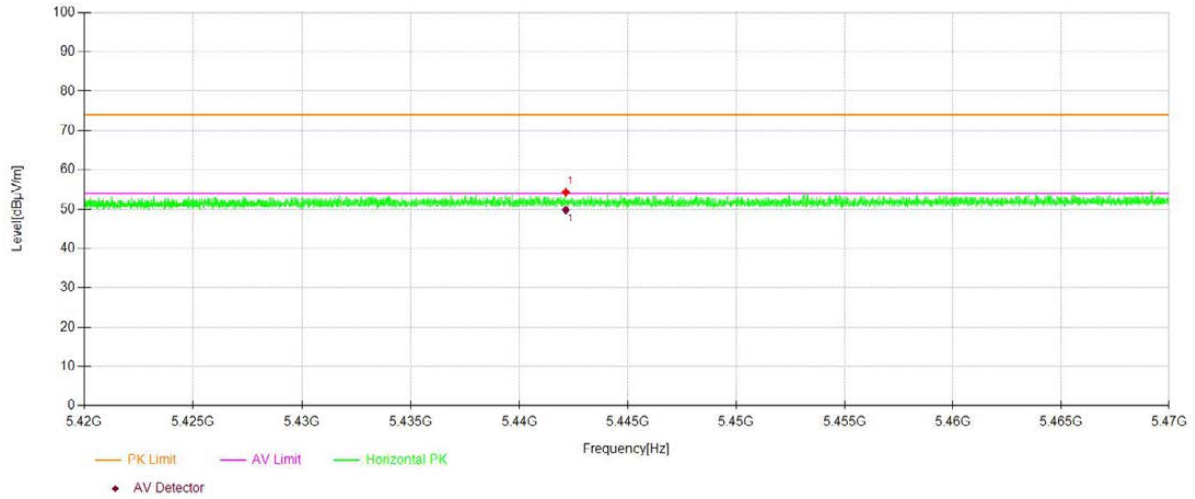


**U-NII -2C**

**Test Model**    Undesirable radiated Spurious Emission in Restricted Band (5100-5150MHz)

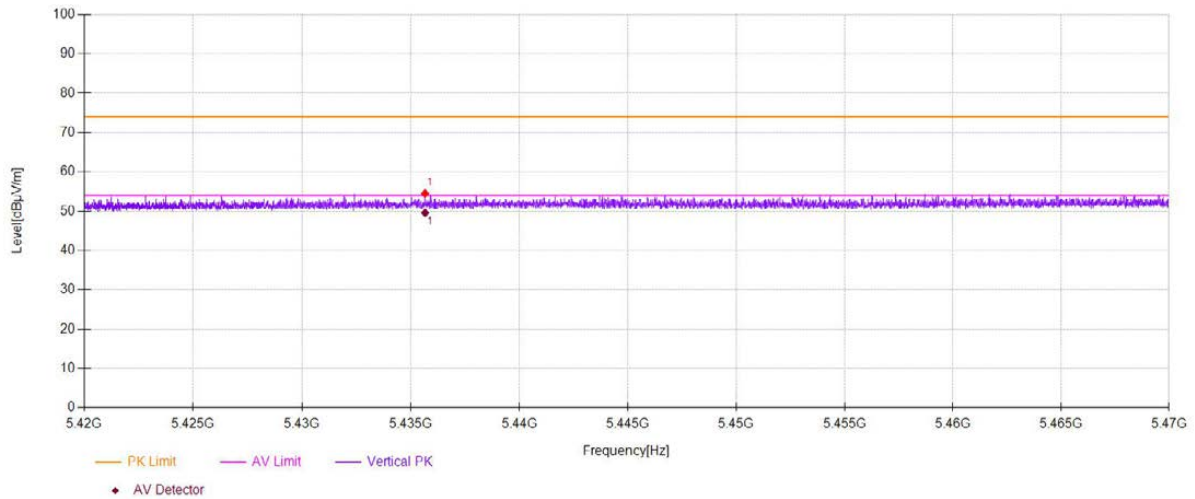
<input type="checkbox"/> 802.11a	<input checked="" type="checkbox"/> 802.11n(HT20)	<input type="checkbox"/> 802.11 ac (VHT20)
<input checked="" type="checkbox"/> 5500	<input type="checkbox"/> 5580	<input type="checkbox"/> 5700
		Ant.Pol    H



