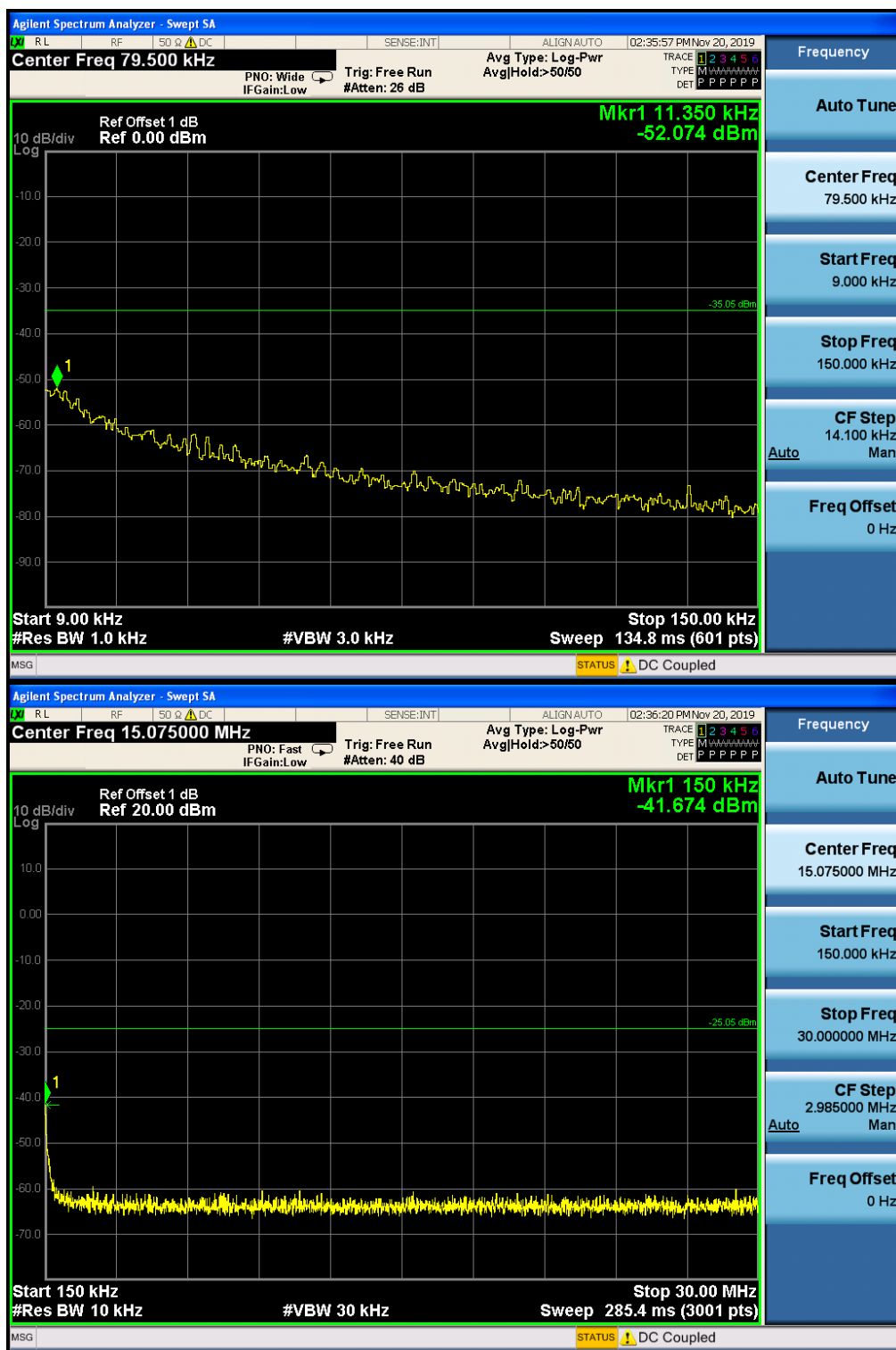
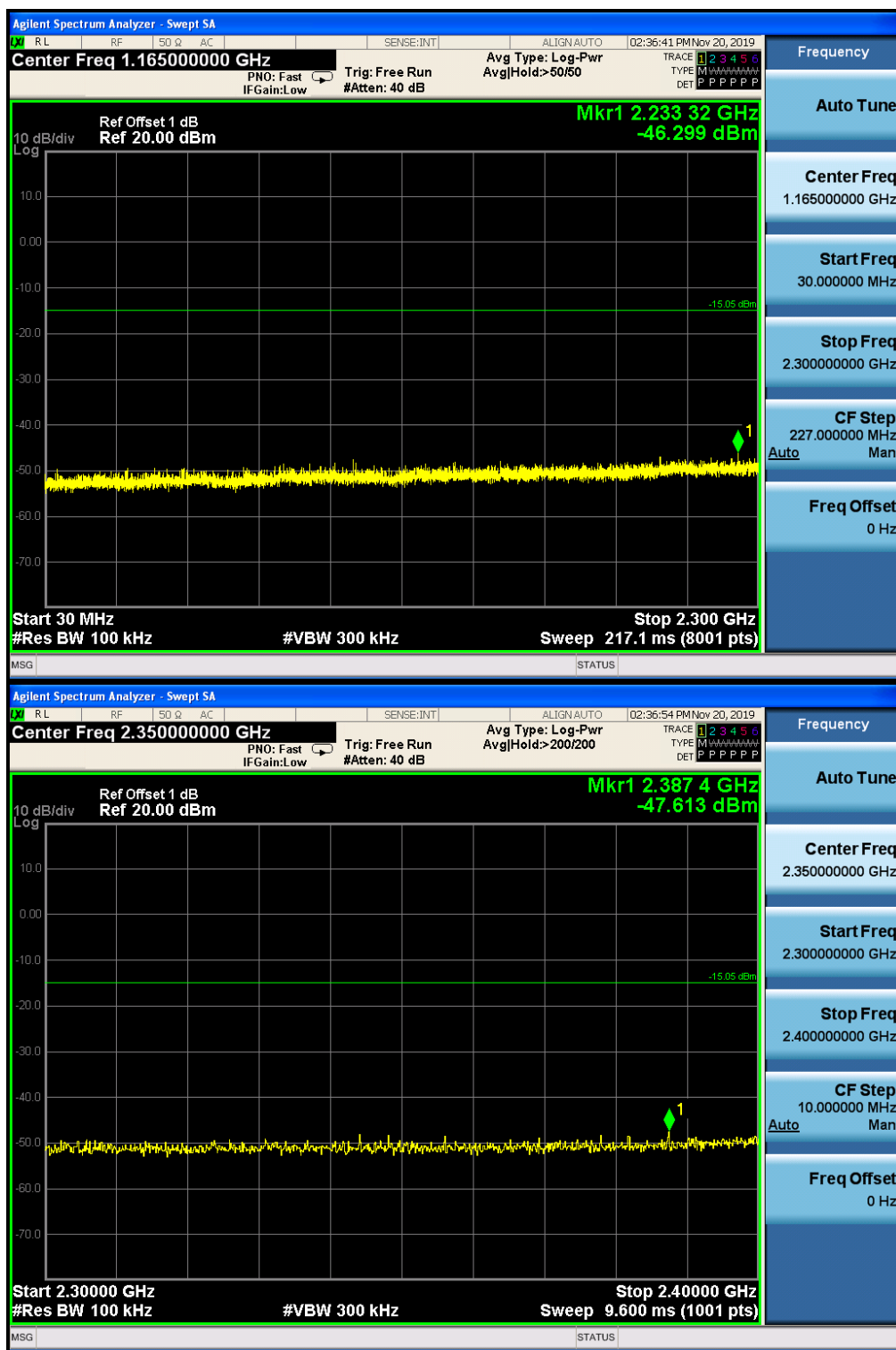


4.8.1.1.8 802.11 N20_ Middle Channel









4.8.1.1.9 802.11 N20_ Highest Channel

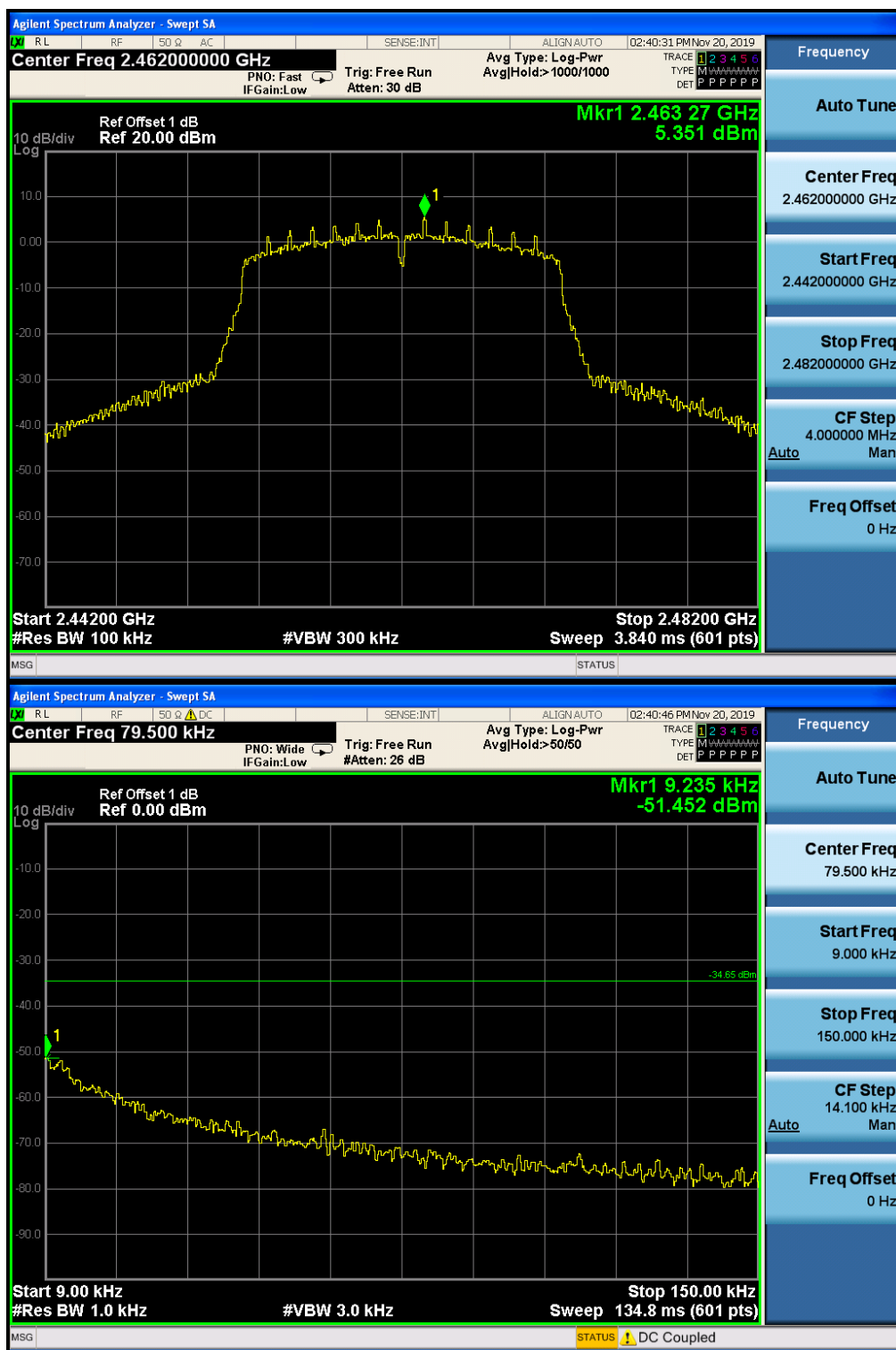


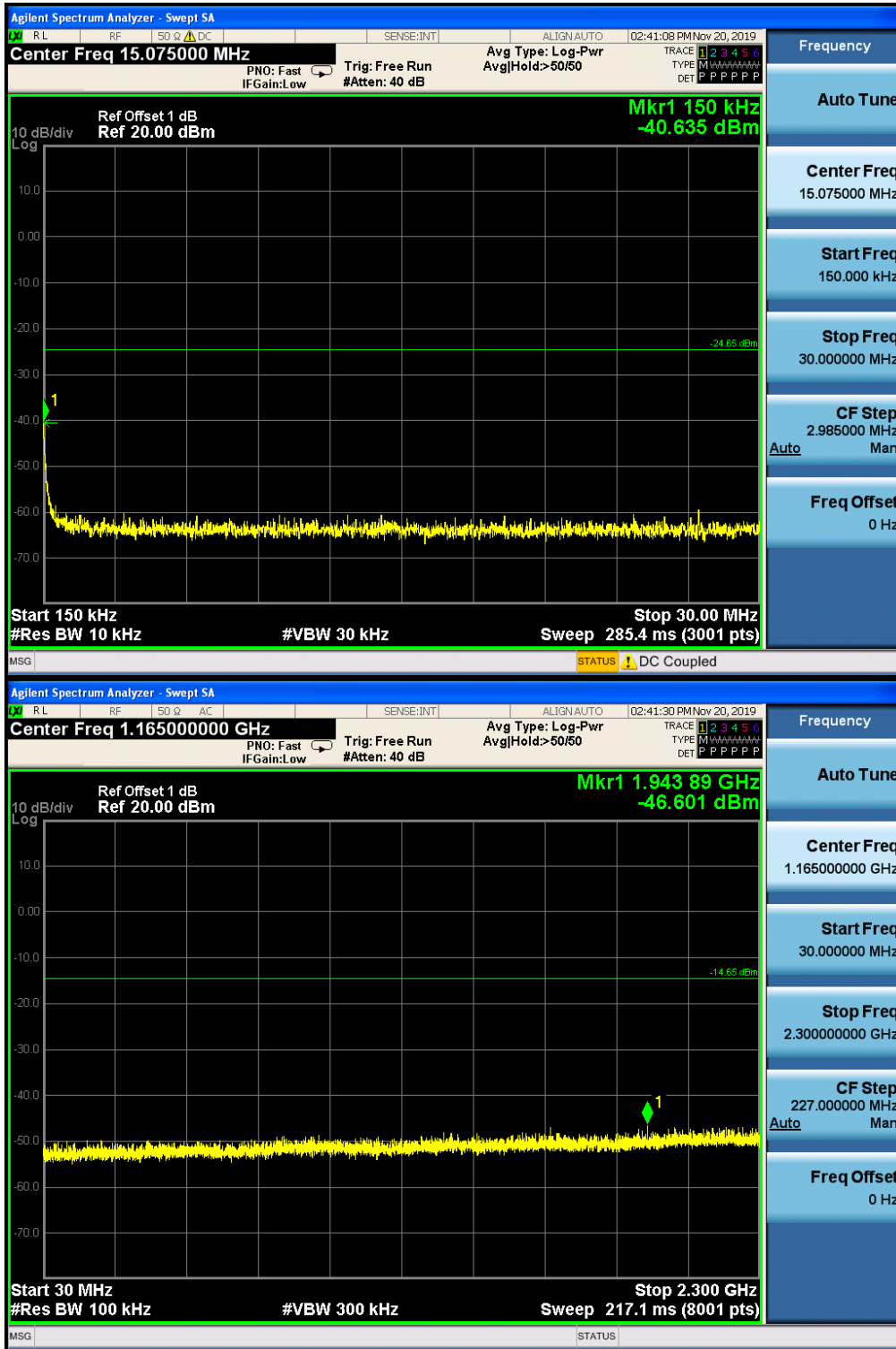
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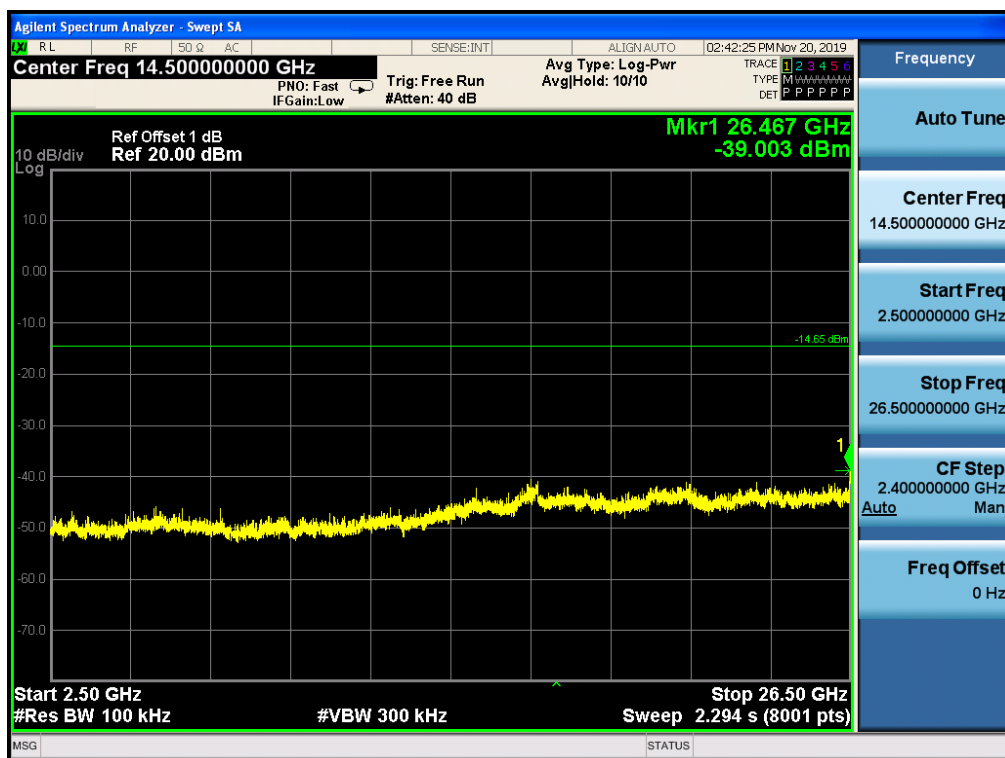
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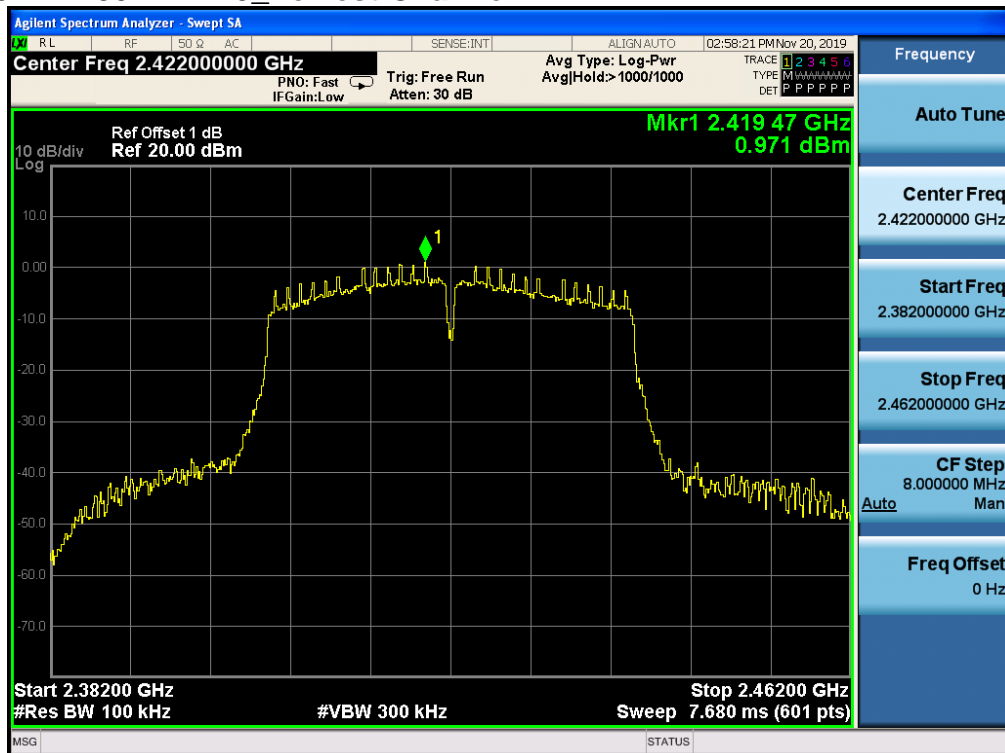


