FCC RF Test Report

For

Hunan Vathin Medical Instrument Co., Ltd.

Test Standards:	Part 15 Subpart E §15. 407 IC RSS-247 issue 3
Product Name:	Digital Video Monitor
Tested Model:	DVM-D1
Additional Model No. :	DVM-D2
HVIN:	DVM-D1, DVM-D2
FCC ID:	2AY4E-DVMD
IC:	27001-DVMD
Classification	(NII)Unlicensed National Information Infrastructure
Report No.:	EC2401052RF02
Tested Date:	2024-03-18 to 2024-08-17
Issued Date:	2024-08-17
Prepared By:	Luo Xiang / Engineer
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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	2024.08.17	Valid	Based on the original report EC2207002RF02, a new series model DVM-D2 was added and the battery model was updated.

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Summary of Test Result

FCC Rule	IC Rule	Description	Limit	Result	Remark
2.1049 15.403(i)	RSS-247 Section 6	26dB & 99% Bandwidth	-	Pass	U-NII-1 U-NII-2A U-NII-2C
			>500kHz	Pass	U-NII-3
15.407(a)	RSS-247 Section 6	Maximum Conducted Output Power	≤24dBm	Pass	Note
			≤30dBm	Pass	Note
15.407(b)	RSS-247 Section 6	Unwanted Emissions	15.407(b) 15.209(a) RSS-247(6.2) RSS-GEN(8.9 Table 4,Table 5 and Table 6	Pass	Under limit 2.66 dB at 296.750 MHz
-	RSS-Gen 7.3	Receiver Radiated Emissions	Below 1G:2nW Above 1G:5nW	Pass	-
15.207	RSS-Gen 8.8	AC Conducted Emission	15.207(a) RSS-Gen(8.8 Table 3)	Pass	Under limit 8.02 dB at 0.190 MHz

Note :

1. The Unwanted Emissions, Receiver Radiated Emissions and AC Conducted Emission have been tested based on the current changes.
2. Please check the original report No.: EC2207002RF02 for 26dB & 99% Bandwidth and Maximum Conducted Output Power details.
3. Both two models have been tested, but only the worst models data(DVM-D1) is recorded in this report.

1 General Description

1.1 Applicant

Hunan Vathin Medical Instrument Co., Ltd.
1/F, Building 12, Innovation and Entrepreneurship Service Center, No 9 Chuanqi west road, Jiuhua Economic Development Zone, 411100 Xiangtan, Hunan, China

1.2 Manufacturer

Hunan Vathin Medical Instrument Co., Ltd.
1/F, Building 12, Innovation and Entrepreneurship Service Center, No 9 Chuanqi west road, Jiuhua Economic Development Zone, 411100 Xiangtan, Hunan, China

1.3 General Description Of EUT

Product	Digital Video Monitor
Model No.	DVM-D1
Additional No.	DVM-D2
Difference Description	These models are identical in PCB layout and basic software functionality; The only difference is that the video endoscope interface of the product is not the same. DVM-D1 model video endoscope interface: I (using a 26 pin connector) II (using a 14 pin connector) III (using a 14 pin connector) DVM-D2 model video endoscope interface: I (using a 26 pin connector) II (using a 16 pin connector) III (using a 16 pin connector)
Power Supply	15Vdc from Adapter(Input 100-240Vac) 10.8Vdc from Battery
Modulation Technology	256QAM,64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Type	802.11a/n/ac : OFDM
Operating Frequency	U-NII-1:5150~5250MHz U-NII-2A:5250~5350MHz U-NII-2C:5470~5725MHz U-NII-3:5725~5850MHz
Antenna Type	FPC Antenna with 2 dBi gain
HW Version	V1
SW Version	DVM-D1:V1
Sample no.	2401052R-1/2~2/2

Sample Received Date	2024/03/18
I/O Ports	Refer to user's manual
Cable Supplied	Refer to user's manual

NOTE:

1. The above EUT information is declared by manufacturer. Our laboratory is not responsible for the information provided by the manufacturer.For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

3. The EUT was powered by the following adapters:

Adapter	
Brand:	SINPRO
Model:	HPU63A-106
Input:	AC 100-240V~47-63Hz,1.62-0.72A
Output:	DC 15V, 4.2A max

4. The EUT matched the following cable:

SDI Cable	
Brand:	N/A
Model:	N/A
Signal Line:	2.7 Meter/Shielded

D-SUB9 Cable	
Brand:	N/A
Model:	N/A
Signal Line:	1.89 Meter/Shielded

HDMI Cable	
Brand:	N/A
Model:	N/A
Signal Line:	2.7 Meter/Shielded

1.4 Modification of EUT

No modifications are made to the EUT during all test items.

1.5 Applicable Standards and lab information

According to the specifications of the manufacturer, the EUT must comply with the

requirements of the following standards:

- FCC Part 15 Subpart E §15.407
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01
- IC RSS-247 Issue 3
- IC RSS-Gen Issue 5

Remark:

1. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, ICES-003 recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency and Channel

U-NII-1

Channel	Frequency	Channel	Frequency
36	5180 MHz	46	5230 MHz
38	5190 MHz	48	5240 MHz
40	5200 MHz		
42	5210 MHz		

U-NII-2A

Channel	Frequency	Channel	Frequency
52	5260 MHz	62	5310 MHz
54	5270 MHz	64	5320 MHz
56	5280 MHz		
58	5290 MHz		

U-NII-2C

Channel	Frequency	Channel	Frequency
100	5500 MHz	134	5670 MHz
102	5510 MHz	138	5690 MHz
106	5530 MHz	140	5700 MHz
110	5550 MHz	142	5710 MHz
116	5580 MHz	144	5720 MHz
122	5610 MHz		

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(5600MHz to 5650MHz band will not be operated in Canada)

Channel	Frequency	Channel	Frequency
118	5590 MHz	124	5620 MHz
120	5600 MHz	126	5630 MHz
122	5610 MHz	128	5640 MHz

U-NII-3

Channel	Frequency	Channel	Frequency
149	5745 MHz	159	5795 MHz
151	5755 MHz	165	5825 MHz
155	5775 MHz		
157	5785 MHz		

2.2 Test Mode

Based on the baseline scan, the worst - case data rates were:

802.11a mode: 6 Mbps

802.11n HT20 mode: MCS0

802.11n HT40 mode: MCS0

802.11ac VHT20 mode: MCS0

802.11ac VHT40 mode: MCS0

802.11ac VHT80 mode: MCS0

2.2.1 Antenna Port Conducted Measurement

Summary table of Test Cases				
Test Item	Modulation			
	802.11 a	802.11n HT20/ 802.11ac VHT20	802.11n HT40/ 802.11ac VHT40	802.11ac VHT80
U-NII-1	Mode 1: CH36 Mode 2: CH40 Mode 3: CH48	Mode 1: CH36 Mode 2: CH40 Mode 3: CH48	Mode 1: CH38 Mode 2: CH46 Mode 3: -	Mode 1: CH42 Mode 2: - Mode 3: -

Summary table of Test Cases				
Test Item	Modulation			
	802.11 a	802.11n HT20/ 802.11ac VHT20	802.11n HT40/ 802.11ac VHT40	802.11ac VHT80
U-NII-2A	Mode 1: CH52 Mode 2: CH56 Mode 3: CH64	Mode 1: CH52 Mode 2: CH56 Mode 3: CH64	Mode 1: CH54 Mode 2: CH62 Mode 3: -	Mode 1: CH58 Mode 2: - Mode 3: -

Summary table of Test Cases				
Test Item	Modulation			
	802.11 a	802.11n HT20/ 802.11ac VHT20	802.11n HT40/ 802.11ac VHT40	802.11ac VHT80
U-NII-2C	Mode 1: CH100 Mode 2: CH116 Mode 3: CH140 Mode 4: CH144	Mode 1: CH100 Mode 2: CH116 Mode 3: CH140 Mode 4: CH144	Mode 1: CH102 Mode 2: CH110 Mode 3: CH134 Mode 4: CH142	Mode 1: CH106 Mode 2: CH138 Mode 3: -

Summary table of Test Cases

Test Item	Modulation			
	802.11 a	802.11n HT20/ 802.11ac VHT20	802.11n HT40/ 802.11ac VHT40	802.11ac VHT80
U-NII-3	Mode 1: CH149 Mode 2: CH157 Mode 3: CH165	Mode 1: CH149 Mode 2: CH157 Mode 3: CH165	Mode 1: CH151 Mode 2: CH159	Mode 1: CH155 Mode 2: - Mode 3: -

2.2.2 Radiated Emission Test (Below 1GHz)

Radiated Test Cases	802.11a
	Mode 1: CH165

Note : 1. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type. It was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

2. Following channel(s) was (were) selected for the final test as listed above.

3. All the above test modes were tested, only reported the worst case mode in bold as above.

2.2.3 Radiated Bandedge and Radiated Emission Test (Above 1GHz)

Summary table of Test Cases				
Test Item	Modulation			
	802.11 a	802.11n HT20/ 802.11ac VHT20 SISO	802.11n HT40/ 802.11ac VHT40 SISO	802.11ac VHT80 SISO
U-NII-1 & U-NII-2A	Mode 1: CH36 Mode 2: CH48 Mode 3: CH64	Mode 1: CH36 Mode 2: CH48 Mode 3: CH64	Mode 1: CH38 Mode 2: CH46 Mode 3: CH62	Mode 1: CH42 Mode 2: CH58

Summary table of Test Cases				
Test Item	Modulation			
	802.11 a	802.11n HT20/ 802.11ac VHT20	802.11n HT40/ 802.11ac VHT40	802.11ac VHT80
U-NII-2C	Mode 1: CH100 Mode 2: CH116 Mode 3: CH140 Mode 4: CH144	Mode 1: CH100 Mode 2: CH116 Mode 3: CH140 Mode 4: CH144	Mode 1: CH102 Mode 2: CH110 Mode 3: CH134 Mode 4: CH142	Mode 1: CH106 Mode 2: CH138 Mode 3: -

Summary table of Test Cases				
Test Item	Modulation			
	802.11 a	802.11n HT20/ 802.11ac VHT20	802.11n HT40/ 802.11ac VHT40	802.11ac VHT80
U-NII-3	Mode 1: CH149 Mode 2: CH157 **Mode 3: CH165**	Mode 1: CH149 Mode 2: CH157 Mode 3: CH165	Mode 1: CH151 Mode 2: CH159	Mode 1: CH155 Mode 2: - Mode 3: -

Note : 1. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type. It was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

2. Following channel(s) was (were) selected for the final test as listed above

3. For frequency above 18GHz, the measured value is much lower than the limit, therefore, it is not reflected in the report.

