

# FCC Part 15C Measurement and Test Report

For

**Air Visual Limited**

**Flat B, 18F, Two Chinachem Plaza, 68 Connaught road, Hong Kong**

**FCC ID: 2AHVMAV-5PCA-4A**

**FCC Rule(s):** FCC Part 15C

**Product Description:** AirVisual Node

**Tested Model:** AV-5PCA-4A

**Report No.:** STR16038224I-1

**Tested Date:** 2016-03-28 to 2016-04-20

**Issued Date:** 2016-04-20

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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: Air Visual Limited  
Address of applicant: Flat B, 18F, Two Chinachem Plaza, 68 Connaught road, Hong Kong  
Manufacturer: Air Visual Limited  
Address of manufacturer: Flat B, 18F, Two Chinachem Plaza, 68 Connaught road, Hong Kong

General Description of EUT	
Product Name:	AirVisual Node
Trade Name:	AirVisual
Model No.:	AV-5PCA-4A
Adding Model(s):	AV-0PCA-4A; AV-5PCV-4A; AV-5PAA-4A; AV-0PAA-4A; AV-5PCA-8A; AV-0PCA-8A; AV-5PCV-8A; AV-5PAA-8A; AV-0PAA-8A
Rated Voltage:	DC 3.7V Battery
Power Adapter Model:	GQ05-050100-ZU I/P: AC 100-240V, 50/60Hz; O/P: DC 5V/1A
<i>Note: The test data is gathered from a production sample provided by the manufacturer. The appearance of others models listed in the report is different from main-test model AV-5PCA-4A, but the circuit and the electronic construction do not change, declared 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:	9.28 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:	Integral
Antenna Gain:	3 dBi
Lowest Internal Frequency	32.768kHz

## 1.2 Test Standards

The following report is prepared on behalf of the Air Visual Limited in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication 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 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
USB Cable	1.5	Shielded	With 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
/	/	/	/

## 1.6 Measurement Uncertainty

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

## 1.7 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

FCC Rules	Description of Test Item	Result
§ 2.1093	RF Exposure	Compliant
§ 15.203; § 15.247(b)(4)(i)	Antenna Requirement	Compliant
§ 15.207(a)	Conducted Emission	Compliant
§ 15.247(e)	Power Spectral Density	Compliant
§ 15.247(a)(2)	6 dB Bandwidth	Compliant
§ 15.247(b)(3)	RF Output Power	Compliant
§ 15.209(a)	Radiated Emission	Compliant
§ 15.247(d)	Band Edge (Out of Band Emissions)	Compliant

N/A: not applicable

### **3. RF Exposure**

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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

### 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

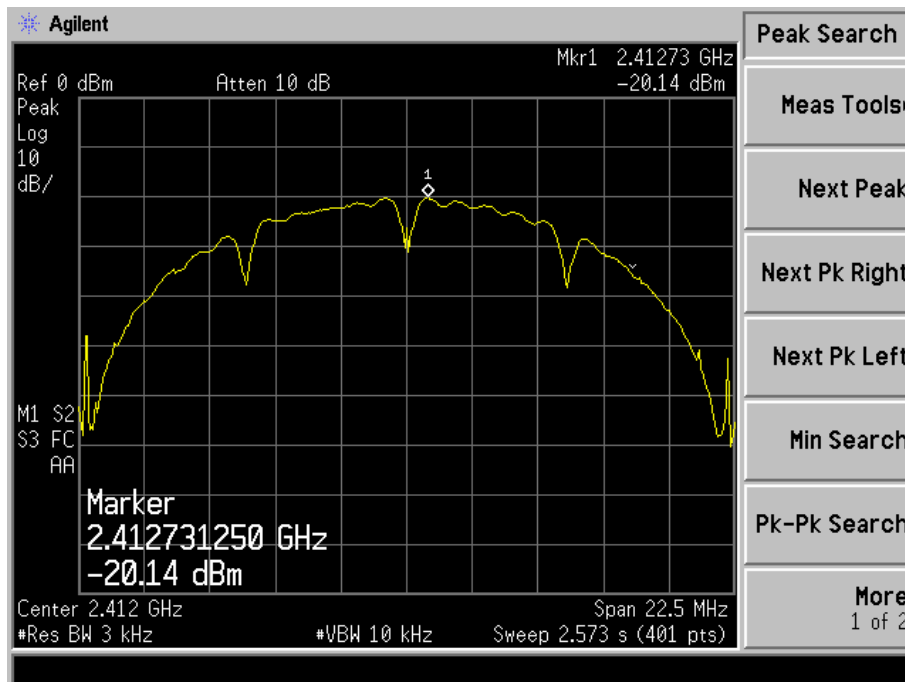
Temperature:	26° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

## 5.4 Summary of Test Results/Plots

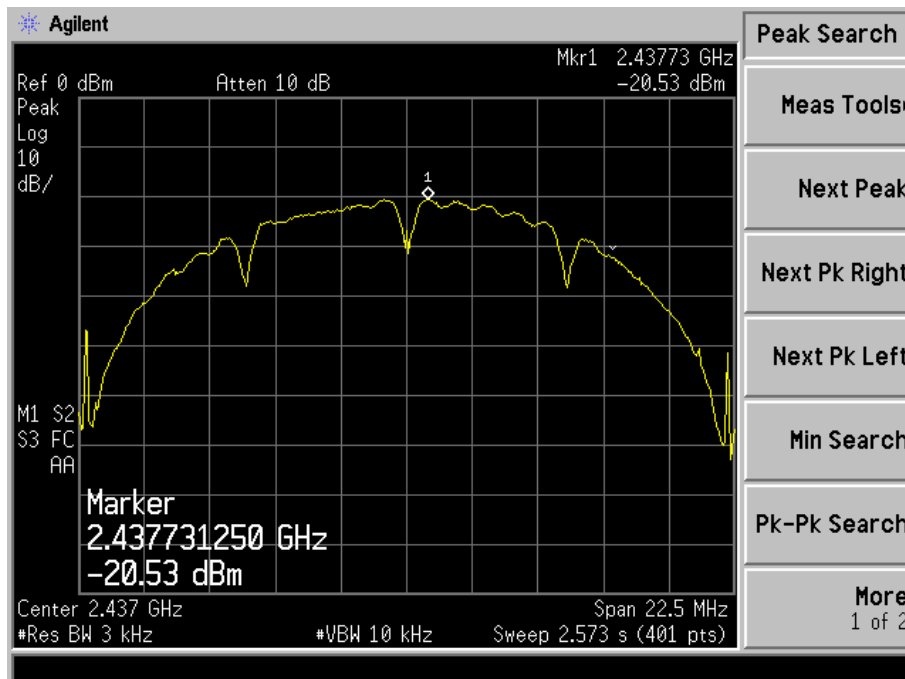
Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
802.11b	2412	-20.14	8
	2437	-20.53	8
	2462	-20.29	8
802.11g	2412	-23.32	8
	2437	-23.64	8
	2462	-23.01	8
802.11n HT20	2412	-24.50	8
	2437	-24.22	8
	2462	-24.12	8
802.11n HT40	2422	-25.14	8
	2437	-25.20	8
	2452	-25.18	8

Please refer to the following test plots:

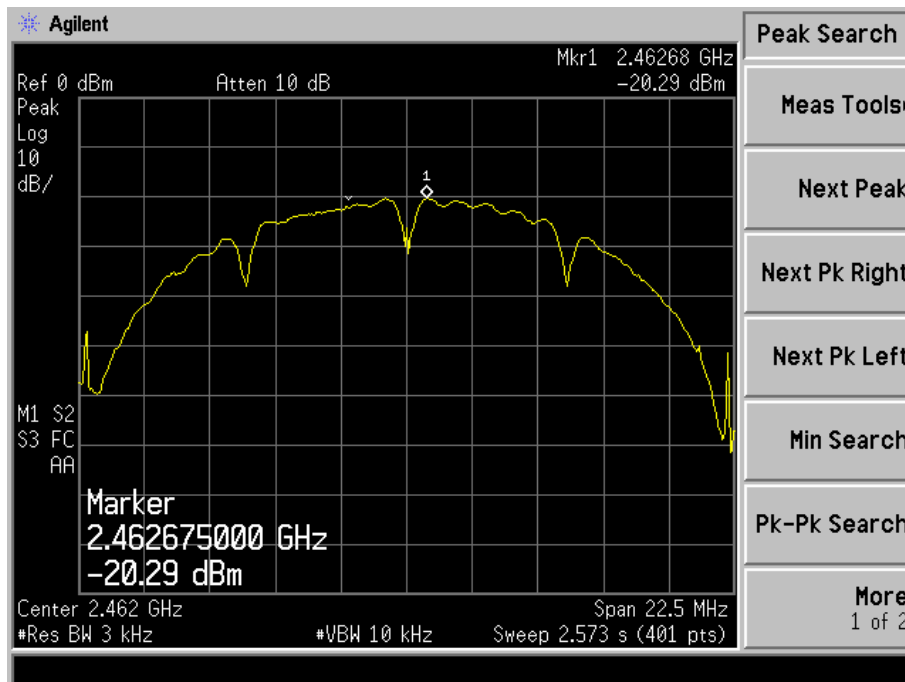
## 802.11b-Low Channel



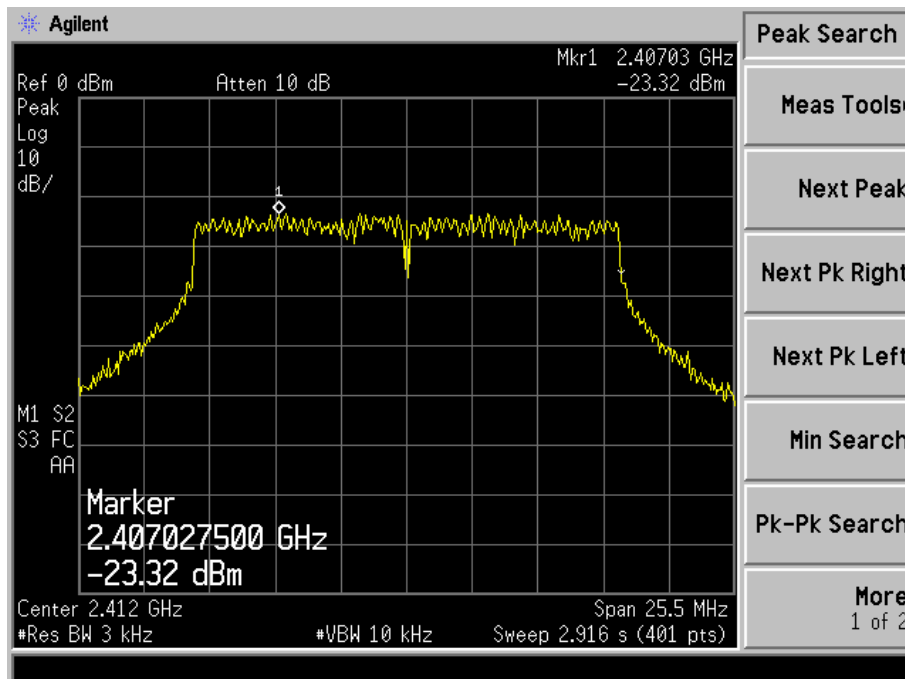
## 802.11b-Middle Channel



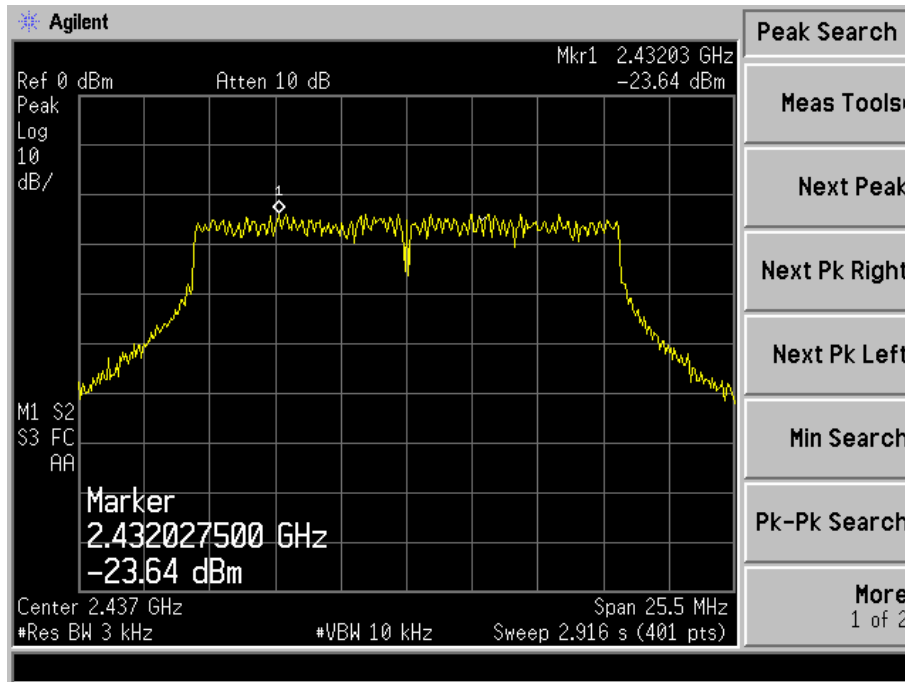
### 802.11b-High Channel



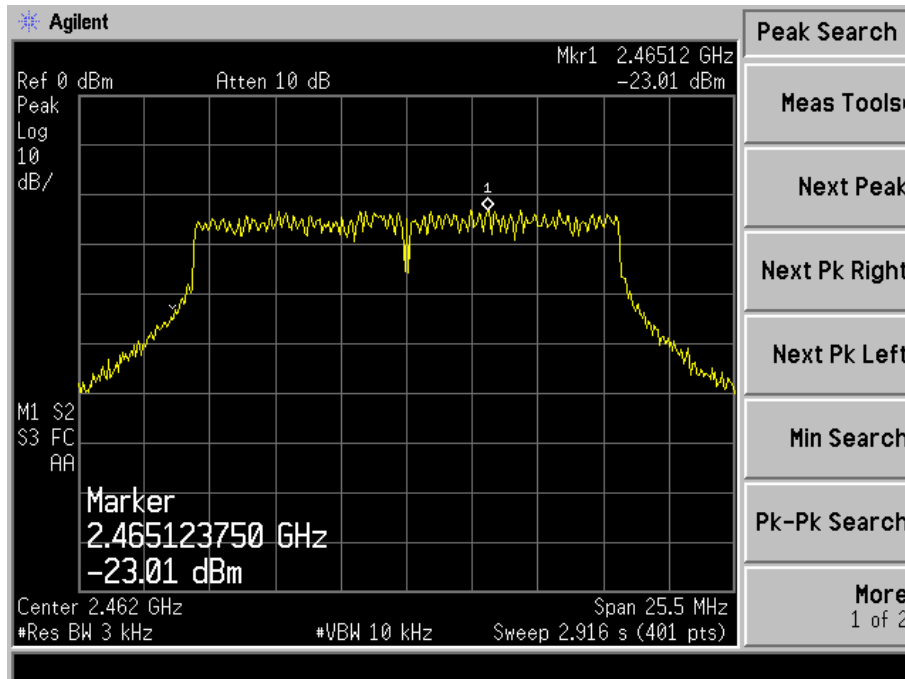
### 802.11g-Low Channel



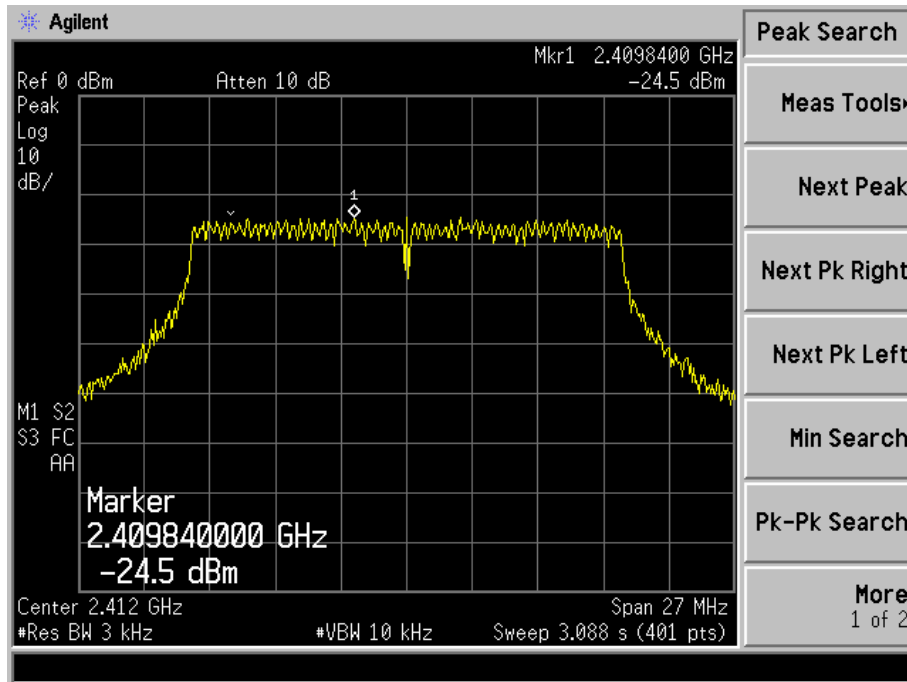
## 802.11g-Middle Channel



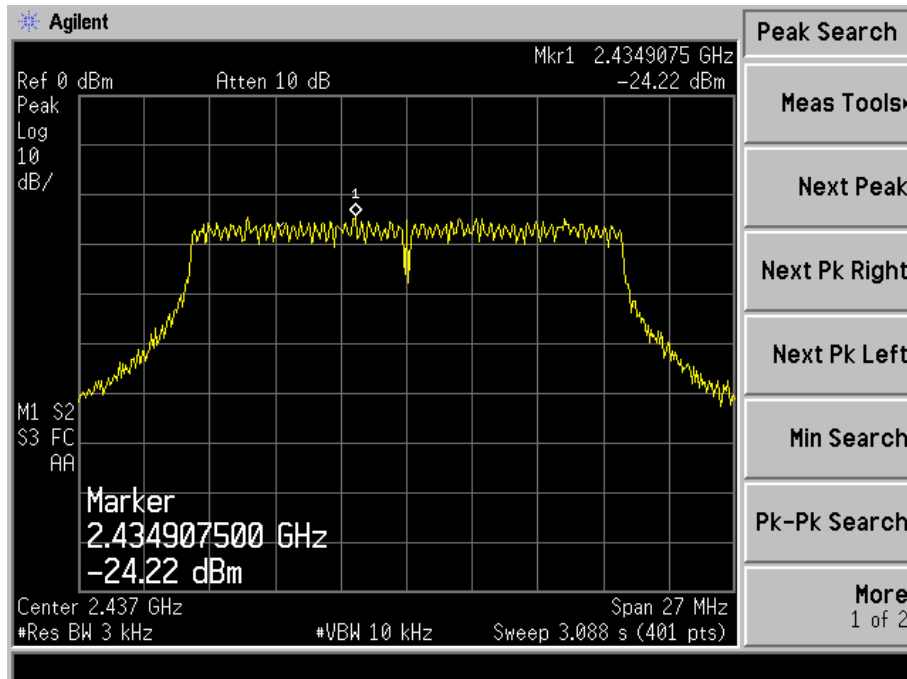
## 802.11g-High Channel



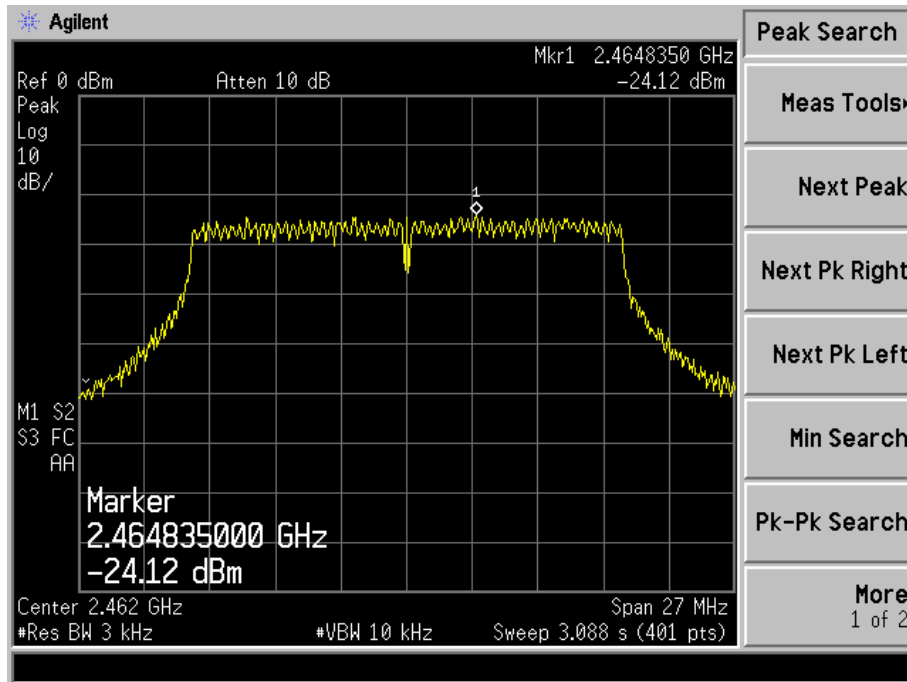
## 802.11n-HT20-Low Channel



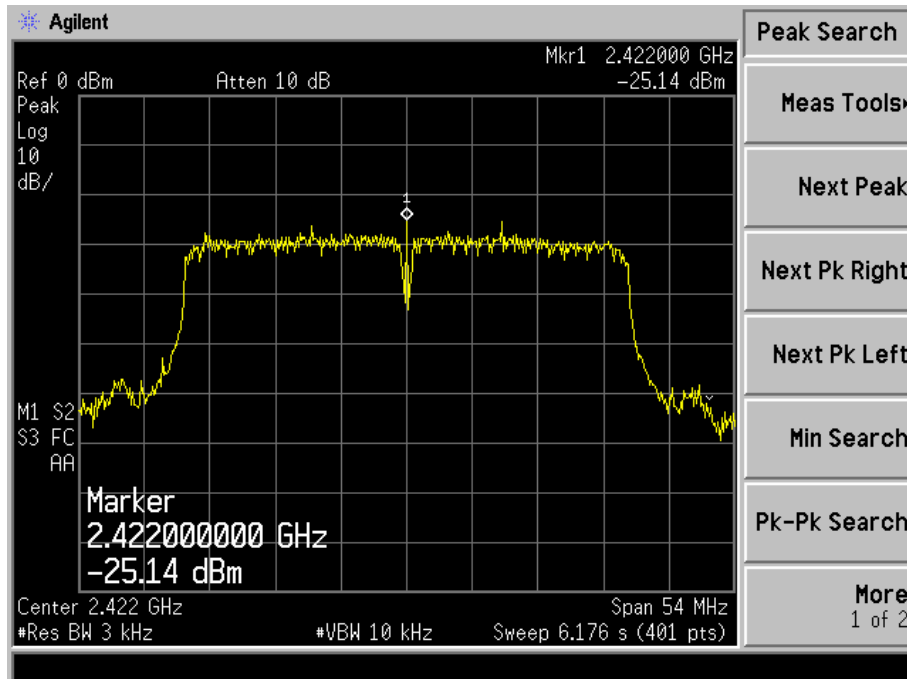
## 802.11n-HT20-Middle Channel



## 802.11n-HT20-High Channel

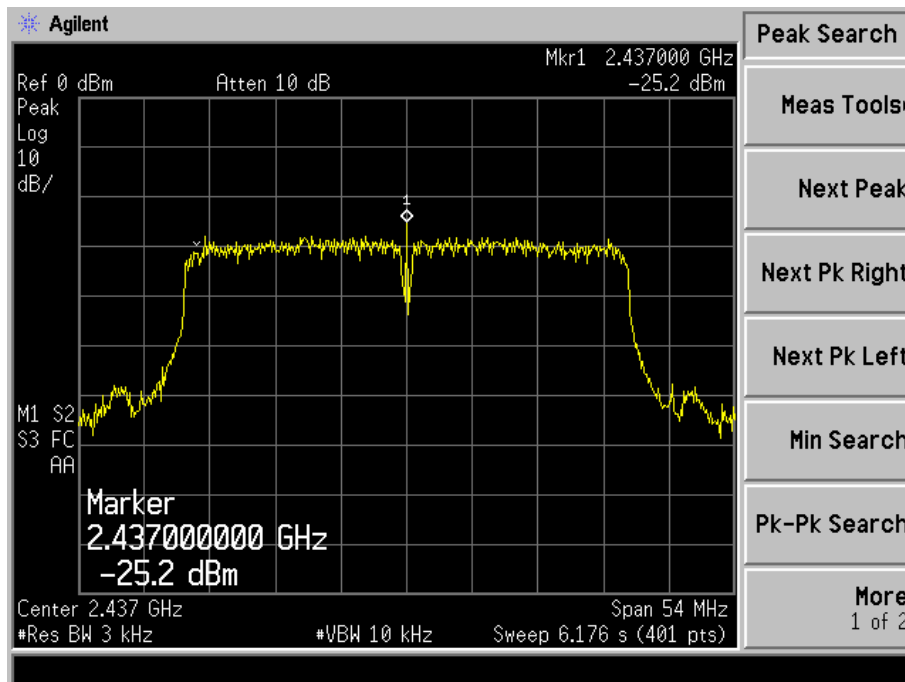


## 802.11n-HT40-Low Channel

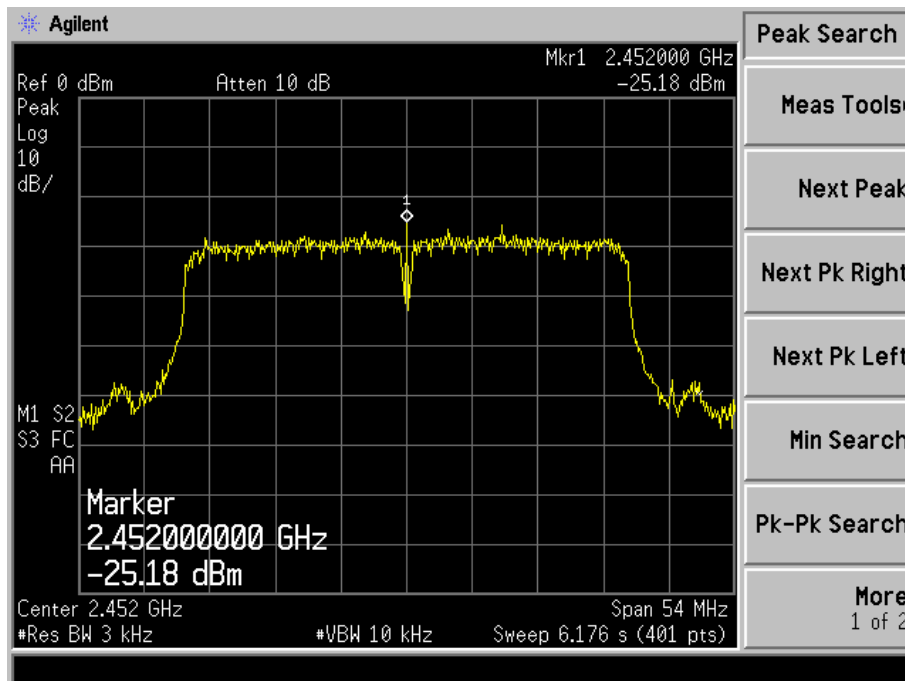




## 802.11n-HT40-Middle Channel



## 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

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- 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

