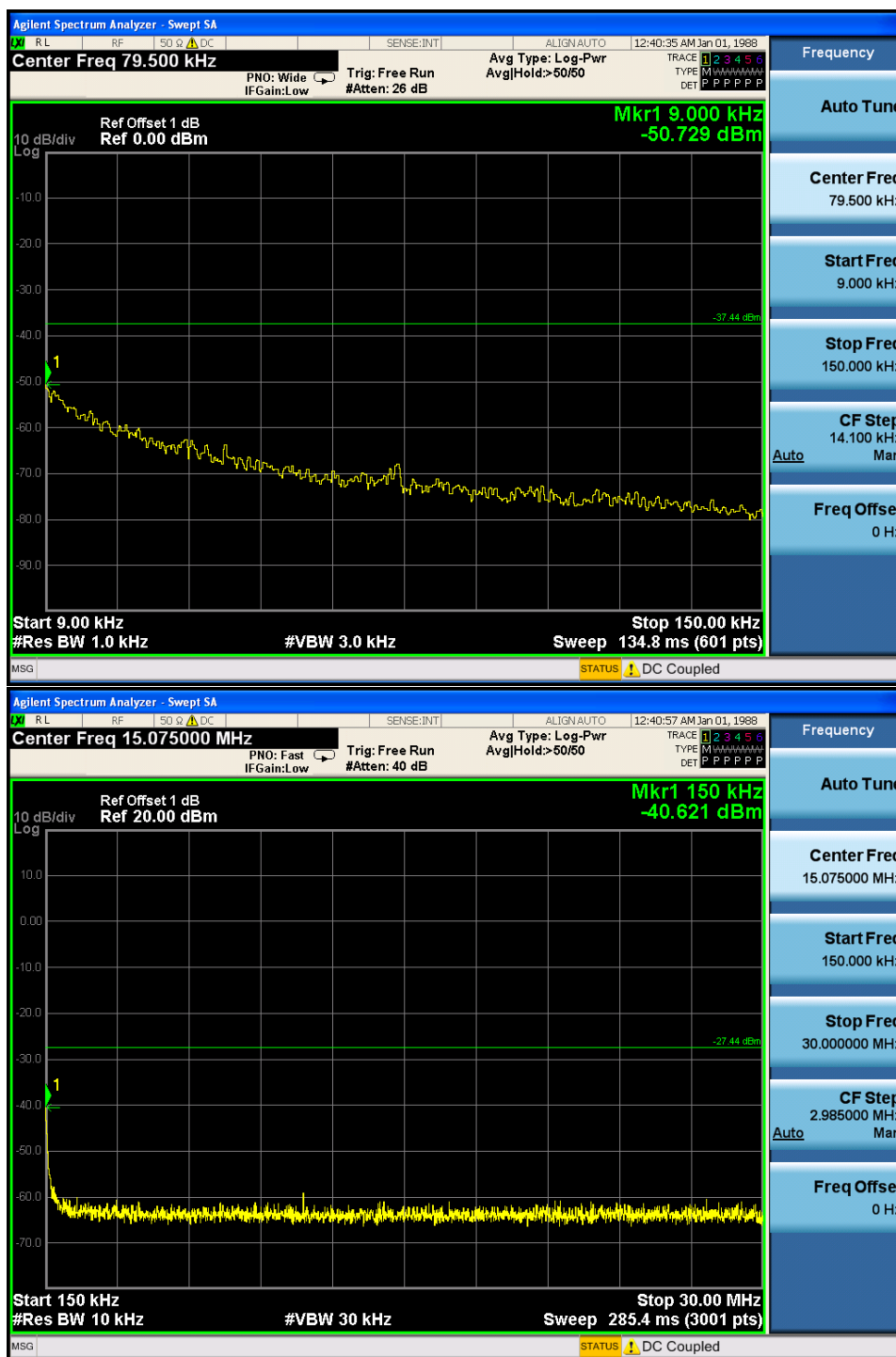




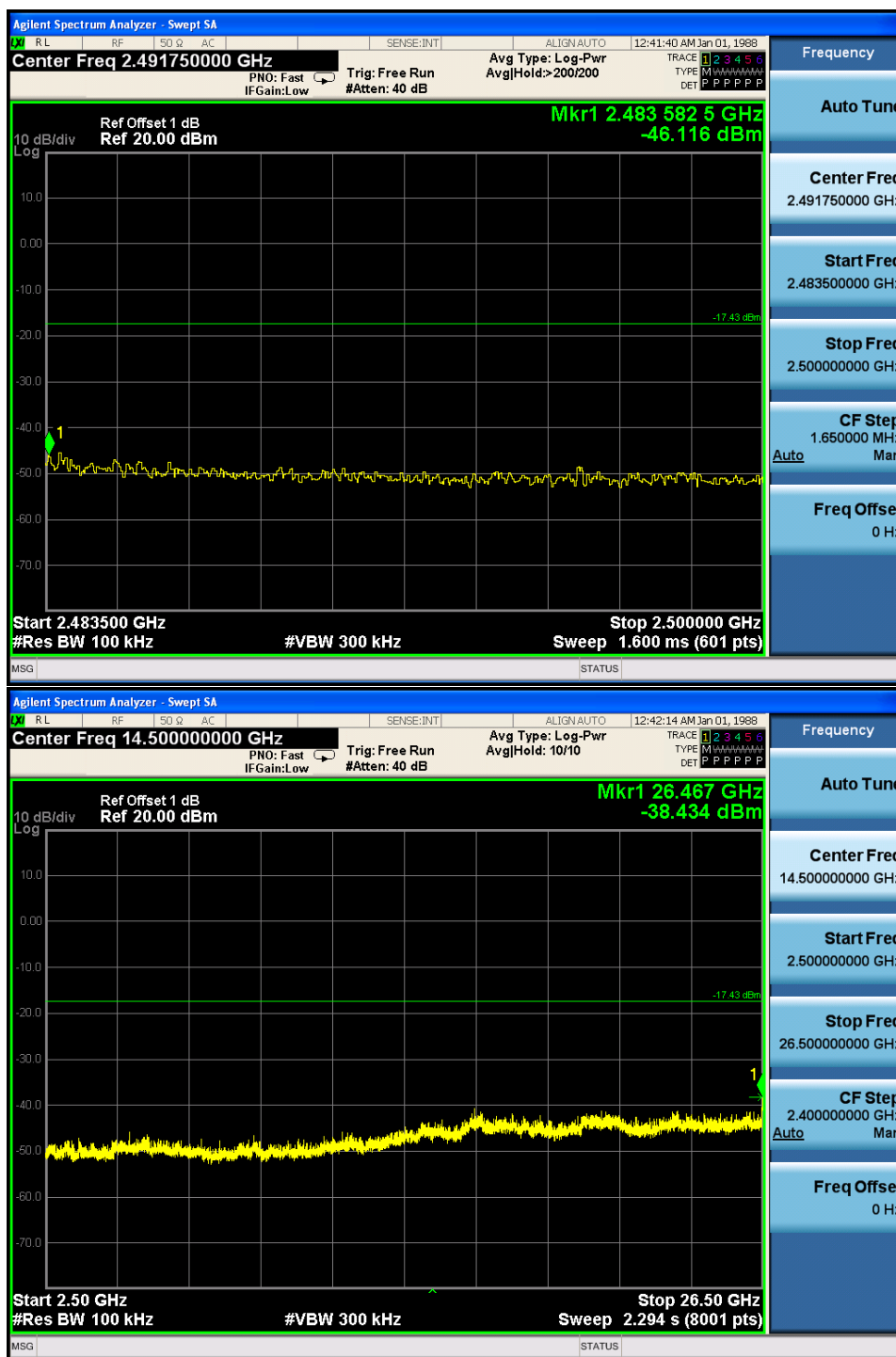
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4.8.1.1.7 802.11N20 Lowest Channel

