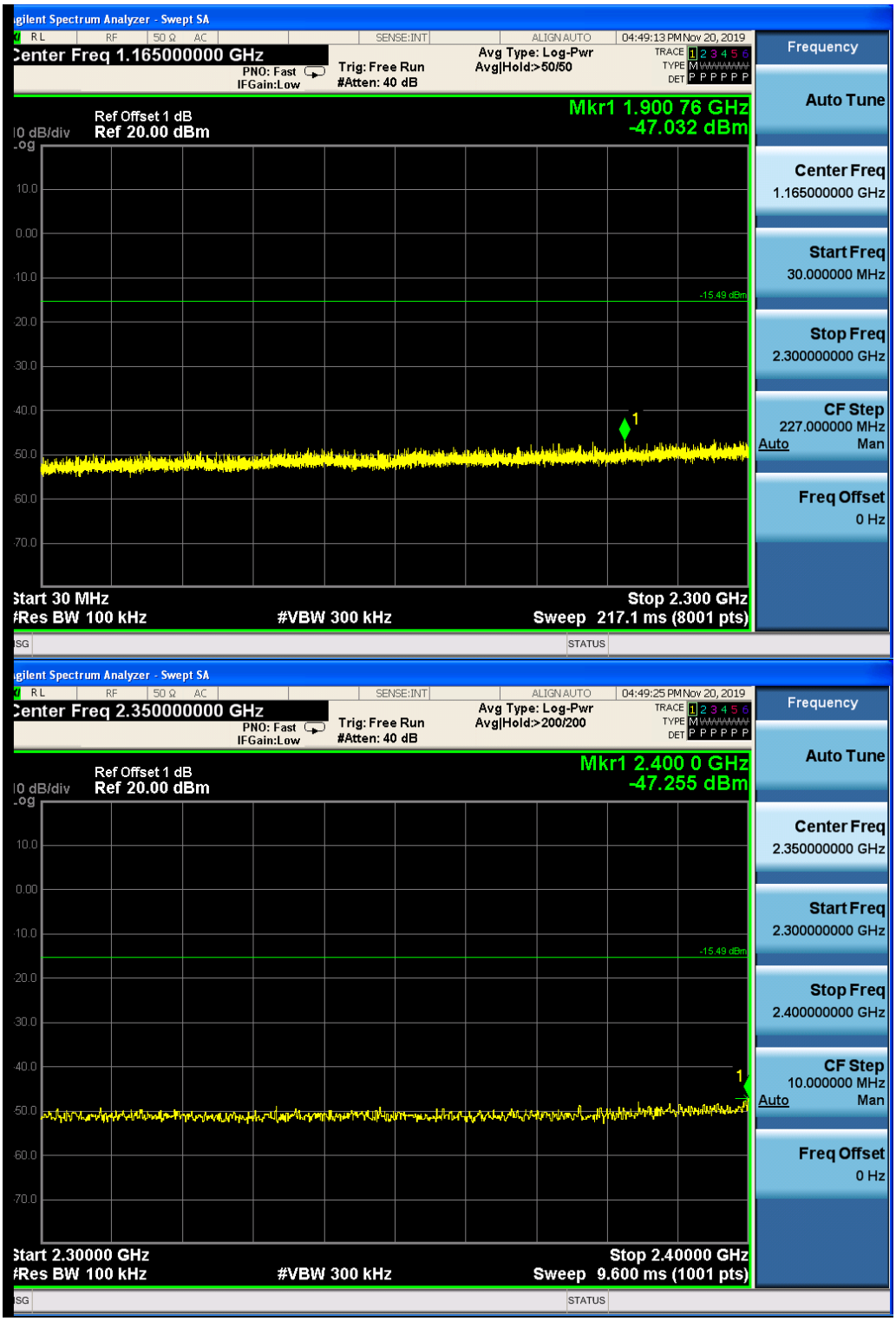

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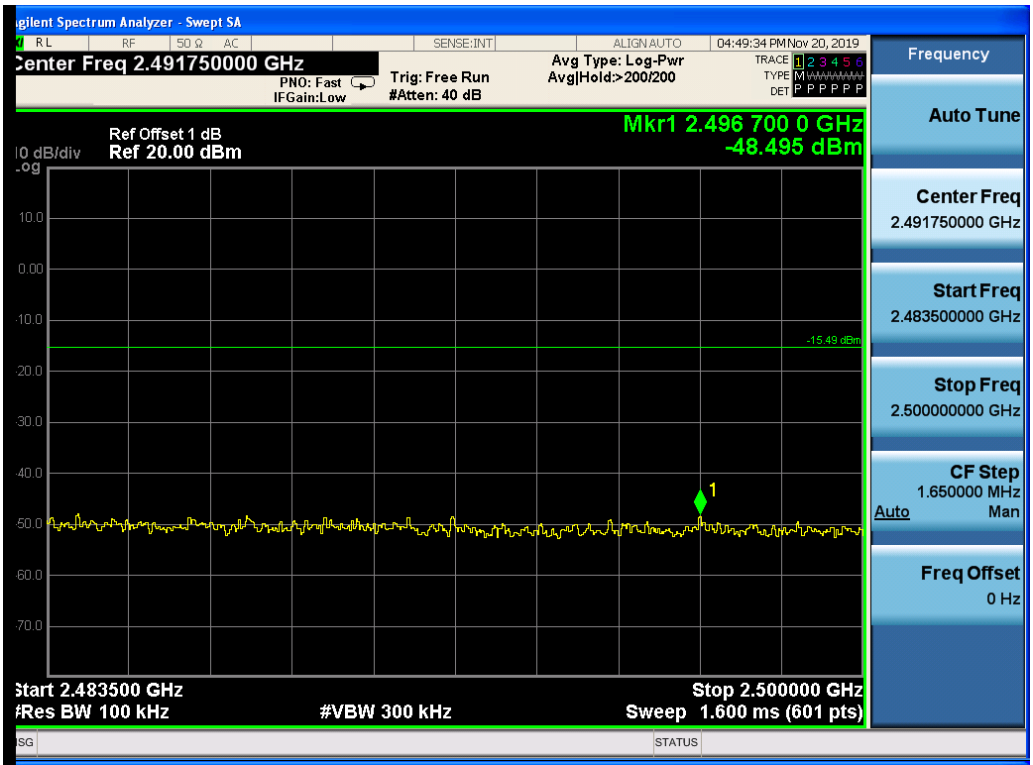
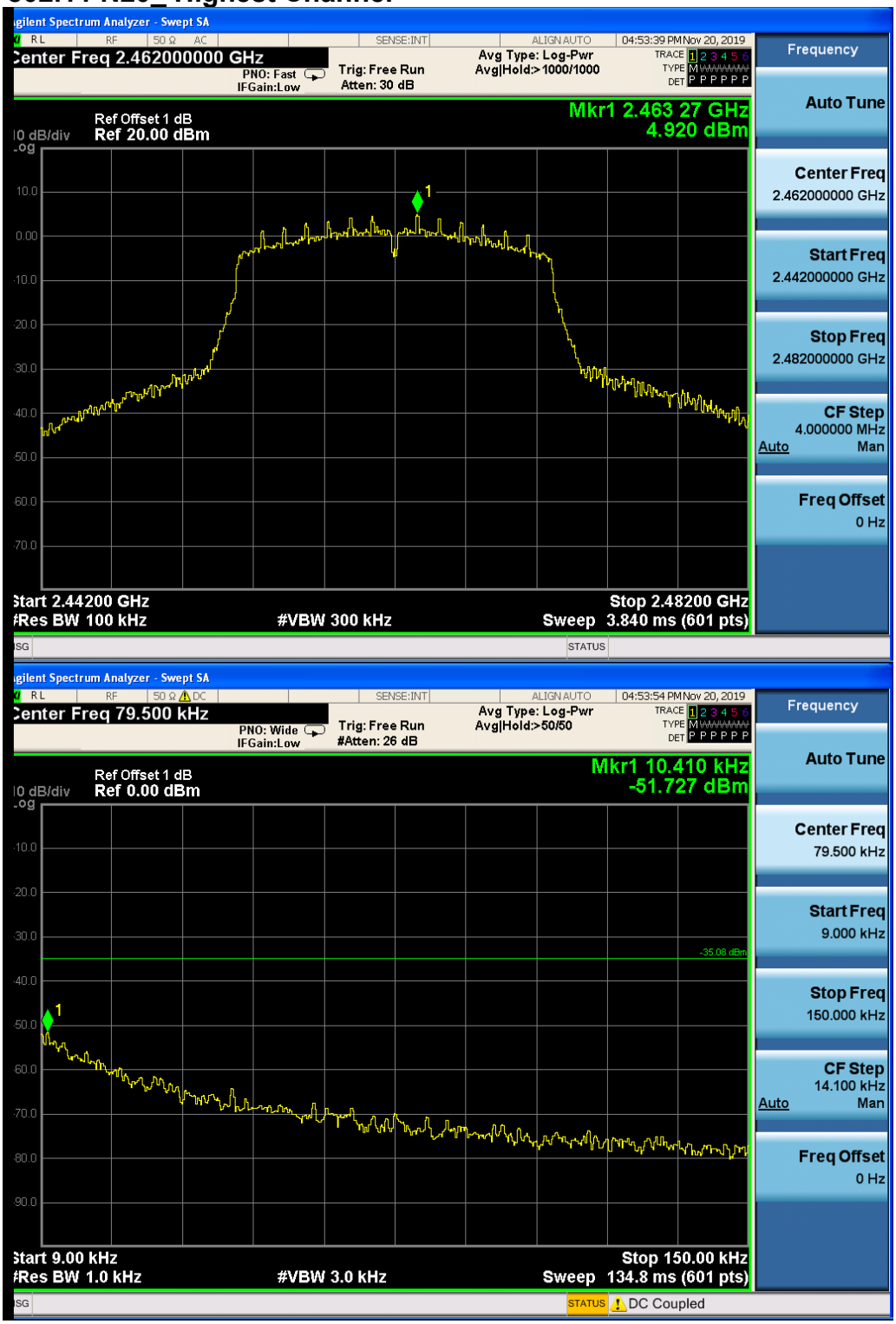
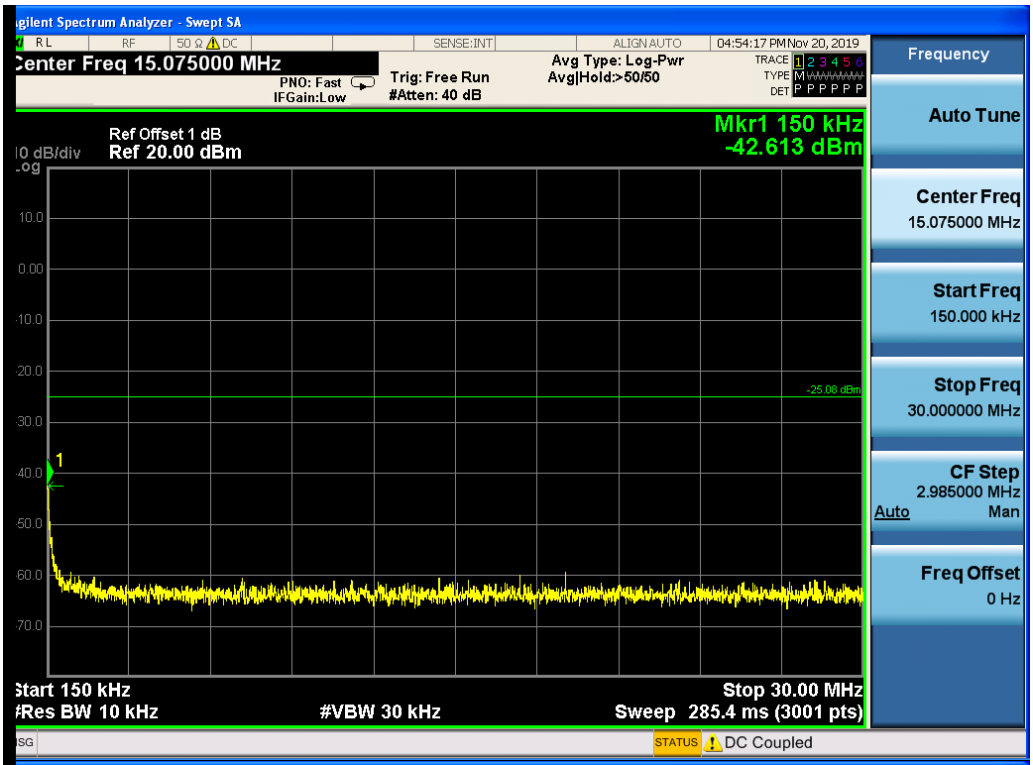
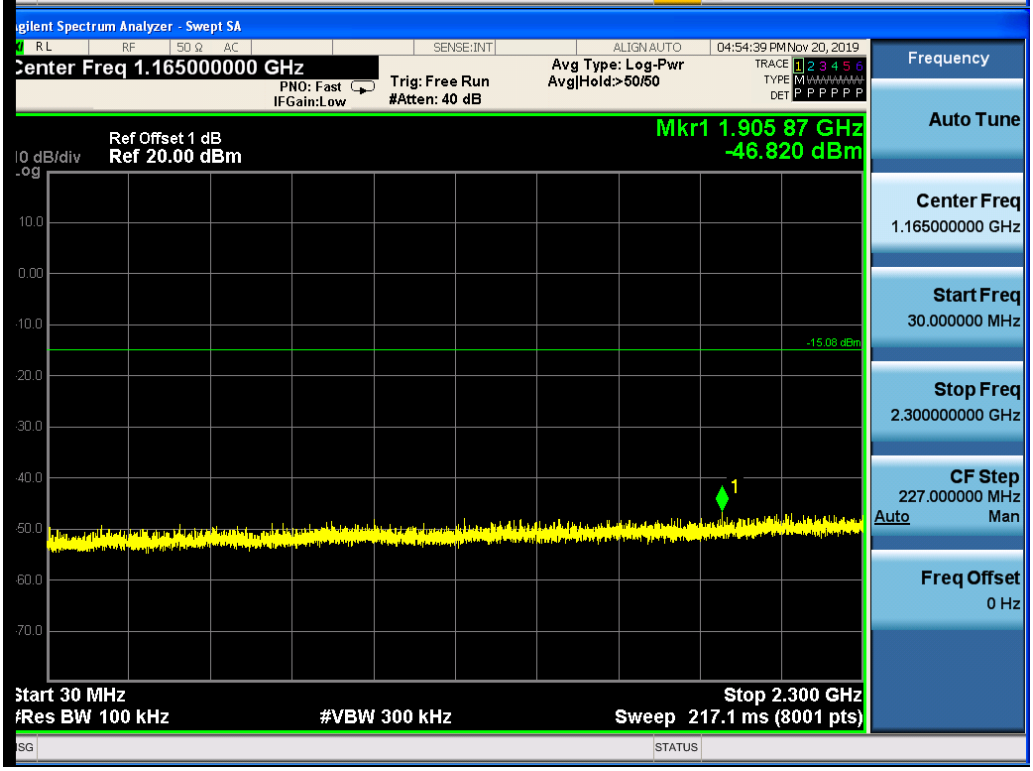
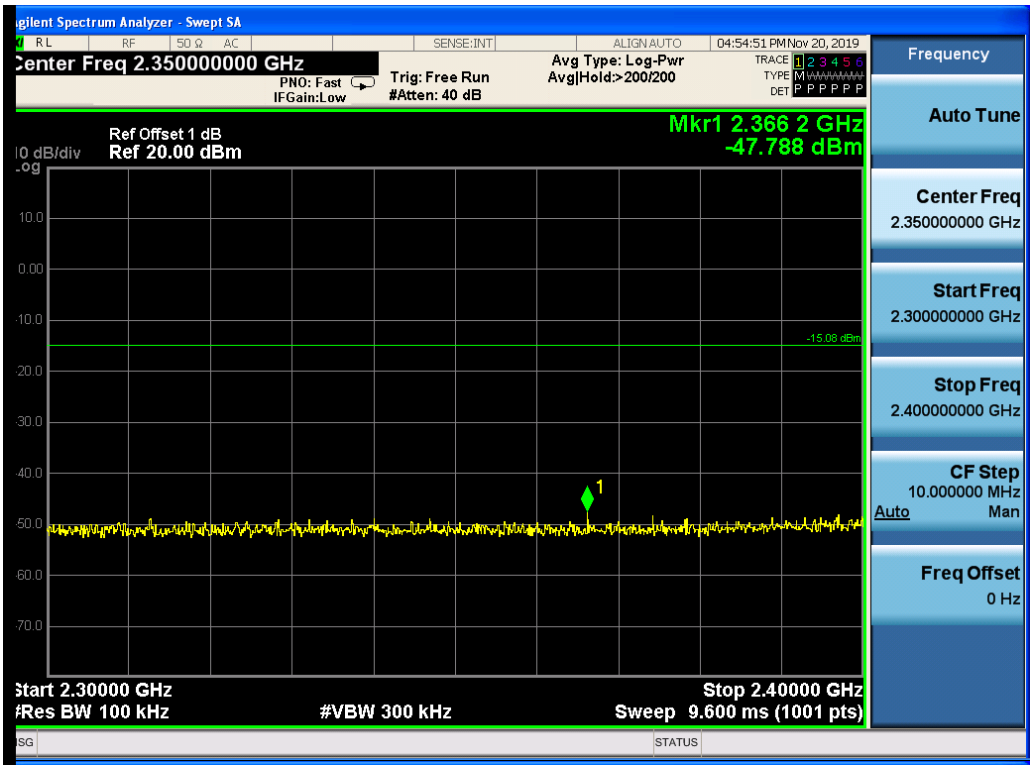


