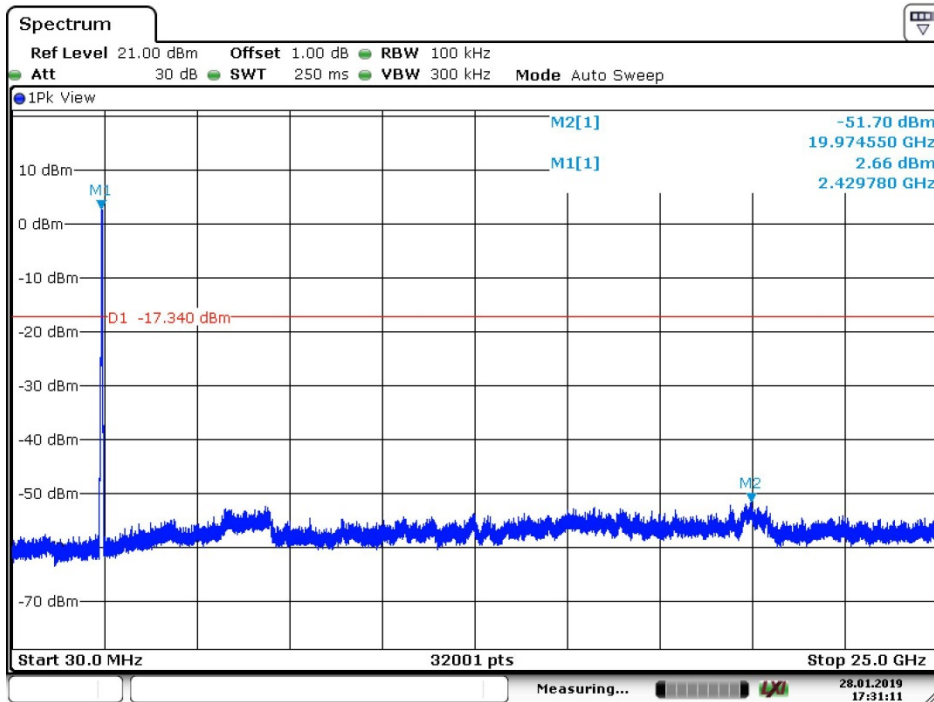
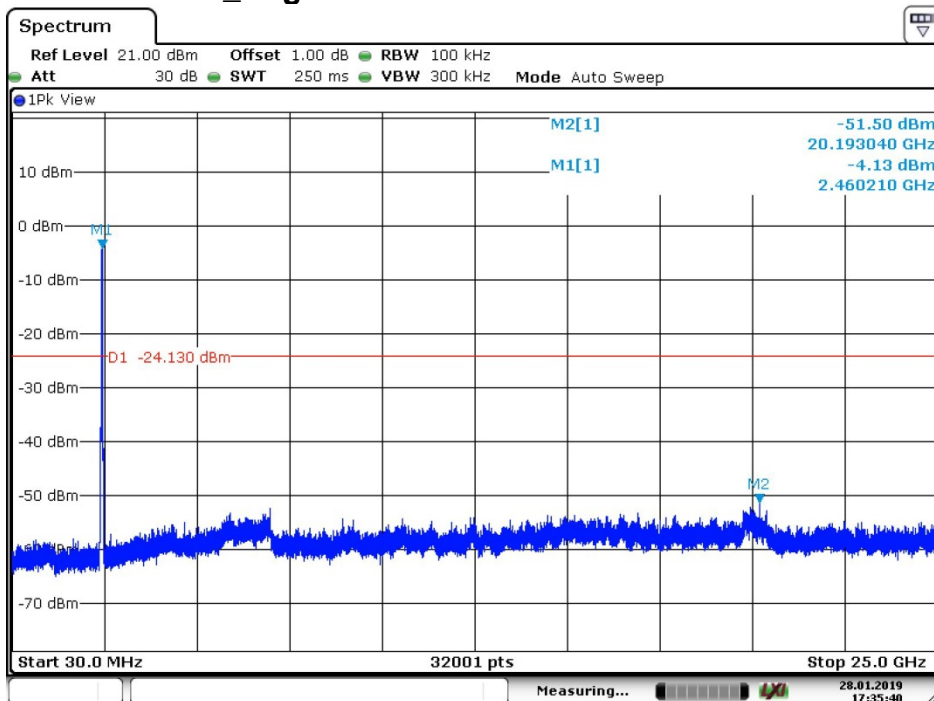


#### 4.8.1.1.11 802.11 N40\_ Middle Channel



Date: 28 JAN 2019 17:31:12

#### 4.8.1.1.12 802.11 N40\_ Highest Channel



Date: 28 JAN 2019 17:35:41



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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.

#### 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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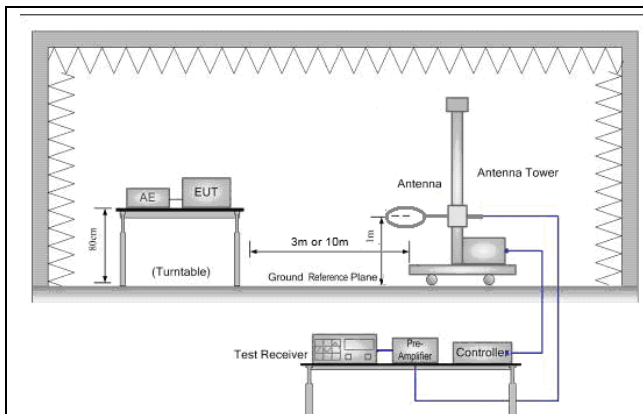


Figure 1. Below 30MHz

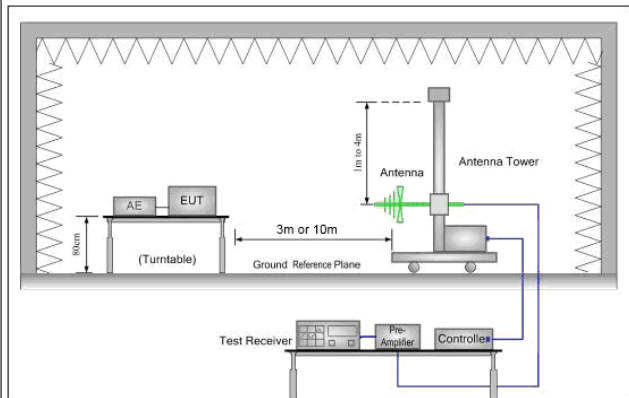


Figure 2. 30MHz to 1GHz

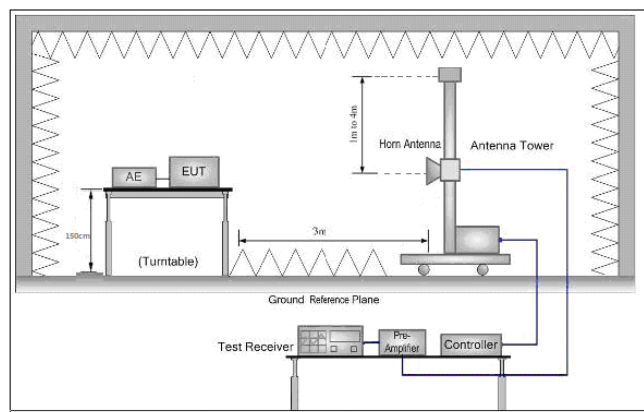


Figure 3. Above 1 GHz

**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

	<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



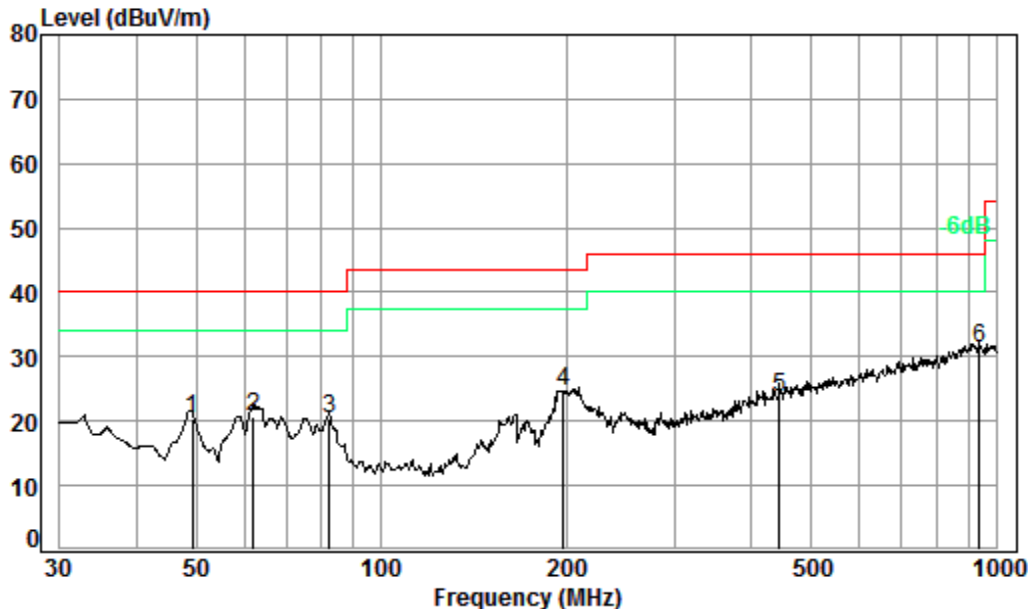
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## 4.9.1 Radiated emission below 1GHz

## 4.9.1.1 Charge + Transmitting, Vertical



Condition: 3m VERTICAL

Job No. : 10012

Test mode: d

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	49.36	0.79	14.39	27.41	32.72	20.49	40.00	-19.51
2	62.00	0.80	13.12	27.39	34.04	20.57	40.00	-19.43
3	82.36	1.10	12.27	27.37	34.28	20.28	40.00	-19.72
4	197.89	1.40	16.44	26.91	33.85	24.78	43.50	-18.72
5	444.85	2.39	23.45	27.38	25.27	23.73	46.00	-22.27
6 pp	938.83	3.64	30.00	26.84	24.46	31.26	46.00	-14.74



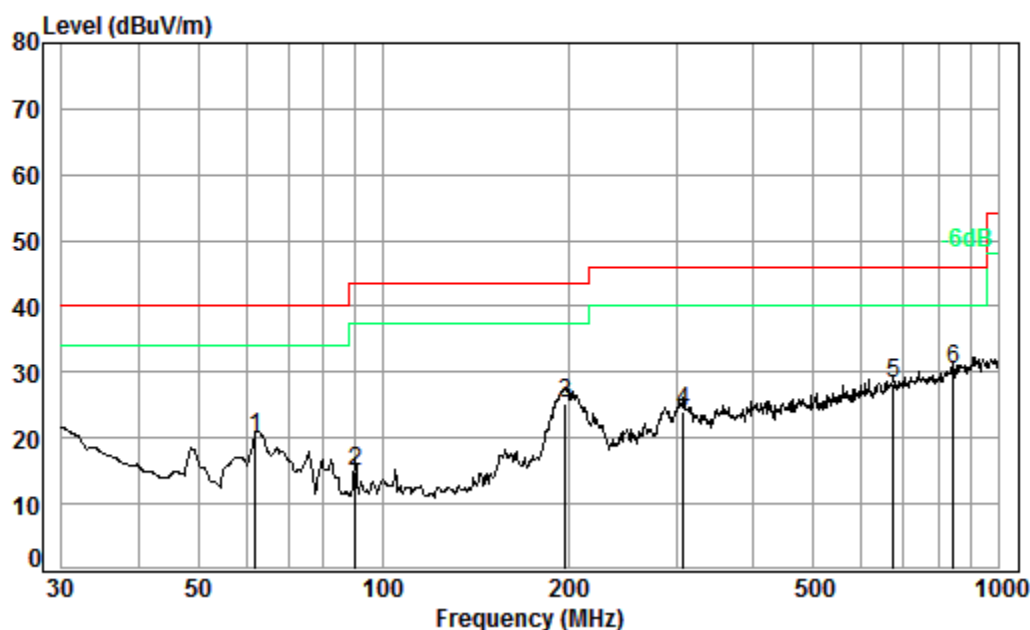
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## 4.9.1.2 Charge + Transmitting, Horizontal



Condition: 3m HORIZONTAL

Job No. : 10012

Test mode: d

	Cable	Ant	Preamp	Read		Limit	Over
Freq	Loss	Factor	Factor	Level	Level	Line	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	62.00	0.80	13.12	27.39	33.42	19.95	40.00 -20.05
2	90.22	1.10	13.12	27.36	28.05	14.91	43.50 -28.59
3	197.89	1.40	16.44	26.91	34.45	25.38	43.50 -18.12
4	307.83	1.93	19.85	26.69	28.93	24.02	46.00 -21.98
5	675.21	2.85	27.60	27.82	25.73	28.36	46.00 -17.64
6 pp	845.09	3.39	29.11	27.37	25.27	30.40	46.00 -15.60



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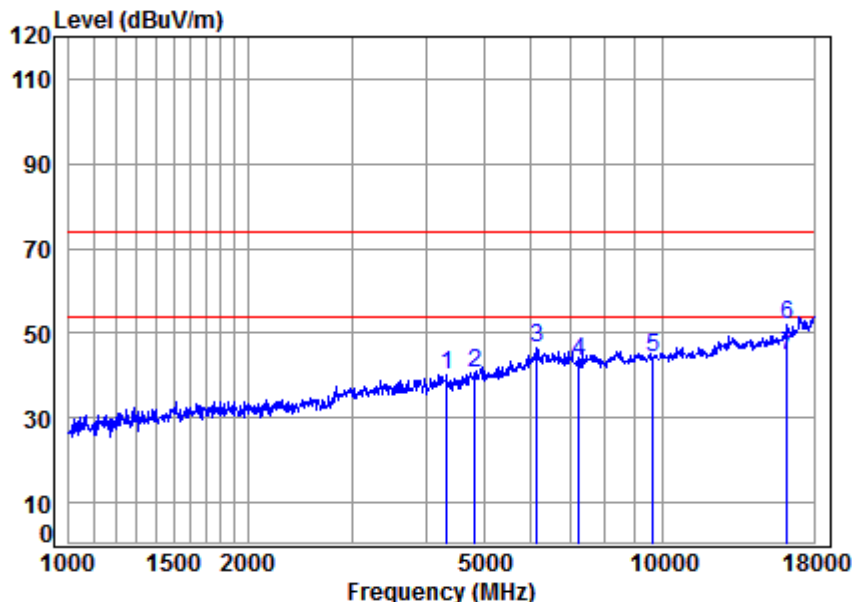
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## 4.9.2 Transmitter emission above 1GHz

## 4.9.2.1 ANT1

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



Site : chamber  
Condition: 3m VERTICAL  
Job No : 10012  
Mode : 2412 TX RSE  
Note : 2.4G WIFI 11B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4341.886	7.38	33.33	43.14	42.68	40.25	74.00	-33.75	peak
2	4824.000	7.91	34.00	43.63	42.37	40.65	74.00	-33.35	peak
3	6142.019	10.85	35.25	42.71	42.97	46.36	74.00	-27.64	peak
4	7236.000	10.07	36.09	41.83	39.11	43.44	74.00	-30.56	peak
5	9648.000	10.77	37.69	38.36	34.26	44.36	74.00	-29.64	peak
6	16221.190	14.77	41.54	40.49	36.39	52.21	74.00	-21.79	Peak
7	16221.190	14.77	41.54	40.49	28.78	44.60	54.00	-9.40	Average



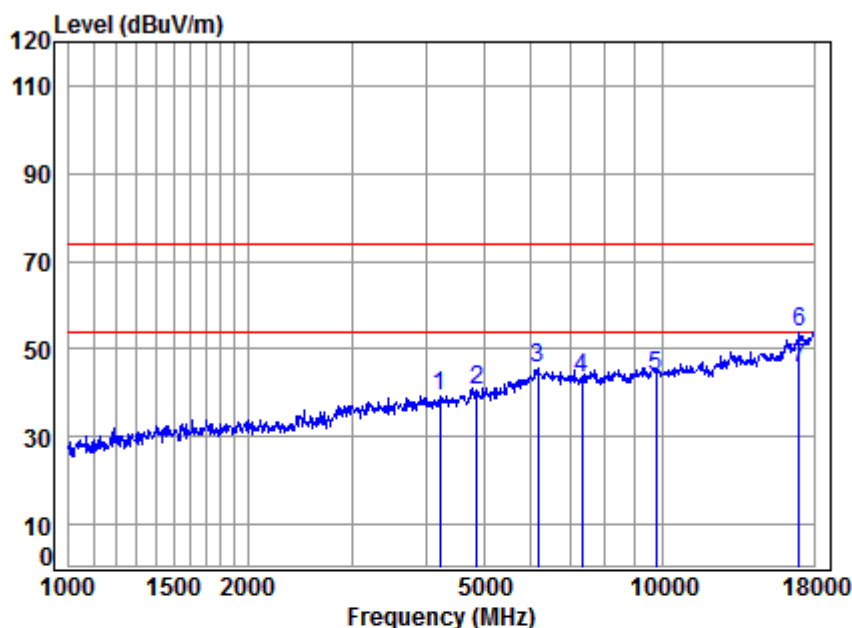
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## 4.9.2.1.2 802.11B\_ Middle Channel\_ Peak\_ Vertical



Site : chamber  
 Condition: 3m VERTICAL  
 Job No : 10012  
 Mode : 2437 TX RSE  
 Note : 2.4G WIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4218.186	7.24	33.11	43.00	42.10	39.45	74.00	-34.55 peak
2	4874.000	7.96	34.05	43.68	42.24	40.57	74.00	-33.43 peak
3	6159.797	10.89	35.26	42.69	42.05	45.51	74.00	-28.49 peak
4	7311.000	10.05	36.15	41.78	38.79	43.21	74.00	-30.79 peak
5	9748.000	10.82	37.75	38.20	33.60	43.97	74.00	-30.03 peak
6	17038.150	16.62	42.62	40.35	35.04	53.93	74.00	-20.07 Peak
7	17038.150	16.62	42.62	40.35	26.79	45.68	54.00	-8.32 Average



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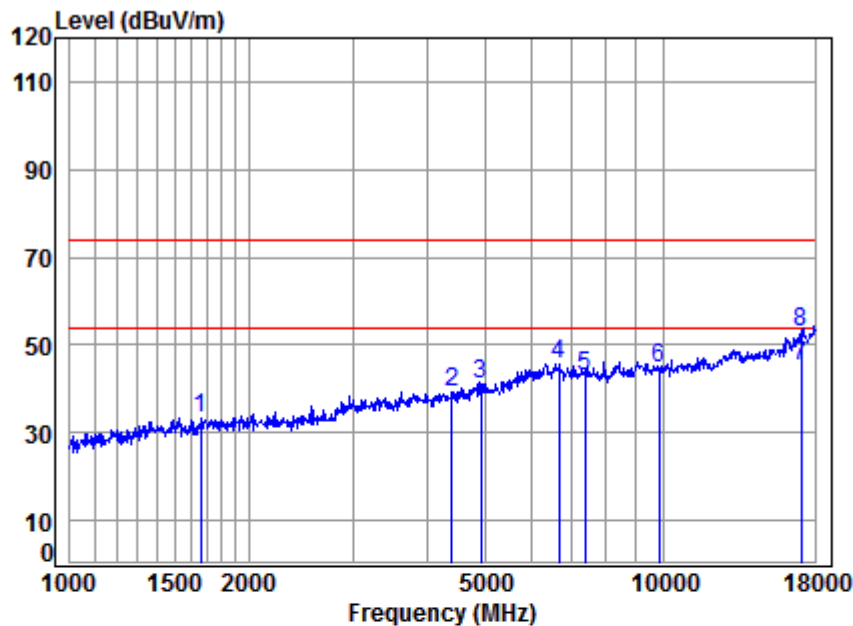
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## 4.9.2.1.3 802.11B\_ Highest Channel\_ Peak\_ Vertical



