

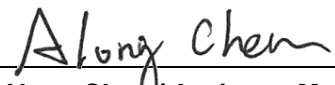
# FCC Test Report

**FCC ID** : ACJ-V2WA  
**Equipment** : Wireless Module  
**Model No.** : PIOT-V2(WA)  
**Brand Name** : Panasonic  
**Applicant** : Panasonic Corporation of North America  
**Address** : Two Riverfront Plaza, 9th Floor Newark New Jersey United States 07102-5490  
**Standard** : 47 CFR FCC Part 15.247  
**Received Date** : Sep. 23, 2020  
**Tested Date** : Sep. 28 ~ Oct. 13, 2020

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:

Approved by:

  
\_\_\_\_\_  
Along Chen / Assistant Manager

  
\_\_\_\_\_  
Gary Chang / Manager



---

## Table of Contents

<b>1</b>	<b>GENERAL DESCRIPTION .....</b>	<b>5</b>
1.1	Information.....	5
1.2	Local Support Equipment List .....	7
1.3	Test Setup Chart .....	7
1.4	The Equipment List .....	8
1.5	Test Standards .....	9
1.6	Reference Guidance .....	9
1.7	Deviation from Test Standard and Measurement Procedure.....	9
1.8	Measurement Uncertainty .....	9
<b>2</b>	<b>TEST CONFIGURATION .....</b>	<b>10</b>
2.1	Testing Facility.....	10
2.2	The Worst Test Modes and Channel Details .....	10
<b>3</b>	<b>TRANSMITTER TEST RESULTS.....</b>	<b>11</b>
3.1	Conducted Emissions.....	11
3.2	6dB and Occupied Bandwidth .....	14
3.3	RF Output Power .....	19
3.4	Power Spectral Density .....	22
3.5	Unwanted Emissions into Restricted Frequency Bands .....	27
3.6	Emissions in Non-Restricted Frequency Bands .....	49
<b>4</b>	<b>TEST LABORATORY INFORMATION .....</b>	<b>53</b>

---

## Release Record

Report No.	Version	Description	Issued Date
FR092302AC	Rev. 01	Initial issue	Oct. 28, 2020

## Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.529MHz 29.59 (Margin -16.41dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2483.50MHz 53.11 (Margin -0.89dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 26.95	Pass
15.247(a)(2)	6dB Bandwidth	Meet the requirement of limit	Pass
15.247(e)	Power Spectral Density	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

### Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

### Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

# 1 General Description

## 1.1 Information

### 1.1.1 Specification of the Equipment under Test (EUT)

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N <sub>TX</sub> )	Data Rate / MCS
2400-2483.5	b	2412-2462	1-11 [11]	1	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	1	6-54 Mbps
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	1	MCS 0-7

Note 1: RF output power specifies that Maximum Peak Conducted Output Power.  
 Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.  
 Note 3: 802.11g/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.

### 1.1.2 Antenna Details

Ant. No.	Brand	Model	Type	Connector	Gain (dBi)	Remarks
1	WNC	ANT-0	Printed	N/A	2.66	---
2	WNC	ANT-1	Printed	N/A	1.28	---

### 1.1.3 Power Supply Type of Equipment under Test (EUT)

<b>Power Supply Type</b>	5Vdc from host
--------------------------	----------------

### 1.1.4 Accessories

N/A

### 1.1.5 Channel List

Channel	Frequency(MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

### 1.1.6 Test Tool and Duty Cycle

Test Tool	AmebaZ2 mptool, Version: 1V3		
Duty Cycle and Duty Factor	Mode	Duty Cycle (%)	Duty Factor (dB)
	11b	99.65%	0.02
	11g	95.40%	0.20
	HT20	95.06%	0.22

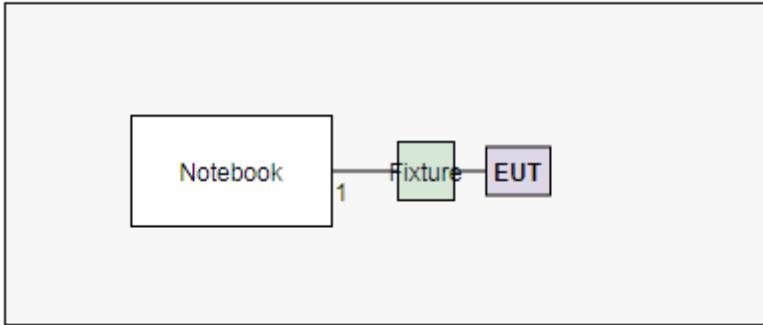
### 1.1.7 Power Index of Test Tool

Modulation Mode	Test Frequency (MHz)	Power Index
11b	2412	106
11b	2437	115
11b	2462	103
11g	2412	99
11g	2437	124
11g	2462	92
HT20	2412	96
HT20	2437	120
HT20	2462	88

## 1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Notebook	DELL	Latitude E6430	DoC	---
2	USB Cable	ICC	extension	---	
3	Fixture	WNC	F5DNSK32.DG1	---	Provided by applicant.

## 1.3 Test Setup Chart

Test Setup Diagram	
 <pre> graph LR     Notebook[Notebook] --- 1  Fixture[Fixture]     Fixture --- EUT[EUT]             </pre>	
No.	Signal cable / Length (m)
1	USB Cable (extension), 1m shielded.

## 1.4 The Equipment List

<b>Test Item</b>	Conducted Emission				
<b>Test Site</b>	Conduction room 1 / (CO01-WS)				
<b>Test Date</b>	Oct. 13, 2020				
<b>Instrument</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Date</b>	<b>Calibration Until</b>
Receiver	R&S	ESR3	101658	Dec. 12, 2019	Dec. 11, 2020
LISN	R&S	ENV216	101579	Mar. 12, 2020	Mar. 11, 2021
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 22, 2019	Oct. 21, 2020
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

<b>Test Item</b>	Radiated Emission				
<b>Test Site</b>	966 chamber 3 / (03CH03-WS)				
<b>Test Date</b>	Sep. 28 ~ Sep. 30, 2020				
<b>Instrument</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Date</b>	<b>Calibration Until</b>
Spectrum Analyzer	R&S	FSV40	101499	Jan. 09, 2020	Jan. 08, 2021
Receiver	R&S	ESR3	101657	Feb. 14, 2020	Feb. 13, 2021
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 29, 2020	Apr. 28, 2021
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Dec. 27, 2019	Dec. 26, 2020
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 15, 2019	Nov. 14, 2020
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 13, 2019	Nov. 12, 2020
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 07, 2019	Oct. 06, 2020
Preamplifier	EMC	EMC02325	980187	Aug. 05, 2020	Aug. 04, 2021
Preamplifier	Agilent	83017A	MY39501309	Sep. 02, 2020	Sep. 01, 2021
Preamplifier	EMC	EMC184045B	980192	Jul. 21, 2020	Jul. 20, 2021
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Sep. 26, 2020	Sep. 25, 2021
RF cable-8M	EMC	EMC104-SM-SM-80 00	181107	Sep. 26, 2020	Sep. 25, 2021
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Sep. 26, 2020	Sep. 25, 2021
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800 -001	Sep. 26, 2020	Sep. 25, 2021
LF cable-3M	EMC	EMC8D-NM-NM-300 0	131103	Sep. 26, 2020	Sep. 25, 2021
LF cable-13M	EMC	EMC8D-NM-NM-130 00	131104	Sep. 26, 2020	Sep. 25, 2021
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					



<b>Test Item</b>	RF Conducted				
<b>Test Site</b>	(TH01-WS)				
<b>Test Date</b>	Oct. 07, 2020				
<b>Instrument</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Calibration Date</b>	<b>Calibration Until</b>
Spectrum Analyzer	R&S	FSV40	101063	Apr. 30, 2020	Apr. 29, 2021
Spectrum Analyzer	R&S	FSV40	101499	Jan. 09, 2020	Jan. 08, 2021
Power Meter	Anritsu	ML2495A	1241002	Oct. 23, 2019	Oct. 22, 2020
Power Sensor	Anritsu	MA2411B	1207366	Oct. 23, 2019	Oct. 22, 2020
AC POWER SOURCE	APC	AFC-500W	F312060012	Dec. 02, 2019	Dec. 01, 2020
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

## 1.5 Test Standards

47 CFR FCC Part 15.247  
ANSI C63.10-2013

## 1.6 Reference Guidance

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

## 1.7 Deviation from Test Standard and Measurement Procedure

None

## 1.8 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ( $k=2$ )).

Measurement Uncertainty	
Parameters	Uncertainty
Bandwidth	±34.130 Hz
Conducted power	±0.808 dB
Power density	±0.583 dB
Conducted emission	±2.715 dB
AC conducted emission	±2.92 dB
Radiated emission ≤ 1GHz	±3.96 dB
Radiated emission > 1GHz	±4.51 dB

## 2 Test Configuration

### 2.1 Testing Facility

<b>Test Laboratory</b>	International Certification Corp.
<b>Test Site</b>	CO01-WS, TH01-WS
<b>Address of Test Site</b>	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.
<b>Test Site</b>	03CH03-WS
<b>Address of Test Site</b>	No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.

- FCC Designation No.: TW0009
- FCC site registration No.: 207696
- ISED#: 10807A
- CAB identifier: TW2732

### 2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Conducted Emissions	11g	2437	6 Mbps	---
Radiated Emissions ≤1GHz	11g	2437	6 Mbps	---
Radiated Emissions >1GHz				
Maximum Output Power	11b	2412 / 2437 / 2462	1 Mbps	---
6dB bandwidth	11g	2412 / 2437 / 2462	6 Mbps	
Power spectral density	HT20	2412 / 2437 / 2462	MCS 0	
<b>NOTE:</b>				
1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The <b>X-plane</b> results were found as the worst case and were shown in this report.				

## 3 Transmitter Test Results

### 3.1 Conducted Emissions

#### 3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: \* Decreases with the logarithm of the frequency.

#### 3.1.2 Test Procedures

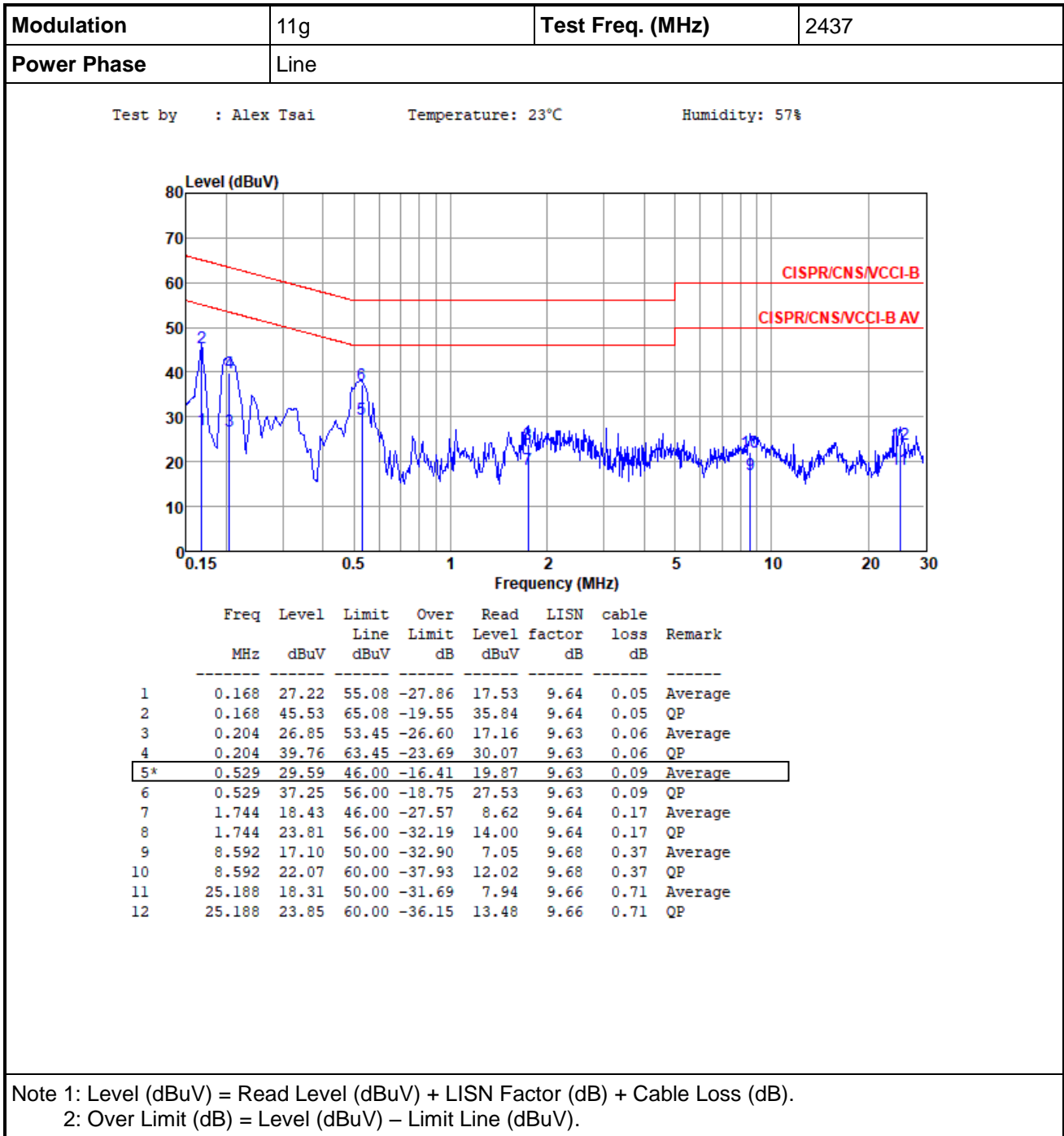
1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50  $\Omega$  LISN port.
3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
4. This measurement was performed with AC 120V / 60Hz.

