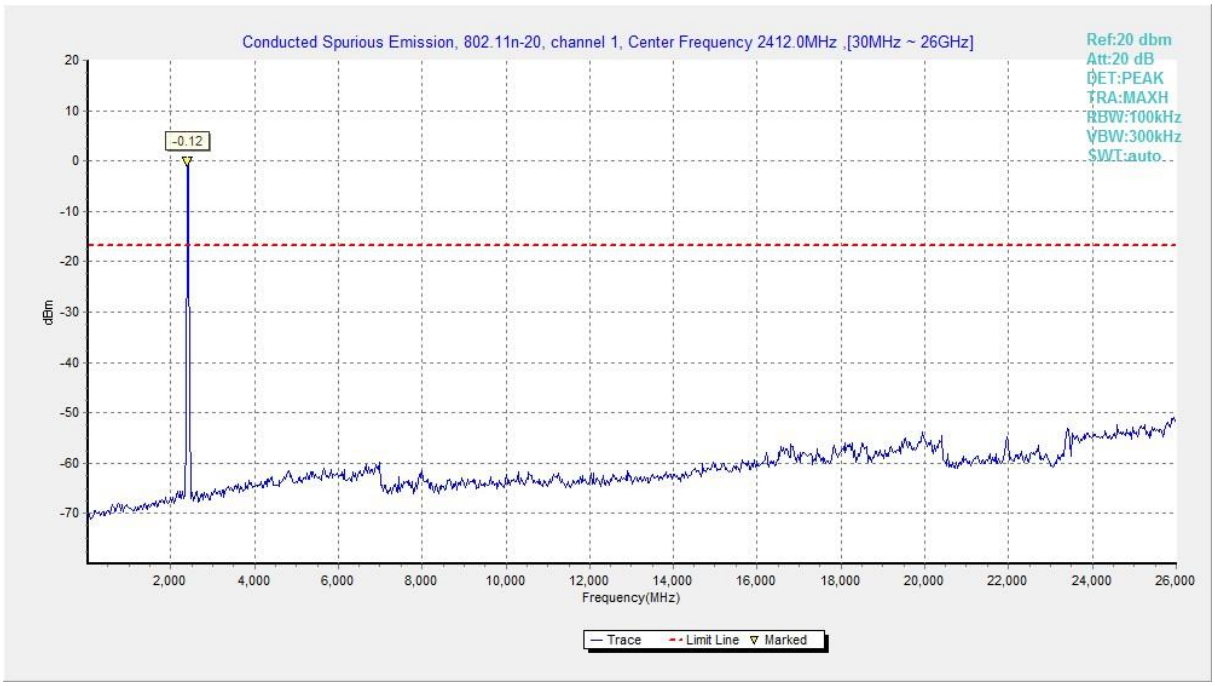

Fig.39 Conducted Spurious Emission (802.11n-HT20, CH1)

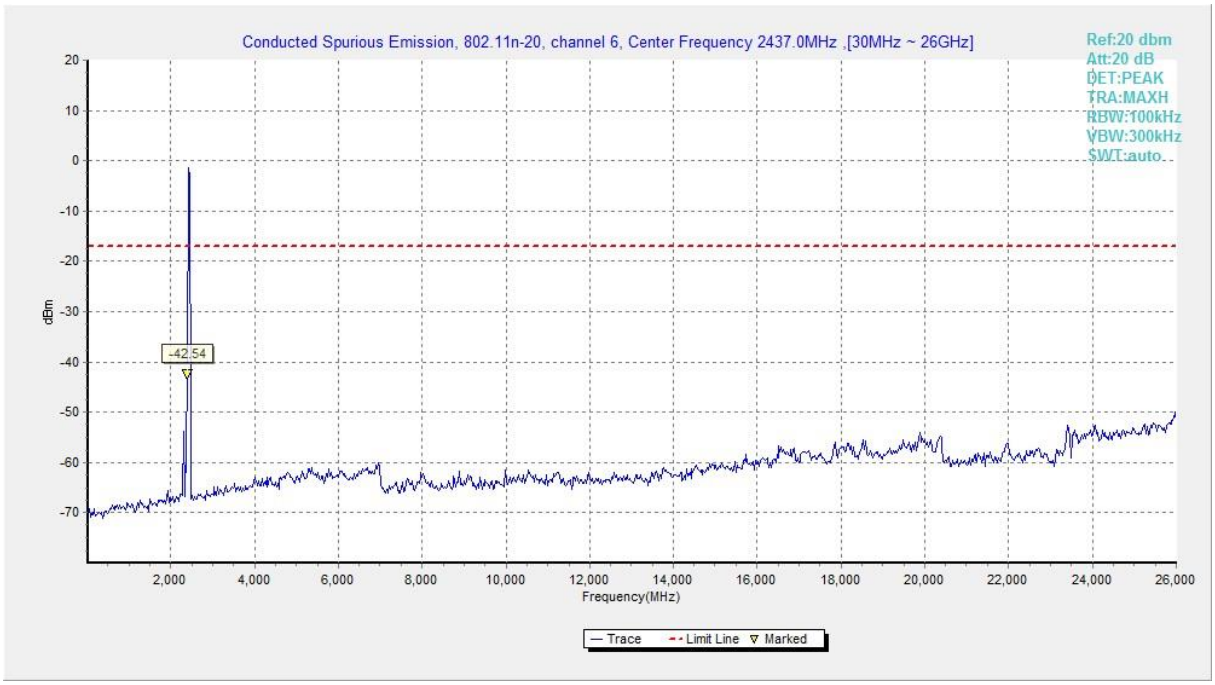

Fig.40 Conducted Spurious Emission (802.11n-HT20, CH6)

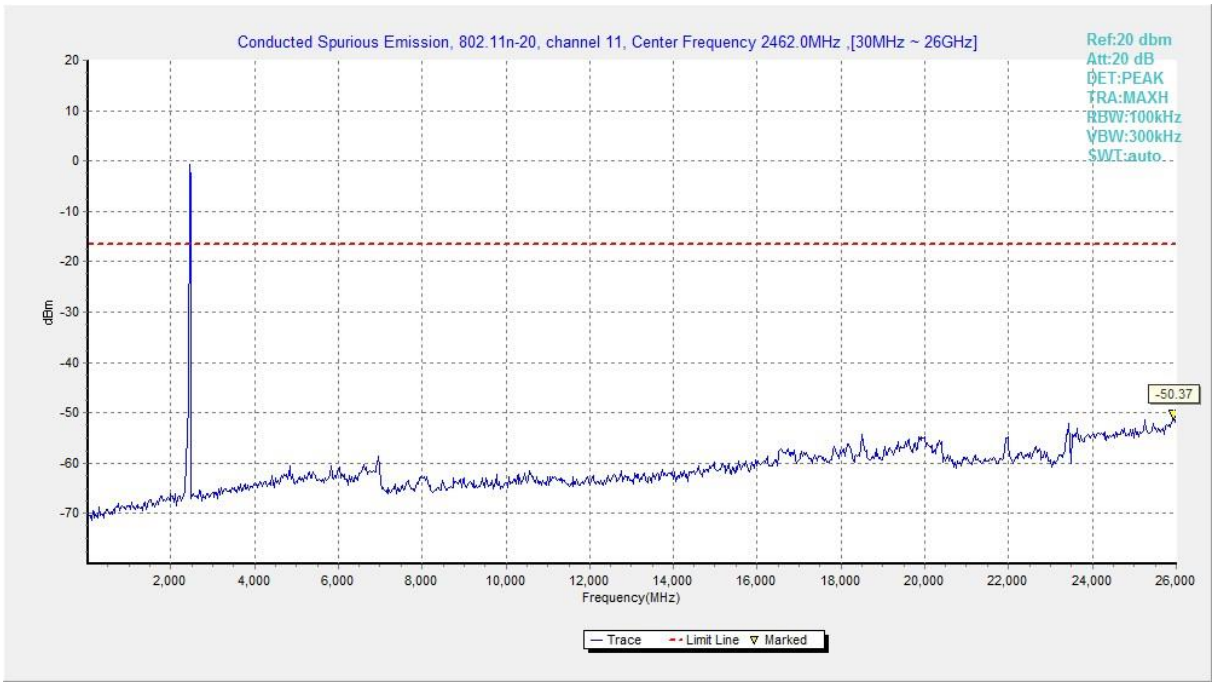

Fig.41 Conducted Spurious Emission (802.11n-HT20, CH11)

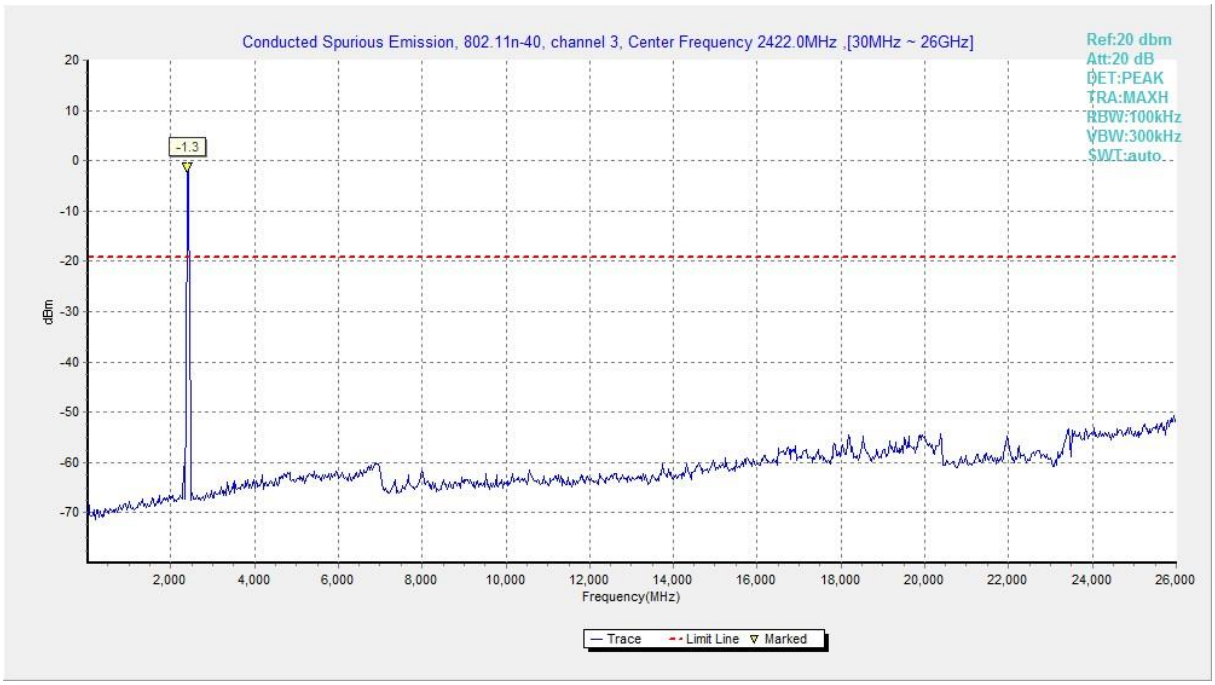

Fig.42 Conducted Spurious Emission (802.11n-HT40, CH3)

