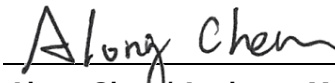


FCC C2PC Test Report

FCC ID : 2ALXJ-WBC100
Equipment : Whiteboard Owl
Model No. : WBC100
Brand Name : OWLLabs™
Applicant : Owl Labs Inc
Address : 33-1/2 Union Sq
Somerville US 02143 United States Of America
Standard : 47 CFR FCC Part 15.407
Received Date : Sep. 17, 2021
Tested Date : Sep. 17 ~ Oct. 07, 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:


Along Chen / Assistant Manager

Approved by:

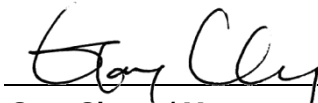

Gary Chang / Manager



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Release Record

Report No.	Version	Description	Issued Date
FR0D1401-02AN	Rev. 01	Initial issue	Oct. 08, 2021

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.484MHz 39.32 (Margin -6.95dB) - AV	Pass
15.407(b) 15.209	Radiated Emissions	[dBuV/m at 3m]: 5350.00MHz 52.52 (Margin -1.48dB) - AV	Pass
15.407(a)	RF Output Power	Max Power [dBm]: 5150~5250MHz: 21.32 5250~5350MHz: 21.29 5470~5725MHz: 21.25 5725~5850MHz: 20.58	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

This is a Class II Permissive Change report (C2PC).

This report is issued as a supplementary report to original report no. FR0D1401AN. The modification is concerned with following item:

- Add two DC brushless fans (at the top) and the power connection to the main PCB.
- Add small holes to top enclosure for thermal dissipations.

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
5150-5250 5250-5350 5470-5725 5725-5850	a	5180-5240 5260-5320 5500-5700 5745-5825	36-48 [4] 52-64 [4] 100-140 [9] 149-165 [5]	2	6-54 Mbps
5150-5250 5250-5350 5470-5725 5725-5850	n (HT20)	5180-5240 5260-5320 5500-5700 5745-5825	36-48 [4] 52-64 [4] 100-140 [9] 149-165 [5]	2	MCS 0-15
5150-5250 5250-5350 5470-5725 5725-5850	n (HT40)	5190-5230 5270-5310 5510-5670 5755-5795	38-46 [2] 54-62 [2] 102-142 [4] 151-159 [2]	2	MCS 0-15
5150-5250 5250-5350 5470-5725 5725-5850	ac (VHT20)	5180-5240 5260-5320 5500-5700 5745-5825	36-48 [4] 52-64 [4] 100-144 [9] 149-165 [5]	2	MCS 0-9
5150-5250 5250-5350 5470-5725 5725-5850	ac (VHT40)	5190-5230 5270-5310 5510-5670 5755-5795	38-46 [2] 54-62 [2] 102-142 [4] 151-159 [2]	2	MCS 0-9
5150-5250 5250-5350 5470-5725 5725-5850	ac (VHT80)	5210 5290 5530 5775	42 [1] 58 [1] 106 [1] 155 [1]	2	MCS 0-9
Note 1: RF output power specifies that Maximum Conducted Output Power. Note 2: 802.11a/n/ac uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation. Note 3: The device has disabled the 5600-5650MHz band by S/W setting.					

1.1.2 Antenna Details

Ant. No.	Model	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)			
				5150~5250	5250~5350	5470~5725	5725~5850
1	WPANT101 40-S1 A	Metal	IPX/MHF	2.4			

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	12Vdc from adapter
--------------------------	--------------------

1.1.4 Accessories

Accessories		
No.	Equipment	Description
1	Adapter	Brand: APX Model: PS120I1000 Power Rating: I/P: 100-240Vac, 50/60Hz, 0.5A Max O/P: 12Vdc, 1.0A, 12W Power Line: 6.06m non-shielded without core
2	Meeting Owl Pro	Brand: OWLLabs™ Model: MTW200

1.1.5 Channel List

802.11 a / HT20 / VHT20		HT40 / VHT40	
Channel	Frequency(MHz)	Channel	Frequency(MHz)
36	5180	38	5190
40	5200	46	5230
44	5220	54	5270
48	5240	62	5310
52	5260	102	5510
56	5280	110	5550
60	5300	134	5670
64	5320	151	5755
100	5500	159	5795
104	5520	VHT80	
108	5540	42	5210
112	5560	58	5290
116	5580	106	5530
132	5660	155	5775
136	5680	---	---
140	5700	---	---
149	5745	---	---
153	5765	---	---
157	5785	---	---
161	5805	---	---
165	5825	---	---

1.1.6 Test Tool and Duty Cycle

Test Tool	Qualcomm Radio Control Tool, Version: 4.0.00134.0		
Duty Cycle and Duty Factor	Mode	Duty Cycle (%)	Duty Factor (dB)
	11a	99.52%	0.02
	VHT20	99.01%	0.04
	VHT40	98.02%	0.09
	VHT80	94.85%	0.23

1.1.7 Power Index of Test Tool

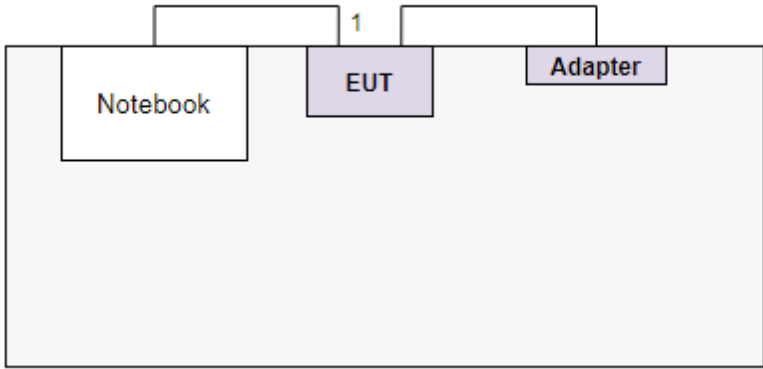
Modulation Mode	Test Frequency (MHz)	Power Index
11a	5180	17.5
11a	5200	18
11a	5240	18
11a	5260	18
11a	5300	18
11a	5320	17.5
11a	5500	16.5
11a	5580	17.5
11a	5700	15.5
11a	5745	17.5
11a	5785	17.5
11a	5825	17.5
VHT20	5180	17
VHT20	5200	18
VHT20	5240	18
VHT20	5260	18
VHT20	5300	18
VHT20	5320	17.5
VHT20	5500	16.5
VHT20	5580	17.5
VHT20	5700	15.5
VHT20	5745	17.5
VHT20	5785	17.5
VHT20	5825	17.5

