

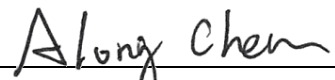
FCC Test Report

FCC ID : P27CAP1800AX
Equipment : CAP1800-AX
Model No. : CAP1800-AX
Brand Name : Centurylink
Applicant : Sercomm Corporation
Address : 8F, No. 3-1, YuanQu St., NanKang, Taipei 115,
Taiwan, R.O.C.
Standard : 47 CFR FCC Part 15.247
Received Date : Apr. 15, 2020
Tested Date : Apr. 24 ~ Jun. 04, 2020

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

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

Reviewed by:


Along Chen / Assistant Manager

Approved by:


Gary Chang / Manager



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Release Record

Report No.	Version	Description	Issued Date
FR041501AC	Rev. 01	Initial issue	Jul. 02, 2020

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 13.479MHz 37.13 (Margin -12.87dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2483.50MHz 72.95 (Margin -1.05dB) - PK	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: <i>Non-beamforming mode</i> 29.72 <i>Beamforming mode</i> 26.63	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]	2	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	2	6-54 Mbps
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	2	MCS 0-15
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	2	MCS 0-15
2400-2483.5	ac (VHT20)	2412-2462	1-11 [11]	2	MCS 0-9
2400-2483.5	ac (VHT40)	2422-2452	3-9 [7]	2	MCS 0-9
2400-2483.5	ax (HE20)	2412-2462	1-11 [11]	2	MCS 0-11
2400-2483.5	ax (HE40)	2422-2452	3-9 [7]	2	MCS 0-11

Note 1: RF output power specifies that Maximum Peak Conducted Output Power.
Note 2: Modulation
DSSS-DBPSK, DQPSK, CCK
OFDM/OFDMA- BPSK, QPSK, 16QAM, 64QAM, 256QAM and 1024QAM
Note 3: 802.11ax supports beamforming function.
Note 4: 802.11ax supports full RU tones only.

1.1.2 Antenna Details

Ant. No.	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)				
				2400~2483.5	5150~5250	5250~5350	5470~5725	5725~5850
1	ANT 1	Dipole	I-PEX	3.1	--	--	--	--
2	ANT 2	Dipole	I-PEX	4	--	--	--	--
3	ANT 3	Dipole	I-PEX	--	2.4	2.4	2.6	2.3
4	ANT 4	Dipole	I-PEX	--	3.3	3.3	2.9	2.7

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	12Vdc from adapter
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1.1.4 Accessories

Accessories		
No.	Equipment	Description
1	AC adapter	Brand: LEI Model: MU24B1120200-A1 I/P: 100-240Vac, 50/60Hz, 0.7A O/P: 12Vdc, 2A Power Line: 1.5m non-shielded without core
2	AC adapter	Brand: Sercomm Model: PU24W120ULB15-DFD-00 I/P: 100-240Vac, 50/60Hz, 0.8A O/P: 12Vdc, 2A Power Line: 1.5m non-shielded without core
3	AC adapter	Brand: Actiontec Model: CDS024T-W120U I/P: 120Vac, 50/60Hz, 0.58A O/P: 12Vdc, 2A Power Line: 1.8m non-shielded without core
4	RJ45 cable	Brand: Ekson Model: 4550159REK 1.83m non-shielded without core
5	RJ45 cable	Brand: EJE Model: ZY-875 1.75m non-shielded without core

1.1.5 Channel List

Frequency band (MHz)		2400~2483.5	
802.11bg / n HT20 / ac VHT20 / ax HE20		802.11n HT40 / ac VHT40 / 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	QATool, V.0.0.2.15		
Duty Cycle and Duty Factor	Mode	Duty Cycle (%)	Duty Factor (dB)
	11b	99.71%	0.01
	11g	98.94%	0.05
	ax (HE20)	98.31%	0.07
	ax (HE40)	95.89%	0.18

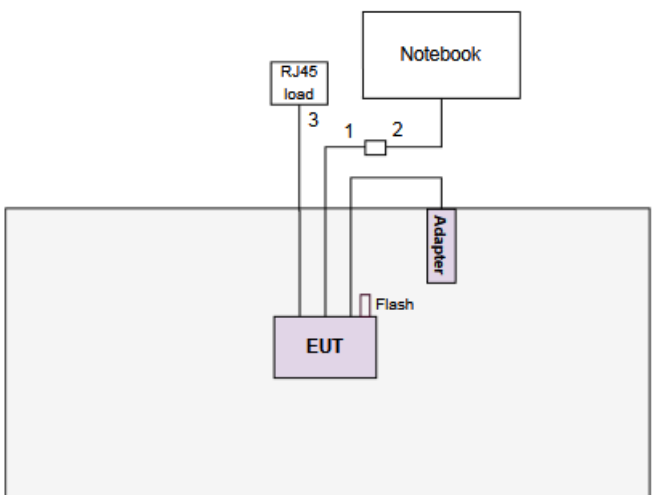
1.1.7 Power Index of Test Tool

Modulation Mode	Test Frequency (MHz)	Power Index
11b	2412	18
11b	2437	21
11b	2462	17
11g	2412	15
11g	2437	19
11g	2462	15
11ax HE20	2412	16
11ax HE20	2437	20
11ax HE20	2462	16
11ax HE40	2422	15
11ax HE40	2437	16
11ax HE40	2452	15

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Notebook	DELL	Latitude E6430	DoC	---
2	USB 3.0 Flash	Transcend	JetFlash 700	---	---
3	RJ45 load	ICC	---	---	---

1.3 Test Setup Chart

Test Setup Diagram	
Kept in control area 	
No.	Signal cable / Length (m)
1	RJ45, 1.83m non-shielded.
2	RJ45, 10m non-shielded.
3	RJ45, 1.3m non-shielded with load.

1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Jun. 04, 2020				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101658	Dec. 12, 2019	Dec. 11, 2020
LISN	R&S	ENV216	101579	Mar. 12, 2020	Mar. 11, 2021
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 22, 2019	Oct. 21, 2020
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber1 / (03CH01-WS)				
Tested Date	Apr. 24 ~ May 08, 2020				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101498	Dec. 17, 2019	Dec. 16, 2020
Receiver	R&S	ESR3	101657	Feb. 14, 2020	Feb. 13, 2021
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jul. 12, 2019	Jul. 11, 2020
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 12, 2019	Dec. 11, 2020
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 15, 2019	Nov. 14, 2020
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 13, 2019	Nov. 12, 2020
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 07, 2019	Oct. 06, 2020
Preamplifier	EMC	EMC02325	980225	Jul. 09, 2019	Jul. 08, 2020
Preamplifier	Agilent	83017A	MY39501308	Oct. 08, 2019	Oct. 07, 2020
Preamplifier	EMC	EMC184045B	980192	Aug. 01, 2019	Jul. 31, 2020
RF Cable	EMC	EMC104-SM-SM-8000	181106	Oct. 07, 2019	Oct. 06, 2020
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 07, 2019	Oct. 06, 2020
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Oct. 07, 2019	Oct. 06, 2020
LF cable 1M	EMC	EMCCFD400-NM-NM-1000	160502	Oct. 07, 2019	Oct. 06, 2020
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 07, 2019	Oct. 06, 2020
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Oct. 07, 2019	Oct. 06, 2020
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	Jun. 02, 2020				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Apr. 30, 2020	Apr. 29, 2021
Power Meter	Anritsu	ML2495A	1241002	Oct. 23, 2019	Oct. 22, 2020
Power Sensor	Anritsu	MA2411B	1207366	Oct. 23, 2019	Oct. 22, 2020
AC POWER SOURCE	APC	AFC-500W	F312060012	Dec. 02, 2019	Dec. 01, 2020
Measurement Software	Sporton	SENSE-15247_DTS	V5.9	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
Radiated emission ≤ 1 GHz	± 3.41 dB
Radiated emission > 1 GHz	± 4.59 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	24°C / 59%	Alex Tsai
Radiated Emissions	03CH01-WS	21-25°C / 66-67%	Roger Lu Akun Chung
RF Conducted	TH01-WS	24°C / 67%	Aska Huang

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- ISED#: 10807A
- CAB identifier: TW2732

2.2 Testing Facility

Test Laboratory	International Certification Corp.
Test Site	CO01-WS, 03CH01-WS, TH01-WS
Address of Test Site	No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.

2.3 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration
Conducted Emissions	11g	2437	6 Mbps	Non-beamforming
Radiated Emissions ≤1GHz	11g	2437	6 Mbps	Non-beamforming
Maximum Output Power	11b 11g 11ax HE20 11ax HE40	2412 / 2437 / 2462 2412 / 2437 / 2462 2412 / 2437 / 2462 2422 / 2437 / 2452	1 Mbps 6 Mbps MCS 0 MCS 0	Non-beamforming
Maximum Output Power	11ax HE20 11ax HE40	2412 / 2437 / 2462 2422 / 2437 / 2452	MCS 0 MCS 0	Beamforming
Radiated Emissions >1GHz 6dB bandwidth Power spectral density	11b 11g 11ax HE20 11ax HE40	2412 / 2437 / 2462 2412 / 2437 / 2462 2412 / 2437 / 2462 2422 / 2437 / 2452	1 Mbps 6 Mbps MCS 0 MCS 0	Non-beamforming

NOTE:

- Two RJ45 cables (Ekson & EJE) had been covered during the pretest and found that **Ekson** RJ45 cable was the worst case and was selected for final testing.
- Three adapters (LEI, Sercomm & Actiontec) had been covered during the pretest and found that **LEI** adapter was the worst case for radiated emission test and **Actiontec** adapter was the worst case for conducted emission test

3 Transmitter Test Results

3.1 Conducted Emissions

3.1.1 Limit of Conducted Emissions

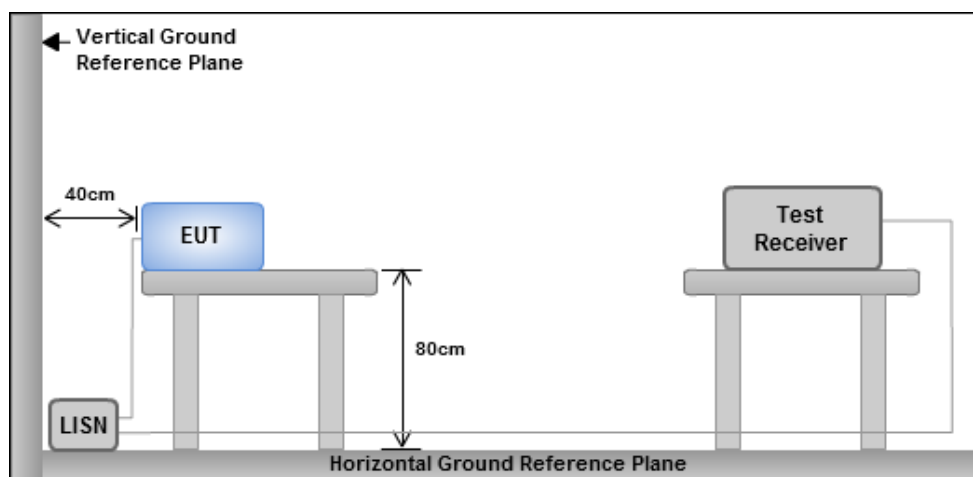
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

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

3.1.2 Test Procedures

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

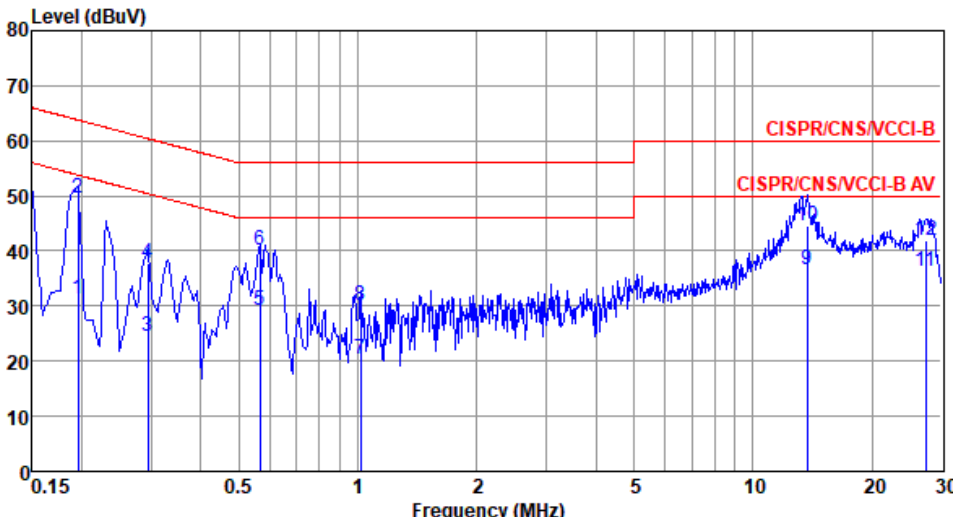
3.1.3 Test Setup



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

3.1.4 Test Result of Conducted Emissions

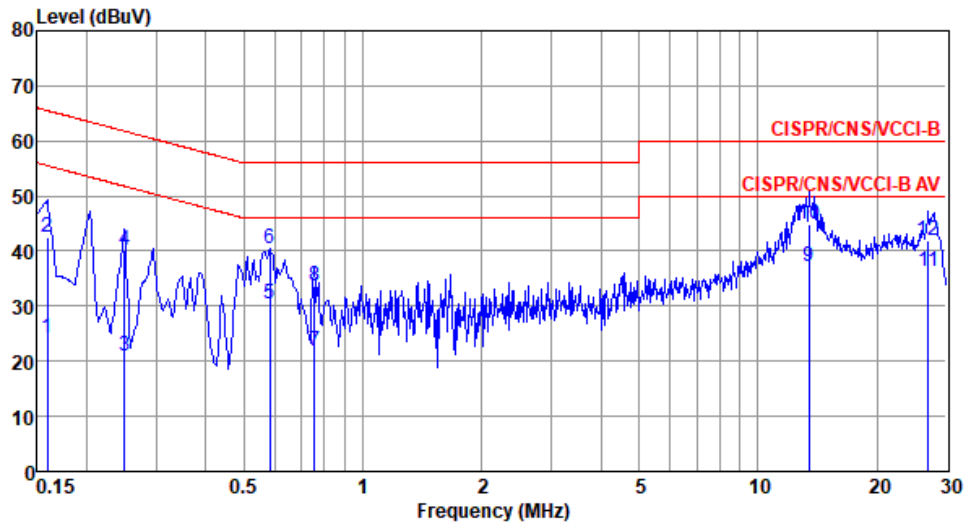
Modulation	11g	Test Freq. (MHz)	2437
Power Phase	Line		