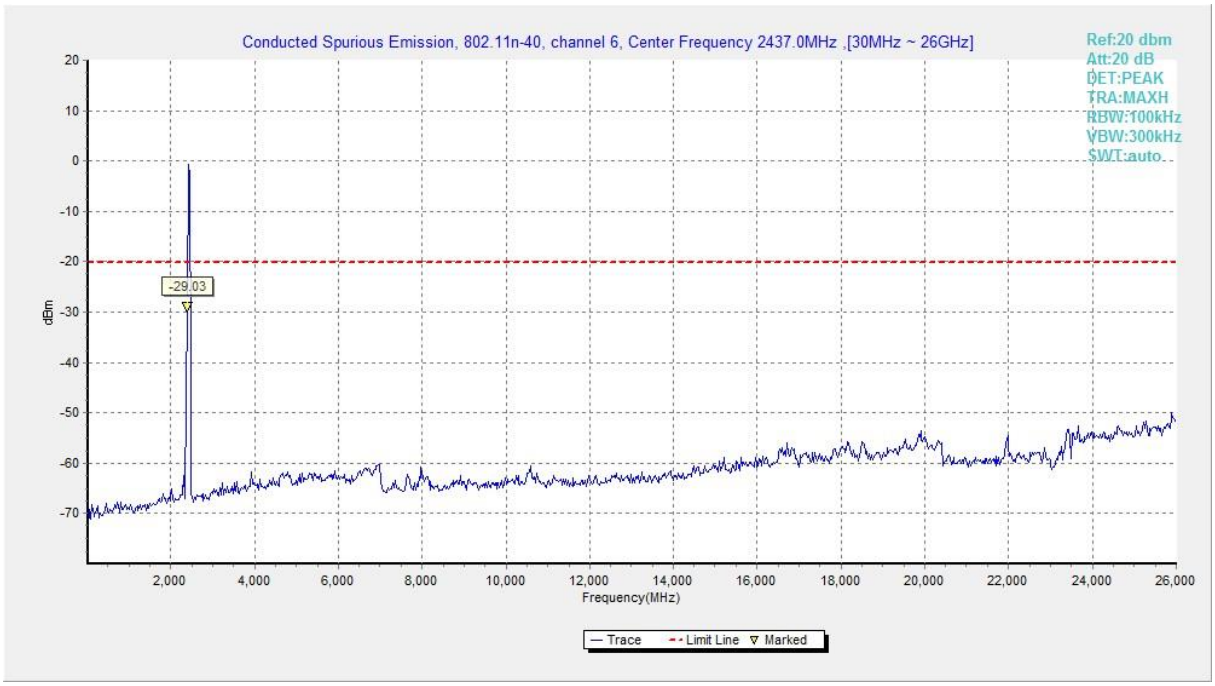

Fig.43 Conducted Spurious Emission (802.11n-HT40, CH6)

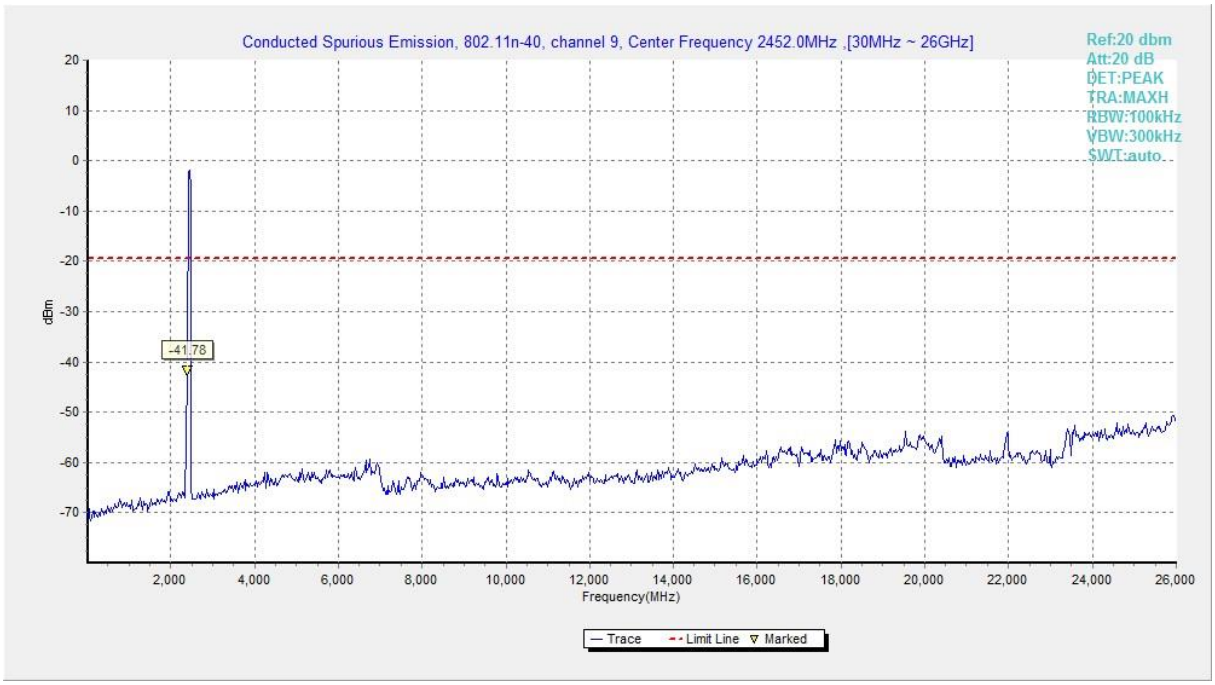

Fig.44 Conducted Spurious Emission (802.11n-HT40, CH9)

A.6 Radiated Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	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(μV/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 below 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.45	**P**
	CH 6	1 GHz ~18 GHz	Fig.46	**P**
	CH 11	1 GHz ~18 GHz	Fig.47	**P**
	Restricted Band (CH1)	2.38 GHz ~ 2.45 GHz	Fig.48	**P**
	Restricted Band (CH11)	2.45 GHz ~ 2.5 GHz	Fig.49	**P**
802.11g	CH 1	1 GHz ~18 GHz	Fig.50	**P**
	CH 6	1 GHz ~18 GHz	Fig.51	**P**
	CH 11	1 GHz ~18 GHz	Fig.52	**P**
	Restricted Band (CH1)	2.38 GHz ~ 2.45 GHz	Fig.53	**P**
	Restricted Band (CH11)	2.45 GHz ~ 2.5 GHz	Fig.54	**P**
802.11n -HT20	CH 1	1 GHz ~18 GHz	Fig.55	**P**
	CH 6	1 GHz ~18 GHz	Fig.56	**P**
	CH 11	1 GHz ~18 GHz	Fig.57	**P**
	Restricted Band (CH1)	2.38 GHz ~ 2.45 GHz	Fig.58	**P**
	Restricted Band (CH11)	2.45 GHz ~ 2.5 GHz	Fig.59	**P**
802.11n -HT40	CH 3	1 GHz ~18 GHz	Fig.60	**P**
	CH 6	1 GHz ~18 GHz	Fig.61	**P**
	CH 9	1 GHz ~18 GHz	Fig.62	**P**
	Restricted Band (CH3)	2.38 GHz ~ 2.45 GHz	Fig.63	**P**
	Restricted Band (CH9)	2.45 GHz ~ 2.5 GHz	Fig.64	**P**
/	All Channels	9 kHz ~30 MHz	Fig.65	**P**
		30 MHz ~1 GHz	Fig.66	**P**
		18 GHz ~26.5 GHz	Fig.67	**P**

MIMO:

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n HT20	CH 1	1 GHz ~18 GHz	Fig.68	**P**
	CH 6	1 GHz ~18 GHz	Fig.69	**P**
	CH 11	1 GHz ~18 GHz	Fig.70	**P**
	Restricted Band (CH1)	2.38 GHz ~ 2.45 GHz	Fig.71	**P**
	Restricted Band (CH11)	2.45 GHz ~ 2.5 GHz	Fig.72	**P**
802.11n -HT40	CH 3	1 GHz ~18 GHz	Fig.73	**P**
	CH 6	1 GHz ~18 GHz	Fig.74	**P**
	CH 9	1 GHz ~18 GHz	Fig.75	**P**
	Restricted Band (CH3)	2.38 GHz ~ 2.45 GHz	Fig.76	**P**
	Restricted Band (CH9)	2.45 GHz ~ 2.5 GHz	Fig.77	**P**
/	All Channels	9 kHz ~30 MHz	Fig.78	**P**
		30 MHz ~1 GHz	Fig.79	**P**
		18 GHz ~26.5 GHz	Fig.80	**P**

Worst-Case Result:

SISO:

802.11b CH11 (1-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
4924.000000	49.50	74.00	24.50	H	13.8
6203.500000	52.78	74.00	21.22	V	18.8
13583.000000	47.13	74.00	26.87	V	12.3
14522.312500	48.98	74.00	25.02	H	13.0
15743.812500	48.51	74.00	25.49	V	14.4
17502.125000	49.18	74.00	24.82	V	17.0

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
4924.000000	39.91	54.00	14.09	V	13.8
6236.500000	40.86	54.00	13.14	V	18.6
13563.750000	37.00	54.00	17.00	V	12.3
14489.937500	37.20	54.00	16.80	V	13.0
15774.437500	38.37	54.00	15.63	H	14.5
17382.250000	39.53	54.00	14.47	V	17.0

802.11g CH11 (1GHz-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
4467.000000	47.07	74.00	26.93	V	12.7
5487.000000	48.85	74.00	25.15	H	15.2
6236.500000	51.04	74.00	22.96	H	18.6
14423.437500	46.73	74.00	27.27	V	13.0
15781.875000	49.06	74.00	24.94	H	14.5
17318.812500	50.50	74.00	23.50	V	16.9

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
4605.000000	37.35	54.00	16.65	H	13.4
5503.000000	38.52	54.00	15.48	V	15.2
6198.000000	41.27	54.00	12.73	V	18.9
14419.062500	36.91	54.00	17.09	H	13.0
15725.875000	38.15	54.00	15.85	V	14.3
17006.000000	39.29	54.00	14.71	H	16.6

802.11n-HT20 CH11 (1GHz-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
4649.000000	47.13	74.00	26.87	H	13.4
5362.000000	49.30	74.00	24.70	V	15.2
6192.500000	50.81	74.00	23.19	H	18.9
14491.687500	47.30	74.00	26.70	H	13.0
15691.312500	48.68	74.00	25.32	V	14.2
17208.125000	49.42	74.00	24.58	V	17.0

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
4600.000000	37.47	54.00	16.53	H	13.4
5395.500000	38.47	54.00	15.53	H	15.3
6187.500000	41.03	54.00	12.97	H	18.9
14485.562500	36.99	54.00	17.01	V	13.0
15786.250000	38.52	54.00	15.48	V	14.6
17132.000000	39.46	54.00	14.54	V	17.0

802.11n-HT40 CH3 (1GHz-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
5172.000000	48.40	74.00	25.60	H	14.6
5857.500000	49.42	74.00	24.58	H	16.6
6182.500000	50.36	74.00	23.64	H	19.0
13578.625000	47.44	74.00	26.56	V	12.3
14519.687500	48.02	74.00	25.98	H	13.0
16907.562500	48.81	74.00	25.19	V	16.2

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
5098.000000	38.14	54.00	15.86	H	14.6
5913.000000	39.94	54.00	14.06	H	17.1
6198.500000	41.20	54.00	12.80	H	18.9
13422.437500	35.92	54.00	18.08	V	12.6
14443.562500	36.87	54.00	17.13	V	13.0
17044.937500	39.27	54.00	14.73	V	16.7

MIMO:

802.11n-HT20 CH11 (1GHz-18GHz)

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5046.500000	47.52	74.00	26.48	H	14.3
6194.500000	51.32	74.00	22.68	V	18.9
9848.037500	48.09	74.00	25.91	V	6.9
14360.000000	46.02	74.00	27.98	V	12.9
15669.000000	47.85	74.00	26.15	H	14.0
17004.250000	48.89	74.00	25.11	V	16.5

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5133.500000	38.02	54.00	15.98	H	14.6
6162.000000	41.08	54.00	12.92	V	18.6
9848.037500	43.17	54.00	10.83	V	6.9
14514.437500	37.03	54.00	16.97	H	13.0
15790.187500	38.39	54.00	15.61	V	14.6
17304.812500	39.41	54.00	14.59	V	16.9

802.11n-HT40 CH3 (1GHz-18GHz)

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5158.000000	48.00	74.00	26.00	H	14.6
6168.000000	51.31	74.00	22.69	H	18.7
9687.862500	45.88	74.00	28.12	V	6.5
13516.937500	47.35	74.00	26.65	H	12.5
15804.187500	48.09	74.00	25.91	H	14.6
17110.562500	49.00	74.00	25.00	V	17.0

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
5157.500000	38.21	54.00	15.79	H	14.6
6195.500000	41.42	54.00	12.58	H	18.9
9687.862500	38.60	54.00	15.40	V	6.5
13464.875000	36.04	54.00	17.96	H	12.5
15757.375000	38.27	54.00	15.73	V	14.4
17143.812500	39.44	54.00	14.56	V	17.1

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. 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

