

# FCC Part 15C Measurement and Test Report

For

**Spheris Digital Ltd.**

**Flat Room A21, BLK a, 4/F, Sheung Shui Plaza, 3ka fu close,  
Sheung Shui Hong Kong**

**FCC ID: YHO-PXT51015**

<b>FCC Rule(s):</b>	<u>FCC Part 15C</u>
<b>Product Description:</b>	<u>Wireless Digital Display</u>
<b>Tested Model:</b>	<u>PXT510WR04F</u>
<b>Report No.:</b>	<u>STR15058259I-1</u>
<b>Tested Date:</b>	<u>2015-05-27 to 2015-07-14</u>
<b>Issued Date:</b>	<u>2015-07-14</u>
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

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## 1. GENERAL INFORMATION

### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Applicant: Spheris Digital Ltd.  
 Address of applicant: Flat Room A21, BLK a, 4/F, Sheung Shui Plaza, 3ka fu close, Sheung Shui Hong Kong  
 Manufacturer: Spheris Digital Ltd.  
 Address of manufacturer: Flat Room A21, BLK a, 4/F, Sheung Shui Plaza, 3ka fu close, Sheung Shui Hong Kong

General Description of EUT	
Product Name:	Wireless Digital Display
Trade Name:	Pix-Star
Model No.:	PXT510WR04F
Adding Model(s):	PXT510VR02F, PXT510GR02F, PXT510WR02F, PXT510VR04F, PXT510GR04
Rated Voltage:	Adapter:DC12V
Power Adapter Model:	GFP241-1220BX-1
<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 PXT510WR04F, 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 11b/g/n(HT20)
RF Output Power:	15.88dBm (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
Antenna Gain:	-2dBi
Lowest Internal Frequency	32.768KHz

## 1.2 Test Standards

The following report is prepared on behalf of the Spheris Digital 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 C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. The measurement guide KDB 558074 D01 V03r03 for digital transmission systems shall be performed also.

## 1.4 Test Facility

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

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

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

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

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

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

## 1.5 EUT Setup and Test Mode

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

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

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
DC Cable	1.7	Unshielded	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 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
Attenuator	ATTEN	ATS100-4-20	/	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 a integral antenna, fulfill the requirement of this section.



## 5. Power Spectral Density

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### 5.1 Standard Applicable

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

### 5.2 Test Procedure

According to the KDB 558074 D01 V03r03, such specifications require that the same method as used to determine the conducted output power shall also be used to determine the power spectral density. The test method of power spectral density as below:

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set span to at least 1.5 times the OBW.
- c) Set RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- d) Set VBW  $\geq 3 \times \text{RBW}$ .
- e) Detector = power averaging (RMS) or sample detector (when RMS not available).
- f) Ensure that the number of measurement points in the sweep  $\geq 2 \times \text{span/RBW}$ .
- g) Sweep time = auto couple.
- h) Employ trace averaging (RMS) mode over a minimum of 100 traces.
- i) Use the peak marker function to determine the maximum amplitude level.
- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span in order to meet the minimum measurement point requirement as the RBW is reduced).

### 5.3 Environmental Conditions

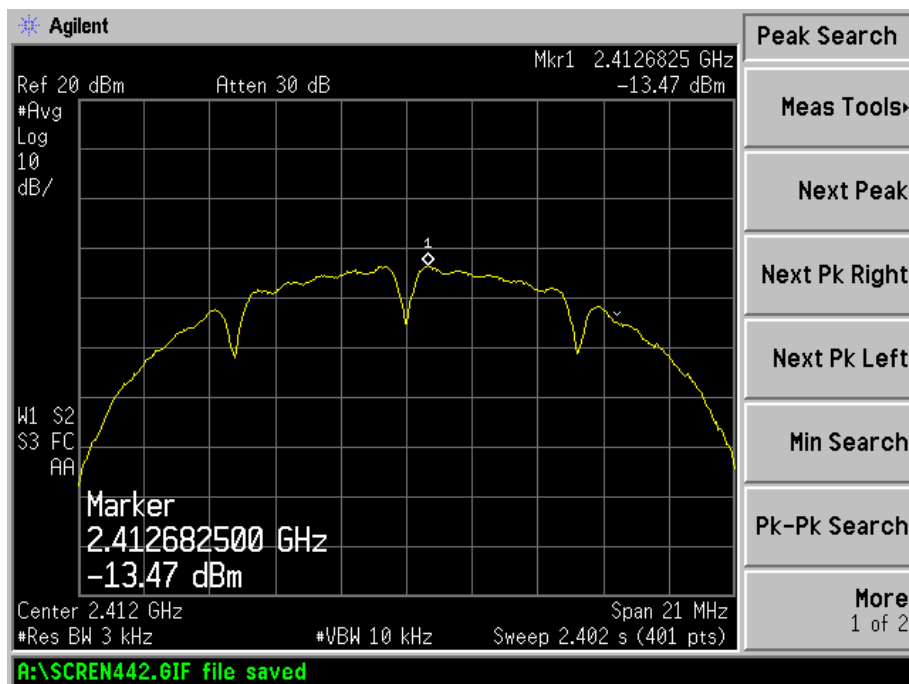
Temperature:	26° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

## 5.4 Summary of Test Results/Plots

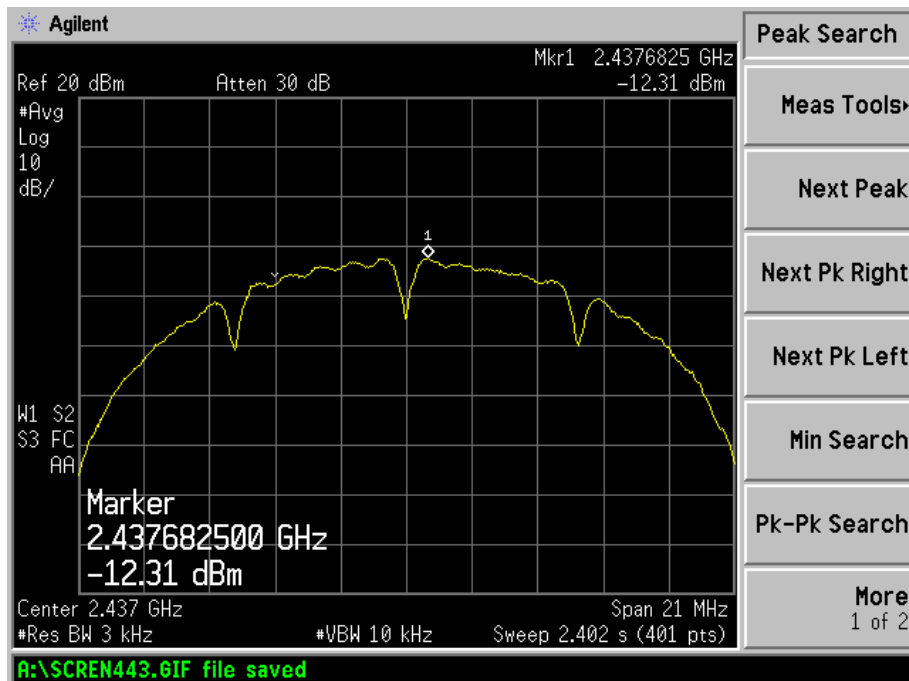
Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
802.11b	2412	-13.47	8
	2437	-12.31	8
	2462	-11.49	8
802.11g	2412	-17.48	8
	2437	-15.36	8
	2462	-14.57	8
802.11n HT20	2412	-16.35	8
	2437	-15.27	8
	2462	-14.54	8

Please refer to the following test plots:

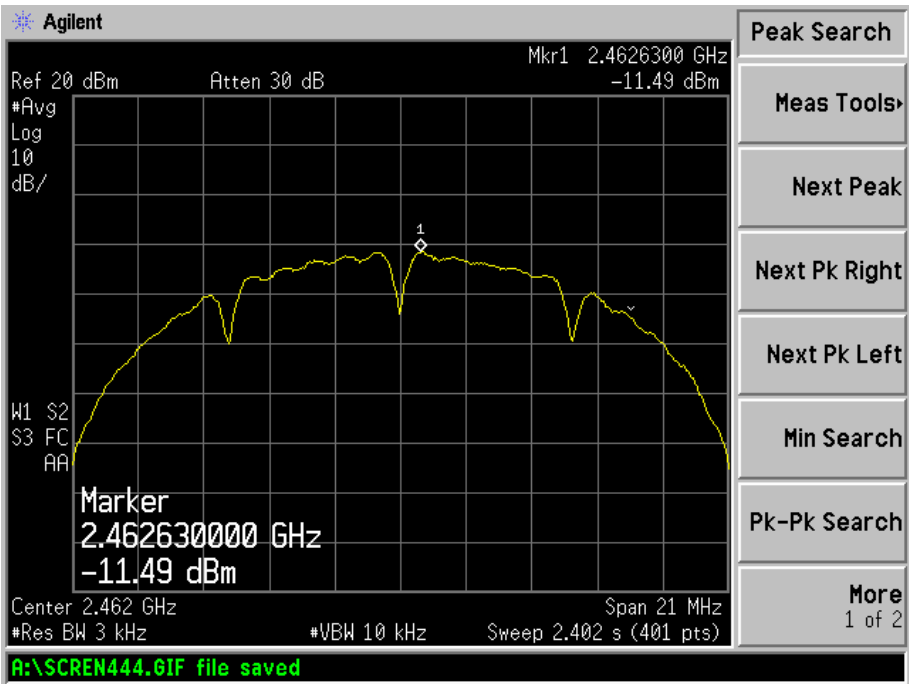
## 802.11b-Low Channel



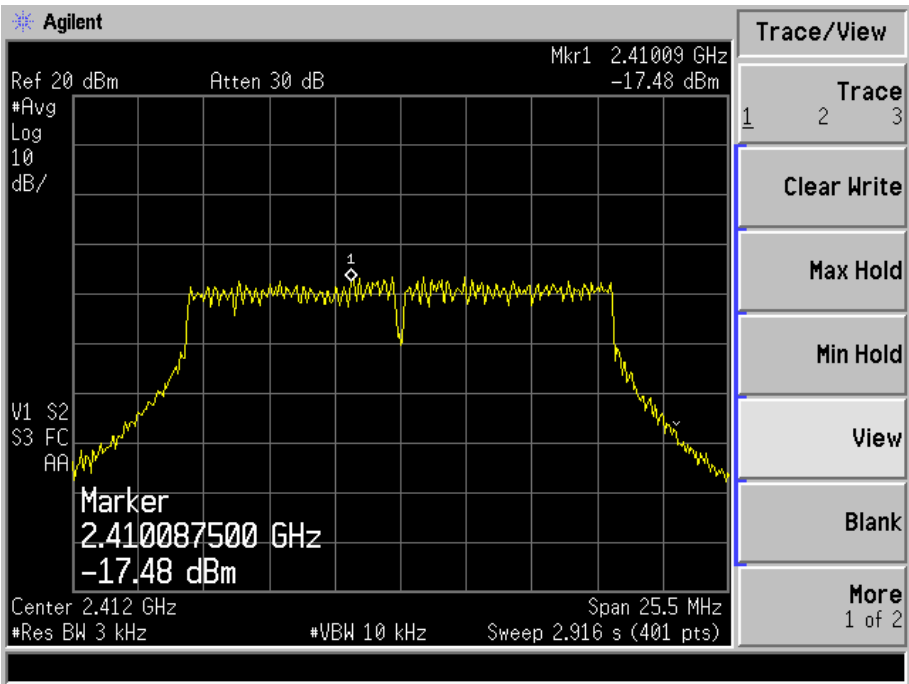
## 802.11b-Middle Channel



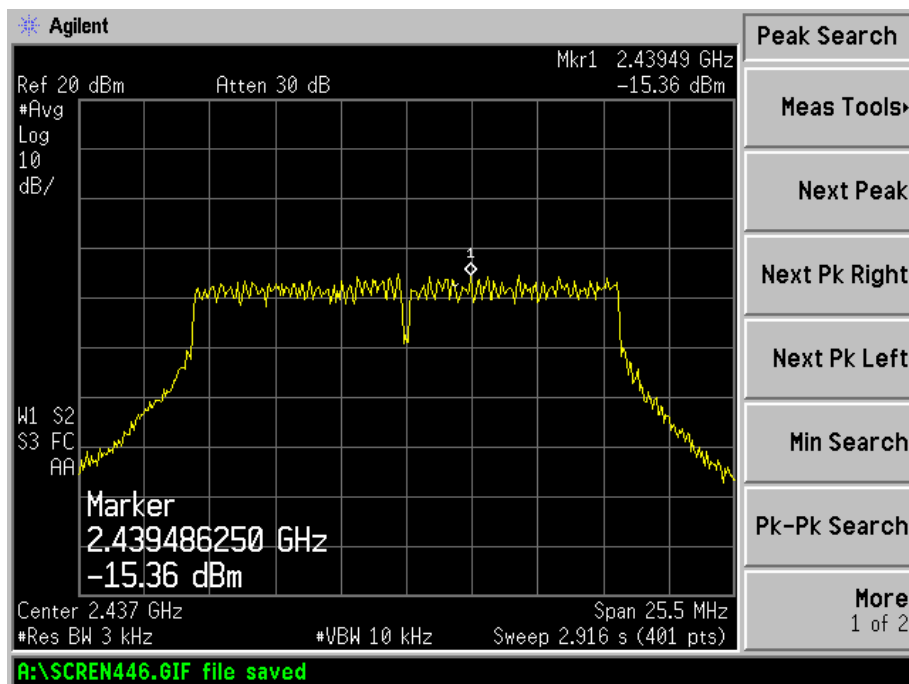
802.11b-High Channel



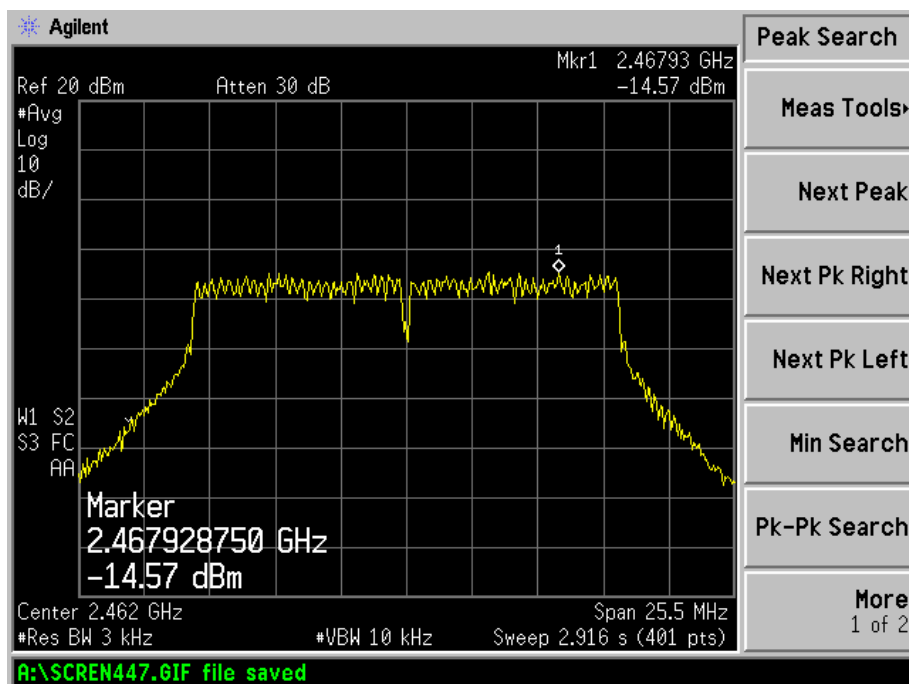
802.11g-Low Channel



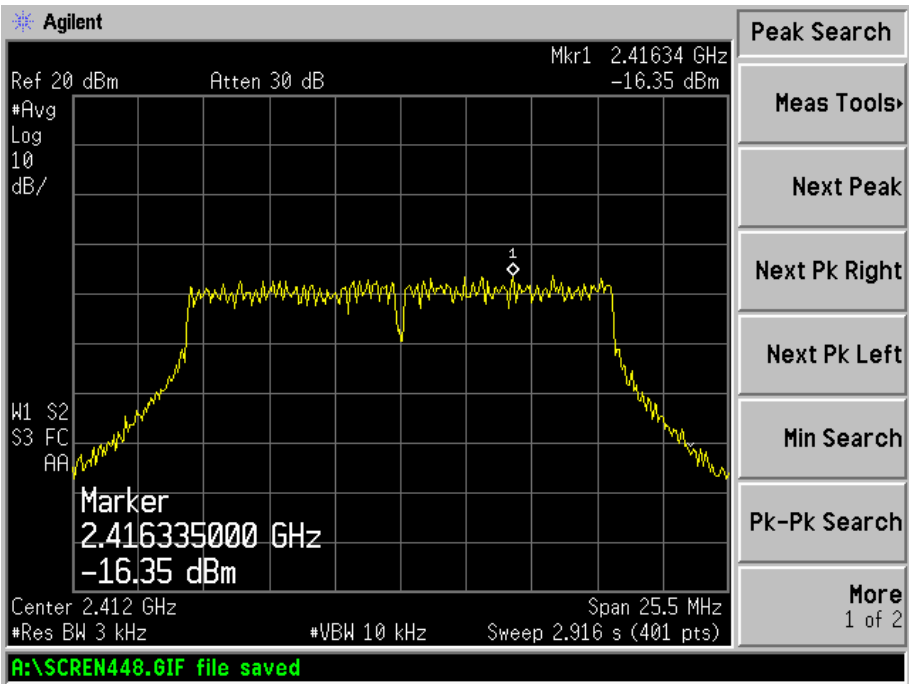
## 802.11g-Middle Channel



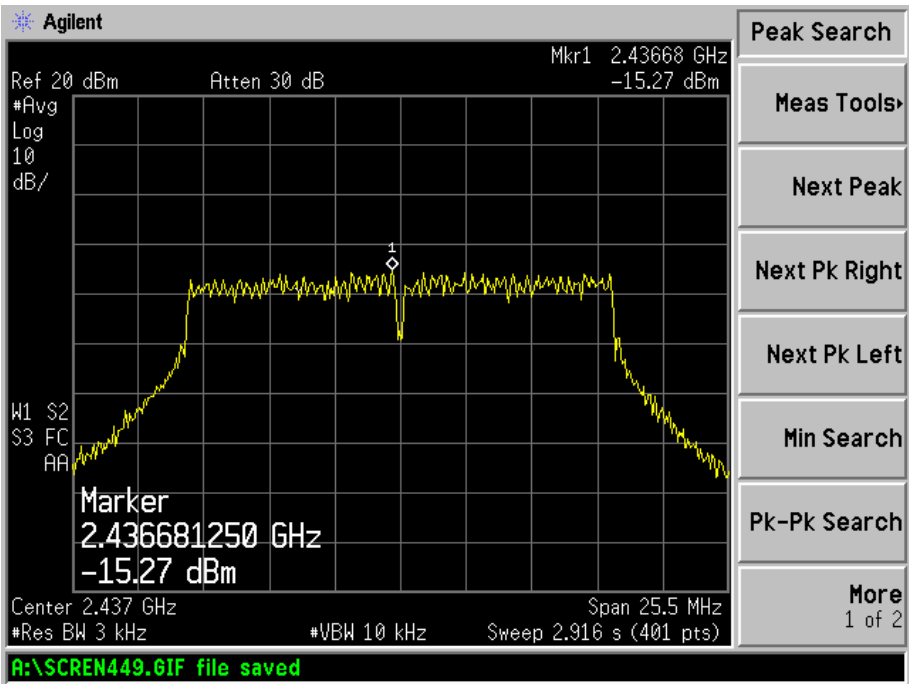
## 802.11g-High Channel



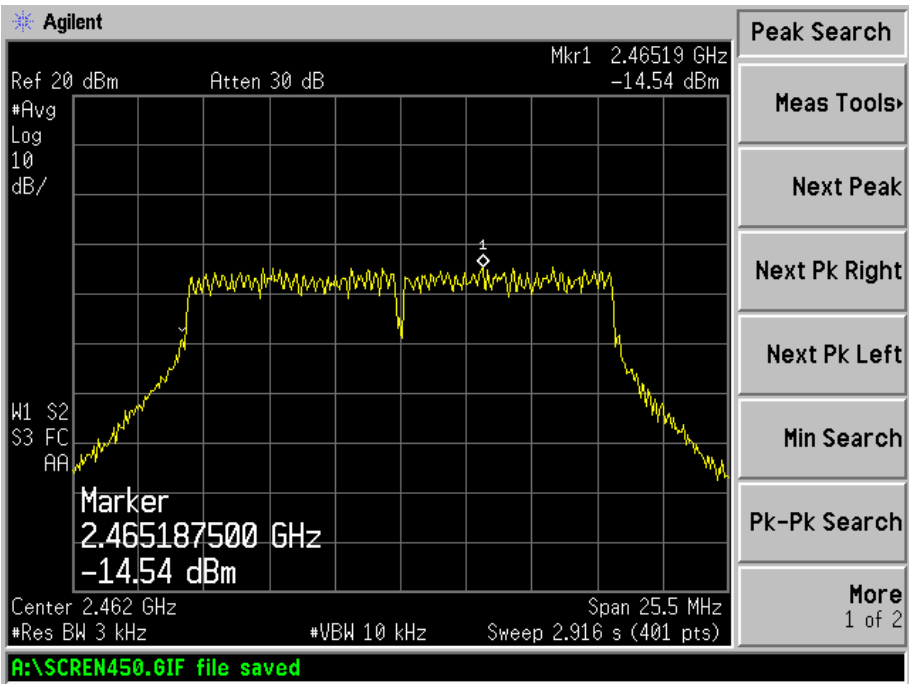
802.11n-HT20-Low Channel



802.11n-HT20-Middle Channel



802.11n-HT20-High Channel



## 6. 6dB Bandwidth

### 6.1 Standard Applicable

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

### 6.2 Test Procedure

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

### 6.3 Environmental Conditions

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

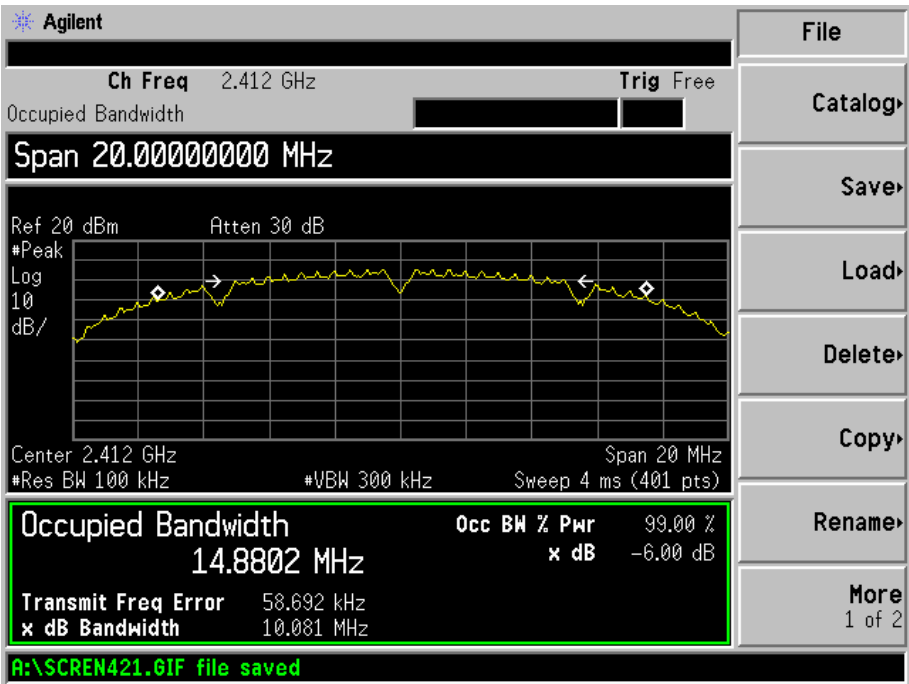
### 6.4 Summary of Test Results/Plots

Test Mode	Test Channel MHz	6 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz
802.11b	2412	10081	14880.2	>500
	2437	8977	14827.4	>500
	2462	10037	14846.3	>500
802.11g	2412	16531	16427.6	>500
	2437	16556	16427.3	>500
	2462	16548	16426.7	>500
802.11n-HT20	2412	16506	16388.2	>500
	2437	16538	16419.1	>500
	2462	16507	16404.5	>500

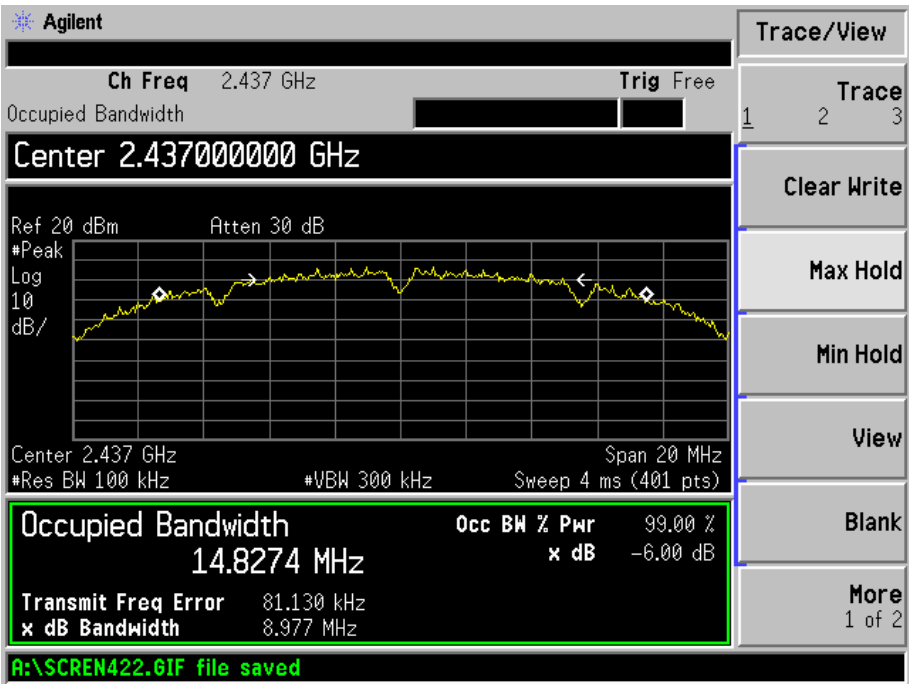
Please refer to the following test plots:



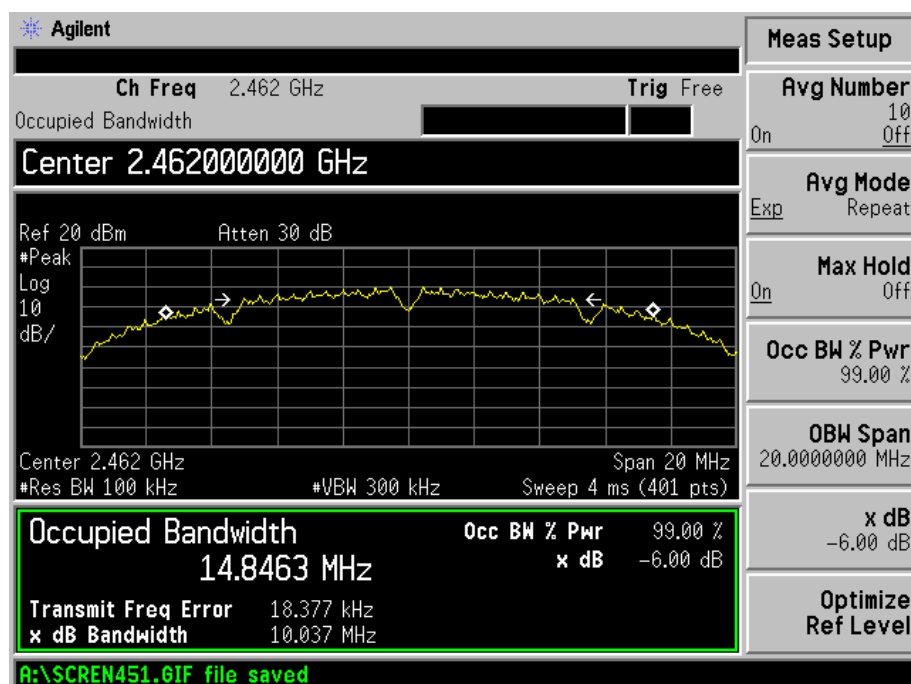
802.11b-Low Channel



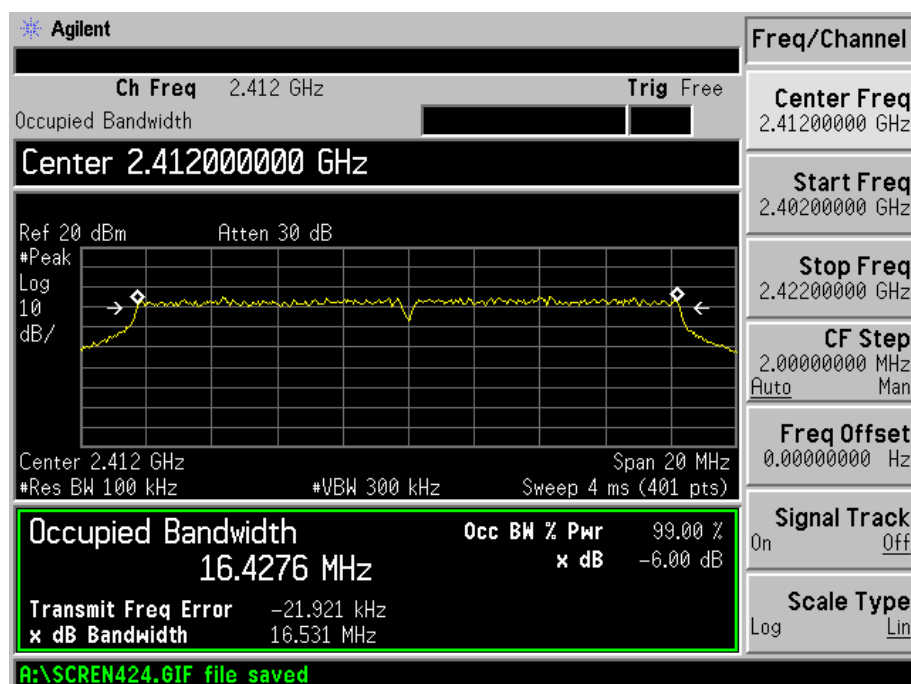
802.11b-Middle Channel



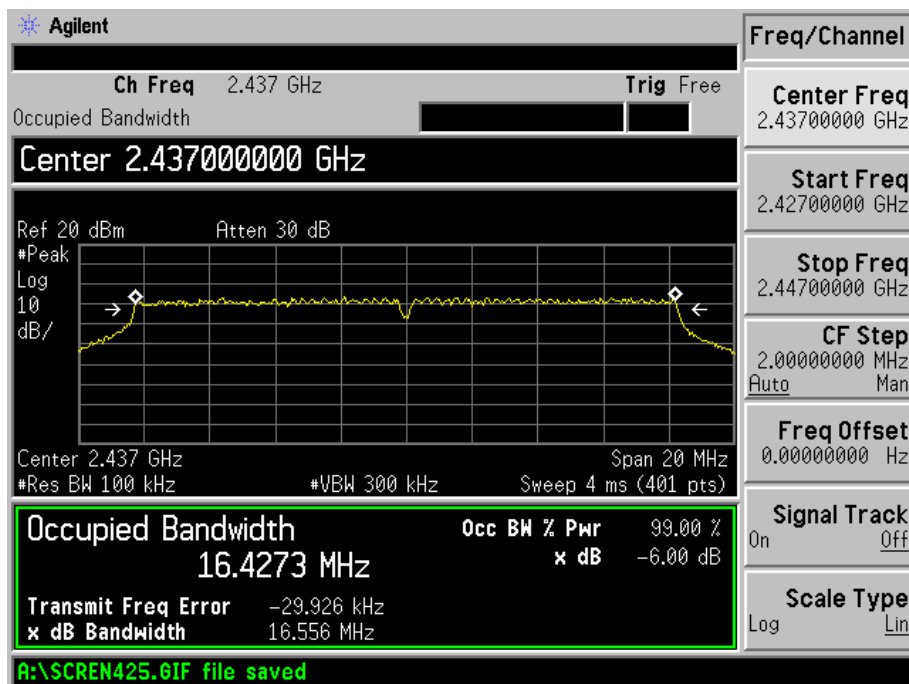
## 802.11b-High Channel



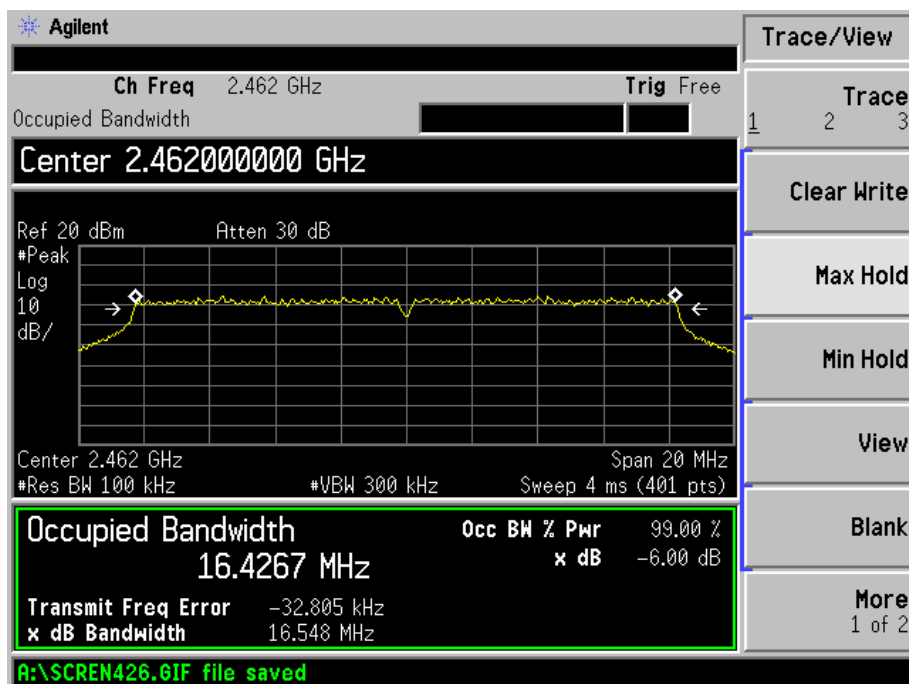
## 802.11g-Low Channel



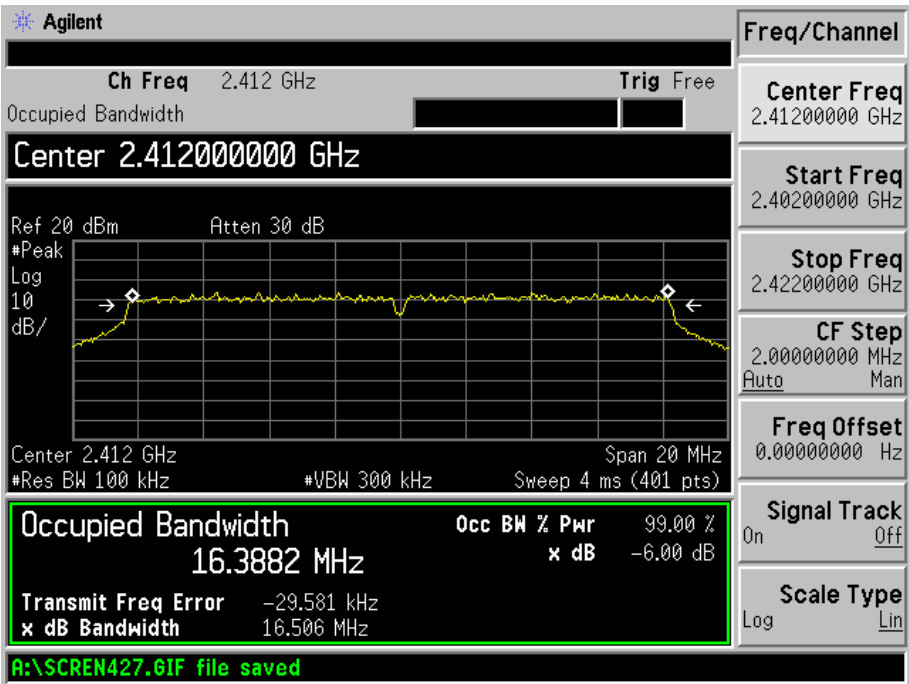
## 802.11g-Middle Channel



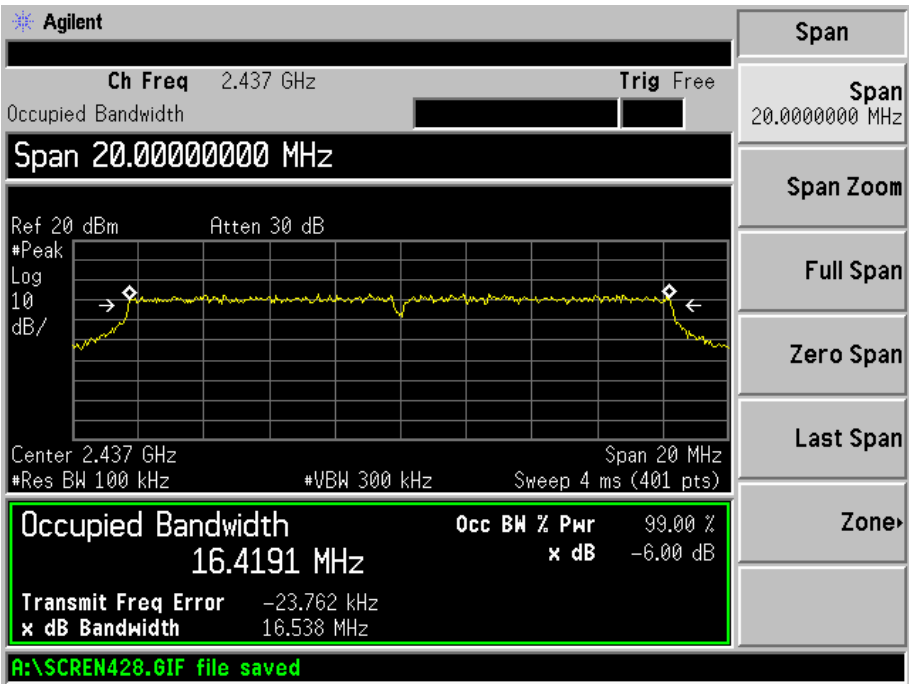
## 802.11g-High Channel



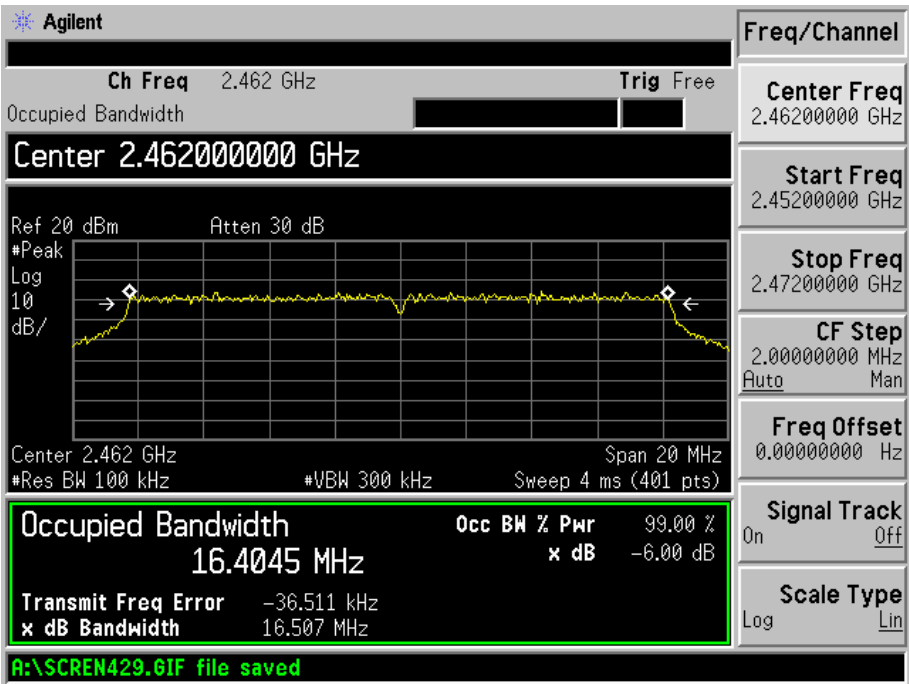
802.11n-HT20-Low Channel



802.11n-HT20-Middle Channel



802.11n-HT20-High Channel



## 7. RF Output Power

### 7.1 Standard Applicable

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

### 7.2 Test Procedure

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

- a) Set span to at least 1.5 times the OBW.
- b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
- c) Set VBW  $\geq 3 \times$  RBW.
- d) Number of points in sweep  $\geq 2 \times \text{span} / \text{RBW}$ . (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