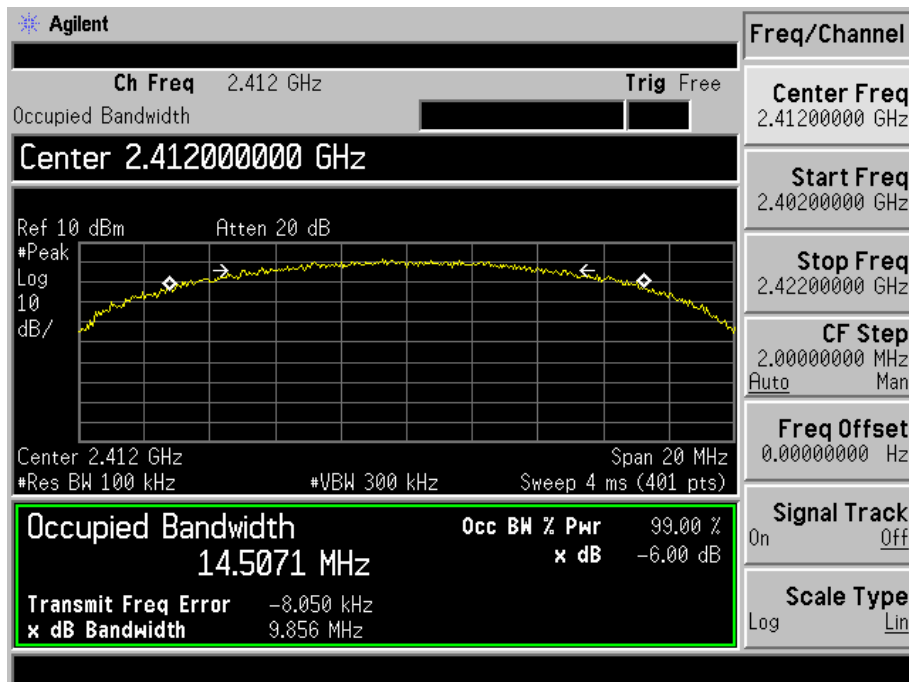
Temperature:	25° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

### 6.4 Summary of Test Results/Plots

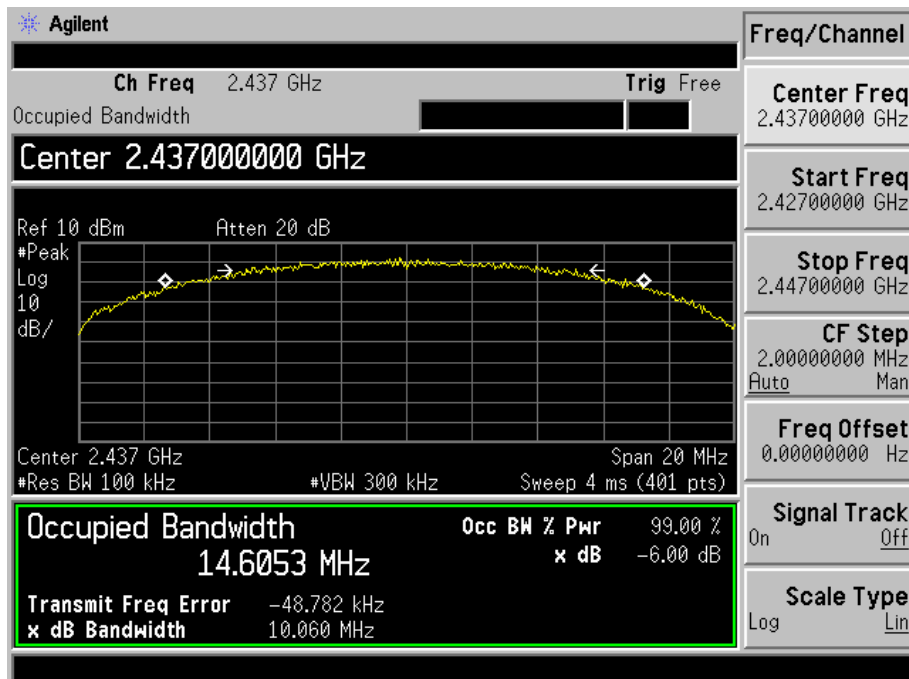
Test Mode	Test Channel MHz	6 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz
802.11b	2412	9856	14507.1	$\geq 500$
	2437	10060	14605.3	$\geq 500$
	2462	8447	14543.7	$\geq 500$
802.11g	2412	16582	16468.9	$\geq 500$
	2437	16578	16461.9	$\geq 500$
	2462	16590	16483.7	$\geq 500$
802.11n-HT20	2412	17835	17668.0	$\geq 500$
	2437	17790	17672.0	$\geq 500$
	2462	17824	17679.4	$\geq 500$
802.11n-HT40	2422	36308	35754.6	$\geq 500$
	2437	36309	35738.1	$\geq 500$
	2452	36345	35761.0	$\geq 500$

Please refer to the following test plots:

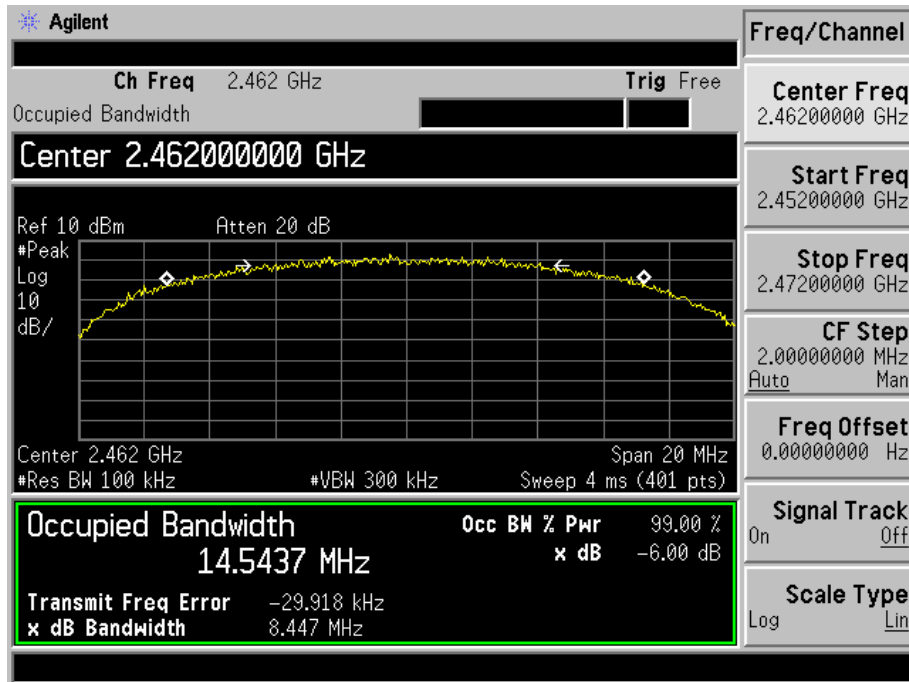
## 802.11b-Low Channel



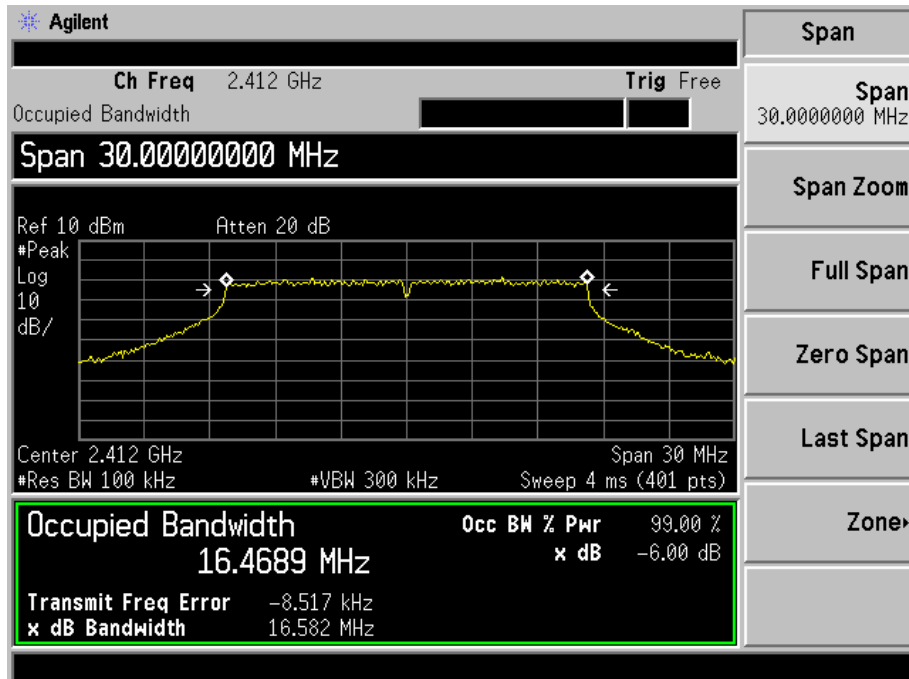
## 802.11b-Middle Channel



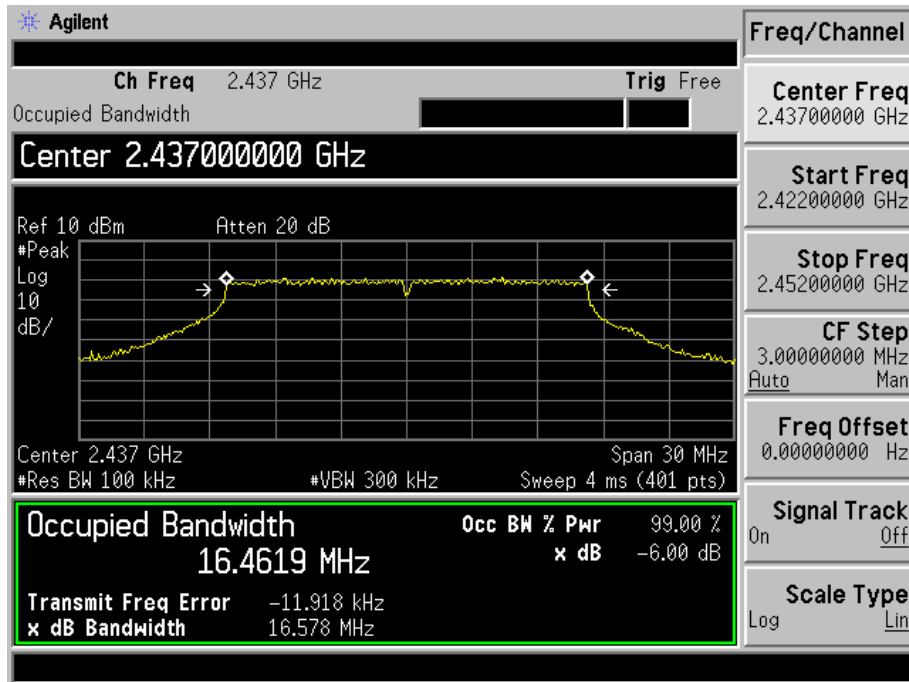
## 802.11b-High Channel



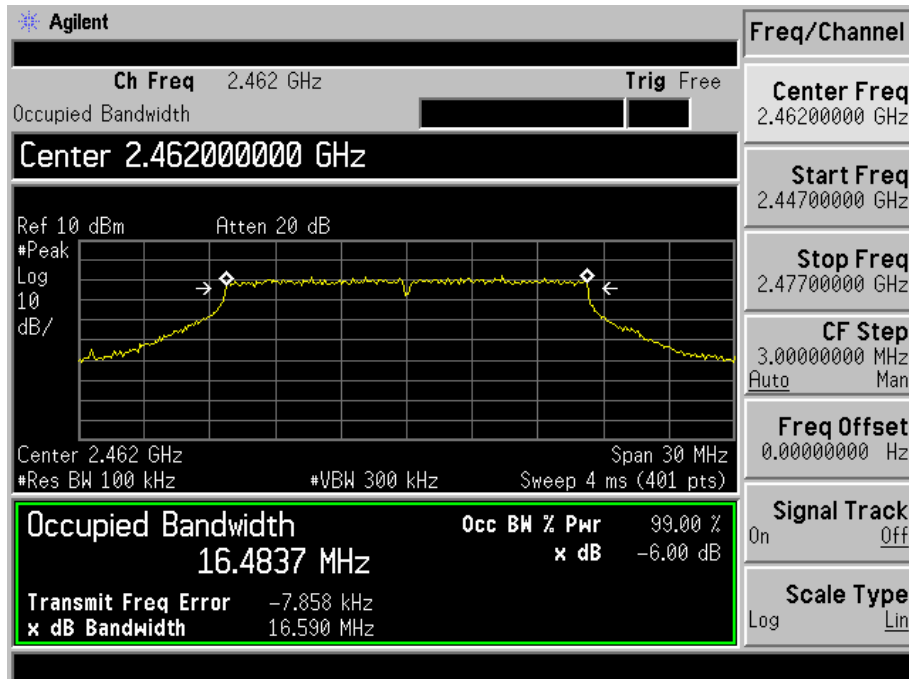
## 802.11g-Low Channel



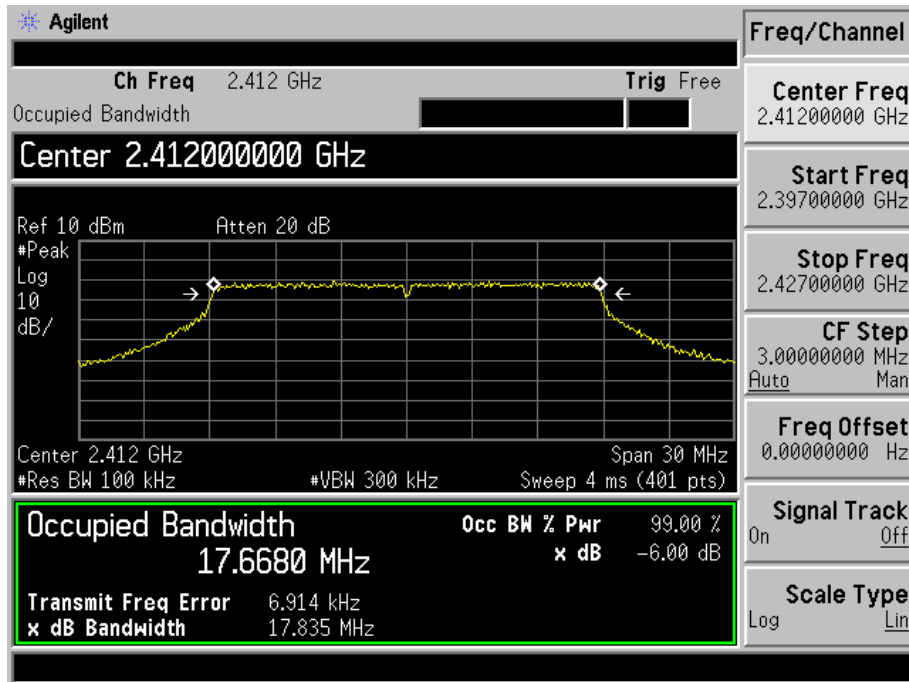
## 802.11g-Middle Channel



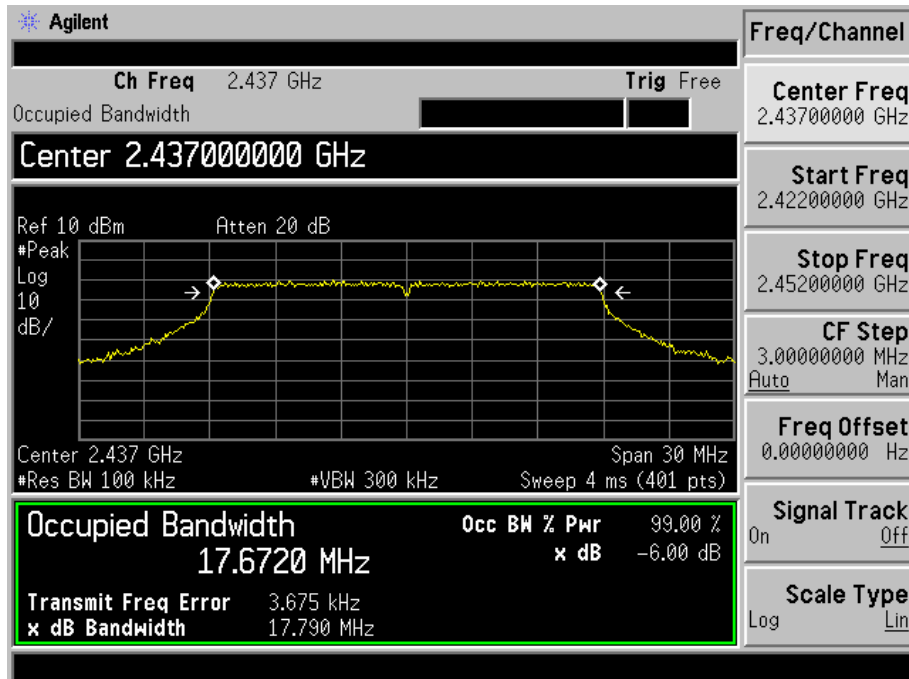
## 802.11g-High Channel



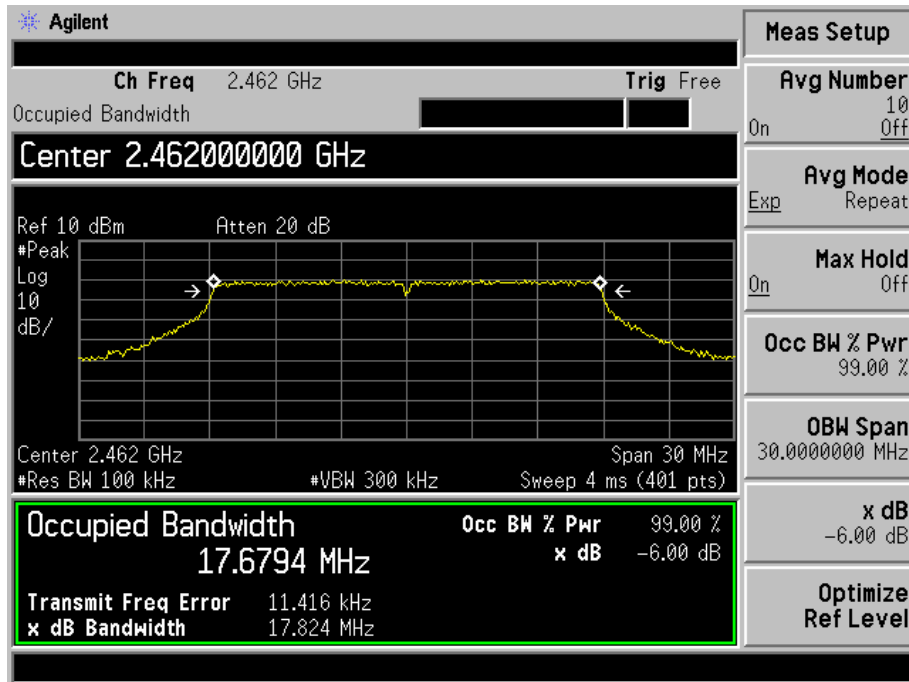
## 802.11n-HT20-Low Channel



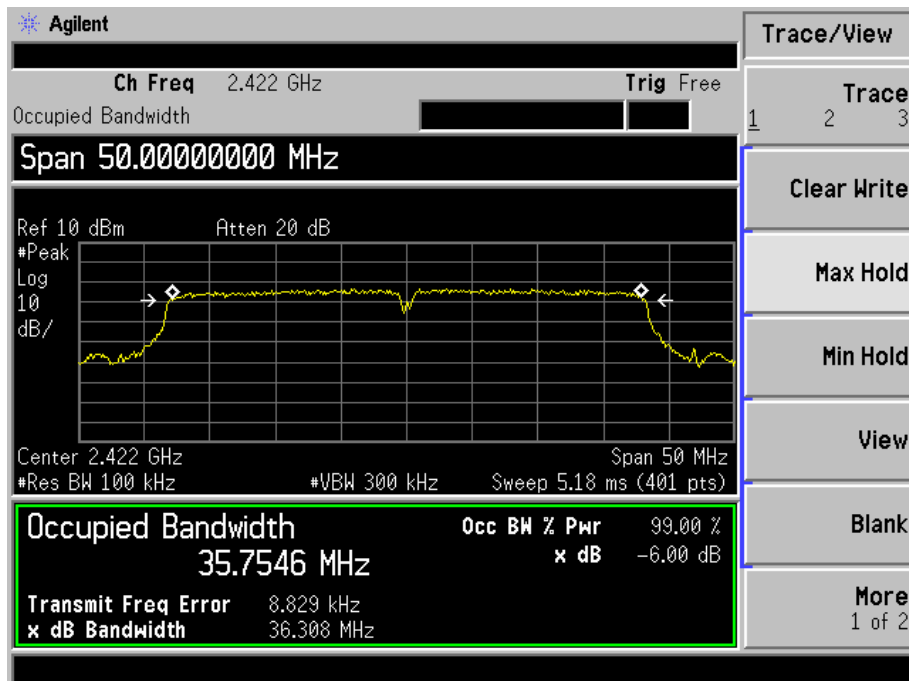
## 802.11n-HT20-Middle Channel



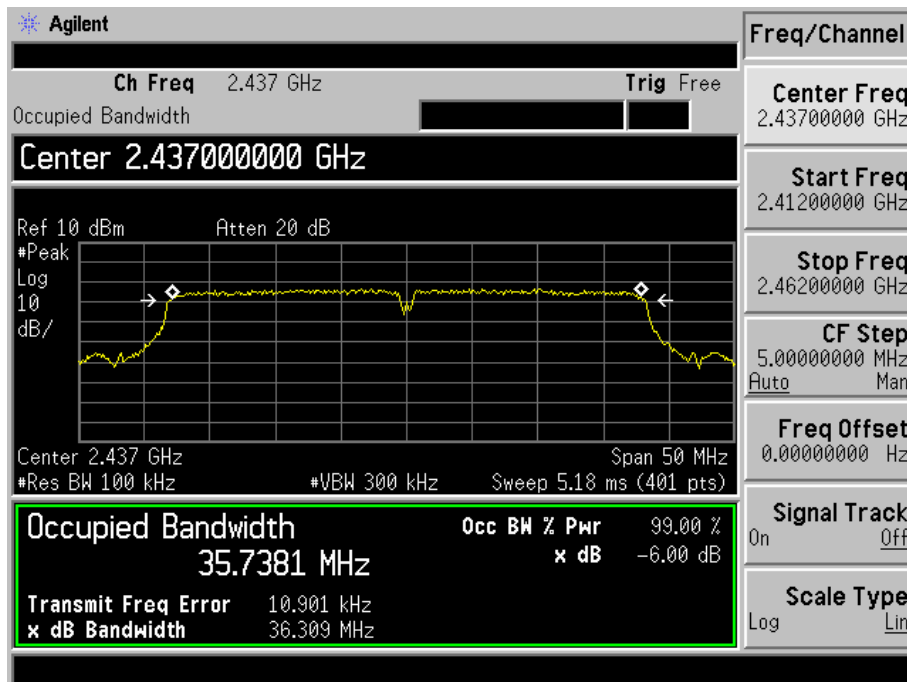
## 802.11n-HT20-High Channel



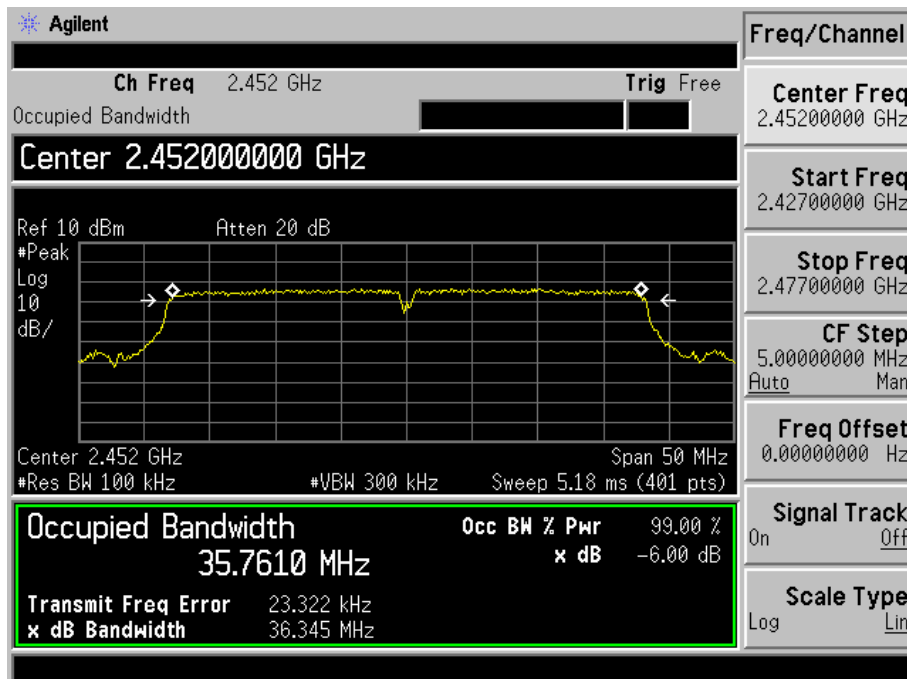
## 802.11n-HT40-Low Channel



## 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 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  $\geq 2 \times \text{span} / \text{RBW}$ . (This gives bin-to-bin spacing  $\leq \text{RBW}/2$ , 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

