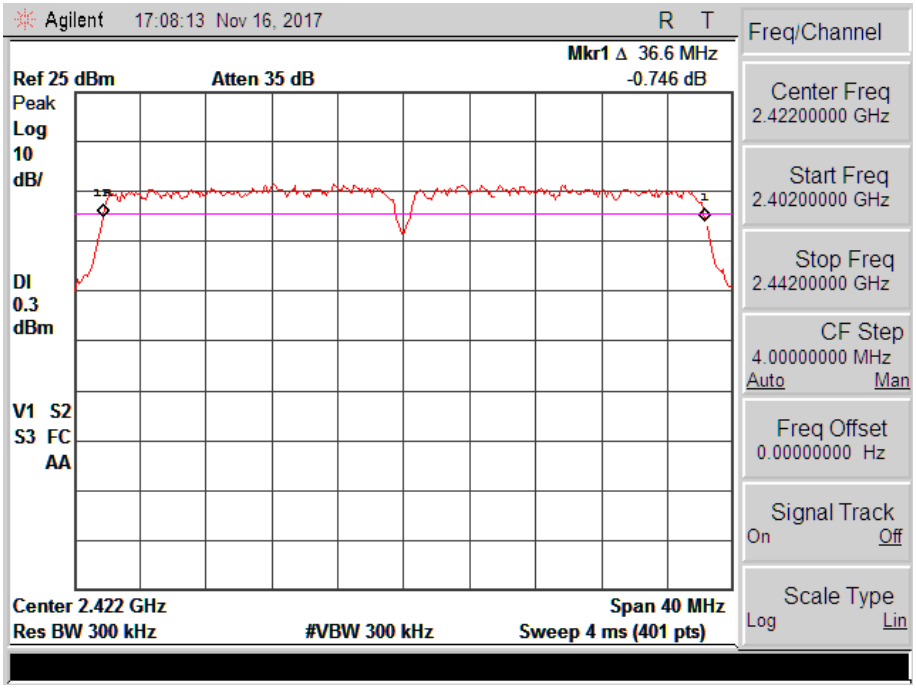
802.11n-HT20-Middle Channel



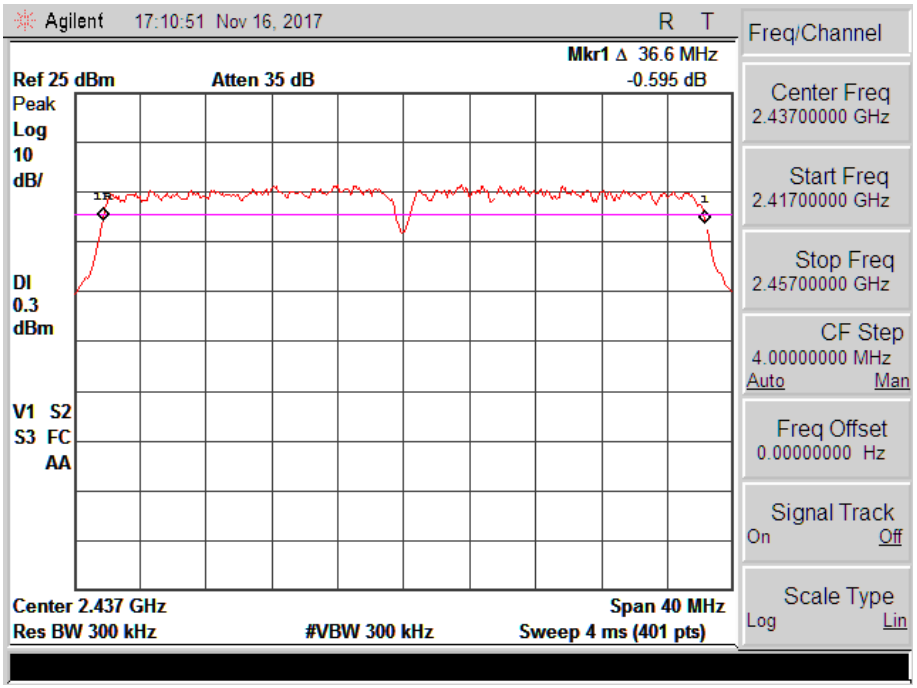
802.11n-HT20-High Channel



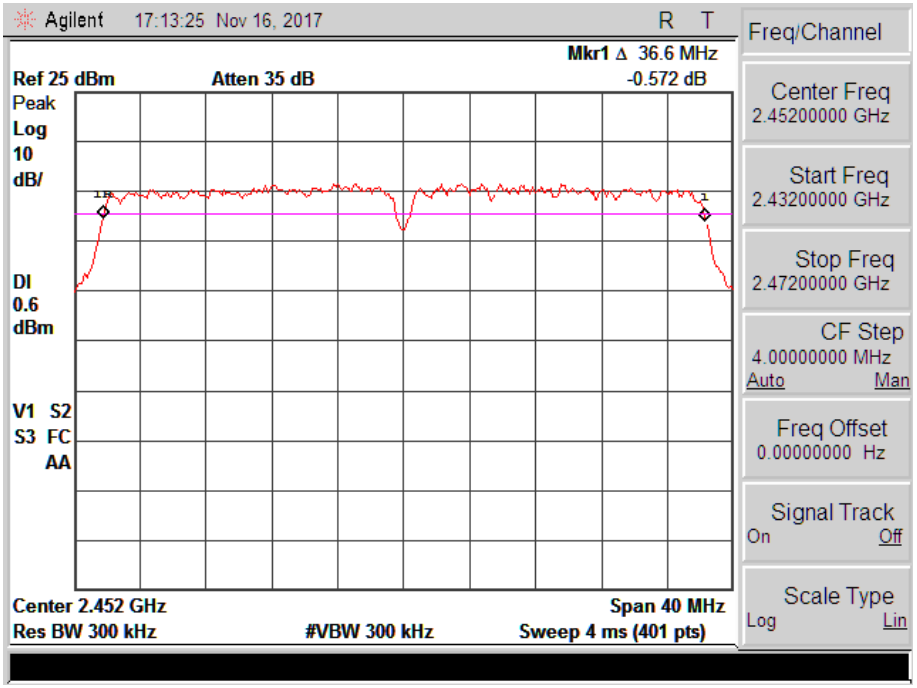
802.11n-HT40-Low Channel



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 V04, (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.

7.3 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	15.02	16.68	18.94	78.3	1000
	2437	14.97	14.62	17.81	60.4	1000
	2462	14.84	16.69	18.87	77.1	1000
802.11g_54Mbps	2412	16.36	15.97	19.18	82.8	1000
	2437	16.16	17.31	19.78	95.1	1000
	2462	16.17	14.73	18.52	71.1	1000
802.11n HT20_MCS7	2412	16.18	15.97	19.09	81.1	1000
	2437	16.02	15.83	18.94	78.3	1000
	2462	16.08	15.93	19.02	79.8	1000
802.11n HT40_MCS7	2422	13.26	12.80	16.05	40.3	1000
	2437	13.00	12.90	15.96	39.4	1000
	2452	13.15	13.07	16.12	40.9	1000

8. Field Strength of Spurious Emissions

8.1 Measurement Uncertainty

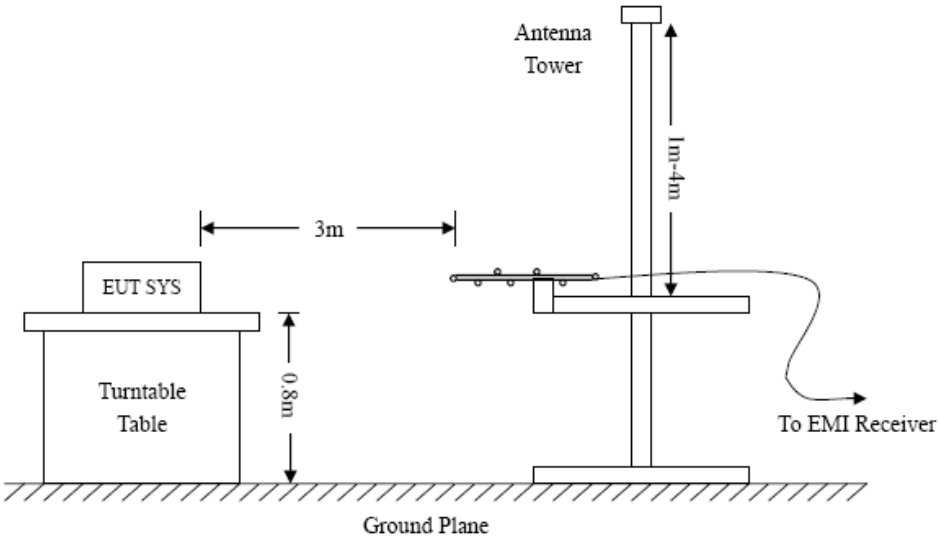
Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ±5.10 dB.

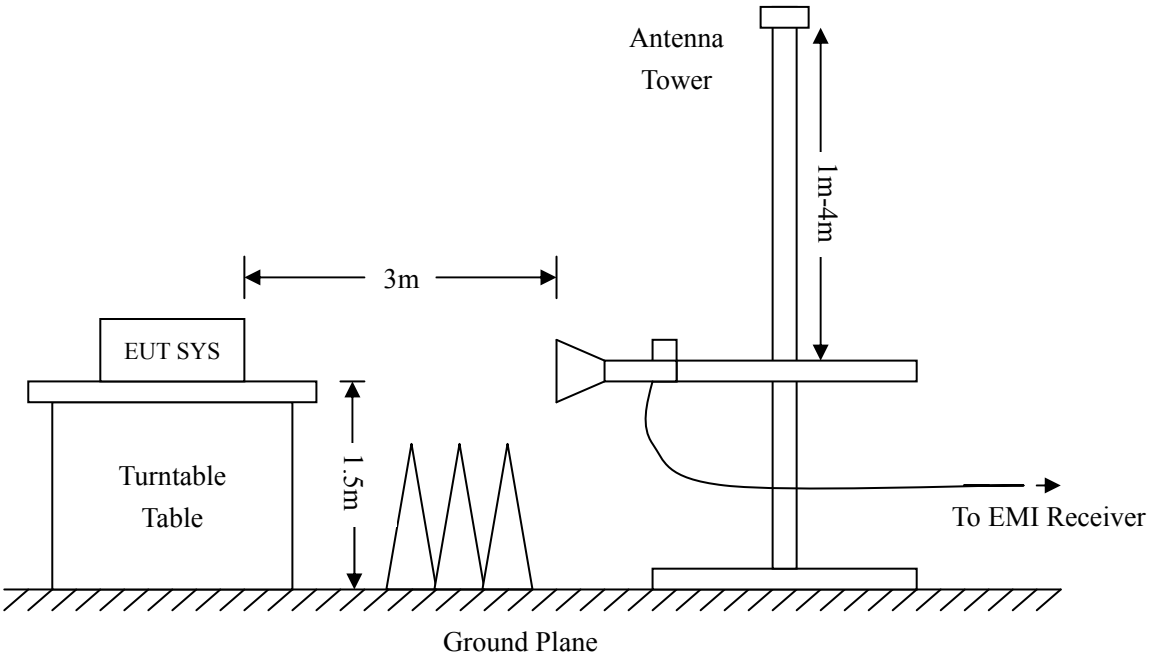
8.2 Standard Applicable

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	Frequency: 30MHz-1GHz	Frequency: Above 1GHz
RBW=10 KHz,	RBW=120 KHz,	RBW=1MHz,
VBW =30 KHz	VBW=300 KHz	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

8.4 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:

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. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – 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 and the worst mode IEEE 802.11b (channel low, middle, high)) data was reported.

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

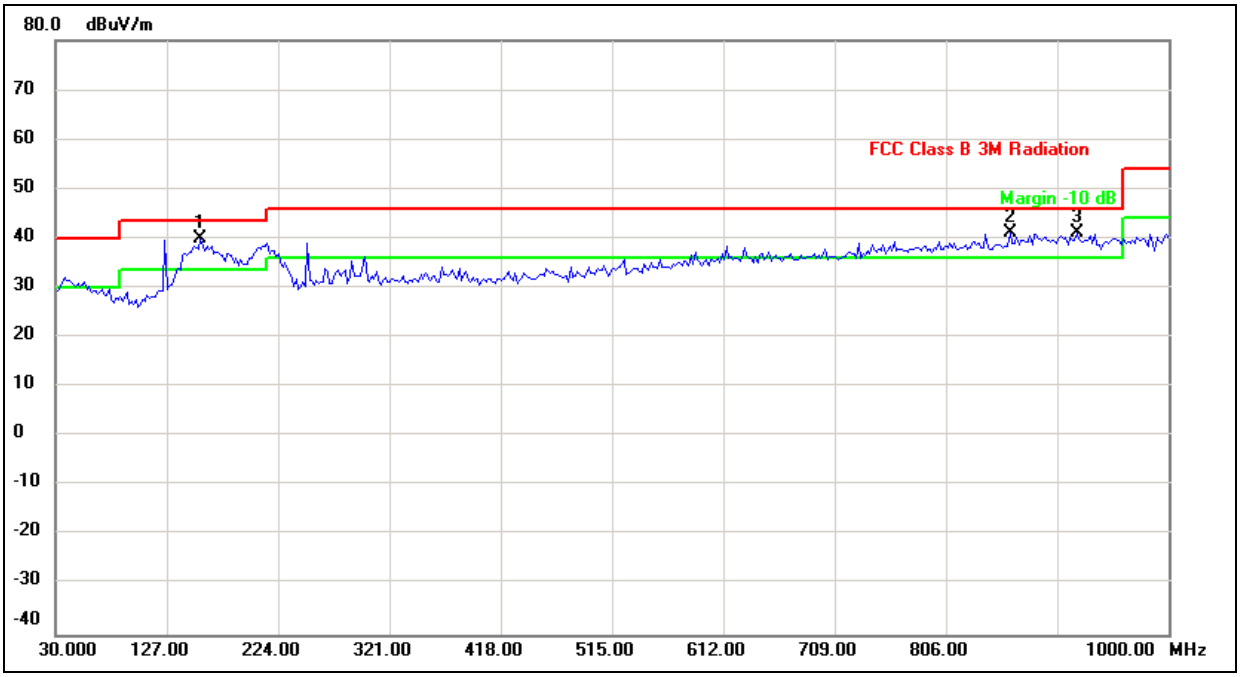
EUT: *GL.iNet 1300M Home AC Router*

Tested Model: *GL-B1300*

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

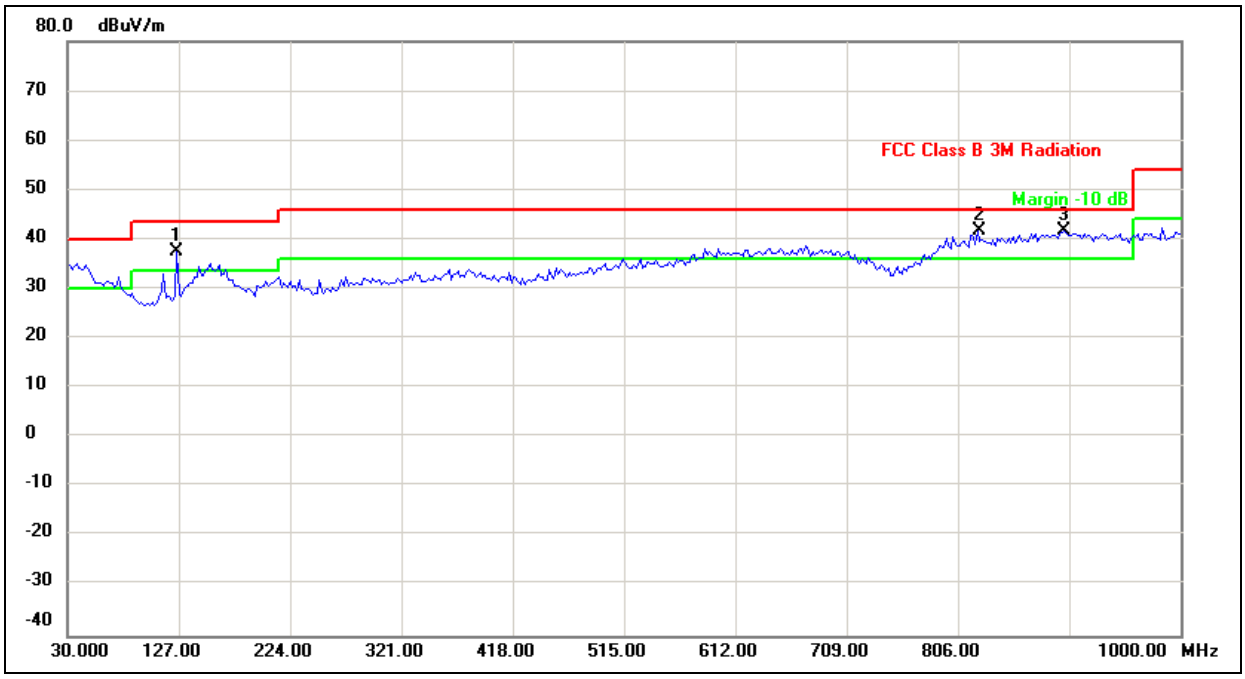
Comment: *120V/60Hz; Adapter DC 12V/1.5A*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	156.3527	24.24	15.80	40.04	43.50	-3.46	QP
2	861.9840	16.38	24.81	41.19	46.00	-4.81	QP
3	920.3006	15.52	25.55	41.07	46.00	-4.93	QP

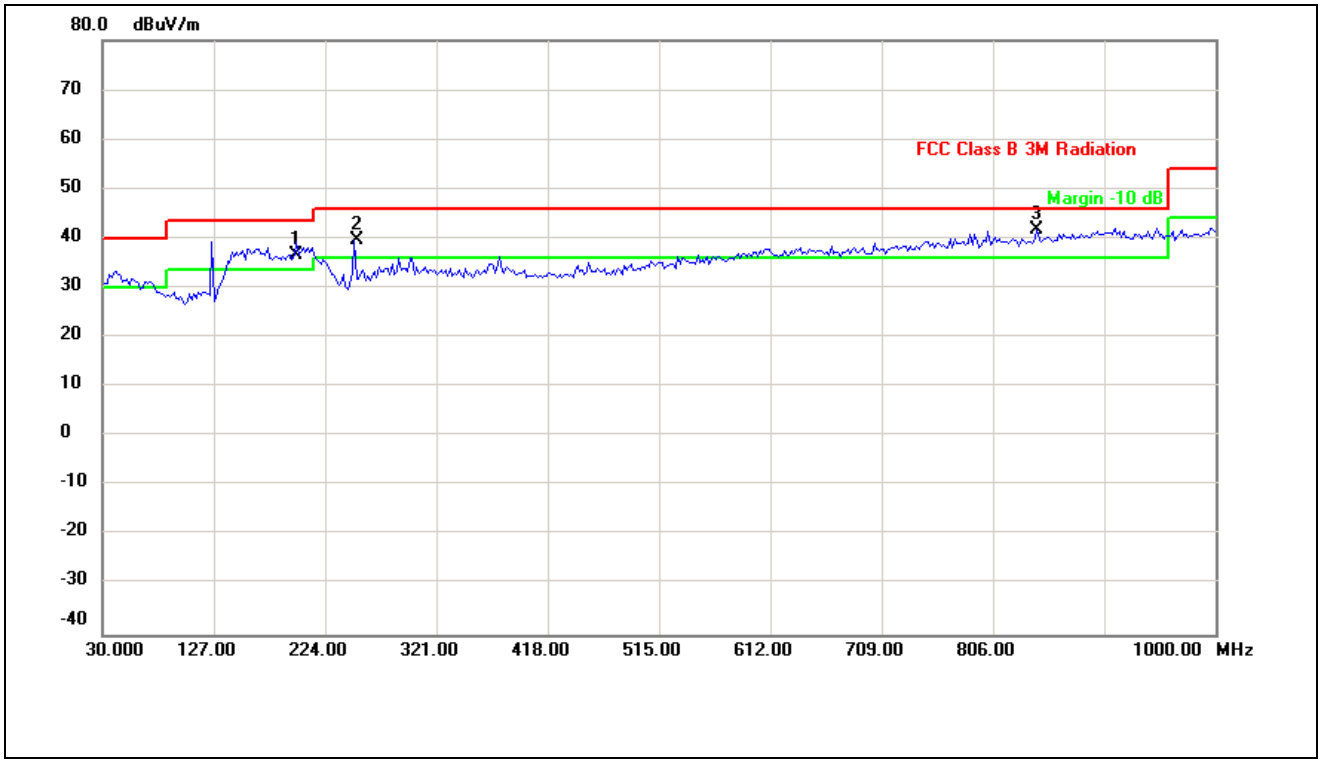
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	125.2505	23.95	13.70	37.65	43.50	-5.85	QP
2	823.1062	17.54	24.14	41.68	46.00	-4.32	QP
3	898.9178	15.97	25.76	41.73	46.00	-4.27	QP

