

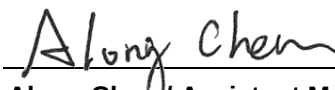
FCC Test Report

FCC ID : HDC-17600073
Equipment : WiFi 6E Mesh AP
Model No. : SDG-8632
Brand Name : Adtran
Applicant : Adtran
Address : 901 Explorer Boulevard, Huntsville, Alabama,
United States, 35806-2807
Standard : 47 CFR FCC Part 15.247
Received Date : Jul. 19, 2023
Tested Date : Aug. 08 ~ Sep. 08, 2023

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:

Approved by:


Along Chen / Assistant Manager

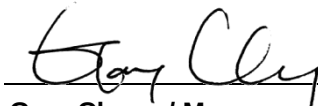

Gary Chang / Manager

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Release Record

Report No.	Version	Description	Issued Date
FR371902AC	Rev. 01	Initial issue	Dec. 22, 2023

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	AC Power Line Conducted Emission	[dBuV]: 0.437MHz 38.67 (Margin -8.44dB) - AV	Pass
15.247(d) 15.209	Unwanted Emissions	[dBuV/m at 3m]: 2390.00MHz 73.89 (Margin -0.11dB) – PK 2483.50MHz 53.89 (Margin -0.11dB) - AV	Pass
15.247(b)(3)	Conducted Output Power	Max Power [dBm]: <i>Non-beamforming mode</i> 27.40 <i>Beamforming mode</i> 26.05	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]	4	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	4	6-54 Mbps
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	4	MCS 0-31
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	4	MCS 0-31
2400-2483.5	ax (HE20)	2412-2462	1-11 [11]	4	MCS 0-11
2400-2483.5	ax (HE40)	2422-2452	3-9 [7]	4	MCS 0-11

Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.
 Note 2: DSSS-DBPSK, DQPSK, CCK modulation
 OFDM / OFDMA- BPSK, QPSK, 16QAM, 64QAM, 256QAM and 1024QAM modulation.
 Note 3: 802.11ax supports beamforming function.

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	Galtronics USA, Inc	Antenna_6DB1	Dipole	UFL	3.990	--	--	--	--
2	Galtronics USA, Inc	Antenna_6DB2	Dipole	UFL	2.964	--	--	--	--
3	Galtronics USA, Inc	Antenna_6DB3	Dipole	UFL	3.680	--	--	--	--
4	Galtronics USA, Inc	Antenna_6DB4	Dipole	UFL	3.471	--	--	--	--
5	Galtronics USA, Inc	Antenna_5G1	Dipole	UFL	--	2.894	2.729	3.984	3.437
6	Galtronics USA, Inc	Antenna_5G2	Dipole	UFL	--	3.193	3.314	3.512	3.464
7	Galtronics USA, Inc	Antenna_5G3	Dipole	UFL	--	2.683	3.289	3.524	4.705
8	Galtronics USA, Inc	Antenna_5G4	Dipole	UFL	--	3.121	3.121	3.305	3.224
9	Galtronics USA, Inc	Zero wait DFS	PIFA	NA	--	--	4.783	4.386	--

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	15Vdc from adapter
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1.1.4 Accessories

Accessories		
No.	Equipment	Description
1	AC Adapter	Brand: LUCENT TRANS Model: 1A78 I/P: 100-240Vac, 50/60Hz, 1.2A O/P: 15V~3.0A, 45.0W Power Line: USB 1.8m non-shielded without core
	RJ45 cable	2m non-shielded without core

1.1.5 Channel List

Frequency band (MHz)		2400~2483.5	
802.11 b / g / n HT20 / ax HE20		802.11n HT40 / ax HE40	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
1	2412	3	2422
2	2417	4	2427
3	2422	5	2432
4	2427	6	2437
5	2432	7	2442
6	2437	8	2447
7	2442	9	2452
8	2447	---	---
9	2452	---	---
10	2457	---	---
11	2462	---	---

1.1.6 Test Tool and Duty Cycle

Test Tool	Non-beamforming: QATool, Version: Ulv2.88_DLLv6.93_ap_2022.01.04(V14)c Beamforming: PuTTY, Version: 0.60				
Duty Cycle and Duty Factor	Mode	Non-beamforming		Beamforming	
		Duty cycle (%)	Duty factor (dB)	Duty cycle (%)	Duty factor (dB)
	11b	100.00%	0.00	---	---
	11g	98.97%	0.04	---	---
	ax HE20	98.03%	0.09	93.59%	0.29
	ax HE40	95.98%	0.18	96.48%	0.16

1.1.7 Power Index of Test Tool

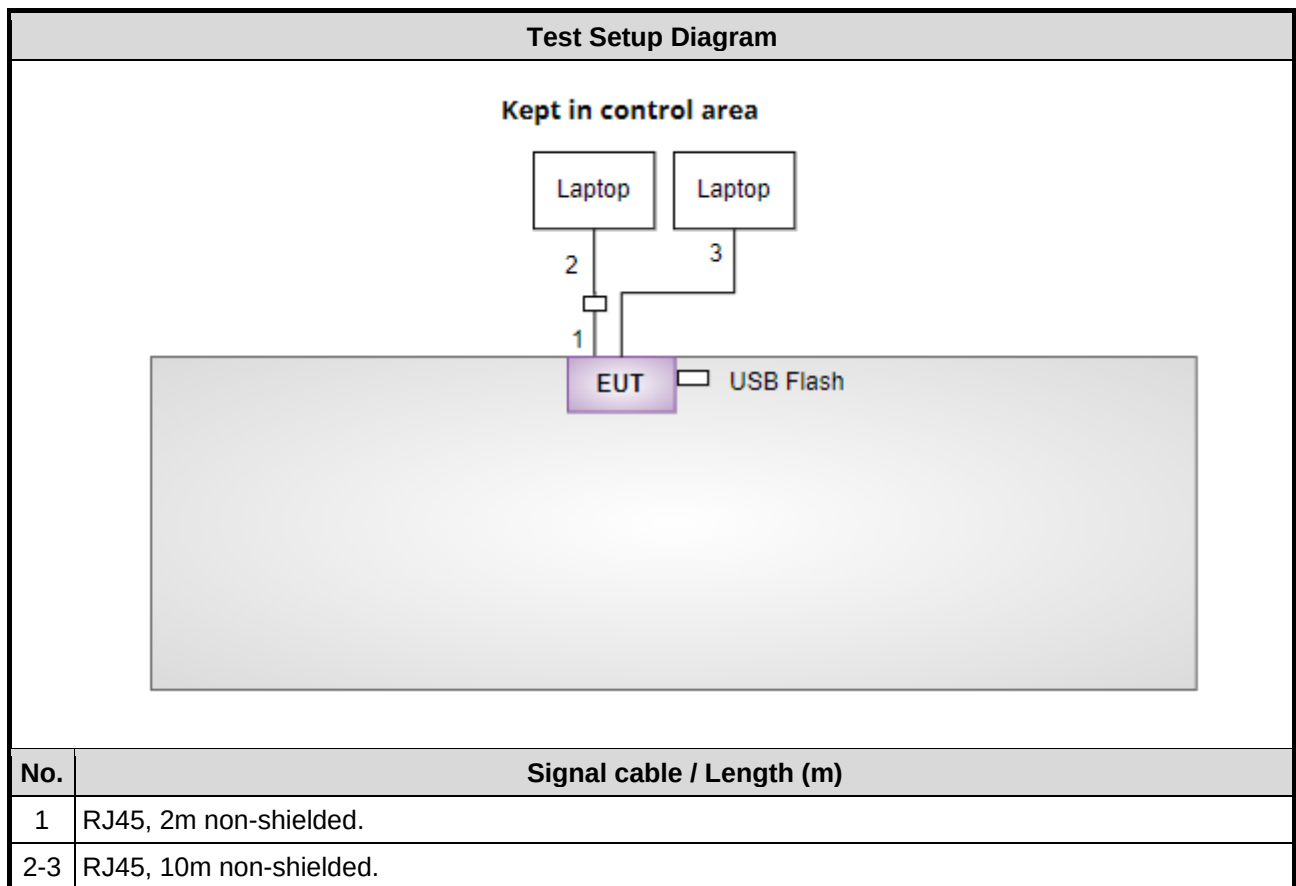
Modulation Mode	Test Frequency (MHz)	Power Index	
		Non-beamforming	Beamforming
11b	2412	18.5	---
11b	2437	19	---
11b	2462	18.5	---
11g	2412	18	---
11g	2437	19	---
11g	2462	17	---
ax HE20	2412	16	23
ax HE20	2437	19	36
ax HE20	2462	14	20
ax HE40	2422	14	25
ax HE40	2437	17	34
ax HE40	2452	12	23

1.2 Local Support Equipment List

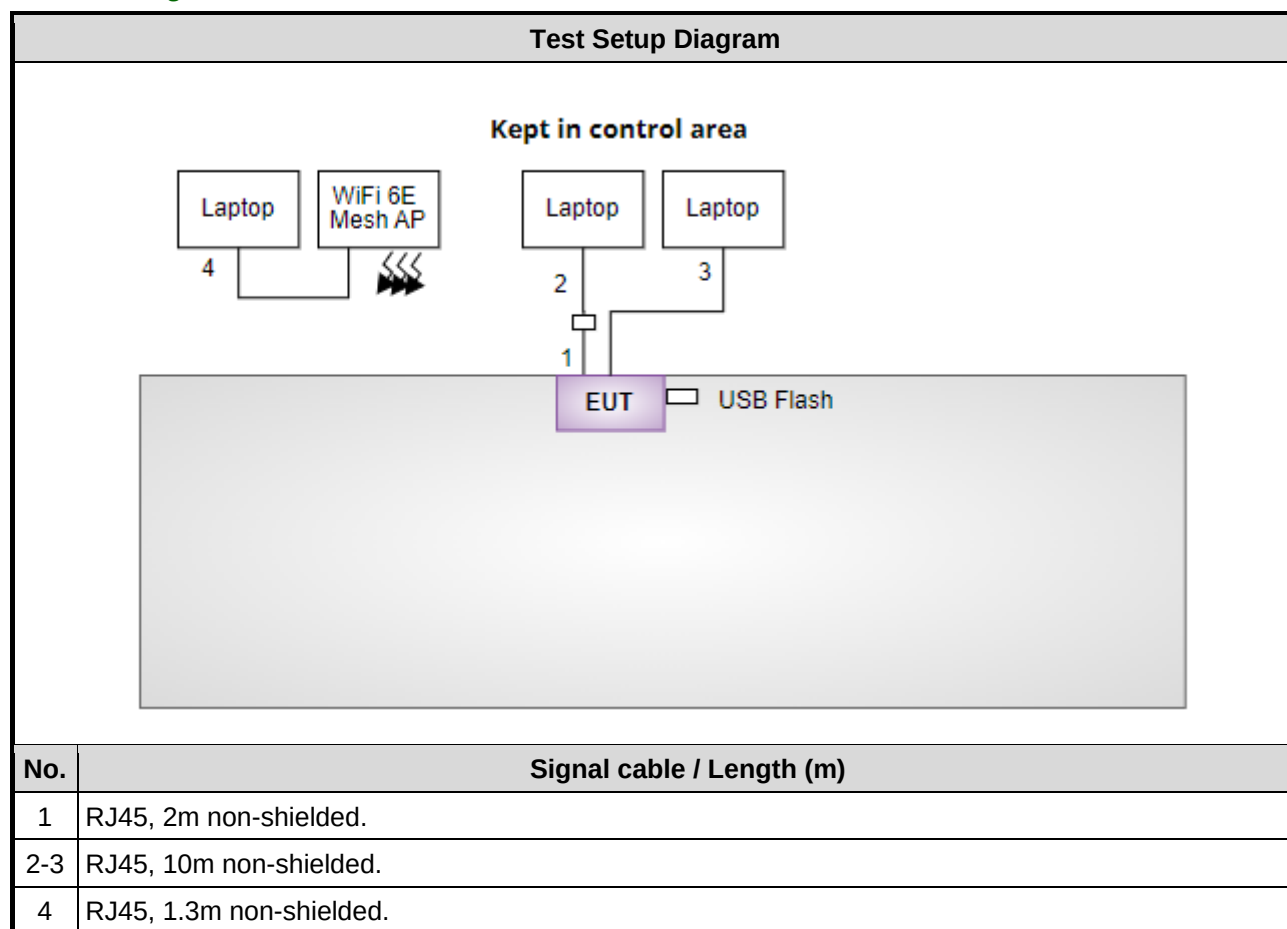
Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Laptop	DELL	Latitude 5400	DoC	---
2	Laptop	DELL	Latitude E5470	DoC	---
3	USB Flash	Transcend(USB 3.0)	JetFlash 700	---	---
4	Laptop	DELL	Latitude E5470	DoC	For Beamforming mode only.
5	WiFi 6E Mesh AP	Adtran	SDG-8632	---	For Beamforming mode only. (Provided by applicant.)

1.3 Test Setup Chart

Non-beamforming mode



Beamforming mode



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Sep. 06, 2023				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Feb. 17, 2023	Feb. 16, 2024
LISN	R&S	ENV216	101579	May 09, 2023	May 08, 2024
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127667	Jan. 03, 2023	Jan. 02, 2024
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 17, 2022	Oct. 16, 2023
50 ohm terminal (Support Unit)	NA	50	01	Jun. 14, 2023	Jun. 13, 2024
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	Aug. 08 ~ Aug. 25, 2023				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Mar. 03, 2023	Mar. 02, 2024
Spectrum Analyzer	R&S	FSV40	101498	Nov. 21, 2022	Nov. 20, 2023
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 01, 2022	Oct. 31, 2023
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jul. 31, 2023	Jul. 30, 2024
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Nov. 25, 2022	Nov. 24, 2023
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Oct. 27, 2022	Oct. 26, 2023
Preamplifier	EMC	EMC02325	980225	Jun. 28, 2023	Jun. 27, 2024
Preamplifier	EMC	EMC118A45SE	980898	Jul. 14, 2023	Jul. 13, 2024
Preamplifier	EMC	EMC184045SE	980903	Jul. 17, 2023	Jul. 16, 2024
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 04, 2022	Oct. 03, 2023
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 04, 2022	Oct. 03, 2023
LF cable 11M	EMC	EMCCFD400-NW-N W-11000	200801	Oct. 04, 2022	Oct. 03, 2023
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 04, 2022	Oct. 03, 2023
RF Cable	EMC	EMC104-35M-35M-8000	210920	Oct. 04, 2022	Oct. 03, 2023
RF Cable	EMC	EMC104-35M-35M-3000	210922	Oct. 04, 2022	Oct. 03, 2023
HIGHPASS FILTER 3.1-18G	WHK	WHK3.1/18G-10SS	39	Oct. 06, 2022	Oct. 05, 2023
Attenuator	Pasternack	PE7005-10	10-1	Oct. 06, 2022	Oct. 05, 2023
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	Sep. 05 ~ Sep. 08, 2023				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101910	Apr. 14, 2023	Apr. 13, 2024
Power Meter	Anritsu	ML2495A	1241002	Nov. 23, 2022	Nov. 22, 2023
Power Sensor	Anritsu	MA2411B	1207366	Nov. 23, 2022	Nov. 22, 2023
Attenuator	Pasternack	PE7005-10	10-2	Oct. 06, 2022	Oct. 05, 2023
Measurement Software	Sporton	SENSE-15247_DTS	V5.11	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
FCC KDB 662911 D01 Multiple Transmitter Output v02r01

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 ≤ 1GHz	±3.41 dB
Unwanted Emission > 1GHz	±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
- ISSED#: 10807A
- CAB identifier: TW2732

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Non-beamforming mode				
AC Power Line Conducted Emission	11b	2437	6 Mbps	---
Unwanted Emissions ≤ 1GHz	11b	2437	6 Mbps	---
Unwanted Emissions >1GHz	11b	2412 / 2437 / 2462	1 Mbps	---
Conducted Output Power	11g	2412 / 2437 / 2462	6 Mbps	
6dB bandwidth	ax HE20	2412 / 2437 / 2462	MCS 0	
Power spectral density	ax HE40	2422 / 2437 / 2452	MCS 0	
Beamforming mode				
AC Power Line Conducted Emission	ax HE20	2437	MCS 0	---
Unwanted Emissions ≤1GHz	ax HE20	2437	MCS 0	---
Unwanted Emissions >1GHz	ax HE20 ax HE40	2412 / 2437 / 2462 2422 / 2437 / 2452	MCS 0 MCS 0	---
Conducted Output Power				
6dB bandwidth				
Power spectral density				
NOTE:				
1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The Z-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

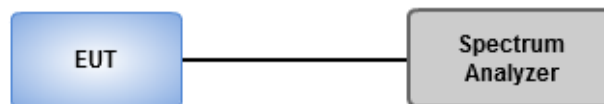
6dB Bandwidth

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	25-26°C / 65-66%	Tested By	Akun Chung
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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

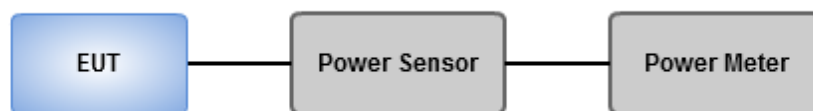
Fixed, point to point operations

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	25-26°C / 65-66%	Tested By	Akun Chung
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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.

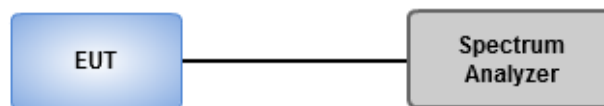
Average PSD, duty cycle $\geq 98\%$

1. Set the RBW = 3 kHz, VBW = 10 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 = 3 kHz, VBW = 10 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.
6. Add $10 \log (1/x)$, where x is the duty cycle.

3.3.3 Test Setup



3.3.4 Test Results

Ambient Condition	25-26°C / 65-66%	Tested By	Akun Chung
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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

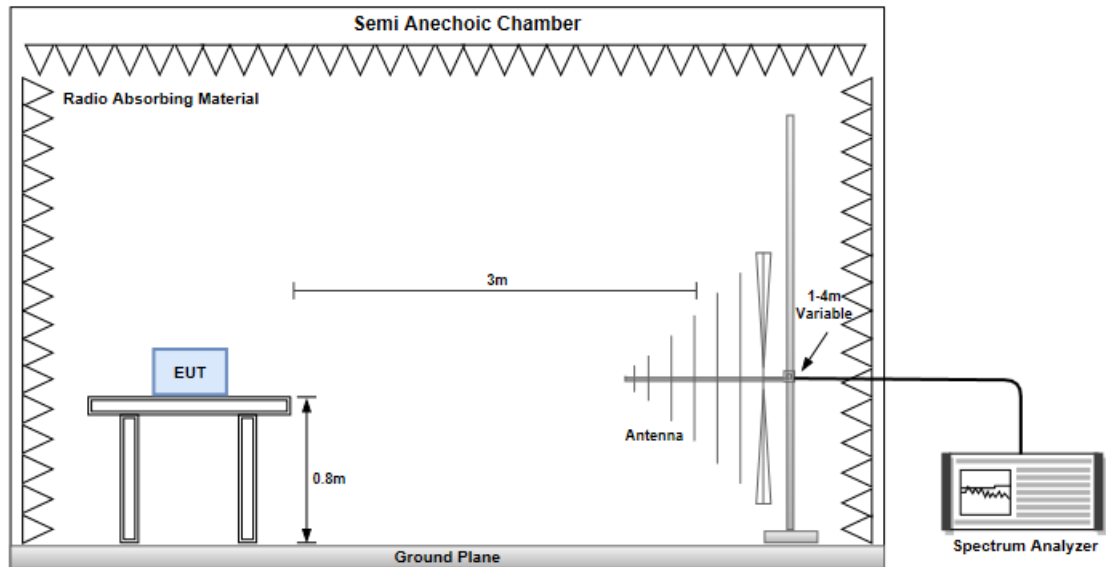
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

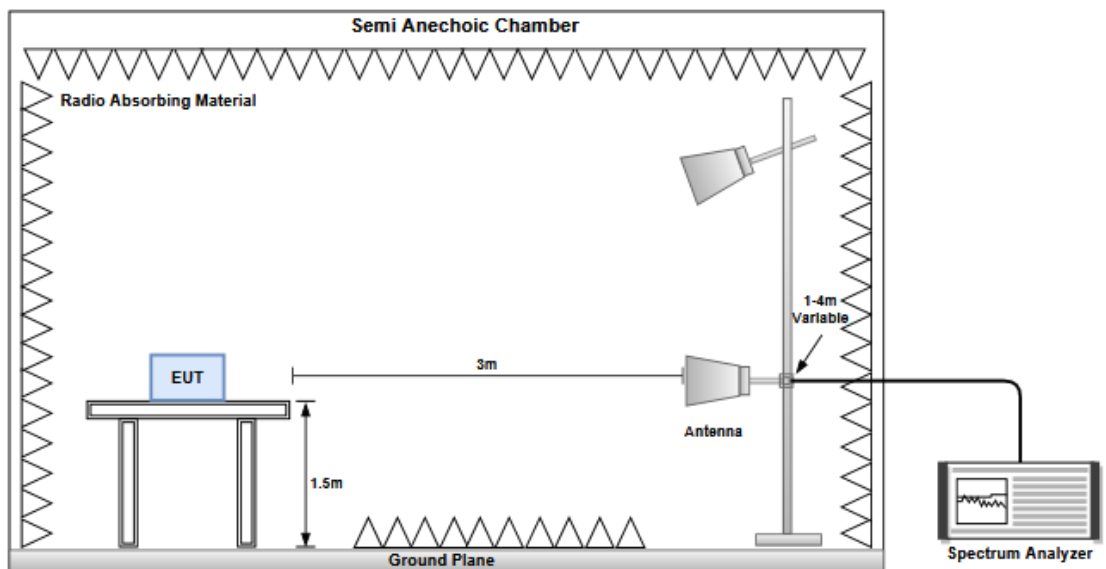
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 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 20 dB relative to the maximum in-band peak PSD level in 100 kHz.