Site : chamber  
Condition: 3m VERTICAL  
Job No : 10012  
Mode : 2462 TX RSE  
Note : 2.4G WIFI 11B

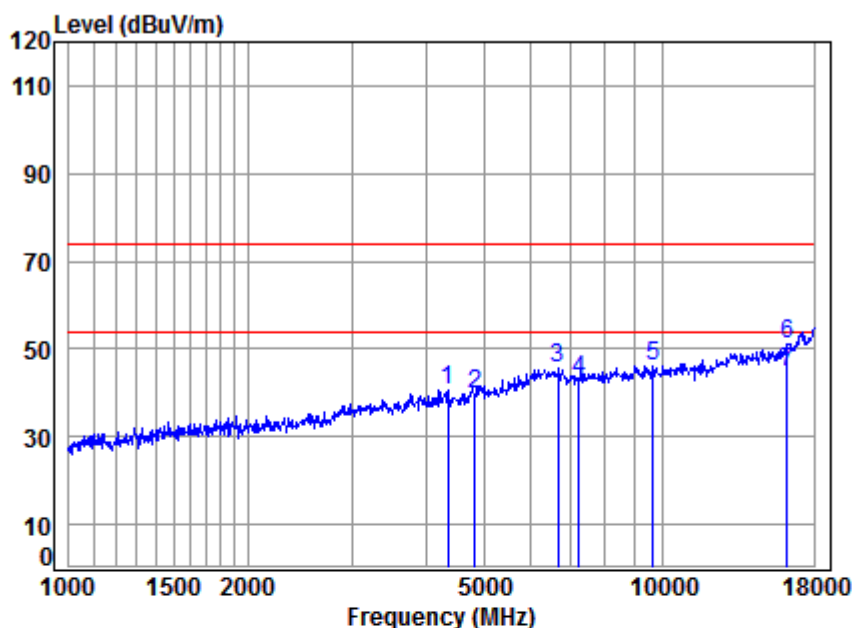
	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1663.137	5.27	26.52	40.81	42.41	33.39	74.00	-40.61 peak
2	4405.090	7.46	33.44	43.20	41.70	39.40	74.00	-34.60 peak
3	4924.000	8.01	34.11	43.73	42.51	40.90	74.00	-33.10 peak
4	6659.763	11.08	35.70	42.28	41.17	45.67	74.00	-28.33 peak
5	7386.000	10.03	36.21	41.72	38.21	42.73	74.00	-31.27 peak
6	9848.000	10.87	37.81	38.04	34.04	44.68	74.00	-29.32 peak
7	17087.460	16.51	42.65	40.34	26.12	44.94	54.00	-9.06 Average
8	17087.460	16.51	42.65	40.34	33.98	52.80	74.00	-21.20 Peak



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## 4.9.2.1.4 802.11B\_Lowest Channel\_ Peak\_ Horizontal



Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 10012  
Mode : 2412 TX RSE  
Note : 2.4G WIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4354.454	7.40	33.35	43.15	43.21	40.81	74.00	-33.19 peak
2	4824.000	7.91	34.00	43.63	41.30	39.58	74.00	-34.42 peak
3	6679.040	11.02	35.71	42.26	41.01	45.48	74.00	-28.52 peak
4	7236.000	10.07	36.09	41.83	38.78	43.11	74.00	-30.89 peak
5	9648.000	10.77	37.69	38.36	36.17	46.27	74.00	-27.73 peak
6	16221.190	14.77	41.54	40.49	35.43	51.25	74.00	-22.75 Peak
7	16221.190	14.77	41.54	40.49	28.98	44.80	54.00	-9.20 Average



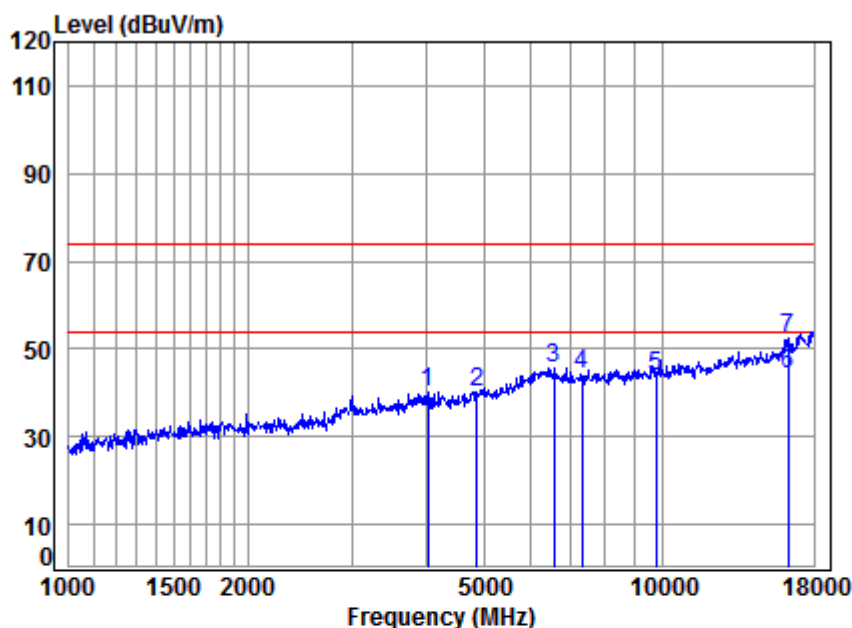
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## 4.9.2.1.5 802.11B\_ Middle Channel\_ Peak\_ Horizontal

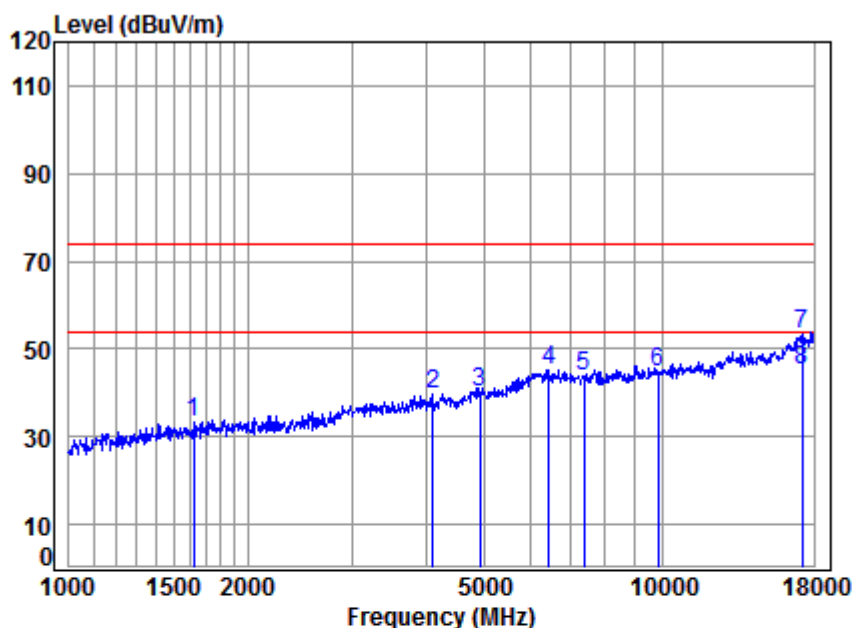


Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2437 TX RSE  
 Note : 2.4G WIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4027.554	7.01	32.75	42.78	43.34	40.32	74.00	-33.68 peak
2	4874.000	7.96	34.05	43.68	41.90	40.23	74.00	-33.77 peak
3	6564.209	11.35	35.64	42.35	41.12	45.76	74.00	-28.24 peak
4	7311.000	10.05	36.15	41.78	39.78	44.20	74.00	-29.80 peak
5	9748.000	10.82	37.75	38.20	33.55	43.92	74.00	-30.08 peak
6	16268.140	14.73	41.65	40.48	28.36	44.26	54.00	-9.74 Average
7	16268.140	14.73	41.65	40.48	36.78	52.68	74.00	-21.32 Peak



## 4.9.2.1.6 802.11B\_ Highest Channel\_ Peak\_ Horizontal



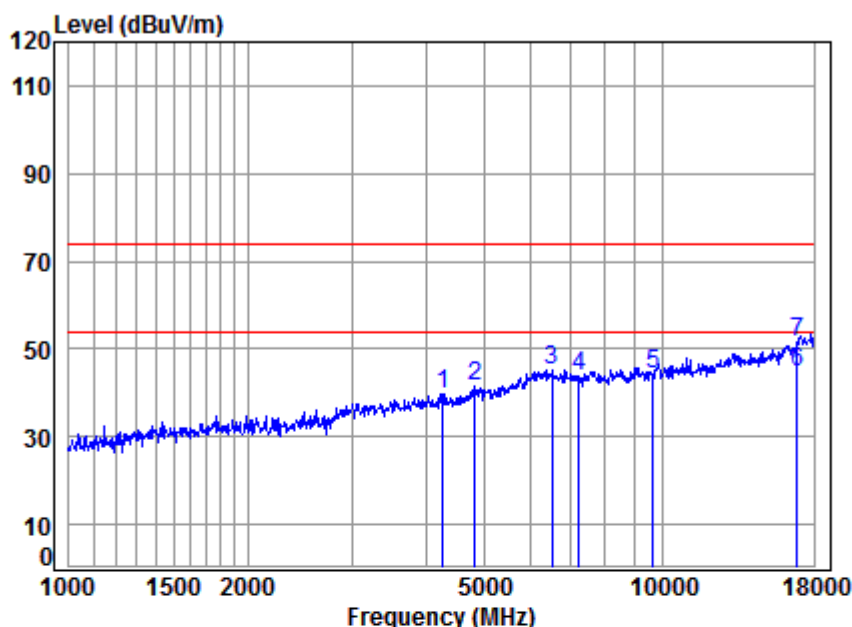
Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2462 TX RSE  
 Note : 2.4G WIFI 11B

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1620.431	5.32	26.34	40.78	42.50	33.38	74.00	-40.62 peak
2	4098.010	7.10	32.88	42.87	42.44	39.55	74.00	-34.45 peak
3	4924.000	8.01	34.11	43.73	41.74	40.13	74.00	-33.87 peak
4	6432.732	11.41	35.54	42.46	40.76	45.25	74.00	-28.75 peak
5	7386.000	10.03	36.21	41.72	39.42	43.94	74.00	-30.06 peak
6	9848.000	10.87	37.81	38.04	33.94	44.58	74.00	-29.42 peak
7	17236.280	16.18	42.74	40.32	34.70	53.30	74.00	-20.70 Peak
8	17236.280	16.18	42.74	40.32	26.46	45.06	54.00	-8.94 Average





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



Site : chamber

Condition: 3m VERTICAL

Job No : 10012

Mode : 2412 TX RSE

Note : 2.4G WIFI 11G

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4267.237	7.30	33.19	43.06	42.47	39.90	74.00	-34.10	peak
2	4824.000	7.91	34.00	43.63	43.07	41.35	74.00	-32.65	peak
3	6526.373	11.46	35.62	42.38	40.53	45.23	74.00	-28.77	peak
4	7236.000	10.07	36.09	41.83	39.30	43.63	74.00	-30.37	peak
5	9648.000	10.77	37.69	38.36	34.29	44.39	74.00	-29.61	peak
6	16891.040	16.23	42.51	40.37	26.33	44.70	54.00	-9.30	Average
7	16891.040	16.23	42.51	40.37	33.03	51.40	74.00	-22.60	Peak



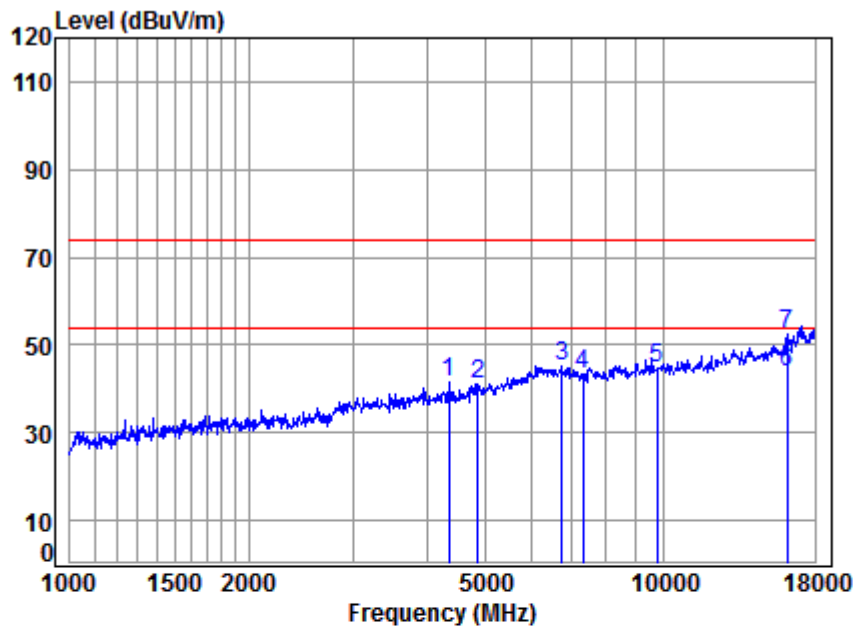
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## 4.9.2.1.8 802.11G\_ Middle Channel\_ Peak\_ Vertical



Site : chamber  
 Condition: 3m VERTICAL  
 Job No : 10012  
 Mode : 2437 TX RSE  
 Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4354.454	7.40	33.35	43.15	43.94	41.54	74.00	-32.46 peak
2	4874.000	7.96	34.05	43.68	42.67	41.00	74.00	-33.00 peak
3	6756.708	10.80	35.76	42.20	40.70	45.06	74.00	-28.94 peak
4	7311.000	10.05	36.15	41.78	39.05	43.47	74.00	-30.53 peak
5	9748.000	10.82	37.75	38.20	34.36	44.73	74.00	-29.27 peak
6	16174.370	14.82	41.42	40.49	27.99	43.74	54.00	-10.26 Average
7	16174.370	14.82	41.42	40.49	36.60	52.35	74.00	-21.65 Peak



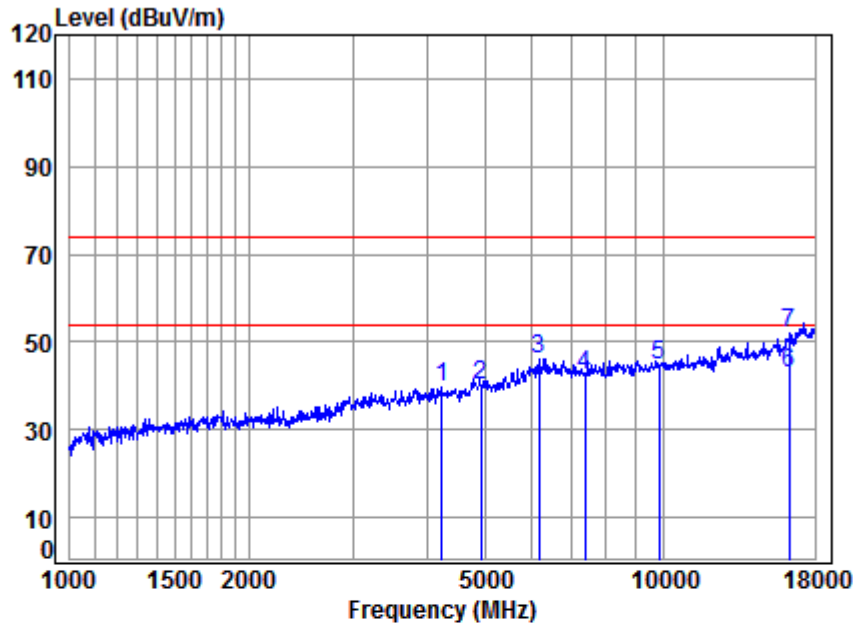
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#### 4.9.2.1.9 802.11G\_ Highest Channel\_ Peak\_ Vertical



Site : chamber

Condition: 3m VERTICAL

Job No : 10012

Mode : 2462 TX RSE

Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4230.396	7.26	33.13	43.01	42.16	39.54	74.00	-34.46 peak
2	4924.000	8.01	34.11	43.73	41.57	39.96	74.00	-34.04 peak
3	6159.797	10.89	35.26	42.69	42.83	46.29	74.00	-27.71 peak
4	7386.000	10.03	36.21	41.72	37.98	42.50	74.00	-31.50 peak
5	9848.000	10.87	37.81	38.04	33.87	44.51	74.00	-29.49 peak
6	16315.230	14.68	41.76	40.47	27.12	43.09	54.00	-10.91 Average
7	16315.230	14.68	41.76	40.47	36.21	52.18	74.00	-21.82 Peak



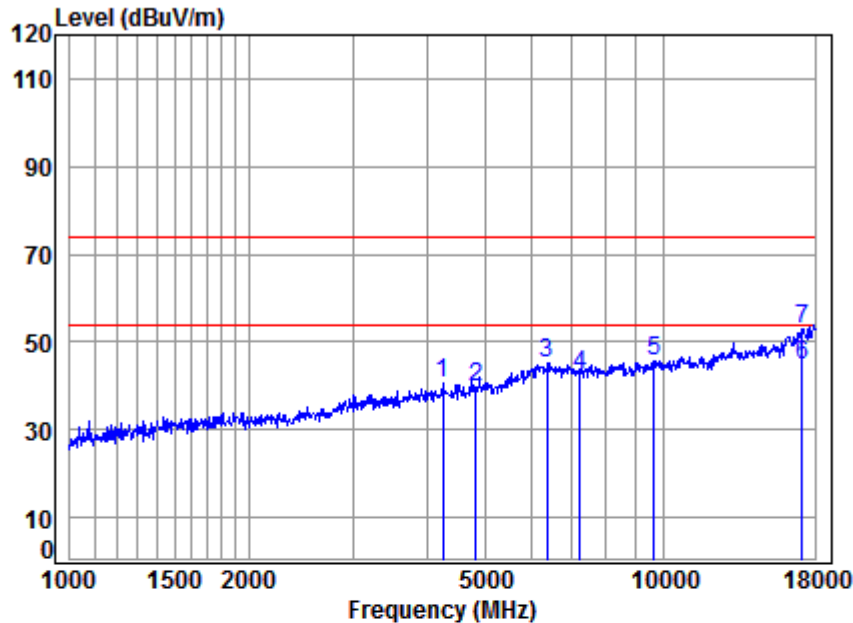
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## 4.9.2.1.10 802.11G\_Lowest Channel\_Peak\_Horizontal



Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 10012  
Mode : 2412 TX RSE  
Note : 2.4G WIFI 11G

		Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4254.921	7.28	33.17	43.04	43.23	40.64	74.00	-33.36 peak
2	4824.000	7.91	34.00	43.63	41.64	39.92	74.00	-34.08 peak
3	6377.195	11.31	35.48	42.51	41.03	45.31	74.00	-28.69 peak
4	7236.000	10.07	36.09	41.83	38.21	42.54	74.00	-31.46 peak
5	9648.000	10.77	37.69	38.36	35.52	45.62	74.00	-28.38 peak
6	17136.920	16.40	42.68	40.33	26.03	44.78	54.00	-9.22 Average
7	17136.920	16.40	42.68	40.33	34.23	52.98	74.00	-21.02 Peak



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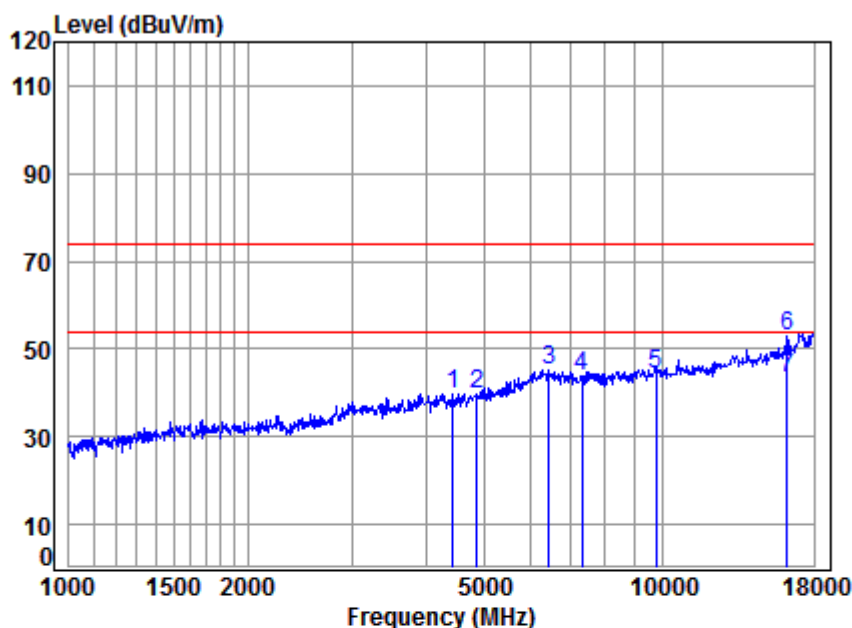
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## 4.9.2.1.11 802.11G\_ Middle Channel\_ Peak\_ Horizontal

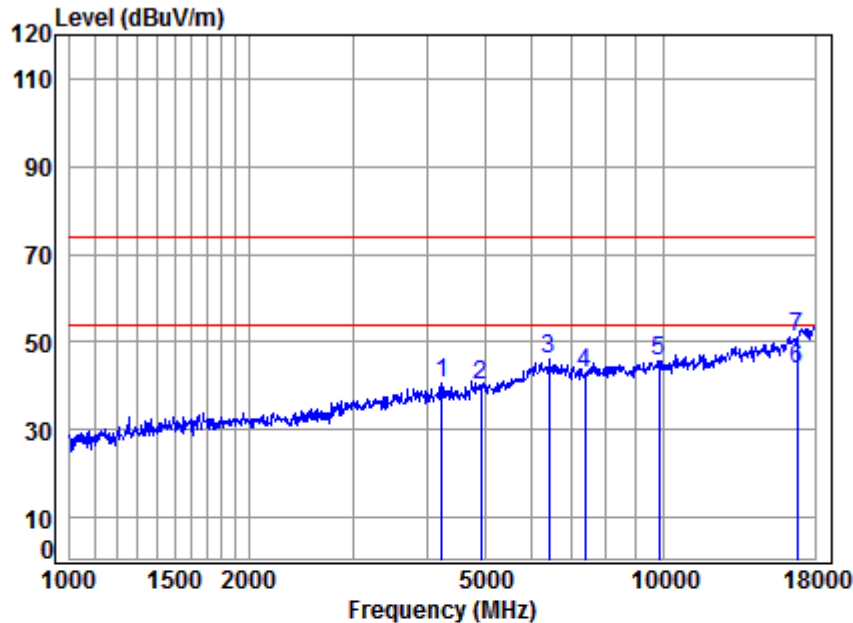


Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2437 TX RSE  
 Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4443.453	7.50	33.50	43.25	42.11	39.86	74.00	-34.14 peak
2	4874.000	7.96	34.05	43.68	41.25	39.58	74.00	-34.42 peak
3	6451.353	11.45	35.55	42.44	40.67	45.23	74.00	-28.77 peak
4	7311.000	10.05	36.15	41.78	39.30	43.72	74.00	-30.28 peak
5	9748.000	10.82	37.75	38.20	33.98	44.35	74.00	-29.65 peak
6	16221.190	14.77	41.54	40.49	37.23	53.05	74.00	-20.95 Peak
7	16221.190	14.77	41.54	40.49	27.52	43.34	54.00	-10.66 Average



**4.9.2.1.12 802.11G\_ Highest Channel\_ Peak\_ Horizontal**



Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 10012  
Mode : 2462 TX RSE  
Note : 2.4G WIFI 11G

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4230.396	7.26	33.13	43.01	43.04	40.42	74.00	-33.58 peak
2	4924.000	8.01	34.11	43.73	41.68	40.07	74.00	-33.93 peak
3	6414.167	11.38	35.52	42.48	41.50	45.92	74.00	-28.08 peak
4	7386.000	10.03	36.21	41.72	38.31	42.83	74.00	-31.17 peak
5	9848.000	10.87	37.81	38.04	35.15	45.79	74.00	-28.21 peak
6	16793.680	15.81	42.44	40.39	26.11	43.97	54.00	-10.03 Average
7	16793.680	15.81	42.44	40.39	33.25	51.11	74.00	-22.89 Peak

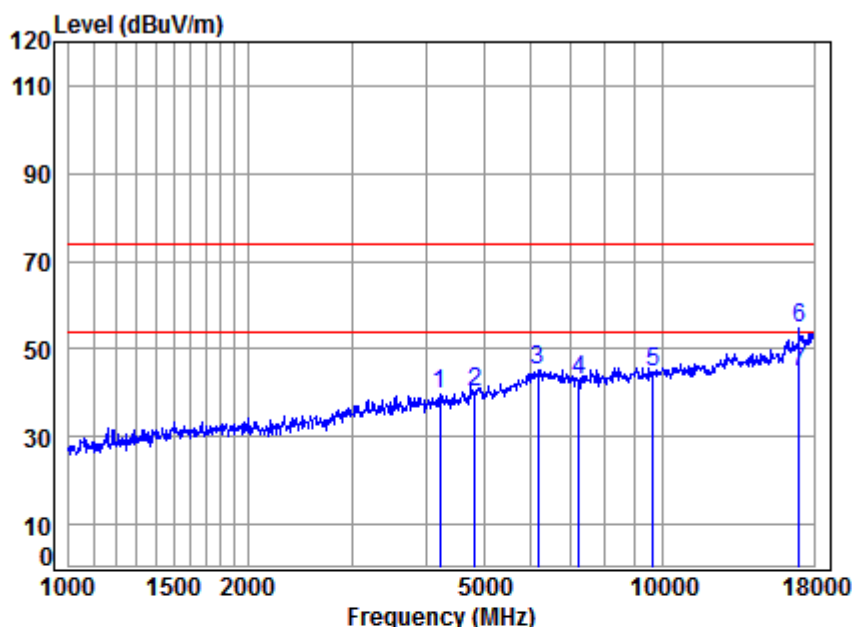


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## 4.9.2.1.13 802.11N20\_Lowest Channel\_ Peak\_ Vertical



Site : chamber  
 Condition: 3m VERTICAL  
 Job No : 10012  
 Mode : 2412 TX RSE  
 Note : 2.4G WIFI 11N 20

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	4218.186	7.24	33.11	43.00	42.56	39.91	74.00	-34.09 peak
2	4824.000	7.91	34.00	43.63	41.87	40.15	74.00	-33.85 peak
3	6177.627	10.92	35.28	42.68	41.76	45.28	74.00	-28.72 peak
4	7236.000	10.07	36.09	41.83	38.76	43.09	74.00	-30.91 peak
5	9648.000	10.77	37.69	38.36	34.55	44.65	74.00	-29.35 peak
6	17038.150	16.62	42.62	40.35	35.66	54.55	74.00	-19.45 Peak
7	17038.150	16.62	42.62	40.35	26.03	44.92	54.00	-9.08 Average



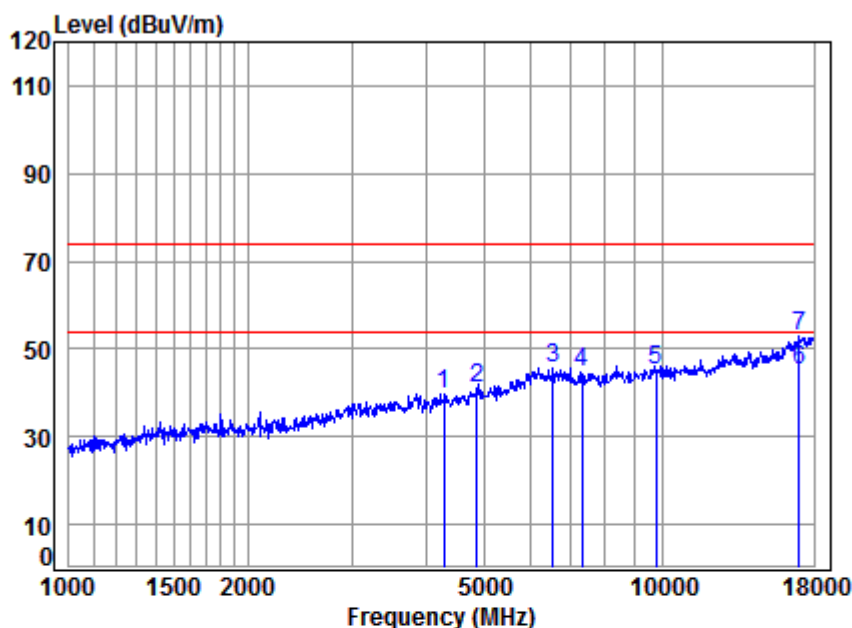
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## 4.9.2.1.14 802.11N20\_Middle Channel\_Peak\_Vertical



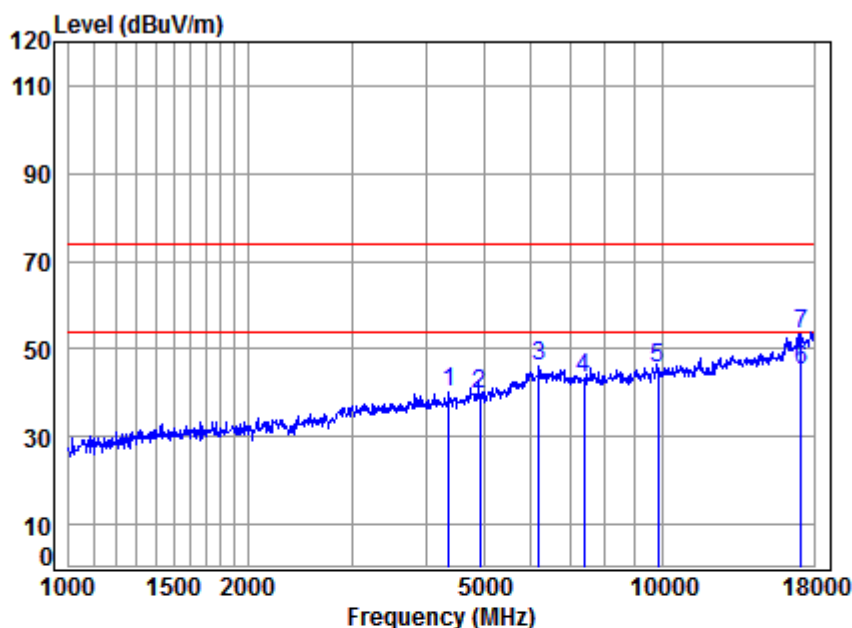
Site : chamber  
 Condition: 3m VERTICAL  
 Job No : 10012  
 Mode : 2437 TX RSE  
 Note : 2.4G WIFI 11N 20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4291.977	7.33	33.24	43.08	42.33	39.82	74.00	-34.18 peak
2	4874.000	7.96	34.05	43.68	42.77	41.10	74.00	-32.90 peak
3	6545.263	11.41	35.63	42.37	40.83	45.50	74.00	-28.50 peak
4	7311.000	10.05	36.15	41.78	40.10	44.52	74.00	-29.48 peak
5	9748.000	10.82	37.75	38.20	35.00	45.37	74.00	-28.63 peak
6	16988.970	16.66	42.59	40.36	26.19	45.08	54.00	-8.92 Average
7	16988.970	16.66	42.59	40.36	34.06	52.95	74.00	-21.05 Peak





## 4.9.2.1.15 802.11N20\_ Highest Channel\_ Peak\_ Vertical



Site : chamber  
 Condition: 3m VERTICAL  
 Job No : 10012  
 Mode : 2462 TX RSE  
 Note : 2.4G WIFI 11N 20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4367.058	7.41	33.37	43.16	42.38	40.00	74.00	-34.00 peak
2	4924.000	8.01	34.11	43.73	41.35	39.74	74.00	-34.26 peak
3	6195.508	10.96	35.30	42.66	42.40	46.00	74.00	-28.00 peak
4	7386.000	10.03	36.21	41.72	38.82	43.34	74.00	-30.66 peak
5	9848.000	10.87	37.81	38.04	34.92	45.56	74.00	-28.44 peak
6	17136.920	16.40	42.68	40.33	26.41	45.16	54.00	-8.84 Average
7	17136.920	16.40	42.68	40.33	34.48	53.23	74.00	-20.77 Peak



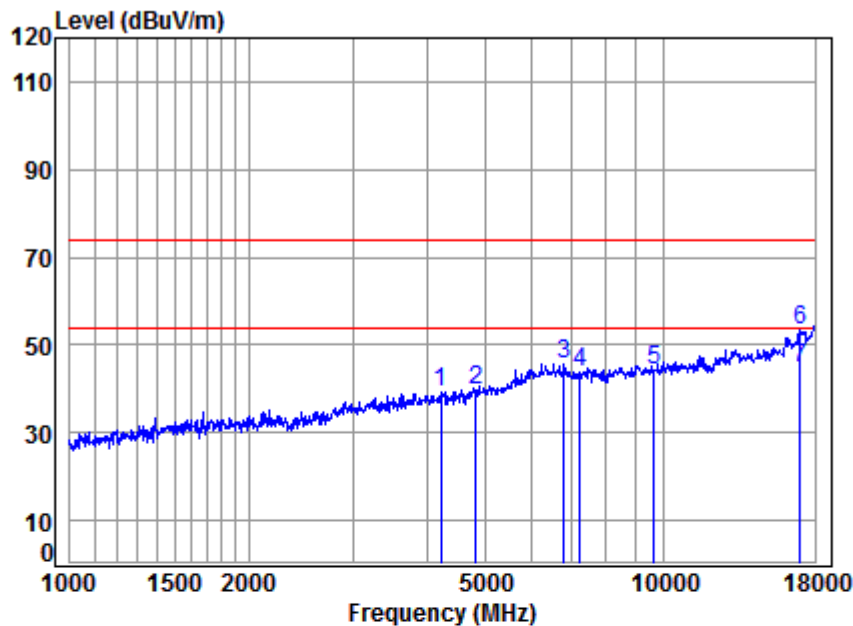
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## 4.9.2.1.16 802.11N20\_Lowest Channel\_ Peak\_ Horizontal

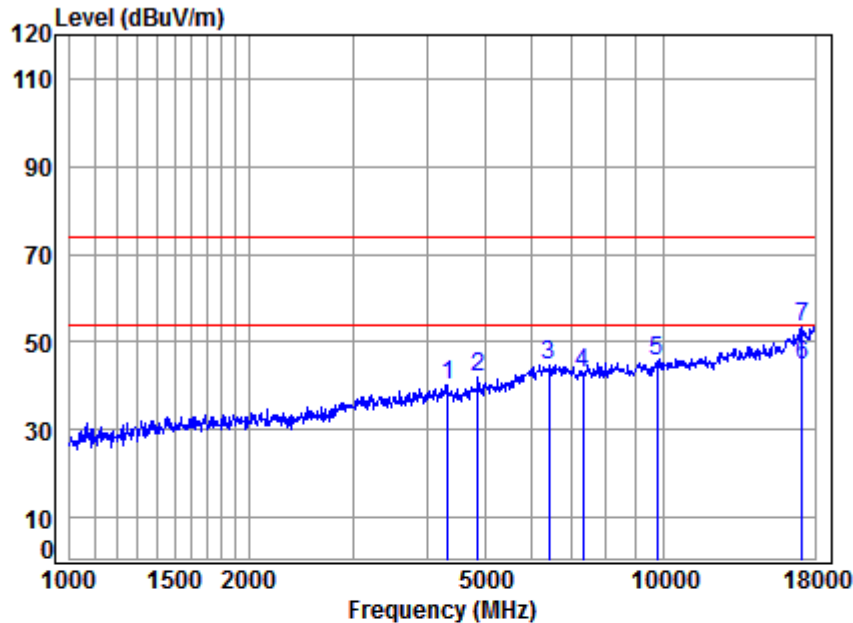


Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2412 TX RSE  
 Note : 2.4G WIFI 11N 20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4218.186	7.24	33.11	43.00	41.97	39.32	74.00	-34.68 peak
2	4824.000	7.91	34.00	43.63	41.41	39.69	74.00	-34.31 peak
3	6795.879	10.69	35.78	42.17	41.50	45.80	74.00	-28.20 peak
4	7236.000	10.07	36.09	41.83	39.50	43.83	74.00	-30.17 peak
5	9648.000	10.77	37.69	38.36	34.34	44.44	74.00	-29.56 peak
6	17038.150	16.62	42.62	40.35	34.72	53.61	74.00	-20.39 Peak
7	17038.150	16.62	42.62	40.35	25.79	44.68	54.00	-9.32 Average



## 4.9.2.1.17 802.11N20\_Middle Channel\_Peak\_Horizontal



Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2437 TX RSE  
 Note : 2.4G WIFI 11N 20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4329.354	7.37	33.30	43.12	42.44	39.99	74.00	-34.01 peak
2	4874.000	7.96	34.05	43.68	43.56	41.89	74.00	-32.11 peak
3	6414.167	11.38	35.52	42.48	40.39	44.81	74.00	-29.19 peak
4	7311.000	10.05	36.15	41.78	38.49	42.91	74.00	-31.09 peak
5	9748.000	10.82	37.75	38.20	35.12	45.49	74.00	-28.51 peak
6	17136.920	16.40	42.68	40.33	26.12	44.87	54.00	-9.13 Average
7	17136.920	16.40	42.68	40.33	34.47	53.22	74.00	-20.78 Peak



