

Fig.57 Conducted Spurious Emission (802.11n HT20, CH11)

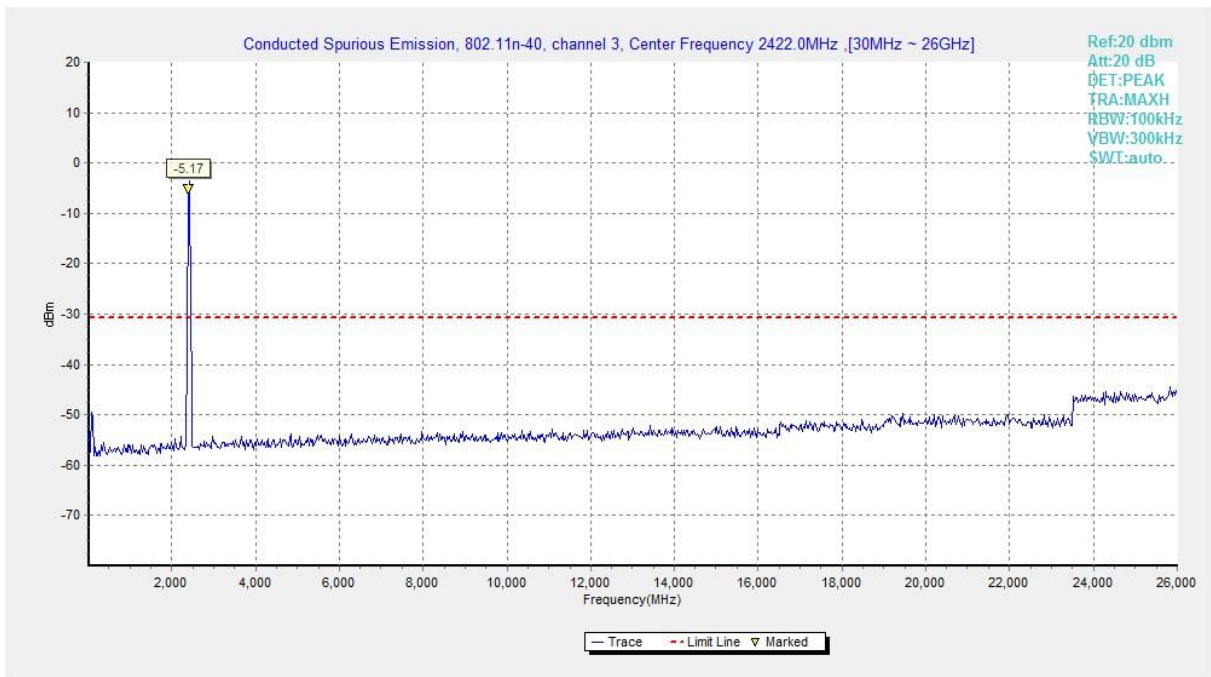


Fig.58 Conducted Spurious Emission (802.11n HT40, CH3)

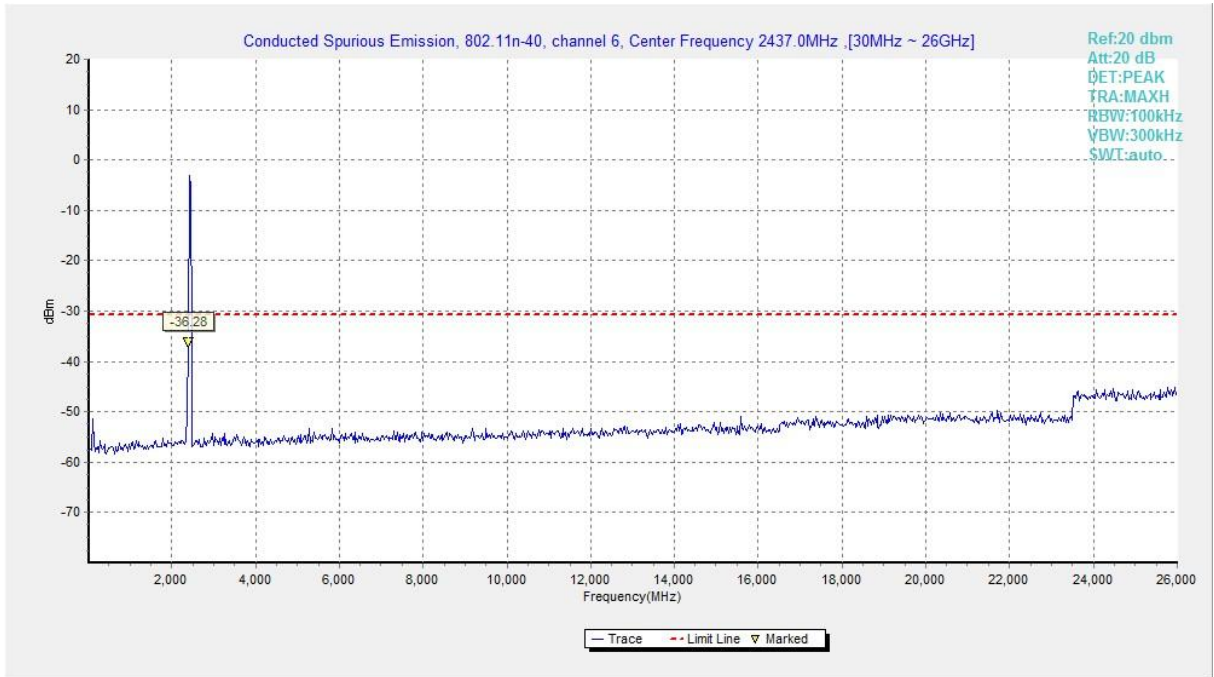


Fig.59 Conducted Spurious Emission (802.11n HT40, CH6)

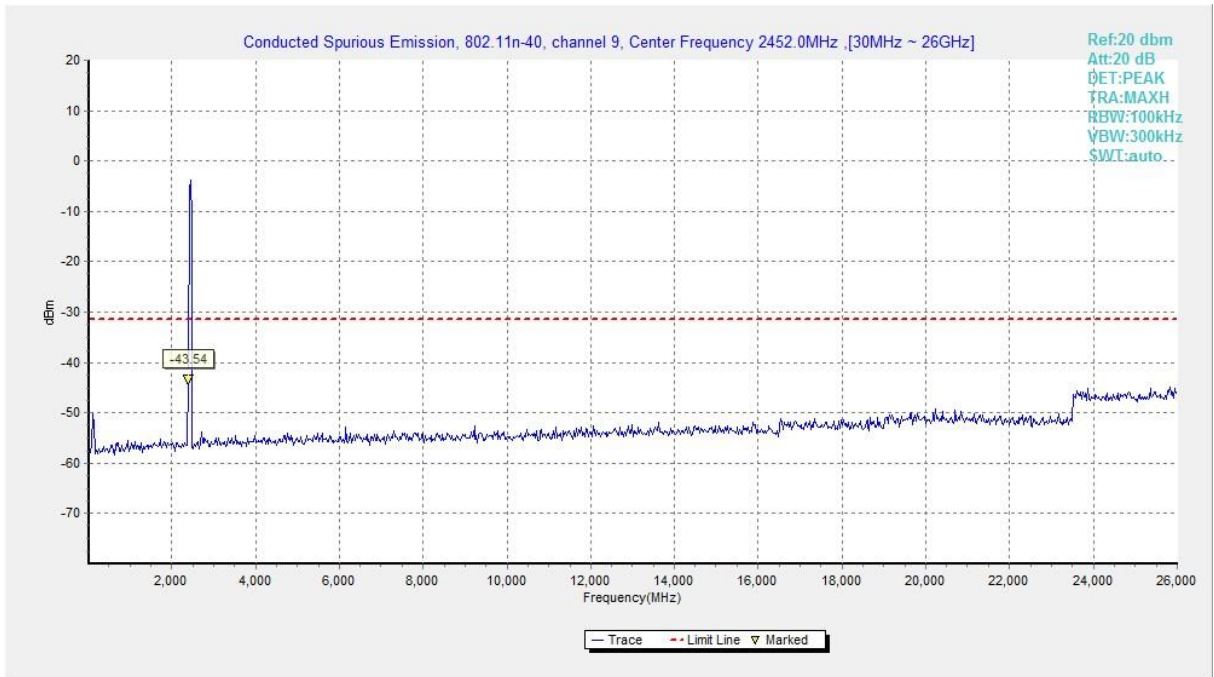


Fig.60 Conducted Spurious Emission (802.11n HT40, CH9)

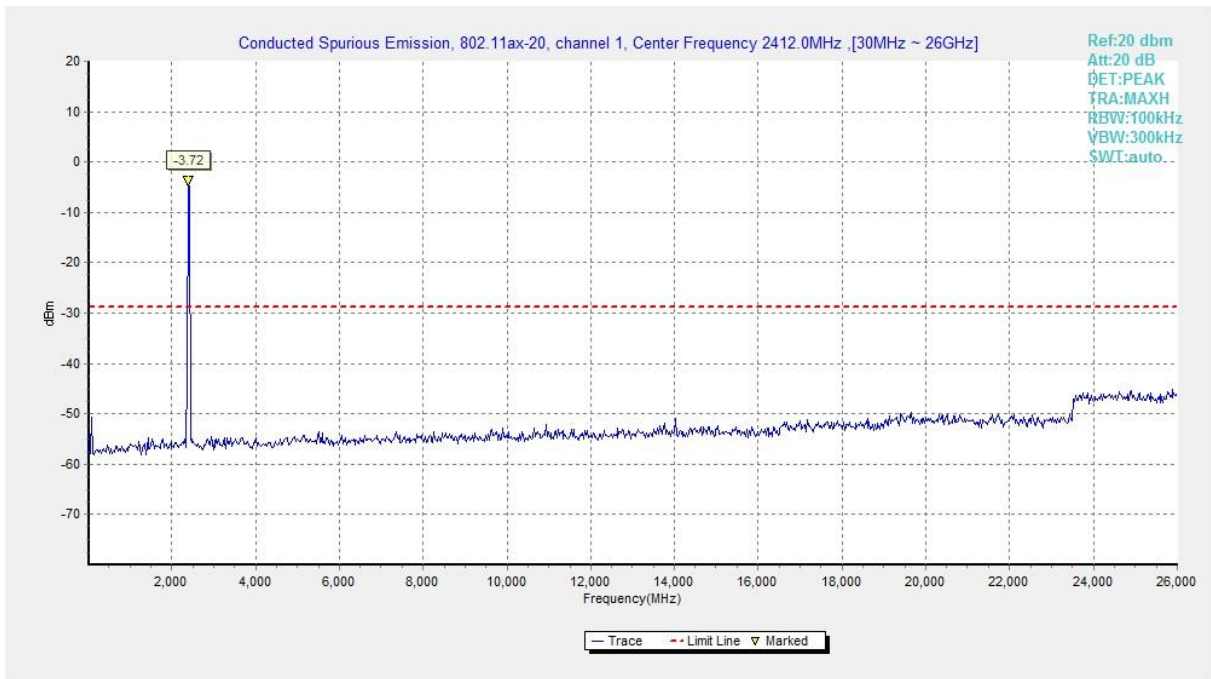


Fig.61 Conducted Spurious Emission (802.11ax HE20, CH1)

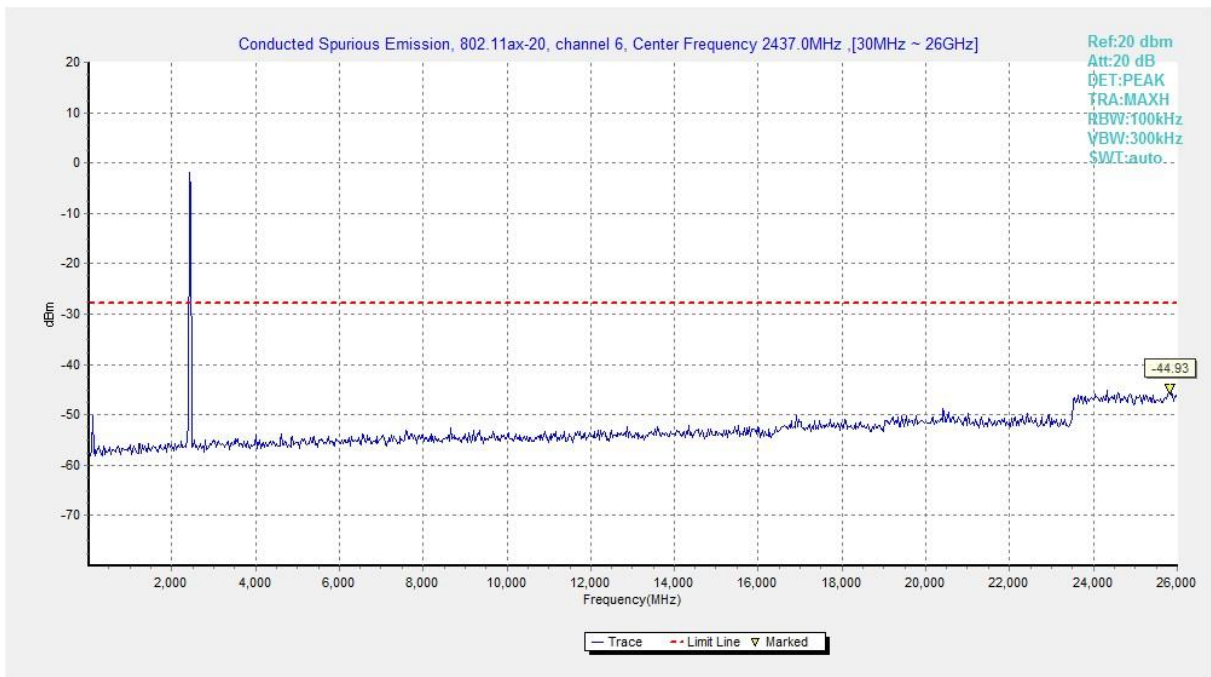


Fig.62 Conducted Spurious Emission (802.11ax HE20, CH6)

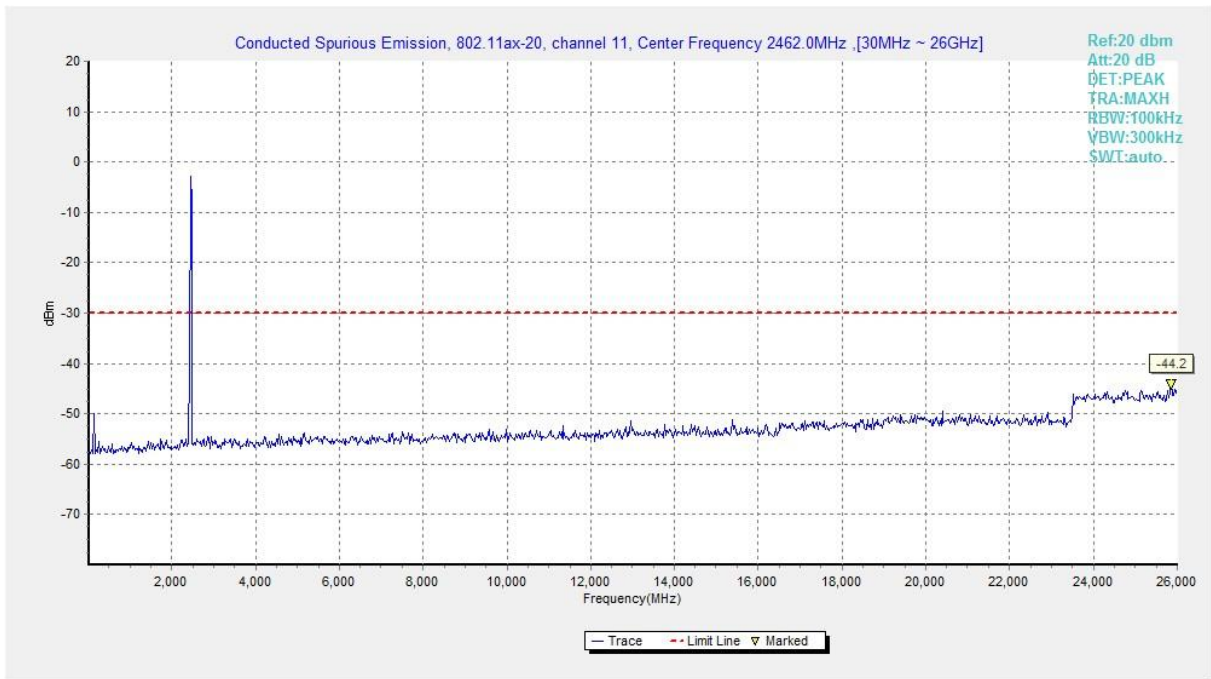


Fig.63 Conducted Spurious Emission (802.11ax HE20, CH11)

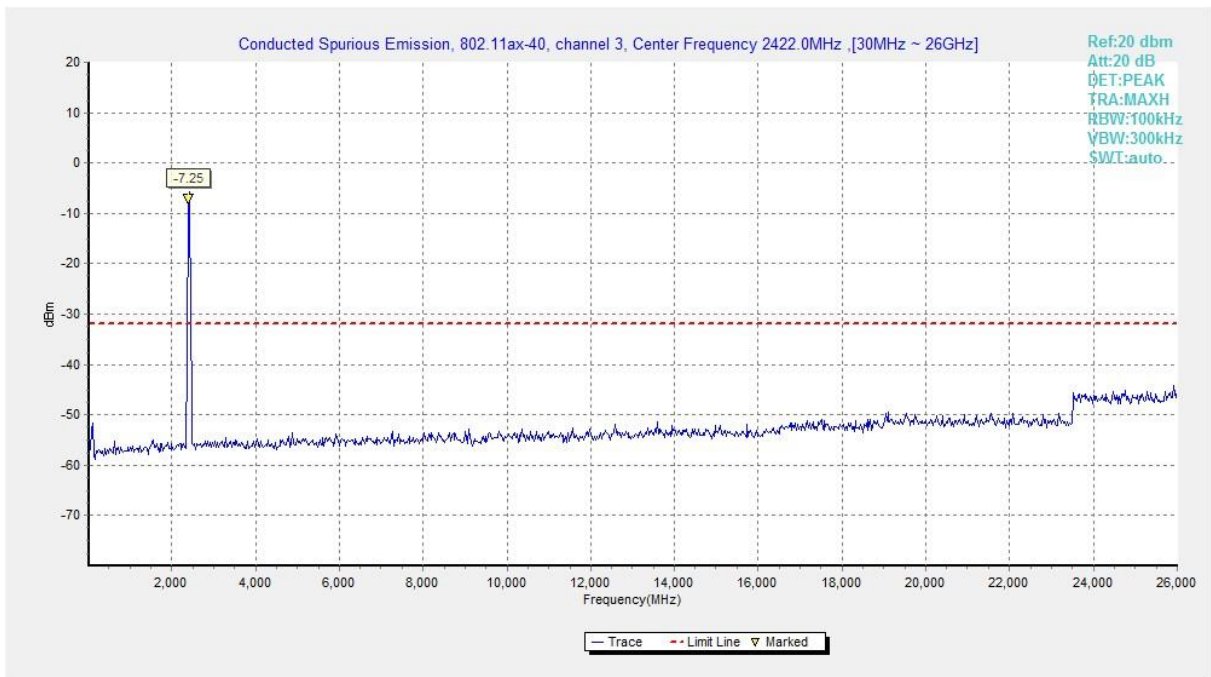


Fig.64 Conducted Spurious Emission (802.11ax HE40, CH3)

