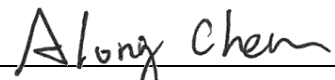


# FCC Test Report

**FCC ID** : TKZAP7628-NU1  
**Equipment** : WiFi Router  
**Model No.** : AP7628-NU1  
**Applicant** : AsiaRF Co., LTD.  
**Address** : 3F, 215, Dehe Road, Yonghe Dist. New Taipei  
City Taiwan  
**Standard** : 47 CFR FCC Part 15.247  
**Received Date** : Jun. 14, 2019  
**Tested Date** : Jun. 21 ~ Jun. 26, 2019

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:

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

Approved by:

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



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## Release Record

Report No.	Version	Description	Issued Date
FR961406	Rev. 01	Initial issue	Aug. 02, 2019

## Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.435MHz 34.15 (Margin -13.00dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2390.00MHz 53.84 (Margin -0.16dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 24.07	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]	2	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	2	6-54 Mbps
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	2	MCS 0-15
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	2	MCS 0-15

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.	Type	Gain (dBi)	Connector	Remark
1	PCB	2	---	---

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

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

Note: The above power supply is not bundled in market.

### 1.1.4 Channel List

Frequency band (MHz)		2400~2483.5	
802.11 b / g / n HT20		802.11n HT40	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2412	3	2422
2	2417	4	2427
3	2422	5	2432
4	2427	6	2437
5	2432	7	2442
6	2437	8	2447
7	2442	9	2452
8	2447	---	---
9	2452	---	---
10	2457	---	---
11	2462	---	---

### 1.1.5 Test Tool and Duty Cycle

Test Tool	Putty, V0.6		
Duty Cycle and Duty Factor	Mode	Duty Cycle (%)	Duty Factor (dB)
	11b	100.00%	0.00
	11g	91.63%	0.38
	HT20	88.94%	0.51
	HT40	83.52%	0.78

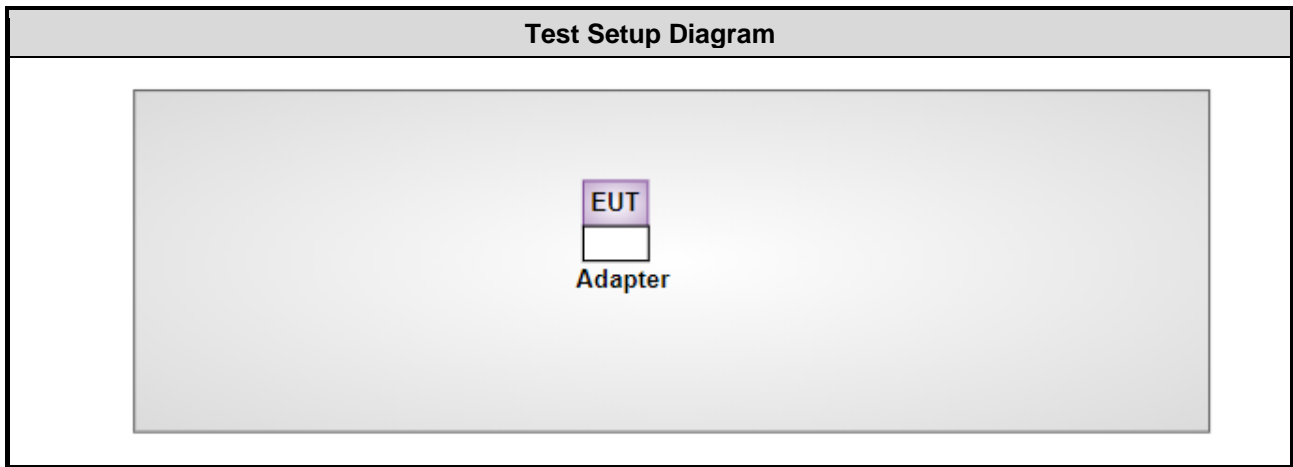
### 1.1.6 Power Index of Test Tool

Modulation Mode	Test Frequency (MHz)	Power Index
11b	2412	25
11b	2437	26
11b	2462	24
11g	2412	23
11g	2437	29
11g	2462	25
HT20	2412	23
HT20	2437	27
HT20	2462	25
HT40	2422	16
HT40	2437	24
HT40	2452	20

## 1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Adapter	YHY	SAW06B050-10 00U	---	Provided by applicant.

## 1.3 Test Setup Chart





## 1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Jan. 08, 2019	Jan. 07, 2020
LISN	R&S	ENV216	101579	Mar. 08, 2019	Mar. 07, 2020
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127-666	Nov. 29, 2018	Nov. 28, 2019
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 23, 2018	Oct. 23, 2019
50 ohm terminal (Support Unit)	NA	50	04	May 28, 2019	May 27, 2020
Measurement Software	AUDIX	e3	6.120210k	NA	NA

Note: Calibration Interval of instruments listed above is one year.

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101499	Jan. 07, 2019	Jan. 06, 2020
Receiver	R&S	ESR3	101658	Dec. 11, 2018	Dec. 10, 2019
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 17, 2019	Apr. 16, 2020
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Jan. 07, 2019	Jan. 06, 2020
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 15, 2018	Nov. 14, 2019
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 09, 2018	Nov. 08, 2019
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 08, 2018	Oct. 07, 2019
Preamplifier	EMC	EMC02325	980187	Aug. 24, 2018	Aug. 23, 2019
Preamplifier	Agilent	83017A	MY53270014	Aug. 09, 2018	Aug. 08, 2019
Preamplifier	EMC	EMC184045B	980192	Aug. 09, 2018	Aug. 08, 2019
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Oct. 01, 2018	Sep. 30, 2019
RF cable-8M	EMC	EMC104-SM-SM-8000	181107	Oct. 01, 2018	Sep. 30, 2019
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Oct. 01, 2018	Sep. 30, 2019
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Oct. 01, 2018	Sep. 30, 2019
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Oct. 01, 2018	Sep. 30, 2019
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Oct. 01, 2018	Sep. 30, 2019
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>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. 17, 2019	Apr. 16, 2020
Spectrum Analyzer	R&S	FSV40	101499	Jan. 07, 2019	Jan. 06, 2020
Power Meter	Anritsu	ML2495A	1241002	Oct. 09, 2018	Oct. 08, 2019
Power Sensor	Anritsu	MA2411B	1207366	Oct. 09, 2018	Oct. 08, 2019
MXG-B RF Vector Signal Generator	Agilent	N5182B	MY53050081	Apr. 21, 2019	Apr. 20, 2020
AC POWER SOURCE	APC	AFC-500W	F312060012	Nov. 29, 2018	Nov. 28, 2019
Measurement Software	Sporton	SENSE-15247_DTS	V5.10	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

## 1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.247

ANSI C63.10-2013

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

## 1.6 Deviation from Test Standard and Measurement Procedure

None

## 1.7 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. 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 Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	23°C / 64%	Alex Tsai
Radiated Emissions	03CH03-WS	25-27°C / 61-66%	Akun Chung Aska Huang
RF Conducted	TH01-WS	22°C / 63%	Brad Wu

- 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	11b	2412 / 2437 / 2462	1 Mbps	---
Maximum Output Power	11g	2412 / 2437 / 2462	6 Mbps	
6dB bandwidth	HT20	2412 / 2437 / 2462	MCS 0	
Power spectral density	HT40	2422 / 2437 / 2452	MCS 0	

**NOTE:**

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** 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

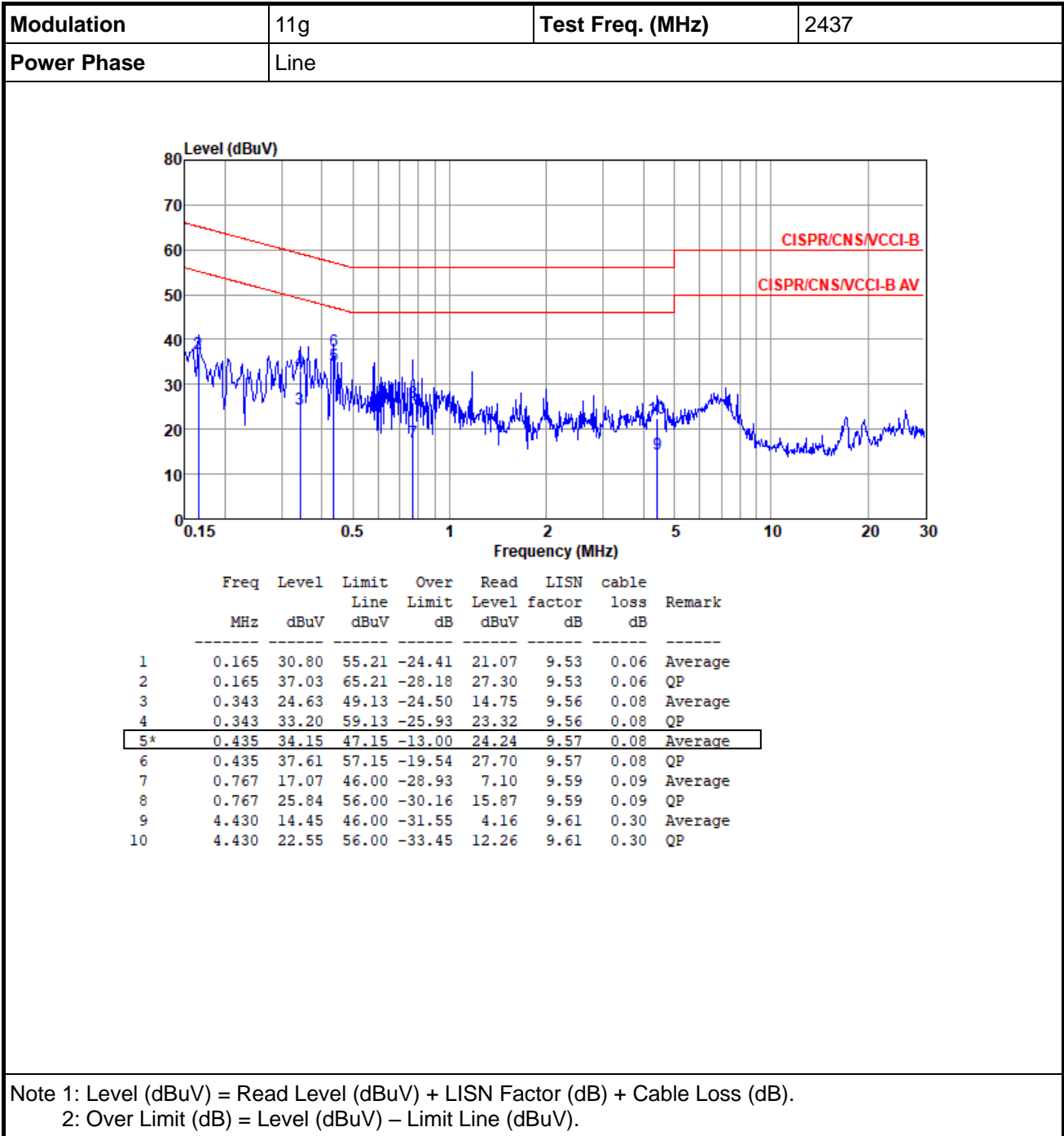
1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels 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

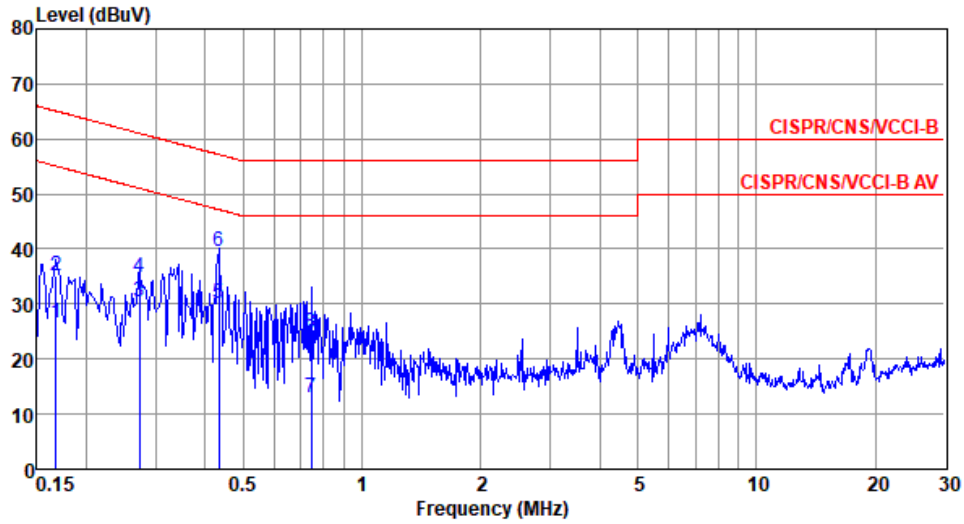


- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

### 3.1.4 Test Result of Conducted Emissions



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



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.168	26.61	55.08	-28.47	16.86	9.57	0.06	Average
2	0.168	35.01	65.08	-30.07	25.26	9.57	0.06	QP
3	0.273	30.47	51.03	-20.56	20.68	9.59	0.07	Average
4	0.273	34.76	61.03	-26.27	24.97	9.59	0.07	QP
5*	0.433	30.14	47.20	-17.06	20.32	9.61	0.08	Average
6	0.433	39.64	57.20	-17.56	29.82	9.61	0.08	QP
7	0.743	12.92	46.00	-33.08	3.01	9.63	0.09	Average
8	0.743	24.80	56.00	-31.20	14.89	9.63	0.09	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

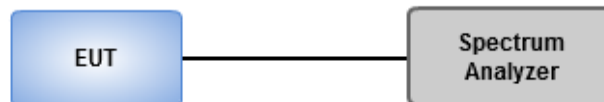
#### 6dB Bandwidth

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

#### 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)_2TX	9.493M	14.399M	14M4G1D	8.551M	14.182M
802.11g_Nss1,(6Mbps)_2TX	15.145M	16.715M	16M7D1D	12.681M	16.353M
802.11n HT20_Nss1,(MCS0)_2TX	15.507M	17.656M	17M7D1D	14.058M	17.511M
802.11n HT40_Nss1,(MCS0)_2TX	35.072M	36.035M	36M0D1D	32.609M	35.745M

**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)	Port 2-N dB (Hz)	Port 2-OBW (Hz)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	9.058M	14.399M	8.551M	14.182M
2437MHz	Pass	500k	9.058M	14.399M	9.493M	14.182M
2462MHz	Pass	500k	9.058M	14.327M	9.058M	14.182M
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	14.493M	16.353M	15.145M	16.425M
2437MHz	Pass	500k	15.072M	16.715M	12.681M	16.715M
2462MHz	Pass	500k	14.493M	16.425M	12.681M	16.425M
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	15.072M	17.511M	15.072M	17.511M
2437MHz	Pass	500k	15.072M	17.656M	14.13M	17.656M
2462MHz	Pass	500k	14.058M	17.511M	15.507M	17.511M
802.11n HT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	500k	33.768M	36.035M	33.768M	35.89M
2437MHz	Pass	500k	32.609M	36.035M	35.072M	36.035M
2452MHz	Pass	500k	33.768M	35.745M	35.072M	35.89M

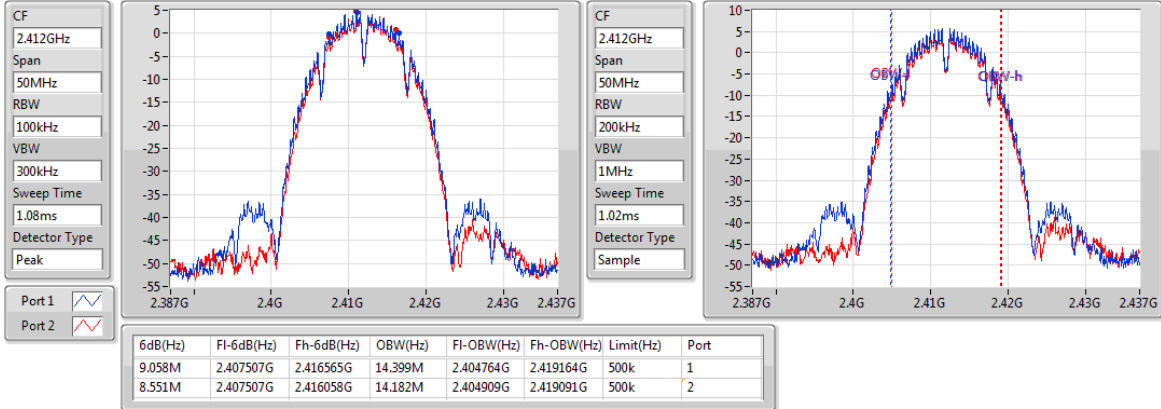
**Port X-N dB** = Port X 6dB down bandwidth; **Port X-OBW** = Port X 99% occupied bandwidth;