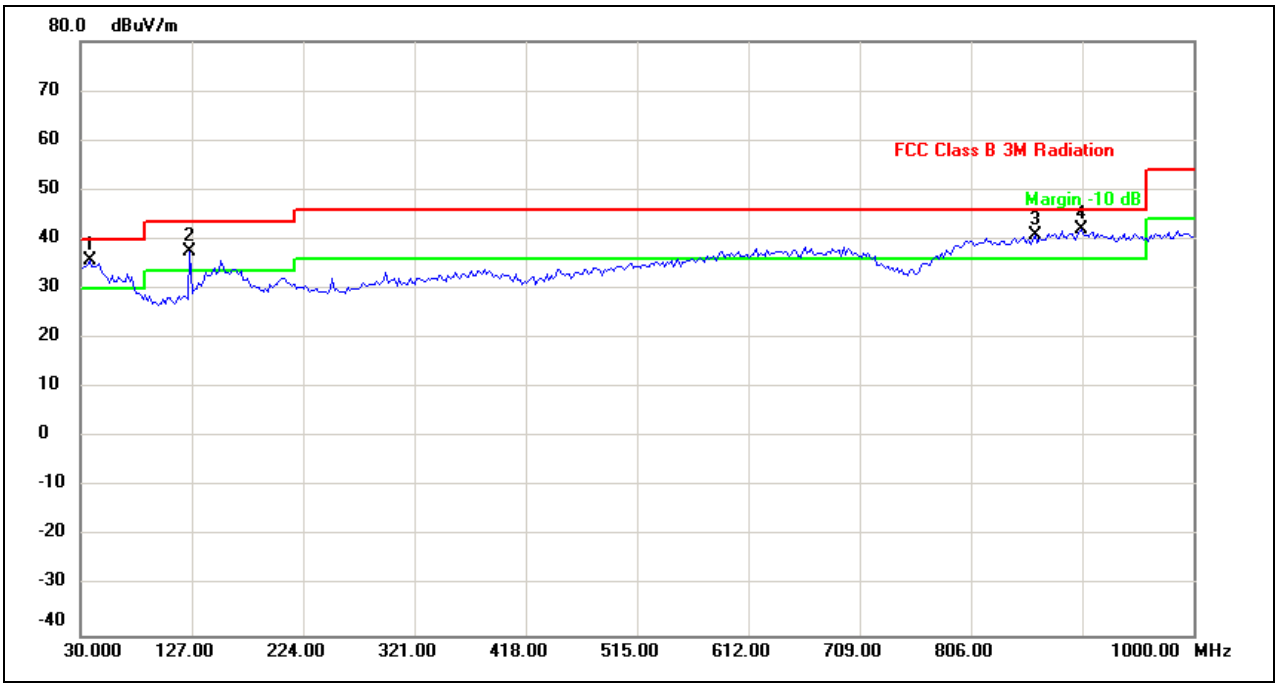
Operating Condition: *802.11b Transmitting Middle Channel-2437MHz*
Comment: *120V/60Hz; Adapter DC 12V/1.5A*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	197.1743	22.51	14.23	36.74	43.50	-6.76	QP
2	249.6593	24.76	14.94	39.70	46.00	-6.30	QP
3	844.4890	17.22	24.43	41.65	46.00	-4.35	QP

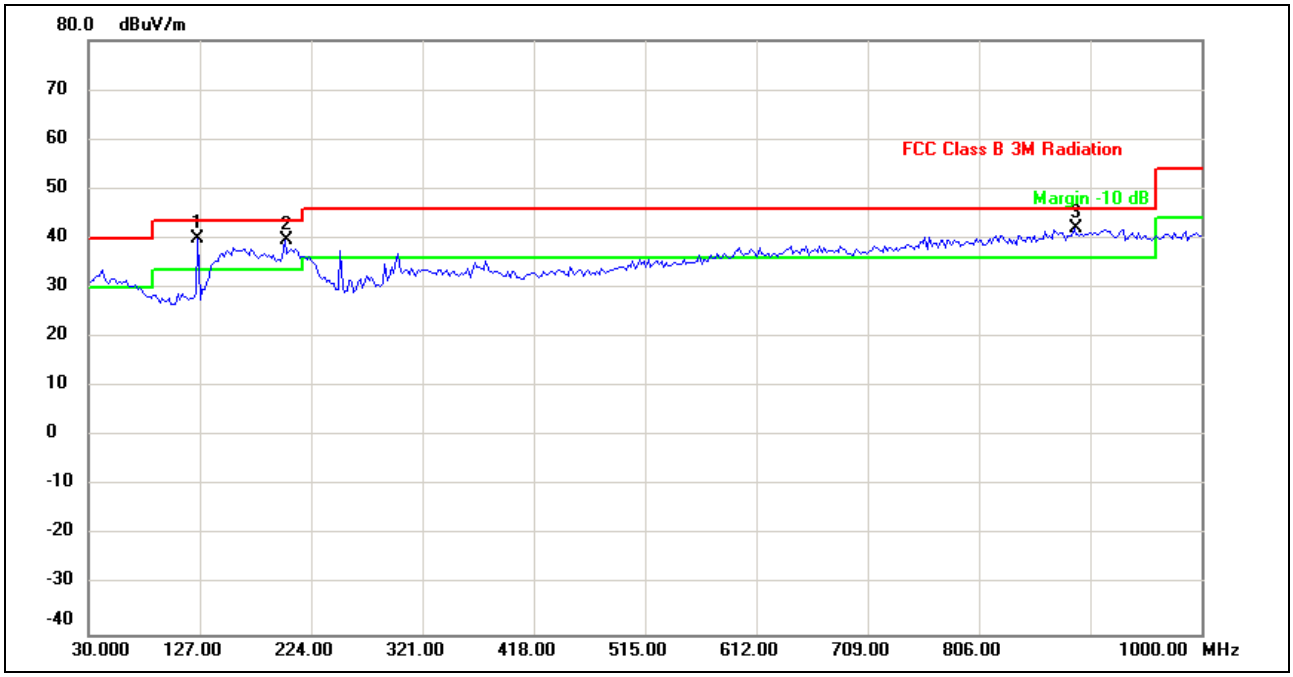
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	37.7756	18.51	17.31	35.82	40.00	-4.18	QP
2	125.2505	23.73	13.70	37.43	43.50	-6.07	QP
3	861.9840	15.98	24.81	40.79	46.00	-5.21	QP
4	902.8056	16.20	25.75	41.95	46.00	-4.05	QP

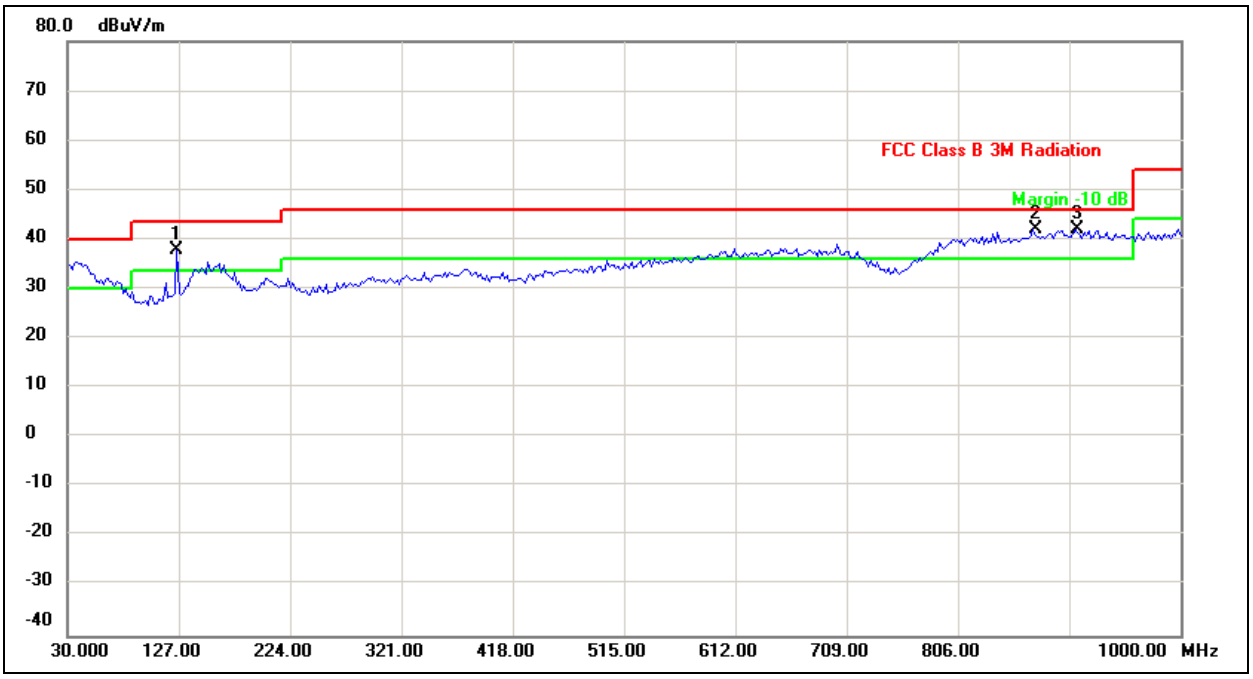
Operating Condition: *802.11b Transmitting Hig Channel-2462MHz*
Comment: *120V/60Hz; Adapter DC 12V/1.5A*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	125.2505	26.23	13.70	39.93	43.50	-3.57	QP
2	201.0621	24.90	14.67	39.57	43.50	-3.93	QP
3	889.1984	16.51	25.50	42.01	46.00	-3.99	QP

Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	125.2505	24.24	13.70	37.94	43.50	-5.56	QP
2	871.7034	16.90	25.06	41.96	46.00	-4.04	QP
3	908.6373	16.28	25.68	41.96	46.00	-4.04	QP

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	52.24	-3.62	48.62	74	-25.38	H	PK
4824.000	36.99	-3.62	33.37	54	-20.63	H	AV
7236.000	44.45	1.39	45.84	74	-28.16	H	PK
7236.000	33.13	1.44	34.57	54	-19.43	H	AV
4824.000	55.46	-3.61	51.85	74	-22.15	V	PK
4824.000	38.65	-3.61	35.04	54	-18.96	V	AV
7236.000	47.26	1.35	48.61	74	-25.39	V	PK
7236.000	35.59	1.35	36.94	54	-17.06	V	AV
Middle Channel-2437MHz							
4874.000	55.24	-3.49	51.75	74	-22.25	H	PK
4874.000	40.49	-3.49	37.00	54	-17.00	H	AV
7311.000	48.27	1.72	49.99	74	-24.01	H	PK
7311.000	33.60	1.72	35.32	54	-18.68	H	AV
4874.000	54.47	-3.49	50.98	74	-23.02	V	PK
4874.000	41.39	-3.49	37.90	54	-16.10	V	AV
7311.000	48.48	1.72	50.20	74	-23.80	V	PK
7311.000	34.58	1.72	36.30	54	-17.70	V	AV
High Channel-2462MHz							
4924.000	56.07	-3.09	52.98	74	-21.02	H	PK
4924.000	42.01	-3.09	38.92	54	-15.08	H	AV
7386.000	46.63	2.29	48.92	74	-25.08	H	PK
7386.000	35.08	2.29	37.37	54	-16.63	H	AV
4924.000	55.19	-3.09	52.10	74	-21.90	V	PK
4924.000	42.29	-3.09	39.20	54	-14.80	V	AV
7386.000	48.24	2.29	50.53	74	-23.47	V	PK
7386.000	35.43	2.29	37.72	54	-16.28	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	53.40	-3.36	50.04	74	-23.96	H	PK
4824.000	40.13	-3.36	36.77	54	-17.23	H	AV
7236.000	46.32	1.60	47.92	74	-26.08	H	PK
7236.000	32.30	1.60	33.90	54	-20.10	H	AV
4824.000	53.89	-3.36	50.53	74	-23.47	V	PK
4824.000	40.55	-3.36	37.19	54	-16.81	V	AV
7236.000	47.12	1.60	48.72	74	-25.28	V	PK
7236.000	33.44	1.60	35.04	54	-18.96	V	AV
Middle Channel-2437MHz							
4874.000	53.00	-3.24	49.76	74	-24.24	H	PK
4874.000	41.18	-3.24	37.94	54	-16.06	H	AV
7311.000	45.28	1.97	47.25	74	-26.75	H	PK
7311.000	33.17	1.97	35.14	54	-18.86	H	AV
4874.000	54.97	-3.24	51.73	74	-22.27	V	PK
4874.000	41.76	-3.24	38.52	54	-15.48	V	AV
7311.000	46.30	1.97	48.27	74	-25.73	V	PK
7311.000	33.23	1.97	35.20	54	-18.80	V	AV
High Channel-2462MHz							
4924.000	51.90	-3.09	48.81	74	-25.19	H	PK
4924.000	38.65	-3.09	35.56	54	-18.44	H	AV
7386.000	45.08	2.29	47.37	74	-26.63	H	PK
7386.000	32.63	2.29	34.92	54	-19.08	H	AV
4924.000	54.01	-3.09	50.92	74	-23.08	V	PK
4924.000	40.59	-3.09	37.50	54	-16.50	V	AV
7386.000	46.48	2.29	48.77	74	-25.23	V	PK
7386.000	33.85	2.29	36.14	54	-17.86	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	53.50	-3.36	50.14	74	-23.86	H	PK
4824.000	38.44	-3.36	35.08	54	-18.92	H	AV
7236.000	45.16	1.60	46.76	74	-27.24	H	PK
7236.000	32.34	1.60	33.94	54	-20.06	H	AV
4824.000	54.61	-3.36	51.25	74	-22.75	V	PK
4824.000	41.08	-3.36	37.72	54	-16.28	V	AV
7236.000	47.11	1.60	48.71	74	-25.29	V	PK
7236.000	33.67	1.60	35.27	54	-18.73	V	AV
Middle Channel-2437MHz							
4874.000	52.06	-3.24	48.82	74	-25.18	H	PK
4874.000	40.38	-3.24	37.14	54	-16.86	H	AV
7311.000	46.64	1.97	48.61	74	-25.39	H	PK
7311.000	31.00	1.97	32.97	54	-21.03	H	AV
4874.000	52.82	-3.24	49.58	74	-24.42	V	PK
4874.000	40.52	-3.24	37.28	54	-16.72	V	AV
7311.000	46.39	1.97	48.36	74	-25.64	V	PK
7311.000	33.10	1.97	35.07	54	-18.93	V	AV
High Channel-2462MHz							
4924.000	51.80	-3.09	48.71	74	-25.29	H	PK
4924.000	41.13	-3.09	38.04	54	-15.96	H	AV
7386.000	46.21	2.29	48.50	74	-25.50	H	PK
7386.000	34.00	2.29	36.29	54	-17.71	H	AV
4924.000	53.60	-3.09	50.51	74	-23.49	V	PK
4924.000	39.38	-3.09	36.29	54	-17.71	V	AV
7386.000	46.45	2.29	48.74	74	-25.26	V	PK
7386.000	33.26	2.29	35.55	54	-18.45	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	51.15	-3.40	47.75	74	-26.25	H	PK
4824.000	36.15	-3.40	32.75	54	-21.25	H	AV
7266.000	44.38	1.56	45.94	74	-28.06	H	PK
7266.000	30.46	1.56	32.02	54	-21.98	H	AV
4844.000	52.12	-3.40	48.72	74	-25.28	V	PK
4824.000	37.32	-3.40	33.92	54	-20.08	V	AV
7266.000	46.71	1.56	48.27	74	-25.73	V	PK
7266.000	32.68	1.56	34.24	54	-19.76	V	AV
Middle Channel-2437MHz							
4874.000	50.43	-3.24	47.19	74	-26.81	H	PK
4874.000	35.78	-3.24	32.54	54	-21.46	H	AV
7311.000	42.78	1.97	44.75	74	-29.25	H	PK
7311.000	29.93	1.97	31.90	54	-22.10	H	AV
4874.000	51.64	-3.24	48.40	74	-25.60	V	PK
4874.000	37.85	-3.24	34.61	54	-19.39	V	AV
7311.000	43.68	1.97	45.65	74	-28.35	V	PK
7311.000	31.90	1.97	33.87	54	-20.13	V	AV
High Channel-2452MHz							
4904.000	50.55	-3.13	47.42	74	-26.58	H	PK
4904.000	37.27	-3.13	34.14	54	-19.86	H	AV
7356.000	43.53	2.12	45.65	74	-28.35	H	PK
7356.000	28.63	2.12	30.75	54	-23.25	H	AV
4904.000	52.74	-3.13	49.61	74	-24.39	V	PK
4904.000	38.73	-3.13	35.60	54	-18.40	V	AV
7356.000	46.08	2.12	48.20	74	-25.80	V	PK
7356.000	33.02	2.12	35.14	54	-18.86	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 Procedure

According to the KDB 558074D01 v04, 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 V04, 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.

