FCC Test Report

FCC ID	:	**ACQ-VIP7802**
Equipment	:	**WiFi Set Top Box**
Model No.	:	**VIP7802**
Brand Name	:	**ARRIS**
Applicant	:	**ARRIS Group, Inc.**
Address	:	**101 Tournament Drive, Horsham, Pennsylvania, United States 19044**
Standard	:	**47 CFR FCC Part 15.247**
Received Date	:	**Feb. 03, 2021**
Tested Date	:	**Feb. 19 ~ Mar. 29, 2021**

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 may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by: **Approved by:**

Along Chen / Assistant Manager **Gary Chang / Manager**

Testing Laboratory 2732

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Release Record

Report No.	Version	Description	Issued Date
FR120304AC	Rev. 01	Initial issue	May 04, 2021

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.582MHz 36.15 (Margin -9.85dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2390.00MHz 53.34 (Margin -0.66dB) – AV	Pass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: ***Non-beamforming mode*** 27.85 ***Beamforming mode*** 24.65	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	ac (VHT20)	2412-2462	1-11 [11]	2	MCS 0-9
2400-2483.5	ax (HE20)	2412-2462	1-11 [11]	2	MCS 0-11
Note 1: RF output power specifies that Maximum Peak Conducted 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. Note 4: 802.11ax supports full and partial loaded RU configuration.					

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	U.FL	3	3	3.1	4.4	4.3
2	Ant 2	Dipole	U.FL	3.2	3.2	3.6	4.5	4.6

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	5Vdc from adapter

1.1.4 Accessories

Accessories		
No.	**Equipment**	**Description**
1	Adapter	Brand: NeBit Model: NBS12F050200VU Power Rating: I/P: 100-240Vac, 50/60Hz, 0.3A O/P: 5Vdc, 2A Power Line: 0.75m non-shielded without core
2	Remote control	Brand: Bell Model: 2855-001
3	HDMI	1.83m shielded without core
4	SD card	Brand: SanDisk Model: SDSDQEC-008G Capacity: 8GB

1.1.5 Channel List

Frequency band (MHz)	**2400~2483.5**
802.11bg / n HT20 / ac VHT20 / ax HE20	
Channel	**Frequency(MHz)**
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

1.1.6 Test Tool and Duty Cycle

Test Tool	accessMTool, Version: 3.1.0.2		
Duty Cycle and Duty Factor	**Mode**	**Duty Cycle (%)**	**Duty Factor (dB)**
	11b	96.11%	0.17
	11g	96.29%	0.16
	ax (HE20)	98.86%	0.05

1.1.7 Power Index of Test Tool

Modulation Mode	Test Frequency (MHz)	Power Index
11b	2412	88
11b	2437	86
11b	2462	86
11g	2412	58
11g	2437	76
11g	2462	56
ax (HE20)	2412	50
ax (HE20)	2437	64
ax (HE20)	2462	48

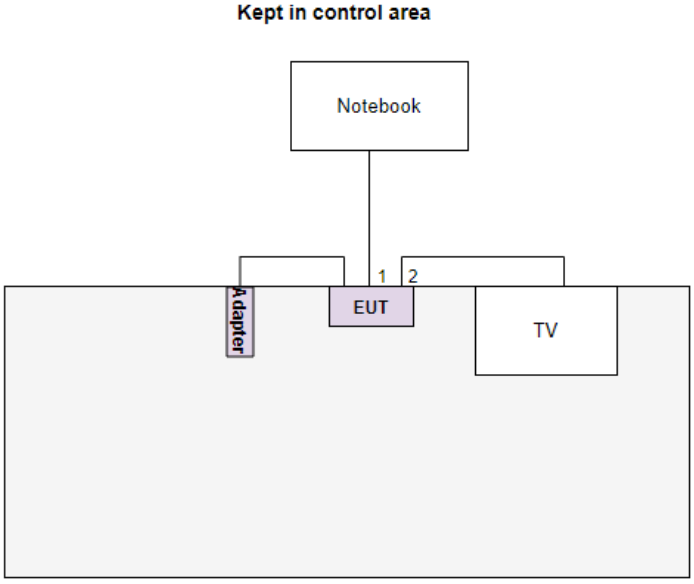
1.2 Local Support Equipment List

Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**FCC ID**	**Remarks**
1	Notebook	DELL	Latitude E5470	DoC	---
2	RJ45	ICC	RJ45-10m	---	---
3	TV	CHIMEI	TL-24LF500D	---	---
4	Fixture	ARRIS	240684-125 REV:1	---	Provided by applicant.
5	RS232	---	---	---	Provided by applicant.
6	USB cable	---	---	---	Provided by applicant.
7	Notebook	DELL	Latitude E5470	DoC	---

Note: The fixture (No.4), RS232 (No.5), USB cable (No.6) and notebook (No.7) are disconnected from EUT and removed from test table when EUT is set to transmit continuously.

1.3 Test Setup Chart

Test Setup Diagram



No.	Signal cable / Length (m)
1	RJ45, 10m non-shielded.
2	HDMI, 1.7m shielded

1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Test Date	Mar. 08, 2021				
Instrument	**Brand**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Receiver	R&S	ESR3	101658	Feb. 08, 2021	Feb. 07, 2022
LISN	R&S	ENV216	100003	Dec. 15, 2020	Dec. 14, 2021
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127-666	Dec. 29, 2020	Dec. 28, 2021
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 21, 2020	Oct. 20, 2021
50 ohm terminal (Support Unit)	NA	50	04	Jun. 05, 2020	Jun. 04, 2021
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber3 / (03CH03-WS)				
Test Date	Feb. 19 ~ Feb. 23, 2021				
Instrument	**Brand**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Receiver	R&S	ESR3	101658	Feb. 08, 2021	Feb. 07, 2022
Spectrum Analyzer	R&S	FSV40	101498	Dec. 04, 2020	Dec. 03, 2021
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 17, 2020	Nov. 16, 2021
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 29, 2020	Apr. 28, 2021
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Dec. 22, 2020	Dec. 21, 2021
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 06, 2020	Nov. 05, 2021
Preamplifier	EMC	EMC02325	980187	Aug. 05, 2020	Aug. 04, 2021
Preamplifier	Agilent	83017A	MY39501309	Sep. 02, 2020	Sep. 01, 2021
Preamplifier	EMC	EMC184045B	980192	Jul. 21, 2020	Jul. 20, 2021
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 06, 2020	Oct. 05, 2021
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800 -001	Sep. 26, 2020	Sep. 25, 2021
LF cable-3M	EMC	EMC8D-NM-NM-300 0	131103	Sep. 26, 2020	Sep. 25, 2021
LF cable-13M	EMC	EMC8D-NM-NM-130 00	131104	Sep. 26, 2020	Sep. 25, 2021
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Sep. 26, 2020	Sep. 25, 2021
RF cable-8M	EMC	EMC104-SM-SM-80 00	181107	Sep. 26, 2020	Sep. 25, 2021
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Test Date	Mar. 29, 2021				
Instrument	**Brand**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
Spectrum Analyzer	R&S	FSV40	101063	Apr. 30, 2020	Apr. 29, 2021
Power Meter	Anritsu	ML2495A	1241002	Nov. 04, 2020	Nov. 03, 2021
Power Sensor	Anritsu	MA2411B	1207366	Nov. 04, 2020	Nov. 03, 2021
Measurement Software	-	SENSE-15247_DTS	V5.10	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 ≤ 1GHz	±3.96 dB
Radiated emission > 1GHz	±4.51 dB

2 Test Configuration

2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	CO01-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.)
Test Site	03CH03-WS
Address of Test Site	No.14-1, Lane 19, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 333, Taiwan (R.O.C.)

- FCC Designation No.: TW0009
- FCC site registration No.: 207696
- ISED#: 10807A
- CAB identifier: TW2732

2.2 The Worst Test Modes and Channel Details

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

3 Transmitter Test Results

3.1 Conducted Emissions

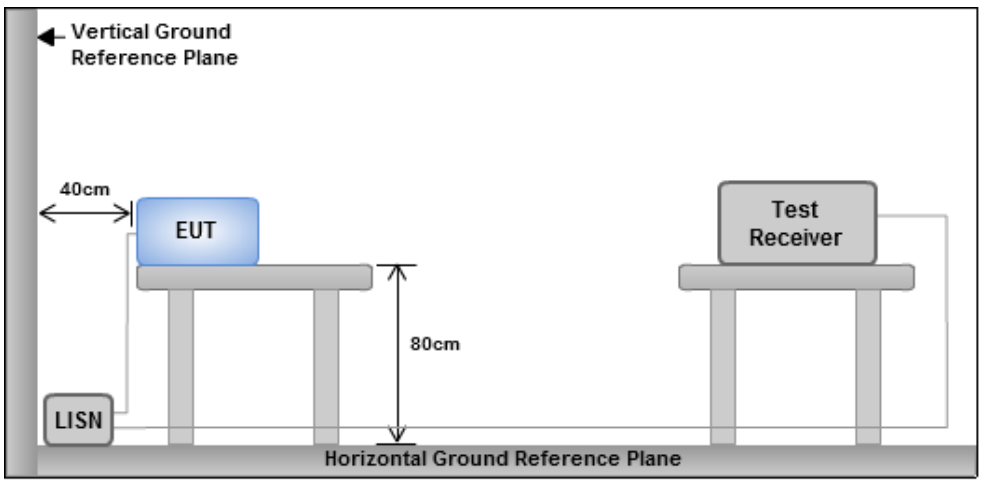
3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit		
Frequency Emission (MHz)	**Quasi-Peak**	**Average**
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

3.1.2 Test Procedures

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

3.1.3 Test Setup



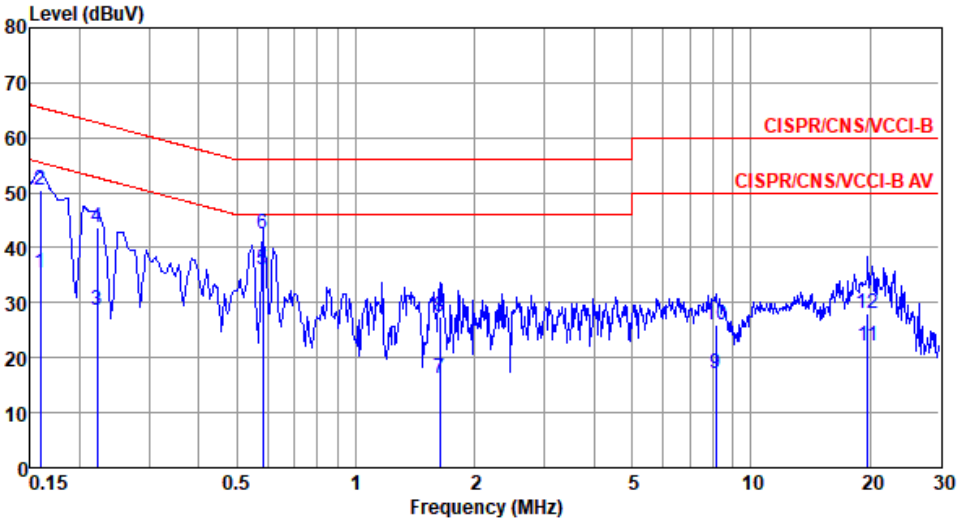
Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

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

Test by : Alex Tsai Temperature: 23°C Humidity: 63%

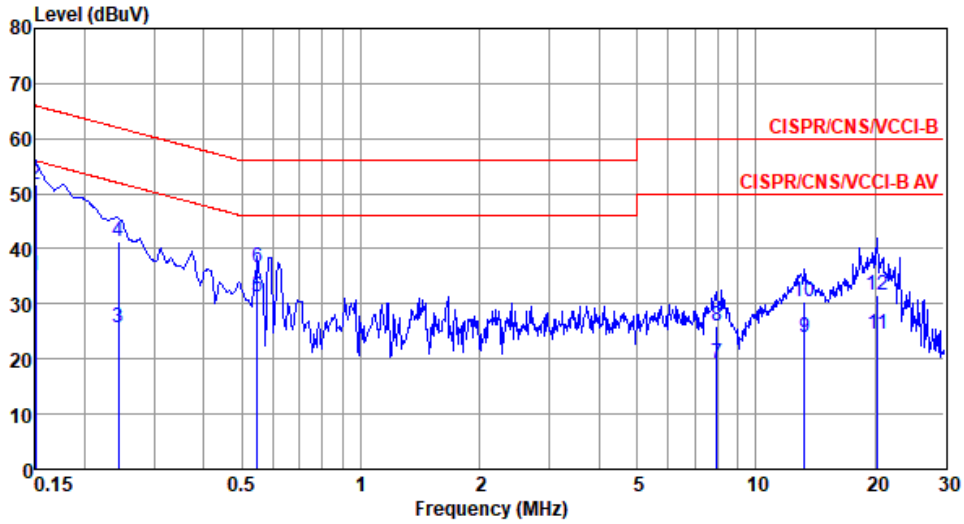


	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.159	35.29	55.52	-20.23	25.43	9.81	0.05	Average
2	0.159	50.41	65.52	-15.11	40.55	9.81	0.05	QP
3	0.222	28.51	52.74	-24.23	18.62	9.83	0.06	Average
4	0.222	43.73	62.74	-19.01	33.84	9.83	0.06	QP
5*	0.582	36.15	46.00	-9.85	26.13	9.92	0.10	Average
6	0.582	42.65	56.00	-13.35	32.63	9.92	0.10	QP
7	1.628	16.27	46.00	-29.73	6.13	9.98	0.16	Average
8	1.628	27.31	56.00	-28.69	17.17	9.98	0.16	QP
9	8.148	17.10	50.00	-32.90	6.65	10.07	0.38	Average
10	8.148	25.94	60.00	-34.06	15.49	10.07	0.38	QP
11	19.740	22.22	50.00	-27.78	11.25	10.30	0.67	Average
12	19.740	27.96	60.00	-32.04	16.99	10.30	0.67	QP