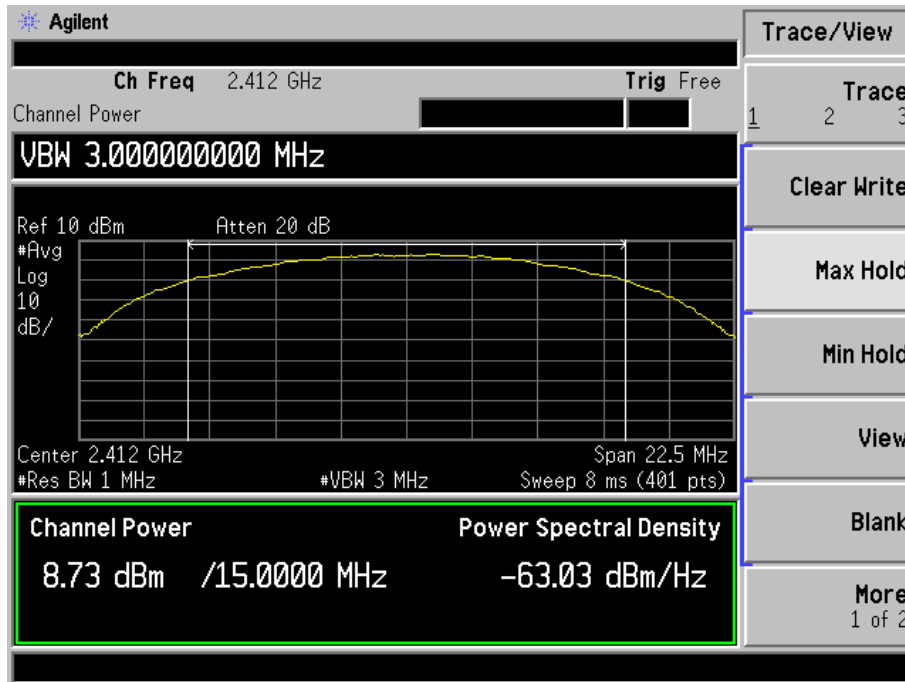
Temperature:	26° C
Relative Humidity:	57%
ATM Pressure:	1011 mbar

#### 7.4 Summary of Test Results/Plots

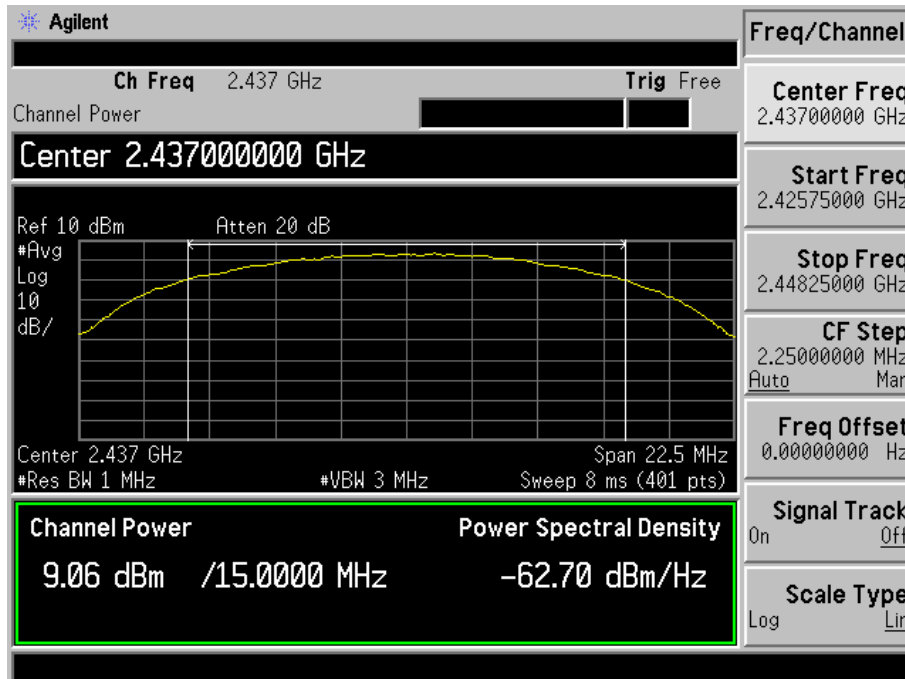
Test Mode	Frequency MHz	Reading dBm	Output Power mW	Limit mW
802.11b_11Mbps	2412	8.73	7.4645	1000
	2437	9.06	8.0538	1000
	2462	9.28	8.4723	1000
802.11g_54Mbps	2412	3.47	2.2233	1000
	2437	3.98	2.5003	1000
	2462	4.43	2.7733	1000
802.11n HT20_MCS7	2412	3.45	2.2131	1000
	2437	4.13	2.5882	1000
	2462	5.27	3.3651	1000
802.11n HT40_MCS7	2422	3.23	2.1038	1000
	2437	3.25	2.1135	1000
	2452	3.66	2.3227	1000

Please refer to the following test plots:

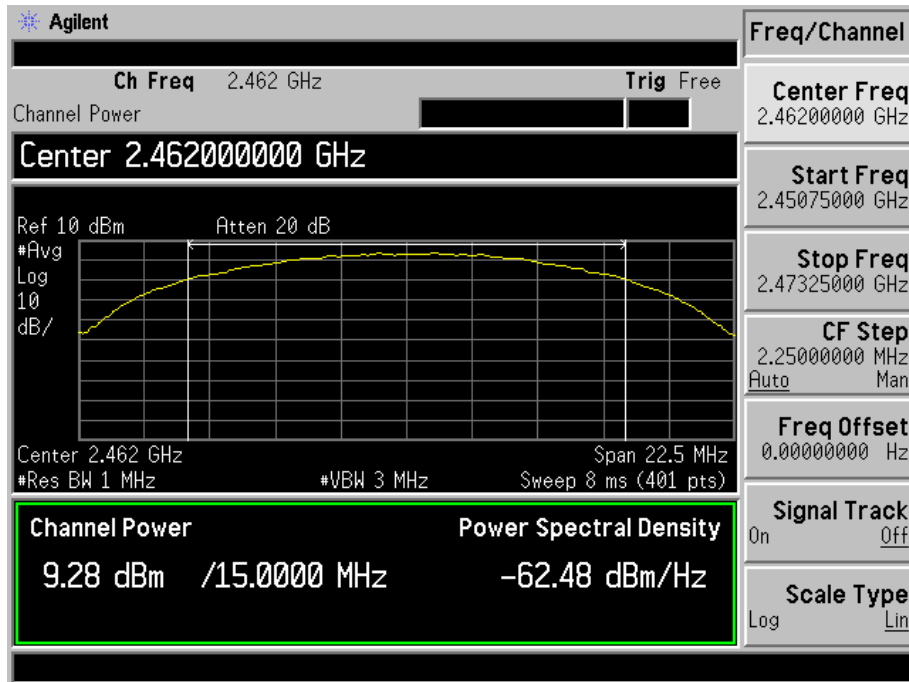
## 802.11-11Mbps-Low Channel



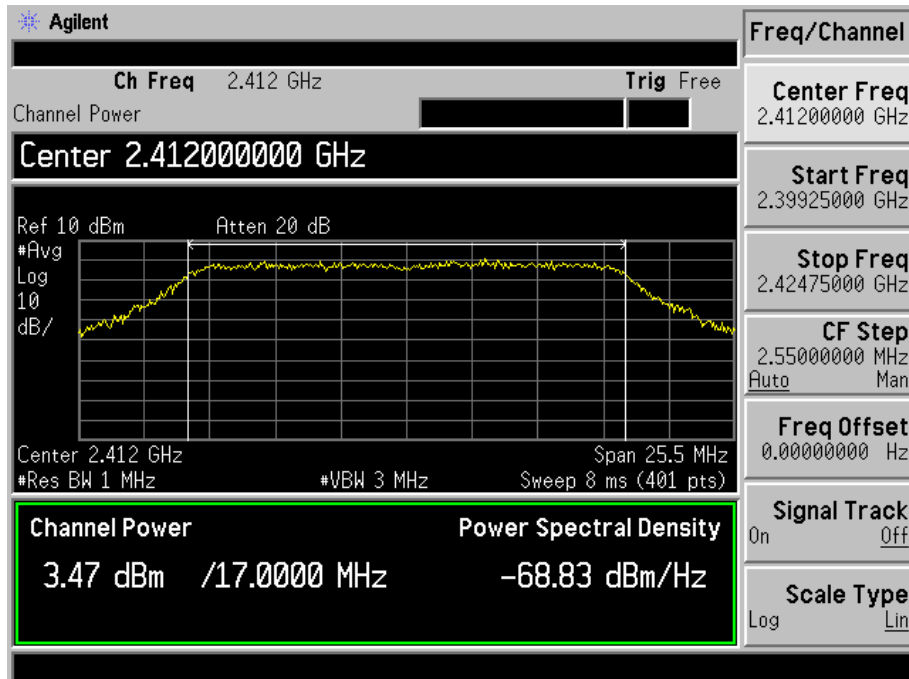
## 802.11b -11Mbps-Middle Channel



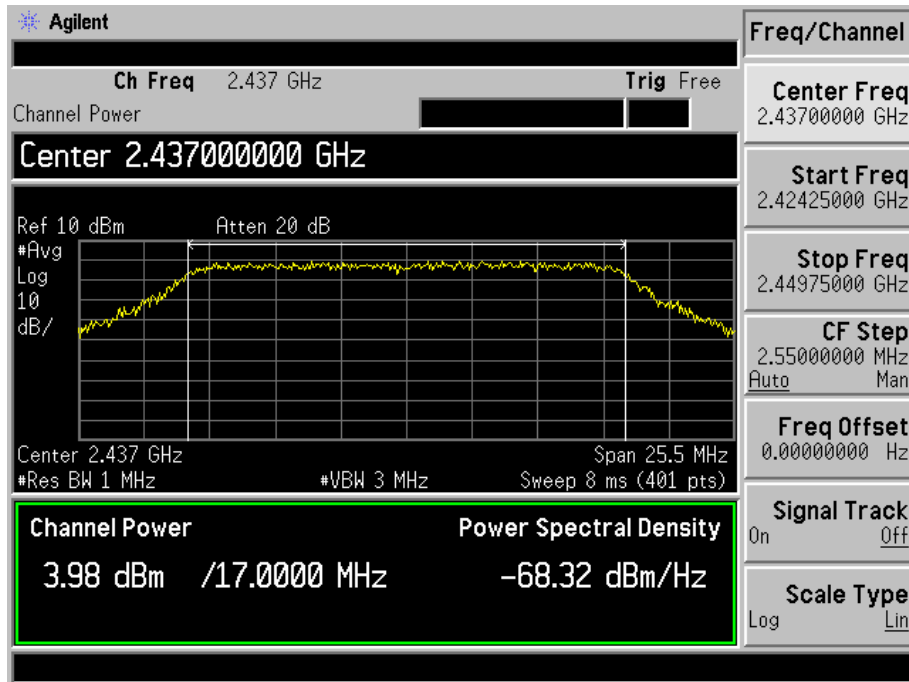
## 802.11b -11Mbps-High Channel



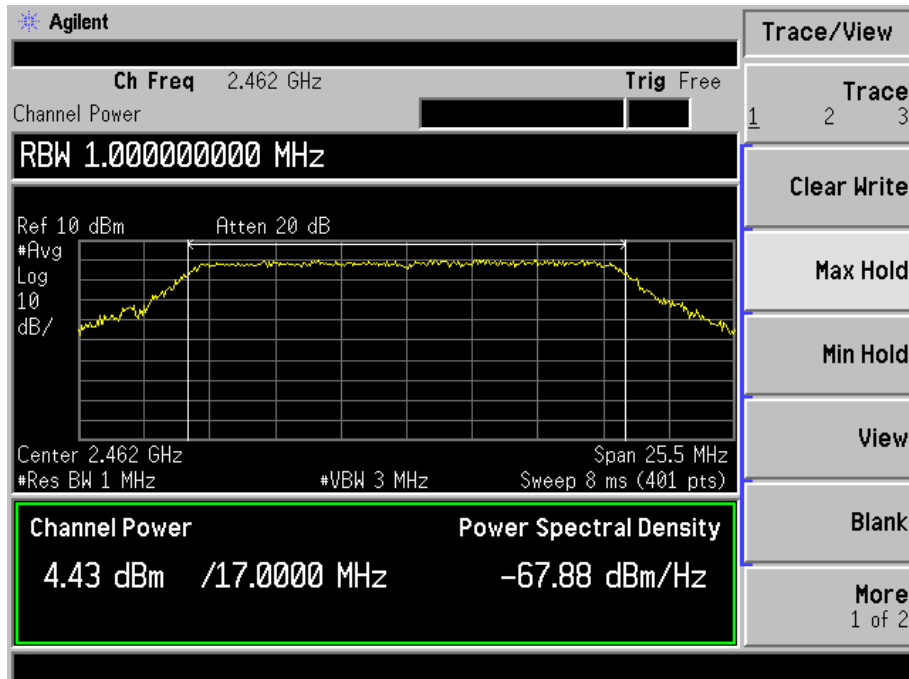
## 802.11g-54Mbps-Low Channel



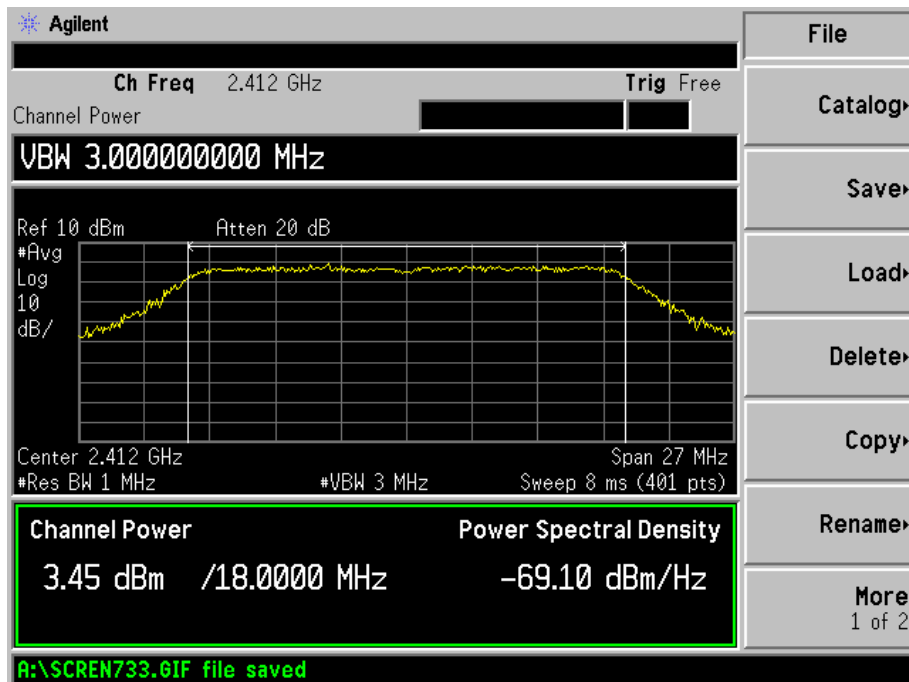
## 802.11g-54Mbps-Middle Channel



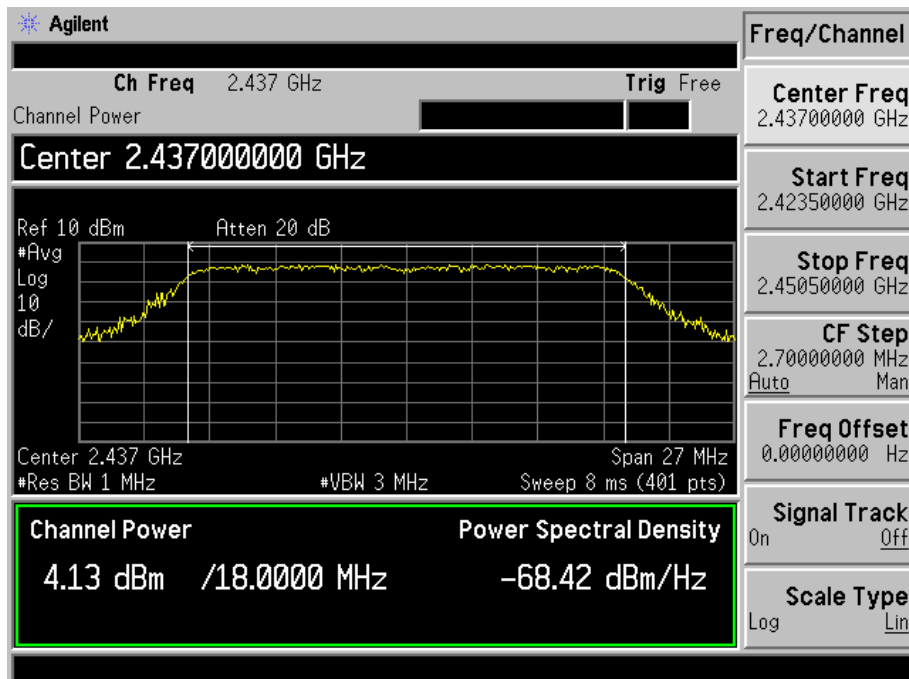
## 802.11g-54Mbps-High Channel



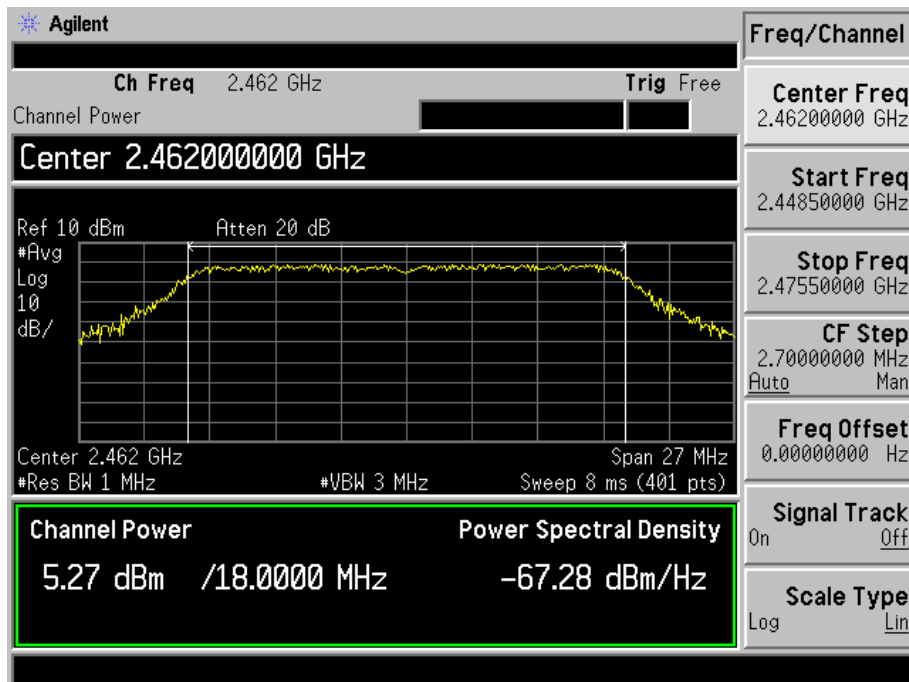
## 802.11n-HT20-MCS7-Low Channel



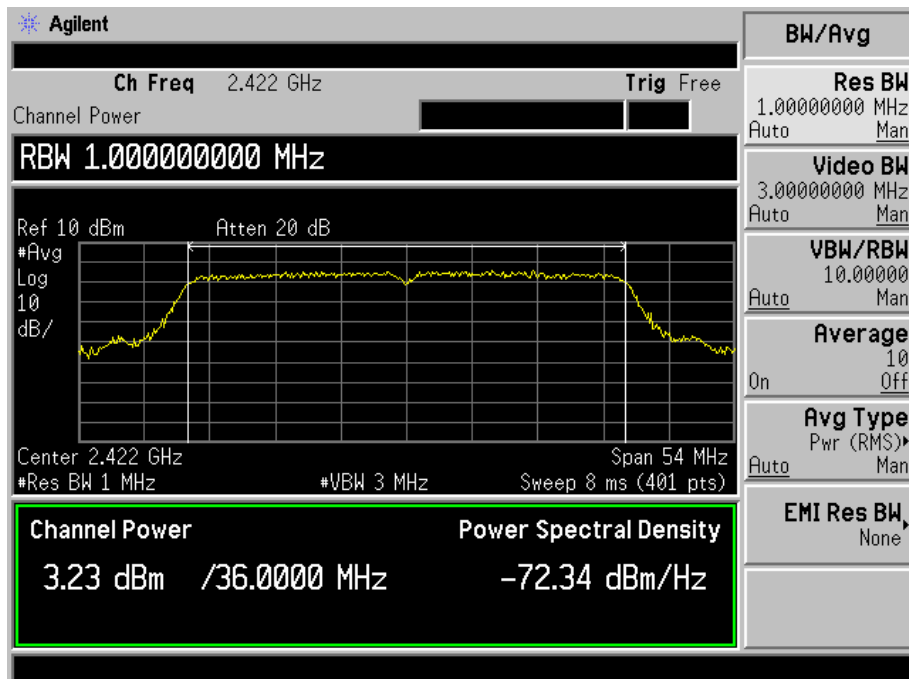
## 802.11n-HT20-MCS7-Middle Channel



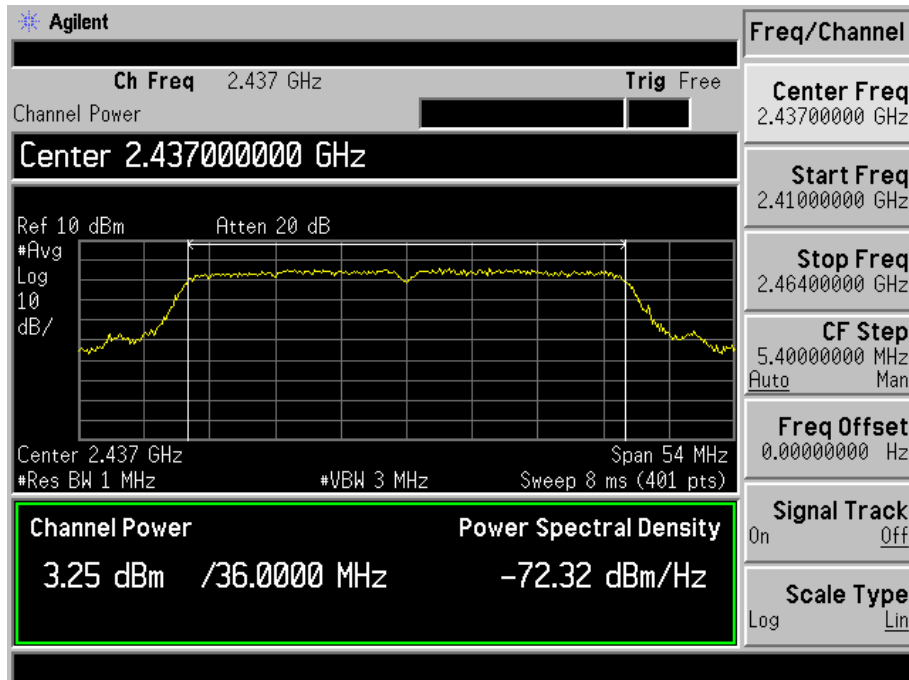
802.11n-HT20-MCS7-High Channel



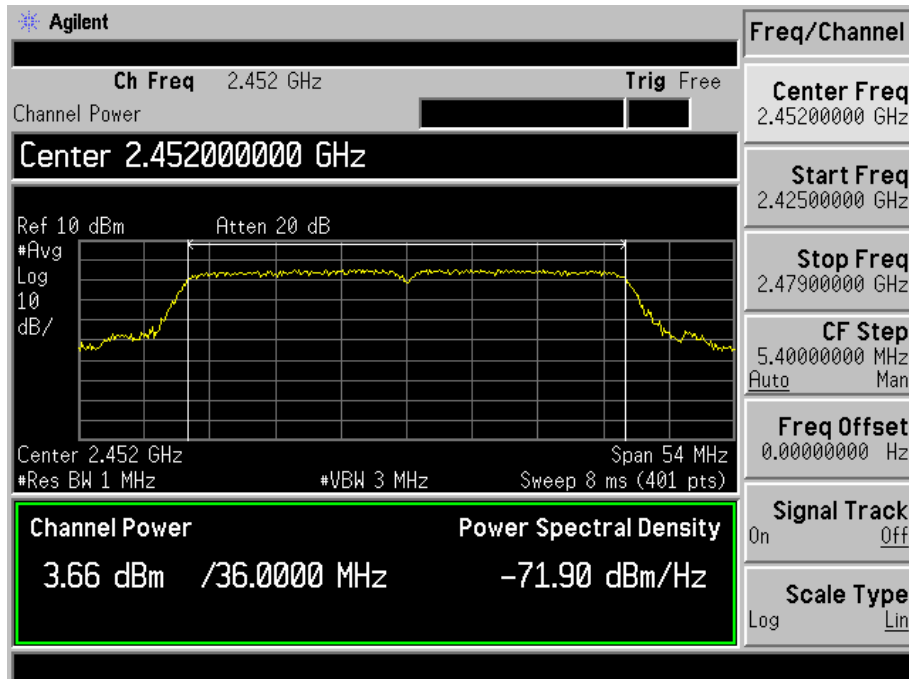
802.11n-HT40-MCS7-Low Channel



## 802.11n-HT40-MCS7-Middle Channel



## 802.11n-HT40-MCS7-High Channel





## 8. Field Strength of Spurious Emissions

### 8.1 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).

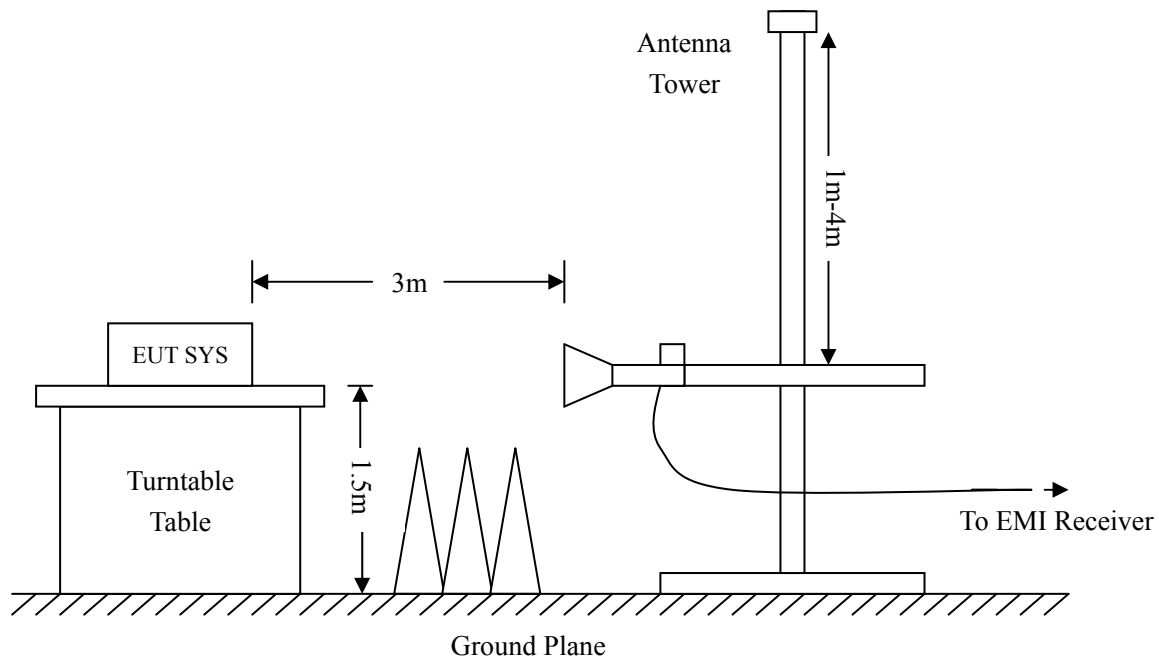
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