**U-NII -2C**

**Test Model**    Undesirable radiated Spurious Emission in Restricted Band (5100-5150MHz)

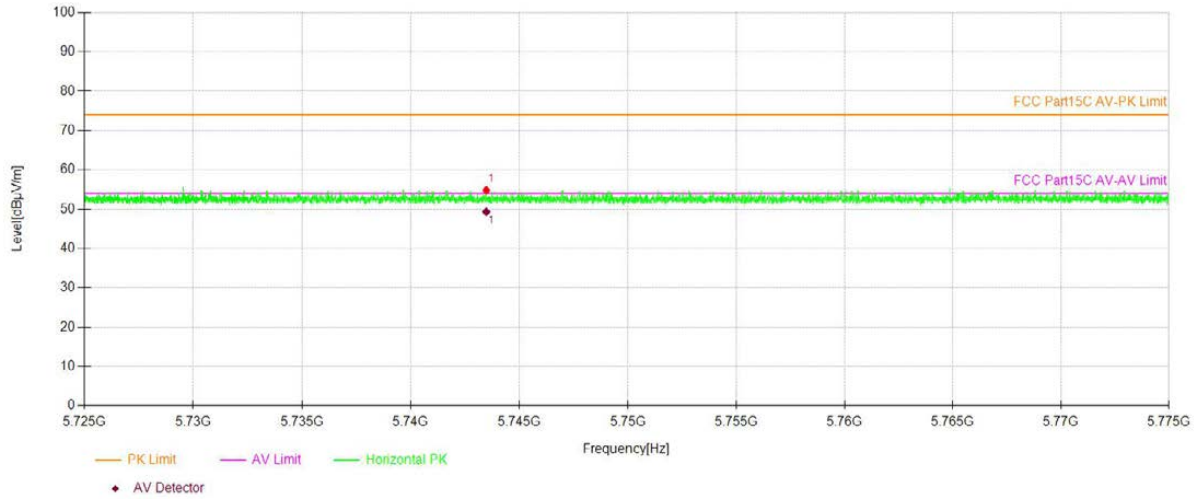
<input type="checkbox"/> 802.11a	<input checked="" type="checkbox"/> 802.11n(HT20)	<input type="checkbox"/> 802.11 ac (VHT20)
<input checked="" type="checkbox"/> 5500	<input type="checkbox"/> 5580	<input type="checkbox"/> 5700
		Ant.Pol    V



**U-NII -2C**

**Test Model**    Undesirable radiated Spurious Emission in Restricted Band (5350-5400MHz )

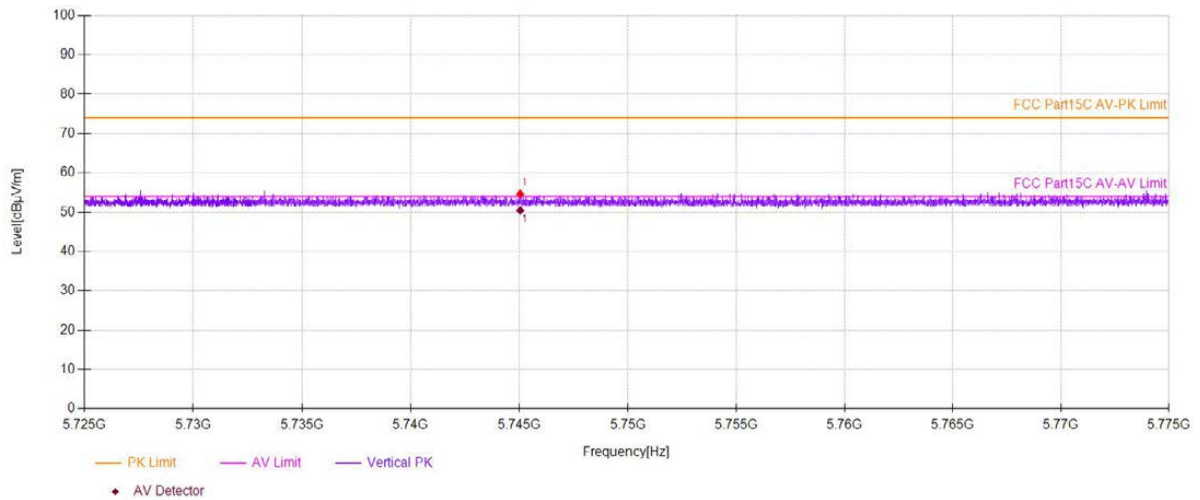
<input type="checkbox"/> 802.11a	<input checked="" type="checkbox"/> 802.11n(HT20)	<input type="checkbox"/> 802.11 ac (VHT20)
<input type="checkbox"/> 5500	<input type="checkbox"/> 5580	<input checked="" type="checkbox"/> 5700
		Ant.Pol            H



**U-NII -2C**

**Test Model**    Undesirable radiated Spurious Emission in Restricted Band (5350-5400MHz )

<input type="checkbox"/> 802.11a	<input checked="" type="checkbox"/> 802.11n(HT20)	<input type="checkbox"/> 802.11 ac (VHT20)
<input type="checkbox"/> 5500	<input type="checkbox"/> 5580	<input checked="" type="checkbox"/> 5700
		Ant.Pol            V



- For Undesirable radiated Spurious Emission in U-NII -3
  - Undesirable radiated Spurious Emission Above 1GHz (1GHz to 40GHz)
- All of the configurations or modes are tested, the data of the worst case is recorded in the report.  
Highest gain of each antenna and highest output power is ANT1 and MIMO as below:

**ANT1:**

Test mode: 802.11n(20) Frequency(MHz): 5745

Freq. (MHz)	Ant.Pol. H/V	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)
10669.33	V	59.86	-35.37	-27	8.37
15159.58	V	62.01	-33.22	-27	6.22
17506.75	V	65.79	-29.44	-27	2.44
11579.29	H	59.92	-35.31	-27	8.31
14564.28	H	61.53	-33.70	-27	6.70
17489.74	H	66.23	-29.00	-27	2.00

Test mode: 802.11n(20) Frequency(MHz): 5785

Freq. (MHz)	Ant.Pol. H/V	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)
12514.76	V	58.96	-36.27	-27	9.27
15108.55	V	61.9	-33.33	-27	6.33
17498.25	V	64.89	-30.34	-27	3.34
11502.75	H	59.66	-35.57	-27	8.57
14555.78	H	62.26	-32.97	-27	5.97
17489.74	H	65.53	-29.70	-27	2.70