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

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

Test by : Alex Tsai Temperature: 23°C Humidity: 63%



	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.150	35.28	56.00	-20.72	25.44	9.79	0.05	Average
2*	0.150	51.59	66.00	-14.41	41.75	9.79	0.05	QP
3	0.243	25.68	52.00	-26.32	15.80	9.81	0.07	Average
4	0.243	41.35	62.00	-20.65	31.47	9.81	0.07	QP
5	0.546	31.39	46.00	-14.61	21.46	9.84	0.09	Average
6	0.546	36.68	56.00	-19.32	26.75	9.84	0.09	QP
7	7.977	19.30	50.00	-30.70	8.90	10.03	0.37	Average
8	7.977	26.04	60.00	-33.96	15.64	10.03	0.37	QP
9	13.267	23.85	50.00	-26.15	13.18	10.13	0.54	Average
10	13.267	30.49	60.00	-29.51	19.82	10.13	0.54	QP
11	20.270	24.57	50.00	-25.43	13.57	10.33	0.67	Average
12	20.270	31.51	60.00	-28.49	20.51	10.33	0.67	QP

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

3.2 6dB and Occupied Bandwidth

3.2.1 Limit of 6dB Bandwidth

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

3.2.2 Test Procedures

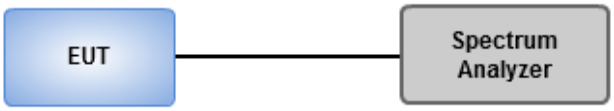
6dB Bandwidth

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

Occupied Bandwidth

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

3.2.3 Test Setup



3.2.4 Test Result of 6dB and Occupied Bandwidth

Ambient Condition	25°C / 66%	Tested By	Aska Huang

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	8.043M	13.603M	13M6G1D	7.101M	13.025M
802.11g_Nss1,(6Mbps)_2TX	16.377M	18.307M	18M3D1D	16.304M	16.425M
802.11ax HEW20_Nss1,(MCS0)_2TX	18.986M	19.103M	19M1D1D	18.043M	18.886M

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;

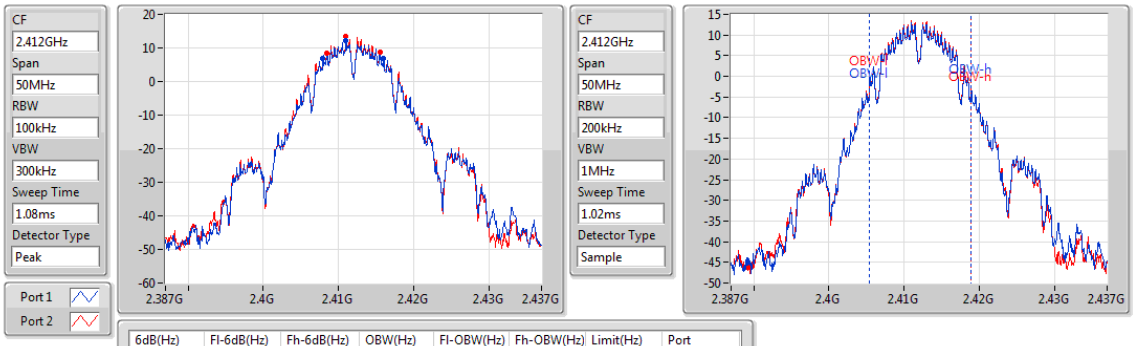
Result

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	8.043M	13.603M	7.101M	13.459M
2437MHz	Pass	500k	7.101M	13.097M	7.536M	13.025M
2462MHz	Pass	500k	7.101M	13.242M	7.101M	13.097M
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	16.377M	16.57M	16.377M	16.498M
2437MHz	Pass	500k	16.377M	17.945M	16.377M	18.307M
2462MHz	Pass	500k	16.304M	16.57M	16.377M	16.425M
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	18.768M	18.886M	18.696M	18.886M
2437MHz	Pass	500k	18.913M	19.03M	18.986M	19.103M
2462MHz	Pass	500k	18.043M	18.886M	18.696M	18.886M

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

802.11b_Nss1,(1Mbps)_2TX **EBW**

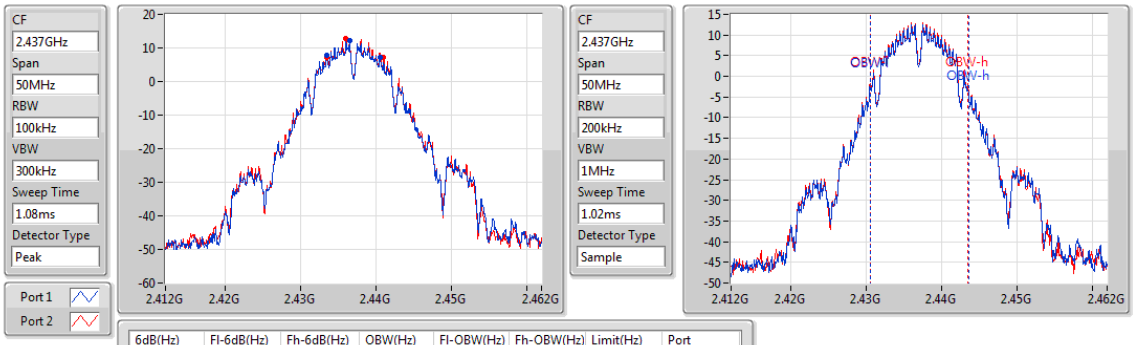
2412MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
8.043M	2.407942G	2.415986G	13.603M	2.405343G	2.418946G	500k	1
7.101M	2.408449G	2.415551G	13.459M	2.405415G	2.418874G	500k	2

802.11b_Nss1,(1Mbps)_2TX **EBW**

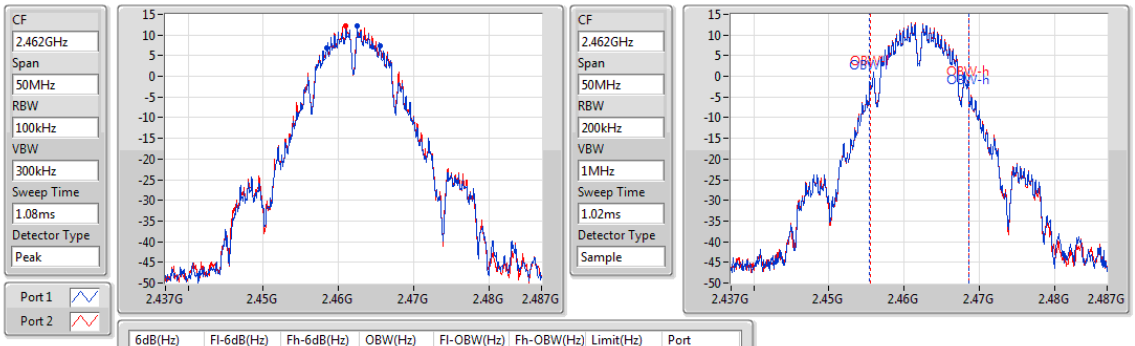
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
7.101M	2.433449G	2.440551G	13.097M	2.430488G	2.443585G	500k	1
7.536M	2.433449G	2.440986G	13.025M	2.430488G	2.443512G	500k	2

802.11b_Nss1,(1Mbps)_2TX **EBW**

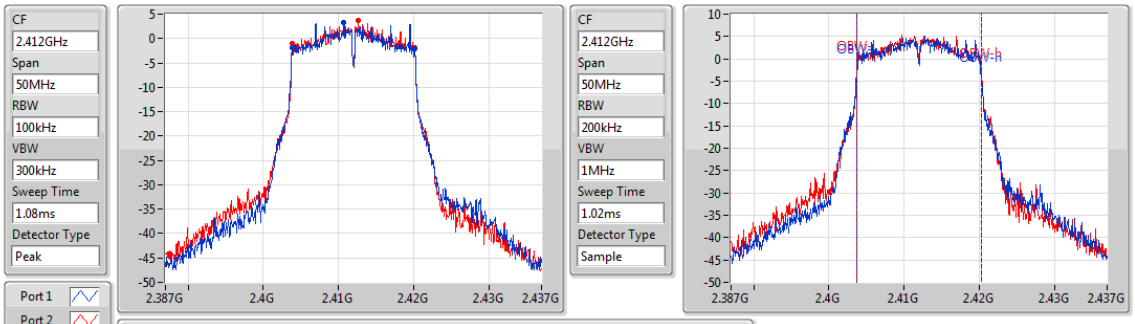
2462MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
7.101M	2.458449G	2.465551G	13.242M	2.455415G	2.468657G	500k	1
7.101M	2.458449G	2.465551G	13.097M	2.455488G	2.468585G	500k	2

802.11g_Nss1,(6Mbps)_2TX **EBW**

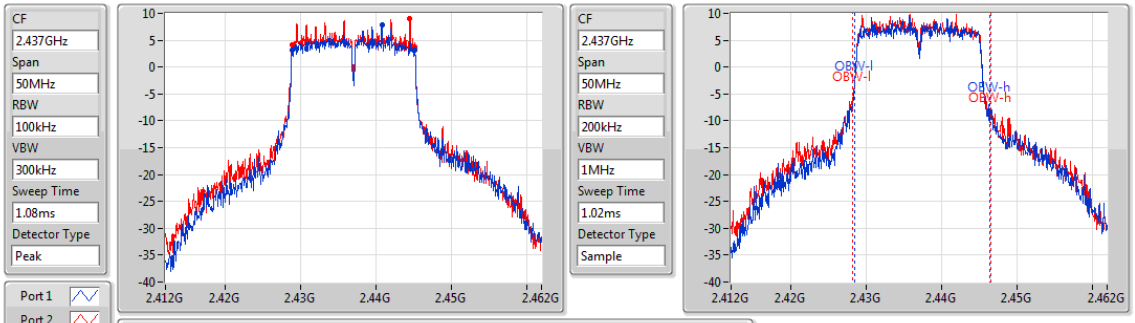
2412MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
16.377M	2.403812G	2.420188G	16.57M	2.403679G	2.420249G	500k	1
16.377M	2.403812G	2.420188G	16.498M	2.403751G	2.420249G	500k	2

802.11g_Nss1,(6Mbps)_2TX **EBW**

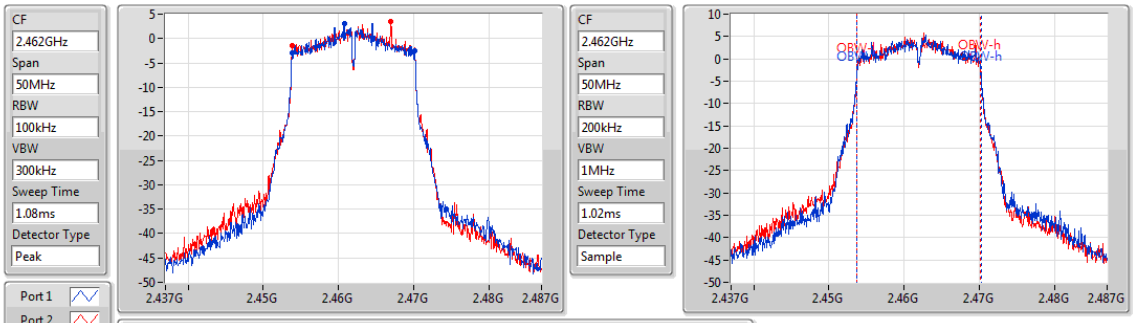
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
16.377M	2.428812G	2.445188G	17.945M	2.428389G	2.446334G	500k	1
16.377M	2.428812G	2.445188G	18.307M	2.428172G	2.446479G	500k	2

802.11g_Nss1,(6Mbps)_2TX **EBW**

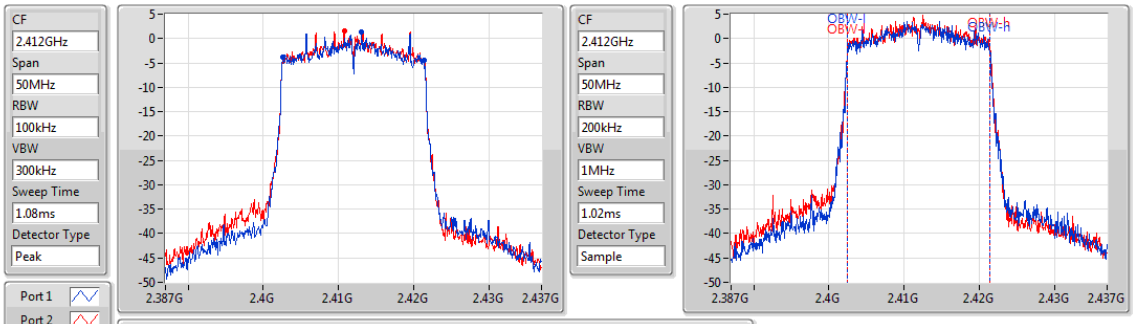
2462MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
16.304M	2.453812G	2.470116G	16.57M	2.453679G	2.470249G	500k	1
16.377M	2.453812G	2.470188G	16.425M	2.453751G	2.470177G	500k	2

802.11ax HEW20_Nss1,(MCS0)_2TX **EBW**

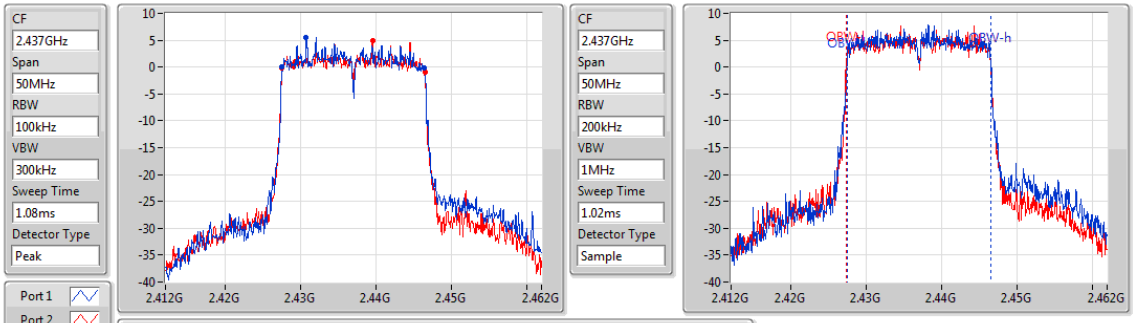
2412MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
18.768M	2.40258G	2.421348G	18.886M	2.402521G	2.421407G	500k	1
18.696M	2.402652G	2.421348G	18.886M	2.402521G	2.421407G	500k	2

