

Fig. 45 99% Occupied Bandwidth (802.11n-HT40, 5190MHz)

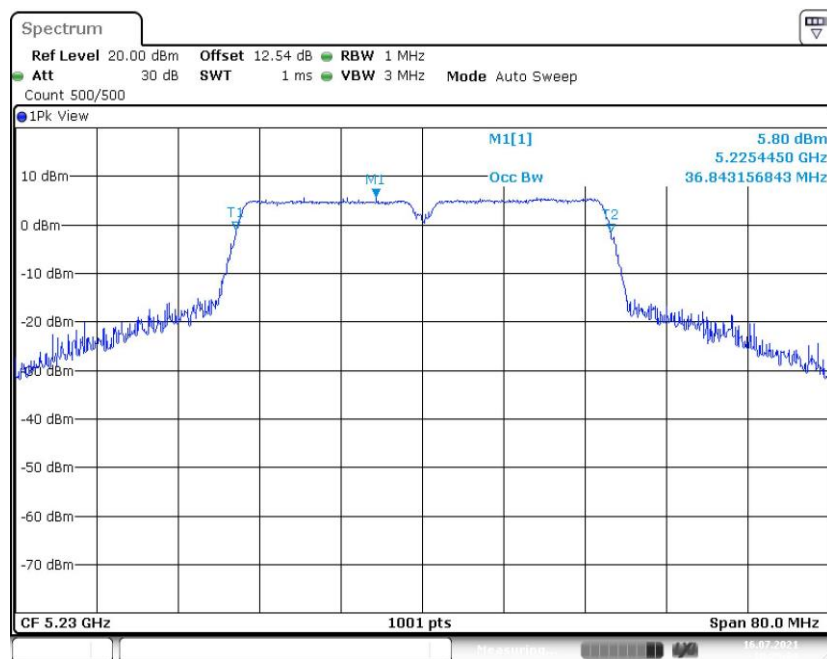


Fig. 46 99% Occupied Bandwidth (802.11n-HT40, 5230MHz)

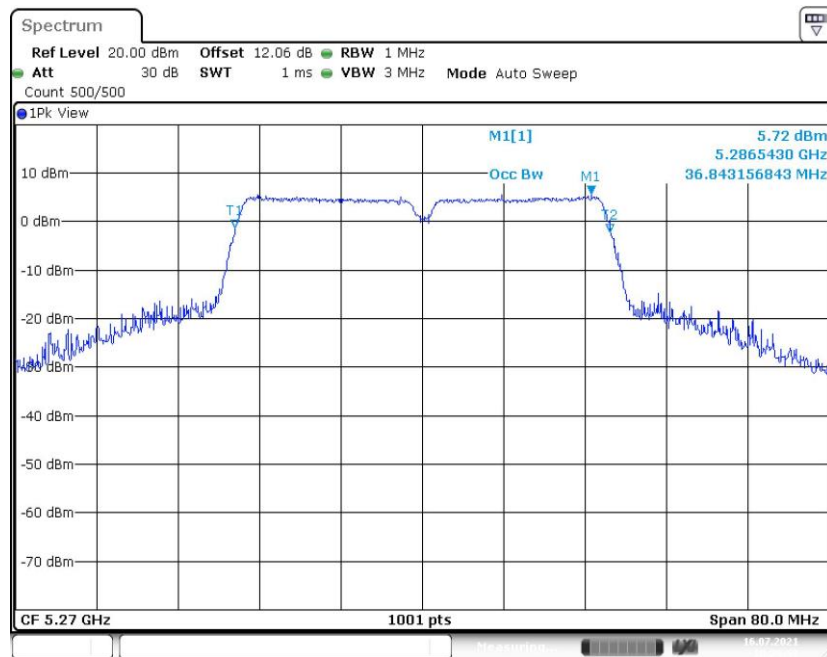


Fig. 47 99% Occupied Bandwidth (802.11n-HT40, 5270MHz)

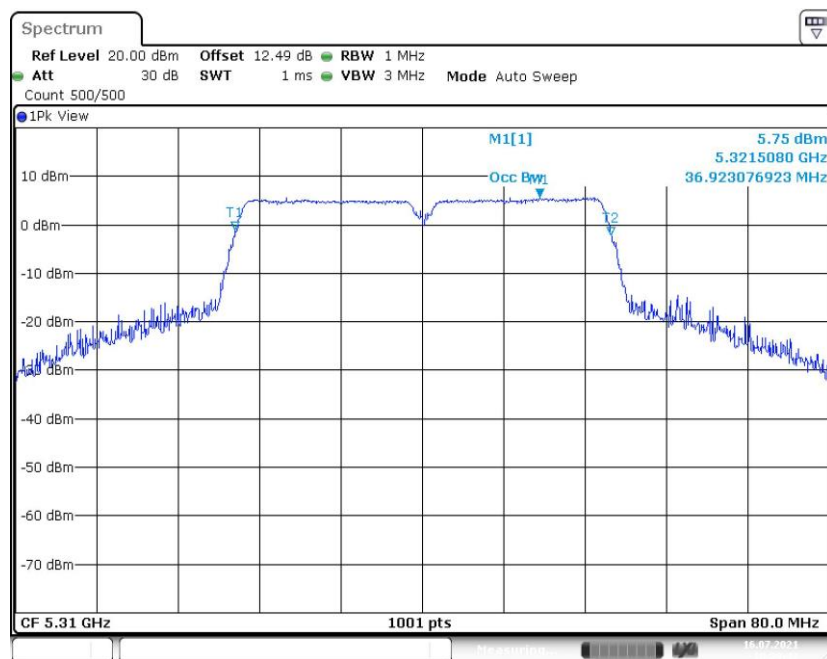


Fig. 48 99% Occupied Bandwidth (802.11n-HT40, 5310MHz)

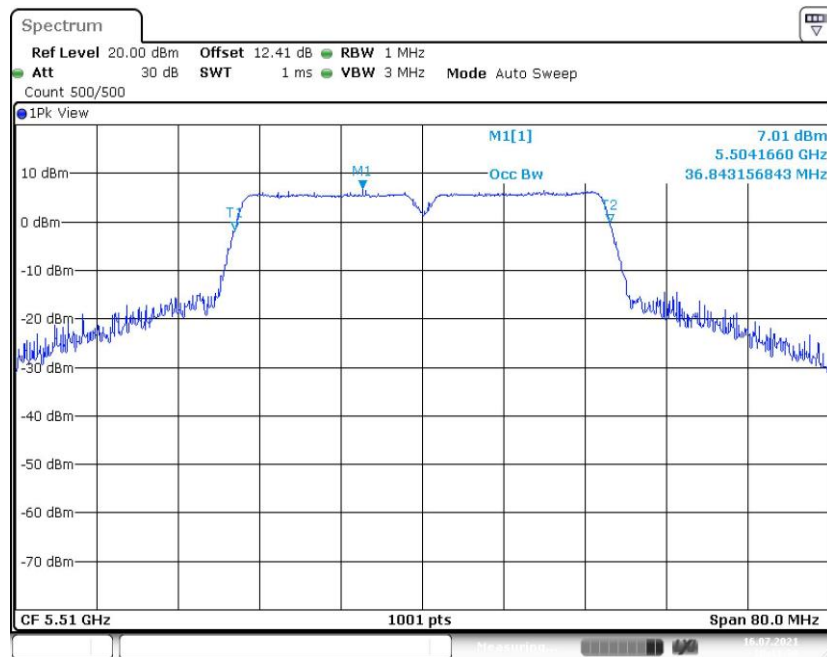


Fig. 49 99% Occupied Bandwidth (802.11n-HT40, 5510MHz)

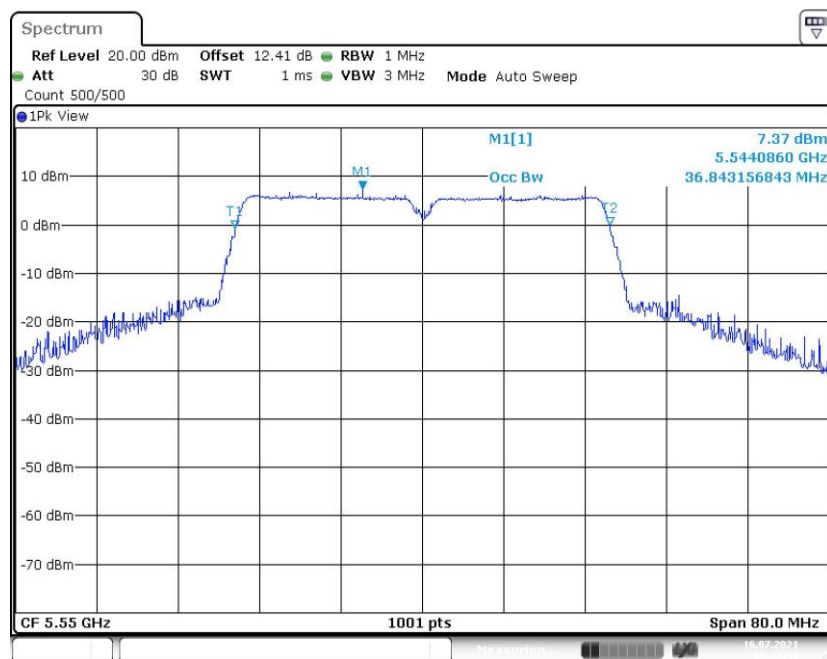


Fig. 50 99% Occupied Bandwidth (802.11n-HT40, 5550MHz)

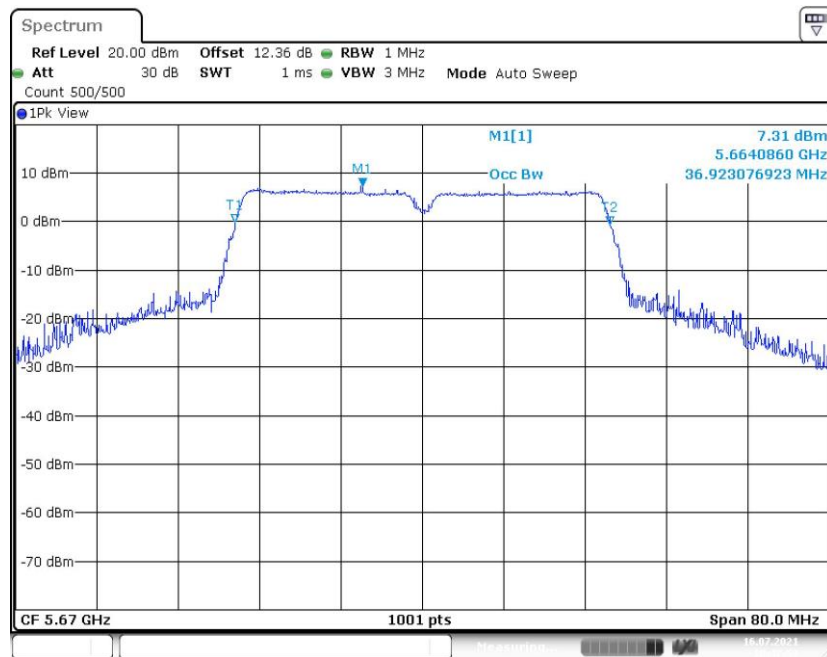


Fig. 51 99% Occupied Bandwidth (802.11n-HT40, 5670MHz)

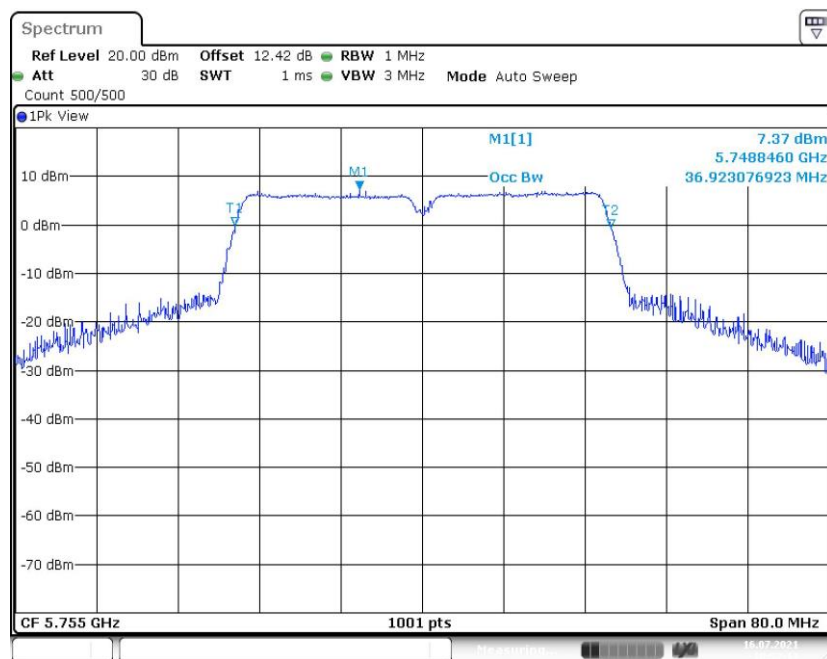


Fig. 52 99% Occupied Bandwidth (802.11n-HT40, 5755MHz)

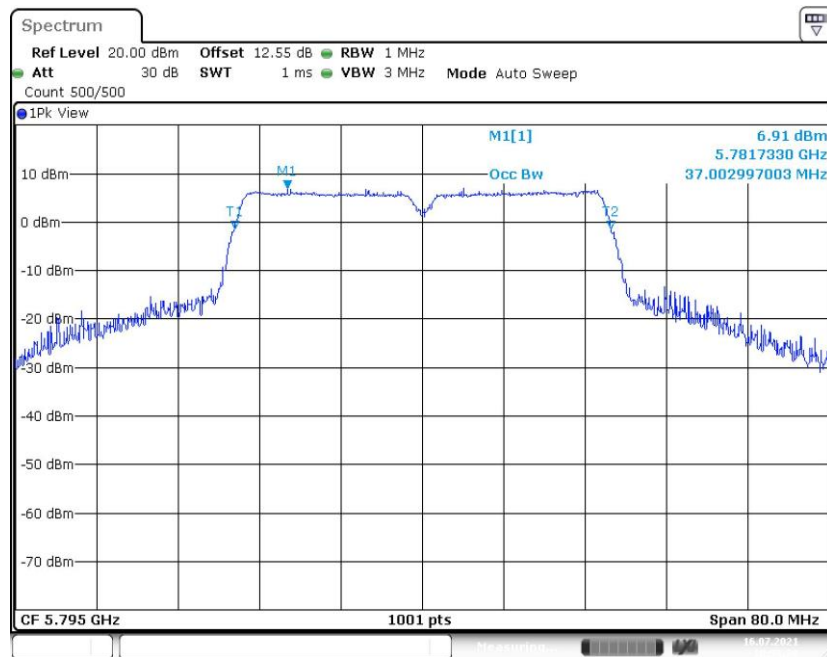


Fig. 53 99% Occupied Bandwidth (802.11n-HT40, 5795MHz)

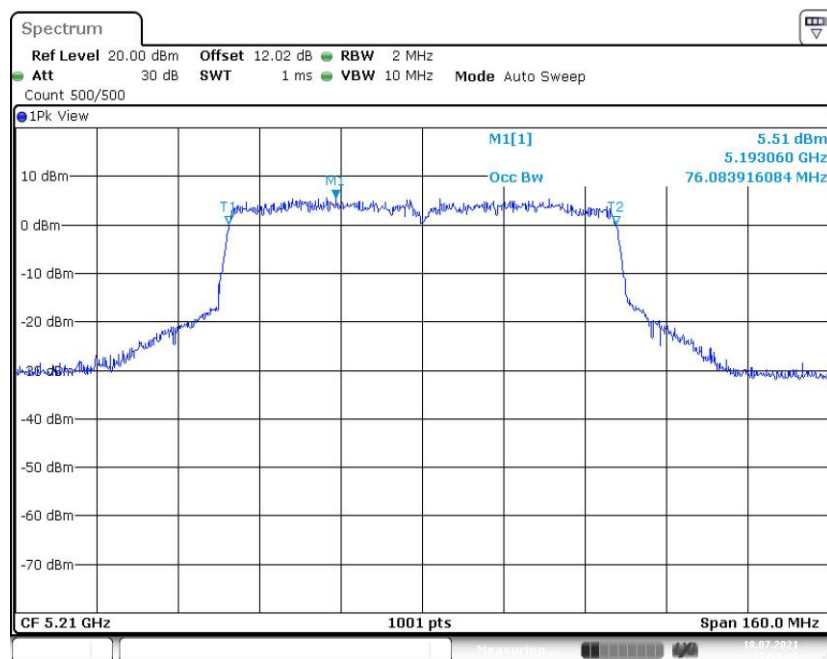


Fig. 54 99% Occupied Bandwidth (802.11ac-VHT80, 5210MHz)