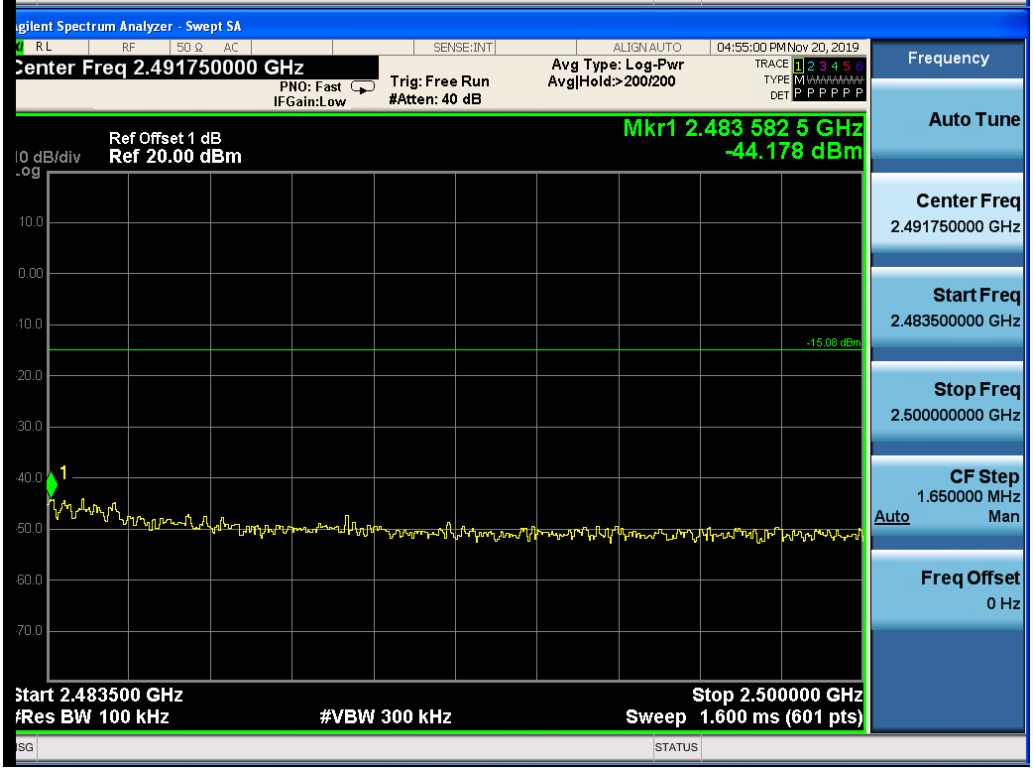
4.8.1.1.9 802.11 N20_ Highest Channel



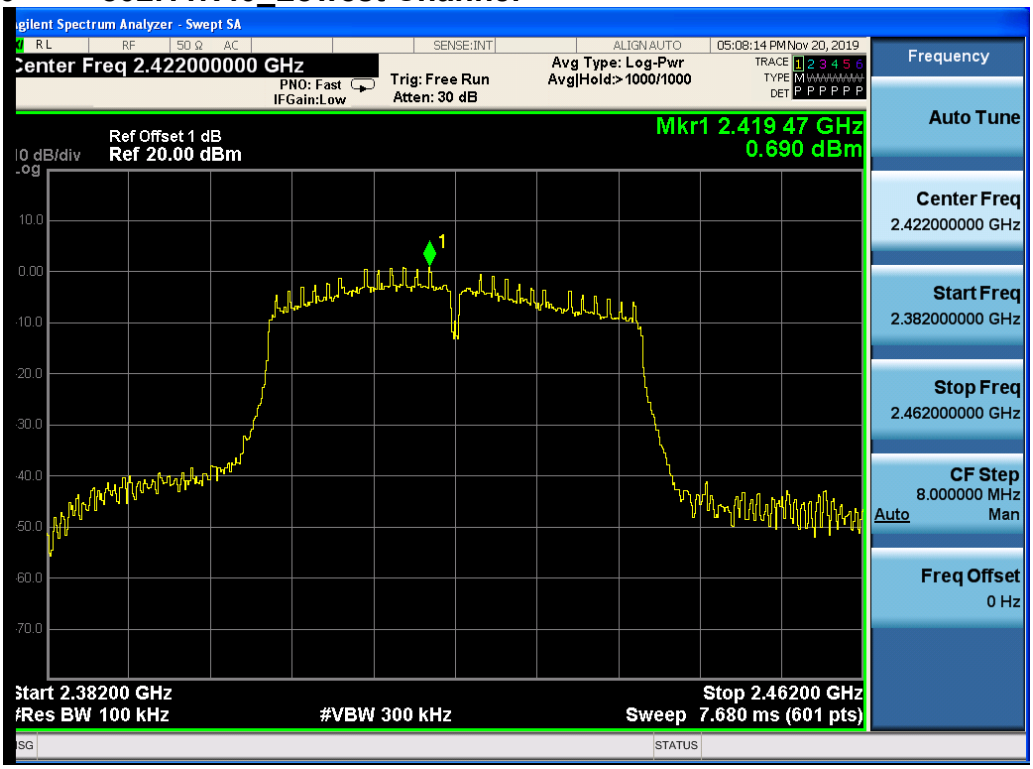


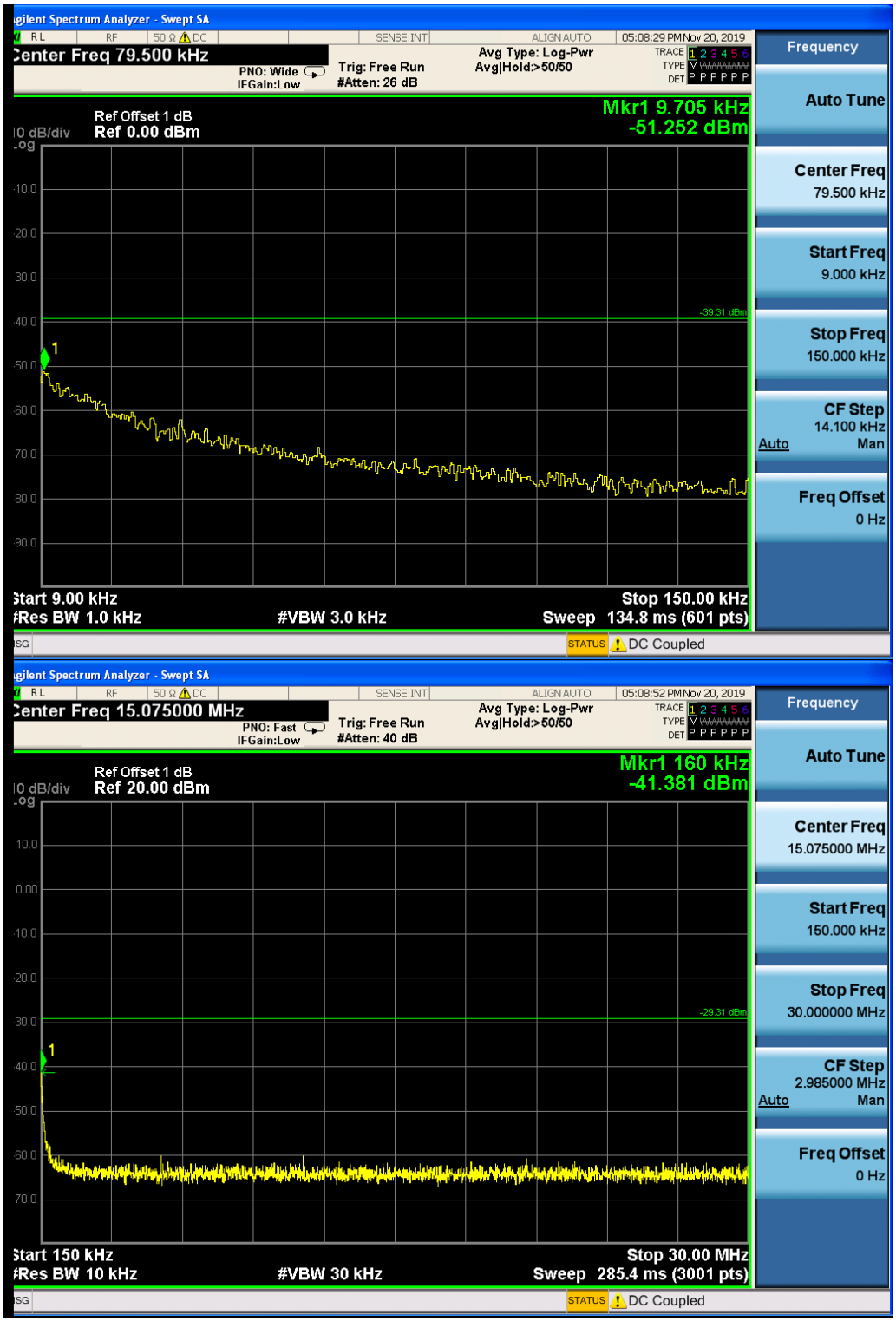


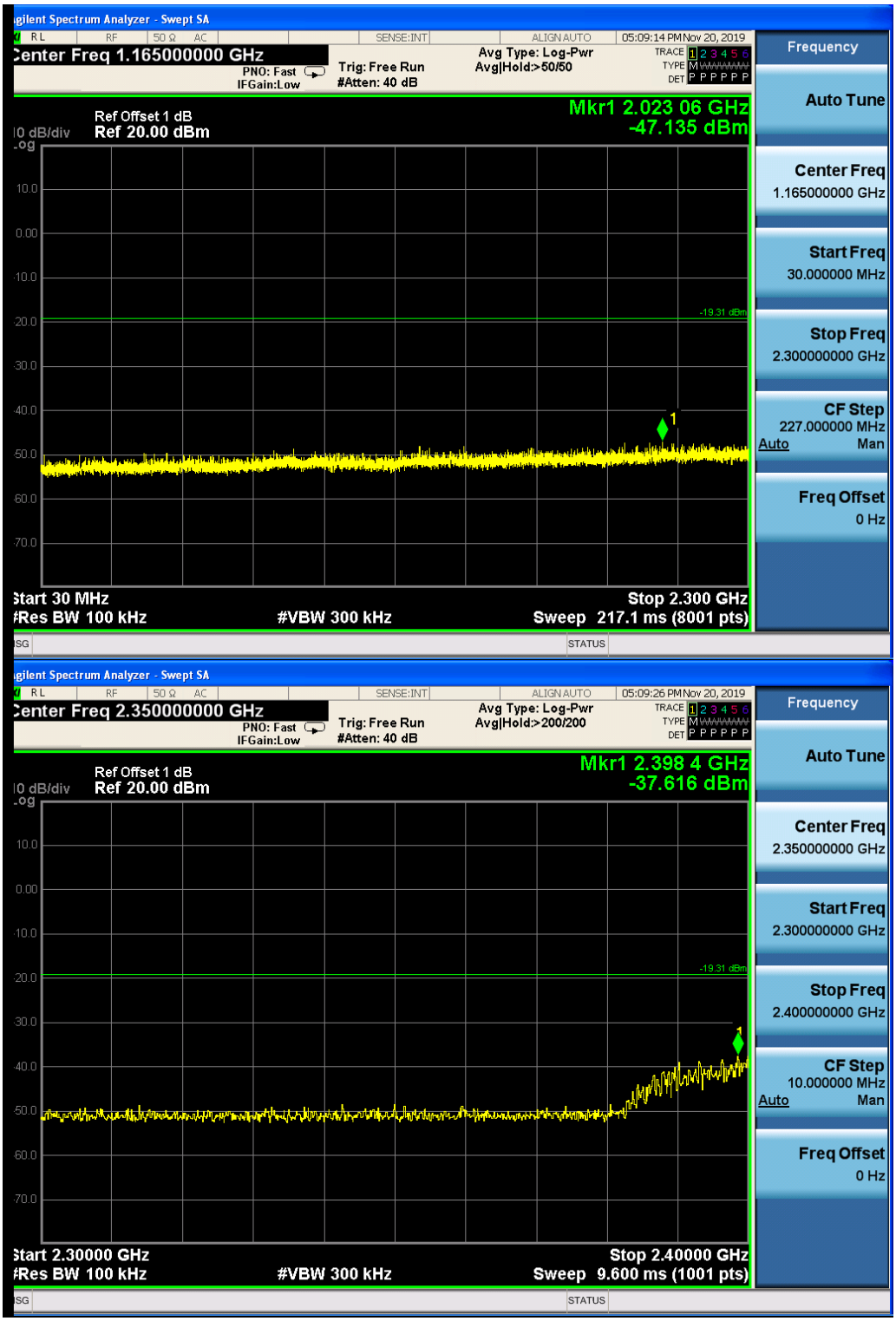


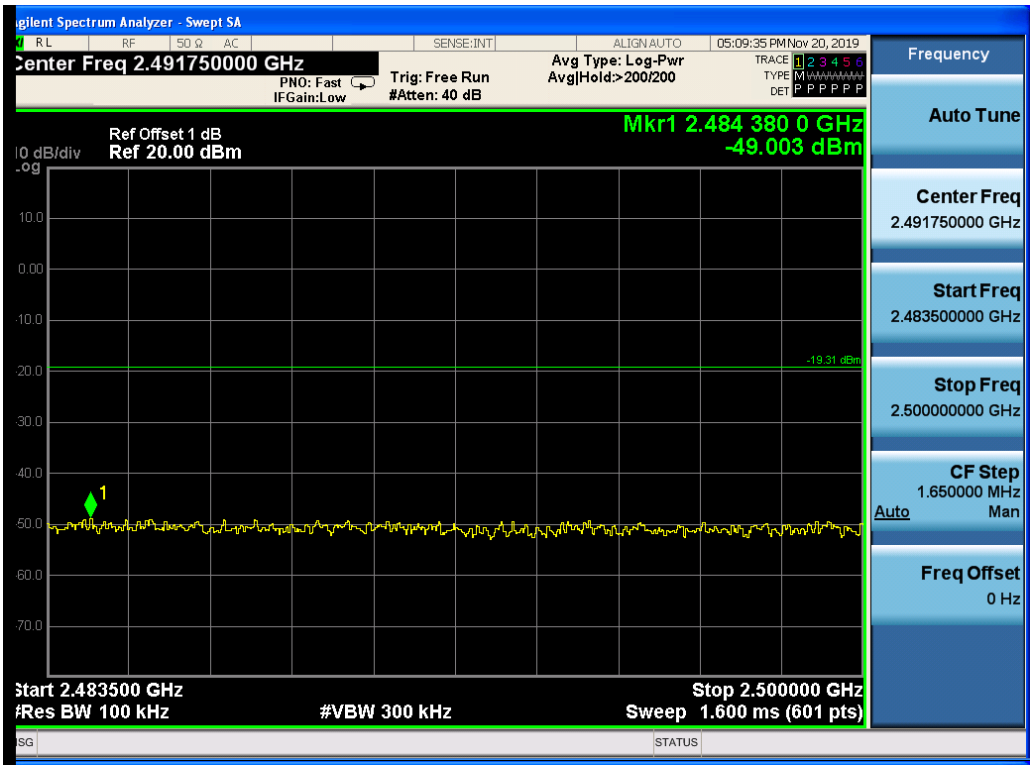


4.8.1.1.10 802.11N40_Lowest Channel

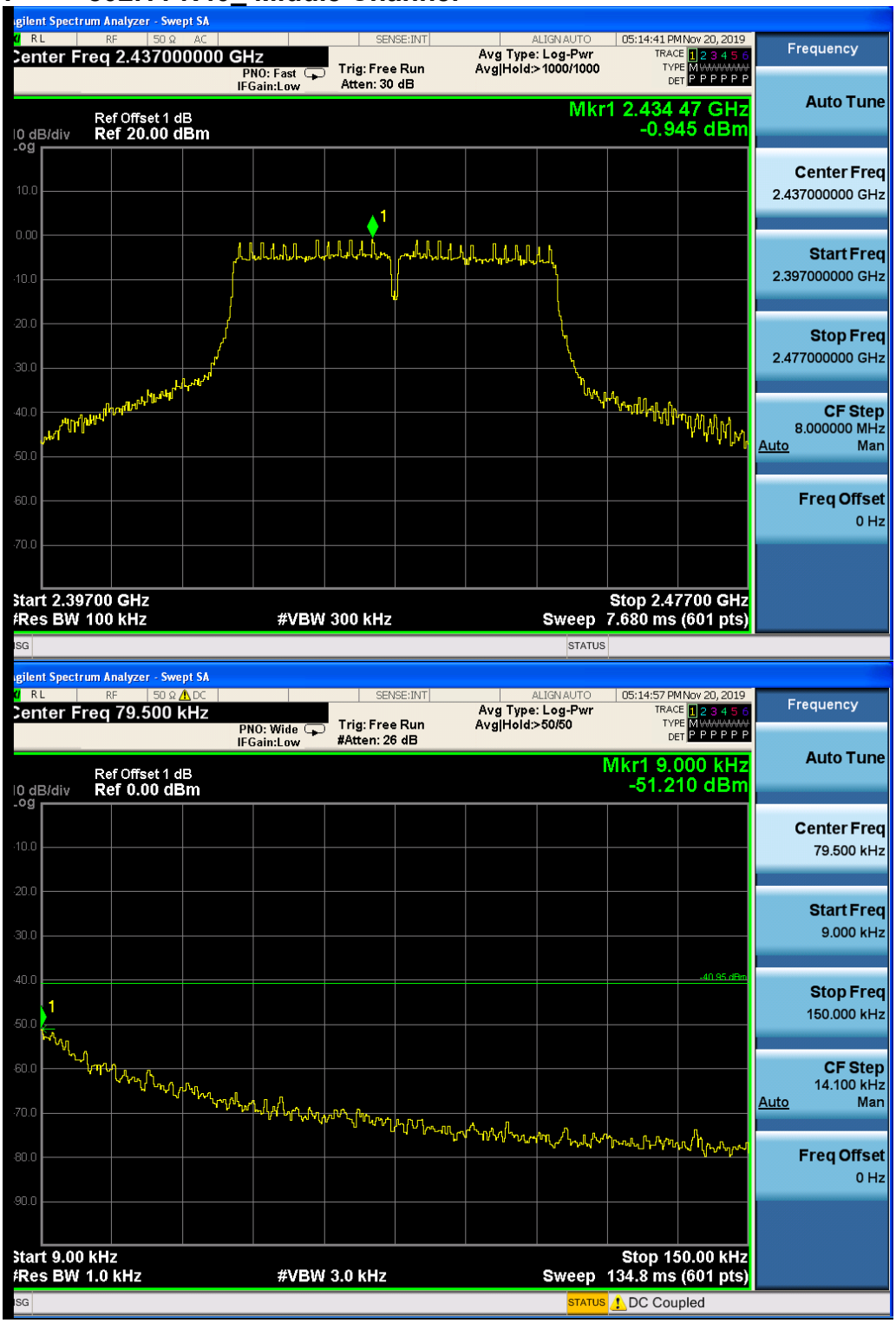


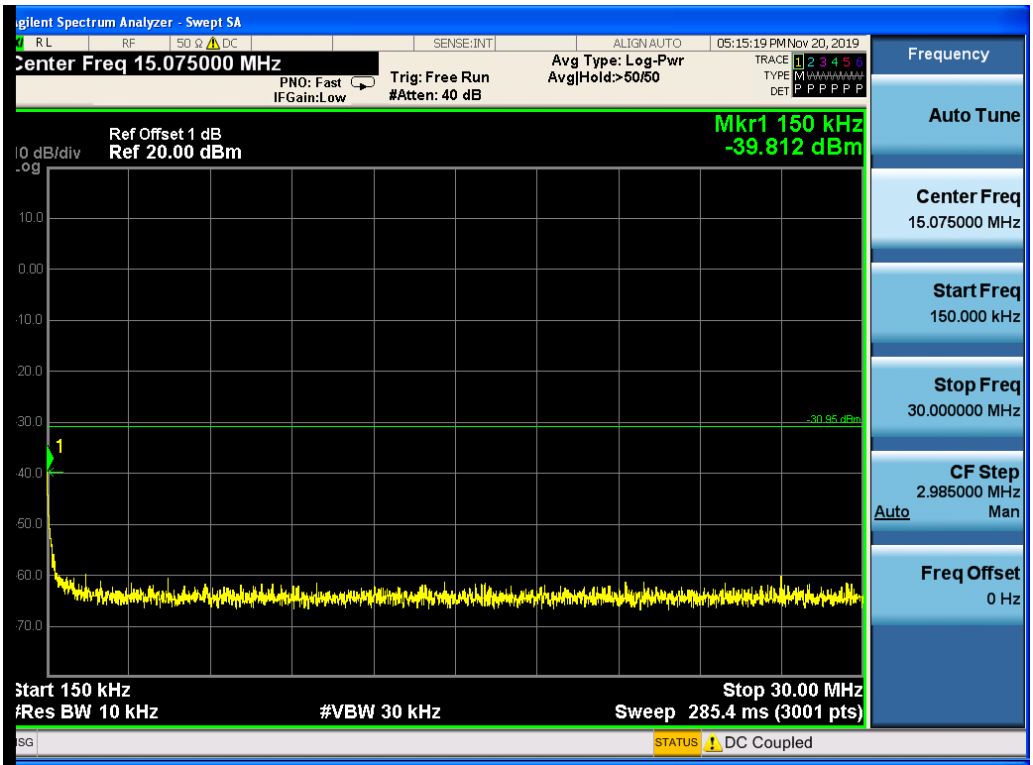


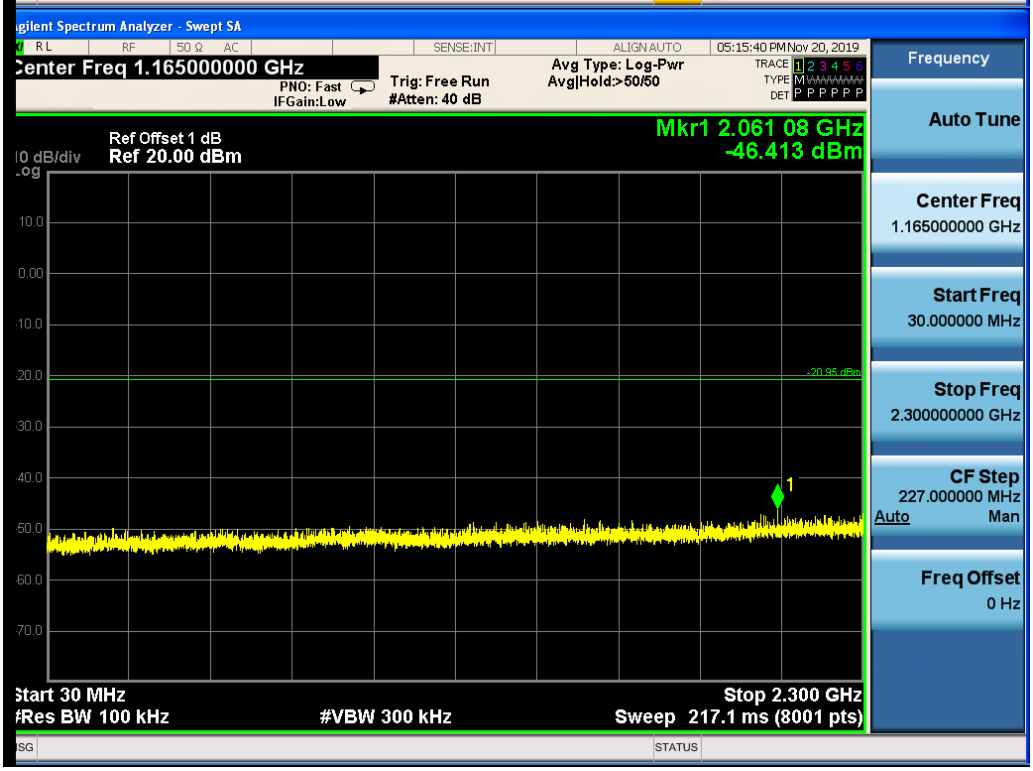


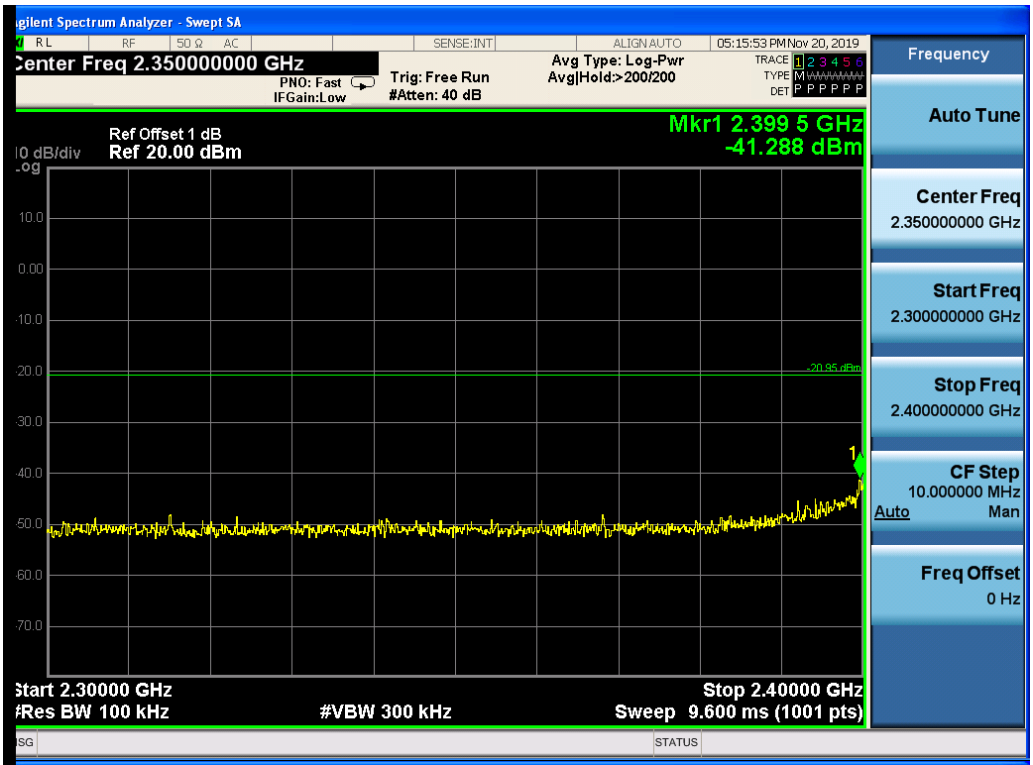


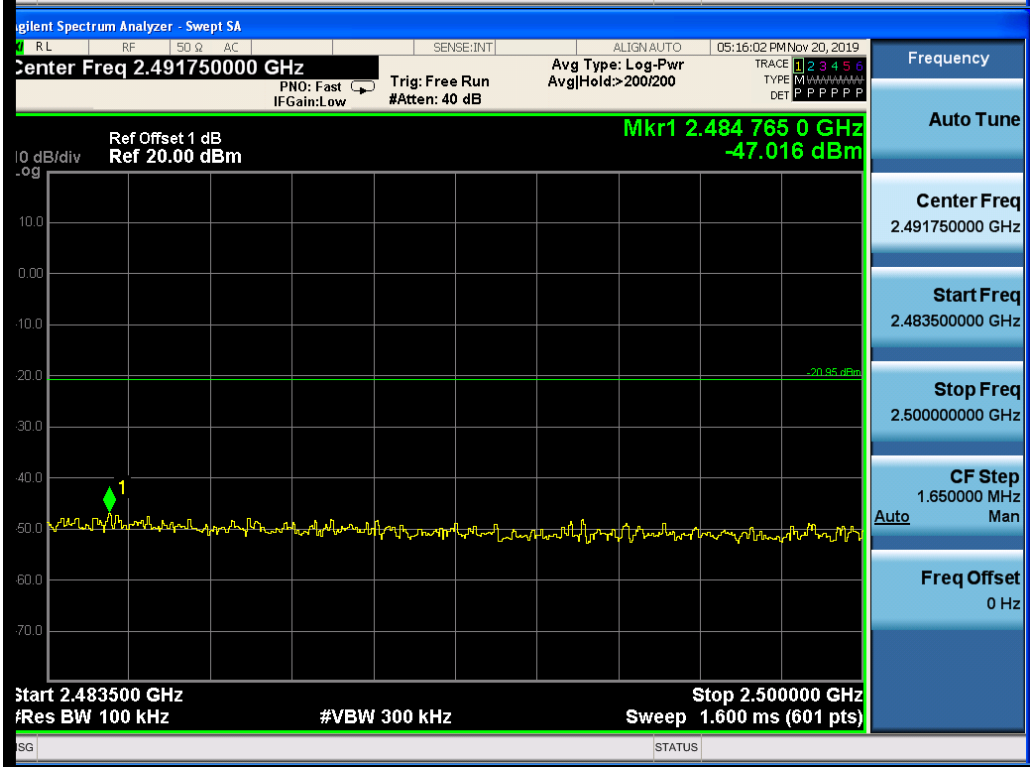
4.8.1.1.11 802.11 N40_ Middle Channel

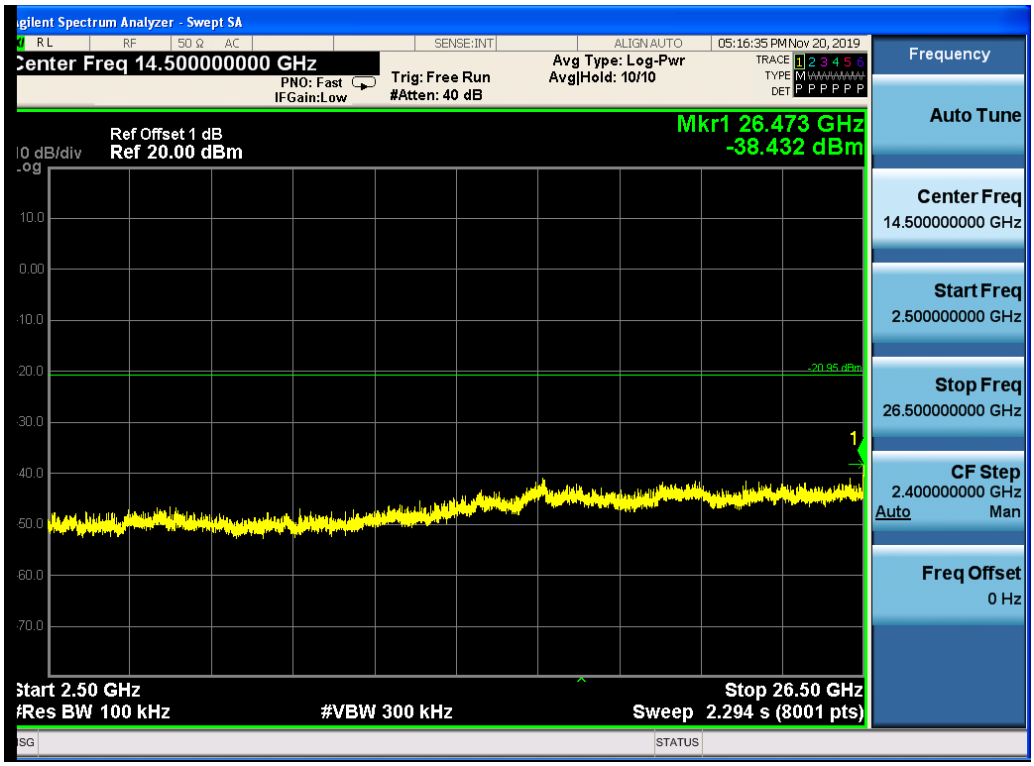




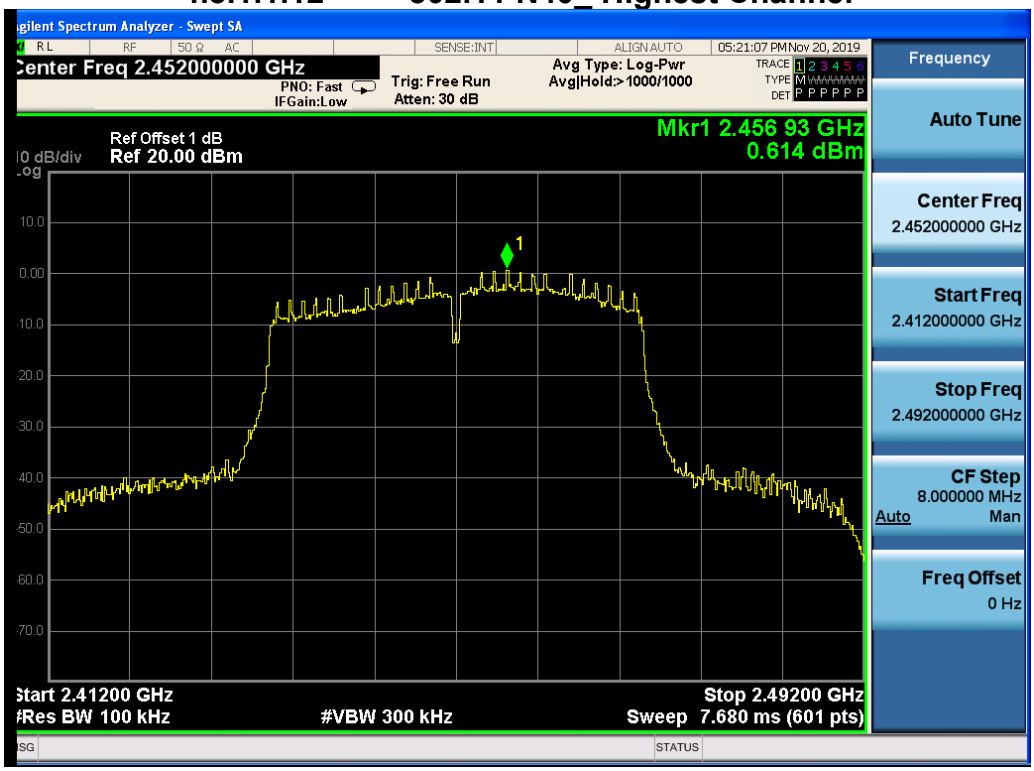


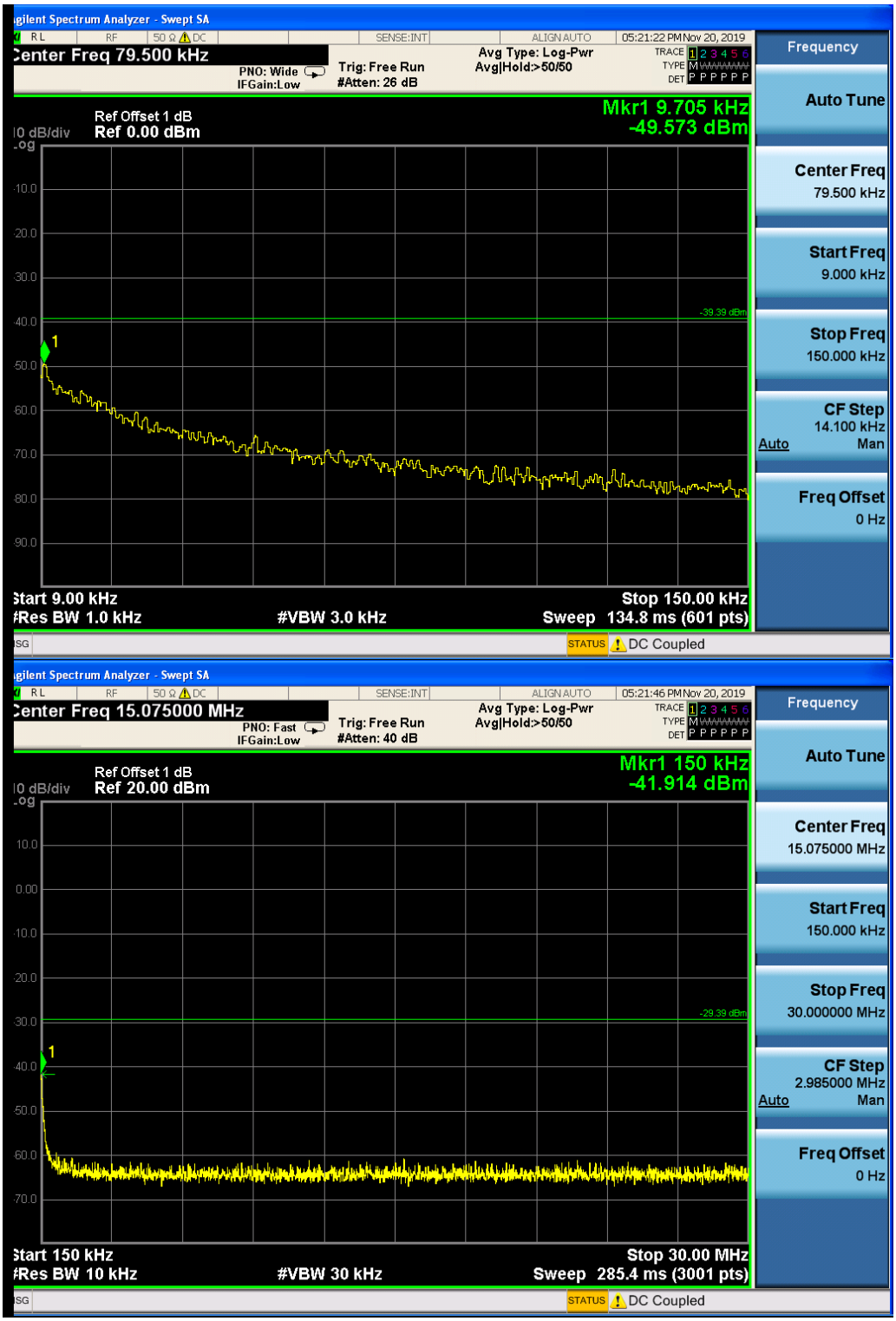


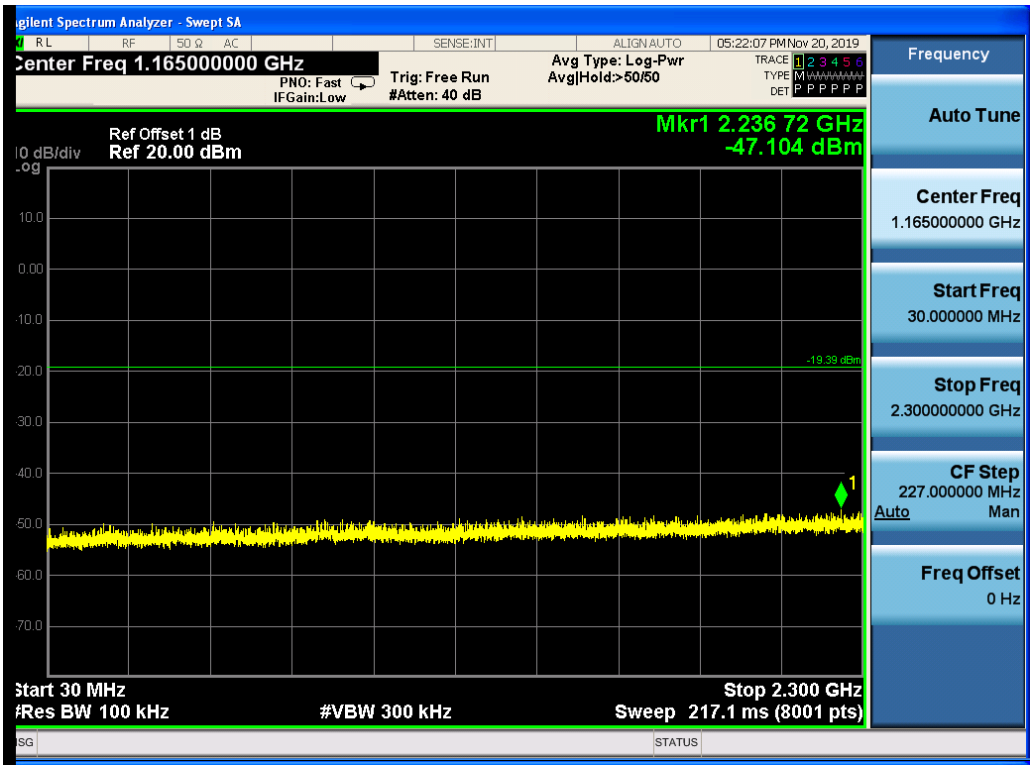


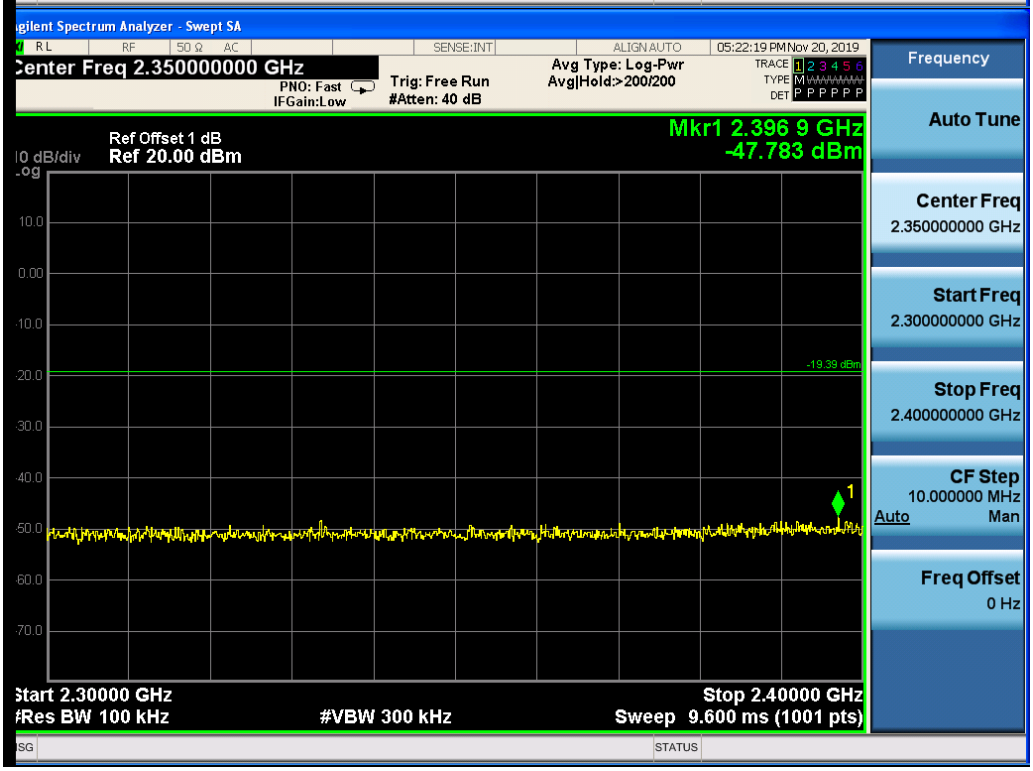


4.8.1.1.12 802.11 N40_ Highest Channel









