

FCC Part 15C Measurement and Test Report

For

Hui Zhou Gaoshengda Technology Co.,LTD

NO.75 Zhongkai Development Area, Huizhou, Guangdong, China

FCC ID:2AC23- WT31M2311A

FCC Rule(s):	<u>FCC Part 15C</u>	
Product Description:	<u>WIFI Module</u>	
Tested Model:	<u>WT31M2311A</u>	
Report No.:	<u>FCC-ATL20161118886-1</u>	
Issued Date:	<u>2016-11-23</u>	
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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Hui Zhou Gaoshengda Technology Co.,LTD
 Address of applicant: NO.75 Zhongkai Development Area, Huizhou, Guangdong, China

Manufacturer: Hui Zhou Gaoshengda Technology Co.,LTD
 Address of manufacturer: NO.75 Zhongkai Development Area, Huizhou, Guangdong, China

General Description of EUT	
Product Name:	WIFI Module
Trade Name:	GS
Model No.:	WT31M2311A
Adding Model(s):	/
Power Adapter Model:	/
<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
RF Output Power:	14.34 dBm (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Quantity of Channels:	11
Channel Separation:	5MHz
Type of Antenna:	PIFA Antenna
Antenna Gain:	3 dBm
Lowest Internal Frequency	4MHz

1.2 Test Standards

The following report is prepared on behalf of the Hui Zhou Gaoshengda Technology Co.,LTD in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, 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 shall be performed also.

1.4 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

Accessories Equipment List and Details			
Description	Manufacturer	Model No.	Serial Number
Notebook	Lenovo	T410	/
Accessories Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With Core/Without Core
DC Cable	1.0	Unshielded	Without Ferrite
EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

1.5 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	$\pm 5.1\text{dB}$

1.6 Test Equipment List and Details

Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
Spectrum Analyzer	Agilent	E4407B	MY41440400	2016-06-04	2017-06-03
Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2016-06-04	2017-06-03
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2016-06-04	2017-06-03
Amplifier	Agilent	8447F	3113A06717	2016-06-04	2017-06-03
Amplifier	C&D	PAP-1G18	2002	2016-06-04	2017-06-03
Broadband Antenna	Schwarz beck	VULB9163	9163-333	2016-06-04	2017-06-03
Horn Antenna	ETS	3117	00086197	2016-06-04	2017-06-03
Horn Antenna	ETS	3116B	00088203	2016-06-04	2017-06-03
Loop Antenna	Schwarz beck	FMZB 1516	9773	2016-06-04	2017-06-03
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2016-06-04	2017-06-03
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2016-06-04	2017-06-03
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2016-06-04	2017-06-03
Power Meter	R&S	NRVS	100444	2016-06-18	2017-06-17

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 § 2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the RF Exposure Report.

4. Antenna Requirement

4.1 Standard Applicable

According to FCC Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

4.2 Evaluation Information

This product has an integral 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 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 $\geq 2 \times \text{span/RBW}$.
- 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

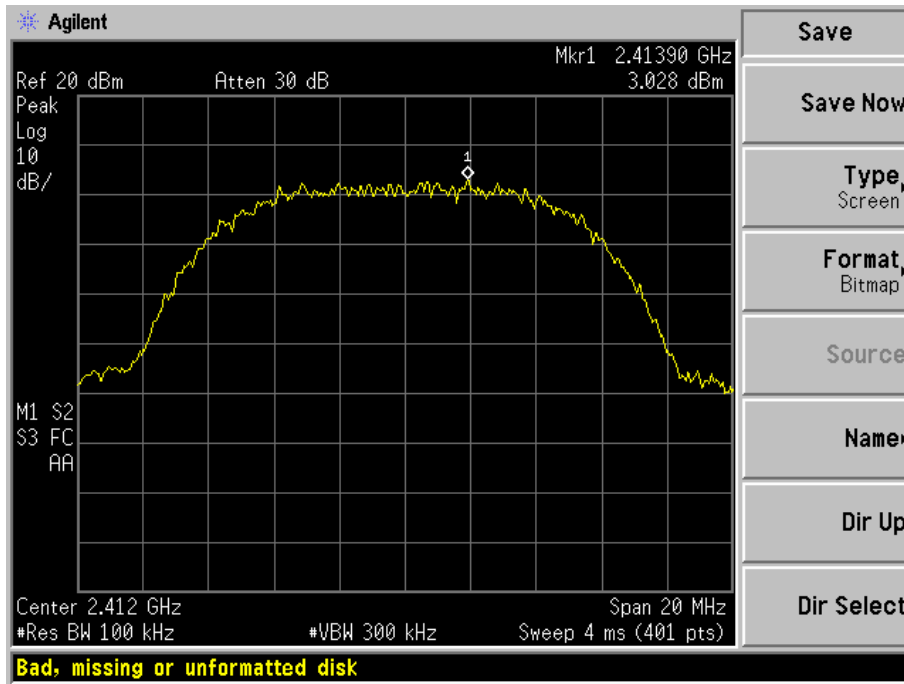
Temperature:	26° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.4 Summary of Test Results/Plots

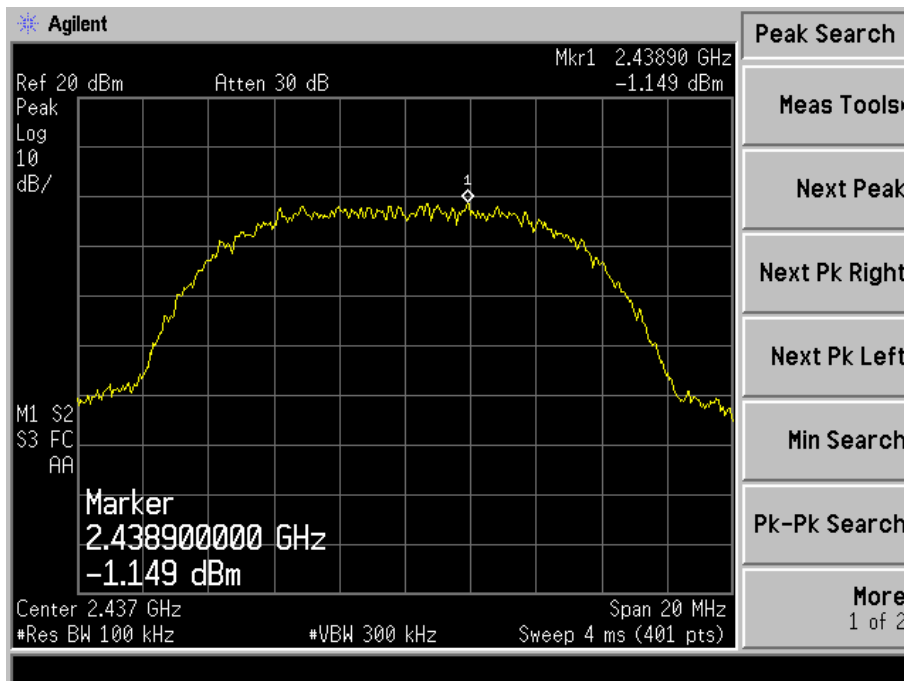
Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
802.11b	2412	3.028	8
	2437	-1.149	8
	2462	-2.041	8
802.11g	2412	-1.922	8
	2437	-2.971	8
	2462	-4.136	8
802.11n HT20	2412	-2.513	8
	2437	-3.221	8
	2462	-4.467	8
802.11n HT40	2422	-6.117	8
	2437	-6.334	8
	2452	-6.15	8

Please refer to the following test plots:

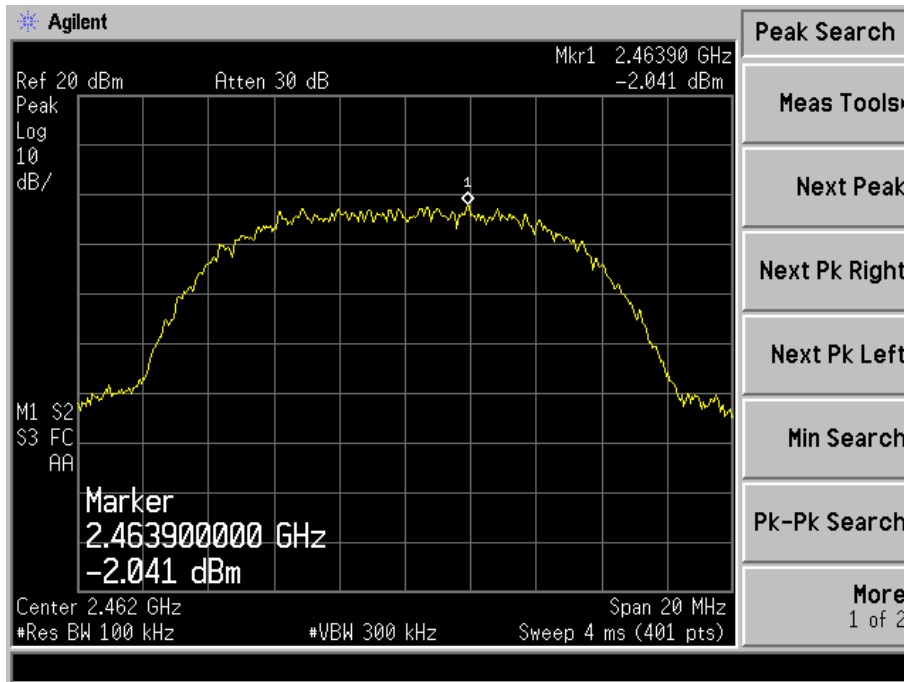
802.11b-Low Channel



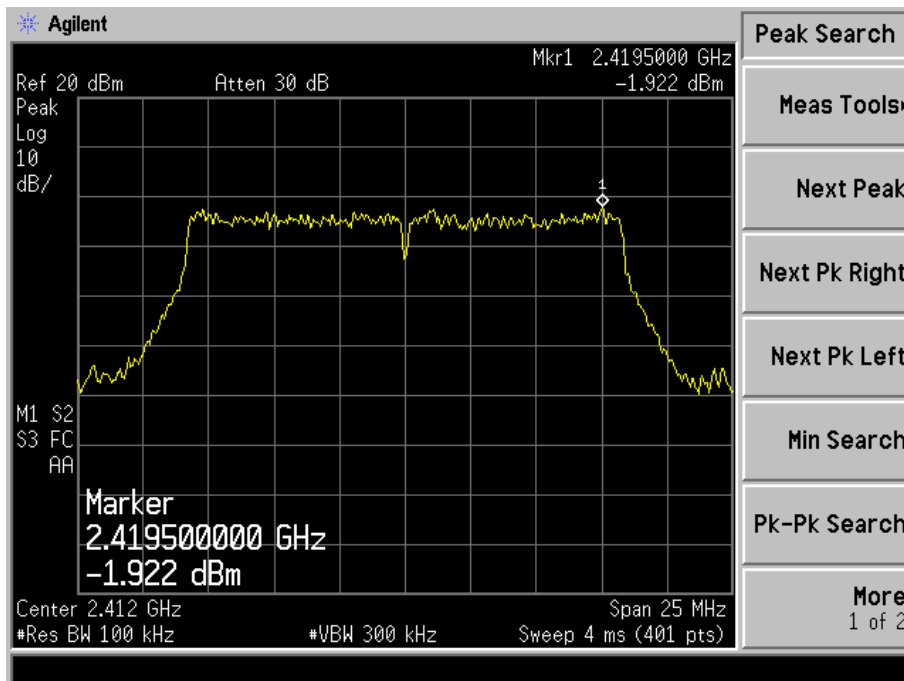
802.11b-Middle Channel



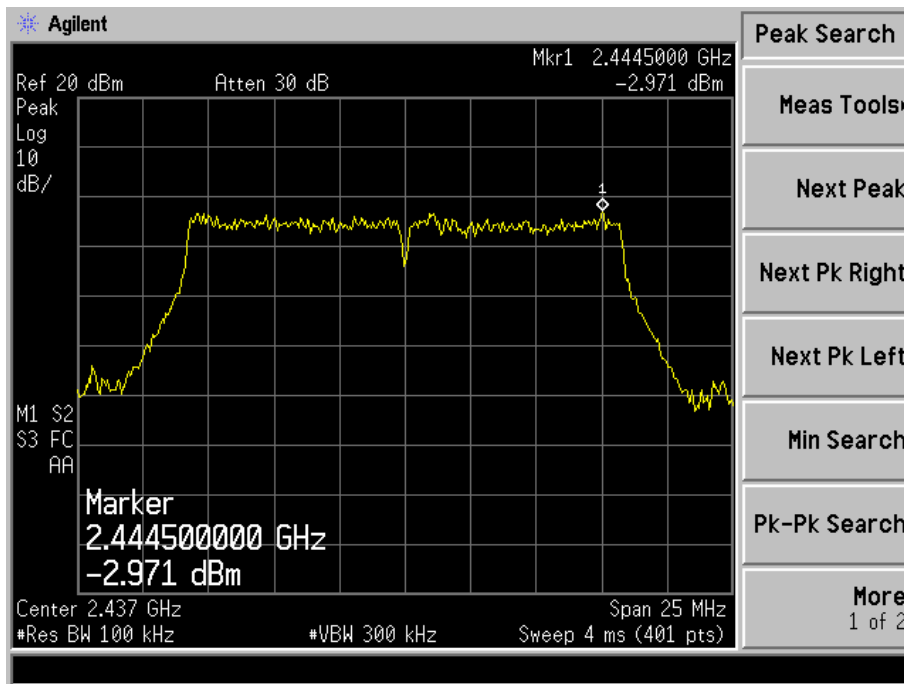
802.11b-High Channel



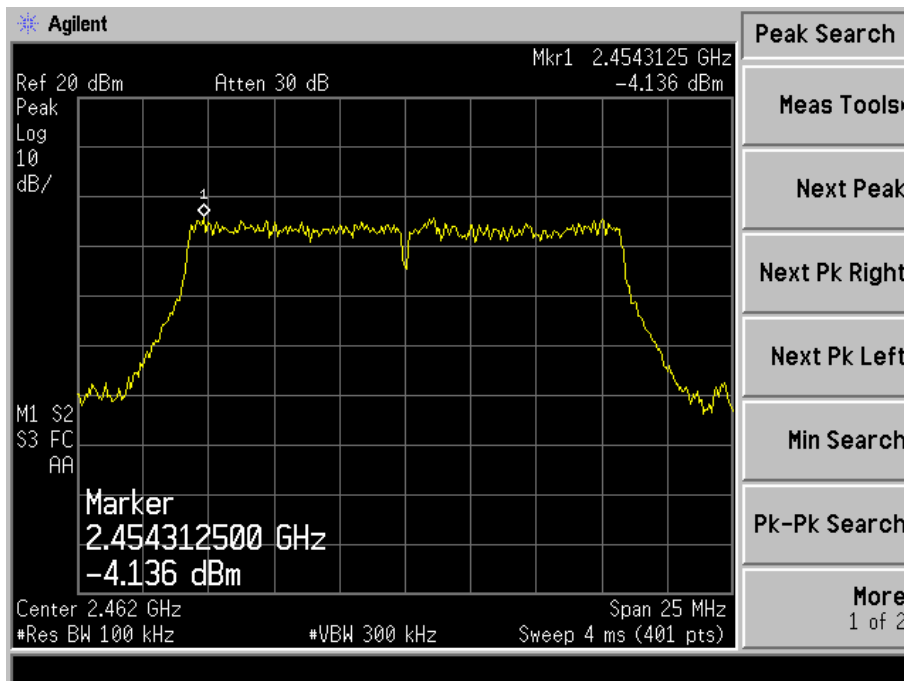
802.11g-Low Channel



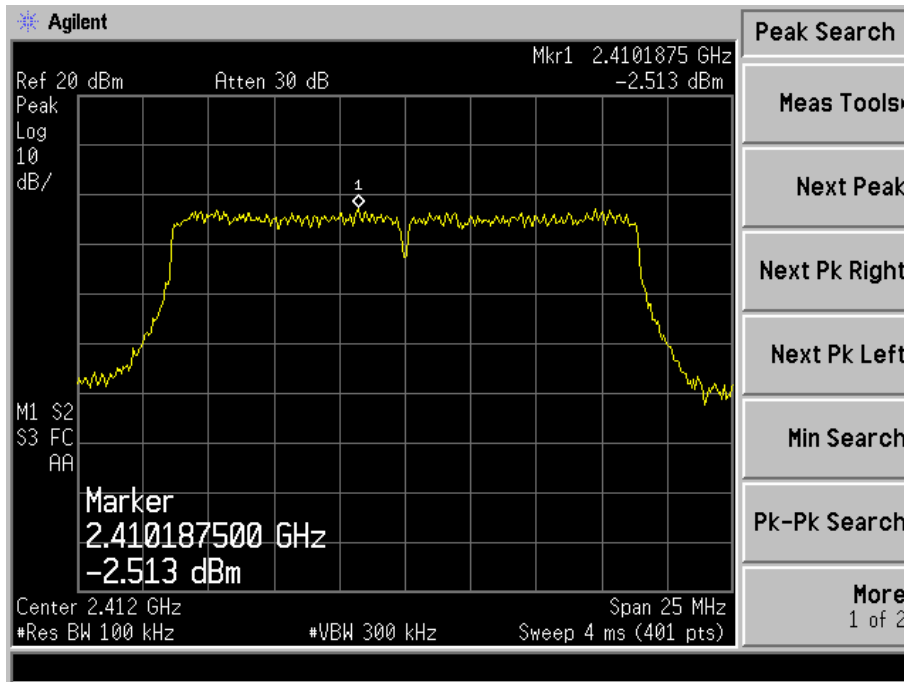
802.11g-Middle Channel



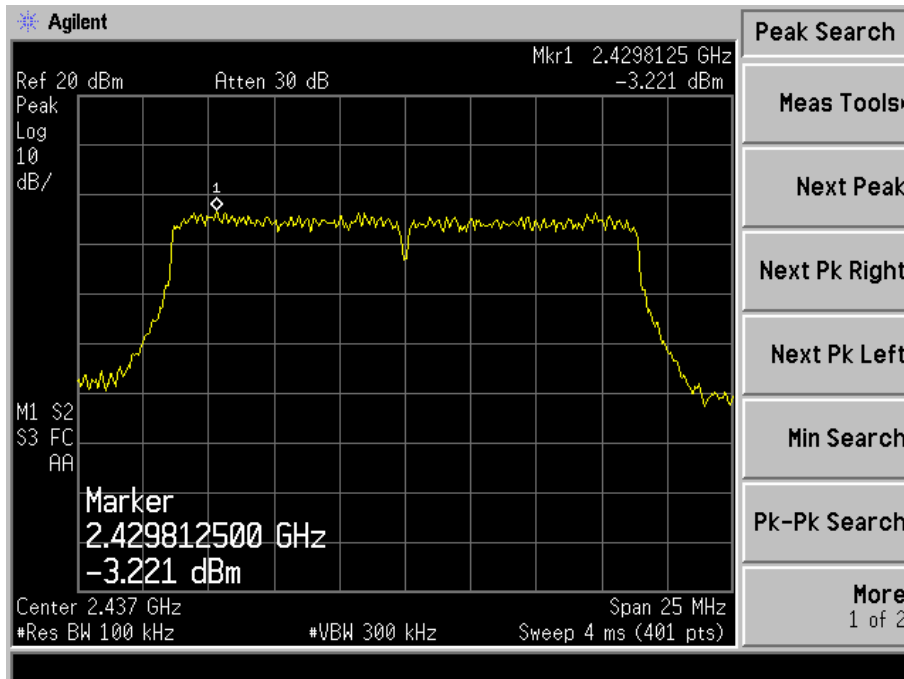
802.11g-High Channel



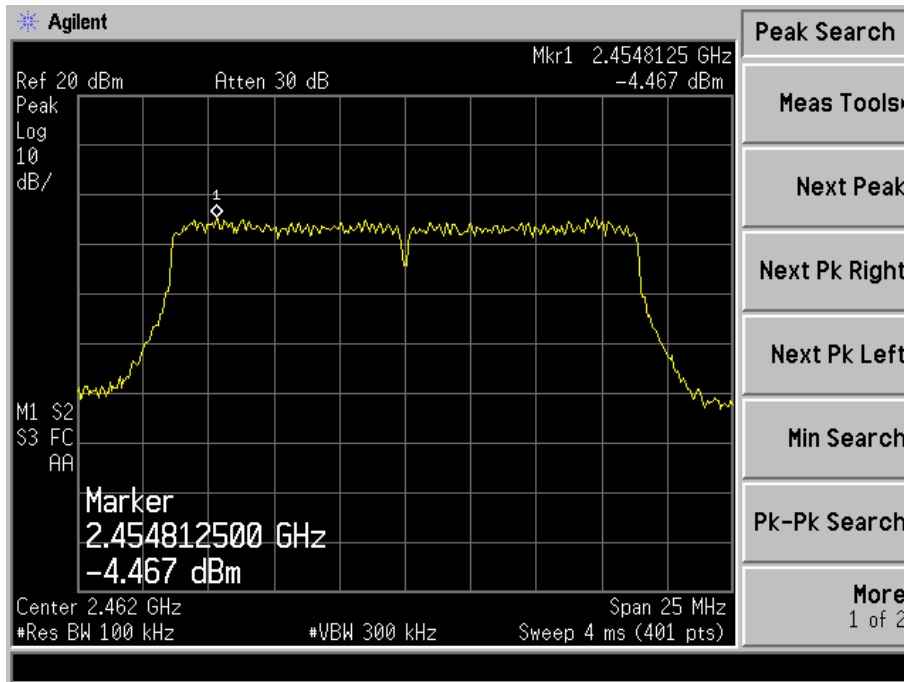
802.11n-HT20-Low Channel



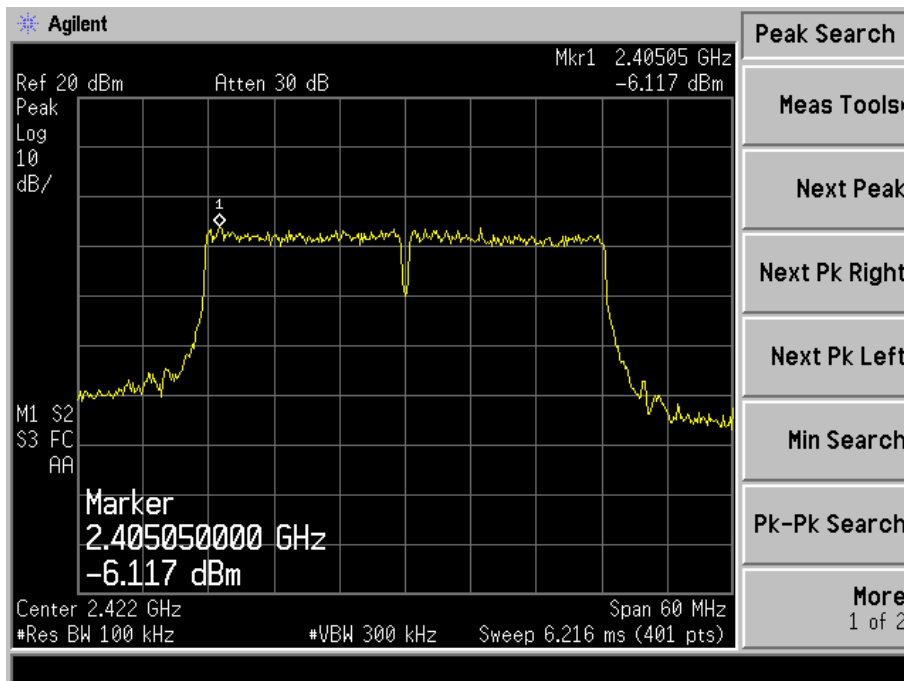
802.11n-HT20-Middle Channel



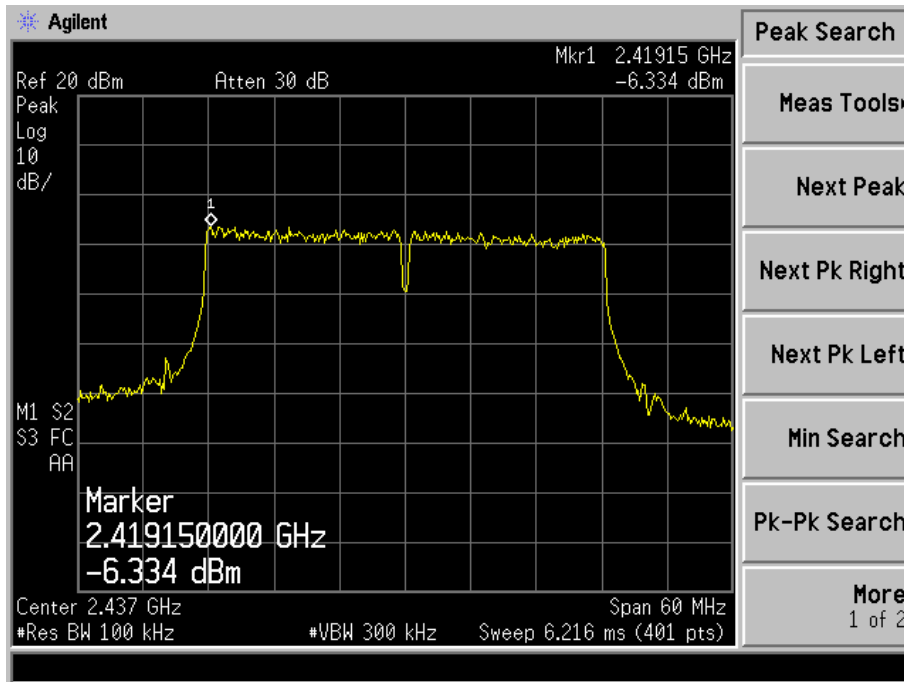
802.11n-HT20-High Channel



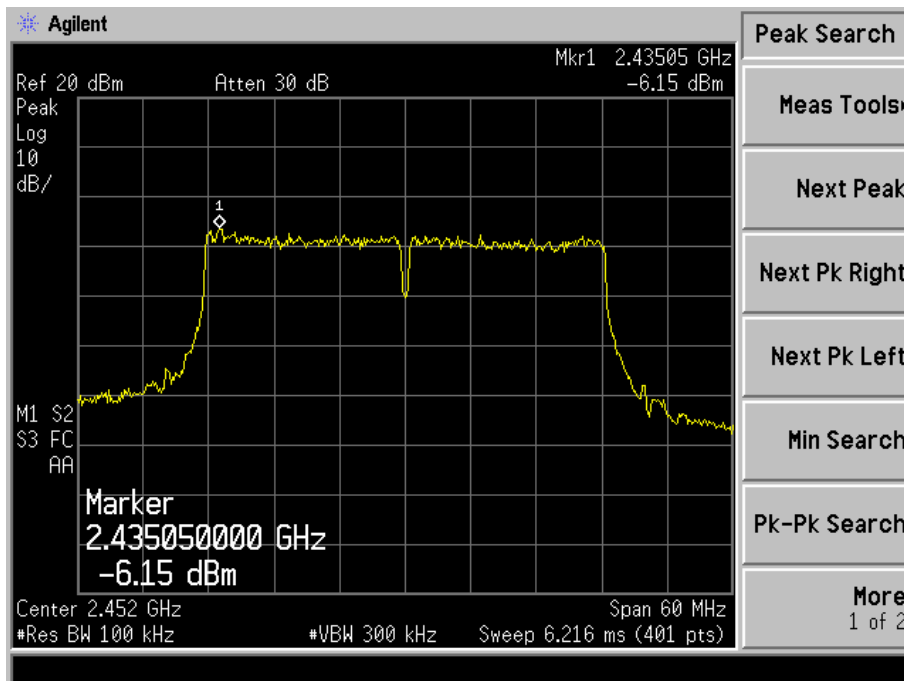
802.11n-HT40-Low Channel



802.11n-HT40-Middle Channel



802.11n-HT40-High Channel



6. 6dB Bandwidth

6.1 Standard Applicable

According to 15.247(a)(2). Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

6.2 Test 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

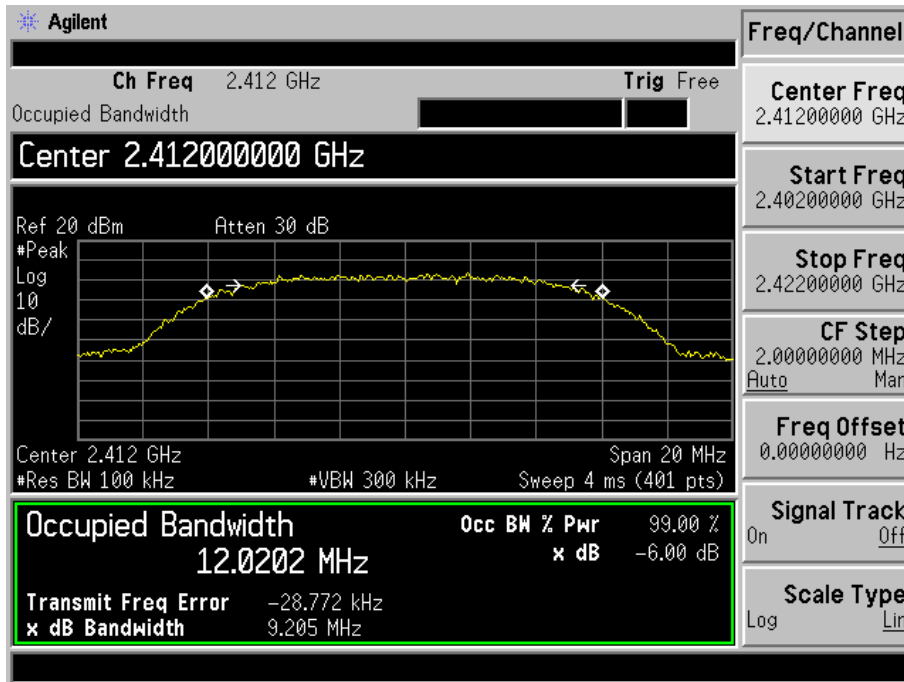
Temperature:	25° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.4 Summary of Test Results/Plots