Modulation Mode	Test Frequency (MHz)	Power Index
VHT40	5190	13
VHT40	5230	14.5
VHT40	5270	14.5
VHT40	5310	13
VHT40	5510	13
VHT40	5550	14.5
VHT40	5670	14.5
VHT40	5755	15
VHT40	5795	15
VHT80	5210	12
VHT80	5290	12
VHT80	5530	12
VHT80	5775	15

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Remarks
1	Notebook	DELL	Latitude 5400	DoC	---

1.3 Test Setup Chart

Test Setup Diagram	
	
No.	Signal cable / Length (m)
1	Type C, 1.8m non-shielded.

1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Sep. 23, 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	101579	Mar. 17, 2021	Mar. 16, 2022
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	May 25, 2021	May 24, 2022
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber 1 / (03CH01-WS)				
Tested Date	Sep. 17 ~ Sep. 18, 2021				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Mar. 12, 2021	Mar. 11, 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	VULB9168-522	Jun. 30, 2021	Jun. 29, 2022
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 11, 2020	Dec. 10, 2021
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170508	Dec. 31, 2020	Dec. 30, 2021
Preamplifier	EMC	EMC02325	980225	Jun. 29, 2021	Jun. 28, 2022
Preamplifier	Agilent	83017A	MY39501308	Sep. 26, 2020	Sep. 25, 2021
Preamplifier	EMC	EMC184045B	980192	Jul. 14, 2021	Jul. 13, 2022
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 06, 2020	Oct. 05, 2021
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 06, 2020	Oct. 05, 2021
LF cable 11M	EMC	EMCCFD400-NW-N W-11000	200801	Oct. 06, 2020	Oct. 05, 2021
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 06, 2020	Oct. 05, 2021
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 06, 2020	Oct. 05, 2021
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Oct. 06, 2020	Oct. 05, 2021
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Oct. 07, 2021				
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101498	Dec. 04, 2020	Dec. 03, 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	Sporton	SENSE-15247_FS	V5.10.7.11	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

47 CFR FCC Part 15.407
ANSI C63.10-2013

1.6 Reference Guidance

FCC KDB 412172 D01 Determining ERP and EIRP v01r01
FCC KDB 662911 D01 Multiple Transmitter Output v02r01
FCC KDB 789033 D02 General UNII Test Procedures New Rules 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
Conducted power	±0.808 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, 03CH01-WS, TH01-WS
Address of Test Site	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

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

2.2 The Worst Test Modes and Channel Details

Frequency band 5150~5350 MHz / 5470~5725 MHz				
Test item	Modulation Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Conducted Emissions	11a	5260	6 Mbps	---
Radiated Emissions ≤1GHz	11a	5260	6 Mbps	---
Radiated Emissions >1GHz	VHT40	5510	MCS 0	---
	VHT80	5210 / 5290	MCS 0	---
RF Output Power	11a	5180 / 5200 / 5240 / 5260 / 5300 / 5320 / 5500 / 5580 / 5700	6 Mbps	---
	VHT20	5180 / 5200 / 5240 / 5260 / 5300 / 5320 / 5500 / 5580 / 5700	MCS 0	---
	VHT40	5190 / 5230 / 5270 / 5310 / 5510 / 5550 / 5670	MCS 0	---
	VHT80	5210 / 5290 / 5530	MCS 0	---
Frequency band 5725-5850 MHz				
Test item	Modulation Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Conducted Emissions	VHT20	5785	MCS 0	---
Radiated Emissions ≤1GHz	VHT20	5785	MCS 0	---
Radiated Emissions >1GHz	VHT80	5775	MCS 0	---
RF Output Power	11a	5745 / 5785 / 5825	6 Mbps	---
	VHT20	5745 / 5785 / 5825	MCS 0	---
	VHT40	5755 / 5795	MCS 0	---
	VHT80	5775	MCS 0	---
NOTE:				
1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The Y-plane results were found as the worst case and were shown in this report.				

3 Transmitter Test Results

3.1 Conducted Emissions

3.1.1 Limit of Conducted Emissions

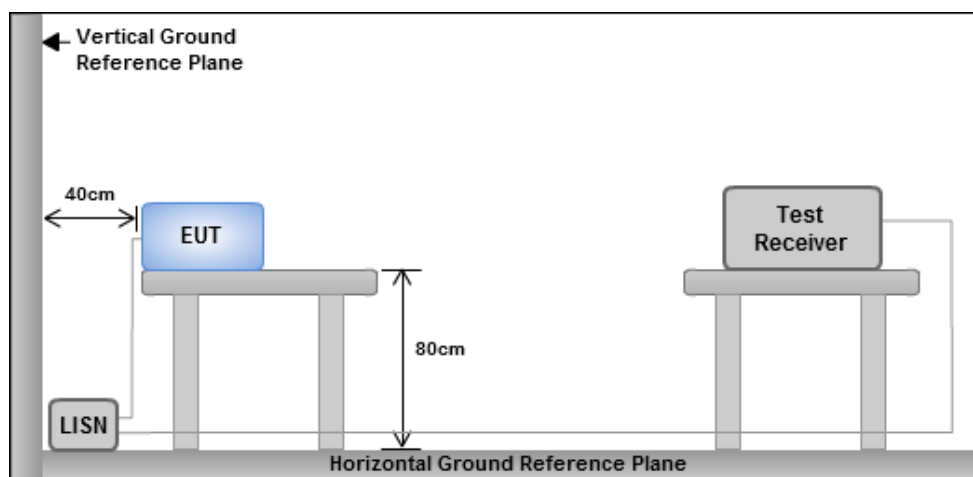
Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