Remark:

Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz 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.

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:	

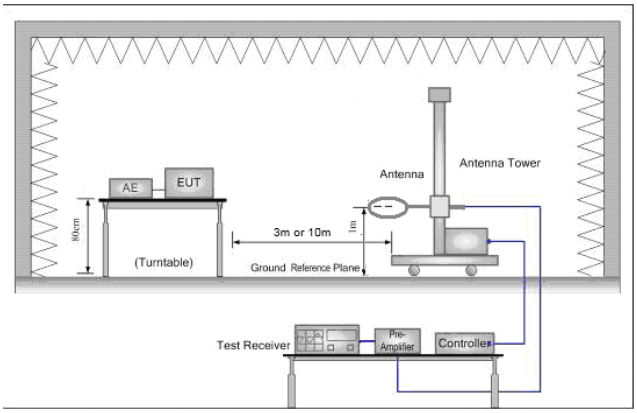


Figure 1. Below 30MHz

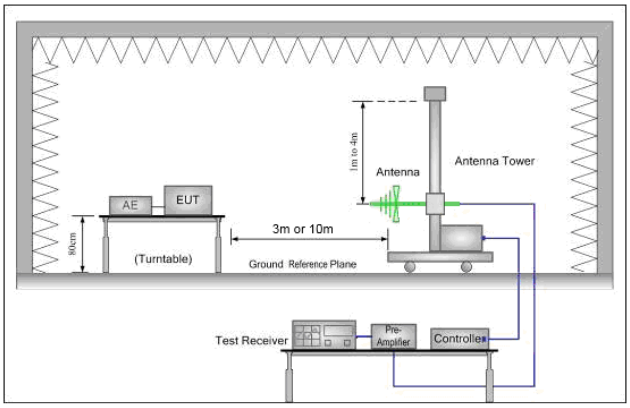


Figure 2. 30MHz to 1GHz

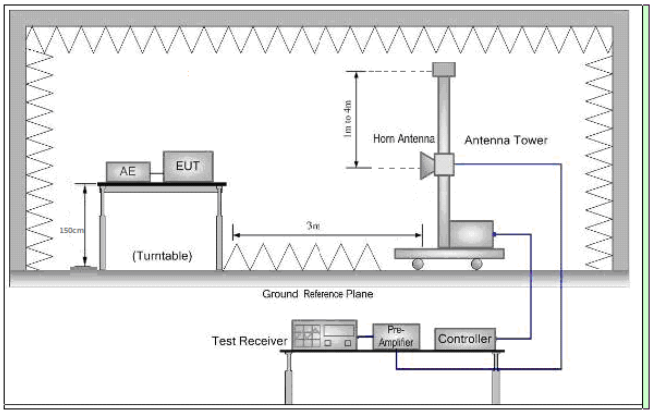


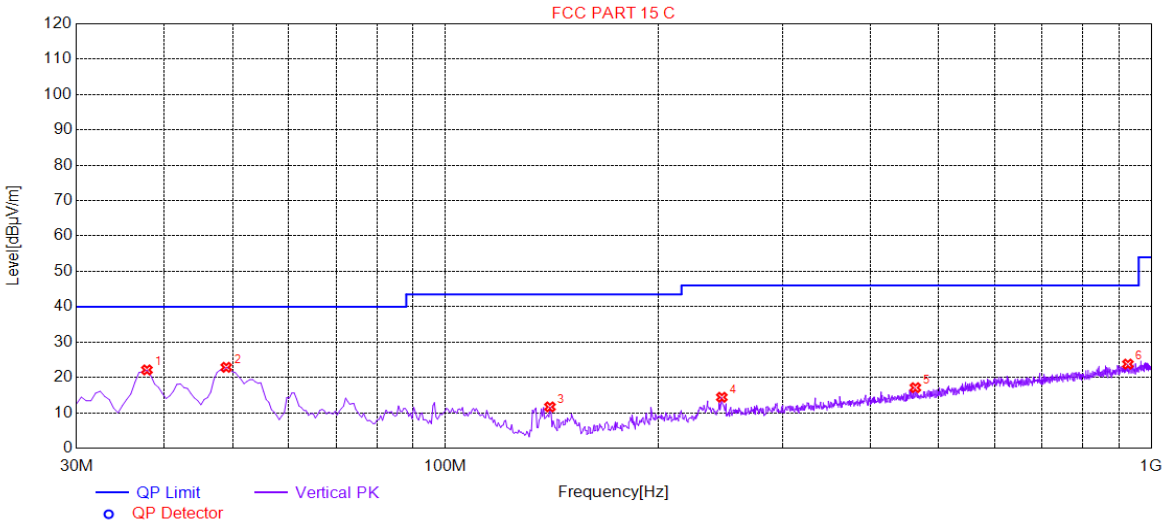
Figure 3. Above 1 GHz

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. 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. f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. g. 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. h. Test the EUT in the lowest channel, the middle 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) 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

