FCC Test Report

FCC ID	:	**TLZ-NM372SM**
Equipment	:	**IEEE 802.11 b/g/n Wireless LAN and Bluetooth Module**
Model No.	:	**AW-NM372SM**
Brand Name	:	**AzureWave**
Applicant	:	**AzureWave Technologies, Inc.**
Address	:	**8F., No.94, Baozhong Rd., Xindian Dist. New Taipei City, Taiwan 231**
Standard	:	**47 CFR FCC Part 15.247**
Received Date	:	**Oct. 06, 2020**
Tested Date	:	**Nov. 25 ~ Dec. 03, 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**

Testing Laboratory 2732

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Release Record

Report No.	Version	Description	Issued Date
FR0O0601AC	Rev. 01	Initial issue	Jan. 26, 2021

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.150MHz 59.60 (Margin -6.40dB) - QP	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2483.50MHz 52.95 (Margin -1.05dB) - AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 26.69	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_{TX})**	**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.	Model	Type	Gain (dBi)	Connector
1	RFMTA340715IMLB301	PIFA	3	UFL

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	3.3Vdc 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	GNOME Terminal, Version: 3.28.2		
Duty Cycle and Duty Factor	Mode	Duty Cycle (%)	Duty Factor (dB)
	11b	99.49%	0.02
	11g	91.57%	0.38
	HT20	90.48%	0.43

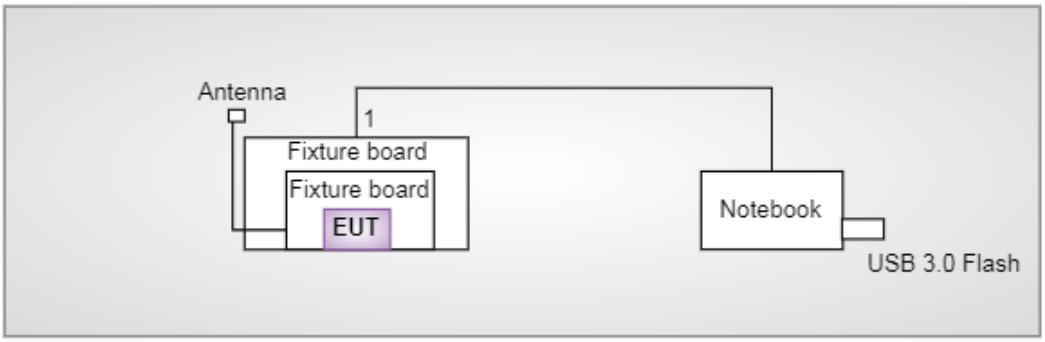
1.1.7 Power Index of Test Tool

Modulation Mode	Test Frequency (MHz)	Power Index
11b	2412	78
11b	2437	80
11b	2462	80
11g	2412	70
11g	2437	80
11g	2462	72
HT20	2412	70
HT20	2437	80
HT20	2462	70

1.2 Local Support Equipment List

Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**FCC ID**	**Remarks**
1	Notebook	DELL	Latitude E5470	BJ5JVF2	---
2	USB 3.0 Flash	SiliconPower	BLAZE B05	0000010	---
3	SDIO Fixture	---	---	---	Provided by applicant.
4	Fixture board	---	---	---	Provided by applicant.
5	Fixture board	---	---	---	Provided by applicant.

1.3 Test Setup Chart

Test Setup Diagram


No.	Signal cable / Length (m)
1	USB, 2m shielded.

Note: The SDIO fixture is disconnected from EUT and removed from test table when EUT is set to transmit continuously

1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Nov. 30, 2020				
Instrument	**Brand**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
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. 21, 2020	Oct. 20, 2021
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)				
Tested Date	Nov 25 ~ Nov. 27, 2020				
Instrument	**Brand**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
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. 06, 2020	Nov. 05, 2021
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 17, 2020	Nov. 16, 2021
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 06, 2020	Oct. 05, 2021
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-8000	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-3000	131103	Sep. 26, 2020	Sep. 25, 2021
LF cable-13M	EMC	EMC8D-NM-NM-13000	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.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Dec. 03, 2020				
Instrument	**Brand**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101063	Apr. 30, 2020	Apr. 29, 2021
Power Meter	Anritsu	ML2495A	1241002	Nov. 04, 2020	Nov. 03, 2021
Power Sensor	Anritsu	MA2411B	1207366	Nov. 04, 2020	Nov. 03, 2021
DC POWER SOURCE	GW INSTEK	GPC-6030D	GES855395	Nov. 09, 2020	Nov. 08, 2021
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

Test Laboratory	International Certification Corp.
Test Site	CO01-WS, TH01-WS
Address of Test Site	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.
Test Site	03CH03-WS
Address of Test Site	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 6dB bandwidth Power spectral density	11b 11g HT20	2412 / 2437 / 2462 2412 / 2437 / 2462 2412 / 2437 / 2462	1 Mbps 6 Mbps 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

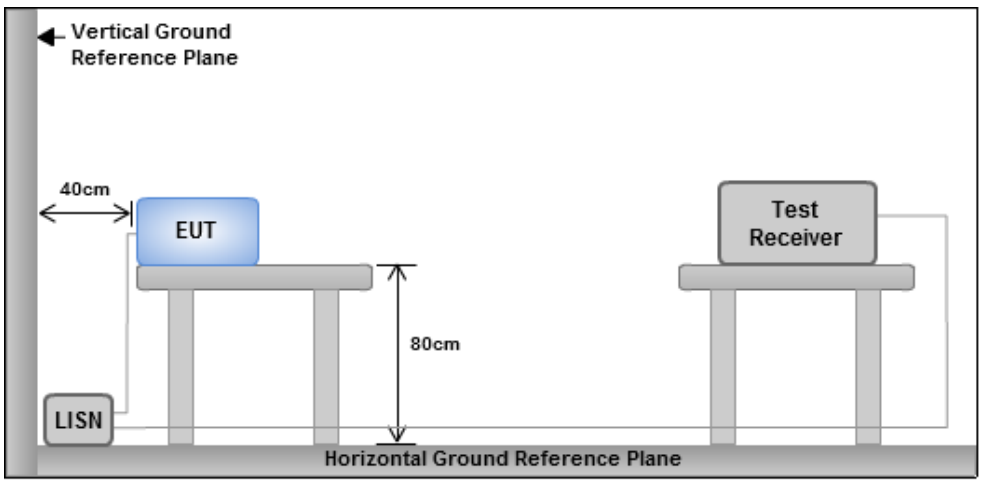
3.1.1 Limit of Conducted Emissions

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 Ω 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



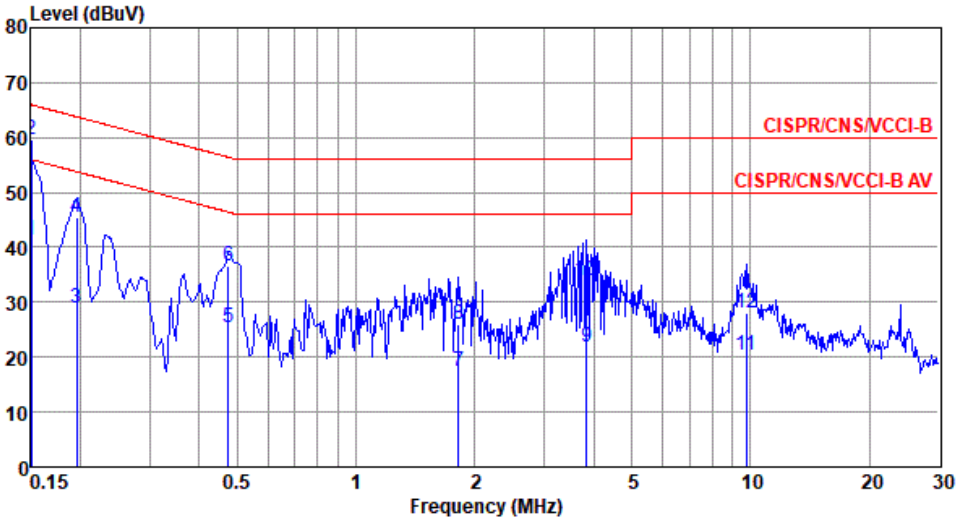
Note: 1. Support units were connected to second LISN.

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

Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Line		

Test by : Alex Tsai Temperature: 25°C Humidity: 61%

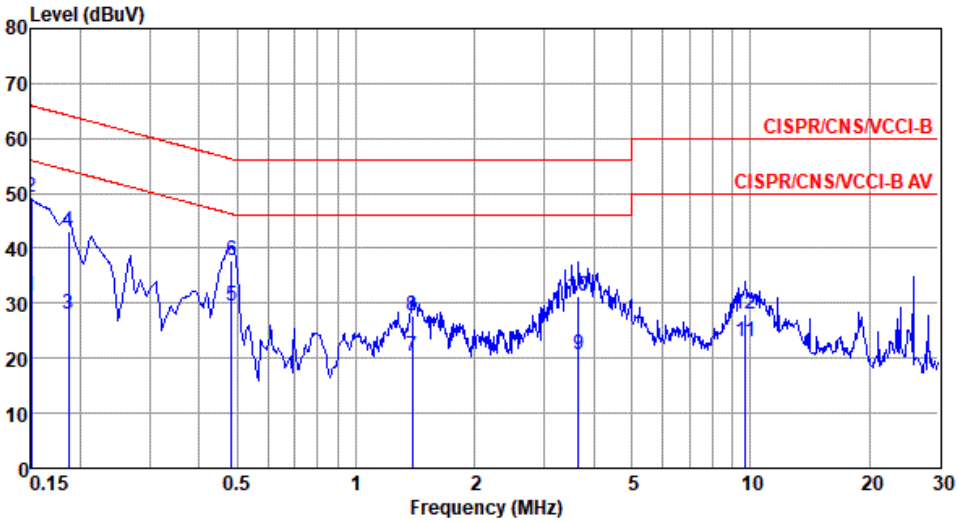


	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.150	41.22	56.00	-14.78	31.53	9.64	0.05	Average
2*	0.150	59.60	66.00	-6.40	49.91	9.64	0.05	QP
3	0.195	29.02	53.80	-24.78	19.33	9.63	0.06	Average
4	0.195	45.48	63.80	-18.32	35.79	9.63	0.06	QP
5	0.474	25.47	46.45	-20.98	15.75	9.63	0.09	Average
6	0.474	36.61	56.45	-19.84	26.89	9.63	0.09	QP
7	1.819	17.34	46.00	-28.66	7.53	9.64	0.17	Average
8	1.819	26.01	56.00	-29.99	16.20	9.64	0.17	QP
9	3.840	21.92	46.00	-24.08	11.99	9.65	0.28	Average
10	3.840	33.99	56.00	-22.01	24.06	9.65	0.28	QP
11	9.757	20.29	50.00	-29.71	10.21	9.69	0.39	Average
12	9.757	27.95	60.00	-32.05	17.87	9.69	0.39	QP

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

Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Neutral		

Test by : Alex Tsai Temperature: 25°C Humidity: 61%



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.150	31.36	56.00	-24.64	21.65	9.66	0.05	Average
2	0.150	49.25	66.00	-16.75	39.54	9.66	0.05	QP
3	0.186	27.99	54.20	-26.21	18.28	9.65	0.06	Average
4	0.186	43.12	64.20	-21.08	33.41	9.65	0.06	QP
5*	0.484	29.60	46.27	-16.67	19.86	9.65	0.09	Average
6	0.484	37.72	56.27	-18.55	27.98	9.65	0.09	QP
7	1.388	20.30	46.00	-25.70	10.50	9.65	0.15	Average
8	1.388	27.61	56.00	-28.39	17.81	9.65	0.15	QP
9	3.661	20.67	46.00	-25.33	10.72	9.67	0.28	Average
10	3.661	31.30	56.00	-24.70	21.35	9.67	0.28	QP
11	9.705	22.95	50.00	-27.05	12.83	9.73	0.39	Average
12	9.705	27.90	60.00	-32.10	17.78	9.73	0.39	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

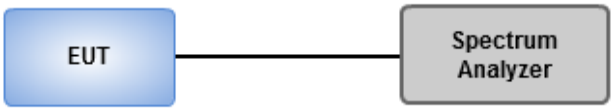
6dB Bandwidth

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

Ambient Condition	22°C / 66%	Tested By	Brad Wu

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	8.551M	14.067M	14M1G1D	7.536M	14.067M
802.11g_Nss1,(6Mbps)_1TX	15.145M	16.498M	16M5D1D	12.826M	16.266M
802.11n HT20_Nss1,(MCS0)_1TX	15.072M	17.54M	17M5D1D	14.203M	17.424M

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;

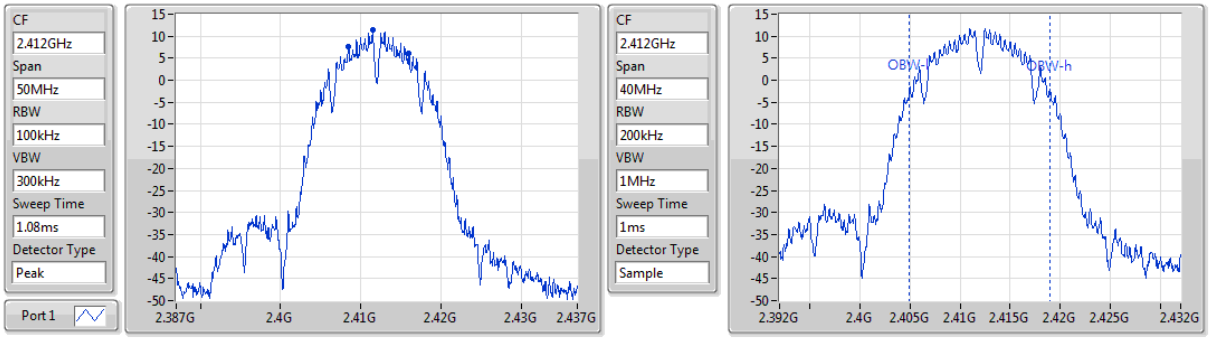
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	7.536M	14.067M
2437MHz	Pass	500k	8.551M	14.067M
2462MHz	Pass	500k	8.116M	14.067M
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	12.826M	16.266M
2437MHz	Pass	500k	15M	16.498M
2462MHz	Pass	500k	15.145M	16.266M
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-
2412MHz	Pass	500k	14.203M	17.424M
2437MHz	Pass	500k	15.072M	17.54M
2462MHz	Pass	500k	14.71M	17.424M

