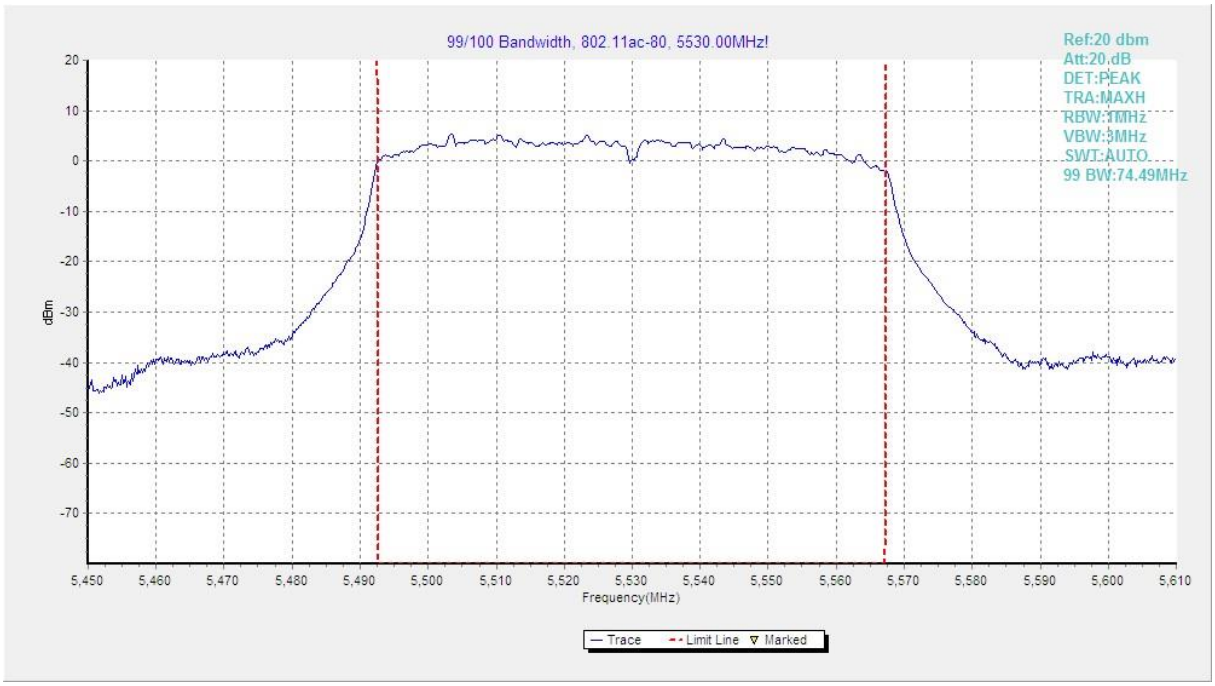

Fig. 45 99% Occupied Bandwidth (802. 11ac-VHT80, 5530MHz)

Fig. 46 99% Occupied Bandwidth (802. 11ac-VHT80, 5610MHz)

A.7. Band Edges Compliance

Measurement Limit:

Standard	Limit (dBuV/m)	
FCC 47 CFR Part 15.209	Peak	74
	Average	54

The measurement is made according to KDB 789033

Measurement Result:

Mode	Channel	Test Results	Conclusion
802.11a	5180 MHz(CH36)	Fig.47	**P**
	5320 MHz(CH64)	Fig.48	**P**
	5500 MHz(CH100)	Fig.49	**P**
	5700 MHz(CH140)	Fig.50	**P**
	5745 MHz(CH149)	Fig.51	**P**
	5825 MHz(CH165)	Fig.52	**P**
802.11n HT40	5190 MHz(CH38)	Fig.53	**P**
	5310 MHz(CH62)	Fig.54	**P**
	5510 MHz(CH102)	Fig.55	**P**
	5670 MHz(CH134)	Fig.56	**P**
	5755 MHz(CH151)	Fig.57	**P**
	5795 MHz(CH159)	Fig.58	**P**
802.11ac VHT80	5210 MHz(CH42)	Fig.59	**P**
	5290 MHz(CH58)	Fig.60	**P**
	5530 MHz(CH106)	Fig.61	**P**
	5775 MHz(CH155)	Fig.62	**P**

Conclusion: PASS

Test graphs as below:

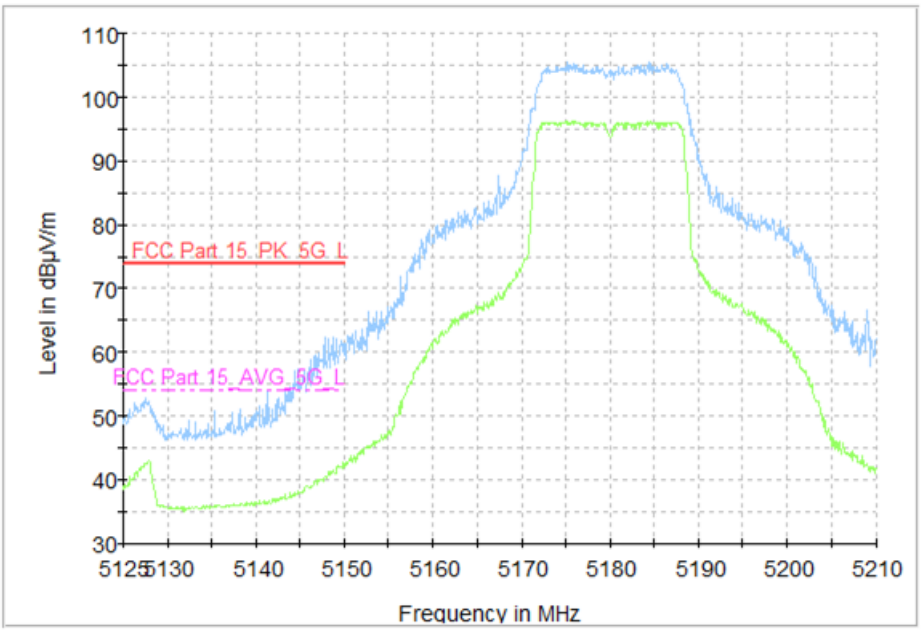

Fig. 47 Band Edges (802.11a, CH36 5180MHz)

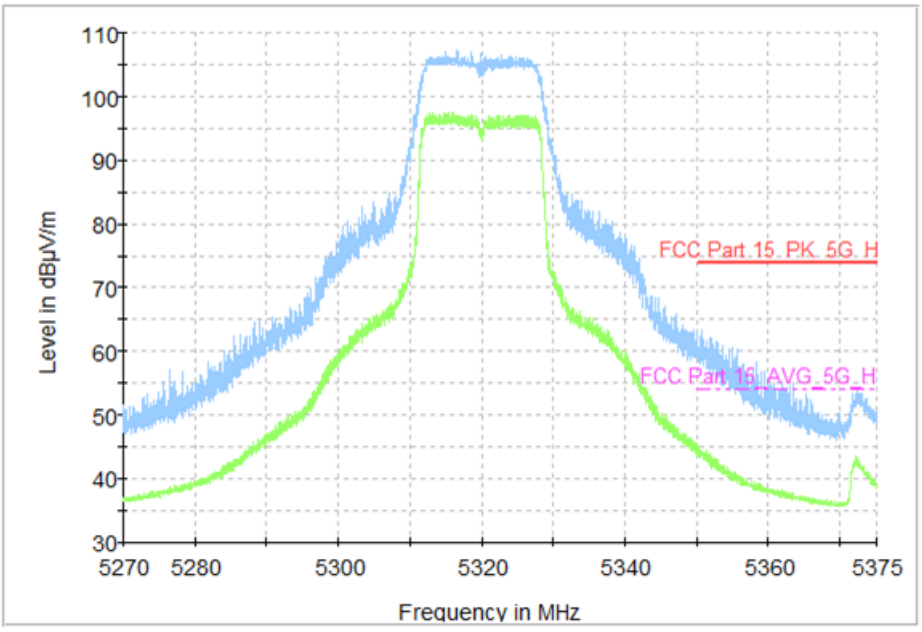

Fig. 48 Band Edges (802.11a, CH64 5320MHz)

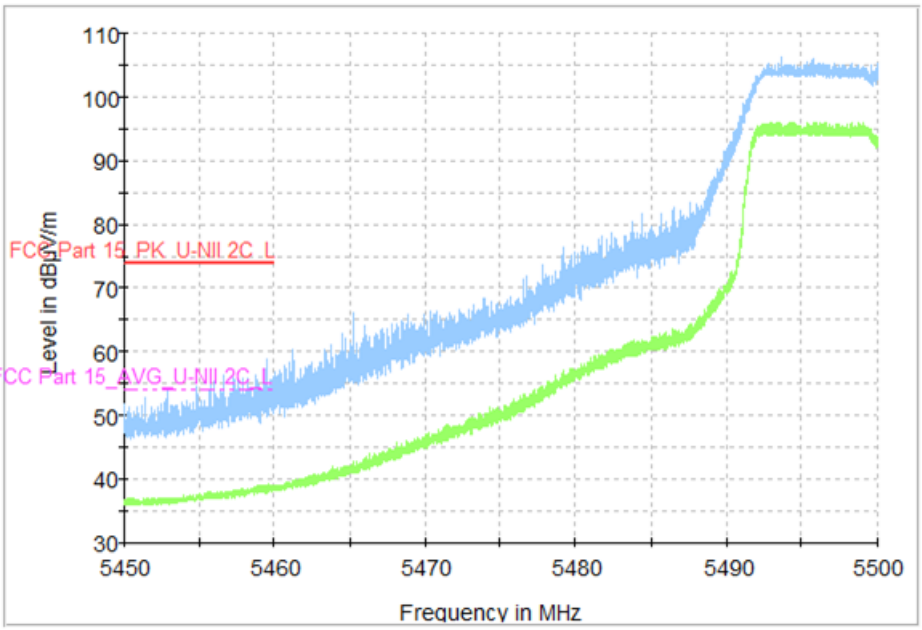

Fig. 49 Band Edges (802.11a, CH100 5500MHz)

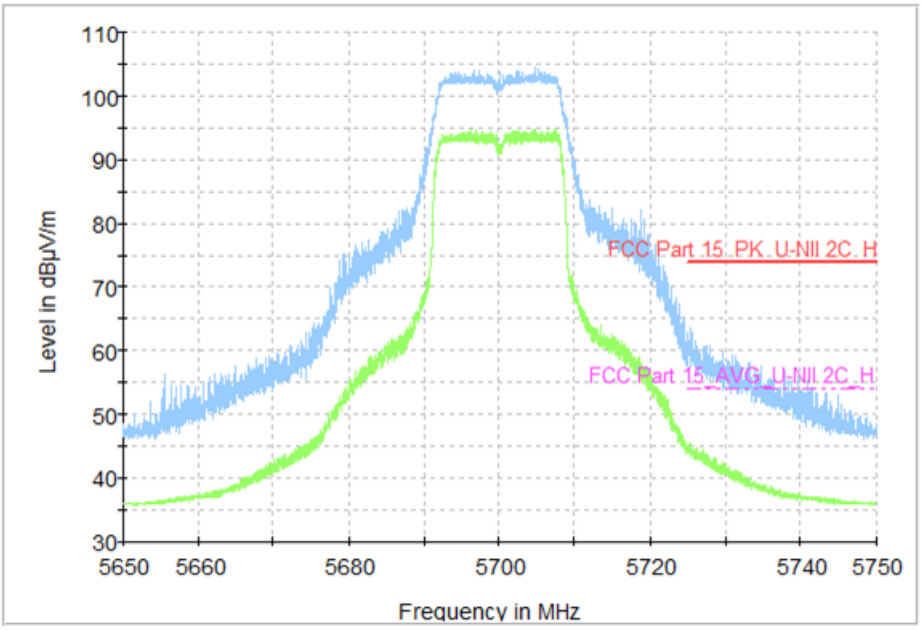

Fig. 50 Band Edges (802.11a, CH140 5700MHz)

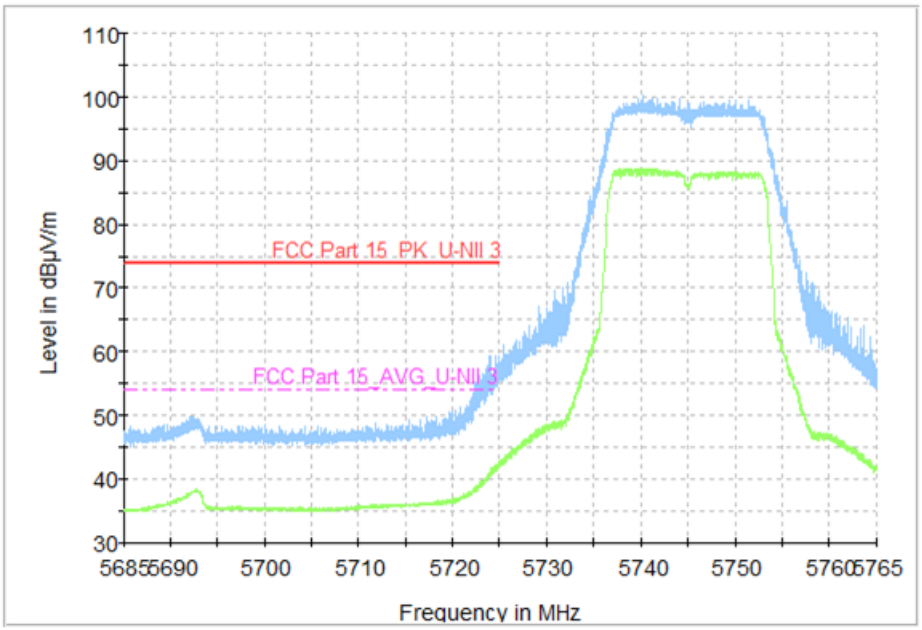

Fig. 51 Band Edges (802.11a, CH149 5745MHz)