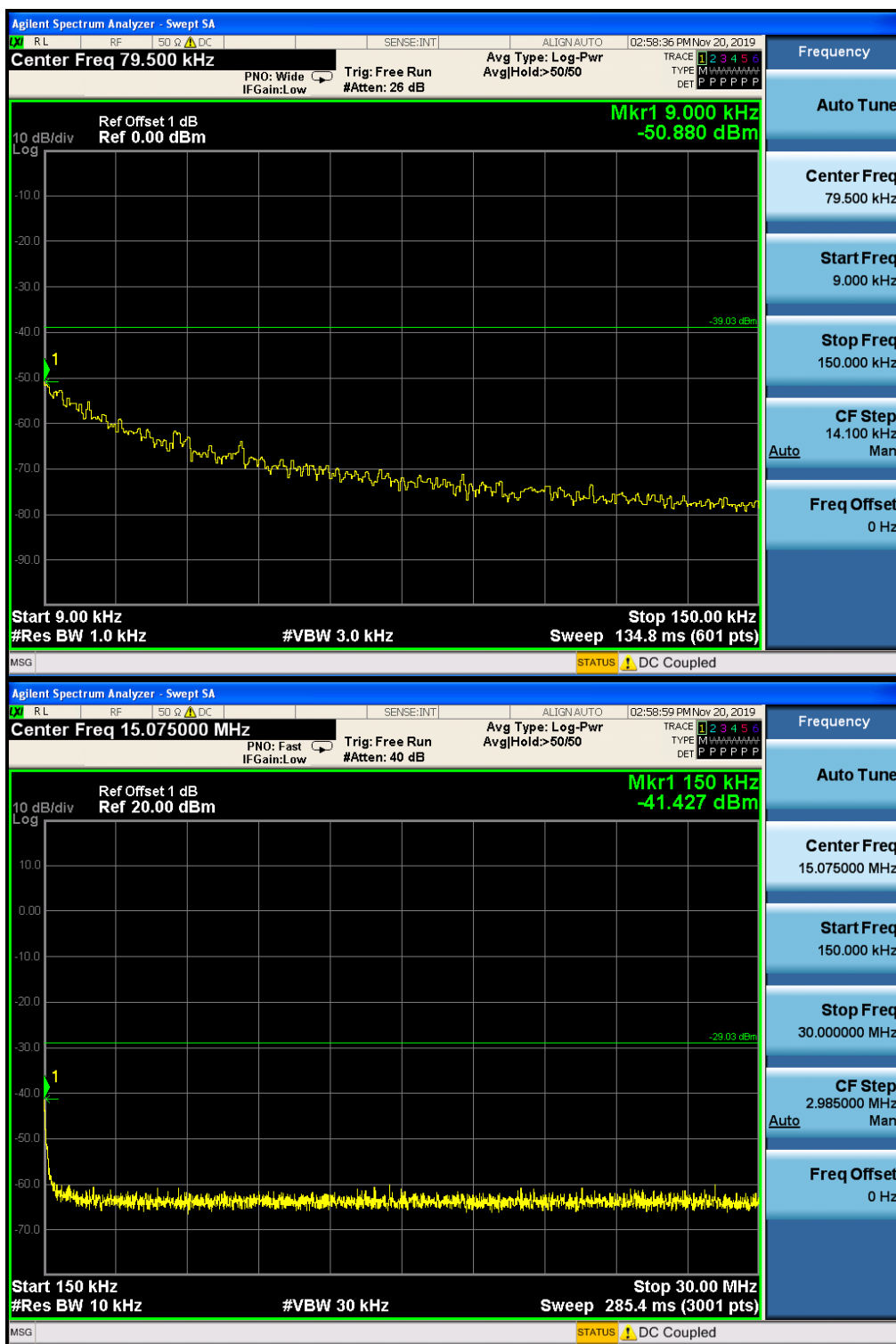






4.8.1.1.10 802.11N40_Lowest Channel

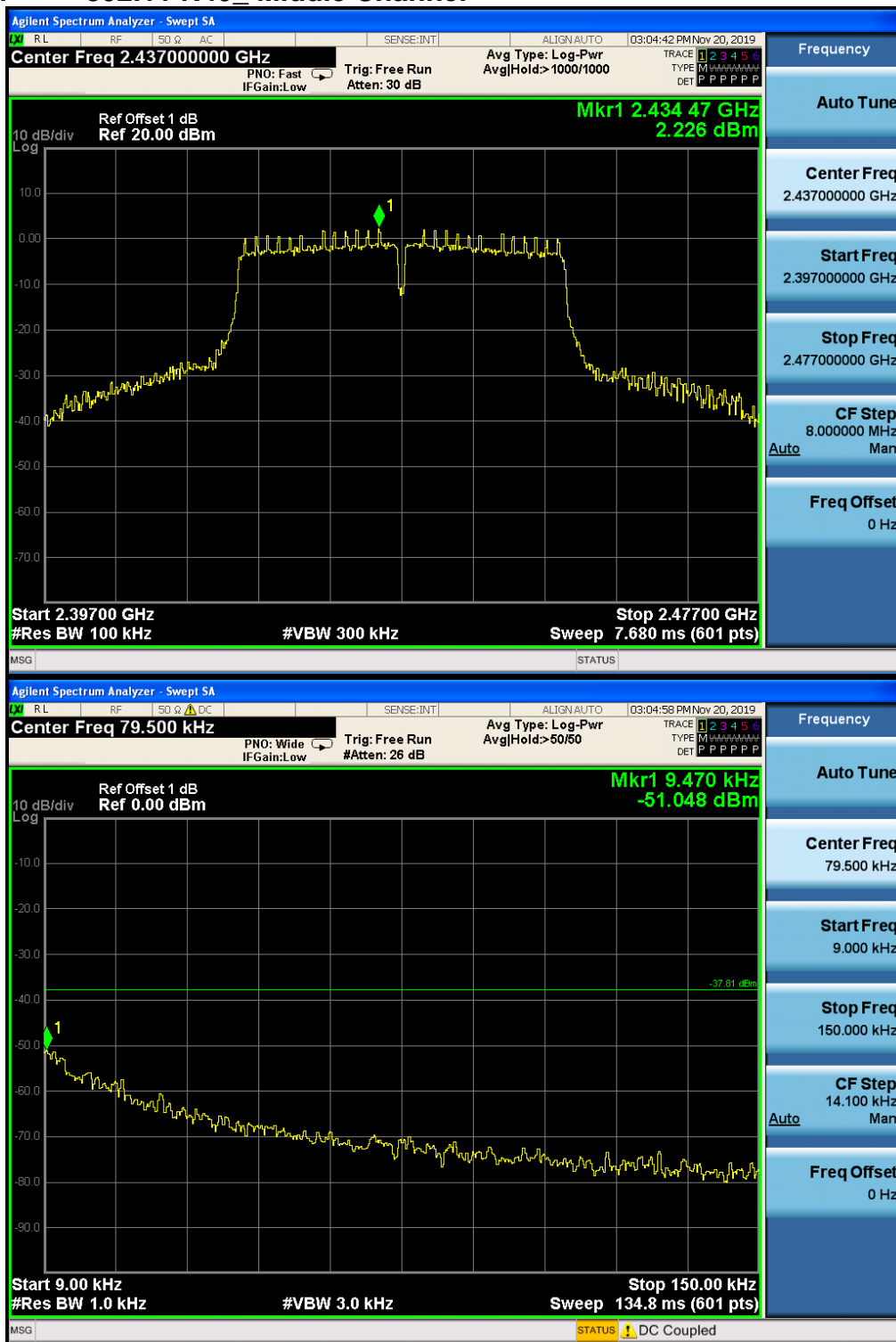


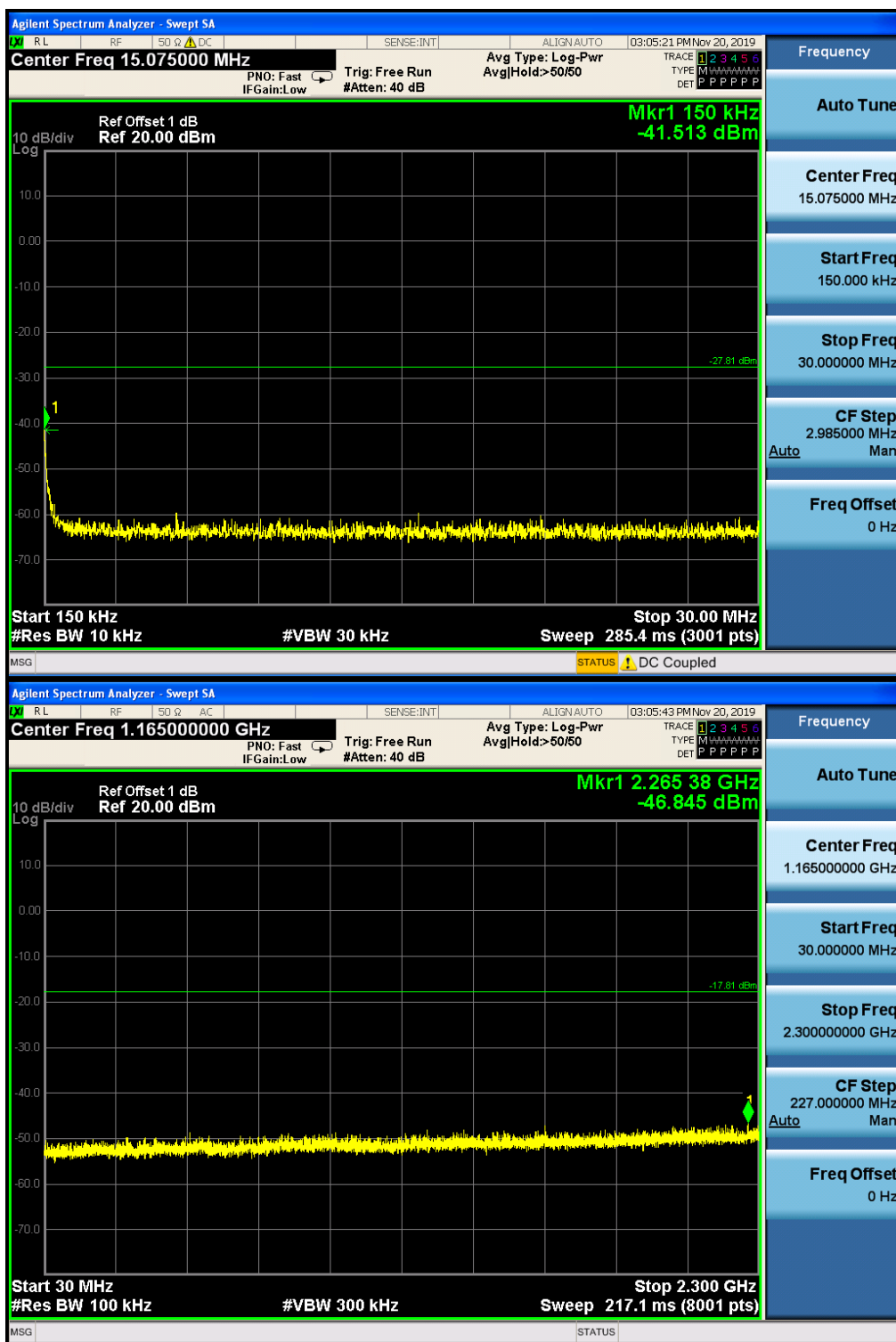


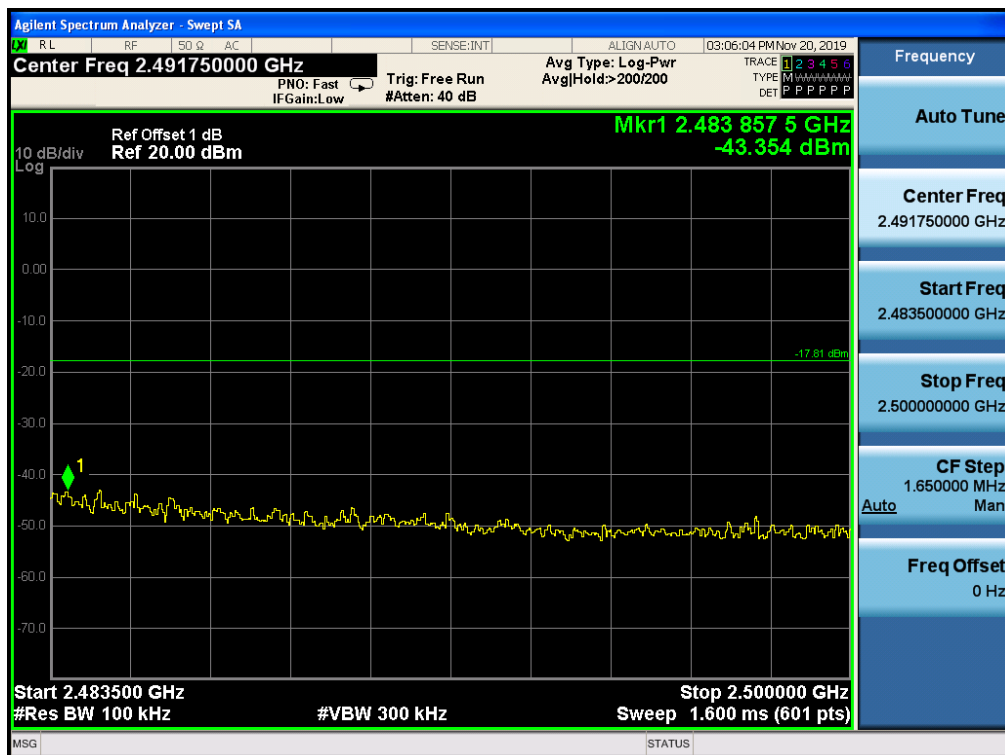
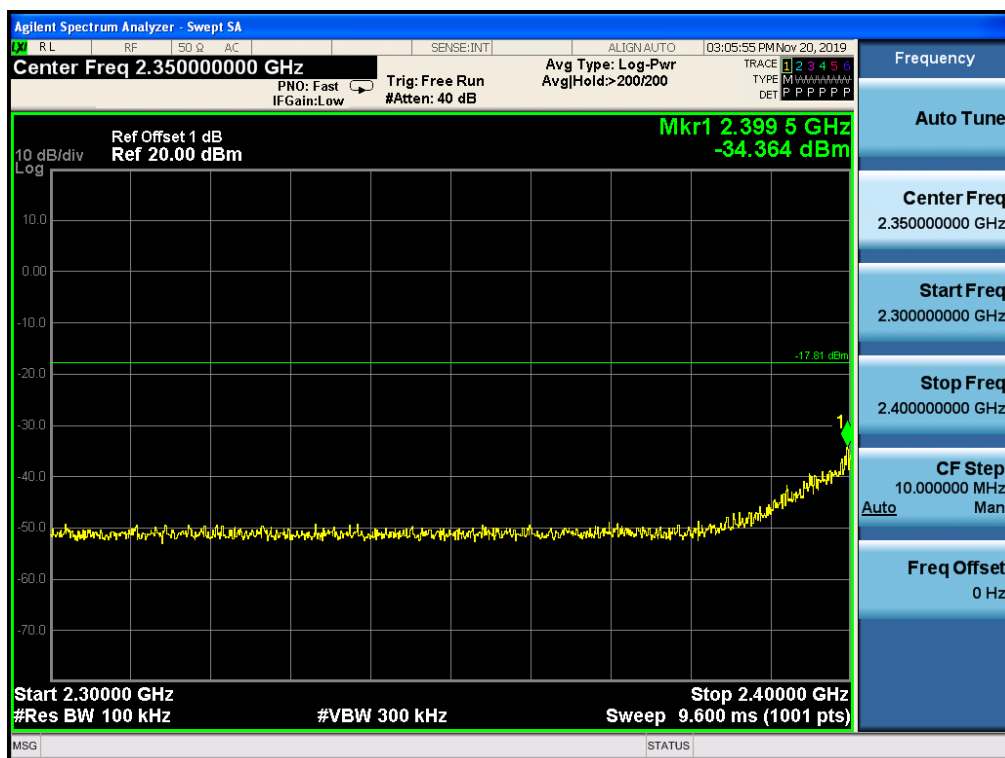


