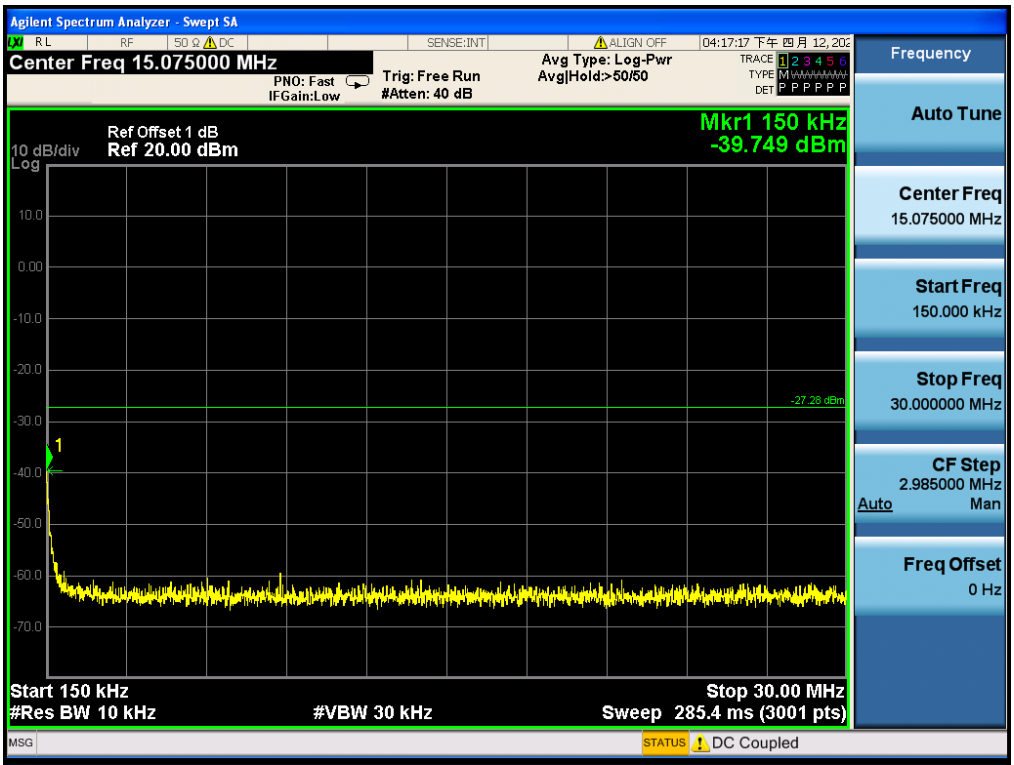
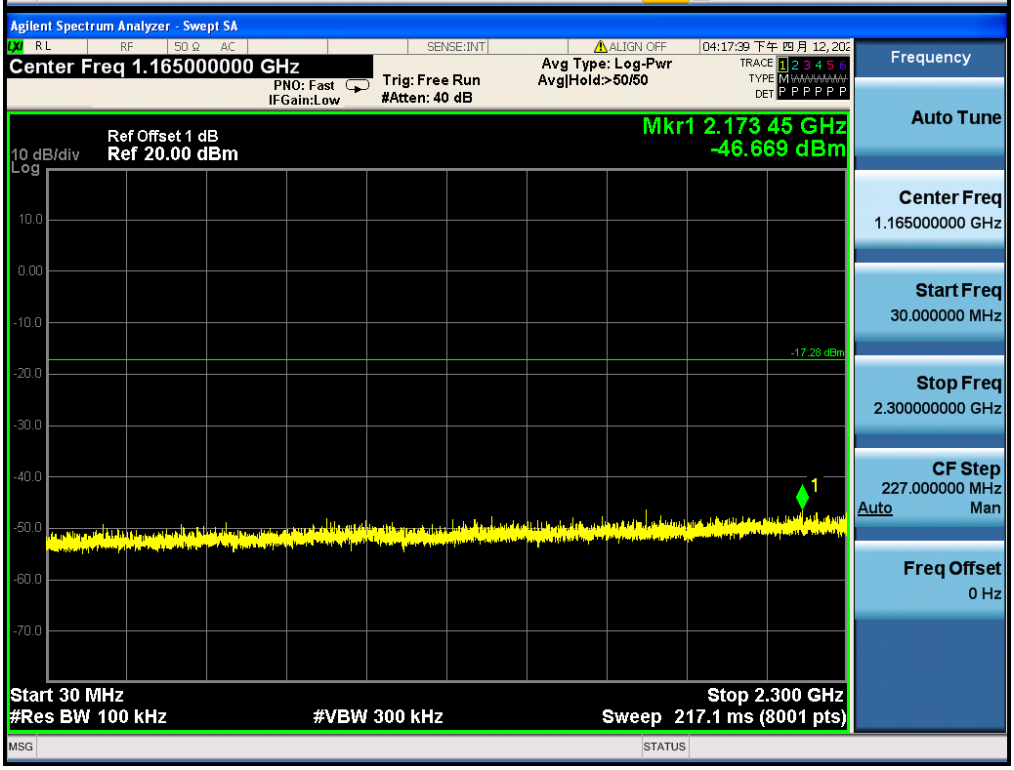
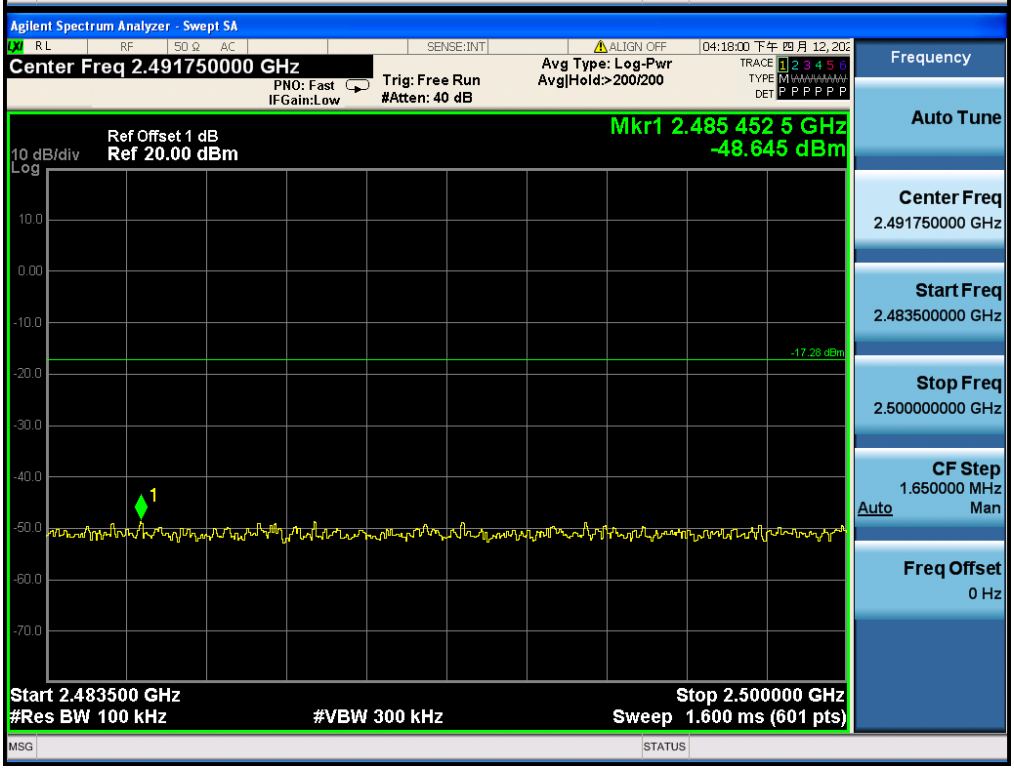
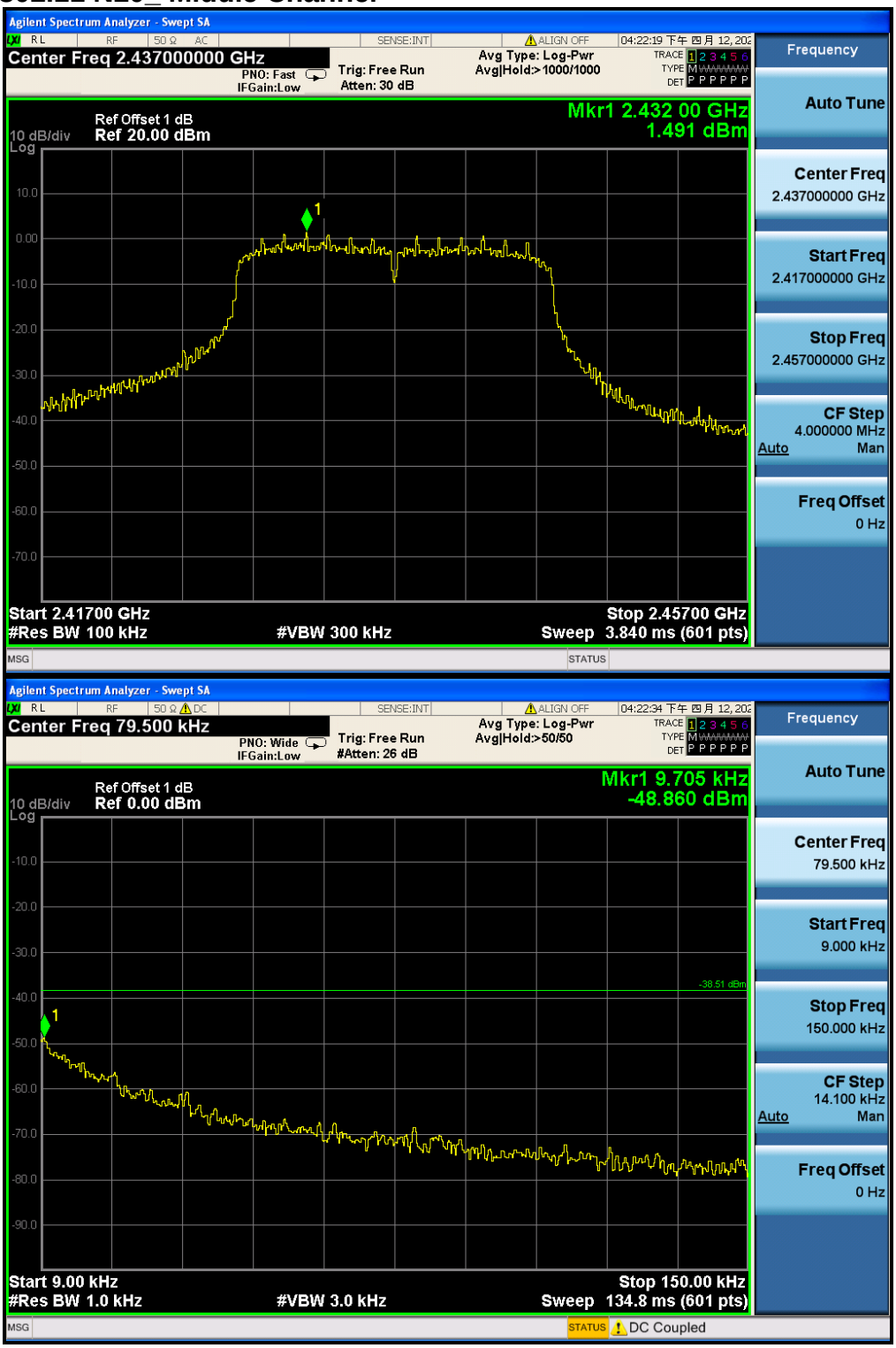
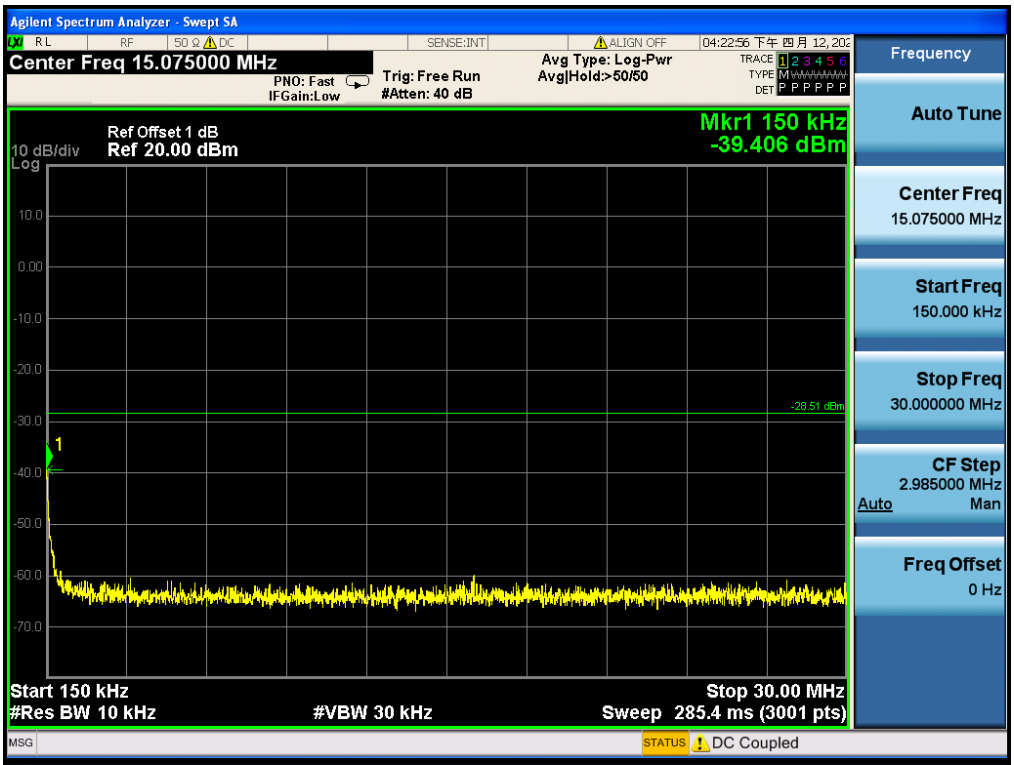