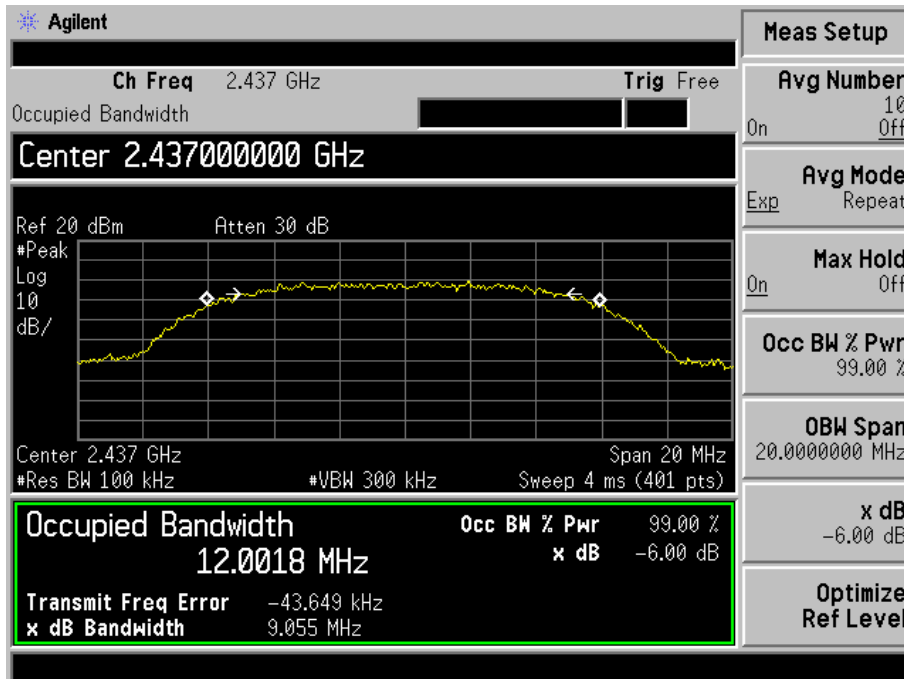
Test Mode	Test Channel MHz	6 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz
802.11b	2412	9205	12020.2	≥ 500
	2437	9055	12001.8	≥ 500
	2462	9200	12027.5	≥ 500
802.11g	2412	16589	16486.9	≥ 500
	2437	16568	16473.4	≥ 500
	2462	16628	16496.7	≥ 500
802.11n-HT20	2412	17773	17585.4	≥ 500
	2437	17791	17574.5	≥ 500
	2462	17774	17593.5	≥ 500
802.11n-HT40	2422	36576	36171	≥ 500
	2437	36593	36168.5	≥ 500
	2452	36554	36162.8	≥ 500

Please refer to the following test plots:

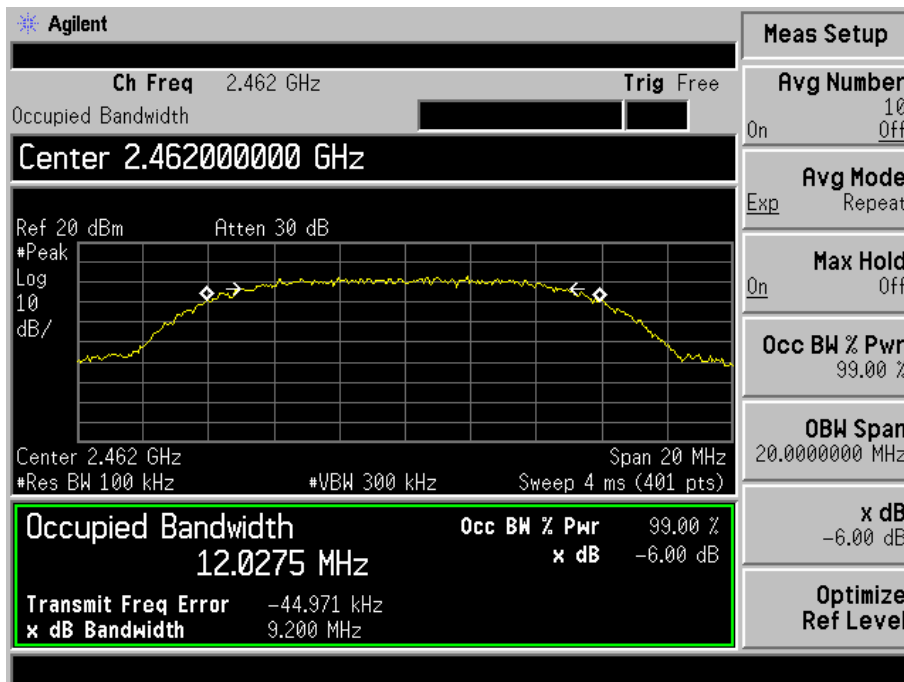
802.11b-Low Channel



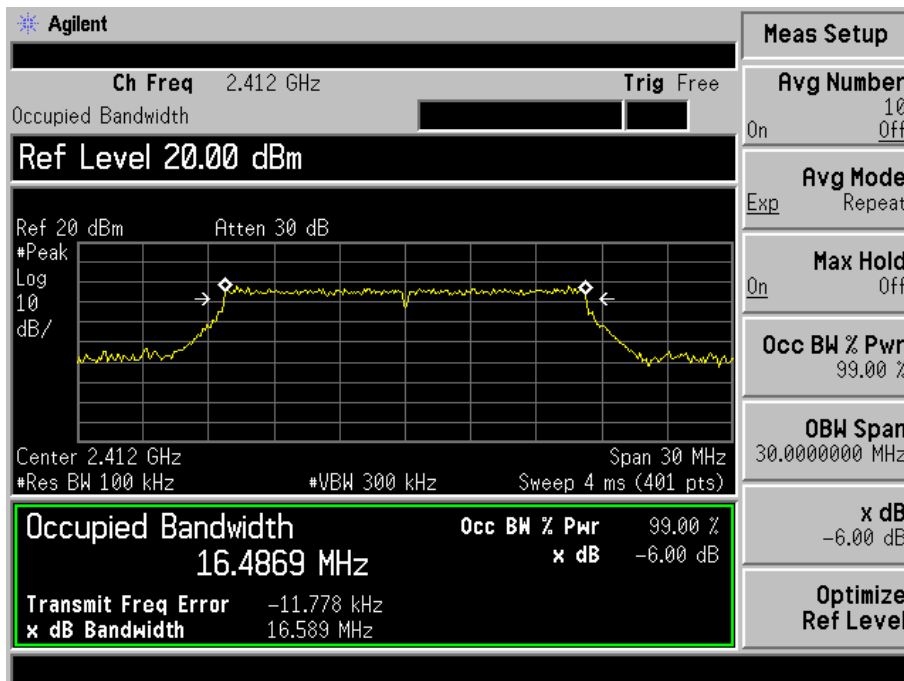
802.11b-Middle Channel



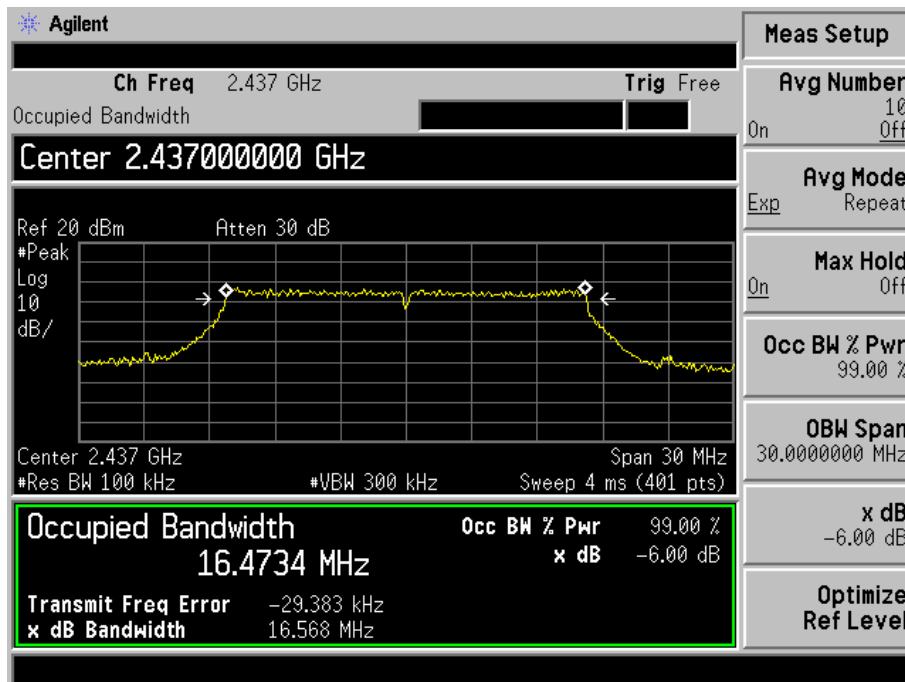
802.11b-High Channel



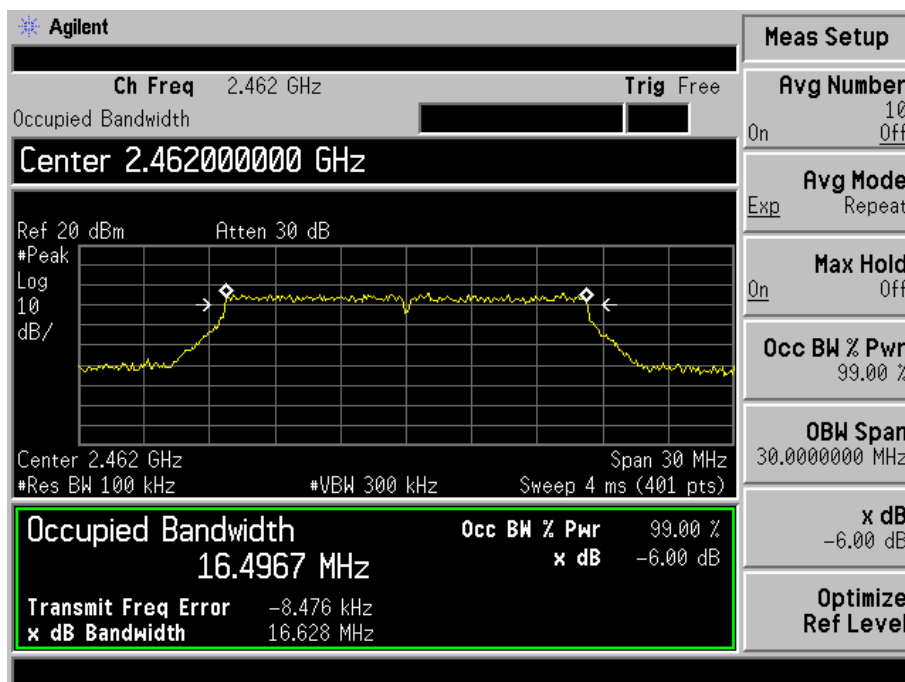
802.11g-Low Channel



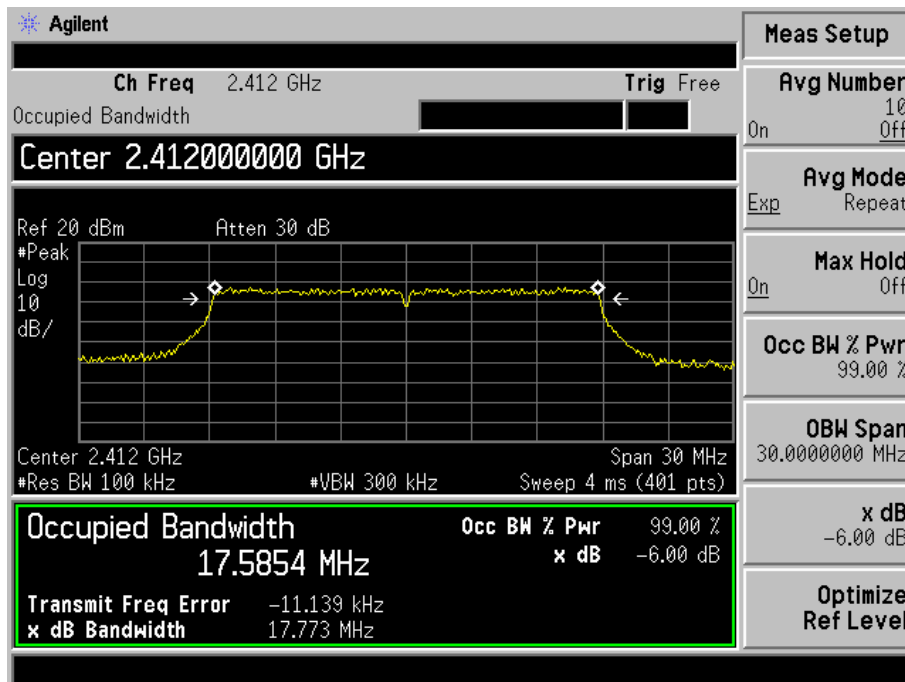
802.11g-Middle Channel



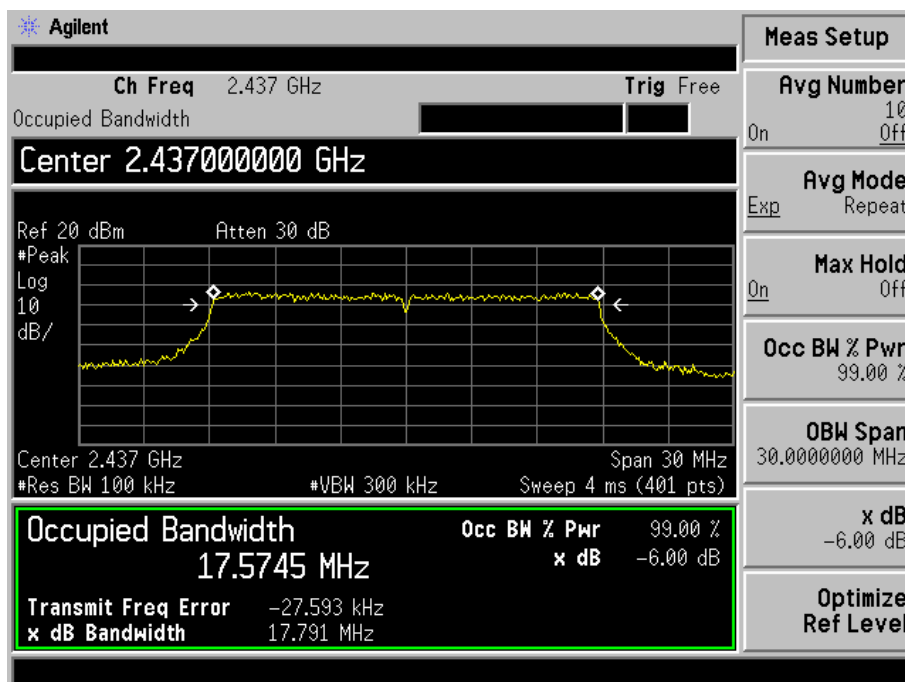
802.11g-High Channel



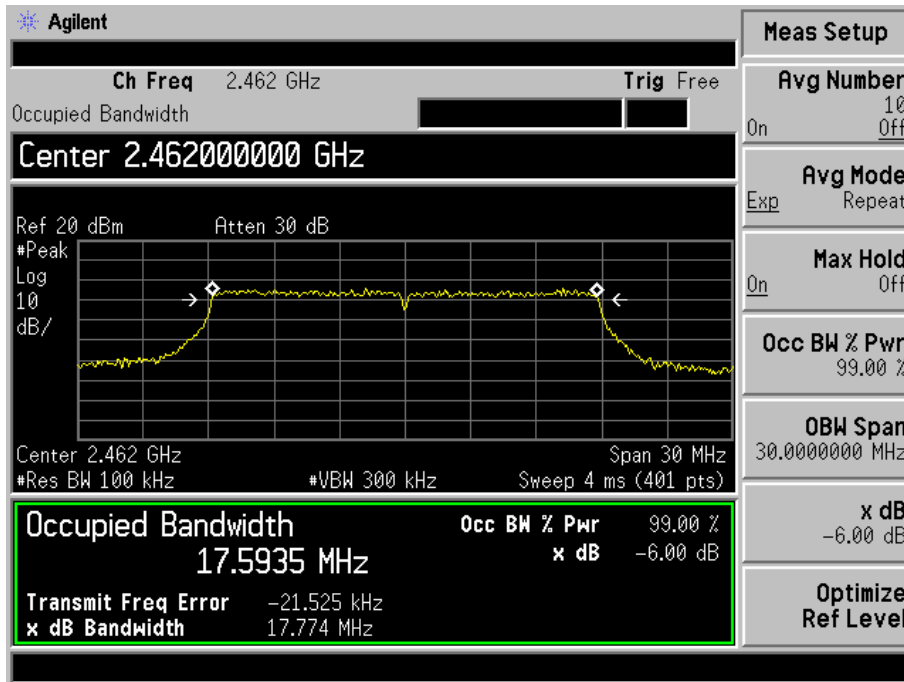
802.11n-HT20-Low Channel



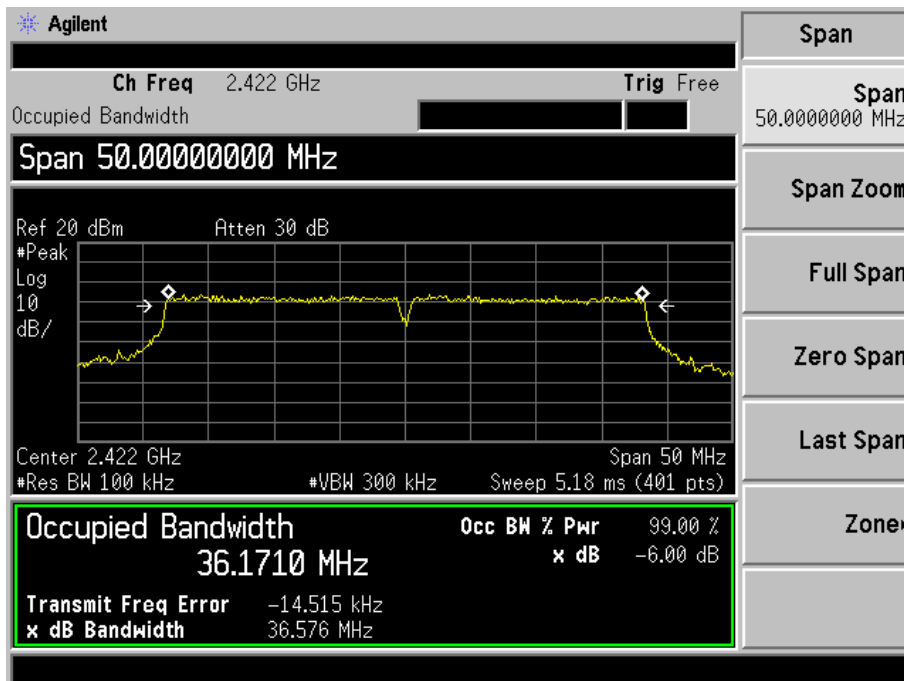
802.11n-HT20-Middle Channel



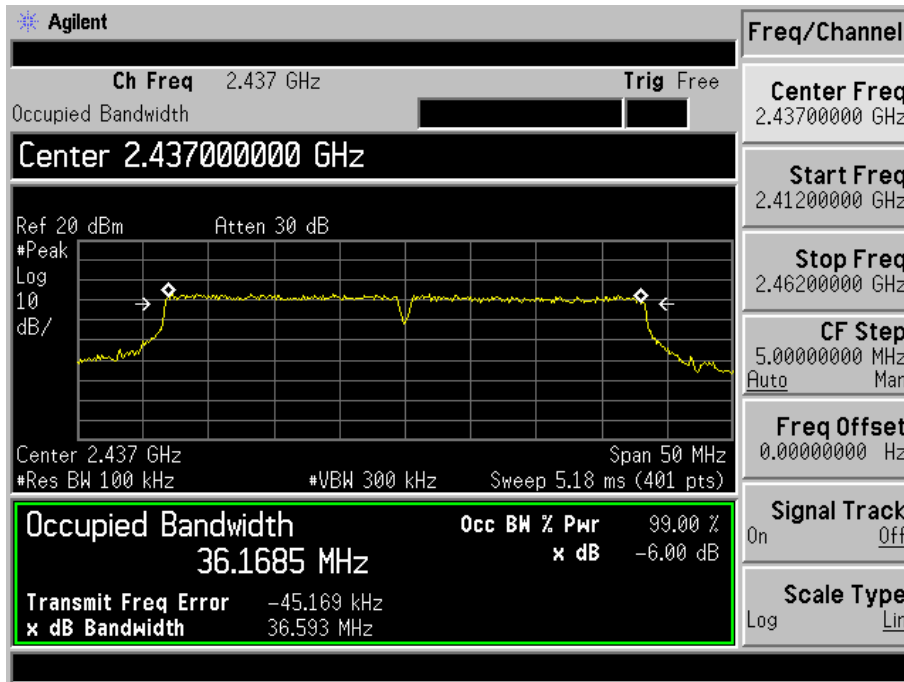
802.11n-HT20-High Channel



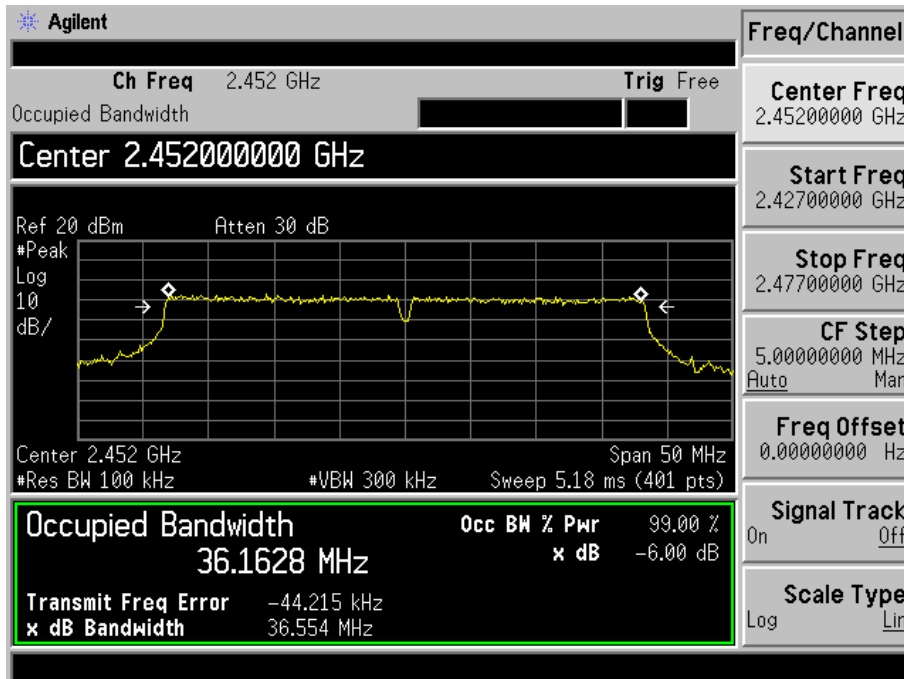
802.11n-HT40-Low Channel



802.11n-HT40-Middle Channel



802.11n-HT40-High Channel



7. RF Output Power

7.1 Standard Applicable

According to 15.247(b)(3). For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