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

802.11b_Nss1,(1Mbps)_1TX EBW

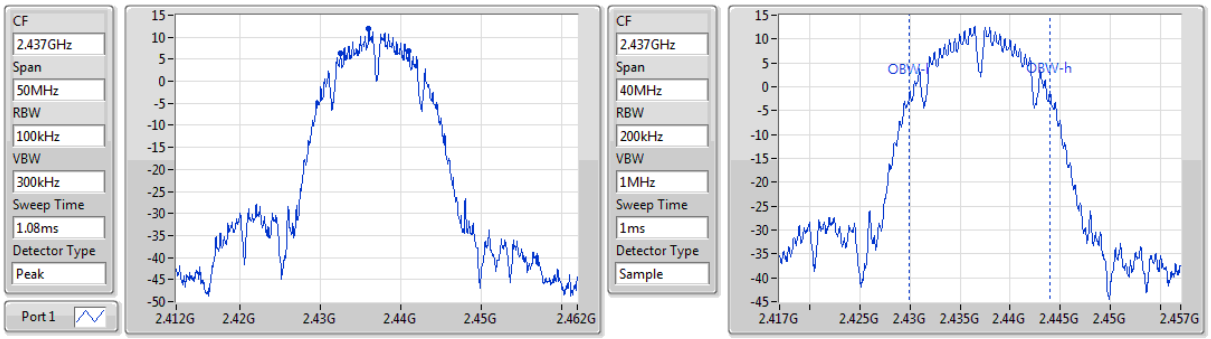
2412MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
7.536M	2.408449G	2.415986G	14.067M	2.404938G	2.419004G	500k	1

802.11b_Nss1,(1Mbps)_1TX EBW

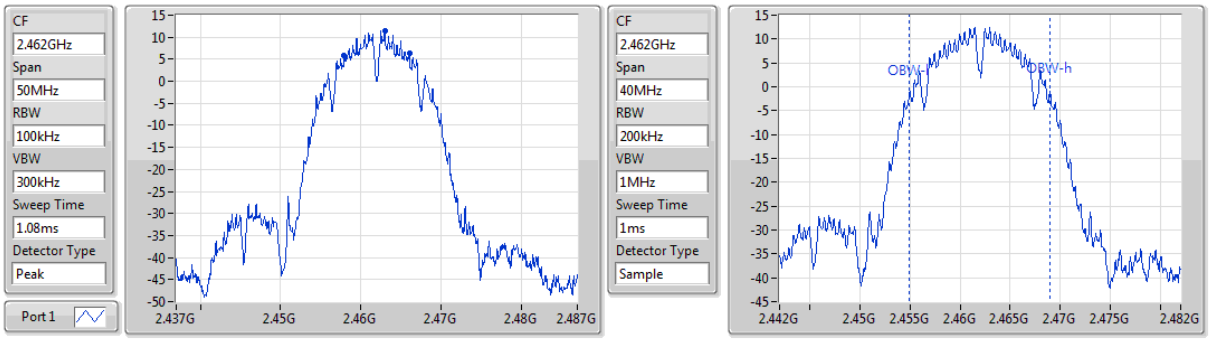
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
8.551M	2.432435G	2.440986G	14.067M	2.429938G	2.444004G	500k	1

802.11b_Nss1,(1Mbps)_1TX EBW

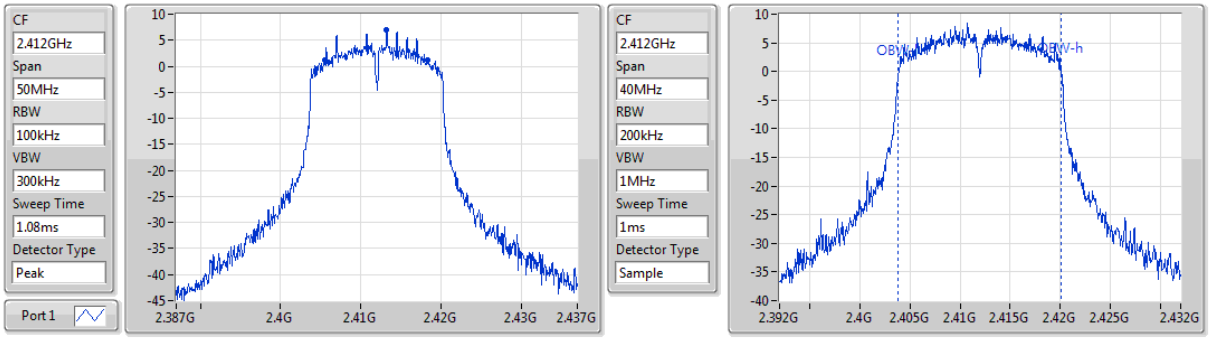
2462MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
8.116M	2.457942G	2.466058G	14.067M	2.454938G	2.469004G	500k	1

802.11g_Nss1,(6Mbps)_1TX EBW

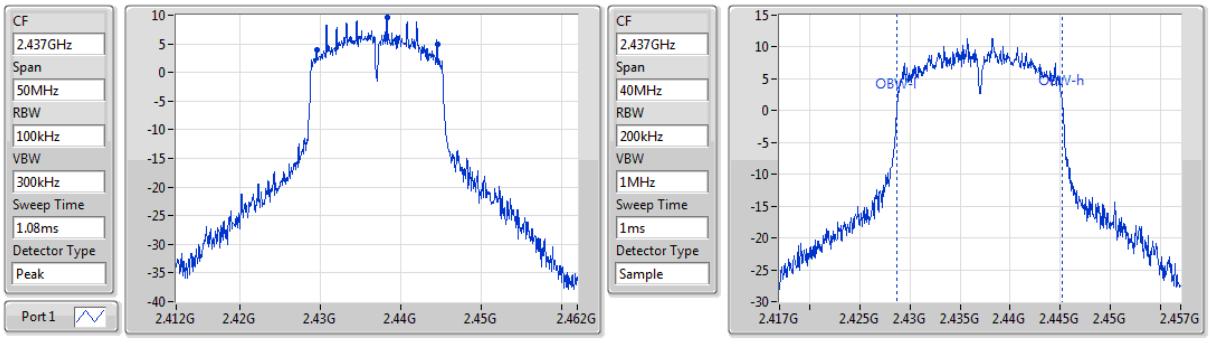
2412MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
12.826M	2.405478G	2.418304G	16.266M	2.403838G	2.420104G	500k	1

802.11g_Nss1,(6Mbps)_1TX EBW

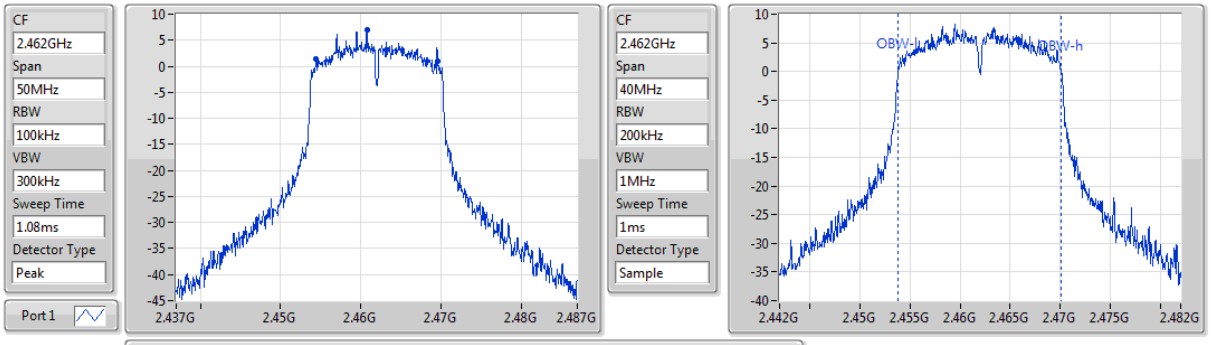
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
15M	2.429536G	2.444536G	16.498M	2.428722G	2.44522G	500k	1

802.11g_Nss1,(6Mbps)_1TX EBW

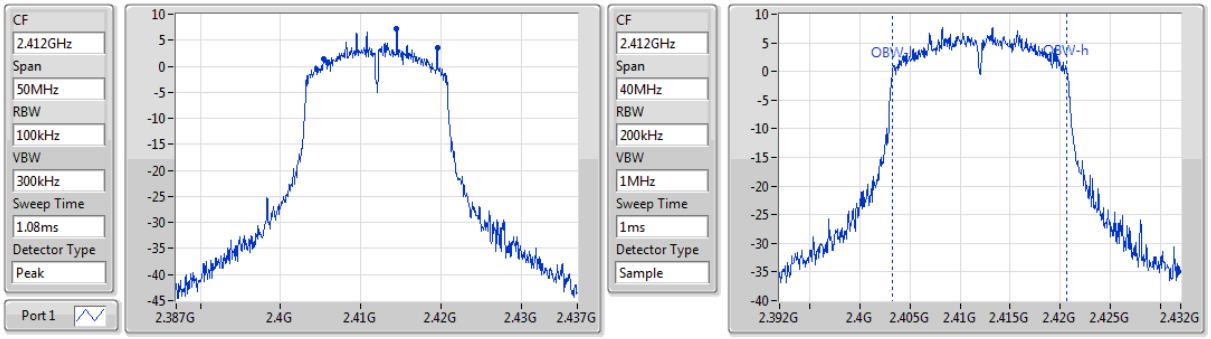
2462MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
15.145M	2.454464G	2.469609G	16.266M	2.453838G	2.470104G	500k	1

802.11n HT20_Nss1,(MCS0)_1TX EBW

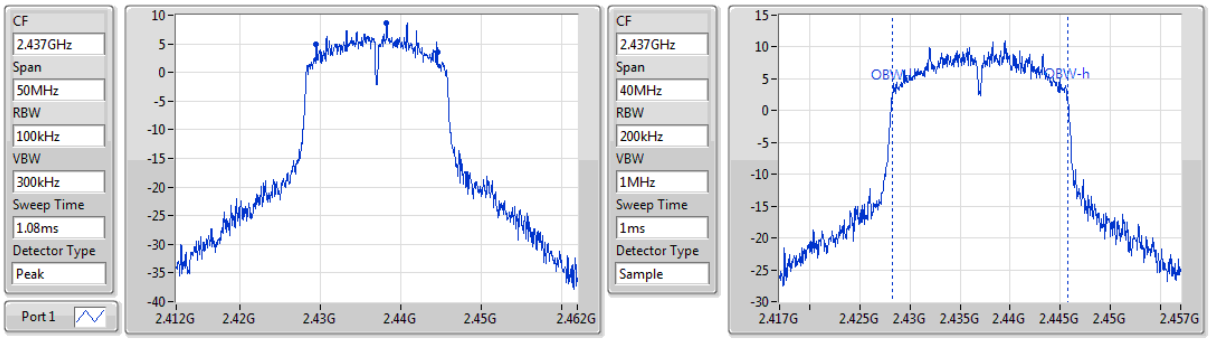
2412MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
14.203M	2.405333G	2.419536G	17.424M	2.403259G	2.420683G	500k	1

802.11n HT20_Nss1,(MCS0)_1TX EBW

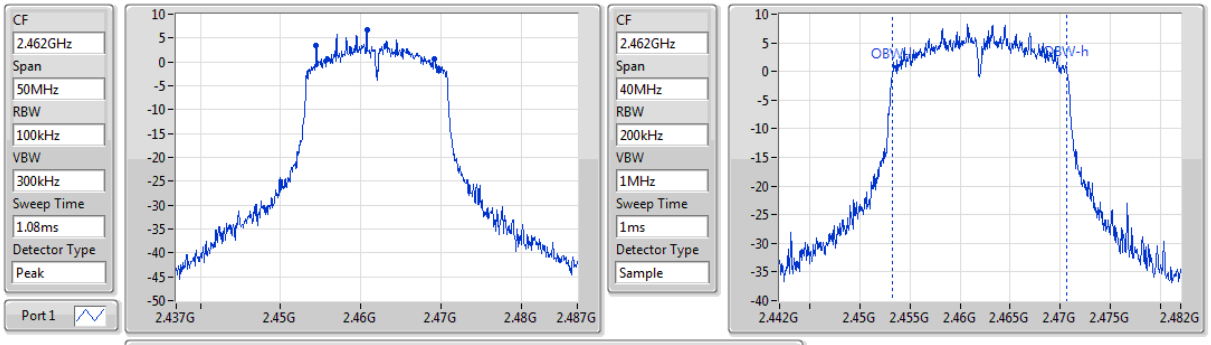
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
15.072M	2.429464G	2.444536G	17.54M	2.428201G	2.445741G	500k	1

802.11n HT20_Nss1,(MCS0)_1TX EBW

2462MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
14.71M	2.454464G	2.469174G	17.424M	2.453259G	2.470683G	500k	1