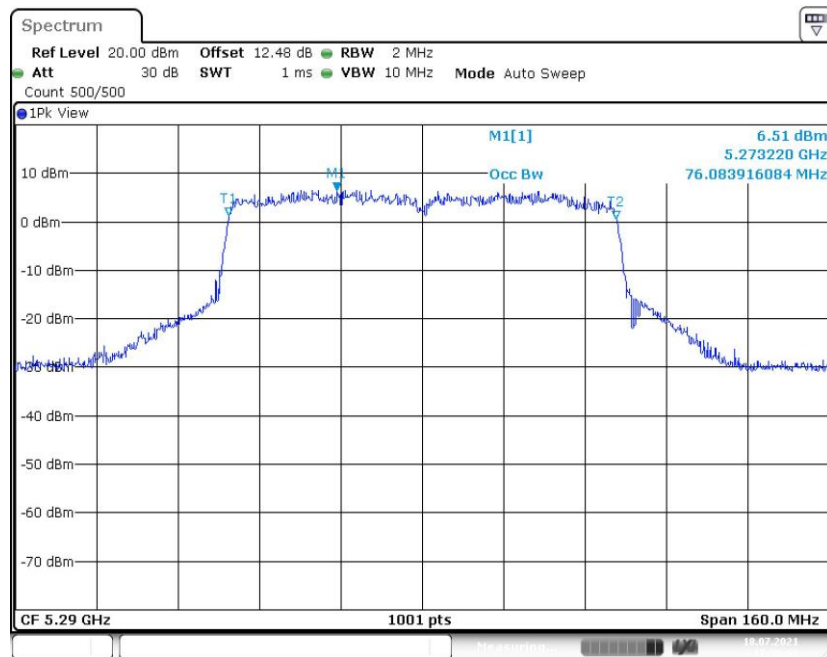


Fig. 55 99% Occupied Bandwidth (802.11ac-VHT80, 5290MHz)

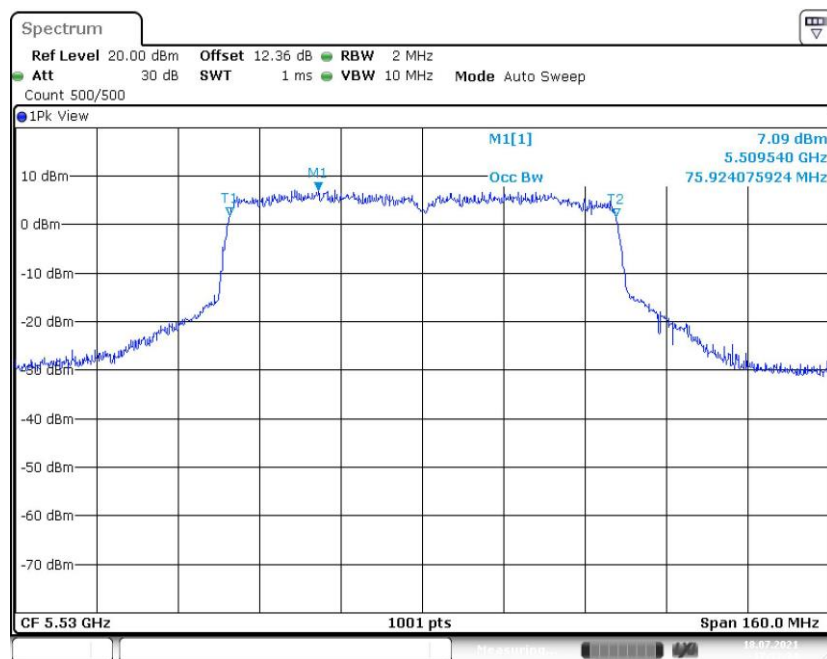


Fig. 56 99% Occupied Bandwidth (802.11ac-VHT80, 5530MHz)

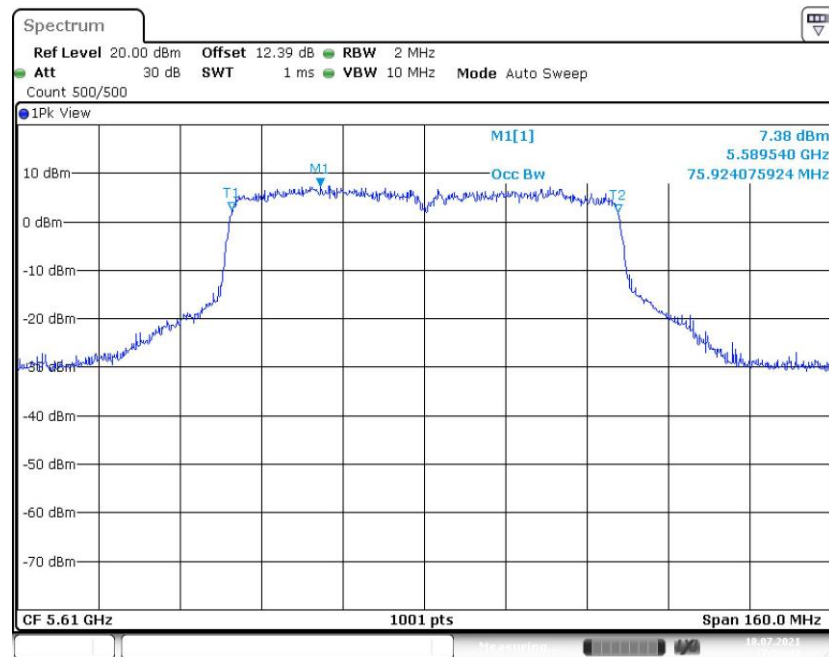


Fig. 57 99% Occupied Bandwidth (802.11ac-VHT80, 5610MHz)

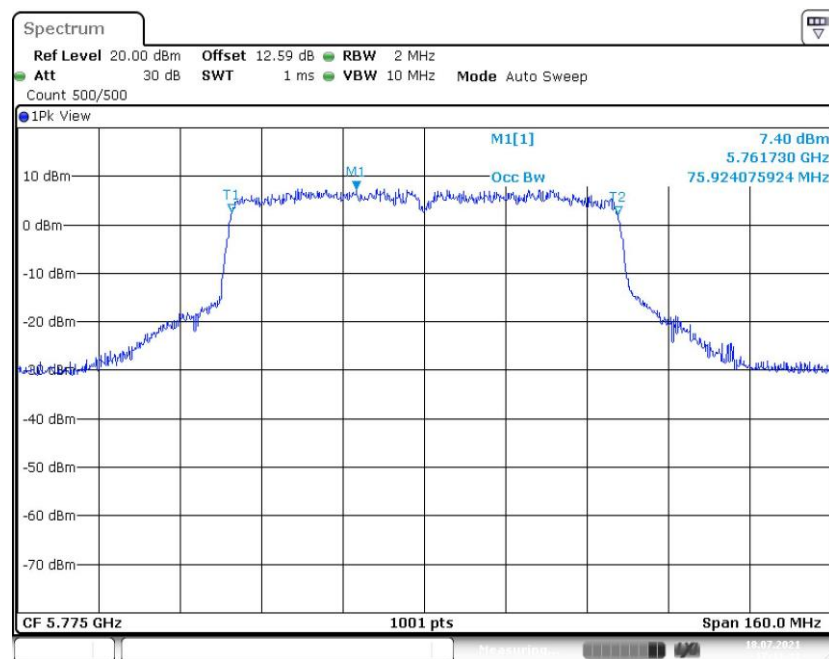


Fig. 58 99% Occupied Bandwidth (802.11ac-VHT80, 5775MHz)

A.7. Dynamic Frequency Selection

The EUT is Client without radar detection (only support client mode).

Measurement Limit:

Standard	Test Items	Limit
FCC 47 CFR Part 15.407 (h)	Channel Move Time	< 10 s
	Channel Closing Transmission Time	< 200 ms + 60 ms
	Non-Occupancy Period	> 1800 s

The measurement is made according to KDB 905462.

1). Parameters of DFS test signal:

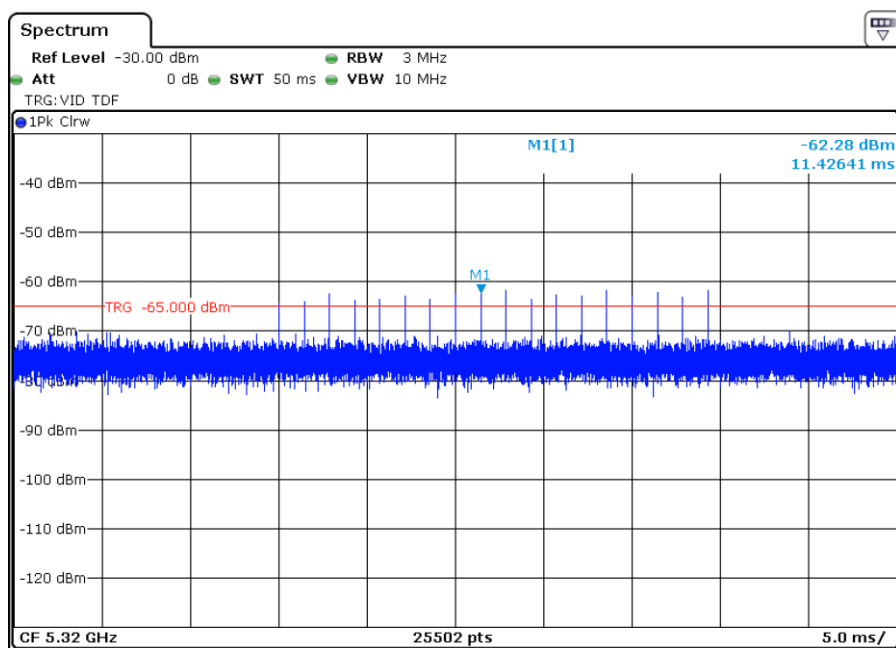
Interference threshold values, master or client incorporation in service monitoring. For device Power less than 23dBm (E.I.R.P.), the threshold level is -62 dBm at the antenna port after Correction for antenna gain and procedural adjustments.

Because of conducted measurement performed, the calibration power from radar signal generator to antenna port of DFS test equipment is -62 dBm.

Maximum Transmit Power	Value
> 200 mW	-64 dBm
< 200 mW	-62 dBm

2). Parameters of the reference DFS test signal:

Pulse width W (μs)	Pulse repetition frequency PRF (PPS)	Pulses per burst (PPB)
1	700	18



Radar Signal (Type 0)

Measurement Results:

Channel Move Time & Channel Closing Transmission Time:

Mode	Channel	Test Results	Conclusion
802.11a	5320MHz(Ch64)	Fig.59	P
802.11ac-VHT80	5530MHz(Ch106)	Fig.60	P

Non-Occupancy Period:

Mode	Channel	Test Results	Conclusion
802.11a	5320MHz(Ch64)	Fig.61	P
802.11ac-VHT80	5530MHz(Ch106)	Fig.62	P

See below for test graphs.

Conclusion: **PASS**

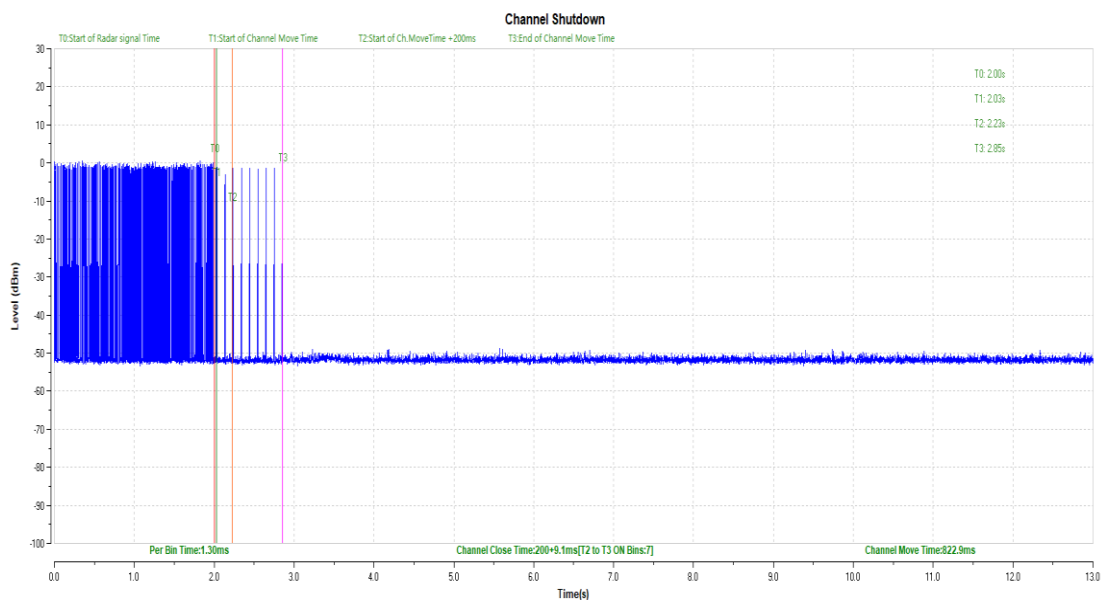


Fig. 59 Channel Move Time & Channel Closing Transmission Time (802.11a Frequency Band: 5250MHz ~ 5350MHz)

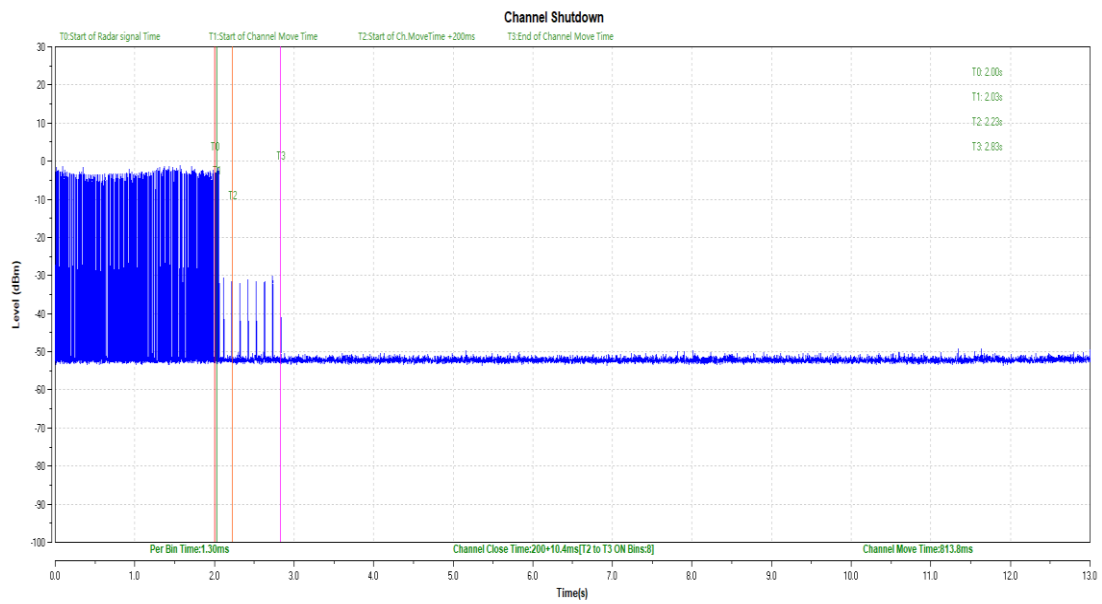


Fig. 60 Channel Move Time & Channel Closing Transmission Time (802.11ac-VHT80 Frequency Band: 5470MHz~5725MHz)