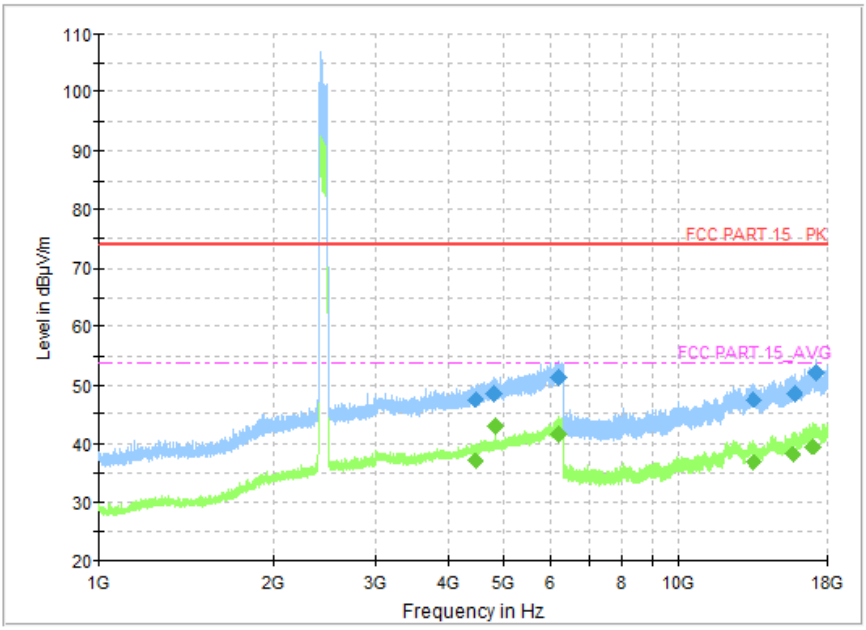

Fig.45 Radiated Spurious Emission (802.11b, CH1, 1 GHz-18GHz)

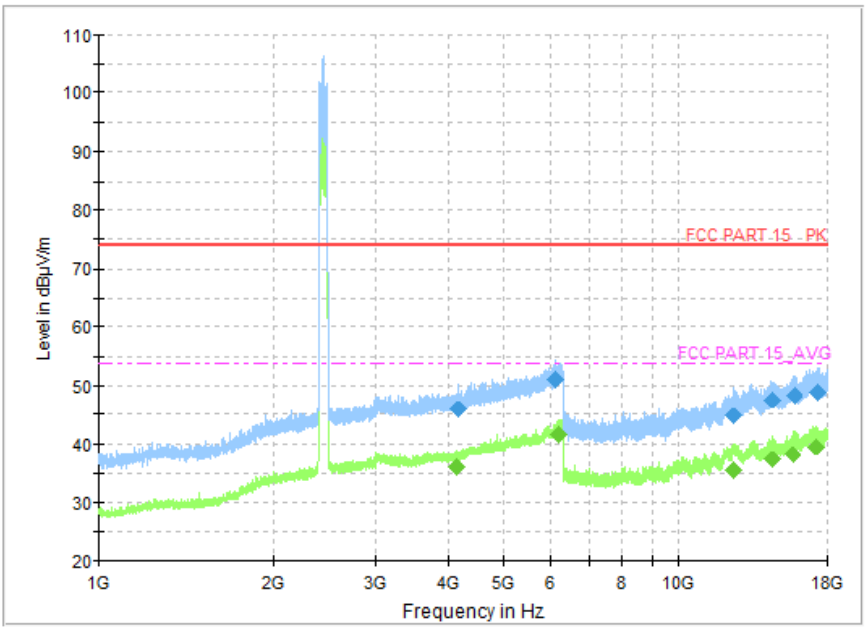

Fig.46 Radiated Spurious Emission (802.11b, CH6, 1 GHz-18GHz)

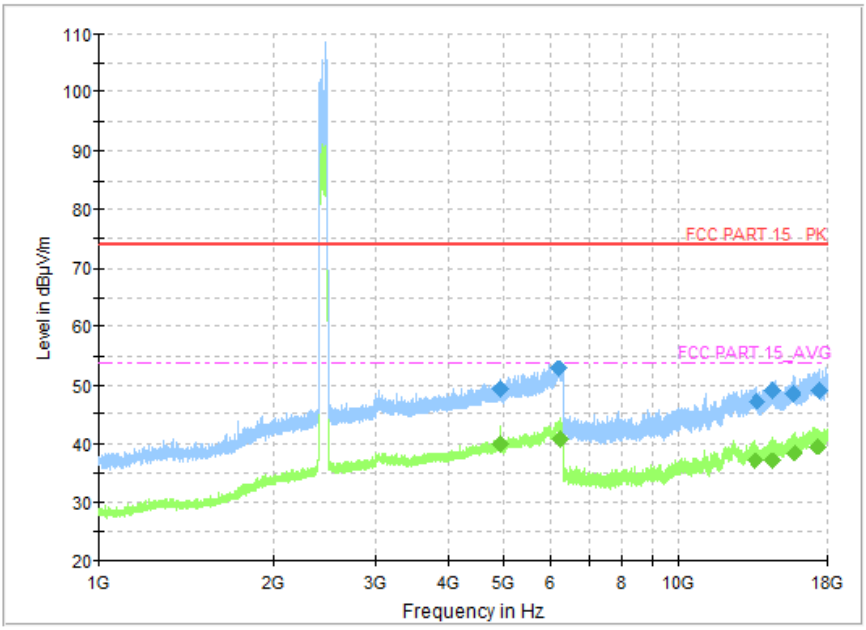

Fig.47 Radiated Spurious Emission (802.11b, CH11, 1 GHz-18GHz)

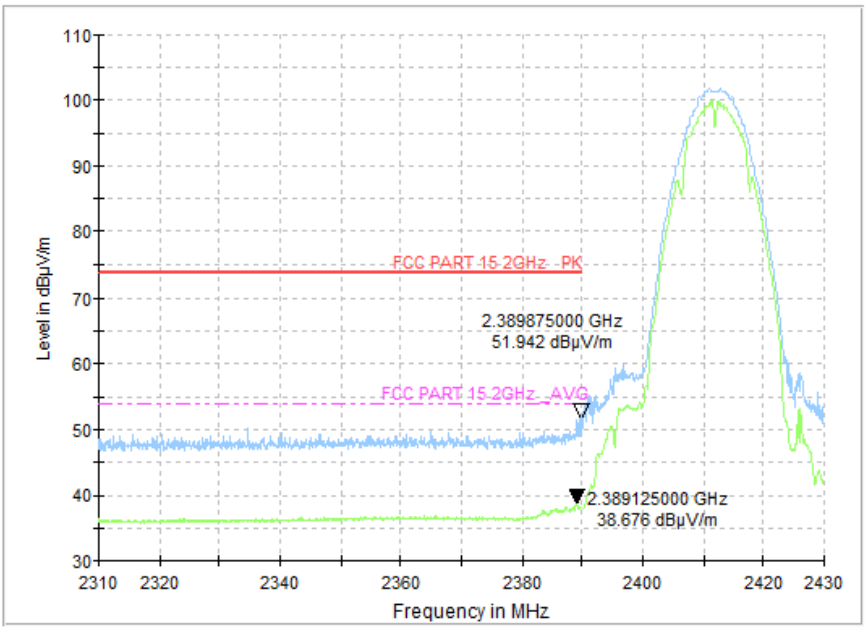

Fig.48 Radiated Restricted Band (802.11b, CH1, 2.38GHz~2.45GHz)

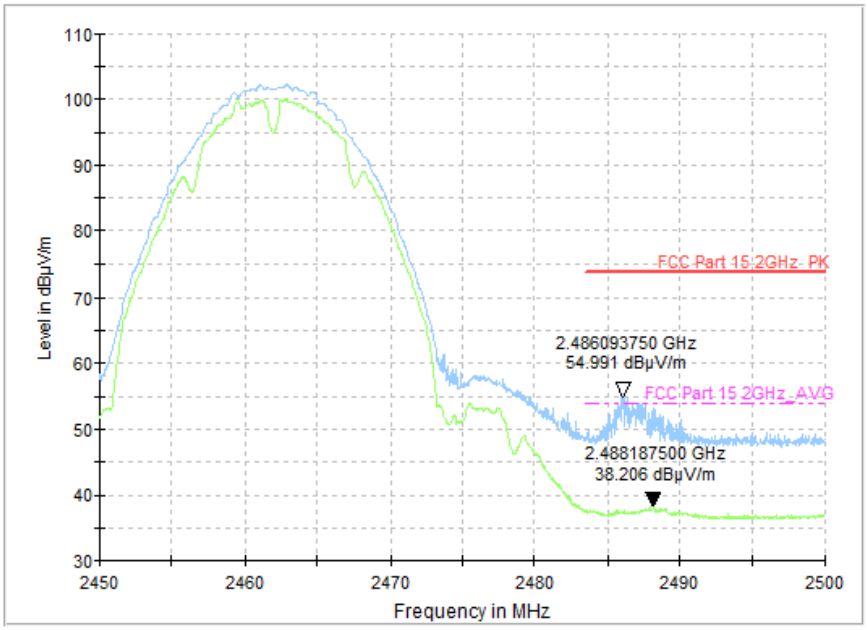

Fig.49 Radiated Restricted Band (802.11b, CH11, 2.45GHz~2.5GHz)

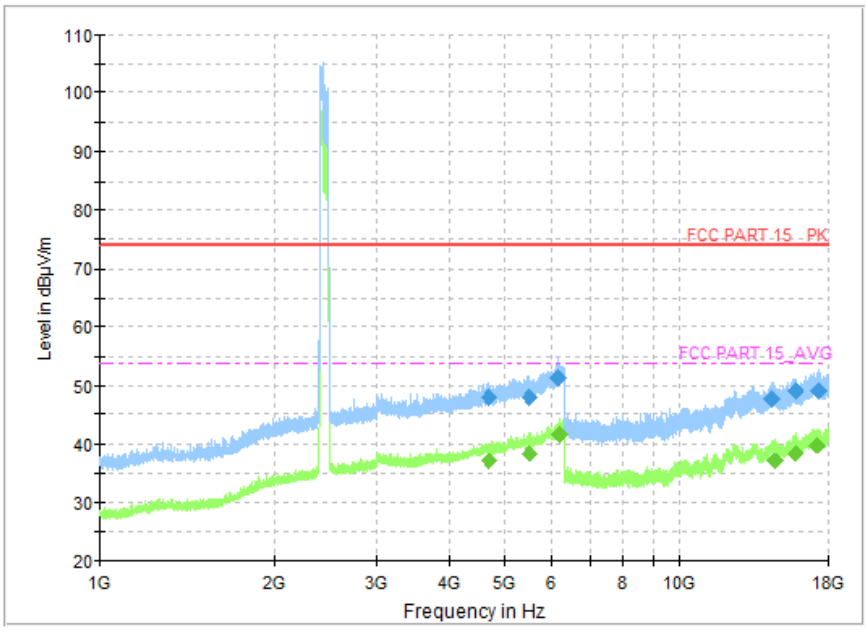

Fig.50 Radiated Spurious Emission (802.11g, CH1, 1 GHz-18 GHz)

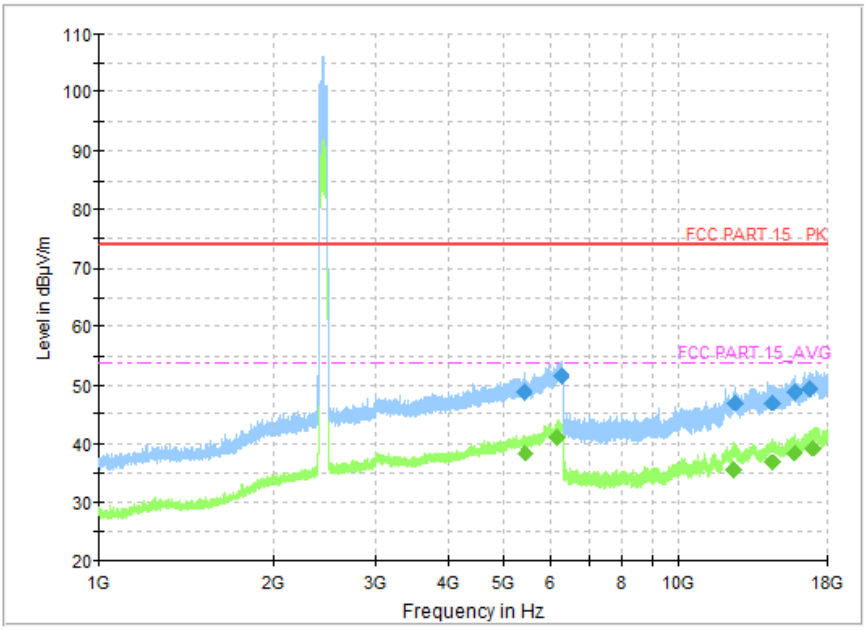

Fig.51 Radiated Spurious Emission (802.11g, CH6, 1 GHz-18 GHz)