### 802.11b\_Nss1,(1Mbps)\_2TX

EBW

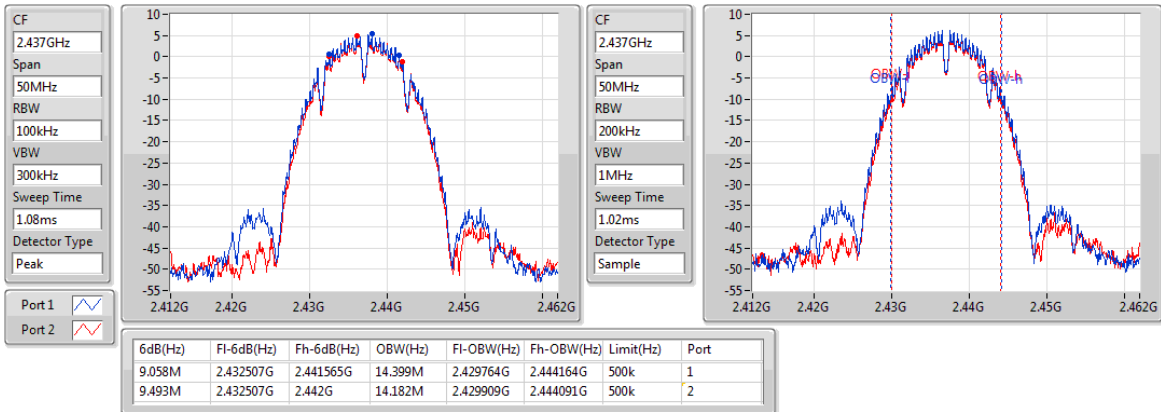
2412MHz



### 802.11b\_Nss1,(1Mbps)\_2TX

EBW

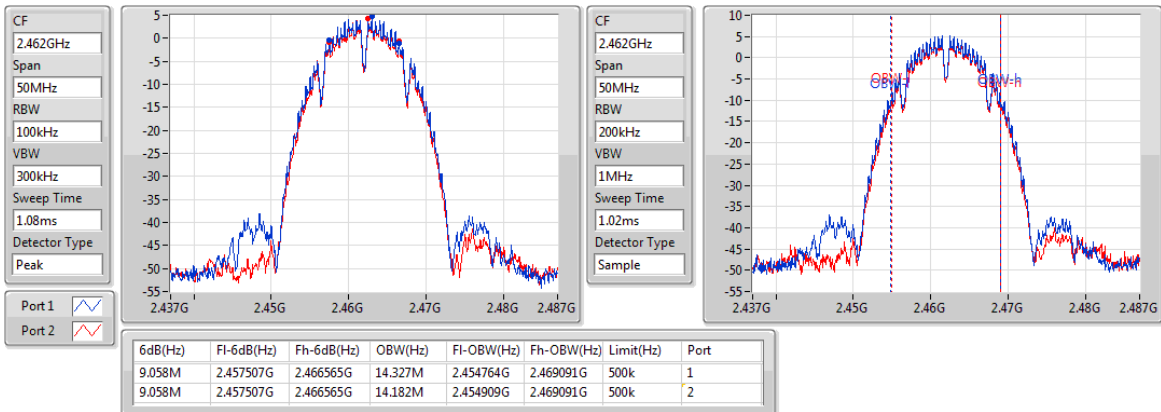
2437MHz



### 802.11b\_Nss1,(1Mbps)\_2TX

EBW

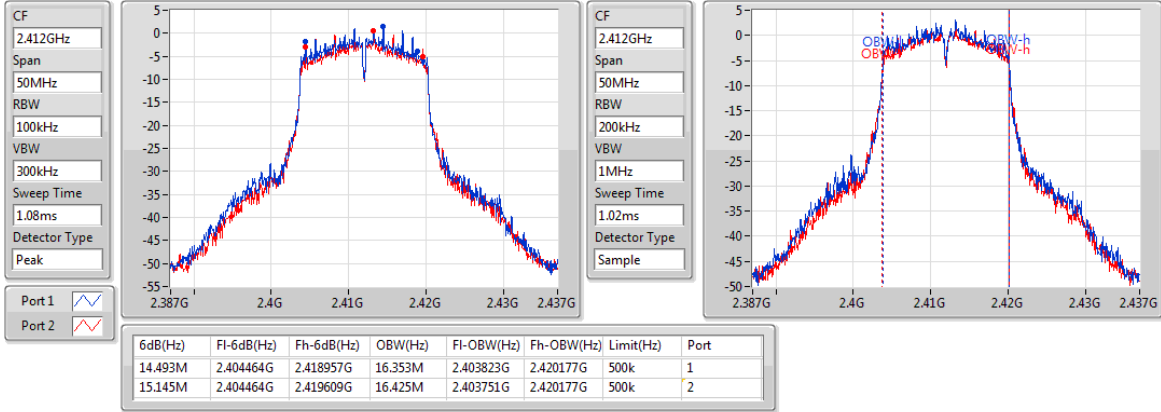
2462MHz



### 802.11g\_Nss1,(6Mbps)\_2TX

EBW

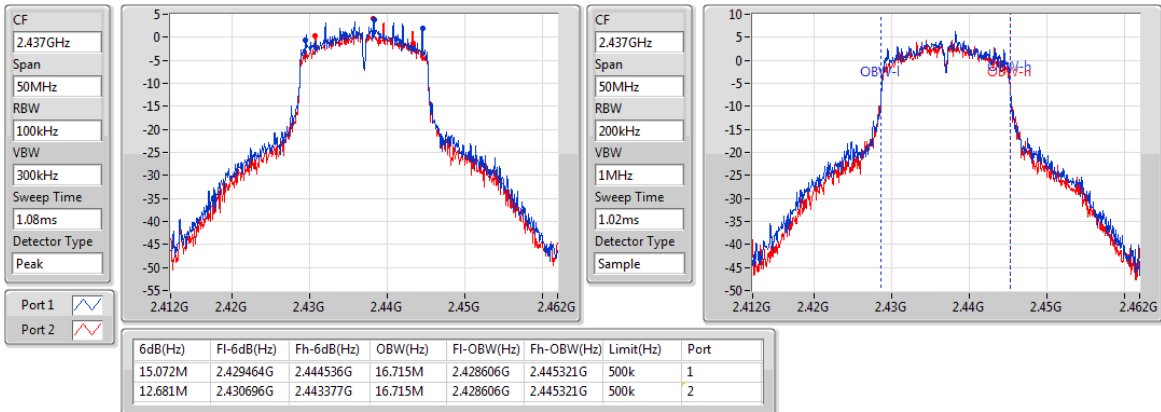
2412MHz



### 802.11g\_Nss1,(6Mbps)\_2TX

EBW

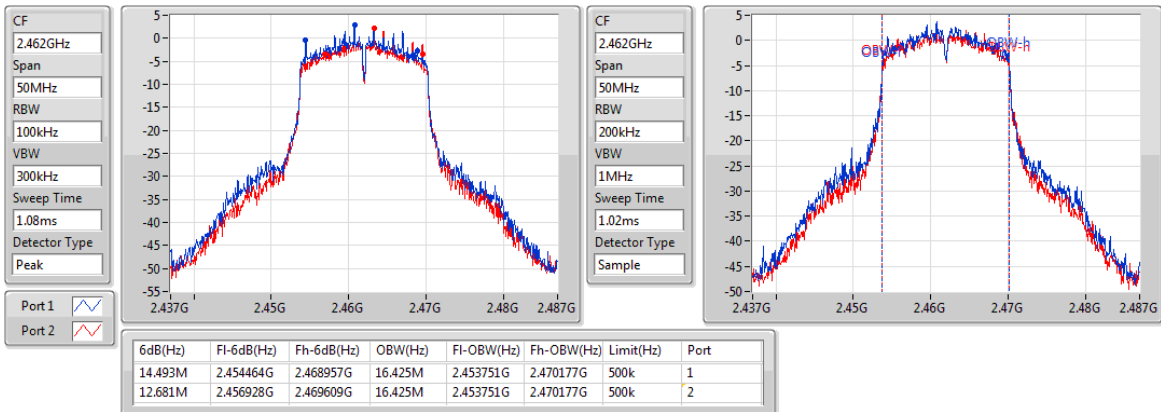
2437MHz



### 802.11g\_Nss1,(6Mbps)\_2TX

EBW

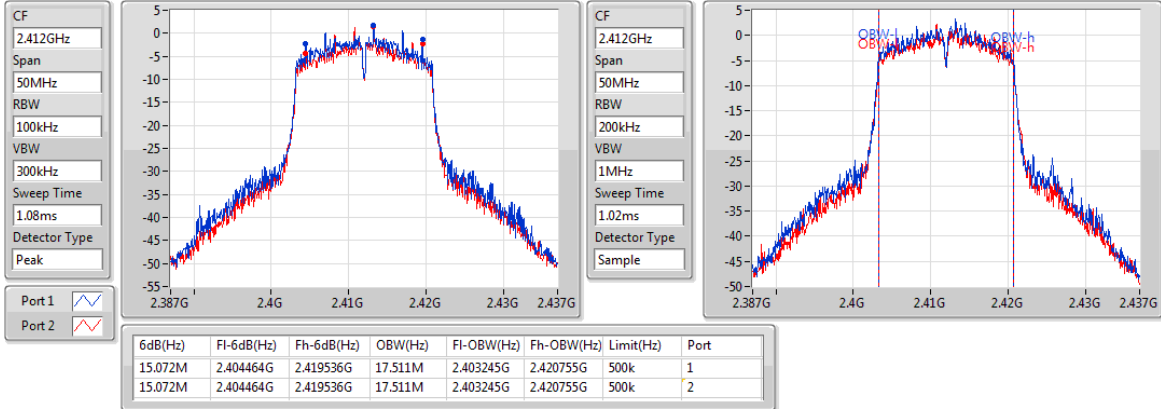
2462MHz



### 802.11n HT20\_Nss1,(MCS0)\_2TX

EBW

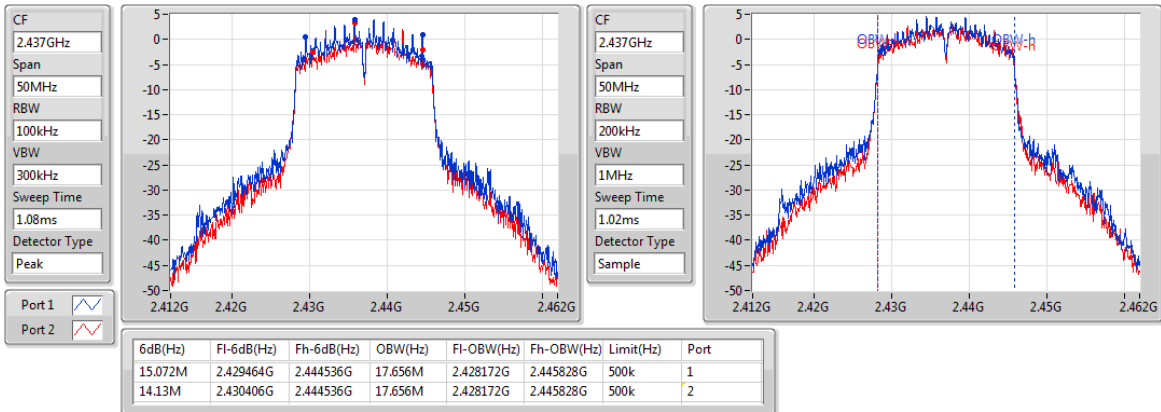
2412MHz



### 802.11n HT20\_Nss1,(MCS0)\_2TX

EBW

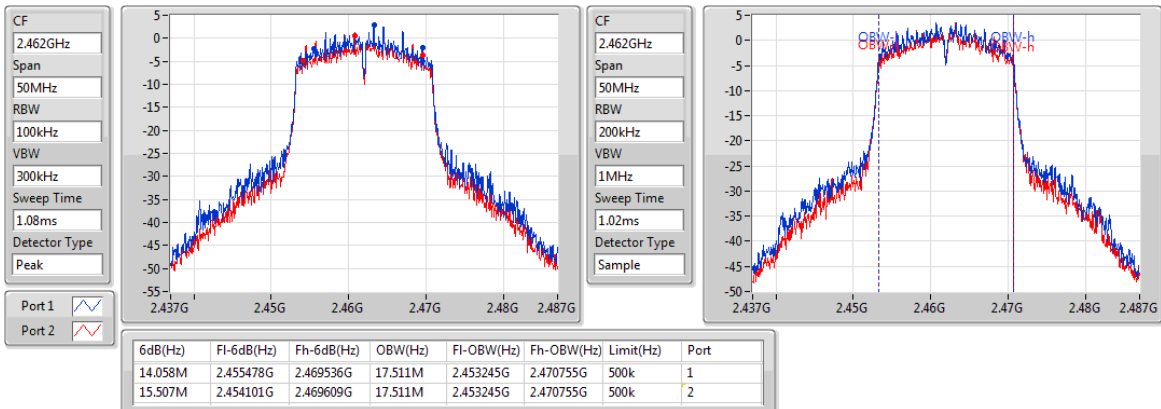
2437MHz



### 802.11n HT20\_Nss1,(MCS0)\_2TX

EBW

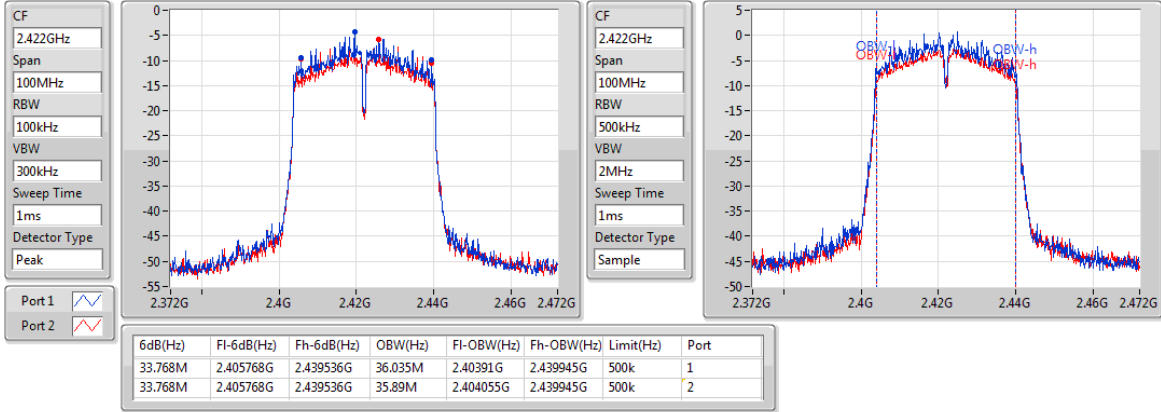
2462MHz



### 802.11n HT40\_Nss1,(MCS0)\_2TX

EBW

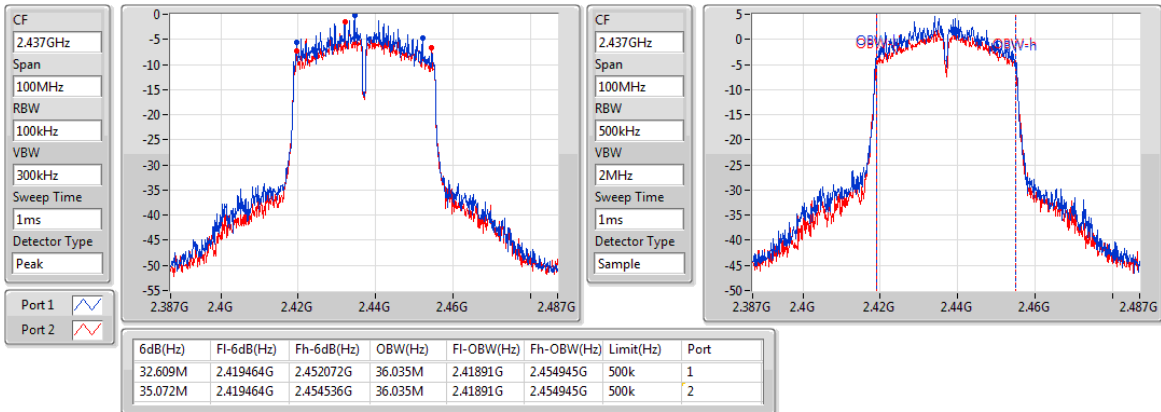
2422MHz



### 802.11n HT40\_Nss1,(MCS0)\_2TX

EBW

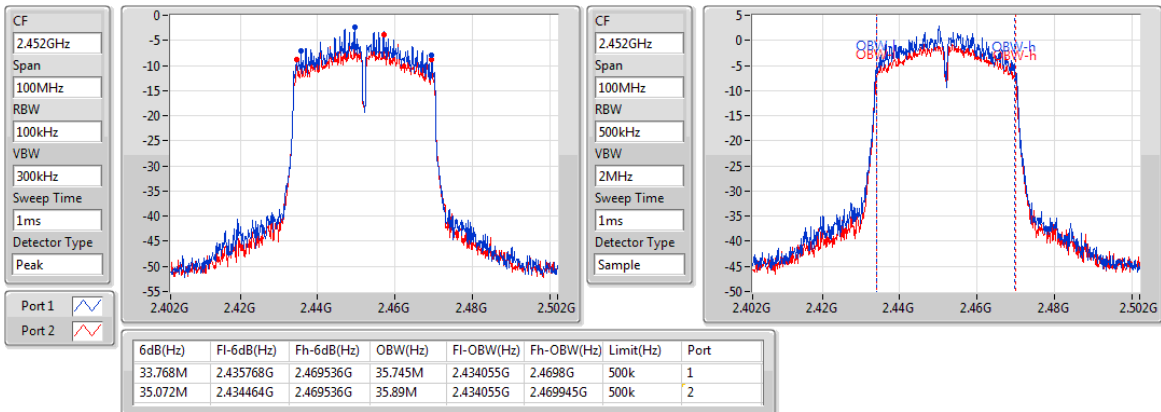
2437MHz



### 802.11n HT40\_Nss1,(MCS0)\_2TX

EBW

2452MHz



### 3.3 RF Output Power

#### 3.3.1 Limit of RF Output Power

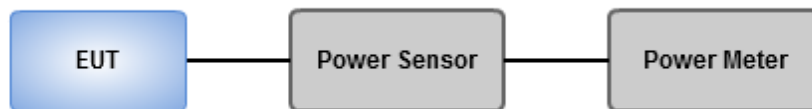
Conducted power shall not exceed 1Watt.

