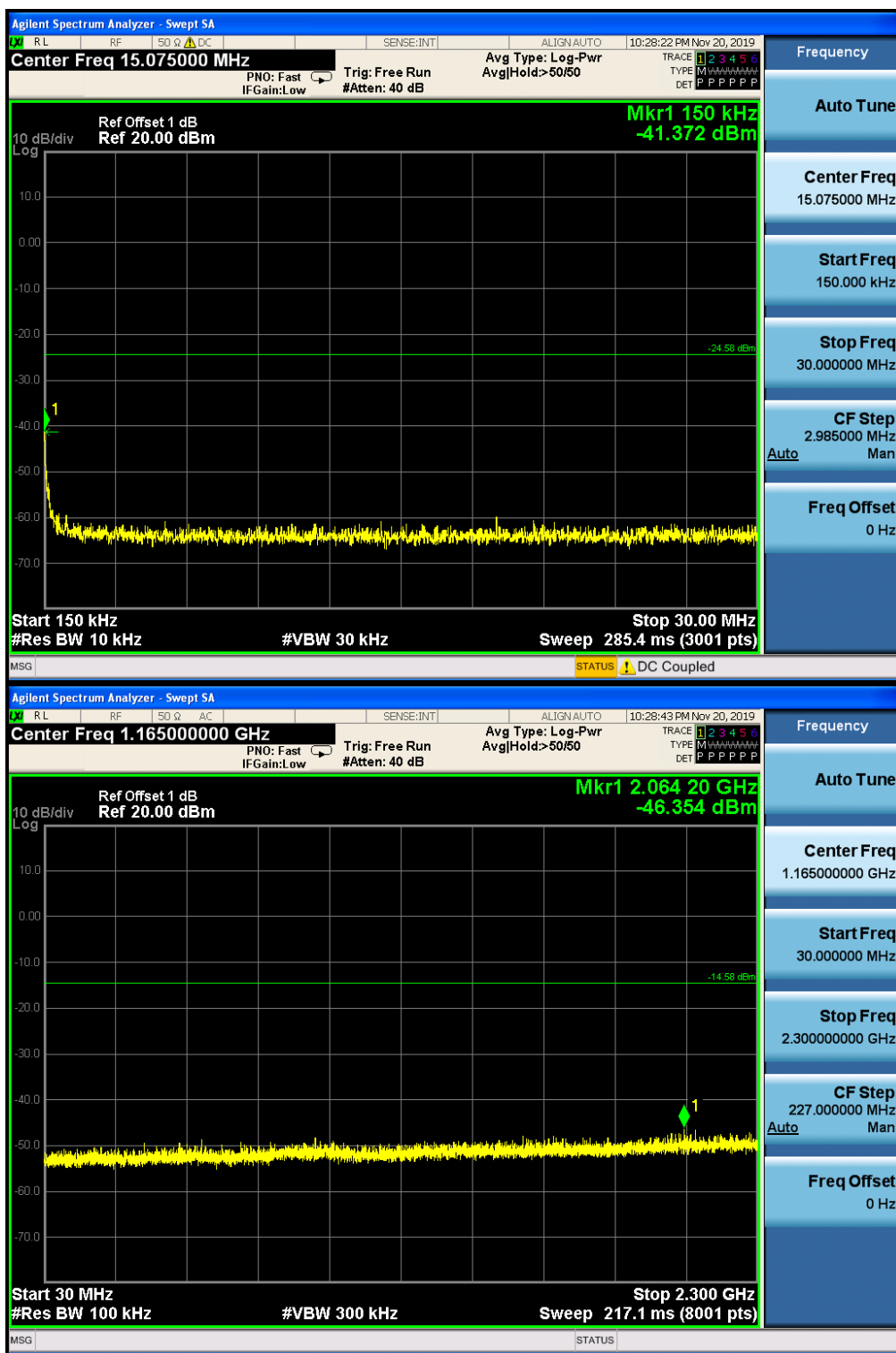
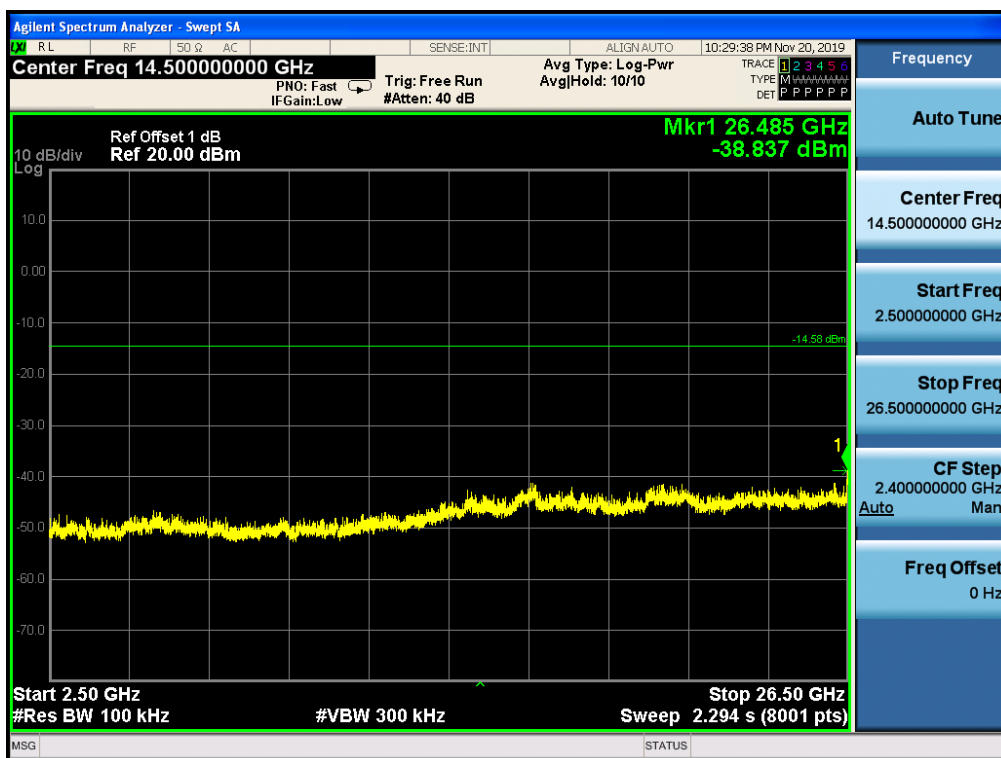


#### 4.8.1.1.9 802.11 N20\_Highest Channel









**Remark:**

Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz was very low, and the above harmonics were the highest point could be found when testing, The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.



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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               |
| Limit:            | Above 1GHz                                                                                                                                                                                                                                                                    | Peak                             | 1MHz           | 3MHz       | Peak                     |
|                   |                                                                                                                                                                                                                                                                               | Peak                             | 1MHz           | 10Hz       | Average                  |
|                   | Frequency                                                                                                                                                                                                                                                                     | Field strength (microvolt/meter) | Limit (dBuV/m) | Remark     | Measurement distance (m) |
|                   | 0.009MHz-0.490MHz                                                                                                                                                                                                                                                             | 2400/F(kHz)                      | -              | -          | 300                      |
|                   | 0.490MHz-1.705MHz                                                                                                                                                                                                                                                             | 24000/F(kHz)                     | -              | -          | 30                       |
|                   | 1.705MHz-30MHz                                                                                                                                                                                                                                                                | 30                               | -              | -          | 30                       |
|                   | 30MHz-88MHz                                                                                                                                                                                                                                                                   | 100                              | 40.0           | Quasi-peak | 3                        |
|                   | 88MHz-216MHz                                                                                                                                                                                                                                                                  | 150                              | 43.5           | Quasi-peak | 3                        |
|                   | 216MHz-960MHz                                                                                                                                                                                                                                                                 | 200                              | 46.0           | Quasi-peak | 3                        |
|                   | 960MHz-1GHz                                                                                                                                                                                                                                                                   | 500                              | 54.0           | Quasi-peak | 3                        |
|                   | Above 1GHz                                                                                                                                                                                                                                                                    | 500                              | 54.0           | Average    | 3                        |
|                   | Remark: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device. |                                  |                |            |                          |