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

3.1.2 Test Procedures

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

3.1.3 Test Setup



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

3.1.4 Test Result of Conducted Emissions

Modulation	11a	Test Freq. (MHz)	5260					
Power Phase	Line							
Test by : Joe Liao Temperature: 22°C Humidity: 63%								
Level (dBuV) Frequency (MHz)								
	Freq	Level	Limit	Over	Read	Factor	Cable	
	MHz	dBuV	Line	Limit	Level		loss	Remark
			dBuV	dB	dBuV	dB	dB	
1	0.150	33.87	56.00	-22.13	23.99	9.83	0.05	Average
2	0.150	46.53	66.00	-19.47	36.65	9.83	0.05	QP
3	0.177	32.74	54.64	-21.90	22.84	9.84	0.06	Average
4	0.177	44.76	64.64	-19.88	34.86	9.84	0.06	QP
5	0.222	28.37	52.74	-24.37	18.46	9.85	0.06	Average
6	0.222	41.44	62.74	-21.30	31.53	9.85	0.06	QP
7*	0.484	31.00	46.27	-15.27	21.00	9.91	0.09	Average
8	0.484	36.87	56.27	-19.40	26.87	9.91	0.09	QP
9	1.005	22.16	46.00	-23.84	12.05	9.99	0.12	Average
10	1.005	32.15	56.00	-23.85	22.04	9.99	0.12	QP
11	17.109	27.00	50.00	-23.00	16.14	10.23	0.63	Average
12	17.109	36.34	60.00	-23.66	25.48	10.23	0.63	QP

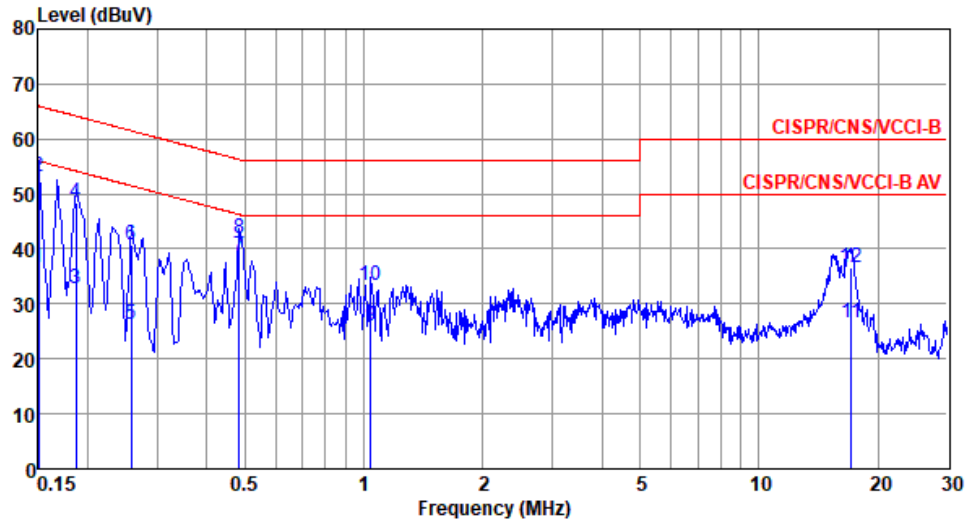
Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Modulation	11a	Test Freq. (MHz)	5260
Power Phase	Neutral		

Test by : Joe Liao

Temperature: 22°C

Humidity: 63%



	Freq MHz	Level dBUV	Limit Line dBUV	Over Limit dB	Read Level dBUV	Factor dB	Cable loss dB	Remark
1	0.150	36.67	56.00	-19.33	26.80	9.82	0.05	Average
2	0.150	53.13	66.00	-12.87	43.26	9.82	0.05	QP
3	0.186	32.79	54.20	-21.41	22.90	9.83	0.06	Average
4	0.186	48.39	64.20	-15.81	38.50	9.83	0.06	QP
5	0.258	26.20	51.51	-25.31	16.29	9.84	0.07	Average
6	0.258	40.77	61.51	-20.74	30.86	9.84	0.07	QP
7*	0.484	38.60	46.27	-7.67	28.65	9.86	0.09	Average
8	0.484	41.80	56.27	-14.47	31.85	9.86	0.09	QP
9	1.043	25.91	46.00	-20.09	15.91	9.88	0.12	Average
10	1.043	33.30	56.00	-22.70	23.30	9.88	0.12	QP
11	17.109	26.63	50.00	-23.37	15.73	10.27	0.63	Average
12	17.109	36.48	60.00	-23.52	25.58	10.27	0.63	QP

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

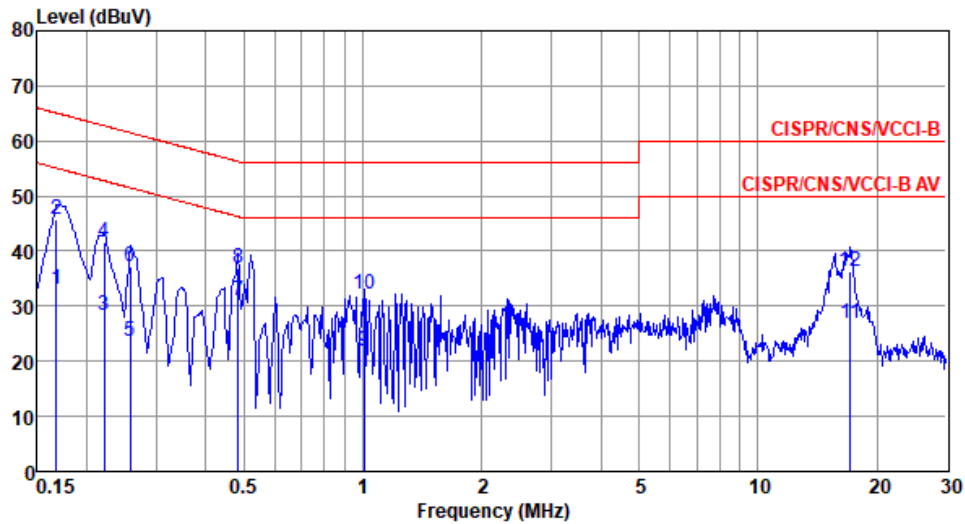
Note 2: Over Limit (dB) = Level (dBUV) – Limit Line (dBUV).