3.3 RF Output Power

3.3.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

Antenna gain <= 6dBi, 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

Ambient Condition	22°C / 66%	Tested By	Brad Wu

Summary of Peak Conducted Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_1TX	23.45	0.22131
802.11g_Nss1,(6Mbps)_1TX	26.69	0.46666
802.11n HT20_Nss1,(MCS0)_1TX	26.64	0.46132

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	3.00	23.05	23.05	30.00	26.05	36.00
2437MHz	Pass	3.00	23.38	23.38	30.00	26.38	36.00
2462MHz	Pass	3.00	23.45	23.45	30.00	26.45	36.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	3.00	26.12	26.12	30.00	29.12	36.00
2437MHz	Pass	3.00	26.69	26.69	30.00	29.69	36.00
2462MHz	Pass	3.00	26.18	26.18	30.00	29.18	36.00
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	3.00	25.86	25.86	30.00	28.86	36.00
2437MHz	Pass	3.00	26.64	26.64	30.00	29.64	36.00
2462MHz	Pass	3.00	25.92	25.92	30.00	28.92	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	21.15	0.13032
802.11g_Nss1,(6Mbps)_1TX	21.15	0.13032
802.11n HT20_Nss1,(MCS0)_1TX	21.03	0.12677

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	3.00	20.52	20.52	30.00	23.52	-
2437MHz	Pass	3.00	21.11	21.11	30.00	24.11	-
2462MHz	Pass	3.00	21.15	21.15	30.00	24.15	-
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	3.00	18.36	18.36	30.00	21.36	-
2437MHz	Pass	3.00	21.15	21.15	30.00	24.15	-
2462MHz	Pass	3.00	18.61	18.61	30.00	21.61	-
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	3.00	17.96	17.96	30.00	20.96	-
2437MHz	Pass	3.00	21.03	21.03	30.00	24.03	-
2462MHz	Pass	3.00	18.01	18.01	30.00	21.01	-

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

Note : Conducted average output power is for reference only

3.4 Power Spectral Density

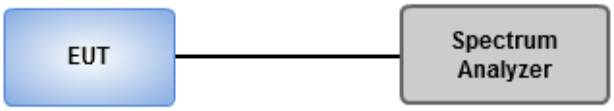
3.4.1 Limit of Power Spectral Density

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

Ambient Condition	22°C / 66%	Tested By	Brad Wu

Summary

Mode	PD (dBm/3kHz)
2.4-2.4835GHz	-
802.11b_Nss1,(1Mbps)_1TX	-1.58
802.11g_Nss1,(6Mbps)_1TX	-4.02
802.11n HT20_Nss1,(MCS0)_1TX	-5.20

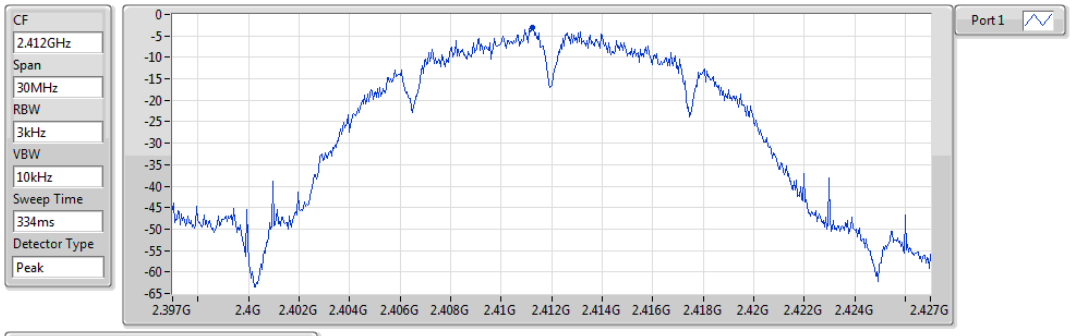
Result

Mode	Result	DG (dBi)	Port 1 (dBm/3kHz)	PD (dBm/3kHz)	PD Limit (dBm/3kHz)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	3.00	-3.08	-3.08	8.00
2437MHz	Pass	3.00	-2.73	-2.73	8.00
2462MHz	Pass	3.00	-1.58	-1.58	8.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	3.00	-6.66	-6.66	8.00
2437MHz	Pass	3.00	-4.02	-4.02	8.00
2462MHz	Pass	3.00	-7.08	-7.08	8.00
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-
2412MHz	Pass	3.00	-7.51	-7.51	8.00
2437MHz	Pass	3.00	-5.20	-5.20	8.00
2462MHz	Pass	3.00	-7.45	-7.45	8.00

DG = Directional Gain;
PD = Maximum power density; **Port X** = Port X power density;

802.11b_Nss1,(1Mbps)_1TX **PSD**

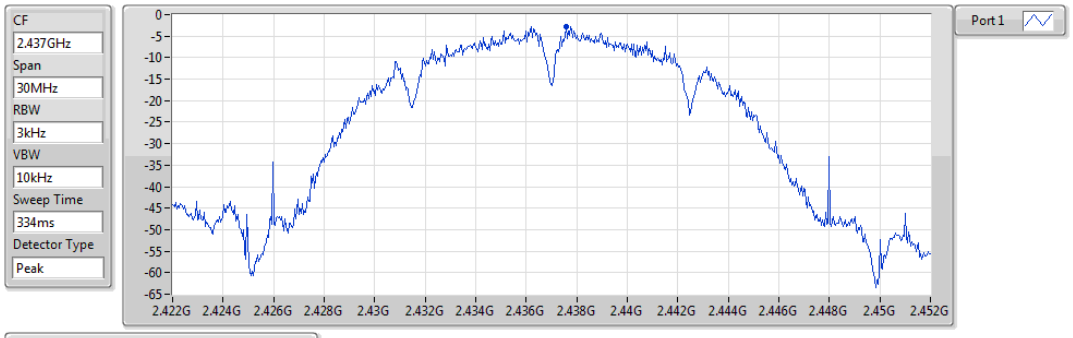
2412MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-3.08	-3.08	-3.08

802.11b_Nss1,(1Mbps)_1TX **PSD**

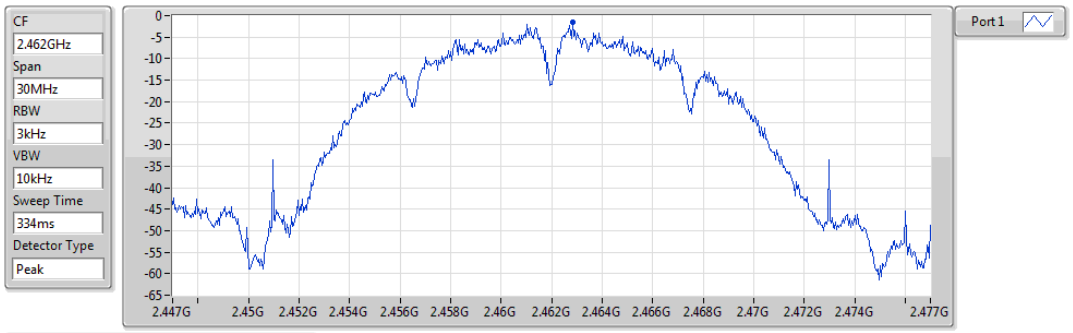
2437MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-2.73	-2.73	-2.73

802.11b_Nss1,(1Mbps)_1TX **PSD**

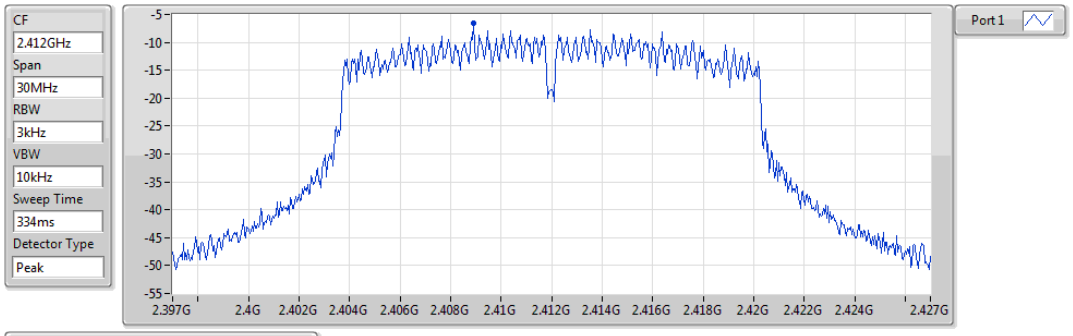
2462MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-1.58	-1.58	-1.58

802.11g_Nss1,(6Mbps)_1TX **PSD**

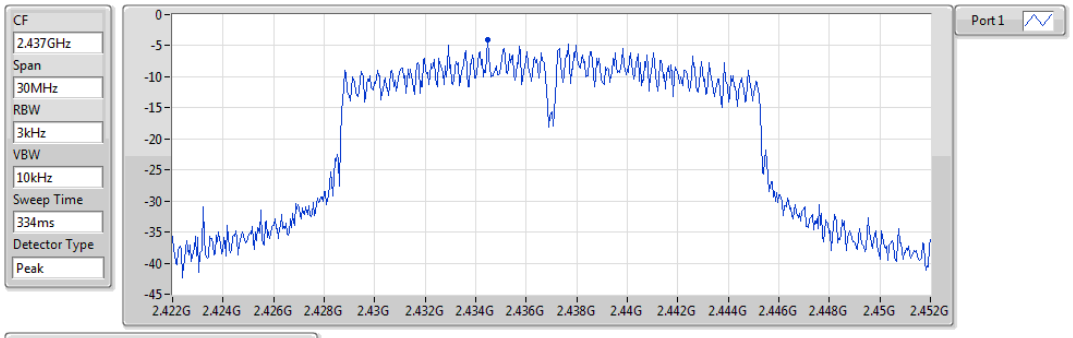
2412MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-6.66	-6.66	-6.66

802.11g_Nss1,(6Mbps)_1TX **PSD**

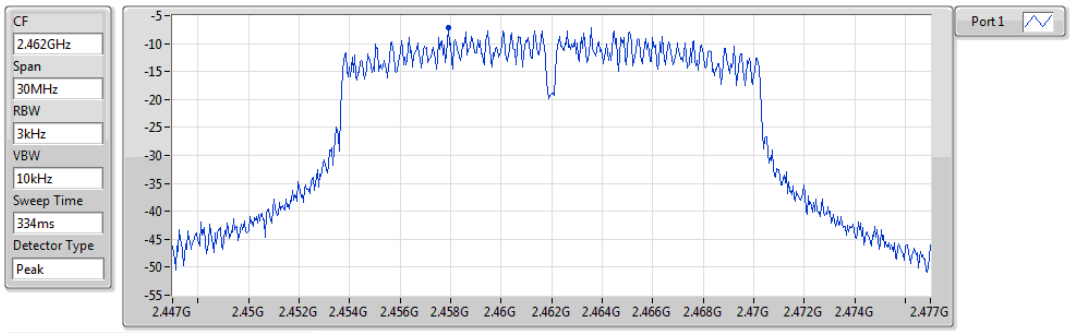
2437MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-4.02	-4.02	-4.02

802.11g_Nss1,(6Mbps)_1TX **PSD**

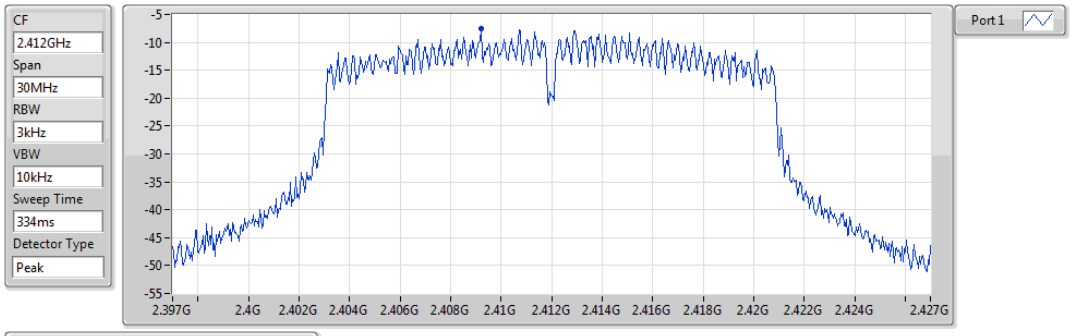
2462MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-7.08	-7.08	-7.08

802.11n HT20_Nss1,(MCS0)_1TX **PSD**

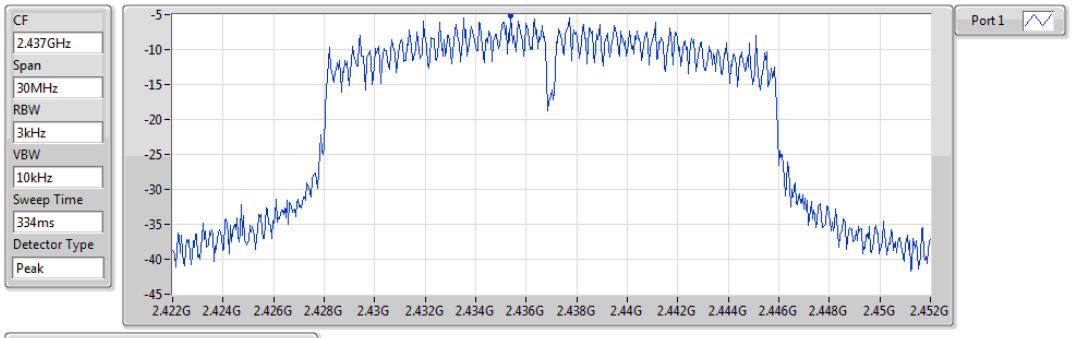
2412MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-7.51	-7.51	-7.51