|             |  |
|-------------|--|
| Test Setup: |  |
|-------------|--|



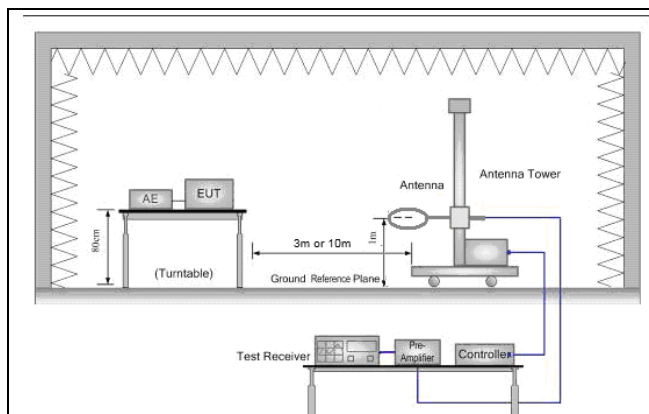


Figure 1. Below 30MHz

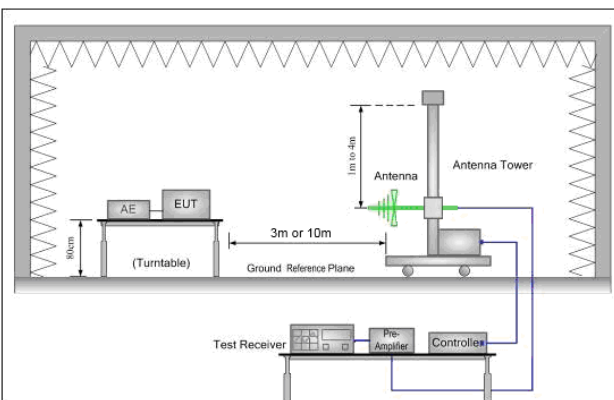


Figure 2. 30MHz to 1GHz

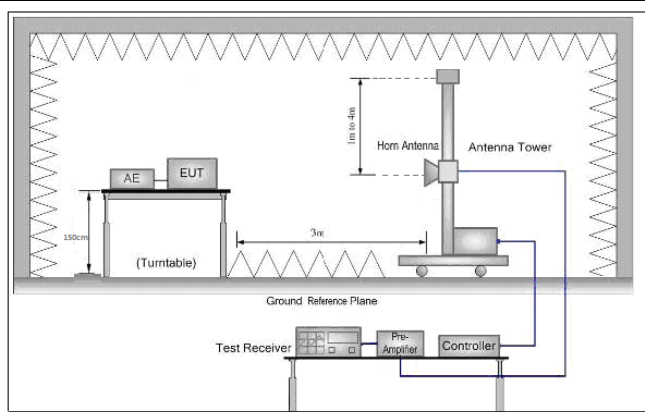


Figure 3. Above 1 GHz

**Test Procedure:**

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic 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





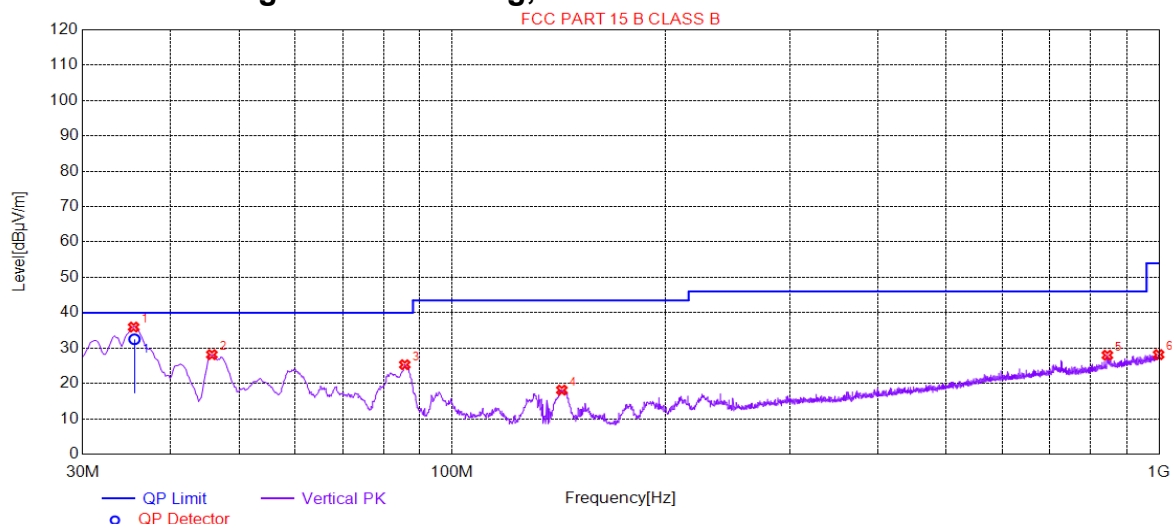
|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | <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: | Transmitting with all kind of modulations, data rates.<br>Charge + Transmitting mode.                                                                                                                                                                                                                                                                                                                                                                    |
| Final Test Mode:       | Pretest the EUT at Charge + Transmitting mode.<br>Through Pre-scan, find the<br>1Mbps of rate is the worst case of 802.11B;<br>6Mbps of rate is the worst case of 802.11G;<br>6.5Mbps of rate is the worst case of 802.11N(HT20);<br>For below 1GHz, through Pre-scan, find the 1Mbps of rate of 802.11B at lowest channel is the worst case. Only the worst case is recorded in the report.                                                             |
| Instruments Used:      | Refer to section 5.10 for details                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Test Results:          | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                     |





#### 4.9.1 Radiated emission below 1GHz

##### 4.9.1.1 Charge + Transmitting, Vertical

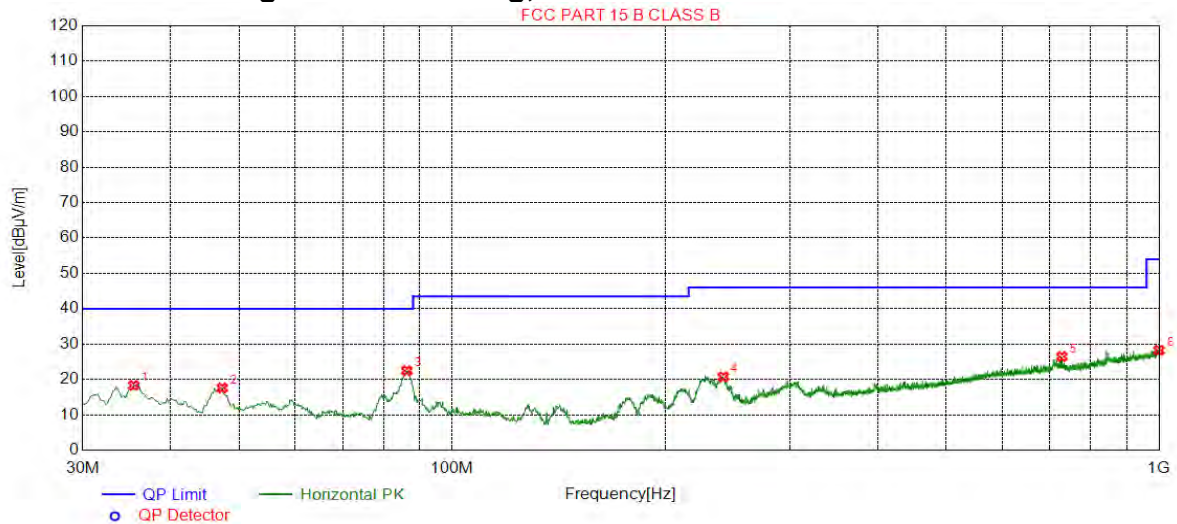


#### Suspected List

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| 1   | 35.4331     | 35.94          | -29.82      | 40.00          | 4.06        | 100         | 360       | Vertical |
| 2   | 45.7171     | 28.15          | -30.42      | 40.00          | 11.85       | 100         | 58        | Vertical |
| 3   | 85.6891     | 25.30          | -34.77      | 40.00          | 14.70       | 100         | 220       | Vertical |
| 4   | 142.9306    | 18.13          | -35.41      | 43.50          | 25.37       | 100         | 49        | Vertical |
| 5   | 844.9630    | 27.99          | -16.97      | 46.00          | 18.01       | 200         | 119       | Vertical |
| 6   | 998.4477    | 28.15          | -14.81      | 54.00          | 25.85       | 200         | 314       | Vertical |



