

# FCC Part 15C Measurement and Test Report

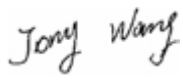


For

**LM Technologies Ltd.**

**Unit 19, Spectrum House, 32-34, Gordon House Road, London,**

**NW5 1LP, United Kingdom**

**FCC ID: VVX-LM820-0462**

<b>FCC Rule(s):</b>	<u>FCC Part 15C</u>
<b>Product Description:</b>	<u>LM820 Wi-Fi SMT Module 802.11n 150Mbps</u>
<b>Tested Model:</b>	<u>LM820-XXXX</u>
<b>Report No.:</b>	<u>STR15098222I</u>
<b>Tested Date:</b>	<u>2015-09-21 to 2015-10-10</u>
<b>Issued Date:</b>	<u>2015-10-10</u>
<b>Tested By:</b>	<u>Jong Wang/ Engineer</u> 
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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: LM Technologies Ltd  
Address of applicant: Unit19, Spectrum House, 32-34, Gordon House Road, London, NW5 1LP, United Kingdom

Manufacturer: LM Technologies Ltd  
Address of manufacturer: Unit19, Spectrum House, 32-34, Gordon House Road, London, NW5 1LP, United Kingdom

General Description of EUT	
Product Name:	LM820 Wi-Fi SMT Module 802.11n 150Mbps
Trade Name:	LM Technologies
Model No.:	LM820-XXXX
Adding Model(s):	/
Rated Voltage:	DC 3.3V
Power Adapter Model:	/
<i>Note: The test data is gathered from a production sample LM820-XXXX provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2462MHz for 802.11b/g/n(HT20) 2422-2452MHz for 802.11n(HT40)
RF Output Power:	12.89 dBm (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Quantity of Channels:	11 for 802.11b/g/n(HT20); 7 for 802.11n(HT40)
Channel Separation:	5MHz
Type of Antenna:	Ceramic antenna
Antenna Gain:	5 dBi
Lowest Internal Frequency	40MHz

## 1.2 Test Standards

The following report is prepared on behalf of the LM Technologies 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 V03r03 for digital transmission systems shall be performed also.

## 1.4 Test Facility

### **FCC – Registration No.: 934118**

Shenzhen SEM.Test Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 934118.

### **Industry Canada (IC) Registration No.: 11464A**

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

### **CNAS Registration No.: L4062**

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2<sup>nd</sup> Road, Bao'an District, Shenzhen, P.R.C (518101).

## 1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	802.11b	2412MHz, 2437MHz, 2462MHz
TM2	802.11g	2412MHz, 2437MHz, 2462MHz
TM3	802.11n-HT20	2412MHz, 2437MHz, 2462MHz
TM4	802.11n-HT40	2422MHz, 2437MHz, 2452MHz

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

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

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
DC Power Supply	LW	APR-3003	N/A

## 1.6 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Spectrum Analyzer	Agilent	E4407B	MY41440400	2015-06-17	2016-06-16
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2015-06-17	2016-06-16
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2015-06-17	2016-06-16
Amplifier	Agilent	8447F	3113A06717	2015-06-17	2016-06-16
Amplifier	C&D	PAP-1G18	2002	2015-06-17	2016-06-16
Broadband Antenna	Schwarz beck	VULB9163	9163-333	2015-06-17	2016-06-16
Horn Antenna	ETS	3117	00086197	2015-06-17	2016-06-16
Horn Antenna	ETS	3116B	00088203	2015-06-17	2016-06-16
Loop Antenna	Schwarz beck	FMZB 1516	9773	2015-06-17	2016-06-16
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2015-06-17	2016-06-16
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2015-06-17	2016-06-16
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2015-06-17	2016-06-16

## 2. SUMMARY OF TEST RESULTS

<b>FCC Rules</b>	<b>Description of Test Item</b>	<b>Result</b>
§ 2.1093	RF Exposure	Compliant
§ 15.203; § 15.247(b)(4)(i)	Antenna Requirement	Compliant
§ 15.207(a)	Conducted Emission	N/A
§ 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**

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#### **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**

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### **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

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### 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 V03r03, 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

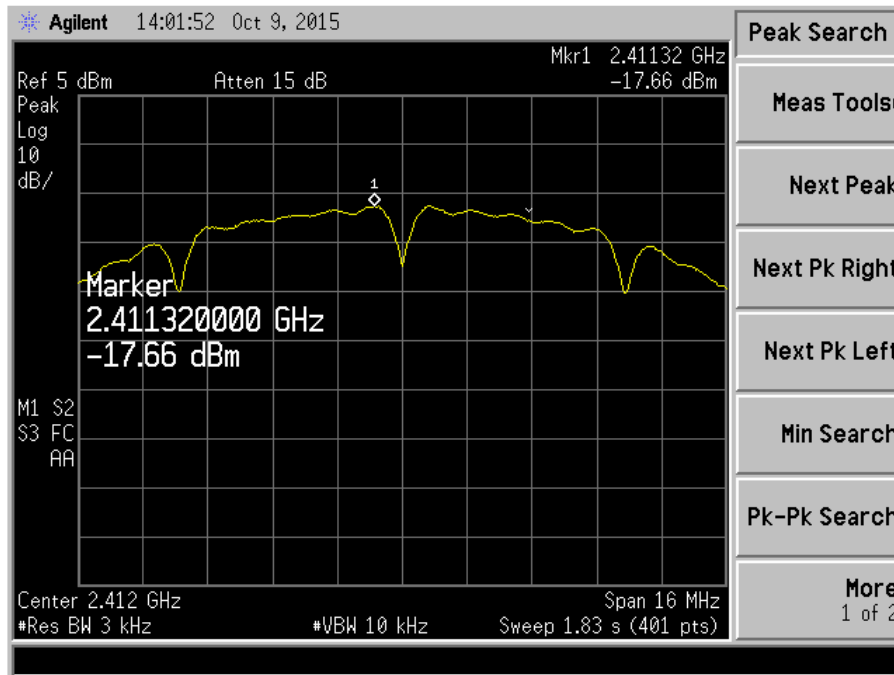
Temperature:	26° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

#### 5.4 Summary of Test Results/Plots

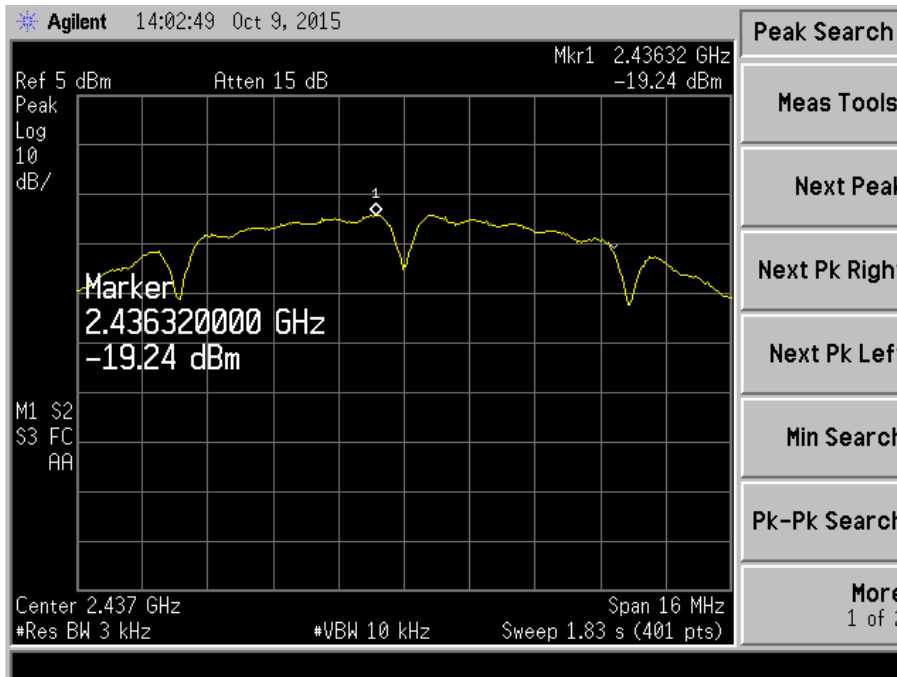
Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
802.11b	2412	-17.66	8
	2437	-19.24	8
	2462	-21.34	8
802.11g	2412	-18.33	8
	2437	-19.90	8
	2462	-22.04	8
802.11n HT20	2412	-18.11	8
	2437	-19.94	8
	2462	-21.23	8
802.11n HT40	2422	-20.37	8
	2437	-21.66	8
	2452	-20.83	8

Please refer to the following test plots:

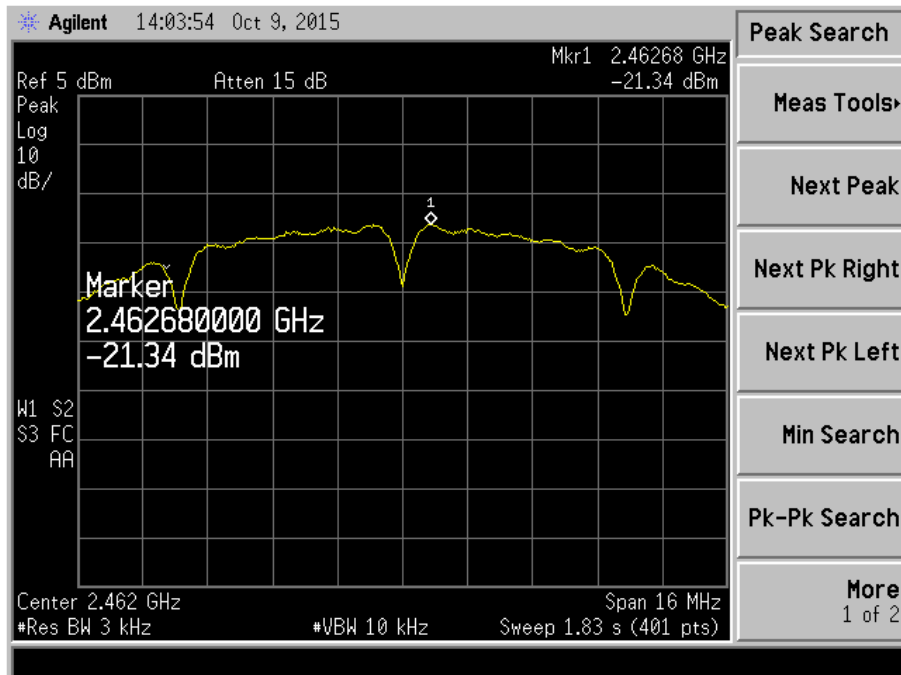
802.11b-Low Channel



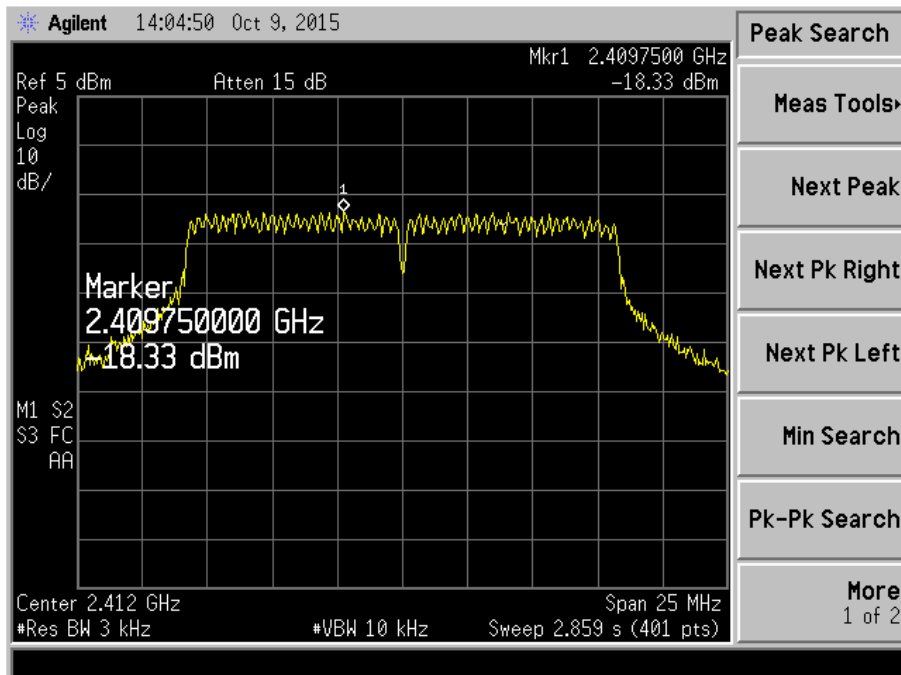
802.11b-Middle Channel



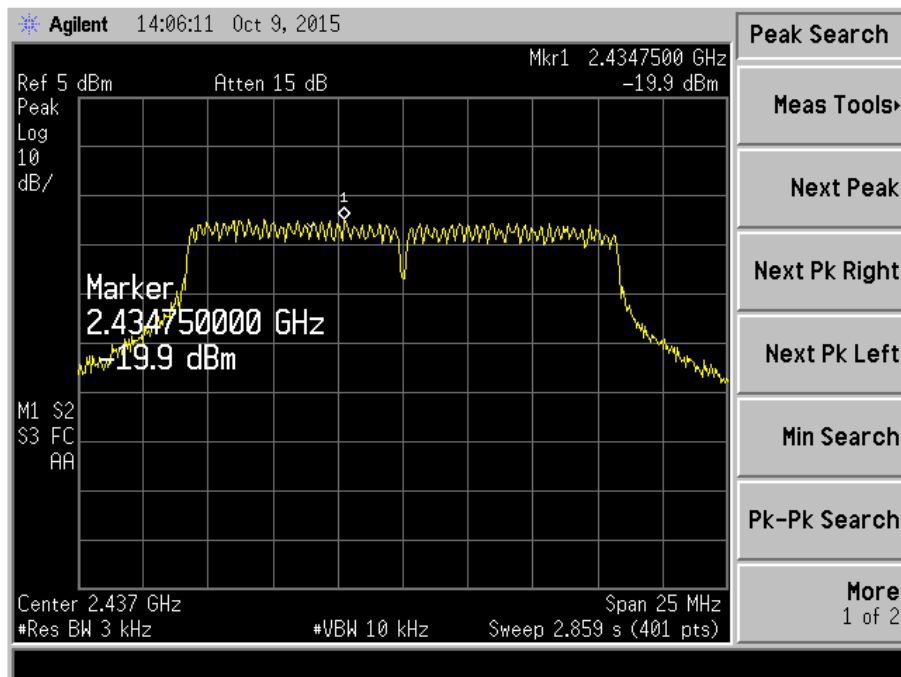
802.11b-High Channel



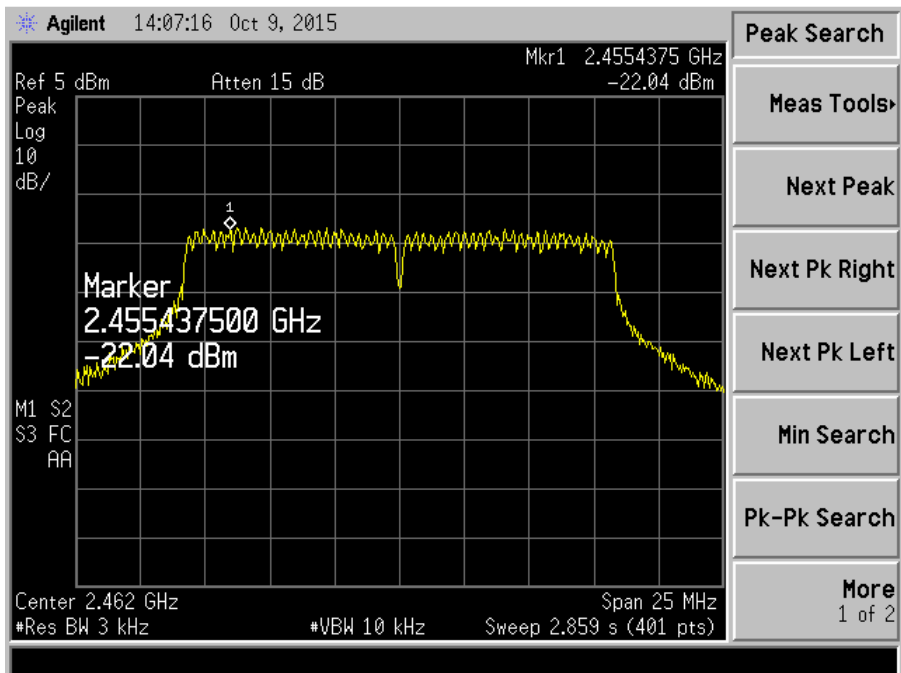
802.11 g-Lows Channel



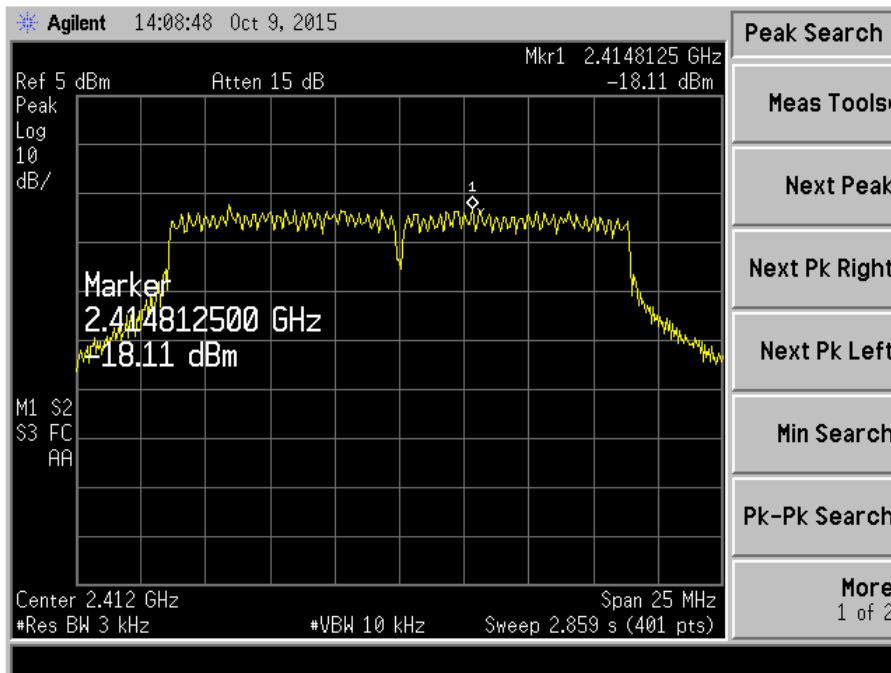
## 802.11g-Middle Channel



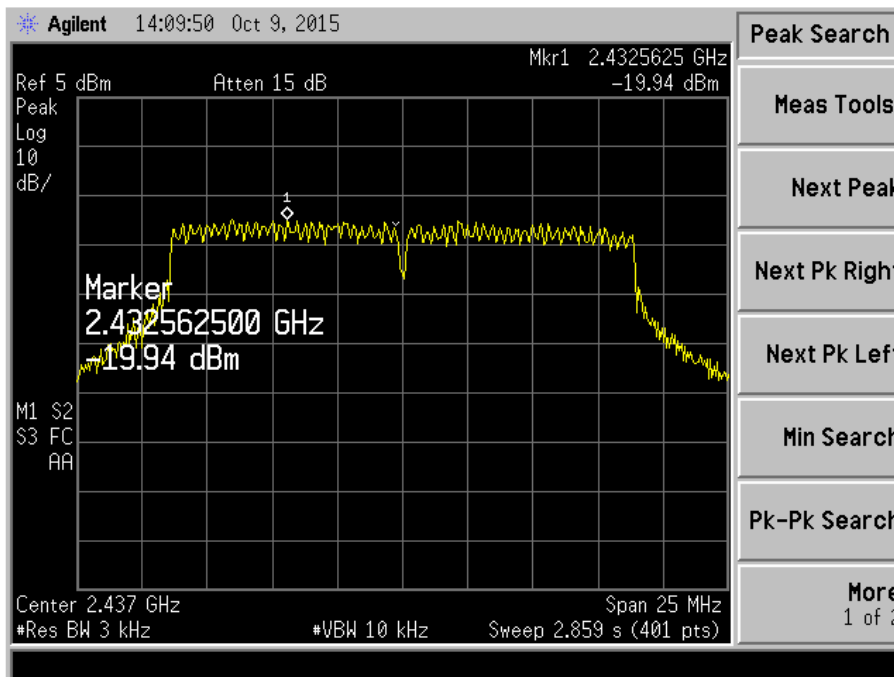
## 802.11g-High Channel



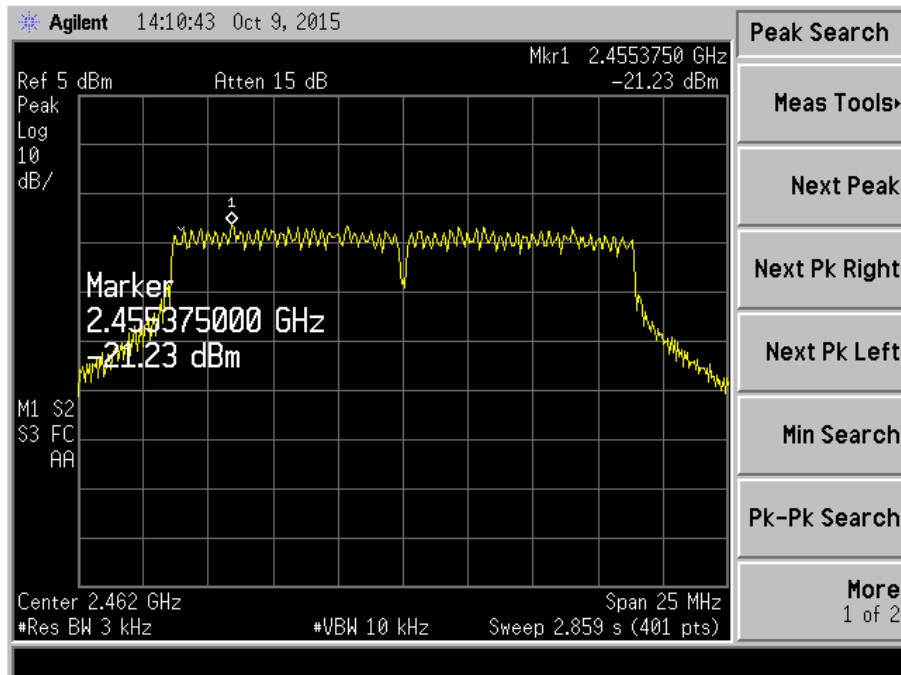
802.11n-HT20-Low Channel



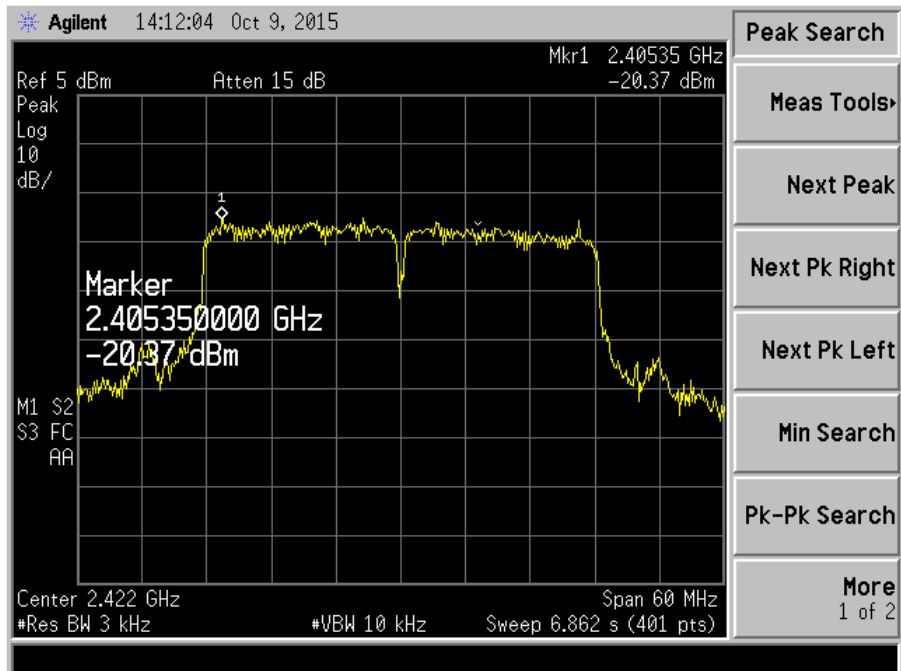
802.11n-HT20-Middle Channel



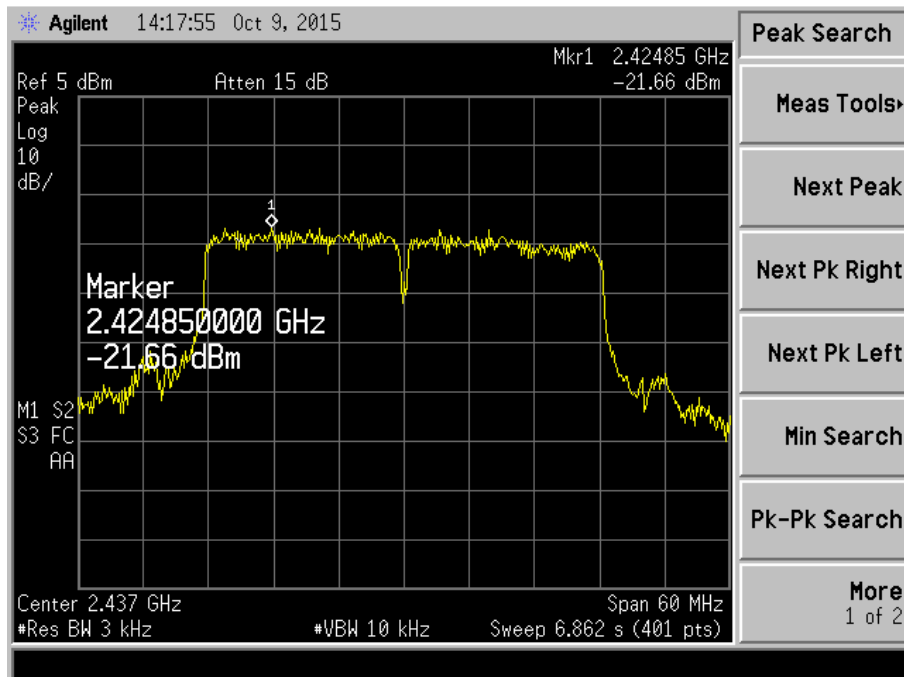
802.11n-HT20-High Channel



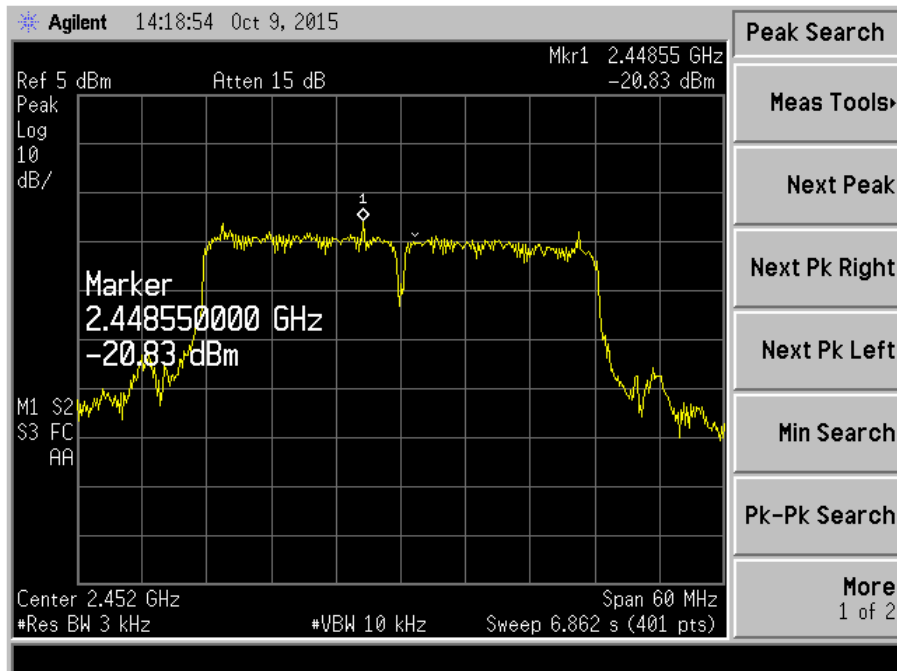
802.11n-HT40-Low Channel



802.11n-HT40-Middle Channel



802.11n-HT40-High Channel





## 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

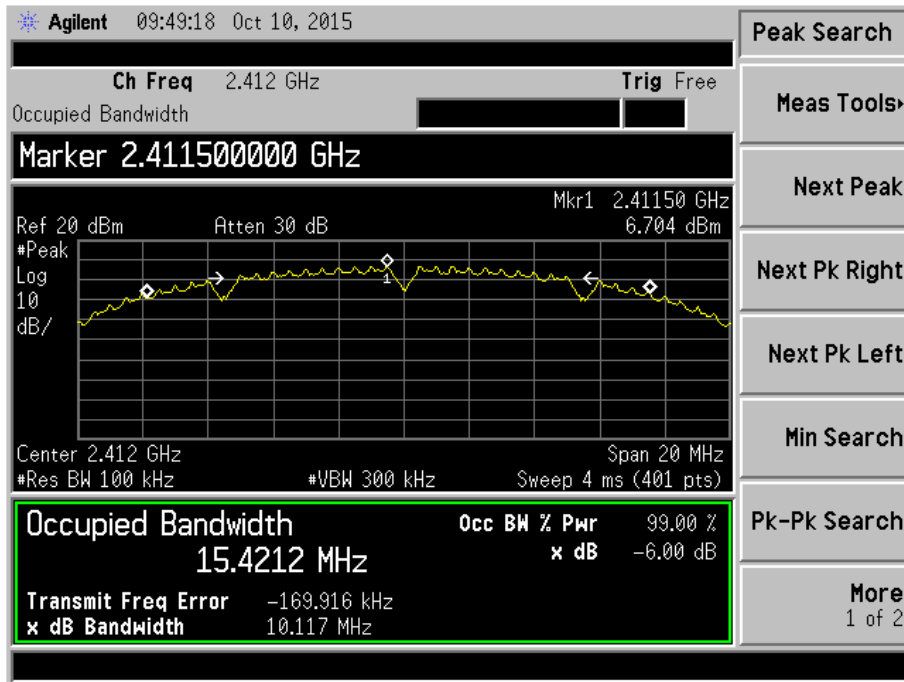
Temperature:	25° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

### 6.4 Summary of Test Results/Plots

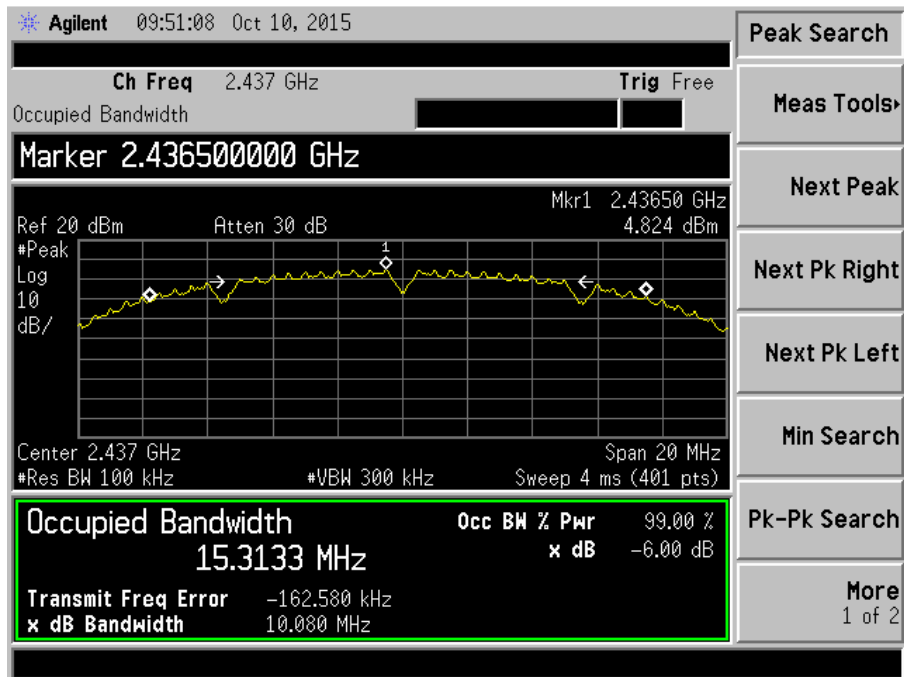
Test Mode	Test Channel MHz	6 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz
802.11b	2412	10117	15421.2	$\geq 500$
	2437	10080	15313.3	$\geq 500$
	2462	10097	15242.9	$\geq 500$
802.11g	2412	16516	17401.8	$\geq 500$
	2437	16528	17254.6	$\geq 500$
	2462	16528	16932.9	$\geq 500$
802.11n-HT20	2412	17784	18089.3	$\geq 500$
	2437	17804	18375.4	$\geq 500$
	2462	17808	18192.6	$\geq 500$
802.11n-HT40	2422	36379	36153.6	$\geq 500$
	2437	36219	36167.7	$\geq 500$
	2452	36414	36148.4	$\geq 500$

Please refer to the following test plots:

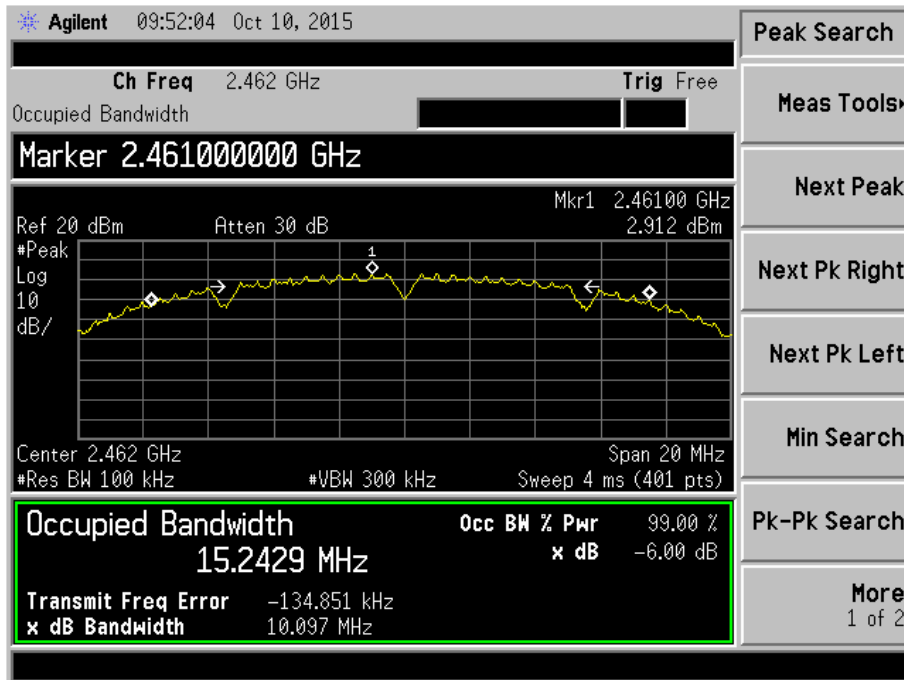
802.11b-Low Channel



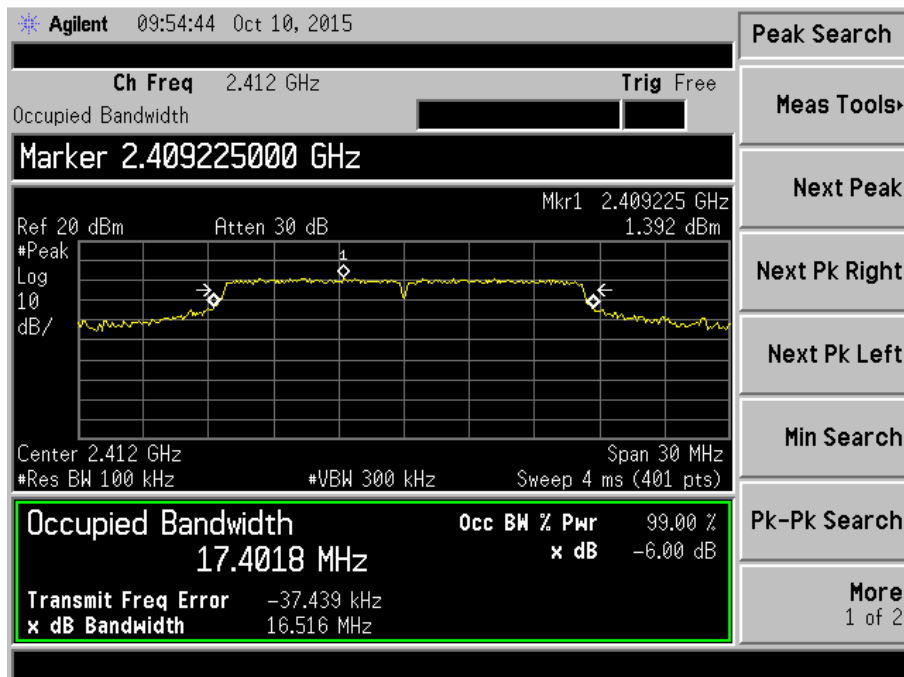
802.11b-Middle Channel



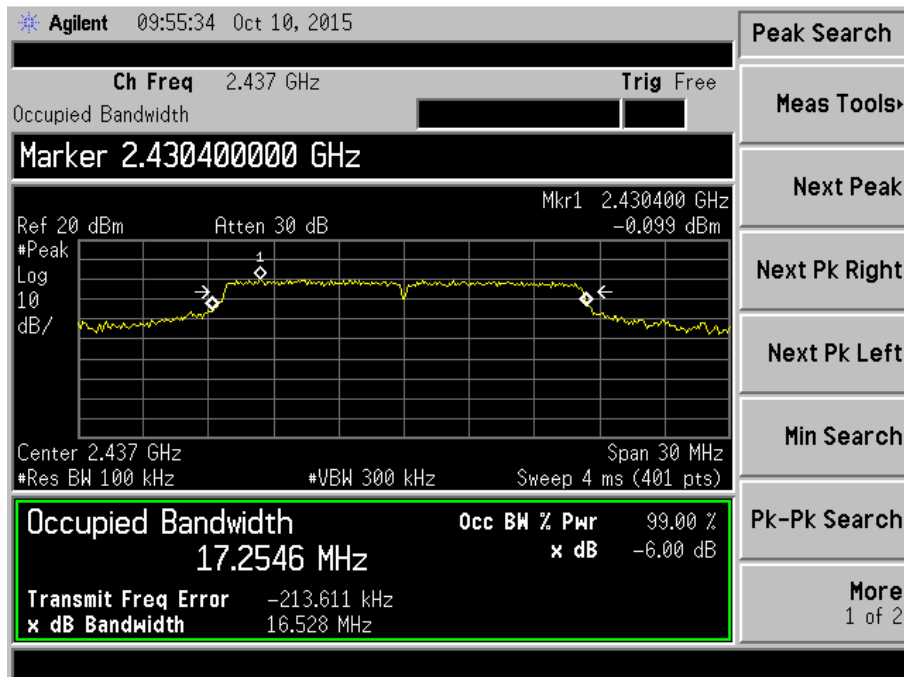
## 802.11b-High Channel



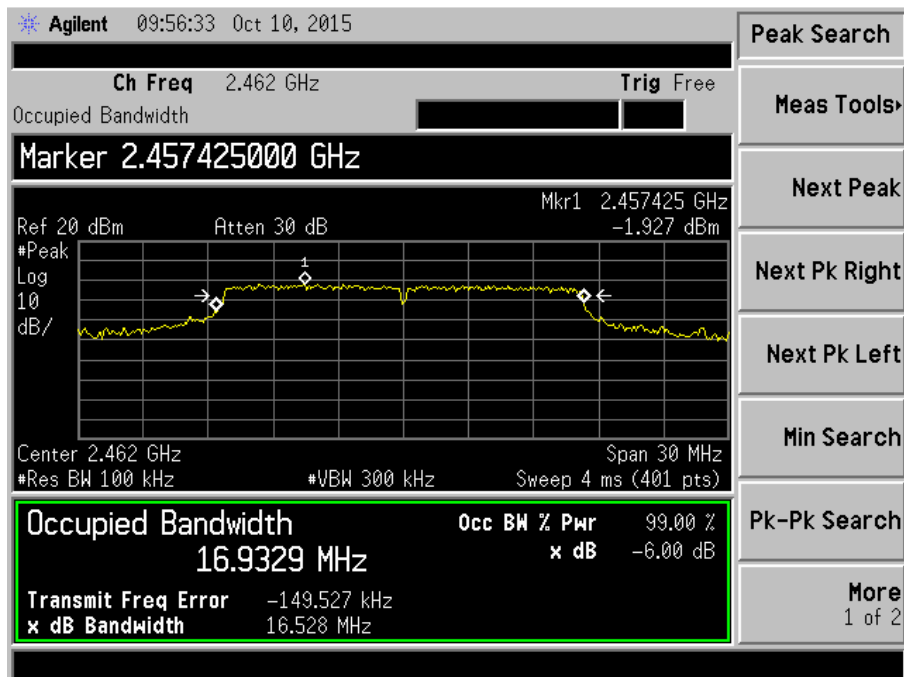
## 802.11g-Low Channel



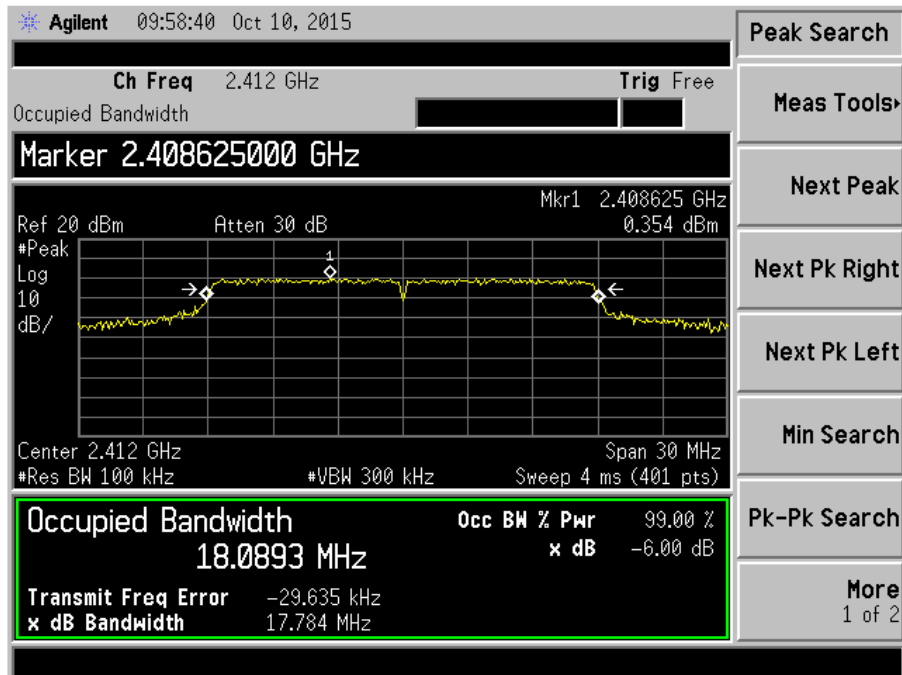
802.11g-Middle Channel



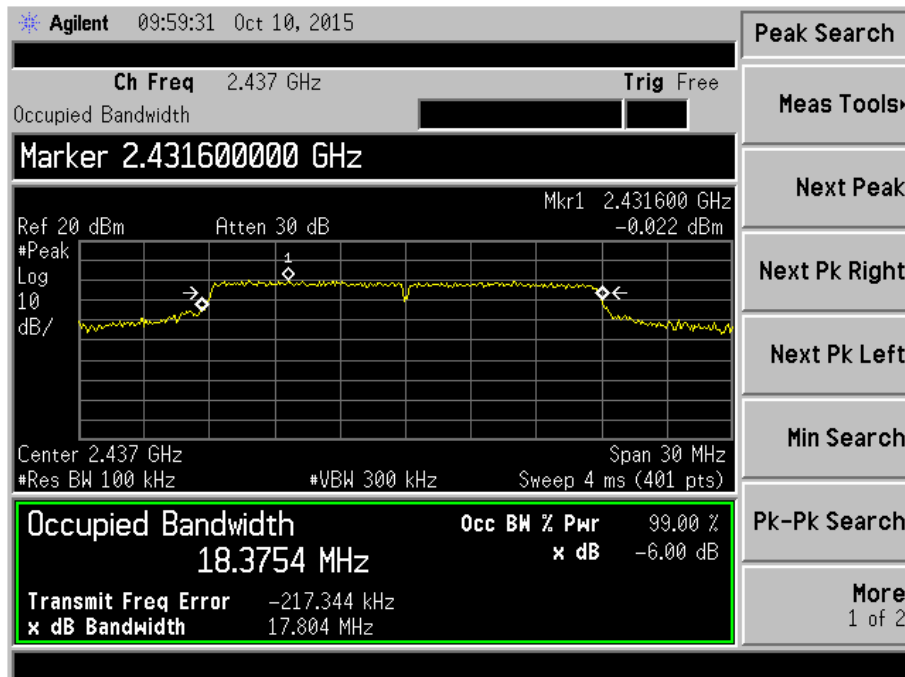
802.11g-High Channel



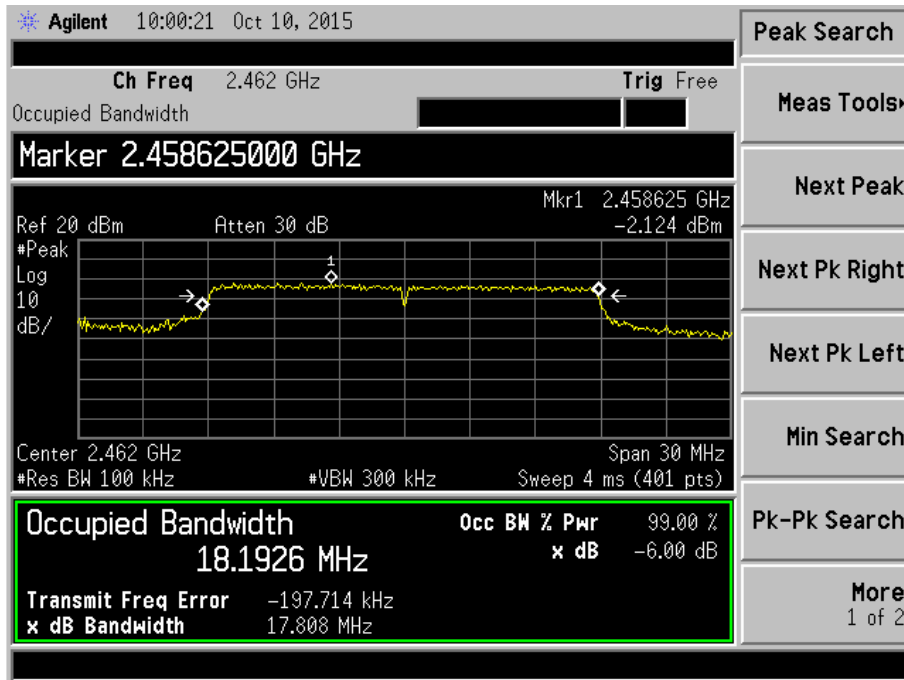
## 802.11n-HT20-Low Channel



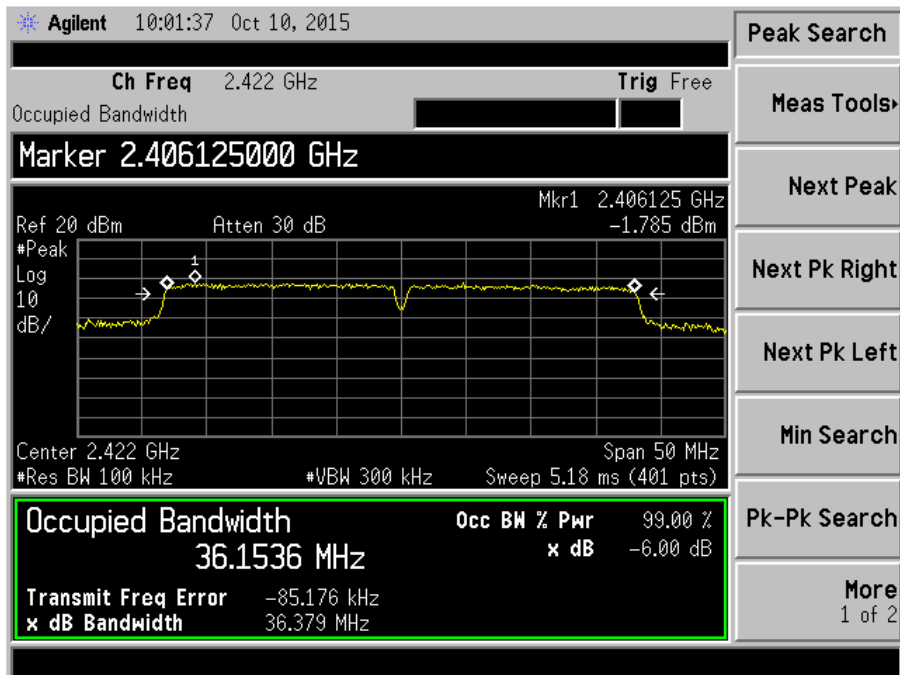
## 802.11n-HT20-Middle Channel



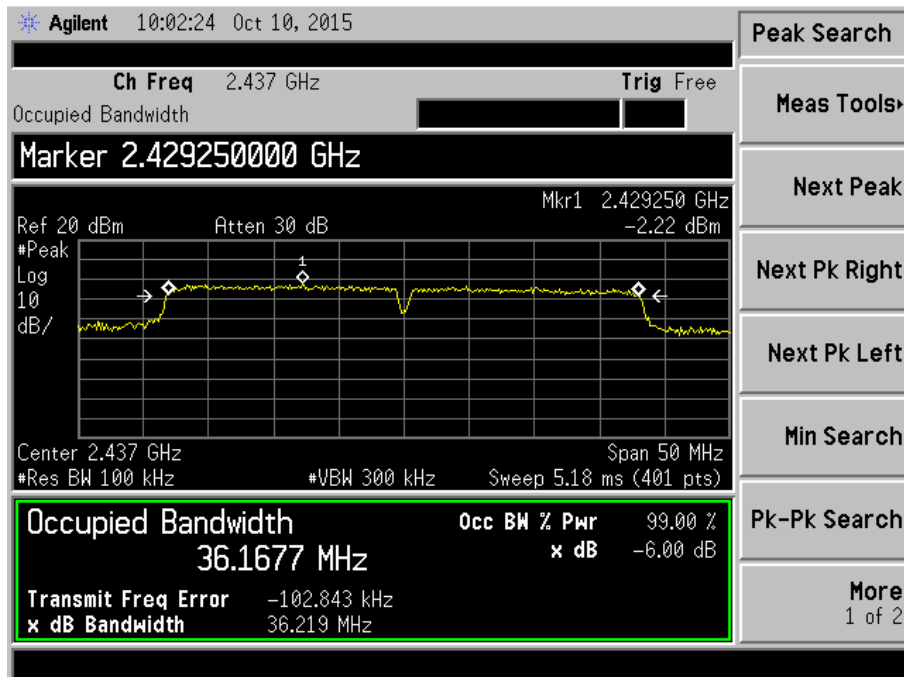
802.11n-HT20-High Channel



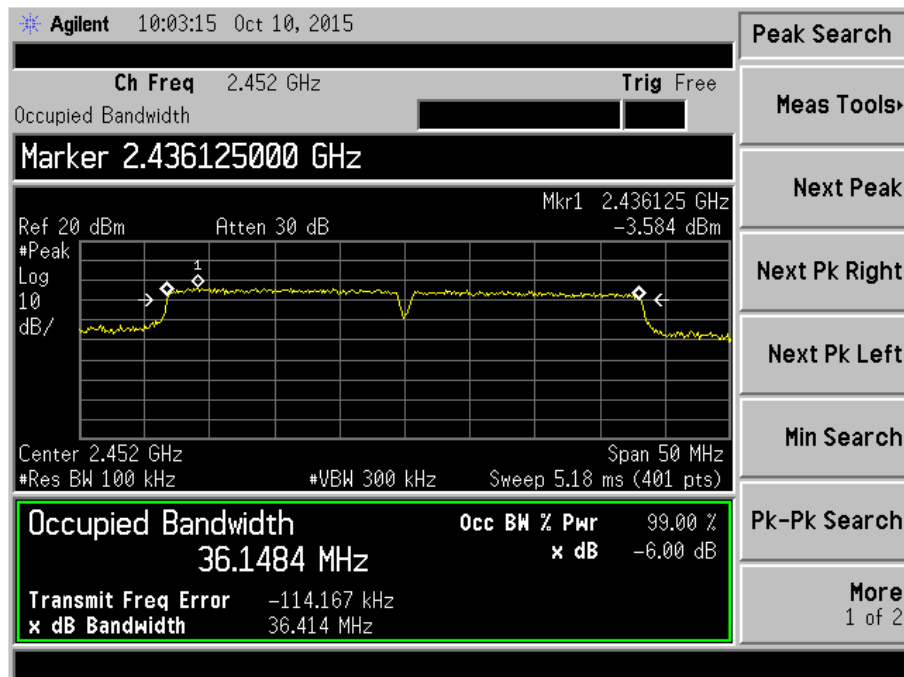
802.11n-HT40-Low Channel



## 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 section 15.247(b)-power output of the KDB-558074 D01 V03r03, 9.2.2.2 (channel integration method) When this option is exercised, the measured power is to be referenced to the OBW rather than the DTS bandwidth