Test mode: 802.11n(20) Frequency(MHz): 5825

Freq. (MHz)	Ant.Pol. H/V	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)
11298.65	V	59.6	-35.63	-27	8.63
14572.79	V	61.06	-34.17	-27	7.17
17489.74	V	65.4	-29.83	-27	2.83
13739.37	H	60.79	-34.44	-27	7.44
16851.93	H	62.29	-32.94	-27	5.94
17498.25	H	66.5	-28.73	-27	1.73

MIMO:

Test mode: 802.11n(20) Frequency(MHz): 5745

Freq. (MHz)	Ant.Pol. H/V	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)
10667.94	V	59.73	-35.50	-27	8.50
15158.19	V	61.85	-33.38	-27	6.38
17508.03	V	65.76	-29.47	-27	2.47
11590.98	H	59.84	-35.39	-27	8.39
14575.97	H	61.32	-33.91	-27	6.91
17501.43	H	66.07	-29.16	-27	2.16

Test mode: 802.11n(20) Frequency(MHz): 5785

Freq. (MHz)	Ant.Pol. H/V	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)
12513.37	V	58.83	-36.40	-27	9.40
15107.16	V	61.74	-33.49	-27	6.49
17499.53	V	64.86	-30.37	-27	3.37
11514.44	H	59.58	-35.65	-27	8.65
14567.47	H	62.05	-33.18	-27	6.18
17501.43	H	65.37	-29.86	-27	2.86

Test mode: 802.11n(20) Frequency(MHz): 5825

Freq. (MHz)	Ant.Pol. H/V	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)
11297.26	V	59.47	-35.76	-27	8.76
14571.40	V	60.9	-34.33	-27	7.33
17491.02	V	65.37	-29.86	-27	2.86
13751.06	H	60.71	-34.52	-27	7.52
16863.62	H	62.08	-33.15	-27	6.15
17509.94	H	66.34	-28.89	-27	1.89

- 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

ANT1:

Test mode:		802.11n(20)		Frequency(MHz): 5745	
Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
10669.3347	V	59.86	74.00	14.14	peak
15159.5798	V	62.01	74.00	11.99	peak
17506.7534	V	65.79	74.00	8.21	peak
10669.3347	V	46.85	54.00	7.15	AVG
15159.5798	V	43.83	54.00	10.17	AVG
17506.7534	V	44.47	54.00	9.53	AVG
11579.2896	H	59.92	74.00	14.08	peak
14564.2821	H	61.53	74.00	12.47	peak
17489.7449	H	66.23	74.00	7.77	peak
11579.2896	H	46.06	54.00	7.94	AVG
14564.2821	H	45.59	54.00	8.41	AVG
17489.7449	H	44.85	54.00	9.15	AVG

Test mode:		802.11n(20)		Frequency(MHz): 5785	
Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
12514.7574	V	58.96	74.00	15.04	peak
15108.5543	V	61.90	74.00	12.10	peak
17498.2491	V	64.89	74.00	9.11	peak
12514.7574	V	48.88	54.00	5.12	AVG
15108.5543	V	43.44	54.00	10.56	AVG
17498.2491	V	44.90	54.00	9.10	AVG
11502.7514	H	59.66	74.00	14.34	peak
14555.7779	H	62.26	74.00	11.74	peak
17489.7449	H	65.53	74.00	8.47	peak
11502.7514	H	46.33	54.00	7.67	AVG
14555.7779	H	45.10	54.00	8.90	AVG
17489.7449	H	44.54	54.00	9.46	AVG

Test mode:		802.11n(20)		Frequency(MHz): 5825	
Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
11298.6493	V	59.60	74.00	14.40	peak
14572.7864	V	61.06	74.00	12.94	peak
17489.7449	V	65.40	74.00	8.60	peak
11298.6493	V	46.40	54.00	7.60	AVG
14572.7864	V	45.45	54.00	8.55	AVG
17489.7449	V	44.62	54.00	9.38	AVG
13739.3697	H	60.79	74.00	13.21	peak
16851.926	H	62.29	74.00	11.71	peak
17498.2491	H	66.50	74.00	7.50	peak
13739.3697	H	47.73	54.00	6.27	AVG
16851.926	H	45.16	54.00	8.84	AVG
17498.2491	H	44.76	54.00	9.24	AVG

MIMO:

Test mode: 802.11n(20)		Frequency(MHz): 5745			
Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
10667.945	V	59.73	74.00	14.27	peak
15158.190	V	61.85	74.00	12.15	peak
17508.033	V	65.76	74.00	8.24	peak
10670.615	V	46.83	54.00	7.17	AVG
15157.330	V	43.57	54.00	10.43	AVG
17504.503	V	44.28	54.00	9.72	AVG
11590.980	H	59.84	74.00	14.16	peak
14575.972	H	61.32	74.00	12.68	peak
17501.435	H	66.07	74.00	7.93	peak
11590.980	H	45.92	54.00	8.08	AVG
14560.972	H	45.41	54.00	8.59	AVG
17486.435	H	44.72	54.00	9.28	AVG

Test mode: 802.11n(20)		Frequency(MHz): 5785			
Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
12513.367	V	58.83	74.00	15.17	peak
15107.164	V	61.74	74.00	12.26	peak
17499.529	V	64.86	74.00	9.14	peak
12516.037	V	48.86	54.00	5.14	AVG
15106.304	V	43.18	54.00	10.82	AVG
17495.999	V	44.71	54.00	9.29	AVG
11514.441	H	59.58	74.00	14.42	peak
14567.468	H	62.05	74.00	11.95	peak
17501.435	H	65.37	74.00	8.63	peak
11514.441	H	46.19	54.00	7.81	AVG
14552.468	H	44.92	54.00	9.08	AVG
17486.435	H	44.41	54.00	9.59	AVG