### 8.2 Test Procedure

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

### 8.3 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 $\mu$ V means the emission is 6dB $\mu$ V below the maximum limit. The equation for margin calculation is as follows:

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

### 8.4 Environmental Conditions

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

## 8.5 Summary of Test Results/Plots

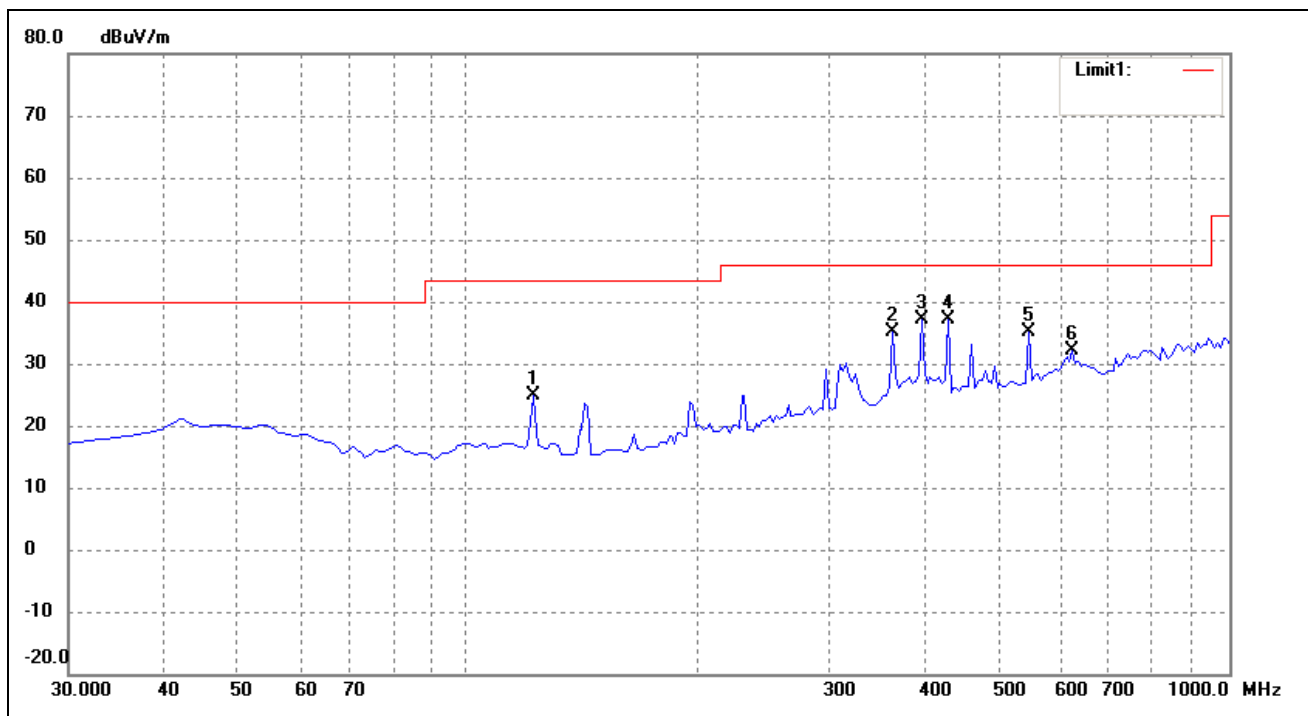
According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst cases:

*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)

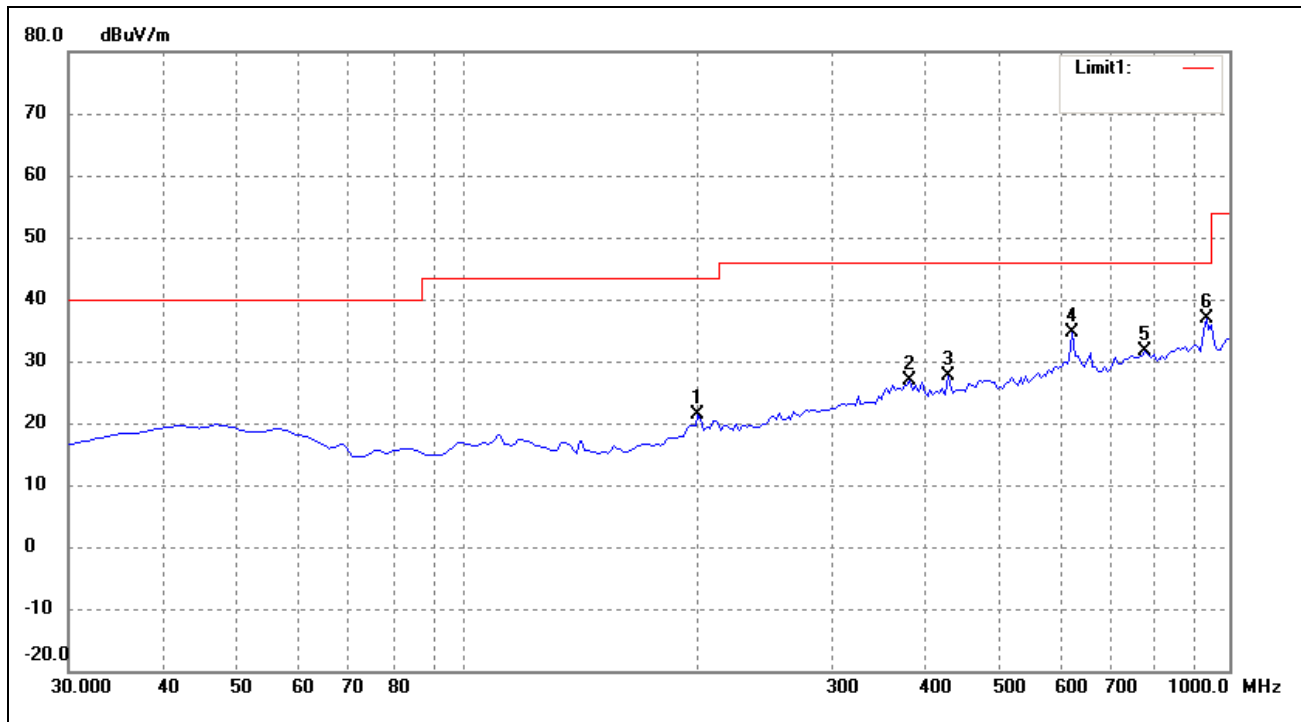
EUT: AirVisual Node  
 Tested Model: AV-5PCA-4A  
 Operating Condition: 802.11b Transmitting Low Channel-2412MHz  
 Comment: DC 3.7V

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	122.1500	36.49	-11.55	24.94	43.50	-18.56	254	100	peak
2	362.2250	38.31	-3.13	35.18	46.00	-10.82	113	100	peak
3	396.1750	40.20	-2.95	37.25	46.00	-8.75	284	100	peak
4	430.1250	40.39	-3.22	37.17	46.00	-8.83	360	100	peak
5	546.5249	36.78	-1.66	35.12	46.00	-10.88	100	100	peak
6	626.5499	31.13	1.07	32.20	46.00	-13.80	43	100	peak

Test Specification: Vertical

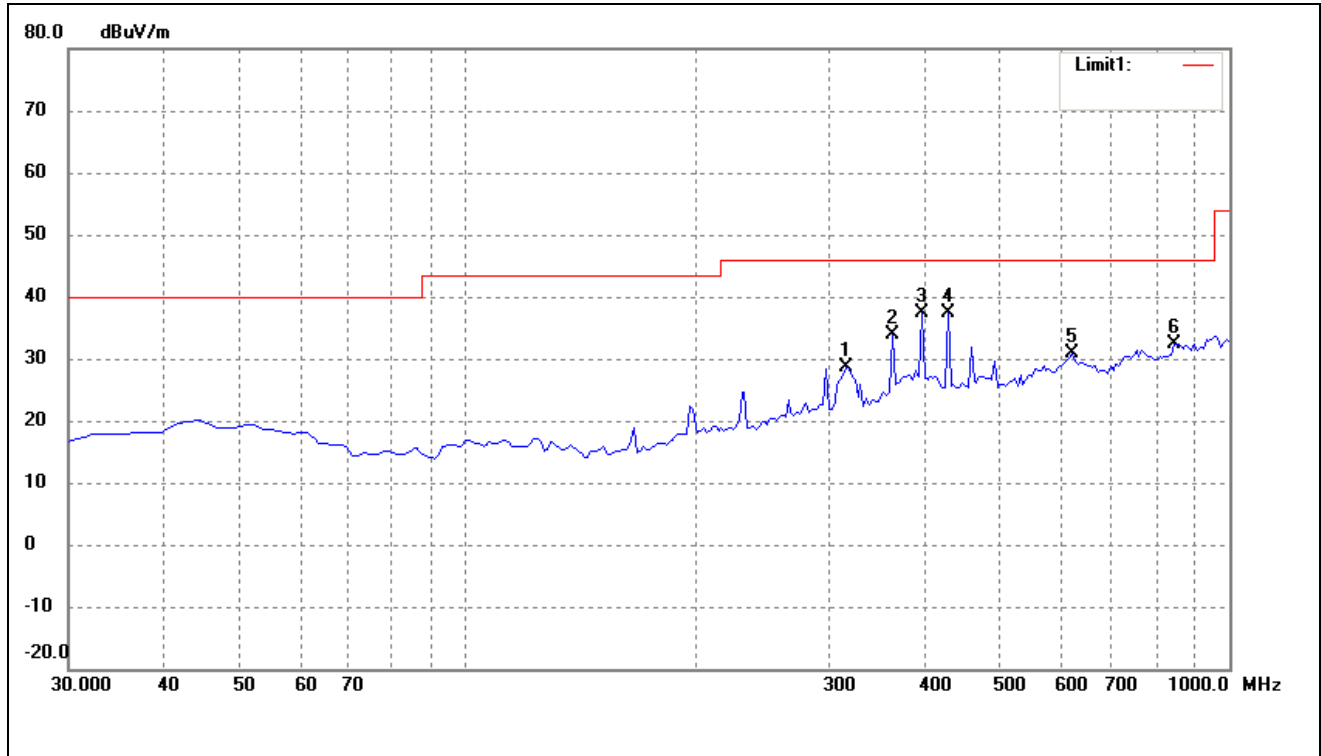


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	202.1750	30.05	-8.67	21.38	43.50	-22.12	114	100	peak
2	384.0500	29.06	-2.30	26.76	46.00	-19.24	270	100	peak
3	430.1250	30.78	-3.22	27.56	46.00	-18.44	76	100	peak
4	626.5499	33.50	1.07	34.57	46.00	-11.43	159	100	peak
5	779.3250	28.81	2.86	31.67	46.00	-14.33	360	100	peak
6	936.9500	32.74	4.17	36.91	46.00	-9.09	116	100	peak

Operating Condition: 802.11b Transmitting Middle Channel-2437MHz

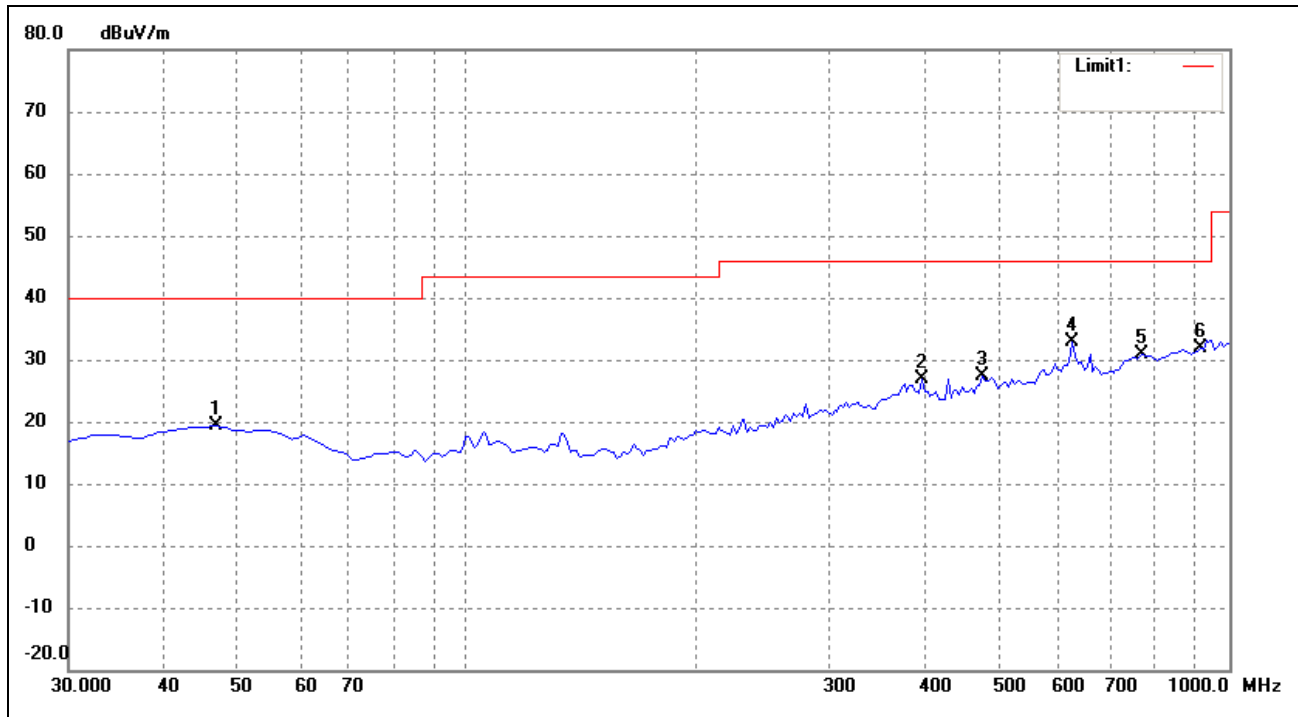
Comment: DC 3.7V

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	316.1499	33.37	-4.81	28.56	46.00	-17.44	178	100	peak
2	362.2250	37.10	-3.13	33.97	46.00	-12.03	68	100	peak
3	396.1750	40.34	-2.95	37.39	46.00	-8.61	131	100	peak
4	430.1250	40.49	-3.22	37.27	46.00	-8.73	224	100	peak
5	626.5499	29.92	1.07	30.99	46.00	-15.01	160	100	peak
6	849.6499	30.07	2.40	32.47	46.00	-13.53	290	100	peak

Test Specification: Vertical

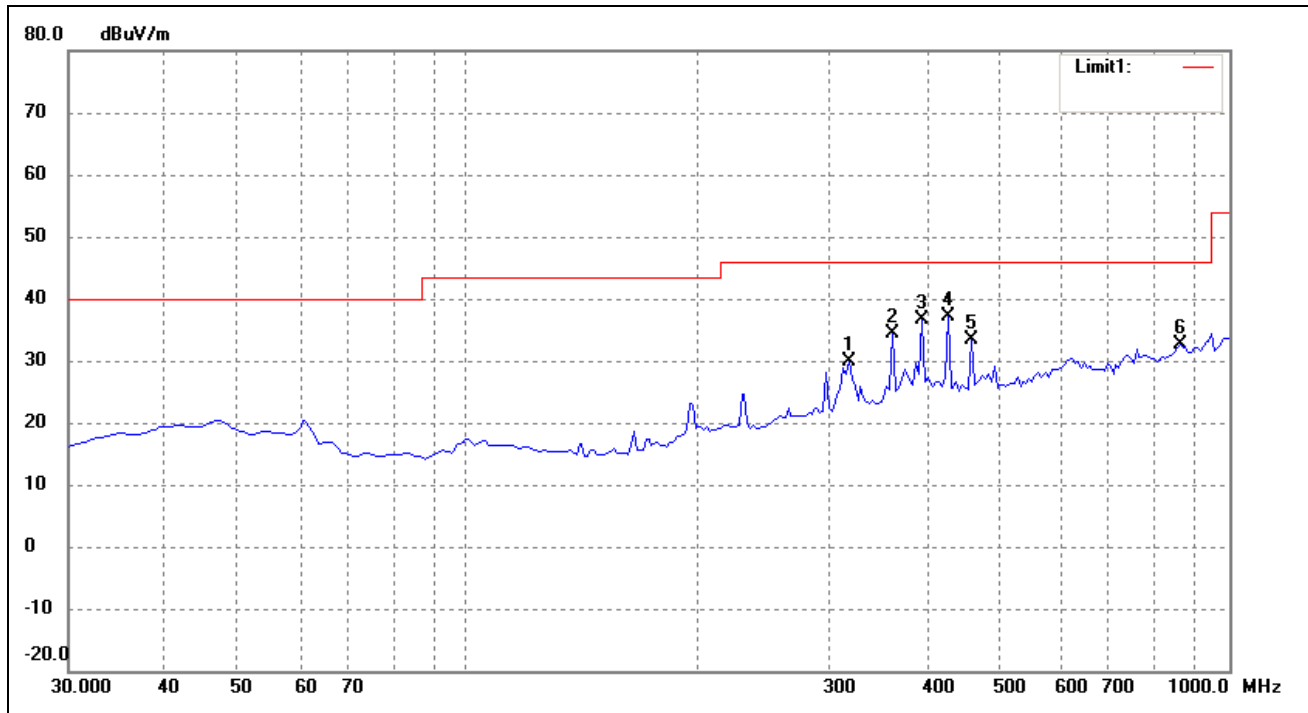


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	46.9750	27.46	-8.13	19.33	40.00	-20.67	60	100	peak
2	396.1750	29.93	-2.95	26.98	46.00	-19.02	135	100	peak
3	476.1999	28.81	-1.36	27.45	46.00	-18.55	157	100	peak
4	626.5499	31.84	1.07	32.91	46.00	-13.09	194	100	peak
5	774.4750	28.26	2.60	30.86	46.00	-15.14	242	100	peak
6	917.5499	28.16	3.60	31.76	46.00	-14.24	231	100	peak

Operating Condition: 802.11b Transmitting High Channel-2462MHz

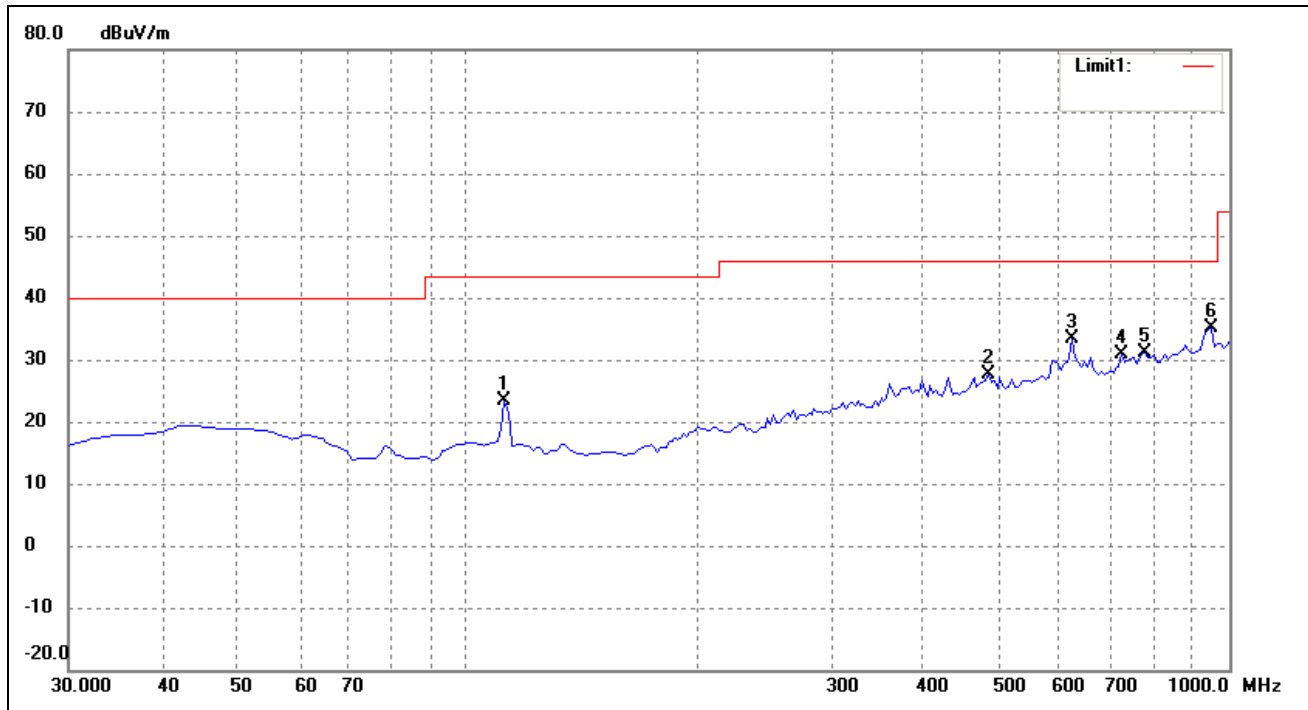
Comment: DC 3.7V

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	318.5749	34.65	-4.70	29.95	46.00	-16.05	64	100	peak
2	362.2250	37.39	-3.13	34.26	46.00	-11.74	90	100	peak
3	396.1750	39.62	-2.95	36.67	46.00	-9.33	131	100	peak
4	430.1250	40.34	-3.22	37.12	46.00	-8.88	178	100	peak
5	461.6499	36.00	-2.56	33.44	46.00	-12.56	176	100	peak
6	861.7749	29.72	2.95	32.67	46.00	-13.33	255	100	peak

Test Specification: Vertical



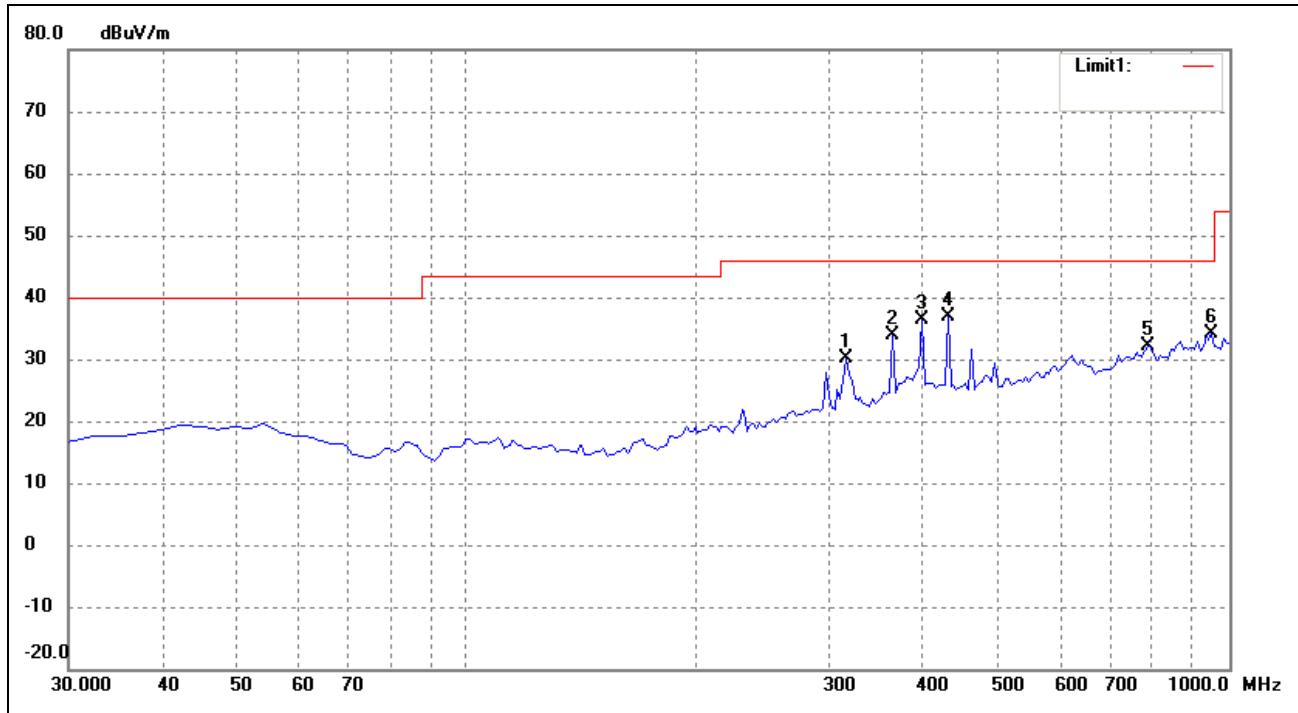
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( ° )	Height (cm)	Remark
1	112.4500	34.53	-11.23	23.30	43.50	-20.20	66	100	peak
2	483.4750	28.89	-1.23	27.66	46.00	-18.34	91	100	peak
3	626.5499	32.34	1.07	33.41	46.00	-12.59	135	100	peak
4	728.3999	29.31	1.45	30.76	46.00	-15.24	168	100	peak
5	779.3250	28.31	2.86	31.17	46.00	-14.83	225	100	peak
6	951.5000	31.30	3.87	35.17	46.00	-10.83	160	100	peak