- a) Set span to at least 1.5 times the OBW.
- b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
- c) Set VBW  $\geq 3 \times$  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

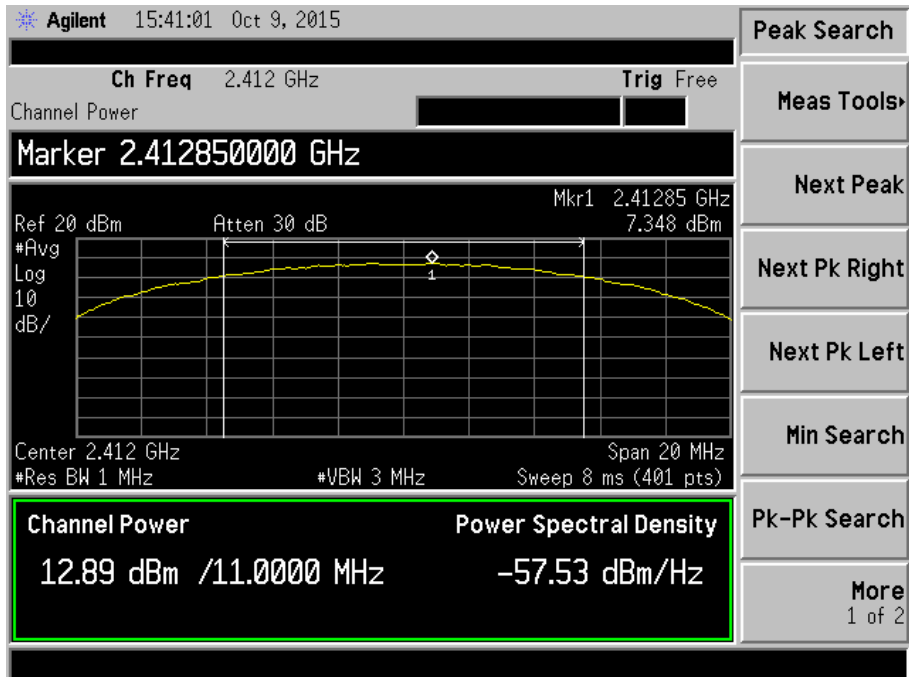


#### 7.4 Summary of Test Results/Plots

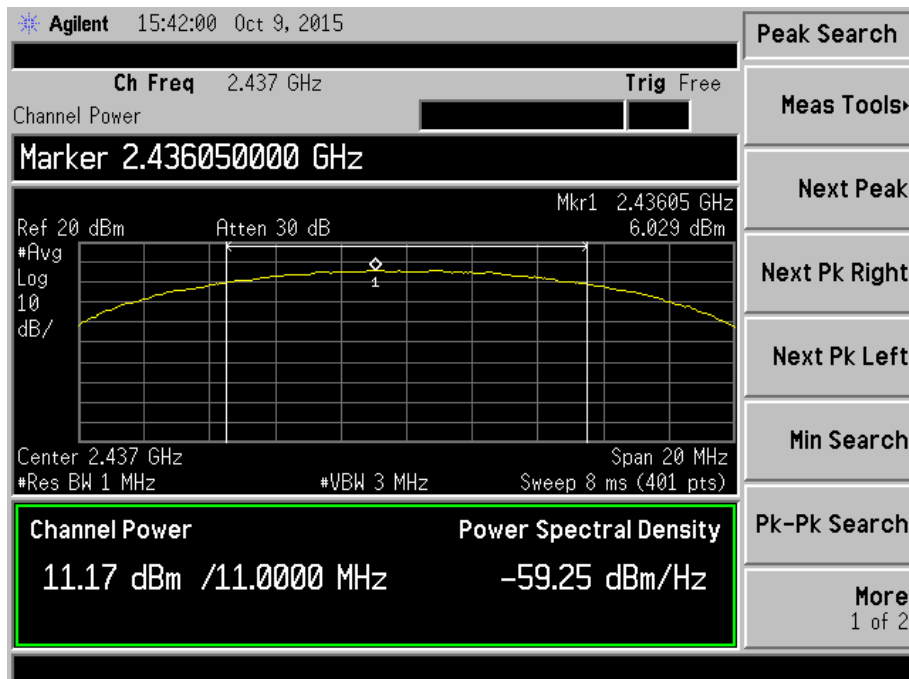
Test Mode	Frequency MHz	Reading dBm	Output Power mW	Limit mW
802.11b_1Mbps	2412	12.89	19.45	1000
	2437	11.17	13.09	1000
	2462	9.93	9.84	1000
802.11g_6Mbps	2412	11.96	15.70	1000
	2437	10.08	10.19	1000
	2462	8.55	7.16	1000
802.11n HT20_MCS0	2412	11.08	12.82	1000
	2437	10.31	10.74	1000
	2462	7.71	5.90	1000
802.11n HT40_MCS0	2422	11.51	14.16	1000
	2437	10.62	11.53	1000
	2452	9.47	8.85	1000

Please refer to the following test plots:

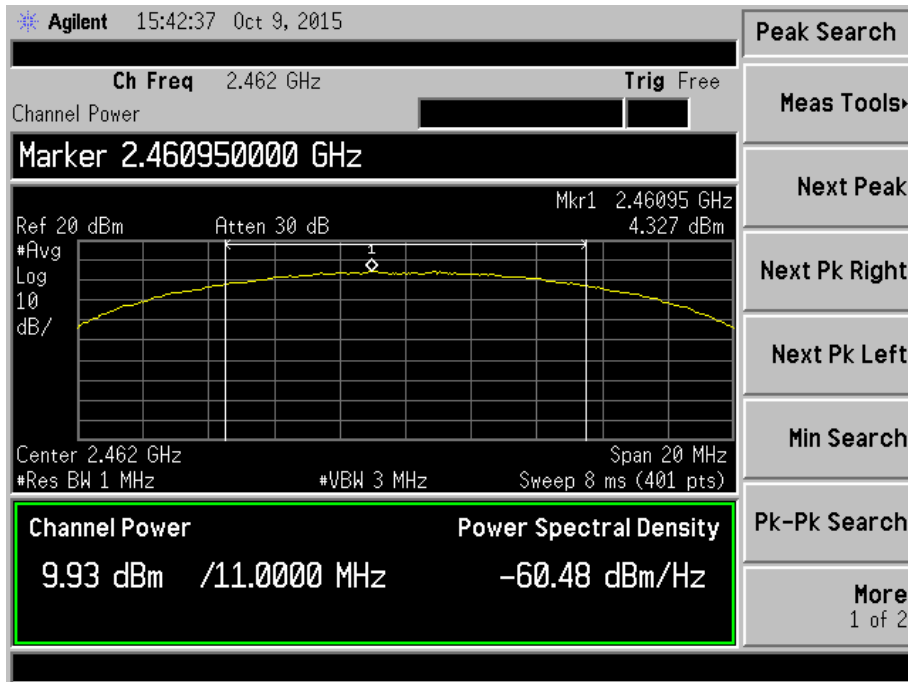
## 802.11b-1Mbps-Low Channel



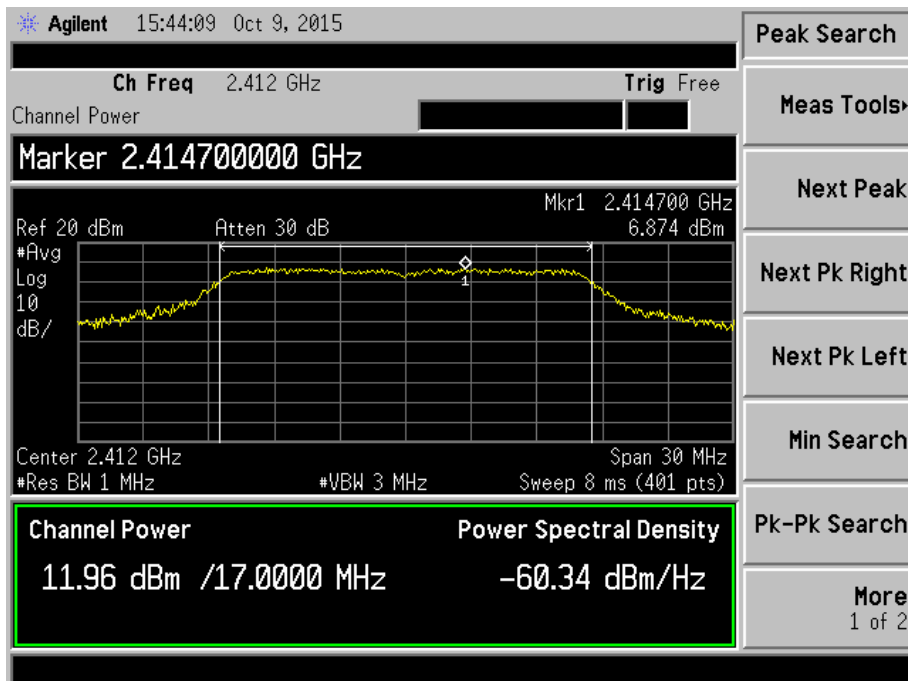
## 802.11b -1Mbps-Middle Channel



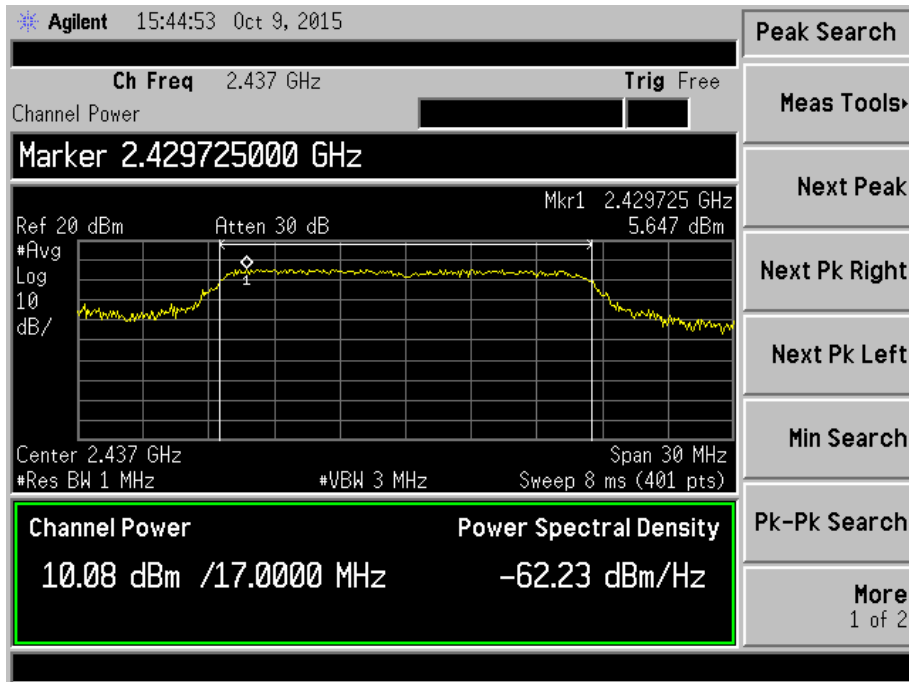
## 802.11b -1Mbps-High Channel



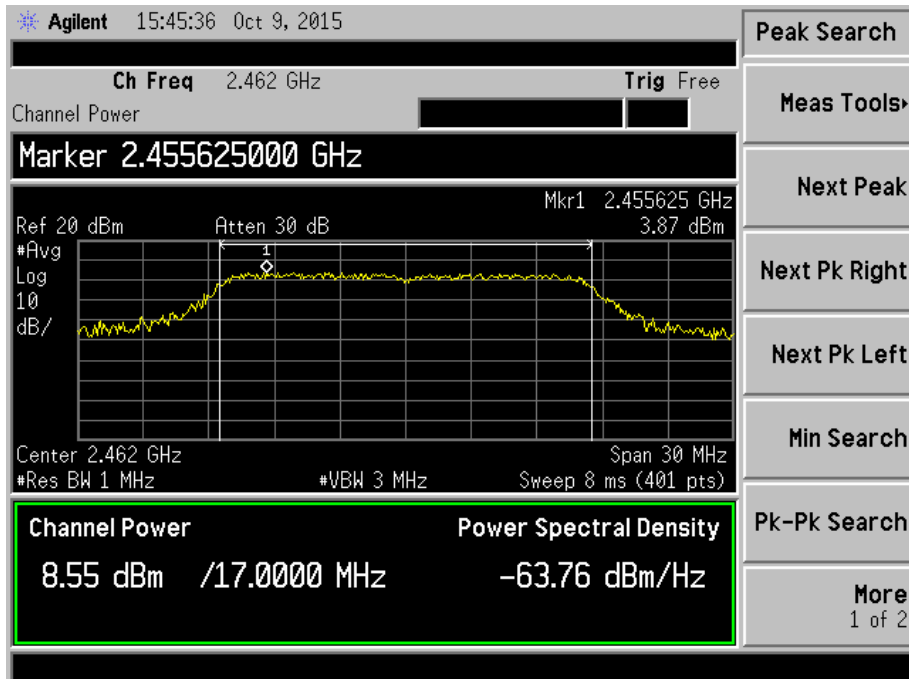
## 802.11g-6Mbps-Low Channel



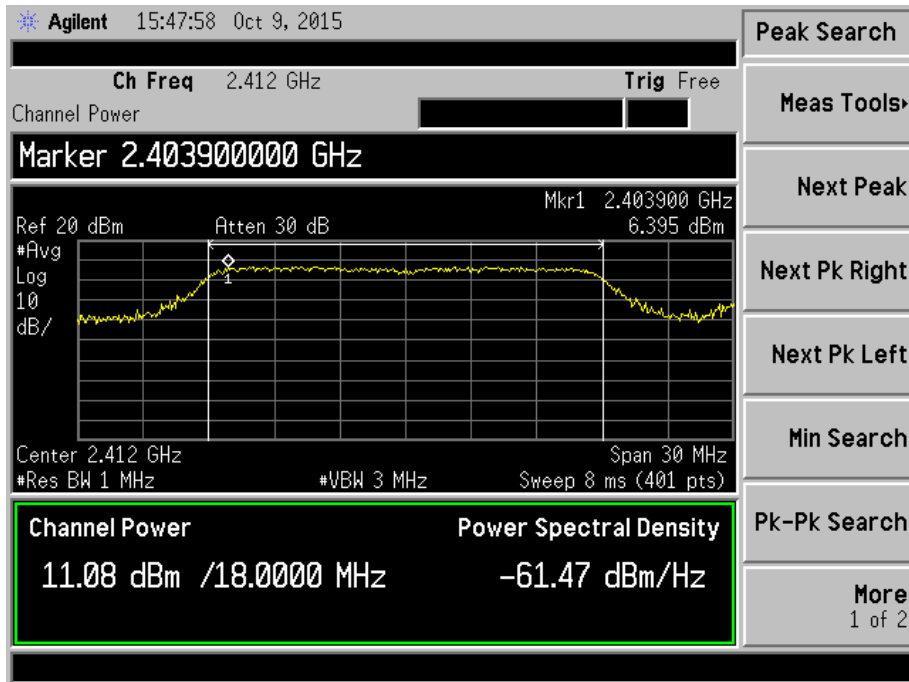
## 802.11g-6Mbps-Middle Channel



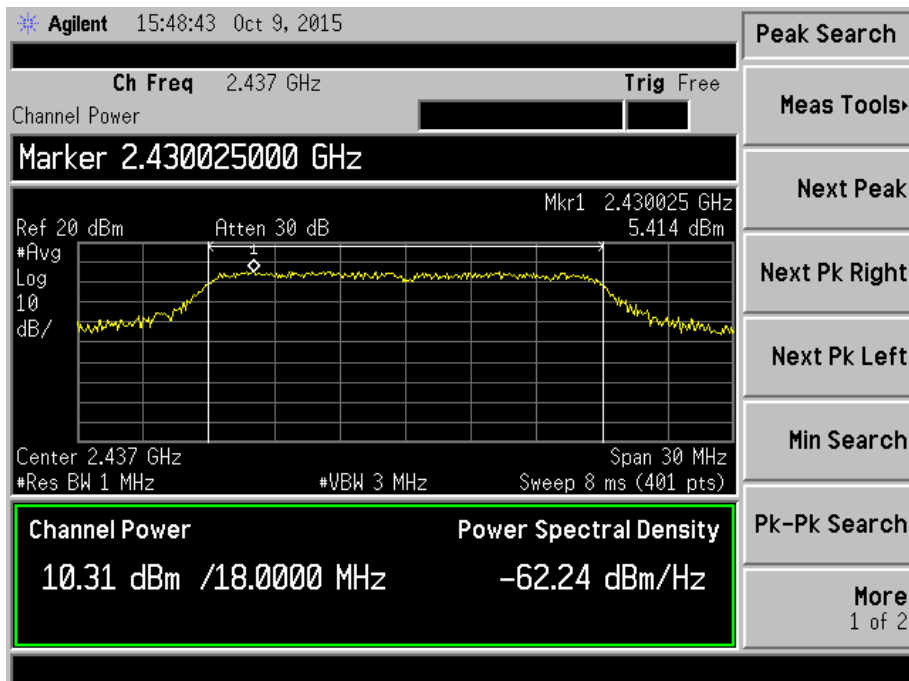
## 802.11g-6Mbps-High Channel



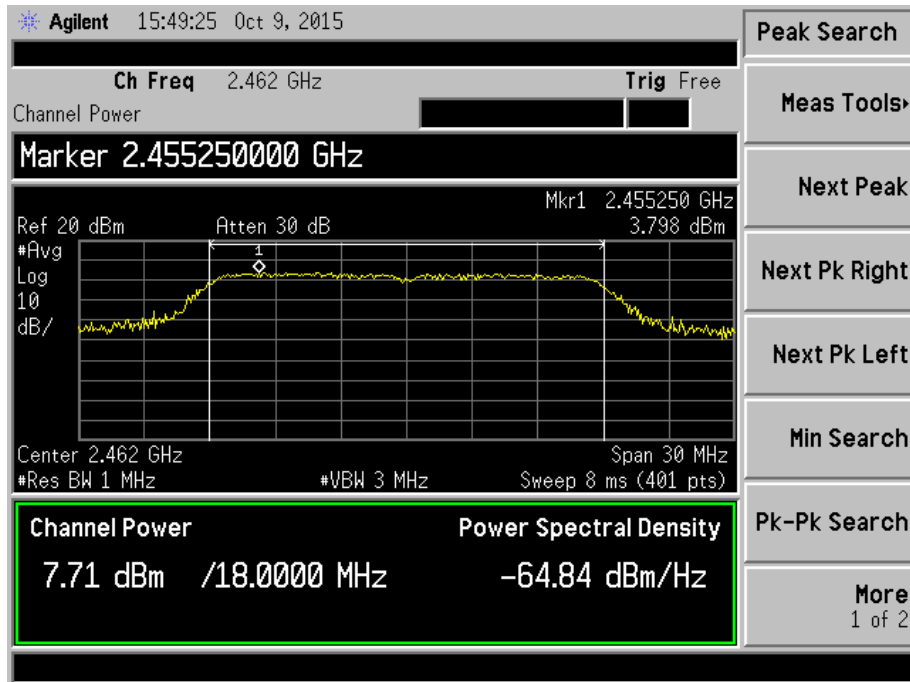
## 802.11n-HT20-MCS0-Low Channel



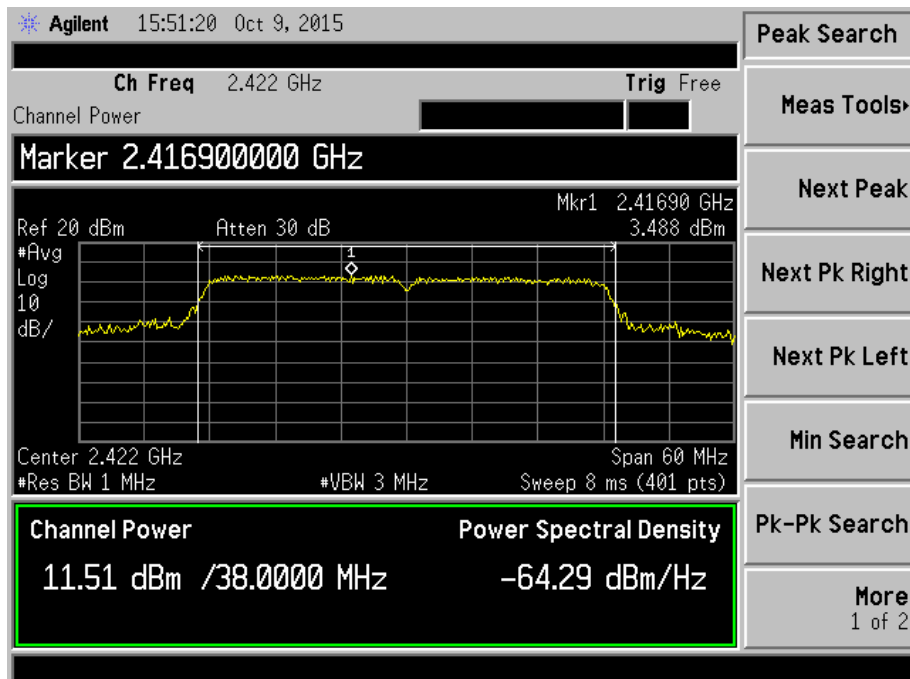
## 802.11n-HT20-MCS0-Middle Channel



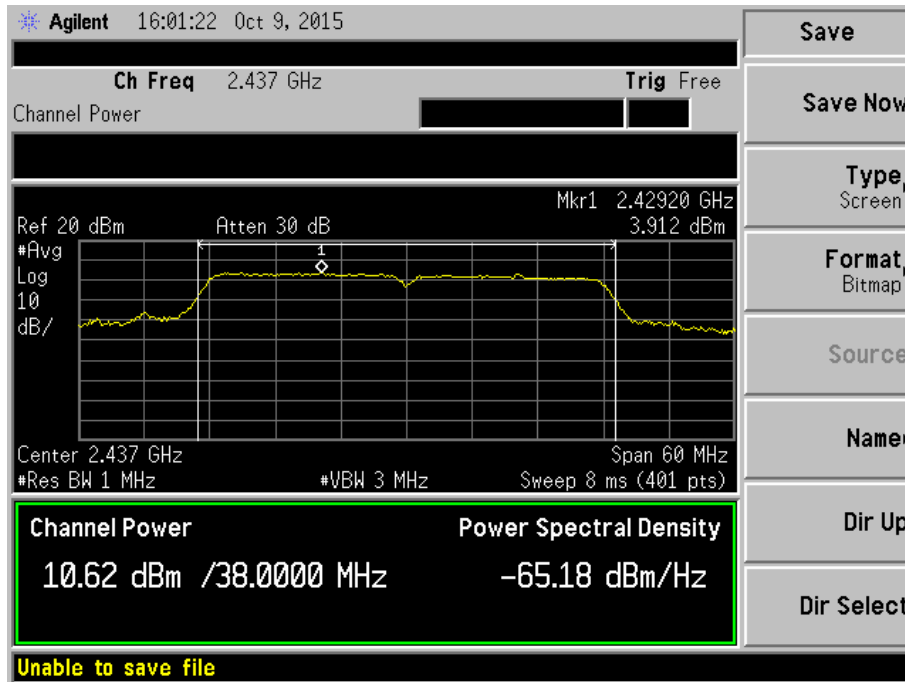
## 802.11n-HT20-MCS0-High Channel



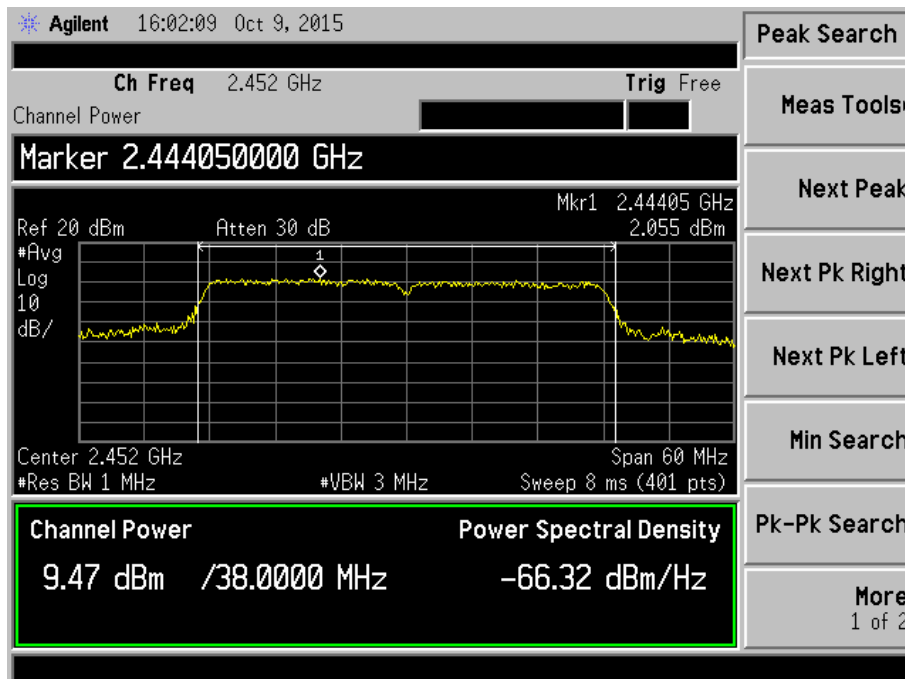
## 802.11n-HT40-MCS0-Low Channel



## 802.11n-HT40-MCS0-Middle Channel



## 802.11n-HT40-MCS0-High Channel



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## 8. Field Strength of Spurious Emissions

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### 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  $\pm 5.10$  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.