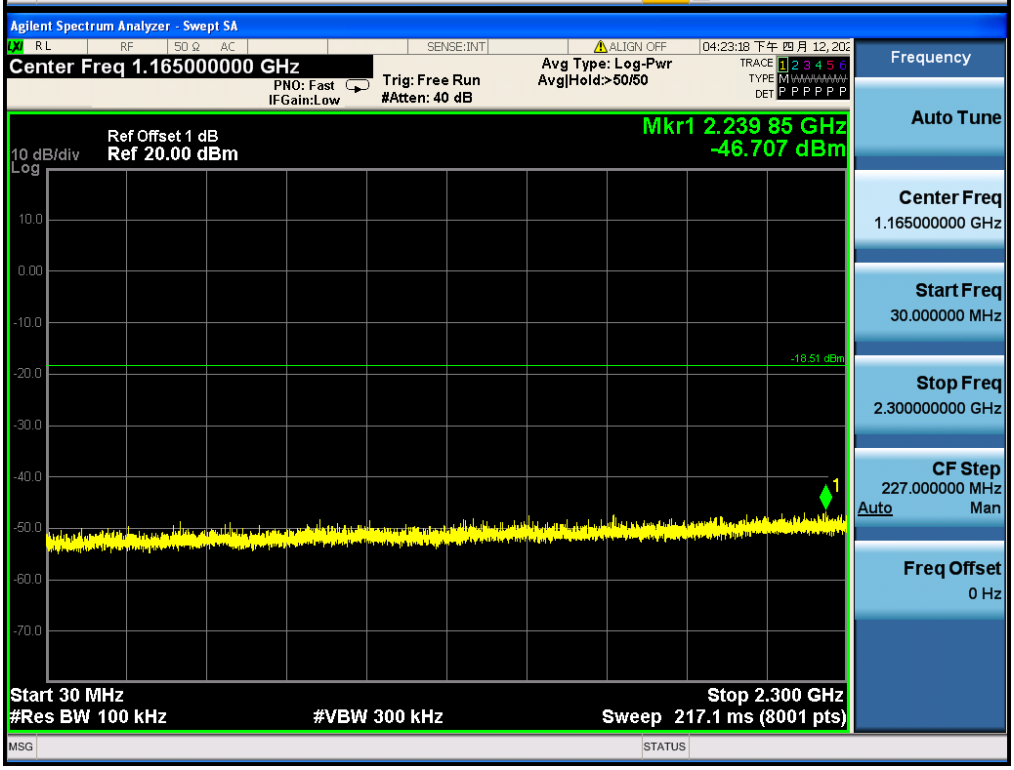


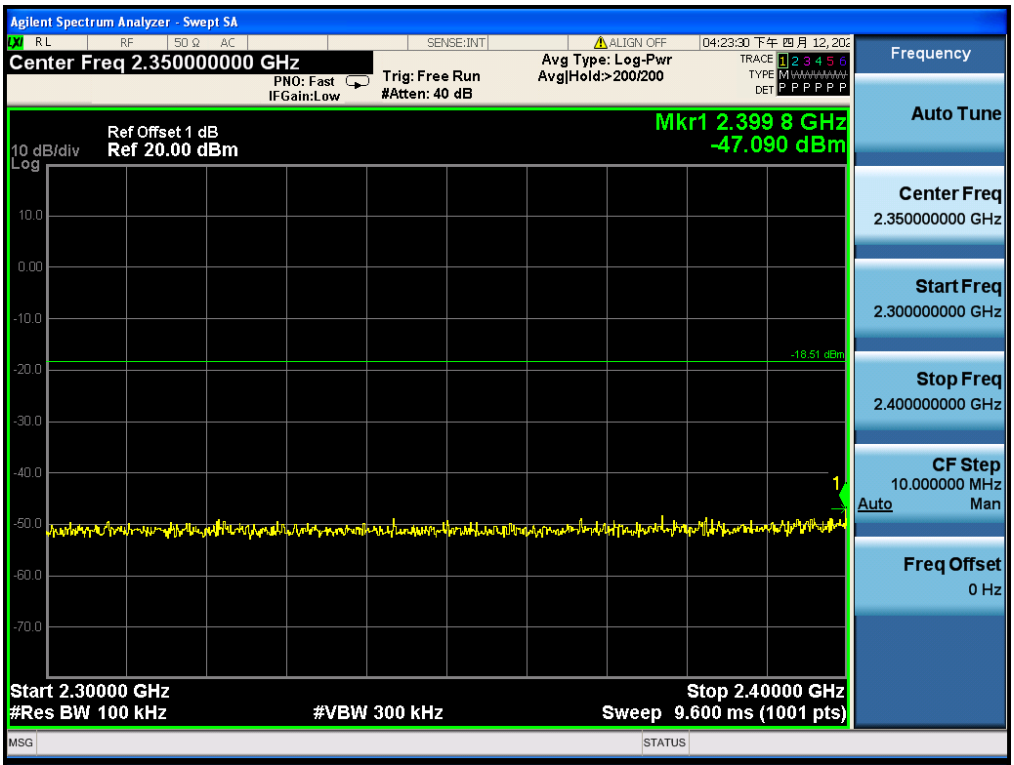


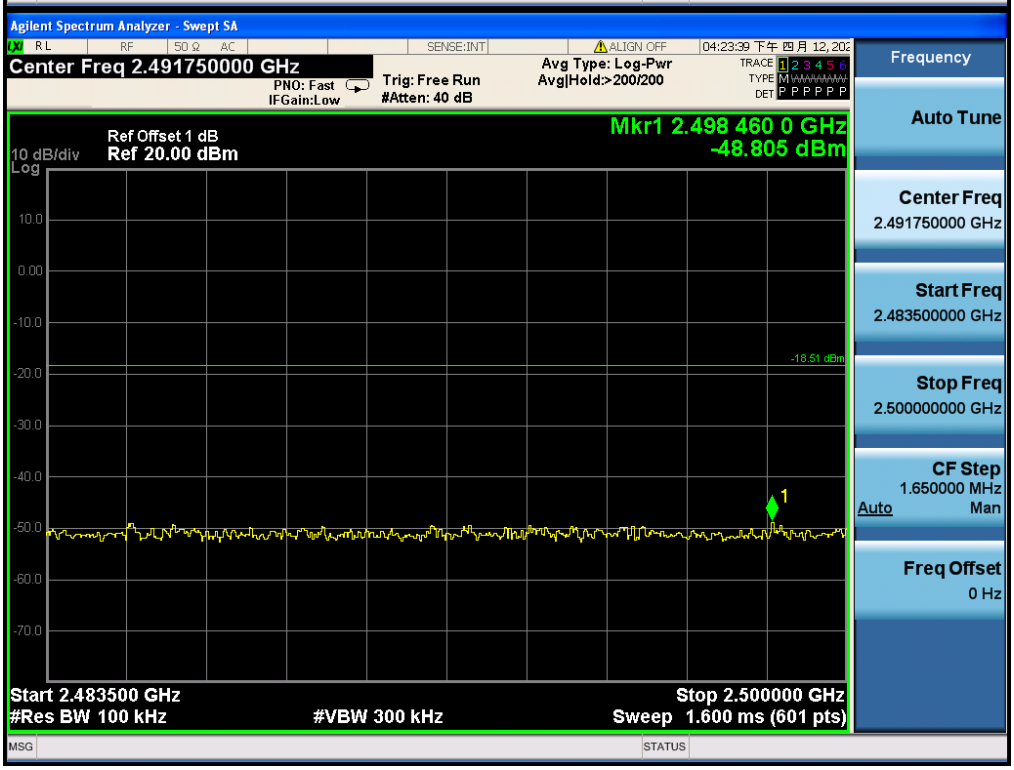
4.8.1.1.8 802.11 N20_ Middle Channel



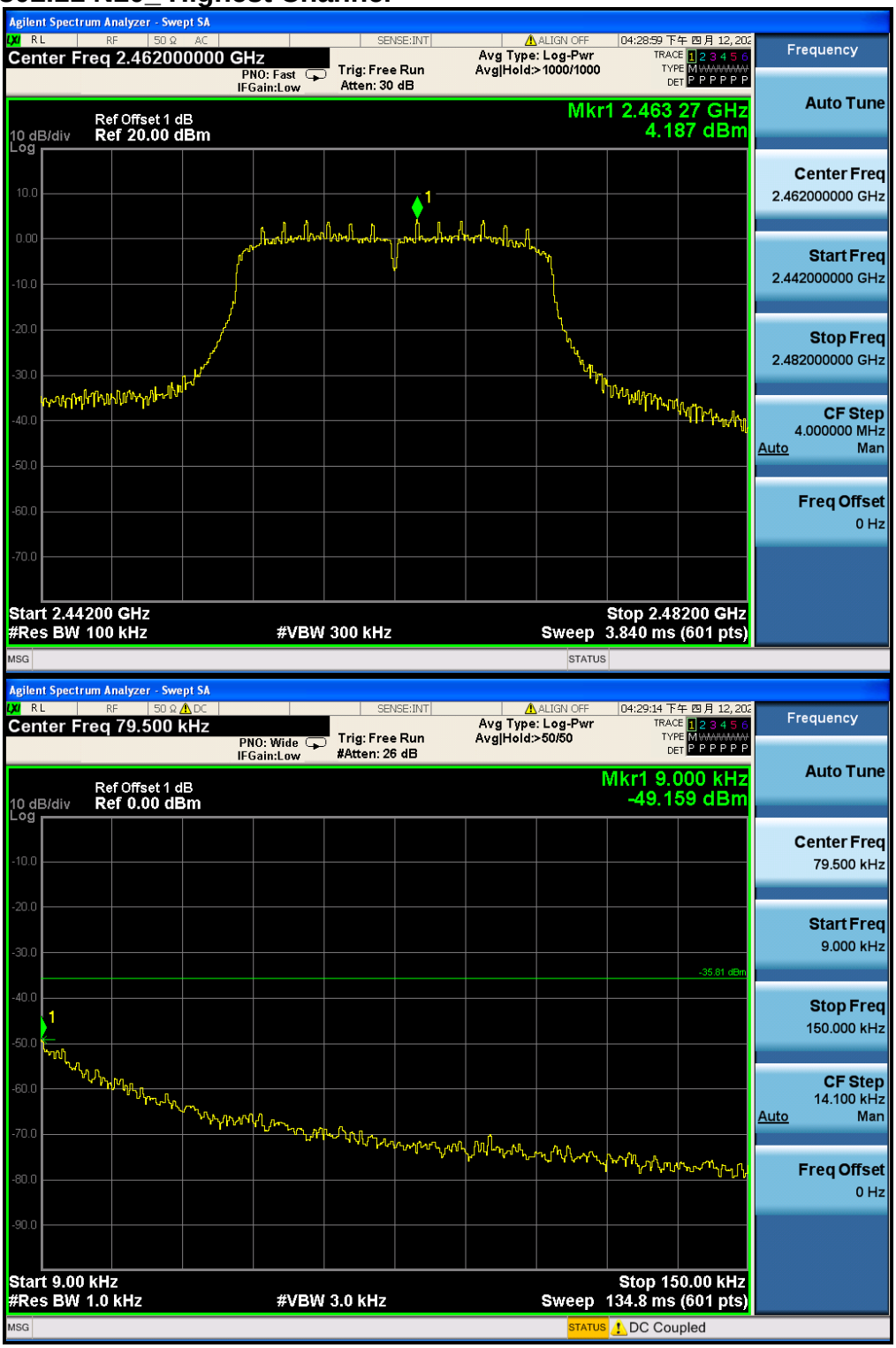


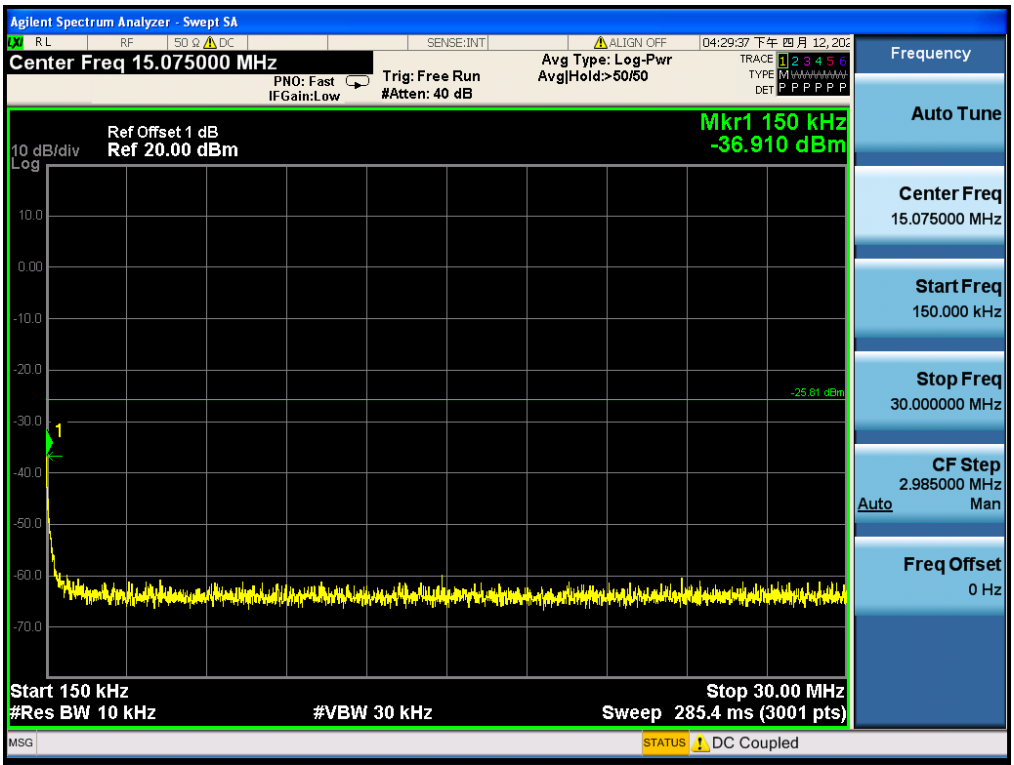


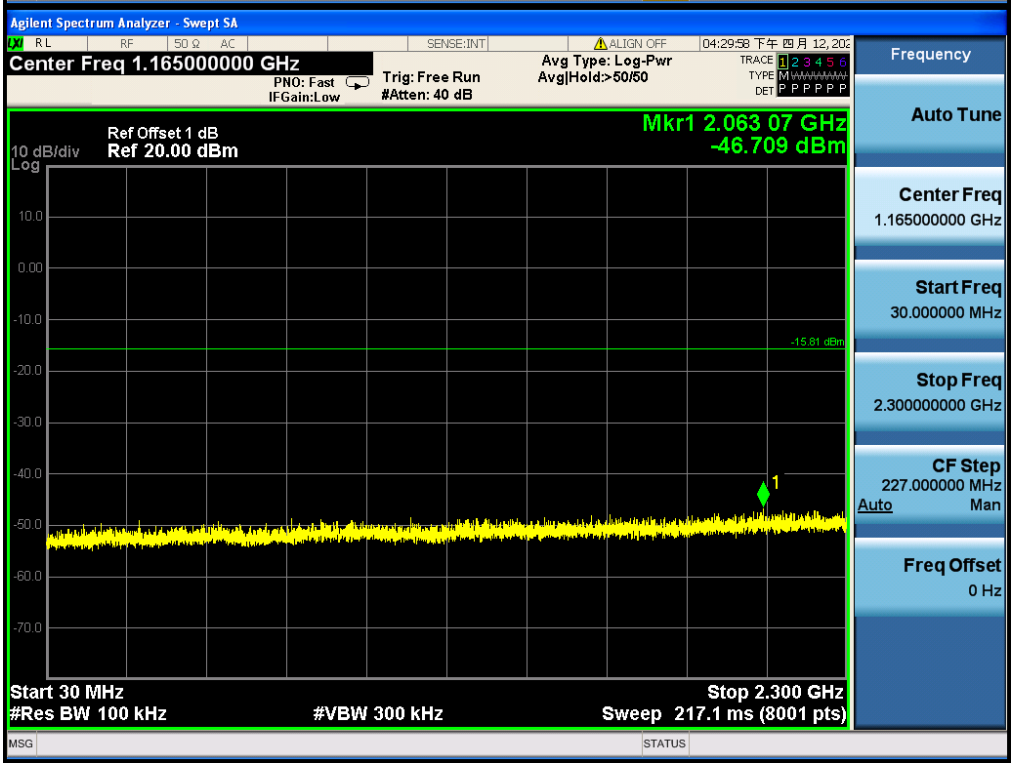


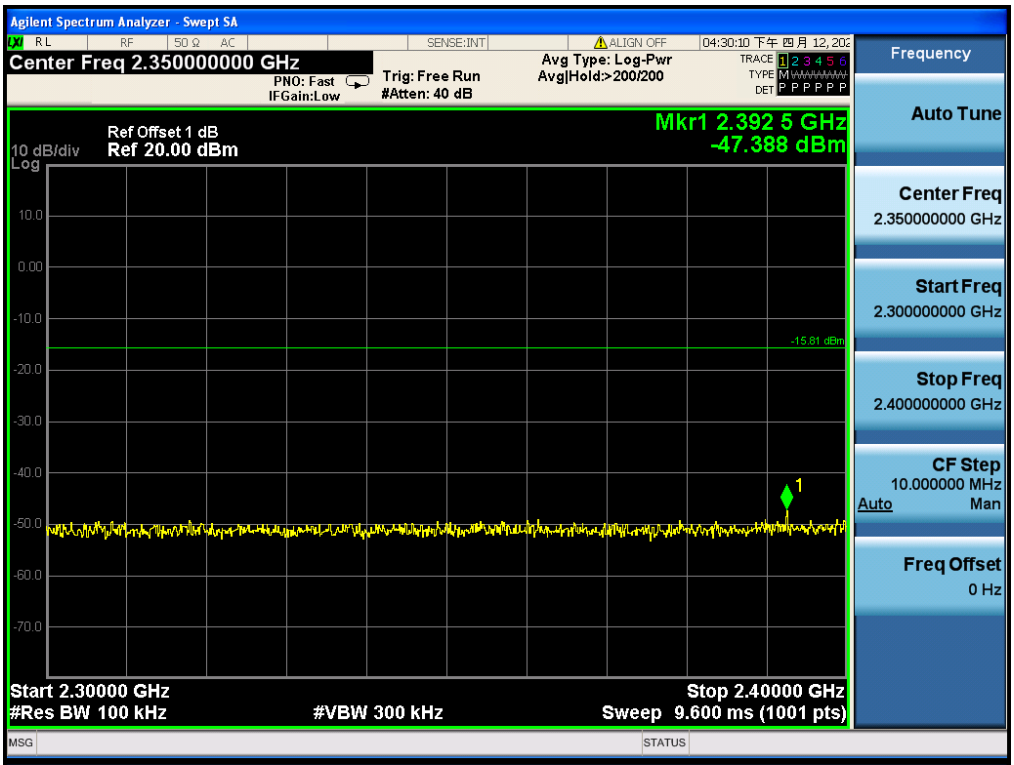


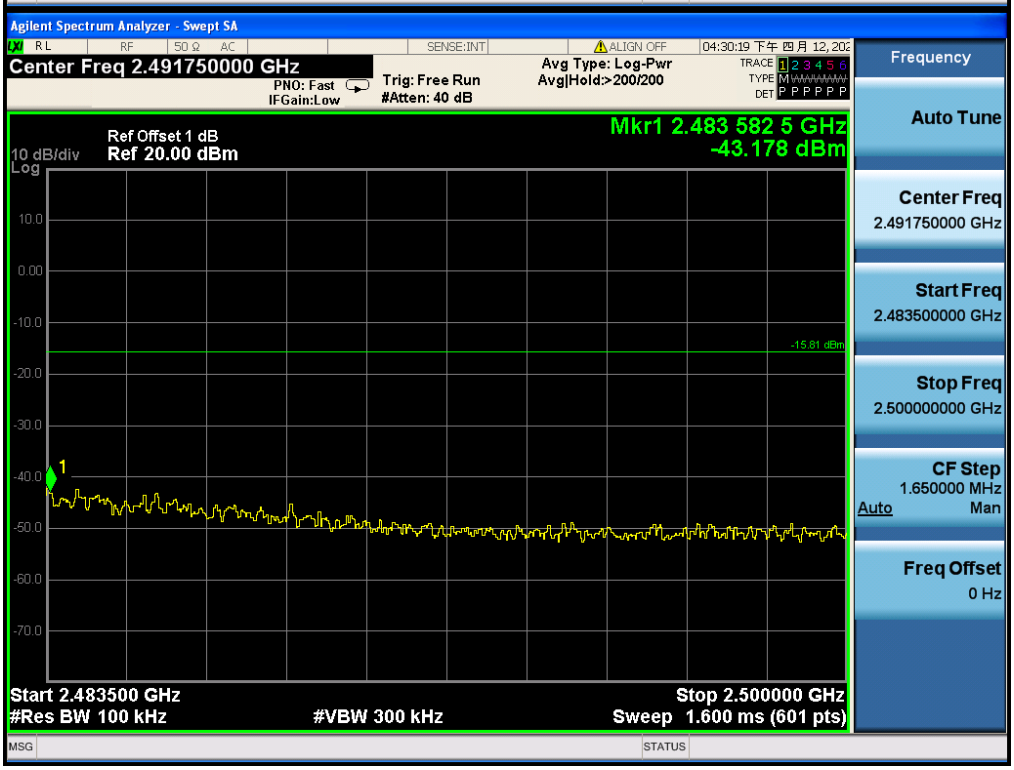
4.8.1.1.9 802.11 N20_ Highest Channel



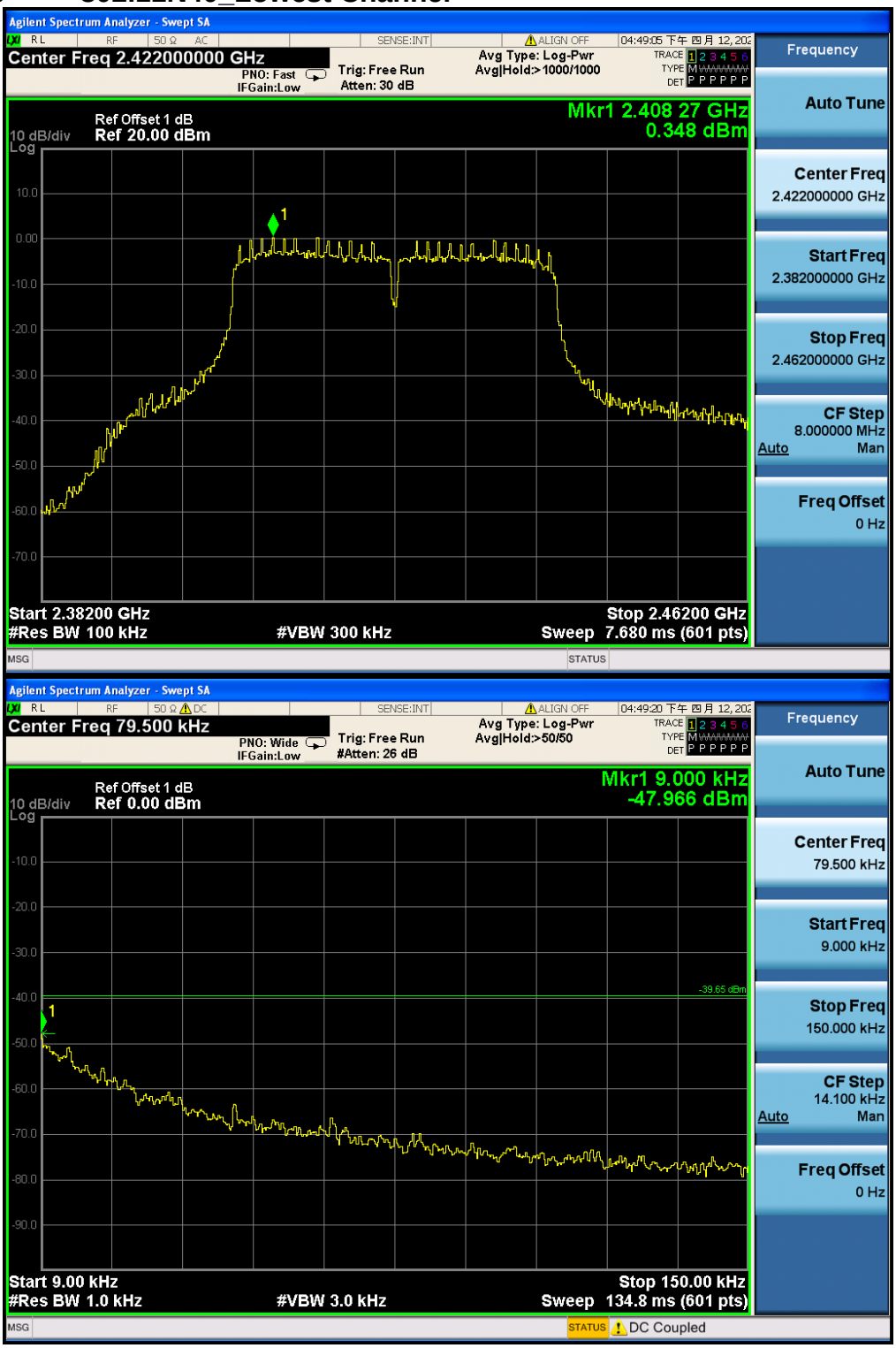


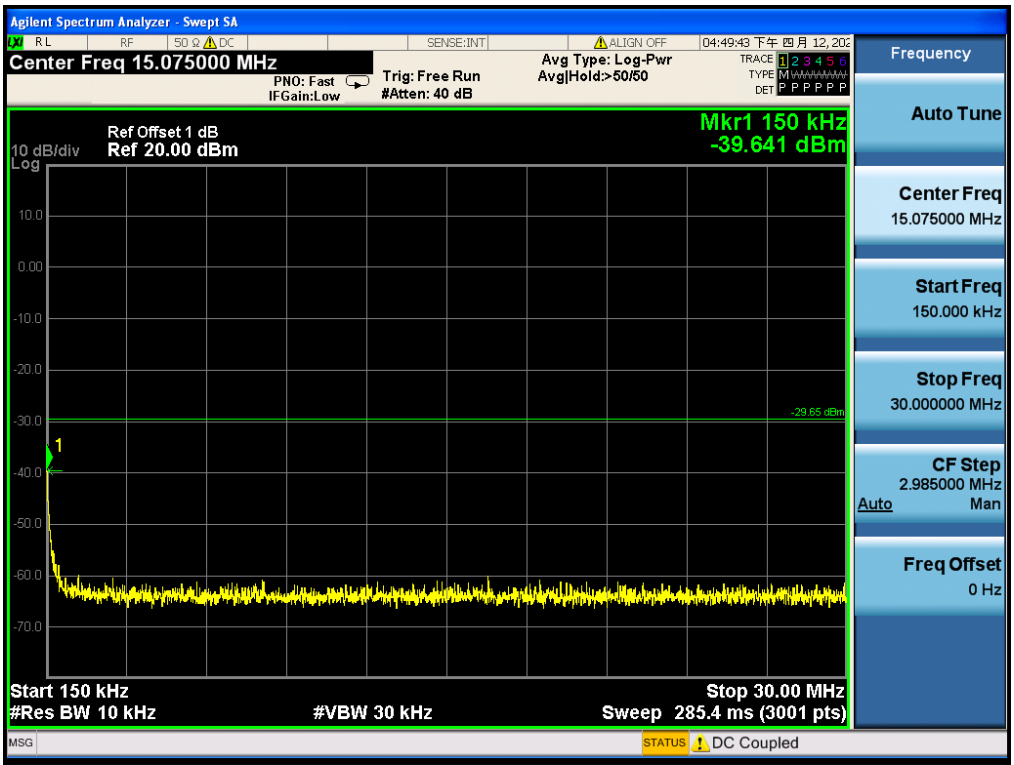


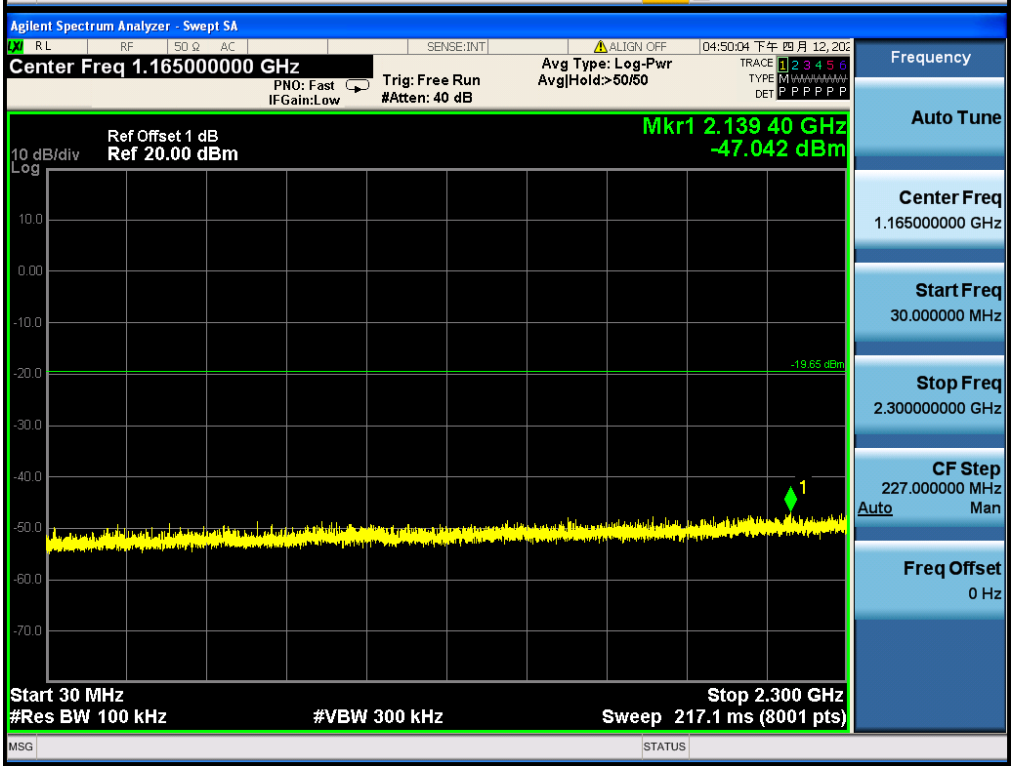


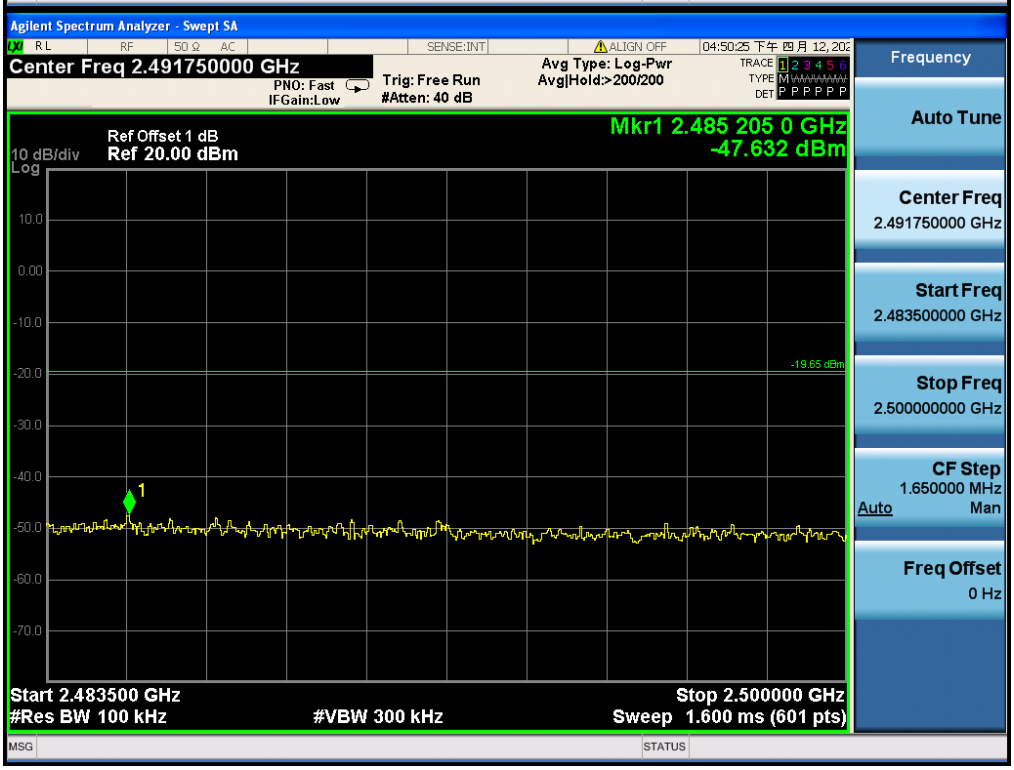


4.8.1.1.10 802.11N40_Lowest Channel

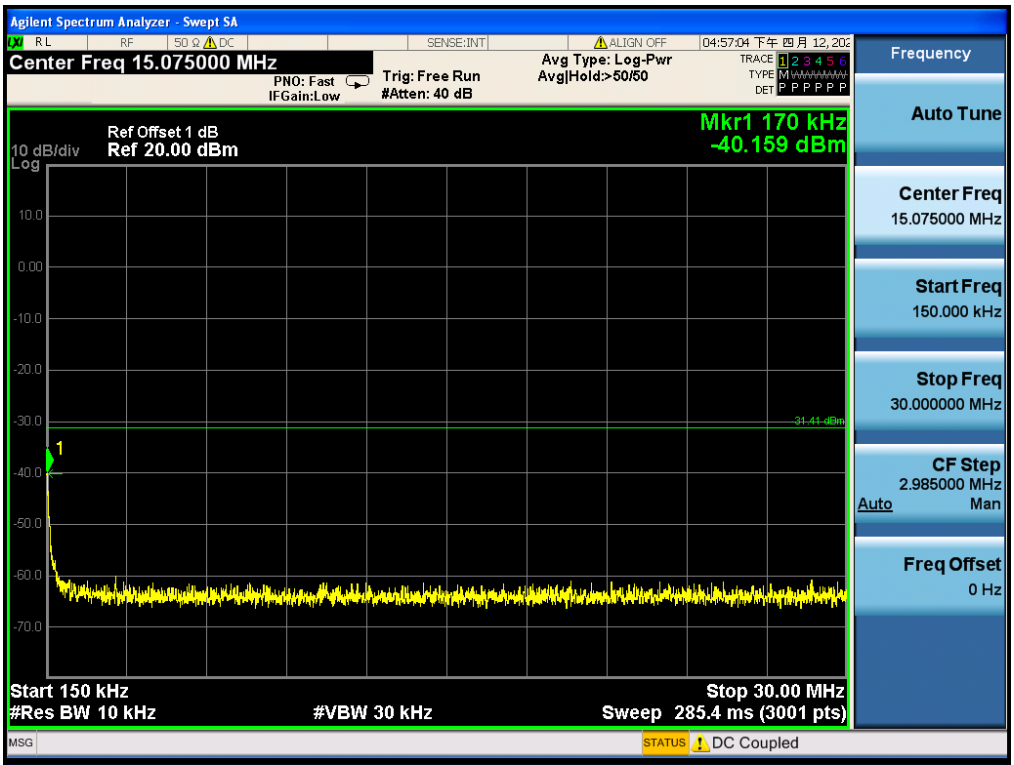


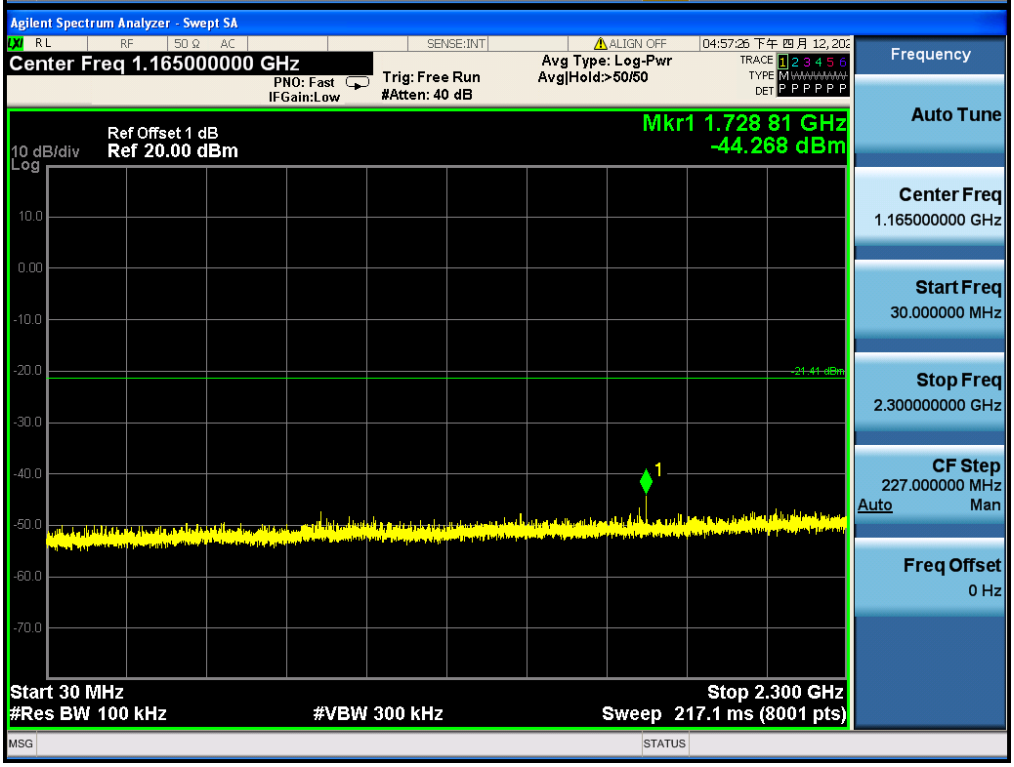


