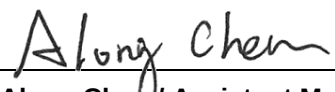


FCC Test Report

FCC ID : QVHDBWIFIBLE05
Equipment : 802.11 abgn + BLE 5.0 module
Model No. : DBWIFIBLE05
Brand Name : Dyson
Applicant : Dyson Technology Ltd
Address : Tetbury Hill Malmesbury Wiltshire SN16 0RP
United Kingdom
Standard : 47 CFR FCC Part 15.247
Received Date : May 30, 2022
Tested Date : Jun. 09 ~ Jun. 15, 2022

We, International Certification Corporation, 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 shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by:


Along Chen / Assistant Manager

Approved by:

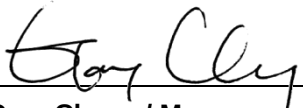

Gary Chang / Manager

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Release Record

Report No.	Version	Description	Issued Date
FR253002AC	Rev. 01	Initial issue	May. 05, 2023

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	AC Power Line Conducted Emission	[dBuV]: 2.309MHz 27.18 (Margin -18.82dB) - AV	Pass
15.247(d) 15.209	Unwanted Emissions	[dBuV/m at 3m]: 2390.00MHz 50.65 (Margin -3.35dB) - AV	Pass
15.247(b)(3)	Conducted Output Power	Max Power [dBm]: 22.47	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 Conducted (Average) Output Power. Note 2: DSSS-DBPSK, DQPSK, CCK modulation OFDM - BPSK, QPSK, 16QAM, 64QAM modulation.					

1.1.2 Antenna Details

Ant. No.	Brand	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)				
					2400~2483.5	5150~5250	5250~5350	5470~5725	5725~5850
1	Dyson	ANT2_1370X950	PIFA	No	2.12	2.59	2.62	2.79	3.44

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

802.11 b / g / n HT20	
Frequency band (MHz)	2400~2483.5
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	Tera Term, V4.89		
Duty Cycle and Duty Factor	Mode	Duty Cycle (%)	Duty Factor (dB)
	11b	98.31%	0.07
	11g	83.68%	0.77
	HT20	82.85%	0.82

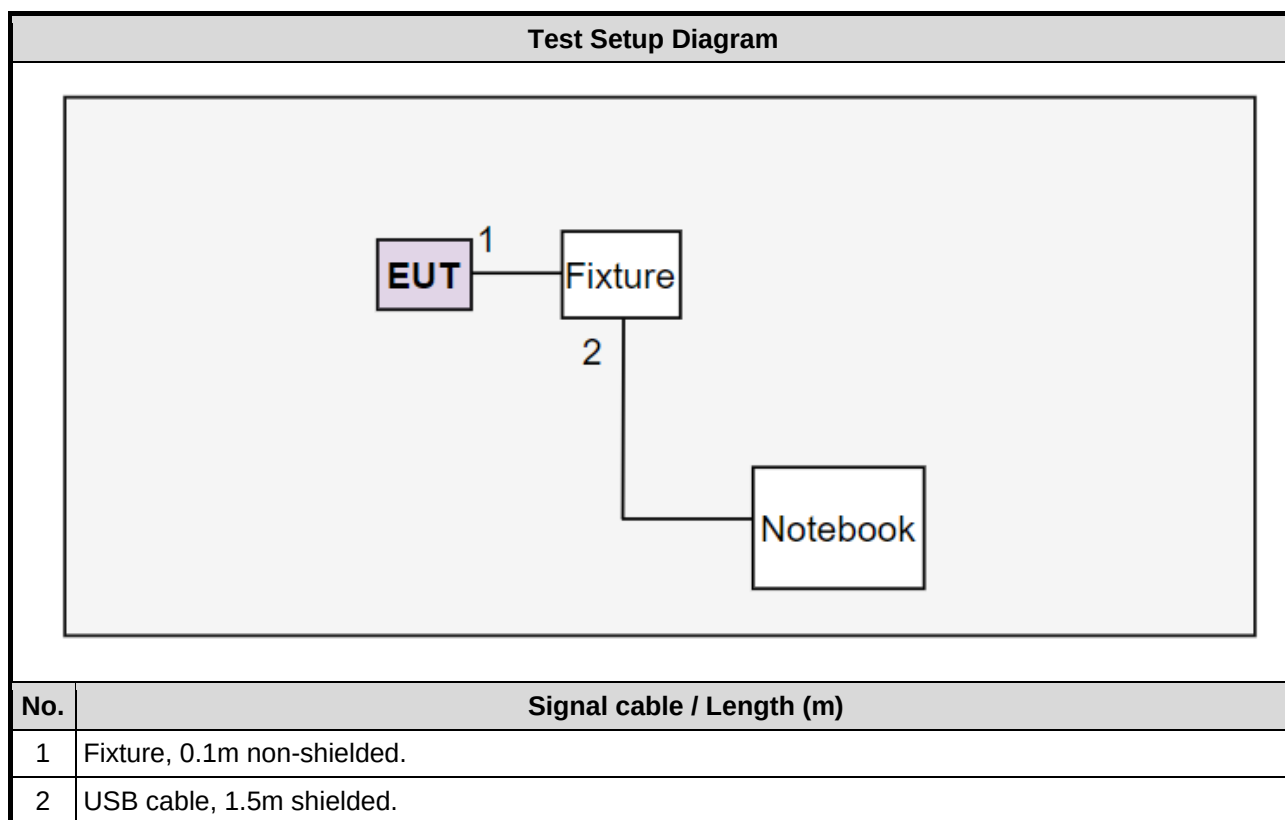
1.1.7 Power Index of Test Tool

Modulation Mode	Test Frequency (MHz)	Power Index
11b	2412	20.5
11b	2437	22.5
11b	2462	20.5
11g	2412	16.5
11g	2437	21
11g	2462	16.5
HT20	2412	16.5
HT20	2437	20.5
HT20	2462	16.5

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Notebook	DELL	Latitude 5400	DoC	---
2	Fixture	WNC	48DHSK07.SGA	---	Provided by applicant.

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Jun. 15, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Feb. 16, 2022	Feb. 15, 2023
LISN	R&S	ENV216	101579	Apr. 21, 2022	Apr. 20, 2023
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127667	Jan. 07, 2022	Jan. 06, 2023
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 19, 2021	Oct. 18, 2022
50 ohm terminal (Support Unit)	NA	50	01	May 10, 2022	May 09, 2023
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 chamber1 / (03CH01-WS)				
Tested Date	Jun. 09 ~ Jun. 10, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Mar. 15, 2022	Mar. 14, 2023
Spectrum Analyzer	R&S	FSV40	101498	Nov. 29, 2021	Nov. 28, 2022
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 08, 2021	Nov. 07, 2022
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jun. 30, 2021	Jun. 29, 2022
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 03, 2021	Dec. 02, 2022
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170508	Jan. 11, 2022	Jan. 10, 2023
Preamplifier	EMC	EMC02325	980225	Jun. 29, 2021	Jun. 28, 2022
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Jun. 15, 2022				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101498	Nov. 29, 2021	Nov. 28, 2022
Power Meter	Anritsu	ML2495A	1241002	Nov. 07, 2021	Nov. 06, 2022
Power Sensor	Anritsu	MA2411B	1207366	Nov. 07, 2021	Nov. 06, 2022
Measurement Software	Sporton	SENSE-15247_DTS	V5.10.7.18	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
Unwanted Emission ≤ 1 GHz	± 3.41 dB
Unwanted Emission > 1 GHz	± 4.59 dB

2 Test Configuration

2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	CO01-WS, 03CH01-WS, TH01-WS
Address of Test Site	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- 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
AC Power Line Conducted Emission	11b	2437	1 Mbps	---
Unwanted Emissions ≤ 1GHz	11b	2437	1 Mbps	---
Unwanted Emissions >1GHz				
Conducted Output Power	11b	2412 / 2437 / 2462	1 Mbps	---
6dB bandwidth	11g	2412 / 2437 / 2462	6 Mbps	
Power spectral density	HT20	2412 / 2437 / 2462	MCS 0	

NOTE:

1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **X-plane** results were found as the worst case and were shown in this report.

3 Transmitter Test Results

3.1 6dB and Occupied Bandwidth

3.1.1 Limit of 6dB Bandwidth

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

3.1.2 Test Procedures

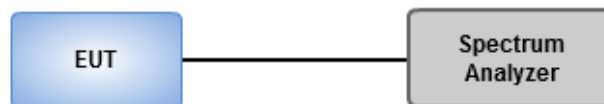
6dB Bandwidth

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.

3.1.3 Test Setup



3.1.4 Test Results

Ambient Condition	23°C / 64%	Tested By	Brad Wu
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Refer to Appendix A.

3.2 Conducted Output Power

3.2.1 Limit of Conducted Output Power

Conducted power shall not exceed 1Watt.

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

Antenna gain $> 6\text{dBi}$

Non Fixed, point to point operations.

The conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB

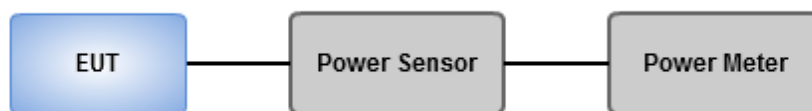
Fixed, point to point operations

Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point Operations, maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

3.2.2 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.

3.2.3 Test Setup



3.2.4 Test Results

Ambient Condition	23°C / 64%	Tested By	Brad Wu
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Refer to Appendix B.

3.3 Power Spectral Density

3.3.1 Limit of Power Spectral Density

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

3.3.2 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.

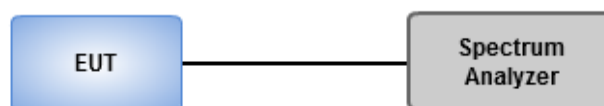
Average PSD, duty cycle $\geq 98\%$

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: ≥ 10 (number of measurement points in sweep) $\times$ (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.

3.3.3 Test Setup



3.3.4 Test Results

Ambient Condition	23°C / 64%	Tested By	Brad Wu
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Refer to Appendix C.

3.4 Unwanted Emissions into Restricted Frequency Bands

3.4.1 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.

3.4.2 Test Procedures

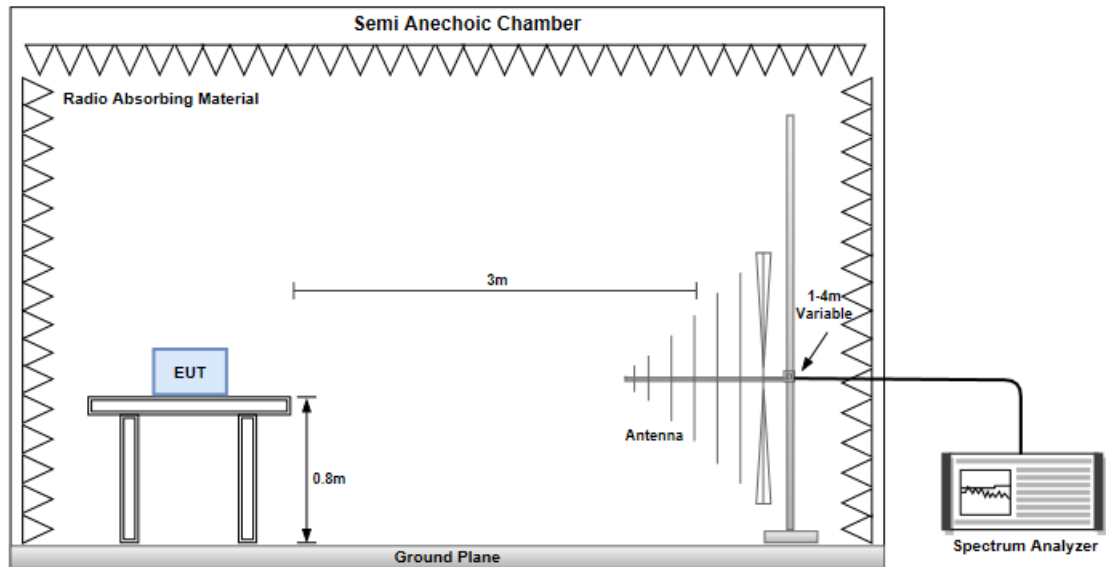
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

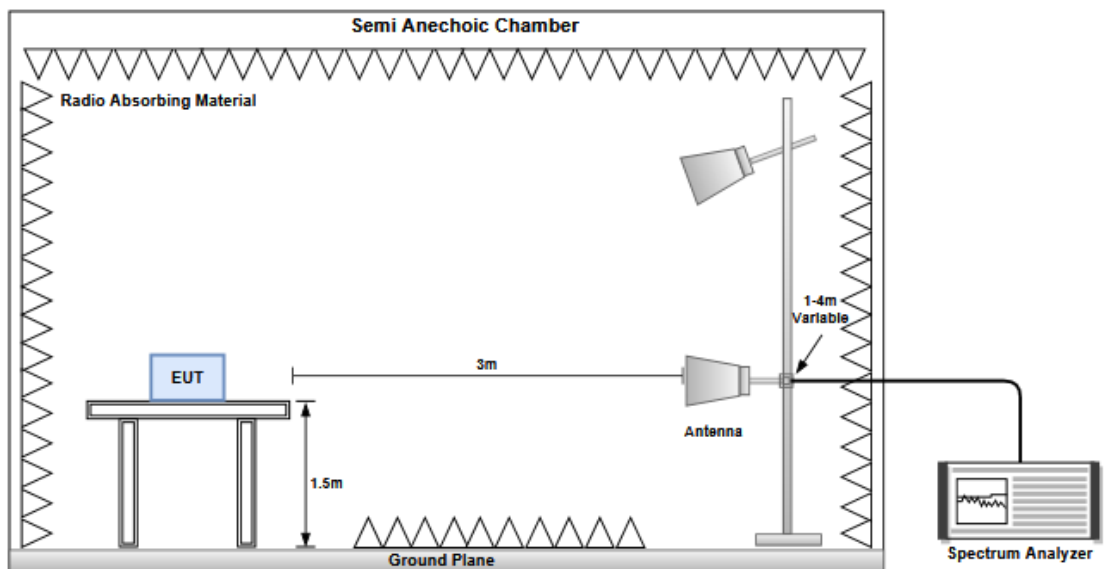
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.4.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



3.4.4 Test Results

Refer to Appendix D.