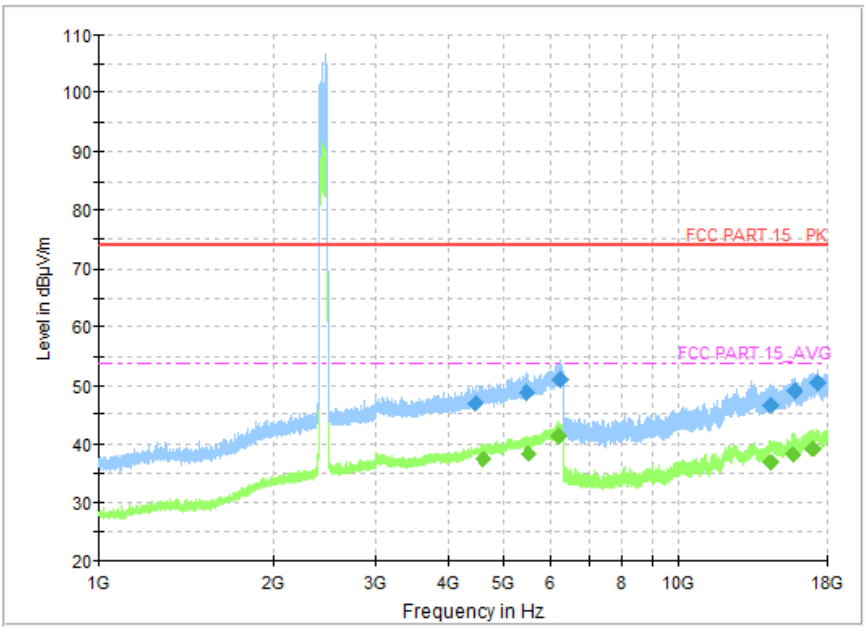

Fig.52 Radiated Spurious Emission (802.11g, CH11, 1 GHz-18 GHz)

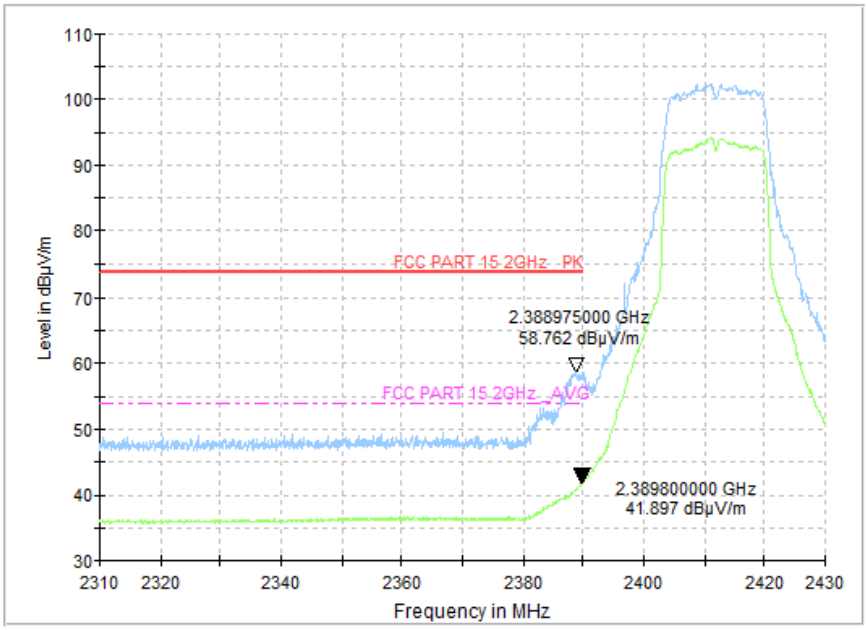

Fig.53 Radiated Restricted Band (802.11g, CH1, 2.38GHz~2.45GHz)

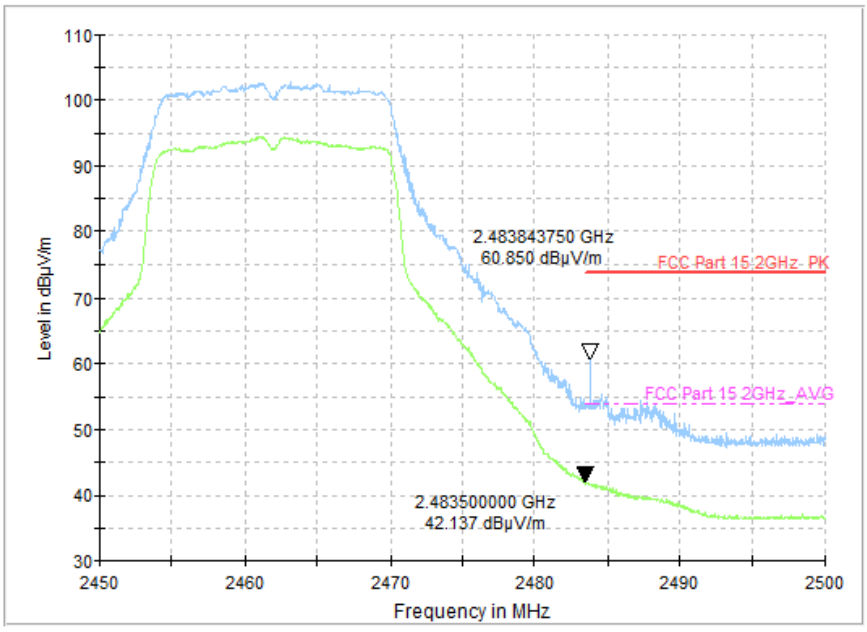

Fig.54 Radiated Restricted Band (802.11g, CH11, 2.45GHz~2.5GHz)

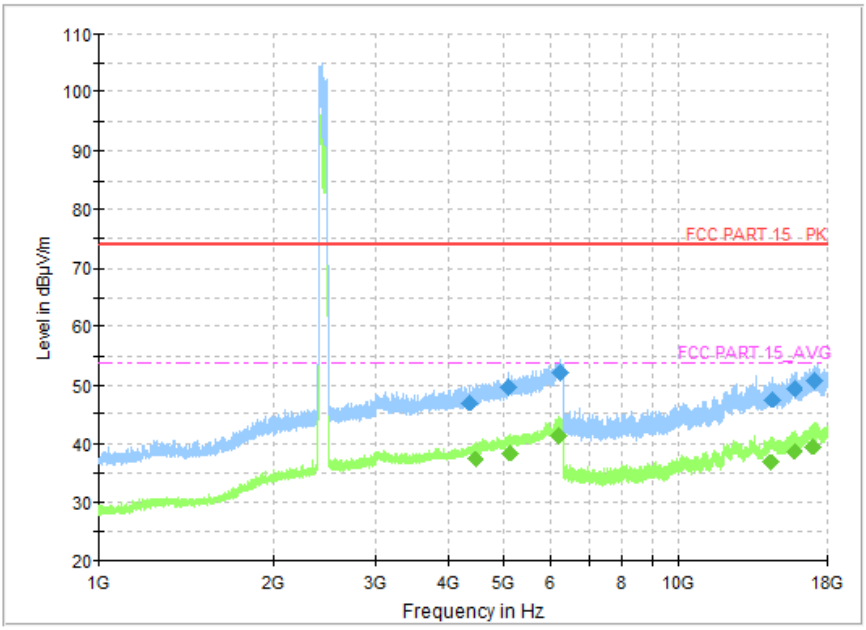

Fig.55 Radiated Spurious Emission (802.11n-HT20, CH1, 1 GHz-18 GHz)

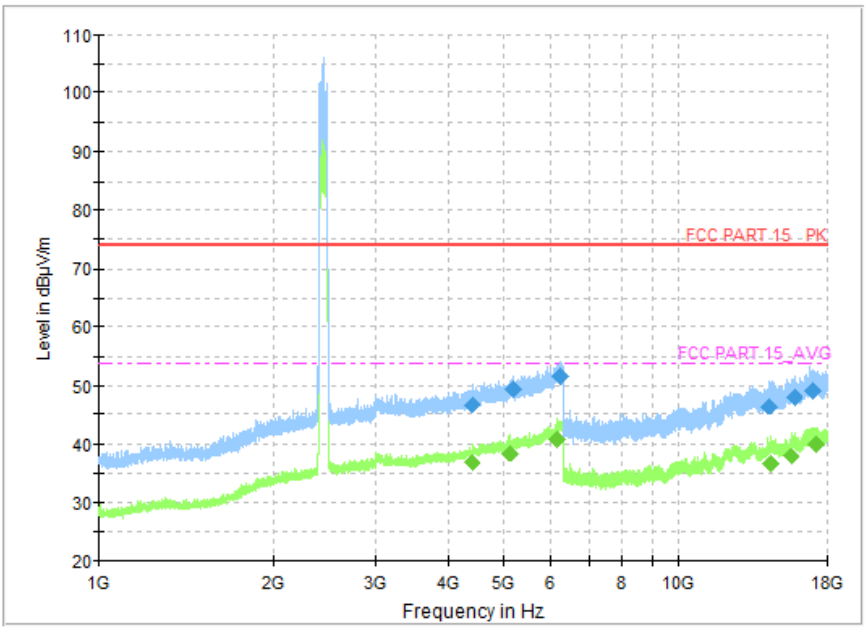

Fig.56 Radiated Spurious Emission (802.11n-HT20, CH6, 1 GHz-18 GHz)

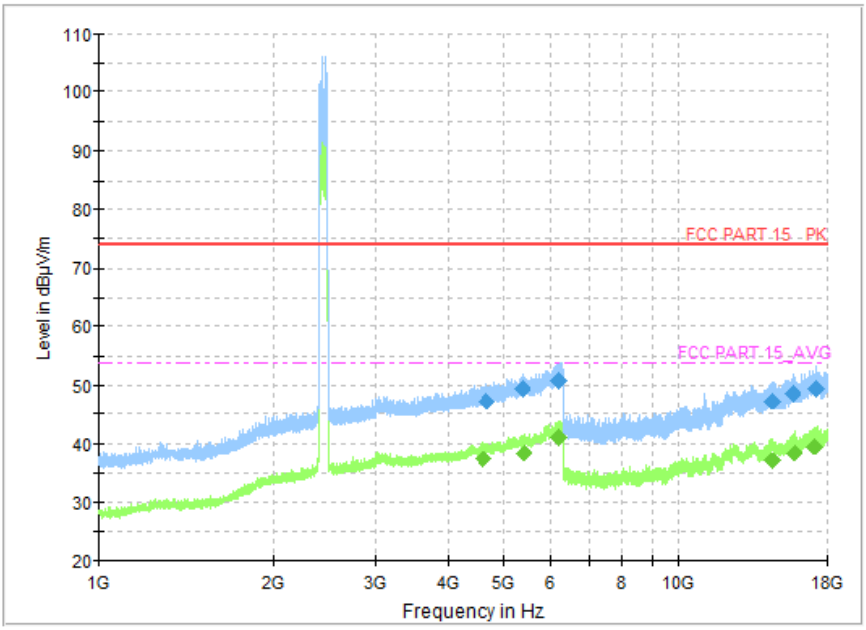

Fig.57 Radiated Spurious Emission (802.11n-HT20, CH11, 1 GHz-18 GHz)