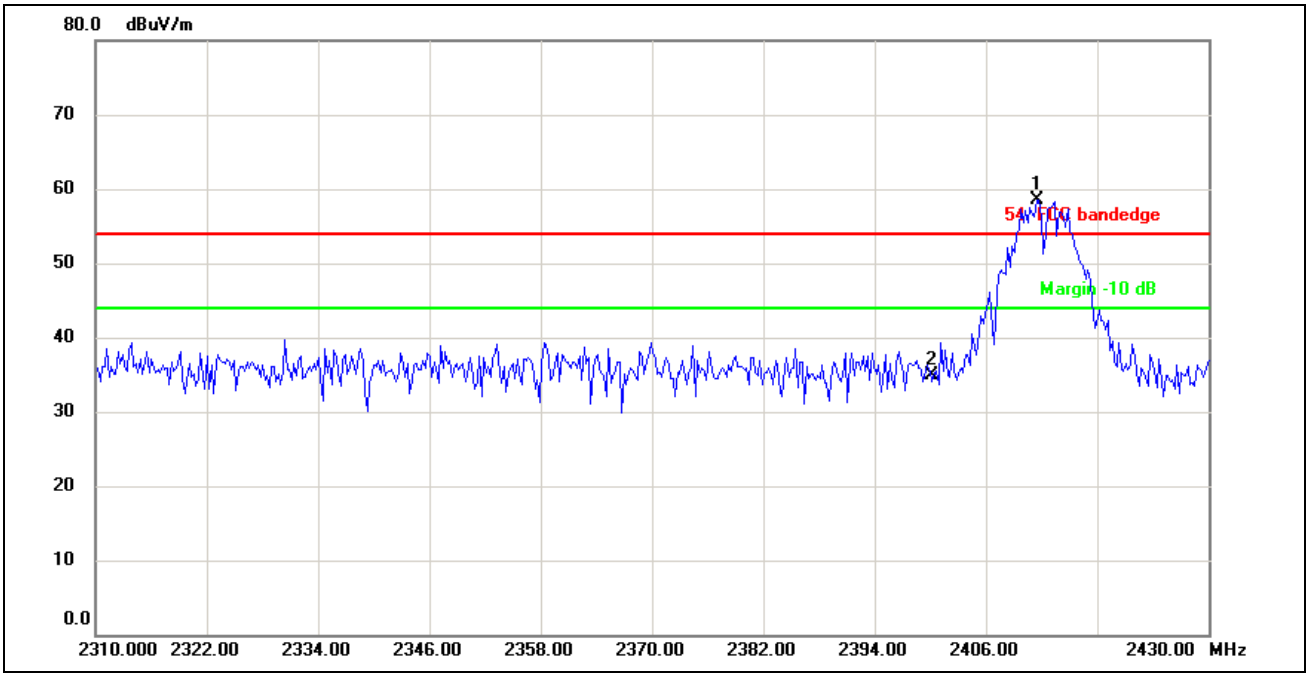
9.3 Environmental Conditions

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

9.4 Summary of Test Results/Plots

802.11b-Lowest Band edge

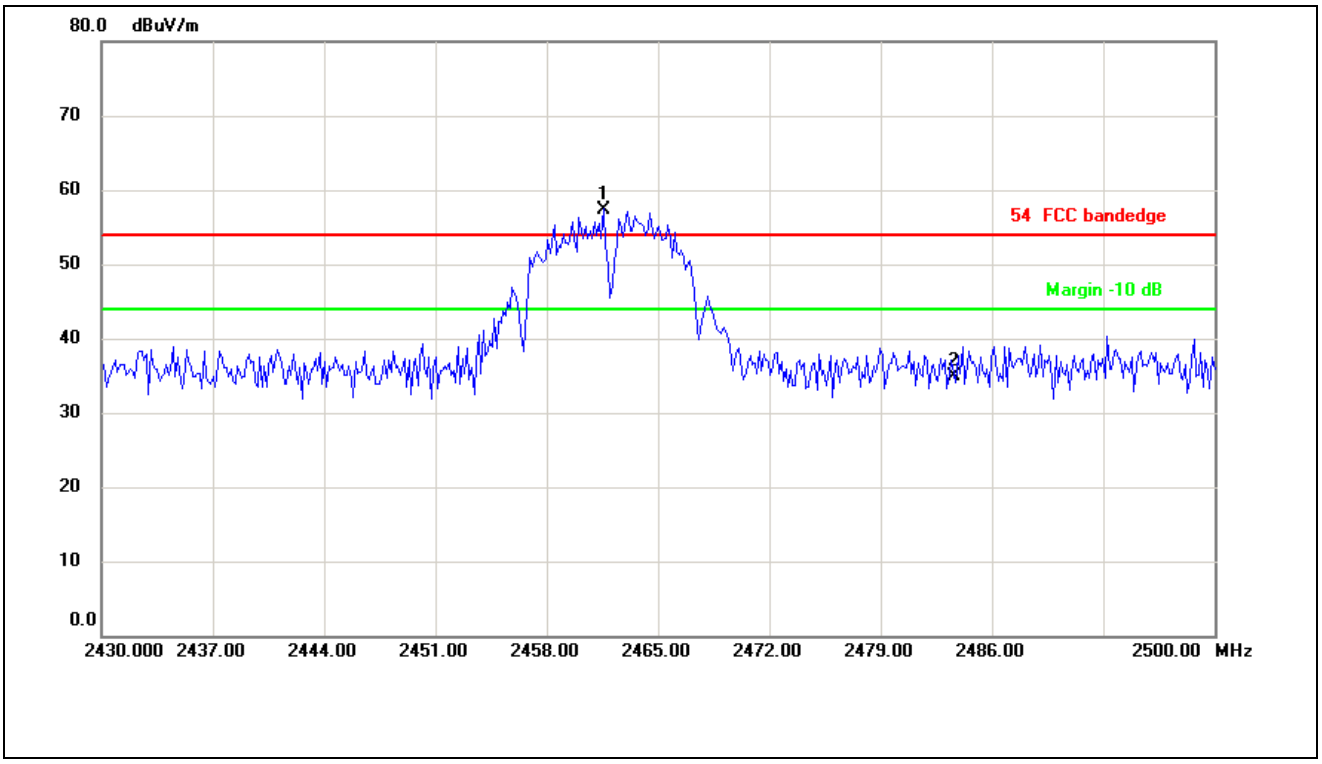
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2411.483	52.09	6.47	58.56	/	/	QP
2	2400.000	28.55	6.45	35.00	54.00	-19.00	QP

802.11b-Highest Band edge

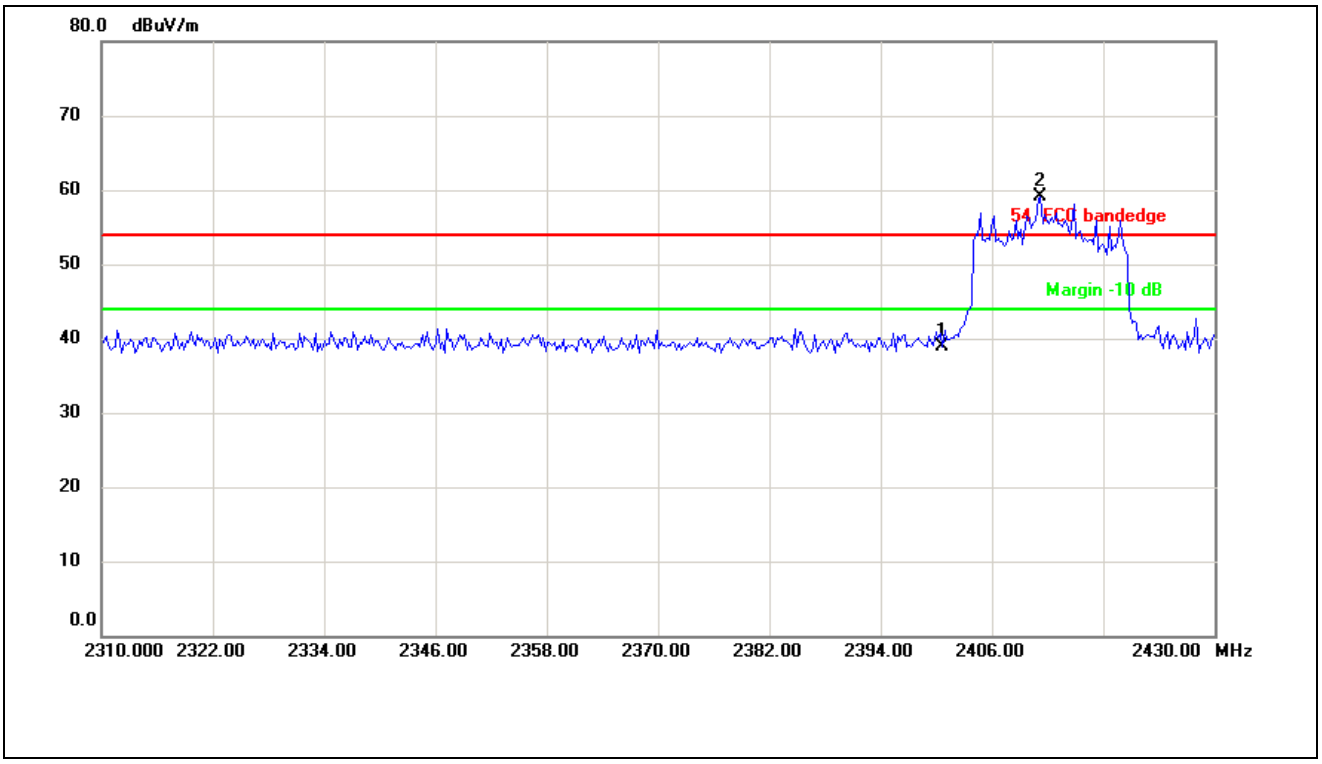
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2461.563	50.85	6.55	57.40	/	/	QP
2	2483.500	28.41	6.59	35.00	54.00	-19.00	QP

802.11g-Lowest Band edge

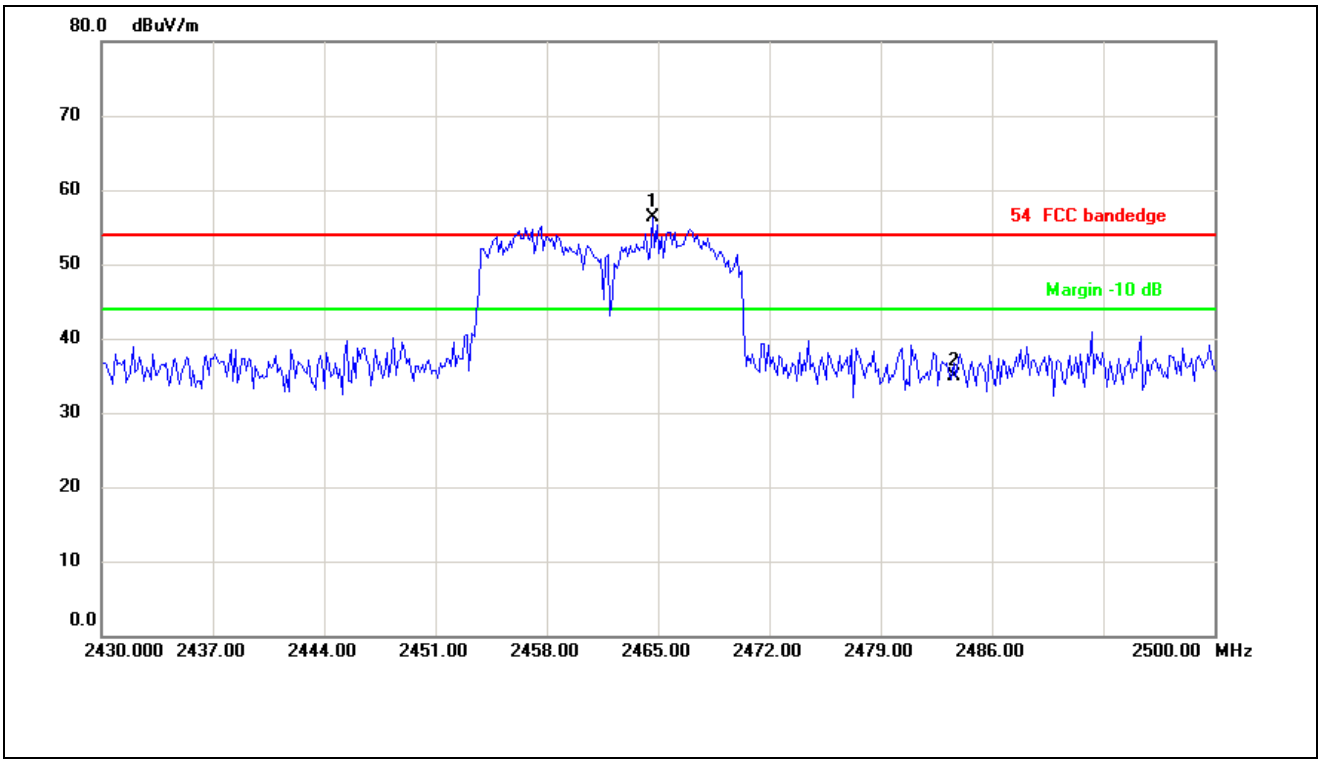
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2400.661	32.47	6.45	38.92	54.00	-15.08	QP
2	2411.242	52.71	6.47	59.18	/	/	QP

802.11g-Highest Band edge

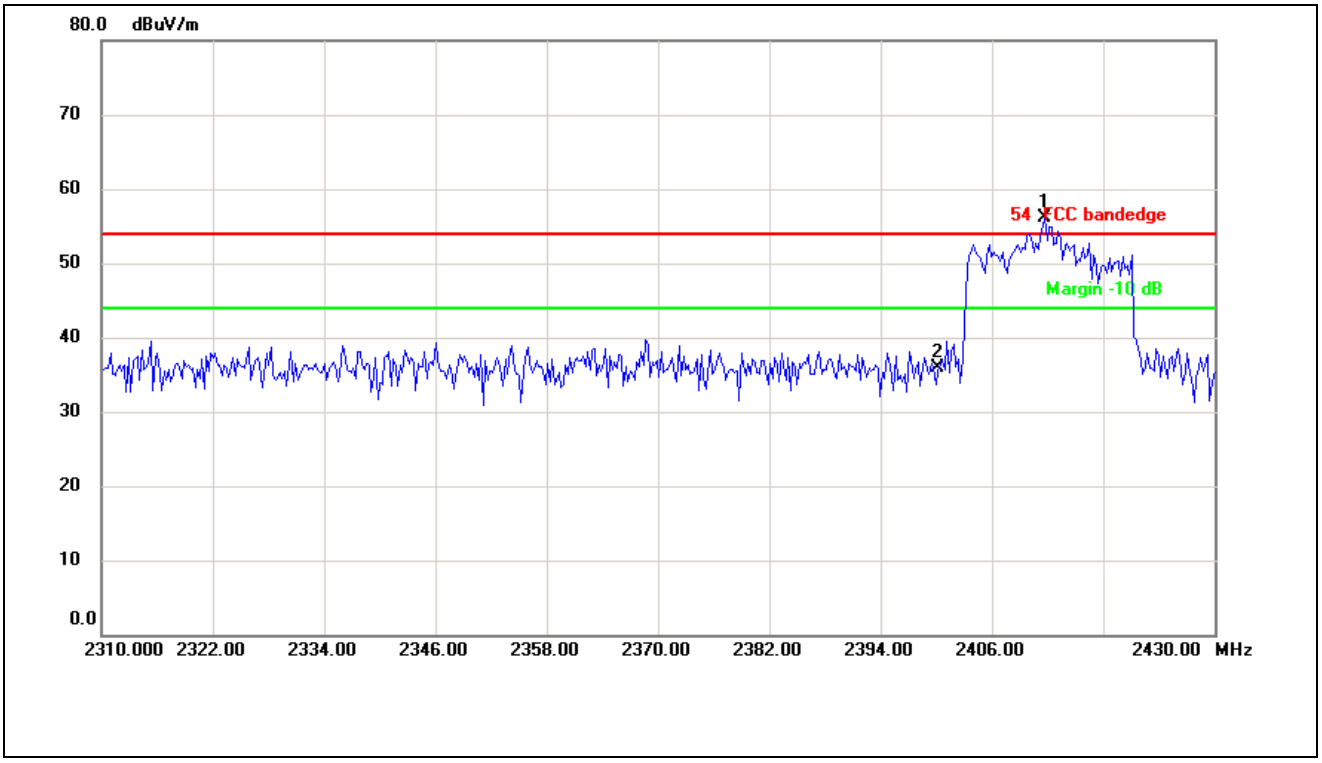
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2464.649	49.69	6.56	56.25	/	/	QP
2	2483.500	28.41	6.59	35.00	54.00	-19.00	QP

802.11n-HT20-Lowest Band edge

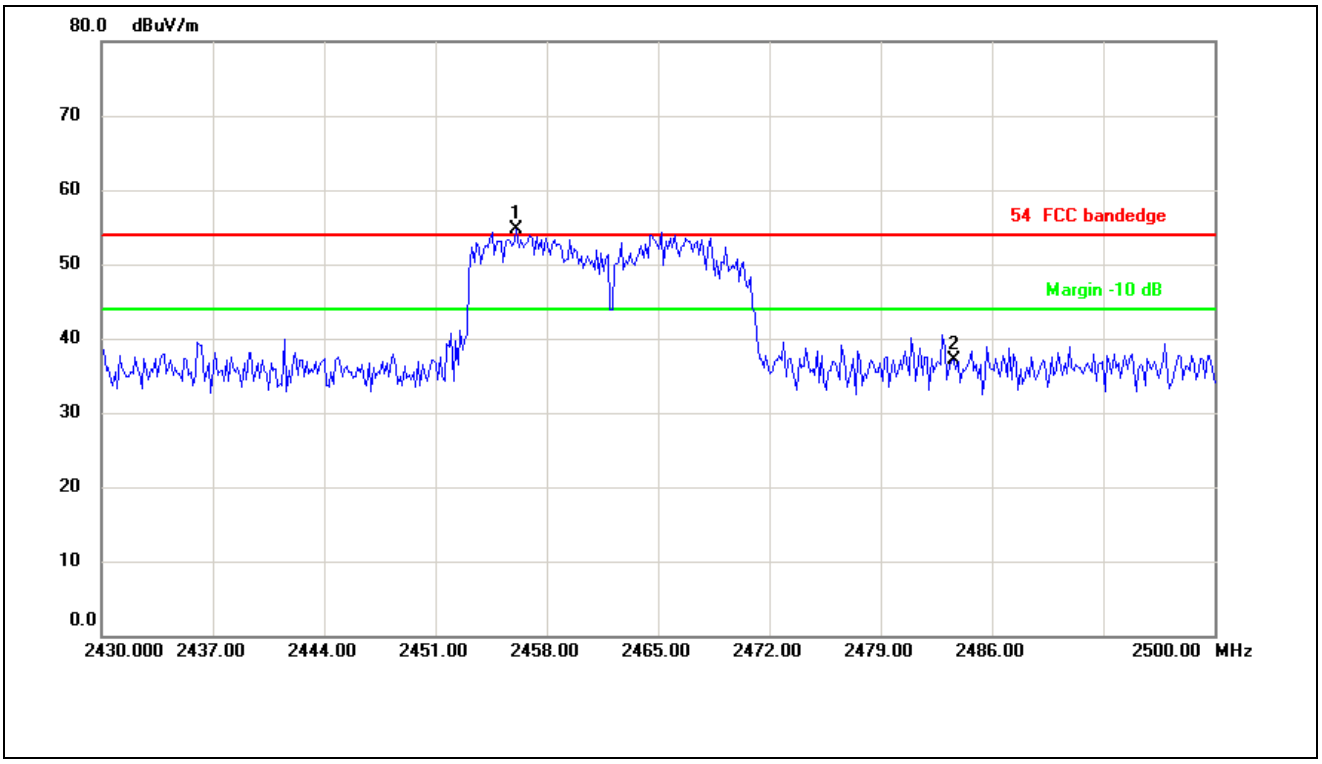
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2411.723	49.71	6.47	56.18	/	/	QP
2	2400.000	29.55	6.45	36.00	54.00	-18.00	QP