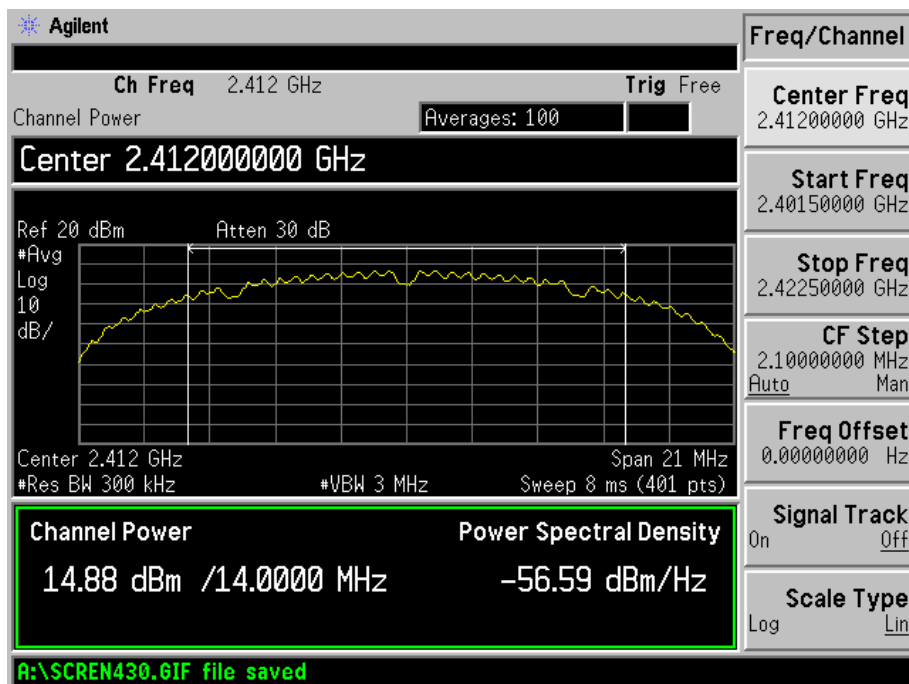
Temperature:	26° C
Relative Humidity:	57%
ATM Pressure:	1011 mbar

**7.4 Summary of Test Results/Plots**

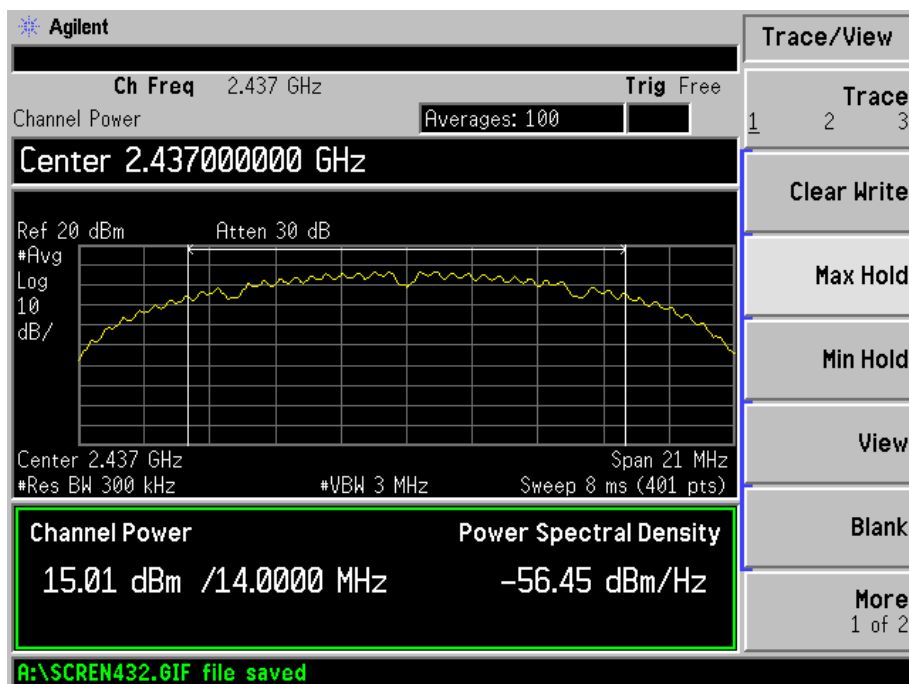
Test Mode	Frequency MHz	Reading dBm	Output Power mW	Limit mW
802.11b_11Mbps	2412	14.88	30.76	1000
	2437	15.01	31.70	1000
	2462	15.88	38.73	1000
802.11g_54Mbps	2412	9.77	9.48	1000
	2437	10.22	10.52	1000
	2462	10.81	12.05	1000
802.11n HT20_MCS7	2412	9.39	8.69	1000
	2437	9.93	9.84	1000
	2462	10.95	12.45	1000

Please refer to the following test plots:

## 802.11b-1Mbps-Low Channel

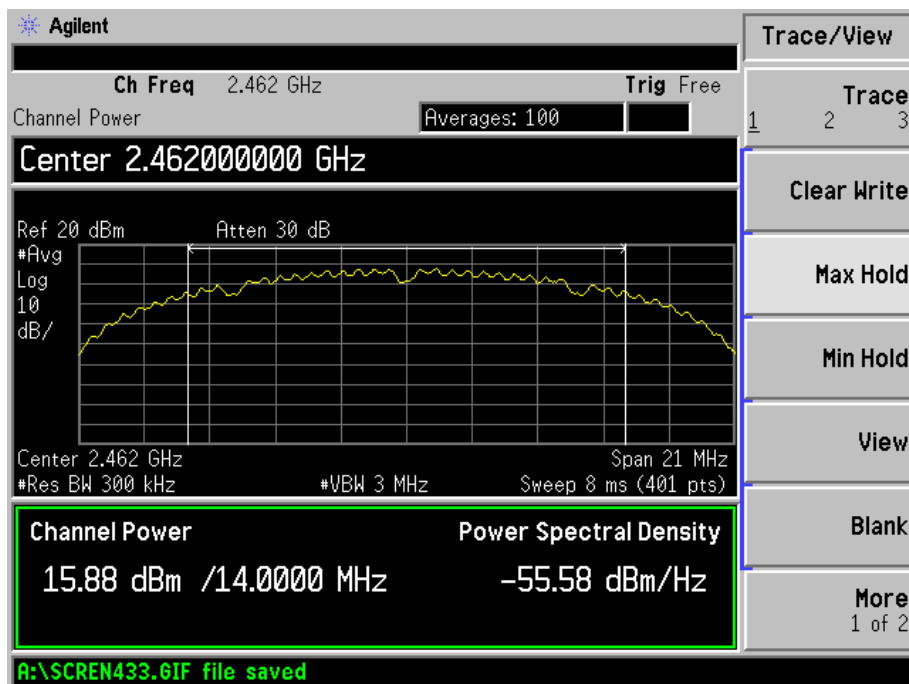


## 802.11b -1Mbps-Middle Channel

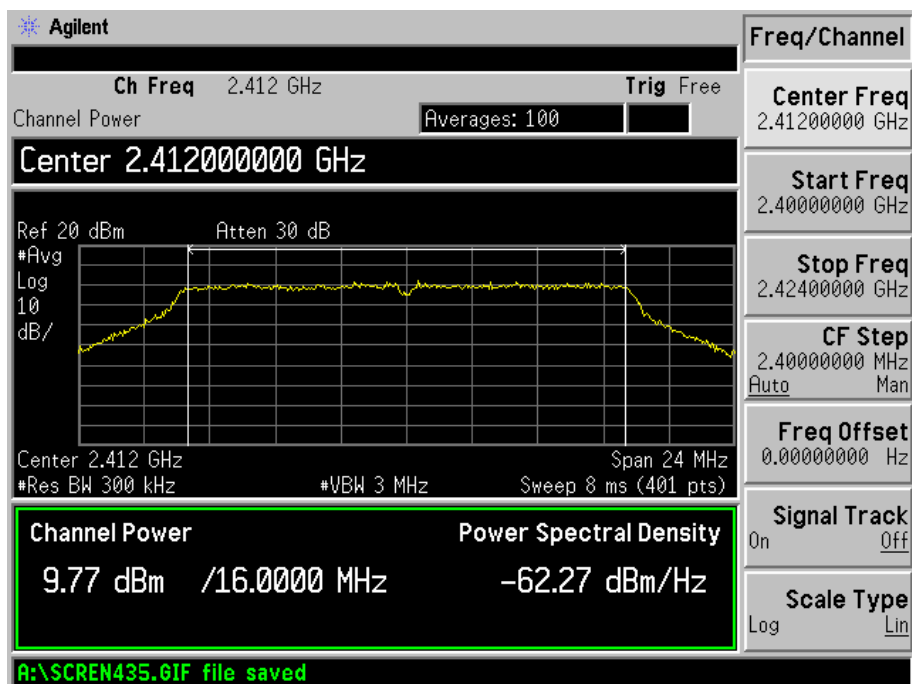




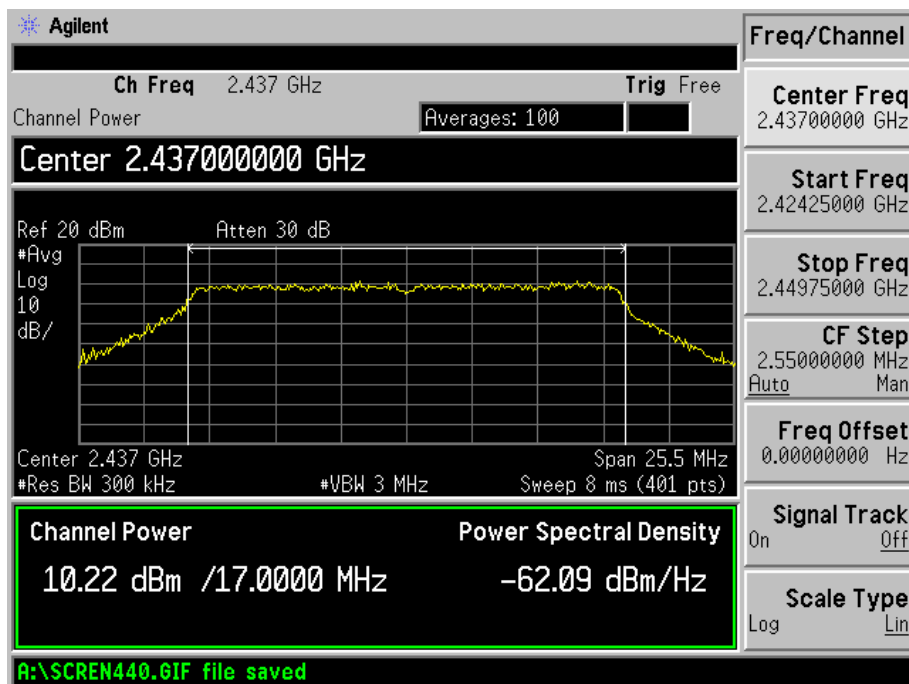
## 802.11b -1Mbps-High Channel



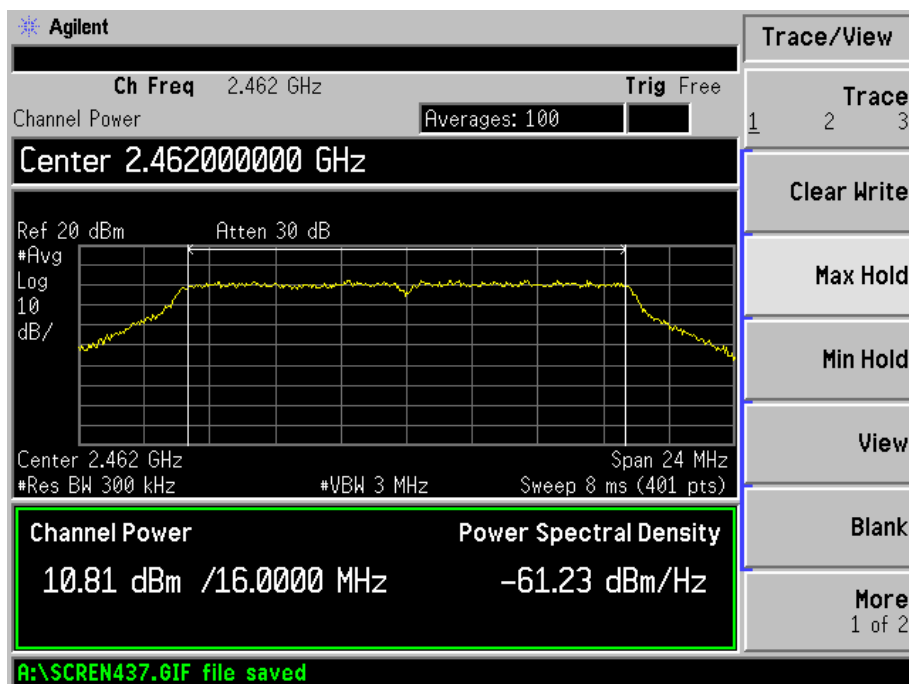
## 802.11g-54Mbps-Low Channel



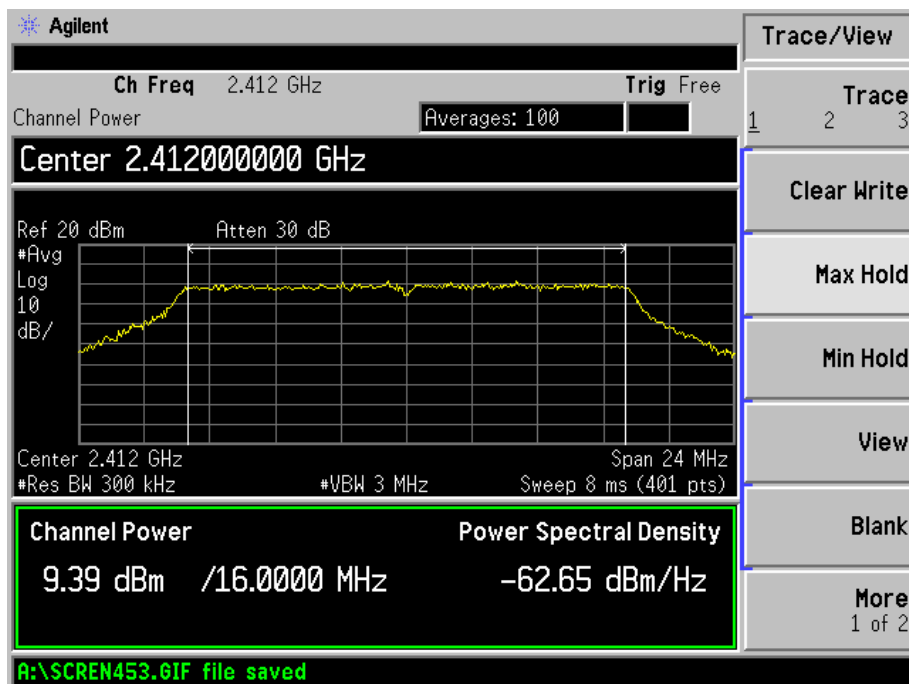
## 802.11g-54Mbps-Middle Channel



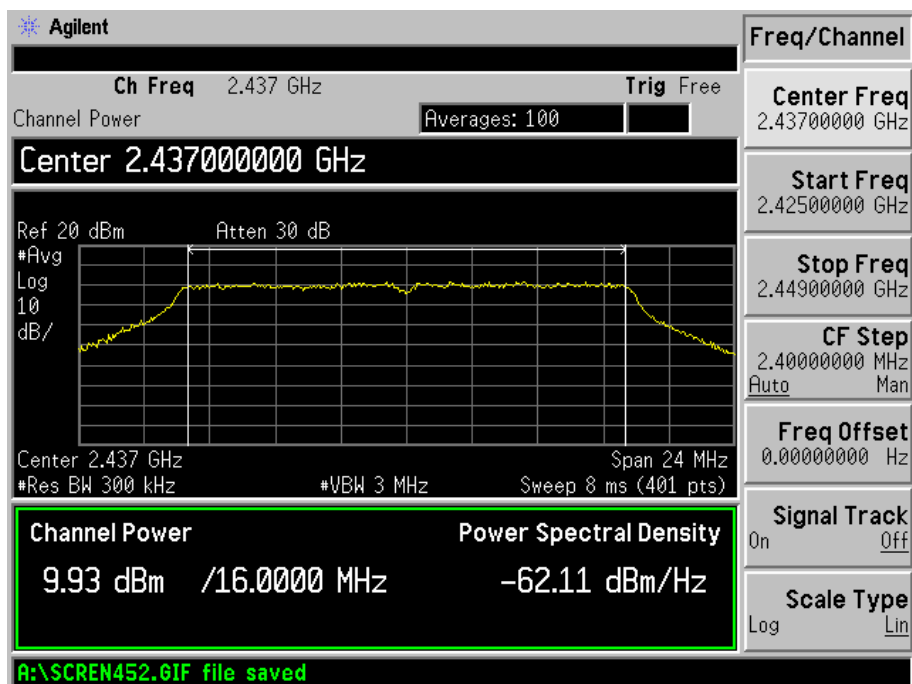
## 802.11g-54Mbps-High Channel



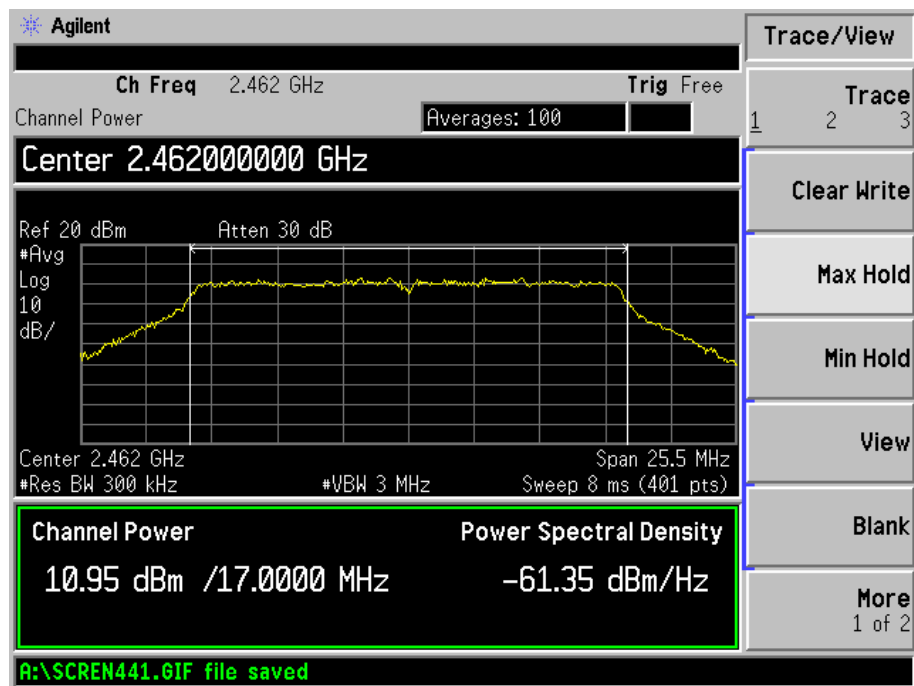
## 802.11n-HT20-MCS7-Low Channel



## 802.11n-HT20-MCS7-Middle Channel



## 802.11n-HT20-MCS7-High Channel



## 8. Field Strength of Spurious Emissions

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### 8.1 Measurement Uncertainty

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

### 8.2 Standard Applicable

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

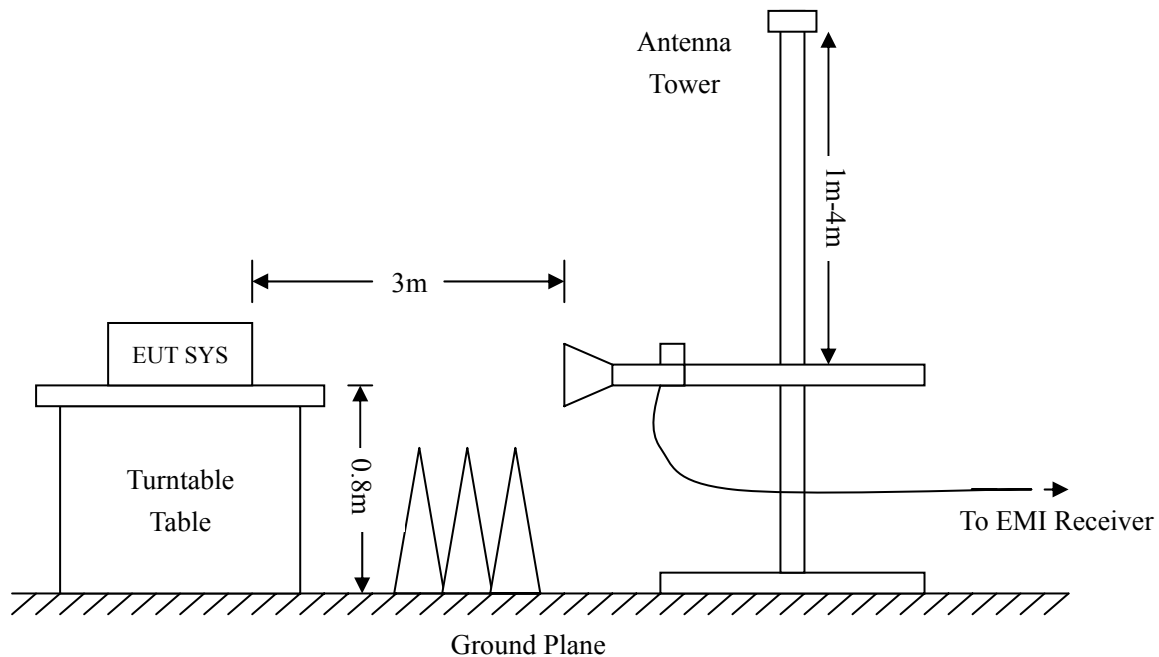
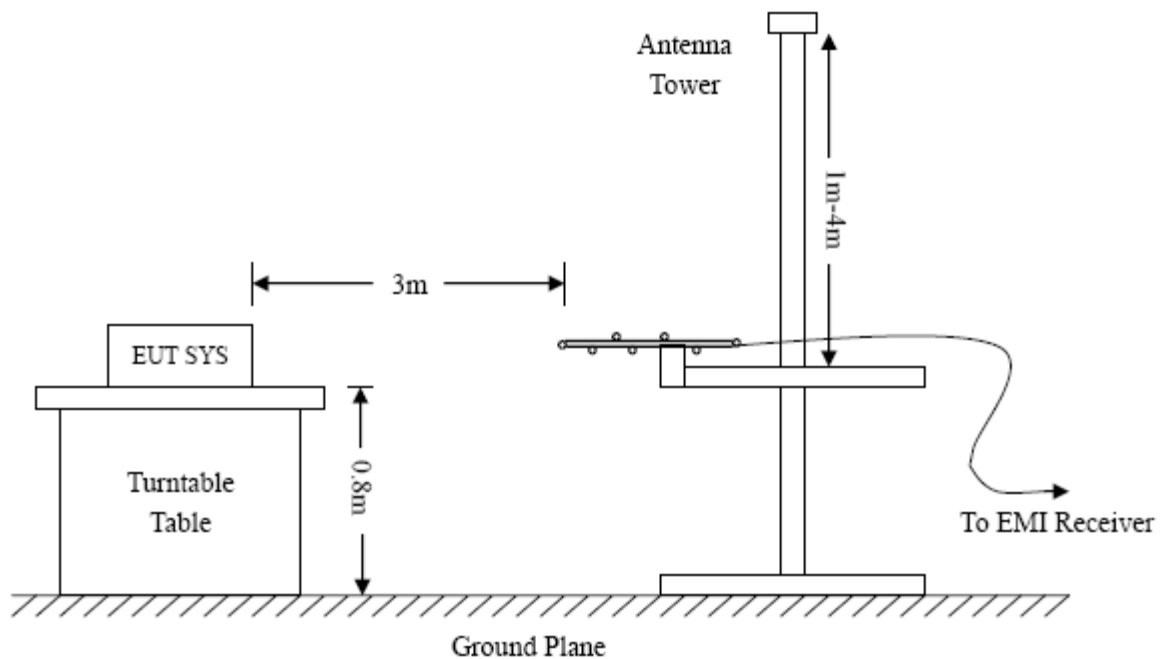
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