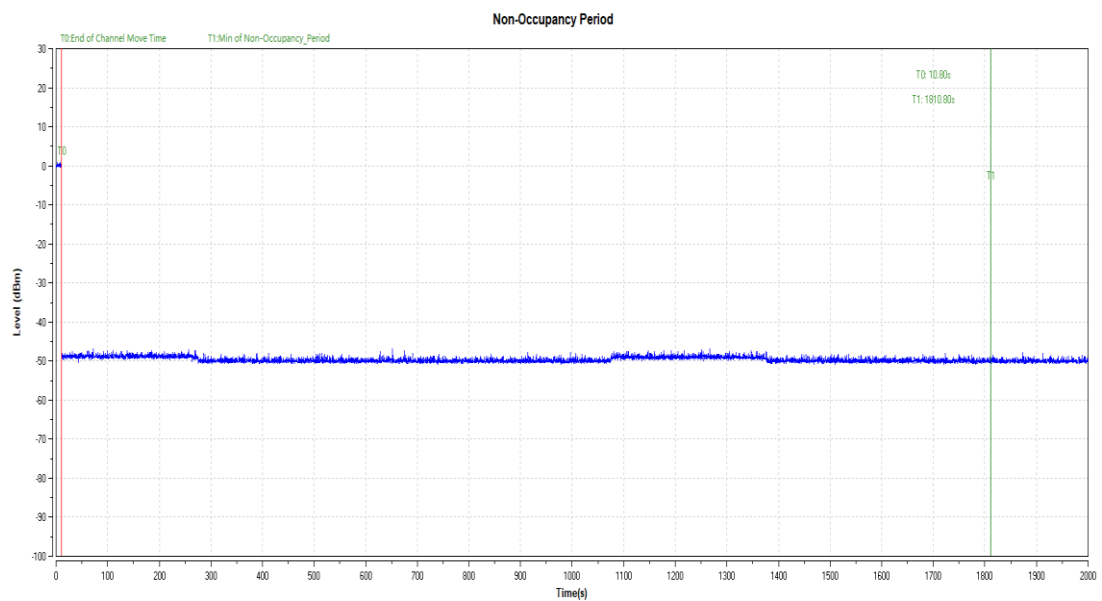


Fig. 61 Non-Occupancy Period (802.11a Frequency Band: 5250MHz ~ 5350MHz)

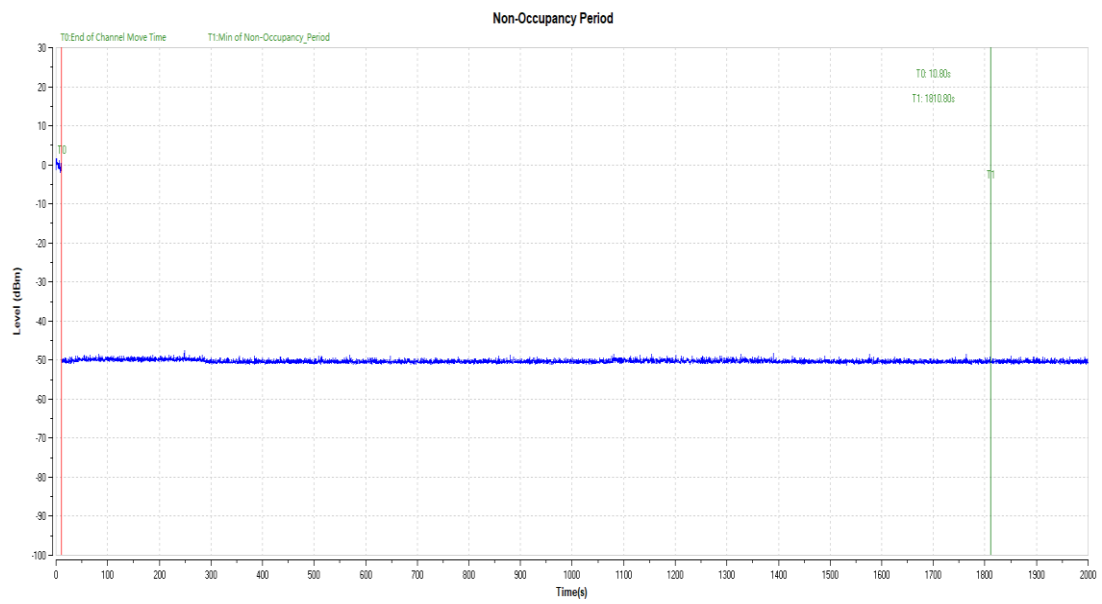


Fig. 62 Non-Occupancy Period (802.11ac-VHT80 Frequency Band: 5470MHz~5725MHz)

A.8. 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

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)).

Measurement Result:

Mode	Channel	Test Results	Conclusion
802.11a	5180 MHz(CH36)	Fig.63	P
	5320 MHz(CH64)	Fig.64	P
	5500 MHz(CH100)	Fig.65	P
	5700 MHz(CH140)	Fig.66	P
	5745 MHz(CH149)	Fig.67	P
	5825 MHz(CH165)	Fig.68	P
802.11n-HT40	5190 MHz(CH38)	Fig.69	P
	5310 MHz(CH62)	Fig.70	P
	5510 MHz(CH102)	Fig.71	P
	5670 MHz(CH134)	Fig.72	P
	5755 MHz(CH151)	Fig.73	P
	5795 MHz(CH159)	Fig.74	P
802.11ac-VHT80	5210 MHz(CH42)	Fig.75	P
	5290 MHz(CH58)	Fig.76	P
	5530 MHz(CH106)	Fig.77	P
	5610MHz(Ch122)	Fig.78	P
	5775 MHz(CH155)	Fig.79	P

See below for test graphs.

Conclusion: PASS

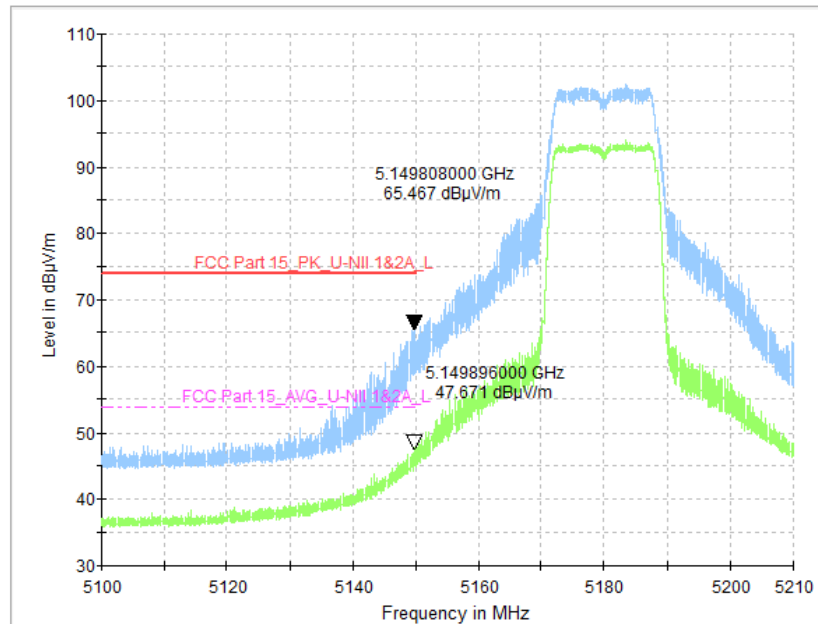


Fig. 63 Band Edges (802.11a, CH36 5180MHz)

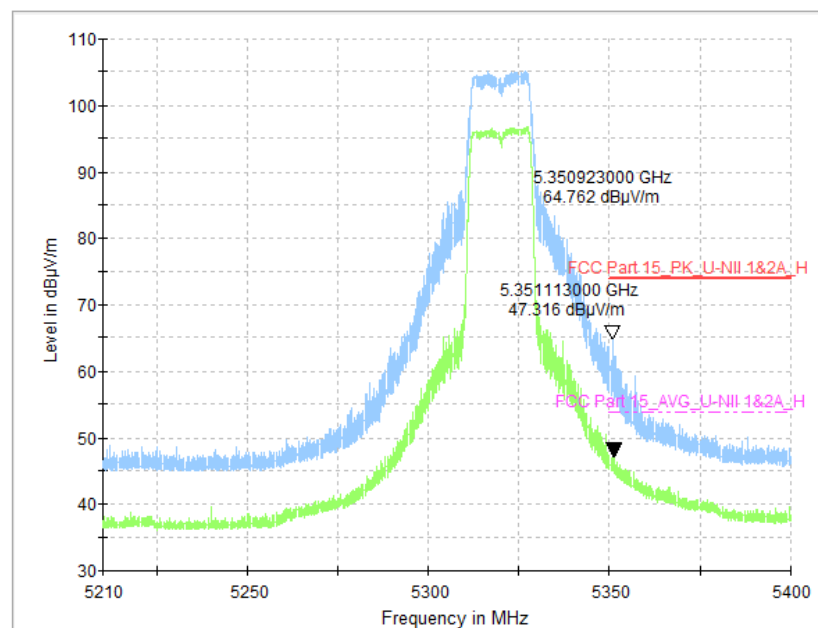


Fig. 64 Band Edges (802.11a, CH64 5320MHz)

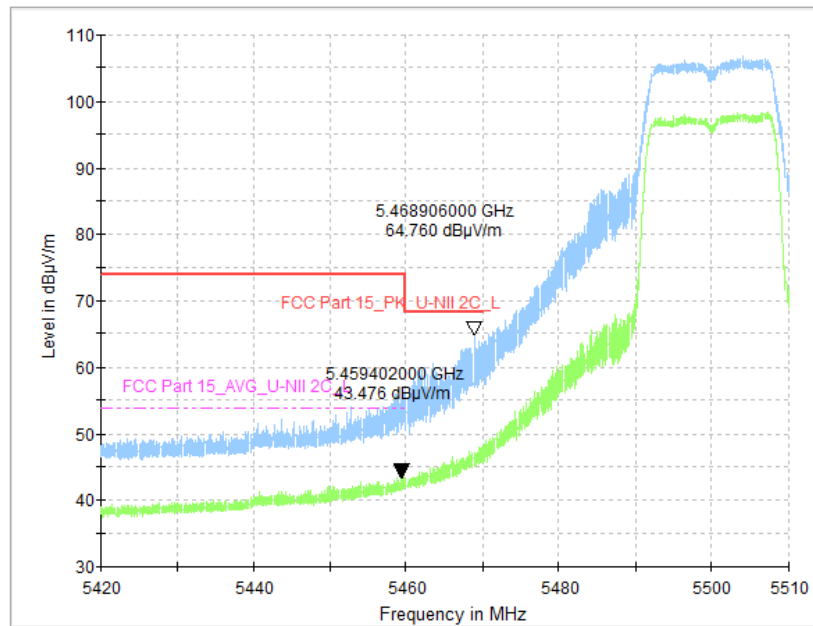


Fig. 65 Band Edges (802.11a, CH100 5500MHz)

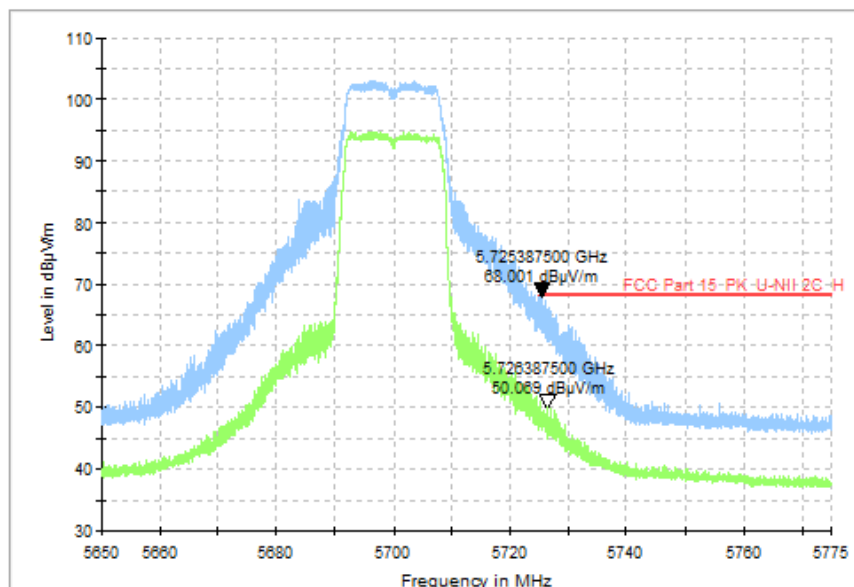


Fig. 66 Band Edges (802.11a, CH140 5700MHz)

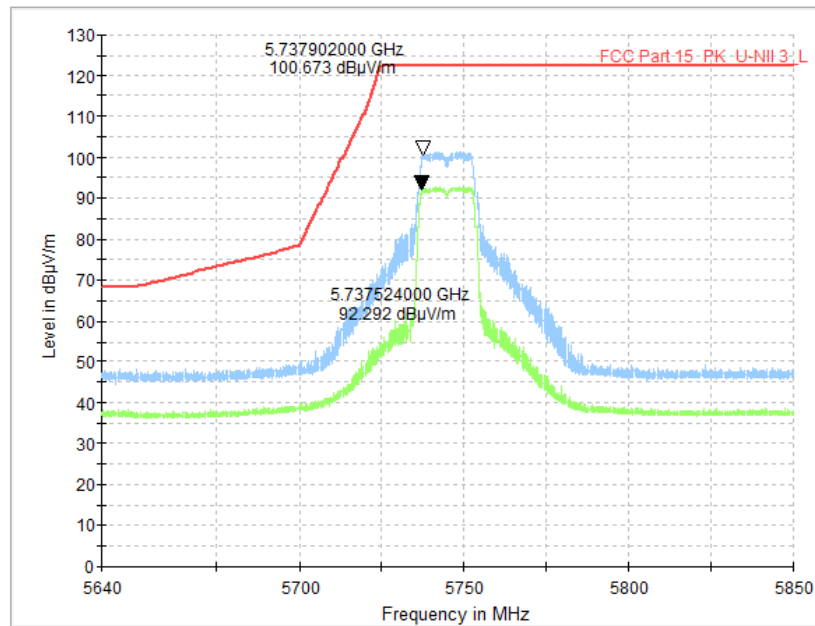


Fig. 67 Band Edges (802.11a, CH149 5745MHz)

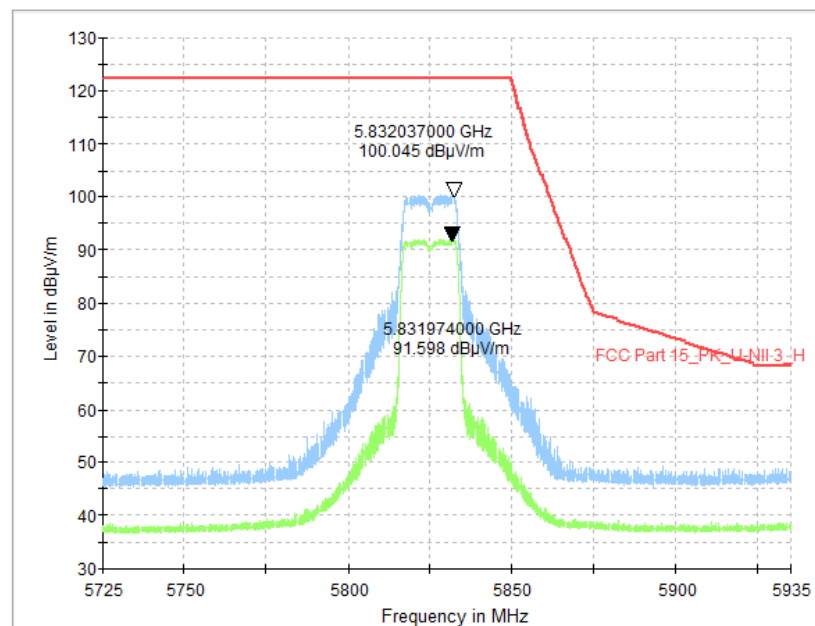


Fig. 68 Band Edges (802.11a, CH165 5825MHz)

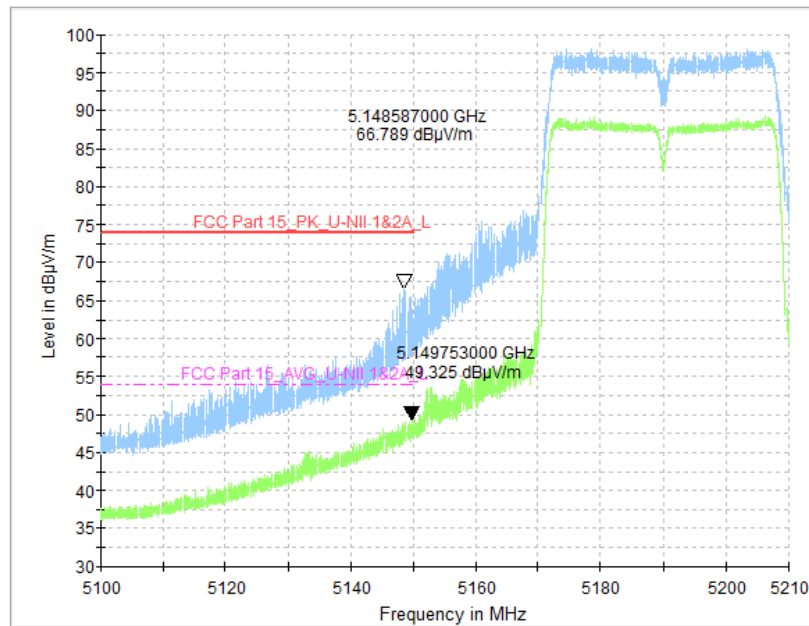


Fig. 69 Band Edges (802.11n-HT40, CH38 5190MHz)