802.11ax HEW20_Nss1,(MCS0)_2TX **EBW**

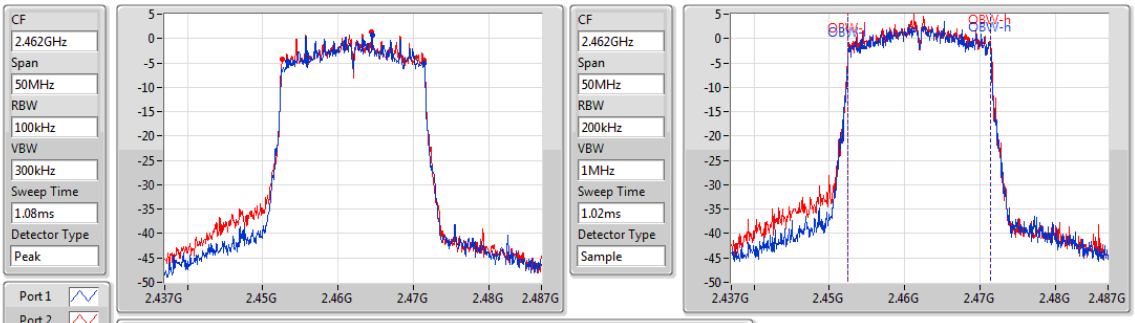
2437MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
18.913M	2.427507G	2.44642G	19.03M	2.427449G	2.446479G	500k	1
18.986M	2.427507G	2.446493G	19.103M	2.427376G	2.446479G	500k	2

802.11ax HEW20_Nss1,(MCS0)_2TX **EBW**

2462MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
18.043M	2.453304G	2.471348G	18.886M	2.452521G	2.471407G	500k	1
18.696M	2.452652G	2.471348G	18.886M	2.452521G	2.471407G	500k	2

3.3 RF Output Power

3.3.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

Antenna gain <= 6dBi, no any corresponding reduction is in output power limit.

3.3.2 Test Procedures

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

3.3.3 Test Setup

3.3.4 Test Result of Maximum Output Power

Ambient Condition	25°C / 66%	Tested By	Aska Huang

Non-beamforming mode

Summary of Peak Conducted Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_2TX	26.14	0.41115
802.11g_Nss1,(6Mbps)_2TX	27.85	0.60954
802.11ax HEW20_Nss1,(MCS0)_2TX	27.66	0.58345

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	3.20	22.92	23.33	26.14	30.00	29.34	36.00
2437MHz	Pass	3.20	22.61	23.02	25.83	30.00	29.03	36.00
2462MHz	Pass	3.20	22.69	23.06	25.89	30.00	29.09	36.00
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	3.20	23.26	24.32	26.83	30.00	30.03	36.00
2437MHz	Pass	3.20	24.66	25.01	27.85	30.00	31.05	36.00
2462MHz	Pass	3.20	23.3	23.72	26.53	30.00	29.73	36.00
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	3.20	22.66	23.42	26.07	30.00	29.27	36.00
2437MHz	Pass	3.20	24.58	24.72	27.66	30.00	30.86	36.00
2462MHz	Pass	3.20	21.93	23.56	25.83	30.00	29.03	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	23.84	0.24210
802.11g_Nss1,(6Mbps)_2TX	23.02	0.20045
802.11ax HEW20_Nss1,(MCS0)_2TX	20.55	0.11350

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	3.20	20.62	21.03	23.84	-	27.04	-
2437MHz	Pass	3.20	20.26	20.75	23.52	-	26.72	-
2462MHz	Pass	3.20	20.36	20.67	23.53	-	26.73	-
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	3.20	15.15	15.62	18.40	-	21.60	-
2437MHz	Pass	3.20	19.83	20.19	23.02	-	26.22	-
2462MHz	Pass	3.20	14.75	14.95	17.86	-	21.06	-
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
2412MHz	Pass	3.20	13.17	13.73	16.47	-	19.67	-
2437MHz	Pass	3.20	17.32	17.74	20.55	-	23.75	-
2462MHz	Pass	3.20	12.51	13.26	15.91	-	19.11	-

DG = Directional Gain; **Port X** = Port X output power
Note: Conducted average output power is for reference only

Beamforming mode

Summary of Peak Conducted Output Power

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	24.65	0.29174

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	6.11	19.65	20.41	23.06	29.89	29.17	36.00
2437MHz	Pass	6.11	21.57	21.71	24.65	29.89	30.76	36.00
2462MHz	Pass	6.11	18.92	20.55	22.82	29.89	28.93	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	-	-
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	17.54	0.05675

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	6.11	10.16	10.72	13.46	-	19.57	-
2437MHz	Pass	6.11	14.31	14.73	17.54	-	23.65	-
2462MHz	Pass	6.11	9.50	10.25	12.90	-	19.01	-

DG = Directional Gain;
Directional gain = $10 * \log((10^{3/20}+10^{3.2/20})^2/2) = 6.11$ dBi
Port X = Port X output power
Note: Conducted average output power is for reference only

3.4 Power Spectral Density

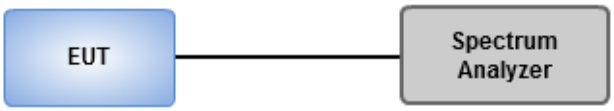
3.4.1 Limit of Power Spectral Density

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.
2. Detector = Peak, Sweep time = auto couple.
3. Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

3.4.3 Test Setup



3.4.4 Test Result of Power Spectral Density

Ambient Condition	25°C / 66%	Tested By	Aska Huang

Summary

Mode	PD (dBm/3kHz)
2.4-2.4835GHz	-
802.11b_Nss1,(1Mbps)_2TX	1.90
802.11g_Nss1,(6Mbps)_2TX	-2.75
802.11ax HEW20_Nss1,(MCS0)_2TX	-6.87

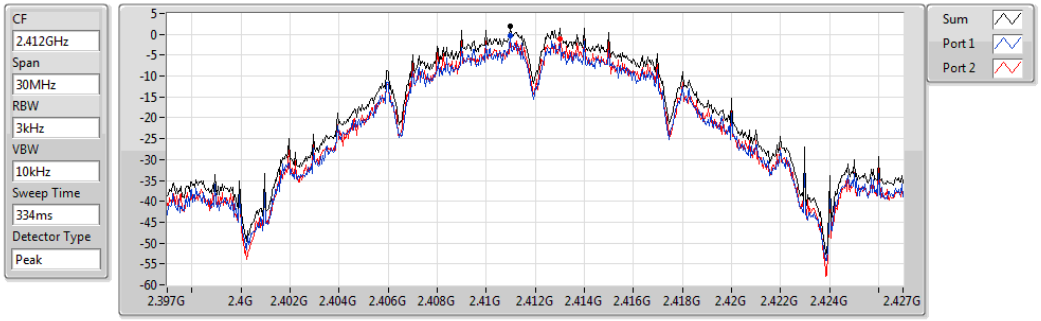
Result

Mode	Result	DG (dBi)	Port 1 (dBm/3kHz)	Port 2 (dBm/3kHz)	PD (dBm/3kHz)	PD Limit (dBm/3kHz)
802.11b_Nss1,(1Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	6.11	-0.27	-1.20	1.90	7.89
2437MHz	Pass	6.11	-2.10	-1.80	0.79	7.89
2462MHz	Pass	6.11	-2.29	-1.70	0.37	7.89
802.11g_Nss1,(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	6.11	-8.20	-8.82	-5.74	7.89
2437MHz	Pass	6.11	-5.83	-4.98	-2.75	7.89
2462MHz	Pass	6.11	-8.75	-9.67	-6.43	7.89
802.11ax HEW20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	6.11	-12.66	-11.25	-9.14	7.89
2437MHz	Pass	6.11	-8.36	-8.51	-6.87	7.89
2462MHz	Pass	6.11	-13.11	-11.96	-10.07	7.89

DG = Directional Gain;
Directional gain = $10 * \log((10^{3/20}+10^{3.2/20})^2/2) = 6.11$ dBi
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port X power density;

802.11b_Nss1,(1Mbps)_2TX **PSD**

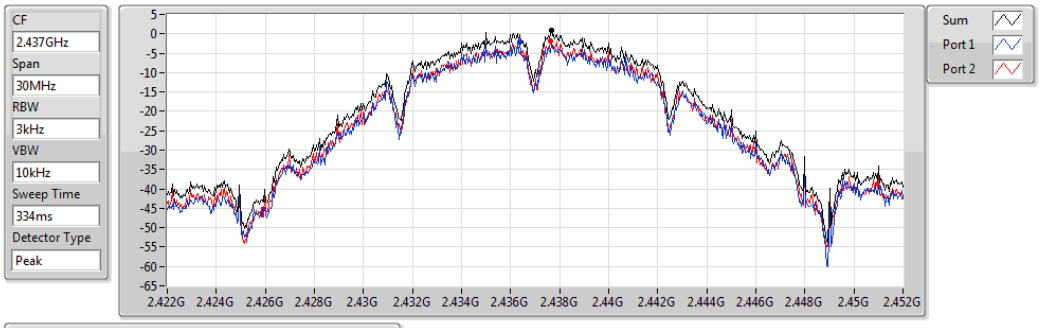
2412MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
1.90	1.90	-0.27	-1.20

802.11b_Nss1,(1Mbps)_2TX **PSD**

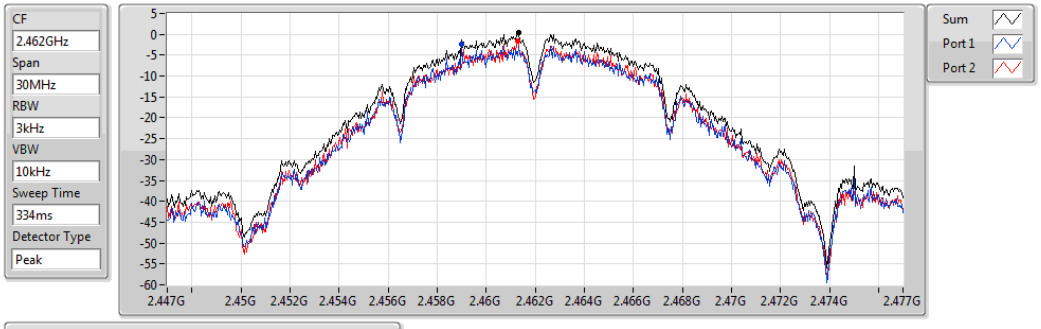
2437MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
0.79	0.79	-2.10	-1.80

802.11b_Nss1,(1Mbps)_2TX **PSD**

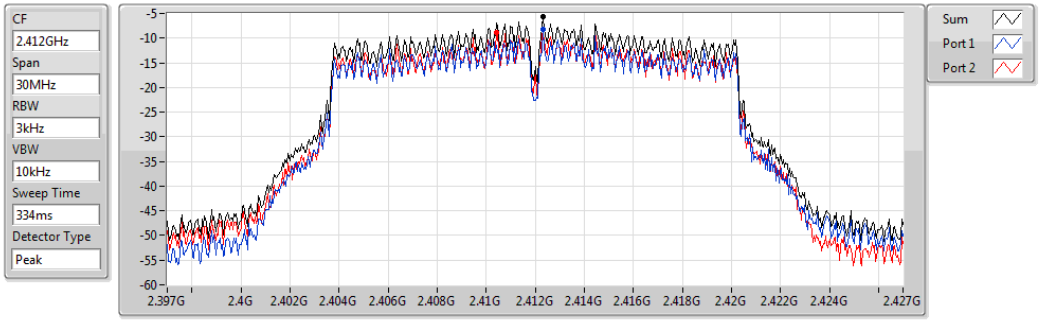
2462MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
0.37	0.37	-2.29	-1.70

802.11g_Nss1,(6Mbps)_2TX **PSD**

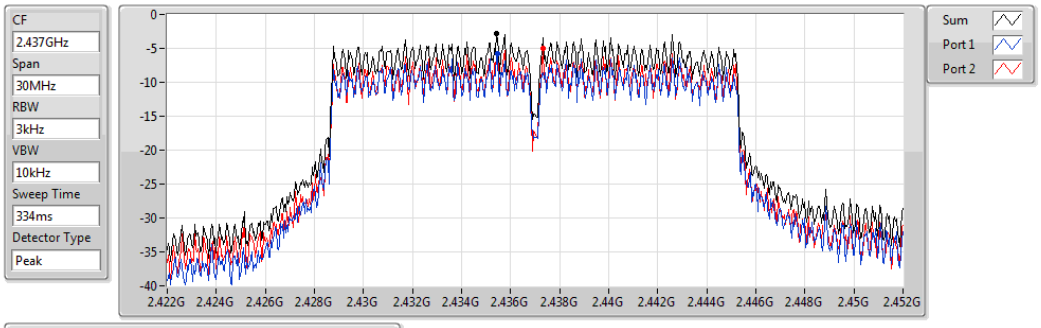
2412MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-5.74	-5.74	-8.20	-8.82