### 8.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2009 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 -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

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

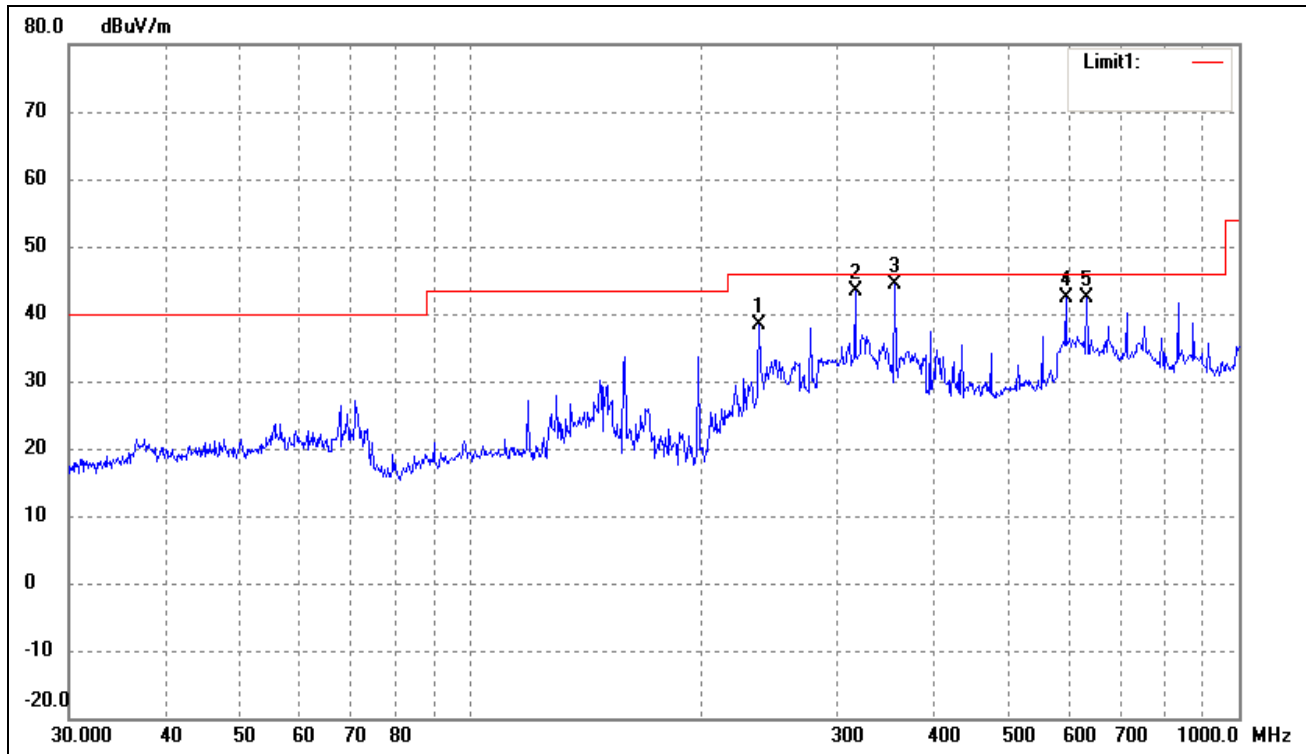
## 8.5 Environmental Conditions

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:

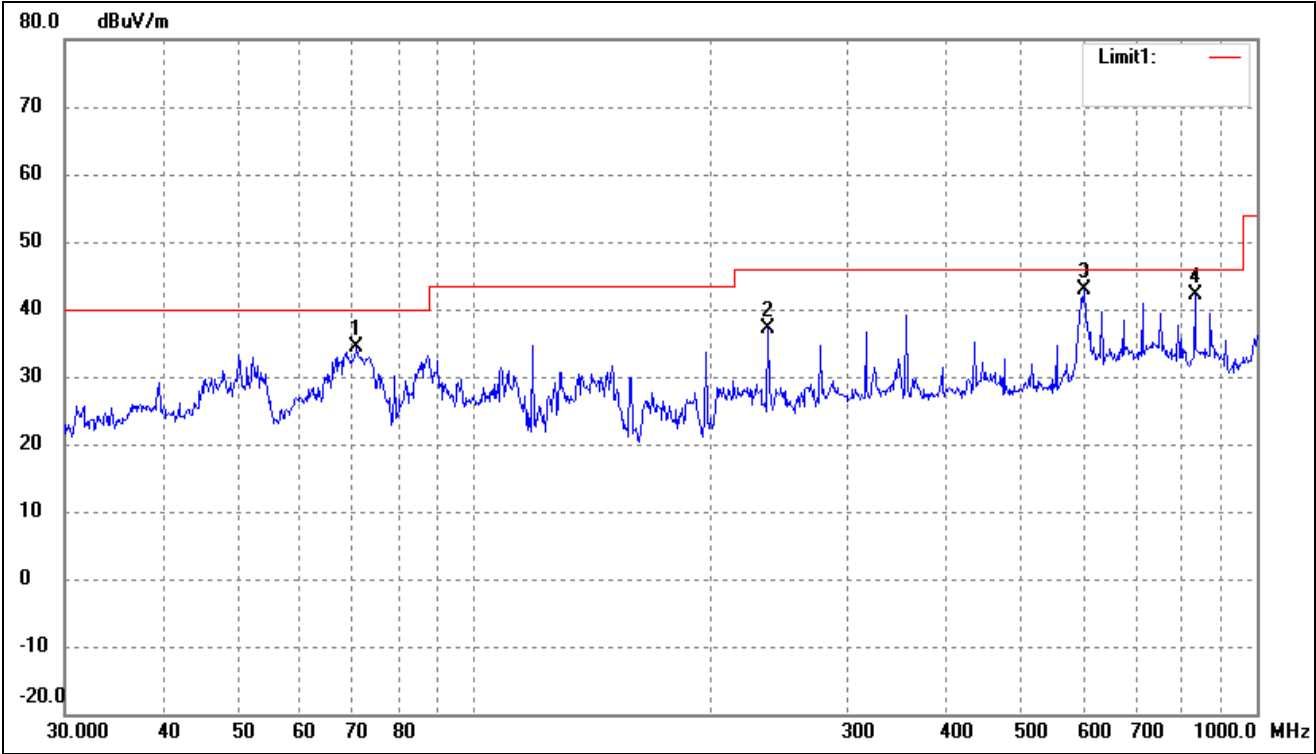
*Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

**Plot of Radiated Emissions Test Data (30MHz to 1GHz)***EUT: Wireless Digital Display**Tested Model: PXT510WR04F**Operating Condition: 802.11b Transmitting Low Channel-2412MHz**Comment: Adapter:DC12V**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	237.4759	29.32	9.18	38.50	46.00	-7.50	65	100	peak
2	316.5889	31.06	12.28	43.34	46.00	-2.66	133	100	peak
3	356.6757	32.23	12.15	44.38	46.00	-1.62	21	100	peak
4	595.1328	24.03	18.41	42.44	46.00	-3.56	130	100	peak
5	633.9072	24.02	18.41	42.43	46.00	-3.57	65	100	peak



Test Specification: Vertical

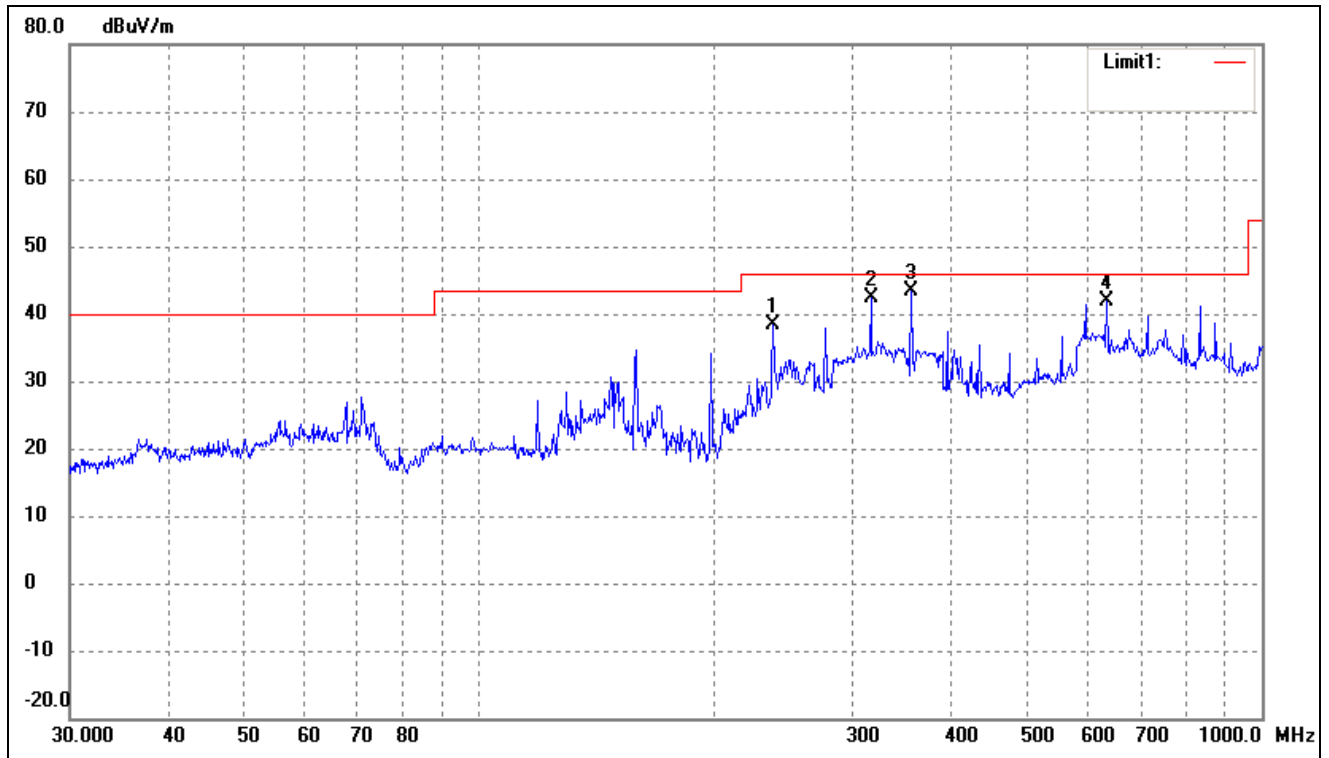


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	70.8315	31.31	3.09	34.40	40.00	-5.60	95	100	peak
2	237.4759	27.91	9.18	37.09	46.00	-8.91	163	100	peak
3	601.4265	23.71	19.22	42.93	46.00	-3.07	325	100	peak
4	833.3170	24.87	17.36	42.23	46.00	-3.77	98	100	peak

Operating Condition: 802.11b Transmitting Middle Channel-2437MHz

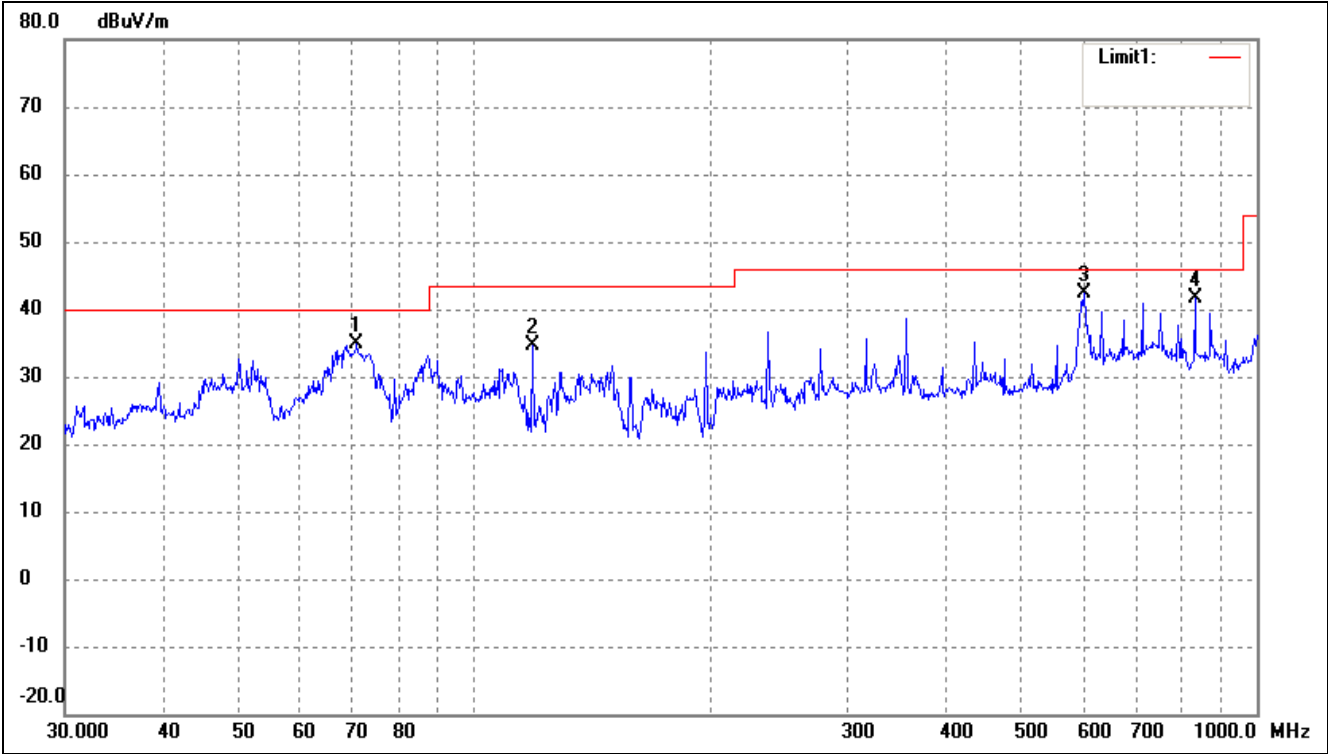
Comment: Adapter:DC12V

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	237.4759	29.32	9.18	38.50	46.00	-7.50	65	100	peak
2	316.5889	30.06	12.28	42.34	46.00	-3.66	136	100	peak
3	356.6757	31.23	12.15	43.38	46.00	-2.62	342	100	peak
4	633.9072	23.52	18.41	41.93	46.00	-4.07	301	100	peak

Test Specification: Vertical

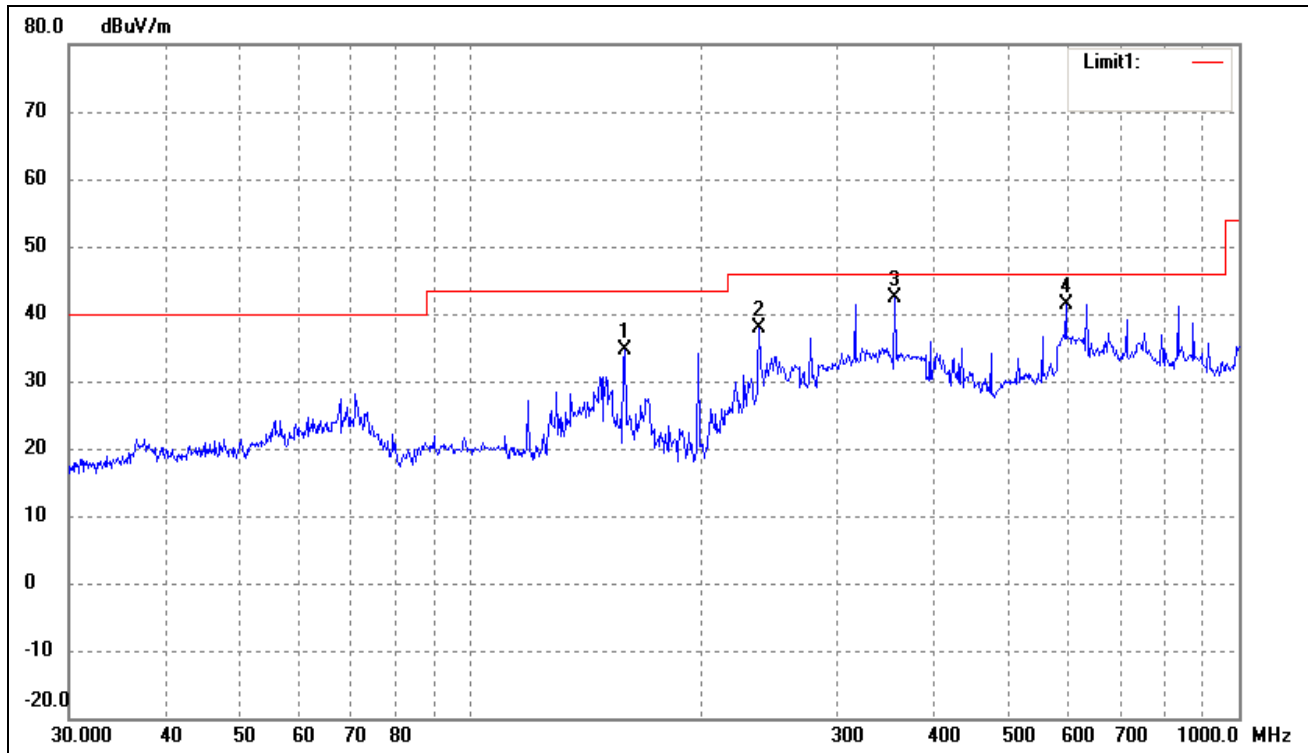


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	70.8315	31.81	3.09	34.90	40.00	-5.10	98	100	peak
2	118.6013	29.53	5.03	34.56	43.50	-8.94	163	100	peak
3	601.4265	23.21	19.22	42.43	46.00	-3.57	265	100	peak
4	833.3170	24.37	17.36	41.73	46.00	-4.27	215	100	peak