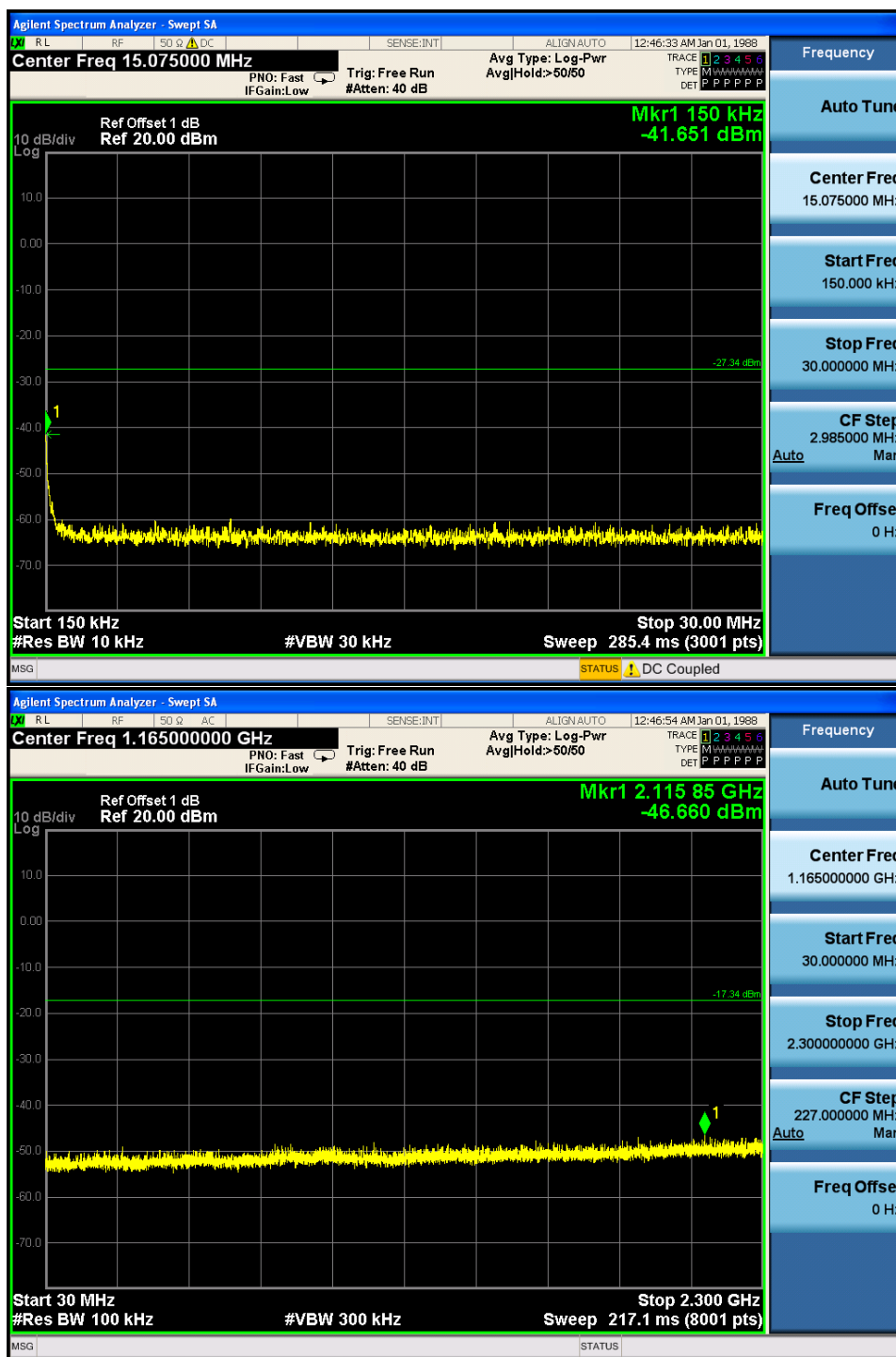


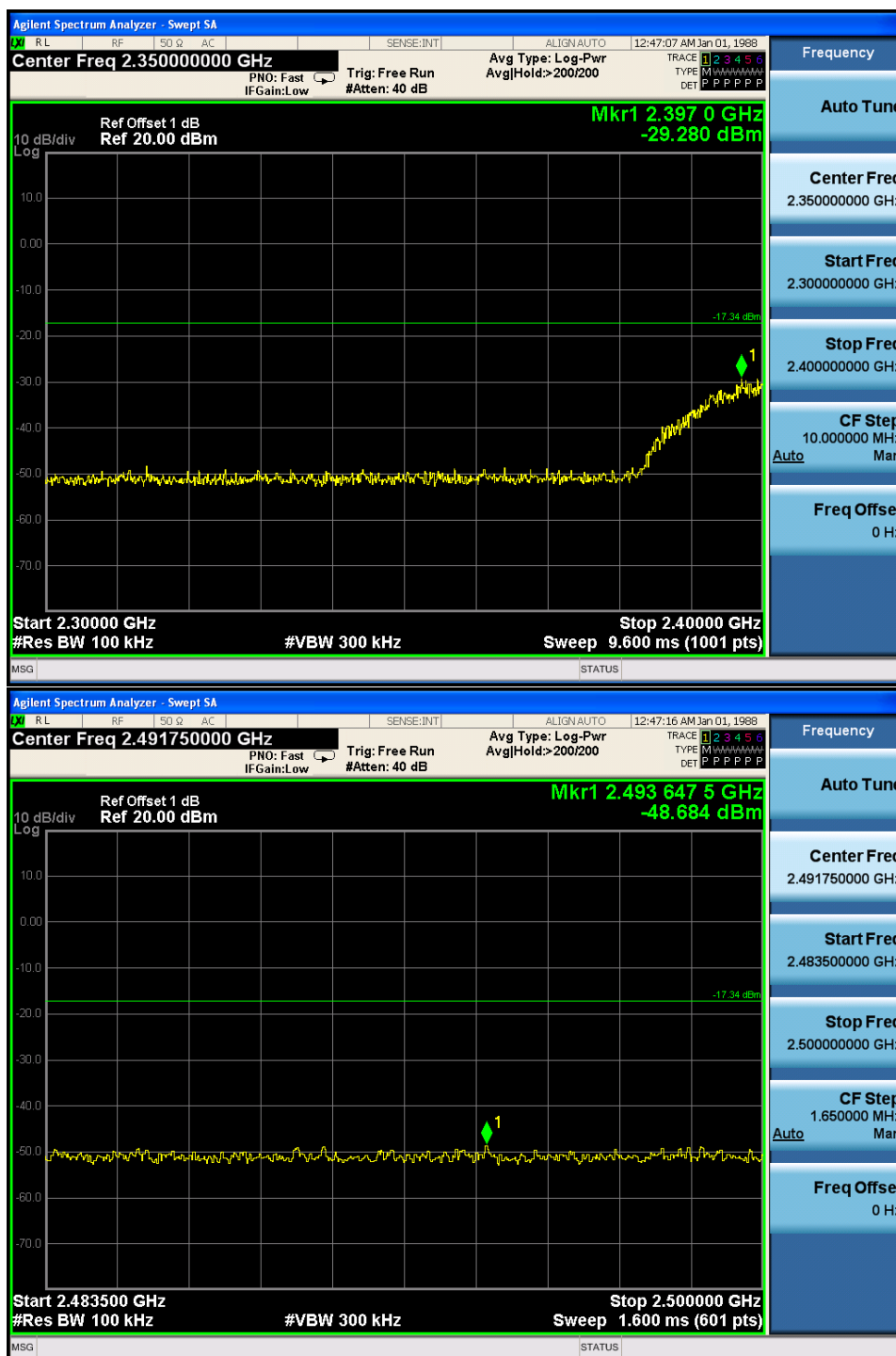
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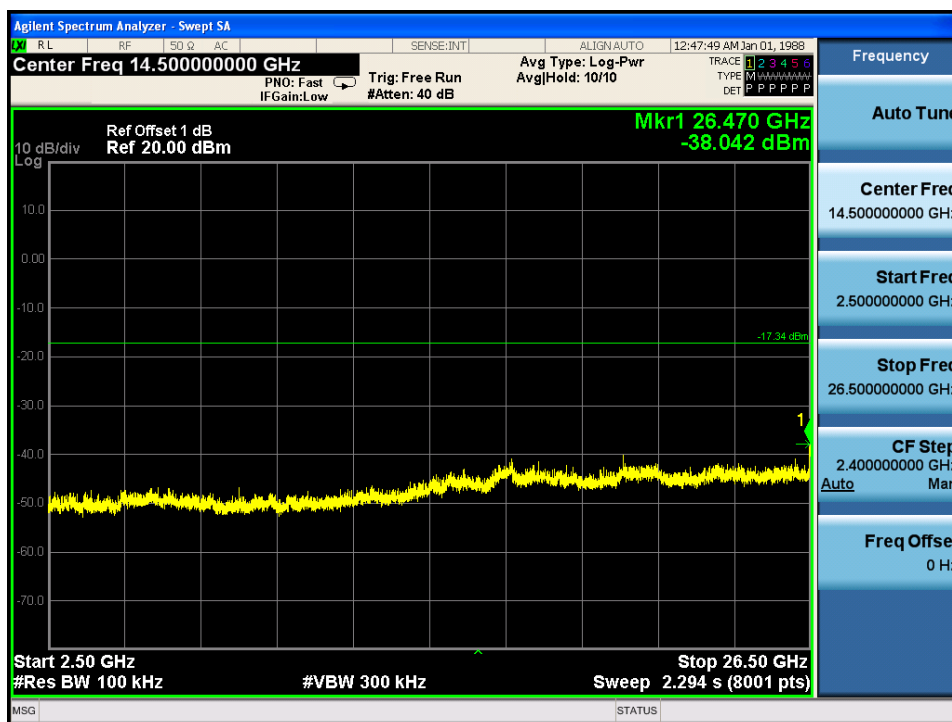


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4.8.1.1.8 802.11 N20 Middle Channel



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4.8.1.1.9 802.11 N20_Highest Channel

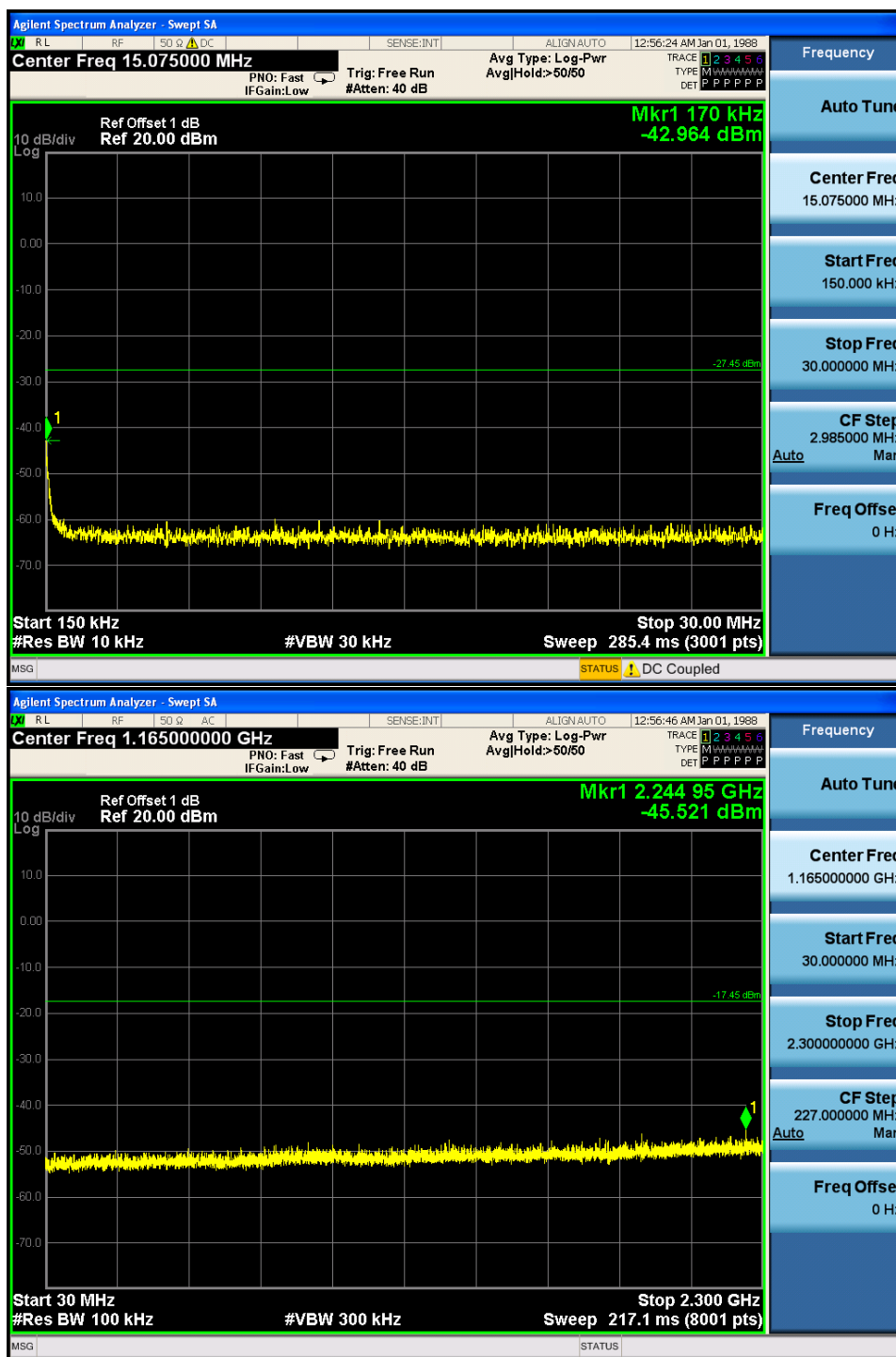


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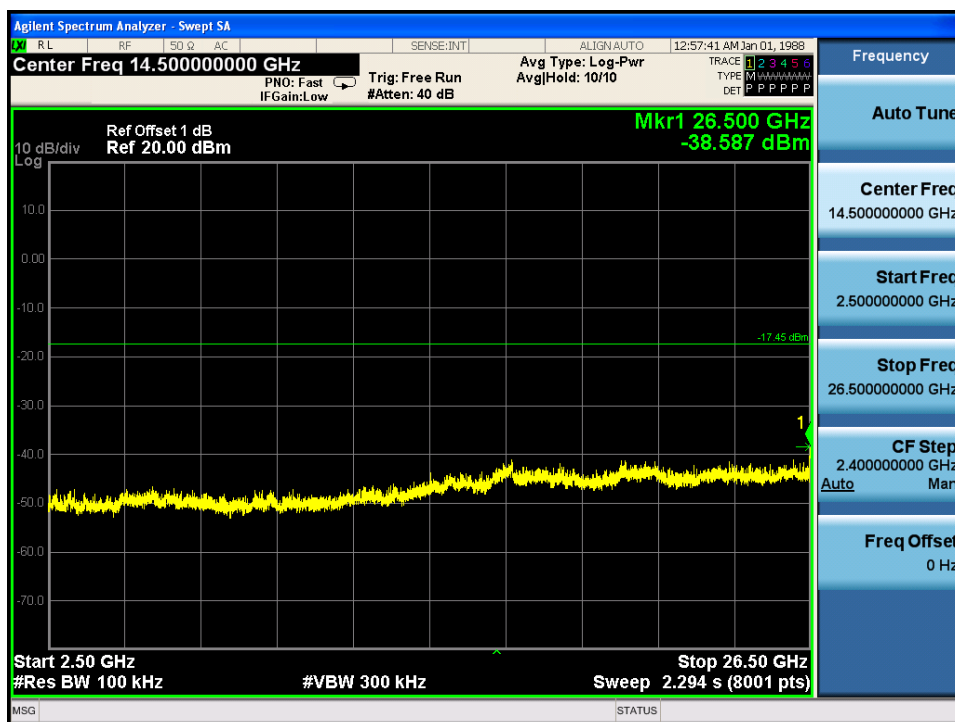


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Remark:

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.



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



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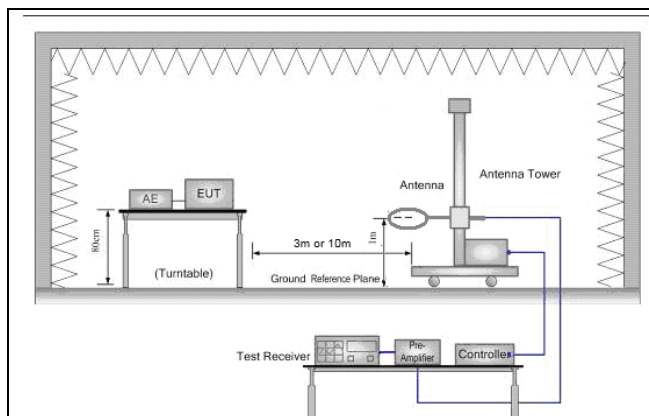


Figure 1. Below 30MHz

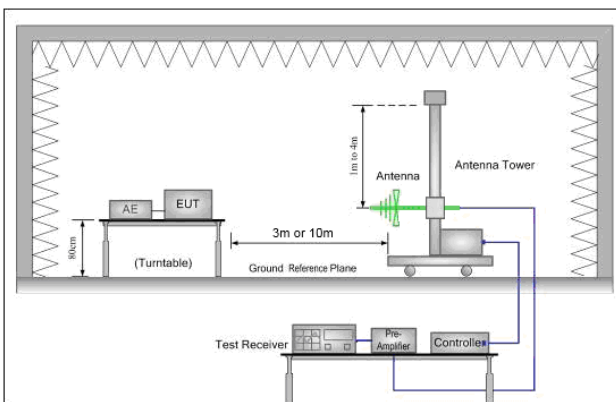


Figure 2. 30MHz to 1GHz

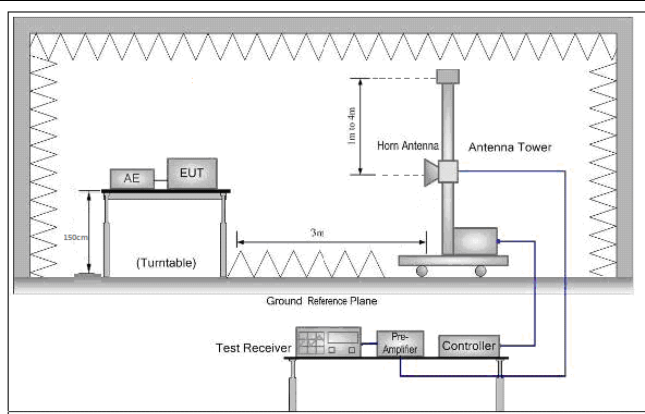


Figure 3. Above 1 GHz

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 chamber. 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 chamber. 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





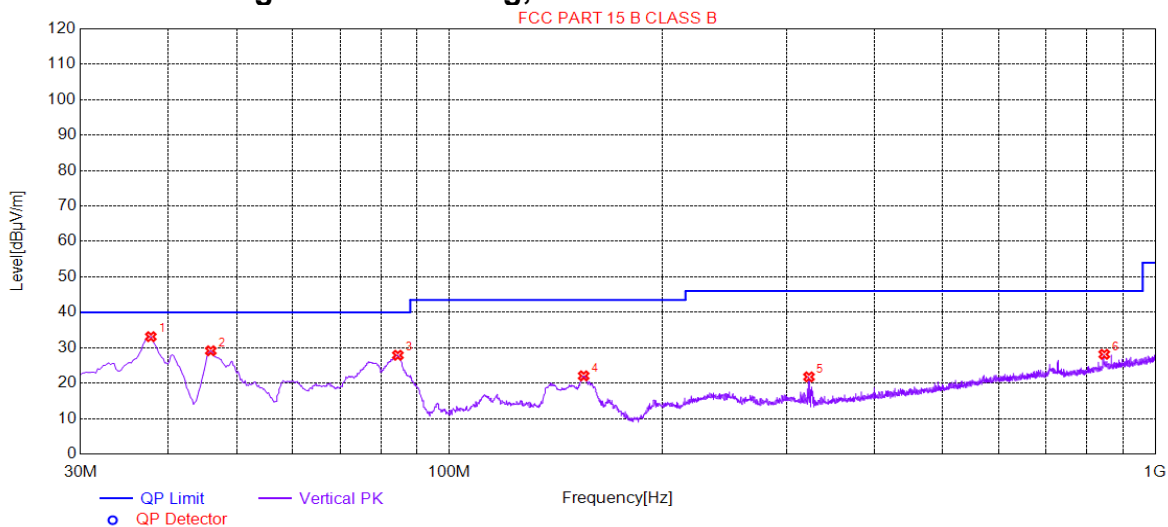
	re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. h. Test the EUT in the lowest channel, the middle channel ,the Highest channel i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis 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); 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