802.11n-HT20-Highest Band edge

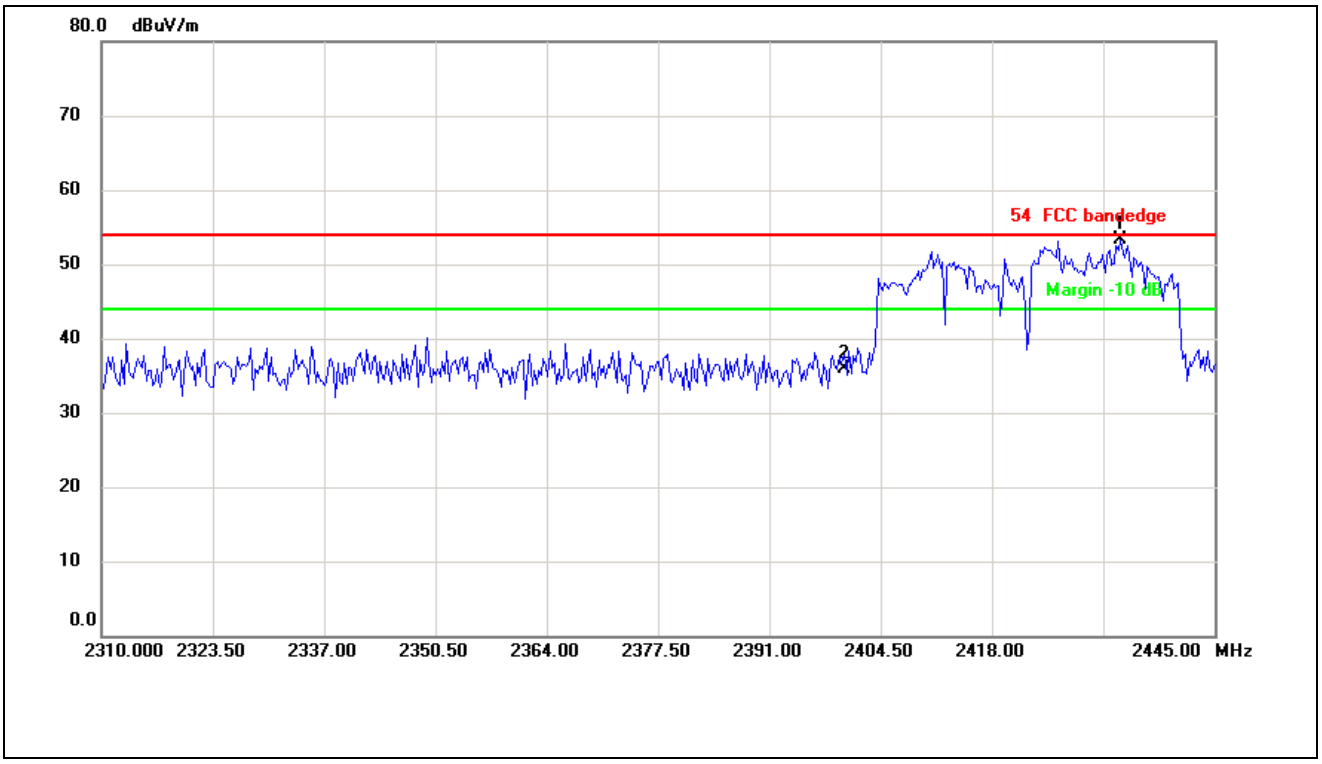
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2456.092	48.08	6.54	54.62	/	/	QP
2	2483.587	30.46	6.59	37.05	54.00	-16.95	QP

802.11n-HT40-Lowest Band edge

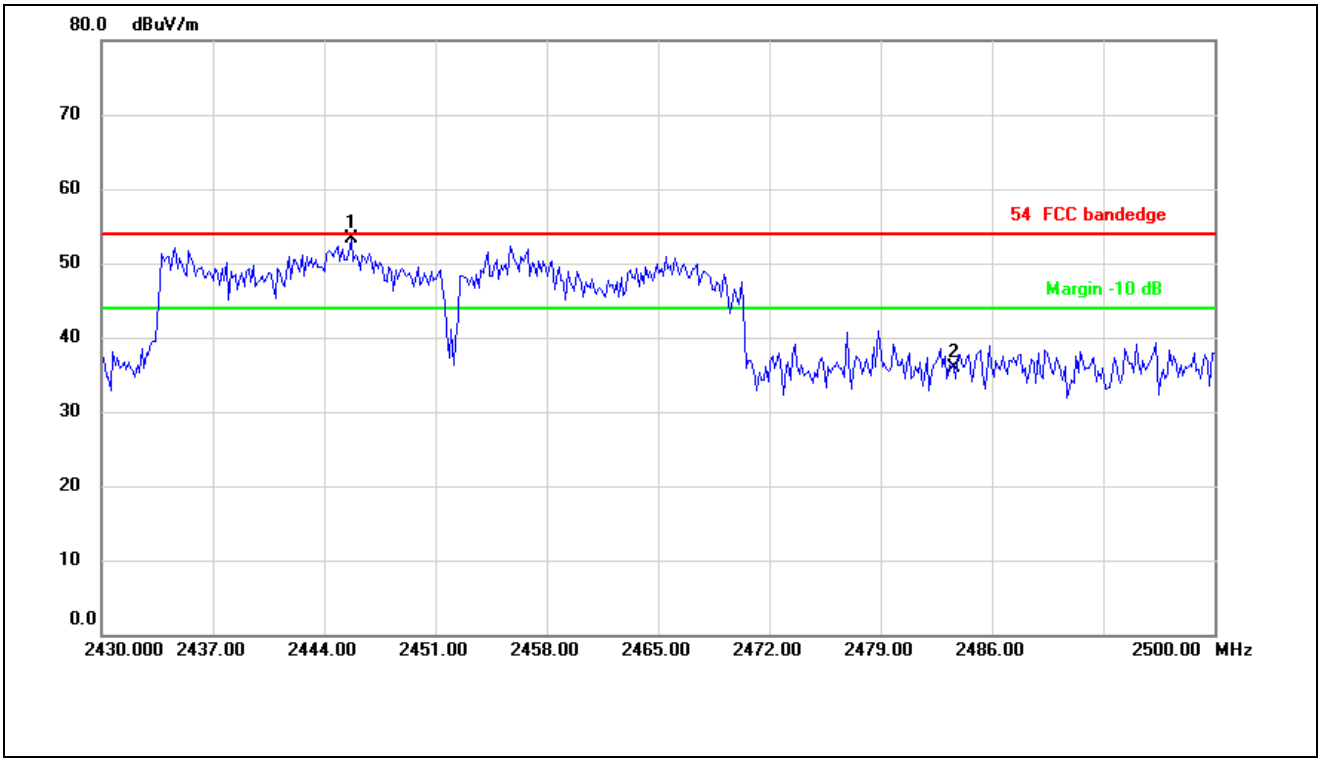
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2433.637	46.74	6.51	53.25	/	/	QP
2	2400.000	29.55	6.45	36.00	54.00	-18.00	QP

802.11n-HT40-Highest Band edge

Vertical (Worst case)



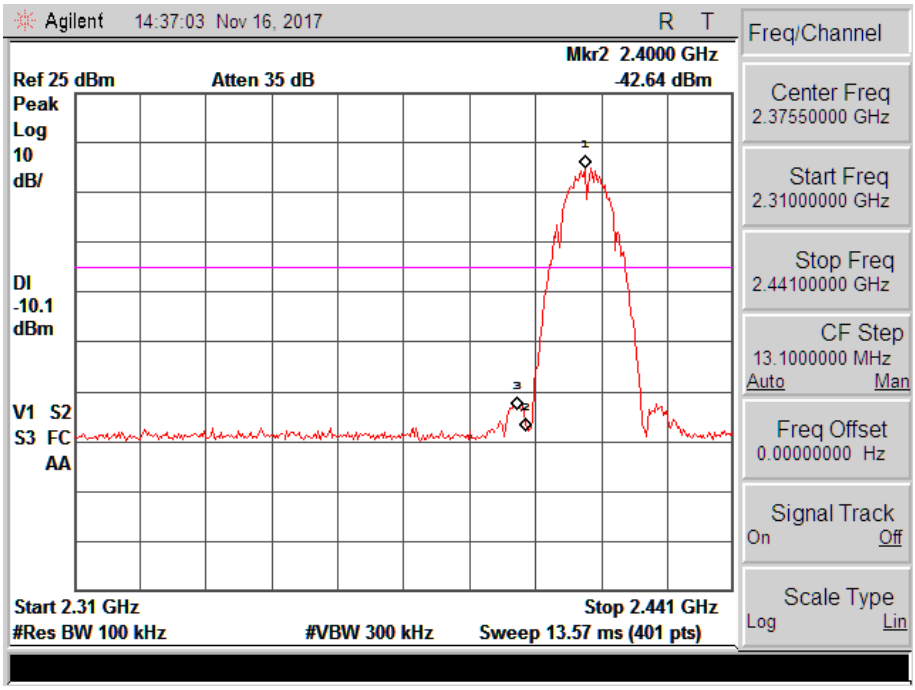
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2445.711	46.85	6.53	53.38	54.00	-0.62	QP
2	2483.587	29.37	6.59	35.96	54.00	-18.04	QP

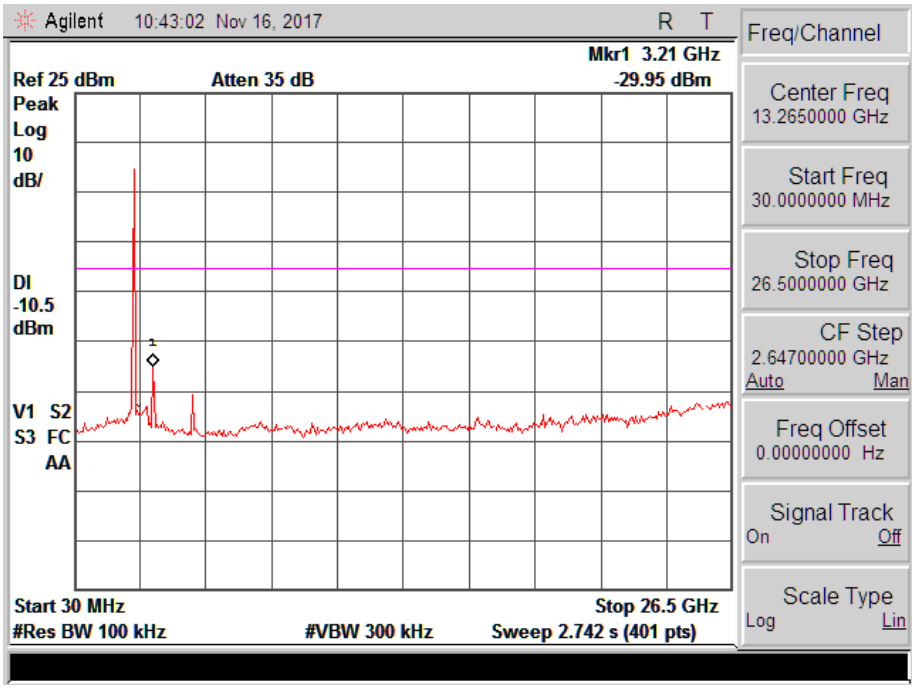
Antenna 1

Out-of-Band and Spurious Emission (Conducted)