Operating Condition: 802.11b Transmitting High Channel-2462MHz

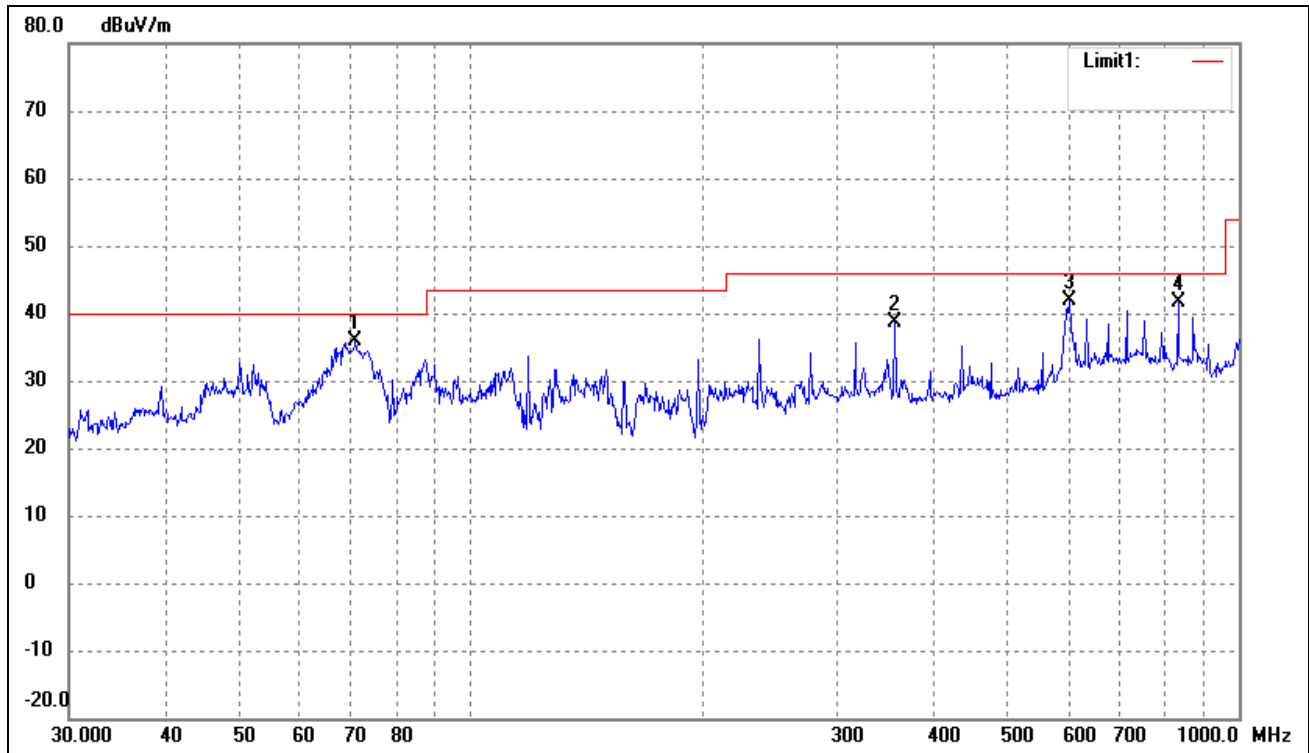
Comment: Adapter:DC12V

Test Specification: Horizontal

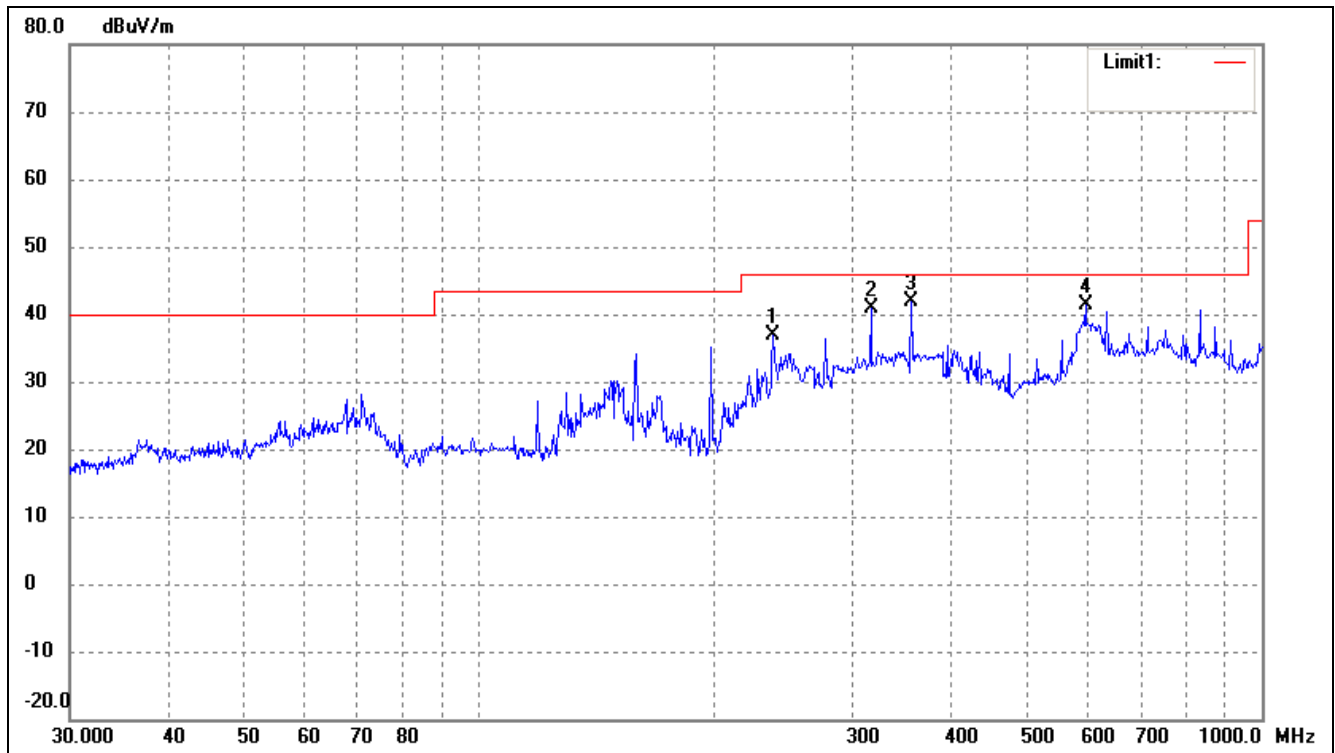


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	158.6676	31.98	2.66	34.64	43.50	-8.86	65	100	peak
2	237.4759	28.82	9.18	38.00	46.00	-8.00	125	100	peak
3	356.6757	30.23	12.15	42.38	46.00	-3.62	201	100	peak
4	595.1328	23.03	18.41	41.44	46.00	-4.56	165	100	peak

Test Specification: Vertical

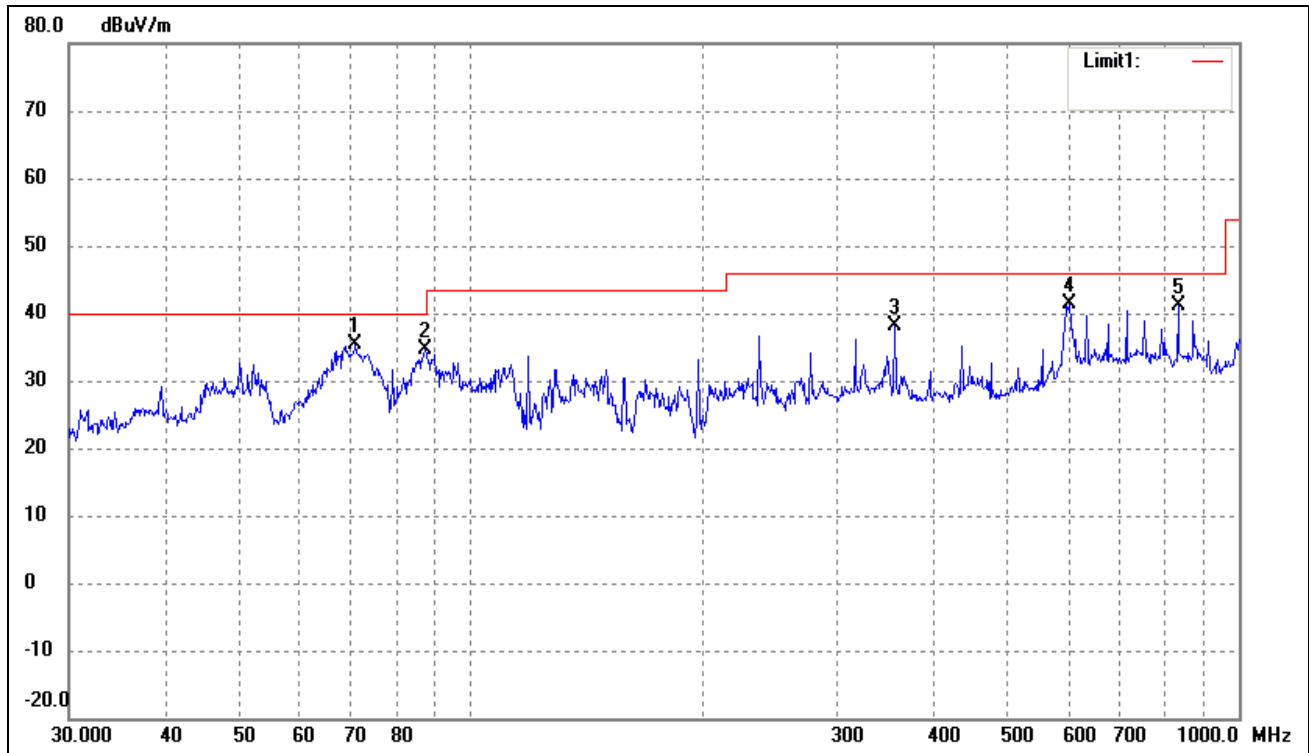


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	70.8315	32.81	3.09	35.90	40.00	-4.10	269	100	peak
2	356.6757	26.46	12.15	38.61	46.00	-7.39	162	100	peak
3	601.4265	22.71	19.22	41.93	46.00	-4.07	121	100	peak
4	833.3170	24.37	17.36	41.73	46.00	-4.27	98	100	peak

**Plot of Radiated Emissions Test Data (30MHz to 1GHz)***EUT: Wireless Digital Display**Tested Model: PXT510WR04F**Operating Condition: 802.11g Transmitting Low Channel-2412MHz**Comment: Adapter:DC12V**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	237.4759	27.82	9.18	37.00	46.00	-9.00	65	100	peak
2	316.5889	28.56	12.28	40.84	46.00	-5.16	150	100	peak
3	356.6757	29.73	12.15	41.88	46.00	-4.12	301	100	peak
4	595.1328	23.03	18.41	41.44	46.00	-4.56	214	100	peak

Test Specification: Vertical

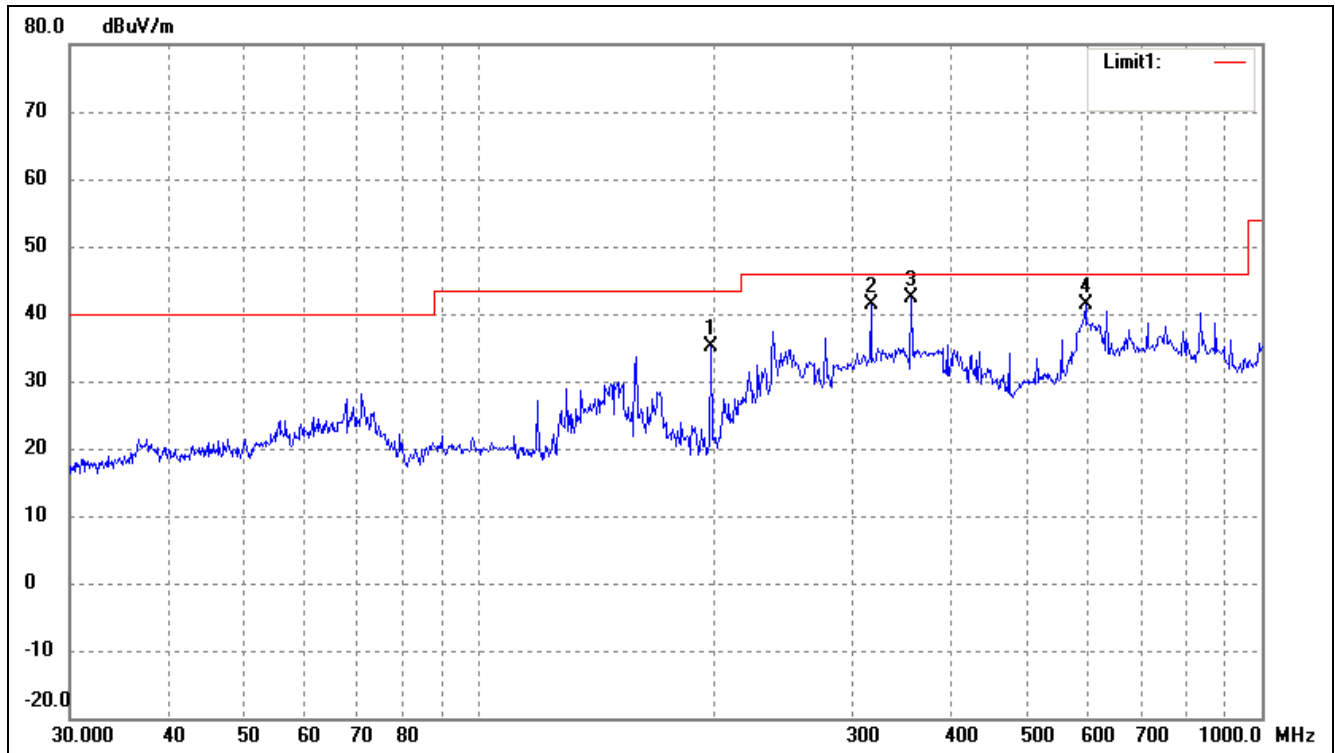


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	70.8315	32.31	3.09	35.40	40.00	-4.60	85	100	peak
2	87.4176	31.38	3.20	34.58	40.00	-5.42	320	100	peak
3	356.6757	25.96	12.15	38.11	46.00	-7.89	156	100	peak
4	601.4265	22.21	19.22	41.43	46.00	-4.57	195	100	peak
5	833.3170	23.87	17.36	41.23	46.00	-4.77	102	100	peak

Operating Condition: 802.11g Transmitting Middle Channel-2437MHz

Comment: Adapter:DC12V

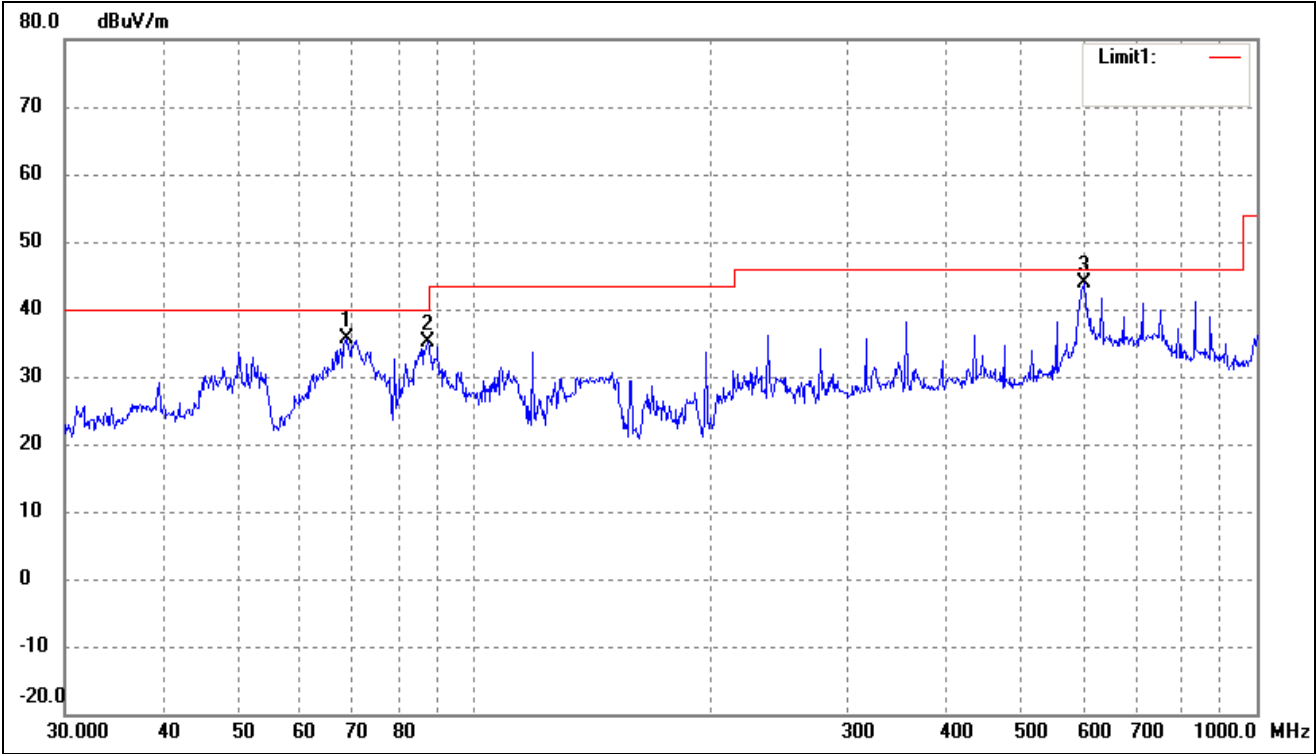
Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	197.8927	31.54	3.58	35.12	43.50	-8.38	210	100	peak
2	316.5889	29.06	12.28	41.34	46.00	-4.66	126	100	peak
3	356.6757	30.23	12.15	42.38	46.00	-3.62	65	100	peak
4	595.1328	23.03	18.41	41.44	46.00	-4.56	120	100	peak



Test Specification: Vertical

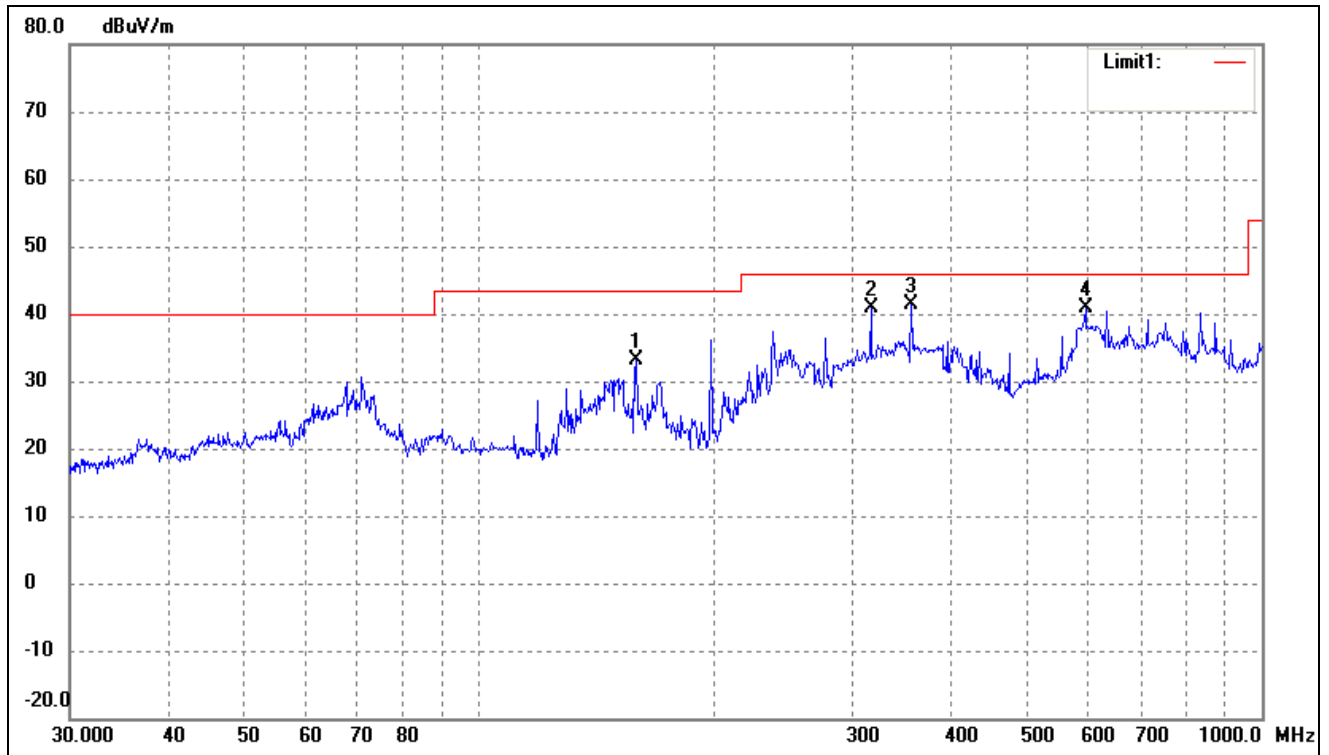


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	68.6310	32.03	3.49	35.52	40.00	-4.48	89	100	peak
2	87.4176	31.88	3.20	35.08	40.00	-4.92	25	100	peak
3	601.4265	24.71	19.22	43.93	46.00	-2.07	223	100	peak