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.195	31.16	53.80	-22.64	21.28	9.63	0.06	Average
2	0.195	49.68	63.80	-14.12	39.80	9.63	0.06	QP
3	0.294	24.48	50.41	-25.93	14.56	9.63	0.07	Average
4	0.294	37.72	60.41	-22.69	27.80	9.63	0.07	QP
5	0.564	29.20	46.00	-16.80	19.20	9.63	0.09	Average
6	0.564	40.26	56.00	-15.74	30.26	9.63	0.09	QP
7	1.016	20.45	46.00	-25.55	10.38	9.63	0.12	Average
8	1.016	30.21	56.00	-25.79	20.14	9.63	0.12	QP
9*	13.695	36.52	50.00	-13.48	25.81	9.70	0.55	Average
10	13.695	44.49	60.00	-15.51	33.78	9.70	0.55	QP
11	27.416	36.38	50.00	-13.62	25.20	9.64	0.75	Average
12	27.416	41.96	60.00	-18.04	30.78	9.64	0.75	QP

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

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



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.159	24.28	55.52	-31.24	14.44	9.66	0.05	Average
2	0.159	42.42	65.52	-23.10	32.58	9.66	0.05	QP
3	0.249	20.95	51.78	-30.83	11.07	9.65	0.07	Average
4	0.249	40.17	61.78	-21.61	30.29	9.65	0.07	QP
5	0.582	30.44	46.00	-15.56	20.51	9.65	0.10	Average
6	0.582	40.30	56.00	-15.70	30.37	9.65	0.10	QP
7	0.755	21.74	46.00	-24.26	11.79	9.65	0.11	Average
8	0.755	33.67	56.00	-22.33	23.72	9.65	0.11	QP
9*	13.479	37.13	50.00	-12.87	26.45	9.78	0.54	Average
10	13.479	44.88	60.00	-15.12	34.20	9.78	0.54	QP
11	26.984	36.22	50.00	-13.78	24.98	9.79	0.74	Average
12	26.984	42.03	60.00	-17.97	30.79	9.79	0.74	QP

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

3.2 6dB and Occupied Bandwidth

3.2.1 Limit of 6dB Bandwidth

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

3.2.2 Test Procedures

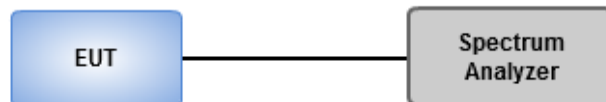
6dB Bandwidth

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

Occupied Bandwidth

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

3.2.3 Test Setup



3.2.4 Test Result of 6dB and Occupied Bandwidth

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
802.11b_Nss1,(1Mbps)_2TX	9.565M	14.182M	14M2G1D	7.029M	12.663M
802.11g_Nss1,(6Mbps)_2TX	16.377M	17.294M	17M3D1D	14.493M	16.353M
802.11ax HEW20_Nss1,(MCS0)_2TX	18.696M	19.32M	19M3D1D	17.681M	18.886M
802.11ax HEW40_Nss1,(MCS0)_2TX	36.957M	37.627M	37M6D1D	34.928M	37.482M

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

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

Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)	Port 2-N dB (Hz)	Port 2-OBW (Hz)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	7.536M	12.735M	7.029M	12.808M
2437MHz	Pass	500k	9.565M	14.182M	7.609M	13.097M
2462MHz	Pass	500k	8.043M	12.663M	7.609M	12.808M
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	15.87M	16.425M	15.652M	16.353M
2437MHz	Pass	500k	16.377M	17.294M	16.014M	16.643M
2462MHz	Pass	500k	14.493M	16.425M	15.072M	16.425M
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	18.696M	18.958M	18.551M	19.03M
2437MHz	Pass	500k	18.551M	19.32M	17.681M	19.03M
2462MHz	Pass	500k	18.623M	18.958M	18.623M	18.886M
802.11ax HEW40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	500k	36.522M	37.627M	35.797M	37.627M
2437MHz	Pass	500k	34.928M	37.627M	35.217M	37.627M
2452MHz	Pass	500k	35.942M	37.627M	36.957M	37.482M

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

3.3 RF Output Power

3.3.1 Limit of RF Output Power

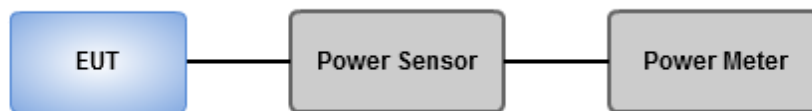
Conducted power shall not exceed 1Watt.

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

3.3.2 Test Procedures

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

3.3.3 Test Setup



3.3.4 Test Result of Maximum Output Power

Non-beamforming mode

Summary of Conducted (Peak) Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_2TX	28.31	0.67764
802.11g_Nss1,(6Mbps)_2TX	29.72	0.93756
802.11ax HEW20_Nss1,(MCS0)_2TX	29.64	0.92045
802.11ax HEW40_Nss1,(MCS0)_2TX	28.32	0.67920

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	4.00	22.68	22.30	25.50	30.00	29.50	36.00
2437MHz	Pass	4.00	25.56	25.02	28.31	30.00	32.31	36.00
2462MHz	Pass	4.00	21.79	21.27	24.55	30.00	28.55	36.00
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	4.00	25.34	25.01	28.19	30.00	32.19	36.00
2437MHz	Pass	4.00	26.68	26.74	29.72	30.00	33.72	36.00
2462MHz	Pass	4.00	25.66	25.11	28.40	30.00	32.40	36.00
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	4.00	25.22	25.01	28.13	30.00	32.13	36.00
2437MHz	Pass	4.00	26.63	26.63	29.64	30.00	33.64	36.00
2462MHz	Pass	4.00	25.56	25.12	28.36	30.00	32.36	36.00
802.11ax HEW40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2422MHz	Pass	4.00	24.19	24.01	27.11	30.00	31.11	36.00
2437MHz	Pass	4.00	25.66	24.93	28.32	30.00	32.32	36.00
2452MHz	Pass	4.00	24.56	24.02	27.31	30.00	31.31	36.00

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

Summary of Conducted (Average) Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_2TX	26.29	0.42560
802.11g_Nss1,(6Mbps)_2TX	24.37	0.27353
802.11ax HEW20_Nss1,(MCS0)_2TX	24.29	0.26853
802.11ax HEW40_Nss1,(MCS0)_2TX	20.29	0.10691

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	4.00	20.21	19.86	23.05	-	27.05	-
2437MHz	Pass	4.00	23.69	22.82	26.29	-	30.29	-
2462MHz	Pass	4.00	19.28	18.81	22.06	-	26.06	-
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	4.00	17.48	17.19	20.35	-	24.35	-
2437MHz	Pass	4.00	21.76	20.92	24.37	-	28.37	-
2462MHz	Pass	4.00	17.72	17.28	20.52	-	24.52	-
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	4.00	17.38	17.05	20.23	-	24.23	-
2437MHz	Pass	4.00	21.67	20.84	24.29	-	28.29	-
2462MHz	Pass	4.00	17.62	17.17	20.41	-	24.41	-
802.11ax HEW40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2422MHz	Pass	4.00	16.22	15.93	19.09	-	23.09	-
2437MHz	Pass	4.00	17.73	16.78	20.29	-	24.29	-
2452MHz	Pass	4.00	16.53	16.64	19.60	-	23.60	-

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

Note : Conducted average output power is for reference only

Beamforming mode

Summary of Conducted (Peak) Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	26.63	0.46026
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	25.31	0.33963

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	6.57	22.21	22	25.12	29.43	31.69	36.00
2437MHz	Pass	6.57	23.62	23.62	26.63	29.43	33.20	36.00
2462MHz	Pass	6.57	22.55	22.11	25.35	29.43	31.92	36.00
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2422MHz	Pass	6.57	21.18	21	24.10	29.43	30.67	36.00
2437MHz	Pass	6.57	22.65	21.92	25.31	29.43	31.88	36.00
2452MHz	Pass	6.57	21.55	21.01	24.30	29.43	30.87	36.00

DG = Directional Gain = $10 * \log((10^{3.1/20} + 10^{4/20})/2) = 6.57 \text{ dBi} > 6 \text{ dBi}$, limit shall be reduced to $30 \text{ dBm} - (6.57 \text{ dBi} - 6 \text{ dBi}) = 29.43 \text{ dBm}$

Port X = Port X output power

Summary of Conducted (Average) Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	21.28	0.13428
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	17.28	0.05346

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	6.57	14.37	14.04	17.22	-	23.79	-
2437MHz	Pass	6.57	18.66	17.83	21.28	-	27.85	-
2462MHz	Pass	6.57	14.61	14.16	17.40	-	23.97	-
802.11ax HEW40-BF_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2422MHz	Pass	6.57	13.21	12.92	16.08	-	22.65	-
2437MHz	Pass	6.57	14.72	13.77	17.28	-	23.85	-
2452MHz	Pass	6.57	13.52	13.63	16.59	-	23.16	-

DG = Directional Gain; $10 * \log((10^{3.1/20} + 10^{4/20})^2 / 2) = 6.57$ dBi

Port X = Port X output power

Note : Conducted average output power is for reference only

3.4 Power Spectral Density

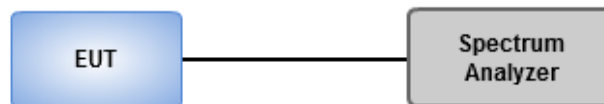
3.4.1 Limit of Power Spectral Density

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

3.4.2 Test Procedures

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

3.4.3 Test Setup



3.4.4 Test Result of Power Spectral Density

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
802.11b_Nss1,(1Mbps)_2TX	1.86
802.11g_Nss1,(6Mbps)_2TX	-1.18
802.11ax HEW20_Nss1,(MCS0)_2TX	-2.94
802.11ax HEW40_Nss1,(MCS0)_2TX	-8.85

Result

Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	Port 2 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	6.57	-2.57	-2.26	-0.28	7.43
2437MHz	Pass	6.57	0.12	0.12	1.86	7.43
2462MHz	Pass	6.57	-2.95	-5.33	-1.26	7.43
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	6.57	-6.76	-6.50	-4.52	7.43
2437MHz	Pass	6.57	-3.13	-3.84	-1.18	7.43
2462MHz	Pass	6.57	-6.40	-8.16	-5.10	7.43
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	6.57	-8.38	-7.72	-6.33	7.43
2437MHz	Pass	6.57	-4.82	-5.68	-2.94	7.43
2462MHz	Pass	6.57	-6.84	-8.88	-5.48	7.43
802.11ax HEW40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	6.57	-11.79	-12.34	-10.05	7.43
2437MHz	Pass	6.57	-11.06	-11.80	-8.85	7.43
2452MHz	Pass	6.57	-10.53	-12.75	-9.28	7.43

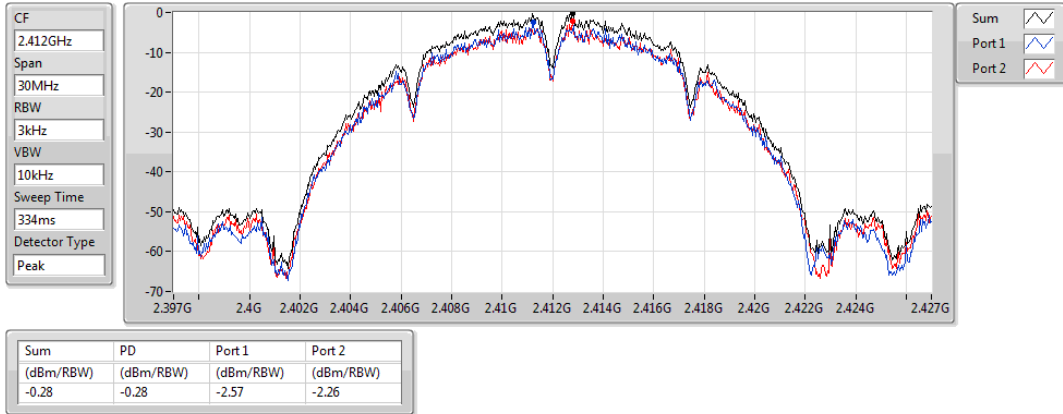
DG = Directional Gain = $10 * \log((10^{3.1/20} + 10^{4/20})/2) = 6.57 \text{ dBi}$ > 6 dBi, limit shall be reduced to 8 dBm – (6.57 dBi – 6 dBi) = 7.43 dBm