7.2 Test Procedure

According to the KDB-558074 D01 v03r05, 9.2.2.2, 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	Reading dBm	Output Power mW	Limit mW
802.11b _ 11Mbps	2412	14.34	27.16	1000
	2437	13.52	22.49	1000
	2462	14.01	25.18	1000
802.11g_54Mbps	2412	13.29	21.33	1000
	2437	13.29	21.33	1000
	2462	14.01	25.18	1000
802.11n HT20_MCS7	2412	14.07	25.53	1000
	2437	13.67	23.28	1000
	2462	13.19	20.84	1000
802.11n HT40_MCS7	2422	13.27	21.23	1000
	2437	13.17	20.75	1000
	2452	13.15	20.65	1000

8. Field Strength of Spurious Emissions

8.1 Standard Applicable

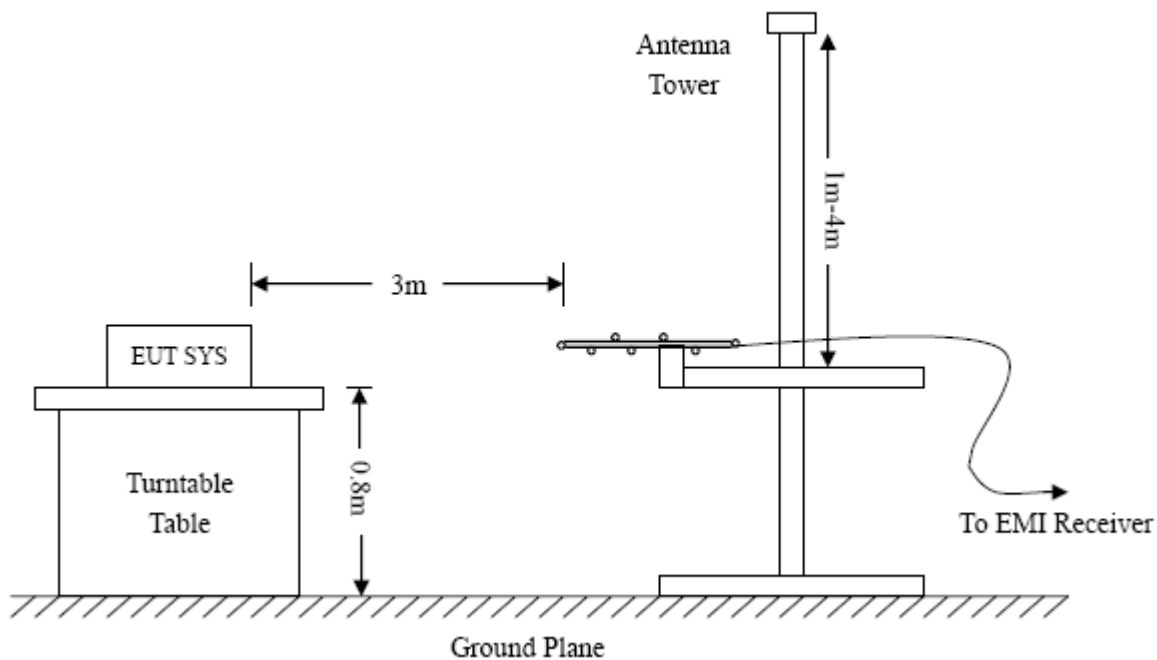
According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within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

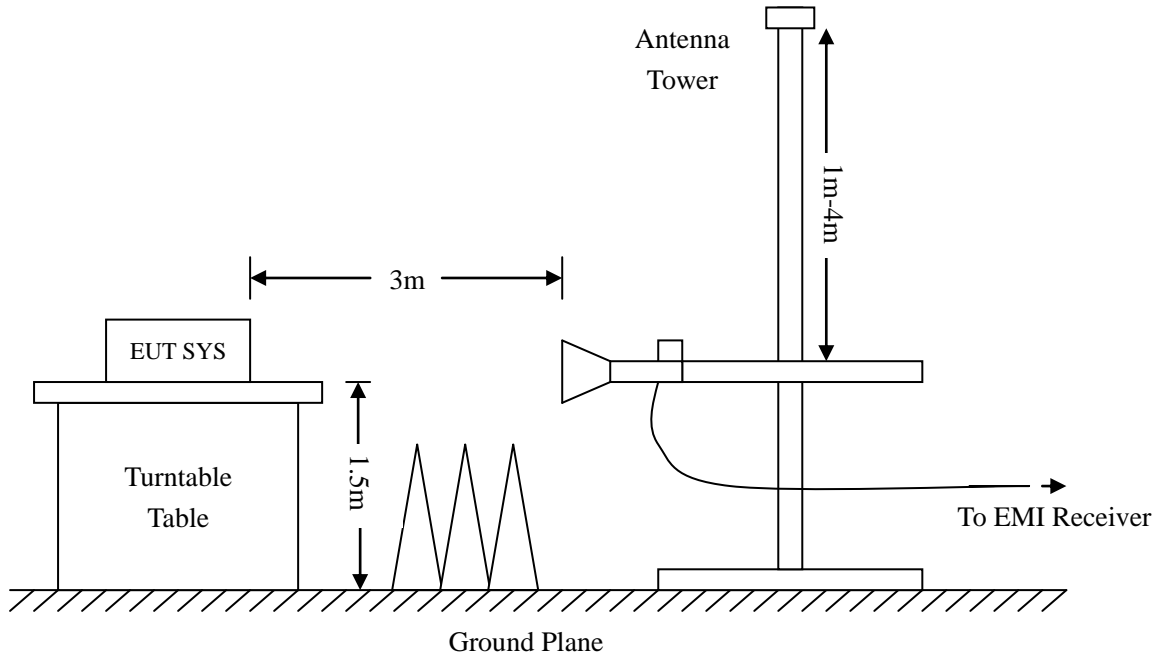
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

8.2 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

8.3 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:

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

8.4 Environmental Conditions

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

8.5 Summary of Test Results/Plots

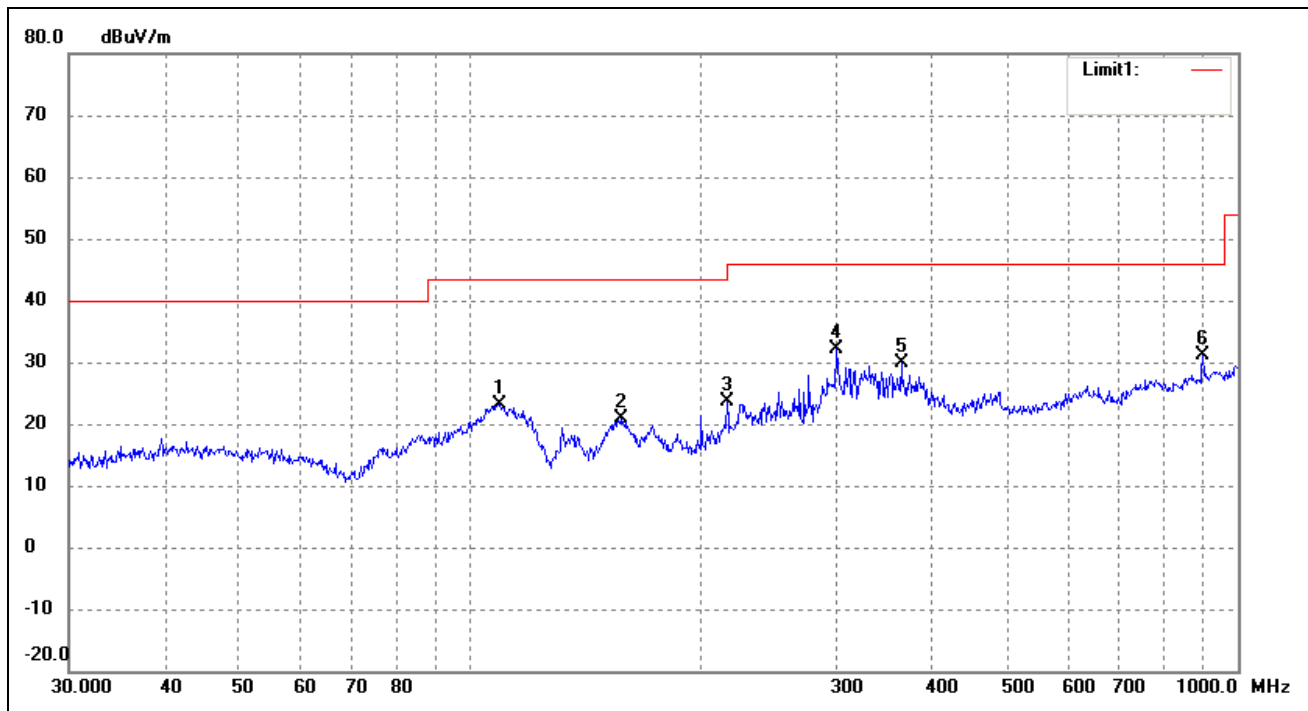
According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst cases:

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)

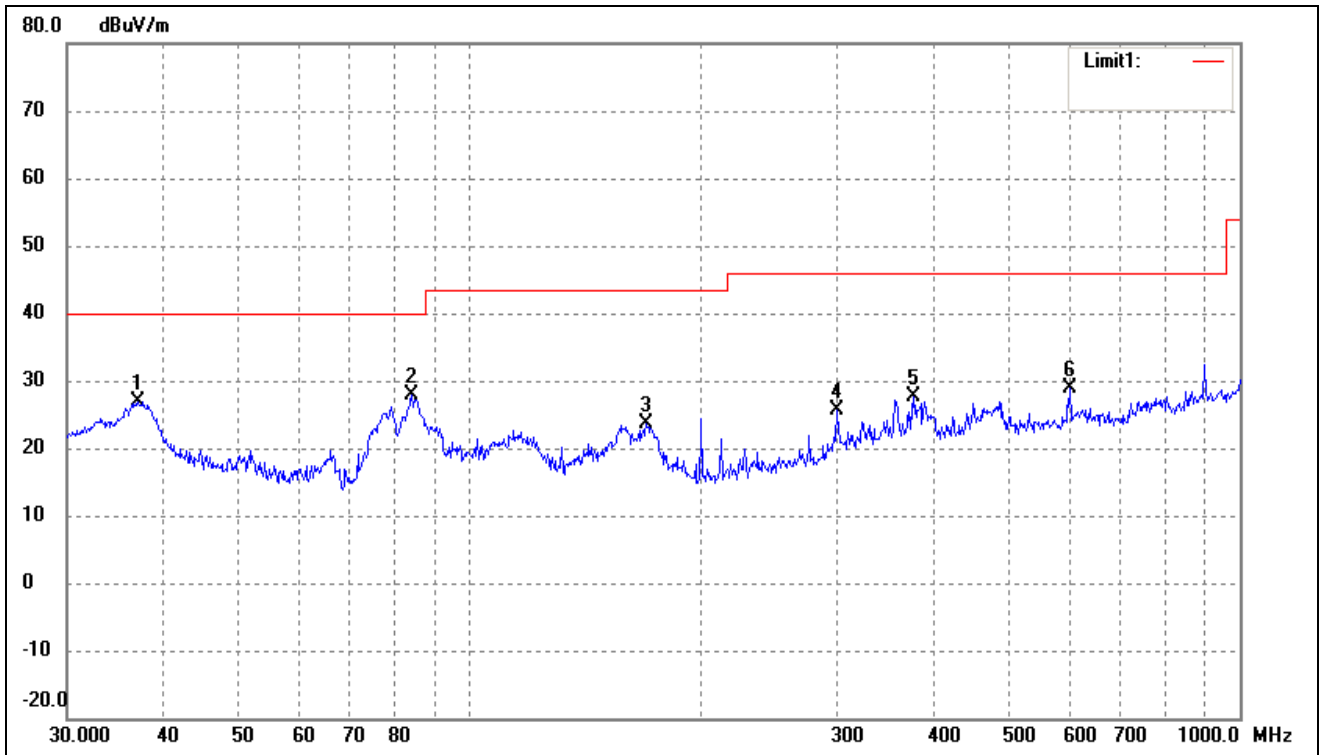
EUT: *WIFI Module*
 Tested Model: *WT31M2311A*
 Operating Condition: *802.11b Transmitting Low Channel-2412MHz*
 Comment: *AC 120V/60Hz; Connected to PC*

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	109.0286	34.33	-11.14	23.19	43.50	-20.31	180	150	peak
2	157.0074	33.29	-12.31	20.98	43.50	-22.52	180	150	peak
3	216.0240	32.52	-8.81	23.71	46.00	-22.29	180	150	peak
4	300.3673	37.84	-5.63	32.21	46.00	-13.79	180	150	peak
5	364.2595	32.76	-3.00	29.76	46.00	-16.24	180	150	peak
6	900.1474	27.90	3.15	31.05	46.00	-14.95	180	150	peak

Test Specification: Vertical

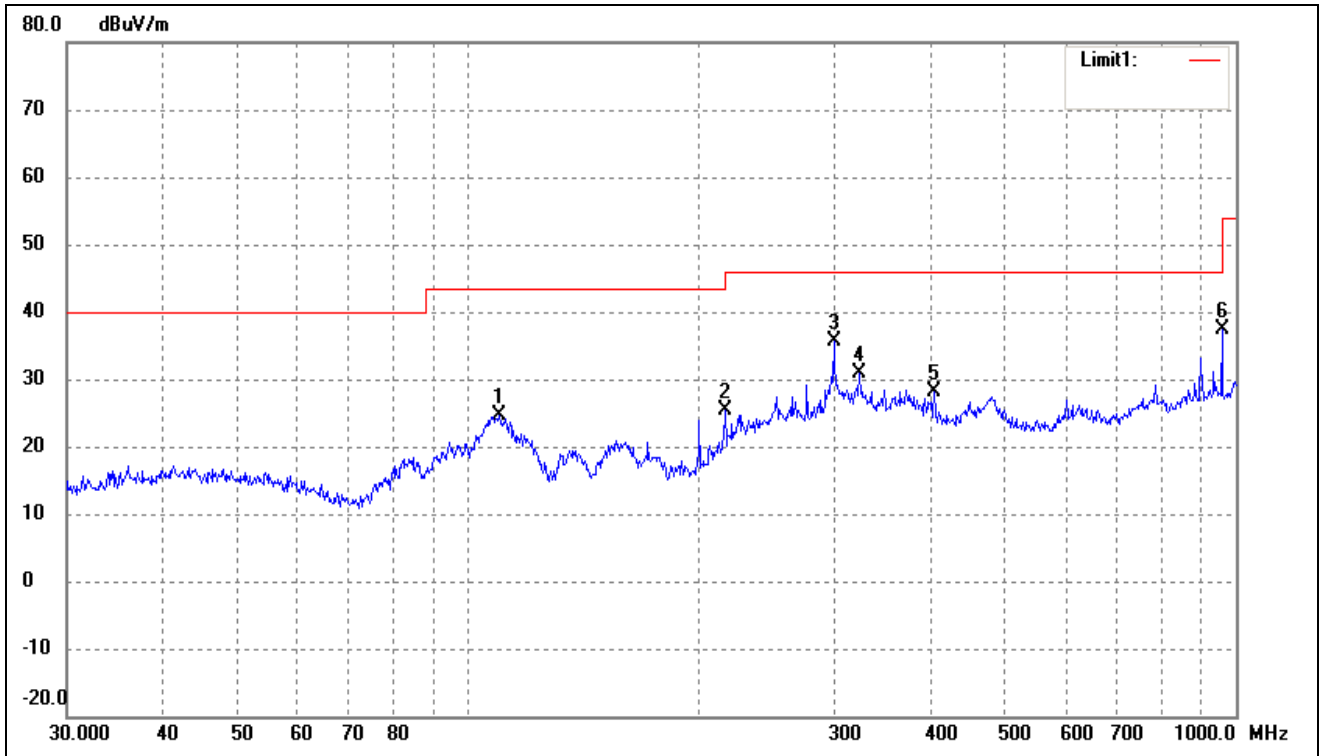


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.0249	35.45	-8.48	26.97	40.00	-13.03	114	100	peak
2	84.1100	40.25	-12.38	27.87	40.00	-12.13	270	100	peak
3	169.5990	35.42	-11.83	23.59	43.50	-19.91	360	100	peak
4	299.3158	31.20	-5.66	25.54	46.00	-20.46	114	100	peak
5	377.2591	29.92	-2.26	27.66	46.00	-18.34	270	100	peak
6	601.4265	28.98	-0.05	28.93	46.00	-17.07	360	100	peak

Operating Condition: 802.11b Transmitting Middle Channel-2437MHz

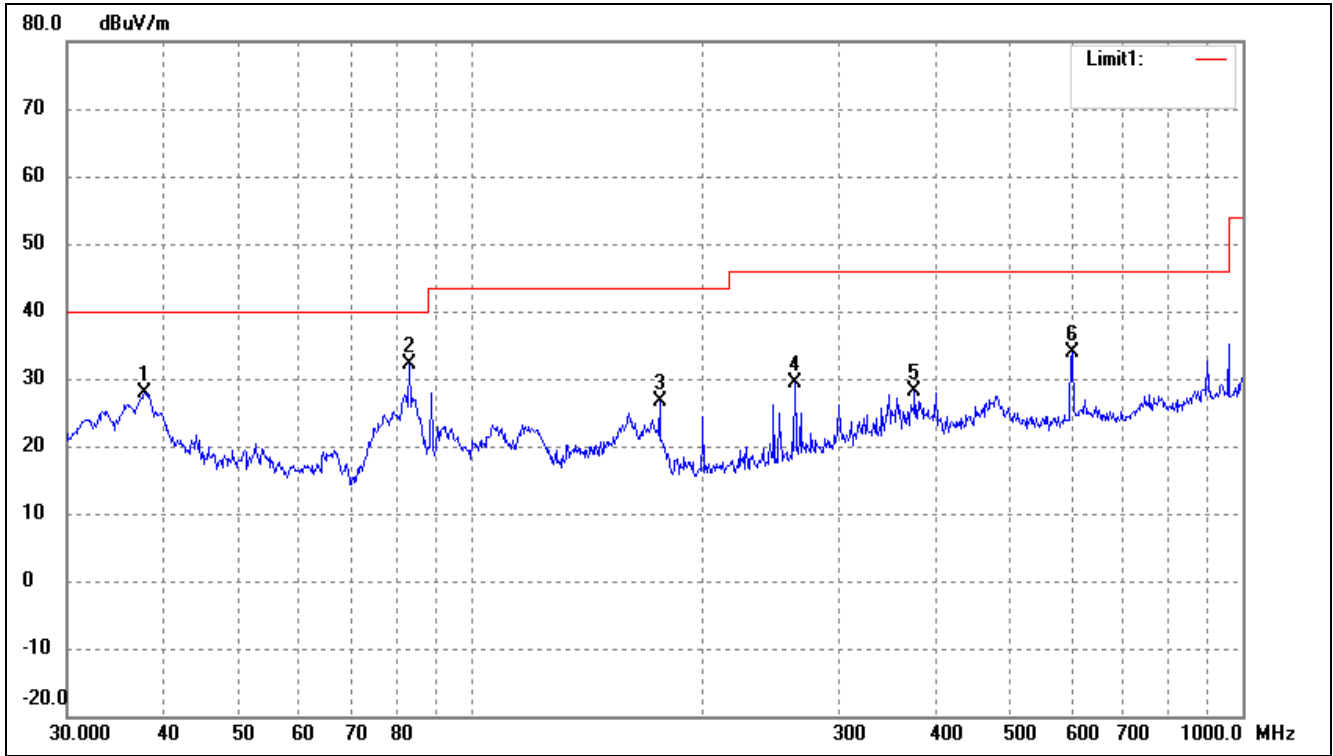
Comment: AC 120V/60Hz; Connected to PC

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	109.7960	35.82	-11.16	24.66	43.50	-18.84	360	150	peak
2	216.0240	34.18	-8.81	25.37	46.00	-20.63	360	150	peak
3	299.3158	41.21	-5.66	35.55	46.00	-10.45	360	150	peak
4	323.3204	35.48	-4.68	30.80	46.00	-15.20	360	150	peak
5	404.6665	31.34	-3.23	28.11	46.00	-17.89	360	150	peak
6	958.7943	33.85	3.63	37.48	46.00	-8.52	360	150	peak

Test Specification: Vertical

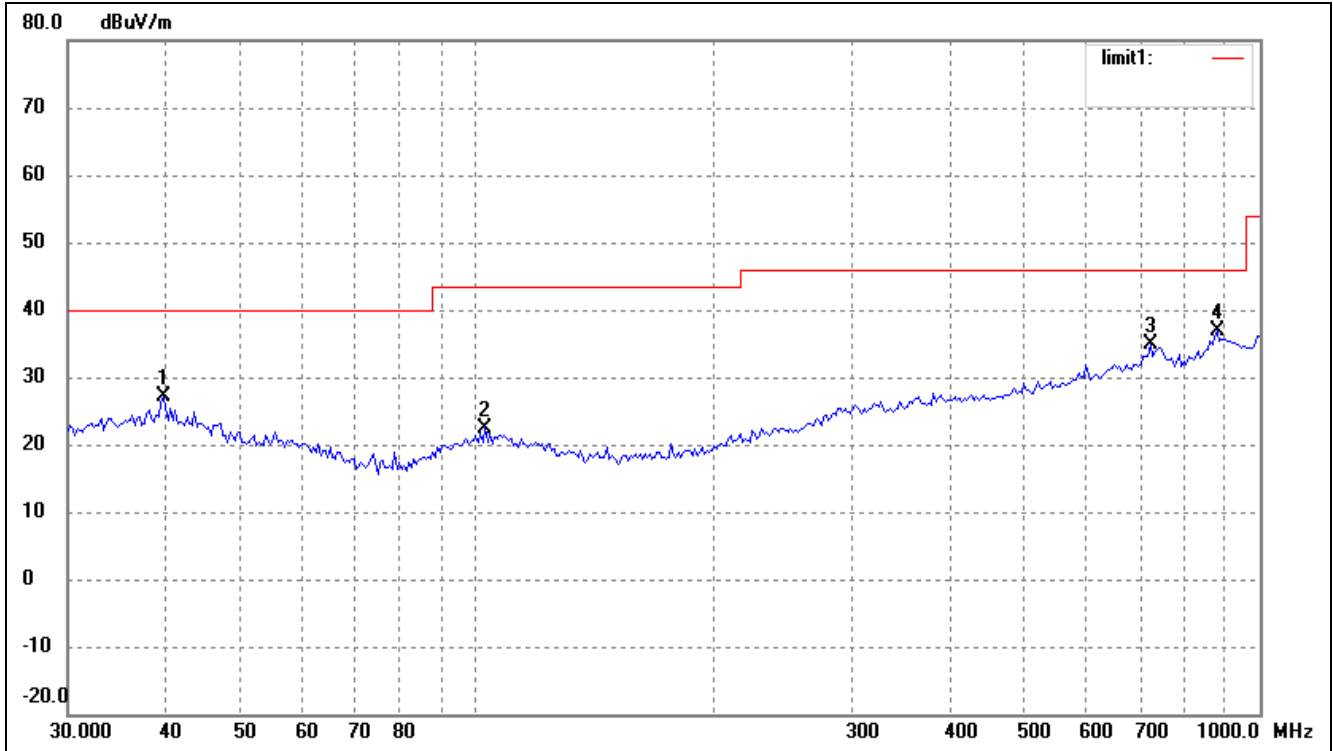


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.8121	36.24	-8.26	27.98	40.00	-12.02	360	100	peak
2	83.2298	44.52	-12.30	32.22	40.00	-7.78	360	100	peak
3	175.6516	38.17	-11.56	26.61	43.50	-16.89	360	100	peak
4	262.8955	36.16	-6.83	29.33	46.00	-16.67	360	100	peak
5	375.9385	30.55	-2.33	28.22	46.00	-17.78	360	100	peak
6	601.4265	33.89	-0.05	33.84	46.00	-12.16	360	100	peak