Operating Condition: 802.11g Transmitting High Channel-2462MHz

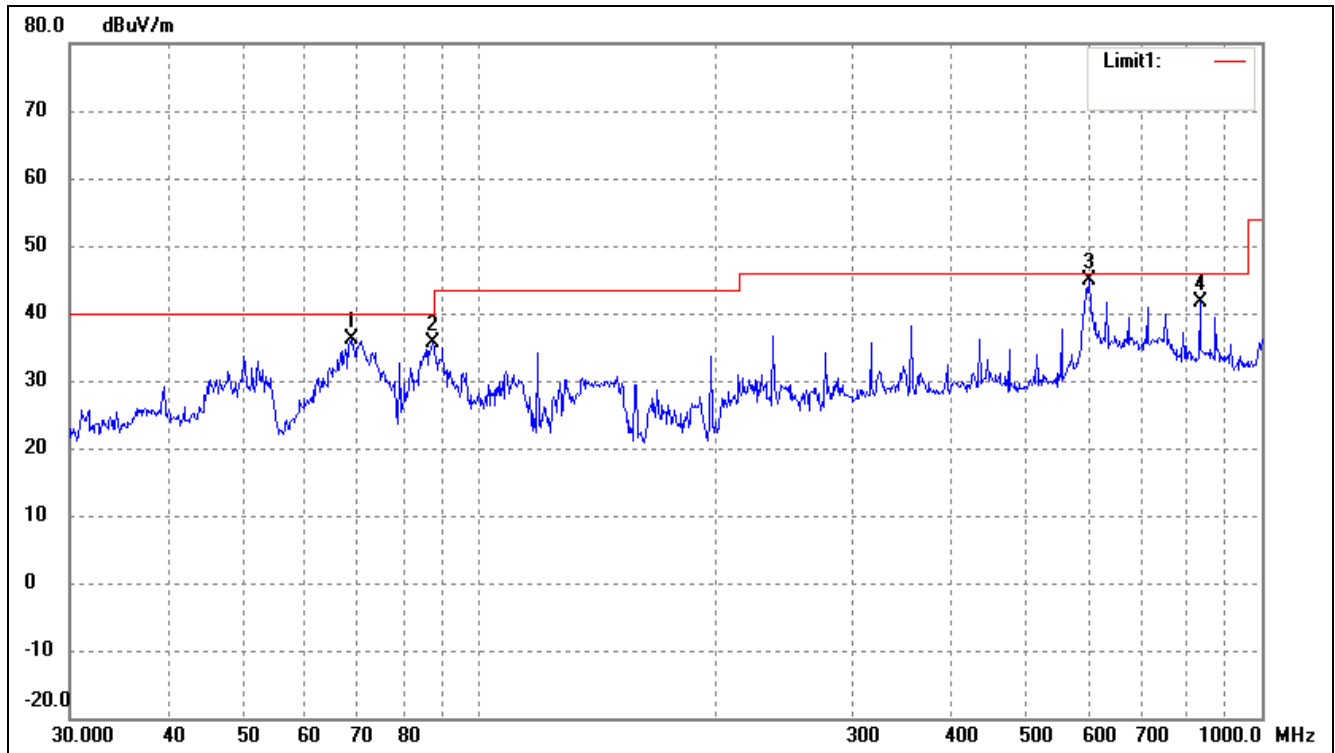
Comment: Adapter:DC12V

Test Specification: Horizontal

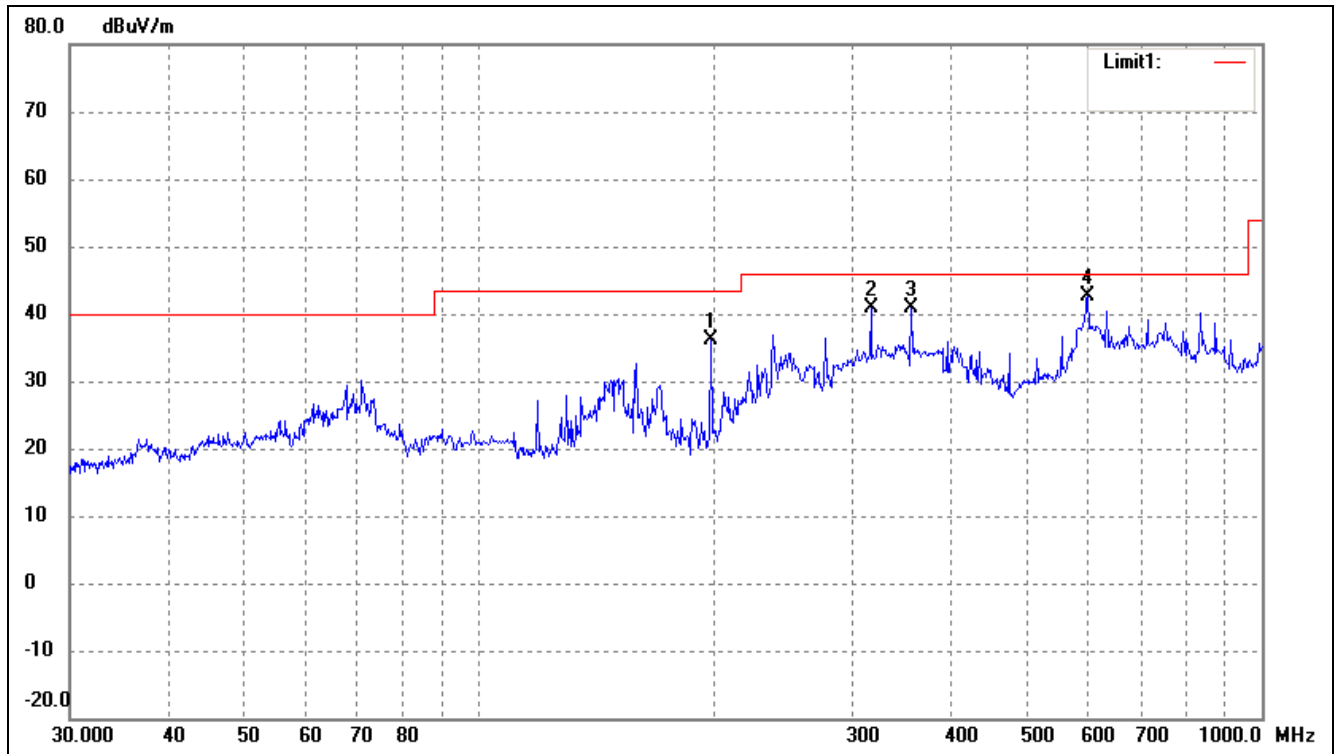


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	158.6676	30.48	2.66	33.14	43.50	-10.36	270	100	peak
2	316.5889	28.56	12.28	40.84	46.00	-5.16	51	100	peak
3	356.6757	29.23	12.15	41.38	46.00	-4.62	89	100	peak
4	595.1328	22.53	18.41	40.94	46.00	-5.06	310	100	peak

Test Specification: Vertical

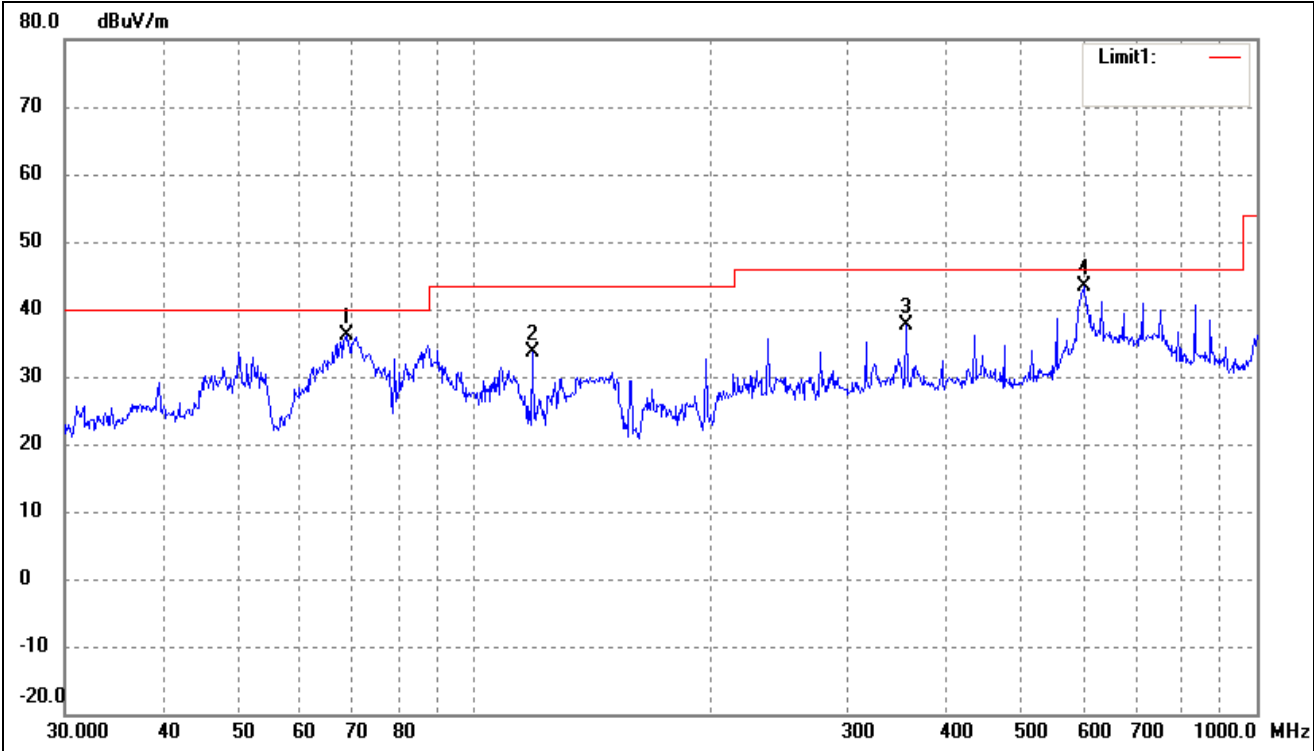


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	68.6310	32.53	3.49	36.02	40.00	-3.98	95	100	peak
2	87.4176	32.38	3.20	35.58	40.00	-4.42	120	100	peak
3	601.4265	25.71	19.22	44.93	46.00	-1.07	301	100	peak
4	833.3170	24.37	17.36	41.73	46.00	-4.27	126	100	peak

**Plot of Radiated Emissions Test Data (30MHz to 1GHz)***EUT:* Wireless Digital Display*Tested Model:* PXT510WR04F*Operating Condition:* 802.11n-HT20 Transmitting Low Channel-2412MHz*Comment:* Adapter:DC12V*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	197.8927	32.54	3.58	36.12	43.50	-7.38	263	100	peak
2	316.5889	28.56	12.28	40.84	46.00	-5.16	112	100	peak
3	356.6757	28.73	12.15	40.88	46.00	-5.12	29	100	peak
4	599.3212	23.35	19.19	42.54	46.00	-3.46	221	100	peak

Test Specification: Vertical

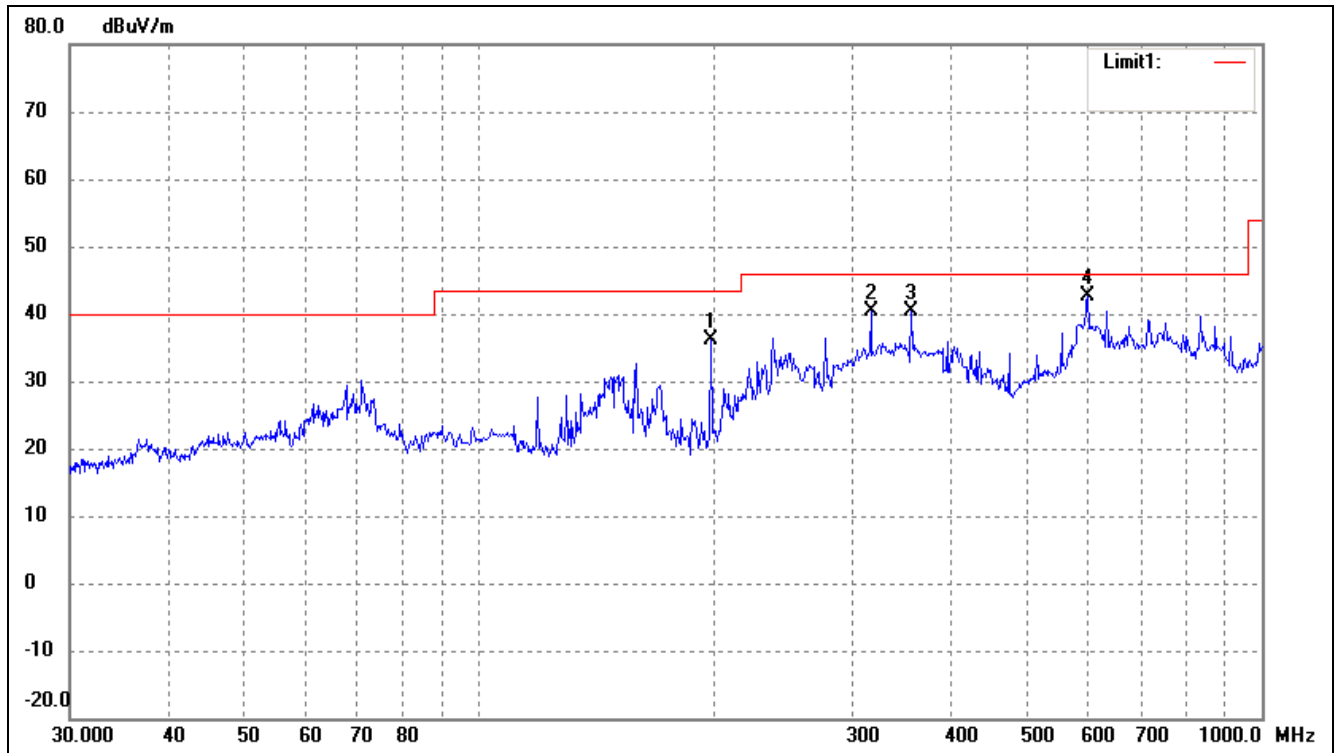


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	68.6310	32.53	3.49	36.02	40.00	-3.98	85	100	peak
2	118.6013	28.53	5.03	33.56	43.50	-9.94	127	100	peak
3	356.6757	25.46	12.15	37.61	46.00	-8.39	23	100	peak
4	601.4265	24.21	19.22	43.43	46.00	-2.57	129	100	peak

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

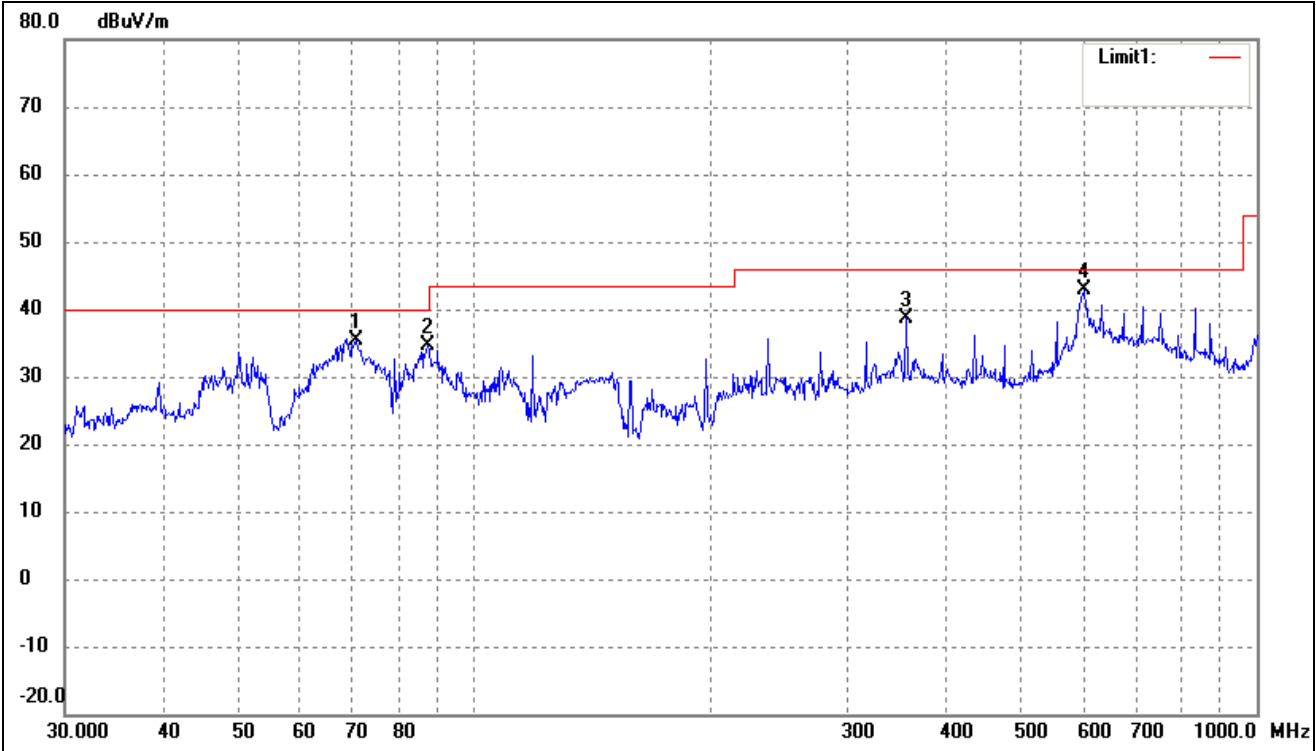
Comment: Adapter:DC12V

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	197.8927	32.54	3.58	36.12	43.50	-7.38	78	100	peak
2	316.5889	28.06	12.28	40.34	46.00	-5.66	126	100	peak
3	356.6757	28.23	12.15	40.38	46.00	-5.62	36	100	peak
4	599.3212	23.35	19.19	42.54	46.00	-3.46	201	100	peak

Test Specification: Vertical

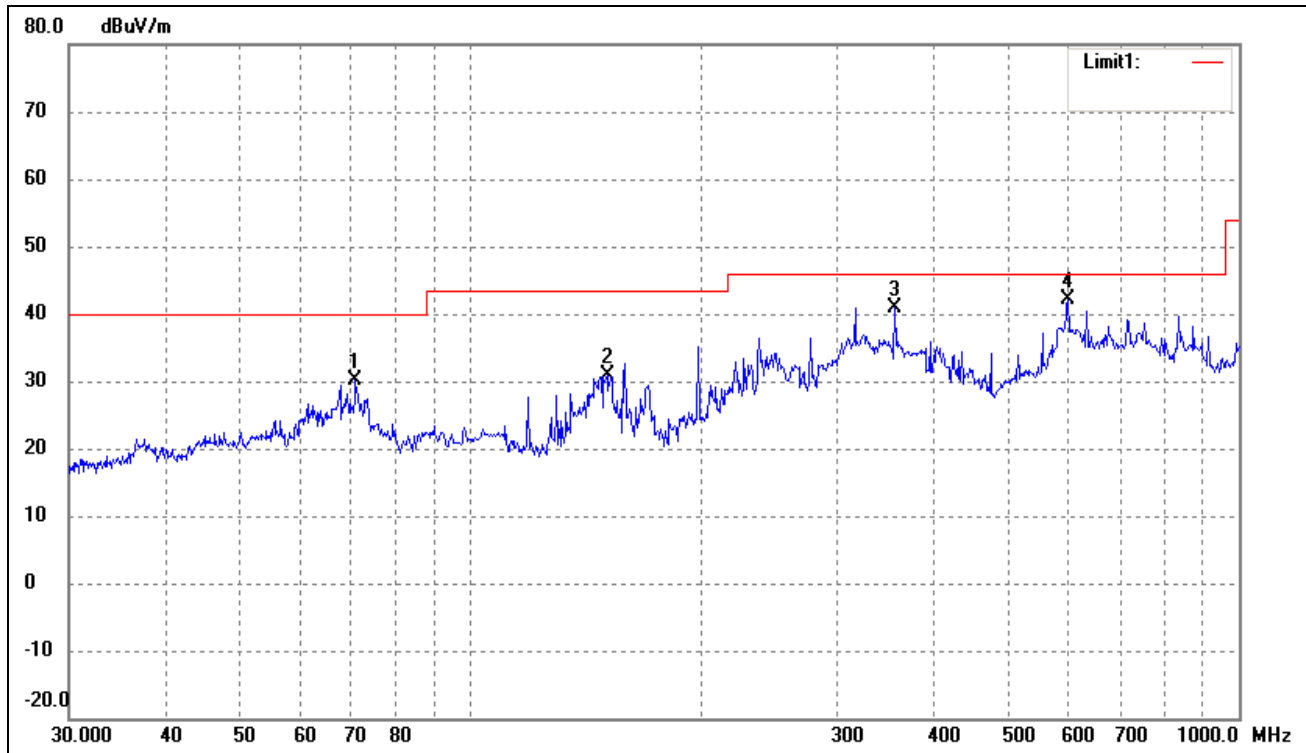


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	70.8315	32.31	3.09	35.40	40.00	-4.60	165	100	peak
2	87.4176	31.38	3.20	34.58	40.00	-5.42	230	100	peak
3	356.6757	26.46	12.15	38.61	46.00	-7.39	146	100	peak
4	601.4265	23.71	19.22	42.93	46.00	-3.07	87	100	peak