3.5.2 Test Procedures

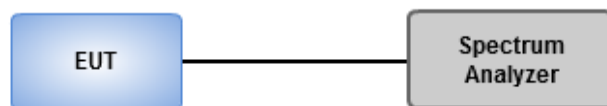
Reference level measurement

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	25-26°C / 65-66%	Tested By	Akun Chung
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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

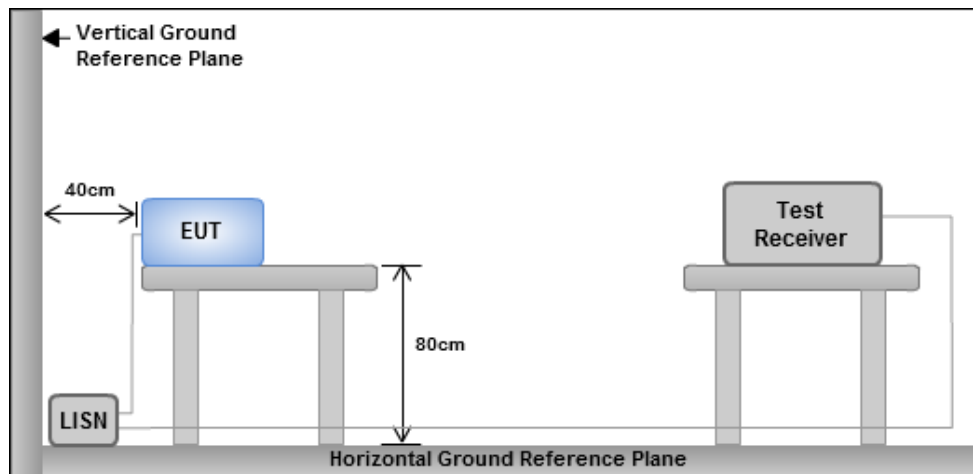
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

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==

Non-beamforming mode
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)_4TX	8.05M	12.409M	12M4G1D	7.05M	12.172M
802.11g_Nss1,(6Mbps)_4TX	16.275M	16.429M	16M4D1D	13.725M	16.268M
802.11ax HEW20_Nss1,(MCS0)_4TX	17.375M	18.834M	18M8D1D	14.825M	18.706M
802.11ax HEW40_Nss1,(MCS0)_4TX	37.3M	37.522M	37M5D1D	33.75M	37.328M

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

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

Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)	Port 2-N dB (Hz)	Port 2-OBW (Hz)	Port 3-N dB (Hz)	Port 3-OBW (Hz)	Port 4-N dB (Hz)	Port 4-OBW (Hz)
802.11b_Nss1,(1Mbps)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	500k	8M	12.34M	7.525M	12.172M	8.05M	12.222M	8.025M	12.29M
2437MHz	Pass	500k	8.05M	12.348M	7.55M	12.231M	7.05M	12.287M	7.075M	12.298M
2462MHz	Pass	500k	8.025M	12.409M	7.525M	12.203M	8M	12.356M	7.975M	12.199M
802.11g_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	500k	16.275M	16.419M	15.425M	16.429M	15.075M	16.326M	15.675M	16.394M
2437MHz	Pass	500k	15.325M	16.356M	15.075M	16.302M	15.05M	16.376M	14.975M	16.343M
2462MHz	Pass	500k	15M	16.376M	13.8M	16.292M	15.65M	16.363M	13.725M	16.268M
802.11ax HEW20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	500k	15.05M	18.724M	16.275M	18.723M	15.4M	18.706M	16.2M	18.713M
2437MHz	Pass	500k	16.55M	18.795M	14.825M	18.808M	16.9M	18.834M	16.025M	18.813M
2462MHz	Pass	500k	17.375M	18.8M	16.025M	18.798M	16.5M	18.81M	15.4M	18.787M
802.11ax HEW40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	500k	35.05M	37.444M	33.75M	37.353M	35M	37.429M	33.85M	37.411M
2437MHz	Pass	500k	35.65M	37.456M	35.05M	37.418M	37.3M	37.522M	35M	37.415M
2452MHz	Pass	500k	35.45M	37.394M	36.1M	37.493M	33.75M	37.328M	33.85M	37.433M

Port X-N dB = Port X 6dB down bandwidth;

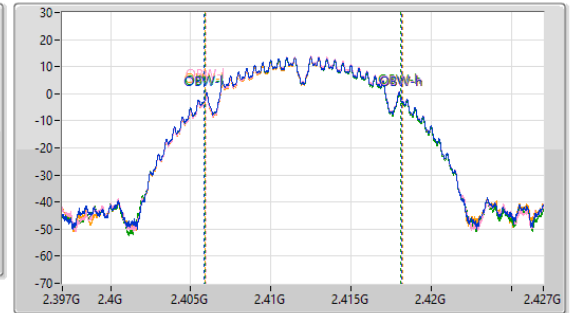
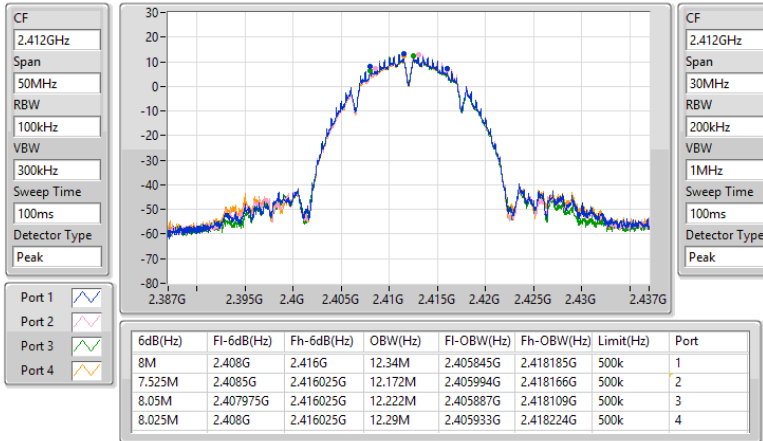
Port X-OBW = Port X 99% occupied bandwidth



2.4-2.4835GHz_802.11b_Nss1,(1Mbps)_4TX

EBW

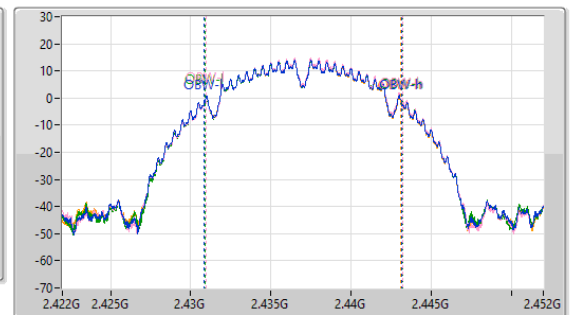
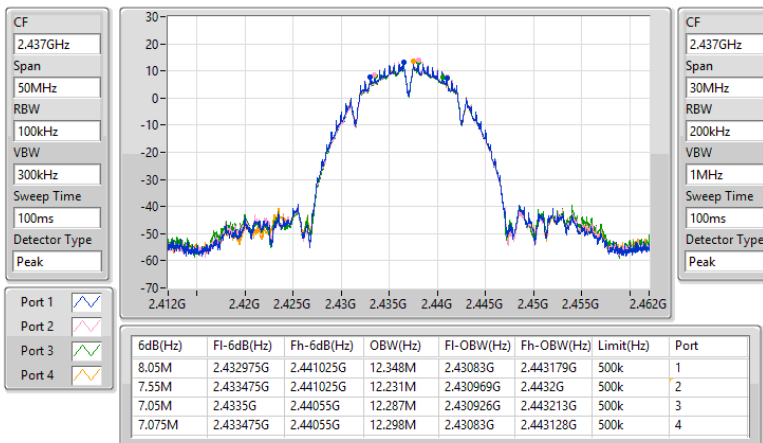
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2.4-2.4835GHz_802.11b_Nss1,(1Mbps)_4TX

EBW

2437MHz

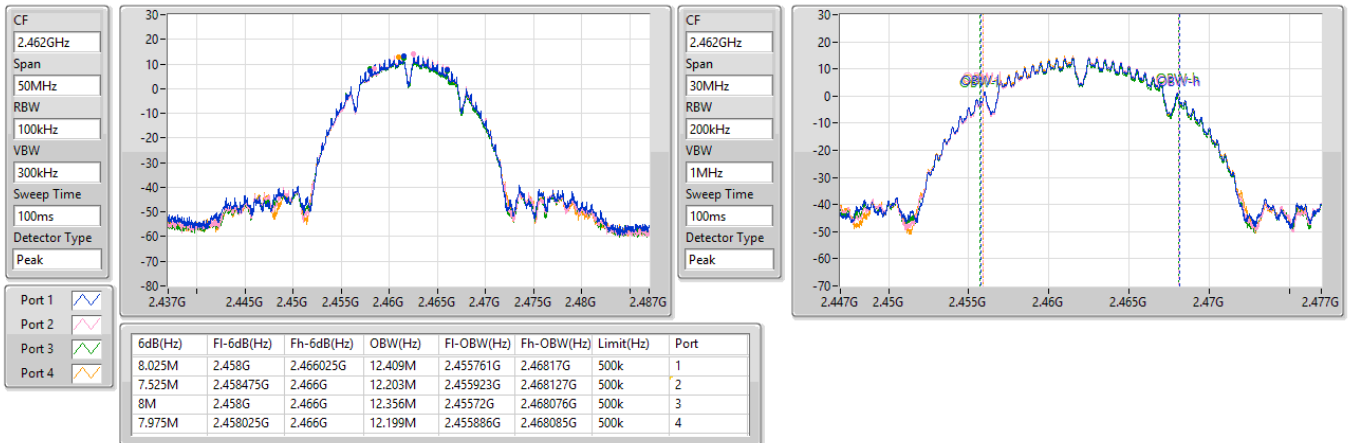




2.4-2.4835GHz_802.11b_Nss1,(1Mbps)_4TX

EBW

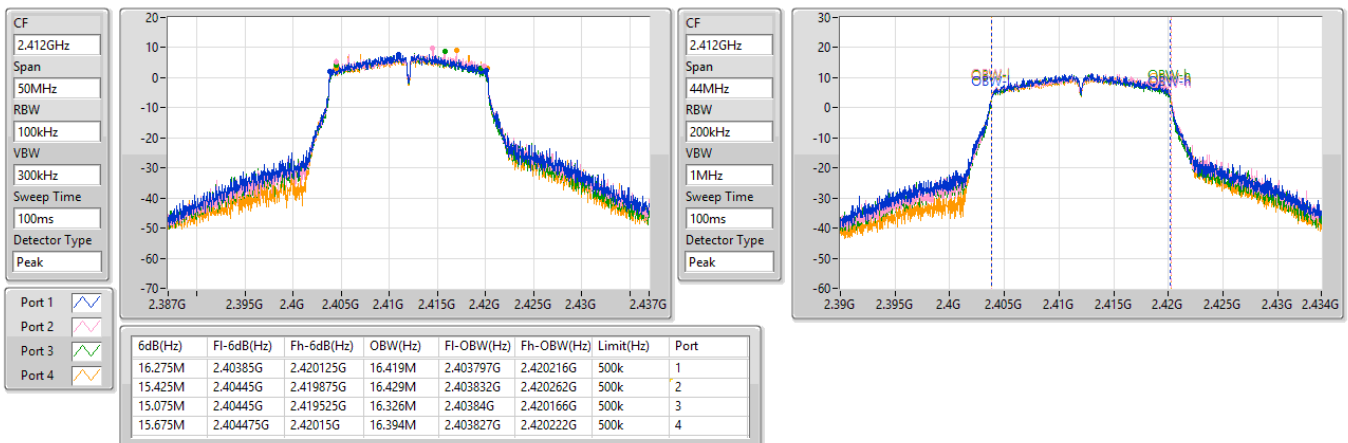
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2.4-2.4835GHz_802.11g_Nss1,(6Mbps)_4TX

EBW

2412MHz

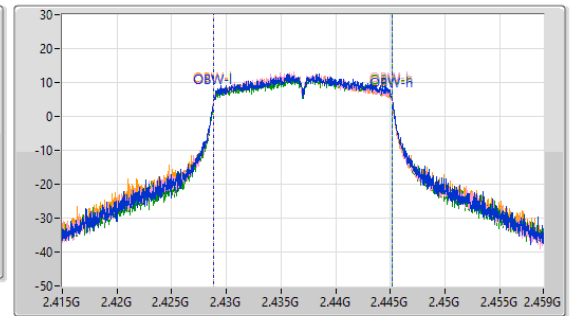
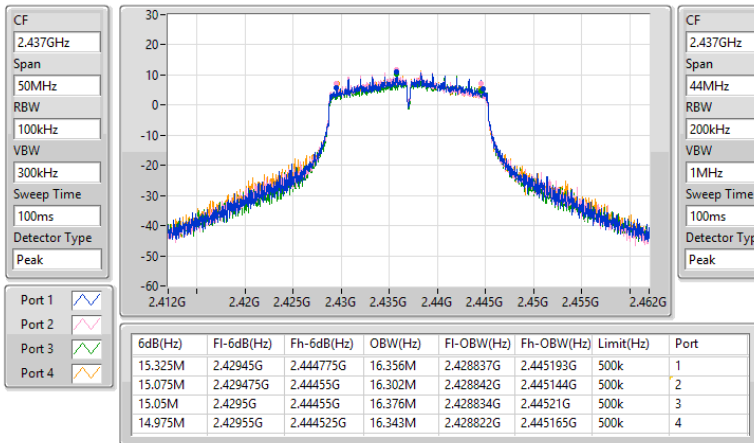




2.4-2.4835GHz_802.11g_Nss1,(6Mbps)_4TX

EBW

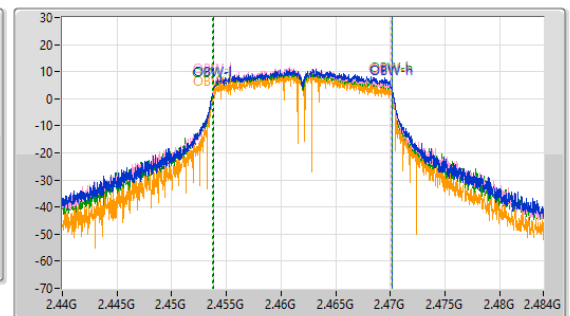
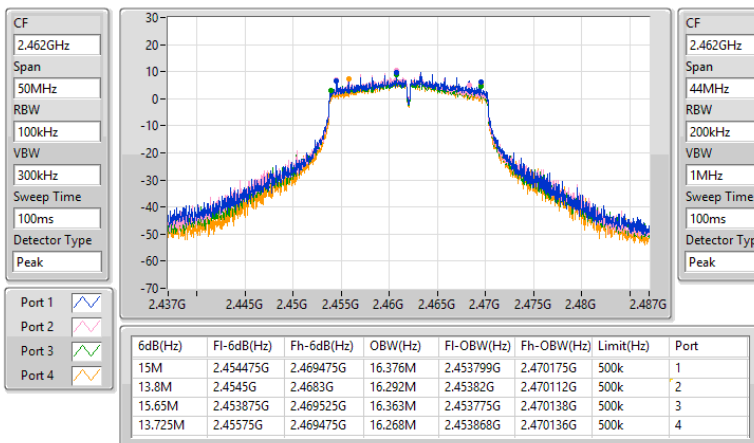
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2.4-2.4835GHz_802.11g_Nss1,(6Mbps)_4TX

EBW

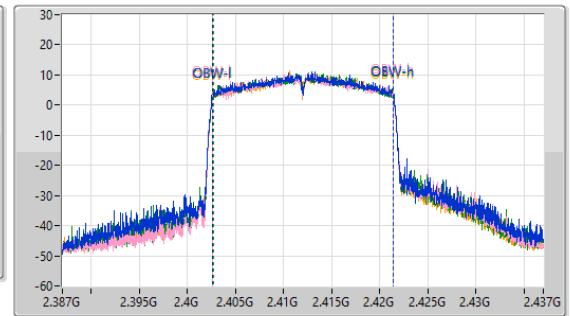
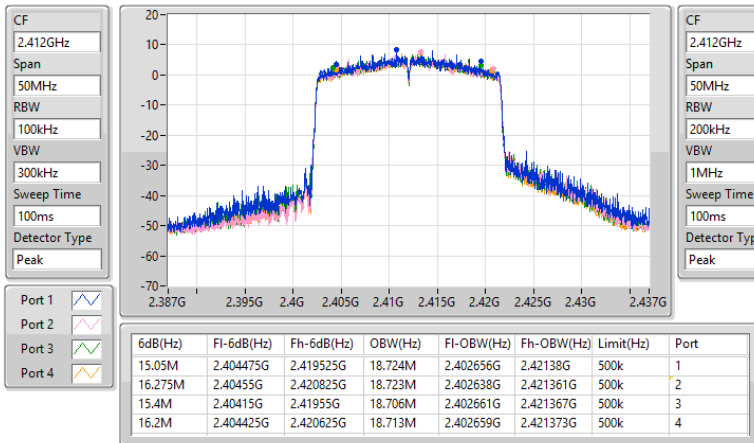
2462MHz



2.4-2.4835GHz_802.11ax_HEW20_Nss1,(MCS0)_4TX

EBW

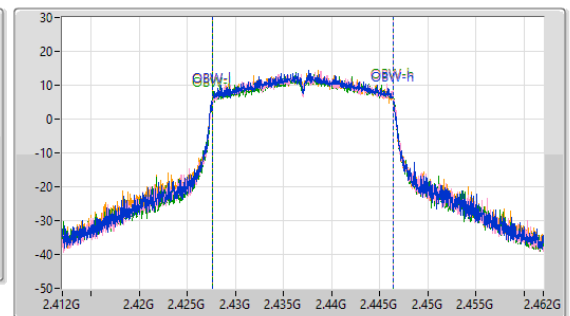
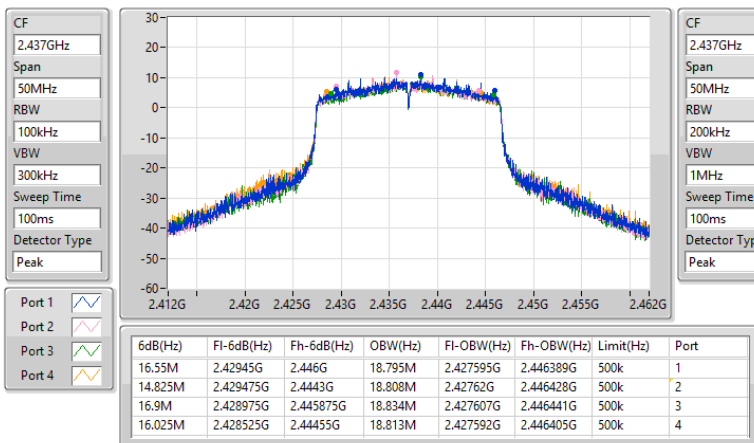
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2.4-2.4835GHz_802.11ax_HEW20_Nss1,(MCS0)_4TX

EBW

2437MHz

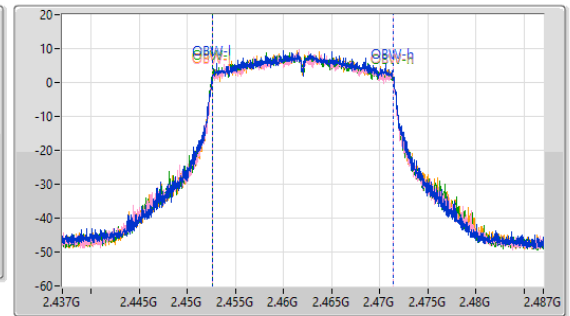
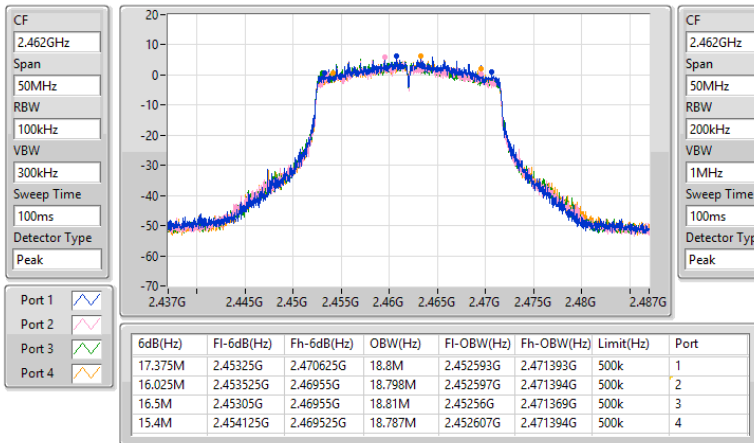




2.4-2.4835GHz_802.11ax HEW20_Nss1,(MCS0)_4TX

EBW

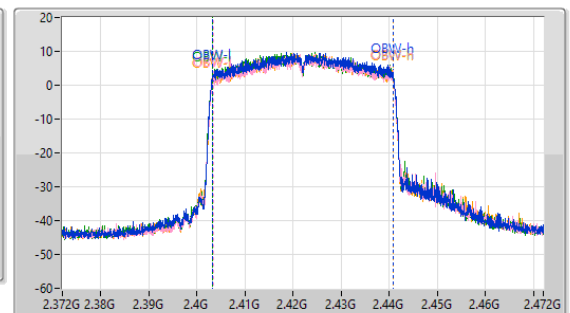
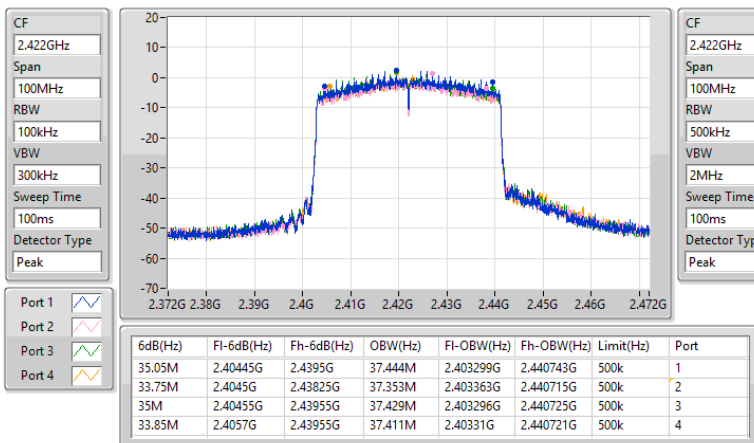
2462MHz