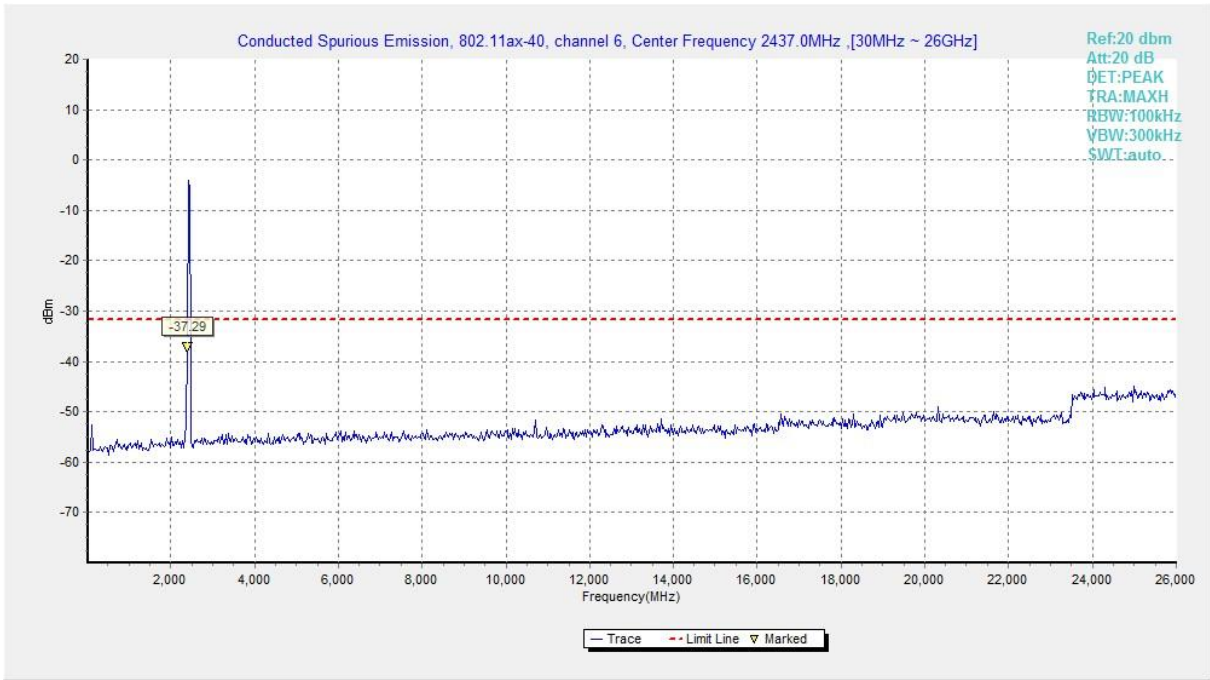


Fig.65 Conducted Spurious Emission (802.11ax HE40, CH6)

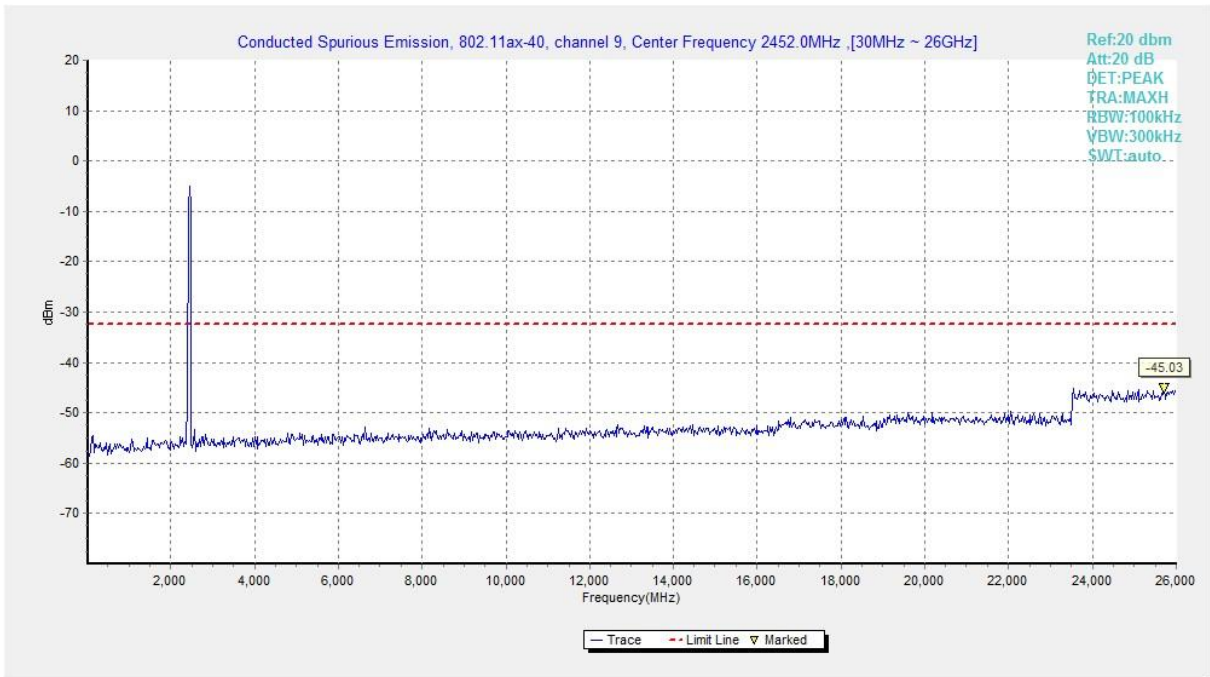


Fig.66 Conducted Spurious Emission (802.11ax HE40, CH9)



A.6 Radiated Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209 & RSS-247 section 5.5/RSS-Gen section 6.13	20dB below peak output power

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 ($\mu\text{V}/\text{m}$)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Condition:

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time (s)
30-1000	120kHz/300kHz	5
1000-4000	1MHz/3MHz	15
4000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

Note: According to the performance evaluation, the radiated emission margin of EUT is over 20dB in the band from 9kHz to 30MHz. Therefore, the measurement starts from 30MHz to tenth harmonic. The measurement results include the horizontal polarization and vertical polarization measurements.

Measurement Results:

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	CH 1	1 GHz ~ 18 GHz	Fig.67	P
	CH 6	1 GHz ~ 18 GHz	Fig.68	P
	CH 11	1 GHz ~ 18 GHz	Fig.69	P
	Restricted Band (CH1)	2.38 GHz ~ 2.45 GHz	Fig.70	P
	Restricted Band (CH11)	2.45 GHz ~ 2.5 GHz	Fig.71	P
802.11g	CH 1	1 GHz ~ 18 GHz	Fig.72	P
	CH 6	1 GHz ~ 18 GHz	Fig.73	P
	CH 11	1 GHz ~ 18 GHz	Fig.74	P
	Restricted Band (CH1)	2.38 GHz ~ 2.45 GHz	Fig.75	P
	Restricted Band (CH11)	2.45 GHz ~ 2.5 GHz	Fig.76	P
802.11n HT20	CH 1	1 GHz ~ 18 GHz	Fig.77	P
	CH 6	1 GHz ~ 18 GHz	Fig.78	P
	CH 11	1 GHz ~ 18 GHz	Fig.79	P
	Restricted Band (CH1)	2.38 GHz ~ 2.45 GHz	Fig.80	P
	Restricted Band (CH11)	2.45 GHz ~ 2.5 GHz	Fig.81	P
802.11n HT40	CH 3	1 GHz ~ 18 GHz	Fig.82	P
	CH 6	1 GHz ~ 18 GHz	Fig.83	P
	CH 9	1 GHz ~ 18 GHz	Fig.84	P
	Restricted Band (CH3)	2.38 GHz ~ 2.45 GHz	Fig.85	P
	Restricted Band (CH9)	2.45 GHz ~ 2.5 GHz	Fig.86	P
802.11ax HE20	CH 1	1 GHz ~ 18 GHz	Fig.87	P
	CH 6	1 GHz ~ 18 GHz	Fig.88	P
	CH 11	1 GHz ~ 18 GHz	Fig.89	P
	Restricted Band (CH1)	2.38 GHz ~ 2.45 GHz	Fig.90	P
	Restricted Band (CH11)	2.45 GHz ~ 2.5 GHz	Fig.91	P
802.11ax HE40	CH 3	1 GHz ~ 18 GHz	Fig.92	P
	CH 6	1 GHz ~ 18 GHz	Fig.93	P
	CH 9	1 GHz ~ 18 GHz	Fig.94	P
	Restricted Band (CH3)	2.38 GHz ~ 2.45 GHz	Fig.95	P
	Restricted Band (CH9)	2.45 GHz ~ 2.5 GHz	Fig.96	P
/	All Channels	9 kHz ~ 30 MHz	Fig.97	P
		30 MHz ~ 1 GHz	Fig.98	P
		18 GHz ~ 26.5 GHz	Fig.99	P



Worst-Case Result:

802.11b CH6 (1-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
2883.600000	47.77	74.00	26.23	H	10.60
4874.100000	51.02	74.00	22.98	V	-9.48
4996.200000	45.65	74.00	28.35	H	-8.61
6959.600000	44.02	74.00	29.98	V	-3.71
14248.800000	50.31	74.00	23.69	V	7.10
17988.400000	54.06	74.00	19.94	V	14.06

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
2883.600000	34.57	54.00	19.43	H	10.60
4874.100000	48.53	54.00	5.47	V	-9.48
4996.200000	27.97	54.00	26.03	H	-8.61
6959.600000	37.18	54.00	16.82	V	-3.71
14248.800000	38.05	54.00	15.95	V	7.10
17988.400000	41.65	54.00	12.35	V	14.06

802.11g CH6 (1-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
2940.800000	47.34	74.00	26.66	H	10.80
3873.000000	36.39	74.00	37.61	V	-12.71
4868.400000	46.19	74.00	27.81	V	-9.51
6960.000000	43.95	74.00	30.05	V	-3.71
14581.200000	51.06	74.00	22.94	V	6.35
17988.000000	53.73	74.00	20.27	H	14.07

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
2940.800000	34.31	54.00	19.69	H	10.80
3873.000000	22.80	54.00	31.20	V	-12.71
4868.400000	32.96	54.00	21.04	V	-9.51
6960.000000	37.87	54.00	16.13	V	-3.71
14581.200000	37.59	54.00	16.41	V	6.35
17988.000000	41.20	54.00	12.80	H	14.07



802.11n HT20 CH6 (1-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
2995.600000	47.73	74.00	26.27	H	10.99
4871.700000	47.04	74.00	26.96	V	-9.49
4981.500000	44.02	74.00	29.98	H	-8.76
6959.600000	44.46	74.00	29.54	V	-3.71
13372.800000	49.28	74.00	24.72	V	4.06
17986.000000	54.83	74.00	19.17	V	14.10

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
2995.600000	35.34	54.00	18.66	H	10.99
4871.700000	34.74	54.00	19.26	V	-9.49
4981.500000	28.22	54.00	25.78	H	-8.76
6959.600000	37.17	54.00	16.83	V	-3.71
13372.800000	36.29	54.00	17.71	V	4.06
17986.000000	41.44	54.00	12.56	V	14.10

802.11n HT40 CH3 (1-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
2976.800000	47.94	74.00	26.06	H	10.99
4842.600000	44.74	74.00	29.26	H	-9.59
4986.000000	44.82	74.00	29.18	V	-8.72
6960.000000	44.10	74.00	29.90	H	-3.71
13377.200000	50.52	74.00	23.48	V	4.08
17982.800000	53.98	74.00	20.02	H	14.17

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
2976.800000	35.56	54.00	18.44	H	10.99
4842.600000	32.36	54.00	21.64	H	-9.59
4986.000000	27.21	54.00	26.79	V	-8.72
6960.000000	38.08	54.00	15.92	H	-3.71
13377.200000	36.36	54.00	17.64	V	4.08
17982.800000	41.19	54.00	12.81	H	14.17



802.11ax HE20 CH6 (1-18GHz)

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
2951.600000	46.67	74.00	27.33	V	10.75
4880.100000	42.97	74.00	31.03	V	-9.44
4979.400000	45.83	74.00	28.17	H	-8.78
6960.000000	43.91	74.00	30.09	V	-3.71
14588.400000	51.47	74.00	22.53	H	6.43
17978.400000	55.90	74.00	18.10	V	14.25

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
2951.600000	34.61	54.00	19.39	V	10.75
4880.100000	29.94	54.00	24.06	V	-9.44
4979.400000	29.18	54.00	24.82	H	-8.78
6960.000000	37.87	54.00	16.13	V	-3.71
14588.400000	38.53	54.00	15.47	H	6.43
17978.400000	43.82	54.00	10.18	V	14.25

802.11ax HE40 CH6 (1-18GHz)

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
2888.800000	47.82	74.00	26.18	V	10.61
4977.000000	45.22	74.00	28.78	H	-8.81
6960.000000	41.70	74.00	32.30	V	-3.71
10909.600000	46.01	74.00	27.99	V	1.43
14567.200000	51.98	74.00	22.02	H	6.19
17990.400000	55.32	74.00	18.68	H	14.02

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
2888.800000	34.94	54.00	19.06	V	10.61
4977.000000	28.47	54.00	25.53	H	-8.81
6960.000000	34.62	54.00	19.38	V	-3.71
10909.600000	34.03	54.00	19.97	V	1.43
14567.200000	37.83	54.00	16.17	H	6.19
17990.400000	43.16	54.00	10.84	H	14.02

Note:

A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss", and Antenna Factor, the gain of the preamplifier, the cable loss. P_{Mea} is the field strength recorded from the instrument.



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The measurement results are obtained as described below:

Result = P_{Mea} + Cable Loss + Antenna Factor - Gain of the preamplifier

See below for test graphs.

Conclusion: PASS

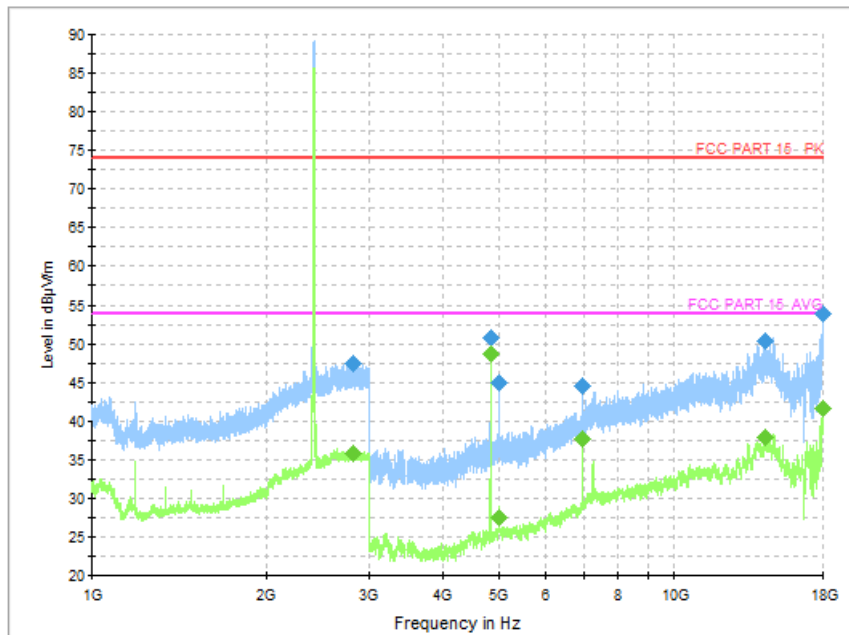


Fig.67 Radiated Spurious Emission (802.11b, CH1, 1GHz-18GHz)

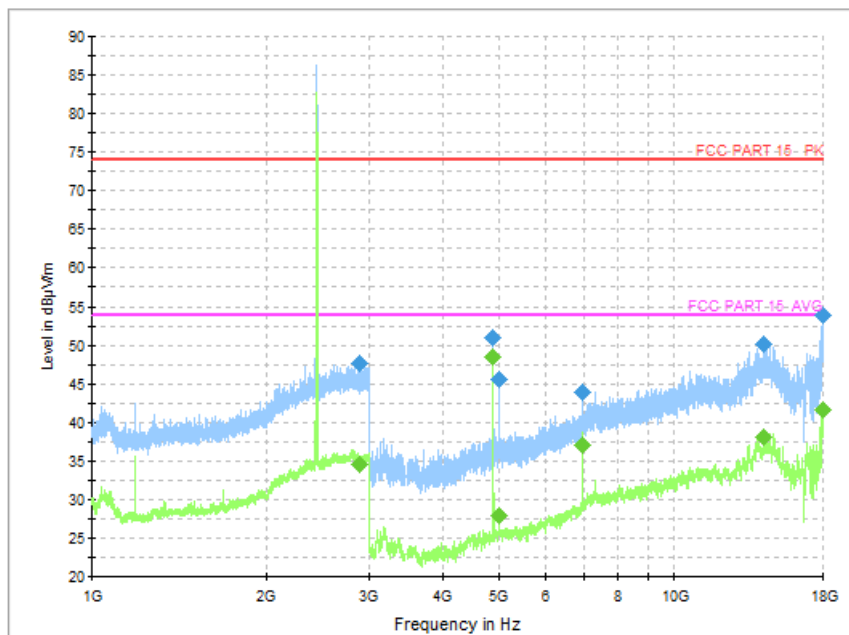


Fig.68 Radiated Spurious Emission (802.11b, CH6, 1GHz-18GHz)