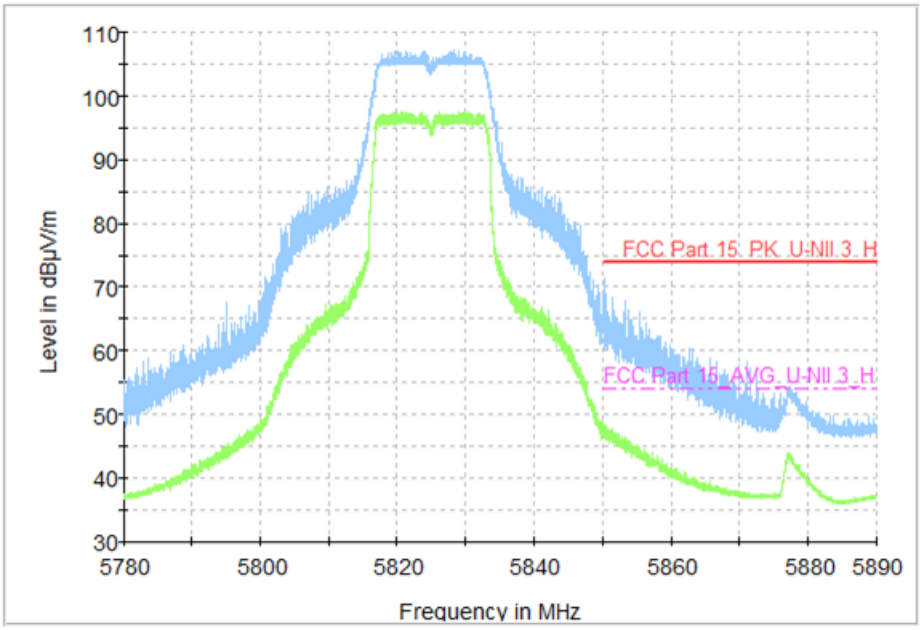

Fig. 52 Band Edges (802.11a, CH165 5825MHz)

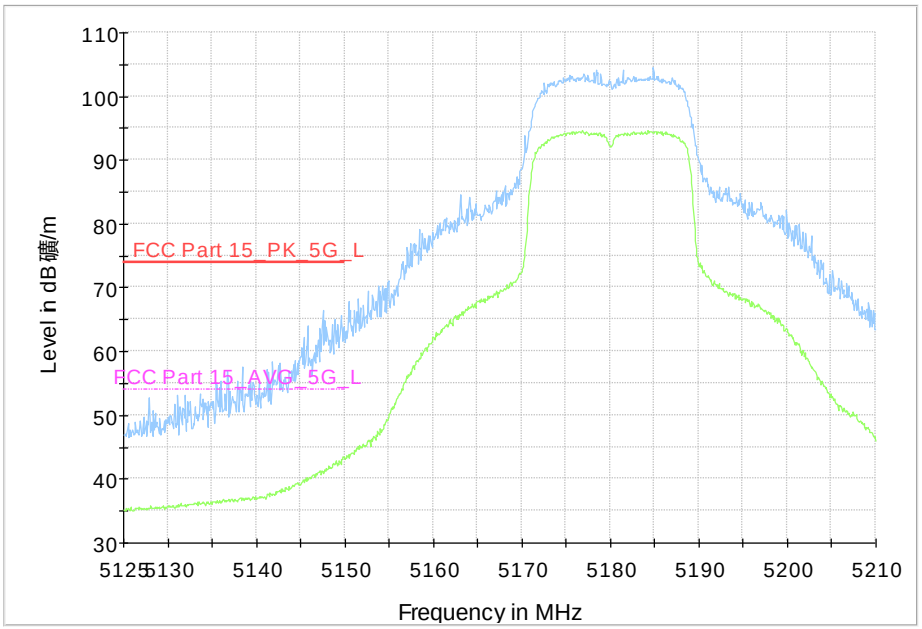

Fig. 53 Band Edges (802.11n-HT40, CH38 5190MHz)

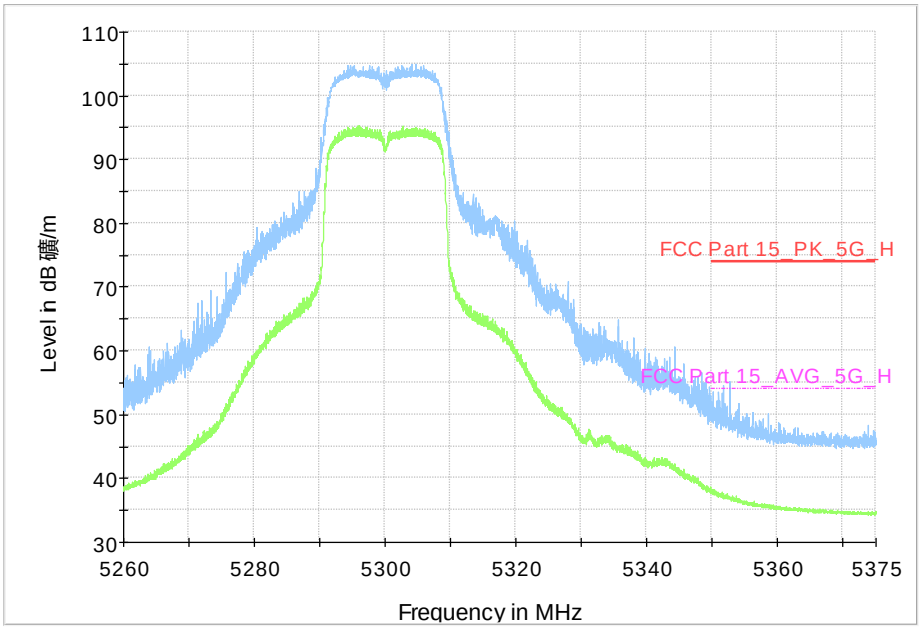

Fig. 54 Band Edges (802.11n-HT40, CH62 5310MHz)

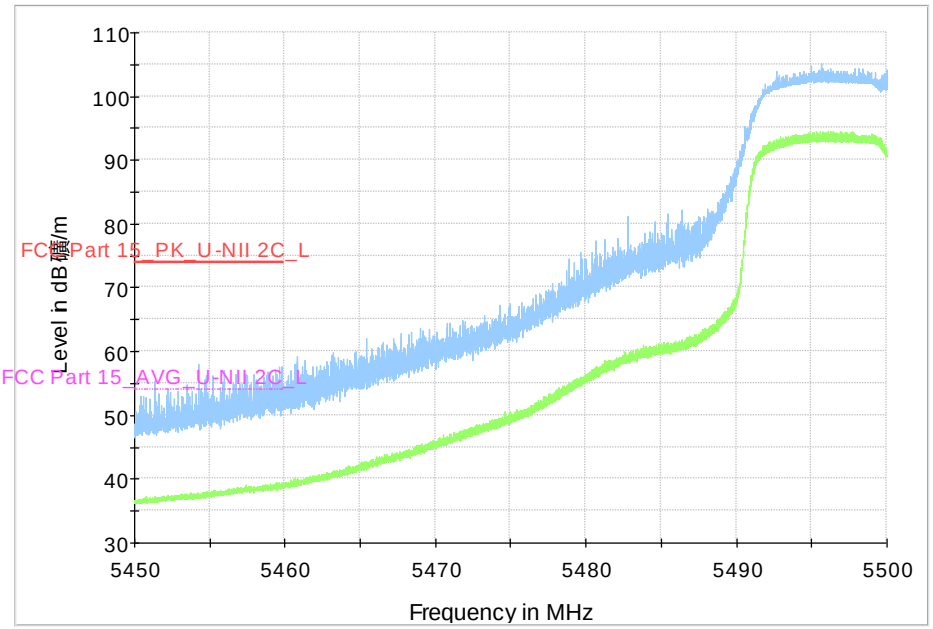

Fig. 55 Band Edges (802.11n-HT40, CH102 5510MHz)

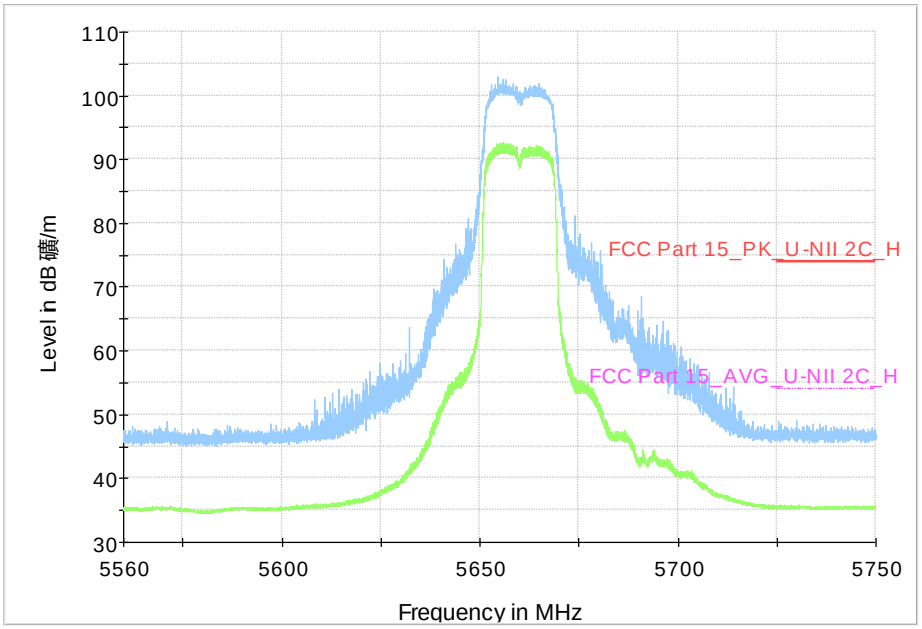

Fig. 56 Band Edges (802.11n-HT40, CH134 5670MHz)

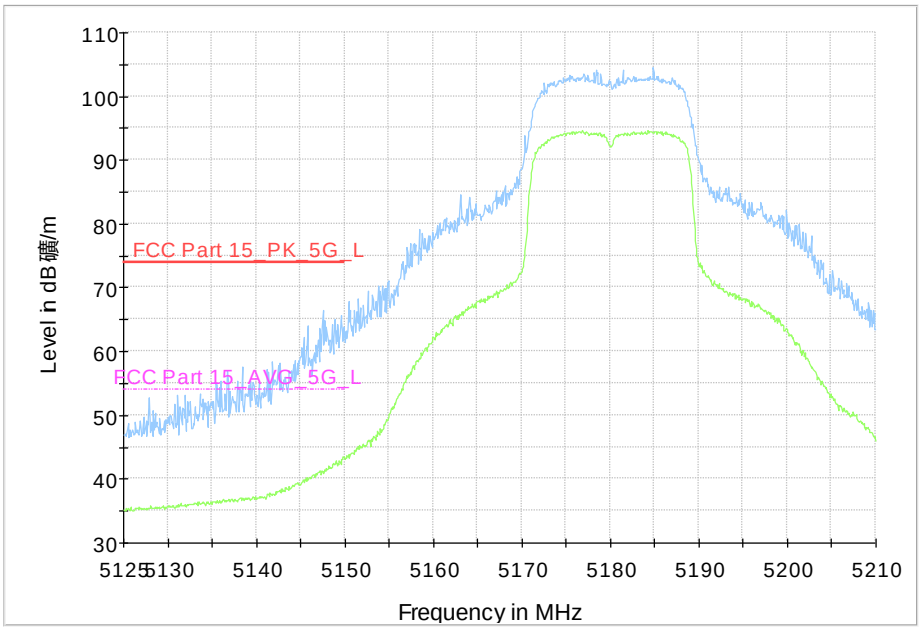

Fig. 57 Band Edges (802.11n-HT40, CH151 5755MHz)

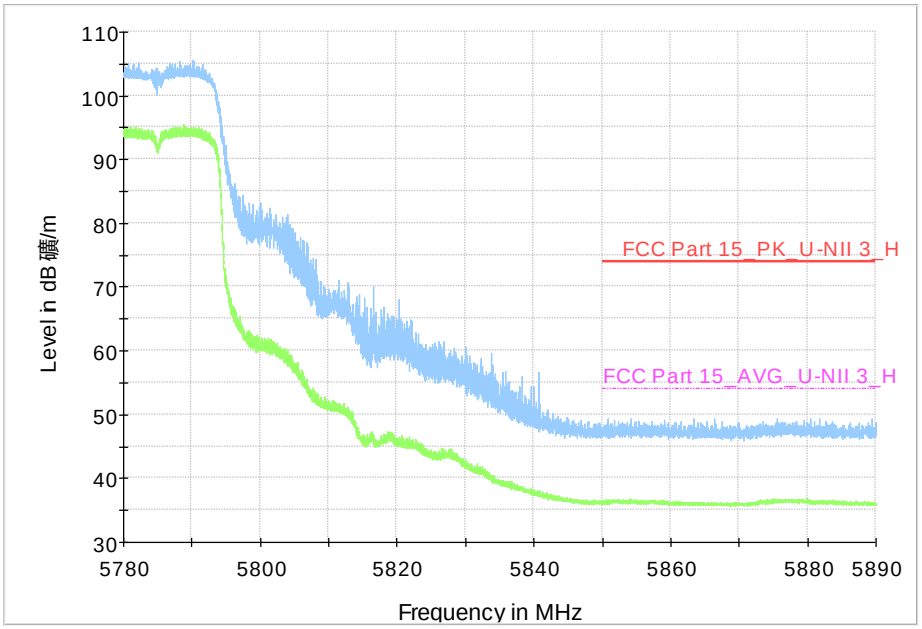

Fig. 58 Band Edges (802.11n-HT40, CH159 5795MHz)