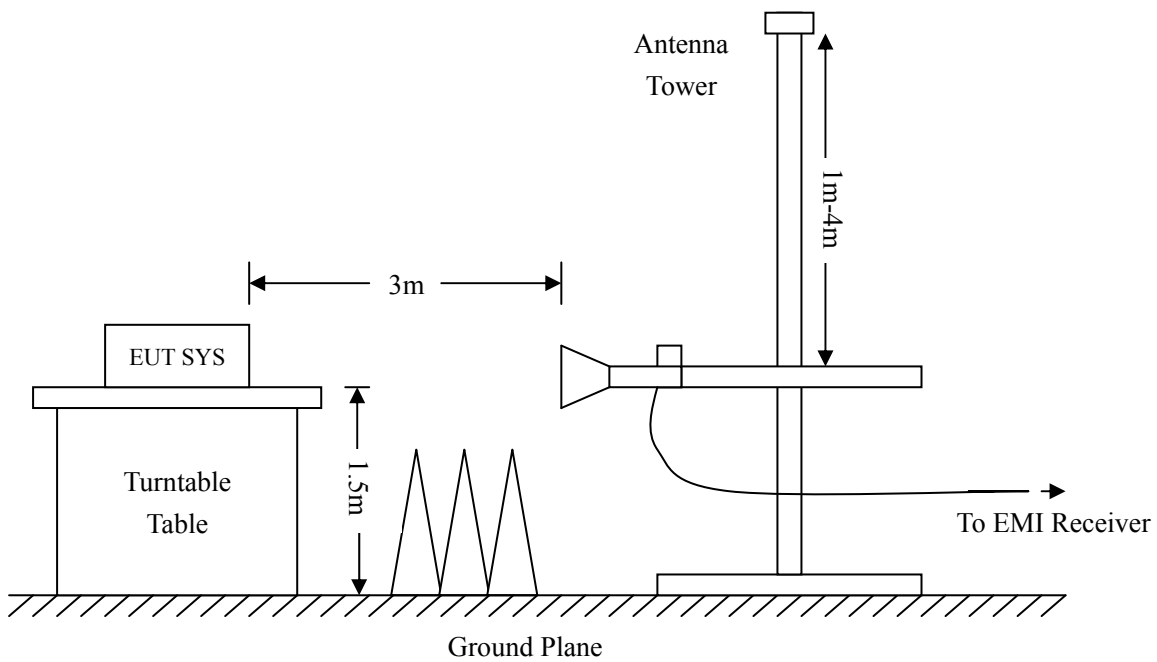
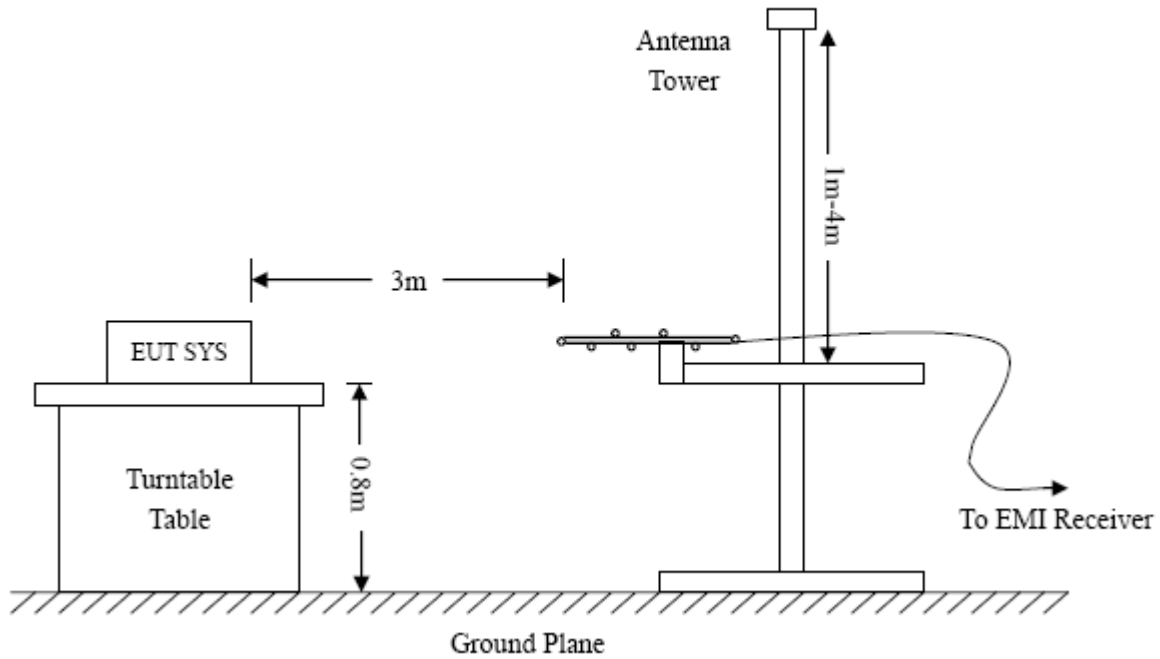
### 8.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.





Frequency :9kHz-30MHz  
 RBW=10KHz,  
 VBW =30KHz  
 Sweep time= Auto  
 Trace = max hold  
 Detector function = peak

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

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

## 8.4 Corrected Amplitude & Margin Calculation

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

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

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

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

## 8.5 Environmental Conditions

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

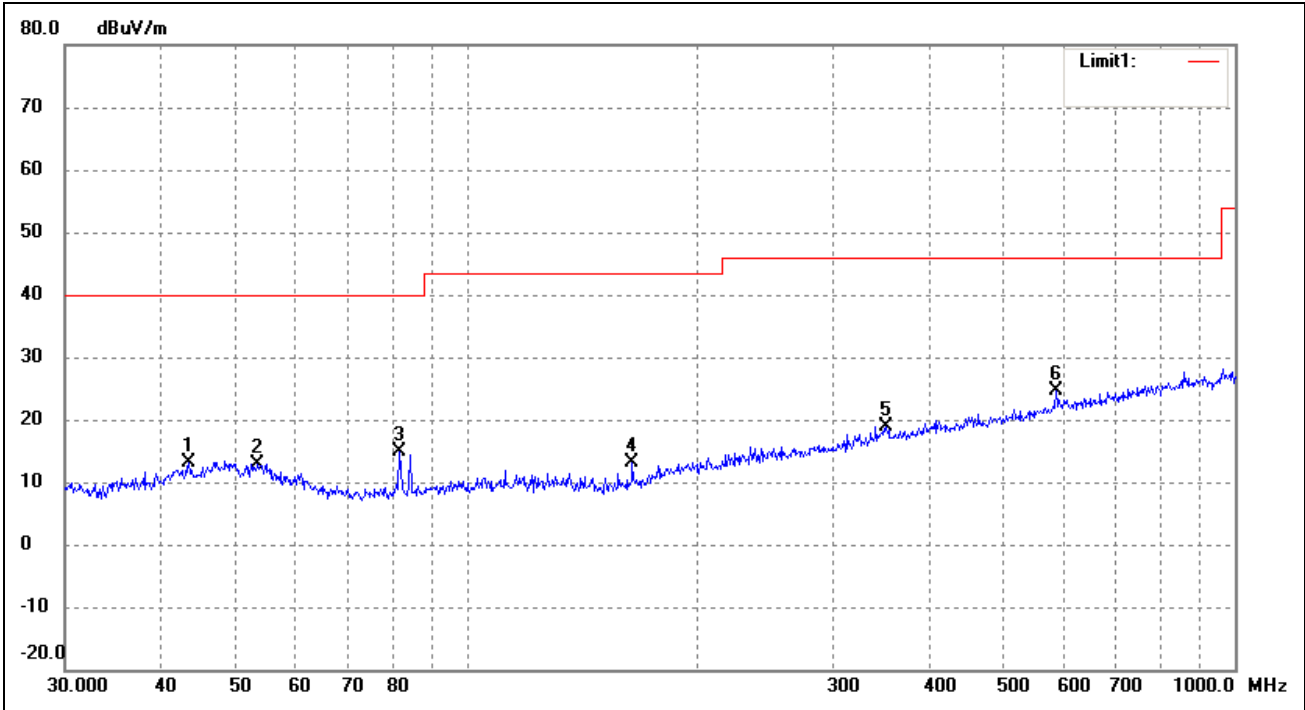
## 8.6 Summary of Test Results/Plots

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

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

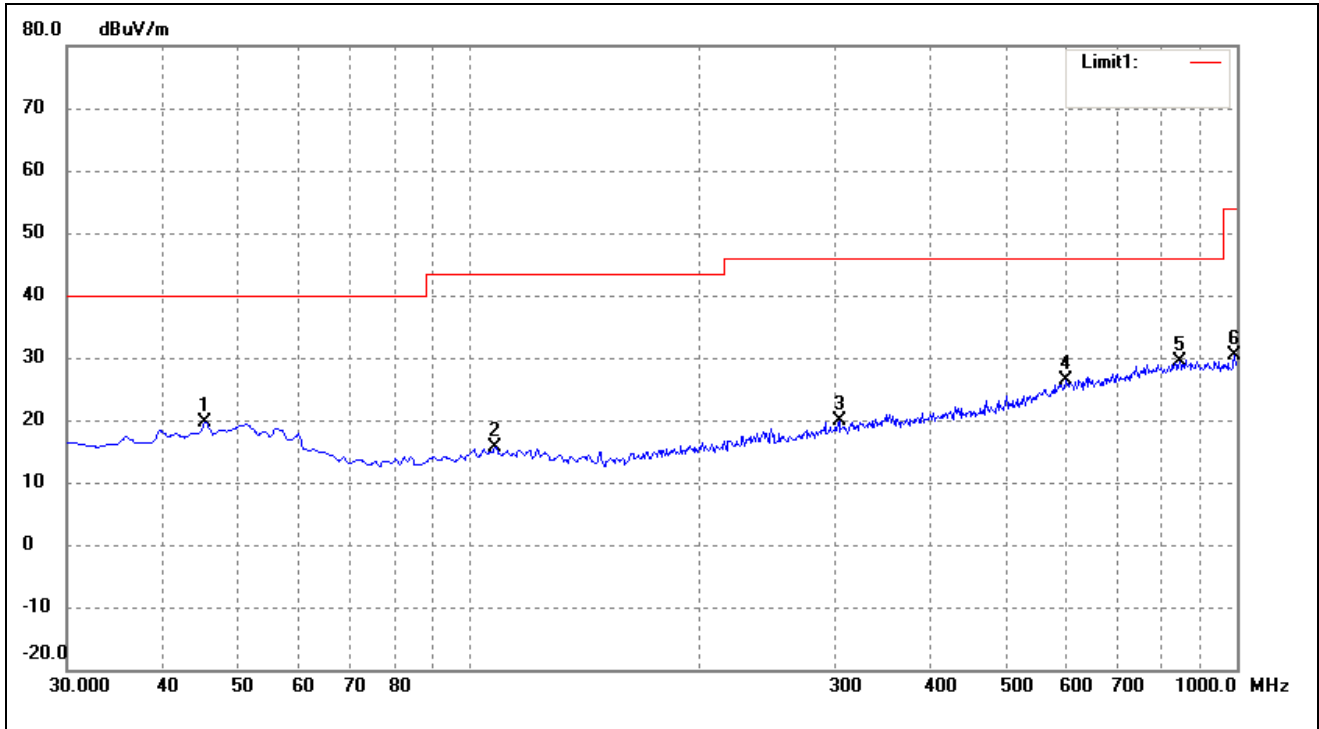
EUT: LM820 Wi-Fi SMT Module 802.11n 150Mbps  
 Tested Model: LM820-XXXX  
 Operating Condition: 802.11b Transmitting Low Channel-2412MHz  
 Comment: DC 3.3V

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	43.5057	22.40	-9.32	13.08	40.00	-26.92	114	100	peak
2	53.5052	22.03	-9.09	12.94	40.00	-27.06	270	100	peak
3	81.7833	27.10	-12.23	14.87	40.00	-25.13	164	100	peak
4	164.3302	23.41	-10.35	13.06	43.50	-30.44	275	100	peak
5	351.7079	22.00	-3.11	18.89	46.00	-27.11	360	100	peak
6	584.7895	23.44	1.24	24.68	46.00	-21.32	116	100	peak

Test Specification: Vertical

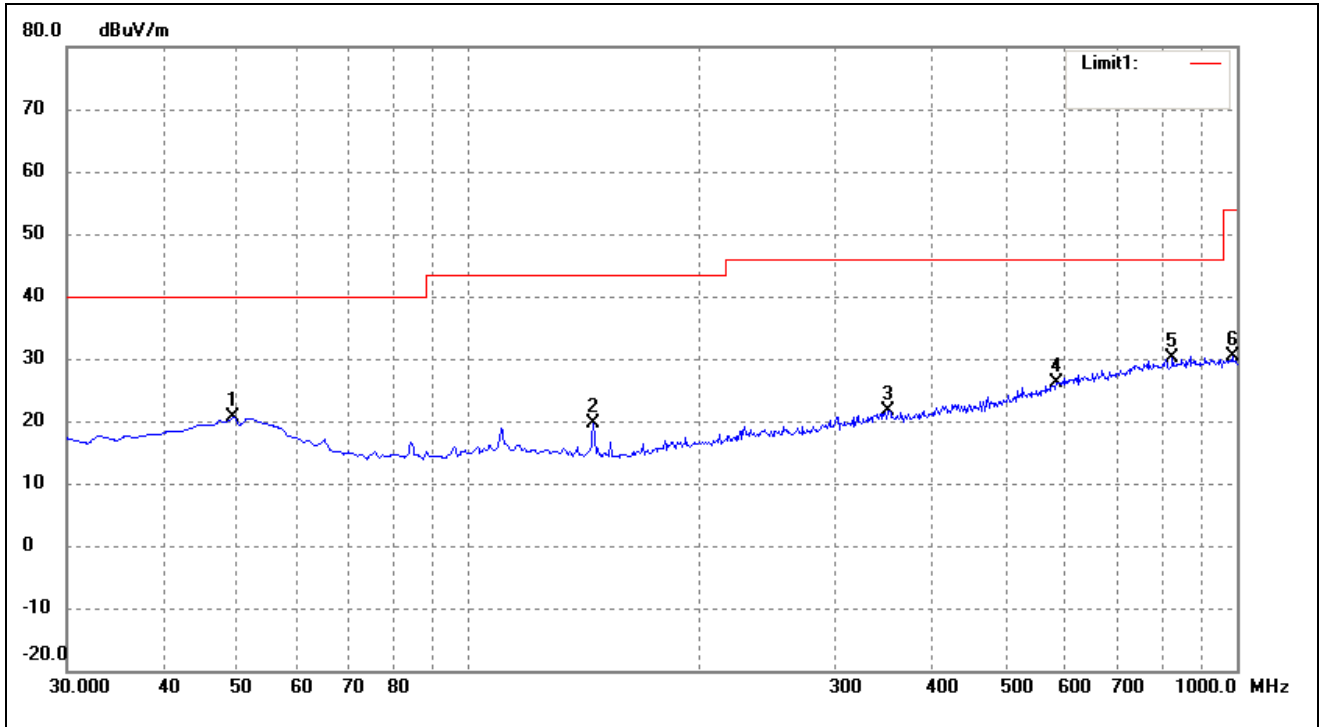


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	45.5200	41.21	-21.50	19.71	40.00	-20.29	178	100	peak
2	108.5700	40.70	-25.06	15.64	43.50	-27.86	224	100	peak
3	304.5100	41.24	-21.26	19.98	46.00	-26.02	183	100	peak
4	601.3300	41.32	-14.82	26.50	46.00	-19.50	271	100	peak
5	842.8600	41.77	-12.48	29.29	46.00	-16.71	160	100	peak
6	995.1500	42.20	-11.86	30.34	54.00	-23.66	299	100	peak

Operating Condition: 802.11b Transmitting Middle Channel-2437MHz

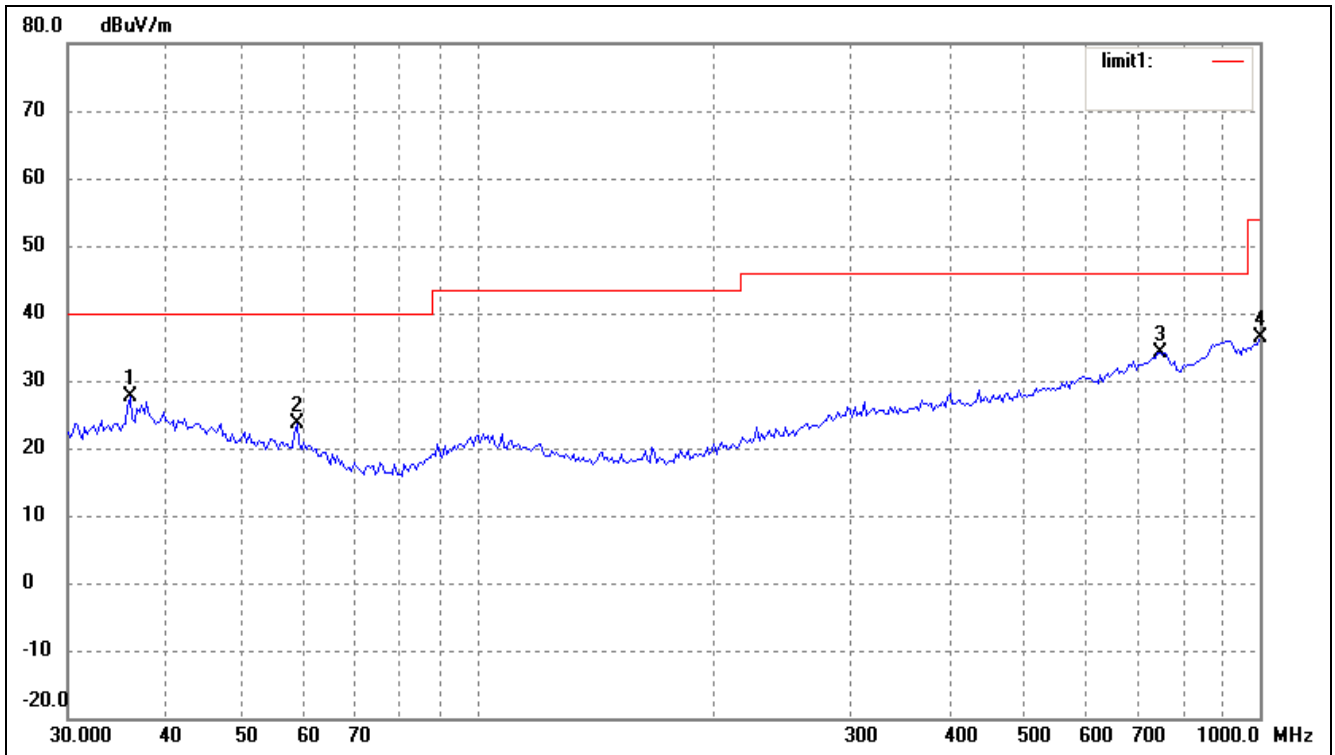
Comment: DC 3.3V

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	49.4000	41.67	-20.97	20.70	40.00	-19.30	360	100	peak
2	145.4300	45.80	-26.18	19.62	43.50	-23.88	360	100	peak
3	352.0400	41.73	-20.00	21.73	46.00	-24.27	360	100	peak
4	583.8700	41.70	-15.50	26.20	46.00	-19.80	360	100	peak
5	827.3400	42.75	-12.51	30.24	46.00	-15.76	360	100	peak
6	988.3600	42.22	-11.92	30.30	54.00	-23.70	360	100	peak

Test Specification: Vertical

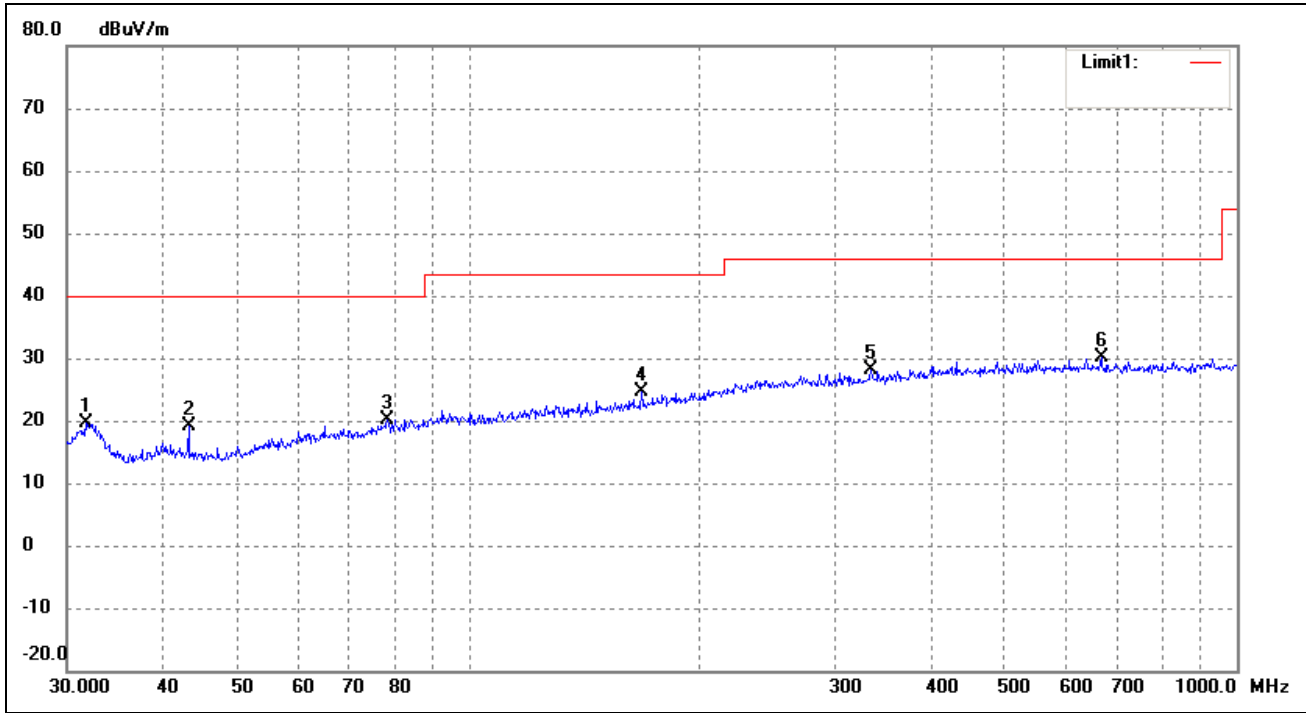


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	36.0007	18.59	9.04	27.63	40.00	-12.37	256	100	peak
2	58.8185	17.75	5.81	23.56	40.00	-16.44	360	100	peak
3	744.8661	16.16	17.95	34.11	46.00	-11.89	360	100	peak
4	1000.000	16.41	19.90	36.31	54.00	-17.69	360	100	peak