Modulation	VHT20	Test Freq. (MHz)	5785
Power Phase	Line		

Test by : Joe Liao

Temperature: 22°C

Humidity: 63%



	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1	0.168	33.21	55.08	-21.87	23.33	9.83	0.05	Average
2	0.168	45.82	65.08	-19.26	35.94	9.83	0.05	QP
3	0.222	28.35	52.74	-24.39	18.44	9.85	0.06	Average
4	0.222	41.48	62.74	-21.26	31.57	9.85	0.06	QP
5	0.258	23.65	51.51	-27.86	13.72	9.86	0.07	Average
6	0.258	37.27	61.51	-24.24	27.34	9.86	0.07	QP
7*	0.484	30.86	46.27	-15.41	20.86	9.91	0.09	Average
8	0.484	36.81	56.27	-19.46	26.81	9.91	0.09	QP
9	1.005	21.89	46.00	-24.11	11.78	9.99	0.12	Average
10	1.005	32.16	56.00	-23.84	22.05	9.99	0.12	QP
11	17.109	26.98	50.00	-23.02	16.12	10.23	0.63	Average
12	17.109	36.25	60.00	-23.75	25.39	10.23	0.63	QP

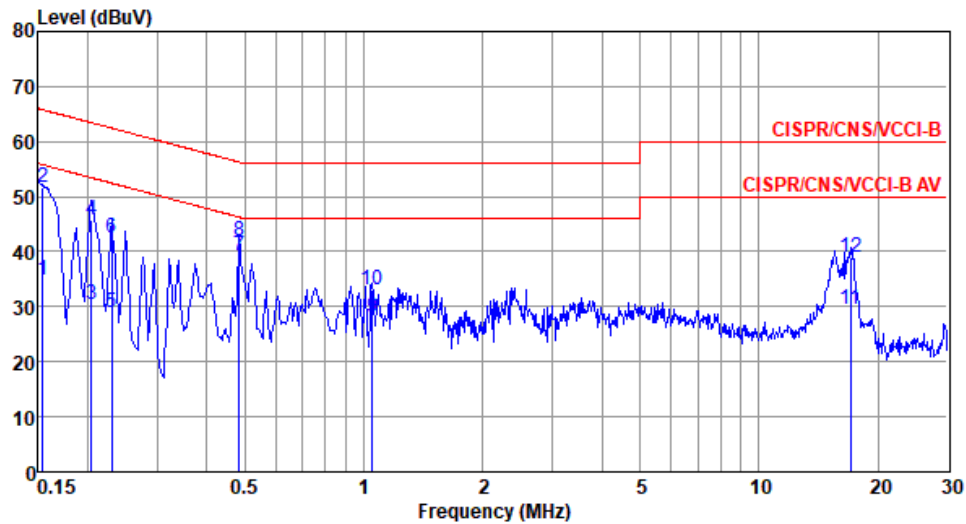
Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).

Modulation	VHT20	Test Freq. (MHz)	5785
Power Phase	Neutral		

Test by : Joe Liao

Temperature: 22°C

Humidity: 63%



	Freq MHz	Level dBuV	Limit dBuV	Over Limit dB	Read Level dBuV	Factor dB	Cable loss dB	Remark
1	0.154	34.86	55.78	-20.92	24.99	9.82	0.05	Average
2	0.154	51.63	65.78	-14.15	41.76	9.82	0.05	QP
3	0.204	30.48	53.45	-22.97	20.59	9.83	0.06	Average
4	0.204	45.88	63.45	-17.57	35.99	9.83	0.06	QP
5	0.230	28.88	52.44	-23.56	18.99	9.83	0.06	Average
6	0.230	42.62	62.44	-19.82	32.73	9.83	0.06	QP
7*	0.484	39.32	46.27	-6.95	29.37	9.86	0.09	Average
8	0.484	41.82	56.27	-14.45	31.87	9.86	0.09	QP
9	1.049	28.07	46.00	-17.93	18.07	9.88	0.12	Average
10	1.049	33.03	56.00	-22.97	23.03	9.88	0.12	QP
11	17.018	29.67	50.00	-20.33	18.77	10.27	0.63	Average
12	17.018	38.92	60.00	-21.08	28.02	10.27	0.63	QP

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

3.2 RF Output Power

3.2.1 Limit of RF Output Power

Frequency band 5150-5250 MHz		
Operating Mode		Limit
☐	Outdoor access point	Conducted Power: 1 W The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm)
☐	Indoor access point	Conducted Power: 1 W
☐	Fixed point-to-point access points	Conducted Power: 1 W
☒	Client devices	Conducted Power: 250 mW

Frequency Band (MHz)		Limit
☒	5250 ~ 5350	Conducted Power: 250mW or 11dBm+10 log B
☒	5470 ~ 5725	Conducted Power: 250mW or 11dBm+10 log B
☒	5725 ~ 5850	Conducted Power: 1 W

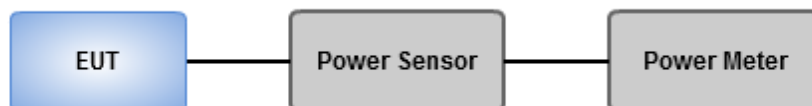
Note: "B" is the 26dB emission bandwidth in MHz.

3.2.2 Test Procedures

Method PM-G (Measurement using a gated RF average power meter)

Measurements is performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

3.2.3 Test Setup



3.2.4 Test Result of Maximum Conducted Output Power

Ambient Condition	23°C / 60%	Tested By	Brad Wu
--------------------------	------------	------------------	---------