Test mode: 802.11n(20)		Frequency(MHz): 5825			
Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
11297.259	V	59.47	74.00	14.53	peak
14571.396	V	60.9	74.00	13.1	peak
17491.025	V	65.37	74.00	8.63	peak
11299.929	V	46.38	54.00	7.62	AVG
14570.536	V	45.19	54.00	8.81	AVG
17487.495	V	44.43	54.00	9.57	AVG
13751.060	H	60.71	74.00	13.29	peak
16863.616	H	62.08	74.00	11.92	peak
17509.939	H	66.34	74.00	7.66	peak
13751.060	H	47.59	54.00	6.41	AVG
16848.616	H	44.98	54.00	9.02	AVG
17494.939	H	44.63	54.00	9.37	AVG

- 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) 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 Spurious Emission in band edge

Test mode: 802.11n(20) Frequency: 5745

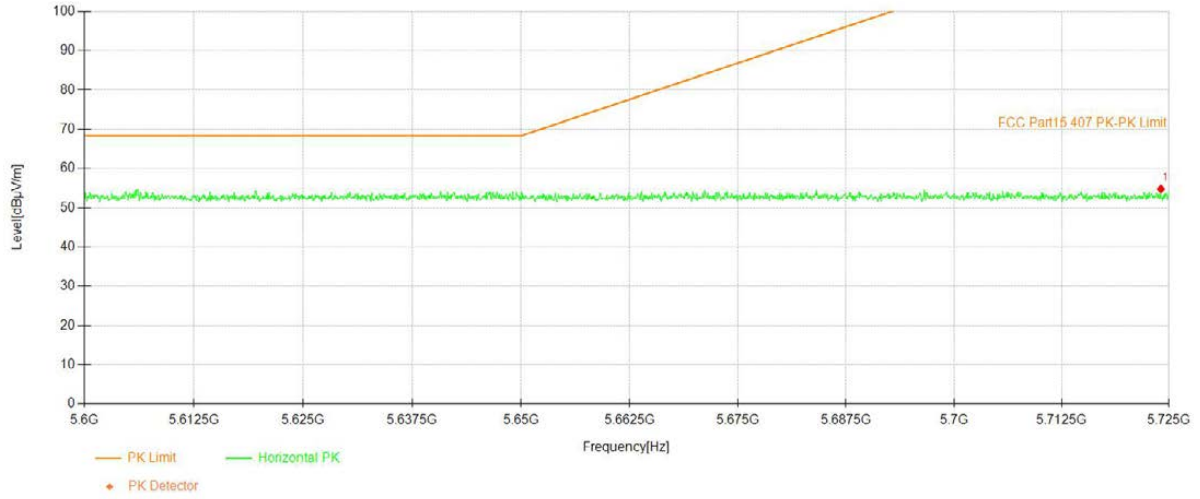
Freq. (MHz)	Ant.Pol. H/V	Field Strength (RBW=100KHz) (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Verdict
5724.06	H	54.78	-40.45	-27.00	PASS
5719.05	V	55.25	-39.98	-27.00	PASS

Test mode: 802.11n(20) Frequency: 5825

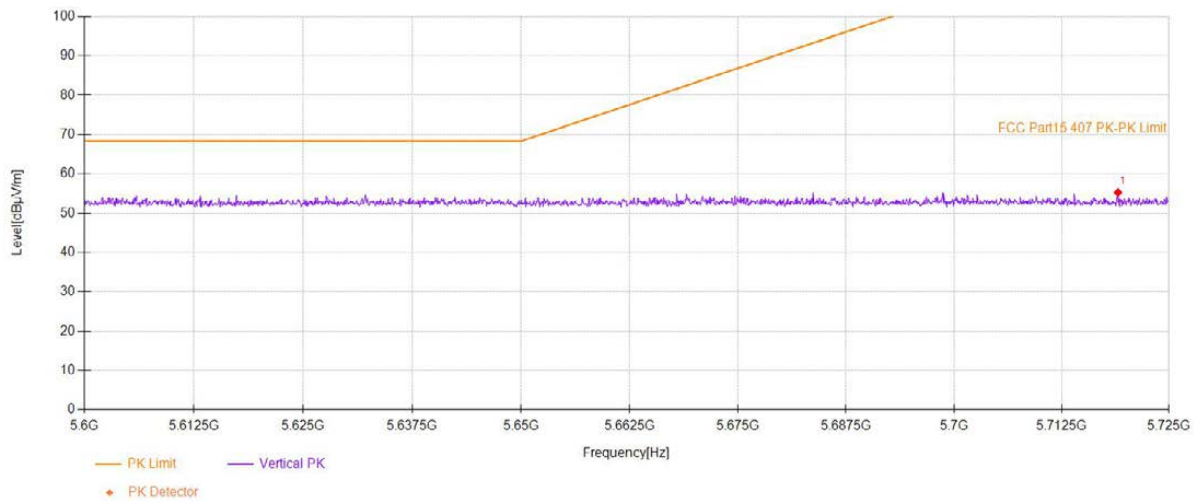
Freq. (MHz)	Ant.Pol. H/V	Field Strength (RBW=100KHz) (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Verdict
5864.44	H	54.93	-40.30	-27.00	PASS
5851.50	V	54.45	-40.78	-27.00	PASS

- 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

U-NII -3  
 Test Model Undesirable radiated  802.11a Undesirable radiated  5745 Spurious Emission in Band Edge  802.11n(HT40)  802.11n(HT20) Ant.Pol H