4.The bandwidth of 11A and ac20 and n20 is consistent with the modulation mode, so only the worst mode data is listed in the report, and ac40 is the same as n40.

5. All the above test modes were tested, only reported the worst case mode in bold as above.

2.2.4 Power Line Conducted Emission Test:

AC Conducted Emission	Mode 1 : RLAN(5G) Link + SDI + RJ-45 + HDMI + USB Disk + H-Steriscope + D-SUBS9 + REMOTE +Adapter

2.2.5 Radiated receiver emissions Test:

Radiated Test Cases	Mode 2 : 802.11 a CH165

2.3 Support Equipment

Manufacturer	Description	Model	Serial Number	FCC ID
Lenovo	Notebook Computer	ThinkPad E580	PF-12XLH6	FCC SDoC
NETGARE	WLAN AP	R7800	4H487A590021A	PY315100319
Lenovo	Notebook Computer	ThinkPad E470C	PF-OP4YX1	FCC SDoC
Vathin	H-Steriscope	Normal 4.9/2.2	T211023 321	FCC SDoC

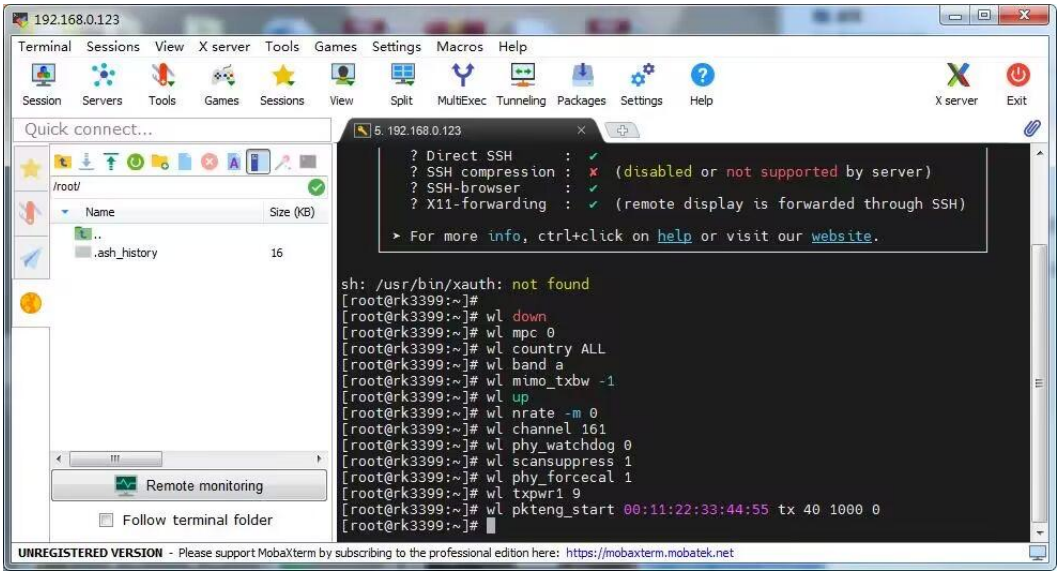
Vathin	H-Steriscope	Normal 4.9/2.2	T211023 322	FCC SDoC
Vathin	H-Steriscope	BCV1-C2-L	T220428 012	FCC SDoC
Vathin	H-Steriscope	BCV1-C2-L	T220428 011	FCC SDoC
Vathin	H-Steriscope	BC-S1E00-L	T2306009	FCC SDoC
MEGMEET	AC/DC Adapter	MANGO150S-24AW-JS	60602222000022	FCC SDoC
JUSHA	LCD Monitor	E320A	DE320A10CDC24008	FCC SDoC
N/A	3.5mm Audio Cable(Remote Port)	N/A	N/A	FCC SDoC
UGREEN	D-SUB9 To USB Converter	N/A	N/A	FCC SDoC
QUECTEL	USB Storage	N/A	N/A	FCC SDoC

2.4 Test Setup

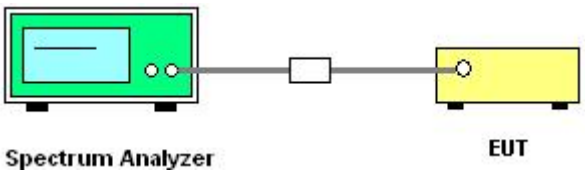
The EUT is continuously communicating to the WIFI tester during the tests.

EUT was set in the Hidden menu mode to enable WIFI communications.

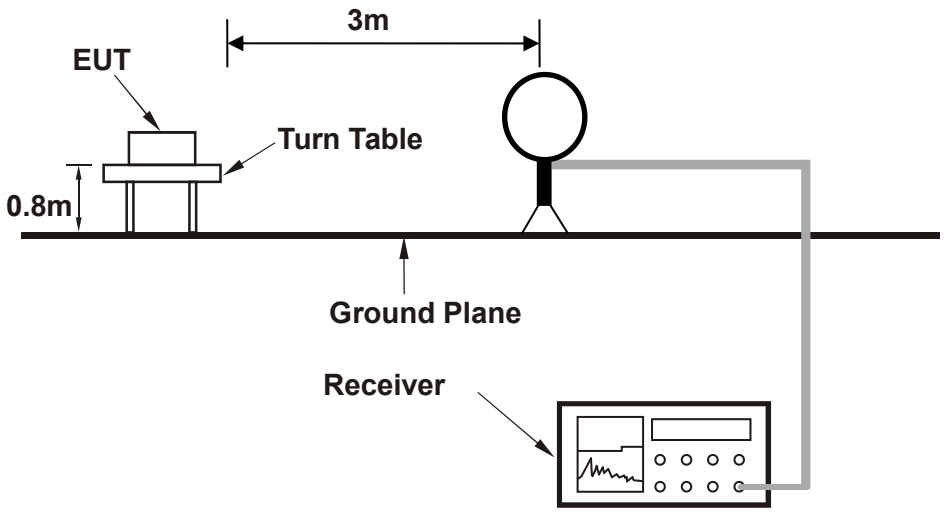
The following picture is a screenshot of the test software



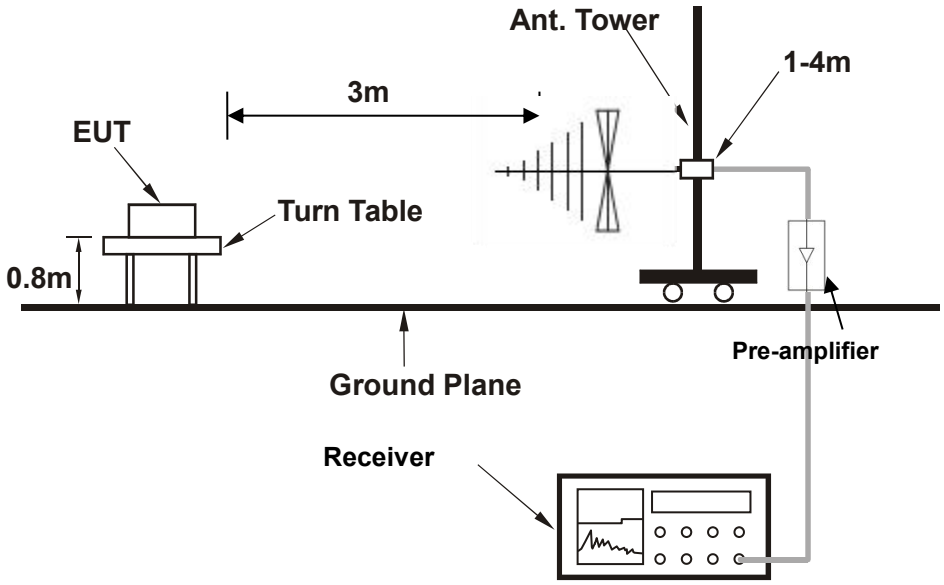
Setup diagram for Conducted Test



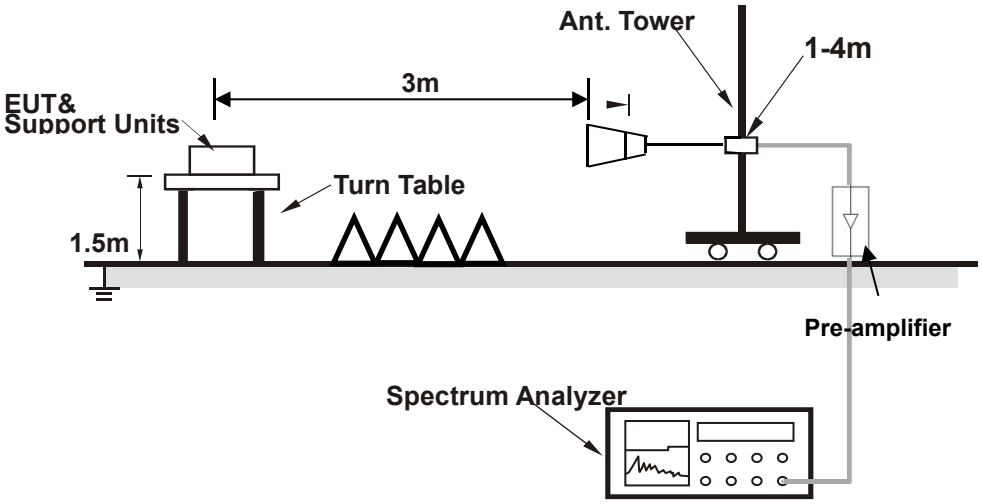
Setup diagram for Radiation(9KHz~30MHz) Test