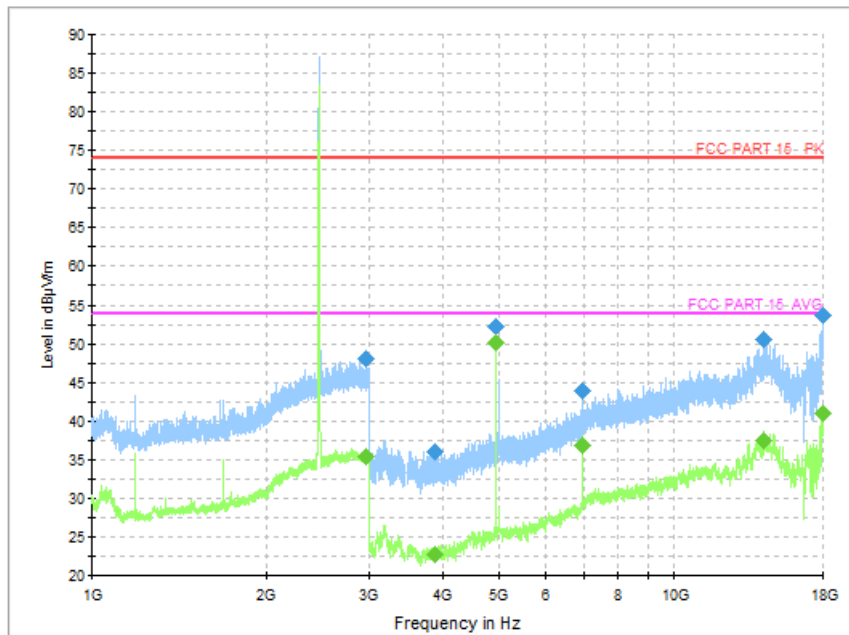


Fig.69 Radiated Spurious Emission (802.11b, CH11, 1GHz-18GHz)

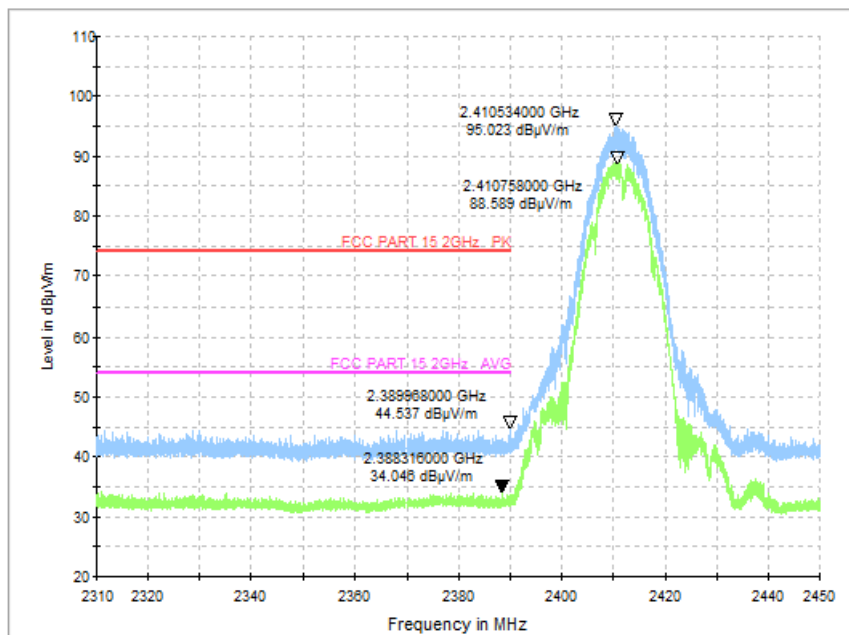


Fig.70 Radiated Restricted Band (802.11b, CH1, 2.38GHz~2.45GHz)

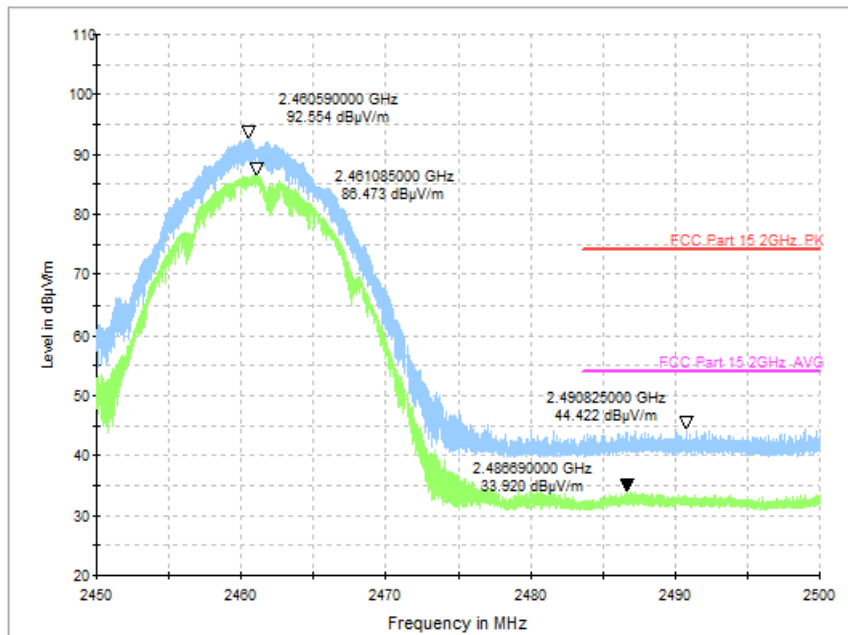


Fig.71 Radiated Restricted Band (802.11b, CH11, 2.45GHz~2.5GHz)

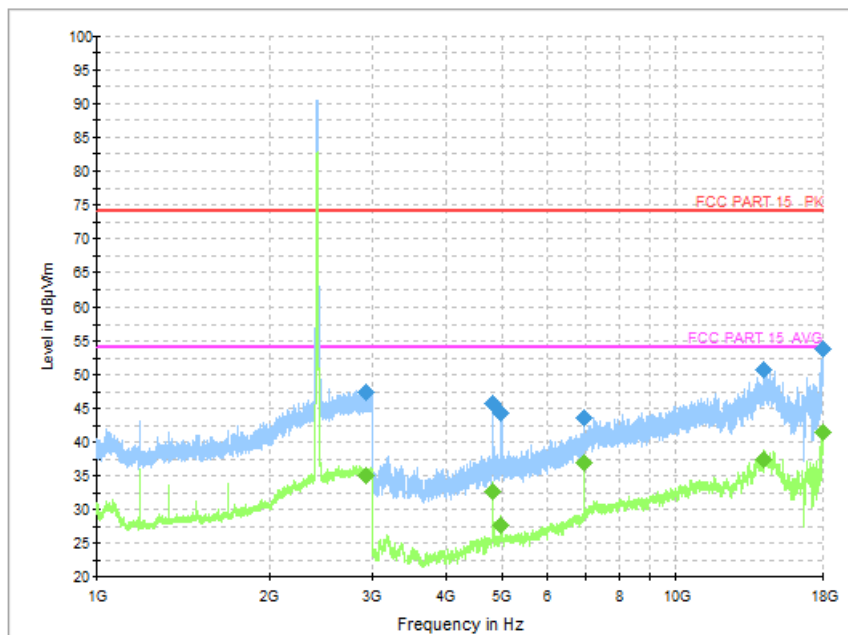


Fig.72 Radiated Spurious Emission (802.11g, CH1, 1GHz-18GHz)

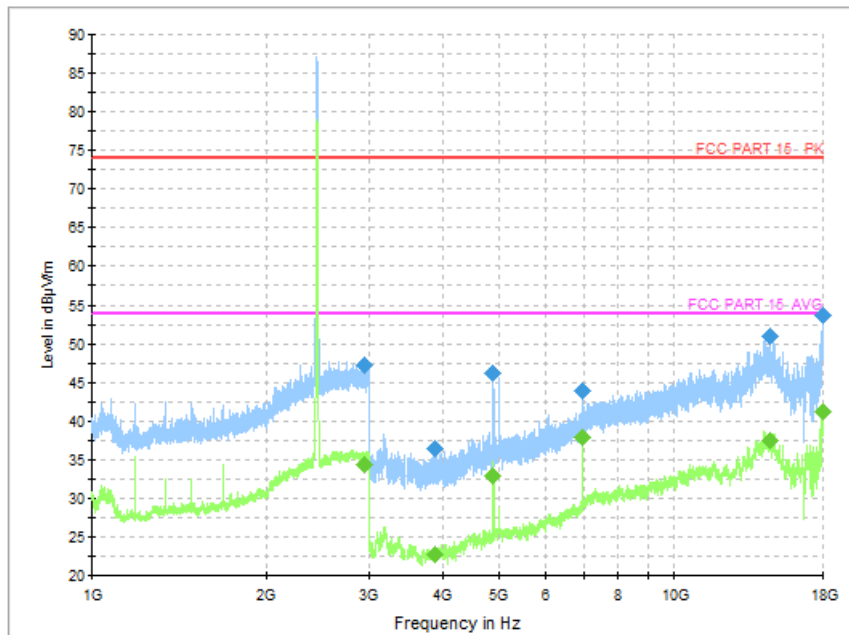


Fig.73 Radiated Spurious Emission (802.11g, CH6, 1GHz-18GHz)

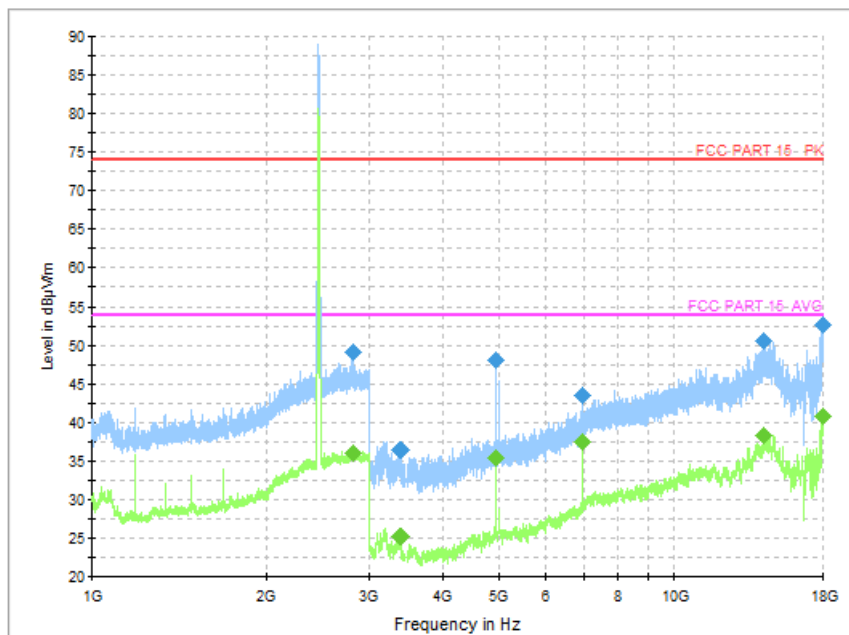


Fig.74 Radiated Spurious Emission (802.11g, CH11, 1GHz-18GHz)

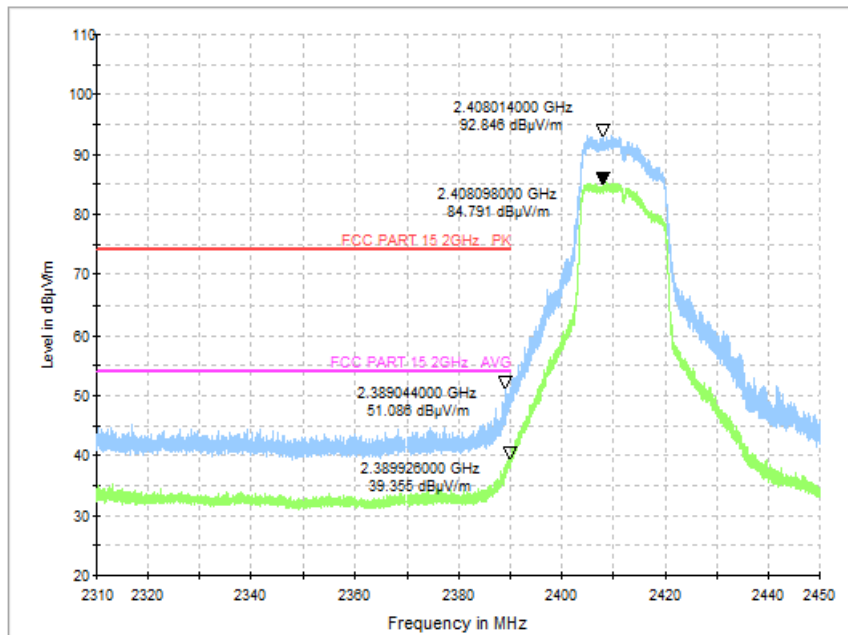


Fig.75 Radiated Restricted Band (802.11g, CH1, 2.38GHz~2.45GHz)

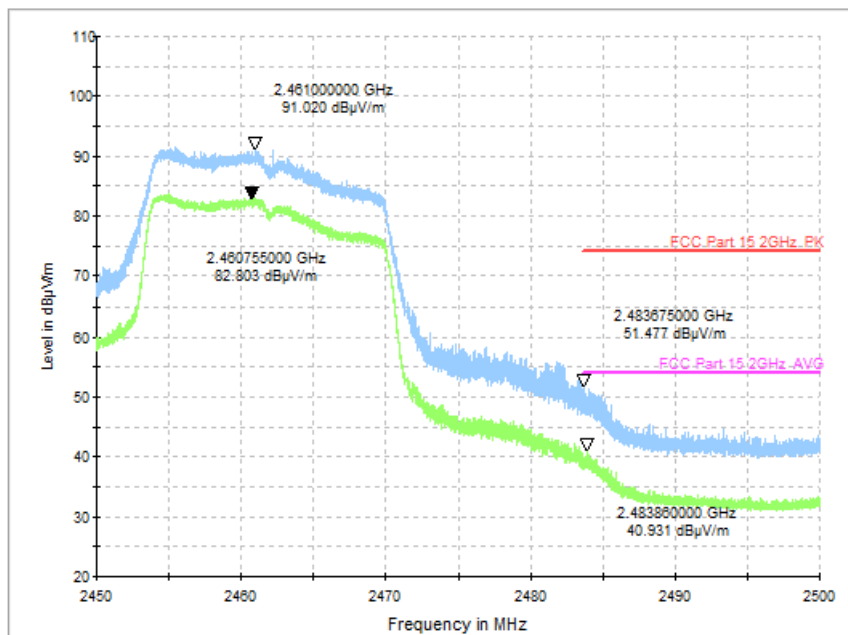


Fig.76 Radiated Restricted Band (802.11g, CH11, 2.45GHz~2.5GHz)

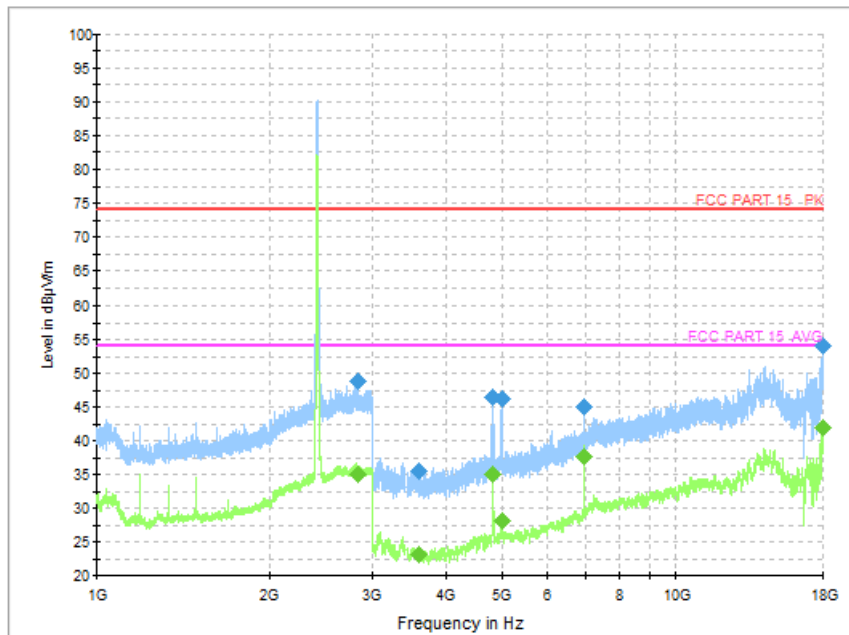


Fig.77 Radiated Spurious Emission (802.11n HT20, CH1, 1GHz-18GHz)

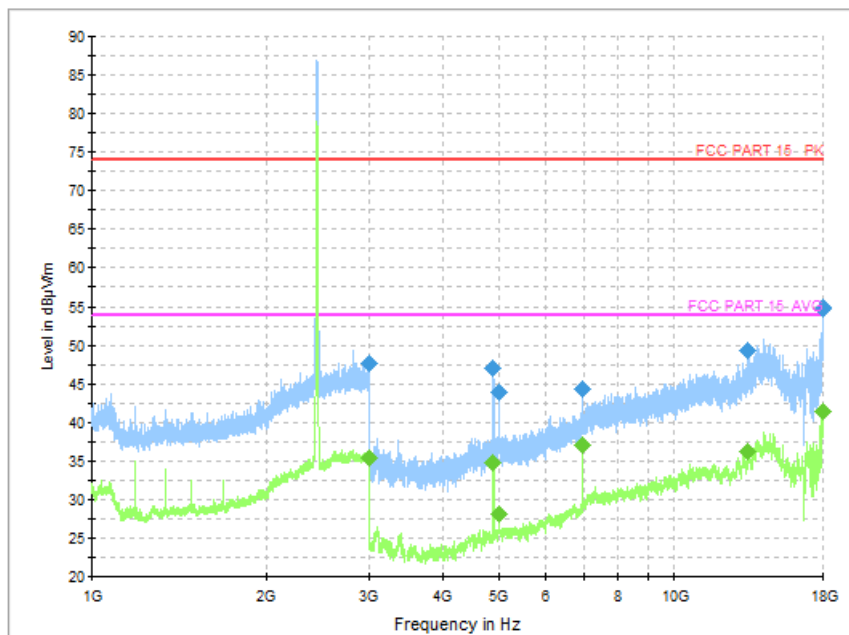


Fig.78 Radiated Spurious Emission (802.11n HT20, CH6, 1GHz-18GHz)