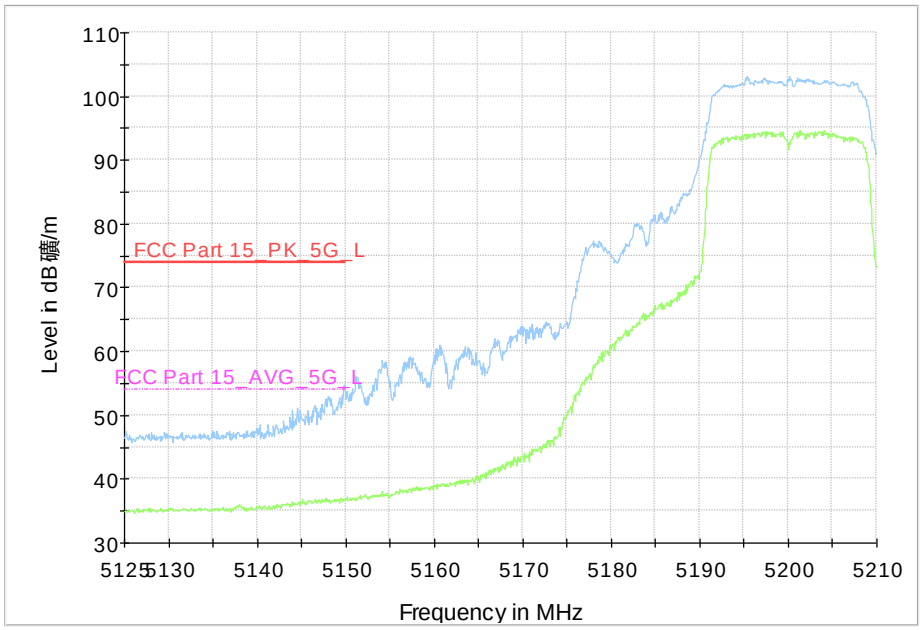

Fig. 59 Band Edges (802.11ac-VHT80, CH42 5210MHz)

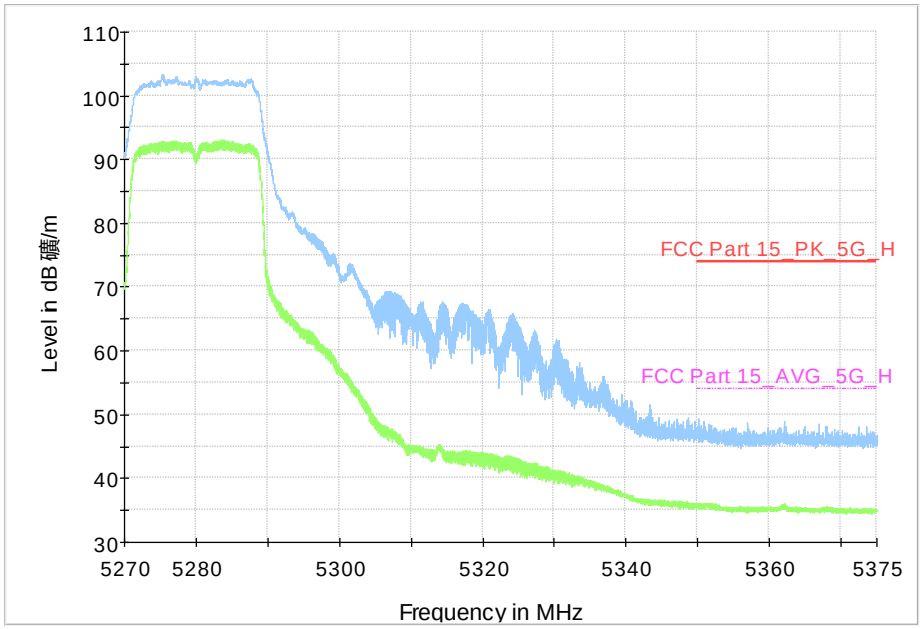

Fig. 60 Band Edges (802.11ac-VHT80, CH58 5290MHz)

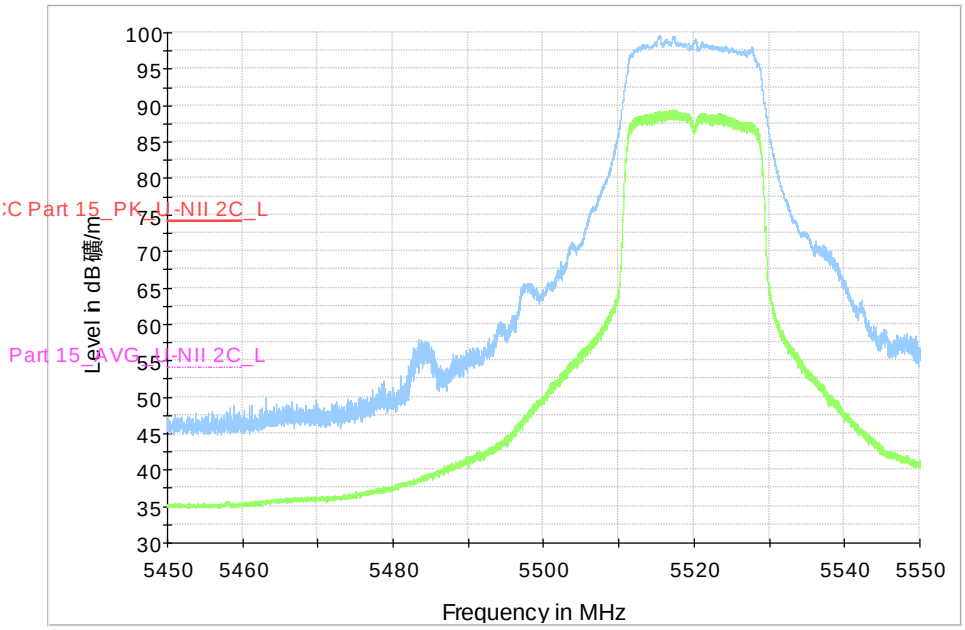

Fig. 61 Band Edges (802.11ac-VHT80, CH106 5530MHz)

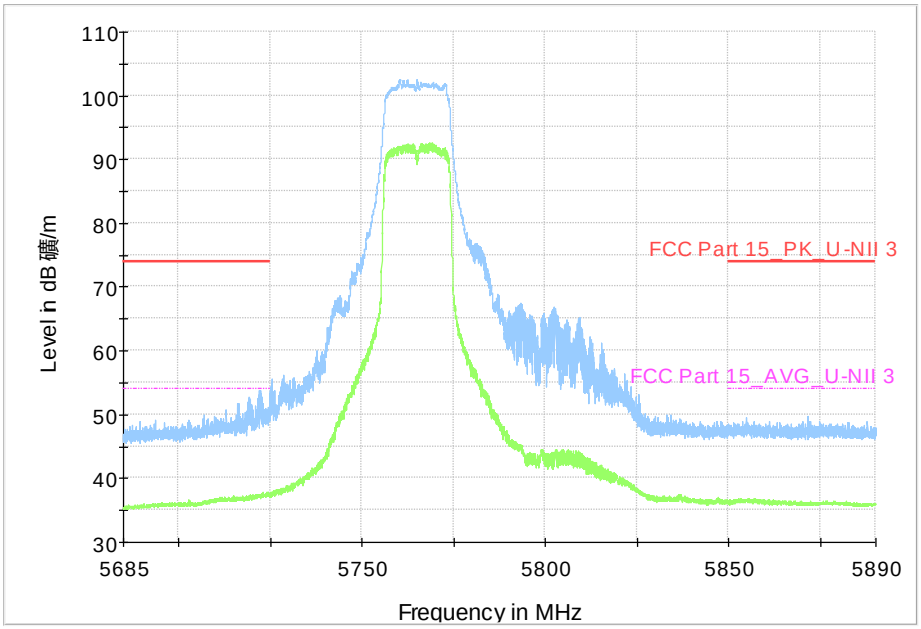

Fig. 62 Band Edges (802.11ac-VHT80, CH155 5775MHz)

A.8. Transmitter Spurious Emission

Measurement Limit:

Standard	Limit (dBm/MHz)
FCC 47 CFR Part 15.407	< -27

The measurement is made according to KDB 789033.

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit in restricted band:

Frequency of emission (MHz)	Field strength (dBμV/m)	Measurement distance (m)
30-88	40.0	3
88-216	43.5	3
216-960	46.0	3
Above 960	54.0	3

Note: For frequency range below 960MHz, the limit in 15.209 is defined in 10m test distance. The limit used above is calculated from 10m to 3m.

Measurement Result:

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11a	5180MHz(Ch36)	1 GHz ~18 GHz	Fig.63	**P**
	5200MHz(Ch40)	1 GHz ~18 GHz	Fig.64	**P**
	5240MHz(Ch48)	1 GHz ~18 GHz	Fig.65	**P**
	5260MHz(Ch52)	1 GHz ~18 GHz	Fig.66	**P**
	5280MHz(Ch56)	1 GHz ~18 GHz	Fig.67	**P**
	5320MHz(Ch64)	1 GHz ~18 GHz	Fig.68	**P**
	5500MHz(Ch100)	1 GHz ~18 GHz	Fig.69	**P**
	5580MHz(Ch116)	1 GHz ~18 GHz	Fig.70	**P**
	5700MHz(Ch140)	1 GHz ~18 GHz	Fig.71	**P**
	5745MHz(Ch149)	1 GHz ~18 GHz	Fig.72	**P**
	5785MHz(Ch157)	1 GHz ~18 GHz	Fig.73	**P**
	5825MHz(Ch165)	1 GHz ~18 GHz	Fig.74	**P**
802.11n HT40	5190MHz(Ch38)	1 GHz ~18 GHz	Fig.75	**P**
	5230MHz(Ch46)	1 GHz ~18 GHz	Fig.76	**P**
	5270MHz(Ch54)	1 GHz ~18 GHz	Fig.77	**P**
	5310MHz(Ch62)	1 GHz ~18 GHz	Fig.78	**P**
	5510MHz(Ch102)	1 GHz ~18 GHz	Fig.79	**P**
	5550MHz(Ch110)	1 GHz ~18 GHz	Fig.80	**P**
	5670MHz(Ch134)	1 GHz ~18 GHz	Fig.81	**P**
	5755MHz(Ch151)	1 GHz ~18 GHz	Fig.82	**P**
	5795MHz(Ch159)	1 GHz ~18 GHz	Fig.83	**P**
802.11ac	5210MHz(Ch42)	1 GHz ~18 GHz	Fig.84	**P**

VHT80	5290MHz(Ch58)	1 GHz ~18 GHz	Fig.85	**P**
	5530MHz(Ch106)	1 GHz ~18 GHz	Fig.86	**P**
	5610MHz(Ch122)	1 GHz ~18 GHz	Fig.87	**P**
	5775MHz(Ch155)	1 GHz ~18 GHz	Fig.88	**P**
All channels		30 MHz ~1 GHz	Fig.89	**P**
		18 GHz ~26.5 GHz	Fig.90	**P**
		26.5GHz~40GHz	Fig.91	**P**

Conclusion: PASS

Test graphs as below:

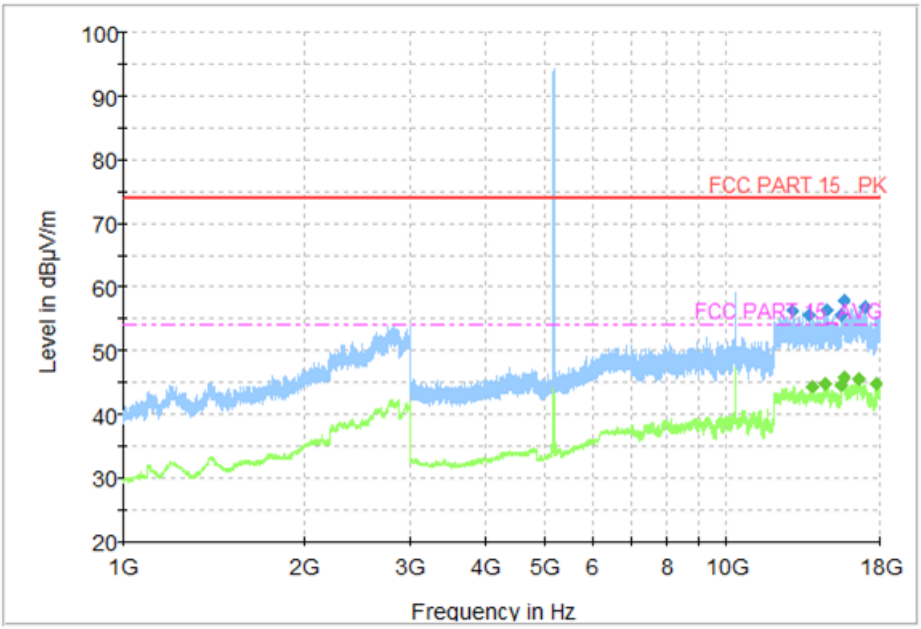

Fig. 63 Transmitter Spurious Emission (802.11a, CH36 5180MHz)

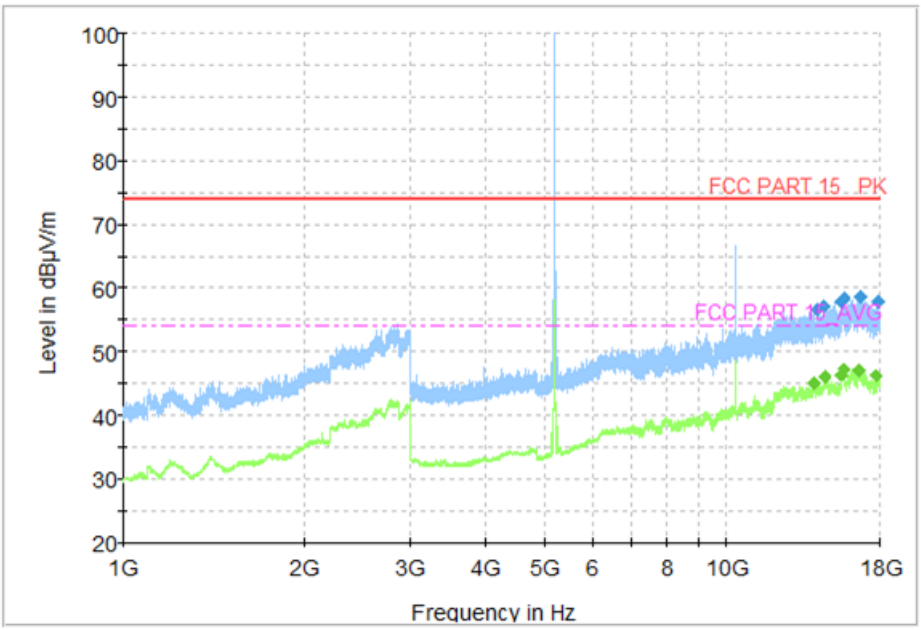

Fig. 64 Transmitter Spurious Emission (802.11a, CH40 5200MHz)

