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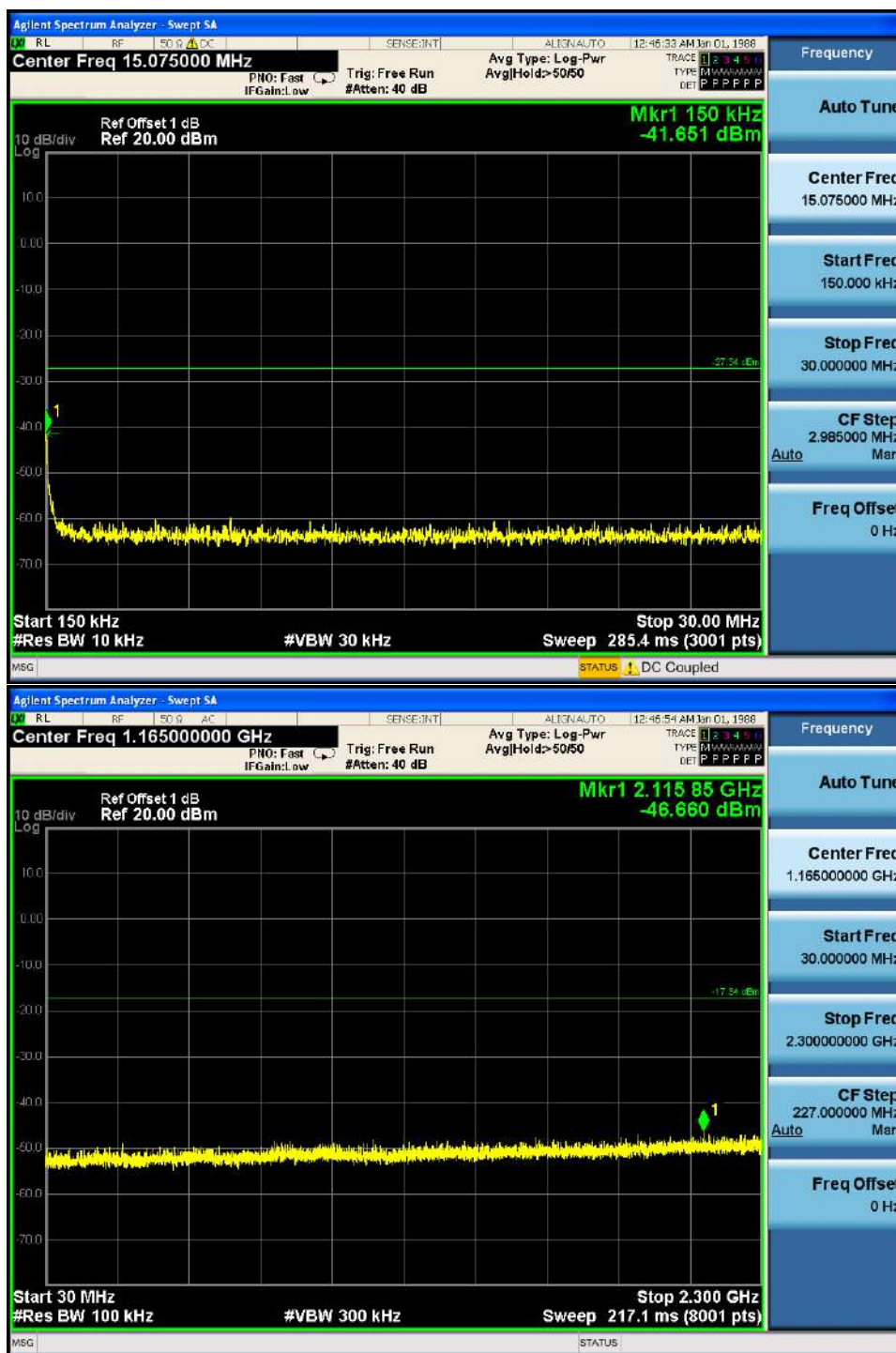


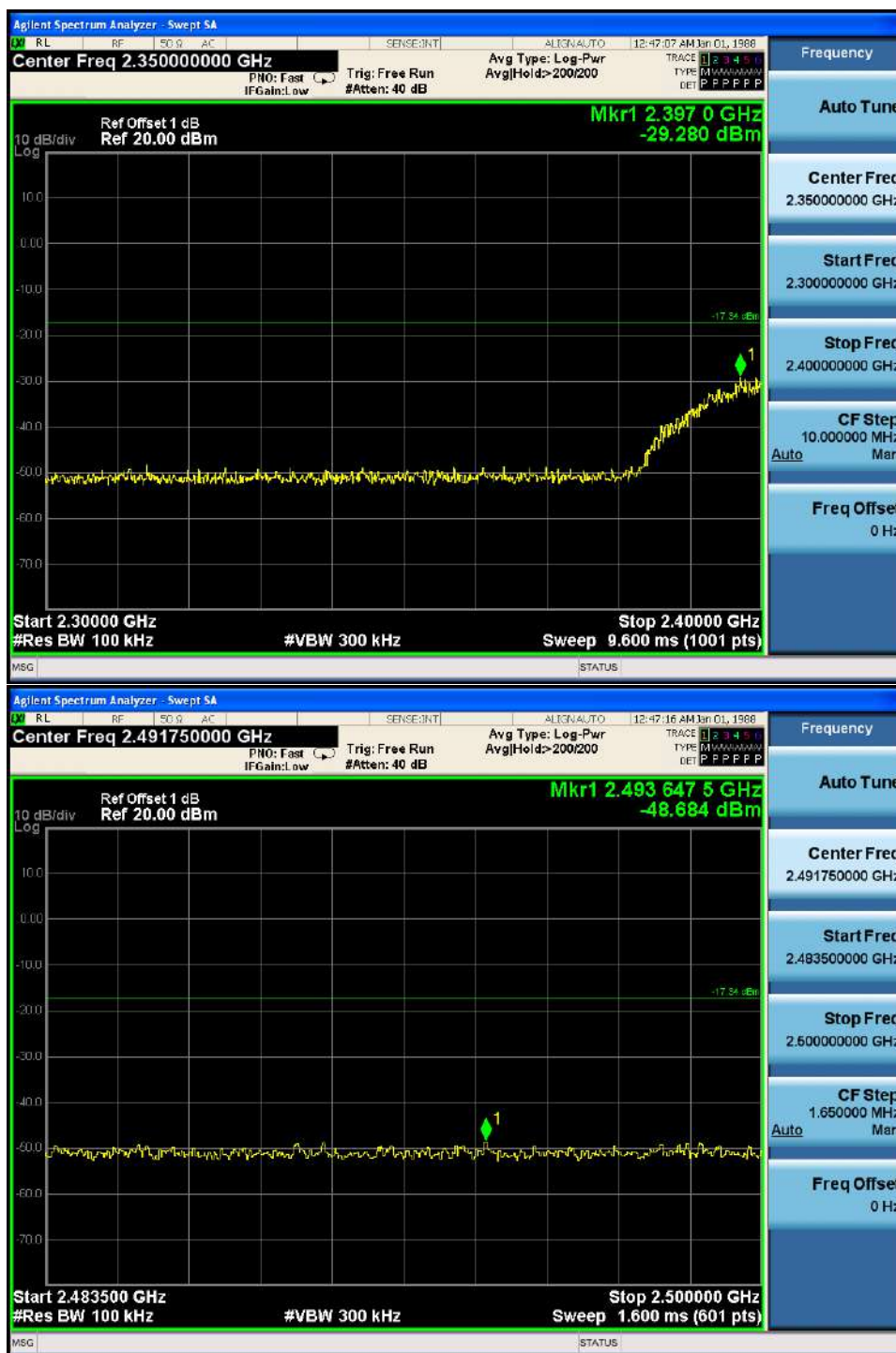
#### 4.8.1.1.7 802.11N20\_Lowest Channel



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## 4.8.1.1.8 802.11 N20\_ Middle Channel





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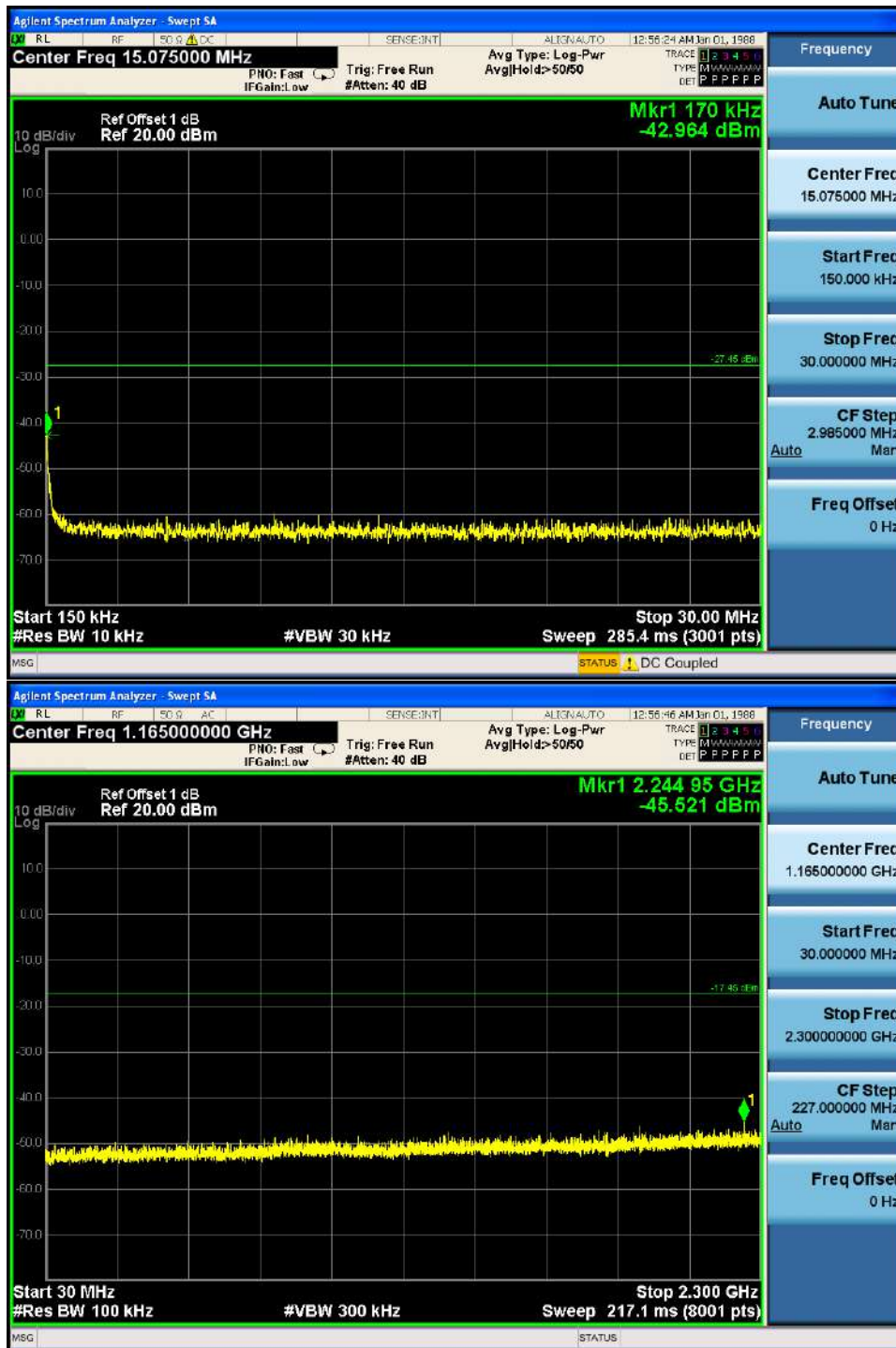
#### 4.8.1.1.9 802.11 N20\_ Highest Channel



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## 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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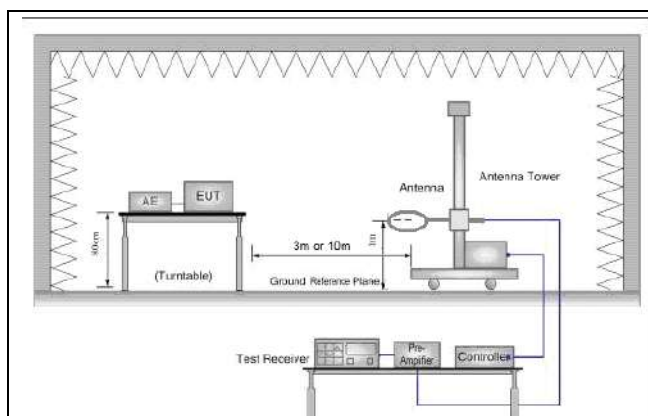