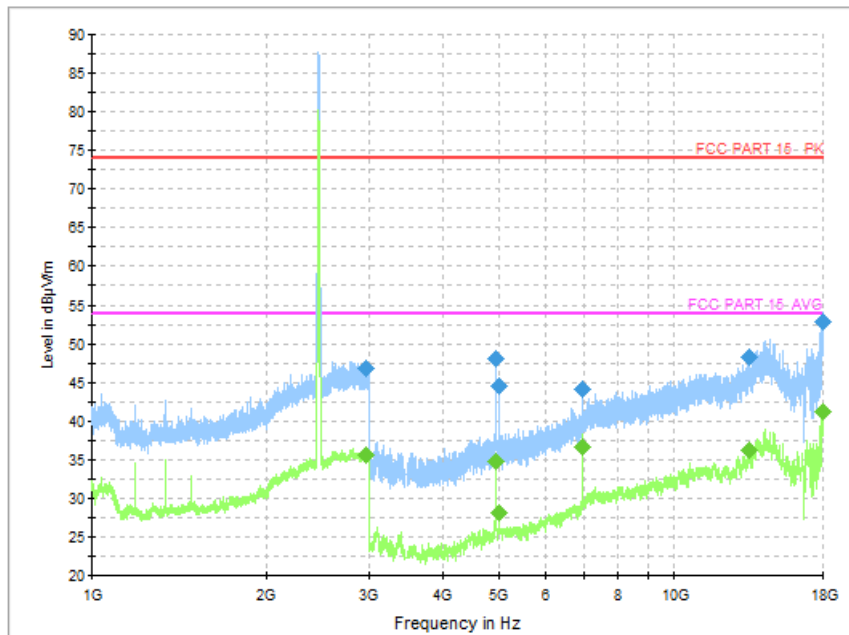


Fig.79 Radiated Spurious Emission (802.11n HT20, CH11, 1GHz-18GHz)

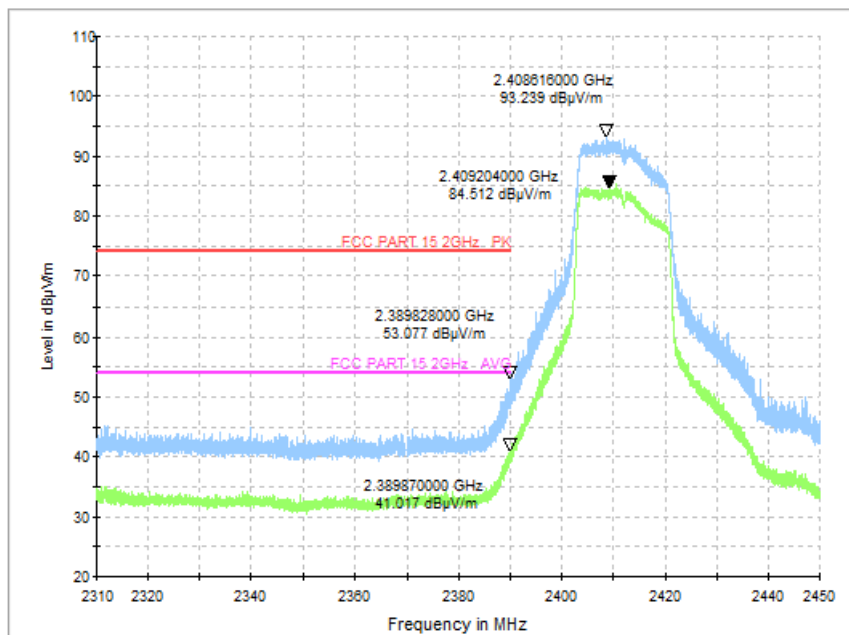


Fig.80 Radiated Restricted Band (802.11n HT20, CH1, 2.38GHz~2.45GHz)

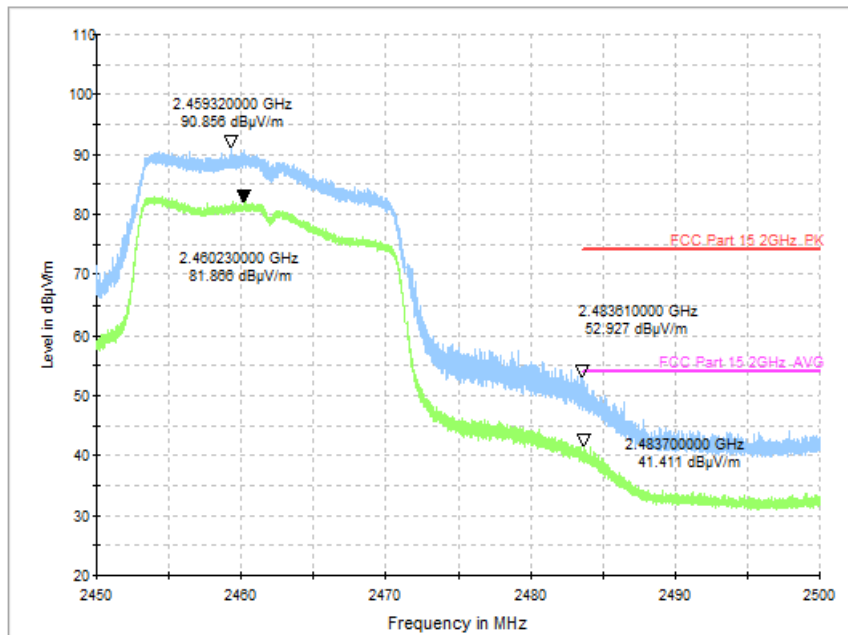


Fig.81 Radiated Restricted Band (802.11n HT20, CH11, 2.45GHz~2.5GHz)

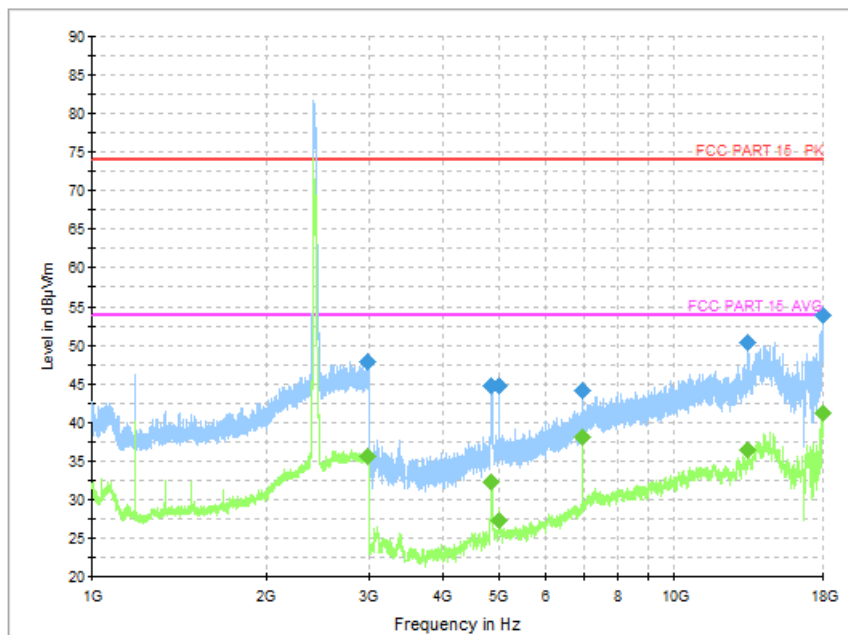


Fig.82 Radiated Spurious Emission (802.11n HT40, CH3, 1GHz-18GHz)

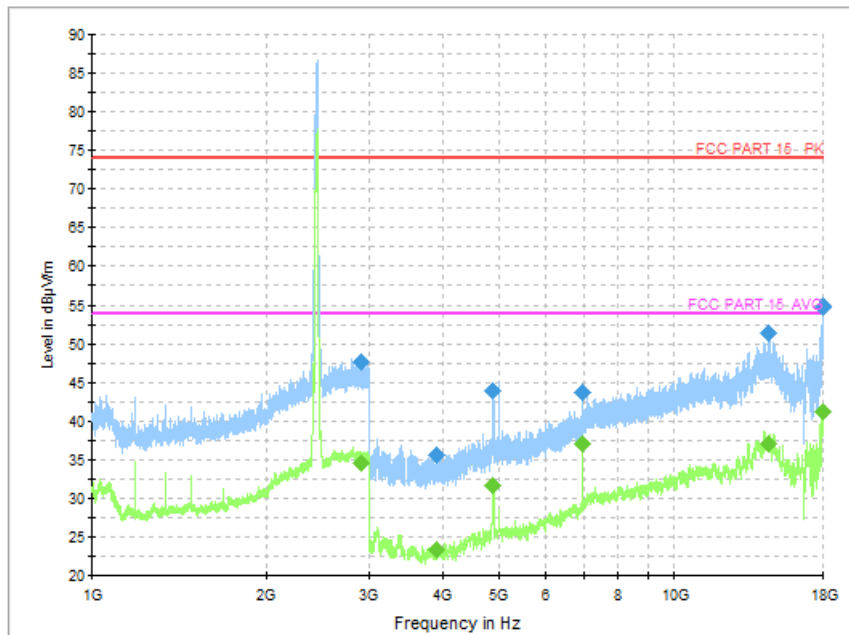


Fig.83 Radiated Spurious Emission (802.11n HT40, CH6, 1GHz-18GHz)

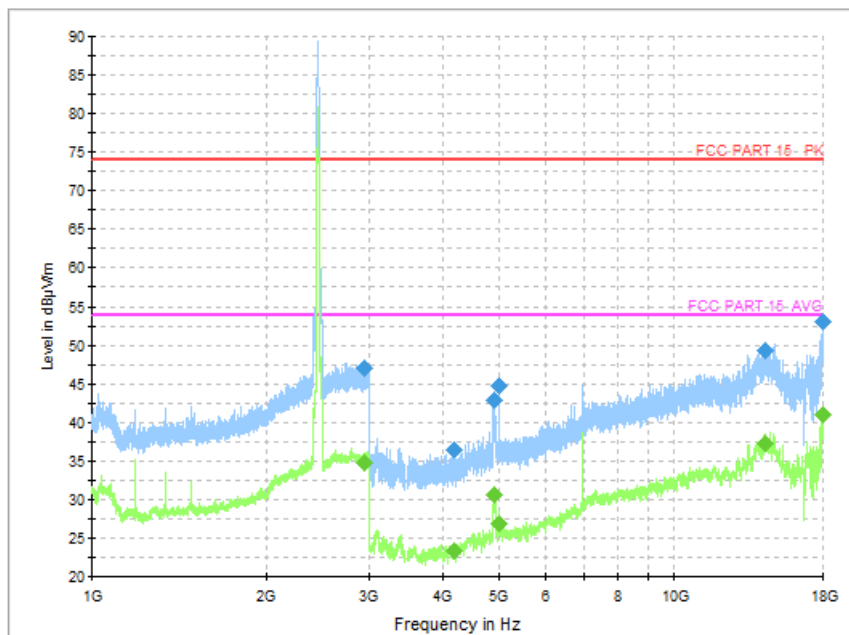


Fig.84 Radiated Spurious Emission (802.11n HT40, CH9, 1GHz-18GHz)

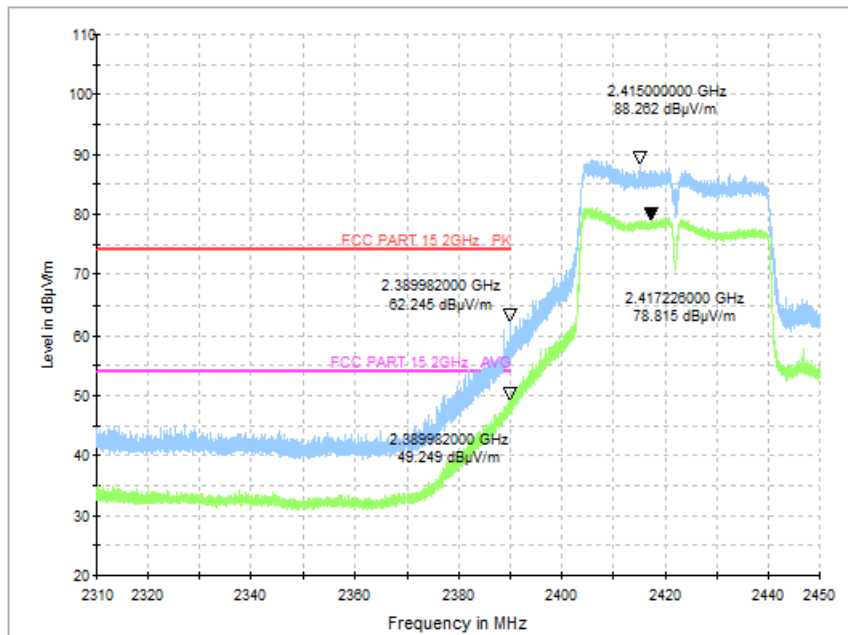


Fig.85 Radiated Restricted Band (802.11n HT40, CH3, 2.38GHz~2.45GHz)

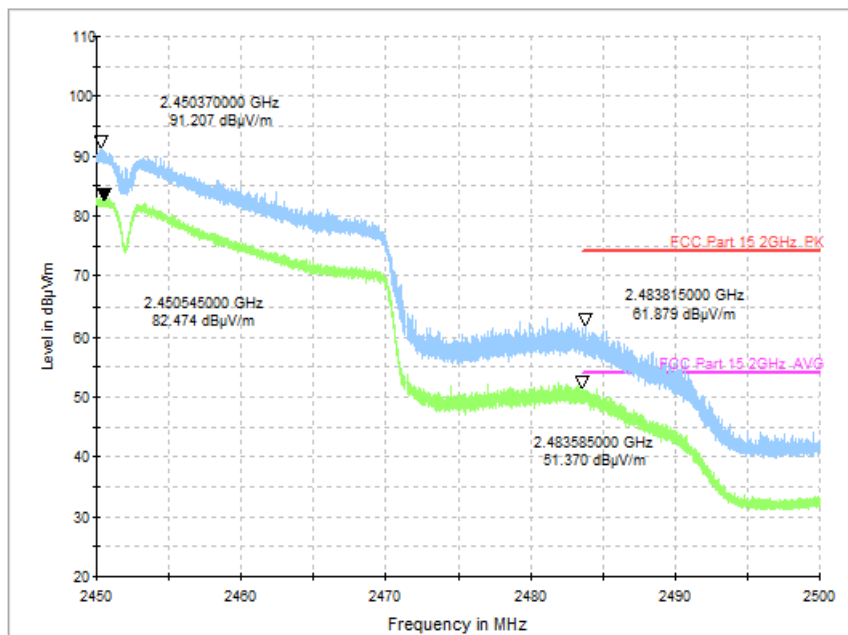


Fig.86 Radiated Restricted Band (802.11n HT40, CH9, 2.45GHz~2.5GHz)

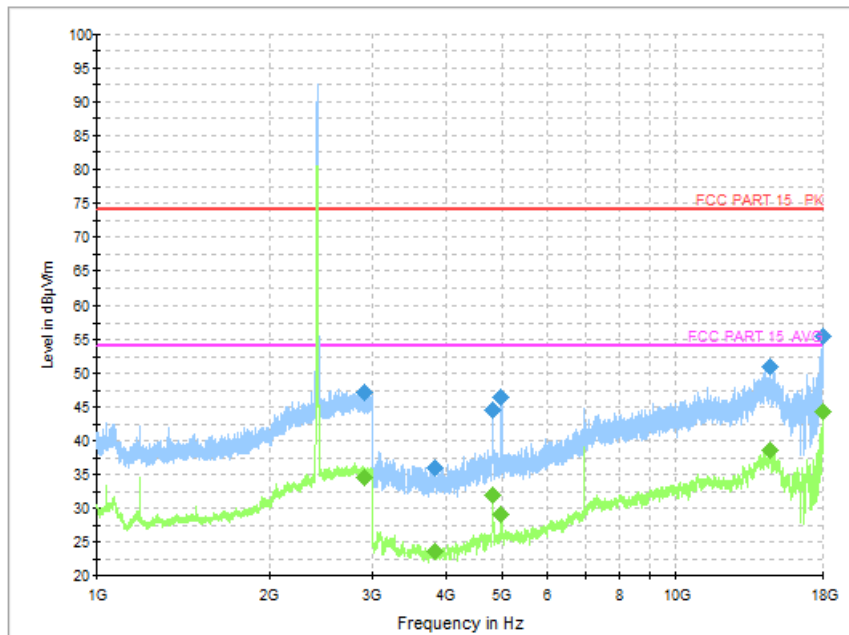


Fig.87 Radiated Spurious Emission (802.11ax HE20, CH1, 1GHz-18GHz)

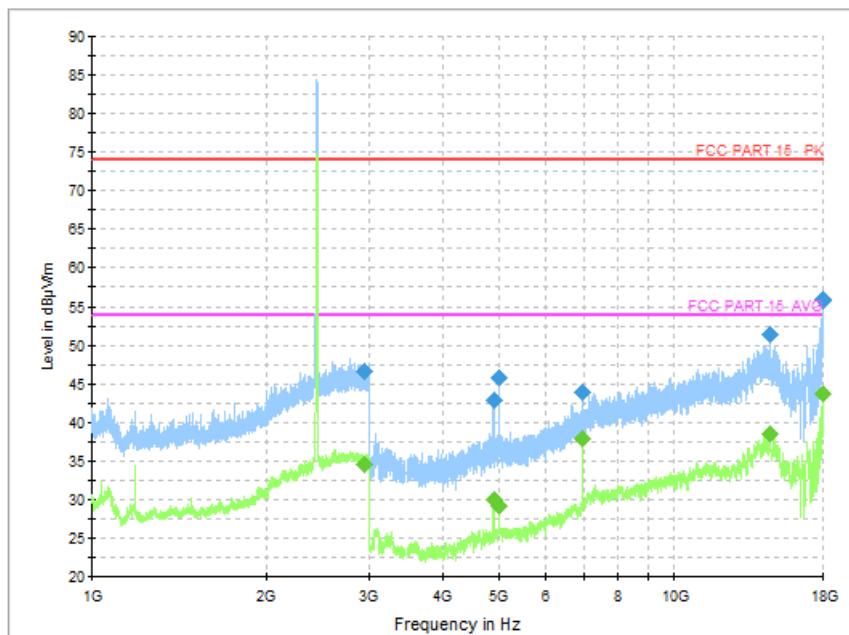


Fig.88 Radiated Spurious Emission (802.11ax HE20, CH6, 1GHz-18GHz)