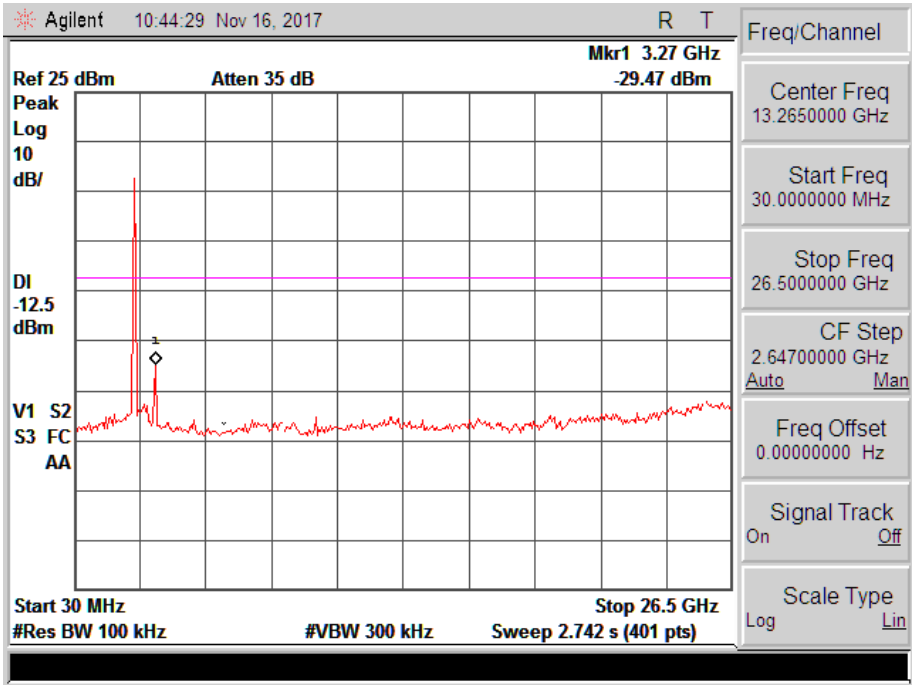
802.11b

Low Channel

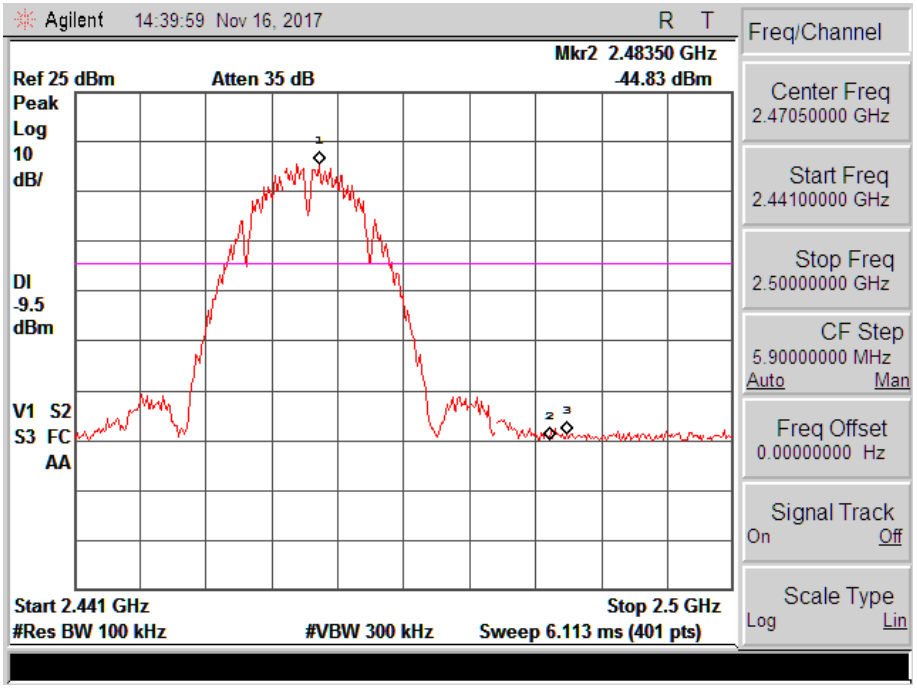


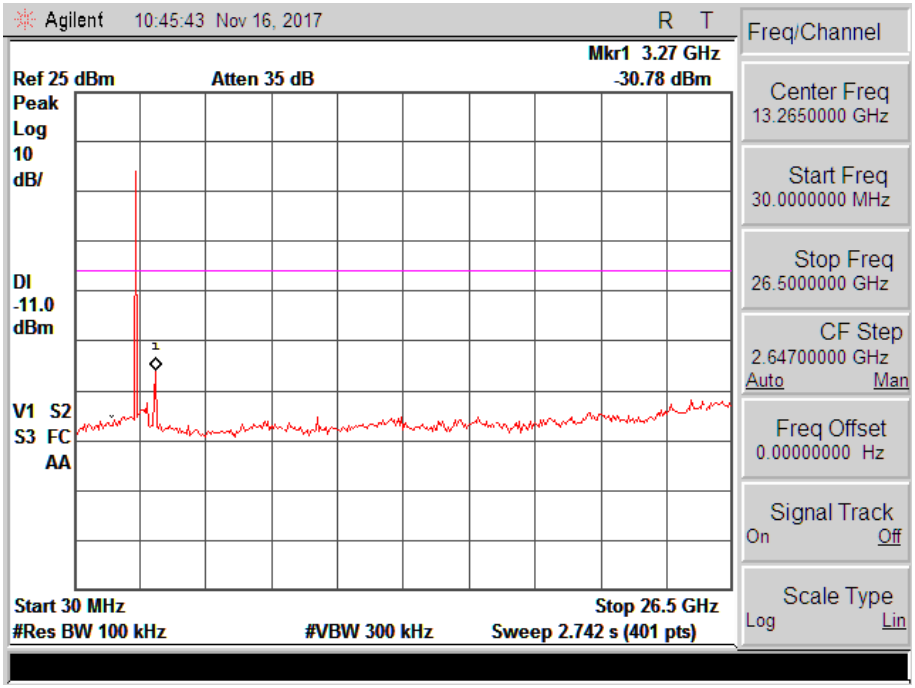


Middle Channel



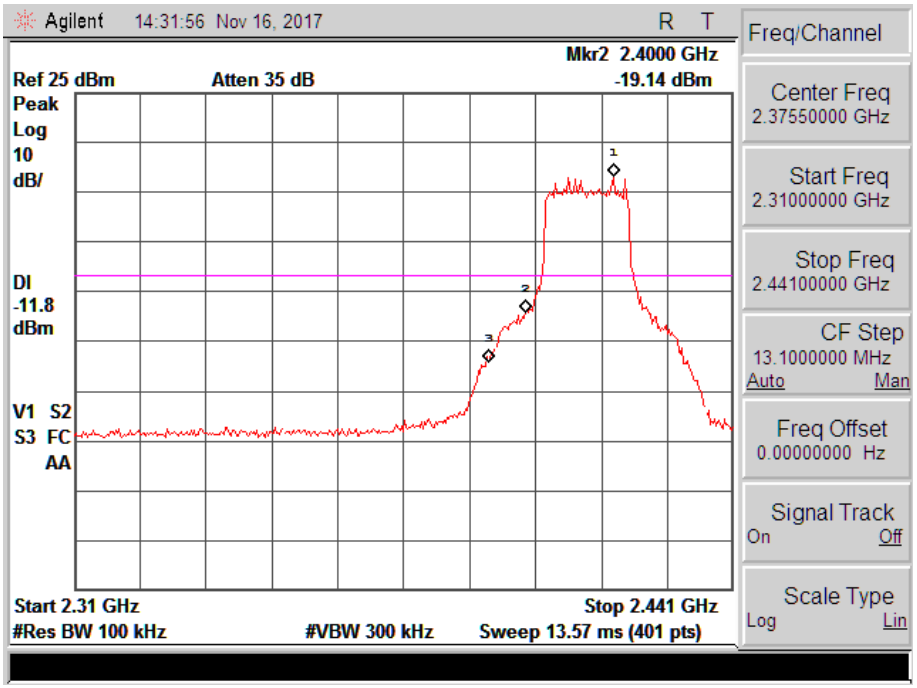
High Channel

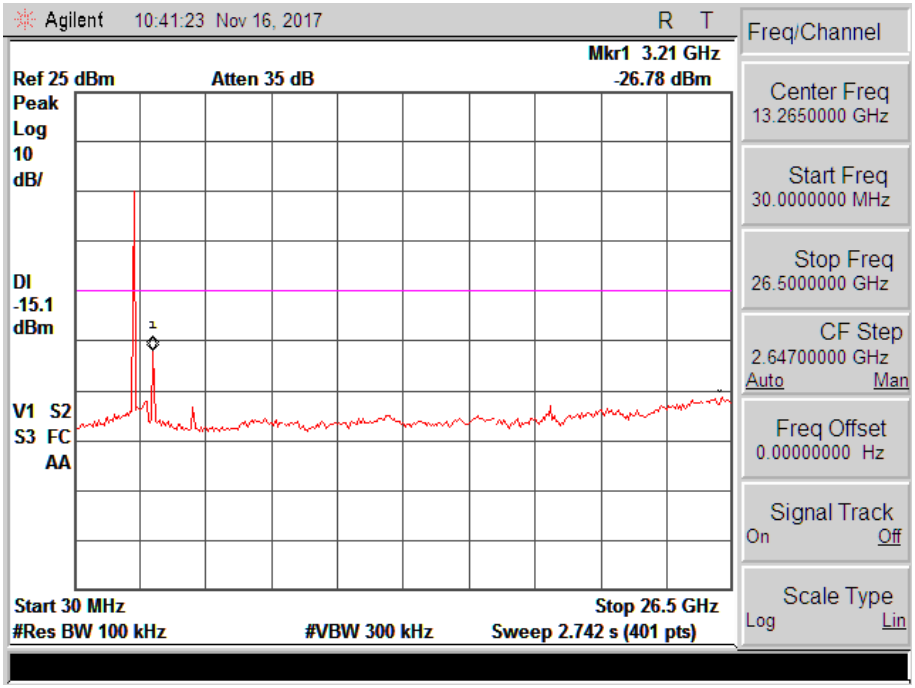




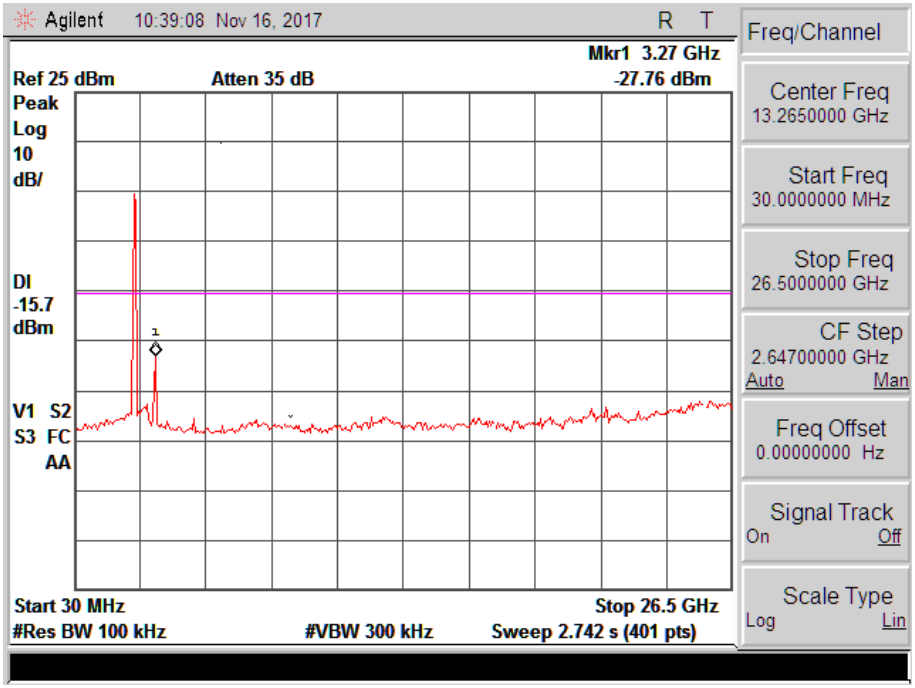
802.11g

Low Channel

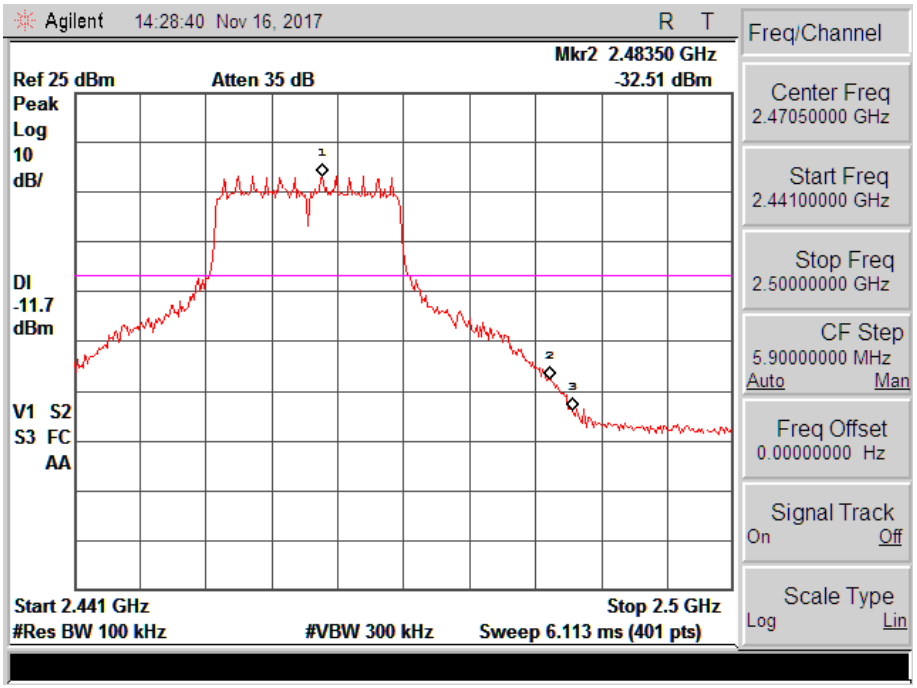


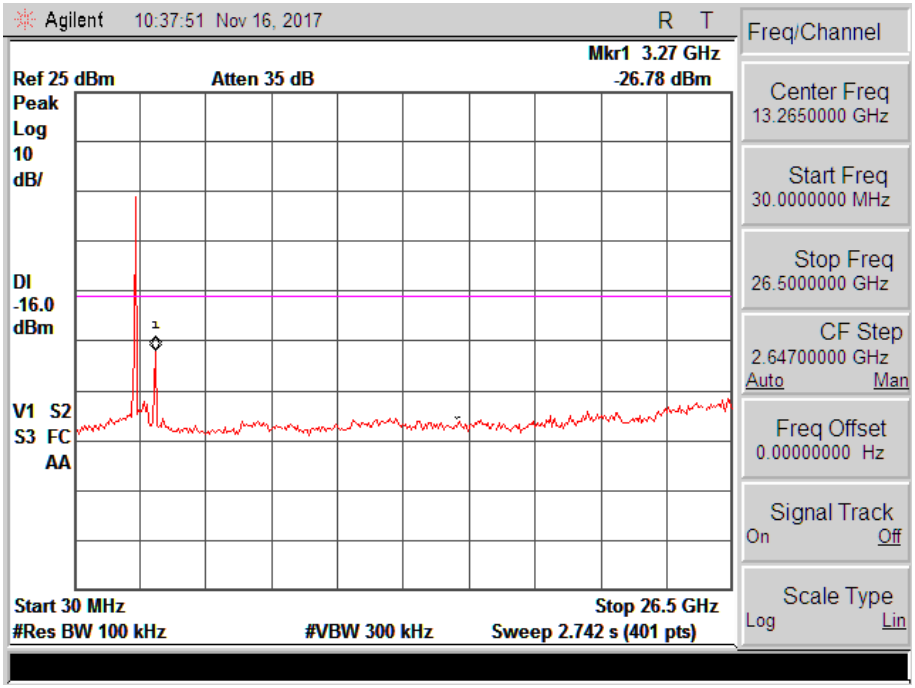


Middle Channel



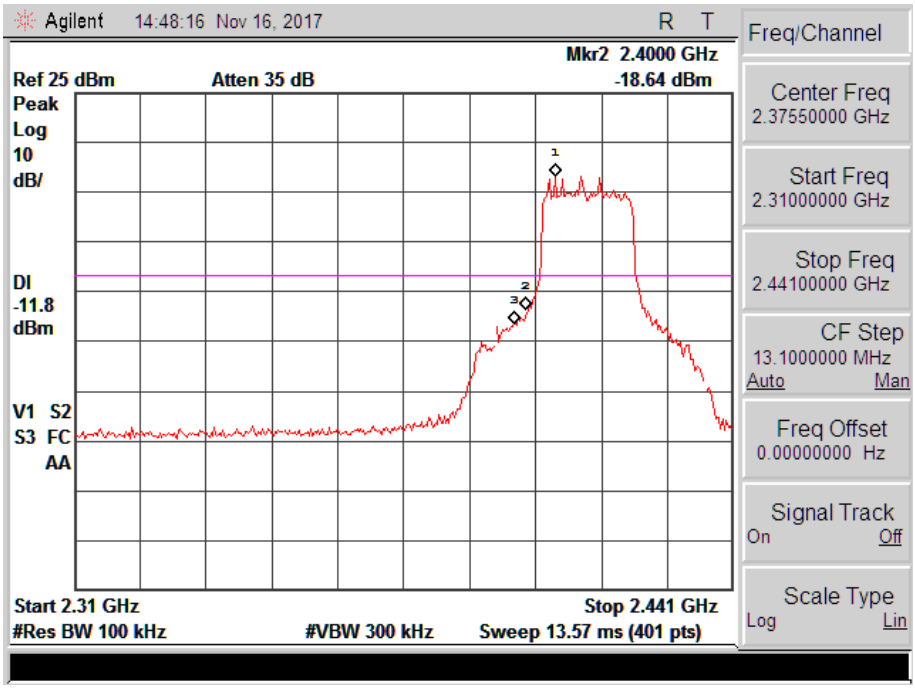
High Channel

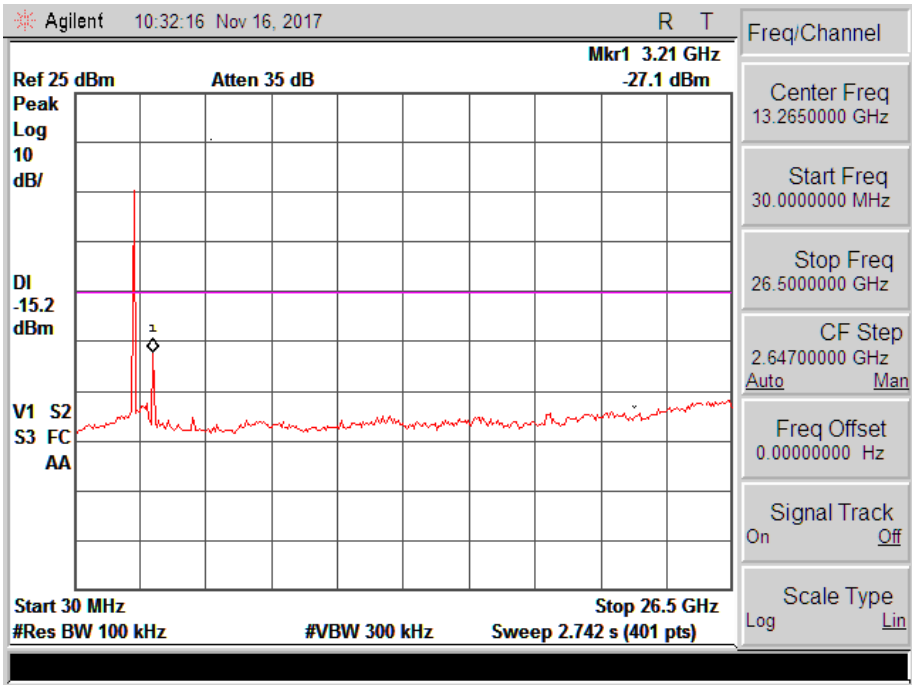




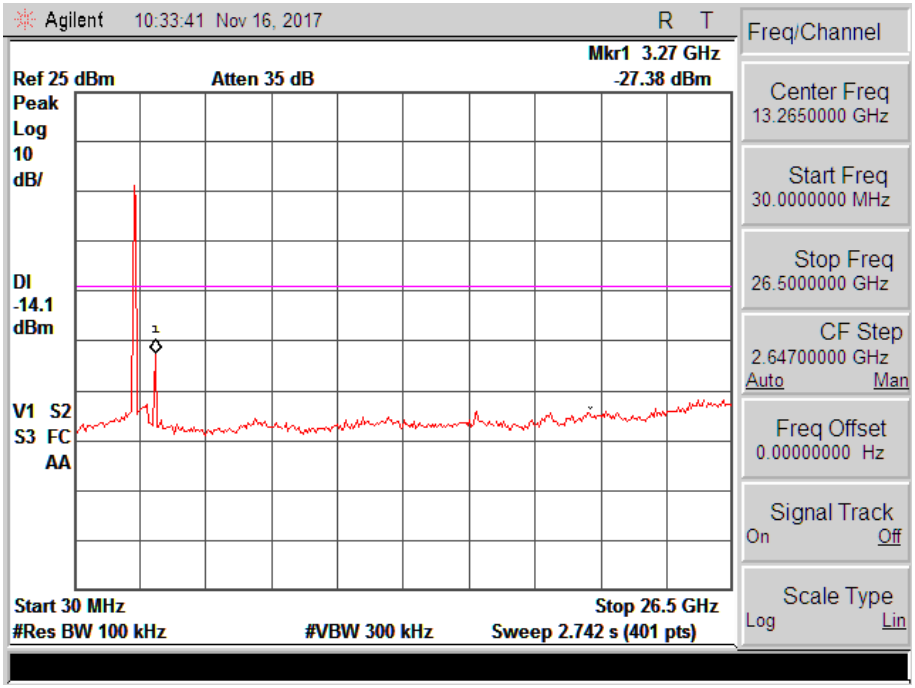
11n-HT20

Low Channel

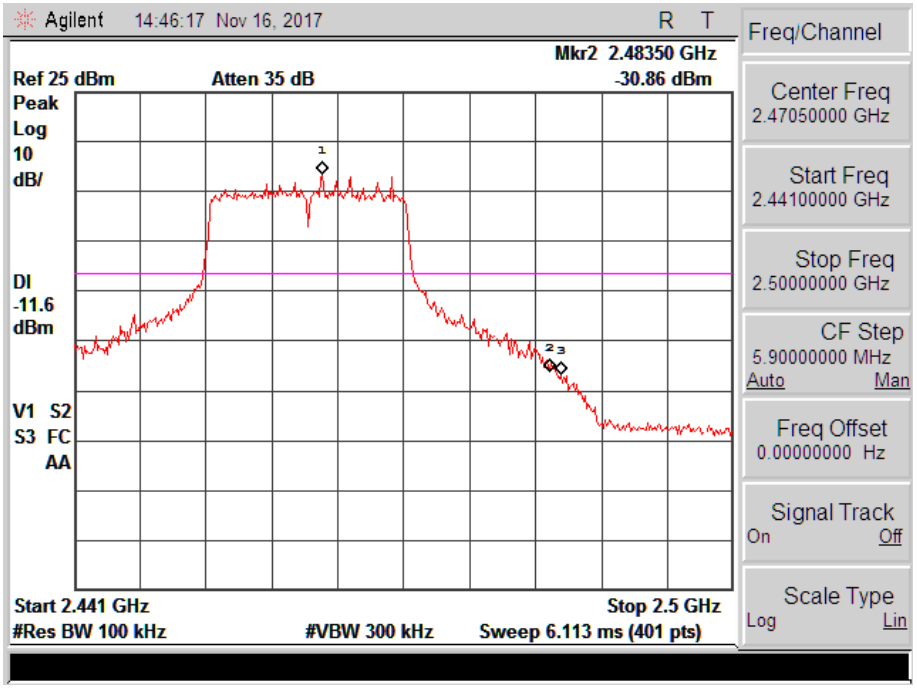


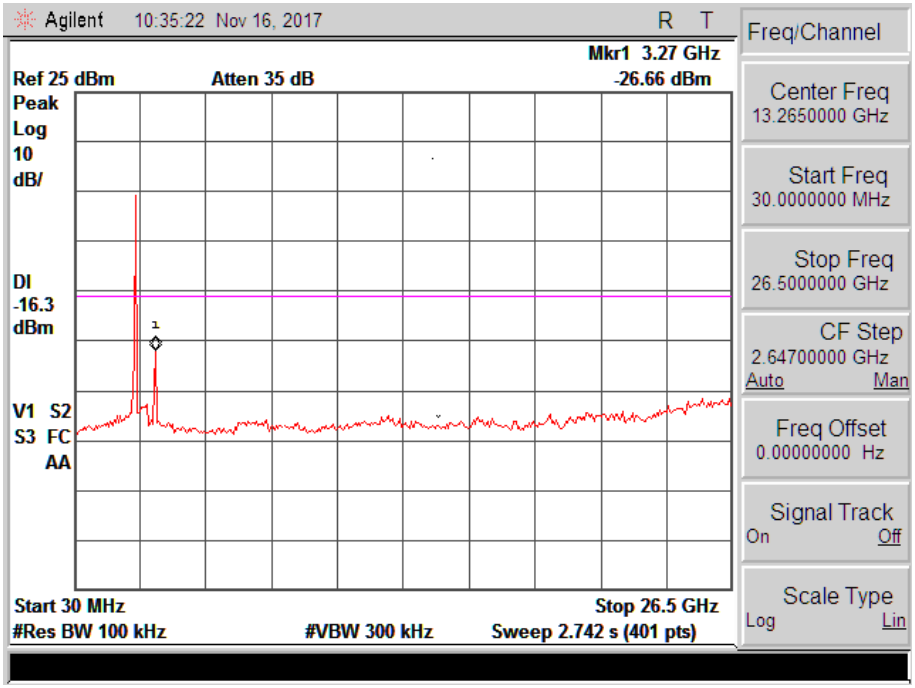


Middle Channel



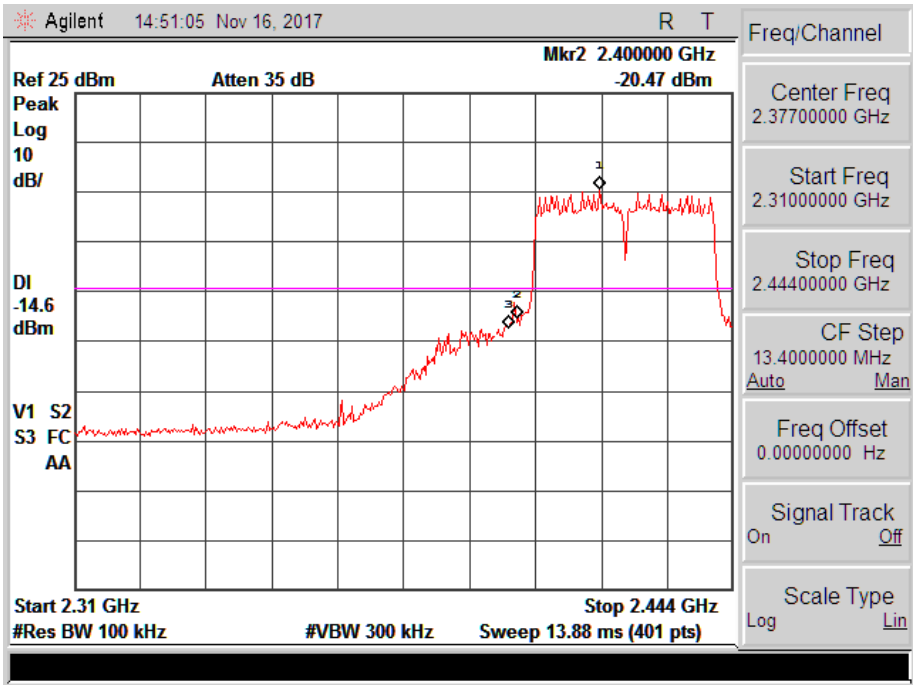
High Channel

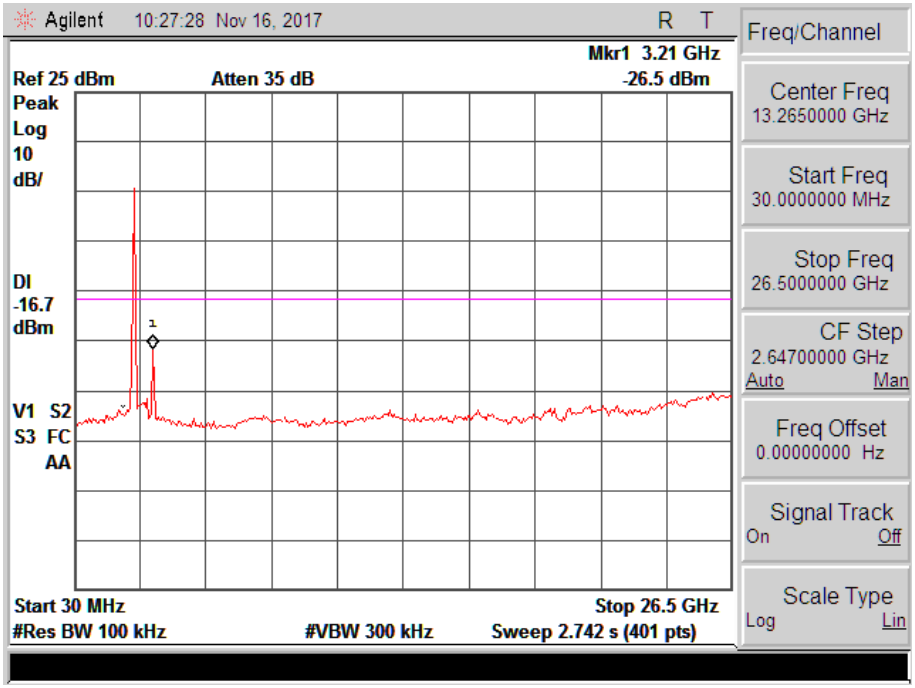




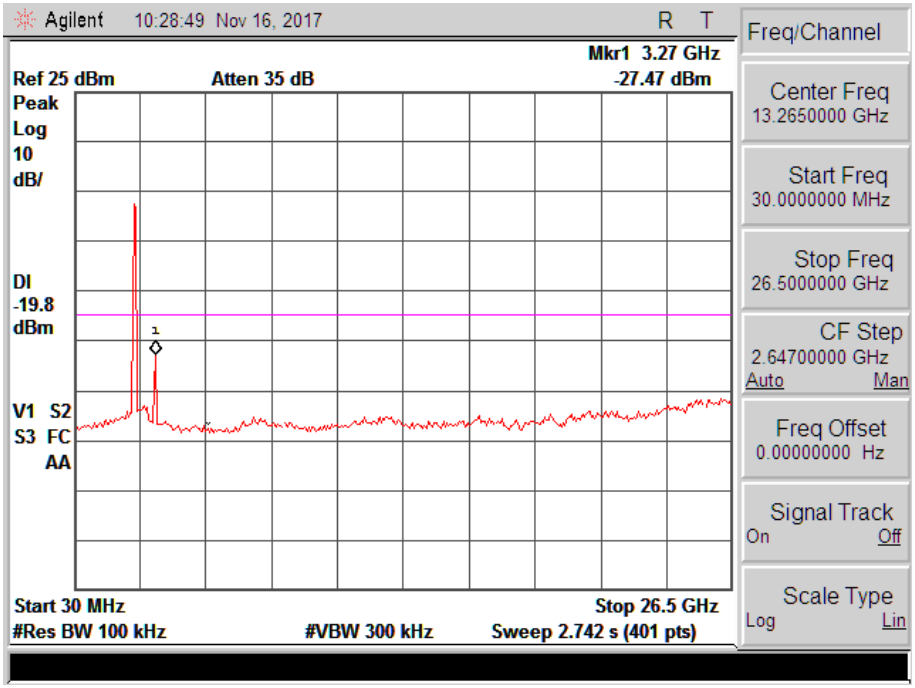
11n-HT40

Low Channel

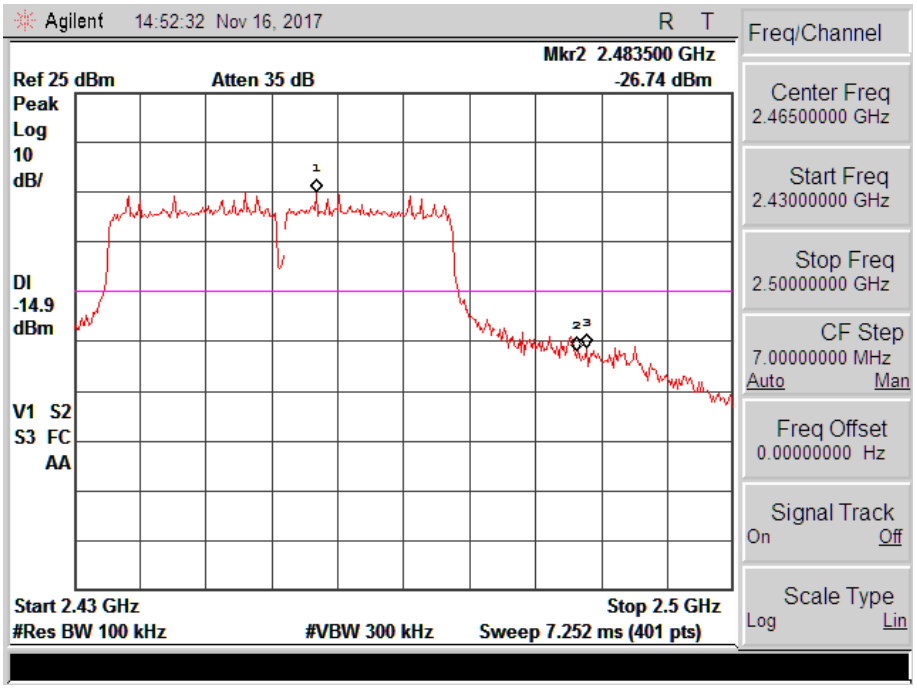