#### 3.1.3 Test Setup



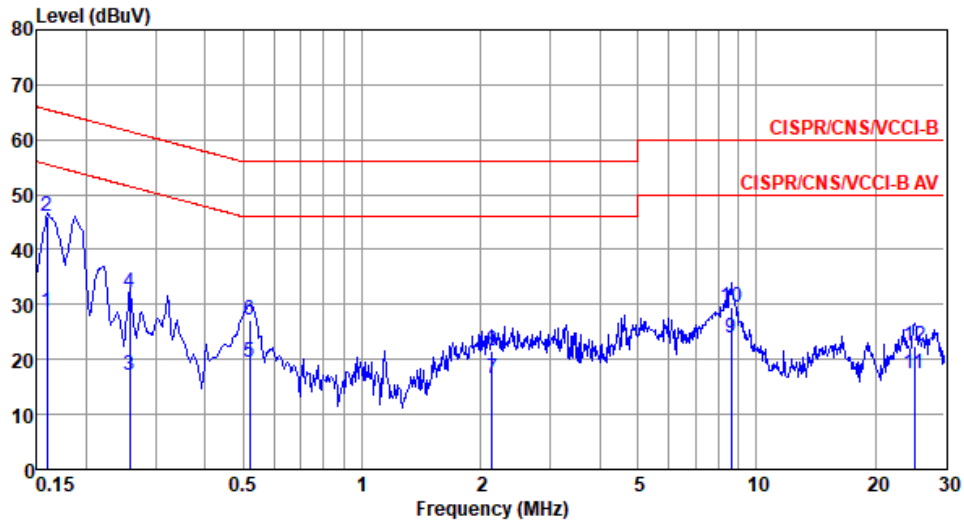
- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

### 3.1.4 Test Result of Conducted Emissions



<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2437
<b>Power Phase</b>	Neutral		

Test by : Alex Tsai      Temperature: 23°C      Humidity: 57%



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.159	28.69	55.52	-26.83	18.98	9.66	0.05	Average
2*	0.159	46.13	65.52	-19.39	36.42	9.66	0.05	QP
3	0.258	17.16	51.51	-34.35	7.44	9.65	0.07	Average
4	0.258	32.17	61.51	-29.34	22.45	9.65	0.07	QP
5	0.518	19.36	46.00	-26.64	9.62	9.65	0.09	Average
6	0.518	27.16	56.00	-28.84	17.42	9.65	0.09	QP
7	2.133	16.49	46.00	-29.51	6.64	9.66	0.19	Average
8	2.133	21.48	56.00	-34.52	11.63	9.66	0.19	QP
9	8.637	24.00	50.00	-26.00	13.91	9.72	0.37	Average
10	8.637	29.49	60.00	-30.51	19.40	9.72	0.37	QP
11	25.188	17.39	50.00	-32.61	6.88	9.80	0.71	Average
12	25.188	22.30	60.00	-37.70	11.79	9.80	0.71	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).  
 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

## 3.2 6dB and Occupied Bandwidth

### 3.2.1 Limit of 6dB Bandwidth

The minimum 6dB bandwidth shall be at least 500 kHz.

### 3.2.2 Test Procedures

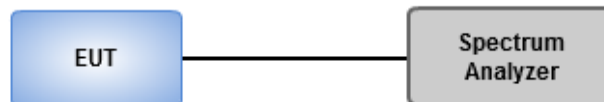
#### 6dB Bandwidth

1. Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth = 300 kHz.
2. Detector = Peak, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

#### Occupied Bandwidth

1. Set resolution bandwidth (RBW) = 1% ~ 5 % of OBW, Video bandwidth = 3 x RBW
2. Detector = Sample, Trace mode = max hold.
3. Sweep = auto couple, Allow the trace to stabilize.
4. Use the OBW measurement function of spectrum analyzer to measure the occupied bandwidth.

### 3.2.3 Test Setup



### 3.2.4 Test Result of 6dB and Occupied Bandwidth

<b>Ambient Condition</b>	22°C / 67%	<b>Tested By</b>	Aska Huang
--------------------------	------------	------------------	------------

#### Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
802.11b_Nss1,(1Mbps)_1TX	9.058M	14.906M	14M9G1D	8.551M	14.255M
802.11g_Nss1,(6Mbps)_1TX	16.377M	20.622M	20M6D1D	16.377M	16.715M
802.11n HT20_Nss1,(MCS0)_1TX	17.536M	19.175M	19M2D1D	17.536M	17.8M

**Max-N dB** = Maximum 6dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth;

**Min-N dB** = Minimum 6dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

#### Result

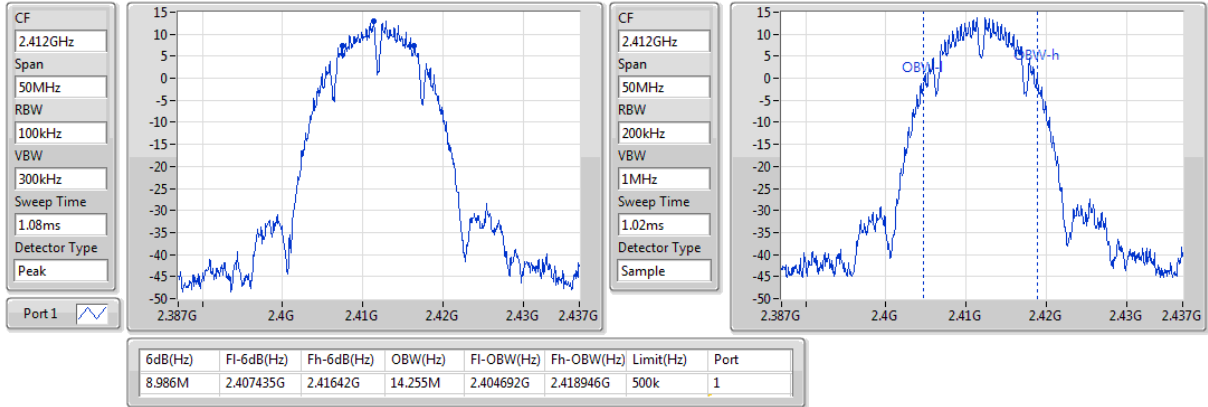
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	8.986M	14.255M
2437MHz	Pass	500k	8.551M	14.906M
2462MHz	Pass	500k	9.058M	14.327M
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	16.377M	16.715M
2437MHz	Pass	500k	16.377M	20.622M
2462MHz	Pass	500k	16.377M	16.715M
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-
2412MHz	Pass	500k	17.536M	17.8M
2437MHz	Pass	500k	17.536M	19.175M
2462MHz	Pass	500k	17.536M	17.8M

**Port X-N dB** = Port X 6dB down bandwidth; **Port X-OBW** = Port X 99% occupied bandwidth;

### 802.11b\_Nss1,(1Mbps)\_1TX

EBW

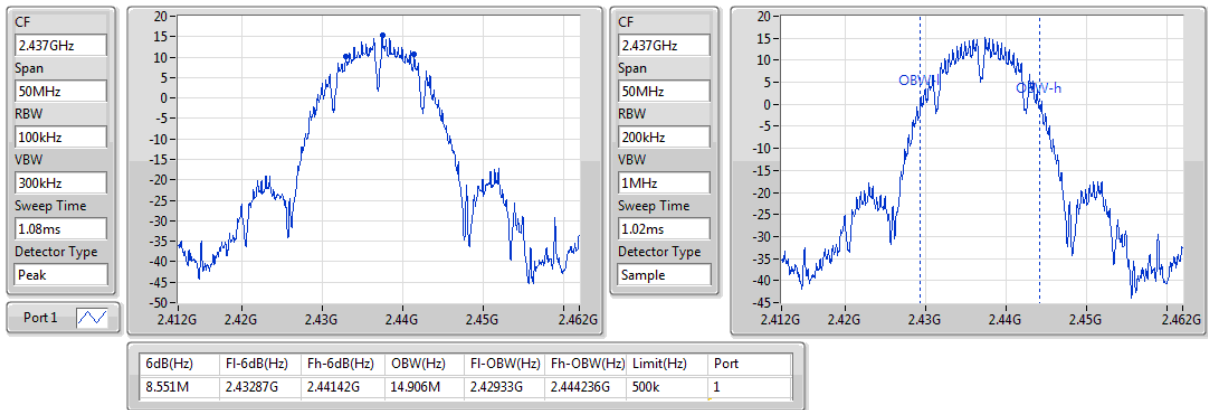
2412MHz



### 802.11b\_Nss1,(1Mbps)\_1TX

EBW

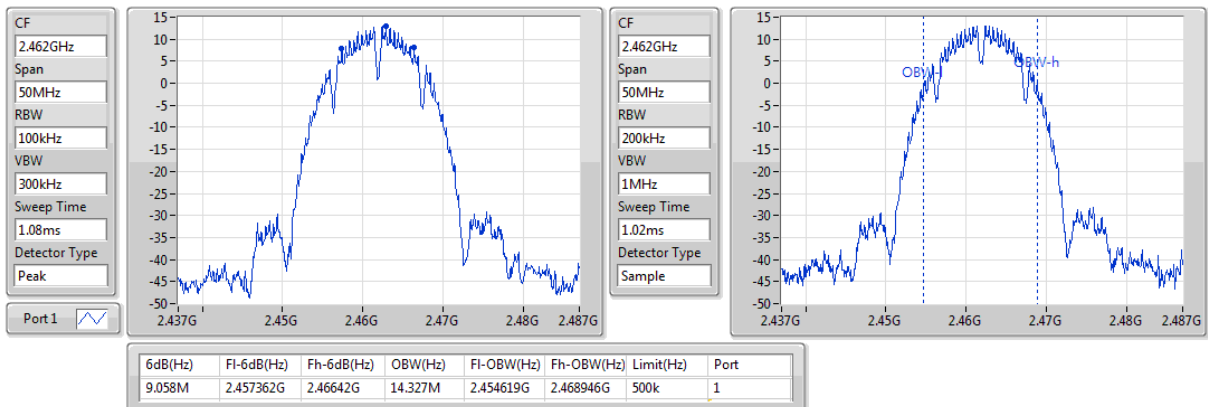
2437MHz



### 802.11b\_Nss1,(1Mbps)\_1TX

EBW

2462MHz

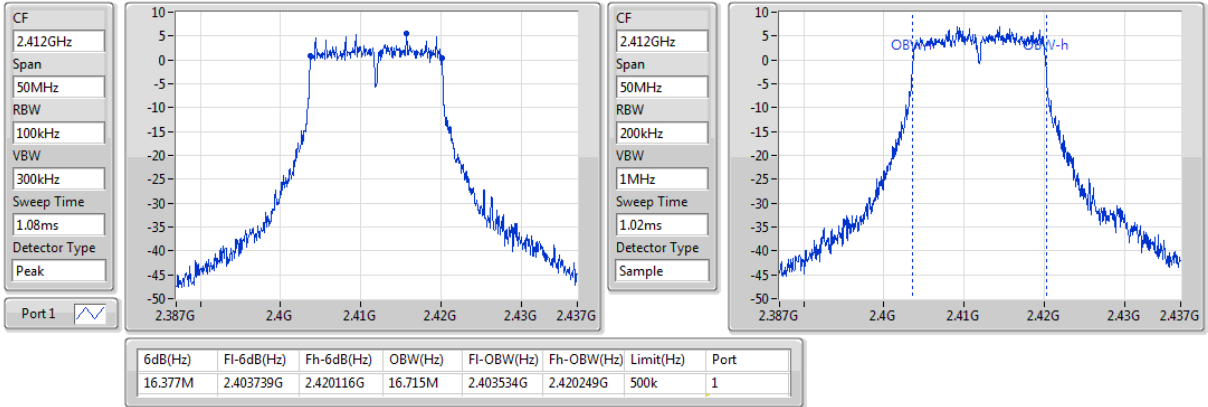




### 802.11g\_Nss1,(6Mbps)\_1TX

EBW

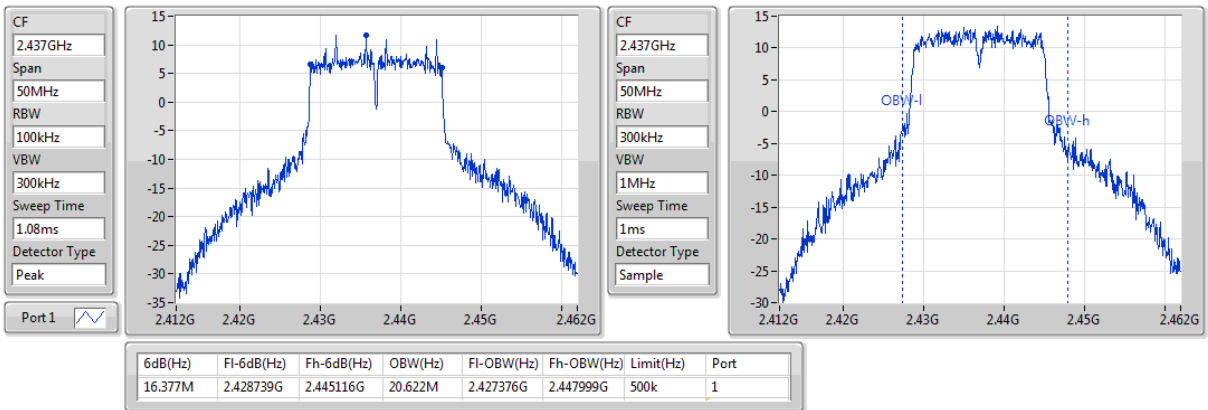
2412MHz



### 802.11g\_Nss1,(6Mbps)\_1TX

EBW

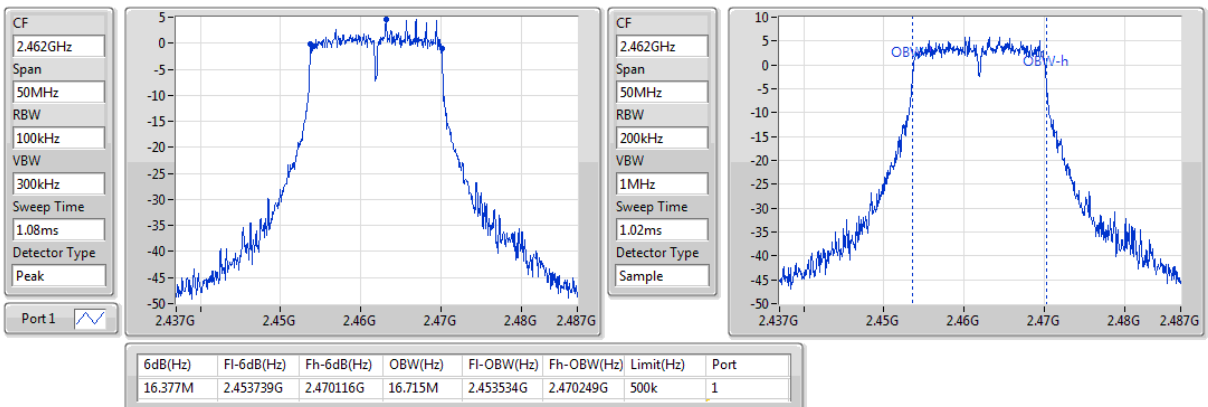
2437MHz



### 802.11g\_Nss1,(6Mbps)\_1TX

EBW

2462MHz

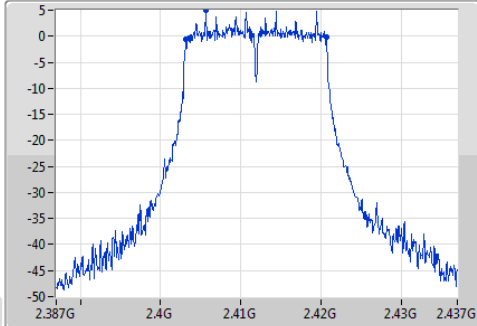


### 802.11n HT20\_Nss1,(MCS0)\_1TX

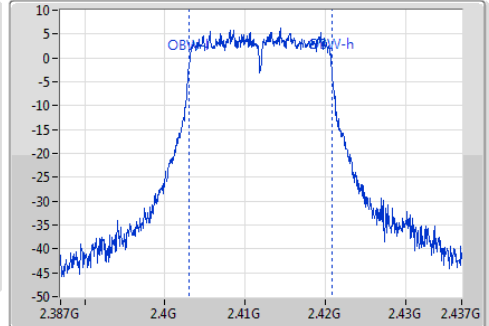
EBW

2412MHz

CF  
2.412GHz  
Span  
50MHz  
RBW  
100kHz  
VBW  
300kHz  
Sweep Time  
1.08ms  
Detector Type  
Peak