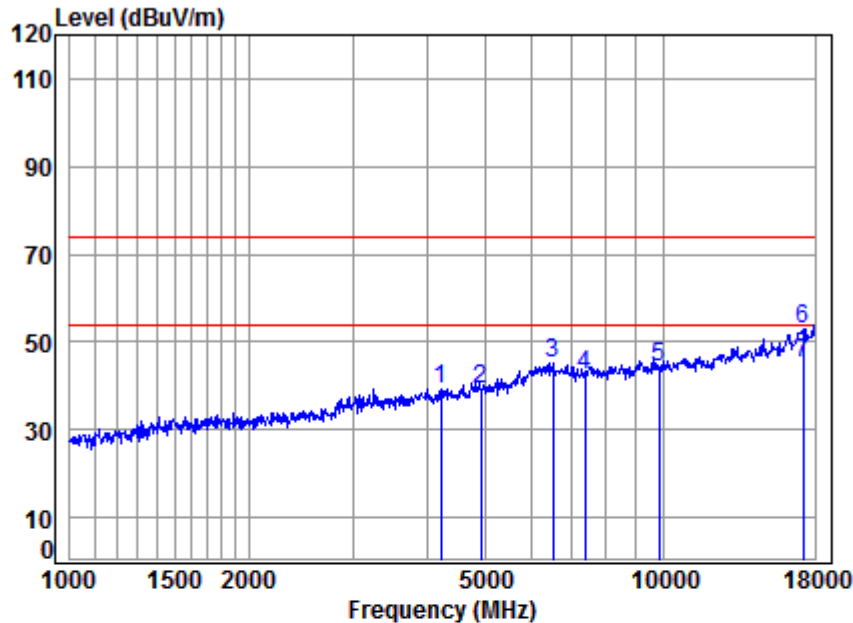
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**4.9.2.1.18 802.11N20\_ Highest Channel\_ Peak\_ Horizontal**



Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 10012  
Mode : 2462 TX RSE  
Note : 2.4G WIFI 11N 20

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4218.186	7.24	33.11	43.00	42.01	39.36	74.00	-34.64 peak
2	4924.000	8.01	34.11	43.73	40.88	39.27	74.00	-34.73 peak
3	6507.536	11.52	35.60	42.40	40.38	45.10	74.00	-28.90 peak
4	7386.000	10.03	36.21	41.72	37.93	42.45	74.00	-31.55 peak
5	9848.000	10.87	37.81	38.04	33.82	44.46	74.00	-29.54 peak
6	17186.530	16.29	42.71	40.33	34.47	53.14	74.00	-20.86 Peak
7	17186.530	16.29	42.71	40.33	26.33	45.00	54.00	-9.00 Average



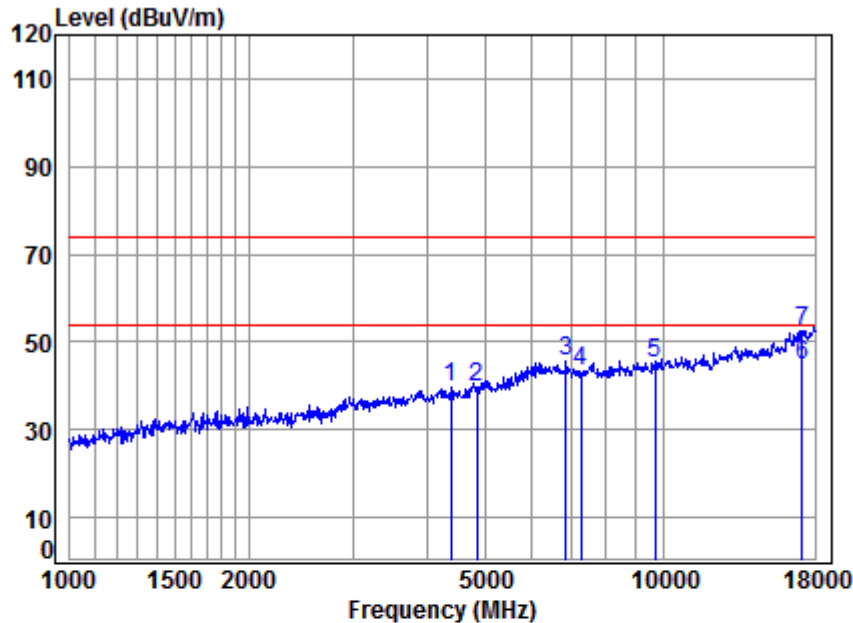
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4.9.2.1.19 802.11N40\_Lowest Channel\_ Peak\_ Vertical



Site : chamber  
Condition: 3m VERTICAL  
Job No : 10012  
Mode : 2422 TX RSE  
Note : 2.4G WIFI 11N 40

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4392.376	7.44	33.42	43.19	42.03	39.70	74.00	-34.30 peak
2	4844.000	7.93	34.02	43.65	41.56	39.86	74.00	-34.14 peak
3	6855.063	10.53	35.82	42.12	41.19	45.42	74.00	-28.58 peak
4	7266.000	10.06	36.12	41.81	38.93	43.30	74.00	-30.70 peak
5	9688.000	10.79	37.71	38.30	34.82	45.02	74.00	-28.98 peak
6	17136.920	16.40	42.68	40.33	26.03	44.78	54.00	-9.22 Average
7	17136.920	16.40	42.68	40.33	33.90	52.65	74.00	-21.35 Peak

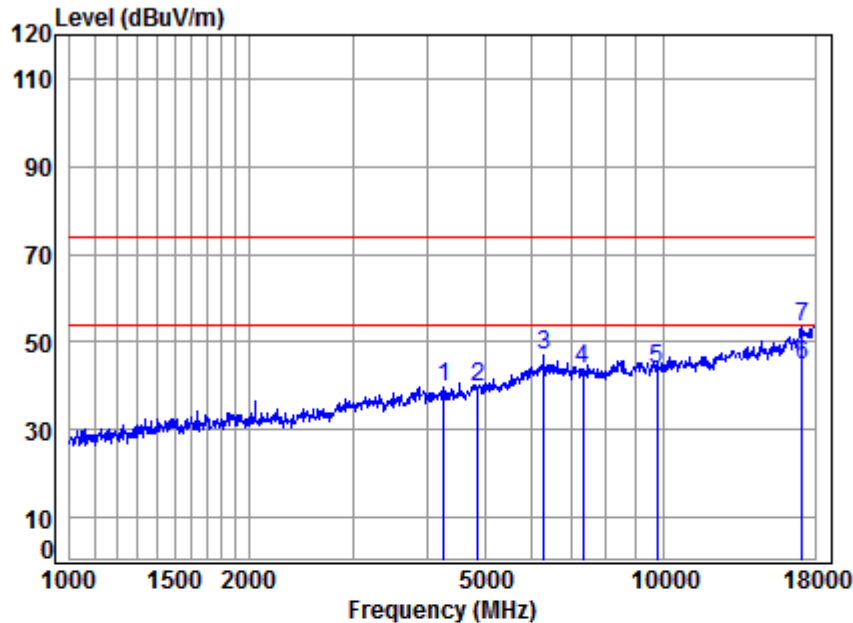


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**4.9.2.1.20 802.11N40\_Middle Channel\_Peak\_Vertical**

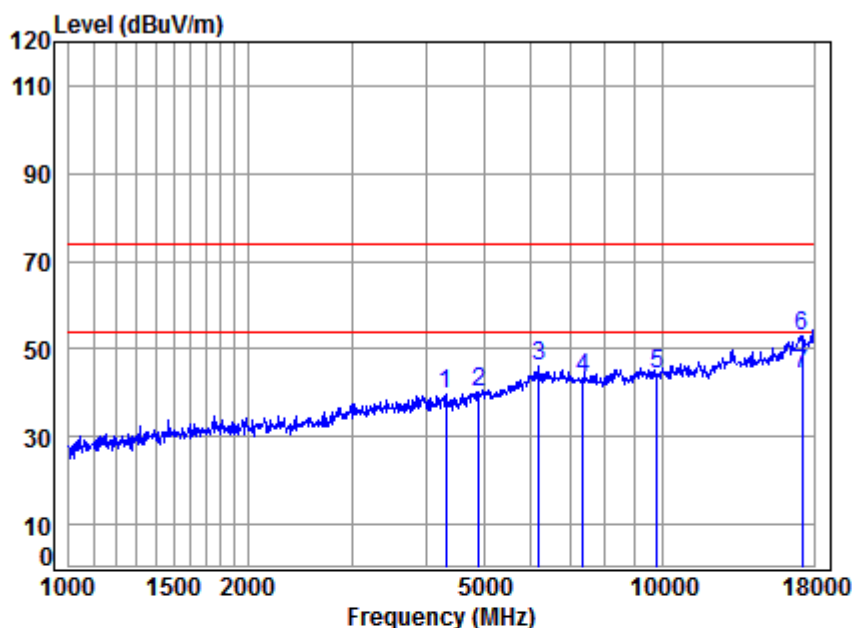


Site : chamber  
Condition: 3m VERTICAL  
Job No : 10012  
Mode : 2437 TX RSE  
Note : 2.4G WIFI 11N 40

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4267.237	7.30	33.19	43.06	42.42	39.85	74.00	-34.15 peak
2	4874.000	7.96	34.05	43.68	41.42	39.75	74.00	-34.25 peak
3	6303.890	11.17	35.41	42.57	42.90	46.91	74.00	-27.09 peak
4	7311.000	10.05	36.15	41.78	39.49	43.91	74.00	-30.09 peak
5	9748.000	10.82	37.75	38.20	33.42	43.79	74.00	-30.21 peak
6	17136.920	16.40	42.68	40.33	26.08	44.83	54.00	-9.17 Average
7	17136.920	16.40	42.68	40.33	34.48	53.23	74.00	-20.77 Peak



## 4.9.2.1.21 802.11N40\_ Highest Channel\_ Peak\_ Vertical



Site : chamber  
 Condition: 3m VERTICAL  
 Job No : 10012  
 Mode : 2452 TX RSE  
 Note : 2.4G WIFI 11N 40

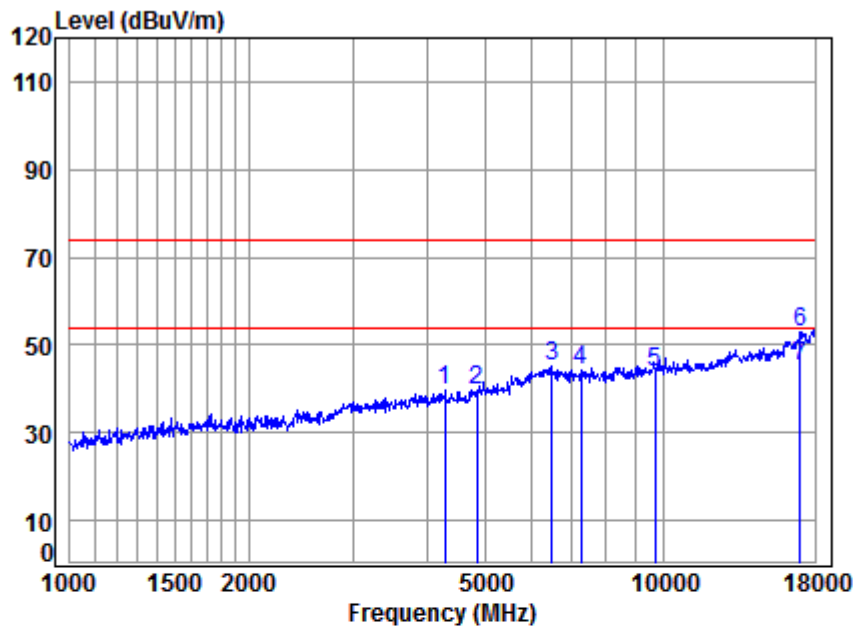
	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4316.859	7.36	33.28	43.11	41.94	39.47	74.00	-34.53 peak
2	4904.000	7.99	34.09	43.71	41.65	40.02	74.00	-33.98 peak
3	6195.508	10.96	35.30	42.66	42.26	45.86	74.00	-28.14 peak
4	7356.000	10.04	36.19	41.75	39.01	43.49	74.00	-30.51 peak
5	9808.000	10.85	37.79	38.10	33.82	44.36	74.00	-29.64 peak
6	17236.280	16.18	42.74	40.32	34.54	53.14	74.00	-20.86 Peak
7	17236.280	16.18	42.74	40.32	25.81	44.41	54.00	-9.59 Average



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## 4.9.2.1.22 802.11N40\_Lowest Channel\_Peak\_Horizontal



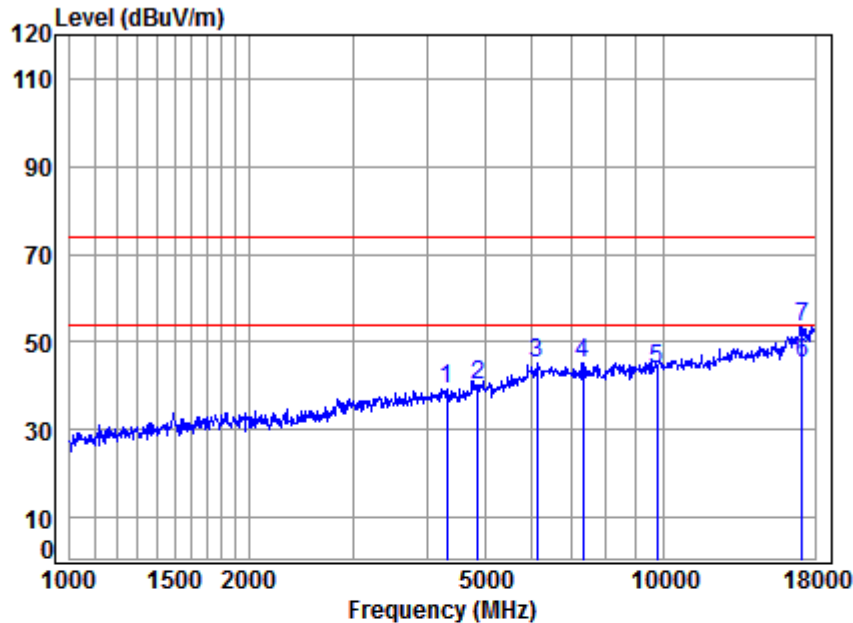
Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2422 TX RSE  
 Note : 2.4G WIFI 11N 40

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4291.977	7.33	33.24	43.08	42.15	39.64	74.00	-34.36 peak
2	4844.000	7.93	34.02	43.65	41.36	39.66	74.00	-34.34 peak
3	6488.754	11.52	35.59	42.41	40.49	45.19	74.00	-28.81 peak
4	7266.000	10.06	36.12	41.81	39.86	44.23	74.00	-29.77 peak
5	9688.000	10.79	37.71	38.30	33.75	43.95	74.00	-30.05 peak
6	17038.150	16.62	42.62	40.35	34.04	52.93	74.00	-21.07 Peak
7	17038.150	16.62	42.62	40.35	26.09	44.98	54.00	-9.02 Average





**4.9.2.1.23 802.11N40\_ Middle Channel\_ Peak\_ Horizontal**



Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2437 TX RSE  
 Note : 2.4G WIFI 11N 40

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	4316.859	7.36	33.28	43.11	41.75	39.28	74.00	-34.72 peak
2	4874.000	7.96	34.05	43.68	41.70	40.03	74.00	-33.97 peak
3	6124.292	10.82	35.23	42.72	41.69	45.02	74.00	-28.98 peak
4	7311.000	10.05	36.15	41.78	40.74	45.16	74.00	-28.84 peak
5	9748.000	10.82	37.75	38.20	33.23	43.60	74.00	-30.40 peak
6	17136.920	16.40	42.68	40.33	26.45	45.20	54.00	-8.80 Average
7	17136.920	16.40	42.68	40.33	34.79	53.54	74.00	-20.46 Peak

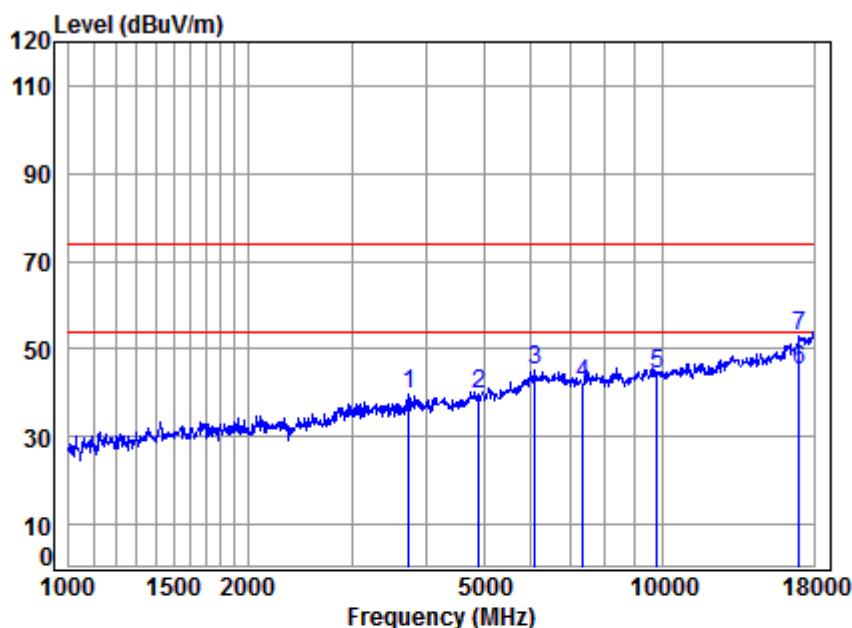


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## 4.9.2.1.24 802.11N40\_ Highest Channel\_ Peak\_ Horizontal



Site : chamber

Condition: 3m HORIZONTAL

Job No : 10012

Mode : 2452 TX RSE

Note : 2.4G WIFI 11N 40

	Cable	Ant	Preamp	Read	Limit	Over		
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	3746.792	6.73	32.21	42.44	43.12	39.62	74.00	-34.38 peak
2	4904.000	7.99	34.09	43.71	41.37	39.74	74.00	-34.26 peak
3	6088.991	10.75	35.19	42.75	41.87	45.06	74.00	-28.94 peak
4	7356.000	10.04	36.19	41.75	37.60	42.08	74.00	-31.92 peak
5	9808.000	10.85	37.79	38.10	33.57	44.11	74.00	-29.89 peak
6	16988.970	16.66	42.59	40.36	26.07	44.96	54.00	-9.04 Average
7	16988.970	16.66	42.59	40.36	33.88	52.77	74.00	-21.23 Peak



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## Remark:

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

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

- 2) Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz and 18GHz to 25GHz was very low, and the above harmonics were the highest point could be found when testing, The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.
- 4) All Modes have been tested, but only the worst case data displayed in this report.