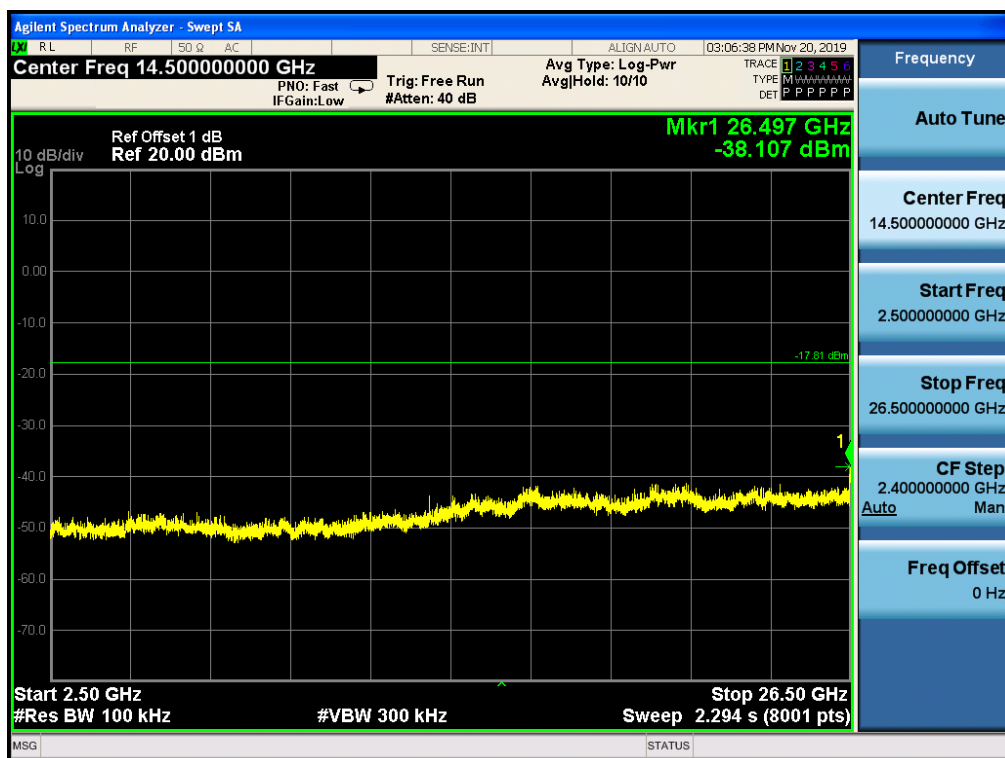


4.8.1.1.11 802.11 N40_ Middle Channel

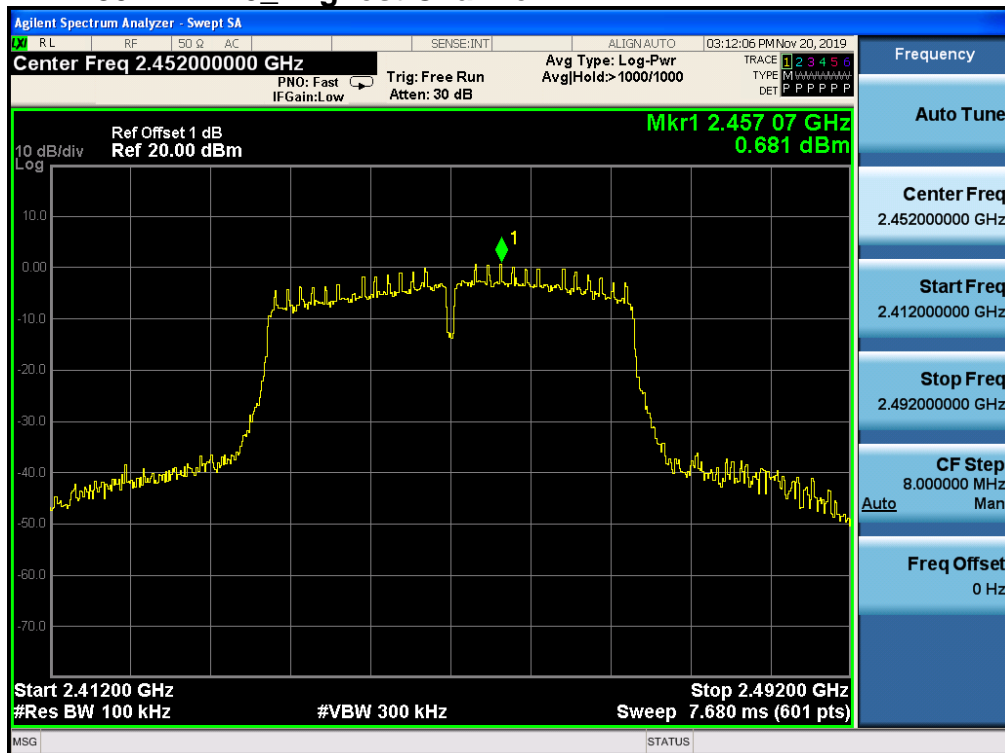


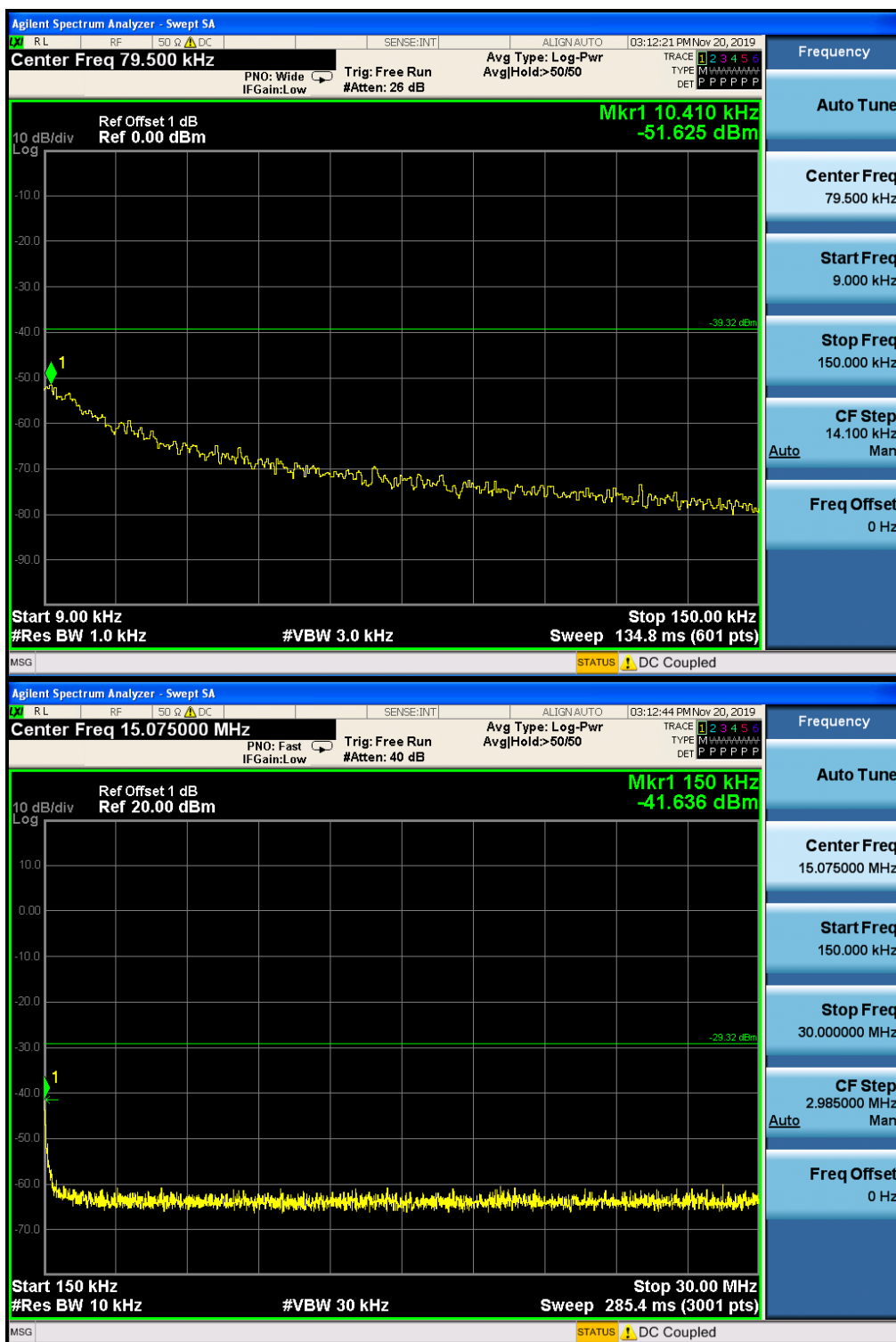


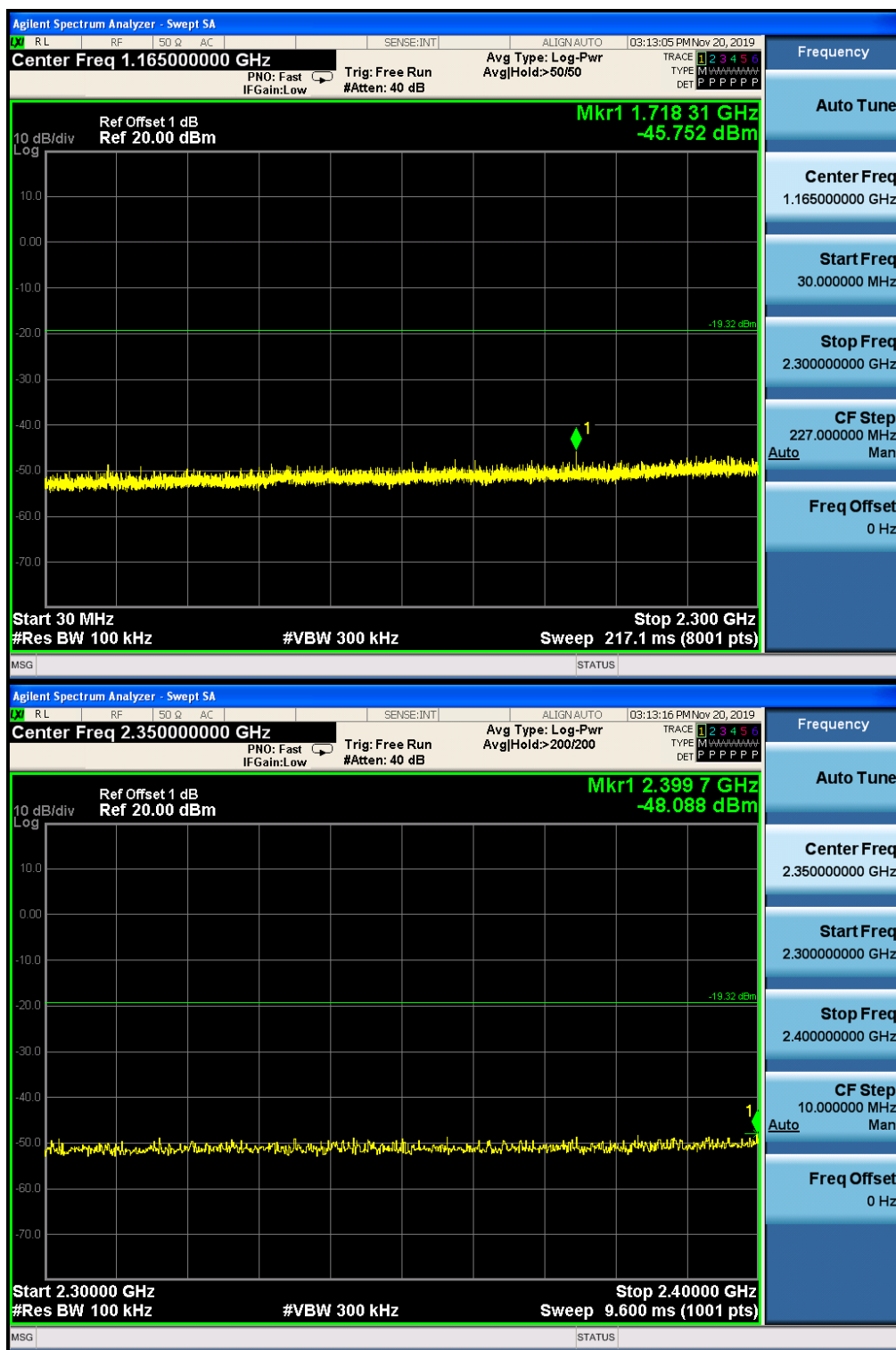




4.8.1.1.12 802.11 N40_Highest Channel









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:	
-------------	--



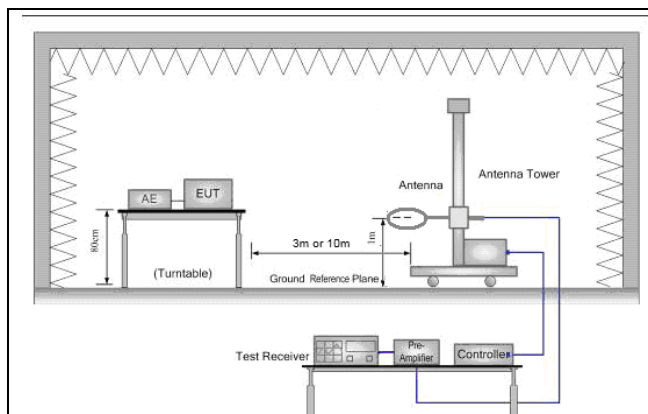


Figure 1. Below 30MHz

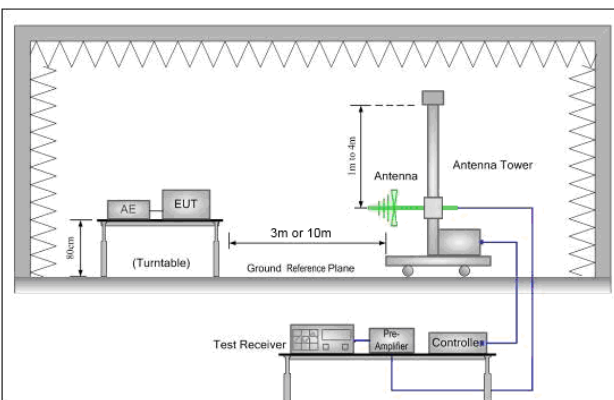


Figure 2. 30MHz to 1GHz

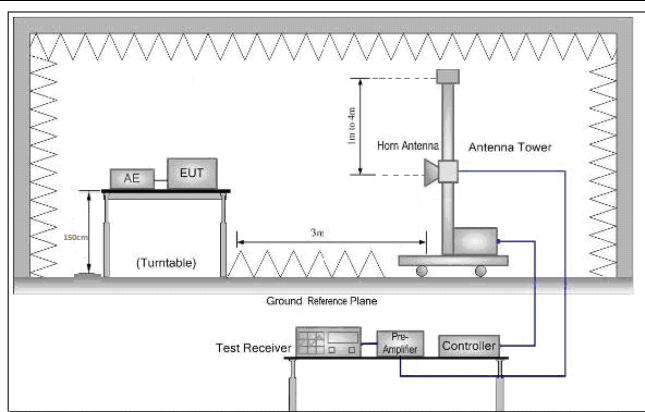


Figure 3. Above 1 GHz

Test Procedure:

- 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.
- 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
- 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.
- 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.
- 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.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 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



	<p>re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p> <p>h. Test the EUT in the lowest channel, the middle channel ,the Highest channel</p> <p>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.</p> <p>j. Repeat above procedures until all frequencies measured was complete.</p>
Exploratory Test Mode:	<p>Transmitting with all kind of modulations, data rates.</p> <p>Charge + Transmitting mode.</p>
Final Test Mode:	<p>Pretest the EUT at Charge + Transmitting mode.</p> <p>Through Pre-scan, find the</p> <p>1Mbps of rate is the worst case of 802.11B;</p> <p>6Mbps of rate is the worst case of 802.11G;</p> <p>6.5Mbps of rate is the worst case of 802.11N(HT20);</p> <p>13.5Mbps of rate is the worst case of 802.11N(HT40)</p> <p>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.</p>
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass



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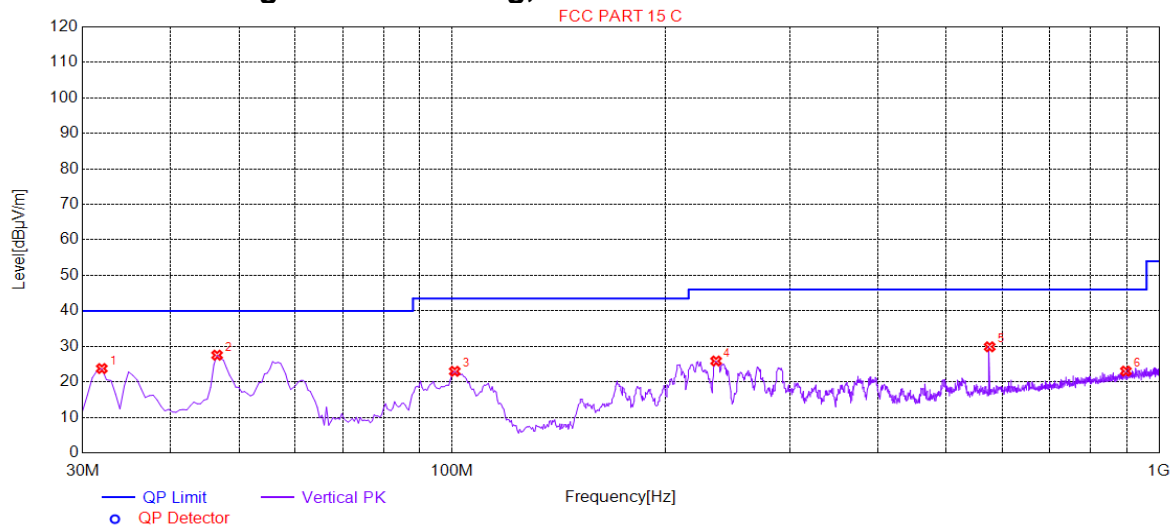
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4.9.1 Radiated emission below 1GHz

4.9.1.1 Charge + Transmitting, Vertical

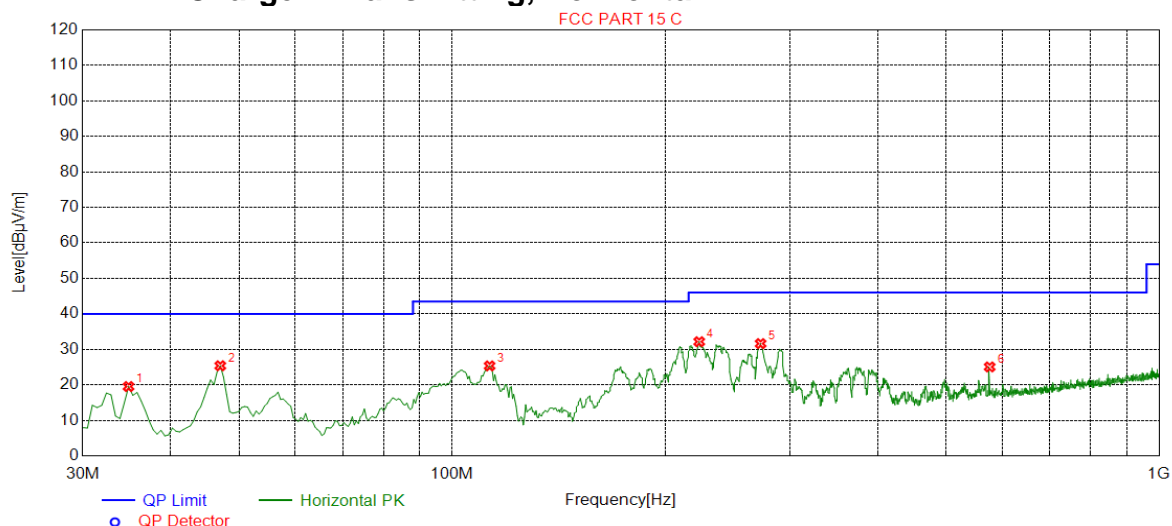


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	31.9410	23.75	-32.81	40.00	16.25	227	347	Vertical
2	46.4982	27.52	-30.20	40.00	12.48	158	344	Vertical
3	100.8454	22.97	-31.68	43.50	20.53	293	110	Vertical
4	236.2281	25.87	-29.74	46.00	20.13	156	177	Vertical
5	575.8979	29.88	-20.74	46.00	16.12	241	72	Vertical
6	897.6138	23.03	-15.27	46.00	22.97	278	294	Vertical



4.9.1.2 Charge + Transmitting, Horizontal



Suspected List

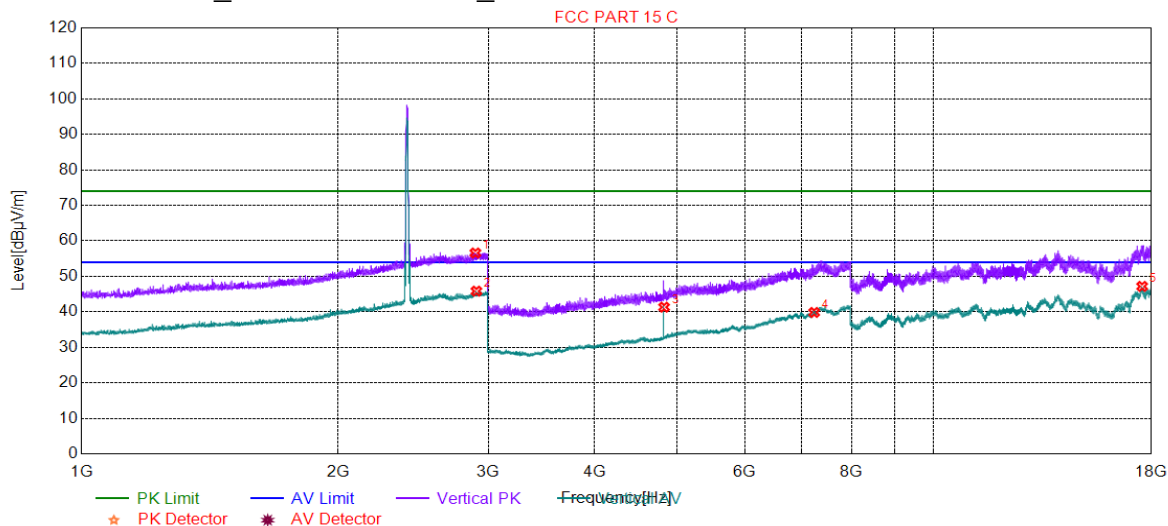
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	34.8524	19.53	-32.76	40.00	20.47	147	316	Horizontal
2	46.9835	25.38	-30.20	40.00	14.62	234	344	Horizontal
3	112.9765	25.35	-32.16	43.50	18.15	199	256	Horizontal
4	223.6118	32.16	-30.19	46.00	13.84	115	227	Horizontal
5	273.1066	31.62	-28.64	46.00	14.38	242	220	Horizontal
6	575.8979	25.06	-20.74	46.00	20.94	189	332	Horizontal



4.9.2 Transmitter emission above 1GHz

4.9.2.1 ANT1

4.9.2.1.1 802.11B_Lowest Channel_ Vertical

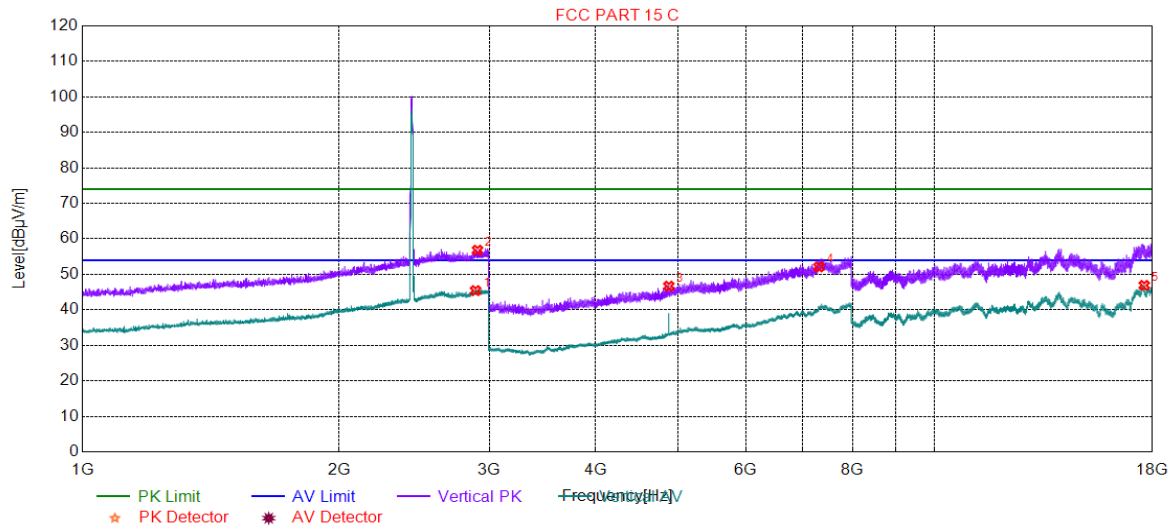


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2897.97	56.58	11.39	74.00	17.42	167	94	Vertical
2	2905.97	45.84	11.41	54.00	8.16	228	217	Vertical
3	4824.00	41.32	-14.90	54.00	12.68	170	318	Vertical
4	7236.00	39.84	-6.82	54.00	14.16	275	208	Vertical
5	17550.4	47.18	1.00	54.00	6.82	163	192	Vertical