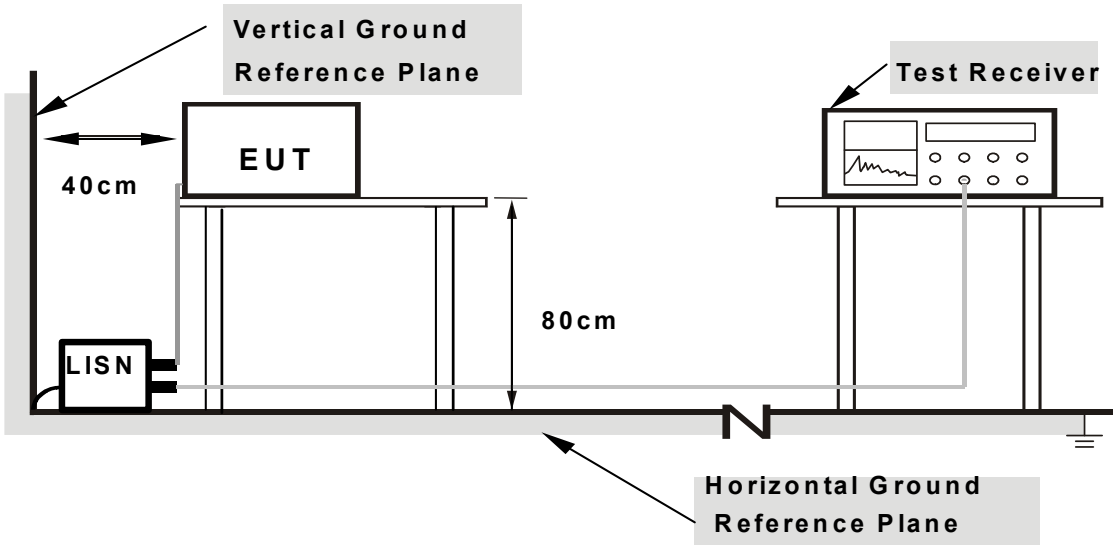
Setup diagram for Radiation(Below 1G) Test



Setup diagram for Radiation(Above1G) Test



Setup diagram for AC Conducted Emission Test



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

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

2.5 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:
The spectrum analyzer offset is derived from RF cable loss and attenuator factor.
Offset = RF cable loss + attenuator factor.
Following shows an offset computation example with cable loss 5 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 5 + 10 = 15 (dB)

For all radiated test items:

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

Over Limit (dB μ V/m) = Level(dB μ V/m) - Limit Level (dB μ V/m)

3 Test Result

3.1 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part15.205.

3.1.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350MHz band shall not exceed an EIRP of –27dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5600 MHz and 5650-5725MHz band: all emissions outsideof the 5470-5600 MHz and 5650-5725MHz band shall not exceed an EIRP of -27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band:
15.407(b)(4)(i) 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.

(2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3

Above 960	500	3

Note: The following formula is used to convert the EIRP to field strength.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

EIRP (dBm)	Field Strength at 3m (dBμV/m)
-17	78.3
-27	68.3

3.1.2 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.

   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz

   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground..
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.

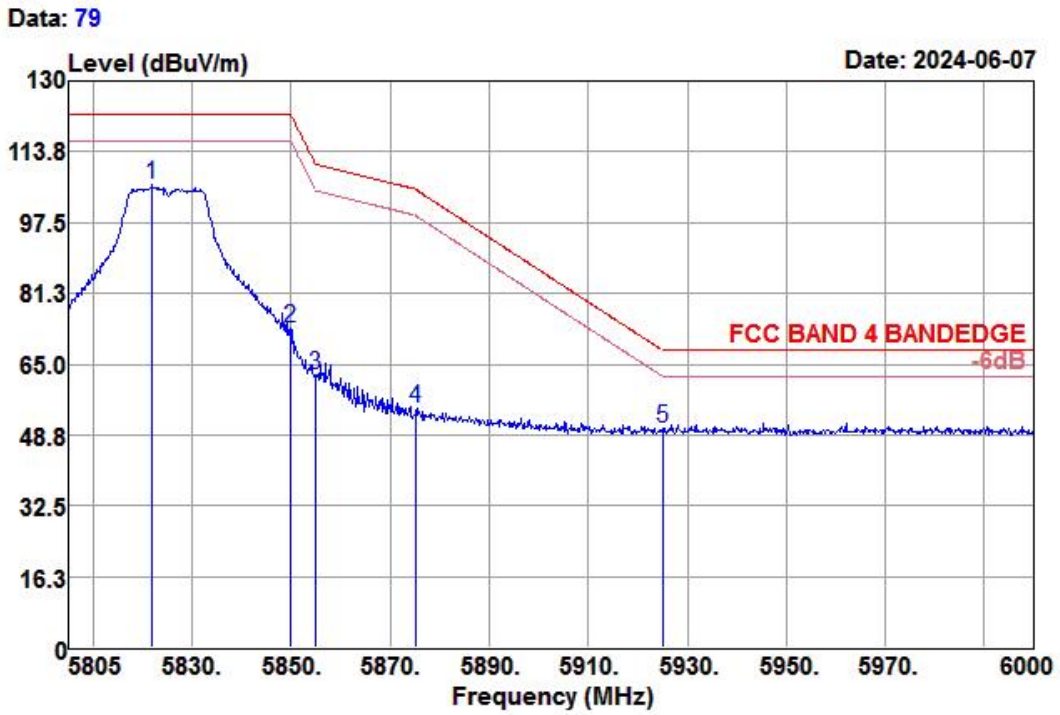
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

3.1.3 Test Result of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

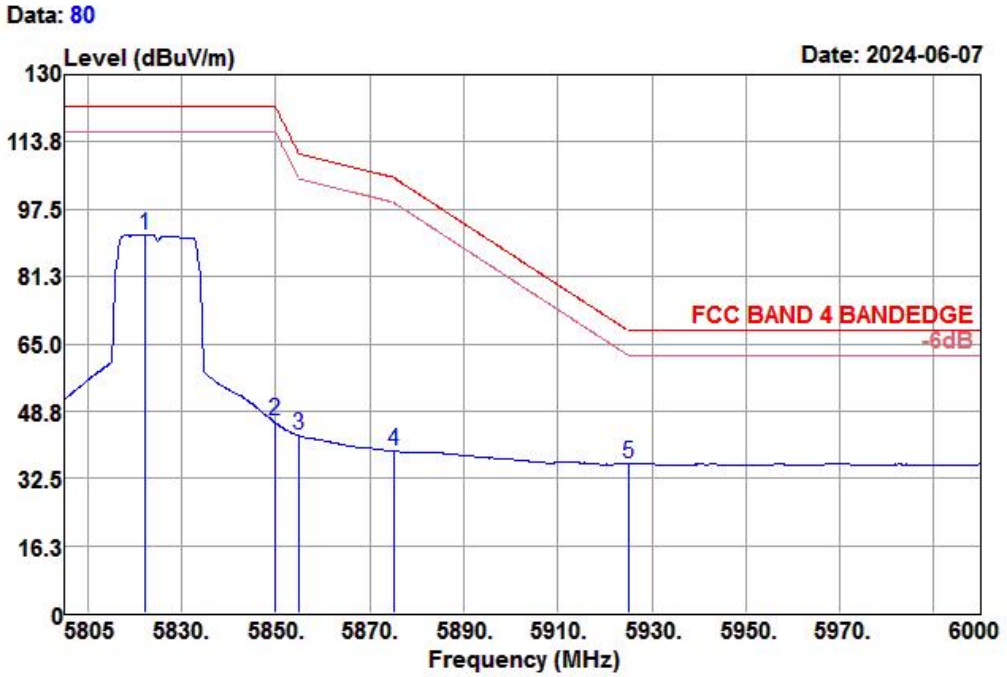
3.1.4 Test Result of Radiated Spurious at Band Edges

Test Mode :	802.11a CH165 5825MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	61~64%
Frequencey Range	5.8GHz~6.0GHz	**Polarization :**	Horizontal



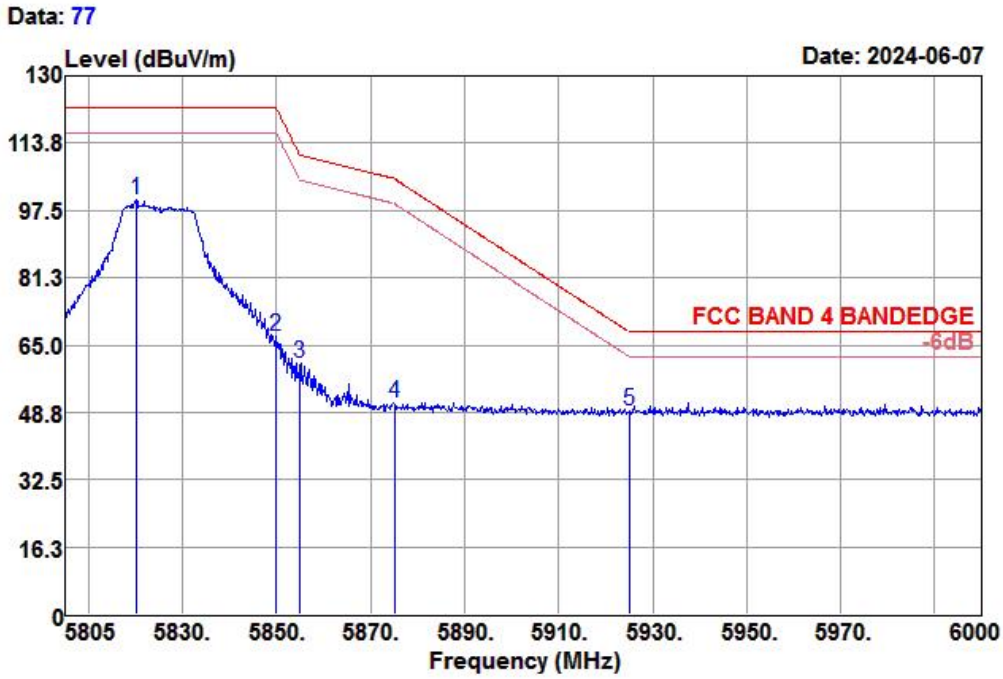
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5821.965	101.42	33.59	6.00	34.78	106.23	122.20	-15.97	Peak
5850.000	68.21	33.70	6.02	34.74	73.19	122.20	-49.01	Peak
5855.000	57.47	33.75	6.02	34.73	62.51	110.80	-48.29	Peak
5875.000	49.51	33.95	6.04	34.70	54.80	105.20	-50.40	Peak
5925.000	44.74	34.20	6.07	34.62	50.39	68.20	-17.81	Peak