Operating Condition: 802.11b Transmitting High Channel-2462MHz

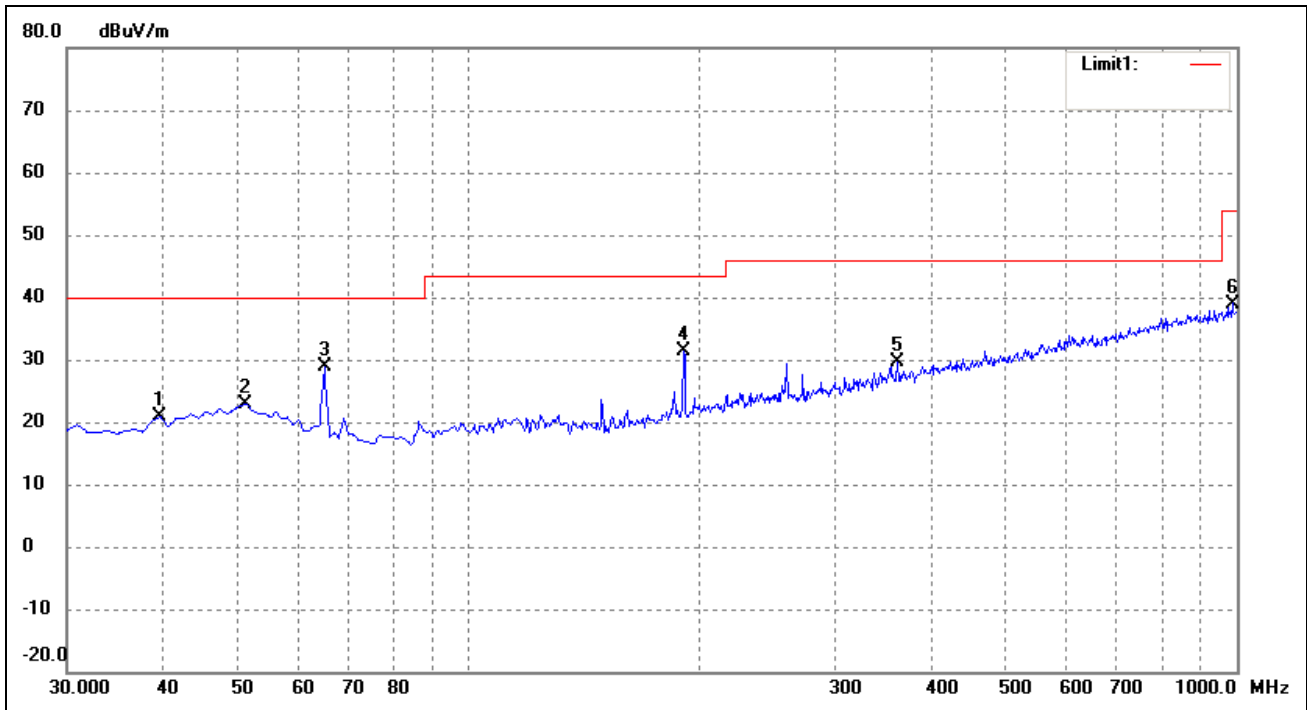
Comment: DC 3.3V

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	31.7313	30.57	-11.06	19.51	40.00	-20.49	360	100	peak
2	43.2017	28.46	-9.36	19.10	40.00	-20.90	225	100	peak
3	78.5000	32.40	-12.31	20.09	40.00	-19.91	160	100	peak
4	167.8243	34.86	-10.18	24.68	43.50	-18.82	360	100	peak
5	334.5800	31.85	-3.83	28.02	46.00	-17.98	225	100	peak
6	667.2900	27.69	2.46	30.15	46.00	-15.85	160	100	peak

Test Specification: Vertical

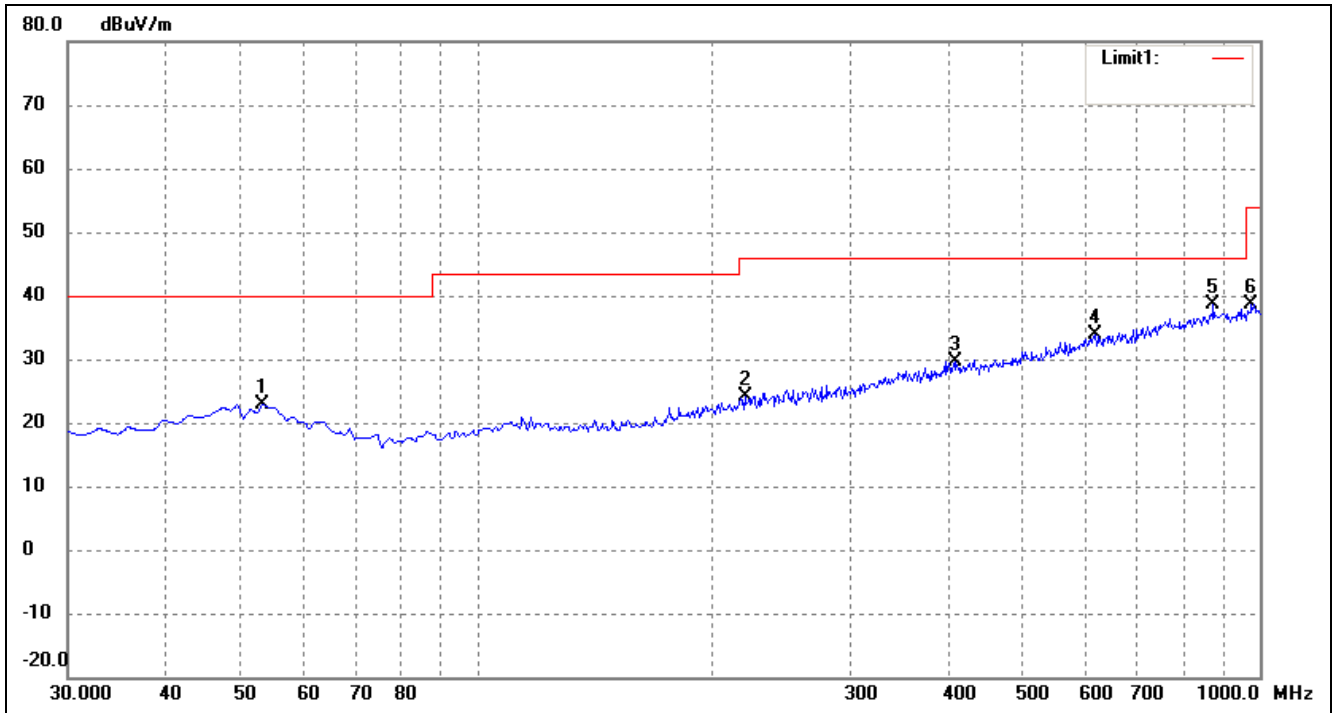


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	39.7000	30.74	-9.88	20.86	40.00	-19.14	360	100	peak
2	51.3400	31.59	-8.64	22.95	40.00	-17.05	360	100	peak
3	64.9200	40.41	-11.48	28.93	40.00	-11.07	360	100	peak
4	191.0200	39.84	-8.41	31.43	43.50	-12.07	360	100	peak
5	362.7100	32.74	-3.16	29.58	46.00	-16.42	360	100	peak
6	986.4200	32.68	6.32	39.00	54.00	-15.00	360	100	peak



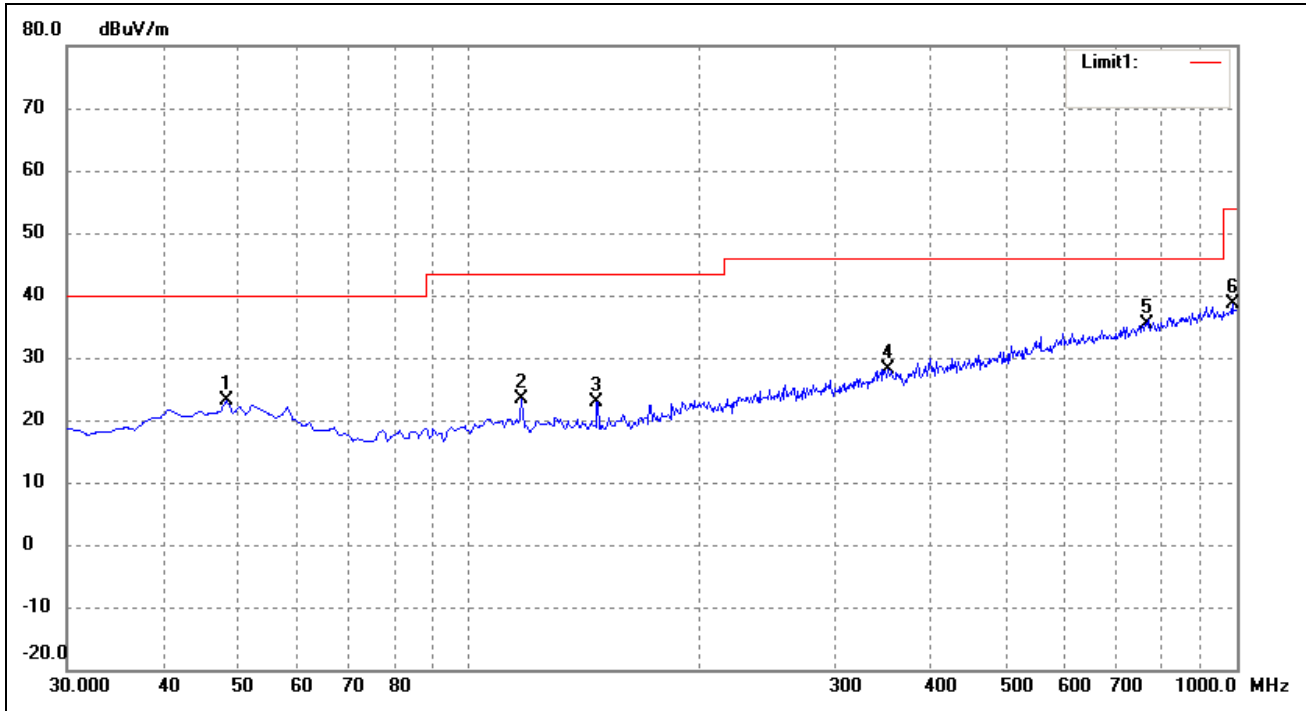
**Plot of Radiated Emissions Test Data (30MHz to 1GHz)**

EUT: LM820 Wi-Fi SMT Module 802.11n 150Mbps  
 Tested Model: LM820-XXXX  
 Operating Condition: 802.11g Transmitting Low Channel-2412MHz  
 Comment: DC 3.3V  
 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	53.2800	32.01	-9.03	22.98	40.00	-17.02	177	100	peak
2	220.1200	31.44	-7.30	24.14	46.00	-21.86	90	100	peak
3	409.2700	31.69	-2.04	29.65	46.00	-16.35	336	100	peak
4	617.8200	32.20	1.80	34.00	46.00	-12.00	336	100	peak
5	874.8700	33.20	5.34	38.54	46.00	-7.46	336	100	peak
6	978.6600	32.34	6.23	38.57	54.00	-15.43	336	100	peak

Test Specification: Vertical

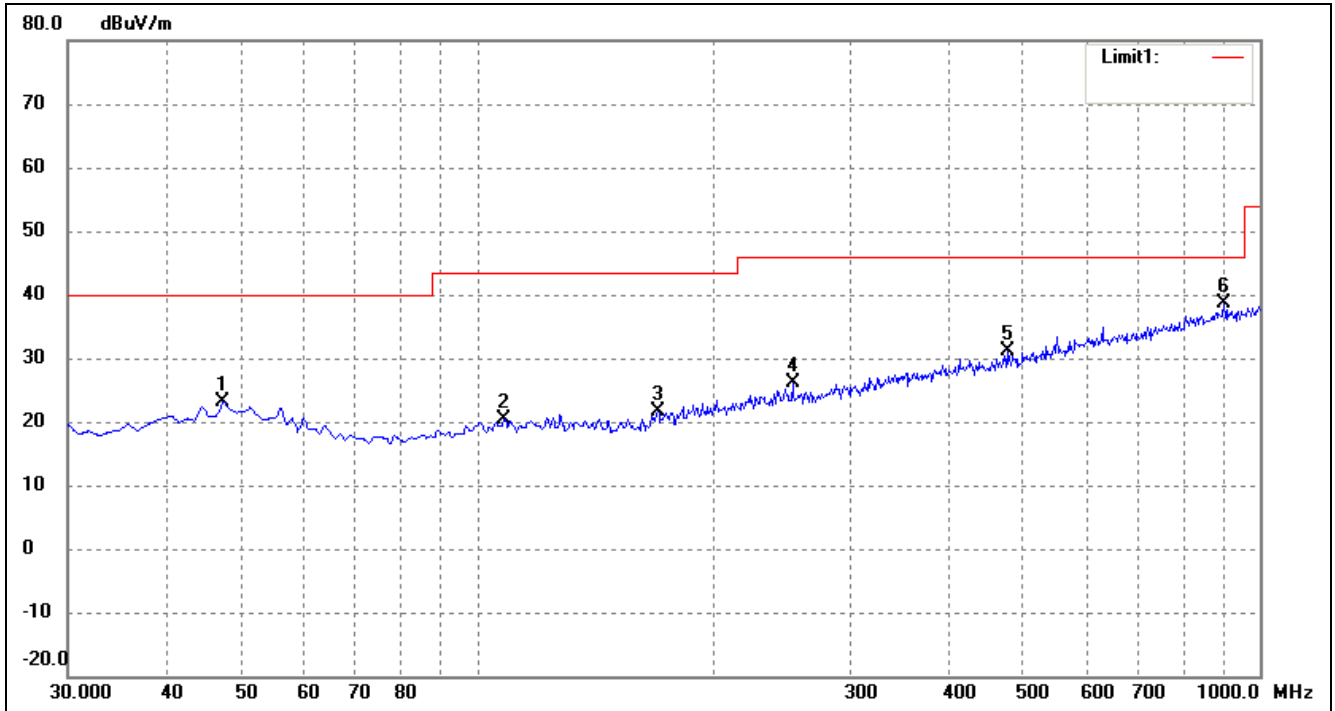


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	48.4300	31.73	-8.59	23.14	40.00	-16.86	360	100	peak
2	117.3000	33.95	-10.56	23.39	43.50	-20.11	360	100	peak
3	147.3700	33.96	-11.00	22.96	43.50	-20.54	360	100	peak
4	352.0400	31.20	-3.12	28.08	46.00	-17.92	360	100	peak
5	765.2600	31.45	4.04	35.49	46.00	-10.51	360	100	peak
6	987.3900	32.30	6.33	38.63	54.00	-15.37	360	100	peak

Operating Condition: 802.11g Transmitting Middle Channel-2437MHz

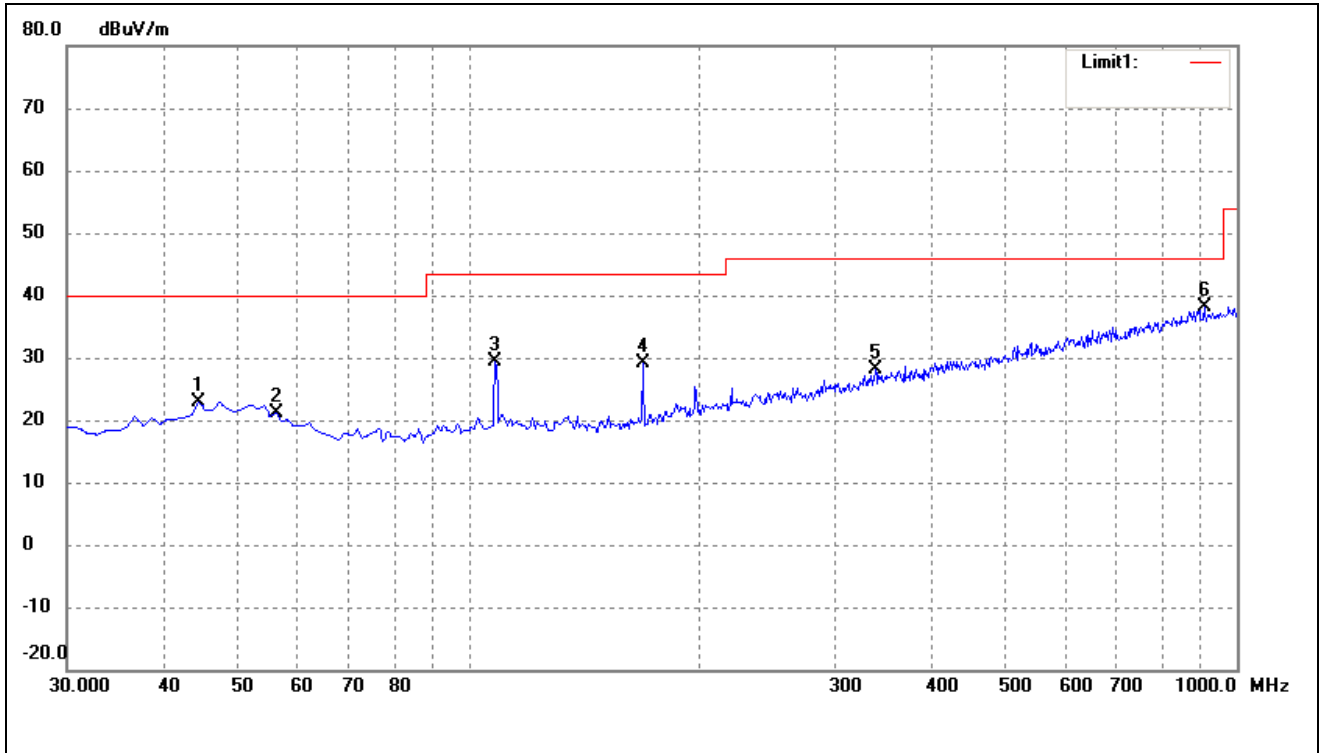
Comment: DC 3.3V

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	47.4600	31.86	-8.72	23.14	40.00	-16.86	228	200	peak
2	108.5700	31.01	-10.57	20.44	43.50	-23.06	130	200	peak
3	170.6500	31.59	-10.03	21.56	43.50	-21.94	360	100	peak
4	253.1000	32.28	-6.12	26.16	46.00	-19.84	228	200	peak
5	476.2000	32.33	-1.11	31.22	46.00	-14.78	130	200	peak
6	902.0300	33.03	5.66	38.69	46.00	-7.31	360	100	peak

Test Specification: Vertical

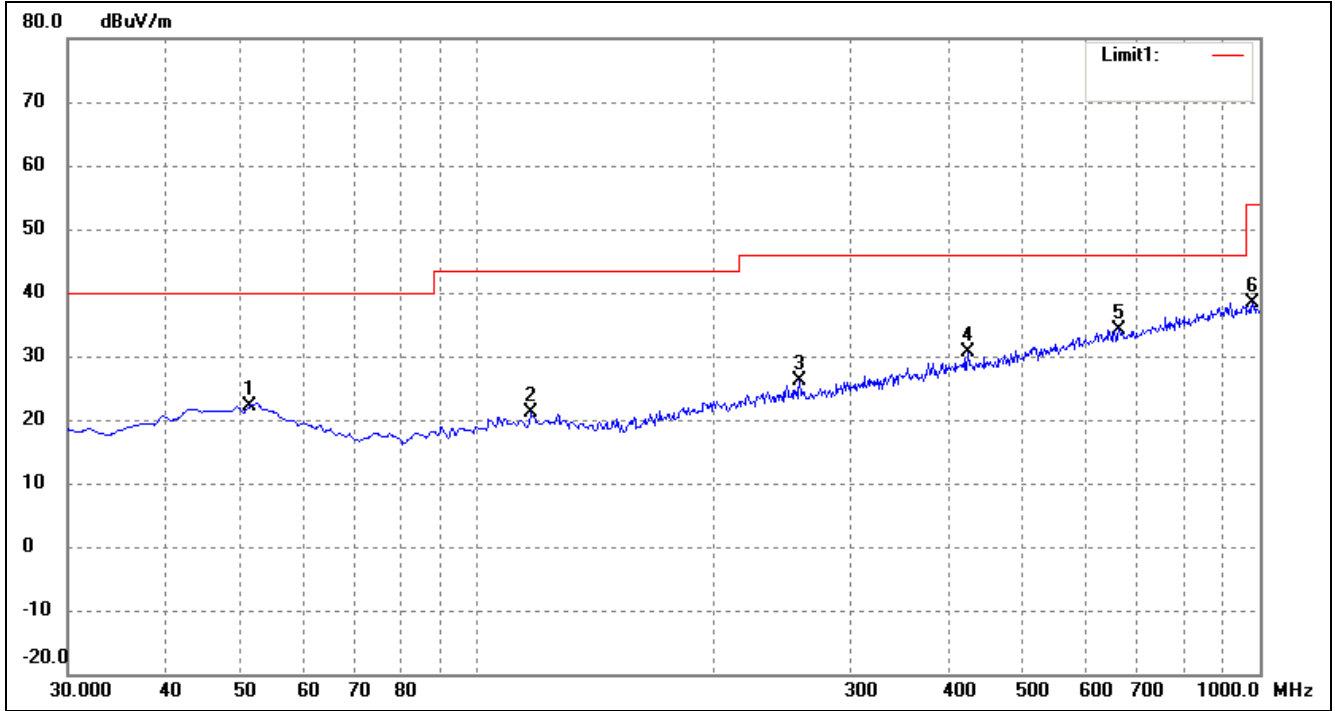


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	44.5500	32.07	-9.16	22.91	40.00	-17.09	360	100	peak
2	56.1974	30.75	-9.65	21.10	40.00	-18.90	255	100	peak
3	108.5700	39.85	-10.57	29.28	43.50	-14.22	270	100	peak
4	168.7100	39.26	-10.13	29.13	43.50	-14.37	180	100	peak
5	339.4300	31.80	-3.60	28.20	46.00	-17.80	270	100	peak
6	907.8500	32.31	5.70	38.01	46.00	-7.99	180	100	peak

Operating Condition: 802.11g Transmitting High Channel-2462MHz

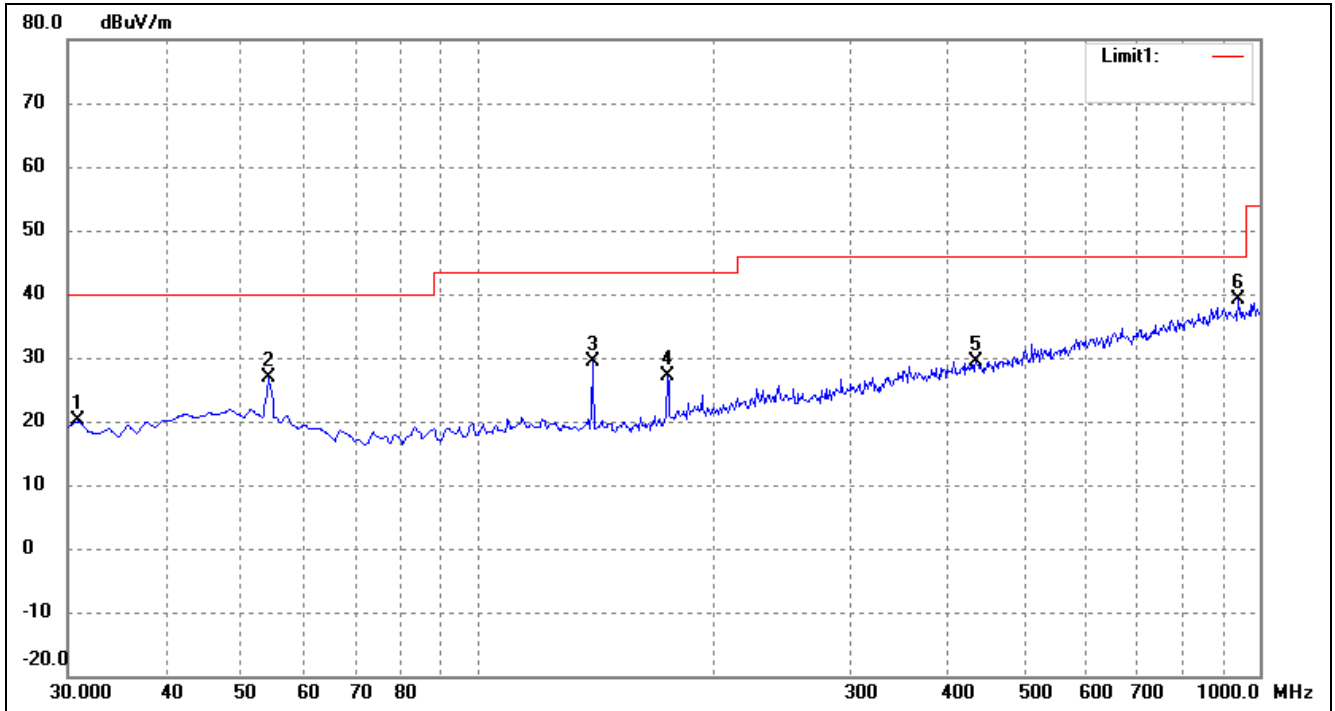
Comment: DC 3.3V

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	51.3400	30.85	-8.64	22.21	40.00	-17.79	360	100	peak
2	117.3000	31.61	-10.56	21.05	43.50	-22.45	360	100	peak
3	258.9200	32.26	-6.10	26.16	46.00	-19.84	360	100	peak
4	424.7900	32.37	-1.77	30.60	46.00	-15.40	360	100	peak
5	663.4100	31.82	2.43	34.25	46.00	-11.75	360	100	peak
6	982.5400	32.09	6.28	38.37	54.00	-15.63	360	100	peak

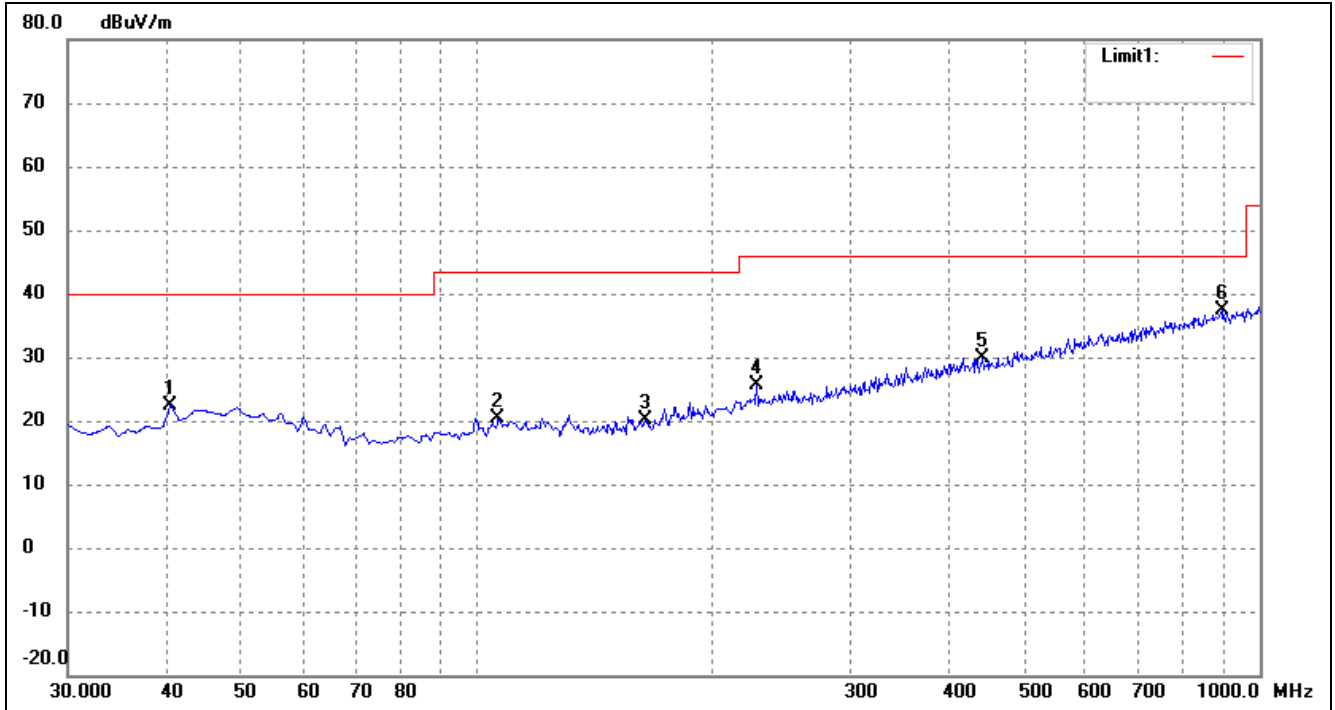
Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	30.9700	31.30	-11.18	20.12	40.00	-19.88	360	100	peak
2	54.2500	36.02	-9.25	26.77	40.00	-13.23	180	100	peak
3	140.5800	40.33	-10.89	29.44	43.50	-14.06	360	100	peak
4	175.5000	36.86	-9.63	27.23	43.50	-16.27	180	100	peak
5	434.4900	31.13	-1.66	29.47	46.00	-16.53	360	100	peak
6	939.8600	33.31	5.86	39.17	46.00	-6.83	180	100	peak