## 4.10 Restricted bands around fundamental frequency

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

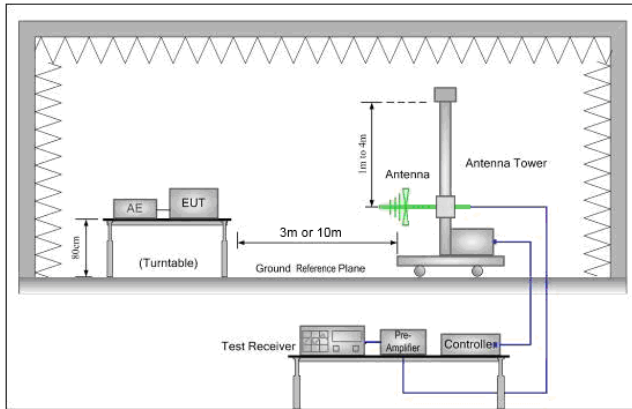


Figure 1. 30MHz to 1GHz

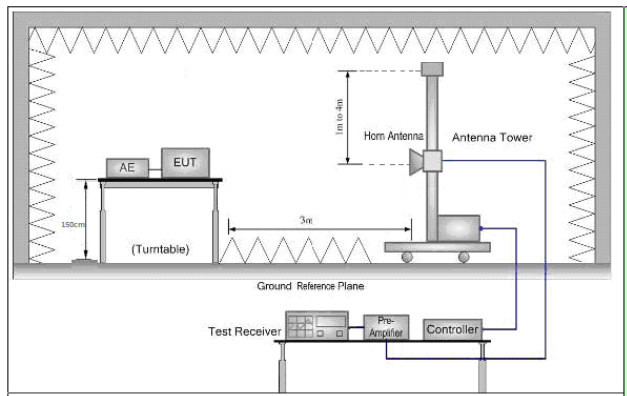


Figure 2. Above 1 GHz



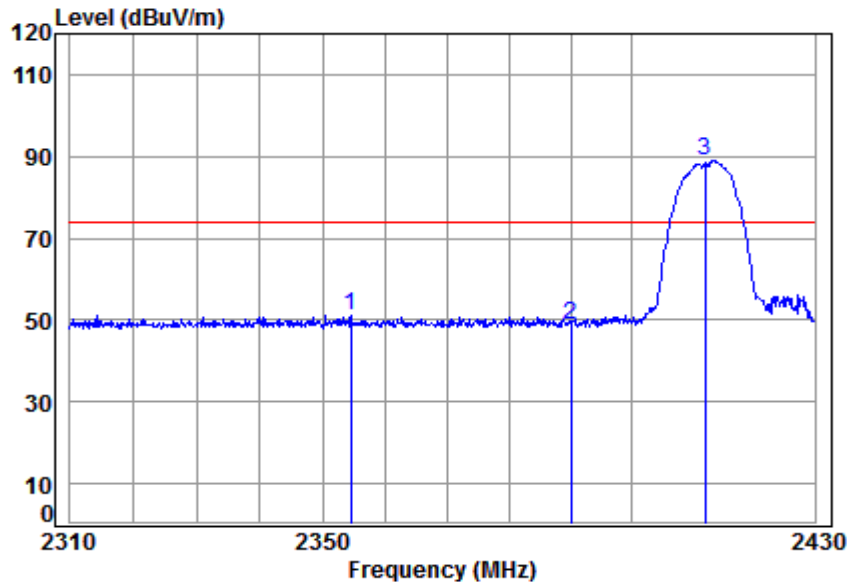
Test Procedure:	<ul style="list-style-type: none"> <li>a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>b. For above 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:	<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\_Peak\_Vertical



Site : chamber  
Condition: 3m VERTICAL  
Job No : 10012  
Mode : 2412 Band edge  
Note : 2.4GWIFI 11B  
: Power setting 18

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2354.528	5.43	28.46	41.16	58.41	51.14	74.00	-22.86	Peak
2	2390.000	5.47	28.52	41.17	56.07	48.89	74.00	-25.11	Peak
3 *	2412.000	5.50	28.56	41.18	96.03	88.91	74.00	14.91	Peak



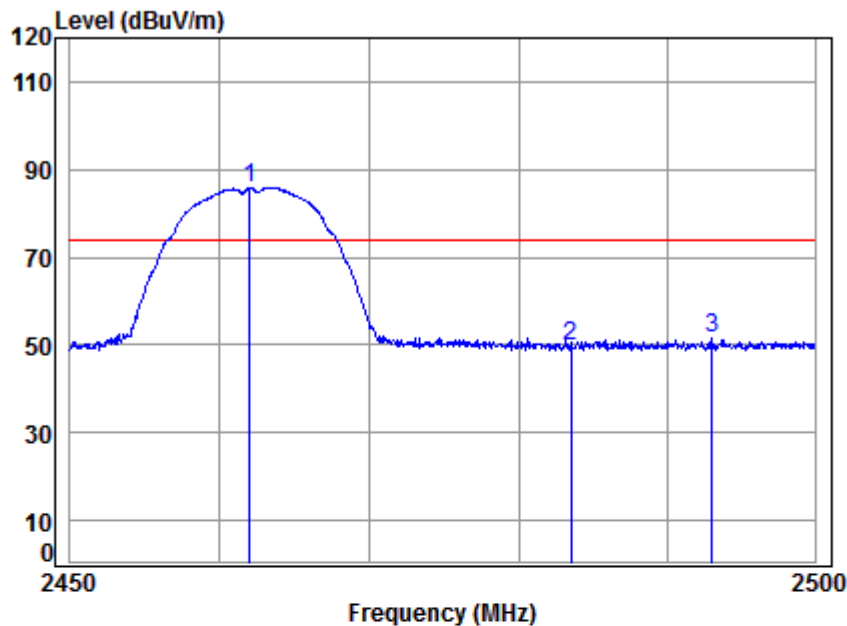
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## 4.10.1.2 802.11B\_Highest Channel\_Peak\_Vertical

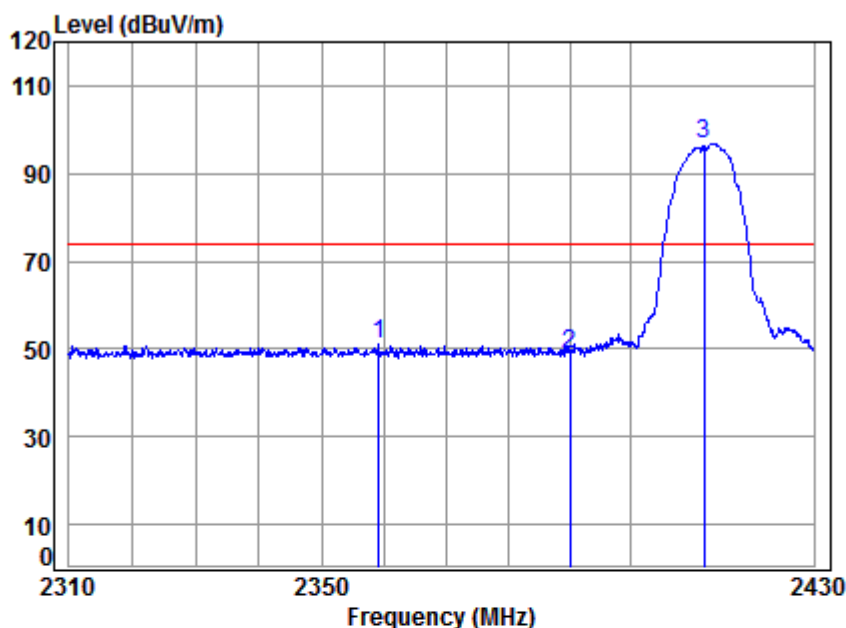


Site : chamber  
Condition: 3m VERTICAL  
Job No : 10012  
Mode : 2462 Band edge  
Note : 2.4GWIFI 11B  
: Power setting 18

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB		dB/m	dB	dBuV	dBuV/m	dB
1 *	2462.000	5.57	28.64	41.20	92.93	85.94	74.00	11.94 Peak
2	2483.500	5.60	28.67	41.21	56.50	49.56	74.00	-24.44 Peak
3	2493.040	5.61	28.69	41.21	58.33	51.42	74.00	-22.58 Peak



## 4.10.1.3 802.11B\_Lowest Channel\_Peak\_Horizontal



Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 10012  
Mode : 2412 Band edge  
Note : 2.4GWIFI 11B  
: Power setting 18

		Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB		dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2359.183	5.43	28.47	41.16	58.51	51.25	74.00	-22.75 peak
2	2390.000	5.47	28.52	41.17	56.03	48.85	74.00	-25.15 peak
3 *	2412.000	5.50	28.56	41.18	104.01	96.89	74.00	22.89 peak



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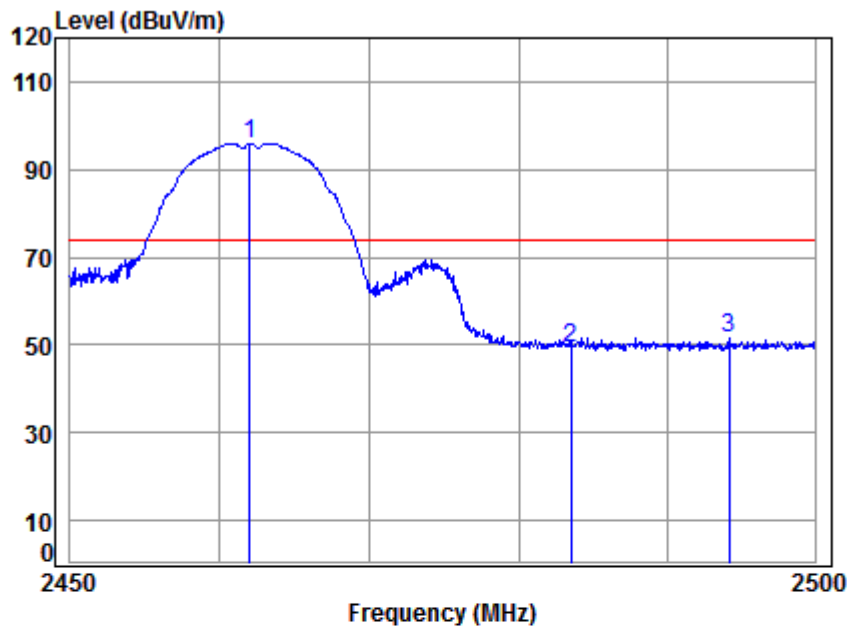
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## 4.10.1.4 802.11B\_Highest Channel\_Peak\_Horizontal

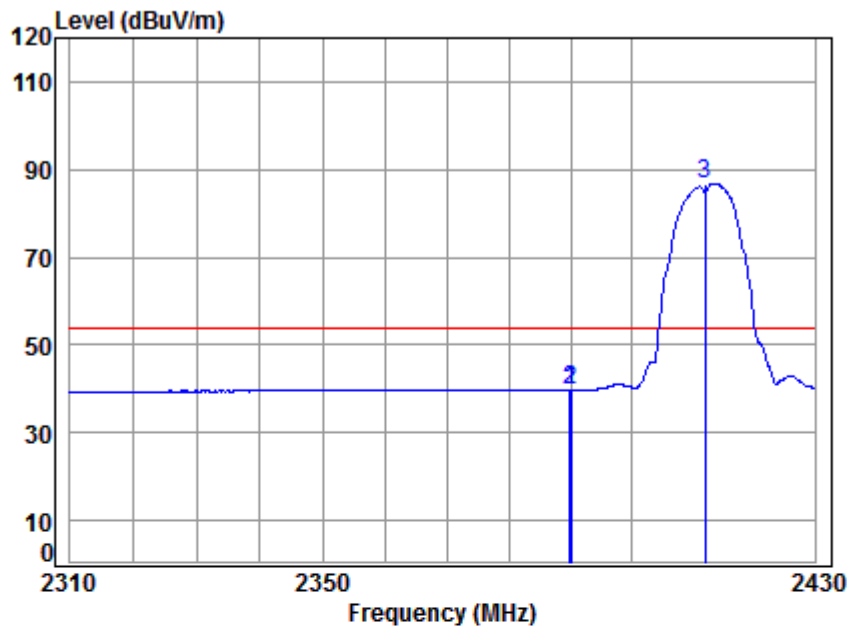


Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 10012  
Mode : 2462 Band edge  
Note : 2.4GWIFI 11B  
: Power setting 18

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB		dB/m	dB	dBuV	dBuV/m	dB
1 *	2462.000	5.57	28.64	41.20	103.00	96.01	74.00	22.01 peak
2	2483.500	5.60	28.67	41.21	56.14	49.20	74.00	-24.80 peak
3	2494.198	5.61	28.69	41.22	58.39	51.47	74.00	-22.53 peak



**4.10.1.5 802.11B\_Lowest Channel\_ Average\_ Vertical**



Site : chamber  
 Condition: 3m VERTICAL  
 Job No : 10012  
 Mode : 2412 Band edge  
 Note : 2.4GWIFI 11B  
 : Power setting 18

		Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB		dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2389.847	5.47	28.52	41.17	46.99	39.81	54.00	-14.19 Average
2	2390.000	5.47	28.52	41.17	46.94	39.76	54.00	-14.24 Average
3 *	2412.000	5.50	28.56	41.18	93.96	86.84	54.00	32.84 Average



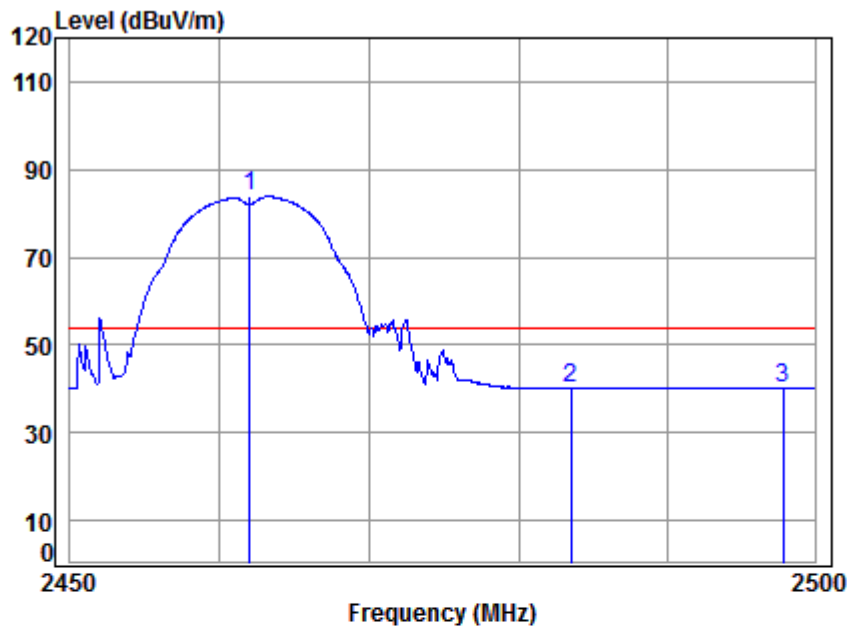
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## 4.10.1.6 802.11B\_ Highest Channel\_ Average \_ Vertical

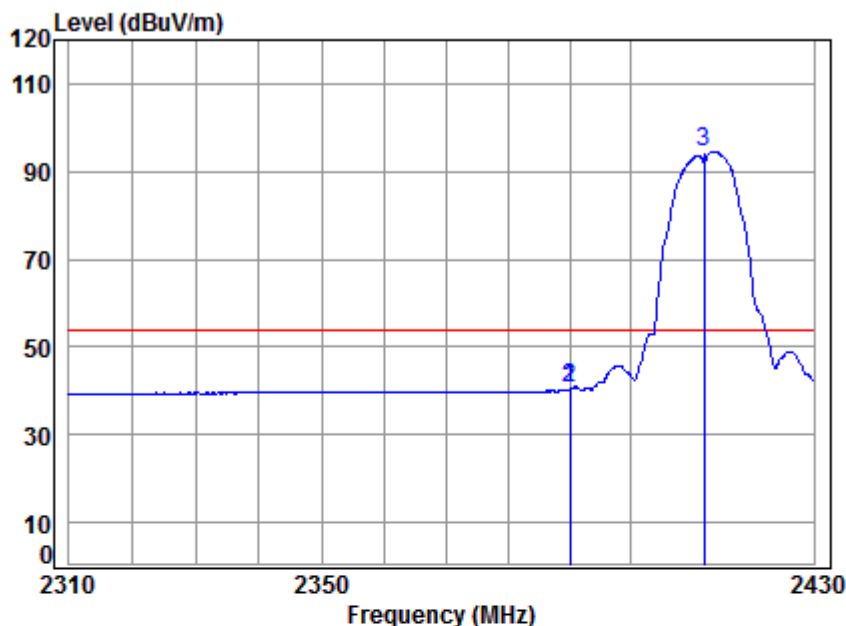


Site : chamber  
 Condition: 3m VERTICAL  
 Job No : 10012  
 Mode : 2462 Band edge  
 Note : 2.4GWIFI 11B  
 : Power setting 18

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 *	2462.000	5.57	28.64	41.20	90.80	83.81	54.00	29.81 Average
2	2483.500	5.60	28.67	41.21	47.07	40.13	54.00	-13.87 Average
3	2497.829	5.62	28.70	41.22	47.24	40.34	54.00	-13.66 Average



**4.10.1.7 802.11B\_Lowest Channel\_ Average \_ Horizontal**



Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2412 Band edge  
 Note : 2.4GWIFI 11B  
 : Power setting 18

		Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB		dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2389.968	5.47	28.52	41.17	47.59	40.41	54.00	-13.59 Average
2	2390.000	5.47	28.52	41.17	47.59	40.41	54.00	-13.59 Average
3 *	2412.000	5.50	28.56	41.18	101.60	94.48	54.00	40.48 Average

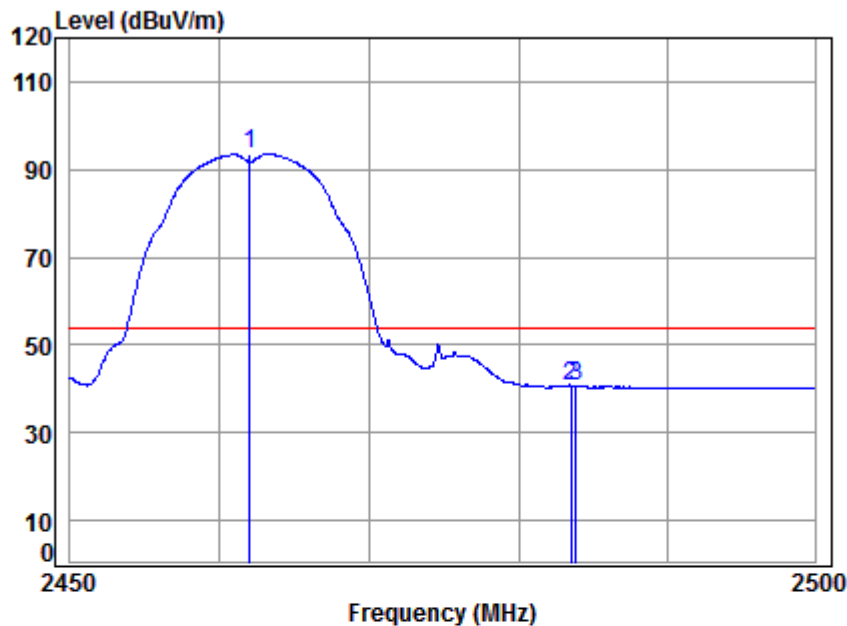


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**4.10.1.8 802.11B\_ Highest Channel\_ Average\_ Horizontal**



Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2462 Band edge  
 Note : 2.4GWIFI 11B  
 : Power setting 18

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 *	2462.000	5.57	28.64	41.20	100.46	93.47	54.00	39.47 Average
2	2483.500	5.60	28.67	41.21	47.65	40.71	54.00	-13.29 Average
3	2483.890	5.60	28.67	41.21	47.66	40.72	54.00	-13.28 Average

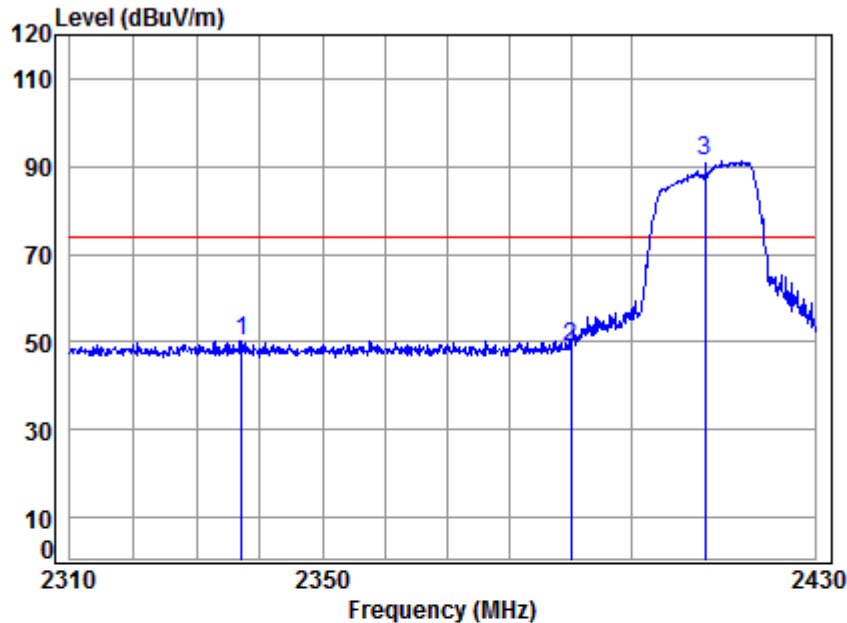


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**4.10.1.9 802.11G\_Lowest Channel\_ Peak\_ Vertical**



Site : chamber  
Condition: 3m VERTICAL  
Job No : 10012  
Mode : 2412 Band edge  
Note : 2.4GWIFI 11G  
: Power setting 14

		Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB		dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2337.064	5.40	28.43	41.15	57.68	50.36	74.00	-23.64 peak
2	2390.000	5.47	28.52	41.17	56.05	48.87	74.00	-25.13 peak
3 *	2412.000	5.50	28.56	41.18	98.43	91.31	74.00	17.31 peak



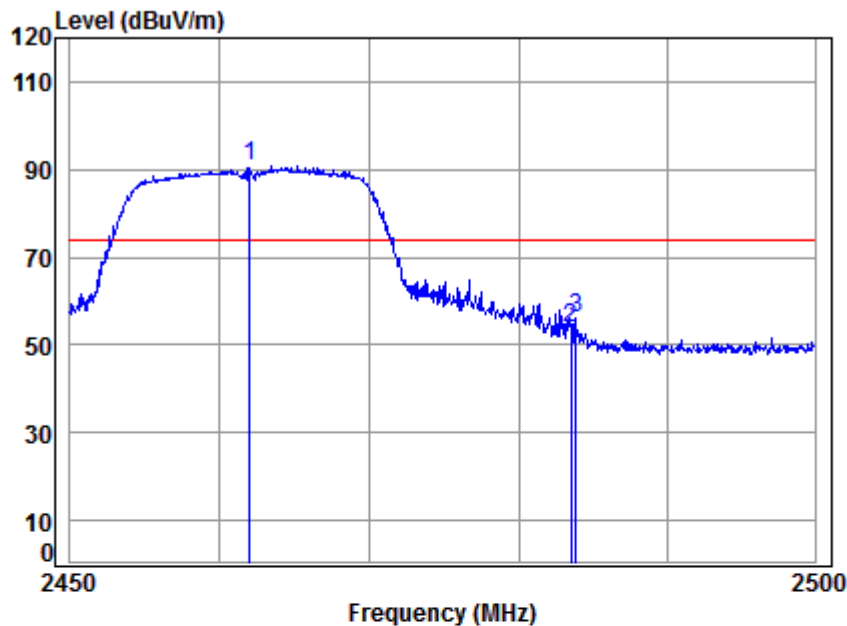
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## 4.10.1.10 802.11G\_ Highest Channel\_ Peak\_ Vertical

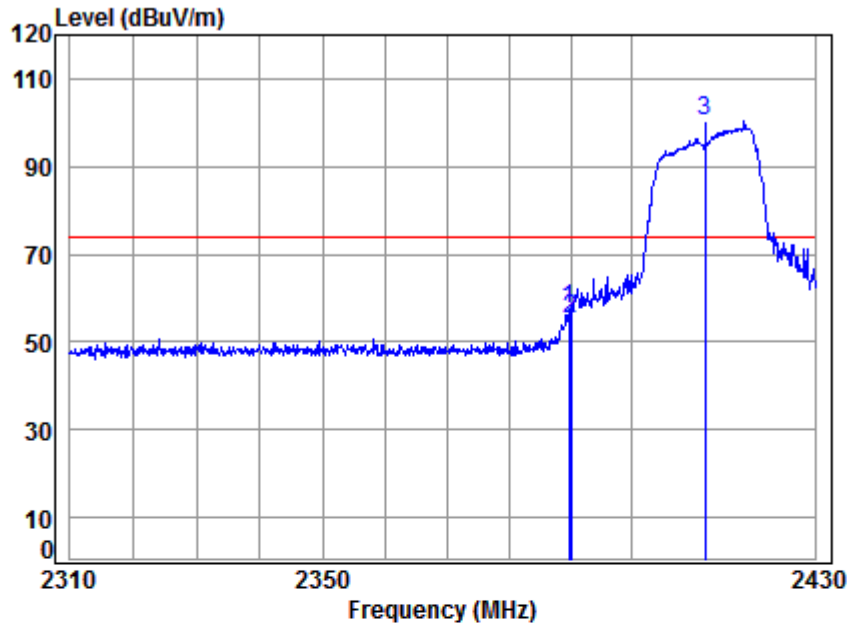


Site : chamber  
 Condition: 3m VERTICAL  
 Job No : 10012  
 Mode : 2462 Band edge  
 Note : 2.4GWIFI 11G  
 : Power setting 14

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB		dB/m	dB	dBuV	dBuV/m	dBuV/m
1 *	2462.000	5.57	28.64	41.20	97.97	90.98	74.00	16.98 peak
2	2483.500	5.60	28.67	41.21	60.61	53.67	74.00	-20.33 peak
3	2483.840	5.60	28.67	41.21	63.00	56.06	74.00	-17.94 peak



**4.10.1.11 802.11G\_Lowest Channel\_ Peak\_ Horizontal**



Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2412 Band edge  
 Note : 2.4GWIFI 11G  
 : Power setting 14

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2389.726	5.47	28.52	41.17	64.44	57.26	74.00	-16.74 peak
2	2390.000	5.47	28.52	41.17	62.56	55.38	74.00	-18.62 peak
3 *	2412.000	5.50	28.56	41.18	107.41	100.29	74.00	26.29 peak

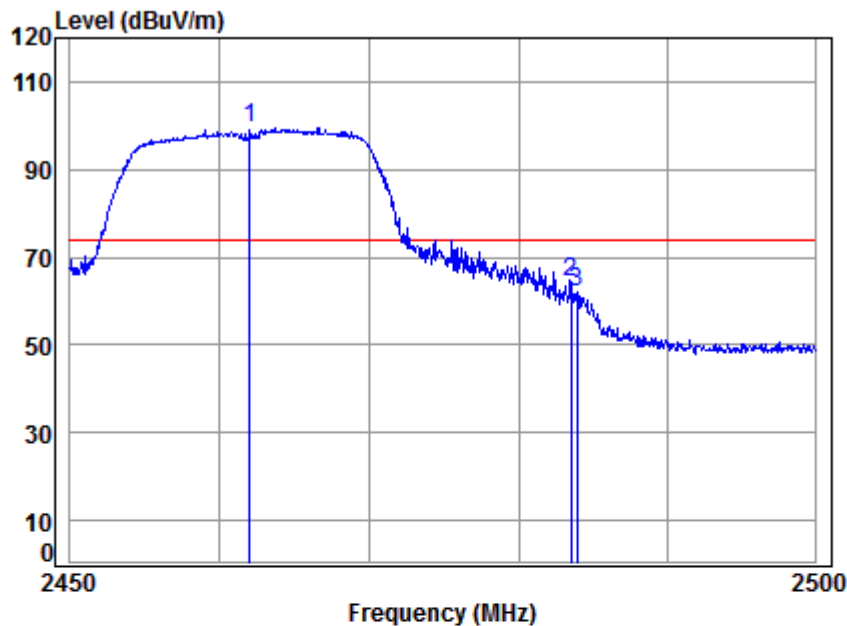


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## 4.10.1.12 802.11G\_ Highest Channel\_ Peak\_ Horizontal



Site : chamber

Condition: 3m HORIZONTAL

Job No : 10012

Mode : 2462 Band edge

Note : 2.4GWIFI 11G

: Power setting 14

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 *	2462.000	5.57	28.64	41.20	106.54	99.55	74.00	25.55 peak
2	2483.500	5.60	28.67	41.21	71.24	64.30	74.00	-9.70 peak
3	2483.940	5.60	28.67	41.21	68.79	61.85	74.00	-12.15 peak



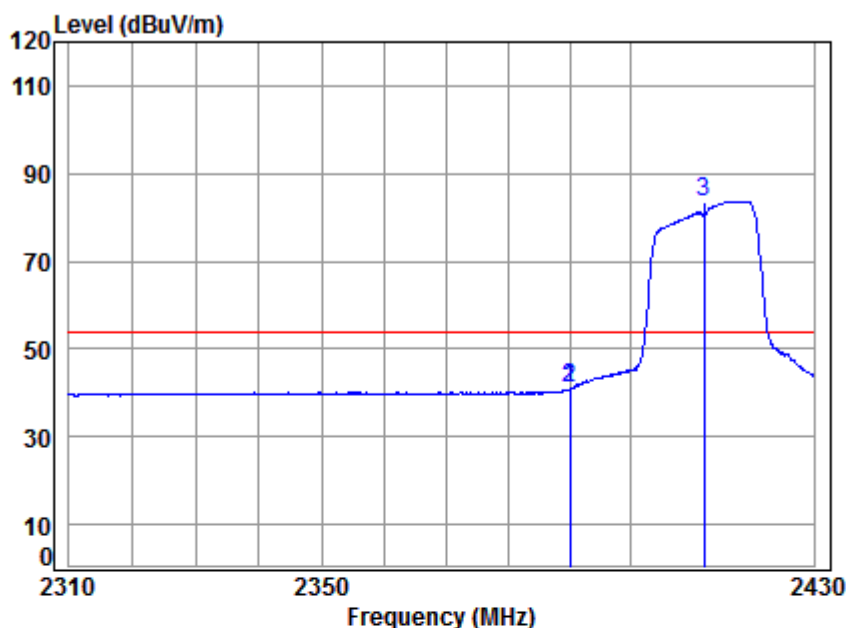
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## 4.10.1.13 802.11G\_Lowest Channel\_ Average\_ Vertical



Site : chamber  
Condition: 3m VERTICAL  
Job No : 10012  
Mode : 2412 Band edge  
Note : 2.4GWIFI 11G  
: Power setting 14

		Cable	Ant	Preamp	Read		Limit	Over	
Freq		Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2389.968	5.47	28.52	41.17	48.19	41.01	54.00	-12.99	Average
2	2390.000	5.47	28.52	41.17	48.19	41.01	54.00	-12.99	Average
3 *	2412.000	5.50	28.56	41.18	90.79	83.67	54.00	29.67	Average



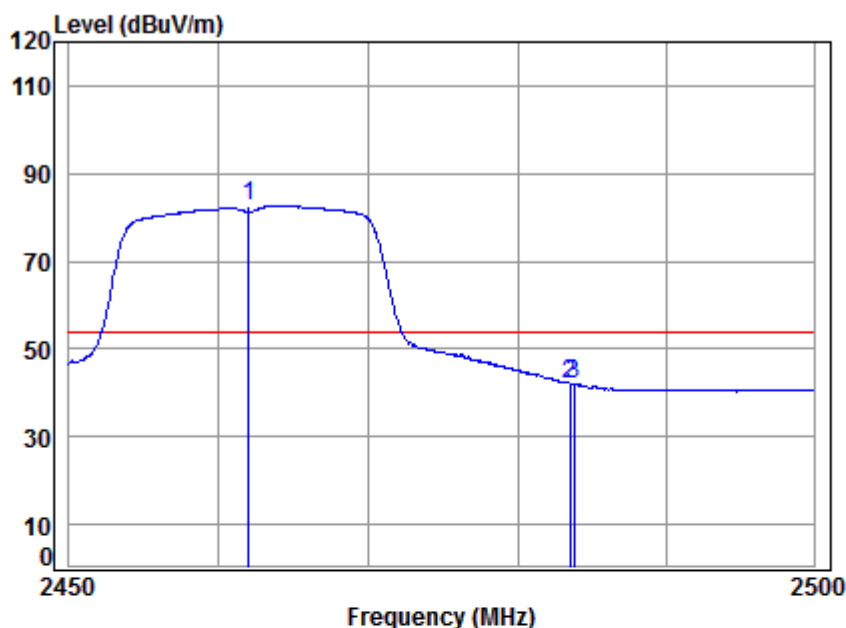
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## 4.10.1.14 802.11G\_Highest Channel\_Average\_Vertical

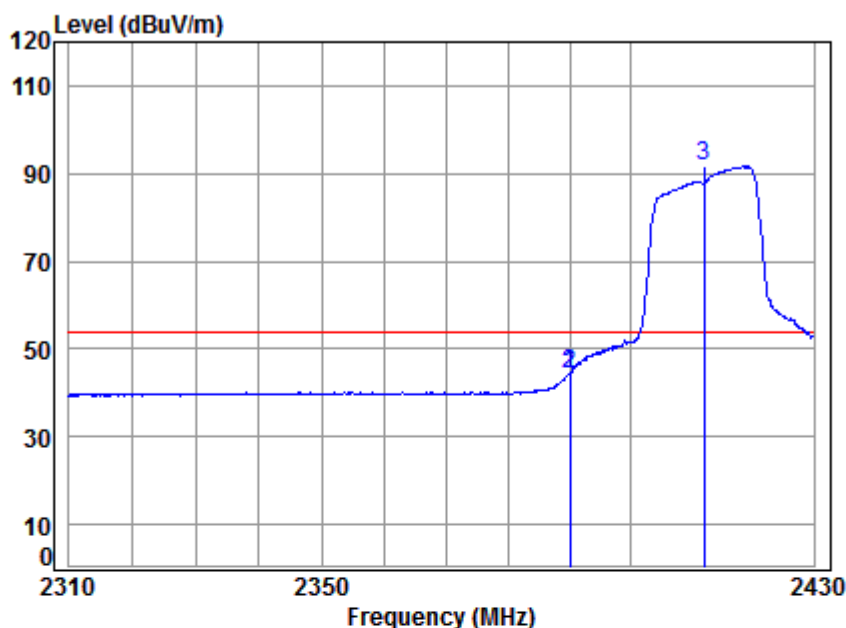


Site : chamber  
 Condition: 3m VERTICAL  
 Job No : 10012  
 Mode : 2462 Band edge  
 Note : 2.4GWIFI 11G  
 : Power setting 14

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 *	2462.000	5.57	28.64	41.20	89.59	82.60	54.00	28.60 Average
2	2483.500	5.60	28.67	41.21	49.14	42.20	54.00	-11.80 Average
3	2483.790	5.60	28.67	41.21	48.89	41.95	54.00	-12.05 Average



## 4.10.1.15 802.11G\_Lowest Channel\_ Average \_ Horizontal



Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2412 Band edge  
 Note : 2.4GWIFI 11G  
 : Power setting 14

		Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB		dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2389.968	5.47	28.52	41.17	51.64	44.46	54.00	-9.54 Average
2	2390.000	5.47	28.52	41.17	51.64	44.46	54.00	-9.54 Average
3 *	2412.000	5.50	28.56	41.18	98.64	91.52	54.00	37.52 Average



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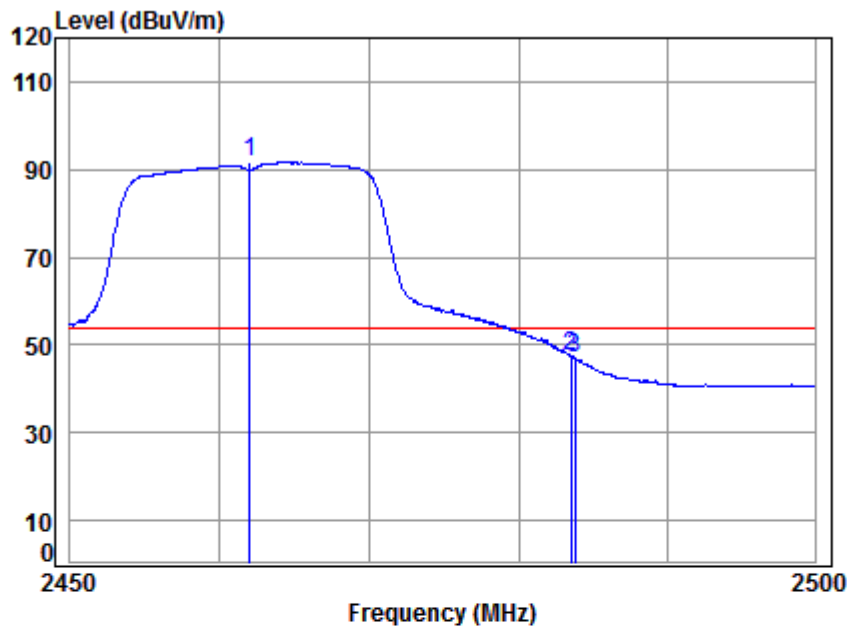
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**4.10.1.16 802.11G\_ Highest Channel\_ Average\_ Horizontal**



Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2462 Band edge  
 Note : 2.4GWIFI 11G  
 : Power setting 14