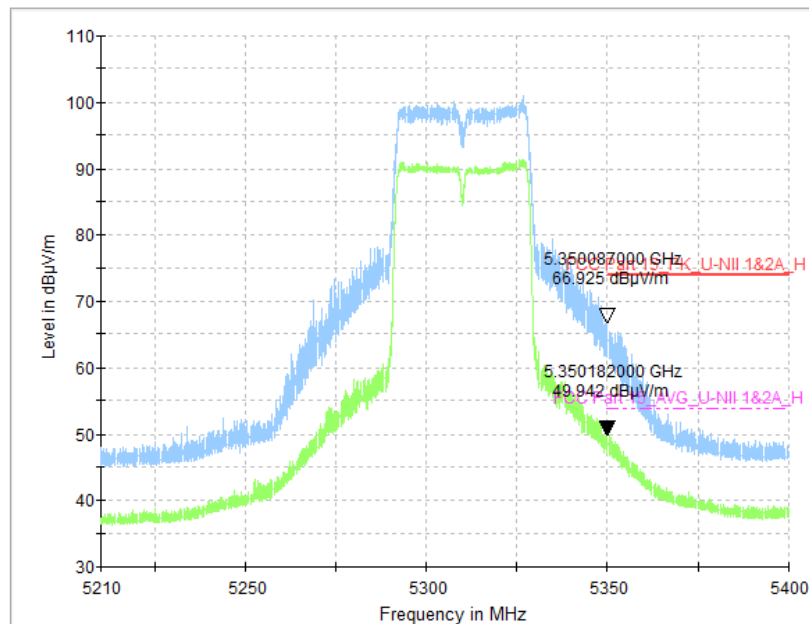


Fig. 70 Band Edges (802.11n-HT40, CH62 5310MHz)

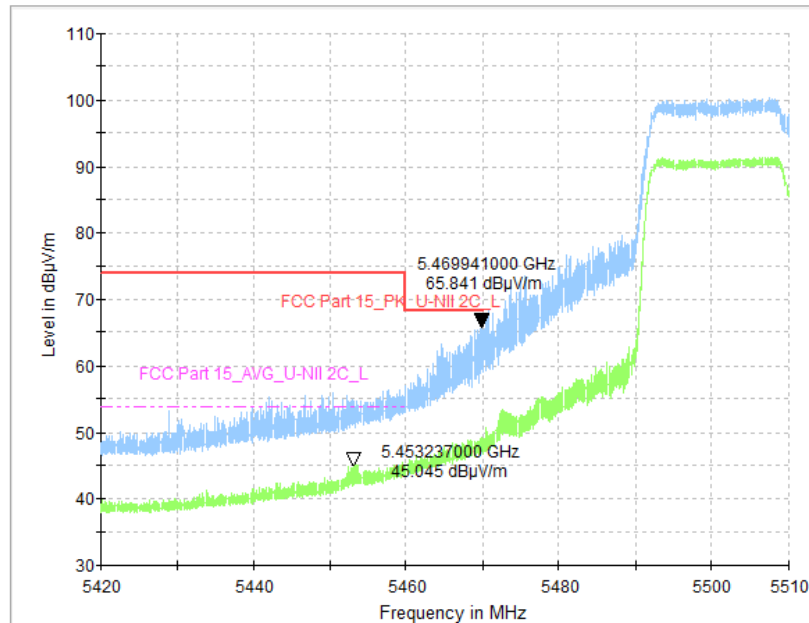


Fig. 71 Band Edges (802.11n-HT40, CH102 5510MHz)

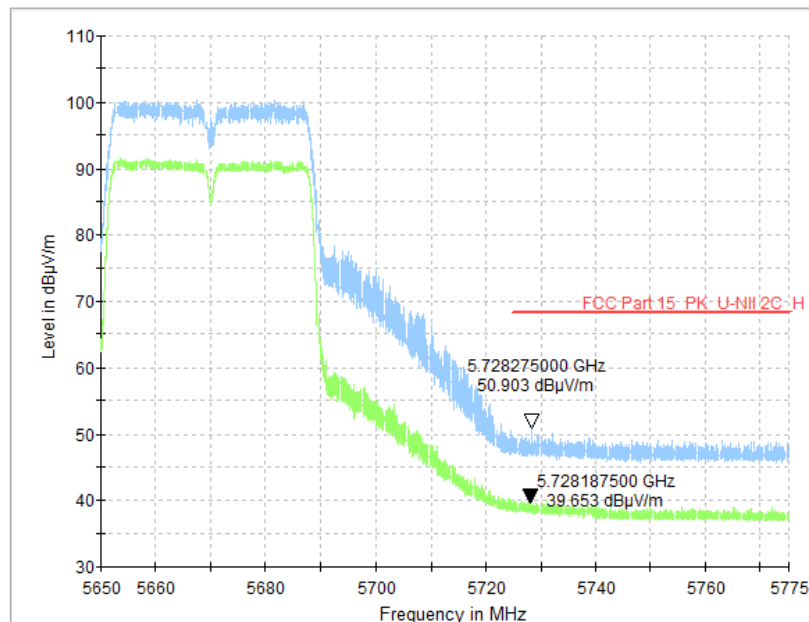


Fig. 72 Band Edges (802.11n-HT40, CH134 5670MHz)

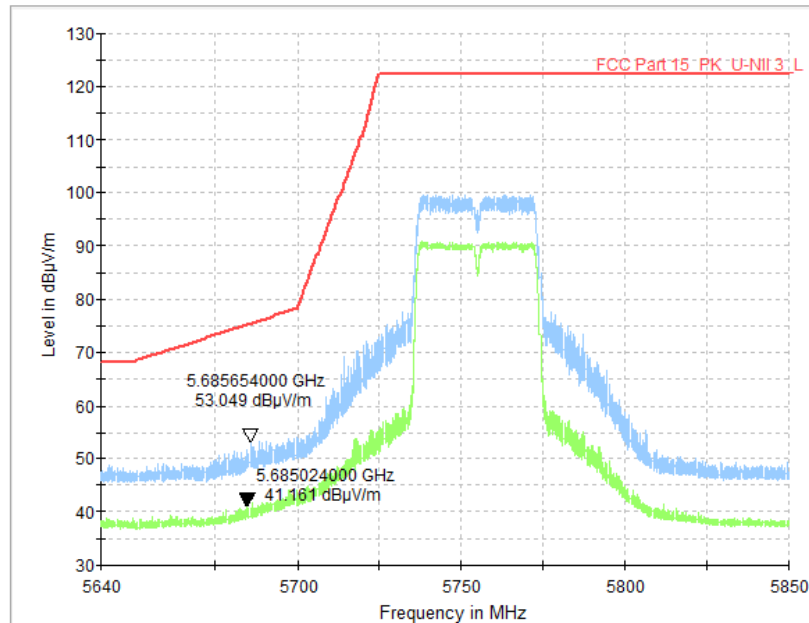


Fig. 73 Band Edges (802.11n-HT40, CH151 5755MHz)

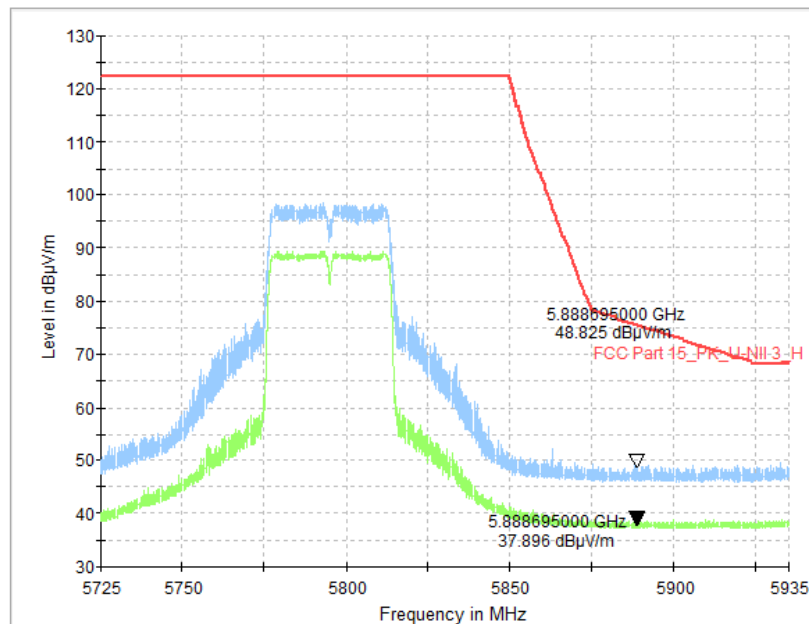


Fig. 74 Band Edges (802.11n-HT40, CH159 5795MHz)

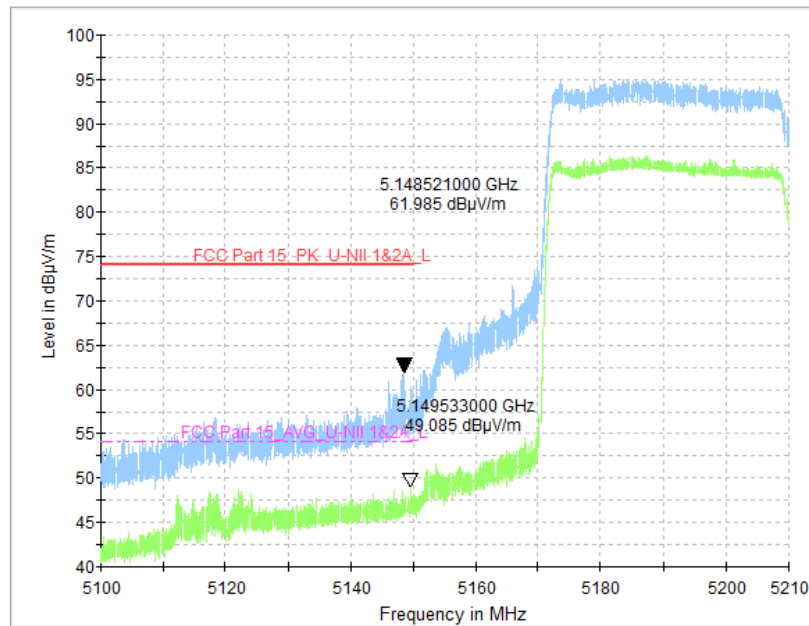


Fig. 75 Band Edges (802.11ac-VHT80, CH42 5210MHz)

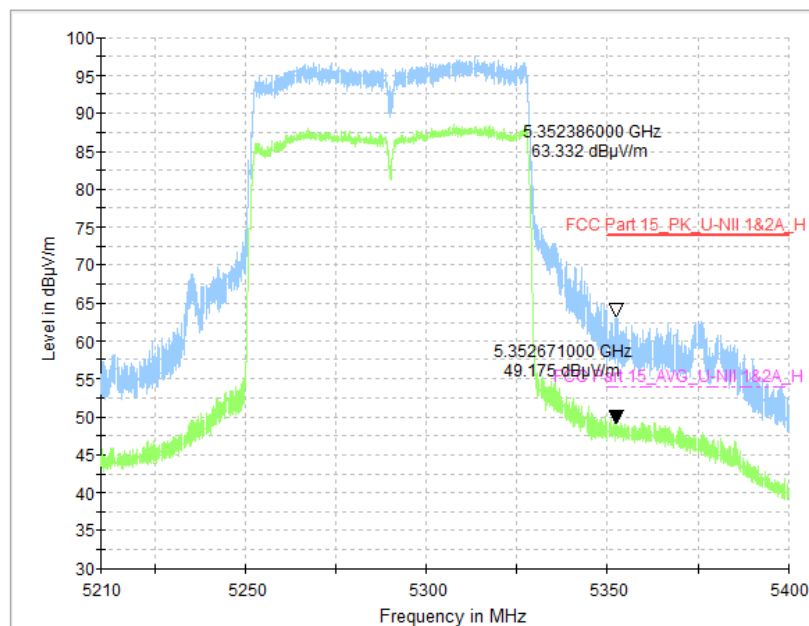


Fig. 76 Band Edges (802.11ac-VHT80, CH58 5290MHz)

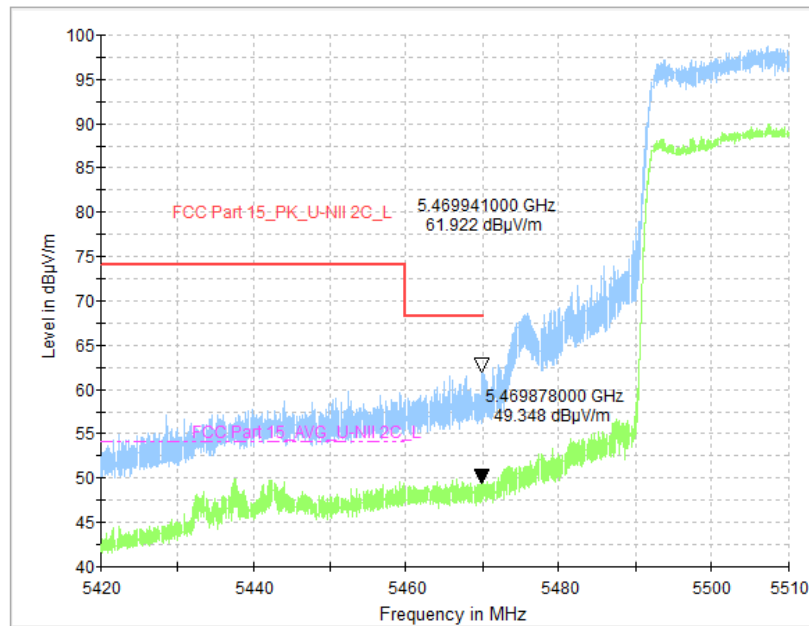


Fig. 77 Band Edges (802.11ac-VHT80, CH106 5530MHz)

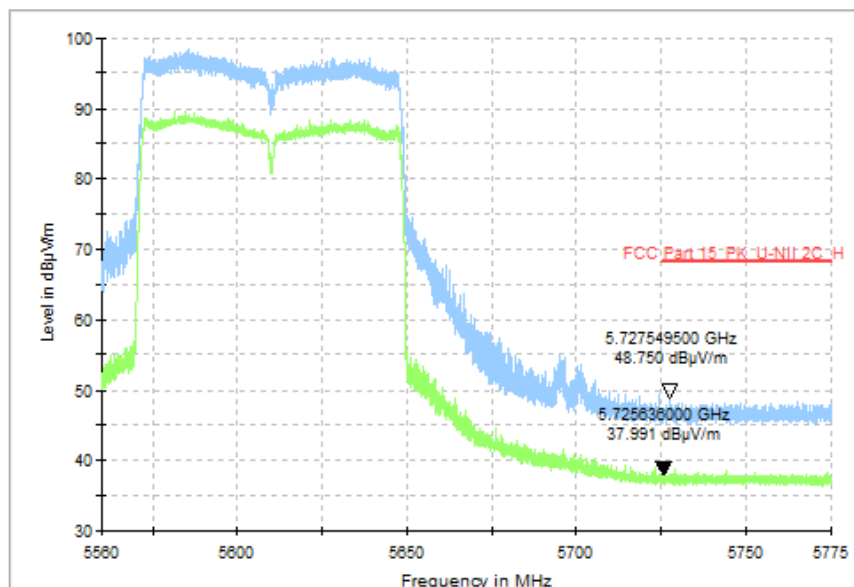


Fig. 78 Band Edges (802.11ac-VHT80, CH122 5610MHz)