## 4.9.1.2 Charge + Transmitting, Horizontal



## Suspected List

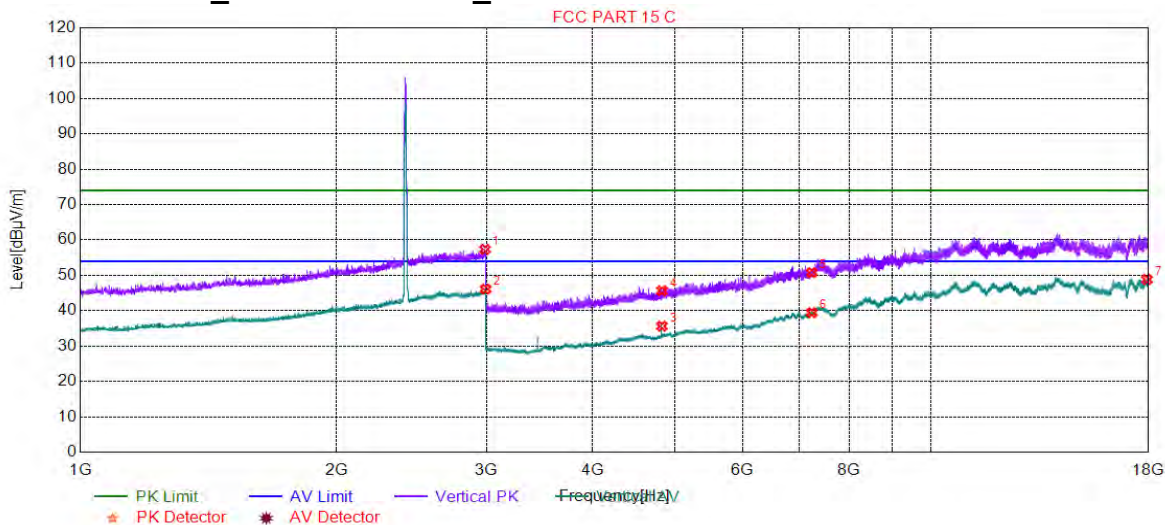
| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| 1   | 35.4331     | 18.30          | -29.82      | 40.00          | 21.70       | 100         | 276       | Horizontal |
| 2   | 47.2695     | 17.60          | -30.40      | 40.00          | 22.40       | 200         | 329       | Horizontal |
| 3   | 86.2713     | 22.45          | -34.63      | 40.00          | 17.55       | 200         | 309       | Horizontal |
| 4   | 241.8904    | 20.74          | -29.99      | 46.00          | 25.26       | 100         | 267       | Horizontal |
| 5   | 728.5397    | 26.48          | -18.84      | 46.00          | 19.52       | 200         | 204       | Horizontal |
| 6   | 999.6119    | 28.25          | -14.80      | 54.00          | 25.75       | 100         | 28        | Horizontal |



## 4.9.2 Transmitter emission above 1GHz

### 4.9.2.1 ANT1

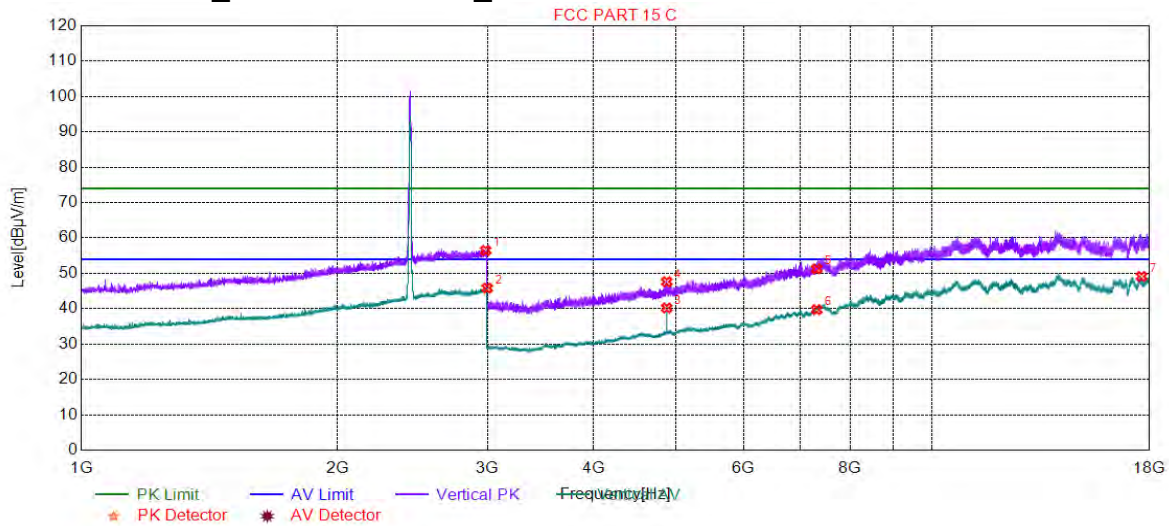
#### 4.9.2.1.1 802.11B\_Lowest Channel\_ Vertical



| Suspected List |             |                |             |                |             |             |           |          |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1              | 2988.9972   | 57.35          | 11.78       | 74.00          | 16.65       | 150         | 237       | Vertical |
| 2              | 2993.9985   | 46.12          | 11.80       | 54.00          | 7.88        | 150         | 333       | Vertical |
| 3              | 4824.0000   | 35.64          | -14.90      | 54.00          | 18.36       | 150         | 45        | Vertical |
| 4              | 4824.0000   | 45.65          | -14.90      | 74.00          | 28.35       | 150         | 99        | Vertical |
| 5              | 7236.0000   | 50.76          | -6.82       | 74.00          | 23.24       | 150         | 153       | Vertical |
| 6              | 7236.0000   | 39.45          | -6.82       | 54.00          | 14.55       | 150         | 289       | Vertical |
| 7              | 17919.4960  | 48.83          | 2.50        | 54.00          | 5.17        | 150         | 88        | Vertical |



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

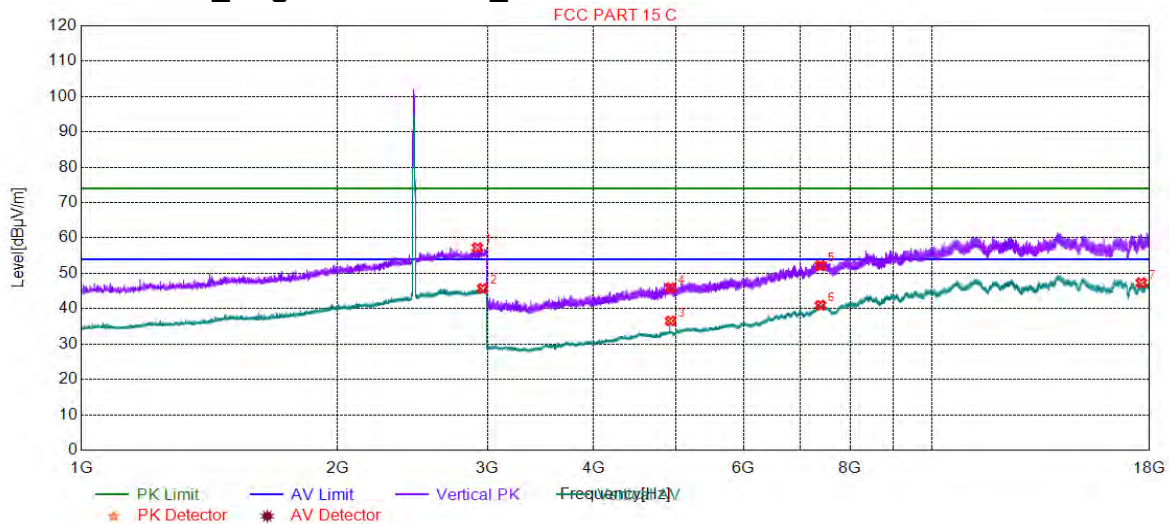


## Suspected List

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| 1   | 2986.4966   | 56.50          | 11.77       | 74.00          | 17.50       | 150         | 222       | Vertical |
| 2   | 2998.4996   | 45.83          | 11.81       | 54.00          | 8.17        | 150         | 346       | Vertical |
| 3   | 4874.0000   | 40.21          | -14.68      | 54.00          | 13.79       | 150         | 18        | Vertical |
| 4   | 4874.0000   | 47.63          | -14.68      | 74.00          | 26.37       | 150         | 49        | Vertical |
| 5   | 7311.0000   | 51.27          | -6.24       | 74.00          | 22.73       | 150         | 333       | Vertical |
| 6   | 7311.0000   | 39.72          | -6.24       | 54.00          | 14.28       | 150         | 248       | Vertical |
| 7   | 17609.9805  | 49.12          | 4.12        | 54.00          | 4.88        | 150         | 243       | Vertical |