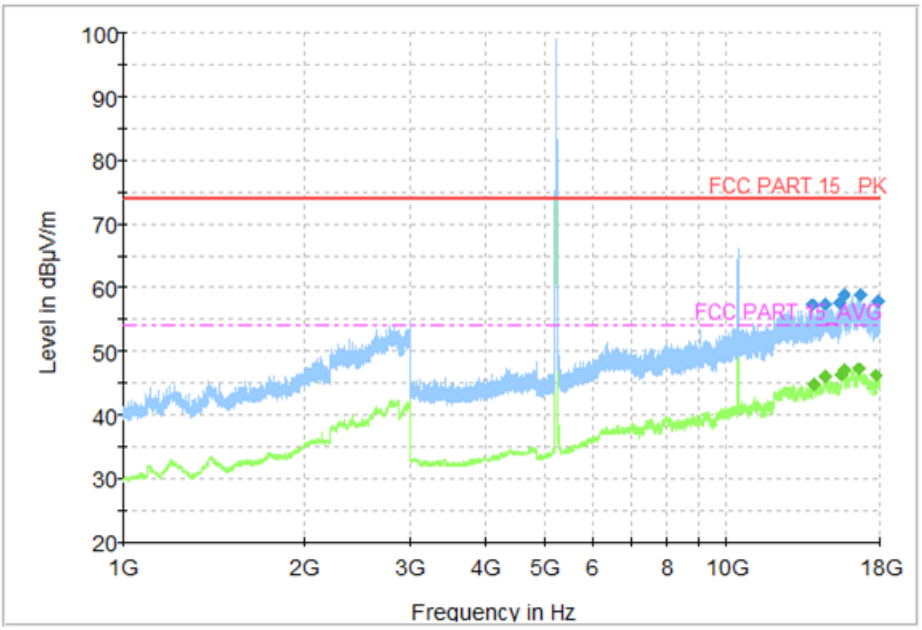

Fig. 65 Transmitter Spurious Emission (802.11a, CH48 5240MHz)

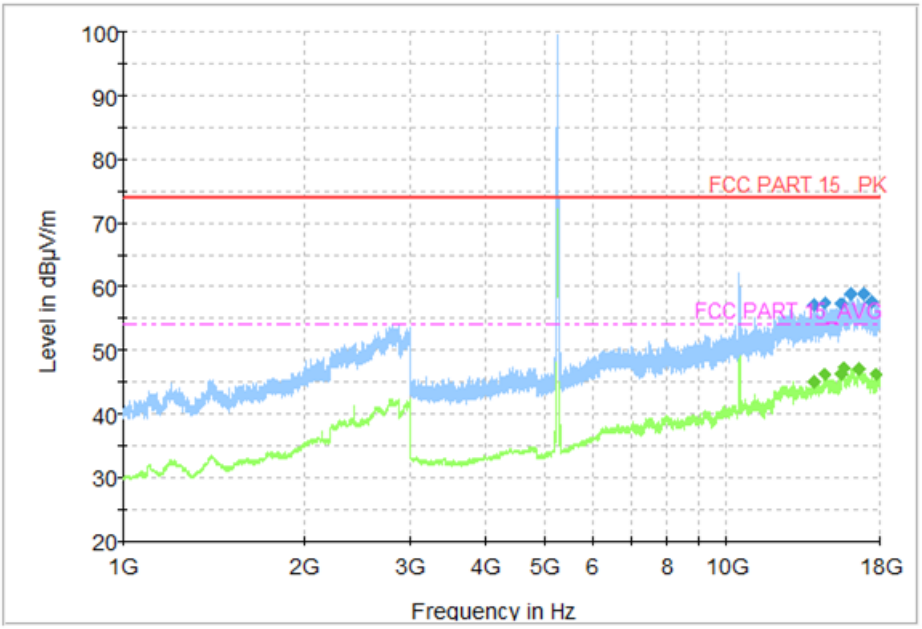

Fig. 66 Transmitter Spurious Emission (802.11a, CH52 5260MHz)

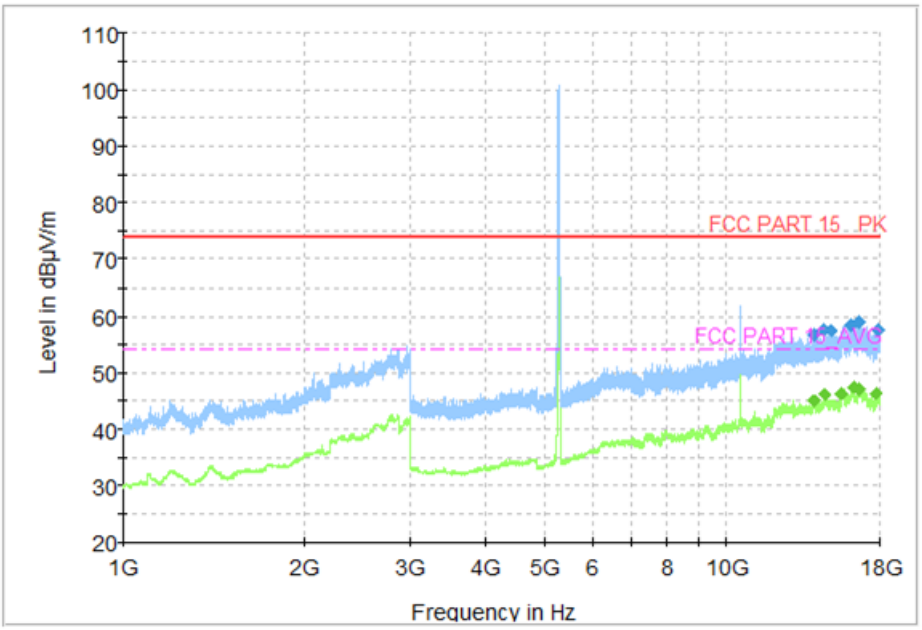

Fig. 67 Transmitter Spurious Emission (802.11a, CH56 5280MHz)

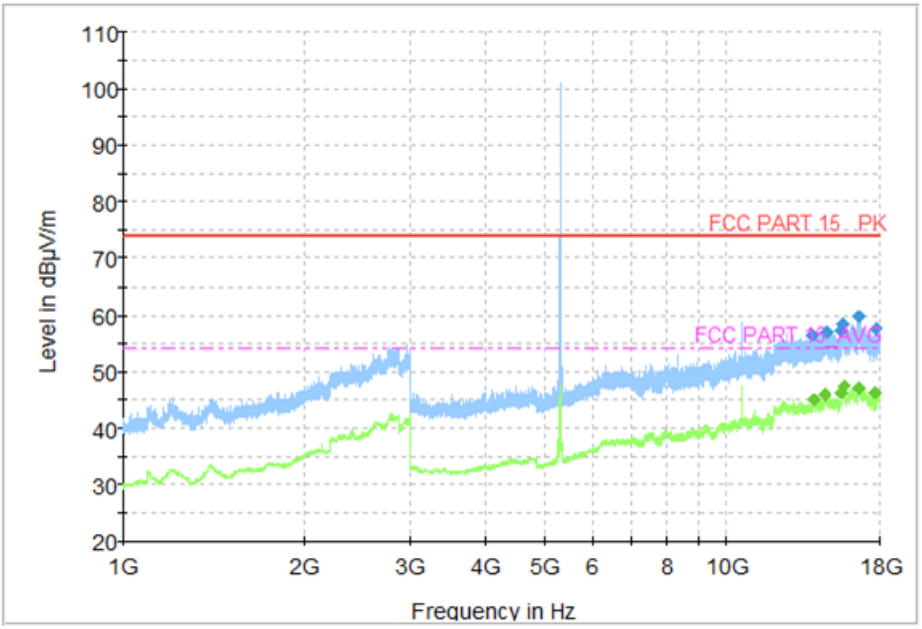

Fig. 68 Transmitter Spurious Emission (802.11a, CH64 5320MHz)

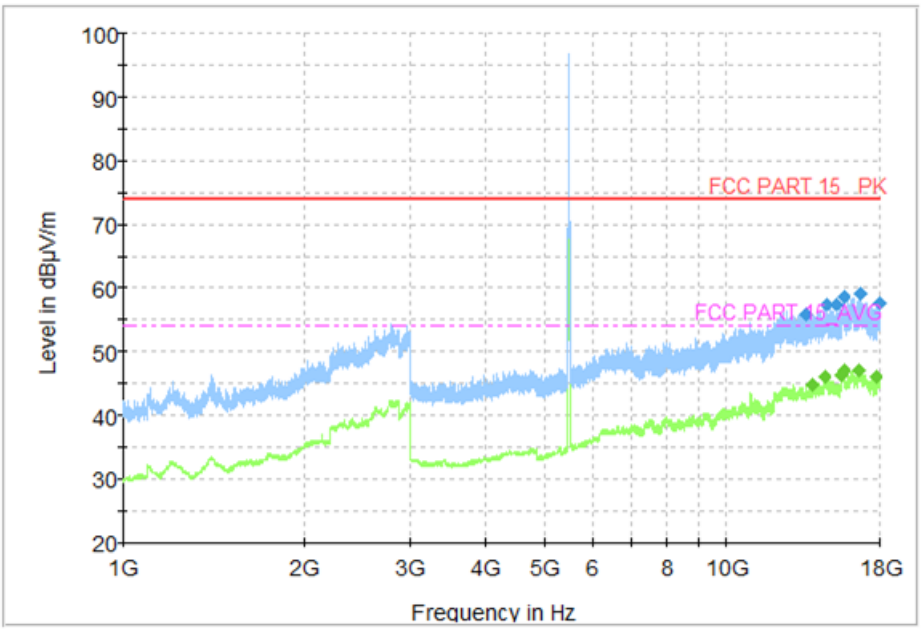

Fig. 69 Transmitter Spurious Emission (802. 11a, CH100 5500MHz)

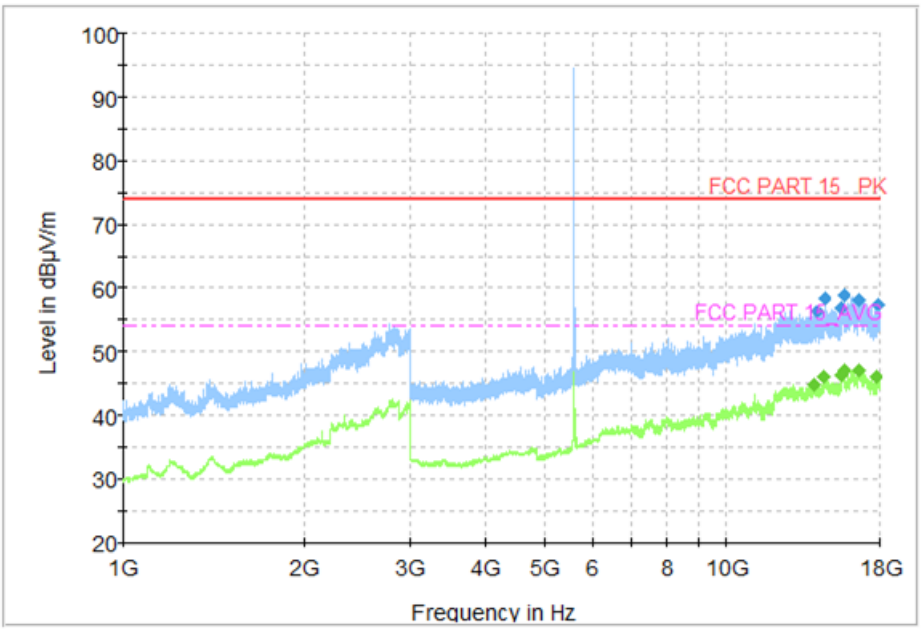

Fig. 70 Transmitter Spurious Emission (802. 11a, CH116 5600MHz)

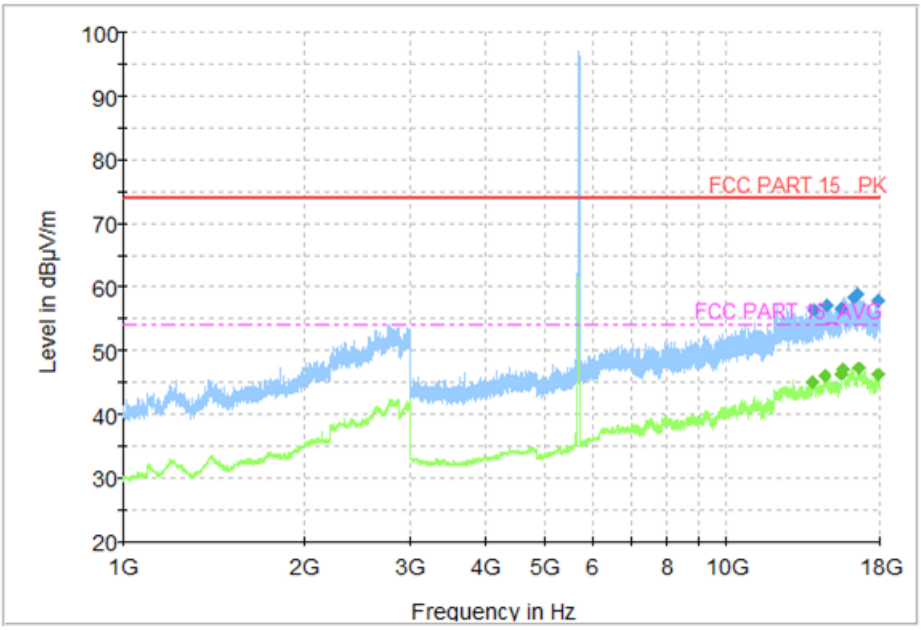

Fig. 71 Transmitter Spurious Emission (802. 11a, CH140 5700MHz)