802.11n HT20_Nss1,(MCS0)_1TX **PSD**

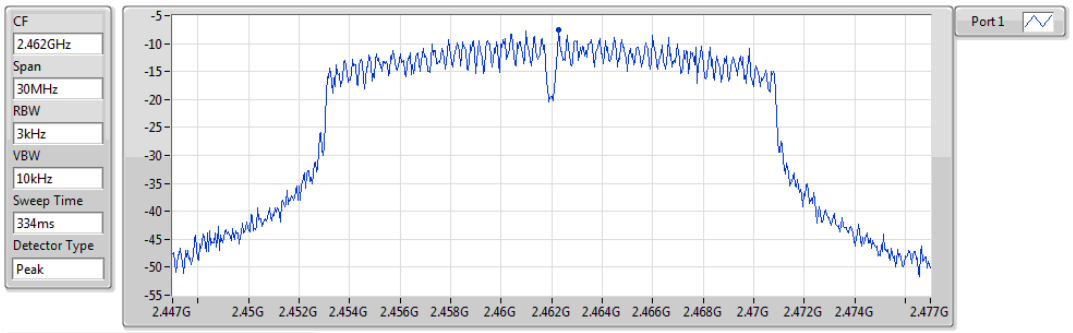
2437MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-5.20	-5.20	-5.20

802.11n HT20_Nss1,(MCS0)_1TX **PSD**

2462MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-7.45	-7.45	-7.45

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:
Qusai-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

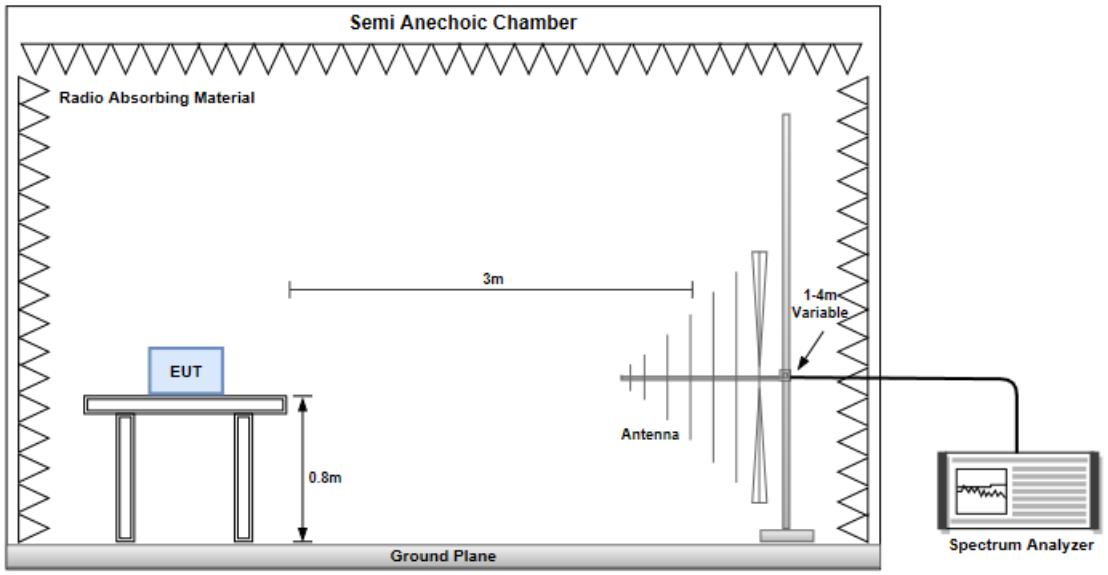
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

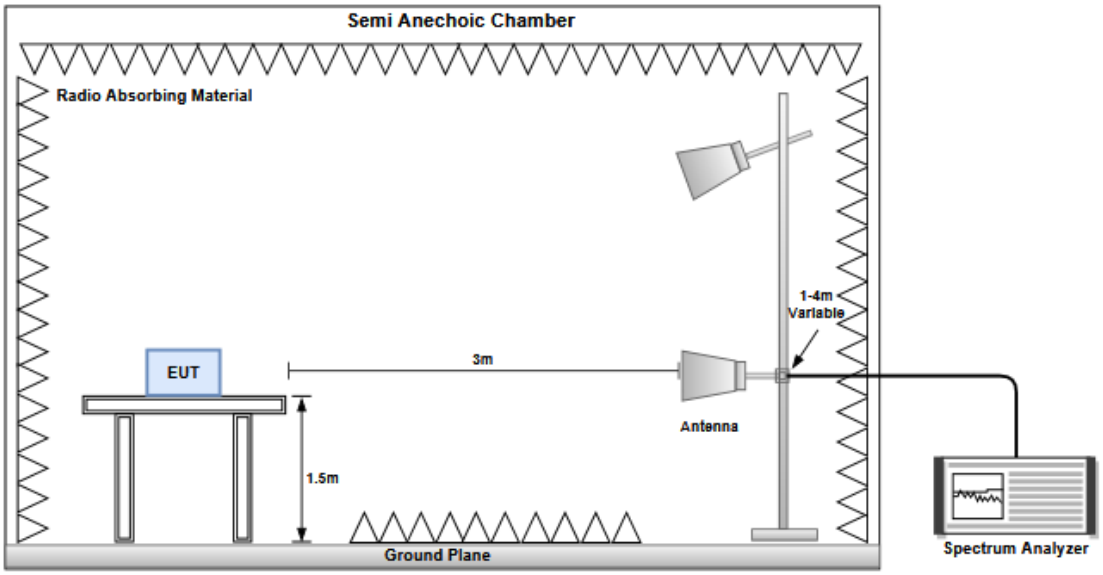
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz



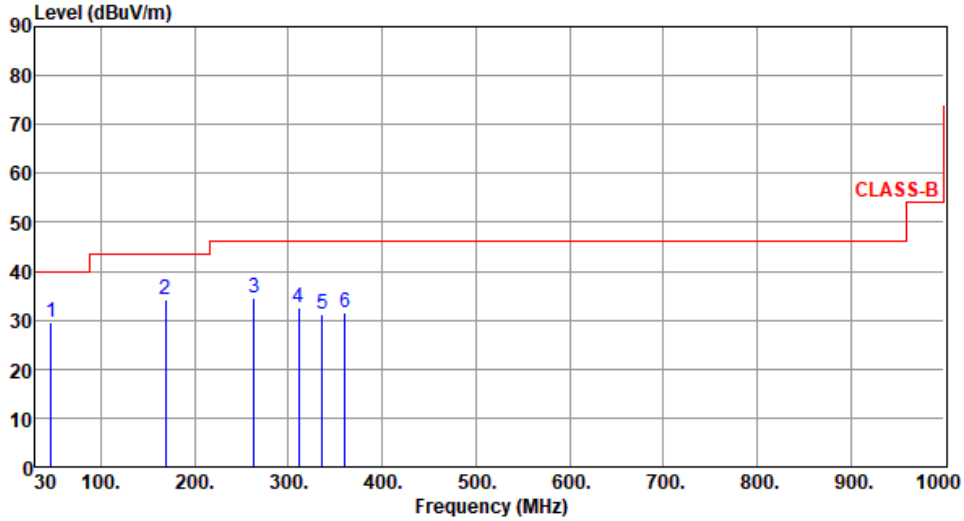
Radiated Emissions above 1 GHz



3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		

Test By :Roger Lu Temperature(℃):25 Humidity(%):61

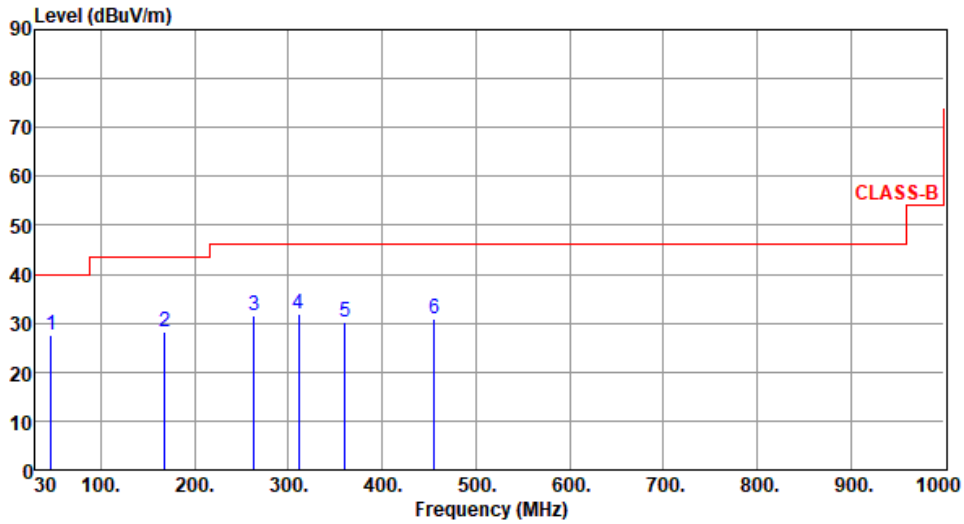


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	46.49	29.63	40.00	-10.37	38.38	-8.75	Peak	---	---
2	168.71	34.27	43.50	-9.23	43.44	-9.17	Peak	---	---
3	263.77	34.47	46.00	-11.53	44.27	-9.80	Peak	---	---
4	311.30	32.45	46.00	-13.55	40.71	-8.26	Peak	---	---
5	336.52	31.11	46.00	-14.89	38.40	-7.29	Peak	---	---
6	360.77	31.53	46.00	-14.47	38.54	-7.01	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.

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		

Test By :Roger Lu Temperature(℃):25 Humidity(%):61



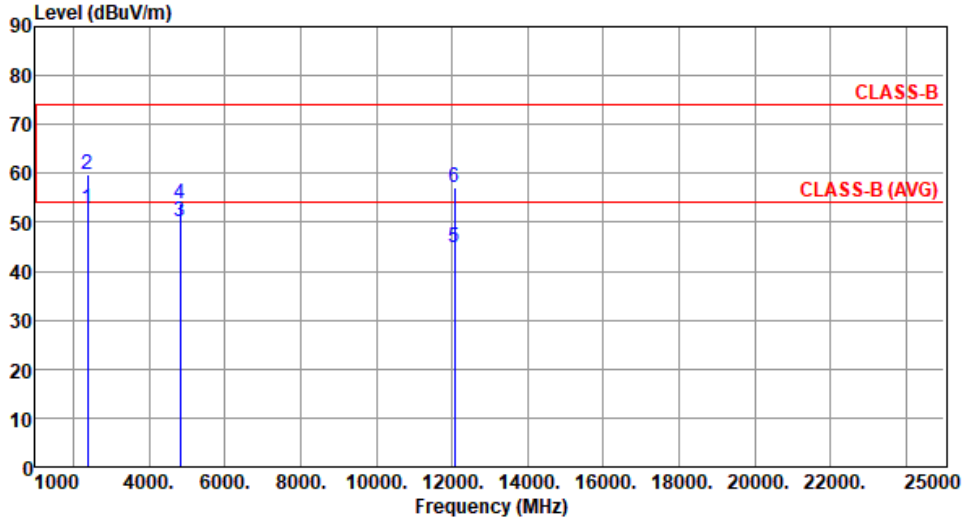
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	46.49	27.69	40.00	-12.31	36.44	-8.75	Peak	---	---
2	167.74	28.38	43.50	-15.12	37.48	-9.10	Peak	---	---
3	263.77	31.50	46.00	-14.50	41.30	-9.80	Peak	---	---
4	311.30	32.04	46.00	-13.96	40.30	-8.26	Peak	---	---
5	360.77	30.19	46.00	-15.81	37.20	-7.01	Peak	---	---
6	455.83	30.94	46.00	-15.06	34.89	-3.95	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		

Test By :Roger Lu Temperature(℃):24 Humidity(%):65

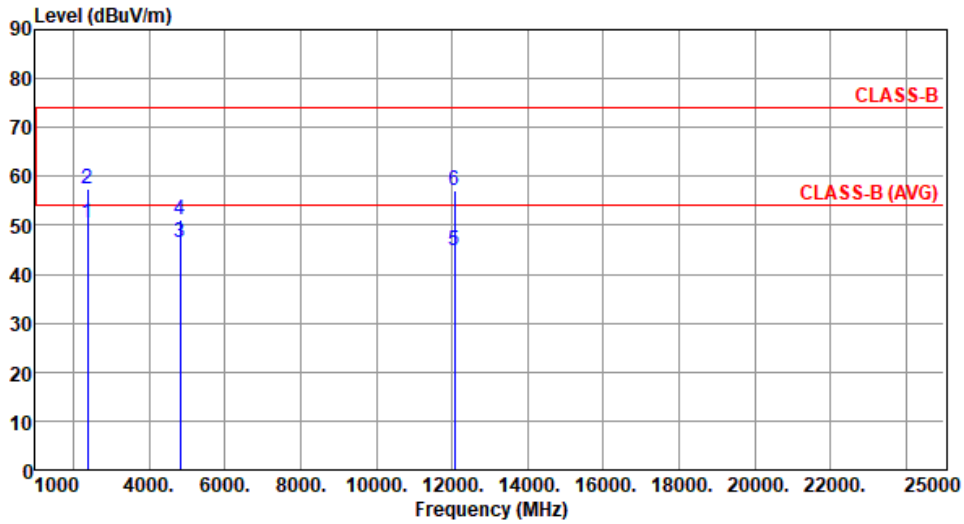


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	52.74	54.00	-1.26	54.58	-1.84	Average	101	214
2	2390.00	59.86	74.00	-14.14	61.70	-1.84	Peak	101	214
3	4824.00	50.09	54.00	-3.91	45.01	5.08	Average	108	335
4	4824.00	53.69	74.00	-20.31	48.61	5.08	Peak	108	335
5	12060.00	44.93	54.00	-9.07	30.24	14.69	Average	100	30
6	12060.00	57.26	74.00	-16.74	42.57	14.69	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).