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

#### Summary of Peak Conducted Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_2TX	20.15	0.10351
802.11g_Nss1,(6Mbps)_2TX	<b>24.07</b>	0.25527
802.11n HT20_Nss1,(MCS0)_2TX	23.70	0.23442
802.11n HT40_Nss1,(MCS0)_2TX	22.35	0.17179

#### Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	2.00	16.75	16.29	19.54	30.00	21.54	36.00
2437MHz	Pass	2.00	17.40	16.86	20.15	30.00	22.15	36.00
2462MHz	Pass	2.00	16.58	15.88	19.25	30.00	21.25	36.00
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	2.00	20.33	19.85	23.11	30.00	25.11	36.00
2437MHz	Pass	2.00	21.23	20.89	<b>24.07</b>	30.00	26.07	36.00
2462MHz	Pass	2.00	21.01	20.43	23.74	30.00	25.74	36.00
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	2.00	20.29	19.73	23.03	30.00	25.03	36.00
2437MHz	Pass	2.00	20.93	20.43	23.70	30.00	25.70	36.00
2462MHz	Pass	2.00	20.95	20.31	23.65	30.00	25.65	36.00
802.11n HT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2422MHz	Pass	2.00	16.55	15.72	19.17	30.00	21.17	36.00
2437MHz	Pass	2.00	19.57	19.09	22.35	30.00	24.35	36.00
2452MHz	Pass	2.00	18.18	17.44	20.84	30.00	22.84	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)_2TX	18.31	0.06776
802.11g_Nss1,(6Mbps)_2TX	18.18	0.06577
802.11n HT20_Nss1,(MCS0)_2TX	17.46	0.05572
802.11n HT40_Nss1,(MCS0)_2TX	15.54	0.03581

### Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	2.00	14.98	14.27	17.65	-	19.65	-
2437MHz	Pass	2.00	15.68	14.89	18.31	-	20.31	-
2462MHz	Pass	2.00	14.72	13.91	17.34	-	19.34	-
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	2.00	13.22	12.46	15.87	-	17.87	-
2437MHz	Pass	2.00	15.54	14.76	18.18	-	20.18	-
2462MHz	Pass	2.00	14.23	13.29	16.80	-	18.80	-
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	2.00	13.29	12.34	15.85	-	17.85	-
2437MHz	Pass	2.00	14.76	14.12	17.46	-	19.46	-
2462MHz	Pass	2.00	14.25	13.21	16.77	-	18.77	-
802.11n HT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2422MHz	Pass	2.00	8.93	8.05	11.52	-	13.52	-
2437MHz	Pass	2.00	12.87	12.16	15.54	-	17.54	-
2452MHz	Pass	2.00	10.91	10.05	13.51	-	15.51	-

**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

#### Peak PSD

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.

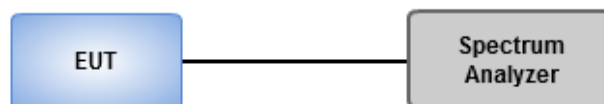
#### Average PSD, duty cycle $\geq 98\%$

1. Set the RBW = 30 kHz, VBW = 100 kHz.
2. Detector = RMS, Sweep time = auto couple.
3. Sweep time = auto couple.
4. Employ trace averaging (RMS) mode over a minimum of 100 traces.
5. Use the peak marker function to determine the maximum amplitude level.

#### Average PSD, duty cycle $< 98\%$

1. Set the RBW = 30 kHz, VBW = 100 kHz. Detector = RMS.
2. Set the sweep time to:  $\geq 10$  (number of measurement points in sweep) x (total on/off period of the transmitted signal).
3. Perform the measurement over a single sweep.
4. Use the peak marker function to determine the maximum amplitude level.
5. Add  $10 \log (1/x)$ , where x is the duty cycle.

### 3.4.3 Test Setup





### 3.4.4 Test Result of Power Spectral Density

#### Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
802.11b_Nss1,(1Mbps)_2TX	-5.67
802.11g_Nss1,(6Mbps)_2TX	-9.73
802.11n HT20_Nss1,(MCS0)_2TX	-9.32
802.11n HT40_Nss1,(MCS0)_2TX	-15.03

RBW=3kHz.

#### Result

Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	Port 2 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	5.01	-8.85	-9.33	-6.87	8.00
2437MHz	Pass	5.01	-8.31	-8.72	-5.67	8.00
2462MHz	Pass	5.01	-9.38	-10.52	-7.50	8.00
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	5.01	-15.11	-14.86	-12.54	8.00
2437MHz	Pass	5.01	-12.34	-12.87	-9.73	8.00
2462MHz	Pass	5.01	-14.28	-14.35	-11.82	8.00
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	5.01	-13.76	-15.77	-11.97	8.00
2437MHz	Pass	5.01	-11.04	-13.47	-9.32	8.00
2462MHz	Pass	5.01	-13.23	-13.81	-10.58	8.00
802.11n HT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	5.01	-20.02	-21.69	-18.58	8.00
2437MHz	Pass	5.01	-16.90	-18.09	-15.03	8.00
2452MHz	Pass	5.01	-18.83	-20.27	-16.88	8.00

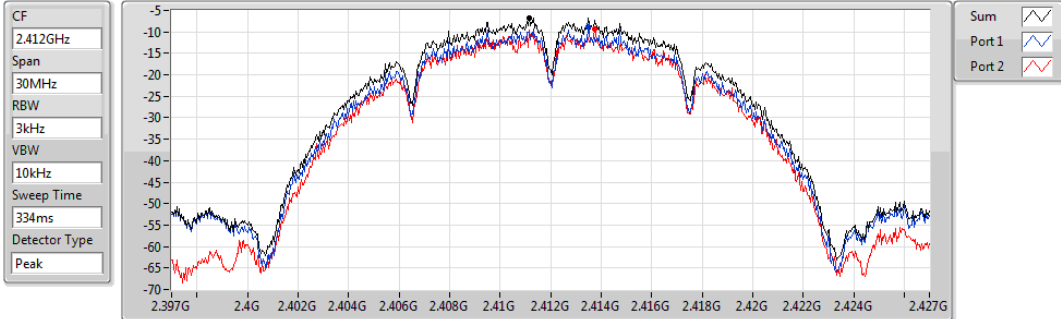
**DG** = Directional Gain =  $2 + 10 \cdot \log(2/1) = 5.01$  dBi;

**PD** = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port X power density;

### 802.11b\_Nss1,(1Mbps)\_2TX

PSD

2412MHz

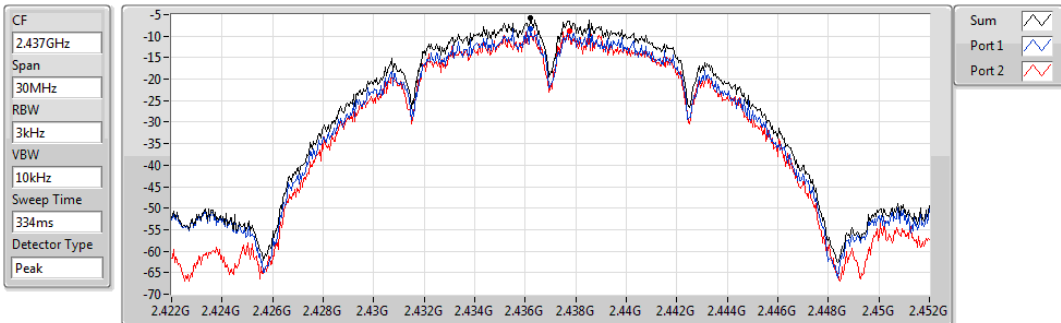


Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-6.87	-6.87	-8.85	-9.33

### 802.11b\_Nss1,(1Mbps)\_2TX

PSD

2437MHz

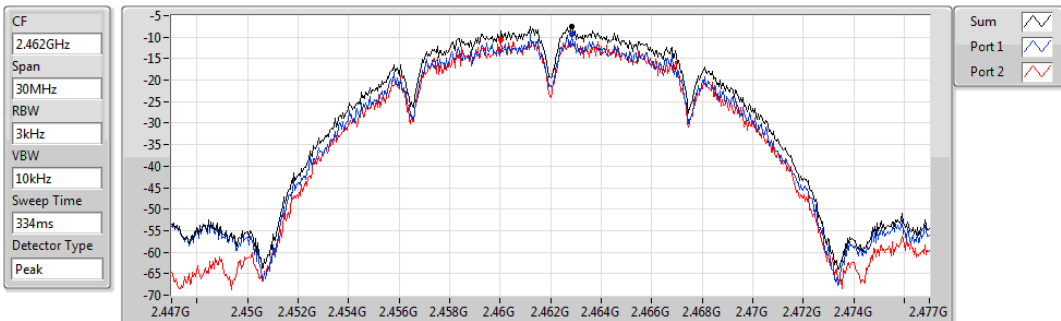


Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-5.67	-5.67	-8.31	-8.72

### 802.11b\_Nss1,(1Mbps)\_2TX

PSD

2462MHz

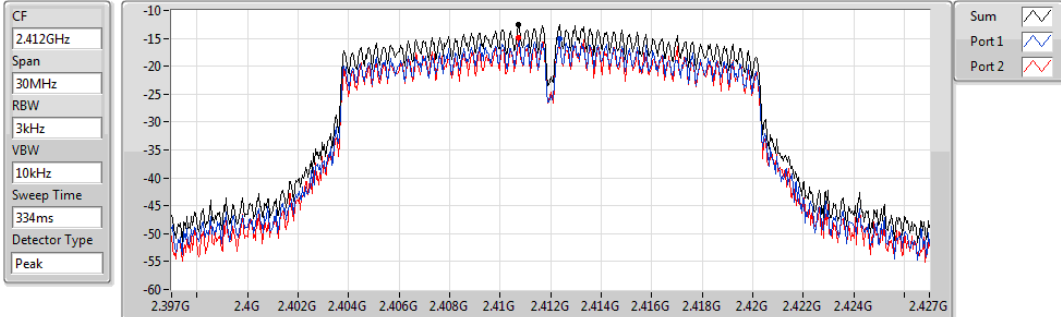


Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-7.50	-7.50	-9.38	-10.52

### 802.11g\_Nss1,(6Mbps)\_2TX

PSD

2412MHz

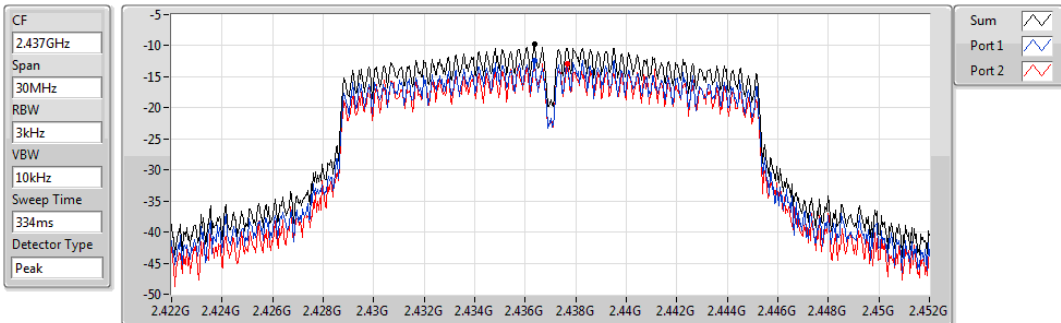


Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-12.54	-12.54	-15.11	-14.86

### 802.11g\_Nss1,(6Mbps)\_2TX

PSD

2437MHz

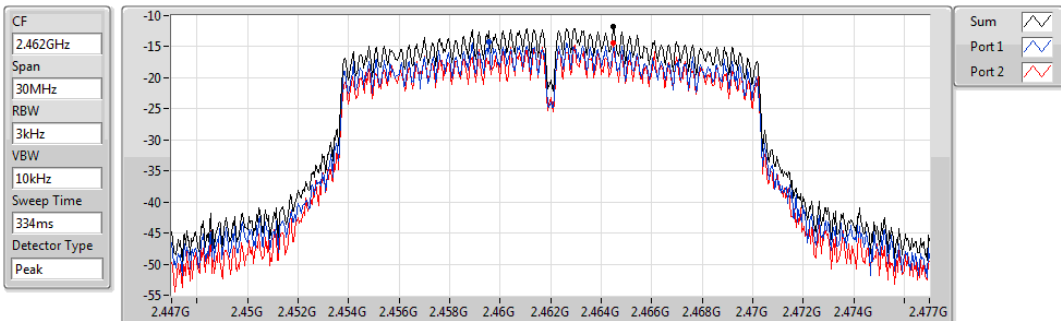


Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.73	-9.73	-12.34	-12.87

### 802.11g\_Nss1,(6Mbps)\_2TX

PSD

2462MHz

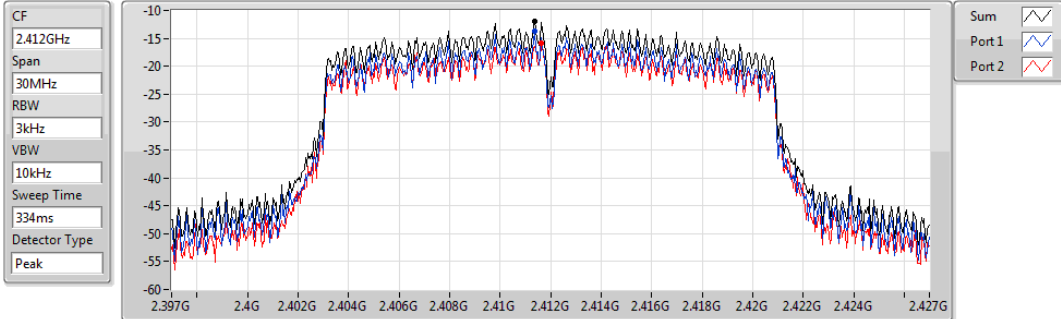


Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-11.82	-11.82	-14.28	-14.35

### 802.11n HT20\_Nss1,(MCS0)\_2TX

PSD

2412MHz

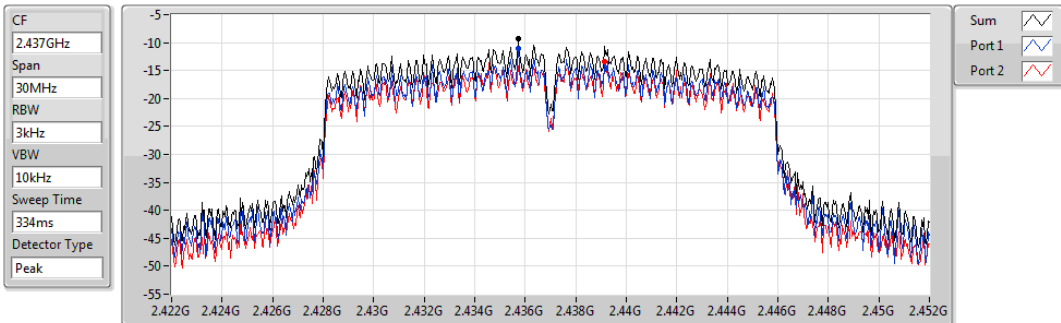


Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-11.97	-11.97	-13.76	-15.77

### 802.11n HT20\_Nss1,(MCS0)\_2TX

PSD

2437MHz

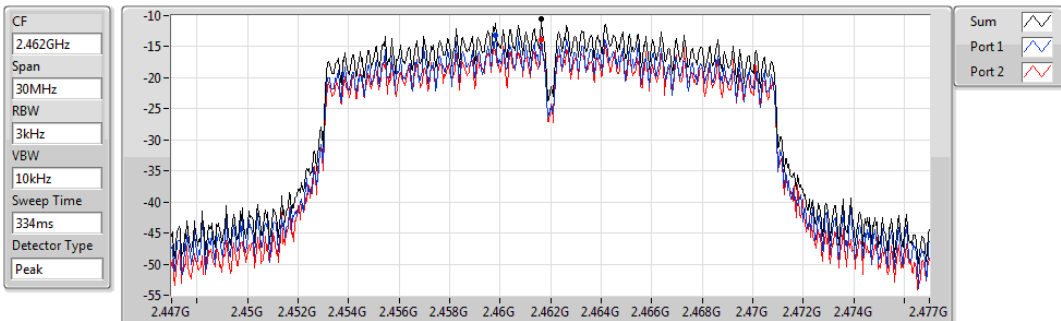


Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.32	-9.32	-11.04	-13.47

### 802.11n HT20\_Nss1,(MCS0)\_2TX

PSD

2462MHz

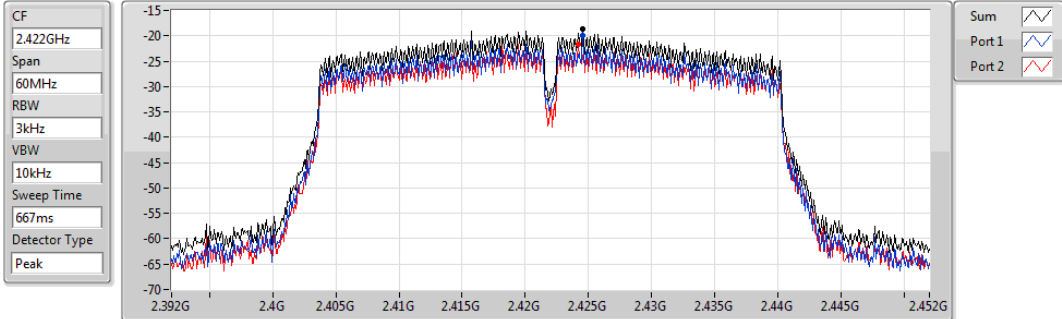


Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-10.58	-10.58	-13.23	-13.81

### 802.11n HT40\_Nss1,(MCS0)\_2TX

PSD

2422MHz

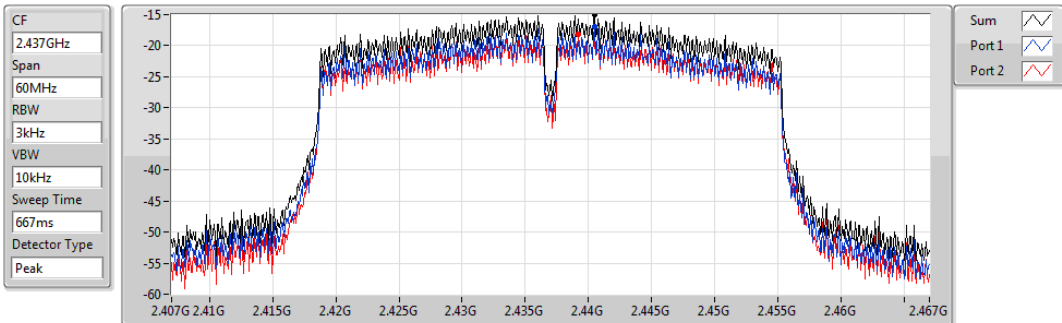


Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-18.58	-18.58	-20.02	-21.69

### 802.11n HT40\_Nss1,(MCS0)\_2TX

PSD

2437MHz

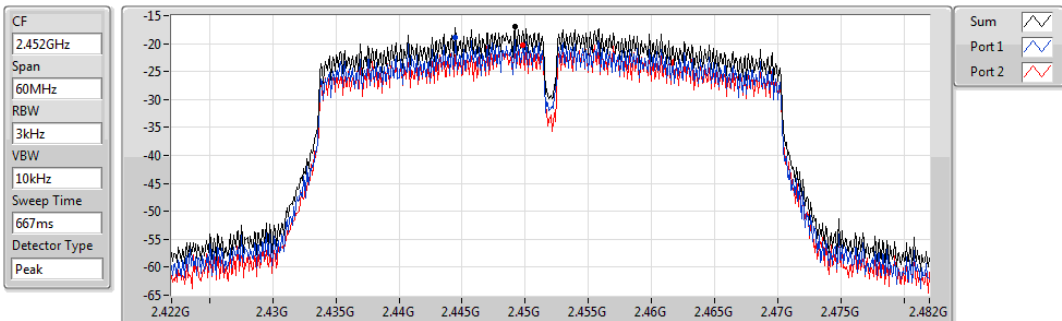


Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-15.03	-15.03	-16.90	-18.09

### 802.11n HT40\_Nss1,(MCS0)\_2TX

PSD

2452MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-16.88	-16.88	-18.83	-20.27