802.11g_Nss1,(6Mbps)_2TX **PSD**

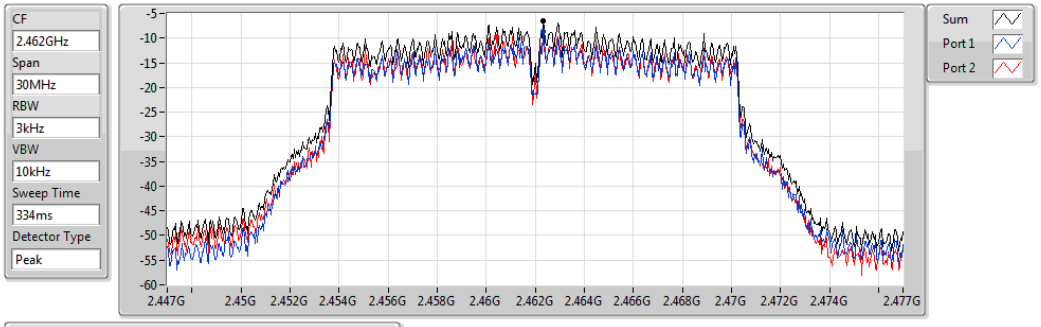
2437MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-2.75	-2.75	-5.83	-4.98

802.11g_Nss1,(6Mbps)_2TX **PSD**

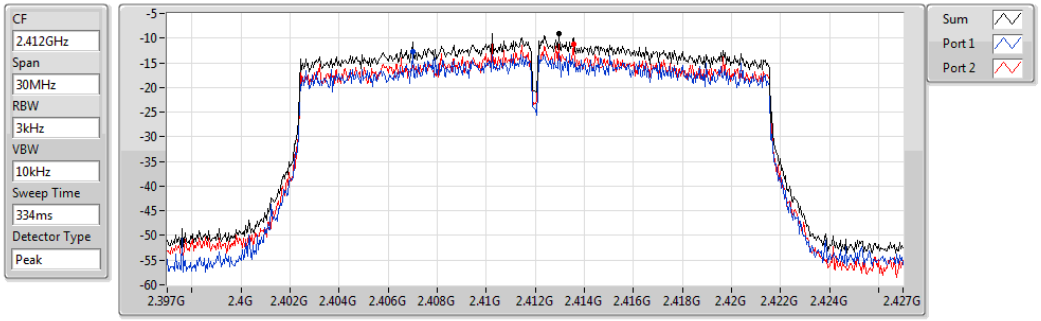
2462MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-6.43	-6.43	-8.75	-9.67

802.11ax HEW20_Nss1,(MCS0)_2TX **PSD**

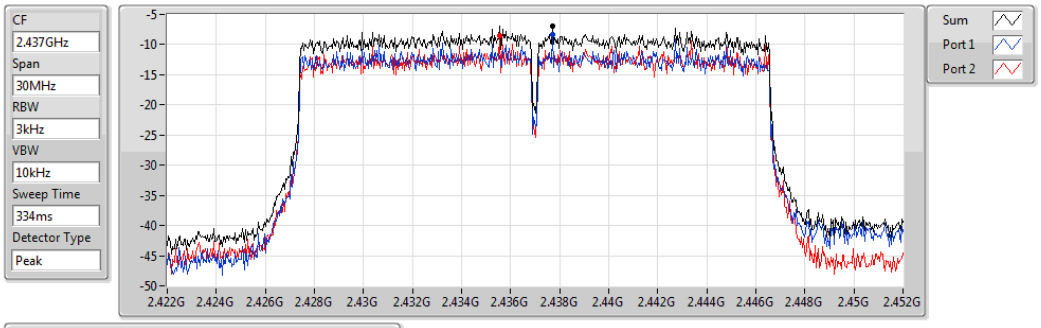
2412MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.14	-9.14	-12.66	-11.25

802.11ax HEW20_Nss1,(MCS0)_2TX **PSD**

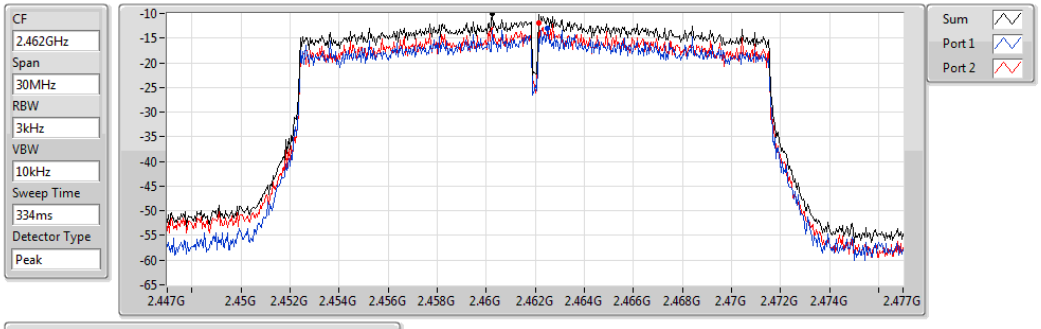
2437MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-6.87	-6.87	-8.36	-8.51

802.11ax HEW20_Nss1,(MCS0)_2TX **PSD**

2462MHz



Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-10.07	-10.07	-13.11	-11.96

3.5 Unwanted Emissions into Restricted Frequency Bands

3.5.1 Limit of Unwanted Emissions into Restricted Frequency Bands

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

Note 1:
Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit
Note 2:
Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.5.2 Test Procedures

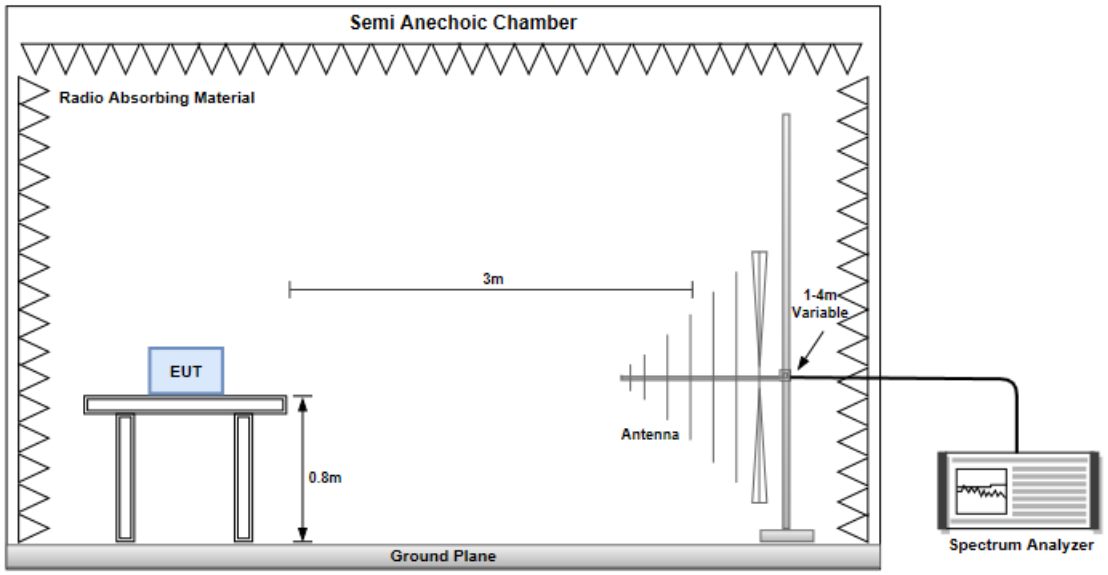
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

Note:

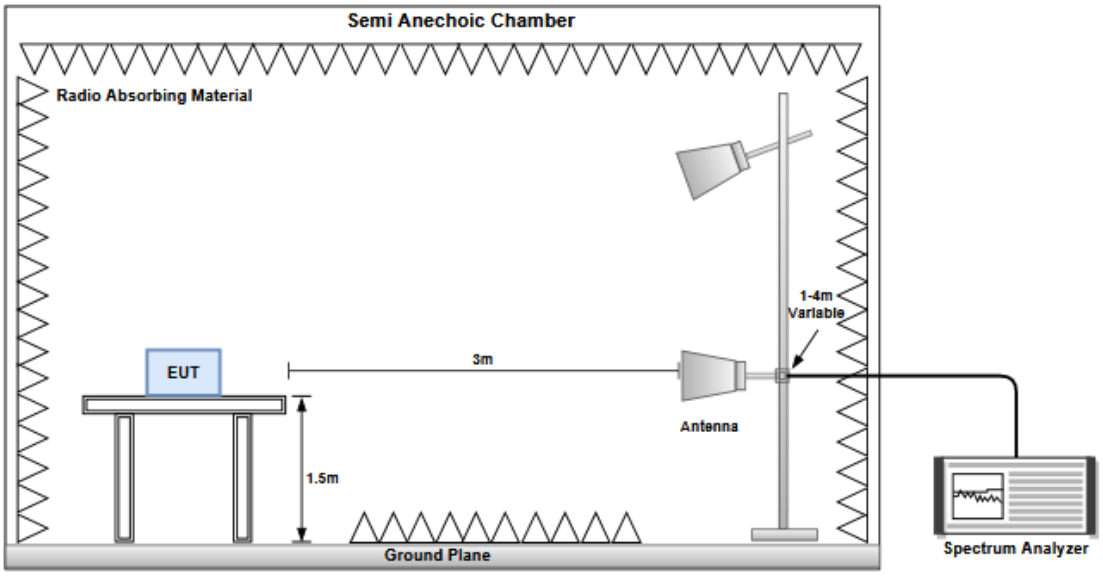
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.5.3 Test Setup

Radiated Emissions below 1 GHz



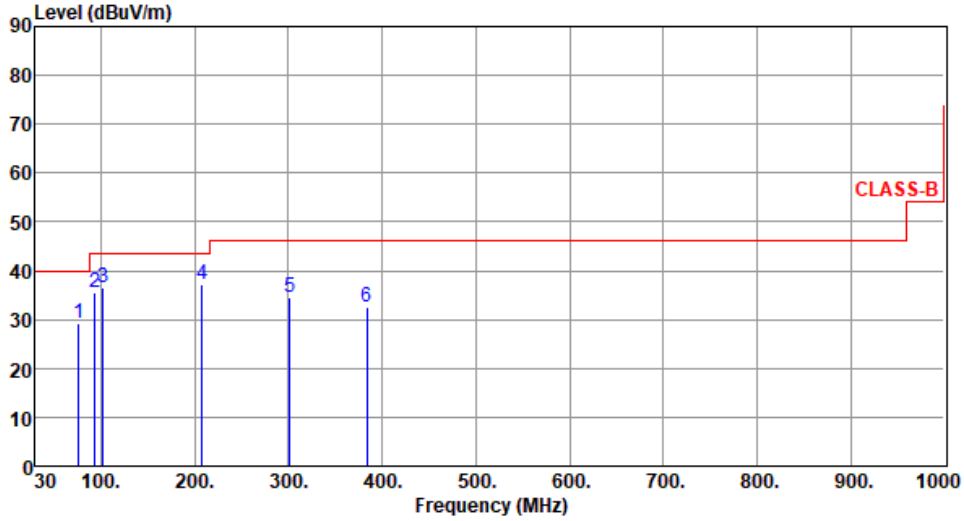
Radiated Emissions above 1 GHz



3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

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

Test By :Roger Lu Temperature(℃):23 Humidity(%):65

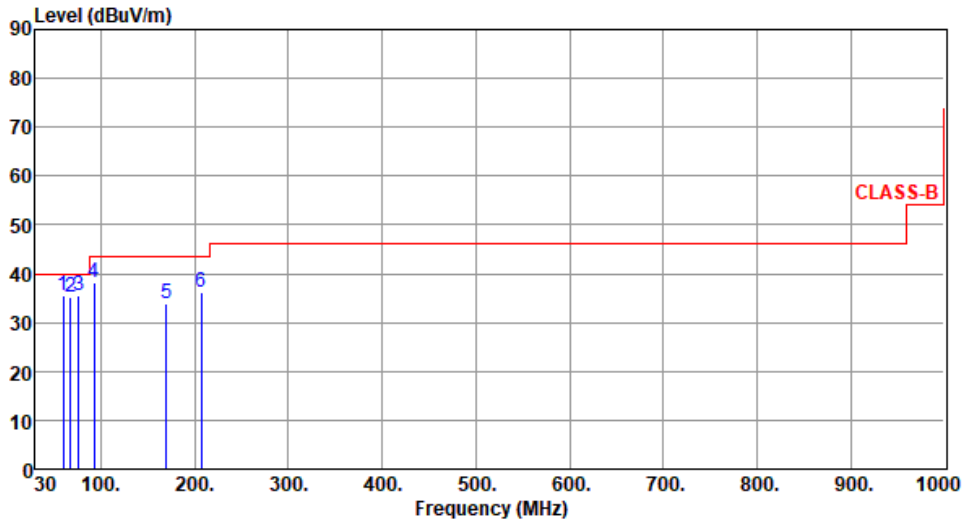


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	76.24	29.36	40.00	-10.64	41.85	-12.49	Peak	---	---
2	93.24	35.46	43.50	-8.04	50.11	-14.65	Peak	---	---
3	101.85	36.42	43.50	-7.08	49.78	-13.36	Peak	---	---
4	208.04	37.14	43.50	-6.36	49.34	-12.20	QP	125	248
5	301.26	34.59	46.00	-11.41	43.16	-8.57	Peak	---	---
6	383.95	32.46	46.00	-13.54	38.65	-6.19	Peak	---	---