3.5 Emissions in Non-Restricted Frequency Bands

3.5.1 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 30 dB relative to the maximum in-band peak PSD level in 100 kHz.

3.5.2 Test Procedures

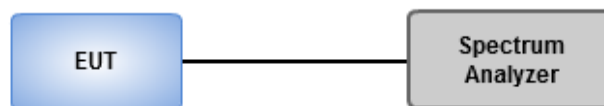
Reference level measurement

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

3.5.3 Test Setup



3.5.4 Test Results

Ambient Condition	23°C / 64%	Tested By	Brad Wu
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Refer to Appendix E.

3.6 AC Power Line Conducted Emissions

3.6.1 Limit of AC Power Line Conducted Emissions

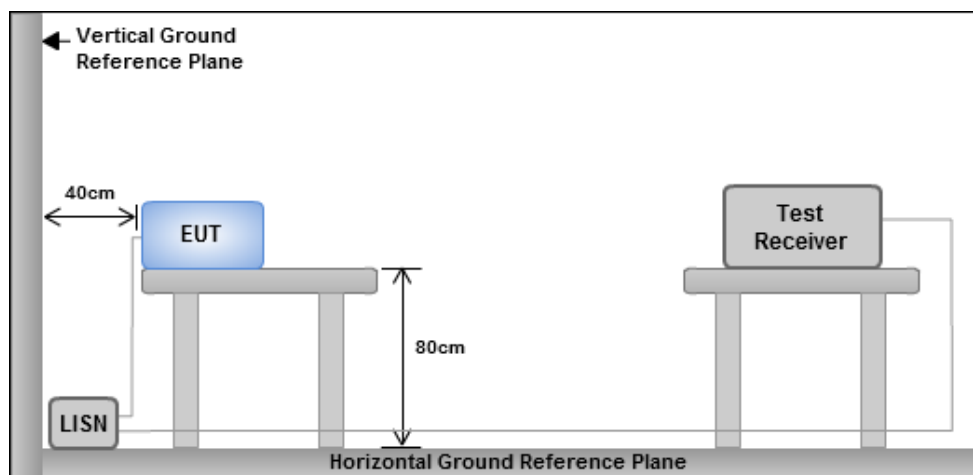
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

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

3.6.2 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.

3.6.3 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

3.6.4 Test Results

Refer to Appendix F.

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

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

Linkou

Tel: 886-2-2601-1640

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

Kwei Shan

Tel: 886-3-271-8666

No.3-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)
No.2-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)

Kwei Shan Site II

Tel: 886-3-271-8640

No.14-1, Lane 19, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)

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

Tel: 886-3-271-8666

Fax: 886-3-318-0345

Email: ICC_Service@icertifi.com.tw

==END==

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	10.025M	14.868M	14M9G1D	9.05M	13.993M
802.11g_Nss1,(6Mbps)_1TX	15.1M	16.842M	16M8D1D	14.05M	16.417M
802.11n HT20_Nss1,(MCS0)_1TX	15.075M	17.791M	17M8D1D	15M	17.541M

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

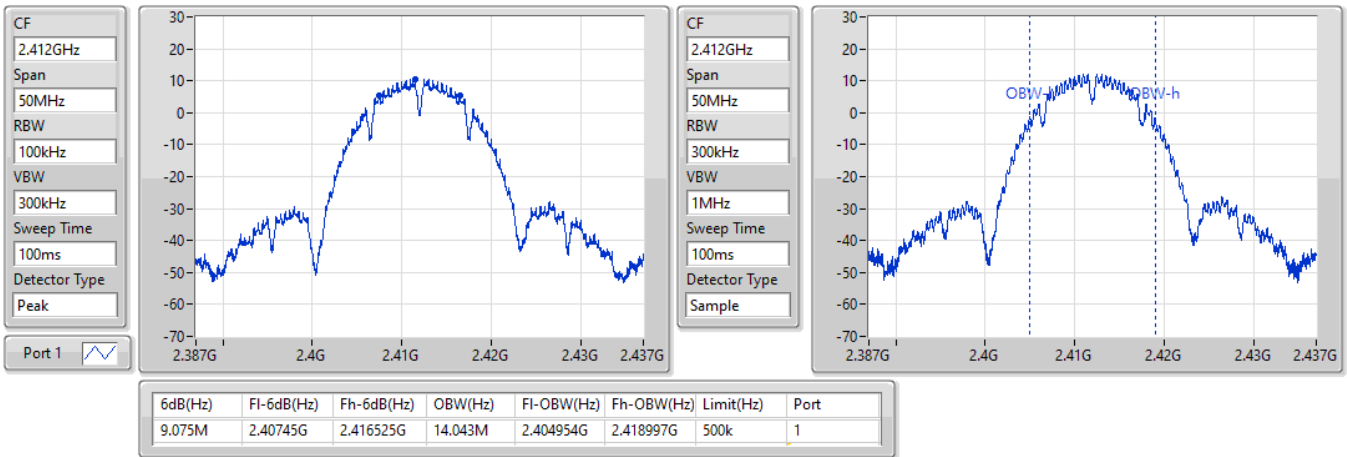
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	9.075M	14.043M
2437MHz	Pass	500k	10.025M	14.868M
2462MHz	Pass	500k	9.05M	13.993M
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	14.05M	16.467M
2437MHz	Pass	500k	15.05M	16.842M
2462MHz	Pass	500k	15.1M	16.417M
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-
2412MHz	Pass	500k	15.075M	17.541M
2437MHz	Pass	500k	15M	17.791M
2462MHz	Pass	500k	15.025M	17.566M