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

802.11b_Nss1,(1Mbps)_2TX

PSD

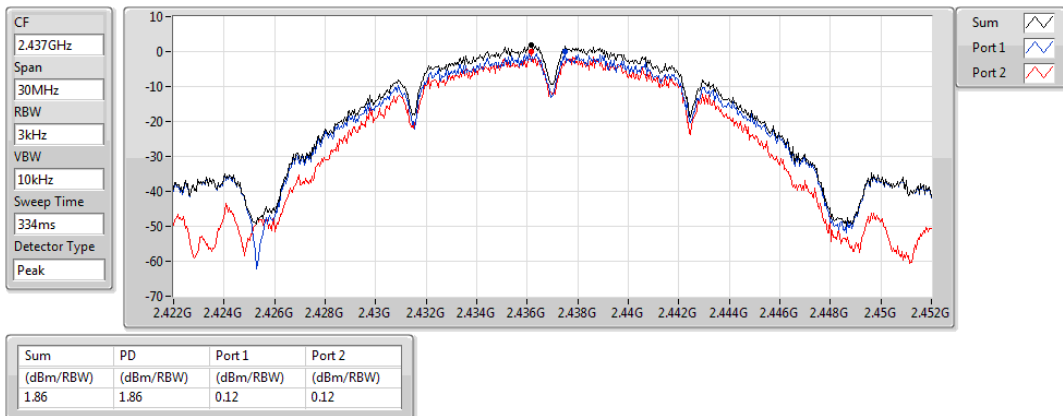
2412MHz



802.11b_Nss1,(1Mbps)_2TX

PSD

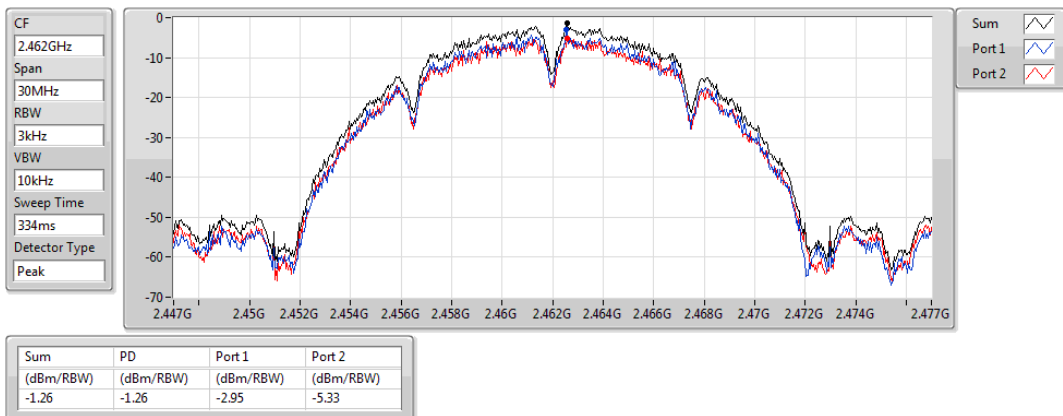
2437MHz



802.11b_Nss1,(1Mbps)_2TX

PSD

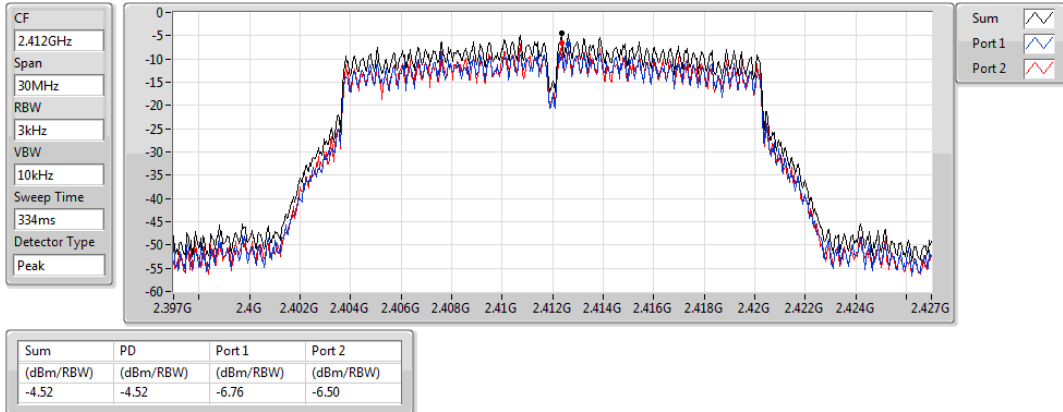
2462MHz



802.11g_Nss1,(6Mbps)_2TX

PSD

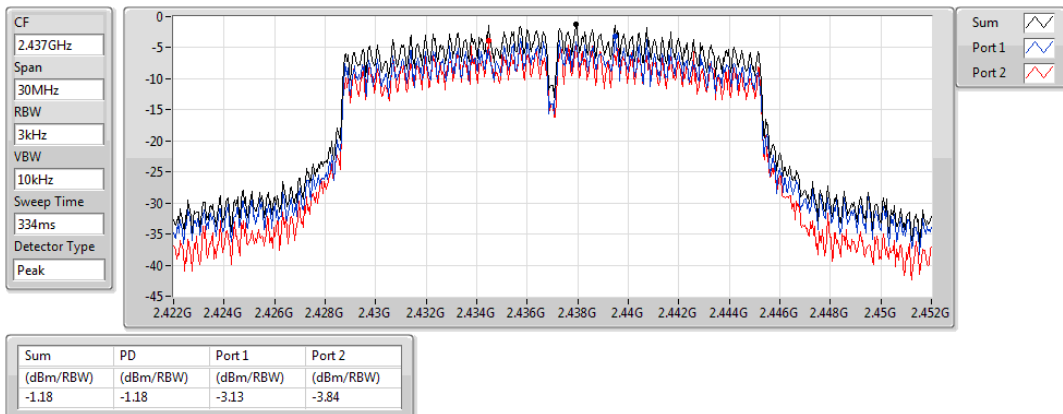
2412MHz



802.11g_Nss1,(6Mbps)_2TX

PSD

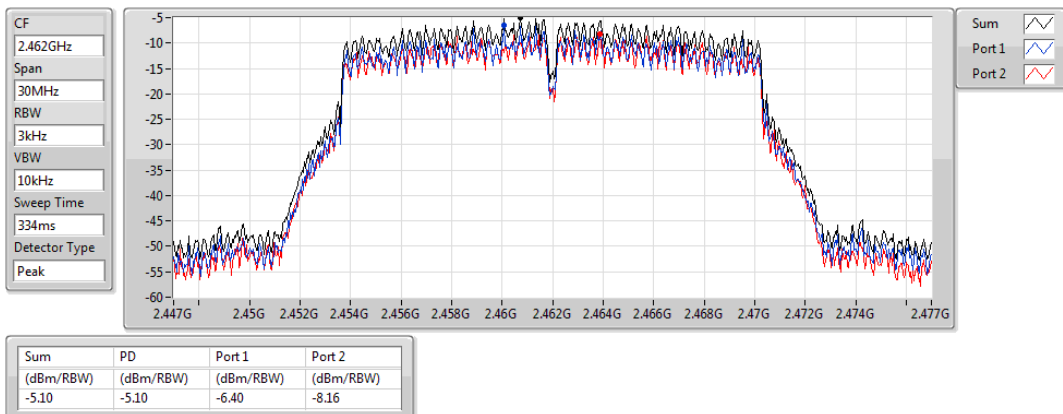
2437MHz



802.11g_Nss1,(6Mbps)_2TX

PSD

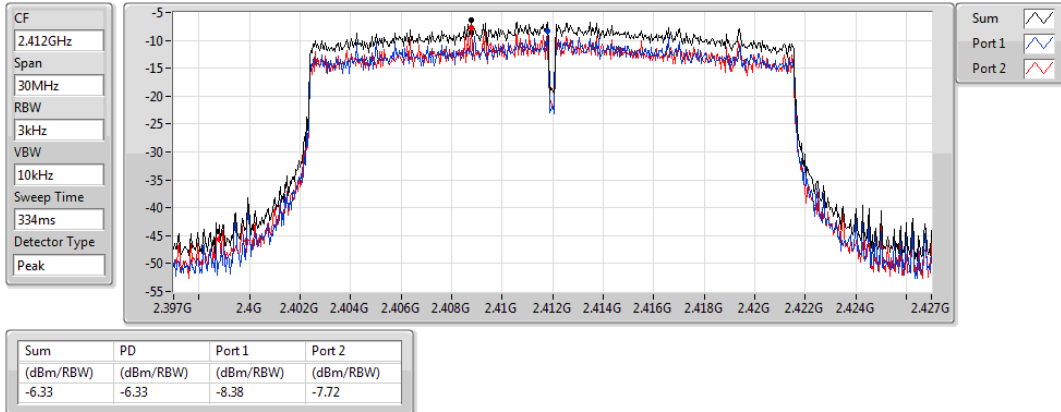
2462MHz



802.11ax HEW20_Nss1,(MCS0)_2TX

PSD

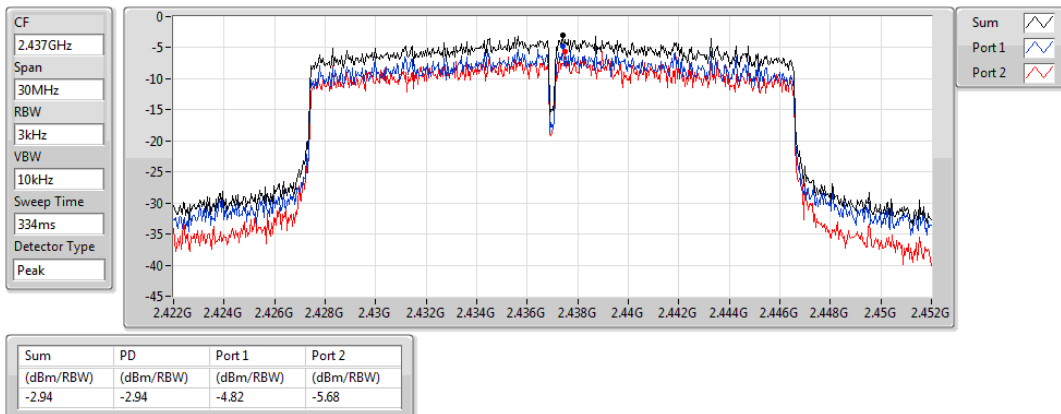
2412MHz



802.11ax HEW20_Nss1,(MCS0)_2TX

PSD

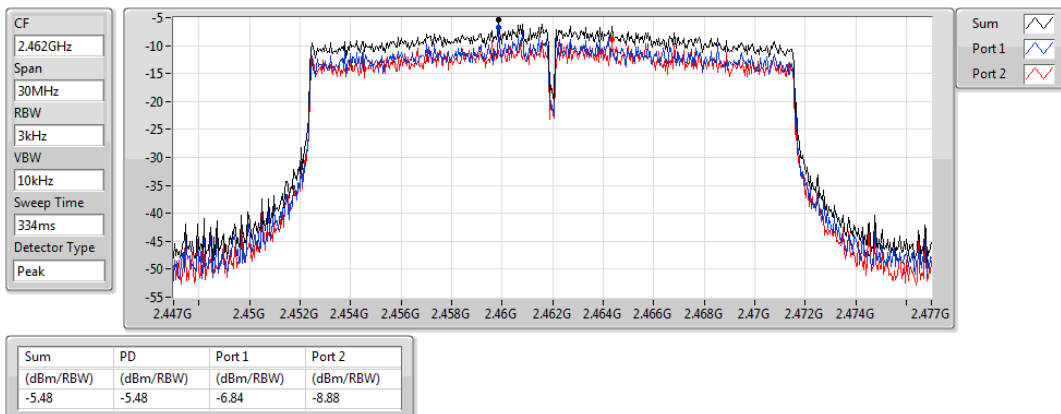
2437MHz



802.11ax HEW20_Nss1,(MCS0)_2TX

PSD

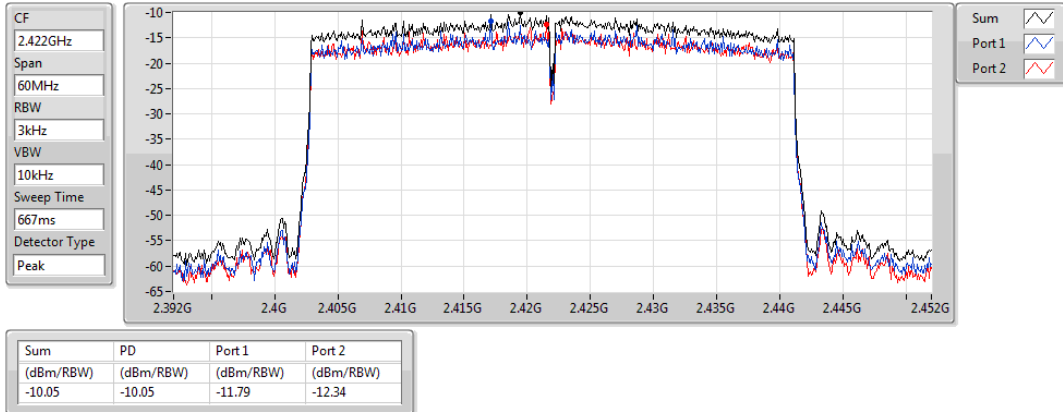
2462MHz



802.11ax HEW40_Nss1,(MCS0)_2TX

PSD

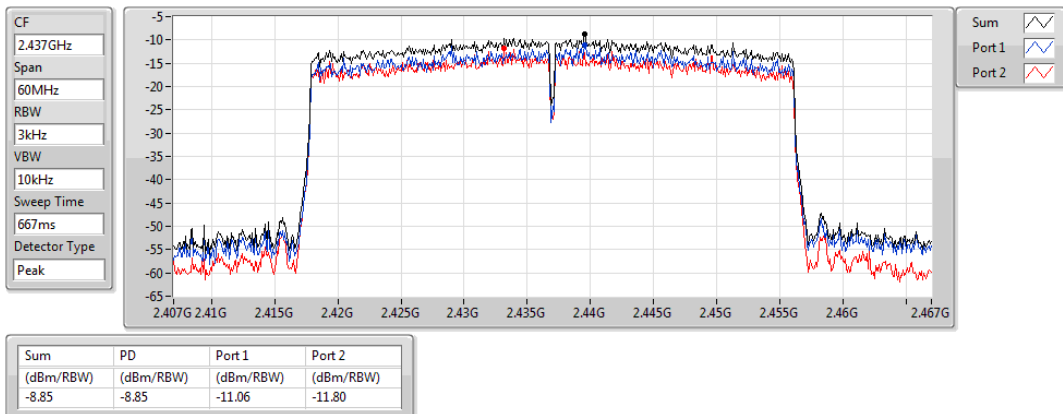
2422MHz



802.11ax HEW40_Nss1,(MCS0)_2TX

PSD

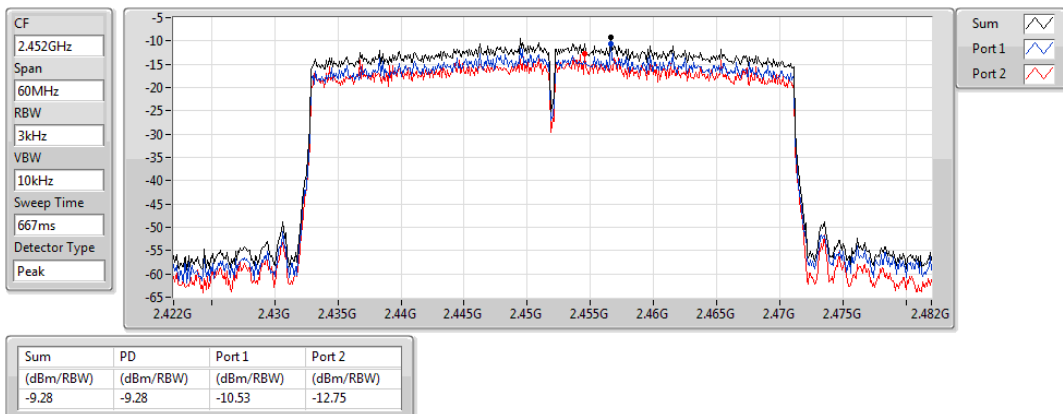
2437MHz



802.11ax HEW40_Nss1,(MCS0)_2TX

PSD

2452MHz



3.5 Unwanted Emissions into Restricted Frequency Bands

3.5.1 Limit of Unwanted Emissions into Restricted Frequency Bands

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

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

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

3.5.2 Test Procedures

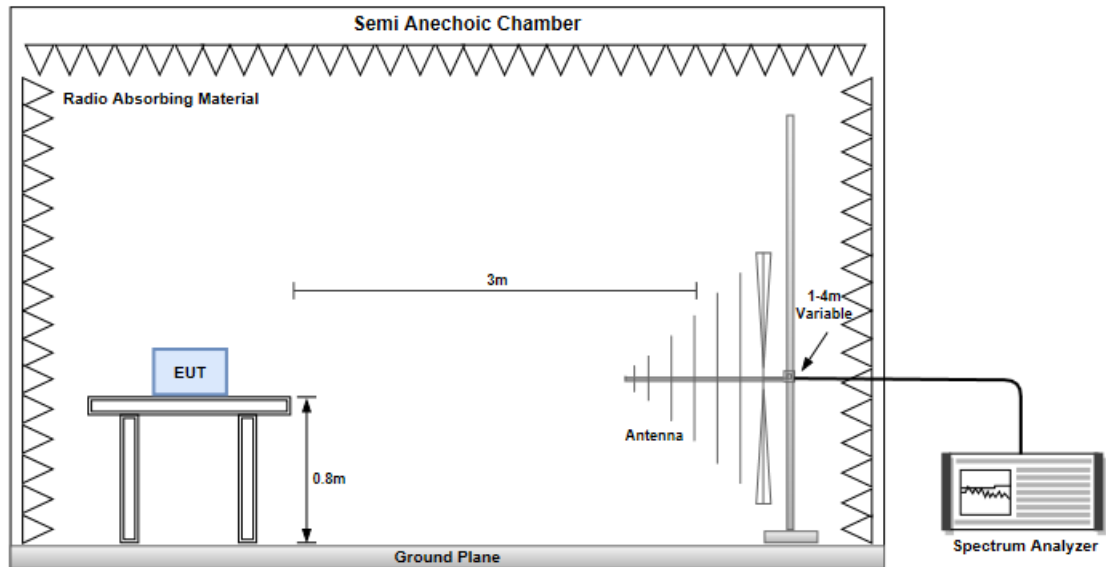
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