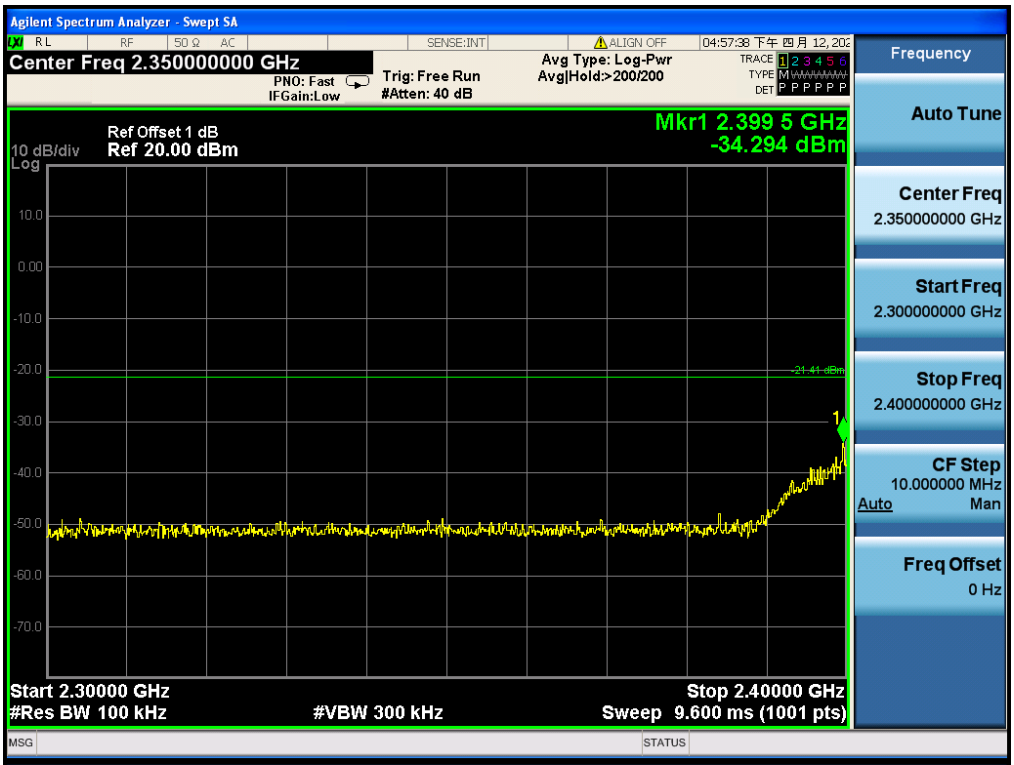


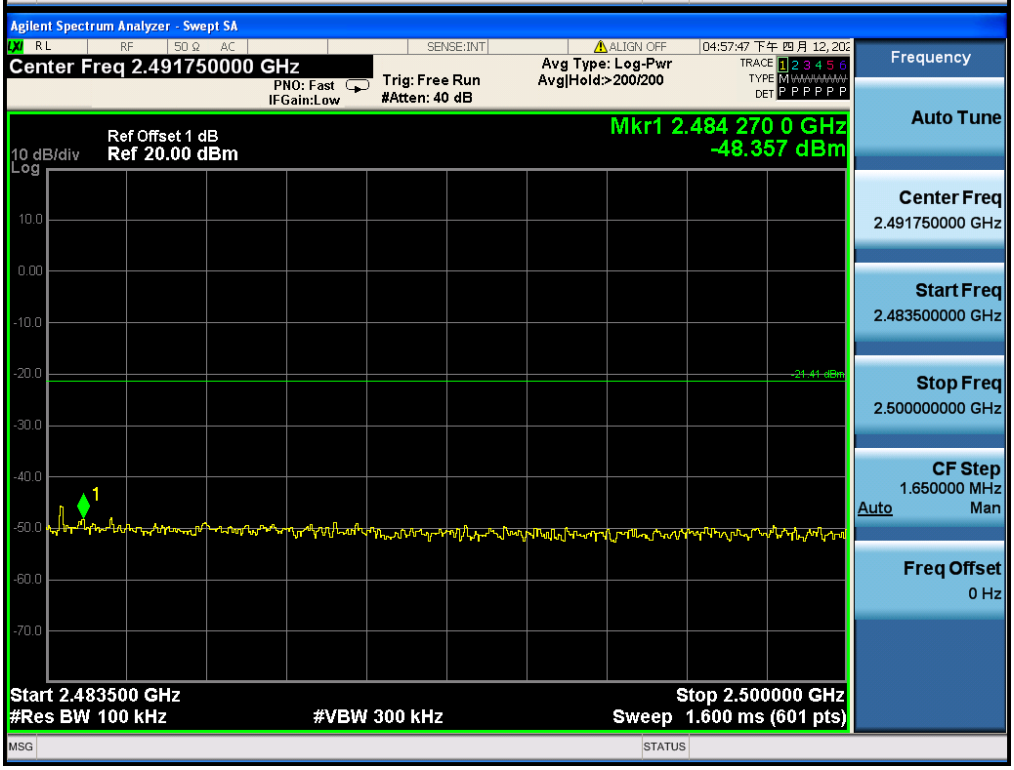


4.8.1.1.11 802.11 N40_ Middle Channel

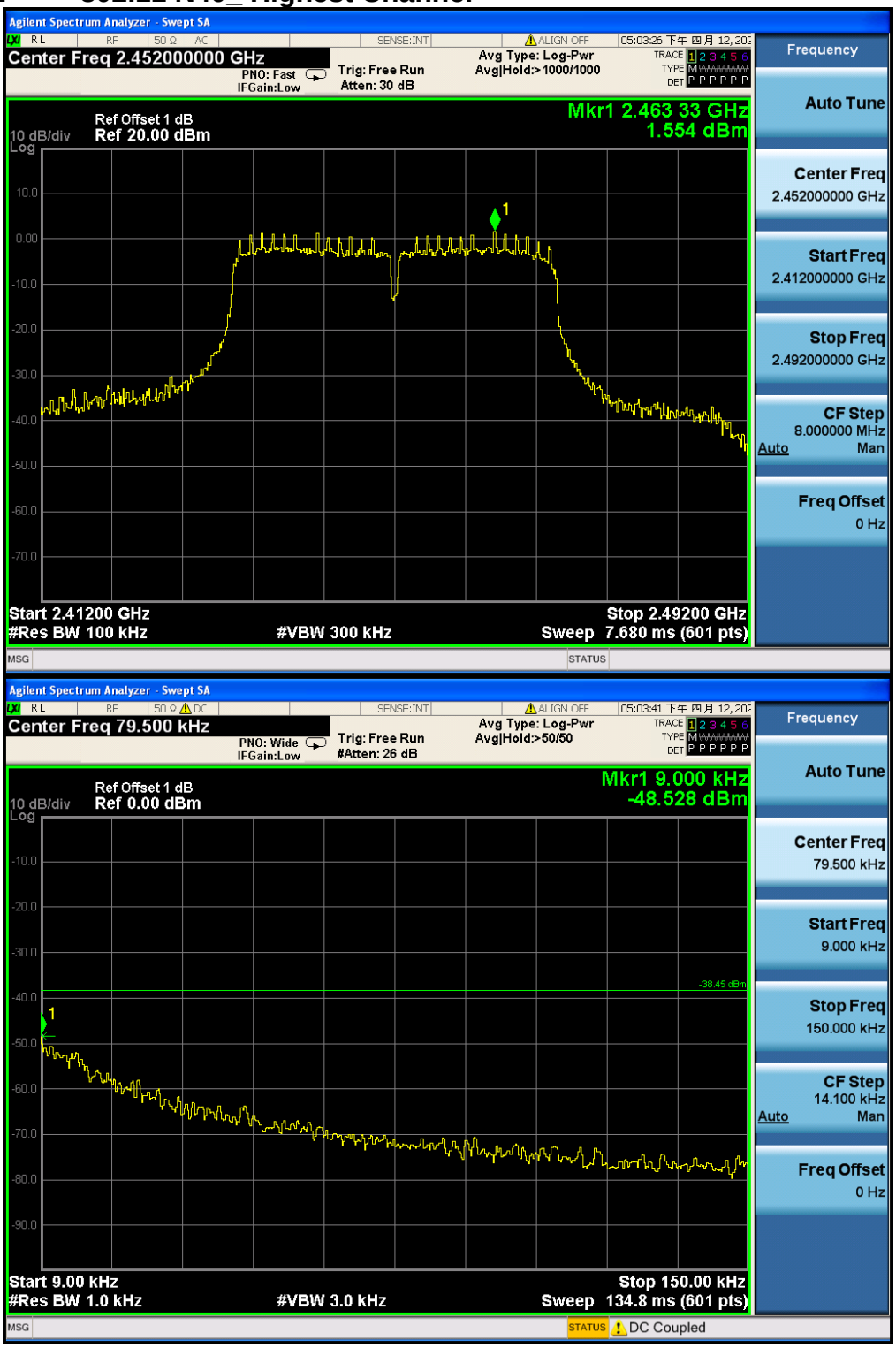


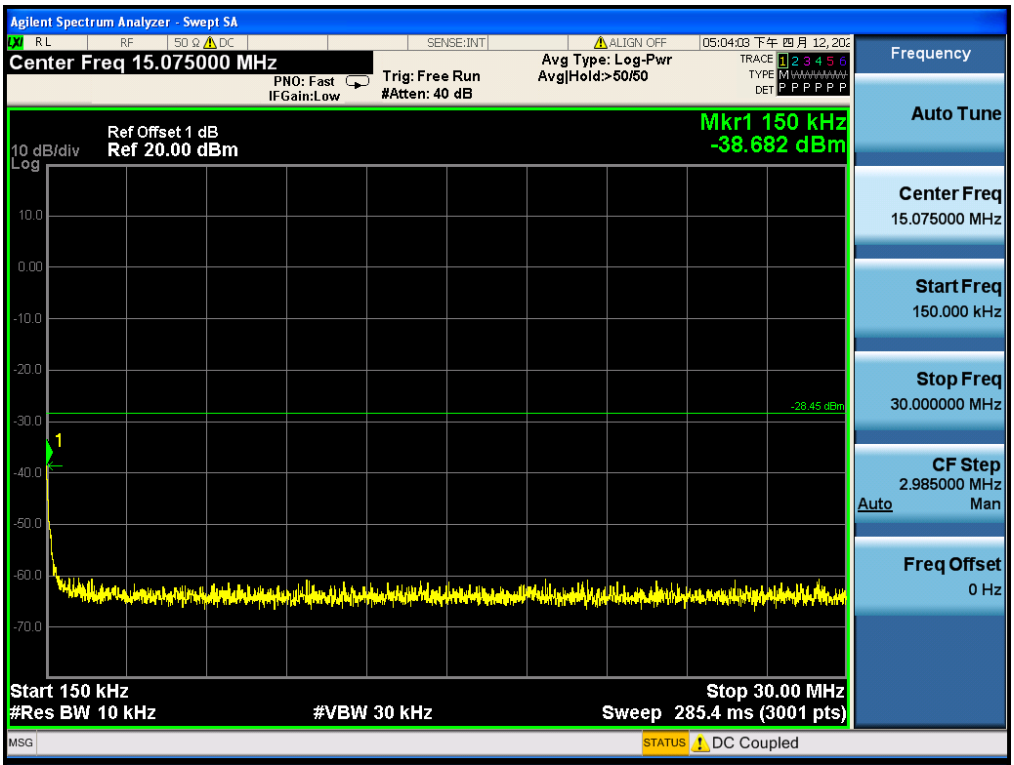


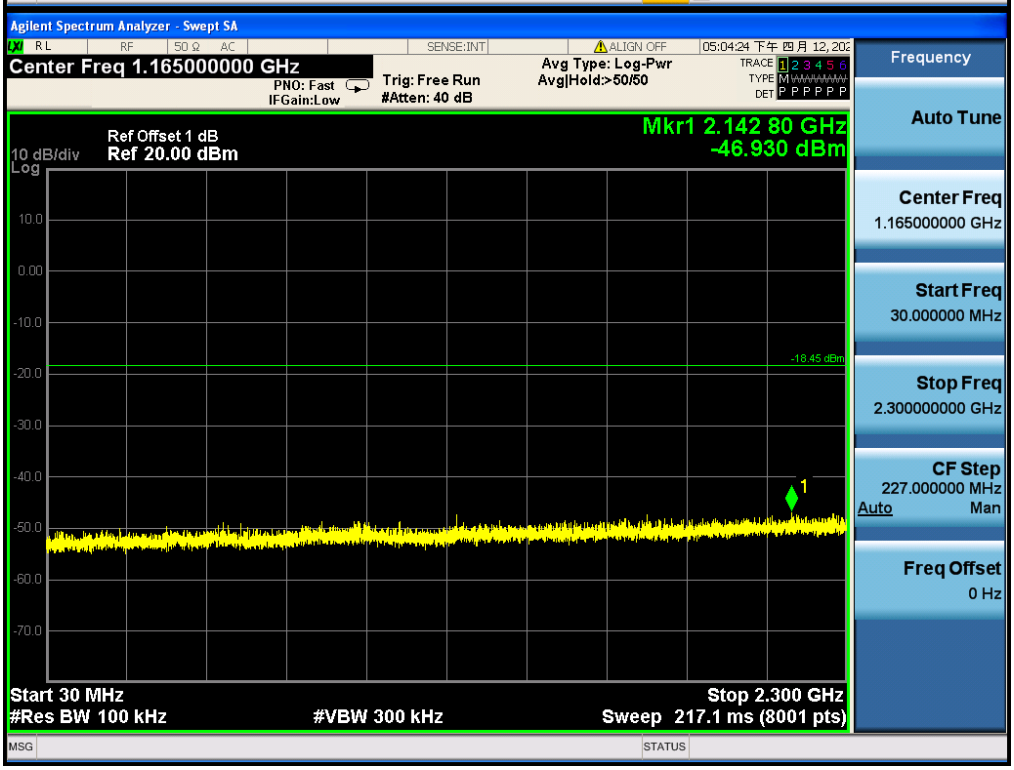


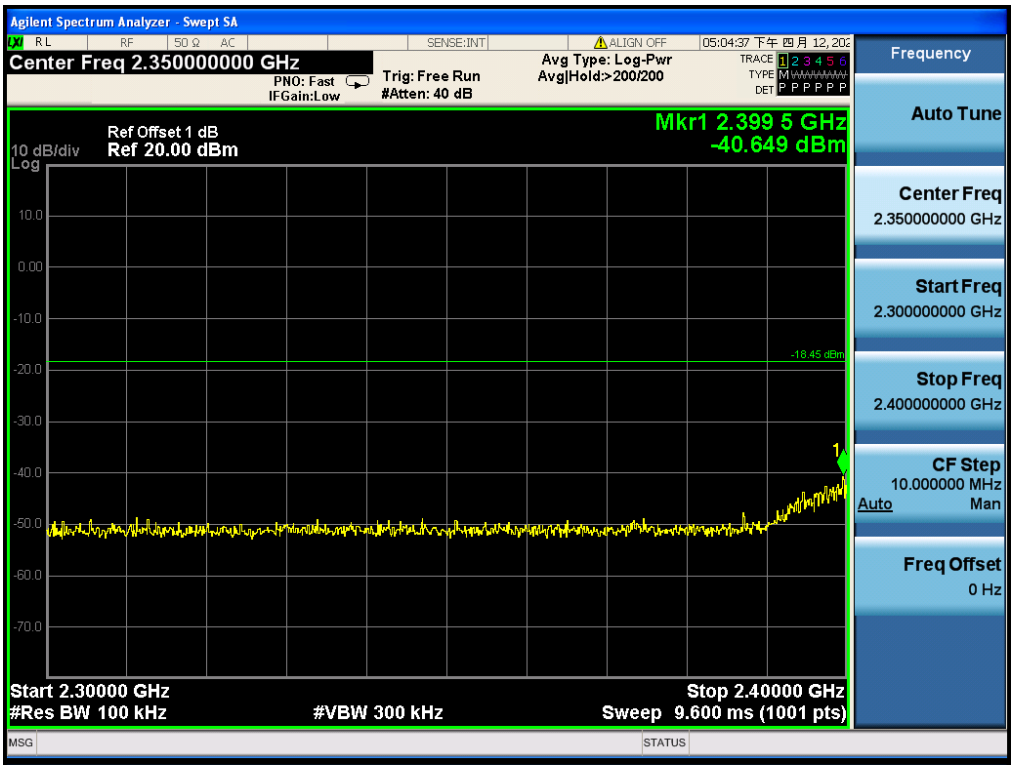


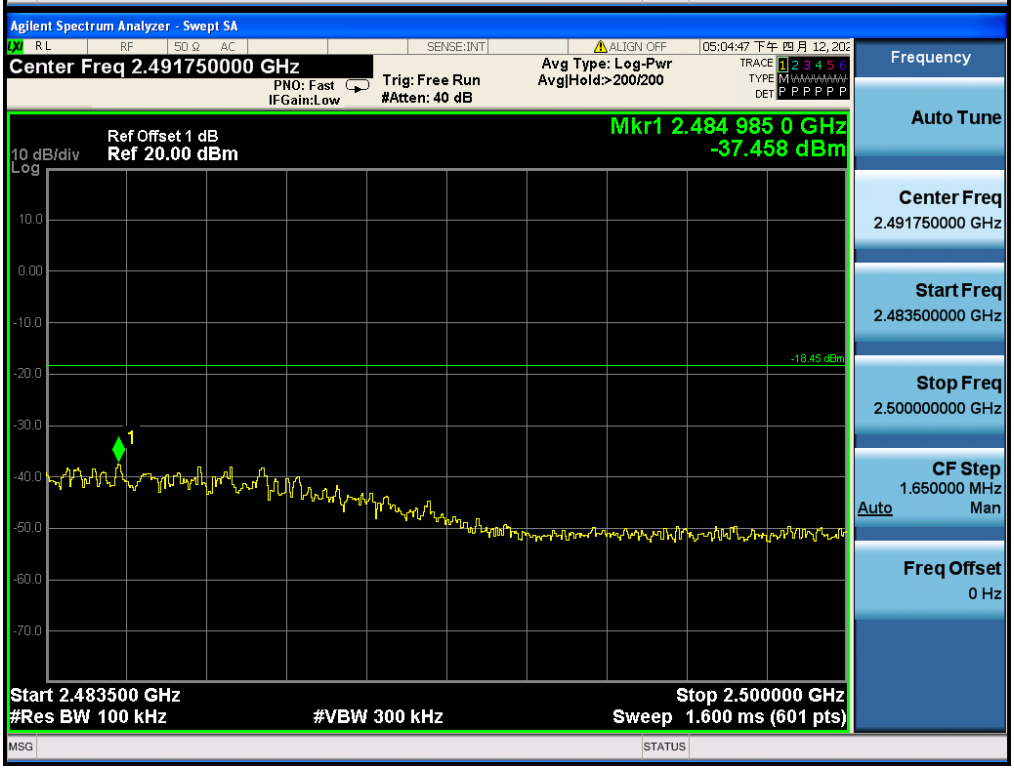
4.8.1.1.12 802.11 N40_ Highest Channel











4.9 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205				
Test Method:	ANSI C63.10 :2013 Section 11.12				
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100 kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1GHz	500	54.0	Quasi-peak	3
	Above 1GHz	500	54.0	Average	3
	Remark: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.				