4.9.2.1.2 802.11B_ Middle Channel_ Vertical

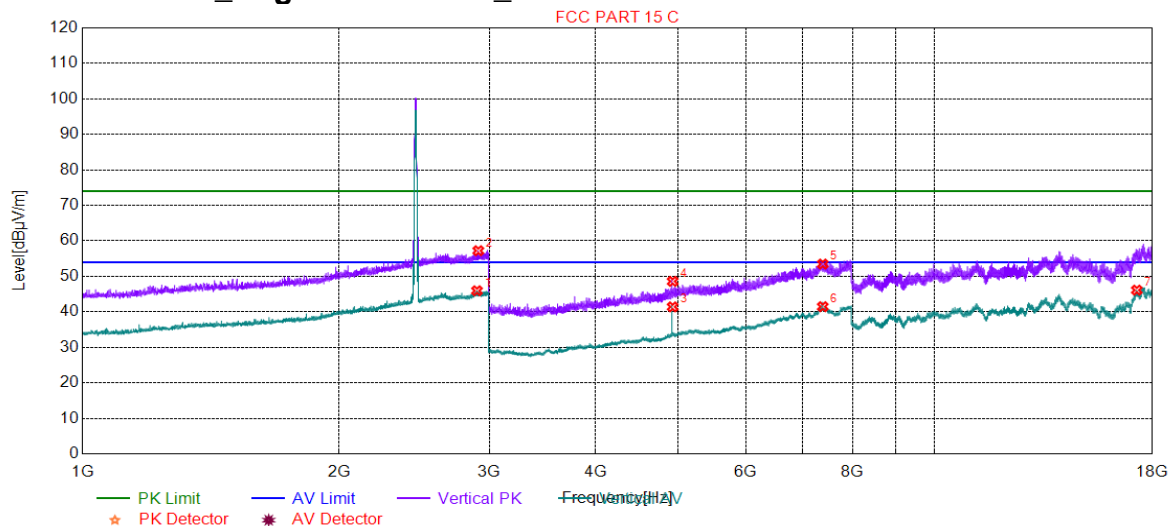


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2891.47	45.43	11.34	54.00	8.57	240	67	Vertical
2	2906.47	56.82	11.41	74.00	17.18	263	3	Vertical
3	4874.00	46.69	-14.68	74.00	27.31	279	207	Vertical
4	7311.00	52.12	-6.24	74.00	21.88	241	343	Vertical
5	17601.9	46.90	1.58	54.00	7.10	188	194	Vertical



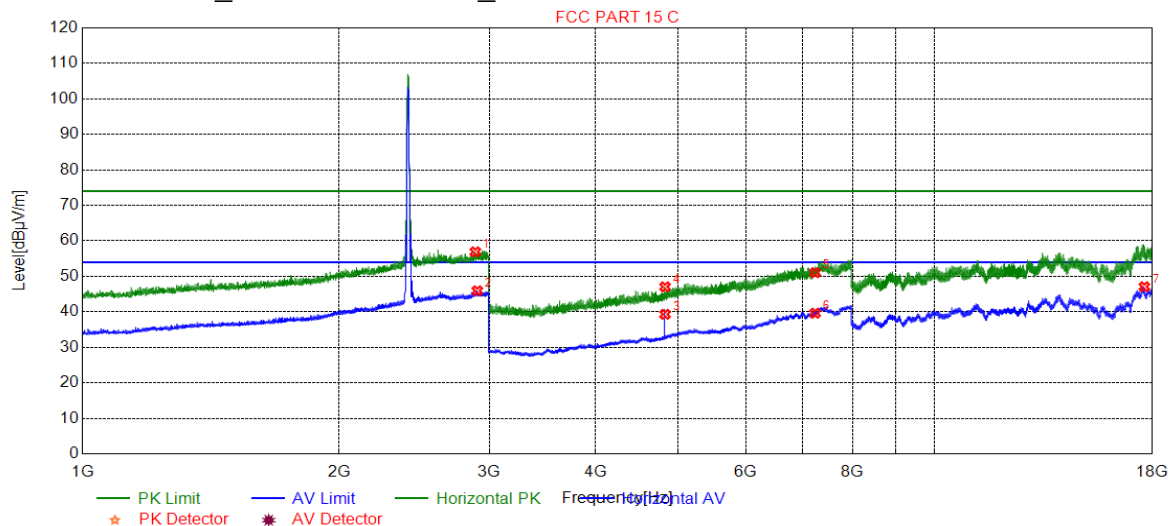
4.9.2.1.3 802.11B_ Highest Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2902.4756	45.95	11.41	54.00	8.05	236	30	Vertical
2	2912.9782	57.22	11.40	74.00	16.78	200	234	Vertical
3	4924.0000	41.41	-14.43	54.00	12.59	164	18	Vertical
4	4924.0000	48.59	-14.43	74.00	25.41	215	360	Vertical
5	7386.0000	53.47	-5.71	74.00	20.53	297	234	Vertical
6	7386.0000	41.46	-5.71	54.00	12.54	177	342	Vertical
7	17252.4626	46.13	-1.39	54.00	7.87	195	243	Vertical



4.9.2.1.4 802.11B_Lowest Channel_ Horizontal



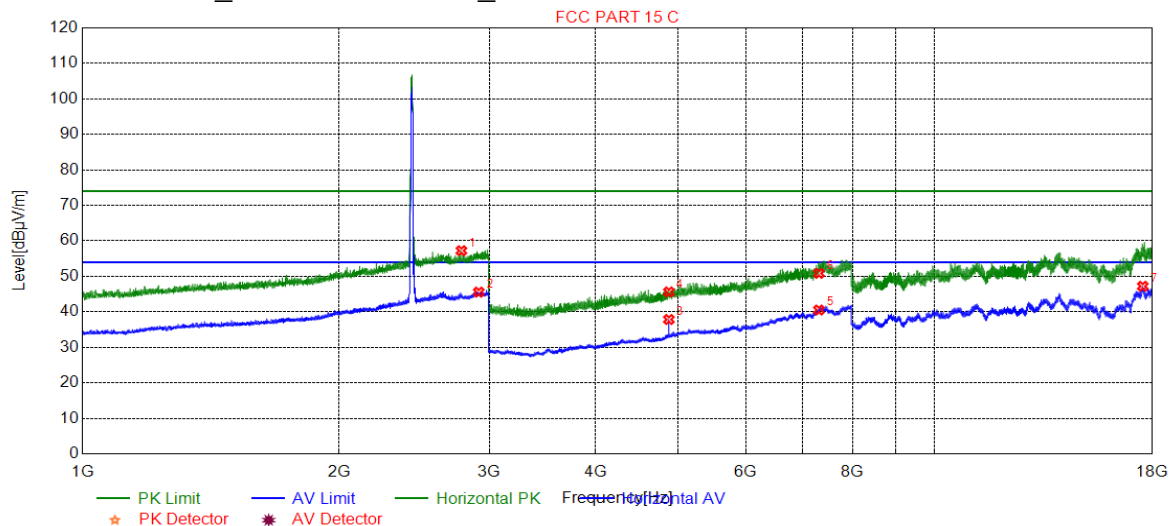
Suspected List								
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1	2889.9725	56.91	11.33	74.00	17.09	232	336	Horizontal
2	2904.9762	45.94	11.41	54.00	8.06	228	293	Horizontal
3	4824.0000	39.31	-14.90	54.00	14.69	228	209	Horizontal
4	4824.0000	47.05	-14.90	74.00	26.95	195	236	Horizontal
5	7236.0000	51.05	-6.82	74.00	22.95	246	18	Horizontal
6	7236.0000	39.63	-6.82	54.00	14.37	236	18	Horizontal
7	17609.9805	47.08	1.37	54.00	6.92	166	0	Horizontal



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4.9.2.1.5 802.11B_ Middle Channel_ Horizontal

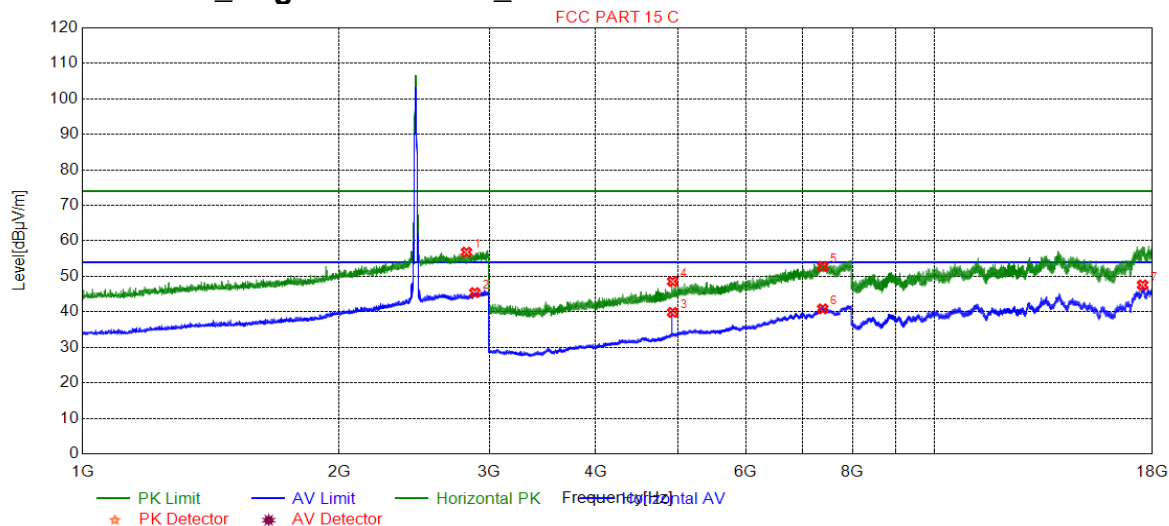


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2782.9457	57.24	10.54	74.00	16.76	186	347	Horizontal
2	2916.4791	45.57	11.40	54.00	8.43	200	269	Horizontal
3	4874.0000	37.86	-14.68	54.00	16.14	170	240	Horizontal
4	4874.0000	45.62	-14.68	74.00	28.38	151	212	Horizontal
5	7311.0000	40.53	-6.24	54.00	13.47	161	45	Horizontal
6	7311.0000	50.85	-6.24	74.00	23.15	237	45	Horizontal
7	17533.9767	47.21	0.78	54.00	6.79	220	43	Horizontal



4.9.2.1.6 802.11B_ Highest Channel_ Horizontal

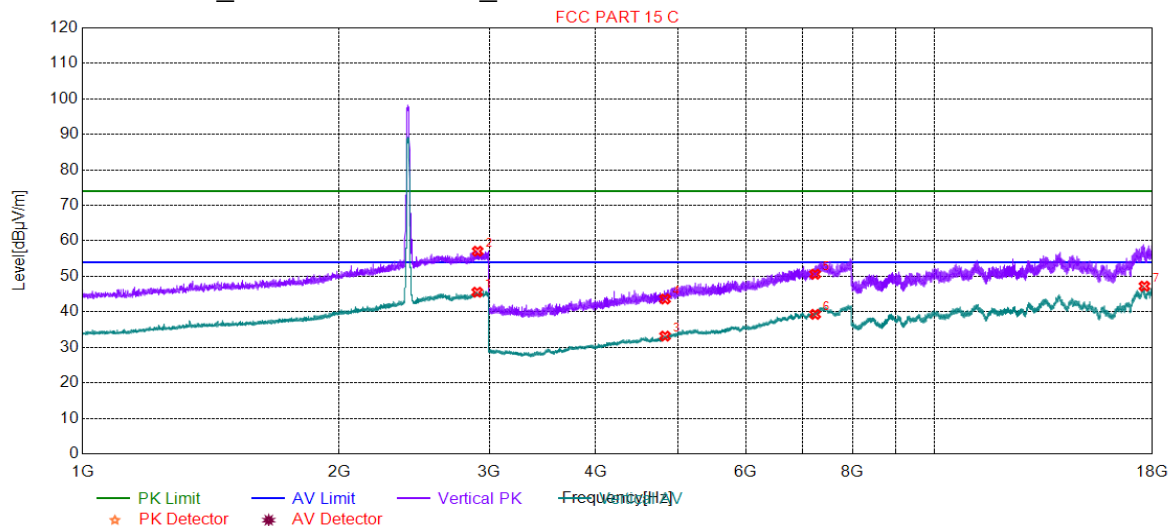


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2821.4554	56.83	10.81	74.00	17.17	125	88	Horizontal
2	2885.9715	45.41	11.30	54.00	8.59	203	191	Horizontal
3	4924.0000	39.85	-14.43	54.00	14.15	216	236	Horizontal
4	4924.0000	48.56	-14.43	74.00	25.44	247	236	Horizontal
5	7386.0000	52.82	-5.71	74.00	21.18	147	209	Horizontal
6	7386.0000	40.84	-5.71	54.00	13.16	182	236	Horizontal
7	17526.9763	47.59	0.70	54.00	6.41	159	242	Horizontal



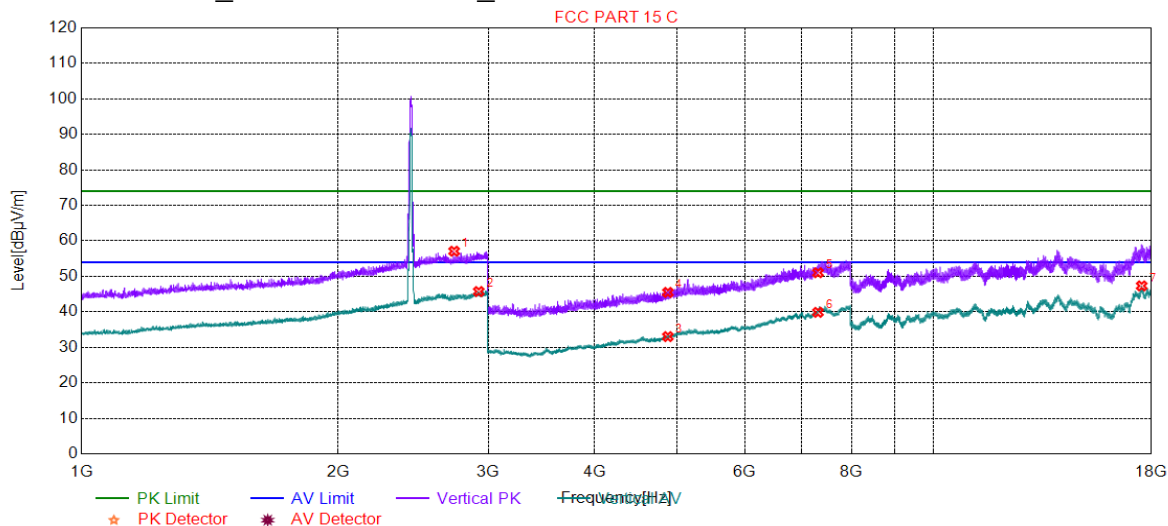
4.9.2.1.7 802.11G_Lowest Channel_Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2903.9760	45.54	11.41	54.00	8.46	165	44	Vertical
2	2907.4769	57.09	11.41	74.00	16.91	217	5	Vertical
3	4824.0000	33.17	-14.90	54.00	20.83	285	18	Vertical
4	4824.0000	43.62	-14.90	74.00	30.38	290	52	Vertical
5	7236.0000	50.61	-6.82	74.00	23.39	268	18	Vertical
6	7236.0000	39.31	-6.82	54.00	14.69	267	340	Vertical
7	17609.4805	47.24	1.38	54.00	6.76	207	220	Vertical



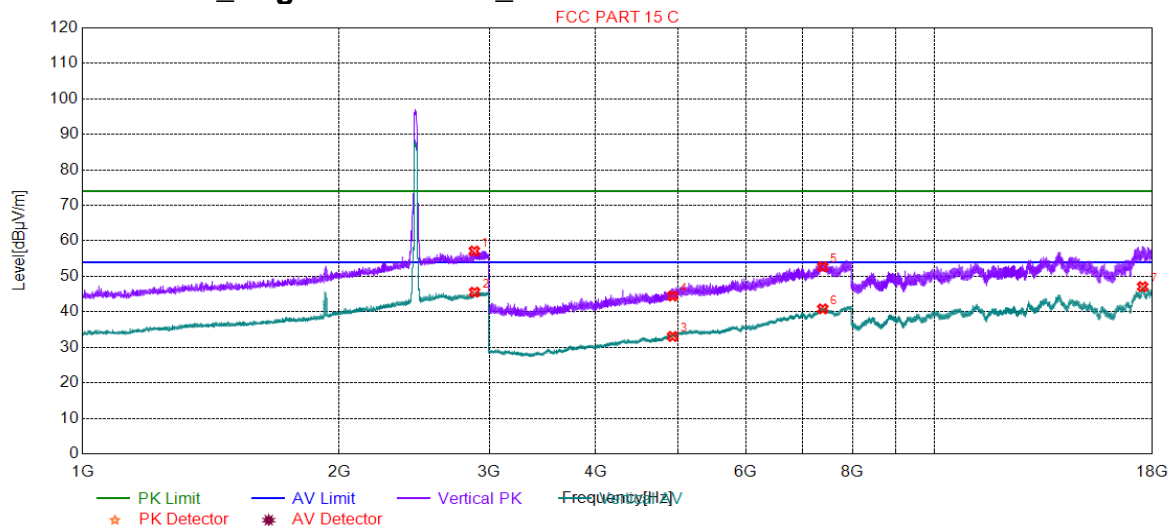
4.9.2.1.8 802.11G_ Middle Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2735.9340	57.09	10.26	74.00	16.91	234	38	Vertical
2	2923.9810	45.73	11.40	54.00	8.27	181	139	Vertical
3	4874.0000	33.03	-14.68	54.00	20.97	183	18	Vertical
4	4874.0000	45.48	-14.68	74.00	28.52	178	18	Vertical
5	7311.0000	51.03	-6.24	74.00	22.97	246	207	Vertical
6	7311.0000	39.87	-6.24	54.00	14.13	292	99	Vertical
7	17529.9765	47.32	0.73	54.00	6.68	293	193	Vertical



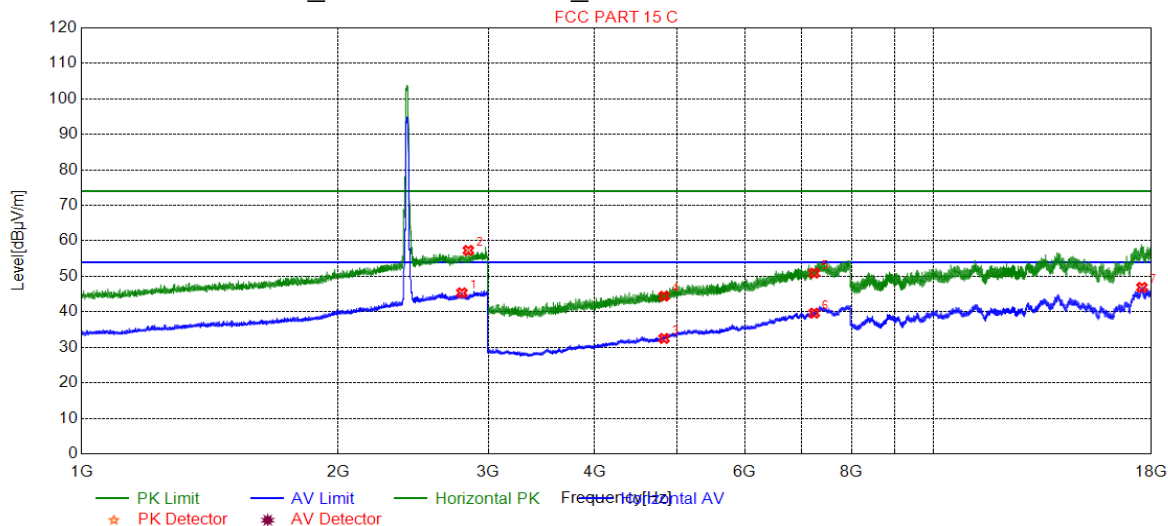
4.9.2.1.9 802.11G_ Highest Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2881.9705	57.14	11.27	74.00	16.86	252	62	Vertical
2	2883.4709	45.54	11.28	54.00	8.46	262	240	Vertical
3	4924.0000	33.09	-14.43	54.00	20.91	191	345	Vertical
4	4924.0000	44.47	-14.43	74.00	29.53	193	291	Vertical
5	7386.0000	52.72	-5.71	74.00	21.28	274	44	Vertical
6	7386.0000	40.84	-5.71	54.00	13.16	229	345	Vertical
7	17527.4764	47.10	0.70	54.00	6.90	275	241	Vertical