Operating Condition: 802.11b Transmitting High Channel-2462MHz

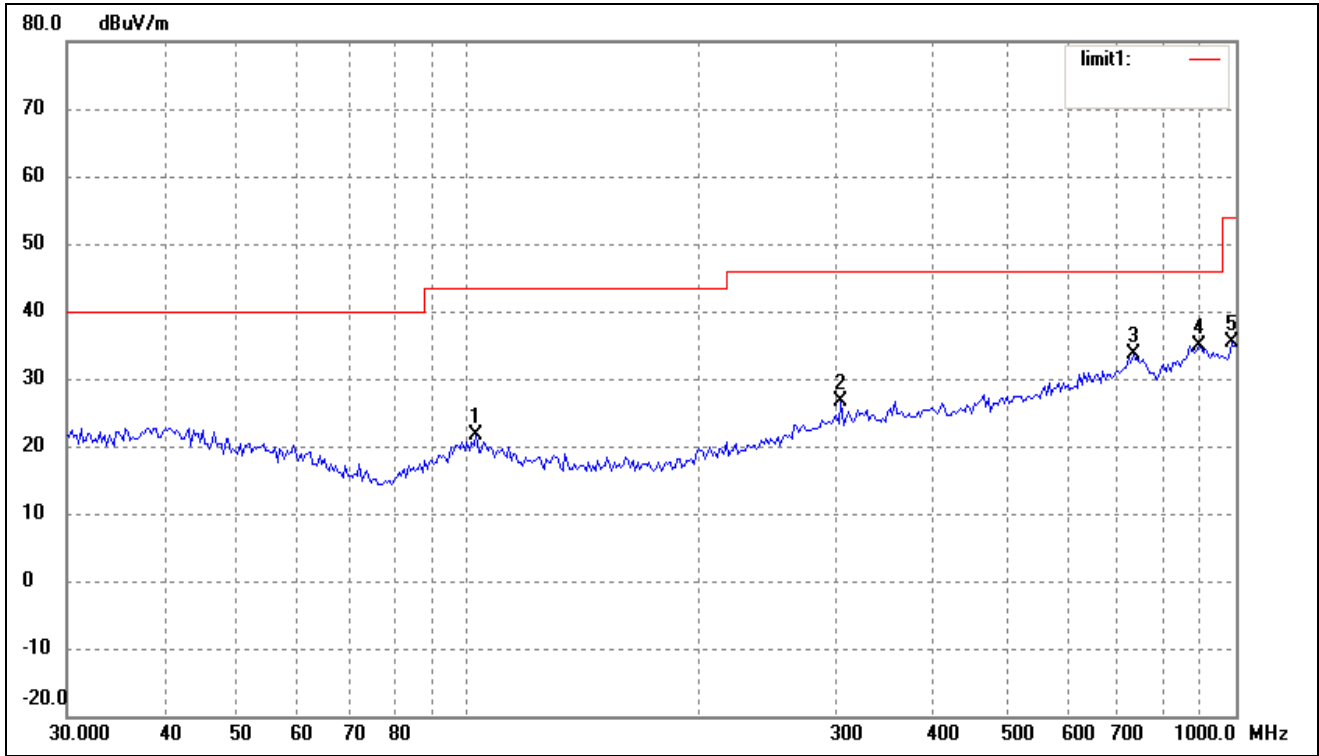
Comment: AC 120V/60Hz; Connected to PC

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	39.7147	17.39	9.64	27.03	40.00	-12.97	360	100	peak
2	102.3597	15.89	6.61	22.50	43.50	-21.00	287	100	peak
3	724.2611	18.01	16.93	34.94	46.00	-11.06	168	100	peak
4	881.4067	17.84	19.03	36.87	46.00	-9.13	122	100	peak

Test Specification: Vertical

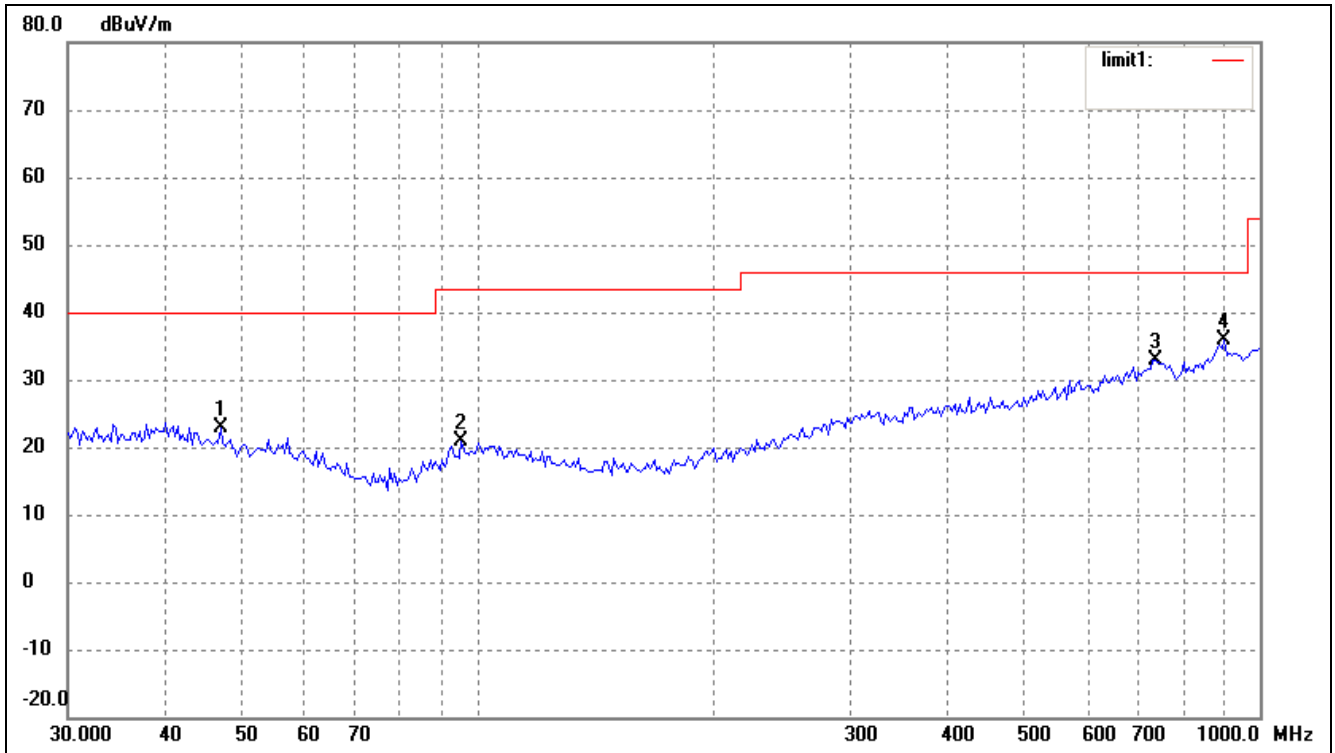


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	102.3597	15.01	6.61	21.62	43.50	-21.88	78	100	peak
2	305.6800	16.44	10.27	26.71	46.00	-19.29	136	100	peak
3	734.4913	15.93	17.68	33.61	46.00	-12.39	284	100	peak
4	893.8567	15.69	19.27	34.96	46.00	-11.04	60	100	peak
5	986.0717	16.20	19.17	35.37	54.00	-18.63	330	100	peak

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

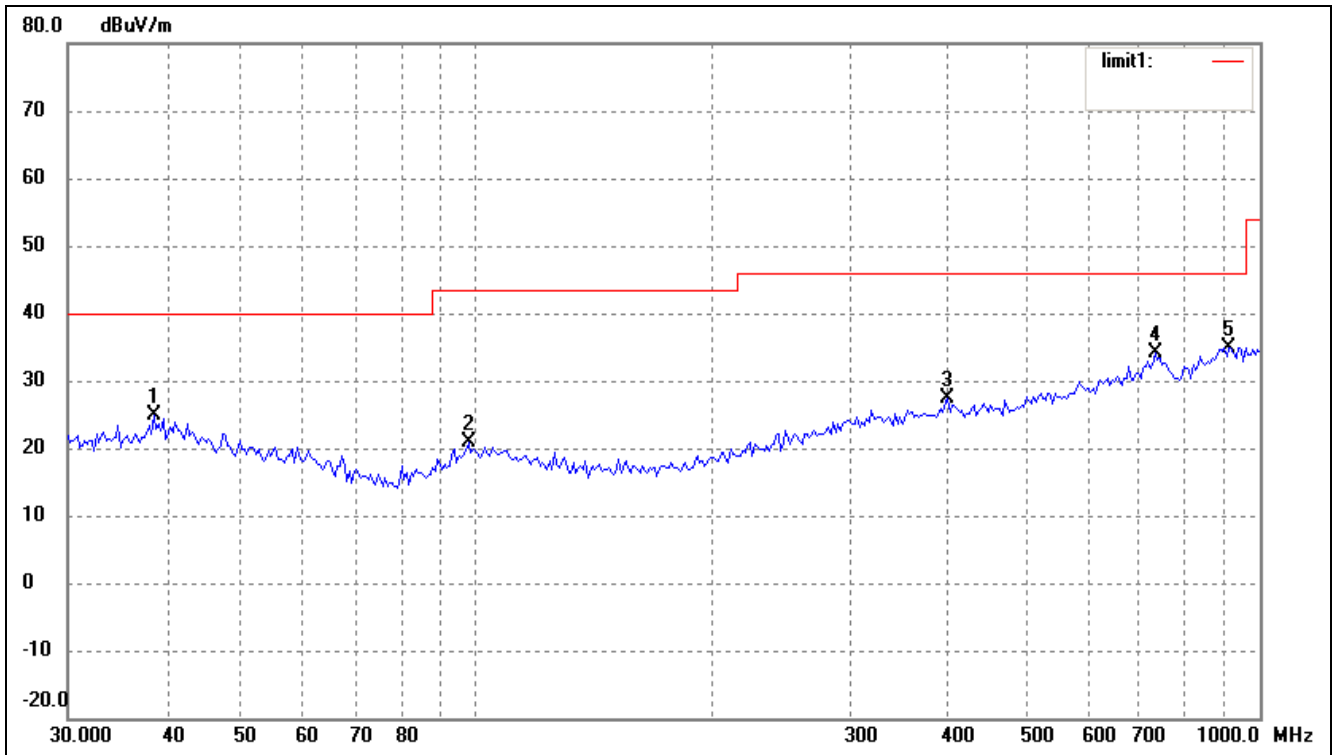
EUT: *WIFI Module*
 Tested Model: *WT31M2311A*
 Operating Condition: *802.11g Transmitting Low Channel-2412MHz*
 Comment: *AC 120V/60Hz; Connected to PC*

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	46.9948	15.43	7.54	22.97	40.00	-17.03	251	100	peak
2	95.4270	15.15	5.71	20.86	43.50	-22.64	167	100	peak
3	734.4913	15.18	17.68	32.86	46.00	-13.14	44	100	peak
4	900.1474	16.39	19.38	35.77	46.00	-10.23	130	100	peak

Test Specification: Vertical

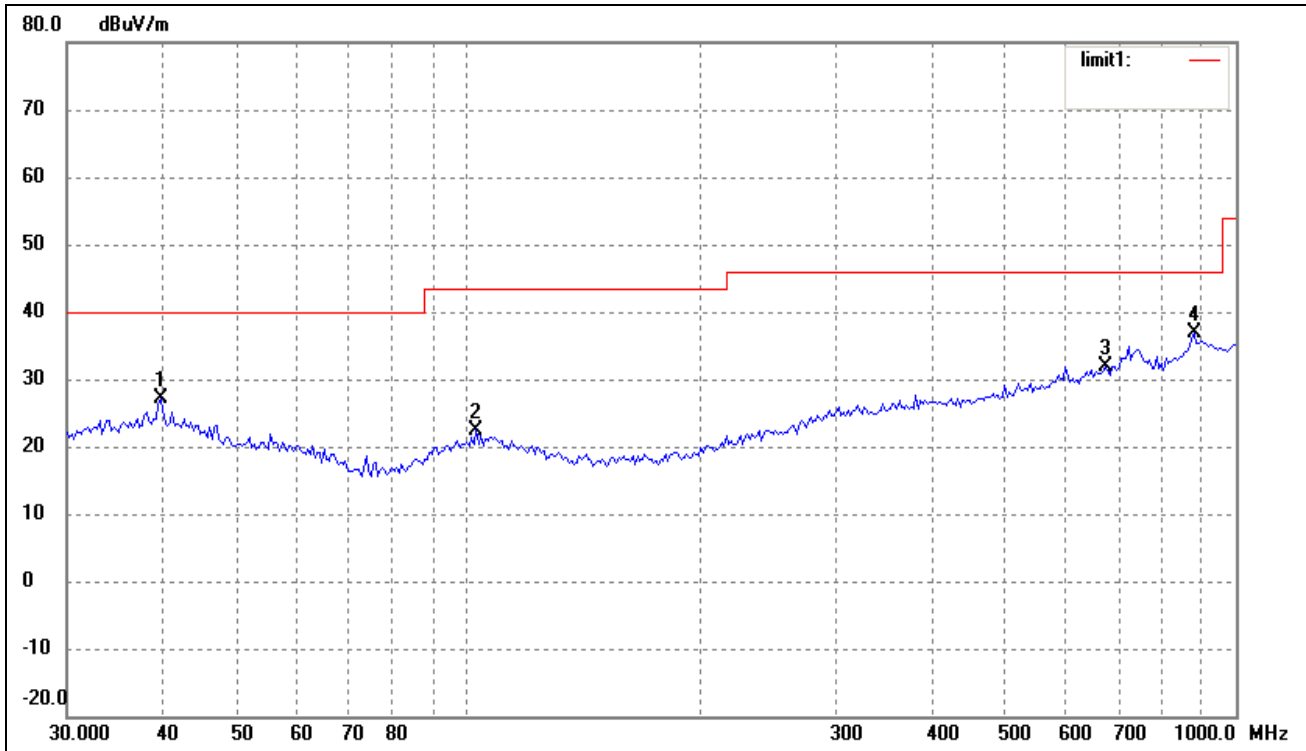


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	38.6161	15.30	9.46	24.76	40.00	-15.24	47	100	peak
2	97.4560	14.68	6.21	20.89	43.50	-22.61	264	100	peak
3	399.0302	15.85	11.50	27.35	46.00	-18.65	225	100	peak
4	734.4913	16.36	17.68	34.04	46.00	-11.96	180	100	peak
5	912.8620	15.86	18.93	34.79	46.00	-11.21	315	100	peak

Operating Condition: 802.11g Transmitting Middle Channel-2437MHz

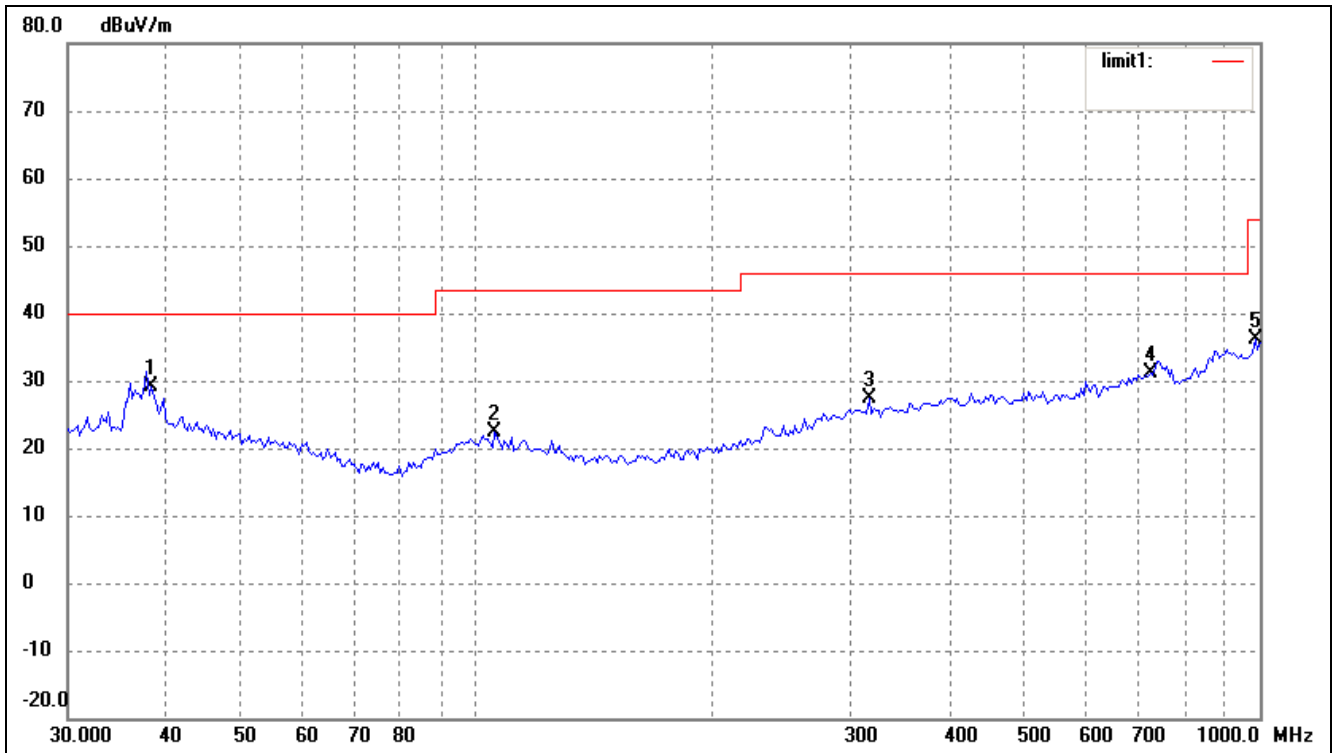
Comment: AC 120V/60Hz; Connected to PC

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	39.7147	17.39	9.64	27.03	40.00	-12.97	267	100	peak
2	102.3597	15.89	6.61	22.50	43.50	-21.00	114	200	peak
3	675.2080	16.60	15.36	31.96	46.00	-14.04	35	200	peak
4	881.4067	17.84	19.03	36.87	46.00	-9.13	81	100	peak

Test Specification: Vertical

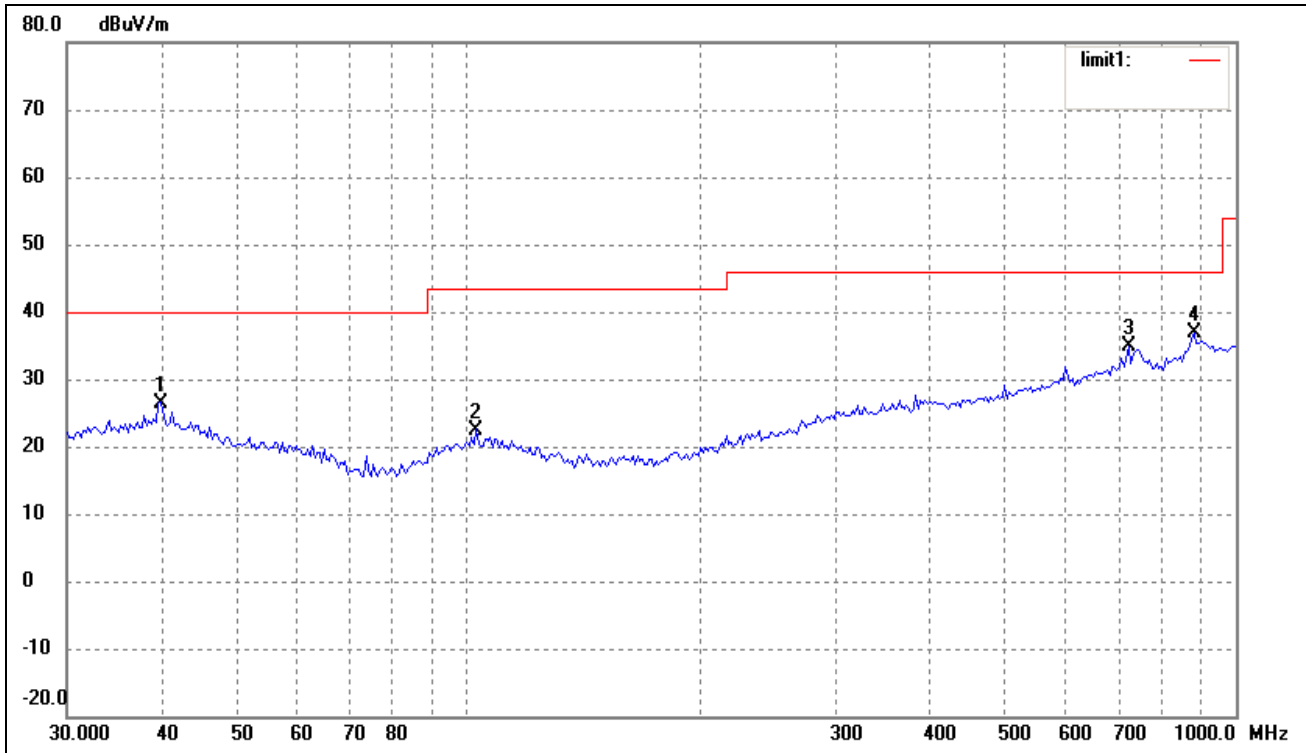


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	38.3462	19.59	9.42	29.01	40.00	-10.99	360	100	peak
2	105.2718	15.98	6.32	22.30	43.50	-21.20	258	100	peak
3	316.5890	16.84	10.44	27.28	46.00	-18.72	347	100	peak
4	724.2611	14.21	16.93	31.14	46.00	-14.86	270	100	peak
5	986.0717	16.86	19.17	36.03	54.00	-17.97	90	100	peak

Operating Condition: 802.11g Transmitting High Channel-2462MHz

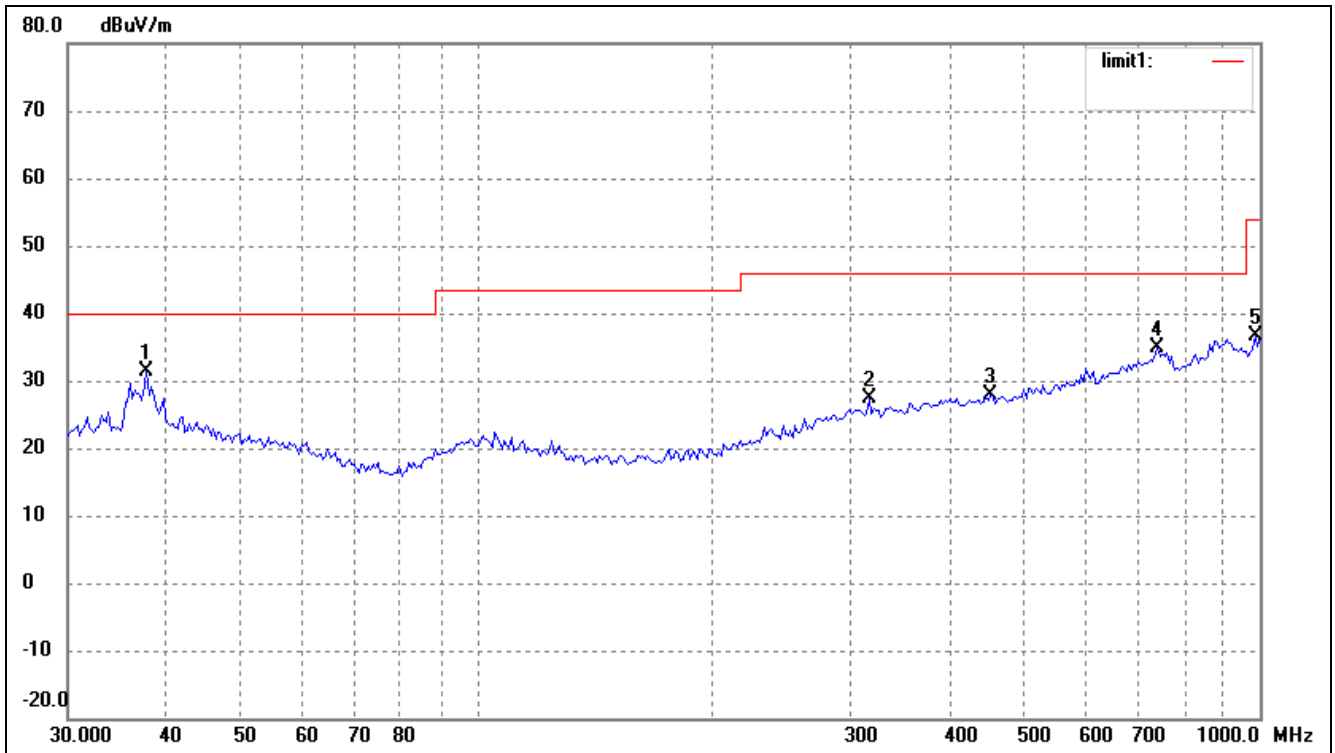
Comment: AC 120V/60Hz; Connected to PC

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	39.7147	16.86	9.64	26.50	40.00	-13.50	360	100	peak
2	102.3597	15.89	6.61	22.50	43.50	-21.00	112	100	peak
3	724.2611	18.01	16.93	34.94	46.00	-11.06	180	200	peak
4	881.4067	17.84	19.03	36.87	46.00	-9.13	270	200	peak

Test Specification: Vertical

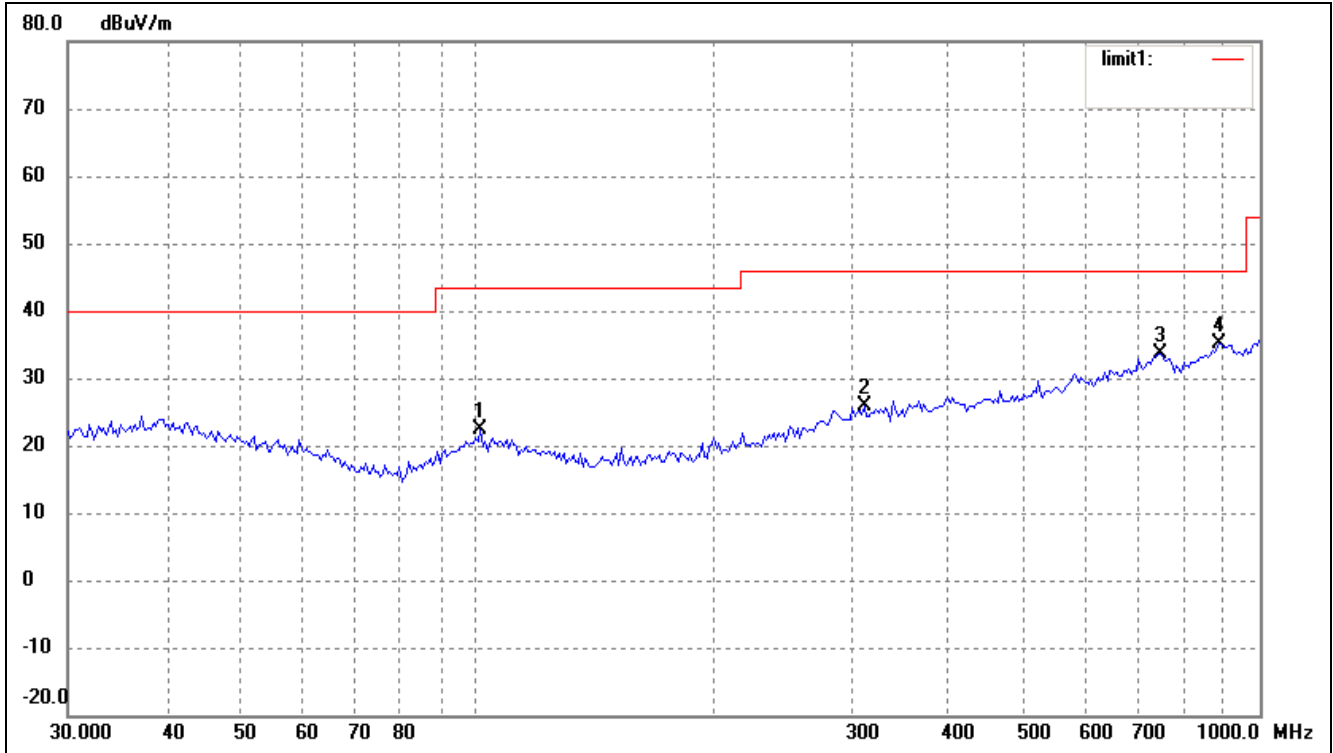


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.8121	21.98	9.33	31.31	40.00	-8.69	267	100	peak
2	316.5890	16.84	10.44	27.28	46.00	-18.72	116	100	peak
3	452.7197	16.27	11.58	27.85	46.00	-18.15	360	100	peak
4	739.6605	16.81	18.07	34.88	46.00	-11.12	228	100	peak
5	986.0717	17.36	19.17	36.53	54.00	-17.47	270	100	peak