CF  
2.412GHz  
Span  
50MHz  
RBW  
200kHz  
VBW  
1MHz  
Sweep Time  
1.02ms  
Detector Type  
Sample



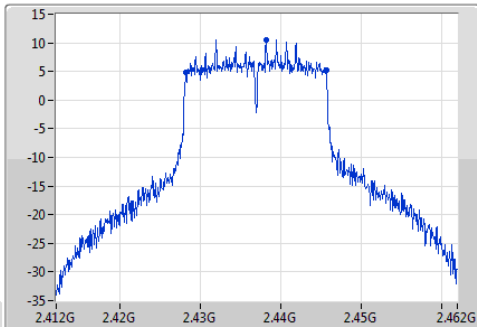
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
17.536M	2.403159G	2.420696G	17.8M	2.403027G	2.420828G	500k	1

### 802.11n HT20\_Nss1,(MCS0)\_1TX

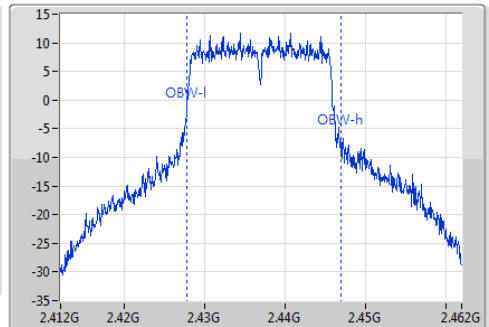
EBW

2437MHz

CF  
2.437GHz  
Span  
50MHz  
RBW  
100kHz  
VBW  
300kHz  
Sweep Time  
1.08ms  
Detector Type  
Peak



CF  
2.437GHz  
Span  
50MHz  
RBW  
200kHz  
VBW  
1MHz  
Sweep Time  
1.02ms  
Detector Type  
Sample



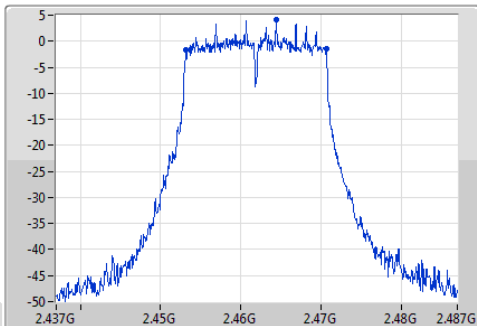
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
17.536M	2.428159G	2.445696G	19.175M	2.427738G	2.446913G	500k	1

### 802.11n HT20\_Nss1,(MCS0)\_1TX

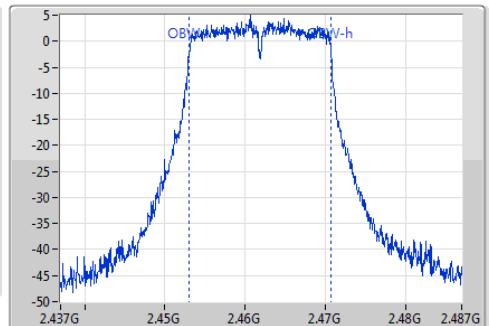
EBW

2462MHz

CF  
2.462GHz  
Span  
50MHz  
RBW  
100kHz  
VBW  
300kHz  
Sweep Time  
1.08ms  
Detector Type  
Peak



CF  
2.462GHz  
Span  
50MHz  
RBW  
200kHz  
VBW  
1MHz  
Sweep Time  
1.02ms  
Detector Type  
Sample



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
17.536M	2.453159G	2.470696G	17.8M	2.452955G	2.470755G	500k	1

### 3.3 RF Output Power

#### 3.3.1 Limit of RF Output Power

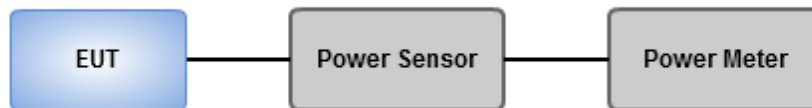
Conducted power shall not exceed 1Watt.

Antenna gain  $\leq 6\text{dBi}$ , no any corresponding reduction is in output power limit.

#### 3.3.2 Test Procedures

A broadband RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.

#### 3.3.3 Test Setup



### 3.3.4 Test Result of Maximum Output Power

<b>Ambient Condition</b>	22°C / 67%	<b>Tested By</b>	Aska Huang
--------------------------	------------	------------------	------------

#### Summary of Peak Conducted Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_1TX	25.71	0.37239
802.11g_Nss1,(6Mbps)_1TX	26.95	0.49545
802.11n HT20_Nss1,(MCS0)_1TX	26.92	0.49204

#### Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.66	24.82	24.82	30.00	27.48	36.00
2437MHz	Pass	2.66	25.71	25.71	30.00	28.37	36.00
2462MHz	Pass	2.66	24.45	24.45	30.00	27.11	36.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.66	25.22	25.22	30.00	27.88	36.00
2437MHz	Pass	2.66	26.95	26.95	30.00	29.61	36.00
2462MHz	Pass	2.66	24.86	24.86	30.00	27.52	36.00
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.66	25.23	25.23	30.00	27.89	36.00
2437MHz	Pass	2.66	26.92	26.92	30.00	29.58	36.00
2462MHz	Pass	2.66	23.99	23.99	30.00	26.65	36.00

**DG** = Directional Gain; **Port X** = Port X output power

**Summary of Conducted (Average) Output Power**

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_1TX	23.61	0.22961
802.11g_Nss1,(6Mbps)_1TX	22.75	0.18836
802.11n HT20_Nss1,(MCS0)_1TX	22.13	0.16331

**Result**

Mode	Result	DG (dBi)	Port 1 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.66	22.38	22.38	-	25.04	-
2437MHz	Pass	2.66	23.61	23.61	-	26.27	-
2462MHz	Pass	2.66	22.03	22.03	-	24.69	-
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.66	17.62	17.62	-	20.28	-
2437MHz	Pass	2.66	22.75	22.75	-	25.41	-
2462MHz	Pass	2.66	16.51	16.51	-	19.17	-
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.66	16.95	16.95	-	19.61	-
2437MHz	Pass	2.66	22.13	22.13	-	24.79	-
2462MHz	Pass	2.66	15.59	15.59	-	18.25	-

**DG** = Directional Gain; **Port X** = Port X output power

**Note** : Conducted average output power is for reference only

## 3.4 Power Spectral Density

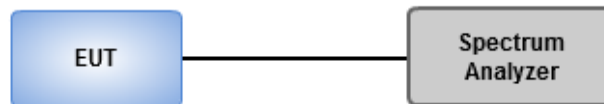
### 3.4.1 Limit of Power Spectral Density

Power spectral density shall not be greater than 8 dBm in any 3 kHz band.

### 3.4.2 Test Procedures

1. Set the RBW = 3 kHz, VBW = 10 kHz.
2. Detector = Peak, Sweep time = auto couple.
3. Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

### 3.4.3 Test Setup



### 3.4.4 Test Result of Power Spectral Density

<b>Ambient Condition</b>	22°C / 67%	<b>Tested By</b>	Aska Huang
--------------------------	------------	------------------	------------

#### Summary

Mode	PD (dBm/3kHz)
2.4-2.4835GHz	-
802.11b_Nss1,(1Mbps)_1TX	0.77
802.11g_Nss1,(6Mbps)_1TX	-3.54
802.11n HT20_Nss1,(MCS0)_1TX	-4.46

#### Result

Mode	Result	DG (dBi)	Port 1 (dBm/3kHz)	PD (dBm/3kHz)	PD Limit (dBm/3kHz)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	2.66	-0.43	-0.43	8.00
2437MHz	Pass	2.66	0.77	0.77	8.00
2462MHz	Pass	2.66	-1.63	-1.63	8.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	2.66	-8.21	-8.21	8.00
2437MHz	Pass	2.66	-3.54	-3.54	8.00
2462MHz	Pass	2.66	-9.77	-9.77	8.00
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-
2412MHz	Pass	2.66	-9.11	-9.11	8.00
2437MHz	Pass	2.66	-4.46	-4.46	8.00
2462MHz	Pass	2.66	-11.08	-11.08	8.00

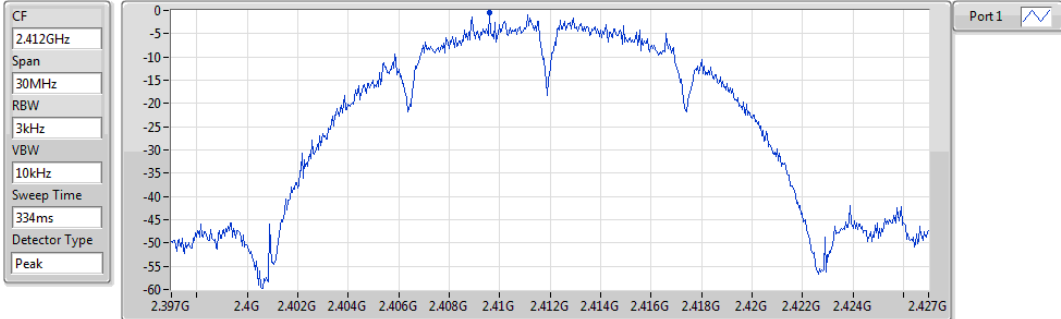
**DG** = Directional Gain;

**PD** = Maximum power density; **Port X** = Port X power density;

### 802.11b\_Nss1,(1Mbps)\_1TX

PSD

#### 2412MHz

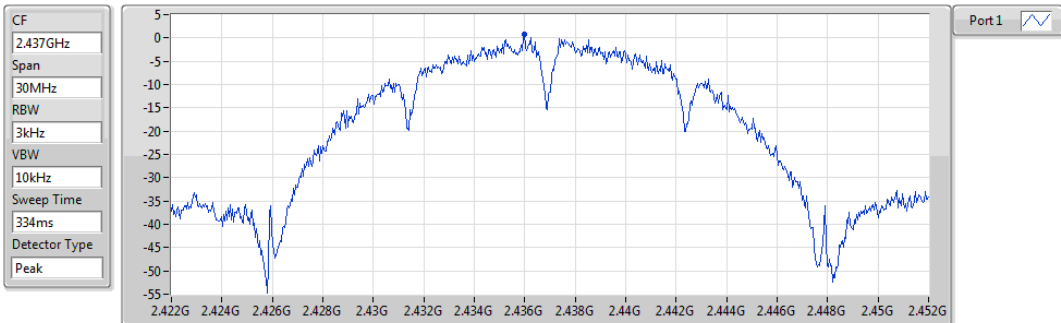


Sum	PD	Port 1
(dBm/100kHz)	(dBm/100kHz)	(dBm/100kHz)
-0.43	-0.43	-0.43

### 802.11b\_Nss1,(1Mbps)\_1TX

PSD

#### 2437MHz

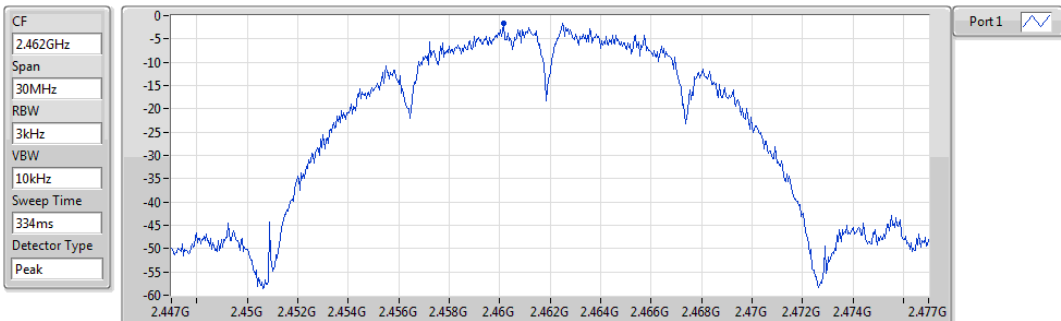


Sum	PD	Port 1
(dBm/100kHz)	(dBm/100kHz)	(dBm/100kHz)
0.77	0.77	0.77

### 802.11b\_Nss1,(1Mbps)\_1TX

PSD

#### 2462MHz



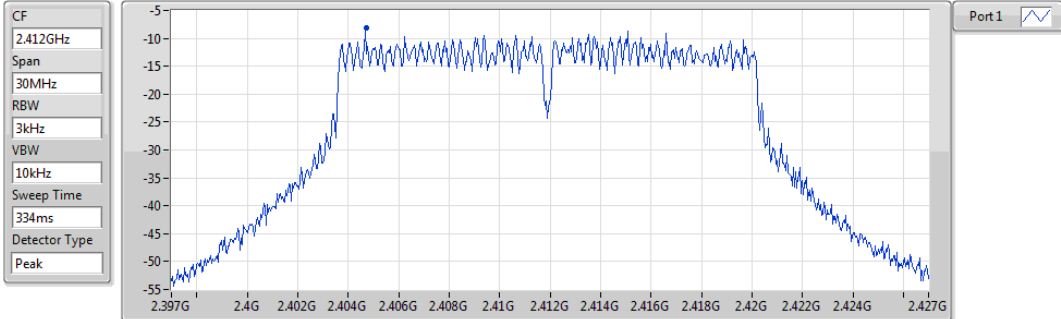
Sum	PD	Port 1
(dBm/100kHz)	(dBm/100kHz)	(dBm/100kHz)
-1.63	-1.63	-1.63