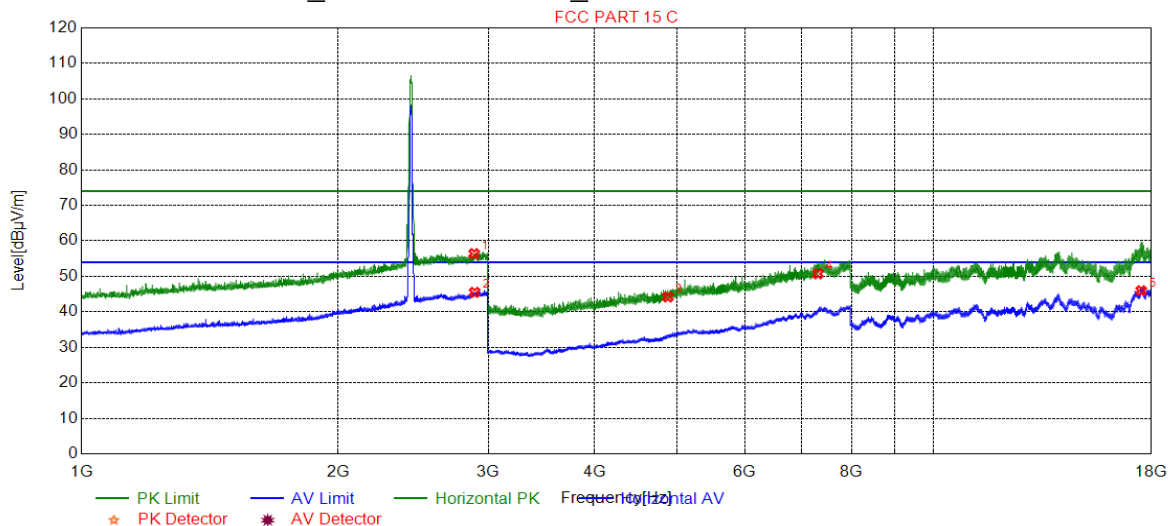
4.9.2.1.10 802.11G_Lowest Channel_Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2793.9485	45.37	10.60	54.00	8.63	126	198	Horizontal
2	2843.4609	57.31	10.97	74.00	16.69	160	64	Horizontal
3	4824.0000	32.52	-14.90	54.00	21.48	125	358	Horizontal
4	4824.0000	44.43	-14.90	74.00	29.57	245	246	Horizontal
5	7236.0000	50.92	-6.82	74.00	23.08	131	246	Horizontal
6	7236.0000	39.65	-6.82	54.00	14.35	106	213	Horizontal
7	17543.4772	46.91	0.91	54.00	7.09	248	163	Horizontal



4.9.2.1.11 802.11G_ Middle Channel_ Horizontal

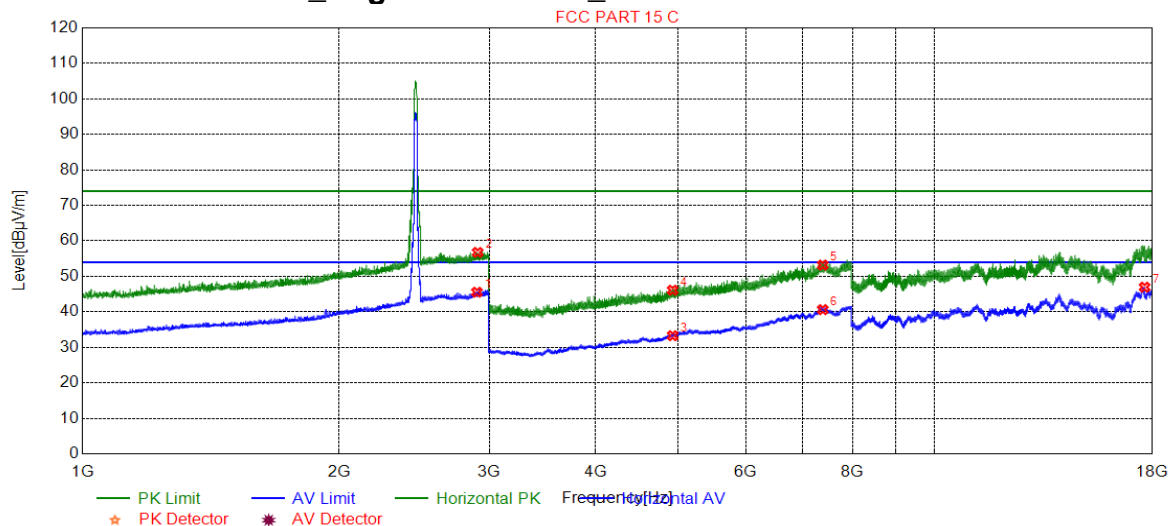


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2888.47	56.41	11.32	74.00	17.59	174	53	Horizontal
2	2891.97	45.50	11.35	54.00	8.50	185	241	Horizontal
3	4874.00	44.20	-14.68	74.00	29.80	196	263	Horizontal
4	4874.00	32.99	-14.68	54.00	21.01	213	18	Horizontal
5	7311.00	50.71	-6.24	74.00	23.29	261	181	Horizontal
6	7311.00	39.62	-6.24	54.00	14.38	241	317	Horizontal
7	17508.4	45.96	0.46	54.00	8.04	151	42	Horizontal



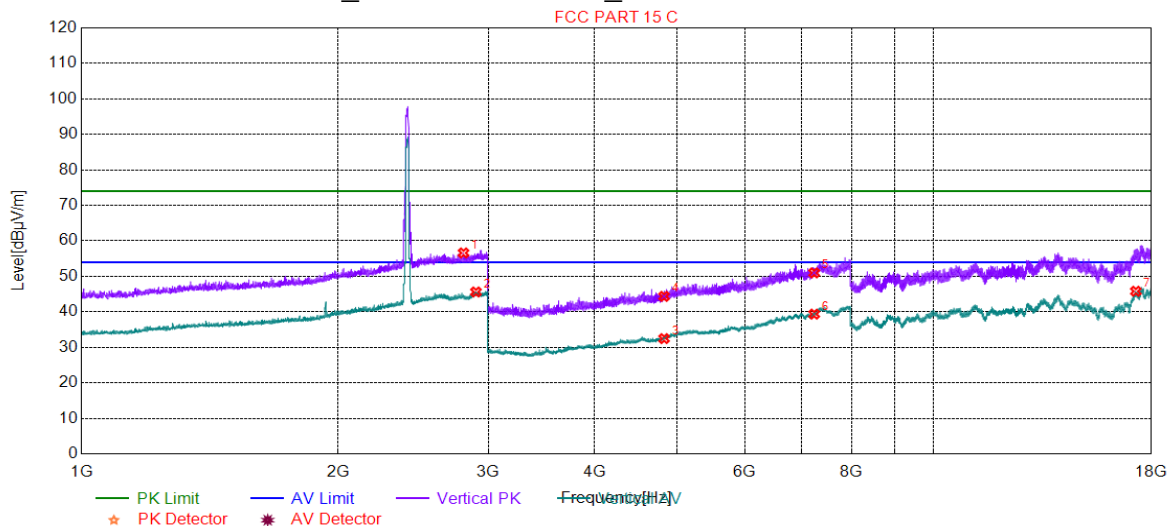
4.9.2.1.12 802.11G_ Highest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2901.9755	45.54	11.41	54.00	8.46	137	28	Horizontal
2	2907.9770	56.75	11.41	74.00	17.25	146	353	Horizontal
3	4924.0000	33.29	-14.43	54.00	20.71	170	127	Horizontal
4	4924.0000	46.10	-14.43	74.00	27.90	204	263	Horizontal
5	7386.0000	53.18	-5.71	74.00	20.82	114	316	Horizontal
6	7386.0000	40.63	-5.71	54.00	13.37	209	18	Horizontal
7	17620.4810	46.96	1.10	54.00	7.04	192	242	Horizontal



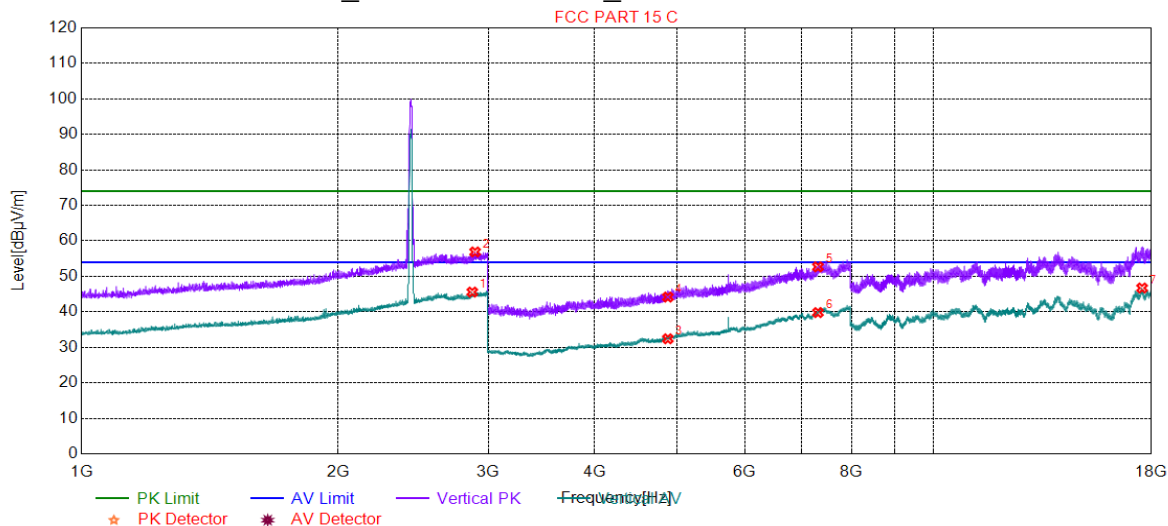
4.9.2.1.13 802.11N20_Lowest Channel_Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2806.4516	56.60	10.69	74.00	17.40	241	134	Vertical
2	2902.4756	45.61	11.41	54.00	8.39	277	64	Vertical
3	4824.0000	32.47	-14.90	54.00	21.53	171	99	Vertical
4	4824.0000	44.37	-14.90	74.00	29.63	232	18	Vertical
5	7236.0000	50.99	-6.82	74.00	23.01	191	18	Vertical
6	7236.0000	39.37	-6.82	54.00	14.63	270	343	Vertical
7	17253.9627	45.81	-1.39	54.00	8.19	194	0	Vertical



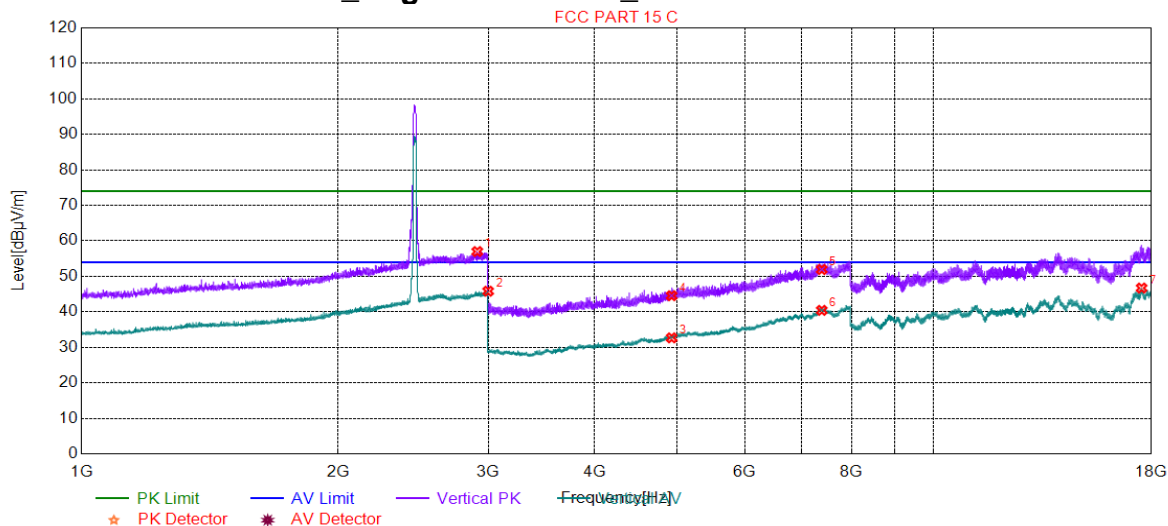
4.9.2.1.14 802.11N20_ Middle Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2873.4684	45.58	11.21	54.00	8.42	226	202	Vertical
2	2895.4739	56.88	11.38	74.00	17.12	197	246	Vertical
3	4874.0000	32.42	-14.68	54.00	21.58	171	180	Vertical
4	4874.0000	44.17	-14.68	74.00	29.83	187	262	Vertical
5	7311.0000	52.68	-6.24	74.00	21.32	192	289	Vertical
6	7311.0000	39.80	-6.24	54.00	14.20	215	45	Vertical
7	17548.4774	46.72	0.97	54.00	7.28	158	240	Vertical



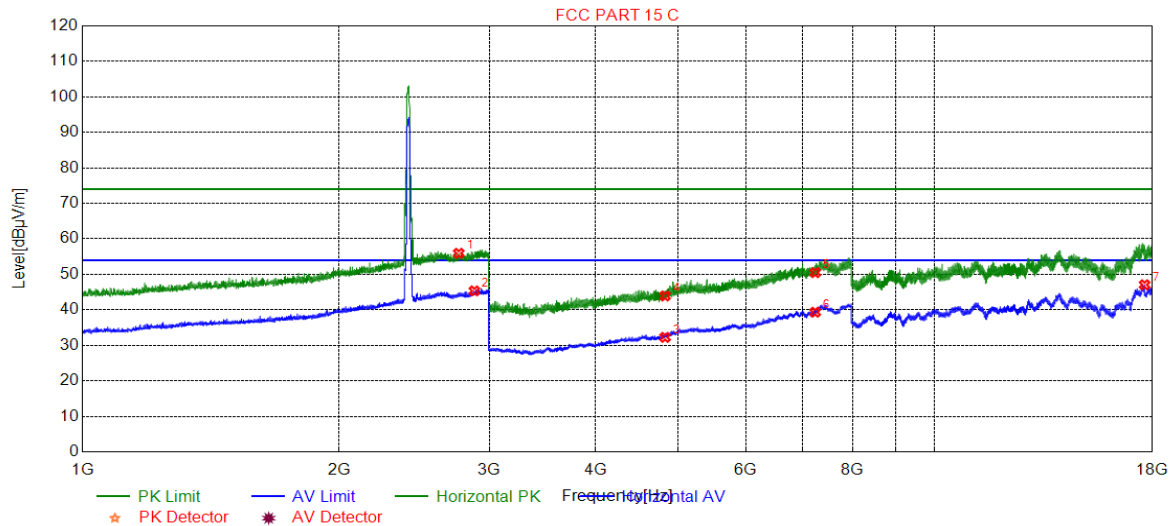
4.9.2.1.15 802.11N20_ Highest Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2912.4781	56.99	11.40	74.00	17.01	236	82	Vertical
2	2999.4999	45.82	11.36	54.00	8.18	176	104	Vertical
3	4924.0000	32.68	-14.43	54.00	21.32	241	18	Vertical
4	4924.0000	44.55	-14.43	74.00	29.45	268	317	Vertical
5	7386.0000	51.93	-5.71	74.00	22.07	200	290	Vertical
6	7386.0000	40.43	-5.71	54.00	13.57	234	263	Vertical
7	17524.4762	46.71	0.66	54.00	7.29	205	193	Vertical



4.9.2.1.16 802.11N20_Lowest Channel_Horizontal

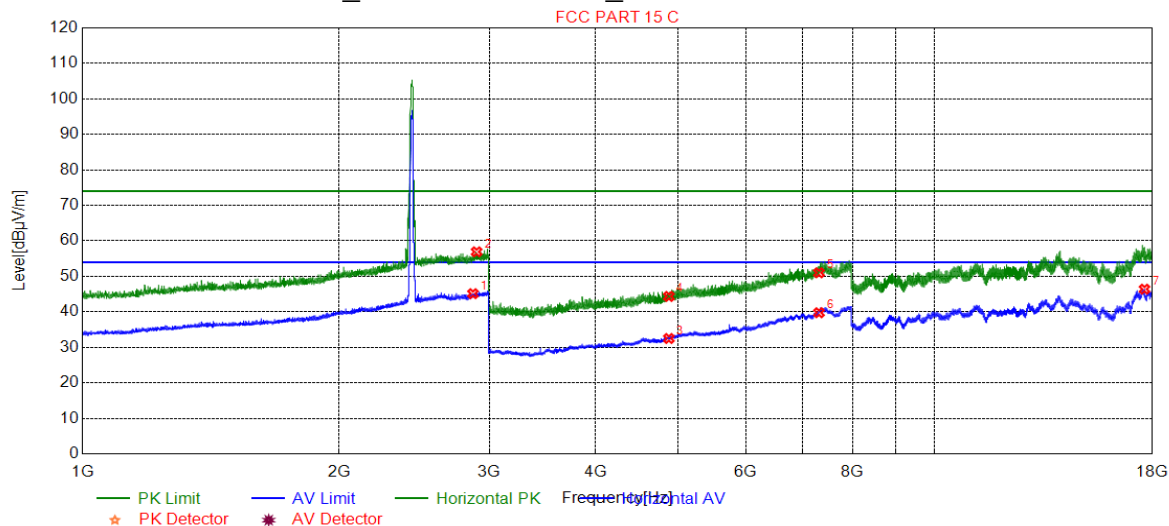


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2762.9407	55.93	10.42	74.00	18.07	188	32	Horizontal
2	2881.9705	45.35	11.27	54.00	8.65	168	148	Horizontal
3	4824.0000	32.25	-14.90	54.00	21.75	146	125	Horizontal
4	4824.0000	43.91	-14.90	74.00	30.09	233	342	Horizontal
5	7236.0000	50.50	-6.82	74.00	23.50	178	206	Horizontal
6	7236.0000	39.35	-6.82	54.00	14.65	163	179	Horizontal
7	17619.9810	47.07	1.11	54.00	6.93	143	0	Horizontal



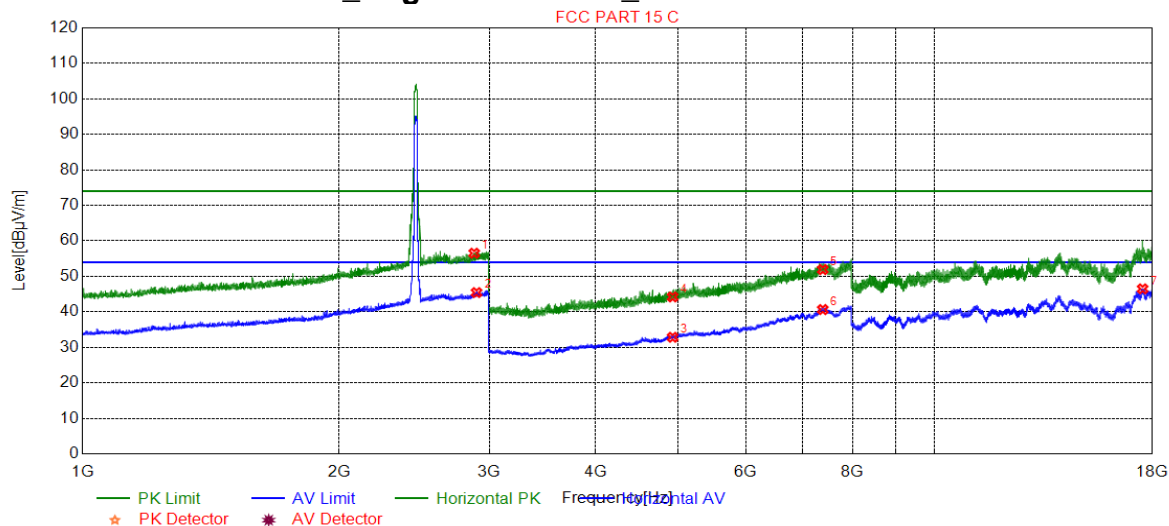
4.9.2.1.17 802.11N20_ Middle Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2870.9677	45.13	11.19	54.00	8.87	204	134	Horizontal
2	2899.4749	56.92	11.41	74.00	17.08	211	214	Horizontal
3	4874.0000	32.50	-14.68	54.00	21.50	206	127	Horizontal
4	4874.0000	44.35	-14.68	74.00	29.65	194	45	Horizontal
5	7311.0000	51.01	-6.24	74.00	22.99	169	18	Horizontal
6	7311.0000	39.76	-6.24	54.00	14.24	196	357	Horizontal
7	17615.9808	46.40	1.21	54.00	7.60	221	292	Horizontal