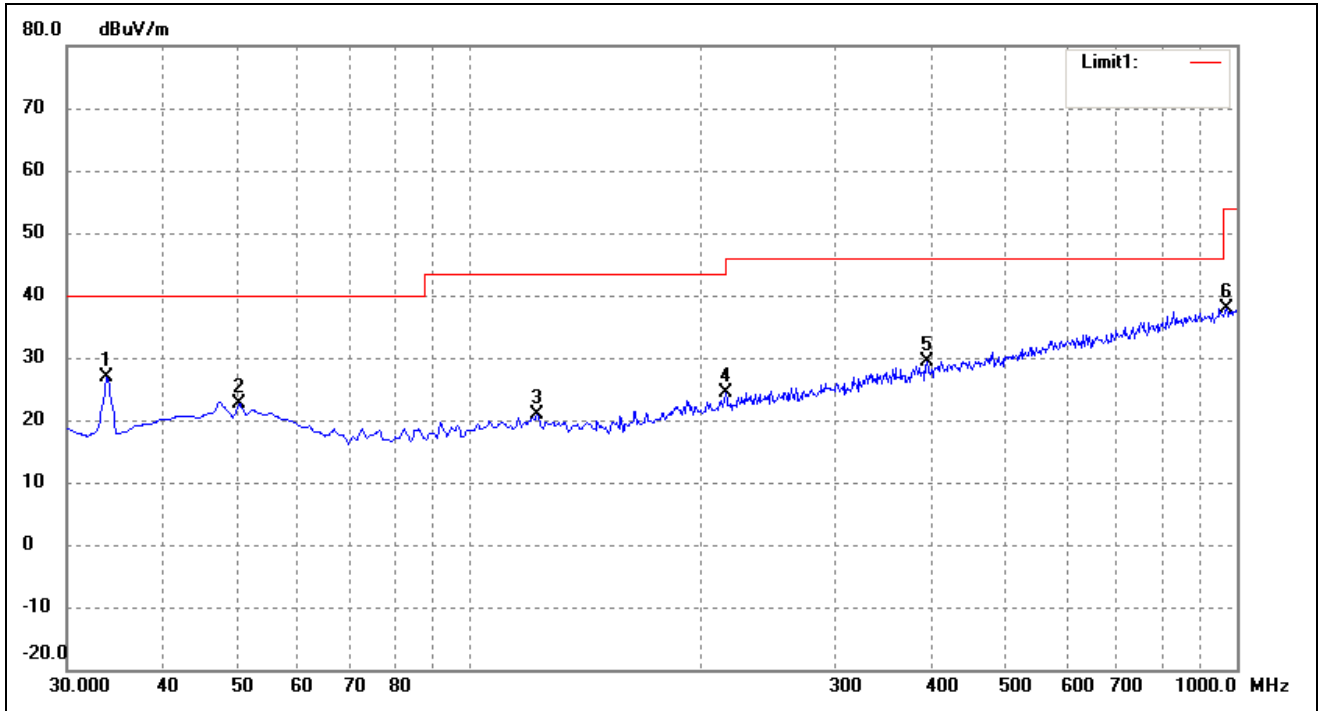
**Plot of Radiated Emissions Test Data (30MHz to 1GHz)**

EUT: LM820 Wi-Fi SMT Module 802.11n 150Mbps  
 Tested Model: LM820-XXXX  
 Operating Condition: 802.11n-HT20 Transmitting Low Channel-2412MHz  
 Comment: DC 3.3V  
 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	40.6700	32.11	-9.74	22.37	40.00	-17.63	260	100	peak
2	106.6300	31.12	-10.71	20.41	43.50	-23.09	260	100	peak
3	164.8300	30.55	-10.32	20.23	43.50	-23.27	260	100	peak
4	227.8800	32.49	-6.88	25.61	46.00	-20.39	260	100	peak
5	443.2200	31.41	-1.62	29.79	46.00	-16.21	260	100	peak
6	896.2100	31.74	5.62	37.36	46.00	-8.64	260	100	peak

Test Specification: Vertical



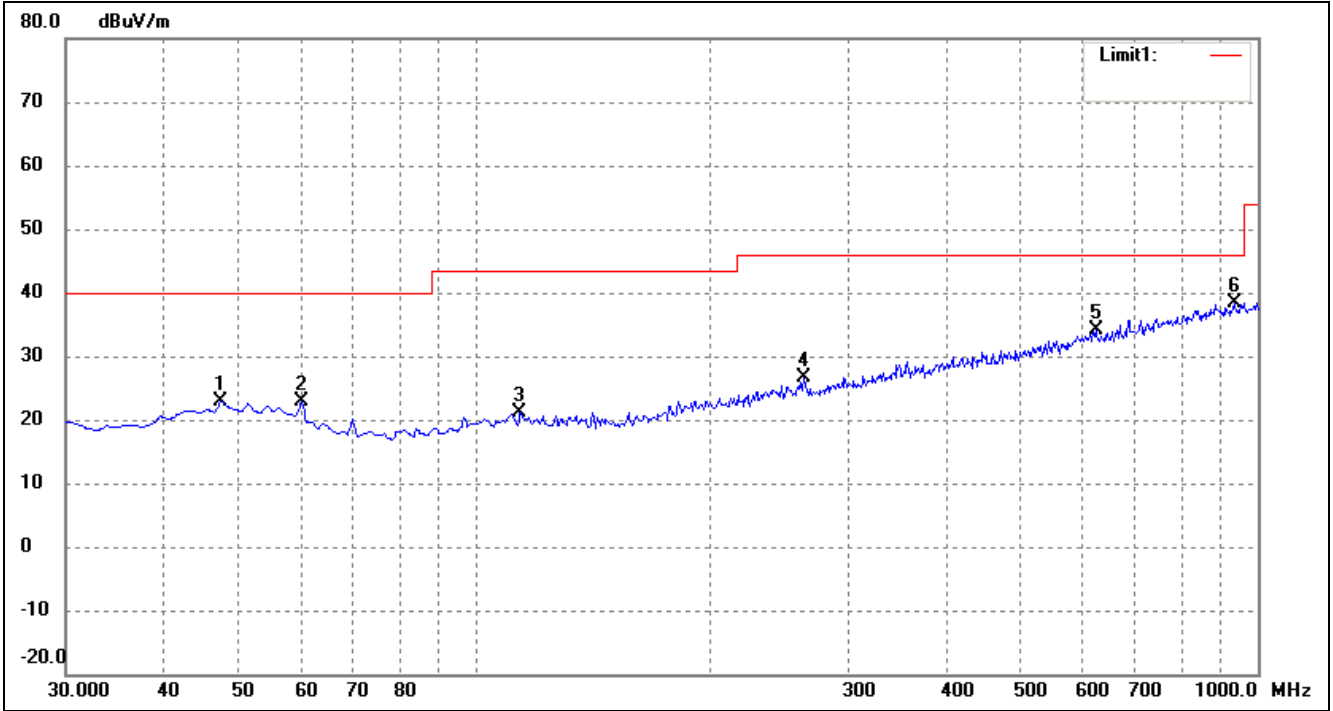
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	33.8800	37.65	-10.74	26.91	40.00	-13.09	310	100	peak
2	50.3700	31.06	-8.43	22.63	40.00	-17.37	310	100	peak
3	123.1200	31.61	-10.63	20.98	43.50	-22.52	310	100	peak
4	216.2400	31.83	-7.51	24.32	46.00	-21.68	310	100	peak
5	395.6900	31.79	-2.41	29.38	46.00	-16.62	310	100	peak
6	971.8700	31.70	6.16	37.86	54.00	-16.14	310	100	peak



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

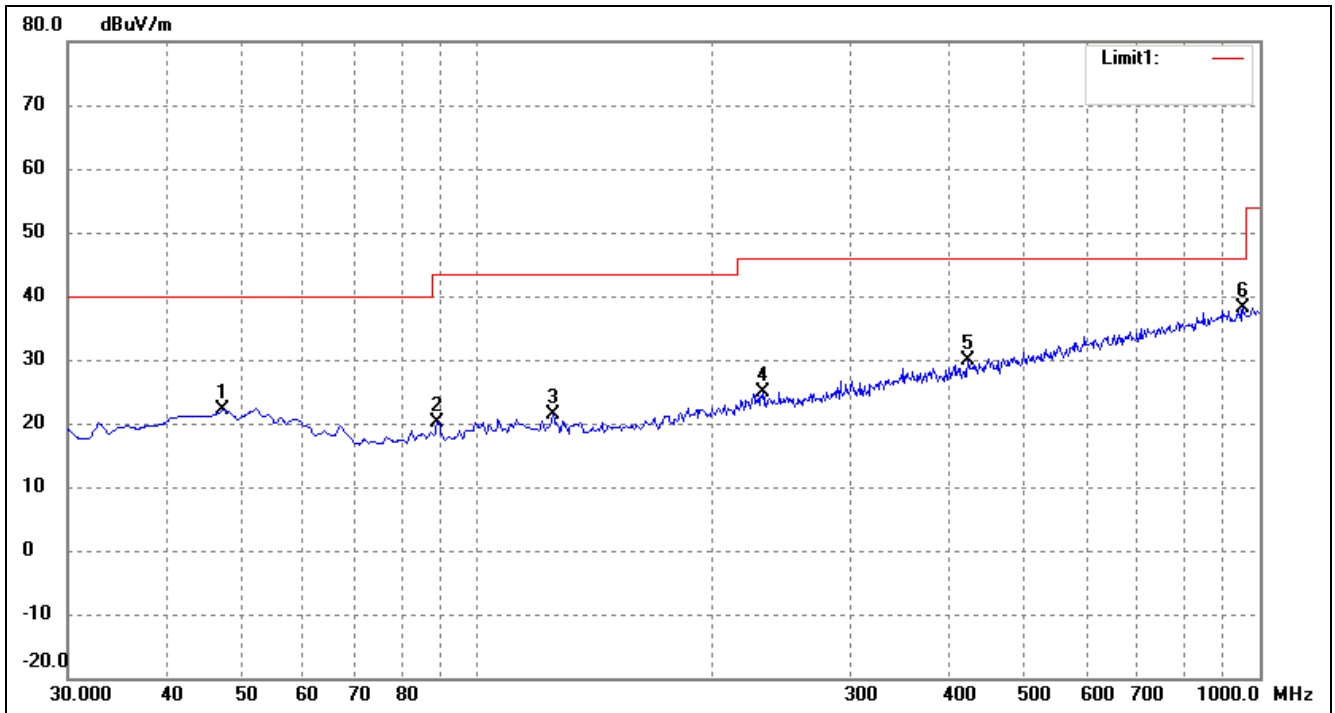
Comment: DC 3.3V

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	47.4600	31.52	-8.72	22.80	40.00	-17.20	274	100	peak
2	60.0700	33.30	-10.45	22.85	40.00	-17.15	116	100	peak
3	114.3900	31.73	-10.52	21.21	43.50	-22.29	82	100	peak
4	263.7700	32.72	-6.08	26.64	46.00	-19.36	274	100	peak
5	621.7000	32.29	1.84	34.13	46.00	-11.87	116	100	peak
6	933.0700	32.54	5.83	38.37	46.00	-7.63	82	100	peak

Test Specification: Vertical

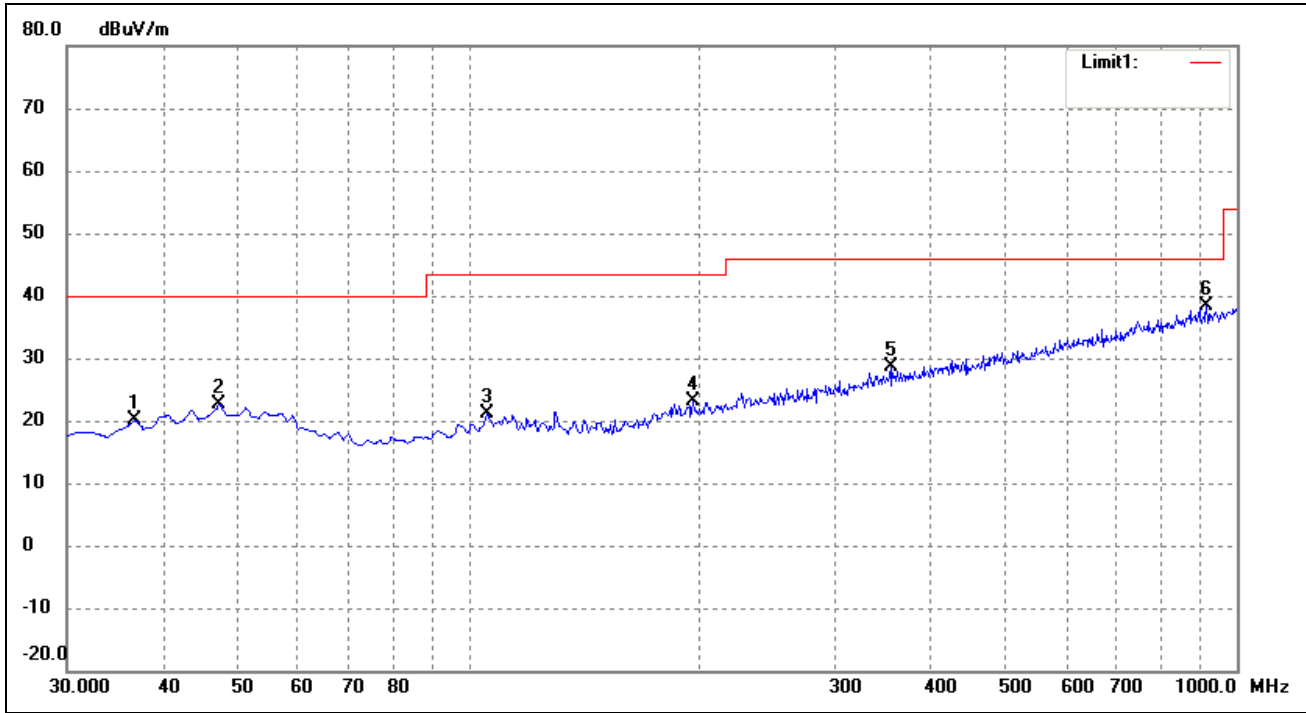


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	47.4600	30.87	-8.72	22.15	40.00	-17.85	110	100	peak
2	89.1700	32.23	-12.03	20.20	43.50	-23.30	136	100	peak
3	125.0600	32.00	-10.66	21.34	43.50	-22.16	90	100	peak
4	231.7600	31.54	-6.71	24.83	46.00	-21.17	110	100	peak
5	424.7900	31.76	-1.77	29.99	46.00	-16.01	136	100	peak
6	952.4700	32.14	5.96	38.10	46.00	-7.90	90	100	peak

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

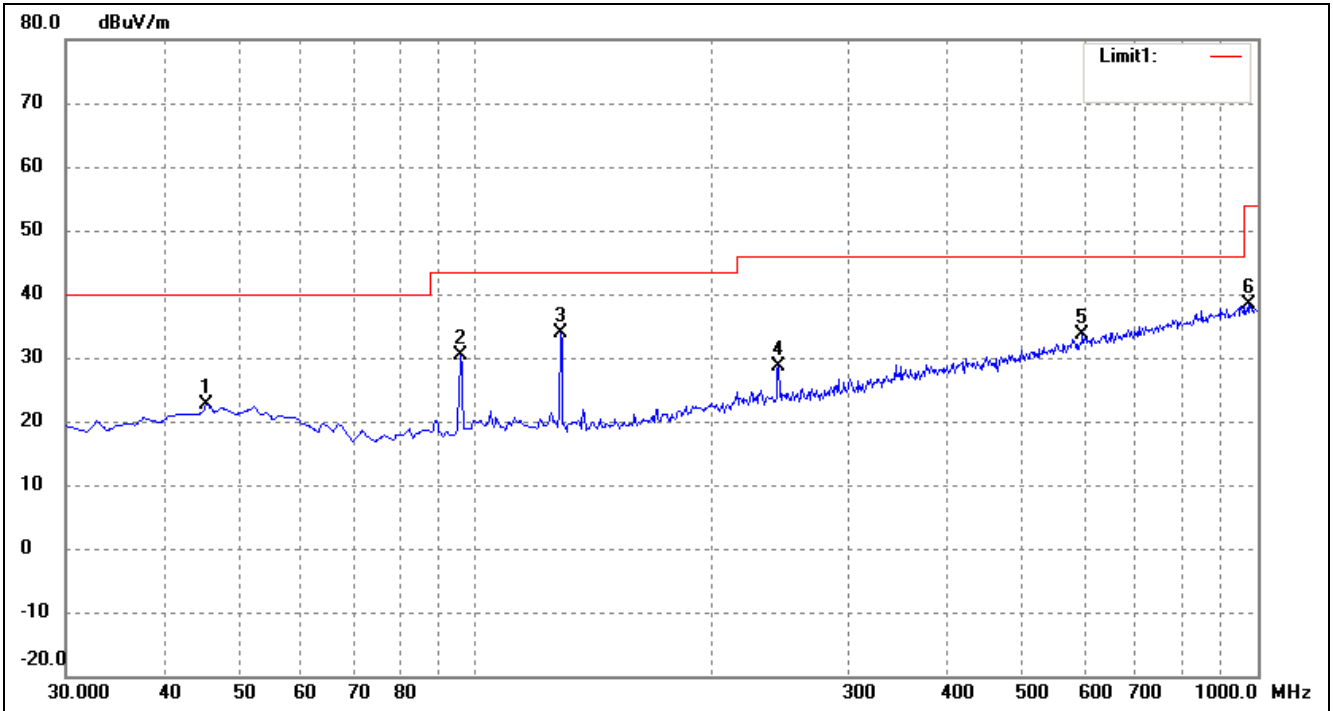
Comment: DC 3.3V

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	36.7900	30.39	-10.31	20.08	40.00	-19.92	270	100	peak
2	47.4600	31.29	-8.72	22.57	40.00	-17.43	270	100	peak
3	105.6600	31.84	-10.79	21.05	43.50	-22.45	270	100	peak
4	195.8700	31.41	-8.27	23.14	43.50	-20.36	270	100	peak
5	354.9500	31.69	-3.13	28.56	46.00	-17.44	270	100	peak
6	915.6100	32.74	5.75	38.49	46.00	-7.51	270	100	peak

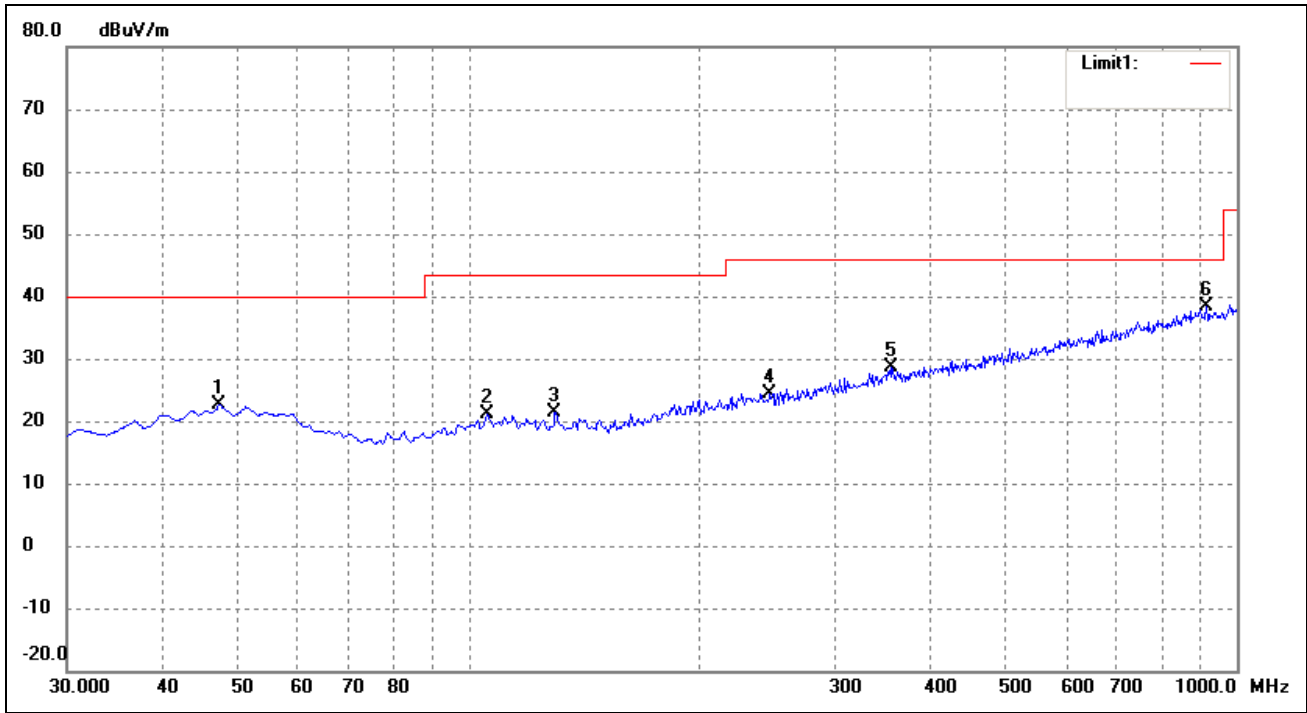
Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	45.5200	31.66	-9.02	22.64	40.00	-17.36	267	100	peak
2	95.9600	41.83	-11.53	30.30	43.50	-13.20	116	100	peak
3	128.9400	44.66	-10.71	33.95	43.50	-9.55	360	100	peak
4	244.3700	34.90	-6.32	28.58	46.00	-17.42	228	100	peak
5	597.4500	31.89	1.65	33.54	46.00	-12.46	270	100	peak
6	972.8400	32.09	6.17	38.26	54.00	-15.74	270	100	peak

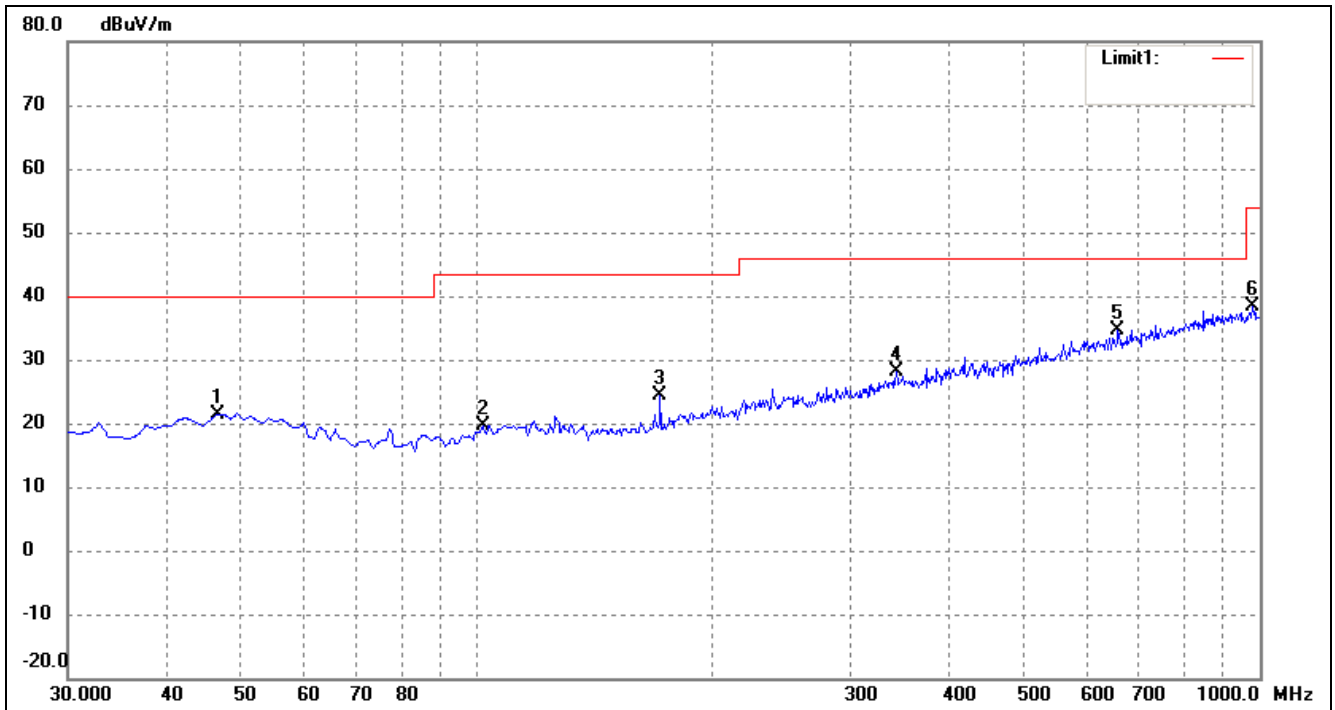
EUT: LM820 Wi-Fi SMT Module 802.11n 150Mbps  
 Tested Model: LM820-XXXX  
 Operating Condition: 802.11n-HT40 Transmitting Low Channel-2422MHz  
 Comment: DC 3.3V