Note:

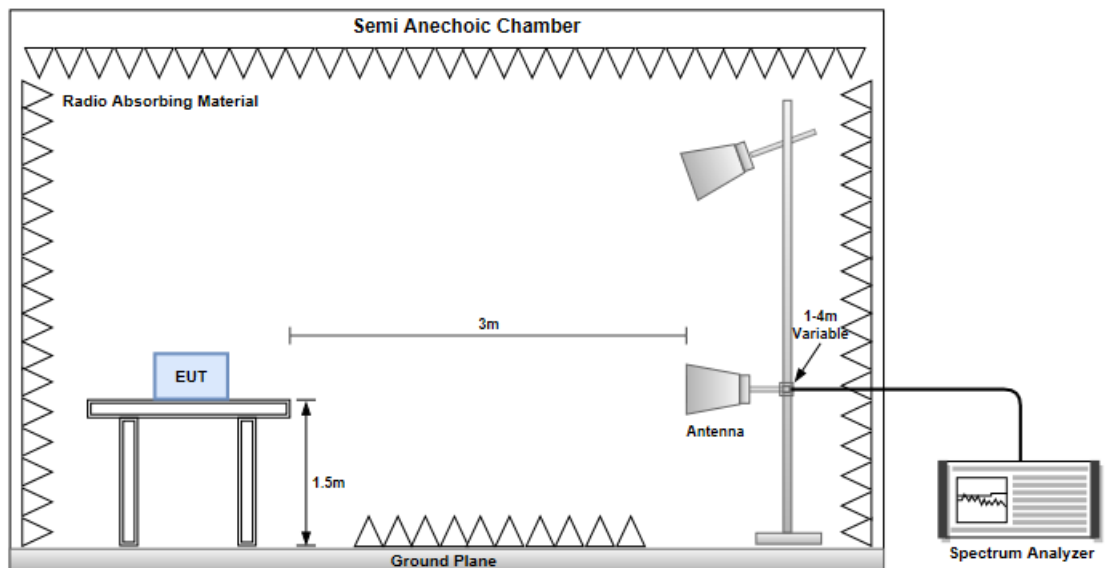
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz

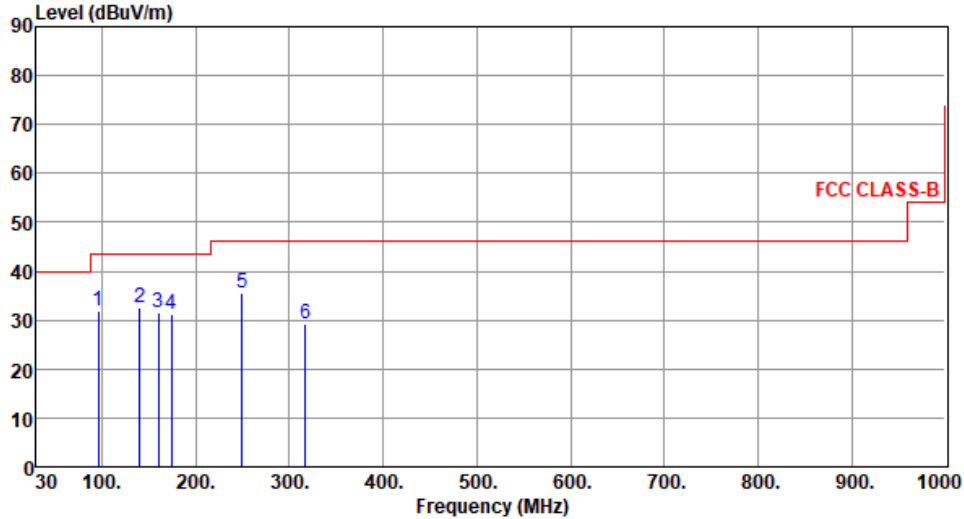


Radiated Emissions above 1 GHz



3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

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

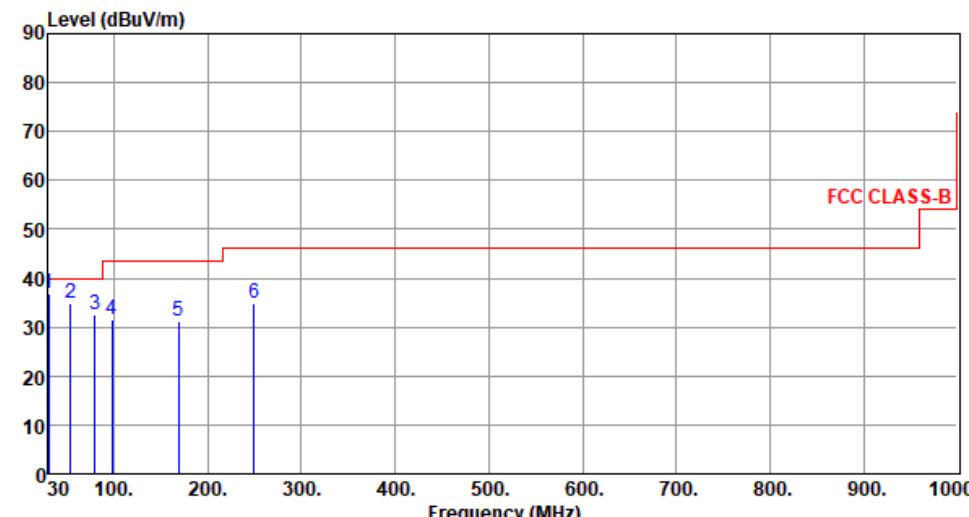


The graph displays the radiated unwanted emissions for a transmitter operating at 2437 MHz. The y-axis represents the emission level in dBUV/m, ranging from 0 to 90. The x-axis represents the frequency in MHz, ranging from 30 to 1000. A red line indicates the FCC CLASS-B limit, which is 40 dBUV/m from 30 MHz to 100 MHz, 45 dBUV/m from 100 MHz to 300 MHz, and 55 dBUV/m from 300 MHz to 1000 MHz. Six blue vertical lines represent measured emissions at various frequencies, labeled 1 through 6. The emission levels are approximately 31.88, 32.39, 31.63, 31.32, 35.52, and 29.07 dBUV/m respectively.

	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	96.55	31.88	43.50	-11.62	45.35	-13.47	Peak	---	---
2	140.60	32.39	43.50	-11.11	41.25	-8.86	Peak	---	---
3	160.25	31.63	43.50	-11.87	40.05	-8.42	Peak	---	---
4	173.88	31.32	43.50	-12.18	40.58	-9.26	Peak	---	---
5	249.39	35.52	46.00	-10.48	45.48	-9.96	Peak	---	---
6	317.05	29.07	46.00	-16.93	36.54	-7.47	Peak	---	---

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

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

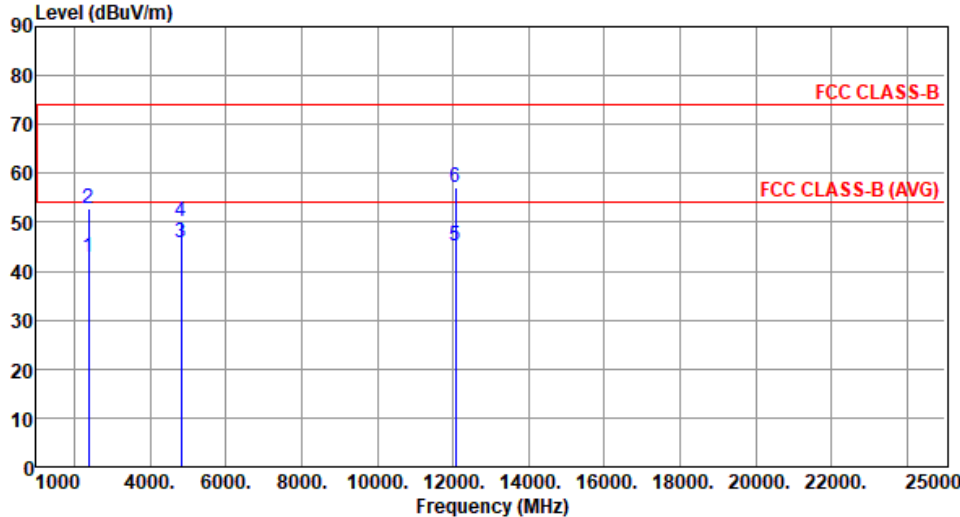


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	30.02	36.89	40.00	-3.11	46.60	-9.71	QP	100	183
2	54.15	35.02	40.00	-4.98	43.54	-8.52	QP	117	177
3	79.66	32.66	40.00	-7.34	45.65	-12.99	Peak	---	---
4	97.84	31.71	43.50	-11.79	45.02	-13.31	Peak	---	---
5	168.54	31.12	43.50	-12.38	39.88	-8.76	Peak	---	---
6	249.85	35.02	46.00	-10.98	44.98	-9.96	Peak	---	---

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

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

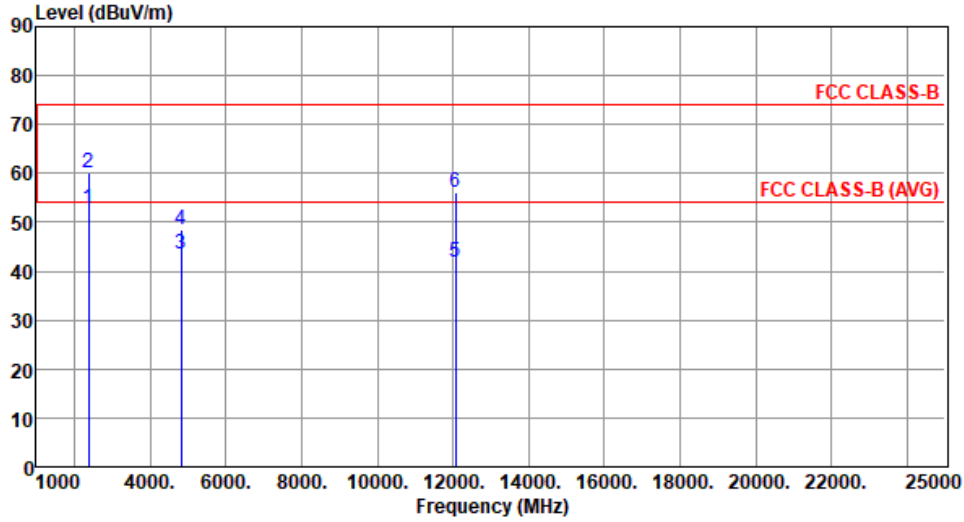
Modulation	11b	Test Freq. (MHz)	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	42.78	54.00	-11.22	45.58	-2.80	Average	225	59
2	2390.00	52.70	74.00	-21.30	55.50	-2.80	Peak	225	59
3	4824.00	45.77	54.00	-8.23	42.17	3.60	Average	358	78
4	4824.00	50.24	74.00	-23.76	46.64	3.60	Peak	358	78
5	12060.00	45.10	54.00	-8.90	31.25	13.85	Average	100	50
6	12060.00	57.01	74.00	-16.99	43.16	13.85	Peak	100	50

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

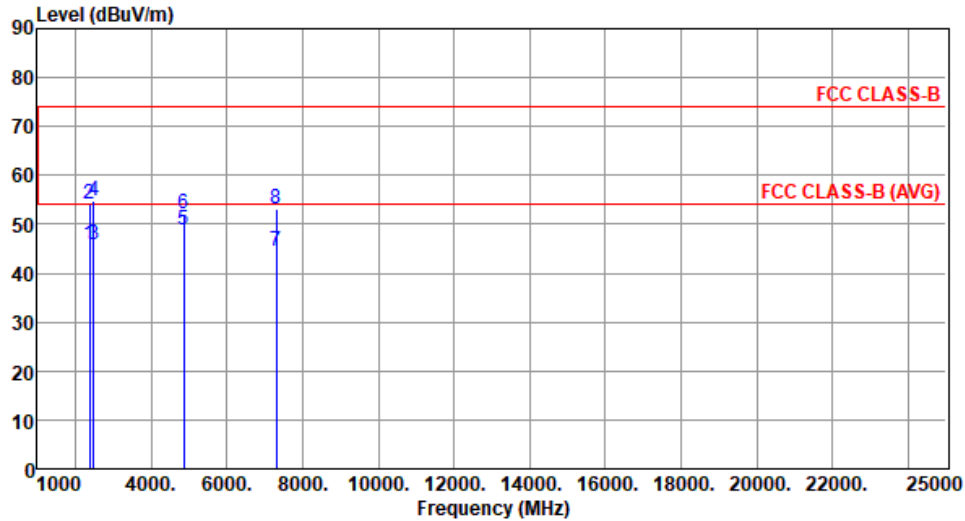
Modulation	11b	Test Freq. (MHz)	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	52.88	54.00	-1.12	55.68	-2.80	Average	254	140
2	2390.00	60.04	74.00	-13.96	62.84	-2.80	Peak	254	140
3	4824.00	43.59	54.00	-10.41	39.99	3.60	Average	122	308
4	4824.00	48.44	74.00	-25.56	44.84	3.60	Peak	122	308
5	12060.00	41.99	54.00	-12.01	28.14	13.85	Average	100	300
6	12060.00	56.10	74.00	-17.90	42.25	13.85	Peak	100	300