Figure 1. Below 30MHz

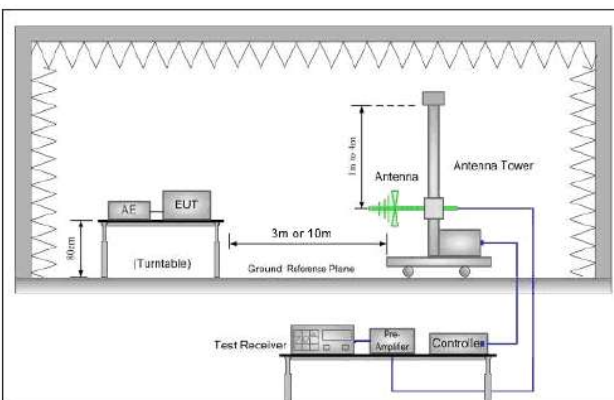


Figure 2. 30MHz to 1GHz

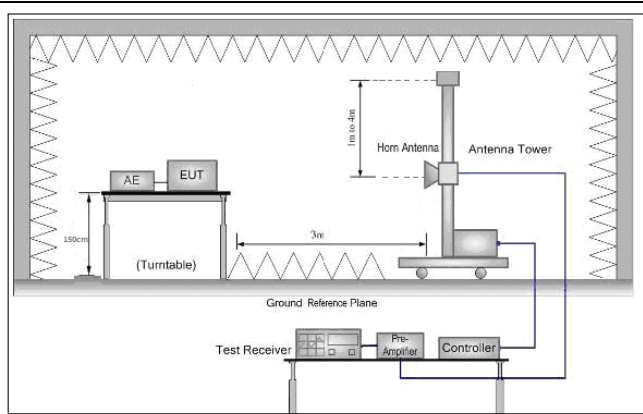


Figure 3. Above 1 GHz

**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



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	<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>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



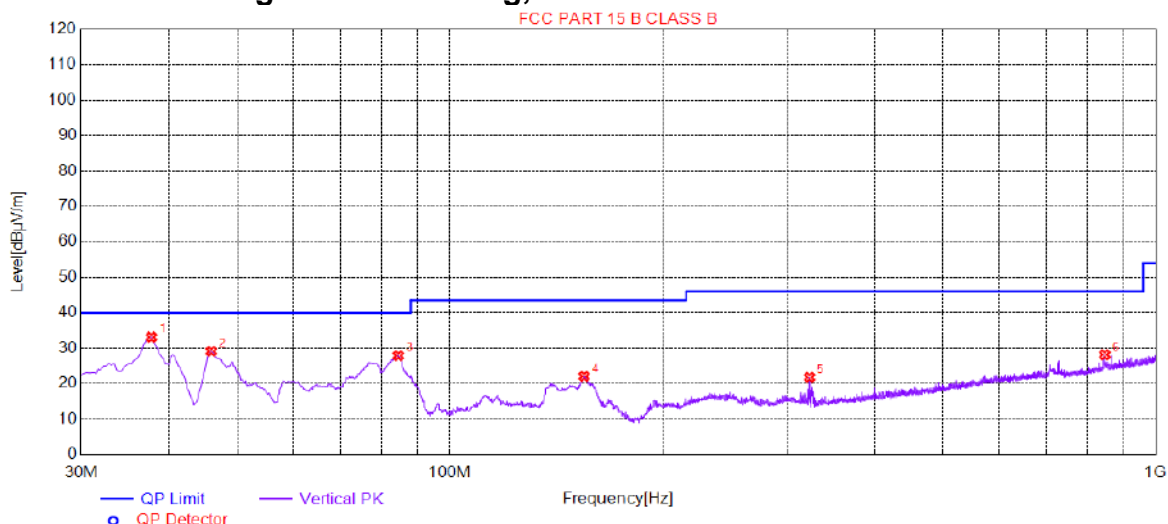
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#### 4.9.1 Radiated emission below 1GHz

##### 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	214	351	Vertical
2	45.9112	29.14	-30.42	40.00	10.86	153	22	Vertical
3	84.5249	27.88	-35.05	40.00	12.12	187	32	Vertical
4	154.9610	22.06	-34.86	43.50	21.44	226	97	Vertical
5	323.1926	21.77	-27.61	46.00	24.23	195	200	Vertical
6	846.9034	28.14	-16.94	46.00	17.86	285	198	Vertical



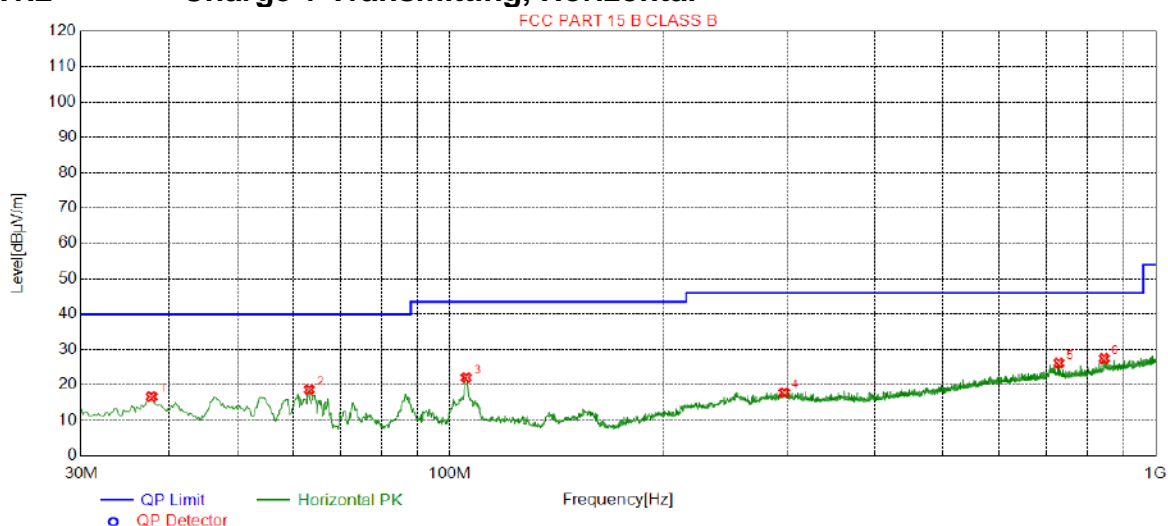
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#### 4.9.1.2 Charge + Transmitting, Horizontal



#### Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	37.7616	16.70	-29.07	40.00	23.30	123	269	Horizontal
2	63.1806	18.64	-32.68	40.00	21.36	219	231	Horizontal
3	105.4811	22.08	-32.00	43.50	21.42	130	183	Horizontal
4	297.7736	17.77	-28.35	46.00	28.23	140	248	Horizontal
5	728.7337	26.22	-18.83	46.00	19.78	242	328	Horizontal
6	844.9630	27.46	-16.97	46.00	18.54	172	272	Horizontal



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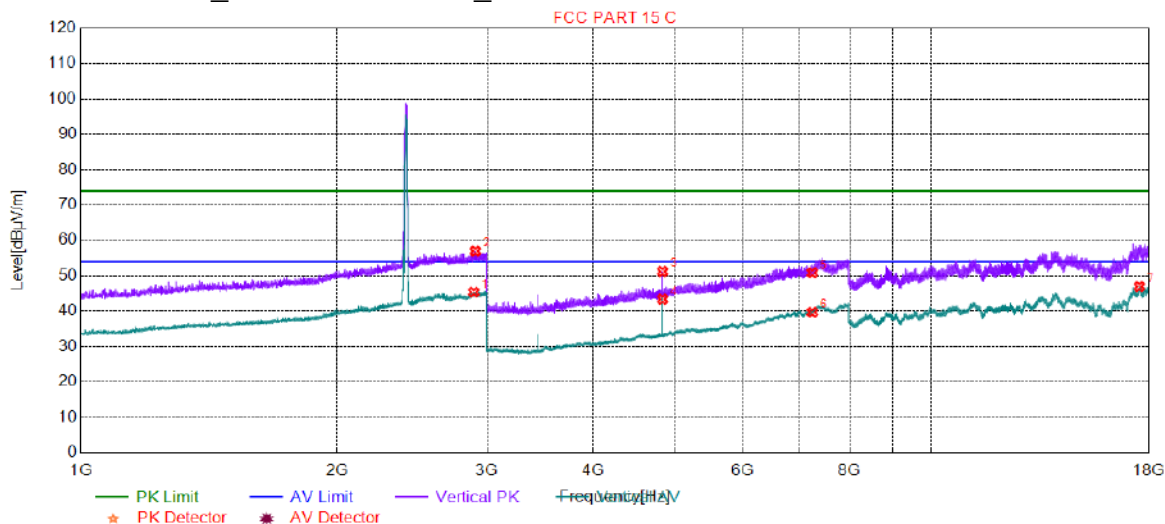
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## 4.9.2 Transmitter emission above 1GHz

### 4.9.2.1 ANT1

#### 4.9.2.1.1 802.11B\_Lowest Channel\_ Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2894.4736	45.37	11.37	54.00	8.63	288	68	Vertical
2	2907.9770	57.00	11.41	74.00	17.00	272	54	Vertical
3	4824.0000	51.21	-14.90	74.00	22.79	162	290	Vertical
4	4824.0000	43.40	-14.90	54.00	10.60	194	262	Vertical
5	7236.0000	50.88	-6.82	74.00	23.12	193	360	Vertical
6	7236.0000	39.70	-6.82	54.00	14.30	164	317	Vertical
7	17527.9764	46.97	0.71	54.00	7.03	295	41	Vertical

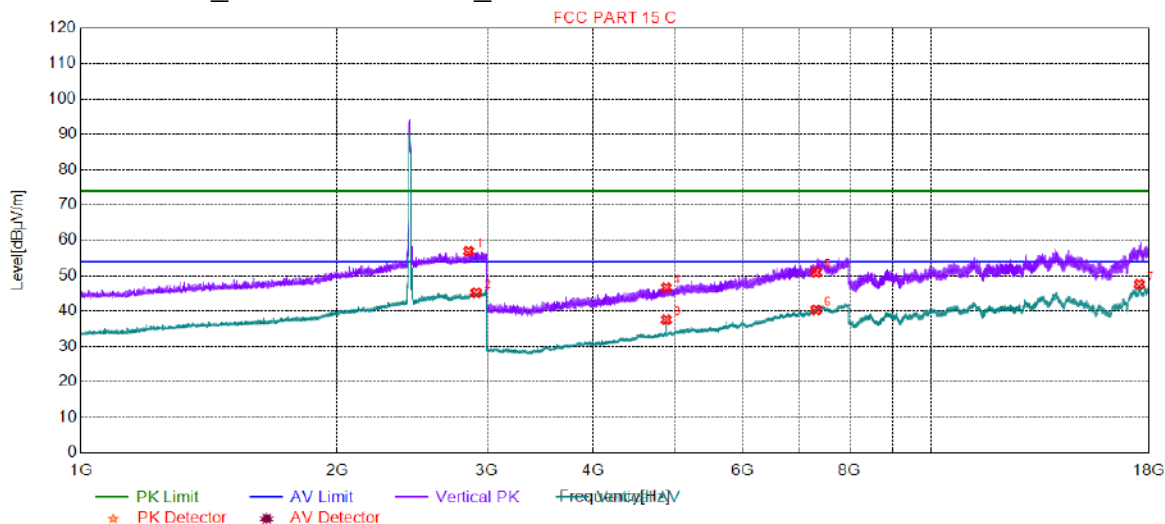


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## 4.9.2.1.2 802.11B\_ Middle Channel\_ Vertical



## Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2854.4636	56.94	11.06	74.00	17.06	157	28	Vertical
2	2914.9787	45.17	11.40	54.00	8.83	205	234	Vertical
3	4874.0000	37.59	-14.68	54.00	16.41	257	290	Vertical
4	4874.0000	46.66	-14.68	74.00	27.34	292	290	Vertical
5	7311.0000	51.01	-6.24	74.00	22.99	243	235	Vertical
6	7311.0000	40.37	-6.24	54.00	13.63	231	344	Vertical
7	17526.4763	47.61	0.69	54.00	6.39	214	142	Vertical



