

8.4 FREQUENCY STABILITY

8.4.1 Applicable Standard

According to FCC Part 15.407(g)
ANSI C63.10 Section 6.8

8.4.2 Conformance Limit

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

8.4.3 Test Configuration

Test according to clause 6.1 radio frequency test setup

8.4.4 Test Procedure

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously

Set RBW = 10 kHz.

Set Span= Entire absence of modulation emissions band

Set the video bandwidth (VBW) =30 kHz. width

Set Detector = Peak.

Set Trace mode = max hold.

Set Sweep = auto couple.

Allow the trace to stabilize.

The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.

Beginning at each temperature level specified in user manual , the frequency shall be measured within one minute after application of primary power to the transmitter and at intervals of no more than one minute thereafter until ten minutes have elapsed or until sufficient measurements are obtained to indicate clearly that the frequency has stabilized within the applicable tolerance, whichever time period is greater. During each test, the ambient temperature shall not be allowed to rise more than 10° centigrade above the respective beginning ambient temperature level

Measure and record the results in the test report.

8.4.5 Test Results

802.11a 5180

Voltage(V)	Temp(°C)	Test Frequency (MHz)	Max. Deviation (KHz)	Verdict
Vnom	-20	5179.96	-40.00	Pass
	-10	5179.98	-20.00	Pass
	0	5179.98	-20.00	Pass
	10	5179.96	-40.00	Pass
	20	5179.96	-40.00	Pass
	30	5179.98	-20.00	Pass
	40	5179.98	-20.00	Pass
	55	5179.98	-20.00	Pass
85% Vnom	25	5179.96	-40.00	Pass
115% Vnom	25	5179.98	-20.00	Pass

802.11a 5745

Voltage(V)	Temp(°C)	Test Frequency (MHz)	Max. Deviation (KHz)	Verdict
Vnom	-20	5744.98	-20.00	Pass
	-10	5744.98	-20.00	Pass
	0	5744.98	-20.00	Pass
	10	5744.98	-20.00	Pass
	20	5744.96	-40.00	Pass
	30	5744.96	-40.00	Pass
	40	5744.98	-20.00	Pass
	55	5744.96	-40.00	Pass
85% Vnom	25	5744.96	-40.00	Pass
115% Vnom	25	5744.96	-40.00	Pass

802.11N20 5180

Voltage(V)	Temp(°C)	Test Frequency (MHz)	Max. Deviation (KHz)	Verdict
Vnom	-20	5179.96	-40.00	Pass
	-10	5179.96	-40.00	Pass
	0	5179.96	-40.00	Pass
	10	5179.96	-40.00	Pass
	20	5179.96	-40.00	Pass
	30	5179.96	-40.00	Pass
	40	5179.96	-40.00	Pass
	55	5179.96	-40.00	Pass
85% Vnom	25	5180.01	10.00	Pass
115% Vnom	25	5179.96	-40.00	Pass

802.11N20

5745

Voltage(V)	Temp(℃)	Test Frequency (MHz)	Max. Deviation (KHz)	Verdict
Vnom	-20	5744.96	-40.00	Pass
	-10	5744.94	-60.00	Pass
	0	5744.96	-40.00	Pass
	10	5744.94	-60.00	Pass
	20	5744.96	-40.00	Pass
	30	5744.96	-40.00	Pass
	40	5744.96	-40.00	Pass
	55	5744.96	-40.00	Pass
85% Vnom	25	5744.96	-40.00	Pass
115% Vnom	25	5744.96	-40.00	Pass

802.11N40

5190

Voltage(V)	Temp(℃)	Test Frequency (MHz)	Max. Deviation (KHz)	Verdict
Vnom	-20	5189.96	-40.00	Pass
	-10	5189.96	-40.00	Pass
	0	5189.92	-80.00	Pass
	10	5189.92	-80.00	Pass
	20	5189.96	-40.00	Pass
	30	5189.96	-40.00	Pass
	40	5189.96	-40.00	Pass
	55	5189.96	-40.00	Pass
85% Vnom	25	5189.96	-40.00	Pass
115% Vnom	25	5189.96	-40.00	Pass

802.11N40

5755

Voltage(V)	Temp(℃)	Test Frequency (MHz)	Max. Deviation (KHz)	Verdict
Vnom	-20	5754.98	-20.00	Pass
	-10	5754.98	-20.00	Pass
	0	5754.98	-20.00	Pass
	10	5754.98	-20.00	Pass
	20	5754.98	-20.00	Pass
	30	5754.96	-40.00	Pass
	40	5754.96	-40.00	Pass
	55	5754.98	-20.00	Pass
85% Vnom	25	5754.96	-40.00	Pass
115% Vnom	25	5754.96	-40.00	Pass

8.5 UNDESIRABLE RADIATED SPURIOUS EMISSION

8.5.1 Applicable Standard

According to FCC Part 15.407 (b)
According to 789033 D02 Section II(G)

8.5.2 Conformance Limit

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: 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.

The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209 The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 15.209(a):

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009-0.490	2400/F(KHz)	20 log (uV/m)	300
0.490-1.705	2400/F(KHz)	20 log (uV/m)	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

The provisions of §15.205 apply to intentional radiators operating under this section, 15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

Remark: 1. Emission level in dBuV/m=20 log (uV/m)

2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

8.5.3 Test Configuration

Test according to clause 6.2 radio frequency test setup

8.5.4 Test Procedure

■ Unwanted Emissions Measurements below 1000 MHz

Compliance shall be demonstrated using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection.

The EUT was placed on a turn table which is 0.8m above ground plane.

And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

Repeat above procedures until all frequency measured was complete.

We use software control the EUT, Let EUT hopping on and transmit with highest power, All the modes have been tested and the worst result was reported.

Use the following spectrum analyzer settings:

Set RBW=120kHz for $f < 1$ GHz(30MHz to 1GHz), 200Hz for $f < 150$ KHz(9KHz to 150KHz), 9KHz for $f < 30$ MHz

(150KHz to 30KHz).

Set the VBW > RBW.

Detector = Peak.

Trace mode = max hold.

Follow the guidelines in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b). Submit this data.

Repeat above procedures until all frequency measured was complete.

■ Unwanted Maximum peak Emissions Measurements above 1000 MHz

Maximum emission levels are measured by setting the analyzer as follows:

RBW = 1 MHz.

VBW $\geq$ 3 MHz.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately $1/x$, where x is the duty cycle. For example, at 50 percent duty cycle, the measurement time will increase by a factor of two relative to measurement time for continuous transmission.

■ Unwanted Average Emissions Measurements above 1000 MHz

Method VB (Averaging using reduced video bandwidth): Alternative method.

RBW = 1 MHz.

Video bandwidth. • If the EUT is configured to transmit with duty cycle $\geq$ 98 percent, set $VBW \leq RBW/100$ (i.e., 10 kHz) but not less than 10 Hz.

• If the EUT duty cycle is < 98 percent, set $VBW \geq 1/T$, where T is defined in section II.B.1.a).

Video bandwidth mode or display mode • The instrument shall be set to ensure that video filtering is applied in the power domain. Typically, this requires setting the detector mode to RMS and setting the Average-VBW Type to Power (RMS).

• As an alternative, the analyzer may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some analyzers require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to "Voltage" regardless of the display mode.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of $1/x$, where x is the duty cycle. For example, use at least 200 traces if the duty cycle is 25 percent. (If a specific emission is demonstrated to be continuous—i.e., 100 percent duty cycle—rather than turning on and off with the transmit cycle, at least 50 traces shall be averaged.)