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

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



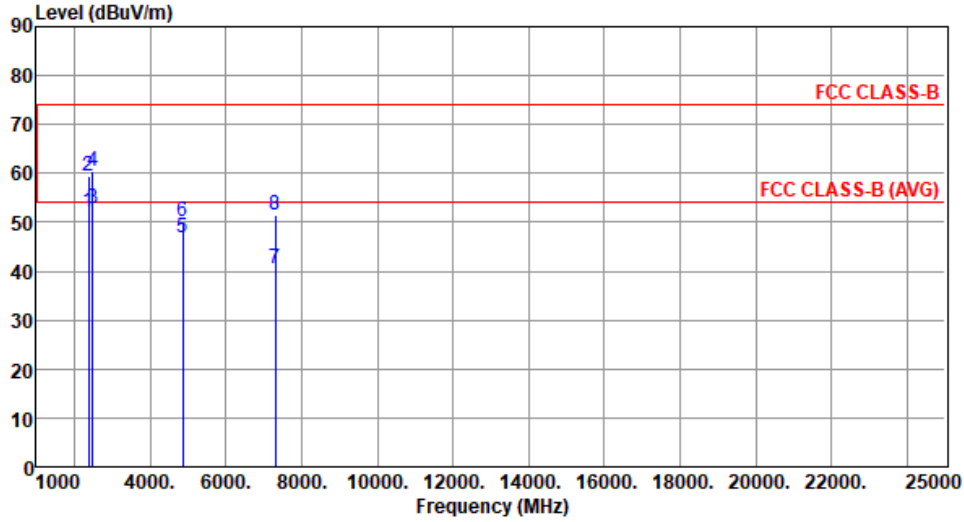
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	45.84	54.00	-8.16	48.64	-2.80	Average	237	55
2	2390.00	54.12	74.00	-19.88	56.92	-2.80	Peak	237	55
3	2483.50	45.90	54.00	-8.10	48.93	-3.03	Average	237	55
4	2483.50	54.82	74.00	-19.18	57.85	-3.03	Peak	237	55
5	4874.00	48.97	54.00	-5.03	45.33	3.64	Average	377	83
6	4874.00	51.99	74.00	-22.01	48.35	3.64	Peak	377	83
7	7311.00	44.42	54.00	-9.58	35.15	9.27	Average	146	257
8	7311.00	53.30	74.00	-20.70	44.03	9.27	Peak	146	257

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

*Factor includes antenna factor , cable loss and amplifier gain

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

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

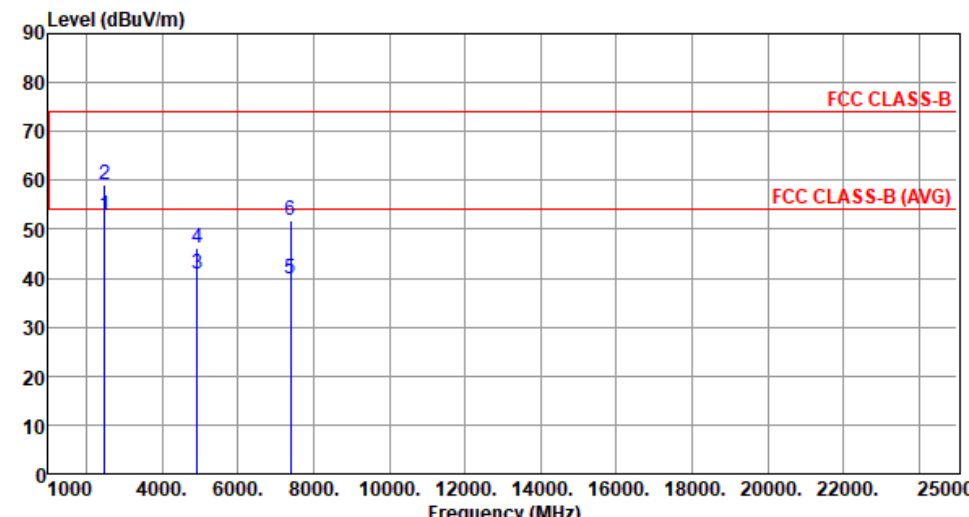


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	52.06	54.00	-1.94	54.86	-2.80	Average	277	143
2	2390.00	59.53	74.00	-14.47	62.33	-2.80	Peak	277	143
3	2483.50	52.78	54.00	-1.22	55.81	-3.03	Average	277	143
4	2483.50	60.44	74.00	-13.56	63.47	-3.03	Peak	277	143
5	4874.00	46.90	54.00	-7.10	43.26	3.64	Average	121	313
6	4874.00	50.24	74.00	-23.76	46.60	3.64	Peak	121	313
7	7311.00	40.50	54.00	-13.50	31.23	9.27	Average	100	261
8	7311.00	51.43	74.00	-22.57	42.16	9.27	Peak	100	261

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

Modulation	11b	Test Freq. (MHz)	2462
Polarization	Horizontal		
Level (dBuV/m)			

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

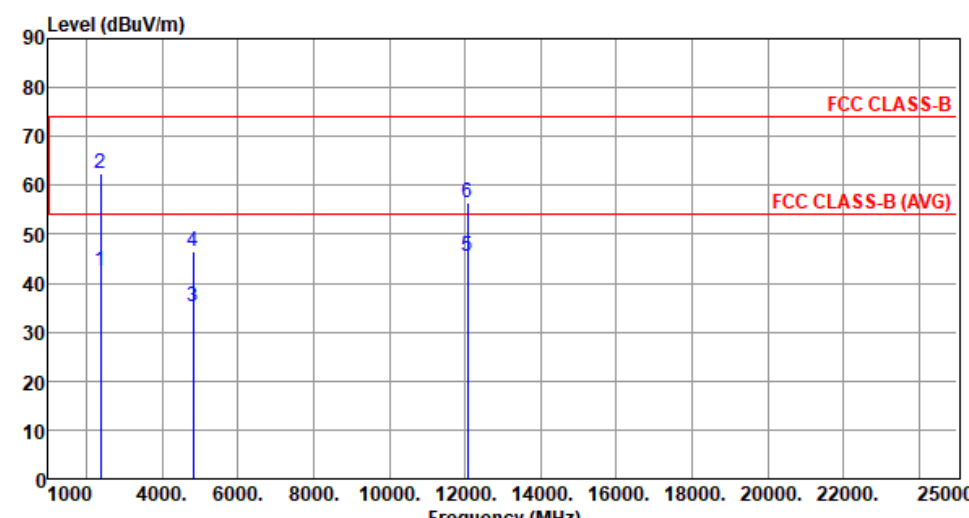


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	52.83	54.00	-1.17	55.86	-3.03	Average	222	104
2	2483.50	59.26	74.00	-14.74	62.29	-3.03	Peak	222	104
3	4924.00	40.79	54.00	-13.21	37.10	3.69	Average	128	309
4	4924.00	46.21	74.00	-27.79	42.52	3.69	Peak	128	309
5	7386.00	39.70	54.00	-14.30	30.63	9.07	Average	100	301
6	7386.00	51.91	74.00	-22.09	42.84	9.07	Peak	100	301

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

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

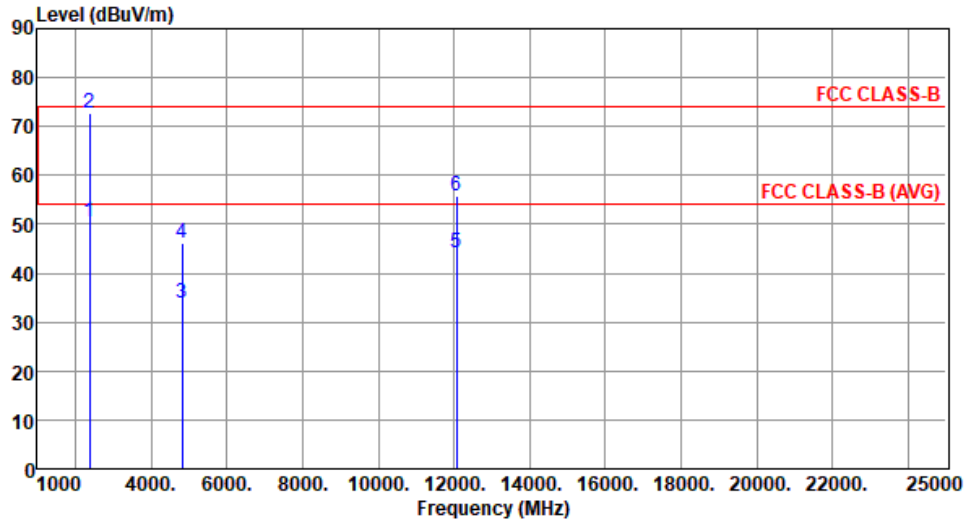
Modulation	11g	Test Freq. (MHz)	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	42.45	54.00	-11.55	45.25	-2.80	Average	225	57
2	2390.00	62.45	74.00	-11.55	65.25	-2.80	Peak	225	57
3	4824.00	35.17	54.00	-18.83	31.57	3.60	Average	100	109
4	4824.00	46.57	74.00	-27.43	42.97	3.60	Peak	100	109
5	12060.00	45.51	54.00	-8.49	31.66	13.85	Average	100	102
6	12060.00	56.51	74.00	-17.49	42.66	13.85	Peak	100	102

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

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



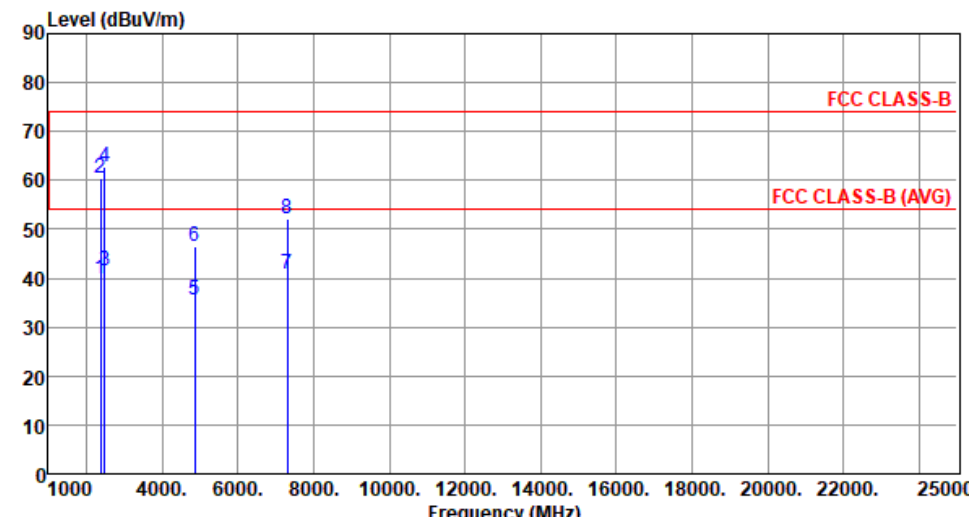
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	50.36	54.00	-3.64	53.16	-2.80	Average	237	98
2	2390.00	72.58	74.00	-1.42	75.38	-2.80	Peak	237	98
3	4824.00	33.72	54.00	-20.28	30.12	3.60	Average	100	309
4	4824.00	46.01	74.00	-27.99	42.41	3.60	Peak	100	309
5	12060.00	44.29	54.00	-9.71	30.44	13.85	Average	100	302
6	12060.00	55.95	74.00	-18.05	42.10	13.85	Peak	100	302

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

*Factor includes antenna factor , cable loss and amplifier gain

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

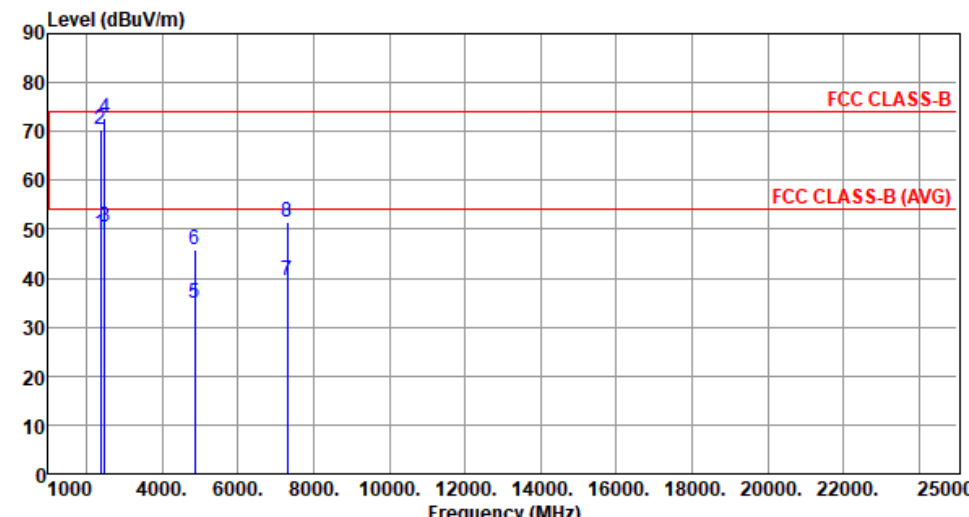
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	39.86	54.00	-14.14	42.66	-2.80	Average	252	53
2	2390.00	60.45	74.00	-13.55	63.25	-2.80	Peak	252	53
3	2483.50	41.55	54.00	-12.45	44.58	-3.03	Average	252	53
4	2483.50	62.90	74.00	-11.10	65.93	-3.03	Peak	252	53
5	4874.00	35.51	54.00	-18.49	31.87	3.64	Average	100	105
6	4874.00	46.58	74.00	-27.42	42.94	3.64	Peak	100	105
7	7311.00	40.95	54.00	-13.05	31.68	9.27	Average	100	101
8	7311.00	52.04	74.00	-21.96	42.77	9.27	Peak	100	101