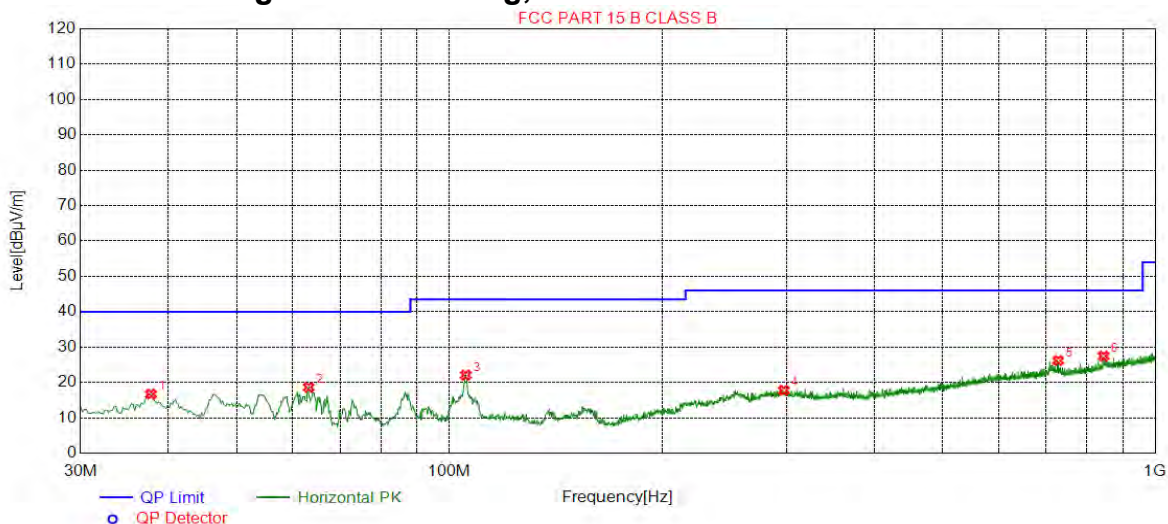


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	37.7616	33.12	-29.07	40.00	6.88	100	351	Vertical
2	45.9112	29.14	-30.42	40.00	10.86	100	22	Vertical
3	84.5249	27.88	-35.05	40.00	12.12	100	32	Vertical
4	154.9610	22.06	-34.86	43.50	21.44	100	97	Vertical
5	323.1926	21.77	-27.61	46.00	24.23	100	200	Vertical
6	846.9034	28.14	-16.94	46.00	17.86	100	198	Vertical



4.9.1.2 Charge + Transmitting, Horizontal



Suspected List

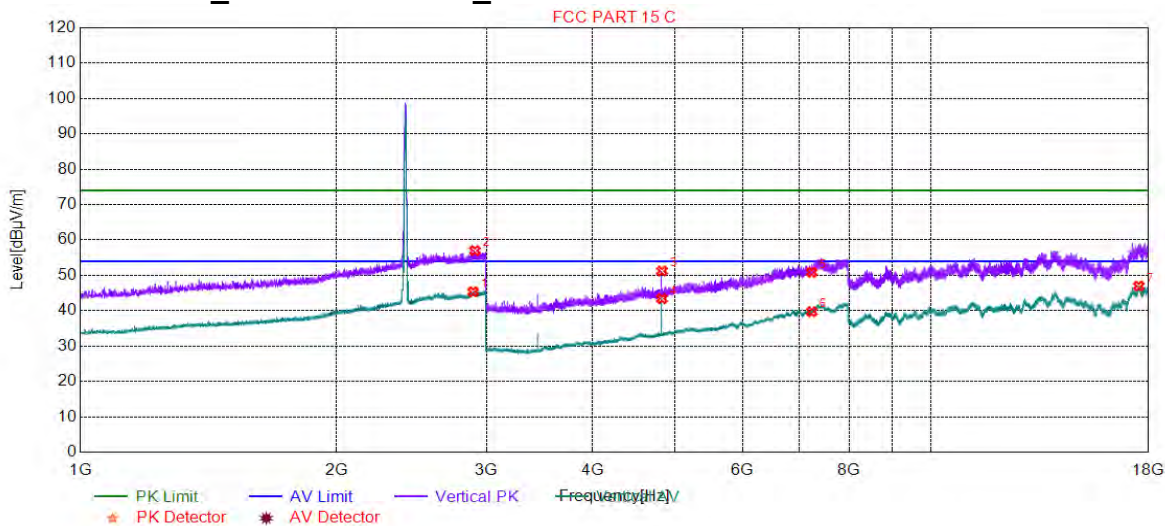
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	37.7616	16.70	-29.07	40.00	23.30	100	269	Horizontal
2	63.1806	18.64	-32.68	40.00	21.36	100	231	Horizontal
3	105.4811	22.08	-32.00	43.50	21.42	100	183	Horizontal
4	297.7736	17.77	-28.35	46.00	28.23	100	248	Horizontal
5	728.7337	26.22	-18.83	46.00	19.78	100	328	Horizontal
6	844.9630	27.46	-16.97	46.00	18.54	100	272	Horizontal



4.9.2 Transmitter emission above 1GHz

4.9.2.1 ANT1

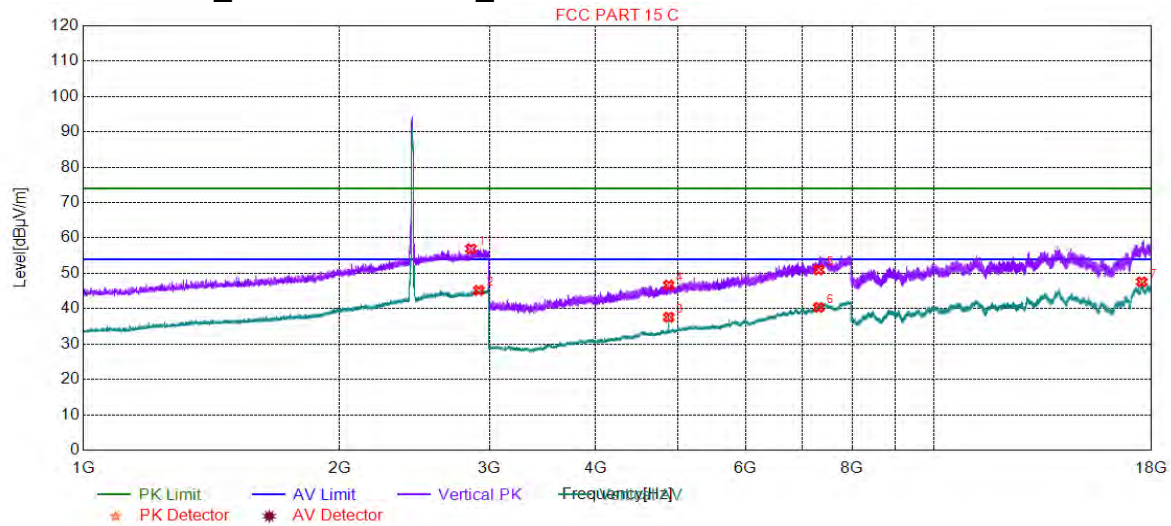
4.9.2.1.1 802.11B_Lowest Channel_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2894.4736	45.37	11.37	54.00	8.63	150	68	Vertical
2	2907.9770	57.00	11.41	74.00	17.00	150	54	Vertical
3	4824.0000	51.21	-14.90	74.00	22.79	150	290	Vertical
4	4824.0000	43.40	-14.90	54.00	10.60	150	262	Vertical
5	7236.0000	50.88	-6.82	74.00	23.12	150	360	Vertical
6	7236.0000	39.70	-6.82	54.00	14.30	150	317	Vertical
7	17527.9764	46.97	0.71	54.00	7.03	150	41	Vertical



4.9.2.1.2 802.11B_ Middle Channel_ Vertical

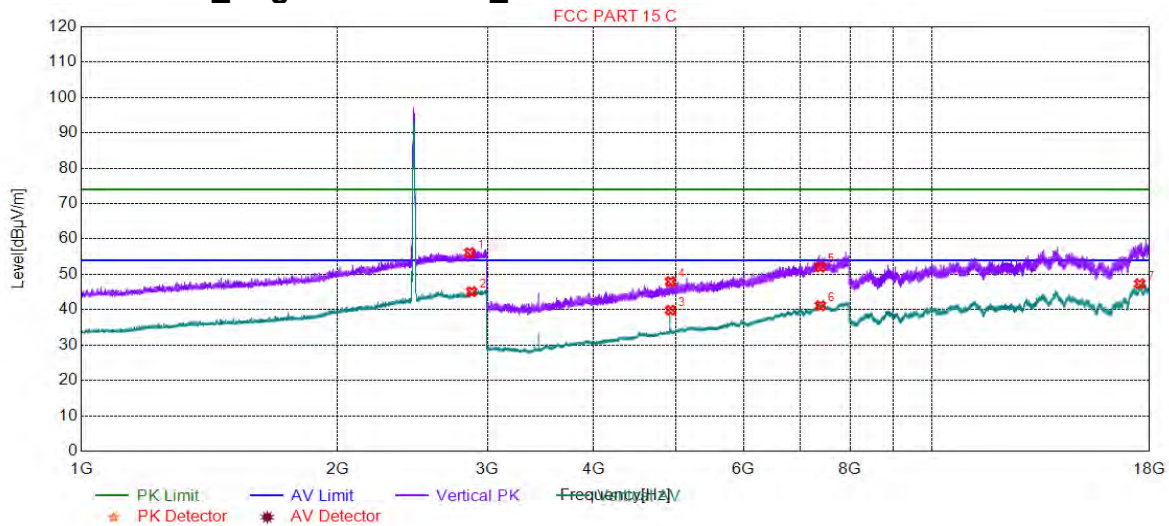


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2854.4636	56.94	11.06	74.00	17.06	150	28	Vertical
2	2914.9787	45.17	11.40	54.00	8.83	150	234	Vertical
3	4874.0000	37.59	-14.68	54.00	16.41	150	290	Vertical
4	4874.0000	46.66	-14.68	74.00	27.34	150	290	Vertical
5	7311.0000	51.01	-6.24	74.00	22.99	150	235	Vertical
6	7311.0000	40.37	-6.24	54.00	13.63	150	344	Vertical
7	17526.4763	47.61	0.69	54.00	6.39	150	142	Vertical



4.9.2.1.3 802.11B_Highest Channel_Vertical

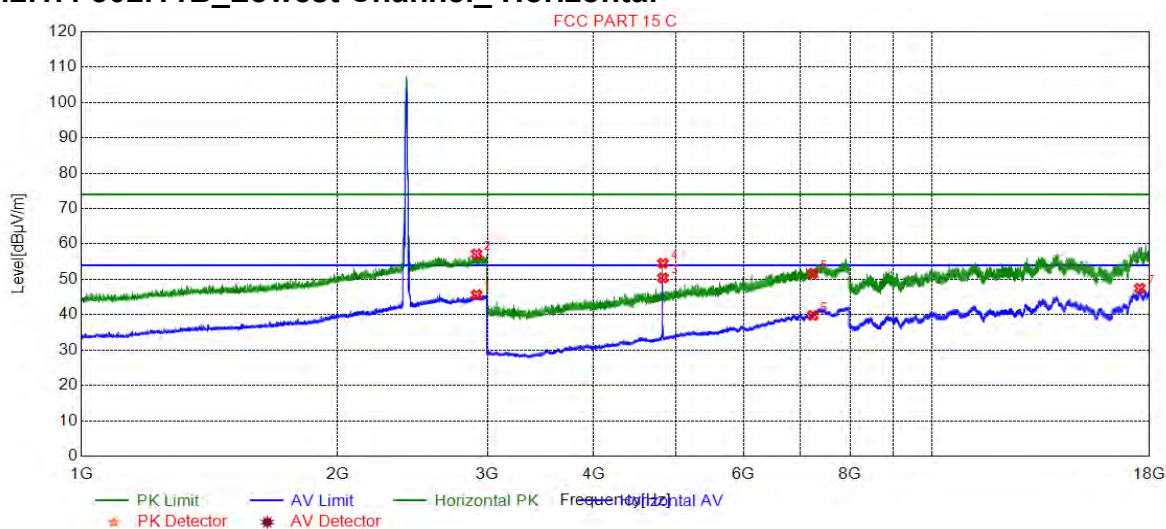


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2858.9647	56.14	11.09	74.00	17.86	150	177	Vertical
2	2874.9687	45.11	11.22	54.00	8.89	150	13	Vertical
3	4924.0000	39.84	-14.43	54.00	14.16	150	289	Vertical
4	4924.0000	47.94	-14.43	74.00	26.06	150	316	Vertical
5	7386.0000	52.08	-5.71	74.00	21.92	150	126	Vertical
6	7386.0000	41.13	-5.71	54.00	12.87	150	126	Vertical
7	17524.9762	47.33	0.67	54.00	6.67	150	143	Vertical



4.9.2.1.4 802.11B_Lowest Channel_ Horizontal



Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2913.4784	45.64	11.40	54.00	8.36	150	236	Horizontal
2	2913.9785	57.17	11.40	74.00	16.83	150	195	Horizontal
3	4824.0000	50.42	-14.90	54.00	3.58	150	315	Horizontal
4	4824.0000	54.52	-14.90	74.00	19.48	150	342	Horizontal
5	7236.0000	51.64	-6.82	74.00	22.36	150	342	Horizontal
6	7236.0000	39.81	-6.82	54.00	14.19	150	73	Horizontal
7	17527.4764	47.47	0.70	54.00	6.53	150	143	Horizontal