2.4-2.4835GHz_802.11ax HEW40_Nss1,(MCS0)_4TX

EBW

2422MHz

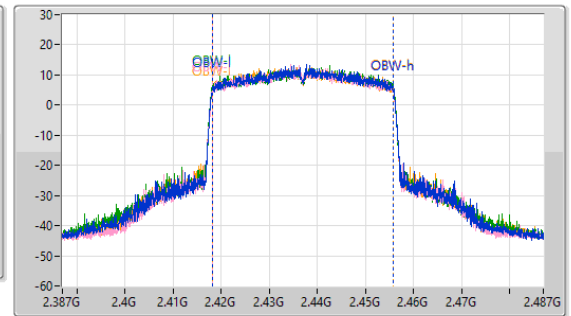
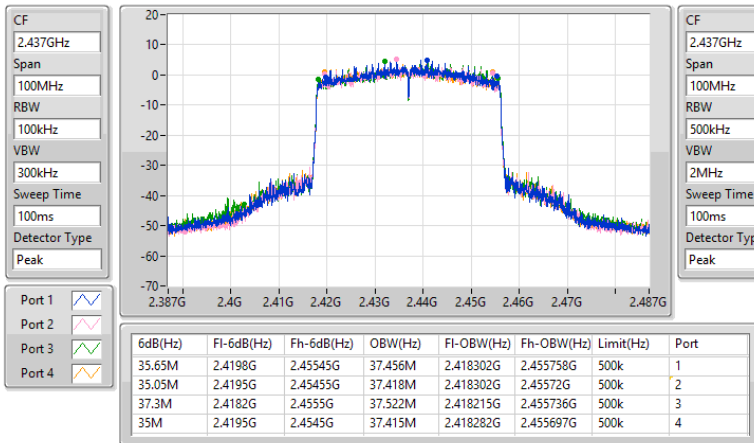




2.4-2.4835GHz_802.11ax HEW40_Nss1,(MCS0)_4TX

EBW

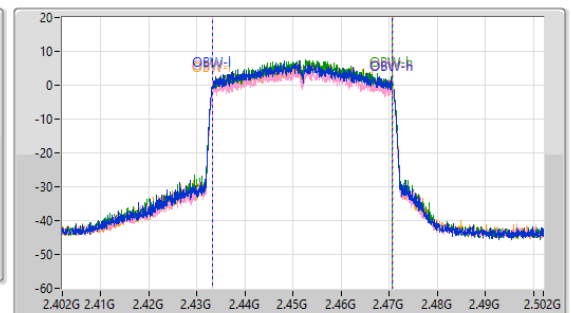
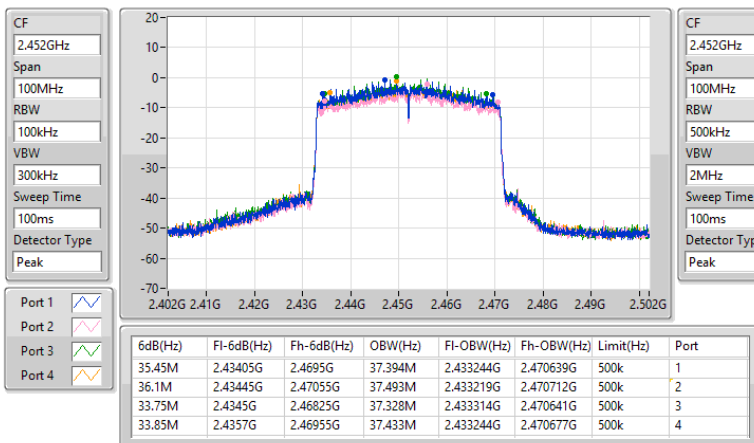
2437MHz



2.4-2.4835GHz_802.11ax HEW40_Nss1,(MCS0)_4TX

EBW

2452MHz



**Beamforming mode****Summary**

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
802.11ax HEW20-BF_Nss1,(MCS0)_4TX	18.525M	18.847M	18M8D1D	15.125M	18.72M
802.11ax HEW40-BF_Nss1,(MCS0)_4TX	36.3M	37.532M	37M5D1D	31.65M	37.306M

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

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

Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)	Port 2-N dB (Hz)	Port 2-OBW (Hz)	Port 3-N dB (Hz)	Port 3-OBW (Hz)	Port 4-N dB (Hz)	Port 4-OBW (Hz)
802.11ax HEW20-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	500k	18.525M	18.847M	17.675M	18.725M	18.15M	18.72M	18.175M	18.769M
2437MHz	Pass	500k	15.575M	18.798M	16.825M	18.796M	15.775M	18.811M	17.525M	18.787M
2462MHz	Pass	500k	17.7M	18.81M	15.125M	18.785M	17.05M	18.78M	17.5M	18.755M
802.11ax HEW40-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	500k	34.85M	37.469M	33.75M	37.306M	32.25M	37.464M	31.65M	37.415M
2437MHz	Pass	500k	35.05M	37.436M	33.75M	37.408M	36.3M	37.457M	35.7M	37.532M
2452MHz	Pass	500k	35.35M	37.464M	35M	37.319M	35M	37.347M	35M	37.394M

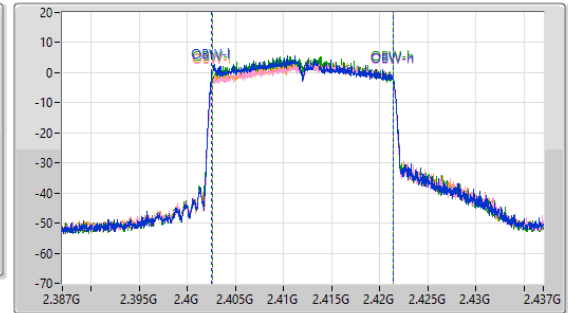
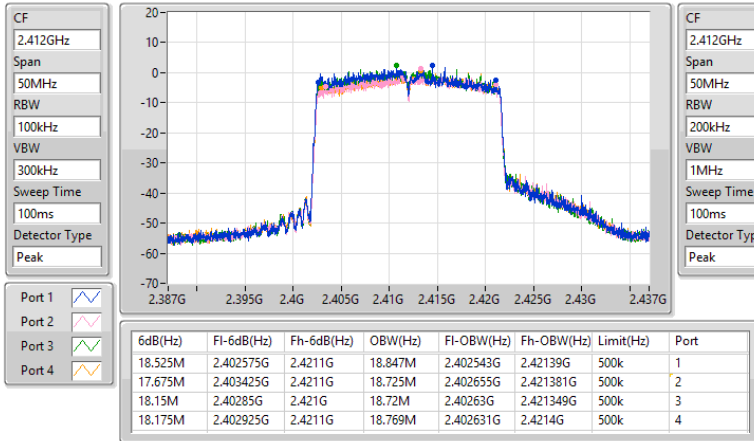
Port X-N dB = Port X 6dB down bandwidth;

Port X-OBW = Port X 99% occupied bandwidth

2.4-2.4835GHz_802.11ax HEW20-BF_Nss1,(MCS0)_4TX

EBW

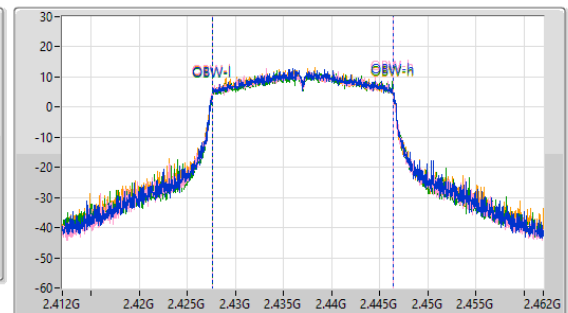
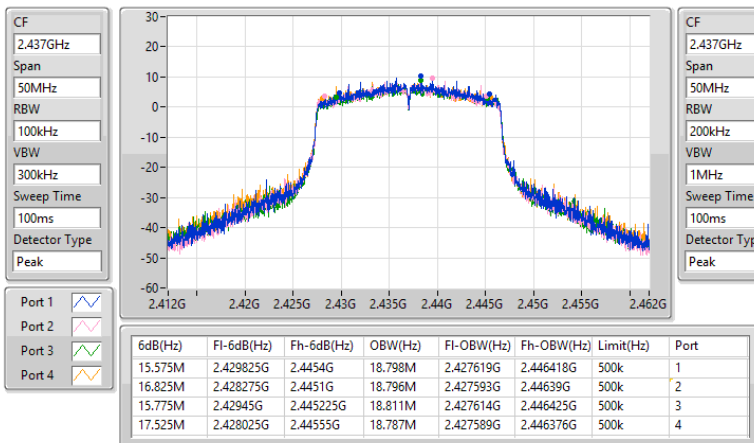
2412MHz



2.4-2.4835GHz_802.11ax HEW20-BF_Nss1,(MCS0)_4TX

EBW

2437MHz

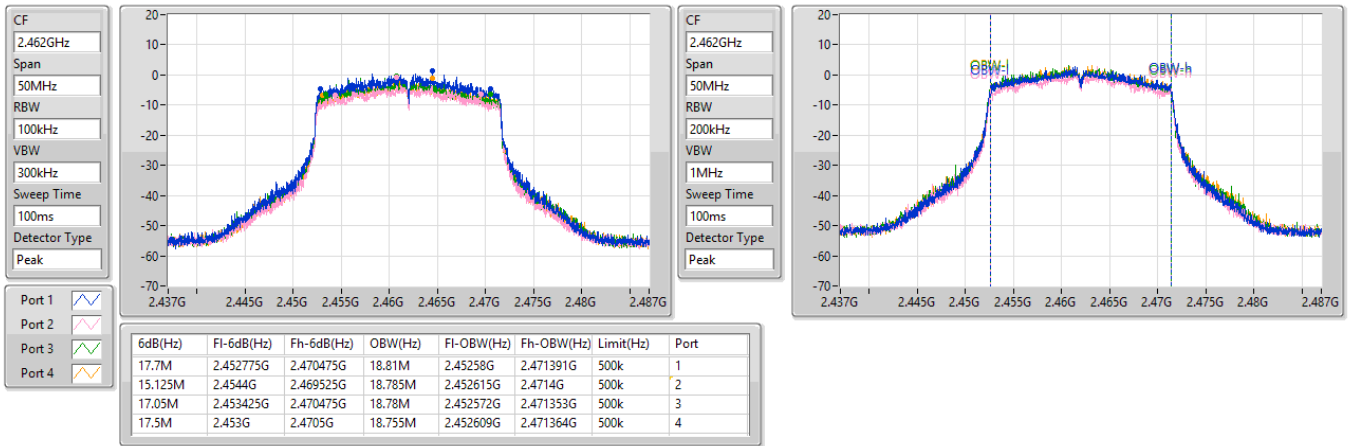




2.4-2.4835GHz_802.11ax HEW20-BF_Nss1,(MCS0)_4TX

EBW

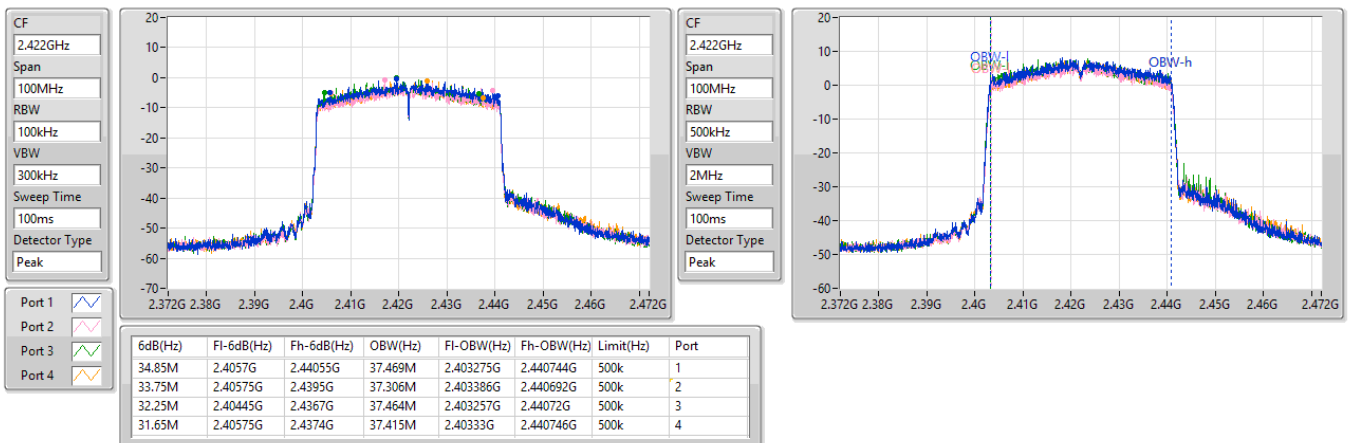
2462MHz



2.4-2.4835GHz_802.11ax HEW40-BF_Nss1,(MCS0)_4TX

EBW

2422MHz

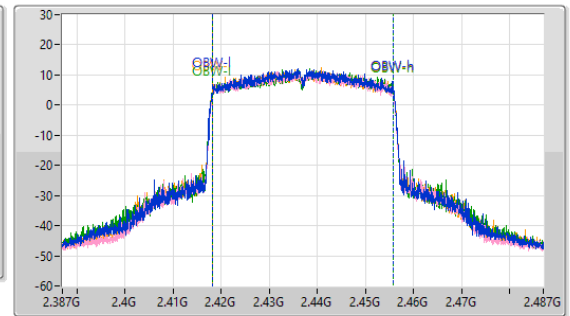
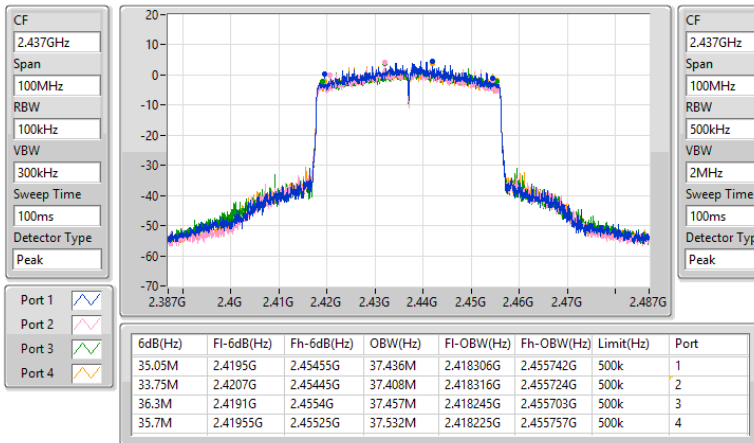




2.4-2.4835GHz_802.11ax HEW40-BF_Nss1,(MCS0)_4TX

EBW

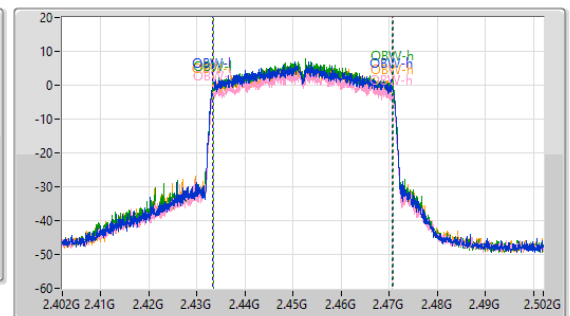
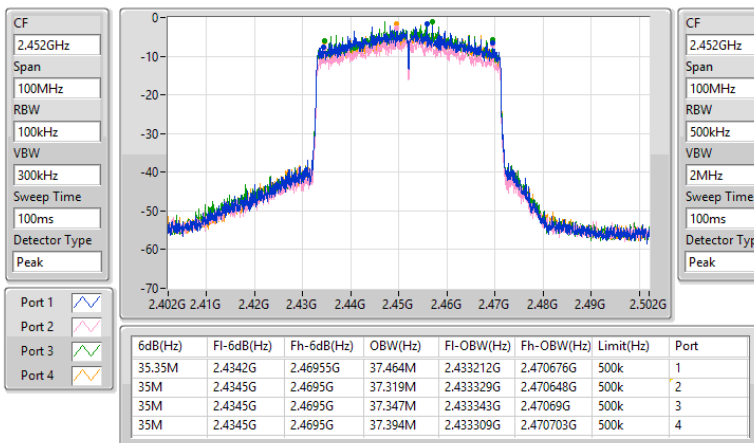
2437MHz



2.4-2.4835GHz_802.11ax HEW40-BF_Nss1,(MCS0)_4TX

EBW

2452MHz



Non-beamforming mode
Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_4TX	27.40	0.54954
802.11g_Nss1,(6Mbps)_4TX	27.26	0.53211
802.11ax HEW20_Nss1,(MCS0)_4TX	27.12	0.51523
802.11ax HEW40_Nss1,(MCS0)_4TX	24.39	0.27479

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Port 3 (dBm)	Port 4 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11b_Nss1,(1Mbps)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	3.990	21.08	21.07	20.96	20.86	27.01	30.00	31.00	36.00
2437MHz	Pass	3.990	21.52	21.43	21.23	21.33	27.40	30.00	31.39	36.00
2462MHz	Pass	3.990	21.58	21.29	21.02	21.43	27.36	30.00	31.35	36.00
802.11g_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	3.990	20.57	20.65	20.54	20.38	26.56	30.00	30.55	36.00
2437MHz	Pass	3.990	21.45	21.02	20.97	21.51	27.26	30.00	31.25	36.00
2462MHz	Pass	3.990	20.12	20.16	19.82	19.84	26.01	30.00	30.00	36.00
802.11ax HEW20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	3.990	18.84	18.23	18.75	18.26	24.55	30.00	28.54	36.00
2437MHz	Pass	3.990	21.21	21.07	20.92	21.21	27.12	30.00	31.11	36.00
2462MHz	Pass	3.990	17.18	16.43	16.83	16.75	22.83	30.00	26.82	36.00
802.11ax HEW40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	3.990	15.67	14.66	15.43	15.04	21.24	30.00	25.23	36.00
2437MHz	Pass	3.990	18.54	18.02	18.53	18.37	24.39	30.00	28.38	36.00
2452MHz	Pass	3.990	12.75	11.35	13.13	12.33	18.46	30.00	22.45	36.00

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

Note : Conducted average output power is for reference

Beamforming mode
Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11ax HEW20-BF_Nss1,(MCS0)_4TX	26.05	0.40272
802.11ax HEW40-BF_Nss1,(MCS0)_4TX	24.34	0.27164

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Port 3 (dBm)	Port 4 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11ax HEW20-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	9.555	13.88	13.7	12.61	13.86	19.56	26.45	29.11	36.00
2437MHz	Pass	9.555	20.37	19.59	20.2	19.91	26.05	26.45	35.61	36.00
2462MHz	Pass	9.555	12.46	12.18	11.52	12.95	18.33	26.45	27.88	36.00
802.11ax HEW40-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	9.555	13.11	12.95	12.06	13.72	19.02	26.45	28.57	36.00
2437MHz	Pass	9.555	18.73	17.72	18.05	18.68	24.34	26.45	33.89	36.00
2452MHz	Pass	9.555	11.91	10.79	12.25	12.01	17.80	26.45	27.36	36.00

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

Note : Conducted average output power is for reference

Directional gain = $10 \times \log((10^{3.99/20} + 10^{2.964/20} + 10^{3.68/20} + 10^{3.471/20})^2/4) = 9.555 \text{ dBi} > 6 \text{ dBi}$, limit shall be reduced to 30 dBm – (9.555 dBi – 6 dBi) = 26.45dBm

Non-beamforming mode
Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
802.11b_Nss1,(1Mbps)_4TX	-2.92
802.11g_Nss1,(6Mbps)_4TX	-5.27
802.11ax HEW20_Nss1,(MCS0)_4TX	-5.74
802.11ax HEW40_Nss1,(MCS0)_4TX	-11.42

RBW = 3kHz;

Result

Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	Port 2 (dBm/RBW)	Port 3 (dBm/RBW)	Port 4 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11b_Nss1,(1Mbps)_4TX	-	-	-	-	-	-	-	-
2412MHz	Pass	9.555	-8.75	-7.83	-8.18	-8.90	-3.71	4.45
2437MHz	Pass	9.555	-7.78	-7.50	-8.71	-8.21	-3.01	4.45
2462MHz	Pass	9.555	-7.02	-7.25	-8.69	-8.12	-2.92	4.45
802.11g_Nss1,(6Mbps)_4TX	-	-	-	-	-	-	-	-
2412MHz	Pass	9.555	-10.68	-10.66	-10.94	-11.49	-6.45	4.45
2437MHz	Pass	9.555	-9.88	-9.58	-10.80	-9.49	-5.27	4.45
2462MHz	Pass	9.555	-11.29	-10.98	-10.94	-11.21	-6.38	4.45
802.11ax HEW20_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
2412MHz	Pass	9.555	-13.65	-13.45	-14.27	-14.14	-7.95	4.45
2437MHz	Pass	9.555	-11.06	-11.06	-11.63	-10.30	-5.74	4.45
2462MHz	Pass	9.555	-14.68	-15.50	-15.17	-15.46	-9.66	4.45
802.11ax HEW40_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
2422MHz	Pass	9.555	-19.08	-20.02	-19.95	-19.96	-14.43	4.45
2437MHz	Pass	9.555	-16.53	-16.96	-17.10	-16.97	-11.42	4.45
2452MHz	Pass	9.555	-22.46	-23.33	-20.74	-23.13	-16.84	4.45

DG = Directional Gain; RBW = 3kHz;

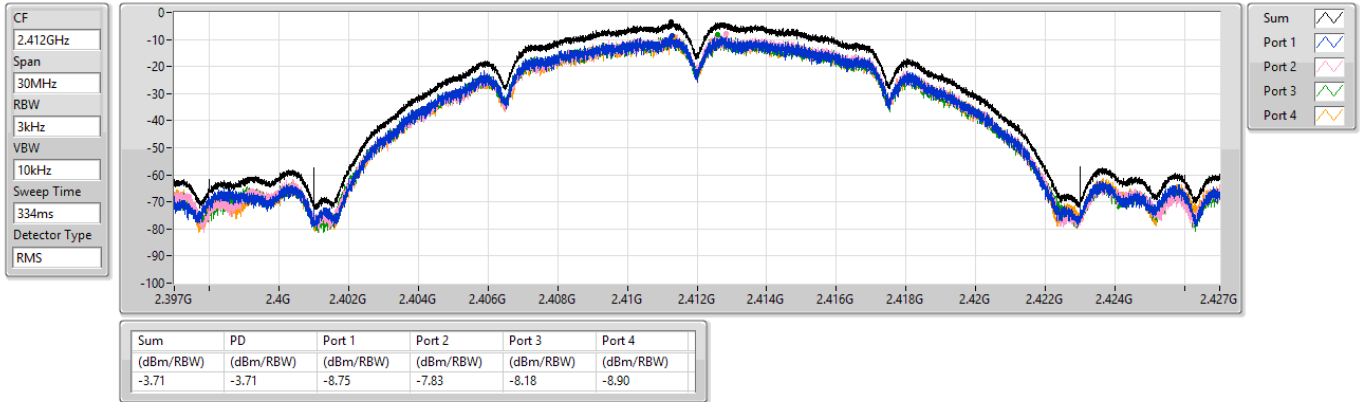
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;

$$\text{Directional gain} = 10 \times \log((10^{3.99/20} + 10^{2.964/20} + 10^{3.68/20} + 10^{3.471/20})^2/4) = 9.555 \text{ dBi} > 6 \text{ dBi, limit shall be reduced to } 8 \text{ dBm} - (9.555 \text{ dBi} - 6 \text{ dBi}) = 4.45 \text{ dBm}$$

