

FCC Part 15C Measurement and Test Report

For

Shenzhen Zhaotian Electronic Technology Co., Ltd

511, D block, the economic building, No. 288, Xixiang Road, Xixiang Baoan

District, Shenzhen, China

FCC ID: 2AHRK-Z1

FCC Rule(s): FCC Part 15C

Product Description: Mini Projector

Tested Model: Z1

Report No.: STR16038079I

Tested Date: 2016-03-10 to 2016-03-18

Issued Date: 2016-03-18

Tested By: Rode Liu / Engineer

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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: Shenzhen Zhaotian Electronic Technology Co., Ltd
Address of applicant: 511, D block, the economic building, No. 288,
Xixiang Road, Xixiang Baoan District, Shenzhen,
China
Manufacturer: Dongguan Cheng Mao Electrical Technology Co.,
Ltd.
Address of manufacturer: Dongguan Pingshan Town Tangxia City Sanlian
Road No. 4

General Description of EUT	
Product Name:	Mini Projector
Trade Name:	Zenbility
Model No.:	Z1
Adding Model(s):	Z2,Z3,Z6,Z8,V7,V8,Q5,Q6,Q8,X6,X10
Rated Voltage:	AC230V/50Hz, Adapter 12V
Power Adapter Model:	0106124 Input:100-240V 0.9A
	Output:12V/4A
<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 Z1, 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
RF Output Power:	9.26 dBm (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Data Rate:	1-11Mbps, 6-54Mbps, up to 150Mbps
Quantity of Channels:	11
Channel Separation:	5MHz
Type of Antenna:	Integral
Antenna Gain:	0dBi
Lowest Internal Frequency	32.768kHz

1.2 Test Standards

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

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

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

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices, and ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. The measurement guide KDB 558074 D01 v03r04 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 2nd Road, Bao'an District, Shenzhen, P.R.C (518101).

1.5 EUT Setup and Test Mode

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

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

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

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

3.1 Standard Applicable

According to § 1.1307 and § 2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

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

4. Antenna Requirement

4.1 Standard Applicable

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

4.2 Evaluation Information

This product has an integral antenna, fulfill the requirement of this section.

5. Power Spectral Density

5.1 Standard Applicable

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

5.2 Test Procedure

According to the KDB 558074 D01 v03r04, 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

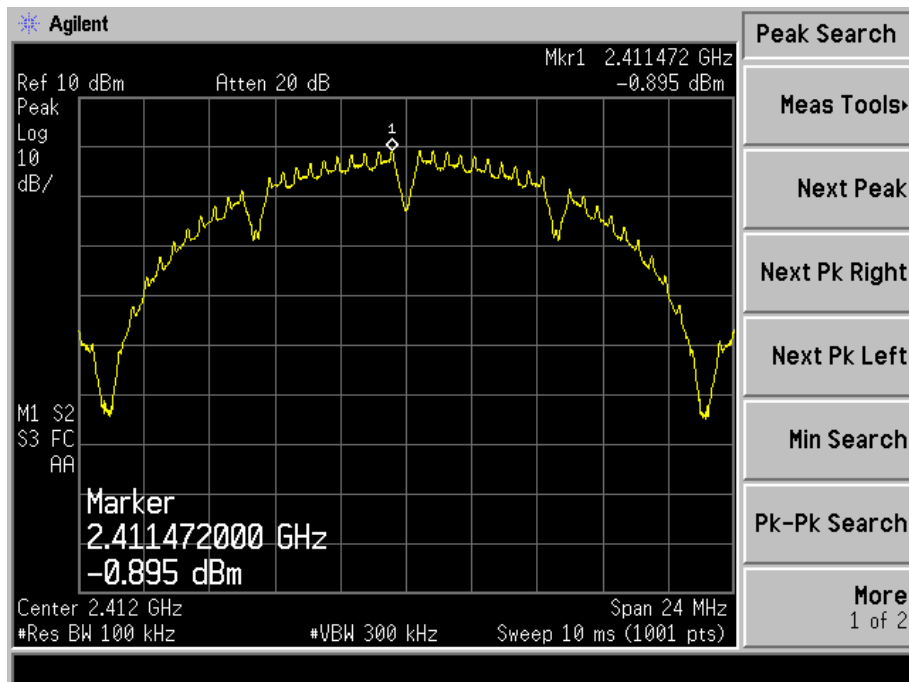
Temperature:	26° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.4 Summary of Test Results/Plots

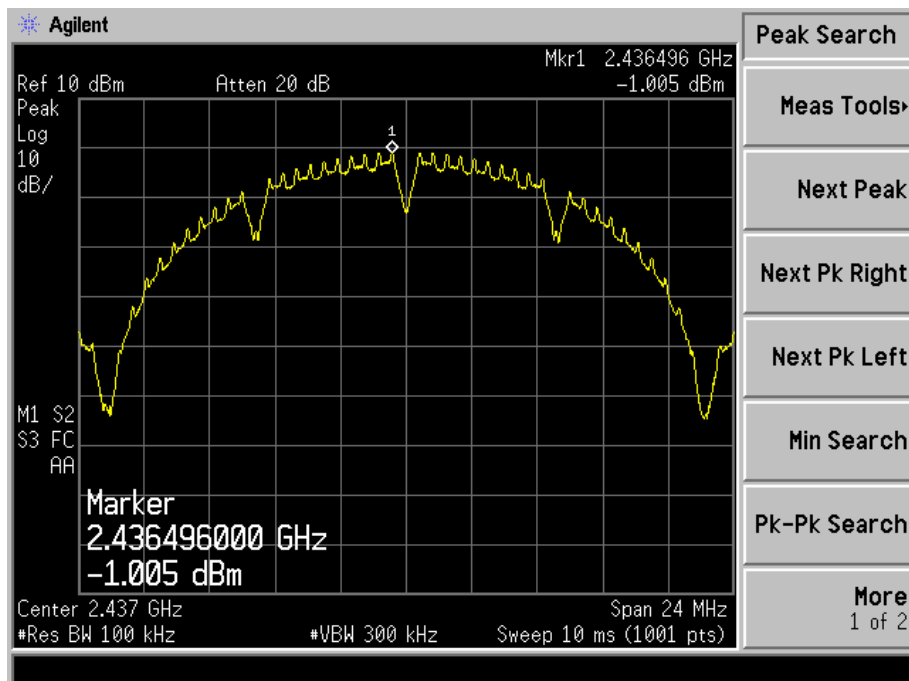
Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
802.11b	2412	-0.895	8
	2437	-1.005	8
	2462	-1.386	8
802.11g	2412	-5.867	8
	2437	-6.094	8
	2462	-6.38	8
802.11n HT20	2412	-5.973	8
	2437	-6.092	8
	2462	-6.375	8
802.11n HT40	2422	-9.472	8
	2437	-9.599	8
	2452	-9.794	8

Please refer to the following test plots:

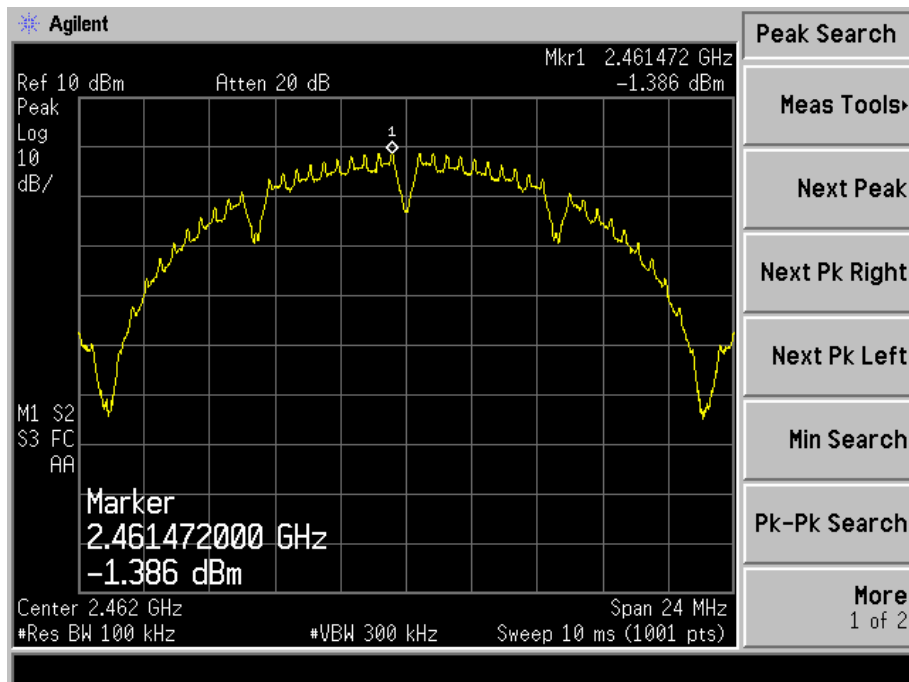
802.11b-Low Channel



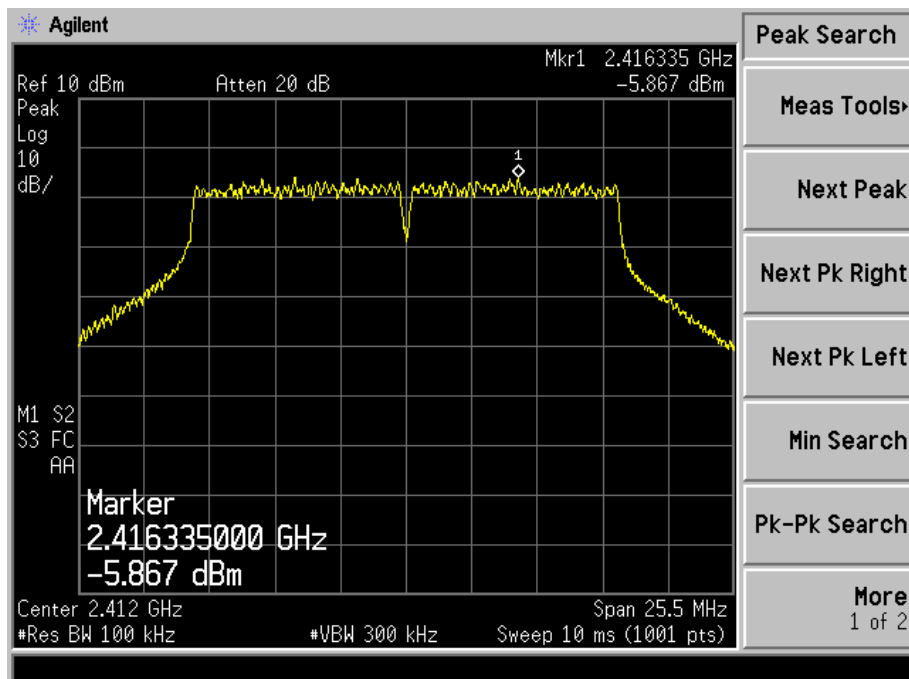
802.11b-Middle Channel



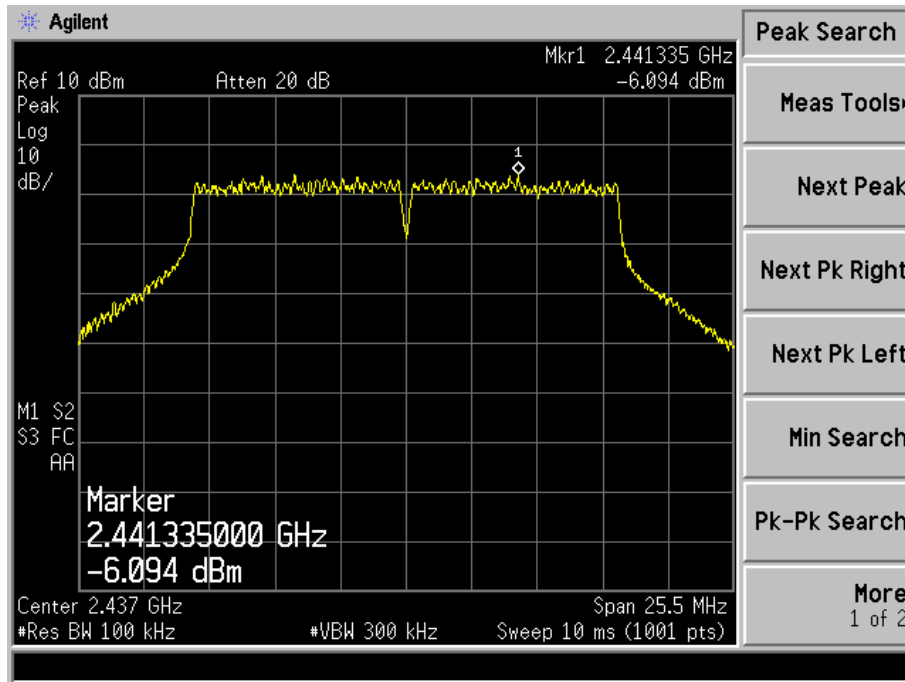
802.11b-High Channel



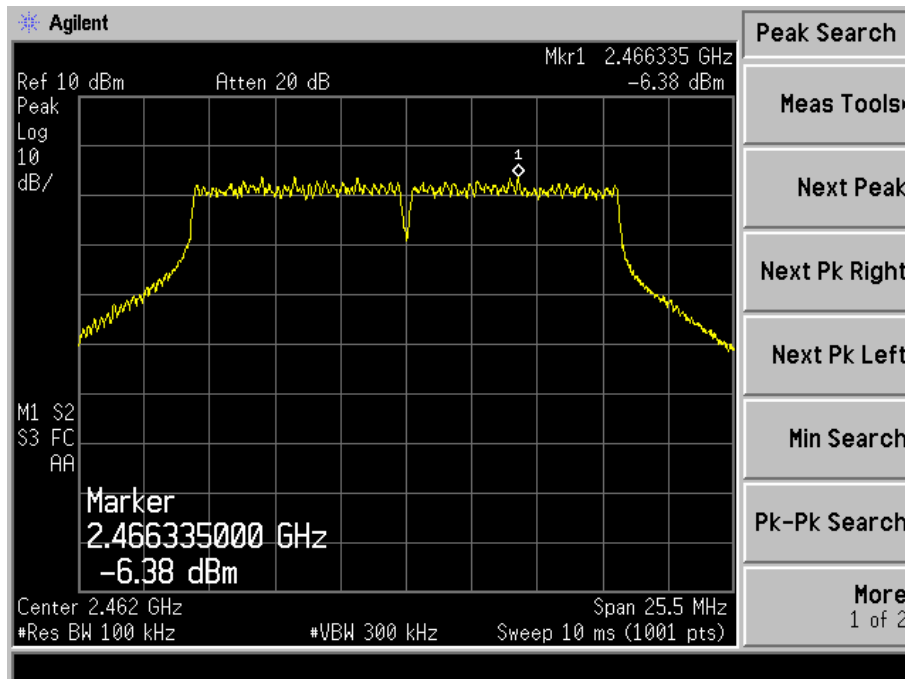
802.11g-Low Channel



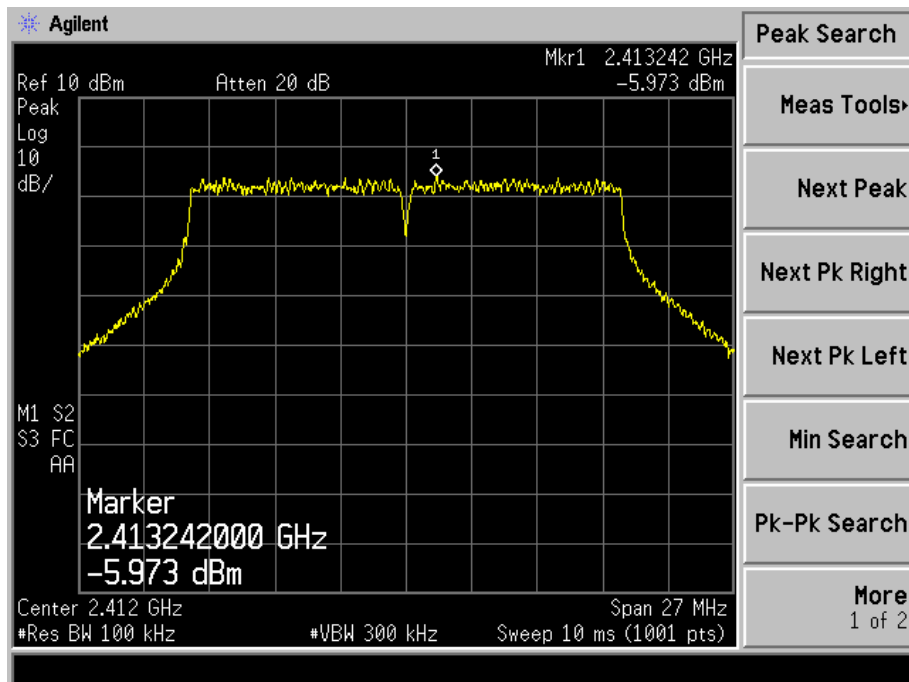
802.11g-Middle Channel



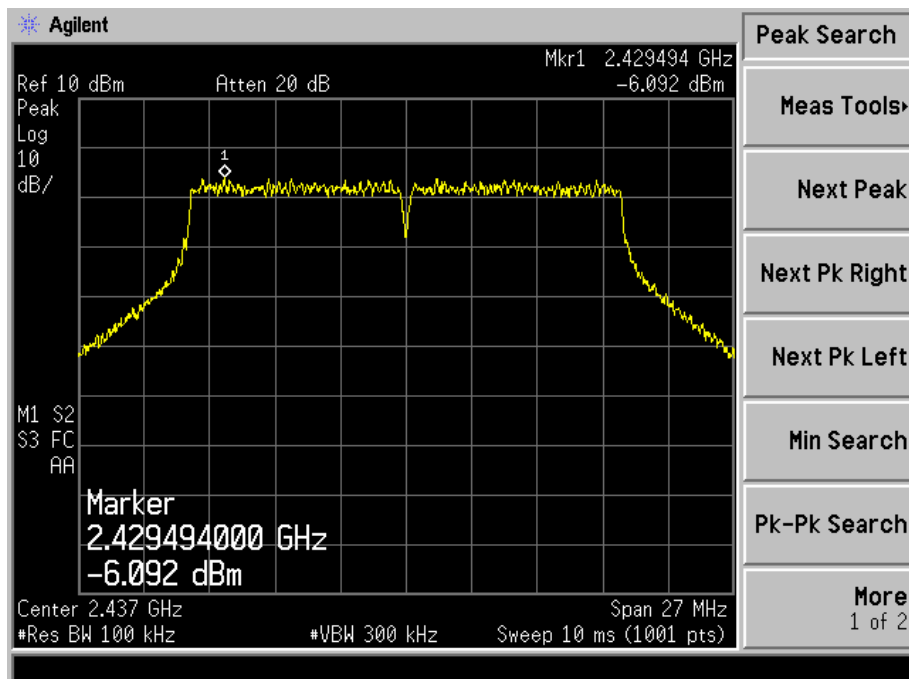
802.11g-High Channel



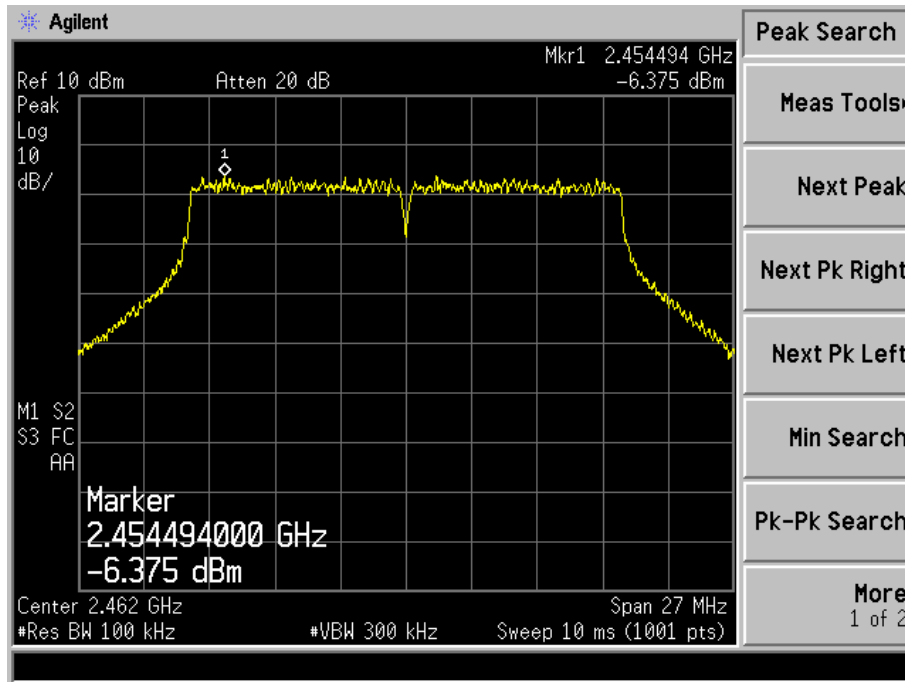
802.11n-HT20-Low Channel



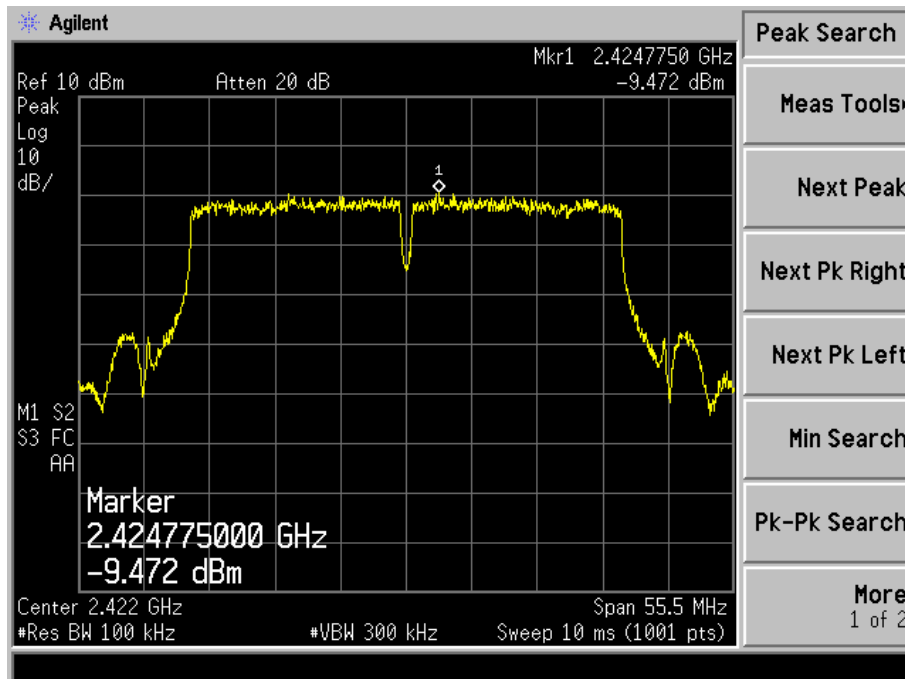
802.11n-HT20-Middle Channel



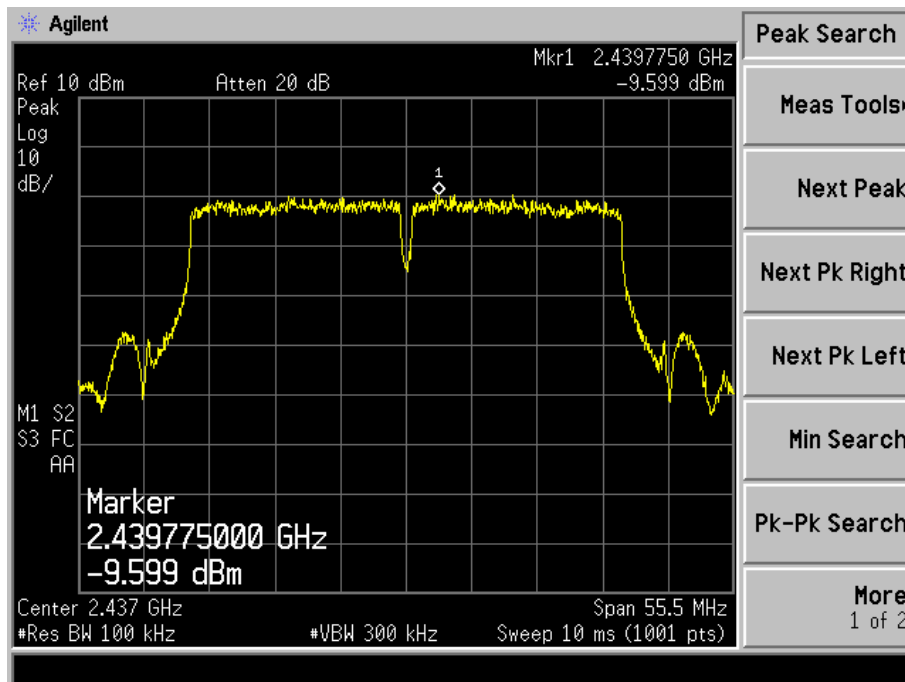
802.11n-HT20-High Channel



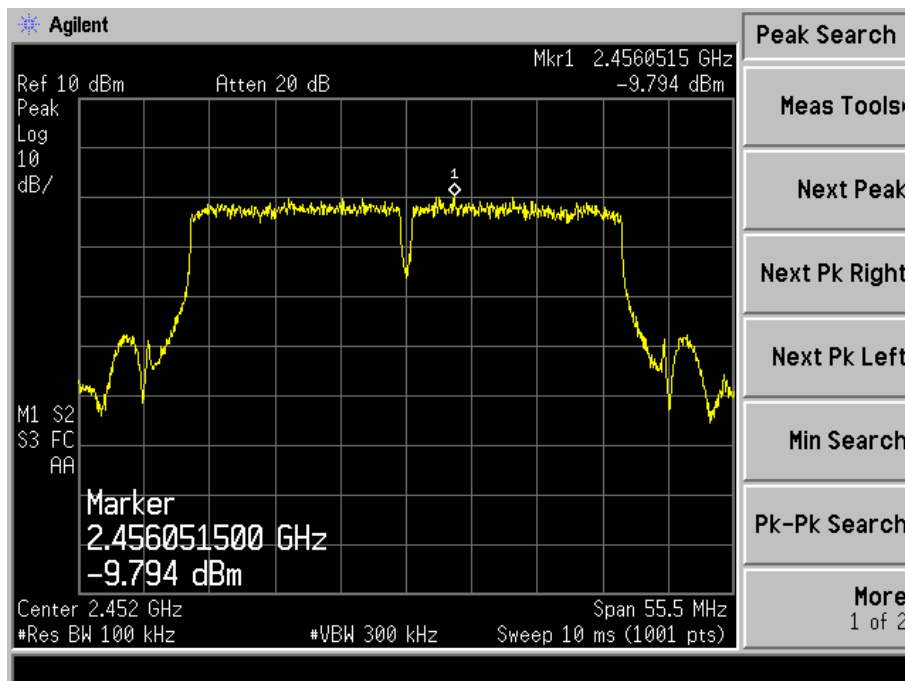
802.11n-HT40-Low Channel



802.11n-HT40-Middle Channel



802.11n-HT40-High Channel



6. 6dB Bandwidth

6.1 Standard Applicable

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

6.2 Test Procedure

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.3 Environmental Conditions

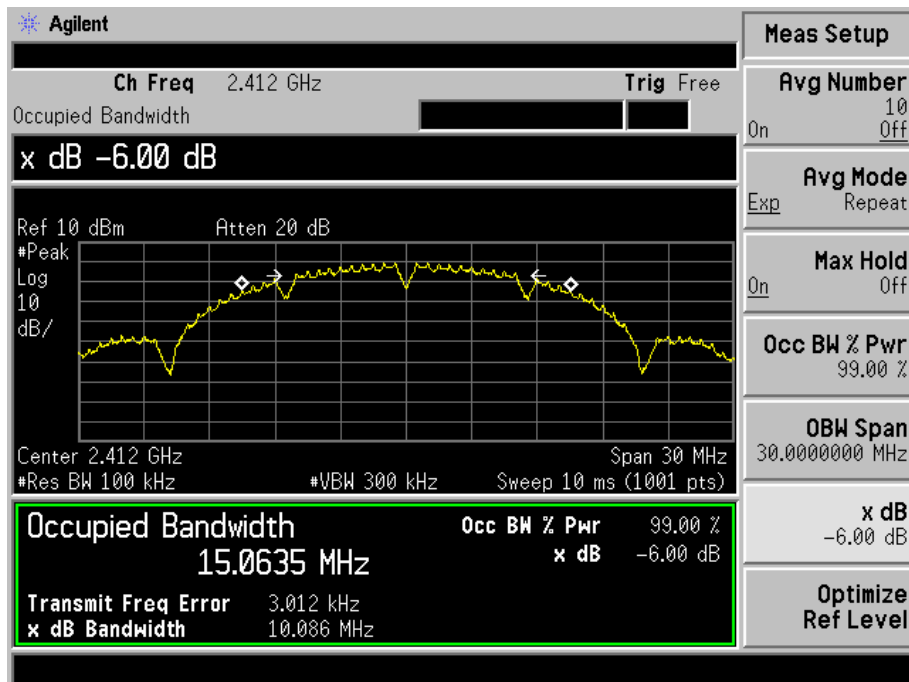
Temperature:	25° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.4 Summary of Test Results/Plots