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

Test By :Roger Lu Temperature(℃):24 Humidity(%):65

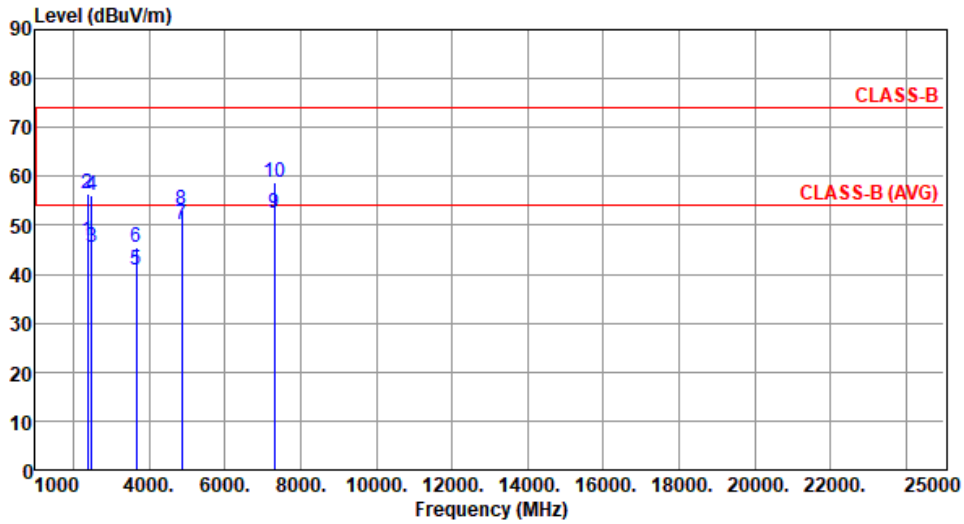


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	50.64	54.00	-3.36	52.48	-1.84	Average	105	3
2	2390.00	57.60	74.00	-16.40	59.44	-1.84	Peak	105	3
3	4824.00	46.45	54.00	-7.55	41.37	5.08	Average	110	49
4	4824.00	51.18	74.00	-22.82	46.10	5.08	Peak	110	49
5	12060.00	44.86	54.00	-9.14	30.17	14.69	Average	100	22
6	12060.00	57.15	74.00	-16.85	42.46	14.69	Peak	100	22

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).

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

Test By :Roger Lu Temperature(℃):24 Humidity(%):65

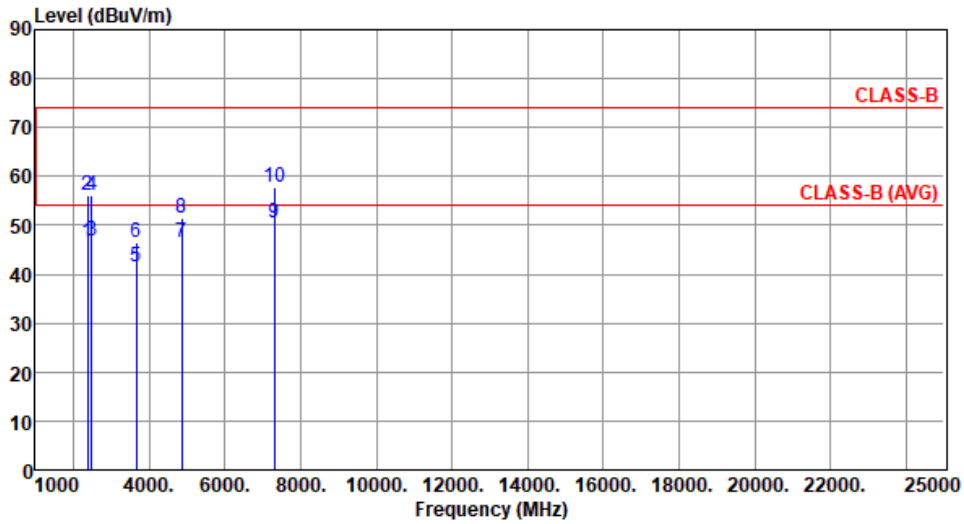


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	46.78	54.00	-7.22	48.62	-1.84	Average	222	178
2	2390.00	56.46	74.00	-17.54	58.30	-1.84	Peak	222	178
3	2483.50	45.54	54.00	-8.46	47.34	-1.80	Average	222	178
4	2483.50	56.01	74.00	-17.99	57.81	-1.80	Peak	222	178
5	3655.50	40.82	54.00	-13.18	39.07	1.75	Average	100	294
6	3655.50	45.52	74.00	-28.48	43.77	1.75	Peak	100	294
7	4874.00	50.25	54.00	-3.75	45.18	5.07	Average	100	335
8	4874.00	53.21	74.00	-20.79	48.14	5.07	Peak	100	335
9	7311.00	52.64	54.00	-1.36	42.36	10.28	Average	234	299
10	7311.00	58.68	74.00	-15.32	48.40	10.28	Peak	234	299

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).

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

Test By :Roger Lu Temperature(℃):24 Humidity(%):65

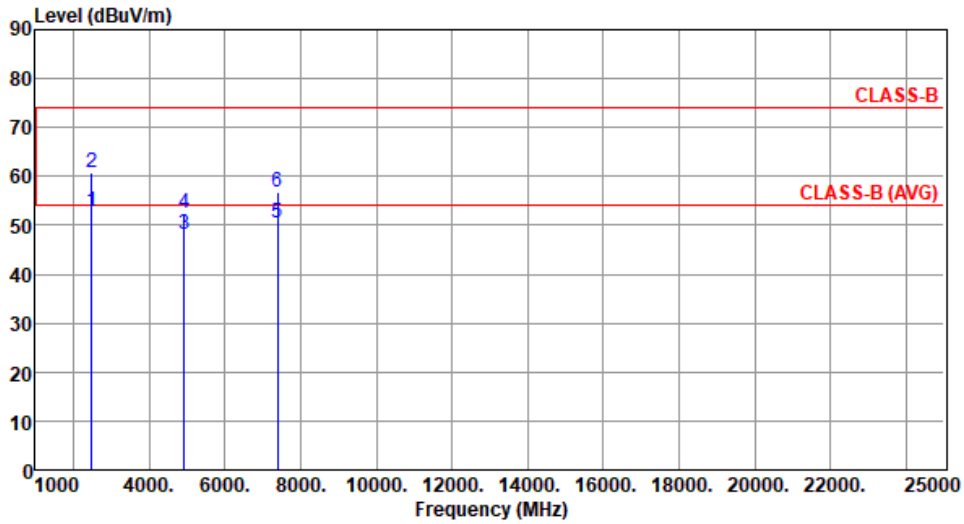


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	46.37	54.00	-7.63	48.21	-1.84	Average	100	1
2	2390.00	56.27	74.00	-17.73	58.11	-1.84	Peak	100	1
3	2483.50	46.97	54.00	-7.03	48.77	-1.80	Average	100	1
4	2483.50	56.21	74.00	-17.79	58.01	-1.80	Peak	100	1
5	3655.50	41.62	54.00	-12.38	39.87	1.75	Average	244	18
6	3655.50	46.40	74.00	-27.60	44.65	1.75	Peak	244	18
7	4874.00	46.61	54.00	-7.39	41.54	5.07	Average	109	45
8	4874.00	51.35	74.00	-22.65	46.28	5.07	Peak	109	45
9	7311.00	50.34	54.00	-3.66	40.06	10.28	Average	188	344
10	7311.00	57.75	74.00	-16.25	47.47	10.28	Peak	188	344

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).

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

Test By :Roger Lu Temperature(℃):24 Humidity(%):65

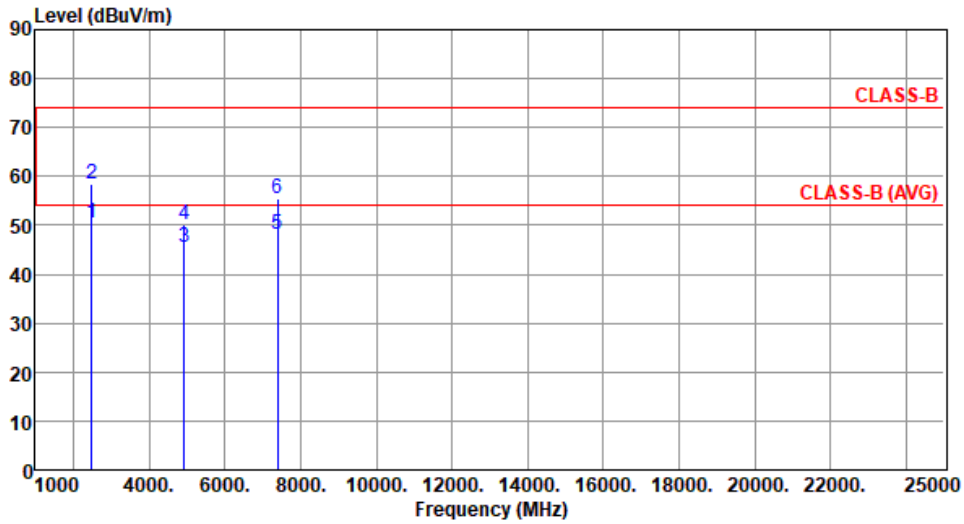


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	52.95	54.00	-1.05	54.75	-1.80	Average	100	178
2	2483.50	60.61	74.00	-13.39	62.41	-1.80	Peak	100	178
3	4924.00	48.28	54.00	-5.72	43.16	5.12	Average	100	340
4	4924.00	52.54	74.00	-21.46	47.42	5.12	Peak	100	340
5	7386.00	50.52	54.00	-3.48	40.25	10.27	Average	260	300
6	7386.00	56.63	74.00	-17.37	46.36	10.27	Peak	260	300

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).

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

Test By :Roger Lu Temperature(℃):24 Humidity(%):65



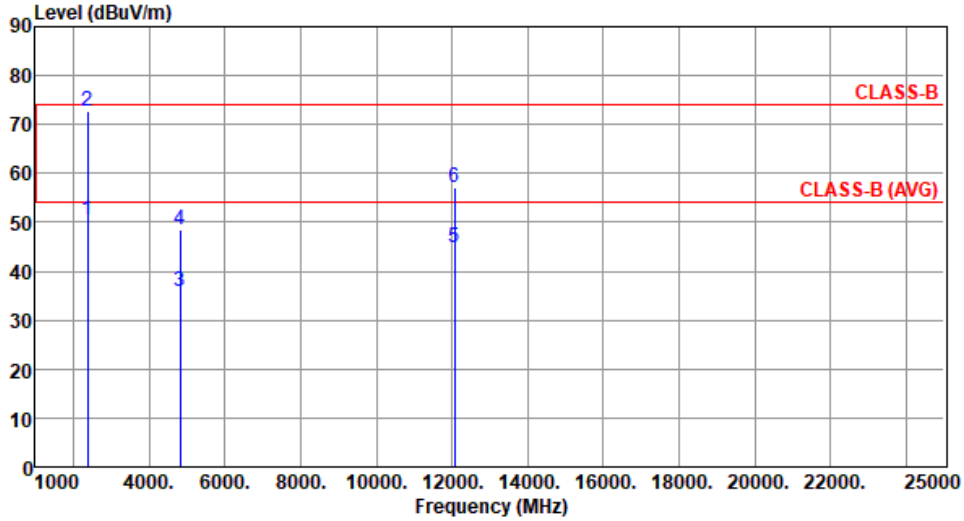
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	50.44	54.00	-3.56	52.24	-1.80	Average	103	4
2	2483.50	58.35	74.00	-15.65	60.15	-1.80	Peak	103	4
3	4924.00	45.53	54.00	-8.47	40.41	5.12	Average	114	39
4	4924.00	50.14	74.00	-23.86	45.02	5.12	Peak	114	39
5	7386.00	48.11	54.00	-5.89	37.84	10.27	Average	184	346
6	7386.00	55.45	74.00	-18.55	45.18	10.27	Peak	184	346

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		

Test By :BRAD WU Temperature(°C):24 Humidity(%):65

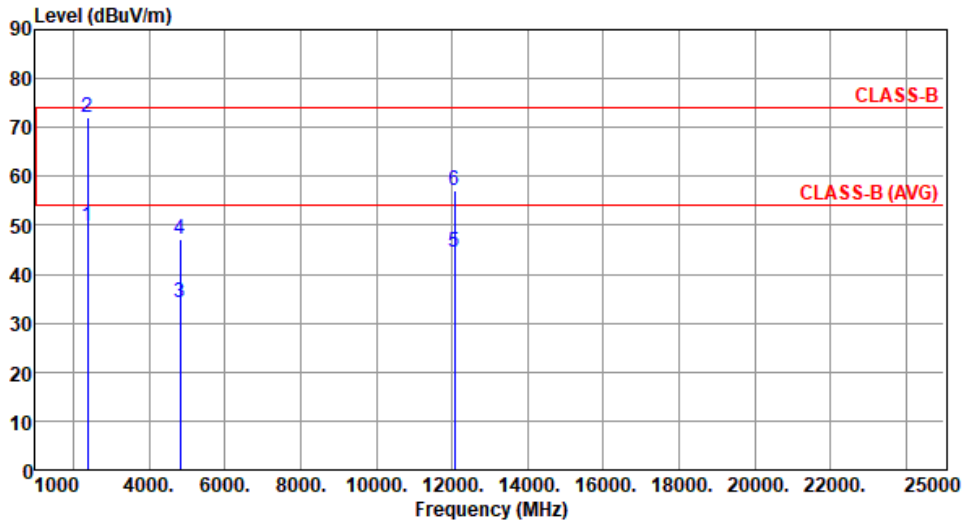


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	50.51	54.00	-3.49	52.35	-1.84	Average	179	211
2	2390.00	72.73	74.00	-1.27	74.57	-1.84	Peak	179	211
3	4824.00	35.78	54.00	-18.22	30.70	5.08	Average	104	335
4	4824.00	48.45	74.00	-25.55	43.37	5.08	Peak	104	335
5	12060.00	44.86	54.00	-9.14	30.17	14.69	Average	100	36
6	12060.00	57.15	74.00	-16.85	42.46	14.69	Peak	100	36

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).