2.4-2.4835GHz_802.11b_Nss1,(1Mbps)_4TX

PSD

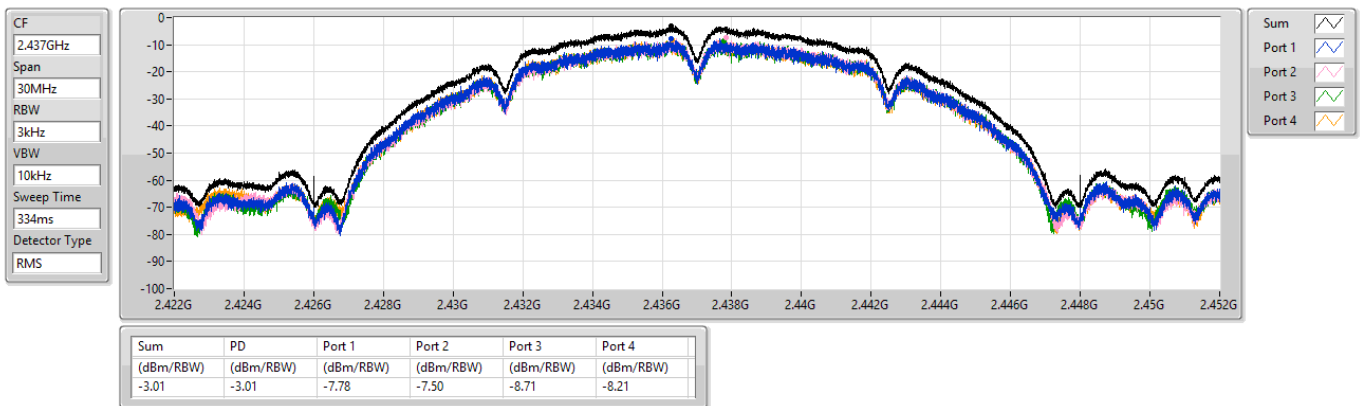
2412MHz



2.4-2.4835GHz_802.11b_Nss1,(1Mbps)_4TX

PSD

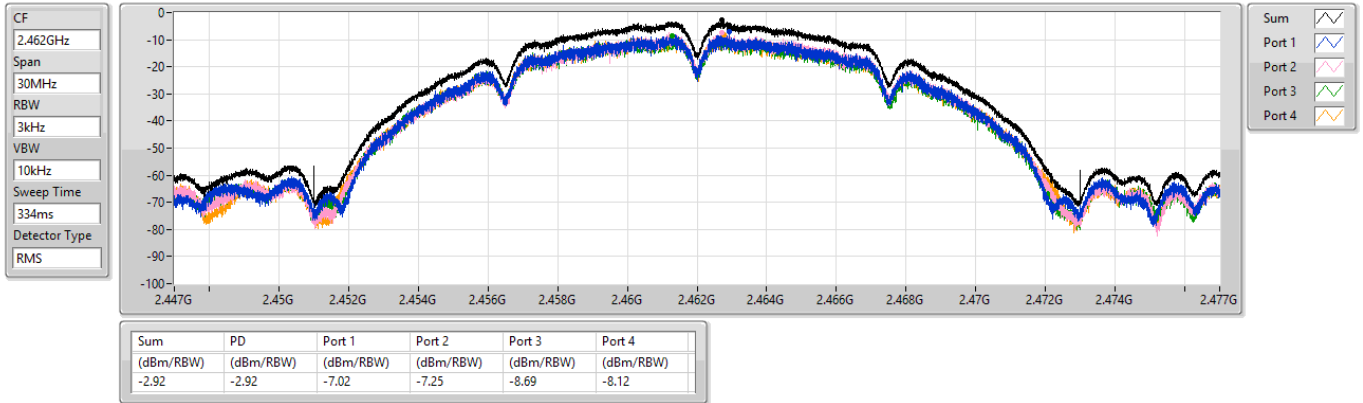
2437MHz



2.4-2.4835GHz_802.11b_Nss1,(1Mbps)_4TX

PSD

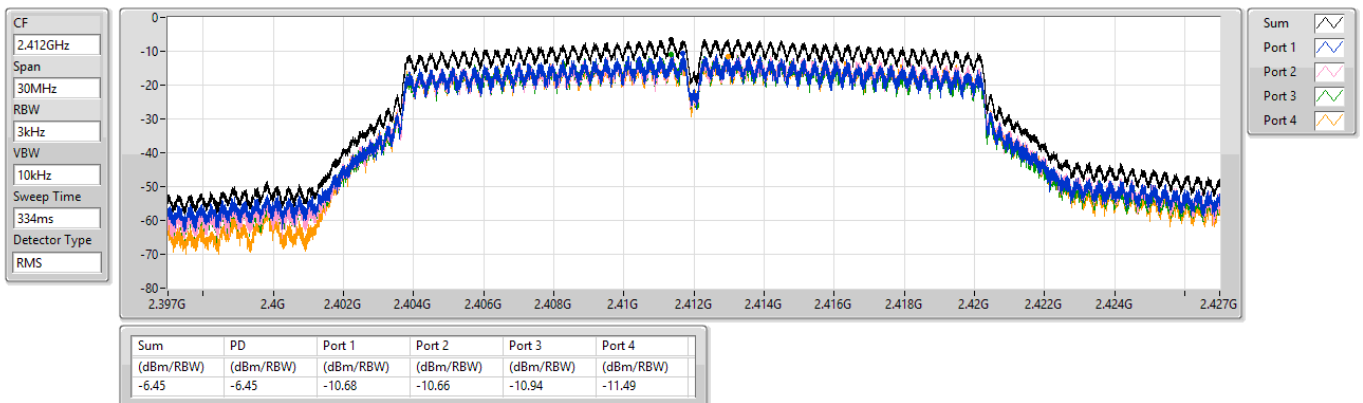
2462MHz



2.4-2.4835GHz_802.11g_Nss1,(6Mbps)_4TX

PSD

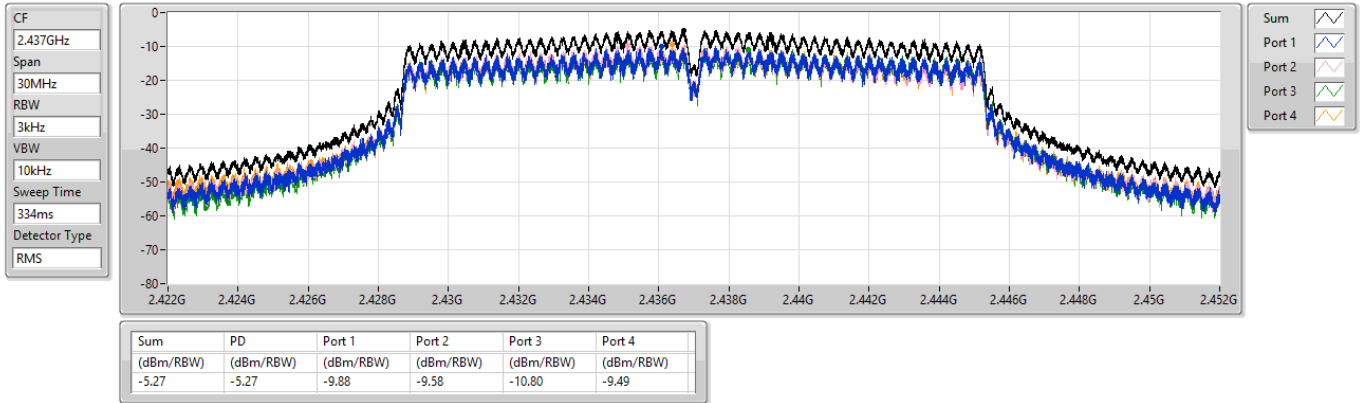
2412MHz



2.4-2.4835GHz_802.11g_Nss1,(6Mbps)_4TX

PSD

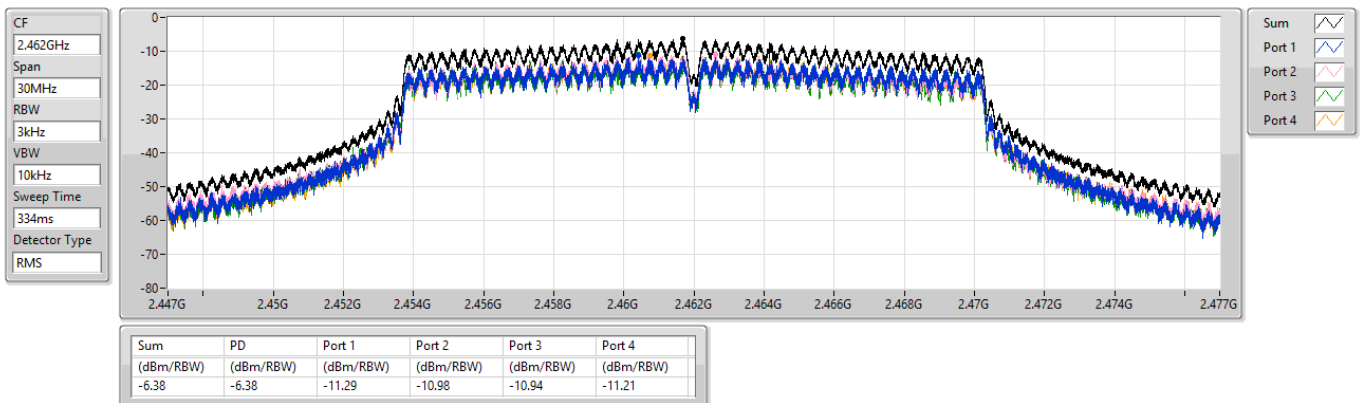
2437MHz



2.4-2.4835GHz_802.11g_Nss1,(6Mbps)_4TX

PSD

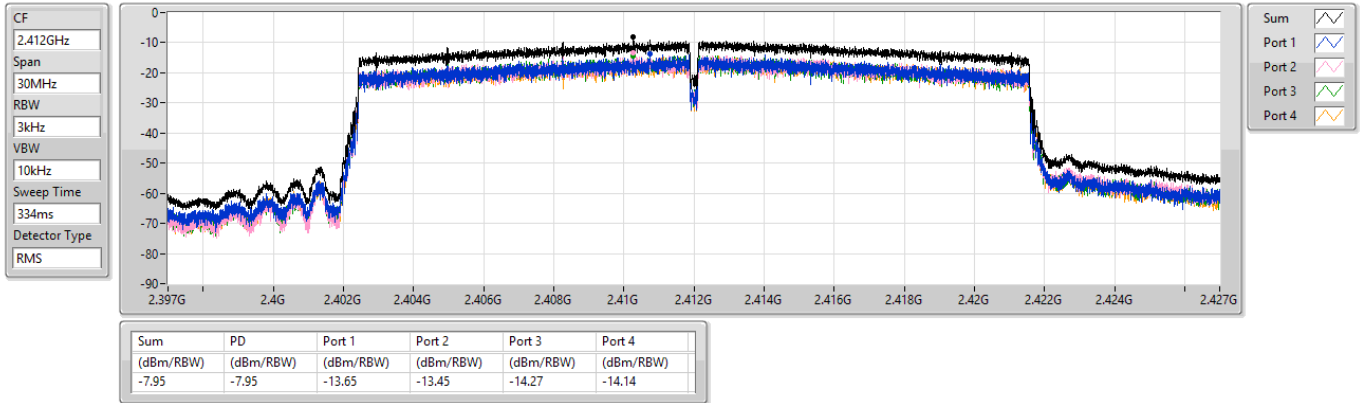
2462MHz



2.4-2.4835GHz_802.11ax HEW20_Nss1,(MCS0)_4TX

PSD

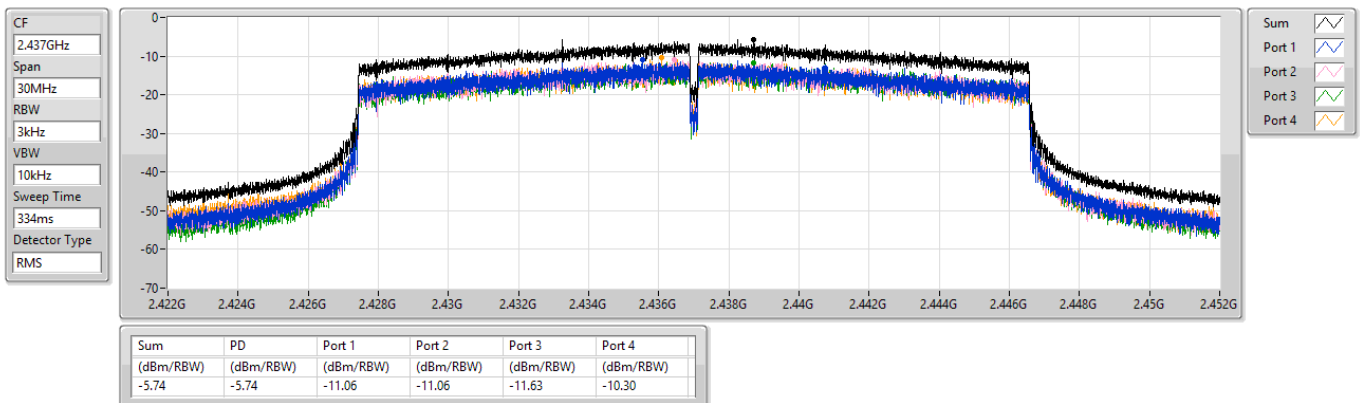
2412MHz



2.4-2.4835GHz_802.11ax HEW20_Nss1,(MCS0)_4TX

PSD

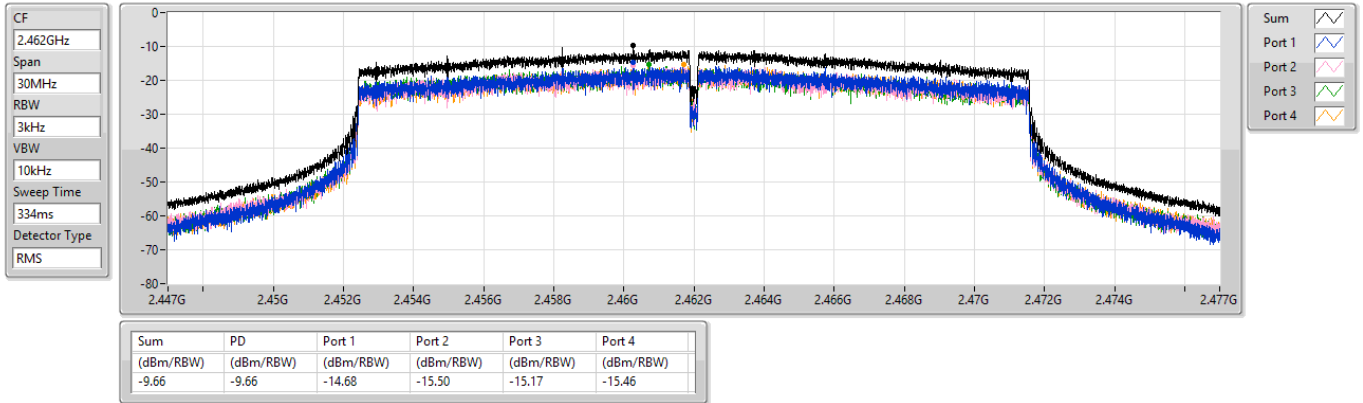
2437MHz



2.4-2.4835GHz_802.11ax HEW20_Nss1,(MCS0)_4TX

PSD

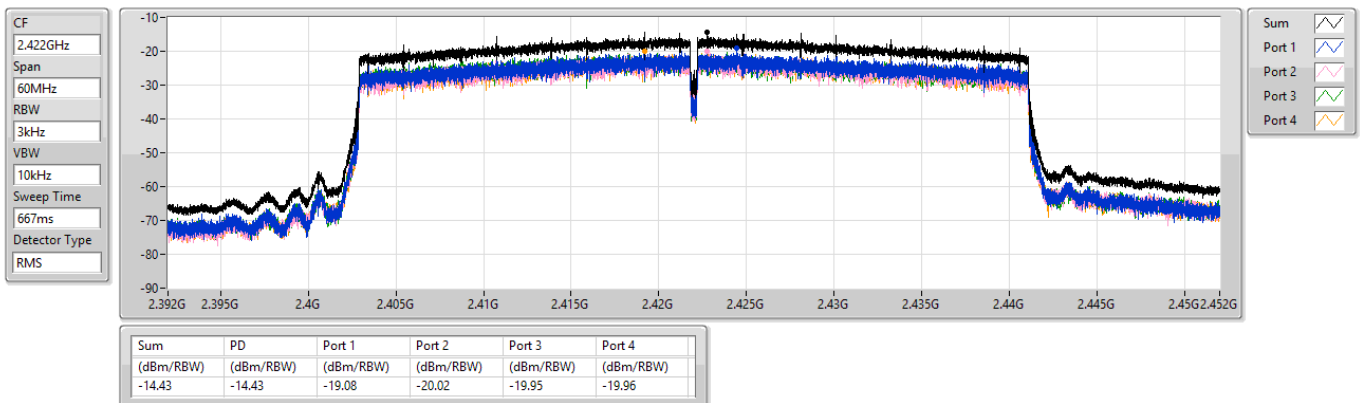
2462MHz



2.4-2.4835GHz_802.11ax HEW40_Nss1,(MCS0)_4TX

PSD

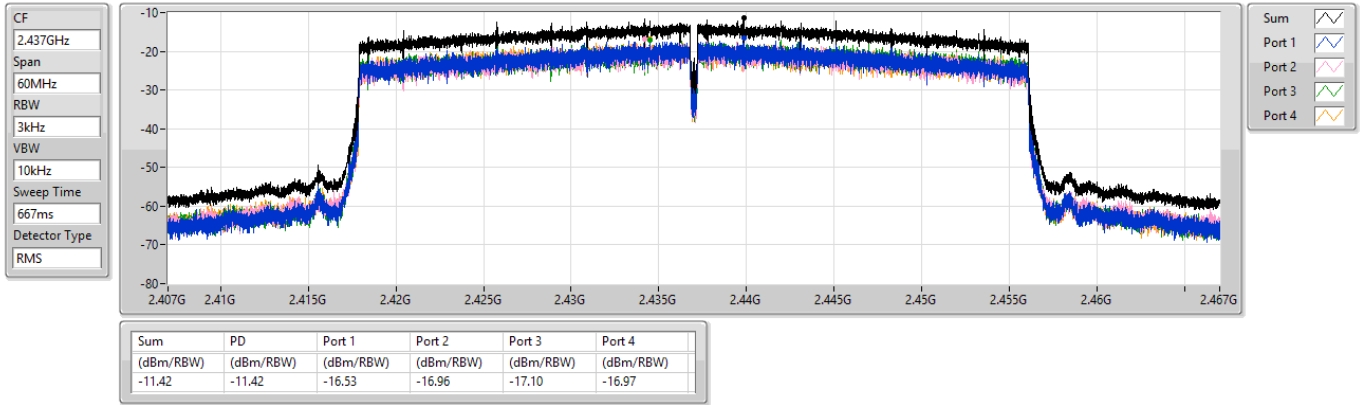
2422MHz



2.4-2.4835GHz_802.11ax HEW40_Nss1,(MCS0)_4TX

PSD

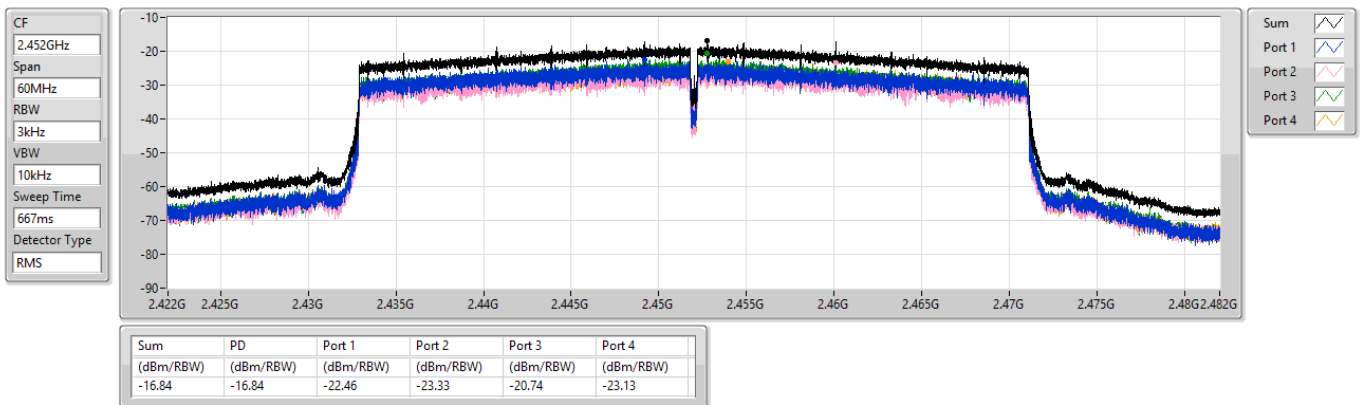
2437MHz



2.4-2.4835GHz_802.11ax HEW40_Nss1,(MCS0)_4TX

PSD

2452MHz



Beamforming mode
Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
802.11ax HEW20-BF_Nss1,(MCS0)_4TX	-7.00
802.11ax HEW40-BF_Nss1,(MCS0)_4TX	-13.54

RBW = 3kHz;