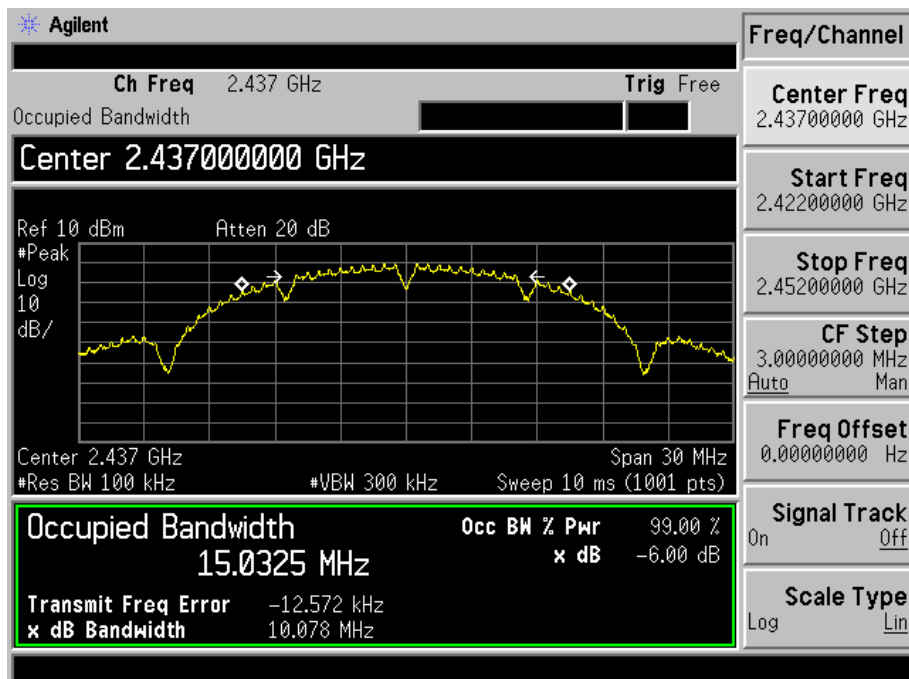
Test Mode	Test Channel MHz	6 dB Bandwidth MHz	99% Bandwidth MHz	Limit kHz
802.11b	2412	10.086	15.0635	≥ 500
	2437	10.078	15.0325	≥ 500
	2462	10.033	15.0447	≥ 500
802.11g	2412	16.551	16.5023	≥ 500
	2437	16.537	16.4949	≥ 500
	2462	16.516	16.5036	≥ 500
802.11n-HT20	2412	17.819	17.7065	≥ 500
	2437	17.827	17.7075	≥ 500
	2462	17.826	17.7074	≥ 500
802.11n-HT40	2422	36.433	36.1103	≥ 500
	2437	36.433	36.0645	≥ 500
	2452	36.418	36.0786	≥ 500

Please refer to the following test plots:

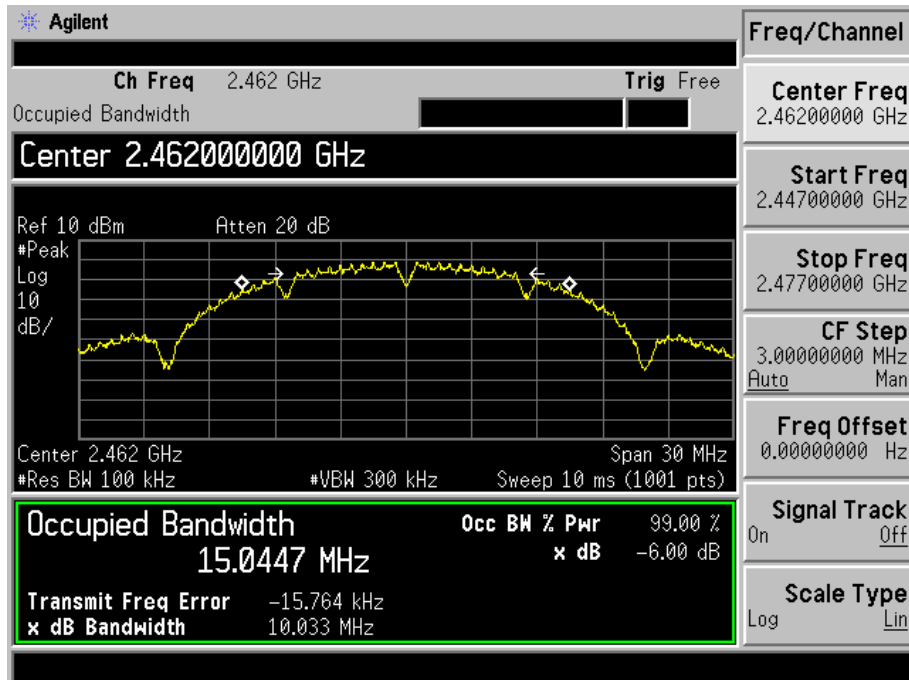
802.11b-Low Channel



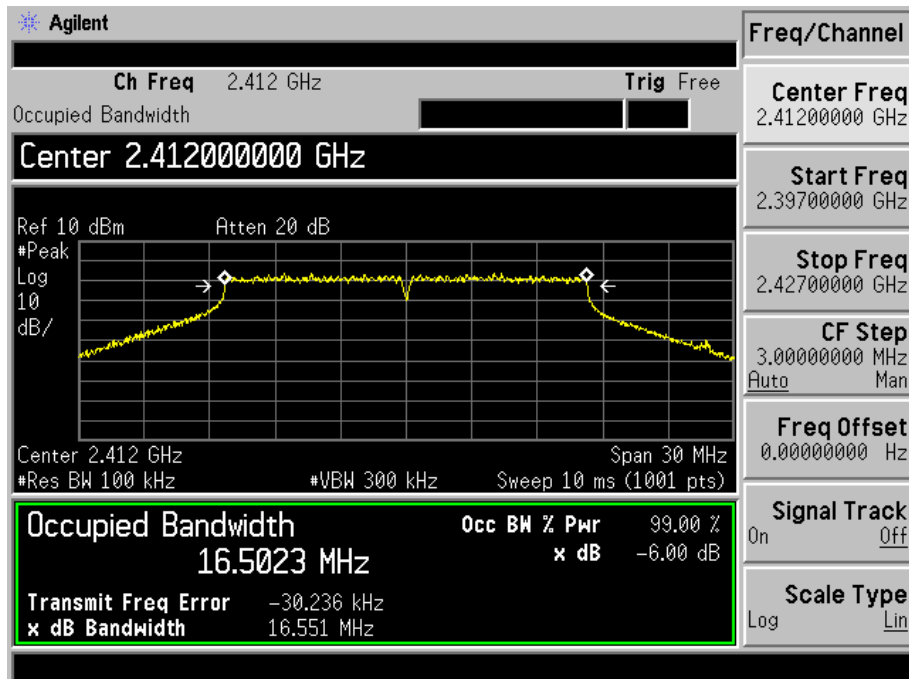
802.11b-Middle Channel



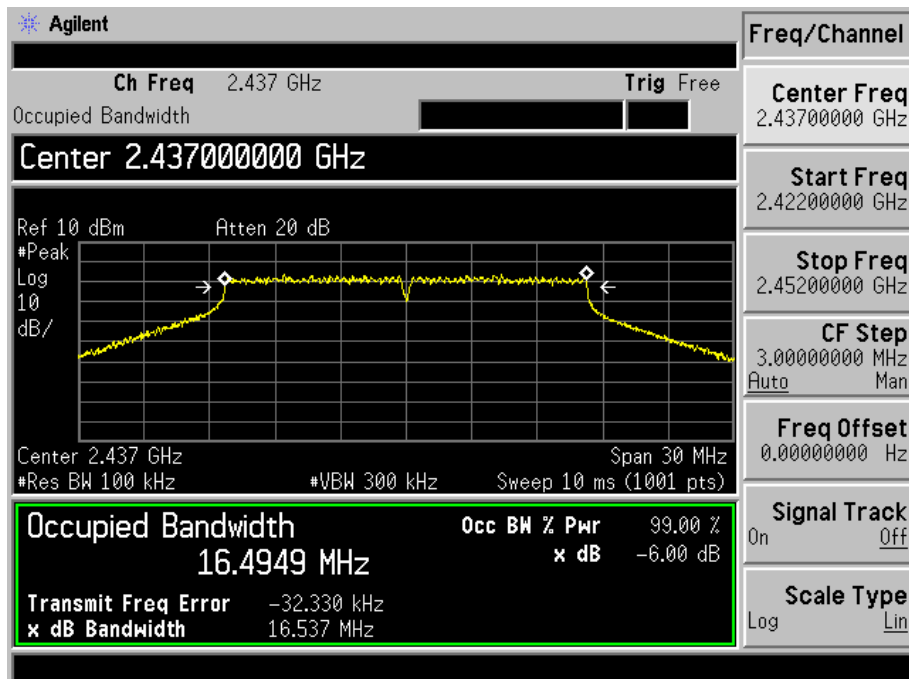
802.11b-High Channel



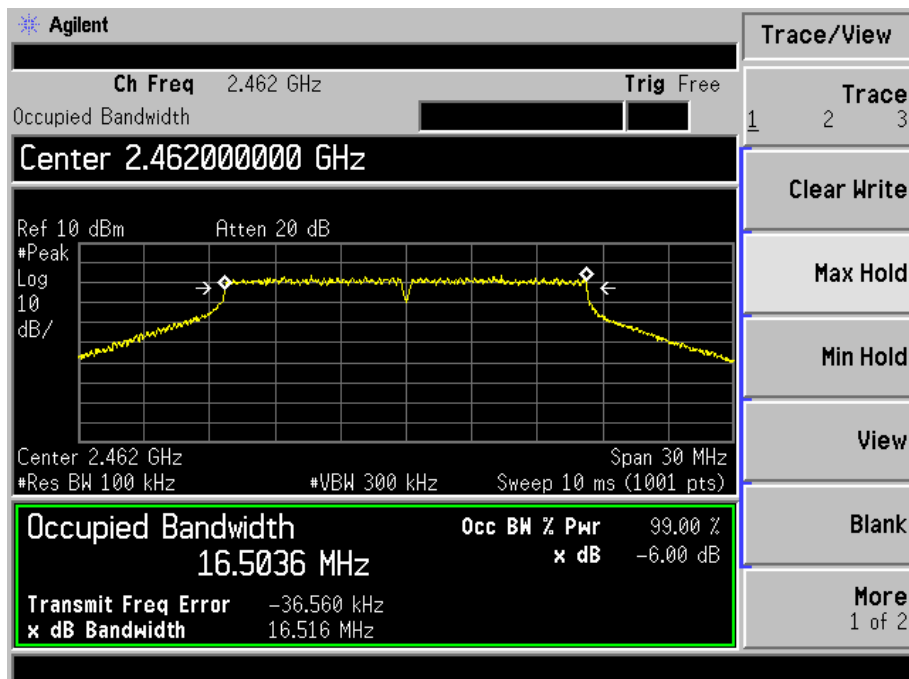
802.11g-Low Channel



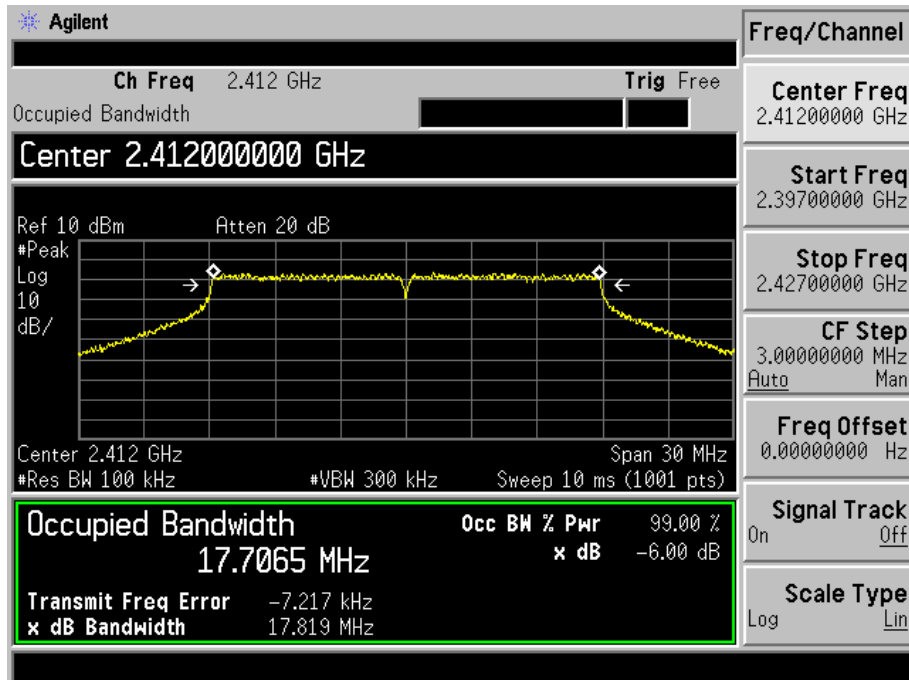
802.11g-Middle Channel



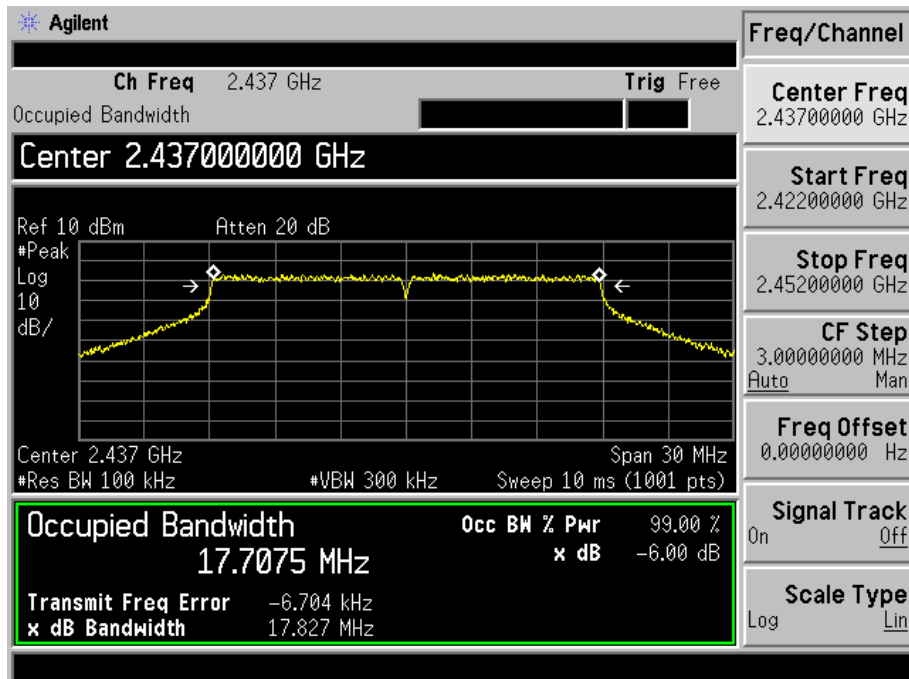
802.11g-High Channel



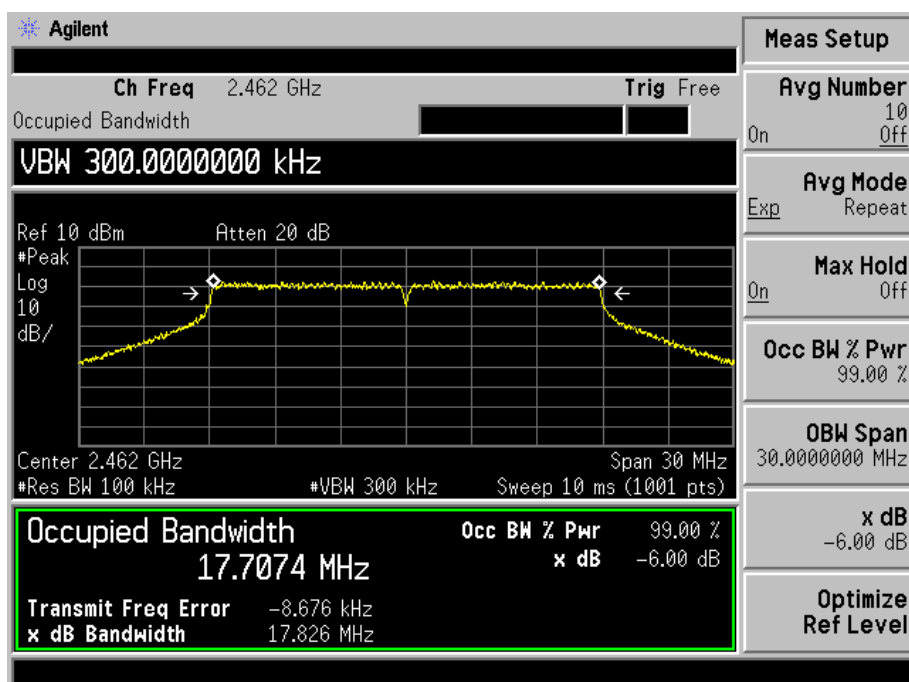
802.11n-HT20-Low Channel



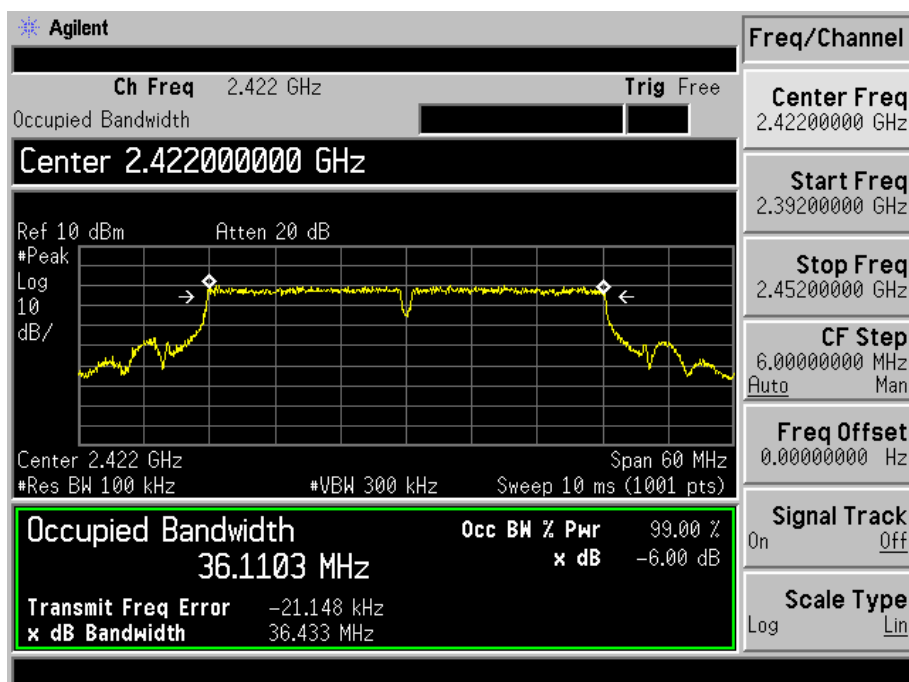
802.11n-HT20-Middle Channel



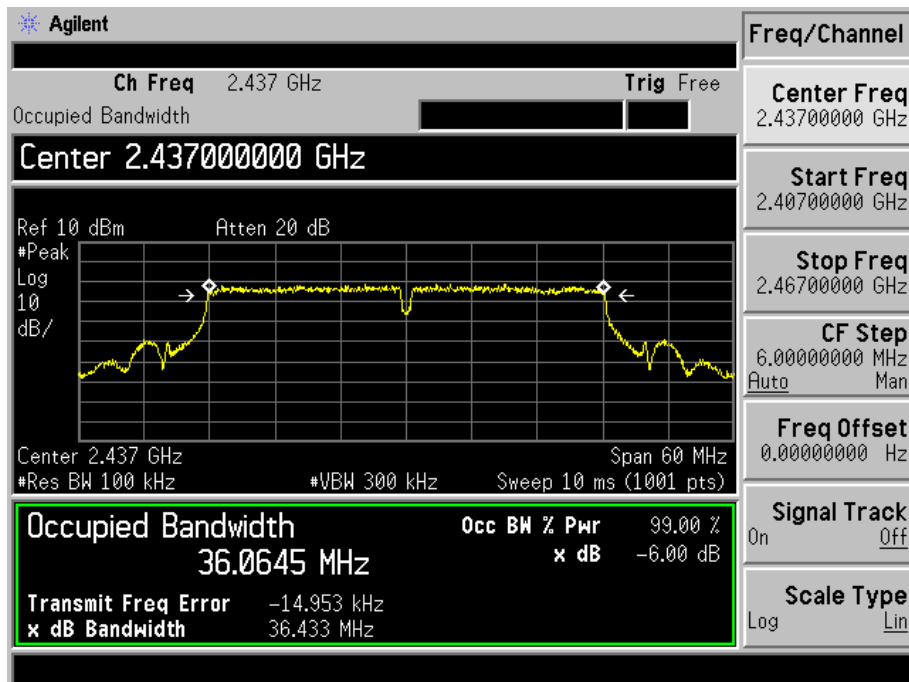
802.11n-HT20-High Channel



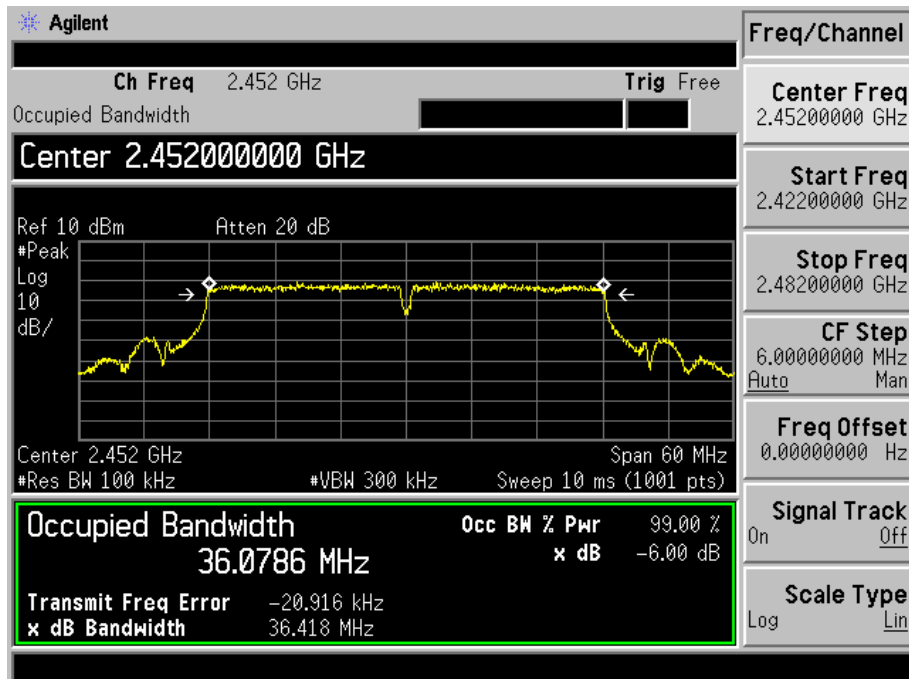
802.11n-HT40-Low Channel



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 v03r04, 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

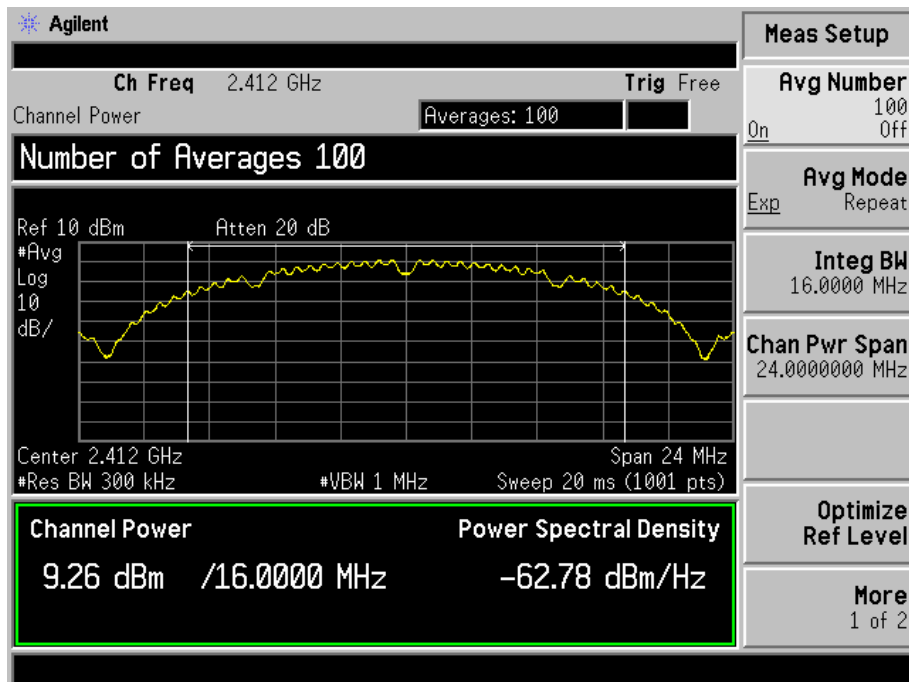
Temperature:	26° C
Relative Humidity:	57%
ATM Pressure:	1011 mbar