Test Setup:	

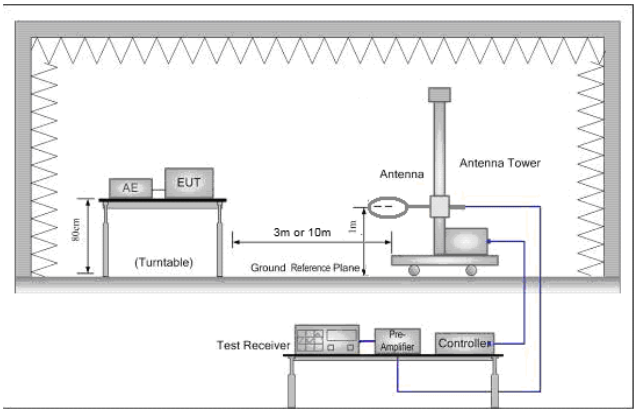


Figure 1. Below 30MHz

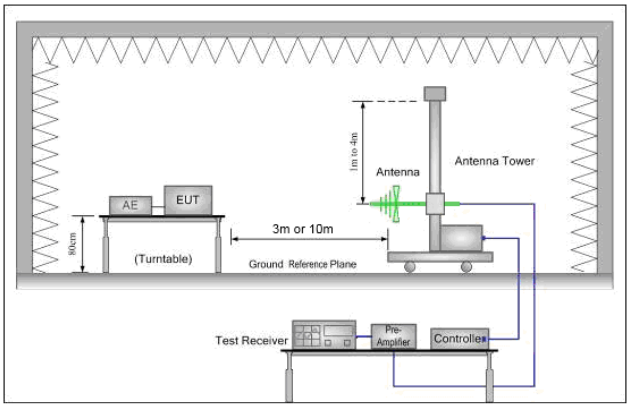


Figure 2. 30MHz to 1GHz

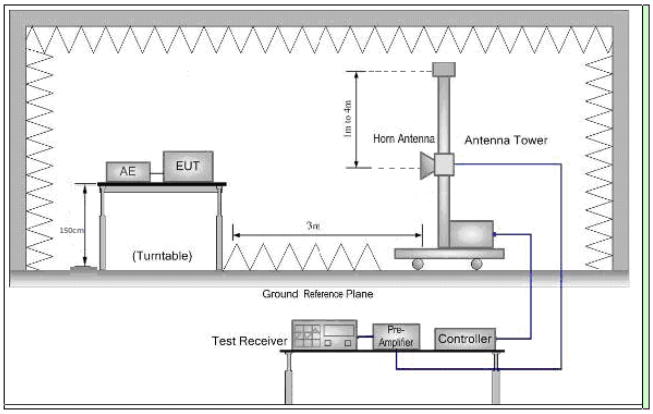


Figure 3. Above 1 GHz

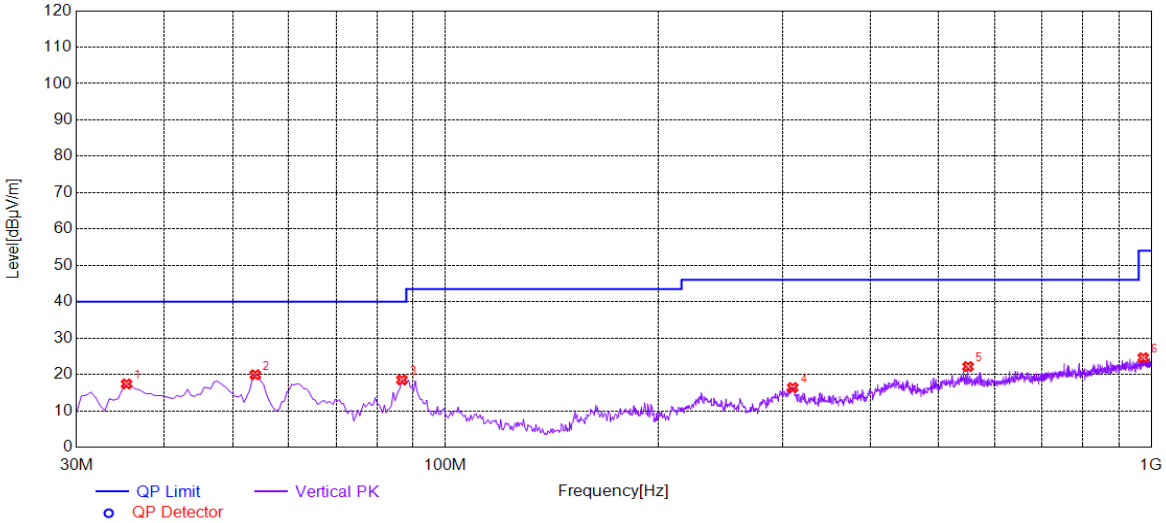
Test Procedure:	a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. e. Use the following spectrum analyzer settings: (1) Span shall wide enough to fully capture the emission being measured; (2) Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW ⩾ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak (3) For average measurement: use duty cycle correction factor method per 15.35(c). Duty cycle = On time/100 milliseconds

	On time = N 1 *L 1 +N 2 *L 2 +...+N n-1 *LN n-1 +N n *L n Where N 1 is number of type 1 pulses, L 1 is length of type 1 pulses, etc. Average Emission Level = Peak Emission Level + 20*log(Duty cycl f. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. g. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. h. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. i. Test the EUT in the lowest channel, the middle channel ,the Highest channel j. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case. k. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Charge + Transmitting mode.
Final Test Mode:	Pretest the EUT at Charge + Transmitting mode. Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G; 6.5Mbps of rate is the worst case of 802.11N(HT20); 13.5Mbps of rate is the worst case of 802.11N(HT40) For below 1GHz, through Pre-scan, find the 1Mbps of rate of 802.11B at lowest channel is the worst case. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

4.9.1 Radiated emission below 1GHz

4.9.1.1 Charge + Transmitting, Vertical

Test Graph



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	35.3377	17.39	-32.65	40.00	22.61	237	287	Vertical
2	53.7769	19.92	-30.75	40.00	20.08	294	326	Vertical
3	86.7734	18.51	-34.20	40.00	21.49	159	253	Vertical
4	310.470	16.38	-27.55	46.00	29.62	198	332	Vertical
5	550.180	22.18	-21.45	46.00	23.82	209	319	Vertical
6	974.282	24.61	-14.18	54.00	29.39	195	0	Vertical

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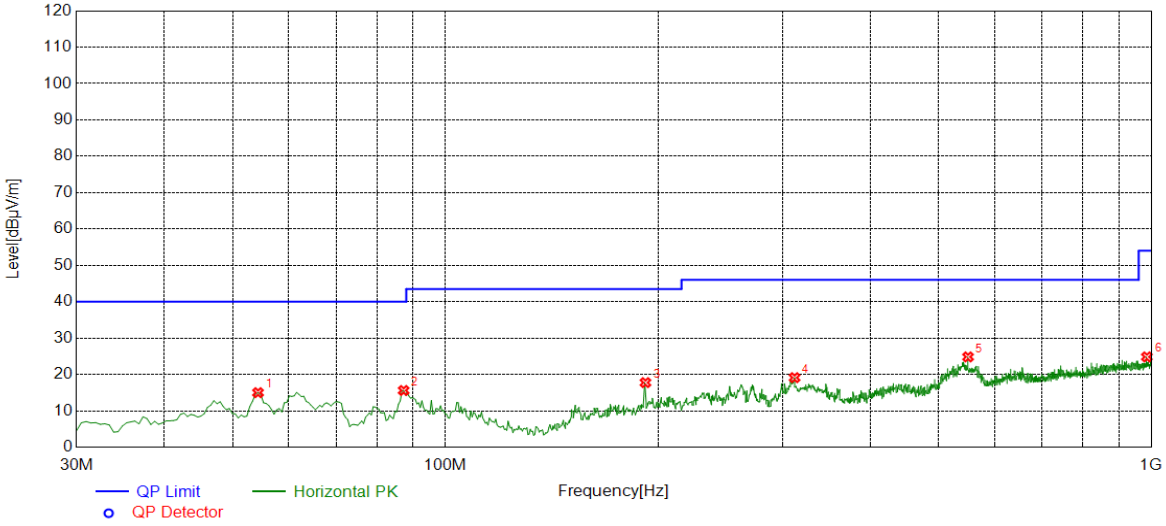
4.9.1.2 Charge + Transmitting, Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	54.2621	15.00	-30.82	40.00	25.00	133	282	Horizontal
2	87.2586	15.60	-34.09	40.00	24.40	203	69	Horizontal
3	192.071	17.76	-31.66	43.50	25.74	144	266	Horizontal
4	312.411	19.12	-27.49	46.00	26.88	224	218	Horizontal
5	550.180	24.83	-21.45	46.00	21.17	241	240	Horizontal
6	985.928	24.84	-14.04	54.00	29.16	225	306	Horizontal

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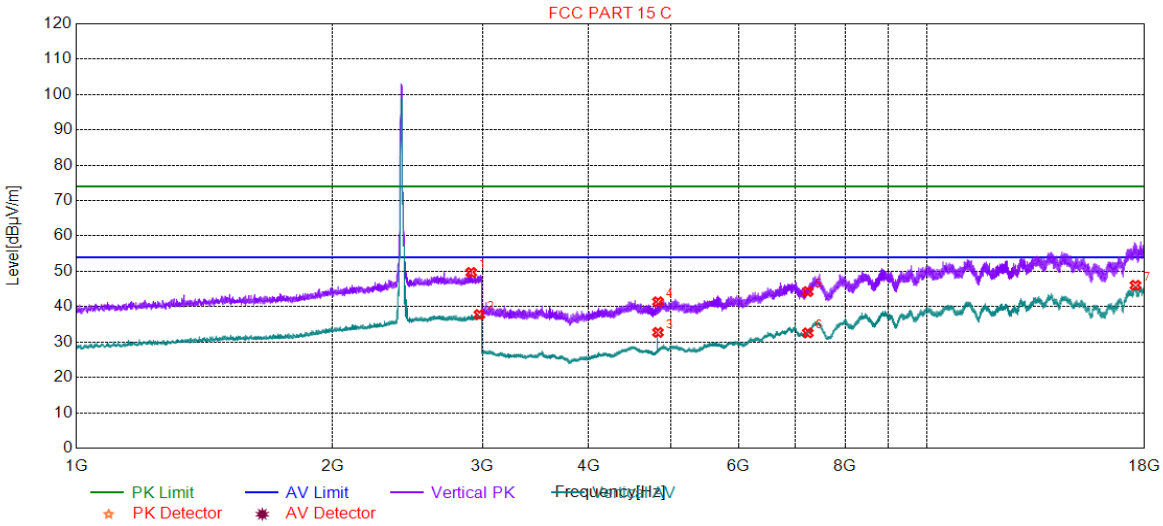
4.9.2 Transmitter emission above 1GHz

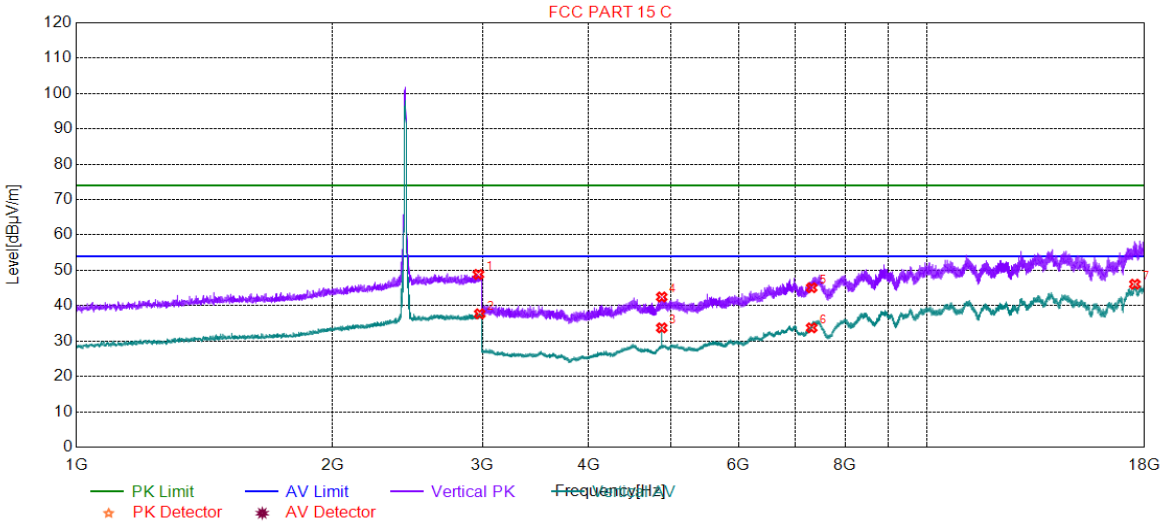
4.9.2.1 ANT1

4.9.2.1.1 802.11B_Lowest Channel_ Vertical



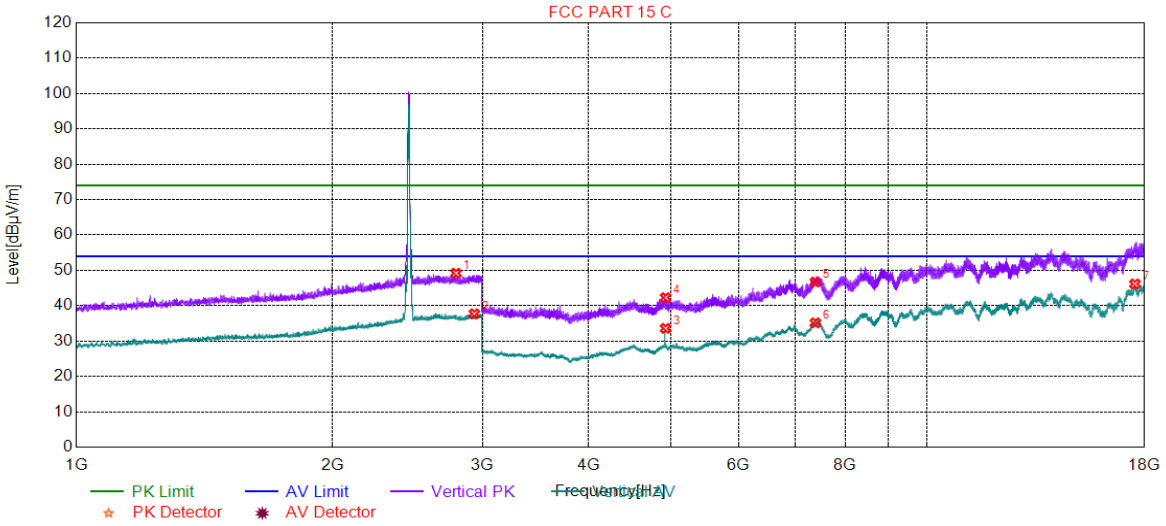
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2910.47	49.69	2.27	74.00	24.31	218	269	Vertical
2	2975.49	37.78	2.31	54.00	16.22	286	41	Vertical
3	4824.00	32.74	-20.09	54.00	21.26	235	34	Vertical
4	4824.00	41.41	-20.09	74.00	32.59	183	34	Vertical
5	7236.00	44.28	-12.40	74.00	29.72	206	115	Vertical
6	7236.00	32.60	-12.40	54.00	21.40	271	326	Vertical
7	17560.9	46.07	1.13	54.00	7.93	274	190	Vertical

4.9.2.1.2 802.11B_ Middle Channel_ Vertical



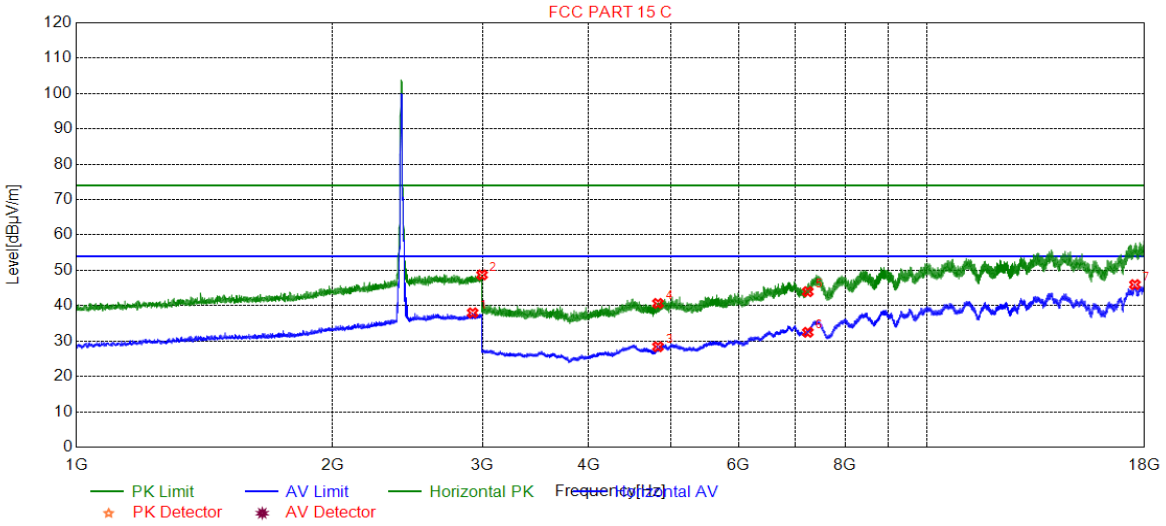
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2967.49	48.86	2.31	74.00	25.14	169	333	Vertical
2	2978.49	37.71	2.31	54.00	16.29	254	317	Vertical
3	4874.00	33.74	-19.37	54.00	20.26	183	50	Vertical
4	4874.00	42.47	-19.37	74.00	31.53	261	3	Vertical
5	7311.00	45.09	-11.50	74.00	28.91	157	342	Vertical
6	7311.00	33.74	-11.50	54.00	20.26	183	310	Vertical
7	17530.4	46.10	0.74	54.00	7.90	283	162	Vertical

4.9.2.1.3 802.11B_ Highest Channel_ Vertical



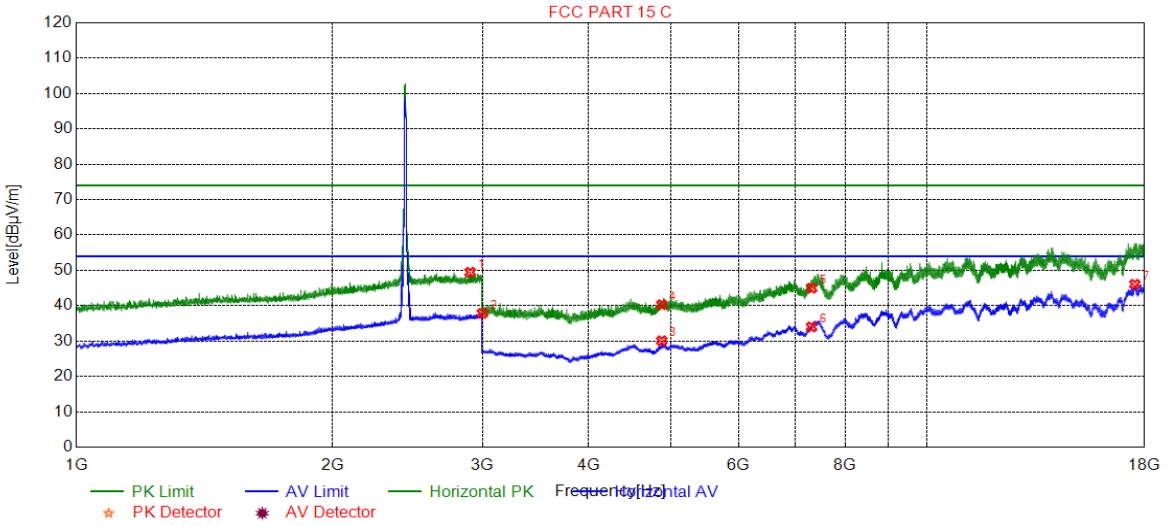
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2792.94	49.19	2.13	74.00	24.81	276	17	Vertical
2	2934.98	37.73	2.28	54.00	16.27	207	359	Vertical
3	4924.00	33.60	-18.87	54.00	20.40	202	32	Vertical
4	4924.00	42.28	-18.87	74.00	31.72	166	2	Vertical
5	7386.00	46.71	-10.72	74.00	27.29	230	310	Vertical
6	7386.00	35.15	-10.72	54.00	18.85	231	196	Vertical
7	17533.4	46.15	0.78	54.00	7.85	204	360	Vertical

4.9.2.1.4 802.11B_Lowest Channel_ Horizontal



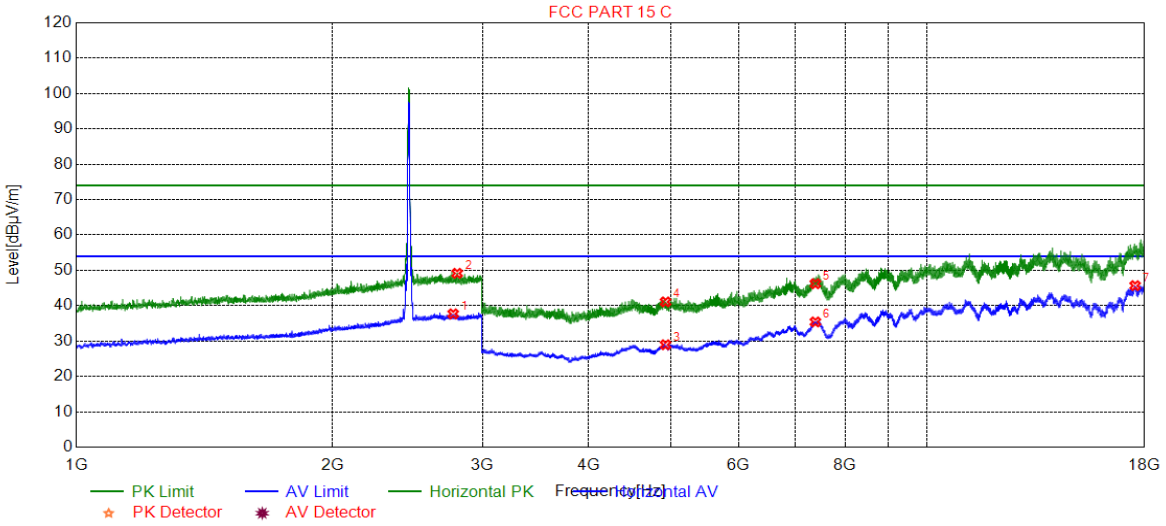
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2921.98	37.98	2.28	54.00	16.02	131	343	Horizontal
2	2996.99	48.71	2.33	74.00	25.29	131	272	Horizontal
3	4824.00	28.40	-20.09	54.00	25.60	147	35	Horizontal
4	4824.00	40.65	-20.09	74.00	33.35	185	35	Horizontal
5	7236.00	43.97	-12.40	74.00	30.03	121	67	Horizontal
6	7236.00	32.49	-12.40	54.00	21.51	242	99	Horizontal
7	17533.4	45.97	0.78	54.00	8.03	180	18	Horizontal