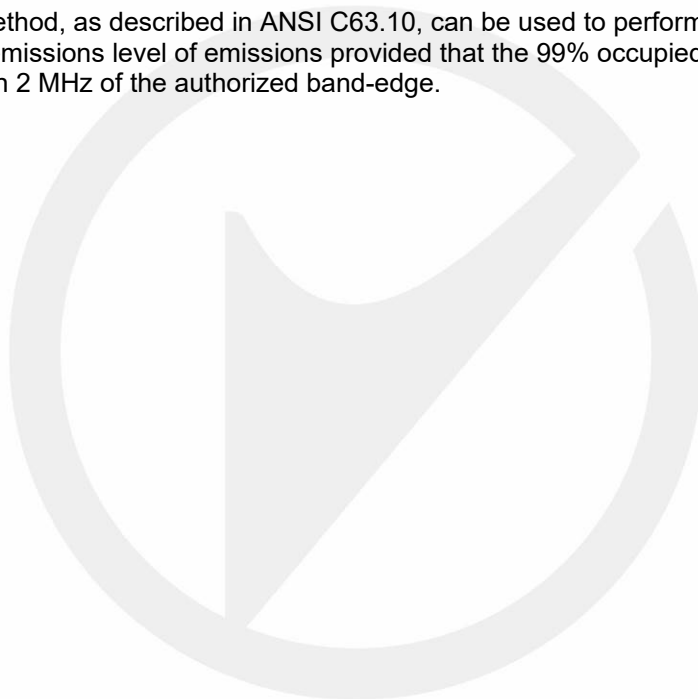
■ **Band edge measurements.**

Unwanted band-edge emissions may be measured using either of the special band-edge measurement techniques (the marker-delta or integration methods) described below. Note that the marker-delta method is primarily a radiated measurement technique that requires the 99% occupied bandwidth edge to be within 2 MHz of the authorized band edge, whereas the integration method can be used in either a radiated or conducted measurement without any special requirement with regards to the displacement of the unwanted emission(s) relative to the authorized bandwidth.

Marker-Delta Method.

The marker-delta method, as described in ANSI C63.10, can be used to perform measurements of the radiated unwanted emissions level of emissions provided that the 99% occupied bandwidth of the fundamental is within 2 MHz of the authorized band-edge.

8.5.5 Test Results



- ☒ For Undesirable radiated Spurious Emission in U-NII – 1
All the modes 802.11a/n/ac has been tested and the worst result 802.11a recorded as below:
- : ☒ Undesirable radiated Spurious Emission Above 1GHz (1GHz to 40GHz)

Test mode:		802.11a				Frequency(MHz):		5180	
Freq. (MHz)	Ant.Pol. H/V	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)				
10354.21	V	52.78	-42.44	-27	-15.44				
13062.57	V	51.42	-43.80	-27	-16.80				
17877.43	V	52.06	-43.16	-27	-16.16				
19914.00	V	31.76	-63.47	-27	-36.47				
36502.00	V	46.43	-48.80	-27	-21.80				
10362.86	H	53.30	-41.92	-27	-14.92				
13586.64	H	50.71	-44.51	-27	-17.51				
17890.79	H	51.88	-43.34	-27	-16.34				
23896.00	H	35.35	-59.88	-27	-32.88				
33180.00	H	36.75	-58.48	-27	-31.48				

Test mode:		802.11a		Frequency(MHz):		5200	
Freq. (MHz)	Ant.Pol. H/V	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)		
10400.57	V	47.96	-47.26	-27	-20.26		
13891.50	V	51.16	-44.06	-27	-17.06		
17918.29	V	52.30	-42.92	-27	-15.92		
26778.00	V	36.45	-58.78	-27	-31.78		
38922.00	V	44.46	-50.77	-27	-23.77		
10399.00	H	50.60	-44.62	-27	-17.62		
13356.43	H	51.71	-43.51	-27	-16.51		
17854.64	H	52.20	-43.02	-27	-16.02		
21586.00	H	33.54	-61.69	-27	-34.69		
38768.00	H	45.64	-49.59	-27	-22.59		

Test mode:		802.11a		Frequency(MHz): 5240	
Freq. (MHz)	Ant.Pol. H/V	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)
10479.14	V	52.77	-42.45	-27	-15.45
15173.79	V	50.96	-44.26	-27	-17.26
17915.14	V	52.07	-43.15	-27	-16.15
19892.00	V	32.34	-62.89	-27	-35.89
36612.00	V	45.59	-49.64	-27	-22.64
10480.71	H	52.65	-42.57	-27	-15.57
13515.14	H	50.65	-44.57	-27	-17.57
17880.57	H	51.69	-43.53	-27	-16.53
23368.00	H	33.56	-61.67	-27	-34.67
36524.00	H	45.81	-49.42	-27	-22.42

Note: (1) All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3)EIRP[dBm] = E[dBμV/m] + 20 log(d[meters]) - 104.77
d is the measurement distance in 3 meters

Frequency: 5180							
Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin (dB)	
		PK	AV	PK	AV	PK	AV
10354.21	V	52.78	36.55	74	54	21.22	17.45
13062.57	V	51.42	33.29	74	54	22.58	20.71
17877.43	V	52.06	37.84	74	54	21.94	16.16
19914.00	V	31.76	22.53	74	54	42.24	31.47
36502.00	V	46.43	33.45	74	54	27.57	20.55
10362.86	H	53.30	38.62	74	54	20.70	15.38
13586.64	H	50.71	36.38	74	54	23.29	17.62
17890.79	H	51.88	35.29	74	54	22.12	18.71
23896.00	H	35.35	26.46	74	54	38.65	27.54
33180.00	H	36.75	28.03	74	54	37.25	25.97

Frequency: 5200							
Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin (dB)	
		PK	AV	PK	AV	PK	AV
10400.57	V	47.96	33.91	74	54	26.04	20.09
13891.50	V	51.16	34.67	74	54	22.84	19.33
17918.29	V	52.30	34.15	74	54	21.70	19.85
26778.00	V	36.45	24.07	74	54	37.55	29.93
38922.00	V	44.46	30.22	74	54	29.54	23.78
10399.00	H	50.60	34.72	74	54	23.40	19.28
13356.43	H	51.71	36.54	74	54	22.29	17.46
17854.64	H	52.20	35.29	74	54	21.80	18.71
21586.00	H	33.54	25.06	74	54	40.46	28.94
38768.00	H	45.64	35.04	74	54	28.36	18.96

Frequency: 5240							
Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin (dB)	
		PK	AV	PK	AV	PK	AV
10479.14	V	52.77	37.56	74	54	21.23	16.44
15173.79	V	50.96	35.23	74	54	23.04	18.77
17915.14	V	52.07	36.14	74	54	21.93	17.86
19892.00	V	32.34	21.04	74	54	41.66	32.96
36612.00	V	45.59	31.29	74	54	28.41	22.71
10480.71	H	52.65	35.20	74	54	21.35	18.80
13515.14	H	50.65	34.69	74	54	23.35	19.31
17880.57	H	51.69	36.85	74	54	22.31	17.15
23368.00	H	33.56	22.58	74	54	40.44	31.42
36524.00	H	45.81	33.47	74	54	28.19	20.53

- Note:** (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
(2) Emission Level= Reading Level+Correct Factor +Cable Loss.
(3) Correct Factor= Ant_F + Cab_L - Preamp
(4)Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

● ☒ Undesirable radiated Undesirable radiated Spurious Emission in Band Edge

Test mode: 802.11a Frequency(MHz): 5180

Freq. (MHz)	Ant.Pol. H/V	Field Strength (RBW=100KHz) (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Verdict
5146.989	H	60.20	-35.03	-27	Pass
5098.871	V	59.89	-35.34	-27	Pass

Test mode: 802.11a Frequency(MHz): 5240

Freq. (MHz)	Ant.Pol. H/V	Field Strength (RBW=100KHz) (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Verdict
5423.024	H	59.21	-36.02	-27	Pass
5457.941	V	60.09	-35.14	-27	Pass

Note: (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
 (2) Emission Level= Reading Level+Correct Factor +Cable Loss.
 (3) Correct Factor= Ant_F + Cab_L - Preamp
 (4) EIRP[dBm] = E[dBuV/m] + 20 log(d[meters]) - 104.77
 d is the measurement distance in 3 meters