7.4 Summary of Test Results/Plots

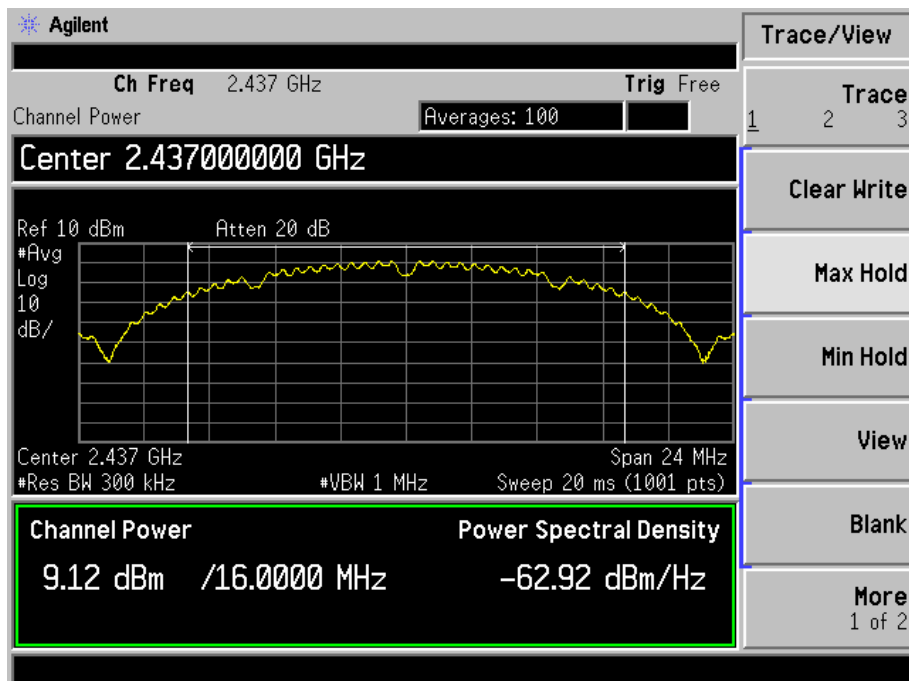
Test Mode	Frequency MHz	Reading dBm	Output Power mW	Limit mW
802.11b_11Mbps	2412	9.26	8.43	1000
	2437	9.12	8.17	1000
	2462	8.70	7.41	1000
802.11g_54Mbps	2412	7.13	5.16	1000
	2437	7.26	5.32	1000
	2462	6.94	4.94	1000
802.11n HT20_MCS7	2412	6.63	4.60	1000
	2437	6.61	4.58	1000
	2462	6.28	4.25	1000
802.11n HT40_MCS7	2422	4.83	3.04	1000
	2437	4.71	2.96	1000
	2452	4.61	2.89	1000

Please refer to the following test plots:

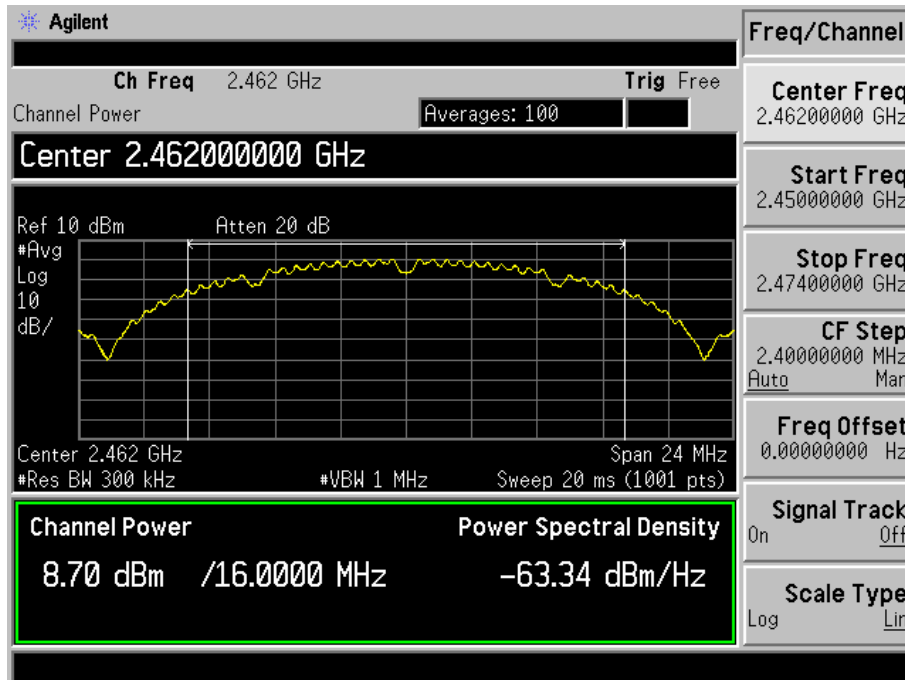
802.11b-11Mbps-Low Channel



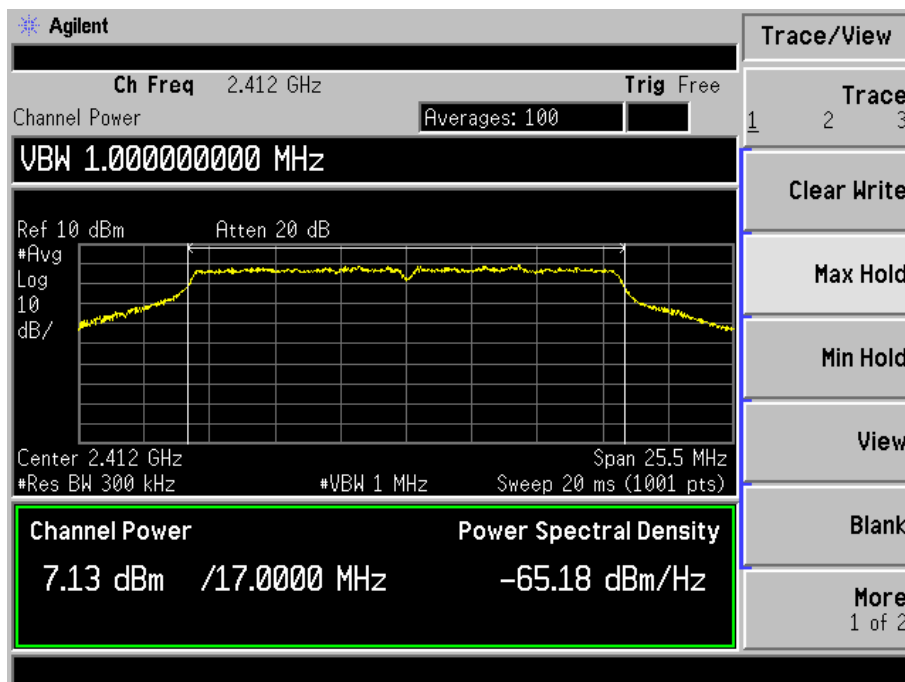
802.11b -11Mbps-Middle Channel



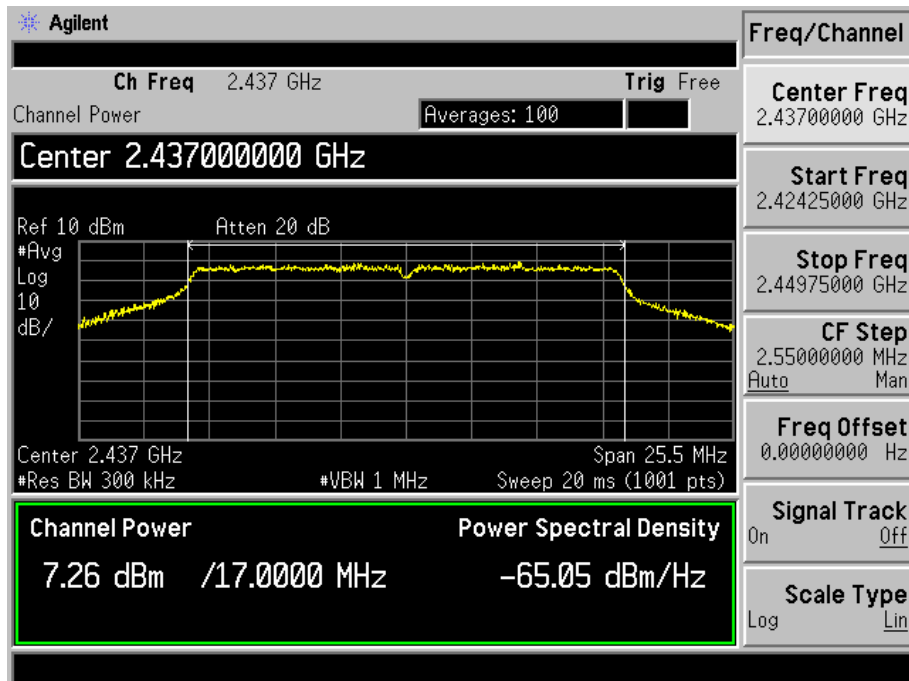
802.11b -11Mbps-High Channel



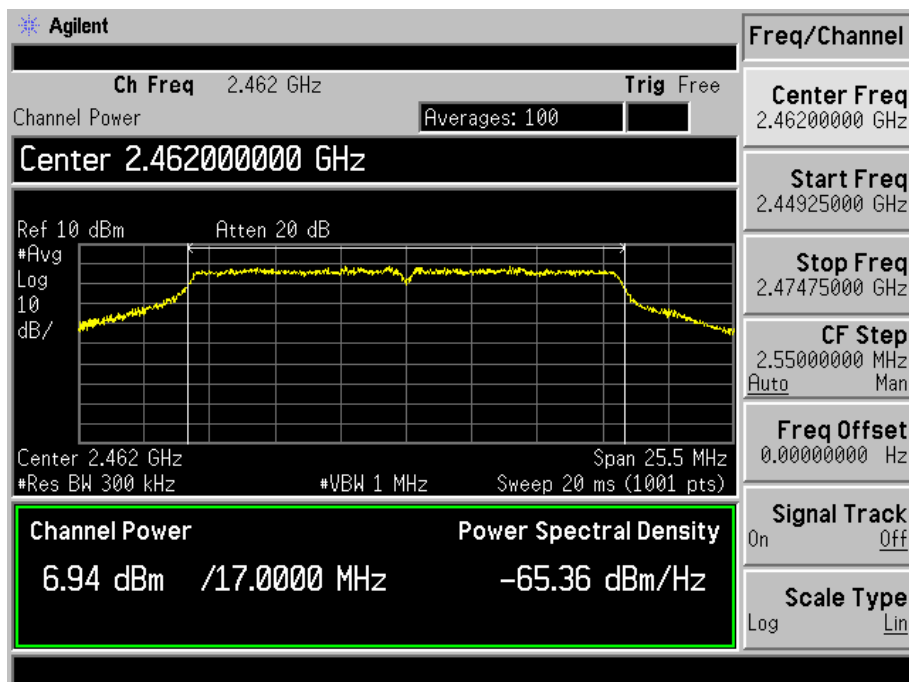
802.11g-54Mbps-Low Channel



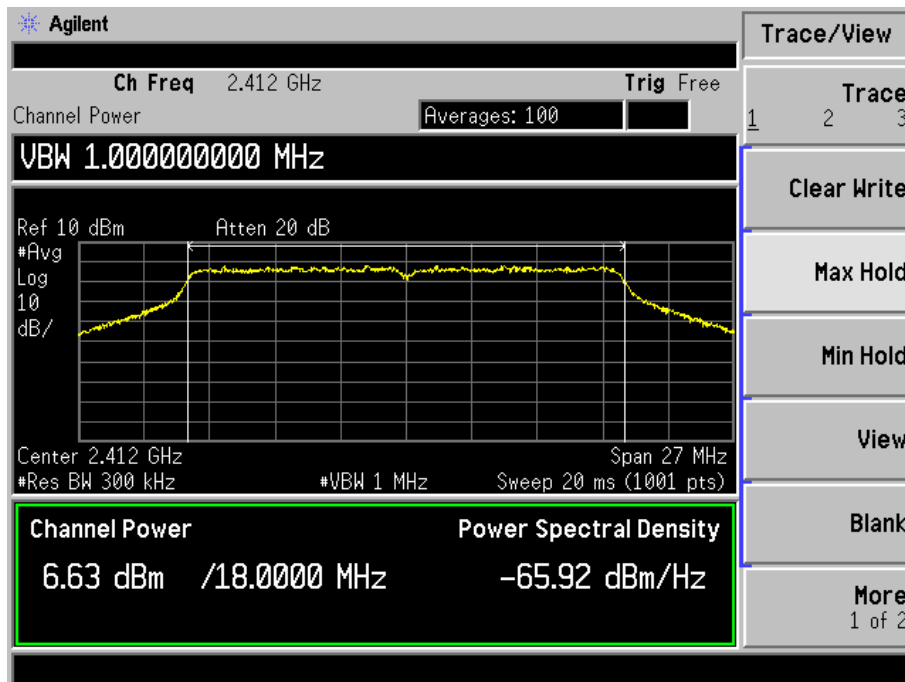
802.11g-54Mbps-Middle Channel



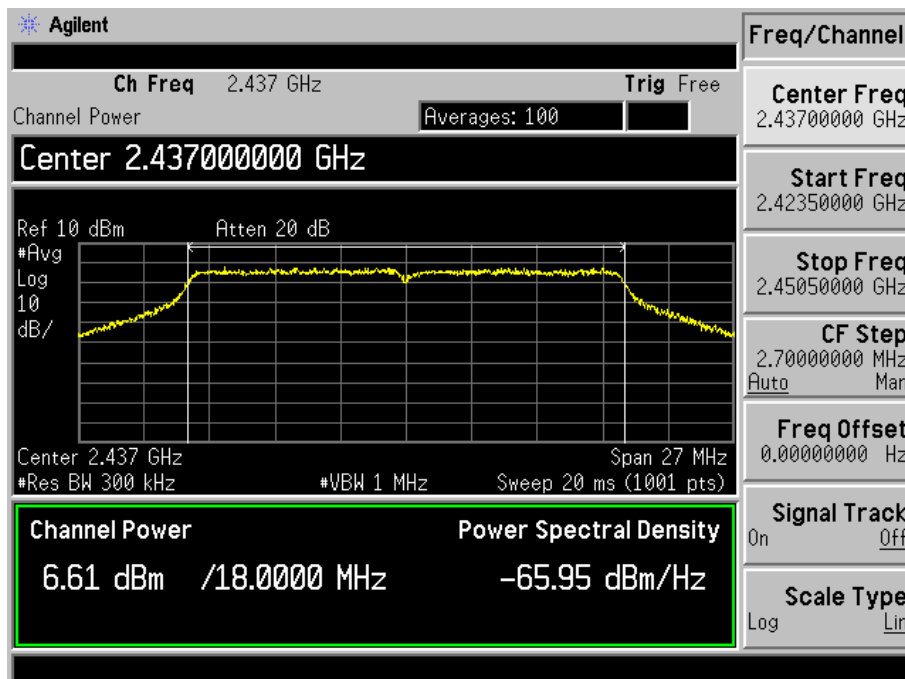
802.11g-54Mbps-High Channel



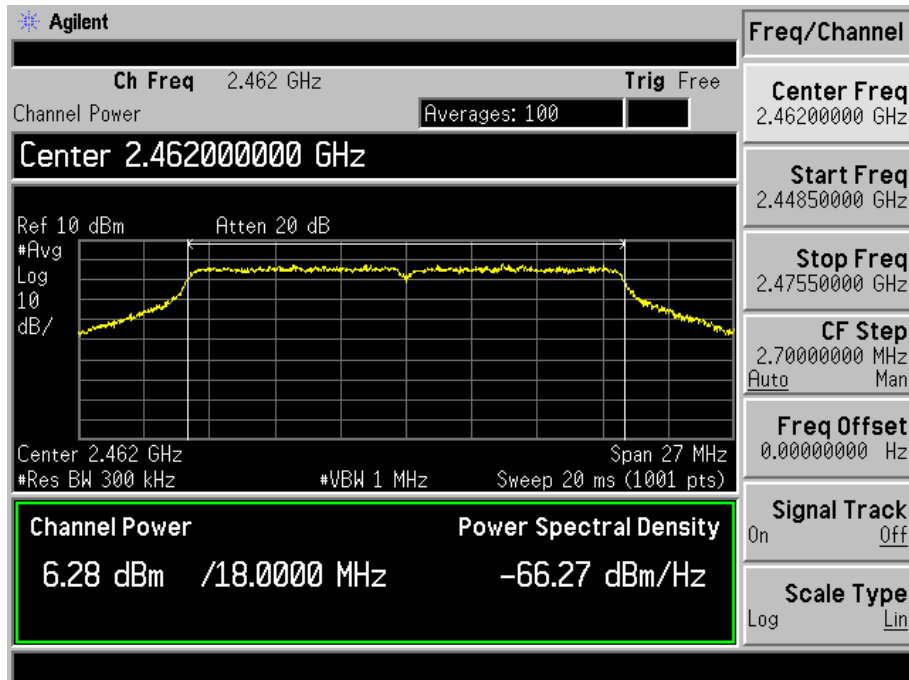
802.11n-HT20-MCS7-Low Channel



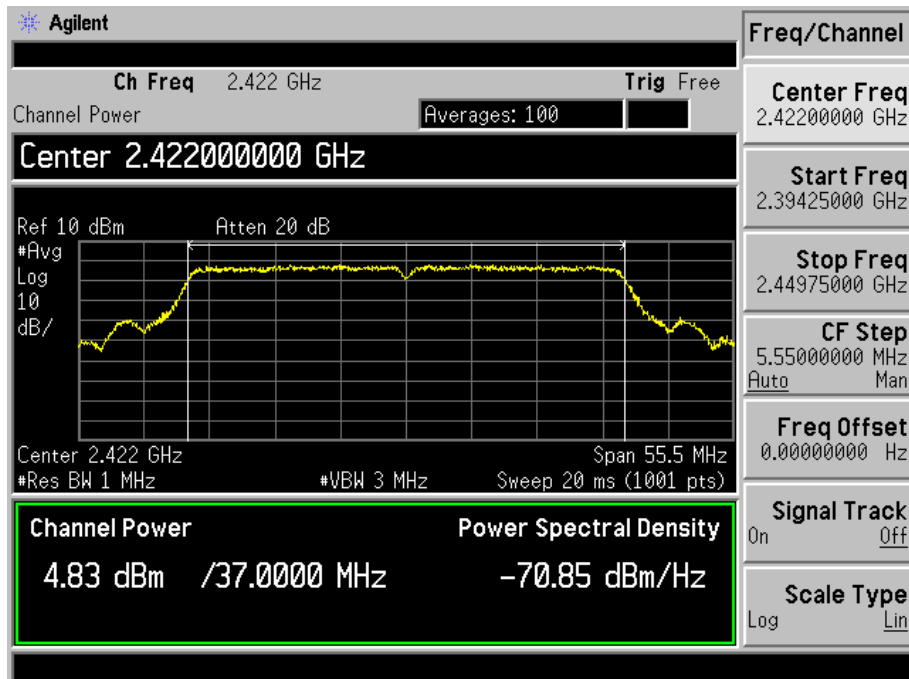
802.11n-HT20-MCS7-Middle Channel



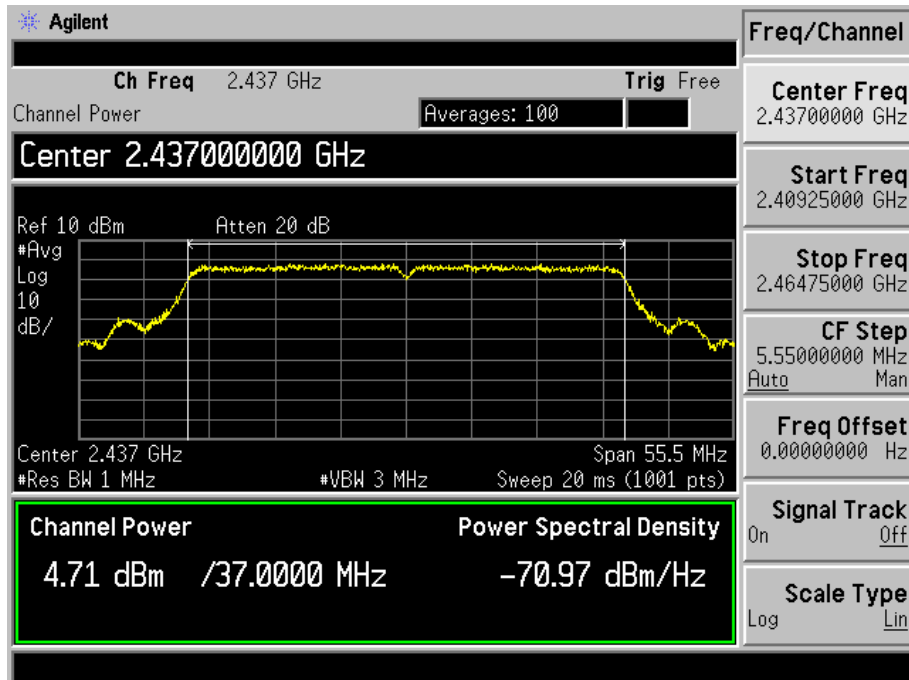
802.11n-HT20-MCS7-High Channel



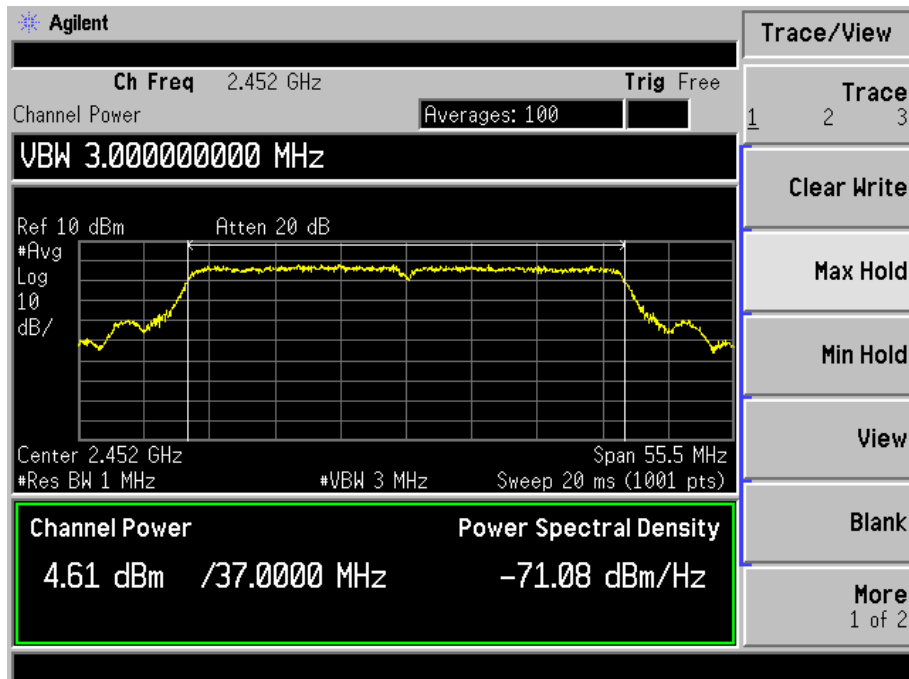
802.11n-HT40-MCS7-Low Channel



802.11n-HT40-MCS7-Middle Channel



802.11n-HT40-MCS7-High Channel



8. Field Strength of Spurious Emissions

8.1 Measurement Uncertainty

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

8.2 Standard Applicable

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

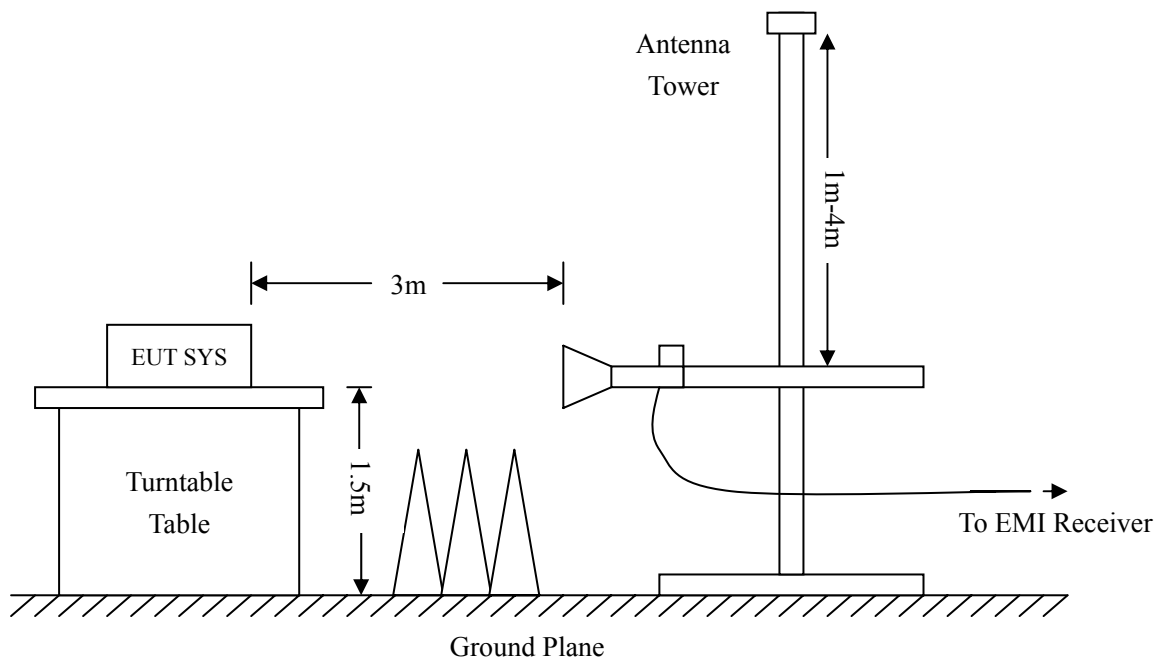
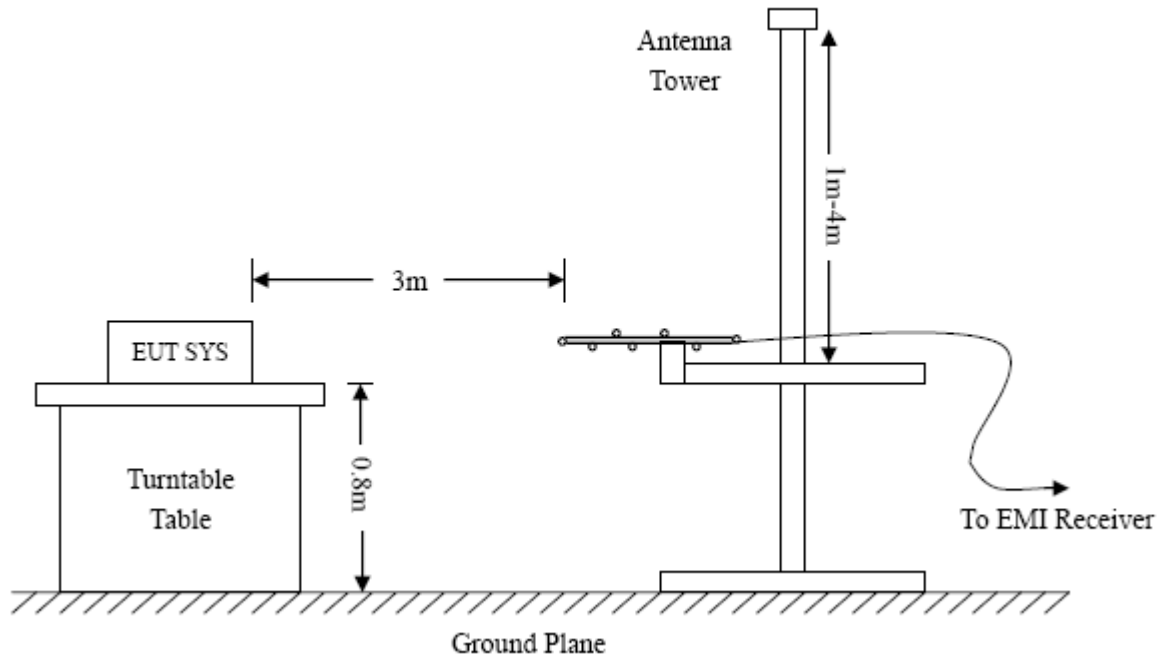
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