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

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

Test By :Roger Lu Temperature(℃):23 Humidity(%):65



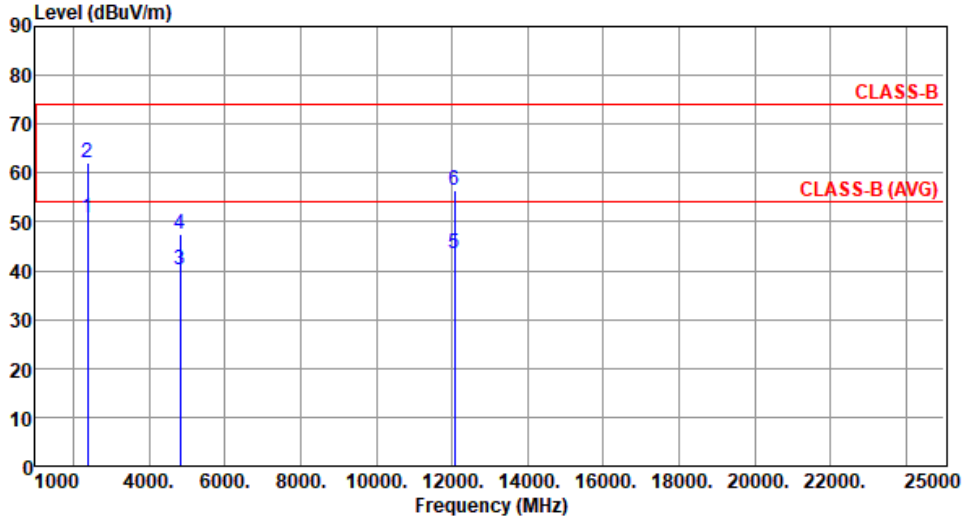
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	59.46	35.61	40.00	-4.39	44.80	-9.19	Peak	---	---
2	67.24	35.21	40.00	-4.79	45.58	-10.37	Peak	---	---
3	75.92	35.44	40.00	-4.56	47.78	-12.34	Peak	---	---
4	92.81	38.25	43.50	-5.25	52.94	-14.69	Peak	---	---
5	170.22	33.85	43.50	-9.65	43.06	-9.21	Peak	---	---
6	207.22	36.21	43.50	-7.29	48.41	-12.20	Peak	---	---

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

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

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

Test By :BRAD WU Temperature(℃):23 Humidity(%):65

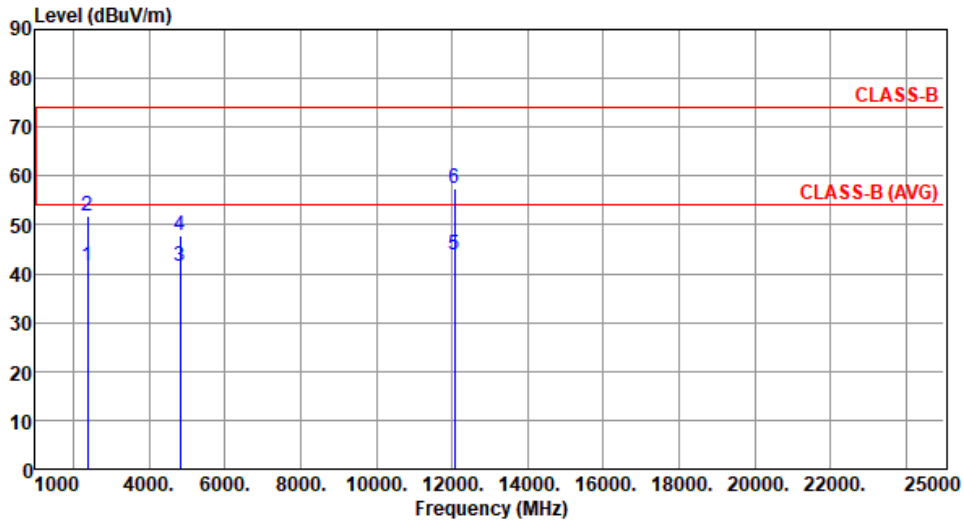


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	50.76	54.00	-3.24	52.42	-1.66	Average	100	311
2	2390.00	62.15	74.00	-11.85	63.81	-1.66	Peak	100	311
3	4824.00	40.11	54.00	-13.89	35.08	5.03	Average	108	121
4	4824.00	47.51	74.00	-26.49	42.48	5.03	Peak	108	121
5	12060.00	43.44	54.00	-10.56	28.67	14.77	Average	100	19
6	12060.00	56.52	74.00	-17.48	41.75	14.77	Peak	100	19

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

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

Test By :BRAD WU Temperature(℃):23 Humidity(%):65

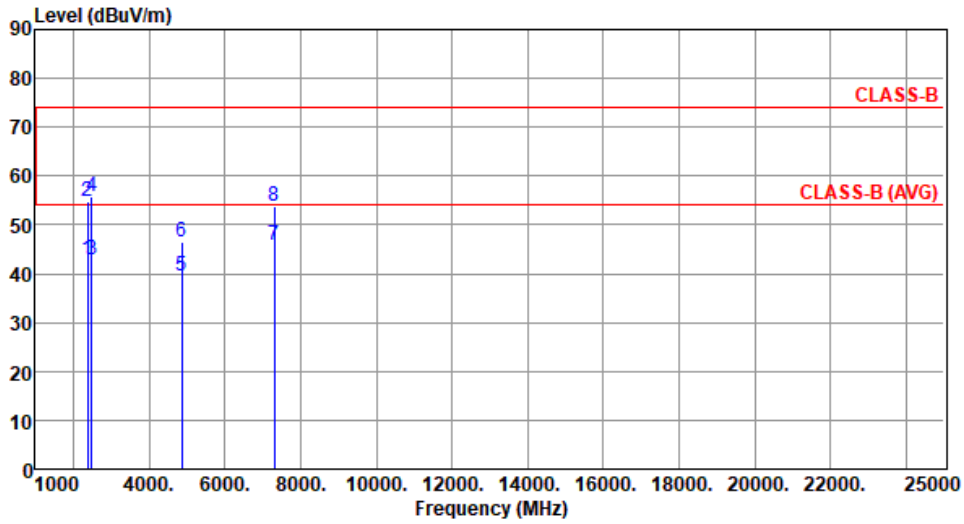


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	41.52	54.00	-12.48	43.18	-1.66	Average	100	137
2	2390.00	51.96	74.00	-22.04	53.62	-1.66	Peak	100	137
3	4824.00	41.41	54.00	-12.59	36.38	5.03	Average	103	256
4	4824.00	47.93	74.00	-26.07	42.90	5.03	Peak	103	256
5	12060.00	43.90	54.00	-10.10	29.13	14.77	Average	100	34
6	12060.00	57.41	74.00	-16.59	42.64	14.77	Peak	100	34

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

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

Test By :BRAD WU Temperature(℃):23 Humidity(%):65

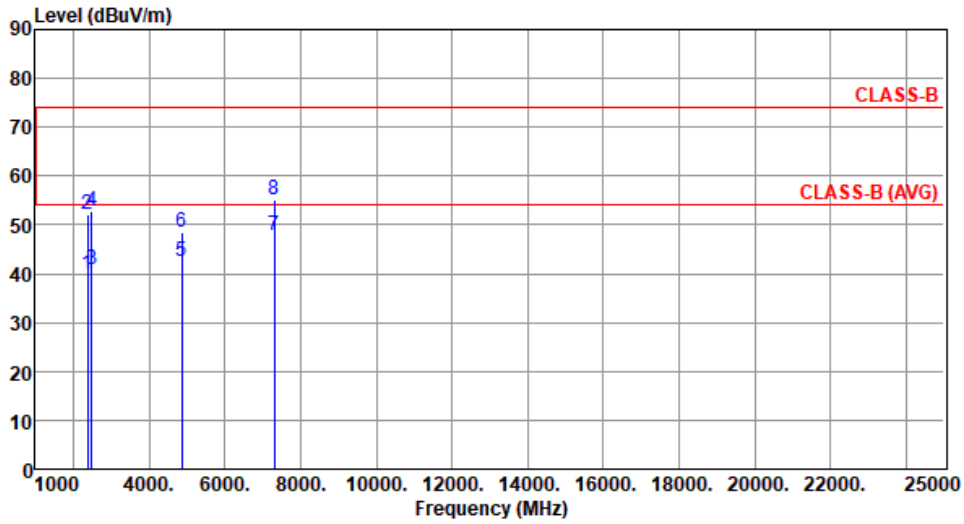


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	42.84	54.00	-11.16	44.50	-1.66	Average	100	310
2	2390.00	54.81	74.00	-19.19	56.47	-1.66	Peak	100	310
3	2483.50	42.76	54.00	-11.24	44.62	-1.86	Average	100	310
4	2483.50	55.75	74.00	-18.25	57.61	-1.86	Peak	100	310
5	4874.00	39.52	54.00	-14.48	34.45	5.07	Average	110	124
6	4874.00	46.59	74.00	-27.41	41.52	5.07	Peak	110	124
7	7311.00	45.77	54.00	-8.23	35.39	10.38	Average	100	62
8	7311.00	53.92	74.00	-20.08	43.54	10.38	Peak	100	62

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

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

Test By :BRAD WU Temperature(℃):23 Humidity(%):65

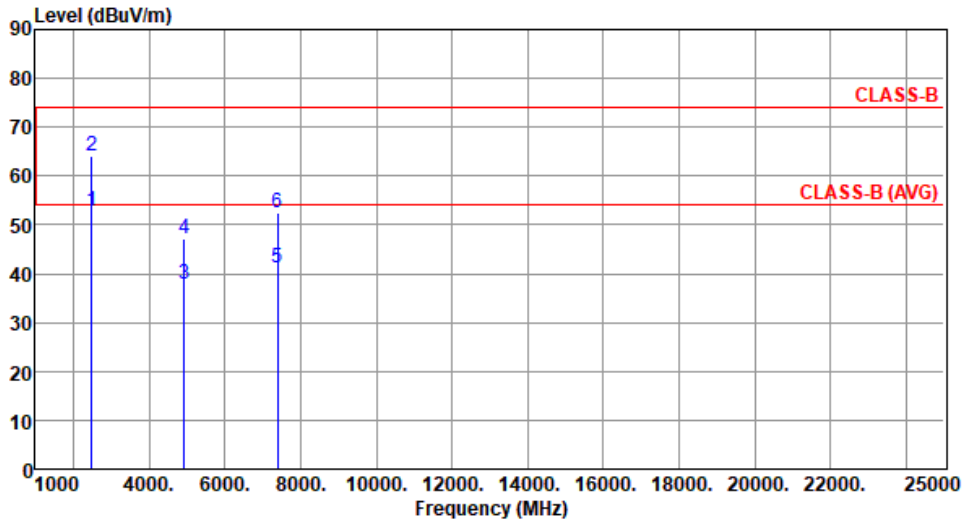


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	39.71	54.00	-14.29	41.37	-1.66	Average	100	168
2	2390.00	52.29	74.00	-21.71	53.95	-1.66	Peak	100	168
3	2483.50	40.89	54.00	-13.11	42.75	-1.86	Average	100	168
4	2483.50	52.76	74.00	-21.24	54.62	-1.86	Peak	100	168
5	4874.00	42.48	54.00	-11.52	37.41	5.07	Average	100	231
6	4874.00	48.56	74.00	-25.44	43.49	5.07	Peak	100	231
7	7311.00	47.77	54.00	-6.23	37.39	10.38	Average	113	207
8	7311.00	55.08	74.00	-18.92	44.70	10.38	Peak	113	207

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

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

Test By :BRAD WU Temperature(℃):23 Humidity(%):65

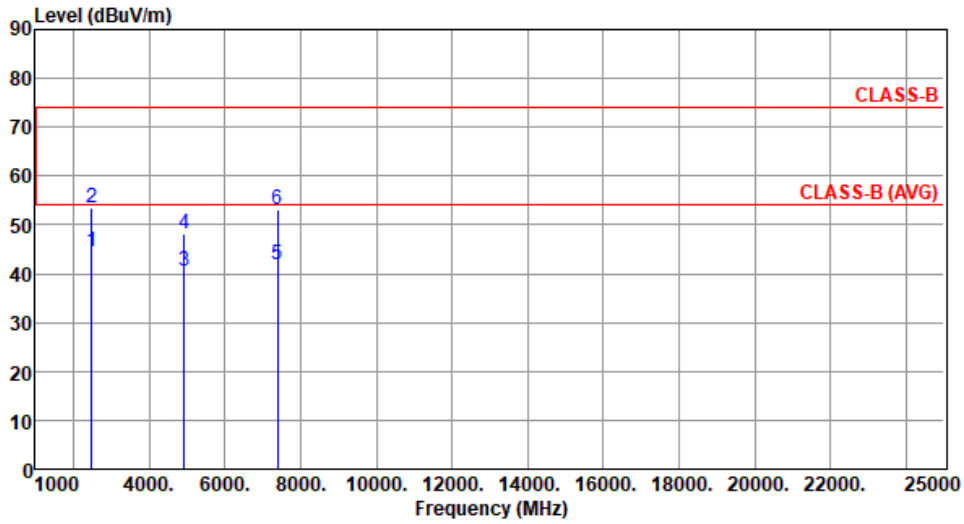


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	52.96	54.00	-1.04	54.82	-1.86	Average	100	325
2	2483.50	64.23	74.00	-9.77	66.09	-1.86	Peak	100	325
3	4924.00	37.98	54.00	-16.02	32.81	5.17	Average	101	121
4	4924.00	47.32	74.00	-26.68	42.15	5.17	Peak	101	121
5	7386.00	41.06	54.00	-12.94	30.98	10.08	Average	103	48
6	7386.00	52.32	74.00	-21.68	42.24	10.08	Peak	103	48