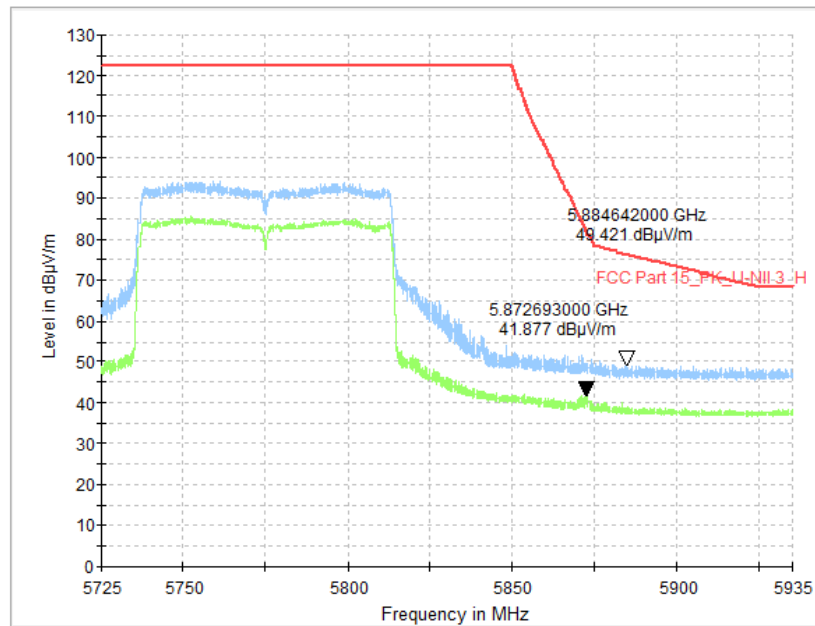


Fig. 79 Band Edges (802.11ac-VHT80, CH155 5775MHz)

A.9. Transmitter Spurious Emission

Measurement Limit:

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

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.80	P
	5200MHz(Ch40)	1 GHz ~18 GHz	Fig.81	P
	5240MHz(Ch48)	1 GHz ~18 GHz	Fig.82	P
	5260MHz(Ch52)	1 GHz ~18 GHz	Fig.83	P
	5280MHz(Ch56)	1 GHz ~18 GHz	Fig.84	P
	5320MHz(Ch64)	1 GHz ~18 GHz	Fig.85	P
	5500MHz(Ch100)	1 GHz ~18 GHz	Fig.86	P
	5600MHz(Ch120)	1 GHz ~18 GHz	Fig.87	P
	5700MHz(Ch140)	1 GHz ~18 GHz	Fig.88	P
	5745MHz(Ch149)	1 GHz ~18 GHz	Fig.89	P
	5785MHz(Ch157)	1 GHz ~18 GHz	Fig.90	P
	5825MHz(Ch165)	1 GHz ~18 GHz	Fig.91	P
802.11n- HT40	5190MHz(Ch38)	1 GHz ~18 GHz	Fig.92	P
	5230MHz(Ch46)	1 GHz ~18 GHz	Fig.93	P
	5270MHz(Ch54)	1 GHz ~18 GHz	Fig.94	P
	5310MHz(Ch62)	1 GHz ~18 GHz	Fig.95	P
	5510MHz(Ch102)	1 GHz ~18 GHz	Fig.96	P
	5580MHz(Ch118)	1 GHz ~18 GHz	Fig.97	P
	5670MHz(Ch134)	1 GHz ~18 GHz	Fig.98	P
	5755MHz(Ch151)	1 GHz ~18 GHz	Fig.99	P
	5795MHz(Ch159)	1 GHz ~18 GHz	Fig.100	P

802.11ac -VHT80	5210MHz(Ch42)	1 GHz ~18 GHz	Fig.101	P
	5290MHz(Ch58)	1 GHz ~18 GHz	Fig.102	P
	5530MHz(Ch106)	1 GHz ~18 GHz	Fig.103	P
	5610MHz(Ch122)	1 GHz ~18 GHz	Fig.104	P
	5775MHz(Ch155)	1 GHz ~18 GHz	Fig.105	P
All channels		30 MHz ~1 GHz	Fig.106	P
		18 GHz ~26.5 GHz	Fig.107	P
		26.5GHz~40GHz	Fig.108	P

Worst Case Result

802.11a CH165

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
8280.000000	44.83	74.00	29.17	V	6.0
9281.076923	44.58	68.20	23.62	H	6.8
11647.846154	52.85	74.00	21.15	H	9.9
15843.230769	51.95	74.00	22.05	H	14.0
17053.384615	53.53	68.20	14.67	H	18.5
17907.692308	54.06	74.00	19.94	H	18.8

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
8280.000000	34.57	54.00	19.43	V	6.0
9281.076923	33.95	54.00	20.05	H	6.8
11647.846154	41.02	54.00	12.98	H	9.9
15843.230769	41.38	54.00	12.62	H	14.0
17053.384615	43.00	54.00	11.00	H	18.5
17907.692308	43.54	54.00	10.46	H	18.8

802.11n-HT40 CH151

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
11174.307692	47.57	74.00	26.43	V	9.7
11520.000000	48.39	74.00	25.61	H	10.1
11980.153846	47.68	74.00	26.32	H	10.3
15888.000000	52.39	74.00	21.61	H	14.0
17042.769231	53.54	68.20	14.66	V	18.4
17886.923077	53.30	74.00	20.70	V	18.8

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
11174.307692	36.29	54.00	17.71	V	9.7
11520.000000	37.68	54.00	16.32	H	10.1
11980.153846	36.48	54.00	17.52	H	10.3
15888.000000	41.20	54.00	12.80	H	14.0
17042.769231	43.41	54.00	10.59	V	18.4
17886.923077	43.15	54.00	10.85	V	18.8

802.11ac-VHT80 CH155

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
8274.000000	45.62	74.00	28.38	V	6.0
10899.692308	47.75	74.00	26.25	H	9.4
11594.769231	47.65	74.00	26.35	H	10.0
12417.230769	48.79	74.00	25.21	V	11.4
15879.692308	52.13	74.00	21.87	H	14.0
17917.846154	53.71	74.00	20.29	V	18.9

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
8274.000000	34.52	54.00	19.48	V	6.0
10899.692308	37.02	54.00	16.98	H	9.4
11594.769231	36.54	54.00	17.46	H	10.0
12417.230769	37.39	54.00	16.61	V	11.4
15879.692308	41.21	54.00	12.79	H	14.0
17917.846154	43.77	54.00	10.23	V	18.9

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 = $P_{Mea} + A_{Rpl} = P_{Mea} + \text{Cable Loss} + \text{Antenna Factor}$

See below for test graphs.

Conclusion: PASS

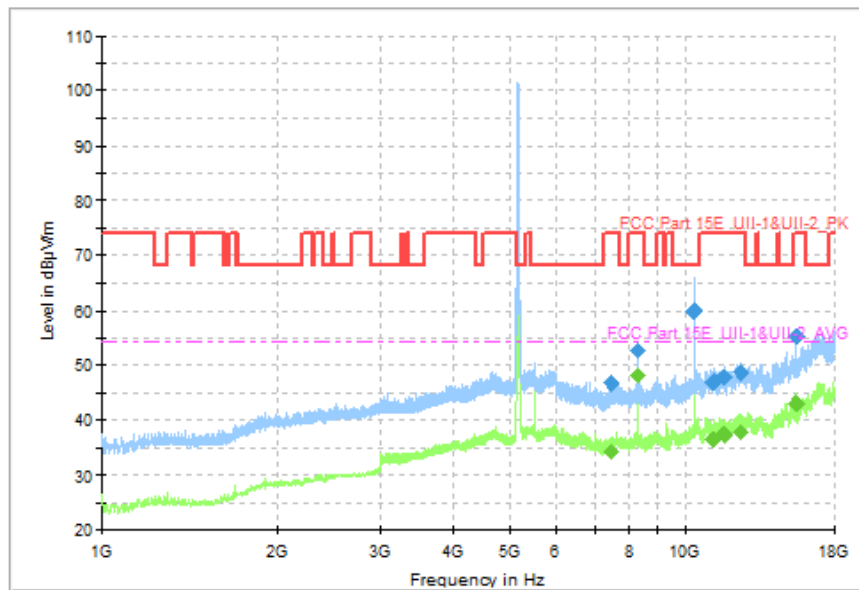


Fig. 80 Transmitter Spurious Emission (802.11a, CH36 5180MHz, 1 GHz-18 GHz)

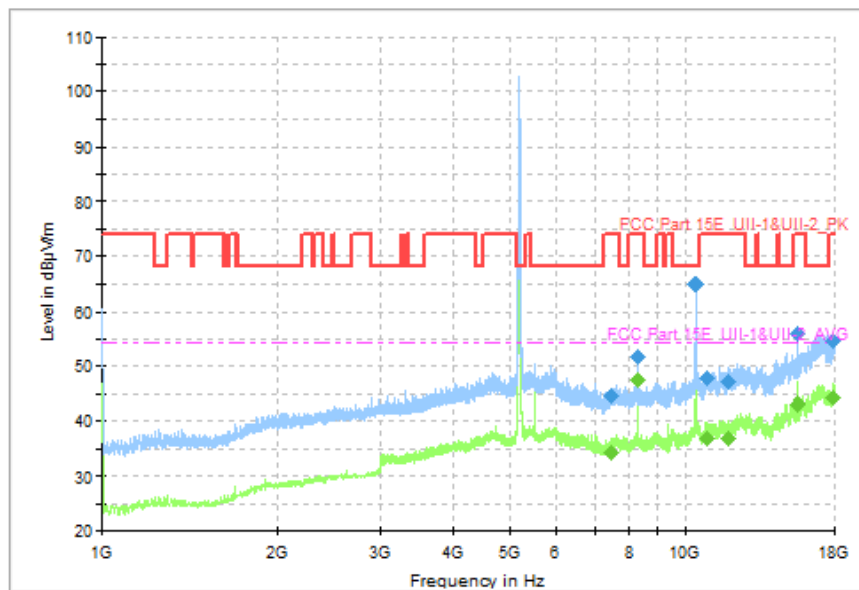


Fig. 81 Transmitter Spurious Emission (802.11a, CH40 5200MHz, 1 GHz-18 GHz)

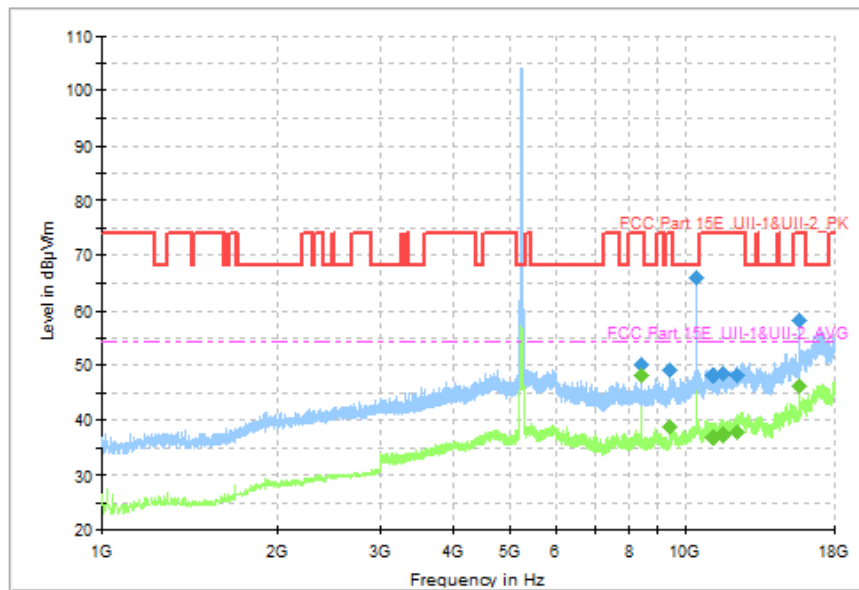


Fig. 82 Transmitter Spurious Emission (802.11a, CH48 5240MHz, 1 GHz-18 GHz)

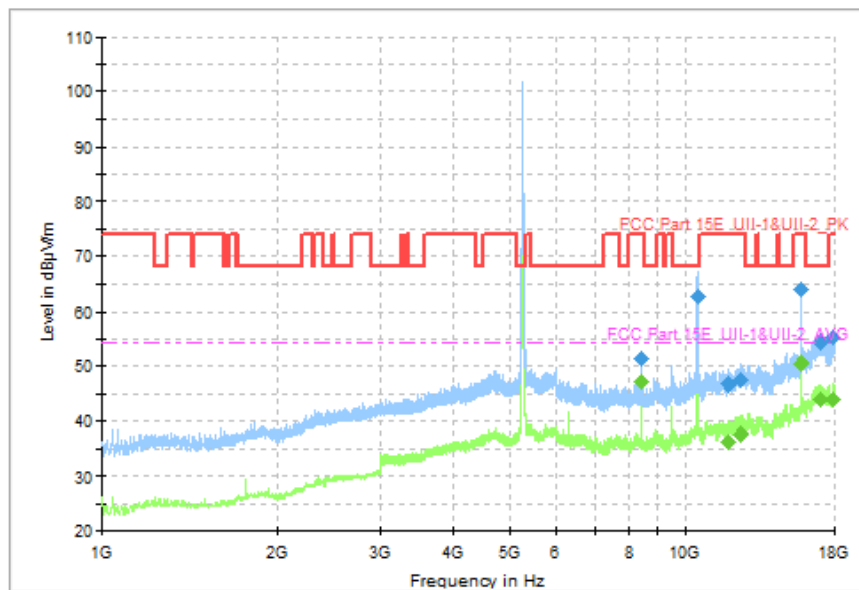


Fig. 83 Transmitter Spurious Emission (802.11a, CH52 5260MHz, 1 GHz-18 GHz)

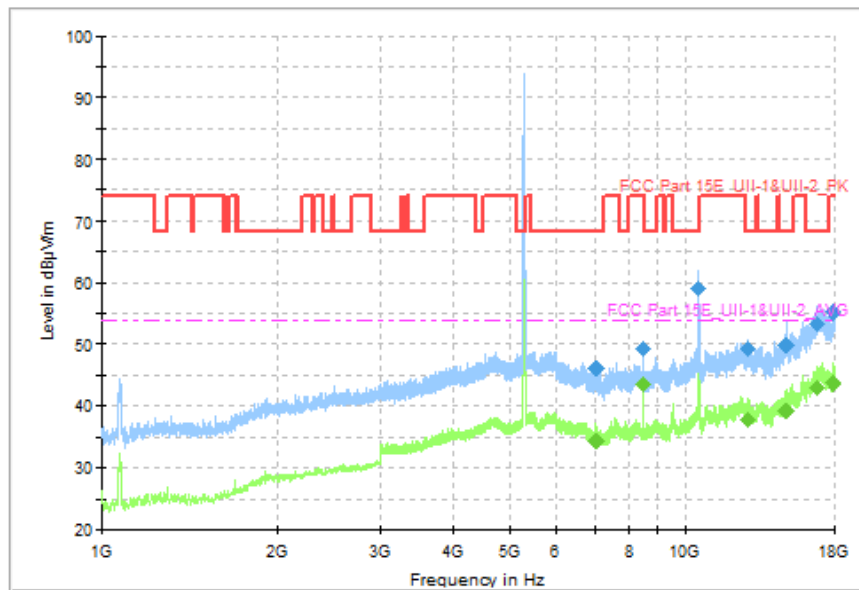


Fig. 84 Transmitter Spurious Emission (802.11a, CH56 5280MHz, 1 GHz-18 GHz)

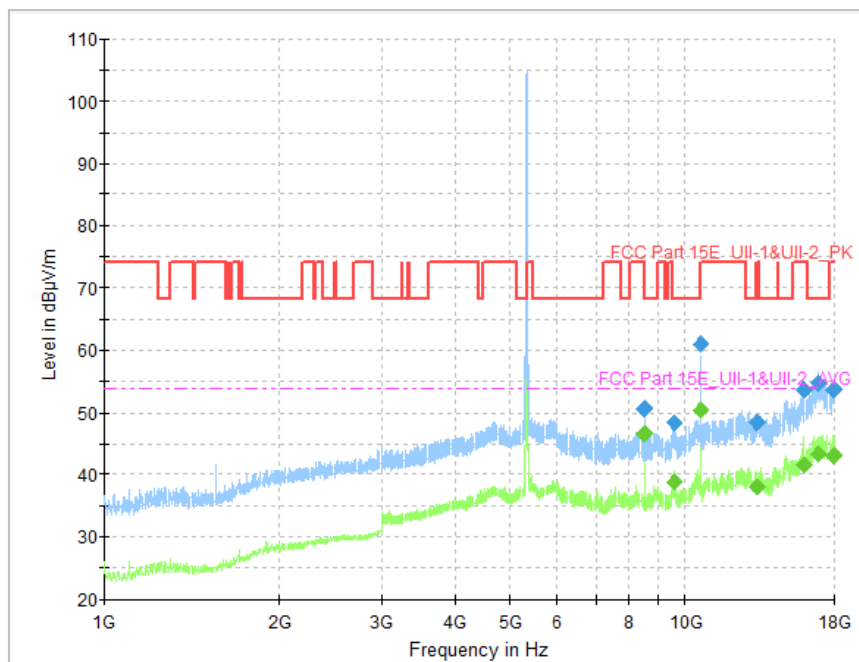


Fig. 85 Transmitter Spurious Emission (802.11a, CH64 5320MHz, 1 GHz-18 GHz)