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

Comment: Adapter:DC12V

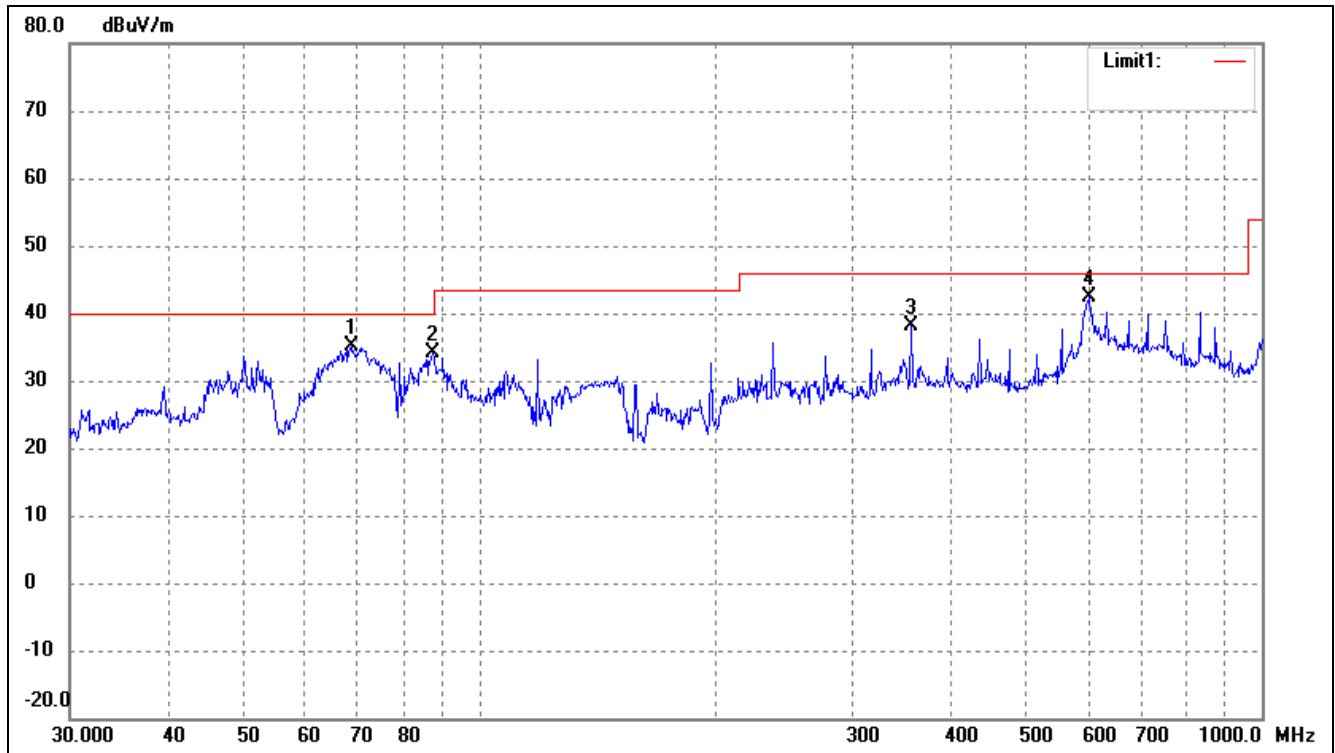
Test Specification: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( ° )	(cm)	
1	70.8315	27.00	3.09	30.09	40.00	-9.91	143	100	peak
2	150.5378	27.78	2.98	30.76	43.50	-12.74	98	100	peak
3	356.6757	28.73	12.15	40.88	46.00	-5.12	113	200	peak
4	599.3212	22.85	19.19	42.04	46.00	-3.96	239	200	peak



Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	68.6310	31.53	3.49	35.02	40.00	-4.98	68	100	peak
2	87.4176	30.88	3.20	34.08	40.00	-5.92	231	100	peak
3	356.6757	25.96	12.15	38.11	46.00	-7.89	64	100	peak
4	601.4265	23.21	19.22	42.43	46.00	-3.57	18	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	54.07	-3.87	50.20	74.00	-23.80	H	PK
4824.000	38.81	-3.87	34.94	54.00	-19.06	H	AV
7236.000	46.32	1.14	47.46	74.00	-26.54	H	PK
7236.000	34.93	1.19	36.12	54.00	-17.88	H	AV
4824.000	57.31	-3.86	53.45	74.00	-20.55	V	PK
4824.000	40.52	-3.86	36.66	54.00	-17.34	V	AV
7236.000	49.11	1.10	50.21	74.00	-23.79	V	PK
7236.000	37.42	1.10	38.52	54.00	-15.48	V	AV
Middle Channel-2437MHz							
4874.000	54.72	-3.74	50.98	74.00	-23.02	H	PK
4874.000	39.91	-3.74	36.17	54.00	-17.83	H	AV
7311.000	47.76	1.47	49.23	74.00	-24.77	H	PK
7311.000	33.11	1.47	34.58	54.00	-19.42	H	AV
4874.000	53.95	-3.74	50.21	74.00	-23.79	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	34.07	1.47	35.54	54.00	-18.46	V	AV
High Channel-2462MHz							
4924.000	55.81	-3.59	52.22	74.00	-21.78	H	PK
4924.000	41.72	-3.59	38.13	54.00	-15.87	H	AV
7386.000	46.33	1.79	48.12	74.00	-25.88	H	PK
7386.000	34.86	1.79	36.65	54.00	-17.35	H	AV
4924.000	54.99	-3.59	51.40	74.00	-22.60	V	PK
4924.000	42.08	-3.59	38.49	54.00	-15.51	V	AV
7386.000	47.91	1.79	49.70	74.00	-24.30	V	PK
7386.000	35.11	1.79	36.90	54.00	-17.10	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	55.55	-3.86	51.69	74.00	-22.31	H	PK
4824.000	42.26	-3.86	38.40	54.00	-15.60	H	AV
7236.000	48.41	1.10	49.51	74.00	-24.49	H	PK
7236.000	34.42	1.10	35.52	54.00	-18.48	H	AV
4824.000	55.96	-3.86	52.10	74.00	-21.90	V	PK
4824.000	42.62	-3.86	38.76	54.00	-15.24	V	AV
7236.000	49.21	1.10	50.31	74.00	-23.69	V	PK
7236.000	35.50	1.10	36.60	54.00	-17.40	V	AV
Middle Channel-2437MHz							
4874.000	55.12	-3.74	51.38	74.00	-22.62	H	PK
4874.000	43.23	-3.74	39.49	54.00	-14.51	H	AV
7311.000	47.31	1.47	48.78	74.00	-25.22	H	PK
7311.000	35.25	1.47	36.72	54.00	-17.28	H	AV
4874.000	57.06	-3.74	53.32	74.00	-20.68	V	PK
4874.000	43.88	-3.74	40.14	54.00	-13.86	V	AV
7311.000	48.41	1.47	49.88	74.00	-24.12	V	PK
7311.000	35.33	1.47	36.80	54.00	-17.20	V	AV
High Channel-2462MHz							
4924.000	54.01	-3.59	50.42	74.00	-23.58	H	PK
4924.000	40.72	-3.59	37.13	54.00	-16.87	H	AV
7386.000	47.16	1.79	48.95	74.00	-25.05	H	PK
7386.000	34.79	1.79	36.58	54.00	-17.42	H	AV
4924.000	56.18	-3.59	52.59	74.00	-21.41	V	PK
4924.000	42.64	-3.59	39.05	54.00	-14.95	V	AV
7386.000	48.51	1.79	50.30	74.00	-23.70	V	PK
7386.000	35.92	1.79	37.71	54.00	-16.29	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	55.65	-3.86	51.79	74.00	-22.21	H	PK
4824.000	40.56	-3.86	36.70	54.00	-17.30	H	AV
7236.000	47.21	1.10	48.31	74.00	-25.69	H	PK
7236.000	34.42	1.10	35.52	54.00	-18.48	H	AV
4824.000	56.73	-3.86	52.87	74.00	-21.13	V	PK
4824.000	43.11	-3.86	39.25	54.00	-14.75	V	AV
7236.000	49.25	1.10	50.35	74.00	-23.65	V	PK
7236.000	35.76	1.10	36.86	54.00	-17.14	V	AV
Middle Channel-2437MHz							
4874.000	54.11	-3.74	50.37	74.00	-23.63	H	PK
4874.000	42.46	-3.74	38.72	54.00	-15.28	H	AV
7311.000	48.72	1.47	50.19	74.00	-23.81	H	PK
7311.000	33.11	1.47	34.58	54.00	-19.42	H	AV
4874.000	54.95	-3.74	51.21	74.00	-22.79	V	PK
4874.000	42.69	-3.74	38.95	54.00	-15.05	V	AV
7311.000	48.47	1.47	49.94	74.00	-24.06	V	PK
7311.000	35.21	1.47	36.68	54.00	-17.32	V	AV
High Channel-2462MHz							
4924.000	53.92	-3.59	50.33	74.00	-23.67	H	PK
4924.000	43.21	-3.59	39.62	54.00	-14.38	H	AV
7386.000	48.35	1.79	50.14	74.00	-23.86	H	PK
7386.000	36.16	1.79	37.95	54.00	-16.05	H	AV
4924.000	55.79	-3.59	52.20	74.00	-21.80	V	PK
4924.000	41.47	-3.59	37.88	54.00	-16.12	V	AV
7386.000	48.12	1.79	49.91	74.00	-24.09	V	PK
7386.000	35.35	1.79	37.14	54.00	-16.86	V	AV

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

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

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## 9. Out of Band Emissions

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### 9.1 Standard Applicable

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

### 9.2 Test Procedure

According to the KDB 558074D01 v03r03, the band-edge radiated test method as follows:

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

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

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

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

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

According to the KDB 558074 D01 V03r03, the conducted spurious emissions test method as follows:

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

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

### 9.3 Environmental Conditions

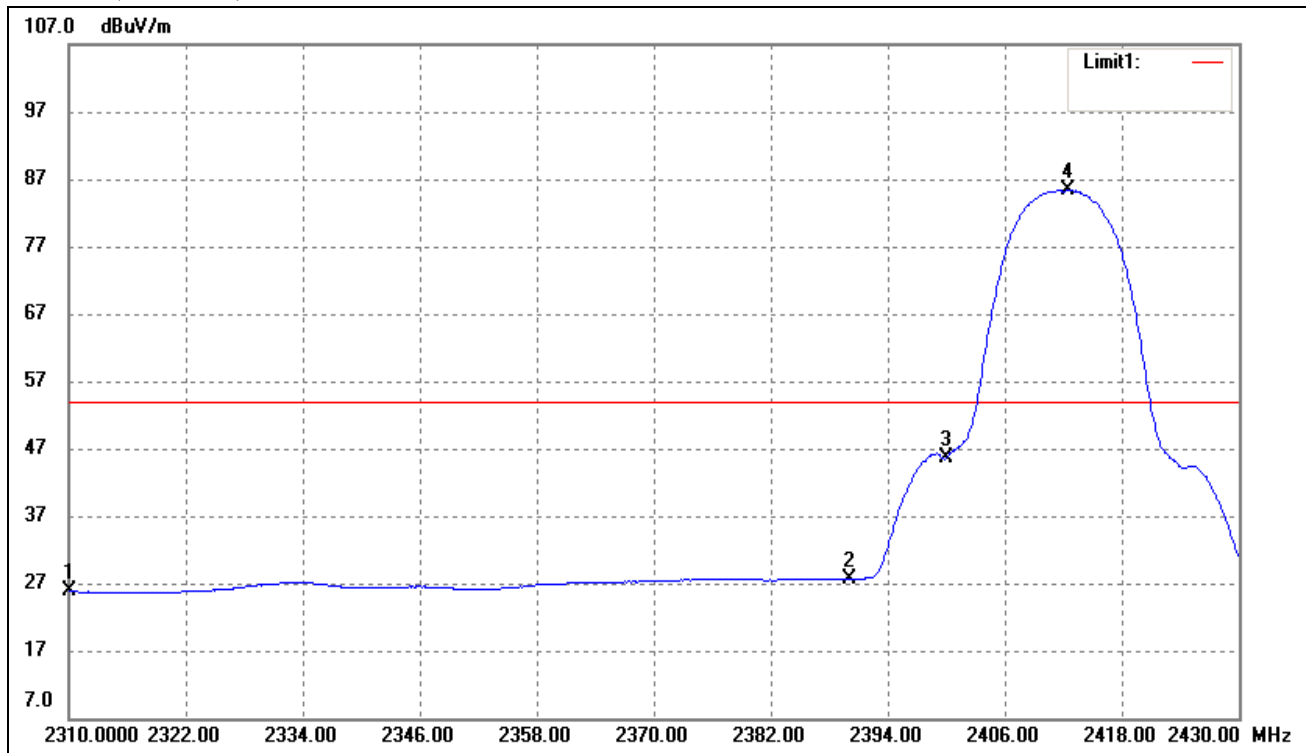
Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

### 9.4 Summary of Test Results/Plots

Please refer to the test plots as below.

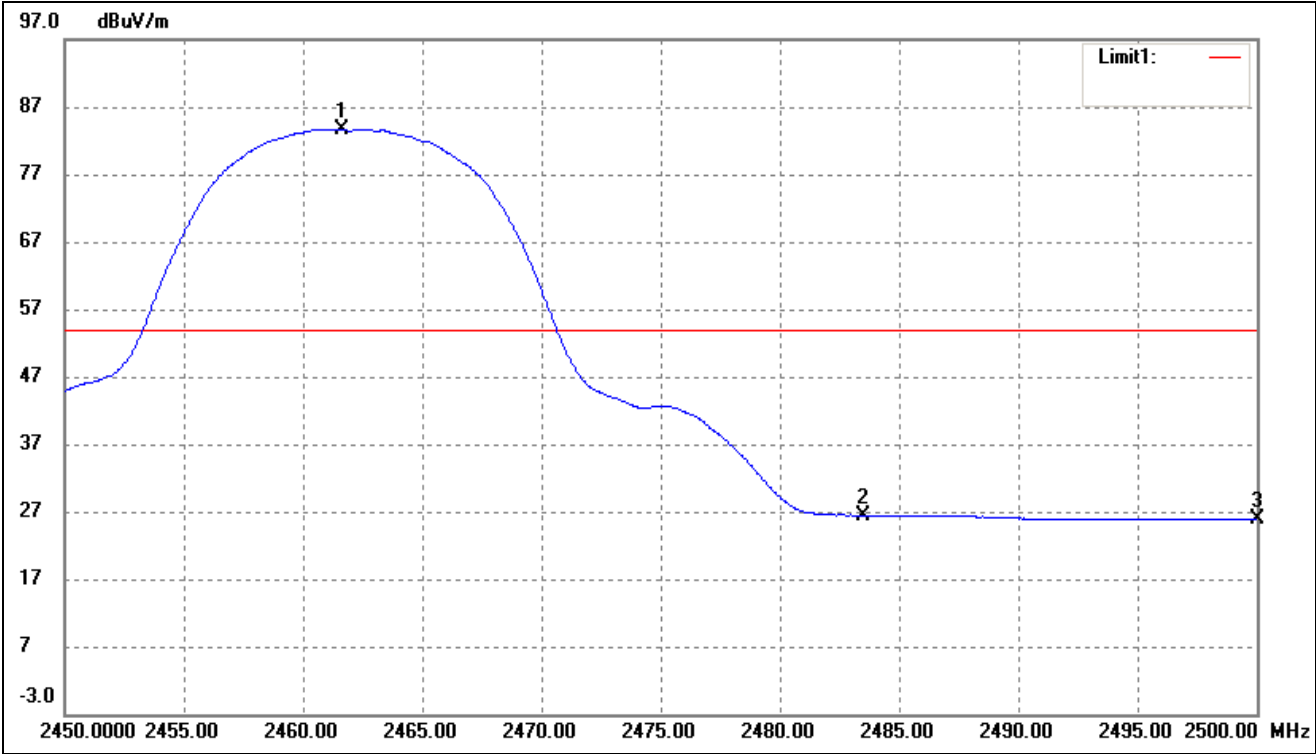
802.11b-Lowest Bandedge

Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	29.50	-3.71	25.79	54.00	-28.21	Average Detector
	2310.000	42.81	-3.71	39.10	74.00	-34.90	Peak Detector
2	2390.000	31.27	-3.54	27.73	54.00	-26.27	Average Detector
	2390.000	44.12	-3.54	40.58	74.00	-33.42	Peak Detector
3	2400.000	49.20	-3.51	45.69	Delta = 39.65 dBc		Average Detector
4	2412.480	88.82	-3.48	85.34			Average Detector

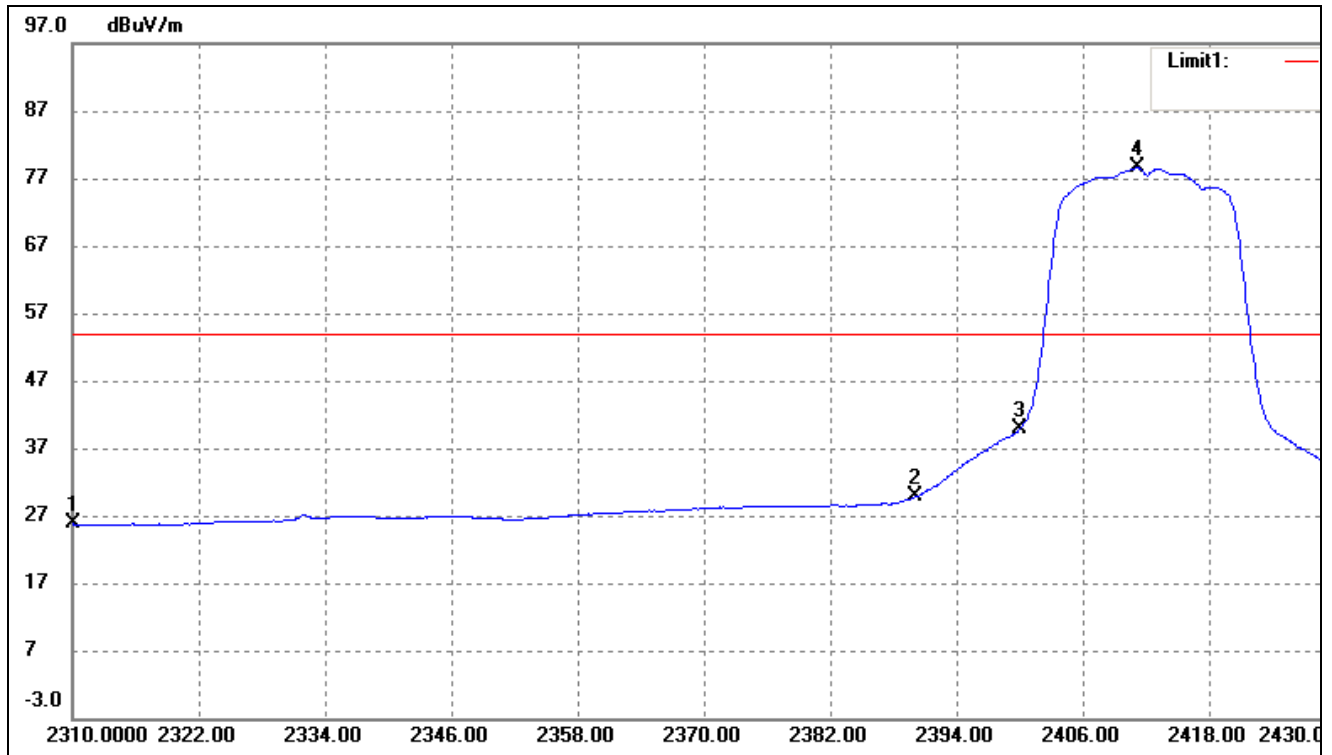
802.11b-Highest Bandedge  
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2461.600	87.03	-3.37	83.66	/	/	Average Detector
	2463.300	96.02	-3.36	92.66	/	/	Peak Detector
2	2483.500	Delta = 58.99dBc		24.67	54.00	-29.33	Average Detector
	2483.500			33.67	74.00	-40.33	Peak Detector
3	2500.000	29.17	-3.28	25.89	54.00	-28.11	Average Detector
	2500.000	41.43	-3.28	38.15	74.00	-35.85	Peak Detector