### 802.11g\_Nss1,(6Mbps)\_1TX

PSD

#### 2412MHz

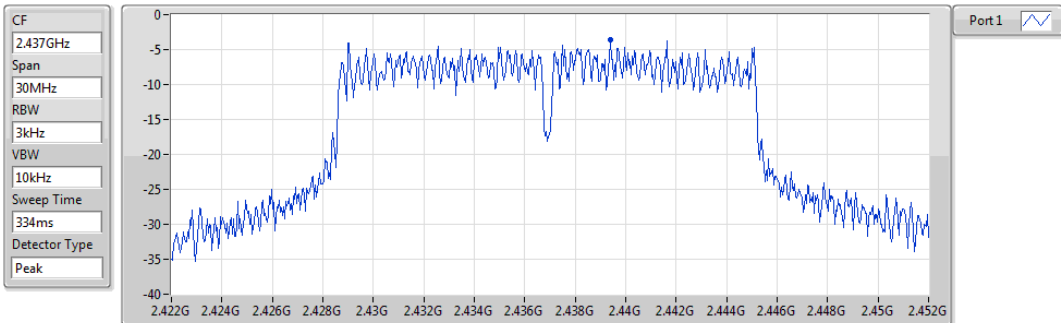


Sum	PD	Port1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-8.21	-8.21	-8.21

### 802.11g\_Nss1,(6Mbps)\_1TX

PSD

#### 2437MHz

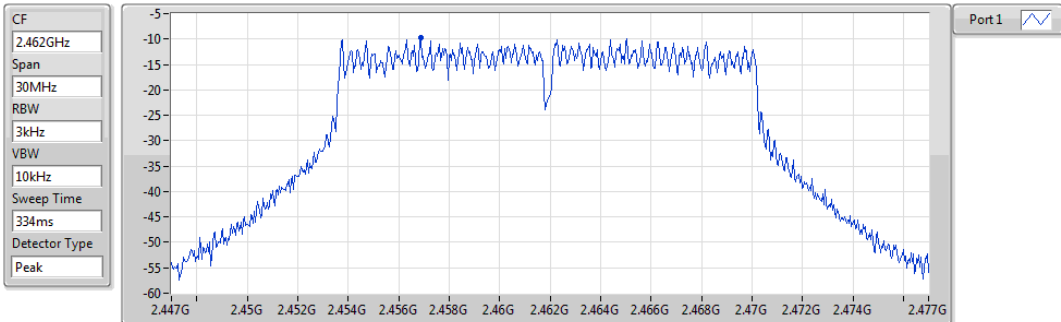


Sum	PD	Port1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-3.54	-3.54	-3.54

### 802.11g\_Nss1,(6Mbps)\_1TX

PSD

#### 2462MHz

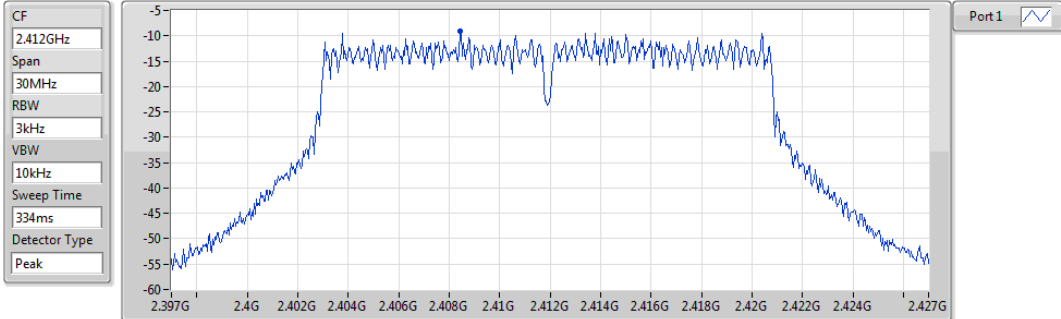


Sum	PD	Port1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.77	-9.77	-9.77

### 802.11n HT20\_Nss1,(MCS0)\_1TX

PSD

2412MHz

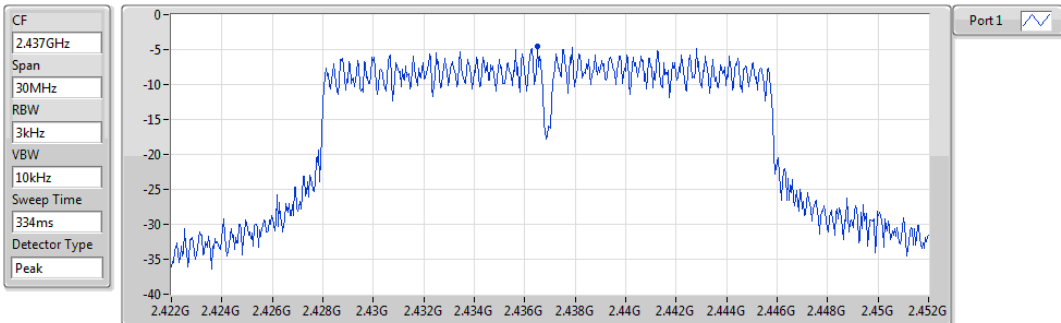


Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.11	-9.11	-9.11

### 802.11n HT20\_Nss1,(MCS0)\_1TX

PSD

2437MHz

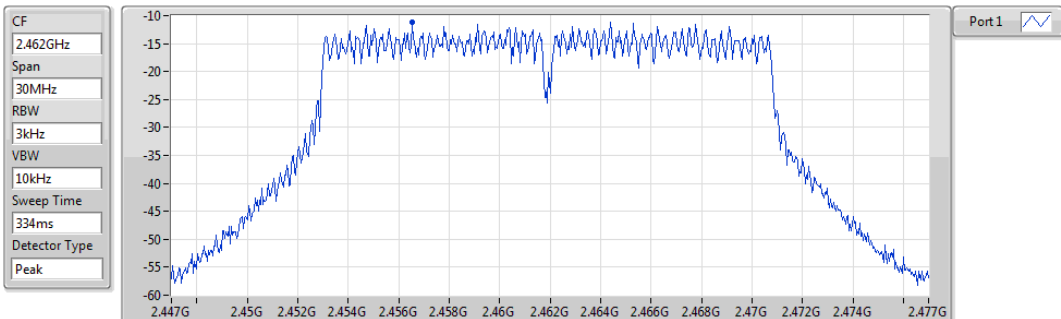


Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-4.46	-4.46	-4.46

### 802.11n HT20\_Nss1,(MCS0)\_1TX

PSD

2462MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-11.08	-11.08	-11.08

## 3.5 Unwanted Emissions into Restricted Frequency Bands

### 3.5.1 Limit of Unwanted Emissions into Restricted Frequency Bands

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

**Note 1:**  
Quasi-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

**Note 2:**  
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

### 3.5.2 Test Procedures

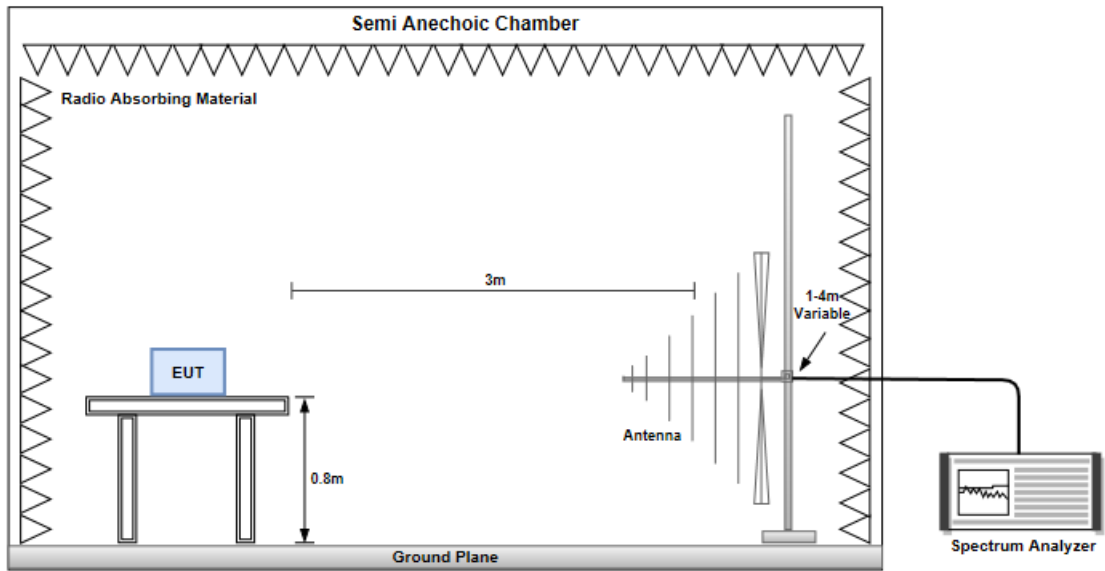
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

**Note:**

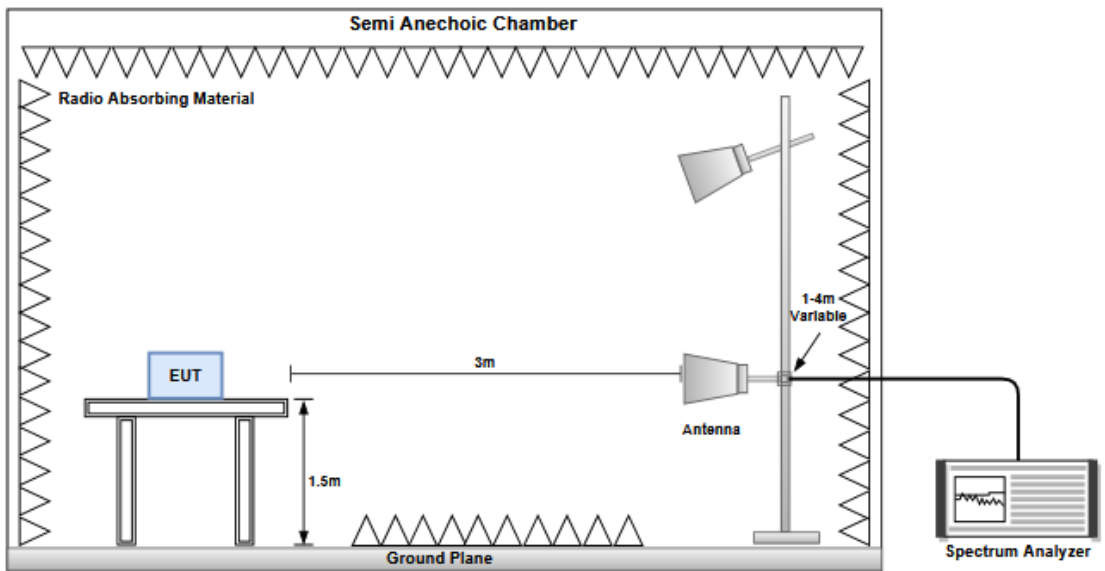
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

### 3.5.3 Test Setup

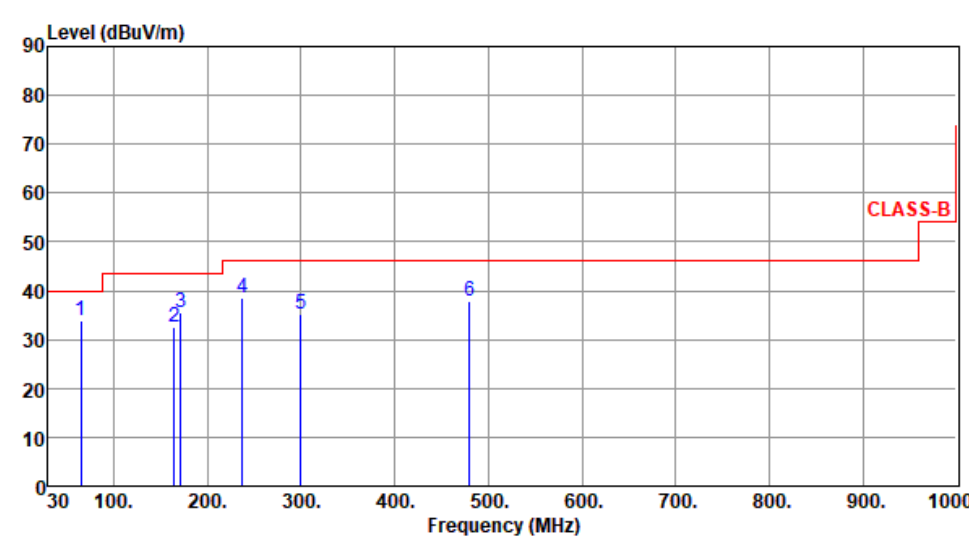
#### Radiated Emissions below 1 GHz



#### Radiated Emissions above 1 GHz



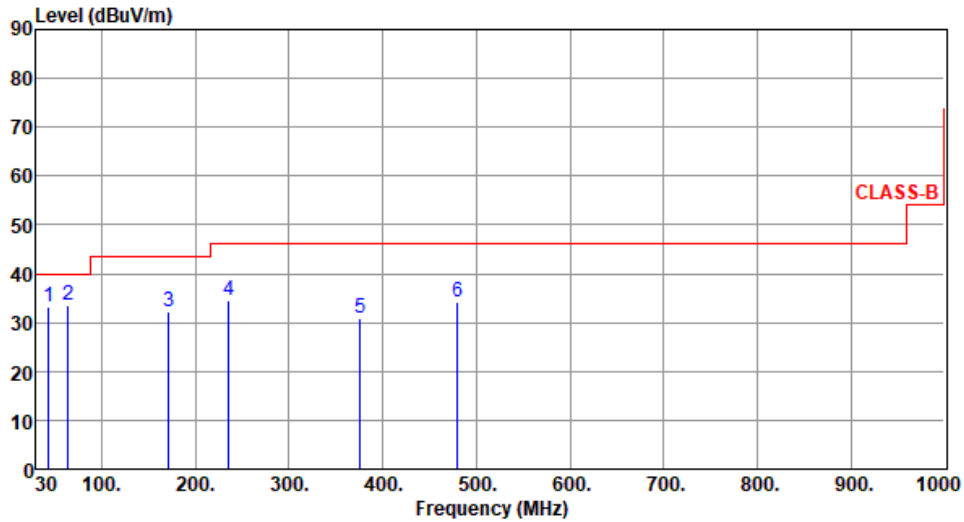
### 3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2437						
<b>Polarization</b>	Horizontal								
Test By :BRAD WU      Temperature(°C):22      Humidity(%):65									
									