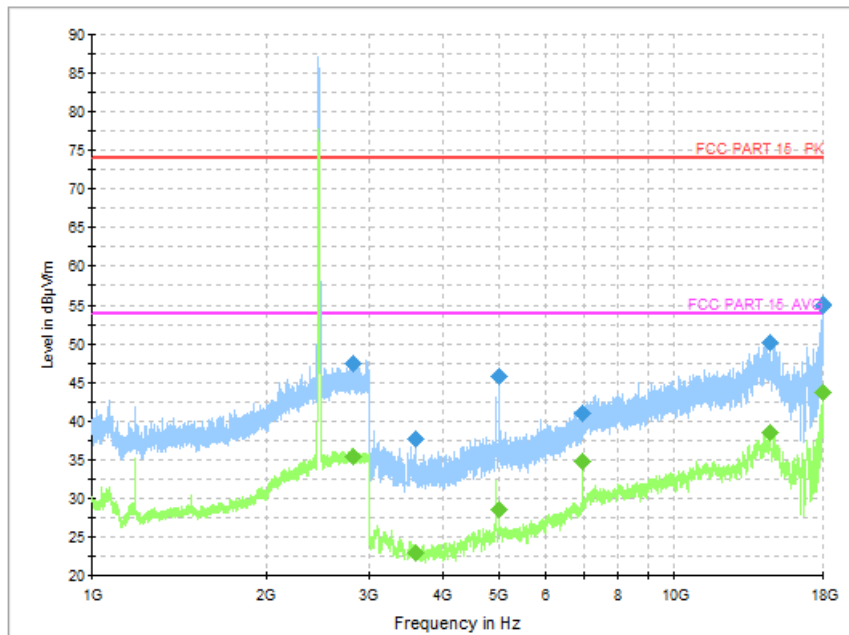


Fig.89 Radiated Spurious Emission (802.11ax HE20, CH11, 1GHz-18GHz)

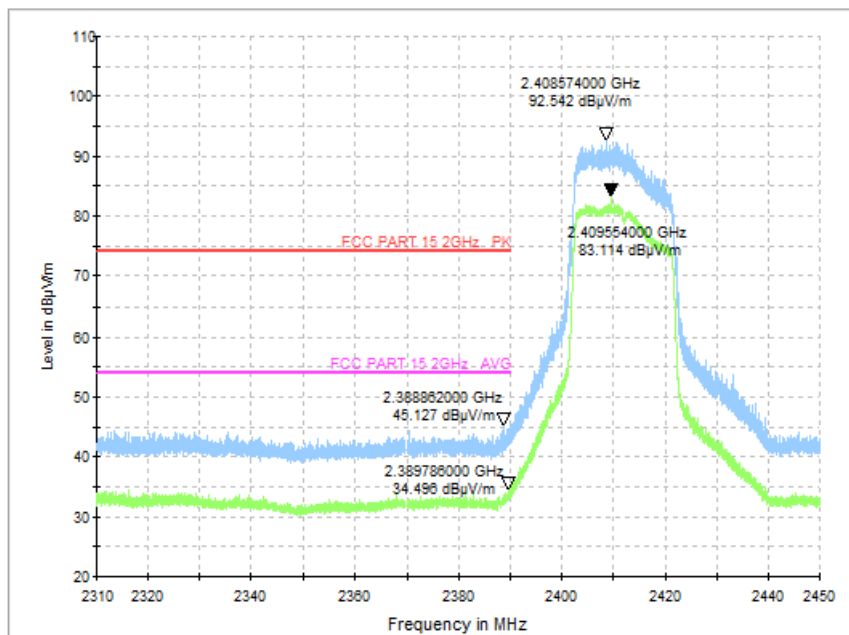


Fig.90 Radiated Restricted Band (802.11ax HE20, CH1, 2.38GHz~2.45GHz)

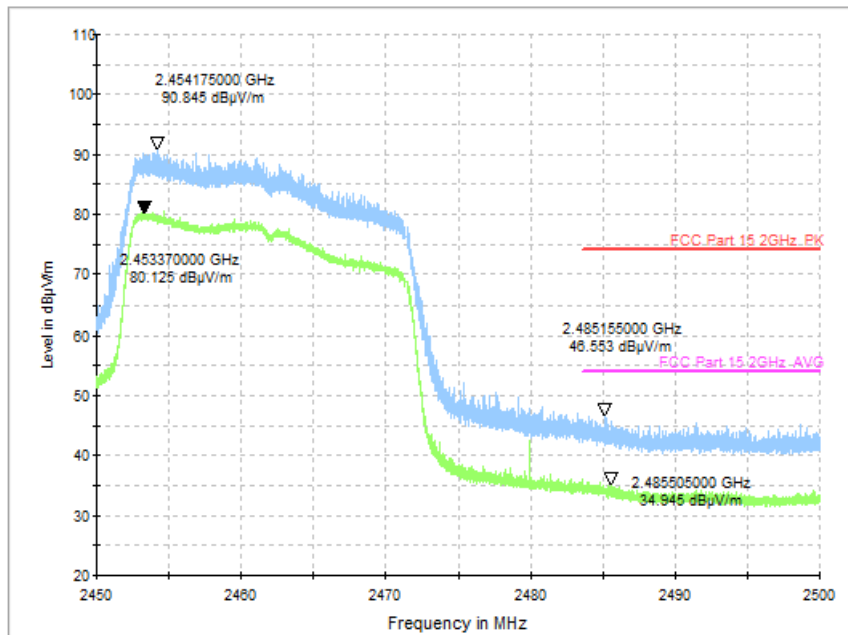


Fig.91 Radiated Restricted Band (802.11ax HE20, CH11, 2.45GHz~2.5GHz)

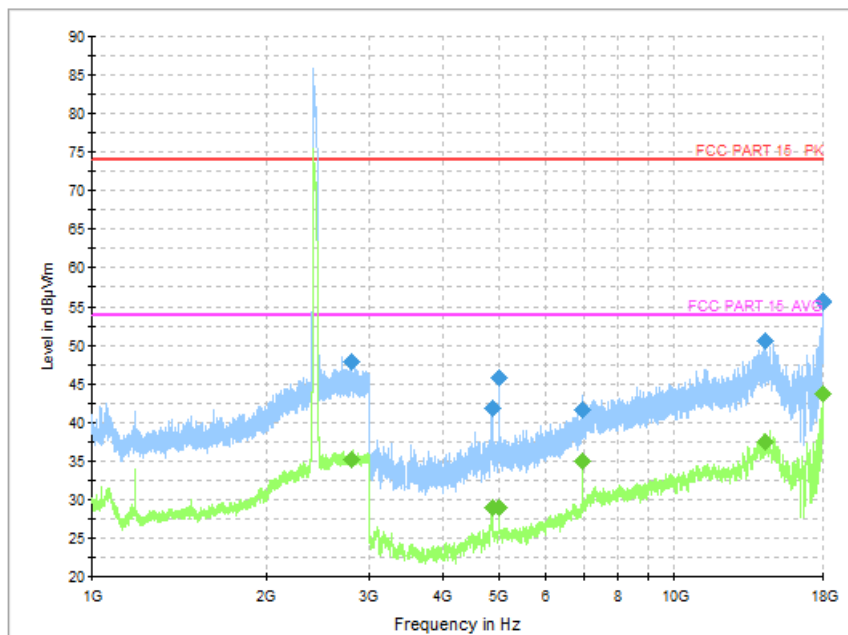


Fig.92 Radiated Spurious Emission (802.11ax HE40, CH3, 1GHz-18GHz)

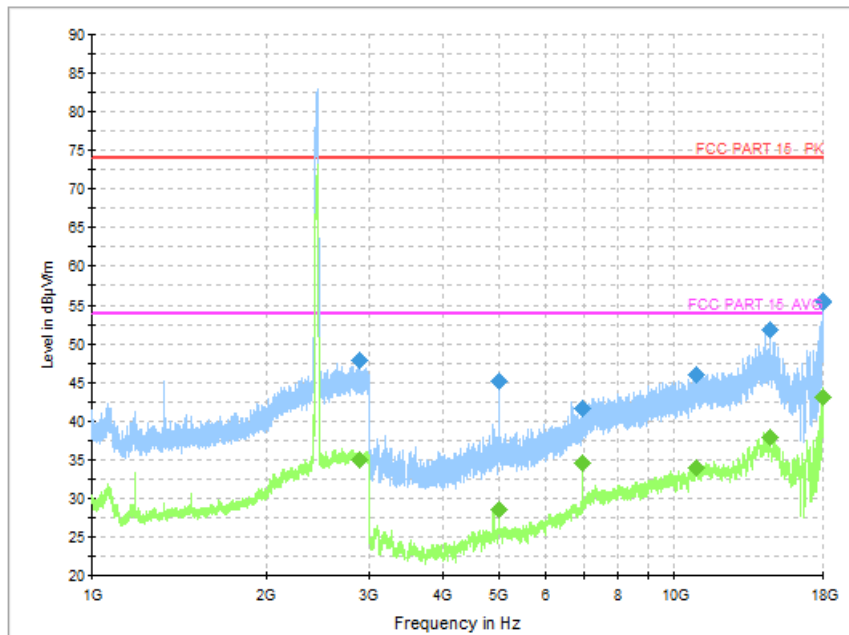


Fig.93 Radiated Spurious Emission (802.11ax HE40, CH6, 1GHz-18GHz)

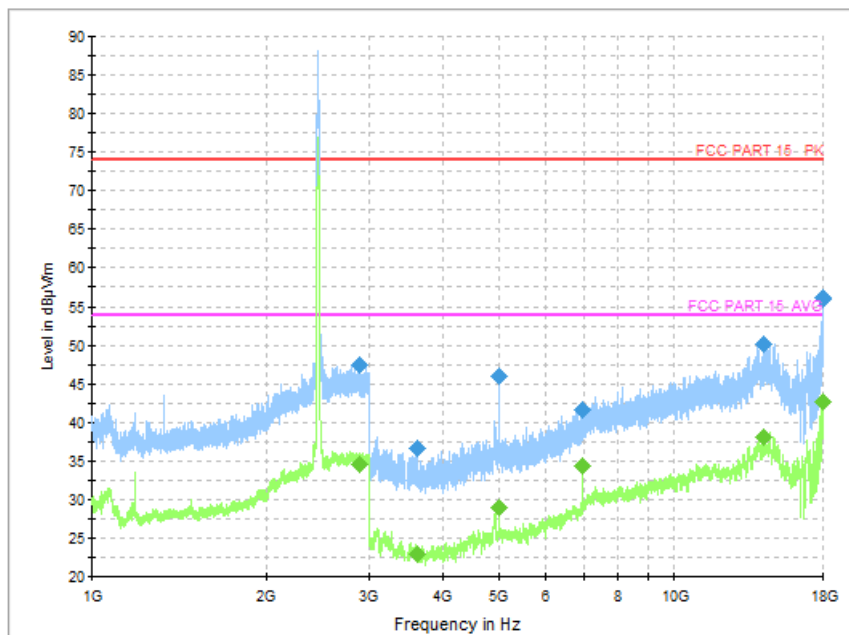


Fig.94 Radiated Spurious Emission (802.11ax HE40, CH9, 1GHz-18GHz)

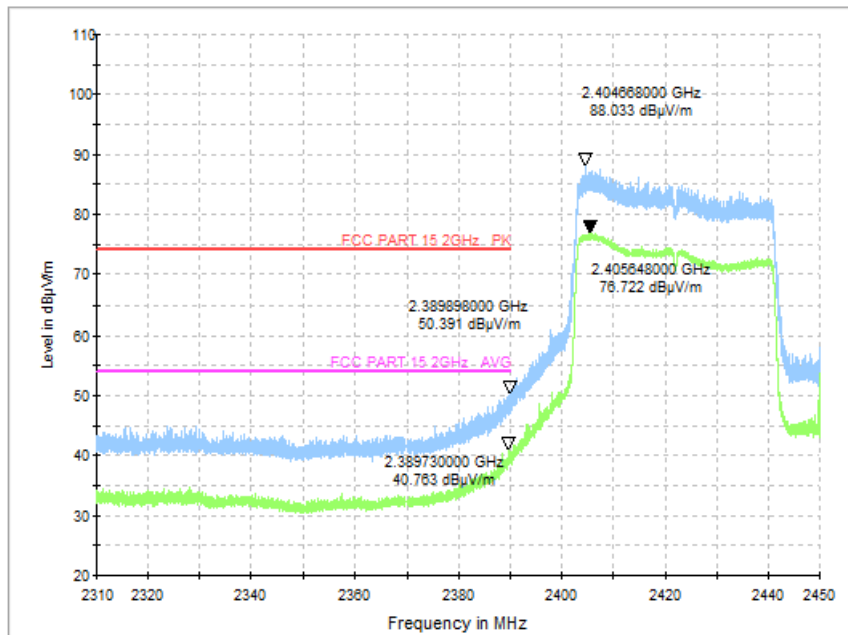


Fig.95 Radiated Restricted Band (802.11ax HE40, CH3, 2.38GHz~2.45GHz)

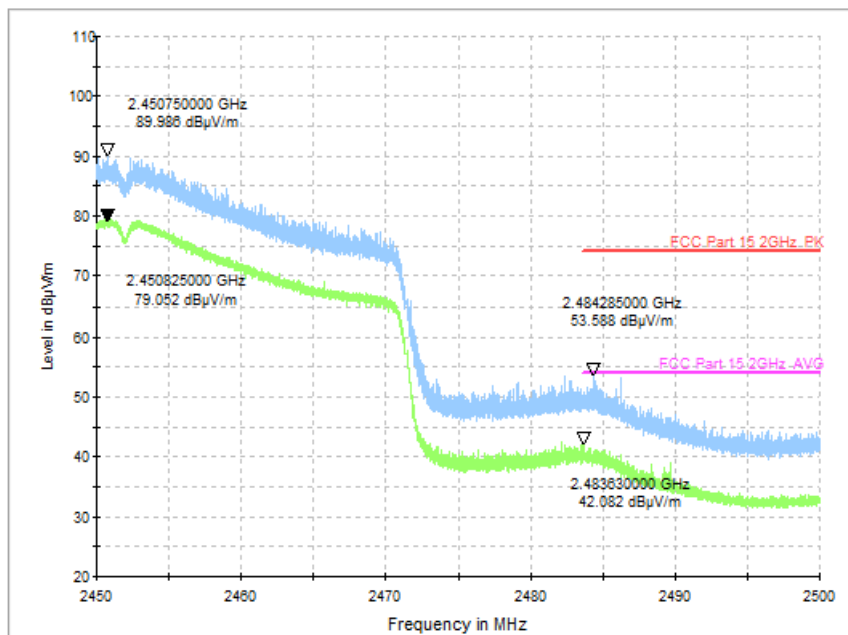


Fig.96 Radiated Restricted Band (802.11ax HE40, CH9, 2.45GHz~2.5GHz)

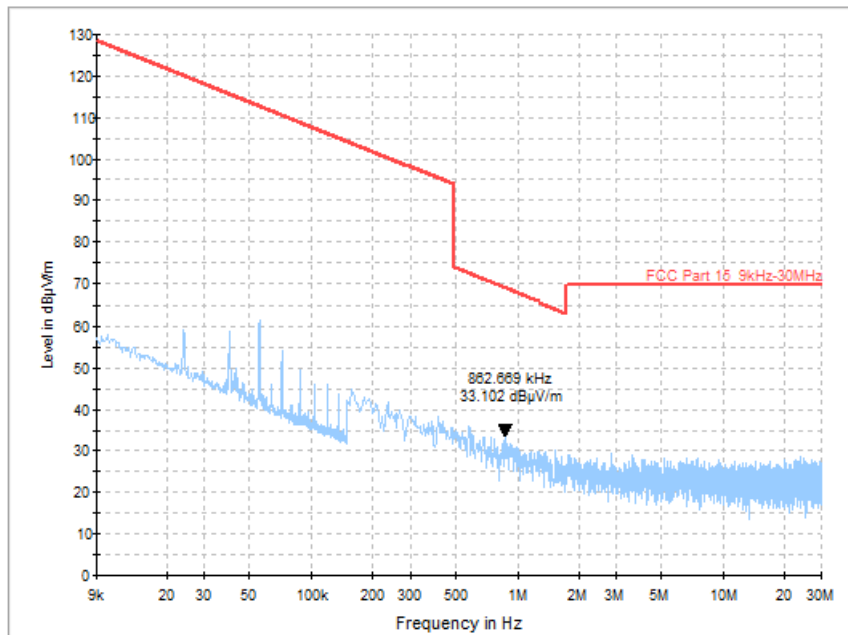


Fig.97 Radiated Spurious Emission (All Channels, 9KHz-30MHz)

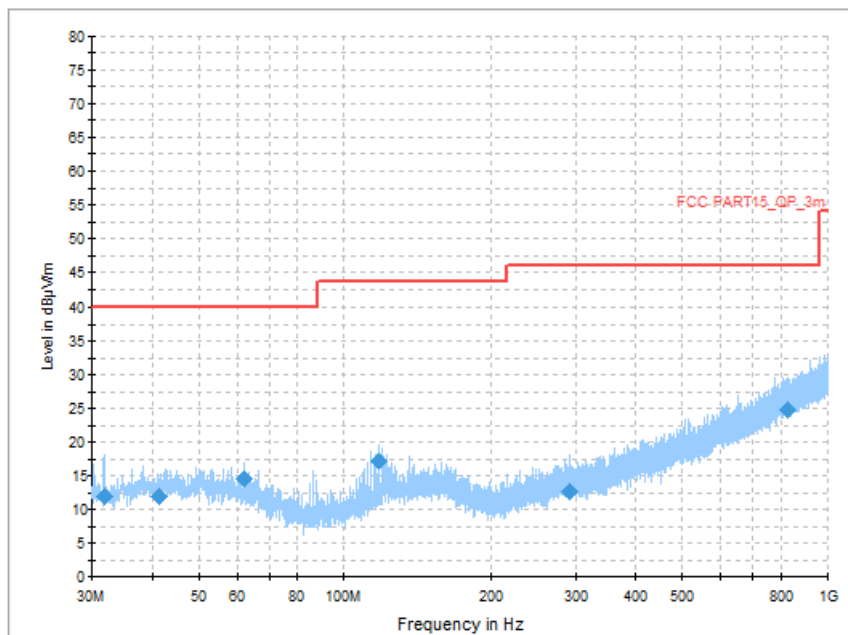


Fig.98 Radiated Spurious Emission (All Channels, 30MHz-1GHz)

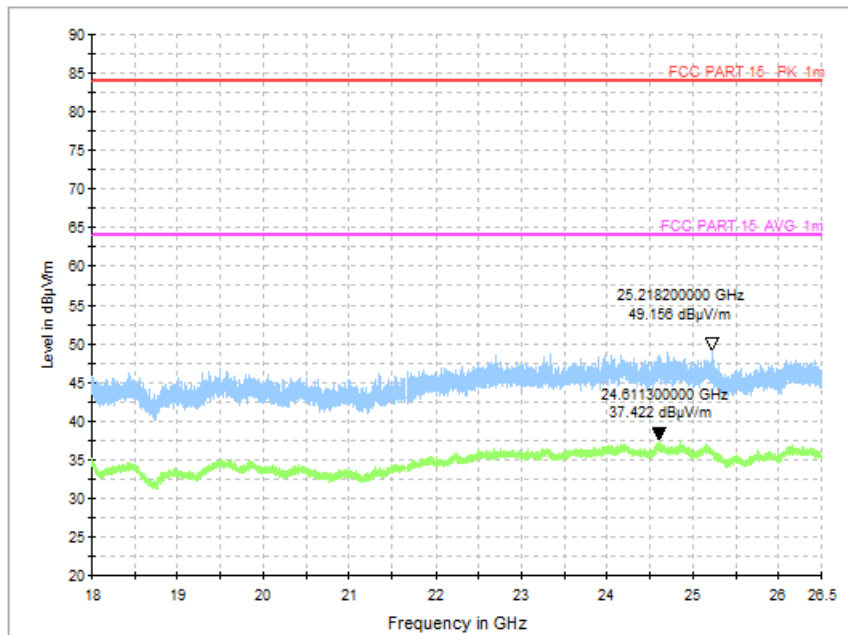


Fig.99 Radiated Spurious Emission (All Channels, 18GHz-26.5GHz)

**A.7 AC Power line Conducted Emission****Test Condition:**

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

WLAN (Quasi-peak Limit) - AE2

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.100	Fig.101	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.