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



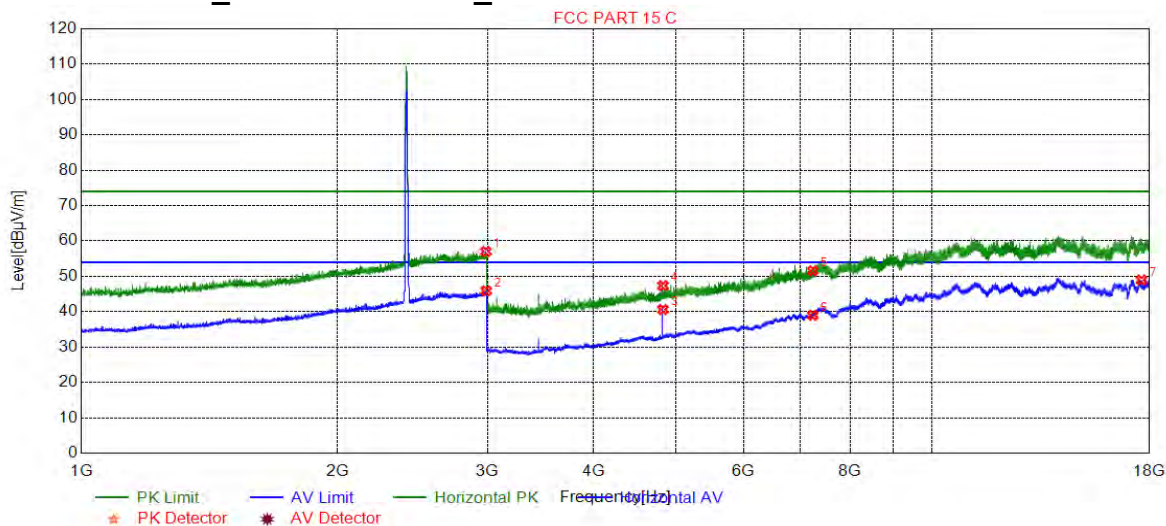
| Suspected List |             |                |             |                |             |             |           |          |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1              | 2920.4801   | 57.26          | 11.50       | 74.00          | 16.74       | 150         | 319       | Vertical |
| 2              | 2960.9902   | 45.73          | 11.66       | 54.00          | 8.27        | 150         | 18        | Vertical |
| 3              | 4924.0000   | 36.53          | -14.43      | 54.00          | 17.47       | 150         | 18        | Vertical |
| 4              | 4924.0000   | 45.94          | -14.43      | 74.00          | 28.06       | 150         | 127       | Vertical |
| 5              | 7386.0000   | 52.21          | -5.71       | 74.00          | 21.79       | 150         | 99        | Vertical |
| 6              | 7386.0000   | 40.96          | -5.71       | 54.00          | 13.04       | 150         | 316       | Vertical |
| 7              | 17601.4801  | 47.32          | 4.28        | 54.00          | 6.68        | 150         | 144       | 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   | 2988.4971   | 57.02          | 11.77       | 74.00          | 16.98       | 150         | 2         | Horizontal |
| 2   | 2989.9975   | 45.91          | 11.78       | 54.00          | 8.09        | 150         | 342       | Horizontal |
| 3   | 4824.0000   | 40.62          | -14.90      | 54.00          | 13.38       | 150         | 46        | Horizontal |
| 4   | 4824.0000   | 47.36          | -14.90      | 74.00          | 26.64       | 150         | 73        | Horizontal |
| 5   | 7236.0000   | 51.56          | -6.82       | 74.00          | 22.44       | 150         | 263       | Horizontal |
| 6   | 7236.0000   | 39.00          | -6.82       | 54.00          | 15.00       | 150         | 289       | Horizontal |
| 7   | 17608.9804  | 48.96          | 4.13        | 54.00          | 5.04        | 150         | 243       | Horizontal |



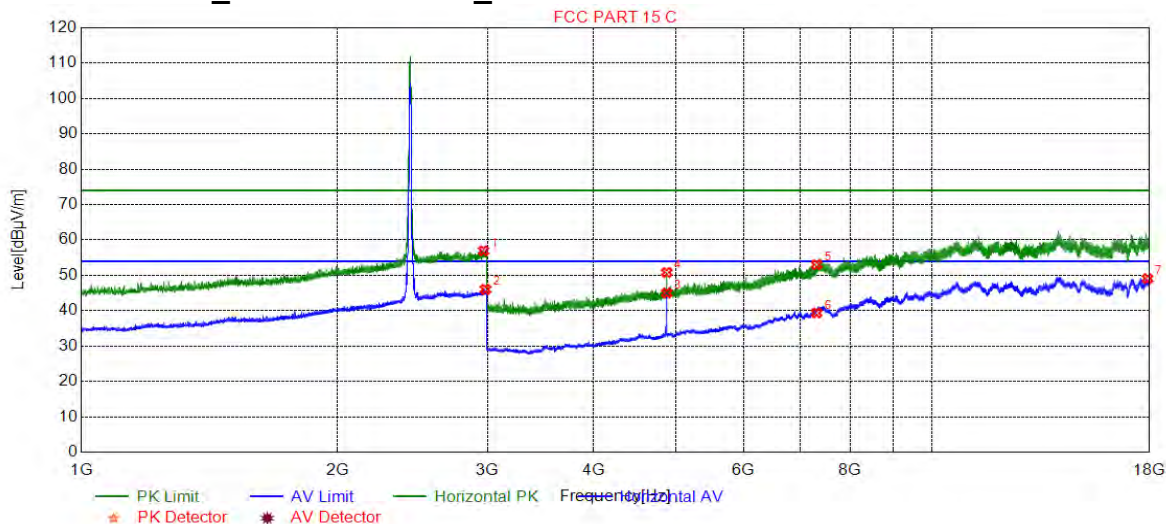
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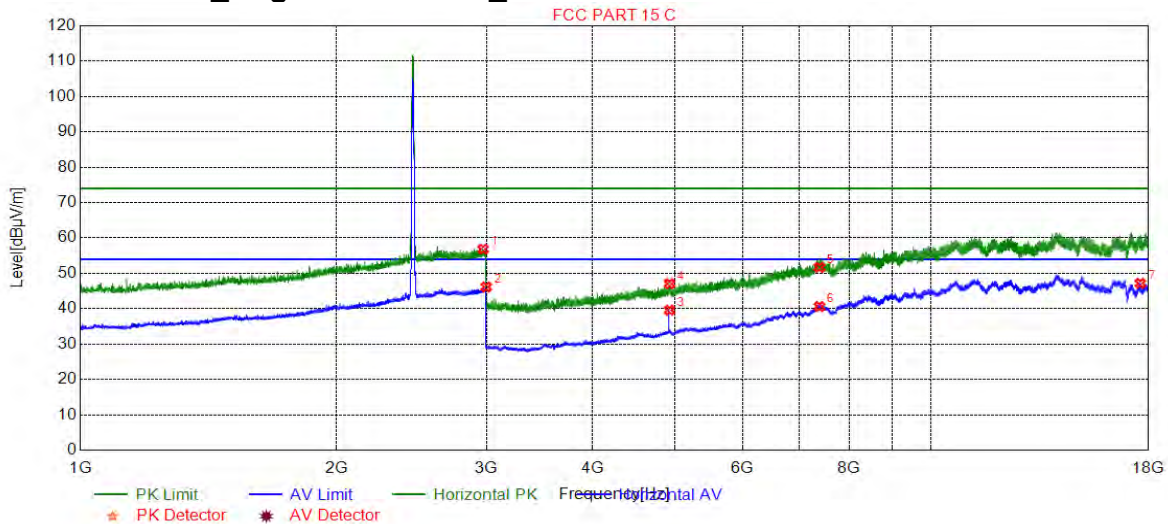
## 4.9.2.1.5 802.11B\_ Middle Channel\_ Horizontal



| Suspected List |             |                |             |                |             |             |           |            |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
| 1              | 2968.9922   | 56.96          | 11.70       | 74.00          | 17.04       | 150         | 14        | Horizontal |
| 2              | 2984.9962   | 46.05          | 11.76       | 54.00          | 7.95        | 150         | 342       | Horizontal |
| 3              | 4874.0000   | 45.01          | -14.68      | 54.00          | 8.99        | 150         | 126       | Horizontal |
| 4              | 4874.0000   | 50.83          | -14.68      | 74.00          | 23.17       | 150         | 126       | Horizontal |
| 5              | 7311.0000   | 53.05          | -6.24       | 74.00          | 20.95       | 150         | 126       | Horizontal |
| 6              | 7311.0000   | 39.37          | -6.24       | 54.00          | 14.63       | 150         | 99        | Horizontal |
| 7              | 17901.4951  | 49.06          | 2.68        | 54.00          | 4.94        | 150         | 44        | Horizontal |