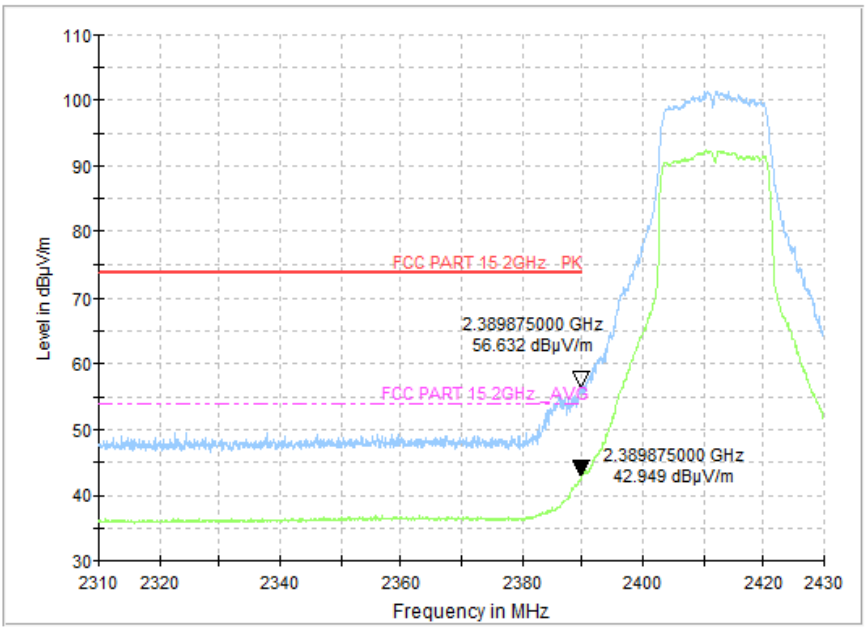

Fig.58 Radiated Restricted Band (802.11n-HT20, CH1, 2.38GHz~2.45GHz)

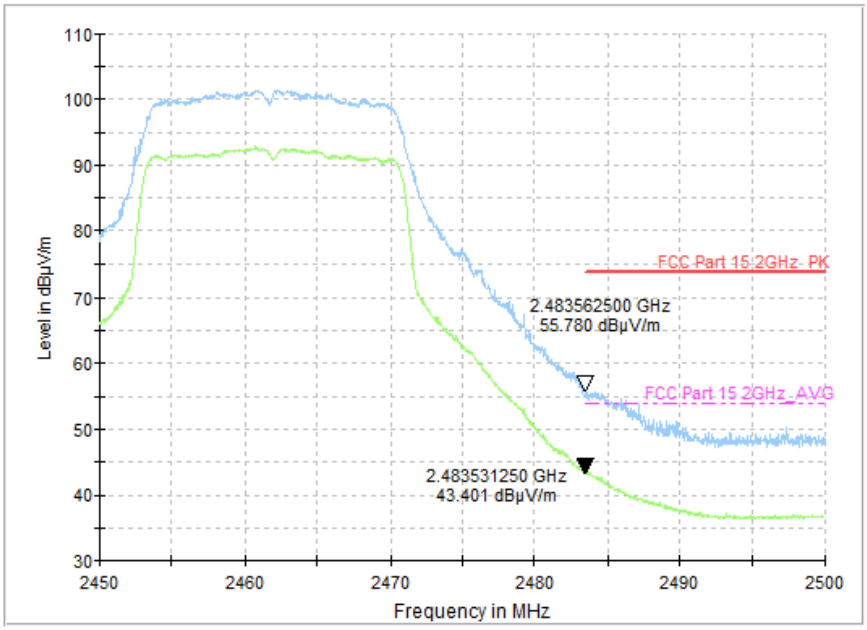

Fig.59 Radiated Restricted Band (802.11n-HT20, CH11, 2.45GHz~2.5GHz)

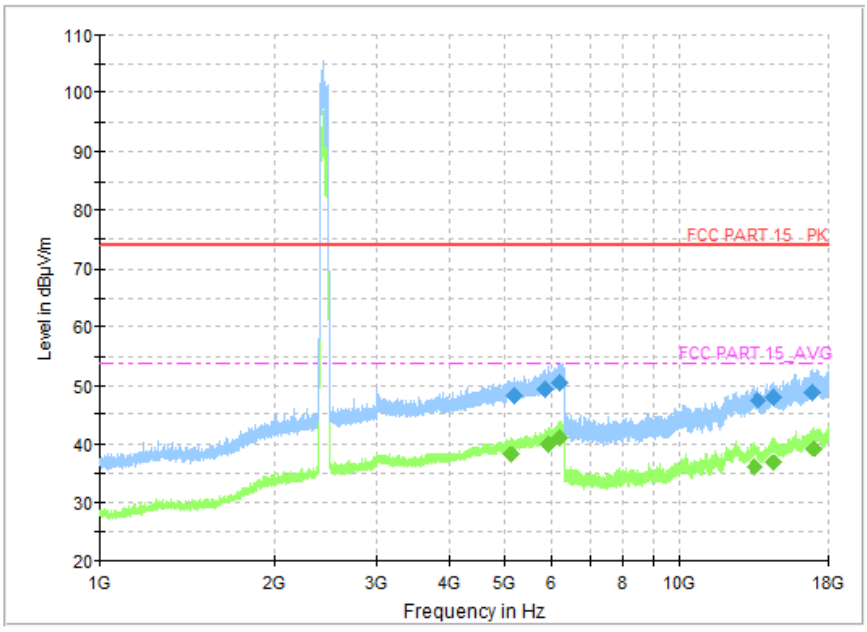

Fig.60 Radiated Spurious Emission (802.11n-HT40, CH3, 1 GHz-18 GHz)

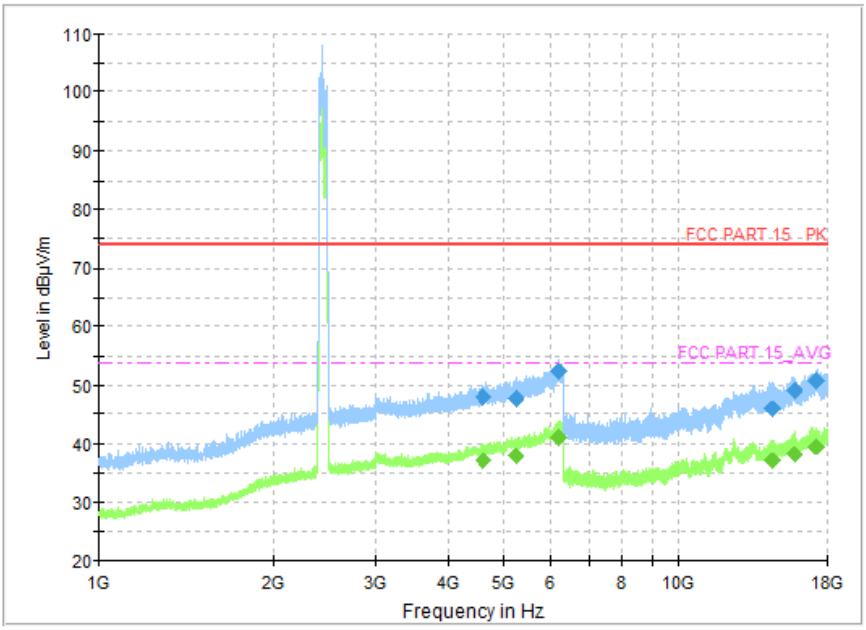

Fig.61 Radiated Spurious Emission (802.11n-HT40, CH6, 1 GHz-18 GHz)

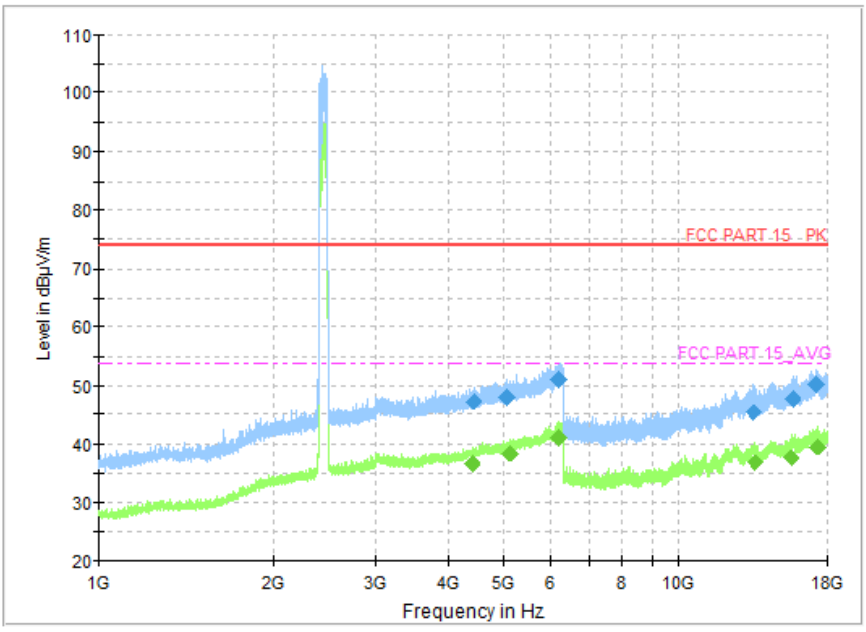

Fig.62 Radiated Spurious Emission (802.11n-HT40, CH9, 1 GHz-18 GHz)

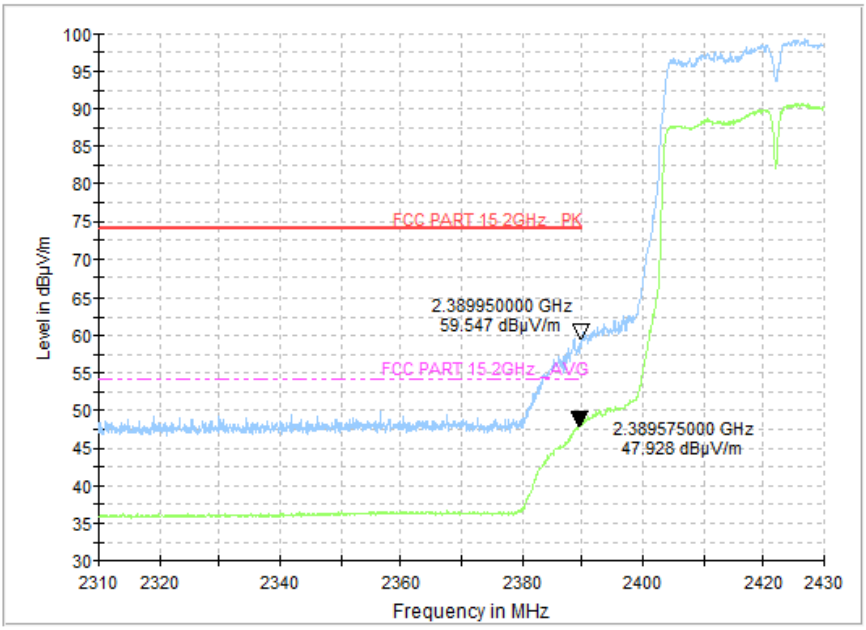

Fig.63 Radiated Restricted Band (802.11n-HT40, CH3, 2.38GHz~2.45GHz)

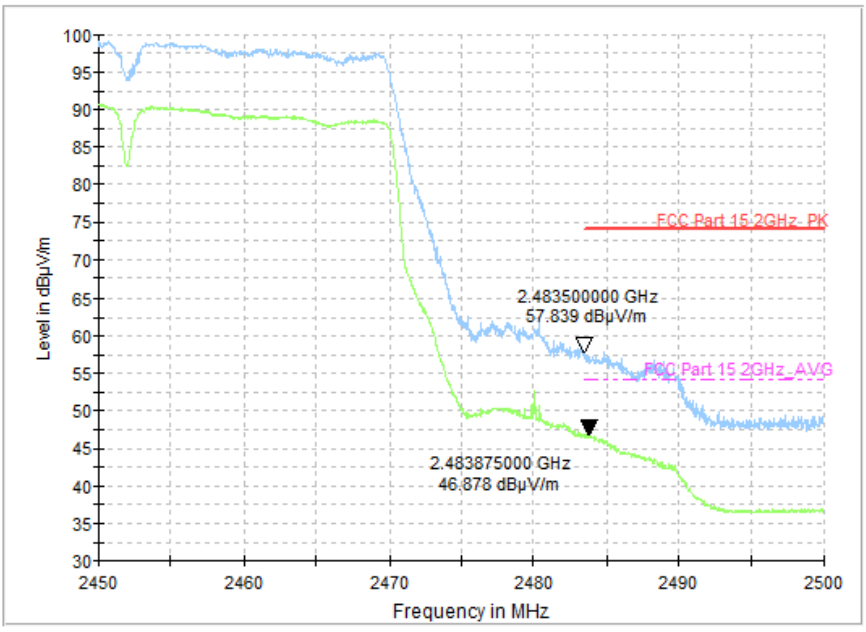

Fig.64 Radiated Restricted Band (802.11n-HT40, CH9, 2.45GHz~2.5GHz)