## 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

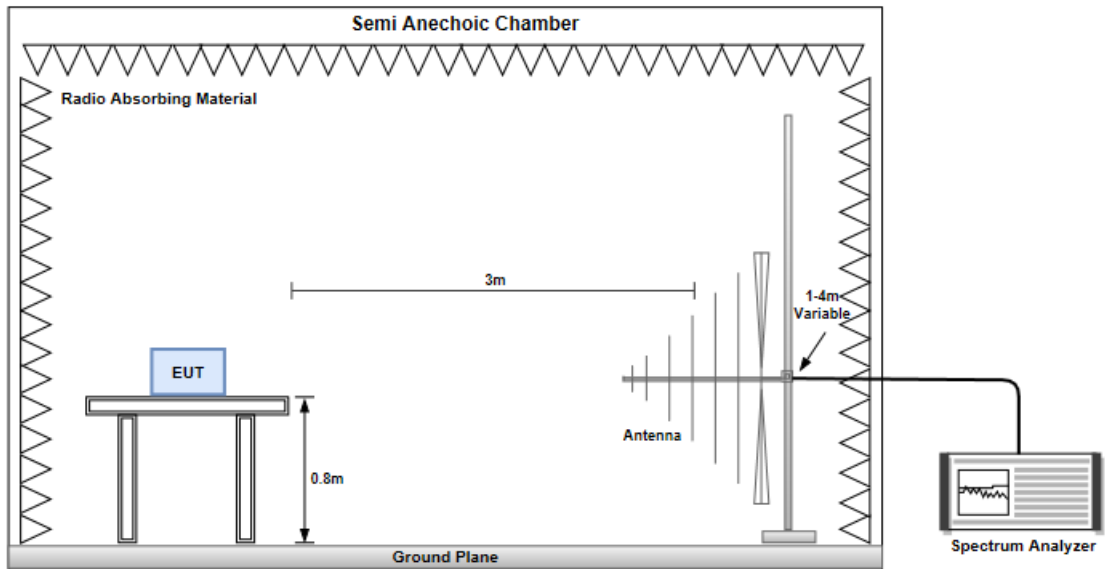
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission 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:

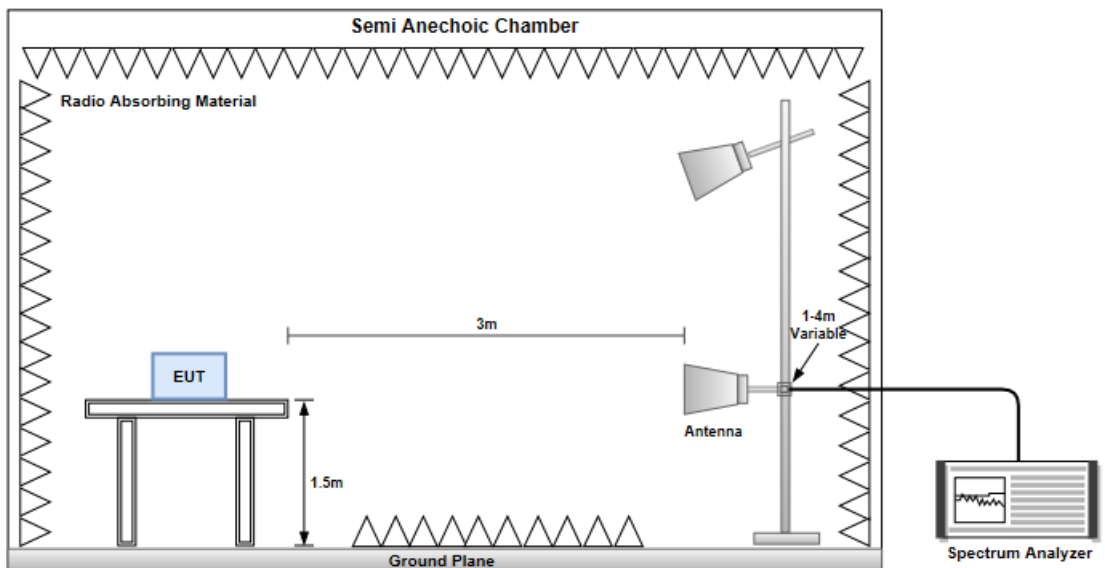
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

### 3.5.3 Test Setup

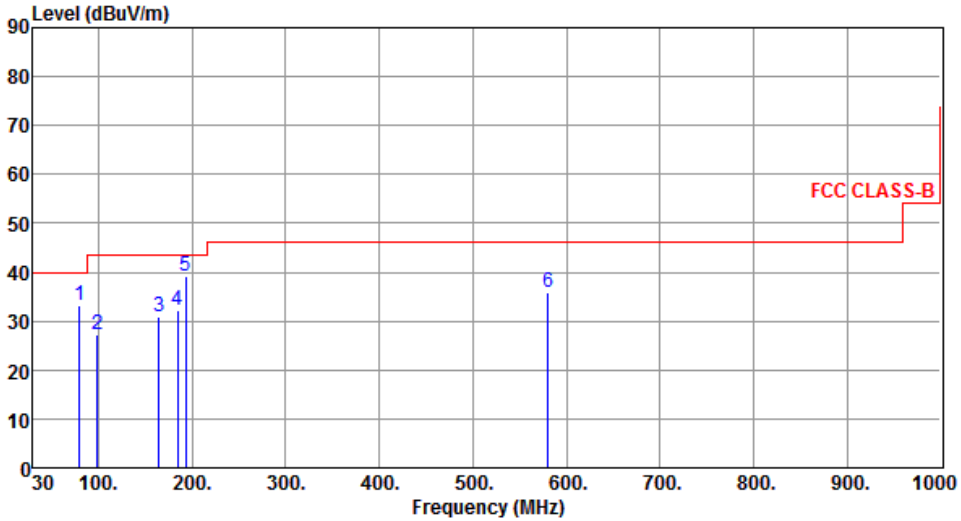
#### Radiated Emissions below 1 GHz



#### Radiated Emissions above 1 GHz



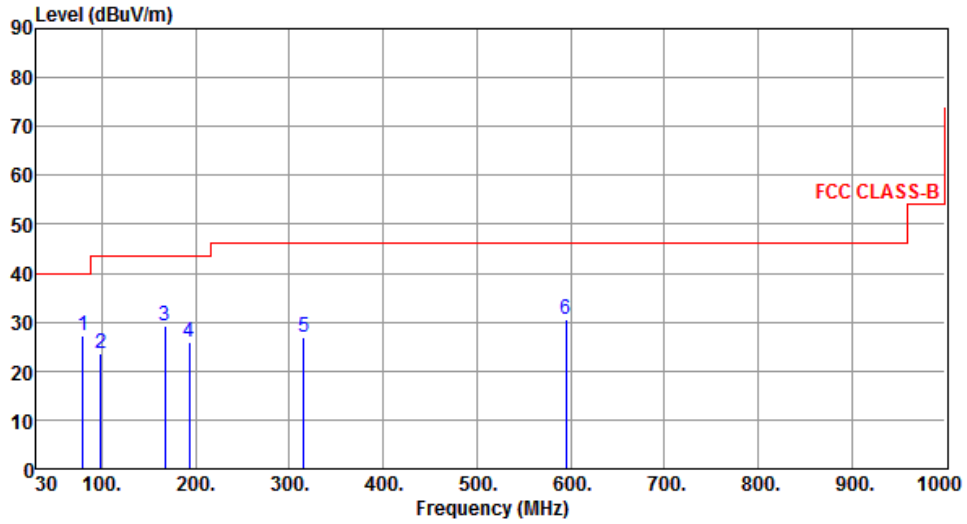
### 3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	11g	Test Freq. (MHz)	2437						
Polarization	Horizontal								
									
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	79.47	33.34	40.00	-6.66	46.56	-13.22	Peak	---	---
2	98.87	27.07	43.50	-16.43	40.94	-13.87	Peak	---	---
3	164.83	30.94	43.50	-12.56	39.90	-8.96	Peak	---	---
4	184.23	32.28	43.50	-11.22	43.02	-10.74	Peak	---	---
5	192.96	39.30	43.50	-4.20	50.96	-11.66	Peak	---	---
6	579.99	35.97	46.00	-10.03	37.65	-1.68	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		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	79.47	27.13	40.00	-12.87	40.35	-13.22	Peak	---	---
2	98.87	23.53	43.50	-19.97	37.40	-13.87	Peak	---	---
3	166.77	29.27	43.50	-14.23	38.33	-9.06	Peak	---	---
4	192.96	25.79	43.50	-17.71	37.45	-11.66	Peak	---	---
5	315.18	26.81	46.00	-19.19	34.70	-7.89	Peak	---	---
6	595.51	30.45	46.00	-15.55	31.55	-1.10	Peak	---	---

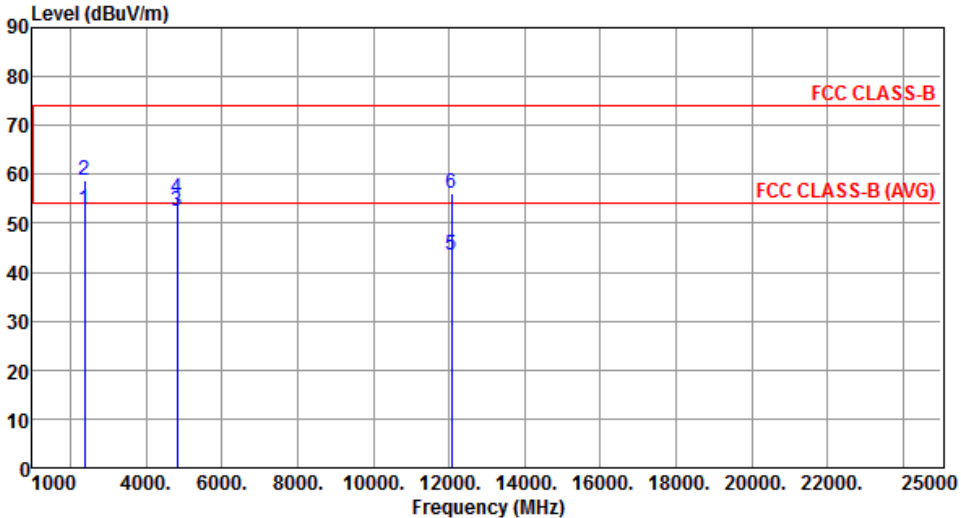
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

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

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

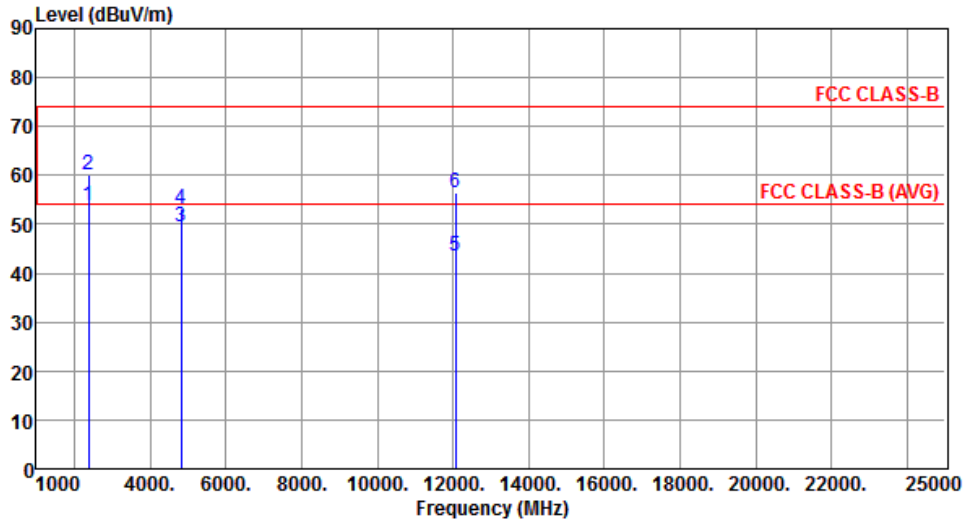
Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

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

Modulation	11b	Test Freq. (MHz)	2412						
Polarization	Horizontal								
									
	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	52.89	54.00	-1.11	53.85	-0.96	Average	104	245
2	2390.00	58.76	74.00	-15.24	59.72	-0.96	Peak	104	245
3	4824.00	52.54	54.00	-1.46	47.67	4.87	Average	240	23
4	4824.00	55.12	74.00	-18.88	50.25	4.87	Peak	240	23
5	12060.00	43.37	54.00	-10.63	28.45	14.92	Average	100	30
6	12060.00	56.20	74.00	-17.80	41.28	14.92	Peak	100	30

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>	2412
<b>Polarization</b>	Vertical		



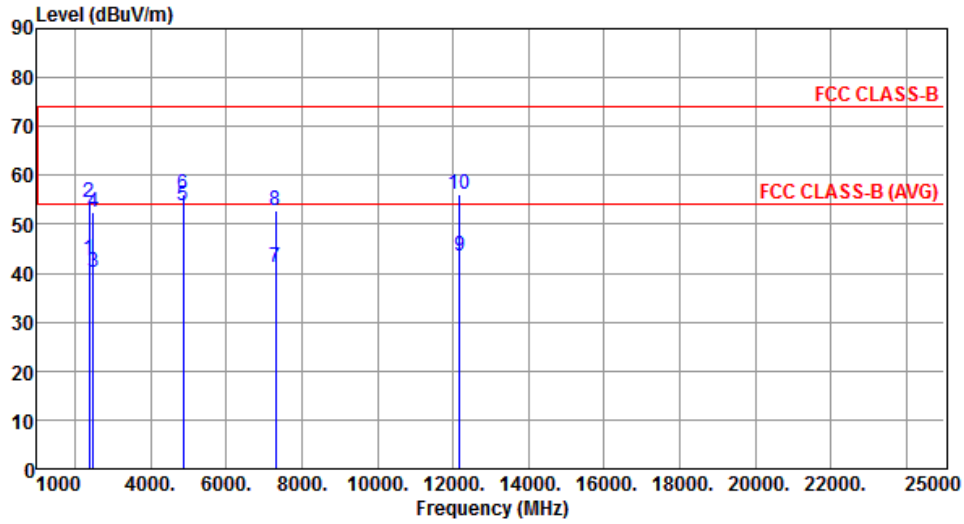
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.84	54.00	-0.16	54.80	-0.96	Average	108	255
2	2390.00	59.96	74.00	-14.04	60.92	-0.96	Peak	108	255
3	4824.00	49.38	54.00	-4.62	44.51	4.87	Average	325	352
4	4824.00	52.98	74.00	-21.02	48.11	4.87	Peak	325	352
5	12060.00	43.57	54.00	-10.43	28.65	14.92	Average	100	40
6	12060.00	56.31	74.00	-17.69	41.39	14.92	Peak	100	40

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		



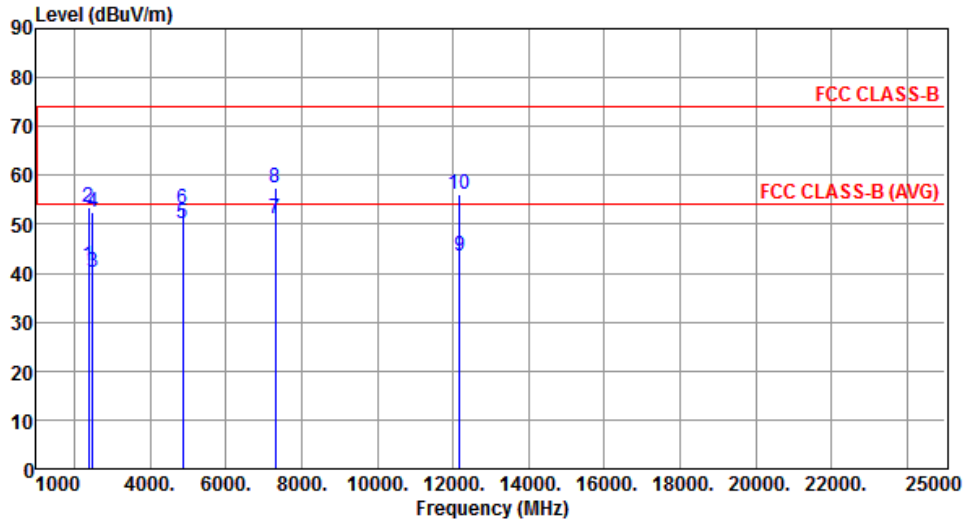
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	42.71	54.00	-11.29	43.67	-0.96	Average	169	247
2	2390.00	54.43	74.00	-19.57	55.39	-0.96	Peak	169	247
3	2483.50	40.33	54.00	-13.67	41.45	-1.12	Average	169	247
4	2483.50	52.56	74.00	-21.44	53.68	-1.12	Peak	169	247
5	4874.00	53.70	54.00	-0.30	48.79	4.91	Average	247	26
6	4874.00	56.24	74.00	-17.76	51.33	4.91	Peak	247	26
7	7311.00	41.03	54.00	-12.97	30.68	10.35	Average	100	338
8	7311.00	52.83	74.00	-21.17	42.48	10.35	Peak	100	338
9	12185.00	43.51	54.00	-10.49	28.65	14.86	Average	100	20
10	12185.00	56.24	74.00	-17.76	41.38	14.86	Peak	100	20