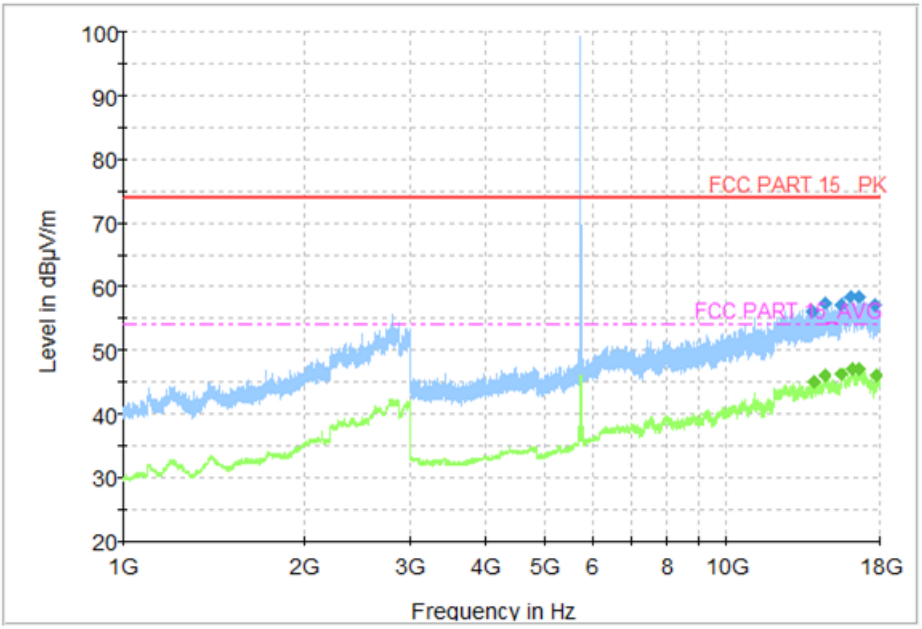

Fig. 72 Transmitter Spurious Emission (802. 11a, CH149 5745MHz)

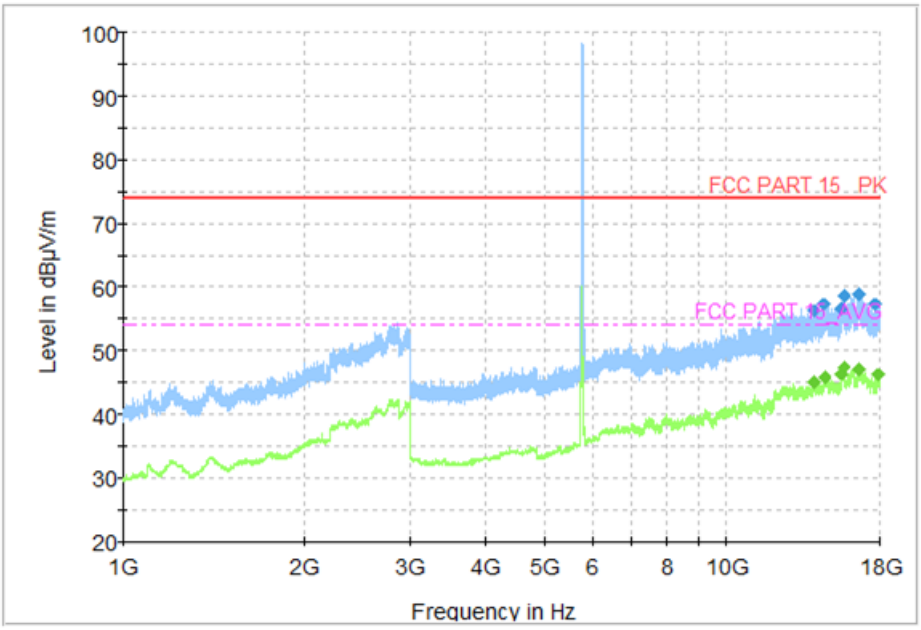

Fig. 73 Transmitter Spurious Emission (802. 11a, CH157 5785MHz)

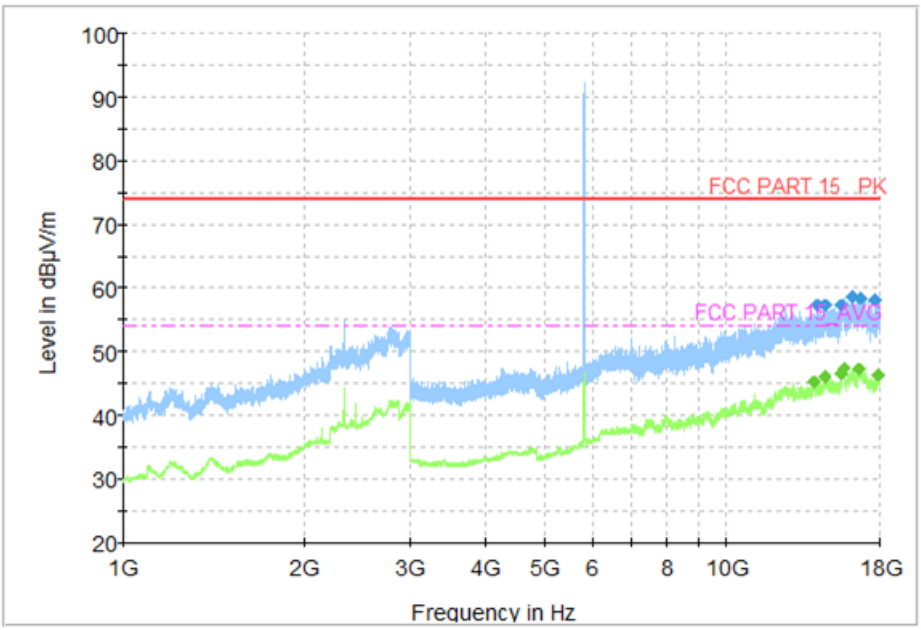

Fig. 74 Transmitter Spurious Emission (802. 11a, CH165 5825MHz)

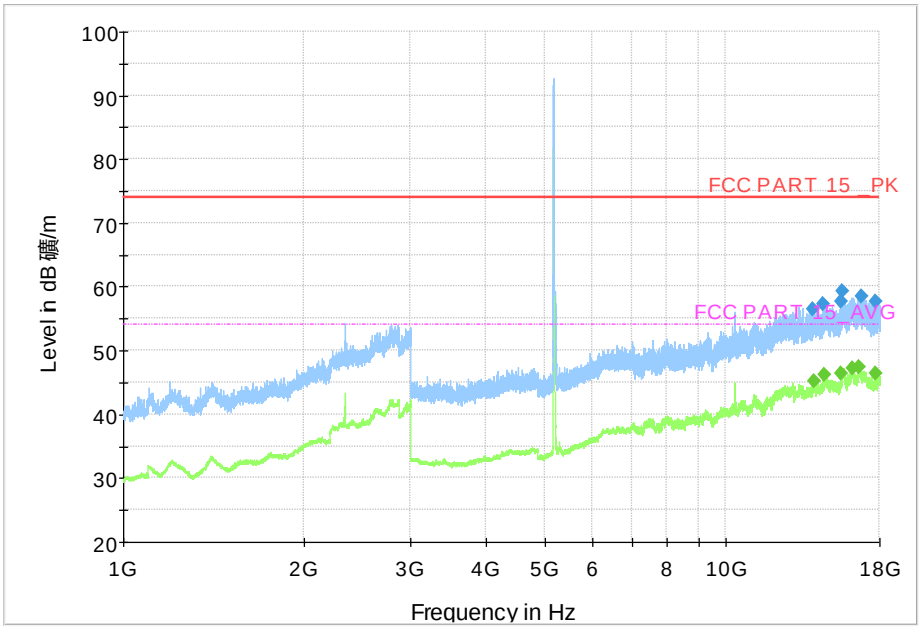

Fig. 75 Transmitter Spurious Emission (802.11n-HT40, CH38 5190MHz)

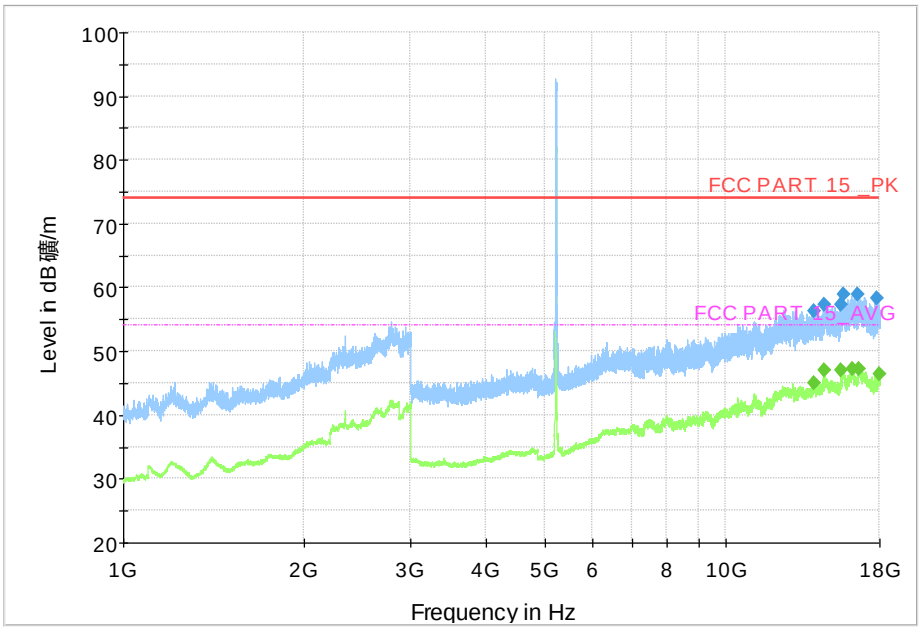

Fig. 76 Transmitter Spurious Emission (802.11n-HT40, CH46 5230MHz)

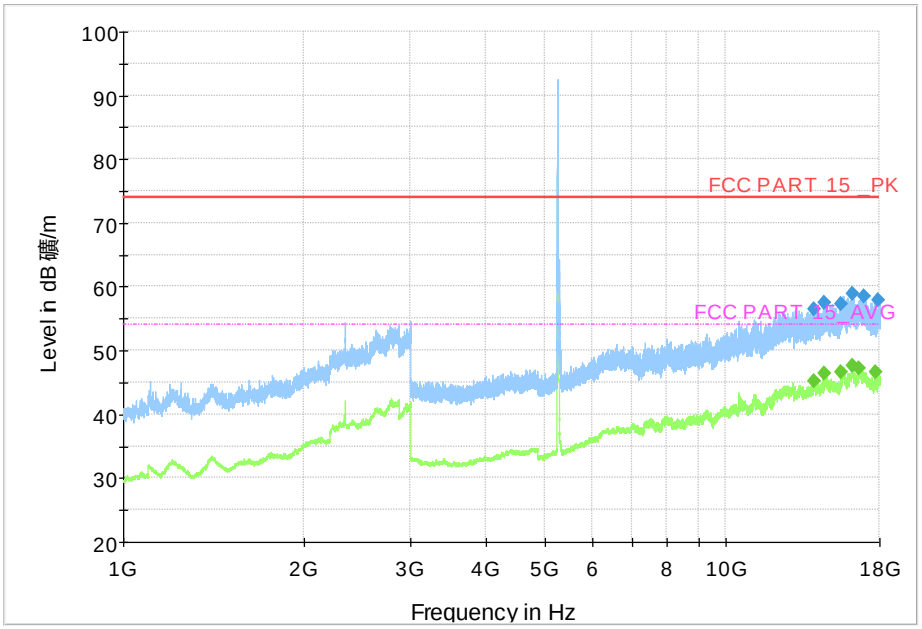

Fig. 77 Transmitter Spurious Emission (802.11n-HT40, CH54 5270MHz)

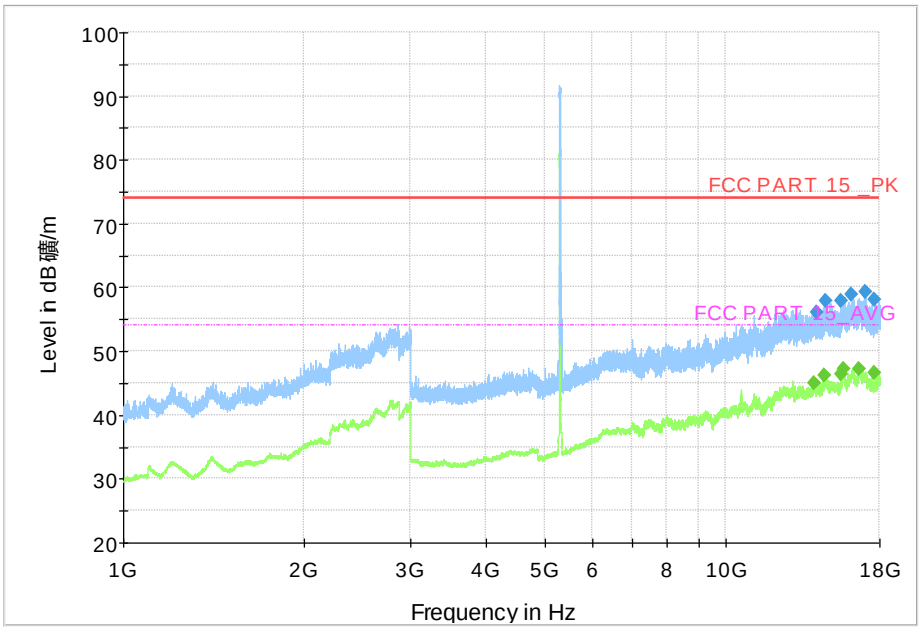

Fig. 78 Transmitter Spurious Emission (802.11n-HT40, CH62 5310MHz)