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

802.11b_Nss1,(1Mbps)_1TX

EBW

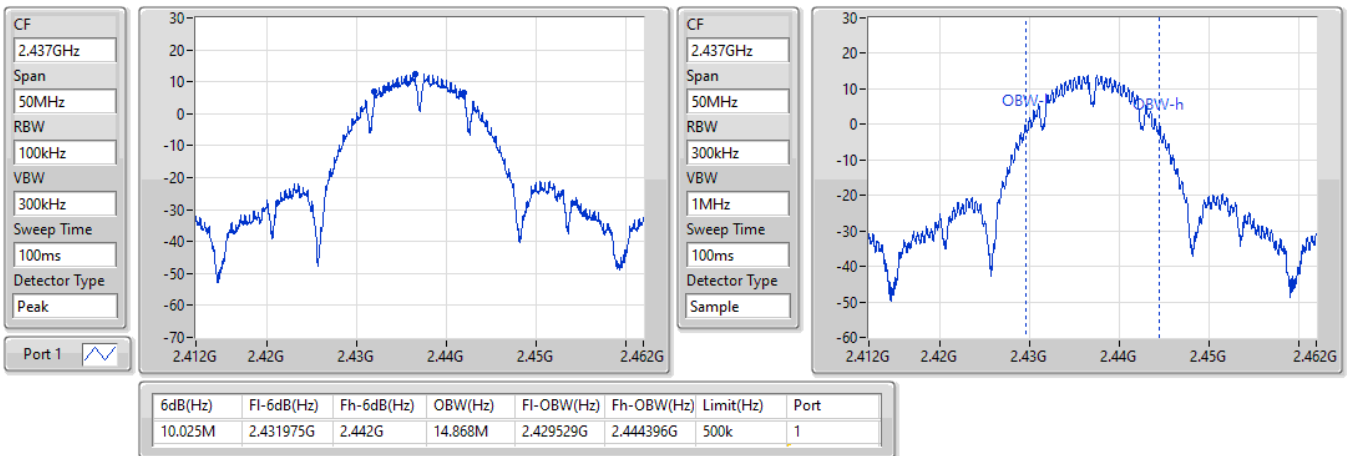
2412MHz



802.11b_Nss1,(1Mbps)_1TX

EBW

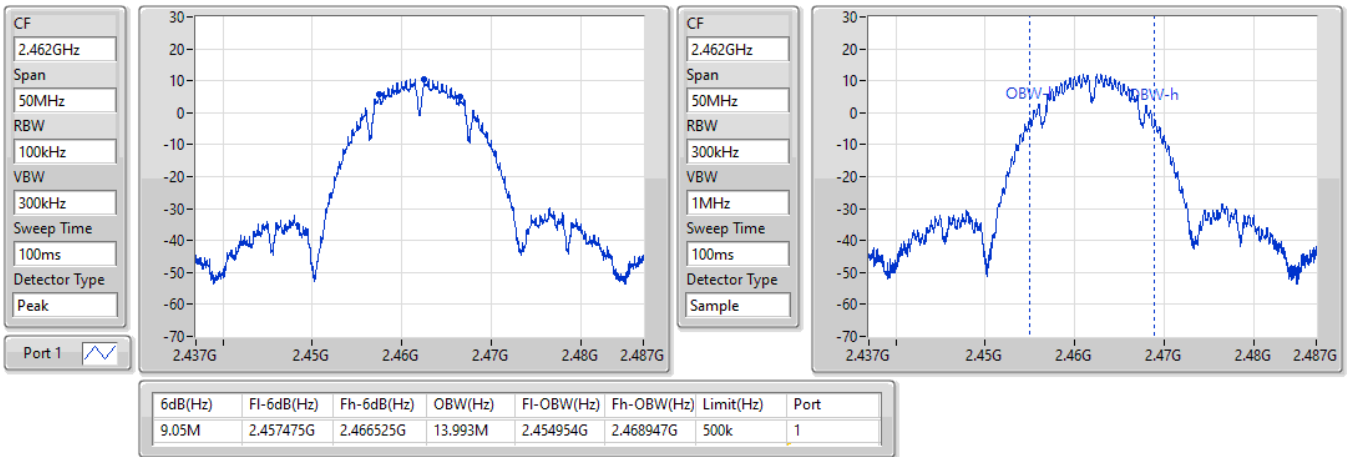
2437MHz



802.11b_Nss1,(1Mbps)_1TX

EBW

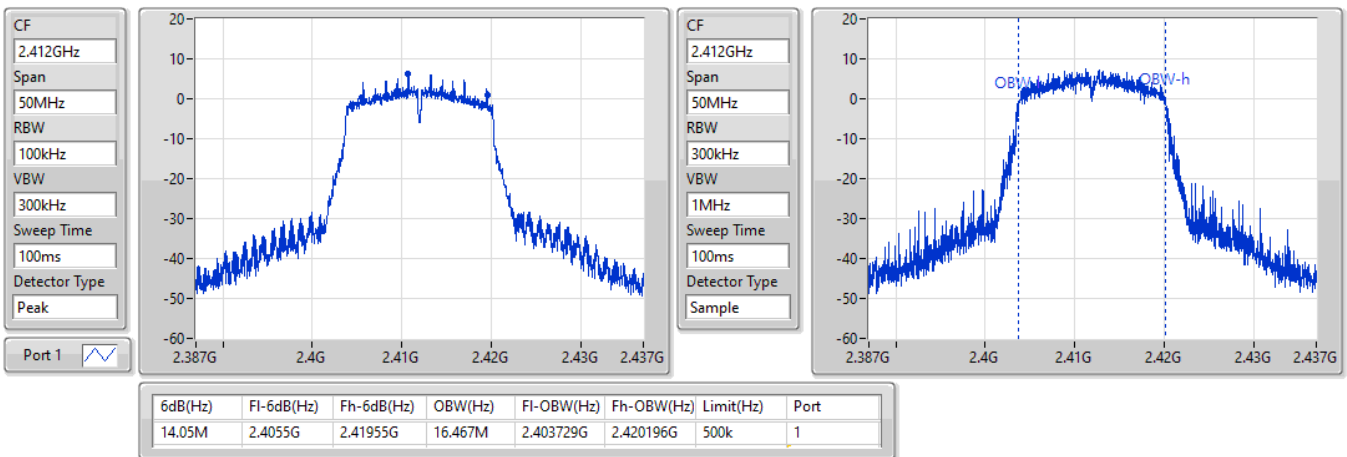
2462MHz



802.11g_Nss1,(6Mbps)_1TX

EBW

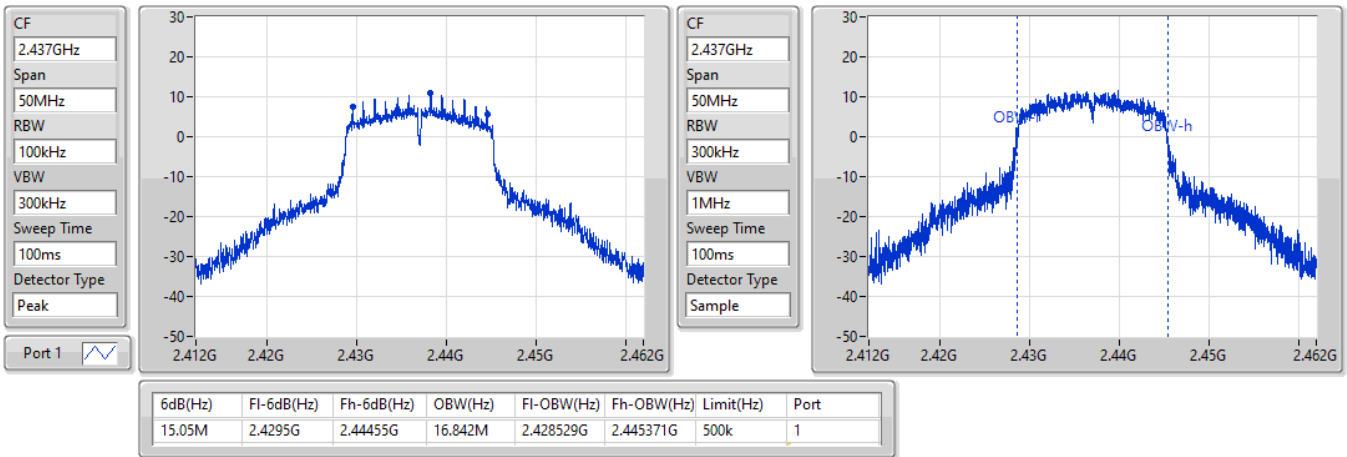
2412MHz



802.11g_Nss1,(6Mbps)_1TX

EBW

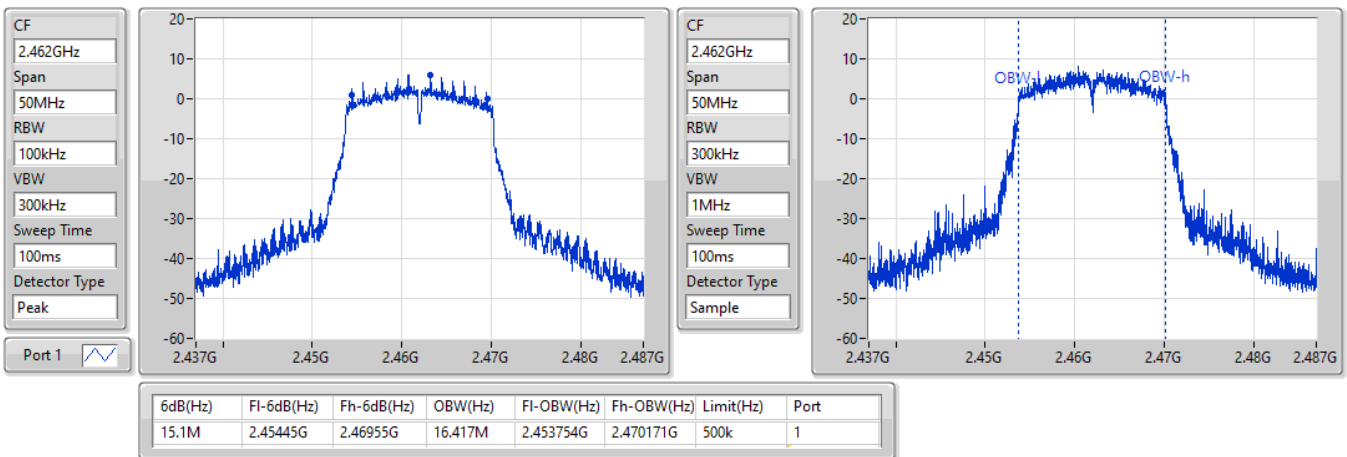
2437MHz



802.11g_Nss1,(6Mbps)_1TX

EBW

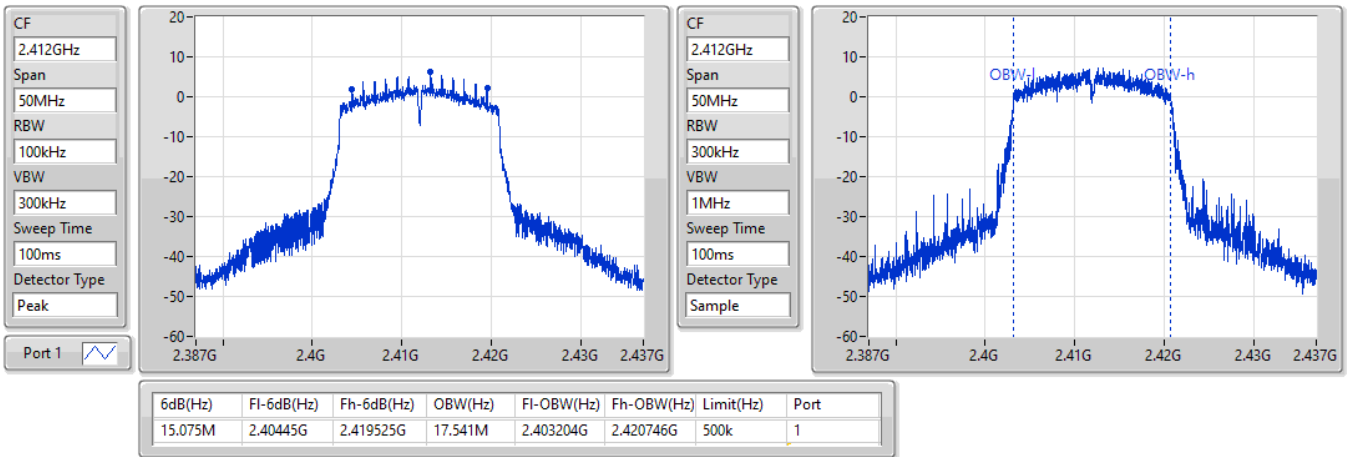
2462MHz



802.11n HT20_Nss1,(MCS0)_1TX

EBW

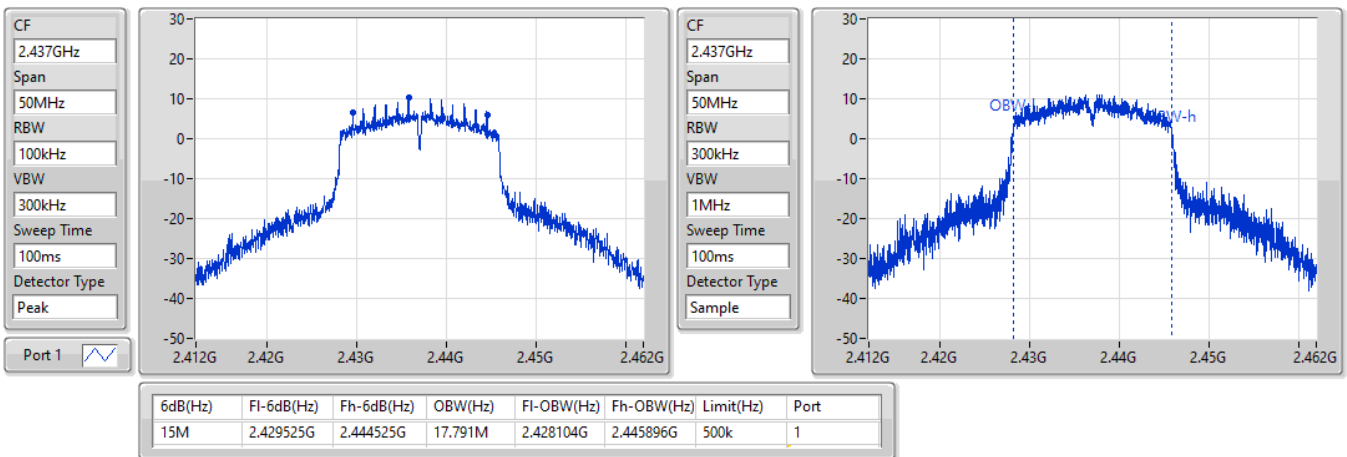
2412MHz



802.11n HT20_Nss1,(MCS0)_1TX

EBW

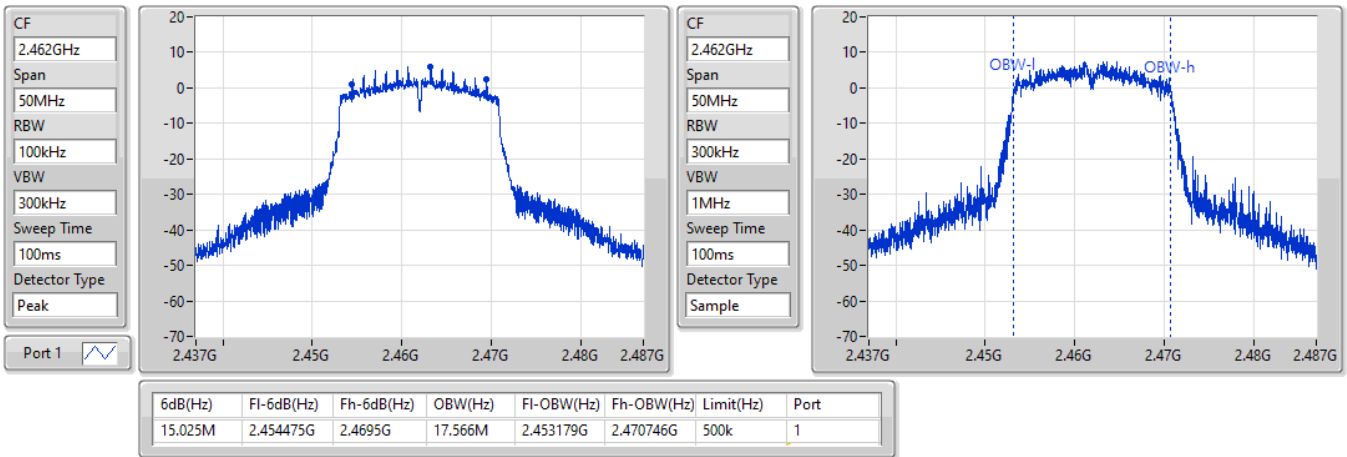
2437MHz



802.11n HT20_Nss1,(MCS0)_1TX

EBW

2462MHz





Conducted Output Power(Average)

Appendix B

Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_1TX	22.47	0.17660
802.11g_Nss1,(6Mbps)_1TX	20.89	0.12274
802.11n HT20_Nss1,(MCS0)_1TX	20.24	0.10568

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.12	20.48	20.48	30.00	22.60	36.00
2437MHz	Pass	2.12	22.47	22.47	30.00	24.59	36.00
2462MHz	Pass	2.12	20.43	20.43	30.00	22.55	36.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.12	16.57	16.57	30.00	18.69	36.00
2437MHz	Pass	2.12	20.89	20.89	30.00	23.01	36.00
2462MHz	Pass	2.12	16.49	16.49	30.00	18.61	36.00
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.12	16.39	16.39	30.00	18.51	36.00
2437MHz	Pass	2.12	20.24	20.24	30.00	22.36	36.00
2462MHz	Pass	2.12	16.31	16.31	30.00	18.43	36.00