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		



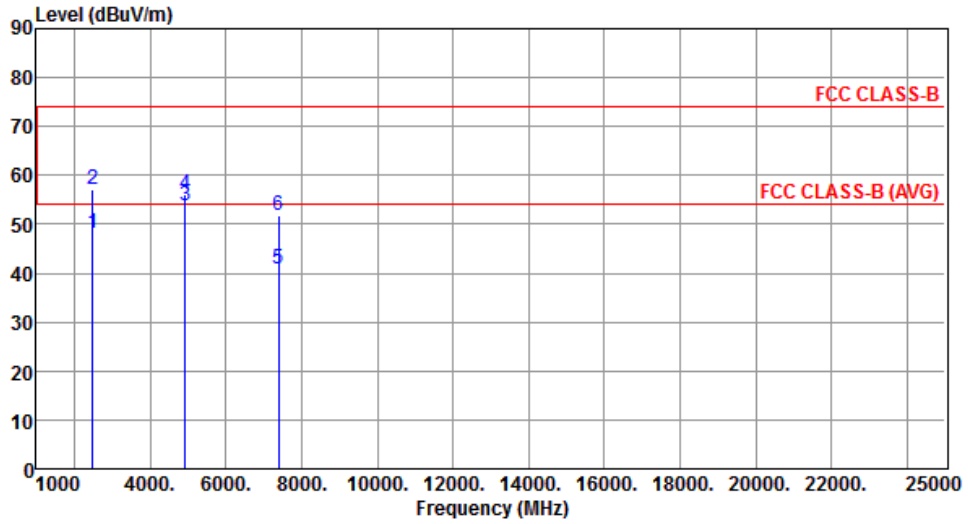
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	41.63	54.00	-12.37	42.59	-0.96	Average	109	248
2	2390.00	53.43	74.00	-20.57	54.39	-0.96	Peak	109	248
3	2483.50	40.26	54.00	-13.74	41.38	-1.12	Average	109	248
4	2483.50	52.43	74.00	-21.57	53.55	-1.12	Peak	109	248
5	4874.00	50.10	54.00	-3.90	45.19	4.91	Average	329	350
6	4874.00	53.00	74.00	-21.00	48.09	4.91	Peak	329	350
7	7311.00	51.10	54.00	-2.90	40.75	10.35	Average	176	311
8	7311.00	57.44	74.00	-16.56	47.09	10.35	Peak	176	311
9	12185.00	43.61	54.00	-10.39	28.75	14.86	Average	100	50
10	12185.00	56.28	74.00	-17.72	41.42	14.86	Peak	100	50

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		



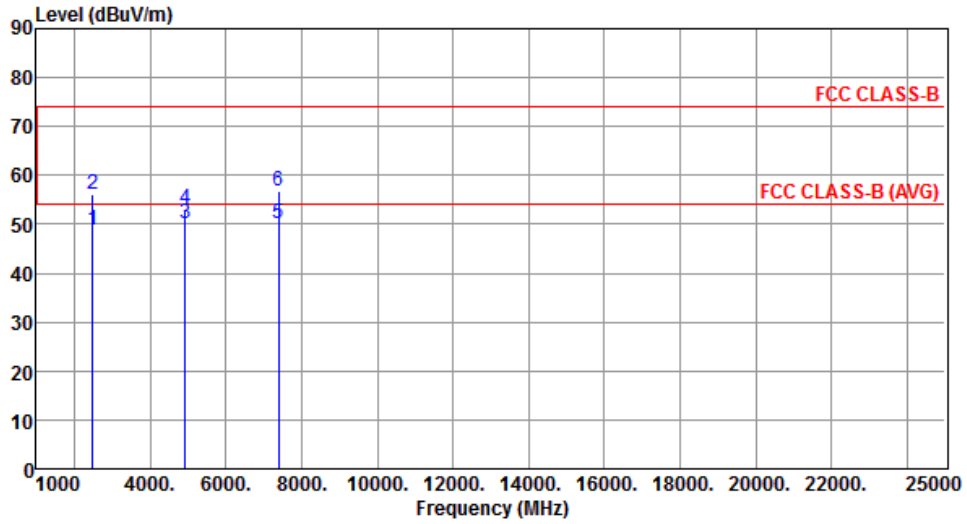
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	48.09	54.00	-5.91	49.21	-1.12	Average	163	246
2	2483.50	57.01	74.00	-16.99	58.13	-1.12	Peak	163	246
3	4924.00	53.76	54.00	-0.24	48.75	5.01	Average	232	37
4	4924.00	56.14	74.00	-17.86	51.13	5.01	Peak	232	37
5	7386.00	40.70	54.00	-13.30	30.55	10.15	Average	100	340
6	7386.00	51.83	74.00	-22.17	41.68	10.15	Peak	100	340

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		



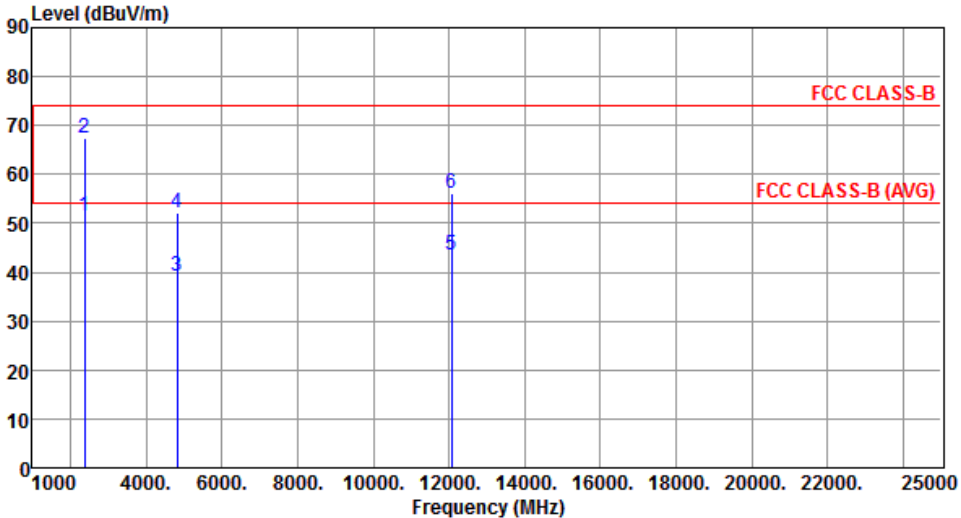
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	48.75	54.00	-5.25	49.87	-1.12	Average	109	255
2	2483.50	56.21	74.00	-17.79	57.33	-1.12	Peak	109	255
3	4924.00	50.29	54.00	-3.71	45.28	5.01	Average	330	353
4	4924.00	53.30	74.00	-20.70	48.29	5.01	Peak	330	353
5	7386.00	50.27	54.00	-3.73	40.12	10.15	Average	188	308
6	7386.00	56.70	74.00	-17.30	46.55	10.15	Peak	188	308

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

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

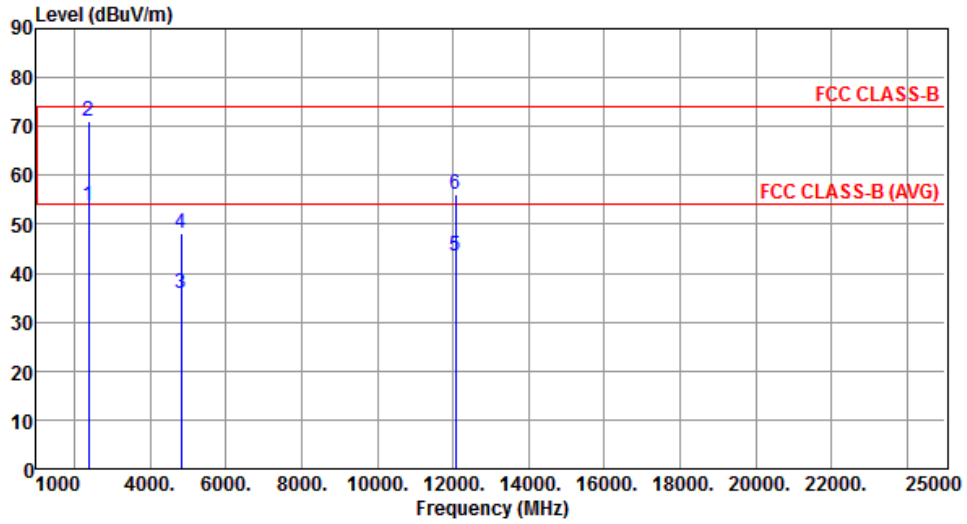
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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

Modulation	11g	Test Freq. (MHz)	2412						
Polarization	Horizontal								
									
	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	51.40	54.00	-2.60	52.36	-0.96	Average	145	255
2	2390.00	67.49	74.00	-6.51	68.45	-0.96	Peak	145	255
3	4824.00	39.12	54.00	-14.88	34.25	4.87	Average	232	20
4	4824.00	52.25	74.00	-21.75	47.38	4.87	Peak	232	20
5	12060.00	43.55	54.00	-10.45	28.63	14.92	Average	100	50
6	12060.00	56.26	74.00	-17.74	41.34	14.92	Peak	100	50
<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		



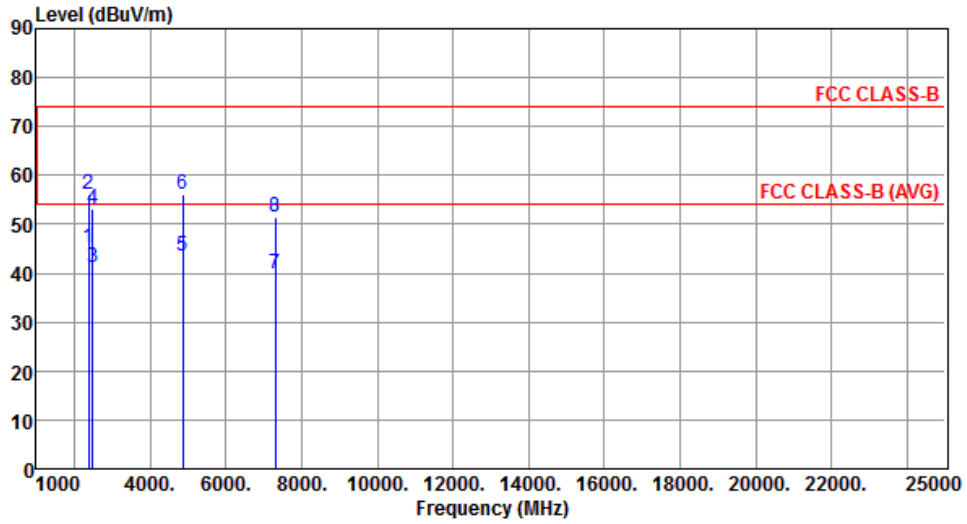
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.74	54.00	-0.26	54.70	-0.96	Average	160	267
2	2390.00	70.93	74.00	-3.07	71.89	-0.96	Peak	160	267
3	4824.00	35.99	54.00	-18.01	31.12	4.87	Average	311	345
4	4824.00	48.12	74.00	-25.88	43.25	4.87	Peak	311	345
5	12060.00	43.55	54.00	-10.45	28.63	14.92	Average	100	90
6	12060.00	56.29	74.00	-17.71	41.37	14.92	Peak	100	90

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		



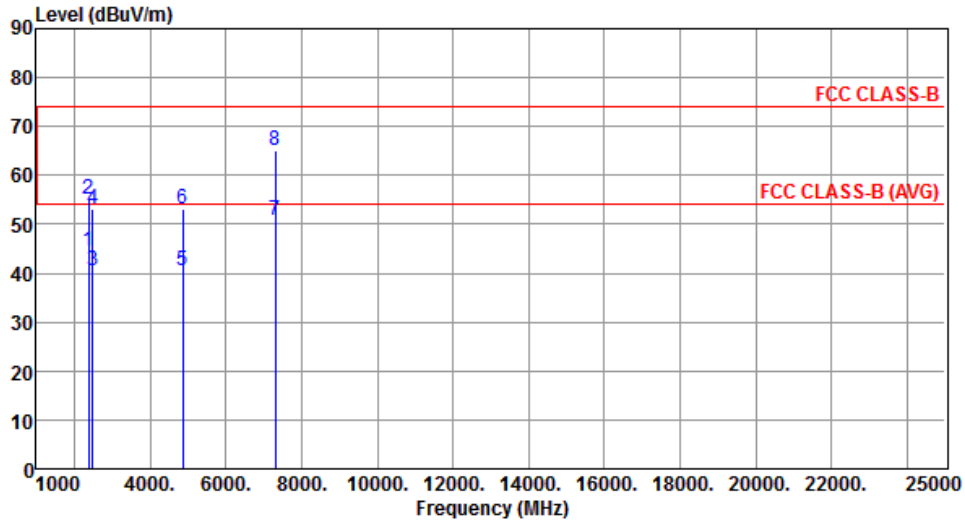
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	45.16	54.00	-8.84	46.12	-0.96	Average	155	252
2	2390.00	56.23	74.00	-17.77	57.19	-0.96	Peak	155	252
3	2483.50	41.20	54.00	-12.80	42.32	-1.12	Average	155	252
4	2483.50	53.27	74.00	-20.73	54.39	-1.12	Peak	155	252
5	4874.00	43.65	54.00	-10.35	38.74	4.91	Average	231	19
6	4874.00	56.18	74.00	-17.82	51.27	4.91	Peak	231	19
7	7311.00	39.80	54.00	-14.20	29.45	10.35	Average	100	335
8	7311.00	51.61	74.00	-22.39	41.26	10.35	Peak	100	335

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		



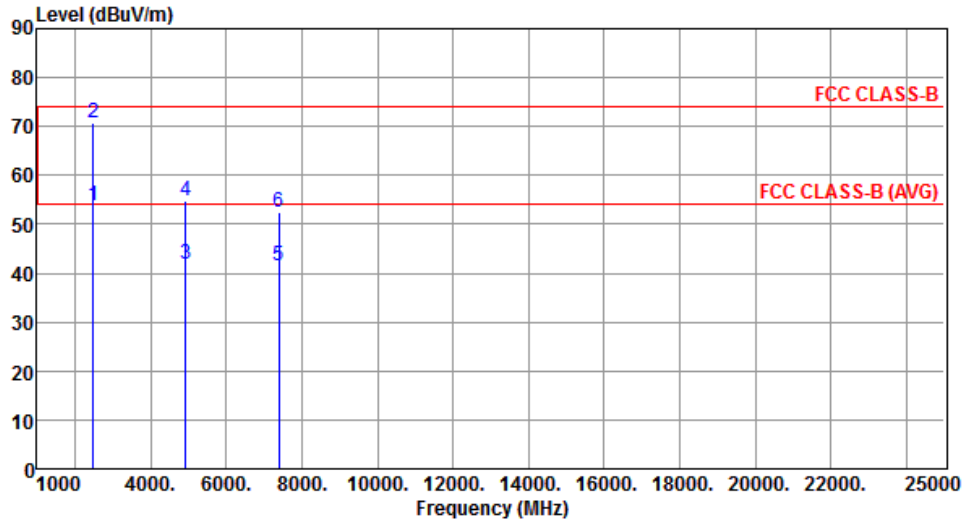
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	44.60	54.00	-9.40	45.56	-0.96	Average	130	241
2	2390.00	55.25	74.00	-18.75	56.21	-0.96	Peak	130	241
3	2483.50	40.44	54.00	-13.56	41.56	-1.12	Average	130	241
4	2483.50	53.00	74.00	-21.00	54.12	-1.12	Peak	130	241
5	4874.00	40.53	54.00	-13.47	35.62	4.91	Average	315	342
6	4874.00	53.27	74.00	-20.73	48.36	4.91	Peak	315	342
7	7311.00	50.84	54.00	-3.16	40.49	10.35	Average	181	333
8	7311.00	64.98	74.00	-9.02	54.63	10.35	Peak	181	333