Test Mode :	802.11a CH165 5825MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	61~64%
Frequencey Range	5.8GHz~6.0GHz	Polarization :	Horizontal



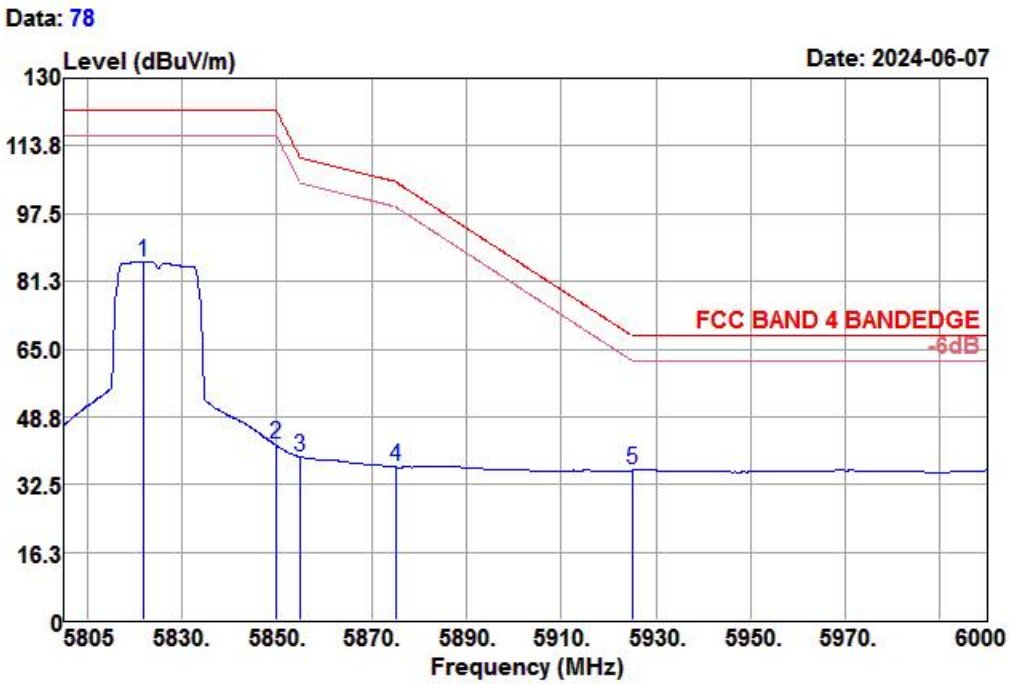
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5822.355	86.62	33.59	6.00	34.78	91.43	122.20	-30.77	Average
5850.000	41.26	33.70	6.02	34.74	46.24	122.20	-75.96	Average
5855.000	37.83	33.75	6.02	34.73	42.87	110.80	-67.93	Average
5875.000	33.77	33.95	6.04	34.70	39.06	105.20	-66.14	Average
5925.000	30.50	34.20	6.07	34.62	36.15	68.20	-32.05	Average

Test Mode :	802.11a CH165 5825MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	61~64%
Frequencey Range	5.8GHz~6.0GHz	Polarization :	Vertical



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5820.015	95.36	33.58	6.00	34.79	100.15	122.20	-22.05	Peak
5850.000	61.96	33.70	6.02	34.74	66.94	122.20	-55.26	Peak
5855.000	55.45	33.75	6.02	34.73	60.49	110.80	-50.31	Peak
5875.000	45.60	33.95	6.04	34.70	50.89	105.20	-54.31	Peak
5925.000	43.42	34.20	6.07	34.62	49.07	68.20	-19.13	Peak

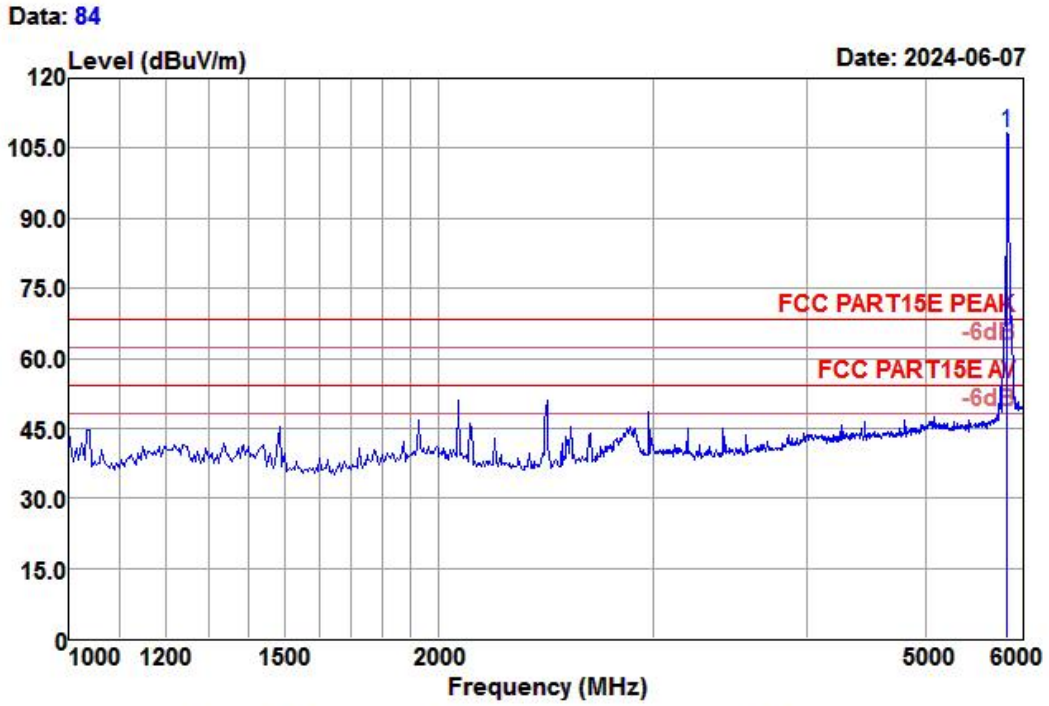
Test Mode :	802.11a CH165 5825MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	61~64%
Frequencey Range	5.8GHz~6.0GHz	Polarization :	Vertical



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5821.770	81.19	33.59	6.00	34.79	85.99	122.20	-36.21	Average
5850.000	37.23	33.70	6.02	34.74	42.21	122.20	-79.99	Average
5855.000	34.21	33.75	6.02	34.73	39.25	110.80	-71.55	Average
5875.000	31.46	33.95	6.04	34.70	36.75	105.20	-68.45	Average
5925.000	30.24	34.20	6.07	34.62	35.89	68.20	-32.31	Average

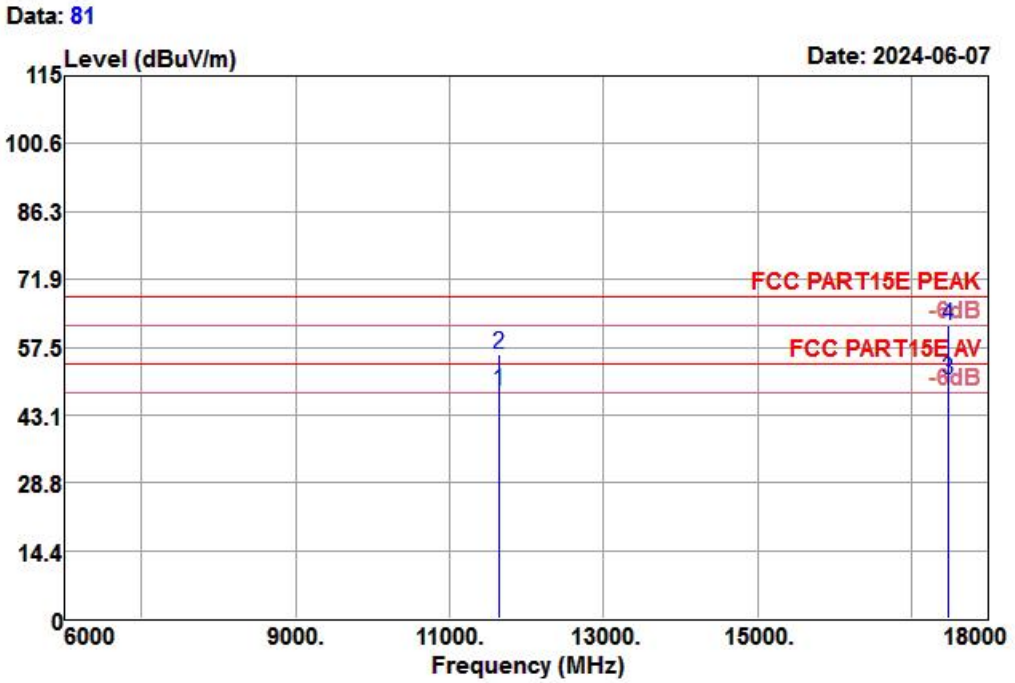
3.1.5 Test Result of Radiated Spurious Emission (1GHz ~ 10th Harmonic)

Test Mode :	802.11a CH165 5825MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	61~64%
Frequencey Range	1GHz~6GHz	Polarization :	Horizontal



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5825.000	103.41	33.60	6.01	34.78	108.24	68.20	40.04	Peak