802.11g-Lowest Bandedge

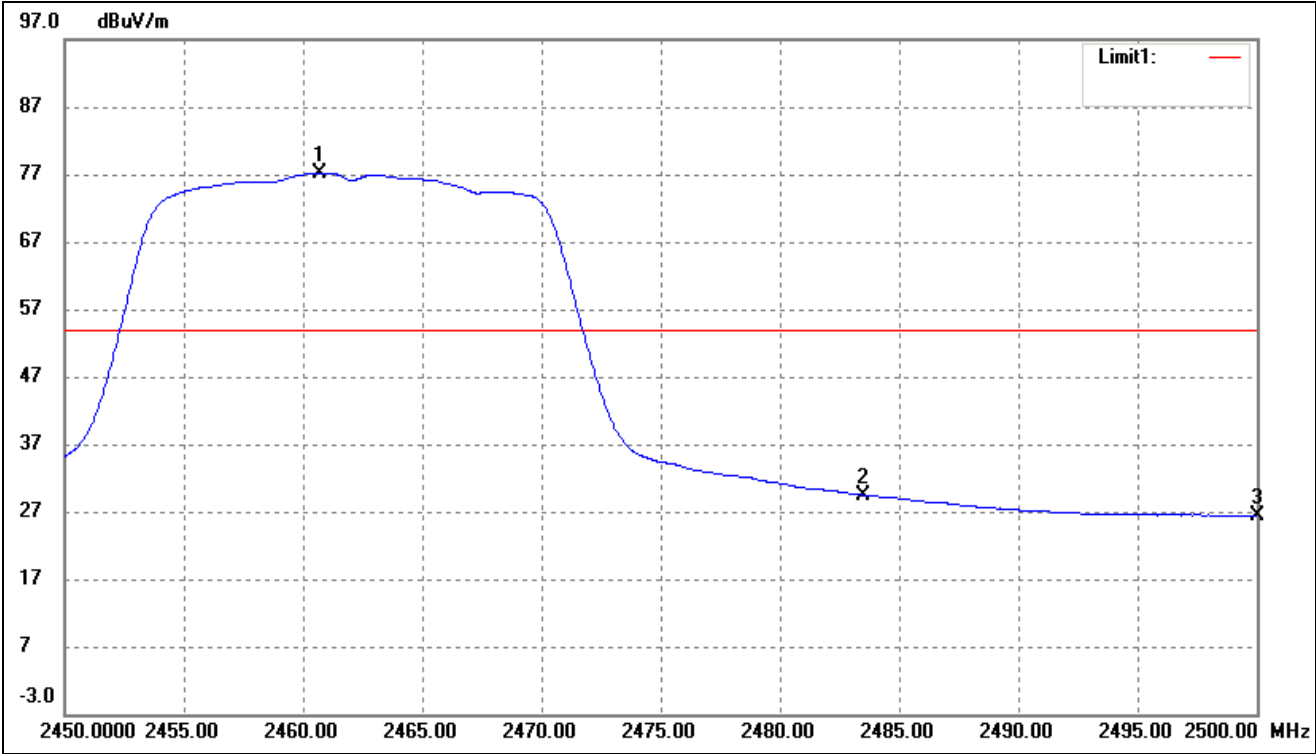
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	29.51	-3.71	25.80	54.00	-28.20	Average Detector
	2310.000	41.73	-3.71	38.02	74.00	-35.98	Peak Detector
2	2390.000	33.32	-3.54	29.78	54.00	-24.22	Average Detector
	2390.000	47.51	-3.54	43.97	74.00	-30.03	Peak Detector
3	2400.000	43.36	-3.51	39.85	Delta = 38.69dBc		Average Detector
4	2411.160	82.02	-3.48	78.54			Average Detector

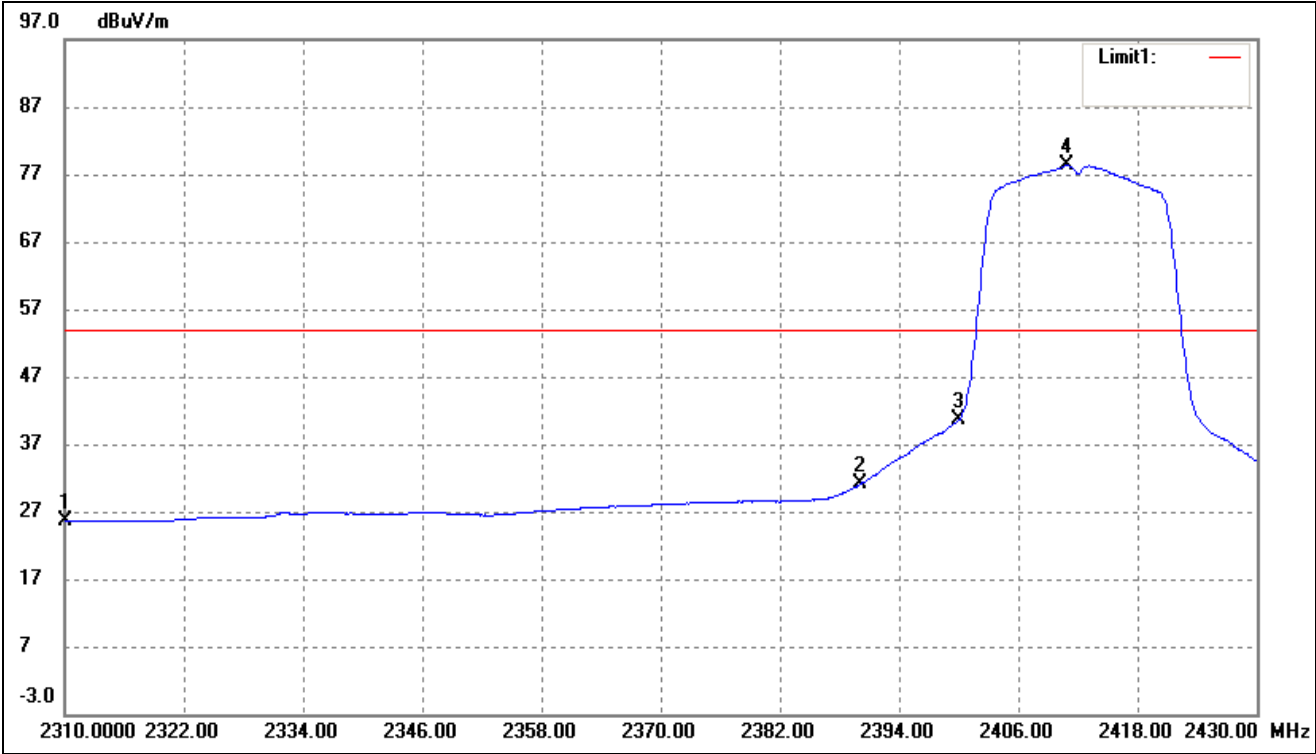


802.11g-Highest Bandedge  
Vertical (Worst case)



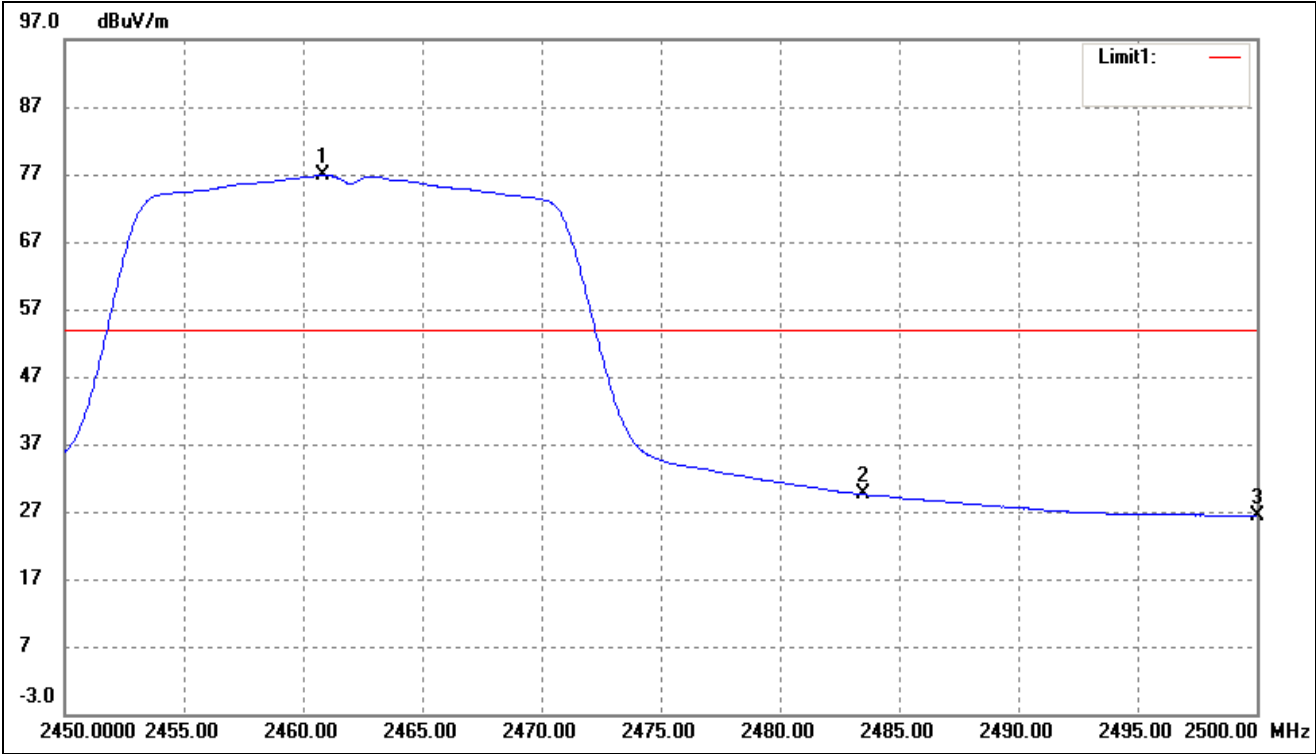
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2460.700	80.60	-3.37	77.23	/	/	Average Detector
	2463.450	91.85	-3.36	88.49	/	/	Peak Detector
1	2483.500	Delta = 46.90dBc		30.33	54.00	-23.69	Average Detector
	2483.500			41.59	74.00	-32.41	Peak Detector
3	2500.000	29.60	-3.28	26.32	54.00	-27.68	Average Detector
	2500.000	42.55	-3.28	39.27	74.00	-34.73	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	29.43	-3.71	25.72	54.00	-28.28	Average Detector
	2310.000	42.34	-3.71	38.63	74.00	-35.37	Peak Detector
2	2390.000	34.55	-3.54	31.01	54.00	-22.99	Average Detector
	2390.000	51.10	-3.54	47.56	74.00	-26.44	Peak Detector
3	2400.000	44.09	-3.51	40.58	Delta = 37.75dBc		Average Detector
4	2410.920	81.81	-3.48	78.33			Average Detector

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



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2460.850	80.29	-3.37	76.92	/	/	Average Detector
	2461.400	91.78	-3.37	88.41	/	/	Peak Detector
2	2483.500	Delta = 48.25dBc		28.67	54.00	-25.33	Average Detector
	2483.500			40.16	74.00	-33.84	Peak Detector
3	2500.000	29.63	-3.28	26.35	54.00	-27.65	Average Detector
	2500.000	41.59	-3.28	38.31	74.00	-35.69	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  $\pm 2.88$  dB.

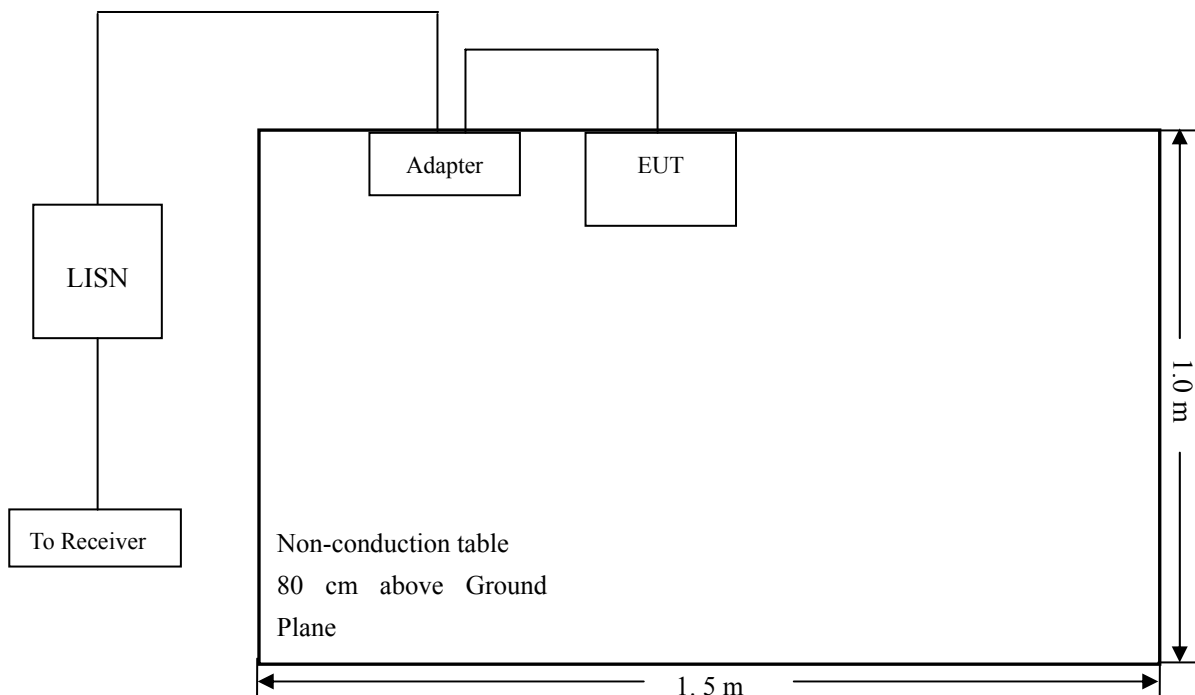
### 10.2 Test Procedure

The setup of EUT is according with per ANSI C63.4-2009 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



## 10.5 Environmental Conditions

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

## 10.6 Test Receiver Setup

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

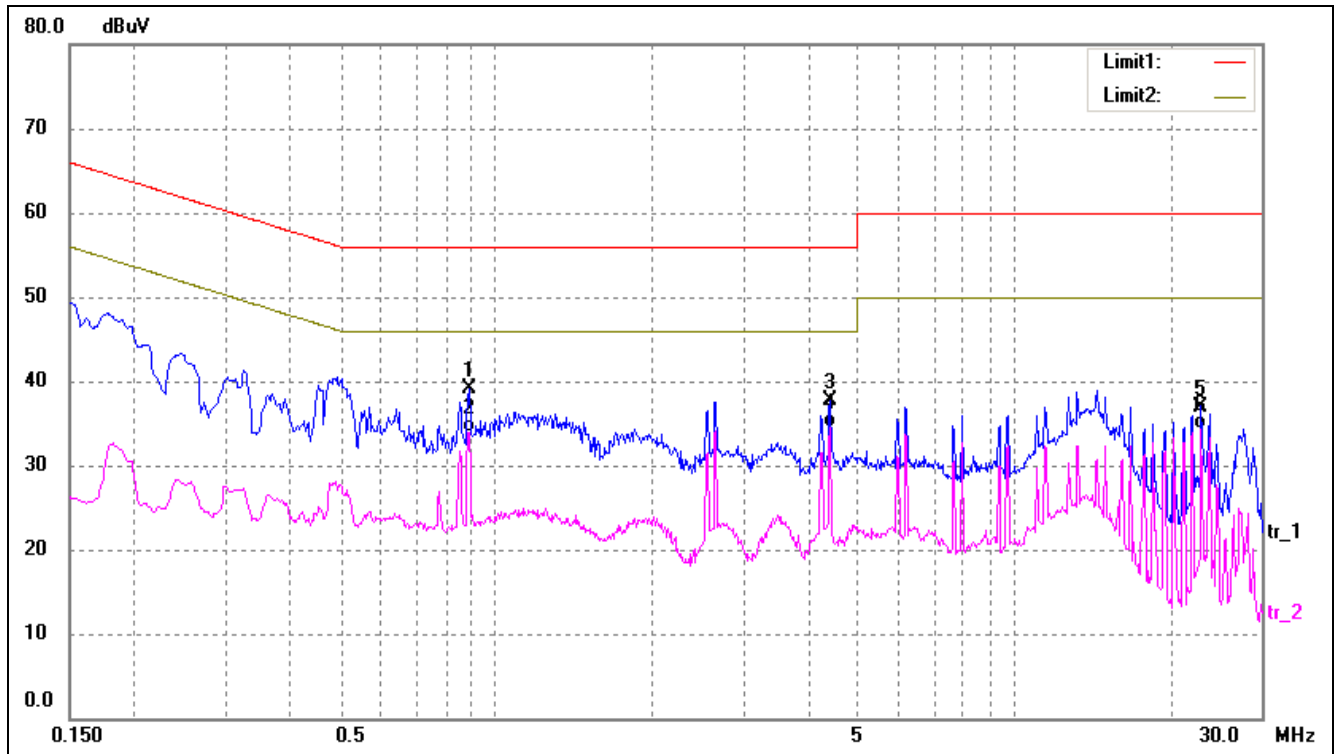
Start Frequency ..... 150 kHz  
Stop Frequency..... 30 MHz  
Sweep Speed ..... Auto  
IF Bandwidth..... 10 kHz  
Quasi-Peak Adapter Bandwidth ..... 9 kHz  
Quasi-Peak Adapter Mode ..... Normal

## 10.7 Summary of Test Results/Plots

According to the data in section 10.8, the EUT complied with the FCC Part 15.207 Conducted margin for a Class B device, with the *worst* margin reading of:

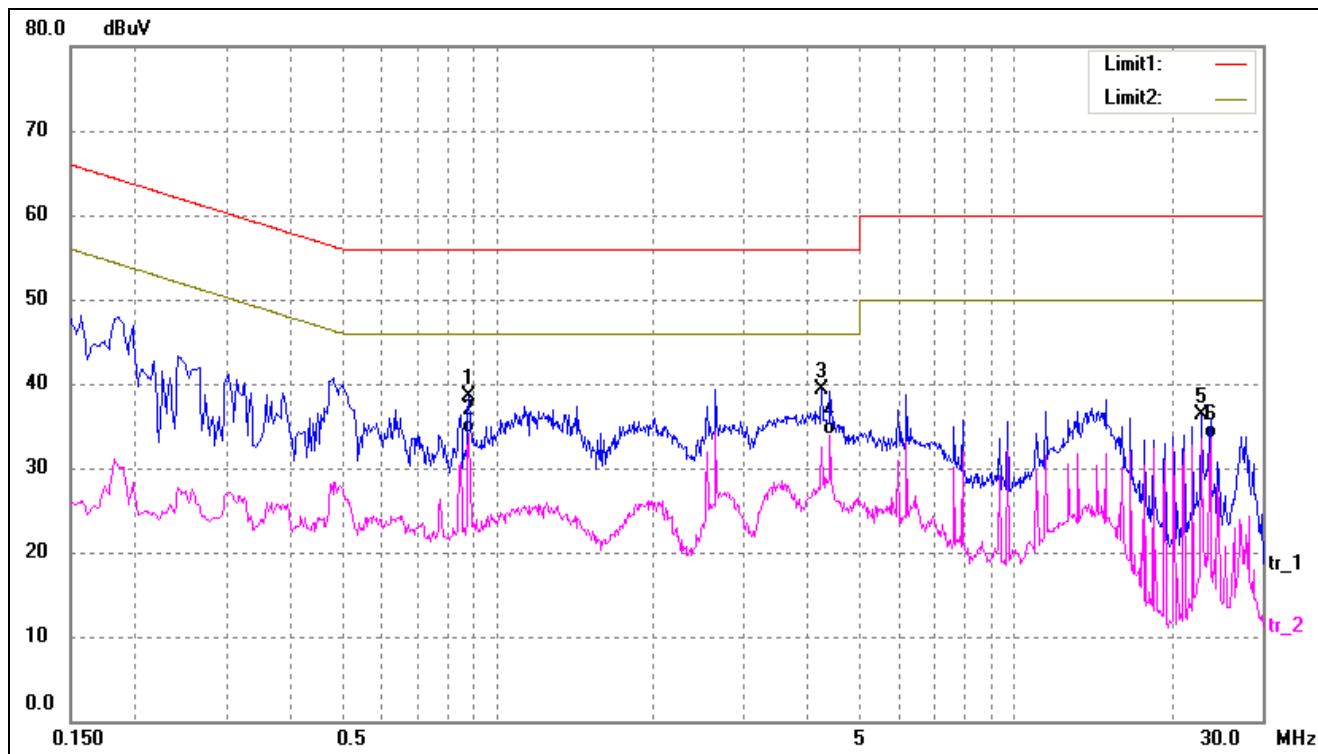
**-11.58 dB at 4.4220 MHz in the Neutral mode, AVG detector, 0.15-30MHz**

## 10.8 Conducted Emissions Test Data

**Plot of Conducted Emissions Test Data***EUT:* Wireless Digital Display*Tested Model:* PXT510WR04F*Operating Condition:* Transmitting(Wi-Fi)*Comment:* Adapter:DC12V*Test Specification:* Neutral

No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.8860	26.12	12.89	39.01	56.00	-16.99	peak
2	0.8860	21.07	12.89	33.96	46.00	-12.04	AVG
3	4.4220	24.76	13.00	37.76	56.00	-18.24	peak
4	4.4220	21.42	13.00	34.42	46.00	-11.58	AVG
5	22.9980	24.67	12.33	37.00	60.00	-23.00	peak
6	22.9980	21.97	12.33	34.30	50.00	-15.70	AVG

Test Specification: Live



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.8820	25.70	12.88	38.58	56.00	-17.42	peak
2*	0.8820	21.18	12.88	34.06	46.00	-11.94	AVG
3	4.2380	26.22	13.00	39.22	56.00	-16.78	peak
4	4.4060	20.86	13.00	33.86	46.00	-12.14	AVG
5	22.8900	23.91	12.30	36.21	60.00	-23.79	peak
6	23.7900	20.90	12.60	33.50	50.00	-16.50	AVG

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