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		



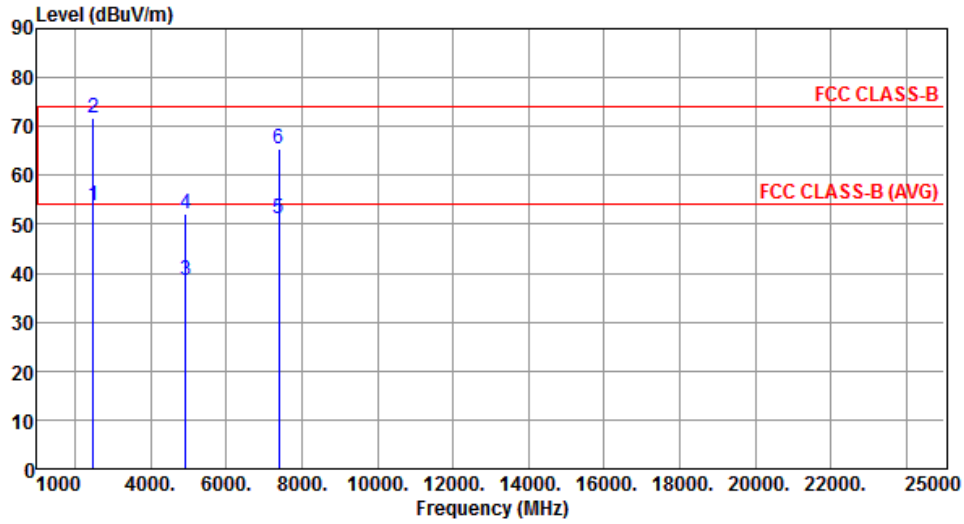
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	53.79	54.00	-0.21	54.91	-1.12	Average	149	253
2	2483.50	70.61	74.00	-3.39	71.73	-1.12	Peak	149	253
3	4924.00	41.70	54.00	-12.30	36.69	5.01	Average	235	25
4	4924.00	54.69	74.00	-19.31	49.68	5.01	Peak	235	25
5	7386.00	41.38	54.00	-12.62	31.23	10.15	Average	100	336
6	7386.00	52.51	74.00	-21.49	42.36	10.15	Peak	100	336

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		



	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	53.71	54.00	-0.29	54.83	-1.12	Average	126	236
2	2483.50	71.79	74.00	-2.21	72.91	-1.12	Peak	126	236
3	4924.00	38.56	54.00	-15.44	33.55	5.01	Average	313	345
4	4924.00	52.22	74.00	-21.78	47.21	5.01	Peak	313	345
5	7386.00	51.07	54.00	-2.93	40.92	10.15	Average	182	335
6	7386.00	65.41	74.00	-8.59	55.26	10.15	Peak	182	335

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

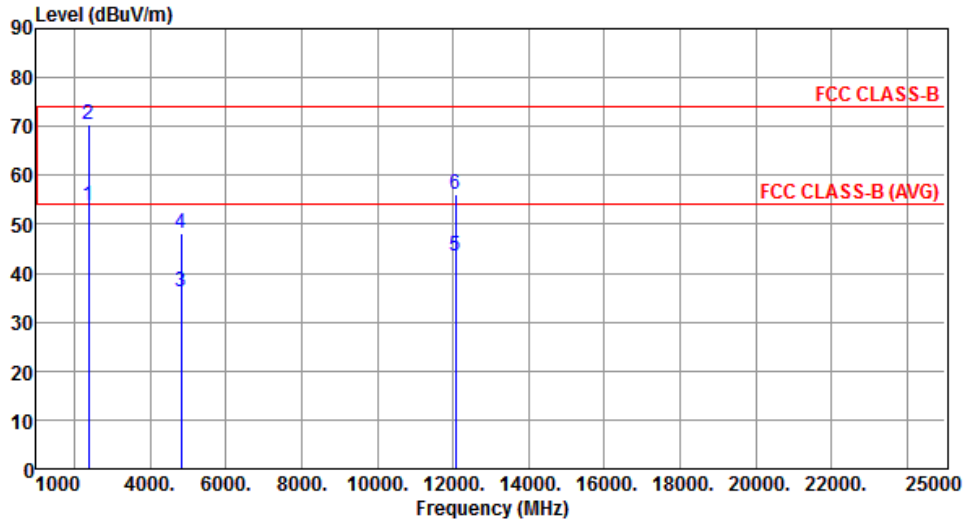
\*Factor includes antenna factor , cable loss and amplifier gain

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

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

Modulation	HT20	Test Freq. (MHz)	2412																																																																																			
Polarization	Horizontal																																																																																					
	<table border="1"> <thead> <tr> <th>Freq.</th> <th>Emission level</th> <th>Limit</th> <th>Margin</th> <th>SA reading</th> <th>Factor</th> <th>Remark</th> <th>ANT High</th> <th>Turn Table</th> </tr> <tr> <th>MHz</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th></th> <th>cm</th> <th>deg</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2390.00</td> <td>52.46</td> <td>54.00</td> <td>-1.54</td> <td>53.42</td> <td>-0.96</td> <td>Average</td> <td>182</td> <td>251</td> </tr> <tr> <td>2</td> <td>2390.00</td> <td>68.37</td> <td>74.00</td> <td>-5.63</td> <td>69.33</td> <td>-0.96</td> <td>Peak</td> <td>182</td> <td>251</td> </tr> <tr> <td>3</td> <td>4824.00</td> <td>38.17</td> <td>54.00</td> <td>-15.83</td> <td>33.30</td> <td>4.87</td> <td>Average</td> <td>235</td> <td>12</td> </tr> <tr> <td>4</td> <td>4824.00</td> <td>51.28</td> <td>74.00</td> <td>-22.72</td> <td>46.41</td> <td>4.87</td> <td>Peak</td> <td>235</td> <td>12</td> </tr> <tr> <td>5</td> <td>12060.00</td> <td>43.47</td> <td>54.00</td> <td>-10.53</td> <td>28.55</td> <td>14.92</td> <td>Average</td> <td>100</td> <td>60</td> </tr> <tr> <td>6</td> <td>12060.00</td> <td>56.15</td> <td>74.00</td> <td>-17.85</td> <td>41.23</td> <td>14.92</td> <td>Peak</td> <td>100</td> <td>60</td> </tr> </tbody> </table>	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	53.42	-0.96	Average	182	251	2	2390.00	68.37	74.00	-5.63	69.33	-0.96	Peak	182	251	3	4824.00	38.17	54.00	-15.83	33.30	4.87	Average	235	12	4	4824.00	51.28	74.00	-22.72	46.41	4.87	Peak	235	12	5	12060.00	43.47	54.00	-10.53	28.55	14.92	Average	100	60	6	12060.00	56.15	74.00	-17.85	41.23	14.92	Peak	100	60							
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	53.42	-0.96	Average	182	251																																																																													
2	2390.00	68.37	74.00	-5.63	69.33	-0.96	Peak	182	251																																																																													
3	4824.00	38.17	54.00	-15.83	33.30	4.87	Average	235	12																																																																													
4	4824.00	51.28	74.00	-22.72	46.41	4.87	Peak	235	12																																																																													
5	12060.00	43.47	54.00	-10.53	28.55	14.92	Average	100	60																																																																													
6	12060.00	56.15	74.00	-17.85	41.23	14.92	Peak	100	60																																																																													
<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>	HT20	<b>Test Freq. (MHz)</b>	2412
<b>Polarization</b>	Vertical		



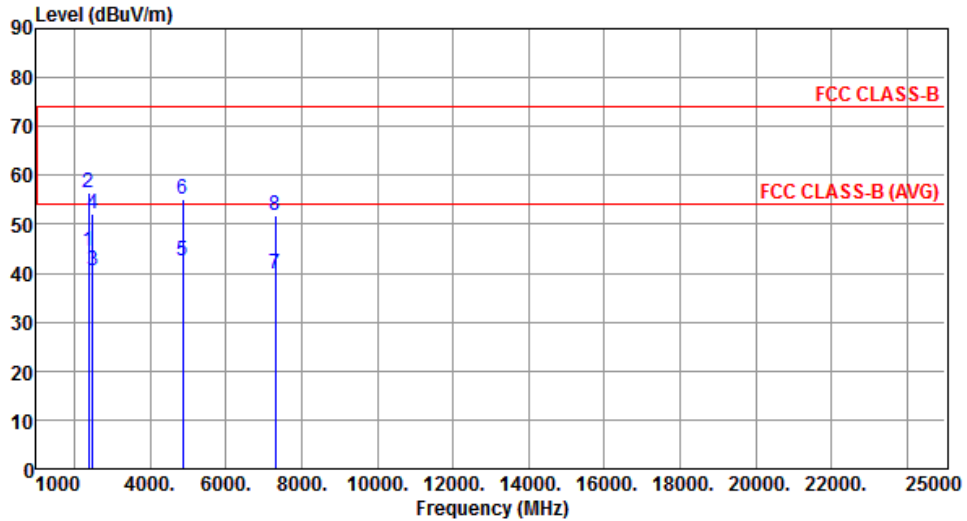
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.72	54.00	-0.28	54.68	-0.96	Average	143	242
2	2390.00	70.45	74.00	-3.55	71.41	-0.96	Peak	143	242
3	4824.00	36.12	54.00	-17.88	31.25	4.87	Average	315	346
4	4824.00	48.25	74.00	-25.75	43.38	4.87	Peak	315	346
5	12060.00	43.58	54.00	-10.42	28.66	14.92	Average	100	80
6	12060.00	56.18	74.00	-17.82	41.26	14.92	Peak	100	80

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		



	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	44.50	54.00	-9.50	45.46	-0.96	Average	176	244
2	2390.00	56.31	74.00	-17.69	57.27	-0.96	Peak	176	244
3	2483.50	40.58	54.00	-13.42	41.70	-1.12	Average	176	244
4	2483.50	52.14	74.00	-21.86	53.26	-1.12	Peak	176	244
5	4874.00	42.56	54.00	-11.44	37.65	4.91	Average	235	23
6	4874.00	55.22	74.00	-18.78	50.31	4.91	Peak	235	23
7	7311.00	39.96	54.00	-14.04	29.61	10.35	Average	100	336
8	7311.00	51.73	74.00	-22.27	41.38	10.35	Peak	100	336

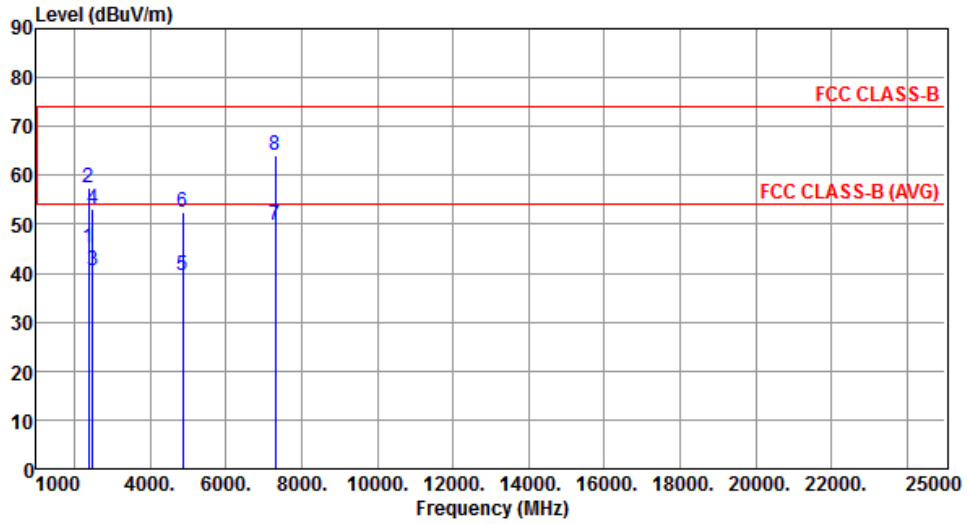
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

\*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		



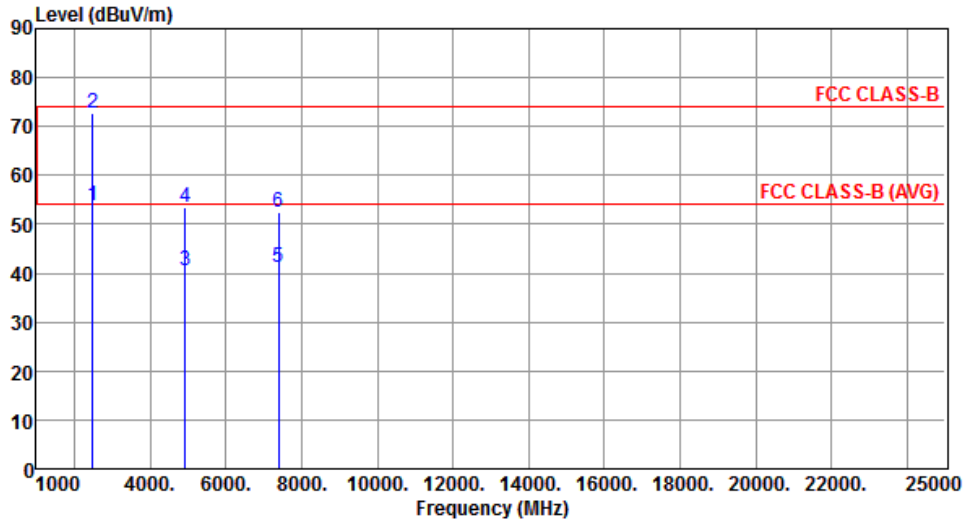
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	45.18	54.00	-8.82	46.14	-0.96	Average	131	269
2	2390.00	57.48	74.00	-16.52	58.44	-0.96	Peak	131	269
3	2483.50	40.65	54.00	-13.35	41.77	-1.12	Average	131	269
4	2483.50	53.00	74.00	-21.00	54.12	-1.12	Peak	131	269
5	4874.00	39.42	54.00	-14.58	34.51	4.91	Average	316	338
6	4874.00	52.47	74.00	-21.53	47.56	4.91	Peak	316	338
7	7311.00	49.87	54.00	-4.13	39.52	10.35	Average	175	336
8	7311.00	63.94	74.00	-10.06	53.59	10.35	Peak	175	336

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		



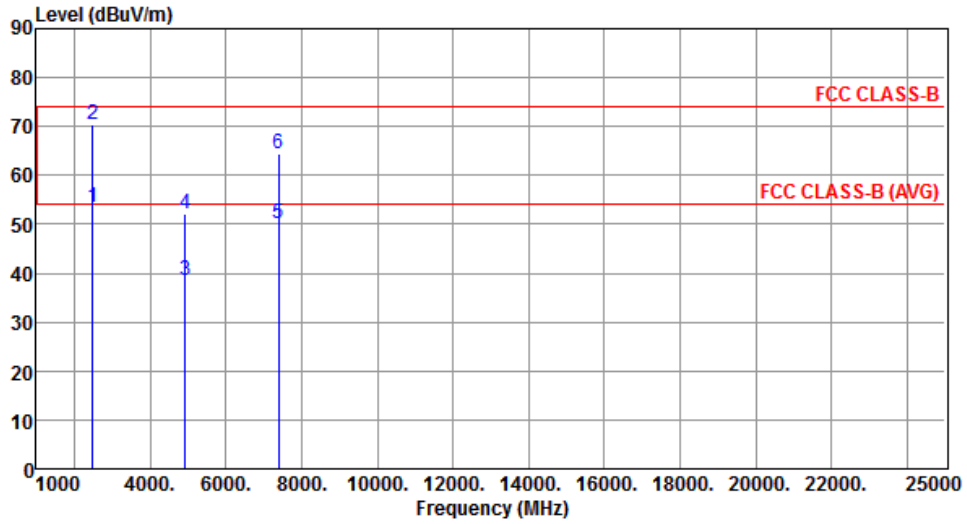
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	53.74	54.00	-0.26	54.86	-1.12	Average	174	247
2	2483.50	72.79	74.00	-1.21	73.91	-1.12	Peak	174	247
3	4924.00	40.66	54.00	-13.34	35.65	5.01	Average	233	33
4	4924.00	53.57	74.00	-20.43	48.56	5.01	Peak	233	33
5	7386.00	41.33	54.00	-12.67	31.18	10.15	Average	100	333
6	7386.00	52.40	74.00	-21.60	42.25	10.15	Peak	100	333

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		



	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	53.58	54.00	-0.42	54.70	-1.12	Average	145	279
2	2483.50	70.56	74.00	-3.44	71.68	-1.12	Peak	145	279
3	4924.00	38.42	54.00	-15.58	33.41	5.01	Average	311	348
4	4924.00	52.07	74.00	-21.93	47.06	5.01	Peak	311	348
5	7386.00	50.11	54.00	-3.89	39.96	10.15	Average	188	331
6	7386.00	64.53	74.00	-9.47	54.38	10.15	Peak	188	331

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

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

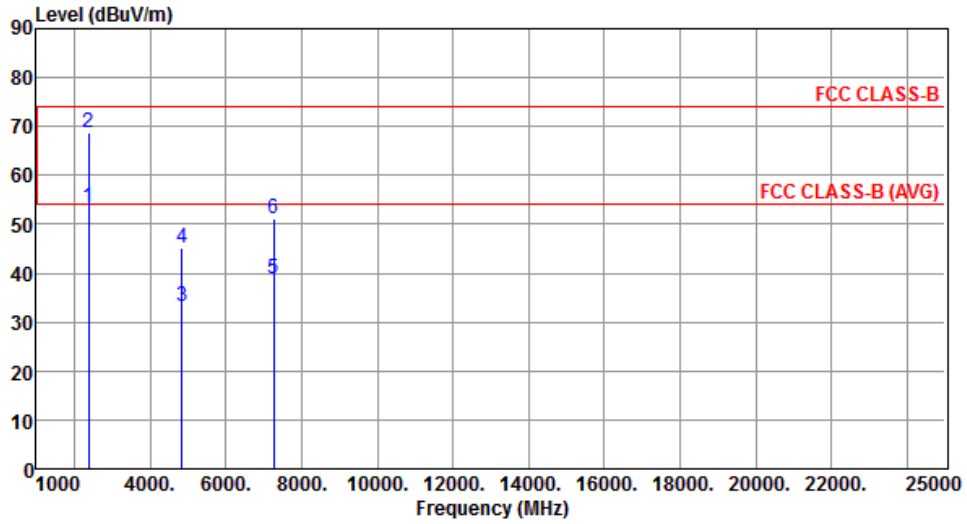
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