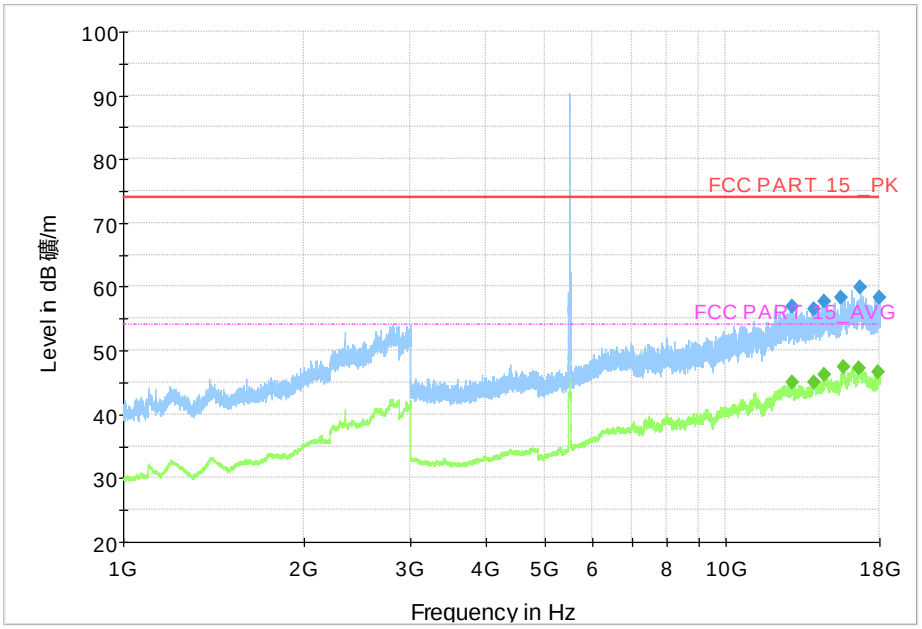

Fig. 79 Transmitter Spurious Emission (802. 11n-HT40, CH102 5510MHz)

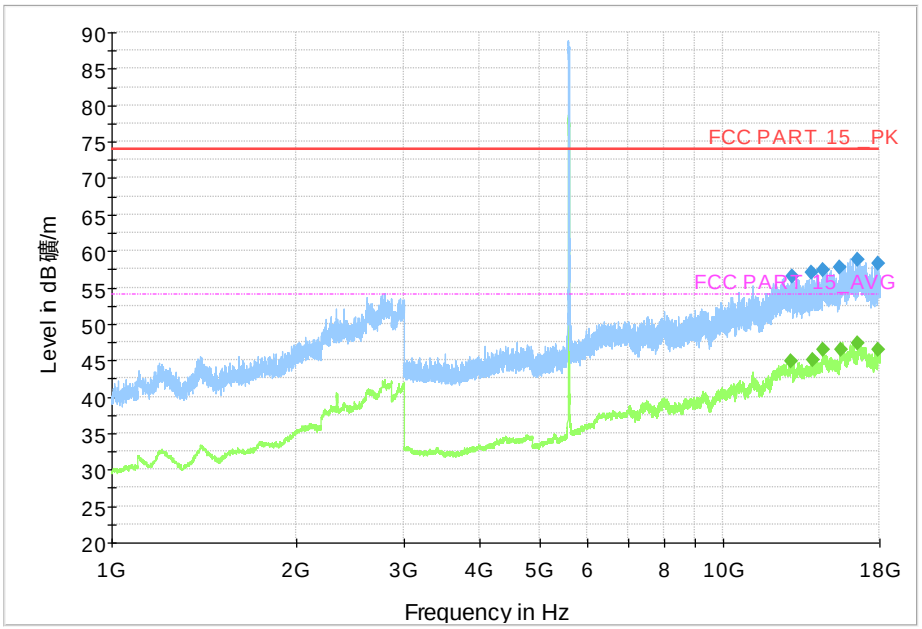

Fig. 80 Transmitter Spurious Emission (802. 11n-HT40, CH110 5590MHz)

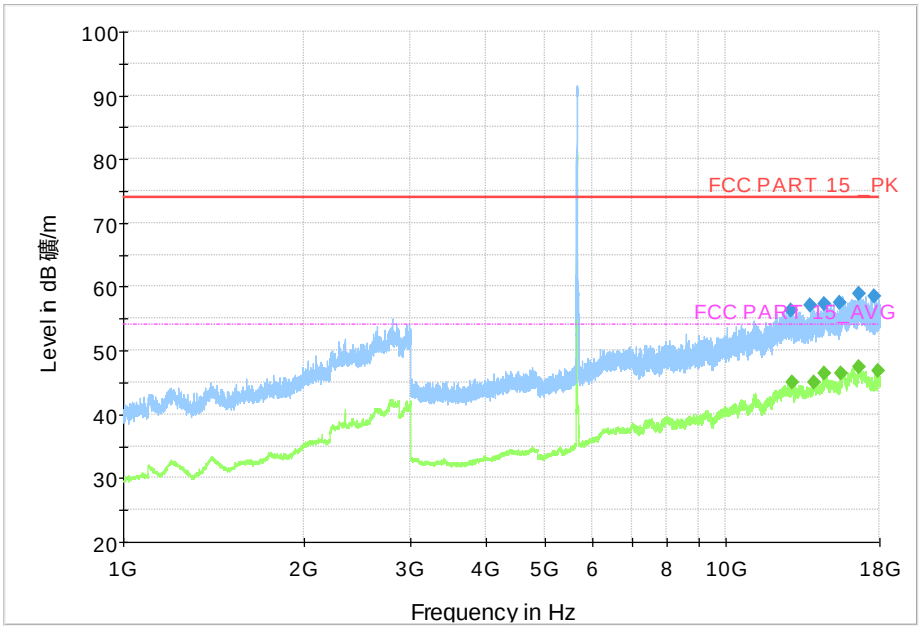

Fig. 81 Transmitter Spurious Emission (802. 11n-HT40, CH134 5670MHz)

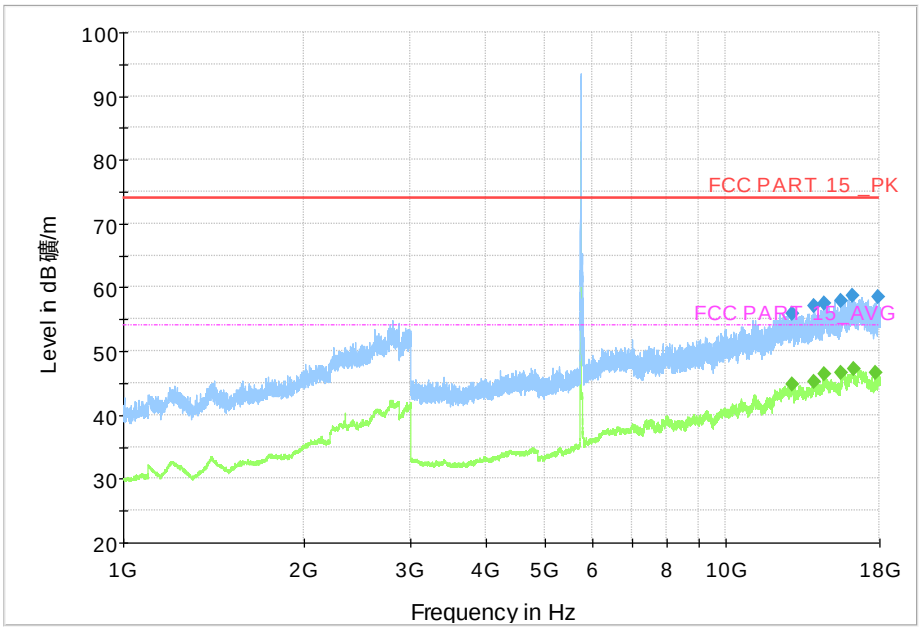

Fig. 82 Transmitter Spurious Emission (802. 11n-HT40, CH151 5755MHz)

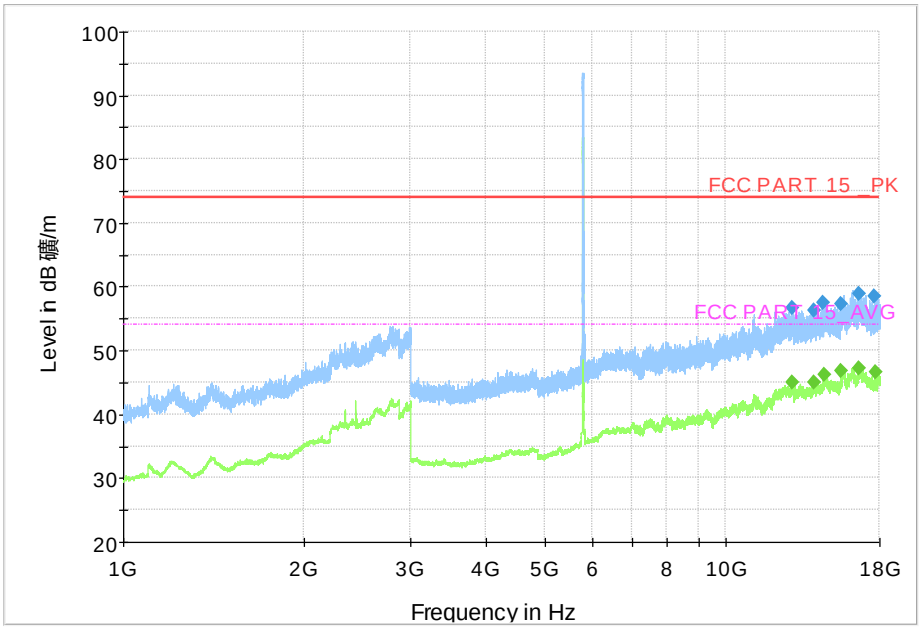

Fig. 83 Transmitter Spurious Emission (802. 11n-HT40, CH159 5795MHz)

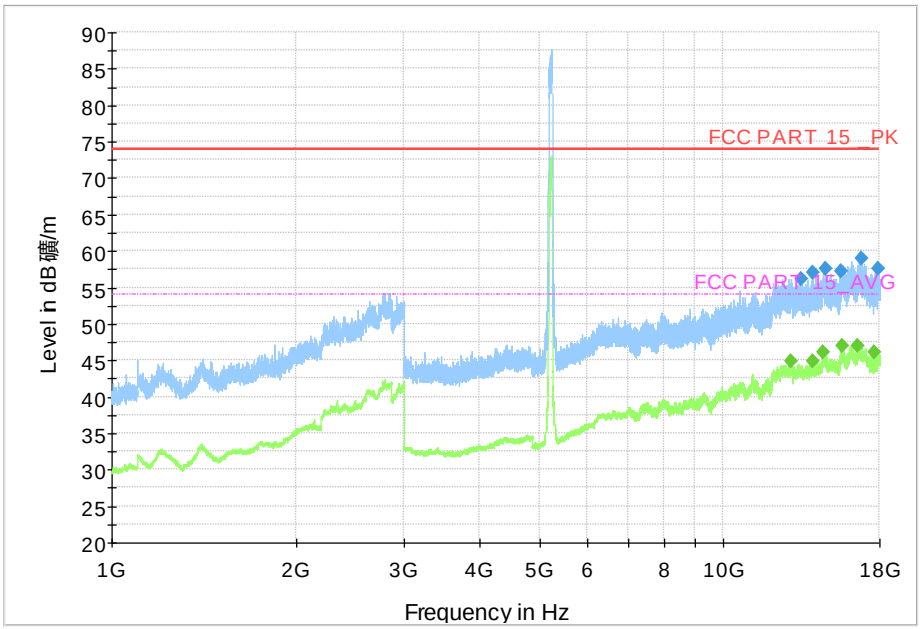

Fig. 84 Transmitter Spurious Emission (802. 11ac-VHT80, CH42 5210MHz)

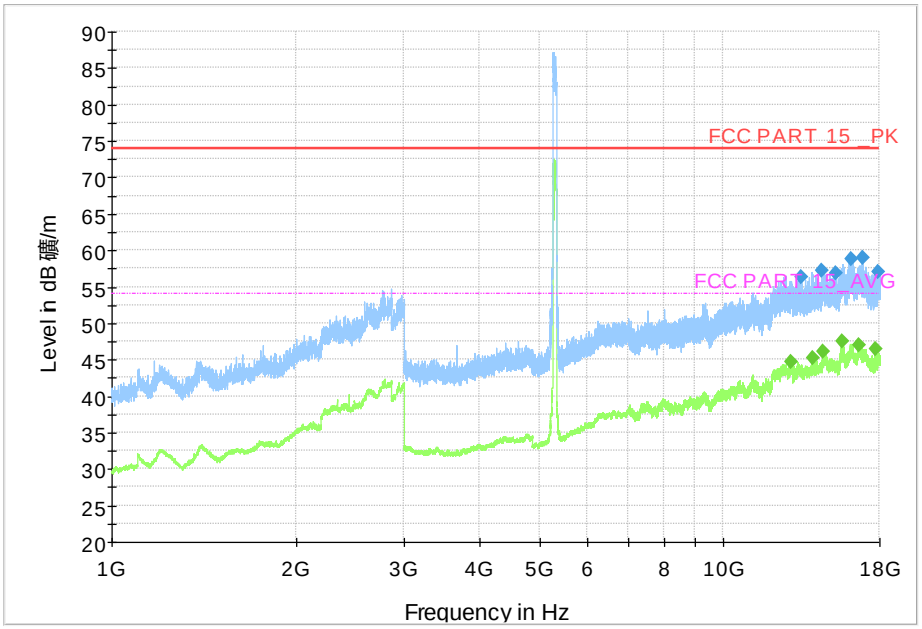

Fig. 85 Transmitter Spurious Emission (802. 11ac-VHT80, CH58 5290MHz)