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

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

Test By :BRAD WU Temperature(℃):23 Humidity(%):65



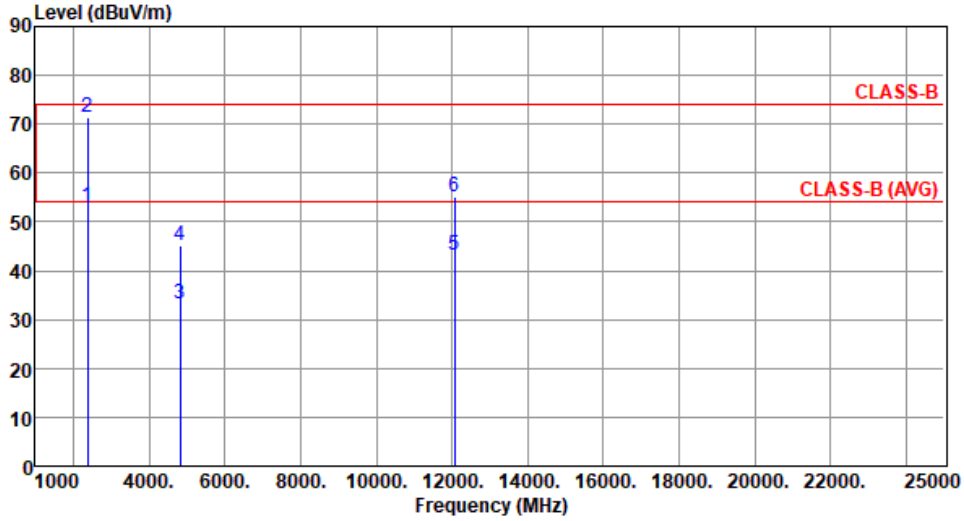
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	44.47	54.00	-9.53	46.33	-1.86	Average	102	136
2	2483.50	53.40	74.00	-20.60	55.26	-1.86	Peak	102	136
3	4924.00	40.50	54.00	-13.50	35.33	5.17	Average	106	234
4	4924.00	48.16	74.00	-25.84	42.99	5.17	Peak	106	234
5	7386.00	41.74	54.00	-12.26	31.66	10.08	Average	121	206
6	7386.00	53.01	74.00	-20.99	42.93	10.08	Peak	121	206

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

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

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

Test By :BRAD WU Temperature(℃):23 Humidity(%):65

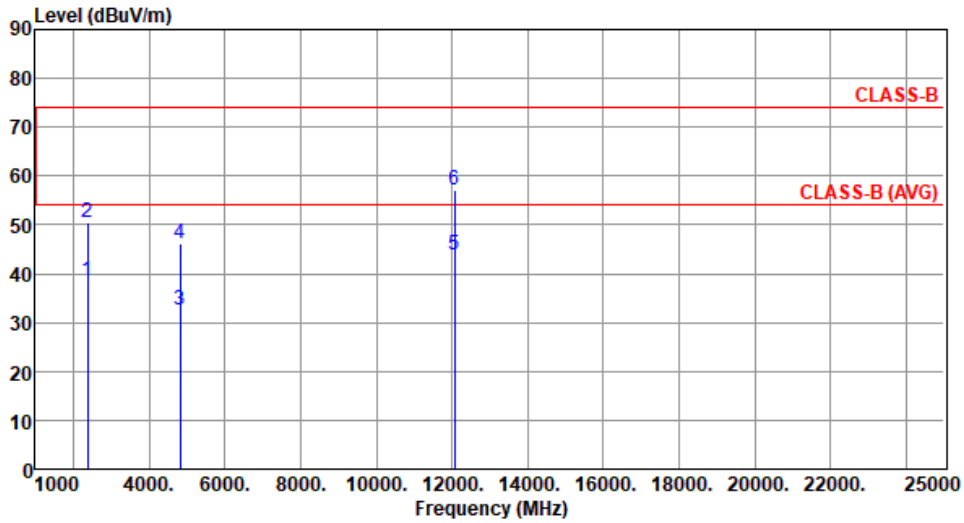


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.15	54.00	-0.85	54.81	-1.66	Average	101	311
2	2390.00	71.28	74.00	-2.72	72.94	-1.66	Peak	101	311
3	4824.00	33.23	54.00	-20.77	28.20	5.03	Average	100	125
4	4824.00	45.30	74.00	-28.70	40.27	5.03	Peak	100	125
5	12060.00	43.05	54.00	-10.95	28.28	14.77	Average	100	136
6	12060.00	55.08	74.00	-18.92	40.31	14.77	Peak	100	136

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

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

Test By :BRAD WU Temperature(℃):23 Humidity(%):65

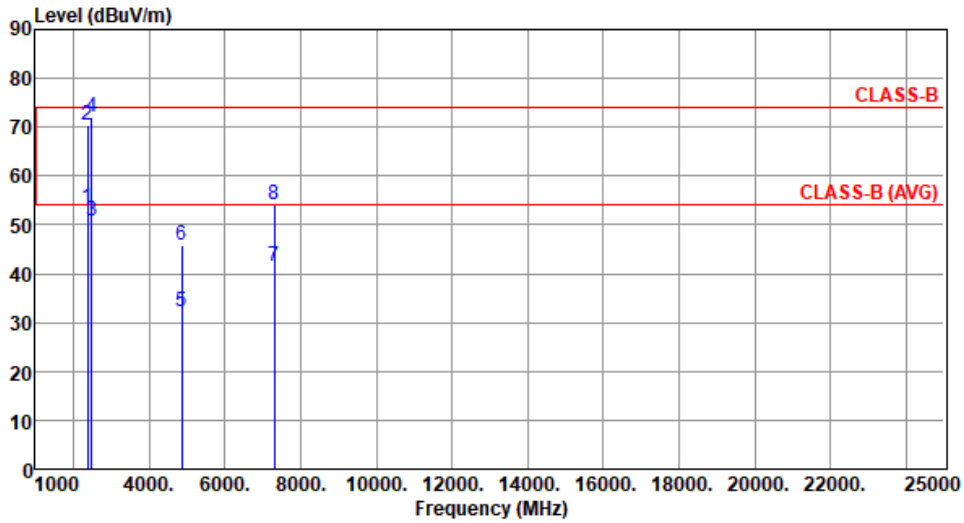


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	38.58	54.00	-15.42	40.24	-1.66	Average	100	135
2	2390.00	50.59	74.00	-23.41	52.25	-1.66	Peak	100	135
3	4824.00	32.41	54.00	-21.59	27.38	5.03	Average	105	226
4	4824.00	46.04	74.00	-27.96	41.01	5.03	Peak	105	226
5	12060.00	43.84	54.00	-10.16	29.07	14.77	Average	100	41
6	12060.00	57.28	74.00	-16.72	42.51	14.77	Peak	100	41

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

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

Test By :BRAD WU Temperature(℃):23 Humidity(%):65

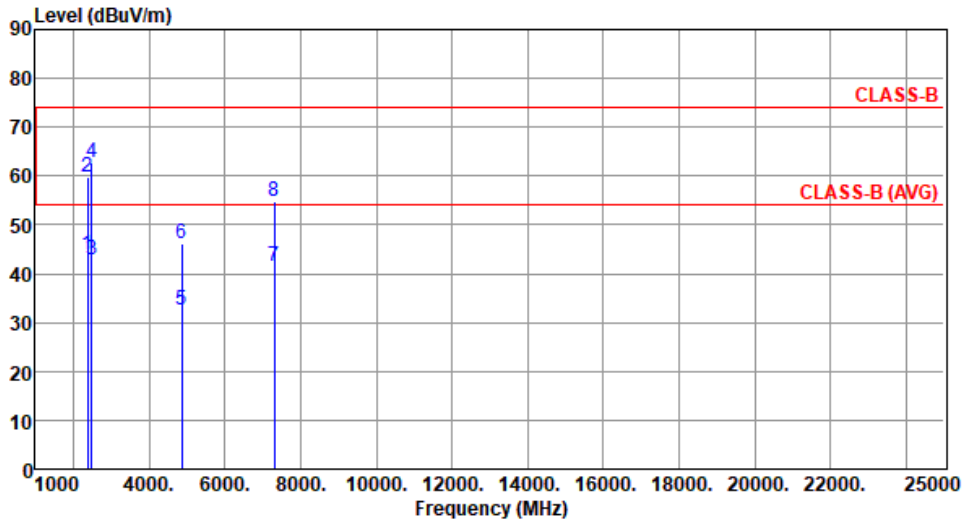


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	53.34	54.00	-0.66	55.00	-1.66	Average	100	308
2	2390.00	70.41	74.00	-3.59	72.07	-1.66	Peak	100	308
3	2483.50	50.83	54.00	-3.17	52.69	-1.86	Average	100	308
4	2483.50	71.95	74.00	-2.05	73.81	-1.86	Peak	100	308
5	4874.00	32.15	54.00	-21.85	27.08	5.07	Average	109	122
6	4874.00	45.76	74.00	-28.24	40.69	5.07	Peak	109	122
7	7311.00	41.55	54.00	-12.45	31.17	10.38	Average	102	64
8	7311.00	54.25	74.00	-19.75	43.87	10.38	Peak	102	64

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

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

Test By :BRAD WU Temperature(℃):23 Humidity(%):65

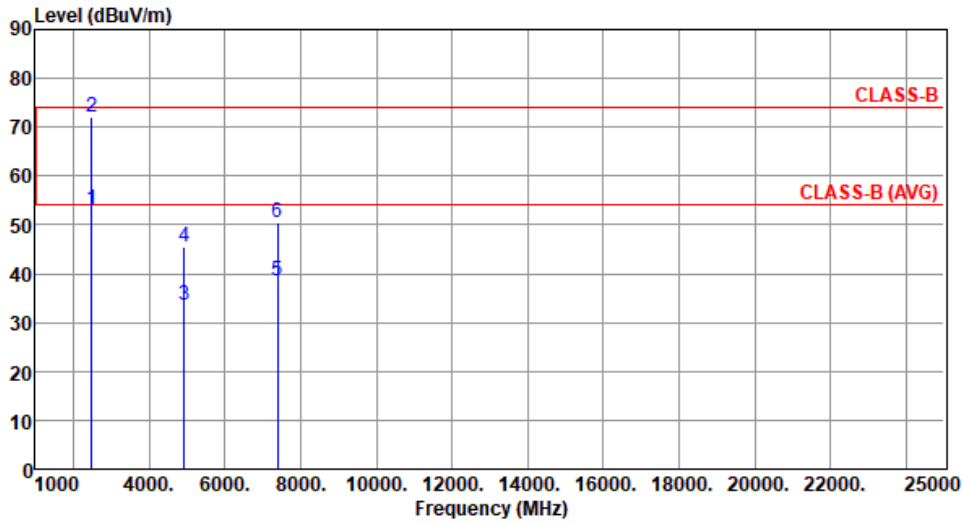


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	43.84	54.00	-10.16	45.50	-1.66	Average	102	169
2	2390.00	59.68	74.00	-14.32	61.34	-1.66	Peak	102	169
3	2483.50	42.80	54.00	-11.20	44.66	-1.86	Average	102	169
4	2483.50	62.77	74.00	-11.23	64.63	-1.86	Peak	102	169
5	4874.00	32.53	54.00	-21.47	27.46	5.07	Average	108	225
6	4874.00	46.11	74.00	-27.89	41.04	5.07	Peak	108	225
7	7311.00	41.65	54.00	-12.35	31.27	10.38	Average	119	223
8	7311.00	54.70	74.00	-19.30	44.32	10.38	Peak	119	223

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

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

Test By :BRAD WU Temperature(℃):23 Humidity(%):65

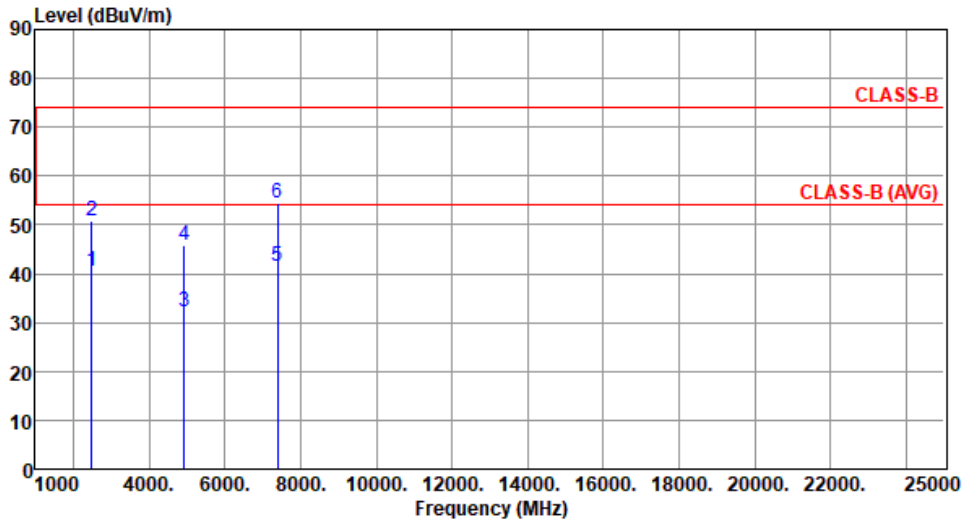


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	53.17	54.00	-0.83	55.03	-1.86	Average	103	314
2	2483.50	72.18	74.00	-1.82	74.04	-1.86	Peak	103	314
3	4924.00	33.43	54.00	-20.57	28.26	5.17	Average	100	127
4	4924.00	45.53	74.00	-28.47	40.36	5.17	Peak	100	127
5	7386.00	38.37	54.00	-15.63	28.29	10.08	Average	100	125
6	7386.00	50.47	74.00	-23.53	40.39	10.08	Peak	100	125

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

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

Test By :BRAD WU Temperature(℃):23 Humidity(%):65



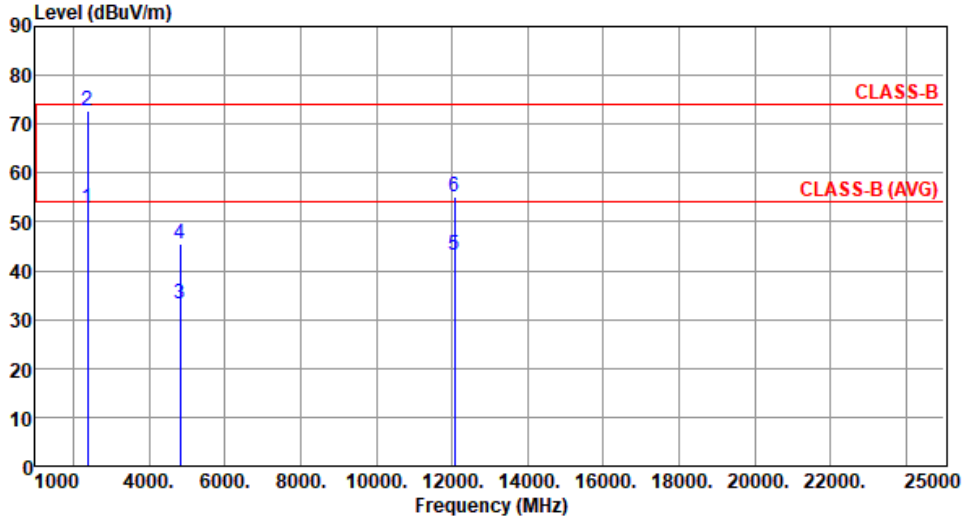
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	40.62	54.00	-13.38	42.48	-1.86	Average	100	135
2	2483.50	50.83	74.00	-23.17	52.69	-1.86	Peak	100	135
3	4924.00	32.21	54.00	-21.79	27.04	5.17	Average	103	229
4	4924.00	45.98	74.00	-28.02	40.81	5.17	Peak	103	229
5	7386.00	41.38	54.00	-12.62	31.30	10.08	Average	115	220
6	7386.00	54.52	74.00	-19.48	44.44	10.08	Peak	115	220