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	64.98	33.99	40.00	-6.01	43.96	-9.97	Peak	---	---
2	164.83	32.38	43.50	-11.12	41.40	-9.02	Peak	---	---
3	171.56	35.48	43.50	-8.02	44.83	-9.35	Peak	---	---
4	237.58	38.46	46.00	-7.54	49.25	-10.79	Peak	---	---
5	299.66	35.36	46.00	-10.64	43.98	-8.62	Peak	---	---
6	480.12	37.79	46.00	-8.21	41.30	-3.51	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)  
\*Factor includes antenna factor , cable loss and amplifier gain  
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).  
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2437
<b>Polarization</b>	Vertical		

Test By :BRAD WU      Temperature(°C):22      Humidity(%):65



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	43.44	33.19	40.00	-6.81	41.95	-8.76	Peak	---	---
2	63.92	33.48	40.00	-6.52	43.18	-9.70	Peak	---	---
3	171.62	32.27	43.50	-11.23	41.62	-9.35	Peak	---	---
4	235.64	34.51	46.00	-11.49	45.47	-10.96	Peak	---	---
5	376.29	30.78	46.00	-15.22	37.22	-6.44	Peak	---	---
6	480.22	34.30	46.00	-11.70	37.81	-3.51	Peak	---	---

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

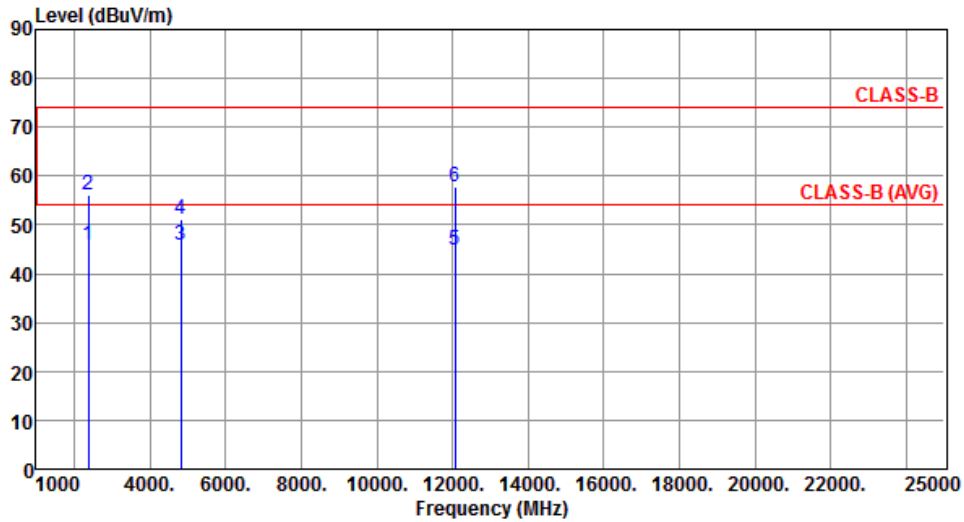
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

### 3.5.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11b

<b>Modulation</b>	11b	<b>Test Freq. (MHz)</b>	2412						
<b>Polarization</b>	Horizontal								
Test By :BRAD WU      Temperature(°C):23      Humidity(%):66									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	52.86	54.00	-1.14	54.70	-1.84	Average	134	249
2	2390.00	62.68	74.00	-11.32	64.52	-1.84	Peak	134	249
3	4824.00	49.62	54.00	-4.38	44.54	5.08	Average	236	295
4	4824.00	53.61	74.00	-20.39	48.53	5.08	Peak	236	295
5	12060.00	45.19	54.00	-8.81	30.50	14.69	Average	100	12
6	12060.00	58.53	74.00	-15.47	43.84	14.69	Peak	100	12
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)  *Factor includes antenna factor , cable loss and amplifier gain  Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).</p>									

<b>Modulation</b>	11b	<b>Test Freq. (MHz)</b>	2412
<b>Polarization</b>	Vertical		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):66



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	45.82	54.00	-8.18	47.66	-1.84	Average	103	266
2	2390.00	56.24	74.00	-17.76	58.08	-1.84	Peak	103	266
3	4824.00	45.72	54.00	-8.28	40.64	5.08	Average	100	286
4	4824.00	51.06	74.00	-22.94	45.98	5.08	Peak	100	286
5	12060.00	44.74	54.00	-9.26	30.05	14.69	Average	100	24
6	12060.00	57.86	74.00	-16.14	43.17	14.69	Peak	100	24

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

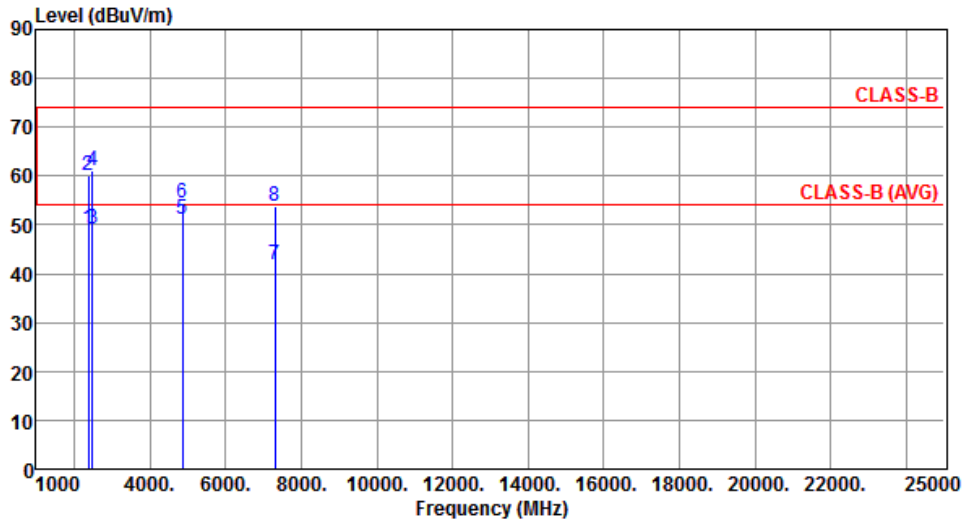
\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



<b>Modulation</b>	11b	<b>Test Freq. (MHz)</b>	2437
<b>Polarization</b>	Horizontal		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):66



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	49.22	54.00	-4.78	51.06	-1.84	Average	102	258
2	2390.00	60.06	74.00	-13.94	61.90	-1.84	Peak	102	258
3	2483.50	49.01	54.00	-4.99	50.81	-1.80	Average	102	258
4	2483.50	60.94	74.00	-13.06	62.74	-1.80	Peak	102	258
5	4874.00	51.06	54.00	-2.94	45.99	5.07	Average	194	302
6	4874.00	54.42	74.00	-19.58	49.35	5.07	Peak	194	302
7	7311.00	41.82	54.00	-12.18	31.54	10.28	Average	100	226
8	7311.00	53.74	74.00	-20.26	43.46	10.28	Peak	100	226

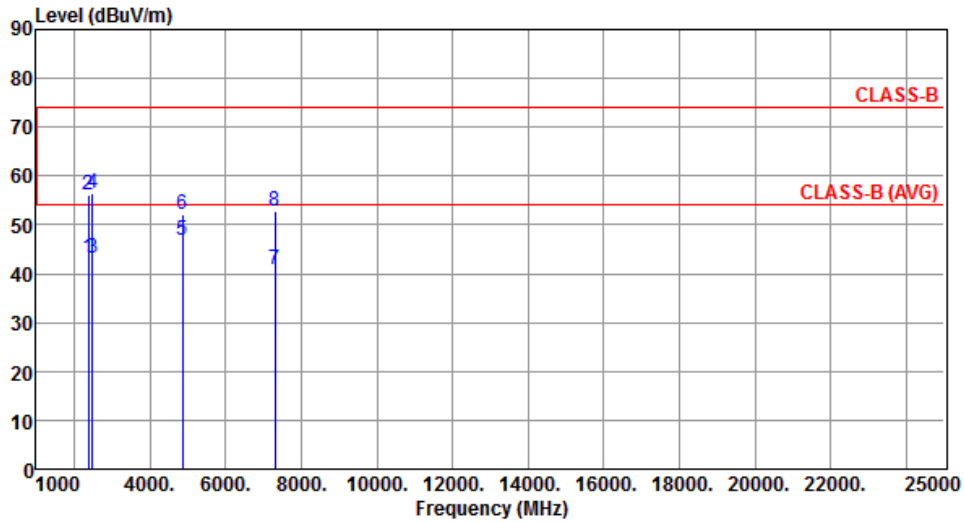
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

<b>Modulation</b>	11b	<b>Test Freq. (MHz)</b>	2437
<b>Polarization</b>	Vertical		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):66



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	43.27	54.00	-10.73	45.11	-1.84	Average	103	293
2	2390.00	56.25	74.00	-17.75	58.09	-1.84	Peak	103	293
3	2483.50	43.09	54.00	-10.91	44.89	-1.80	Average	103	293
4	2483.50	56.49	74.00	-17.51	58.29	-1.80	Peak	103	293
5	4874.00	46.86	54.00	-7.14	41.79	5.07	Average	101	281
6	4874.00	52.14	74.00	-21.86	47.07	5.07	Peak	101	281
7	7311.00	40.88	54.00	-13.12	30.60	10.28	Average	100	6
8	7311.00	52.81	74.00	-21.19	42.53	10.28	Peak	100	6

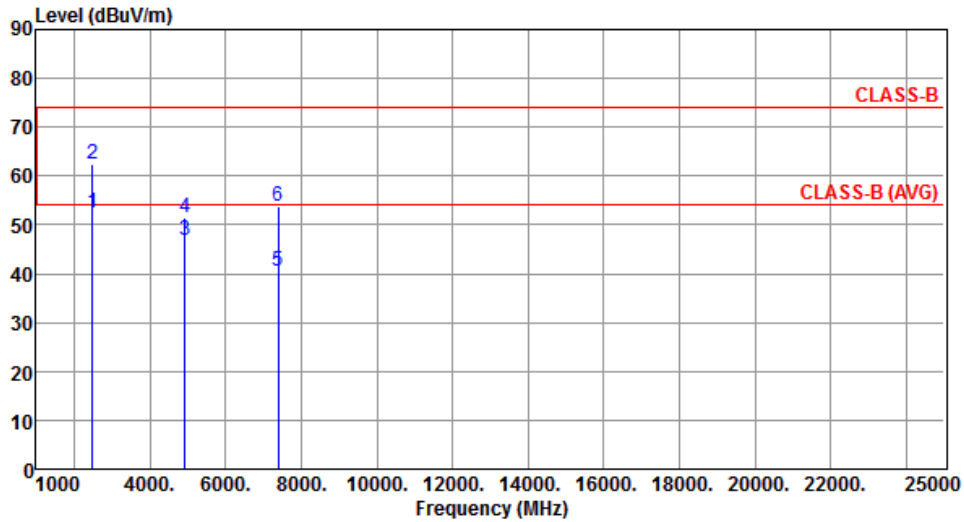
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

<b>Modulation</b>	11b	<b>Test Freq. (MHz)</b>	2462
<b>Polarization</b>	Horizontal		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):66



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	52.54	54.00	-1.46	54.34	-1.80	Average	129	251
2	2483.50	62.28	74.00	-11.72	64.08	-1.80	Peak	129	251
3	4924.00	46.98	54.00	-7.02	41.86	5.12	Average	195	293
4	4924.00	51.63	74.00	-22.37	46.51	5.12	Peak	195	293
5	7386.00	40.68	54.00	-13.32	30.41	10.27	Average	100	221
6	7386.00	53.82	74.00	-20.18	43.55	10.27	Peak	100	221

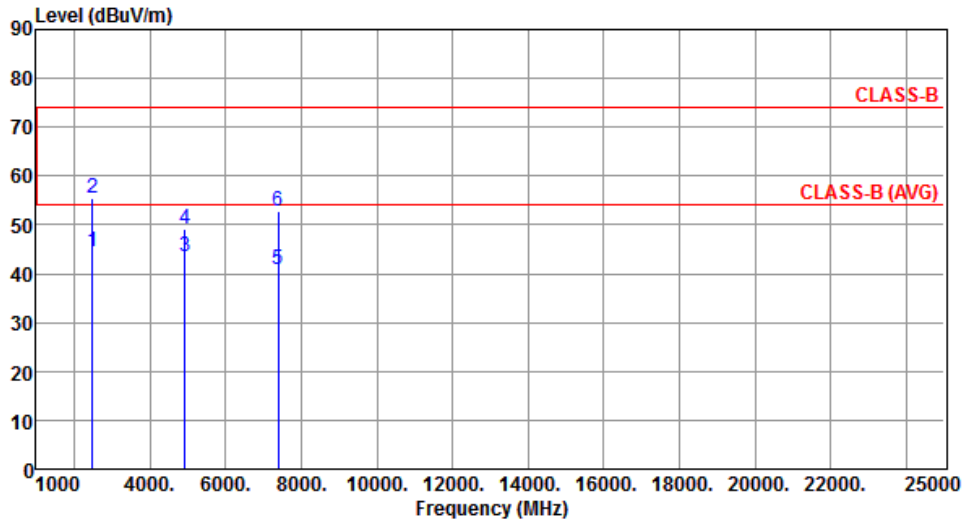
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

<b>Modulation</b>	11b	<b>Test Freq. (MHz)</b>	2462
<b>Polarization</b>	Vertical		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):66