WLAN (Average Limit) - AE2

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.100	Fig.101	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.

See below for test graphs.

Conclusion: PASS

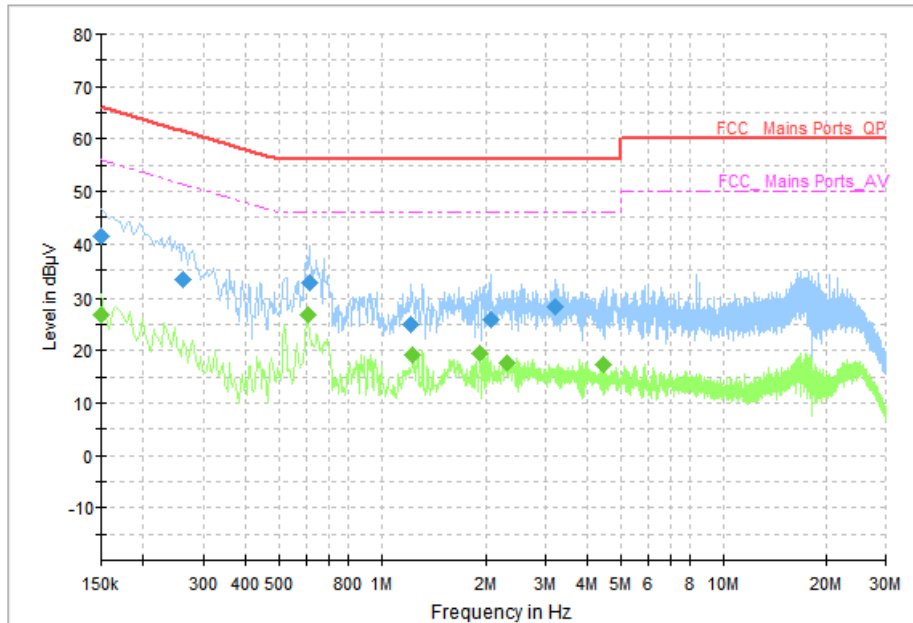


Fig.100 AC Power line Conducted Emission (Traffic, 120V)

Measurement Results: Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	41.36	66.00	24.64	N	ON	10
0.262000	33.36	61.37	28.01	L1	ON	10
0.618000	32.71	56.00	23.29	N	ON	10
1.222000	24.91	56.00	31.09	N	ON	10
2.066000	25.89	56.00	30.11	N	ON	10
3.222000	28.22	56.00	27.78	N	ON	10

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	26.92	56.00	29.08	N	ON	10
0.606000	26.76	46.00	19.24	L1	ON	10
1.238000	19.11	46.00	26.89	L1	ON	10
1.926000	19.48	46.00	26.52	L1	ON	10
2.326000	17.73	46.00	28.27	L1	ON	10
4.462000	17.21	46.00	28.79	L1	ON	10

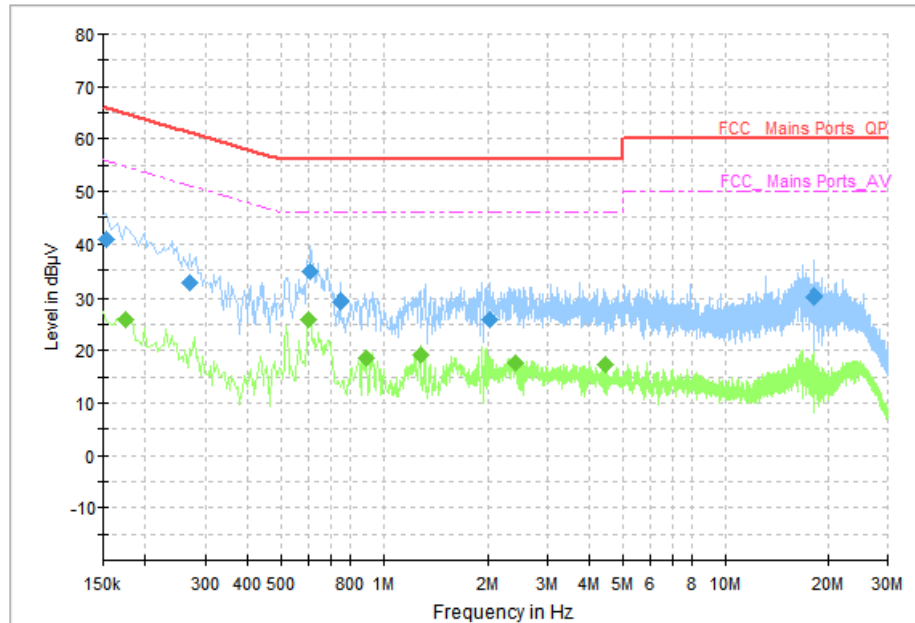


Fig.101 AC Power line Conducted Emission (Idle, 120V)

Measurement Results: Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154000	40.97	65.78	24.81	L1	ON	10
0.270000	32.68	61.12	28.44	L1	ON	10
0.610000	34.73	56.00	21.27	N	ON	10
0.746000	29.32	56.00	26.68	N	ON	10
2.034000	25.73	56.00	30.27	L1	ON	10
18.274000	30.13	60.00	29.87	N	ON	11

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.174000	25.88	54.77	28.89	N	ON	10
0.602000	25.75	46.00	20.25	L1	ON	10
0.890000	18.68	46.00	27.32	L1	ON	10
1.282000	19.26	46.00	26.74	L1	ON	10
2.410000	17.48	46.00	28.52	L1	ON	10
4.462000	17.24	46.00	28.76	L1	ON	10

**A.8 99% Occupied Bandwidth****Measurement Limit:**

Standard	Limit
RSS-Gen section 6.7	/

Measurement Result:

Mode	Channel	Frequency (MHz)	Test Results (MHz)		Conclusion
802.11b	CH 1	2412	Fig.102	13.12	P
	CH 6	2437	Fig.103	13.48	P
	CH 11	2462	Fig.104	13.48	P
802.11g	CH 1	2412	Fig.105	16.32	P
	CH 6	2437	Fig.106	16.32	P
	CH 11	2462	Fig.107	16.40	P
802.11n HT20	CH 1	2412	Fig.108	17.56	P
	CH 6	2437	Fig.109	17.52	P
	CH 11	2462	Fig.110	17.60	P
802.11n HT40	CH 3	2422	Fig.111	36.32	P
	CH 6	2437	Fig.112	35.76	P
	CH 9	2452	Fig.113	35.84	P
802.11ax HE20	CH 1	2412	Fig.114	18.92	P
	CH 6	2437	Fig.115	18.84	P
	CH 11	2462	Fig.116	18.96	P
802.11ax HE40	CH 3	2422	Fig.117	37.84	P
	CH 6	2437	Fig.118	37.36	P
	CH 9	2452	Fig.119	37.44	P

See below for test graphs.

Conclusion: PASS

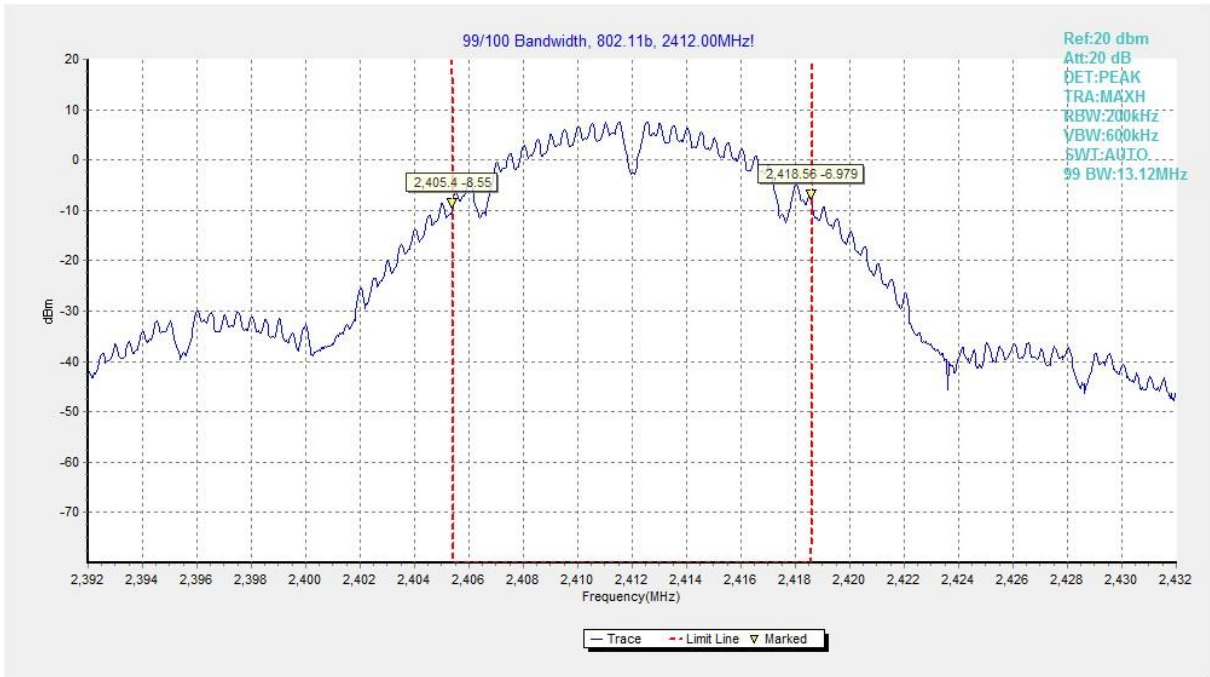


Fig.102 99% Occupied Bandwidth (802.11b, CH 1)

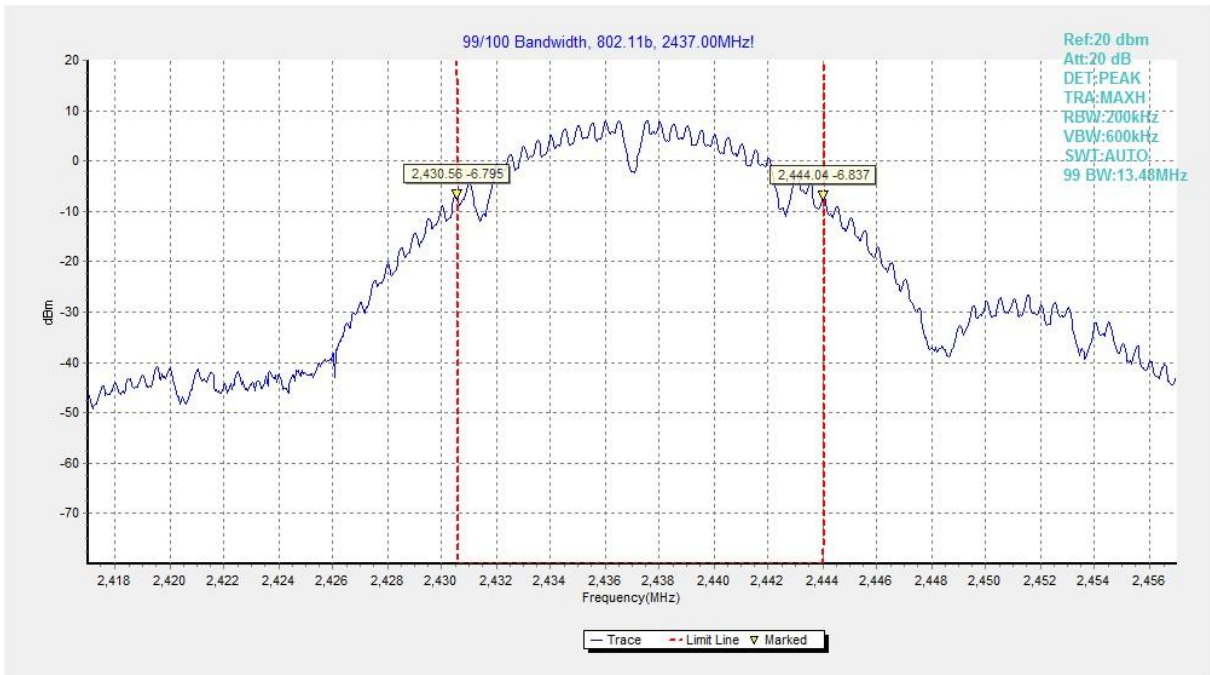


Fig.103 99% Occupied Bandwidth (802.11b, CH 6)

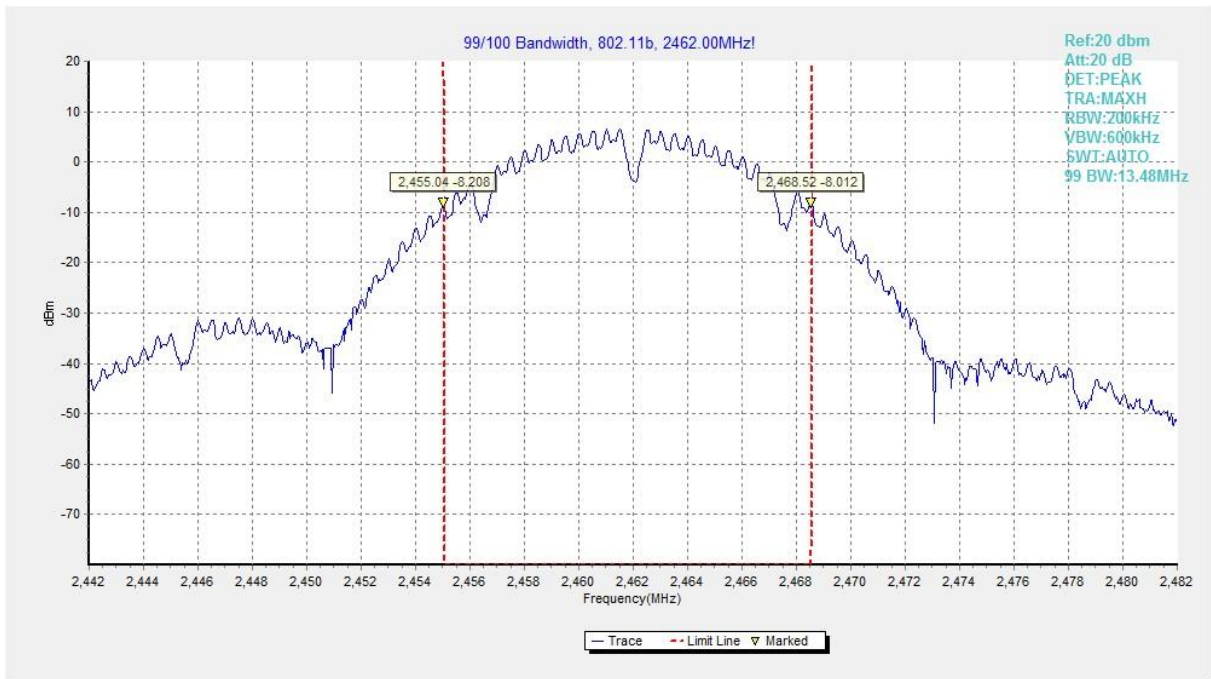


Fig.104 99% Occupied Bandwidth (802.11b, CH 11)

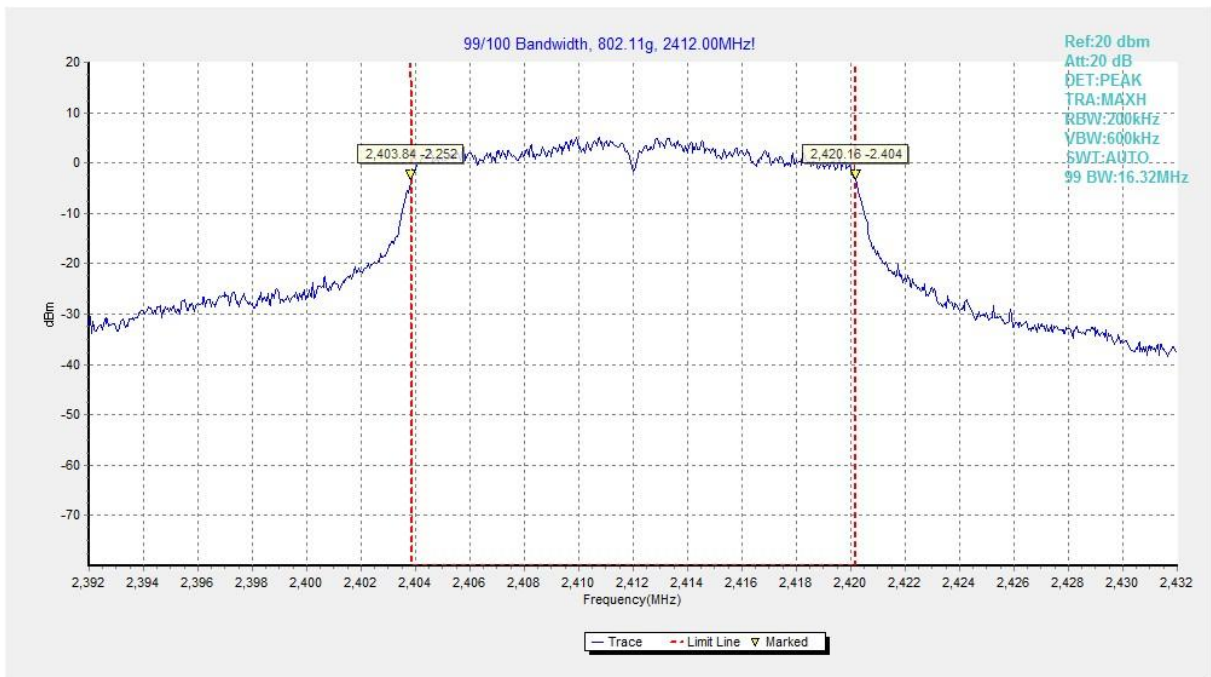


Fig.105 99% Occupied Bandwidth (802.11g, CH 1)