Modulation	11g	Test Freq. (MHz)	2412
Polarization	Vertical		

Test By :BRAD WU Temperature(℃):24 Humidity(%):65

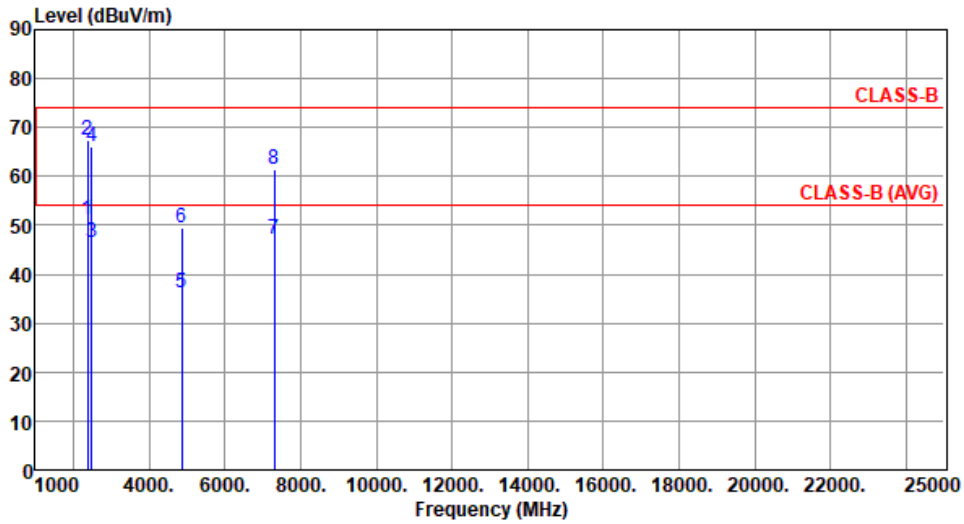


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	49.66	54.00	-4.34	51.50	-1.84	Average	140	354
2	2390.00	72.20	74.00	-1.80	74.04	-1.84	Peak	140	354
3	4824.00	34.16	54.00	-19.84	29.08	5.08	Average	104	12
4	4824.00	47.25	74.00	-26.75	42.17	5.08	Peak	104	12
5	12060.00	44.62	54.00	-9.38	29.93	14.69	Average	100	29
6	12060.00	57.04	74.00	-16.96	42.35	14.69	Peak	100	29

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).

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		

Test By :BRAD WU Temperature(℃):24 Humidity(%):65

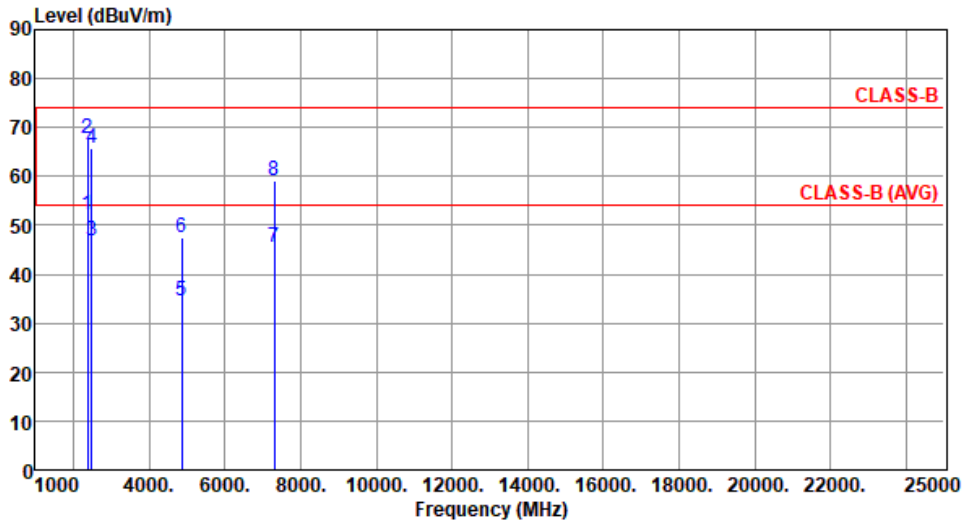


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	51.11	54.00	-2.89	52.95	-1.84	Average	202	210
2	2390.00	67.50	74.00	-6.50	69.34	-1.84	Peak	202	210
3	2483.50	46.62	54.00	-7.38	48.42	-1.80	Average	198	207
4	2483.50	65.98	74.00	-8.02	67.78	-1.80	Peak	198	207
5	4874.00	36.24	54.00	-17.76	31.17	5.07	Average	100	336
6	4874.00	49.60	74.00	-24.40	44.53	5.07	Peak	100	336
7	7311.00	47.18	54.00	-6.82	36.90	10.28	Average	242	302
8	7311.00	61.58	74.00	-12.42	51.30	10.28	Peak	242	302

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).

Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		

Test By :BRAD WU Temperature(℃):24 Humidity(%):65

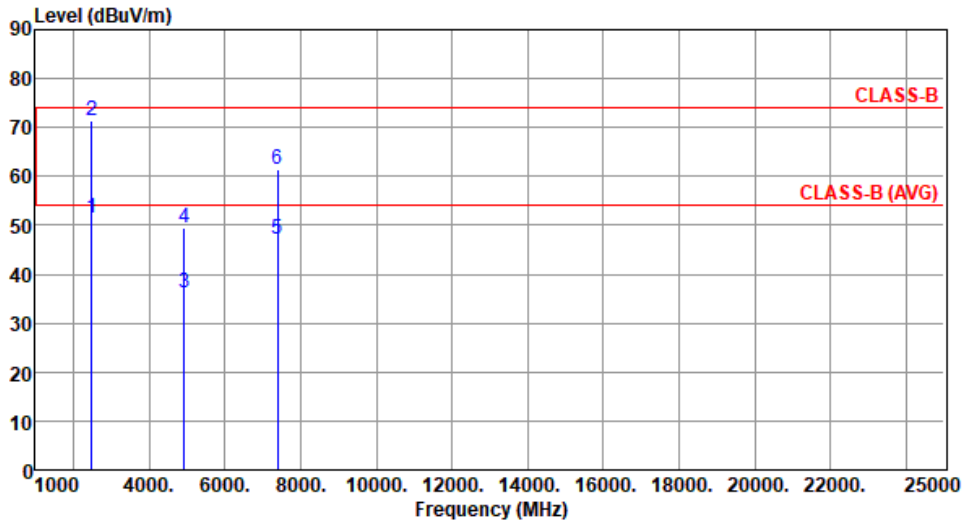


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	52.16	54.00	-1.84	54.00	-1.84	Average	145	352
2	2390.00	67.80	74.00	-6.20	69.64	-1.84	Peak	145	352
3	2483.50	46.89	54.00	-7.11	48.69	-1.80	Average	163	353
4	2483.50	65.80	74.00	-8.20	67.60	-1.80	Peak	163	353
5	4874.00	34.53	54.00	-19.47	29.46	5.07	Average	110	15
6	4874.00	47.41	74.00	-26.59	42.34	5.07	Peak	110	15
7	7311.00	45.54	54.00	-8.46	35.26	10.28	Average	196	355
8	7311.00	59.10	74.00	-14.90	48.82	10.28	Peak	196	355

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).

Modulation	11g	Test Freq. (MHz)	2462
Polarization	Horizontal		

Test By :BRAD WU Temperature(℃):24 Humidity(%):65

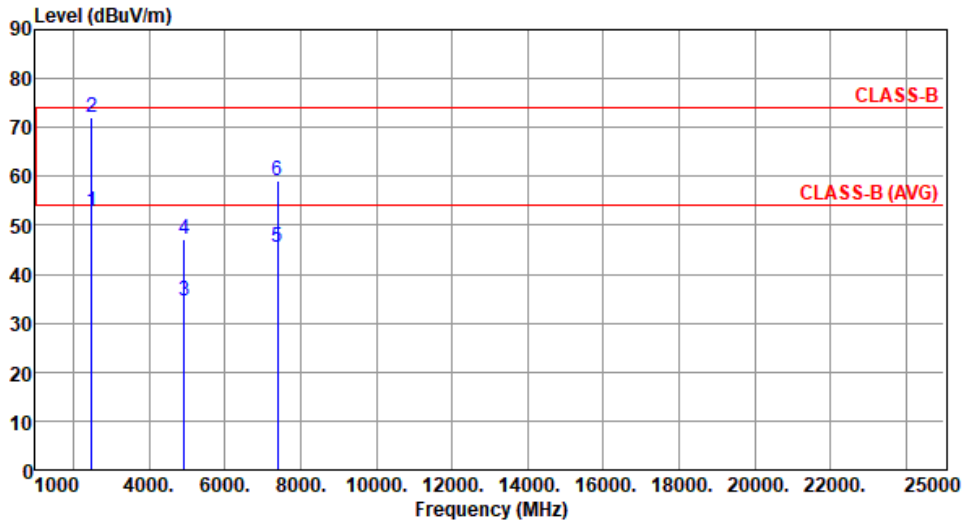


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	51.41	54.00	-2.59	53.21	-1.80	Average	246	201
2	2483.50	71.48	74.00	-2.52	73.28	-1.80	Peak	246	201
3	4924.00	36.12	54.00	-17.88	31.00	5.12	Average	115	338
4	4924.00	49.48	74.00	-24.52	44.36	5.12	Peak	115	338
5	7386.00	47.02	54.00	-6.98	36.75	10.27	Average	239	301
6	7386.00	61.35	74.00	-12.65	51.08	10.27	Peak	239	301

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).

Modulation	11g	Test Freq. (MHz)	2462
Polarization	Vertical		

Test By :BRAD WU Temperature(℃):24 Humidity(%):65



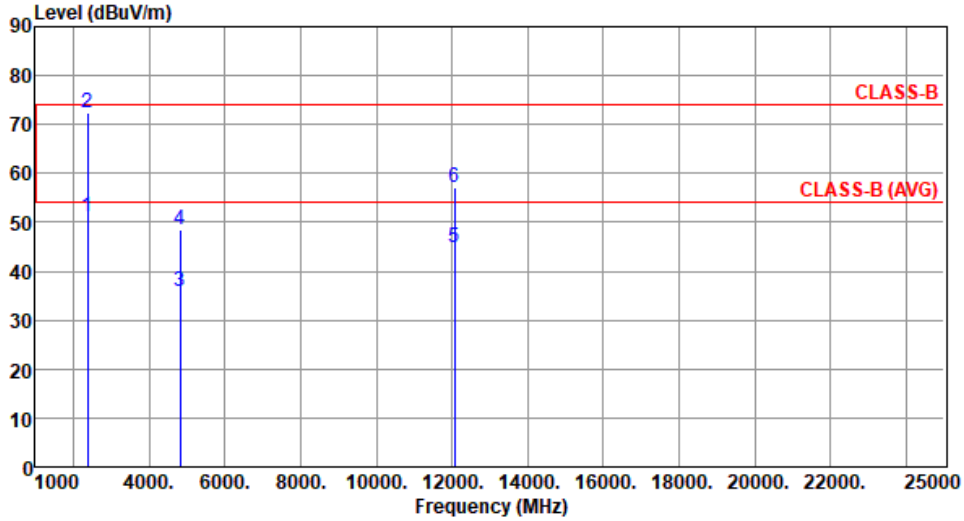
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	52.78	54.00	-1.22	54.58	-1.80	Average	176	136
2	2483.50	72.12	74.00	-1.88	73.92	-1.80	Peak	176	136
3	4924.00	34.42	54.00	-19.58	29.30	5.12	Average	100	17
4	4924.00	47.28	74.00	-26.72	42.16	5.12	Peak	100	17
5	7386.00	45.39	54.00	-8.61	35.12	10.27	Average	195	358
6	7386.00	58.96	74.00	-15.04	48.69	10.27	Peak	195	358

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		

Test By :BRAD WU Temperature(℃):24 Humidity(%):65

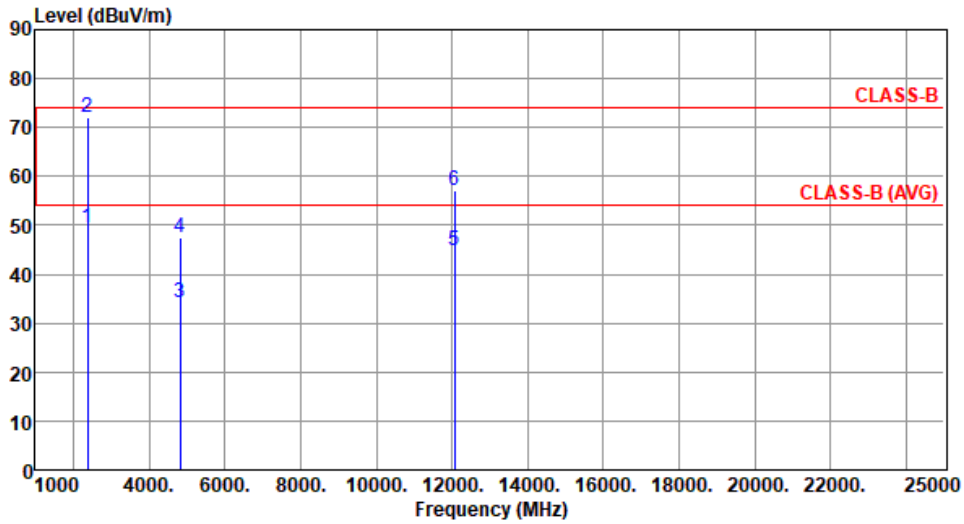


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	50.99	54.00	-3.01	52.83	-1.84	Average	178	212
2	2390.00	72.37	74.00	-1.63	74.21	-1.84	Peak	178	212
3	4824.00	35.84	54.00	-18.16	30.76	5.08	Average	108	339
4	4824.00	48.62	74.00	-25.38	43.54	5.08	Peak	108	339
5	12060.00	44.95	54.00	-9.05	30.26	14.69	Average	103	41
6	12060.00	57.26	74.00	-16.74	42.57	14.69	Peak	103	41

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).

Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Vertical		

Test By :BRAD WU Temperature(℃):24 Humidity(%):65

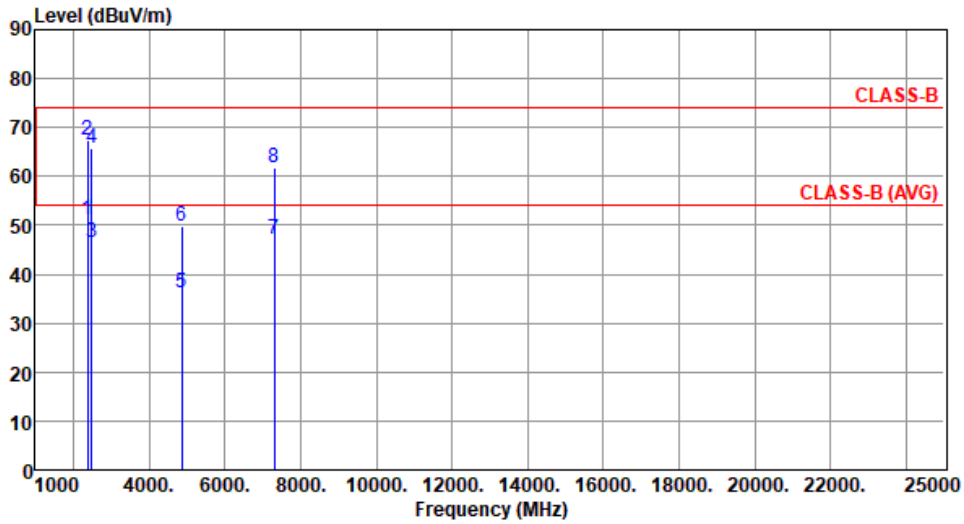


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	49.52	54.00	-4.48	51.36	-1.84	Average	144	351
2	2390.00	71.94	74.00	-2.06	73.78	-1.84	Peak	144	351
3	4824.00	34.29	54.00	-19.71	29.21	5.08	Average	108	19
4	4824.00	47.41	74.00	-26.59	42.33	5.08	Peak	108	19
5	12060.00	44.69	54.00	-9.31	30.00	14.69	Average	100	45
6	12060.00	57.15	74.00	-16.85	42.46	14.69	Peak	100	45

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).

Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal		

Test By :BRAD WU Temperature(℃):24 Humidity(%):65

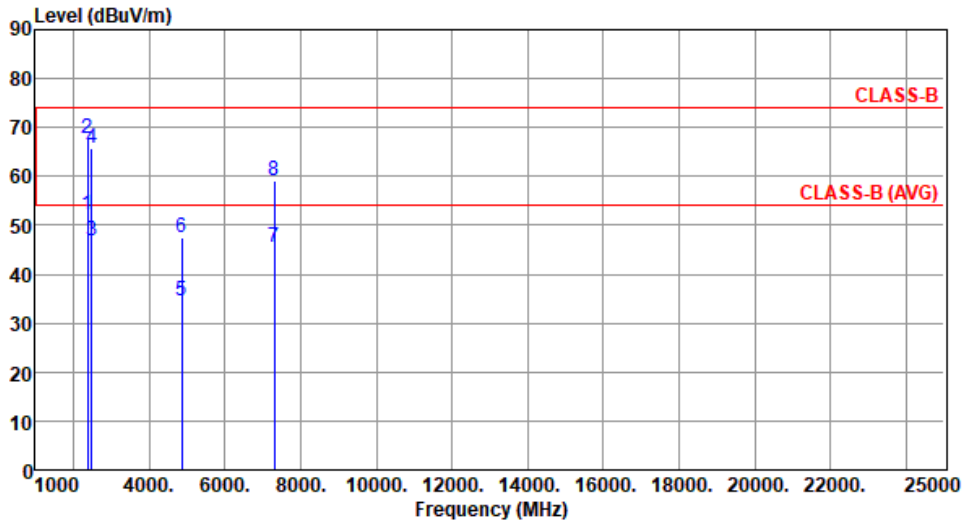


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	51.04	54.00	-2.96	52.88	-1.84	Average	201	212
2	2390.00	67.42	74.00	-6.58	69.26	-1.84	Peak	201	212
3	2483.50	46.55	54.00	-7.45	48.35	-1.80	Average	199	205
4	2483.50	65.82	74.00	-8.18	67.62	-1.80	Peak	199	205
5	4874.00	36.31	54.00	-17.69	31.24	5.07	Average	100	342
6	4874.00	49.65	74.00	-24.35	44.58	5.07	Peak	100	342
7	7311.00	47.22	54.00	-6.78	36.94	10.28	Average	238	305
8	7311.00	61.69	74.00	-12.31	51.41	10.28	Peak	238	305

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).

Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Vertical		

Test By :BRAD WU Temperature(℃):24 Humidity(%):65

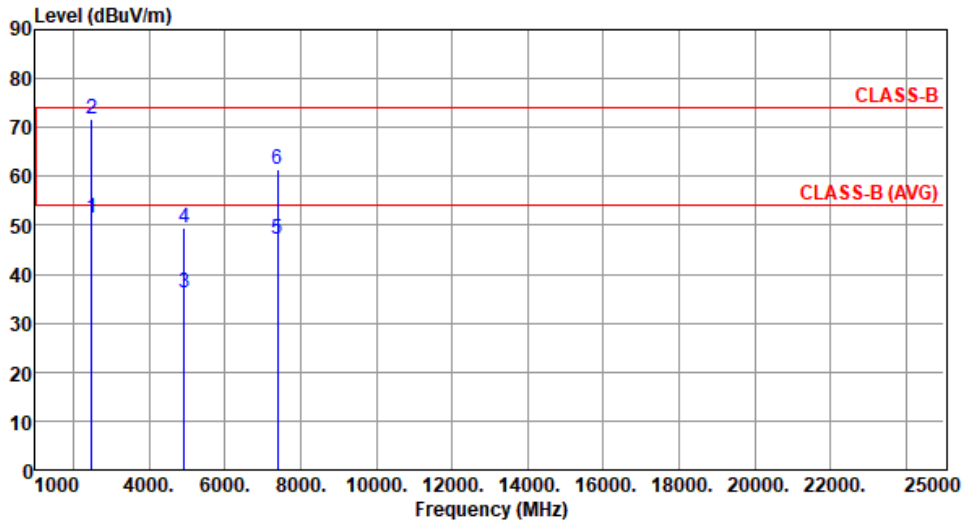


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	52.12	54.00	-1.88	53.96	-1.84	Average	146	354
2	2390.00	67.74	74.00	-6.26	69.58	-1.84	Peak	146	354
3	2483.50	46.75	54.00	-7.25	48.55	-1.80	Average	164	354
4	2483.50	65.84	74.00	-8.16	67.64	-1.80	Peak	164	354
5	4874.00	34.62	54.00	-19.38	29.55	5.07	Average	100	21
6	4874.00	47.55	74.00	-26.45	42.48	5.07	Peak	100	21
7	7311.00	45.65	54.00	-8.35	35.37	10.28	Average	195	351
8	7311.00	59.23	74.00	-14.77	48.95	10.28	Peak	195	351

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).

Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Horizontal		

Test By :BRAD WU Temperature(℃):24 Humidity(%):65

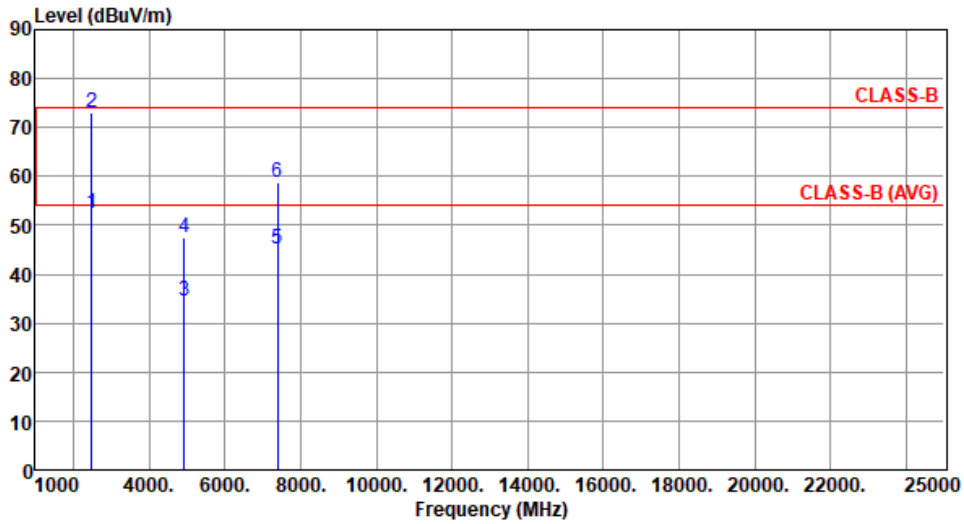


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	51.46	54.00	-2.54	53.26	-1.80	Average	247	202
2	2483.50	71.58	74.00	-2.42	73.38	-1.80	Peak	247	202
3	4924.00	36.25	54.00	-17.75	31.13	5.12	Average	111	335
4	4924.00	49.53	74.00	-24.47	44.41	5.12	Peak	111	335
5	7386.00	47.19	54.00	-6.81	36.92	10.27	Average	233	304
6	7386.00	61.44	74.00	-12.56	51.17	10.27	Peak	233	304

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).

Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Vertical		

Test By :BRAD WU Temperature(℃):24 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	2483.50	52.40	54.00	-1.60	54.20	-1.80	Average	176	135
2	2483.50	72.91	74.00	-1.09	74.71	-1.80	Peak	176	135
3	4924.00	34.46	54.00	-19.54	29.34	5.12	Average	100	27
4	4924.00	47.41	74.00	-26.59	42.29	5.12	Peak	100	27
5	7386.00	45.26	54.00	-8.74	34.99	10.27	Average	191	354
6	7386.00	58.84	74.00	-15.16	48.57	10.27	Peak	191	354

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

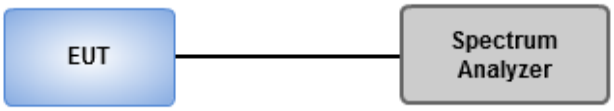
Reference level measurement

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

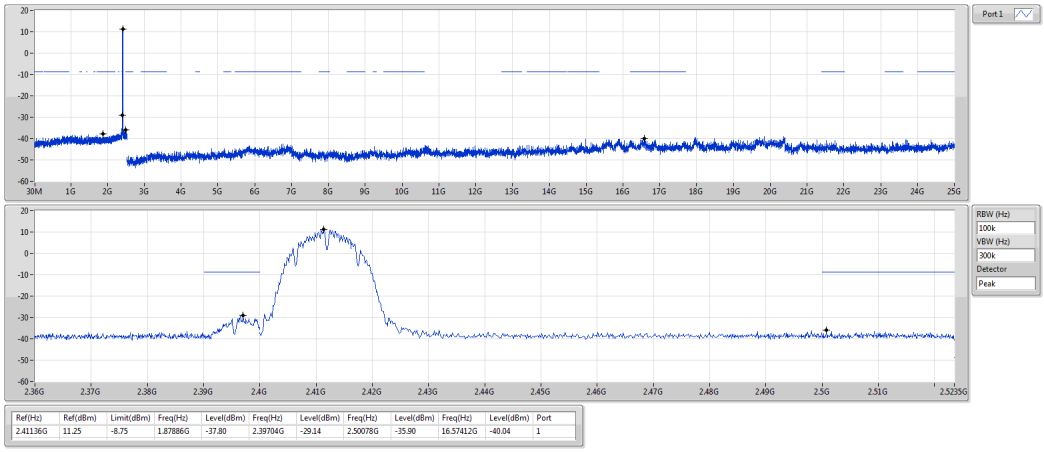


3.6.4 Unwanted Emissions into Non-Restricted Frequency Bands

Ambient Condition	22°C / 66%	Tested By	Brad Wu

802.11b_Nss1,(1Mbps)_1TX CSENdB

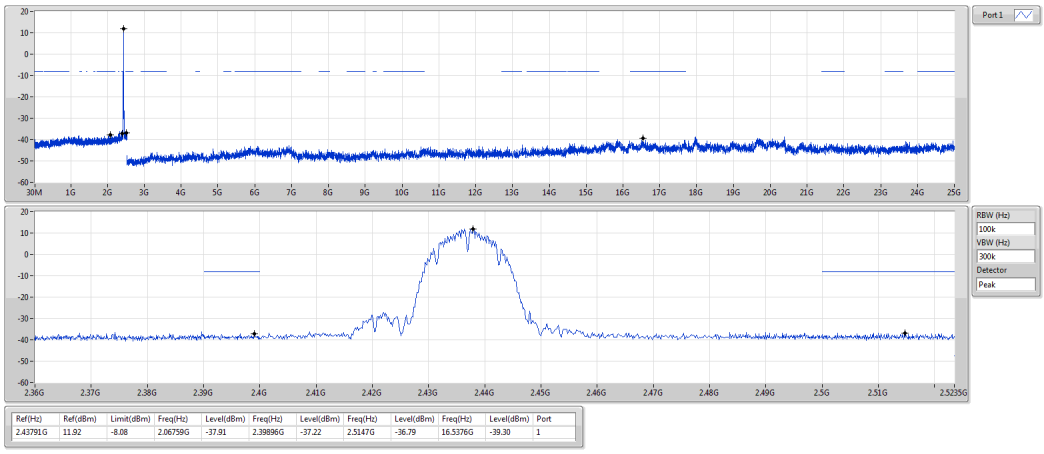
2412MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.41136G	11.25	-8.75	1.87886G	-37.80	2.39704G	-29.14	2.50078G	-35.90	16.57412G	-40.04	1