Result

Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	Port 2 (dBm/RBW)	Port 3 (dBm/RBW)	Port 4 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11ax HEW20-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
2412MHz	Pass	9.555	-20.48	-20.90	-19.60	-20.04	-15.45	4.45
2437MHz	Pass	9.555	-11.04	-11.93	-12.83	-12.18	-7.00	4.45
2462MHz	Pass	9.555	-20.55	-22.05	-20.81	-20.76	-16.17	4.45
802.11ax HEW40-BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
2422MHz	Pass	9.555	-22.53	-22.85	-22.23	-22.34	-17.44	4.45
2437MHz	Pass	9.555	-17.36	-18.64	-18.86	-17.42	-13.54	4.45
2452MHz	Pass	9.555	-23.11	-25.47	-23.15	-24.35	-18.68	4.45

DG = Directional Gain; RBW = 3kHz;

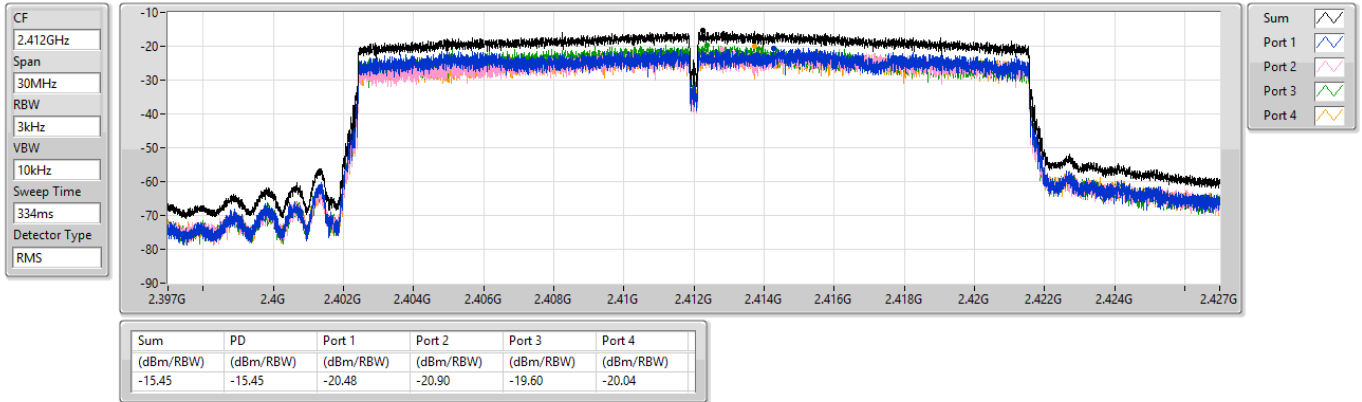
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;

Directional gain = $10 \times \log((10^{3.99/20} + 10^{2.964/20} + 10^{3.68/20} + 10^{3.471/20})^2/4) = 9.555 \text{ dBi} > 6 \text{ dBi}$, limit shall be reduced to 8 dBm – (9.555dBi – 6dBi) = 4.45 dBm

2.4-2.4835GHz_802.11ax HEW20-BF_Nss1,(MCS0)_4TX

PSD

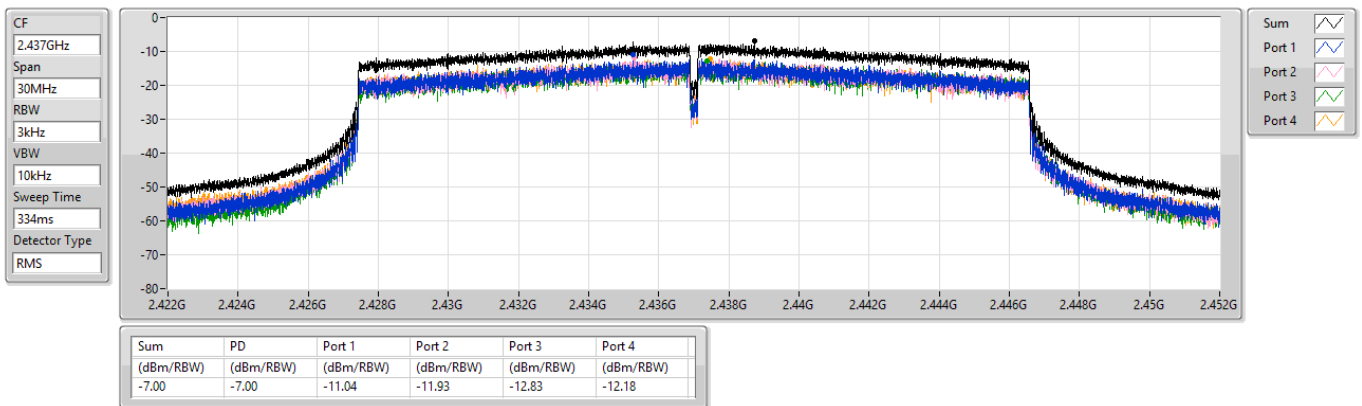
2412MHz



2.4-2.4835GHz_802.11ax HEW20-BF_Nss1,(MCS0)_4TX

PSD

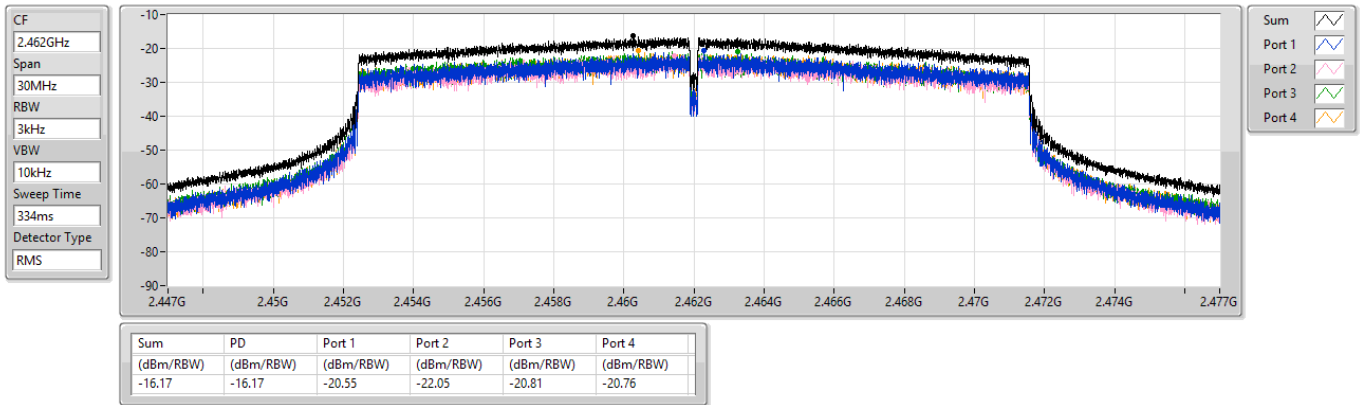
2437MHz



2.4-2.4835GHz_802.11ax HEW20-BF_Nss1,(MCS0)_4TX

PSD

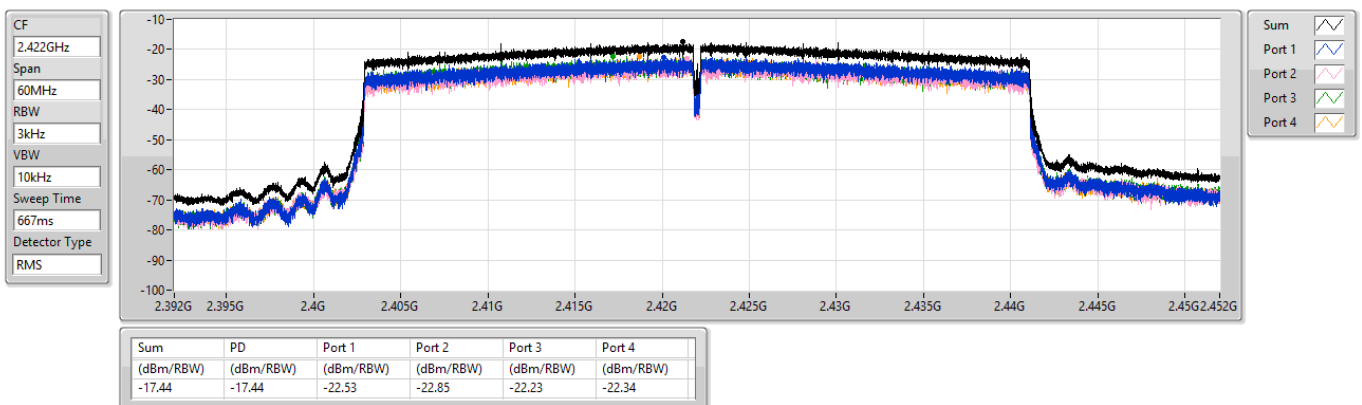
2462MHz



2.4-2.4835GHz_802.11ax HEW40-BF_Nss1,(MCS0)_4TX

PSD

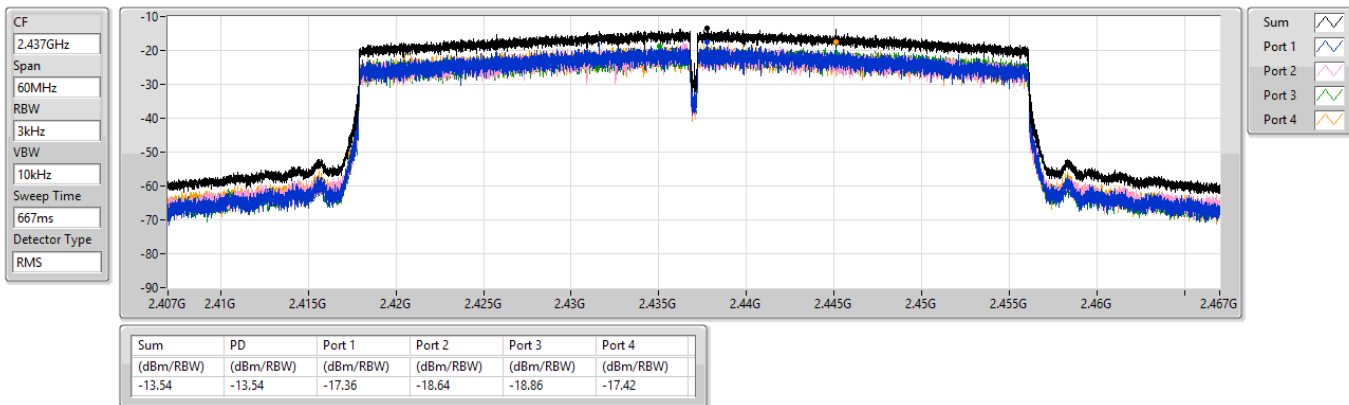
2422MHz



2.4-2.4835GHz_802.11ax HEW40-BF_Nss1,(MCS0)_4TX

PSD

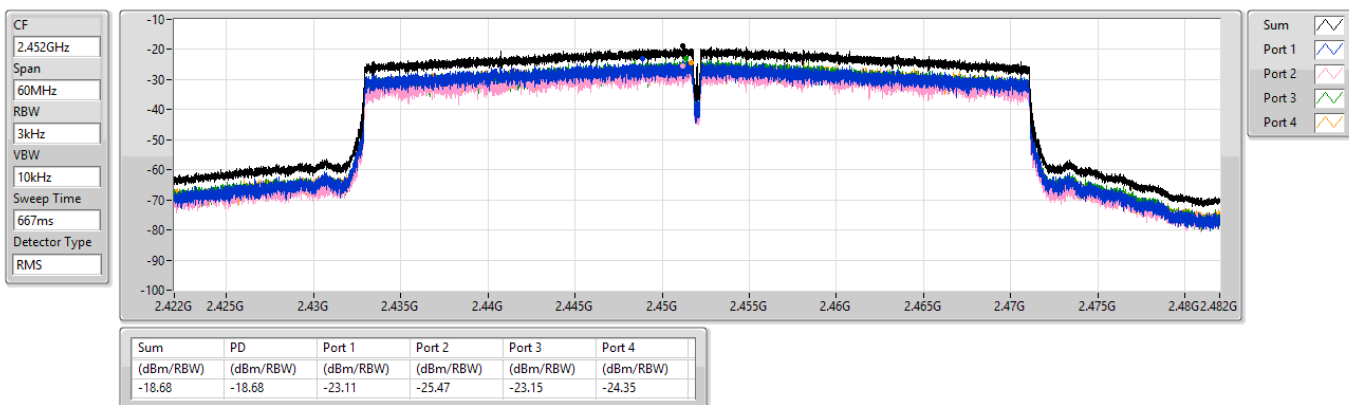
2437MHz



2.4-2.4835GHz_802.11ax HEW40-BF_Nss1,(MCS0)_4TX

PSD

2452MHz





Non-beamforming mode

Unwanted Emissions (Below 1GHz)

Modulation	11b	Test Freq. (MHz)	2437
Polarization	Horizontal		
Test By :Paul Lin Temperature(°C):25 Humidity(%):64			
Level (dBuV/m) <			



Unwanted Emissions into Restricted Frequency Bands

Appendix D

Modulation	11b	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Paul Lin Temperature(°C):25 Humidity(%):64			
Level (dBUV/m)			



Unwanted Emission (Above 1GHz) for 11b

Modulation	11b	Test Freq. (MHz)	2412
Polarization	Horizontal		
Test By :Sean Yu Temperature(°C):26 Humidity(%):61			
Level (dBuV/m)			



Modulation	11b	Test Freq. (MHz)	2412
Polarization	Vertical		
Test By :Sean Yu Temperature(°C):26 Humidity(%):61			
Level (dBuV/m) </			



Modulation	11b	Test Freq. (MHz)	2437
Polarization	Horizontal		
Test By :Sean Yu Temperature(°C):26 Humidity(%):61			
Level (dBuV/m)			



Modulation	11b	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Sean Yu Temperature(°C):26 Humidity(%):61			
Level (dBuV/m)			



Modulation	11b	Test Freq. (MHz)	2462
Polarization	Horizontal		
Test By :Sean Yu Temperature(°C):26 Humidity(%):61			
Level (dBuV/m)			



Modulation	11b	Test Freq. (MHz)	2462
Polarization	Vertical		
Test By :Sean Yu Temperature(°C):26 Humidity(%):61			
Level (dBUV/m) <			



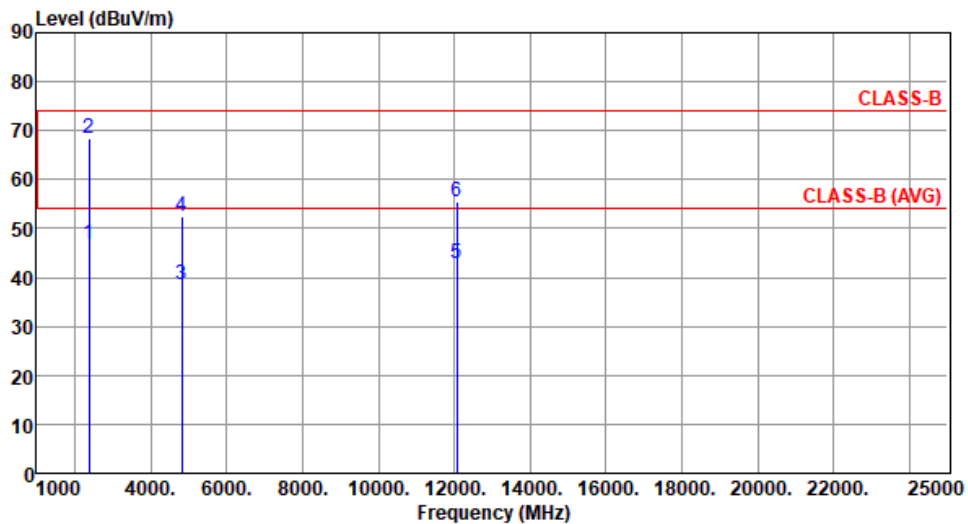
Unwanted Emissions (Above 1GHz) for 11g

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

Test By :Brad Wu

Temperature(°C):25

Humidity(%):62



	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	46.85	54.00	-7.15	51.39	-4.54	Average	137	225
2	2390.00	68.49	74.00	-5.51	73.03	-4.54	Peak	137	225
3	4824.00	38.64	54.00	-15.36	39.05	-0.41	Average	220	252
4	4824.00	52.42	74.00	-21.58	52.83	-0.41	Peak	220	252
5	12060.00	42.71	54.00	-11.29	36.26	6.45	Average	100	179
6	12060.00	55.32	74.00	-18.68	48.87	6.45	Peak	100	179

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):25 Humidity(%):62			
Level (dBuV/m)			



Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		
Test By :Sean Yu Temperature(°C):26 Humidity(%):61			
Level (dBuV/m) <			



Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Sean Yu Temperature(°C):26 Humidity(%):61			
Level (dBuV/m) </			



Modulation	11g	Test Freq. (MHz)	2462
Polarization	Horizontal		
Test By :Brad Wu Temperature(°C):25 Humidity(%):62			
Level (dBUV/m)			



Modulation	11g	Test Freq. (MHz)	2462
Polarization	Vertical		
Test By :Brad Wu Temperature(°C):25 Humidity(%):62			
Level (dBUV/m) <			

Unwanted Emissions (Above 1GHz) for ax HE20

Modulation	ax HE20	Test Freq. (MHz)	2412
Polarization	Horizontal		
Test By :Brad Wu Temperature(°C):25 Humidity(%):62			
Level (dBUV/m)			



Modulation	ax HE20	Test Freq. (MHz)	2412
Polarization	Vertical		
Test By :Brad Wu Temperature(°C):25 Humidity(%):62			
Level (dBUV/m)			



Modulation	ax HE20	Test Freq. (MHz)	2437
Polarization	Horizontal		
Test By :Sean Yu Temperature(°C):26 Humidity(%):61			
Level (dBuV/m) </			



Modulation	ax HE20	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Sean Yu Temperature(°C):26 Humidity(%):61			
Level (dBuV/m) <			



Modulation	ax HE20	Test Freq. (MHz)	2462
Polarization	Horizontal		
Test By :Brad Wu Temperature(°C):25 Humidity(%):62			
Level (dBUV/m) </			



Modulation	ax HE20	Test Freq. (MHz)	2462
Polarization	Vertical		
Test By :Brad Wu Temperature(°C):25 Humidity(%):62			
Level (dBuV/m) </			



Unwanted Emissions (Above 1GHz) for ax HE40

Modulation	ax HE40	Test Freq. (MHz)	2422
Polarization	Horizontal		
Test By :Brad Wu Temperature(°C):25 Humidity(%):62			
Level (dBuV/m)			



Modulation	ax HE40	Test Freq. (MHz)	2422
Polarization	Vertical		
Test By :Brad Wu Temperature(°C):25 Humidity(%):62			
Level (dBuV/m) </			



Modulation	ax HE40	Test Freq. (MHz)	2437
Polarization	Horizontal		
Test By :Brad Wu Temperature(°C):25 Humidity(%):62			
Level (dBuV/m) <			



Modulation	ax HE40	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Brad Wu Temperature(°C):25 Humidity(%):62			
Level (dBuV/m) </			



Modulation	ax HE40	Test Freq. (MHz)	2452
Polarization	Horizontal		
Test By :Brad Wu Temperature(°C):25 Humidity(%):62			
Level (dBuV/m) </			



Modulation	ax HE40	Test Freq. (MHz)	2452
Polarization	Vertical		
Test By :Brad Wu Temperature(°C):25 Humidity(%):62			
Level (dBuV/m)			

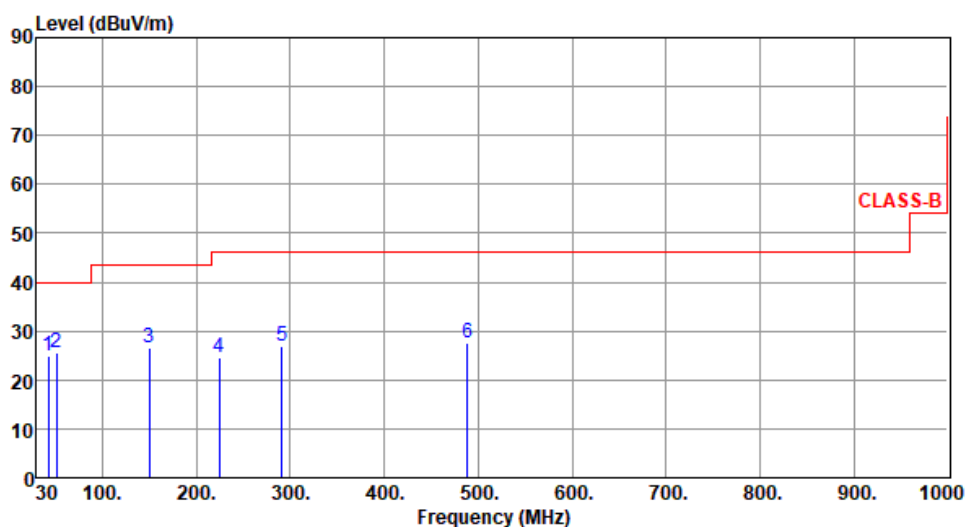


Beamforming mode

Unwanted Emissions (Below 1GHz)

Modulation	ax HE20	Test Freq. (MHz)	2437
Polarization	Horizontal		

Test By :Paul Lin Temperature(°C):25 Humidity(%):64



	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	42.48	24.88	40.00	-15.12	33.24	-8.36	Peak	---	---
2	51.13	25.59	40.00	-14.41	33.37	-7.78	Peak	---	---
3	150.18	26.71	43.50	-16.79	35.46	-8.75	Peak	---	---
4	224.43	24.49	46.00	-21.51	36.54	-12.05	Peak	---	---
5	291.15	26.74	46.00	-19.26	35.10	-8.36	Peak	---	---
6	488.89	27.44	46.00	-18.56	30.81	-3.37	Peak	---	---

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).