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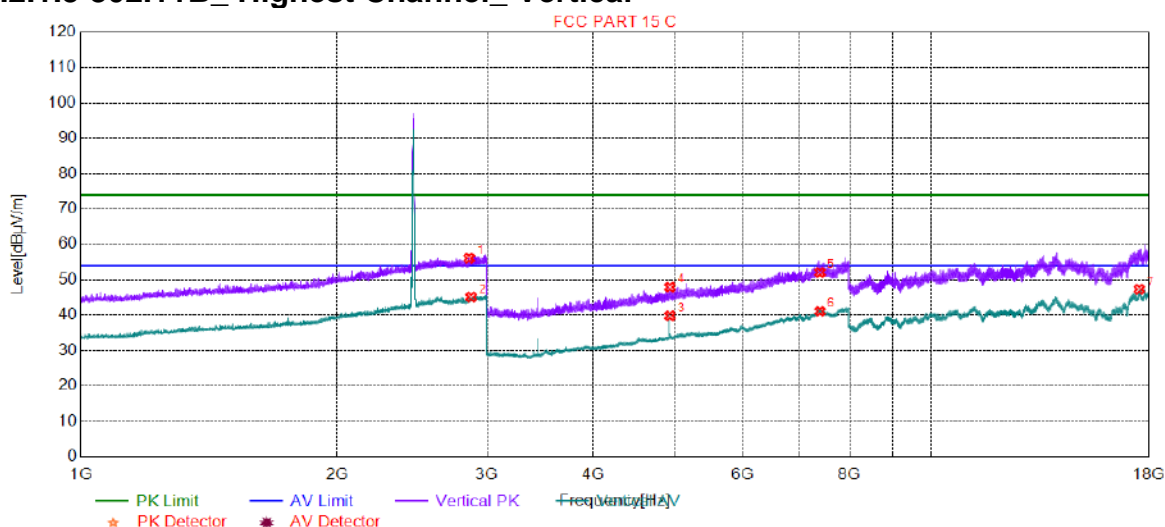
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#### 4.9.2.1.3 802.11B\_Highest Channel\_Vertical



#### 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	165	177	Vertical
2	2874.9687	45.11	11.22	54.00	8.89	153	13	Vertical
3	4924.0000	39.84	-14.43	54.00	14.16	193	289	Vertical
4	4924.0000	47.94	-14.43	74.00	26.06	166	316	Vertical
5	7386.0000	52.08	-5.71	74.00	21.92	273	126	Vertical
6	7386.0000	41.13	-5.71	54.00	12.87	266	126	Vertical
7	17524.9762	47.33	0.67	54.00	6.67	294	143	Vertical



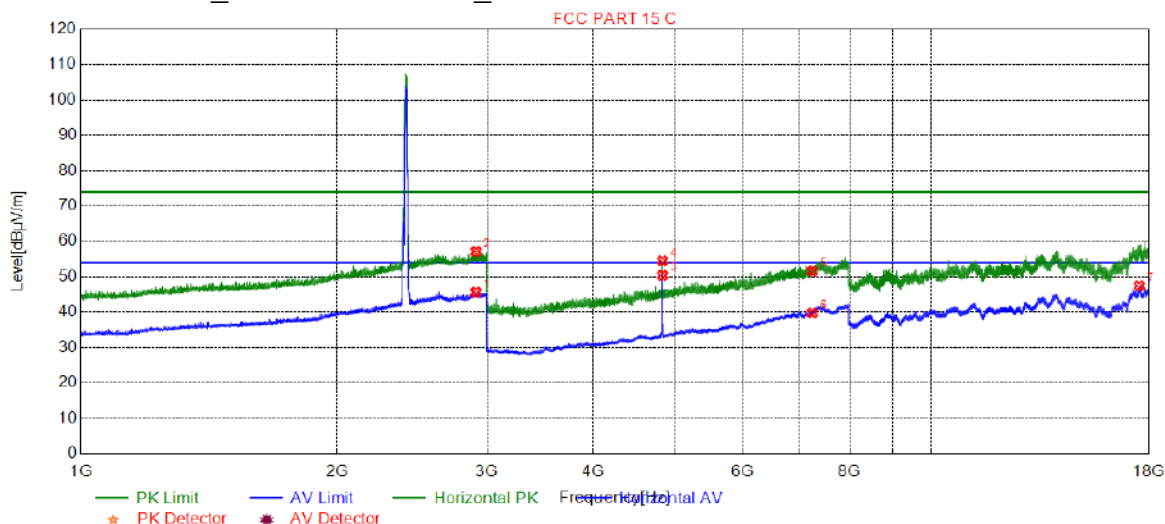
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## 4.9.2.1.4 802.11B\_Lowest Channel\_ Horizontal



## Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2913.4784	45.64	11.40	54.00	8.36	178	236	Horizontal
2	2913.9785	57.17	11.40	74.00	16.83	156	195	Horizontal
3	4824.0000	50.42	-14.90	54.00	3.58	107	315	Horizontal
4	4824.0000	54.52	-14.90	74.00	19.48	137	342	Horizontal
5	7236.0000	51.64	-6.82	74.00	22.36	186	342	Horizontal
6	7236.0000	39.81	-6.82	54.00	14.19	242	73	Horizontal
7	17527.4764	47.47	0.70	54.00	6.53	140	143	Horizontal

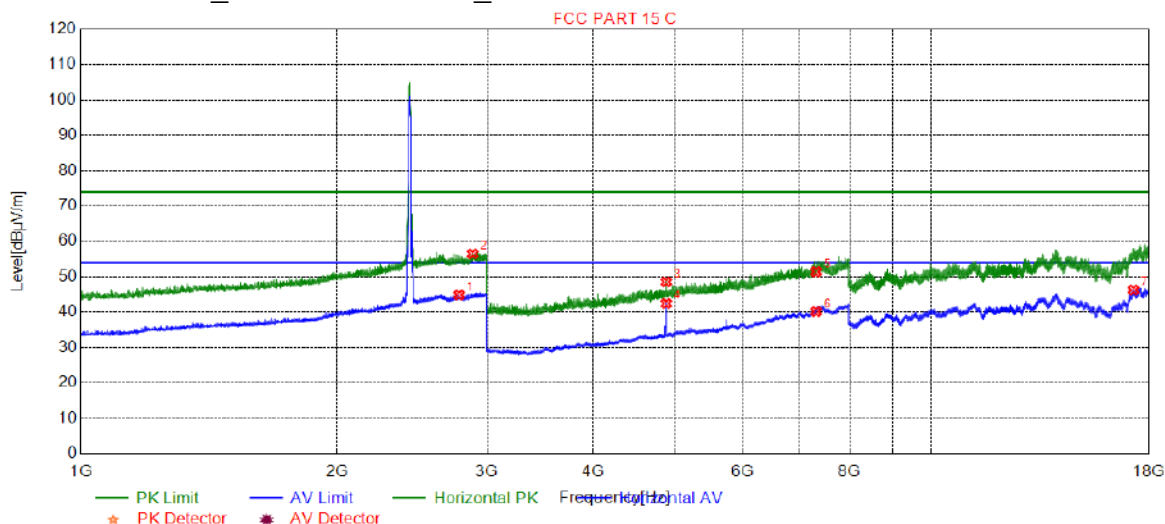


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## 4.9.2.1.5 802.11B\_ Middle Channel\_ Horizontal



## 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	212	250	Horizontal
2	2886.9717	56.52	11.31	74.00	17.48	209	154	Horizontal
3	4874.0000	48.56	-14.68	74.00	25.44	179	344	Horizontal
4	4874.0000	42.48	-14.68	54.00	11.52	180	316	Horizontal
5	7311.0000	51.43	-6.24	74.00	22.57	160	154	Horizontal
6	7311.0000	40.22	-6.24	54.00	13.78	204	18	Horizontal
7	17253.9627	46.27	-1.39	54.00	7.73	187	44	Horizontal



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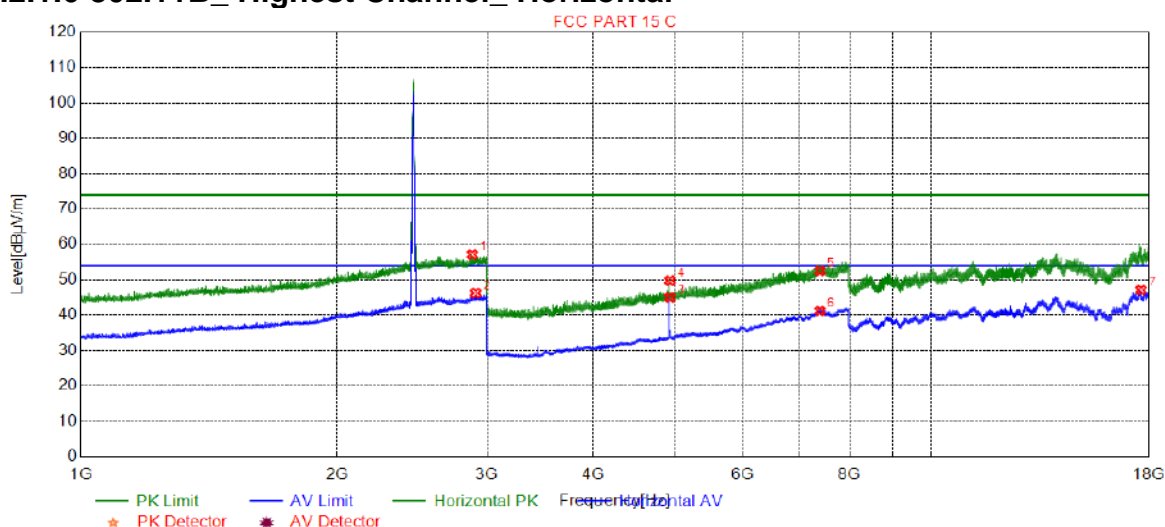
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## 4.9.2.1.6 802.11B\_Highest Channel\_Horizontal



## 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	118	276	Horizontal
2	2910.9777	46.25	11.40	54.00	7.75	135	207	Horizontal
3	4924.0000	45.01	-14.43	54.00	8.99	144	316	Horizontal
4	4924.0000	49.80	-14.43	74.00	24.20	118	289	Horizontal
5	7386.0000	52.51	-5.71	74.00	21.49	139	344	Horizontal
6	7386.0000	41.23	-5.71	54.00	12.77	189	18	Horizontal
7	17612.4806	47.15	1.31	54.00	6.85	243	342	Horizontal



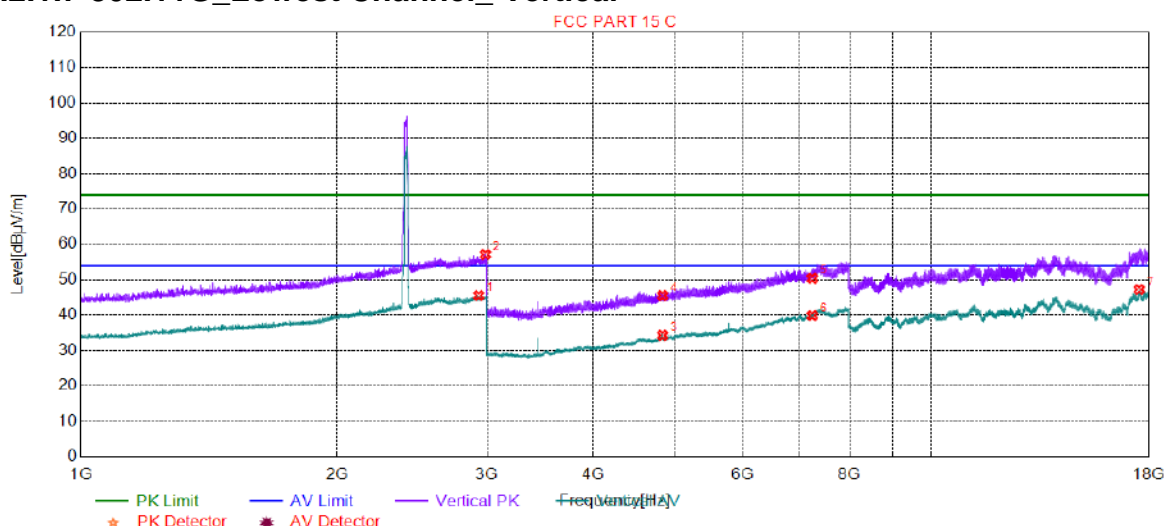
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#### 4.9.2.1.7 802.11G\_Lowest Channel\_Vertical