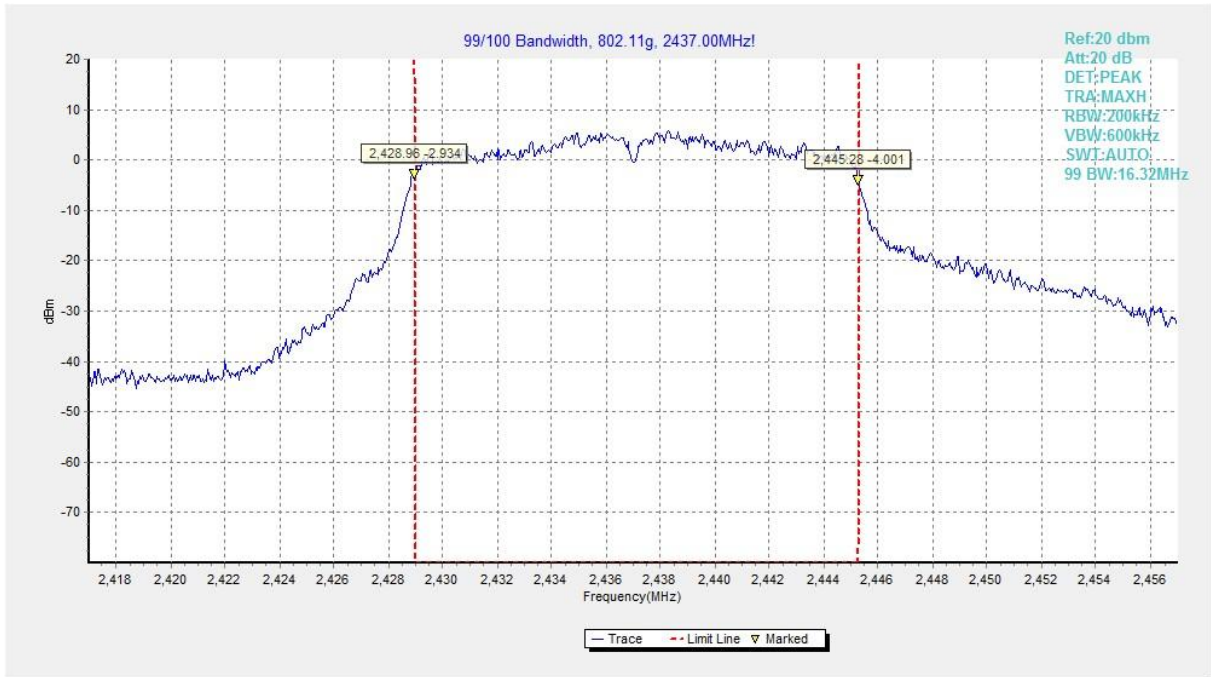


Fig.106 99% Occupied Bandwidth (802.11g, CH 6)

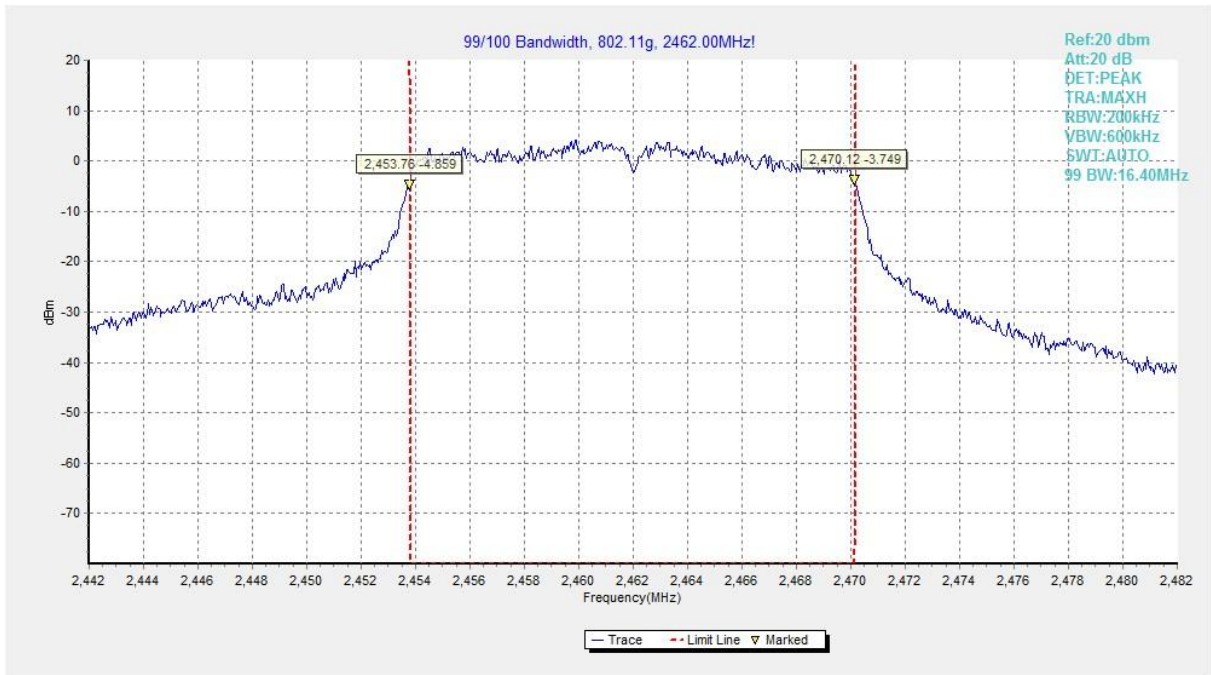


Fig.107 99% Occupied Bandwidth (802.11g, CH 11)

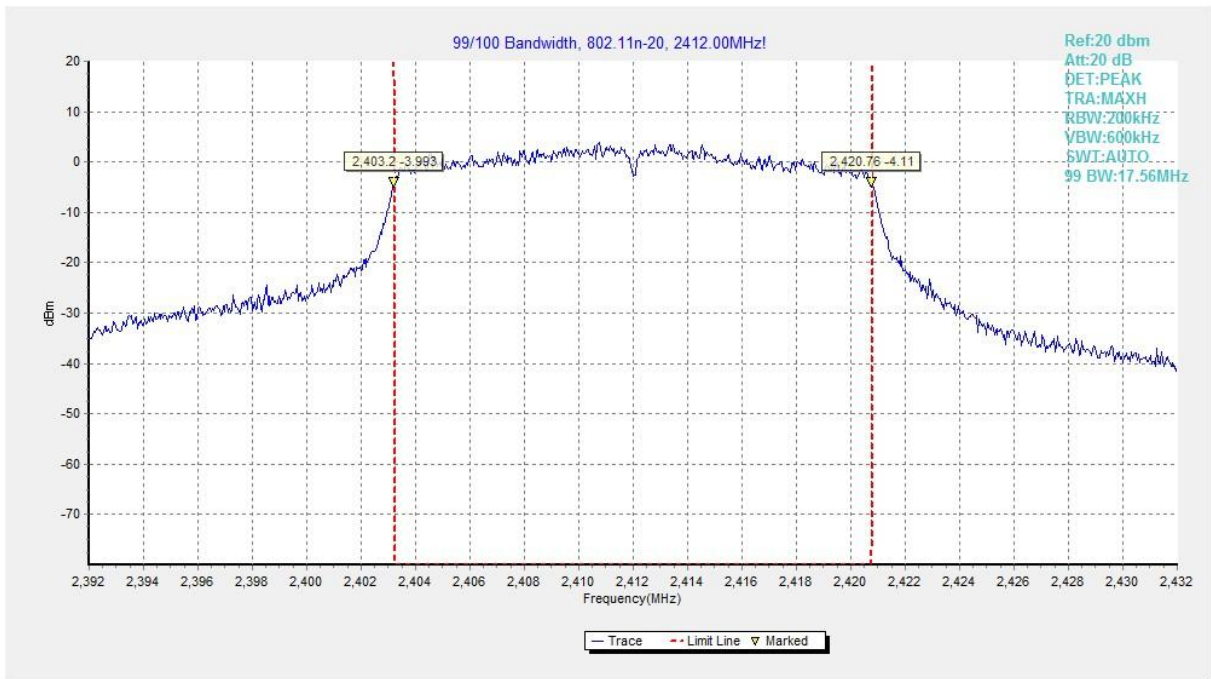


Fig.108 99% Occupied Bandwidth (802.11n HT20, CH 1)

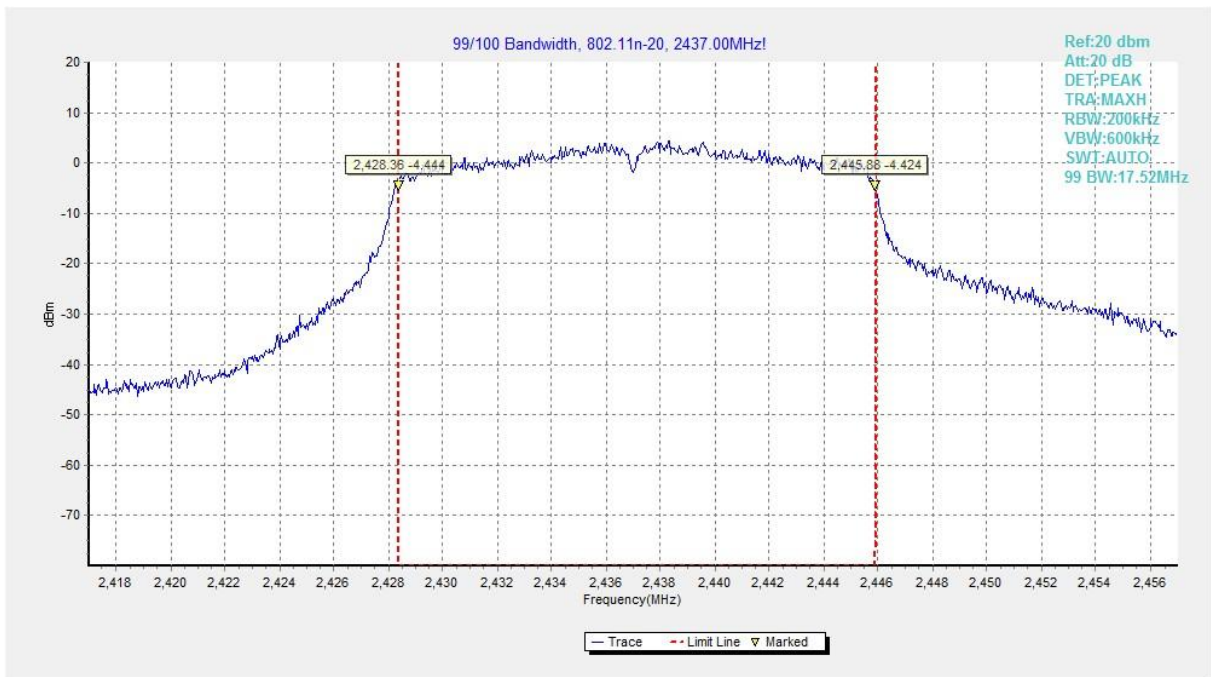


Fig.109 99% Occupied Bandwidth (802.11n HT20, CH 6)

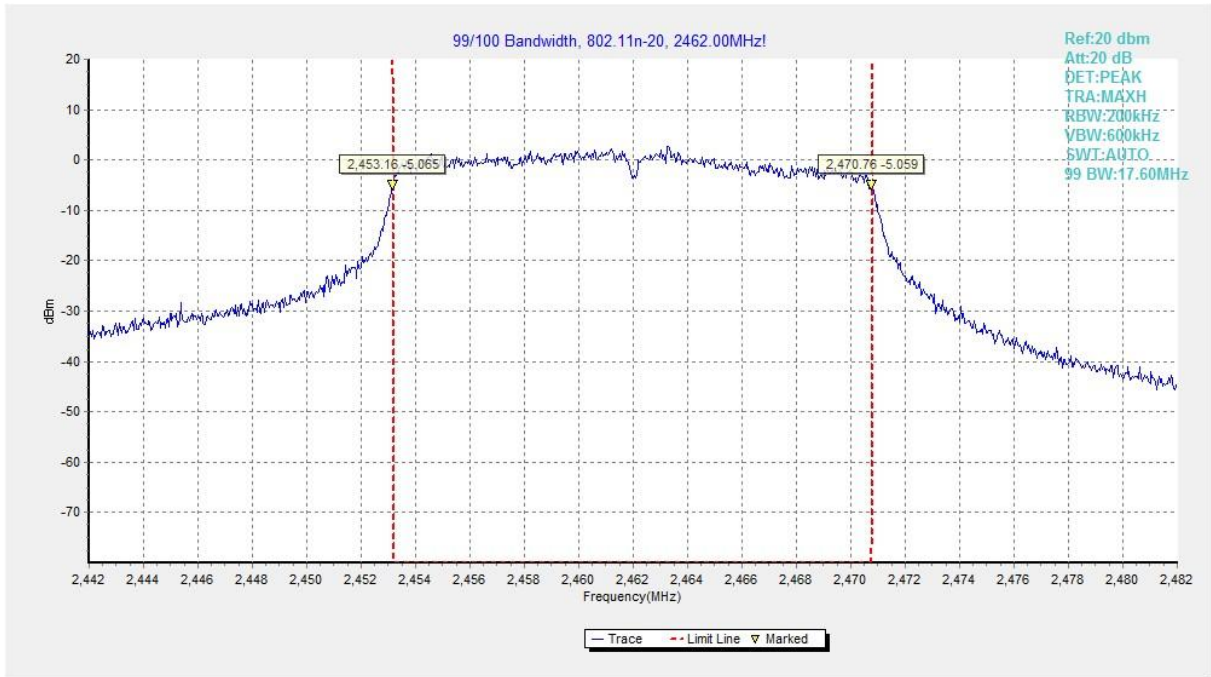


Fig.110 99% Occupied Bandwidth (802.11n HT20, CH 11)

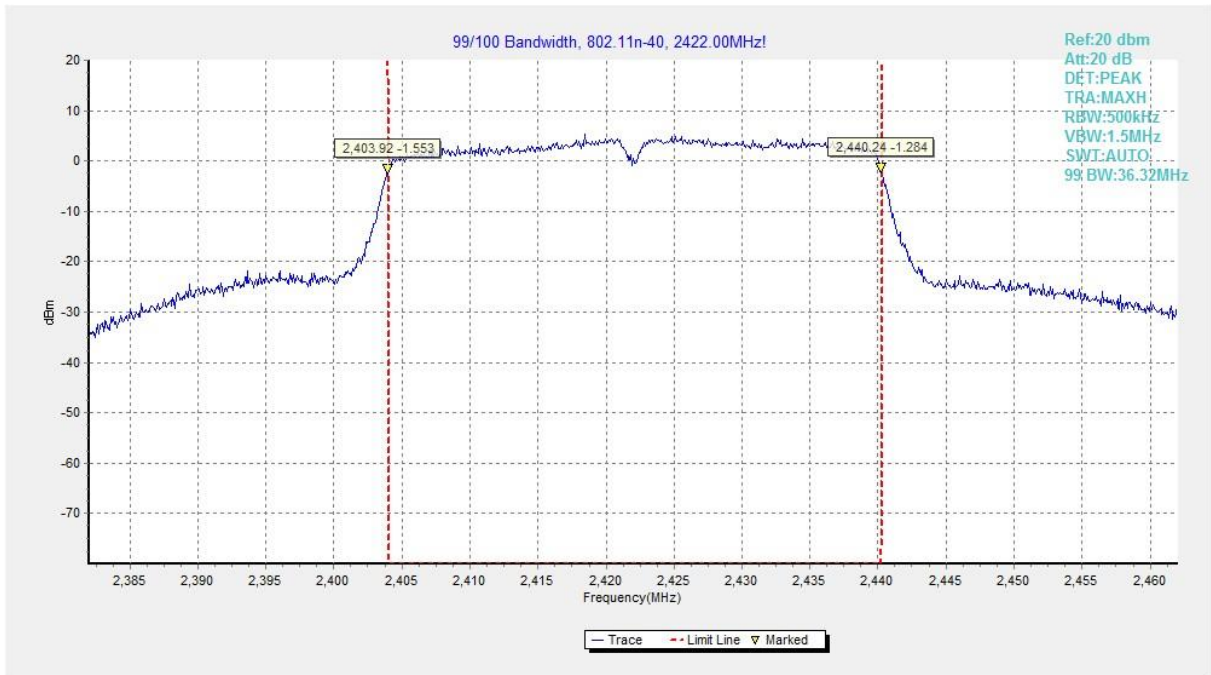


Fig.111 99% Occupied Bandwidth (802.11n HT40, CH 3)



Fig.112 99% Occupied Bandwidth (802.11n HT40, CH 6)