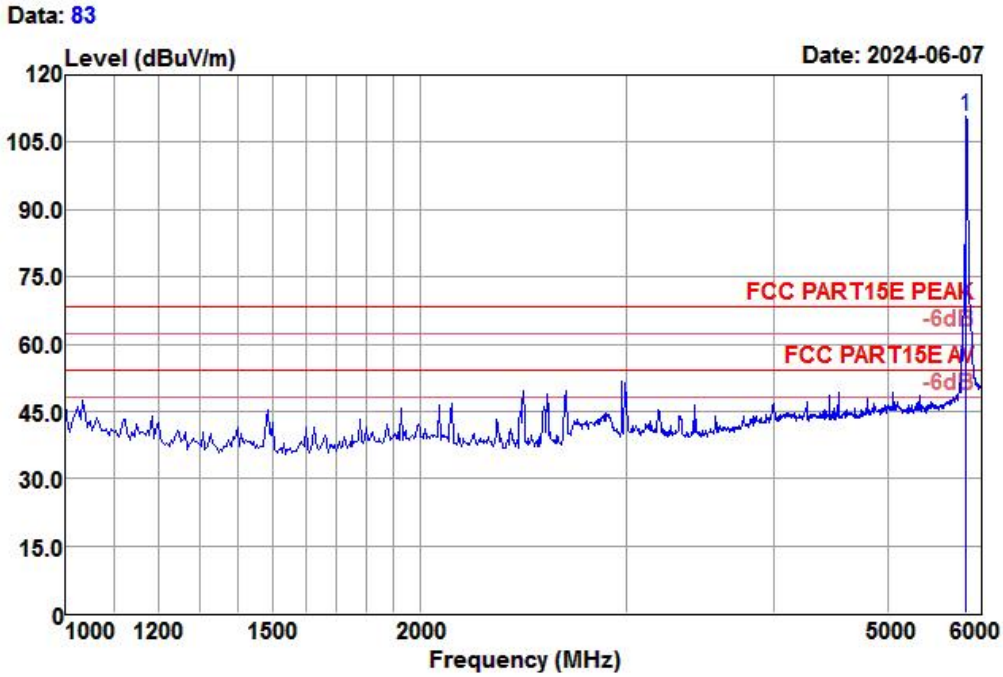
Test Mode :	802.11a CH165 5825MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	61~64%
Frequencey Range	6GHz~18GHz	Polarization :	Horizontal



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11650.000	33.20	39.05	8.16	32.17	48.24	54.00	-5.76	Average
11650.000	40.87	39.05	8.16	32.17	55.91	68.20	-12.29	Peak
17475.000	30.70	38.90	11.60	30.48	50.72	54.00	-3.28	Average
17475.000	42.20	38.90	11.60	30.48	62.22	68.20	-5.98	Peak

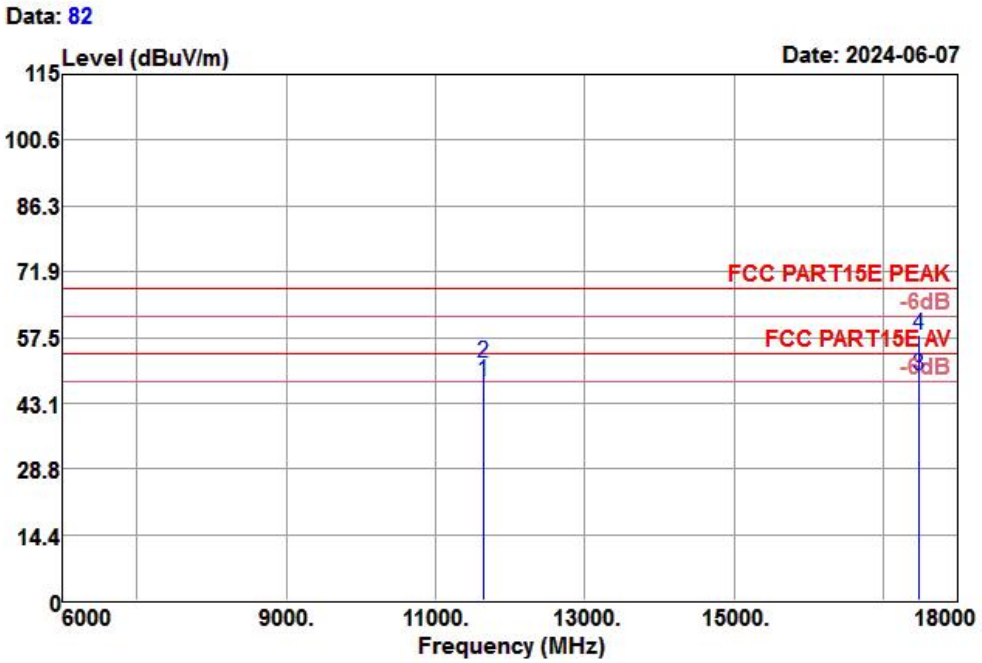
Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11a CH165 5825MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	61~64%
Frequencey Range	1GHz~6GHz	Polarization :	Vertical



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
5825.000	106.11	33.60	6.01	34.78	110.94	68.20	42.74	Peak

Test Mode :	802.11a CH165 5825MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	61~64%
Frequencey Range	6GHz~18GHz	Polarization :	Vertical

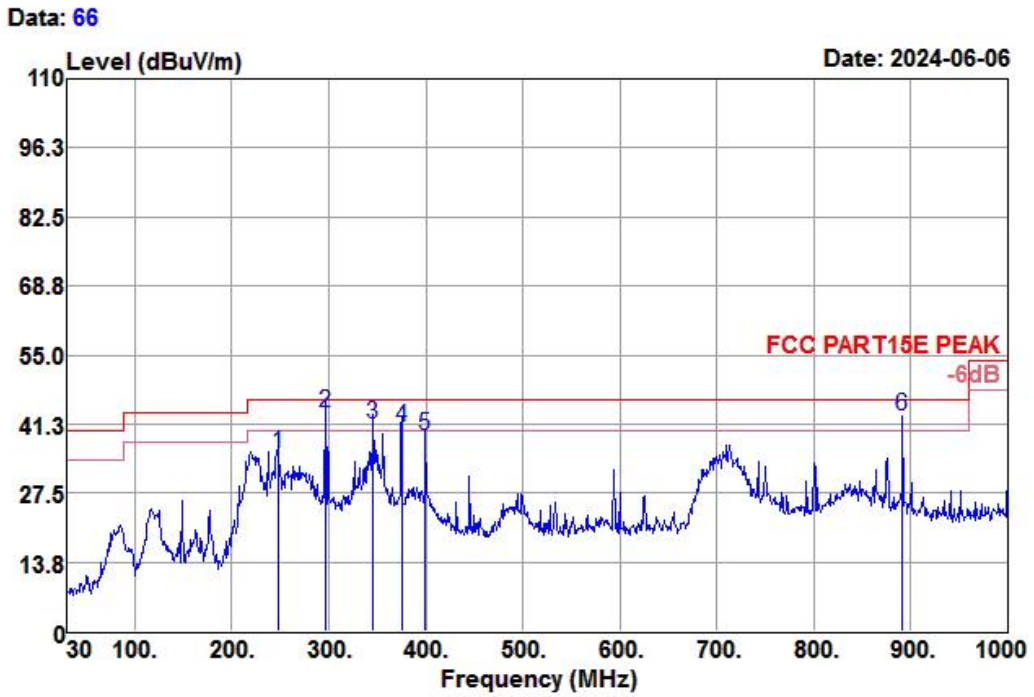


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
11650.000	32.80	39.05	8.16	32.17	47.84	54.00	-6.16	Average
11650.000	36.98	39.05	8.16	32.17	52.02	68.20	-16.18	Peak
17475.000	29.20	38.90	11.60	30.48	49.22	54.00	-4.78	Average
17475.000	38.09	38.90	11.60	30.48	58.11	68.20	-10.09	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

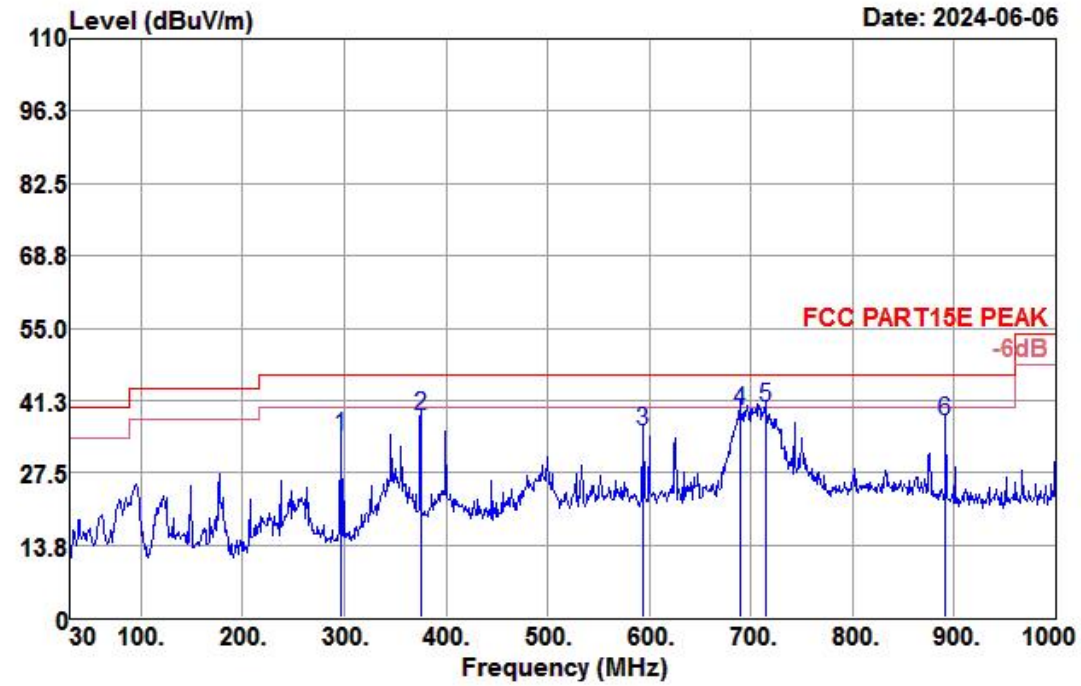
3.1.6 Test Result of Radiated Spurious Emission (30MHz ~ 1GHz)