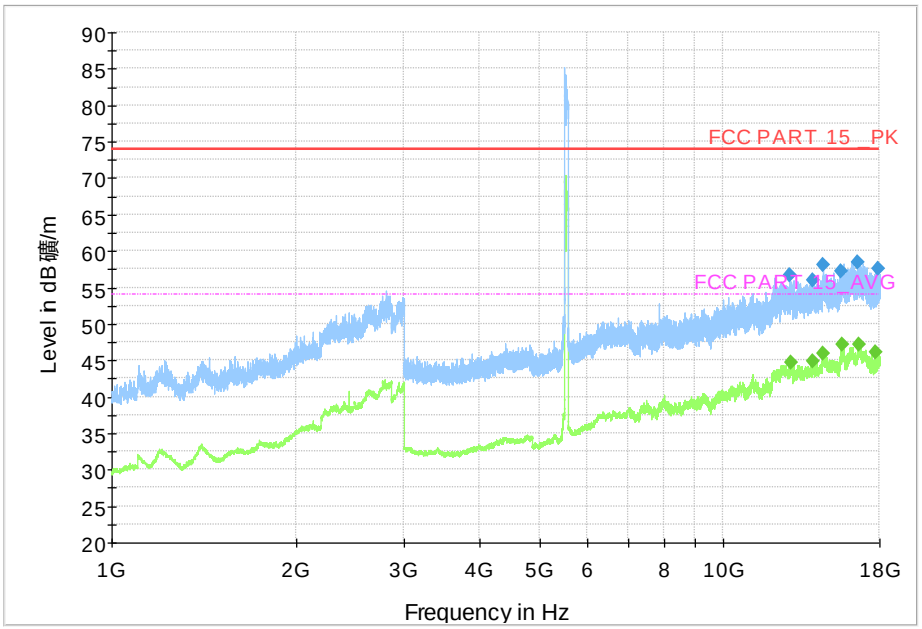

Fig. 86 Transmitter Spurious Emission (802. 11ac-VHT80, CH106 5530MHz)

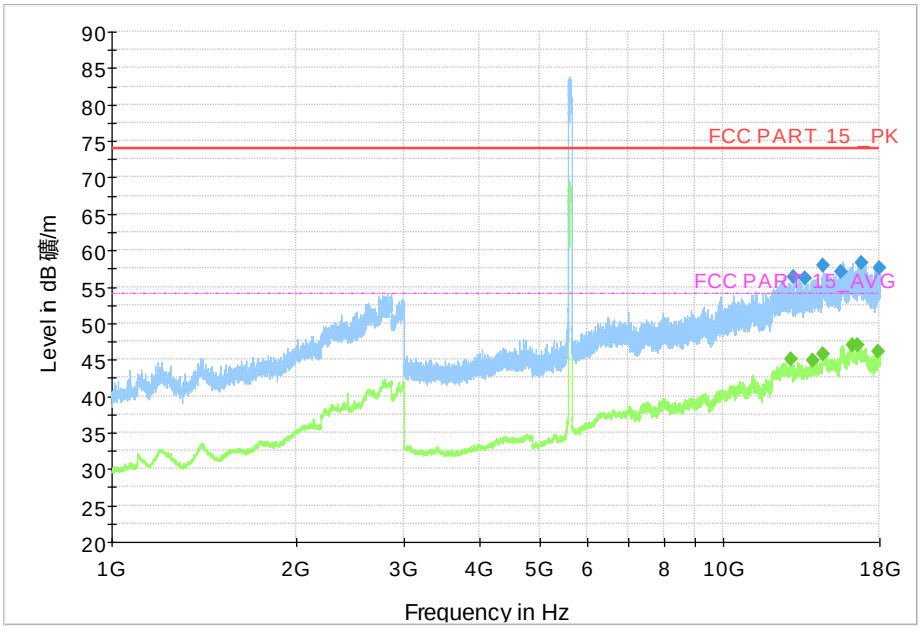

Fig. 87 Transmitter Spurious Emission (802. 11ac-VHT80, CH122 5610MHz)

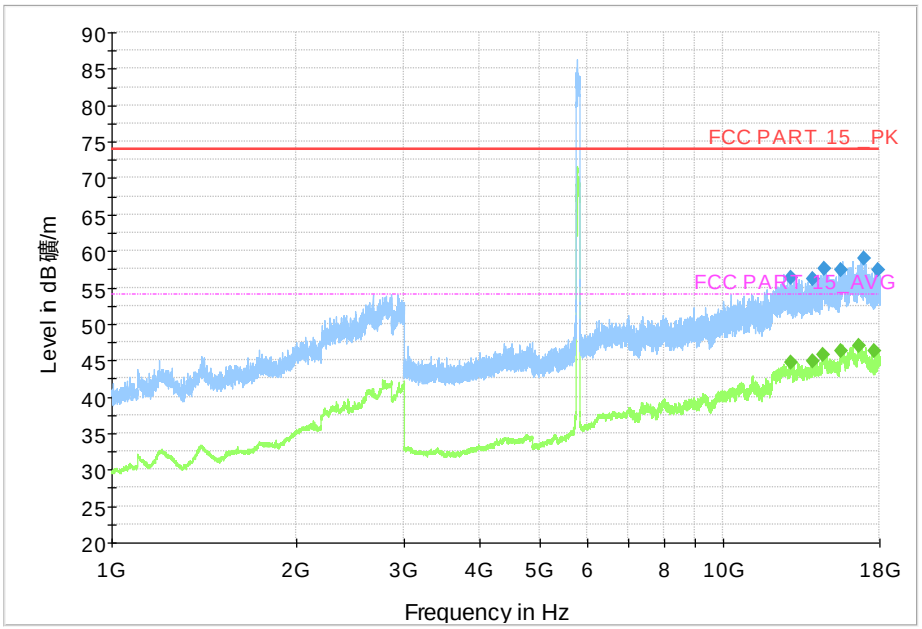

Fig. 88 Transmitter Spurious Emission (802. 11ac-VHT80, CH156 5775MHz)

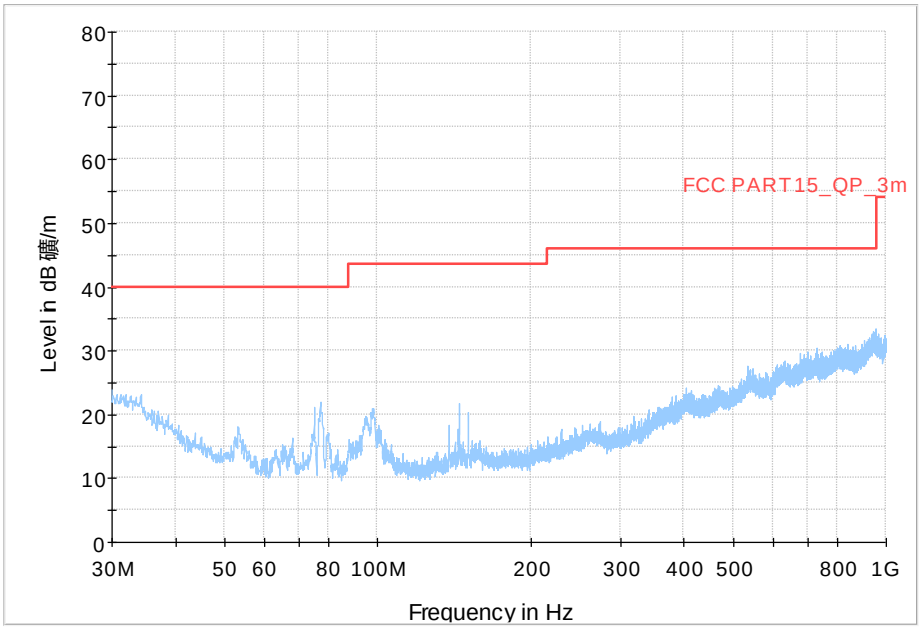

Fig. 89 Transmitter Spurious Emission (All channel, 30MHz~1GHz)

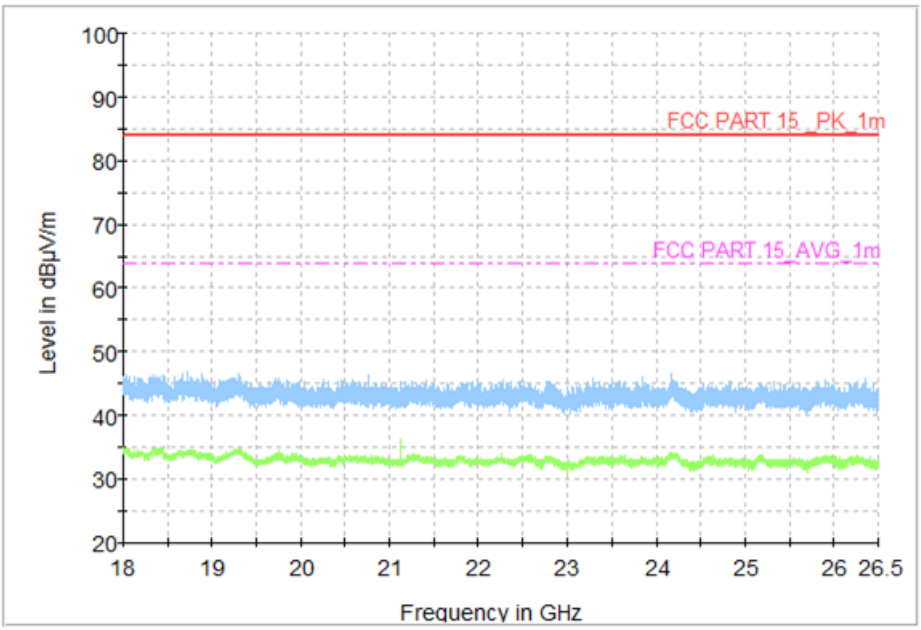

Fig. 90 Transmitter Spurious Emission (All channel, 18GHz~26.5GHz)

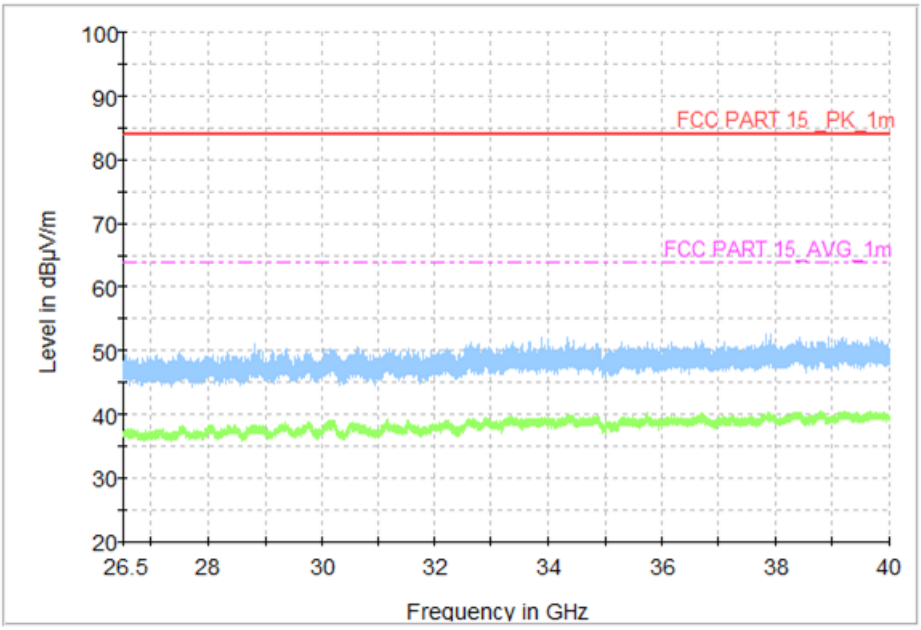

Fig. 91 Transmitter Spurious Emission (All channel, 26.5GHz~40GHz)

Worst Case Result

802.11a CH36

Frequency (MHz)	Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
12899.500000	56.22	74.00	17.78	V	20.0
13782.000000	55.59	74.00	18.41	H	19.3
14699.000000	56.46	74.00	17.54	V	20.7
15570.000000	55.69	74.00	18.31	V	21.0
15691.000000	57.97	74.00	16.03	H	21.3
17033.500000	56.87	74.00	17.13	V	22.4

Frequency (MHz)	Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
13948.000000	44.31	54.00	9.69	H	19.7
14687.500000	44.72	54.00	9.28	V	20.7
15575.500000	44.67	54.00	9.33	H	21.0
15664.500000	45.75	54.00	8.25	V	21.3
16635.000000	45.63	54.00	8.37	H	22.5
17694.500000	44.69	54.00	9.31	H	22.9

802.11a CH52

Frequency (MHz)	Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
14026.500000	57.03	74.00	16.97	V	19.4
14588.500000	57.55	74.00	16.45	V	20.5
15549.500000	57.23	74.00	16.77	H	20.8
16149.000000	58.95	74.00	15.05	H	22.3
16979.500000	58.95	74.00	15.05	H	22.8
17501.500000	57.66	74.00	16.34	V	22.1

Frequency (MHz)	Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
14003.500000	44.99	54.00	9.01	H	19.5
14565.000000	46.11	54.00	7.89	V	20.4
15566.500000	46.21	54.00	7.80	H	20.9
15664.000000	47.11	54.00	6.89	V	21.3
16618.000000	46.97	54.00	7.03	V	22.7
17703.000000	46.11	54.00	7.89	H	22.9

802.11a CH100

Frequency (MHz)	Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
13645.500000	55.96	74.00	18.04	V	19.2
14689.000000	57.44	74.00	16.56	H	20.7
15201.500000	57.43	74.00	16.57	H	20.3
15666.500000	58.72	74.00	15.28	H	21.3
16737.500000	59.14	74.00	14.86	V	21.9
17992.000000	57.69	74.00	16.31	H	23.0

Frequency (MHz)	Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
13977.500000	44.82	54.00	9.18	V	19.6
14567.000000	45.99	54.00	8.01	H	20.5
15577.000000	46.12	54.00	7.88	H	21.1
15674.000000	47.00	54.00	7.00	V	21.3
16613.500000	47.04	54.00	6.96	V	22.8
17700.500000	46.01	54.00	7.99	V	22.9

802.11a CH157

Frequency (MHz)	Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
14001.000000	56.29	74.00	17.71	H	19.5
14536.500000	57.25	74.00	16.75	H	20.4
15568.000000	56.77	74.00	17.23	V	21.0
15670.500000	58.77	74.00	15.23	H	21.3
16663.000000	58.83	74.00	15.17	H	22.2
17677.000000	57.22	74.00	16.78	H	22.6

Frequency (MHz)	Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
14000.500000	45.08	54.00	8.92	V	19.6
14550.500000	45.83	54.00	8.17	V	20.4
15566.000000	46.32	54.00	7.68	H	20.9
15664.500000	47.35	54.00	6.65	H	21.3
16643.000000	47.09	54.00	6.91	V	22.4
17886.500000	46.24	54.00	7.76	V	23.8