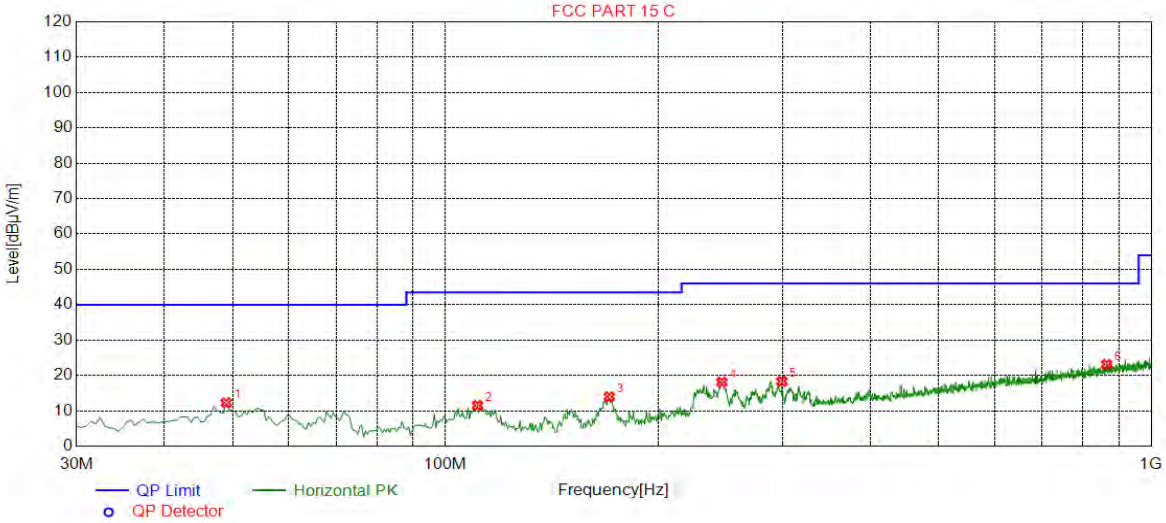
4.9.1 Radiated emission below 1GHz

4.9.1.1 Charge + Transmitting, Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	37.7639	22.13	-31.88	40.00	17.87	167	341	Vertical
2	48.9245	22.87	-30.19	40.00	17.13	150	320	Vertical
3	140.6353	11.67	-35.18	43.50	31.83	279	71	Vertical
4	246.4182	14.40	-29.38	46.00	31.60	298	210	Vertical
5	463.3217	17.11	-23.55	46.00	28.89	188	291	Vertical
6	926.7284	23.78	-14.82	46.00	22.22	281	109	Vertical

4.9.1.2 Charge + Transmitting, Horizontal

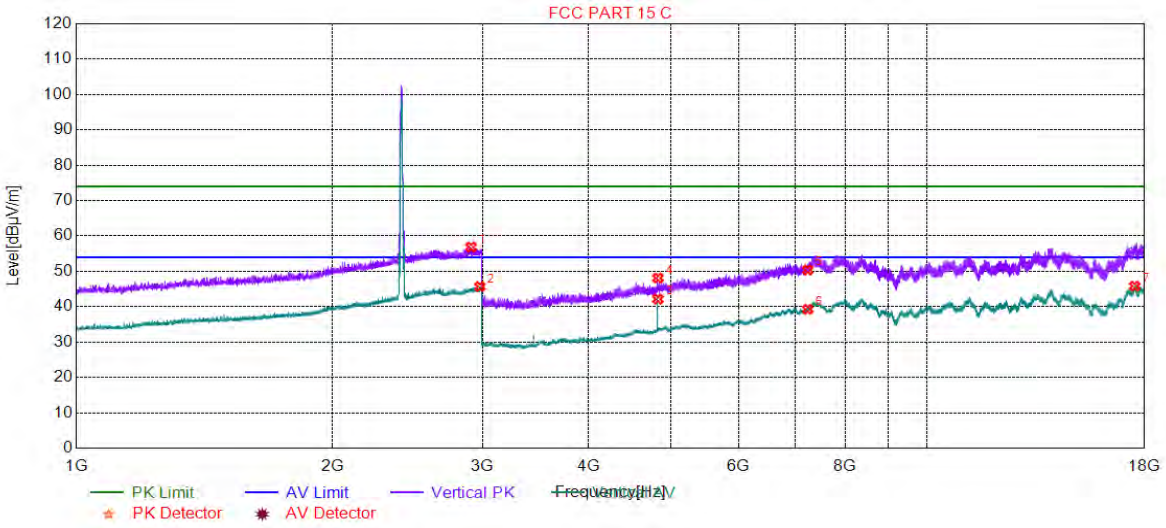


Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	48.9245	12.27	-30.19	40.00	27.73	180	108	Horizontal
2	111.0355	11.53	-31.85	43.50	31.97	119	105	Horizontal
3	170.7204	13.97	-33.56	43.50	29.53	132	205	Horizontal
4	246.4182	18.11	-29.38	46.00	27.89	213	286	Horizontal
5	299.7949	18.33	-27.87	46.00	27.67	122	22	Horizontal
6	865.1026	23.12	-15.80	46.00	22.88	243	102	Horizontal

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	2908.9772	56.90	11.41	74.00	17.10	164	301	Vertical
2	2979.9950	45.70	11.37	54.00	8.30	155	273	Vertical
3	4824.0000	42.16	-14.90	54.00	11.84	244	18	Vertical
4	4824.0000	48.13	-14.90	74.00	25.87	292	18	Vertical
5	7236.0000	50.41	-6.82	74.00	23.59	202	45	Vertical
6	7236.0000	39.27	-6.82	54.00	14.73	235	126	Vertical
7	17526.9763	45.82	0.70	54.00	8.18	205	0	Vertical

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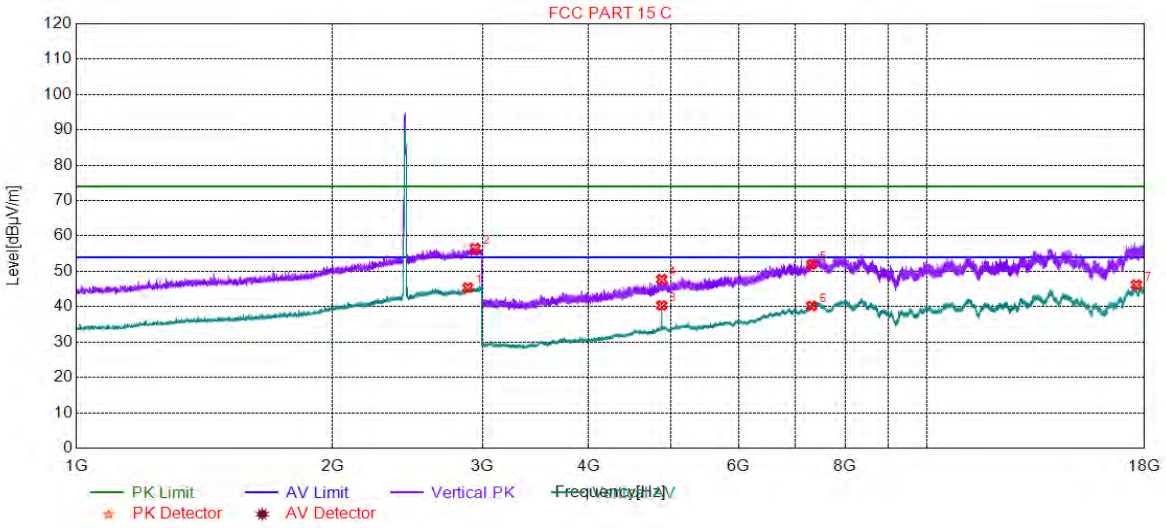
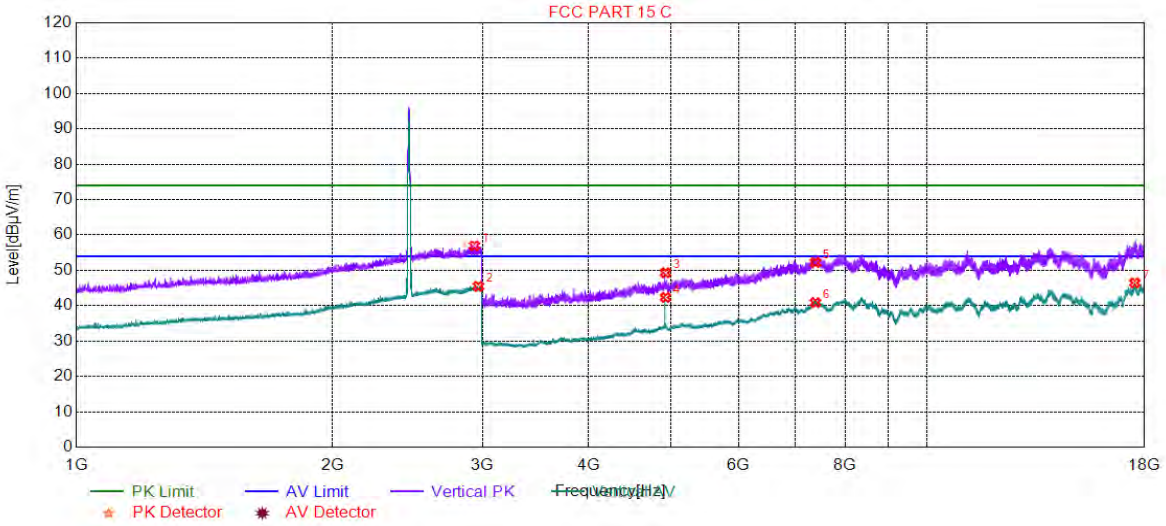
4.9.2.1.2 802.11B_ Middle Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2883.9710	45.39	11.29	54.00	8.61	290	91	Vertical
2	2940.9852	56.54	11.39	74.00	17.46	196	273	Vertical
3	4874.0000	40.36	-14.68	54.00	13.64	190	209	Vertical
4	4874.0000	47.73	-14.68	74.00	26.27	191	360	Vertical
5	7311.0000	51.96	-6.24	74.00	22.04	255	209	Vertical
6	7311.0000	40.22	-6.24	54.00	13.78	263	127	Vertical
7	17605.9803	46.20	1.47	54.00	7.80	234	242	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	2935.4839	56.96	11.39	74.00	17.04	197	248	Vertical
2	2967.4919	45.48	11.38	54.00	8.52	157	275	Vertical
3	4924.0000	49.32	-14.43	74.00	24.68	176	100	Vertical
4	4924.0000	42.34	-14.43	54.00	11.66	262	209	Vertical
5	7386.0000	52.20	-5.71	74.00	21.80	178	100	Vertical
6	7386.0000	40.87	-5.71	54.00	13.13	200	72	Vertical
7	17528.4764	46.47	0.71	54.00	7.53	293	142	Vertical

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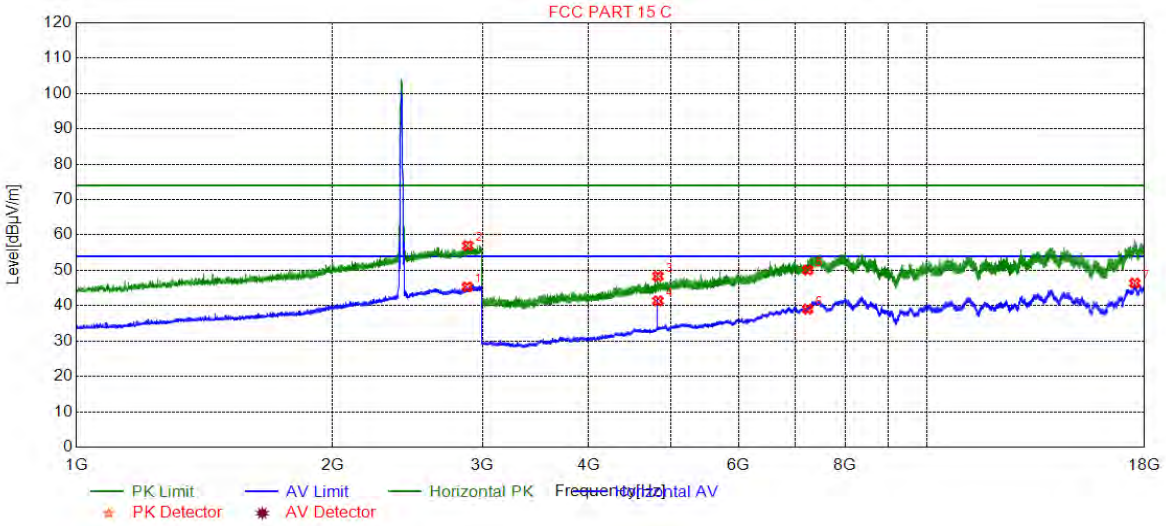
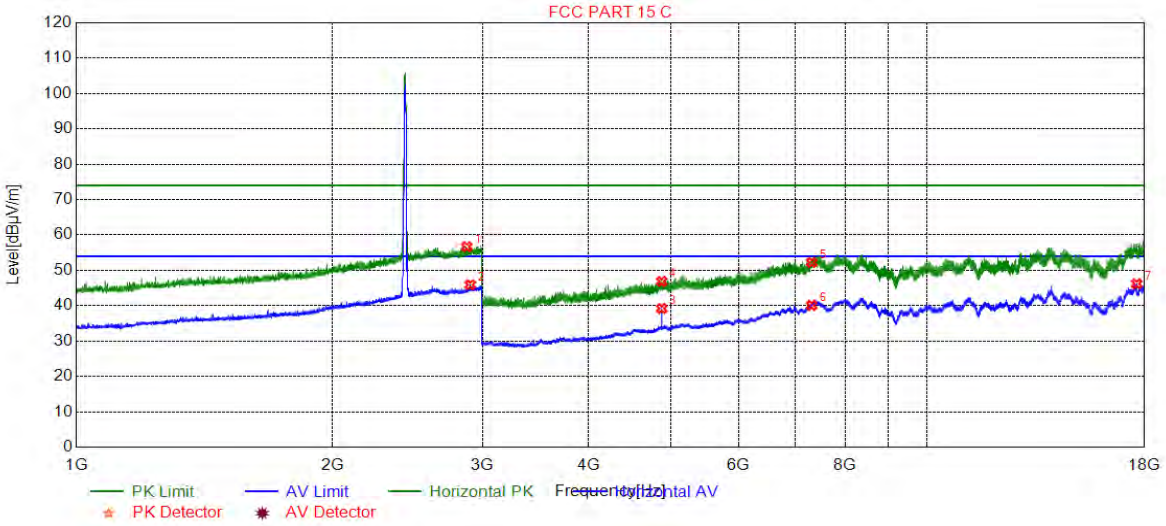
4.9.2.1.4 802.11B_Lowest Channel_ Horizontal



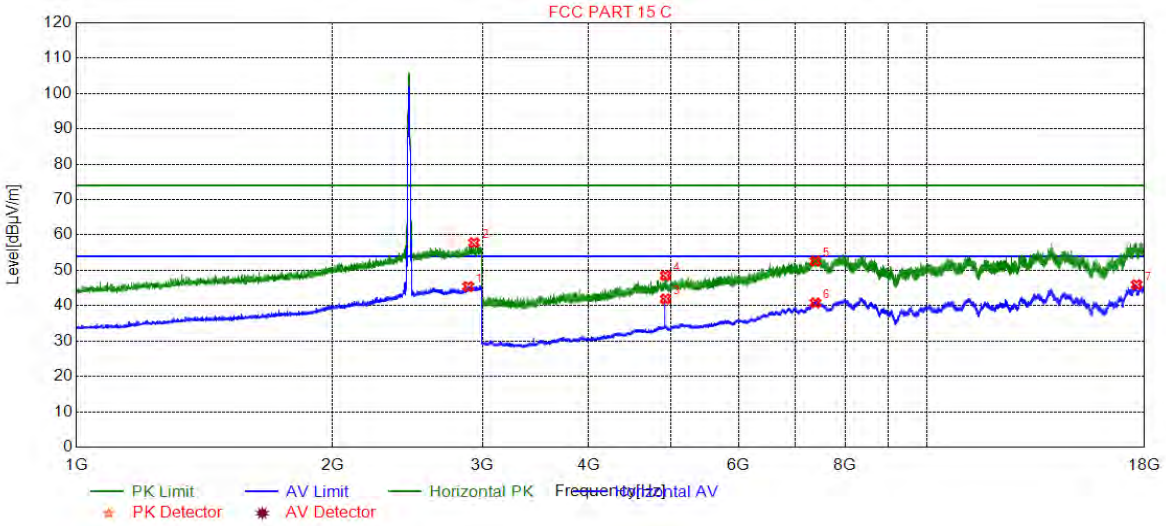
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2880.4701	45.32	11.26	54.00	8.68	120	18	Horizontal
2	2883.9710	57.00	11.29	74.00	17.00	233	209	Horizontal
3	4824.0000	48.33	-14.90	74.00	25.67	228	235	Horizontal
4	4824.0000	41.36	-14.90	54.00	12.64	163	208	Horizontal
5	7236.0000	50.08	-6.82	74.00	23.92	167	344	Horizontal
6	7236.0000	39.05	-6.82	54.00	14.95	132	18	Horizontal
7	17528.4764	46.37	0.71	54.00	7.63	243	0	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	2875.9690	56.67	11.22	74.00	17.33	202	168	Horizontal
2	2902.9757	45.91	11.41	54.00	8.09	195	87	Horizontal
3	4874.0000	39.20	-14.68	54.00	14.80	239	209	Horizontal
4	4874.0000	46.87	-14.68	74.00	27.13	151	46	Horizontal
5	7311.0000	52.23	-6.24	74.00	21.77	199	181	Horizontal
6	7311.0000	40.10	-6.24	54.00	13.90	104	318	Horizontal
7	17620.9810	46.20	1.08	54.00	7.80	109	42	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	2886.9717	45.43	11.31	54.00	8.57	125	44	Horizontal
2	2932.4831	57.80	11.39	74.00	16.20	206	277	Horizontal
3	4924.0000	41.91	-14.43	54.00	12.09	202	210	Horizontal
4	4924.0000	48.49	-14.43	74.00	25.51	166	237	Horizontal
5	7386.0000	52.62	-5.71	74.00	21.38	105	45	Horizontal
6	7386.0000	40.79	-5.71	54.00	13.21	145	265	Horizontal
7	17613.4807	45.97	1.28	54.00	8.03	240	292	Horizontal

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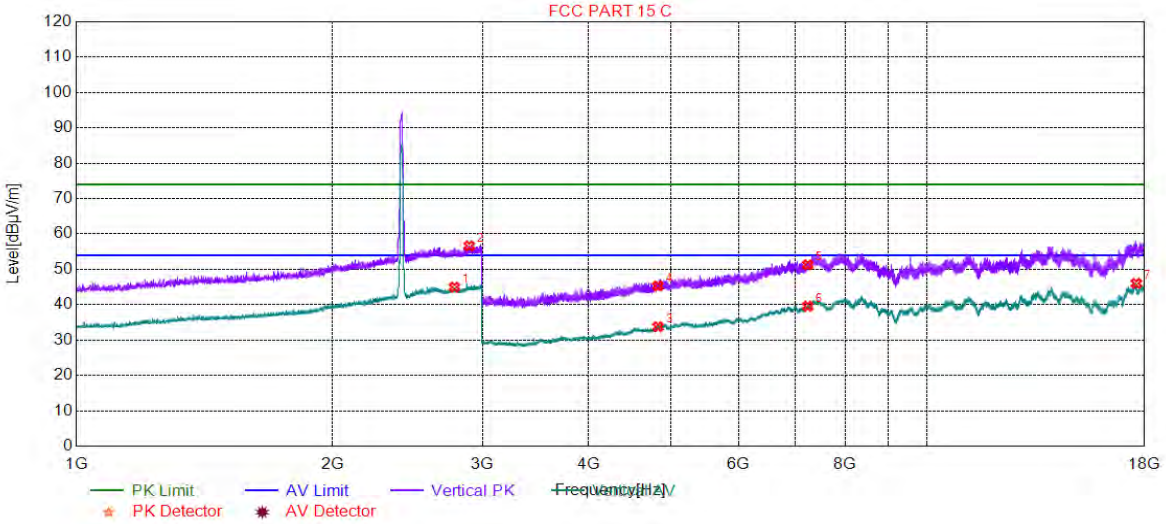
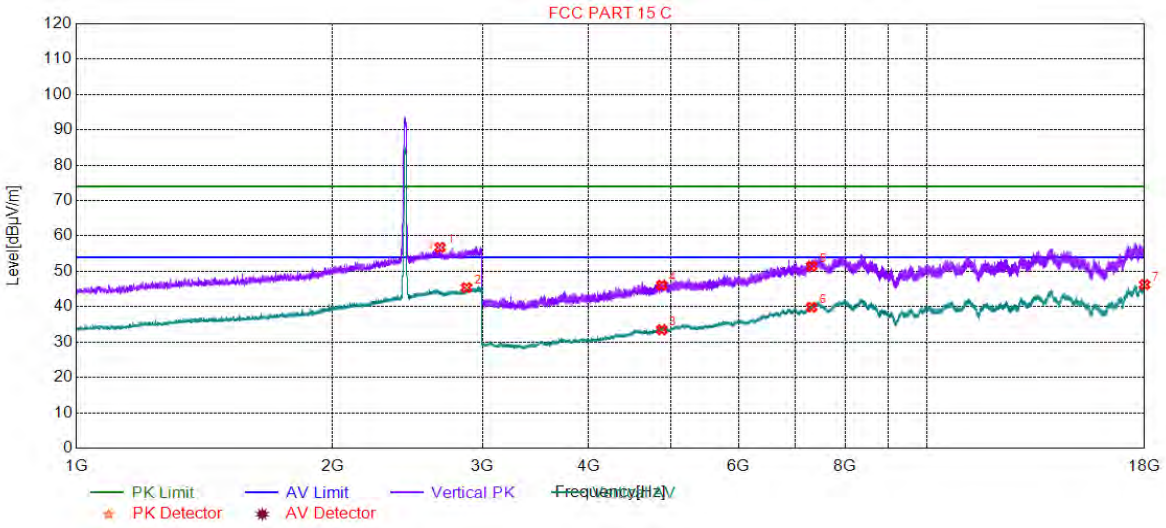
4.9.2.1.7 802.11G_Lowest Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2781.4454	44.98	10.53	54.00	9.02	185	149	Vertical
2	2895.4739	56.65	11.38	74.00	17.35	232	108	Vertical
3	4824.0000	33.77	-14.90	54.00	20.23	246	360	Vertical
4	4824.0000	45.30	-14.90	74.00	28.70	216	46	Vertical
5	7236.0000	51.28	-6.82	74.00	22.72	168	347	Vertical
6	7236.0000	39.58	-6.82	54.00	14.42	245	210	Vertical
7	17602.4801	46.05	1.57	54.00	7.95	234	0	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	2675.4189	56.79	10.14	74.00	17.21	296	178	Vertical
2	2873.9685	45.39	11.21	54.00	8.61	223	233	Vertical
3	4874.0000	33.49	-14.68	54.00	20.51	278	318	Vertical
4	4874.0000	46.10	-14.68	74.00	27.90	294	18	Vertical
5	7311.0000	51.46	-6.24	74.00	22.54	236	73	Vertical
6	7311.0000	39.85	-6.24	54.00	14.15	180	182	Vertical
7	17999.5000	46.25	-0.35	54.00	7.75	287	342	Vertical