Test mode: 802.11a Frequency(MHz): 5180

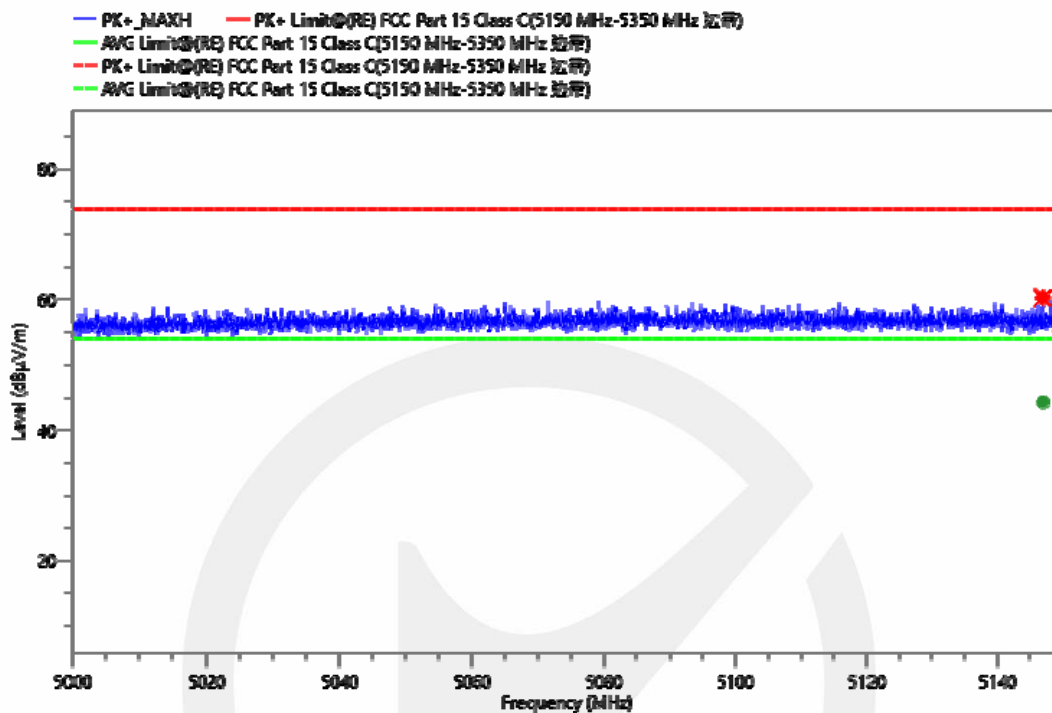
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Margin (dB)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)	Margin (dB)
5146.989	H	60.20	74	13.80	44.36	54	9.64
5098.871	V	59.89	74	14.11	42.56	54	11.44

Test mode: 802.11a Frequency(MHz): 5240

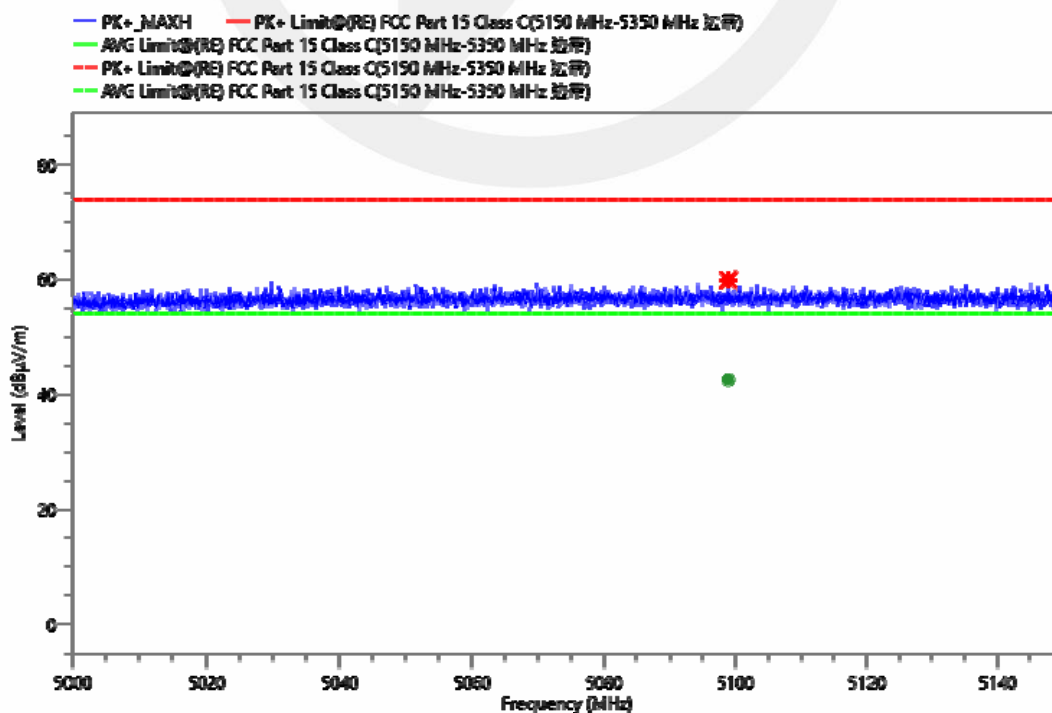
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Margin (dB)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)	Margin (dB)
5423.024	H	59.21	74	14.79	42.18	54	11.82
5457.941	V	60.09	74	13.91	43.26	54	10.74

Note: (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
 (2) Emission Level= Reading Level+Correct Factor +Cable Loss.
 (3) Correct Factor= Ant_F + Cab_L - Preamp
 (4) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

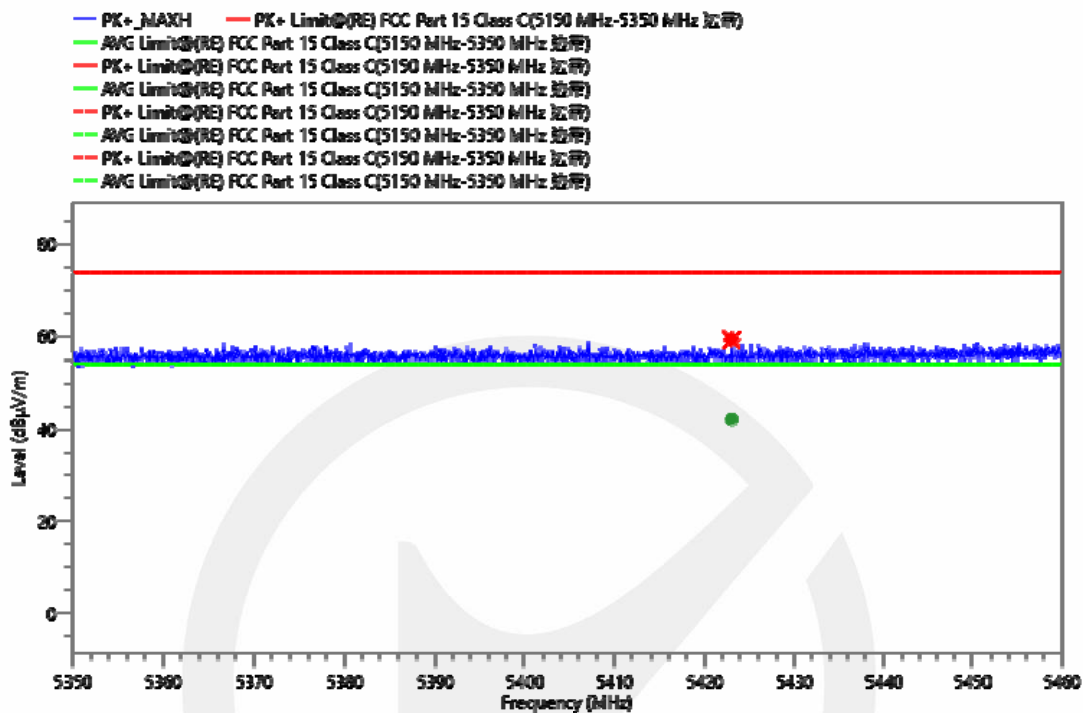
Test Model	U-NII - 1					
	Undesirable radiated Spurious Emission in Restricted Band (5100-5150MHz)					
	☒ 802.11a	☐ 802.11n(HT20)			☐ 802.11n(HT40)	
	☒ 5180	☐ 5200	☐ 5240	Ant.Pol	H	