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

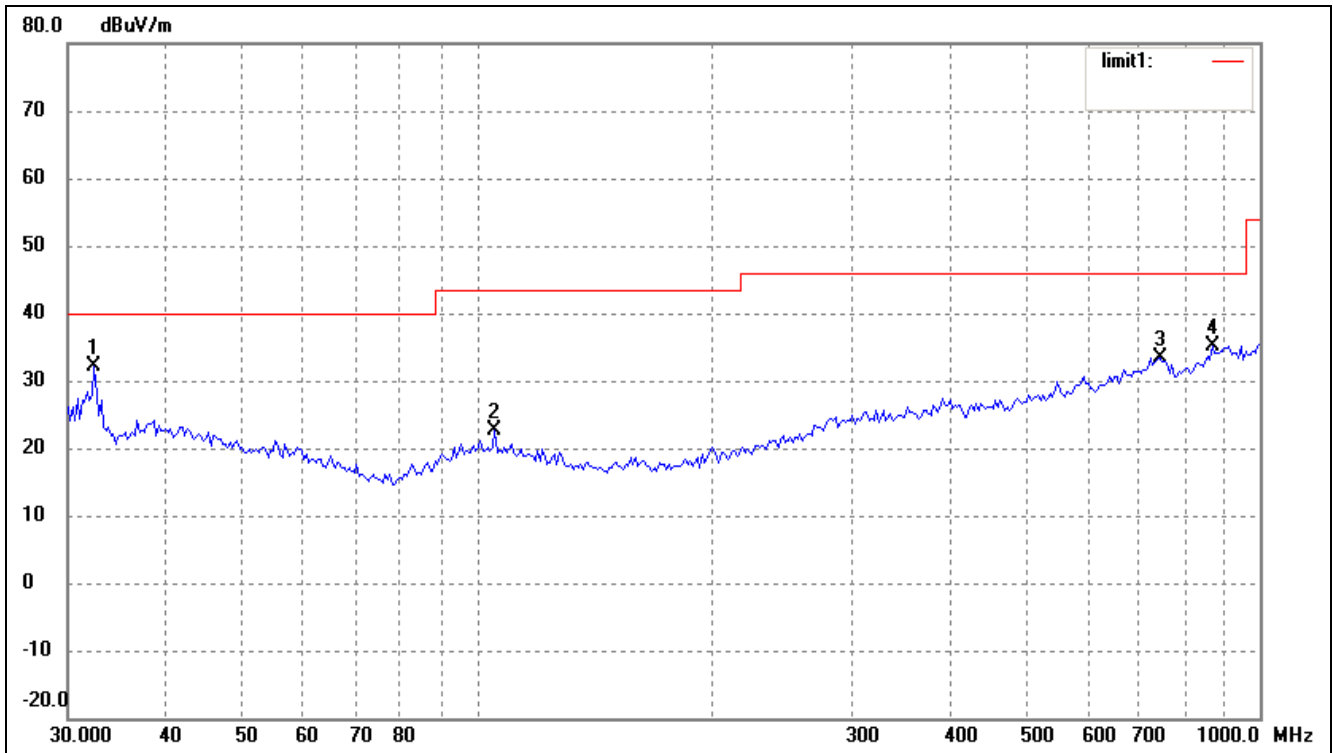
EUT: *WIFI Module*
 Tested Model: *WT31M2311A*
 Operating Condition: *802.11n-HT20 Transmitting Low Channel-2412MHz*
 Comment: *AC 120V/60Hz; Connected to PC*

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	100.9340	15.68	6.75	22.43	43.50	-21.07	274	100	peak
2	312.1794	15.59	10.36	25.95	46.00	-20.05	116	100	peak
3	744.8661	15.61	17.95	33.56	46.00	-12.44	82	100	peak
4	887.6099	15.93	19.15	35.08	46.00	-10.92	134	100	peak

Test Specification: Vertical

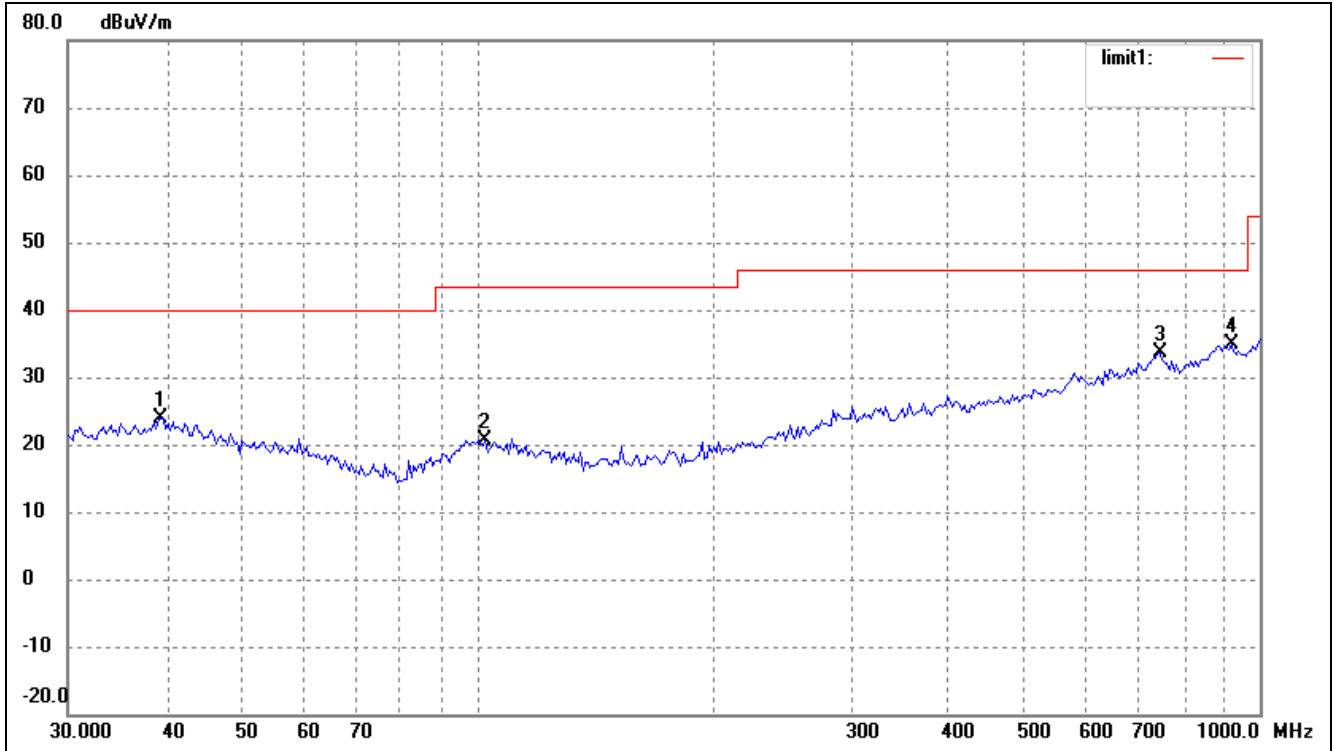


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	32.4059	23.69	8.44	32.13	40.00	-7.87	264	100	peak
2	105.2718	16.25	6.32	22.57	43.50	-20.93	110	100	peak
3	744.8661	15.46	17.95	33.41	46.00	-12.59	136	100	peak
4	869.1302	16.70	18.54	35.24	46.00	-10.76	90	100	peak

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

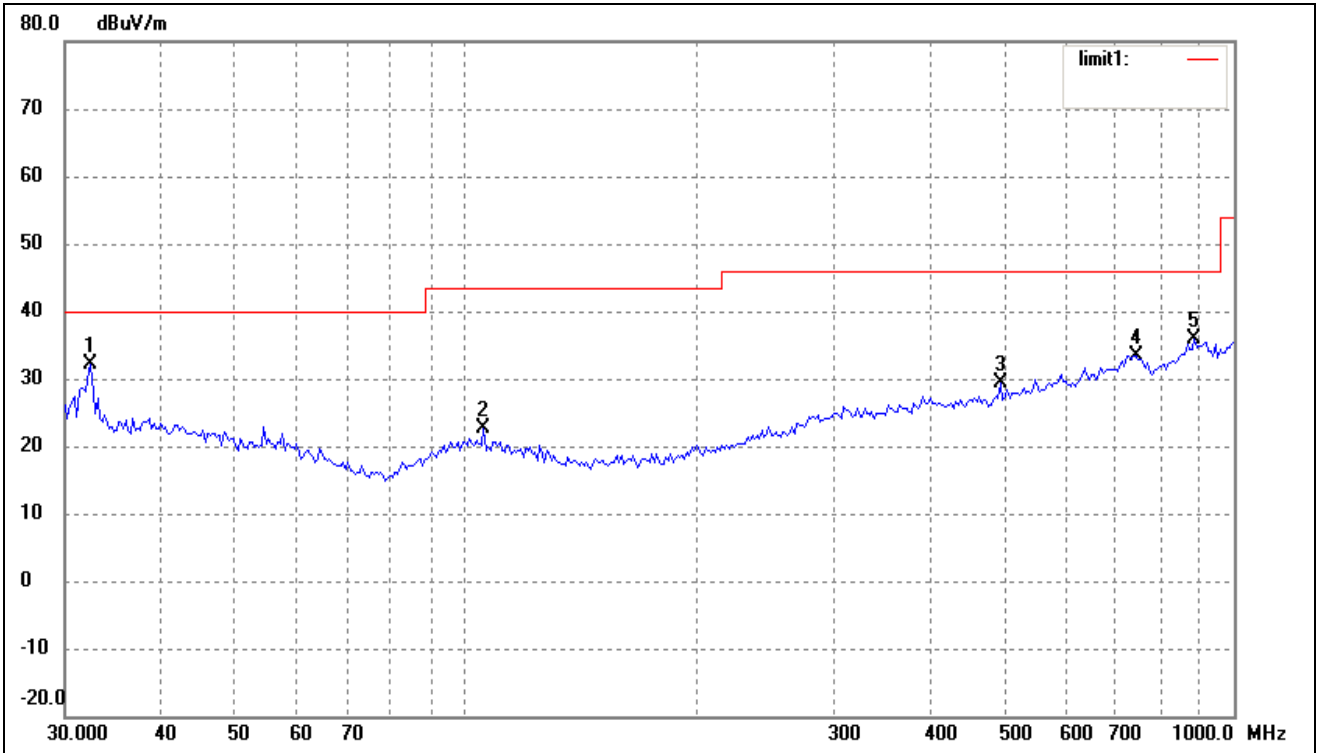
Comment: AC 120V/60Hz; Connected to PC

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	39.4372	14.37	9.60	23.97	40.00	-16.03	260	100	peak
2	102.3597	14.14	6.61	20.75	43.50	-22.75	131	200	peak
3	744.8661	15.61	17.95	33.56	46.00	-12.44	285	200	peak
4	919.2866	16.27	18.70	34.97	46.00	-11.03	224	100	peak

Test Specification: Vertical

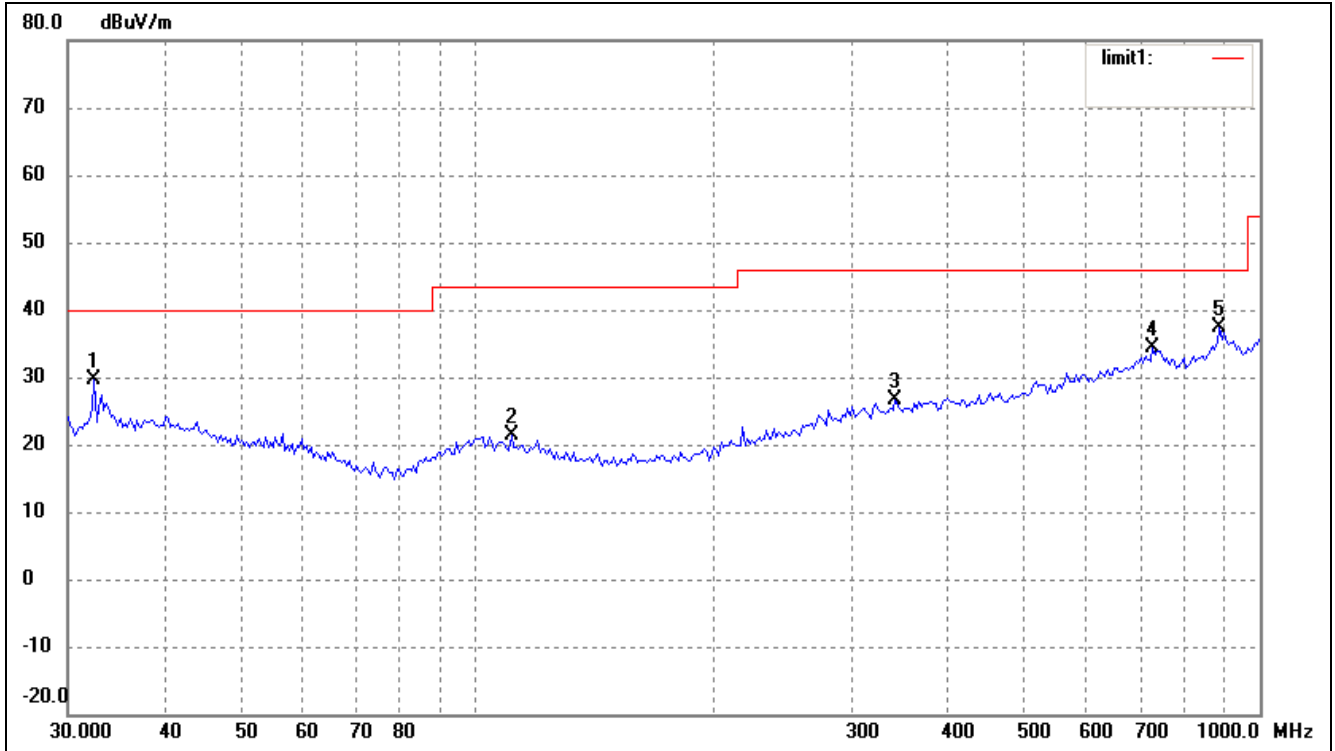


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	32.4059	23.69	8.44	32.13	40.00	-7.87	155	100	peak
2	105.2718	16.25	6.32	22.57	43.50	-20.93	197	100	peak
3	495.9344	17.25	12.04	29.29	46.00	-16.71	310	100	peak
4	744.8661	15.46	17.95	33.41	46.00	-12.59	229	100	peak
5	887.6099	16.71	19.15	35.86	46.00	-10.14	130	100	peak

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

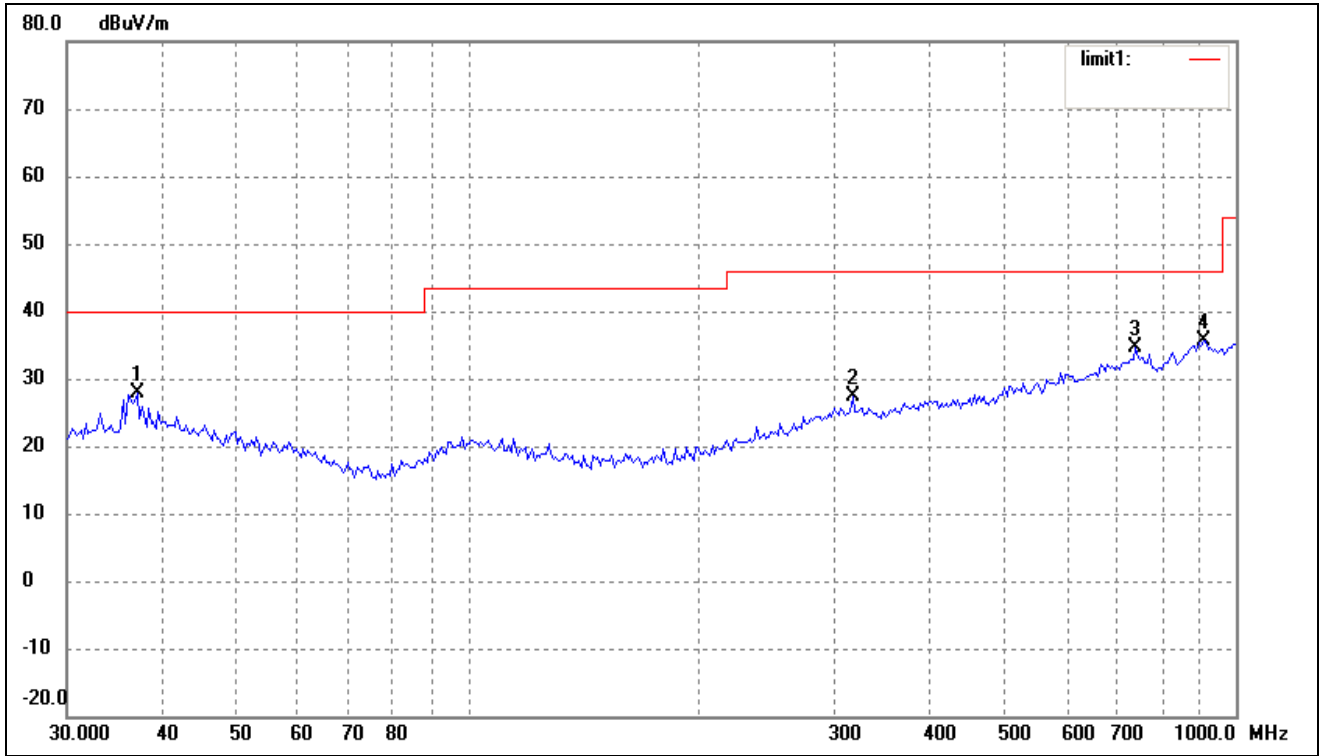
Comment: AC 120V/60Hz; Connected to PC

Test Specification: Horizontal



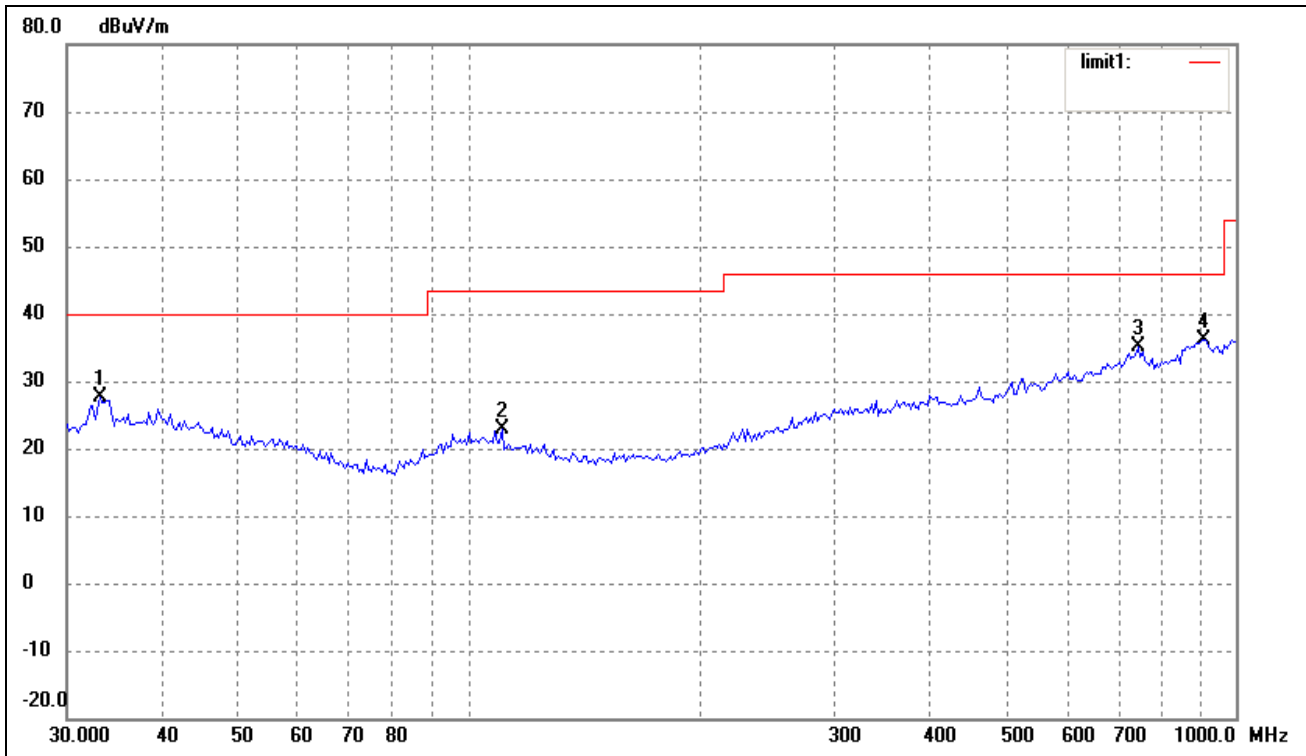
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	32.4059	21.23	8.44	29.67	40.00	-10.33	270	100	peak
2	110.5687	15.56	5.80	21.36	43.50	-22.14	164	100	peak
3	341.9787	16.40	10.16	26.56	46.00	-19.44	228	200	peak
4	729.3583	17.11	17.31	34.42	46.00	-11.58	130	200	peak
5	887.6099	18.21	19.15	37.36	46.00	-8.64	360	100	peak

Test Specification: Vertical



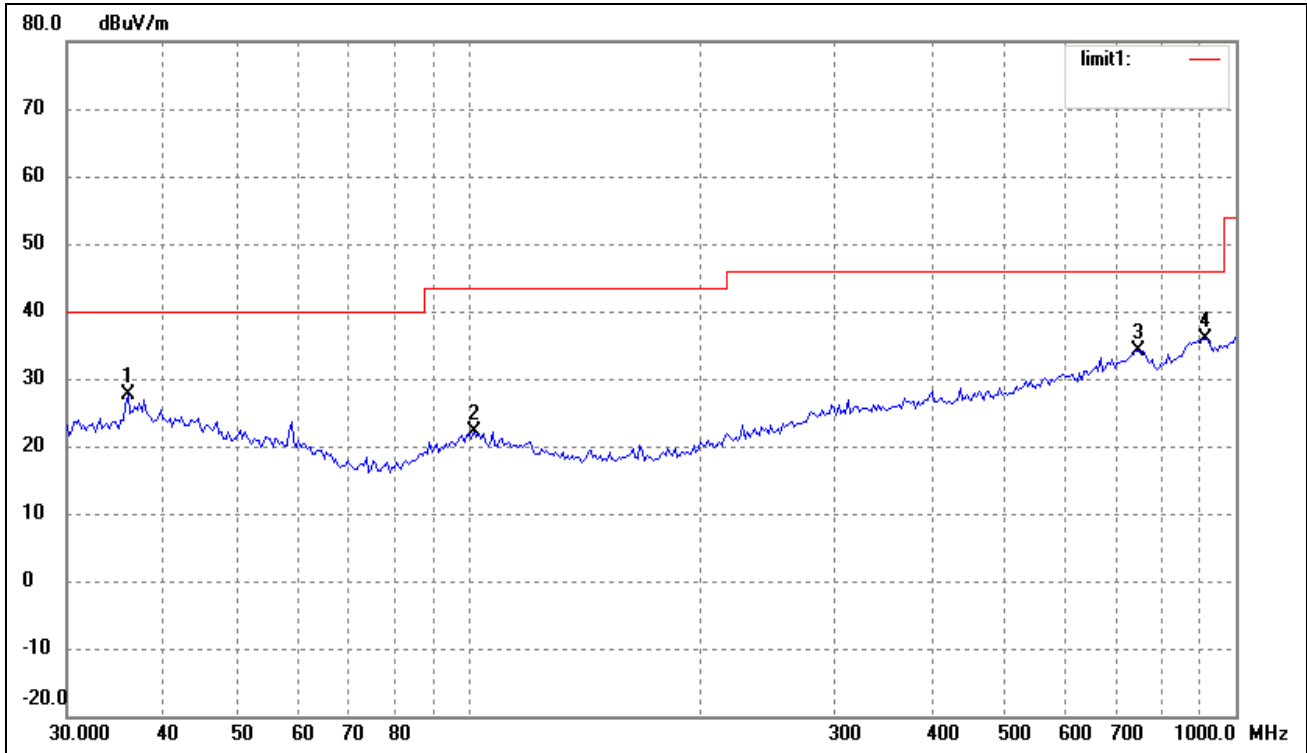
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.0249	18.59	9.21	27.80	40.00	-12.20	360	100	peak
2	316.5890	16.84	10.44	27.28	46.00	-18.72	255	100	peak
3	739.6605	16.54	18.07	34.61	46.00	-11.39	270	100	peak
4	906.4824	16.47	19.15	35.62	46.00	-10.38	180	100	peak

EUT: *WIFI Module*
 Tested Model: *WT31M2311A*
 Operating Condition: *802.11n-HT40 Transmitting Low Channel-2422MHz*
 Comment: *AC 120V/60Hz; Connected to PC*



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	19.05	8.56	27.61	40.00	-12.39	176	100	peak
2	110.5687	16.99	5.80	22.79	43.50	-20.71	255	100	peak
3	744.8661	17.06	17.95	35.01	46.00	-10.99	360	100	peak
4	906.4824	16.94	19.15	36.09	46.00	-9.91	178	100	peak