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 ax HE20

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

Test By :BRAD WU Temperature(℃):23 Humidity(%):63

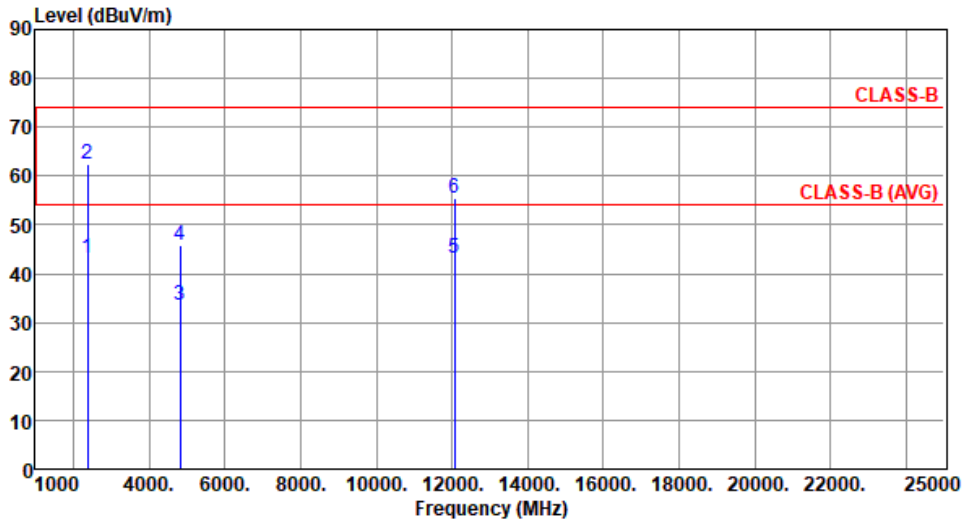


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	52.64	54.00	-1.36	54.30	-1.66	Average	100	312
2	2390.00	72.58	74.00	-1.42	74.24	-1.66	Peak	100	312
3	4824.00	33.31	54.00	-20.69	28.28	5.03	Average	100	123
4	4824.00	45.35	74.00	-28.65	40.32	5.03	Peak	100	123
5	12060.00	43.15	54.00	-10.85	28.38	14.77	Average	100	127
6	12060.00	55.14	74.00	-18.86	40.37	14.77	Peak	100	127

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	ax HE20	Test Freq. (MHz)	2412
Polarization	Vertical		

Test By :BRAD WU Temperature(℃):23 Humidity(%):63

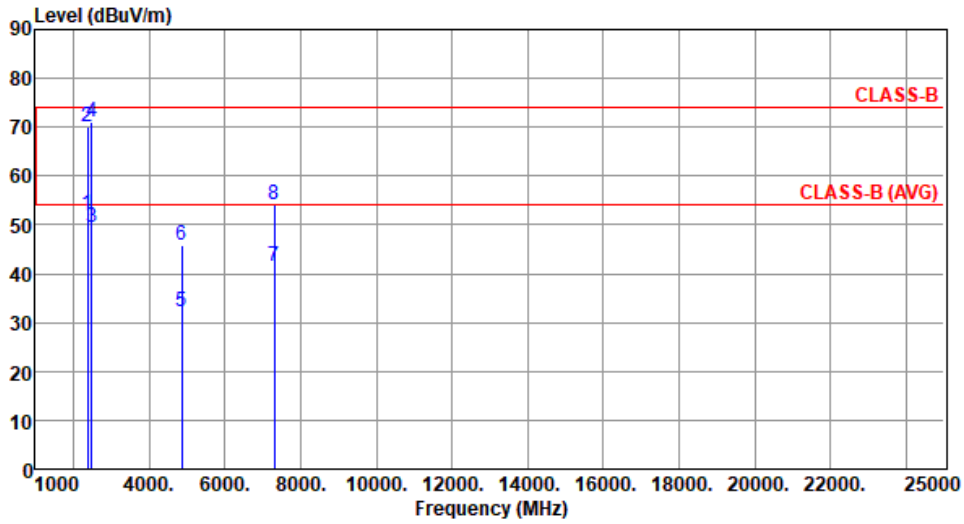


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	43.21	54.00	-10.79	44.87	-1.66	Average	100	138
2	2390.00	62.58	74.00	-11.42	64.24	-1.66	Peak	100	138
3	4824.00	33.65	54.00	-20.35	28.62	5.03	Average	100	236
4	4824.00	45.71	74.00	-28.29	40.68	5.03	Peak	100	236
5	12060.00	43.15	54.00	-10.85	28.38	14.77	Average	100	239
6	12060.00	55.46	74.00	-18.54	40.69	14.77	Peak	100	239

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	ax HE20	Test Freq. (MHz)	2437
Polarization	Horizontal		

Test By :BRAD WU Temperature(℃):23 Humidity(%):63

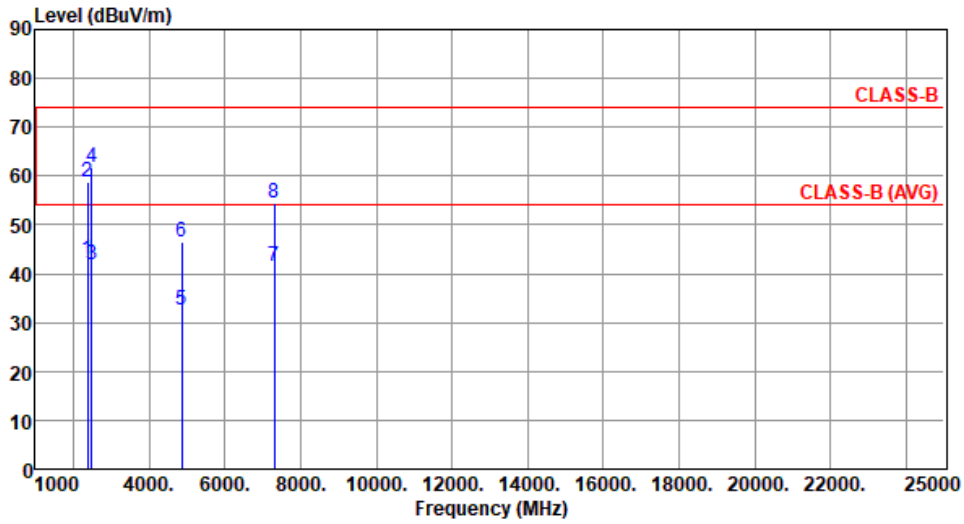


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	51.99	54.00	-2.01	53.65	-1.66	Average	100	311
2	2390.00	70.04	74.00	-3.96	71.70	-1.66	Peak	100	311
3	2483.50	49.49	54.00	-4.51	51.35	-1.86	Average	100	311
4	2483.50	71.18	74.00	-2.82	73.04	-1.86	Peak	100	311
5	4874.00	32.25	54.00	-21.75	27.18	5.07	Average	110	125
6	4874.00	45.91	74.00	-28.09	40.84	5.07	Peak	110	125
7	7311.00	41.39	54.00	-12.61	31.01	10.38	Average	103	61
8	7311.00	54.12	74.00	-19.88	43.74	10.38	Peak	103	61

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	ax HE20	Test Freq. (MHz)	2437
Polarization	Vertical		

Test By :BRAD WU Temperature(℃):23 Humidity(%):63

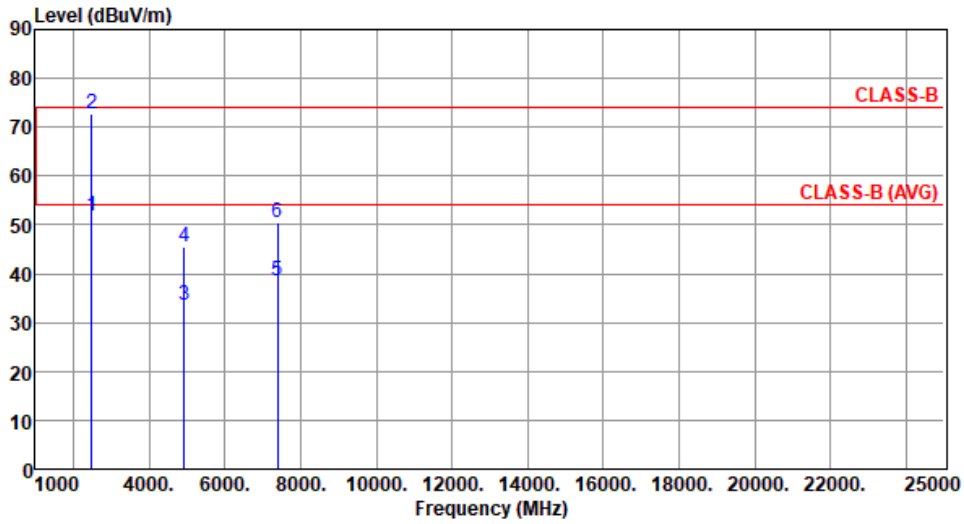


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	42.95	54.00	-11.05	44.61	-1.66	Average	105	166
2	2390.00	58.81	74.00	-15.19	60.47	-1.66	Peak	105	166
3	2483.50	41.86	54.00	-12.14	43.72	-1.86	Average	105	166
4	2483.50	61.81	74.00	-12.19	63.67	-1.86	Peak	105	166
5	4874.00	32.65	54.00	-21.35	27.58	5.07	Average	110	231
6	4874.00	46.34	74.00	-27.66	41.27	5.07	Peak	110	231
7	7311.00	41.59	54.00	-12.41	31.21	10.38	Average	121	229
8	7311.00	54.63	74.00	-19.37	44.25	10.38	Peak	121	229

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	ax HE20	Test Freq. (MHz)	2462
Polarization	Horizontal		

Test By :BRAD WU Temperature(℃):23 Humidity(%):63

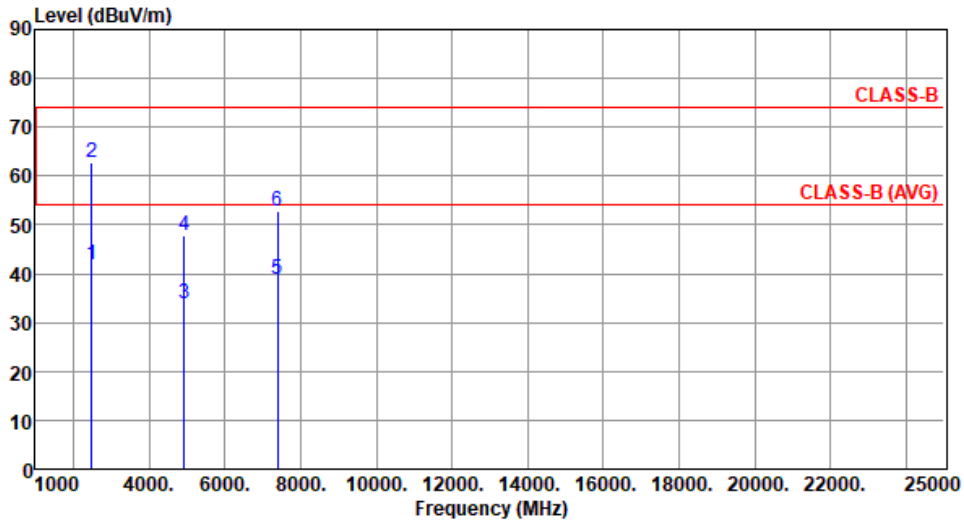


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2483.50	51.77	54.00	-2.23	53.63	-1.86	Average	114	313
2	2483.50	72.82	74.00	-1.18	74.68	-1.86	Peak	114	313
3	4924.00	33.56	54.00	-20.44	28.39	5.17	Average	100	124
4	4924.00	45.56	74.00	-28.44	40.39	5.17	Peak	100	124
5	7386.00	38.50	54.00	-15.50	28.42	10.08	Average	100	122
6	7386.00	50.56	74.00	-23.44	40.48	10.08	Peak	100	122

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	ax HE20	Test Freq. (MHz)	2462
Polarization	Vertical		

Test By :BRAD WU Temperature(℃):23 Humidity(%):63



	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	41.83	54.00	-12.17	43.69	-1.86	Average	100	139
2	2483.50	62.91	74.00	-11.09	64.77	-1.86	Peak	100	139
3	4924.00	33.82	54.00	-20.18	28.65	5.17	Average	100	245
4	4924.00	47.82	74.00	-26.18	42.65	5.17	Peak	100	245
5	7386.00	38.70	54.00	-15.30	28.62	10.08	Average	100	241
6	7386.00	52.78	74.00	-21.22	42.70	10.08	Peak	100	241