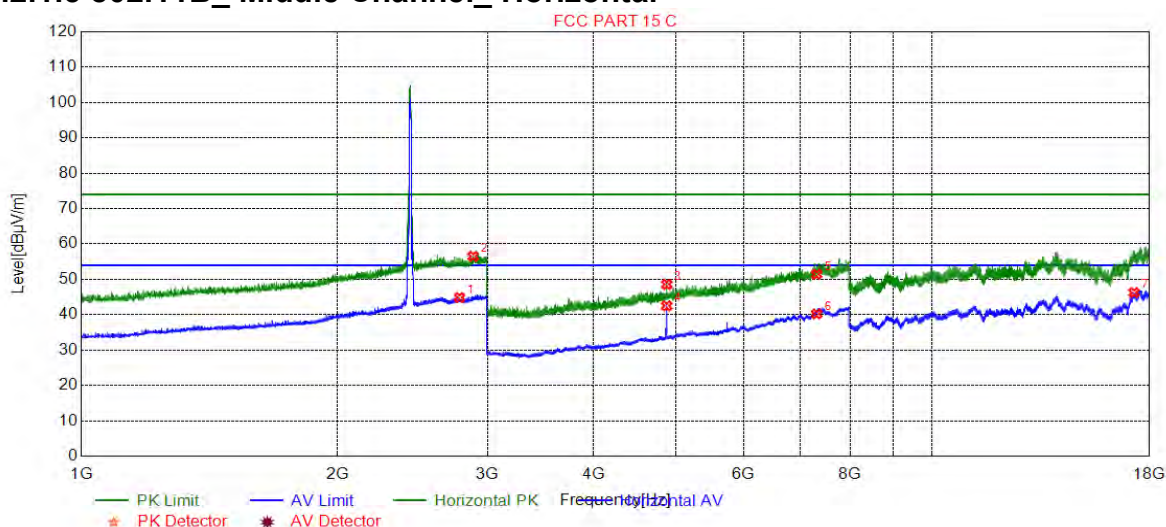
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4.9.2.1.5 802.11B_ Middle Channel_ Horizontal

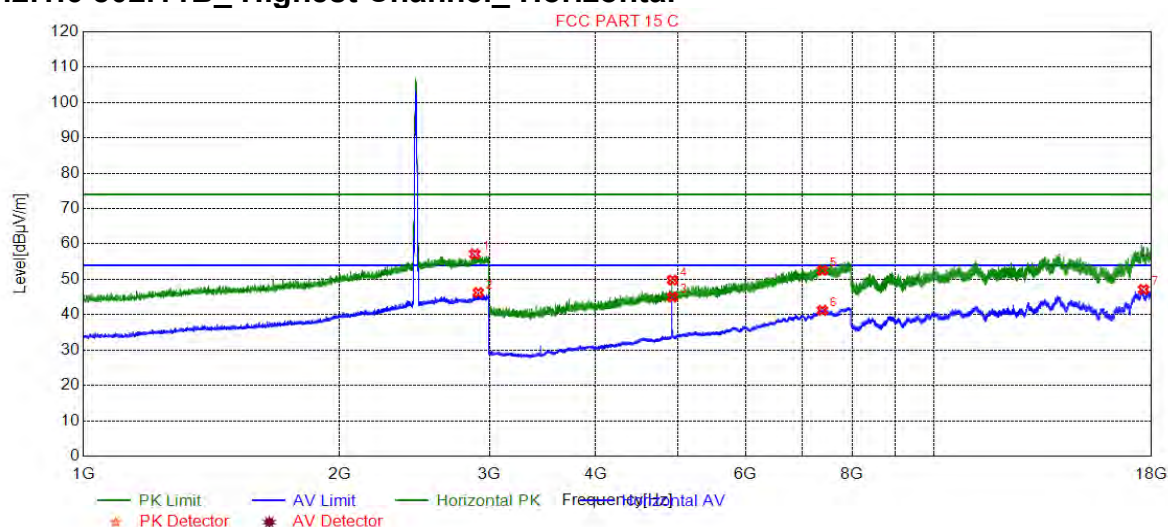


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2782.4456	44.87	10.53	54.00	9.13	150	250	Horizontal
2	2886.9717	56.52	11.31	74.00	17.48	150	154	Horizontal
3	4874.0000	48.56	-14.68	74.00	25.44	150	344	Horizontal
4	4874.0000	42.48	-14.68	54.00	11.52	150	316	Horizontal
5	7311.0000	51.43	-6.24	74.00	22.57	150	154	Horizontal
6	7311.0000	40.22	-6.24	54.00	13.78	150	18	Horizontal
7	17253.9627	46.27	-1.39	54.00	7.73	150	44	Horizontal



4.9.2.1.6 802.11B_Highest Channel_Horizontal

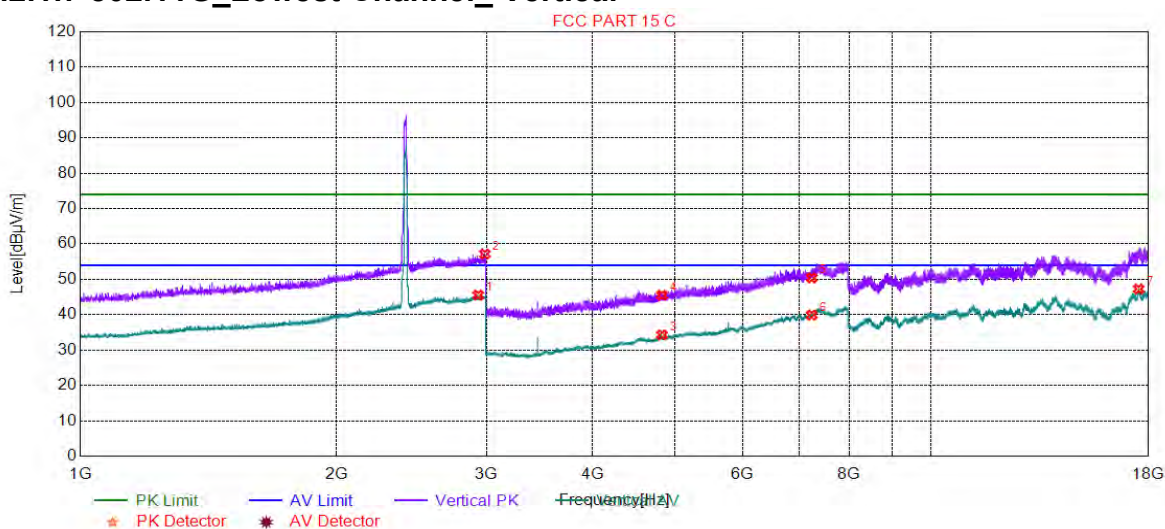


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2883.9710	57.17	11.29	74.00	16.83	150	276	Horizontal
2	2910.9777	46.25	11.40	54.00	7.75	150	207	Horizontal
3	4924.0000	45.01	-14.43	54.00	8.99	150	316	Horizontal
4	4924.0000	49.80	-14.43	74.00	24.20	150	289	Horizontal
5	7386.0000	52.51	-5.71	74.00	21.49	150	344	Horizontal
6	7386.0000	41.23	-5.71	54.00	12.77	150	18	Horizontal
7	17612.4806	47.15	1.31	54.00	6.85	150	342	Horizontal



4.9.2.1.7 802.11G_Lowest Channel_Vertical

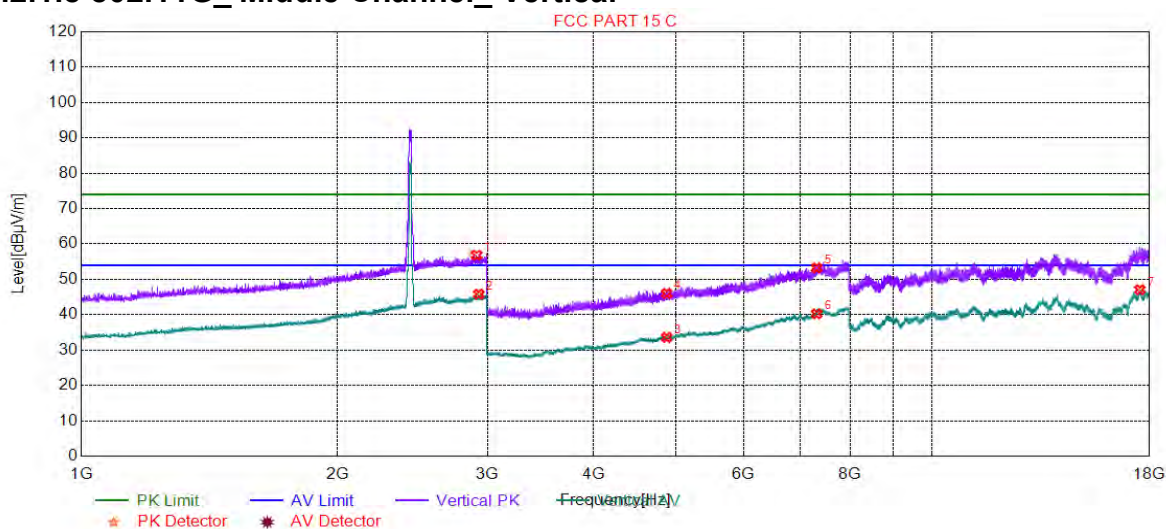


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2933.9835	45.54	11.39	54.00	8.46	150	220	Vertical
2	2987.9970	57.19	11.37	74.00	16.81	150	300	Vertical
3	4824.0000	34.30	-14.90	54.00	19.70	150	264	Vertical
4	4824.0000	45.52	-14.90	74.00	28.48	150	292	Vertical
5	7236.0000	50.43	-6.82	74.00	23.57	150	18	Vertical
6	7236.0000	39.91	-6.82	54.00	14.09	150	292	Vertical
7	17521.4761	47.27	0.62	54.00	6.73	150	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	2914.4786	56.86	11.40	74.00	17.14	150	163	Vertical
2	2930.9827	45.81	11.39	54.00	8.19	150	163	Vertical
3	4874.0000	33.59	-14.68	54.00	20.41	150	317	Vertical
4	4874.0000	46.05	-14.68	74.00	27.95	150	45	Vertical
5	7311.0000	53.25	-6.24	74.00	20.75	150	127	Vertical
6	7311.0000	40.25	-6.24	54.00	13.75	150	127	Vertical
7	17531.9766	47.07	0.76	54.00	6.93	150	342	Vertical



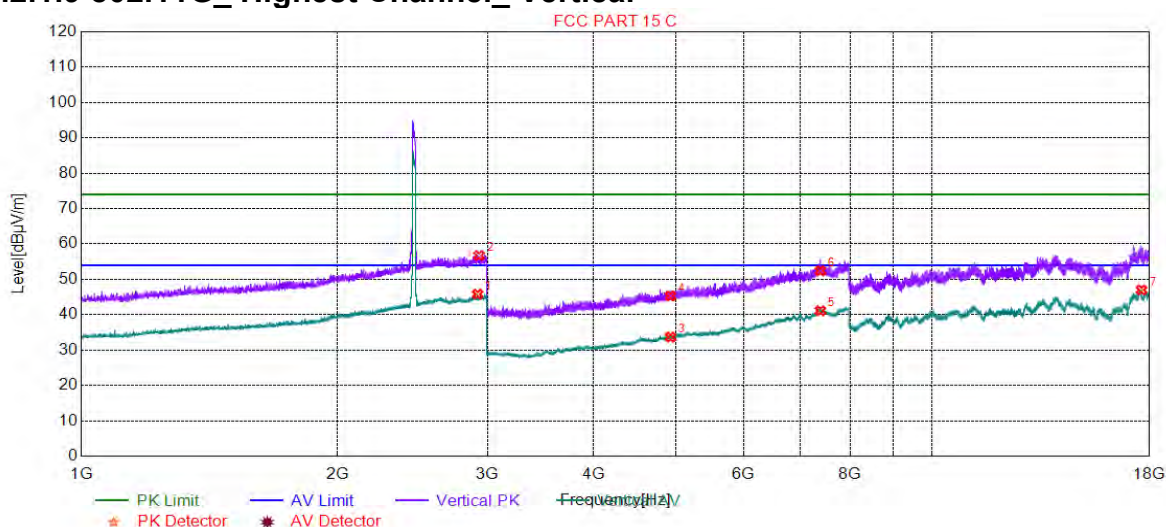
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4.9.2.1.9 802.11G_Highest Channel_Vertical

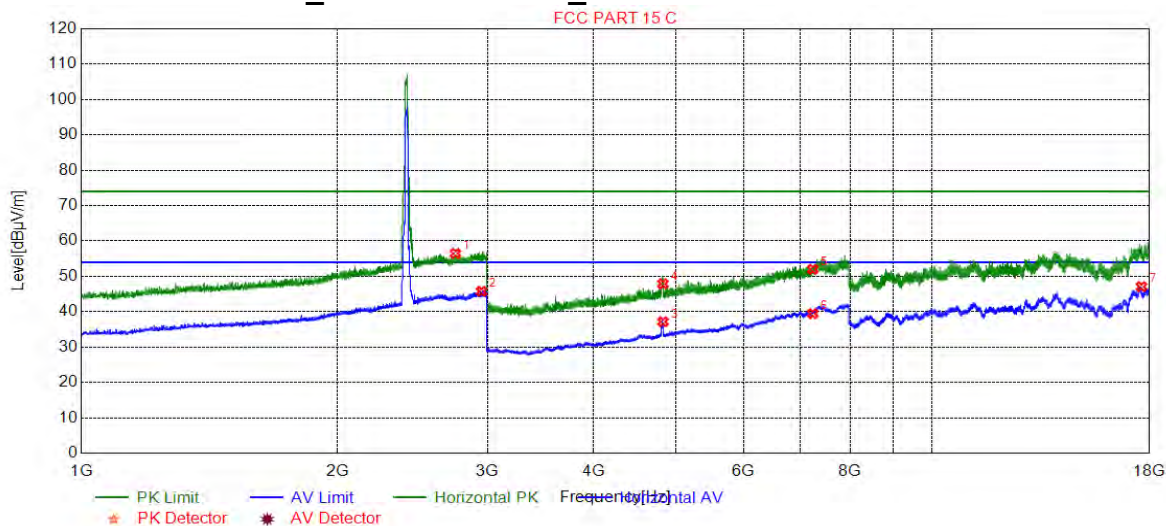


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2921.9805	45.82	11.40	54.00	8.18	150	151	Vertical
2	2932.4831	56.74	11.39	74.00	17.26	150	164	Vertical
3	4924.0000	33.66	-14.43	54.00	20.34	150	46	Vertical
4	4924.0000	45.31	-14.43	74.00	28.69	150	155	Vertical
5	7386.0000	41.12	-5.71	54.00	12.88	150	291	Vertical
6	7386.0000	52.42	-5.71	74.00	21.58	150	46	Vertical
7	17608.9804	47.01	1.40	54.00	6.99	150	192	Vertical