Test Specification: Vertical

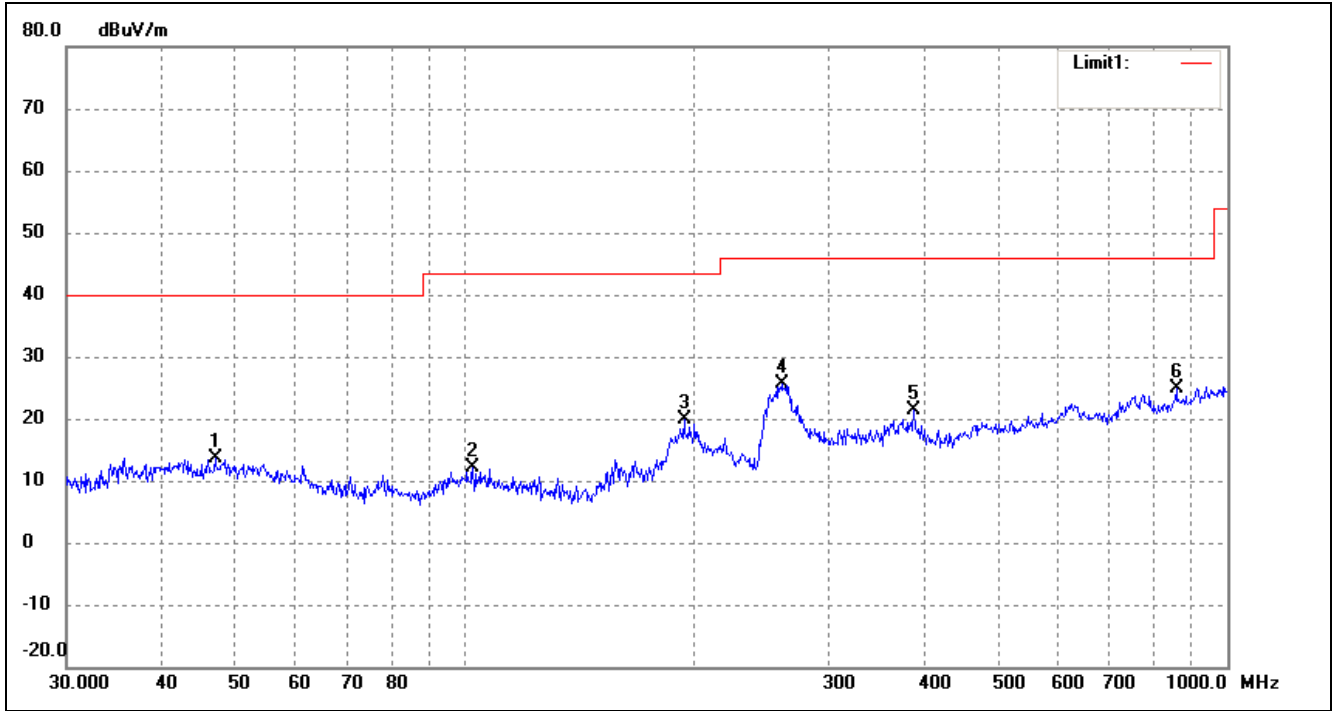


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	36.0007	18.59	9.04	27.63	40.00	-12.37	360	100	peak
2	101.6443	15.50	6.67	22.17	43.50	-21.33	225	100	peak
3	744.8661	16.16	17.95	34.11	46.00	-11.89	160	100	peak
4	912.8620	16.92	18.93	35.85	46.00	-10.15	310	100	peak

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

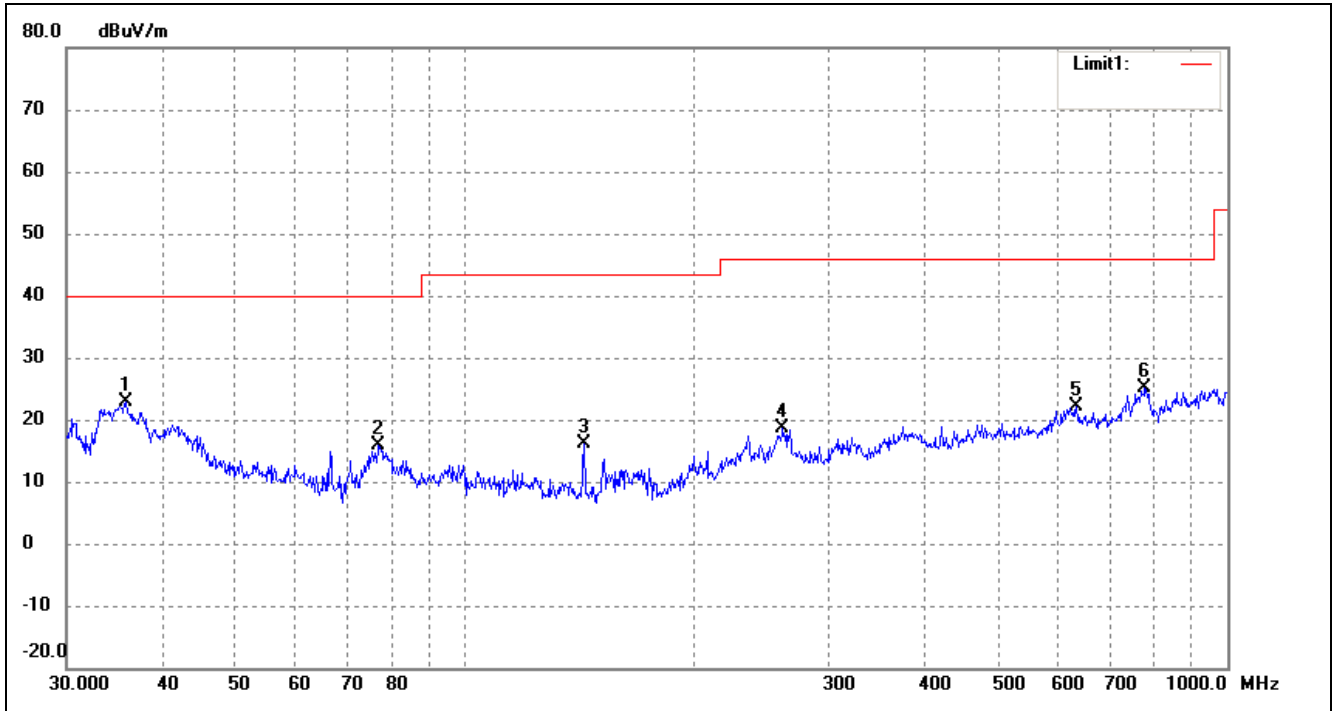
Comment: AC 120V/60Hz; Connected to PC

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	46.9948	21.85	-8.13	13.72	40.00	-26.28	251	100	peak
2	102.3597	23.12	-10.97	12.15	43.50	-31.35	167	100	peak
3	193.7728	29.43	-9.48	19.95	43.50	-23.55	44	100	peak
4	260.1444	32.63	-6.95	25.68	46.00	-20.32	251	100	peak
5	387.9920	23.93	-2.51	21.42	46.00	-24.58	167	100	peak
6	857.0247	22.19	2.78	24.97	46.00	-21.03	44	100	peak

Test Specification: Vertical

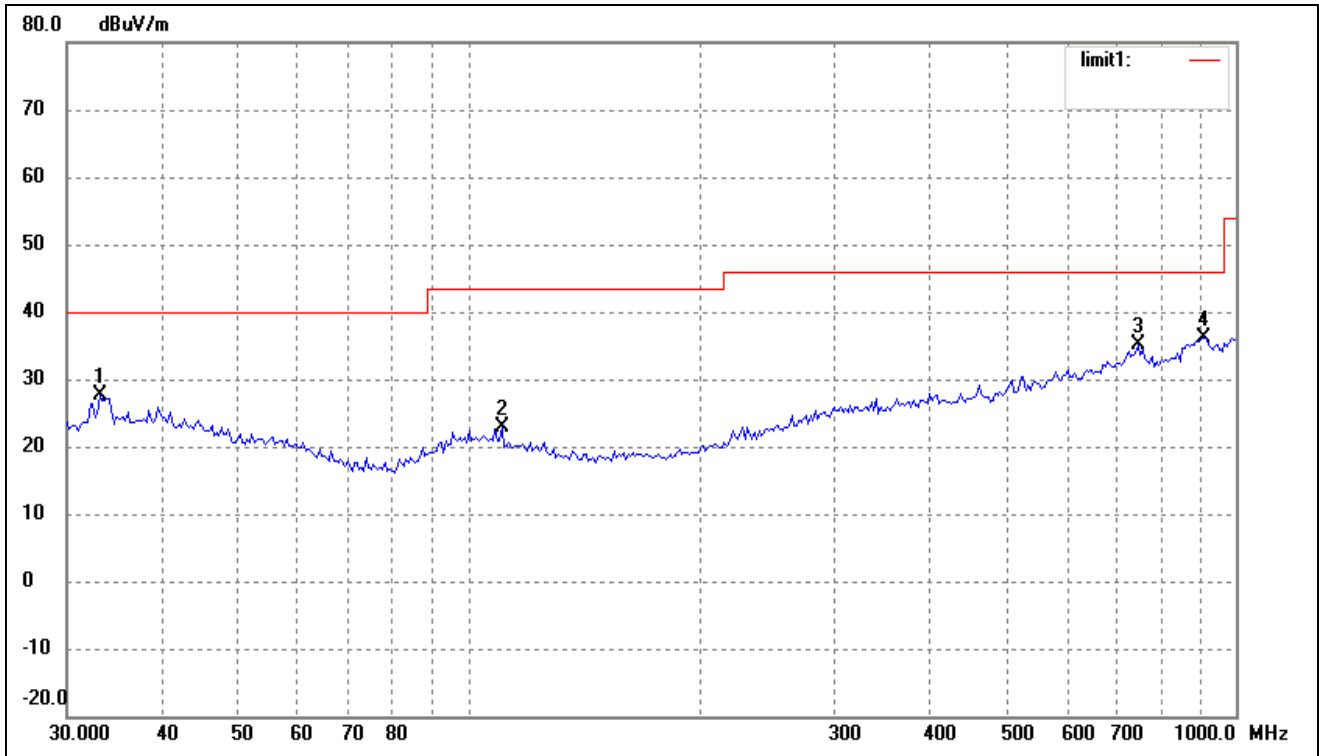


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	35.8747	31.66	-8.79	22.87	40.00	-17.13	47	100	peak
2	77.0505	28.01	-12.24	15.77	40.00	-24.23	264	100	peak
3	143.3261	28.73	-12.51	16.22	43.50	-27.28	225	100	peak
4	261.0583	25.46	-6.91	18.55	46.00	-27.45	47	100	peak
5	633.9073	21.33	0.87	22.20	46.00	-23.80	264	100	peak
6	779.6068	22.18	2.88	25.06	46.00	-20.94	225	100	peak

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

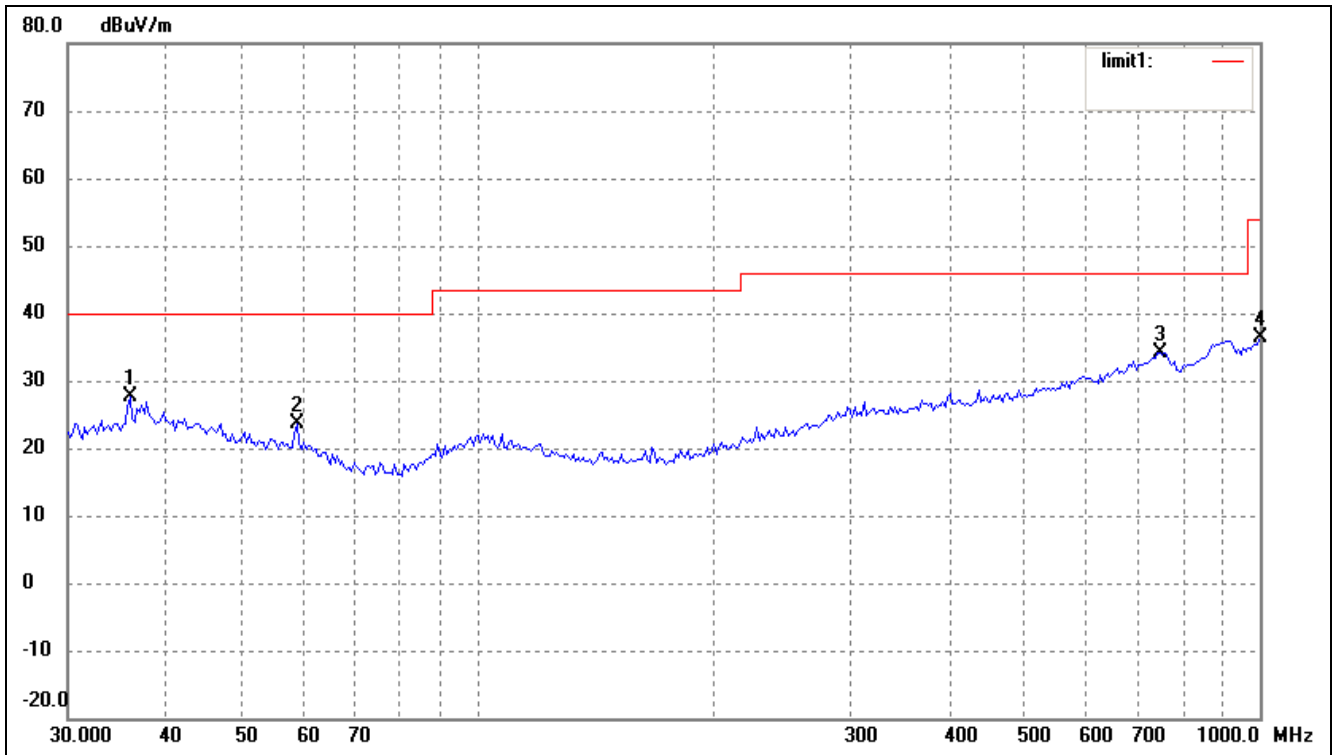
Comment: AC 120V/60Hz; Connected to PC

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	33.0950	19.05	8.56	27.61	40.00	-12.39	178	100	peak
2	110.5687	16.99	5.80	22.79	43.50	-20.71	224	100	peak
3	744.8661	17.06	17.95	35.01	46.00	-10.99	160	100	peak
4	906.4824	16.94	19.15	36.09	46.00	-9.91	290	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	36.0007	18.59	9.04	27.63	40.00	-12.37	256	100	peak
2	58.8185	17.75	5.81	23.56	40.00	-16.44	360	100	peak
3	744.8661	16.16	17.95	34.11	46.00	-11.89	360	100	peak
4	1000.000	16.41	19.90	36.31	54.00	-17.69	360	100	peak

Spurious Emissions Above 1GHz

Test Mode: 802.11b

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
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	(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	(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	(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 9kHz to the tenth harmonics, other than listed in the table above 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 v03r04, 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.

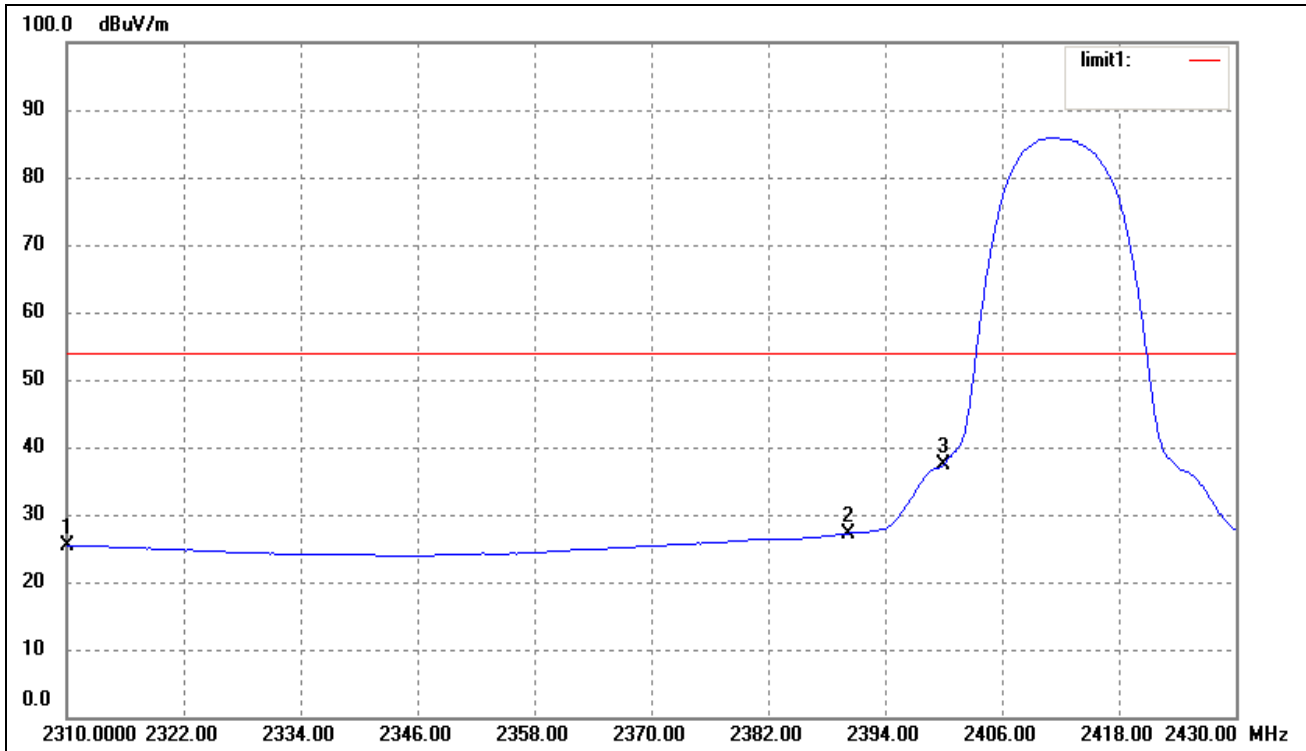
9.3 Environmental Conditions

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

9.4 Summary of Test Results/Plots

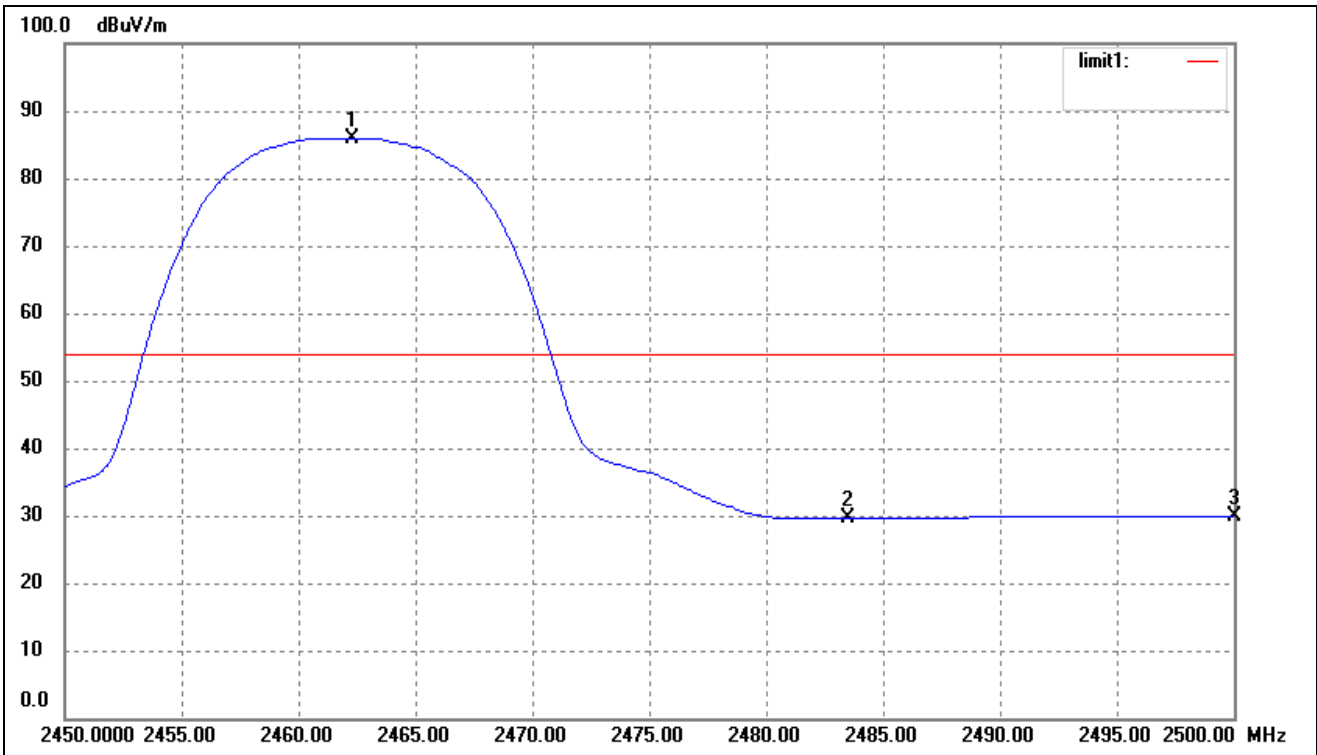
802.11b-Lowest Bandedge

Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	29.17	-3.71	25.46	54.00	-28.54	Average Detector
	2310.000	42.23	-3.71	38.52	74.00	-35.48	Peak Detector
2	2390.000	30.75	-3.54	27.21	54.00	-26.79	Average Detector
	2390.000	42.90	-3.54	39.36	74.00	-34.64	Peak Detector
3	2400.000	41.00	-3.51	37.49	54.00	-16.51	Average Detector
	2400.000	51.93	-3.51	48.42	74.00	-25.58	Peak Detector

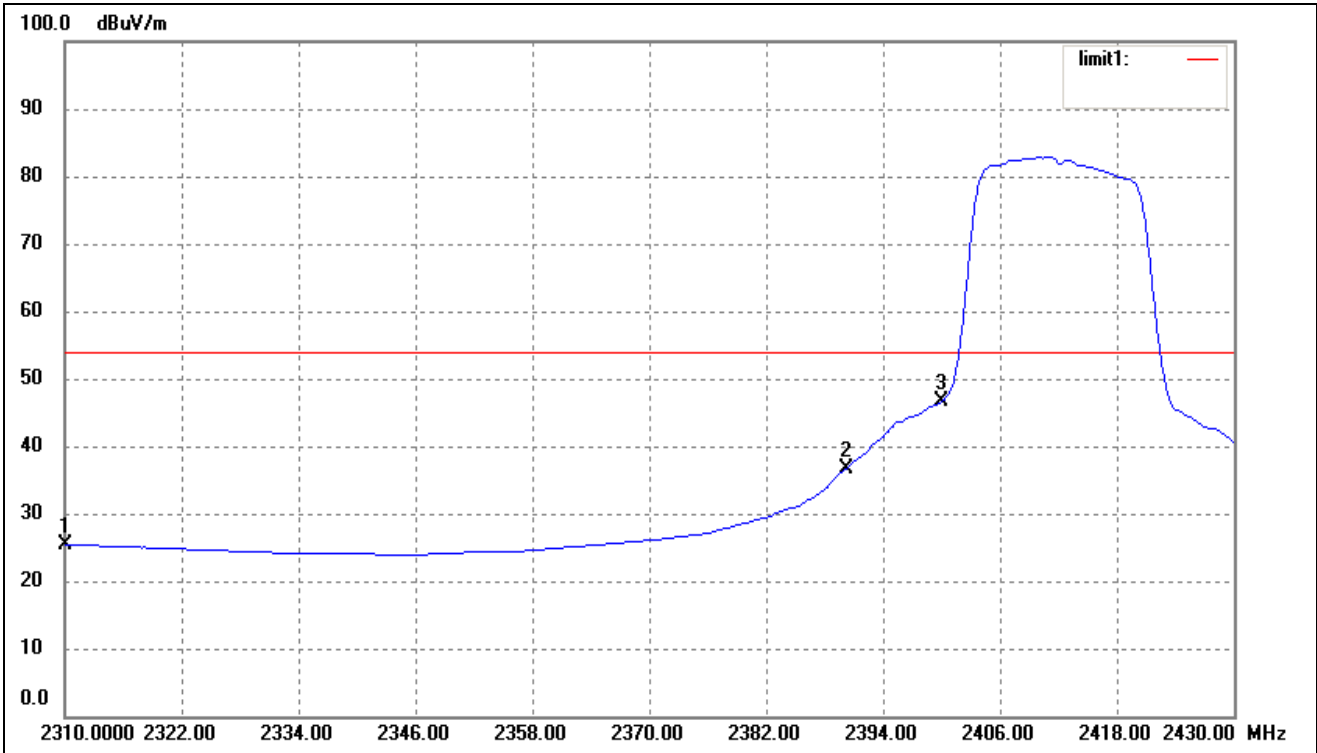
802.11b-Highest Bandedge
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2462.300	89.35	-3.37	85.98	/	/	Average Detector
	2462.300	97.99	-3.37	94.62	/	/	Peak Detector
2	2483.500	Delta = 56.6dBc		29.38	54.00	-24.62	Average Detector
	2483.500	Delta = 56.6dBc		38.02	74.00	-35.98	Peak Detector
3	2500.000	33.13	-3.28	29.85	54.00	-24.15	Average Detector
	2500.000	46.79	-3.28	43.51	74.00	-30.49	Peak Detector