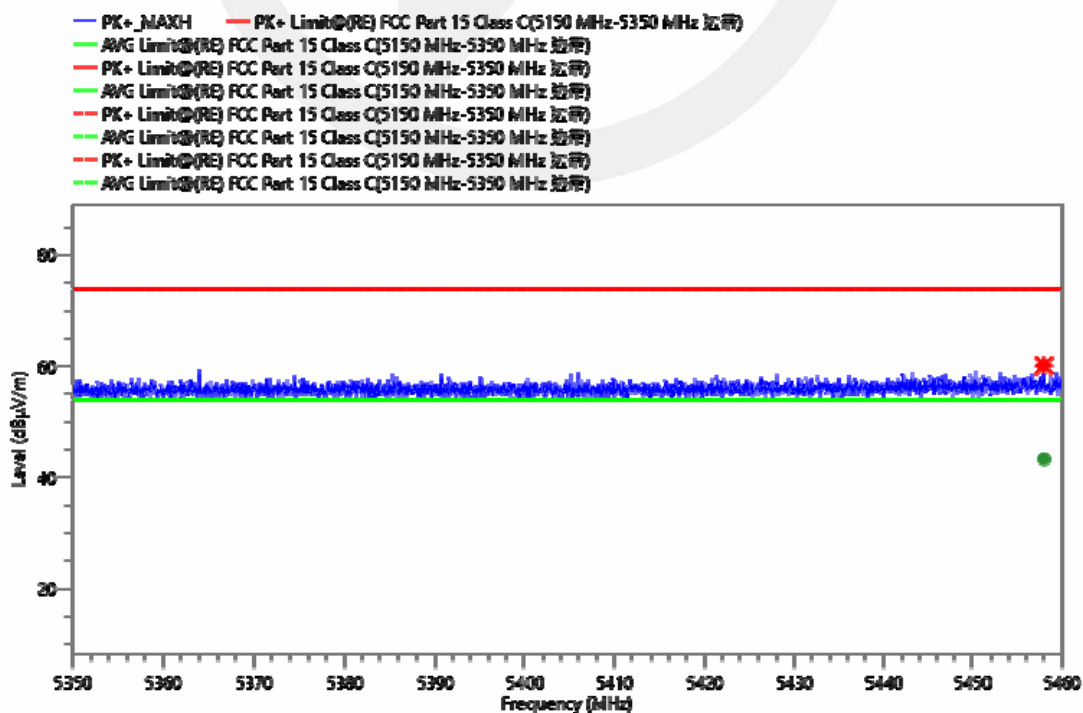
Test Model	U-NII - 1						
	Undesirable radiated Spurious Emission in Restricted Band (5100-5150MHz)						
	☒ 802.11a		☐ 802.11n(HT20)		☐ 802.11n(HT40)		
	☒ 5180	☐ 5200	☐ 5240		Ant.Pol		V



Test Model	U-NII - 1			
	Undesirable radiated Spurious Emission in Restricted Band (5350-5400MHz)			
	☒ 802.11a	☐ 802.11n(HT20)	☐ 802.11n(HT40)	
	☐ 5180	☐ 5200	☒ 5240	Ant.Pol H



Test Model	U-NII - 1			
	Undesirable radiated Spurious Emission in Restricted Band (5350-5400MHz)			
	☒ 802.11a	☐ 802.11n(HT20)	☐ 802.11n(HT40)	
	☐ 5180	☐ 5200	☒ 5240	Ant.Pol V



- ☒ For Undesirable radiated Spurious Emission in U-NII – 3
All the modes 802.11a/n/ac has been tested and the worst result 802.11a recorded as below:
: ☒ Undesirable radiated Spurious Emission Above 1GHz (1GHz to 40GHz)

Test mode:		802.11a		Frequency(MHz):		5745	
Freq. (MHz)	Ant.Pol. H/V	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)		
11494.286	V	51.34	-43.89	-27	-16.89		
14114.643	V	51.35	-43.88	-27	-16.88		
17879.786	V	52.79	-42.44	-27	-15.44		
34500.000	V	40.51	-54.72	-27	-27.72		
36480.000	V	45.53	-49.70	-27	-22.70		
11484.857	H	53.11	-42.12	-27	-15.12		
14143.714	H	50.73	-44.50	-27	-17.50		
17897.071	H	51.41	-43.82	-27	-16.82		
34544.000	H	39.43	-55.80	-27	-28.80		
36568.000	H	45.18	-50.05	-27	-23.05		

Test mode:		802.11a		Frequency(MHz):		5785	
Freq. (MHz)	Ant.Pol. H/V	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)		
11570.500	V	49.42	-45.81	-27	-18.81		
14257.643	V	51.11	-44.12	-27	-17.12		
17915.143	V	52.25	-42.98	-27	-15.98		
35314.000	V	41.34	-53.89	-27	-26.89		
39010.000	V	44.40	-50.83	-27	-23.83		
11571.286	H	53.16	-42.07	-27	-15.07		
15165.143	H	52.97	-42.26	-27	-15.26		
17926.143	H	52.49	-42.74	-27	-15.74		
26448.000	H	36.35	-58.88	-27	-31.88		
36612.000	H	45.13	-50.10	-27	-23.10		

Test mode:		802.11a		Frequency(MHz):		5825	
Freq. (MHz)	Ant.Pol. H/V	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)		
11650.643	V	50.27	-44.96	-27	-17.96		
14120.929	V	50.67	-44.56	-27	-17.56		
17893.143	V	52.46	-42.77	-27	-15.77		
22642.000	V	34.19	-61.04	-27	-34.04		
36612.000	V	45.77	-49.46	-27	-22.46		
11643.571	H	52.05	-43.18	-27	-16.18		
13922.929	H	51.35	-43.88	-27	-16.88		
17945.786	H	52.19	-43.04	-27	-16.04		
36502.000	H	45.62	-49.61	-27	-22.61		
38878.000	H	45.02	-50.21	-27	-23.21		

Note: (1) All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) EIRP[dBm] = E[dBμV/m] + 20 log(d[meters]) - 104.77
d is the measurement distance in 3 meters

Test mode: 802.11a				Frequency(MHz): 5745			
Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin (dB)	
		PK	AV	PK	AV	PK	AV
11494.286	V	51.34	34.62	74	54	22.66	19.38
14114.643	V	51.35	36.93	74	54	22.65	17.07
17879.786	V	52.79	33.74	74	54	21.21	20.26
34500.000	V	40.51	28.53	74	54	33.49	25.47
36480.000	V	45.53	32.15	74	54	28.47	21.85
11484.857	H	53.11	36.59	74	54	20.89	17.41
14143.714	H	50.73	34.32	74	54	23.27	19.68
17897.071	H	51.41	34.78	74	54	22.59	19.22
34544.000	H	39.43	29.85	74	54	34.57	24.15
36568.000	H	45.18	34.05	74	54	28.82	19.95

Test mode: 802.11a				Frequency(MHz): 5785			
Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin (dB)	
		PK	AV	PK	AV	PK	AV
11570.500	V	49.42	33.02	74	54	24.58	20.98
14257.643	V	51.11	36.75	74	54	22.89	17.25
17915.143	V	52.25	35.64	74	54	21.75	18.36
35314.000	V	41.34	28.27	74	54	32.66	25.73
39010.000	V	44.40	32.74	74	54	29.60	21.26
11571.286	H	53.16	34.29	74	54	20.84	19.71
15165.143	H	52.97	36.57	74	54	21.03	17.43
17926.143	H	52.49	35.24	74	54	21.51	18.76
26448.000	H	36.35	24.59	74	54	37.65	29.41
36612.000	H	45.13	32.15	74	54	28.87	21.85

Test mode: 802.11a				Frequency(MHz): 5825			
Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin (dB)	
		PK	AV	PK	AV	PK	AV
11650.643	V	50.27	34.58	74	54	23.73	19.42
14120.929	V	50.67	33.21	74	54	23.33	20.79
17893.143	V	52.46	34.02	74	54	21.54	19.98
22642.000	V	34.19	24.56	74	54	39.81	29.44
36612.000	V	45.77	33.21	74	54	28.23	20.79
11643.571	H	52.05	37.45	74	54	21.95	16.55
13922.929	H	51.35	36.29	74	54	22.65	17.71
17945.786	H	52.19	38.46	74	54	21.81	15.54
36502.000	H	45.62	36.49	74	54	28.38	17.51
38878.000	H	45.02	35.78	74	54	28.98	18.22

- Note:** (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
(2) Emission Level= Reading Level+Correct Factor +Cable Loss.
(3) Correct Factor= Ant_F + Cab_L - Preamp
(4)Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