4.9.2.1.5 802.11B_ Middle Channel_ Horizontal



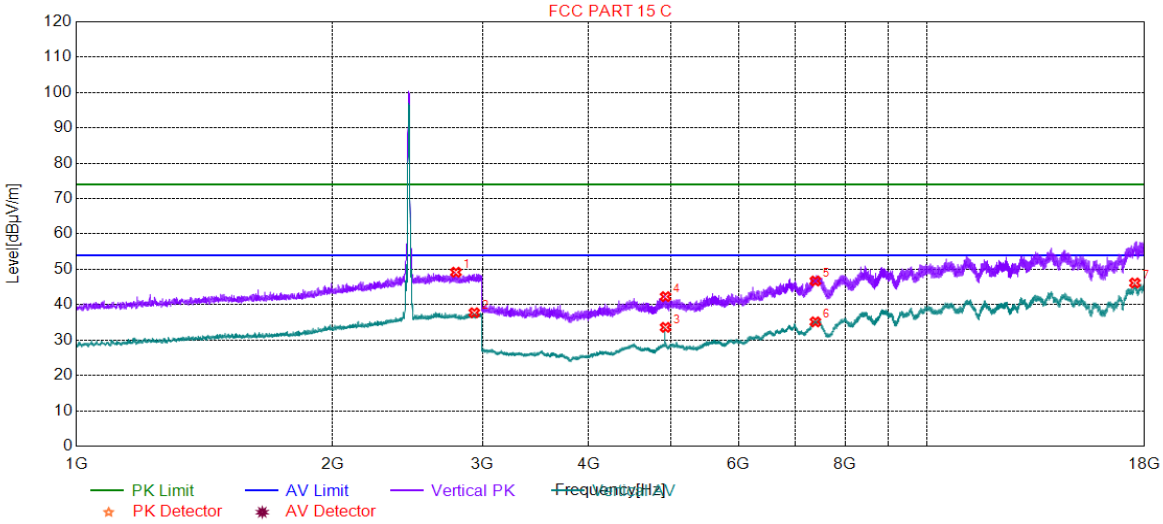
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2902.97	49.47	2.26	74.00	24.53	125	146	Horizontal
2	3000.00	37.85	2.33	54.00	16.15	139	177	Horizontal
3	4874.00	30.08	-19.37	54.00	23.92	169	48	Horizontal
4	4874.00	40.30	-19.37	74.00	33.70	194	113	Horizontal
5	7311.00	44.96	-11.50	74.00	29.04	127	244	Horizontal
6	7311.00	34.01	-11.50	54.00	19.99	203	293	Horizontal
7	17530.4	46.06	0.74	54.00	7.94	192	359	Horizontal

4.9.2.1.6 802.11B_ Highest Channel_ Horizontal



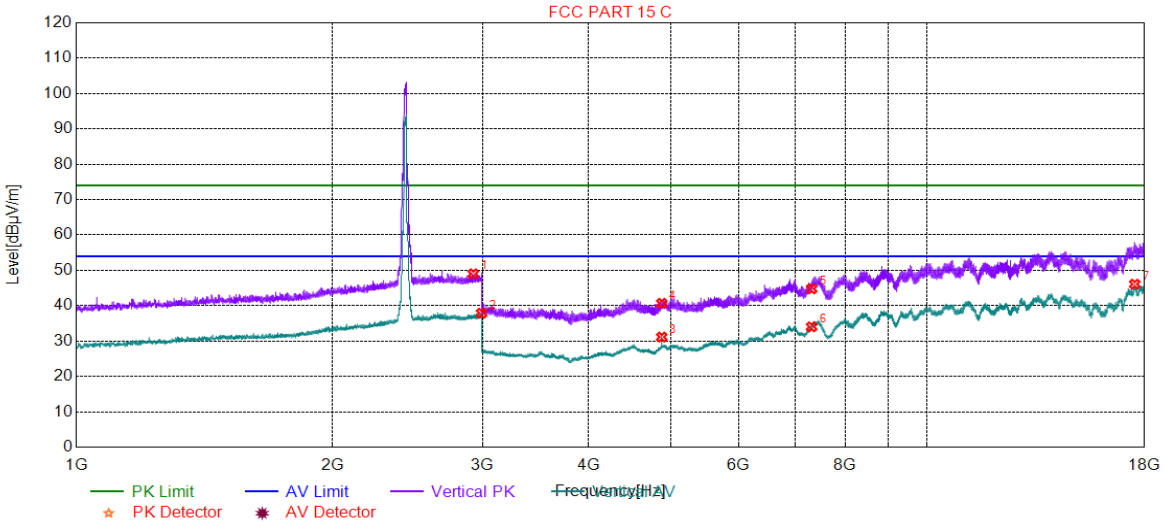
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2771.94	37.69	2.09	54.00	16.31	220	202	Horizontal
2	2801.95	49.16	2.14	74.00	24.84	223	76	Horizontal
3	4924.00	28.96	-18.87	54.00	25.04	140	33	Horizontal
4	4924.00	41.08	-18.87	74.00	32.92	159	33	Horizontal
5	7386.00	46.22	-10.72	74.00	27.78	177	243	Horizontal
6	7386.00	35.42	-10.72	54.00	18.58	128	82	Horizontal
7	17543.4	45.67	0.91	54.00	8.33	203	104	Horizontal

4.9.2.1.7 802.11G_Lowest Channel_ Vertical



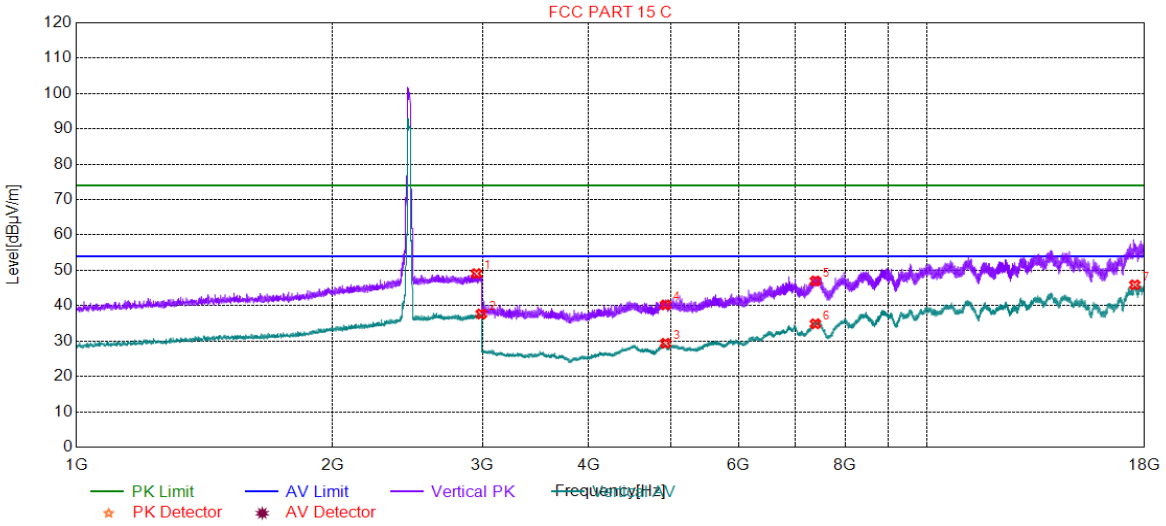
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2792.94	49.19	2.13	74.00	24.81	154	17	Vertical
2	2934.98	37.73	2.28	54.00	16.27	276	359	Vertical
3	4924.00	33.60	-18.87	54.00	20.40	292	32	Vertical
4	4924.00	42.28	-18.87	74.00	31.72	241	2	Vertical
5	7386.00	46.71	-10.72	74.00	27.29	229	310	Vertical
6	7386.00	35.15	-10.72	54.00	18.85	172	196	Vertical
7	17533.4	46.15	0.78	54.00	7.85	270	360	Vertical

4.9.2.1.8 802.11G_ Middle Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2926.98	49.02	2.28	74.00	24.98	288	41	Vertical
2	2993.99	37.88	2.33	54.00	16.12	253	41	Vertical
3	4874.00	31.15	-19.37	54.00	22.85	182	33	Vertical
4	4874.00	40.69	-19.37	74.00	33.31	182	33	Vertical
5	7311.00	44.77	-11.50	74.00	29.23	268	342	Vertical
6	7311.00	34.04	-11.50	54.00	19.96	229	342	Vertical
7	17525.4	46.09	0.68	54.00	7.91	259	190	Vertical

4.9.2.1.9 802.11G_ Highest Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2951.48	49.09	2.30	74.00	24.91	273	347	Vertical
2	2990.99	37.66	2.32	54.00	16.34	157	136	Vertical
3	4924.00	29.37	-18.87	54.00	24.63	299	5	Vertical
4	4924.00	40.23	-18.87	74.00	33.77	257	5	Vertical
5	7386.00	46.99	-10.72	74.00	27.01	259	165	Vertical
6	7386.00	34.89	-10.72	54.00	19.11	273	149	Vertical
7	17528.9	45.90	0.72	54.00	8.10	276	161	Vertical

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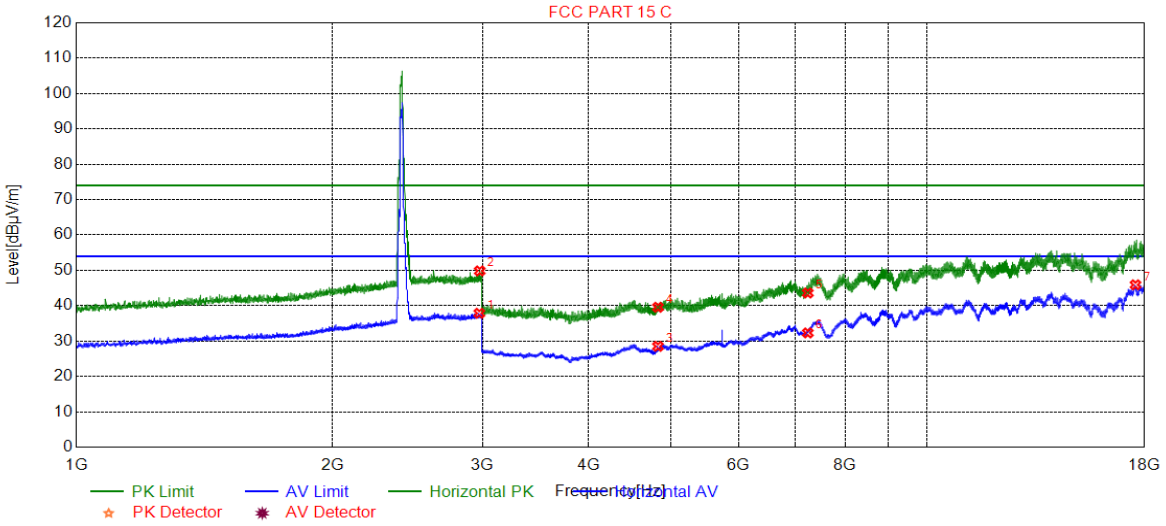
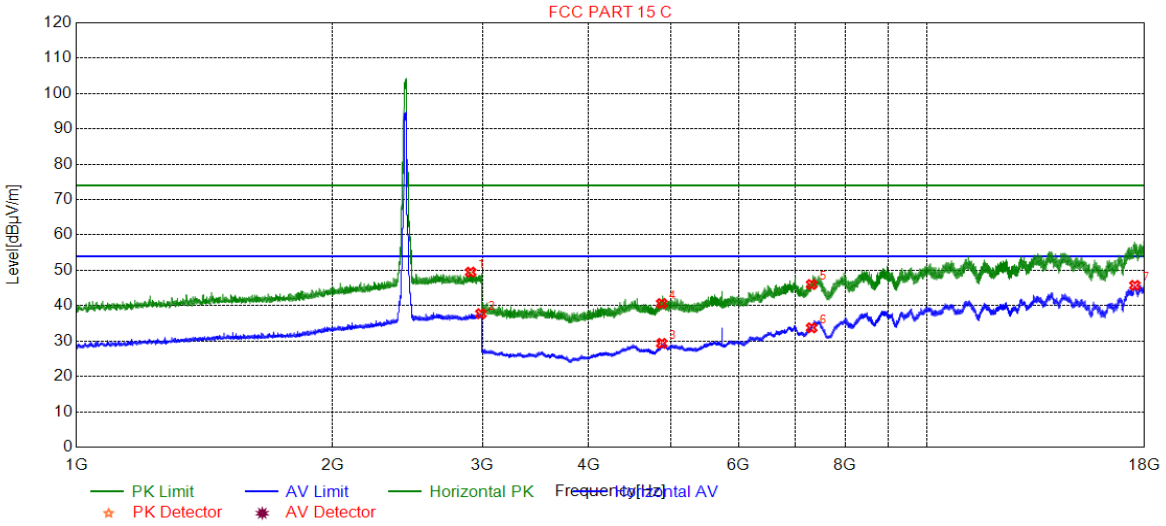
4.9.2.1.10 802.11G_Lowest Channel_ Horizontal



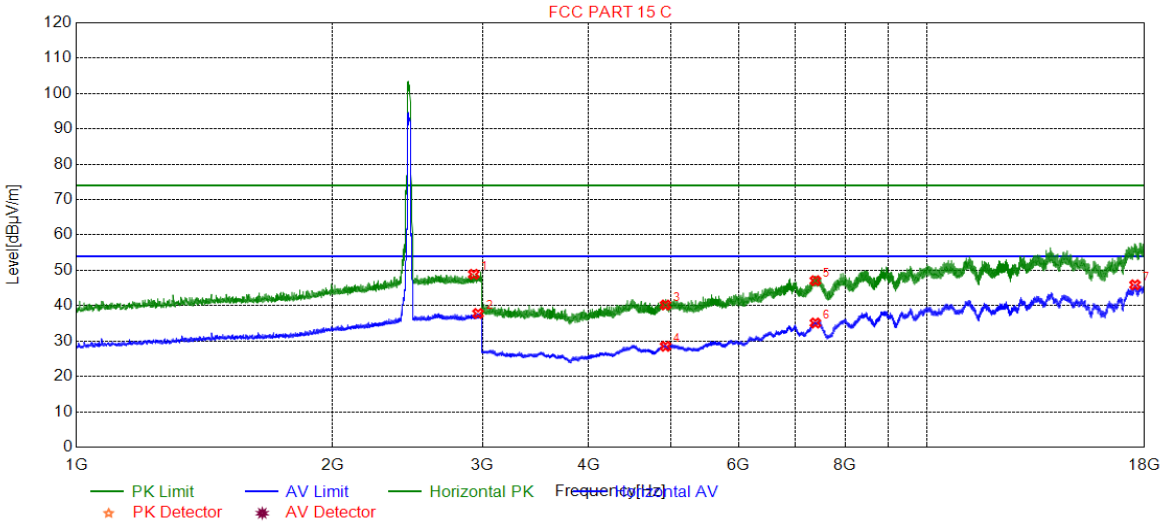
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2974.99	37.86	2.31	54.00	16.14	164	326	Horizontal
2	2978.49	49.84	2.31	74.00	24.16	203	201	Horizontal
3	4824.00	28.51	-20.09	54.00	25.49	224	33	Horizontal
4	4824.00	39.56	-20.09	74.00	34.44	229	65	Horizontal
5	7236.00	43.60	-12.40	74.00	30.40	107	130	Horizontal
6	7236.00	32.31	-12.40	54.00	21.69	155	196	Horizontal
7	17561.4	45.91	1.14	54.00	8.09	107	104	Horizontal

4.9.2.1.11 802.11G_ Middle Channel_ Horizontal



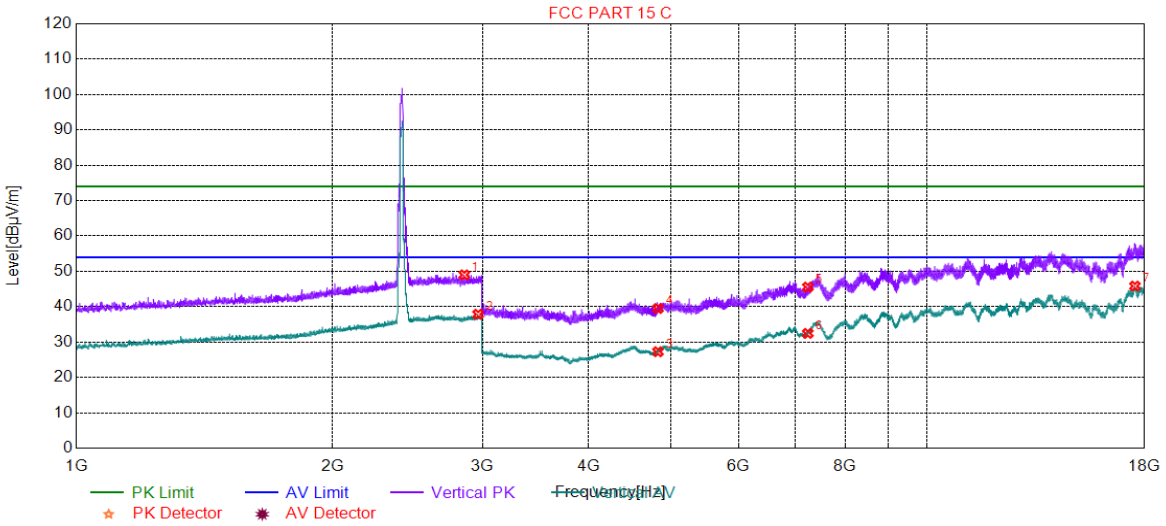
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2905.97	49.49	2.26	74.00	24.51	231	20	Horizontal
2	2987.99	37.75	2.32	54.00	16.25	193	122	Horizontal
3	4874.00	29.35	-19.37	54.00	24.65	203	26	Horizontal
4	4874.00	40.63	-19.37	74.00	33.37	193	108	Horizontal
5	7311.00	46.00	-11.50	74.00	28.00	123	212	Horizontal
6	7311.00	33.75	-11.50	54.00	20.25	228	92	Horizontal
7	17533.4	45.75	0.78	54.00	8.25	190	333	Horizontal

4.9.2.1.12 802.11G_ Highest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2930.48	48.89	2.28	74.00	25.11	112	131	Horizontal
2	2964.99	37.80	2.31	54.00	16.20	142	139	Horizontal
3	4924.00	40.21	-18.87	74.00	33.79	181	51	Horizontal
4	4924.00	28.51	-18.87	54.00	25.49	145	342	Horizontal
5	7386.00	47.08	-10.72	74.00	26.92	103	84	Horizontal
6	7386.00	35.12	-10.72	54.00	18.88	244	164	Horizontal
7	17537.4	45.91	0.83	54.00	8.09	141	333	Horizontal

4.9.2.1.13 802.11N20_Lowest Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2856.96	49.00	2.21	74.00	25.00	295	198	Vertical
2	2965.49	37.88	2.31	54.00	16.12	172	261	Vertical
3	4824.00	27.28	-20.09	54.00	26.72	187	18	Vertical
4	4824.00	39.50	-20.09	74.00	34.50	185	82	Vertical
5	7236.00	45.56	-12.40	74.00	28.44	286	164	Vertical
6	7236.00	32.47	-12.40	54.00	21.53	210	66	Vertical
7	17534.4	45.83	0.79	54.00	8.17	158	18	Vertical

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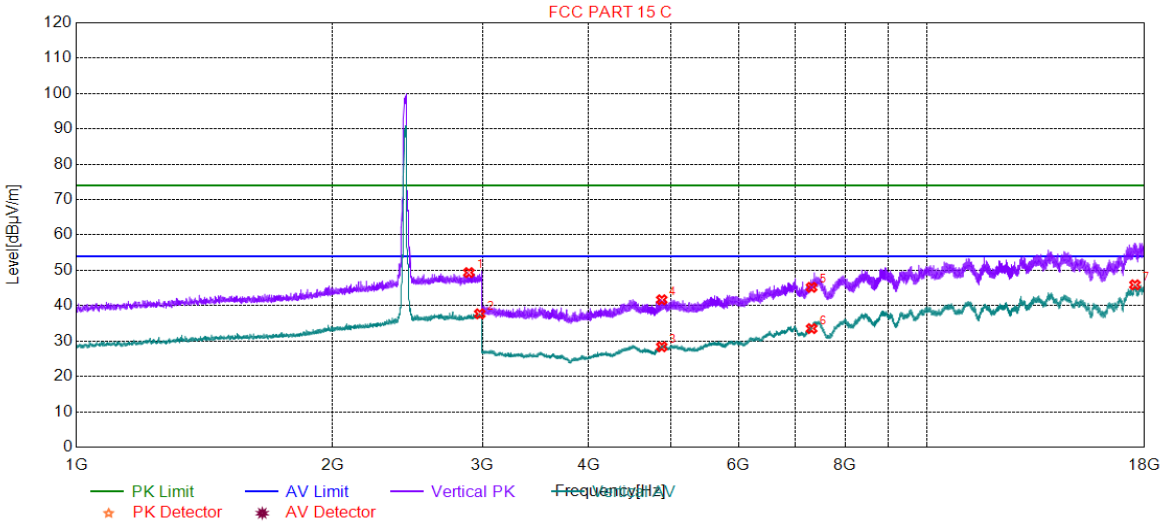
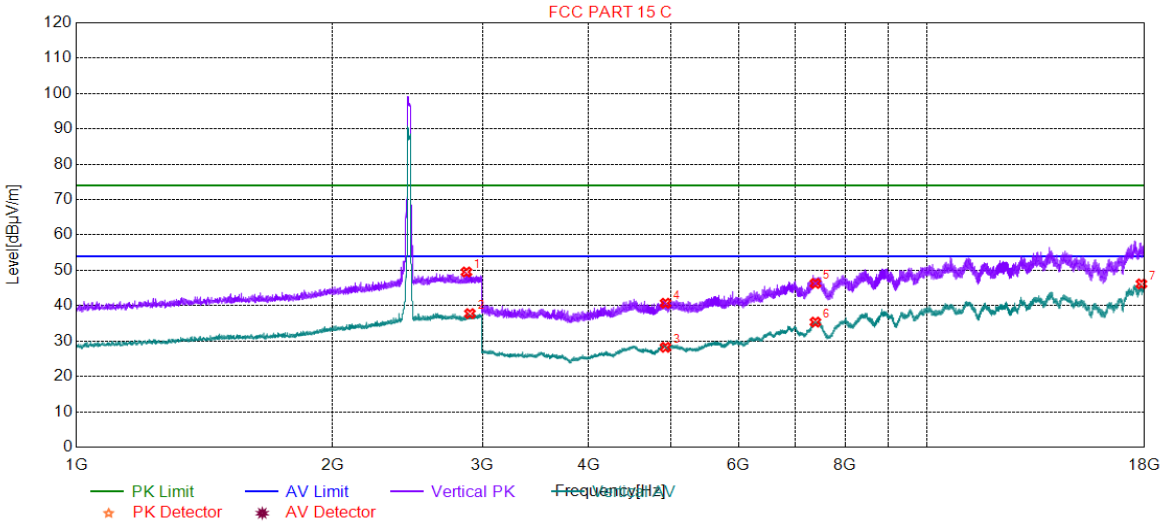
4.9.2.1.14 802.11N20_ Middle Channel_ Vertical