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2933.9835	45.54	11.39	54.00	8.46	205	220	Vertical
2	2987.9970	57.19	11.37	74.00	16.81	287	300	Vertical
3	4824.0000	34.30	-14.90	54.00	19.70	250	264	Vertical
4	4824.0000	45.52	-14.90	74.00	28.48	163	292	Vertical
5	7236.0000	50.43	-6.82	74.00	23.57	228	18	Vertical
6	7236.0000	39.91	-6.82	54.00	14.09	221	292	Vertical
7	17521.4761	47.27	0.62	54.00	6.73	153	0	Vertical

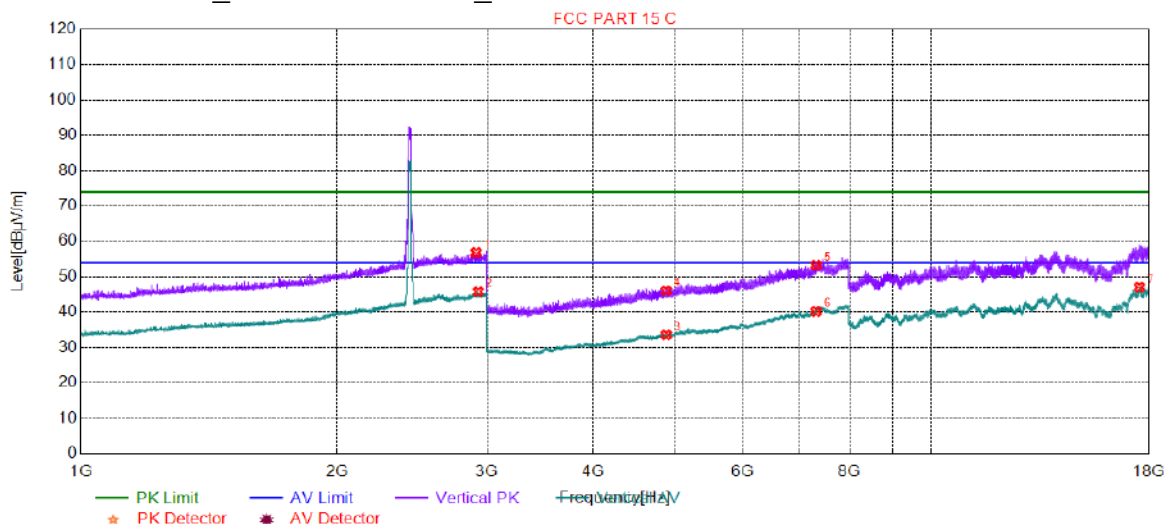


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## 4.9.2.1.8 802.11G\_Middle Channel\_Vertical



## 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	162	163	Vertical
2	2930.9827	45.81	11.39	54.00	8.19	156	163	Vertical
3	4874.0000	33.59	-14.68	54.00	20.41	214	317	Vertical
4	4874.0000	46.05	-14.68	74.00	27.95	224	45	Vertical
5	7311.0000	53.25	-6.24	74.00	20.75	192	127	Vertical
6	7311.0000	40.25	-6.24	54.00	13.75	286	127	Vertical
7	17531.9766	47.07	0.76	54.00	6.93	274	342	Vertical



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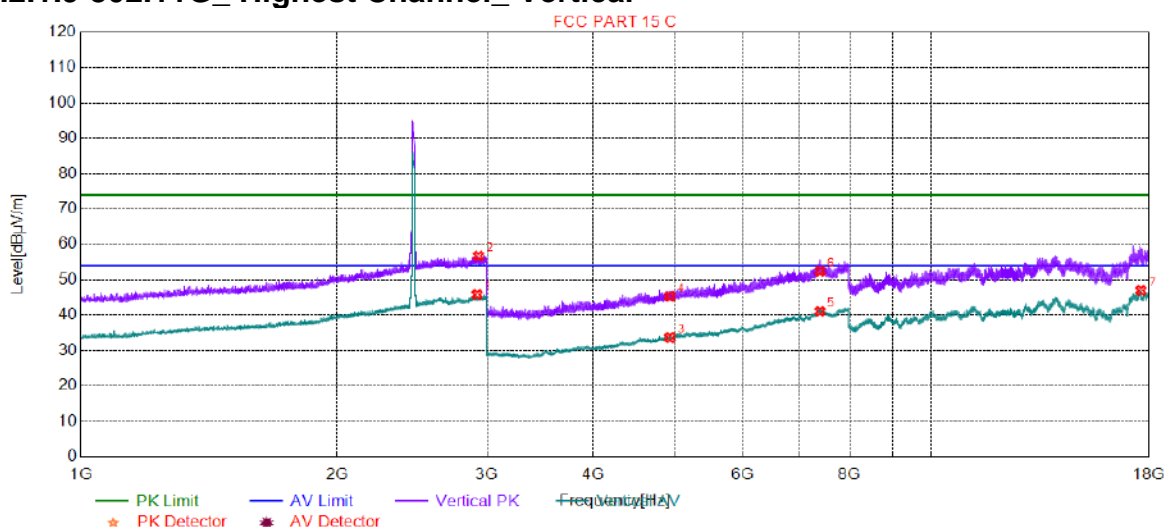
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## 4.9.2.1.9 802.11G\_Highest Channel\_Vertical



## 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	295	151	Vertical
2	2932.4831	56.74	11.39	74.00	17.26	283	164	Vertical
3	4924.0000	33.66	-14.43	54.00	20.34	178	46	Vertical
4	4924.0000	45.31	-14.43	74.00	28.69	224	155	Vertical
5	7386.0000	41.12	-5.71	54.00	12.88	221	291	Vertical
6	7386.0000	52.42	-5.71	74.00	21.58	218	46	Vertical
7	17608.9804	47.01	1.40	54.00	6.99	230	192	Vertical



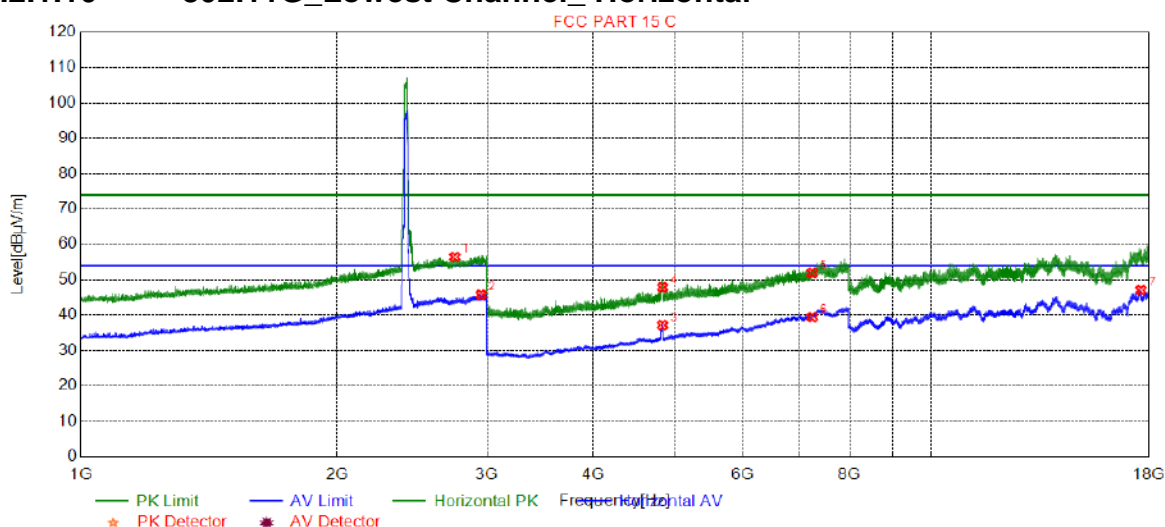
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## 4.9.2.1.10 802.11G\_Lowest Channel\_Horizontal



## Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2751.9380	56.47	10.35	74.00	17.53	128	154	Horizontal
2	2952.4881	45.75	11.38	54.00	8.25	133	18	Horizontal
3	4824.0000	37.17	-14.90	54.00	16.83	168	317	Horizontal
4	4824.0000	47.88	-14.90	74.00	26.12	122	317	Horizontal
5	7236.0000	51.99	-6.82	74.00	22.01	201	46	Horizontal
6	7236.0000	39.46	-6.82	54.00	14.54	163	360	Horizontal
7	17609.9805	47.10	1.37	54.00	6.90	248	43	Horizontal



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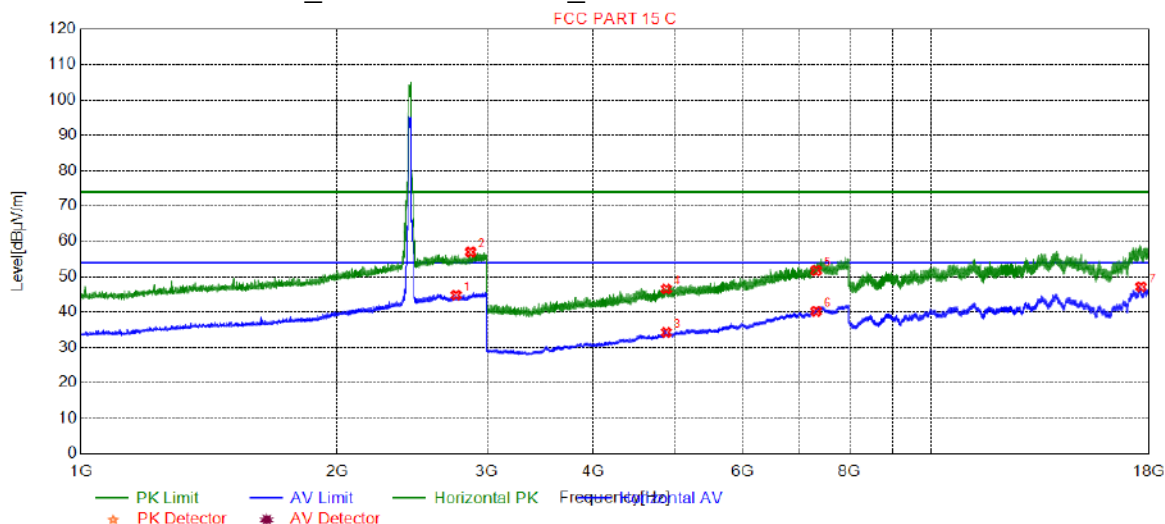
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## 4.9.2.1.11 802.11G\_Middle Channel\_Horizontal



## 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	129	167	Horizontal
2	2870.4676	57.04	11.18	74.00	16.96	230	303	Horizontal
3	4874.0000	34.29	-14.68	54.00	19.71	185	316	Horizontal
4	4874.0000	46.58	-14.68	74.00	27.42	209	316	Horizontal
5	7311.0000	51.78	-6.24	74.00	22.22	201	208	Horizontal
6	7311.0000	40.27	-6.24	54.00	13.73	129	234	Horizontal
7	17613.9807	47.18	1.27	54.00	6.82	102	144	Horizontal