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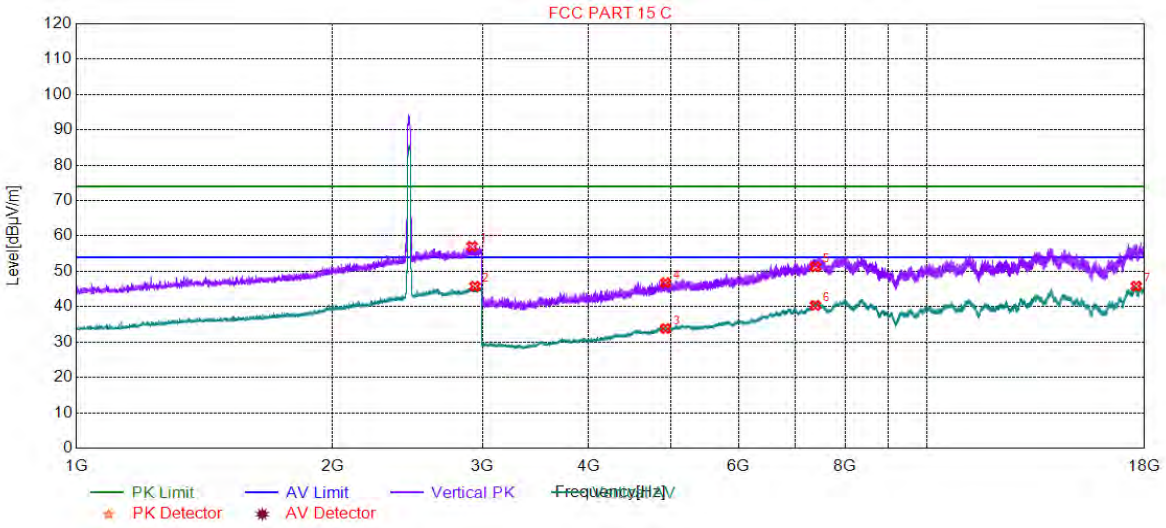
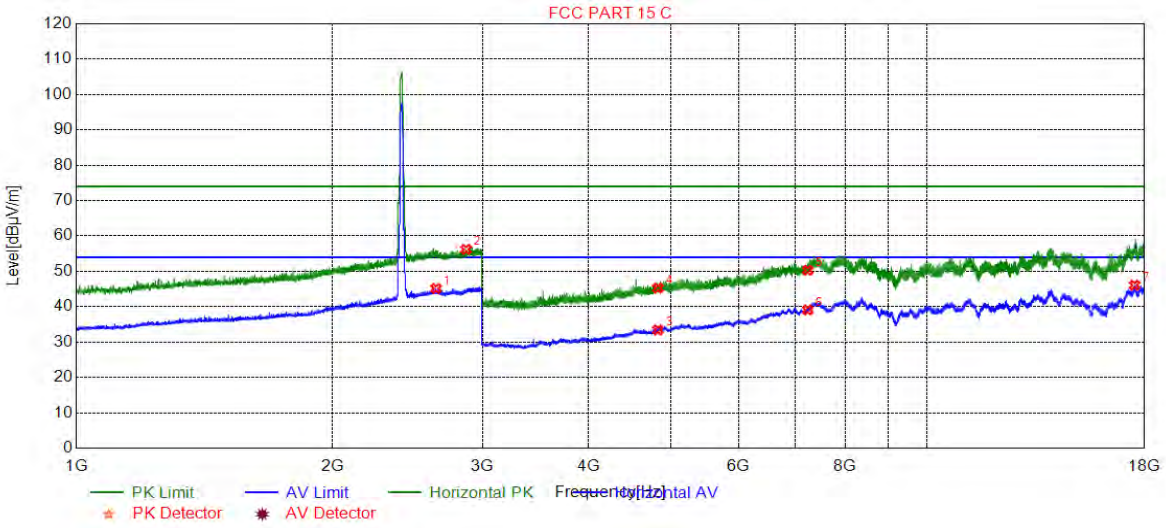
4.9.2.1.9 802.11G_ Highest Channel_ Vertical



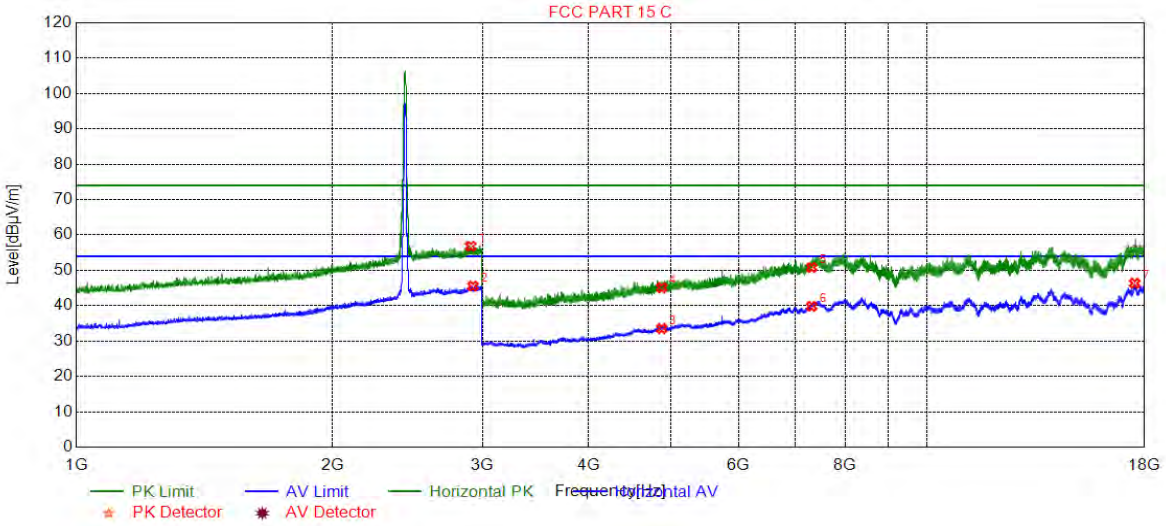
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2917.9795	57.06	11.40	74.00	16.94	169	342	Vertical
2	2939.4849	45.77	11.39	54.00	8.23	282	262	Vertical
3	4924.0000	33.83	-14.43	54.00	20.17	283	101	Vertical
4	4924.0000	46.79	-14.43	74.00	27.21	233	238	Vertical
5	7386.0000	51.28	-5.71	74.00	22.72	168	360	Vertical
6	7386.0000	40.37	-5.71	54.00	13.63	204	183	Vertical
7	17597.4799	45.80	1.60	54.00	8.20	219	41	Vertical

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	2646.9117	45.15	10.26	54.00	8.85	143	58	Horizontal
2	2870.4676	56.22	11.18	74.00	17.78	195	18	Horizontal
3	4824.0000	33.44	-14.90	54.00	20.56	215	360	Horizontal
4	4824.0000	45.25	-14.90	74.00	28.75	113	128	Horizontal
5	7236.0000	50.32	-6.82	74.00	23.68	229	155	Horizontal
6	7236.0000	39.09	-6.82	54.00	14.91	134	264	Horizontal
7	17520.9760	46.09	0.62	54.00	7.91	170	288	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	2906.9767	56.83	11.41	74.00	17.17	169	319	Horizontal
2	2923.4809	45.55	11.40	54.00	8.45	206	360	Horizontal
3	4874.0000	33.52	-14.68	54.00	20.48	221	46	Horizontal
4	4874.0000	45.10	-14.68	74.00	28.90	229	102	Horizontal
5	7311.0000	50.79	-6.24	74.00	23.21	134	135	Horizontal
6	7311.0000	39.82	-6.24	54.00	14.18	130	254	Horizontal
7	17523.9762	46.34	0.66	54.00	7.66	228	142	Horizontal

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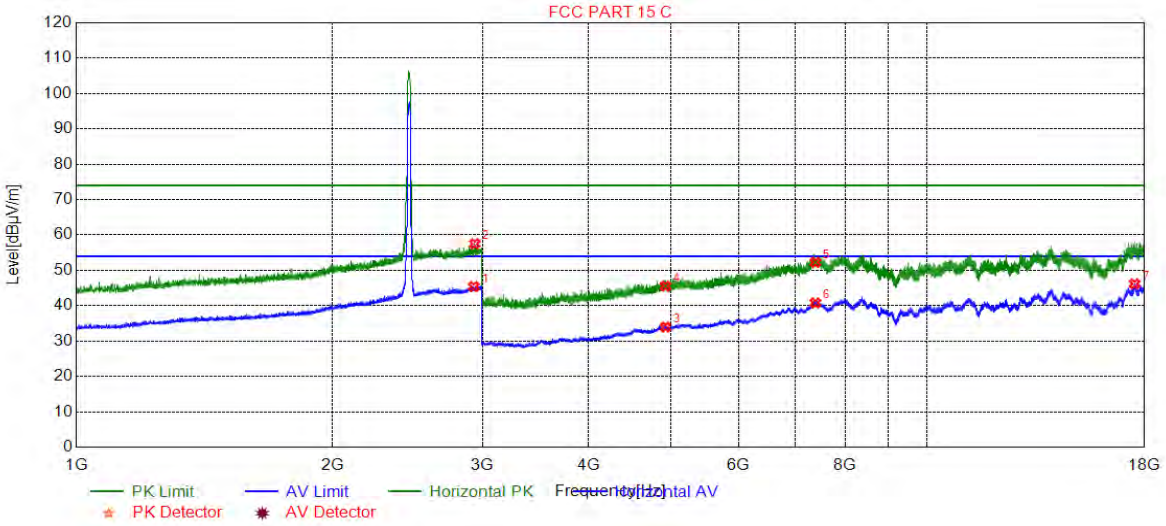
4.9.2.1.12 802.11G_ Highest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2931.4829	45.42	11.39	54.00	8.58	209	358	Horizontal
2	2937.9845	57.52	11.39	74.00	16.48	242	319	Horizontal
3	4924.0000	33.96	-14.43	54.00	20.04	160	128	Horizontal
4	4924.0000	45.53	-14.43	74.00	28.47	161	73	Horizontal
5	7386.0000	52.26	-5.71	74.00	21.74	177	209	Horizontal
6	7386.0000	40.80	-5.71	54.00	13.20	167	128	Horizontal
7	17519.9760	46.17	0.61	54.00	7.83	235	192	Horizontal

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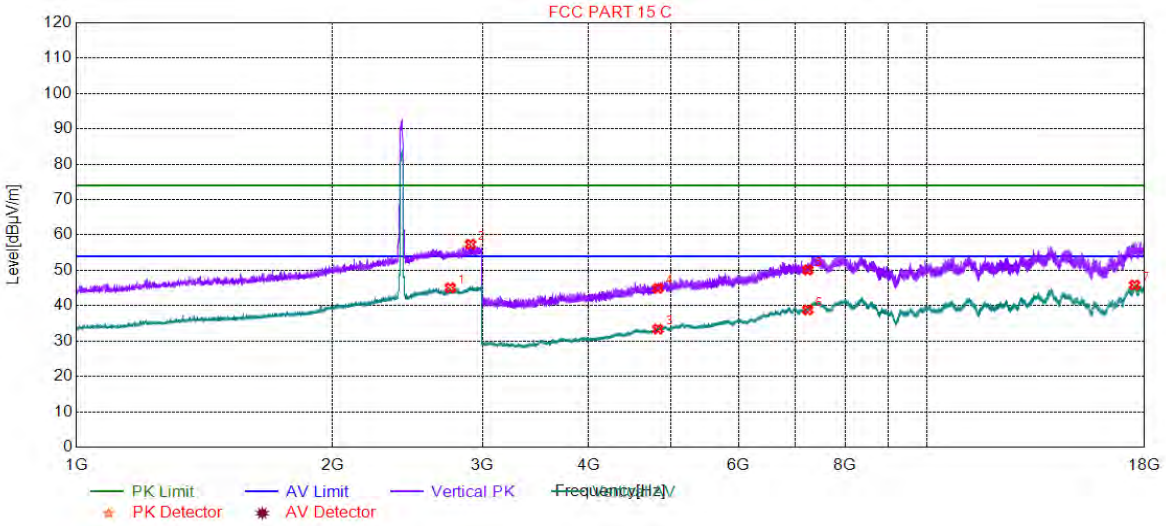
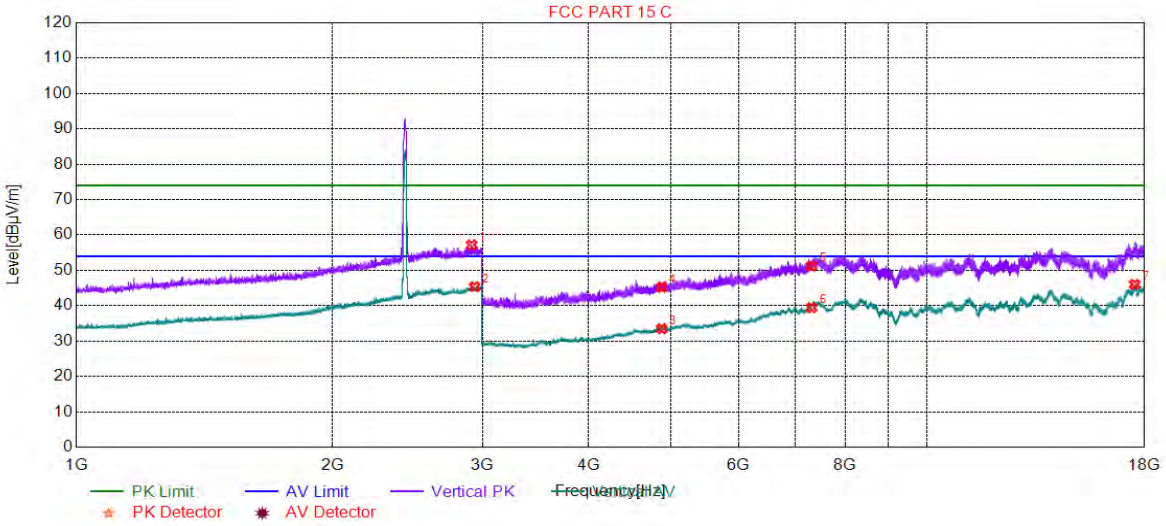
4.9.2.1.13 802.11N20_Lowest Channel_ Vertical



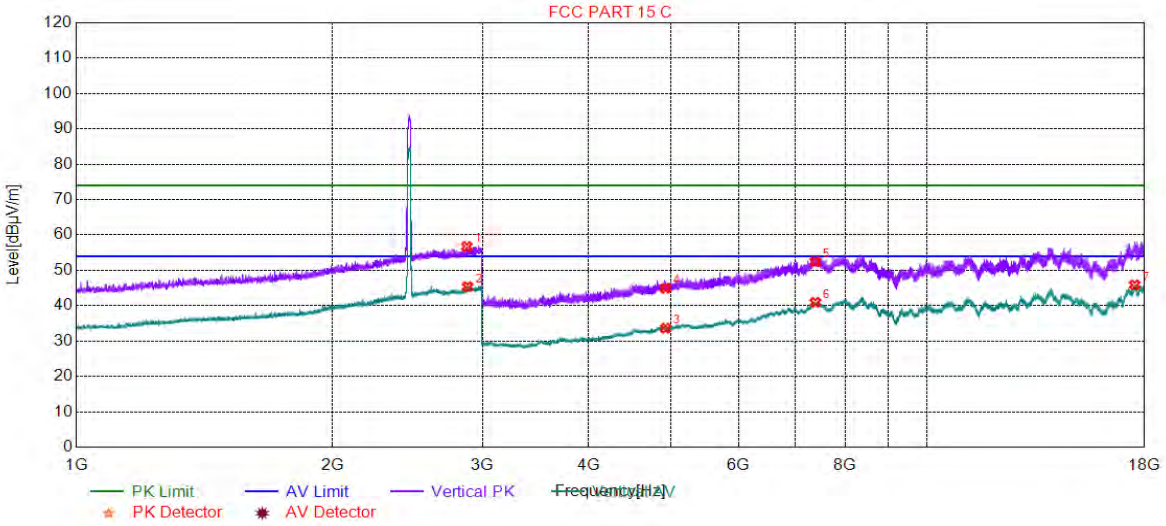
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2750.4376	45.06	10.34	54.00	8.94	253	178	Vertical
2	2905.9765	57.38	11.41	74.00	16.62	244	219	Vertical
3	4824.0000	33.39	-14.90	54.00	20.61	253	360	Vertical
4	4824.0000	44.93	-14.90	74.00	29.07	225	154	Vertical
5	7236.0000	50.09	-6.82	74.00	23.91	281	263	Vertical
6	7236.0000	38.82	-6.82	54.00	15.18	189	18	Vertical
7	17522.4761	45.86	0.64	54.00	8.14	235	0	Vertical

4.9.2.1.14 802.11N20_ Middle Channel_ Vertical



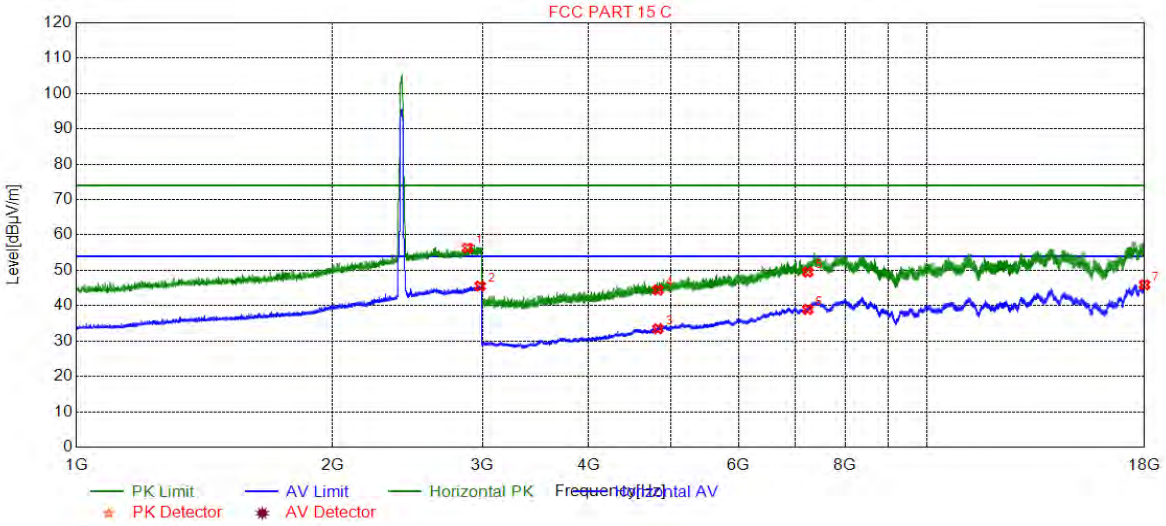
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2914.4786	57.20	11.40	74.00	16.80	166	178	Vertical
2	2937.4844	45.38	11.39	54.00	8.62	157	288	Vertical
3	4874.0000	33.50	-14.68	54.00	20.50	215	73	Vertical
4	4874.0000	45.22	-14.68	74.00	28.78	177	100	Vertical
5	7311.0000	51.22	-6.24	74.00	22.78	194	264	Vertical
6	7311.0000	39.44	-6.24	54.00	14.56	275	292	Vertical
7	17525.4763	46.04	0.68	54.00	7.96	189	0	Vertical