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



Unwanted Emissions into Restricted Frequency Bands

Appendix D

Modulation	ax HE20	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Paul Lin Temperature(°C):25 Humidity(%):64			
Level (dBuV/m) </			



Unwanted Emissions (Above 1GHz) for ax HE20

Modulation	ax HE20	Test Freq. (MHz)	2412
Polarization	Horizontal		
Test By :Sean Yu Temperature(°C):23 Humidity(%):66			
Level (dBUV/m)			



Modulation	ax HE20	Test Freq. (MHz)	2412						
Polarization	Vertical								
Test By :Sean Yu Temperature(°C):23 Humidity(%):66									
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	53.88	54.00	-0.12	58.42	-4.54	Average	174	283
2	2390.00	69.14	74.00	-4.86	73.68	-4.54	Peak	174	283
3	4824.00	38.11	54.00	-15.89	38.52	-0.41	Average	141	230
4	4824.00	51.89	74.00	-22.11	52.30	-0.41	Peak	141	230
5	12060.00	42.61	54.00	-11.39	36.16	6.45	Average	100	105
6	12060.00	55.17	74.00	-18.83	48.72	6.45	Peak	100	105
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	ax HE20	Test Freq. (MHz)	2437
Polarization	Horizontal		
Test By :Sean Yu Temperature(°C):23 Humidity(%):66			
Level (dBuV/m)			



Modulation	ax HE20	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Sean Yu Temperature(°C):23 Humidity(%):66			
Level (dBuV/m) </			



Modulation	ax HE20	Test Freq. (MHz)	2462
Polarization	Horizontal		
Test By :Sean Yu Temperature(°C):23 Humidity(%):66			
Level (dBUV/m) </			



Modulation	ax HE20	Test Freq. (MHz)	2462
Polarization	Vertical		
Test By :Sean Yu Temperature(°C):23 Humidity(%):66			
Level (dBUV/m)			

Unwanted Emissions (Above 1GHz) for ax HE40

Modulation	ax HE40	Test Freq. (MHz)	2422
Polarization	Horizontal		
Test By :Sean Yu Temperature(°C):23 Humidity(%):66			
Level (dBuV/m) </			



Modulation	ax HE40	Test Freq. (MHz)	2422
Polarization	Vertical		
Test By :Sean Yu Temperature(°C):23 Humidity(%):66			
Level (dBuV/m)			



Modulation	ax HE40	Test Freq. (MHz)	2437
Polarization	Horizontal		
Test By :Sean Yu Temperature(°C):23 Humidity(%):66			
Level (dBuV/m)			



Modulation	ax HE40	Test Freq. (MHz)	2437
Polarization	Vertical		
Test By :Sean Yu Temperature(°C):23 Humidity(%):66			
Level (dBuV/m) <			



Modulation	ax HE40	Test Freq. (MHz)	2452
Polarization	Horizontal		
Test By :Sean Yu Temperature(°C):23 Humidity(%):66			
Level (dBUV/m)			



Modulation	ax HE40	Test Freq. (MHz)	2452
Polarization	Vertical		
Test By :Sean Yu Temperature(°C):23 Humidity(%):66			
Level (dBUV/m)			