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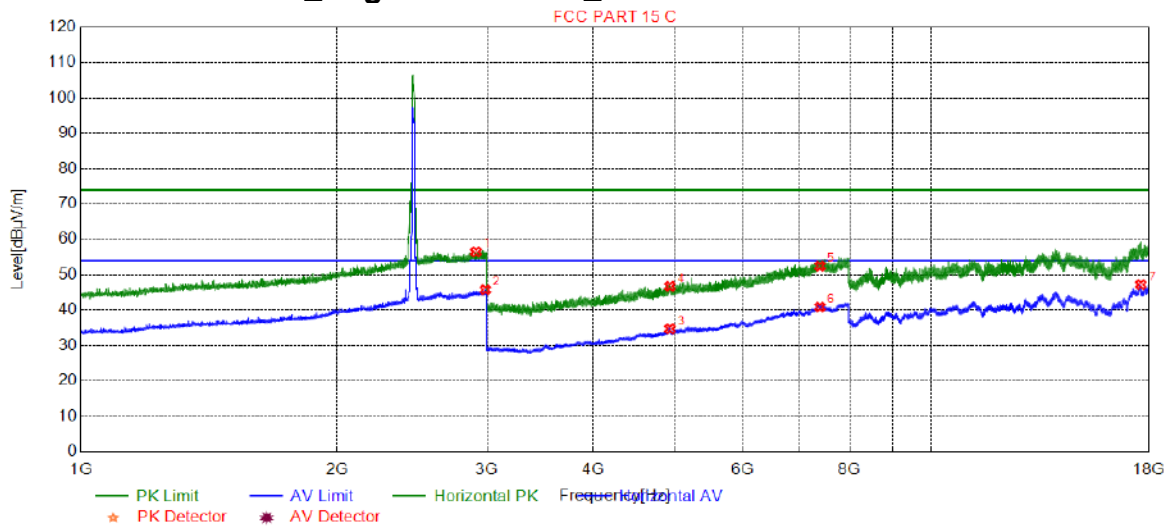
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## 4.9.2.1.12 802.11G\_Highest Channel\_Horizontal

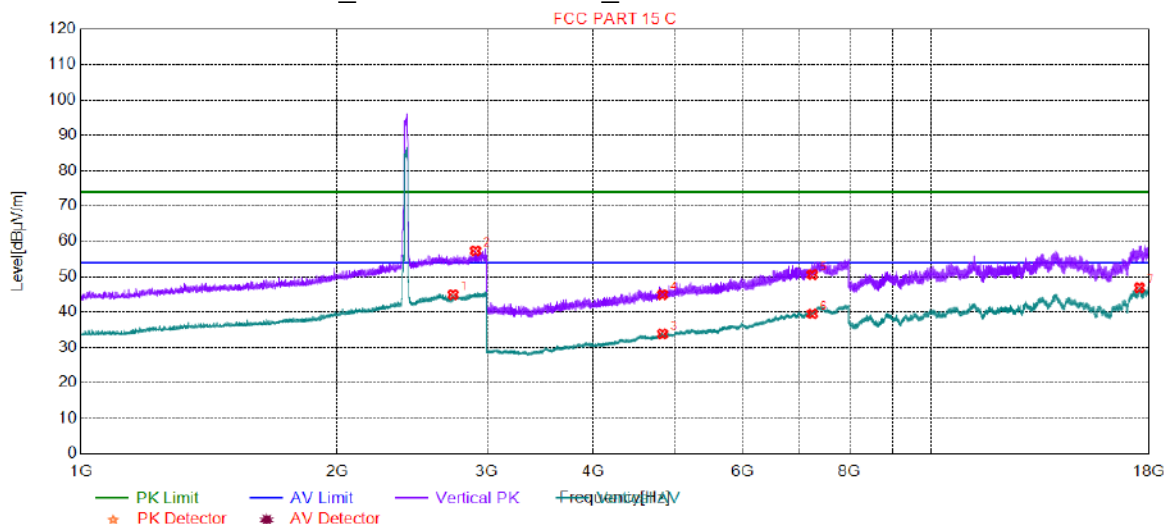


## Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2912.9782	56.49	11.40	74.00	17.51	181	58	Horizontal
2	2986.9967	45.77	11.37	54.00	8.23	182	165	Horizontal
3	4924.0000	34.73	-14.43	54.00	19.27	221	316	Horizontal
4	4924.0000	46.74	-14.43	74.00	27.26	178	344	Horizontal
5	7386.0000	52.44	-5.71	74.00	21.56	160	181	Horizontal
6	7386.0000	40.92	-5.71	54.00	13.08	131	99	Horizontal
7	17602.9801	47.23	1.55	54.00	6.77	185	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	258	219	Vertical
2	2909.4774	57.37	11.41	74.00	16.63	173	260	Vertical
3	4824.0000	33.85	-14.90	54.00	20.15	233	290	Vertical
4	4824.0000	44.94	-14.90	74.00	29.06	183	235	Vertical
5	7236.0000	50.61	-6.82	74.00	23.39	190	235	Vertical
6	7236.0000	39.55	-6.82	54.00	14.45	183	45	Vertical
7	17533.4767	46.92	0.78	54.00	7.08	233	243	Vertical



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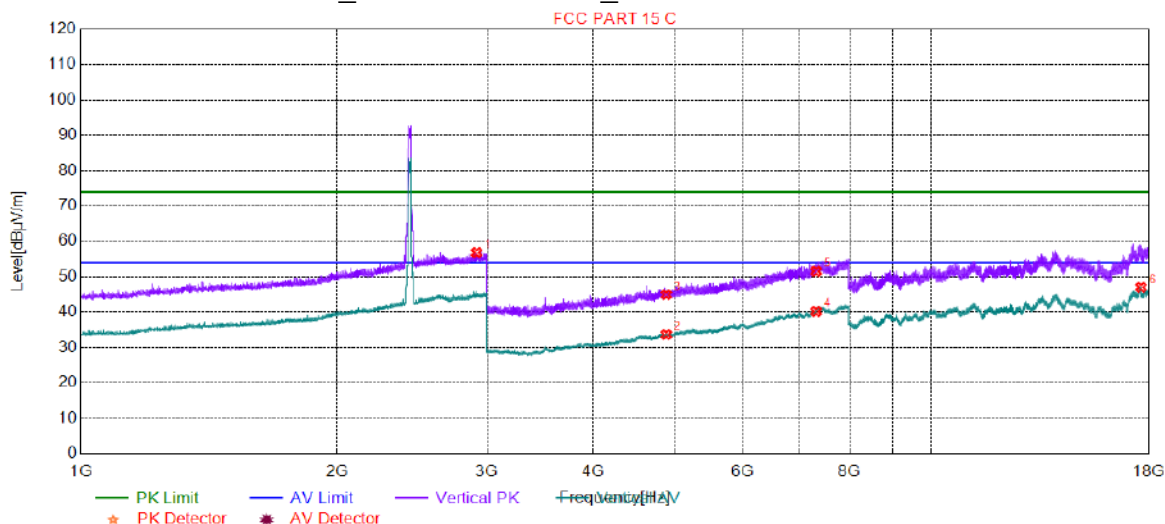
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#### 4.9.2.1.14 802.11N20\_Middle Channel\_Vertical



#### Suspected List

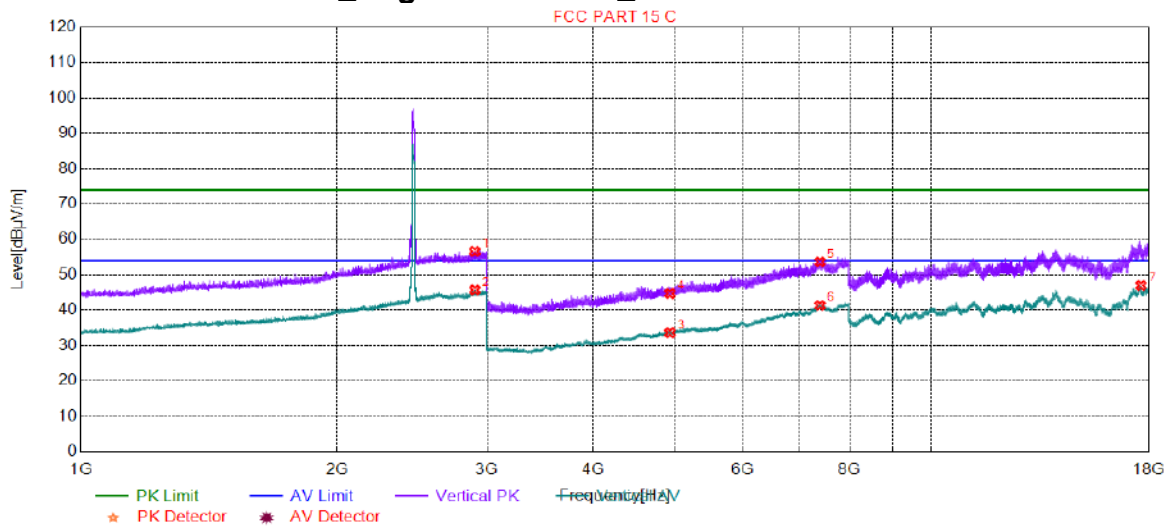
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2918.4796	56.85	11.40	74.00	17.15	284	273	Vertical
2	4874.0000	33.70	-14.68	54.00	20.30	167	72	Vertical
3	4874.0000	44.94	-14.68	74.00	29.06	253	360	Vertical
4	7311.0000	40.24	-6.24	54.00	13.76	179	180	Vertical
5	7311.0000	51.56	-6.24	74.00	22.44	298	18	Vertical
6	17613.9807	47.06	1.27	54.00	6.94	248	342	Vertical



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## 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	172	194	Vertical
2	2903.9760	45.71	11.41	54.00	8.29	277	154	Vertical
3	4924.0000	33.63	-14.43	54.00	20.37	263	316	Vertical
4	4924.0000	44.71	-14.43	74.00	29.29	296	74	Vertical
5	7386.0000	53.64	-5.71	74.00	20.36	214	182	Vertical
6	7386.0000	41.37	-5.71	54.00	12.63	217	263	Vertical
7	17612.4806	46.98	1.31	54.00	7.02	242	0	Vertical



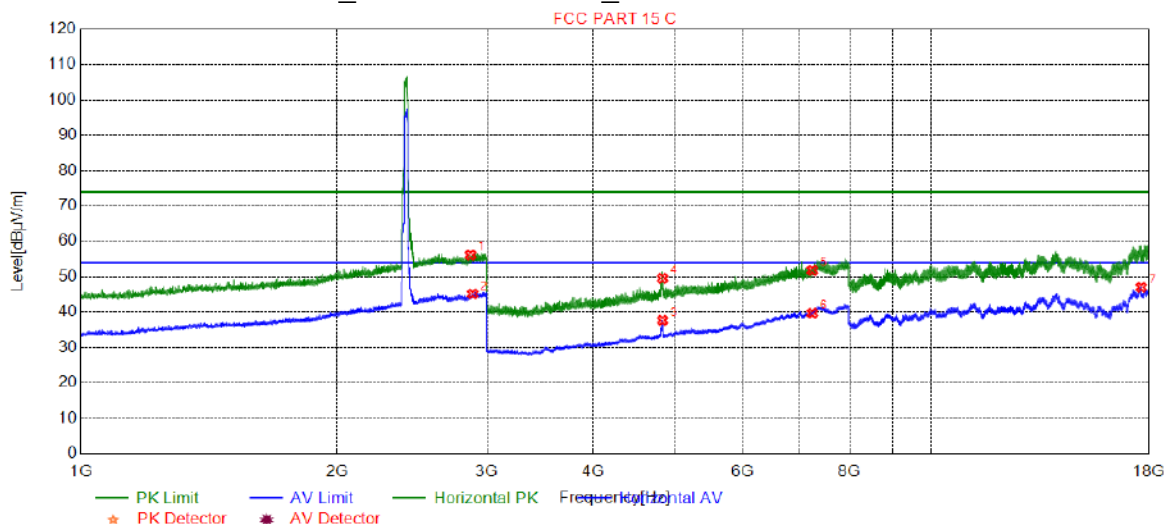
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## 4.9.2.1.16 802.11N20\_Lowest Channel\_Horizontal



## 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	108	46	Horizontal
2	2886.9717	45.15	11.31	54.00	8.85	235	18	Horizontal
3	4824.0000	37.67	-14.90	54.00	16.33	129	316	Horizontal
4	4824.0000	49.59	-14.90	74.00	24.41	129	316	Horizontal
5	7236.0000	51.84	-6.82	74.00	22.16	110	99	Horizontal
6	7236.0000	39.72	-6.82	54.00	14.28	239	126	Horizontal
7	17624.9812	47.05	0.98	54.00	6.95	217	292	Horizontal