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

Note : Conducted average output power is for reference

**Summary**

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
802.11b_Nss1,(1Mbps)_1TX	-2.94
802.11g_Nss1,(6Mbps)_1TX	-8.69
802.11n HT20_Nss1,(MCS0)_1TX	-10.79

RBW = 3kHz;

Result

Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	2.12	-4.04	-4.04	8.00
2437MHz	Pass	2.12	-2.94	-2.94	8.00
2462MHz	Pass	2.12	-5.08	-5.08	8.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	2.12	-14.37	-14.37	8.00
2437MHz	Pass	2.12	-8.69	-8.69	8.00
2462MHz	Pass	2.12	-14.00	-14.00	8.00
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-
2412MHz	Pass	2.12	-14.54	-14.54	8.00
2437MHz	Pass	2.12	-10.79	-10.79	8.00
2462MHz	Pass	2.12	-14.81	-14.81	8.00

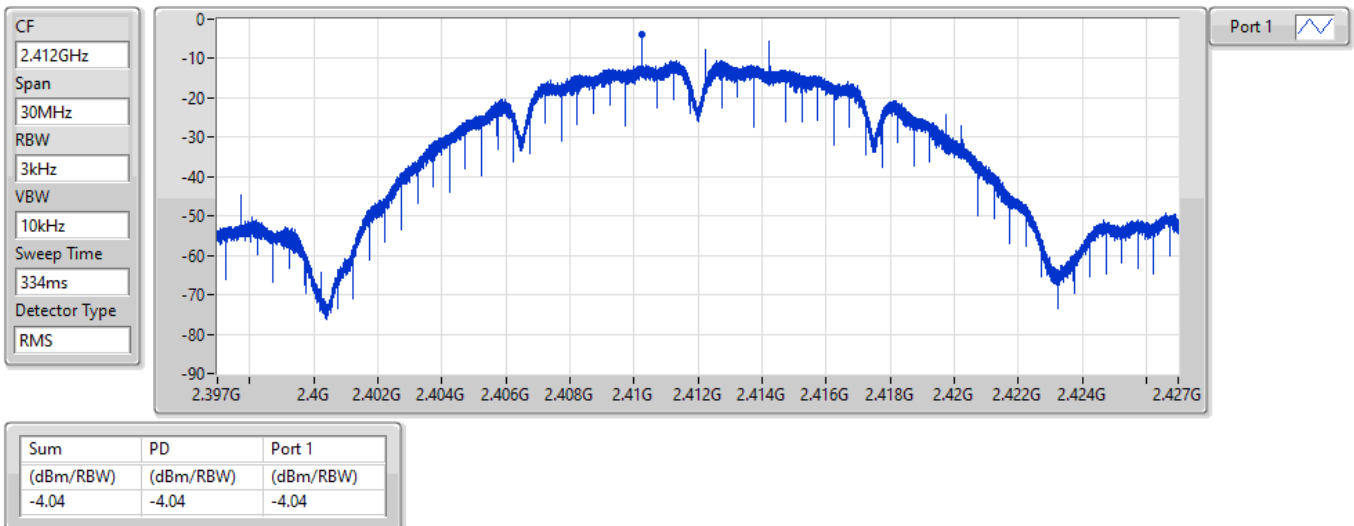
DG = Directional Gain; RBW = 3kHz;

PD = Power density; Port X = Port X Power Density;

802.11b_Nss1,(1Mbps)_1TX

PSD

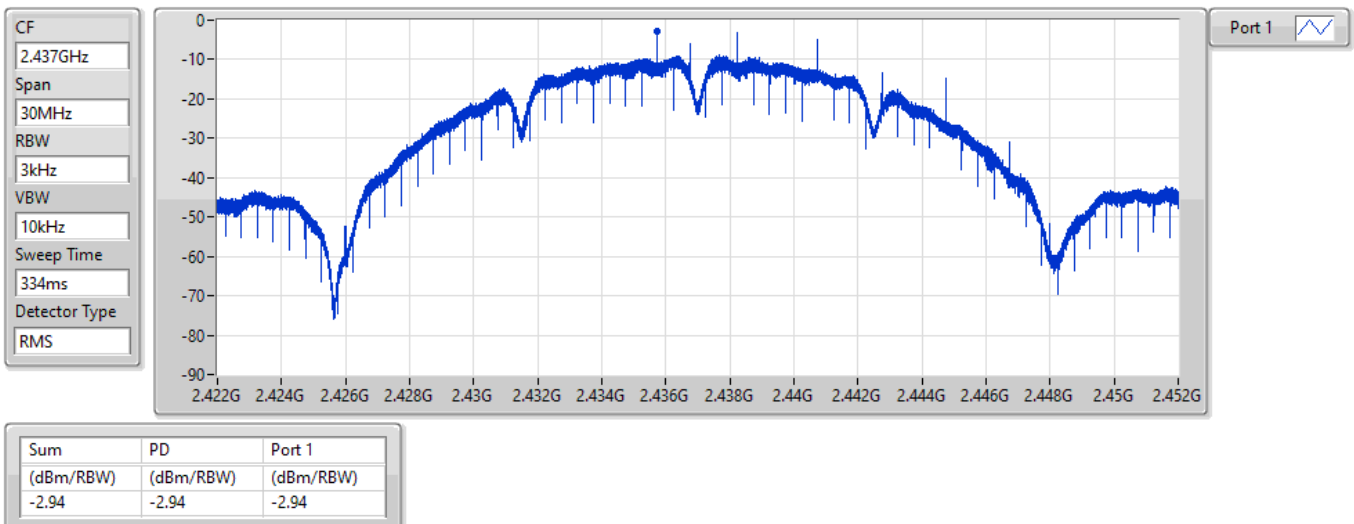
2412MHz



802.11b_Nss1,(1Mbps)_1TX

PSD

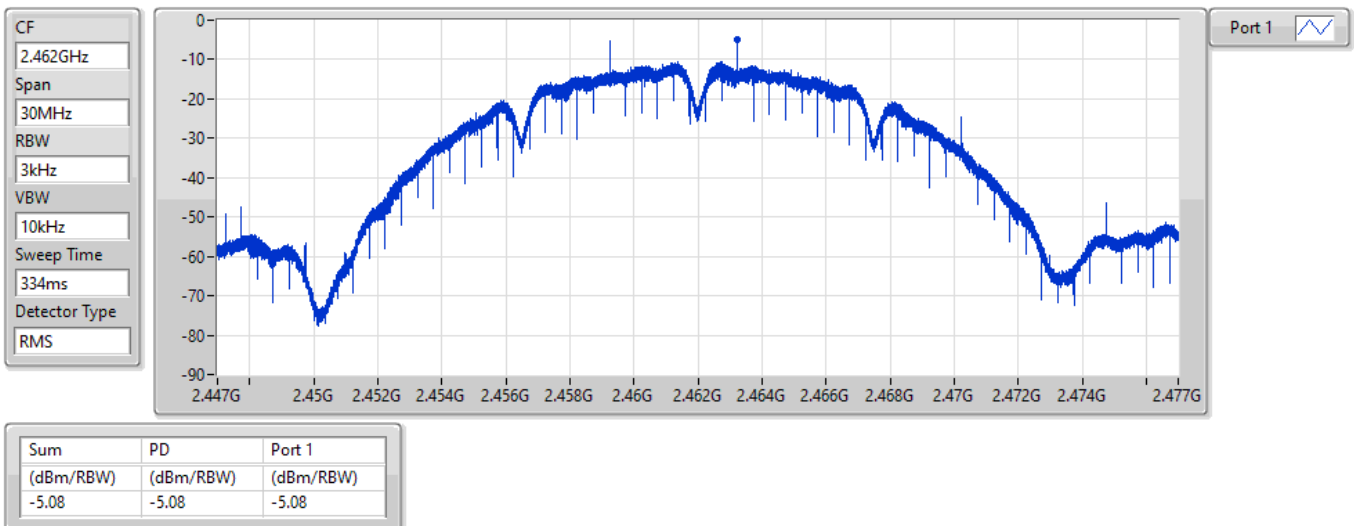
2437MHz



802.11b_Nss1,(1Mbps)_1TX

PSD

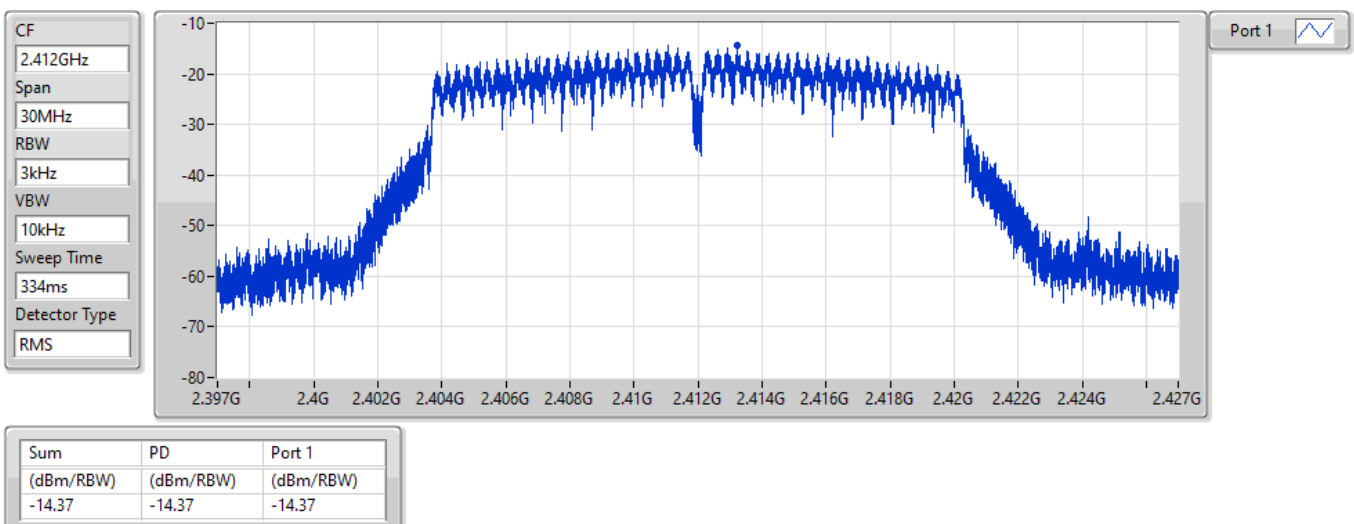
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802.11g_Nss1,(6Mbps)_1TX

PSD

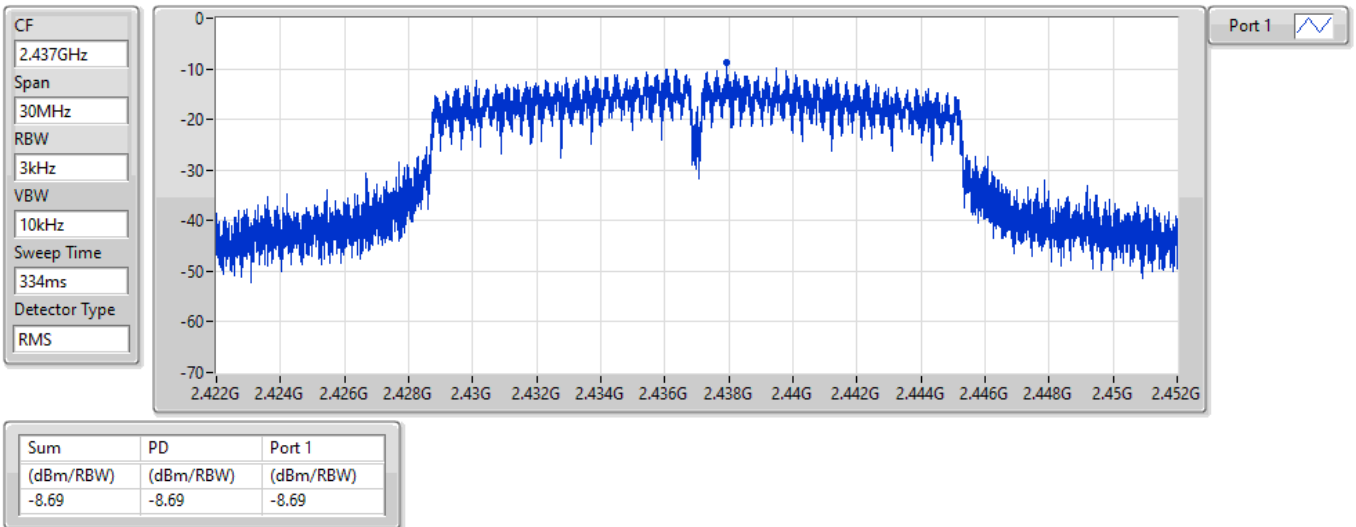
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802.11g_Nss1,(6Mbps)_1TX