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

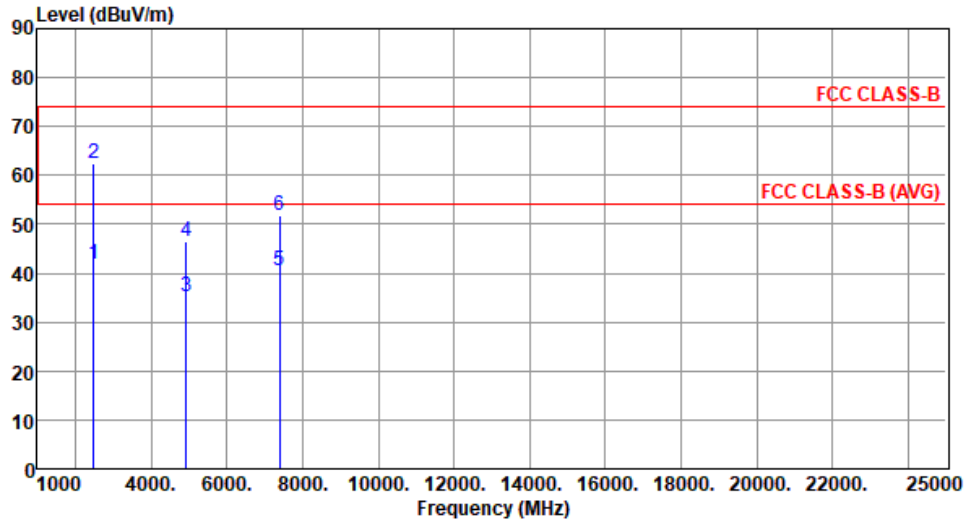
Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	49.21	54.00	-4.79	52.01	-2.80	Average	218	96
2	2390.00	70.39	74.00	-3.61	73.19	-2.80	Peak	218	96
3	2483.50	50.57	54.00	-3.43	53.60	-3.03	Average	218	96
4	2483.50	72.76	74.00	-1.24	75.79	-3.03	Peak	218	96
5	4874.00	34.89	54.00	-19.11	31.25	3.64	Average	100	309
6	4874.00	45.78	74.00	-28.22	42.14	3.64	Peak	100	309
7	7311.00	39.51	54.00	-14.49	30.24	9.27	Average	100	305
8	7311.00	51.51	74.00	-22.49	42.24	9.27	Peak	100	305

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

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



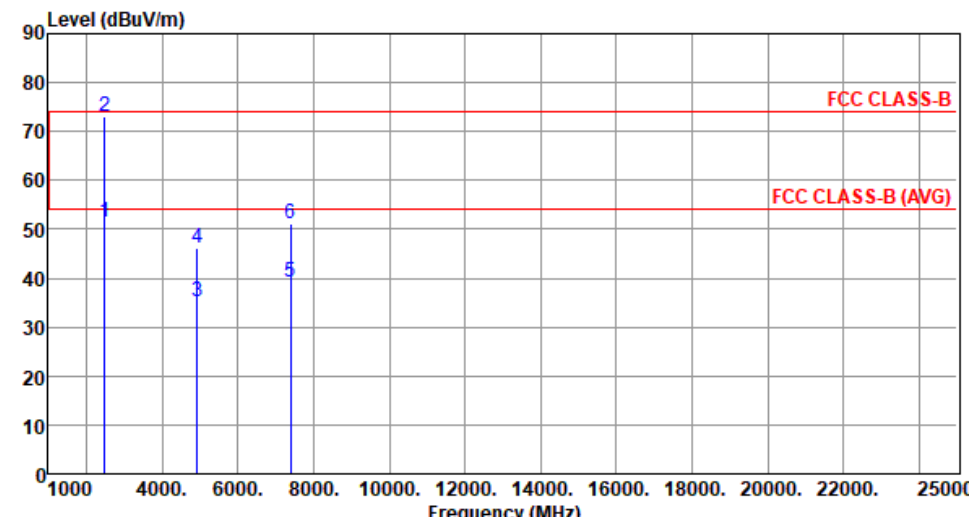
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	41.86	54.00	-12.14	44.89	-3.03	Average	221	57
2	2483.50	62.33	74.00	-11.67	65.36	-3.03	Peak	221	57
3	4924.00	35.32	54.00	-18.68	31.63	3.69	Average	100	107
4	4924.00	46.55	74.00	-27.45	42.86	3.69	Peak	100	107
5	7386.00	40.67	54.00	-13.33	31.60	9.07	Average	100	108
6	7386.00	51.87	74.00	-22.13	42.80	9.07	Peak	100	108

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

*Factor includes antenna factor , cable loss and amplifier gain

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

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

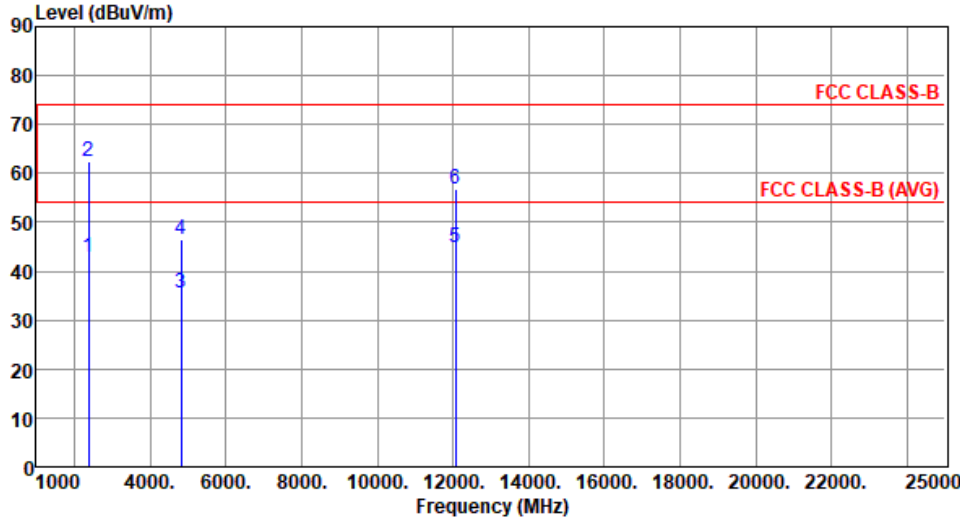


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	51.35	54.00	-2.65	54.38	-3.03	Average	223	93
2	2483.50	72.92	74.00	-1.08	75.95	-3.03	Peak	223	93
3	4924.00	35.16	54.00	-18.84	31.47	3.69	Average	100	305
4	4924.00	46.13	74.00	-27.87	42.44	3.69	Peak	100	305
5	7386.00	39.32	54.00	-14.68	30.25	9.07	Average	100	302
6	7386.00	51.27	74.00	-22.73	42.20	9.07	Peak	100	302

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

3.5.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11ax HE20

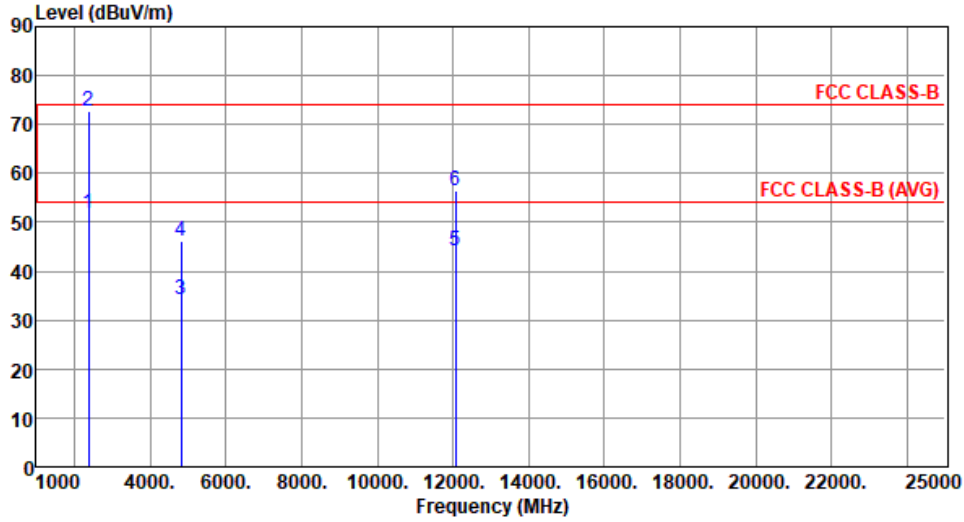
Modulation	11ax HE20	Test Freq. (MHz)	2412
Polarization	Horizontal		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	42.83	54.00	-11.17	45.63	-2.80	Average	229	108
2	2390.00	62.43	74.00	-11.57	65.23	-2.80	Peak	229	108
3	4824.00	35.43	54.00	-18.57	31.83	3.60	Average	100	110
4	4824.00	46.49	74.00	-27.51	42.89	3.60	Peak	100	110
5	12060.00	44.81	54.00	-9.19	30.96	13.85	Average	100	98
6	12060.00	56.73	74.00	-17.27	42.88	13.85	Peak	100	98

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

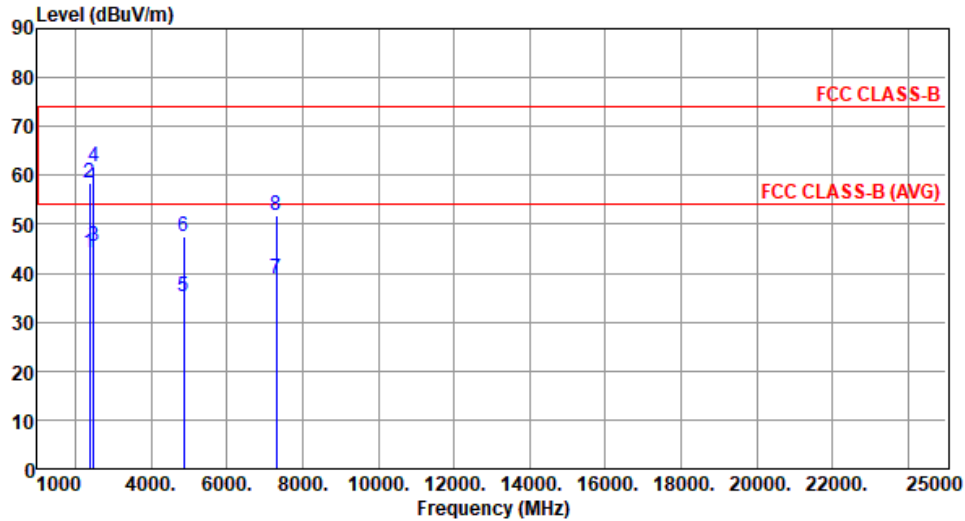
Modulation	11ax HE20	Test Freq. (MHz)	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	51.90	54.00	-2.10	54.70	-2.80	Average	205	90
2	2390.00	72.62	74.00	-1.38	75.42	-2.80	Peak	205	90
3	4824.00	34.22	54.00	-19.78	30.62	3.60	Average	100	305
4	4824.00	46.00	74.00	-28.00	42.40	3.60	Peak	100	305
5	12060.00	44.26	54.00	-9.74	30.41	13.85	Average	100	302
6	12060.00	56.37	74.00	-17.63	42.52	13.85	Peak	100	302

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

Modulation	11ax HE20	Test Freq. (MHz)	2437
Polarization	Horizontal		



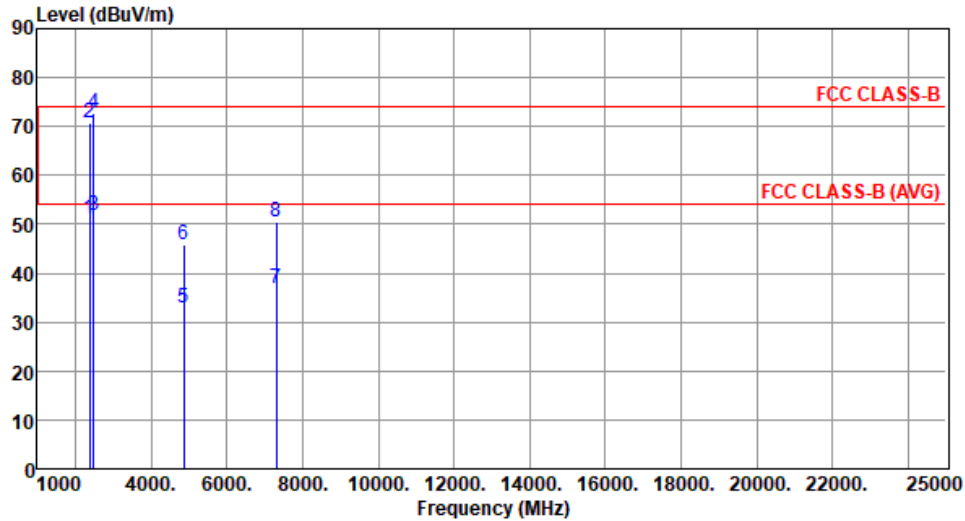
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	44.18	54.00	-9.82	46.98	-2.80	Average	224	49
2	2390.00	58.56	74.00	-15.44	61.36	-2.80	Peak	224	49
3	2483.50	45.45	54.00	-8.55	48.48	-3.03	Average	224	49
4	2483.50	61.74	74.00	-12.26	64.77	-3.03	Peak	224	49
5	4874.00	35.05	54.00	-18.95	31.41	3.64	Average	187	87
6	4874.00	47.40	74.00	-26.60	43.76	3.64	Peak	187	87
7	7311.00	38.99	54.00	-15.01	29.72	9.27	Average	130	259
8	7311.00	51.82	74.00	-22.18	42.55	9.27	Peak	130	259