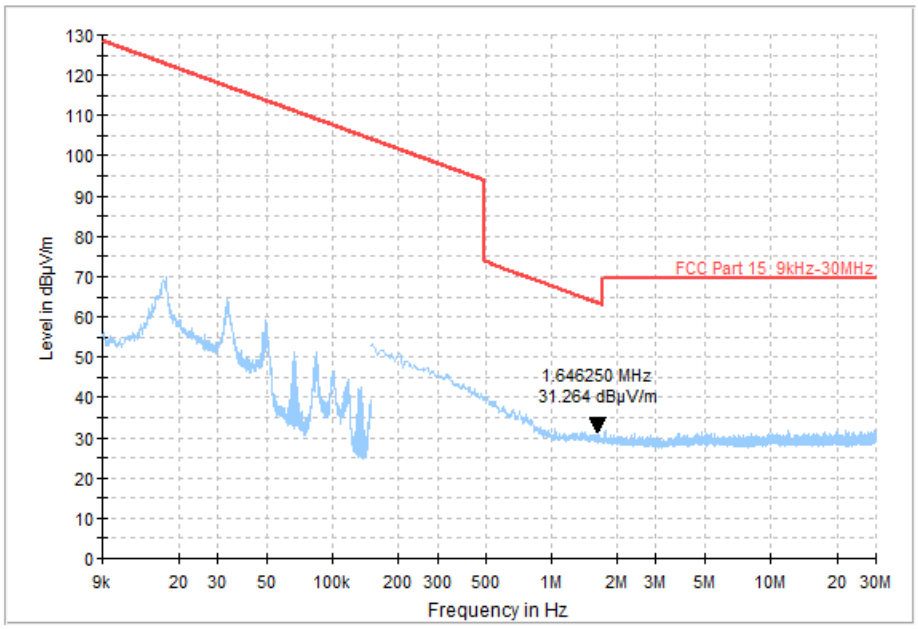

Fig.65 Radiated Spurious Emission (All Channels, 9 kHz-30 MHz)

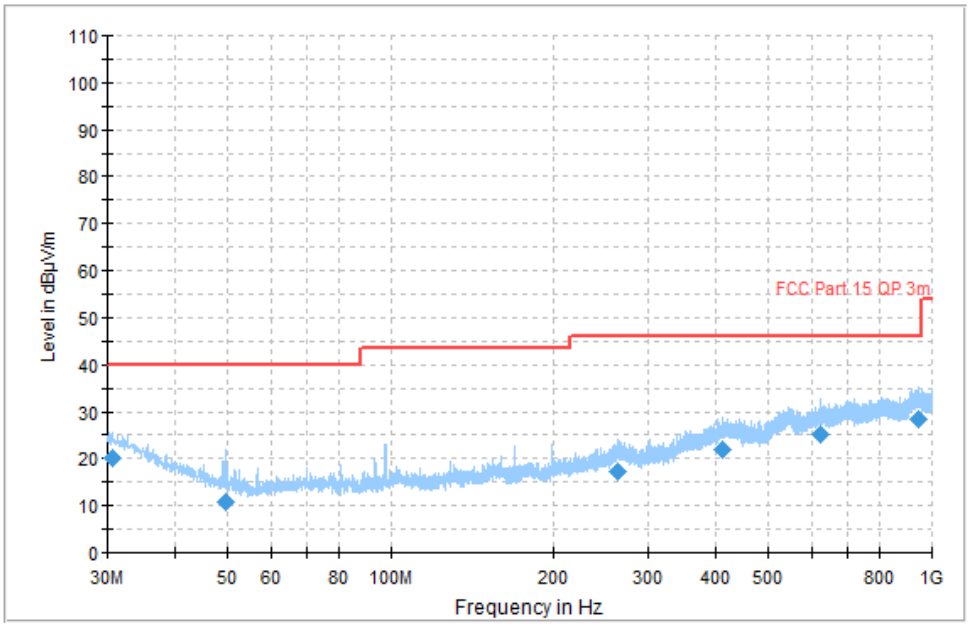

Fig.66 Radiated Spurious Emission (All Channels, 30MHz-1 GHz)

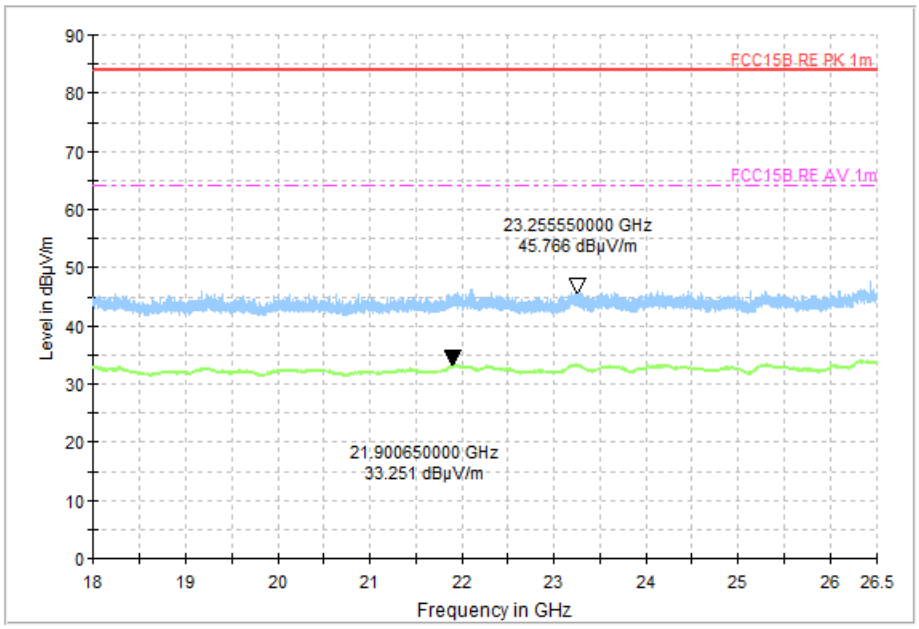

Fig.67 Radiated Spurious Emission (All Channels, 18 GHz-26.5 GHz)