4.9.2.1.15 802.11N20_ Highest Channel_ Vertical



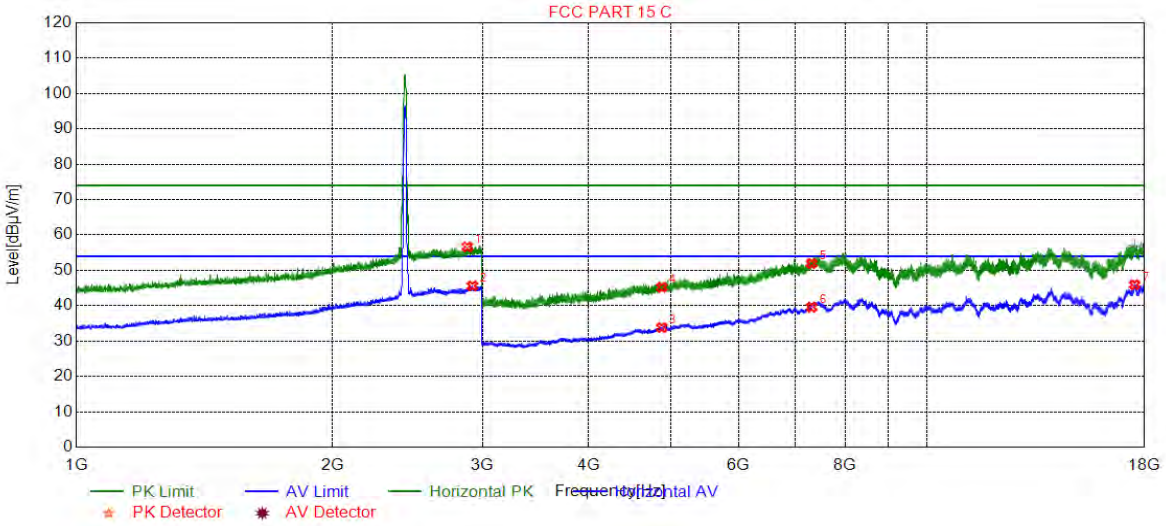
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2876.4691	56.73	11.23	74.00	17.27	215	94	Vertical
2	2882.4706	45.38	11.28	54.00	8.62	213	108	Vertical
3	4924.0000	33.64	-14.43	54.00	20.36	244	319	Vertical
4	4924.0000	44.93	-14.43	74.00	29.07	204	100	Vertical
5	7386.0000	52.48	-5.71	74.00	21.52	151	360	Vertical
6	7386.0000	40.94	-5.71	54.00	13.06	165	319	Vertical
7	17522.9761	45.88	0.64	54.00	8.12	232	242	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	2882.4706	56.35	11.28	74.00	17.65	157	18	Horizontal
2	2981.9955	45.56	11.37	54.00	8.44	154	72	Horizontal
3	4824.0000	33.47	-14.90	54.00	20.53	240	46	Horizontal
4	4824.0000	44.44	-14.90	74.00	29.56	176	320	Horizontal
5	7236.0000	49.51	-6.82	74.00	24.49	110	265	Horizontal
6	7236.0000	38.96	-6.82	54.00	15.04	116	238	Horizontal
7	17999.5000	45.94	-0.35	54.00	8.06	119	242	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	2880.9702	56.64	11.26	74.00	17.36	147	223	Horizontal
2	2919.4799	45.59	11.40	54.00	8.41	108	155	Horizontal
3	4874.0000	33.81	-14.68	54.00	20.19	140	154	Horizontal
4	4874.0000	45.21	-14.68	74.00	28.79	175	127	Horizontal
5	7311.0000	51.96	-6.24	74.00	22.04	187	345	Horizontal
6	7311.0000	39.59	-6.24	54.00	14.41	184	236	Horizontal
7	17519.9760	45.94	0.61	54.00	8.06	247	0	Horizontal

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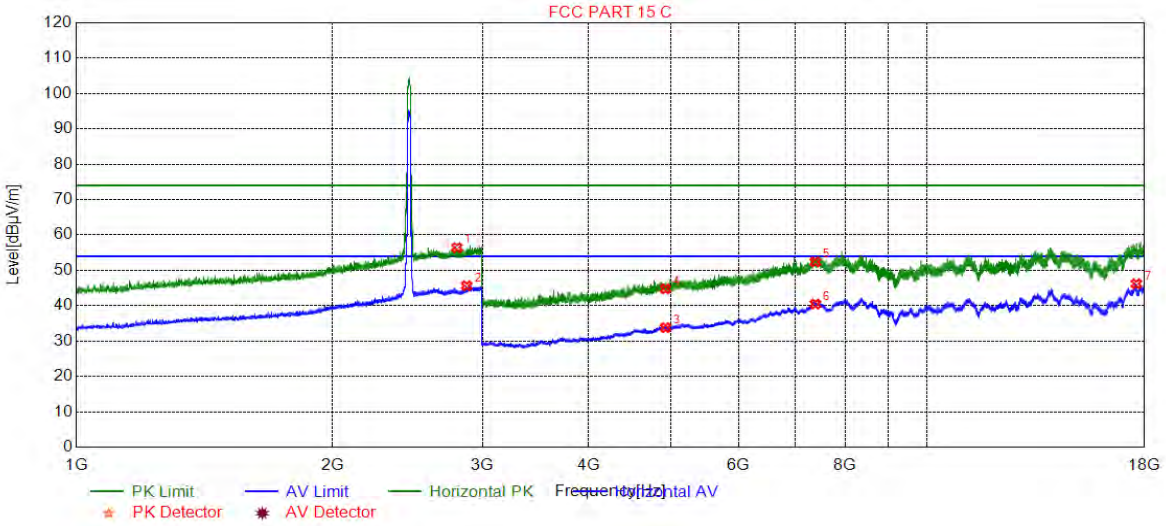
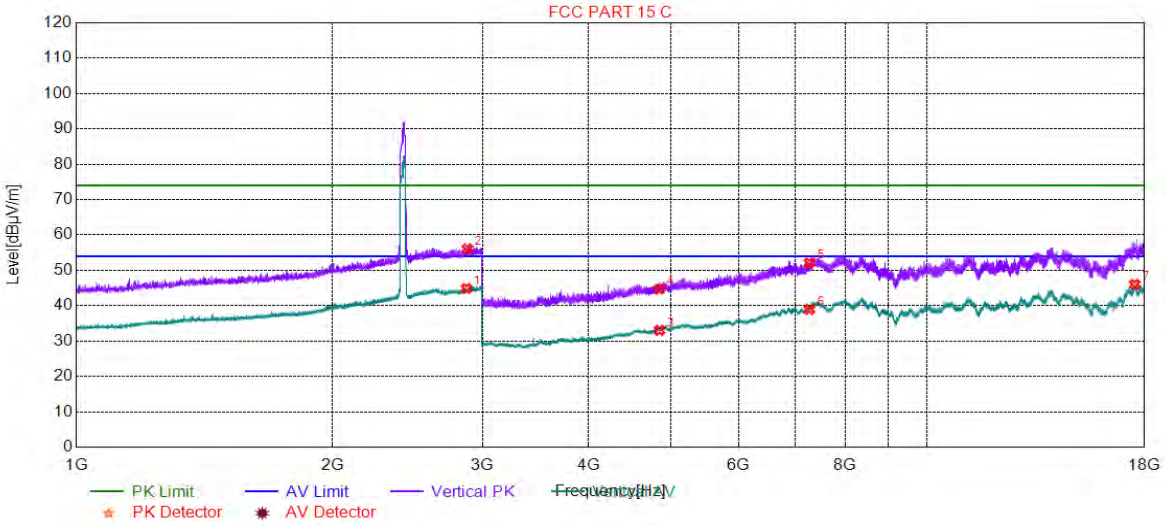
4.9.2.1.18 802.11N20_ Highest Channel_ Horizontal



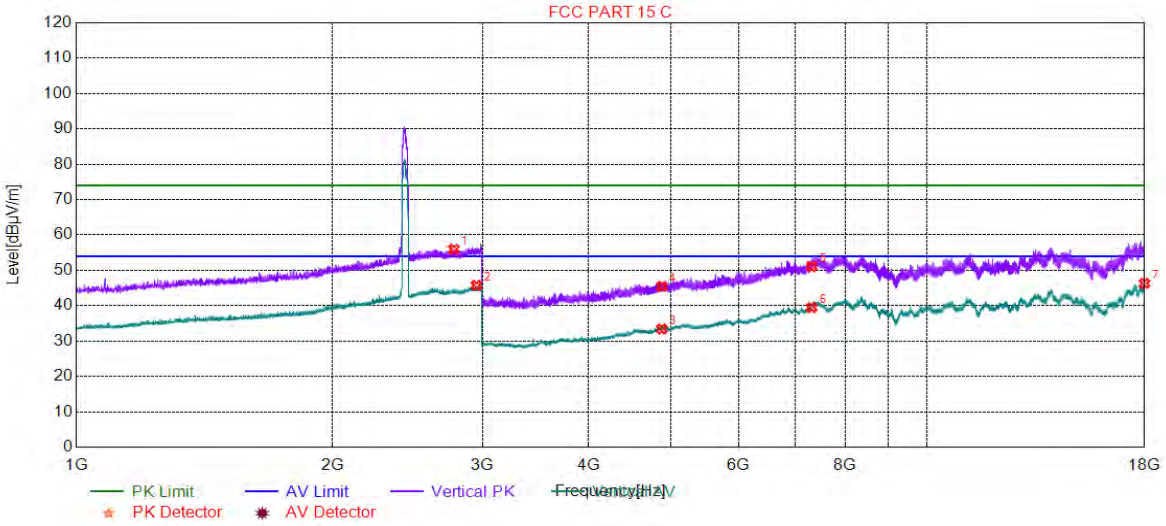
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2800.9502	56.45	10.65	74.00	17.55	129	238	Horizontal
2	2874.4686	45.64	11.21	54.00	8.36	172	18	Horizontal
3	4924.0000	33.80	-14.43	54.00	20.20	237	292	Horizontal
4	4924.0000	44.74	-14.43	74.00	29.26	202	237	Horizontal
5	7386.0000	52.38	-5.71	74.00	21.62	176	360	Horizontal
6	7386.0000	40.46	-5.71	54.00	13.54	111	73	Horizontal
7	17603.9802	46.21	1.53	54.00	7.79	109	292	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	2873.4684	44.86	11.21	54.00	9.14	233	28	Vertical
2	2880.9702	56.09	11.26	74.00	17.91	184	178	Vertical
3	4844.0000	33.06	-14.81	54.00	20.94	192	46	Vertical
4	4844.0000	44.71	-14.81	74.00	29.29	264	320	Vertical
5	7266.0000	52.10	-6.58	74.00	21.90	195	265	Vertical
6	7266.0000	38.99	-6.58	54.00	15.01	237	128	Vertical
7	17526.9763	46.04	0.70	54.00	7.96	279	192	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	2776.9442	55.98	10.50	74.00	18.02	194	178	Vertical
2	2951.9880	45.75	11.38	54.00	8.25	221	328	Vertical
3	4874.0000	33.42	-14.68	54.00	20.58	231	238	Vertical
4	4874.0000	45.47	-14.68	74.00	28.53	286	360	Vertical
5	7311.0000	51.05	-6.24	74.00	22.95	226	128	Vertical
6	7311.0000	39.50	-6.24	54.00	14.50	179	265	Vertical
7	17992.4996	46.30	-0.41	54.00	7.70	210	91	Vertical

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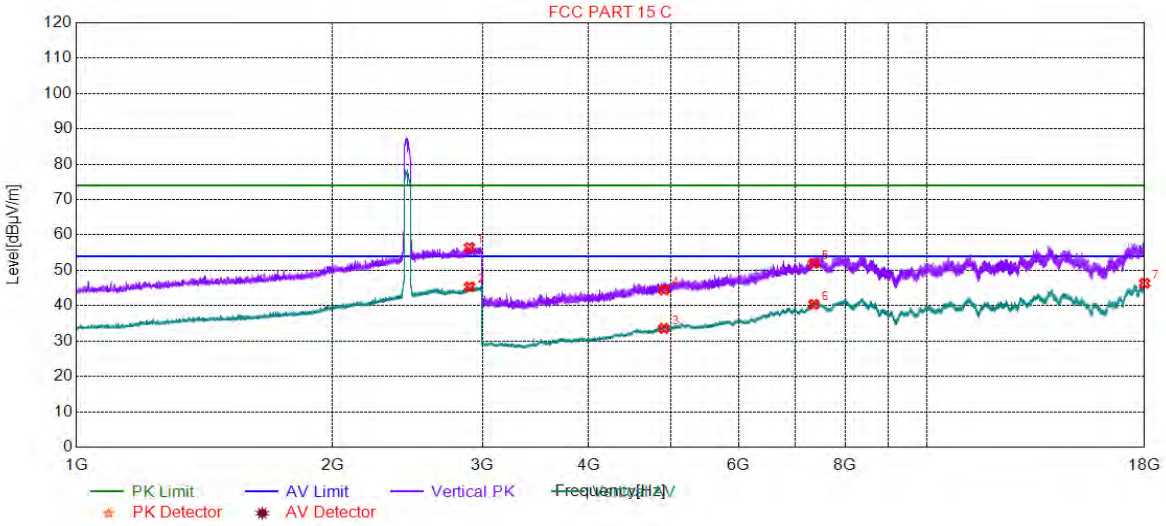
4.9.2.1.21 802.11N40_ Highest Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2897.4744	56.48	11.39	74.00	17.52	173	27	Vertical
2	2898.4746	45.32	11.40	54.00	8.68	291	315	Vertical
3	4904.0000	33.57	-14.54	54.00	20.43	279	320	Vertical
4	4904.0000	44.47	-14.54	74.00	29.53	277	156	Vertical
5	7356.0000	51.98	-5.92	74.00	22.02	250	73	Vertical
6	7356.0000	40.39	-5.92	54.00	13.61	156	46	Vertical
7	18000.0000	46.34	-0.35	54.00	7.66	257	41	Vertical

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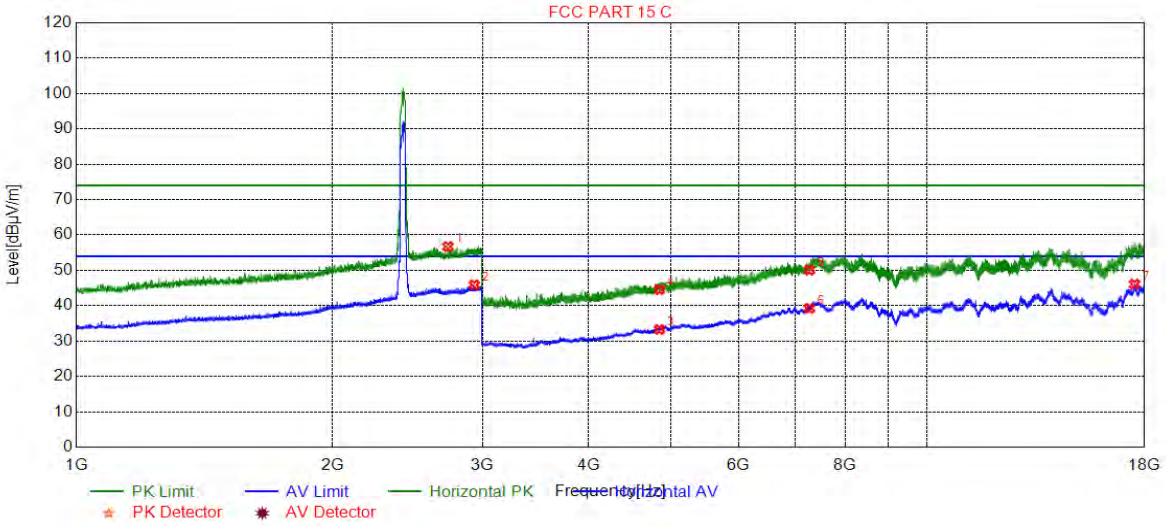
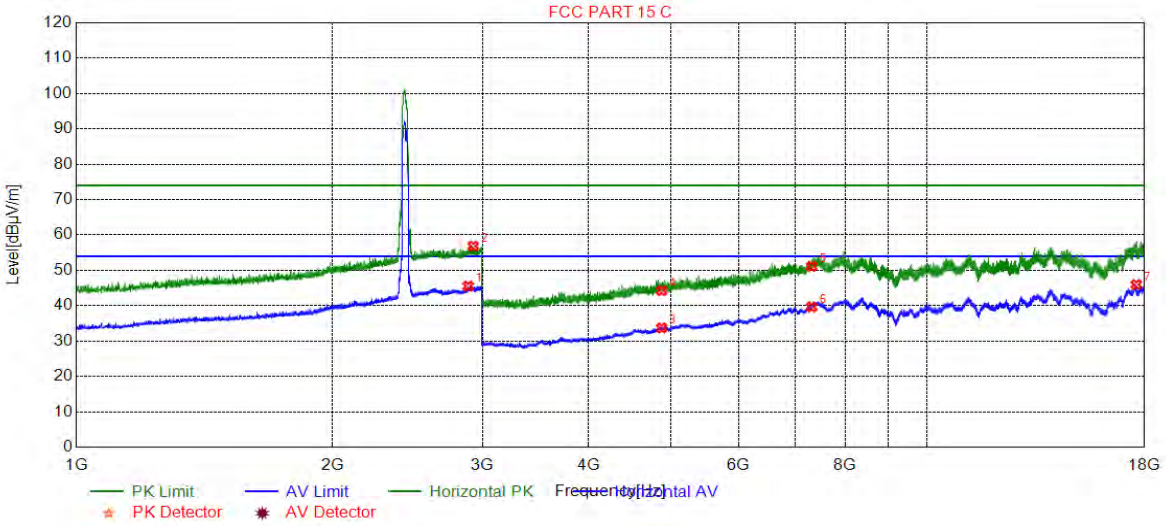
4.9.2.1.22 802.11N40_Lowest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2732.9332	56.73	10.24	74.00	17.27	142	360	Horizontal
2	2934.9837	45.90	11.39	54.00	8.10	158	86	Horizontal
3	4844.0000	33.29	-14.81	54.00	20.71	226	100	Horizontal
4	4844.0000	44.55	-14.81	74.00	29.45	172	360	Horizontal
5	7266.0000	50.08	-6.58	74.00	23.92	230	209	Horizontal
6	7266.0000	39.25	-6.58	54.00	14.75	169	154	Horizontal
7	17517.9759	46.11	0.58	54.00	7.89	146	0	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	2886.4716	45.54	11.31	54.00	8.46	130	278	Horizontal
2	2926.4816	56.87	11.40	74.00	17.13	102	334	Horizontal
3	4874.0000	33.73	-14.68	54.00	20.27	197	208	Horizontal
4	4874.0000	44.25	-14.68	74.00	29.75	115	290	Horizontal
5	7311.0000	51.13	-6.24	74.00	22.87	126	127	Horizontal
6	7311.0000	39.64	-6.24	54.00	14.36	203	344	Horizontal
7	17600.4800	45.98	1.62	54.00	8.02	196	141	Horizontal

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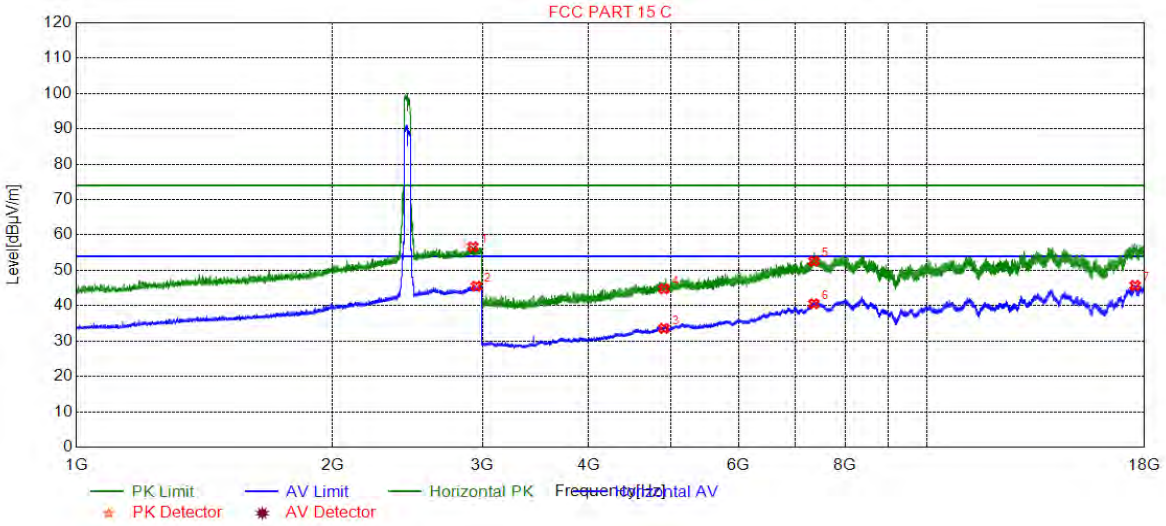
4.9.2.1.24 802.11N40_ Highest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2923.9810	56.66	11.40	74.00	17.34	183	277	Horizontal
2	2951.9880	45.52	11.38	54.00	8.48	163	18	Horizontal
3	4904.0000	33.59	-14.54	54.00	20.41	220	128	Horizontal
4	4904.0000	44.76	-14.54	74.00	29.24	192	18	Horizontal
5	7356.0000	52.60	-5.92	74.00	21.40	189	208	Horizontal
6	7356.0000	40.57	-5.92	54.00	13.43	121	128	Horizontal
7	17542.9771	45.72	0.90	54.00	8.28	232	342	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:			