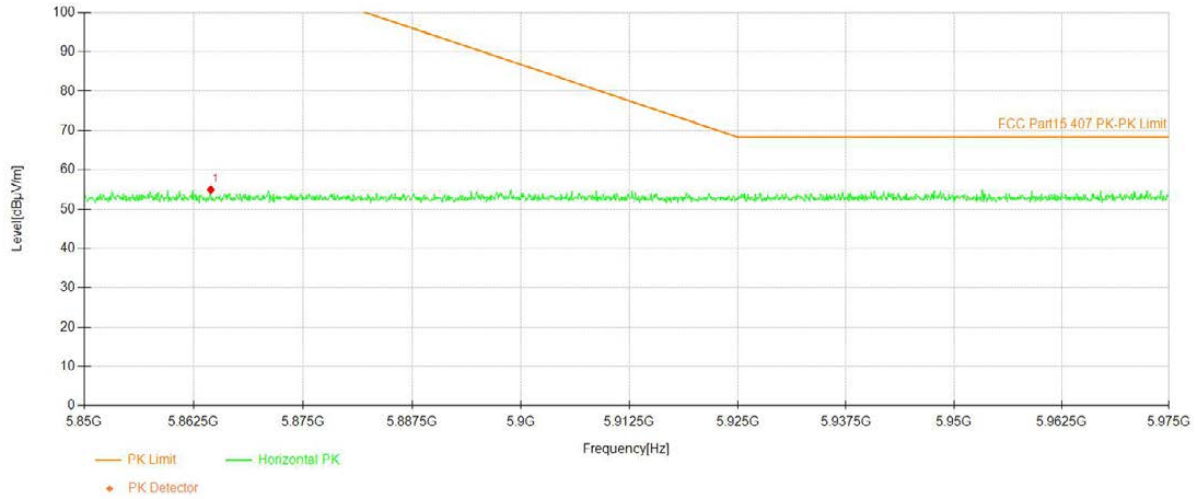


U-NII -3  
 Test Model Undesirable radiated  802.11a Undesirable radiated  5745 Spurious Emission in Band Edge  802.11n(HT40)  802.11n(HT20) Ant.Pol V

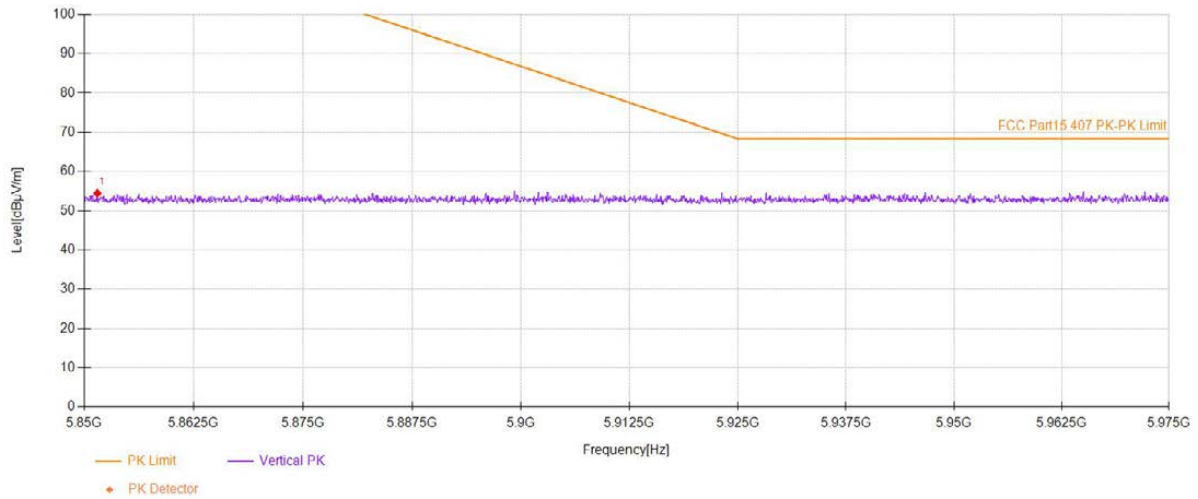




U-NII -3  
Test Model Undesirable radiated Undesirable radiated Spurious Emission in Band Edge  
 802.11a  802.11n(HT20)  802.11n(HT40)  
 5825 Ant.Pol H