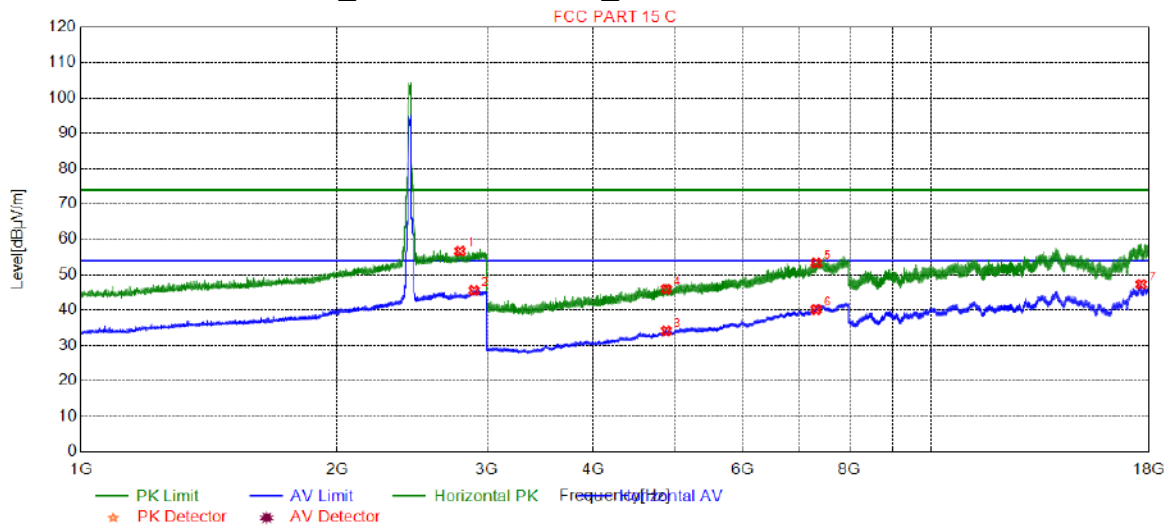


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## 4.9.2.1.17 802.11N20\_ Middle Channel\_ Horizontal



## 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	184	23	Horizontal
2	2896.4741	45.55	11.38	54.00	8.45	165	23	Horizontal
3	4874.0000	34.14	-14.68	54.00	19.86	124	299	Horizontal
4	4874.0000	45.94	-14.68	74.00	28.06	140	326	Horizontal
5	7311.0000	53.33	-6.24	74.00	20.67	138	81	Horizontal
6	7311.0000	40.21	-6.24	54.00	13.79	220	163	Horizontal
7	17620.9810	47.31	1.08	54.00	6.69	156	42	Horizontal



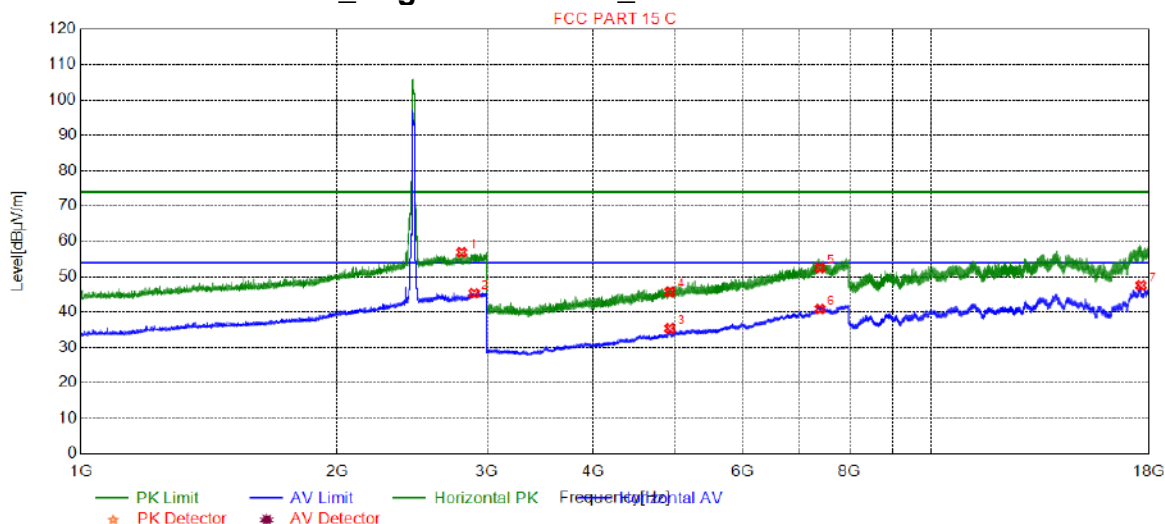
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#### 4.9.2.1.18 802.11N20\_Highest Channel\_Horizontal



Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2802.4506	56.94	10.66	74.00	17.06	196	208	Horizontal
2	2897.4744	45.32	11.39	54.00	8.68	213	18	Horizontal
3	4924.0000	35.37	-14.43	54.00	18.63	212	316	Horizontal
4	4924.0000	45.73	-14.43	74.00	28.27	200	360	Horizontal
5	7386.0000	52.50	-5.71	74.00	21.50	234	126	Horizontal
6	7386.0000	40.92	-5.71	54.00	13.08	164	360	Horizontal
7	17613.4807	47.58	1.28	54.00	6.42	156	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:			

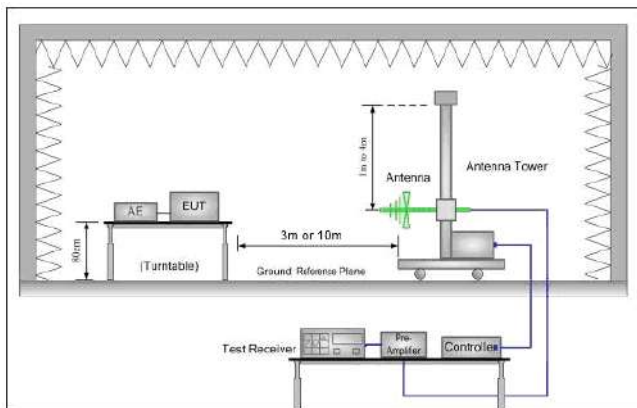


Figure 1. 30MHz to 1GHz

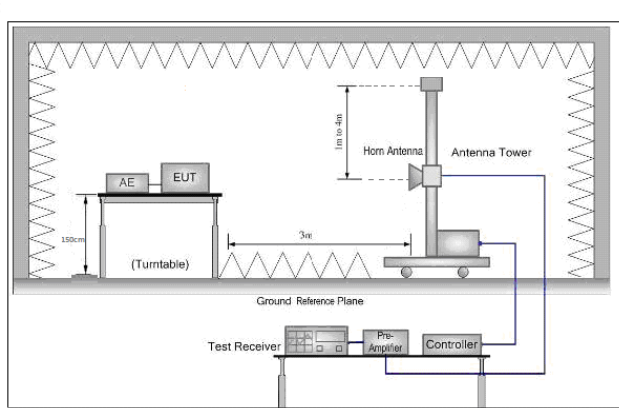


Figure 2. Above 1 GHz



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Test Procedure:	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>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</li> <li>h. Test the EUT in the lowest channel , the Highest channel</li> <li>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.</li> <li>j. Repeat above procedures until all frequencies measured was complete.</li> </ul>
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



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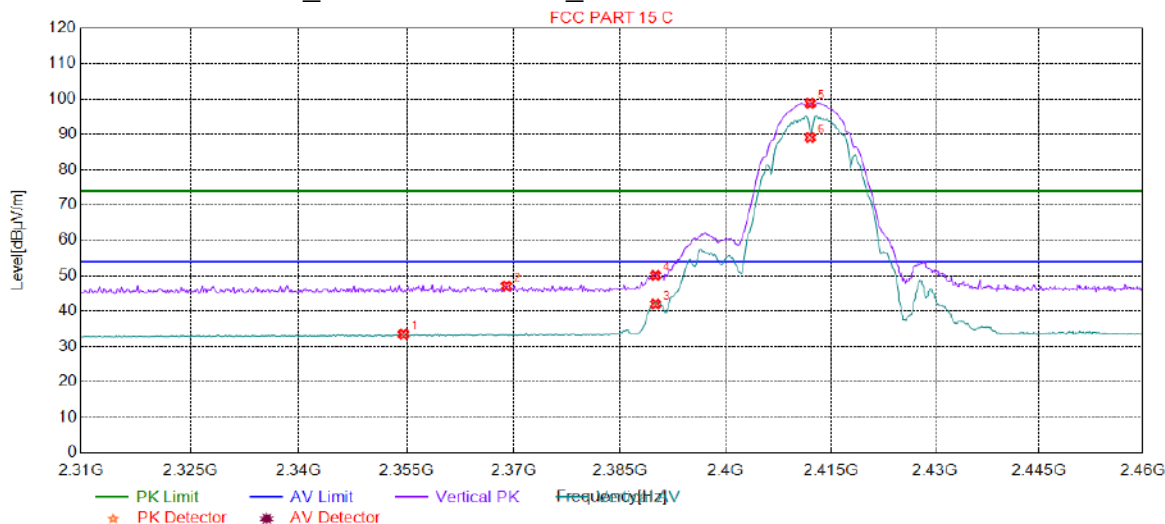
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Test plot as follows:

#### 4.10.1 ANT1

##### 4.10.1.1 802.11B\_Lowest Channel\_Vertical



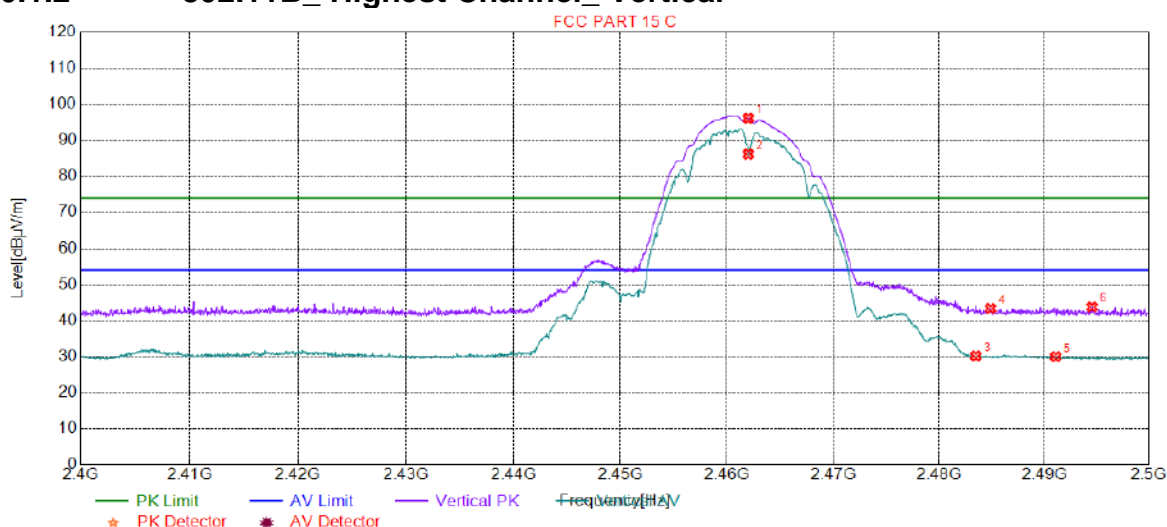
Suspected List								
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2354.5946	33.49	9.08	54.00	20.51	206	327	Vertical
2	2369.0090	47.11	9.13	74.00	26.89	174	315	Vertical
3	2390.0000	42.07	9.20	54.00	11.93	206	232	Vertical
4	2390.0000	50.14	9.20	74.00	23.86	237	228	Vertical
5	2412.0000	98.78	9.27	74.00	-24.78	208	232	Vertical
6	2412.0000	89.14	9.27	54.00	-35.14	206	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	228	199	Vertical
2	2462.0000	86.18	9.43	54.00	-32.18	177	199	Vertical
3	2483.5000	30.10	9.50	54.00	23.90	278	215	Vertical
4	2484.8924	43.35	9.50	74.00	30.65	233	221	Vertical
5	2491.0955	29.93	9.52	54.00	24.07	189	199	Vertical
6	2494.5473	43.78	9.53	74.00	30.22	173	105	Vertical