Summary

Mode	Total Power (dBm)	Total Power (W)	EIRP (dBm)	EIRP (W)
5.15-5.25GHz	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	21.32	0.13552	23.72	0.23550
802.11ac VHT20_Nss1,(MCS0)_2TX	21.05	0.12735	23.45	0.22131
802.11ac VHT40_Nss1,(MCS0)_2TX	18.04	0.06368	20.44	0.11066
802.11ac VHT80_Nss1,(MCS0)_2TX	15.33	0.03412	17.73	0.05929
5.25-5.35GHz	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	21.29	0.13459	23.69	0.23388
802.11ac VHT20_Nss1,(MCS0)_2TX	21.24	0.13305	23.64	0.23121
802.11ac VHT40_Nss1,(MCS0)_2TX	17.98	0.06281	20.38	0.10914
802.11ac VHT80_Nss1,(MCS0)_2TX	15.49	0.03540	17.89	0.06152
5.47-5.725GHz	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	21.25	0.13335	23.65	0.23174
802.11ac VHT20_Nss1,(MCS0)_2TX	21.25	0.13335	23.65	0.23174
802.11ac VHT40_Nss1,(MCS0)_2TX	17.86	0.06109	20.26	0.10617
802.11ac VHT80_Nss1,(MCS0)_2TX	15.05	0.03199	17.45	0.05559
5.725-5.85GHz	-	-	-	-
802.11a_Nss1,(6Mbps)_2TX	20.48	0.11169	22.88	0.19409
802.11ac VHT20_Nss1,(MCS0)_2TX	20.58	0.11429	22.98	0.19861
802.11ac VHT40_Nss1,(MCS0)_2TX	18.72	0.07447	21.12	0.12942
802.11ac VHT80_Nss1,(MCS0)_2TX	17.90	0.06166	20.30	0.10715

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11a_Nss1,(6Mbps)_2TX	-	-	-	-	-	-	-	-
5180MHz	Pass	2.40	17.09	18.16	20.67	24.00	23.07	30.00
5200MHz	Pass	2.40	17.54	18.54	21.08	24.00	23.48	30.00
5240MHz	Pass	2.40	17.89	18.69	21.32	24.00	23.72	30.00
5260MHz	Pass	2.40	17.77	18.61	21.22	24.00	23.62	30.00
5300MHz	Pass	2.40	17.81	18.7	21.29	24.00	23.69	30.00
5320MHz	Pass	2.40	17.01	17.69	20.37	24.00	22.77	30.00
5500MHz	Pass	2.40	16.51	16.97	19.76	24.00	22.16	30.00
5580MHz	Pass	2.40	17.91	18.54	21.25	24.00	23.65	30.00
5700MHz	Pass	2.40	15.21	15.28	18.26	24.00	20.66	30.00
5745MHz	Pass	2.40	16.96	17.48	20.24	30.00	22.64	36.00
5785MHz	Pass	2.40	17.19	17.59	20.40	30.00	22.80	36.00
5825MHz	Pass	2.40	17.42	17.51	20.48	30.00	22.88	36.00
802.11ac VHT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5180MHz	Pass	2.40	16.64	17.52	20.11	24.00	22.51	30.00
5200MHz	Pass	2.40	17.71	18.35	21.05	24.00	23.45	30.00
5240MHz	Pass	2.40	17.64	18.29	20.99	24.00	23.39	30.00
5260MHz	Pass	2.40	17.61	18.31	20.98	24.00	23.38	30.00
5300MHz	Pass	2.40	17.71	18.69	21.24	24.00	23.64	30.00
5320MHz	Pass	2.40	16.85	17.41	20.15	24.00	22.55	30.00
5500MHz	Pass	2.40	16.43	16.71	19.58	24.00	21.98	30.00
5580MHz	Pass	2.40	17.98	18.48	21.25	24.00	23.65	30.00
5700MHz	Pass	2.40	15.12	15.21	18.18	24.00	20.58	30.00
5745MHz	Pass	2.40	16.68	17.25	19.98	30.00	22.38	36.00
5785MHz	Pass	2.40	17.19	17.92	20.58	30.00	22.98	36.00
5825MHz	Pass	2.40	17.36	17.58	20.48	30.00	22.88	36.00
802.11ac VHT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5190MHz	Pass	2.40	13.28	13.69	16.50	24.00	18.90	30.00
5230MHz	Pass	2.40	14.69	15.35	18.04	24.00	20.44	30.00
5270MHz	Pass	2.40	14.59	15.31	17.98	24.00	20.38	30.00
5310MHz	Pass	2.40	13.18	13.62	16.42	24.00	18.82	30.00
5510MHz	Pass	2.40	13.51	13.55	16.54	24.00	18.94	30.00
5550MHz	Pass	2.40	14.62	15.05	17.85	24.00	20.25	30.00
5670MHz	Pass	2.40	14.68	15.02	17.86	24.00	20.26	30.00
5755MHz	Pass	2.40	14.76	15.12	17.95	30.00	20.35	36.00
5795MHz	Pass	2.40	15.44	15.96	18.72	30.00	21.12	36.00

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
802.11ac VHT80_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-
5210MHz	Pass	2.40	11.91	12.69	15.33	24.00	17.73	30.00
5290MHz	Pass	2.40	12.08	12.85	15.49	24.00	17.89	30.00
5530MHz	Pass	2.40	11.89	12.18	15.05	24.00	17.45	30.00
5775MHz	Pass	2.40	14.71	15.06	17.90	30.00	20.30	36.00

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

3.3 Transmitter Radiated and Band Edge Emissions

3.3.1 Limit of Transmitter Radiated and Band Edge Emissions

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.

Un-restricted band emissions above 1GHz Limit	
Operating Band	Limit
5.15 - 5.25 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.25 - 5.35 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.47 - 5.725 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
5.725 - 5.850 GHz	All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

3.3.2 Test Procedures

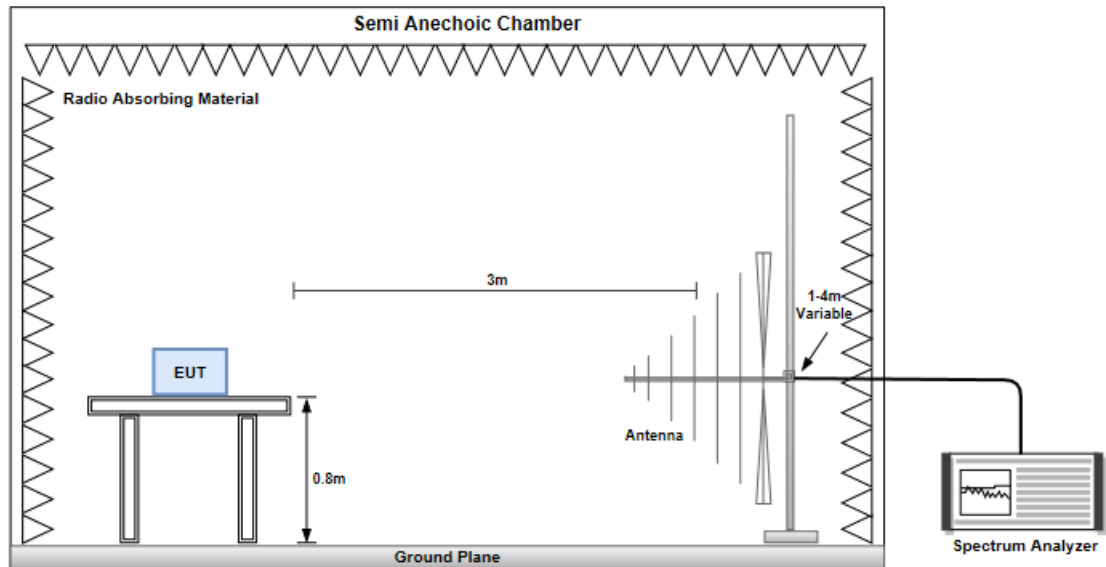
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission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