PSD

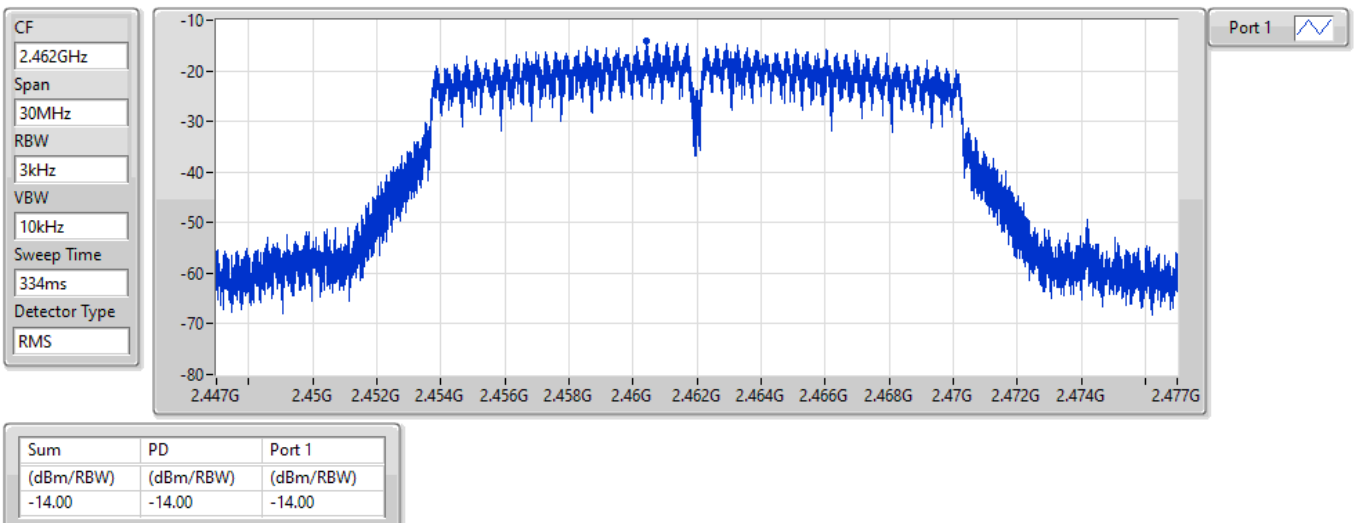
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802.11g_Nss1,(6Mbps)_1TX

PSD

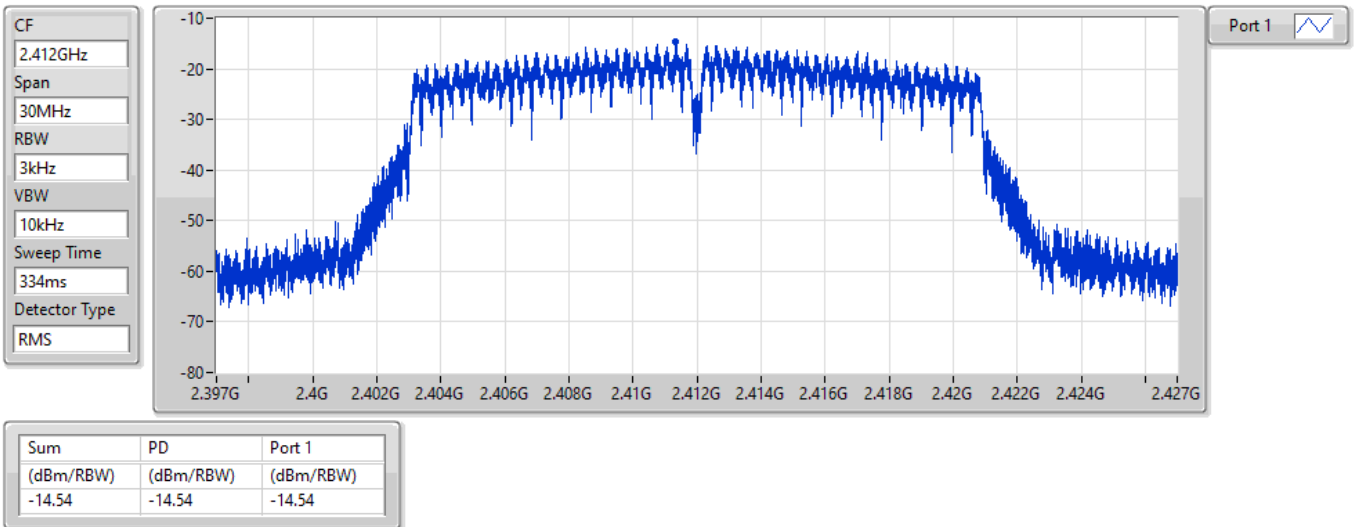
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802.11n HT20_Nss1,(MCS0)_1TX

PSD

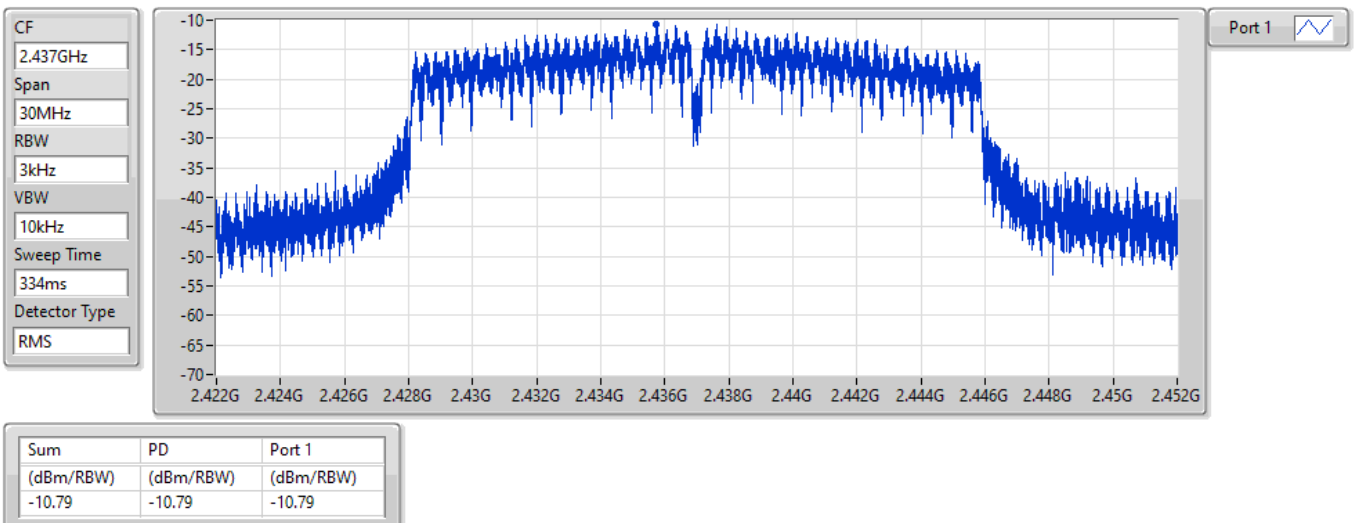
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802.11n HT20_Nss1,(MCS0)_1TX

PSD

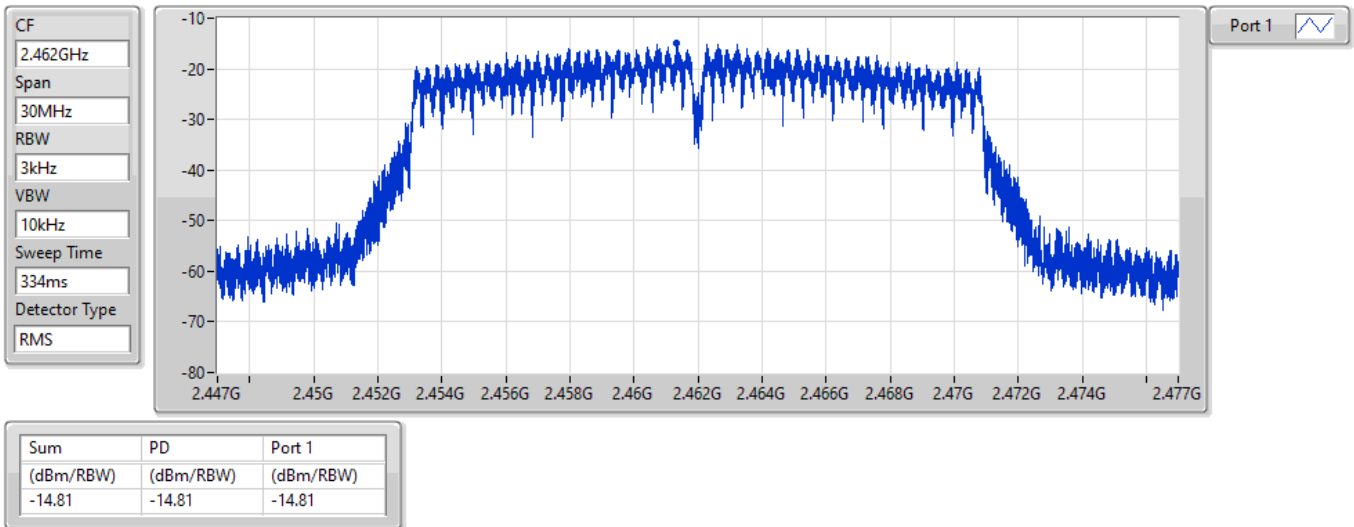
2437MHz



802.11n HT20_Nss1,(MCS0)_1TX

PSD

2462MHz





Unwanted Emissions (Below 1GHz)

Modulation	11b	Test Freq. (MHz)	2437
Polarization	Horizontal		
Test By :Brad Wu Temperature(°C):23 Humidity(%):66			
Level (dBUV/m)			



Modulation	11b	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Brad Wu Temperature(°C):23 Humidity(%):66			
Level (dBuV/m)			



Unwanted Emission (Above 1GHz) for 11b

Modulation	11b	Test Freq. (MHz)	2412
Polarization	Horizontal		
Test By :Brad Wu Temperature(°C):23 Humidity(%):68			
Level (dBuV/m)			



Modulation	11b	Test Freq. (MHz)	2412
Polarization	Vertical		
Test By :Brad Wu Temperature(°C):23 Humidity(%):68			
Level (dBUV/m)			



Modulation	11b	Test Freq. (MHz)	2437
Polarization	Horizontal		
Test By :Brad Wu Temperature(°C):23 Humidity(%):68			
Level (dBUV/m)			



Modulation	11b	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Brad Wu Temperature(°C):23 Humidity(%):68			
Level (dBuV/m)			



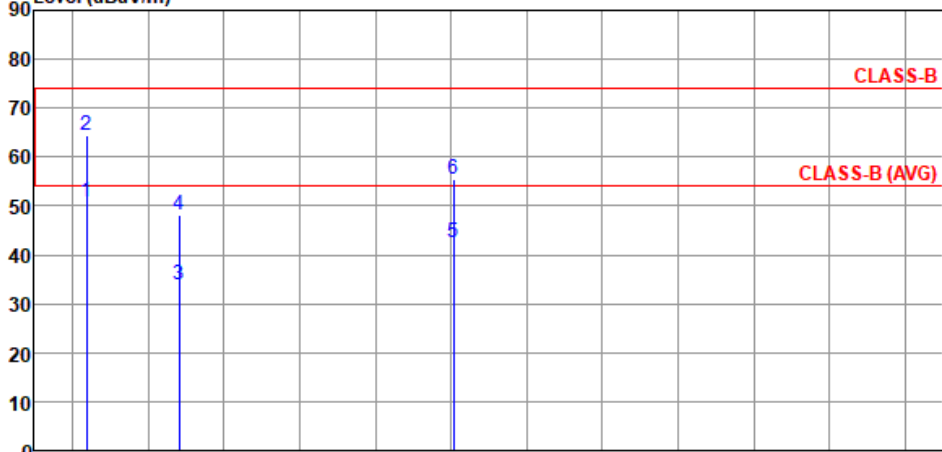
Modulation	11b	Test Freq. (MHz)	2462
Polarization	Horizontal		
Test By :Brad Wu Temperature(°C):23 Humidity(%):68			
Level (dBuV/m)			