4.9.2.1.10 802.11G_Lowest Channel_Horizontal

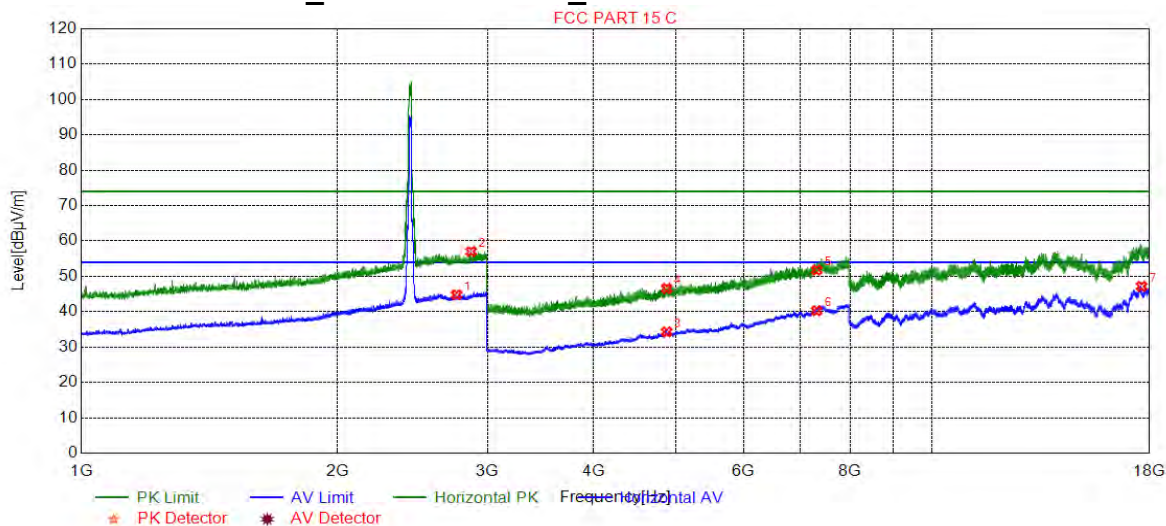


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2751.9380	56.47	10.35	74.00	17.53	150	154	Horizontal
2	2952.4881	45.75	11.38	54.00	8.25	150	18	Horizontal
3	4824.0000	37.17	-14.90	54.00	16.83	150	317	Horizontal
4	4824.0000	47.88	-14.90	74.00	26.12	150	317	Horizontal
5	7236.0000	51.99	-6.82	74.00	22.01	150	46	Horizontal
6	7236.0000	39.46	-6.82	54.00	14.54	150	360	Horizontal
7	17609.9805	47.10	1.37	54.00	6.90	150	43	Horizontal



4.9.2.1.11 802.11G_Middle Channel_Horizontal

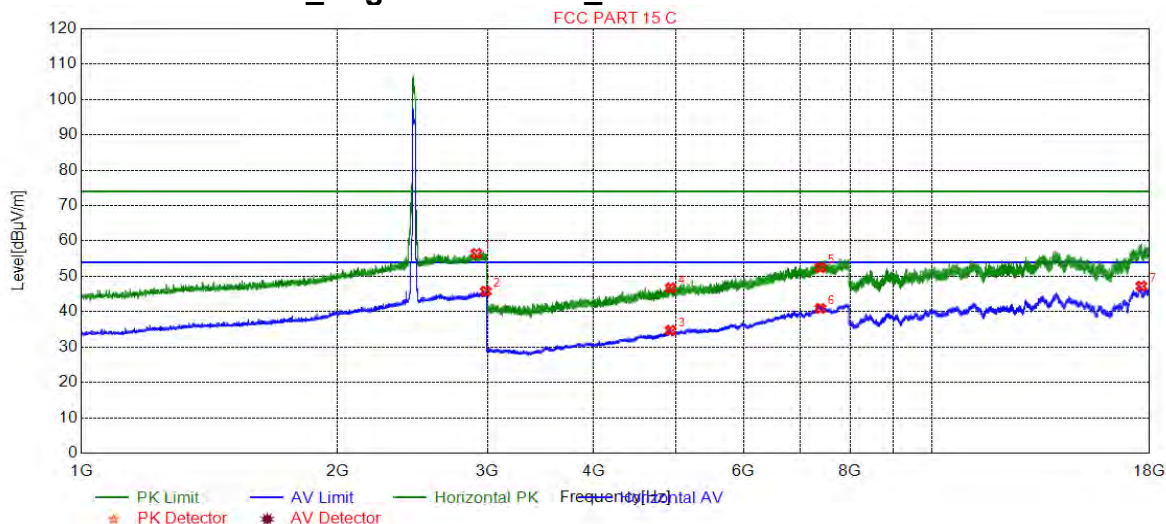


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2760.4401	44.80	10.40	54.00	9.20	150	167	Horizontal
2	2870.4676	57.04	11.18	74.00	16.96	150	303	Horizontal
3	4874.0000	34.29	-14.68	54.00	19.71	150	316	Horizontal
4	4874.0000	46.58	-14.68	74.00	27.42	150	316	Horizontal
5	7311.0000	51.78	-6.24	74.00	22.22	150	208	Horizontal
6	7311.0000	40.27	-6.24	54.00	13.73	150	234	Horizontal
7	17613.9807	47.18	1.27	54.00	6.82	150	144	Horizontal



4.9.2.1.12 802.11G_Highest Channel_Horizontal

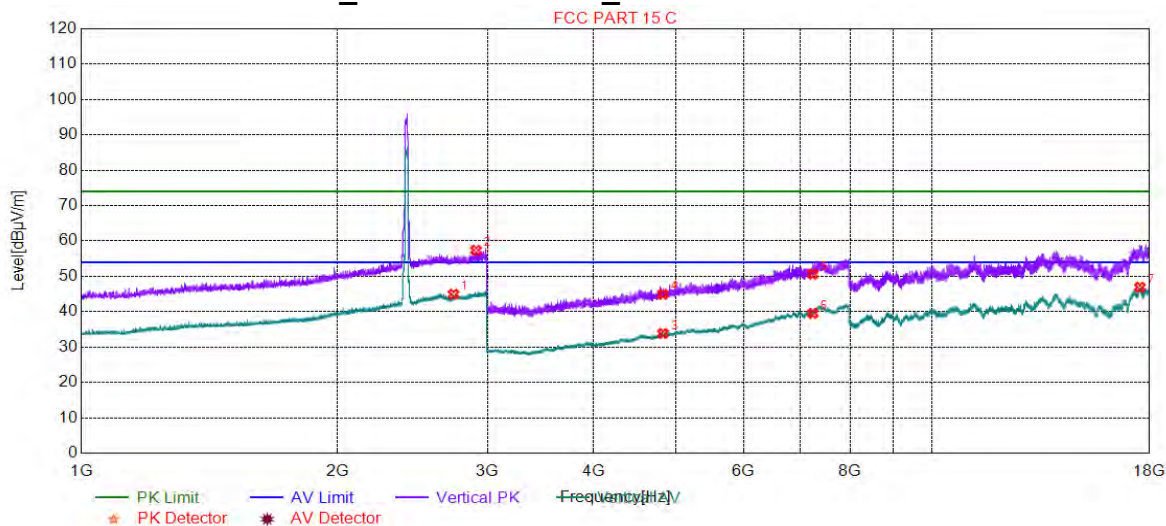


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2912.9782	56.49	11.40	74.00	17.51	150	58	Horizontal
2	2986.9967	45.77	11.37	54.00	8.23	150	165	Horizontal
3	4924.0000	34.73	-14.43	54.00	19.27	150	316	Horizontal
4	4924.0000	46.74	-14.43	74.00	27.26	150	344	Horizontal
5	7386.0000	52.44	-5.71	74.00	21.56	150	181	Horizontal
6	7386.0000	40.92	-5.71	54.00	13.08	150	99	Horizontal
7	17602.9801	47.23	1.55	54.00	6.77	150	342	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	2737.4344	44.95	10.26	54.00	9.05	150	219	Vertical
2	2909.4774	57.37	11.41	74.00	16.63	150	260	Vertical
3	4824.0000	33.85	-14.90	54.00	20.15	150	290	Vertical
4	4824.0000	44.94	-14.90	74.00	29.06	150	235	Vertical
5	7236.0000	50.61	-6.82	74.00	23.39	150	235	Vertical
6	7236.0000	39.55	-6.82	54.00	14.45	150	45	Vertical
7	17533.4767	46.92	0.78	54.00	7.08	150	243	Vertical



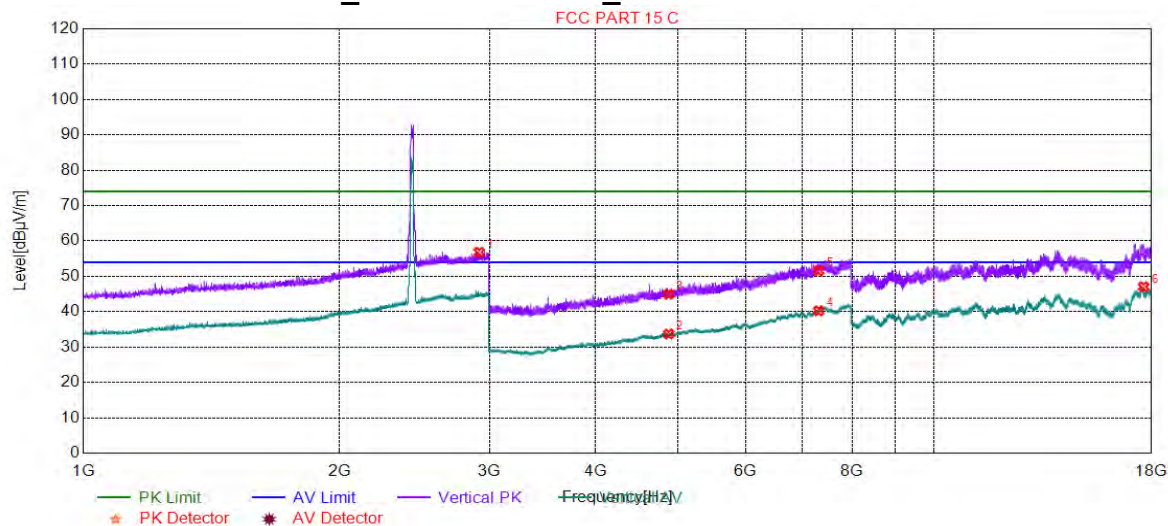
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4.9.2.1.14 802.11N20_Middle Channel_Vertical

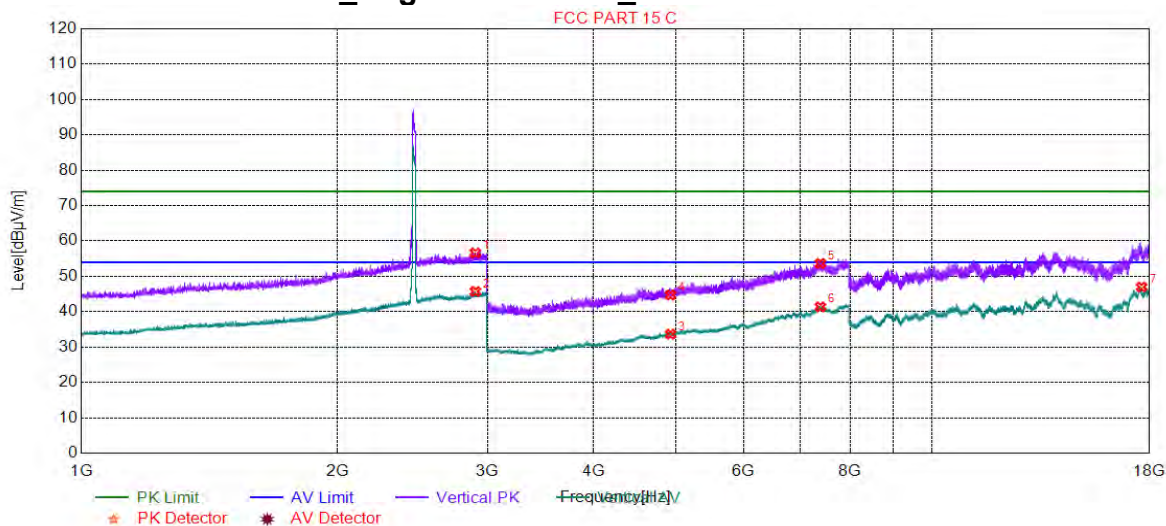


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2918.4796	56.85	11.40	74.00	17.15	150	273	Vertical
2	4874.0000	33.70	-14.68	54.00	20.30	150	72	Vertical
3	4874.0000	44.94	-14.68	74.00	29.06	150	360	Vertical
4	7311.0000	40.24	-6.24	54.00	13.76	150	180	Vertical
5	7311.0000	51.56	-6.24	74.00	22.44	150	18	Vertical
6	17613.9807	47.06	1.27	54.00	6.94	150	342	Vertical