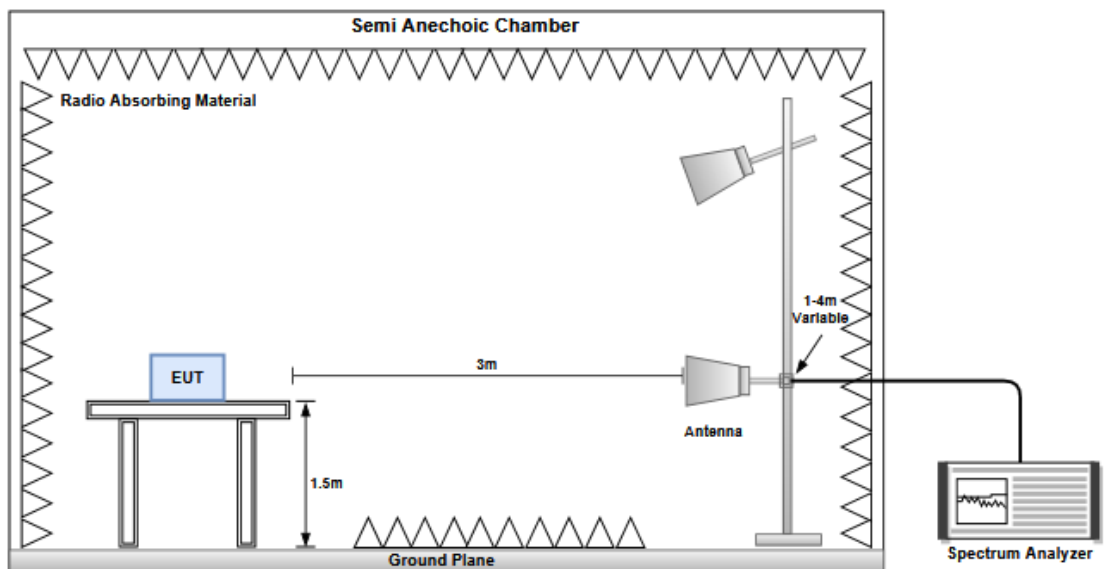
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above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

3.3.3 Test Setup

Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



3.3.1 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	11a	Test Freq. (MHz)	5260
Polarization	Horizontal		
Test By :Akun Chung Temperature(°C):24 Humidity(%):67			
Level (dBUV/m)			

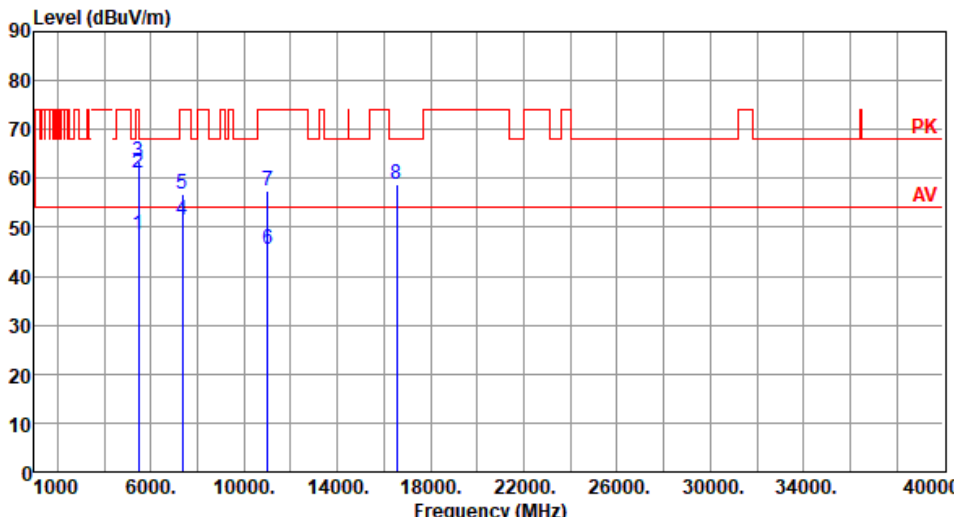
Modulation	11a	Test Freq. (MHz)	5260																																																																						
Polarization	Vertical																																																																								
Test By :Akun Chung Temperature(°C):24 Humidity(%):67																																																																									
Level (dBUV/m) Frequency (MHz) <table><thead><tr><th></th><th>Freq. MHz</th><th>Emission level dBUV/m</th><th>Limit dBUV/m</th><th>Margin dB</th><th>SA reading dBUV</th><th>Factor dB/m</th><th>Remark</th><th>ANT High cm</th><th>Turn Table deg</th></tr></thead><tbody><tr><td>1</td><td>30.00</td><td>29.37</td><td>40.00</td><td>-10.63</td><td>39.38</td><td>-10.01</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>2</td><td>46.49</td><td>31.34</td><td>40.00</td><td>-8.66</td><td>39.85</td><td>-8.51</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>3</td><td>58.13</td><td>28.47</td><td>40.00</td><td>-11.53</td><td>37.70</td><td>-9.23</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>4</td><td>97.90</td><td>31.41</td><td>43.50</td><td>-12.09</td><td>45.17</td><td>-13.76</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>5</td><td>121.18</td><td>34.07</td><td>43.50</td><td>-9.43</td><td>44.71</td><td>-10.64</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>6</td><td>499.48</td><td>31.26</td><td>46.00</td><td>-14.74</td><td>34.63</td><td>-3.37</td><td>Peak</td><td>---</td><td>---</td></tr></tbody></table>					Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB/m	Remark	ANT High cm	Turn Table deg	1	30.00	29.37	40.00	-10.63	39.38	-10.01	Peak	---	---	2	46.49	31.34	40.00	-8.66	39.85	-8.51	Peak	---	---	3	58.13	28.47	40.00	-11.53	37.70	-9.23	Peak	---	---	4	97.90	31.41	43.50	-12.09	45.17	-13.76	Peak	---	---	5	121.18	34.07	43.50	-9.43	44.71	-10.64	Peak	---	---	6	499.48	31.26	46.00	-14.74	34.63	-3.37	Peak	---	---
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB/m	Remark	ANT High cm	Turn Table deg																																																																
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2	46.49	31.34	40.00	-8.66	39.85	-8.51	Peak	---	---																																																																
3	58.13	28.47	40.00	-11.53	37.70	-9.23	Peak	---	---																																																																
4	97.90	31.41	43.50	-12.09	45.17	-13.76	Peak	---	---																																																																
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6	499.48	31.26	46.00	-14.74	34.63	-3.37	Peak	---	---																																																																
Note 1: Emission Level (dBUV/m) = SA Reading (dBUV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m). Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.																																																																									