- ☒ Undesirable radiated Undesirable radiated Spurious Emission in Band Edge

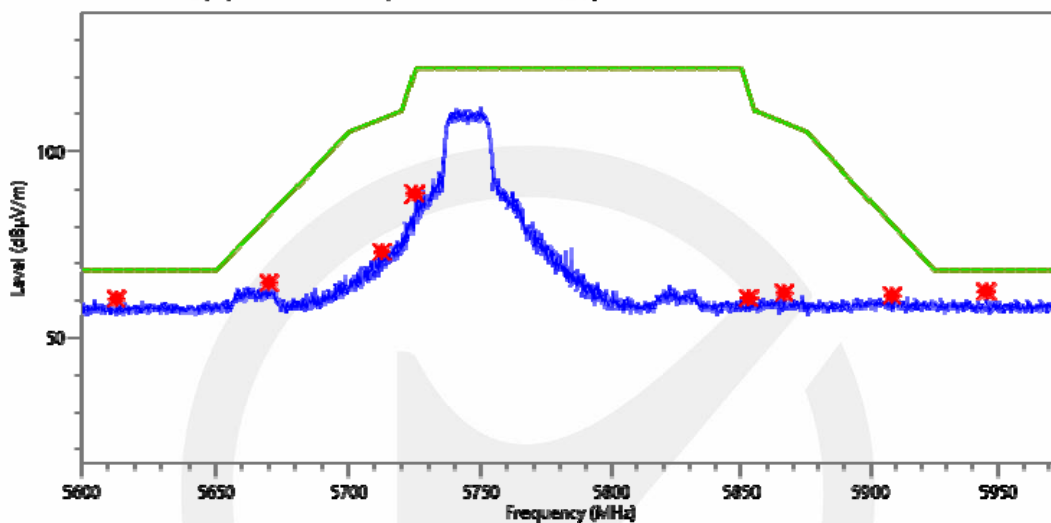
Test mode: 802.11a		Frequency(MHz): 5745			
Freq. (MHz)	Ant.Pol. H/V	Field Strength (RBW=100KHz) (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Verdict
5612.964	H	60.45	-34.78	-27.00	Pass
5670.098	H	64.75	-30.48	-12.10	Pass
5712.527	H	73.11	-22.12	13.50	Pass
5724.875	H	88.78	-6.45	26.71	Pass
5626.063	V	61.33	-33.90	-27.00	Pass
5697.848	V	64.36	-30.87	8.40	Pass
5714.482	V	70.65	-24.58	14.05	Pass
5724.018	V	79.35	-15.88	24.75	Pass

Test mode: 802.11a		Frequency(MHz): 5825			
Freq. (MHz)	Ant.Pol. H/V	Field Strength (RBW=100KHz) (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Verdict
5851.438	H	76.63	-18.60	23.71	Pass
5860.732	H	75.21	-20.02	13.98	Pass
5883.232	H	63.32	-31.91	3.88	Pass
5965.946	H	61.76	-33.47	-27.01	Pass
5850.393	V	73.23	-22.00	26.09	Pass
5859.848	V	67.11	-28.12	14.23	Pass
5903.375	V	62.98	-32.25	-11.05	Pass
5949.875	V	61.58	-33.65	-27.01	Pass

Note: (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
 (2) Emission Level= Reading Level+Correct Factor +Cable Loss.
 (3) Correct Factor= Ant_F + Cab_L - Preamp
 (4) EIRP[dBm] = E[dBuV/m] + 20 log(d[meters]) - 104.77
 d is the measurement distance in 3 meters

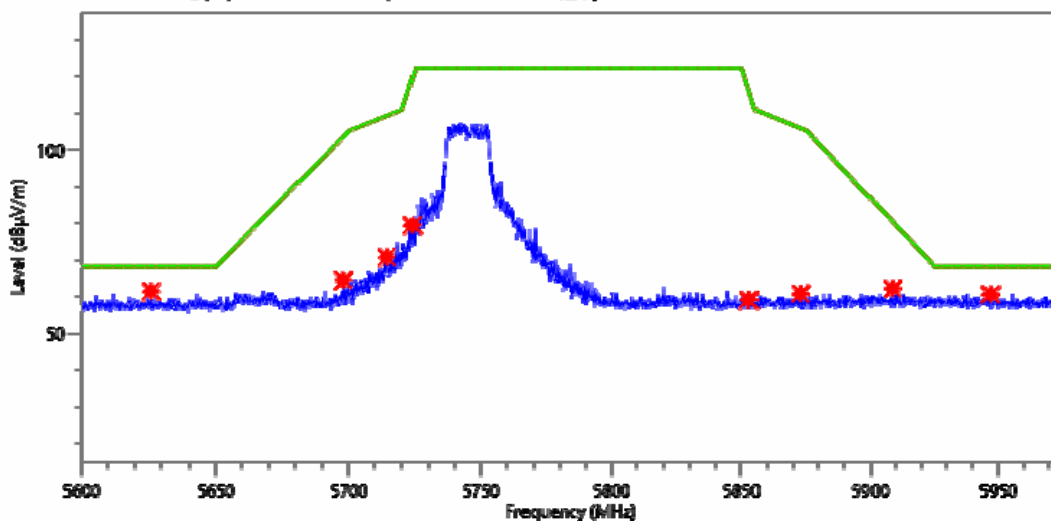
Test Model	U-NII - 3					
	Undesirable radiated Spurious Emission in Restricted Band (5100-5150MHz)					
	☒ 802.11a	☐ 802.11n(HT20)	☐ 802.11n(HT40)	Ant.Pol	H	
	☒ 5745	☐ 5785	☐ 5825			

PK+ _MAXH PK+ Limit(RE) FCC Part 15 Class C(5725 MHz-5850 MHz 频段)
 AVG Limit(RE) FCC Part 15 Class C(5725 MHz-5850 MHz 频段)
 PK+ Limit(RE) FCC Part 15 Class C(5725 MHz-5850 MHz 频段)
 AVG Limit(RE) FCC Part 15 Class C(5725 MHz-5850 MHz 频段)
 PK+ Limit(RE) FCC Part 15 Class C(5725 MHz-5850 MHz 频段)
 AVG Limit(RE) FCC Part 15 Class C(5725 MHz-5850 MHz 频段)
 PK+ Limit(RE) FCC Part 15 Class C(5725 MHz-5850 MHz 频段)
 AVG Limit(RE) FCC Part 15 Class C(5725 MHz-5850 MHz 频段)

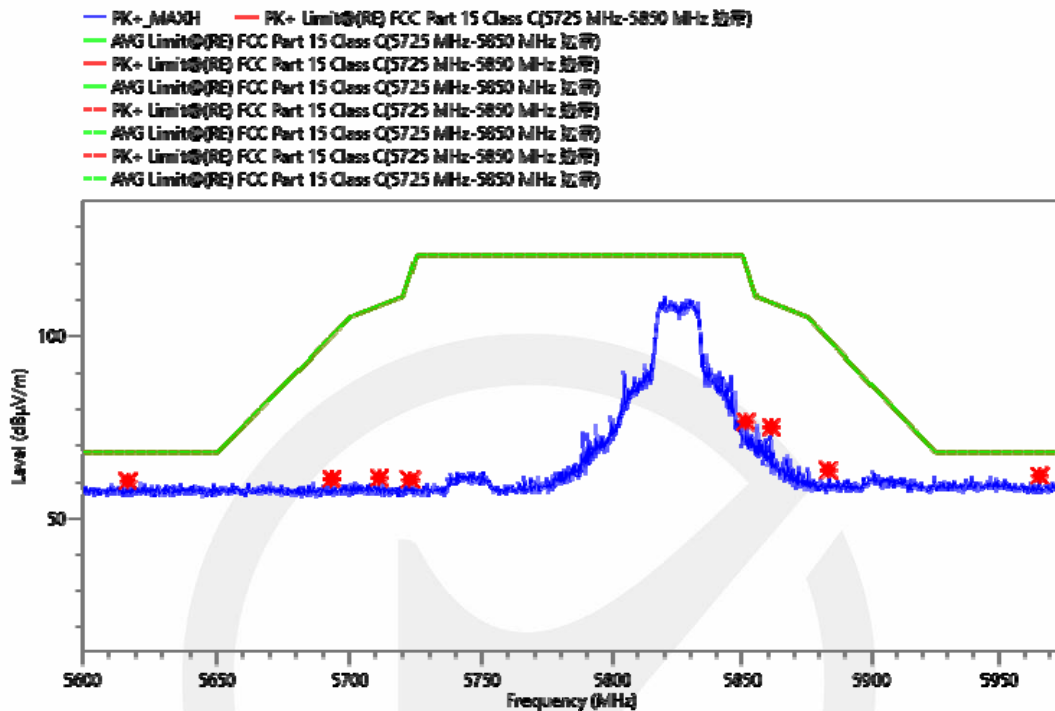


Test Model	U-NII - 3					
	Undesirable radiated Spurious Emission in Restricted Band (5100-5150MHz)					
	☒ 802.11a	☐ 802.11n(HT20)	☐ 802.11n(HT40)	Ant.Pol	V	
	☒ 5745	☐ 5785	☐ 5825			