4.9.2.1.15 802.11N20_Highest Channel_Vertical

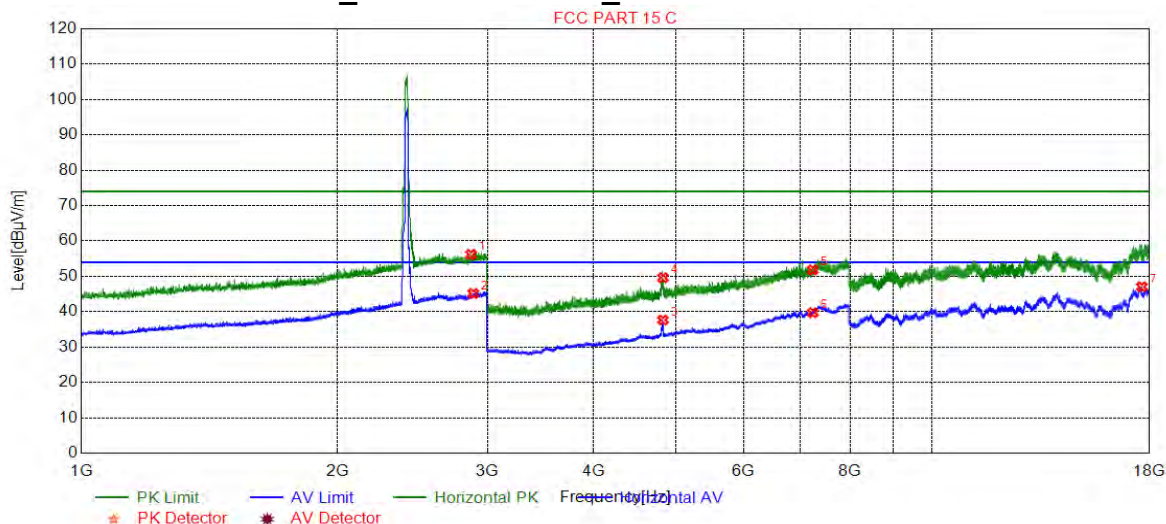


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2902.9757	56.63	11.41	74.00	17.37	150	194	Vertical
2	2903.9760	45.71	11.41	54.00	8.29	150	154	Vertical
3	4924.0000	33.63	-14.43	54.00	20.37	150	316	Vertical
4	4924.0000	44.71	-14.43	74.00	29.29	150	74	Vertical
5	7386.0000	53.64	-5.71	74.00	20.36	150	182	Vertical
6	7386.0000	41.37	-5.71	54.00	12.63	150	263	Vertical
7	17612.4806	46.98	1.31	54.00	7.02	150	0	Vertical



4.9.2.1.16 802.11N20_Lowest Channel_Horizontal

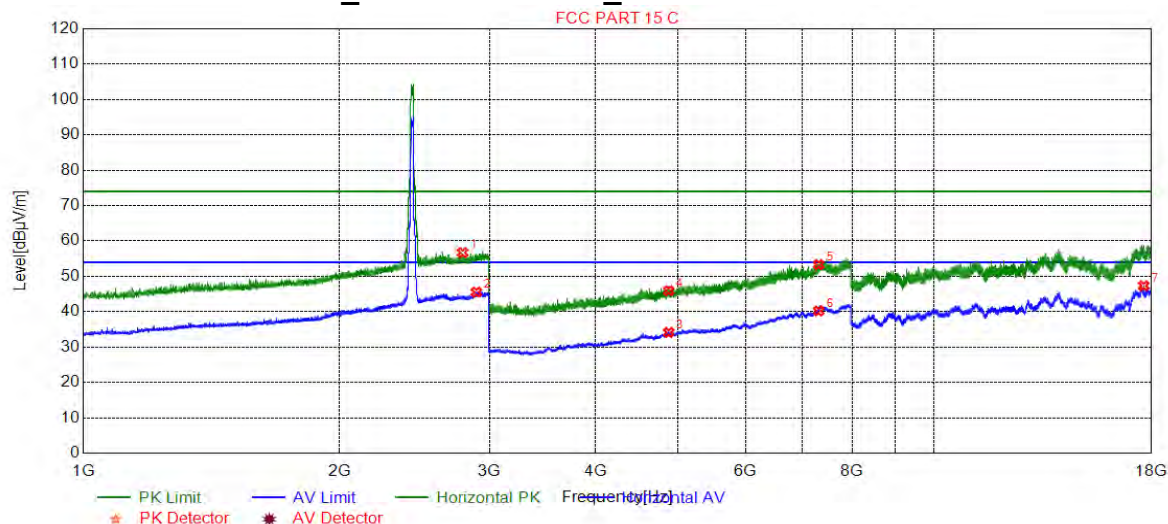


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2869.9675	56.19	11.18	74.00	17.81	150	46	Horizontal
2	2886.9717	45.15	11.31	54.00	8.85	150	18	Horizontal
3	4824.0000	37.67	-14.90	54.00	16.33	150	316	Horizontal
4	4824.0000	49.59	-14.90	74.00	24.41	150	316	Horizontal
5	7236.0000	51.84	-6.82	74.00	22.16	150	99	Horizontal
6	7236.0000	39.72	-6.82	54.00	14.28	150	126	Horizontal
7	17624.9812	47.05	0.98	54.00	6.95	150	292	Horizontal



4.9.2.1.17 802.11N20_ Middle Channel_ Horizontal

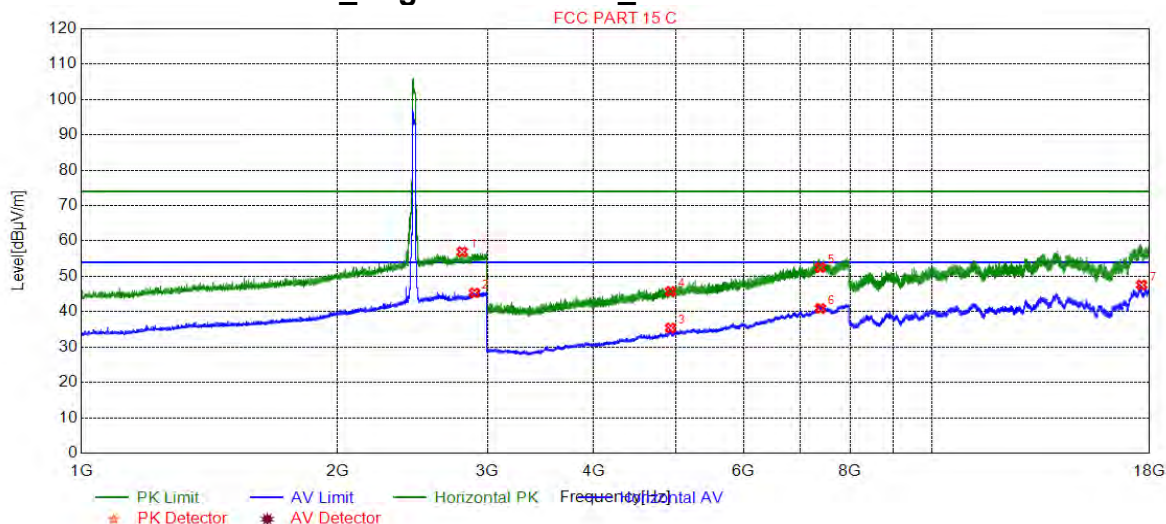


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2790.4476	56.70	10.58	74.00	17.30	150	23	Horizontal
2	2896.4741	45.55	11.38	54.00	8.45	150	23	Horizontal
3	4874.0000	34.14	-14.68	54.00	19.86	150	299	Horizontal
4	4874.0000	45.94	-14.68	74.00	28.06	150	326	Horizontal
5	7311.0000	53.33	-6.24	74.00	20.67	150	81	Horizontal
6	7311.0000	40.21	-6.24	54.00	13.79	150	163	Horizontal
7	17620.9810	47.31	1.08	54.00	6.69	150	42	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	2802.4506	56.94	10.66	74.00	17.06	150	208	Horizontal
2	2897.4744	45.32	11.39	54.00	8.68	150	18	Horizontal
3	4924.0000	35.37	-14.43	54.00	18.63	150	316	Horizontal
4	4924.0000	45.73	-14.43	74.00	28.27	150	360	Horizontal
5	7386.0000	52.50	-5.71	74.00	21.50	150	126	Horizontal
6	7386.0000	40.92	-5.71	54.00	13.08	150	360	Horizontal
7	17613.4807	47.58	1.28	54.00	6.42	150	0	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.



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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:			

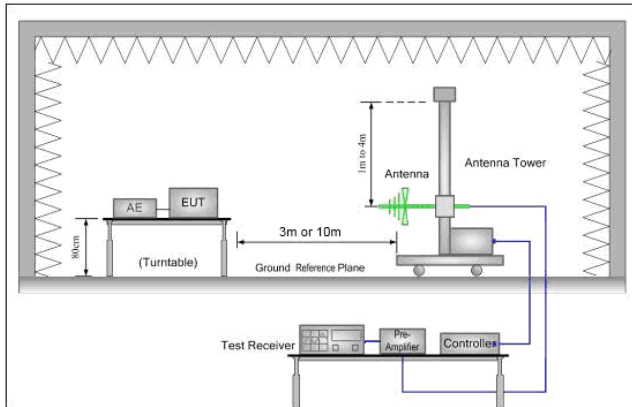


Figure 1. 30MHz to 1GHz

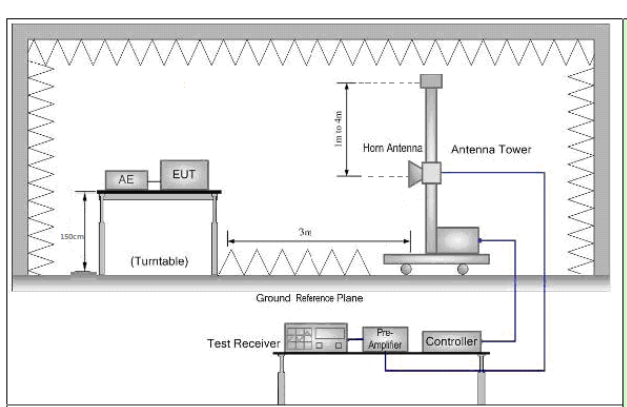


Figure 2. Above 1 GHz

Test Procedure:	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); Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

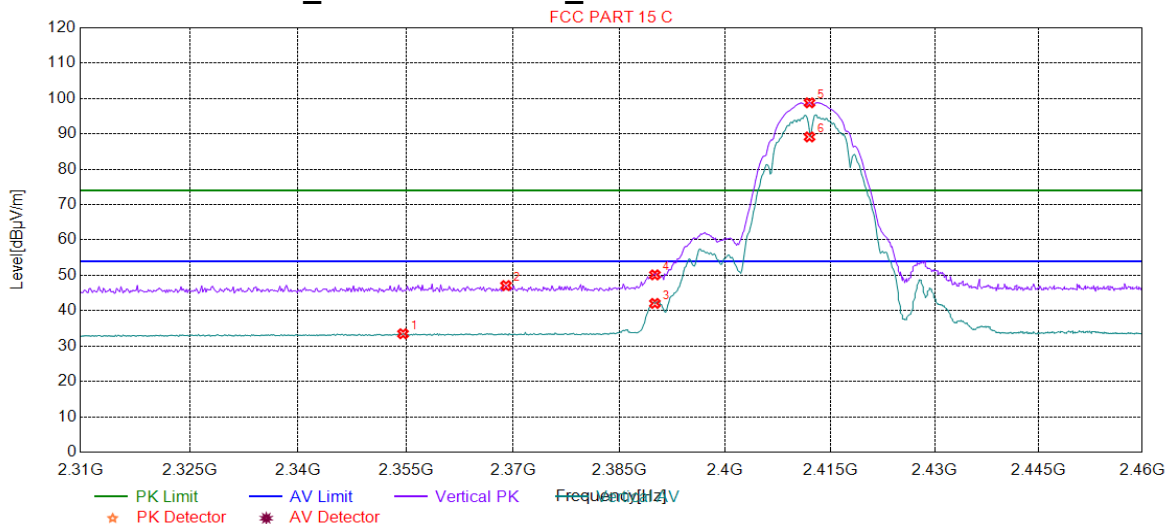




Test plot as follows:

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	2354.5946	33.49	9.08	54.00	20.51	150	327	Vertical
2	2369.0090	47.11	9.13	74.00	26.89	150	315	Vertical
3	2390.0000	42.07	9.20	54.00	11.93	150	232	Vertical
4	2390.0000	50.14	9.20	74.00	23.86	150	228	Vertical
5	2412.0000	98.78	9.27	74.00	-24.78	150	232	Vertical
6	2412.0000	89.14	9.27	54.00	-35.14	150	232	Vertical

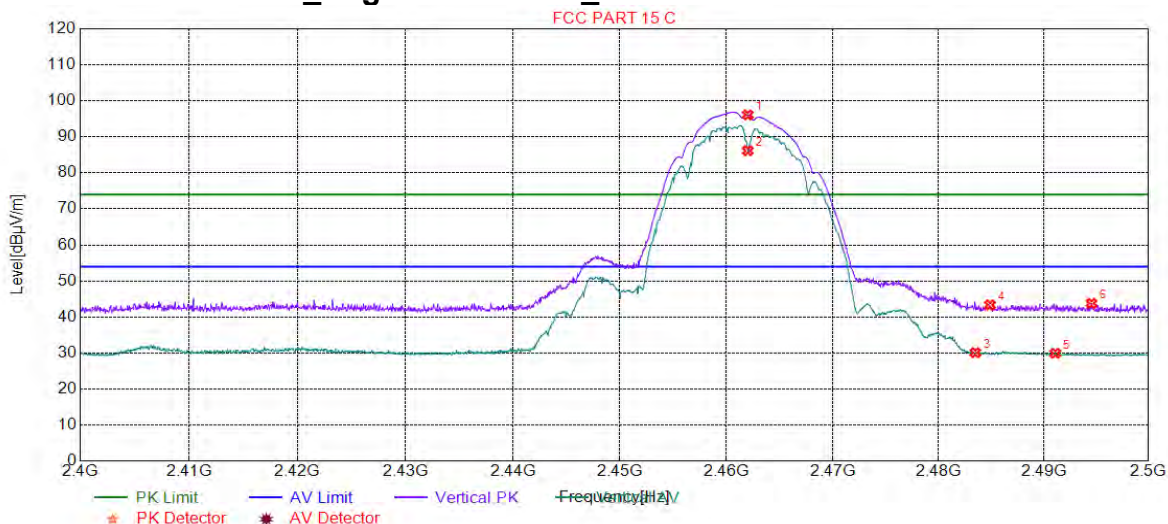


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4.10.1.2 802.11B_Highest Channel_Vertical