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	47.4600	31.29	-8.72	22.57	40.00	-17.43	180	100	peak
2	105.6600	31.84	-10.79	21.05	43.50	-22.45	180	100	peak
3	129.9100	32.22	-10.72	21.50	43.50	-22.00	180	100	peak
4	247.2800	30.69	-6.24	24.45	46.00	-21.55	180	100	peak
5	354.9500	31.69	-3.13	28.56	46.00	-17.44	180	100	peak
6	915.6100	32.74	5.75	38.49	46.00	-7.51	180	100	peak

Test Specification: Vertical

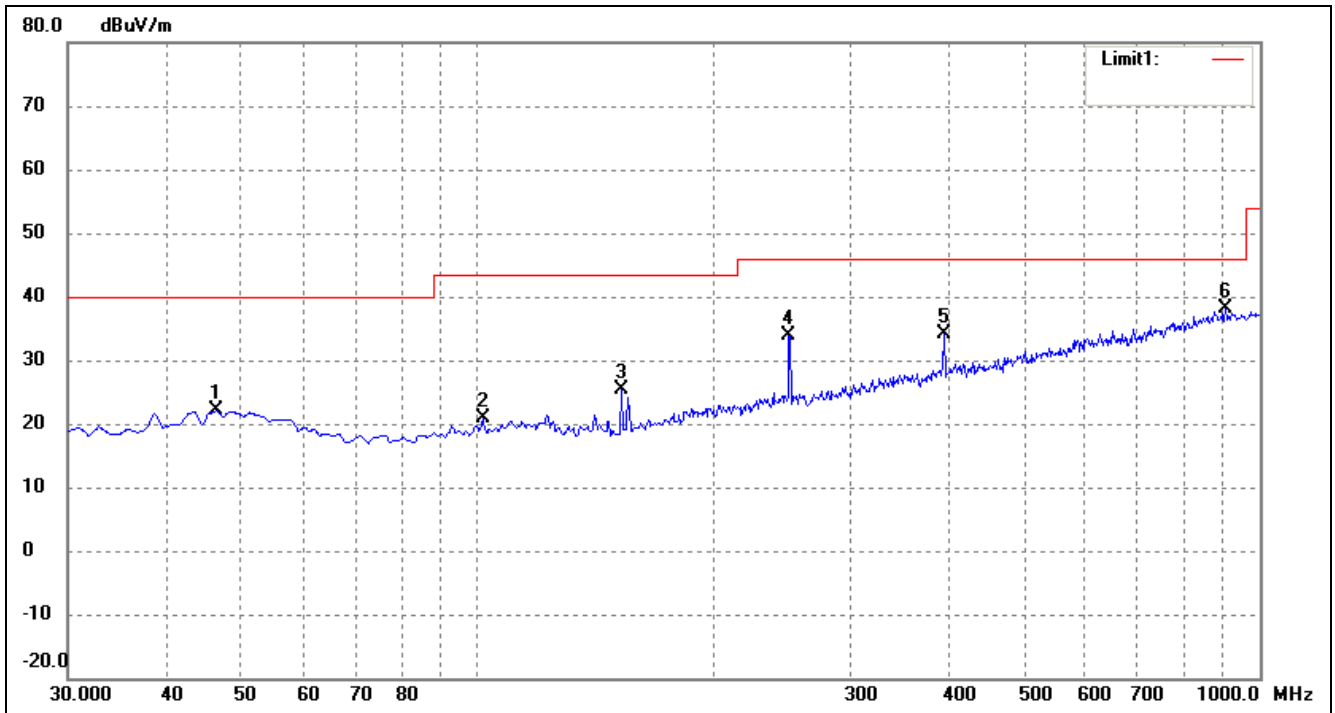


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	46.6664	30.25	-8.84	21.41	40.00	-18.59	360	100	peak
2	101.7800	30.75	-11.08	19.67	43.50	-23.83	360	100	peak
3	171.6200	34.31	-9.95	24.36	43.50	-19.14	360	100	peak
4	343.3100	31.63	-3.43	28.20	46.00	-17.80	360	100	peak
5	660.5000	32.32	2.39	34.71	46.00	-11.29	360	100	peak
6	981.5700	32.05	6.27	38.32	54.00	-15.68	360	100	peak

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

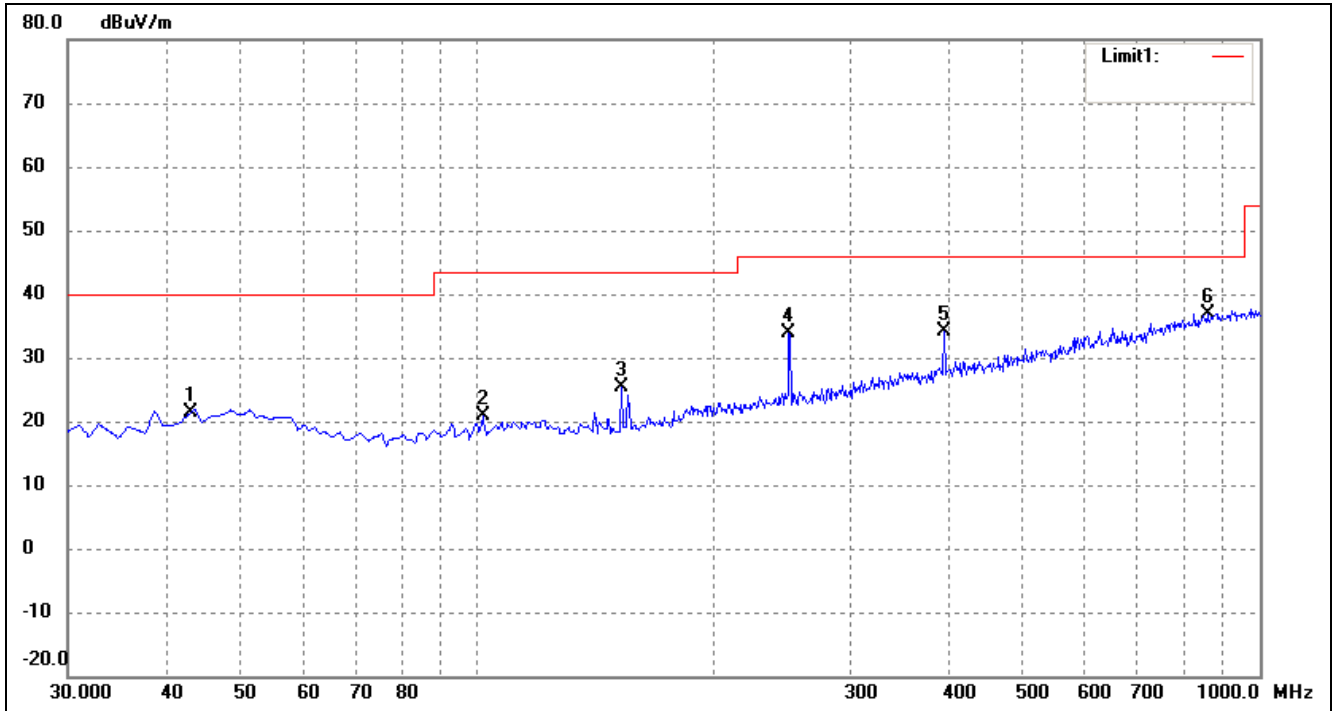
Comment: DC 3.3V

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	46.4900	30.89	-8.86	22.03	40.00	-17.97	360	100	peak
2	101.7800	31.85	-11.08	20.77	43.50	-22.73	360	100	peak
3	153.1900	36.15	-10.89	25.26	43.50	-18.24	360	100	peak
4	251.1600	40.13	-6.14	33.99	46.00	-12.01	360	100	peak
5	395.6900	36.44	-2.41	34.03	46.00	-11.97	360	100	peak
6	905.9100	32.37	5.69	38.06	46.00	-7.94	360	100	peak

Test Specification: Vertical



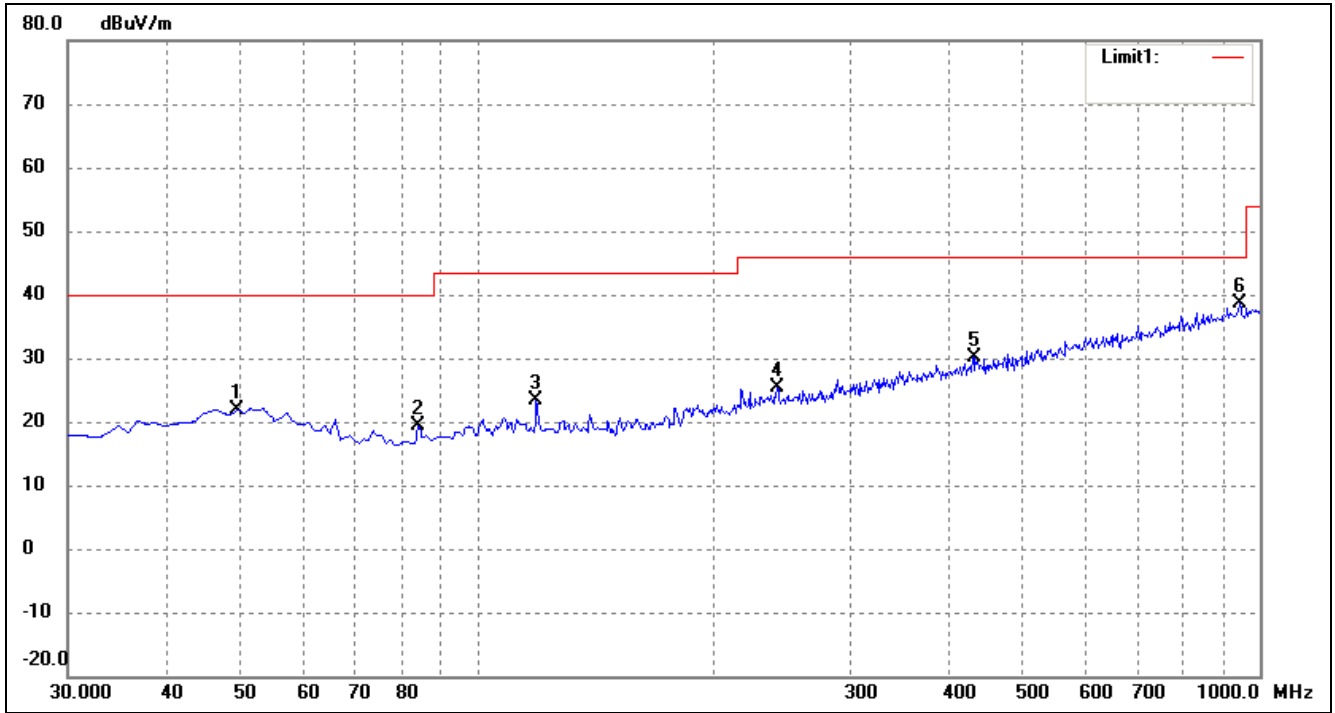
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	43.0505	30.80	-9.39	21.41	40.00	-18.59	180	100	peak
2	101.7800	31.85	-11.08	20.77	43.50	-22.73	180	100	peak
3	153.1900	36.15	-10.89	25.26	43.50	-18.24	180	100	peak
4	251.1600	40.13	-6.14	33.99	46.00	-12.01	180	100	peak
5	395.6900	36.44	-2.41	34.03	46.00	-11.97	180	100	peak
6	857.4100	31.97	5.03	37.00	46.00	-9.00	180	100	peak



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

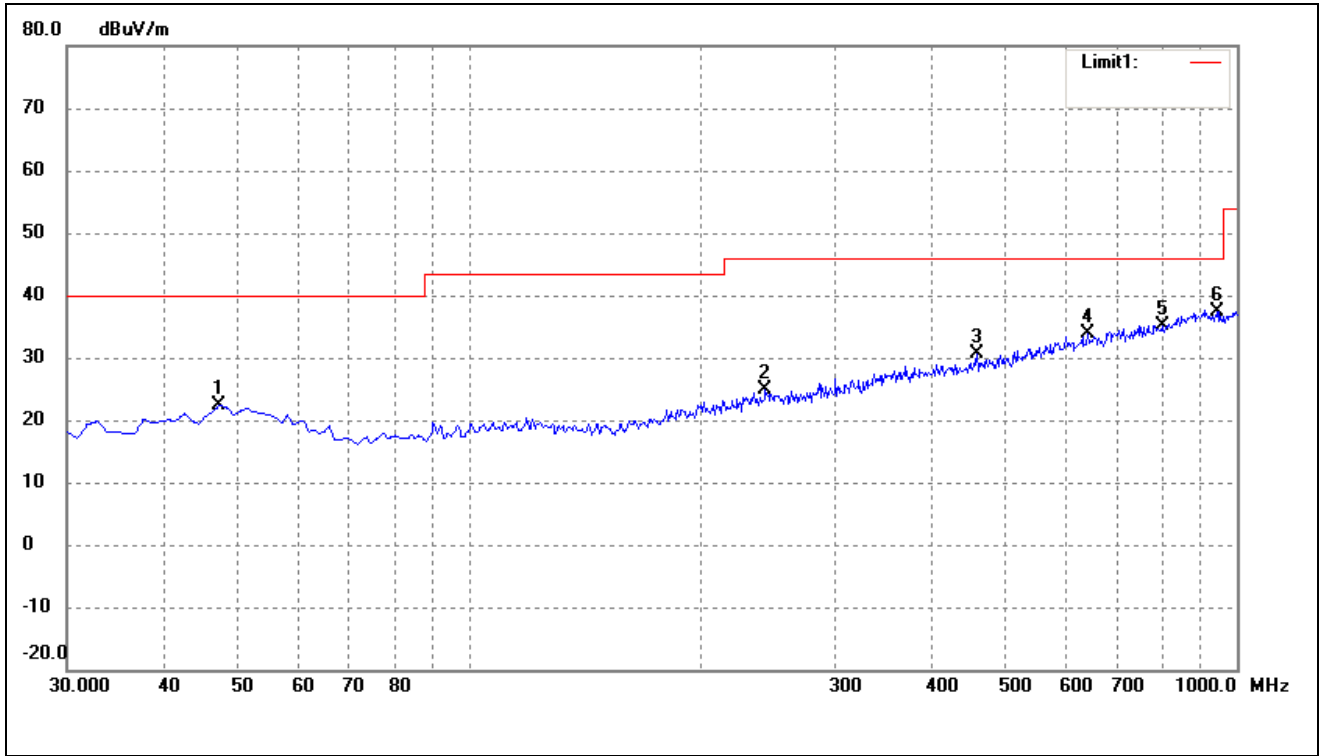
Comment: DC 3.3V

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	49.4000	30.32	-8.44	21.88	40.00	-18.12	360	100	peak
2	84.3200	31.46	-12.16	19.30	40.00	-20.70	360	100	peak
3	119.2400	33.90	-10.59	23.31	43.50	-20.19	360	100	peak
4	242.4300	31.75	-6.39	25.36	46.00	-20.64	360	100	peak
5	433.5200	31.85	-1.67	30.18	46.00	-15.82	360	100	peak
6	944.7100	32.76	5.89	38.65	46.00	-7.35	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	47.4600	31.10	-8.72	22.38	40.00	-17.62	330	100	peak
2	243.4000	31.31	-6.35	24.96	46.00	-21.04	330	100	peak
3	460.6800	32.03	-1.40	30.63	46.00	-15.37	330	100	peak
4	640.1300	31.83	2.10	33.93	46.00	-12.07	330	100	peak
5	801.1500	30.81	4.29	35.10	46.00	-10.90	330	100	peak
6	944.7100	31.41	5.89	37.30	46.00	-8.70	330	100	peak

*Spurious Emissions Above 1GHz*
*Test Mode: 802.11b*

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	51.23	-3.87	47.36	74.00	-26.64	H	PK
4824.000	36.42	-3.87	32.55	54.00	-21.45	H	AV
7236.000	42.51	1.14	43.65	74.00	-30.35	H	PK
7236.000	31.25	1.19	32.44	54.00	-21.56	H	AV
4824.000	54.61	-3.86	50.75	74.00	-23.25	V	PK
4824.000	40.05	-3.86	36.19	54.00	-17.81	V	AV
7236.000	45.62	1.10	46.72	74.00	-27.28	V	PK
7236.000	36.12	1.10	37.22	54.00	-16.78	V	AV
Middle Channel-2437MHz							
4874.000	50.28	-3.74	46.54	74.00	-27.46	H	PK
4874.000	34.62	-3.74	30.88	54.00	-23.12	H	AV
7311.000	47.38	1.47	48.85	74.00	-25.15	H	PK
7311.000	31.62	1.47	33.09	54.00	-20.91	H	AV
4874.000	51.29	-3.74	47.55	74.00	-26.45	V	PK
4874.000	40.36	-3.74	36.62	54.00	-17.38	V	AV
7311.000	45.62	1.47	47.09	74.00	-26.91	V	PK
7311.000	32.81	1.47	34.28	54.00	-19.72	V	AV
High Channel-2462MHz							
4924.000	53.16	-3.59	49.57	74.00	-24.43	H	PK
4924.000	40.81	-3.59	37.22	54.00	-16.78	H	AV
7386.000	42.66	1.79	44.45	74.00	-29.55	H	PK
7386.000	32.32	1.79	34.11	54.00	-19.89	H	AV
4924.000	51.24	-3.59	47.65	74.00	-26.35	V	PK
4924.000	41.04	-3.59	37.45	54.00	-16.55	V	AV
7386.000	42.43	1.79	44.22	74.00	-29.78	V	PK
7386.000	32.14	1.79	33.93	54.00	-20.07	V	AV

Test Mode: 802.11g

Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel-2412MHz							
4824.000	51.22	-3.86	47.36	74.00	-26.64	H	PK
4824.000	40.85	-3.86	36.99	54.00	-17.01	H	AV
7236.000	45.21	1.10	46.31	74.00	-27.69	H	PK
7236.000	34.45	1.10	35.55	54.00	-18.45	H	AV
4824.000	52.84	-3.86	48.98	74.00	-25.02	V	PK
4824.000	40.67	-3.86	36.81	54.00	-17.19	V	AV
7236.000	45.64	1.10	46.74	74.00	-27.26	V	PK
7236.000	33.75	1.10	34.85	54.00	-19.15	V	AV
Middle Channel-2437MHz							
4874.000	53.54	-3.74	49.8	74.00	-24.2	H	PK
4874.000	41.65	-3.74	37.91	54.00	-16.09	H	AV
7311.000	44.58	1.47	46.05	74.00	-27.95	H	PK
7311.000	32.37	1.47	33.84	54.00	-20.16	H	AV
4874.000	54.51	-3.74	50.77	74.00	-23.23	V	PK
4874.000	41.27	-3.74	37.53	54.00	-16.47	V	AV
7311.000	45.63	1.47	47.1	74.00	-26.9	V	PK
7311.000	32.27	1.47	33.74	54.00	-20.26	V	AV
High Channel-2462MHz							
4924.000	51.31	-3.59	47.72	74.00	-26.28	H	PK
4924.000	40.24	-3.59	36.65	54.00	-17.35	H	AV
7386.000	43.85	1.79	45.64	74.00	-28.36	H	PK
7386.000	31.74	1.79	33.53	54.00	-20.47	H	AV
4924.000	54.29	-3.59	50.7	74.00	-23.3	V	PK
4924.000	41.32	-3.59	37.73	54.00	-16.27	V	AV
7386.000	45.94	1.79	47.73	74.00	-26.27	V	PK
7386.000	31.77	1.79	33.56	54.00	-20.44	V	AV

Test Mode: 802.11n-HT20

Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel-2412MHz							
4824.000	51.52	-3.86	47.66	74.00	-26.34	H	PK
4824.000	40.57	-3.86	36.71	54.00	-17.29	H	AV
7236.000	44.62	1.10	45.72	74.00	-28.28	H	PK
7236.000	32.67	1.10	33.77	54.00	-20.23	H	AV
4824.000	51.42	-3.86	47.56	74.00	-26.44	V	PK
4824.000	41.28	-3.86	37.42	54.00	-16.58	V	AV
7236.000	45.63	1.10	46.73	74.00	-27.27	V	PK
7236.000	32.55	1.10	33.65	54.00	-20.35	V	AV
Middle Channel-2437MHz							
4874.000	51.16	-3.74	47.42	74.00	-26.58	H	PK
4874.000	40.45	-3.74	36.71	54.00	-17.29	H	AV
7311.000	43.53	1.47	45	74.00	-29	H	PK
7311.000	31.47	1.47	32.94	54.00	-21.06	H	AV
4874.000	52.47	-3.74	48.73	74.00	-25.27	V	PK
4874.000	42.66	-3.74	38.92	54.00	-15.08	V	AV
7311.000	44.86	1.47	46.33	74.00	-27.67	V	PK
7311.000	33.86	1.47	35.33	54.00	-18.67	V	AV
High Channel-2462MHz							
4924.000	50.98	-3.59	47.39	74.00	-26.61	H	PK
4924.000	42.55	-3.59	38.96	54.00	-15.04	H	AV
7386.000	45.37	1.79	47.16	74.00	-26.84	H	PK
7386.000	32.17	1.79	33.96	54.00	-20.04	H	AV
4924.000	53.75	-3.59	50.16	74.00	-23.84	V	PK
4924.000	41.46	-3.59	37.87	54.00	-16.13	V	AV
7386.000	45.53	1.79	47.32	74.00	-26.68	V	PK
7386.000	32.36	1.79	34.15	54.00	-19.85	V	AV

Test Mode: 802.11n-HT40

Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel-2422MHz							
4844.000	51.97	-3.90	48.07	74.00	-25.93	H	PK
4824.000	35.67	-3.90	31.77	54.00	-22.23	H	AV
7266.000	43.82	1.06	44.88	74.00	-29.12	H	PK
7266.000	32.34	1.06	33.4	54.00	-20.6	H	AV
4844.000	51.54	-3.90	47.64	74.00	-26.36	V	PK
4824.000	36.45	-3.90	32.55	54.00	-21.45	V	AV
7266.000	44.63	1.06	45.69	74.00	-28.31	V	PK
7266.000	32.85	1.06	33.91	54.00	-20.09	V	AV
Middle Channel-2437MHz							
4874.000	51.57	-3.74	47.83	74.00	-26.17	H	PK
4874.000	35.82	-3.74	32.08	54.00	-21.92	H	AV
7311.000	42.86	1.47	44.33	74.00	-29.67	H	PK
7311.000	32.85	1.47	34.32	54.00	-19.68	H	AV
4874.000	52.63	-3.74	48.89	74.00	-25.11	V	PK
4874.000	38.68	-3.74	34.94	54.00	-19.06	V	AV
7311.000	43.47	1.47	44.94	74.00	-29.06	V	PK
7311.000	34.79	1.47	36.26	54.00	-17.74	V	AV
High Channel-2452MHz							
4904.000	51.37	-3.63	47.74	74.00	-26.26	H	PK
4904.000	37.73	-3.63	34.1	54.00	-19.9	H	AV
7356.000	43.47	1.62	45.09	74.00	-28.91	H	PK
7356.000	30.62	1.62	32.24	54.00	-21.76	H	AV
4904.000	51.35	-3.63	47.72	74.00	-26.28	V	PK
4904.000	40.53	-3.63	36.9	54.00	-17.1	V	AV
7356.000	45.16	1.62	46.78	74.00	-27.22	V	PK
7356.000	33.15	1.62	34.77	54.00	-19.23	V	AV

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

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## 9. Out of Band Emissions

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### 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 v03r03, 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 V03r03, 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.