Test Mode :	802.11a CH165 5825MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	61~64%
Frequencey Range	30MHz~1GHz	Polarization :	Horizontal



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
247.280	53.11	11.67	3.01	32.50	35.29	46.00	-10.71	QP
296.750	59.20	13.31	3.33	32.50	43.34	46.00	-2.66	QP
346.220	55.80	14.34	3.60	32.55	41.19	46.00	-4.81	QP
375.320	54.30	15.06	3.76	32.58	40.54	46.00	-5.46	QP
399.570	52.16	15.50	3.90	32.60	38.96	46.00	-7.04	QP
891.360	47.12	22.93	5.86	33.20	42.71	46.00	-3.29	QP

Data: 65



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
296.750	50.25	13.31	3.33	32.50	34.39	46.00	-11.61	QP
375.320	52.10	15.06	3.76	32.58	38.34	46.00	-7.66	QP
594.540	43.70	19.48	4.86	32.70	35.34	46.00	-10.66	QP
688.630	46.09	20.63	5.28	32.70	39.30	46.00	-6.70	QP
713.850	46.23	20.99	5.39	32.70	39.91	46.00	-6.09	QP
891.360	41.85	22.93	5.86	33.20	37.44	46.00	-8.56	QP

3.2 Radiated receiver emissions Measurement

3.2.1 Limit of receiver conducted emissions

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Radiated emission measurements shall be performed with the receiver antenna connected to the receiver antenna ports. The search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is higher, to at least five times the highest tunable or local oscillator frequency, whichever is higher, without exceeding 40 GHz.

Spurious emissions from receivers shall not exceed the radiated emissions limits shown in table below.

Frequency (MHz)	Field strength (μV/m at 3 metres)[Note 1]
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

Note 1: Measurements for compliance with the limits in table 3 may be performed at distances other than 3 metres, in accordance with section 6.6.

3.2.2 Test Procedures

Radiated Test Method

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The measurement distance is 3 meter.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW=3* RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
   (3) For average measurement:
   VBW = 10 Hz, when duty cycle is no less than 98 percent.
   VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission

duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Conducted Test Method

(1) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

(2) Turn on the EUT and connect it to measurement instrument.

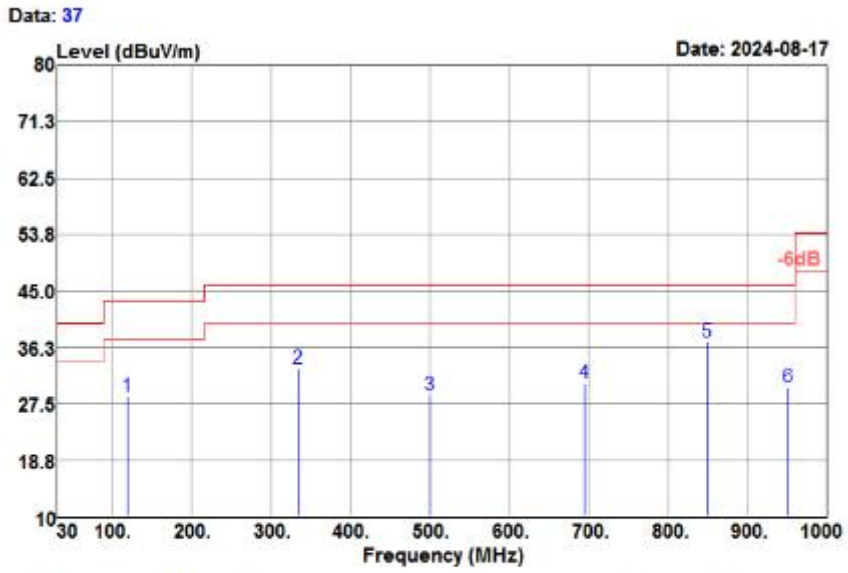
(3) Use the following spectrum analyzer settings.

(4) Span shall wide enough to fully capture the emission being measured;

(5) Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW=3* RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak.

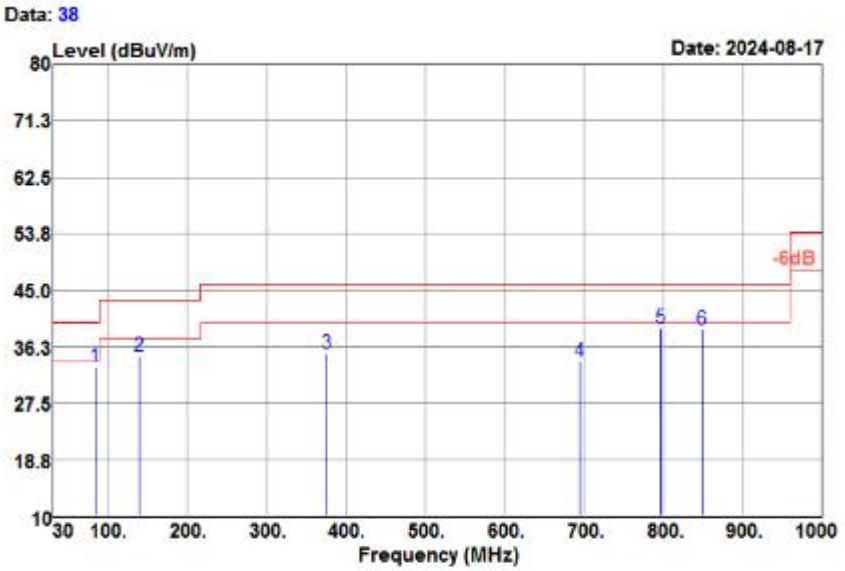
3.2.3 Test Result of Radiated receiver emissions

Test Mode :	Mode 1	**Temperature :**	23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	61%
Test Voltage :	120Vac / 60Hz	**Phase :**	Horizontal
Function Type :	RX Mode		



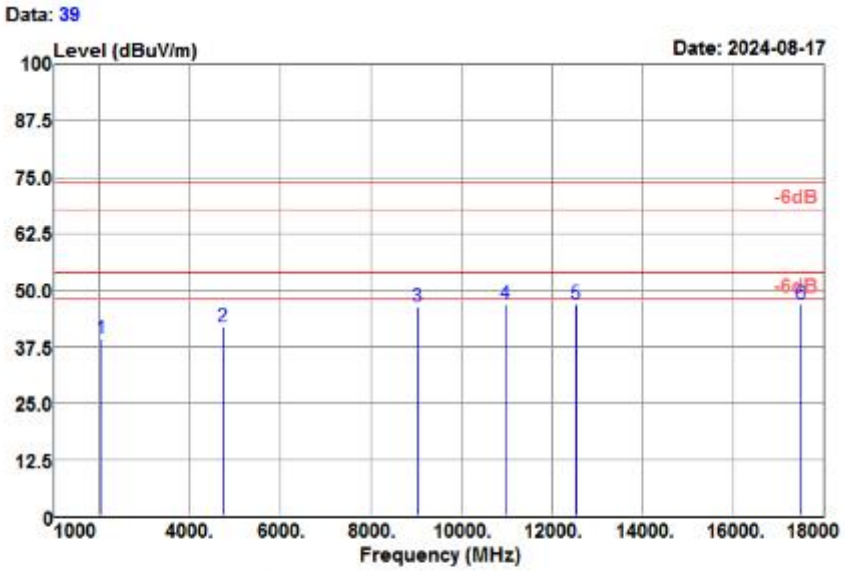
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
119.240	47.99	11.12	2.01	32.50	28.62	43.50	-14.88	Peak
333.610	47.77	14.19	3.55	32.50	33.01	46.00	-12.99	Peak
500.450	38.88	17.80	4.47	32.30	28.85	46.00	-17.15	Peak
694.450	36.90	20.75	5.28	32.32	30.61	46.00	-15.39	Peak
848.680	41.22	22.49	6.01	32.75	36.97	46.00	-9.03	Peak
951.500	33.60	23.72	6.32	33.57	30.07	46.00	-15.93	Peak

Test Mode :	Mode 1	Temperature :	23℃
Test Engineer :	Jack Liu	Relative Humidity :	61%
Test Voltage :	120Vac / 60Hz	Phase :	Vertical
Function Type :	RX Mode		



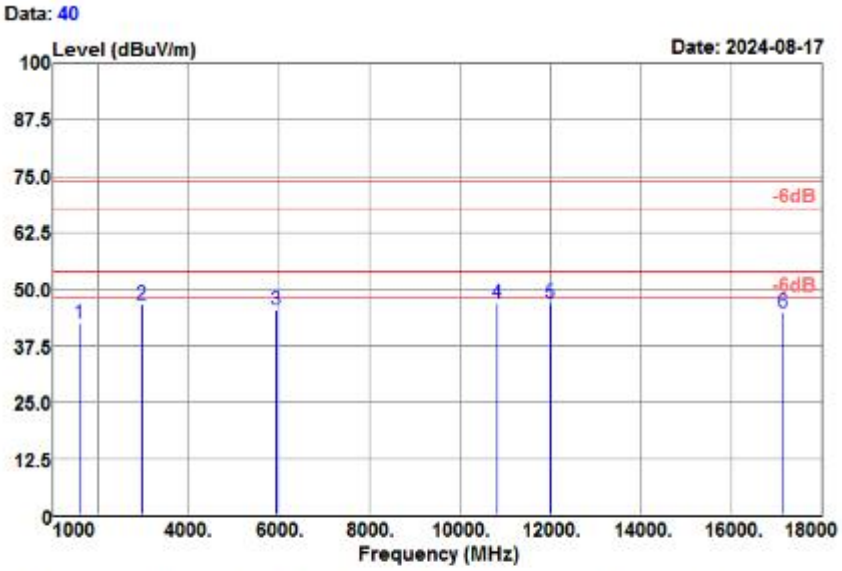
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
83.350	55.84	8.14	1.71	32.47	33.22	40.00	-6.78	Peak
139.610	52.19	12.80	2.23	32.50	34.72	43.50	-8.78	Peak
375.320	49.00	15.06	3.75	32.63	35.18	46.00	-10.82	Peak
694.450	40.29	20.75	5.28	32.32	34.00	46.00	-12.00	Peak
797.270	43.69	22.33	5.78	32.69	39.11	46.00	-6.89	Peak
848.680	43.21	22.49	6.01	32.75	38.96	46.00	-7.04	Peak