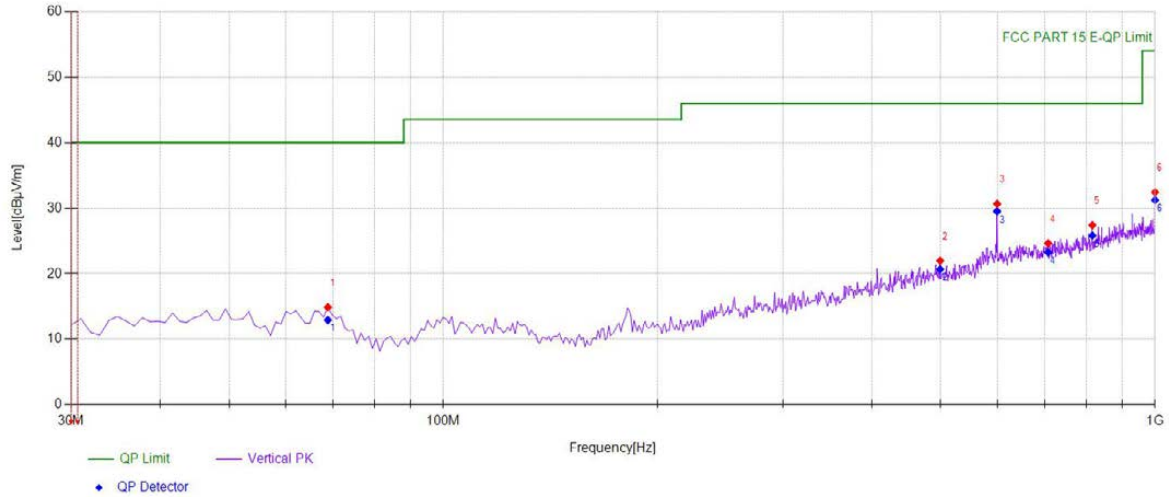


U-NII -3  
Test Model Undesirable radiated Undesirable radiated Spurious Emission in Band Edge  
 802.11a  802.11n(HT20)  802.11n(HT40)  
 5825 Ant.Pol V

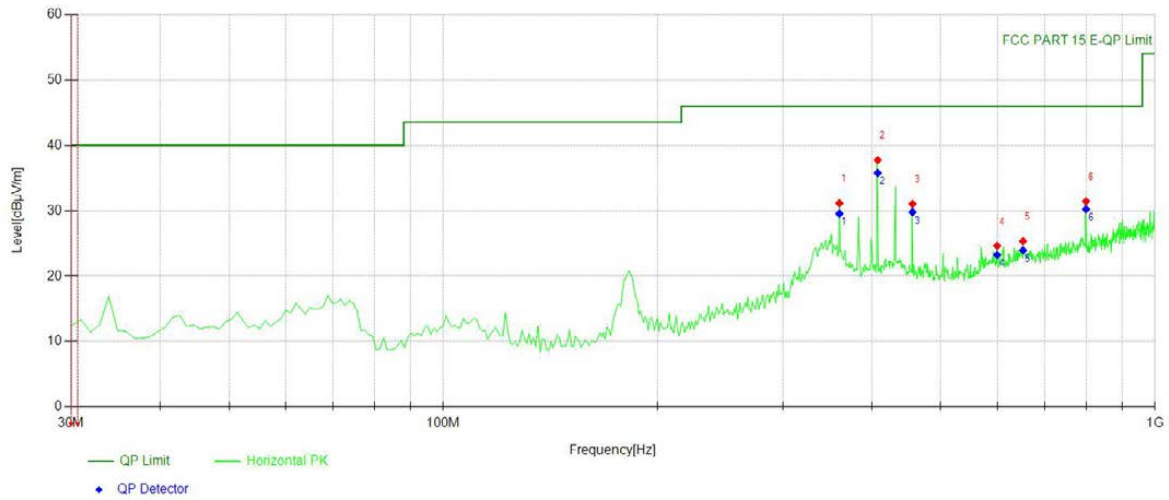


- Undesirable radiated Spurious Emission below 1GHz (30MHz to 1GHz)  
All of the configurations or modes are tested, the data of the worst case is recorded in the report.

Test mode: 802.11n(20) Frequency(MHz): 5180

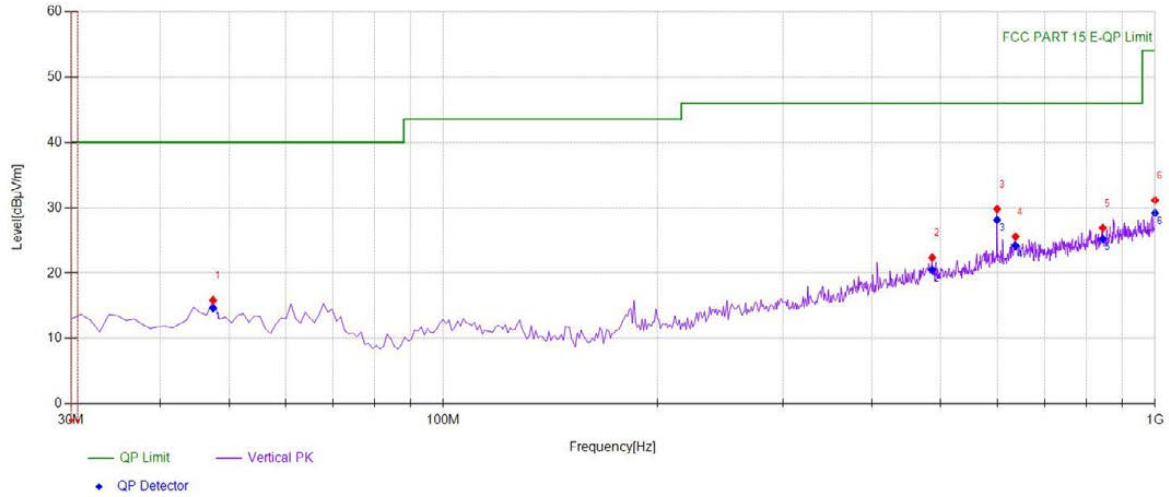


Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity
1	68.8388	34.70	-19.80	14.90	PK	40.00	25.10	Vertical
2	498.979	31.75	-9.76	21.99	PK	46.00	24.01	Vertical
3	599.96	37.78	-7.14	30.64	PK	46.00	15.36	Vertical
4	707.737	30.50	-5.86	24.64	PK	46.00	21.36	Vertical
5	816.486	31.71	-4.31	27.40	PK	46.00	18.60	Vertical
6	1000	34.16	-1.72	32.44	PK	54.00	21.56	Vertical