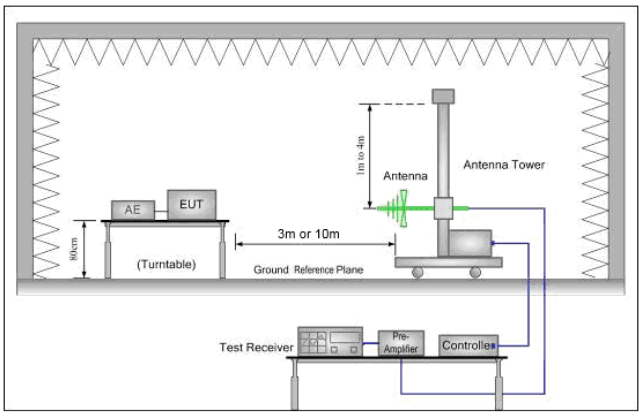


Figure 1. 30MHz to 1GHz

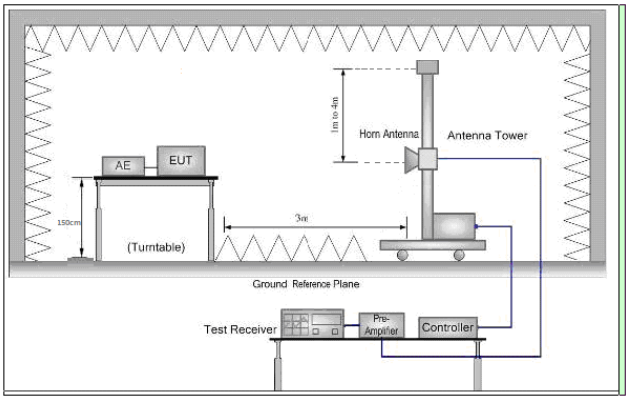


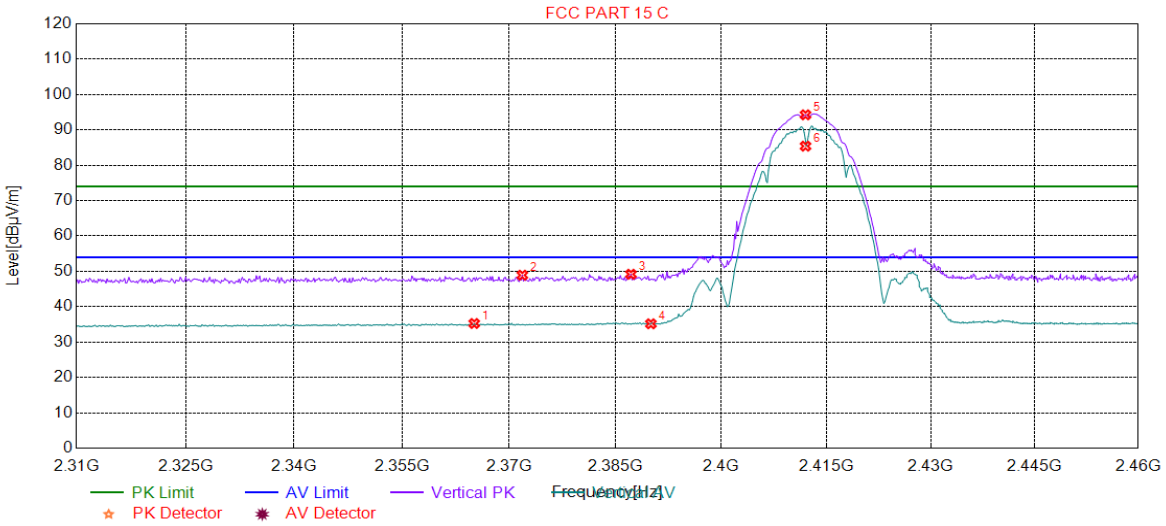
Figure 2. Above 1 GHz

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:

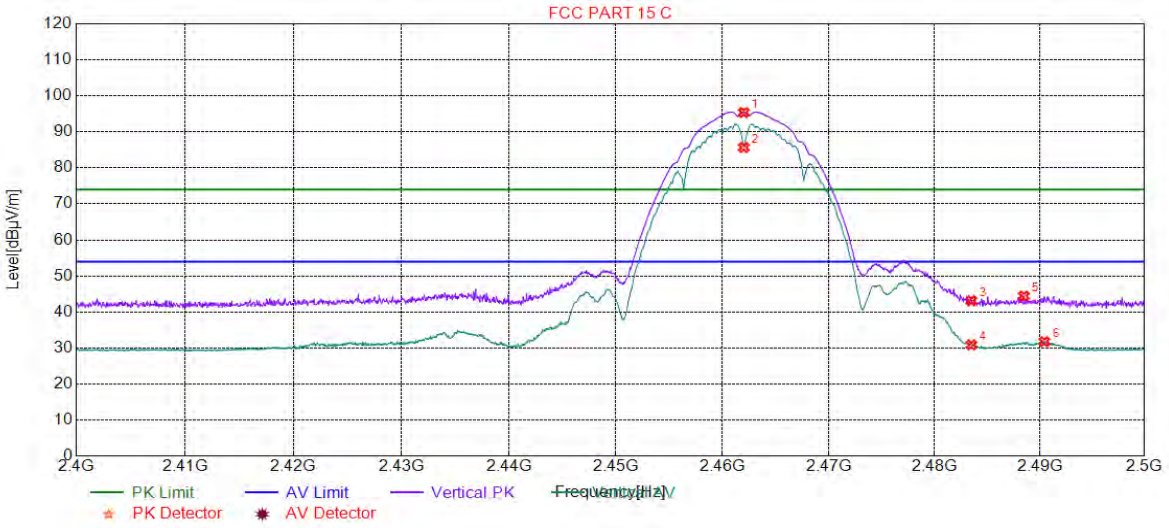
4.10.1 ANT1

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	2365.1051	35.26	9.11	54.00	18.74	171	288	Vertical
2	2371.8619	48.92	9.14	74.00	25.08	180	305	Vertical
3	2387.1772	49.19	9.19	74.00	24.81	276	133	Vertical
4	2390.0000	35.17	9.20	54.00	18.83	196	257	Vertical
5	2412.0000	94.26	9.27	74.00	-20.26	179	62	Vertical
6	2412.0000	85.40	9.27	54.00	-31.40	196	67	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	2462.0000	95.38	9.43	74.00	-21.38	175	297	Vertical
2	2462.0000	85.67	9.43	54.00	-31.67	220	302	Vertical
3	2483.5000	43.14	9.50	74.00	30.86	151	335	Vertical
4	2483.5000	30.87	9.50	54.00	23.13	266	302	Vertical
5	2488.4942	44.44	9.51	74.00	29.56	282	75	Vertical
6	2490.4452	31.77	9.52	54.00	22.23	167	297	Vertical

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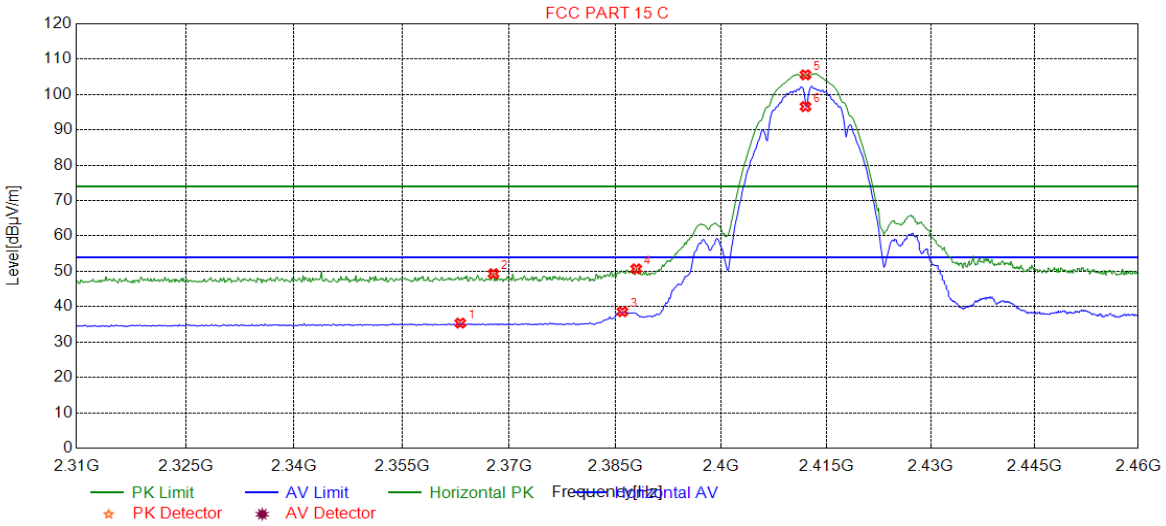
4.10.1.3 802.11B_Lowest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2363.1532	35.36	9.11	54.00	18.64	204	252	Horizontal
2	2367.8078	49.35	9.12	74.00	24.65	109	54	Horizontal
3	2385.9760	38.60	9.18	54.00	15.40	237	188	Horizontal
4	2387.9279	50.70	9.19	74.00	23.30	169	201	Horizontal
5	2412.0000	105.57	9.27	74.00	-31.57	155	188	Horizontal
6	2412.0000	96.58	9.27	54.00	-42.58	166	188	Horizontal

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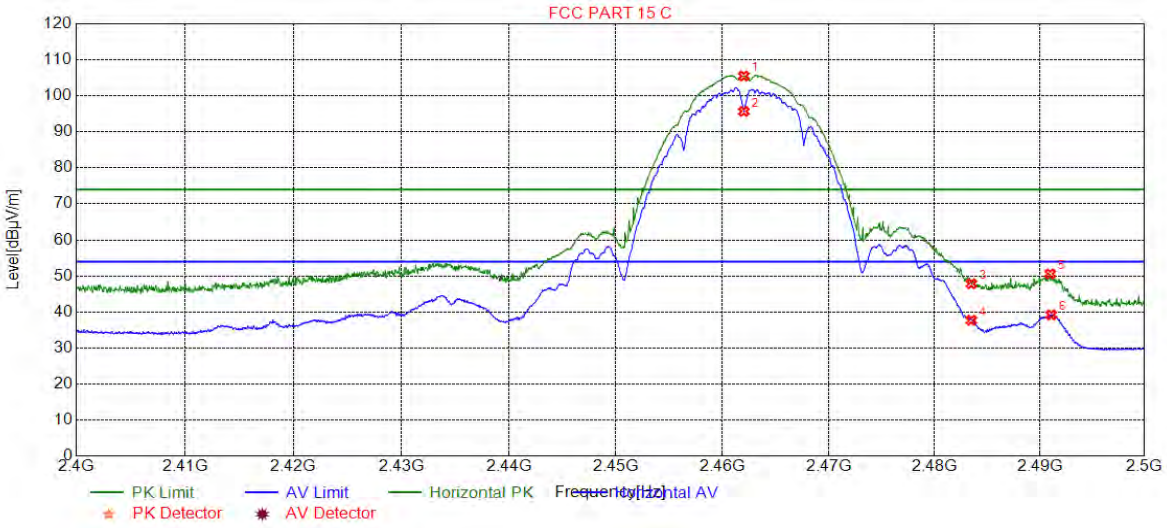
4.10.1.4 802.11B_ Highest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	105.51	9.43	74.00	-31.51	215	205	Horizontal
2	2462.0000	95.67	9.43	54.00	-41.67	160	194	Horizontal
3	2483.5000	47.84	9.50	74.00	26.16	215	199	Horizontal
4	2483.5000	37.71	9.50	54.00	16.29	127	199	Horizontal
5	2490.9955	50.59	9.52	74.00	23.41	171	199	Horizontal
6	2491.0955	39.21	9.52	54.00	14.79	239	194	Horizontal

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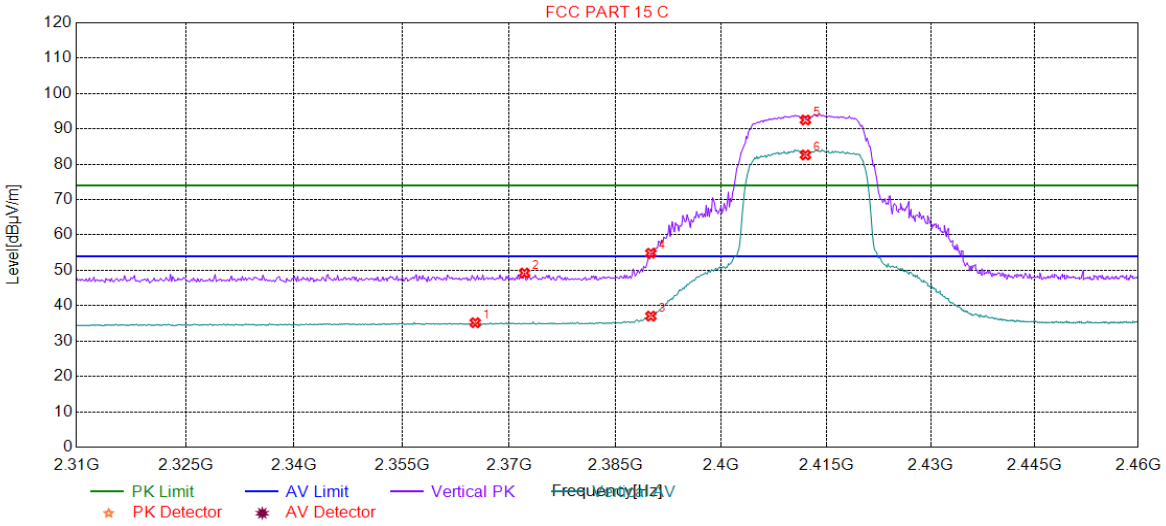
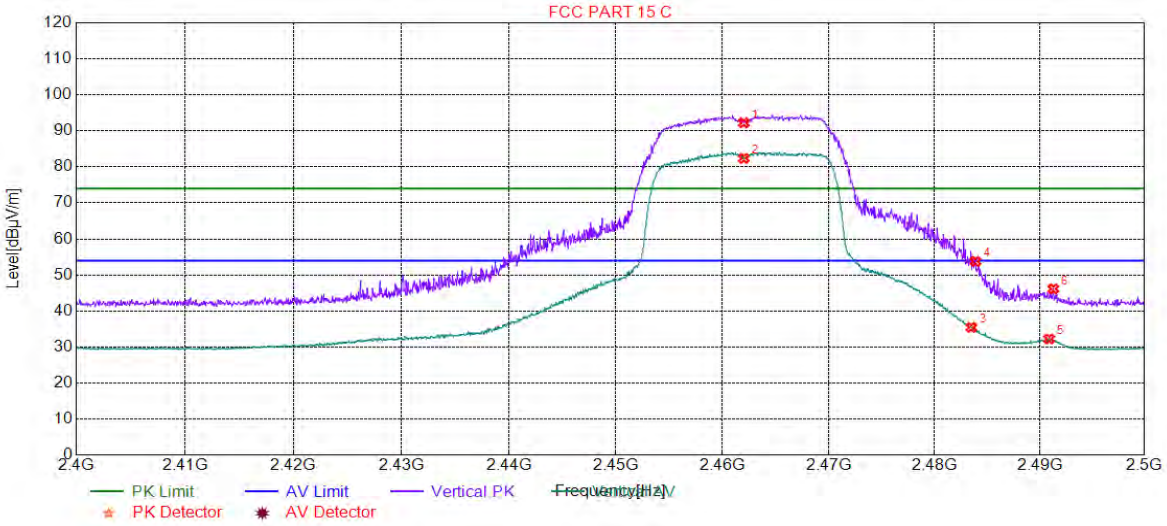
4.10.1.5 802.11G_Lowest Channel_ Vertical



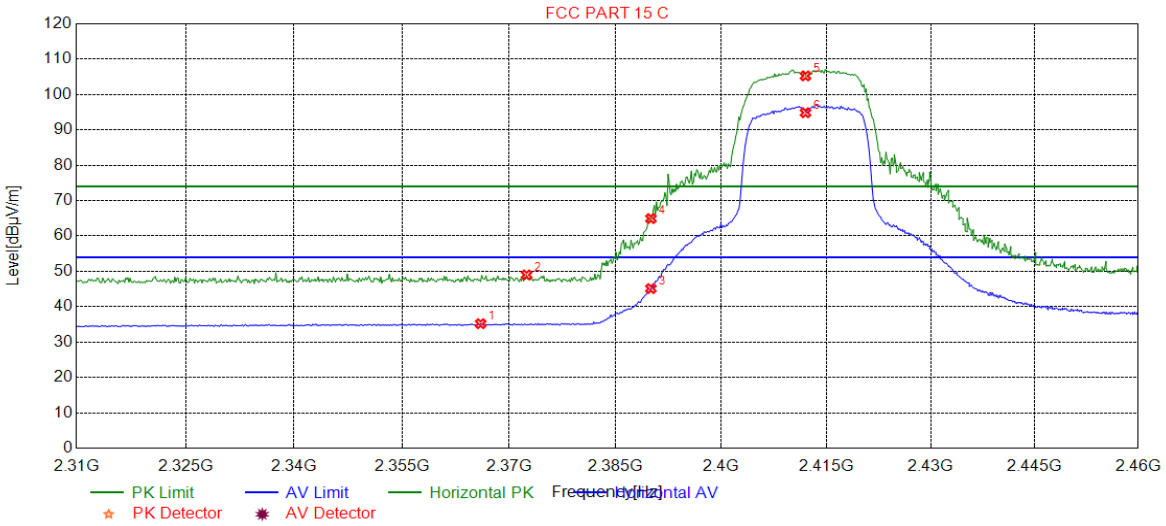
Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2365.2553	35.19	9.12	54.00	18.81	153	346	Vertical
2	2372.1622	49.25	9.14	74.00	24.75	159	264	Vertical
3	2390.0000	37.06	9.20	54.00	16.94	215	66	Vertical
4	2390.0000	54.85	9.20	74.00	19.15	202	62	Vertical
5	2412.0000	92.51	9.27	74.00	-18.51	222	346	Vertical
6	2412.0000	82.63	9.27	54.00	-28.63	274	346	Vertical

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	2462.0000	92.24	9.43	74.00	-18.24	186	299	Vertical
2	2462.0000	82.36	9.43	54.00	-28.36	197	299	Vertical
3	2483.5000	35.43	9.50	54.00	18.57	264	198	Vertical
4	2483.8919	53.78	9.50	74.00	20.22	212	304	Vertical
5	2490.8954	32.25	9.52	54.00	21.75	247	198	Vertical
6	2491.2956	46.16	9.52	74.00	27.84	257	198	Vertical

4.10.1.7 802.11G_Lowest Channel_ Horizontal



NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2366.0060	35.21	9.12	54.00	18.79	224	158	Horizontal
2	2372.4625	49.00	9.14	74.00	25.00	114	49	Horizontal
3	2390.0000	45.14	9.20	54.00	8.86	242	199	Horizontal
4	2390.0000	64.93	9.20	74.00	9.07	200	221	Horizontal
5	2412.0000	105.27	9.27	74.00	-31.27	173	204	Horizontal
6	2412.0000	94.85	9.27	54.00	-40.85	117	195	Horizontal

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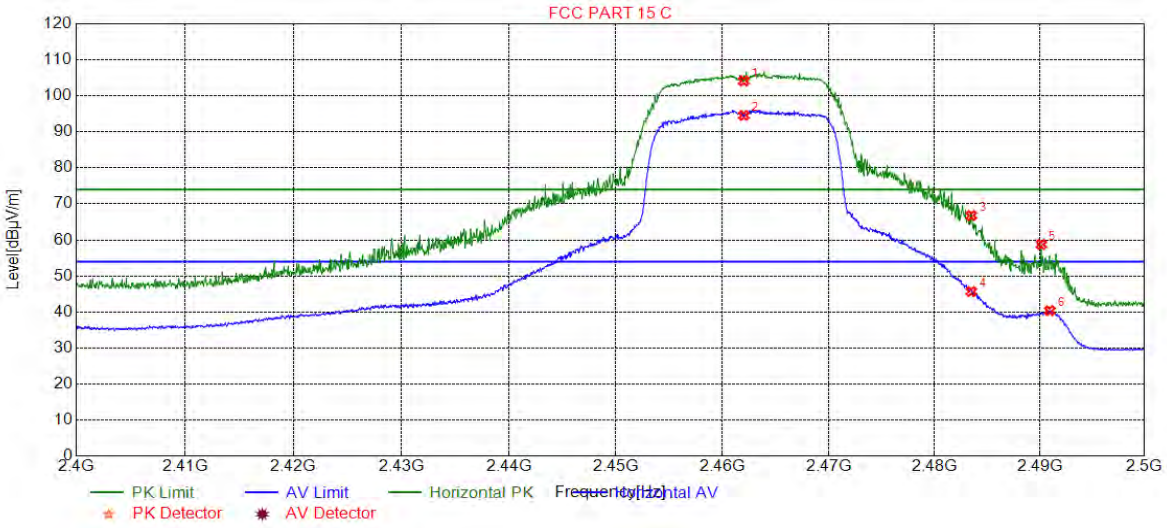
4.10.1.8 802.11G_ Highest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	104.11	9.43	74.00	-30.11	100	206	Horizontal
2	2462.0000	94.55	9.43	54.00	-40.55	185	200	Horizontal
3	2483.5000	66.79	9.50	74.00	7.21	234	333	Horizontal
4	2483.5000	45.70	9.50	54.00	8.30	147	206	Horizontal
5	2490.1451	58.74	9.52	74.00	15.26	110	339	Horizontal
6	2490.9455	40.37	9.52	54.00	13.63	164	206	Horizontal