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

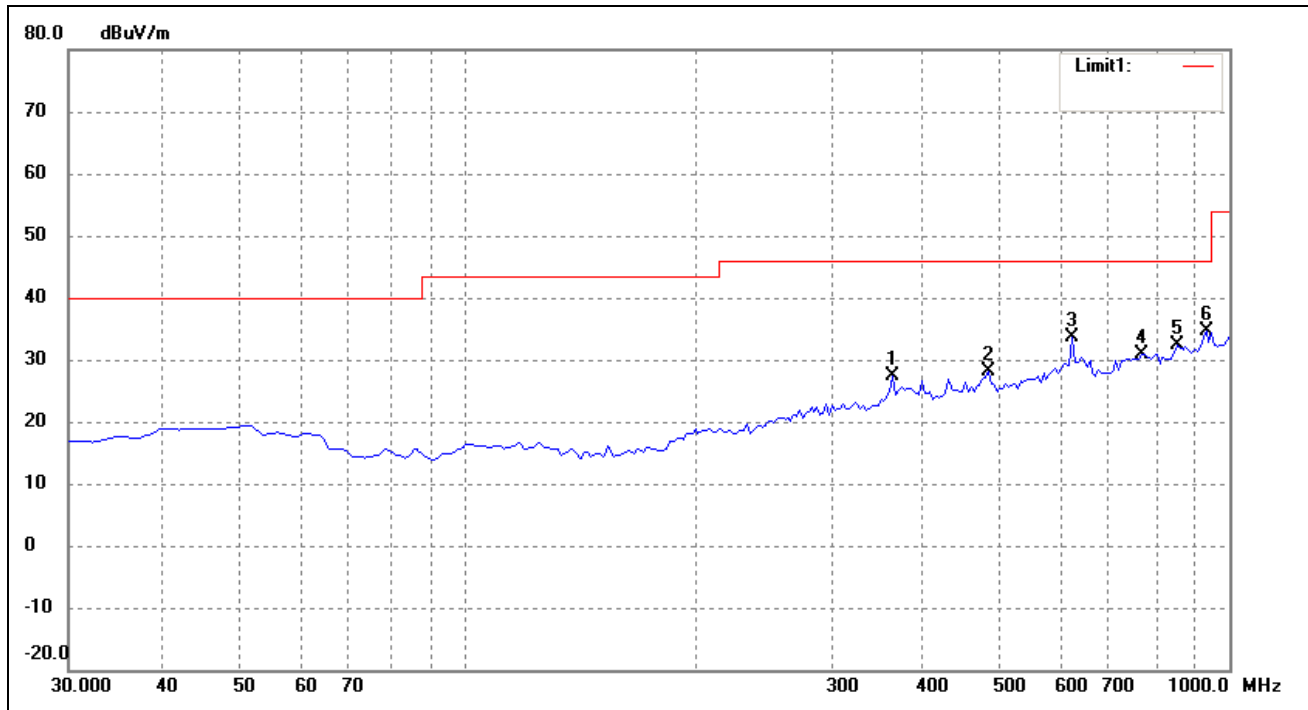
EUT: *AirVisual Node*  
 Tested Model: *AV-5PCA-4A*  
 Operating Condition: *802.11g Transmitting Low Channel-2412MHz*  
 Comment: *DC 3.7V*

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	316.1499	35.06	-4.81	30.25	46.00	-15.75	46	100	peak
2	362.2250	37.01	-3.13	33.88	46.00	-12.12	79	100	peak
3	396.1750	39.42	-2.95	36.47	46.00	-9.53	115	100	peak
4	430.1250	40.20	-3.22	36.98	46.00	-9.02	166	100	peak
5	789.0249	29.70	2.45	32.15	46.00	-13.85	193	100	peak
6	951.5000	30.33	3.87	34.20	46.00	-11.80	258	100	peak

Test Specification: Vertical

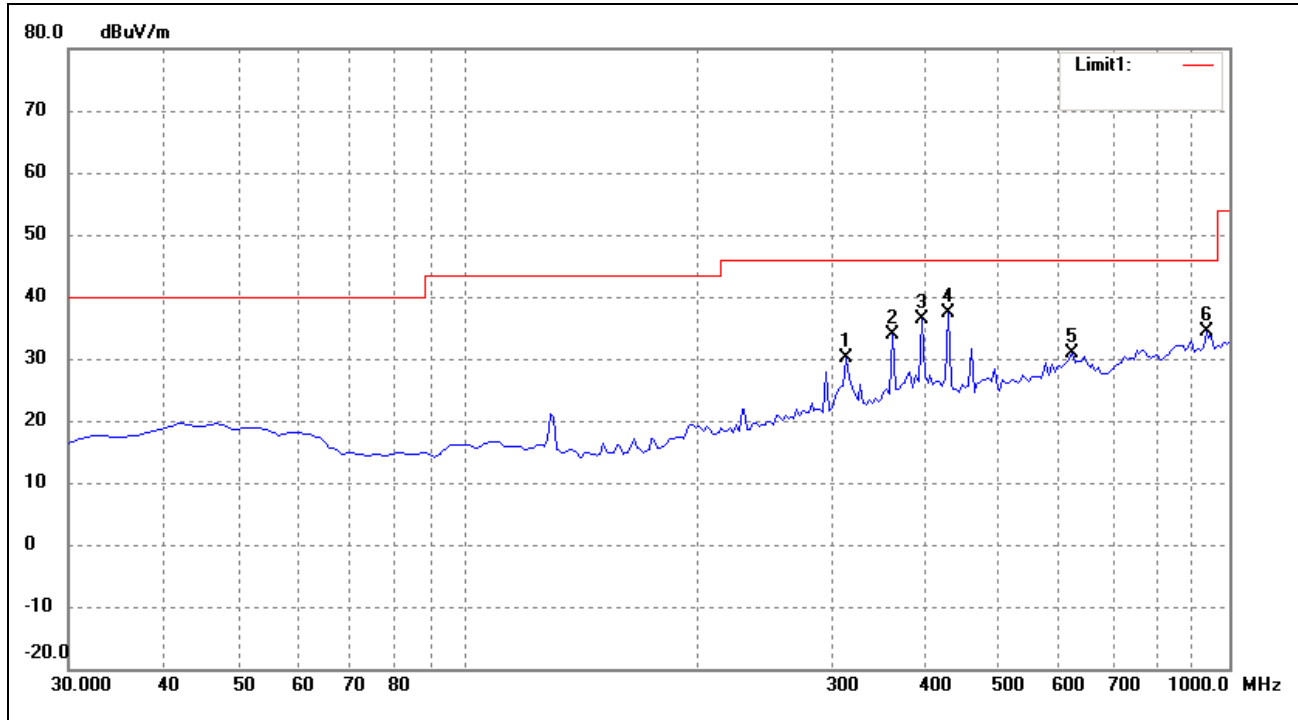


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( ° )	Height (cm)	Remark
1	362.2250	30.56	-3.13	27.43	46.00	-18.57	57	100	peak
2	485.8999	29.40	-1.38	28.02	46.00	-17.98	83	100	peak
3	626.5499	32.45	1.07	33.52	46.00	-12.48	122	100	peak
4	772.0499	28.41	2.46	30.87	46.00	-15.13	177	100	peak
5	856.9249	29.52	2.77	32.29	46.00	-13.71	90	100	peak
6	936.9500	30.52	4.17	34.69	46.00	-11.31	336	100	peak

Operating Condition: 802.11g Transmitting Middle Channel-2437MHz

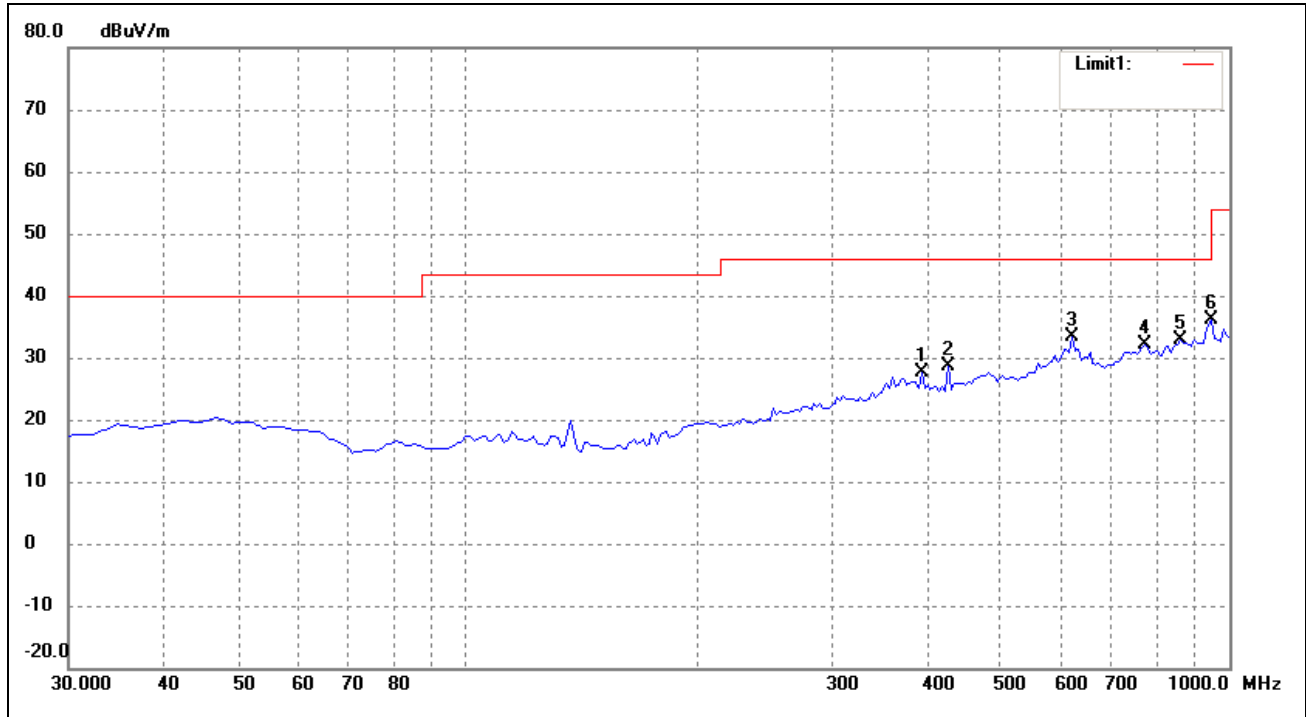
Comment: DC 3.7V

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	316.1499	34.92	-4.81	30.11	46.00	-15.89	88	100	peak
2	362.2250	37.05	-3.13	33.92	46.00	-12.08	137	100	peak
3	396.1750	39.33	-2.95	36.38	46.00	-9.62	105	100	peak
4	430.1250	40.51	-3.22	37.29	46.00	-8.71	164	100	peak
5	626.5499	29.85	1.07	30.92	46.00	-15.08	228	100	peak
6	939.3750	30.11	4.25	34.36	46.00	-11.64	130	100	peak

Test Specification: Vertical

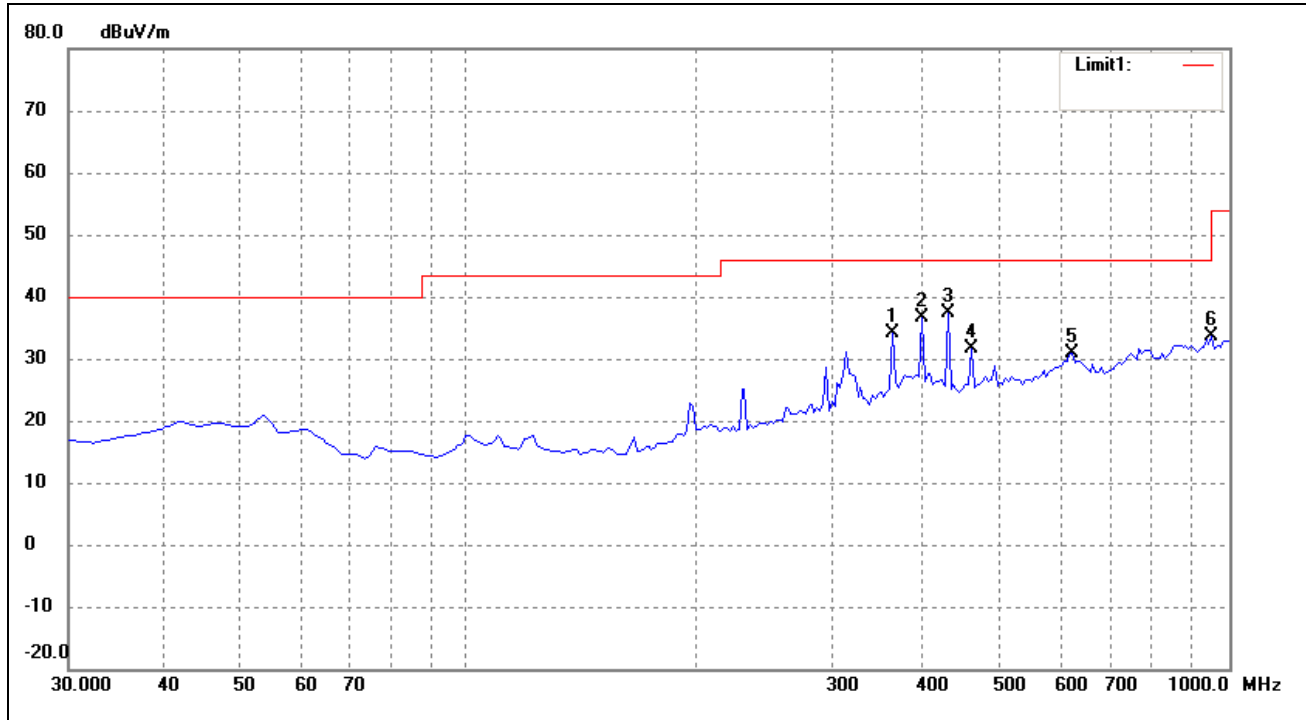


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	396.1750	30.58	-2.95	27.63	46.00	-18.37	67	100	peak
2	430.1250	31.80	-3.22	28.58	46.00	-17.42	136	100	peak
3	626.5499	32.39	1.07	33.46	46.00	-12.54	184	100	peak
4	776.8999	29.35	2.73	32.08	46.00	-13.92	255	100	peak
5	861.7749	29.89	2.95	32.84	46.00	-13.16	270	100	peak
6	949.0750	32.21	3.96	36.17	46.00	-9.83	180	100	peak

Operating Condition: 802.11g Transmitting High Channel-2462MHz

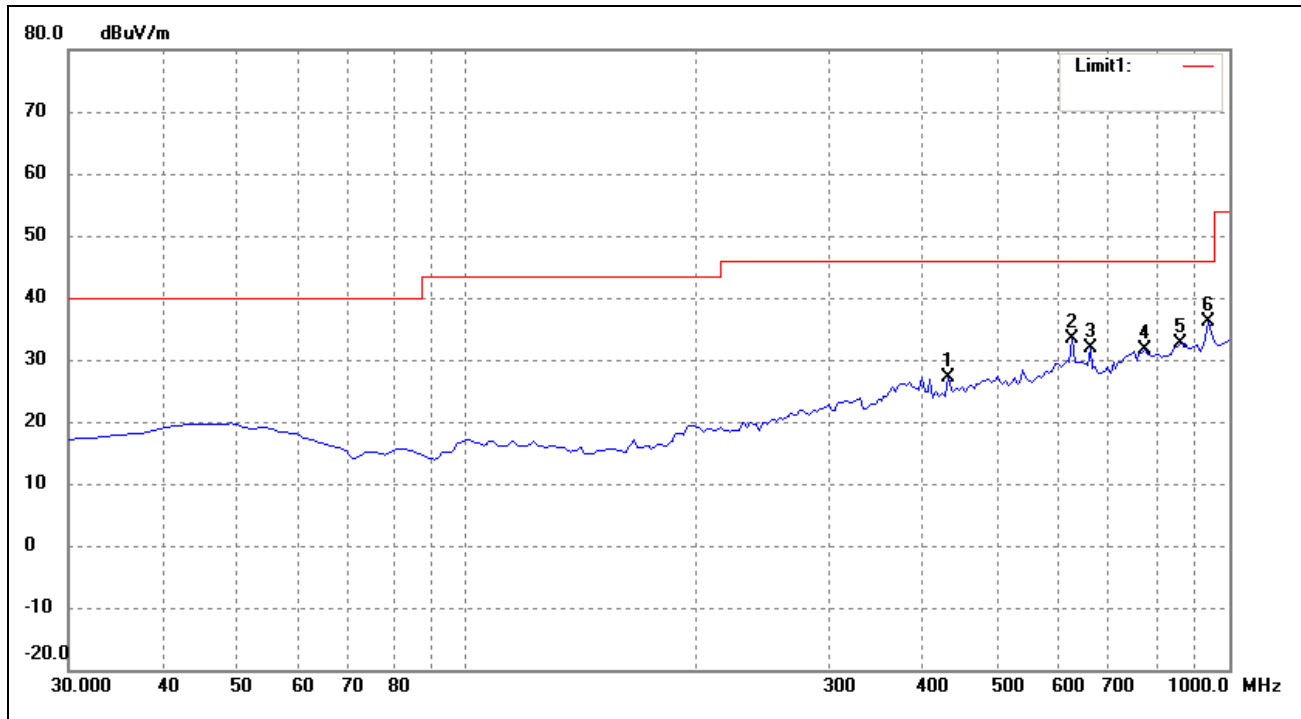
Comment: DC 3.7V

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	362.2250	37.36	-3.13	34.23	46.00	-11.77	114	100	peak
2	396.1750	39.47	-2.95	36.52	46.00	-9.48	157	100	peak
3	430.1250	40.49	-3.22	37.27	46.00	-8.73	169	100	peak
4	461.6499	34.20	-2.56	31.64	46.00	-14.36	132	100	peak
5	626.5499	29.70	1.07	30.77	46.00	-15.23	206	100	peak
6	951.5000	29.78	3.87	33.65	46.00	-12.35	239	100	peak

Test Specification: Vertical

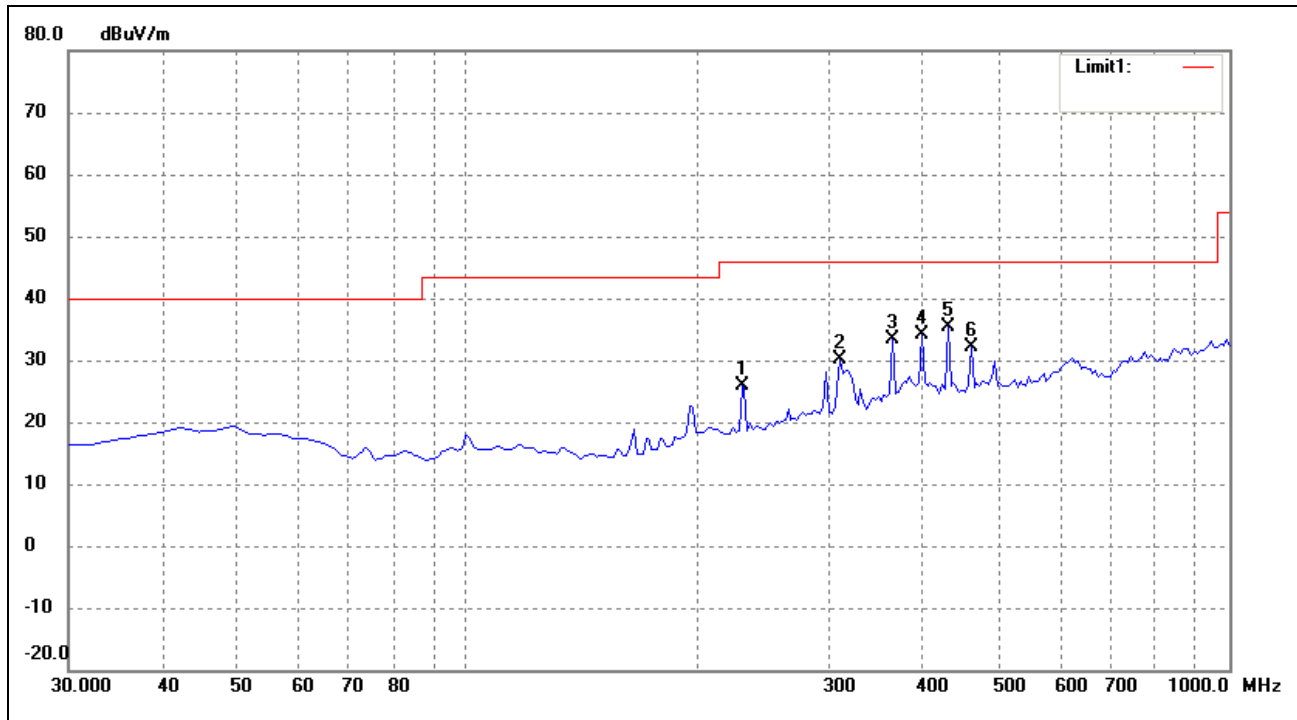


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	430.1250	30.46	-3.22	27.24	46.00	-18.76	84	100	peak
2	626.5499	32.22	1.07	33.29	46.00	-12.71	106	100	peak
3	660.5000	31.66	0.30	31.96	46.00	-14.04	155	100	peak
4	779.3250	28.68	2.86	31.54	46.00	-14.46	180	100	peak
5	861.7749	29.75	2.95	32.70	46.00	-13.30	225	100	peak
6	946.6499	32.05	4.03	36.08	46.00	-9.92	67	100	peak

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

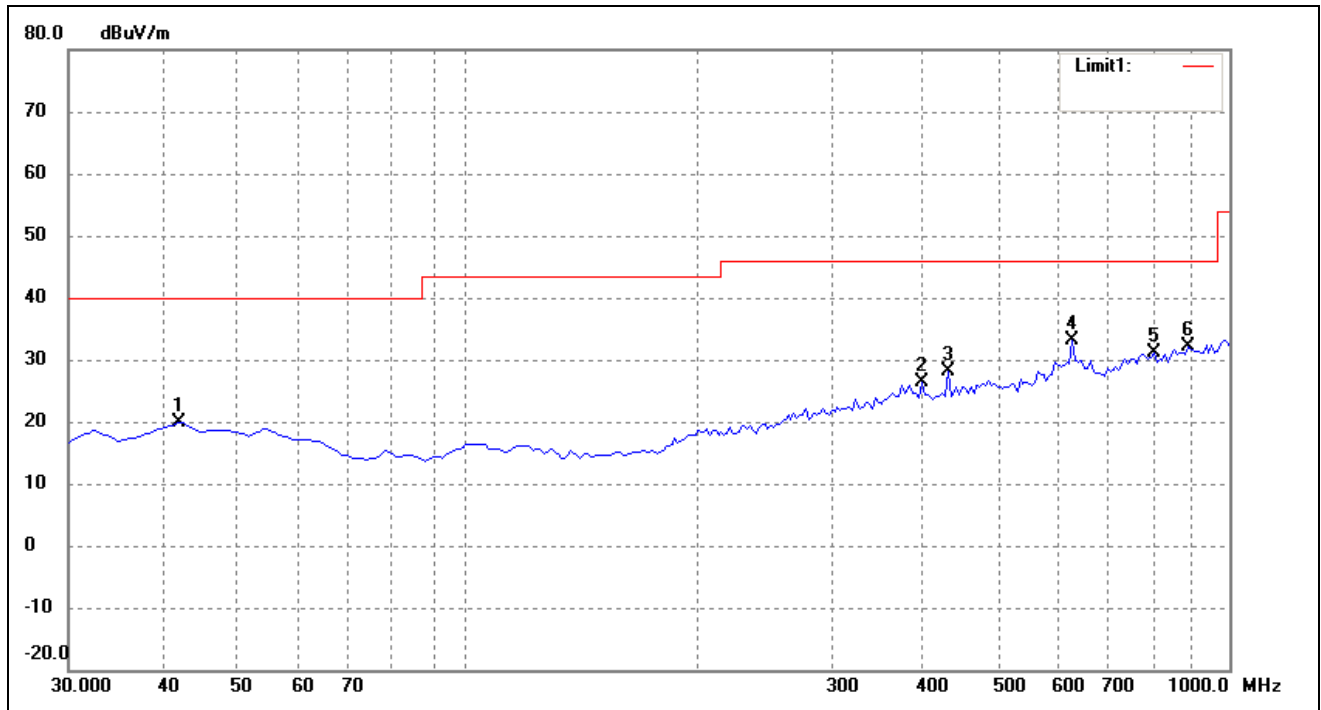
EUT: *AirVisual Node*  
 Tested Model: *AV-5PCA-4A*  
 Operating Condition: *802.11n-HT20 Transmitting Low Channel-2412MHz*  
 Comment: *DC 3.7V*

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	231.2750	34.32	-8.55	25.77	46.00	-20.23	86	100	peak
2	311.3000	35.12	-5.07	30.05	46.00	-15.95	124	100	peak
3	362.2250	36.53	-3.13	33.40	46.00	-12.60	169	100	peak
4	396.1750	37.17	-2.95	34.22	46.00	-11.78	183	100	peak
5	430.1250	38.51	-3.22	35.29	46.00	-10.71	203	100	peak
6	461.6499	34.60	-2.56	32.04	46.00	-13.96	257	100	peak

Test Specification: Vertical



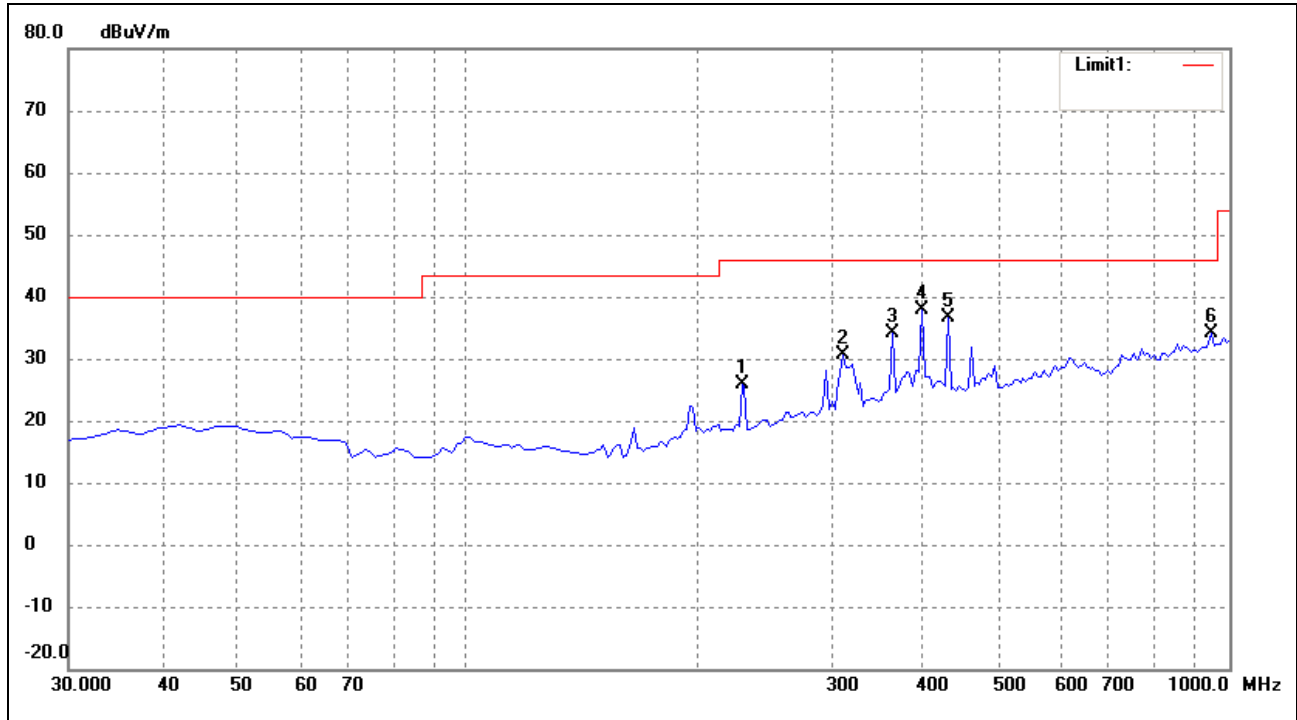
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	42.1250	27.65	-7.81	19.84	40.00	-20.16	67	100	peak
2	396.1750	29.35	-2.95	26.40	46.00	-19.60	133	100	peak
3	430.1250	31.42	-3.22	28.20	46.00	-17.80	169	100	peak
4	626.5499	32.03	1.07	33.10	46.00	-12.90	205	100	peak
5	798.7250	29.28	1.96	31.24	46.00	-14.76	155	100	peak
6	886.0249	28.91	3.14	32.05	46.00	-13.95	197	100	peak