### 3.5.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT40

Modulation	HT40	Test Freq. (MHz)	2422						
Polarization	Horizontal								
	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	52.15	54.00	-1.85	53.11	-0.96	Average	199	244
2	2390.00	67.14	74.00	-6.86	68.10	-0.96	Peak	199	244
3	4844.00	33.28	54.00	-20.72	28.35	4.93	Average	100	30
4	4844.00	45.30	74.00	-28.70	40.37	4.93	Peak	100	30
5	7266.00	38.91	54.00	-15.09	28.51	10.40	Average	100	90
6	7266.00	50.97	74.00	-23.03	40.57	10.40	Peak	100	90

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>	HT40	<b>Test Freq. (MHz)</b>	2422
<b>Polarization</b>	Vertical		



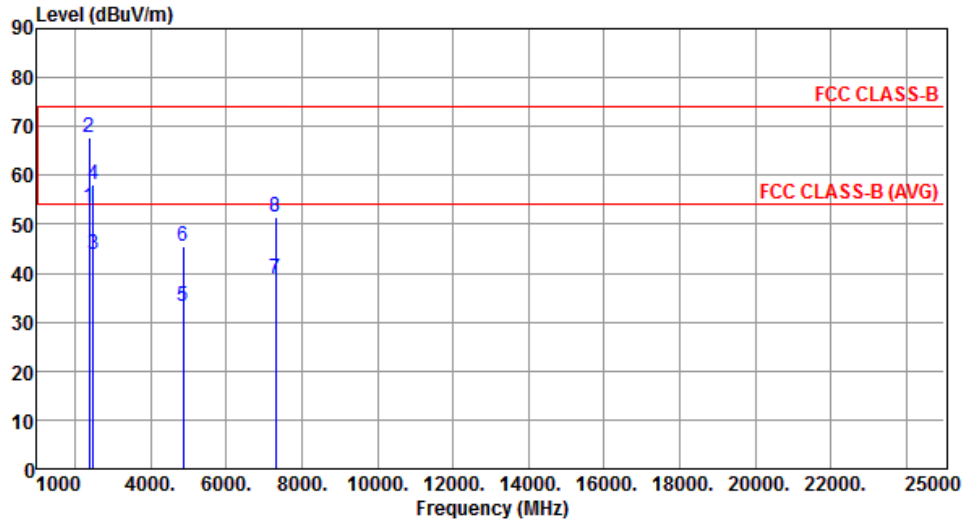
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.50	54.00	-0.50	54.46	-0.96	Average	157	266
2	2390.00	68.68	74.00	-5.32	69.64	-0.96	Peak	157	266
3	4844.00	33.30	54.00	-20.70	28.37	4.93	Average	100	70
4	4844.00	45.26	74.00	-28.74	40.33	4.93	Peak	100	70
5	7266.00	38.99	54.00	-15.01	28.59	10.40	Average	100	40
6	7266.00	51.08	74.00	-22.92	40.68	10.40	Peak	100	40

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>	HT40	<b>Test Freq. (MHz)</b>	2437
<b>Polarization</b>	Horizontal		



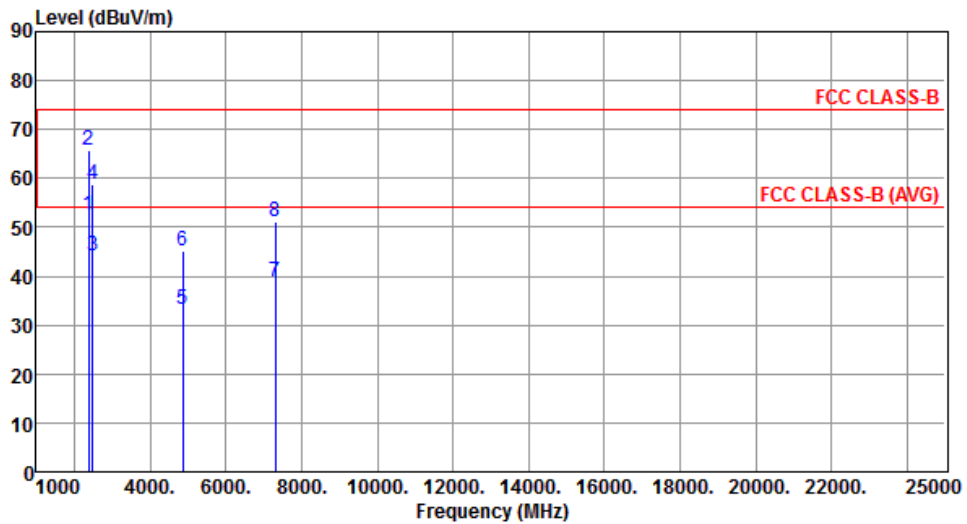
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.57	54.00	-0.43	54.53	-0.96	Average	164	248
2	2390.00	67.66	74.00	-6.34	68.62	-0.96	Peak	164	248
3	2483.50	43.97	54.00	-10.03	45.09	-1.12	Average	164	248
4	2483.50	58.22	74.00	-15.78	59.34	-1.12	Peak	164	248
5	4874.00	33.27	54.00	-20.73	28.36	4.91	Average	100	20
6	4874.00	45.38	74.00	-28.62	40.47	4.91	Peak	100	20
7	7311.00	38.90	54.00	-15.10	28.55	10.35	Average	100	50
8	7311.00	51.56	74.00	-22.44	41.21	10.35	Peak	100	50

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>	HT40	<b>Test Freq. (MHz)</b>	2437
<b>Polarization</b>	Vertical		



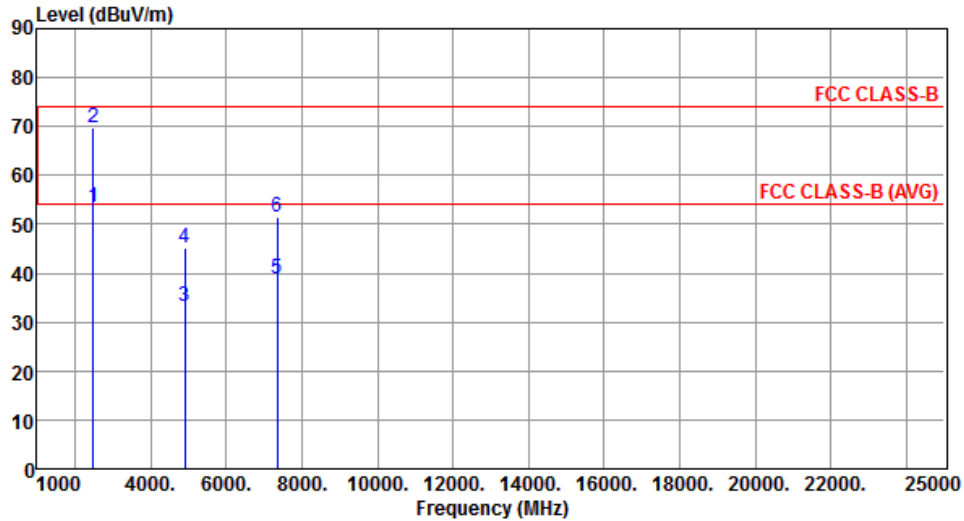
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	52.62	54.00	-1.38	53.58	-0.96	Average	106	255
2	2390.00	65.63	74.00	-8.37	66.59	-0.96	Peak	106	255
3	2483.50	44.25	54.00	-9.75	45.37	-1.12	Average	106	255
4	2483.50	58.73	74.00	-15.27	59.85	-1.12	Peak	106	255
5	4874.00	33.27	54.00	-20.73	28.36	4.91	Average	100	80
6	4874.00	45.15	74.00	-28.85	40.24	4.91	Peak	100	80
7	7311.00	38.88	54.00	-15.12	28.53	10.35	Average	100	30
8	7311.00	51.03	74.00	-22.97	40.68	10.35	Peak	100	30

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>	HT40	<b>Test Freq. (MHz)</b>	2452
<b>Polarization</b>	Horizontal		



	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	53.57	54.00	-0.43	54.69	-1.12	Average	172	249
2	2483.50	69.81	74.00	-4.19	70.93	-1.12	Peak	172	249
3	4904.00	33.25	54.00	-20.75	28.34	4.91	Average	100	20
4	4904.00	45.28	74.00	-28.72	40.37	4.91	Peak	100	20
5	7356.00	38.76	54.00	-15.24	28.53	10.23	Average	100	90
6	7356.00	51.49	74.00	-22.51	41.26	10.23	Peak	100	90

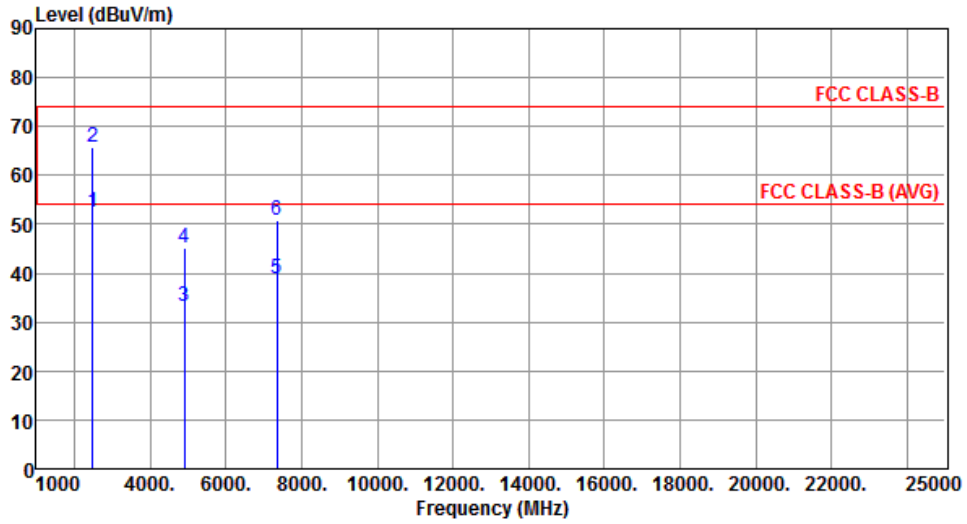
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor\* (dB)

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

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



<b>Modulation</b>	HT40	<b>Test Freq. (MHz)</b>	2452
<b>Polarization</b>	Vertical		



	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	52.33	54.00	-1.67	53.45	-1.12	Average	145	265
2	2483.50	65.60	74.00	-8.40	66.72	-1.12	Peak	145	265
3	4904.00	33.15	54.00	-20.85	28.24	4.91	Average	100	100
4	4904.00	45.24	74.00	-28.76	40.33	4.91	Peak	100	100
5	7356.00	38.77	54.00	-15.23	28.54	10.23	Average	100	70
6	7356.00	50.87	74.00	-23.13	40.64	10.23	Peak	100	70