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



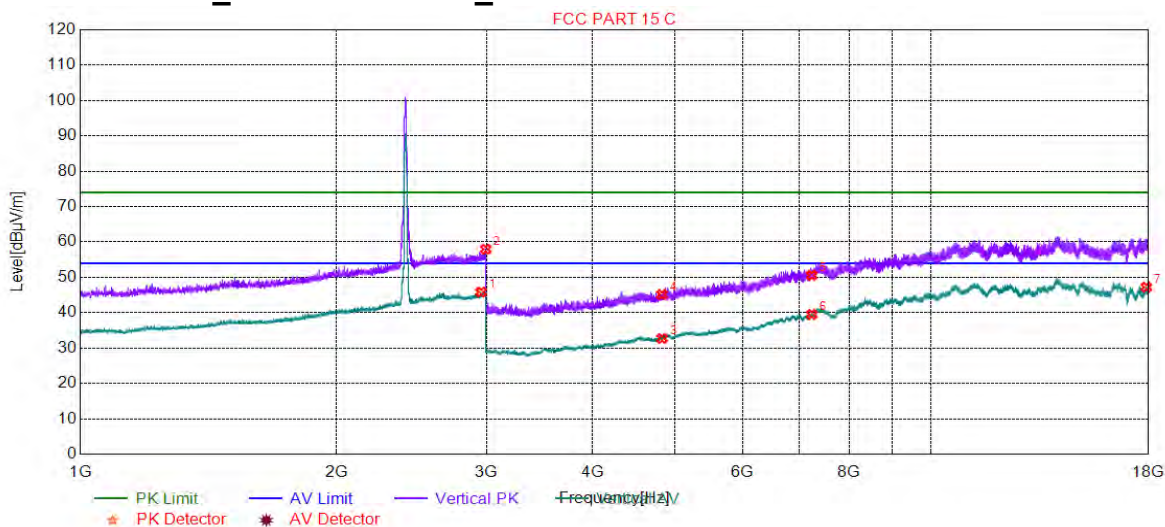
## Suspected List

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| 1   | 2973.4934   | 56.86          | 11.71       | 74.00          | 17.14       | 150         | 123       | Horizontal |
| 2   | 2998.4996   | 46.14          | 11.81       | 54.00          | 7.86        | 150         | 246       | Horizontal |
| 3   | 4924.0000   | 39.61          | -14.43      | 54.00          | 14.39       | 150         | 45        | Horizontal |
| 4   | 4924.0000   | 47.08          | -14.43      | 74.00          | 26.92       | 150         | 98        | Horizontal |
| 5   | 7386.0000   | 51.68          | -5.71       | 74.00          | 22.32       | 150         | 316       | Horizontal |
| 6   | 7386.0000   | 40.61          | -5.71       | 54.00          | 13.39       | 150         | 360       | Horizontal |
| 7   | 17603.4802  | 47.19          | 4.24        | 54.00          | 6.81        | 150         | 342       | Horizontal |





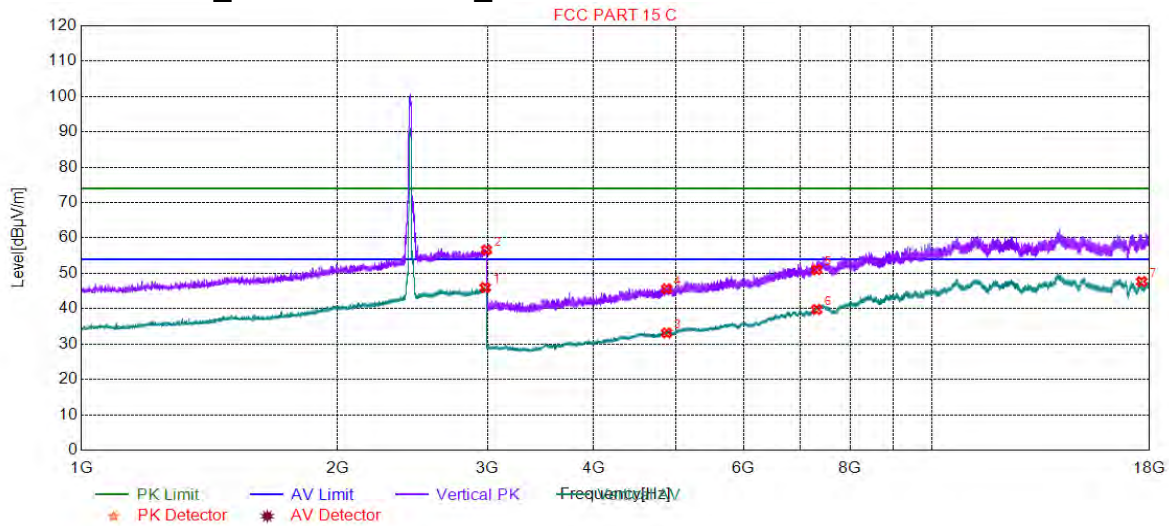
#### 4.9.2.1.7 802.11G\_Lowest Channel\_Vertical



| Suspected List |             |                |             |                |             |             |           |          |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1              | 2956.4891   | 45.86          | 11.65       | 54.00          | 8.14        | 150         | 360       | Vertical |
| 2              | 2995.4989   | 57.95          | 11.80       | 74.00          | 16.05       | 150         | 235       | Vertical |
| 3              | 4824.0000   | 32.71          | -14.90      | 54.00          | 21.29       | 150         | 236       | Vertical |
| 4              | 4824.0000   | 45.14          | -14.90      | 74.00          | 28.86       | 150         | 155       | Vertical |
| 5              | 7236.0000   | 50.58          | -6.82       | 74.00          | 23.42       | 150         | 209       | Vertical |
| 6              | 7236.0000   | 39.51          | -6.82       | 54.00          | 14.49       | 150         | 74        | Vertical |
| 7              | 17888.9945  | 47.22          | 2.54        | 54.00          | 6.78        | 150         | 342       | Vertical |



## 4.9.2.1.8 802.11G\_Middle Channel\_Vertical

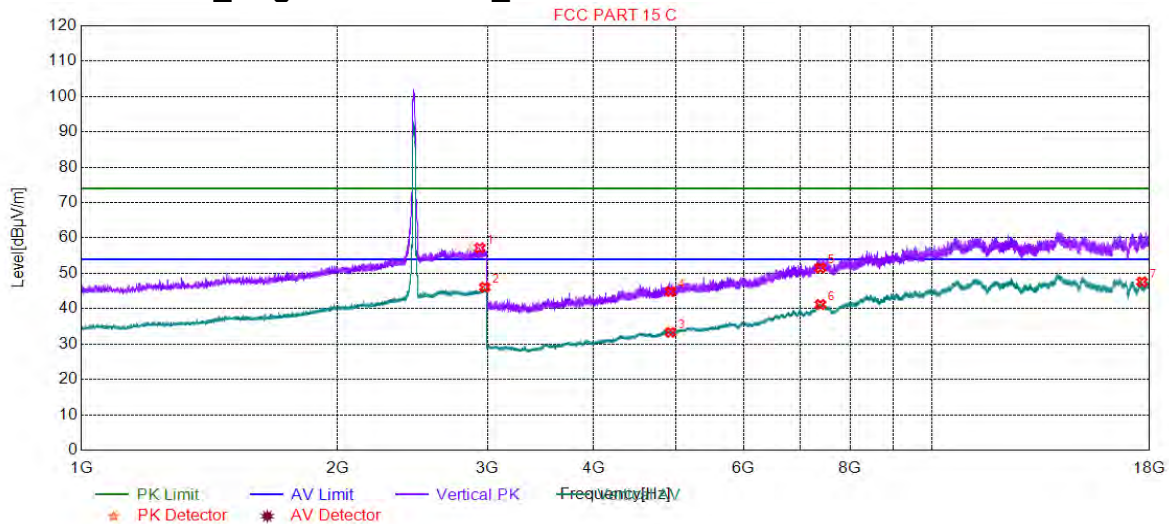


## Suspected List

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| 1   | 2982.4956   | 46.00          | 11.75       | 54.00          | 8.00        | 150         | 18        | Vertical |
| 2   | 2991.9980   | 56.64          | 11.79       | 74.00          | 17.36       | 150         | 333       | Vertical |
| 3   | 4874.0000   | 33.13          | -14.68      | 54.00          | 20.87       | 150         | 45        | Vertical |
| 4   | 4874.0000   | 45.64          | -14.68      | 74.00          | 28.36       | 150         | 18        | Vertical |
| 5   | 7311.0000   | 51.02          | -6.24       | 74.00          | 22.98       | 150         | 18        | Vertical |
| 6   | 7311.0000   | 39.75          | -6.24       | 54.00          | 14.25       | 150         | 207       | Vertical |
| 7   | 17615.9808  | 47.68          | 4.00        | 54.00          | 6.32        | 150         | 342       | Vertical |