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

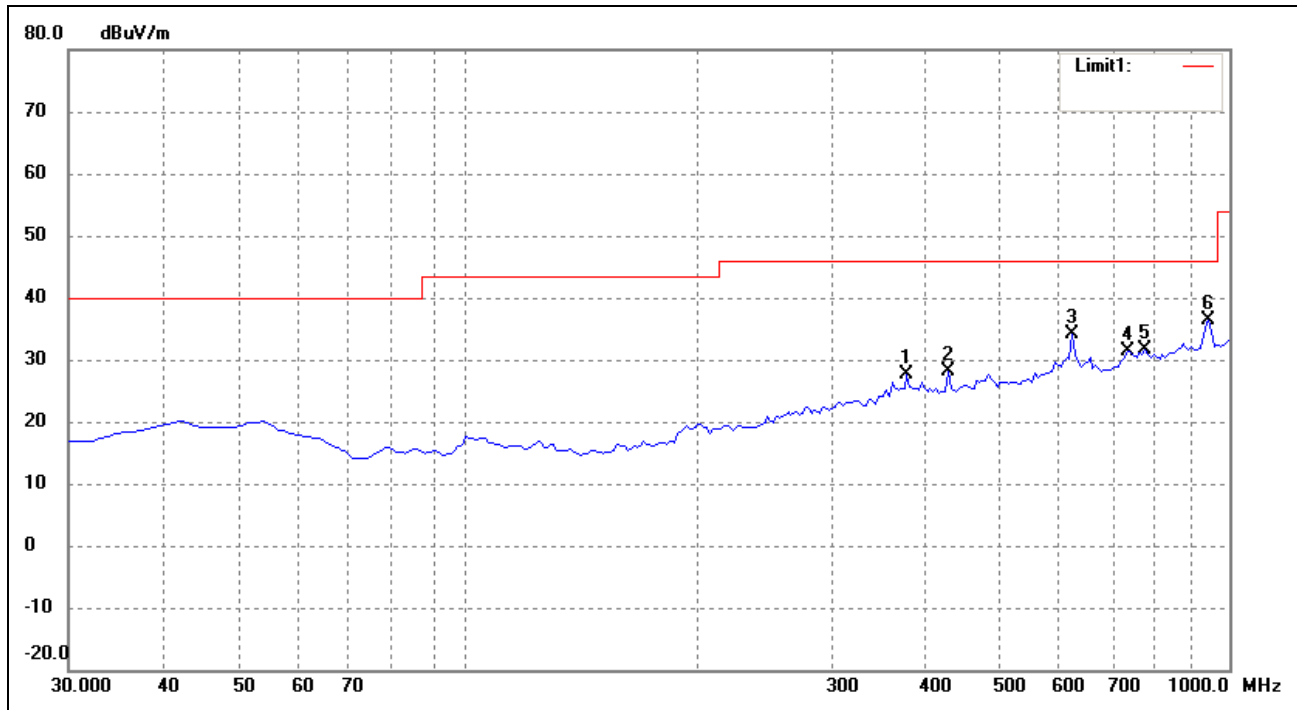
Comment: DC 3.7V

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	231.2750	34.40	-8.55	25.85	46.00	-20.15	38	100	peak
2	313.7250	35.67	-4.95	30.72	46.00	-15.28	117	100	peak
3	362.2250	37.15	-3.13	34.02	46.00	-11.98	160	100	peak
4	396.1750	40.82	-2.95	37.87	46.00	-8.13	228	100	peak
5	430.1250	39.94	-3.22	36.72	46.00	-9.28	269	100	peak
6	956.3500	30.35	3.71	34.06	46.00	-11.94	82	100	peak

Test Specification: Vertical

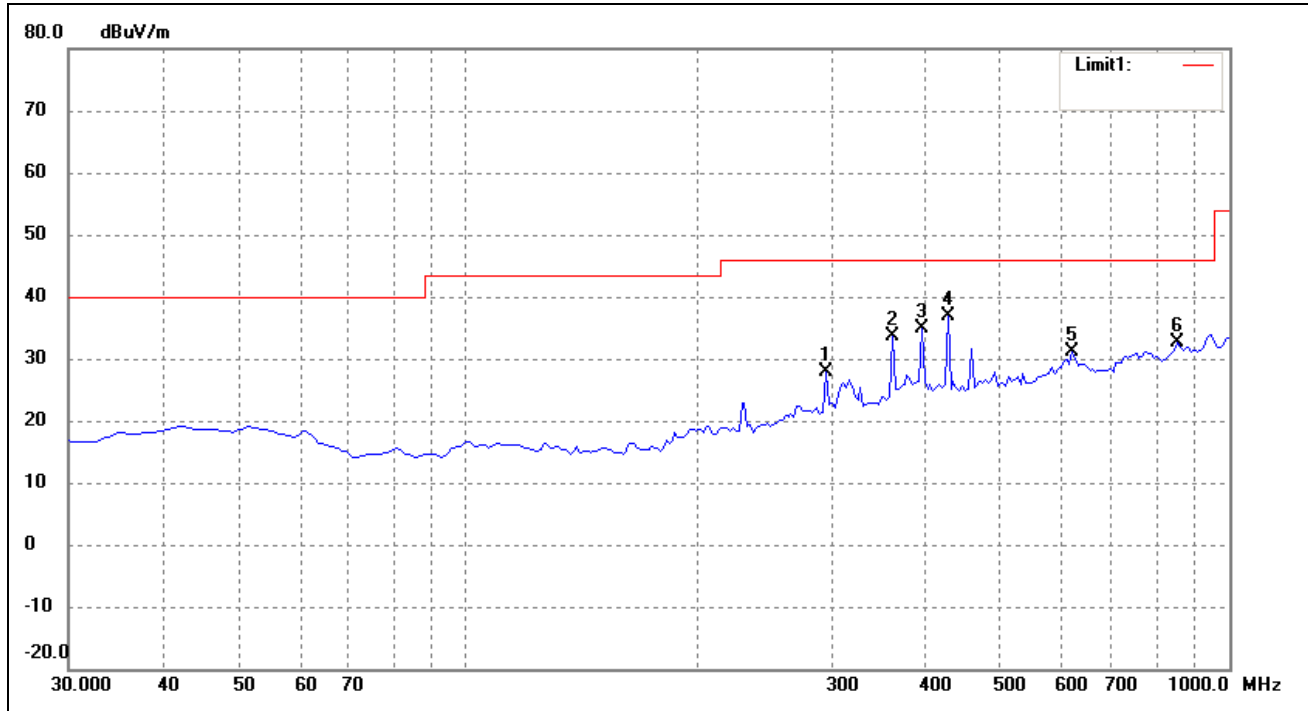


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	379.1999	29.76	-2.14	27.62	46.00	-18.38	49	100	peak
2	430.1250	31.40	-3.22	28.18	46.00	-17.82	136	100	peak
3	626.5499	33.03	1.07	34.10	46.00	-11.90	97	100	peak
4	740.5249	29.37	2.11	31.48	46.00	-14.52	264	100	peak
5	776.8999	28.82	2.73	31.55	46.00	-14.45	110	100	peak
6	941.7999	32.14	4.21	36.35	46.00	-9.65	136	100	peak

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

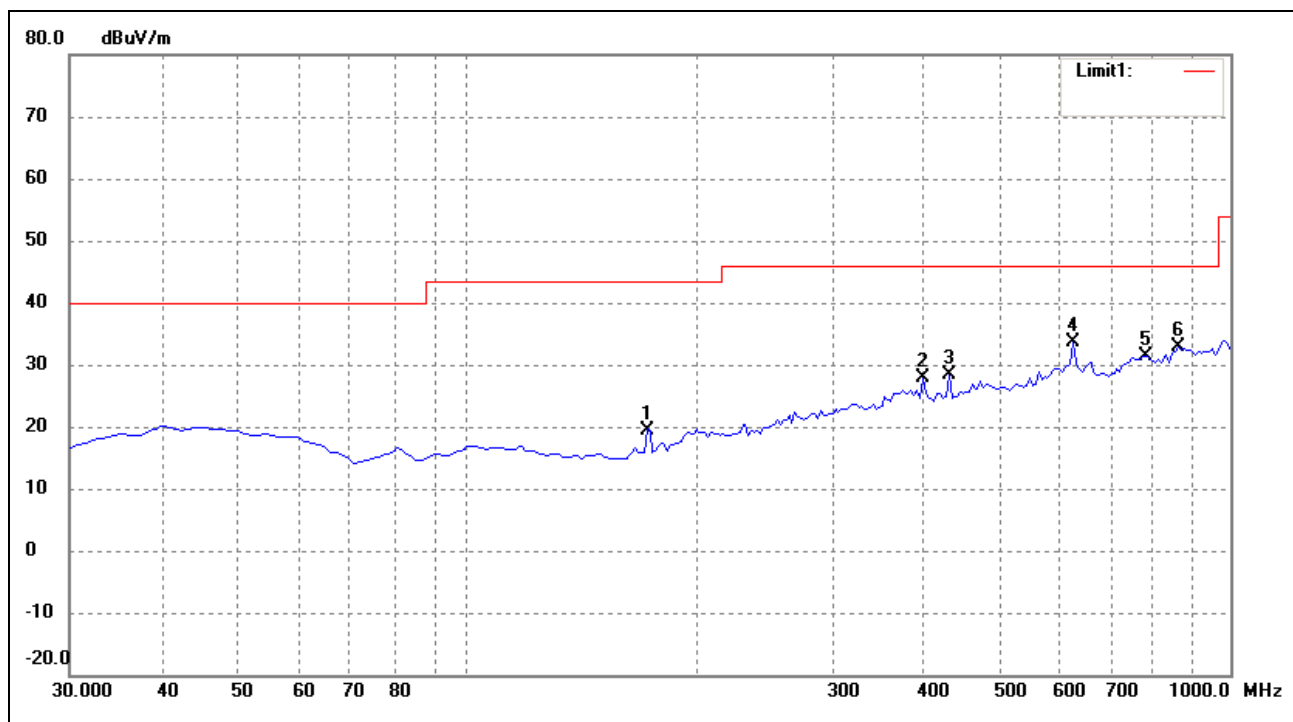
Comment: DC 3.7V

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	296.7500	33.48	-5.72	27.76	46.00	-18.24	126	100	peak
2	362.2250	36.73	-3.13	33.60	46.00	-12.40	172	100	peak
3	396.1750	37.73	-2.95	34.78	46.00	-11.22	139	100	peak
4	430.1250	40.08	-3.22	36.86	46.00	-9.14	112	100	peak
5	626.5499	29.95	1.07	31.02	46.00	-14.98	180	100	peak
6	859.3500	29.73	2.90	32.63	46.00	-13.37	270	100	peak

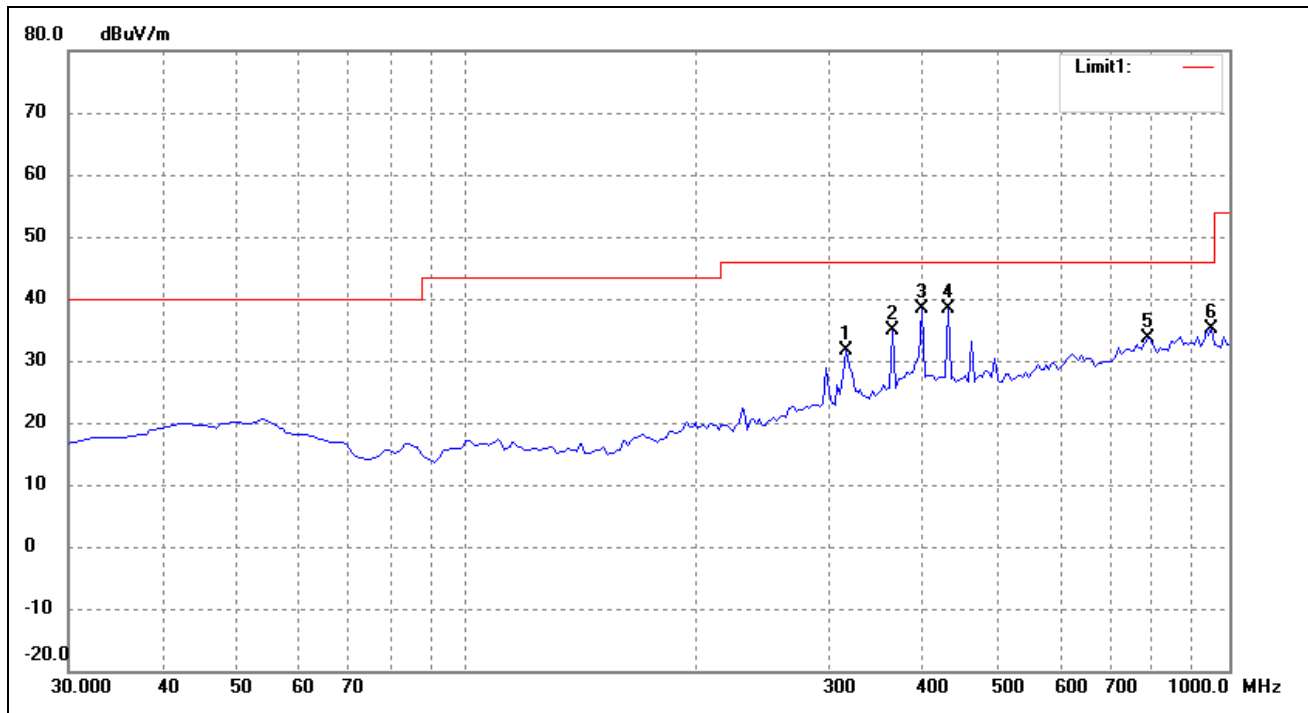
Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	173.0749	31.18	-11.68	19.50	43.50	-24.00	67	100	peak
2	396.1750	30.92	-2.95	27.97	46.00	-18.03	136	100	peak
3	430.1250	31.72	-3.22	28.50	46.00	-17.50	194	100	peak
4	626.5499	32.58	1.07	33.65	46.00	-12.35	267	100	peak
5	776.8999	28.68	2.73	31.41	46.00	-14.59	116	100	peak
6	854.5000	30.22	2.65	32.87	46.00	-13.13	360	100	peak

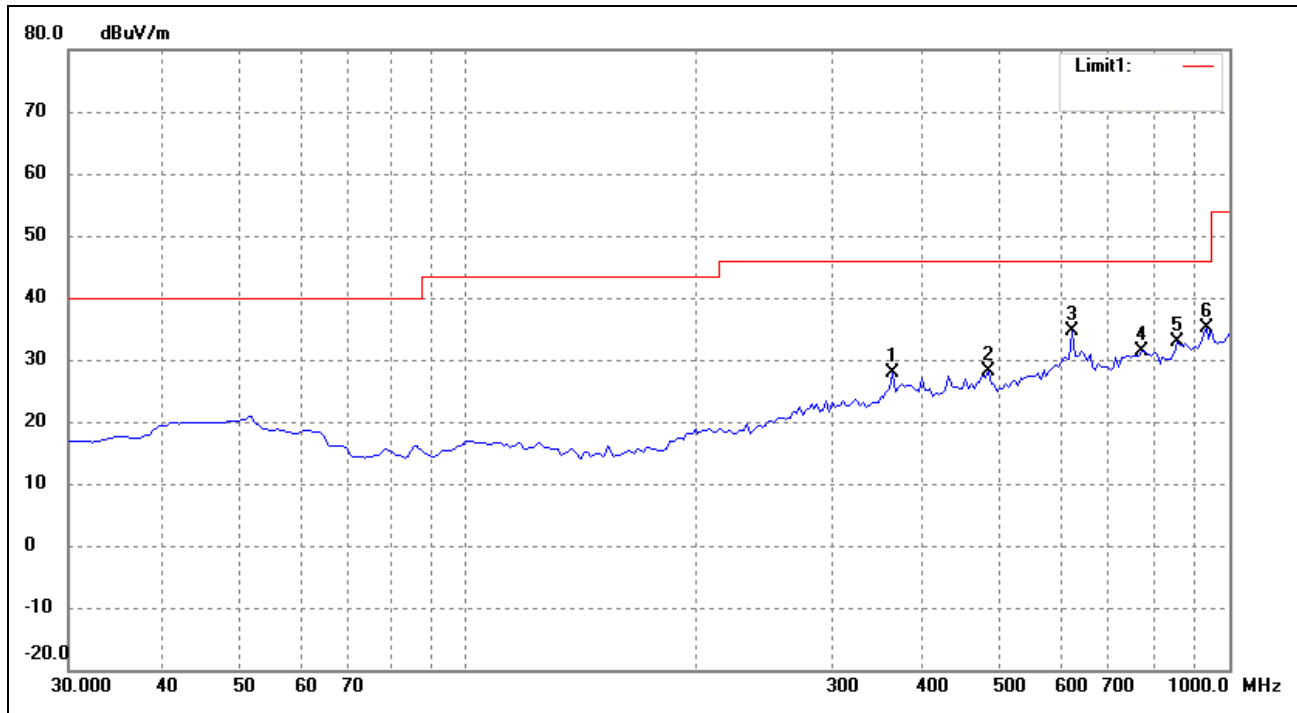
EUT: AirVisual Node  
 Tested Model: AV-5PCA-4A  
 Operating Condition: 802.11n-HT40 Transmitting Low Channel-2422MHz  
 Comment: DC 3.7V

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	316.1499	36.56	-4.81	31.75	46.00	-14.25	114	100	peak
2	362.2250	38.01	-3.13	34.88	46.00	-11.12	35	100	peak
3	396.1750	41.42	-2.95	38.47	46.00	-7.53	81	100	peak
4	430.1250	41.70	-3.22	38.48	46.00	-7.52	163	100	peak
5	789.0249	31.20	2.45	33.65	46.00	-12.35	246	100	peak
6	951.5000	31.33	3.87	35.20	46.00	-10.80	297	100	peak

Test Specification: Vertical

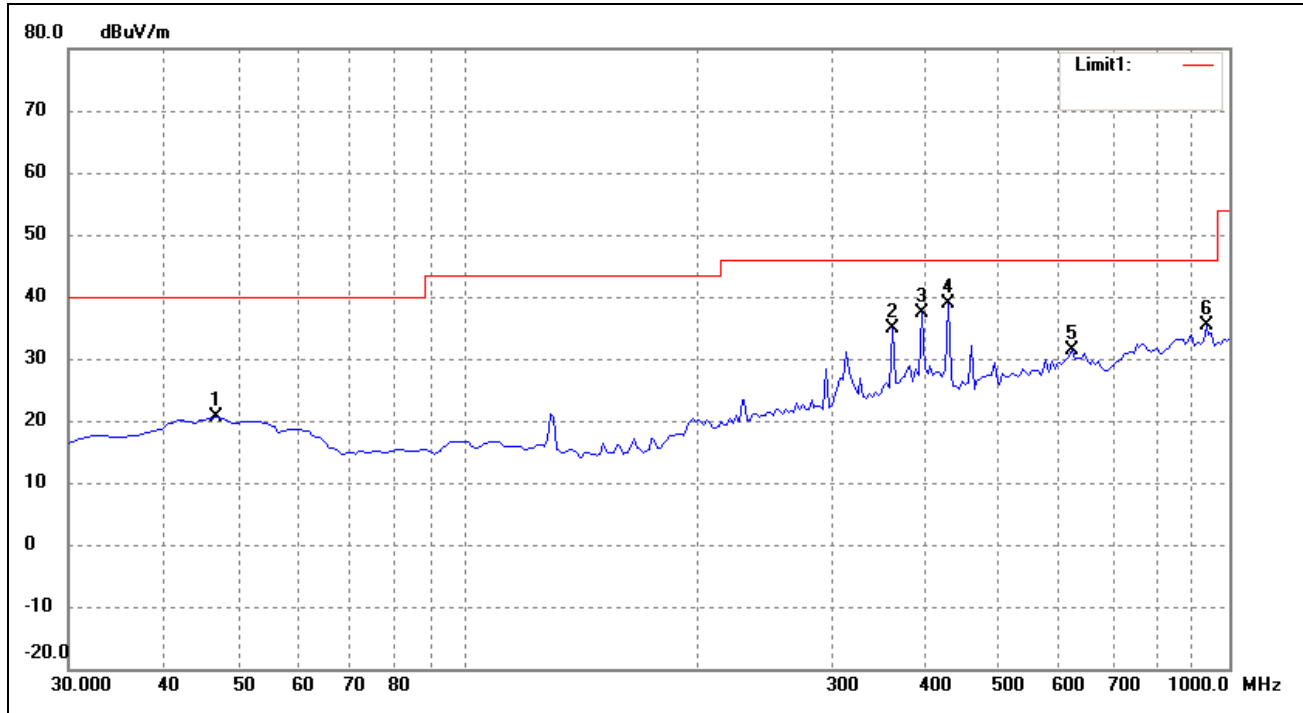


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	362.2250	31.06	-3.13	27.93	46.00	-18.07	113	100	peak
2	485.8999	29.40	-1.38	28.02	46.00	-17.98	148	100	peak
3	626.5498	33.45	1.07	34.52	46.00	-11.48	167	100	peak
4	772.0498	28.91	2.46	31.37	46.00	-14.63	150	100	peak
5	856.9248	30.02	2.77	32.79	46.00	-13.21	194	100	peak
6	936.9500	31.02	4.17	35.19	46.00	-10.81	235	100	peak

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

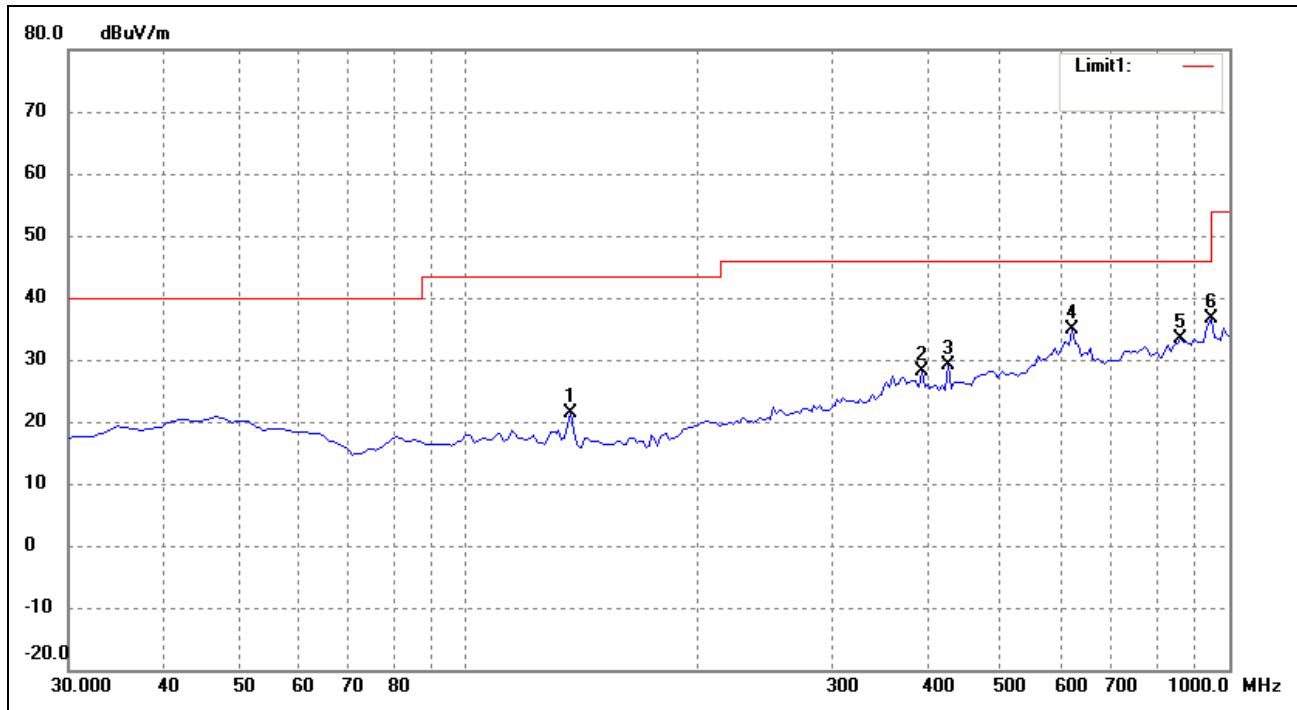
Comment: DC 3.7V

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	46.9750	28.70	-8.13	20.57	40.00	-19.43	67	100	peak
2	362.2250	38.05	-3.13	34.92	46.00	-11.08	124	100	peak
3	396.1750	40.33	-2.95	37.38	46.00	-8.62	198	100	peak
4	430.1250	42.01	-3.22	38.79	46.00	-7.21	167	100	peak
5	626.5498	30.35	1.07	31.42	46.00	-14.58	44	100	peak
6	939.3750	31.11	4.25	35.36	46.00	-10.64	130	100	peak