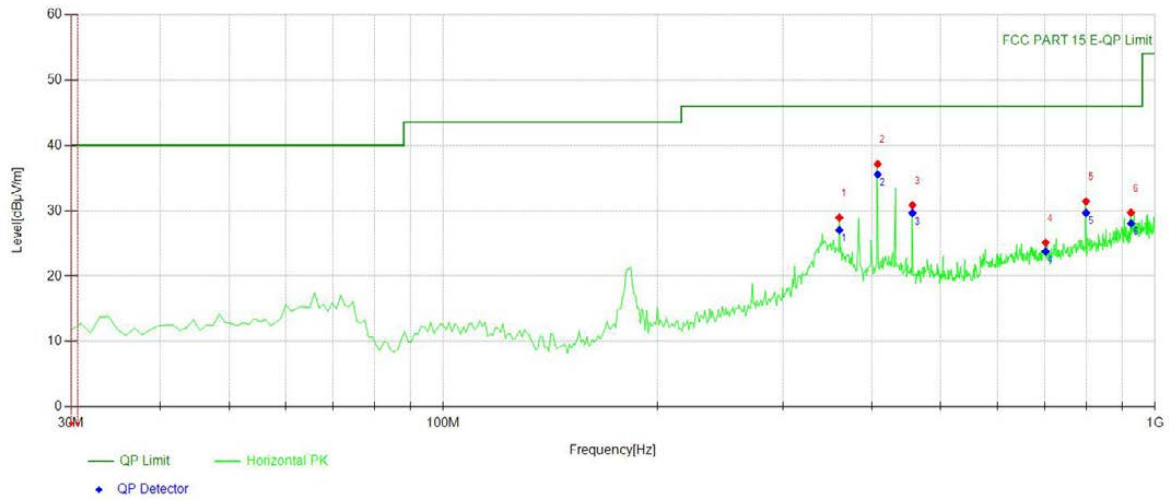


Suspected Data List								
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	360.130	44.57	-13.43	31.14	PK	46.00	14.86	Horizontal
2	407.707	49.51	-11.78	37.73	PK	46.00	8.27	Horizontal
3	456.256	42.10	-11.07	31.03	PK	46.00	14.97	Horizontal
4	599.96	31.77	-7.14	24.63	PK	46.00	21.37	Horizontal
5	652.392	31.55	-6.20	25.35	PK	46.00	20.65	Horizontal
6	799.98	35.86	-4.42	31.44	PK	46.00	14.56	Horizontal

Test mode: 802.11n(20) Frequency(MHz): 5200

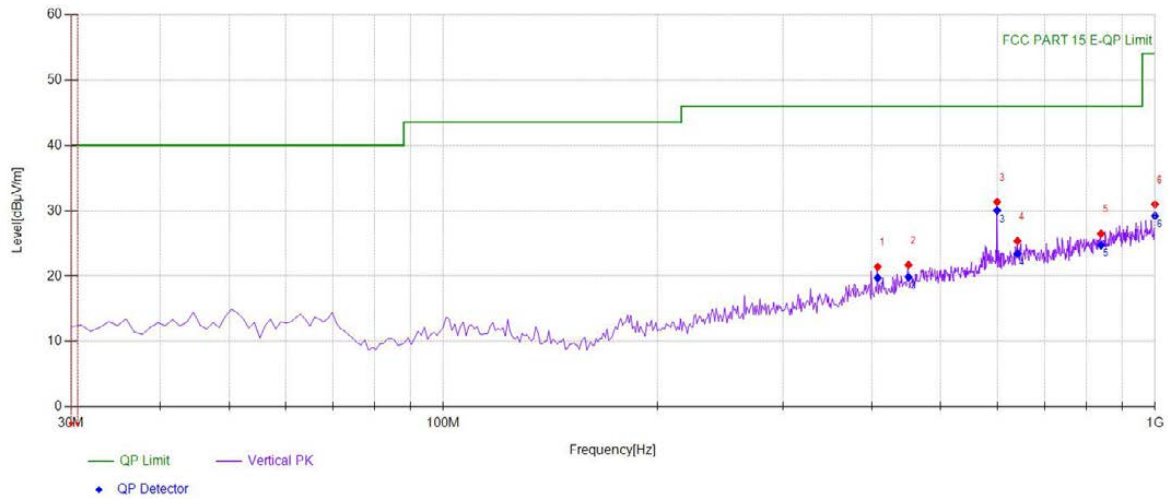


Suspected Data List								
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	47.4775	33.28	-17.39	15.89	PK	40.00	24.11	Vertical
2	486.356	32.17	-9.79	22.38	PK	46.00	23.62	Vertical
3	599.96	36.94	-7.14	29.80	PK	46.00	16.20	Vertical
4	636.856	32.00	-6.41	25.59	PK	46.00	20.41	Vertical
5	844.644	30.73	-3.83	26.90	PK	46.00	19.10	Vertical
6	1000	32.86	-1.72	31.14	PK	54.00	22.86	Vertical