Modulation	VHT20	Test Freq. (MHz)	5785
Polarization	Horizontal		
Test By :Akun Chung Temperature(°C):24 Humidity(%):67			
Level (dBuV/m)			

Modulation	VHT20	Test Freq. (MHz)	5785
Polarization	Vertical		
Test By :Akun Chung Temperature(°C):24 Humidity(%):67			
Level (dBuV/m) </			

3.3.2 Transmitter Radiated Unwanted Emissions (Above 1GHz)

Modulation	VHT40	Test Freq. (MHz)	5510
Polarization	Horizontal		
Test By :Akun Chung Temperature(°C):25 Humidity(%):68			
Level (dBuV/m) <			

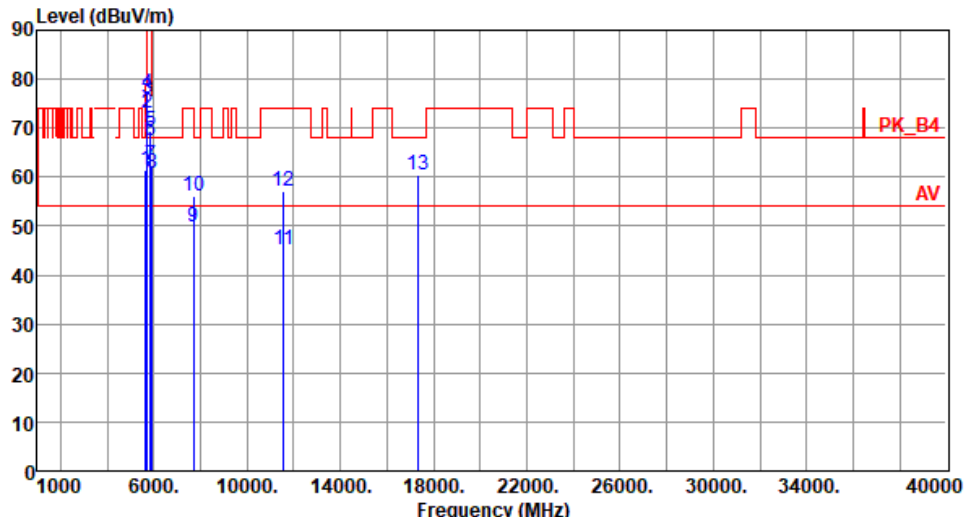
Modulation	VHT40	Test Freq. (MHz)	5510																																																																																										
Polarization	Vertical																																																																																												
Test By :Akun Chung Temperature(°C):25 Humidity(%):68																																																																																													
Level (dBUV/m)  <table><thead><tr><th></th><th>Freq. MHz</th><th>Emission level dBUV/m</th><th>Limit dBUV/m</th><th>Margin dB</th><th>SA reading dBUV</th><th>Factor dB/m</th><th>Remark</th><th>ANT High cm</th><th>Turn Table deg</th></tr></thead><tbody><tr><td>1</td><td>5460.00</td><td>48.36</td><td>54.00</td><td>-5.64</td><td>43.99</td><td>4.37</td><td>Average</td><td>183</td><td>351</td></tr><tr><td>2</td><td>5460.00</td><td>61.14</td><td>74.00</td><td>-12.86</td><td>56.77</td><td>4.37</td><td>Peak</td><td>183</td><td>351</td></tr><tr><td>3</td><td>5470.00</td><td>63.38</td><td>68.20</td><td>-4.82</td><td>58.99</td><td>4.39</td><td>Peak</td><td>183</td><td>351</td></tr><tr><td>4</td><td>7346.66</td><td>51.49</td><td>54.00</td><td>-2.51</td><td>42.43</td><td>9.06</td><td>Average</td><td>163</td><td>37</td></tr><tr><td>5</td><td>7346.66</td><td>56.81</td><td>74.00</td><td>-17.19</td><td>47.75</td><td>9.06</td><td>Peak</td><td>163</td><td>37</td></tr><tr><td>6</td><td>11020.00</td><td>45.40</td><td>54.00</td><td>-8.60</td><td>30.30</td><td>15.10</td><td>Average</td><td>100</td><td>35</td></tr><tr><td>7</td><td>11020.00</td><td>57.33</td><td>74.00</td><td>-16.67</td><td>42.23</td><td>15.10</td><td>Peak</td><td>100</td><td>35</td></tr><tr><td>8</td><td>16530.00</td><td>58.67</td><td>68.20</td><td>-9.53</td><td>42.36</td><td>16.31</td><td>Peak</td><td>100</td><td>37</td></tr></tbody></table>					Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB/m	Remark	ANT High cm	Turn Table deg	1	5460.00	48.36	54.00	-5.64	43.99	4.37	Average	183	351	2	5460.00	61.14	74.00	-12.86	56.77	4.37	Peak	183	351	3	5470.00	63.38	68.20	-4.82	58.99	4.39	Peak	183	351	4	7346.66	51.49	54.00	-2.51	42.43	9.06	Average	163	37	5	7346.66	56.81	74.00	-17.19	47.75	9.06	Peak	163	37	6	11020.00	45.40	54.00	-8.60	30.30	15.10	Average	100	35	7	11020.00	57.33	74.00	-16.67	42.23	15.10	Peak	100	35	8	16530.00	58.67	68.20	-9.53	42.36	16.31	Peak	100	37
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB/m	Remark	ANT High cm	Turn Table deg																																																																																				
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Note 1: Emission Level (dBUV/m) = SA Reading (dBUV) + Factor* (dB/m) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).																																																																																													