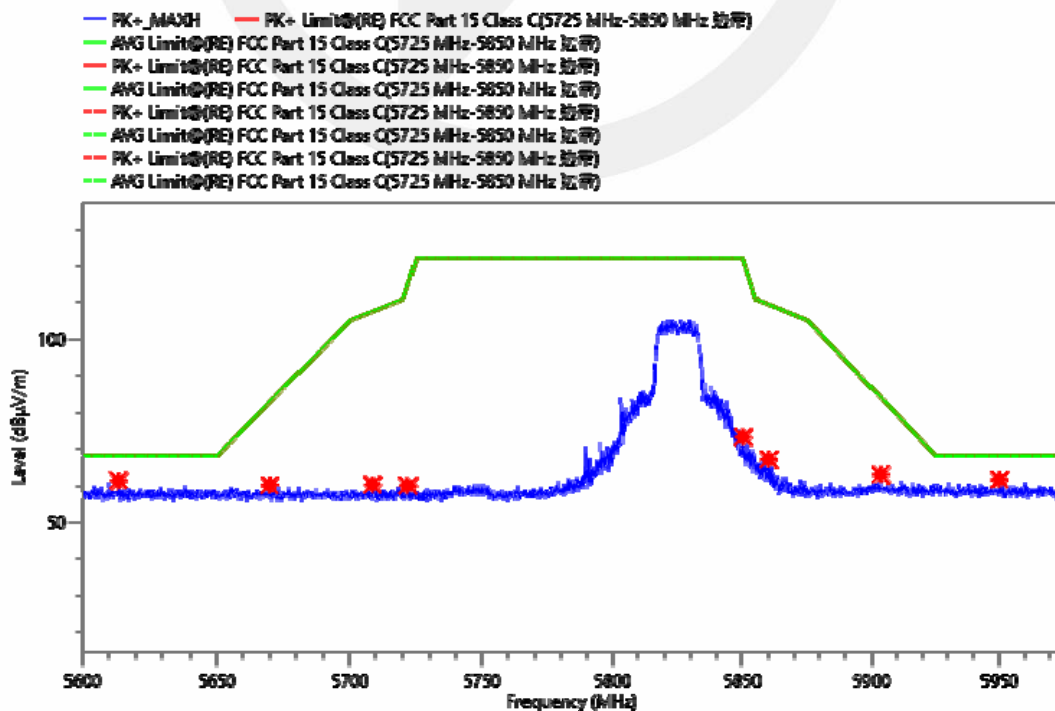
PK+ _MAXH PK+ Limit(RE) FCC Part 15 Class C(5725 MHz-5850 MHz 频段)
 AVG Limit(RE) FCC Part 15 Class C(5725 MHz-5850 MHz 频段)
 PK+ Limit(RE) FCC Part 15 Class C(5725 MHz-5850 MHz 频段)
 AVG Limit(RE) FCC Part 15 Class C(5725 MHz-5850 MHz 频段)
 PK+ Limit(RE) FCC Part 15 Class C(5725 MHz-5850 MHz 频段)
 AVG Limit(RE) FCC Part 15 Class C(5725 MHz-5850 MHz 频段)
 PK+ Limit(RE) FCC Part 15 Class C(5725 MHz-5850 MHz 频段)
 AVG Limit(RE) FCC Part 15 Class C(5725 MHz-5850 MHz 频段)



Test Model	U-NII - 3					
	Undesirable radiated Spurious Emission in Restricted Band (5350-5400MHz)					
	☒ 802.11a	☐ 802.11n(HT20)	☐ 802.11n(HT40)			
	☒ 5745	☐ 5785	☐ 5825	Ant.Pol	H	

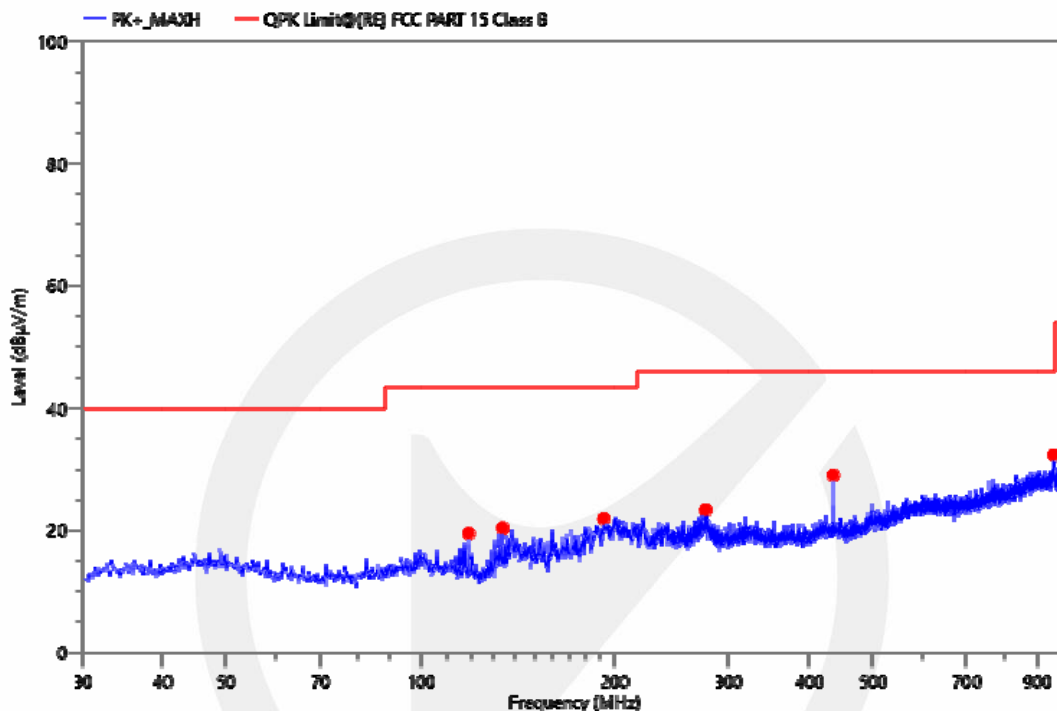


Test Model	U-NII - 3					
	Undesirable radiated Spurious Emission in Restricted Band (5350-5400MHz)					
	☒ 802.11a	☐ 802.11n(HT20)	☐ 802.11n(HT40)			
	☒ 5745	☐ 5785	☐ 5825	Ant.Pol	V	



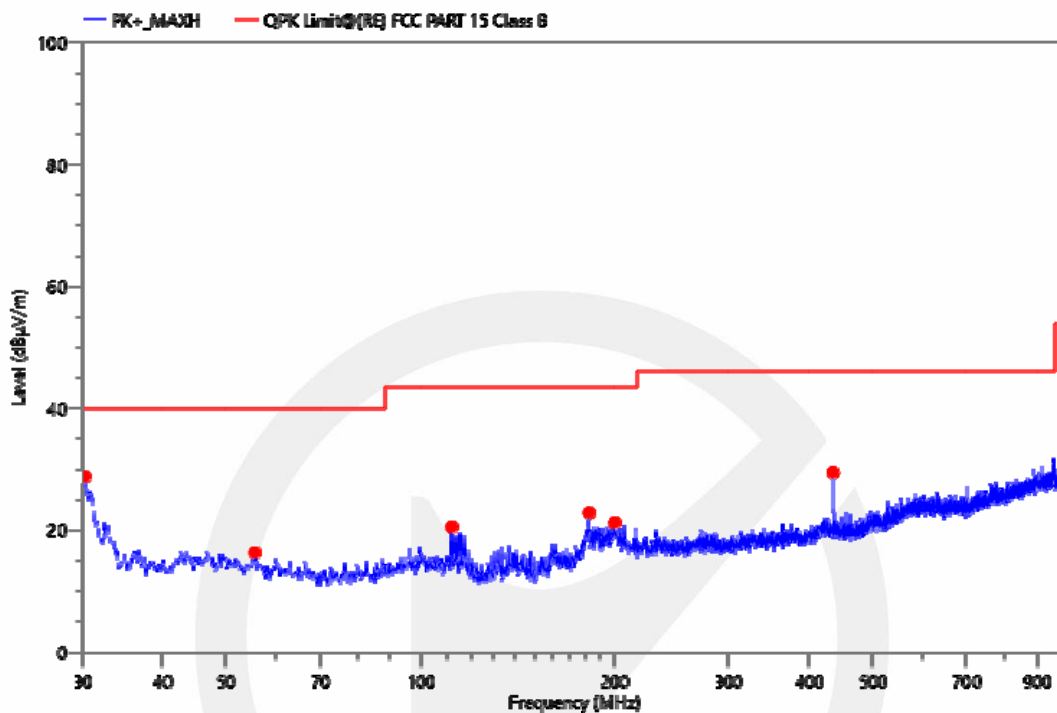
- Undesirable radiated Spurious Emission below 1GHz (30MHz to 1GHz)
All the modes 802.11a/n/ac has been tested and the worst result 802.11a recorded as below:

Project Information			
Mode:	802.11a 2TX 5180 MHz	Voltage:	DC 5V
Environment:	Temp: 18℃; Humi:68%	Engineer:	Victor Chen



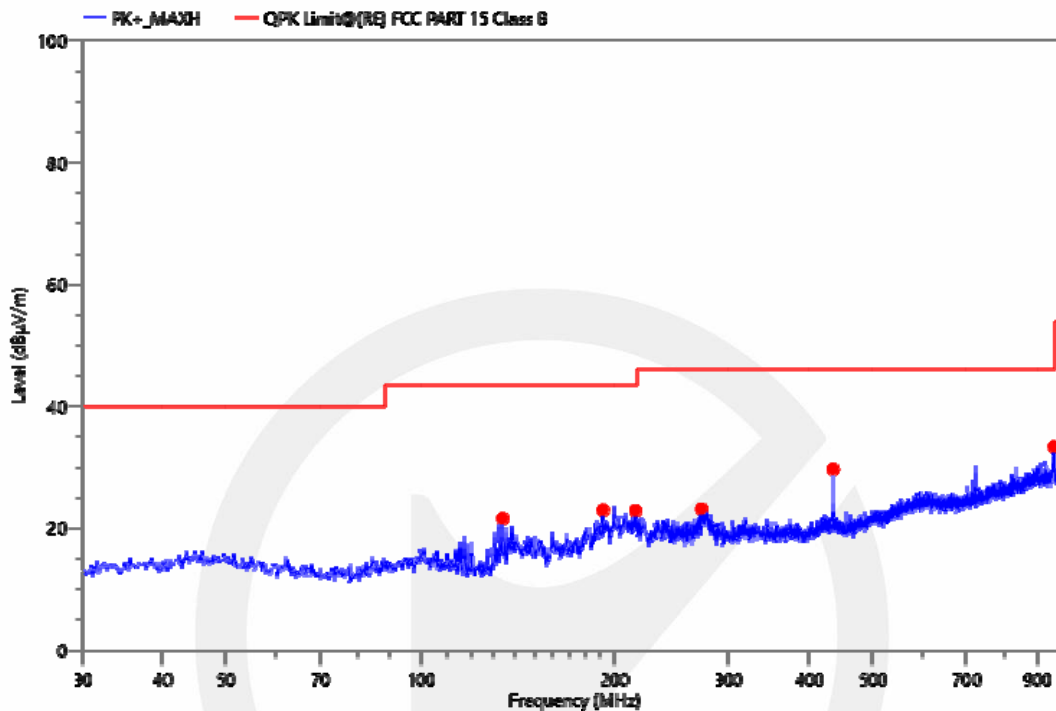
Freq. (MHz)	Reading (dBμV)	Meas. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Verdict
118.755	46.03	-26.52	19.51	43.50	23.99	QPK	100	H	353.3	PASS
134.178	47.76	-27.35	20.41	43.50	23.09	QPK	100	H	332.4	PASS
192.184	47.03	-25.08	21.95	43.50	21.55	QPK	200	H	222.9	PASS
276.089	45.40	-22.02	23.38	46.00	22.62	QPK	100	H	359.7	PASS
435.072	47.63	-18.55	29.08	46.00	16.92	QPK	100	H	355.1	PASS
954.119	43.25	-10.83	32.42	46.00	13.58	QPK	100	H	187.8	PASS

Project Information			
Mode:	802.11a 2TX 5180 MHz	Voltage:	DC 5V
Environment:	Temp: 18°C; Humi:68%	Engineer:	Victor Chen



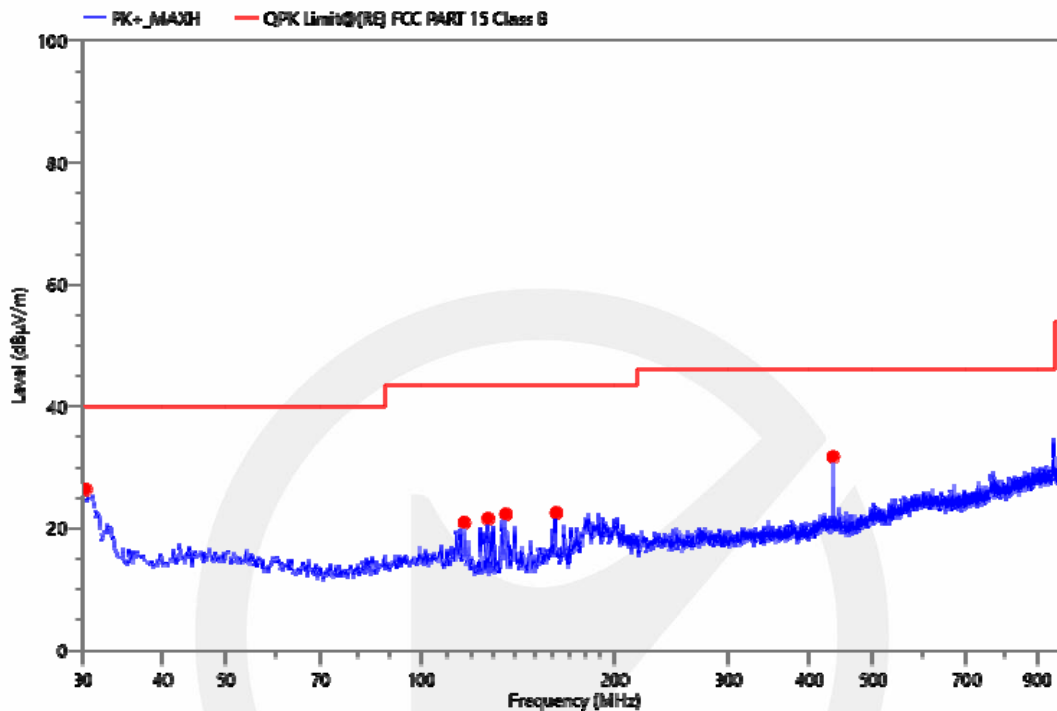
Freq. (MHz)	Reading (dBμV)	Meas. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Verdict
30.194	54.32	-25.53	28.79	40.00	11.21	QPK	100	V	241.4	PASS
55.511	41.18	-24.82	16.36	40.00	23.64	QPK	100	V	252.7	PASS
111.771	46.12	-25.57	20.55	43.50	22.95	QPK	100	V	247.3	PASS
182.387	48.60	-25.73	22.87	43.50	20.63	QPK	100	V	230.7	PASS
200.041	45.45	-24.19	21.26	43.50	22.24	QPK	100	V	212.2	PASS
434.975	48.04	-18.55	29.49	46.00	16.51	QPK	100	V	351.5	PASS

Project Information			
Mode:	802.11a 2TX 5200 MHz	Voltage:	DC 5V
Environment:	Temp: 18°C; Humi:68%	Engineer:	Victor Chen