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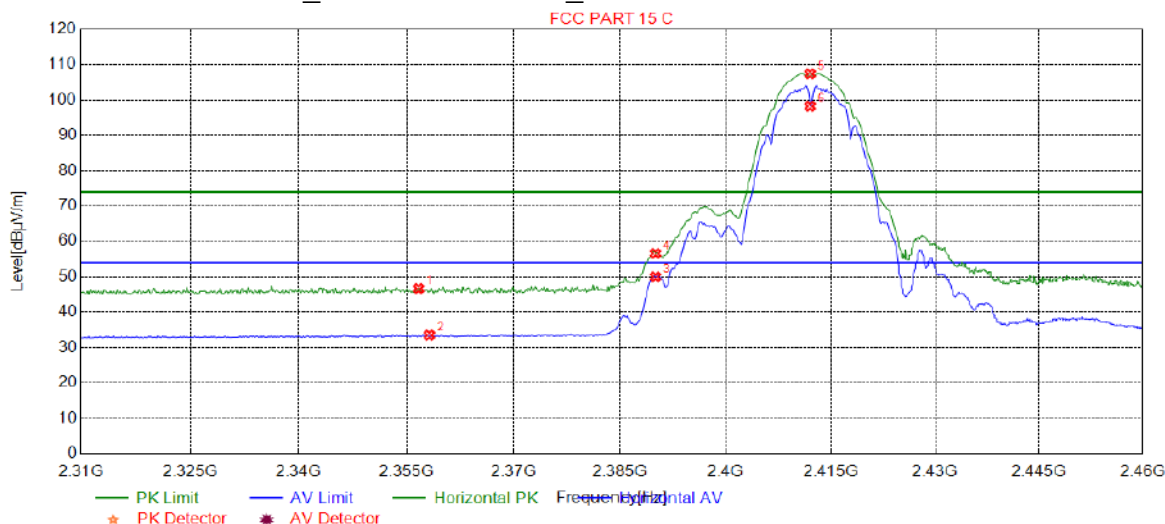
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## 4.10.1.3 802.11B\_Lowest Channel\_Horizontal



## Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2356.6967	46.66	9.09	74.00	27.34	174	299	Horizontal
2	2358.1982	33.53	9.09	54.00	20.47	195	75	Horizontal
3	2390.0000	50.02	9.20	54.00	3.98	187	345	Horizontal
4	2390.0000	56.62	9.20	74.00	17.38	184	341	Horizontal
5	2412.0000	107.42	9.27	74.00	-33.42	195	345	Horizontal
6	2412.0000	98.25	9.27	54.00	-44.25	176	341	Horizontal



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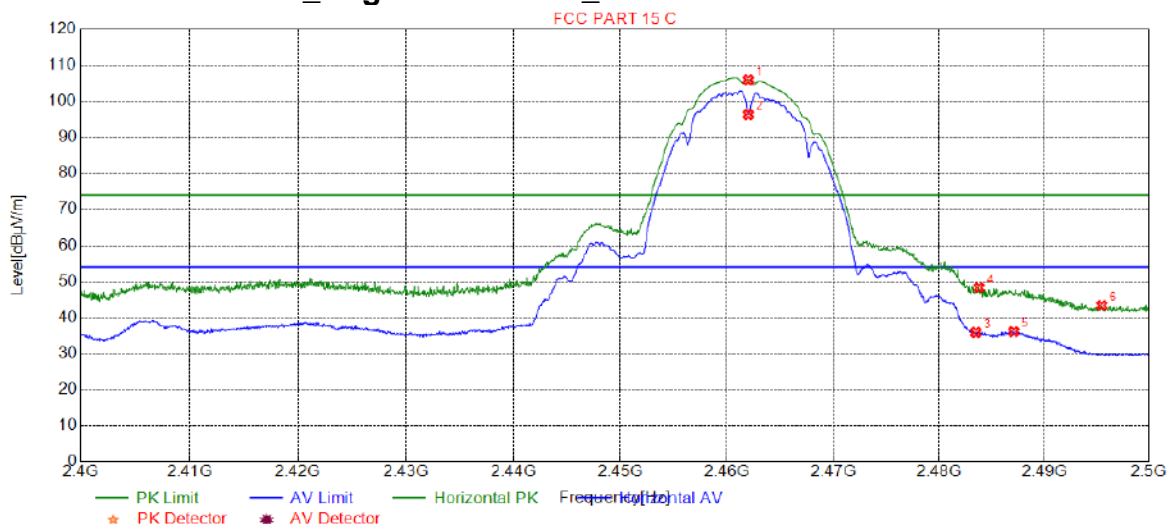
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#### 4.10.1.4 802.11B\_Highest Channel\_Horizontal



#### Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	105.93	9.43	74.00	-31.93	159	299	Horizontal
2	2462.0000	96.31	9.43	54.00	-42.31	224	299	Horizontal
3	2483.5000	35.86	9.50	54.00	18.14	157	294	Horizontal
4	2483.7919	48.27	9.50	74.00	25.73	127	299	Horizontal
5	2487.0935	36.07	9.51	54.00	17.93	130	299	Horizontal
6	2495.4977	43.37	9.54	74.00	30.63	206	14	Horizontal



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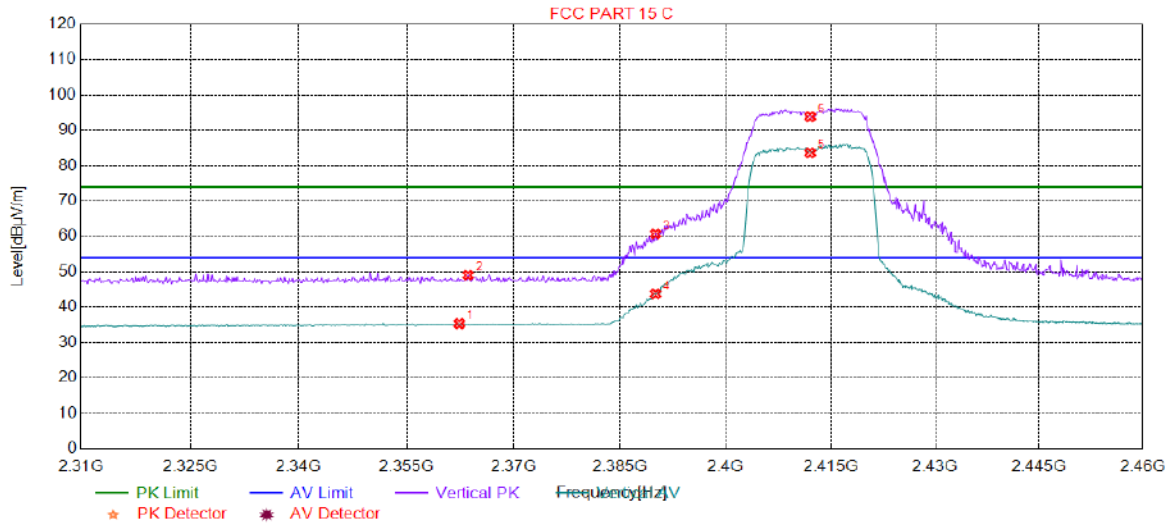
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#### 4.10.1.5 802.11G\_Lowest Channel\_Vertical



#### Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2362.4024	35.35	9.11	54.00	18.65	172	198	Vertical
2	2363.6036	49.08	9.11	74.00	24.92	236	5	Vertical
3	2390.0000	60.71	9.20	74.00	13.29	260	165	Vertical
4	2390.0000	43.77	9.20	54.00	10.23	236	194	Vertical
5	2412.0000	83.66	9.27	54.00	-29.66	285	194	Vertical
6	2412.0000	93.88	9.27	74.00	-19.88	226	346	Vertical



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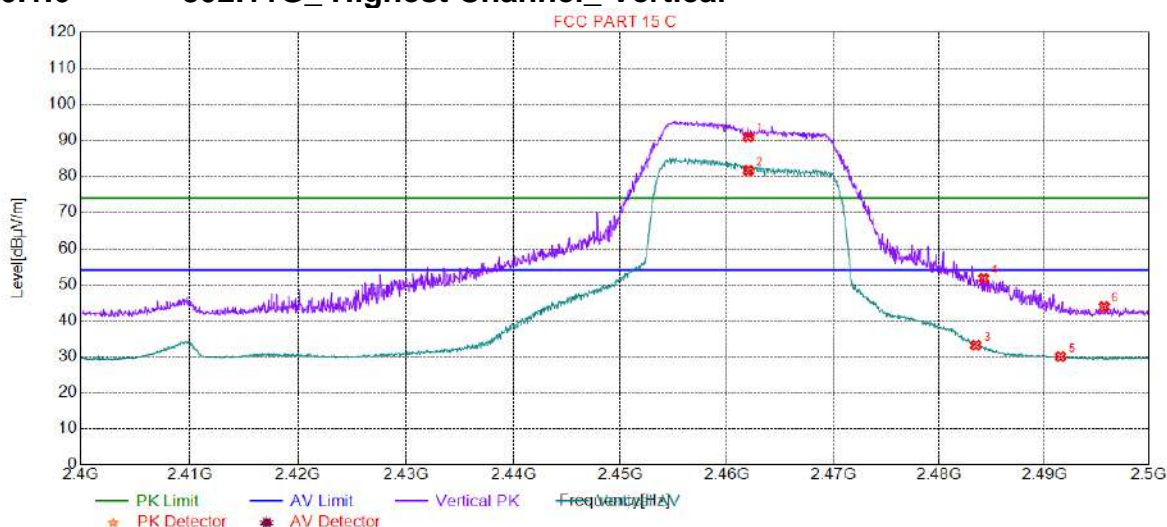
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## 4.10.1.6 802.11G\_Highest Channel\_Vertical



## Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	90.97	9.43	74.00	-16.97	193	216	Vertical
2	2462.0000	81.61	9.43	54.00	-27.61	240	216	Vertical
3	2483.5000	33.14	9.50	54.00	20.86	191	221	Vertical
4	2484.2421	51.69	9.50	74.00	22.31	259	335	Vertical
5	2491.5458	29.95	9.52	54.00	24.05	280	325	Vertical
6	2495.6978	43.82	9.54	74.00	30.18	254	111	Vertical



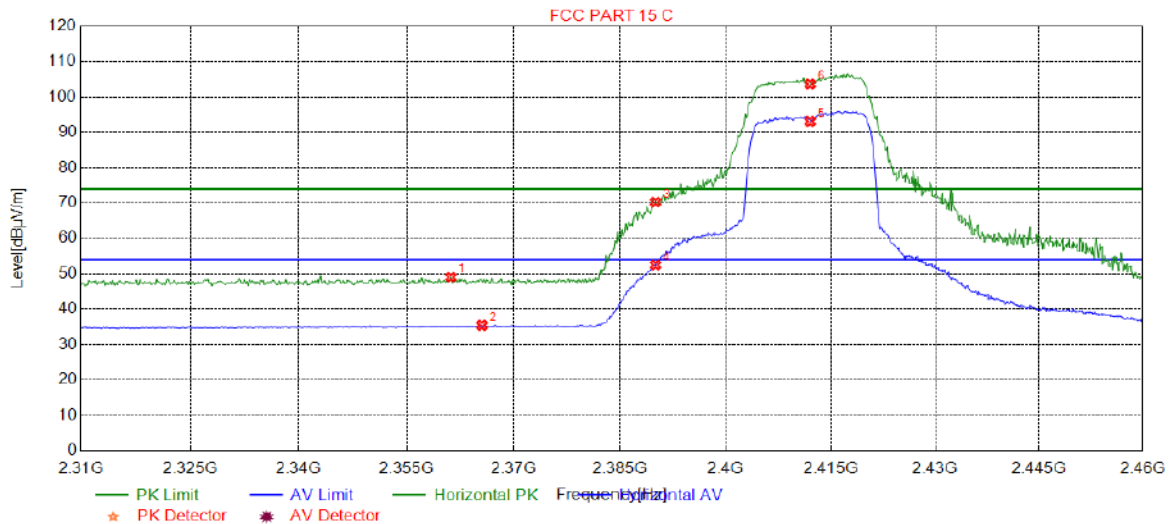
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## 4.10.1.7 802.11G\_Lowest Channel\_Horizontal



## Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2361.2012	49.06	9.10	74.00	24.94	140	88	Horizontal
2	2365.5556	35.45	9.12	54.00	18.55	203	40	Horizontal
3	2390.0000	70.26	9.20	74.00	3.74	137	292	Horizontal
4	2390.0000	52.46	9.20	54.00	1.54	169	309	Horizontal
5	2412.0000	93.11	9.27	54.00	-39.11	222	309	Horizontal
6	2412.0000	103.65	9.27	74.00	-29.65	156	309	Horizontal