Modulation	VHT80	Test Freq. (MHz)	5210
Polarization	Horizontal		
Test By :Akun Chung Temperature(°C):25 Humidity(%):68			
Level (dBuV/m) <			

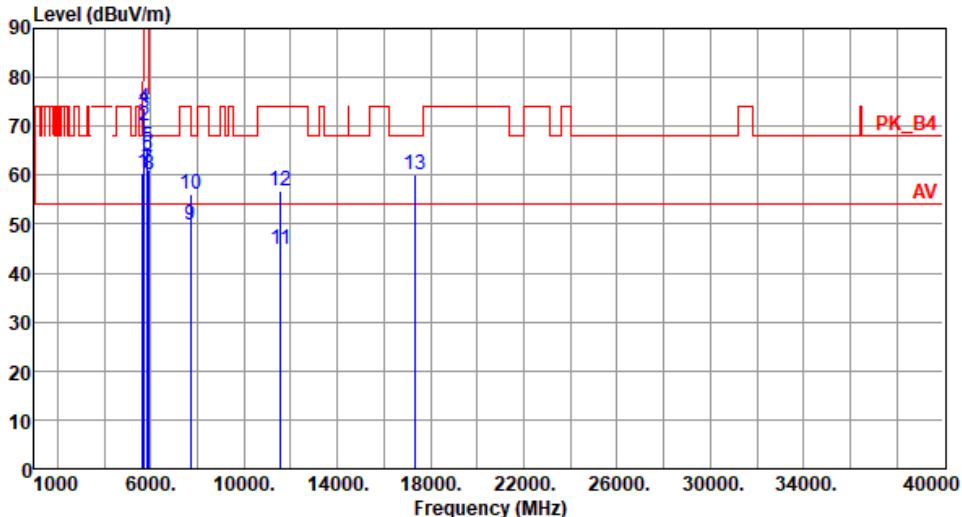
Modulation	VHT80	Test Freq. (MHz)	5210
Polarization	Vertical		
Test By :Akun Chung Temperature(°C):25 Humidity(%):68			
Level (dBuV/m)			

Modulation	VHT80	Test Freq. (MHz)	5290
Polarization	Horizontal		
Test By :Akun Chung Temperature(°C):25 Humidity(%):68			
Level (dBUV/m) <			

Modulation	VHT80	Test Freq. (MHz)	5290
Polarization	Vertical		
Test By :Akun Chung Temperature(°C):25 Humidity(%):68			
Level (dBUV/m)			

Modulation	VHT80	Test Freq. (MHz)	5775						
Polarization	Horizontal								
Test By :Akun Chung Temperature(°C):25 Humidity(%):68									
									
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	5650.00	61.31	68.20	-6.89	56.86	4.45	Peak	202	21
2	5700.00	73.14	105.20	-32.06	68.45	4.69	Peak	202	21
3	5720.00	75.99	110.80	-34.81	71.20	4.79	Peak	202	21
4	5725.00	77.14	122.20	-45.06	72.33	4.81	Peak	202	21
5	5850.00	69.29	122.20	-52.91	64.11	5.18	Peak	202	21
6	5855.00	67.52	110.80	-43.28	62.33	5.19	Peak	202	21
7	5875.00	62.49	105.20	-42.71	57.21	5.28	Peak	202	21
8	5925.00	60.88	68.20	-7.32	55.50	5.38	Peak	202	21
9	7700.00	49.90	54.00	-4.10	41.12	8.78	Average	218	7
10	7700.00	56.28	74.00	-17.72	47.50	8.78	Peak	218	7
11	11550.00	45.18	54.00	-8.82	30.48	14.70	Average	100	16
12	11550.00	57.22	74.00	-16.78	42.52	14.70	Peak	100	16
13	17325.00	60.35	68.20	-7.85	42.45	17.90	Peak	100	19

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

Modulation	VHT80	Test Freq. (MHz)	5775						
Polarization	Vertical								
Test By :Akun Chung Temperature(°C):25 Humidity(%):68									
Level (dBUV/m) 									
	Freq. MHz	Emission level dBUV/m	Limit dBUV/m	Margin dB	SA reading dBUV	Factor dB/m	Remark	ANT High cm	Turn Table deg
1	5650.00	60.33	68.20	-7.87	55.88	4.45	Peak	192	2
2	5700.00	70.11	105.20	-35.09	65.42	4.69	Peak	192	2
3	5720.00	72.67	110.80	-38.13	67.88	4.79	Peak	192	2
4	5725.00	73.68	122.20	-48.52	68.87	4.81	Peak	192	2
5	5850.00	65.72	122.20	-56.48	60.54	5.18	Peak	192	2
6	5855.00	64.05	110.80	-46.75	58.86	5.19	Peak	192	2
7	5875.00	61.16	105.20	-44.04	55.88	5.28	Peak	192	2
8	5925.00	60.04	68.20	-8.16	54.66	5.38	Peak	192	2
9	7700.00	49.83	54.00	-4.17	41.05	8.78	Average	134	36
10	7700.00	56.00	74.00	-18.00	47.22	8.78	Peak	134	36
11	11550.00	44.85	54.00	-9.15	30.15	14.70	Average	100	38
12	11550.00	56.90	74.00	-17.10	42.20	14.70	Peak	100	38
13	17325.00	60.14	68.20	-8.06	42.24	17.90	Peak	100	40

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

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

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Kwei Shan

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

Kwei Shan Site II

Tel: 886-3-271-8640

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

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