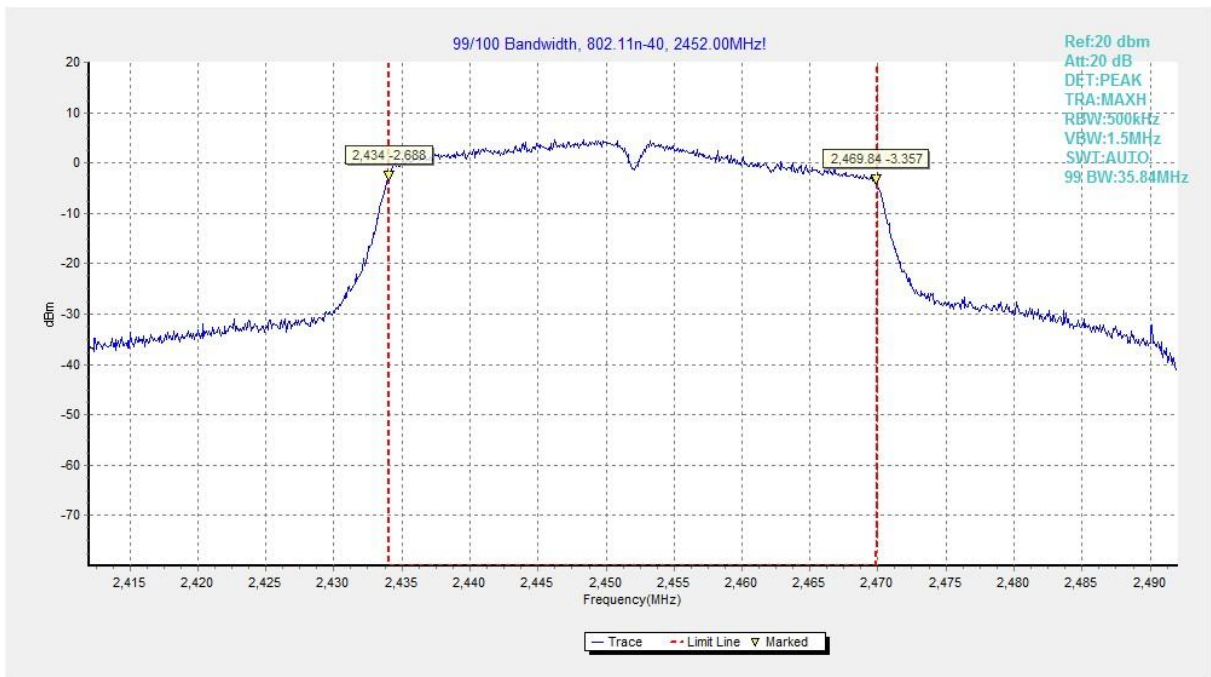


Fig.113 99% Occupied Bandwidth (802.11n HT40, CH 9)

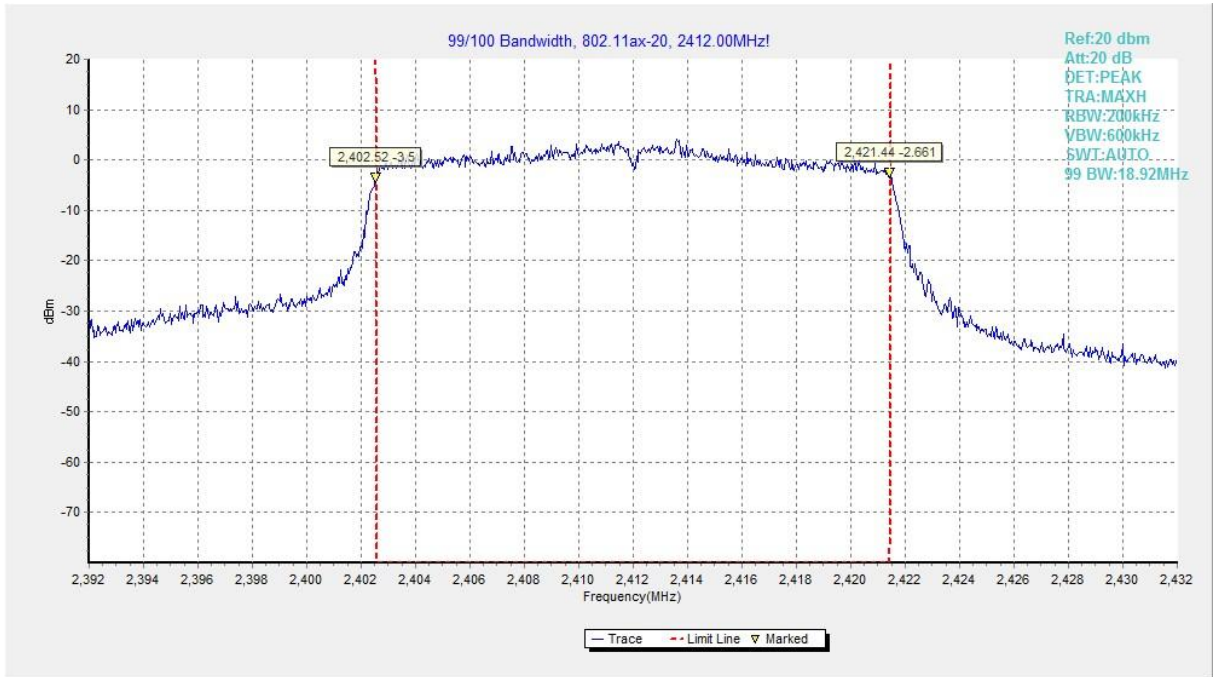


Fig.114 99% Occupied Bandwidth (802.11ax HE20, CH 1)

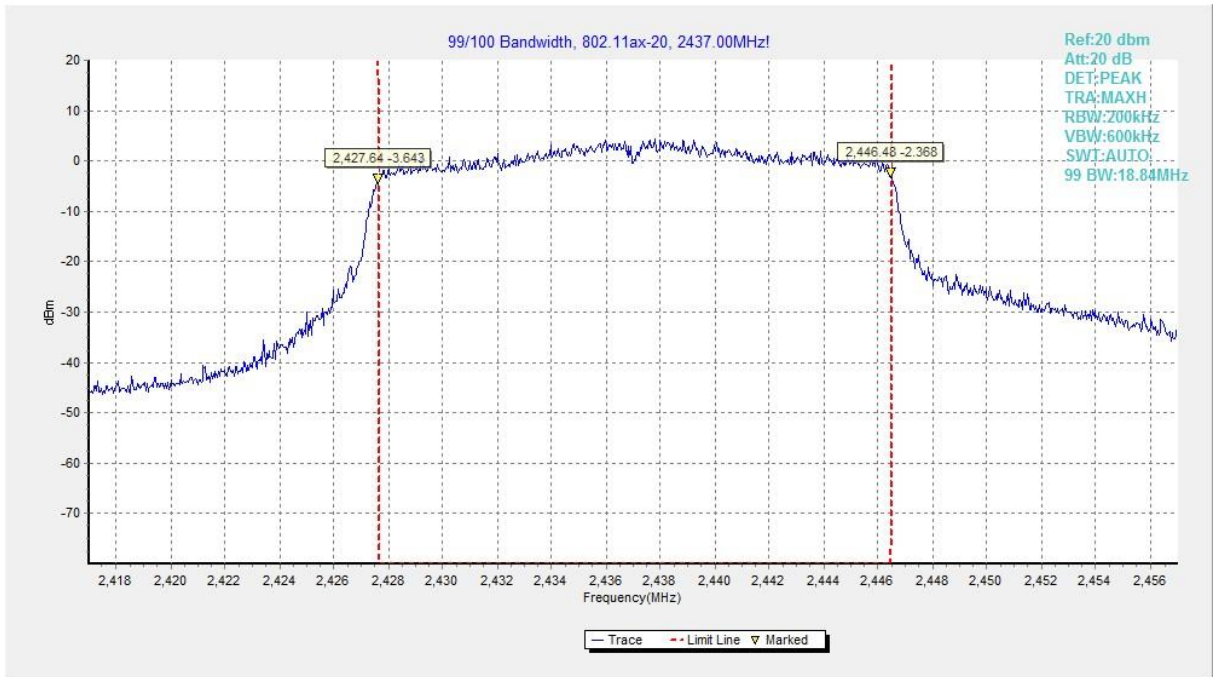


Fig.115 99% Occupied Bandwidth (802.11ax HE20, CH 6)

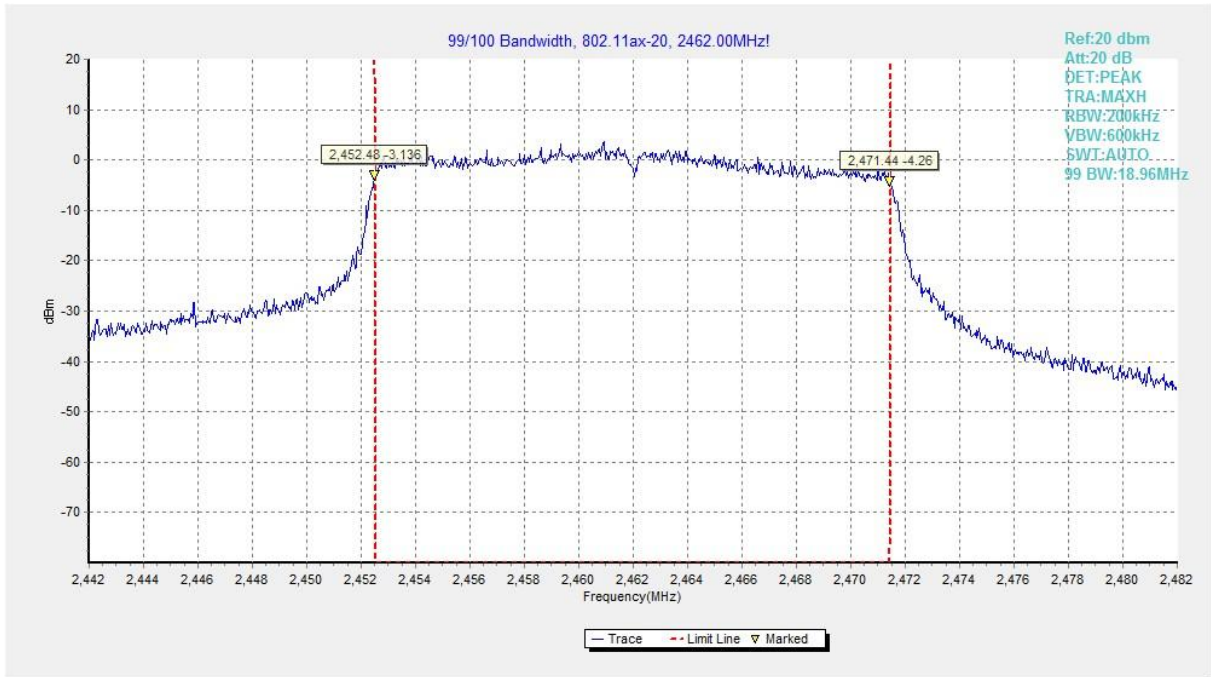


Fig.116 99% Occupied Bandwidth (802.11ax HE20, CH 11)

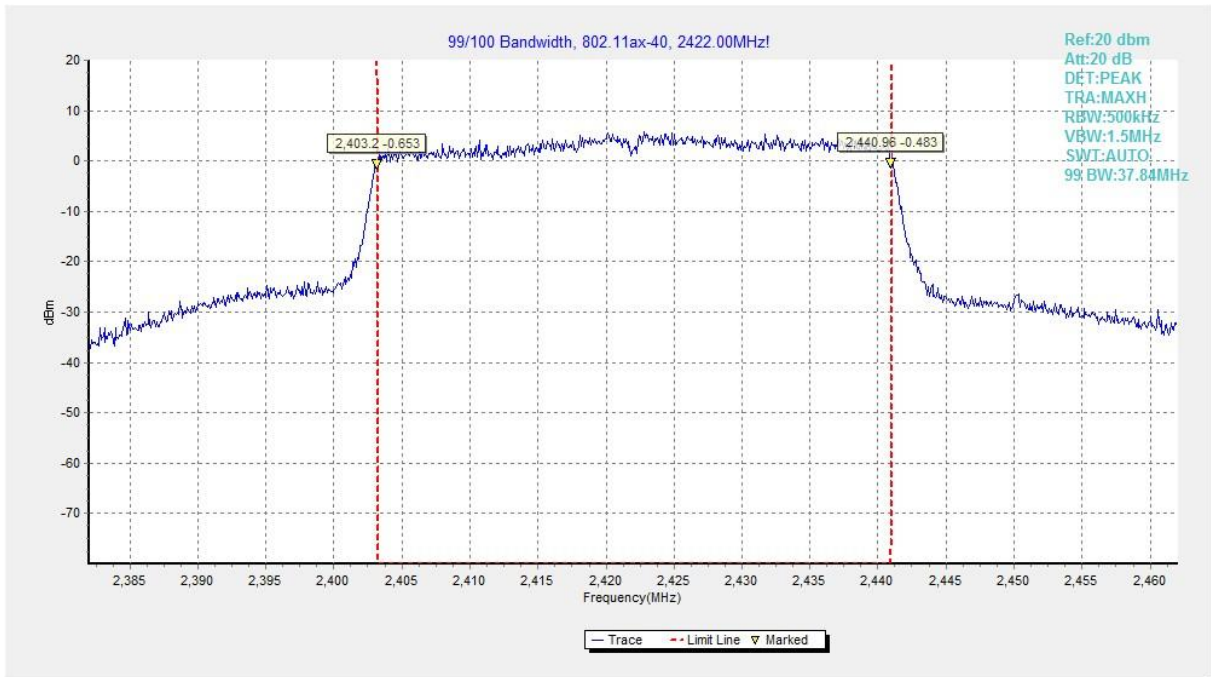


Fig.117 99% Occupied Bandwidth (802.11ax HE40, CH 3)

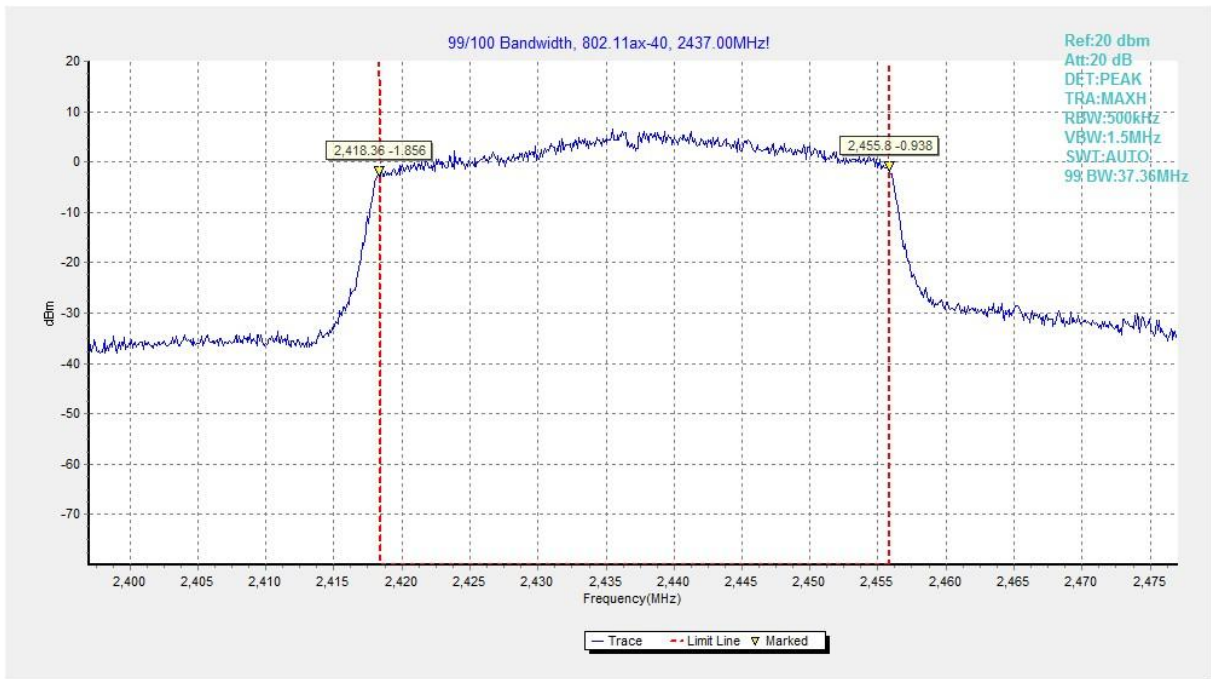


Fig.118 99% Occupied Bandwidth (802.11ax HE40, CH 6)

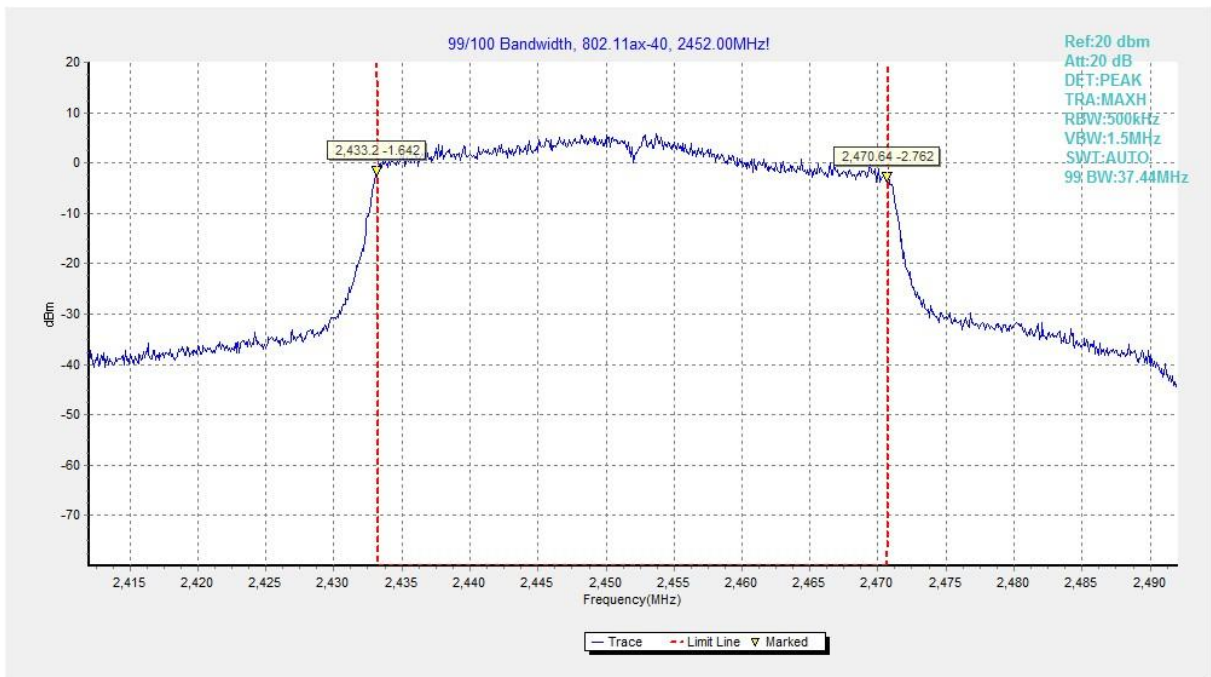


Fig.119 99% Occupied Bandwidth (802.11ax HE40, CH 9)

END OF REPORT