Modulation	11b	Test Freq. (MHz)	2462
Polarization	Vertical		
Test By :Brad Wu Temperature(°C):23 Humidity(%):68			
Level (dBuV/m) </			



Unwanted Emissions (Above 1GHz) for 11g

Modulation	11g	Test Freq. (MHz)	2412						
Polarization	Horizontal								
Test By :Brad Wu Temperature(°C):23 Humidity(%):68									
Level (dBuV/m)  Frequency (MHz)									
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	2390.00	50.65	54.00	-3.35	53.40	-2.75	Average	371	274
2	2390.00	64.31	74.00	-9.69	67.06	-2.75	Peak	371	274
3	4824.00	33.82	54.00	-20.18	29.68	4.14	Average	286	95
4	4824.00	48.21	74.00	-25.79	44.07	4.14	Peak	286	95
5	12060.00	42.54	54.00	-11.46	28.75	13.79	Average	100	22
6	12060.00	55.61	74.00	-18.39	41.82	13.79	Peak	100	22

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m)
*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(°C):23 Humidity(%):68			
Level (dBUV/m)			



Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		
Test By :Brad Wu Temperature(°C):23 Humidity(%):68			
Level (dBUV/m) </			



Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Brad Wu Temperature(°C):23 Humidity(%):68			
Level (dBUV/m)			



Modulation	11g	Test Freq. (MHz)	2462
Polarization	Horizontal		
Test By :Brad Wu Temperature(°C):23 Humidity(%):68			
Level (dBUV/m) <			



Modulation	11g	Test Freq. (MHz)	2462																																																																						
Polarization	Vertical																																																																								
Test By :Brad Wu Temperature(°C):23 Humidity(%):68																																																																									
<table><tr><th></th><th>Freq. MHz</th><th>Emission level dBuV/m</th><th>Limit dBuV/m</th><th>Margin dB</th><th>SA reading dBuV</th><th>Factor dB/m</th><th>Remark</th><th>ANT High cm</th><th>Turn Table deg</th></tr><tr><td>1</td><td>2483.50</td><td>40.21</td><td>54.00</td><td>-13.79</td><td>42.91</td><td>-2.70</td><td>Average</td><td>179</td><td>34</td></tr><tr><td>2</td><td>2483.50</td><td>56.64</td><td>74.00</td><td>-17.36</td><td>59.34</td><td>-2.70</td><td>Peak</td><td>179</td><td>34</td></tr><tr><td>3</td><td>4924.00</td><td>35.22</td><td>54.00</td><td>-18.78</td><td>31.16</td><td>4.06</td><td>Average</td><td>255</td><td>319</td></tr><tr><td>4</td><td>4924.00</td><td>49.42</td><td>74.00</td><td>-24.58</td><td>45.36</td><td>4.06</td><td>Peak</td><td>255</td><td>319</td></tr><tr><td>5</td><td>7386.00</td><td>38.26</td><td>54.00</td><td>-15.74</td><td>29.01</td><td>9.25</td><td>Average</td><td>100</td><td>28</td></tr><tr><td>6</td><td>7386.00</td><td>50.85</td><td>74.00</td><td>-23.15</td><td>41.60</td><td>9.25</td><td>Peak</td><td>100</td><td>28</td></tr></table>					Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg	1	2483.50	40.21	54.00	-13.79	42.91	-2.70	Average	179	34	2	2483.50	56.64	74.00	-17.36	59.34	-2.70	Peak	179	34	3	4924.00	35.22	54.00	-18.78	31.16	4.06	Average	255	319	4	4924.00	49.42	74.00	-24.58	45.36	4.06	Peak	255	319	5	7386.00	38.26	54.00	-15.74	29.01	9.25	Average	100	28	6	7386.00	50.85	74.00	-23.15	41.60	9.25	Peak	100	28
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB/m	Remark	ANT High cm	Turn Table deg																																																																
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Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).																																																																									



Unwanted Emissions (Above 1GHz) for HT20

Modulation	HT20		Test Freq. (MHz)		2412	
Polarization	Horizontal					
Test By :Brad Wu Temperature(°C):23 Humidity(%):68						
Level (dBUV/m) </						



Modulation	HT20	Test Freq. (MHz)	2412																																																																						
Polarization	Vertical																																																																								
Test By :Brad Wu Temperature(°C):23 Humidity(%):68																																																																									
<table><tr><th></th><th>Freq. MHz</th><th>Emission level dBUV/m</th><th>Limit dBUV/m</th><th>Margin dB</th><th>SA reading dBUV</th><th>Factor dB/m</th><th>Remark</th><th>ANT High cm</th><th>Turn Table deg</th></tr><tr><td>1</td><td>2390.00</td><td>40.52</td><td>54.00</td><td>-13.48</td><td>43.27</td><td>-2.75</td><td>Average</td><td>178</td><td>26</td></tr><tr><td>2</td><td>2390.00</td><td>54.94</td><td>74.00</td><td>-19.06</td><td>57.69</td><td>-2.75</td><td>Peak</td><td>178</td><td>26</td></tr><tr><td>3</td><td>4824.00</td><td>34.92</td><td>54.00</td><td>-19.08</td><td>30.78</td><td>4.14</td><td>Average</td><td>248</td><td>315</td></tr><tr><td>4</td><td>4824.00</td><td>49.15</td><td>74.00</td><td>-24.85</td><td>45.01</td><td>4.14</td><td>Peak</td><td>248</td><td>315</td></tr><tr><td>5</td><td>12060.00</td><td>42.46</td><td>54.00</td><td>-11.54</td><td>28.67</td><td>13.79</td><td>Average</td><td>100</td><td>24</td></tr><tr><td>6</td><td>12060.00</td><td>55.58</td><td>74.00</td><td>-18.42</td><td>41.79</td><td>13.79</td><td>Peak</td><td>100</td><td>24</td></tr></table>					Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB/m	Remark	ANT High cm	Turn Table deg	1	2390.00	40.52	54.00	-13.48	43.27	-2.75	Average	178	26	2	2390.00	54.94	74.00	-19.06	57.69	-2.75	Peak	178	26	3	4824.00	34.92	54.00	-19.08	30.78	4.14	Average	248	315	4	4824.00	49.15	74.00	-24.85	45.01	4.14	Peak	248	315	5	12060.00	42.46	54.00	-11.54	28.67	13.79	Average	100	24	6	12060.00	55.58	74.00	-18.42	41.79	13.79	Peak	100	24
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB/m	Remark	ANT High cm	Turn Table deg																																																																
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Note 1: Emission Level (dBUV/m) = SA Reading (dBUV) + Factor* (dB/m) *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(°C):23 Humidity(%):68			
Level (dBUV/m)			



Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Brad Wu Temperature(°C):23 Humidity(%):68			
Level (dBUV/m) </			



Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Horizontal		
Test By :Brad Wu Temperature(°C):23 Humidity(%):68			
Level (dBUV/m) </			



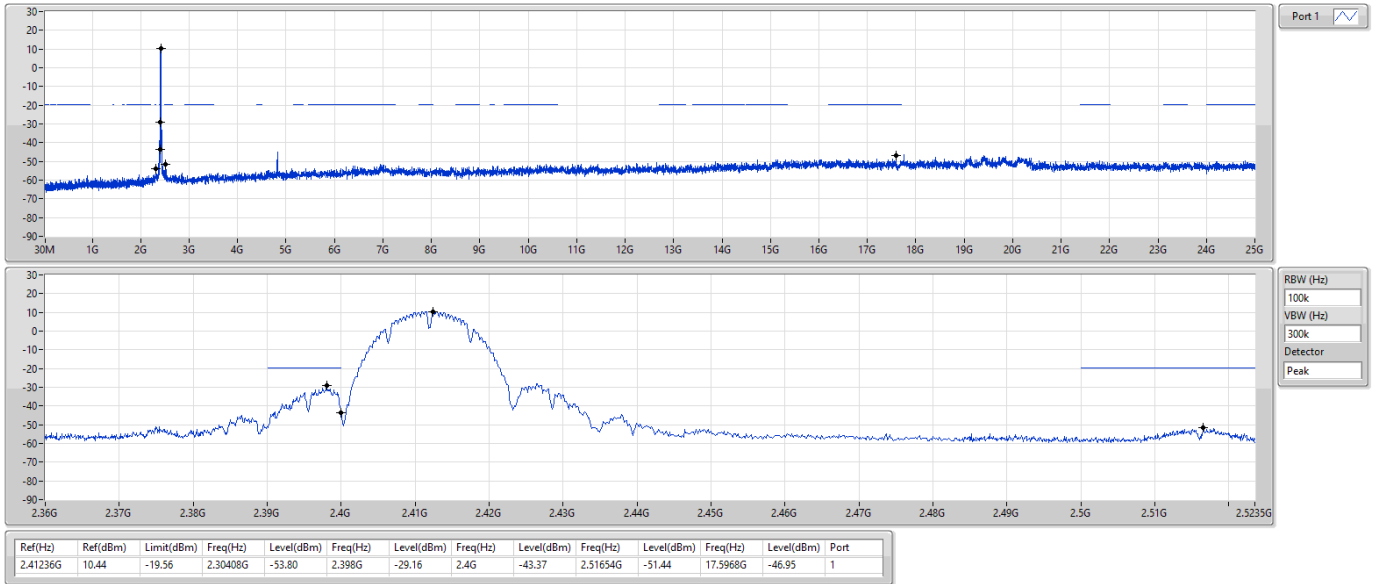
Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Vertical		
Test By :Brad Wu Temperature(°C):23 Humidity(%):68			
Level (dBuV/m)			



802.11b_Nss1,(1Mbps)_1TX

CSEndB

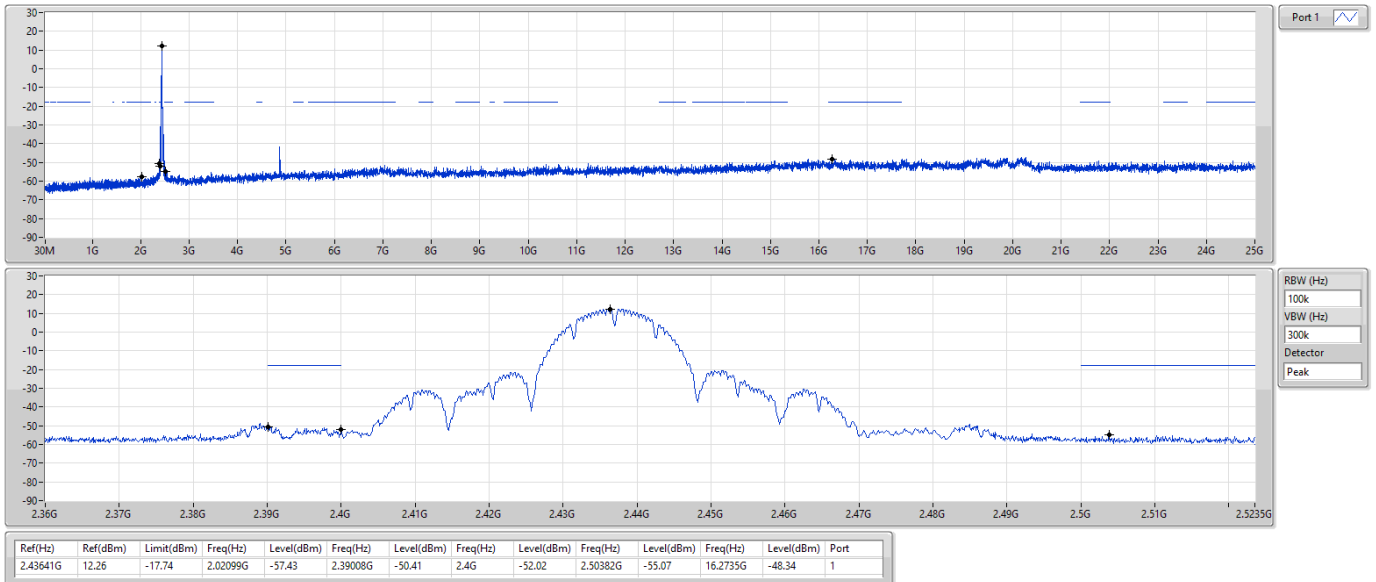
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802.11b_Nss1,(1Mbps)_1TX