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

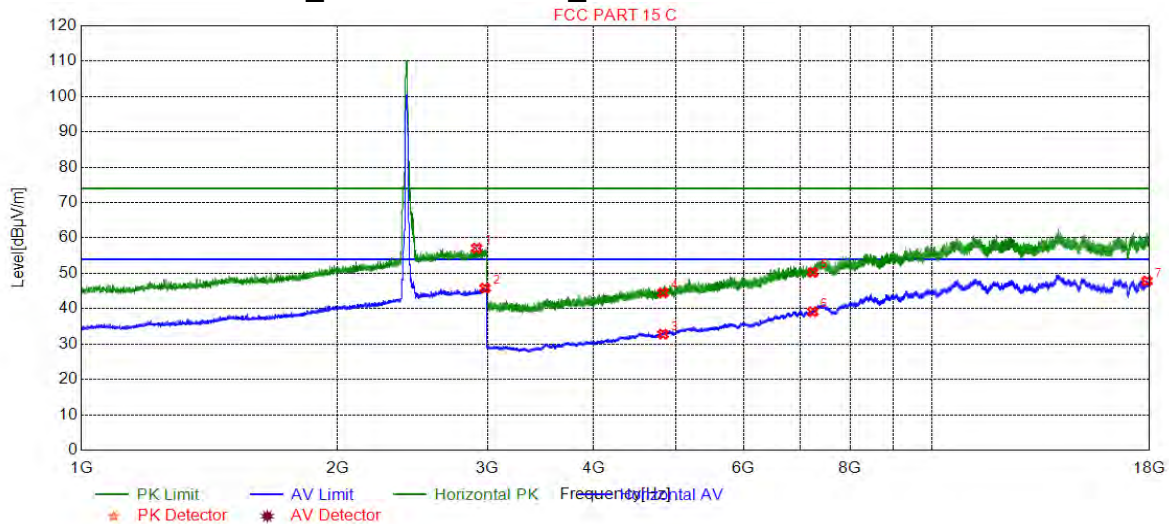


## Suspected List

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| 1   | 2937.9845   | 57.22          | 11.57       | 74.00          | 16.78       | 150         | 86        | Vertical |
| 2   | 2979.4949   | 46.07          | 11.74       | 54.00          | 7.93        | 150         | 357       | Vertical |
| 3   | 4924.0000   | 33.34          | -14.43      | 54.00          | 20.66       | 150         | 234       | Vertical |
| 4   | 4924.0000   | 44.85          | -14.43      | 74.00          | 29.15       | 150         | 288       | Vertical |
| 5   | 7386.0000   | 51.54          | -5.71       | 74.00          | 22.46       | 150         | 45        | Vertical |
| 6   | 7386.0000   | 41.17          | -5.71       | 54.00          | 12.83       | 150         | 72        | Vertical |
| 7   | 17634.4817  | 47.59          | 3.64        | 54.00          | 6.41        | 150         | 44        | Vertical |



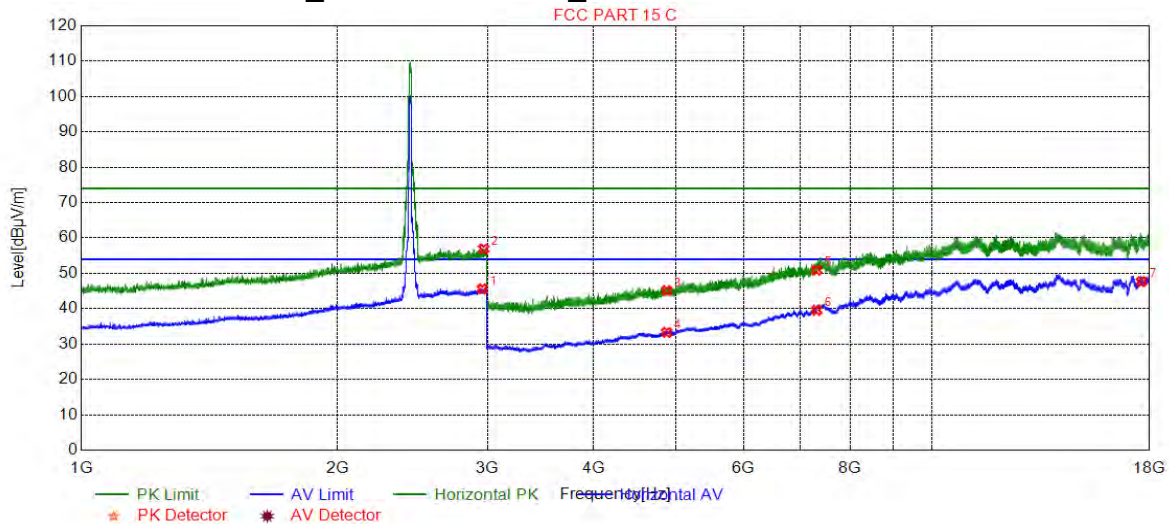
#### 4.9.2.1.10 802.11G\_Lowest Channel\_ Horizontal



| Suspected List |             |                |             |                |             |             |           |            |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
| 1              | 2914.9787   | 57.10          | 11.48       | 74.00          | 16.90       | 150         | 54        | Horizontal |
| 2              | 2981.4954   | 45.82          | 11.75       | 54.00          | 8.18        | 150         | 81        | Horizontal |
| 3              | 4824.0000   | 32.80          | -14.90      | 54.00          | 21.20       | 150         | 18        | Horizontal |
| 4              | 4824.0000   | 44.48          | -14.90      | 74.00          | 29.52       | 150         | 100       | Horizontal |
| 5              | 7236.0000   | 50.29          | -6.82       | 74.00          | 23.71       | 150         | 100       | Horizontal |
| 6              | 7236.0000   | 39.16          | -6.82       | 54.00          | 14.84       | 150         | 315       | Horizontal |
| 7              | 17866.9934  | 47.83          | 2.25        | 54.00          | 6.17        | 150         | 292       | Horizontal |