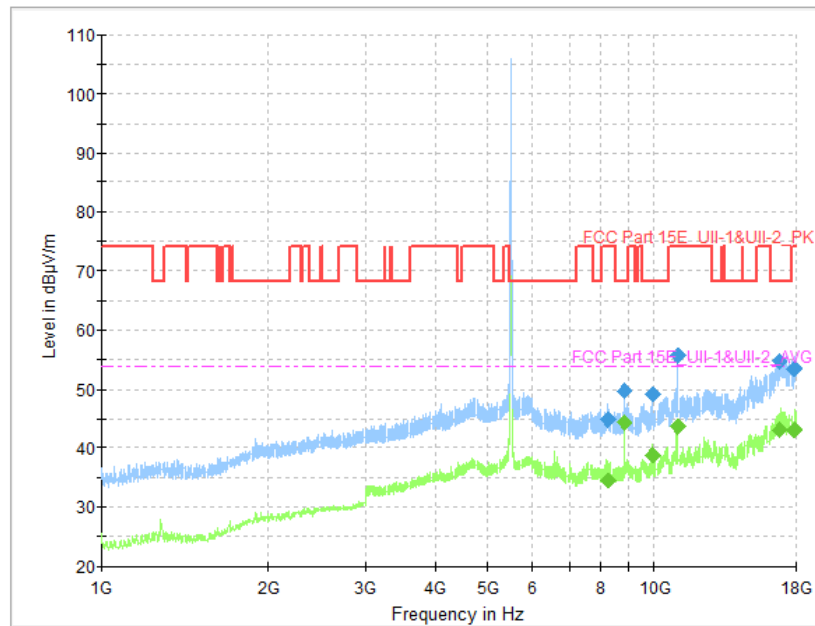


Fig. 86 Transmitter Spurious Emission (802.11a, CH100 5500MHz, 1 GHz-18 GHz)

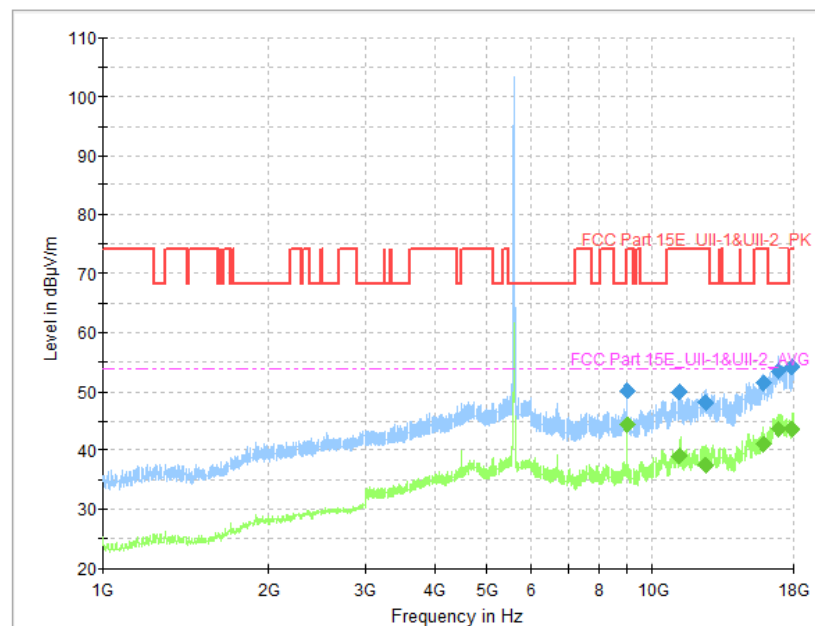


Fig. 87 Transmitter Spurious Emission (802.11a, CH120 5600MHz, 1 GHz-18 GHz)

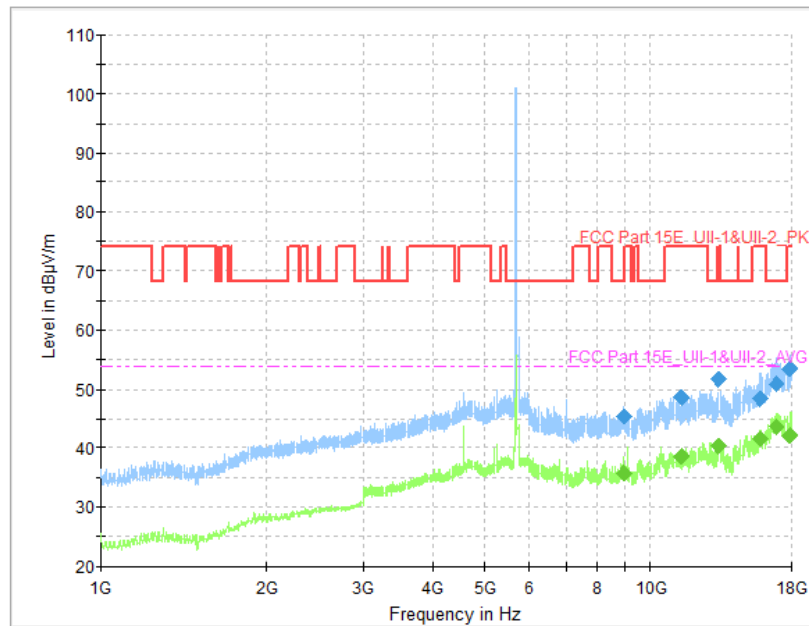


Fig. 88 Transmitter Spurious Emission (802.11a, CH140 5700MHz, 1 GHz-18 GHz)

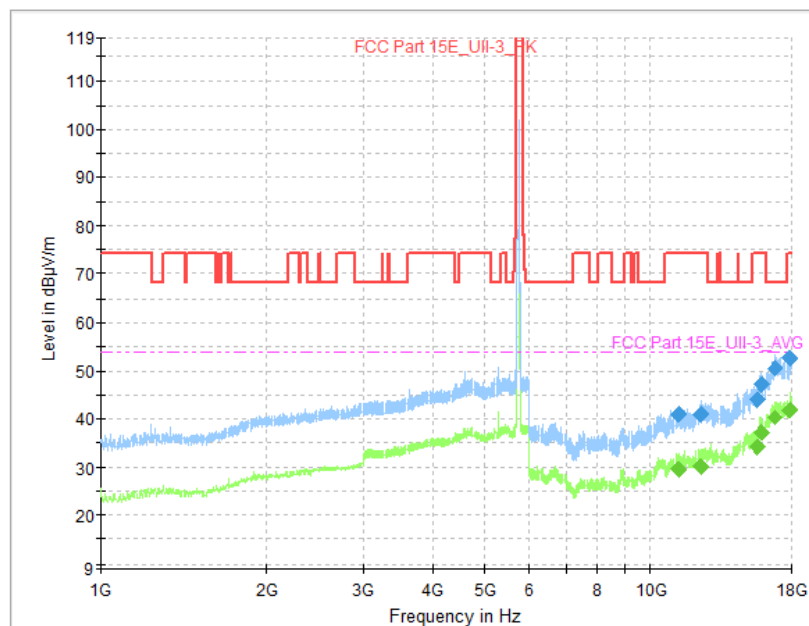


Fig. 89 Transmitter Spurious Emission (802.11a, CH149 5745MHz, 1 GHz-18 GHz)

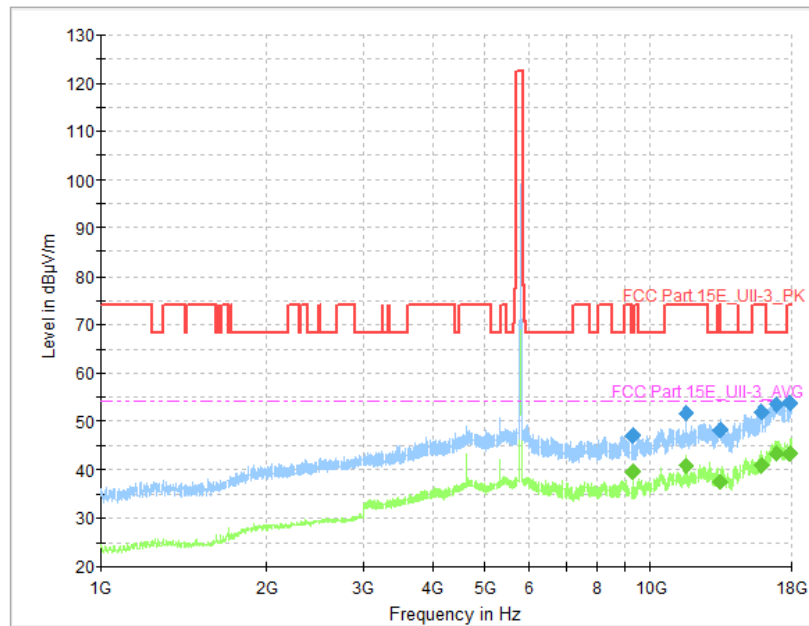


Fig. 90 Transmitter Spurious Emission (802.11a, CH157 5785MHz, 1 GHz-18 GHz)

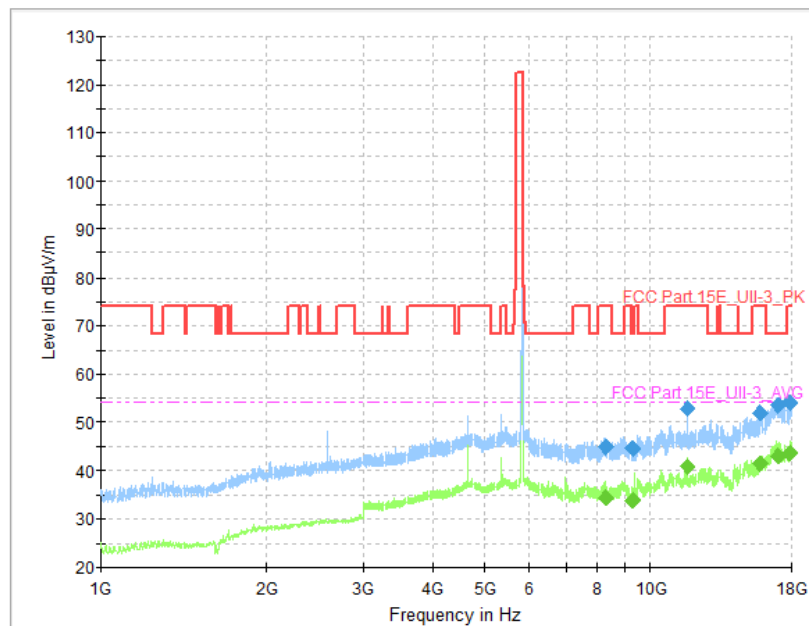


Fig. 91 Transmitter Spurious Emission (802.11a, CH165 5825MHz, 1 GHz-18 GHz)

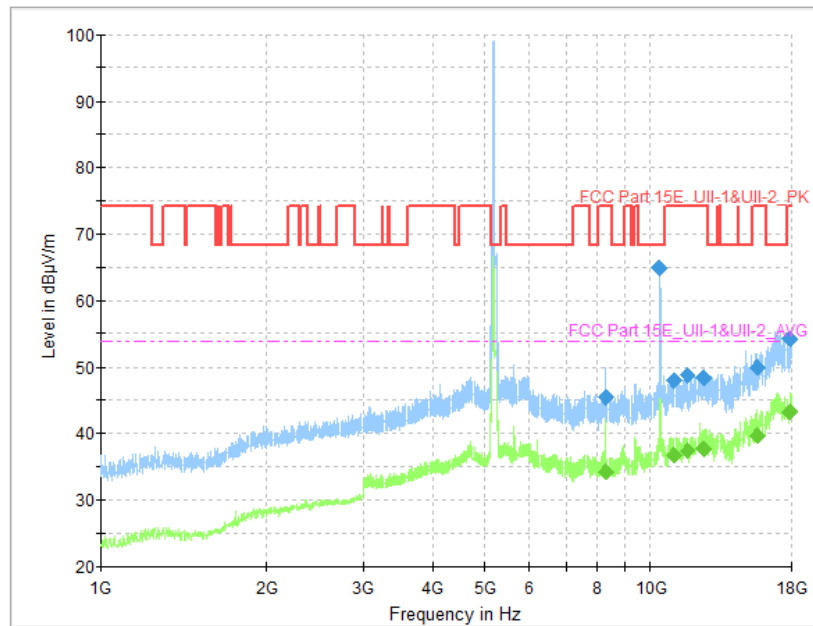


Fig. 92 Transmitter Spurious Emission (802.11n-HT40, CH38 5190MHz, 1 GHz-18 GHz)

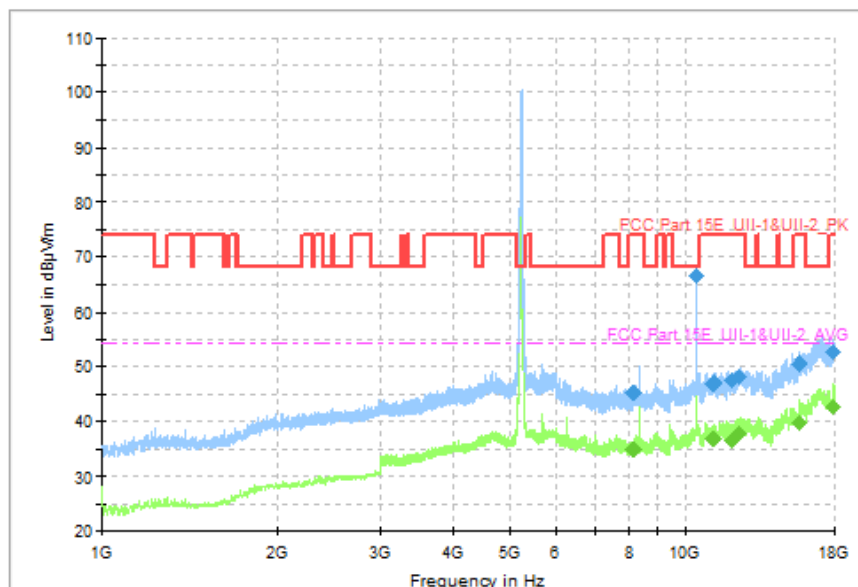


Fig. 93 Transmitter Spurious Emission (802.11n-HT40, CH46 5230MHz, 1 GHz-18 GHz)

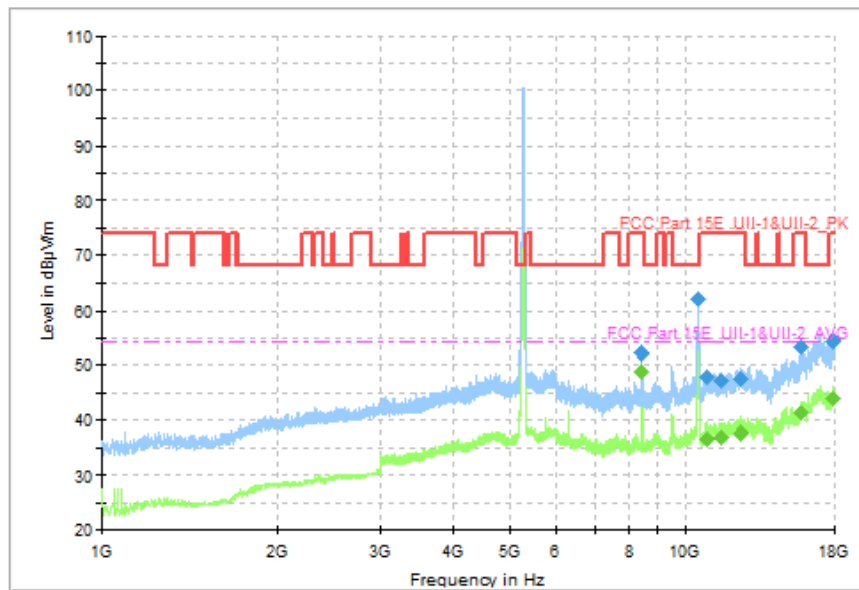


Fig. 94 Transmitter Spurious Emission (802.11n-HT40, CH54 5270MHz, 1 GHz-18 GHz)