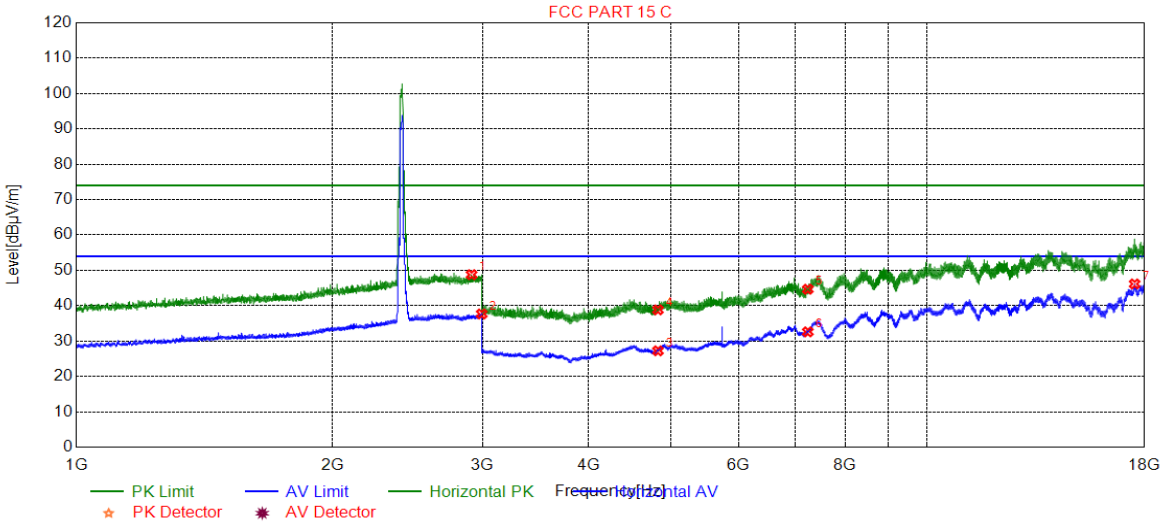
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2892.47	49.37	2.25	74.00	24.63	257	80	Vertical
2	2978.99	37.71	2.32	54.00	16.29	264	333	Vertical
3	4874.00	28.40	-19.37	54.00	25.60	272	114	Vertical
4	4874.00	41.68	-19.37	74.00	32.32	206	16	Vertical
5	7311.00	45.20	-11.50	74.00	28.80	158	326	Vertical
6	7311.00	33.53	-11.50	54.00	20.47	166	98	Vertical
7	17535.4	45.91	0.80	54.00	8.09	259	276	Vertical

4.9.2.1.15 802.11N20_ Highest Channel_ Vertical



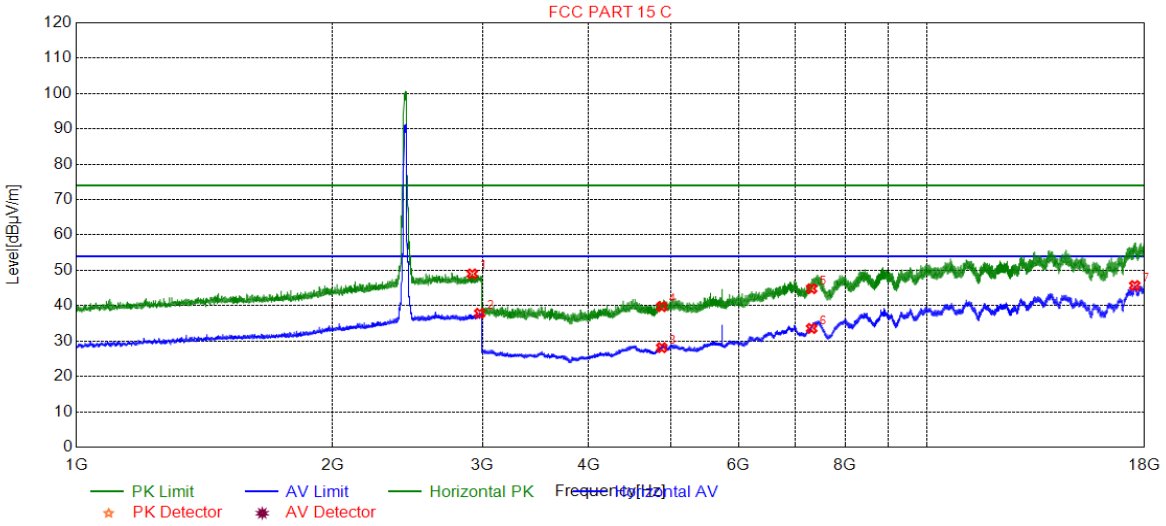
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2873.46	49.54	2.23	74.00	24.46	198	221	Vertical
2	2900.47	37.77	2.26	54.00	16.23	208	64	Vertical
3	4924.00	28.24	-18.87	54.00	25.76	211	51	Vertical
4	4924.00	40.71	-18.87	74.00	33.29	159	51	Vertical
5	7386.00	46.30	-10.72	74.00	27.70	218	326	Vertical
6	7386.00	35.37	-10.72	54.00	18.63	167	19	Vertical
7	17844.9	46.17	-0.92	54.00	7.83	267	161	Vertical

4.9.2.1.16 802.11N20_Lowest Channel_ Horizontal



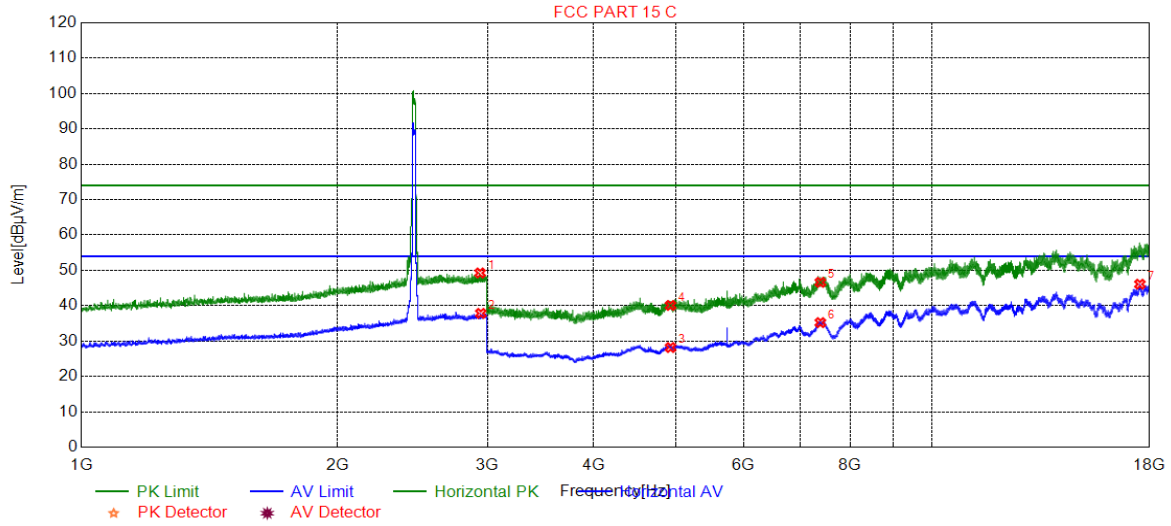
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2913.47	48.78	2.27	74.00	25.22	203	240	Horizontal
2	2994.49	37.67	2.33	54.00	16.33	153	0	Horizontal
3	4824.00	27.24	-20.09	54.00	26.76	241	197	Horizontal
4	4824.00	38.83	-20.09	74.00	35.17	121	148	Horizontal
5	7236.00	44.67	-12.40	74.00	29.33	181	83	Horizontal
6	7236.00	32.61	-12.40	54.00	21.39	221	342	Horizontal
7	17520.9	46.16	0.62	54.00	7.84	198	18	Horizontal

4.9.2.1.17 802.11N20_ Middle Channel_ Horizontal



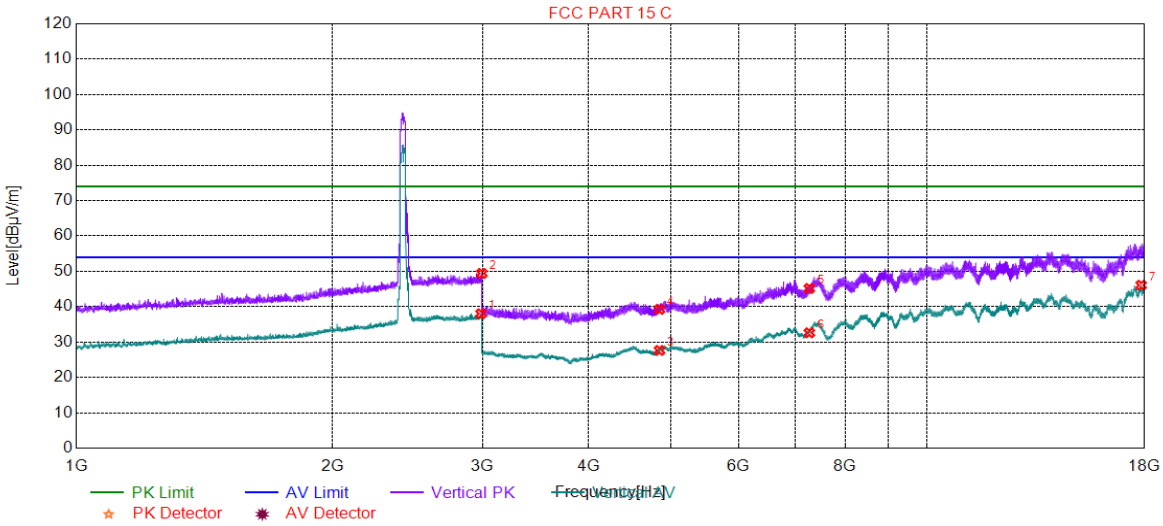
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2918.97	49.01	2.27	74.00	24.99	209	232	Horizontal
2	2978.49	37.86	2.31	54.00	16.14	158	1	Horizontal
3	4874.00	28.14	-19.37	54.00	25.86	112	163	Horizontal
4	4874.00	39.75	-19.37	74.00	34.25	172	34	Horizontal
5	7311.00	44.82	-11.50	74.00	29.18	232	278	Horizontal
6	7311.00	33.57	-11.50	54.00	20.43	223	3	Horizontal
7	17526.4	45.70	0.69	54.00	8.30	211	358	Horizontal

4.9.2.1.18 802.11N20_ Highest Channel_ Horizontal



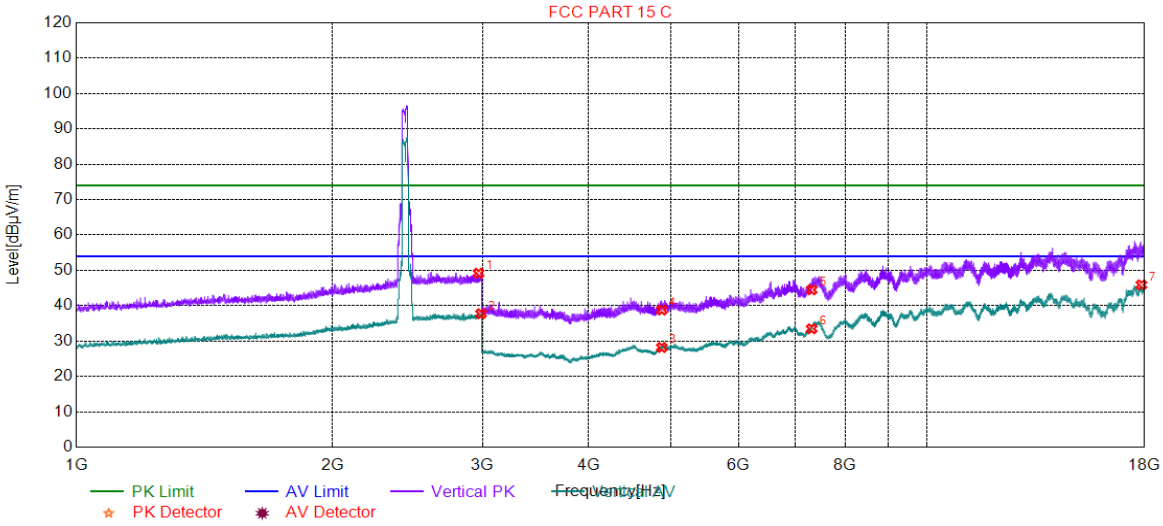
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2941.48	49.26	2.29	74.00	24.74	218	29	Horizontal
2	2946.98	37.84	2.29	54.00	16.16	170	108	Horizontal
3	4924.00	28.18	-18.87	54.00	25.82	189	115	Horizontal
4	4924.00	40.08	-18.87	74.00	33.92	127	293	Horizontal
5	7386.00	46.61	-10.72	74.00	27.39	233	18	Horizontal
6	7386.00	35.22	-10.72	54.00	18.78	181	99	Horizontal
7	17534.4	46.09	0.79	54.00	7.91	199	18	Horizontal

4.9.2.1.19 802.11N40_Lowest Channel_ Vertical



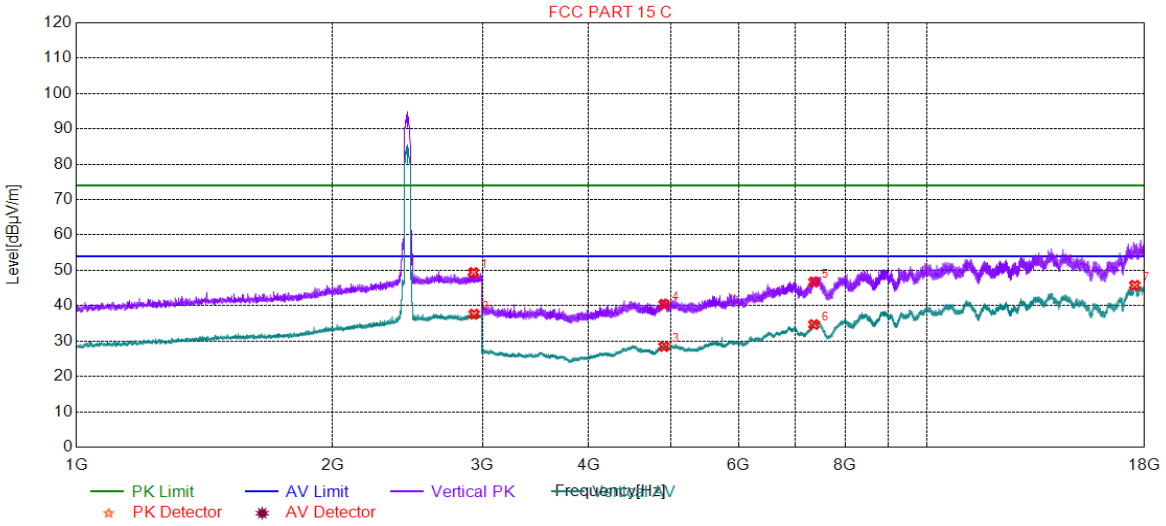
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2988.99	38.03	2.32	54.00	15.97	227	167	Vertical
2	2995.49	49.41	2.33	74.00	24.59	202	17	Vertical
3	4844.00	27.65	-19.80	54.00	26.35	193	148	Vertical
4	4844.00	39.25	-19.80	74.00	34.75	159	35	Vertical
5	7266.00	45.18	-12.03	74.00	28.82	224	310	Vertical
6	7266.00	32.63	-12.03	54.00	21.37	287	68	Vertical
7	17834.9	46.09	-0.89	54.00	7.91	168	248	Vertical

4.9.2.1.20 802.11N40_ Middle Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2968.99	49.19	2.31	74.00	24.81	276	349	Vertical
2	2988.49	37.74	2.32	54.00	16.26	207	262	Vertical
3	4874.00	28.20	-19.37	54.00	25.80	202	99	Vertical
4	4874.00	38.79	-19.37	74.00	35.21	166	326	Vertical
5	7311.00	44.49	-11.50	74.00	29.51	230	34	Vertical
6	7311.00	33.47	-11.50	54.00	20.53	231	116	Vertical
7	17845.4	45.91	-0.92	54.00	8.09	204	333	Vertical

4.9.2.1.21 802.11N40_ Highest Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2927.98	49.39	2.28	74.00	24.61	155	167	Vertical
2	2933.48	37.63	2.28	54.00	16.37	151	49	Vertical
3	4904.00	28.46	-18.98	54.00	25.54	233	277	Vertical
4	4904.00	40.40	-18.98	74.00	33.60	296	18	Vertical
5	7356.00	46.73	-11.03	74.00	27.27	246	83	Vertical
6	7356.00	34.68	-11.03	54.00	19.32	292	99	Vertical
7	17525.9	45.78	0.68	54.00	8.22	230	360	Vertical

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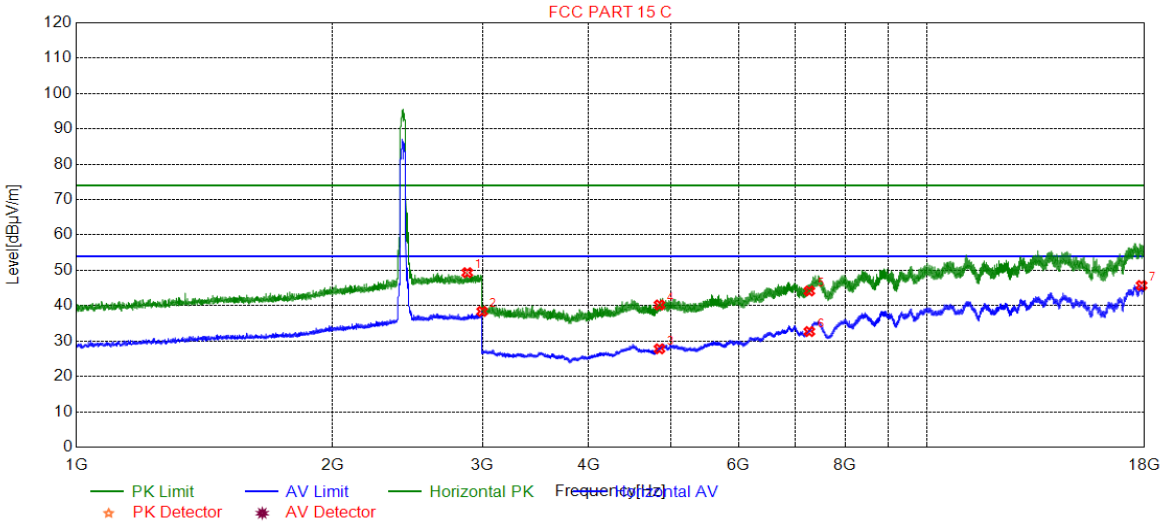
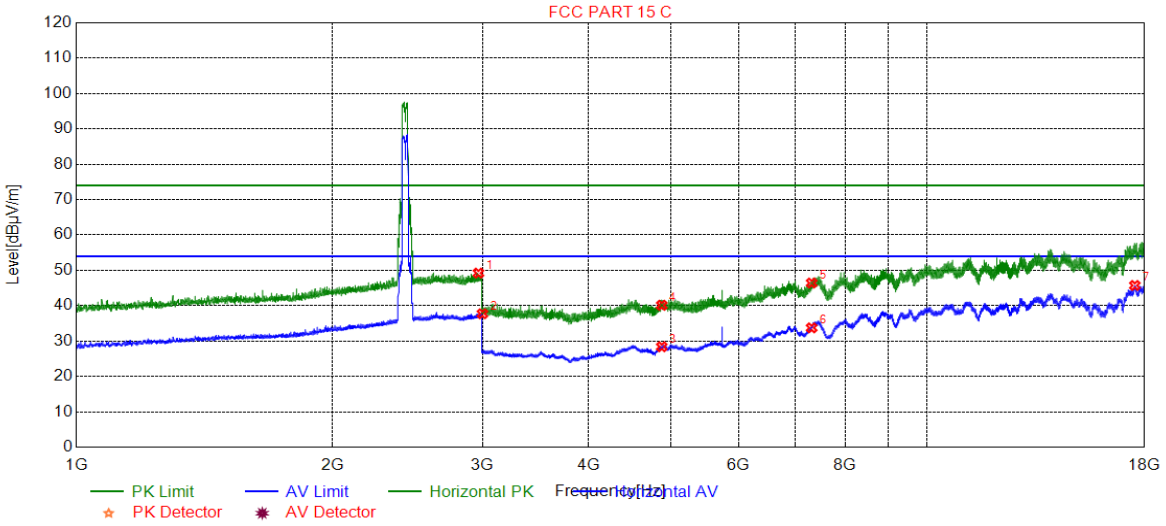
4.9.2.1.22 802.11N40_Lowest Channel_ Horizontal



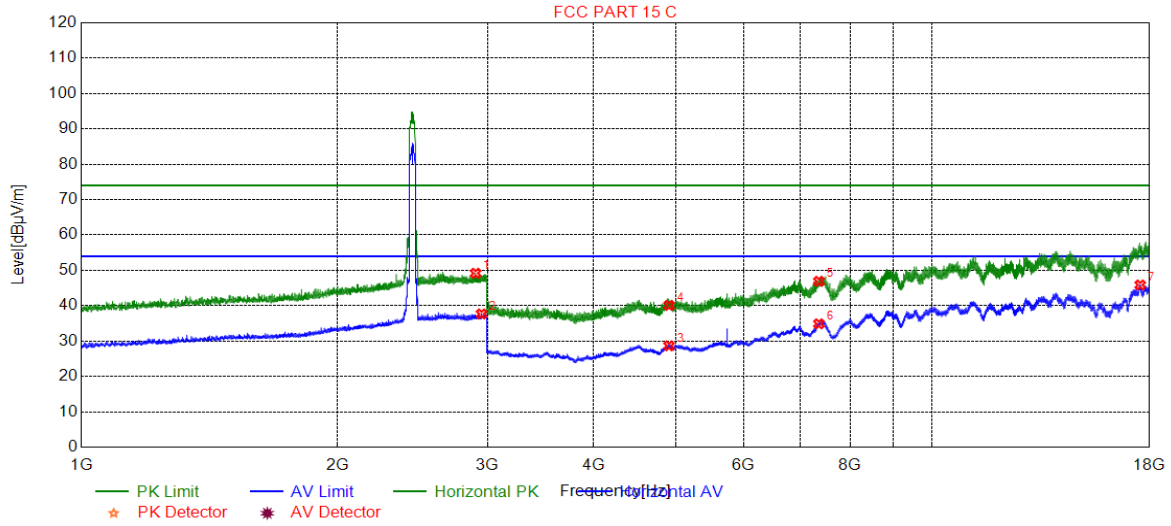
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2879.46	49.35	2.24	74.00	24.65	174	0	Horizontal
2	2997.99	38.39	2.33	54.00	15.61	123	162	Horizontal
3	4844.00	27.81	-19.80	54.00	26.19	100	195	Horizontal
4	4844.00	40.22	-19.80	74.00	33.78	130	212	Horizontal
5	7266.00	44.18	-12.03	74.00	29.82	216	309	Horizontal
6	7266.00	32.70	-12.03	54.00	21.30	117	33	Horizontal
7	17851.9	45.73	-0.95	54.00	8.27	248	104	Horizontal

4.9.2.1.23 802.11N40_ Middle Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2967.99	49.23	2.31	74.00	24.77	192	90	Horizontal
2	3000.00	37.73	2.33	54.00	16.27	192	240	Horizontal
3	4874.00	28.40	-19.37	54.00	25.60	218	132	Horizontal
4	4874.00	40.13	-19.37	74.00	33.87	184	304	Horizontal
5	7311.00	46.42	-11.50	74.00	27.58	205	132	Horizontal
6	7311.00	33.74	-11.50	54.00	20.26	210	242	Horizontal
7	17529.4	45.73	0.73	54.00	8.27	231	334	Horizontal

4.9.2.1.24 802.11N40_ Highest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2905.97	49.18	2.26	74.00	24.82	201	162	Horizontal
2	2952.98	37.68	2.30	54.00	16.32	237	122	Horizontal
3	4904.00	28.66	-18.98	54.00	25.34	197	98	Horizontal
4	4904.00	40.10	-18.98	74.00	33.90	122	342	Horizontal
5	7356.00	46.91	-11.03	74.00	27.09	217	147	Horizontal
6	7356.00	34.89	-11.03	54.00	19.11	233	6	Horizontal
7	17547.9	45.87	0.96	54.00	8.13	174	191	Horizontal

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

   Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

2) Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz and 18GHz to 25GHz was very low, and the above harmonics were the highest point could be found when testing, The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3）As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

4）All Modes have been tested, but only the worst case data displayed in this report.