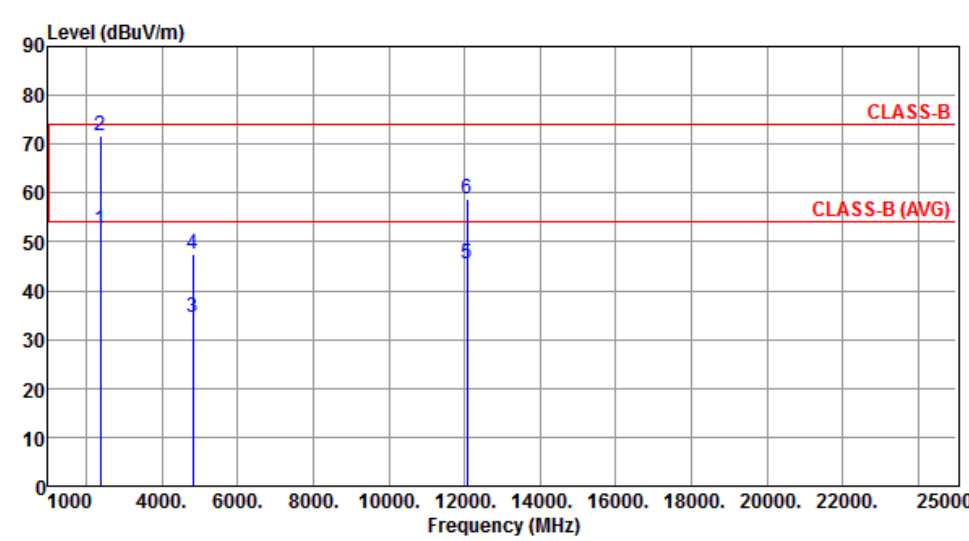
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	44.65	54.00	-9.35	46.45	-1.80	Average	105	296
2	2483.50	55.48	74.00	-18.52	57.28	-1.80	Peak	105	296
3	4924.00	43.44	54.00	-10.56	38.32	5.12	Average	100	286
4	4924.00	49.02	74.00	-24.98	43.90	5.12	Peak	100	286
5	7386.00	40.85	54.00	-13.15	30.58	10.27	Average	100	4
6	7386.00	52.76	74.00	-21.24	42.49	10.27	Peak	100	4

Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

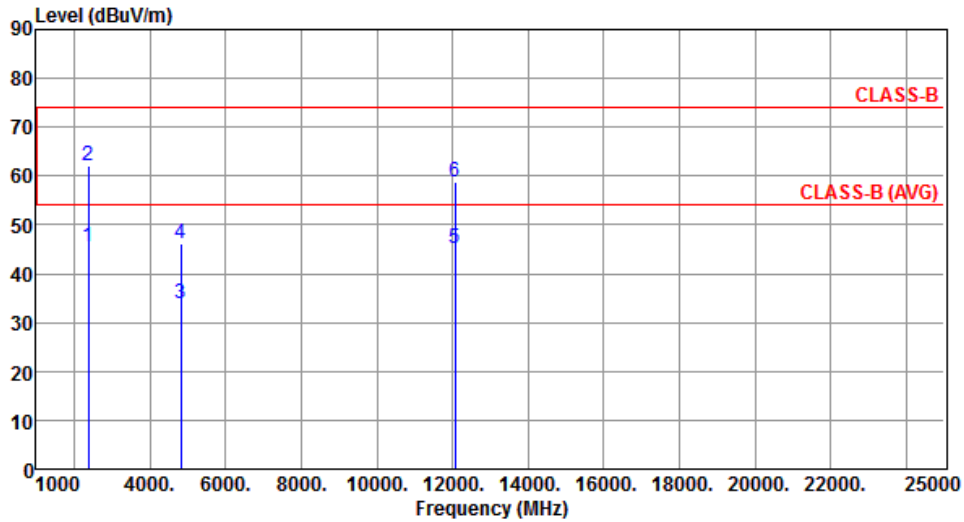
Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).

### 3.5.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11g

<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2412						
<b>Polarization</b>	Horizontal								
Test By :BRAD WU      Temperature(°C):23      Humidity(%):66									
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	52.39	54.00	-1.61	54.23	-1.84	Average	208	249
2	2390.00	71.57	74.00	-2.43	73.41	-1.84	Peak	208	249
3	4824.00	34.59	54.00	-19.41	29.51	5.08	Average	221	285
4	4824.00	47.52	74.00	-26.48	42.44	5.08	Peak	221	285
5	12060.00	45.47	54.00	-8.53	30.78	14.69	Average	100	18
6	12060.00	58.93	74.00	-15.07	44.24	14.69	Peak	100	18
<p>Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)  *Factor includes antenna factor , cable loss and amplifier gain  Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).</p>									

<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2412
<b>Polarization</b>	Vertical		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):66



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	45.41	54.00	-8.59	47.25	-1.84	Average	108	267
2	2390.00	61.96	74.00	-12.04	63.80	-1.84	Peak	108	267
3	4824.00	33.72	54.00	-20.28	28.64	5.08	Average	100	291
4	4824.00	46.19	74.00	-27.81	41.11	5.08	Peak	100	291
5	12060.00	45.24	54.00	-8.76	30.55	14.69	Average	100	31
6	12060.00	58.80	74.00	-15.20	44.11	14.69	Peak	100	31

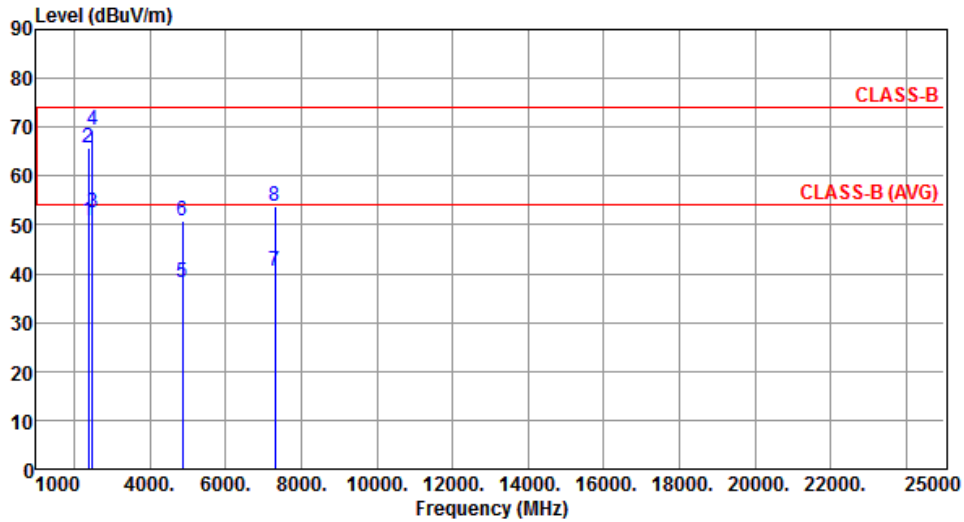
Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).

<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2437
<b>Polarization</b>	Horizontal		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):66



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	50.84	54.00	-3.16	52.68	-1.84	Average	202	249
2	2390.00	65.84	74.00	-8.16	67.68	-1.84	Peak	202	249
3	2483.50	52.41	54.00	-1.59	54.21	-1.80	Average	202	249
4	2483.50	69.45	74.00	-4.55	71.25	-1.80	Peak	202	249
5	4874.00	38.07	54.00	-15.93	33.00	5.07	Average	194	296
6	4874.00	50.96	74.00	-23.04	45.89	5.07	Peak	194	296
7	7311.00	40.60	54.00	-13.40	30.32	10.28	Average	100	242
8	7311.00	53.74	74.00	-20.26	43.46	10.28	Peak	100	242

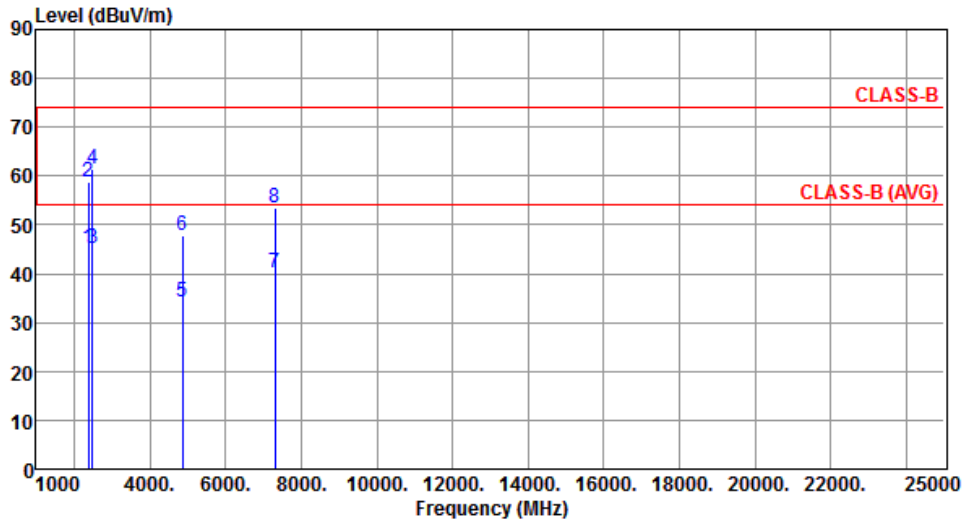
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2437
<b>Polarization</b>	Vertical		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):66



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	45.05	54.00	-8.95	46.89	-1.84	Average	108	266
2	2390.00	58.73	74.00	-15.27	60.57	-1.84	Peak	108	266
3	2483.50	45.31	54.00	-8.69	47.11	-1.80	Average	108	266
4	2483.50	61.52	74.00	-12.48	63.32	-1.80	Peak	108	266
5	4874.00	34.34	54.00	-19.66	29.27	5.07	Average	102	285
6	4874.00	47.97	74.00	-26.03	42.90	5.07	Peak	102	285
7	7311.00	40.25	54.00	-13.75	29.97	10.28	Average	100	16
8	7311.00	53.48	74.00	-20.52	43.20	10.28	Peak	100	16

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

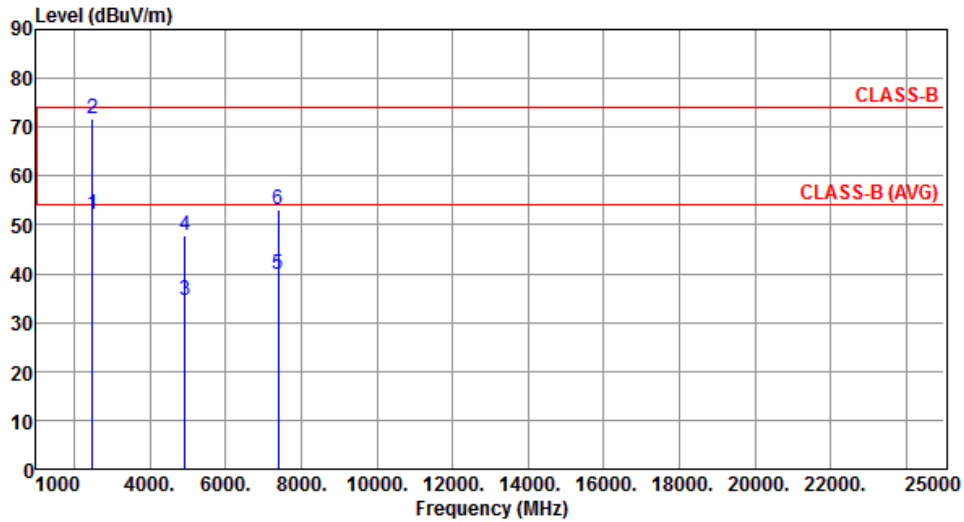
\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2462
<b>Polarization</b>	Horizontal		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):66



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	52.16	54.00	-1.84	53.96	-1.80	Average	200	246
2	2483.50	71.66	74.00	-2.34	73.46	-1.80	Peak	200	246
3	4924.00	34.38	54.00	-19.62	29.26	5.12	Average	196	295
4	4924.00	47.80	74.00	-26.20	42.68	5.12	Peak	196	295
5	7386.00	39.75	54.00	-14.25	29.48	10.27	Average	100	224
6	7386.00	53.22	74.00	-20.78	42.95	10.27	Peak	100	224

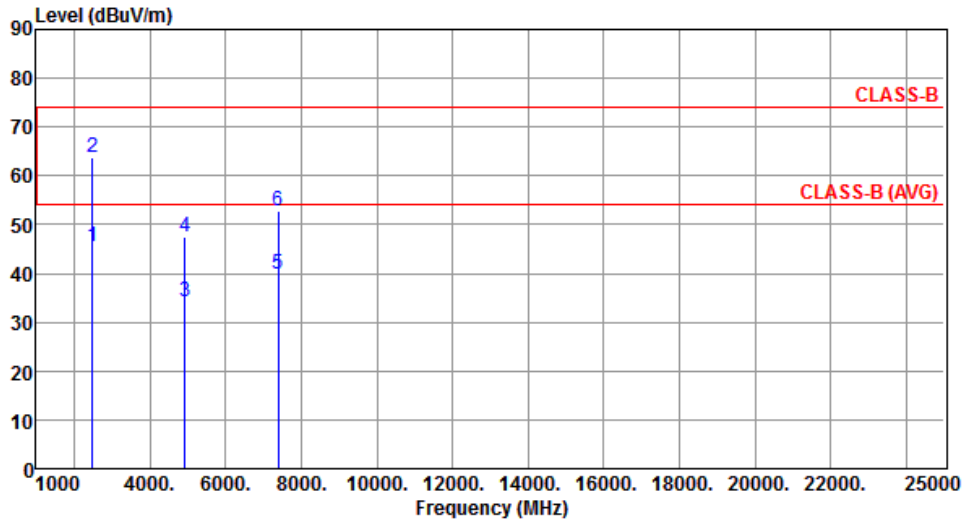
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

<b>Modulation</b>	11g	<b>Test Freq. (MHz)</b>	2462
<b>Polarization</b>	Vertical		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):66