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

*Factor includes antenna factor , cable loss and amplifier gain

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

Modulation	11ax HE20	Test Freq. (MHz)	2437
Polarization	Vertical		



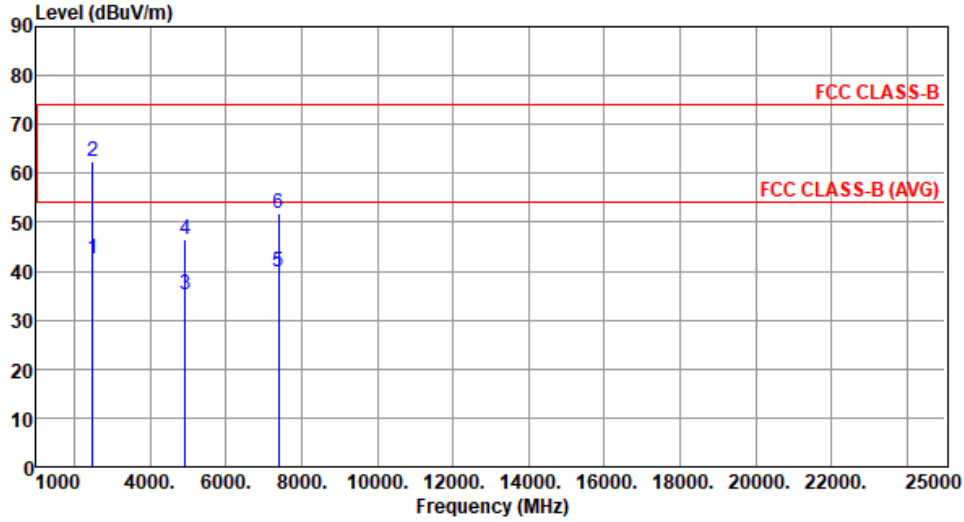
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	51.06	54.00	-2.94	53.86	-2.80	Average	216	104
2	2390.00	70.75	74.00	-3.25	73.55	-2.80	Peak	216	104
3	2483.50	51.81	54.00	-2.19	54.84	-3.03	Average	216	104
4	2483.50	72.85	74.00	-1.15	75.88	-3.03	Peak	216	104
5	4874.00	32.90	54.00	-21.10	29.26	3.64	Average	100	315
6	4874.00	45.80	74.00	-28.20	42.16	3.64	Peak	100	315
7	7311.00	36.95	54.00	-17.05	27.68	9.27	Average	100	255
8	7311.00	50.58	74.00	-23.42	41.31	9.27	Peak	100	255

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

*Factor includes antenna factor , cable loss and amplifier gain

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

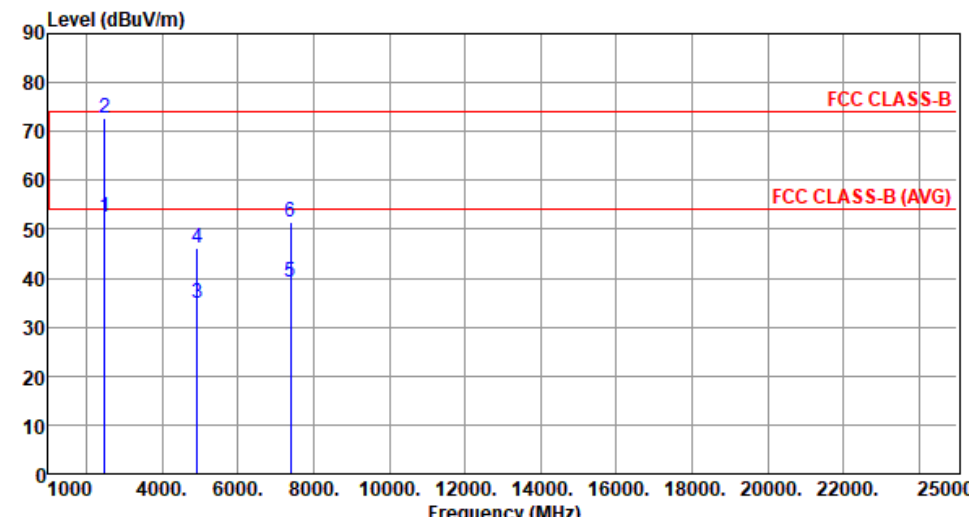
Modulation	11ax HE20	Test Freq. (MHz)	2462
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	42.66	54.00	-11.34	45.69	-3.03	Average	255	100
2	2483.50	62.32	74.00	-11.68	65.35	-3.03	Peak	255	100
3	4924.00	35.21	54.00	-18.79	31.52	3.69	Average	100	106
4	4924.00	46.66	74.00	-27.34	42.97	3.69	Peak	100	106
5	7386.00	39.70	54.00	-14.30	30.63	9.07	Average	100	102
6	7386.00	51.92	74.00	-22.08	42.85	9.07	Peak	100	102

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

Modulation	11ax HE20	Test Freq. (MHz)	2462
Polarization	Vertical		

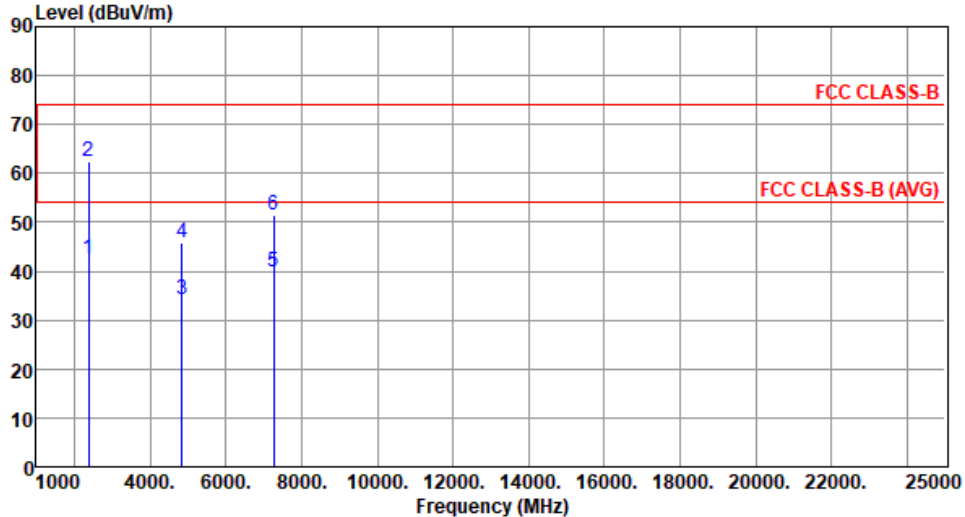


	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	52.32	54.00	-1.68	55.35	-3.03	Average	214	127
2	2483.50	72.83	74.00	-1.17	75.86	-3.03	Peak	214	127
3	4924.00	34.94	54.00	-19.06	31.25	3.69	Average	100	305
4	4924.00	46.02	74.00	-27.98	42.33	3.69	Peak	100	305
5	7386.00	39.32	54.00	-14.68	30.25	9.07	Average	100	302
6	7386.00	51.32	74.00	-22.68	42.25	9.07	Peak	100	302

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

3.5.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11ax HE40

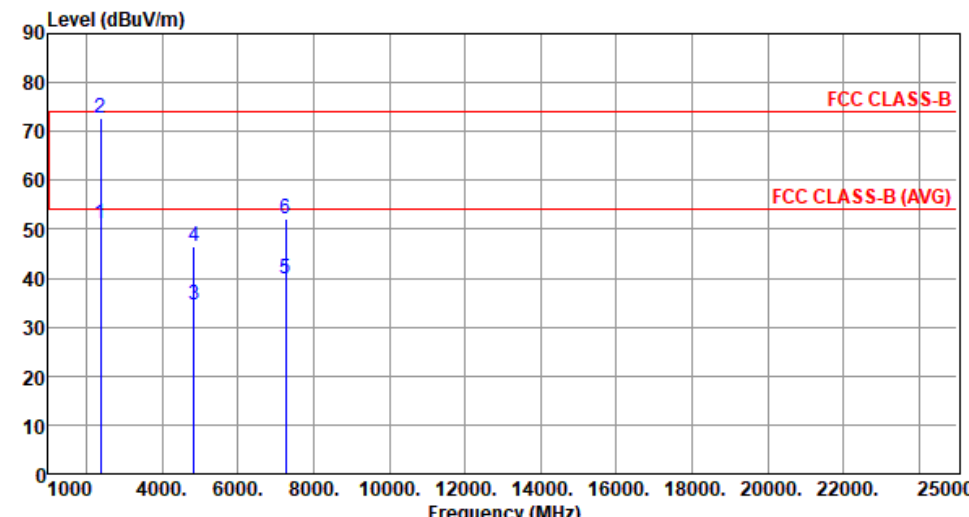
Modulation	11ax HE40	Test Freq. (MHz)	2422
Polarization	Horizontal		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	42.56	54.00	-11.44	45.36	-2.80	Average	228	108
2	2390.00	62.45	74.00	-11.55	65.25	-2.80	Peak	228	108
3	4844.00	34.34	54.00	-19.66	30.69	3.65	Average	100	100
4	4844.00	45.90	74.00	-28.10	42.25	3.65	Peak	100	100
5	7266.00	39.99	54.00	-14.01	30.66	9.33	Average	100	93
6	7266.00	51.47	74.00	-22.53	42.14	9.33	Peak	100	93

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

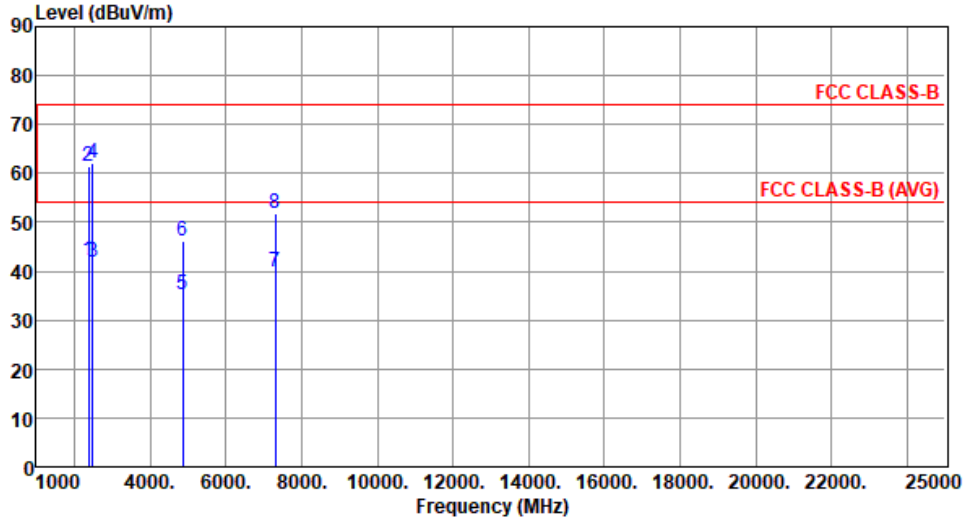
Modulation	11ax HE40	Test Freq. (MHz)	2422
Polarization	Vertical		



	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	51.23	54.00	-2.77	54.03	-2.80	Average	230	104
2	2390.00	72.87	74.00	-1.13	75.67	-2.80	Peak	230	104
3	4844.00	34.43	54.00	-19.57	30.78	3.65	Average	100	305
4	4844.00	46.53	74.00	-27.47	42.88	3.65	Peak	100	305
5	7266.00	39.75	54.00	-14.25	30.42	9.33	Average	100	301
6	7266.00	52.10	74.00	-21.90	42.77	9.33	Peak	100	301

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

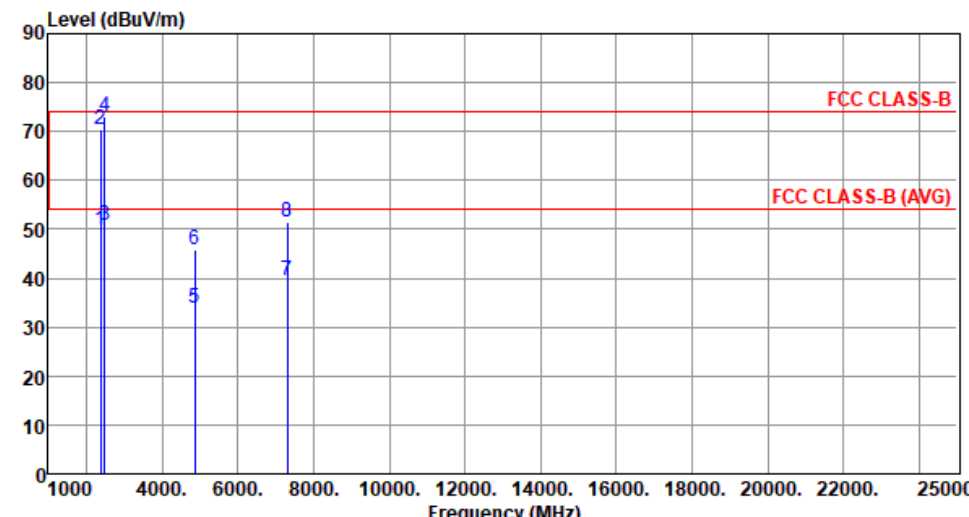
Modulation	11ax HE40	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	42.07	54.00	-11.93	44.87	-2.80	Average	233	107
2	2390.00	61.45	74.00	-12.55	64.25	-2.80	Peak	233	107
3	2483.50	41.83	54.00	-12.17	44.86	-3.03	Average	233	107
4	2483.50	62.22	74.00	-11.78	65.25	-3.03	Peak	233	107
5	4874.00	35.19	54.00	-18.81	31.55	3.64	Average	100	95
6	4874.00	46.20	74.00	-27.80	42.56	3.64	Peak	100	95
7	7311.00	39.81	54.00	-14.19	30.54	9.27	Average	100	97
8	7311.00	51.86	74.00	-22.14	42.59	9.27	Peak	100	97

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

Modulation	11ax HE40	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	49.91	54.00	-4.09	52.71	-2.80	Average	215	135
2	2390.00	70.32	74.00	-3.68	73.12	-2.80	Peak	215	135
3	2483.50	50.90	54.00	-3.10	53.93	-3.03	Average	215	135
4	2483.50	72.95	74.00	-1.05	75.98	-3.03	Peak	215	135
5	4874.00	33.89	54.00	-20.11	30.25	3.64	Average	100	302
6	4874.00	45.89	74.00	-28.11	42.25	3.64	Peak	100	302
7	7311.00	39.51	54.00	-14.49	30.24	9.27	Average	100	309
8	7311.00	51.56	74.00	-22.44	42.29	9.27	Peak	100	309

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

Modulation	11ax HE40	Test Freq. (MHz)	2452
Polarization	Horizontal		
Level (dBuV/m) </			

Modulation	11ax HE40	Test Freq. (MHz)	2452
Polarization	Vertical		
Level (dBuV/m)			