802.11n HT40 CH38

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
13971.500000	56.39	74.00	17.61	H	19.6
14538.000000	57.20	74.00	16.80	H	20.4
15572.500000	57.66	74.00	16.34	H	21.0
15597.000000	59.27	74.00	14.73	H	21.3
16846.000000	58.50	74.00	15.50	H	22.3
17744.500000	57.76	74.00	16.24	H	22.8

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
14014.500000	45.22	54.00	8.78	V	19.5
14559.500000	46.14	54.00	7.86	V	20.4
15567.500000	46.48	54.00	7.52	V	21.0
16275.000000	47.28	54.00	6.72	V	21.7
16625.500000	47.42	54.00	6.58	V	22.6
17701.500000	46.41	54.00	7.59	V	22.9

802.11n HT40 CH62

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
14146.500000	56.15	74.00	17.85	H	19.3
14662.000000	57.85	74.00	16.15	H	20.7
15573.500000	57.87	74.00	16.13	H	21.0
16147.500000	58.91	74.00	15.09	V	22.3
17025.000000	59.33	74.00	14.67	V	22.6
17677.000000	58.06	74.00	15.94	H	22.6

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
14012.500000	44.97	54.00	9.03	H	19.5
14564.000000	46.19	54.00	7.81	V	20.4
15576.500000	46.43	54.00	7.57	H	21.1
15666.000000	47.23	54.00	6.77	H	21.3
16620.000000	47.25	54.00	6.75	H	22.7
17669.500000	46.63	54.00	7.37	V	22.5

802.11n HT40 CH110

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
12947.500000	56.54	74.00	17.46	V	20.0
13953.000000	57.07	74.00	16.93	H	19.7
14580.000000	57.34	74.00	16.66	H	20.5
15533.000000	57.65	74.00	16.35	H	20.6
16596.500000	58.87	74.00	15.13	H	22.9
17895.500000	58.21	74.00	15.79	H	24.0

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
12901.000000	44.89	54.00	9.11	V	20.0
14017.000000	45.07	54.00	8.93	H	19.5
14556.000000	46.42	54.00	7.58	V	20.4
15575.000000	46.40	54.00	7.60	H	21.0
16619.000000	47.26	54.00	6.74	H	22.7
17876.500000	46.48	54.00	7.52	V	23.7

802.11n HT40 CH151

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
12927.000000	55.82	74.00	18.18	V	20.0
14029.000000	56.98	74.00	17.02	V	19.4
14551.000000	57.47	74.00	16.53	H	20.4
15573.500000	57.84	74.00	16.16	H	21.0
16240.000000	58.77	74.00	15.23	V	22.1
17905.500000	58.58	74.00	15.42	H	24.0

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
12886.500000	44.83	54.00	9.17	H	19.9
14012.000000	45.21	54.00	8.79	V	19.5
14558.000000	46.36	54.00	7.64	V	20.4
15577.500000	46.55	54.00	7.45	H	21.1
16288.000000	47.21	54.00	6.79	V	21.6
17703.500000	46.61	54.00	7.39	H	22.9

802.11ac VHT80 CH42

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
13384.500000	56.22	74.00	17.78	H	19.5
13993.000000	57.08	74.00	16.92	H	19.6
14692.500000	57.51	74.00	16.49	V	20.7
15552.000000	57.13	74.00	16.87	V	20.8
16854.000000	58.88	74.00	15.12	H	22.3
17900.500000	57.49	74.00	16.51	H	24.0

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
12900.500000	44.80	54.00	9.20	H	20.0
14007.500000	44.91	54.00	9.09	V	19.5
14553.500000	46.04	54.00	7.96	V	20.4
15657.000000	47.06	54.00	6.94	V	21.3
16621.500000	47.02	54.00	6.98	V	22.7
17697.000000	46.13	54.00	7.87	V	22.9

802.11ac VHT80 CH106

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
12833.000000	56.59	74.00	17.41	H	19.6
13993.500000	55.93	74.00	18.07	H	19.6
14536.000000	58.03	74.00	15.97	H	20.4
15576.500000	57.20	74.00	16.80	V	21.1
16608.000000	58.44	74.00	15.56	V	22.8
17897.000000	57.52	74.00	16.48	H	24.0

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
12901.000000	44.69	54.00	9.31	V	20.0
13993.500000	44.85	54.00	9.15	H	19.6
14564.500000	46.01	54.00	7.99	V	20.4
15665.000000	47.11	54.00	6.89	V	21.3
16634.000000	47.20	54.00	6.80	V	22.5
17700.000000	46.14	54.00	7.86	H	22.9

Note:

A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss. P_{Mea} is the field strength recorded from the instrument. The measurement results are obtained as described below:

Result = P_{Mea} + A_{Rpl} = P_{Mea} + Cable Loss + Antenna Factor

A.9. Radiated Spurious Emissions < 30MHz

Measurement Limit (15.209, 9kHz-30MHz):

Frequency (MHz)	Field strength (μV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

The measurement is made according to KDB 789033.

Note: The measurement distance during the test is 3m. The limit used in plots recalculated based on the extrapolation factor of 40 dB/decade.

Measurement Result(Worst case):

Mode	Frequency Range	Test Results	Conclusion
All Channel	9 kHz ~30 MHz	Fig.92	P

Conclusion: PASS

Test graphs as below:

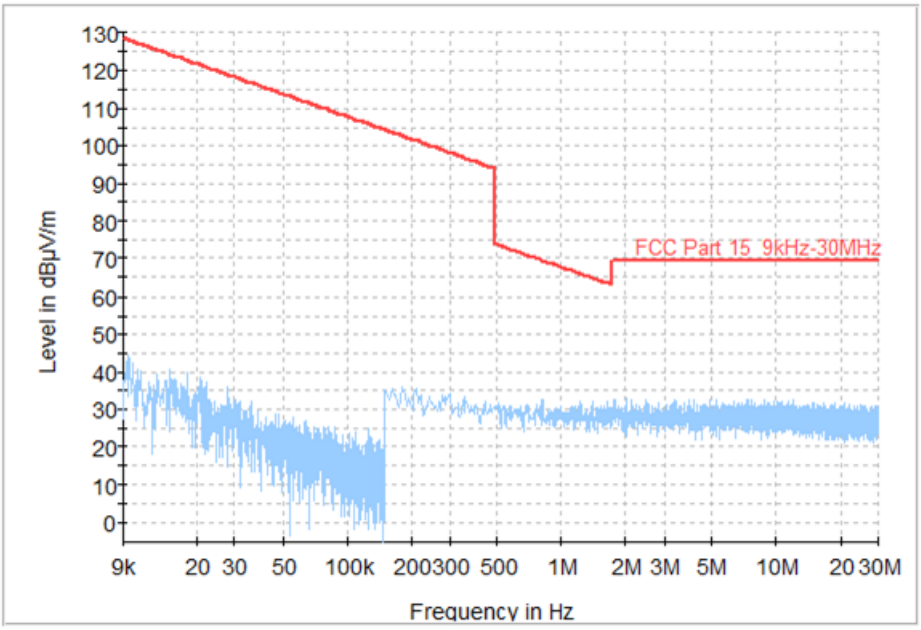

Fig. 92 Radiated Spurious Emission (All Channel, 9 kHz ~30 MHz)

A.10. AC Power Line Conducted Emission

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Measurement Result and limit:

RLAN (Quasi-peak Limit)-AE1

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.93	Fig.94	P
0.5 to 5	56			
5 to 30	60			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

RLAN (Average Limit)-AE1

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig 122	Fig 123	P
0.5 to 5	46			
5 to 30	50			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Note: The measurement results include the L1 and N measurements.

Conclusion: PASS

Test graphs as below:

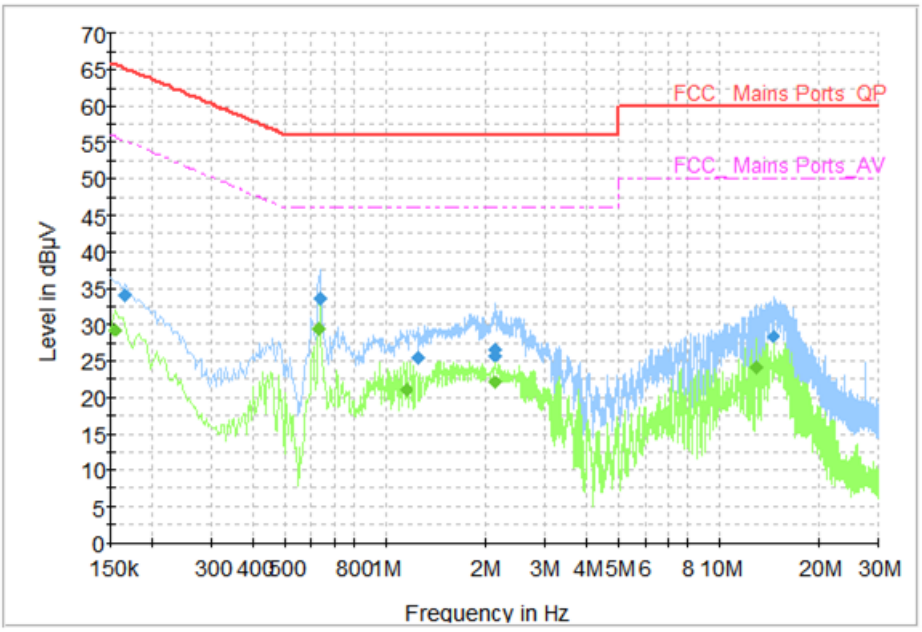

Fig. 93 AC Power line Conducted Emission (802.11n, AE1, 120V)

Measurement Result: Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.166000	33.98	65.16	31.18	N	ON	9.6
0.634000	33.48	56.00	22.52	N	ON	9.7
1.242000	25.41	56.00	30.59	N	ON	9.7
2.118000	25.74	56.00	30.26	L1	ON	9.7
2.126000	26.68	56.00	29.32	L1	ON	9.7
14.570000	28.32	60.00	31.68	L1	ON	10.1

Measurement Result: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154000	29.19	55.78	26.59	L1	ON	9.7
0.630000	29.38	46.00	16.62	N	ON	9.7
1.154000	20.91	46.00	25.09	N	ON	9.7
2.118000	22.09	46.00	23.91	L1	ON	9.7
2.126000	22.11	46.00	23.89	L1	ON	9.7
12.958000	24.18	50.00	25.82	N	ON	9.9

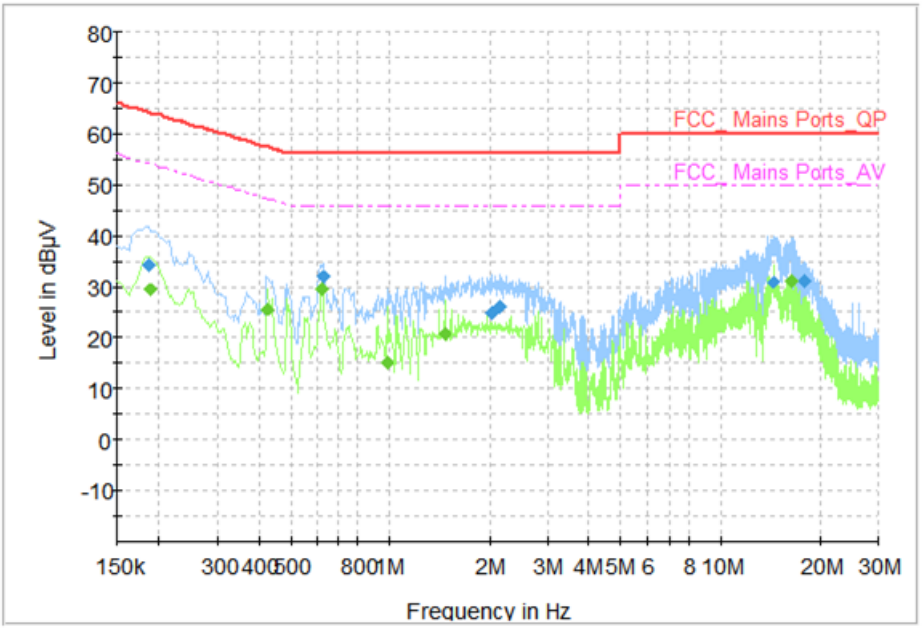

Fig. 94 AC Power line Conducted Emission (Idle, AE1, 120V)

Measurement Result: Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.186000	34.23	64.21	29.98	N	ON	9.6
0.634000	31.95	56.00	24.05	L1	ON	9.7
2.038000	24.80	56.00	31.20	N	ON	9.7
2.142000	26.12	56.00	29.88	N	ON	9.7
14.450000	30.83	60.00	29.17	N	ON	10.0
17.930000	31.25	60.00	28.75	N	ON	10.2

Measurement Result: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.190000	29.44	54.04	24.60	L1	ON	9.7
0.426000	25.47	47.33	21.86	N	ON	9.7
0.622000	29.60	46.00	16.40	L1	ON	9.7
0.982000	14.95	46.00	31.05	N	ON	9.7
1.470000	20.80	46.00	25.20	N	ON	9.7
16.410000	31.25	50.00	18.75	L1	ON	10.1

A.11. Frequency Stability

Manufacturers ensured the EUT meet the requirement of frequency stability, such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

Measurement Result:

Mode	Channel	Condition		Frequency	Conclusion
802.11a	5180 MHz (CH36)	T nom	V nom	5179.9831	**P**
		T max	V nom	5179.9853	**P**
		T min	V nom	5179.9845	**P**
		T nom	V max	5179.9831	**P**
		T nom	V min	5179.9773	**P**
802.11n HT40	5550 MHz (CH110)	T nom	V nom	5549.9131	**P**
		T max	V nom	5549.9638	**P**
		T min	V nom	5549.9684	**P**
		T nom	V max	5549.9658	**P**
		T nom	V min	5549.9652	**P**
802.11ac VHT80	5690 MHz (CH138)	T nom	V nom	5689.9831	**P**
		T max	V nom	5689.9752	**P**
		T min	V nom	5689.9754	**P**
		T nom	V max	5689.9842	**P**
		T nom	V min	5689.9753	**P**

A.12. Power control

A Transmission Power Control mechanism is not required for systems with an e.i.r.p. of less than 27dBm (500mW).

*** **END OF REPORT BODY** ***