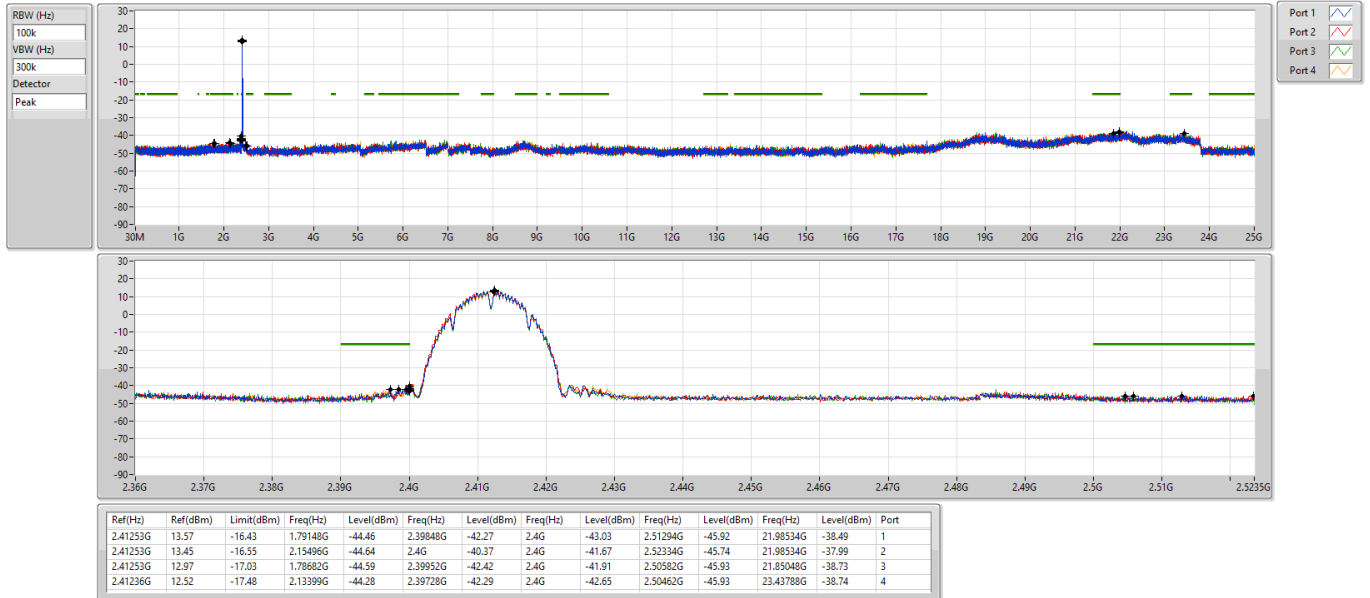


Non-beamforming mode

2.4-2.4835GHz_802.11b_Nss1,(1Mbps)_4TX

CSEndB

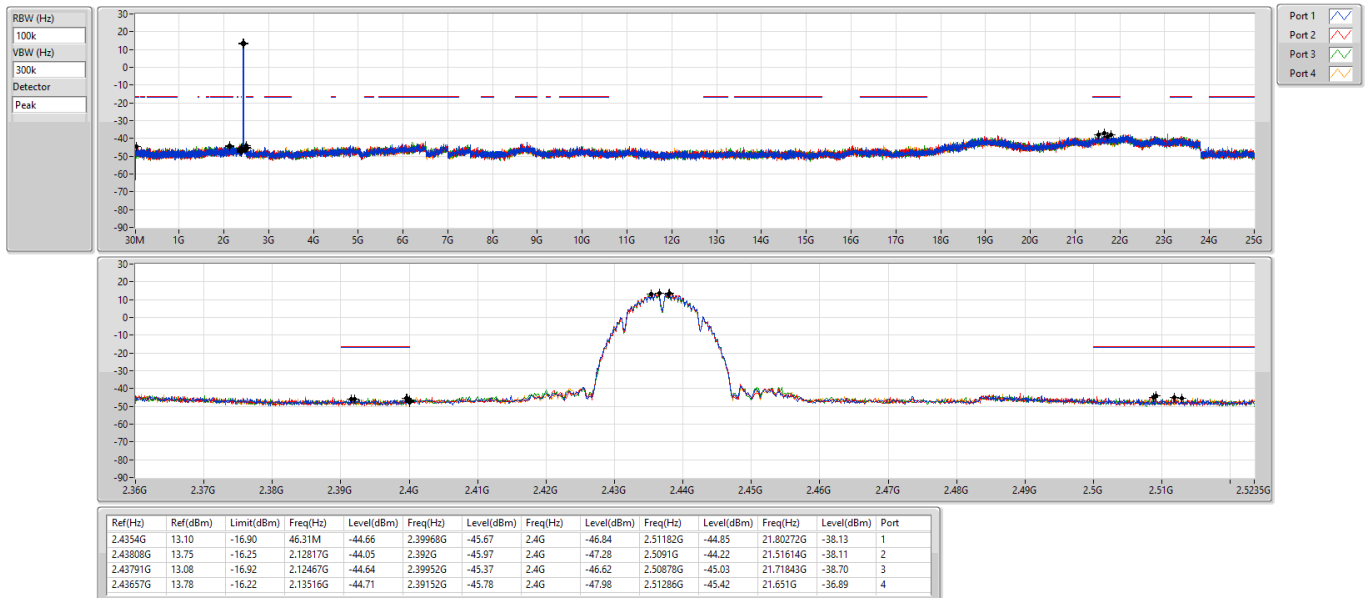
2412MHz



2.4-2.4835GHz_802.11b_Nss1,(1Mbps)_4TX

CSEndB

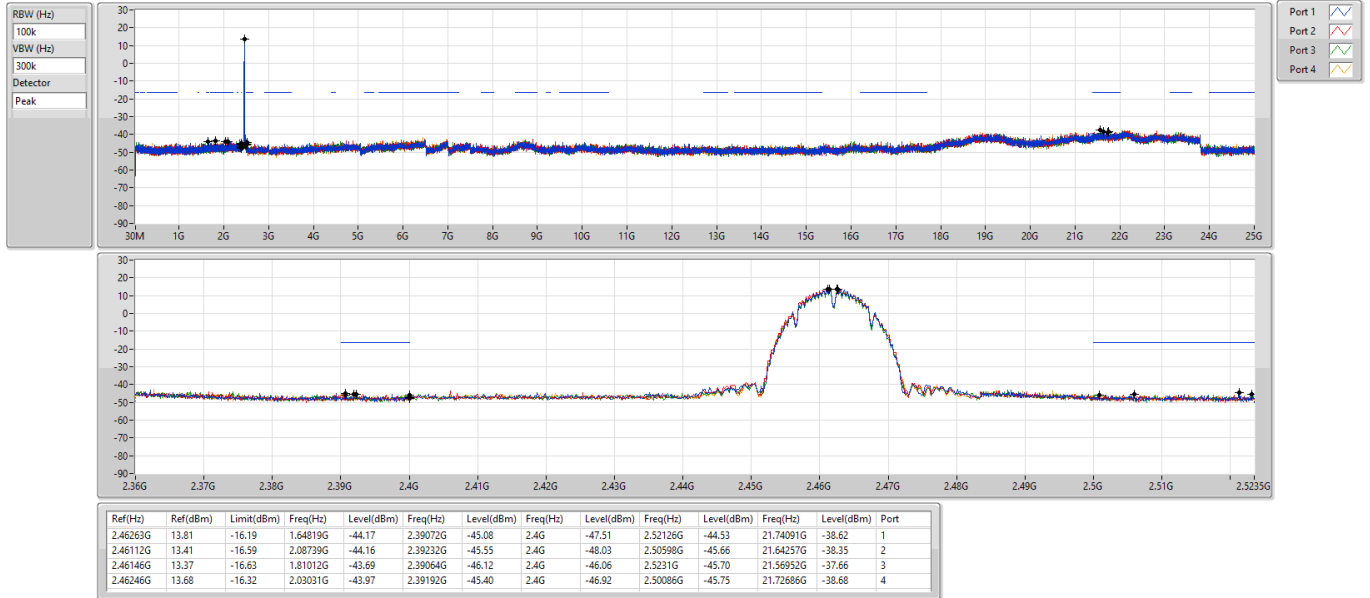
2437MHz



2.4-2.4835GHz_802.11b_Nss1,(1Mbps)_4TX

CSEndB

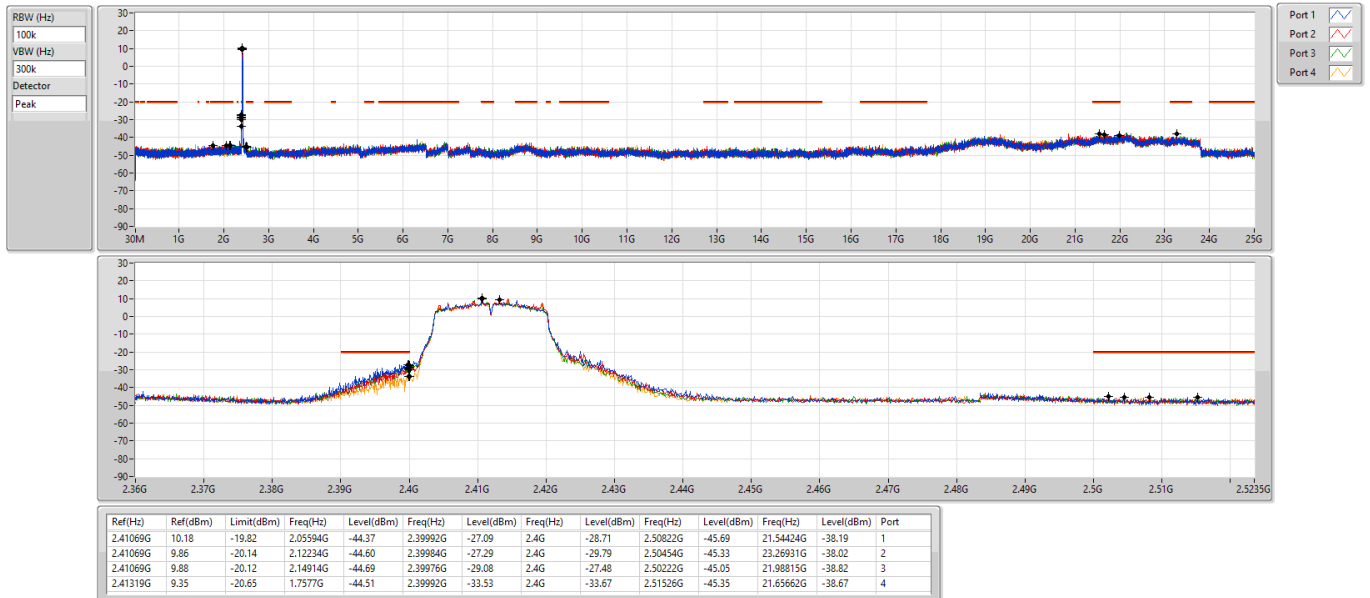
2462MHz



2.4-2.4835GHz_802.11g_Nss1,(6Mbps)_4TX

CSEndB

2412MHz

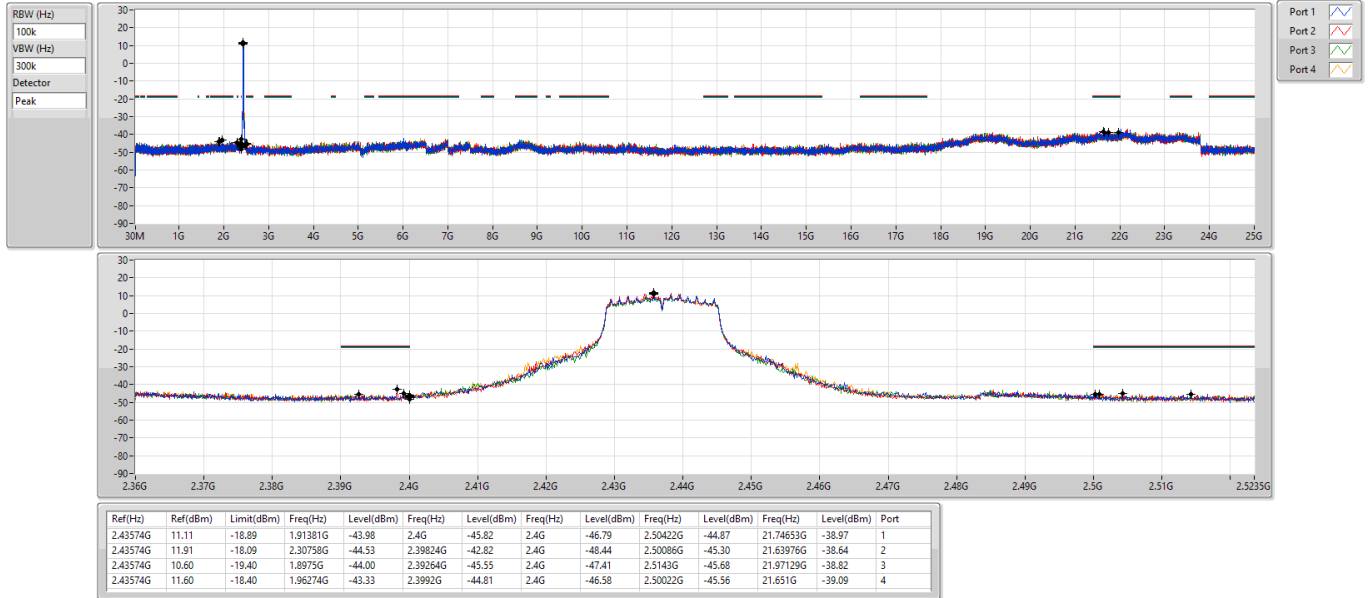




2.4-2.4835GHz_802.11g_Nss1,(6Mbps)_4TX

CSEndB

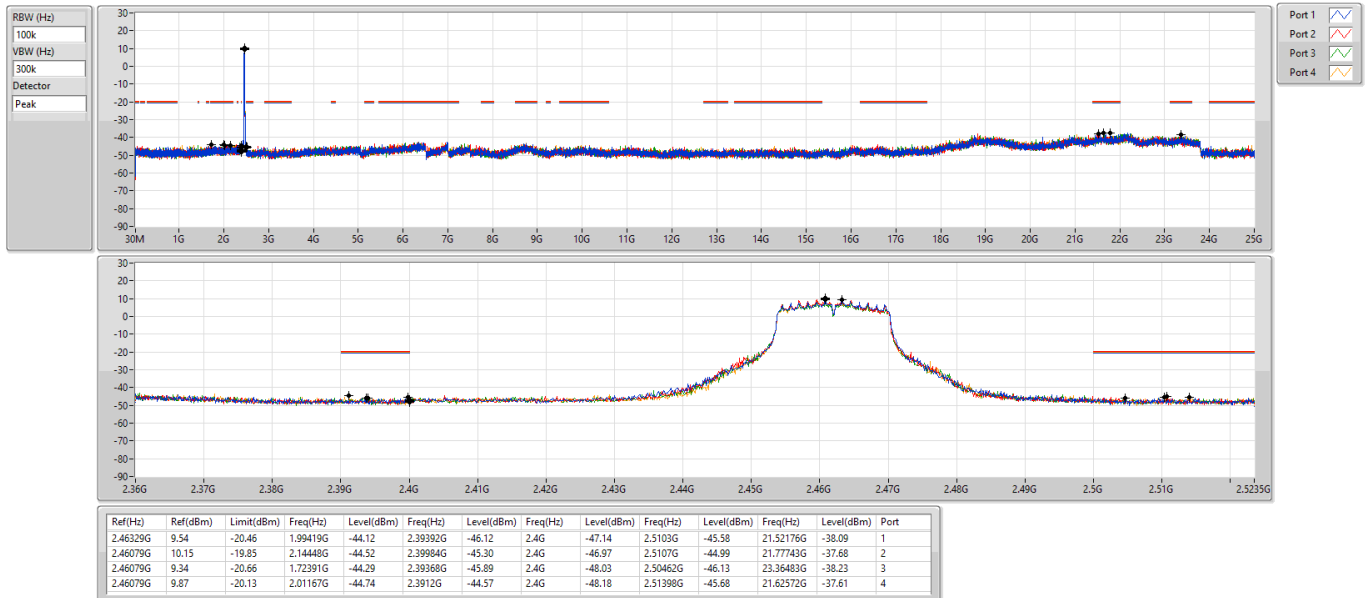
2437MHz



2.4-2.4835GHz_802.11g_Nss1,(6Mbps)_4TX

CSEndB

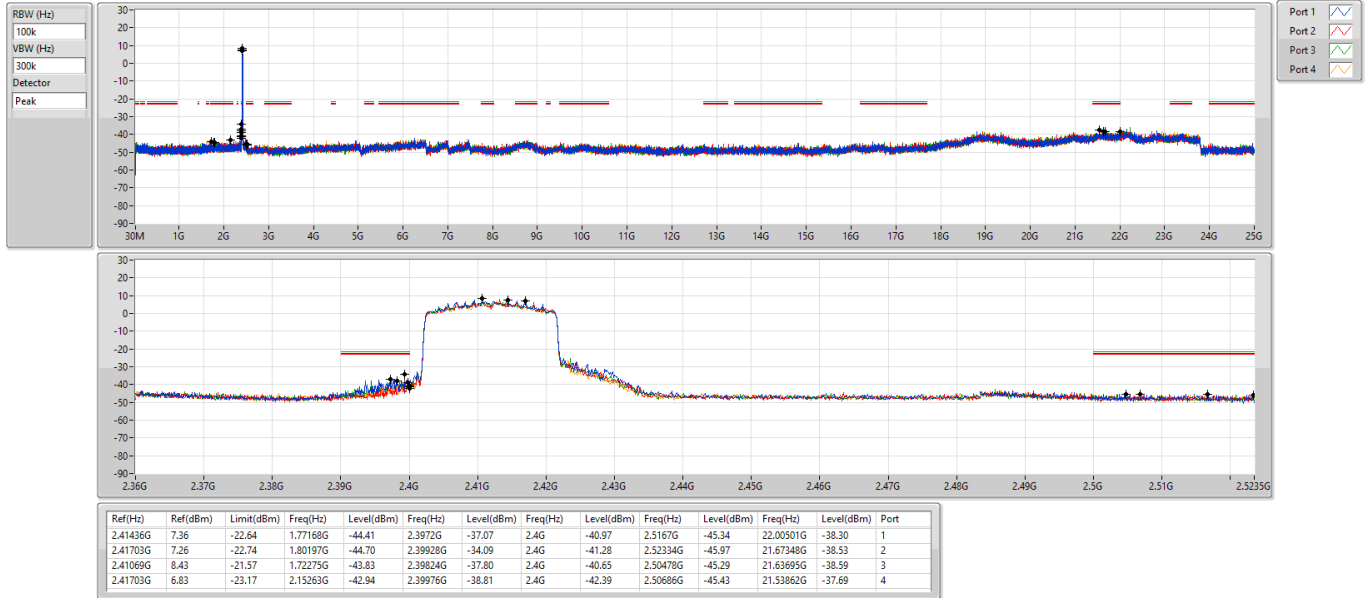
2462MHz



2.4-2.4835GHz_802.11ax_HEW20_Nss1,(MCS0)_4TX

CSEndB

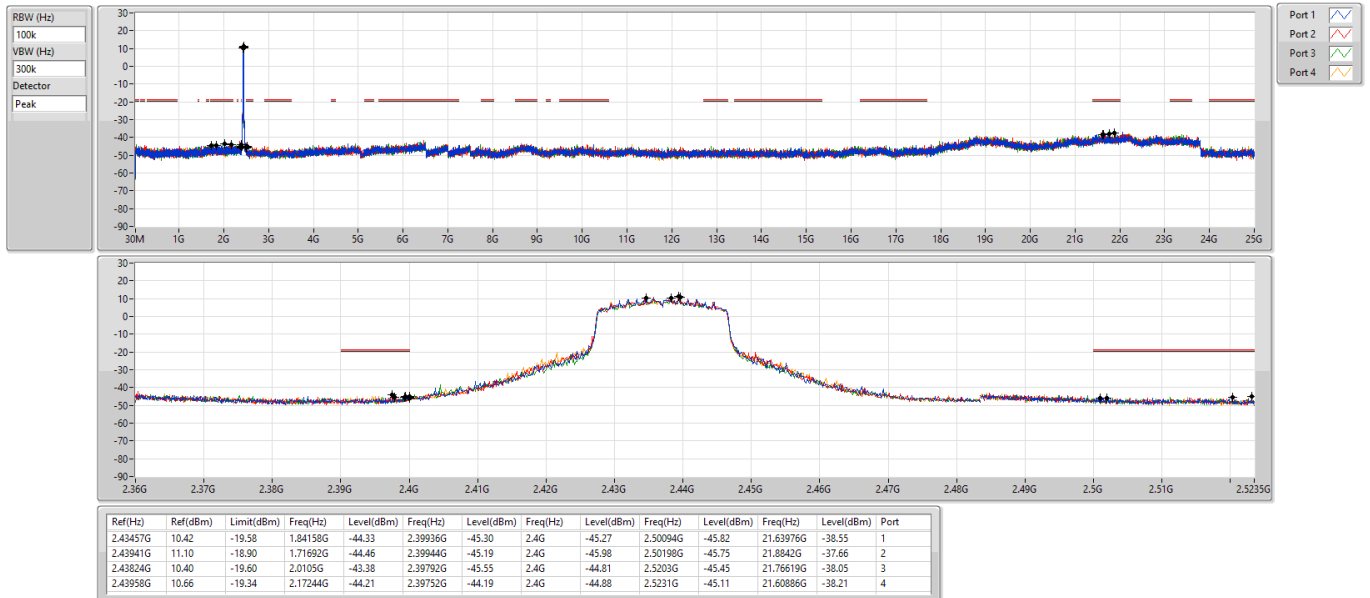
2412MHz



2.4-2.4835GHz_802.11ax_HEW20_Nss1,(MCS0)_4TX

CSEndB

2437MHz

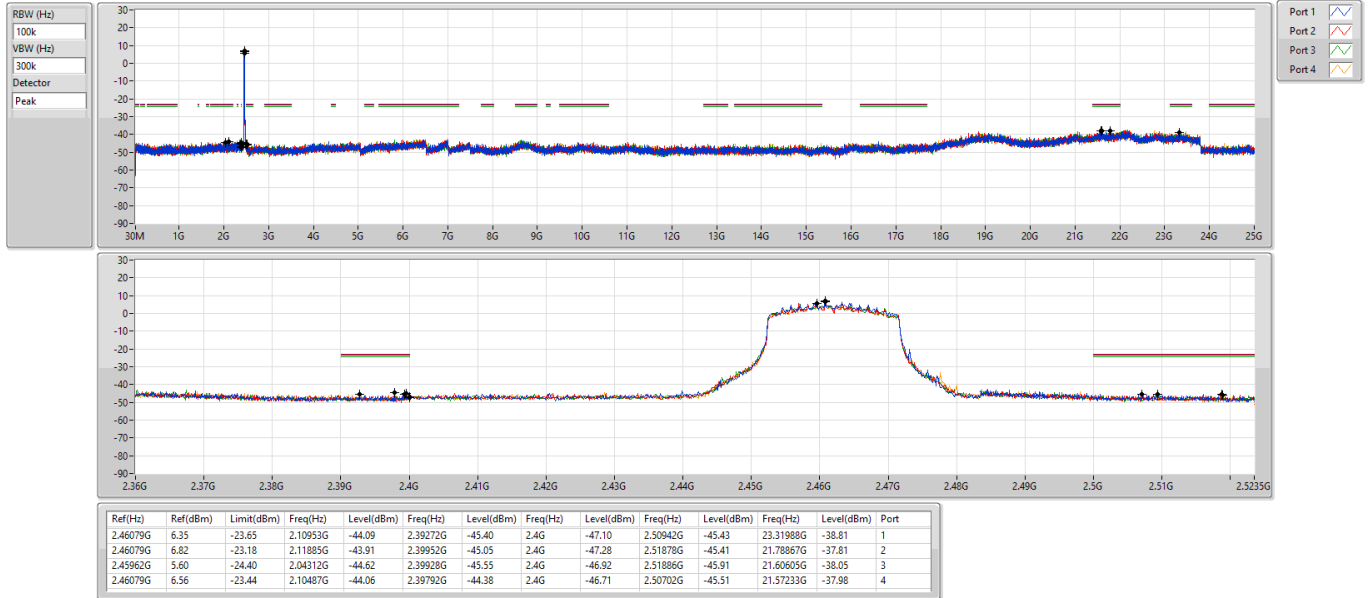




2.4-2.4835GHz_802.11ax_HEW20_Nss1,(MCS0)_4TX

CSEndB

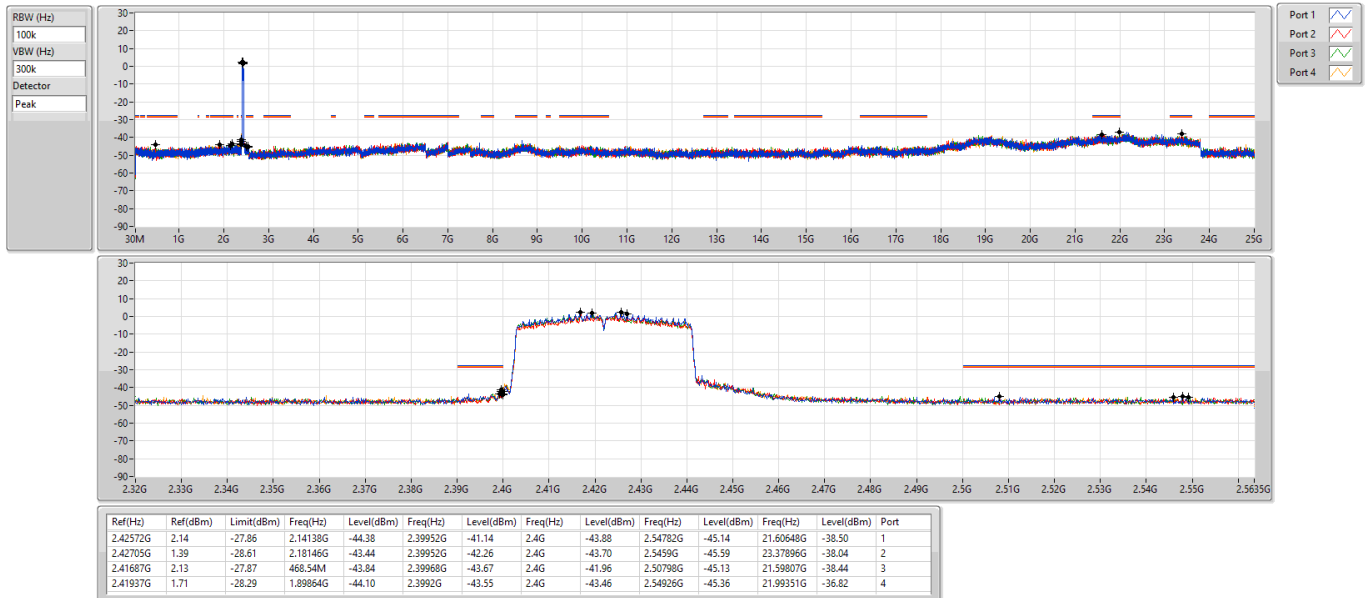
2462MHz



2.4-2.4835GHz_802.11ax_HEW40_Nss1,(MCS0)_4TX

CSEndB

2422MHz

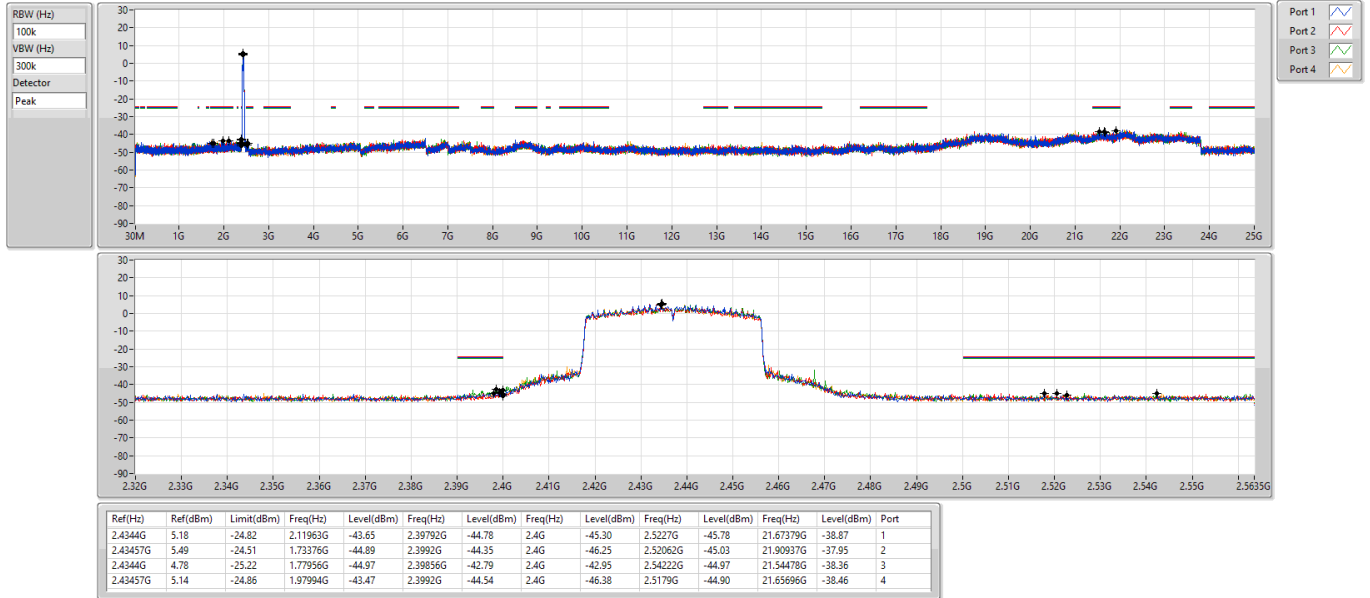




2.4-2.4835GHz_802.11ax HEW40_Nss1,(MCS0)_4TX

CSEndB

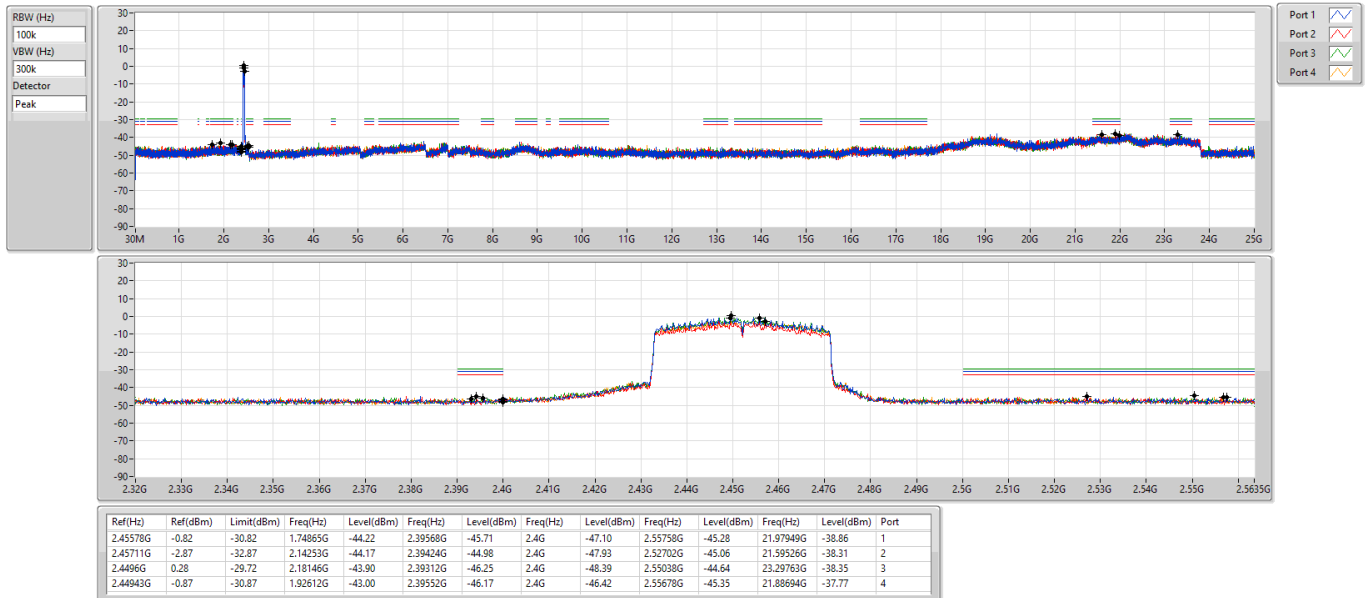
2437MHz



2.4-2.4835GHz_802.11ax HEW40_Nss1,(MCS0)_4TX

CSEndB

2452MHz



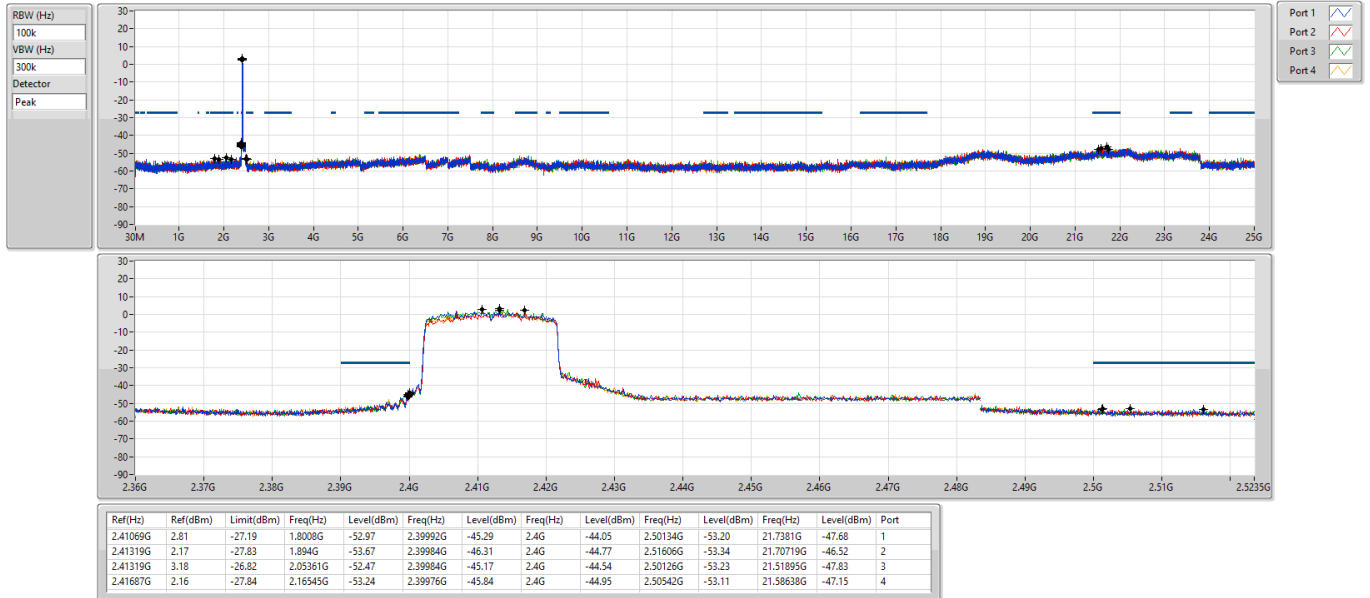


Beamforming mode

2.4-2.4835GHz_802.11ax_HEW20-BF_Nss1,(MCS0)_4TX

CSEndB

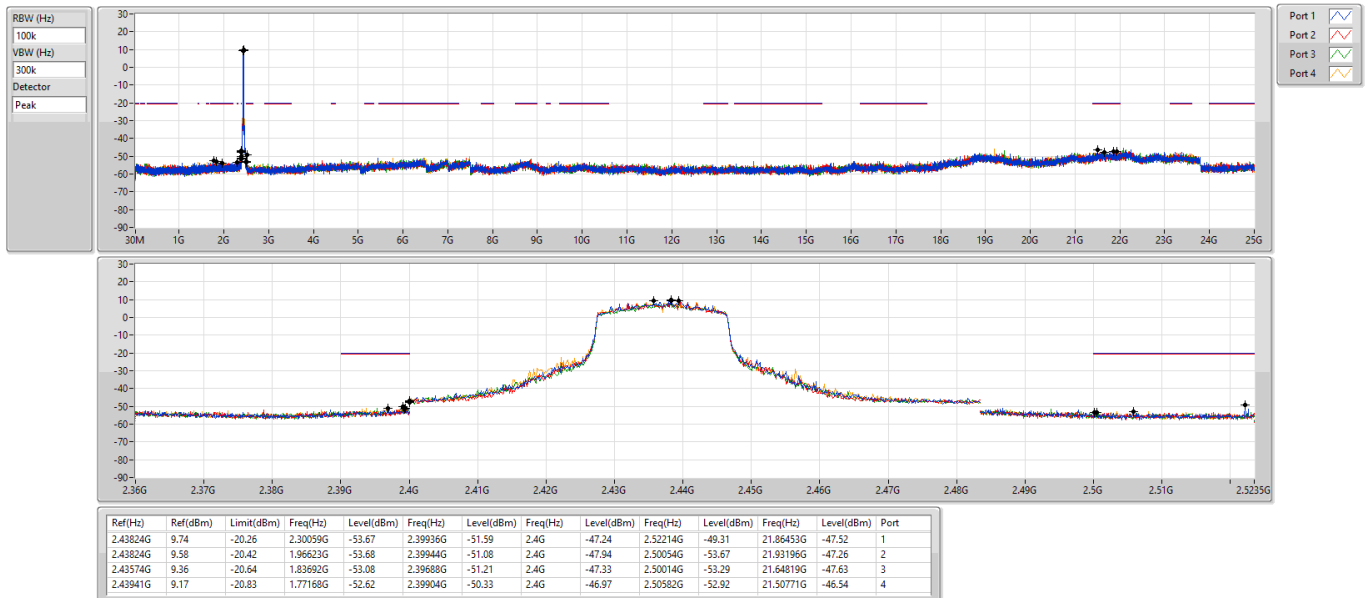
2412MHz



2.4-2.4835GHz_802.11ax_HEW20-BF_Nss1,(MCS0)_4TX

CSEndB

2437MHz

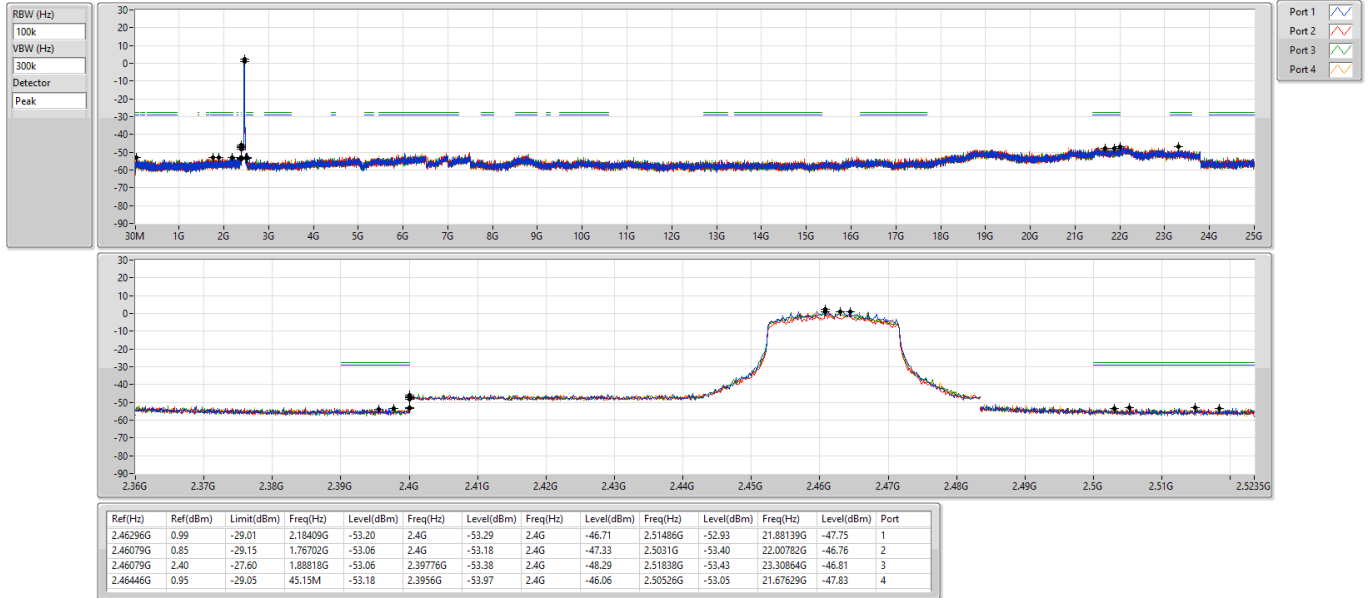




2.4-2.4835GHz_802.11ax HEW20-BF_Nss1,(MCS0)_4TX

CSEndB

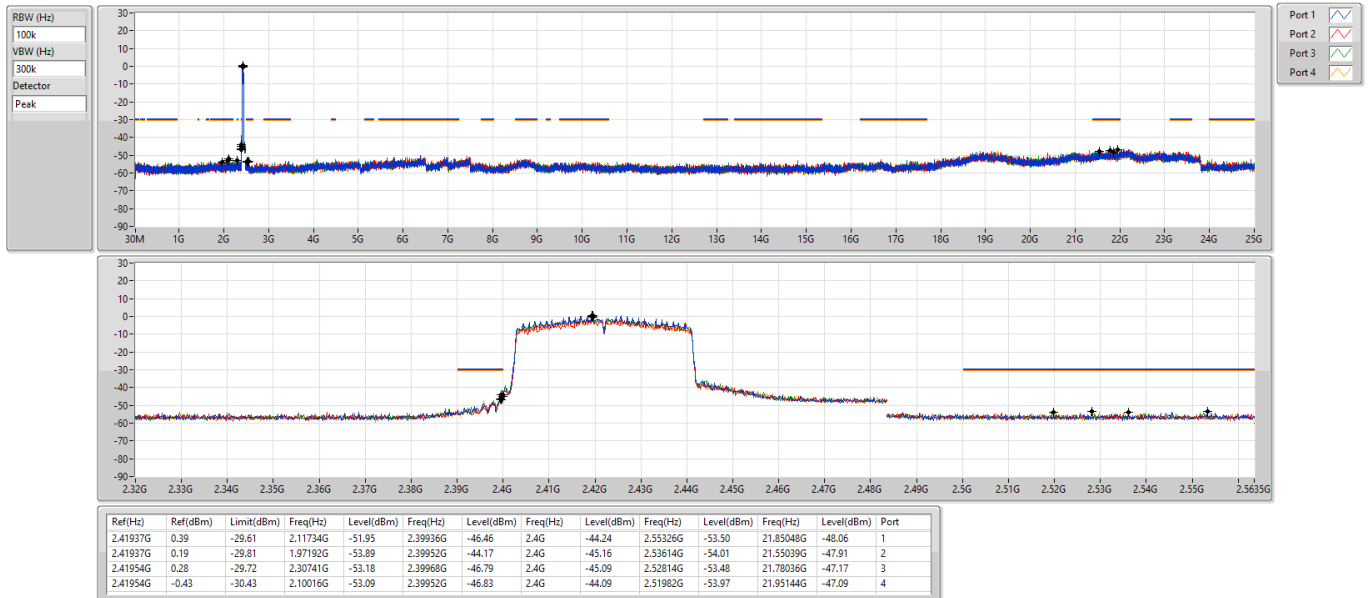
2462MHz



2.4-2.4835GHz_802.11ax HEW40-BF_Nss1,(MCS0)_4TX

CSEndB

2422MHz

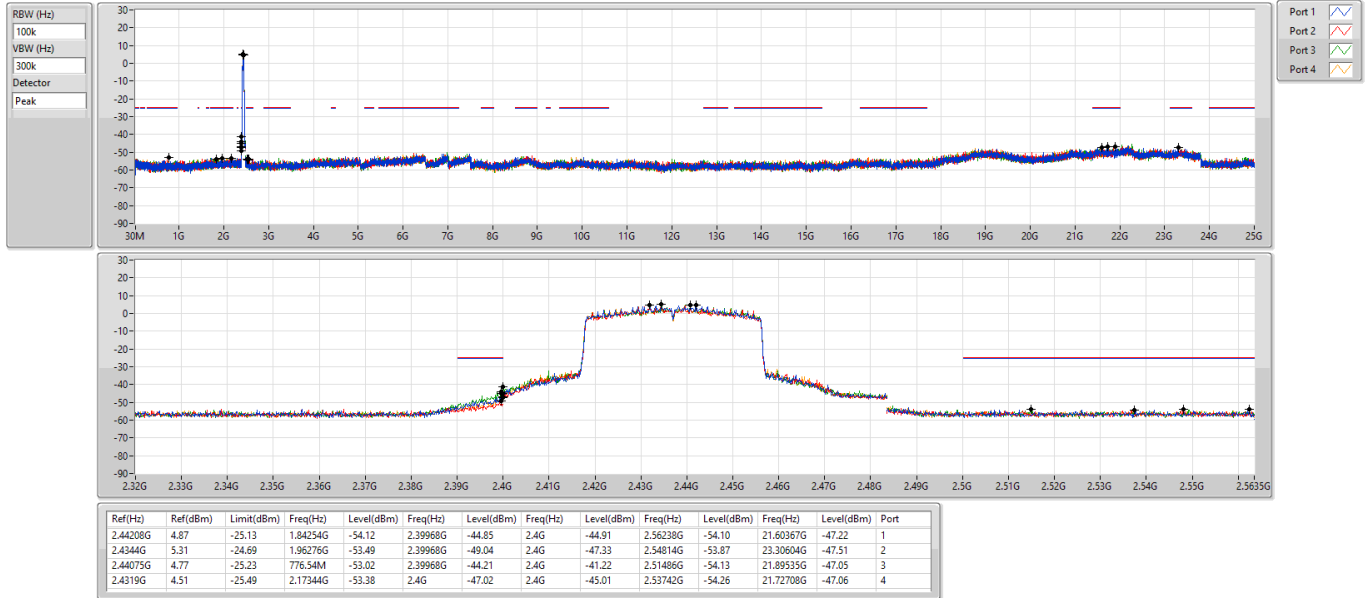




2.4-2.4835GHz_802.11ax HEW40-BF_Nss1,(MCS0)_4TX

CSEndB

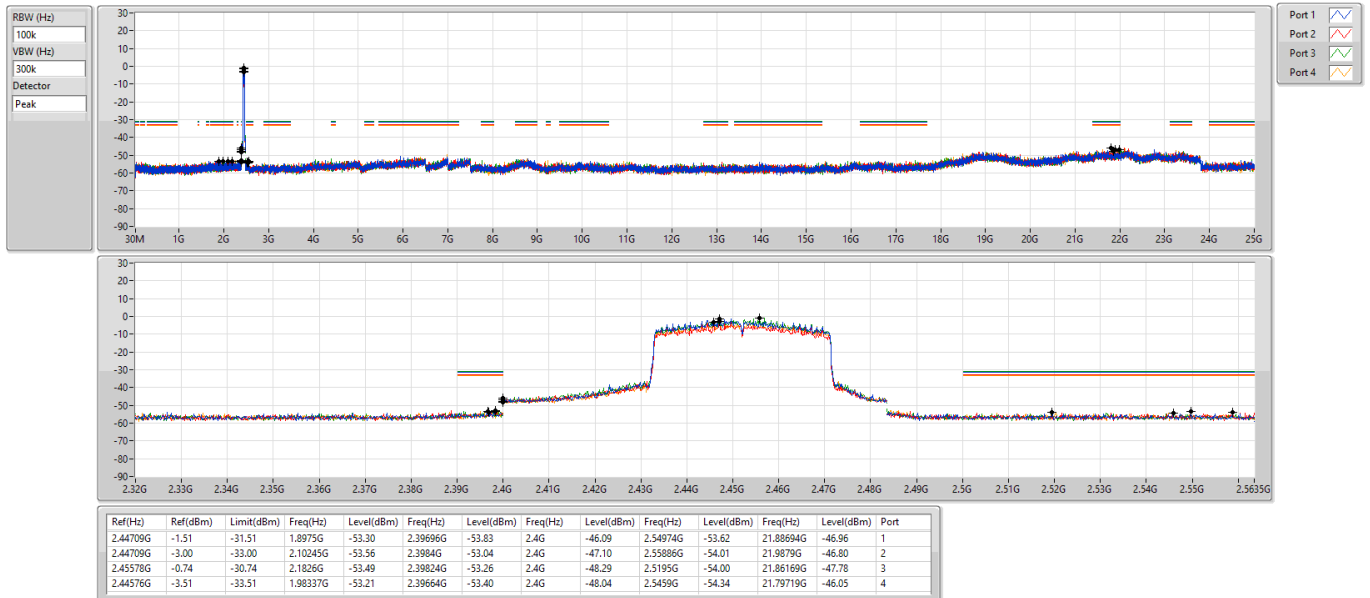
2437MHz



2.4-2.4835GHz_802.11ax HEW40-BF_Nss1,(MCS0)_4TX

CSEndB

2452MHz





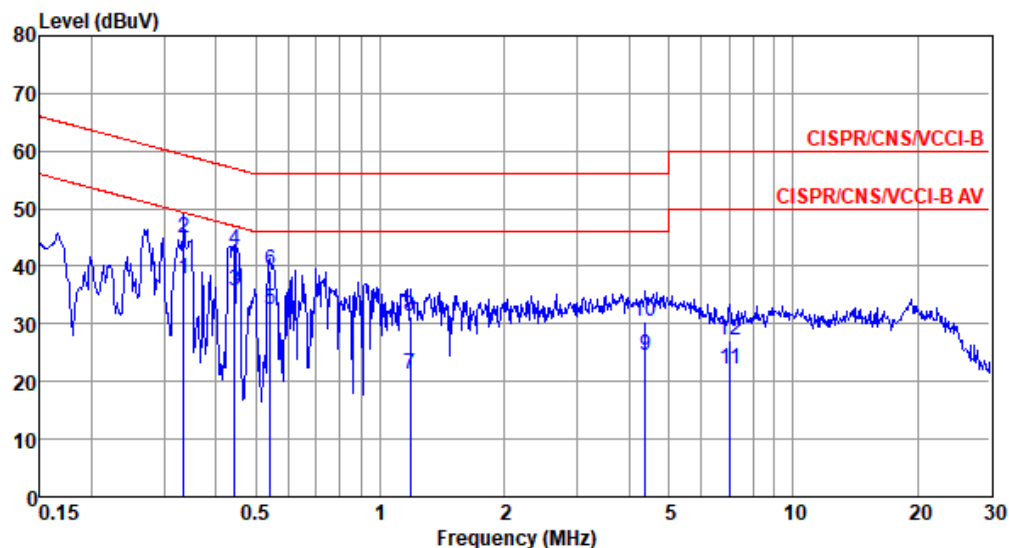
Non-beamforming mode

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

Test by : Joe Liao

Temperature: 24°C

Humidity: 62%



	Freq MHz	Level dBUV	Limit Line dBUV	Over Limit dB	Read Level dBUV	Factor dB	Cable loss dB	Aux dB	Remark
1	0.334	37.65	49.35	-11.70	27.70	9.62	0.06	0.27	Average
2	0.334	44.97	59.35	-14.38	35.02	9.62	0.06	0.27	QP
3*	0.444	35.75	46.98	-11.23	25.76	9.62	0.07	0.30	Average
4	0.444	42.83	56.98	-14.15	32.84	9.62	0.07	0.30	QP
5	0.541	32.56	46.00	-13.44	22.55	9.62	0.08	0.31	Average
6	0.541	39.31	56.00	-16.69	29.30	9.62	0.08	0.31	QP
7	1.184	21.39	46.00	-24.61	11.31	9.63	0.11	0.34	Average
8	1.184	31.32	56.00	-24.68	21.24	9.63	0.11	0.34	QP
9	4.384	24.56	46.00	-21.44	14.29	9.65	0.20	0.42	Average
10	4.384	30.31	56.00	-25.69	20.04	9.65	0.20	0.42	QP
11	7.025	22.08	50.00	-27.92	11.69	9.67	0.29	0.43	Average
12	7.025	27.24	60.00	-32.76	16.85	9.67	0.29	0.43	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).



Modulation Mode	11b	Test Freq. (MHz)	2437																																																																																																																																										
Power Phase	Neutral																																																																																																																																												
Test by : Joe Liao Temperature: 24°C Humidity: 62%																																																																																																																																													
<table><tr><th>Freq</th><th>Level</th><th>Limit</th><th>Over</th><th>Read</th><th>Factor</th><th>Cable</th><th>Aux</th><th>Remark</th></tr><tr><th>MHz</th><th>dBuV</th><th>Line</th><th>Limit</th><th>Level</th><th>dB</th><th>loss</th><th>dB</th><th></th></tr><tr><td>1</td><td>0.270</td><td>38.92</td><td>51.12</td><td>-12.20</td><td>28.99</td><td>9.63</td><td>0.06</td><td>0.24</td><td>Average</td></tr><tr><td>2</td><td>0.270</td><td>44.94</td><td>61.12</td><td>-16.18</td><td>35.01</td><td>9.63</td><td>0.06</td><td>0.24</td><td>QP</td></tr><tr><td>3</td><td>0.323</td><td>36.74</td><td>49.62</td><td>-12.88</td><td>26.79</td><td>9.62</td><td>0.06</td><td>0.27</td><td>Average</td></tr><tr><td>4</td><td>0.323</td><td>44.27</td><td>59.62</td><td>-15.35</td><td>34.32</td><td>9.62</td><td>0.06</td><td>0.27</td><td>QP</td></tr><tr><td>5*</td><td>0.437</td><td>38.67</td><td>47.11</td><td>-8.44</td><td>28.69</td><td>9.62</td><td>0.06</td><td>0.30</td><td>Average</td></tr><tr><td>6</td><td>0.437</td><td>44.04</td><td>57.11</td><td>-13.07</td><td>34.06</td><td>9.62</td><td>0.06</td><td>0.30</td><td>QP</td></tr><tr><td>7</td><td>0.555</td><td>29.40</td><td>46.00</td><td>-16.60</td><td>19.39</td><td>9.62</td><td>0.08</td><td>0.31</td><td>Average</td></tr><tr><td>8</td><td>0.555</td><td>39.05</td><td>56.00</td><td>-16.95</td><td>29.04</td><td>9.62</td><td>0.08</td><td>0.31</td><td>QP</td></tr><tr><td>9</td><td>1.959</td><td>27.97</td><td>46.00</td><td>-18.03</td><td>17.84</td><td>9.64</td><td>0.13</td><td>0.36</td><td>Average</td></tr><tr><td>10</td><td>1.959</td><td>35.39</td><td>56.00</td><td>-20.61</td><td>25.26</td><td>9.64</td><td>0.13</td><td>0.36</td><td>QP</td></tr><tr><td>11</td><td>7.646</td><td>26.65</td><td>50.00</td><td>-23.35</td><td>16.22</td><td>9.69</td><td>0.31</td><td>0.43</td><td>Average</td></tr><tr><td>12</td><td>7.646</td><td>32.50</td><td>60.00</td><td>-27.50</td><td>22.07</td><td>9.69</td><td>0.31</td><td>0.43</td><td>QP</td></tr></table>				Freq	Level	Limit	Over	Read	Factor	Cable	Aux	Remark	MHz	dBuV	Line	Limit	Level	dB	loss	dB		1	0.270	38.92	51.12	-12.20	28.99	9.63	0.06	0.24	Average	2	0.270	44.94	61.12	-16.18	35.01	9.63	0.06	0.24	QP	3	0.323	36.74	49.62	-12.88	26.79	9.62	0.06	0.27	Average	4	0.323	44.27	59.62	-15.35	34.32	9.62	0.06	0.27	QP	5*	0.437	38.67	47.11	-8.44	28.69	9.62	0.06	0.30	Average	6	0.437	44.04	57.11	-13.07	34.06	9.62	0.06	0.30	QP	7	0.555	29.40	46.00	-16.60	19.39	9.62	0.08	0.31	Average	8	0.555	39.05	56.00	-16.95	29.04	9.62	0.08	0.31	QP	9	1.959	27.97	46.00	-18.03	17.84	9.64	0.13	0.36	Average	10	1.959	35.39	56.00	-20.61	25.26	9.64	0.13	0.36	QP	11	7.646	26.65	50.00	-23.35	16.22	9.69	0.31	0.43	Average	12	7.646	32.50	60.00	-27.50	22.07	9.69	0.31	0.43	QP