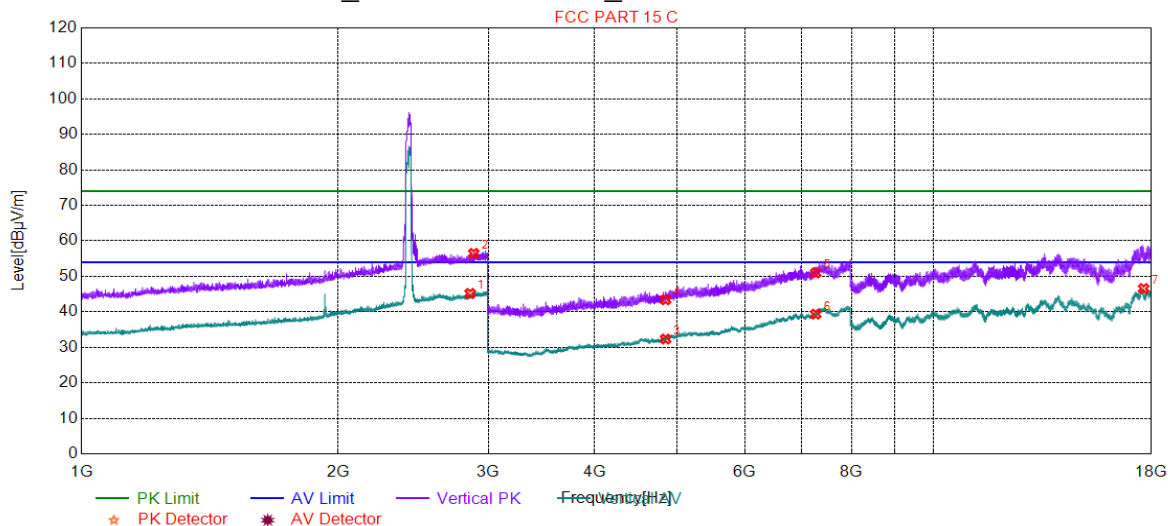
4.9.2.1.18 802.11N20_ Highest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2880.4701	56.53	11.26	74.00	17.47	213	241	Horizontal
2	2898.9747	45.44	11.40	54.00	8.56	155	241	Horizontal
3	4924.0000	32.84	-14.43	54.00	21.16	242	233	Horizontal
4	4924.0000	44.21	-14.43	74.00	29.79	142	18	Horizontal
5	7386.0000	51.91	-5.71	74.00	22.09	108	18	Horizontal
6	7386.0000	40.65	-5.71	54.00	13.35	156	72	Horizontal
7	17526.4763	46.48	0.69	54.00	7.52	231	342	Horizontal



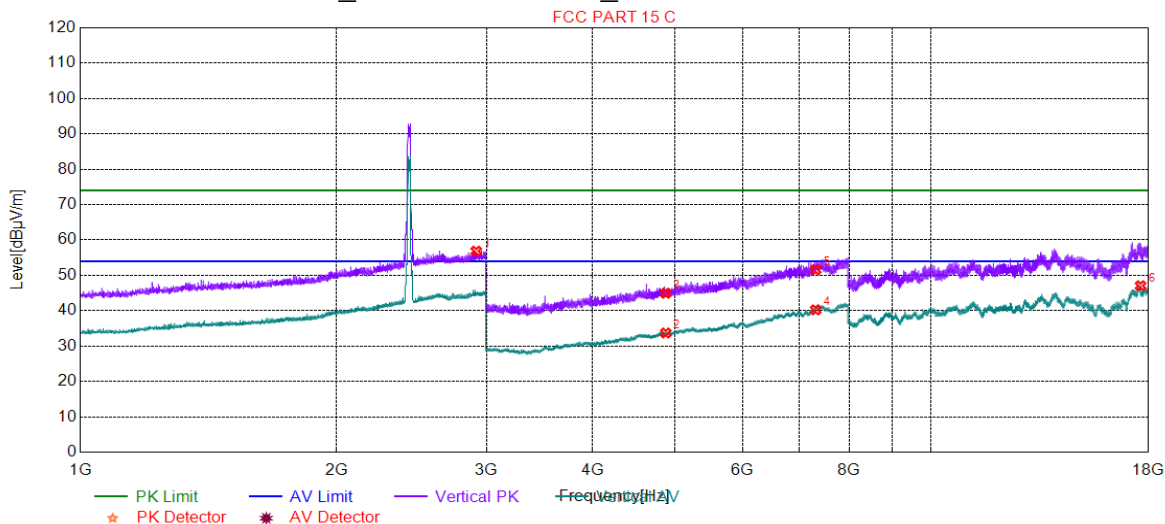
4.9.2.1.19 802.11N40_Lowest Channel_Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2856.9642	45.19	11.08	54.00	8.81	236	68	Vertical
2	2884.9712	56.47	11.29	74.00	17.53	260	249	Vertical
3	4844.0000	32.35	-14.81	54.00	21.65	254	18	Vertical
4	4844.0000	43.41	-14.81	74.00	30.59	244	235	Vertical
5	7266.0000	50.97	-6.58	74.00	23.03	296	290	Vertical
6	7266.0000	39.37	-6.58	54.00	14.63	166	154	Vertical
7	17623.4812	46.56	1.02	54.00	7.44	238	342	Vertical



4.9.2.1.20 802.11N40_ Middle Channel_ Vertical



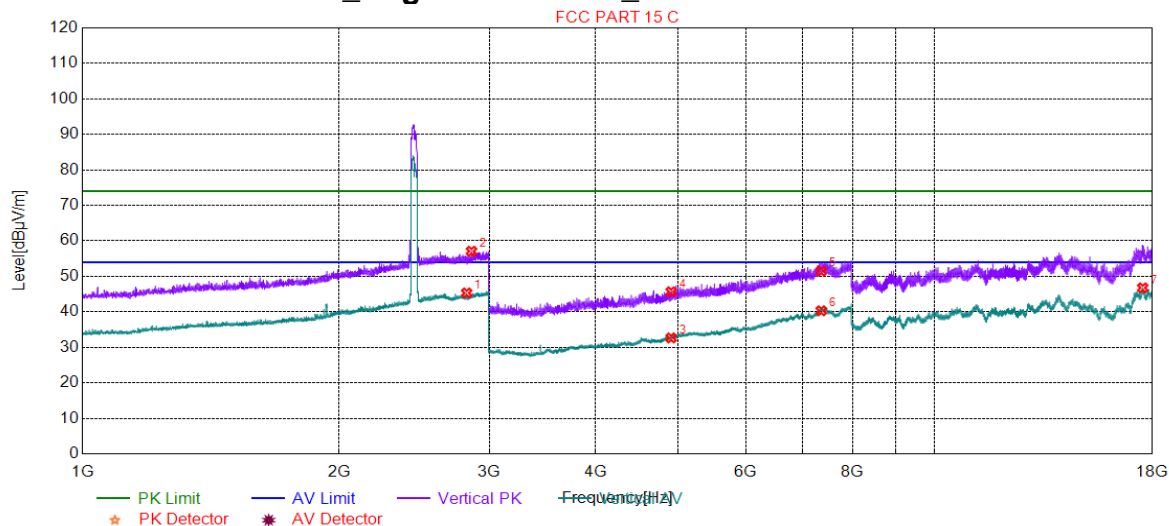
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2918.4796	56.85	11.40	74.00	17.15	174	273	Vertical
2	4874.0000	33.70	-14.68	54.00	20.30	85	72	Vertical
3	4874.0000	44.94	-14.68	74.00	29.06	213	360	Vertical
4	7311.0000	40.24	-6.24	54.00	13.76	196	180	Vertical
5	7311.0000	51.56	-6.24	74.00	22.44	124	18	Vertical
6	17613.9807	47.06	1.27	54.00	6.94	216	342	Vertical



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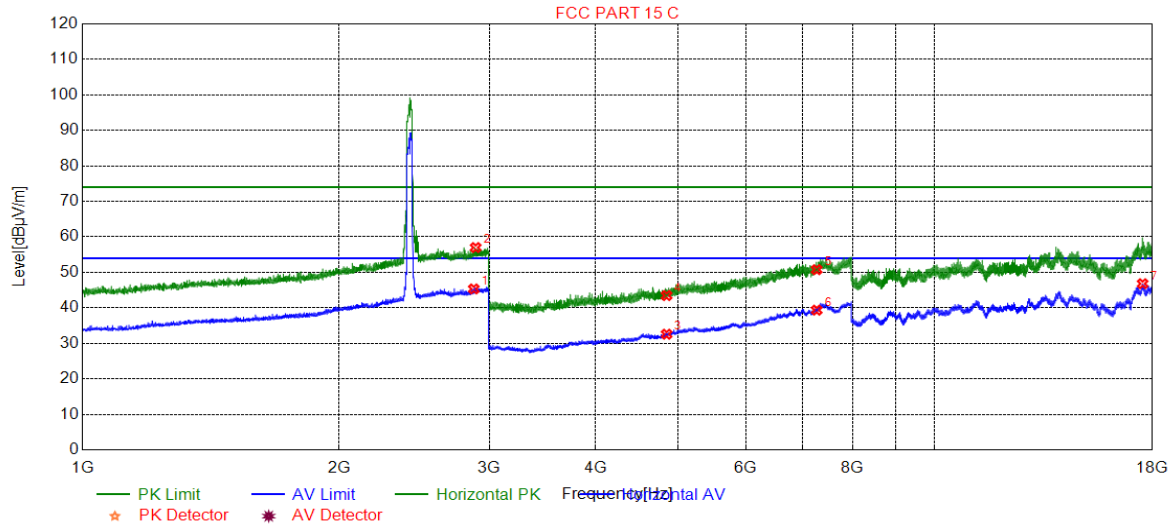
4.9.2.1.21 802.11N40_ Highest Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2822.9557	45.33	10.82	54.00	8.67	181	308	Vertical
2	2859.9650	57.08	11.10	74.00	16.92	230	159	Vertical
3	4904.0000	32.67	-14.54	54.00	21.33	298	125	Vertical
4	4904.0000	45.66	-14.54	74.00	28.34	179	344	Vertical
5	7356.0000	51.49	-5.92	74.00	22.51	191	289	Vertical
6	7356.0000	40.31	-5.92	54.00	13.69	227	153	Vertical
7	17531.9766	46.77	0.76	54.00	7.23	209	143	Vertical



4.9.2.1.22 802.11N40_Lowest Channel_Horizontal

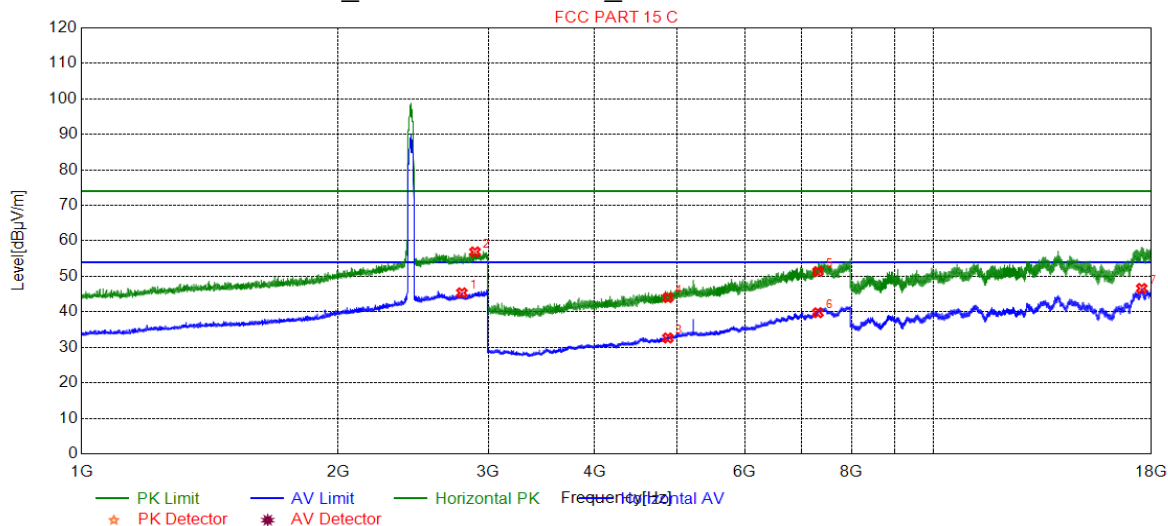


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2877.4694	45.33	11.24	54.00	8.67	124	299	Horizontal
2	2891.9730	56.99	11.35	74.00	17.01	197	342	Horizontal
3	4844.0000	32.58	-14.81	54.00	21.42	227	159	Horizontal
4	4844.0000	43.47	-14.81	74.00	30.53	169	267	Horizontal
5	7266.0000	50.76	-6.58	74.00	23.24	102	18	Horizontal
6	7266.0000	39.36	-6.58	54.00	14.64	111	159	Horizontal
7	17525.4763	46.81	0.68	54.00	7.19	198	43	Horizontal



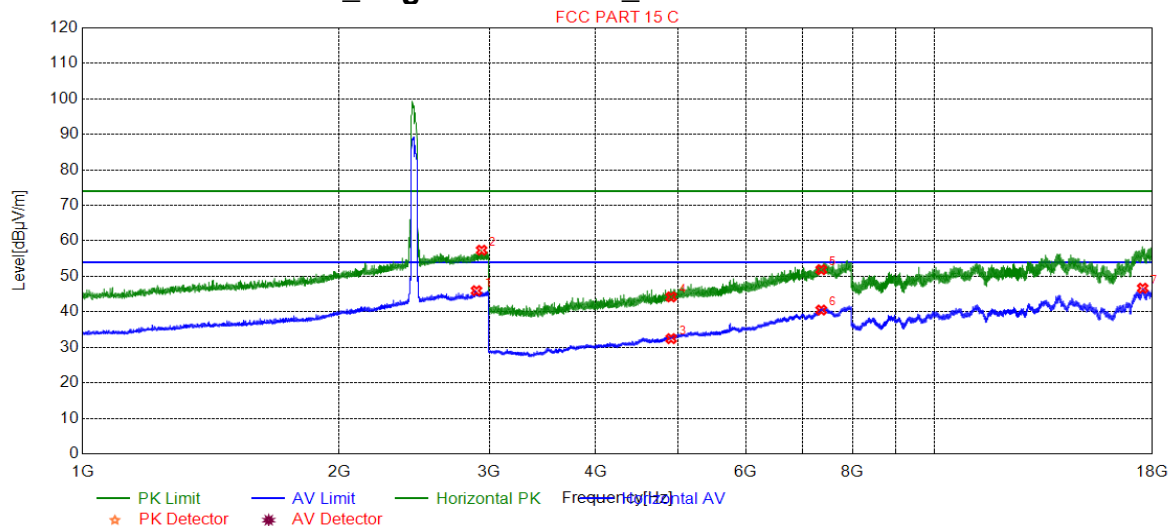
4.9.2.1.23 802.11N40_ Middle Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2793.9485	45.36	10.60	54.00	8.64	178	280	Horizontal
2	2894.4736	56.90	11.37	74.00	17.10	248	133	Horizontal
3	4874.0000	32.65	-14.68	54.00	21.35	234	72	Horizontal
4	4874.0000	44.02	-14.68	74.00	29.98	117	317	Horizontal
5	7311.0000	51.37	-6.24	74.00	22.63	161	154	Horizontal
6	7311.0000	39.75	-6.24	54.00	14.25	100	235	Horizontal
7	17531.9766	46.61	0.76	54.00	7.39	205	243	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	2898.9747	45.97	11.40	54.00	8.03	114	113	Horizontal
2	2938.9847	57.37	11.39	74.00	16.63	128	76	Horizontal
3	4904.0000	32.46	-14.54	54.00	21.54	107	154	Horizontal
4	4904.0000	44.21	-14.54	74.00	29.79	102	317	Horizontal
5	7356.0000	51.88	-5.92	74.00	22.12	229	344	Horizontal
6	7356.0000	40.51	-5.92	54.00	13.49	184	263	Horizontal
7	17529.9765	46.67	0.73	54.00	7.33	207	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:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$

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.



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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:			

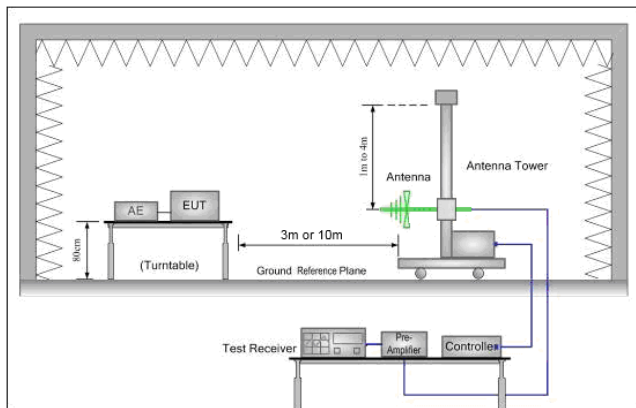


Figure 1. 30MHz to 1GHz

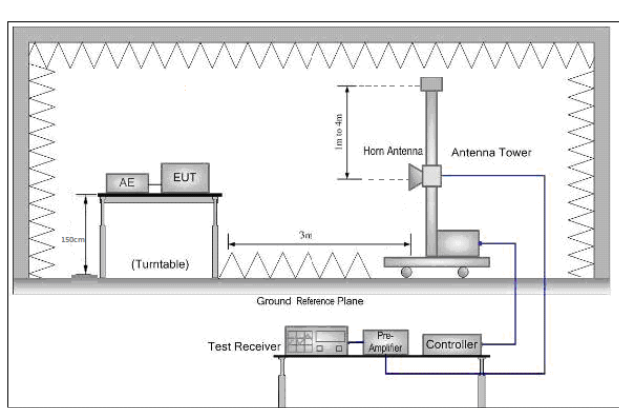


Figure 2. Above 1 GHz



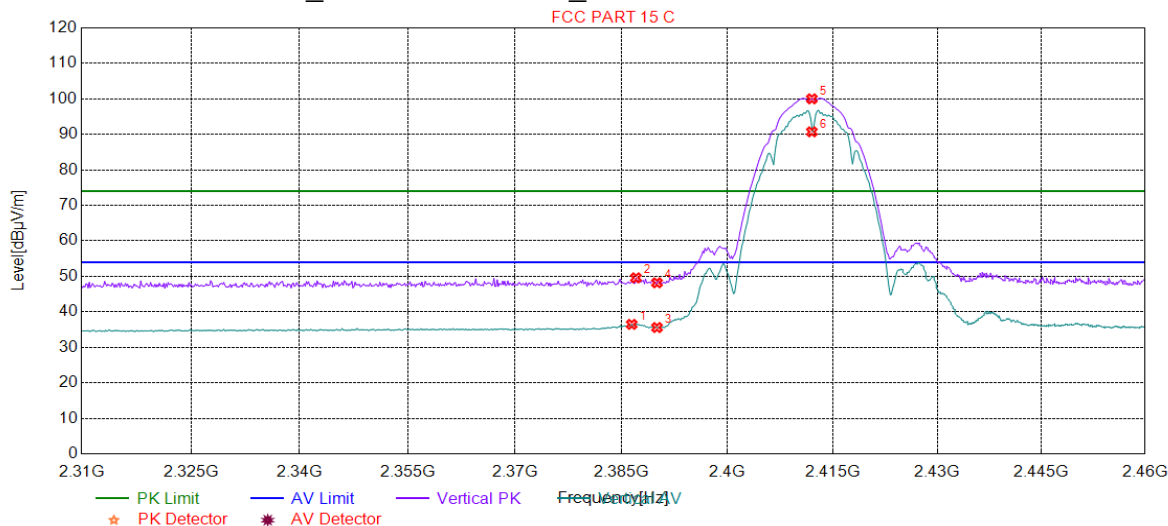
Test Procedure:	<ul style="list-style-type: none"> a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. 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:	<p>Pretest the EUT at Charge +Transmitting mode.</p> <p>Through Pre-scan, find the</p> <p>1Mbps of rate is the worst case of 802.11B;</p> <p>6Mbps of rate is the worst case of 802.11G ;</p> <p>6.5Mbps of rate is the worst case of 802.11N(HT20);</p> <p>13.5Mbps of rate is the worst case of 802.11N(HT40).</p> <p>Only the worst case is recorded in the report.</p>
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