CSEndB

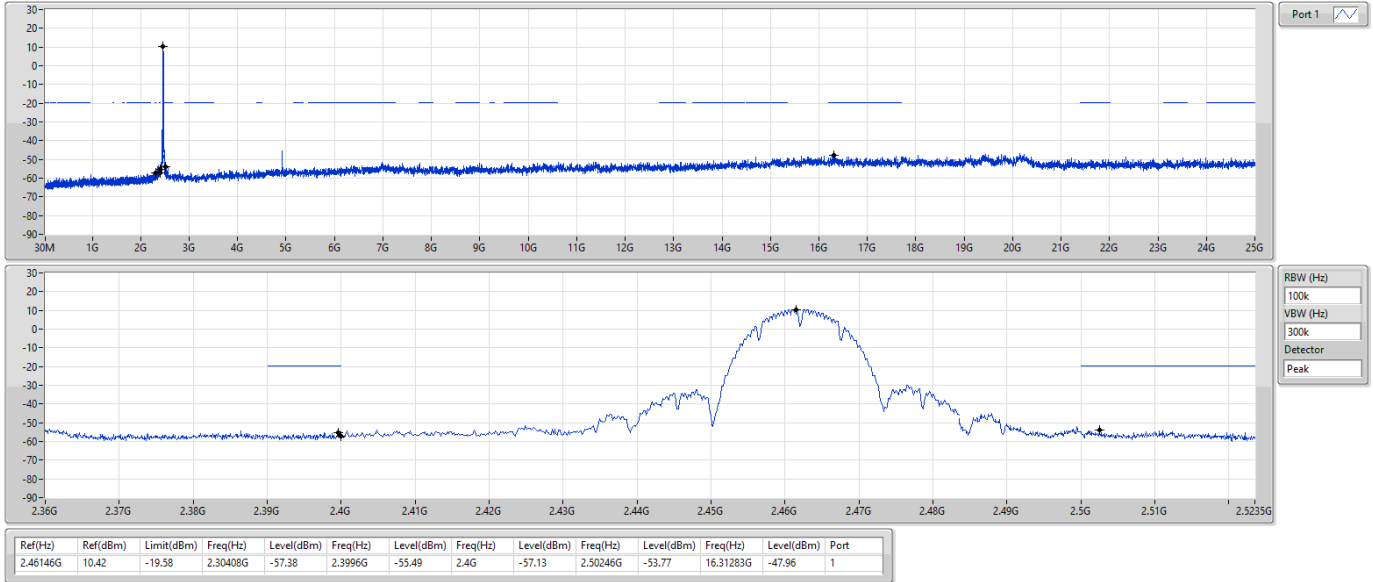
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802.11b_Nss1,(1Mbps)_1TX

CSENdB

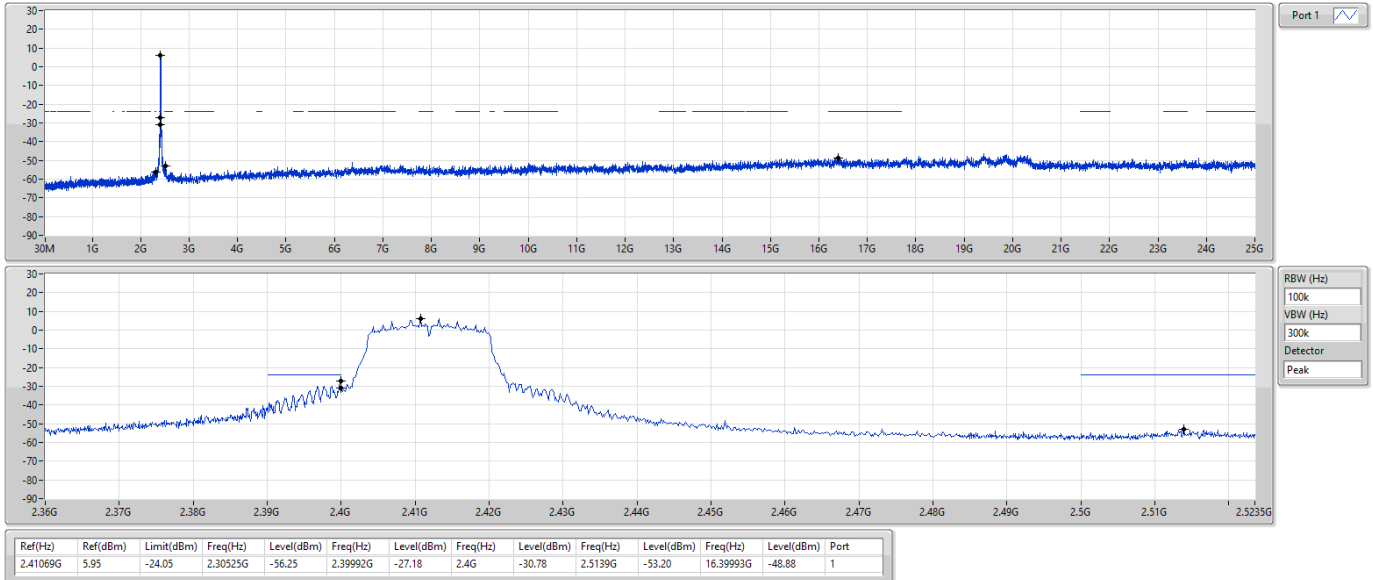
2462MHz



802.11g_Nss1,(6Mbps)_1TX

CSENdB

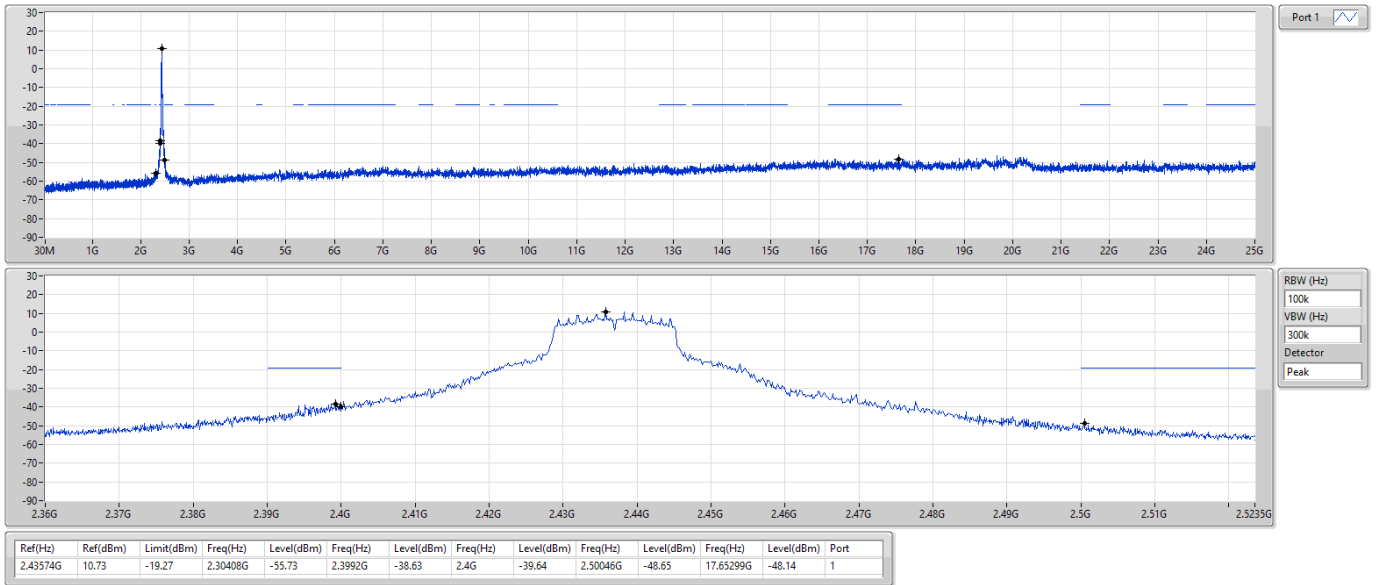
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802.11g_Nss1,(6Mbps)_1TX