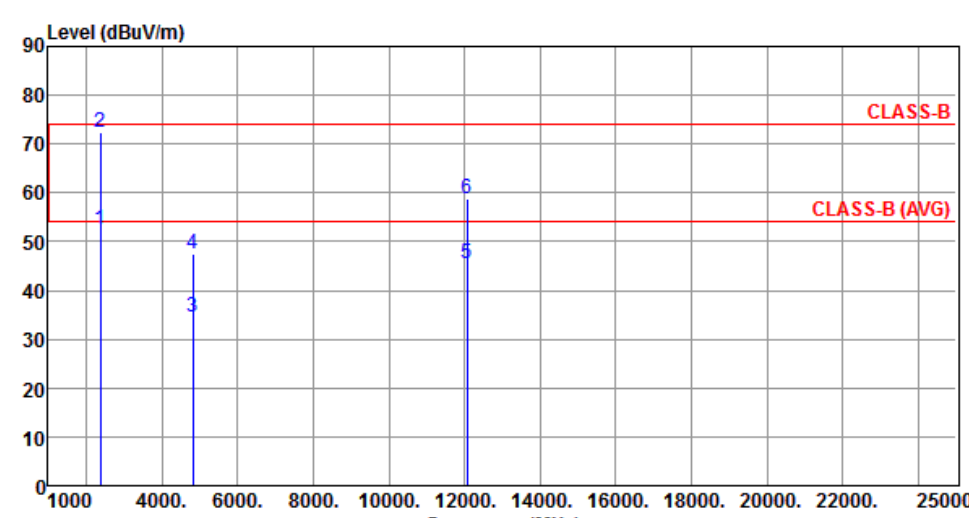
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	45.41	54.00	-8.59	47.21	-1.80	Average	104	260
2	2483.50	63.76	74.00	-10.24	65.56	-1.80	Peak	104	260
3	4924.00	34.27	54.00	-19.73	29.15	5.12	Average	100	291
4	4924.00	47.34	74.00	-26.66	42.22	5.12	Peak	100	291
5	7386.00	39.72	54.00	-14.28	29.45	10.27	Average	100	3
6	7386.00	52.69	74.00	-21.31	42.42	10.27	Peak	100	3

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

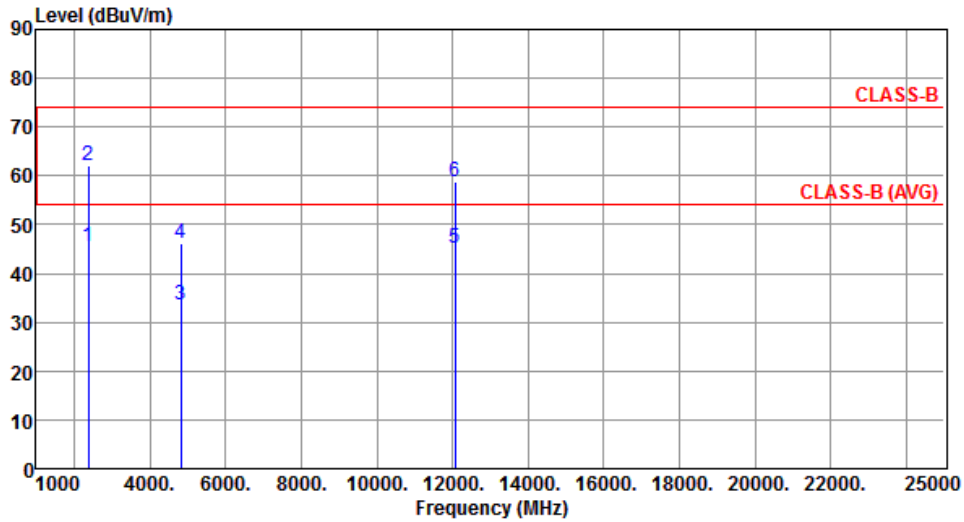
### 3.5.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT20

<b>Modulation</b>	HT20		<b>Test Freq. (MHz)</b>	2412					
<b>Polarization</b>	Horizontal								
Test By :BRAD WU      Temperature(°C):23      Humidity(%):66									
									
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	52.46	54.00	-1.54	54.30	-1.84	Average	209	250
2	2390.00	72.51	74.00	-1.49	74.35	-1.84	Peak	209	250
3	4824.00	34.54	54.00	-19.46	29.46	5.08	Average	208	291
4	4824.00	47.46	74.00	-26.54	42.38	5.08	Peak	208	291
5	12060.00	45.44	54.00	-8.56	30.75	14.69	Average	100	21
6	12060.00	58.89	74.00	-15.11	44.20	14.69	Peak	100	21

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)  
 \*Factor includes antenna factor , cable loss and amplifier gain  
 Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

<b>Modulation</b>	HT20	<b>Test Freq. (MHz)</b>	2412
<b>Polarization</b>	Vertical		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):66

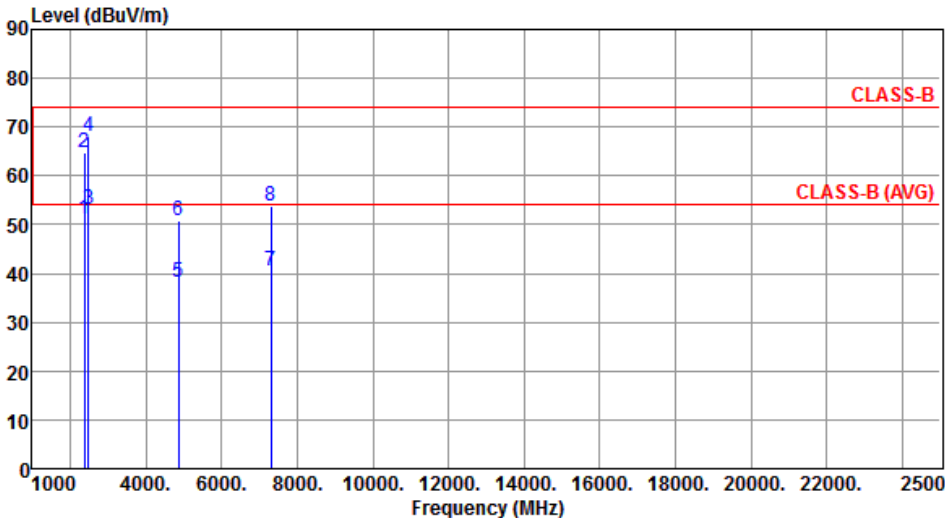


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	45.46	54.00	-8.54	47.30	-1.84	Average	109	266
2	2390.00	61.98	74.00	-12.02	63.82	-1.84	Peak	109	266
3	4824.00	33.69	54.00	-20.31	28.61	5.08	Average	100	296
4	4824.00	46.14	74.00	-27.86	41.06	5.08	Peak	100	296
5	12060.00	45.13	54.00	-8.87	30.44	14.69	Average	100	46
6	12060.00	58.72	74.00	-15.28	44.03	14.69	Peak	100	46

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

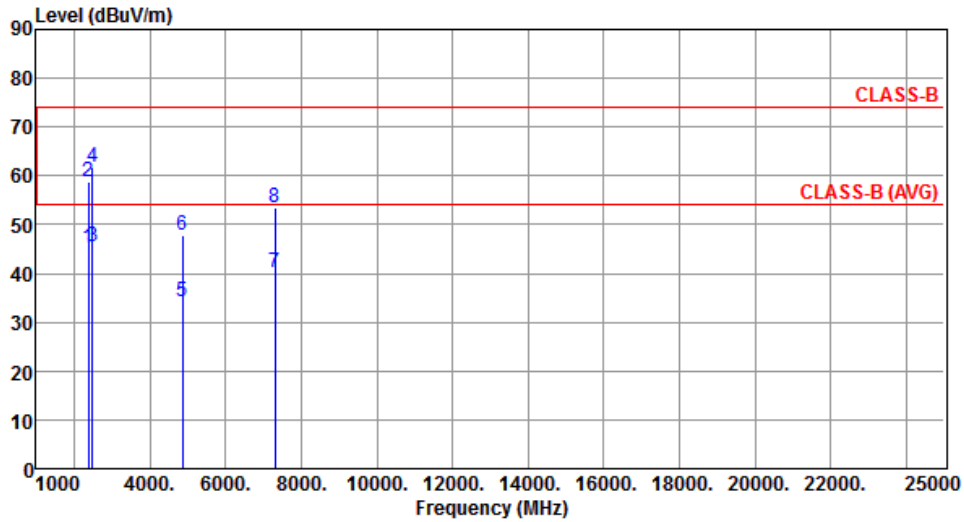
\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

<b>Modulation</b>	HT20	<b>Test Freq. (MHz)</b>	2437						
<b>Polarization</b>	Horizontal								
Test By :BRAD WU      Temperature(°C):23      Humidity(%):66									
									
	Freq.	Emission level	Limit	Margin	SA	Factor	Remark	ANT	Turn
	MHz	dBuV/m	dBuV/m	dB	reading	dB		High	Table
					dBuV			cm	deg
1	2390.00	51.18	54.00	-2.82	53.02	-1.84	Average	202	249
2	2390.00	64.74	74.00	-9.26	66.58	-1.84	Peak	202	249
3	2483.50	53.11	54.00	-0.89	54.91	-1.80	Average	202	249
4	2483.50	68.15	74.00	-5.85	69.95	-1.80	Peak	202	249
5	4874.00	38.11	54.00	-15.89	33.04	5.07	Average	195	291
6	4874.00	50.94	74.00	-23.06	45.87	5.07	Peak	195	291
7	7311.00	40.52	54.00	-13.48	30.24	10.28	Average	100	241
8	7311.00	53.69	74.00	-20.31	43.41	10.28	Peak	100	241
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).									

<b>Modulation</b>	HT20	<b>Test Freq. (MHz)</b>	2437
<b>Polarization</b>	Vertical		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):66



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	45.11	54.00	-8.89	46.95	-1.84	Average	109	263
2	2390.00	58.84	74.00	-15.16	60.68	-1.84	Peak	109	263
3	2483.50	45.36	54.00	-8.64	47.16	-1.80	Average	109	263
4	2483.50	61.62	74.00	-12.38	63.42	-1.80	Peak	109	263
5	4874.00	34.29	54.00	-19.71	29.22	5.07	Average	103	291
6	4874.00	47.88	74.00	-26.12	42.81	5.07	Peak	103	291
7	7311.00	40.17	54.00	-13.83	29.89	10.28	Average	100	19
8	7311.00	53.42	74.00	-20.58	43.14	10.28	Peak	100	19

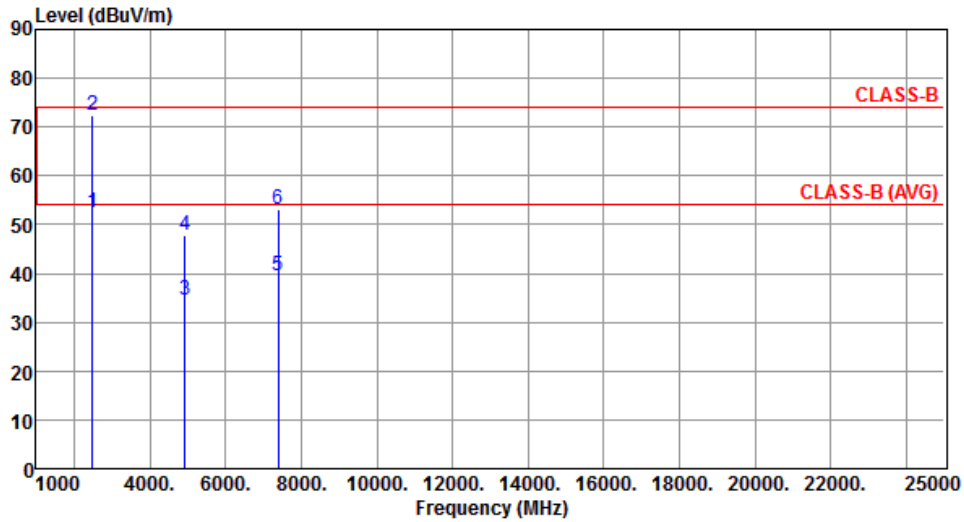
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

<b>Modulation</b>	HT20	<b>Test Freq. (MHz)</b>	2462
<b>Polarization</b>	Horizontal		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):66



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	52.44	54.00	-1.56	54.24	-1.80	Average	202	251
2	2483.50	72.41	74.00	-1.59	74.21	-1.80	Peak	202	251
3	4924.00	34.42	54.00	-19.58	29.30	5.12	Average	194	293
4	4924.00	47.96	74.00	-26.04	42.84	5.12	Peak	194	293
5	7386.00	39.68	54.00	-14.32	29.41	10.27	Average	100	228
6	7386.00	53.19	74.00	-20.81	42.92	10.27	Peak	100	228

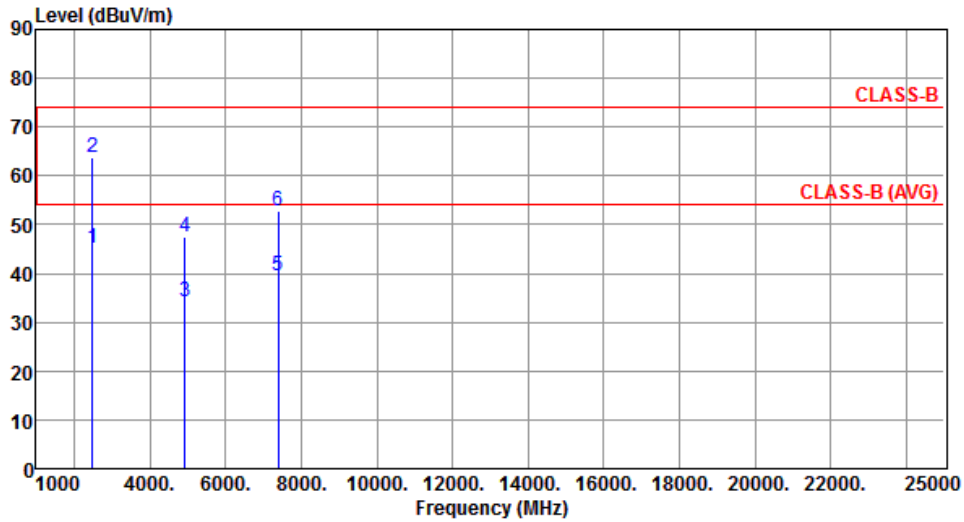
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

<b>Modulation</b>	HT20	<b>Test Freq. (MHz)</b>	2462
<b>Polarization</b>	Vertical		

Test By :BRAD WU      Temperature(°C):23      Humidity(%):66



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	45.32	54.00	-8.68	47.12	-1.80	Average	106	262
2	2483.50	63.68	74.00	-10.32	65.48	-1.80	Peak	106	262
3	4924.00	34.36	54.00	-19.64	29.24	5.12	Average	100	296
4	4924.00	47.42	74.00	-26.58	42.30	5.12	Peak	100	296
5	7386.00	39.68	54.00	-14.32	29.41	10.27	Average	100	5
6	7386.00	52.65	74.00	-21.35	42.38	10.27	Peak	100	5

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



## 3.6 Emissions in Non-Restricted Frequency Bands

### 3.6.1 Emissions in Non-Restricted Frequency Bands Limit

Peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz.