8.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 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 μ V means the emission is 6dB μ V below the maximum limit. The equation for margin calculation is as follows:

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

8.5 Environmental Conditions

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

8.6 Summary of Test Results/Plots

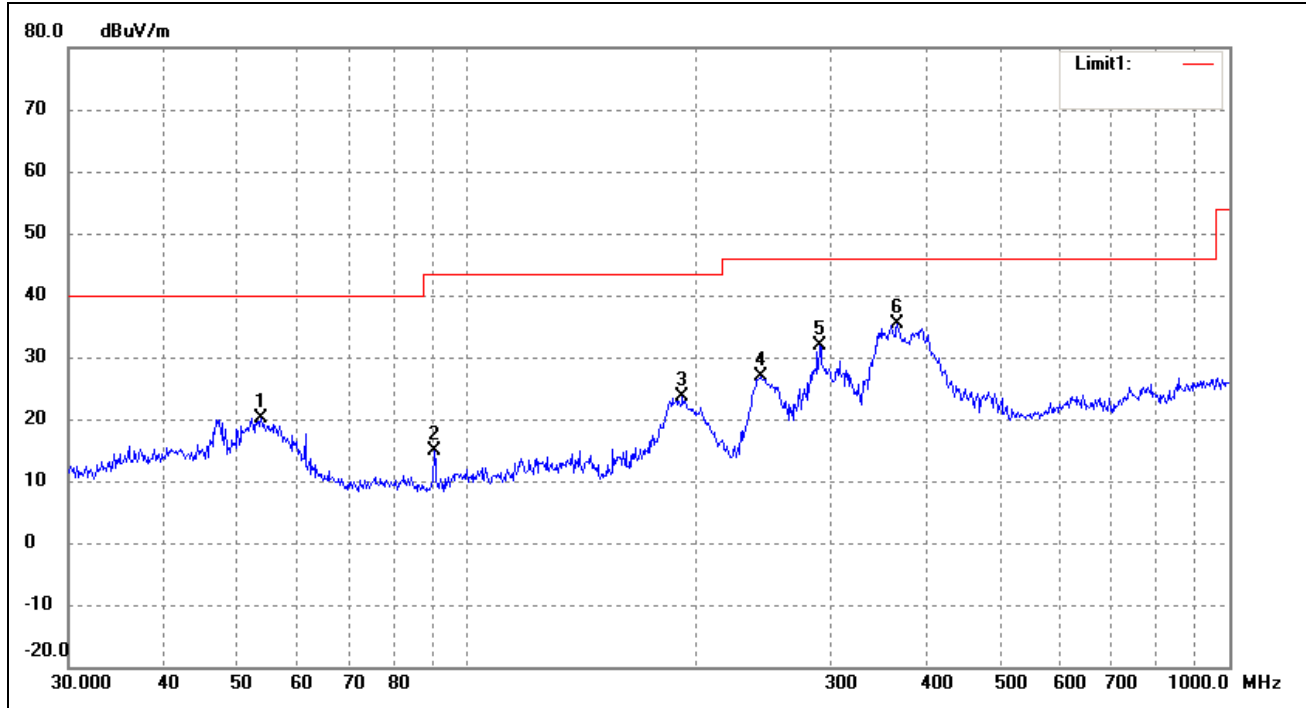
According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst cases:

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

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

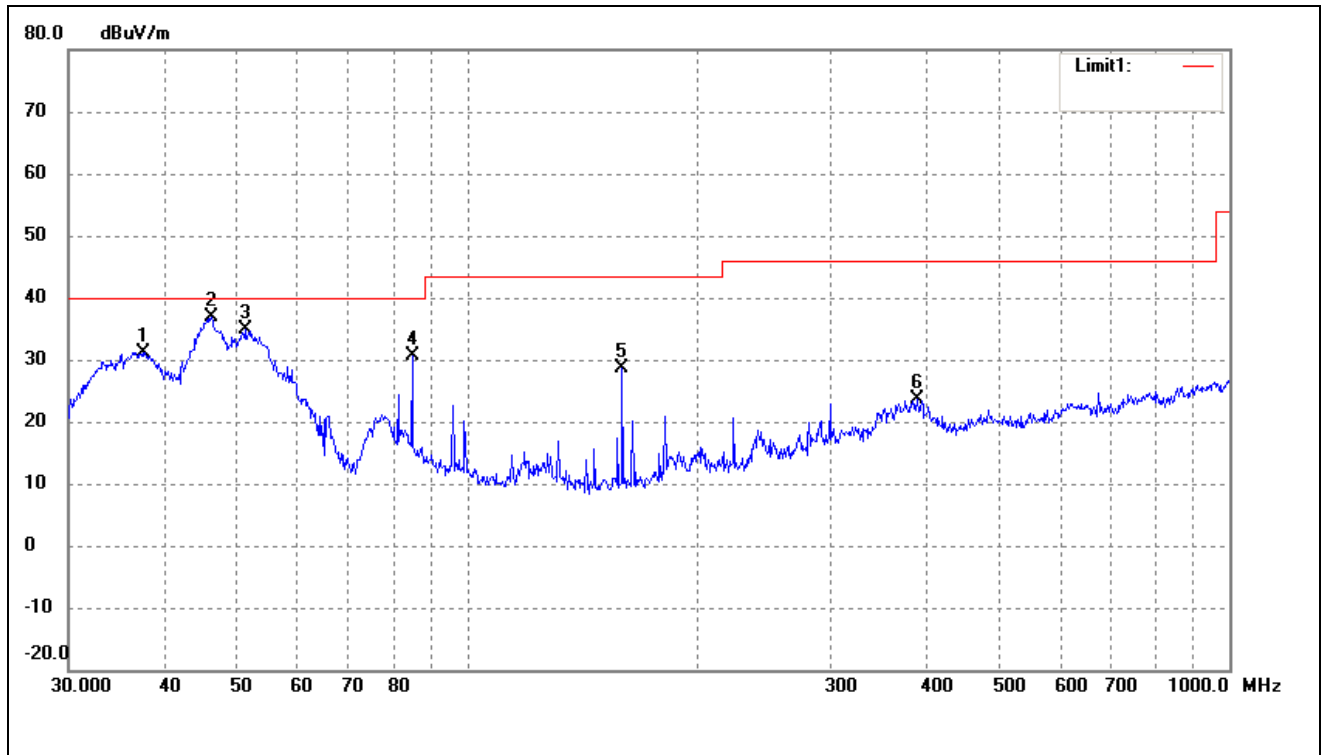
EUT: Mini Projector
 Tested Model: TM1
 Operating Condition: 802.11b Transmitting Low Channel-2412MHz
 Comment: AC120V/60Hz Adapter 12V

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	53.6932	28.98	-8.78	20.20	40.00	-19.80	254	100	peak
2	90.5374	27.82	-12.84	14.98	43.50	-28.52	113	100	peak
3	191.7450	33.36	-9.77	23.59	43.50	-19.91	284	100	peak
4	242.5253	35.15	-8.16	26.99	46.00	-19.01	360	100	peak
5	290.0172	37.79	-5.87	31.92	46.00	-14.08	100	100	peak
6	366.8231	38.17	-2.86	35.31	46.00	-10.69	100	100	peak

Test Specification: Vertical

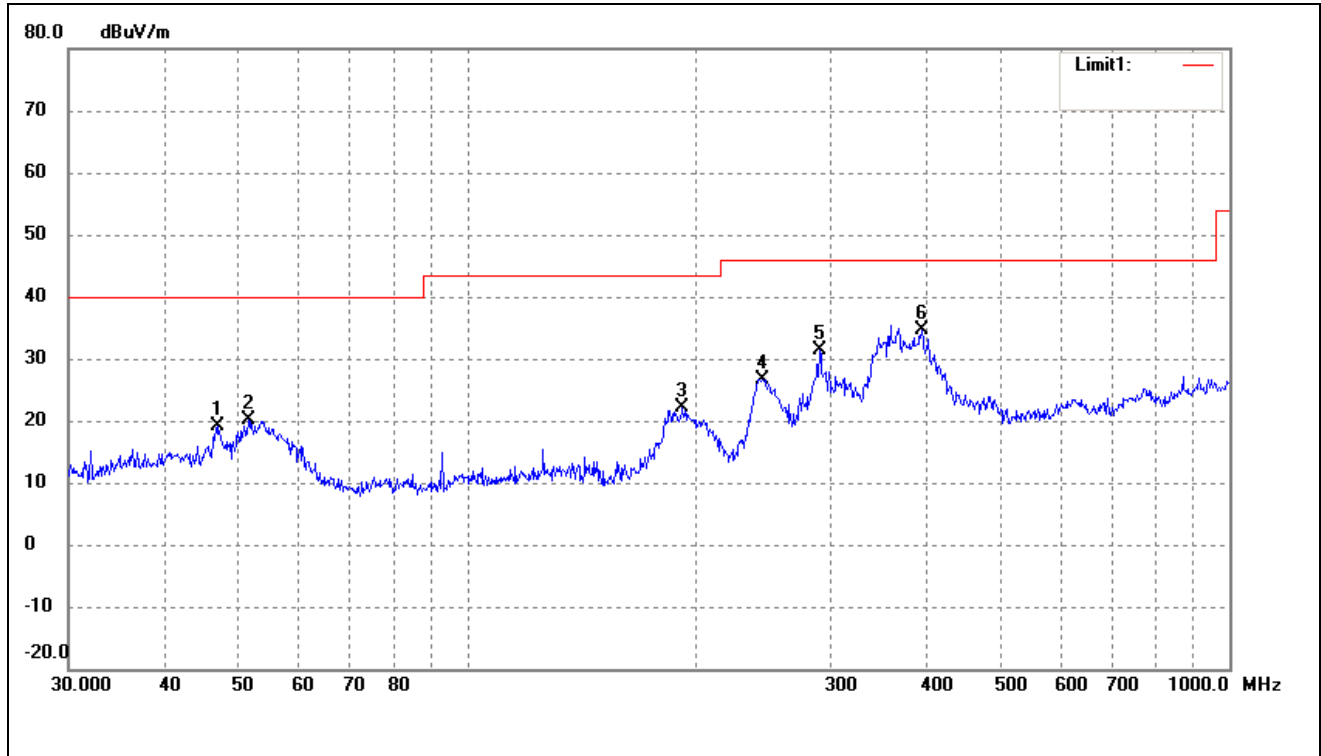


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.5479	39.55	-8.34	31.21	40.00	-8.79	114	100	peak
2	46.1780	45.04	-8.07	36.97	40.00	-3.03	270	100	peak
3	51.1209	43.43	-8.46	34.97	40.00	-5.03	360	100	peak
4	84.7019	42.97	-12.44	30.53	40.00	-9.47	116	100	peak
5	159.7844	40.87	-12.27	28.60	43.50	-14.90	100	100	peak
6	389.3549	26.31	-2.58	23.73	46.00	-22.27	100	100	peak

Operating Condition: 802.11b Transmitting Middle Channel-2437MHz

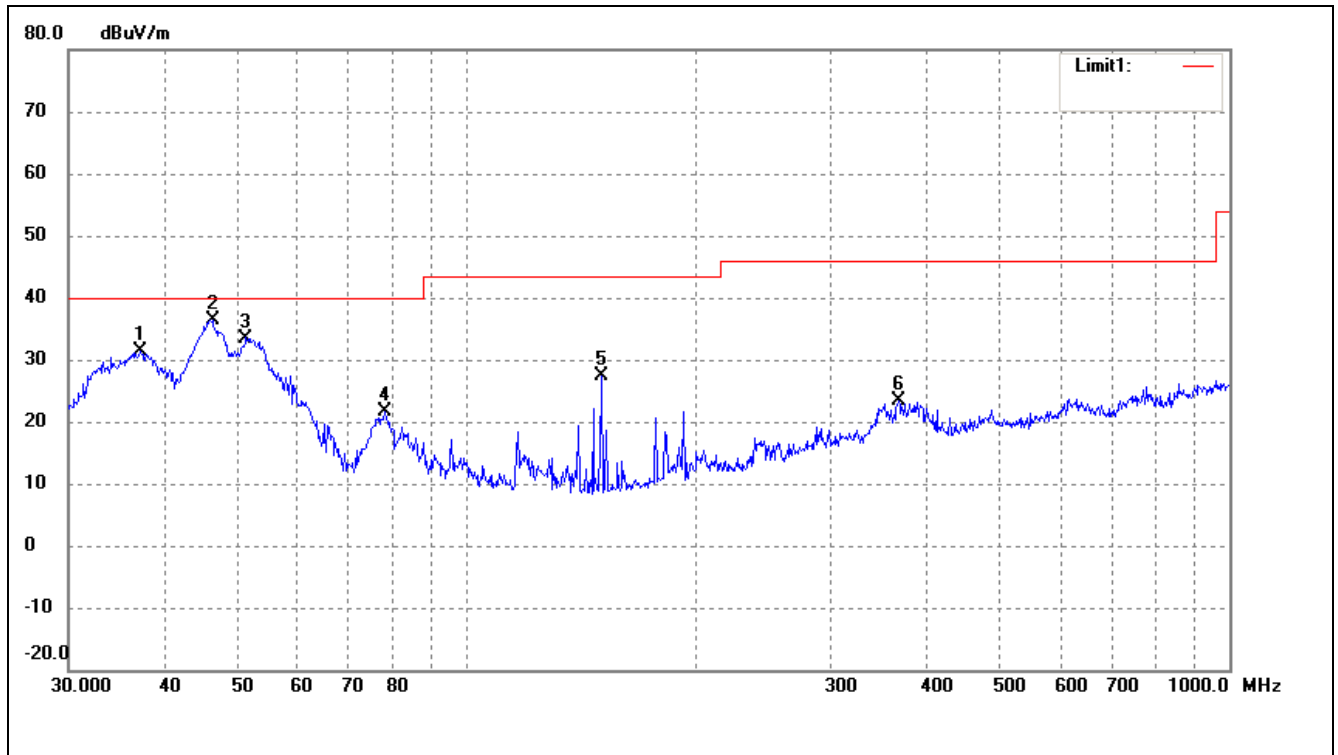
Comment:

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	46.9948	27.17	-8.13	19.04	40.00	-20.96	178	100	peak
2	51.6616	28.62	-8.53	20.09	40.00	-19.91	224	100	peak
3	191.7450	31.86	-9.77	22.09	43.50	-21.41	160	100	peak
4	244.2321	34.73	-8.03	26.70	46.00	-19.30	290	100	peak
5	290.0172	37.32	-5.87	31.45	46.00	-14.55	100	100	peak
6	394.8545	37.42	-2.88	34.54	46.00	-11.46	100	100	peak

Test Specification: Vertical

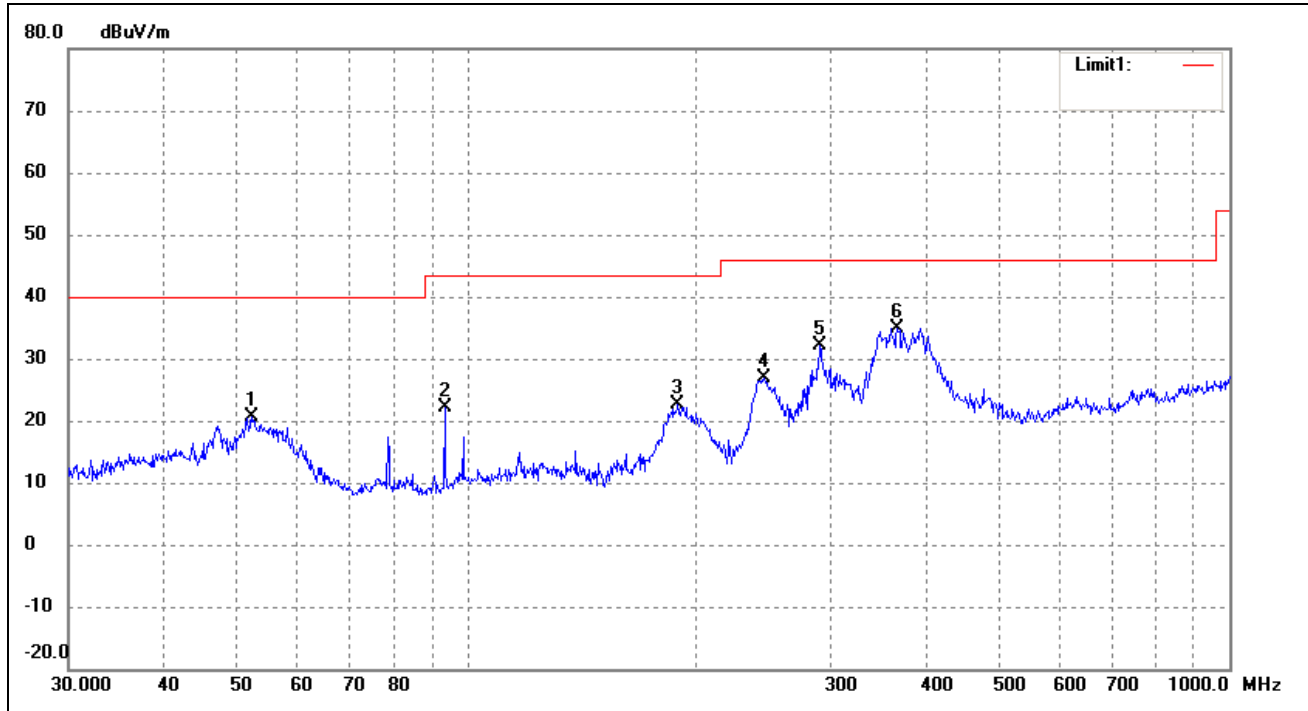


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.2855	39.81	-8.41	31.40	40.00	-8.60	256	100	peak
2	46.3402	44.49	-8.08	36.41	40.00	-3.59	360	100	peak
3	51.3005	41.99	-8.49	33.50	40.00	-6.50	360	100	peak
4	77.8654	33.72	-12.17	21.55	40.00	-18.45	360	100	peak
5	150.0108	39.70	-12.42	27.28	43.50	-16.22	360	100	peak
6	368.1116	26.27	-2.77	23.50	46.00	-22.50	360	100	peak

Operating Condition: 802.11b Transmitting High Channel-2462MHz

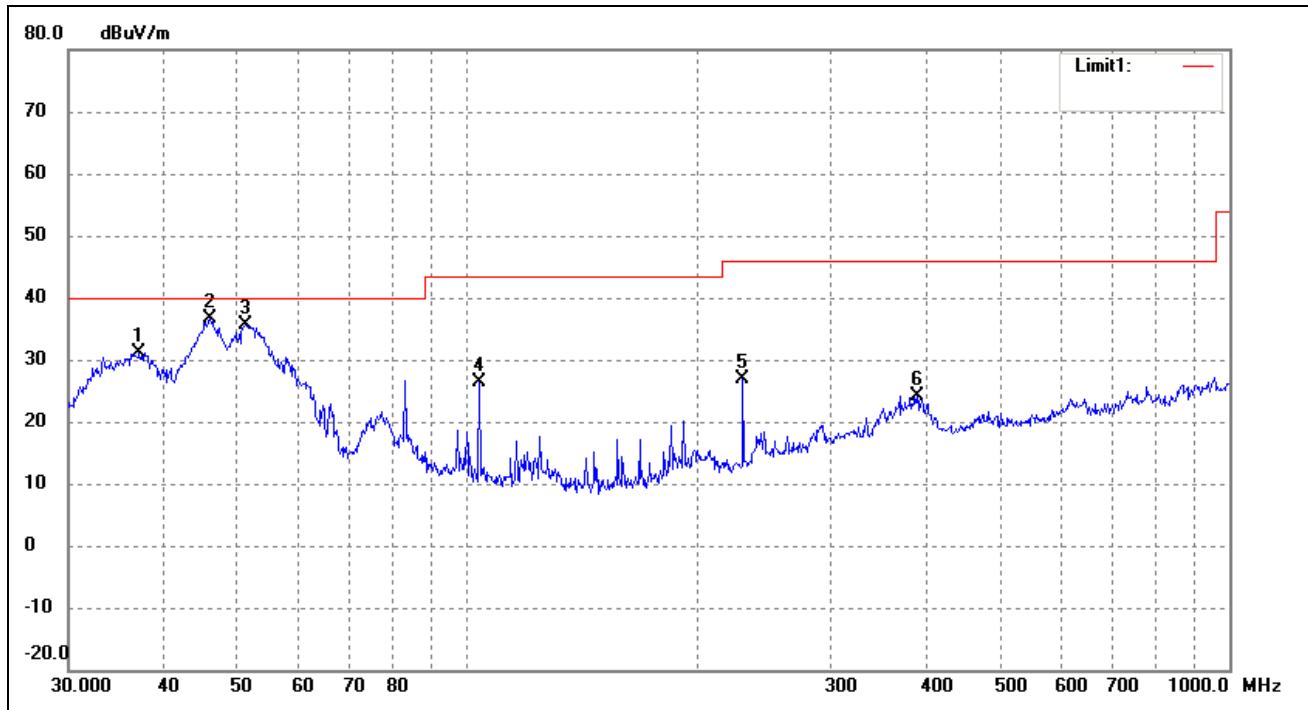
Comment:

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	52.2079	29.16	-8.59	20.57	40.00	-19.43	176	100	peak
2	93.4402	34.36	-12.24	22.12	43.50	-21.38	255	100	peak
3	189.0743	32.67	-10.12	22.55	43.50	-20.95	360	100	peak
4	245.0900	34.88	-7.97	26.91	46.00	-19.09	178	100	peak
5	290.0172	38.09	-5.87	32.22	46.00	-13.78	100	100	peak
6	366.8231	37.84	-2.86	34.98	46.00	-11.02	100	100	peak

Test Specification: Vertical

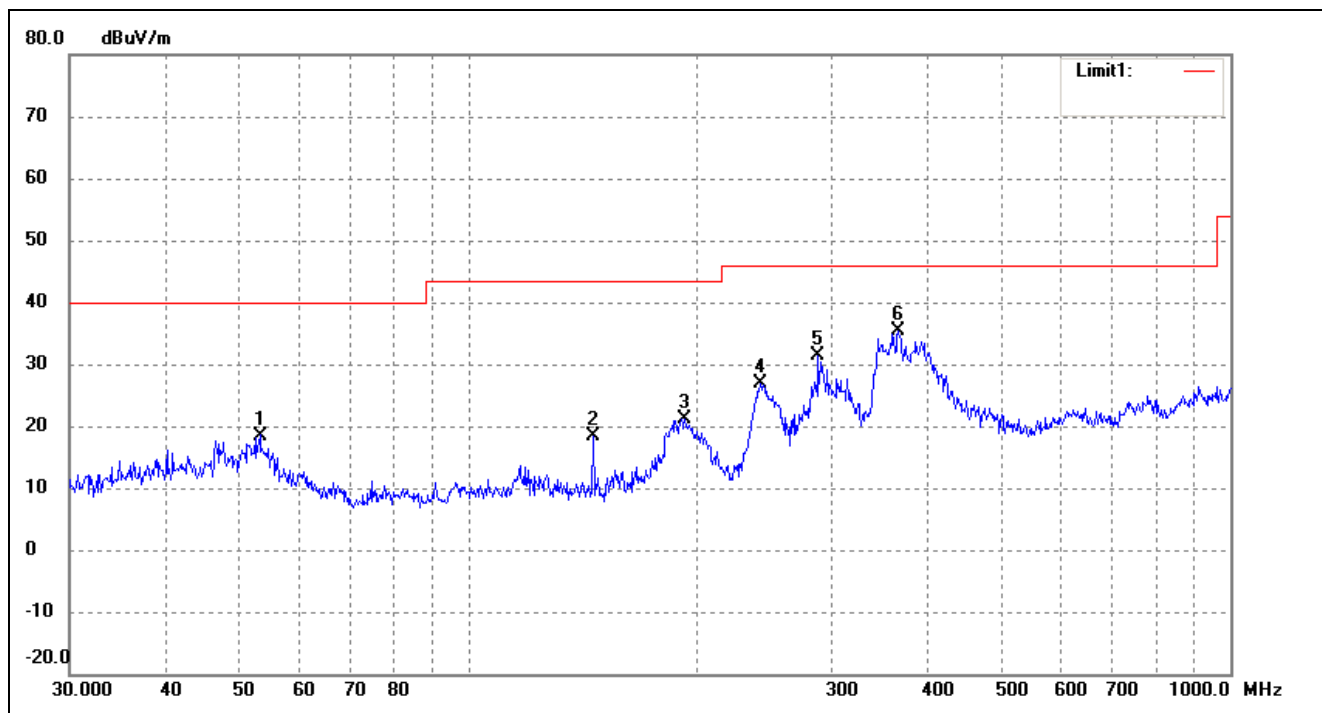


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.1550	39.68	-8.45	31.23	40.00	-8.77	360	100	peak
2	46.0164	44.73	-8.06	36.67	40.00	-3.33	225	100	peak
3	51.1209	44.14	-8.46	35.68	40.00	-4.32	160	100	peak
4	103.8055	37.49	-11.00	26.49	43.50	-17.01	310	100	peak
5	230.0985	35.38	-8.58	26.80	46.00	-19.20	100	100	peak
6	389.3549	26.66	-2.58	24.08	46.00	-21.92	100	100	peak