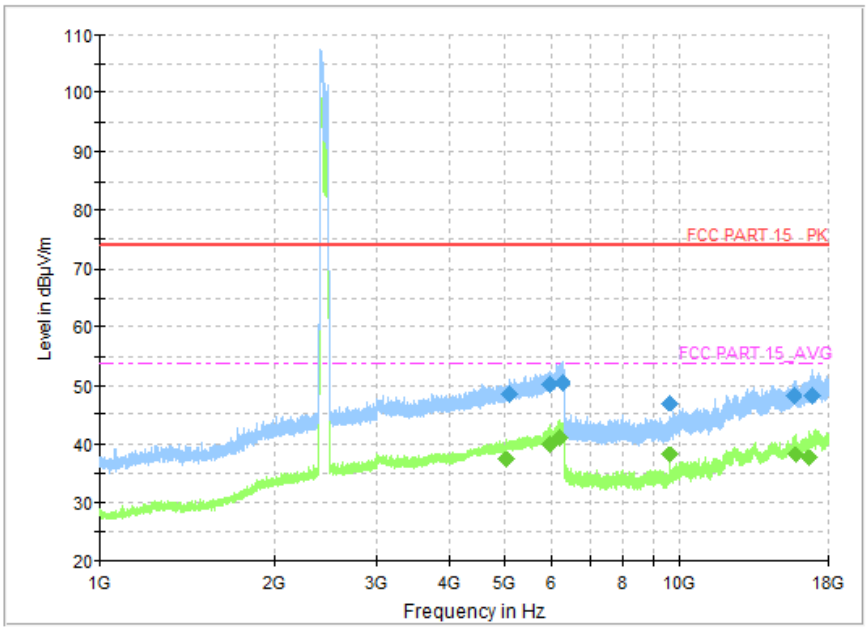

Fig.68 Radiated Spurious Emission (802.11n-HT20, CH1, 1 GHz-18 GHz), MIMO

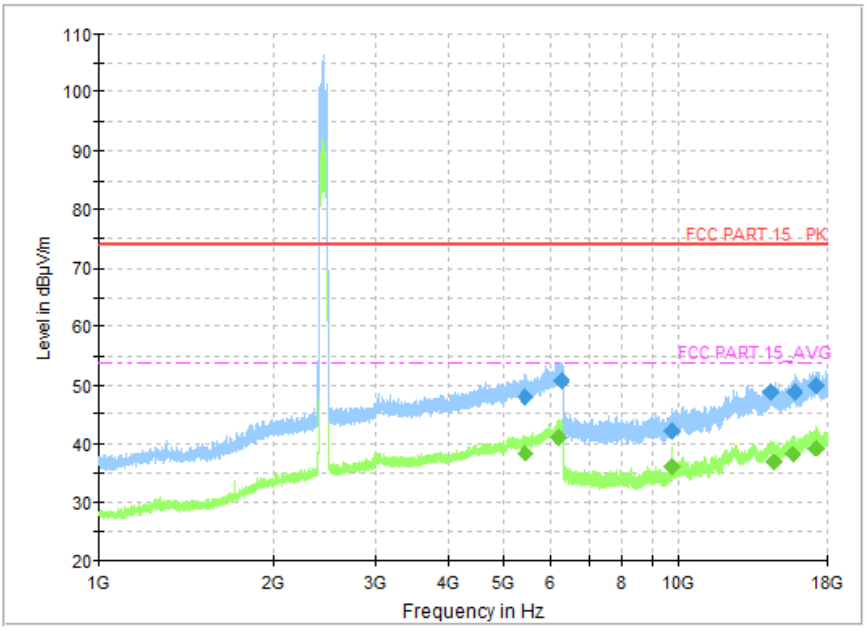

Fig.69 Radiated Spurious Emission (802.11n-HT20, CH6, 1 GHz-18 GHz), MIMO

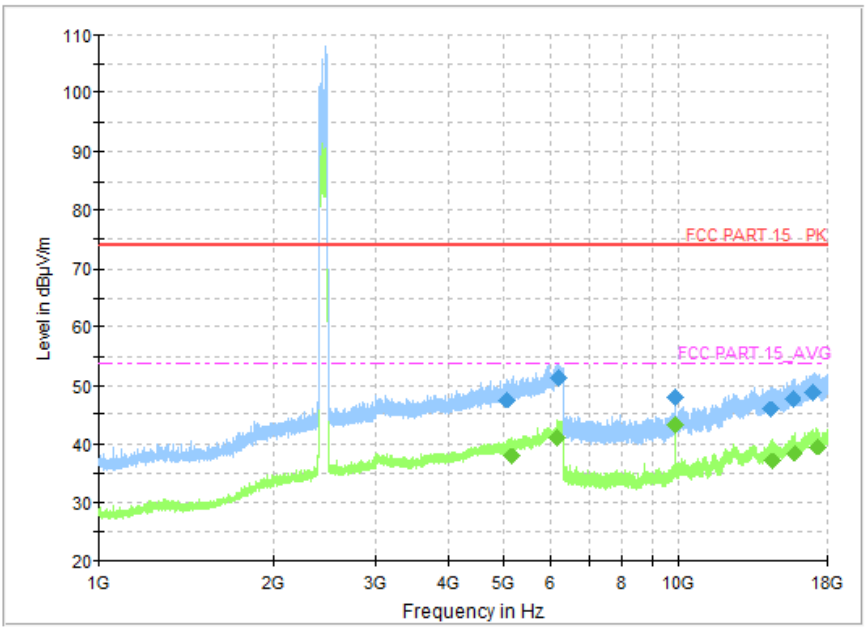

Fig.70 Radiated Spurious Emission (802.11n-HT20, CH11, 1 GHz-18 GHz), MIMO

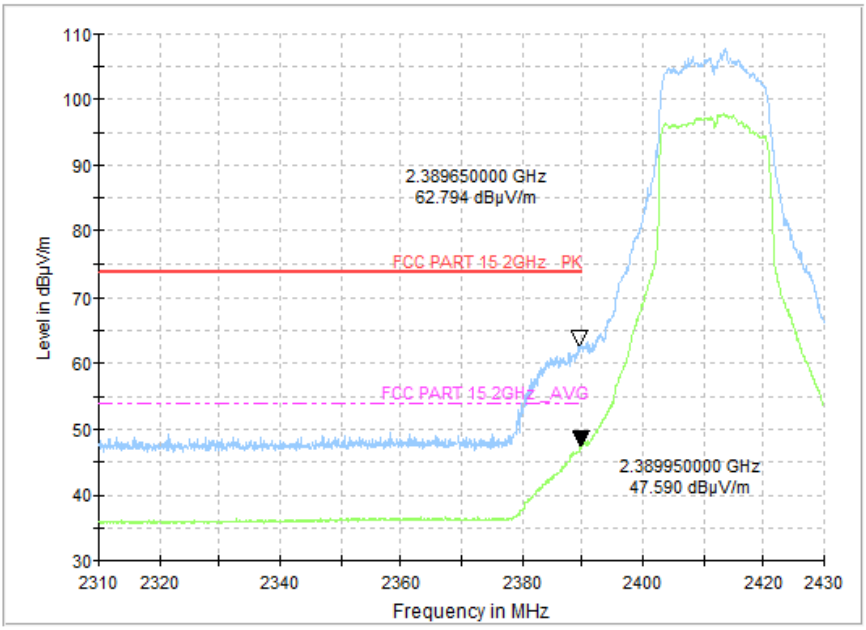

Fig.71 Radiated Restricted Band (802.11n-HT20, CH1, 2.38GHz~2.45GHz), MIMO

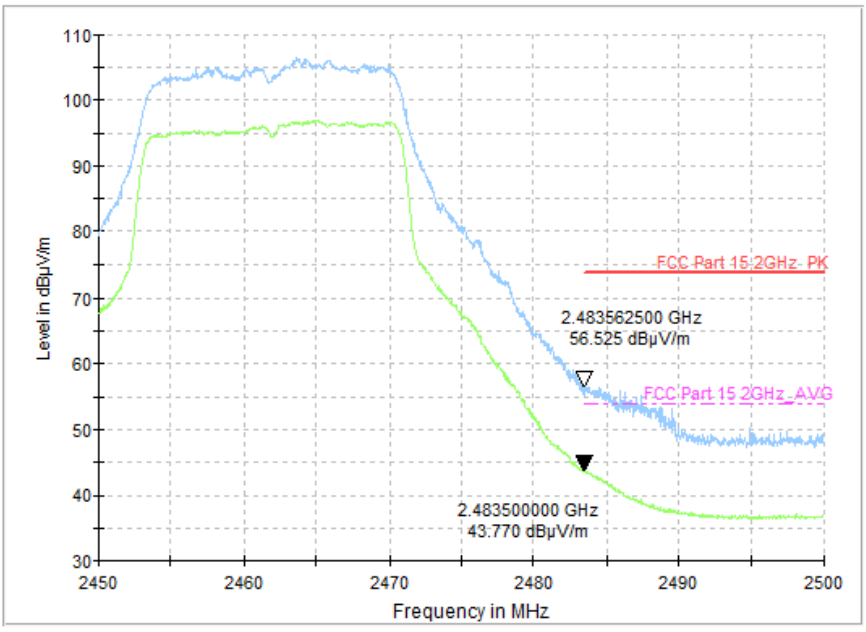

Fig.72 Radiated Restricted Band (802.11n-HT20, CH11, 2.45GHz~2.5GHz), MIMO

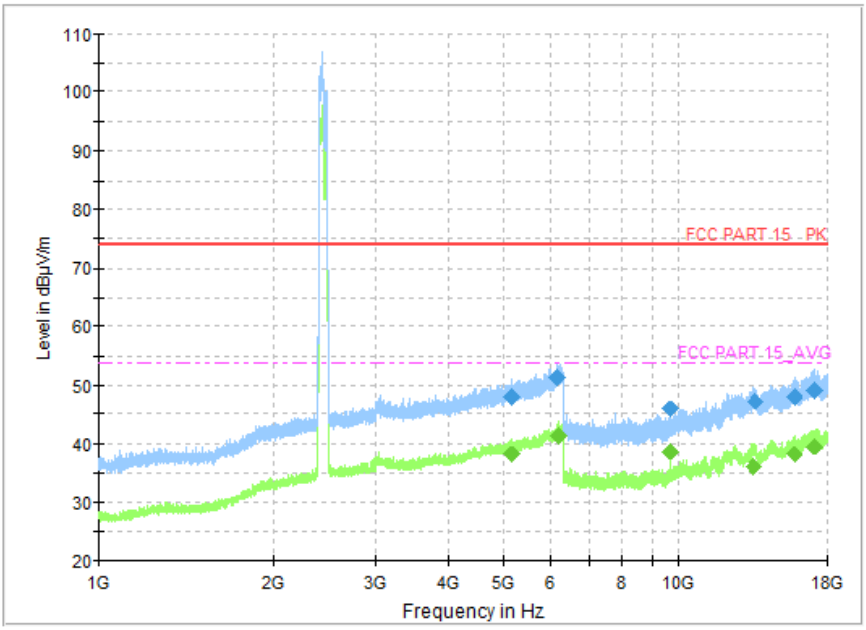

Fig.73 Radiated Spurious Emission (802.11n-HT40, CH3, 1 GHz-18 GHz), MIMO

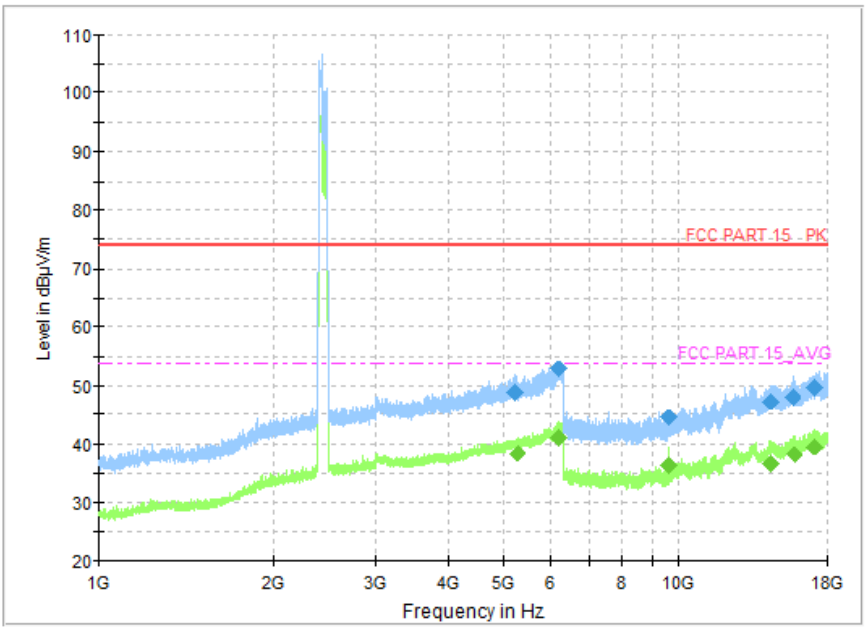

Fig.74 Radiated Spurious Emission (802.11n-HT40, CH6, 1 GHz-18 GHz), MIMO

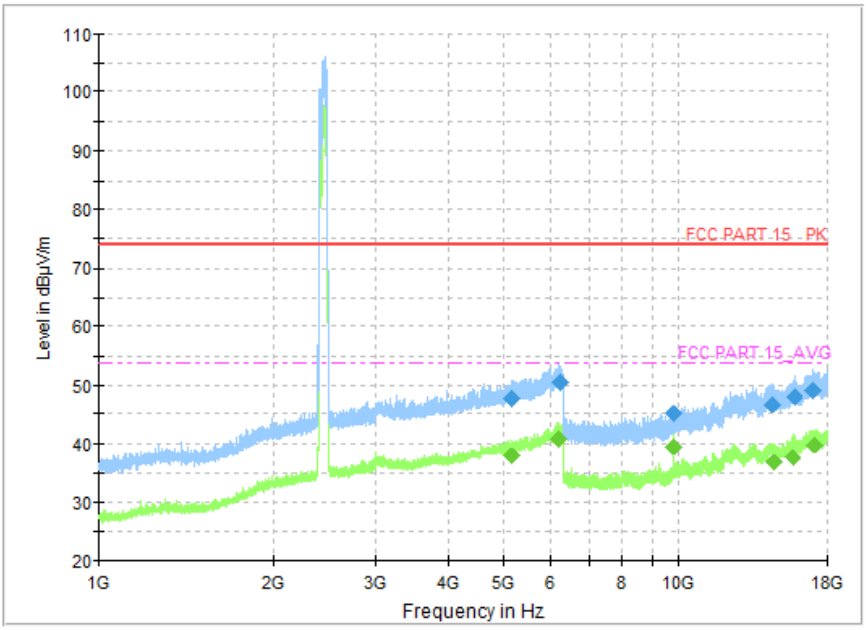

Fig.75 Radiated Spurious Emission (802.11n-HT40, CH9, 1 GHz-18 GHz), MIMO

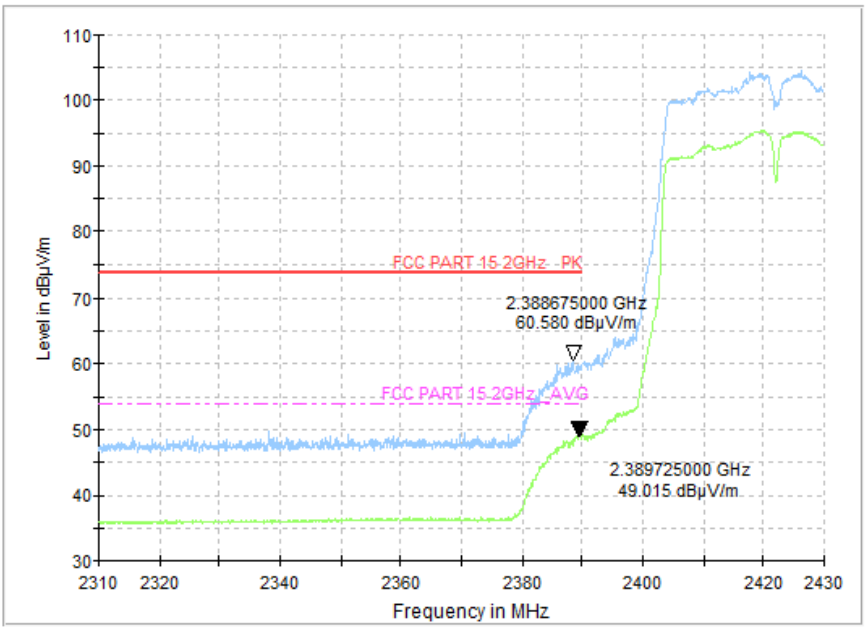

Fig.76 Radiated Restricted Band (802.11n-HT40, CH3, 2.38GHz~2.45GHz), MIMO

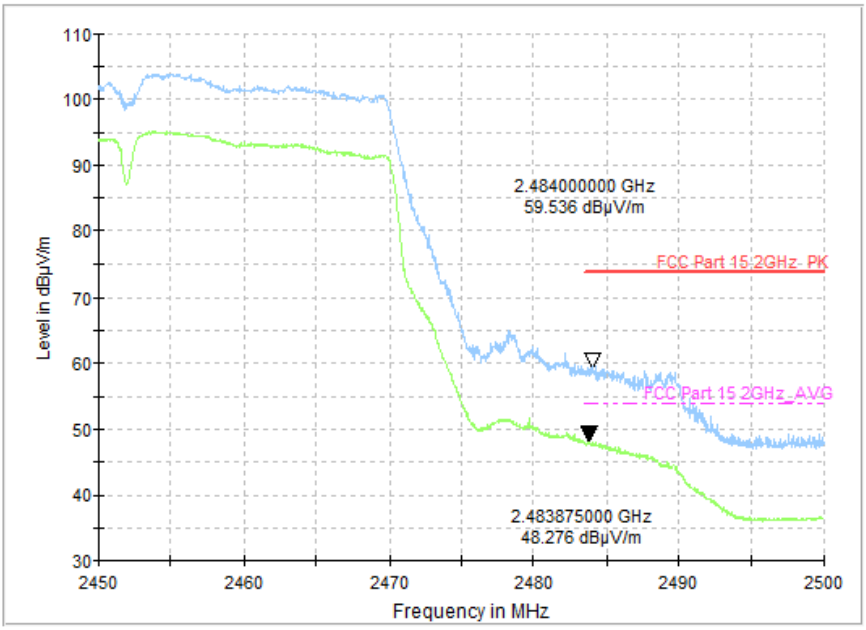

Fig.77 Radiated Restricted Band (802.11n-HT40, CH9, 2.45GHz~2.5GHz), MIMO

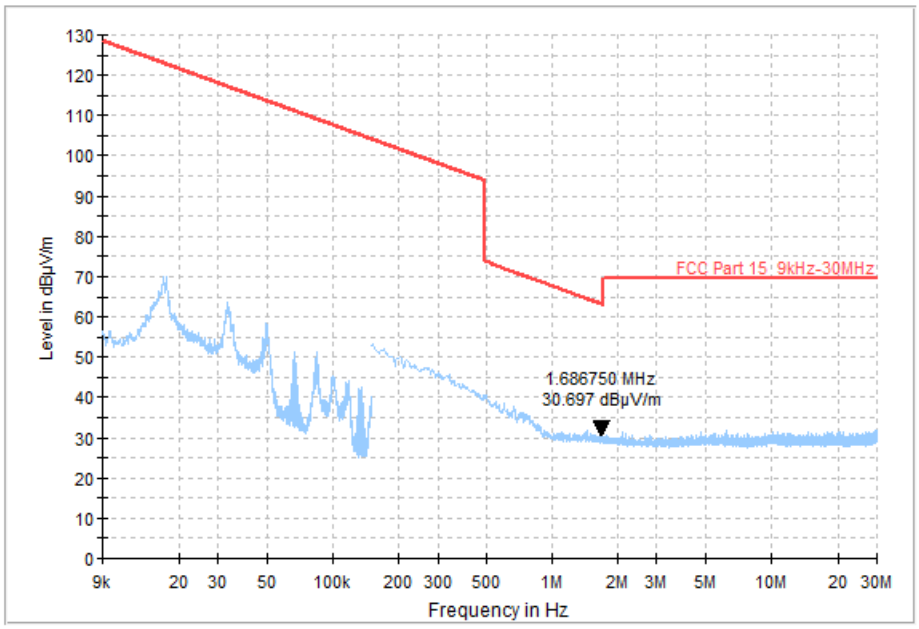

Fig.78 Radiated Spurious Emission (All Channels, 9 kHz-30 MHz), MIMO

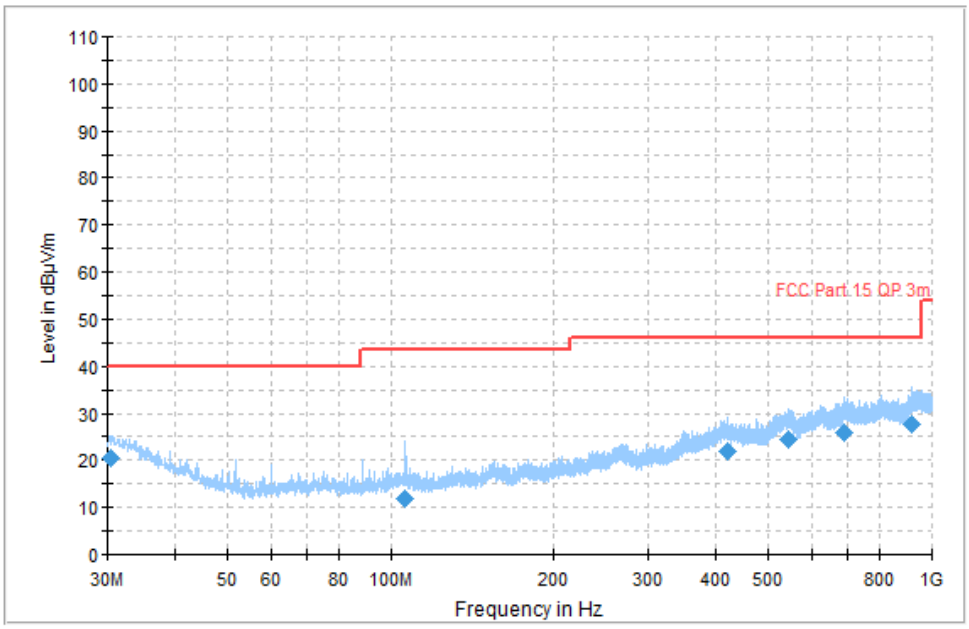

Fig.79 Radiated Spurious Emission (All Channels, 30MHz-1 GHz), MIMO

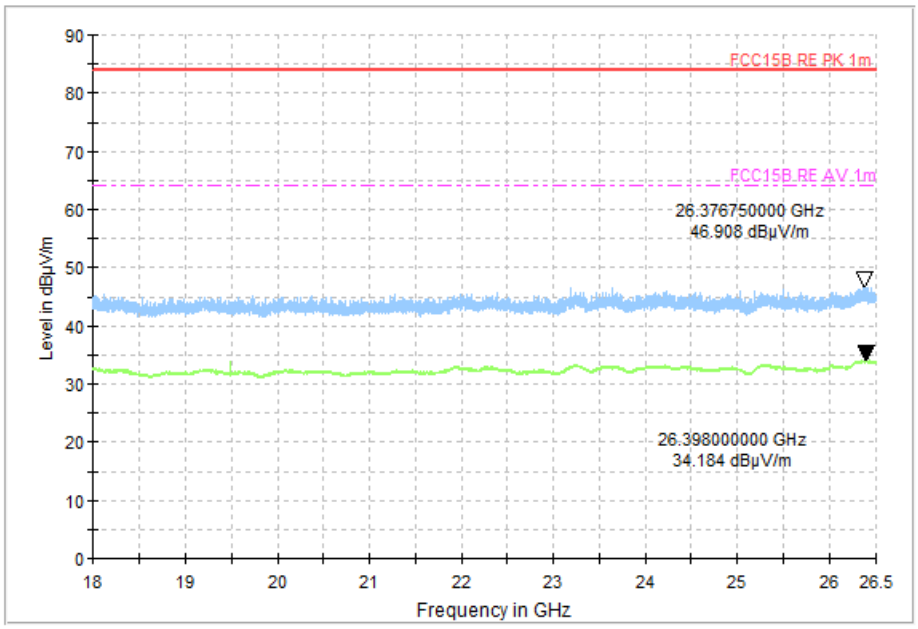

Fig.80 Radiated Spurious Emission (All Channels, 18 GHz-26.5 GHz), MIMO

A.7 AC Power line Conducted Emission

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Measurement Result and limit:

WLAN -AE2, AE3