## 4.9.2.1.11 802.11G\_Middle Channel\_Horizontal

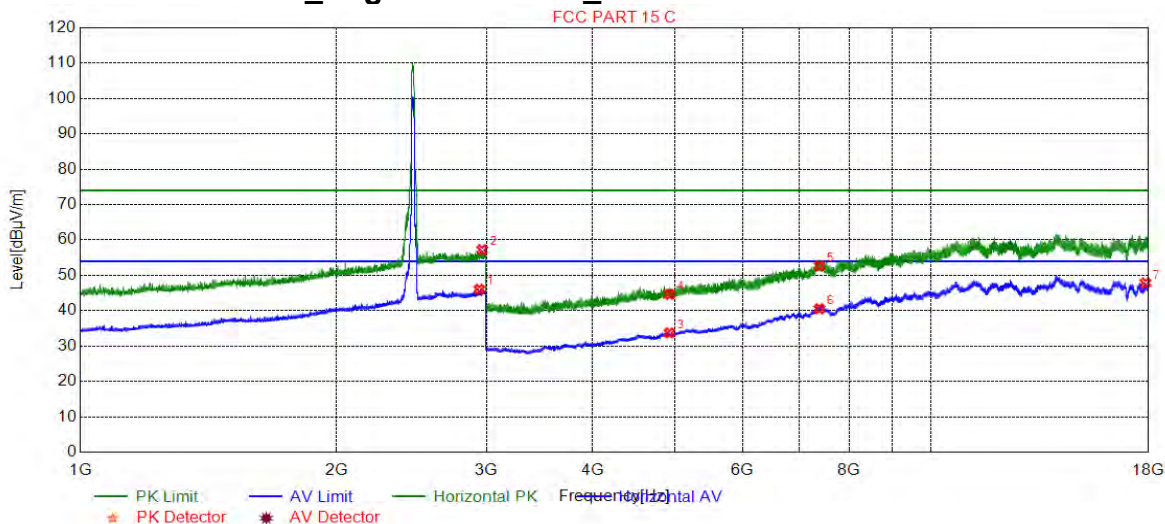


## Suspected List

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| 1   | 2958.4896   | 45.61          | 11.65       | 54.00          | 8.39        | 150         | 68        | Horizontal |
| 2   | 2969.9925   | 56.92          | 11.70       | 74.00          | 17.08       | 150         | 2         | Horizontal |
| 3   | 4874.0000   | 45.13          | -14.68      | 74.00          | 28.87       | 150         | 179       | Horizontal |
| 4   | 4874.0000   | 33.33          | -14.68      | 54.00          | 20.67       | 150         | 18        | Horizontal |
| 5   | 7311.0000   | 50.93          | -6.24       | 74.00          | 23.07       | 150         | 152       | Horizontal |
| 6   | 7311.0000   | 39.58          | -6.24       | 54.00          | 14.42       | 150         | 314       | Horizontal |
| 7   | 17607.4804  | 47.67          | 4.16        | 54.00          | 6.33        | 150         | 93        | Horizontal |



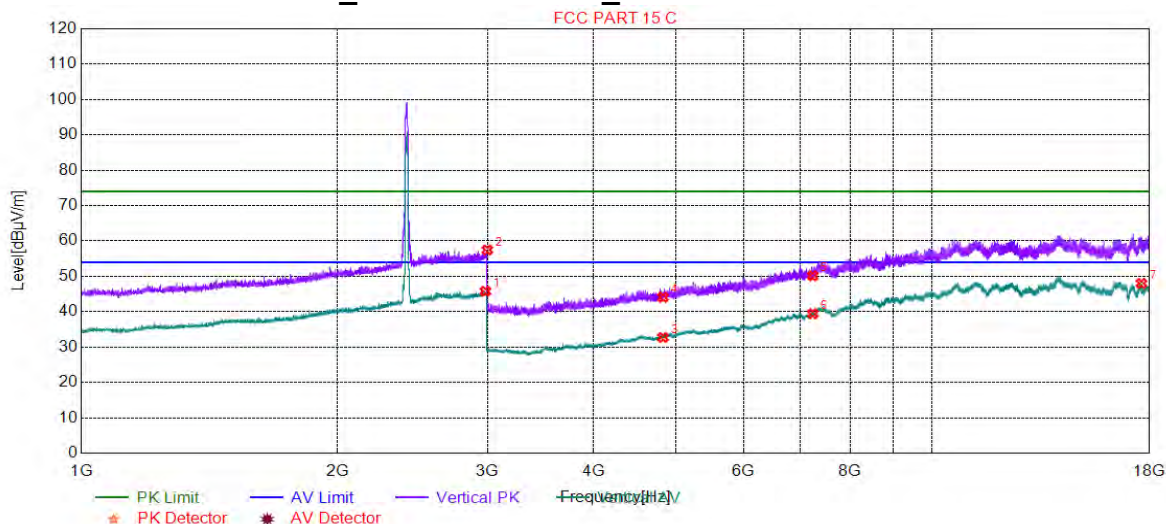
#### 4.9.2.1.12 802.11G\_ Highest Channel\_ Horizontal



| Suspected List |             |                |             |                |             |             |           |            |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
| 1              | 2942.4856   | 46.07          | 11.59       | 54.00          | 7.93        | 150         | 190       | Horizontal |
| 2              | 2965.9915   | 57.25          | 11.68       | 74.00          | 16.75       | 150         | 259       | Horizontal |
| 3              | 4924.0000   | 33.72          | -14.43      | 54.00          | 20.28       | 150         | 360       | Horizontal |
| 4              | 4924.0000   | 44.62          | -14.43      | 74.00          | 29.38       | 150         | 208       | Horizontal |
| 5              | 7386.0000   | 52.68          | -5.71       | 74.00          | 21.32       | 150         | 46        | Horizontal |
| 6              | 7386.0000   | 40.56          | -5.71       | 54.00          | 13.44       | 150         | 289       | Horizontal |
| 7              | 17849.4925  | 47.86          | 2.02        | 54.00          | 6.14        | 150         | 146       | Horizontal |



#### 4.9.2.1.13 802.11N20\_Lowest Channel\_Vertical



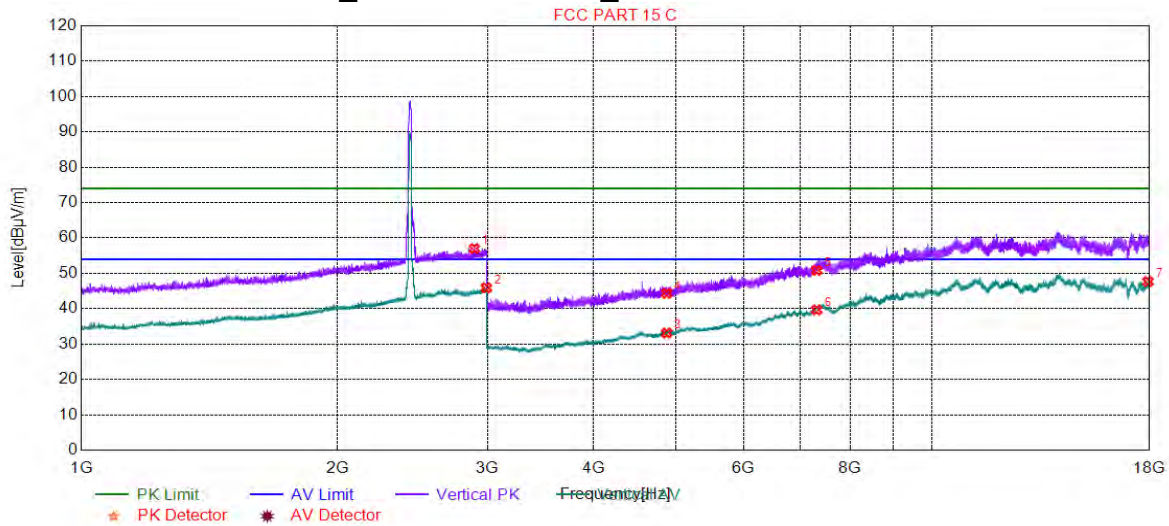
| Suspected List |             |                |             |                |             |             |           |          |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1              | 2983.9960   | 45.79          | 11.76       | 54.00          | 8.21        | 150         | 278       | Vertical |
| 2              | 2999.4999   | 57.48          | 11.82       | 74.00          | 16.52       | 150         | 141       | Vertical |
| 3              | 4824.0000   | 32.72          | -14.90      | 54.00          | 21.28       | 150         | 211       | Vertical |
| 4              | 4824.0000   | 44.08          | -14.90      | 74.00          | 29.92       | 150         | 73        | Vertical |
| 5              | 7236.0000   | 50.13          | -6.82       | 74.00          | 23.87       | 150         | 292       | Vertical |
| 6              | 7236.0000   | 39.45          | -6.82       | 54.00          | 14.55       | 150         | 292       | Vertical |
| 7              | 17607.4804  | 47.99          | 4.16        | 54.00          | 6.01        | 150         | 44        | Vertical |