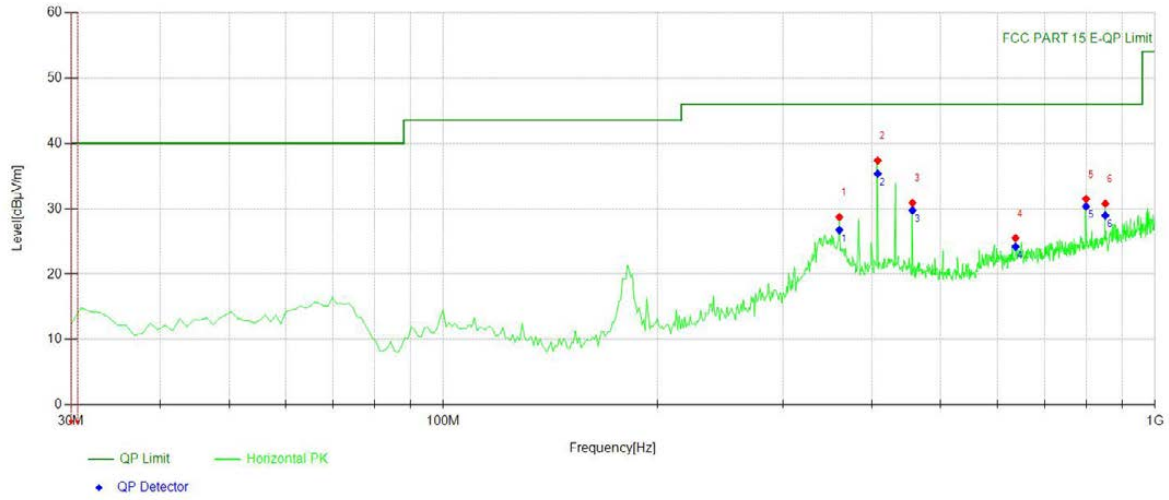


Suspected Data List								
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	360.130	42.38	-13.43	28.95	PK	46.00	17.05	Horizontal
2	407.707	48.89	-11.78	37.11	PK	46.00	8.89	Horizontal
3	456.256	41.92	-11.07	30.85	PK	46.00	15.15	Horizontal
4	701.911	31.04	-5.92	25.12	PK	46.00	20.88	Horizontal
5	799.98	35.84	-4.42	31.42	PK	46.00	14.58	Horizontal
6	925.235	32.44	-2.73	29.71	PK	46.00	16.29	Horizontal

Test mode: 802.11n(20) Frequency(MHz): 5240



Suspected Data List								
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	407.707	33.21	-11.78	21.43	PK	46.00	24.57	Vertical
2	450.430	32.86	-11.13	21.73	PK	46.00	24.27	Vertical
3	599.96	38.49	-7.14	31.35	PK	46.00	14.65	Vertical
4	640.740	31.64	-6.25	25.39	PK	46.00	20.61	Vertical
5	839.789	30.35	-3.86	26.49	PK	46.00	19.51	Vertical
6	1000	32.69	-1.72	30.97	PK	54.00	23.03	Vertical



Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity
1	360.130	42.16	-13.43	28.73	PK	46.00	17.27	Horizontal
2	407.707	49.12	-11.78	37.34	PK	46.00	8.66	Horizontal
3	456.256	41.96	-11.07	30.89	PK	46.00	15.11	Horizontal
4	636.856	31.94	-6.41	25.53	PK	46.00	20.47	Horizontal
5	799.98	35.90	-4.42	31.48	PK	46.00	14.52	Horizontal
6	851.441	34.57	-3.80	30.77	PK	46.00	15.23	Horizontal

## 8.5 POWER LINE CONDUCTED EMISSIONS

### 8.5.1 Applicable Standard

According to FCC Part 15.207(a)

### 8.5.2 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.

### 8.5.3 Test Configuration

Test according to clause 6.3 conducted emission test setup

### 8.5.4 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.

### 8.5.5 Test Results

**N/A**

N/A means not applicable, since EUT is battery power supply.



## 8.6 ANTENNA APPLICATION

### 8.6.1 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.

### 8.6.2 Result

Temperature : 25°C                      ATM Pressure:: 1011 mbar  
 Humidity : 60 %                         Test Engineer: XXH

#### PASS

The EUT is FPC Antenna, the antenna gain as below.

B1: 5150-5250MHz: Ant1: 2.86 dBi, Ant1: 2.65 dBi  
 B2: 5250-5350MHz: Ant1: 2.86 dBi, Ant1: 2.65 dBi  
 B3: 5470-5725MHz: Ant1: 3.21 dBi, Ant1: 2.98 dBi  
 B4: 5725-5850MHz: Ant1: 3.34 dBi, Ant1: 3.12 dBi

- 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.

Detail of factor for radiated emission:

Frequency(MHz)	Ant_F(dB)	Cab_L(dB)	Preamp(dB)	Correct Factor(dB)
0.009	20.6	0.03	\	20.63
0.15	20.7	0.1	\	20.8
1	20.9	0.15	\	21.05
10	20.1	0.28	\	20.38
30	18.8	0.45	\	19.25
30	11.7	0.62	27.9	-15.58
100	12.5	1.02	27.8	-14.28
300	12.9	1.91	27.5	-12.69
600	19.2	2.92	27	-4.88
800	21.1	3.54	26.6	-1.96
1000	22.3	4.17	26.2	0.27
1000	25.6	1.76	41.4	-14.04
3000	28.9	3.27	43.2	-11.03
5000	31.1	4.2	44.6	-9.3
8000	36.2	5.95	44.7	-2.55
10000	38.4	6.3	43.9	0.8
12000	38.5	7.14	42.3	3.34
15000	40.2	8.15	41.4	6.95
18000	45.4	9.02	41.3	13.12
18000	37.9	1.81	47.9	-8.19
21000	37.9	1.95	48.7	-8.85
25000	39.3	2.01	42.8	-1.49
28000	39.6	2.16	46.0	-4.24
31000	41.2	2.24	44.5	-1.06
34000	41.5	2.29	46.6	-2.81
37000	43.8	2.30	46.4	-0.3
40000	43.2	2.50	42.2	3.5

--- End of Report ---