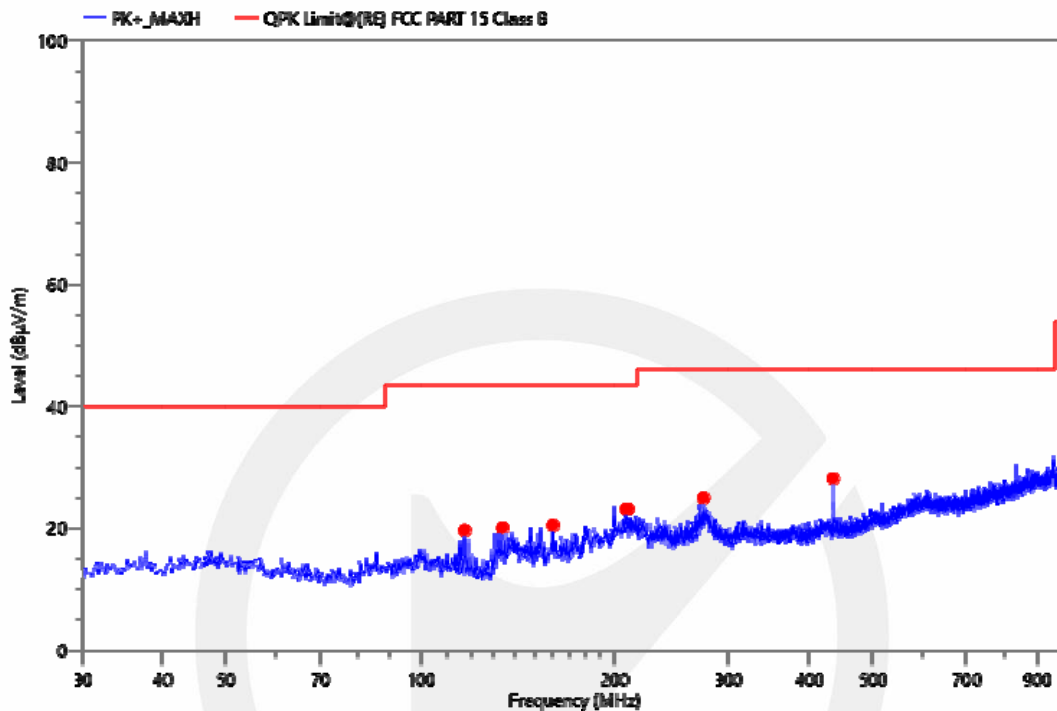
Freq. (MHz)	Reading (dBμV)	Meas. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Verdict
134.178	48.98	-27.35	21.63	43.50	21.87	QPK	100	H	136.4	PASS
191.699	48.14	-25.13	23.01	43.50	20.49	QPK	200	H	213.8	PASS
214.397	46.74	-23.82	22.92	43.50	20.58	QPK	100	H	146.6	PASS
272.112	45.25	-22.06	23.19	46.00	22.81	QPK	100	H	66.2	PASS
435.072	48.26	-18.55	29.71	46.00	16.29	QPK	100	H	326.9	PASS
955.380	44.24	-10.84	33.40	46.00	12.60	QPK	100	H	114.4	PASS

Project Information			
Mode:	802.11a 2TX 5200 MHz	Voltage:	DC 5V
Environment:	Temp: 18°C; Humi:68%	Engineer:	Victor Chen



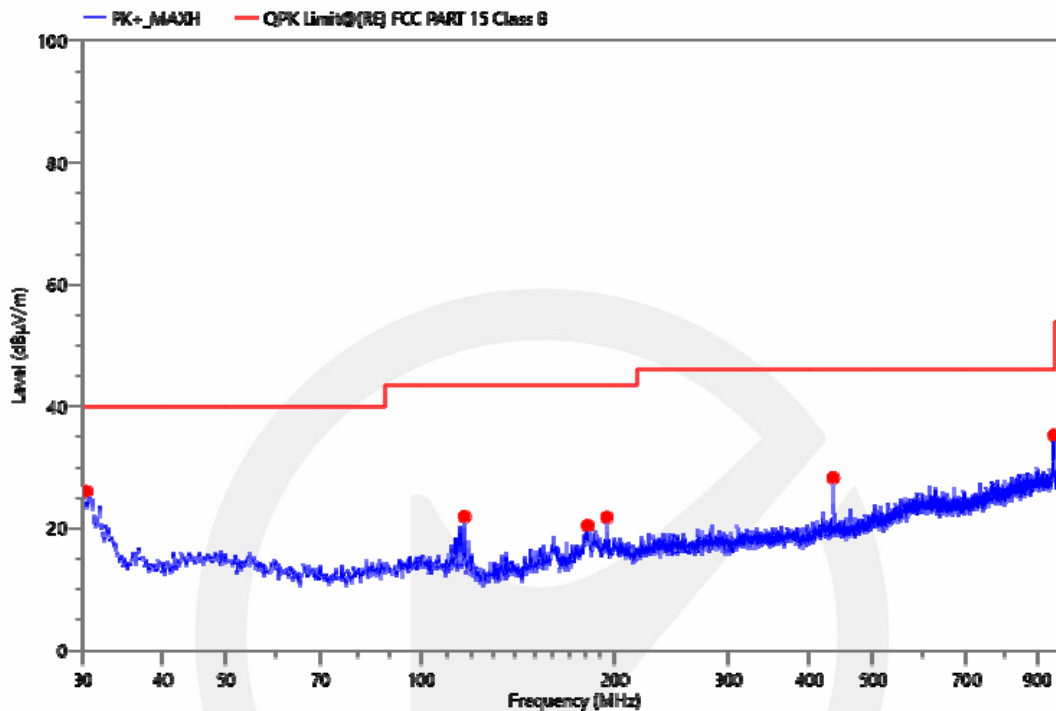
Freq. (MHz)	Reading (dBμV)	Meas. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Verdict
30.291	51.91	-25.51	26.40	40.00	13.60	QPK	100	V	131.8	PASS
116.815	47.22	-26.26	20.96	43.50	22.54	QPK	100	V	231.2	PASS
127.291	48.75	-27.13	21.62	43.50	21.88	QPK	100	V	272.9	PASS
135.730	49.70	-27.37	22.33	43.50	21.17	QPK	100	V	189.0	PASS
161.920	48.93	-26.36	22.57	43.50	20.93	QPK	100	V	231.2	PASS
434.975	50.29	-18.55	31.74	46.00	14.26	QPK	100	V	156.2	PASS

Project Information			
Mode:	802.11a 2TX 5240 MHz	Voltage:	DC 5V
Environment:	Temp: 18°C; Humi:68%	Engineer:	Victor Chen



Freq. (MHz)	Reading (dBμV)	Meas. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Verdict
117.009	45.98	-26.28	19.70	43.50	23.80	QPK	100	H	4.6	PASS
134.178	47.43	-27.35	20.08	43.50	23.42	QPK	100	H	168.9	PASS
159.980	46.90	-26.39	20.51	43.50	22.99	QPK	100	H	0.2	PASS
208.480	47.19	-24.01	23.18	43.50	20.32	QPK	200	H	158.2	PASS
274.052	47.03	-22.03	25.00	46.00	21.00	QPK	100	H	70.7	PASS
434.975	46.72	-18.55	28.17	46.00	17.83	QPK	200	H	0	PASS

Project Information			
Mode:	802.11a 2TX 5240 MHz	Voltage:	DC 5V
Environment:	Temp: 18°C; Humi:68%	Engineer:	Victor Chen



Freq. (MHz)	Reading (dBμV)	Meas. (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Det.	Height (cm)	Pol.	Azimuth (deg)	Corr. (dB)	Verdict
30.388	51.54	-25.48	26.06	40.00	13.94	QPK	100	V	0.0	PASS
116.912	48.21	-26.27	21.94	43.50	21.56	QPK	100	V	105.1	PASS
181.320	46.25	-25.79	20.46	43.50	23.04	QPK	100	V	12.3	PASS
194.318	46.65	-24.84	21.81	43.50	21.69	QPK	100	V	115.9	PASS
434.975	46.86	-18.55	28.31	46.00	17.69	QPK	100	V	36.7	PASS
955.380	46.13	-10.84	35.29	46.00	10.71	QPK	100	V	65.9	PASS

8.6 POWER LINE CONDUCTED EMISSIONS

8.6.1 Applicable Standard

According to FCC Part 15.207(a)

8.6.2 Conformance Limit

Frequency(MHz)	Conducted Emission Limit	
	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

8.6.3 Test Configuration

Test according to clause 6.3 conducted emission test setup

8.6.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Repeat above procedures until all frequency measured were complete.

8.6.5 Test Results

N/A

This product is powered by DC 5V

8.7 ANTENNA APPLICATION

8.7.1 Antenna Requirement

Standard	Requirement
FCC CRF Part 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 replaced 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 §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 §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.

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

8.7.2 Result

PASS.

- The EUT has 1 antennas: one a PCB antenna for WIFI 5G, the gain is -0.69 dBi,
- Note:
- ☒ Antennas use a permanently attached antenna which is not replaceable.
 - ☐ Not using a standard antenna jack or electrical connector for antenna replacement
 - ☐ The antenna has to be professionally installed (please provide method of installation)

Which in accordance to section 15.203, please refer to the internal photos.

声 明 Statement

1. 本报告无授权批准人签字及“检验检测专用章”无效；

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2. 未经许可本报告不得部分复制；

This report shall not be copied partly without authorization.

3. 本报告的检测结果仅对送测样品有效，委托方对样品的代表性和资料的真实性负责；

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4. 本检测报告中检测项目标注有特殊符号则该项目不在资质认定范围内，仅作为客户委托、科研、教学或内部质量控制等目的使用；

The observations or tests with special mark fall outside the scope of accreditation, and are only used for purpose of commission, research, training, internal quality control etc.

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Objections shall be raised within 20 days from the date receiving the report.