3.6 Emissions in Non-Restricted Frequency Bands

3.6.1 Emissions in Non-Restricted Frequency Bands Limit

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

3.6.2 Test Procedures

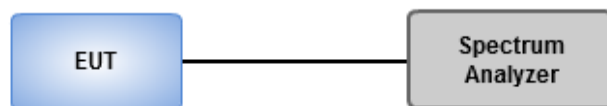
Reference level measurement

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

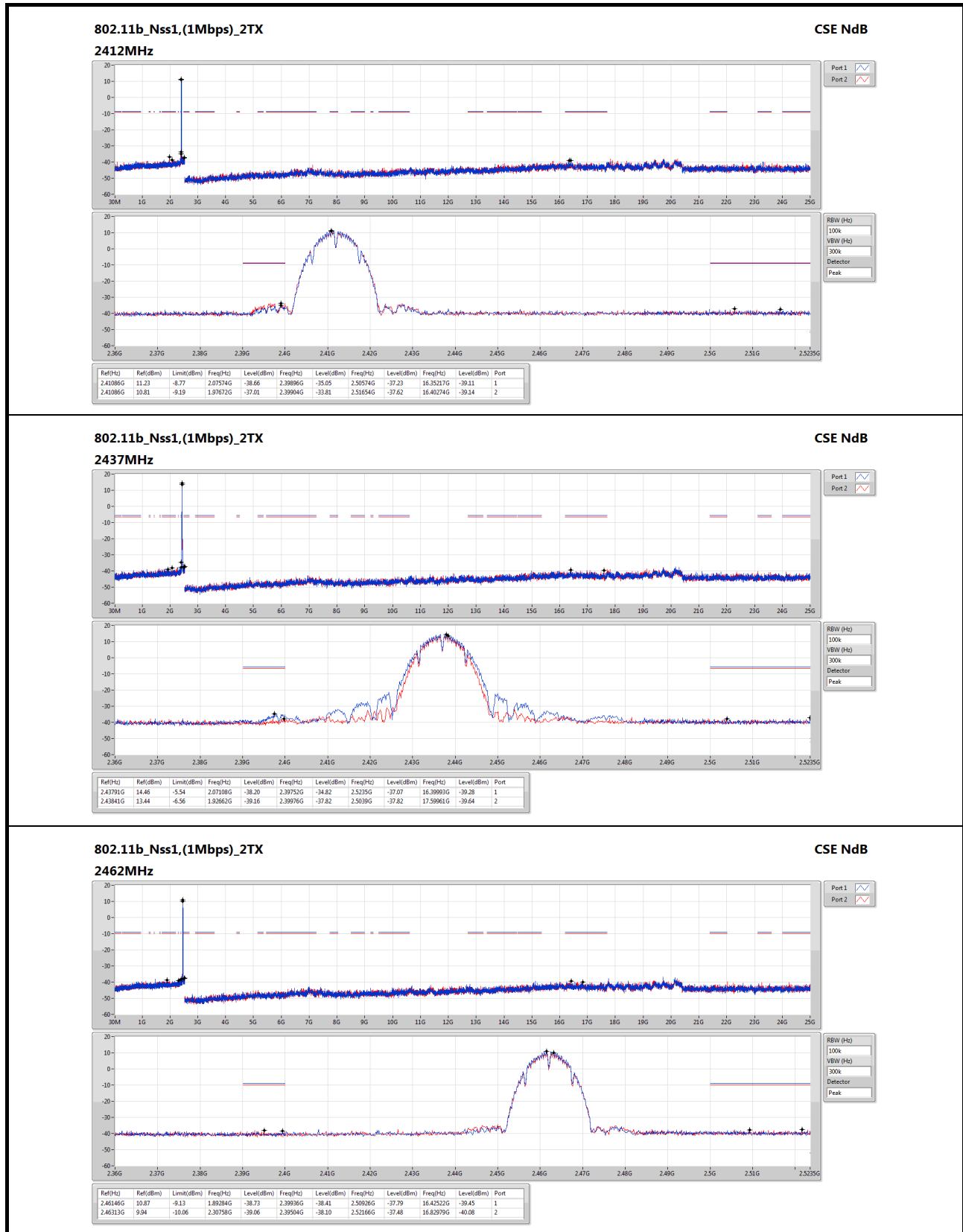
Emission level measurement

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

3.6.3 Test Setup



3.6.4 Unwanted Emissions into Non-Restricted Frequency Bands



802.11g_Nss1,(6Mbps)_2TX

CSE NdB

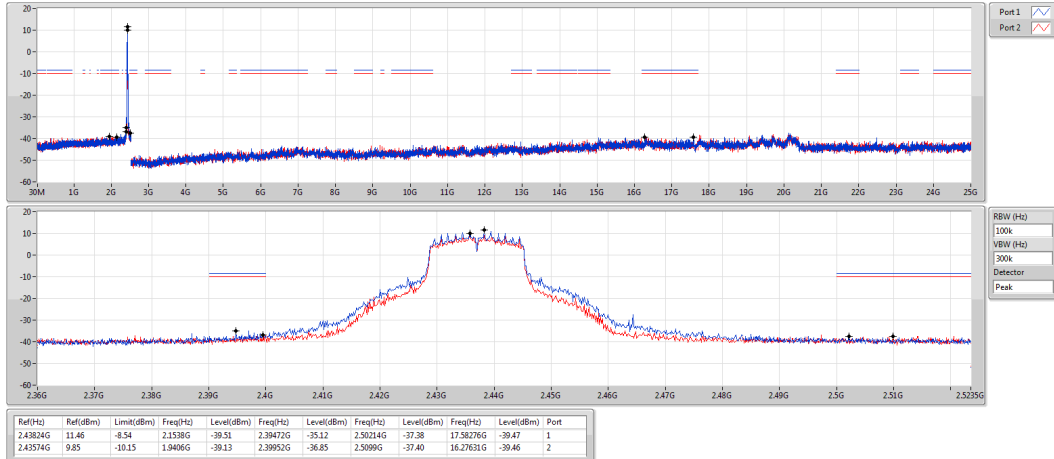
2412MHz



802.11g_Nss1,(6Mbps)_2TX

CSE NdB

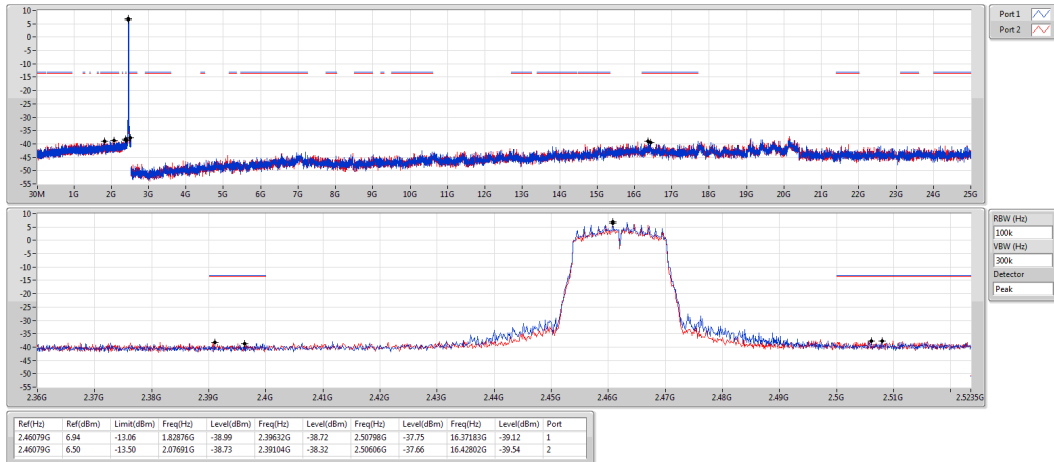
2437MHz



802.11g_Nss1,(6Mbps)_2TX

CSE NdB

2462MHz



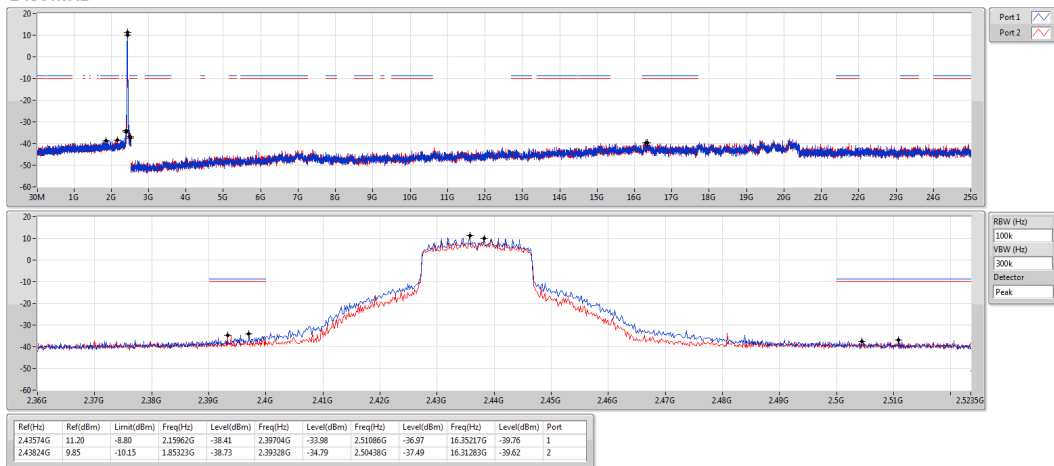
802.11ax HEW20_Nss1,(MCS0)_2TX
2412MHz

CSE NdB



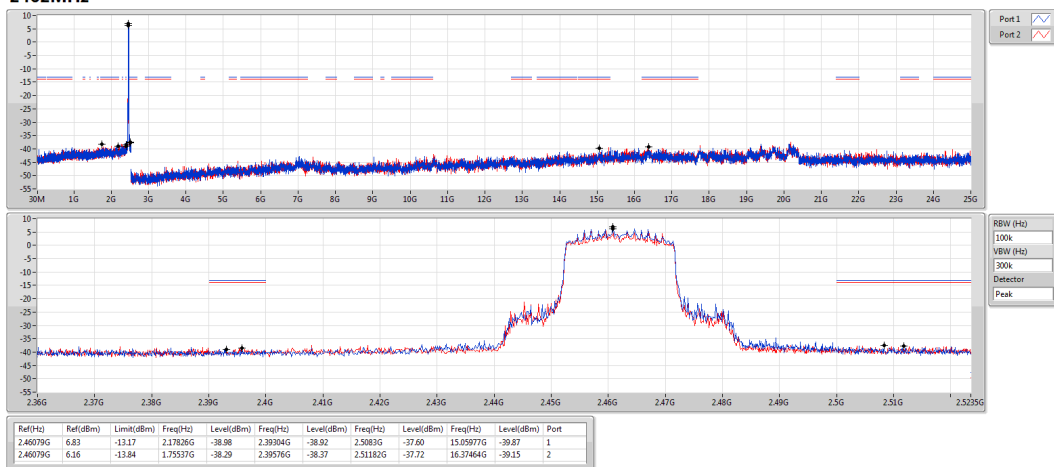
802.11ax HEW20_Nss1,(MCS0)_2TX
2437MHz

CSE NdB



802.11ax HEW20_Nss1,(MCS0)_2TX
2462MHz

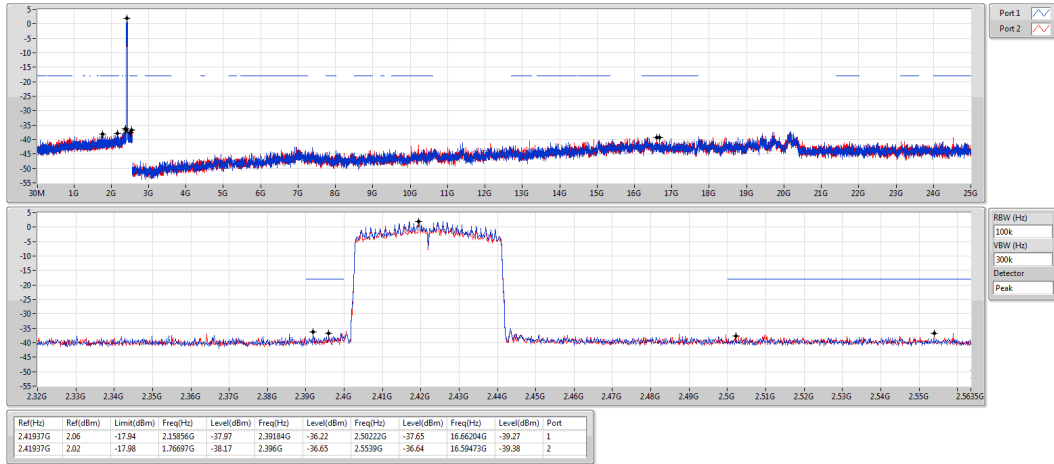
CSE NdB



802.11ax HEW40_Nss1,(MCS0)_2TX

CSE NdB

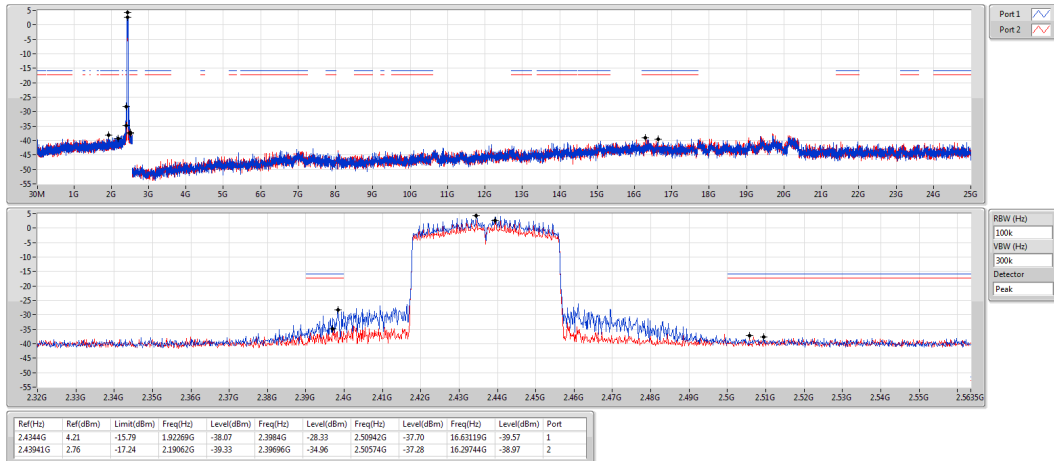
2422MHz



802.11ax HEW40_Nss1,(MCS0)_2TX

CSE NdB

2437MHz



802.11ax HEW40_Nss1,(MCS0)_2TX

CSE NdB

2452MHz



4 Test laboratory information

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

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

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

Linkou

Tel: 886-2-2601-1640

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

Kwei Shan

Tel: 886-3-271-8666

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

Kwei Shan Site II

Tel: 886-3-271-8640

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

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

Tel: 886-3-271-8666

Fax: 886-3-318-0155

Email: ICC_Service@icertifi.com.tw

==END==