### 3.6.2 Test Procedures

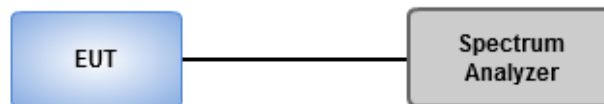
#### Reference level measurement

1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Use the peak marker function to determine the maximum PSD level

#### Emission level measurement

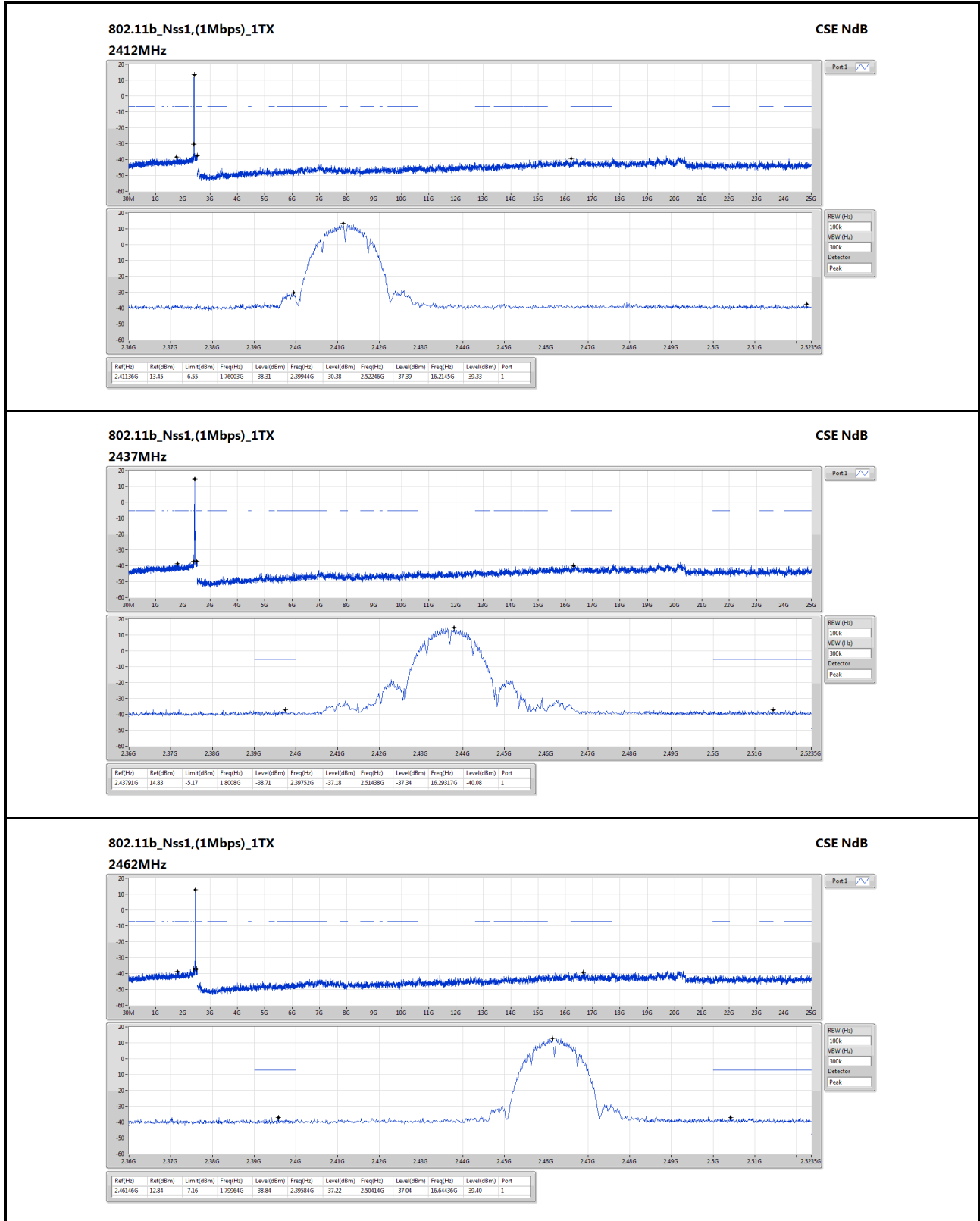
1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 25GHz
4. Use the peak marker function to determine the maximum amplitude level

### 3.6.3 Test Setup



### 3.6.4 Unwanted Emissions into Non-Restricted Frequency Bands

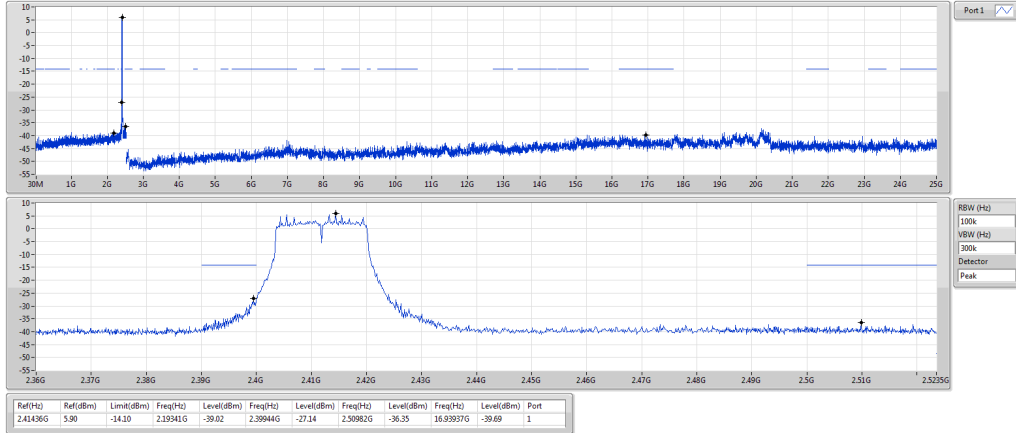
<b>Ambient Condition</b>	22°C / 67%	<b>Tested By</b>	Aska Huang
--------------------------	------------	------------------	------------



802.11g\_Nss1,(6Mbps)\_1TX

CSE NdB

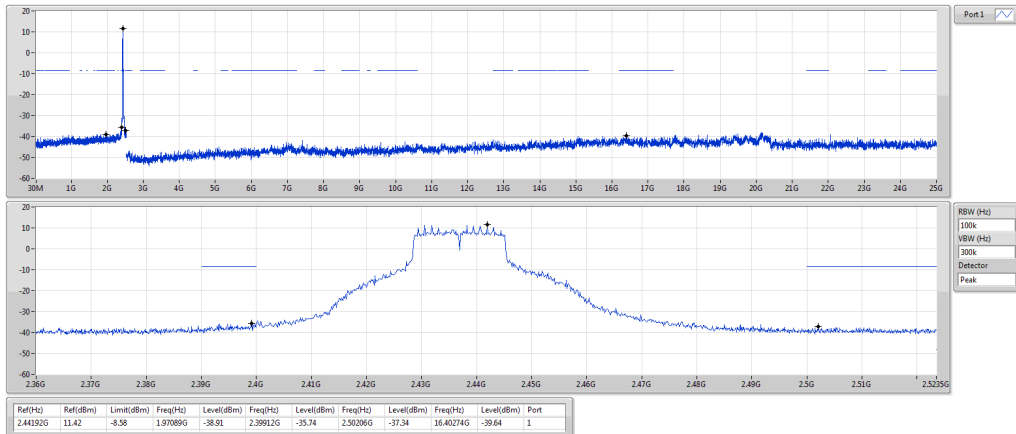
2412MHz



802.11g\_Nss1,(6Mbps)\_1TX

CSE NdB

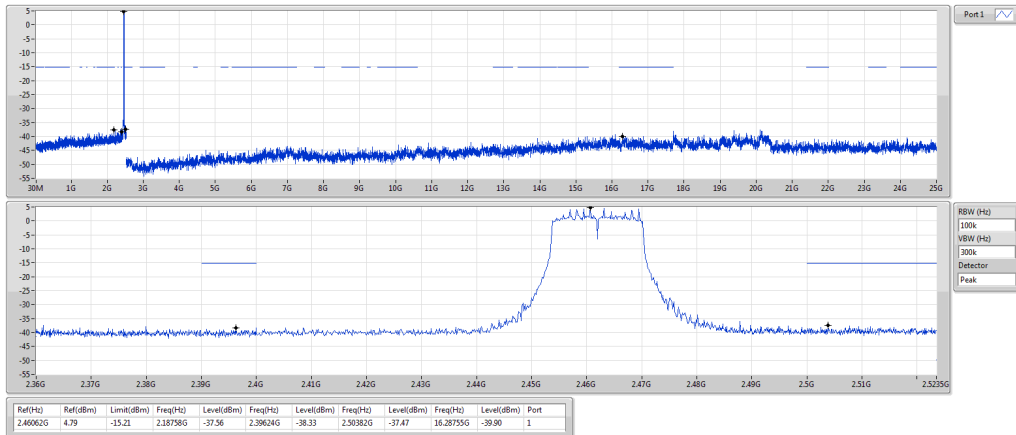
2437MHz



802.11g\_Nss1,(6Mbps)\_1TX

CSE NdB

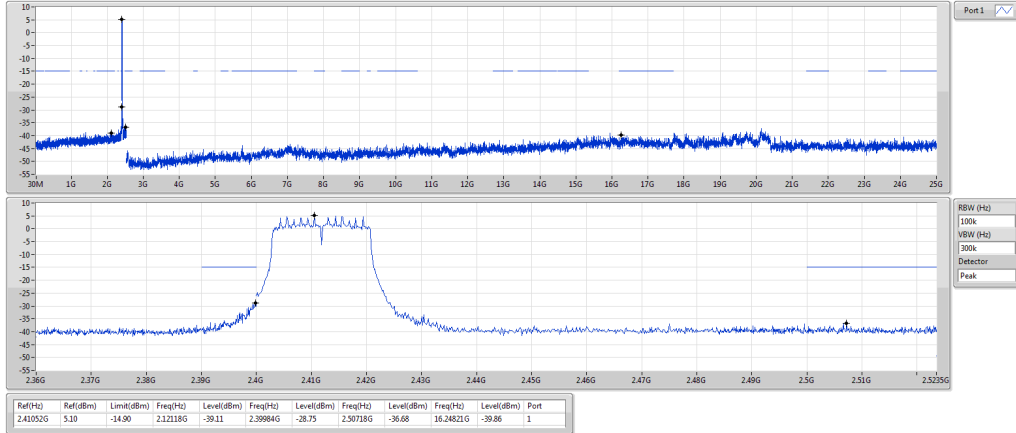
2462MHz



802.11n HT20\_Nss1,(MCS0)\_1TX

CSE NdB

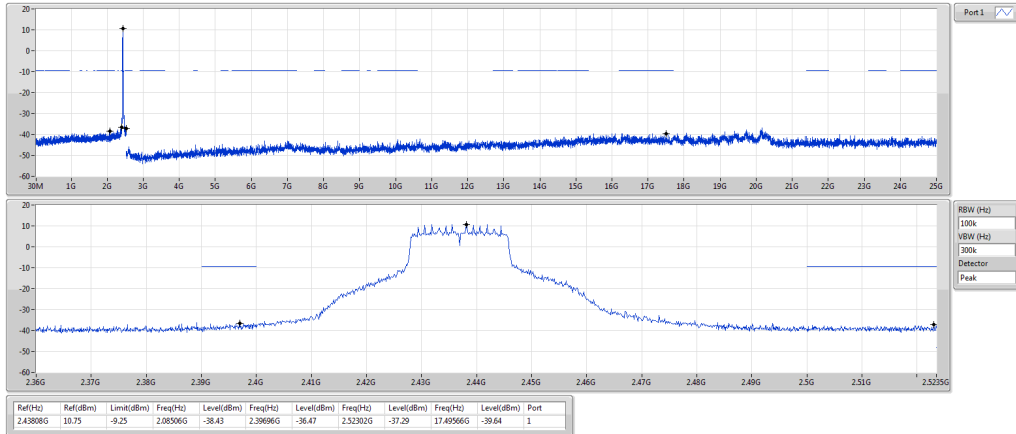
2412MHz



802.11n HT20\_Nss1,(MCS0)\_1TX

CSE NdB

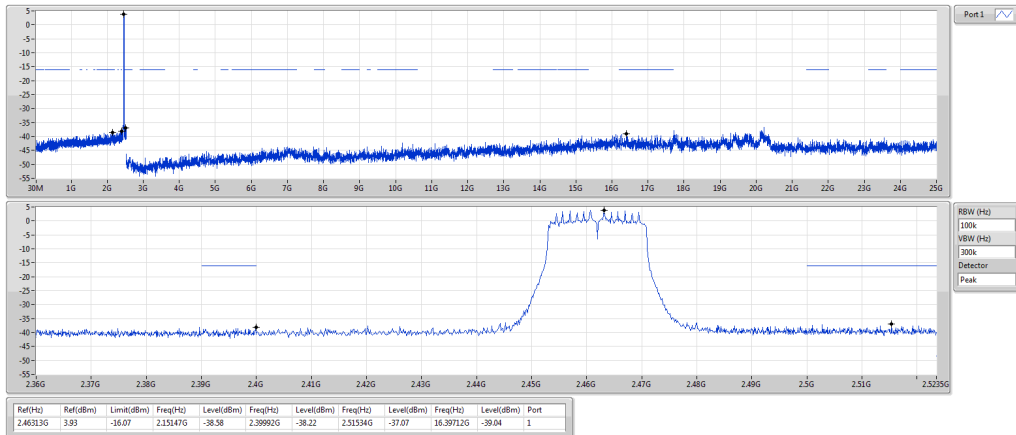
2437MHz



802.11n HT20\_Nss1,(MCS0)\_1TX

CSE NdB

2462MHz



## 4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <http://www.icertifi.com.tw>.

### **Linkou**

Tel: 886-2-2601-1640

No. 30-2, Ding Fwu Tsuen, Lin  
Kou District, New Taipei City,  
Taiwan, R.O.C.

### **Kwei Shan**

Tel: 886-3-271-8666

No. 3-1, Lane 6, Wen San 3rd St.,  
Kwei Shan District, Tao Yuan City  
333, Taiwan, R.O.C.

### **Kwei Shan Site II**

Tel: 886-3-271-8640

No. 14-1, Lane 19, Wen San 3rd  
St., Kwei Shan District, Tao Yuan  
City 333, Taiwan, R.O.C.

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666

Fax: 886-3-318-0155

Email: ICC\_Service@icertifi.com.tw

==END==