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

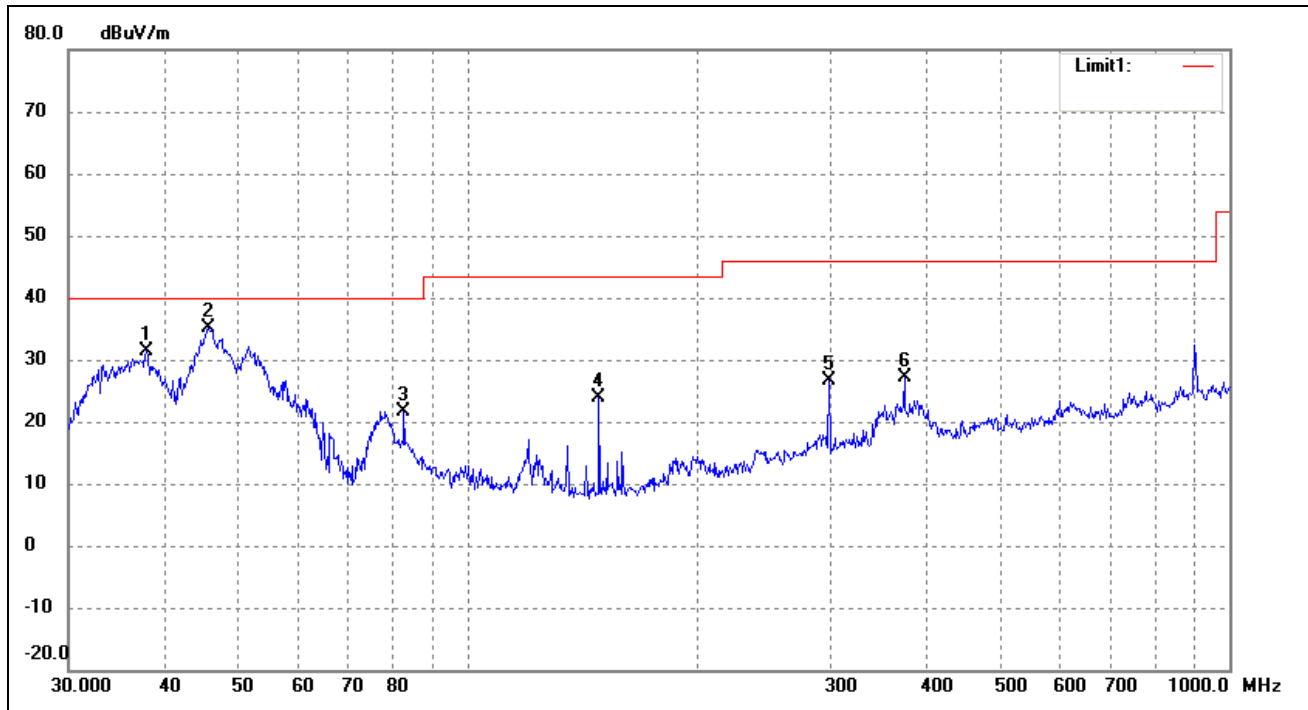
EUT: Mini Projector
 Tested Model: TM1
 Operating Condition: 802.11g Transmitting Low Channel-2412MHz
 Comment: AC120V/50Hz Adapter 12V

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	53.3179	27.24	-8.74	18.50	40.00	-21.50	174	100	peak
2	145.8611	30.93	-12.48	18.45	43.50	-25.05	160	100	peak
3	192.4186	30.83	-9.67	21.16	43.50	-22.34	320	100	peak
4	241.6763	35.07	-8.20	26.87	46.00	-19.13	360	100	peak
5	287.9904	37.23	-5.92	31.31	46.00	-14.69	100	100	peak
6	366.8231	38.22	-2.86	35.36	46.00	-10.64	100	100	peak

Test Specification: Vertical

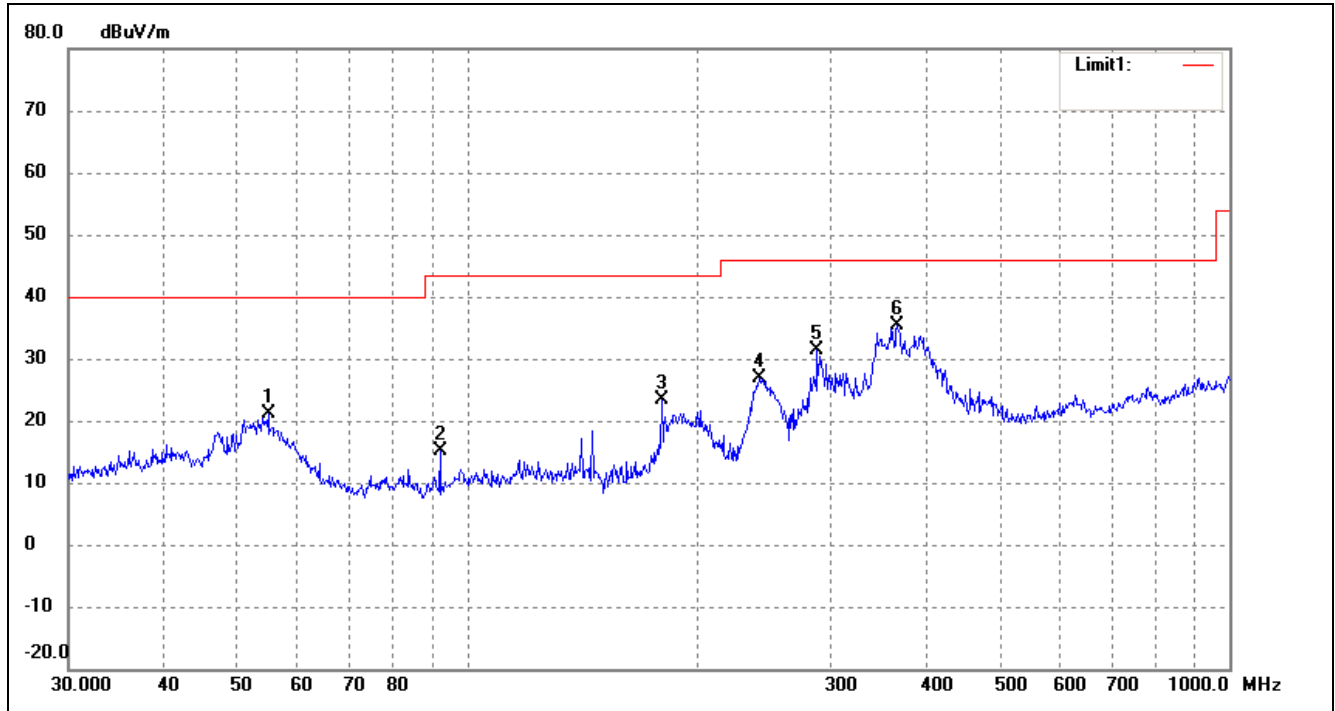


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.9450	39.54	-8.23	31.31	40.00	-8.69	177	100	peak
2	45.8553	43.24	-8.05	35.19	40.00	-4.81	90	100	peak
3	82.6482	33.90	-12.24	21.66	40.00	-18.34	336	100	peak
4	148.9625	36.40	-12.44	23.96	43.50	-19.54	360	100	peak
5	298.2681	32.39	-5.69	26.70	46.00	-19.30	100	100	peak
6	374.6226	29.63	-2.41	27.22	46.00	-18.78	100	100	peak

Operating Condition: 802.11g Transmitting Middle Channel-2437MHz

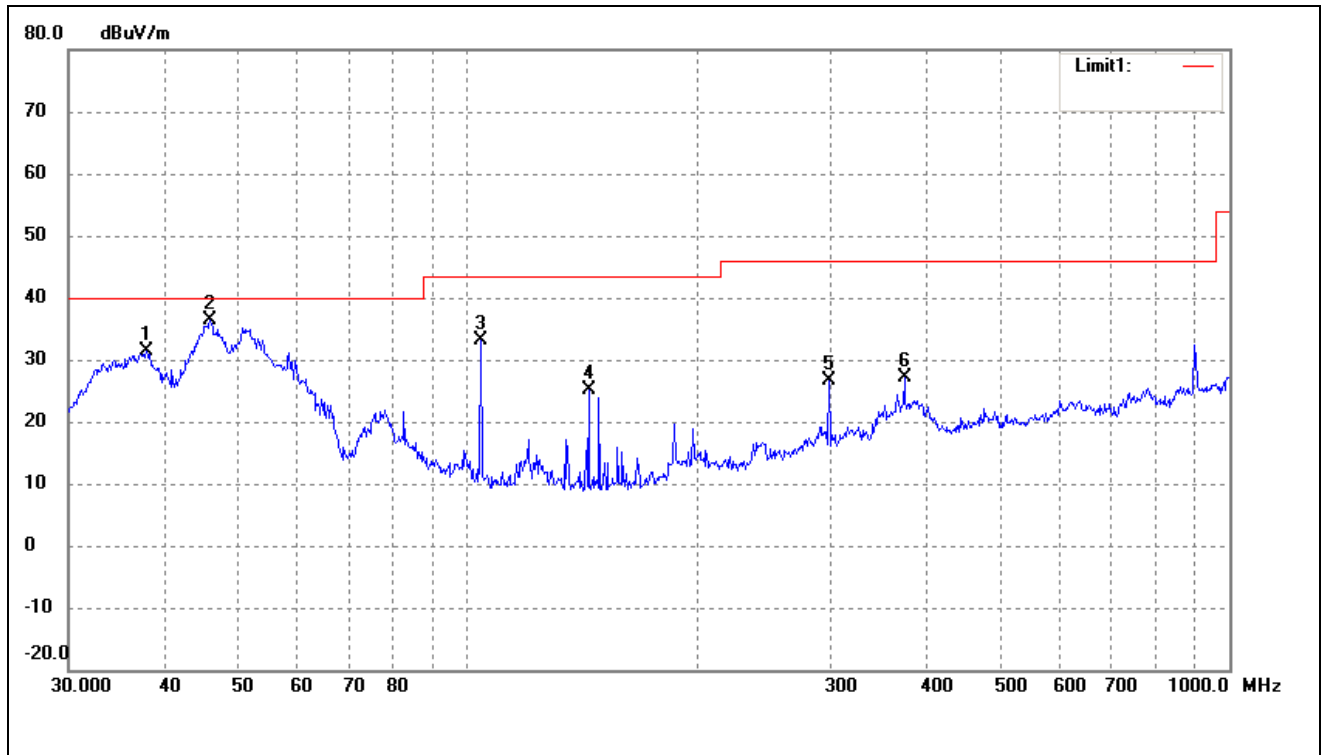
Comment:

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	54.8348	30.00	-8.93	21.07	40.00	-18.93	270	100	peak
2	92.1388	27.65	-12.51	15.14	43.50	-28.36	164	100	peak
3	180.0165	34.76	-11.36	23.40	43.50	-20.10	228	200	peak
4	241.6763	35.07	-8.20	26.87	46.00	-19.13	130	200	peak
5	287.9904	37.23	-5.92	31.31	46.00	-14.69	360	100	peak
6	366.8231	38.22	-2.86	35.36	46.00	-10.64	360	100	peak

Test Specification: Vertical

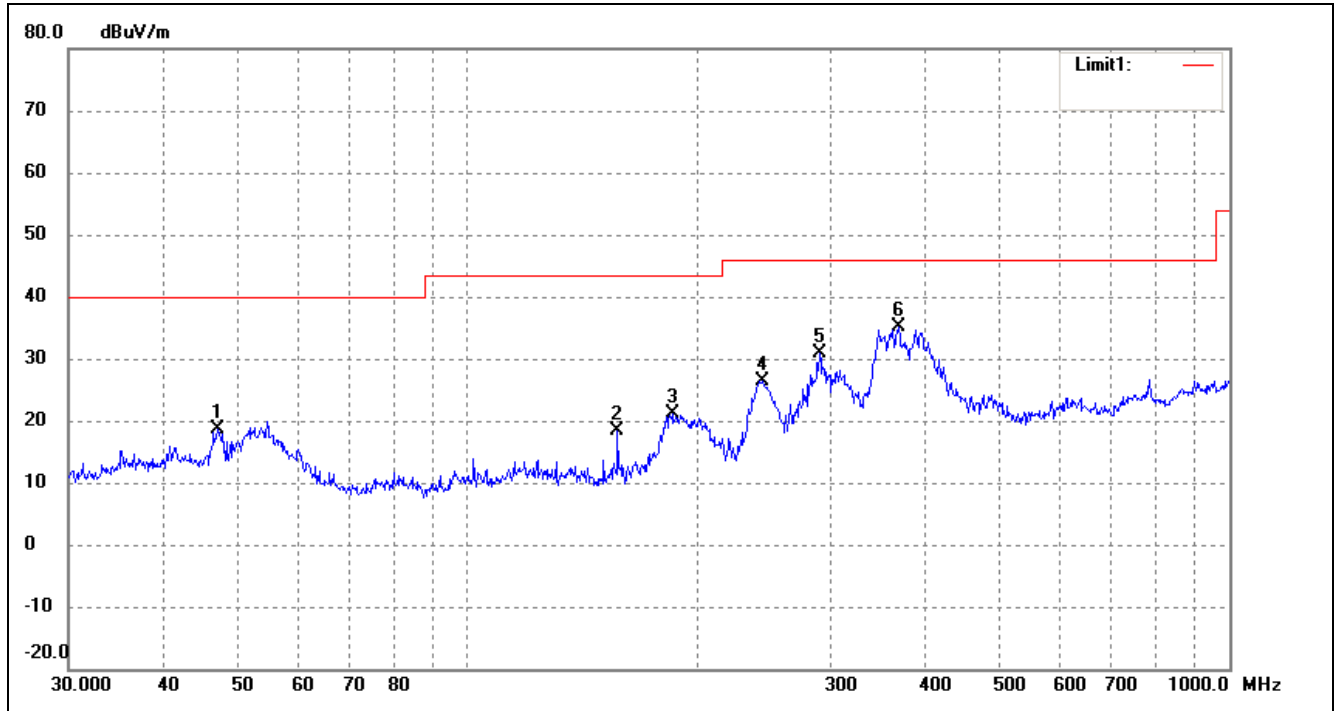


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.9450	39.54	-8.23	31.31	40.00	-8.69	360	100	peak
2	46.0164	44.55	-8.06	36.49	40.00	-3.51	255	100	peak
3	104.1701	44.04	-11.01	33.03	43.50	-10.47	270	100	peak
4	144.3348	37.73	-12.50	25.23	43.50	-18.27	180	100	peak
5	298.2681	32.39	-5.69	26.70	46.00	-19.30	100	100	peak
6	374.6226	29.63	-2.41	27.22	46.00	-18.78	100	100	peak

Operating Condition: 802.11g Transmitting High Channel-2462MHz

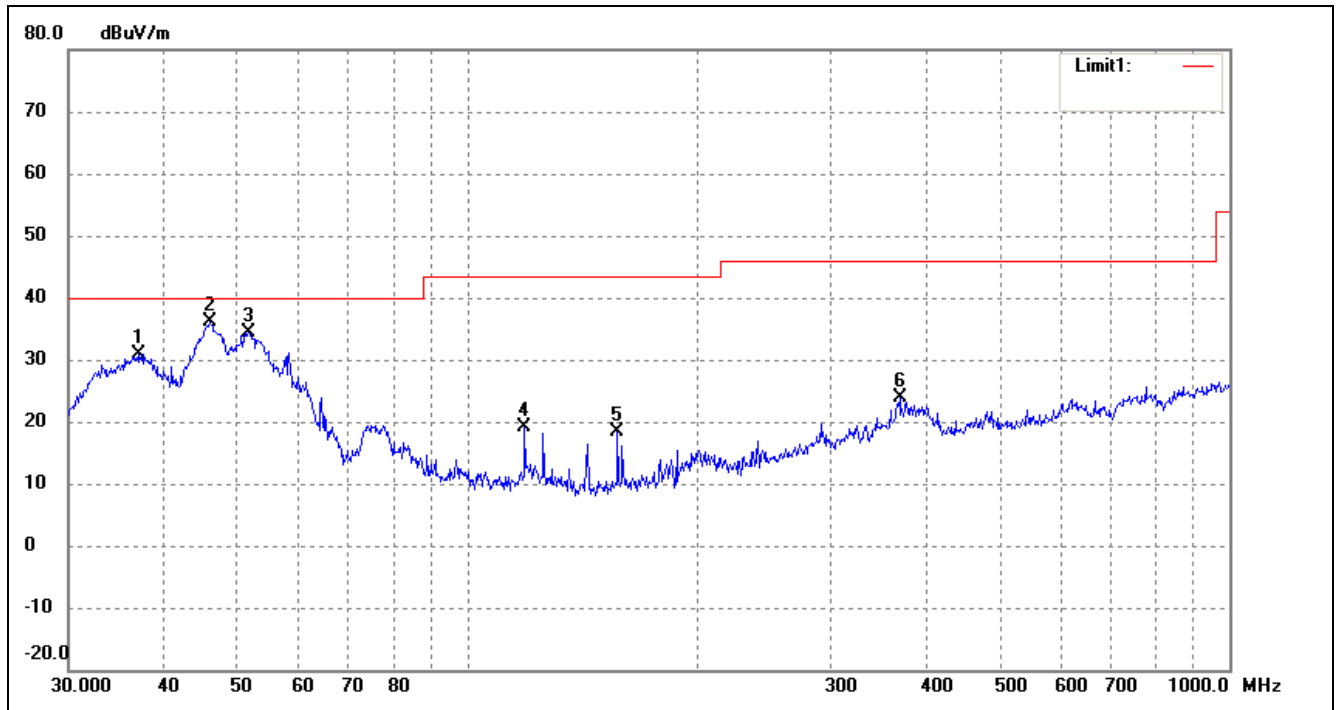
Comment:

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	46.9948	26.85	-8.13	18.72	40.00	-21.28	270	100	peak
2	157.5589	30.64	-12.31	18.33	43.50	-25.17	51	200	peak
3	185.7882	31.68	-10.58	21.10	43.50	-22.40	360	200	peak
4	244.2321	34.48	-8.03	26.45	46.00	-19.55	360	100	peak
5	290.0172	36.70	-5.87	30.83	46.00	-15.17	100	100	peak
6	368.1116	37.96	-2.77	35.19	46.00	-10.81	100	100	peak

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.1550	39.27	-8.45	30.82	40.00	-9.18	360	100	peak
2	46.0164	44.11	-8.06	36.05	40.00	-3.95	180	100	peak
3	51.6616	42.87	-8.53	34.34	40.00	-5.66	225	100	peak
4	119.0180	30.47	-11.40	19.07	43.50	-24.43	67	100	peak
5	157.5589	30.79	-12.31	18.48	43.50	-25.02	100	100	peak
6	369.4047	26.66	-2.71	23.95	46.00	-22.05	100	100	peak

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

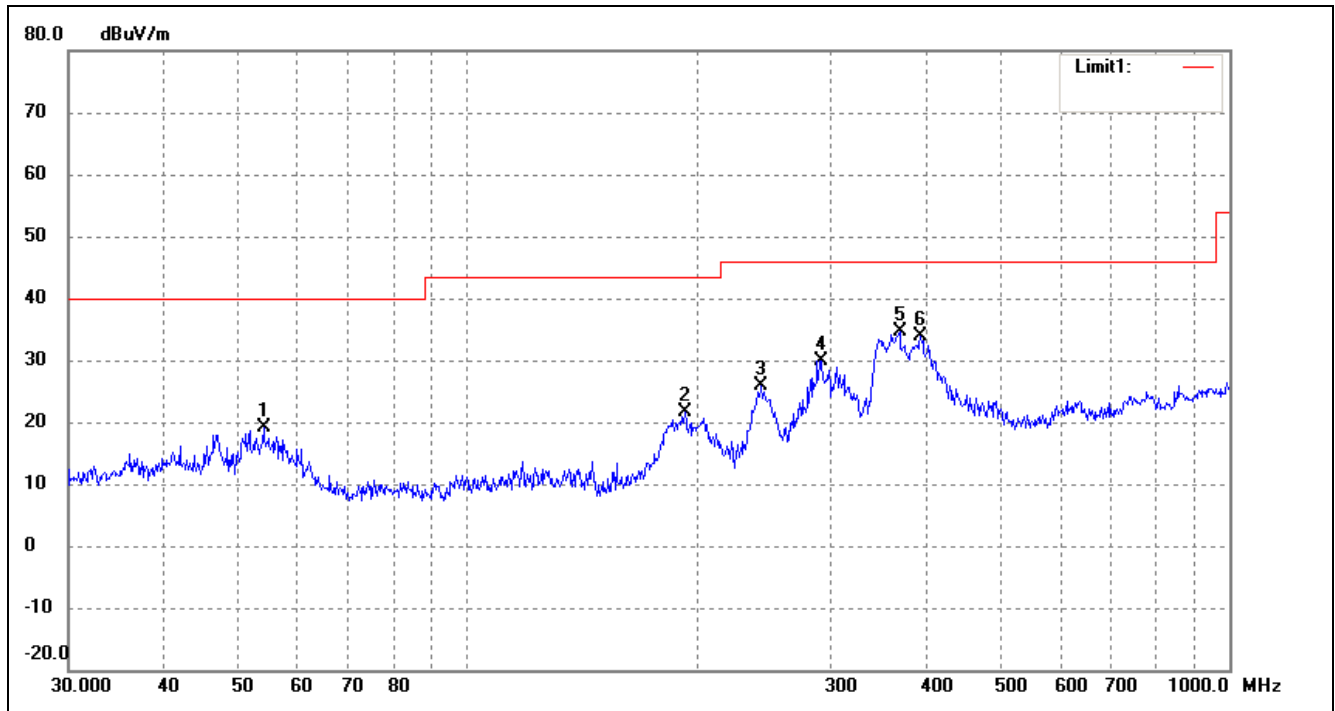
EUT: Mini Projector

Tested Model: TM1

Operating Condition: 802.11n-HT20 Transmitting Low Channel-2412MHz

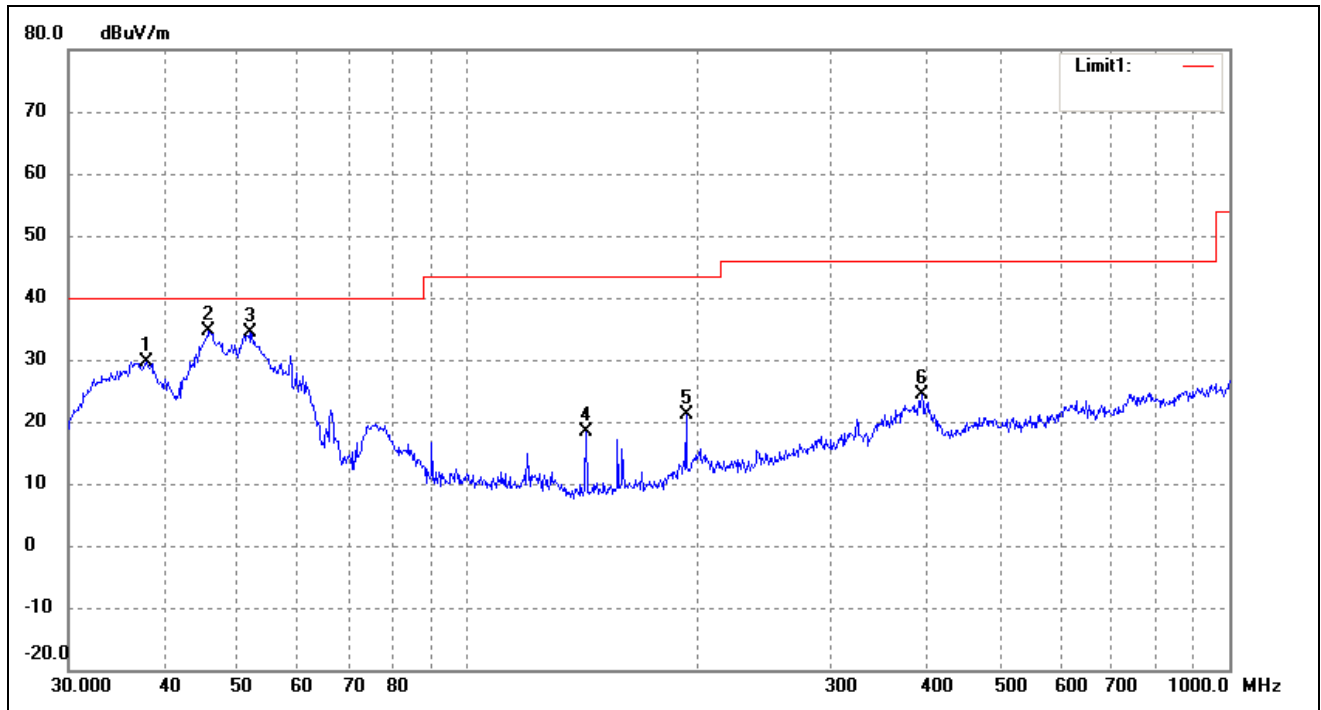
Comment: AC120V/50Hz Adapter 12V

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	54.0711	28.01	-8.83	19.18	40.00	-20.82	260	100	peak
2	193.0945	31.13	-9.59	21.54	43.50	-21.96	131	200	peak
3	243.3772	33.90	-8.10	25.80	46.00	-20.20	285	200	peak
4	291.0360	35.68	-5.85	29.83	46.00	-16.17	224	100	peak
5	369.4047	37.22	-2.71	34.51	46.00	-11.49	100	100	peak
6	393.4724	36.57	-2.80	33.77	46.00	-12.23	100	100	peak