4.10 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205		
Test Method:	ANSI C63.10: 2013 Section 11.12		
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)		
Limit:	Frequency	Limit (dBuV/m @3m)	Remark
	30MHz-88MHz	40.0	Quasi-peak Value
	88MHz-216MHz	43.5	Quasi-peak Value
	216MHz-960MHz	46.0	Quasi-peak Value
	960MHz-1GHz	54.0	Quasi-peak Value
	Above 1GHz	54.0	Average Value
		74.0	Peak Value
Test Setup:			

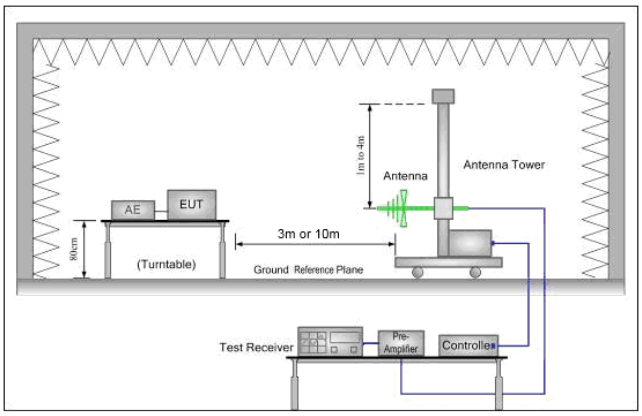


Figure 1. 30MHz to 1GHz

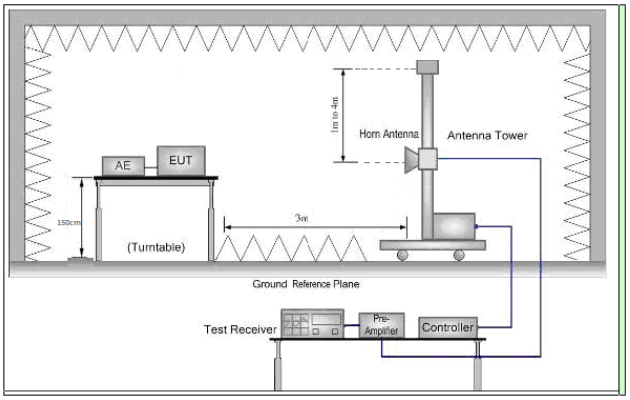


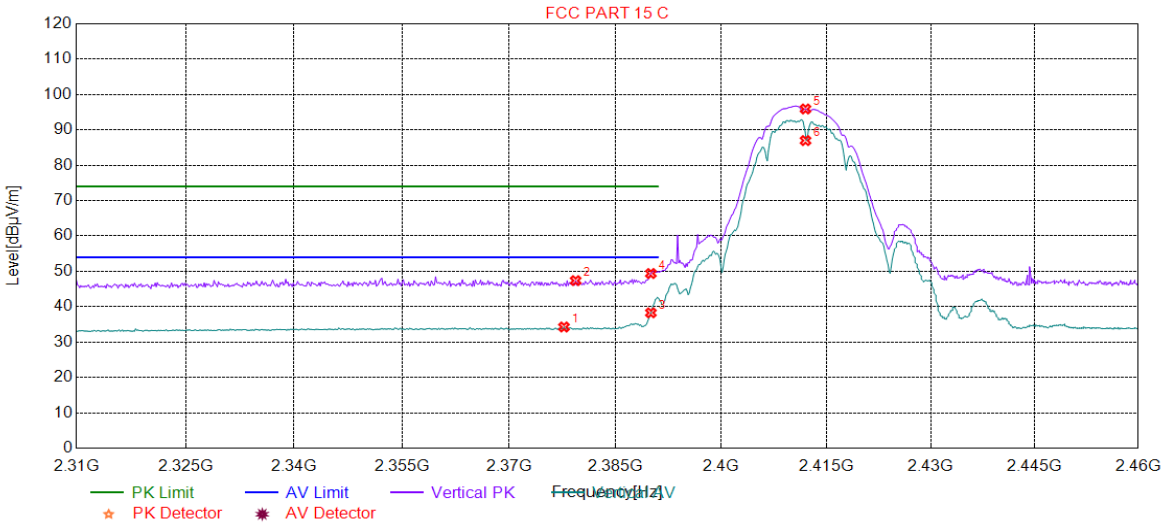
Figure 2. Above 1 GHz

Test Procedure:	a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. g. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel h. Test the EUT in the lowest channel , the Highest channel i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode,And found the X axis positioning which it is worse case. j. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Charge + Transmitting mode.
Final Test Mode:	Pretest the EUT at Charge +Transmitting mode. Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; 6.5Mbps of rate is the worst case of 802.11N(HT20); 13.5Mbps of rate is the worst case of 802.11N(HT40). Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

Test plot as follows:

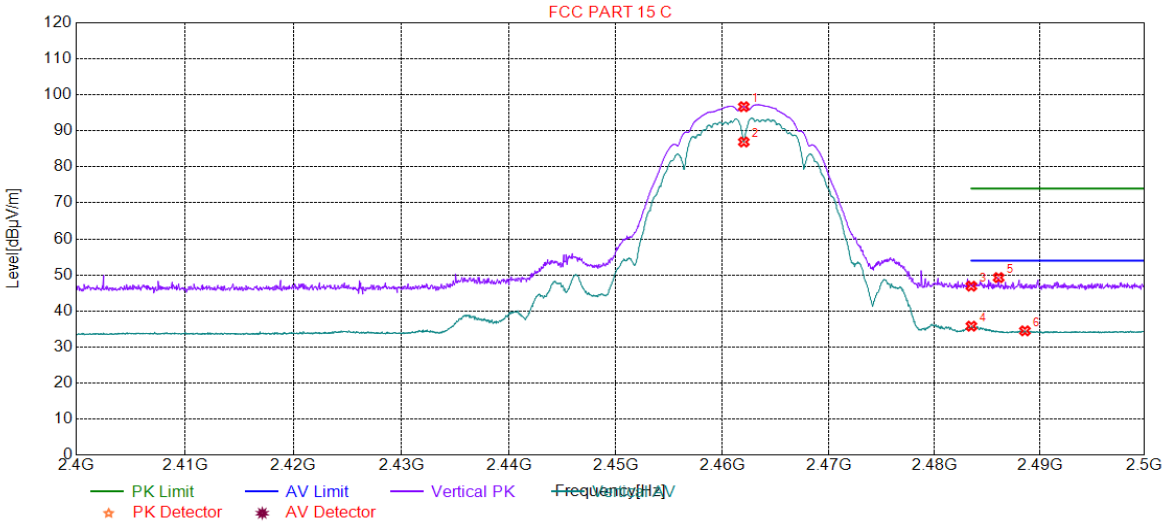
4.10.1 ANT1

4.10.1.1 802.11B_Lowest Channel_ Vertical



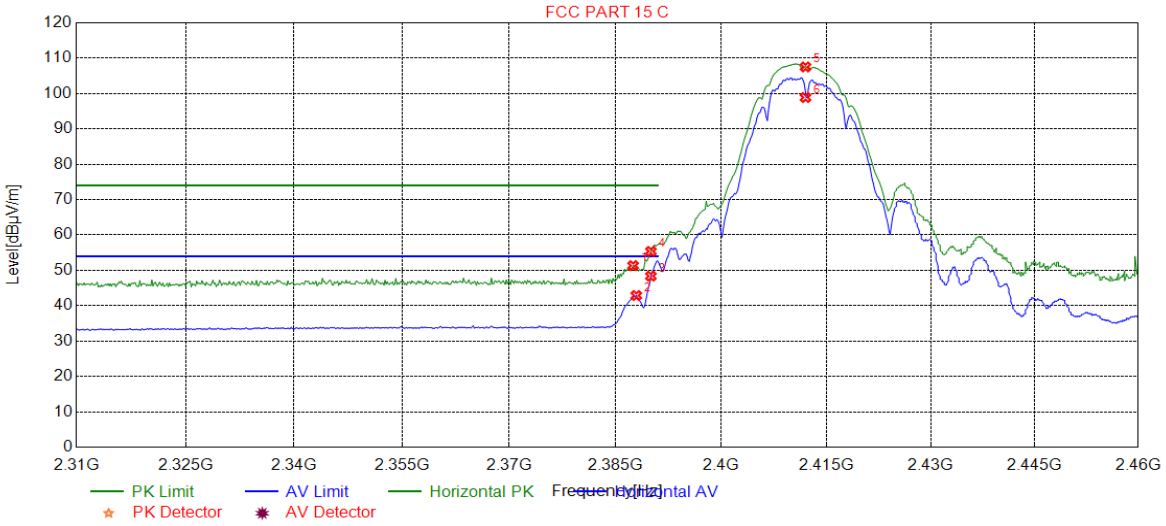
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2377.71	34.27	7.78	54.00	19.73	211	346	Vertical
2	2379.36	47.38	7.78	74.00	26.62	243	234	Vertical
3	2390.00	38.28	7.77	54.00	15.72	298	44	Vertical
4	2390.00	49.39	7.77	74.00	24.61	177	322	Vertical
5	2412.00	95.92	7.81	0.00	-95.92	170	44	Vertical
6	2412.00	86.98	7.81	0.00	-86.98	293	346	Vertical

4.10.1.2 802.11B_ Highest Channel_ Vertical



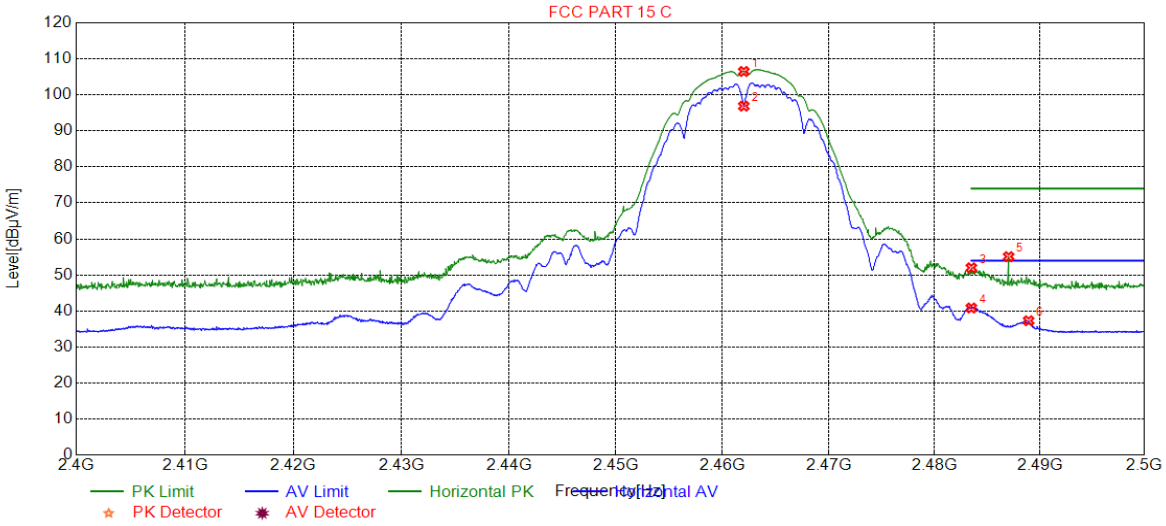
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	96.71	7.98	0.00	-96.71	220	278	Vertical
2	2462.00	86.91	7.98	0.00	-86.91	224	278	Vertical
3	2483.50	46.89	8.01	74.00	27.11	215	128	Vertical
4	2483.50	35.79	8.01	54.00	18.21	214	278	Vertical
5	2486.09	49.27	8.01	74.00	24.73	183	178	Vertical
6	2488.59	34.48	8.02	54.00	19.52	263	35	Vertical

4.10.1.3 802.11B_Lowest Channel_ Horizontal



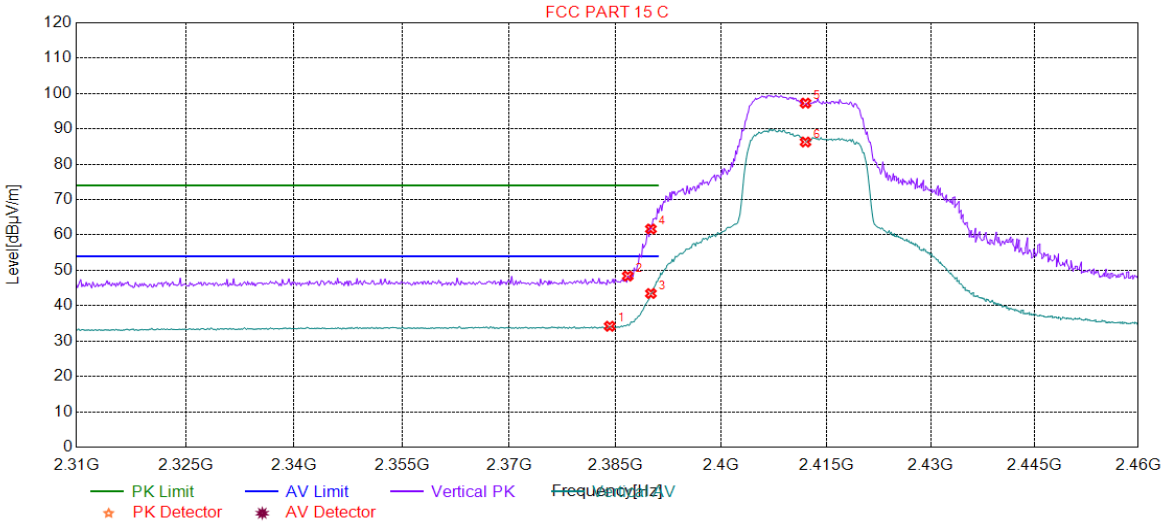
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2387.47	51.33	7.77	74.00	22.67	137	261	Horizontal
2	2387.92	42.88	7.77	54.00	11.12	201	223	Horizontal
3	2390.00	48.37	7.77	54.00	5.63	135	220	Horizontal
4	2390.00	55.37	7.77	74.00	18.63	121	220	Horizontal
5	2412.00	107.52	7.81	0.00	-107.52	245	257	Horizontal
6	2412.00	98.88	7.81	0.00	-98.88	164	223	Horizontal

4.10.1.4 802.11B_ Highest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	106.49	7.98	0.00	-106.49	203	292	Horizontal
2	2462.00	96.86	7.98	0.00	-96.86	123	298	Horizontal
3	2483.50	51.99	8.01	74.00	22.01	203	292	Horizontal
4	2483.50	40.83	8.01	54.00	13.17	195	298	Horizontal
5	2487.04	55.08	8.01	74.00	18.92	143	37	Horizontal
6	2488.94	37.29	8.02	54.00	16.71	193	287	Horizontal

4.10.1.5 802.11G_Lowest Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2384.17	34.19	7.78	54.00	19.81	203	273	Vertical
2	2386.72	48.40	7.77	74.00	25.60	123	273	Vertical
3	2390.00	43.46	7.77	54.00	10.54	203	273	Vertical
4	2390.00	61.69	7.77	74.00	12.31	195	240	Vertical
5	2412.00	97.28	7.81	0.00	-97.28	143	273	Vertical
6	2412.00	86.29	7.81	0.00	-86.29	193	273	Vertical

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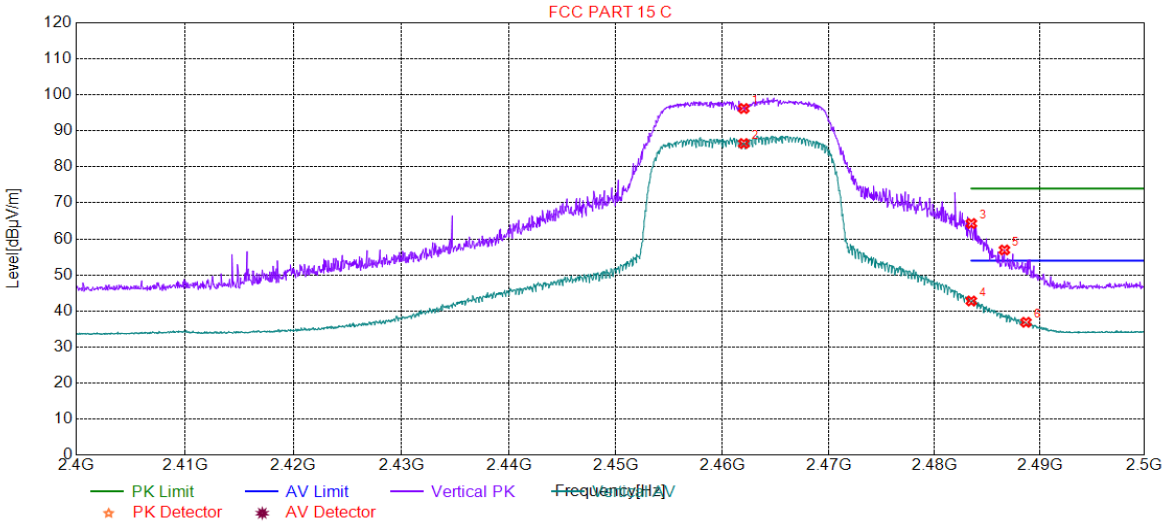
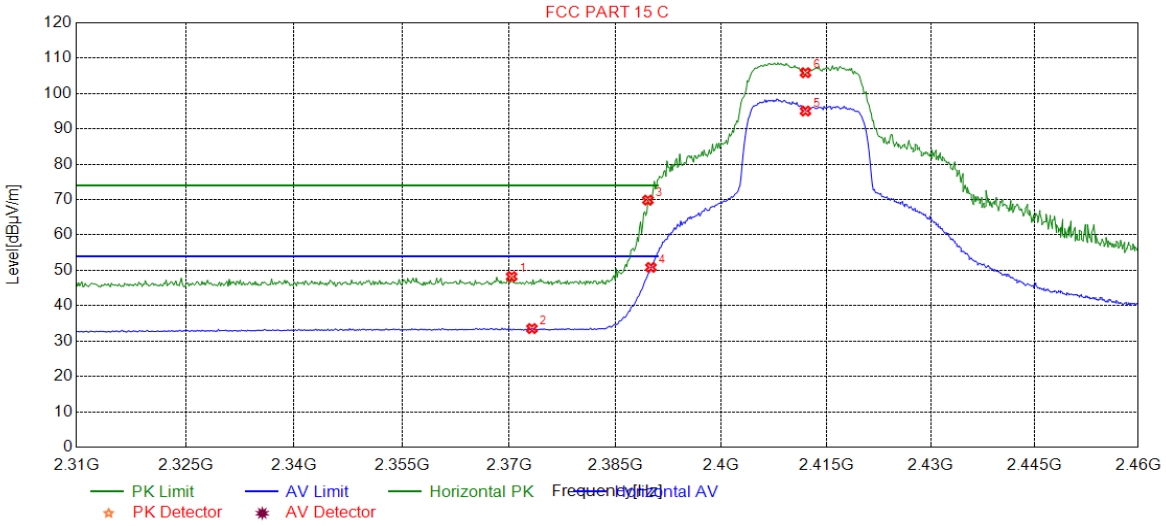
4.10.1.6 802.11G_ Highest Channel_ Vertical



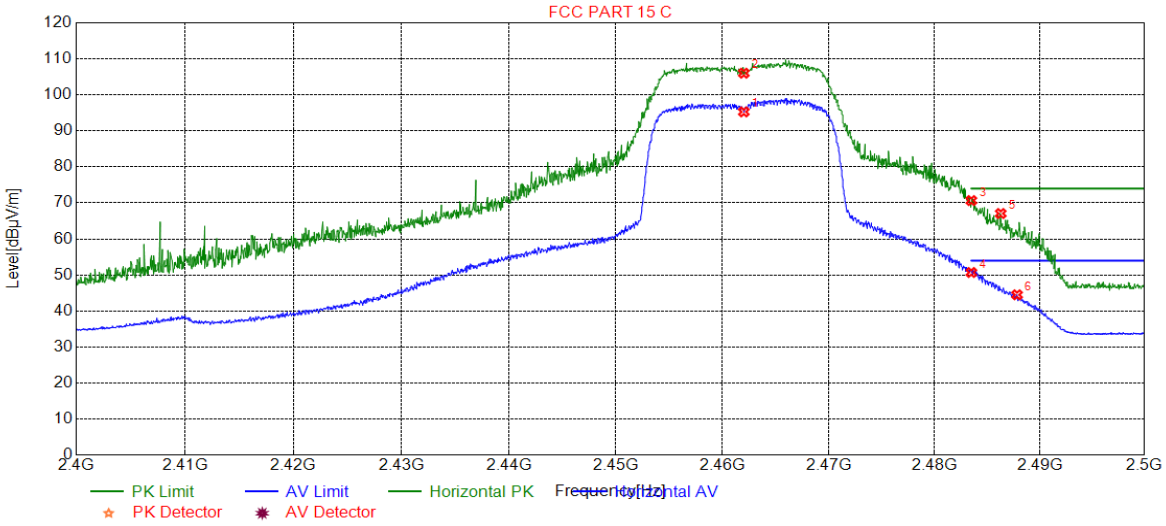
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	96.20	7.98	0.00	-96.20	259	233	Vertical
2	2462.00	86.49	7.98	0.00	-86.49	299	233	Vertical
3	2483.50	64.28	8.01	74.00	9.72	179	252	Vertical
4	2483.50	42.78	8.01	54.00	11.22	266	258	Vertical
5	2486.64	56.94	8.01	74.00	17.06	214	258	Vertical
6	2488.69	36.87	8.02	54.00	17.13	187	258	Vertical