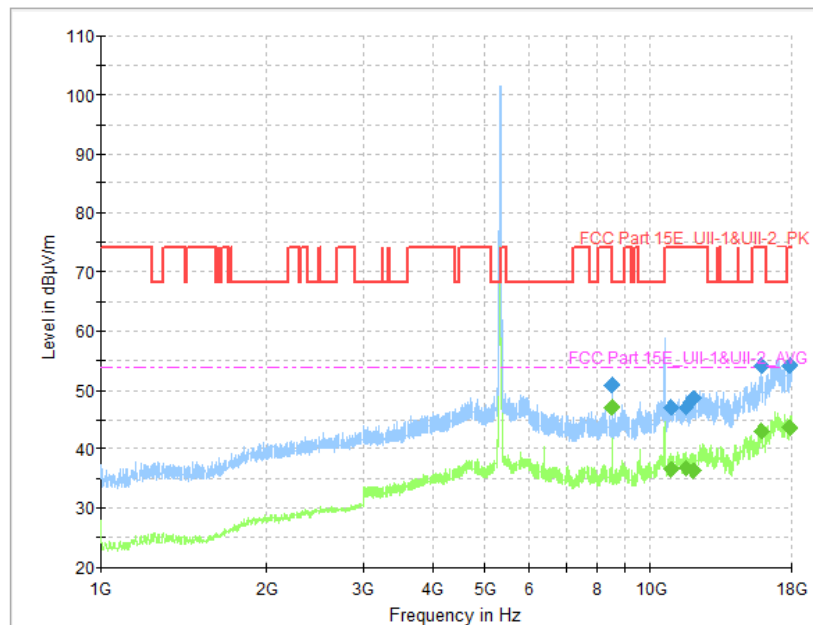


Fig. 95 Transmitter Spurious Emission (802.11n-HT40, CH62 5310MHz, 1 GHz-18 GHz)

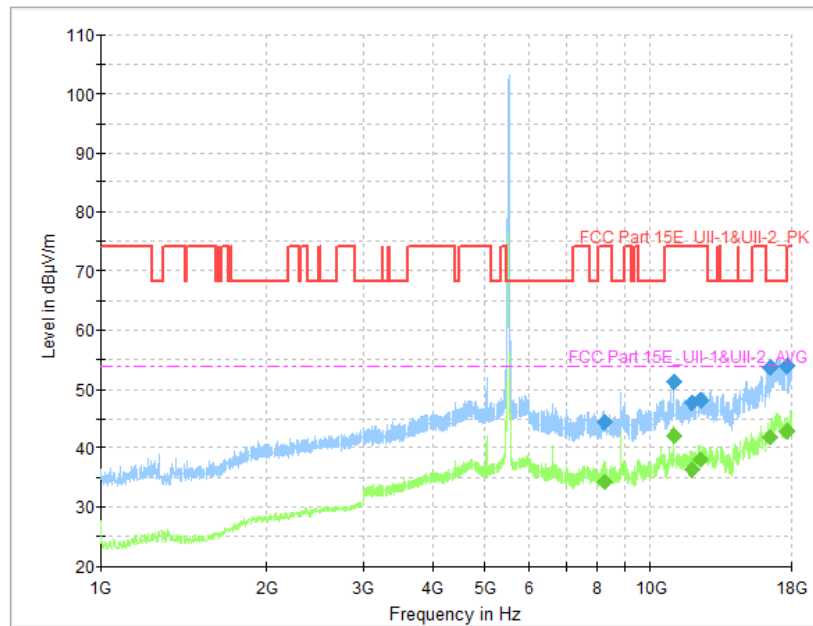


Fig. 96 Transmitter Spurious Emission (802.11n-HT40, CH102 5510MHz, 1 GHz-18 GHz)

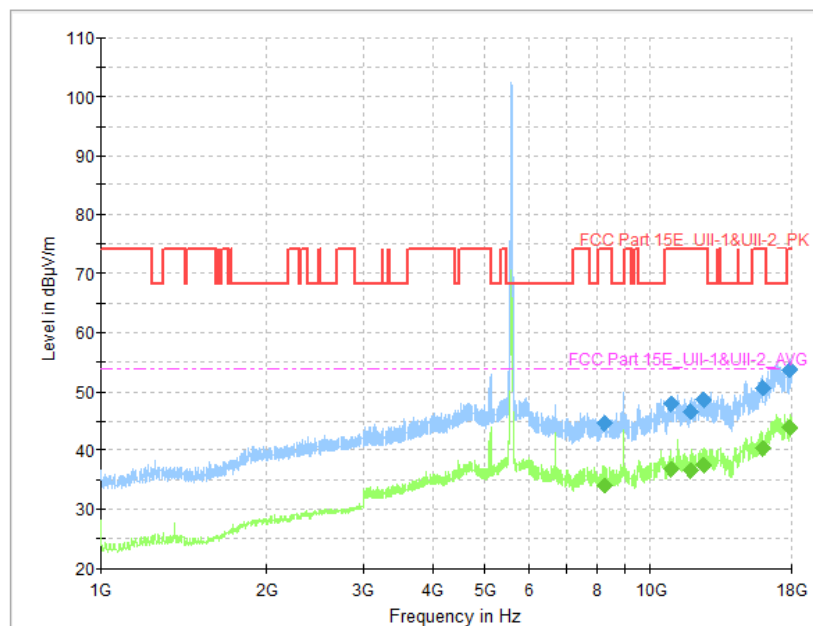


Fig. 97 Transmitter Spurious Emission (802.11n-HT40, CH118 5580MHz, 1 GHz-18 GHz)

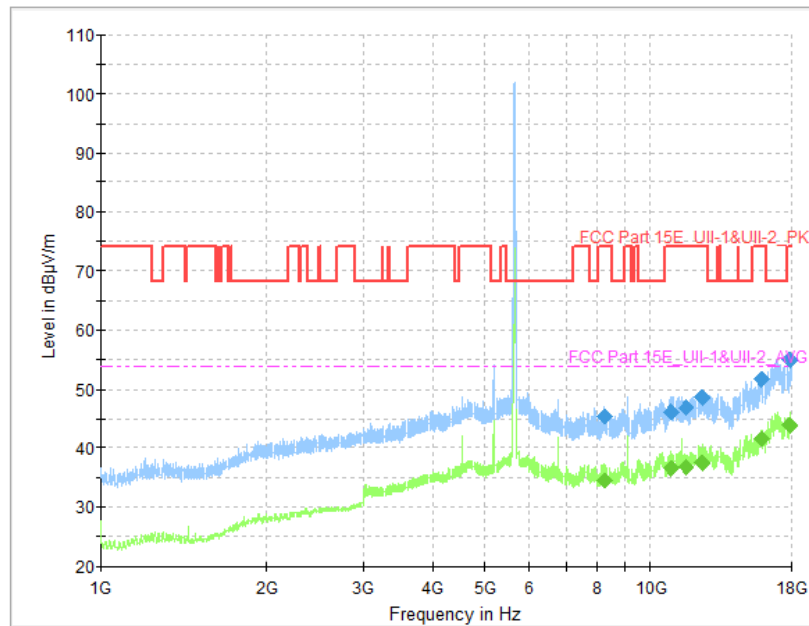


Fig. 98 Transmitter Spurious Emission (802.11n-HT40, CH134 5670MHz, 1 GHz-18 GHz)

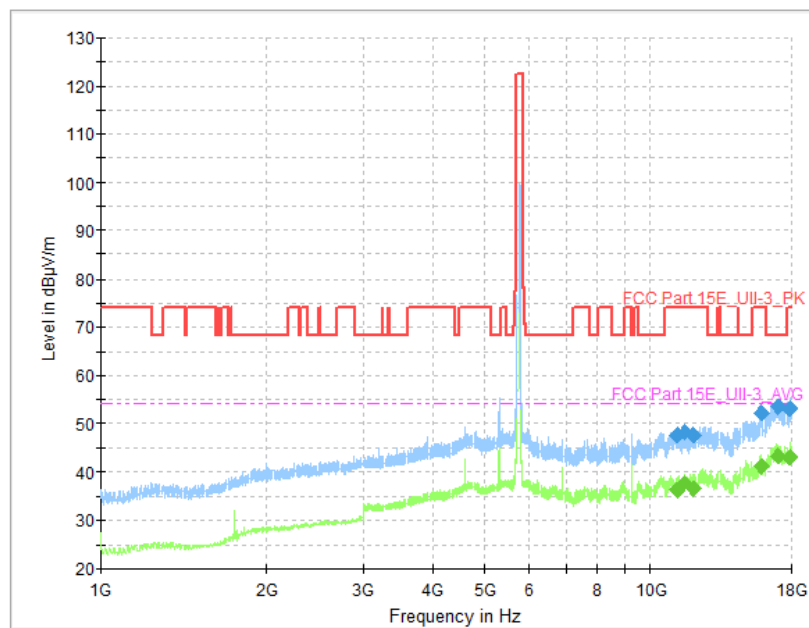


Fig. 99 Transmitter Spurious Emission (802.11n-HT40, CH151 5755MHz, 1 GHz-18 GHz)

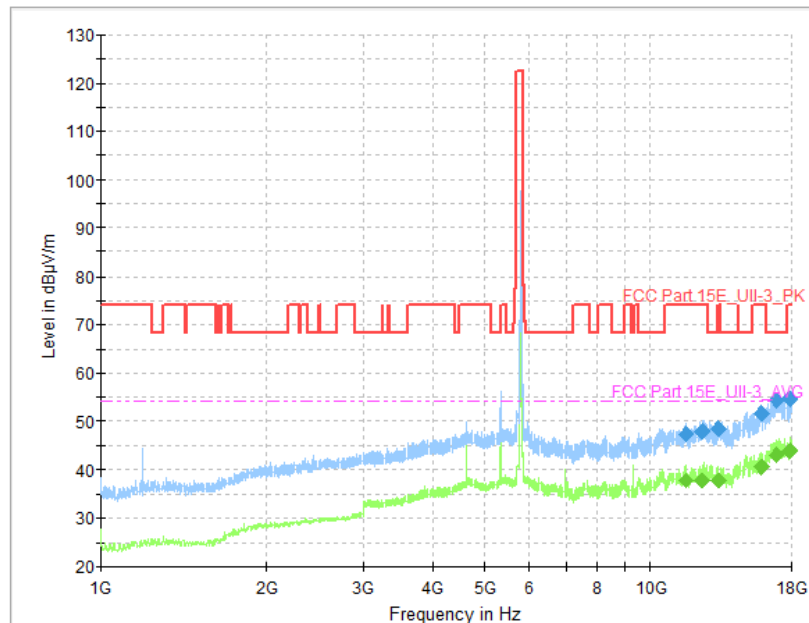


Fig. 100 Transmitter Spurious Emission (802.11n-HT40, CH159 5795MHz, 1 GHz-18 GHz)

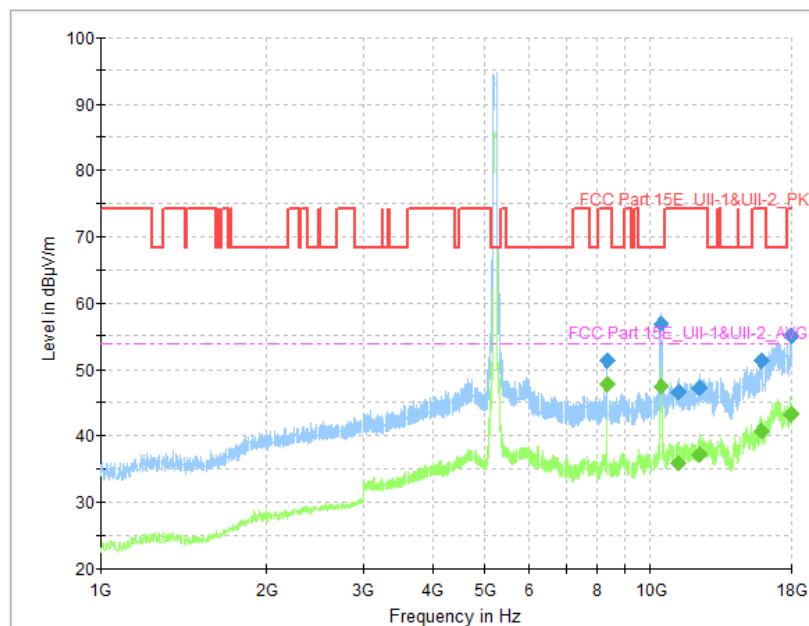


Fig. 101 Transmitter Spurious Emission (802.11ac-VHT80, CH42 5210MHz, 1 GHz-18 GHz)

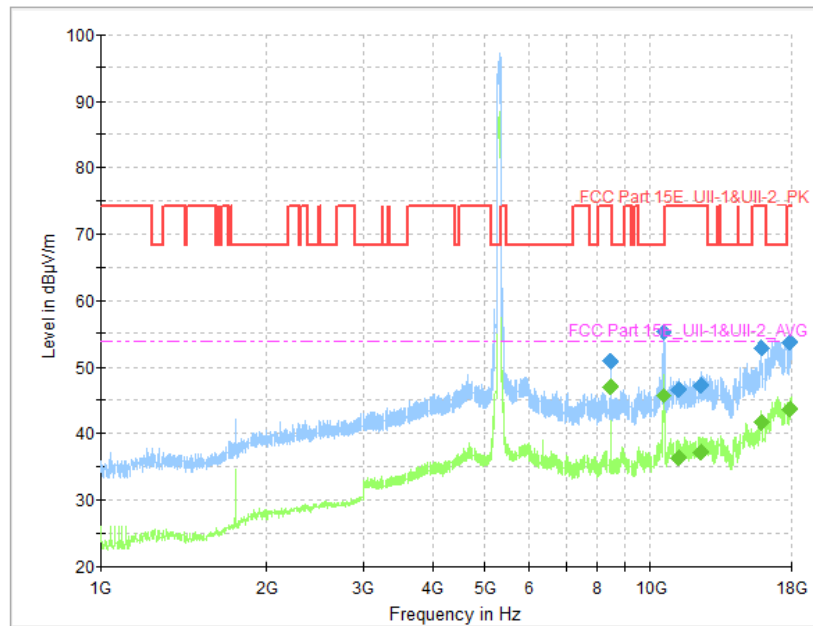


Fig. 102 Transmitter Spurious Emission (802.11ac-VHT80, CH58 5290MHz, 1 GHz-18 GHz)

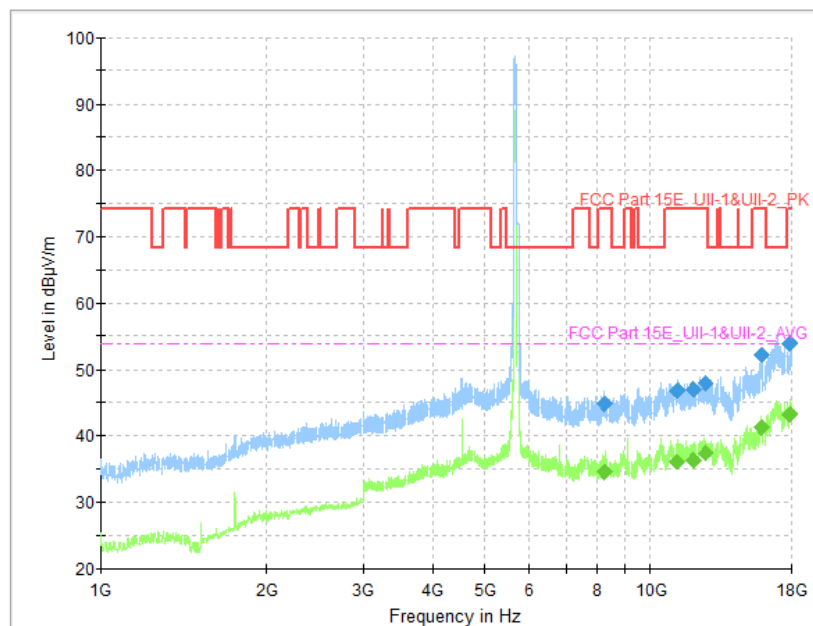


Fig. 103 Transmitter Spurious Emission (802.11ac-VHT80, CH106 5530MHz, 1 GHz-18 GHz)