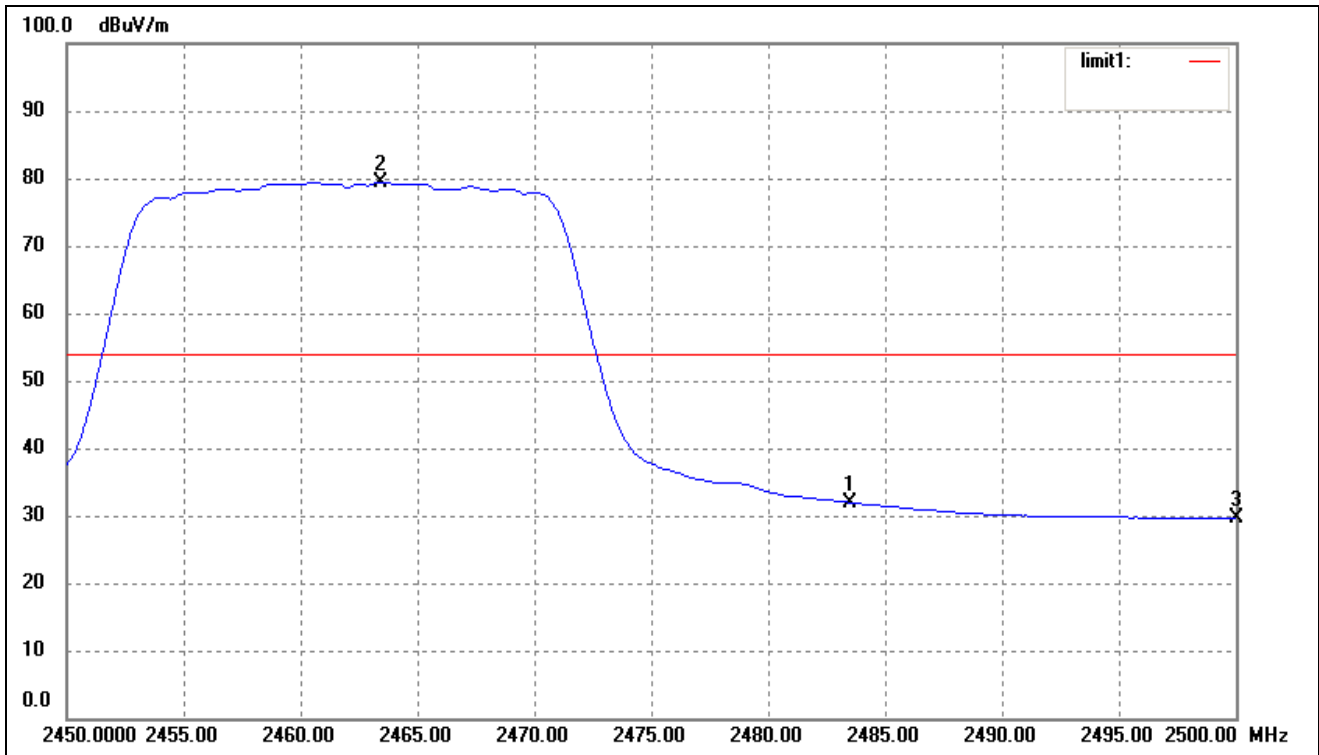
802.11g-Lowest Bandedge

Vertical (Worst case)



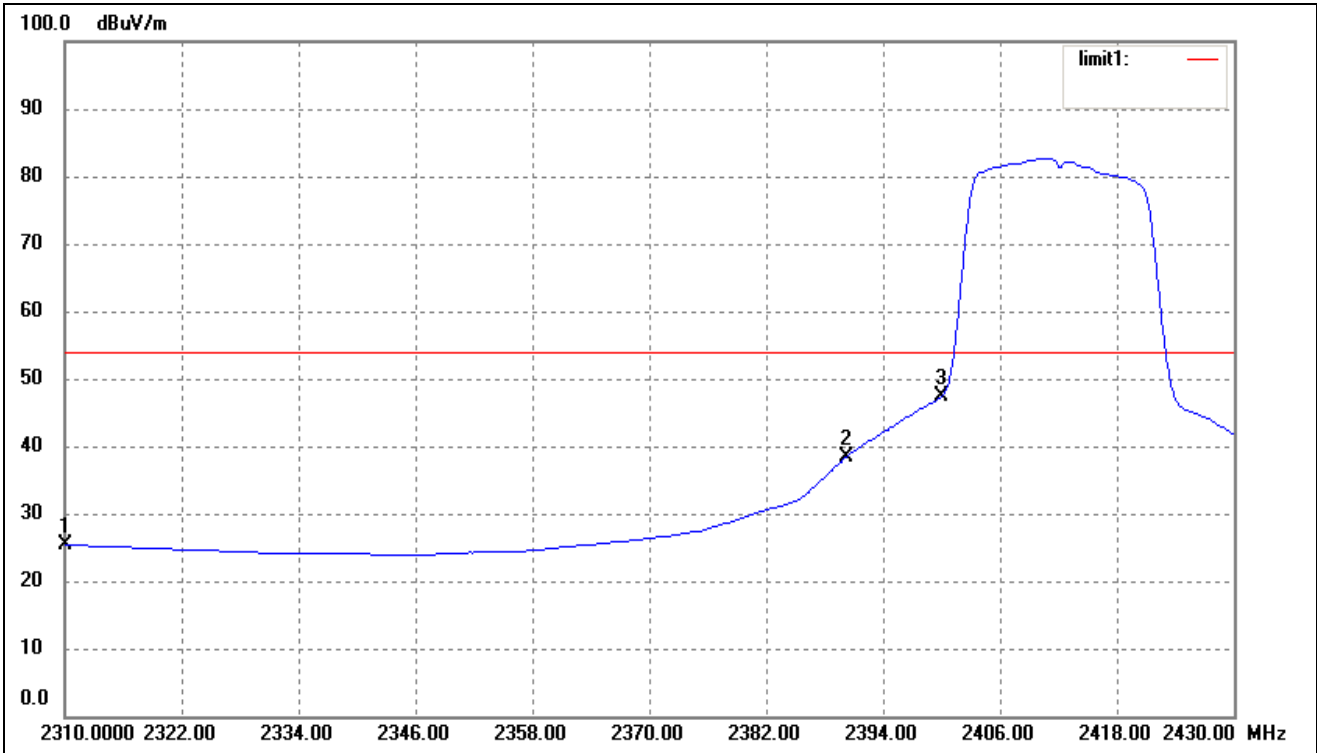
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	29.15	-3.71	25.44	54.00	-28.56	Average Detector
	2310.000	41.87	-3.71	38.16	74.00	-35.84	Peak Detector
2	2390.000	40.17	-3.54	36.63	54.00	-17.37	Average Detector
	2390.000	60.80	-3.54	57.26	74.00	-16.74	Peak Detector
3	2400.000	50.13	-3.51	46.62	54.00	-7.38	Average Detector
	2400.000	70.72	-3.51	67.21	74.00	-6.79	Peak 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
2	2463.400	82.80	-3.36	79.44	/	/	Average Detector
	2463.400	93.60	-3.36	90.24	/	/	Peak Detector
1	2483.500	Delta = 50.07dBc		29.37	54.00	-24.63	Average Detector
	2483.500			45.14	74.00	-33.83	Peak Detector
3	2500.000	32.93	-3.28	29.65	54.00	-24.35	Average Detector
	2500.000	43.83	-3.28	40.55	74.00	-33.45	Peak Detector

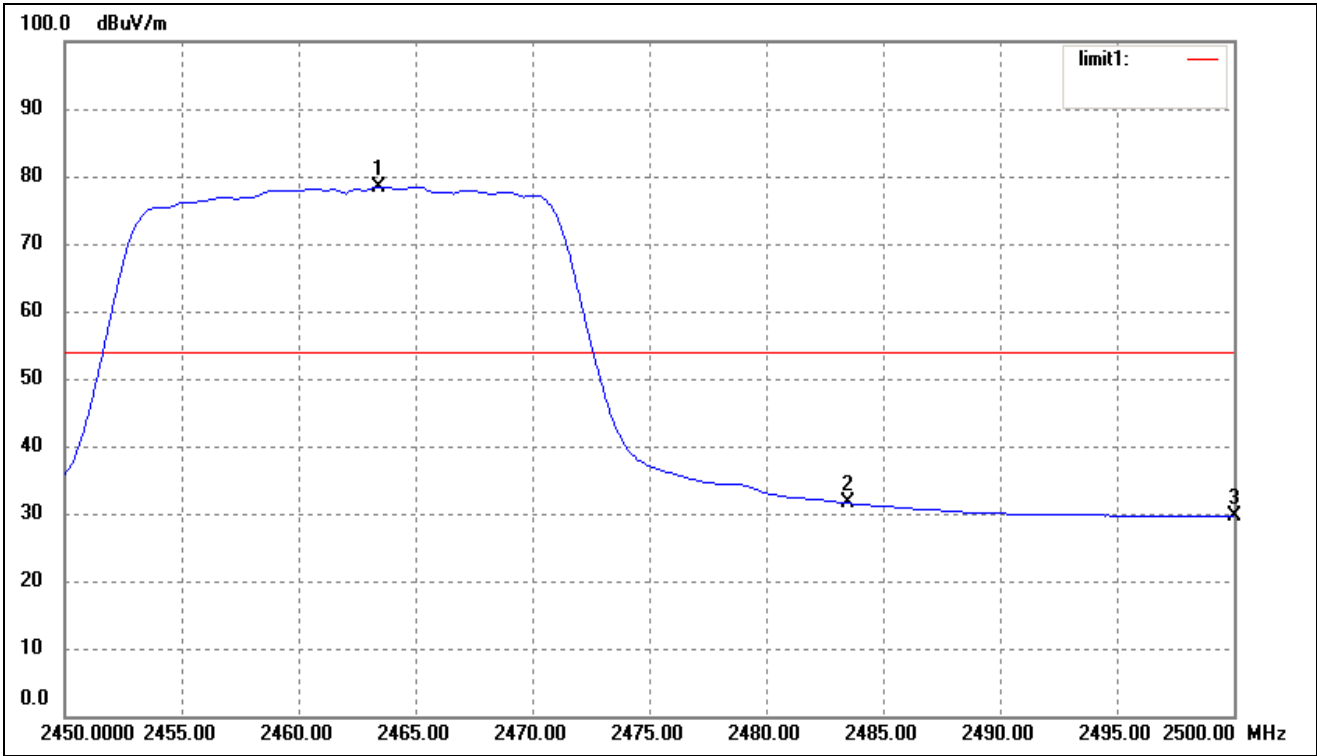
802.11n-HT20-Lowest Bandedge
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	29.11	-3.71	25.40	54.00	-28.60	Average Detector
	2310.000	38.48	-3.71	34.77	74.00	-39.23	Peak Detector
2	2390.000	41.94	-3.54	38.40	54.00	-15.60	Average Detector
	2390.000	54.59	-3.54	51.05	74.00	-22.95	Peak Detector
3	2400.000	50.87	-3.51	47.36	54.00	-6.64	Average Detector
	2400.000	61.86	-3.51	58.35	74.00	-15.65	Peak Detector

802.11n-HT20-Highest Bandedge

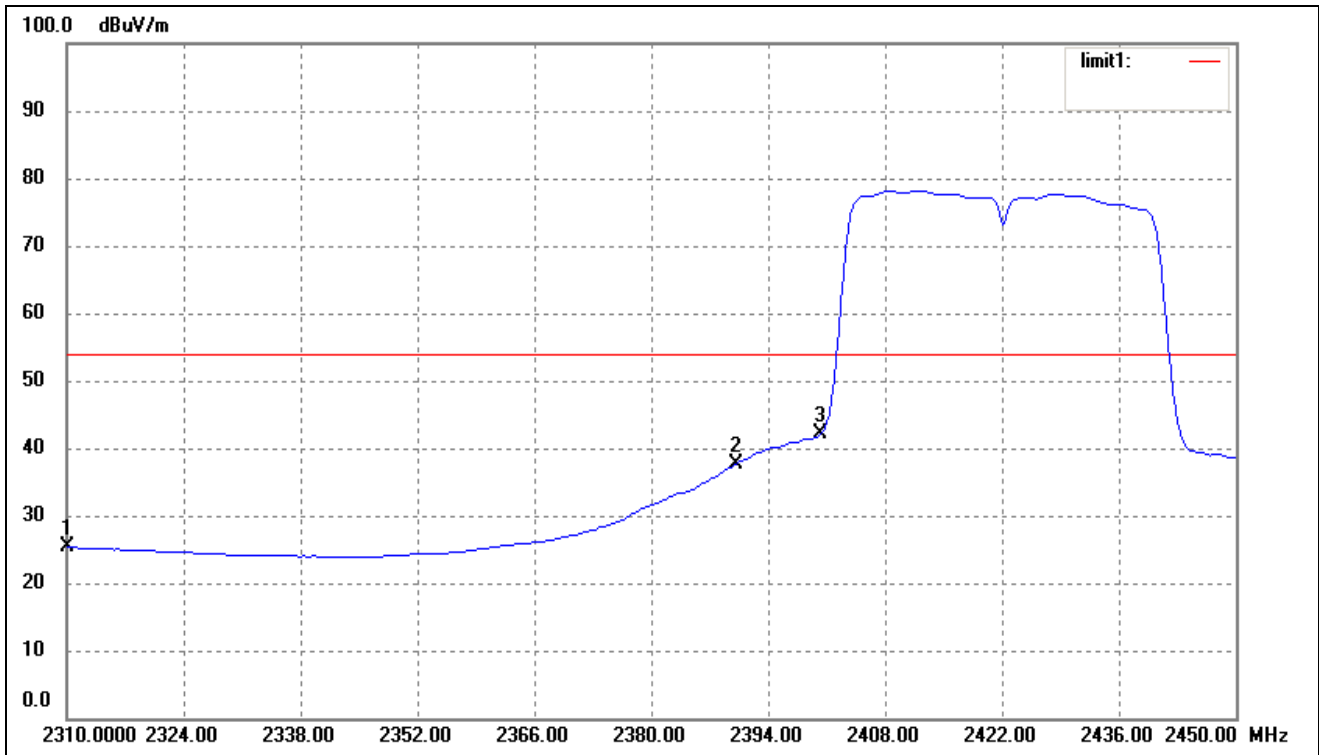
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2463.400	81.80	-3.36	78.44	/	/	Average Detector
	2463.400	92.56	-3.36	89.20	/	/	Peak Detector
2	2483.500	Delta = 47.46dBc		30.98	54.00	-23.02	Average Detector
	2483.500			41.74	74.00	-32.26	Peak Detector
3	2500.000	32.87	-3.28	29.59	54.00	-24.41	Average Detector
	2500.000	45.21	-3.28	41.93	74.00	-32.07	Peak Detector

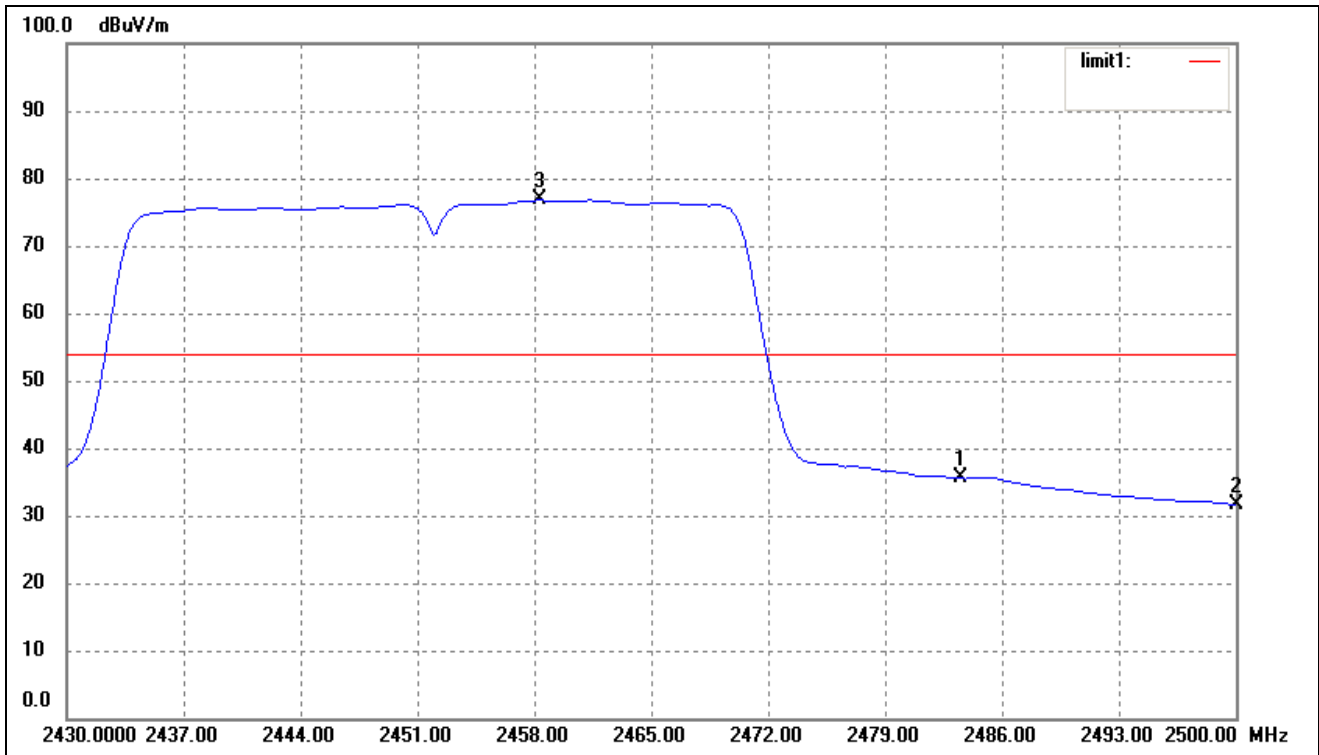
802.11n-HT40-Lowest Bandedge

Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	29.03	-3.71	25.32	54.00	-28.68	Average Detector
	2310.000	42.42	-3.71	38.71	74.00	-35.29	Peak Detector
2	2390.000	41.17	-3.54	37.63	54.00	-16.37	Average Detector
	2390.000	58.01	-3.54	54.47	74.00	-19.53	Peak Detector
3	2400.000	45.53	-3.51	42.02	54.00	-11.98	Average Detector
	2400.000	61.59	-3.51	58.08	74.00	-15.92	Peak Detector

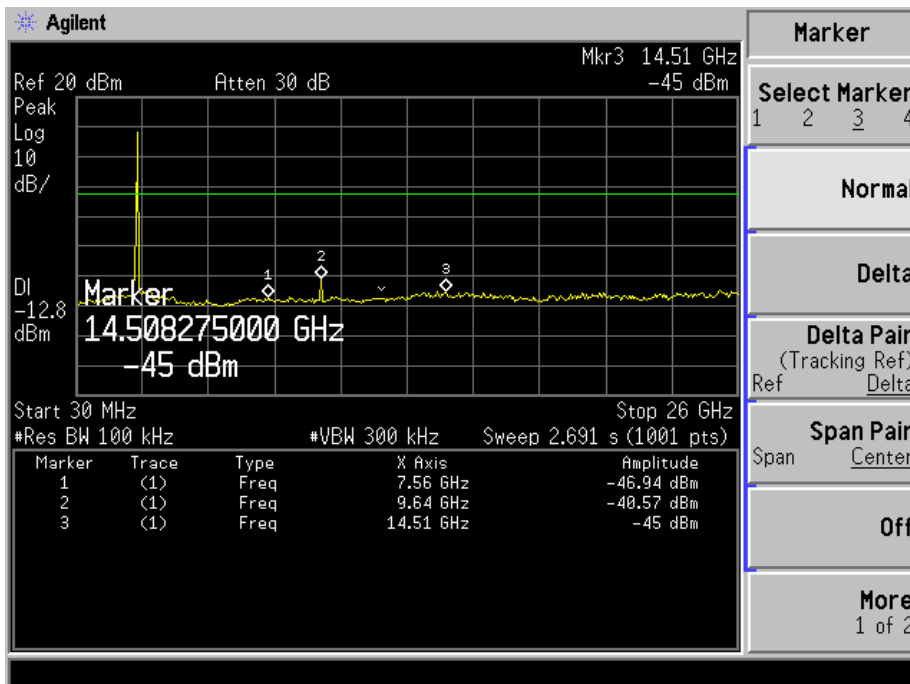
802.11n-HT40-Highest Bandedge
Vertical (Worst case)



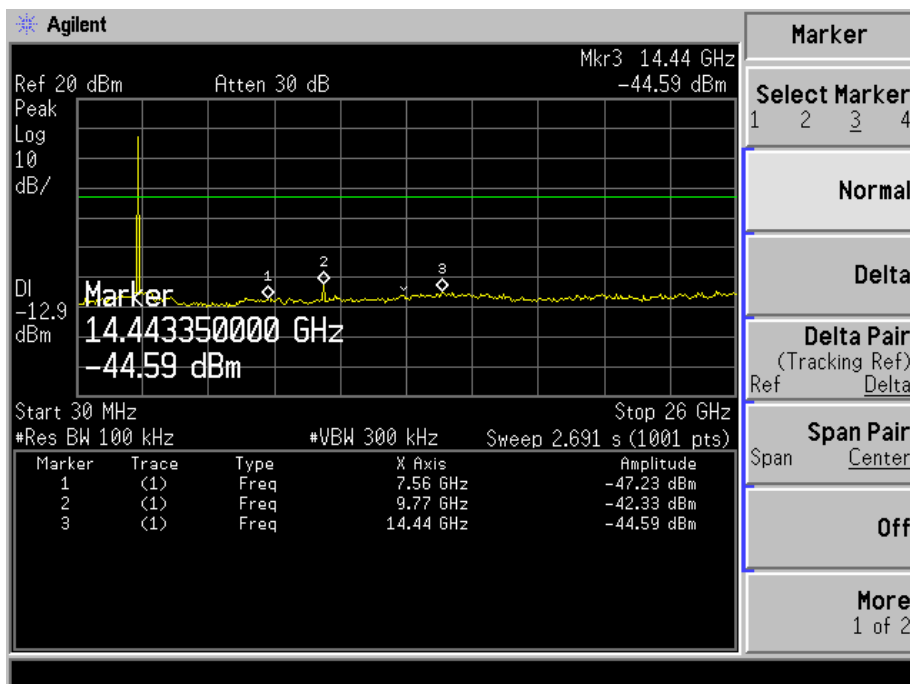
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
3	2458.280	80.15	-3.38	76.77	/	/	Average Detector
	2458.280	91.25	-3.38	87.87	/	/	Peak Detector
1	2483.500	Delta = 40.73dBc		36.04	54.00	-17.96	Average Detector
	2483.500	Delta = 40.73dBc		47.14	74.00	-26.86	Peak Detector
2	2500.000	34.98	-3.28	31.70	54.00	-22.30	Average Detector
	2500.000	48.54	-3.28	45.26	74.00	-28.74	Peak Detector

802.11b Bandedge (Conducted)

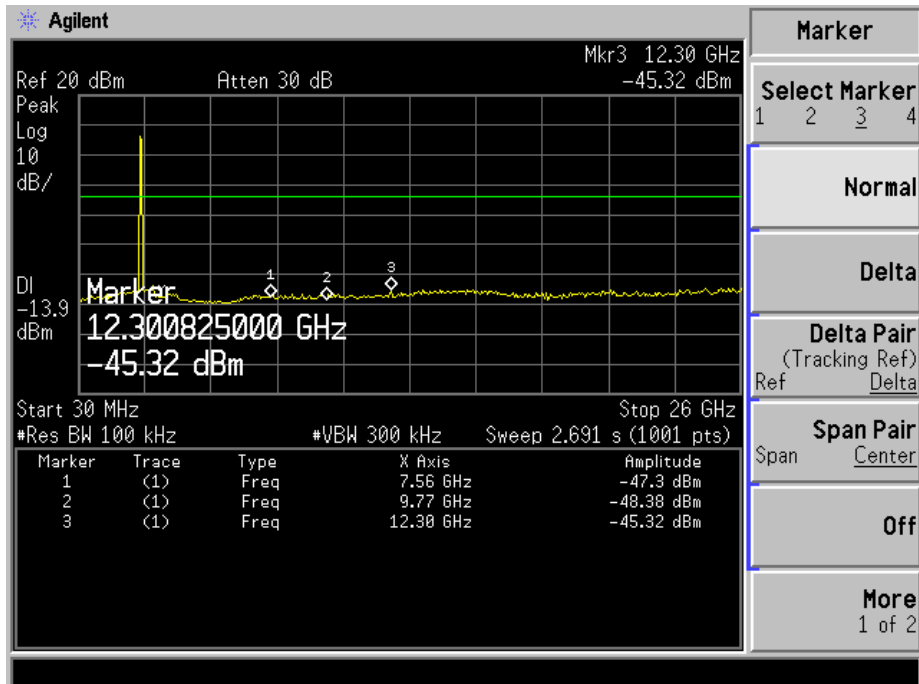
Low Channel



Middle Channel

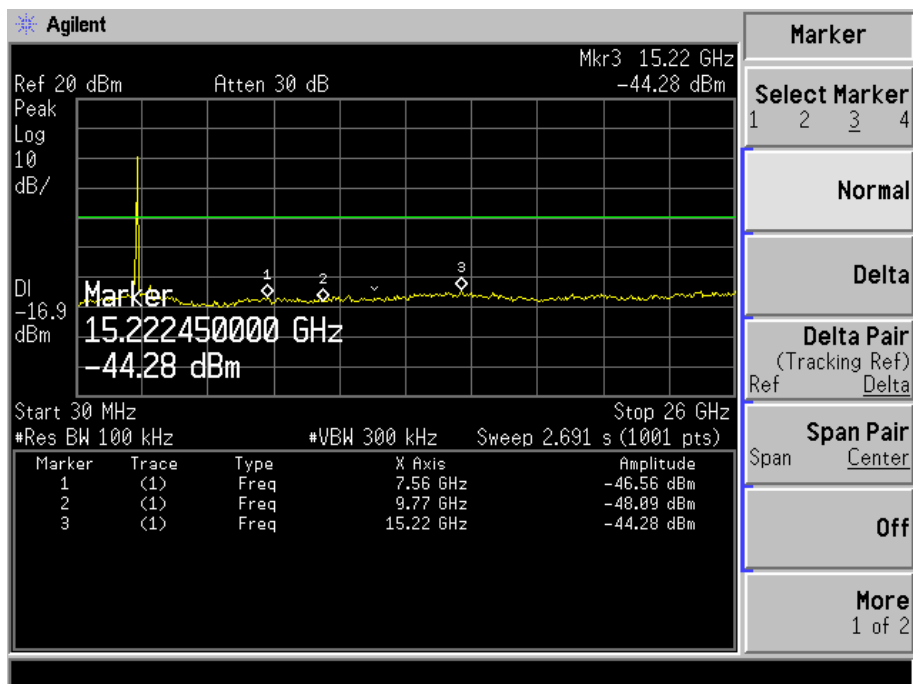


High Channel

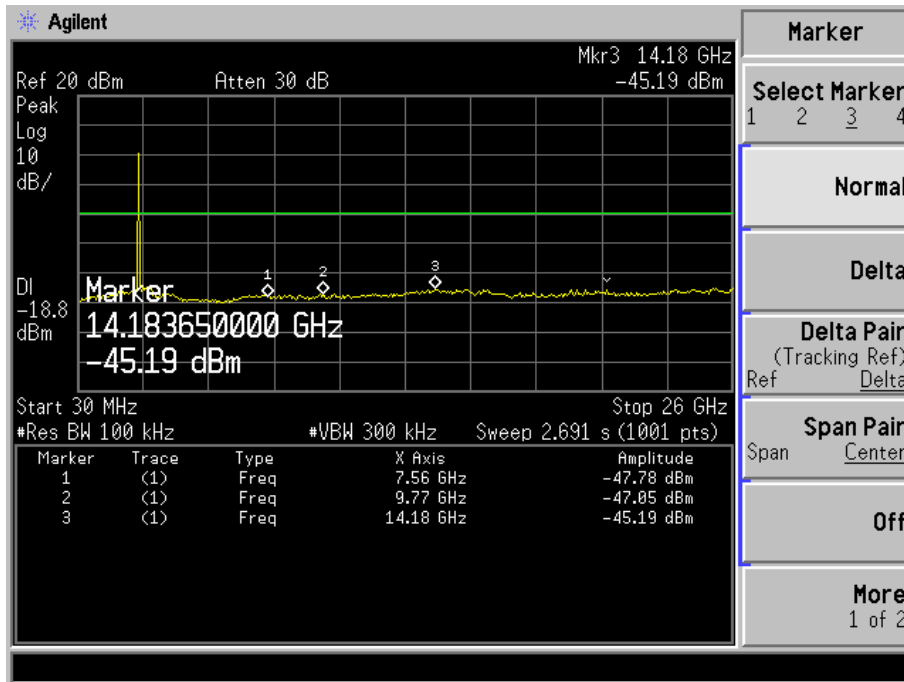


802.11g Bandedge (Conducted)