Freq	Level	Limit	Over	Read	Factor	Cable	Aux	Remark																																																																																																																																					
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Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB) + Aux (dB). 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).																																																																																																																																													



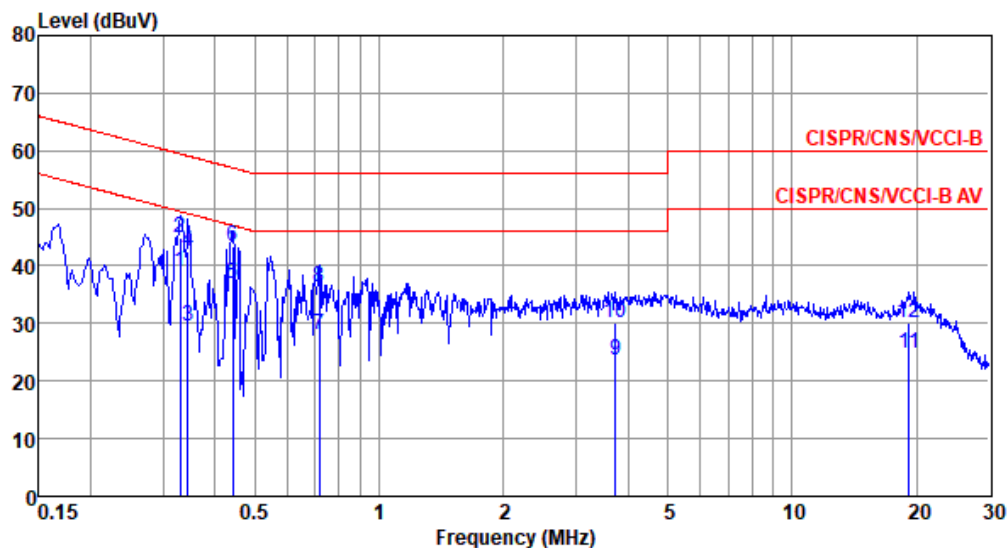
Beamforming mode

Modulation Mode	ax HE20	Test Freq. (MHz)	2437
Power Phase	Line		

Test by : Joe Liao

Temperature: 24°C

Humidity: 62%



	Freq MHz	Level dBUV	Limit Line dBUV	Over Limit dB	Read Level dBUV	Factor dB	Cable loss dB	Aux dB	Remark
1	0.330	38.88	49.44	-10.56	28.93	9.62	0.06	0.27	Average
2	0.330	44.85	59.44	-14.59	34.90	9.62	0.06	0.27	QP
3	0.345	29.60	49.09	-19.49	19.64	9.62	0.06	0.28	Average
4	0.345	42.62	59.09	-16.47	32.66	9.62	0.06	0.28	QP
5*	0.442	36.82	47.02	-10.20	26.83	9.62	0.07	0.30	Average
6	0.442	43.28	57.02	-13.74	33.29	9.62	0.07	0.30	QP
7	0.716	27.97	46.00	-18.03	17.93	9.63	0.09	0.32	Average
8	0.716	36.32	56.00	-19.68	26.28	9.63	0.09	0.32	QP
9	3.740	23.76	46.00	-22.24	13.52	9.65	0.18	0.41	Average
10	3.740	30.18	56.00	-25.82	19.94	9.65	0.18	0.41	QP
11	19.224	24.94	50.00	-25.06	14.24	9.68	0.50	0.52	Average
12	19.224	30.03	60.00	-29.97	19.33	9.68	0.50	0.52	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).



Modulation Mode	ax HE20	Test Freq. (MHz)	2437																																																																																																																																		
Power Phase	Neutral																																																																																																																																				
Test by : Joe Liao Temperature: 24°C Humidity: 62%																																																																																																																																					
Level (dBuV) Frequency (MHz) CISPR/CNS/VCCI-B CISPR/CNS/VCCI-B AV <table><tr><th></th><th>Freq MHz</th><th>Level dBuV</th><th>Limit Line dBuV</th><th>Over Limit dB</th><th>Read Level dBuV</th><th>Factor dB</th><th>Cable loss dB</th><th>Aux dB</th><th>Remark</th></tr><tr><td>1</td><td>0.273</td><td>40.01</td><td>51.03</td><td>-11.02</td><td>30.08</td><td>9.63</td><td>0.06</td><td>0.24</td><td>Average</td></tr><tr><td>2</td><td>0.273</td><td>44.70</td><td>61.03</td><td>-16.33</td><td>34.77</td><td>9.63</td><td>0.06</td><td>0.24</td><td>QP</td></tr><tr><td>3</td><td>0.339</td><td>32.43</td><td>49.22</td><td>-16.79</td><td>22.48</td><td>9.62</td><td>0.06</td><td>0.27</td><td>Average</td></tr><tr><td>4</td><td>0.339</td><td>42.92</td><td>59.22</td><td>-16.30</td><td>32.97</td><td>9.62</td><td>0.06</td><td>0.27</td><td>QP</td></tr><tr><td>5*</td><td>0.435</td><td>38.14</td><td>47.15</td><td>-9.01</td><td>28.16</td><td>9.62</td><td>0.06</td><td>0.30</td><td>Average</td></tr><tr><td>6</td><td>0.435</td><td>43.92</td><td>57.15</td><td>-13.23</td><td>33.94</td><td>9.62</td><td>0.06</td><td>0.30</td><td>QP</td></tr><tr><td>7</td><td>1.153</td><td>28.39</td><td>46.00</td><td>-17.61</td><td>18.31</td><td>9.63</td><td>0.11</td><td>0.34</td><td>Average</td></tr><tr><td>8</td><td>1.153</td><td>37.41</td><td>56.00</td><td>-18.59</td><td>27.33</td><td>9.63</td><td>0.11</td><td>0.34</td><td>QP</td></tr><tr><td>9</td><td>5.836</td><td>26.56</td><td>50.00</td><td>-23.44</td><td>16.21</td><td>9.67</td><td>0.25</td><td>0.43</td><td>Average</td></tr><tr><td>10</td><td>5.836</td><td>32.36</td><td>60.00</td><td>-27.64</td><td>22.01</td><td>9.67</td><td>0.25</td><td>0.43</td><td>QP</td></tr><tr><td>11</td><td>15.307</td><td>26.98</td><td>50.00</td><td>-23.02</td><td>16.28</td><td>9.77</td><td>0.44</td><td>0.49</td><td>Average</td></tr><tr><td>12</td><td>15.307</td><td>32.10</td><td>60.00</td><td>-27.90</td><td>21.40</td><td>9.77</td><td>0.44</td><td>0.49</td><td>QP</td></tr></table>					Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Aux dB	Remark	1	0.273	40.01	51.03	-11.02	30.08	9.63	0.06	0.24	Average	2	0.273	44.70	61.03	-16.33	34.77	9.63	0.06	0.24	QP	3	0.339	32.43	49.22	-16.79	22.48	9.62	0.06	0.27	Average	4	0.339	42.92	59.22	-16.30	32.97	9.62	0.06	0.27	QP	5*	0.435	38.14	47.15	-9.01	28.16	9.62	0.06	0.30	Average	6	0.435	43.92	57.15	-13.23	33.94	9.62	0.06	0.30	QP	7	1.153	28.39	46.00	-17.61	18.31	9.63	0.11	0.34	Average	8	1.153	37.41	56.00	-18.59	27.33	9.63	0.11	0.34	QP	9	5.836	26.56	50.00	-23.44	16.21	9.67	0.25	0.43	Average	10	5.836	32.36	60.00	-27.64	22.01	9.67	0.25	0.43	QP	11	15.307	26.98	50.00	-23.02	16.28	9.77	0.44	0.49	Average	12	15.307	32.10	60.00	-27.90	21.40	9.77	0.44	0.49	QP
	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Aux dB	Remark																																																																																																																												
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