2437MHz

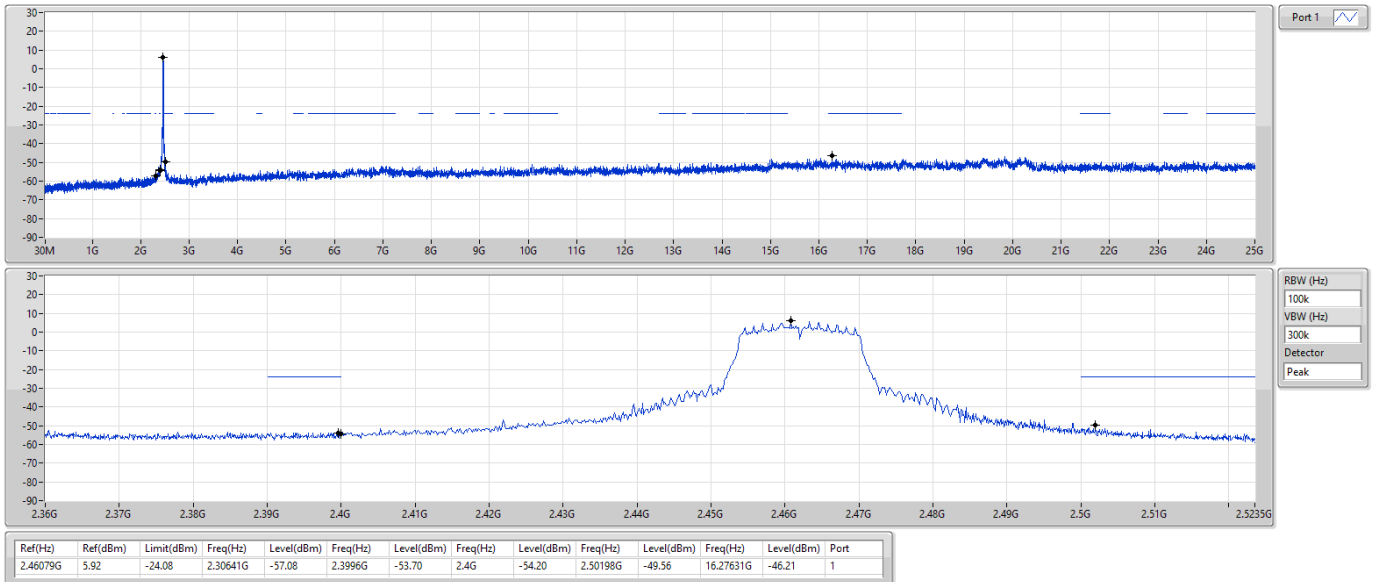
CSEndB



802.11g_Nss1,(6Mbps)_1TX

2462MHz

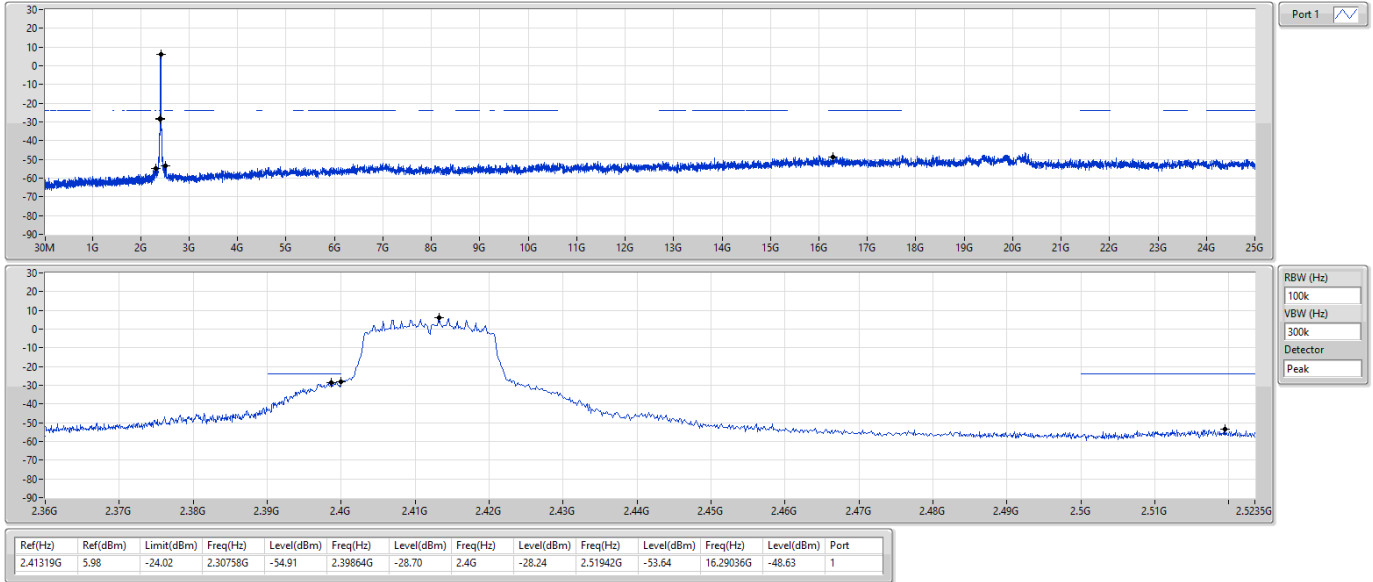
CSEndB



802.11n HT20_Nss1,(MCS0)_1TX

CSENdB

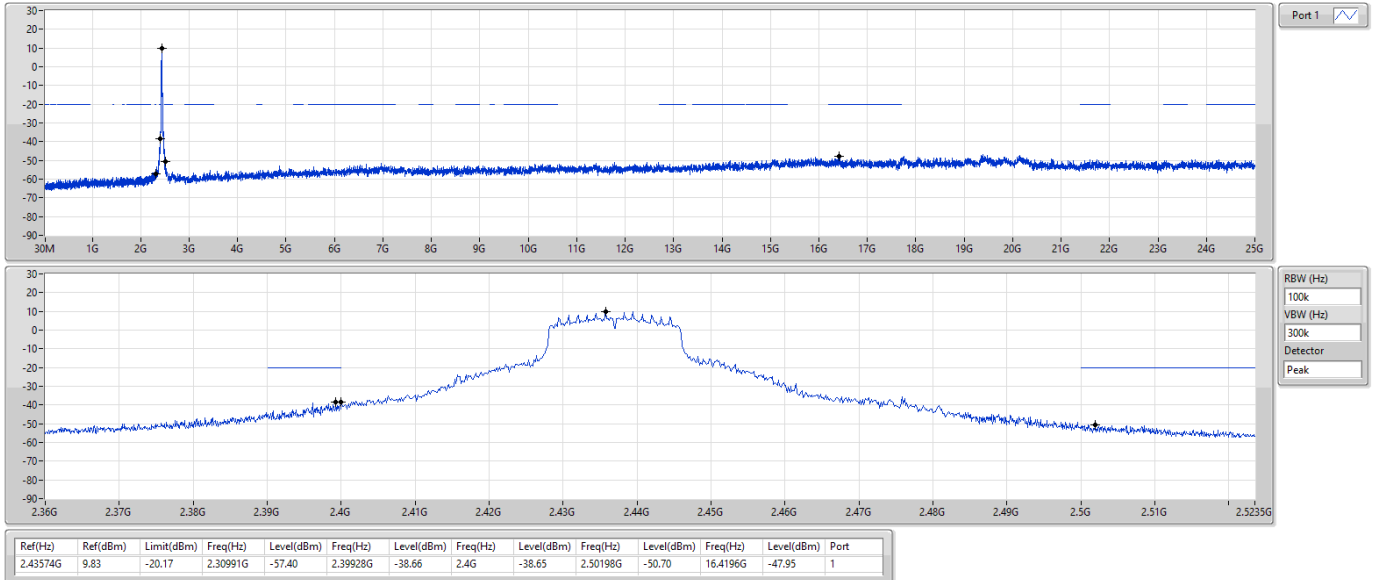
2412MHz



802.11n HT20_Nss1,(MCS0)_1TX

CSENdB

2437MHz

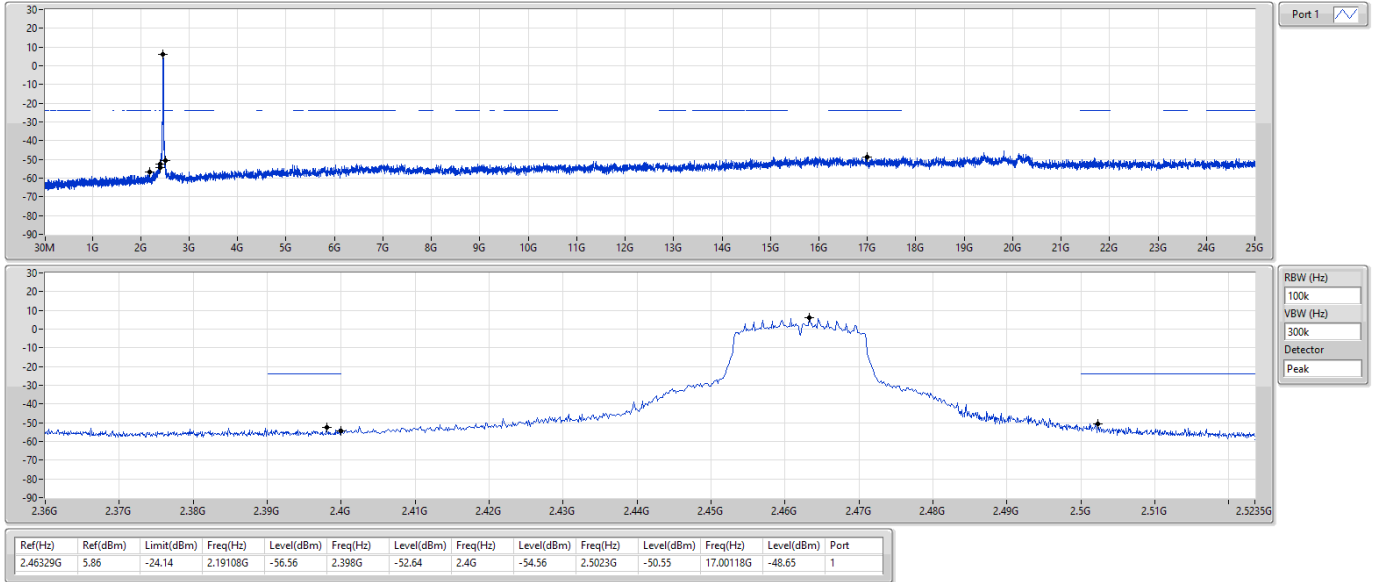




802.11n HT20_Nss1,(MCS0)_1TX

CSEndB

2462MHz



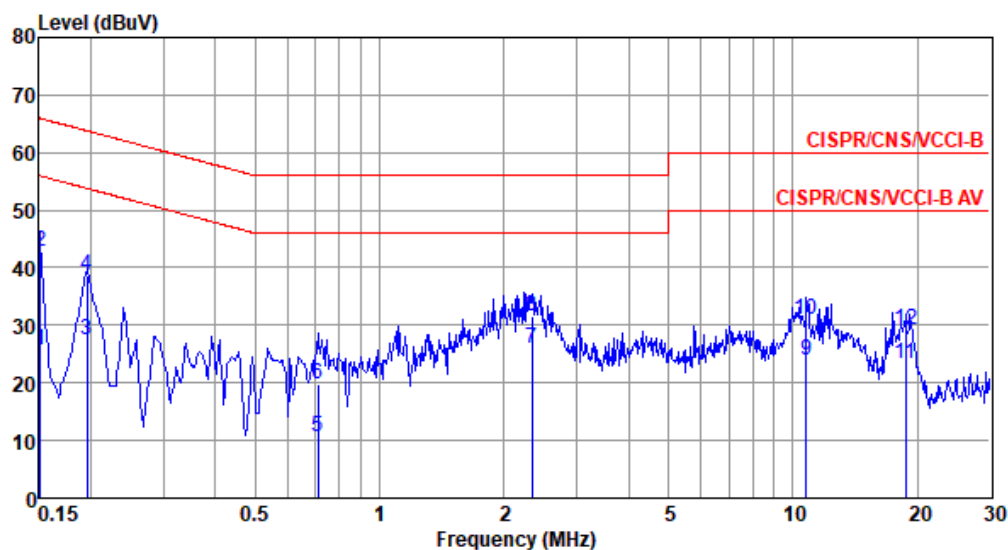


Modulation Mode	11b	Test Freq. (MHz)	2437
Power Phase	Line		

Test by : Joe Liao

Temperature: 21°C

Humidity: 64%



	Freq	Level	Limit	Over	Read	Factor	Cable	Aux	Remark
	MHz	dBuV	Line	Limit	Level	dB	loss	dB	
			dBuV	dB	dBuV				
1	0.151	25.59	55.96	-30.37	15.83	9.68	0.08	0.00	Average
2	0.151	42.84	65.96	-23.12	33.08	9.68	0.08	0.00	QP
3	0.195	27.48	53.80	-26.32	17.72	9.68	0.08	0.00	Average
4	0.195	38.74	63.80	-25.06	28.98	9.68	0.08	0.00	QP
5	0.708	10.67	46.00	-35.33	0.86	9.68	0.13	0.00	Average
6	0.708	19.89	56.00	-36.11	10.08	9.68	0.13	0.00	QP
7*	2.334	25.95	46.00	-20.05	16.06	9.69	0.20	0.00	Average
8	2.334	31.66	56.00	-24.34	21.77	9.69	0.20	0.00	QP
9	10.790	24.05	50.00	-25.95	13.84	9.74	0.47	0.00	Average
10	10.790	31.08	60.00	-28.92	20.87	9.74	0.47	0.00	QP
11	18.721	23.21	50.00	-26.79	12.84	9.73	0.64	0.00	Average
12	18.721	29.36	60.00	-30.64	18.99	9.73	0.64	0.00	QP

Note 1: Level (dBUV) = Read Level (dBUV) + LISN Factor (dB) + Cable Loss (dB) + Aux (dB).

2: Over Limit (dB) = Level (dBUV) - Limit Line (dBUV).



AC Power Line Conducted Emissions

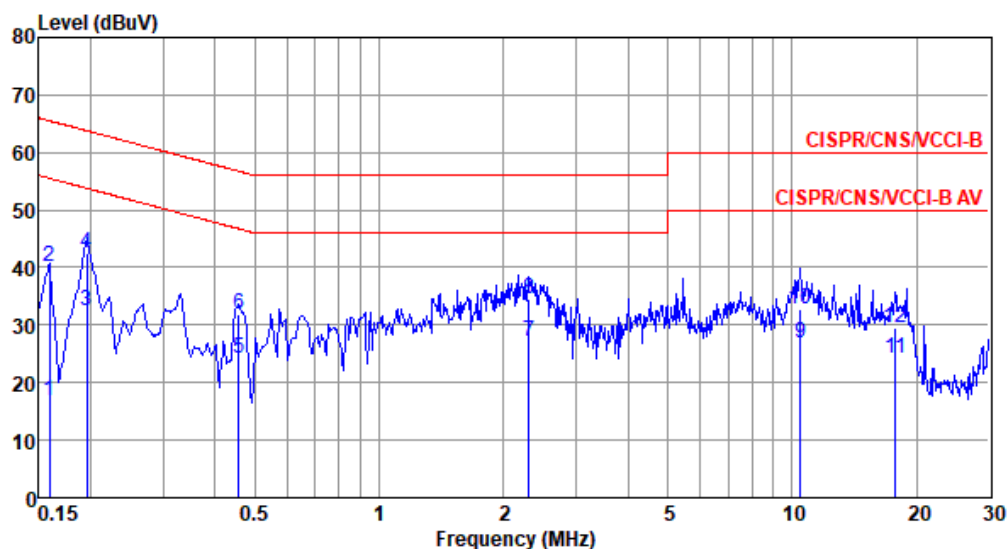
Appendix F

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

Test by : Joe Liao

Temperature: 21°C

Humidity: 64%



	Freq	Level	Limit	Over	Read	Factor	Cable	Aux	Remark
	MHz	dBuV	Line	Limit	Level	dB	loss	dB	
			dBuV	dB	dBuV		dB		
1	0.159	16.68	55.52	-38.84	6.99	9.61	0.08	0.00	Average
2	0.159	40.27	65.52	-25.25	30.58	9.61	0.08	0.00	QP
3	0.195	32.58	53.80	-21.22	22.89	9.61	0.08	0.00	Average
4	0.195	42.47	63.80	-21.33	32.78	9.61	0.08	0.00	QP
5	0.456	24.31	46.76	-22.45	14.61	9.61	0.09	0.00	Average
6	0.456	31.79	56.76	-24.97	22.09	9.61	0.09	0.00	QP
7*	2.309	27.18	46.00	-18.82	17.36	9.62	0.20	0.00	Average
8	2.309	34.55	56.00	-21.45	24.73	9.62	0.20	0.00	QP
9	10.452	26.76	50.00	-23.24	16.60	9.70	0.46	0.00	Average
10	10.452	32.69	60.00	-27.31	22.53	9.70	0.46	0.00	QP
11	17.755	24.06	50.00	-25.94	13.67	9.77	0.62	0.00	Average
12	17.755	29.40	60.00	-30.60	19.01	9.77	0.62	0.00	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB) + Aux (dB).

2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).