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Average-peak Limit (dBμV)	Result (dBμV)		Conclusion
			Traffic	Idle	
0.15 to 0.5	66 to 56	56 to 46	Fig.81	Fig.82	**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.

See below for test graphs.

Conclusion: PASS

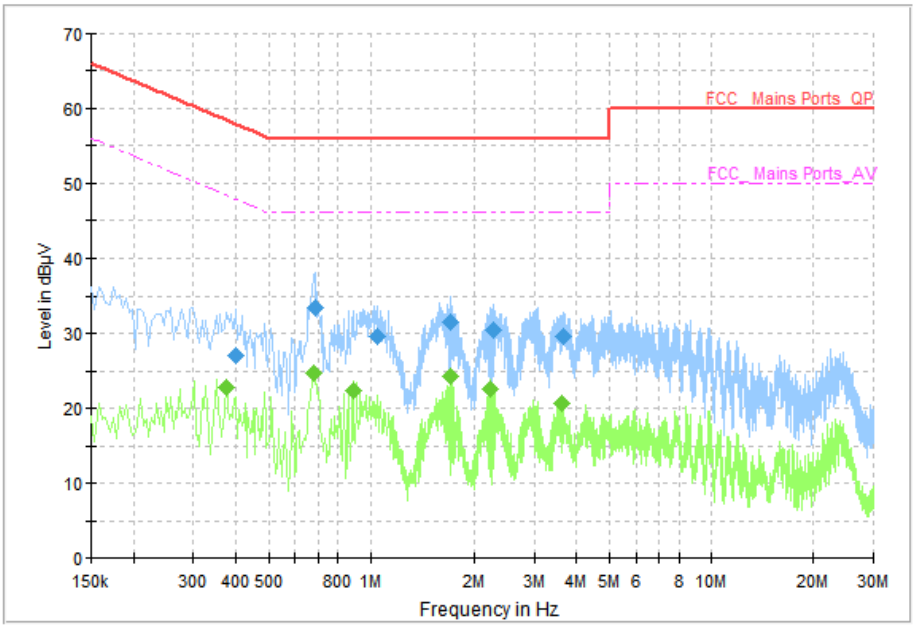

Fig.81 AC Power line Conducted Emission (Traffic)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.402000	27.14	57.81	30.67	N	ON	10
0.686000	33.51	56.00	22.49	N	ON	10
1.046000	29.75	56.00	26.25	N	ON	10
1.694000	31.53	56.00	24.47	N	ON	10
2.282000	30.60	56.00	25.40	N	ON	10
3.650000	29.56	56.00	26.44	N	ON	10

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.374000	22.89	48.41	25.52	N	ON	10
0.678000	24.76	46.00	21.24	N	ON	10
0.886000	22.33	46.00	23.67	N	ON	10
1.694000	24.32	46.00	21.68	N	ON	10
2.230000	22.63	46.00	23.37	N	ON	10
3.622000	20.78	46.00	25.22	N	ON	10

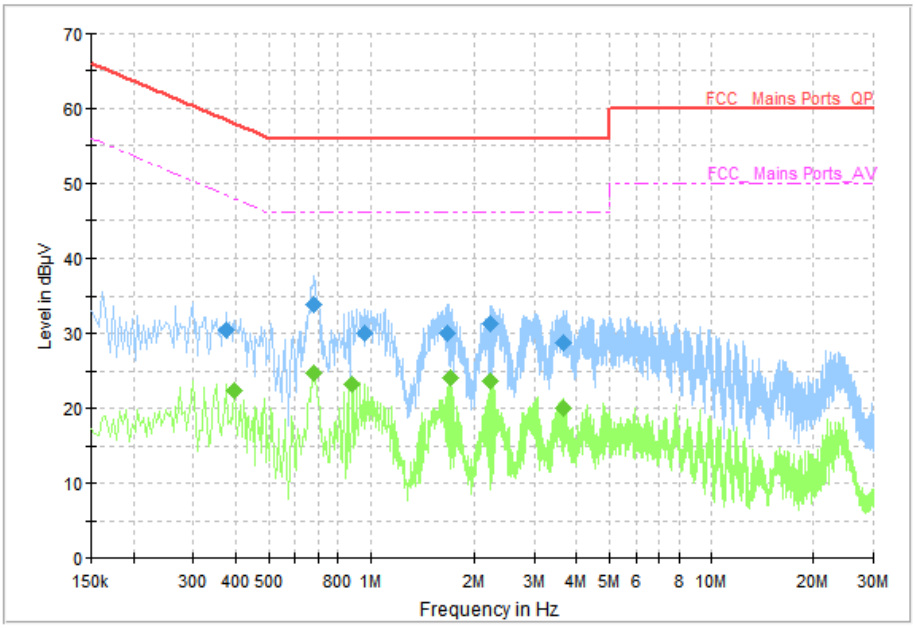

Fig.82 AC Power line Conducted Emission (Idle)

Measurement Results: Quasi Peak

Frequency (MHz)	Quasi Peak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.374000	30.42	58.41	27.99	N	ON	10
0.682000	33.95	56.00	22.05	N	ON	10
0.958000	30.14	56.00	25.86	N	ON	10
1.662000	30.10	56.00	25.90	N	ON	10
2.226000	31.32	56.00	24.68	N	ON	10
3.670000	28.78	56.00	27.22	N	ON	10

Measurement Results: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.398000	22.41	47.90	25.48	N	ON	10
0.682000	24.67	46.00	21.33	N	ON	10
0.882000	23.31	46.00	22.69	N	ON	10
1.694000	24.15	46.00	21.85	N	ON	10
2.226000	23.73	46.00	22.27	N	ON	10
3.646000	20.09	46.00	25.91	N	ON	10

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