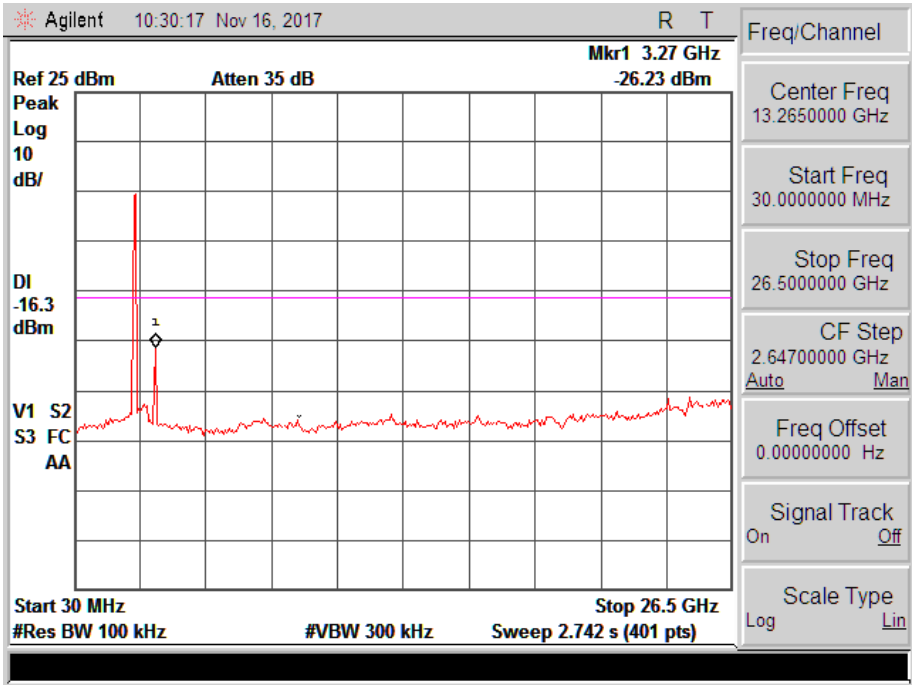


Middle Channel



High Channel

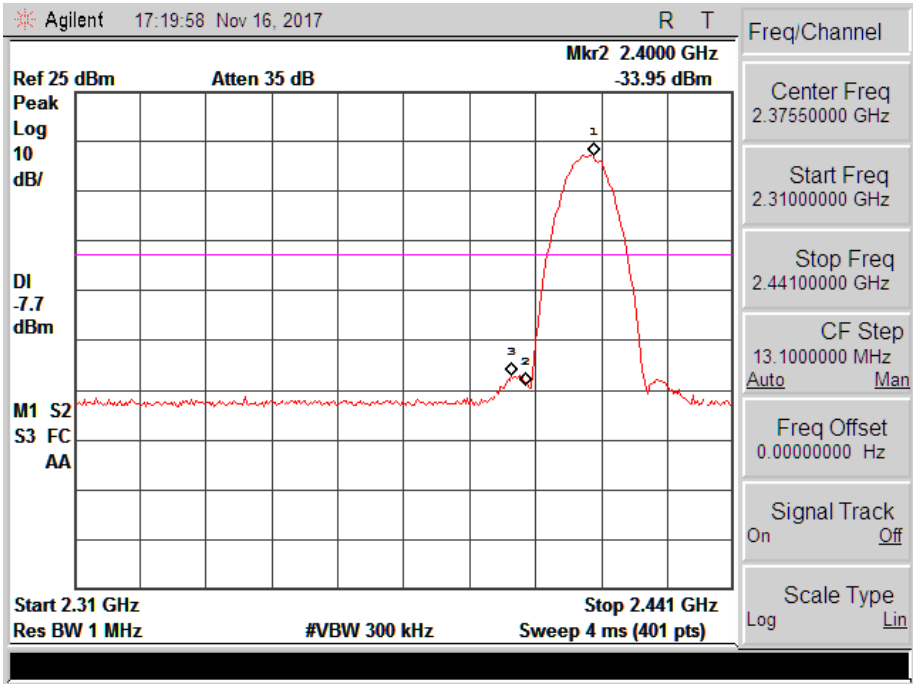


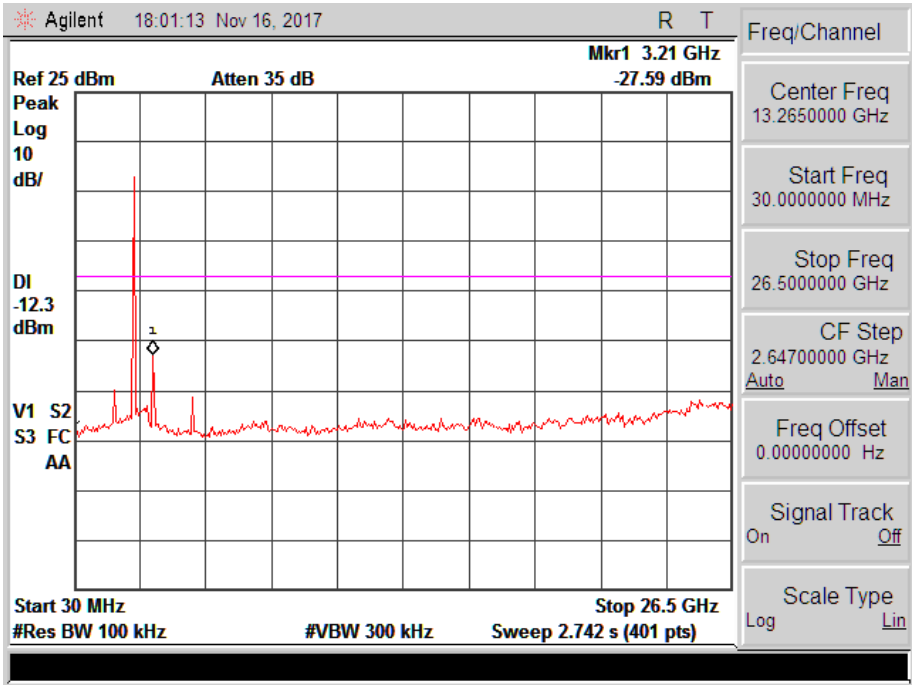


Antenna 2

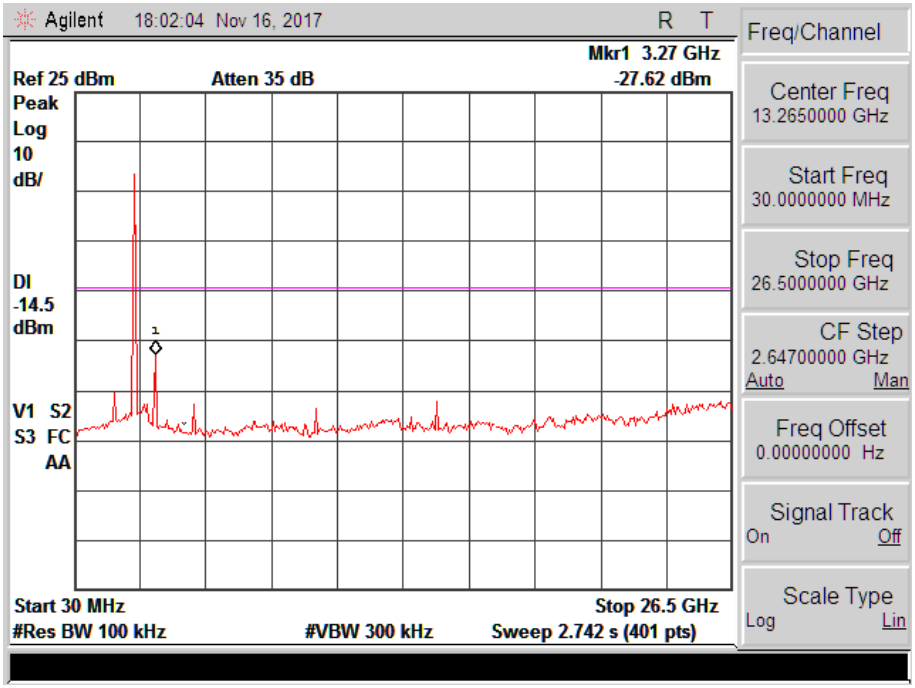
802.11b

Low Channel

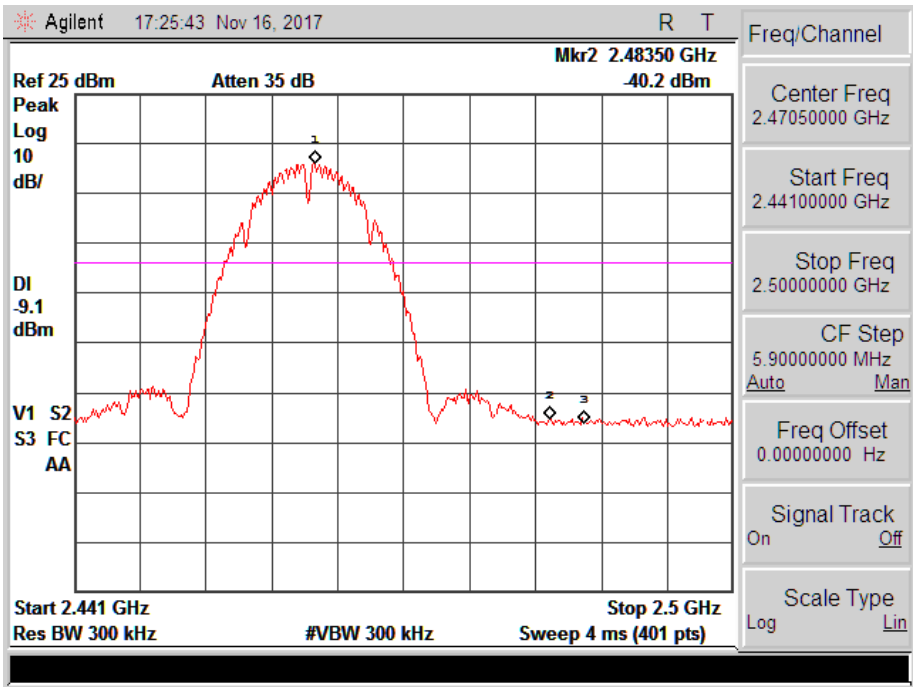


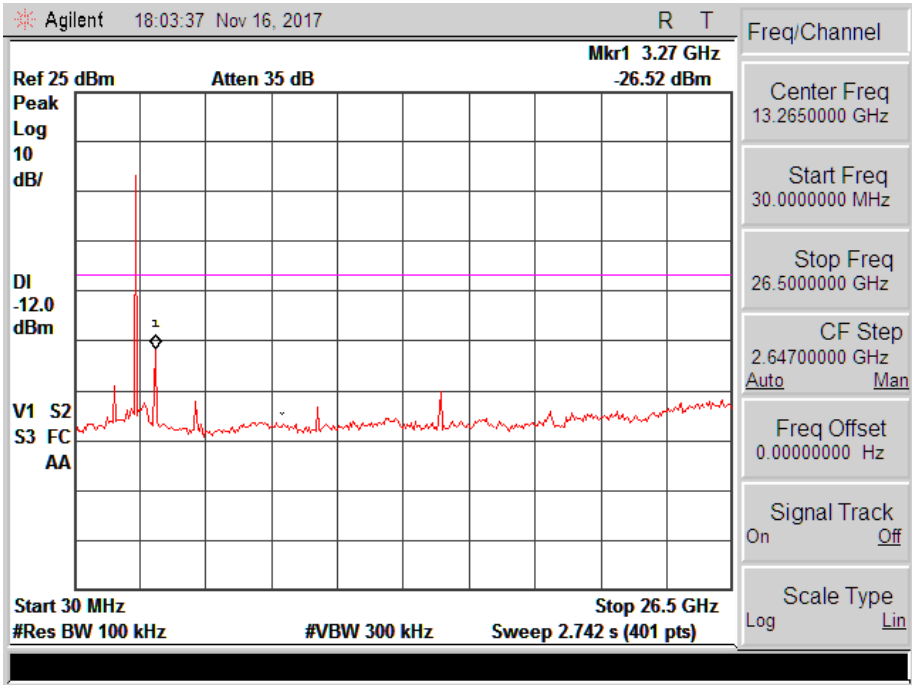


Middle Channel



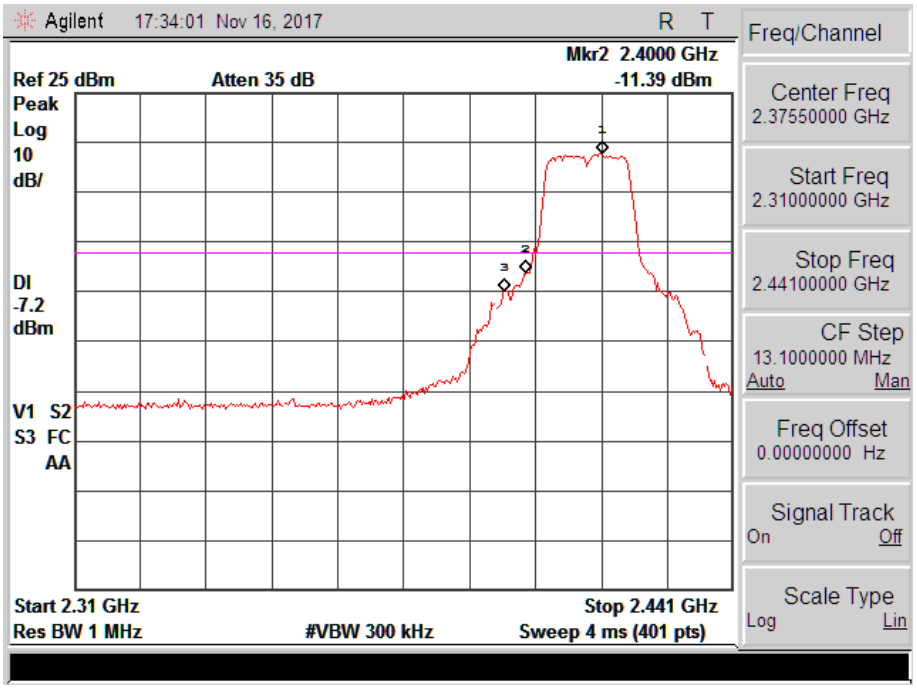
High Channel

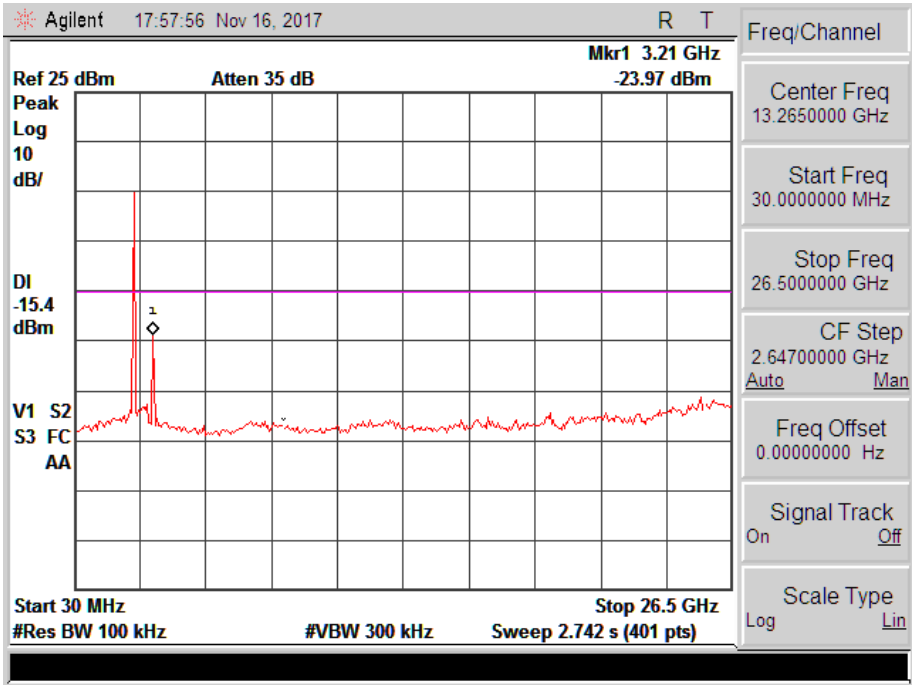




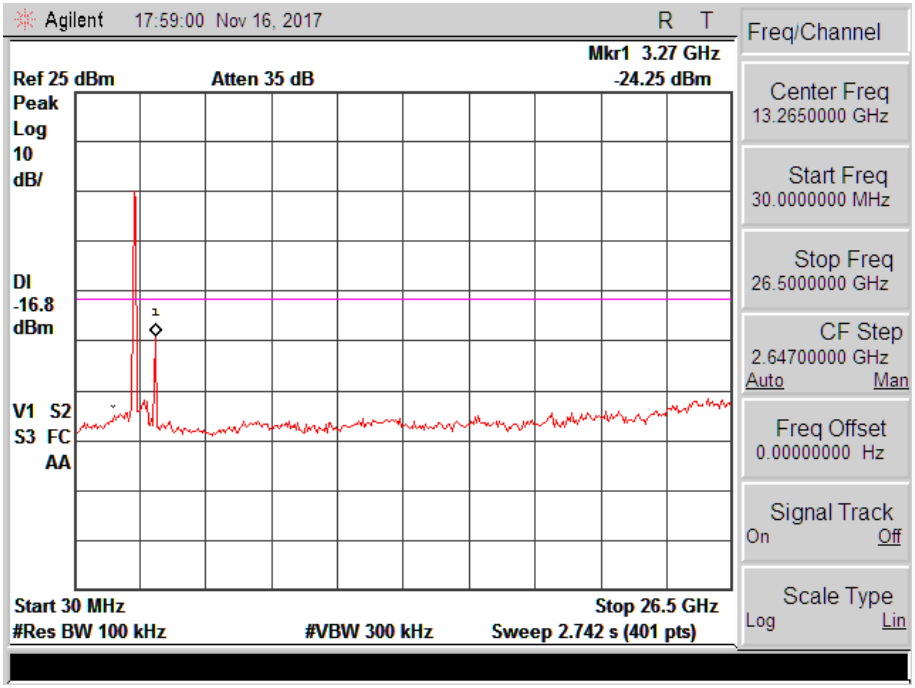
802.11g

Low Channel

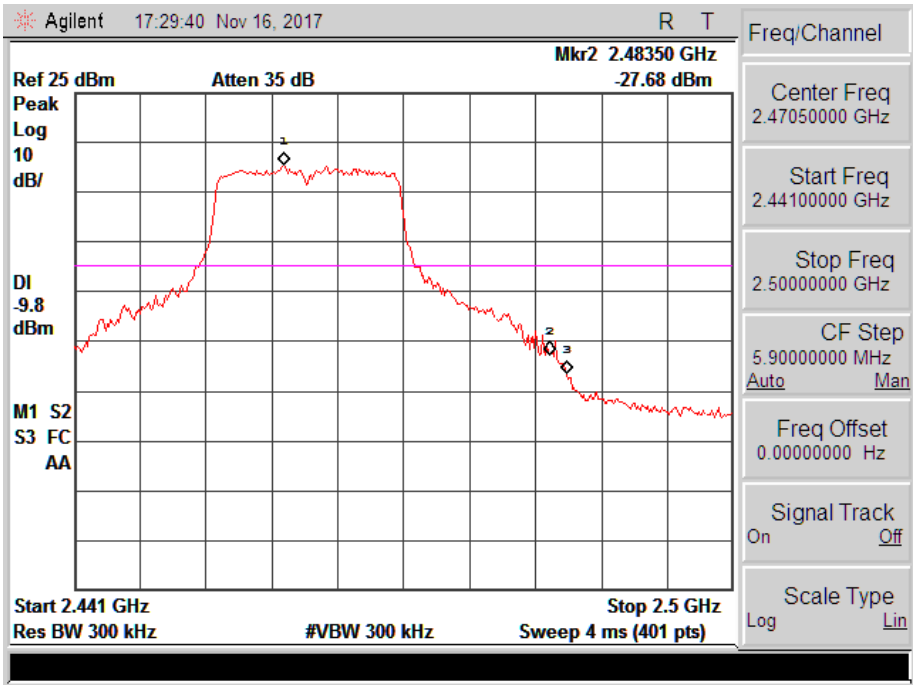


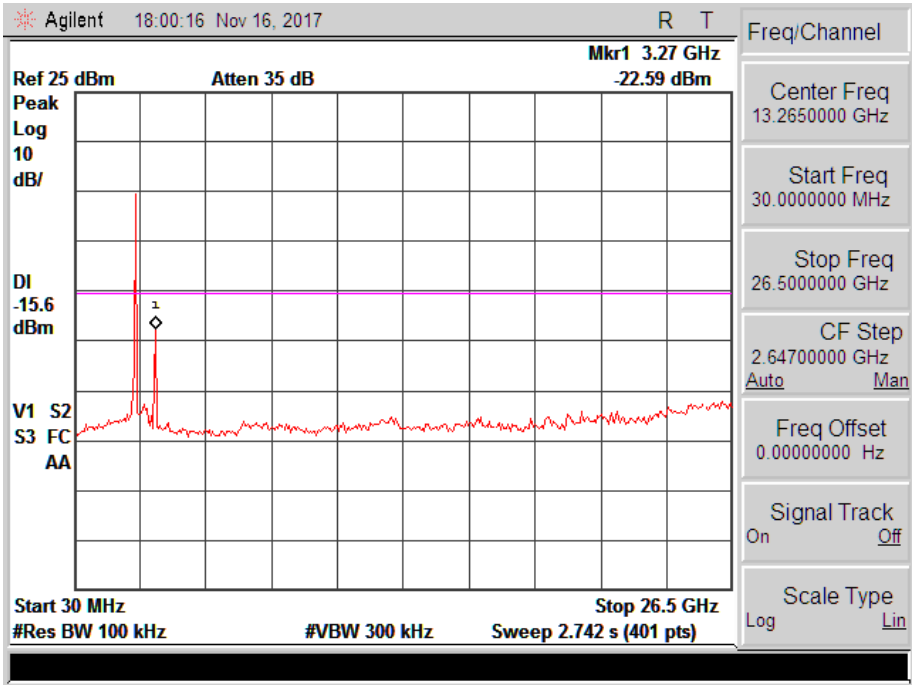


Middle Channel



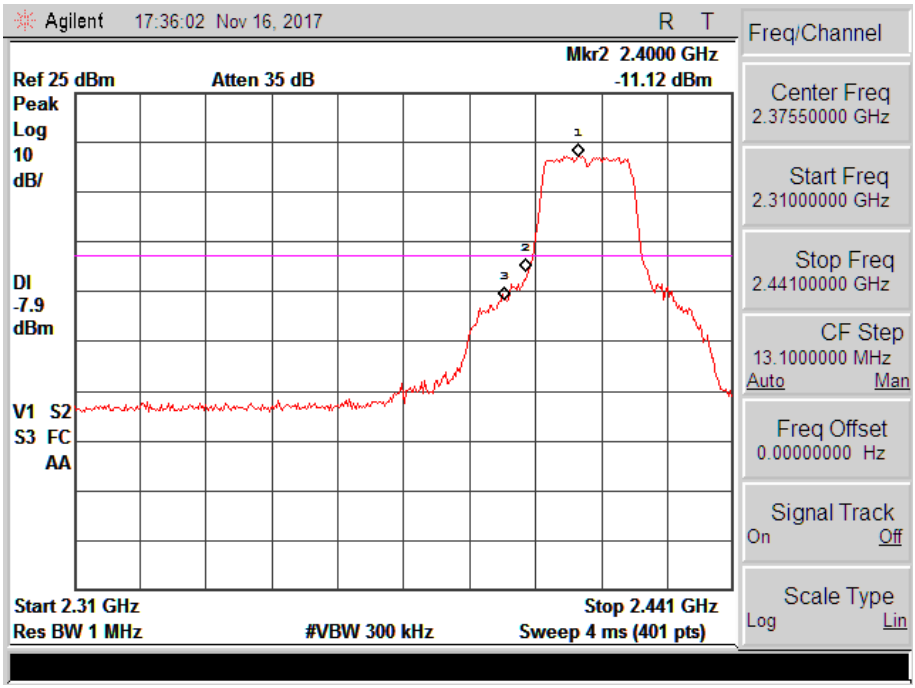
High Channel

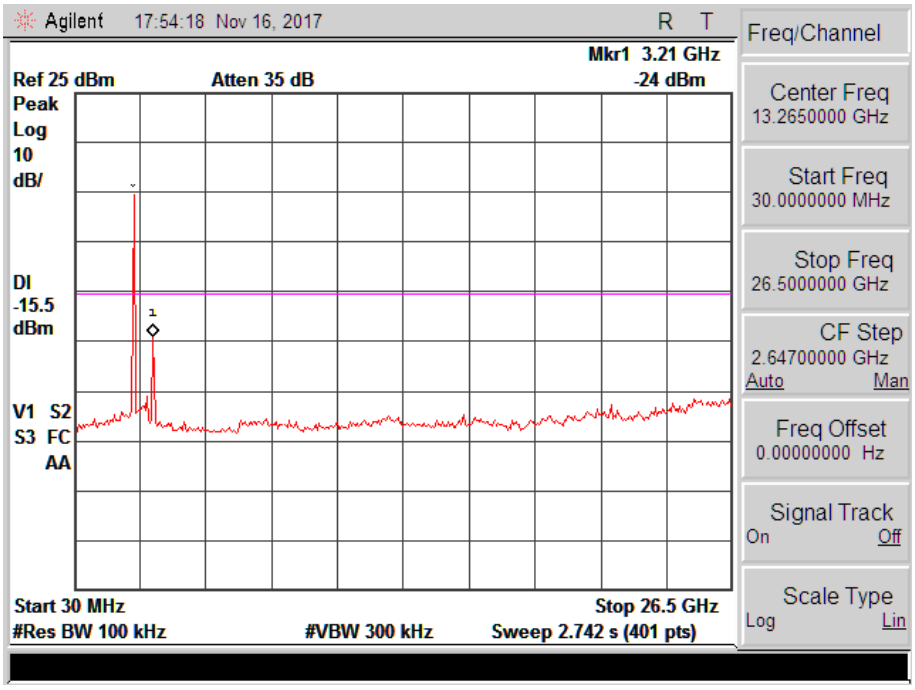




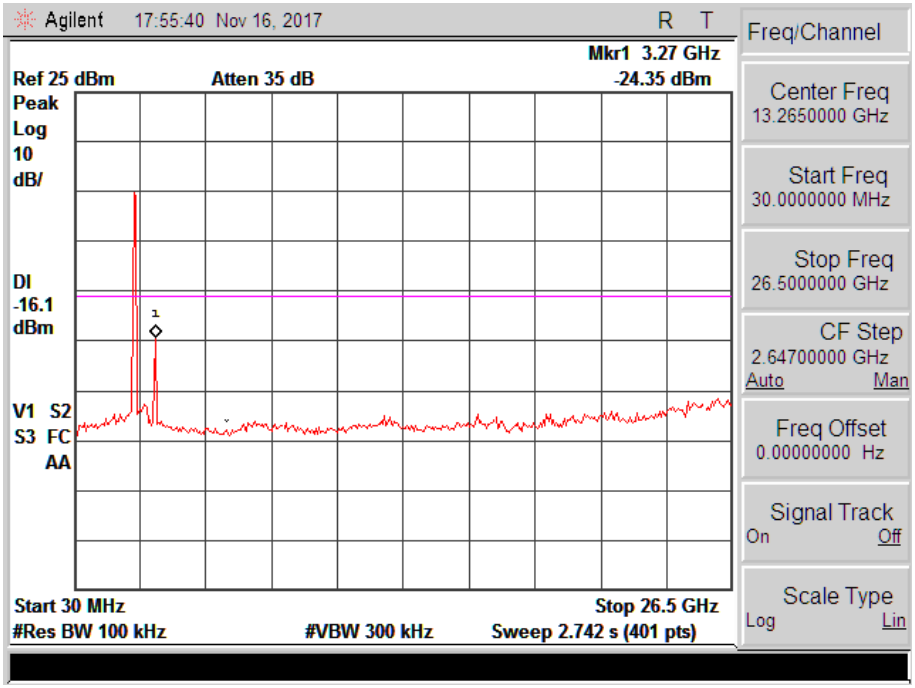
802.11n-HT20

Low Channel

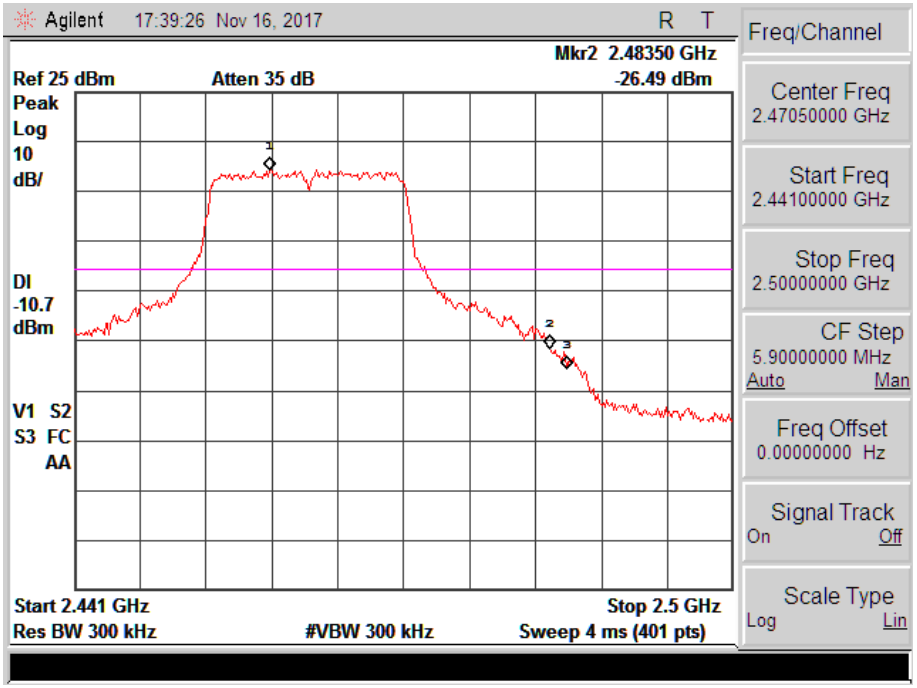


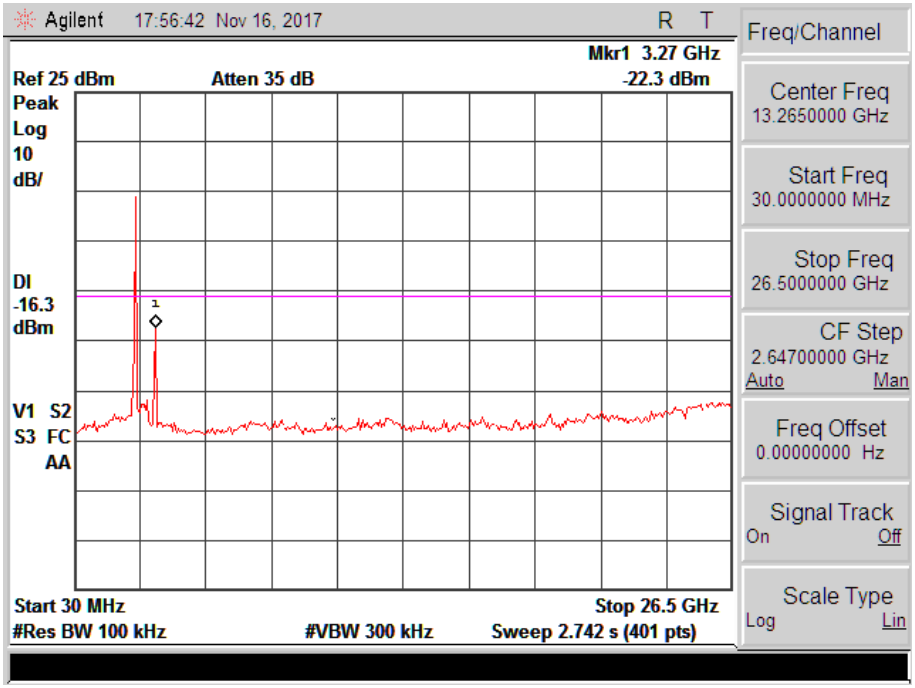