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

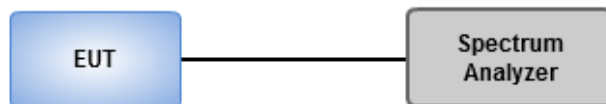
#### Reference level measurement

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

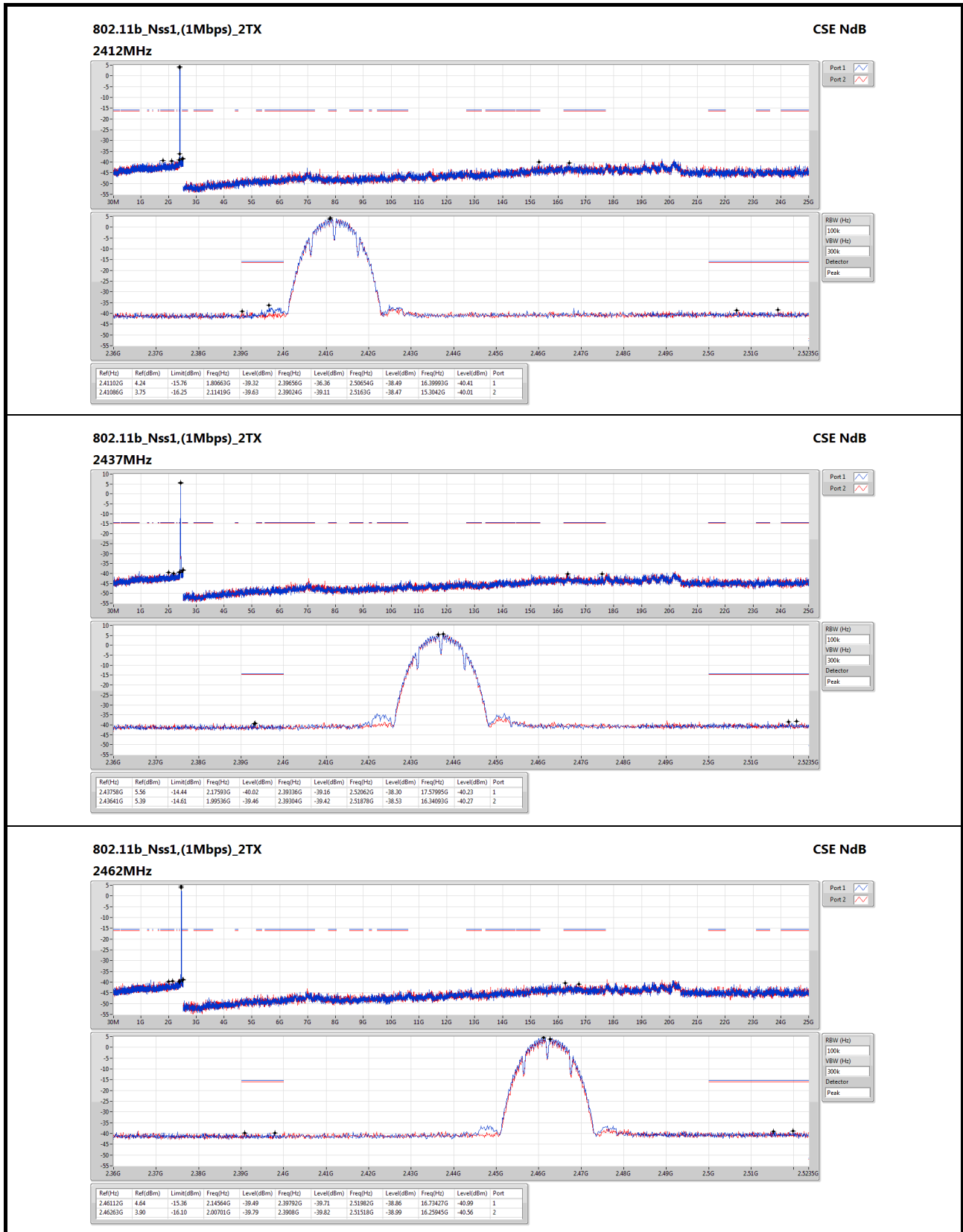
#### Emission level measurement

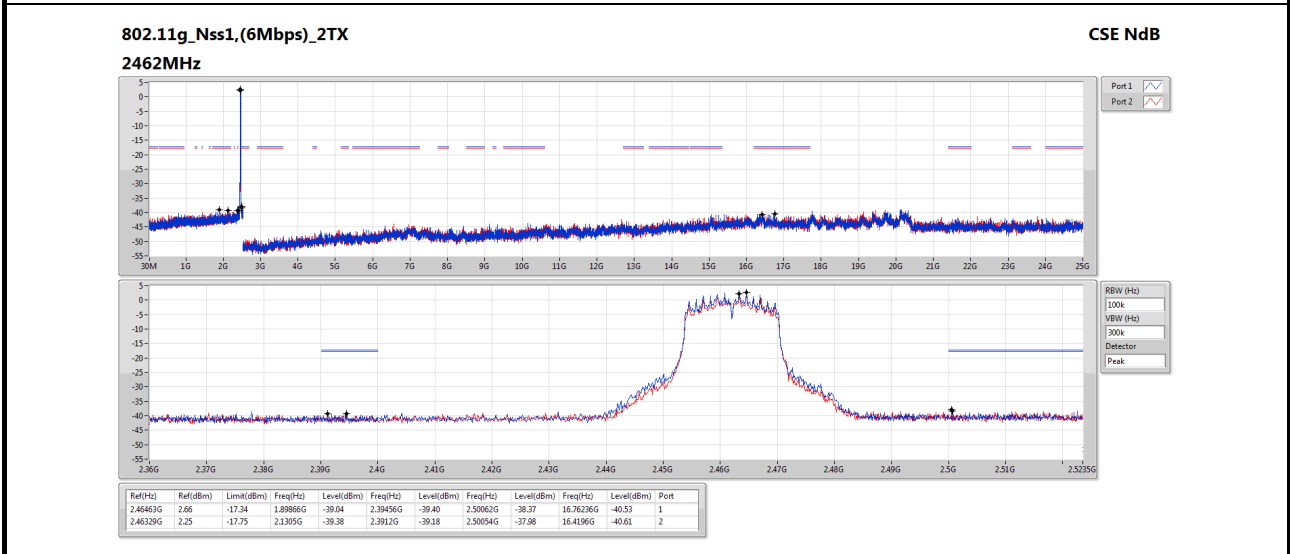
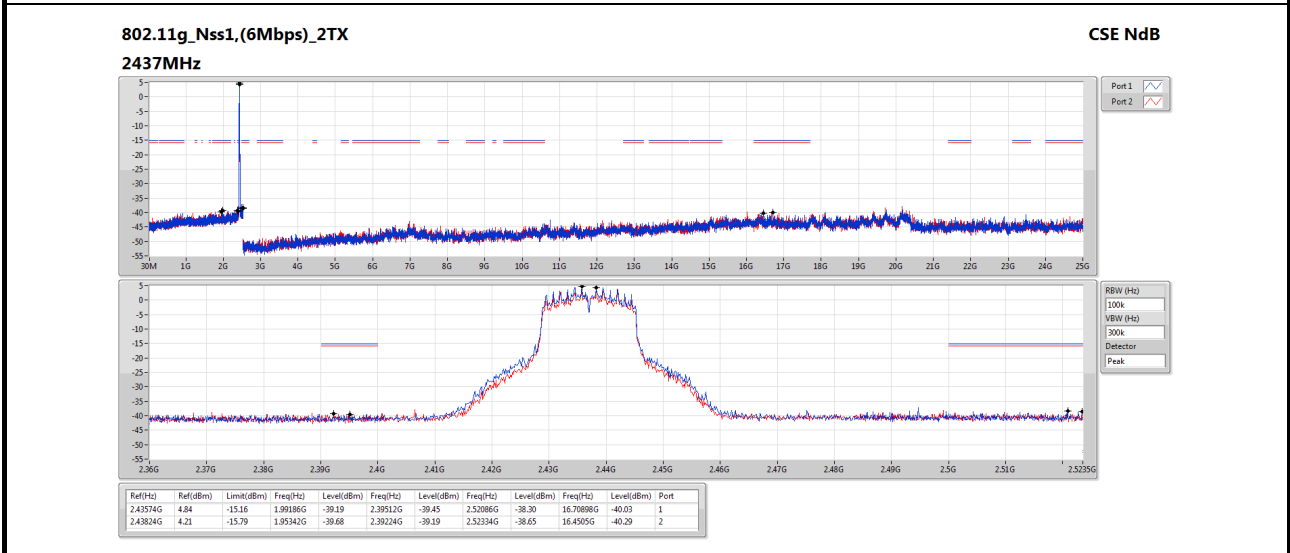
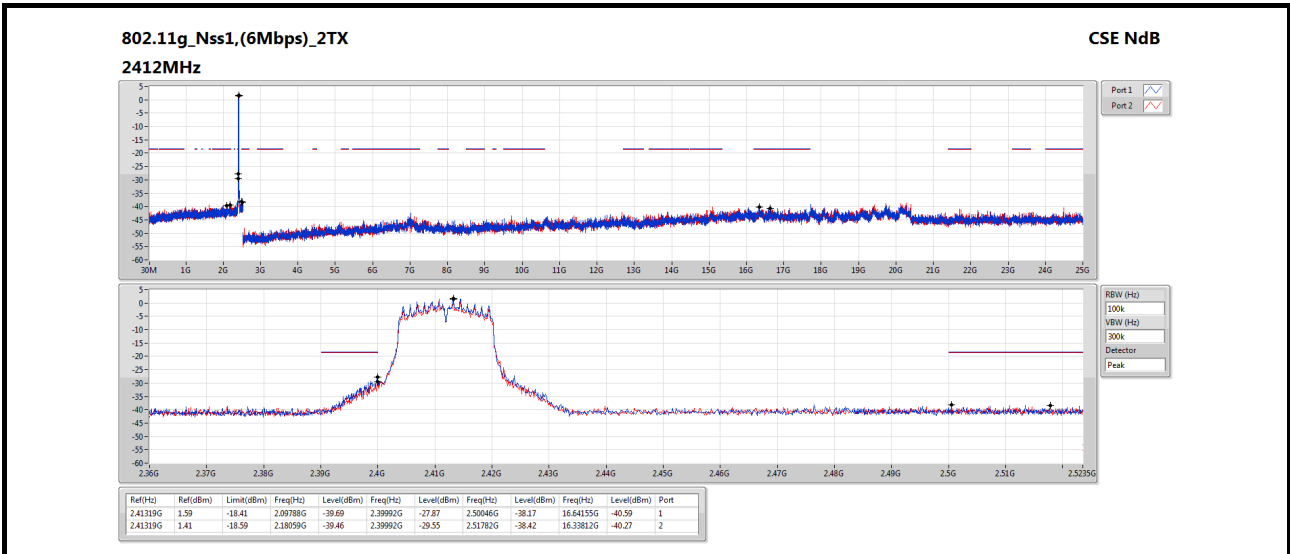
1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Scan Frequency range is up to 25GHz
4. Use the peak marker function to determine the maximum amplitude level

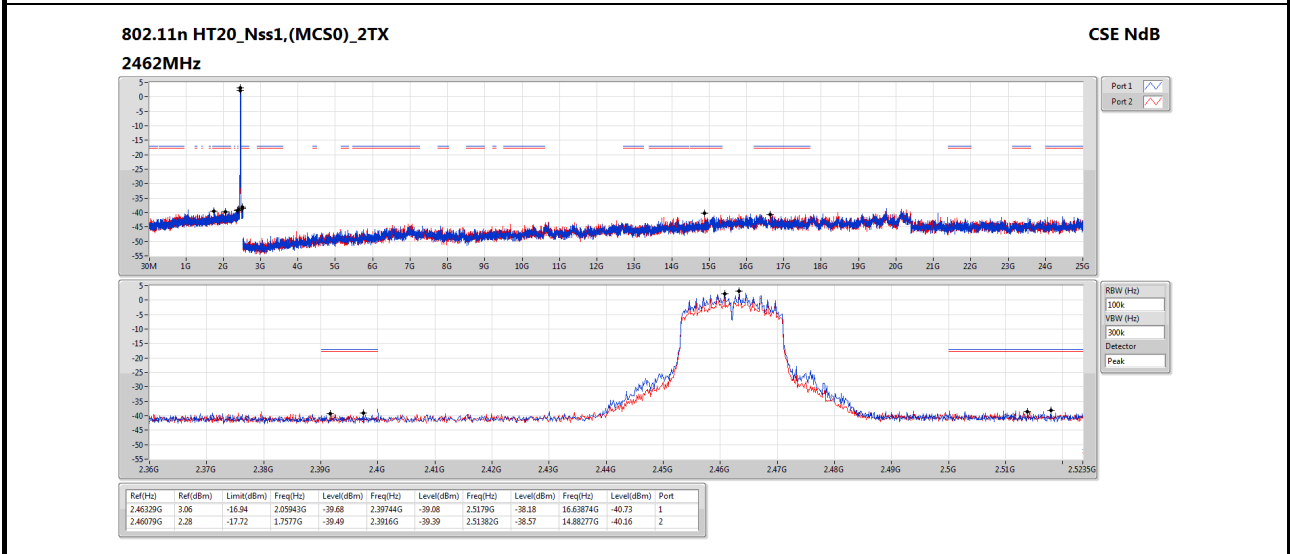
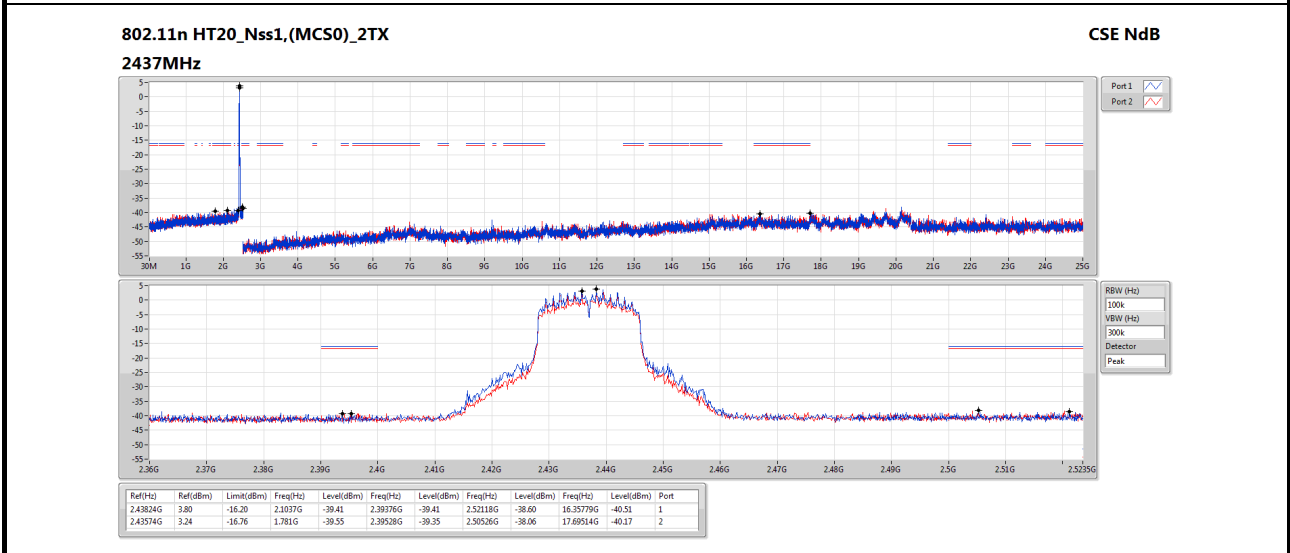
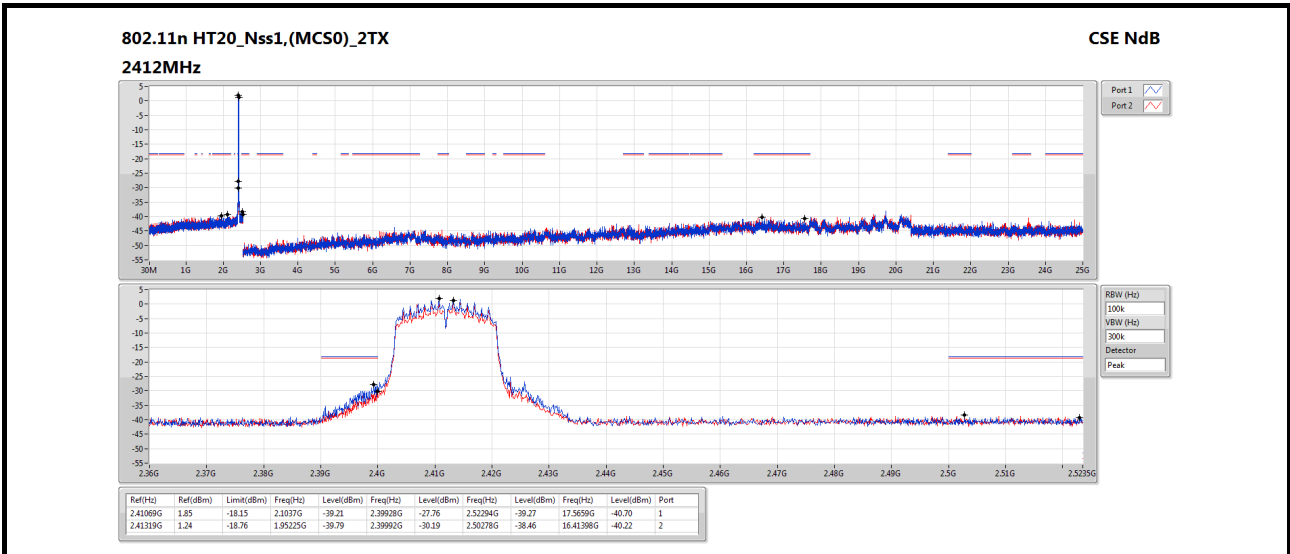
### 3.6.3 Test Setup

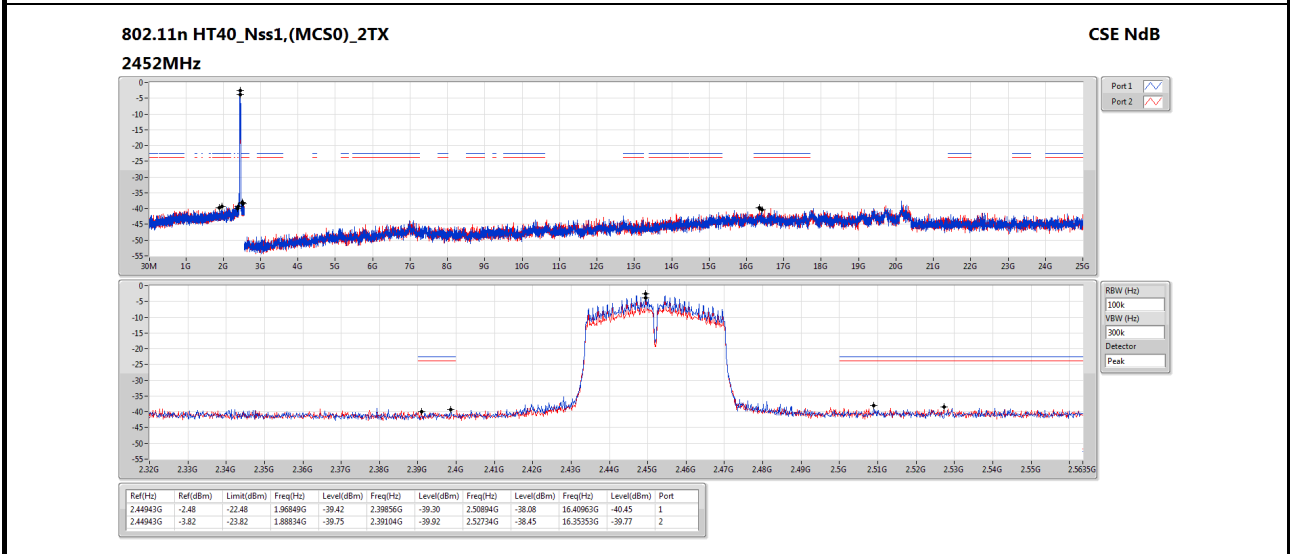
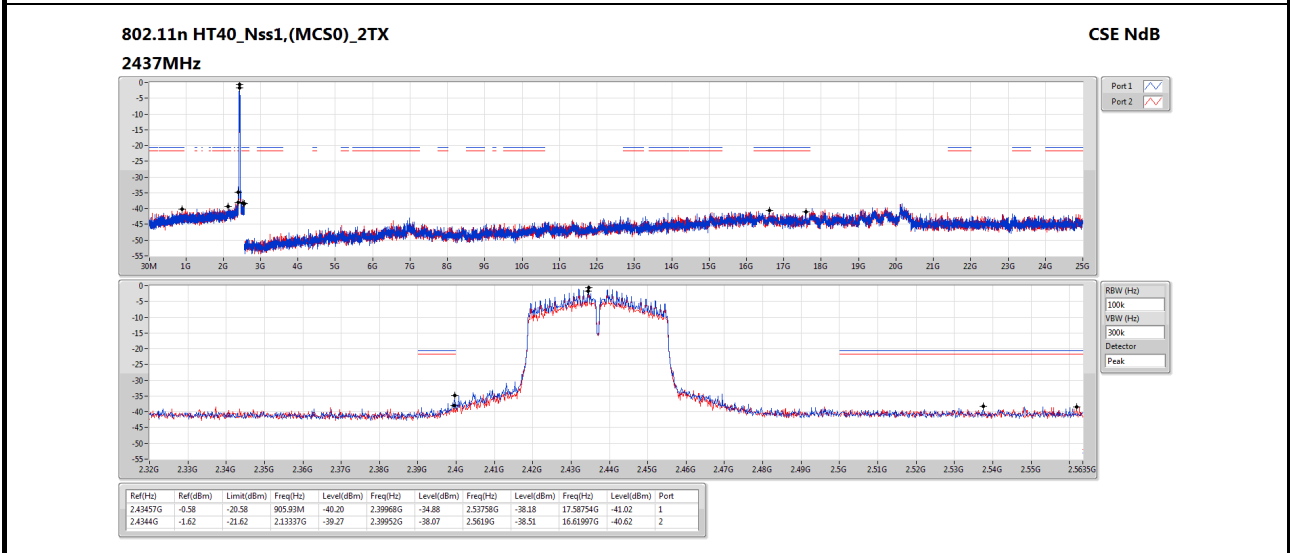
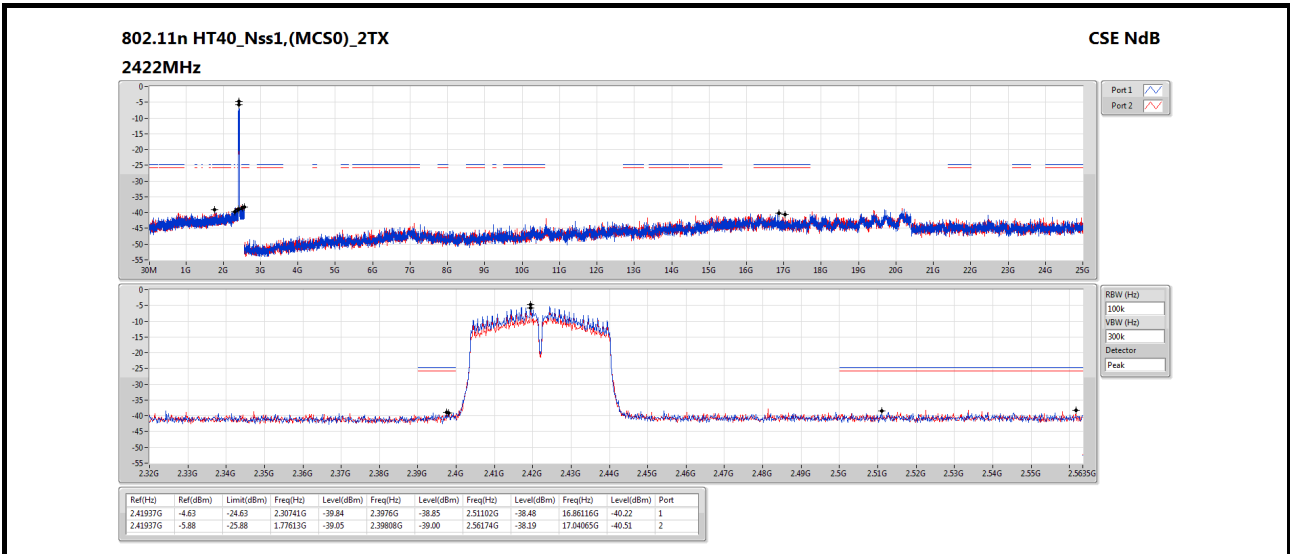


### 3.6.4 Unwanted Emissions into Non-Restricted Frequency Bands


**802.11b\_Nss1,(1Mbps)\_2TX**
**CSE NdB**







## 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>.

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Kou District, New Taipei City,  
Taiwan, R.O.C.

### **Kwei Shan**

Tel: 886-3-271-8666

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Kwei Shan District, Tao Yuan City  
333, Taiwan, R.O.C.

### **Kwei Shan Site II**

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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.

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Email: ICC\_Service@icertifi.com.tw

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