Test Specification: Vertical

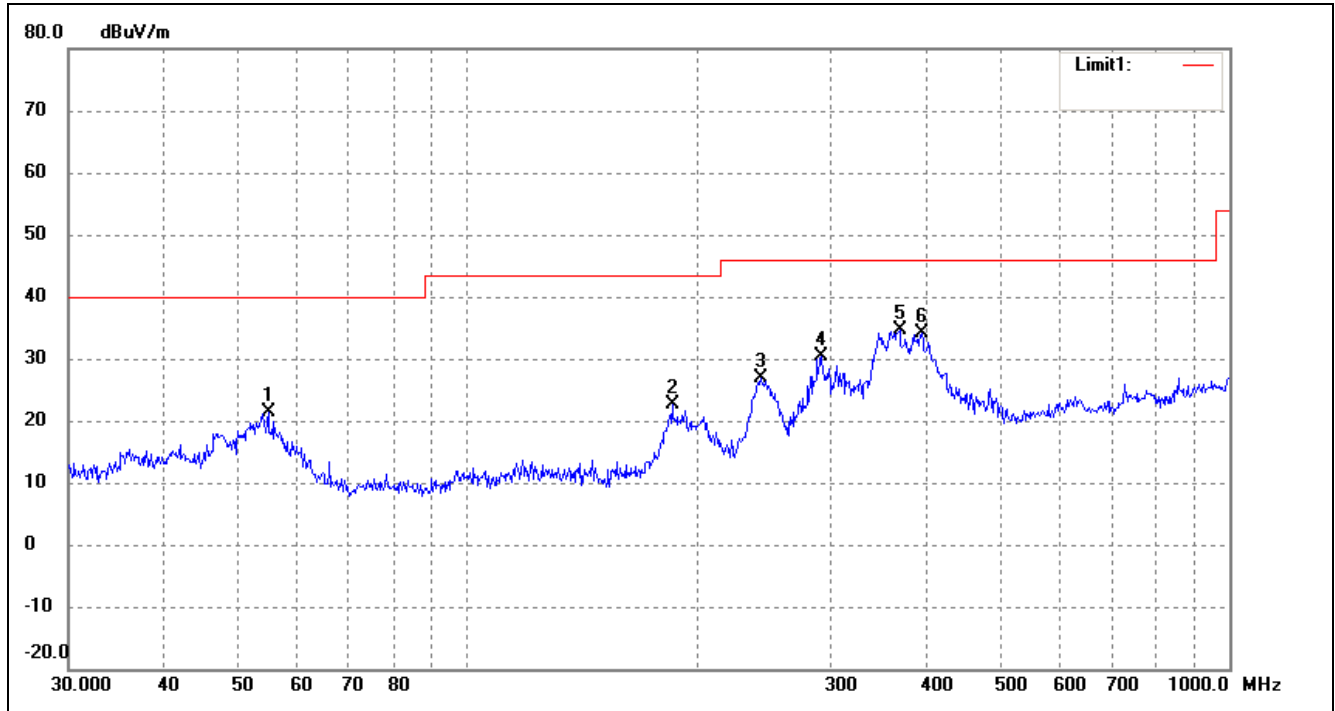


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.9450	37.95	-8.23	29.72	40.00	-10.28	155	100	peak
2	45.8553	42.61	-8.05	34.56	40.00	-5.44	197	100	peak
3	51.8430	42.91	-8.55	34.36	40.00	-5.64	310	100	peak
4	143.3261	30.80	-12.51	18.29	43.50	-25.21	229	100	peak
5	193.7728	30.50	-9.48	21.02	43.50	-22.48	130	100	peak
6	394.8545	27.14	-2.88	24.26	46.00	-21.74	100	100	peak

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

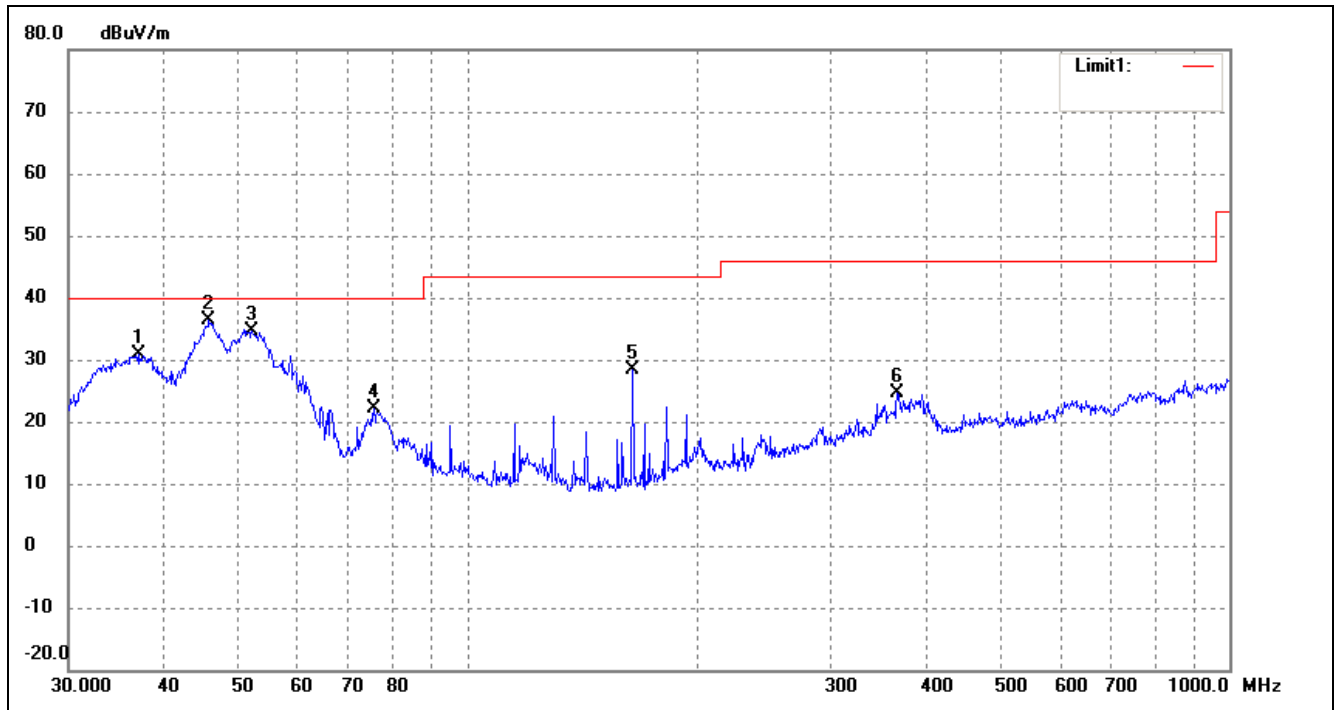
Comment:

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	54.8348	30.41	-8.93	21.48	40.00	-18.52	274	100	peak
2	185.7882	33.27	-10.58	22.69	43.50	-20.81	116	100	peak
3	242.5253	35.01	-8.16	26.85	46.00	-19.15	82	100	peak
4	291.0360	36.29	-5.85	30.44	46.00	-15.56	134	100	peak
5	369.4047	37.22	-2.71	34.51	46.00	-11.49	100	100	peak
6	394.8545	36.93	-2.88	34.05	46.00	-11.95	100	100	peak

Test Specification: Vertical

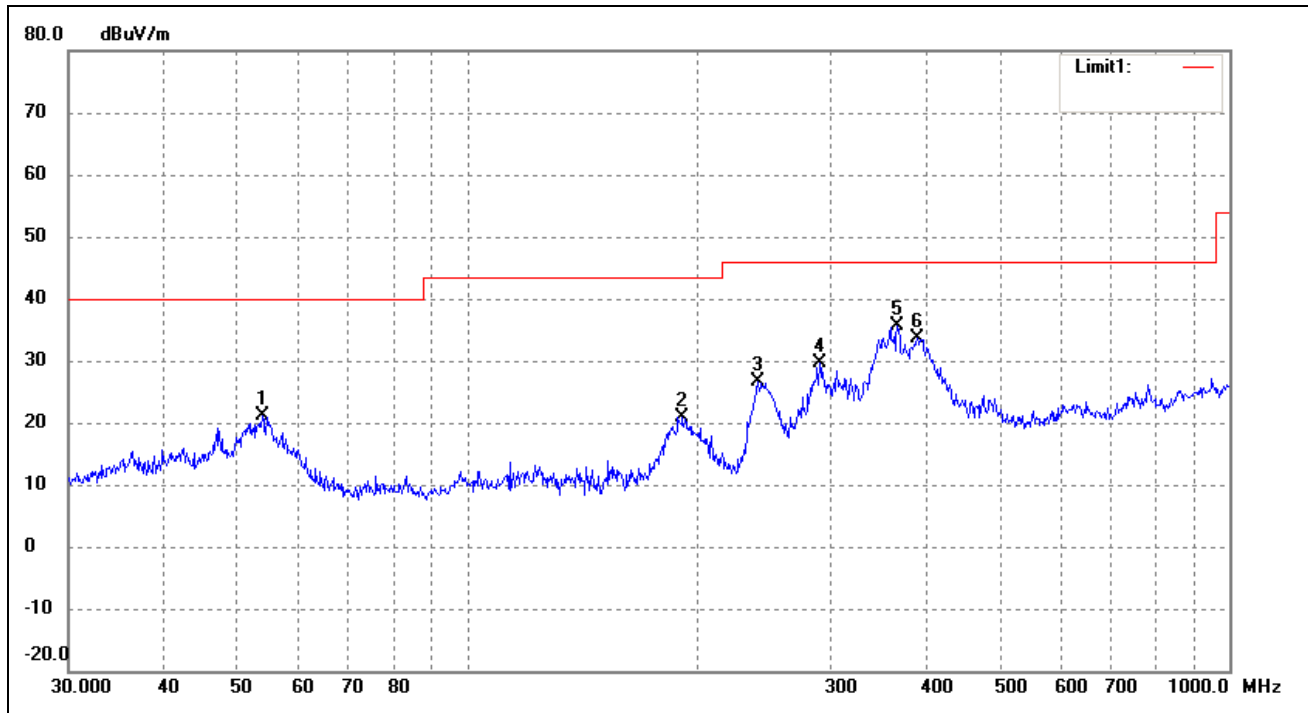


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.0249	39.47	-8.48	30.99	40.00	-9.01	264	100	peak
2	45.8553	44.35	-8.05	36.30	40.00	-3.70	110	100	peak
3	52.2079	43.24	-8.59	34.65	40.00	-5.35	136	100	peak
4	75.4464	34.39	-12.37	22.02	40.00	-17.98	90	100	peak
5	164.9075	40.47	-12.04	28.43	43.50	-15.07	100	100	peak
6	366.8231	27.41	-2.86	24.55	46.00	-21.45	100	100	peak

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

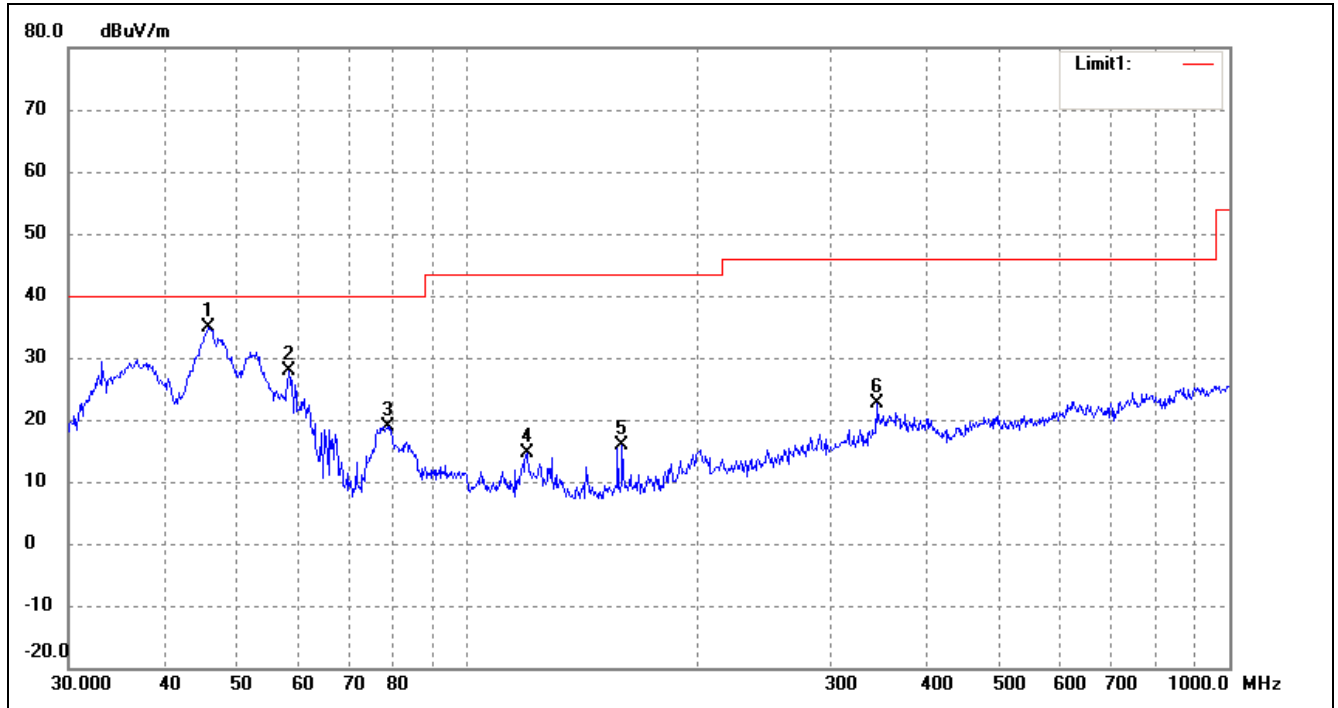
Comment:

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	53.8818	29.87	-8.81	21.06	40.00	-18.94	360	100	peak
2	191.7450	30.59	-9.77	20.82	43.50	-22.68	112	100	peak
3	240.8304	34.81	-8.27	26.54	46.00	-19.46	180	200	peak
4	290.0172	35.58	-5.87	29.71	46.00	-16.29	270	200	peak
5	366.8231	38.44	-2.86	35.58	46.00	-10.42	100	100	peak
6	389.3549	36.26	-2.58	33.68	46.00	-12.32	100	100	peak

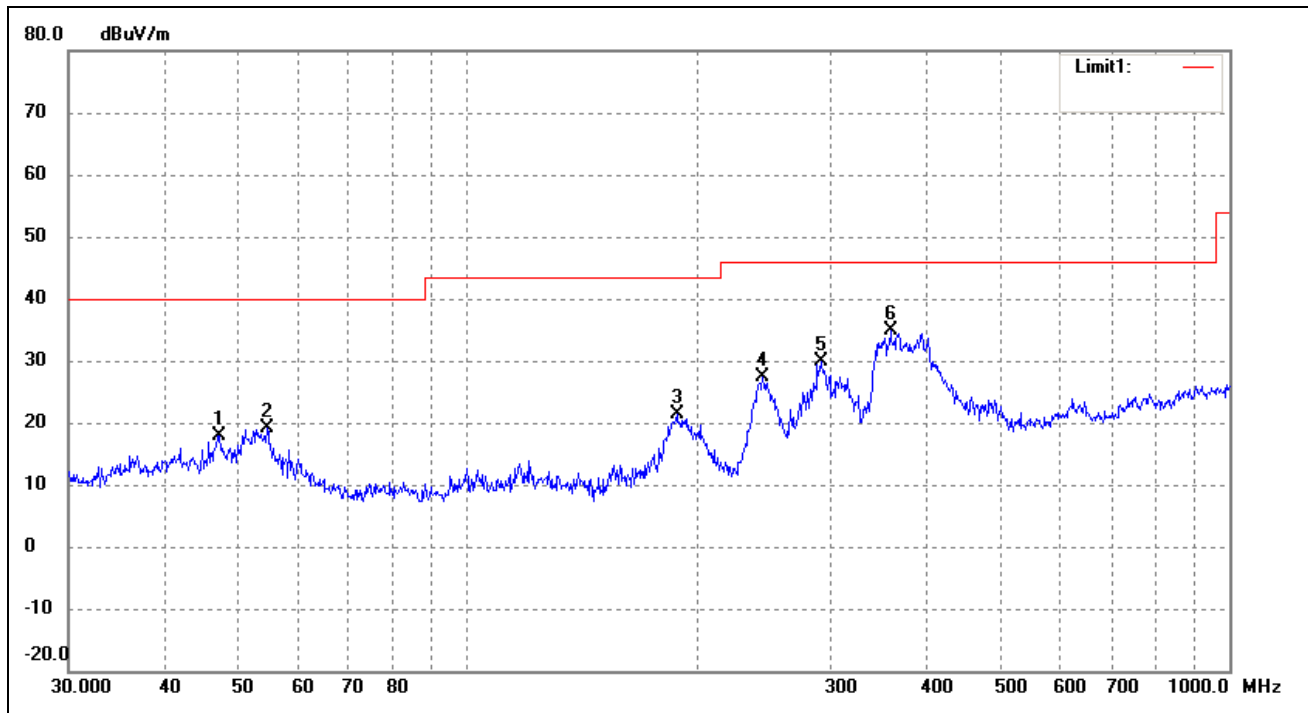
Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	45.8553	42.97	-8.05	34.92	40.00	-5.08	267	100	peak
2	58.4074	37.15	-9.38	27.77	40.00	-12.23	116	100	peak
3	78.6888	31.06	-12.10	18.96	40.00	-21.04	360	100	peak
4	119.8556	26.06	-11.42	14.64	43.50	-28.86	228	100	peak
5	159.7844	28.21	-12.27	15.94	43.50	-27.56	270	100	peak
6	344.3855	27.16	-4.61	22.55	46.00	-23.45	100	100	peak

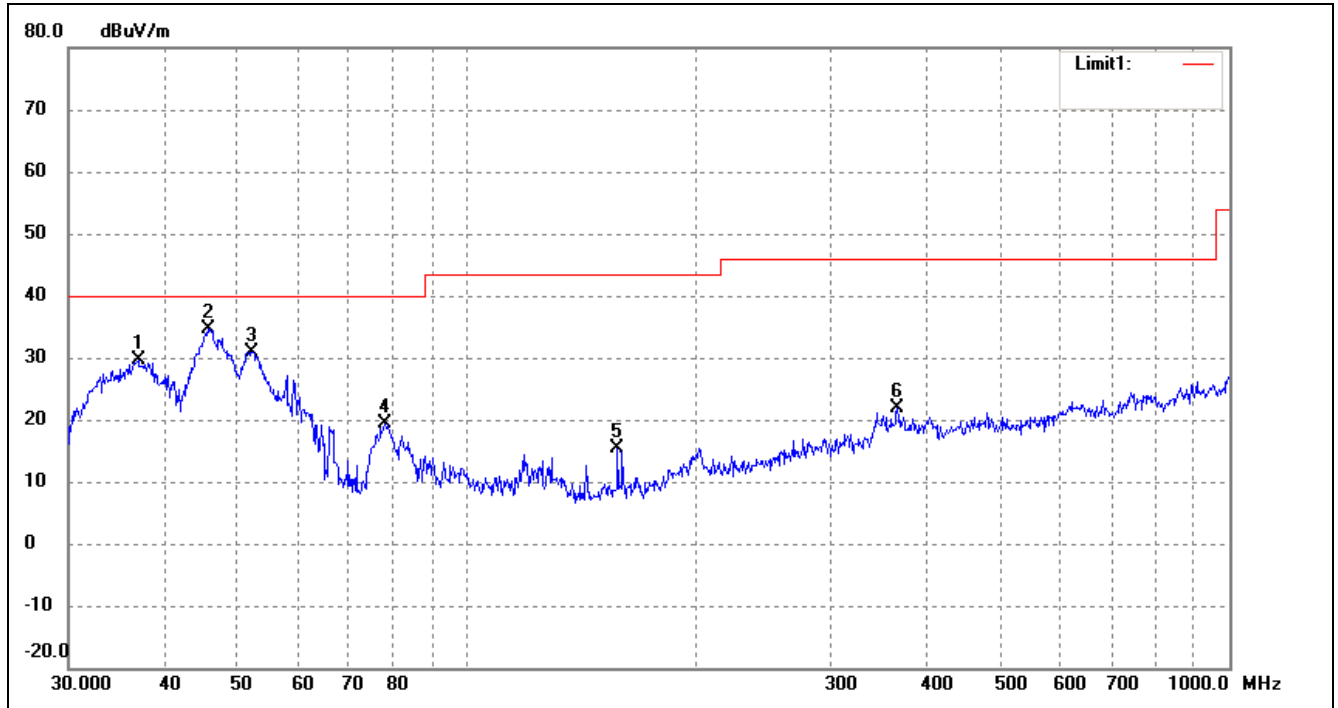
EUT: Mini Projector
 Tested Model: TM1
 Operating Condition: 802.11n-HT40 Transmitting Low Channel-2422MHz
 Comment:

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	47.3255	26.02	-8.15	17.87	40.00	-22.13	267	100	peak
2	54.6429	28.09	-8.91	19.18	40.00	-20.82	114	200	peak
3	188.4125	31.64	-10.22	21.42	43.50	-22.08	35	200	peak
4	244.2321	35.35	-8.03	27.32	46.00	-18.68	81	100	peak
5	291.0360	35.70	-5.85	29.85	46.00	-16.15	100	100	peak
6	359.1860	38.15	-3.32	34.83	46.00	-11.17	100	100	peak

Test Specification: Vertical

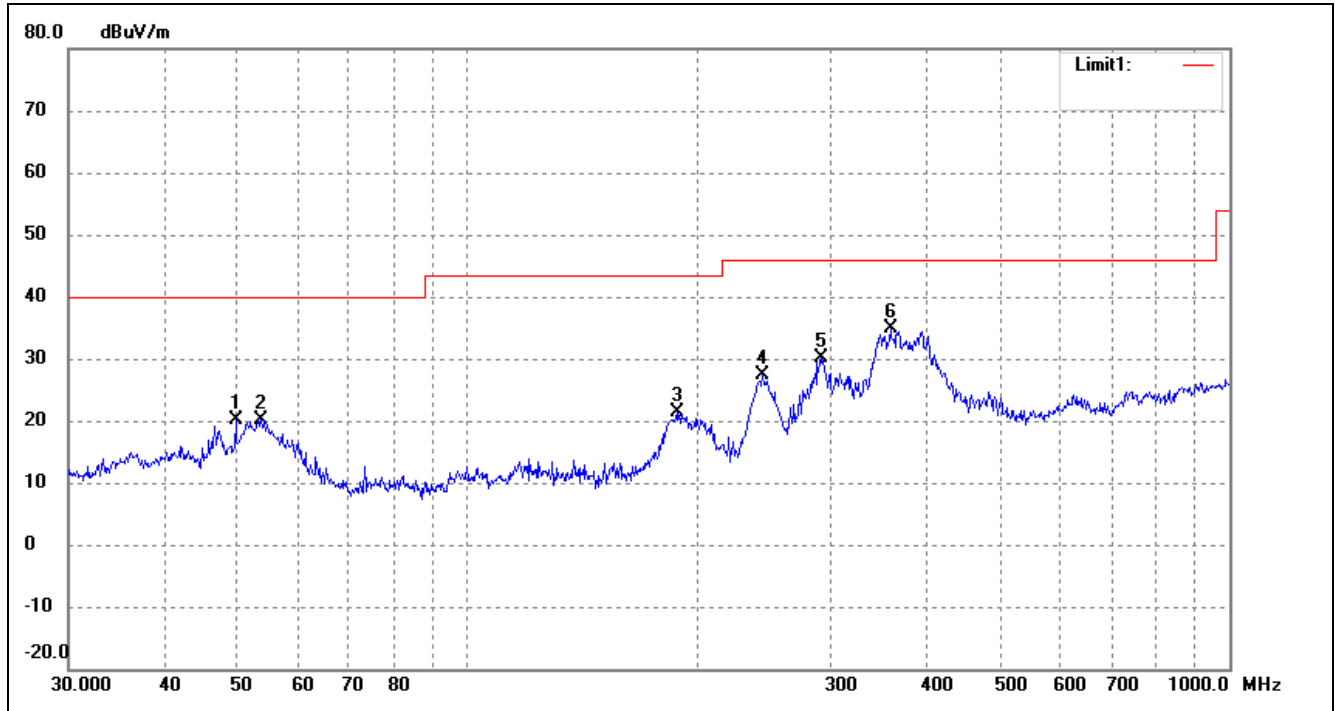


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.0249	38.03	-8.48	29.55	40.00	-10.45	360	100	peak
2	45.6948	42.57	-8.04	34.53	40.00	-5.47	258	100	peak
3	52.2079	39.52	-8.59	30.93	40.00	-9.07	347	100	peak
4	77.8654	31.63	-12.17	19.46	40.00	-20.54	270	100	peak
5	157.5589	27.63	-12.31	15.32	43.50	-28.18	90	100	peak
6	366.8231	24.76	-2.86	21.90	46.00	-24.10	100	100	peak

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

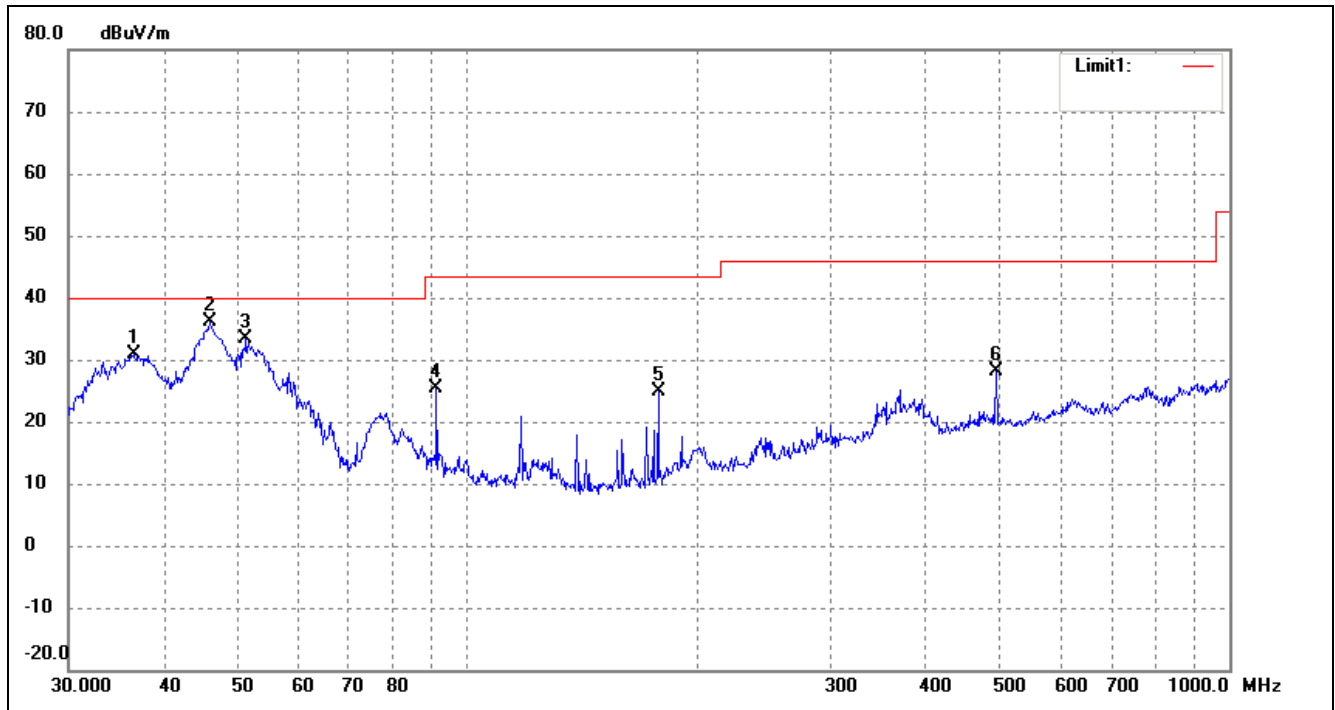
Comment:

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	49.7068	28.54	-8.30	20.24	40.00	-19.76	251	100	peak
2	53.6932	29.00	-8.78	20.22	40.00	-19.78	167	100	peak
3	188.4125	31.64	-10.22	21.42	43.50	-22.08	44	100	peak
4	244.2321	35.35	-8.03	27.32	46.00	-18.68	130	100	peak
5	291.0360	35.95	-5.85	30.10	46.00	-15.90	100	100	peak
6	359.1860	38.15	-3.32	34.83	46.00	-11.17	100	100	peak

Test Specification: Vertical

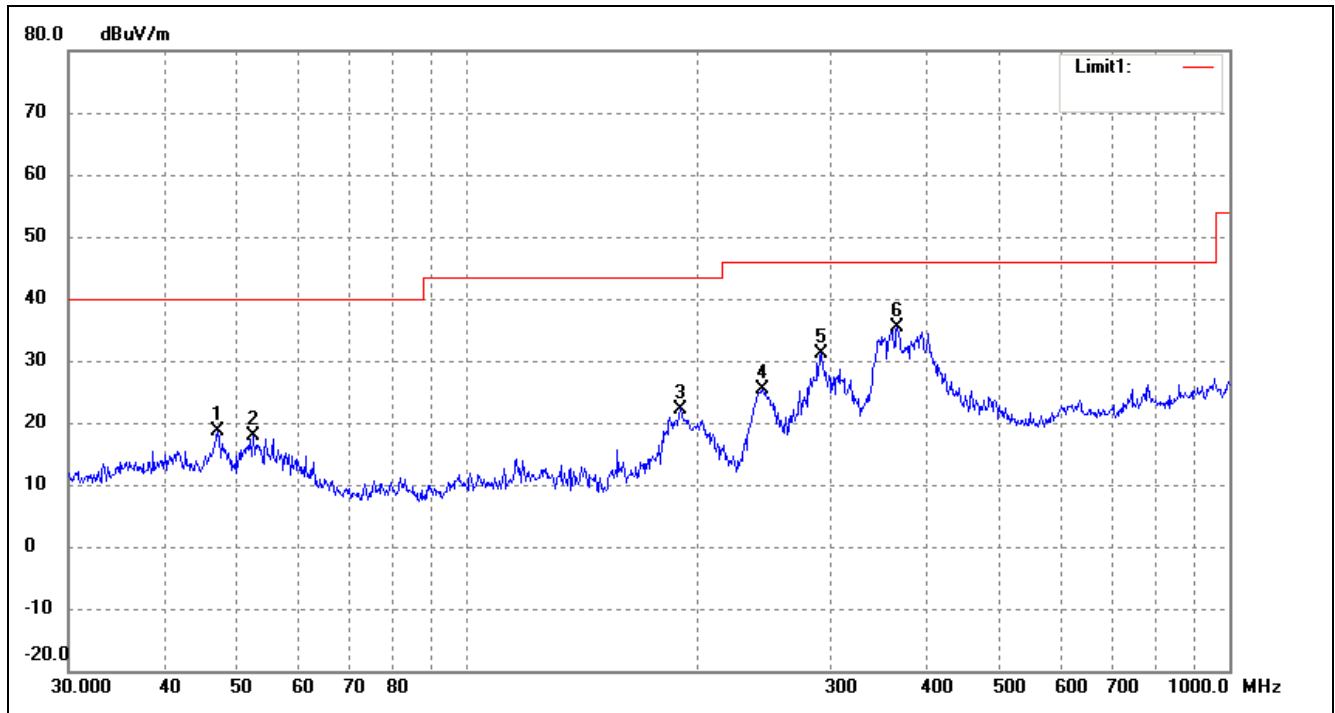


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	36.5092	39.49	-8.63	30.86	40.00	-9.14	47	100	peak
2	46.0164	44.16	-8.06	36.10	40.00	-3.90	264	100	peak
3	51.3005	41.76	-8.49	33.27	40.00	-6.73	225	100	peak
4	91.1746	38.10	-12.70	25.40	43.50	-18.10	180	100	peak
5	178.1327	36.28	-11.45	24.83	43.50	-18.67	315	100	peak
6	494.1984	29.88	-1.86	28.02	46.00	-17.98	100	100	peak

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

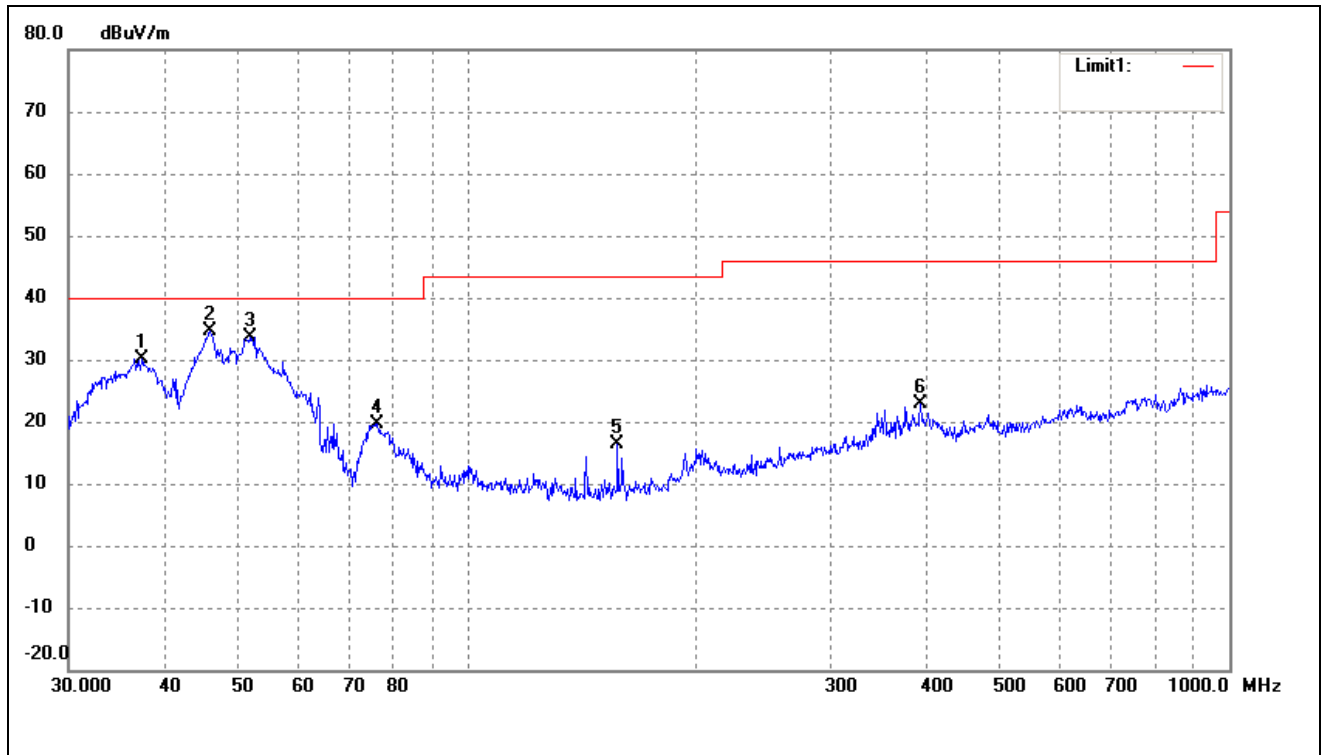
Comment:

Test Specification: Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	46.9948	26.81	-8.13	18.68	40.00	-21.32	360	100	peak
2	52.3913	26.45	-8.63	17.82	40.00	-22.18	287	100	peak
3	190.4050	32.21	-9.96	22.25	43.50	-21.25	168	100	peak
4	244.2321	33.35	-8.03	25.32	46.00	-20.68	122	100	peak
5	291.0360	36.92	-5.85	31.07	46.00	-14.93	100	100	peak
6	366.8231	38.18	-2.86	35.32	46.00	-10.68	100	100	peak

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	37.4165	38.55	-8.37	30.18	40.00	-9.82	78	100	peak
2	46.0164	42.62	-8.06	34.56	40.00	-5.44	136	100	peak
3	51.8430	42.27	-8.55	33.72	40.00	-6.28	284	100	peak
4	76.2442	32.00	-12.31	19.69	40.00	-20.31	60	100	peak
5	157.5589	28.62	-12.31	16.31	43.50	-27.19	330	100	peak
6	393.4724	25.59	-2.80	22.79	46.00	-23.21	100	100	peak

Spurious Emissions Above 1GHz

Test Mode: 802.11b

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	54.09	-3.87	50.22	74.00	-23.78	H	PK
4824.000	38.84	-3.87	34.97	54.00	-19.03	H	AV
7236.000	46.30	1.14	47.44	74.00	-26.56	H	PK
7236.000	34.98	1.19	36.17	54.00	-17.83	H	AV
4824.000	57.31	-3.86	53.45	74.00	-20.55	V	PK
4824.000	40.50	-3.86	36.64	54.00	-17.36	V	AV
7236.000	49.11	1.10	50.21	74.00	-23.79	V	PK
7236.000	37.44	1.10	38.54	54.00	-15.46	V	AV
Middle Channel-2437MHz							
4874.000	54.74	-3.74	51.00	74.00	-23.00	H	PK
4874.000	39.99	-3.74	36.25	54.00	-17.75	H	AV
7311.000	47.77	1.47	49.24	74.00	-24.76	H	PK
7311.000	33.10	1.47	34.57	54.00	-19.43	H	AV
4874.000	53.97	-3.74	50.23	74.00	-23.77	V	PK
4874.000	40.89	-3.74	37.15	54.00	-16.85	V	AV
7311.000	47.98	1.47	49.45	74.00	-24.55	V	PK
7311.000	34.08	1.47	35.55	54.00	-18.45	V	AV
High Channel-2462MHz							
4924.000	55.82	-3.59	52.23	74.00	-21.77	H	PK
4924.000	41.76	-3.59	38.17	54.00	-15.83	H	AV
7386.000	46.38	1.79	48.17	74.00	-25.83	H	PK
7386.000	34.83	1.79	36.62	54.00	-17.38	H	AV
4924.000	54.94	-3.59	51.35	74.00	-22.65	V	PK
4924.000	42.04	-3.59	38.45	54.00	-15.55	V	AV
7386.000	47.99	1.79	49.78	74.00	-24.22	V	PK
7386.000	35.18	1.79	36.97	54.00	-17.03	V	AV

Test Mode: 802.11g

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	55.50	-3.86	51.64	74.00	-22.36	H	PK
4824.000	42.23	-3.86	38.37	54.00	-15.63	H	AV
7236.000	48.42	1.10	49.52	74.00	-24.48	H	PK
7236.000	34.40	1.10	35.50	54.00	-18.50	H	AV
4824.000	55.99	-3.86	52.13	74.00	-21.87	V	PK
4824.000	42.65	-3.86	38.79	54.00	-15.21	V	AV
7236.000	49.22	1.10	50.32	74.00	-23.68	V	PK
7236.000	35.54	1.10	36.64	54.00	-17.36	V	AV
Middle Channel-2437MHz							
4874.000	55.10	-3.74	51.36	74.00	-22.64	H	PK
4874.000	43.28	-3.74	39.54	54.00	-14.46	H	AV
7311.000	47.38	1.47	48.85	74.00	-25.15	H	PK
7311.000	35.27	1.47	36.74	54.00	-17.26	H	AV
4874.000	57.07	-3.74	53.33	74.00	-20.67	V	PK
4874.000	43.86	-3.74	40.12	54.00	-13.88	V	AV
7311.000	48.40	1.47	49.87	74.00	-24.13	V	PK
7311.000	35.33	1.47	36.80	54.00	-17.20	V	AV
High Channel-2462MHz							
4924.000	54.00	-3.59	50.41	74.00	-23.59	H	PK
4924.000	40.75	-3.59	37.16	54.00	-16.84	H	AV
7386.000	47.18	1.79	48.97	74.00	-25.03	H	PK
7386.000	34.73	1.79	36.52	54.00	-17.48	H	AV
4924.000	56.11	-3.59	52.52	74.00	-21.48	V	PK
4924.000	42.69	-3.59	39.10	54.00	-14.90	V	AV
7386.000	48.58	1.79	50.37	74.00	-23.63	V	PK
7386.000	35.95	1.79	37.74	54.00	-16.26	V	AV

Test Mode: 802.11n-HT20

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	55.60	-3.86	51.74	74.00	-22.26	H	PK
4824.000	40.54	-3.86	36.68	54.00	-17.32	H	AV
7236.000	47.26	1.10	48.36	74.00	-25.64	H	PK
7236.000	34.44	1.10	35.54	54.00	-18.46	H	AV
4824.000	56.71	-3.86	52.85	74.00	-21.15	V	PK
4824.000	43.18	-3.86	39.32	54.00	-14.68	V	AV
7236.000	49.21	1.10	50.31	74.00	-23.69	V	PK
7236.000	35.77	1.10	36.87	54.00	-17.13	V	AV
Middle Channel-2437MHz							
4874.000	54.16	-3.74	50.42	74.00	-23.58	H	PK
4874.000	42.48	-3.74	38.74	54.00	-15.26	H	AV
7311.000	48.74	1.47	50.21	74.00	-23.79	H	PK
7311.000	33.10	1.47	34.57	54.00	-19.43	H	AV
4874.000	54.92	-3.74	51.18	74.00	-22.82	V	PK
4874.000	42.62	-3.74	38.88	54.00	-15.12	V	AV
7311.000	48.49	1.47	49.96	74.00	-24.04	V	PK
7311.000	35.20	1.47	36.67	54.00	-17.33	V	AV
High Channel-2462MHz							
4924.000	53.90	-3.59	50.31	74.00	-23.69	H	PK
4924.000	43.23	-3.59	39.64	54.00	-14.36	H	AV
7386.000	48.31	1.79	50.10	74.00	-23.90	H	PK
7386.000	36.10	1.79	37.89	54.00	-16.11	H	AV
4924.000	55.70	-3.59	52.11	74.00	-21.89	V	PK
4924.000	41.48	-3.59	37.89	54.00	-16.11	V	AV
7386.000	48.55	1.79	50.34	74.00	-23.66	V	PK
7386.000	35.36	1.79	37.15	54.00	-16.85	V	AV

Test Mode: 802.11n-HT40

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2422MHz							
4844.000	53.25	-3.90	49.35	74.00	-24.65	H	PK
4824.000	38.25	-3.90	34.35	54.00	-19.65	H	AV
7266.000	46.48	1.06	47.54	74.00	-26.46	H	PK
7266.000	32.56	1.06	33.62	54.00	-20.38	H	AV
4844.000	54.22	-3.90	50.32	74.00	-23.68	V	PK
4824.000	39.42	-3.90	35.52	54.00	-18.48	V	AV
7266.000	48.81	1.06	49.87	74.00	-24.13	V	PK
7266.000	34.78	1.06	35.84	54.00	-18.16	V	AV
Middle Channel-2437MHz							
4874.000	52.53	-3.74	48.79	74.00	-25.21	H	PK
4874.000	37.88	-3.74	34.14	54.00	-19.86	H	AV
7311.000	44.88	1.47	46.35	74.00	-27.65	H	PK
7311.000	32.03	1.47	33.50	54.00	-20.50	H	AV
4874.000	53.74	-3.74	50.00	74.00	-24.00	V	PK
4874.000	39.95	-3.74	36.21	54.00	-17.79	V	AV
7311.000	45.78	1.47	47.25	74.00	-26.75	V	PK
7311.000	34.00	1.47	35.47	54.00	-18.53	V	AV
High Channel-2452MHz							
4904.000	52.65	-3.63	49.02	74.00	-24.98	H	PK
4904.000	39.37	-3.63	35.74	54.00	-18.26	H	AV
7356.000	45.63	1.62	47.25	74.00	-26.75	H	PK
7356.000	30.73	1.62	32.35	54.00	-21.65	H	AV
4904.000	54.84	-3.63	51.21	74.00	-22.79	V	PK
4904.000	40.83	-3.63	37.20	54.00	-16.80	V	AV
7356.000	48.18	1.62	49.80	74.00	-24.20	V	PK
7356.000	35.12	1.62	36.74	54.00	-17.26	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 3th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

The measurements greater than 20dB below the limit from 9kHz to 30MHz.

9. Out of Band Emissions

9.1 Standard Applicable

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

9.2 Test Procedure

According to the KDB 558074D01 v03r04, the band-edge radiated test method as follows:

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

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

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

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

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

According to the KDB 558074 D01 v03r04, the conducted spurious emissions test method as follows:

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

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

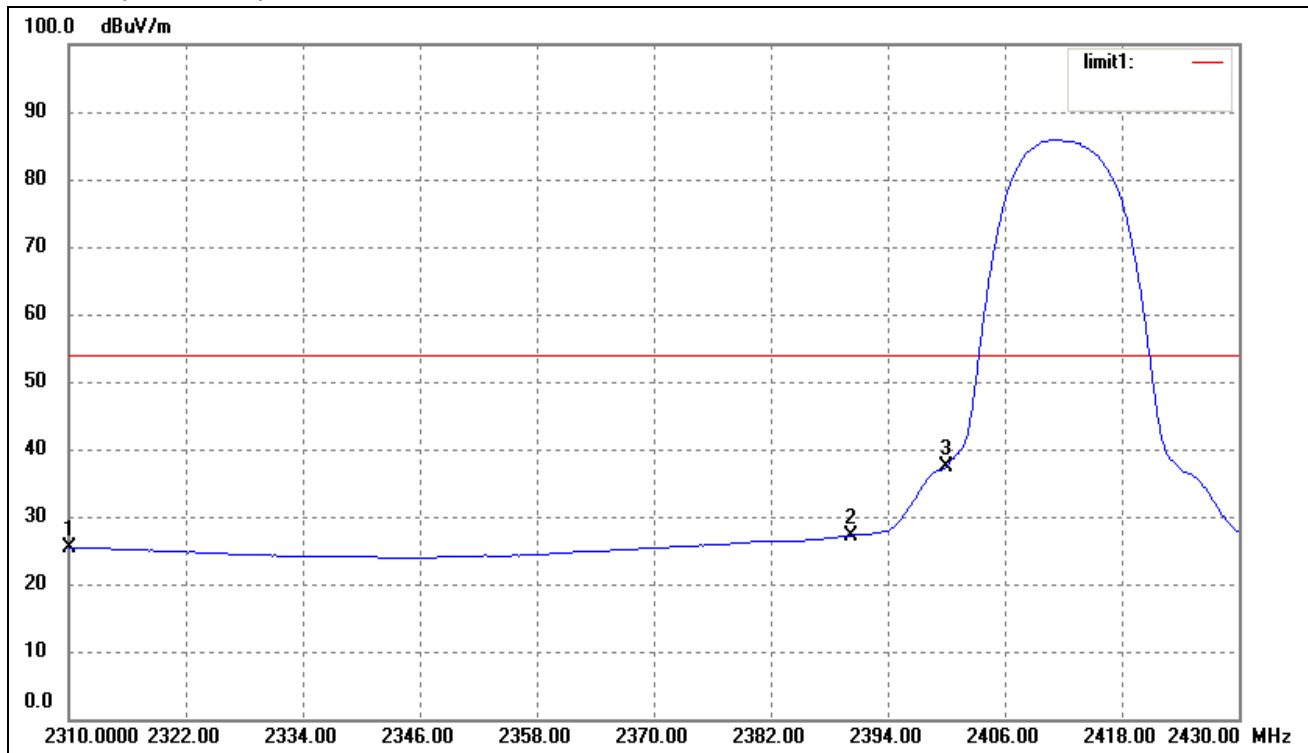
9.3 Environmental Conditions

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

9.4 Summary of Test Results/Plots

802.11b-Lowest Bandedge

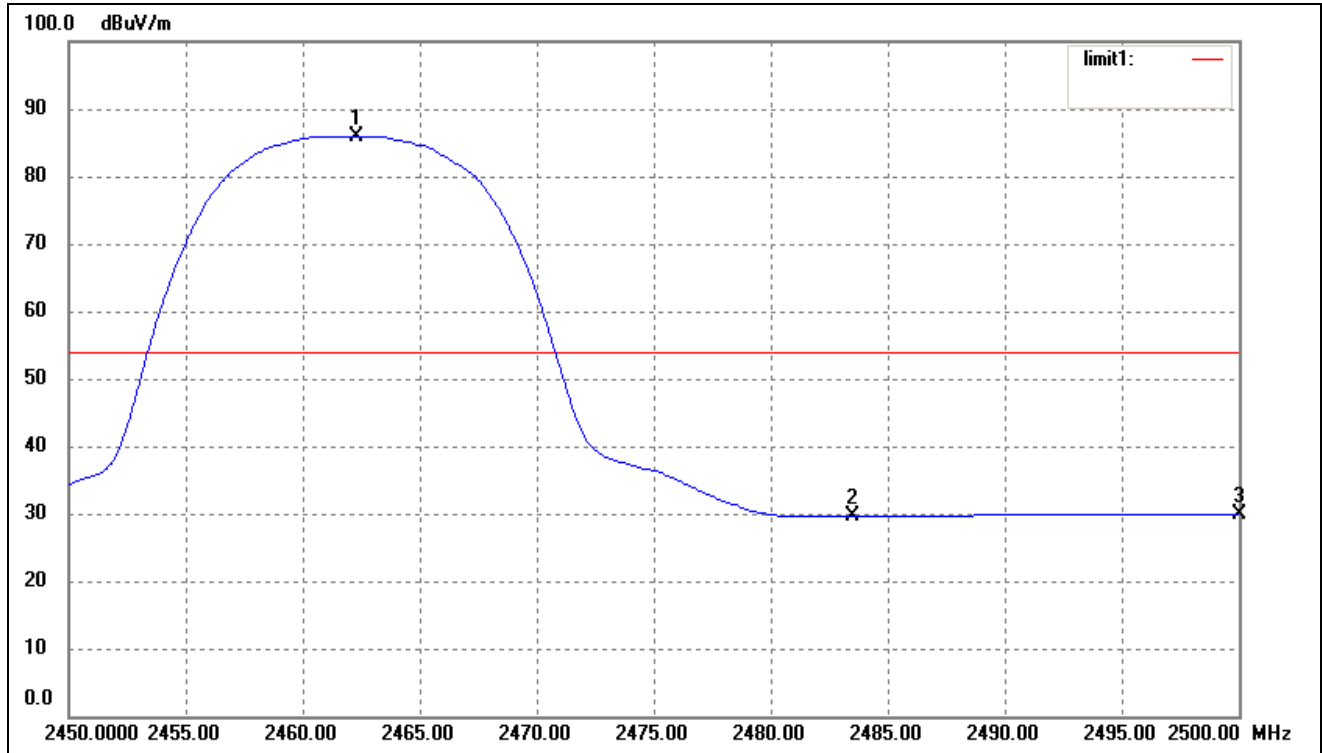
Vertical (Worst case)



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

802.11b-Highest Bandedge

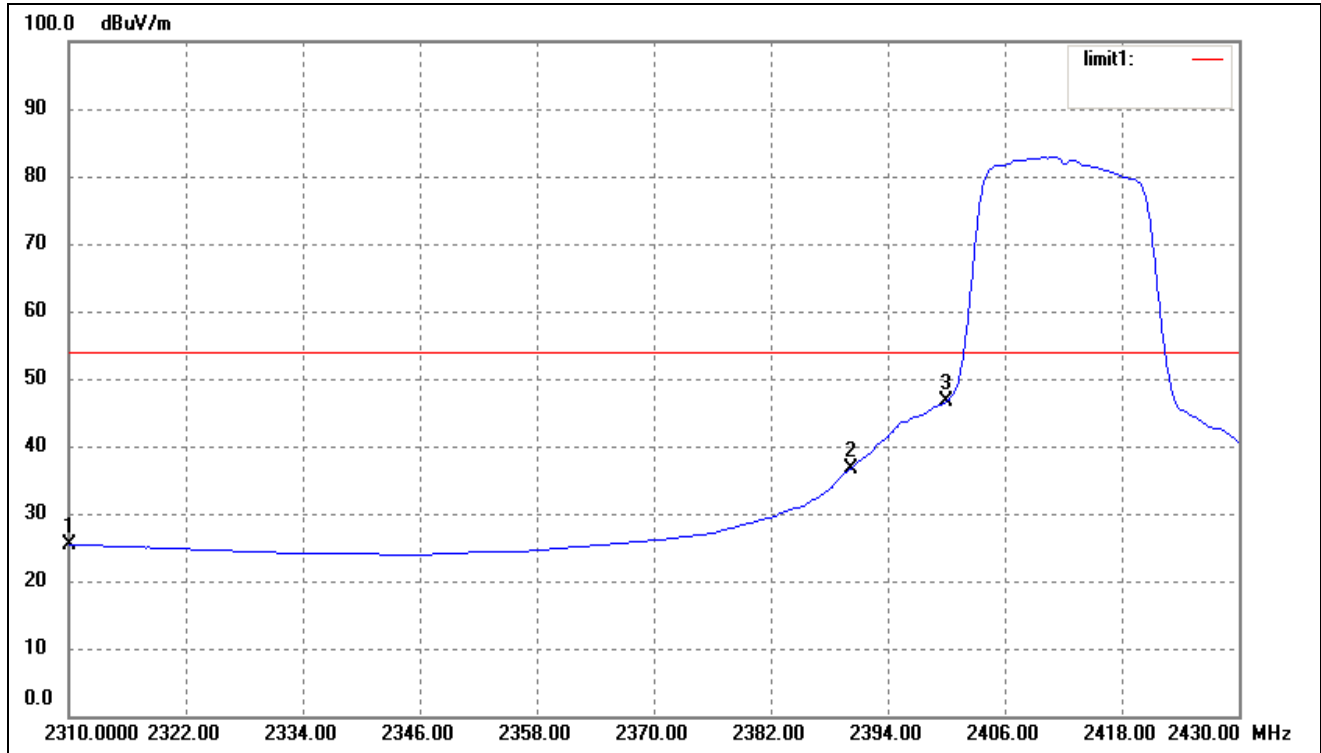
Vertical (Worst case)