802.11b_Nss1,(1Mbps)_1TX CSENdB

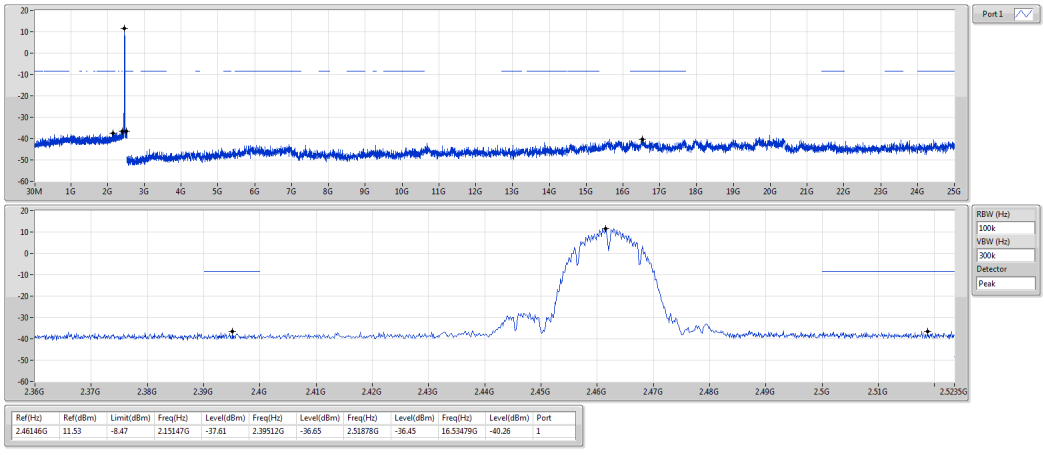
2437MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43791G	11.92	-8.08	2.06759G	-37.91	2.39896G	-37.22	2.5147G	-36.79	16.5376G	-39.30	1

802.11b_Nss1,(1Mbps)_1TX CSENdB

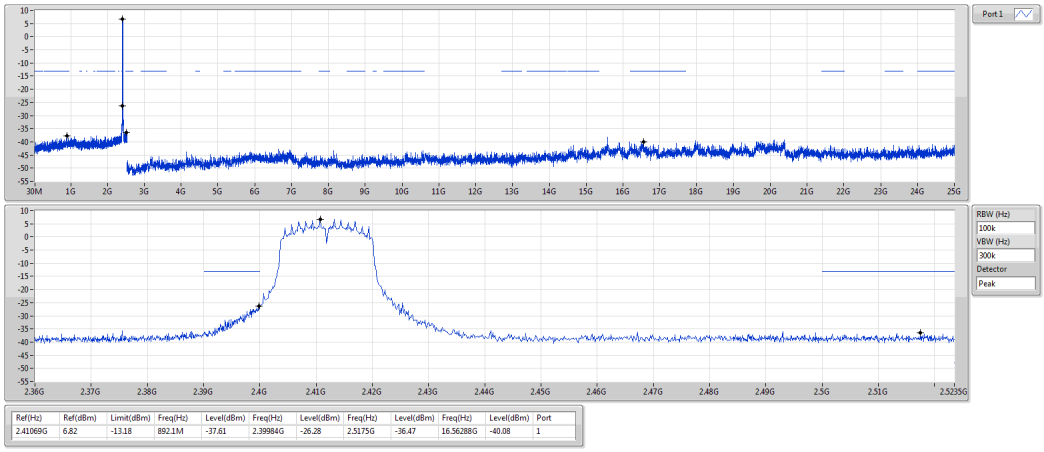
2462MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.46146G	11.53	-8.47	2.15147G	-37.61	2.39512G	-36.65	2.51878G	-36.45	16.53479G	-40.26	1

802.11g_Nss1,(6Mbps)_1TX **CSENdB**

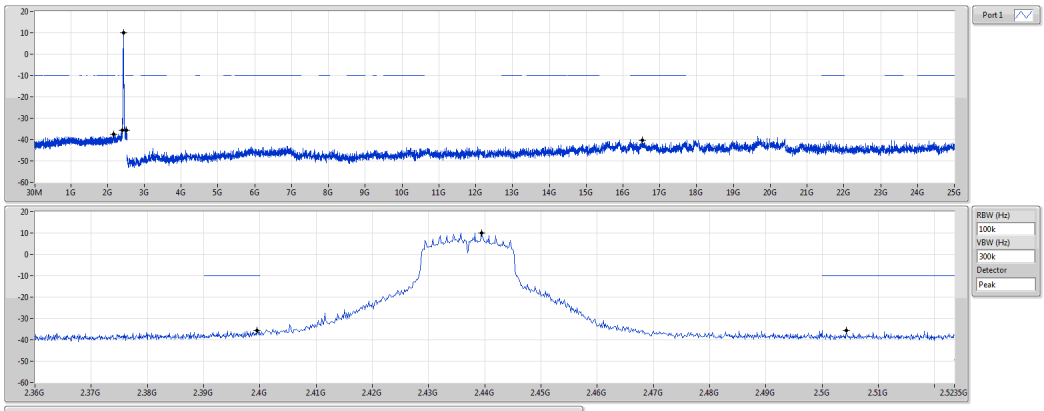
2412MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.41069G	6.82	-13.18	892.1M	-37.61	2.39984G	-26.28	2.5175G	-36.47	16.5628BG	-40.08	1

802.11g_Nss1,(6Mbps)_1TX **CSENdB**

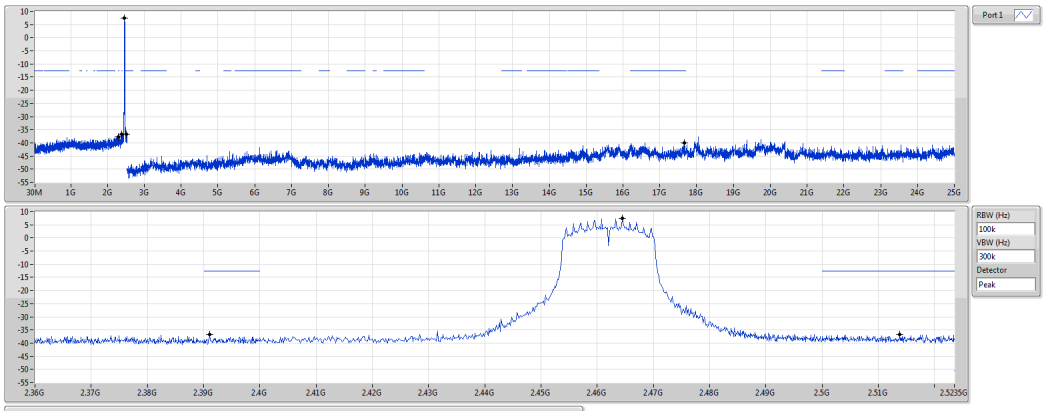
2437MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43941G	10.07	-9.93	2.17477G	-37.44	2.39944G	-35.72	2.5043G	-35.54	16.52636G	-40.19	1

802.11g_Nss1,(6Mbps)_1TX **CSENdB**

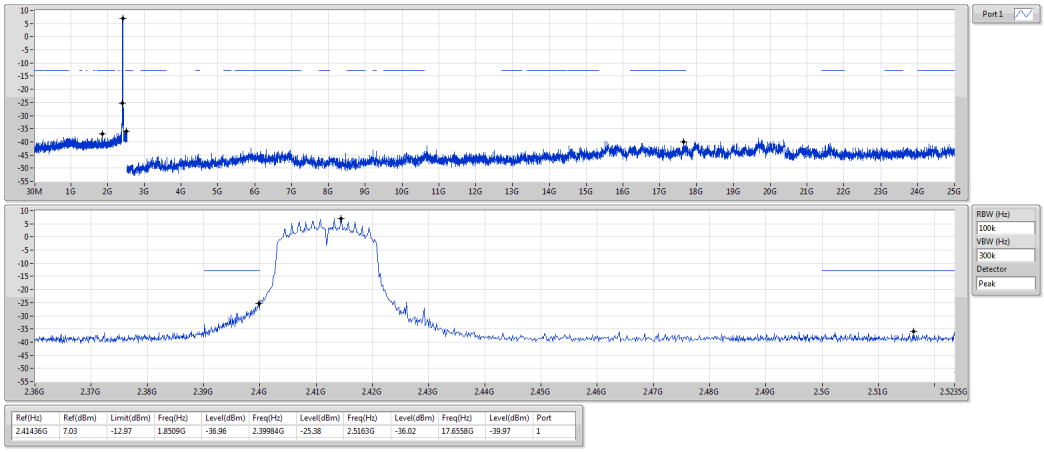
2462MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.46446G	7.38	-12.62	2.30059G	-37.79	2.39112G	-36.79	2.51382G	-36.69	17.66423G	-40.05	1

802.11n HT20_Nss1,(MCS0)_1TX **CSENdB**

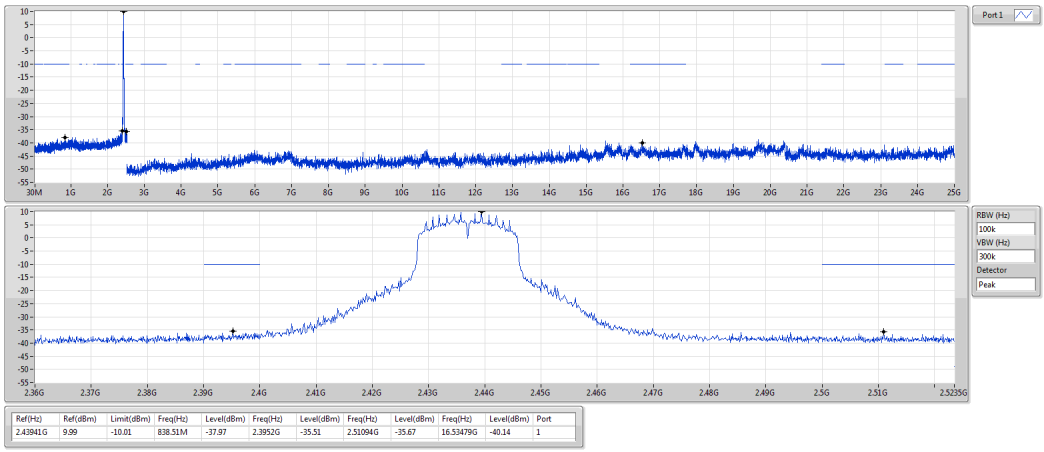
2412MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.41436G	7.03	-12.97	1.8509G	-36.96	2.39984G	-25.38	2.5163G	-36.02	17.6558G	-39.97	1

802.11n HT20_Nss1,(MCS0)_1TX **CSENdB**

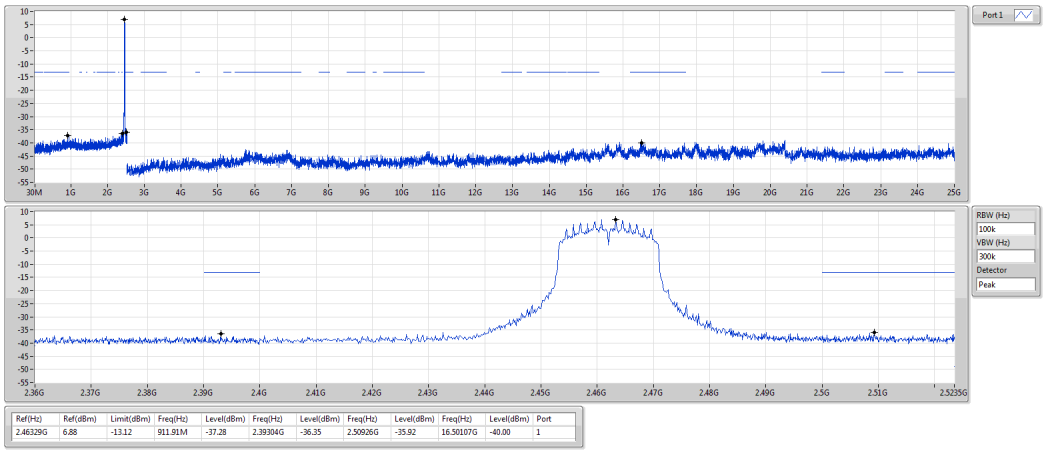
2437MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43941G	9.99	-10.01	838.51M	-37.97	2.3952G	-35.51	2.51094G	-35.67	16.53479G	-40.14	1

802.11n HT20_Nss1,(MCS0)_1TX **CSENdB**

2462MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.46329G	6.88	-13.12	911.91M	-37.28	2.39304G	-36.35	2.50926G	-35.92	16.50107G	-40.00	1

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	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C.	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.	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

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