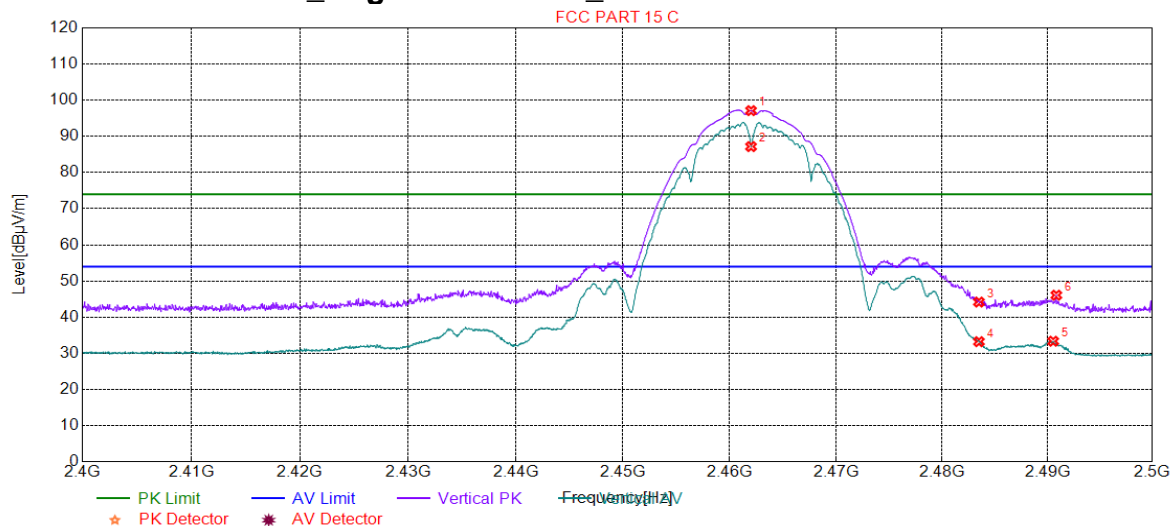


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2386.4264	36.48	9.19	54.00	17.52	271	315	Vertical
2	2387.0270	49.58	9.19	74.00	24.42	204	143	Vertical
3	2390.0000	35.59	9.20	54.00	18.41	186	315	Vertical
4	2390.0000	48.19	9.20	74.00	25.81	220	315	Vertical
5	2412.0000	100.01	9.27	74.00	-26.01	212	311	Vertical
6	2412.0000	90.72	9.27	54.00	-36.72	184	315	Vertical



4.10.1.2 802.11B_ Highest Channel_ Vertical

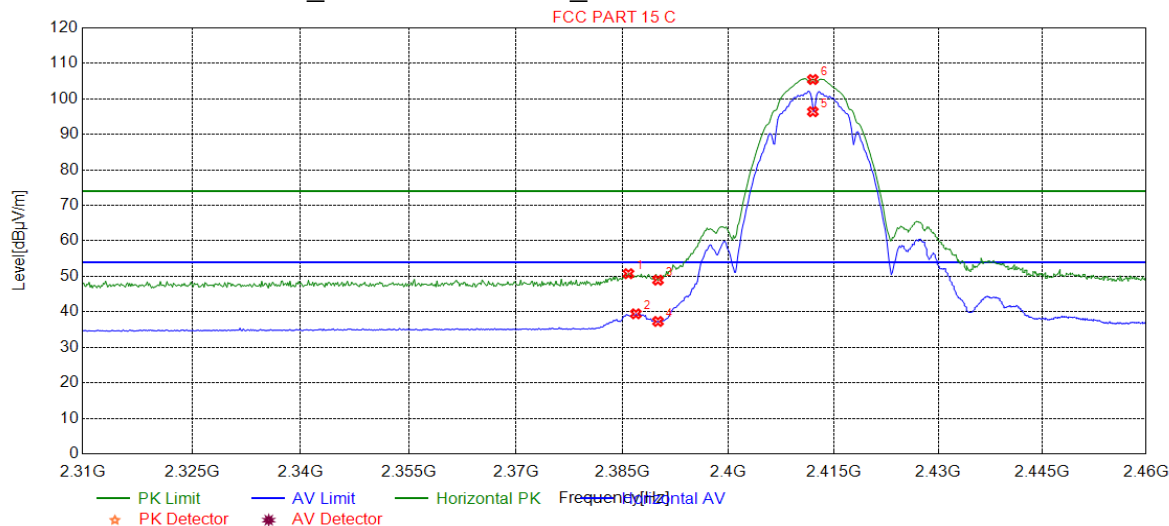


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	97.11	9.43	74.00	-23.11	154	52	Vertical
2	2462.0000	87.17	9.43	54.00	-33.17	197	57	Vertical
3	2483.5000	44.18	9.50	74.00	29.82	281	226	Vertical
4	2483.5000	33.22	9.50	54.00	20.78	279	177	Vertical
5	2490.5453	33.35	9.52	54.00	20.65	166	52	Vertical
6	2490.8454	46.08	9.52	74.00	27.92	278	232	Vertical



4.10.1.3 802.11B_Lowest Channel_Horizontal

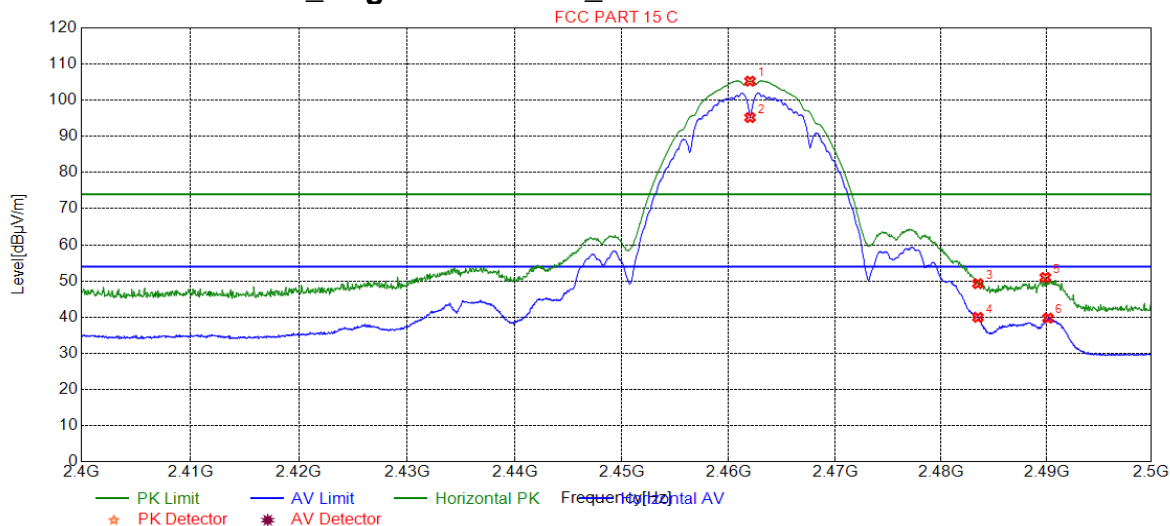


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2385.8258	50.76	9.18	74.00	23.24	133	25	Horizontal
2	2386.8769	39.45	9.19	54.00	14.55	136	182	Horizontal
3	2390.0000	48.94	9.20	74.00	25.06	183	145	Horizontal
4	2390.0000	37.30	9.20	54.00	16.70	170	203	Horizontal
5	2412.0000	96.39	9.27	54.00	-42.39	164	178	Horizontal
6	2412.0000	105.46	9.27	74.00	-31.46	192	182	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	2462.0000	105.26	9.43	74.00	-31.26	121	183	Horizontal
2	2462.0000	95.20	9.43	54.00	-41.20	188	194	Horizontal
3	2483.5000	49.28	9.50	74.00	24.72	176	194	Horizontal
4	2483.5000	39.95	9.50	54.00	14.05	245	144	Horizontal
5	2489.8949	50.97	9.52	74.00	23.03	128	144	Horizontal
6	2490.1451	39.74	9.52	54.00	14.26	103	144	Horizontal



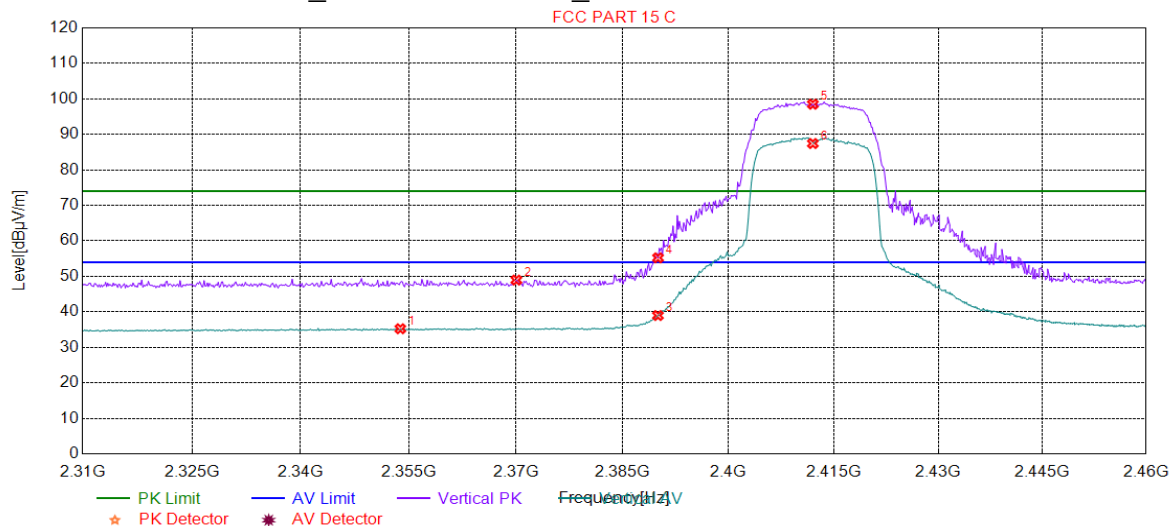
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4.10.1.5 802.11G_Lowest Channel_Vertical

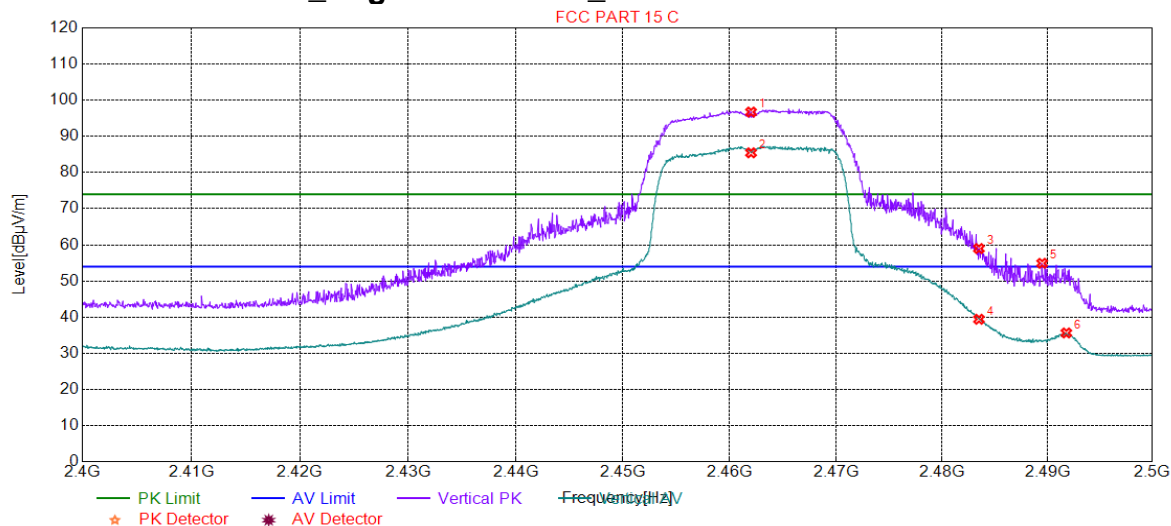


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2353.8438	35.25	9.08	54.00	18.75	269	323	Vertical
2	2370.0601	48.96	9.13	74.00	25.04	244	64	Vertical
3	2390.0000	38.97	9.20	54.00	15.03	292	310	Vertical
4	2390.0000	55.22	9.20	74.00	18.78	167	53	Vertical
5	2412.0000	98.50	9.27	74.00	-24.50	217	314	Vertical
6	2412.0000	87.43	9.27	54.00	-33.43	187	314	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	96.73	9.43	74.00	-22.73	258	202	Vertical
2	2462.0000	85.45	9.43	54.00	-31.45	218	202	Vertical
3	2483.5000	58.97	9.50	74.00	15.03	276	202	Vertical
4	2483.5000	39.42	9.50	54.00	14.58	286	298	Vertical
5	2489.4947	54.90	9.52	74.00	19.10	257	202	Vertical
6	2491.7959	35.63	9.52	54.00	18.37	202	202	Vertical



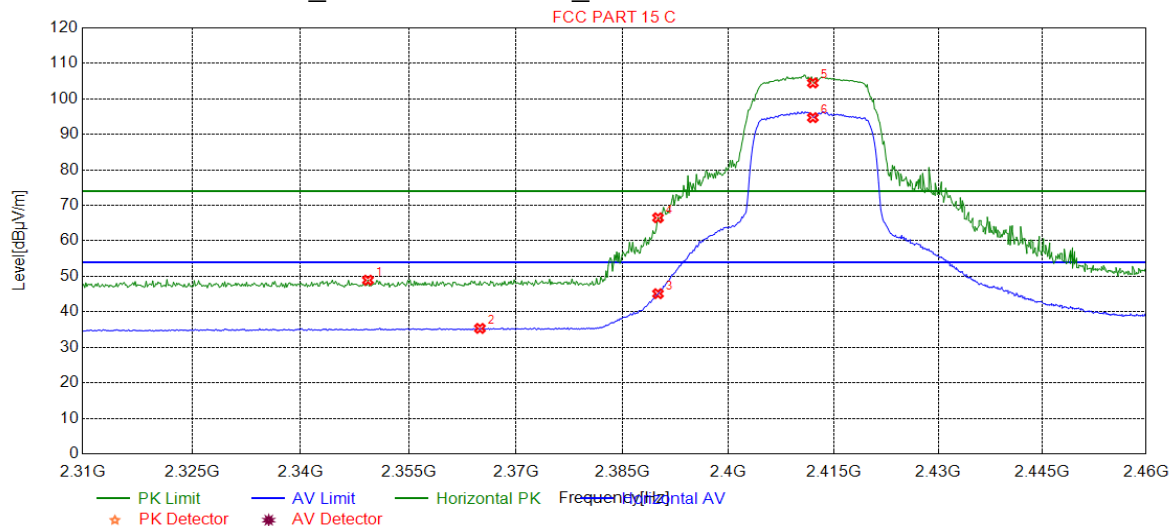
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4.10.1.7 802.11G_Lowest Channel_ Horizontal

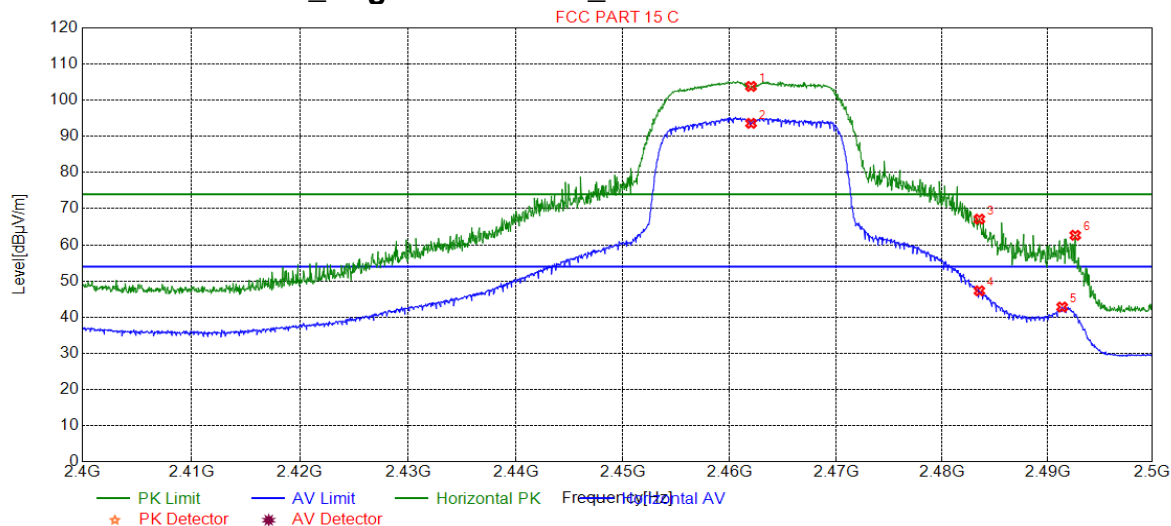


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2349.3393	48.93	9.06	74.00	25.07	113	70	Horizontal
2	2364.9550	35.34	9.11	54.00	18.66	114	134	Horizontal
3	2390.0000	45.12	9.20	54.00	8.88	173	202	Horizontal
4	2390.0000	66.50	9.20	74.00	7.50	141	208	Horizontal
5	2412.0000	104.49	9.27	74.00	-30.49	113	213	Horizontal
6	2412.0000	94.72	9.27	54.00	-40.72	243	208	Horizontal



4.10.1.8 802.11G_ Highest Channel_ Horizontal

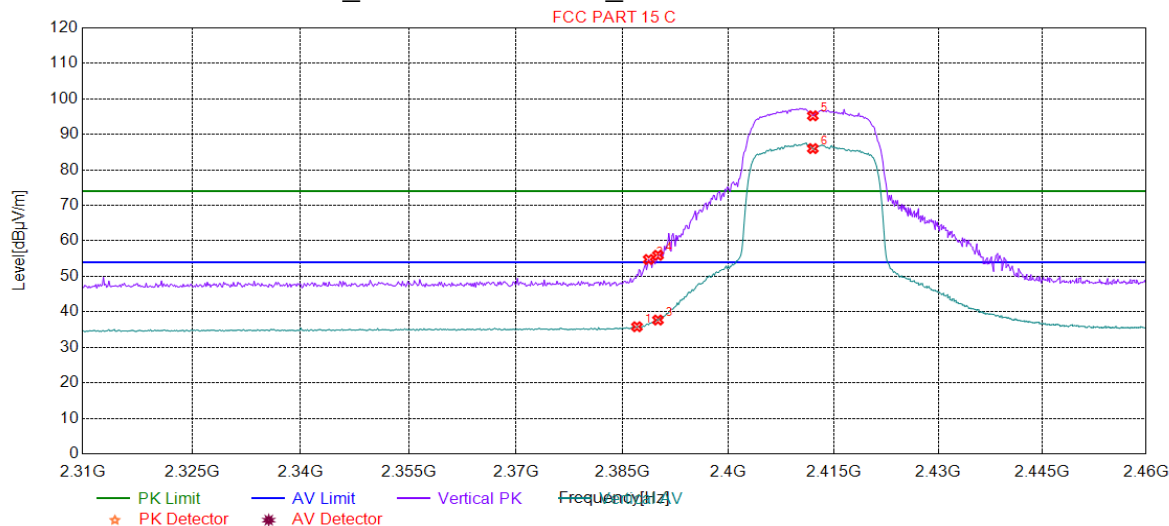


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	103.81	9.43	74.00	-29.81	169	182	Horizontal
2	2462.0000	93.60	9.43	54.00	-39.60	188	182	Horizontal
3	2483.5418	67.12	9.50	74.00	6.88	112	182	Horizontal
4	2483.5418	47.28	9.50	54.00	6.72	104	182	Horizontal
5	2491.3957	42.80	9.52	54.00	11.20	210	182	Horizontal
6	2492.6463	62.64	9.53	74.00	11.36	186	182	Horizontal