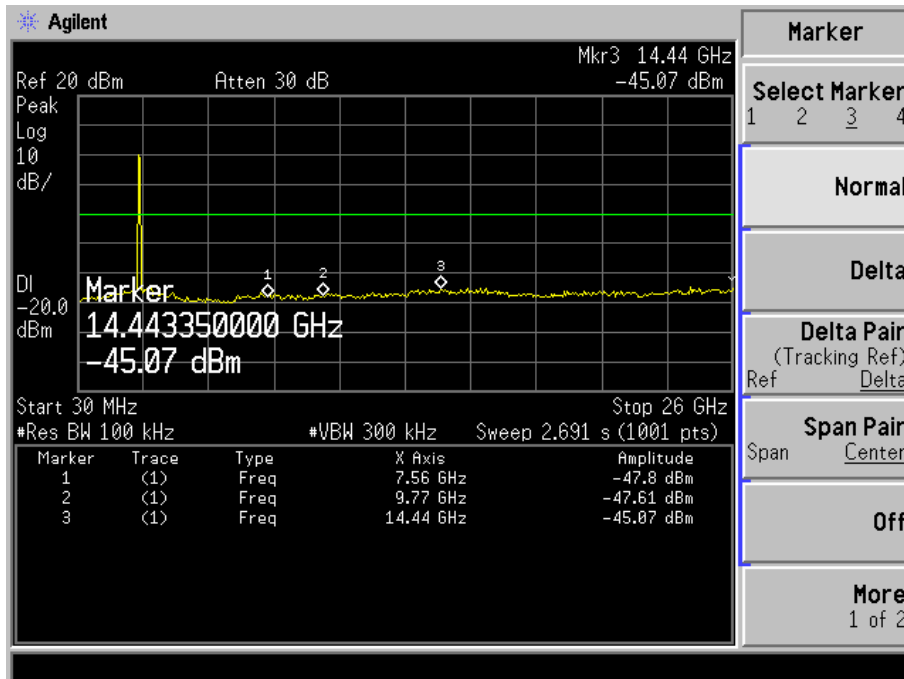
Low Channel



Middle Channel

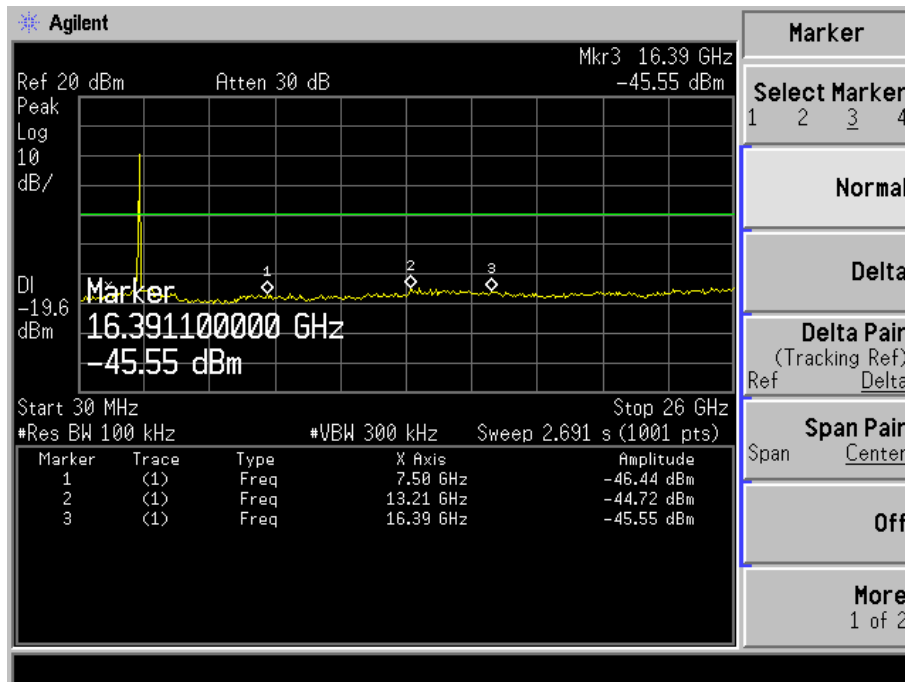


High Channel

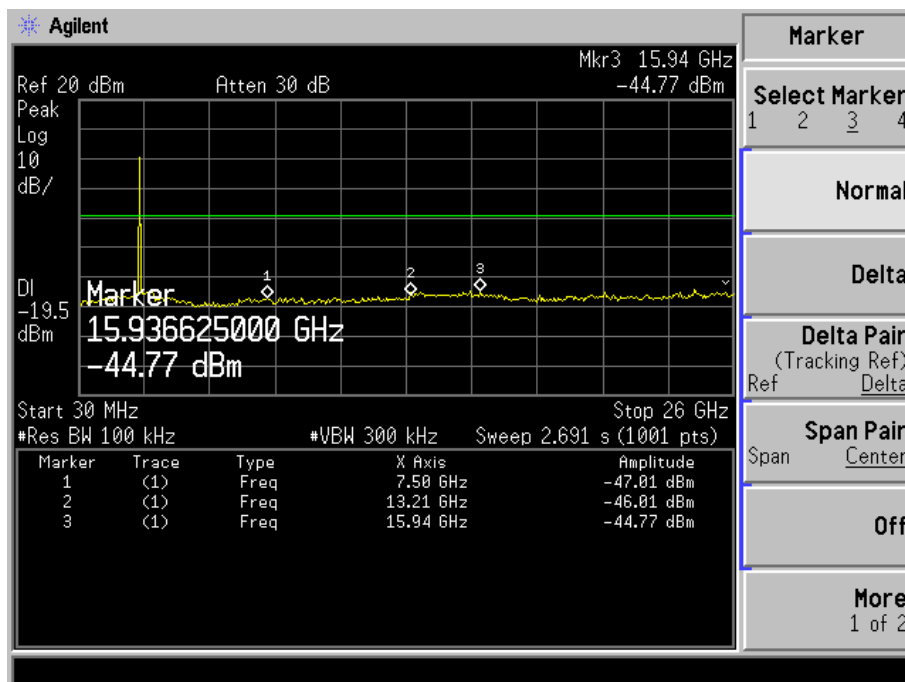


802.11n-HT20 Bandedge (Conducted)

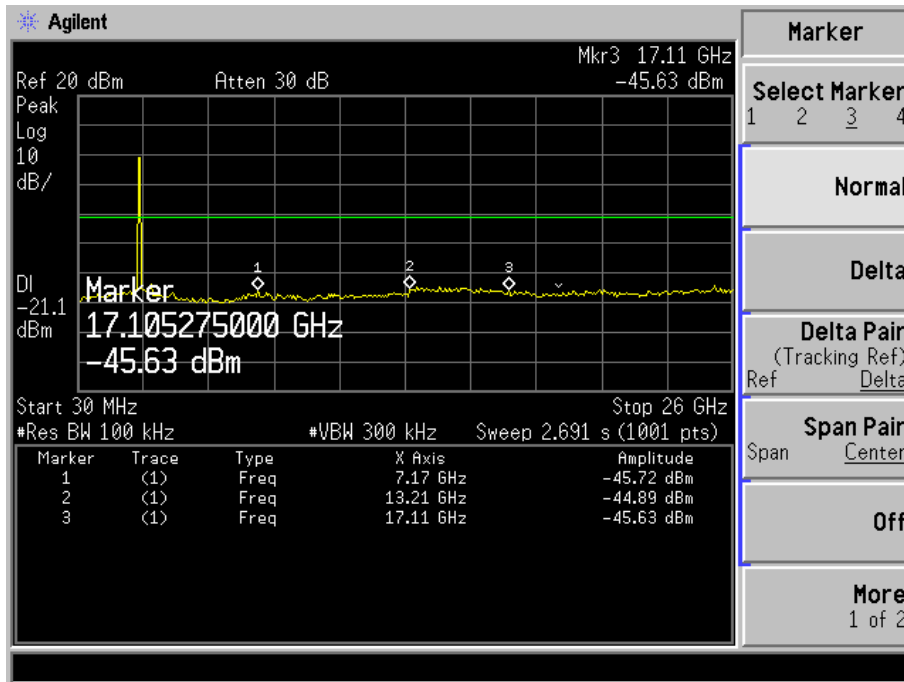
Low Channel



Middle Channel

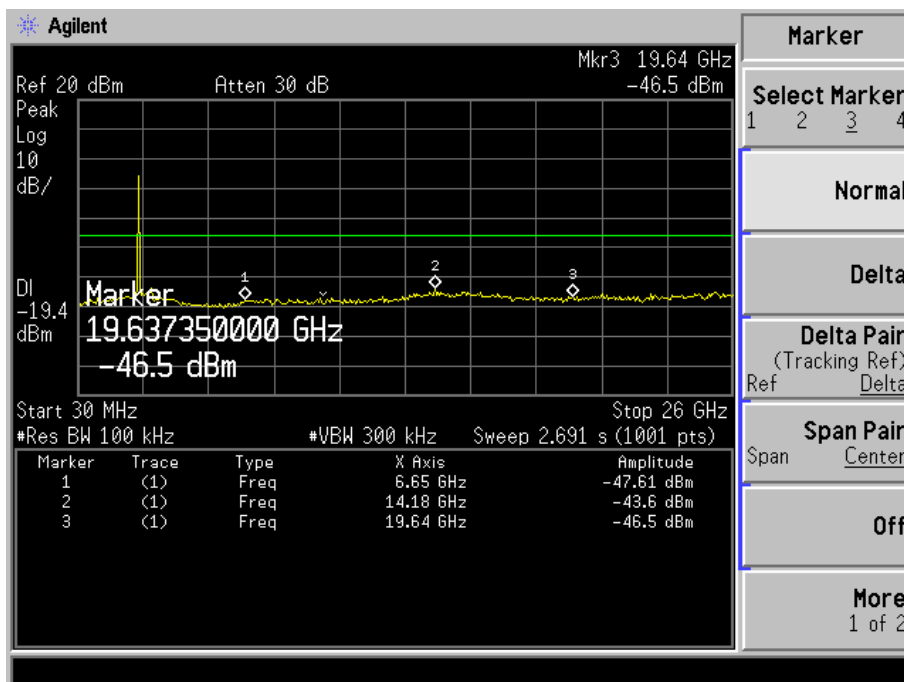


High Channel

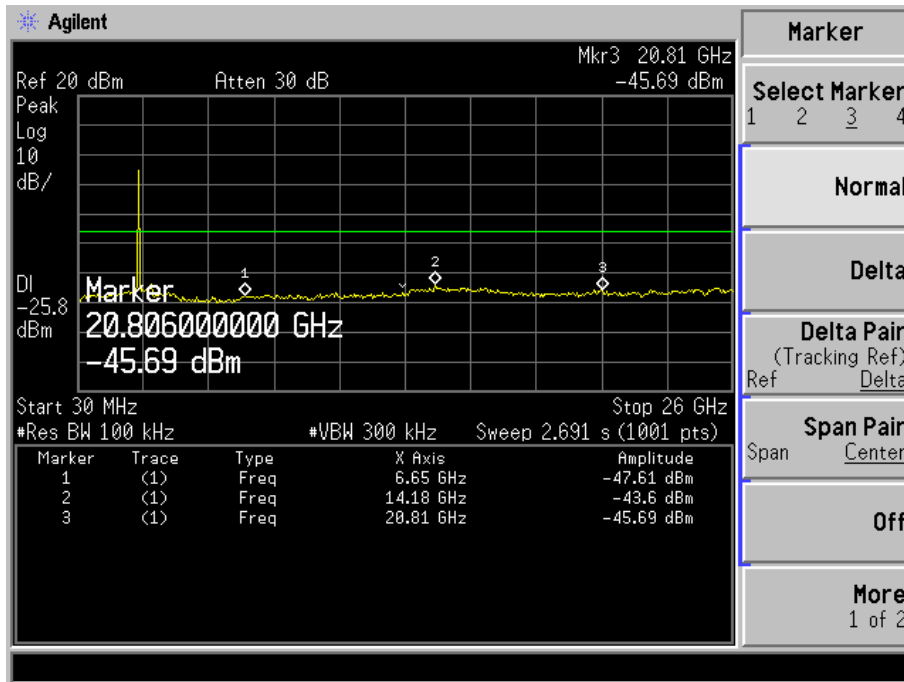


802.11n-HT40 Bandedge (Conducted)

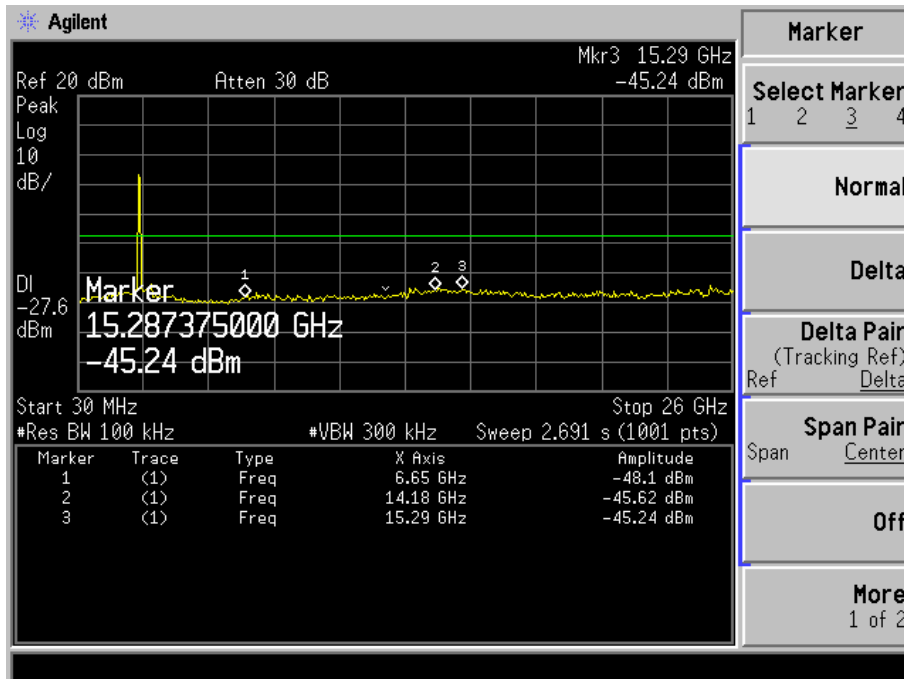
Low Channel



Middle Channel



High Channel



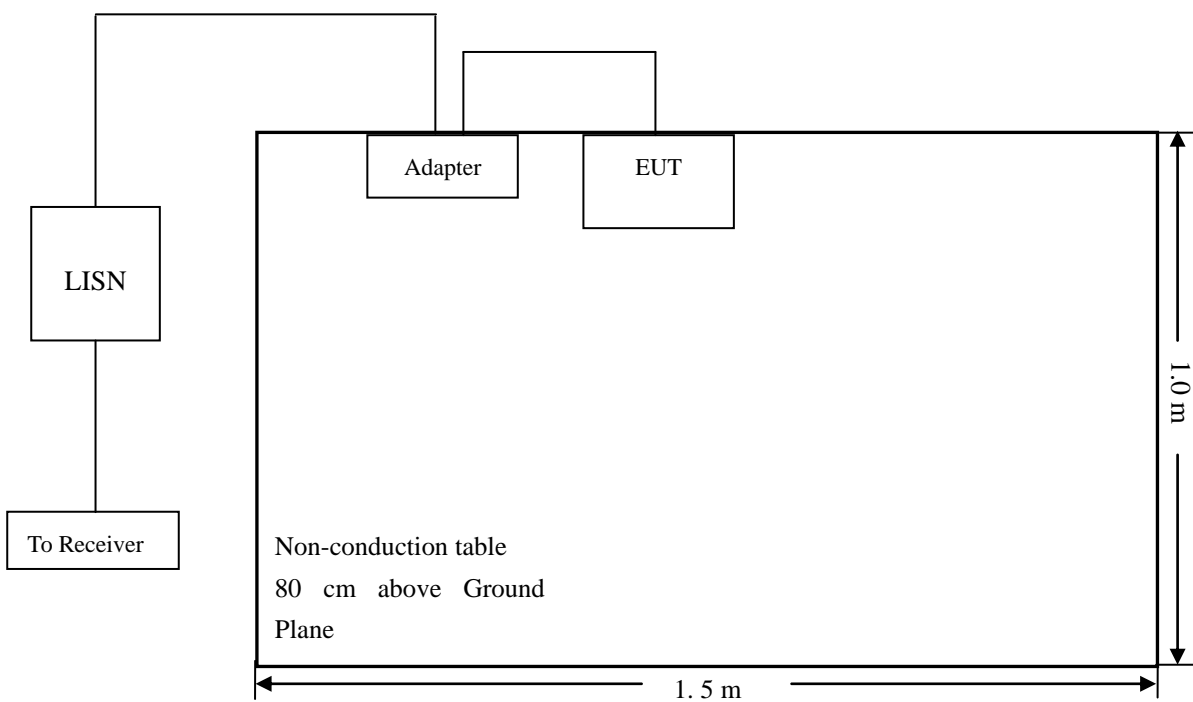
10. Conducted Emissions

10.1 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.

10.2 Basic Test Setup Block Diagram



10.3 Environmental Conditions

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

10.4 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

10.5 Summary of Test Results/Plots

According to the data in section 10.6, the EUT complied with the FCC Part 15.207 Conducted margin for this device, with the *worst* margin reading of:

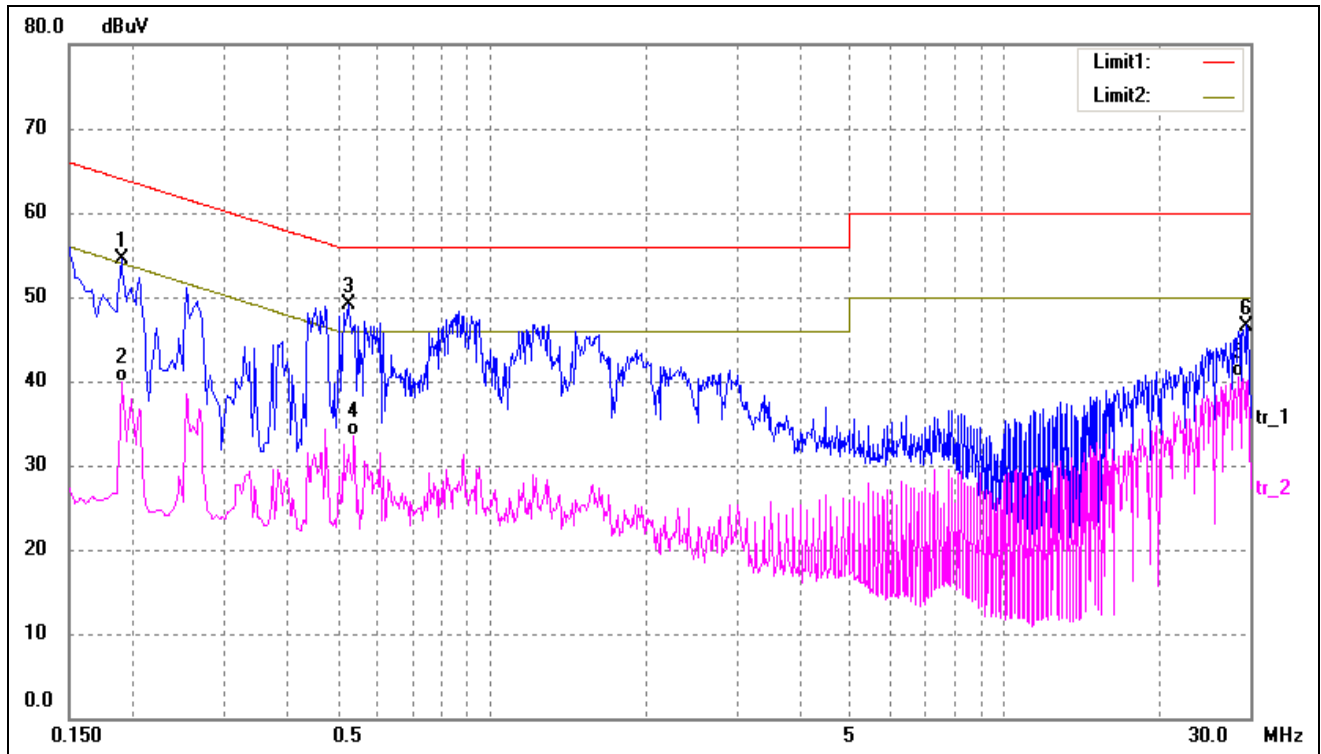
-6.96 dB at 0.526 MHz in the Line mode, Peak detector, 0.15-30MHz

10.6 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

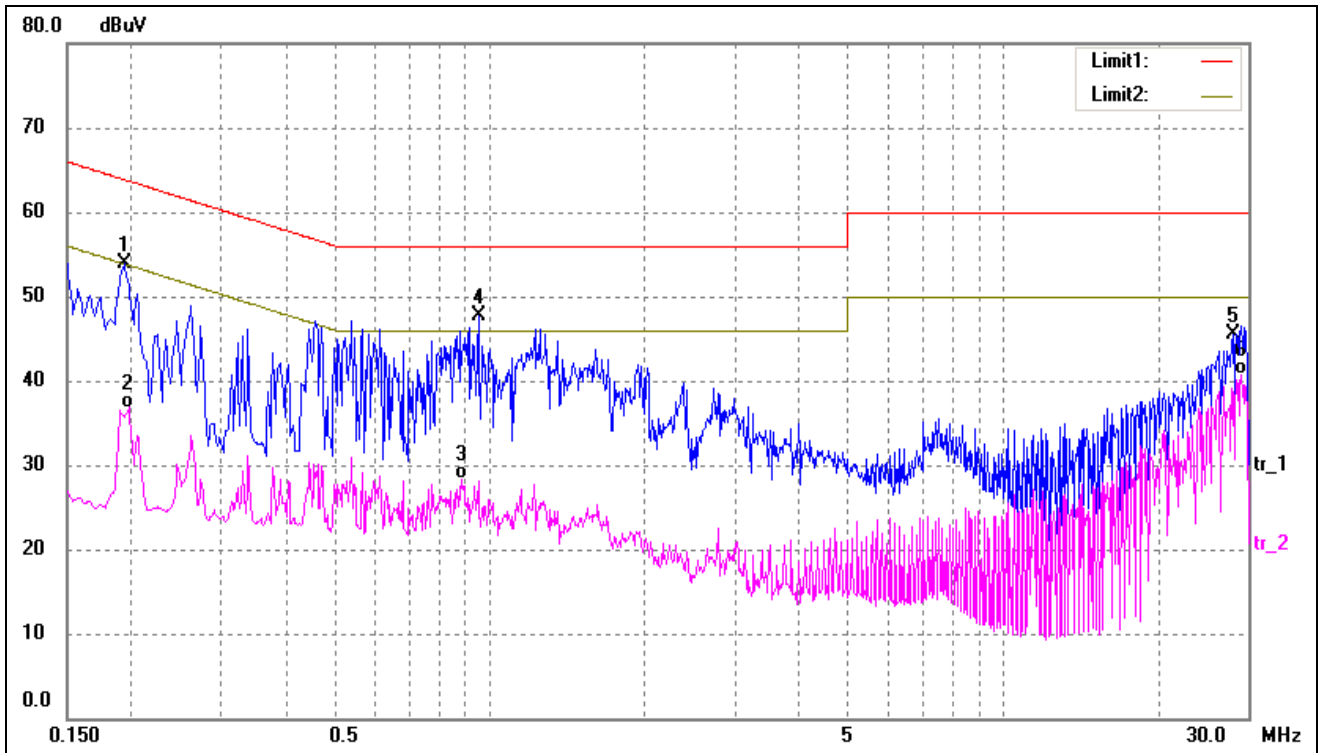
EUT: *WIFI Module*
 Tested Model: *WT31M2311A*
 Operating Condition: *Transmitting(Wi-Fi)*
 Comment: *AC 120V/60Hz; Connected to PC*

Test Specification: *Line*



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1900	41.97	12.50	54.47	64.04	-9.57	peak
2	0.1900	27.48	12.50	39.98	54.04	-14.06	AVG
3*	0.5260	36.51	12.53	49.04	56.00	-6.96	peak
4	0.5380	20.88	12.54	33.42	46.00	-12.58	AVG
5	28.5460	27.55	13.00	40.55	50.00	-9.45	AVG
6	29.6380	33.60	13.00	46.60	60.00	-13.40	peak

Test Specification: Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1940	41.41	12.50	53.91	63.86	-9.95	peak
2	0.1980	24.30	12.50	36.80	53.69	-16.89	AVG
3	0.8820	15.39	12.88	28.27	46.00	-17.73	AVG
4*	0.9500	34.79	12.95	47.74	56.00	-8.26	peak
5	28.0740	32.51	13.00	45.51	60.00	-14.49	peak
6	29.1580	27.74	13.00	40.74	50.00	-9.26	AVG

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