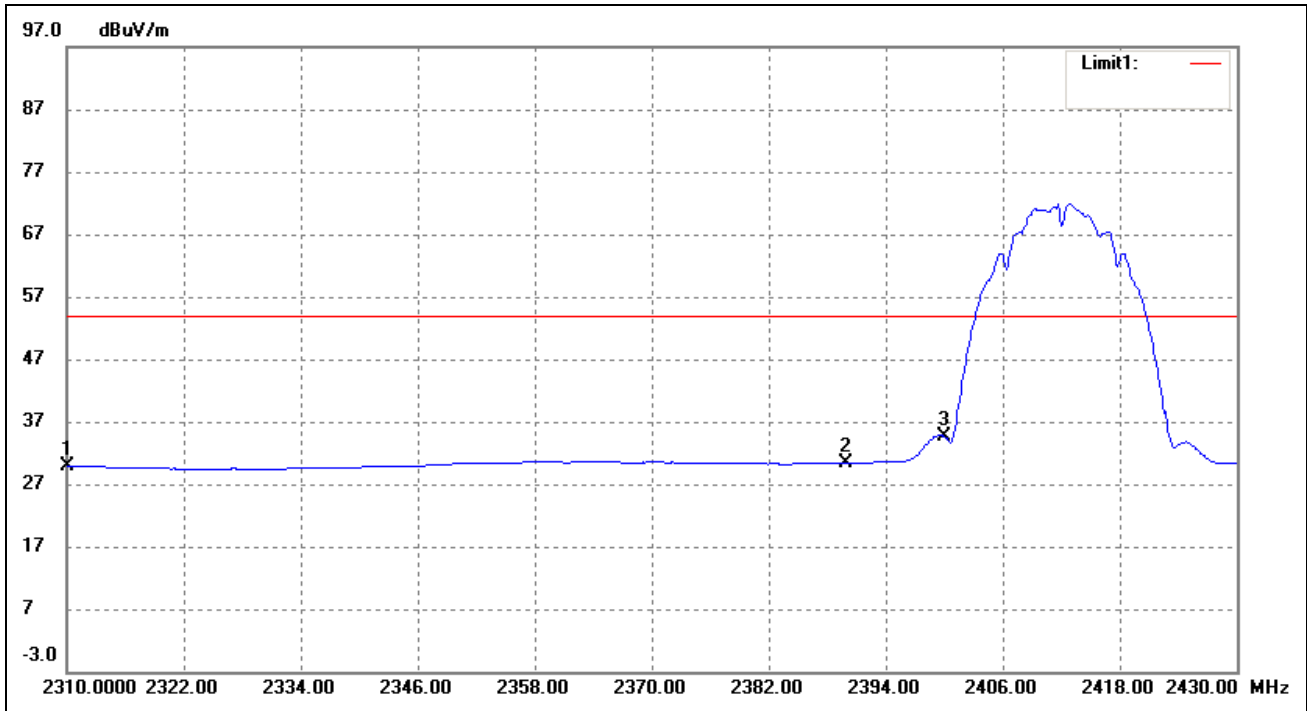
### 9.3 Environmental Conditions

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

### 9.4 Summary of Test Results/Plots

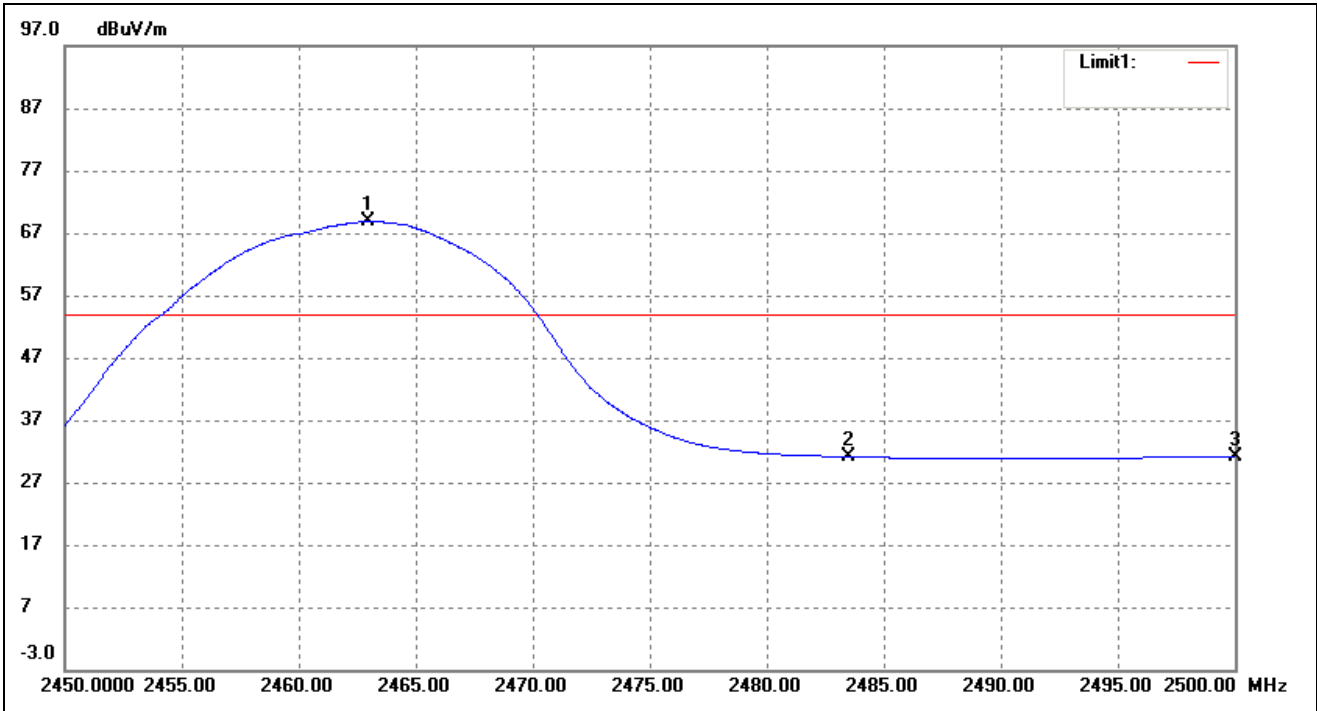
802.11b-Lowest Band edge

Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	34.35	-4.42	29.93	54.00	-24.07	Average Detector
	2310.000	47.03	-4.42	42.61	74.00	-31.39	Peak Detector
2	2390.000	33.99	-3.72	30.27	54.00	-23.73	Average Detector
	2390.000	50.16	-3.72	46.44	74.00	-27.56	Peak Detector
3	2400.000	38.20	-3.64	34.56	54.00	-19.44	Average Detector
	2400.000	52.51	-3.64	48.87	74.00	-25.13	Peak Detector

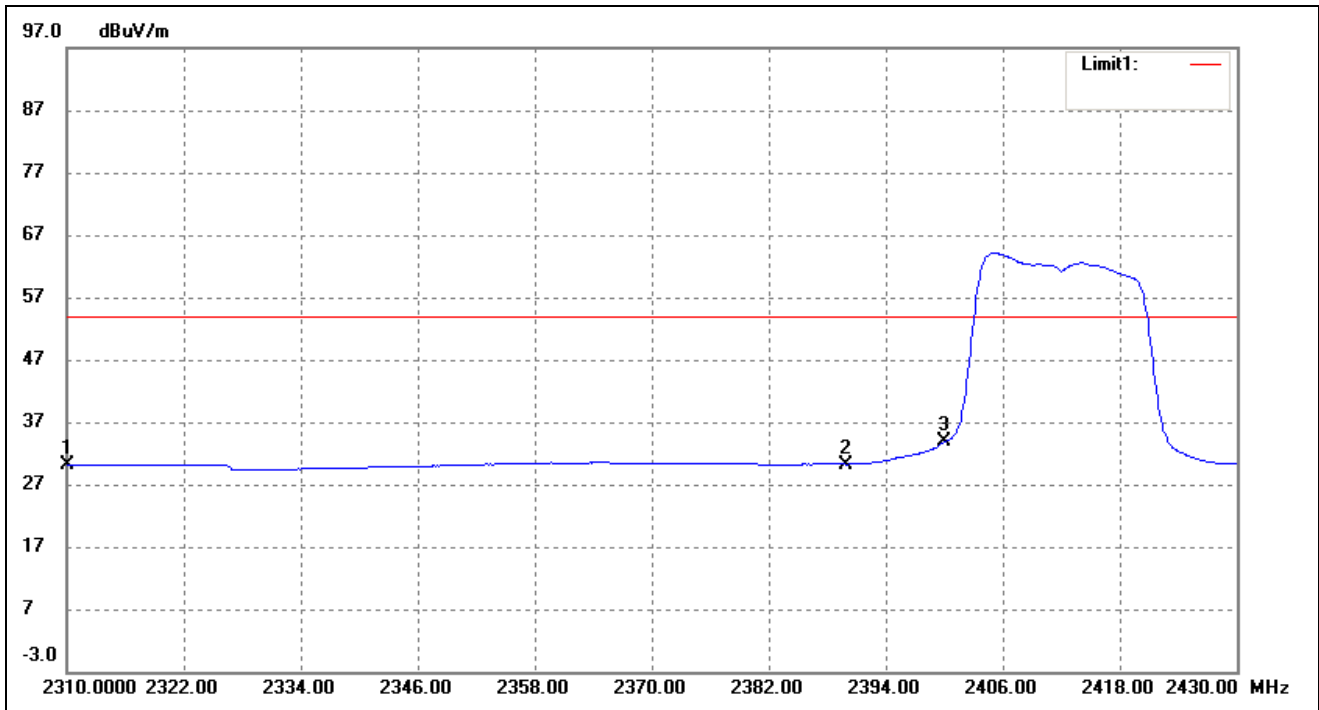


802.11b-Highest Bandedge  
 Vertical (Worst case)


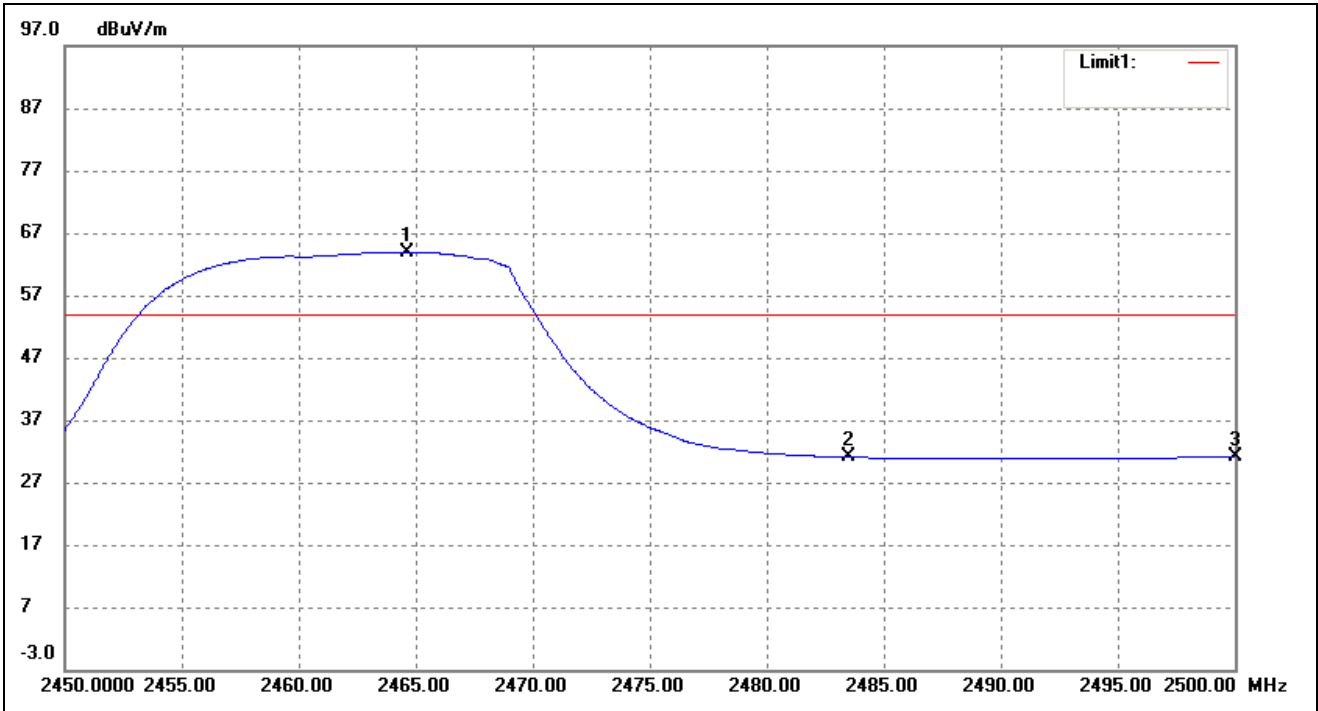
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2462.950	72.08	-3.16	68.92	/	/	Average Detector
	2462.950	77.70	-3.16	74.54	/	/	Peak Detector
2	2483.500	Delta = 37.36dBc		31.16	54.00	-22.84	Average Detector
	2483.500			44.33	74.00	-29.67	Peak Detector
3	2500.000	34.07	-2.89	31.18	54.00	-22.82	Average Detector
	2500.000	47.12	-2.89	44.23	74.00	-29.77	Peak Detector

## 802.11g-Lowest Bandedge

Vertical (Worst case)

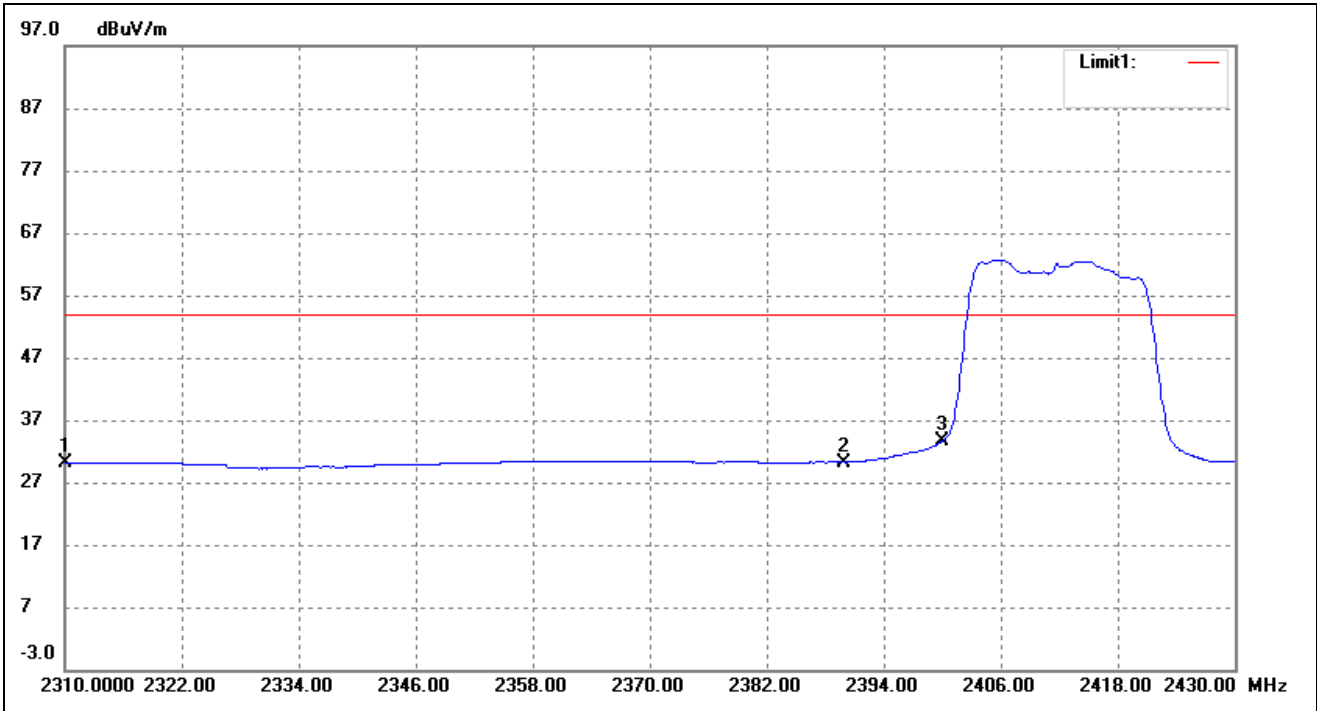


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	34.60	-4.42	30.18	54.00	-23.82	Average Detector
	2310.000	47.43	-4.42	43.01	74.00	-30.99	Peak Detector
2	2390.000	33.96	-3.72	30.24	54.00	-23.76	Average Detector
	2390.000	47.10	-3.72	43.38	74.00	-30.62	Peak Detector
3	2400.000	37.50	-3.64	33.86	54.00	-20.14	Average Detector
	2400.000	59.73	-3.64	56.09	74.00	-17.91	Peak Detector

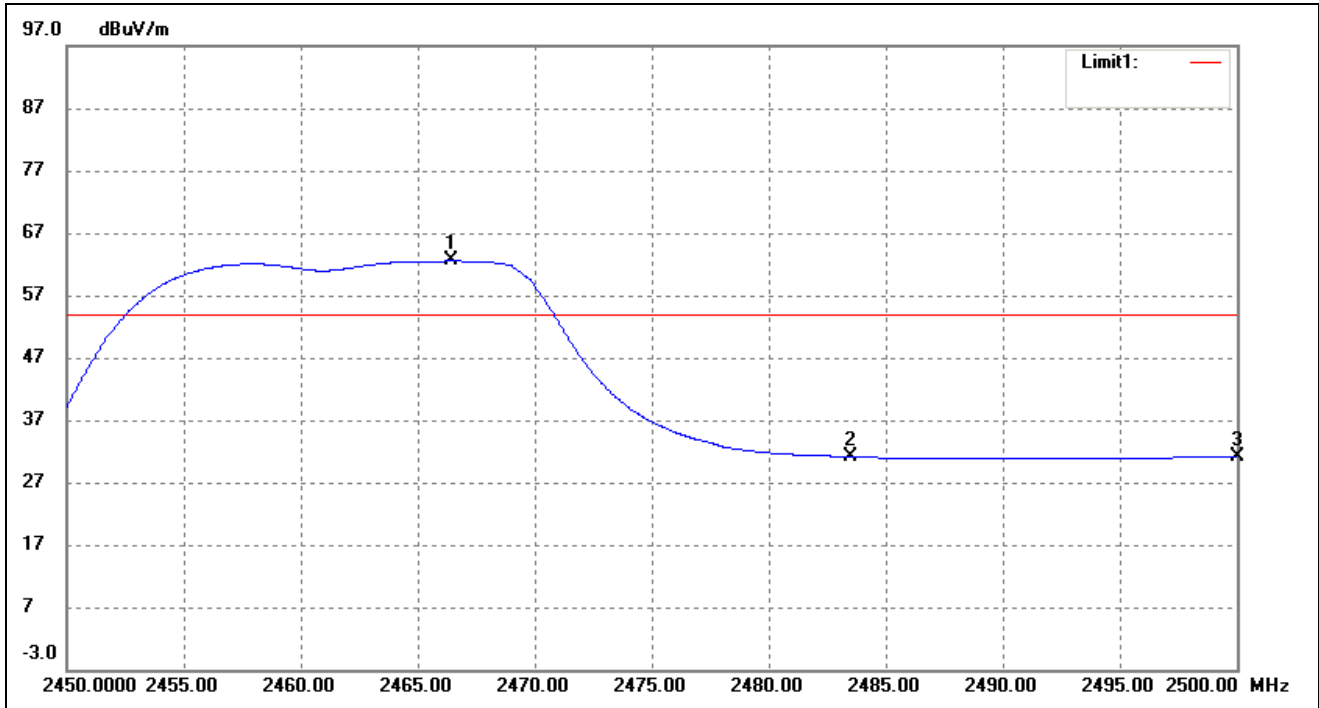
802.11g-Highest Bandedge  
 Vertical (Worst case)


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2464.650	67.15	-3.15	64.00	/	/	Average Detector
	2464.650	78.70	-3.15	75.55	/	/	Peak Detector
2	2483.500	Delta =32.91dBc		31.09	54.00	-22.91	Average Detector
	2483.500			44.34	74.00	-29.66	Peak Detector
3	2500.000	33.99	-2.88	31.11	54.00	-22.89	Average Detector
	2500.000	47.38	-2.88	44.50	74.00	-29.50	Peak Detector

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

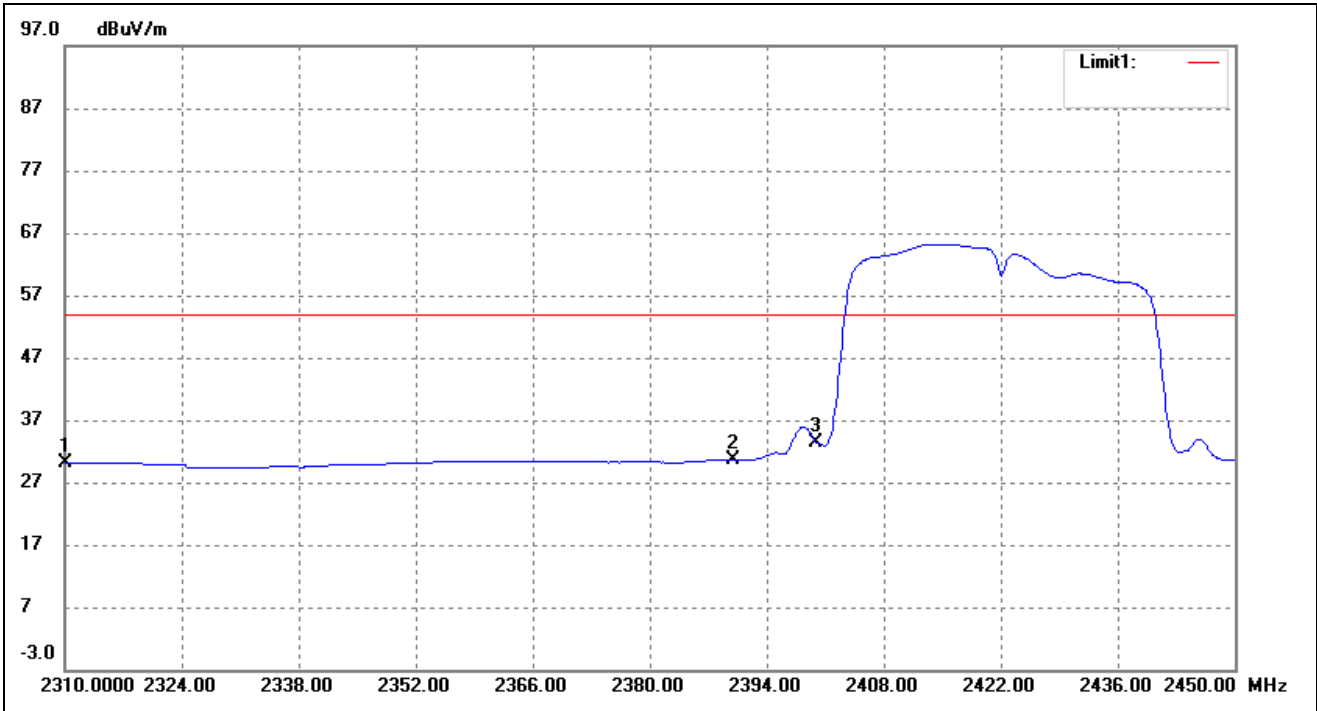


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	34.60	-4.42	30.18	54.00	-23.82	Average Detector
	2310.000	46.63	-4.42	42.21	74.00	-31.79	Peak Detector
2	2390.000	33.96	-3.72	30.24	54.00	-23.76	Average Detector
	2390.000	46.26	-3.72	42.54	74.00	-31.46	Peak Detector
3	2400.000	37.36	-3.64	33.72	54.00	-20.28	Average Detector
	2400.000	59.51	-3.64	55.87	74.00	-18.13	Peak Detector

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


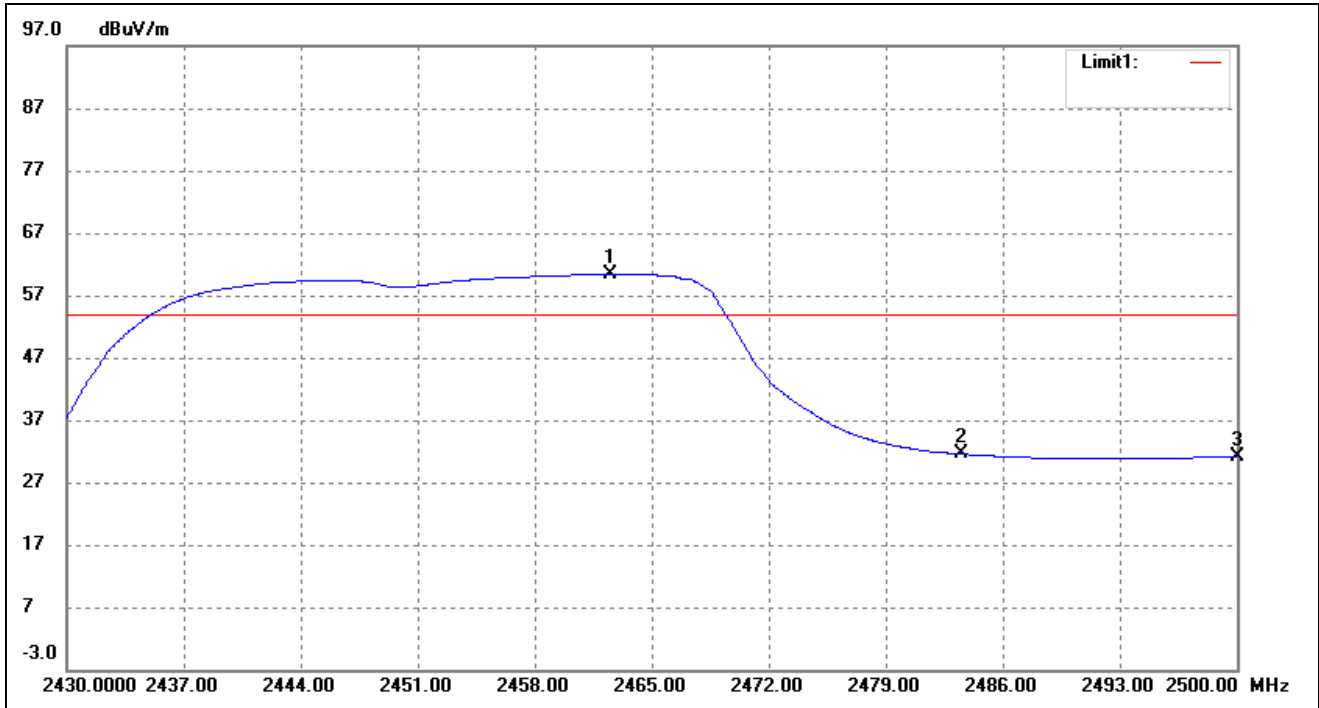
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2466.400	65.67	-3.13	62.54	/	/	Average Detector
		78.26	-3.13	75.13	/	/	Peak Detector
2	2483.500	Delta = 31.39dBc		31.15	54.00	-22.85	Average Detector
				44.07	74.00	-29.93	Peak Detector
3	2500.000	33.96	-2.88	31.08	54.00	-22.92	Average Detector
		47.51	-2.88	44.63	74.00	-29.37	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	34.59	-4.42	30.17	54.00	-23.83	Average Detector
	2310.000	47.35	-4.42	42.93	74.00	-31.07	Peak Detector
2	2390.000	34.34	-3.72	30.62	54.00	-23.38	Average Detector
	2390.000	48.27	-3.72	44.55	74.00	-29.45	Peak Detector
3	2400.000	37.01	-3.64	33.37	54.00	-20.63	Average Detector
	2400.000	50.22	-3.64	46.58	74.00	-27.42	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
1	2462.480	63.58	-3.17	60.41	/	/	Average Detector
	2462.480	74.70	-3.17	71.53	/	/	Peak Detector
2	2483.500	Delta = 40.73dBc		31.56	54.00	-22.44	Average Detector
	2483.500			43.15	74.00	-30.85	Peak Detector
3	2500.000	33.96	-2.88	31.08	54.00	-22.92	Average Detector
	2500.000	46.95	-2.88	44.07	74.00	-29.93	Peak Detector

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