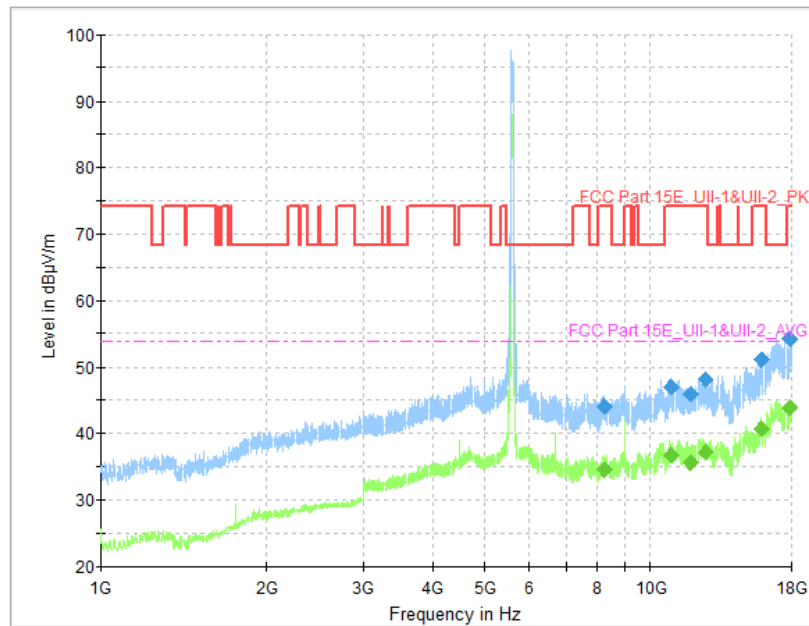


Fig. 104 Transmitter Spurious Emission (802.11ac-VHT80, CH122 5610MHz, 1 GHz-18 GHz)

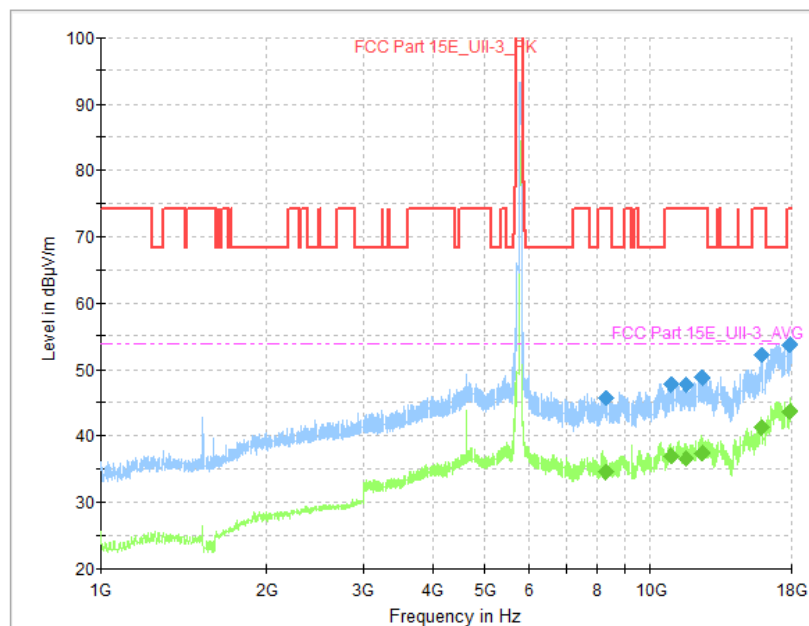


Fig. 105 Transmitter Spurious Emission (802.11ac-VHT80, CH155 5775MHz, 1 GHz-18 GHz)

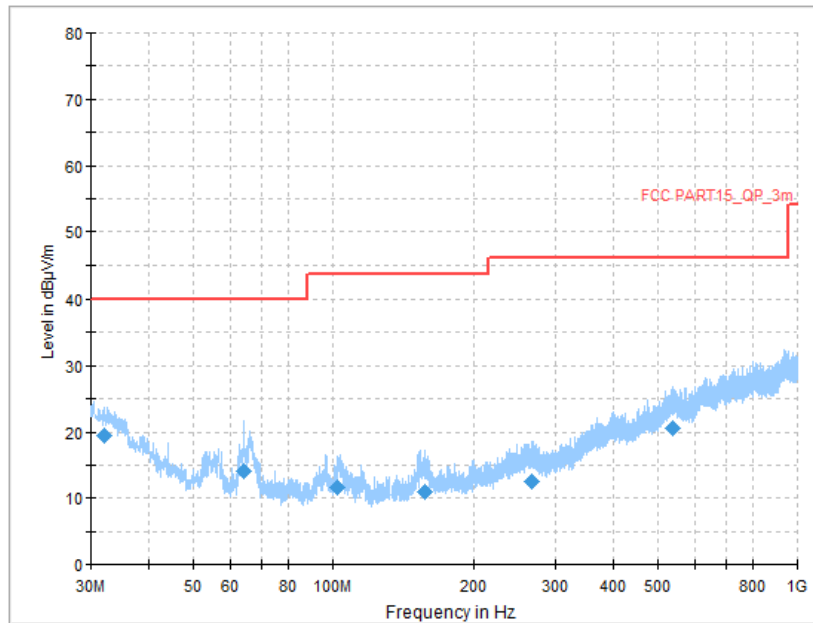


Fig. 106 Transmitter Spurious Emission (All channel, 30MHz~1GHz)

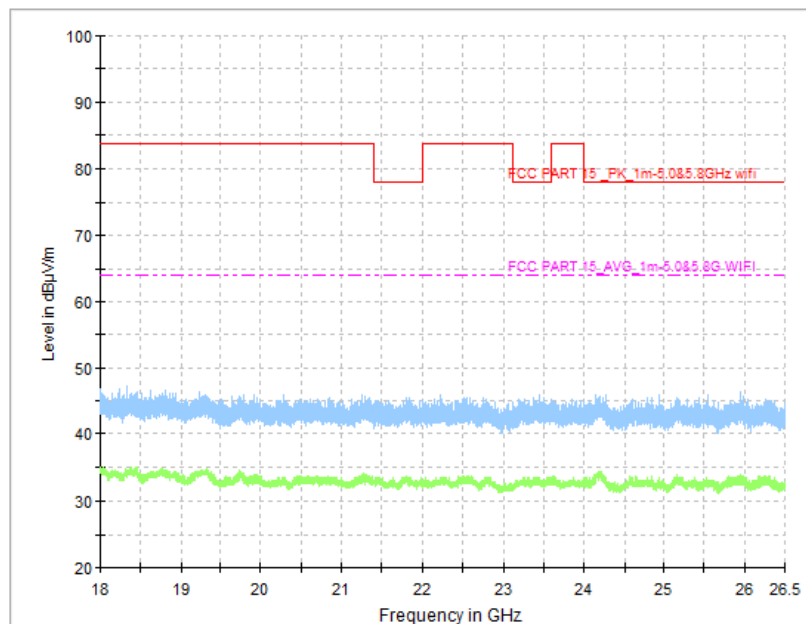


Fig. 107 Transmitter Spurious Emission (All channel, 18GHz~26.5GHz)

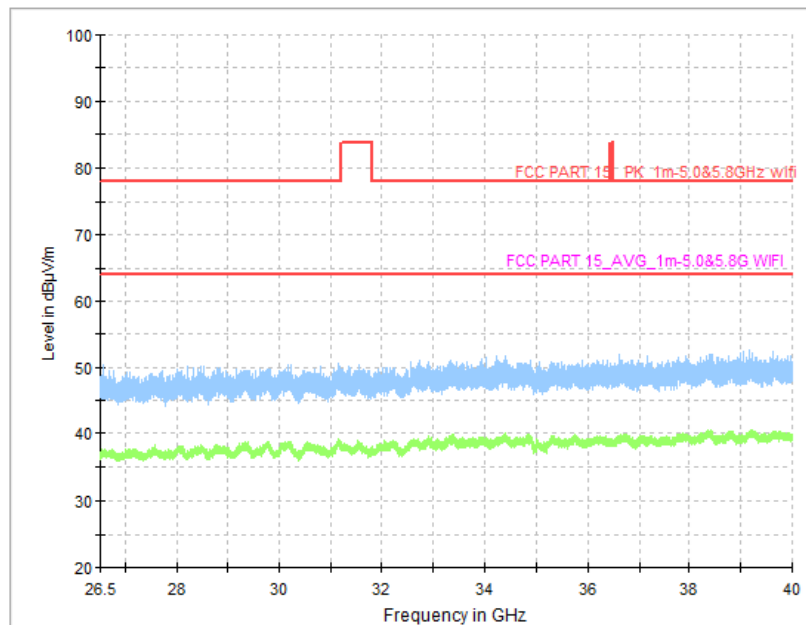


Fig. 108 Transmitter Spurious Emission (All channel, 26.5GHz~40GHz)

A.10. Radiated Spurious Emissions < 30MHz

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

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	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.109	P

See below for test graphs.

Conclusion: PASS

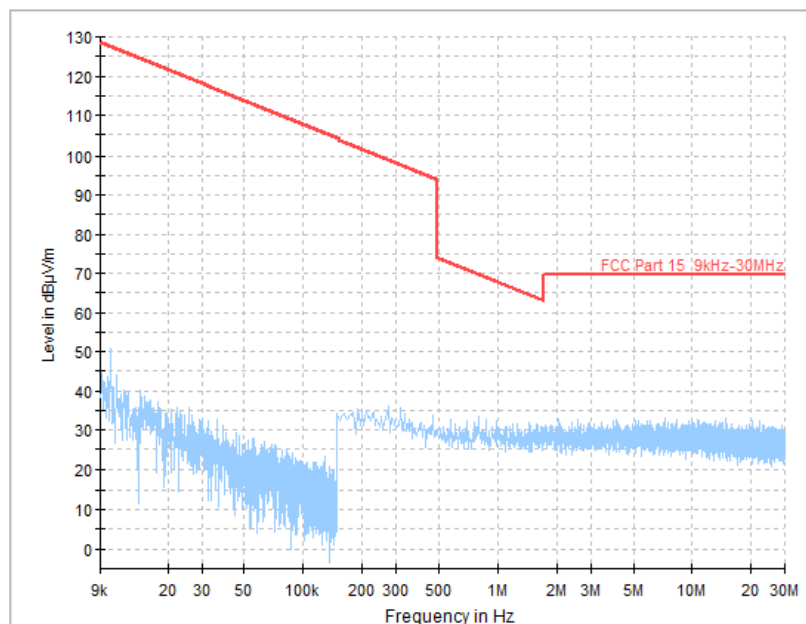


Fig. 109 Radiated Spurious Emission (All Channel, 9 kHz ~30 MHz)

A.11. AC Power Line Conducted Emission

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

RLAN- A2, A3, AE4

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Average-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
			Traffic	Idle	
0.15 to 0.5	66 to 56	56 to 46	Fig.110	Fig.111	P
0.5 to 5	56	46			
5 to 30	60	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.

AE2 was the model with the worst results in the test.

See below for test graphs.

Conclusion: PASS

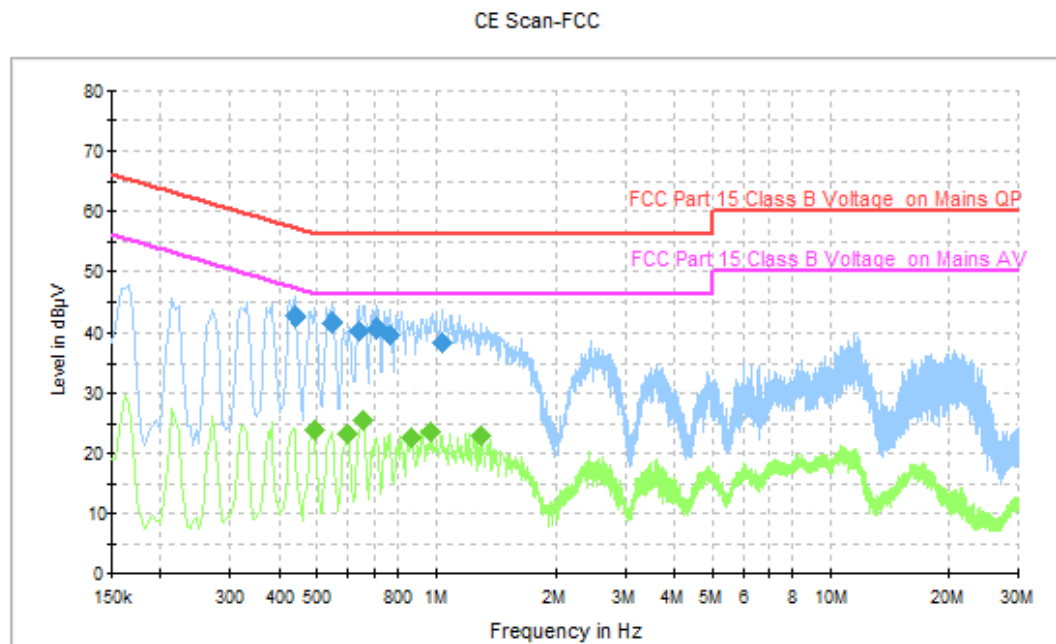


Fig. 110 AC Power line Conducted Emission (Traffic)

Measurement Result: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.438000	42.6	GND	N	9.7	14.5	57.1
0.546000	41.5	GND	N	9.7	14.5	56.0
0.638000	40.4	GND	N	9.6	15.6	56.0
0.710000	40.8	GND	N	9.6	15.2	56.0
0.766000	39.8	GND	N	9.6	16.2	56.0
1.038000	38.4	GND	N	9.6	17.6	56.0

Measurement Result: Average

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.490000	23.9	GND	N	9.7	22.2	46.2
0.598000	23.3	GND	N	9.6	22.7	46.0
0.654000	25.3	GND	N	9.6	20.7	46.0
0.866000	22.6	GND	N	9.6	23.4	46.0
0.974000	23.5	GND	N	9.6	22.5	46.0
1.302000	22.7	GND	N	9.6	23.3	46.0

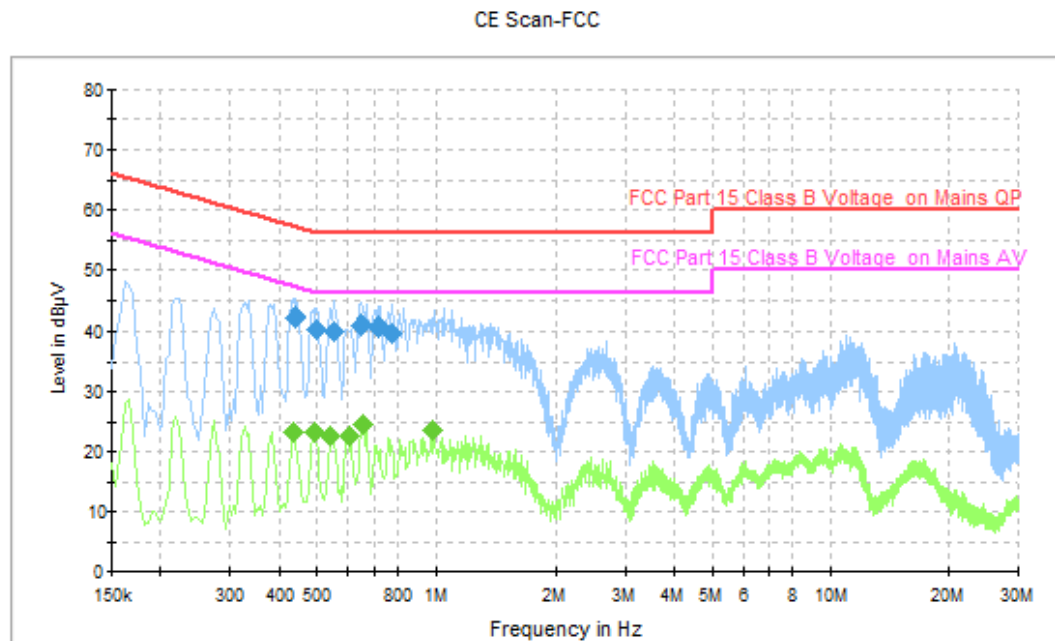


Fig. 111 AC Power line Conducted Emission (Idle)

Measurement Result: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.442000	42.2	GND	N	9.7	14.8	57.0
0.498000	40.2	GND	N	9.7	15.8	56.0
0.550000	40.0	GND	N	9.7	16.0	56.0
0.646000	41.1	GND	N	9.6	14.9	56.0
0.718000	40.5	GND	N	9.6	15.5	56.0
0.774000	39.5	GND	N	9.6	16.5	56.0

Measurement Result: Average

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.434000	23.2	GND	N	9.7	24.0	47.2
0.490000	23.2	GND	N	9.7	22.9	46.2
0.542000	22.6	GND	N	9.7	23.4	46.0
0.602000	22.6	GND	N	9.6	23.4	46.0
0.650000	24.4	GND	N	9.6	21.6	46.0
0.978000	23.5	GND	N	9.6	22.5	46.0



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*****