Test Mode :	Mode 1	Temperature :	23℃
Test Engineer :	Jack Liu	Relative Humidity :	61%
Test Voltage :	120Vac / 60Hz	Phase :	Horizontal
Function Type :	RX Mode		



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2054.000	44.15	26.86	3.34	34.96	39.39	74.00	-34.61	Peak
4740.000	38.98	32.34	6.12	35.53	41.91	74.00	-32.09	Peak
9041.000	29.75	38.34	10.90	32.67	46.32	74.00	-27.68	Peak
10979.000	23.16	39.44	15.41	31.17	46.84	74.00	-27.16	Peak
12526.000	22.72	38.90	16.06	30.63	47.05	74.00	-26.95	Peak
17490.000	22.77	38.90	15.45	30.10	47.02	74.00	-26.98	Peak

Test Mode :	Mode 1	Temperature :	23℃
Test Engineer :	Jack Liu	Relative Humidity :	61%
Test Voltage :	120Vac / 60Hz	Phase :	Vertical
Function Type :	RX Mode		



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1578.000	48.52	25.50	3.39	35.05	42.36	74.00	-31.64	Peak
2972.000	50.05	29.50	4.80	37.62	46.73	74.00	-27.27	Peak
5930.000	36.34	34.20	7.74	32.90	45.38	74.00	-28.62	Peak
10826.000	24.66	39.13	14.77	31.66	46.90	74.00	-27.10	Peak
11999.000	23.30	39.00	15.72	31.10	46.92	74.00	-27.08	Peak
17150.000	18.97	38.80	16.99	30.03	44.73	74.00	-29.27	Peak

3.3 AC Conducted Emission Measurement

3.3.1 Limit of AC Conducted Emission

FCC §15.207

IC RSS-GEN 8.8

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

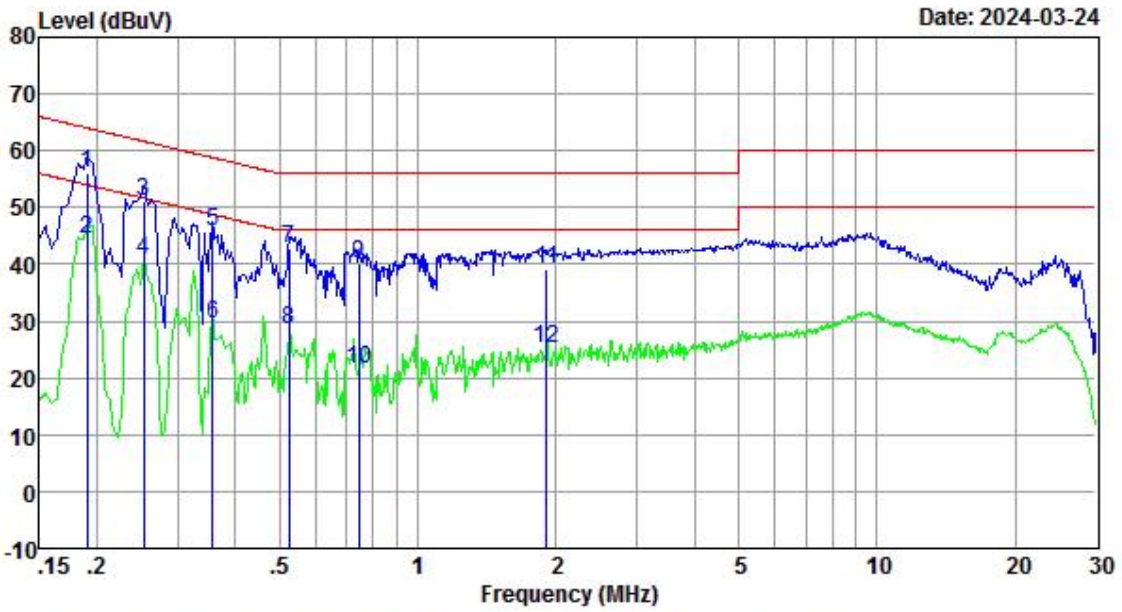
*Decreases with the logarithm of the frequency.

3.3.2 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

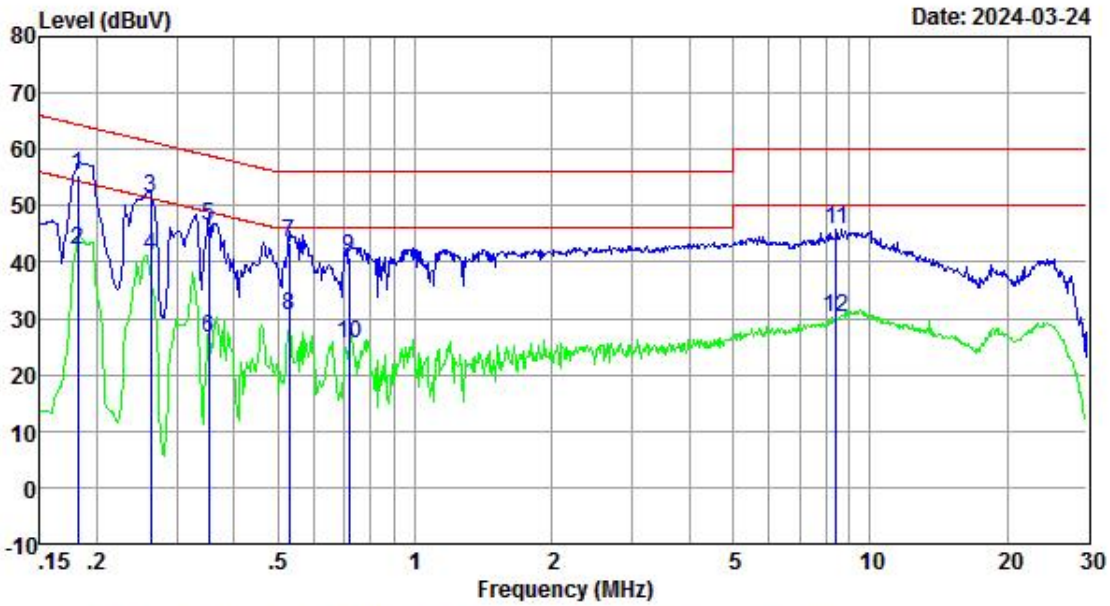
3.3.3 Test Result of AC Conducted Emission

Test Mode :	Mode 1	**Temperature :**	23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	51%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	RLAN(5G) Link + SDI + RJ-45 + HDMI + USB Disk + H-Steriscope + D-SUBS9 + REMOTE +Adapter		



Freq MHz	Reading level dBuV	LISN/ISN factor dB	Cable loss dB	Result level dBuV	Limit level dBuV	Over limit dB	Remark
0.190	46.30	9.69	0.01	56.00	64.02	-8.02	QP
0.190	34.70	9.69	0.01	44.40	54.02	-9.62	Average
0.253	41.40	9.71	0.02	51.13	61.64	-10.51	QP
0.253	31.20	9.71	0.02	40.93	51.64	-10.71	Average
0.358	36.10	9.72	0.02	45.84	58.78	-12.94	QP
0.358	19.90	9.72	0.02	29.64	48.78	-19.14	Average
0.524	33.00	9.75	0.02	42.77	56.00	-13.23	QP
0.524	18.80	9.75	0.02	28.57	46.00	-17.43	Average
0.743	30.40	9.72	0.02	40.14	56.00	-15.86	QP
0.743	11.80	9.72	0.02	21.54	46.00	-24.46	Average
1.908	29.30	9.71	0.04	39.05	56.00	-16.95	QP
1.908	15.30	9.71	0.04	25.05	46.00	-20.95	Average

Test Mode :	Mode 1	Temperature :	23℃
Test Engineer :	Jack Liu	Relative Humidity :	51%
Test Voltage :	120Vac / 60Hz	Phase :	NEUTRAL
Function Type :	RLAN(5G) Link + SDI + RJ-45 + HDMI + USB Disk + H-Steriscope + D-SUBS9 + REMOTE +Adapter		



Freq MHz	Reading level dBuV	LISN/ISN factor dB	Cable loss dB	Result level dBuV	Limit level dBuV	Over limit dB	Remark
0.182	45.70	9.59	0.01	55.30	64.42	-9.12	QP
0.182	32.50	9.59	0.01	42.10	54.42	-12.32	Average
0.263	41.70	9.59	0.02	51.31	61.34	-10.03	QP
0.263	31.70	9.59	0.02	41.31	51.34	-10.03	Average
0.352	36.70	9.59	0.02	46.31	58.91	-12.60	QP
0.352	17.00	9.59	0.02	26.61	48.91	-22.30	Average
0.529	33.80	9.60	0.02	43.42	56.00	-12.58	QP
0.529	20.80	9.60	0.02	30.42	46.00	-15.58	Average
0.716	31.10	9.60	0.02	40.72	56.00	-15.28	QP
0.716	16.00	9.60	0.02	25.62	46.00	-20.38	Average
8.412	36.06	9.81	0.07	45.94	60.00	-14.06	Peak
8.412	20.40	9.81	0.07	30.28	50.00	-19.72	Average

3.4 Automatically Discontinue Transmission

3.4.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.4.2 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

3.5 Antenna Requirements

3.5.1 Standard Applicable

According to antenna requirement of §15.203.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be re-placed by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

And according to §15.247(b)(4), The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the

antenna exceeds 6 dBi.

3.5.2 Antenna Connected Construction

An FPC type antenna design is used.