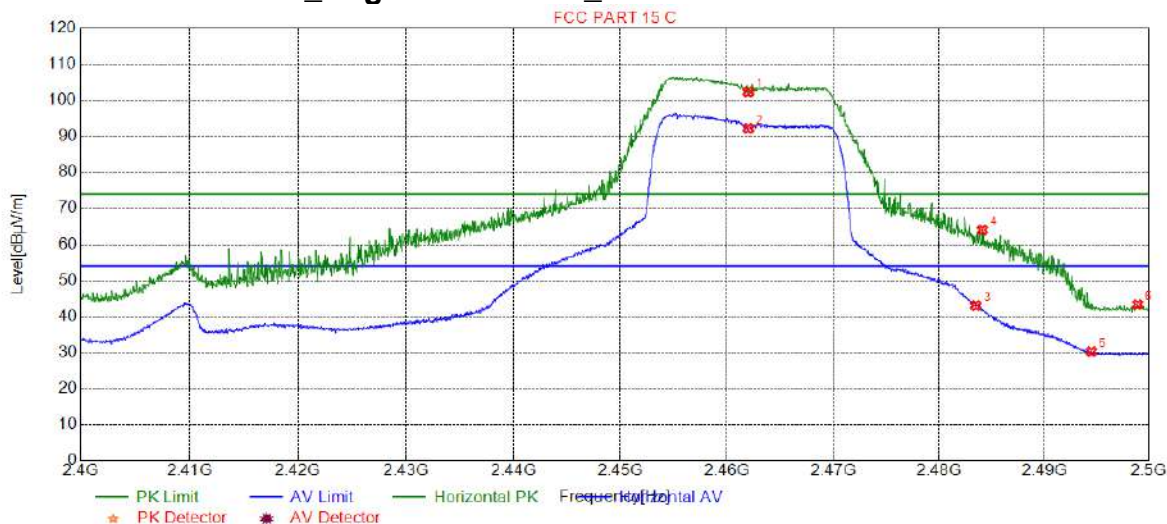
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## 4.10.1.8 802.11G\_ Highest Channel\_ Horizontal

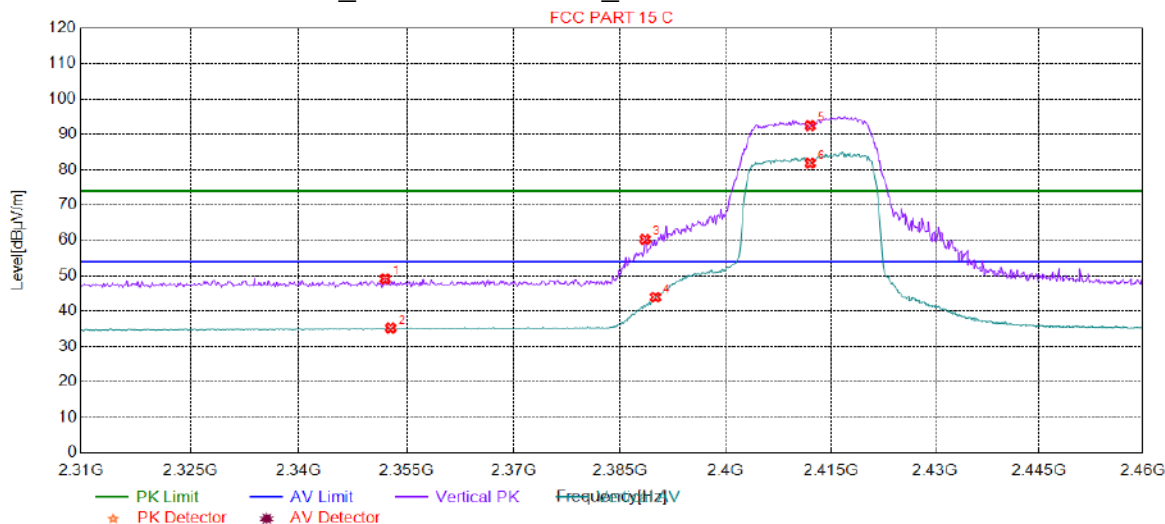


## Suspected List

NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	102.30	9.43	74.00	-28.30	247	347	Horizontal
2	2462.0000	92.22	9.43	54.00	-38.22	218	293	Horizontal
3	2483.5000	43.06	9.50	54.00	10.94	210	293	Horizontal
4	2484.1421	64.01	9.50	74.00	9.99	207	309	Horizontal
5	2494.4972	30.22	9.53	54.00	23.78	236	342	Horizontal
6	2498.8995	43.36	9.55	74.00	30.64	167	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	257	94	Vertical
2	2352.7928	35.24	9.07	54.00	18.76	269	346	Vertical
3	2388.5285	60.31	9.19	74.00	13.69	209	346	Vertical
4	2390.0000	43.98	9.20	54.00	10.02	163	216	Vertical
5	2412.0000	92.44	9.27	74.00	-18.44	182	0	Vertical
6	2412.0000	81.86	9.27	54.00	-27.86	288	216	Vertical



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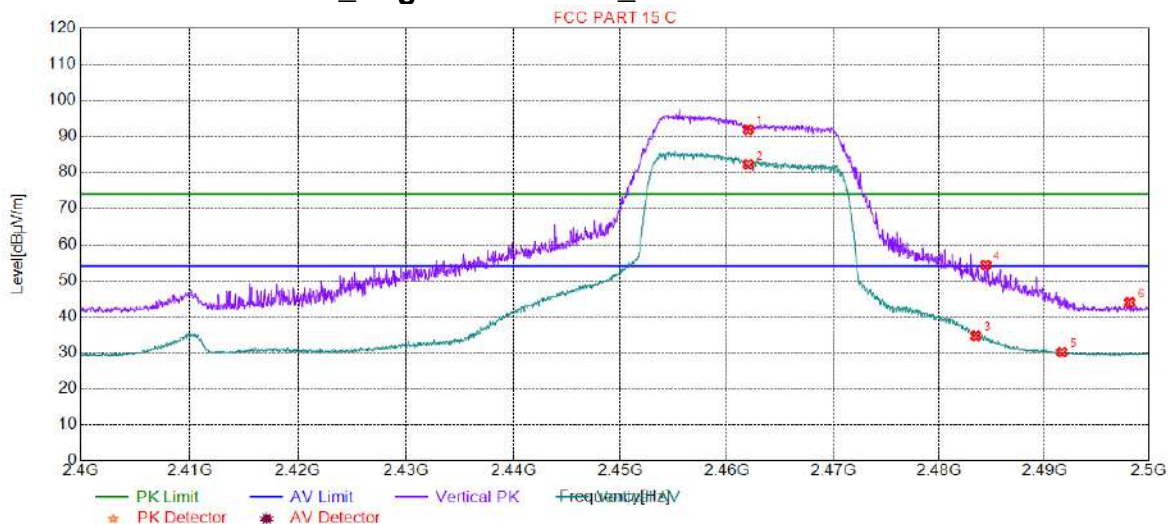
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## 4.10.1.10 802.11N20\_ Highest Channel\_ Vertical



## Suspected List

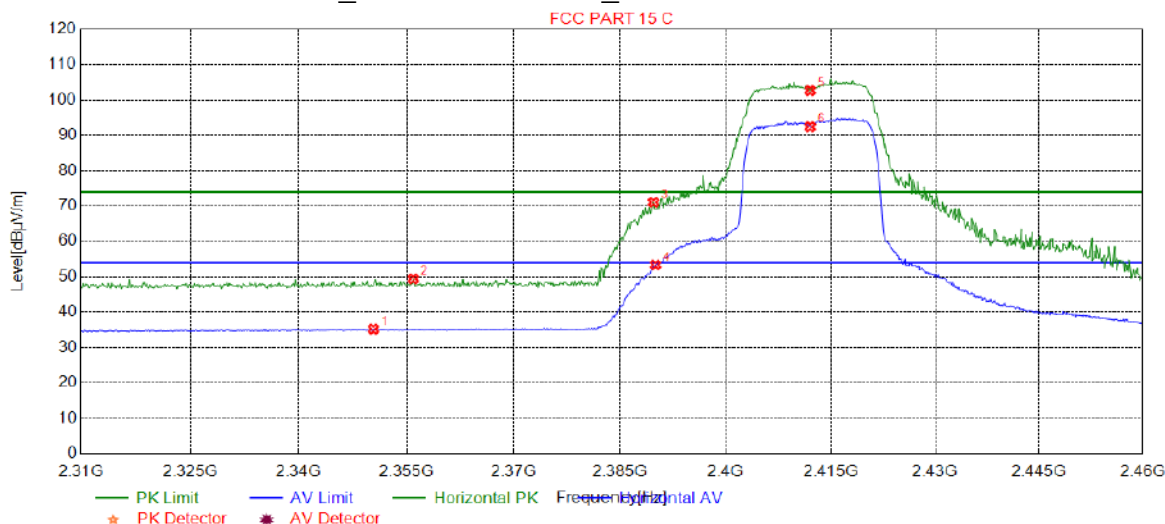
NO.	Freq. [MHz]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2462.0000	91.87	9.43	74.00	-17.87	243	214	Vertical
2	2462.0000	82.20	9.43	54.00	-28.20	192	214	Vertical
3	2483.5000	34.63	9.50	54.00	19.37	268	203	Vertical
4	2484.4422	54.27	9.50	74.00	19.73	232	314	Vertical
5	2491.6958	30.09	9.52	54.00	23.91	193	314	Vertical
6	2498.1491	43.91	9.54	74.00	30.09	237	275	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	2350.3904	35.21	9.07	54.00	18.79	155	41	Horizontal
2	2355.9459	49.44	9.08	74.00	24.56	207	295	Horizontal
3	2389.7297	71.07	9.20	74.00	2.93	148	328	Horizontal
4	2390.0000	53.35	9.20	54.00	0.65	157	295	Horizontal
5	2412.0000	102.67	9.27	74.00	-28.67	170	328	Horizontal
6	2412.0000	92.44	9.27	54.00	-38.44	221	328	Horizontal



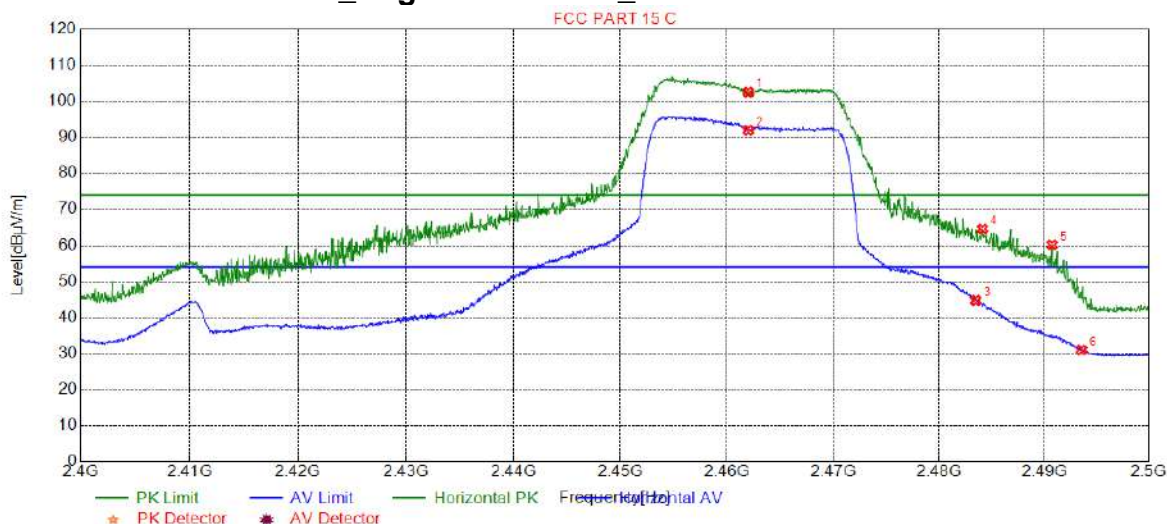
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## 4.10.1.12 802.11N20\_ Highest Channel\_ Horizontal



## 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	163	299	Horizontal
2	2462.0000	91.97	9.43	54.00	-37.97	203	293	Horizontal
3	2483.5000	44.73	9.50	54.00	9.27	119	293	Horizontal
4	2484.1421	64.58	9.50	74.00	9.42	247	293	Horizontal
5	2490.7454	60.16	9.52	74.00	13.84	229	304	Horizontal
6	2493.5468	30.96	9.53	54.00	23.04	156	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.



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## 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 EUT Constructional Details for HR/2019/90003.

The End



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