Test Specification: Vertical



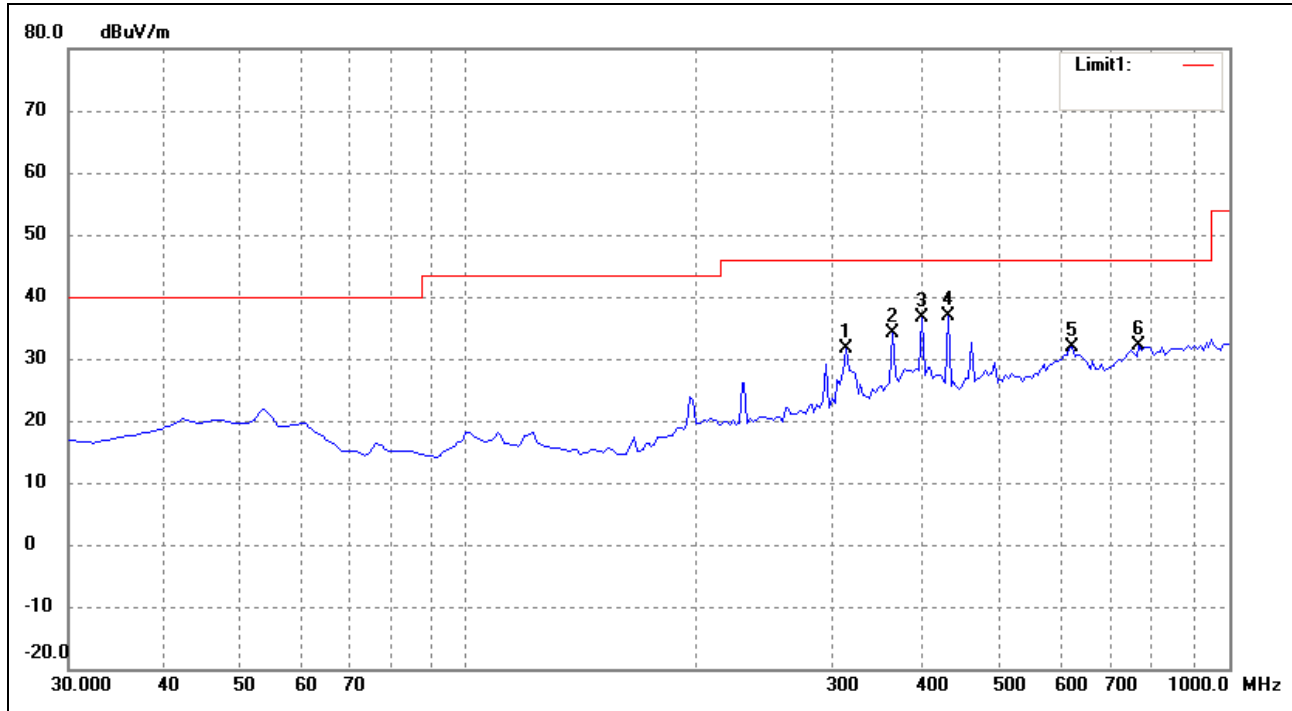
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	136.6999	33.67	-12.38	21.29	43.50	-22.21	77	100	peak
2	396.1750	31.08	-2.95	28.13	46.00	-17.87	135	100	peak
3	430.1250	32.30	-3.22	29.08	46.00	-16.92	169	100	peak
4	626.5498	33.89	1.07	34.96	46.00	-11.04	180	100	peak
5	861.7749	30.39	2.95	33.34	46.00	-12.66	242	100	peak
6	949.0750	32.71	3.96	36.67	46.00	-9.33	293	100	peak



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

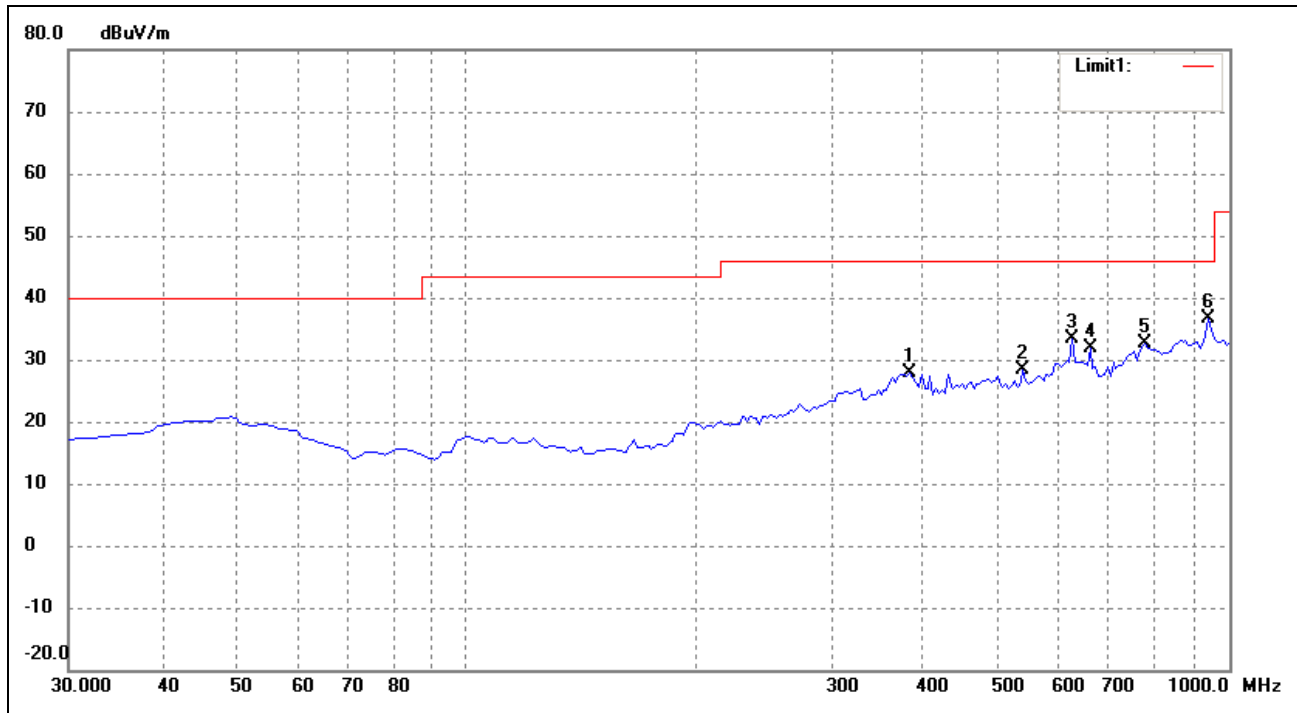
Comment: DC 3.7V

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	316.1499	36.43	-4.81	31.62	46.00	-14.38	71	100	peak
2	362.2250	37.36	-3.13	34.23	46.00	-11.77	136	100	peak
3	396.1750	39.47	-2.95	36.52	46.00	-9.48	169	100	peak
4	430.1250	39.99	-3.22	36.77	46.00	-9.23	205	100	peak
5	626.5498	30.70	1.07	31.77	46.00	-14.23	267	100	peak
6	767.2000	29.84	2.20	32.04	46.00	-13.96	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	384.0500	30.25	-2.30	27.95	46.00	-18.05	90	100	peak
2	536.8250	30.30	-1.81	28.49	46.00	-17.51	136	100	peak
3	626.5498	32.22	1.07	33.29	46.00	-12.71	168	100	peak
4	660.5000	31.66	0.30	31.96	46.00	-14.04	194	100	peak
5	779.3250	29.68	2.86	32.54	46.00	-13.46	245	100	peak
6	946.6499	32.55	4.03	36.58	46.00	-9.42	282	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	59.24	0.57	59.81	74.00	-14.19	H	PK
4824.000	44.84	0.57	45.41	54.00	-8.59	H	AV
7236.000	35.01	3.69	38.70	74.00	-35.30	H	PK
7236.000	23.58	3.69	27.27	54.00	-26.73	H	AV
4824.000	50.85	0.57	51.42	74.00	-22.58	V	PK
4824.000	37.17	0.57	37.74	54.00	-16.26	V	AV
7236.000	34.80	3.69	38.49	74.00	-35.51	V	PK
7236.000	23.41	3.69	27.10	54.00	-26.90	V	AV
Middle Channel-2437MHz							
4874.000	57.35	0.66	58.01	74.00	-15.99	H	PK
4874.000	42.77	0.66	43.43	54.00	-10.57	H	AV
7311.000	37.61	3.76	41.37	74.00	-32.63	H	PK
7311.000	25.87	3.76	29.63	54.00	-24.37	H	AV
4874.000	51.19	0.66	51.85	74.00	-22.15	V	PK
4874.000	37.61	0.66	38.27	54.00	-15.73	V	AV
7311.000	38.83	3.76	42.59	74.00	-31.41	V	PK
7311.000	25.84	3.76	29.60	54.00	-24.40	V	AV
High Channel-2462MHz							
4924.000	56.32	0.74	57.06	74.00	-16.94	H	PK
4924.000	42.94	0.74	43.68	54.00	-10.32	H	AV
7386.000	37.91	3.83	41.74	74.00	-32.26	H	PK
7386.000	27.26	3.83	31.09	54.00	-22.91	H	AV
4924.000	53.07	0.74	53.81	74.00	-20.19	V	PK
4924.000	39.42	0.74	40.16	54.00	-13.84	V	AV
7386.000	38.69	3.83	42.52	74.00	-31.48	V	PK
7386.000	27.20	3.83	31.03	54.00	-22.97	V	AV

Test Mode: 802.11g

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	54.00	0.57	54.57	74.00	-19.43	H	PK
4824.000	47.78	0.57	48.35	54.00	-5.65	H	AV
7236.000	35.17	3.69	38.86	74.00	-35.14	H	PK
7236.000	23.82	3.69	27.51	54.00	-26.49	H	AV
4824.000	42.22	0.57	42.79	74.00	-31.21	V	PK
4824.000	33.11	0.57	33.68	54.00	-20.32	V	AV
7236.000	35.08	3.69	38.77	74.00	-35.23	V	PK
7236.000	23.89	3.69	27.58	54.00	-26.42	V	AV
Middle Channel-2437MHz							
4874.000	53.19	0.66	53.85	74.00	-20.15	H	PK
4874.000	46.35	0.66	47.01	54.00	-6.99	H	AV
7311.000	37.62	3.76	41.38	74.00	-32.62	H	PK
7311.000	26.04	3.76	29.80	54.00	-24.20	H	AV
4874.000	43.36	0.66	44.02	74.00	-29.98	V	PK
4874.000	32.19	0.66	32.85	54.00	-21.15	V	AV
7311.000	37.03	3.76	40.79	74.00	-33.21	V	PK
7311.000	26.65	3.76	30.41	54.00	-23.59	V	AV
High Channel-2462MHz							
4924.000	55.79	0.74	56.53	74.00	-17.47	H	PK
4924.000	33.00	0.74	33.74	54.00	-20.26	H	AV
7386.000	37.86	3.83	41.69	74.00	-32.31	H	PK
7386.000	27.21	3.83	31.04	54.00	-22.96	H	AV
4924.000	45.15	0.74	45.89	74.00	-28.11	V	PK
4924.000	33.60	0.74	34.34	54.00	-19.66	V	AV
7386.000	38.93	3.83	42.76	74.00	-31.24	V	PK
7386.000	27.12	3.83	30.95	54.00	-23.05	V	AV

Test Mode: 802.11n-HT20

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	55.85	0.57	56.42	74.00	-17.58	H	PK
4824.000	32.67	0.57	33.24	54.00	-20.76	H	AV
7236.000	34.49	3.69	38.18	74.00	-35.82	H	PK
7236.000	23.28	3.69	26.97	54.00	-27.03	H	AV
4824.000	43.03	0.57	43.60	74.00	-30.40	V	PK
4824.000	31.74	0.57	32.31	54.00	-21.69	V	AV
7236.000	34.59	3.69	38.28	74.00	-35.72	V	PK
7236.000	23.31	3.69	27.00	54.00	-27.00	V	AV
Middle Channel-2437MHz							
4874.000	53.08	0.66	53.74	74.00	-20.26	H	PK
4874.000	31.66	0.66	32.32	54.00	-21.68	H	AV
7311.000	36.80	3.76	40.56	74.00	-33.44	H	PK
7311.000	26.16	3.76	29.92	54.00	-24.08	H	AV
4874.000	44.14	0.66	44.80	74.00	-29.20	V	PK
4874.000	32.41	0.66	33.07	54.00	-20.93	V	AV
7311.000	37.59	3.76	41.35	74.00	-32.65	V	PK
7311.000	25.48	3.76	29.24	54.00	-24.76	V	AV
High Channel-2462MHz							
4924.000	53.25	0.74	53.99	74.00	-20.01	H	PK
4924.000	31.69	0.74	32.43	54.00	-21.57	H	AV
7386.000	38.35	3.83	42.18	74.00	-31.82	H	PK
7386.000	27.19	3.83	31.02	54.00	-22.98	H	AV
4924.000	43.52	0.74	44.26	74.00	-29.74	V	PK
4924.000	31.12	0.74	31.86	54.00	-22.14	V	AV
7386.000	38.66	3.83	42.49	74.00	-31.51	V	PK
7386.000	26.99	3.83	30.82	54.00	-23.18	V	AV

Test Mode: 802.11n-HT40

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2422MHz							
4844.000	53.25	0.60	53.85	74.00	-20.15	H	PK
4824.000	38.25	0.60	38.85	54.00	-15.15	H	AV
7266.000	46.48	3.72	50.20	74.00	-23.80	H	PK
7266.000	32.56	3.72	36.28	54.00	-17.72	H	AV
4844.000	54.22	0.60	54.82	74.00	-19.18	V	PK
4824.000	39.42	0.60	40.02	54.00	-13.98	V	AV
7266.000	48.81	3.72	52.53	74.00	-21.47	V	PK
7266.000	34.78	3.72	38.50	54.00	-15.50	V	AV
Middle Channel-2437MHz							
4874.000	52.53	0.66	53.19	74.00	-20.81	H	PK
4874.000	37.88	0.66	38.54	54.00	-15.46	H	AV
7311.000	44.88	3.76	48.64	74.00	-25.36	H	PK
7311.000	32.03	3.76	35.79	54.00	-18.21	H	AV
4874.000	53.74	0.66	54.40	74.00	-19.60	V	PK
4874.000	39.95	0.66	40.61	54.00	-13.39	V	AV
7311.000	45.78	3.76	49.54	74.00	-24.46	V	PK
7311.000	34.00	3.76	37.76	54.00	-16.24	V	AV
High Channel-2452MHz							
4904.000	52.65	0.72	53.37	74.00	-20.63	H	PK
4904.000	39.37	0.72	40.09	54.00	-13.91	H	AV
7356.000	45.63	3.81	49.44	74.00	-24.56	H	PK
7356.000	30.73	3.81	34.54	54.00	-19.46	H	AV
4904.000	54.84	0.72	55.56	74.00	-18.44	V	PK
4904.000	40.83	0.72	41.55	54.00	-12.45	V	AV
7356.000	48.18	3.81	51.99	74.00	-22.01	V	PK
7356.000	35.12	3.81	38.93	54.00	-15.07	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.

## 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 v03r05, the band-edge radiated test method as follows:

Set span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation (2310MHz to 2420MHz for low bandedge, 2460MHz to 2500MHz for the high bandedge)

RBW = 1MHz, VBW = 1MHz for peak value measured

RBW = 1MHz, VBW = 10Hz for average value measured

Sweep = auto; Detector function = peak/average; Trace = max hold

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

According to the KDB 558074 D01 v03r05, the conducted spurious emissions test method as follows:

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

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

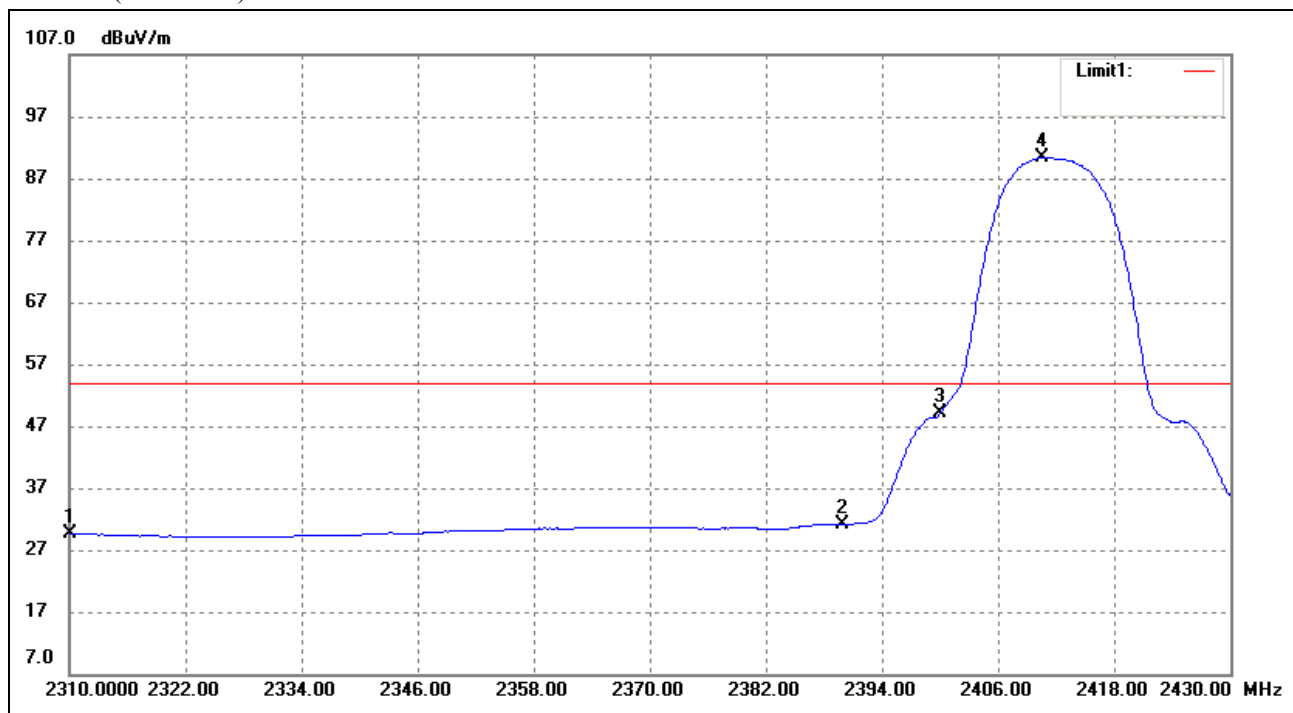
### 9.3 Environmental Conditions

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

### 9.4 Summary of Test Results/Plots

802.11b-Lowest Bandedge

Vertical (Worst case)

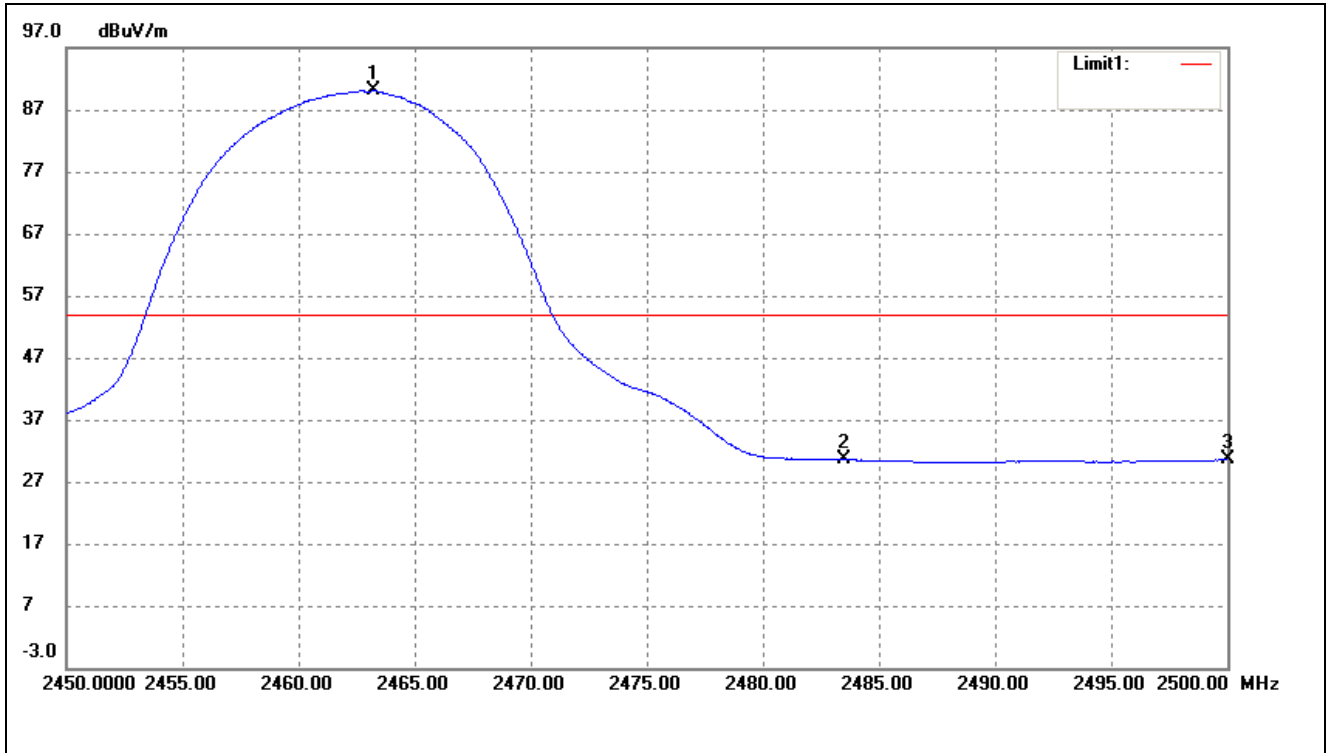


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	33.99	-4.42	29.57	54.00	-24.43	Average Detector
	2310.000	45.54	-4.42	41.12	74.00	-32.88	Peak Detector
2	2390.000	34.92	-3.72	31.20	54.00	-22.80	Average Detector
	2390.000	48.21	-3.72	44.49	74.00	-29.51	Peak Detector
3	2400.000	52.72	-3.64	49.08	Delta =41.34dBc		Average Detector
4	2410.560	93.98	-3.56	90.42			Average Detector



## 802.11b-Highest Bandedge

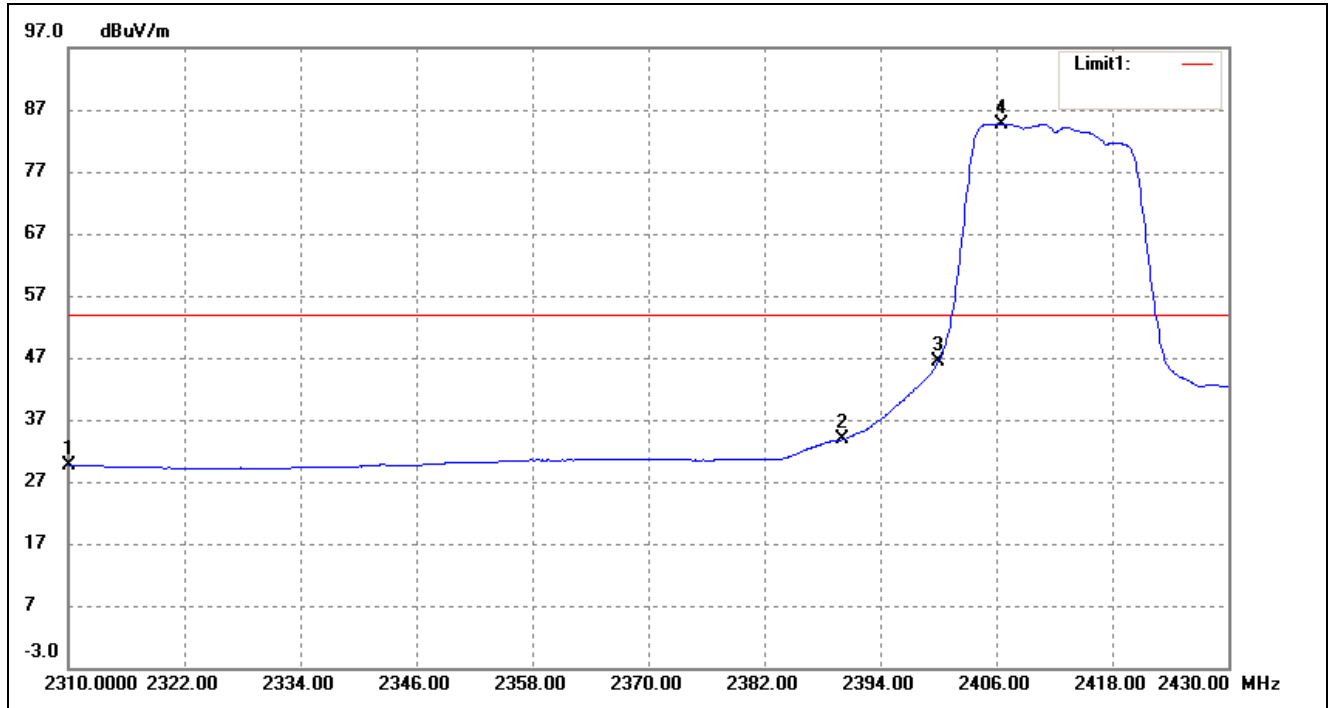
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2463.250	93.19	-3.16	90.03	/	/	Average Detector
	2463.150	104.73	-3.16	101.57	/	/	Peak Detector
2	2483.500	33.54	-3.01	30.53	54.00	-23.47	Average Detector
	2483.500	47.43	-3.01	44.42	74.00	-29.58	Peak Detector
3	2500.000	33.43	-2.88	30.55	54.00	-23.45	Average Detector
	2500.000	44.64	-2.88	41.76	74.00	-32.24	Peak Detector

802.11g-Lowest Bandedge

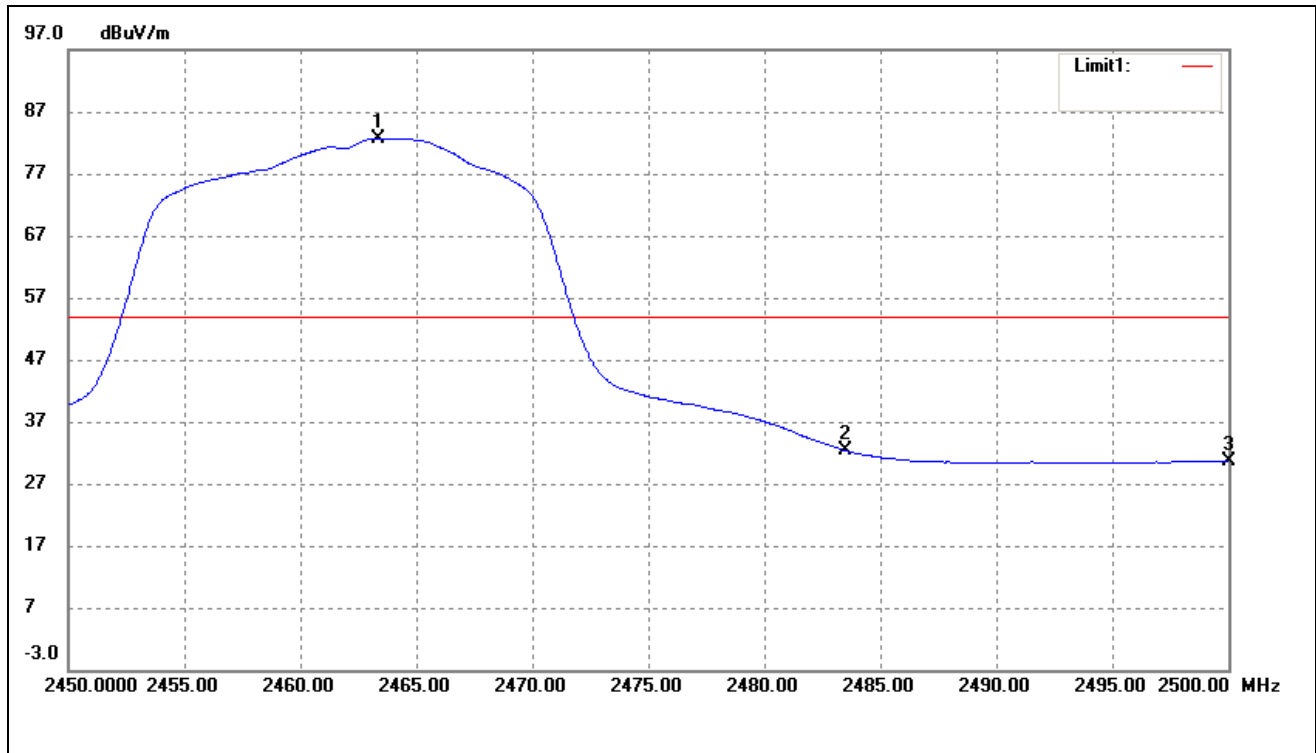
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	34.06	-4.42	29.64	54.00	-24.36	Average Detector
	2310.000	46.01	-4.42	41.59	74.00	-32.41	Peak Detector
2	2390.000	37.50	-3.72	33.78	54.00	-20.22	Average Detector
	2390.000	53.12	-3.72	49.40	74.00	-24.60	Peak Detector
3	2400.000	50.07	-3.64	46.43	Delta =38.31dBc		Average Detector
4	2406.480	88.33	-3.59	84.74			Average Detector