4.10.1.9 802.11N20_Lowest Channel_Vertical

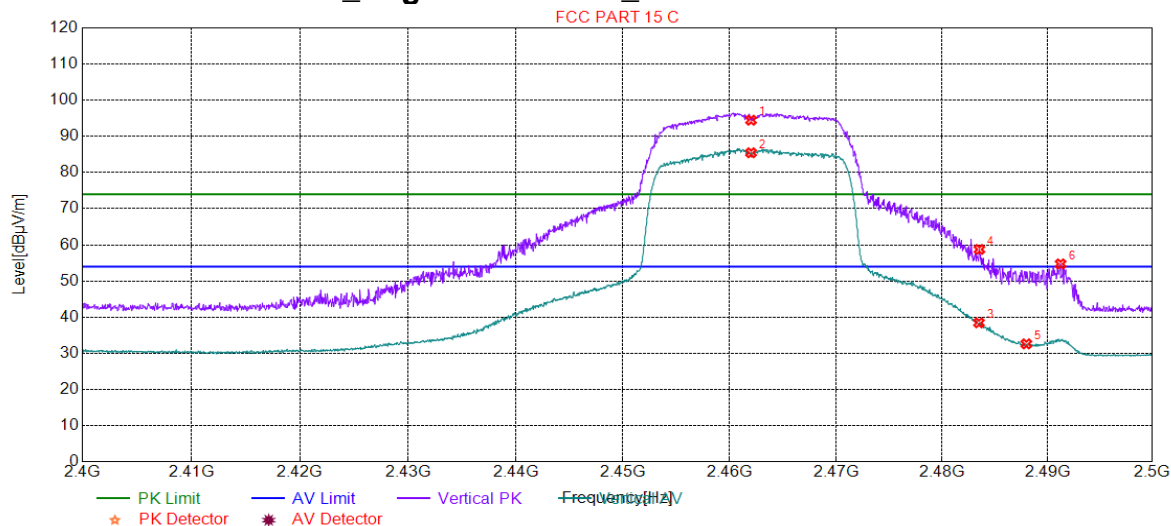


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2387.0270	35.81	9.19	54.00	18.19	150	187	Vertical
2	2388.6787	54.76	9.19	74.00	19.24	212	316	Vertical
3	2390.0000	37.70	9.20	54.00	16.30	282	108	Vertical
4	2390.0000	55.93	9.20	74.00	18.07	199	67	Vertical
5	2412.0000	95.23	9.27	74.00	-21.23	202	308	Vertical
6	2412.0000	86.00	9.27	54.00	-32.00	260	312	Vertical



4.10.1.10 802.11N20_ Highest Channel_ Vertical

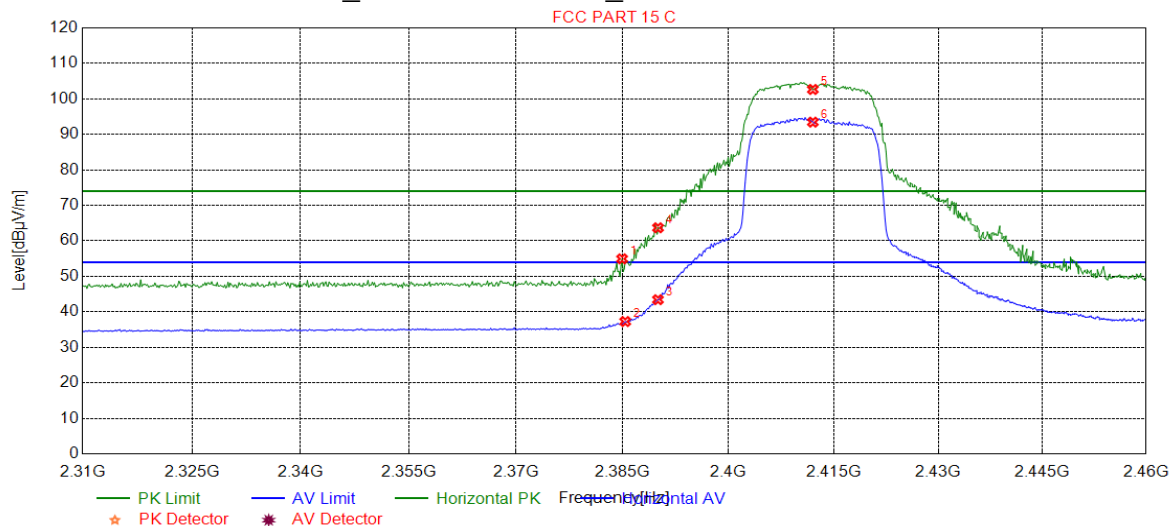


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	94.47	9.43	74.00	-20.47	256	14	Vertical
2	2462.0000	85.46	9.43	54.00	-31.46	252	14	Vertical
3	2483.5000	38.44	9.50	54.00	15.56	160	14	Vertical
4	2483.5418	58.73	9.50	74.00	15.27	290	14	Vertical
5	2487.9940	32.61	9.51	54.00	21.39	208	14	Vertical
6	2491.2456	54.72	9.52	74.00	19.28	277	14	Vertical



4.10.1.11 802.11N20_Lowest Channel_Horizontal

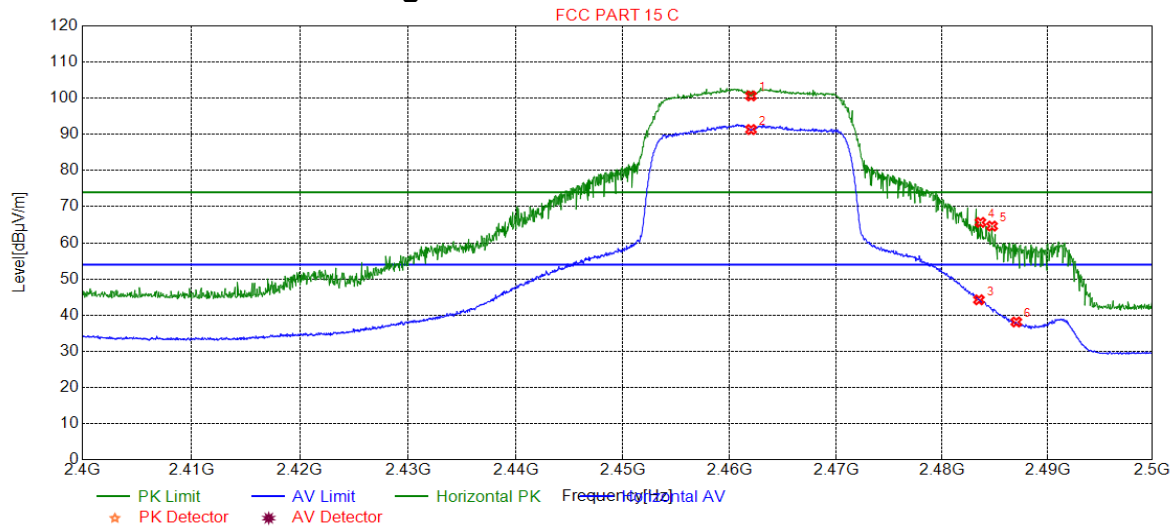


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2384.9249	54.93	9.18	74.00	19.07	247	192	Horizontal
2	2385.3754	37.28	9.18	54.00	16.72	170	184	Horizontal
3	2390.0000	43.43	9.20	54.00	10.57	100	180	Horizontal
4	2390.0000	63.69	9.20	74.00	10.31	173	205	Horizontal
5	2412.0000	102.65	9.27	74.00	-28.65	237	184	Horizontal
6	2412.0000	93.44	9.27	54.00	-39.44	210	184	Horizontal



4.10.1.12 802.11N20_ Highest Channel_ Horizontal

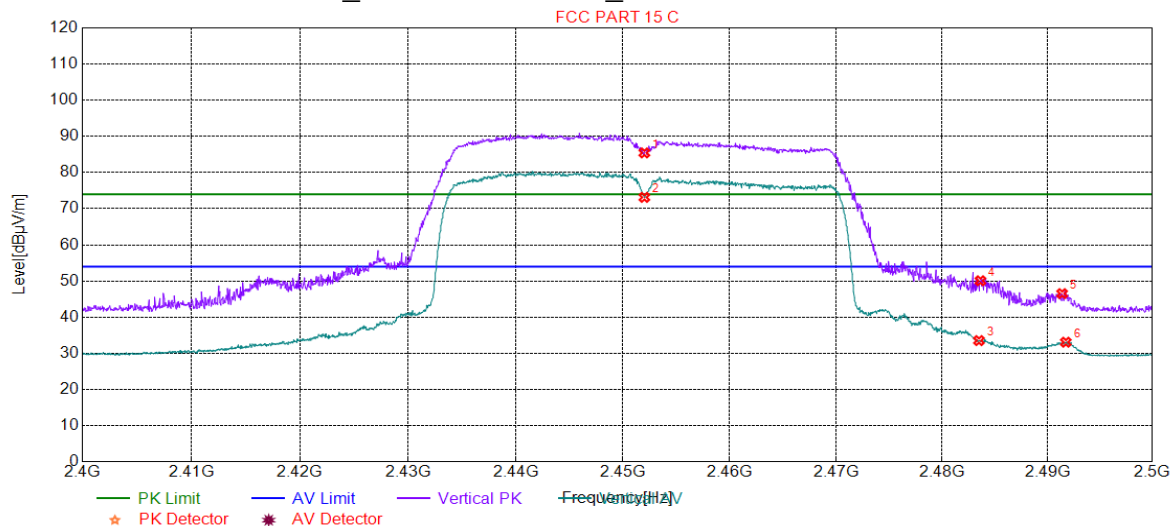


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	100.63	9.43	74.00	-26.63	170	179	Horizontal
2	2462.0000	91.33	9.43	54.00	-37.33	234	190	Horizontal
3	2483.5000	44.25	9.50	54.00	9.75	184	190	Horizontal
4	2483.6418	65.64	9.50	74.00	8.36	106	184	Horizontal
5	2484.7424	64.63	9.50	74.00	9.37	175	184	Horizontal
6	2487.0435	38.11	9.51	54.00	15.89	101	184	Horizontal



4.10.1.13 802.11N40_Lowest Channel_Vertical

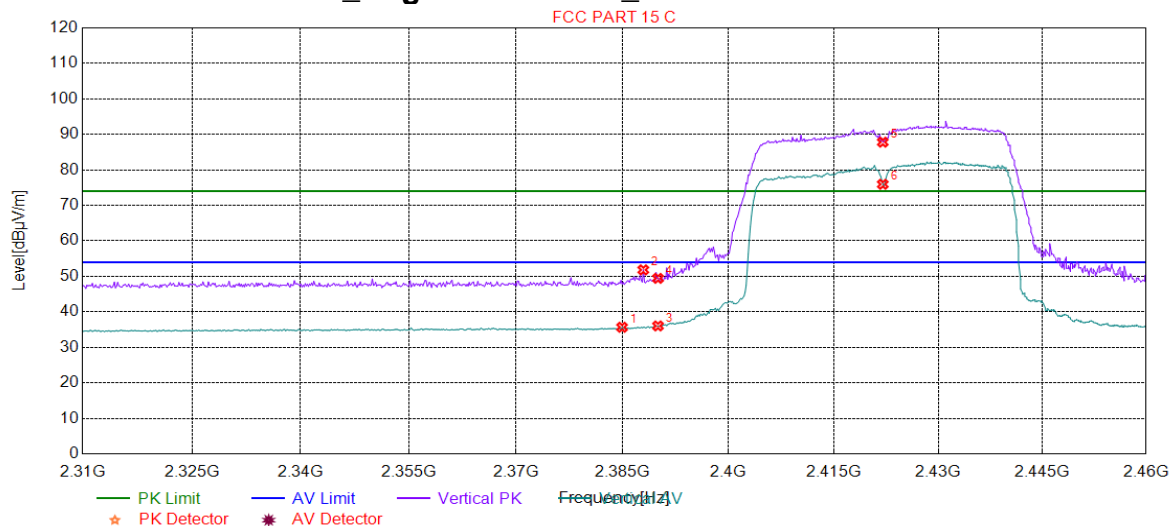


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2452.0000	85.43	9.40	74.00	-11.43	152	14	Vertical
2	2452.0000	73.13	9.40	54.00	-19.13	246	14	Vertical
3	2483.5000	33.52	9.50	54.00	20.48	209	14	Vertical
4	2483.6418	50.07	9.50	74.00	23.93	152	14	Vertical
5	2491.3957	46.52	9.52	74.00	27.48	254	14	Vertical
6	2491.7459	33.07	9.52	54.00	20.93	187	14	Vertical



4.10.1.14 802.11N40_ Highest Channel_ Vertical

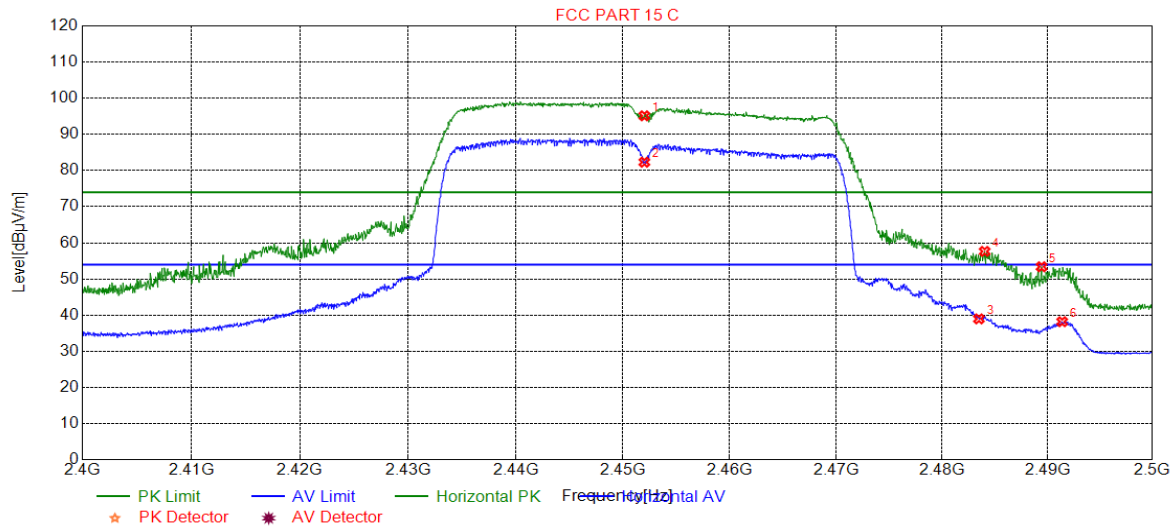


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2384.9249	35.67	9.18	54.00	18.33	267	250	Vertical
2	2387.9279	51.83	9.19	74.00	22.17	250	183	Vertical
3	2390.0000	36.04	9.20	54.00	17.96	152	67	Vertical
4	2390.0000	49.44	9.20	74.00	24.56	232	108	Vertical
5	2422.0000	87.80	9.30	74.00	-13.80	222	183	Vertical
6	2422.0000	75.94	9.30	54.00	-21.94	150	183	Vertical



4.10.1.15 802.11N40_Lowest Channel_Horizontal

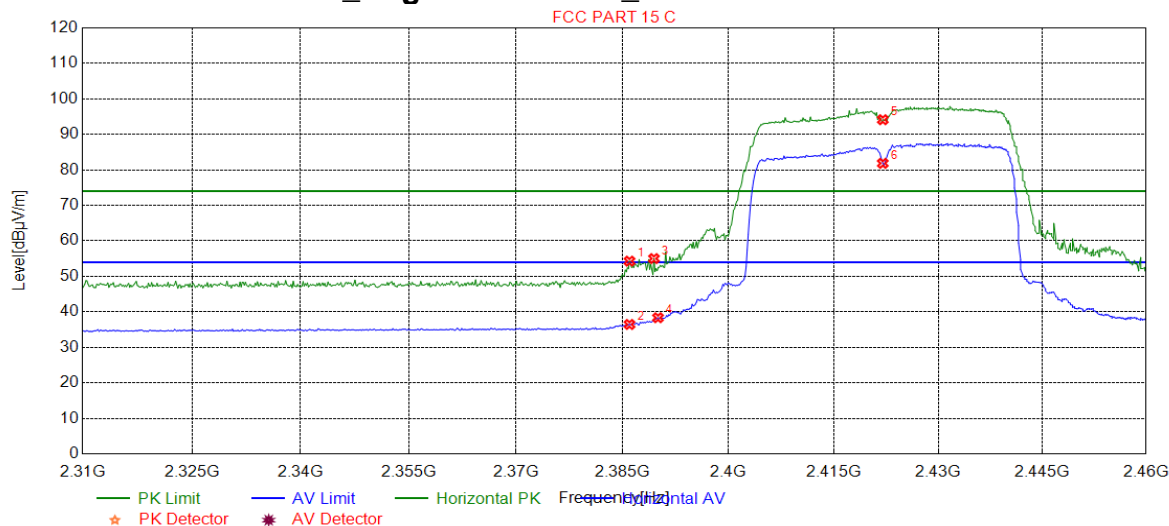


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2452.0000	95.13	9.40	74.00	-21.13	248	133	Horizontal
2	2452.0000	82.30	9.40	54.00	-28.30	218	145	Horizontal
3	2483.5000	38.97	9.50	54.00	15.03	204	150	Horizontal
4	2484.0420	57.63	9.50	74.00	16.37	200	139	Horizontal
5	2489.4447	53.39	9.52	74.00	20.61	139	145	Horizontal
6	2491.3957	38.19	9.52	54.00	15.81	153	150	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	2385.9760	54.29	9.18	74.00	19.71	161	191	Horizontal
2	2385.9760	36.46	9.18	54.00	17.54	142	187	Horizontal
3	2389.4294	55.01	9.20	74.00	18.99	109	187	Horizontal
4	2390.0000	38.35	9.20	54.00	15.65	145	187	Horizontal
5	2422.0000	94.13	9.30	74.00	-20.13	107	146	Horizontal
6	2422.0000	81.84	9.30	54.00	-27.84	103	146	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.



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

Lab A:

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	$\pm 0.75\text{dB}$
2	RF power density, conducted	$\pm 2.84\text{dB}$
3	Spurious emissions, conducted	$\pm 0.75\text{dB}$
4	Temperature test	$\pm 1^\circ\text{C}$
5	Humidity test	$\pm 3\%$
6	DC and low frequency voltages	$\pm 0.5\%$

Lab B:

No.	Item	Measurement Uncertainty
1	Conduction Emission	$\pm 3.0\text{dB}$ (150kHz to 30MHz)
2	Radiated Emission	$\pm 4.8\text{dB}$ (Below 1GHz)
		$\pm 4.8\text{dB}$ (1GHz to 6GHz)
		$\pm 4.5\text{dB}$ (6GHz to 18GHz)
		$\pm 5.02\text{dB}$ (Above 18GHz)



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6 Equipment List

RF conducted test					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
DC Power Supply	Agilent Technologies Inc	66311B	W 009-09	2019/7/15	2020/7/15
Signal Analyzer	Rohde & Schwarz	FSV	W 025-05	2019/1/13	2020/1/12
Coaxial Cable	SGS	N/A	SE M 031-01	2019/6/12	2020/6/11
Attenuator	Weinschel Associates	WA41	SE M 021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SE M 008-05	2019/7/14	2020/7/14
Temperature Chamber	GIANT FORCE	ICT-150-40-CP-AR	W 027-03	2018/11/27	2019/11/27
Power Meter	Rohde & Schwarz	NRVS	SE M 014-02	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	2018-12-16	2019-12-15
Measurement Software	Tonscend	TS+ CE V2.5	XAW02-05-02	NCR	NCR



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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
Amplifier	Tonscend	TAP01018048	XAW01-41-02	2018-12-10	2019-12-09
Amplifier	Tonscend	TAP18040048	XAW01-41-03	2018-12-10	2019-12-09
Amplifier	Shanghai Steed	YX28980930	XAW01-41-06	2018-12-10	2019-12-09
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
Radio communication analyzer	ROHDE&SCHWARZ	CMW 500	XAW01-03-02	2019-06-27	2020-06-26

7 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of Set-Up for ZR/2019/B0003.

The End