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

802.11g-Lowest Bandedge

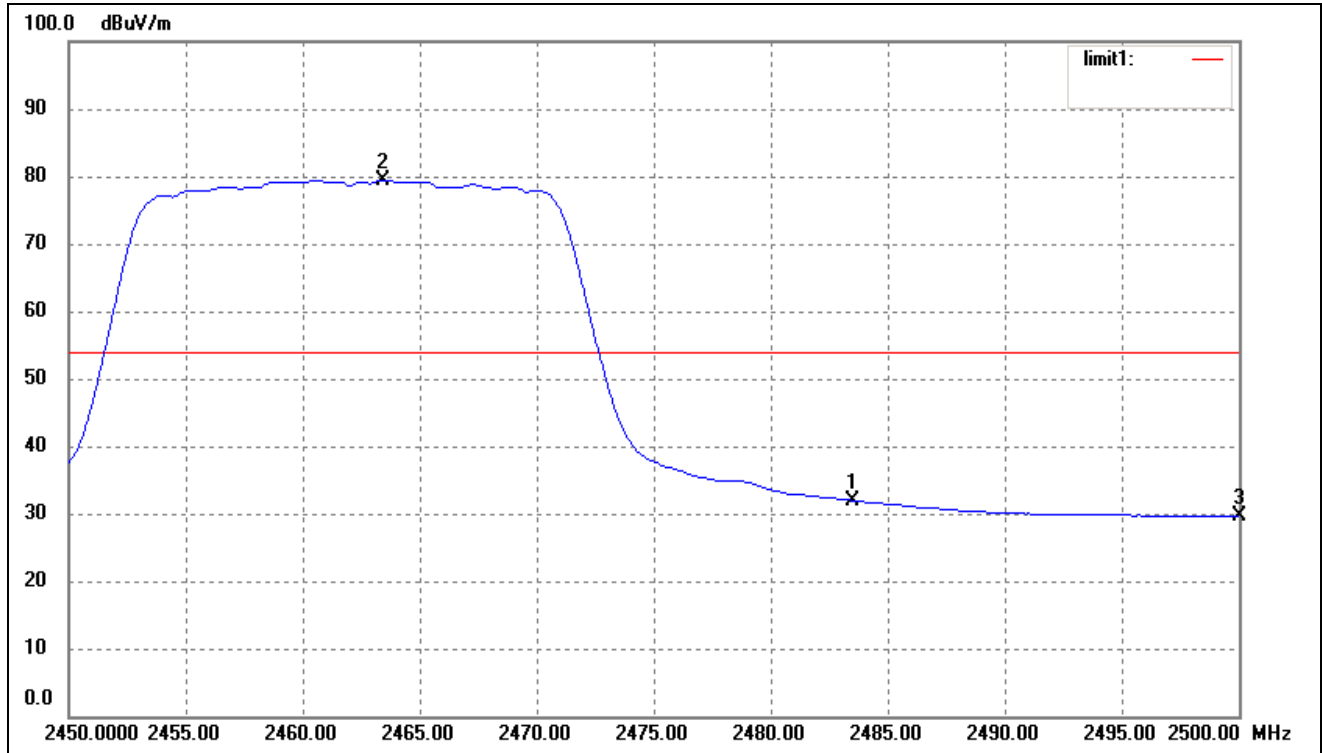
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	29.15	-3.71	25.44	54.00	-28.56	Average Detector
	2310.000	41.87	-3.71	38.16	74.00	-35.84	Peak Detector
2	2390.000	40.17	-3.54	36.63	54.00	-17.37	Average Detector
	2390.000	60.80	-3.54	57.26	74.00	-16.74	Peak Detector
3	2400.000	50.13	-3.51	46.62	54.00	-7.38	Average Detector
	2400.000	70.72	-3.51	67.21	74.00	-6.79	Peak Detector

802.11g-Highest Bandedge

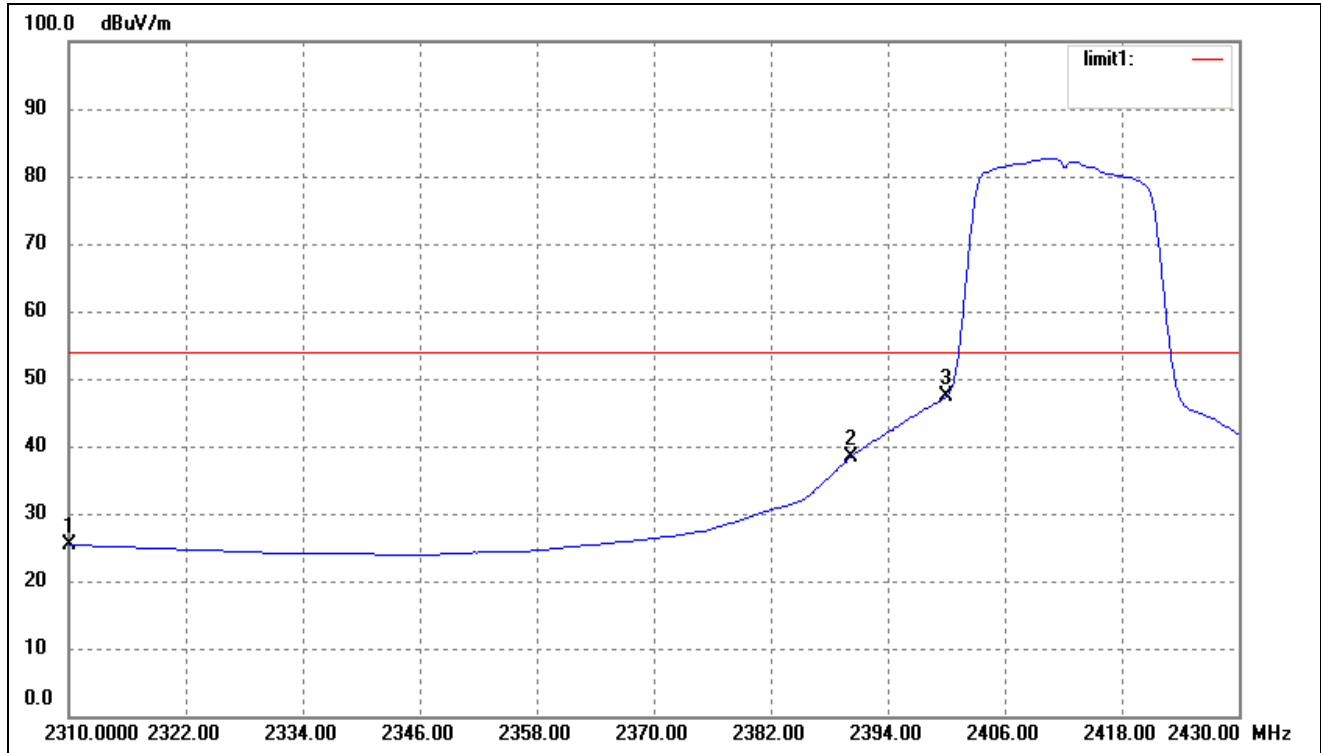
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2	2463.400	82.80	-3.36	79.44	/	/	Average Detector
	2463.400	93.60	-3.36	90.24	/	/	Peak Detector
1	2483.500	Delta = 50.07dBc		29.37	54.00	-24.63	Average Detector
	2483.500			45.14	74.00	-33.83	Peak Detector
3	2500.000	32.93	-3.28	29.65	54.00	-24.35	Average Detector
	2500.000	43.83	-3.28	40.55	74.00	-33.45	Peak Detector

802.11n-HT20-Lowest Bandedge

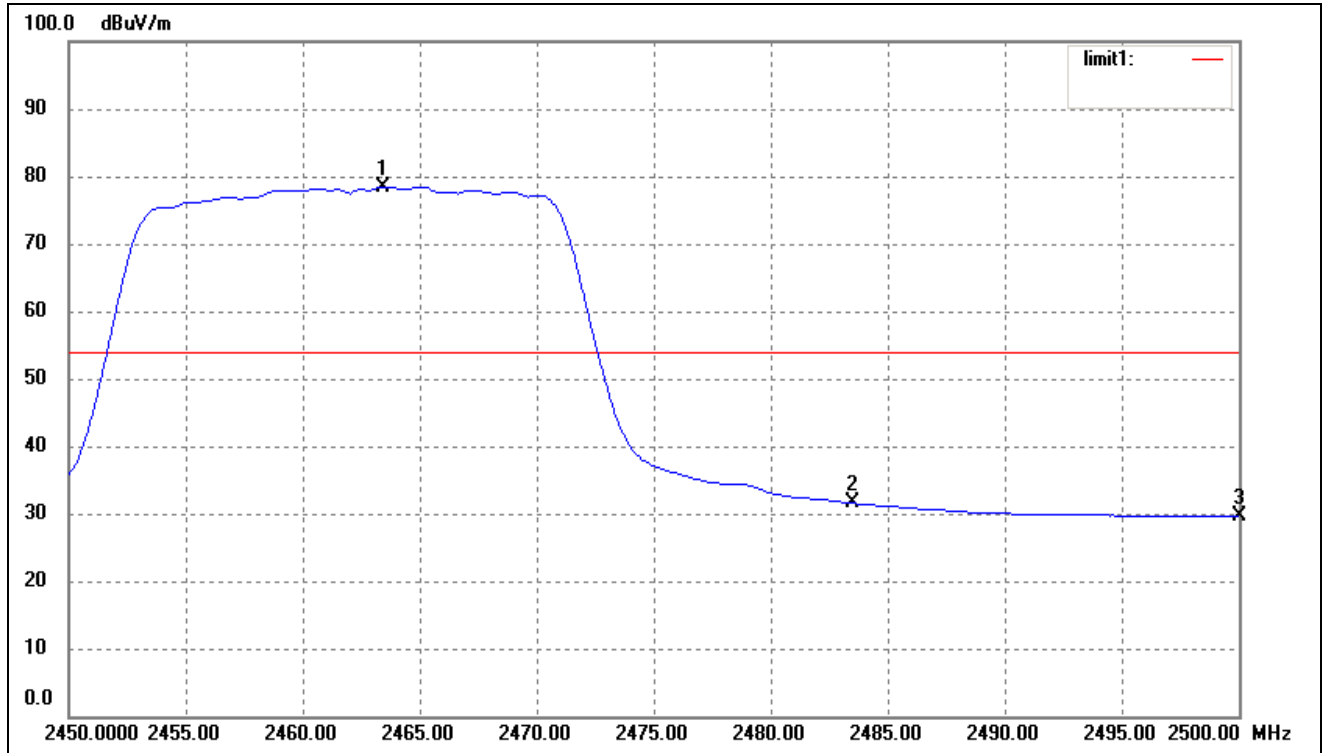
Vertical (Worst case)



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

802.11n-HT20-Highest Bandedge

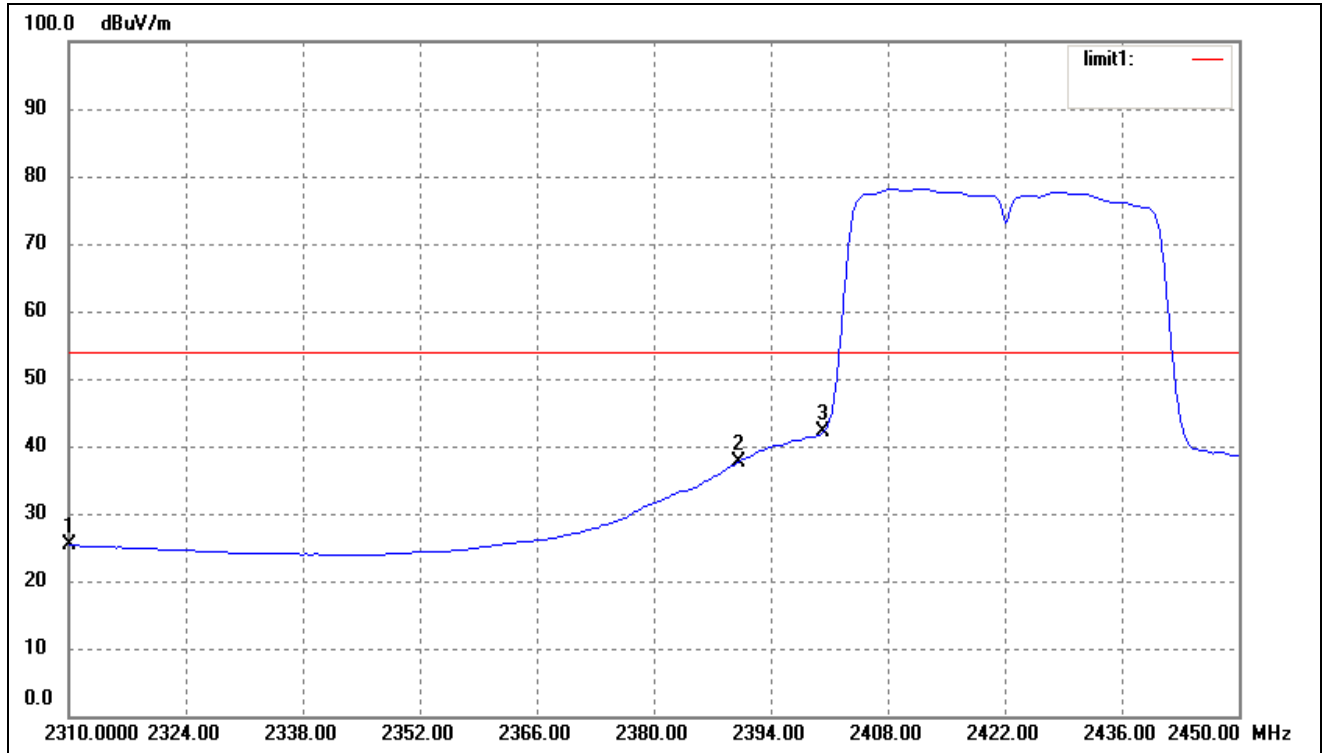
Vertical (Worst case)



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

802.11n-HT40-Lowest Bandedge

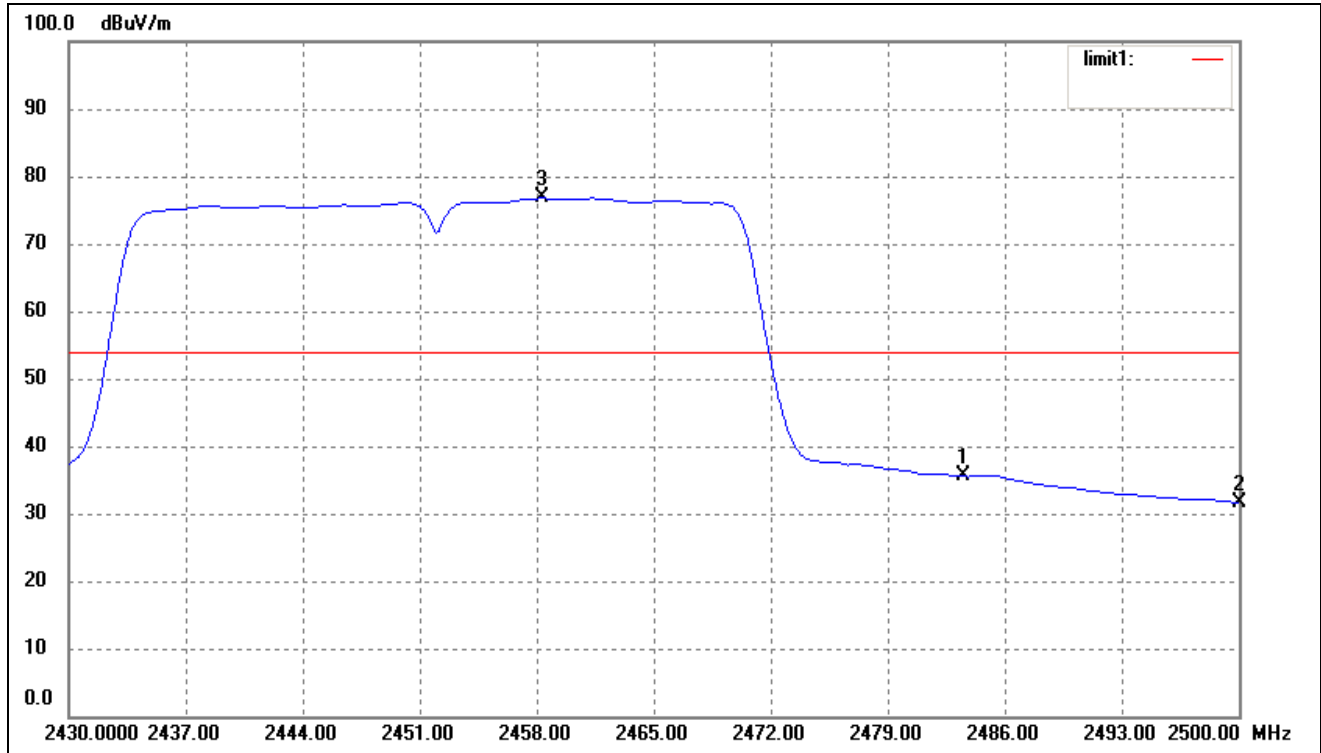
Vertical (Worst case)



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

802.11n-HT40-Highest Bandedge

Vertical (Worst case)



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

10. Conducted Emissions

10.1 Measurement Uncertainty

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

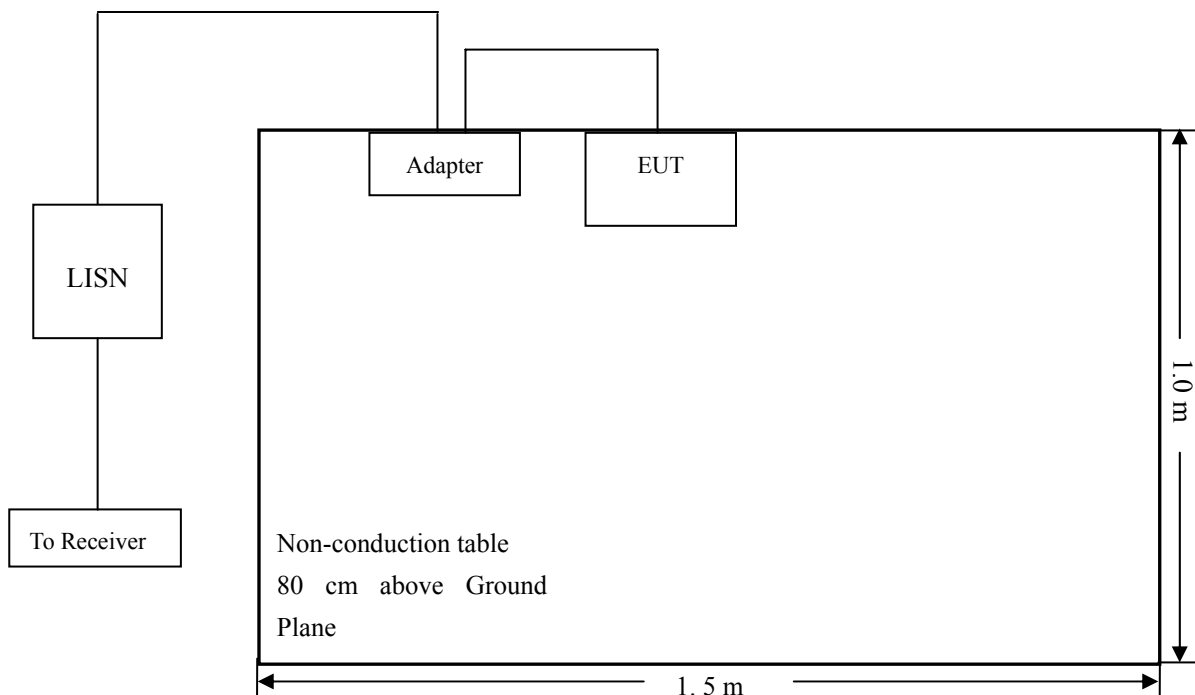
10.2 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.207 Limit.

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

The spacing between the peripherals was 10 cm.

10.3 Basic Test Setup Block Diagram



10.4 Environmental Conditions

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

10.5 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency	150 kHz
Stop Frequency.....	30 MHz
Sweep Speed	Auto
IF Bandwidth.....	10 kHz
Quasi-Peak Adapter Bandwidth	9 kHz
Quasi-Peak Adapter Mode	Normal

10.6 Summary of Test Results/Plots

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

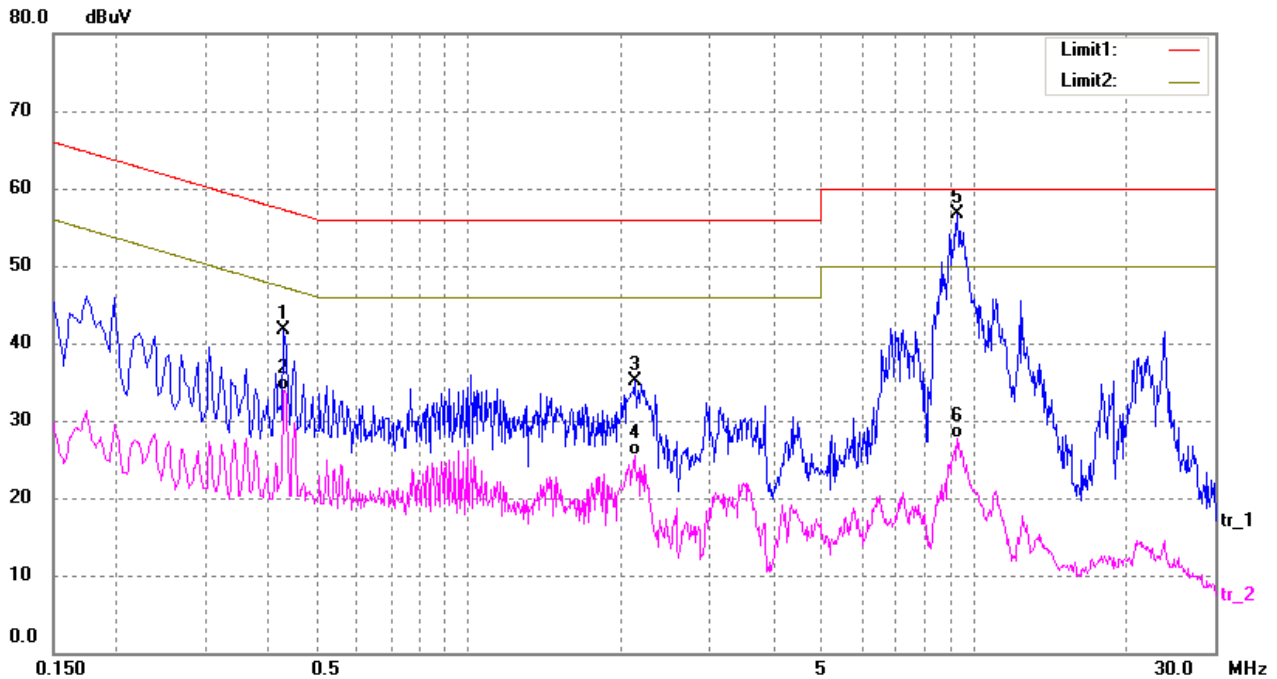
-3.30 dB at 9.2620 MHz in the **Neutral** mode, **Peak** detector, **0.15-30MHz**

10.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

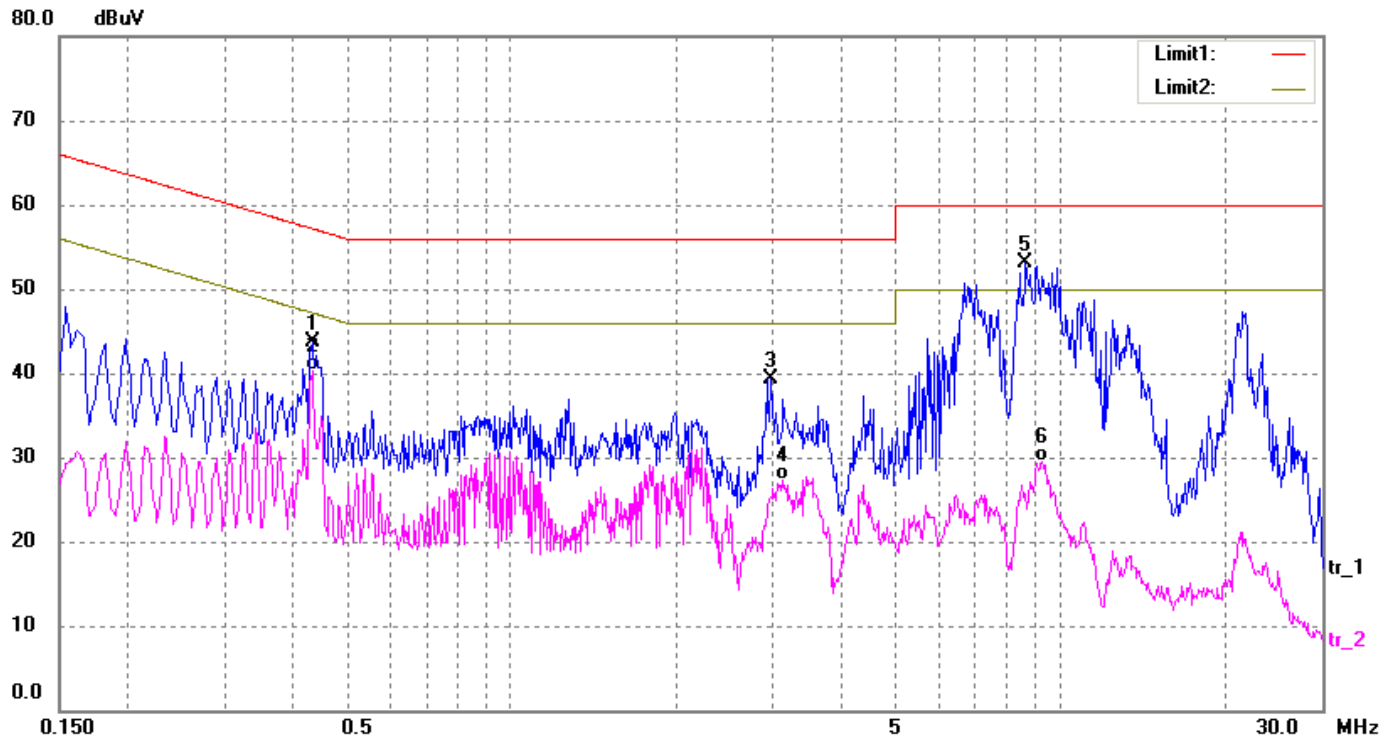
EUT: Mini Projector
 Tested Model: Z1
 Operating Condition: Transmitting(Wi-Fi)
 Comment: AC120V/60Hz Adapter 12V

Test Specification: Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.4300	32.10	9.52	41.62	57.25	-15.63	peak
2	0.4300	24.35	9.52	33.87	47.25	-13.38	AVG
3	2.1220	25.25	9.84	35.09	56.00	-20.91	peak
4	2.1220	15.71	9.84	25.55	46.00	-20.45	AVG
5*	9.2620	46.36	10.34	56.70	60.00	-3.30	peak
6	9.2620	17.33	10.34	27.67	50.00	-22.33	AVG

Test Specification: Live



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.4340	34.21	9.52	43.73	57.18	-13.45	peak
2*	0.4340	30.74	9.52	40.26	47.18	-6.92	AVG
3	2.9700	29.40	9.96	39.36	56.00	-16.64	peak
4	3.1140	17.32	9.98	27.30	46.00	-18.70	AVG
5	8.6620	42.75	10.33	53.08	60.00	-6.92	peak
6	9.2660	19.07	10.34	29.41	50.00	-20.59	AVG

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