4.10.1.7 802.11G_Lowest Channel_ Horizontal



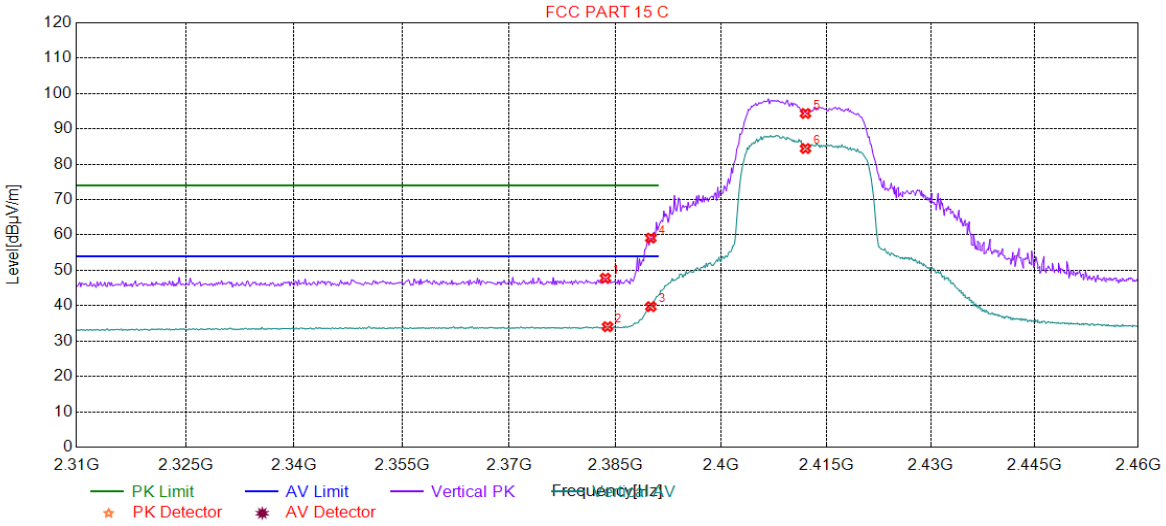
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2370.36	48.24	7.79	74.00	25.76	218	323	Horizontal
2	2373.21	33.54	7.79	54.00	20.46	121	302	Horizontal
3	2389.57	69.86	7.77	74.00	4.14	133	302	Horizontal
4	2390.00	50.84	7.77	54.00	3.16	178	302	Horizontal
5	2412.00	95.05	7.81	0.00	-95.05	215	302	Horizontal
6	2412.00	105.88	7.81	0.00	-105.88	214	331	Horizontal

4.10.1.8 802.11G_ Highest Channel_ Horizontal



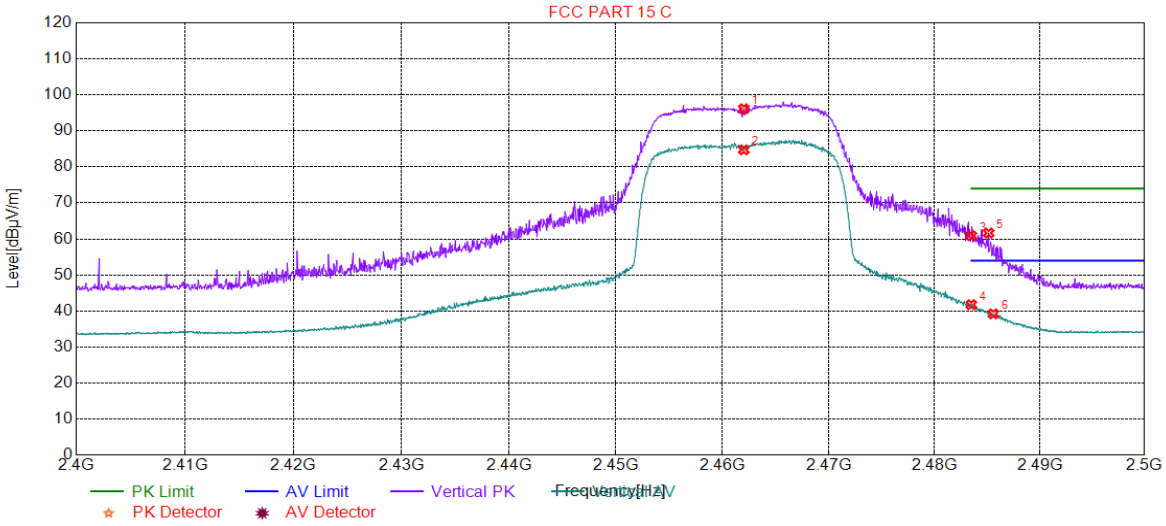
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	95.27	7.98	0.00	-95.27	124	287	Horizontal
2	2462.00	106.01	7.98	0.00	-106.01	152	308	Horizontal
3	2483.50	70.65	8.01	74.00	3.35	211	303	Horizontal
4	2483.50	50.69	8.01	54.00	3.31	124	308	Horizontal
5	2486.29	67.06	8.01	74.00	6.94	107	303	Horizontal
6	2487.84	44.50	8.02	54.00	9.50	206	308	Horizontal

4.10.1.9 802.11N20_Lowest Channel_ Vertical



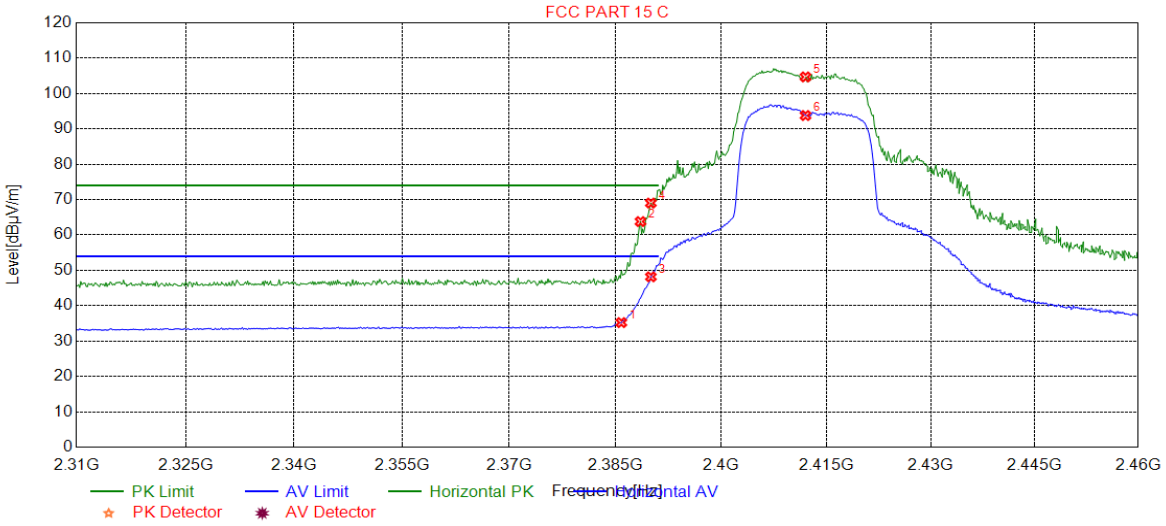
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2383.57	47.79	7.78	74.00	26.21	280	94	Vertical
2	2383.87	34.07	7.78	54.00	19.93	212	112	Vertical
3	2390.00	39.75	7.77	54.00	14.25	198	208	Vertical
4	2390.00	59.14	7.77	74.00	14.86	158	274	Vertical
5	2412.00	94.36	7.81	0.00	-94.36	294	193	Vertical
6	2412.00	84.46	7.81	0.00	-84.46	223	214	Vertical

4.10.1.10 802.11N20_ Highest Channel_ Vertical



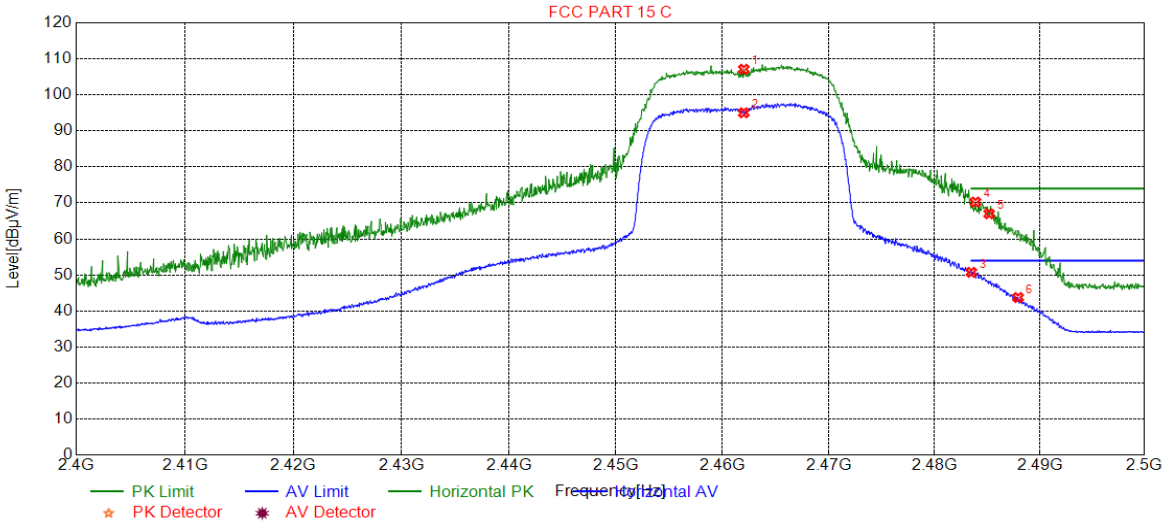
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	96.14	7.98	0.00	-96.14	223	215	Vertical
2	2462.00	84.74	7.98	0.00	-84.74	287	215	Vertical
3	2483.50	60.85	8.01	74.00	13.15	257	23	Vertical
4	2483.50	41.76	8.01	54.00	12.24	183	132	Vertical
5	2485.14	61.65	8.01	74.00	12.35	162	185	Vertical
6	2485.59	39.21	8.01	54.00	14.79	268	132	Vertical

4.10.1.11 802.11N20_Lowest Channel_ Horizontal



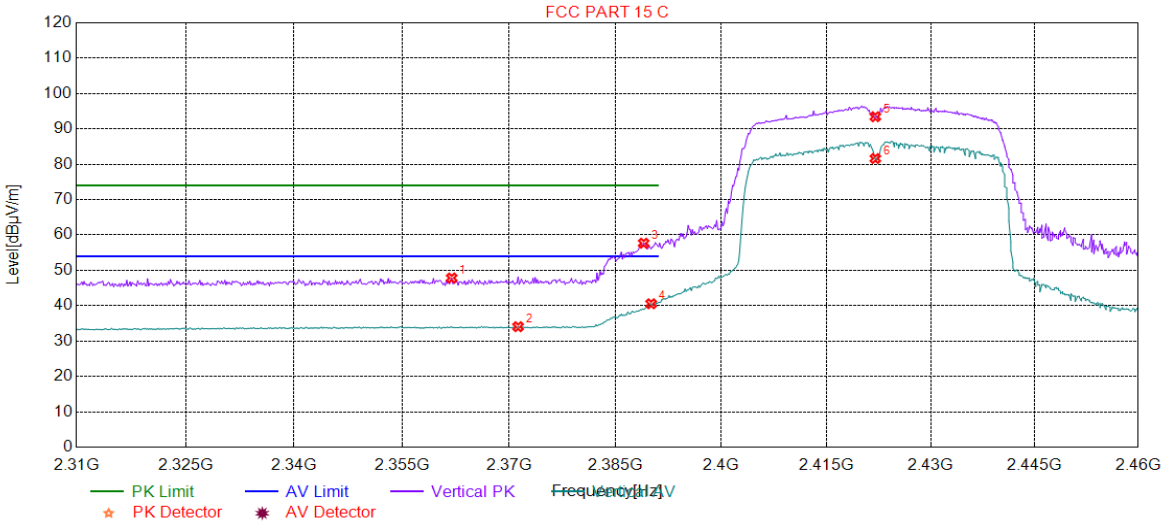
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2385.82	35.23	7.77	54.00	18.77	219	347	Horizontal
2	2388.52	63.80	7.77	74.00	10.20	194	315	Horizontal
3	2390.00	48.17	7.77	54.00	5.83	185	315	Horizontal
4	2390.00	69.03	7.77	74.00	4.97	203	299	Horizontal
5	2412.00	104.69	7.81	0.00	-104.69	193	315	Horizontal
6	2412.00	93.78	7.81	0.00	-93.78	163	347	Horizontal

4.10.1.12 802.11N20_ Highest Channel_ Horizontal



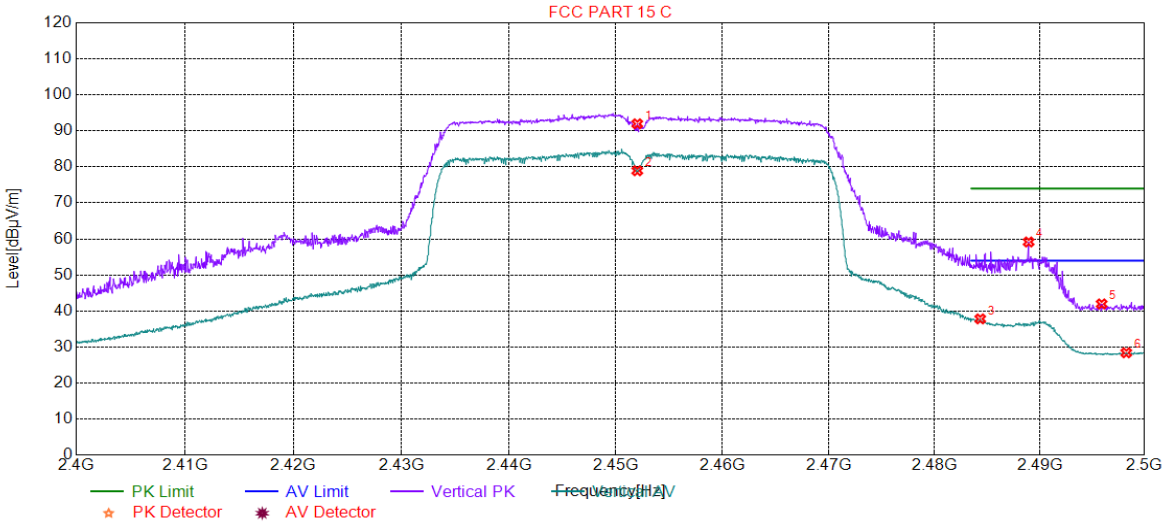
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.00	107.10	7.98	0.00	-107.10	105	307	Horizontal
2	2462.00	95.02	7.98	0.00	-95.02	135	307	Horizontal
3	2483.50	50.73	8.01	54.00	3.27	156	307	Horizontal
4	2483.89	70.25	8.01	74.00	3.75	163	290	Horizontal
5	2485.19	66.98	8.01	74.00	7.02	207	235	Horizontal
6	2487.94	43.74	8.02	54.00	10.26	219	307	Horizontal

4.10.1.13 802.11N40_Lowest Channel_ Vertical



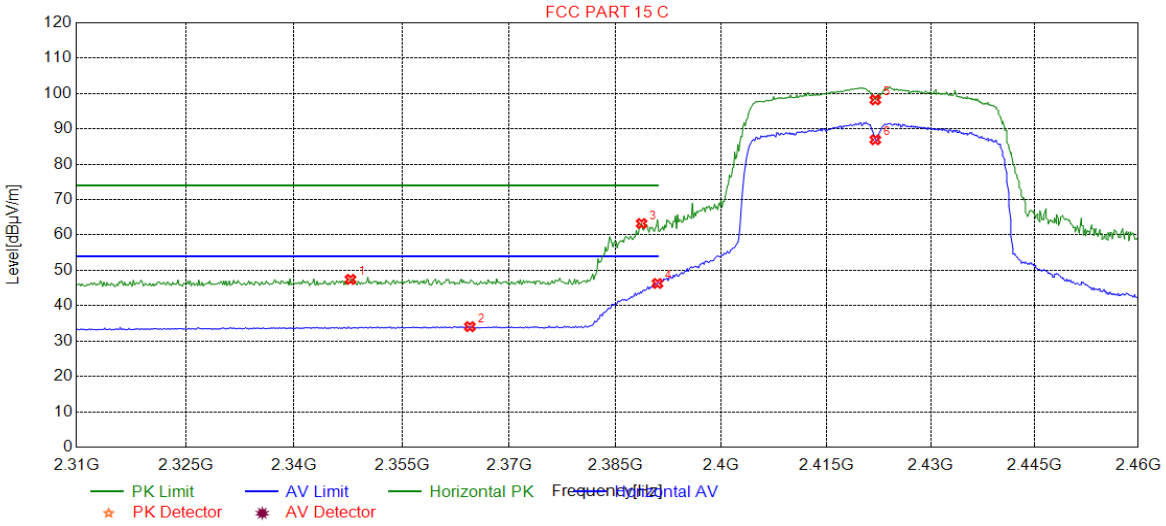
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2361.95	47.84	7.80	74.00	26.16	162	346	Vertical
2	2371.26	34.07	7.79	54.00	19.93	224	44	Vertical
3	2388.97	57.68	7.77	74.00	16.32	187	281	Vertical
4	2390.03	40.55	7.77	54.00	13.45	254	148	Vertical
5	2422.00	93.44	7.85	0.00	-93.44	233	31	Vertical
6	2422.00	81.62	7.85	0.00	-81.62	153	35	Vertical

4.10.1.14 802.11N40_ Highest Channel_ Vertical



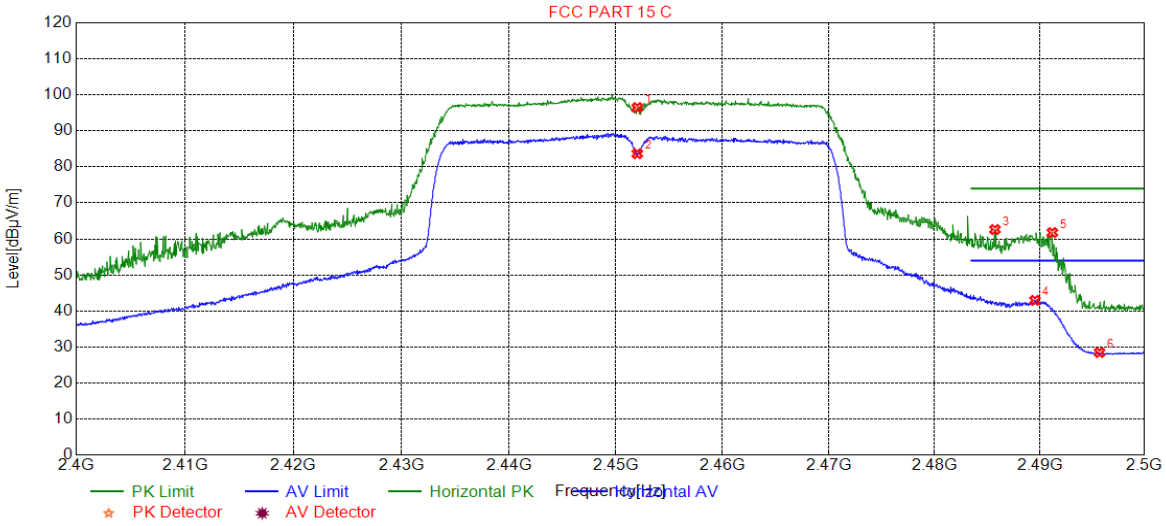
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2452.00	91.96	7.97	0.00	-91.96	162	29	Vertical
2	2452.00	78.93	7.97	0.00	-78.93	299	35	Vertical
3	2484.34	37.81	8.01	54.00	16.19	226	62	Vertical
4	2488.94	59.16	8.02	74.00	14.84	215	96	Vertical
5	2495.89	41.96	8.03	74.00	32.04	285	160	Vertical
6	2498.24	28.40	8.03	54.00	25.60	207	199	Vertical

4.10.1.15 802.11N40_Lowest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2347.83	47.44	7.79	74.00	26.56	244	212	Horizontal
2	2364.50	34.08	7.80	54.00	19.92	233	46	Horizontal
3	2388.67	63.24	7.77	74.00	10.76	238	200	Horizontal
4	2390.93	46.30	7.77	54.00	7.70	220	191	Horizontal
5	2422.00	98.21	7.85	0.00	-98.21	172	195	Horizontal
6	2422.00	86.93	7.85	0.00	-86.93	193	191	Horizontal

4.10.1.16 802.11N40_ Highest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2452.00	96.46	7.97	0.00	-96.46	217	128	Horizontal
2	2452.00	83.66	7.97	0.00	-83.66	199	101	Horizontal
3	2485.74	62.61	8.01	74.00	11.39	237	101	Horizontal
4	2489.54	42.94	8.02	54.00	11.06	155	101	Horizontal
5	2491.19	61.76	8.02	74.00	12.24	230	128	Horizontal
6	2495.69	28.48	8.02	54.00	25.52	196	85	Horizontal

Remark:
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

All Modes have been tested, but only the worst case data displayed in this report.

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86–755) 26012053 f (86–755) 26710594 www.sgsgroup.com.cn
中国·深圳·科技园中区M–10栋一号厂房 邮编: 518057 t (86–755) 26012053 f (86–755) 26710594 sgs.china@sgs.com

5 Measurement Uncertainty (95% confidence levels, k=2)

Lab A:

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	±0.75dB
2	RF power density, conducted	±2.84dB
3	Spurious emissions, conducted	±0.75dB
4	Temperature test	±1°C
5	Humidity test	±3%
6	DC and low frequency voltages	±0.5%

Lab B:

No.	Item	Measurement Uncertainty
1	Conduction Emission	± 3.0dB (150kHz to 30MHz)
2	Radiated Emission	± 4.8dB (Below 1GHz)
		± 4.8dB (1GHz to 6GHz)
		± 4.5dB (6GHz to 18GHz)
		± 5.02dB (Above 18GHz)

6 Equipment List

RF conducted test					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Duedate (yyyy-mm-dd)
DC Power Supply	Agilent Technologies Inc	66311B	W009-09	2019/7/15	2020/7/15
Signal Analyzer	Rohde & Schwarz	FSV	W025-05	2020/1/3	2021/1/2
Coaxial Cable	SGS	N/A	SEM031-01	2019/6/12	2020/6/11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2019/7/14	2020/7/14
Temperature Chamber	GIANT FORCE	ICT-150-40-CP-AR	W027-03	2019/10/27	2020/10/27
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2019/7/14	2020/7/14

CE Test System					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	Brilliant-emc	N/A	XAW03-35-01	2019-09-11	2022-09-10
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2019-09-07	2020-09-06
Artificial network	ROHDE&SCHWARZ	ENV216	XAW01-04-01	2019-07-16	2020-07-15
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2019-12-06	2020-12-05
Measurement Software	Tonscend	TS+ CE V2.5	XAW02-05-02	NCR	NCR

RSE Test System					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Due Date**
Semi-Anechoic Chamber	Brilliant-emc	N/A	XAW03-35-01	2019-09-11	2022-09-10
MXA signal analyzer	Keysight	N9020A	XAW01-06-01	2019-06-27	2020-06-26
Test receiver	ROHDE&SCHWARZ	ESR	XAW01-08-01	2019-09-07	2020-09-06
Receiving antenna (30MHz-3GHz)	Schwarzbeck	VULB 9163	XAW01-09-01	2019-10-13	2021-10-12
Receiving antenna (1GHz~18GHz)	Schwarzbeck	BBHA 9120D	XAW01-09-02	2019-10-13	2021-10-12
Receiving antenna (15GHz~40GHz)	Schwarzbeck	BBHA 9170	XAW01-09-03	2019-10-13	2021-10-12
Directional antenna rack controller	Max-Full	MF-7802BS	XAW03-03-01	NCR	NCR
High-speed antenna rack controller	Max-Full	MF-7802	XAW03-04-01	NCR	NCR
Filter bank	Tonscend	JS0806-F	XAW03-05-01	NCR	NCR
Filter bank	Tonscend	JS0806s	XAW03-05-02	NCR	NCR
Amplifier	Tonscend	TAP00903040	XAW01-41-01	2019-11-18	2020-11-17
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2019-11-18	2020-11-17
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2019-12-03	2020-12-02
Amplifier	Shanghai Steed	YX28980930	XAW01-41-06	2019-11-18	2020-11-17
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2019-12-06	2020-12-05
Measurement Software	Tonscend	TS+ RSE V3.0.0.2	XAW02-05-01	NCR	NCR

7 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of Set-Up for ZR/2020/40008

The End

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com