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

3.6 Emissions in Non-Restricted Frequency Bands

3.6.1 Emissions in Non-Restricted Frequency Bands Limit

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

3.6.2 Test Procedures

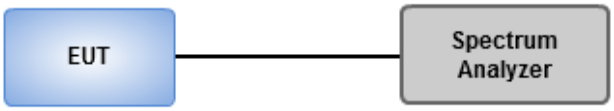
Reference level measurement

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

Emission level measurement

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

3.6.3 Test Setup

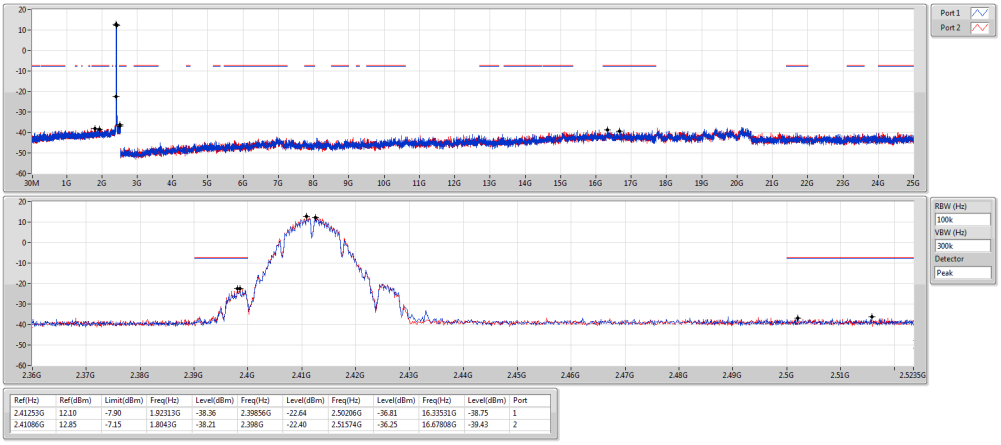


3.6.4 Unwanted Emissions into Non-Restricted Frequency Bands

Ambient Condition	25°C / 66%	Tested By	Aska Huang

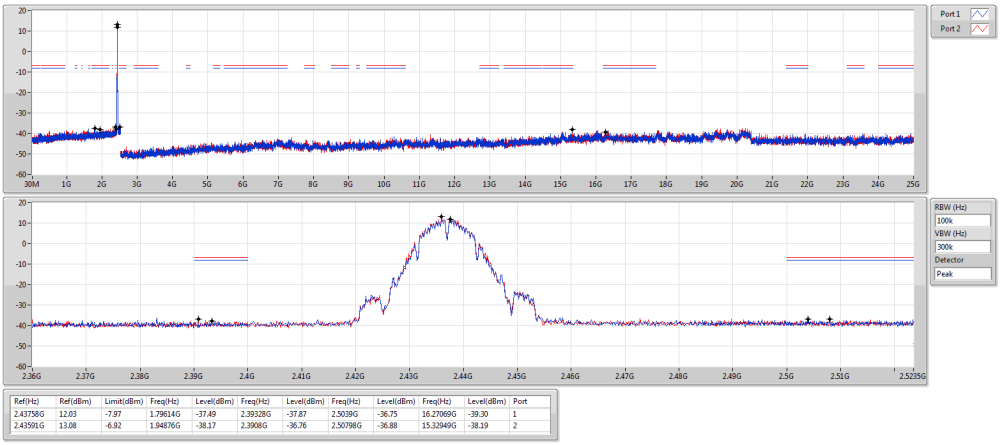
802.11b_Nss1,(1Mbps)_2TX CSE NdB

2412MHz



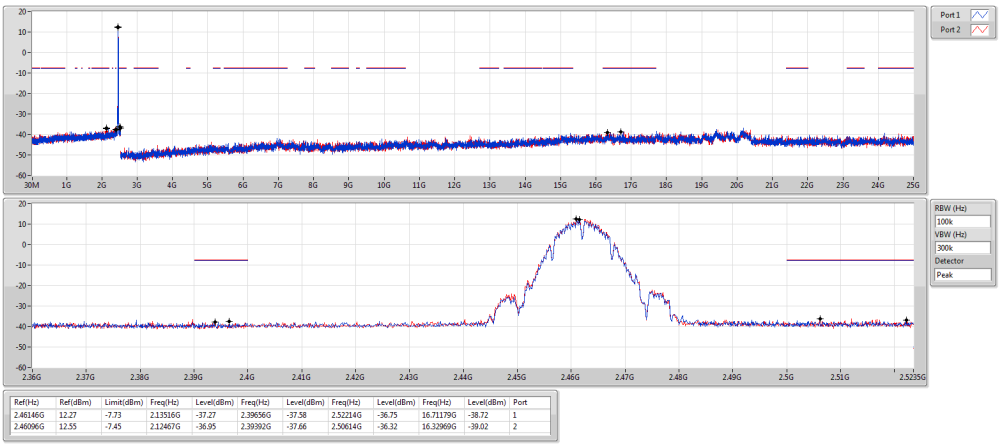
802.11b_Nss1,(1Mbps)_2TX CSE NdB

2437MHz



802.11b_Nss1,(1Mbps)_2TX CSE NdB

2462MHz



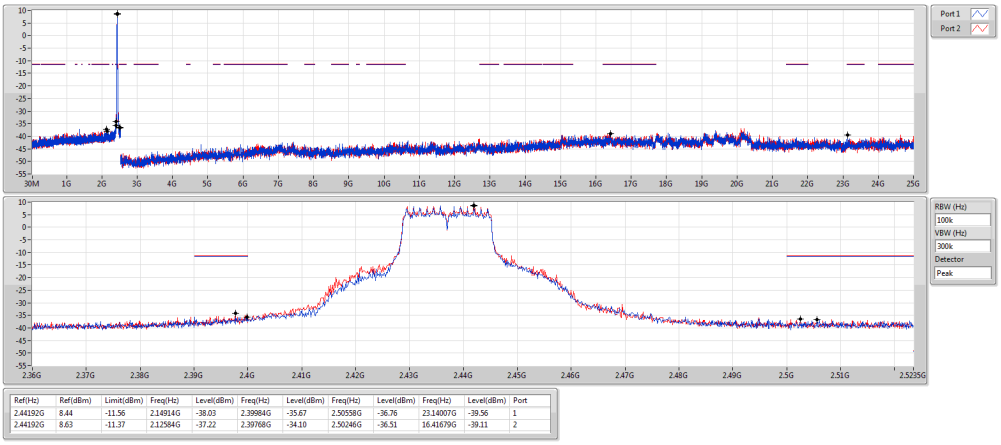
802.11g_Nss1,(6Mbps)_2TX **CSE NdB**

2412MHz

Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.41436G	3.49	-16.51	2.15729G	-37.76	2.39952G	-31.74	2.50662G	-36.35	16.77922G	-38.35	1
2.40685G	3.78	-16.22	2.15496G	-37.27	2.39952G	-27.83	2.50294G	-36.65	16.62469G	-38.62	2

802.11g_Nss1,(6Mbps)_2TX **CSE NdB**

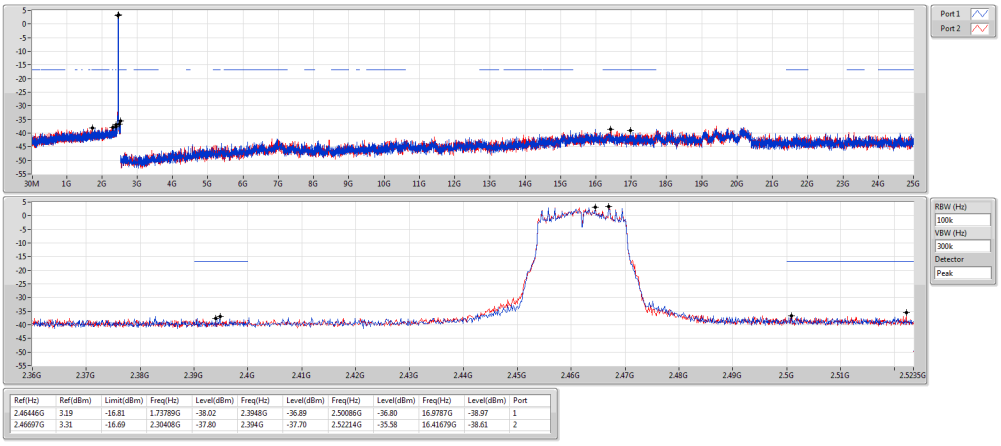
2437MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.44192G	8.44	-11.56	2.14914G	-38.03	2.39984G	-35.67	2.50558G	-36.76	23.14007G	-39.56	1
2.44192G	8.63	-11.37	2.12584G	-37.22	2.39768G	-34.10	2.50246G	-36.51	16.41679G	-39.11	2

802.11g_Nss1,(6Mbps)_2TX **CSE NdB**

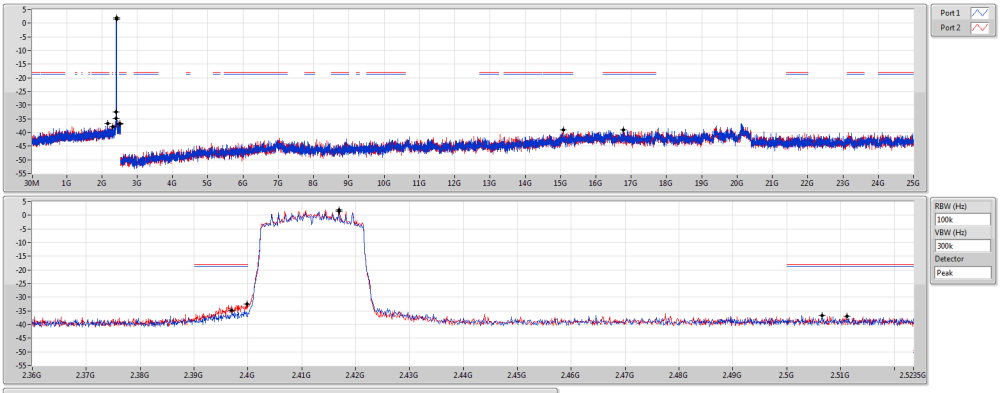
2462MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.46446G	3.19	-16.81	1.73789G	-38.02	2.3948G	-36.89	2.50086G	-36.80	16.9787G	-38.97	1
2.46697G	3.31	-16.69	2.30408G	-37.80	2.394G	-37.70	2.52214G	-35.58	16.41679G	-38.61	2

802.11ax HEW20_Nss1,(MCS0)_2TX **CSE NdB**

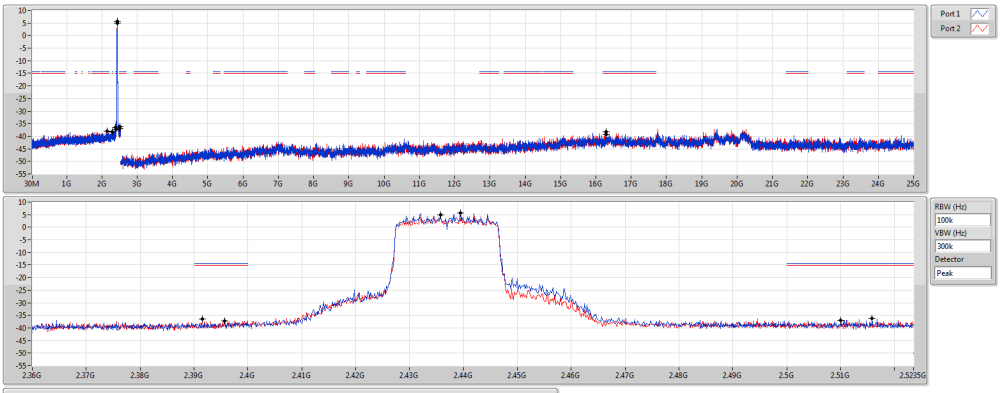
2412MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.41687G	1.42	-18.58	2.16778G	-36.83	2.39704G	-34.79	2.50654G	-36.69	16.77641G	-39.10	1
2.41687G	2.05	-17.95	2.30758G	-37.97	2.39984G	-32.53	2.51118G	-36.88	15.08224G	-38.96	2

802.11ax HEW20_Nss1,(MCS0)_2TX **CSE NdB**

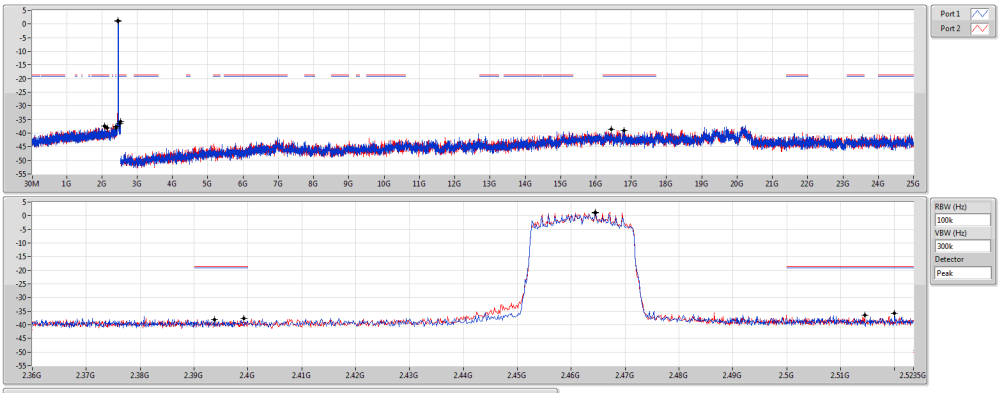
2437MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43941G	5.58	-14.42	2.30175G	-38.35	2.39568G	-37.12	2.51582G	-36.25	16.28755G	-39.14	1
2.43574G	4.84	-15.16	2.14215G	-37.98	2.39152G	-36.39	2.50998G	-36.99	16.28474G	-38.21	2

802.11ax HEW20_Nss1,(MCS0)_2TX **CSE NdB**

2462MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.46446G	0.90	-19.10	2.0839G	-37.36	2.39376G	-38.01	2.51998G	-35.84	16.43083G	-38.50	1
2.46446G	1.32	-18.68	2.14098G	-38.03	2.39928G	-37.77	2.51446G	-36.60	16.79889G	-39.04	2

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	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No.30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan (R.O.C.)	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)	No.14-1, Lane 19, Wen San 3rd St., Kwei Shan Dist., 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==