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 *	2462.000	5.57	28.64	41.20	98.58	91.59	54.00	37.59 Average
2	2483.500	5.60	28.67	41.21	54.36	47.42	54.00	-6.58 Average
3	2483.790	5.60	28.67	41.21	53.93	46.99	54.00	-7.01 Average



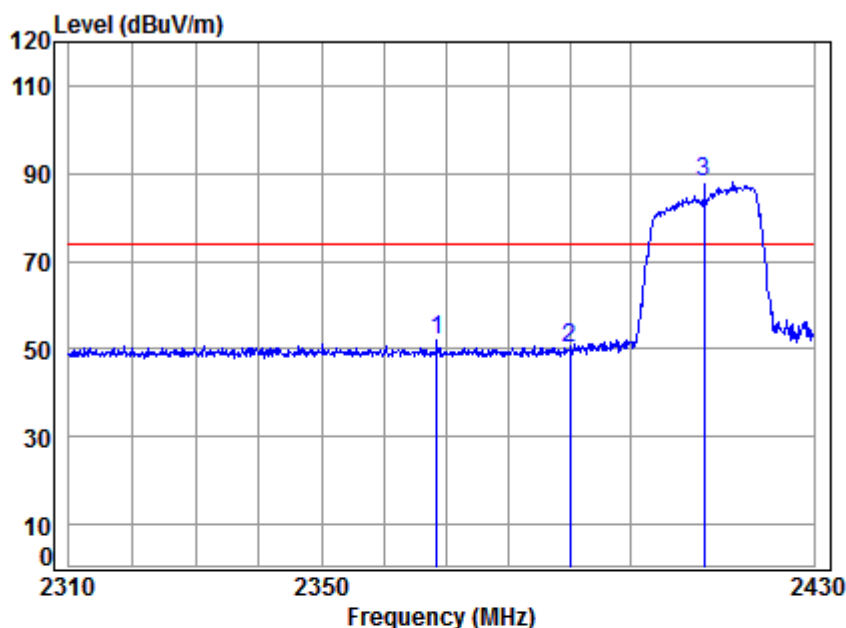
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## 4.10.1.17 802.11N20\_Lowest Channel\_ Peak\_ Vertical

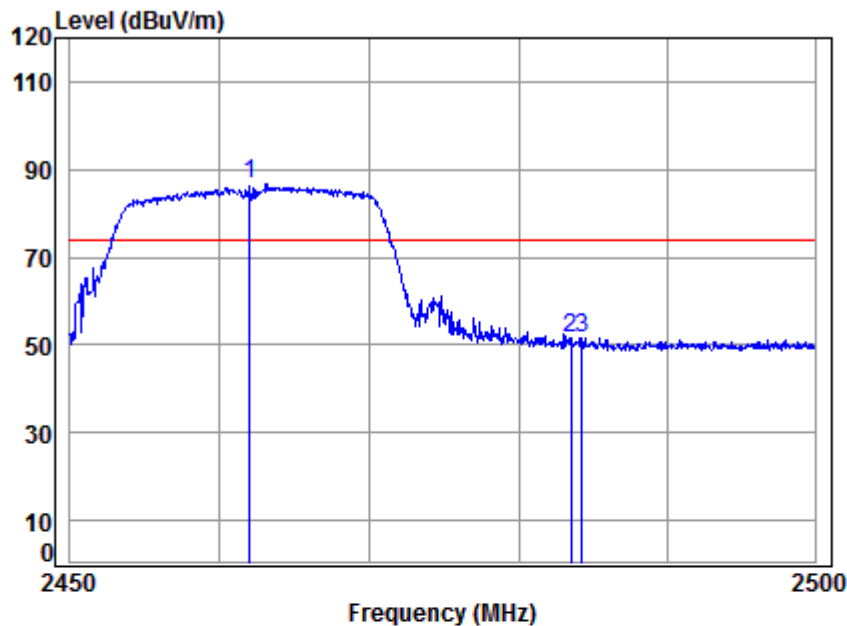


Site : chamber  
 Condition: 3m VERTICAL  
 Job No : 10012  
 Mode : 2412 Band edge  
 Note : 2.4GWIFI 11N 20  
 : Power setting 13

		Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB		dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2368.521	5.45	28.48	41.16	59.29	52.06	74.00	-21.94 Peak
2	2390.000	5.47	28.52	41.17	57.49	50.31	74.00	-23.69 Peak
3 *	2412.000	5.50	28.56	41.18	95.02	87.90	74.00	13.90 Peak



## 4.10.1.18 802.11N20\_ Highest Channel\_ Peak\_ Vertical

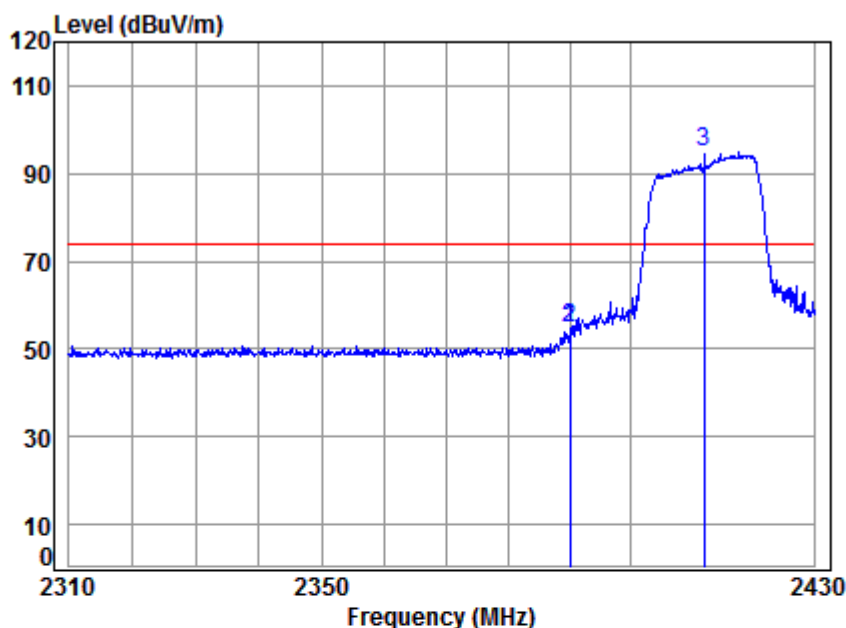


Site : chamber  
Condition: 3m VERTICAL  
Job No : 10012  
Mode : 2462 Band edge  
Note : 2.4GWIFI 11N 20  
: Power setting 13

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB		dB/m	dB	dBuV	dBuV/m	dB
1 *	2462.000	5.57	28.64	41.20	93.73	86.74	74.00	12.74 Peak
2	2483.500	5.60	28.67	41.21	58.39	51.45	74.00	-22.55 Peak
3	2484.292	5.60	28.67	41.21	58.46	51.52	74.00	-22.48 Peak



## 4.10.1.19 802.11N20\_Lowest Channel\_Peak\_Horizontal



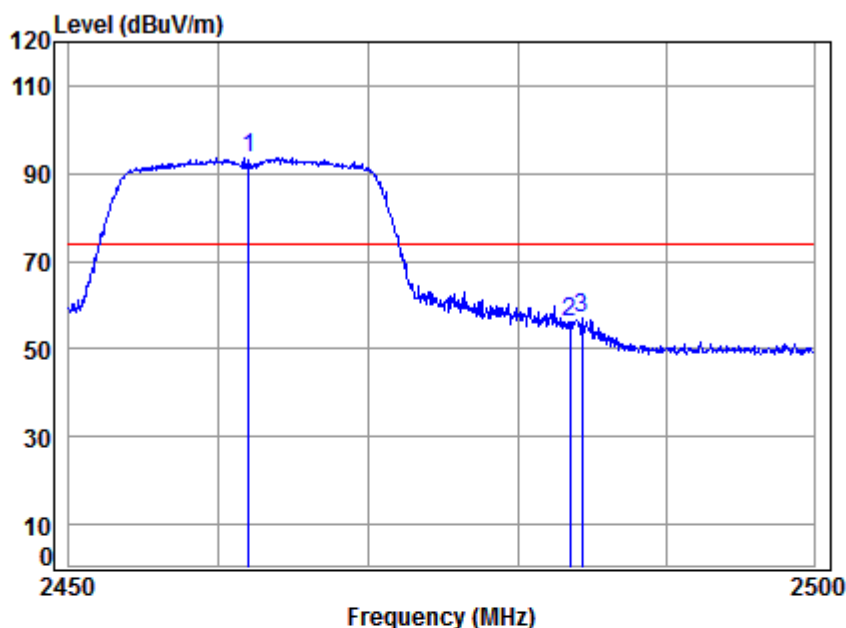
Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2412 Band edge  
 Note : 2.4GWIFI 11N 20  
 : Power setting 13

		Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB		dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2389.968	5.47	28.52	41.17	61.88	54.70	74.00	-19.30 peak
2	2390.000	5.47	28.52	41.17	61.88	54.70	74.00	-19.30 peak
3 *	2412.000	5.50	28.56	41.18	102.24	95.12	74.00	21.12 peak





## 4.10.1.20 802.11N20\_ Highest Channel\_ Peak\_ Horizontal



Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 10012  
Mode : 2462 Band edge  
Note : 2.4GWIFI 11N 20  
: Power setting 13

		Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB		dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 *	2462.000	5.57	28.64	41.20	100.59	93.60	74.00	19.60 peak
2	2483.500	5.60	28.67	41.21	63.16	56.22	74.00	-17.78 peak
3	2484.342	5.60	28.67	41.21	63.84	56.90	74.00	-17.10 peak

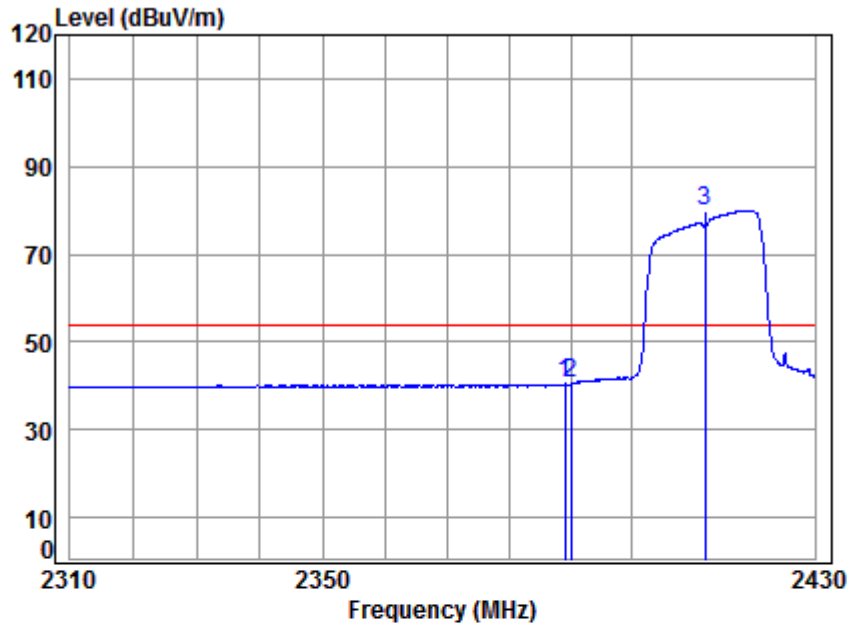


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**4.10.1.21 802.11N20\_Lowest Channel\_ Average\_ Vertical**



Site : chamber  
 Condition: 3m VERTICAL  
 Job No : 10012  
 Mode : 2412 Band edge  
 Note : 2.4GWIFI 11N 20  
 : Power setting 13

		Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB		dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2389.121	5.47	28.52	41.17	47.66	40.48	54.00	-13.52 Average
2	2390.000	5.47	28.52	41.17	47.63	40.45	54.00	-13.55 Average
3 *	2412.000	5.50	28.56	41.18	87.02	79.90	54.00	25.90 Average

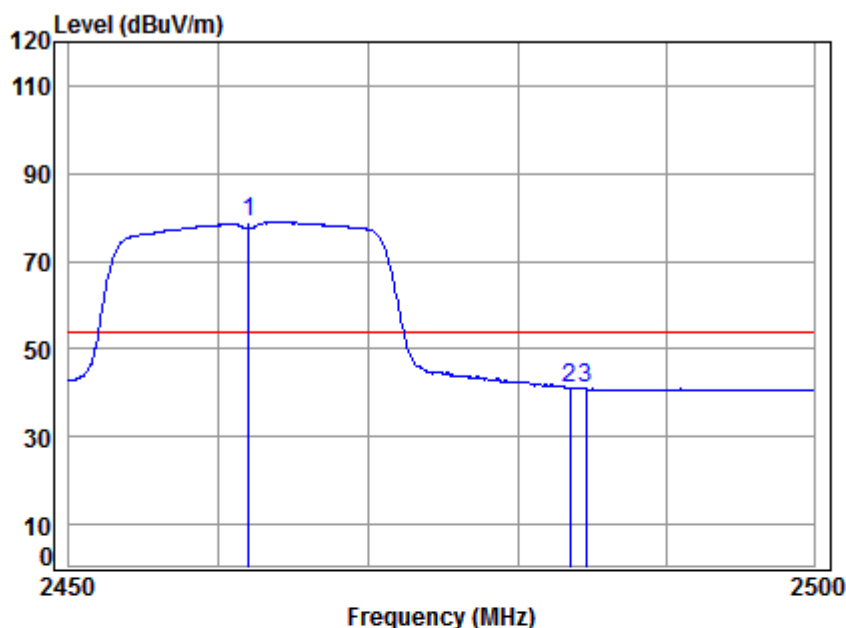


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**4.10.1.22 802.11N20\_ Highest Channel\_ Average \_ Vertical**



Site : chamber  
 Condition: 3m VERTICAL  
 Job No : 10012  
 Mode : 2462 Band edge  
 Note : 2.4GWIFI 11N 20  
 : Power setting 13

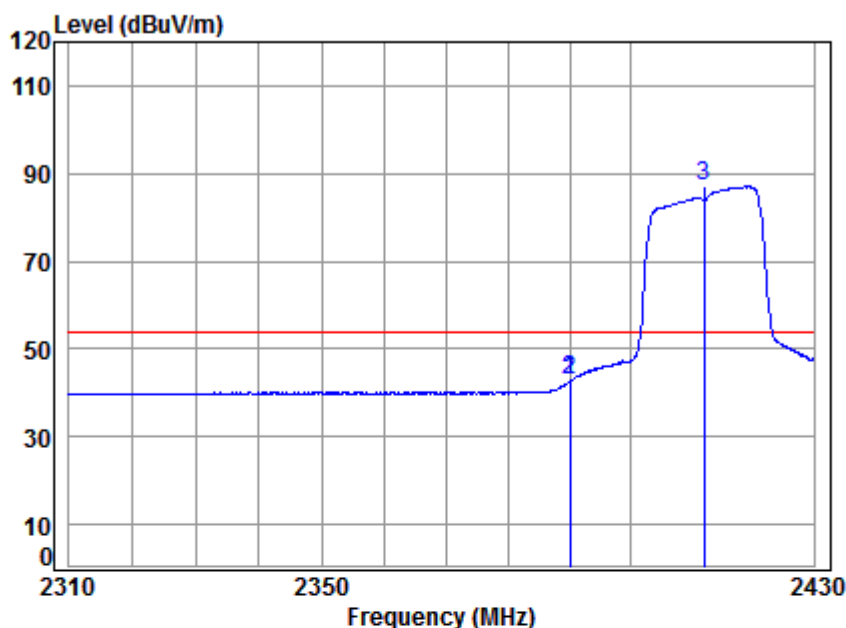
		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 *	2462.000	5.57	28.64	41.20	85.89	78.90	54.00	24.90 Average
2	2483.500	5.60	28.67	41.21	48.13	41.19	54.00	-12.81 Average
3	2484.593	5.60	28.68	41.21	48.04	41.11	54.00	-12.89 Average



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## 4.10.1.23 802.11N20\_Lowest Channel\_ Average \_ Horizontal



Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2412 Band edge  
 Note : 2.4GWIFI 11N 20  
 : Power setting 13

		Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB		dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2389.968	5.47	28.52	41.17	50.00	42.82	54.00	-11.18 Average
2	2390.000	5.47	28.52	41.17	50.00	42.82	54.00	-11.18 Average
3 *	2412.000	5.50	28.56	41.18	94.19	87.07	54.00	33.07 Average



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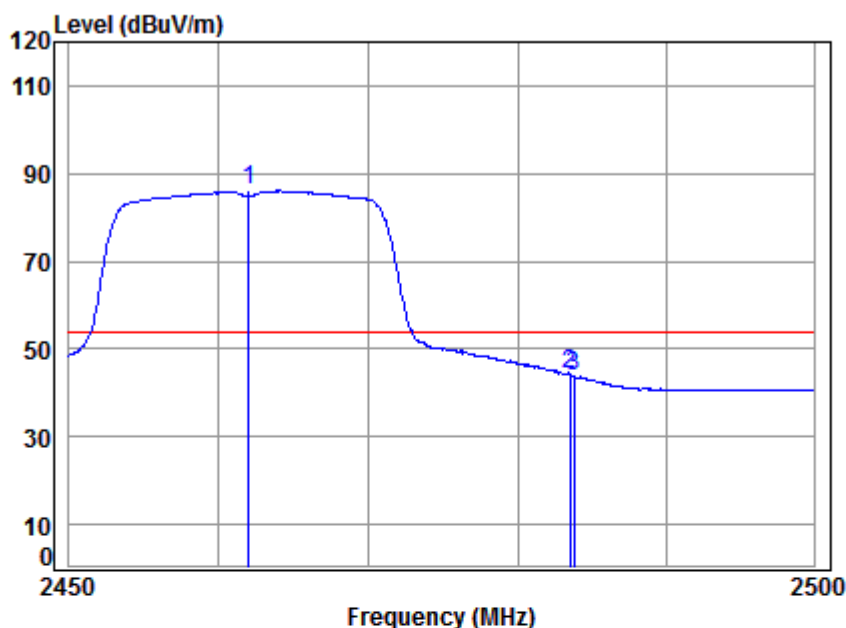
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## 4.10.1.24 802.11N20\_ Highest Channel\_ Average\_ Horizontal