Middle Channel



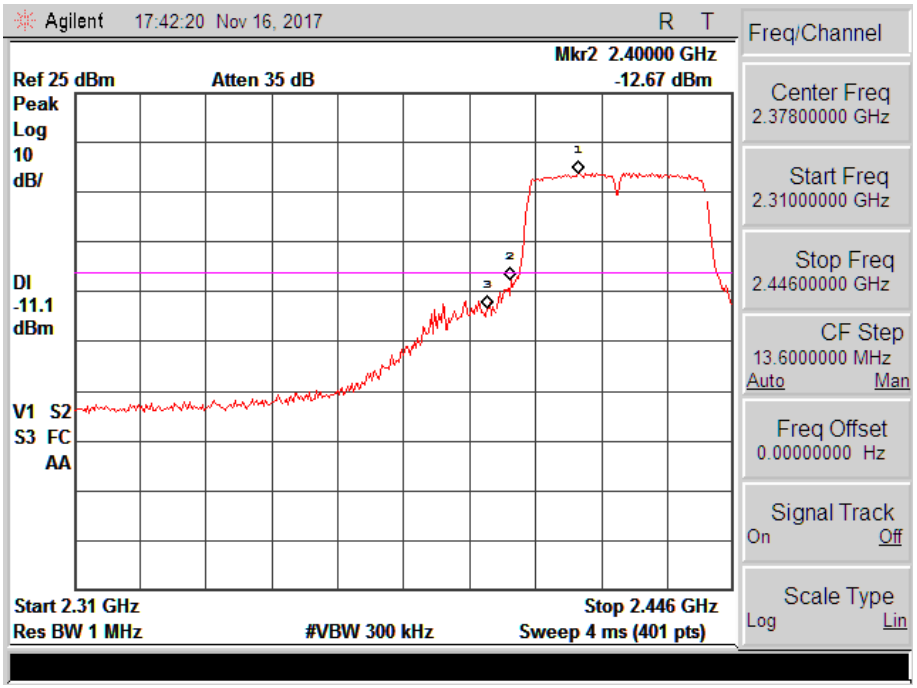
High Channel

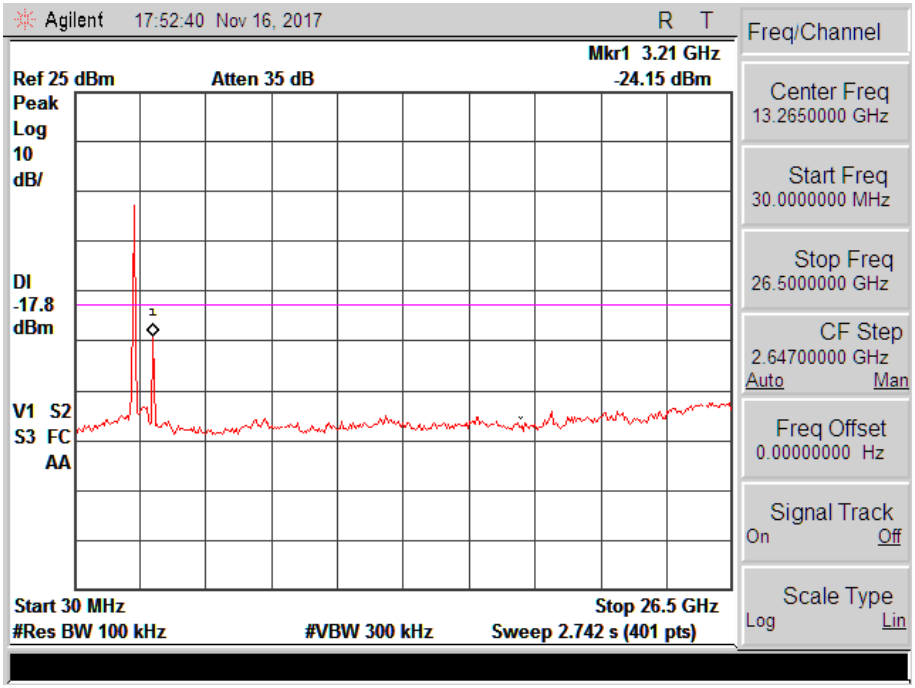




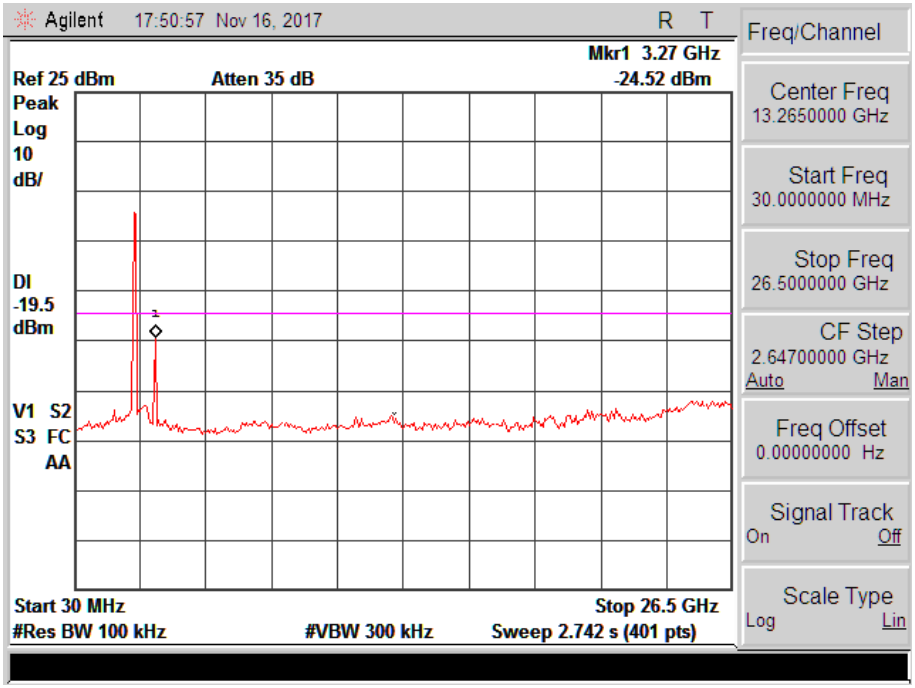
802.11n-HT40

Low Channel

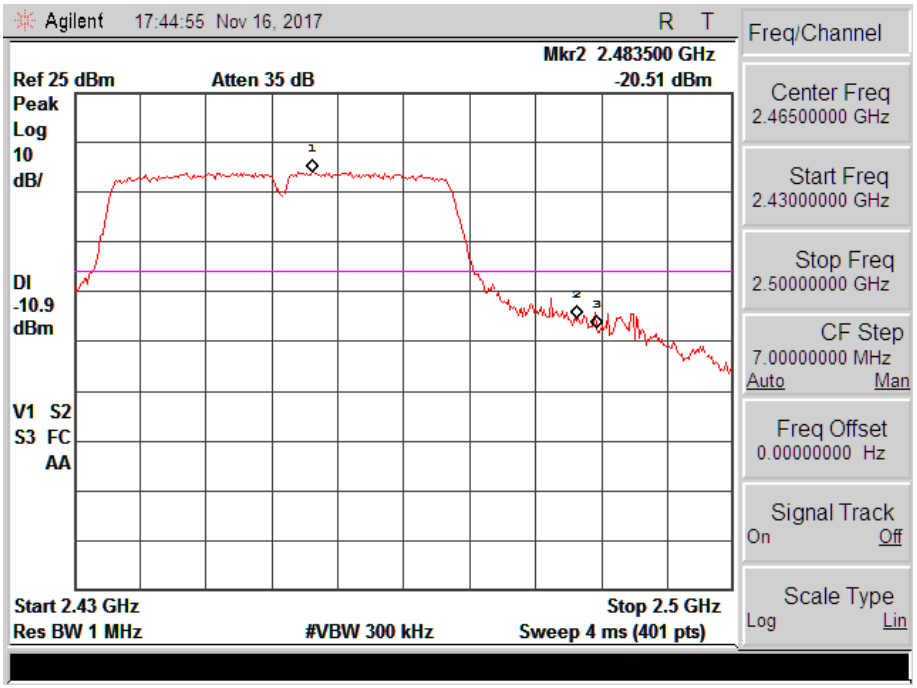


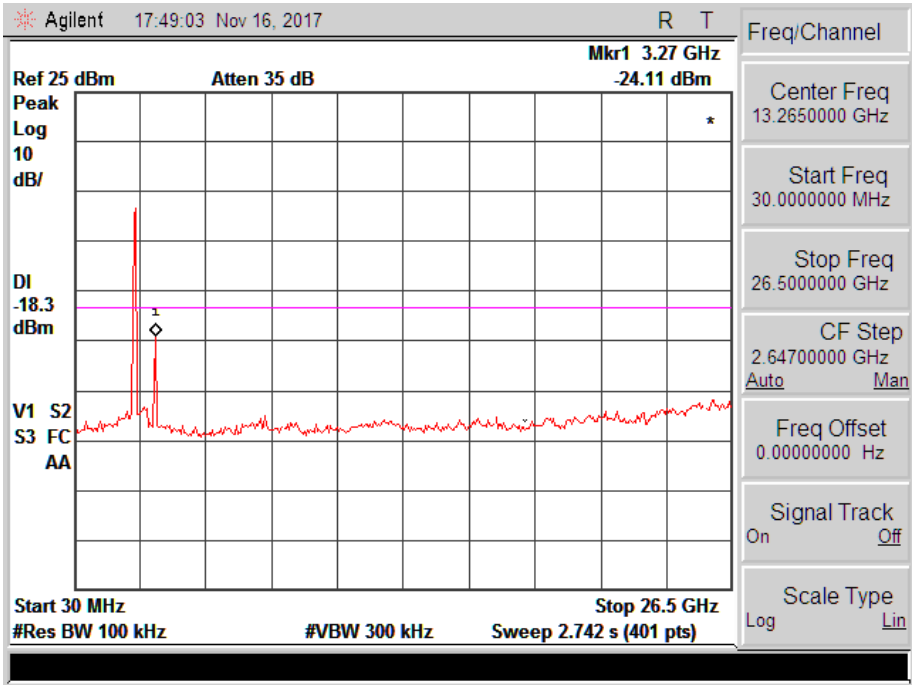


Middle Channel



High Channel





10. Conducted Emissions

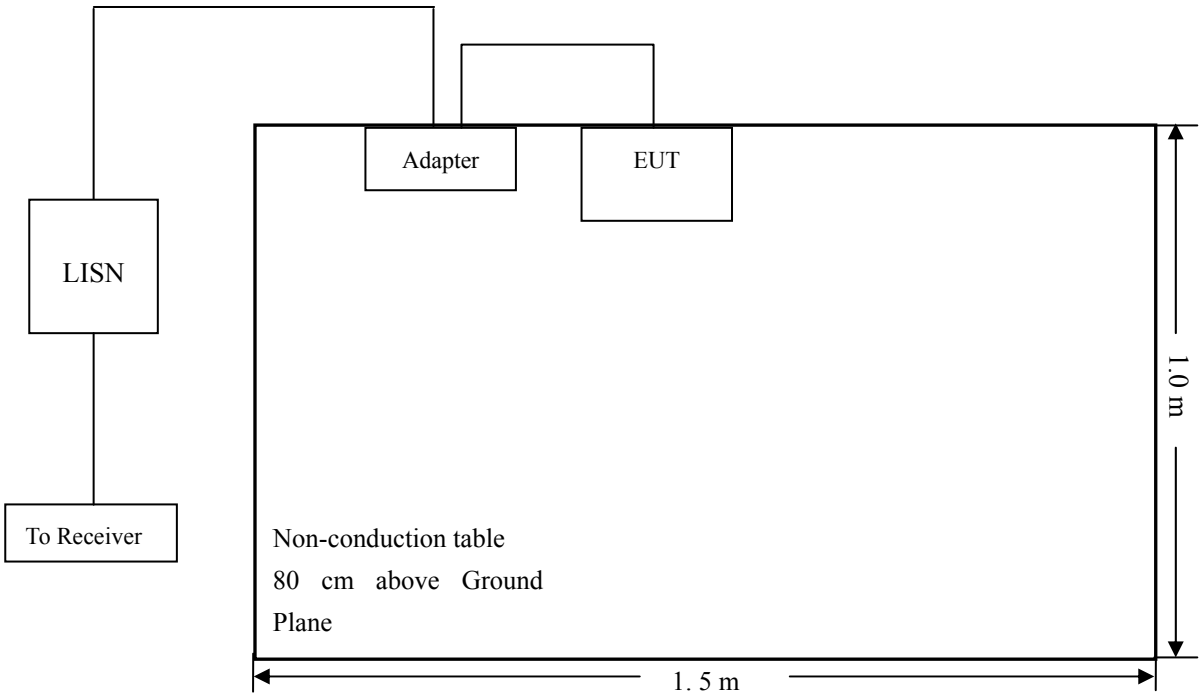
10.1 Measurement Uncertainty

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

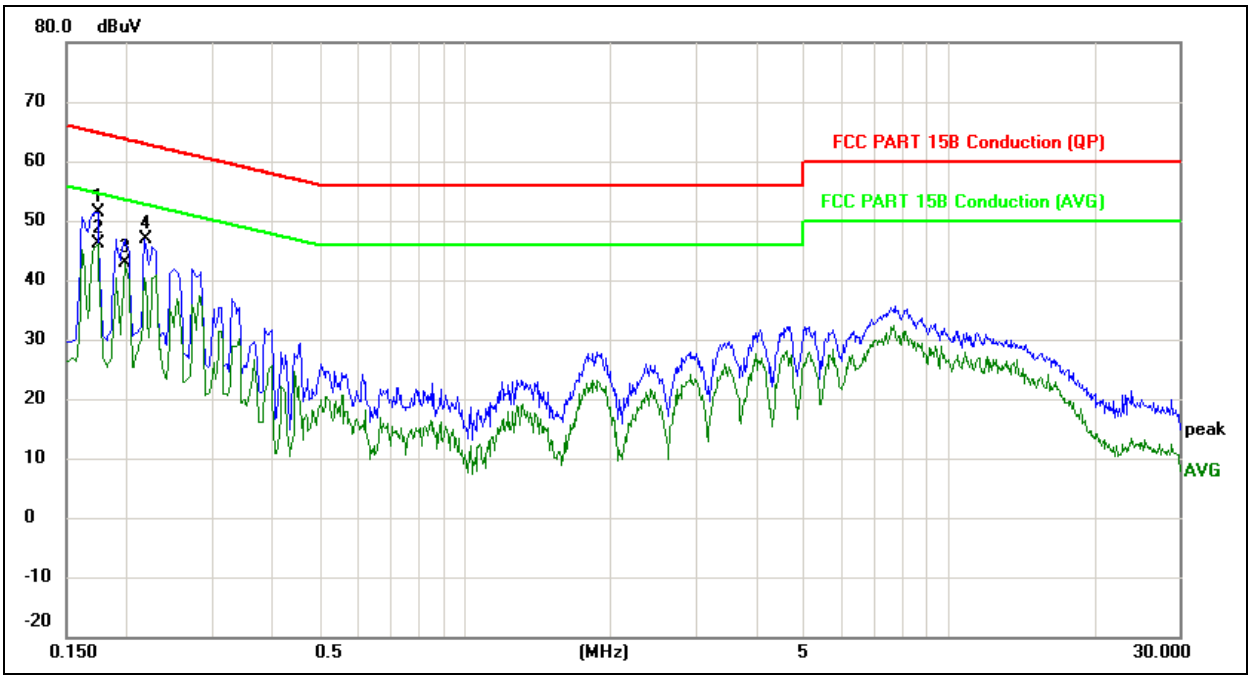
10.6 Summary of Test Results/Plots

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:

10.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

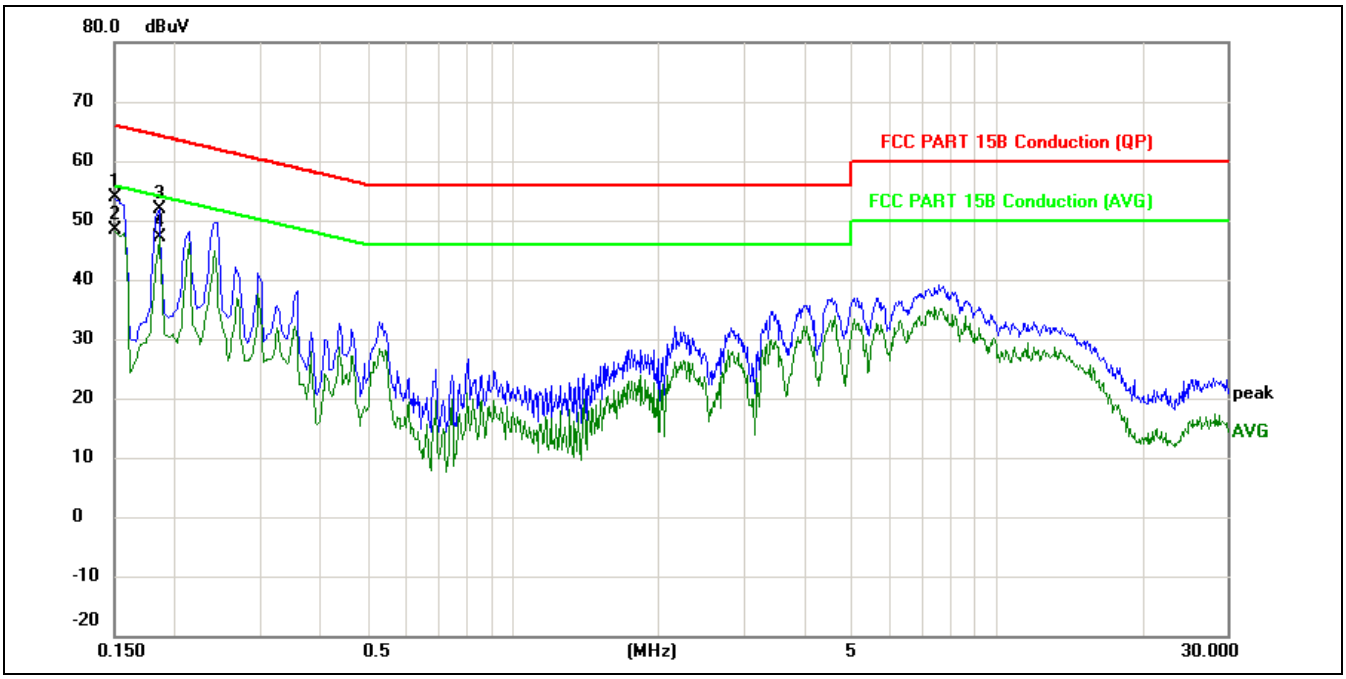
EUT: GL.iNet 1300M Home AC Router
Tested Model: GL-B1300
Operating Condition: Transmitting
Comment: AC 120V/60Hz; Adapter DC12V/1.5A
Test Specification: Neutral



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	
1	0.1740	40.29	11.04	51.33	64.77	-13.44	QP
2	0.1740	35.10	11.04	46.14	54.77	-8.63	AVG
3	0.1980	30.91	11.88	42.79	53.69	-10.90	AVG
4	0.2180	34.99	11.95	46.94	62.89	-15.95	QP

Note:
1. Result Level = Read Level +LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz), Step size: 4 kHz, Scan time: auto.

EUT: GL.iNet 1300M Home AC Router
Tested Model: GL-B1300
Operating Condition: Transmitting
Comment: AC 120V/60Hz; Adapter DC12V/1.5A
Test Specification: Line



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	
1	0.1500	41.57	12.22	53.79	66.00	-12.21	QP
2	0.1500	36.06	12.22	48.28	56.00	-7.72	AVG
3	0.1860	38.49	13.43	51.92	64.21	-12.29	QP
4	0.1860	33.76	13.43	47.19	54.21	-7.02	AVG

Note:
1. Result Level = Read Level +LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz), Step size: 4 kHz, Scan time: auto.

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