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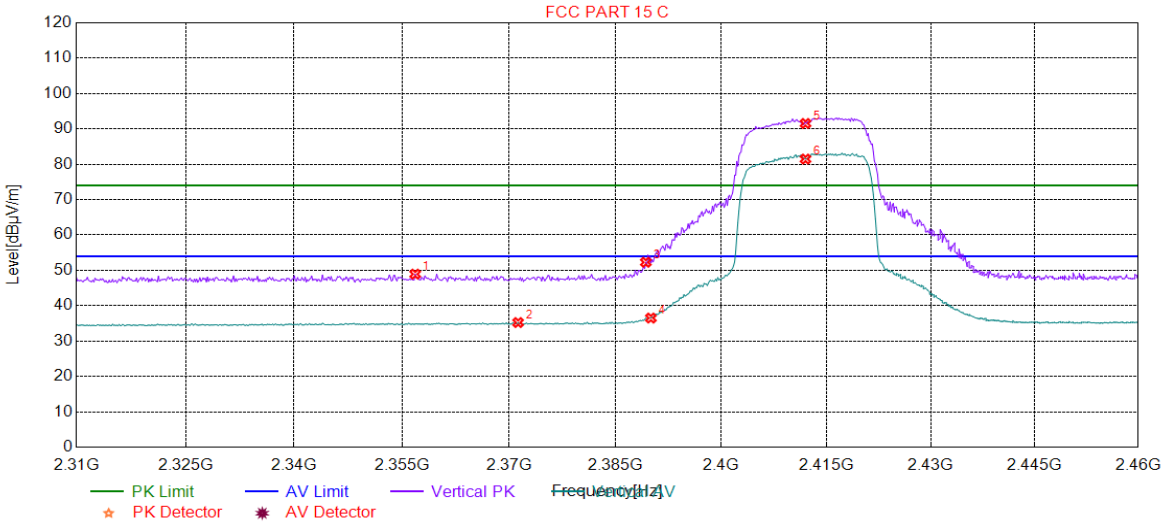
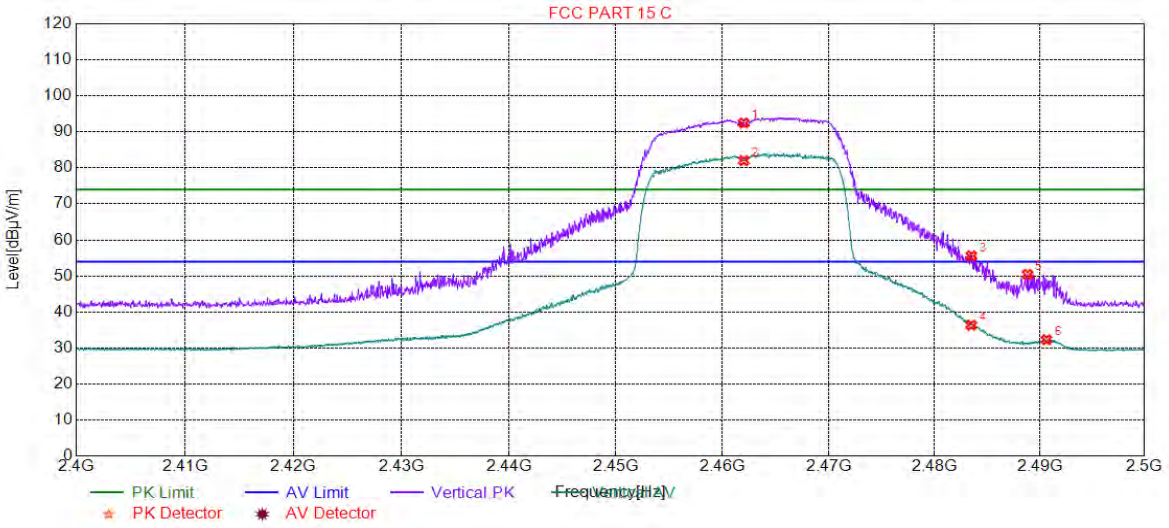
4.10.1.9 802.11N20_Lowest Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2356.8468	48.94	9.09	74.00	25.06	261	346	Vertical
2	2371.2613	35.25	9.14	54.00	18.75	153	39	Vertical
3	2389.2793	52.29	9.19	74.00	21.71	243	30	Vertical
4	2390.0000	36.51	9.20	54.00	17.49	255	176	Vertical
5	2412.0000	91.54	9.27	74.00	-17.54	228	297	Vertical
6	2412.0000	81.47	9.27	54.00	-27.47	276	301	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	2462.0000	92.48	9.43	74.00	-18.48	185	302	Vertical
2	2462.0000	82.01	9.43	54.00	-28.01	266	308	Vertical
3	2483.5000	55.60	9.50	74.00	18.40	232	182	Vertical
4	2483.5000	36.32	9.50	54.00	17.68	257	182	Vertical
5	2488.8444	50.43	9.51	74.00	23.57	285	302	Vertical
6	2490.6453	32.32	9.52	54.00	21.68	163	302	Vertical

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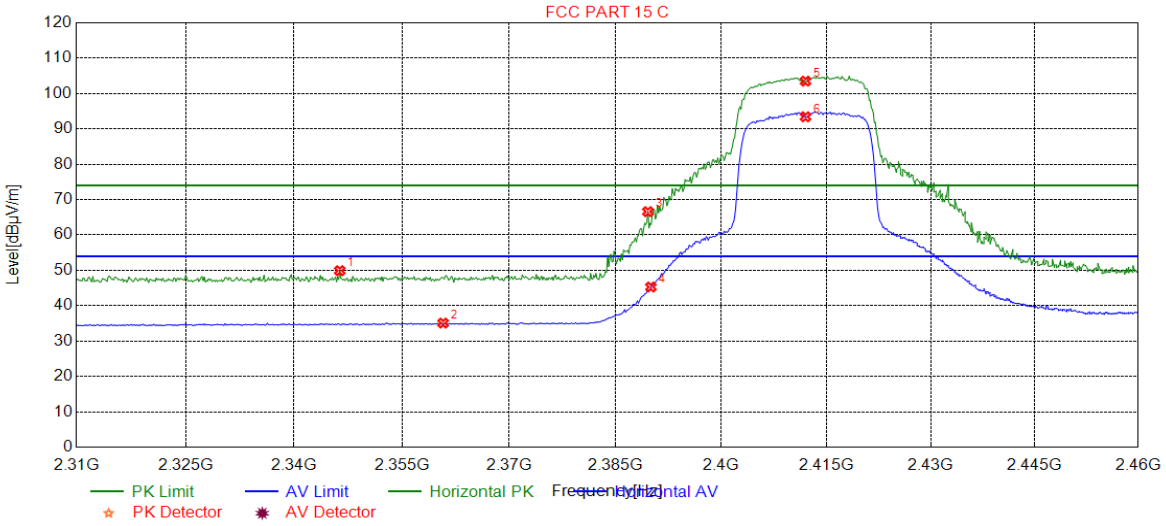
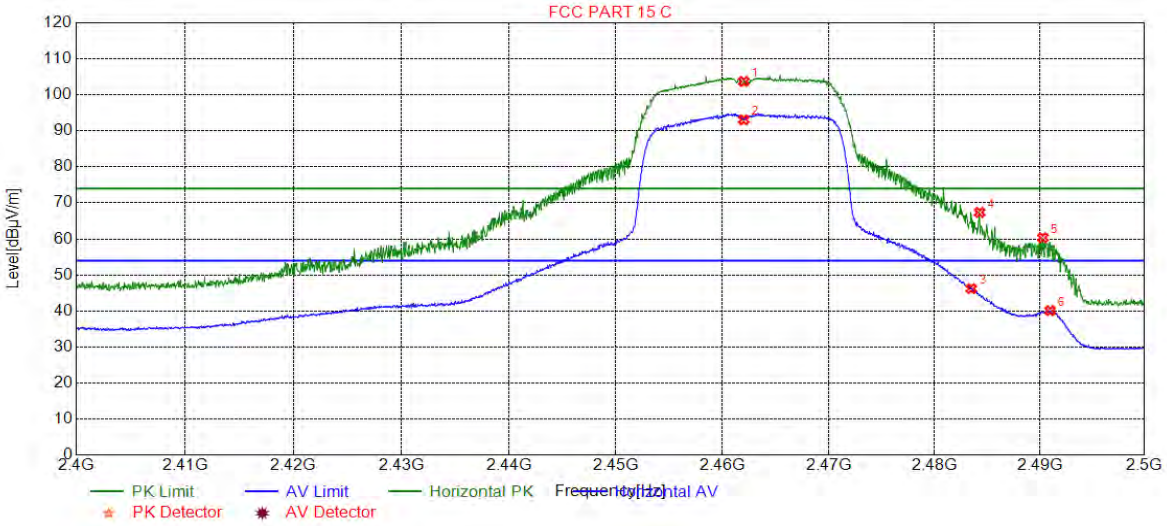
4.10.1.11 802.11N20_Lowest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2346.3363	49.91	9.05	74.00	24.09	158	224	Horizontal
2	2360.7508	35.09	9.10	54.00	18.91	211	303	Horizontal
3	2389.5796	66.60	9.20	74.00	7.40	111	199	Horizontal
4	2390.0000	45.29	9.20	54.00	8.71	103	194	Horizontal
5	2412.0000	103.50	9.27	74.00	-29.50	185	199	Horizontal
6	2412.0000	93.42	9.27	54.00	-39.42	182	190	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	2462.0000	103.70	9.43	74.00	-29.70	174	204	Horizontal
2	2462.0000	93.09	9.43	54.00	-39.09	185	199	Horizontal
3	2483.5000	46.21	9.50	54.00	7.79	196	204	Horizontal
4	2484.2921	67.37	9.50	74.00	6.63	259	199	Horizontal
5	2490.2951	60.34	9.52	74.00	13.66	296	204	Horizontal
6	2490.9955	40.07	9.52	54.00	13.93	241	204	Horizontal

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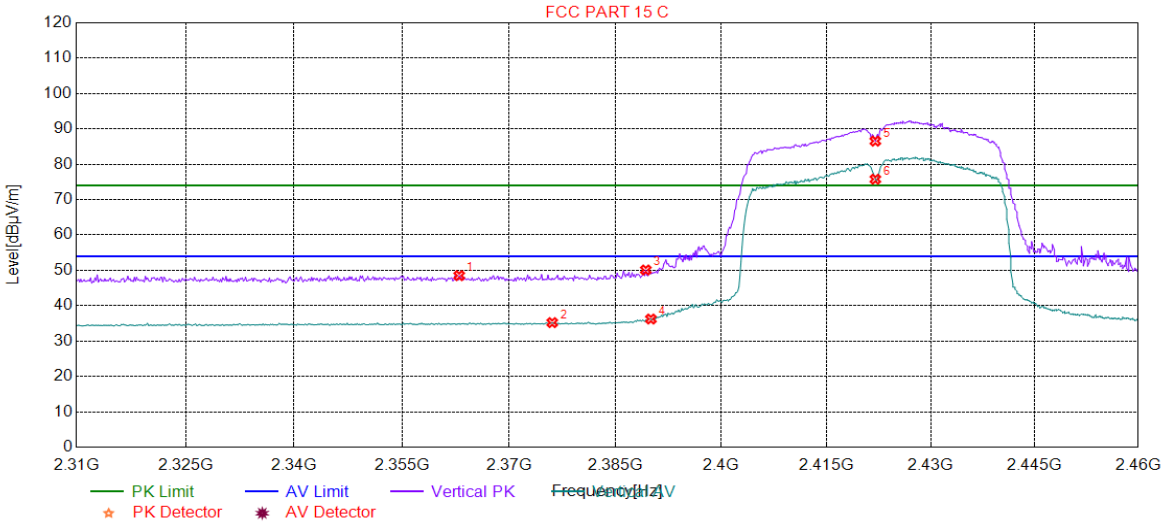
4.10.1.13 802.11N40_Lowest Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2363.0030	48.51	9.11	74.00	25.49	150	248	Vertical
2	2376.0661	35.22	9.15	54.00	18.78	204	100	Vertical
3	2389.2793	50.11	9.19	74.00	23.89	291	302	Vertical
4	2390.0000	36.24	9.20	54.00	17.76	253	306	Vertical
5	2422.0000	86.54	9.30	74.00	-12.54	259	302	Vertical
6	2422.0000	75.77	9.30	54.00	-21.77	283	302	Vertical

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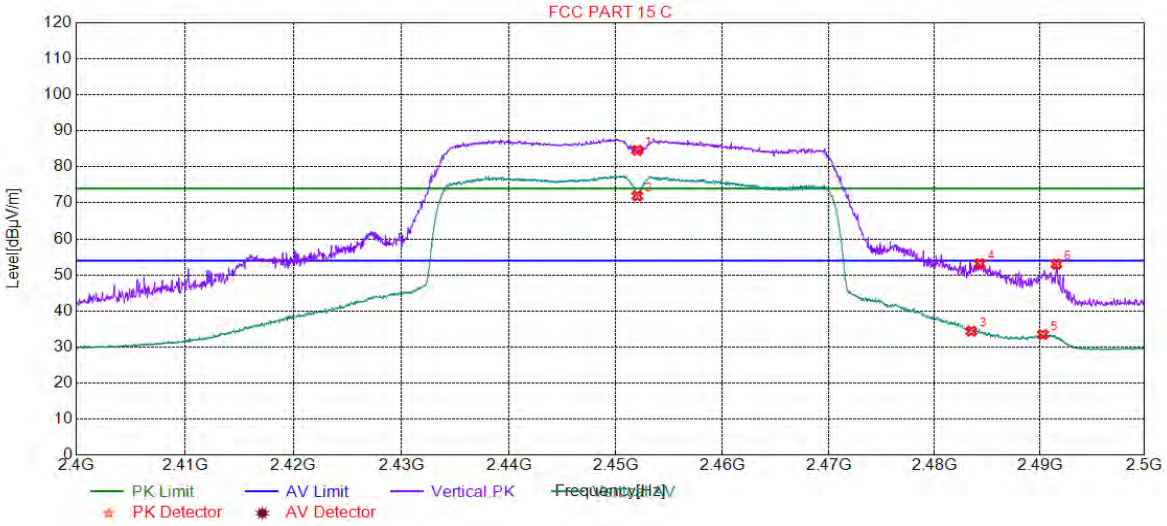
4.10.1.14 802.11N40_ Highest Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2452.0000	84.60	9.40	74.00	-10.60	151	94	Vertical
2	2452.0000	71.93	9.40	54.00	-17.93	236	94	Vertical
3	2483.5000	34.40	9.50	54.00	19.60	262	319	Vertical
4	2484.2921	53.15	9.50	74.00	20.85	227	314	Vertical
5	2490.2951	33.45	9.52	54.00	20.55	255	94	Vertical
6	2491.5958	53.01	9.52	74.00	20.99	166	94	Vertical

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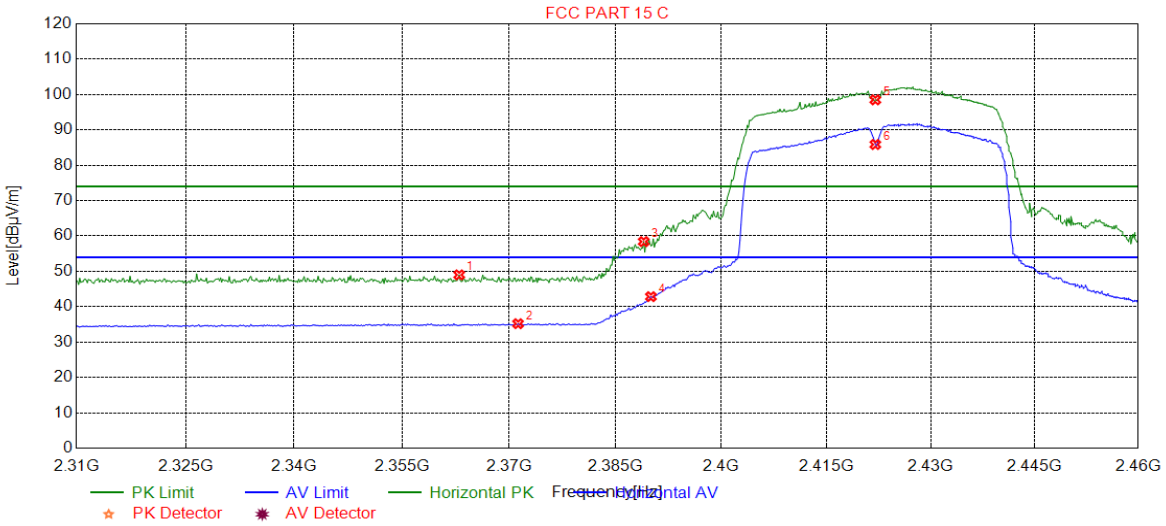
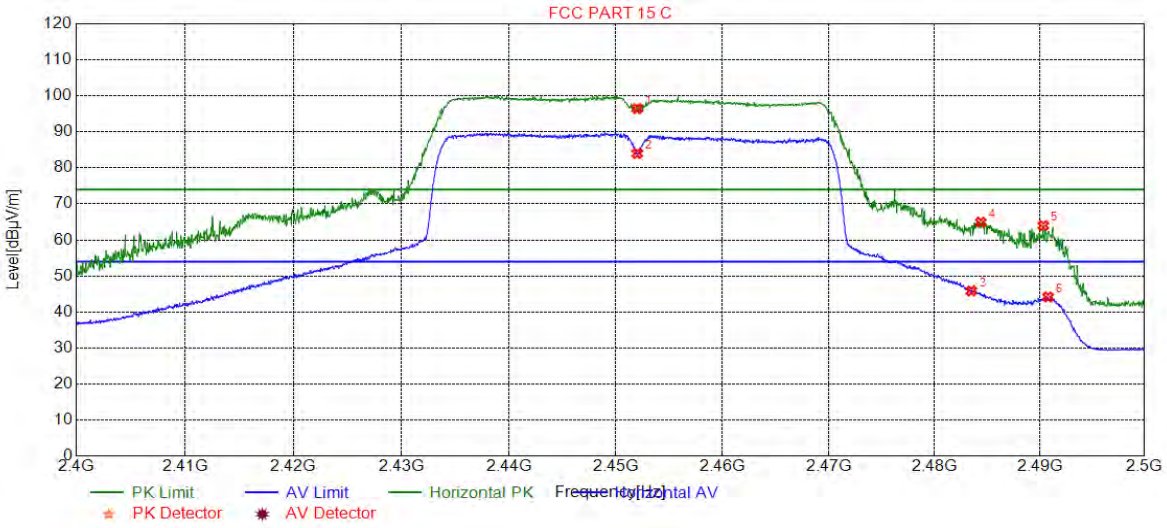
4.10.1.15 802.11N40_Lowest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2363.0030	49.01	9.11	74.00	24.99	201	319	Horizontal
2	2371.2613	35.20	9.14	54.00	18.80	189	278	Horizontal
3	2388.9790	58.41	9.19	74.00	15.59	195	360	Horizontal
4	2390.0000	42.85	9.20	54.00	11.15	162	196	Horizontal
5	2422.0000	98.50	9.30	74.00	-24.50	177	200	Horizontal
6	2422.0000	85.87	9.30	54.00	-31.87	224	200	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	2452.0000	96.46	9.40	74.00	-22.46	208	207	Horizontal
2	2452.0000	84.00	9.40	54.00	-30.00	158	202	Horizontal
3	2483.5000	45.84	9.50	54.00	8.16	126	207	Horizontal
4	2484.3922	64.93	9.50	74.00	9.07	103	207	Horizontal
5	2490.3452	63.98	9.52	74.00	10.02	192	202	Horizontal
6	2490.7954	44.18	9.52	54.00	9.82	115	202	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.

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

Lab A:

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	±0.41dB
2	RF power density, conducted	±1.96dB
3	Spurious emissions, conducted	±0.41dB
4	Radio Frequency	±7.10 x 10^{-8}
5	Duty Cycle	±0.49%
6	Occupied Bandwidth	±0.2%

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 Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (yyyy-mm-dd)**	**Cal. Due date (yyyy-mm-dd)**
Signal Analyzer	Agilent	N9020A	W025-01	2019/6/25	2020/6/24
DC Power Supply	Rohde & Schwarz	HMP2020	W009-08	2018/12/7	2019/12/6
				2019/11/21	2020/11/20
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2019/7/14	2020/7/13
Humidity/ Temperature Indicator	MingGao	TH101B	W006-05	2019/6/27	2020/6/26

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	2018-12-16	2019-12-15
Measurement Software	Tonscend	TS+ CE V2.5	XAW02-05-02	NCR	NCR

RSE Test System					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal 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	2018-12-10	2019-12-09
				2019-11-18	2020-11-17
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2018-12-10	2019-12-09
				2019-11-18	2020-11-17
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2019-12-03	2020-12-02
				2018-12-10	2019-12-09
Amplifier	Shanghai Steed	YX28980930	XAW01-41-06	2018-12-10	2019-12-09
				2019-11-18	2020-11-17
Temperature and humidity meter	MingGao	TH101B	XAW01-01-01	2018-12-16	2019-12-15
Measurement Software	Tonscend	TS+ RSE V3.0.0.2	XAW02-05-01	NCR	NCR

7 Photographs for Set-up

Refer to Appendix A - Photographs of Set-Up for ZR/2019/B0004.

The End