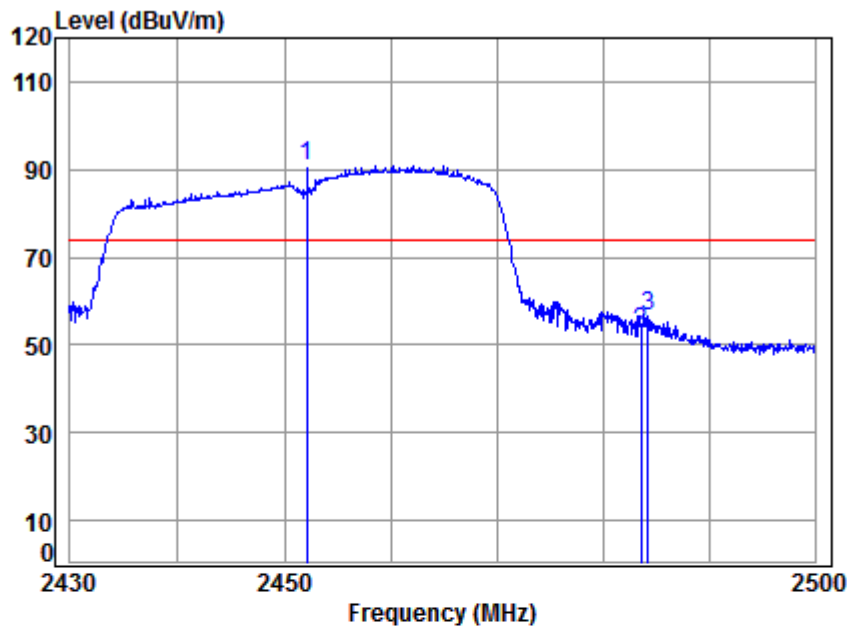


Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2462 Band edge  
 Note : 2.4GWIFI 11N 20  
 : Power setting 13

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 *	2462.000	5.57	28.64	41.20	93.07	86.08	54.00	32.08 Average
2	2483.500	5.60	28.67	41.21	51.11	44.17	54.00	-9.83 Average
3	2483.790	5.60	28.67	41.21	50.59	43.65	54.00	-10.35 Average



## 4.10.1.25 802.11N40\_Lowest Channel\_ Peak\_ Vertical



Site : chamber  
Condition: 3m VERTICAL  
Job No : 10012  
Mode : 2452 Band edge  
Note : 2.4GWIFI 11N 40  
: Power setting 11

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 *	2452.000	5.56	28.62	41.20	97.85	90.83	74.00	16.83 peak
2	2483.500	5.60	28.67	41.21	59.68	52.74	74.00	-21.26 peak
3	2484.147	5.60	28.67	41.21	63.37	56.43	74.00	-17.57 peak



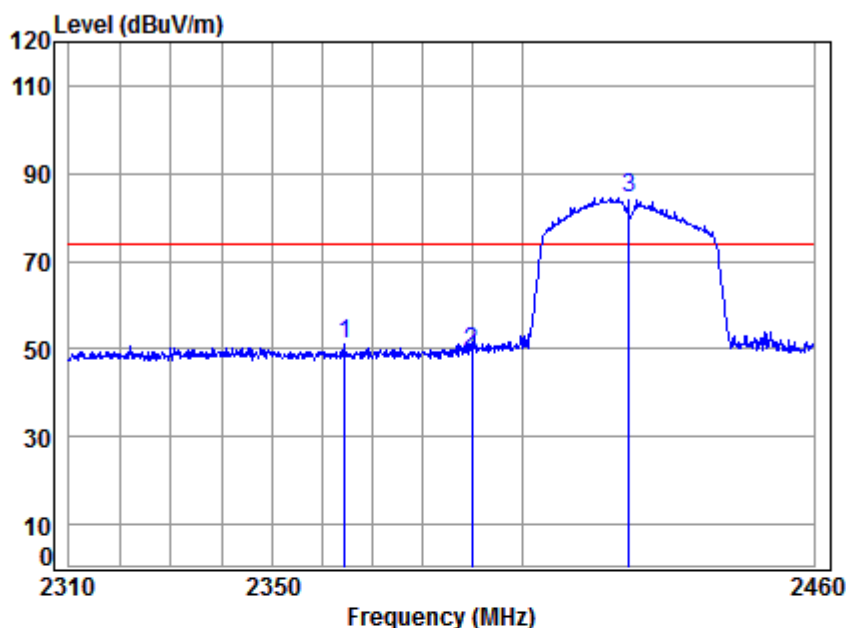
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## 4.10.1.26 802.11N40\_ Highest Channel\_ Peak\_ Vertical

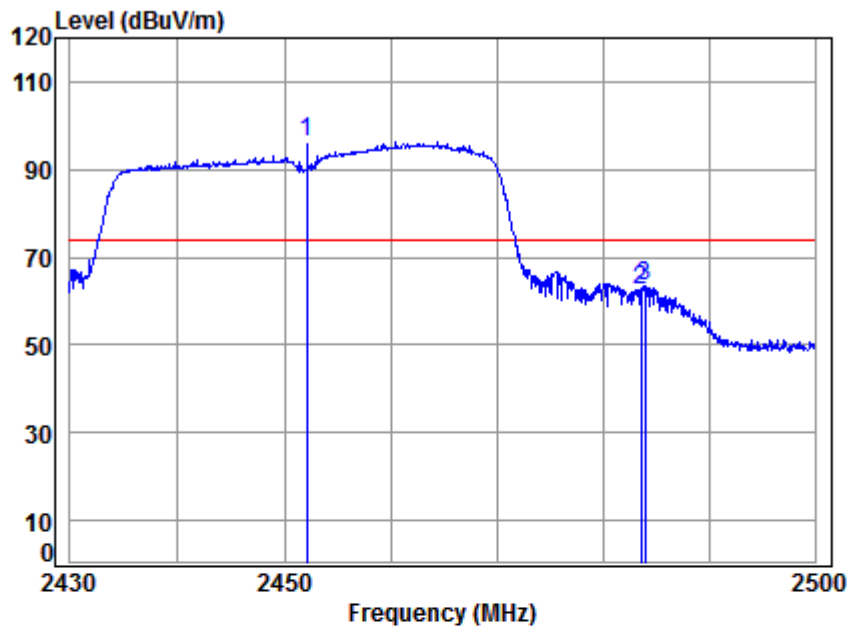


Site : chamber  
 Condition: 3m VERTICAL  
 Job No : 10012  
 Mode : 2422 Band edge  
 Note : 2.4GWIFI 11N 40  
 : Power setting 11

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2364.552	5.44	28.48	41.16	58.30	51.06	74.00	-22.94 peak
2	2390.000	5.47	28.52	41.17	56.63	49.45	74.00	-24.55 peak
3 *	2422.000	5.52	28.57	41.19	91.69	84.59	74.00	10.59 peak



**4.10.1.27 802.11N40\_Lowest Channel\_ Peak\_ Horizontal**



Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2452 Band edge  
 Note : 2.4GWIFI 11N 40  
 : Power setting 11

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 *	2452.000	5.56	28.62	41.20	103.46	96.44	74.00	22.44 peak
2	2483.500	5.60	28.67	41.21	69.61	62.67	74.00	-11.33 peak
3	2483.865	5.60	28.67	41.21	70.22	63.28	74.00	-10.72 peak

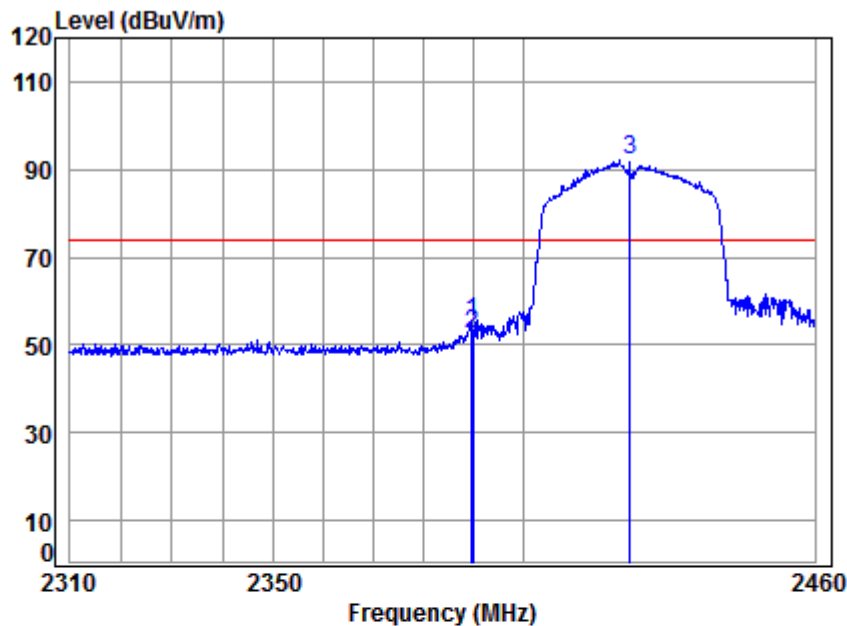


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## 4.10.1.28 802.11N40\_ Highest Channel\_ Peak\_ Horizontal

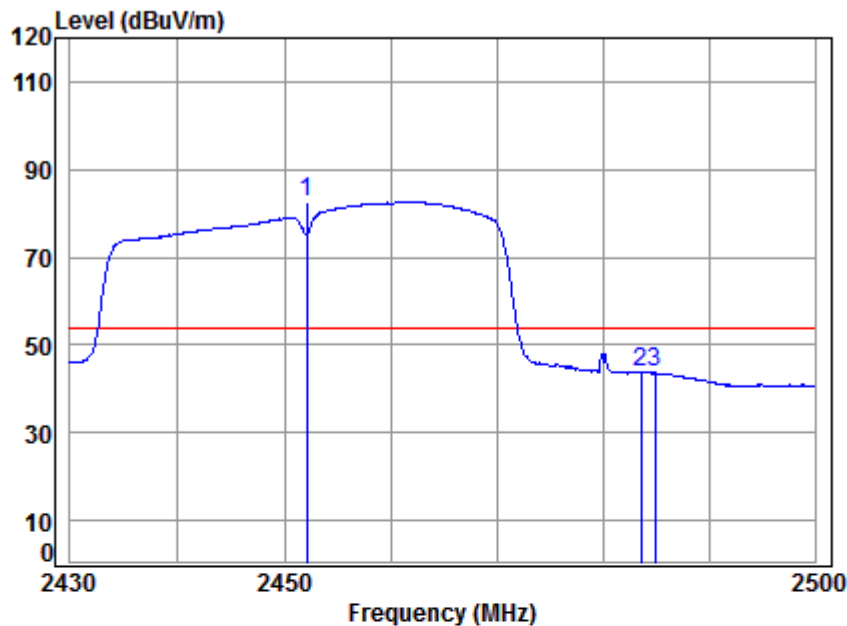


Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 10012  
Mode : 2422 Band edge  
Note : 2.4GWIFI 11N 40  
: Power setting 11

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2389.827	5.47	28.52	41.17	62.49	55.31	74.00	-18.69 peak
2	2390.000	5.47	28.52	41.17	59.52	52.34	74.00	-21.66 peak
3 *	2422.000	5.52	28.57	41.19	99.21	92.11	74.00	18.11 peak



## 4.10.1.29 802.11N40\_Lowest Channel\_ Average\_ Vertical

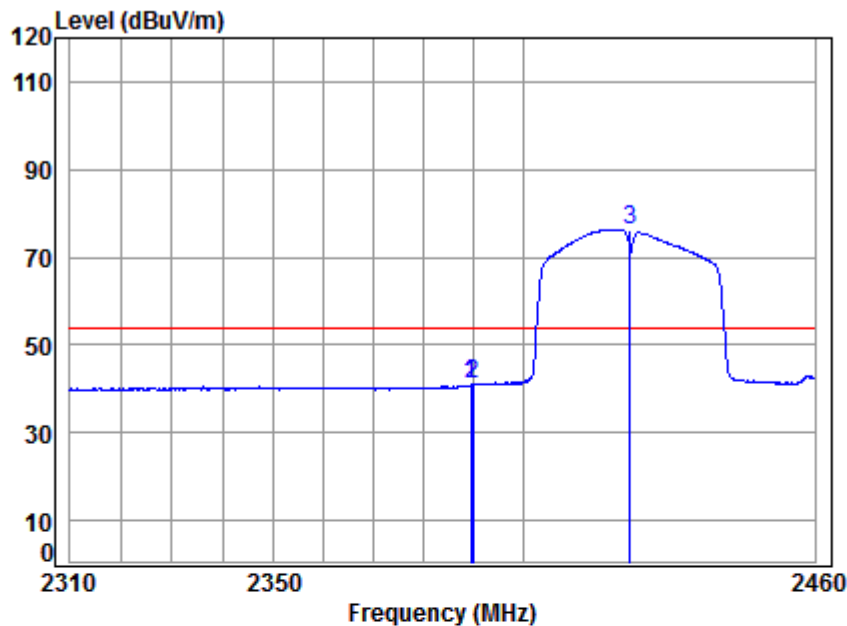


Site : chamber  
 Condition: 3m VERTICAL  
 Job No : 10012  
 Mode : 2452 Band edge  
 Note : 2.4GWIFI 11N 40  
 : Power setting 11

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 *	2452.000	5.56	28.62	41.20	89.49	82.47	54.00	28.47 Average
2	2483.500	5.60	28.67	41.21	50.56	43.62	54.00	-10.38 Average
3	2484.782	5.60	28.68	41.21	50.72	43.79	54.00	-10.21 Average



## 4.10.1.30 802.11N40\_ Highest Channel\_ Average \_ Vertical

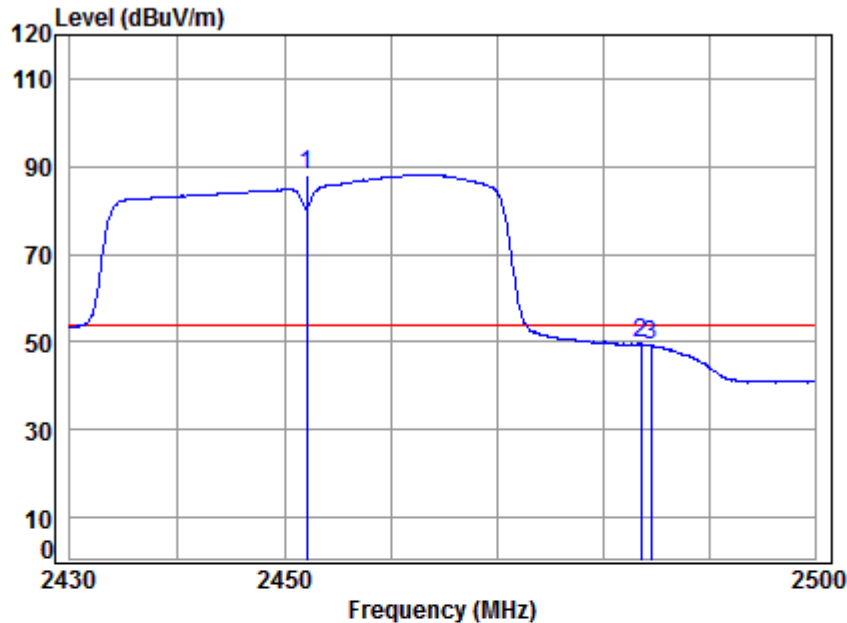


Site : chamber  
Condition: 3m VERTICAL  
Job No : 10012  
Mode : 2422 Band edge  
Note : 2.4GWIFI 11N 40  
: Power setting 11

		Cable	Ant	Preampl	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB		dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2389.526	5.47	28.52	41.17	48.09	40.91	54.00	-13.09 Average
2	2390.000	5.47	28.52	41.17	48.10	40.92	54.00	-13.08 Average
3 *	2422.000	5.52	28.57	41.19	83.51	76.41	54.00	22.41 Average



**4.10.1.31 802.11N40\_Lowest Channel\_ Average \_ Horizontal**



Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 10012  
Mode : 2452 Band edge  
Note : 2.4GWIFI 11N 40  
: Power setting 11

		Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB		dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 * 2452.000	5.56	28.62	41.20	95.20	88.18	54.00	34.18	Average
2 2483.500	5.60	28.67	41.21	56.50	49.56	54.00	-4.44	Average
3 2484.429	5.60	28.67	41.21	56.40	49.46	54.00	-4.54	Average

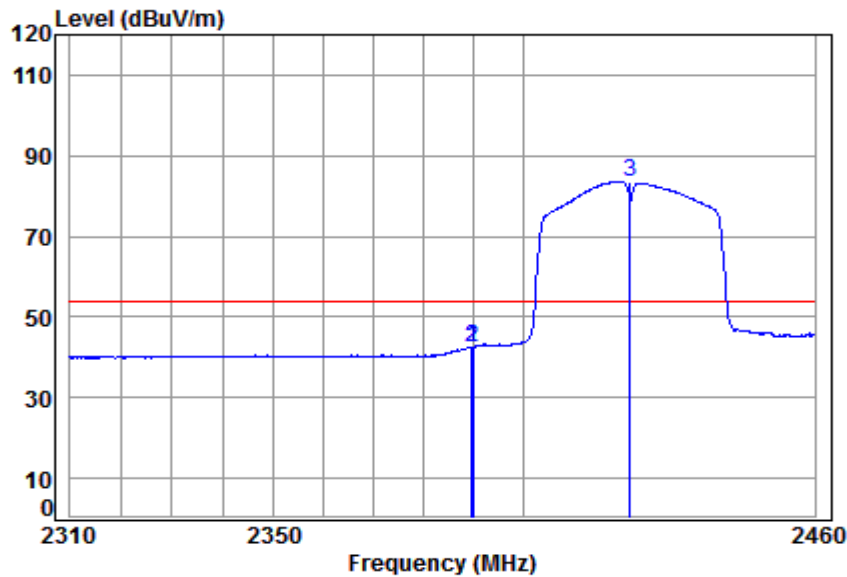


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## 4.10.1.32 802.11N40\_ Highest Channel\_ Average\_ Horizontal



Site : chamber  
 Condition: 3m HORIZONTAL  
 Job No : 10012  
 Mode : 2422 Band edge  
 Note : 2.4GWIFI 11N 40  
 : Power setting 11

		Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2389.827	5.47	28.52	41.17	49.70	42.52	54.00	-11.48 Average
2	2390.000	5.47	28.52	41.17	49.69	42.51	54.00	-11.49 Average
3 *	2422.000	5.52	28.57	41.19	90.66	83.56	54.00	29.56 Average

## 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	$\pm 0.5\%$



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## 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	2018/9/2	2019/9/2
LISN	ETS-LINDGREN	Feb-16	SEM007-02	2018/4/2	2019/4/1
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2018/7/12	2019/7/11
2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	2018/2/14	2019/2/13
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2018/4/2	2019/4/1

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	2018/9/15	2019/9/15
Signal Analyzer	Rohde & Schwarz	FSV	W025-05	2018/3/13	2019/3/12
Coaxial Cable	SGS	N/A	SEM031-01	2018/7/13	2019/7/12
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018/9/2	2019/9/2
Temperature Chamber	GIANT FORCE	ICT-150-40-CP-AR	W027-03	2018/11/27	2019/11/27

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	2018/7/12	2019/7/11
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2018/9/2	2019/9/2
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	2018/4/2	2019/4/1

RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date	Cal. Due date
				(yyyy-mm-dd)	(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	2018/4/2	2019/4/1
Trilog-Broadband Antenna(25M-2GHz)	Schwarzbeck	VULB9168	SEM003-18	2016/6/29	2019/6/28
Pre-amplifier (9k-1GHz)	Sonoma	310N	SEM005-03	2018/4/13	2019/4/12
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



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## 7 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for HR/2019/10012.

The End