3.5.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum output power limit.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Due Date	Remark
Spectrum Analyzer	Keysight	N9010A	MY56070788	2023-12-19	2024-12-18	Conducted
Thermal Chamber	Howkin	UHL-34	19111801	2023-12-18	2024-12-17	Conducted
Power Divider	Camille	ZPD8-2M0-40G-1942	04223129	2024-07-05	2025-07-04	Conducted
10dB Attenuator	MCLI	FAS-8-10	1693	2024-07-05	2025-07-04	Conducted

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV 30	103728	2023-12-19	2024-12-18	Radiation
EMI Test Receiver	R&S	ESR3	102144	2023-12-20	2024-12-19	Radiation
Amplifier	Sonoma	310	363917	2023-12-19	2024-12-18	Radiation
Amplifier	Schwarzbeck	BBV 9718	327	2023-12-19	2024-12-18	Radiation
Amplifier	Narda	TTA1840-35-HG	2034380	2024-01-03	2025-01-02	Radiation
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-051	2023-02-12	2026-02-11	Radiation
Broadband Antenna	Schwarzbeck	VULB 9168	9168-757	2023-09-17	2026-09-16	Radiation
Horn Antenna	Schwarzbeck	BBHA 9120 D	1677	2024-01-30	2027-01-29	Radiation
Horn Antenna	COM-POWER	AH-1840	101117	2024-01-31	2027-01-30	Radiation
Test Software	Auidx	E3	6.111221a	N/A	N/A	Radiation
Filter	Micro-Tronics	BRM 50702	G266	N/A	N/A	Radiation

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Due Date	Remark
LISN	R&S	ENV216	102125	2023-12-18	2024-12-17	Conducted
LISN	R&S	ENV432	101327	2023-12-18	2024-12-17	Conducted
EMI Test Receiver	R&S	ESR3	102143	2023-12-20	2024-12-19	Conducted
EMI Test Software	Audix	E3	N/A	N/A	N/A	Conducted
Base Station	R&S	CMW 270	101231	2023-12-19	2024-12-18	Conducted

N/A: No Calibration Required.

5 Uncertainty of Evaluation

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.00 dB
Radiated emissions	30MHz ~ 1GHz	5.28 dB
	1GHz ~ 18GHz	5.12 dB
	18GHz ~ 40GHz	5.27 dB

MEASUREMENT	UNCERTAINTY
Occupied Channel Bandwidth	±71.333 Hz
RF output power, conducted	±0.78 dB
Power density, conducted	±2.02dB
Emissions, conducted	±2.00dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Appendix E: Setup Photographs

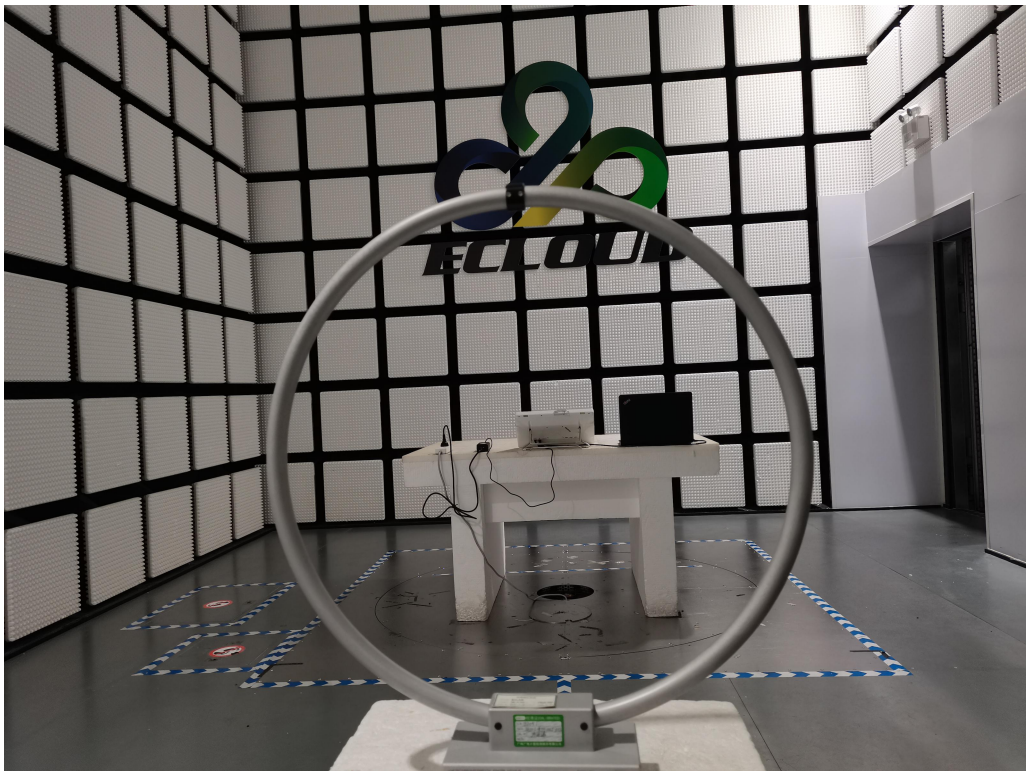


Fig. 1 Radiated emission setup photo(Below 30MHz)

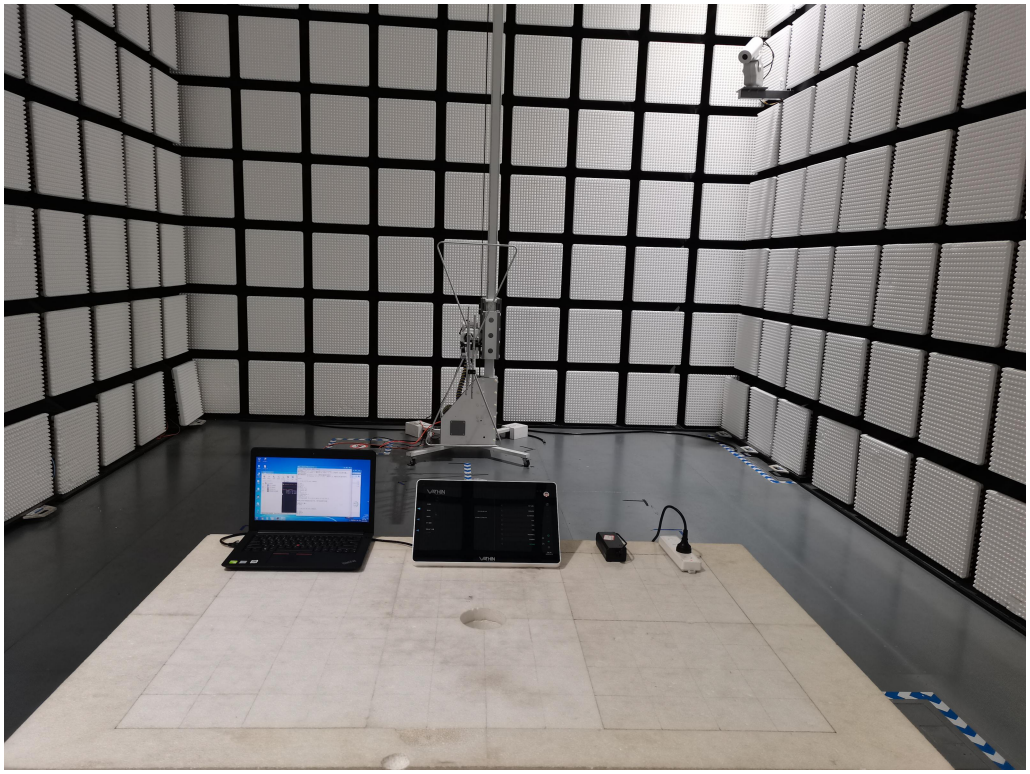


Fig. 2 Radiated emission setup photo(30MHz-1GHz)

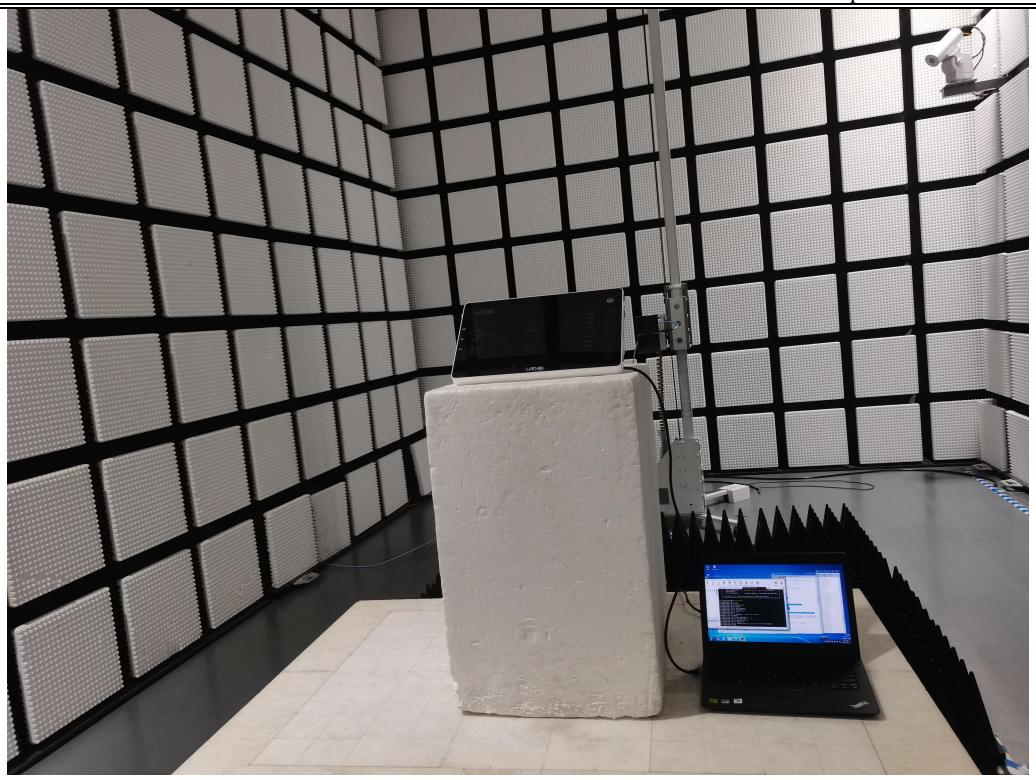


Fig. 3 Radiated emission setup photo(Above 1GHz)

Fig. 4 Power line conducted emission setup photo

----------End of the report----------