802.11g-Highest Bandedge

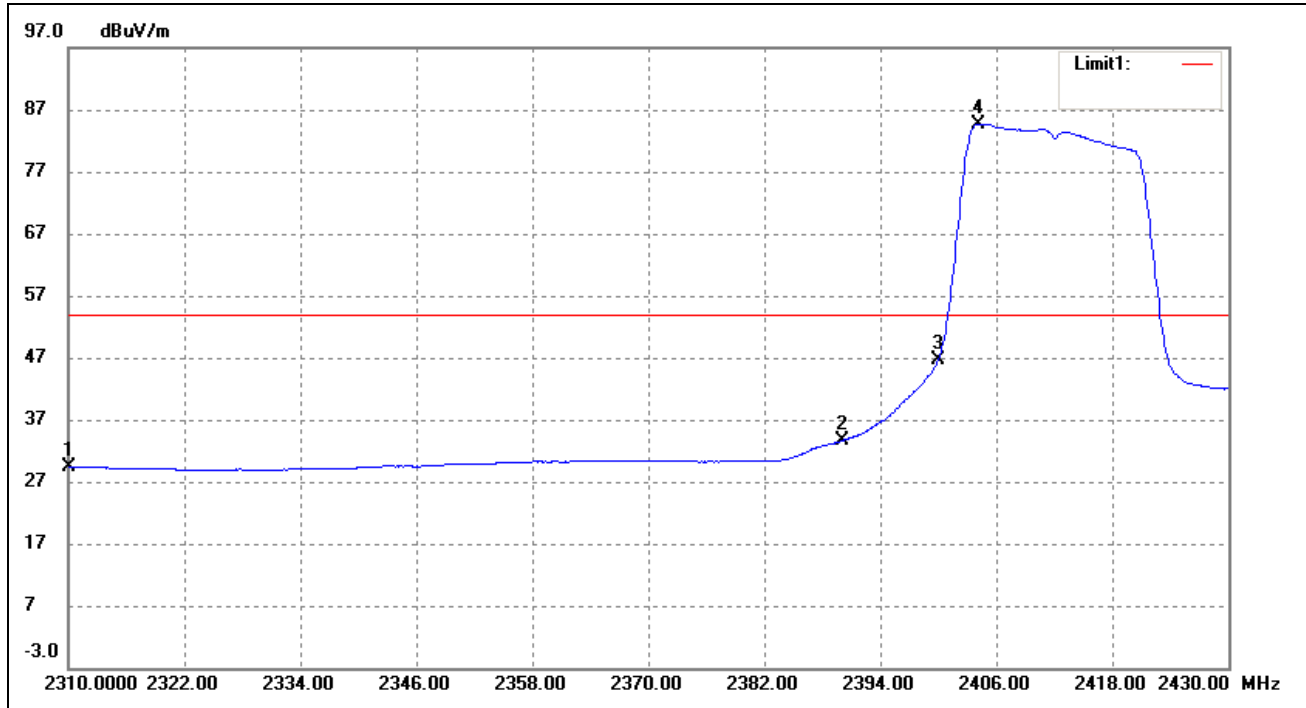
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2463.350	85.83	-3.16	82.67	/	/	Average Detector
	2463.700	98.03	-3.16	94.87	/	/	Peak Detector
2	2483.500	35.33	-3.01	32.32	54.00	-21.68	Average Detector
	2483.500	52.97	-3.01	49.96	74.00	-24.04	Peak Detector
3	2500.000	33.55	-2.88	30.67	54.00	-23.33	Average Detector
	2500.000	46.13	-2.88	43.25	74.00	-30.75	Peak Detector

802.11n-HT20-Lowest Bandedge

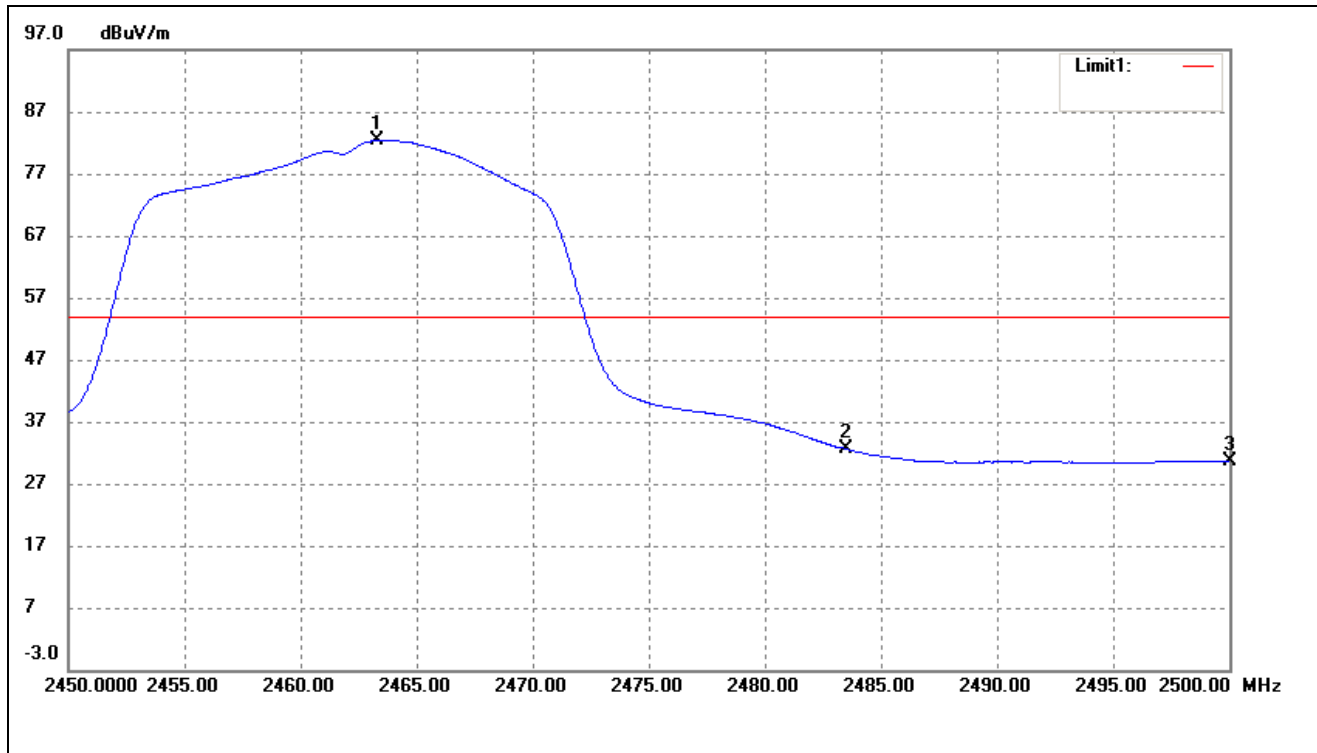
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	33.81	-4.42	29.39	54.00	-24.61	Average Detector
	2310.000	45.57	-4.42	41.15	74.00	-32.85	Peak Detector
2	2390.000	37.35	-3.72	33.63	54.00	-20.37	Average Detector
	2390.000	52.63	-3.72	48.91	74.00	-25.09	Peak Detector
3	2400.000	50.36	-3.64	46.72	Delta =37.95dBc		Average Detector
4	2404.200	88.27	-3.60	84.67			Average Detector

## 802.11n-HT20-Highest Bandedge

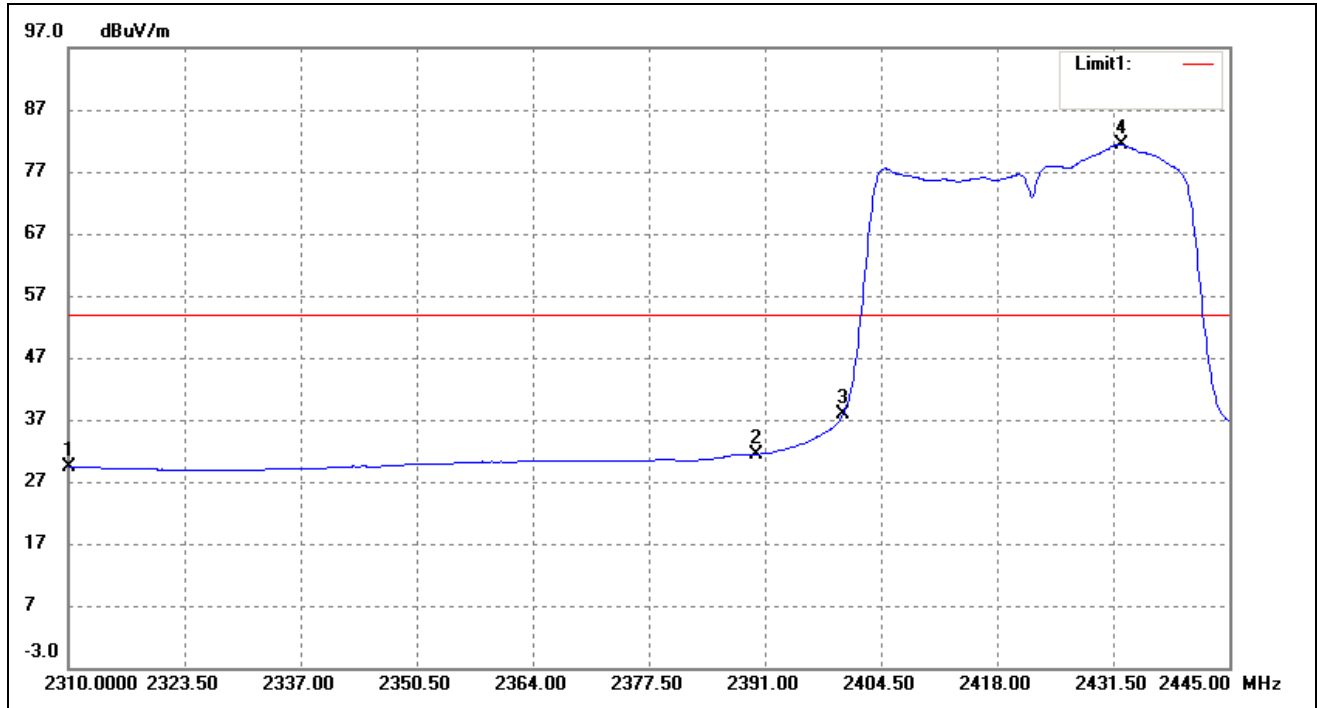
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2463.300	85.49	-3.16	82.33	/	/	Average Detector
	2463.300	96.27	-3.16	93.11	/	/	Peak Detector
2	2483.500	35.60	-3.01	32.59	54.00	-21.41	Average Detector
	2483.500	54.00	-3.01	50.99	74.00	-23.01	Peak Detector
3	2500.000	33.62	-2.88	30.74	54.00	-23.26	Average Detector
	2500.000	45.89	-2.88	43.01	74.00	-30.99	Peak Detector

802.11n-HT40-Lowest Bandedge

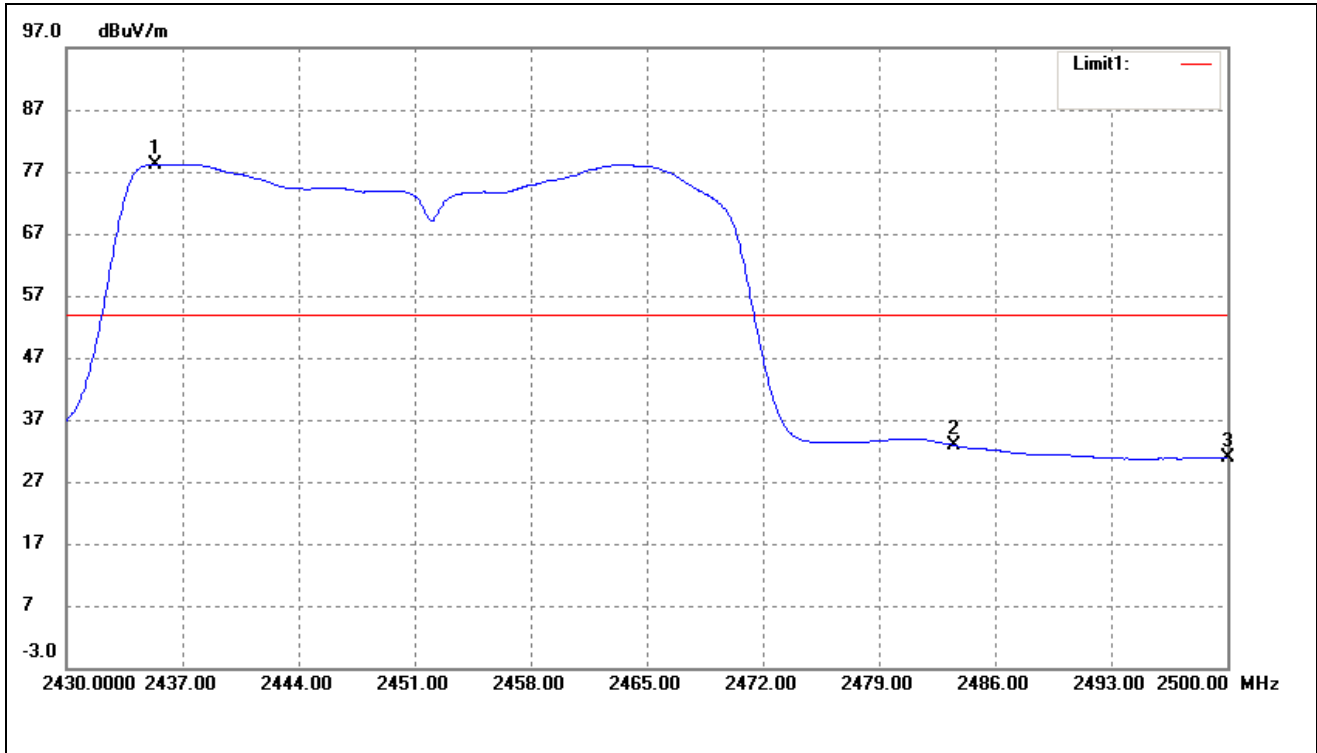
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	33.80	-4.42	29.38	54.00	-24.62	Average Detector
	2310.000	45.65	-4.42	41.23	74.00	-32.77	Peak Detector
2	2390.000	35.20	-3.72	31.48	54.00	-22.52	Average Detector
	2390.000	47.24	-3.72	43.52	74.00	-30.48	Peak Detector
3	2400.000	41.49	-3.64	37.85	Delta =43.46dBc		Average Detector
4	2432.445	84.71	-3.40	81.31			Average Detector

## 802.11n-HT40-Highest Bandedge

Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2435.320	81.62	-3.37	78.25	/	/	Average Detector
	2434.760	92.68	-3.38	89.30	/	/	Peak Detector
2	2483.500	35.87	-3.01	32.86	54.00	-21.14	Average Detector
	2483.500	48.76	-3.01	45.75	74.00	-28.25	Peak Detector
3	2500.000	33.81	-2.88	30.93	54.00	-23.07	Average Detector
	2500.000	44.87	-2.88	41.99	74.00	-32.01	Peak Detector

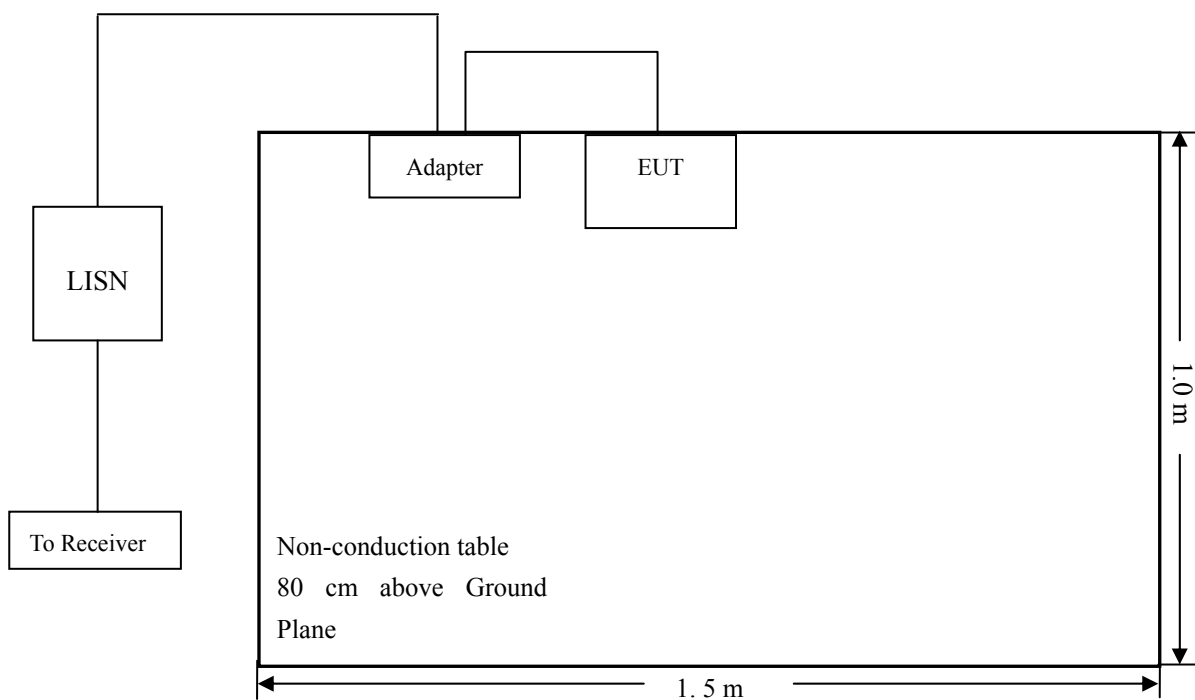
## 10. Conducted Emissions

### 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 10.7, the EUT complied with the FCC Part 15.207 Conducted margin for this device, with the *worst* margin reading of:

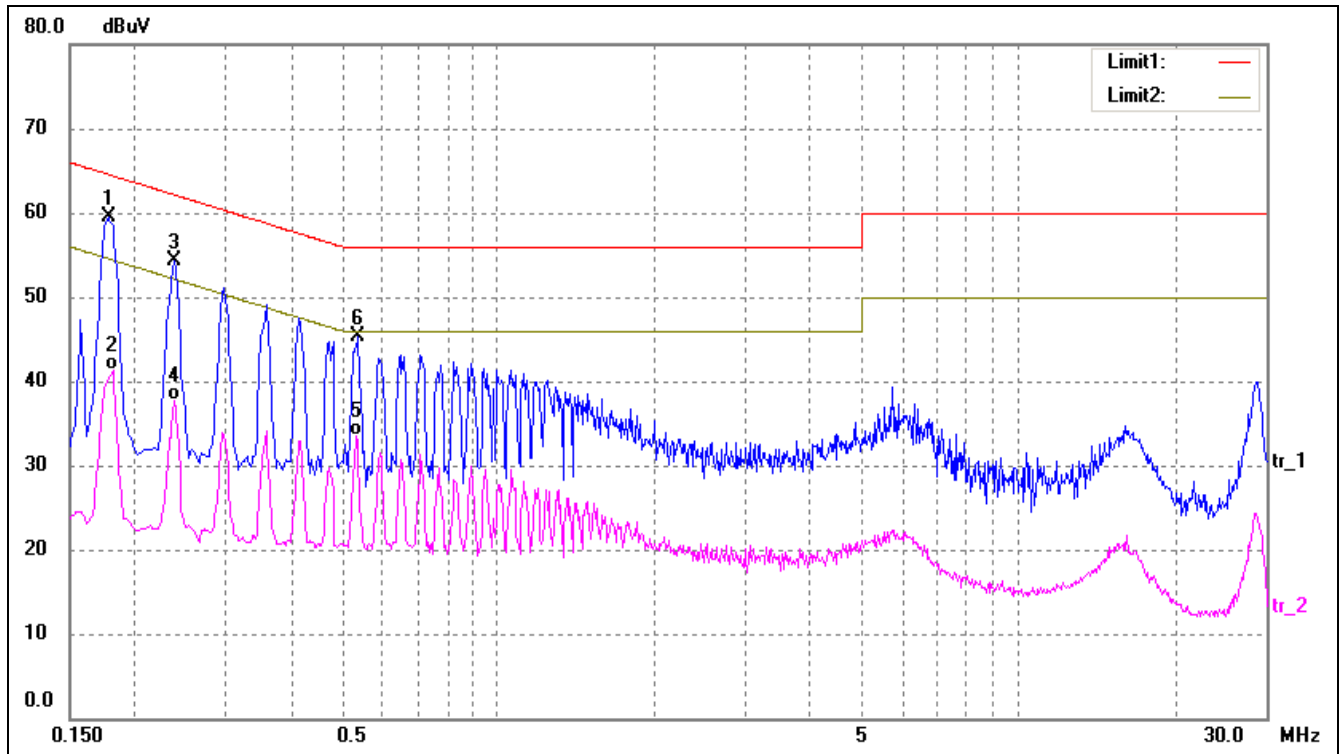
**-5.13 dB at 0.1780 MHz in the Neutral mode, Peak detector, 0.15-30MHz**

## 10.6 Conducted Emissions Test Data

### Plot of Conducted Emissions Test Data

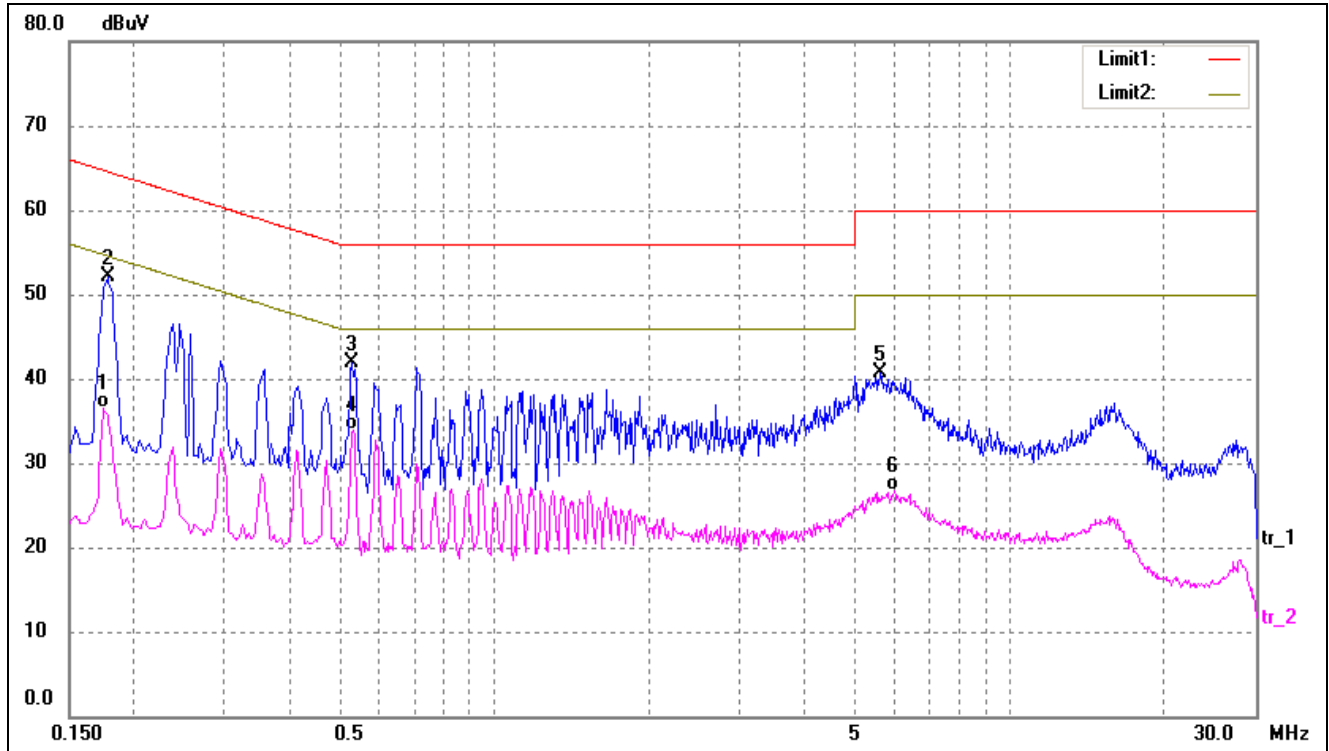
EUT: *AirVisual Node*  
 Tested Model: *AV-5PCA-4A*  
 Operating Condition: *Transmitting(Wi-Fi)*  
 Comment: *AC 120V/60Hz; Adapter DC 5V*

Test Specification: *Neutral*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1*	0.1780	49.95	9.50	59.45	64.58	-5.13	peak
2	0.1820	31.72	9.50	41.22	54.39	-13.17	AVG
3	0.2380	44.72	9.50	54.22	62.17	-7.95	peak
4	0.2380	28.27	9.50	37.77	52.17	-14.40	AVG
5	0.5340	23.91	9.57	33.48	46.00	-12.52	AVG
6	0.5380	35.71	9.57	45.28	56.00	-10.72	peak

Test Specification: Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1740	27.02	9.50	36.52	54.77	-18.25	AVG
2	0.1780	42.51	9.50	52.01	64.58	-12.57	peak
3	0.5300	32.40	9.57	41.97	56.00	-14.03	peak
4*	0.5340	24.24	9.57	33.81	46.00	-12.19	AVG
5	5.6020	30.36	10.25	40.61	60.00	-19.39	peak
6	5.9900	16.49	10.26	26.75	50.00	-23.25	AVG

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