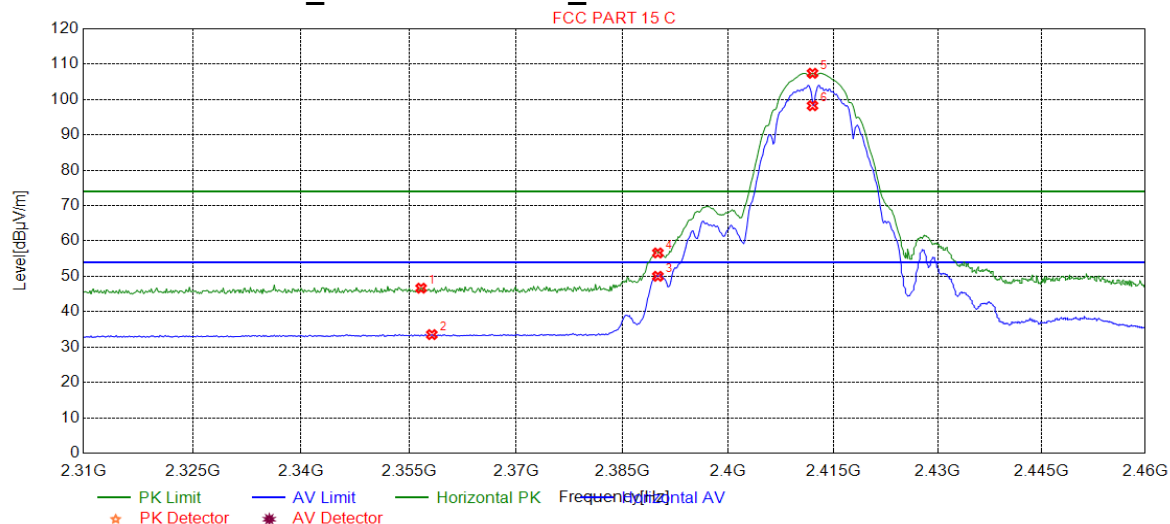


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	96.10	9.43	74.00	-22.10	150	199	Vertical
2	2462.0000	86.18	9.43	54.00	-32.18	150	199	Vertical
3	2483.5000	30.10	9.50	54.00	23.90	150	215	Vertical
4	2484.8924	43.35	9.50	74.00	30.65	150	221	Vertical
5	2491.0955	29.93	9.52	54.00	24.07	150	199	Vertical
6	2494.5473	43.78	9.53	74.00	30.22	150	105	Vertical



4.10.1.3 802.11B_Lowest Channel_Horizontal

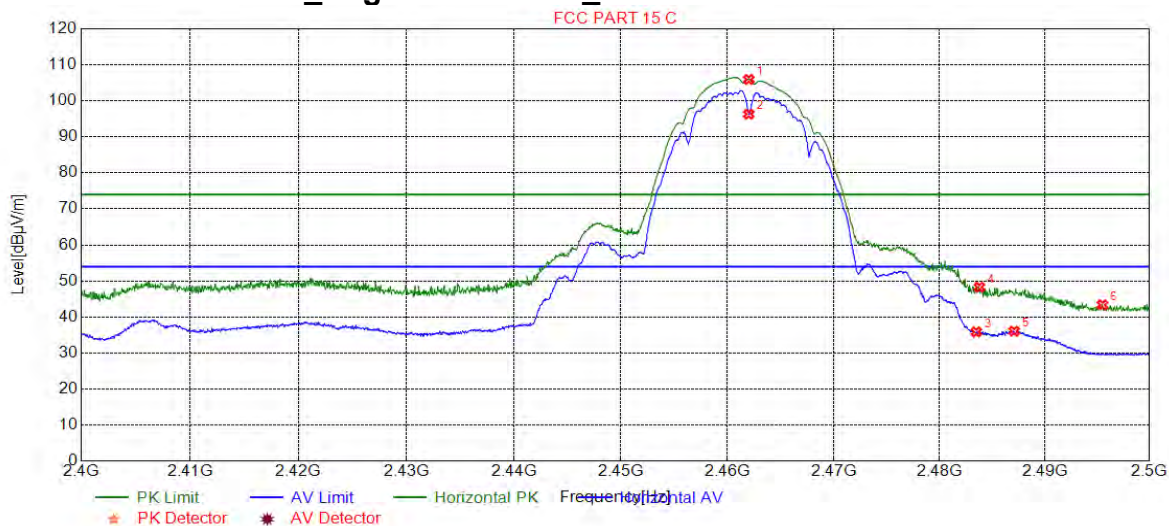


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2356.6967	46.66	9.09	74.00	27.34	150	299	Horizontal
2	2358.1982	33.53	9.09	54.00	20.47	150	75	Horizontal
3	2390.0000	50.02	9.20	54.00	3.98	150	345	Horizontal
4	2390.0000	56.62	9.20	74.00	17.38	150	341	Horizontal
5	2412.0000	107.42	9.27	74.00	-33.42	150	345	Horizontal
6	2412.0000	98.25	9.27	54.00	-44.25	150	341	Horizontal



4.10.1.4 802.11B_Highest Channel_Horizontal



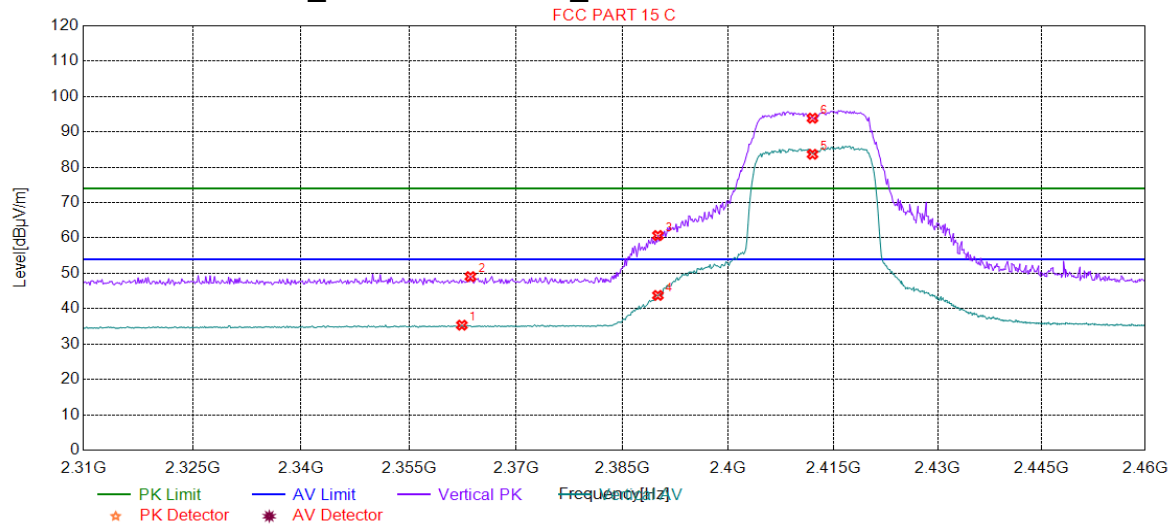
Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	105.93	9.43	74.00	-31.93	150	299	Horizontal
2	2462.0000	96.31	9.43	54.00	-42.31	150	299	Horizontal
3	2483.5000	35.86	9.50	54.00	18.14	150	294	Horizontal
4	2483.7919	48.27	9.50	74.00	25.73	150	299	Horizontal
5	2487.0935	36.07	9.51	54.00	17.93	150	299	Horizontal
6	2495.4977	43.37	9.54	74.00	30.63	150	14	Horizontal





4.10.1.5 802.11G_Lowest Channel_Vertical

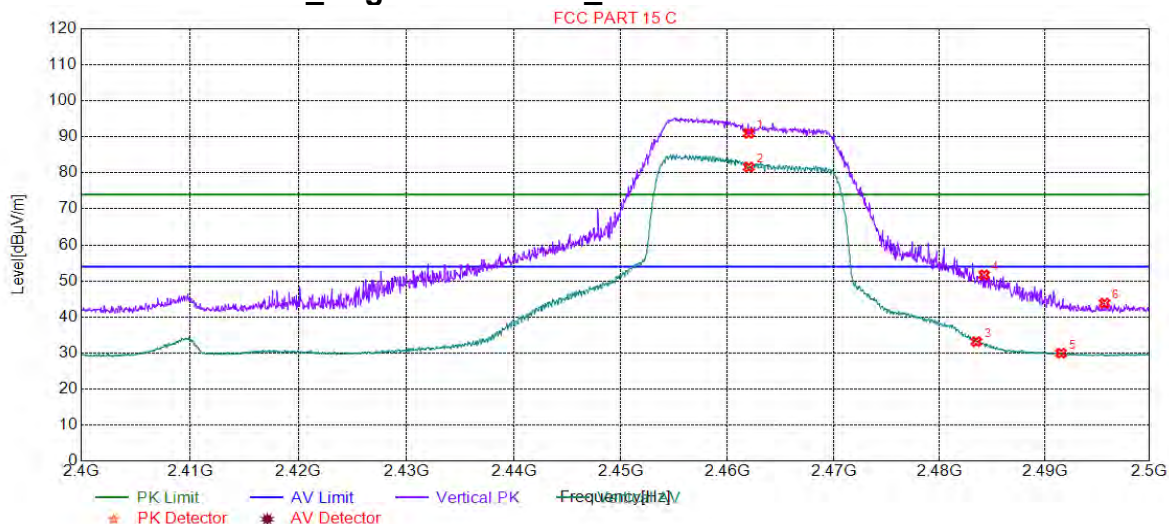


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2362.4024	35.35	9.11	54.00	18.65	150	198	Vertical
2	2363.6036	49.08	9.11	74.00	24.92	150	5	Vertical
3	2390.0000	60.71	9.20	74.00	13.29	150	165	Vertical
4	2390.0000	43.77	9.20	54.00	10.23	150	194	Vertical
5	2412.0000	83.66	9.27	54.00	-29.66	150	194	Vertical
6	2412.0000	93.88	9.27	74.00	-19.88	150	346	Vertical



4.10.1.6 802.11G_Highest Channel_Vertical



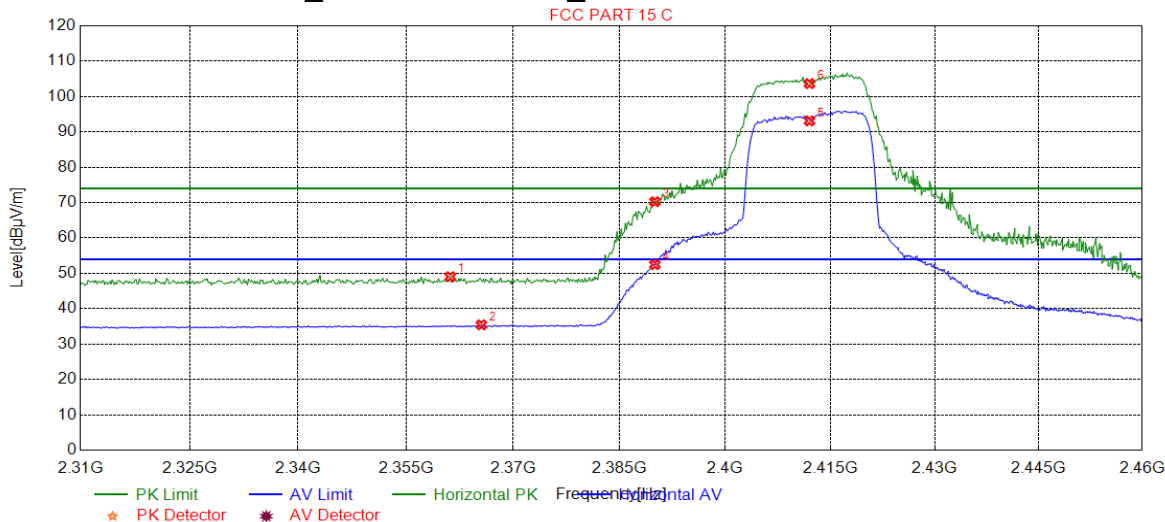
Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	90.97	9.43	74.00	-16.97	150	216	Vertical
2	2462.0000	81.61	9.43	54.00	-27.61	150	216	Vertical
3	2483.5000	33.14	9.50	54.00	20.86	150	221	Vertical
4	2484.2421	51.69	9.50	74.00	22.31	150	335	Vertical
5	2491.5458	29.95	9.52	54.00	24.05	150	325	Vertical
6	2495.6978	43.82	9.54	74.00	30.18	150	111	Vertical





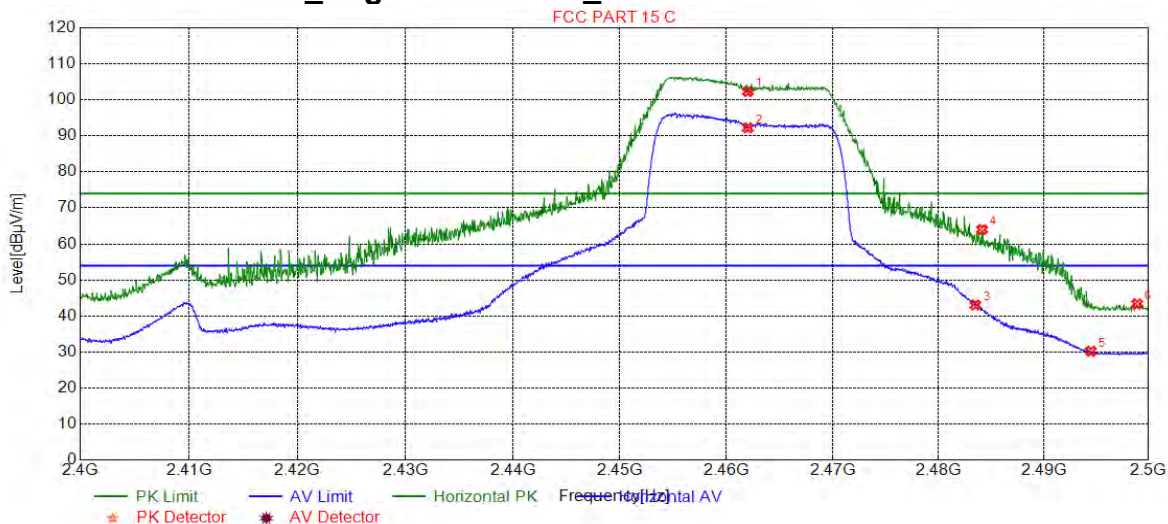
4.10.1.7 802.11G_Lowest Channel_ Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2361.2012	49.06	9.10	74.00	24.94	150	88	Horizontal
2	2365.5556	35.45	9.12	54.00	18.55	150	40	Horizontal
3	2390.0000	70.26	9.20	74.00	3.74	150	292	Horizontal
4	2390.0000	52.46	9.20	54.00	1.54	150	309	Horizontal
5	2412.0000	93.11	9.27	54.00	-39.11	150	309	Horizontal
6	2412.0000	103.65	9.27	74.00	-29.65	150	309	Horizontal



4.10.1.8 802.11G_ Highest Channel_ Horizontal



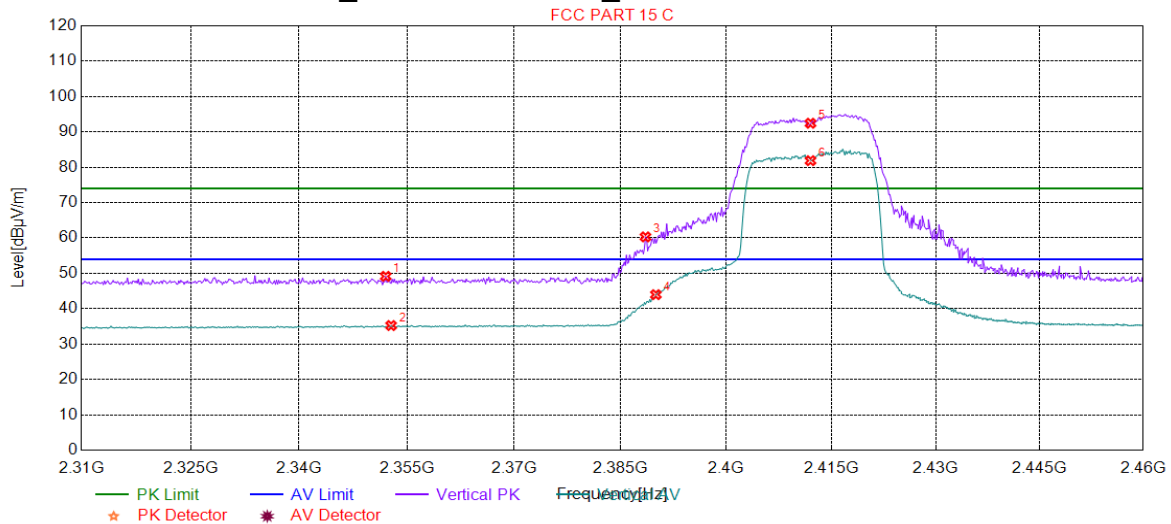
Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	102.30	9.43	74.00	-28.30	150	347	Horizontal
2	2462.0000	92.22	9.43	54.00	-38.22	150	293	Horizontal
3	2483.5000	43.06	9.50	54.00	10.94	150	293	Horizontal
4	2484.1421	64.01	9.50	74.00	9.99	150	309	Horizontal
5	2494.4972	30.22	9.53	54.00	23.78	150	342	Horizontal
6	2498.8995	43.36	9.55	74.00	30.64	150	155	Horizontal





4.10.1.9 802.11N20_Lowest Channel_Vertical

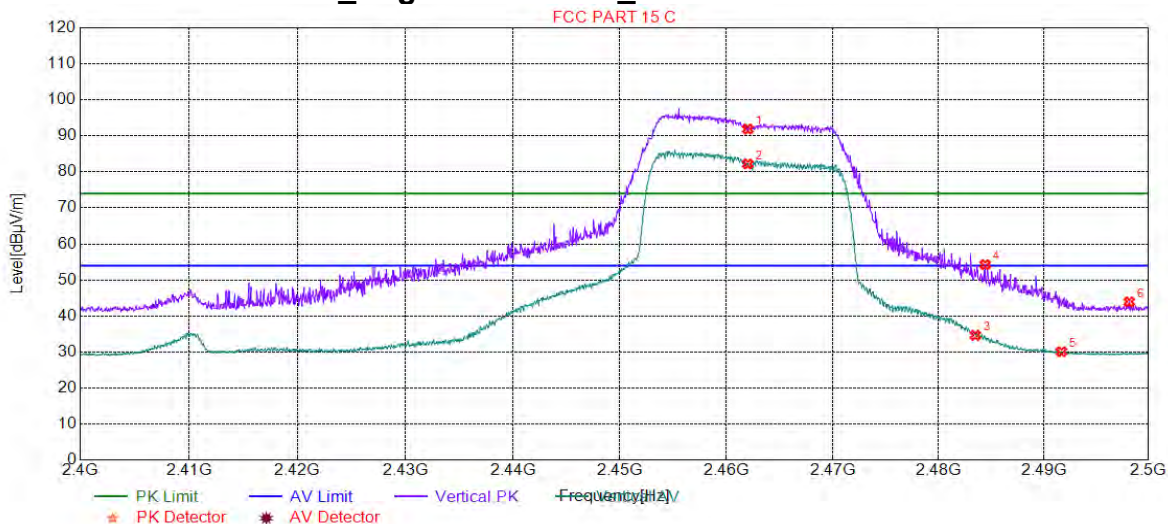


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2352.0420	49.16	9.07	74.00	24.84	150	94	Vertical
2	2352.7928	35.24	9.07	54.00	18.76	150	346	Vertical
3	2388.5285	60.31	9.19	74.00	13.69	150	346	Vertical
4	2390.0000	43.98	9.20	54.00	10.02	150	216	Vertical
5	2412.0000	92.44	9.27	74.00	-18.44	150	0	Vertical
6	2412.0000	81.86	9.27	54.00	-27.86	150	216	Vertical



4.10.1.10 802.11N20_ Highest Channel_ Vertical



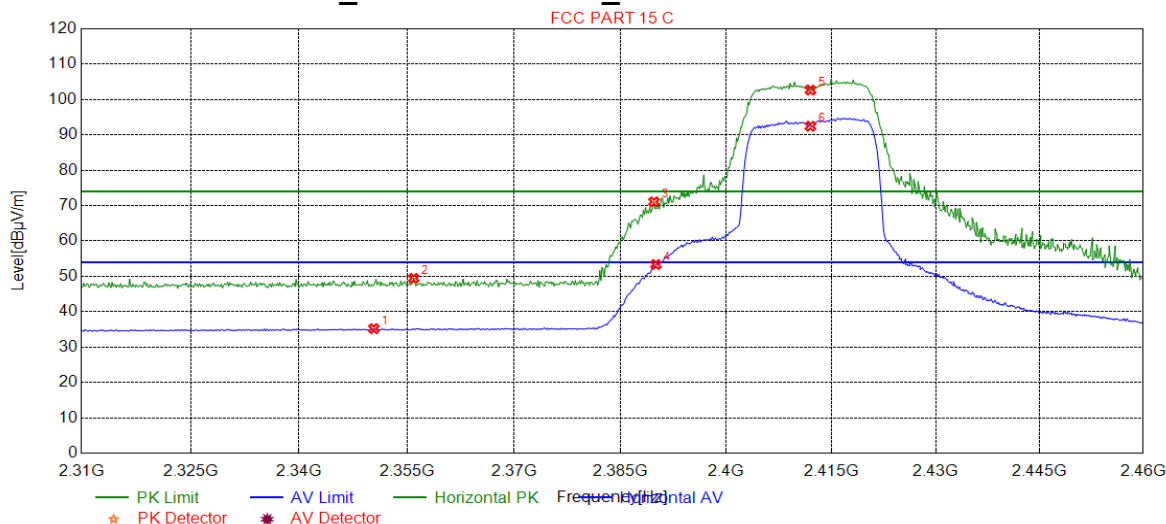
Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	91.87	9.43	74.00	-17.87	150	214	Vertical
2	2462.0000	82.20	9.43	54.00	-28.20	150	214	Vertical
3	2483.5000	34.63	9.50	54.00	19.37	150	203	Vertical
4	2484.4422	54.27	9.50	74.00	19.73	150	314	Vertical
5	2491.6958	30.09	9.52	54.00	23.91	150	314	Vertical
6	2498.1491	43.91	9.54	74.00	30.09	150	275	Vertical





4.10.1.11 802.11N20_Lowest Channel_Horizontal

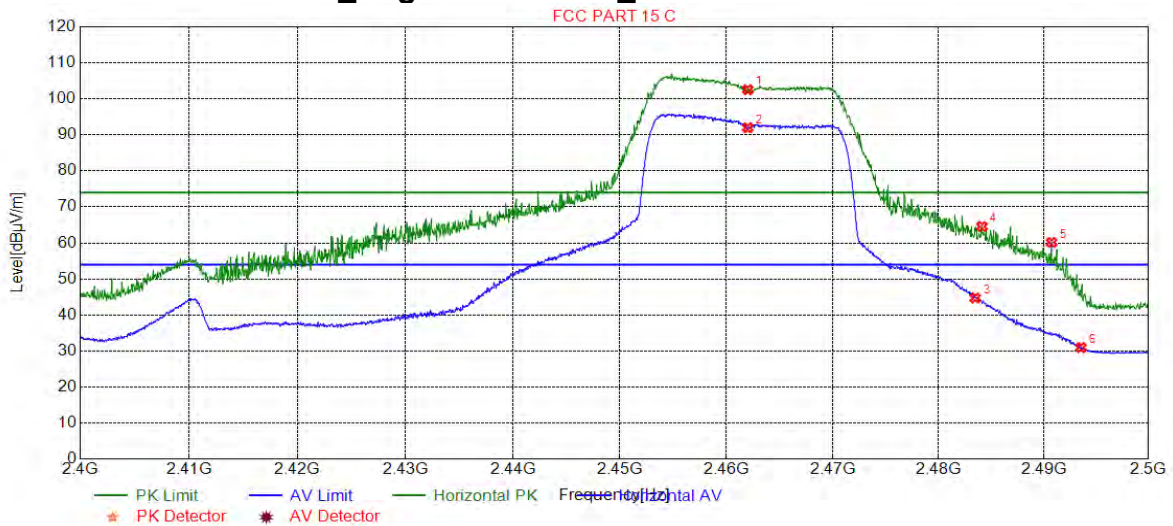


Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2350.3904	35.21	9.07	54.00	18.79	150	41	Horizontal
2	2355.9459	49.44	9.08	74.00	24.56	150	295	Horizontal
3	2389.7297	71.07	9.20	74.00	2.93	150	328	Horizontal
4	2390.0000	53.35	9.20	54.00	0.65	150	295	Horizontal
5	2412.0000	102.67	9.27	74.00	-28.67	150	328	Horizontal
6	2412.0000	92.44	9.27	54.00	-38.44	150	328	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	102.54	9.43	74.00	-28.54	150	299	Horizontal
2	2462.0000	91.97	9.43	54.00	-37.97	150	293	Horizontal
3	2483.5000	44.73	9.50	54.00	9.27	150	293	Horizontal
4	2484.1421	64.58	9.50	74.00	9.42	150	293	Horizontal
5	2490.7454	60.16	9.52	74.00	13.84	150	304	Horizontal
6	2493.5468	30.96	9.53	54.00	23.04	150	293	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)

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	Radiated Spurious emission test	$\pm 4.5\text{dB}$ (30MHz-1GHz)
		$\pm 4.8\text{dB}$ (1GHz-25GHz)
5	Conduct emission test	$\pm 3.12\text{ dB}$ (9KHz- 30MHz)
6	Temperature test	$\pm 1^{\circ}\text{C}$
7	Humidity test	$\pm 3\%$
8	DC and low frequency voltages	$\pm 0.5\%$



6 Equipment List

Conducted Emission					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal. Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2017/5/10	2020/5/9
LISN	Rohde & Schwarz	ENV216	SEM007-01	2019/7/14	2020/7/14
LISN	ETS-LINDGREN	Feb-16	SEM007-02	2019/4/1	2020/3/31
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2019/6/12	2020/6/11
2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	2019/2/11	2020/2/10
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2019/3/2	2020/3/1
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	W009-09	2019/7/15	2020/7/15
Signal Analyzer	Rohde & Schwarz	FSV	W025-05	2019/1/13	2020/1/12
Coaxial Cable	SGS	N/A	SEM031-01	2019/6/12	2020/6/11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2019/7/14	2020/7/14
Temperature Chamber	GIANT FORCE	ICT-150-40-CP-AR	W027-03	2018/11/27	2019/11/27
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2019/7/14	2020/7/14
RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal. Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017/8/5	2020/8/4
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2019/6/12	2020/6/11
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2019/7/14	2020/7/14
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017/6/27	2020/6/26
Pre-amplifier (0.1-1.3GHz)	Agilent Technologies	8447D	SEM005-01	2019/3/2	2020/3/1
RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal. Due date
				(yyyy-mm-dd)	(yyyy-mm-dd)
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018/3/13	2021/3/12
Measurement Software	AUDIX	e3V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2019/6/12	2020/6/11
EXA Signal Analyzer (10Hz-26.5GHz)	Agilent Technologies Inc	N9010A	SEM004-09	2019/3/12	2020/3/11
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2017/6/27	2020/6/26
Horn Antenna (0.8-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018/4/13	2021/4/12
Pre-amplifier(0.1-1.3GHz)	HP	8447D	SEM005-02	2019/7/14	2020/7/14
Low Noise Amplifier(100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2019/9/3	2020/9/2
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017/10/17	2020/10/16
Pre-amplifier(18-26GHz)	Rohde & Schwarz	CH14-H052	SEM005-17	2019/3/2	2020/3/1
Band filter	N/A	N/A	SEM023-01	N/A	N/A



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RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2018/3/31	2021/3/30
EMI Test Receiver (9k-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2019/3/2	2020/3/1
Trilog-Broadband Antenna(25M-2GHz)	Schwarzbeck	VULB9168	SEM003-18	2018/3/15	2020/3/14
Pre-amplifier (9k-1GHz)	Sonoma	310N	SEM005-03	2019/3/12	2020/3/11
Loop Antenna (9kHz-30MHz)	ETS-Lindgren	6502	SEM003-08	2017/8/22	2020/8/21
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM029-01	2019/6/12	2020/6/11

7 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for HR/2019/90003.

The End



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