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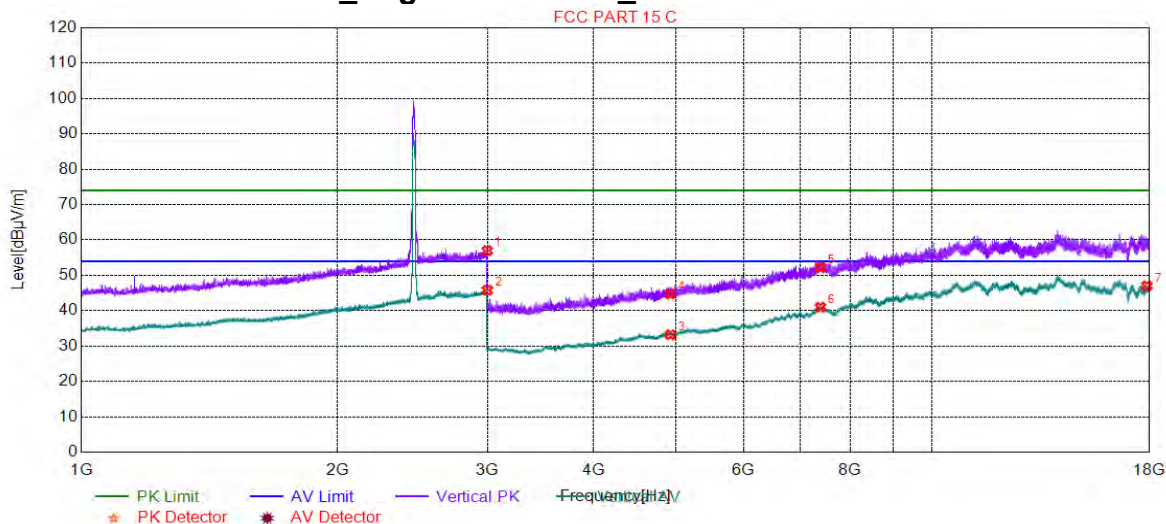
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#### 4.9.2.1.14 802.11N20\_Middle Channel\_Vertical



| Suspected List |             |                |             |                |             |             |           |          |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1              | 2895.9740   | 57.02          | 11.42       | 74.00          | 16.98       | 150         | 183       | Vertical |
| 2              | 2991.4979   | 45.91          | 11.79       | 54.00          | 8.09        | 150         | 266       | Vertical |
| 3              | 4874.0000   | 33.12          | -14.68      | 54.00          | 20.88       | 150         | 187       | Vertical |
| 4              | 4874.0000   | 44.34          | -14.68      | 74.00          | 29.66       | 150         | 348       | Vertical |
| 5              | 7311.0000   | 50.85          | -6.24       | 74.00          | 23.15       | 150         | 133       | Vertical |
| 6              | 7311.0000   | 39.66          | -6.24       | 54.00          | 14.34       | 150         | 18        | Vertical |
| 7              | 17920.4960  | 47.69          | 2.49        | 54.00          | 6.31        | 150         | 1         | Vertical |

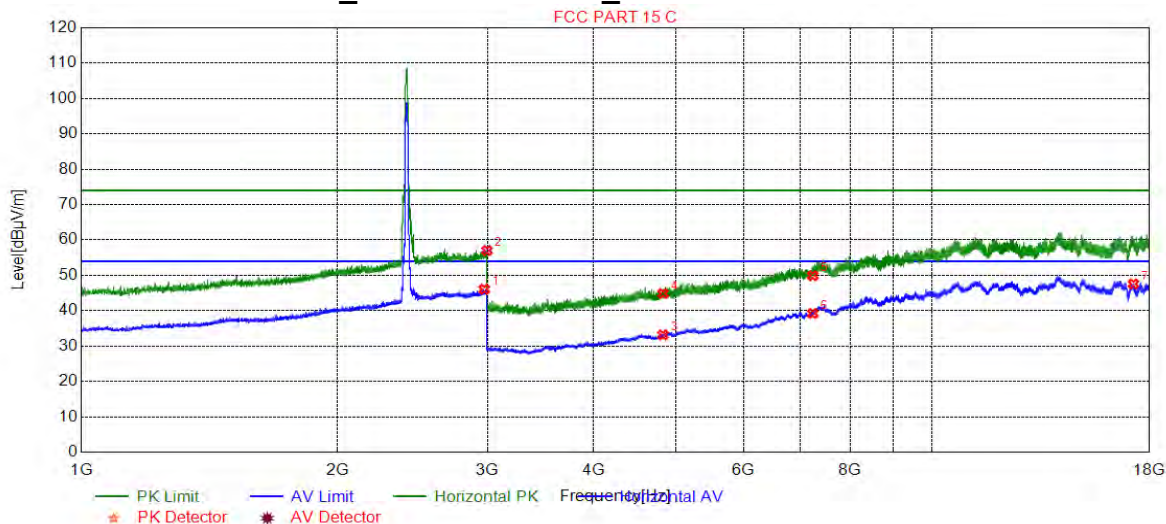
#### 4.9.2.1.15 802.11N20\_ Highest Channel\_ Vertical



| Suspected List |             |                |             |                |             |             |           |          |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1              | 2997.9995   | 56.98          | 11.81       | 74.00          | 17.02       | 150         | 196       | Vertical |
| 2              | 2998.9998   | 45.78          | 11.82       | 54.00          | 8.22        | 150         | 18        | Vertical |
| 3              | 4924.0000   | 33.18          | -14.43      | 54.00          | 20.82       | 150         | 18        | Vertical |
| 4              | 4924.0000   | 44.70          | -14.43      | 74.00          | 29.30       | 150         | 233       | Vertical |
| 5              | 7386.0000   | 52.17          | -5.71       | 74.00          | 21.83       | 150         | 71        | Vertical |
| 6              | 7386.0000   | 40.99          | -5.71       | 54.00          | 13.01       | 150         | 314       | Vertical |
| 7              | 17868.9935  | 47.04          | 2.28        | 54.00          | 6.96        | 150         | 44        | Vertical |



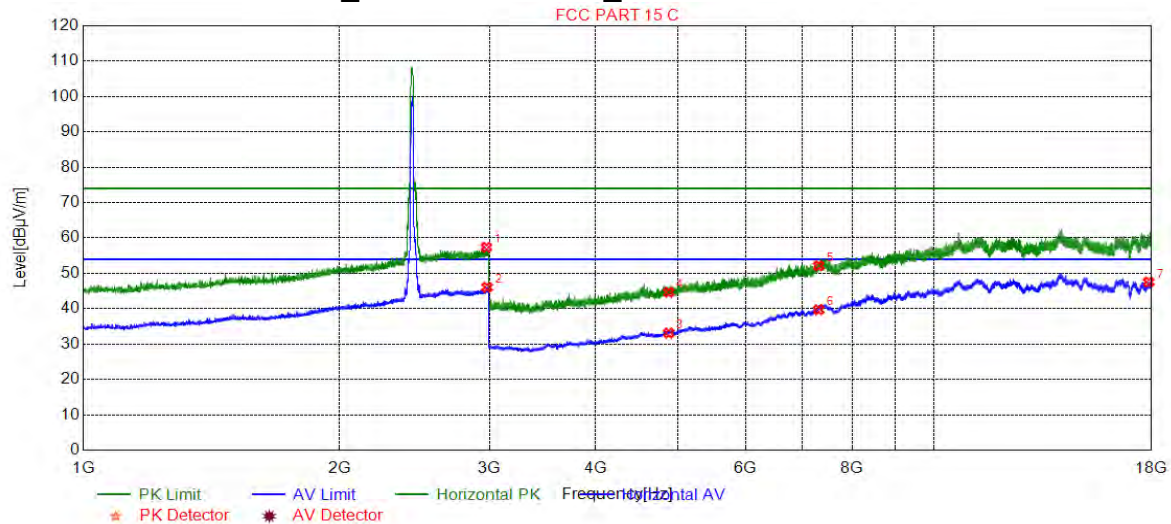
#### 4.9.2.1.16 802.11N20\_Lowest Channel\_ Horizontal



| Suspected List |             |                |             |                |             |             |           |            |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
| 1              | 2974.4936   | 46.08          | 11.72       | 54.00          | 7.92        | 150         | 302       | Horizontal |
| 2              | 2996.9993   | 57.02          | 11.81       | 74.00          | 16.98       | 150         | 14        | Horizontal |
| 3              | 4824.0000   | 33.16          | -14.90      | 54.00          | 20.84       | 150         | 72        | Horizontal |
| 4              | 4824.0000   | 44.85          | -14.90      | 74.00          | 29.15       | 150         | 219       | Horizontal |
| 5              | 7236.0000   | 49.91          | -6.82       | 74.00          | 24.09       | 150         | 160       | Horizontal |
| 6              | 7236.0000   | 39.22          | -6.82       | 54.00          | 14.78       | 150         | 105       | Horizontal |
| 7              | 17226.9613  | 47.59          | 2.51        | 54.00          | 6.41        | 150         | 243       | Horizontal |



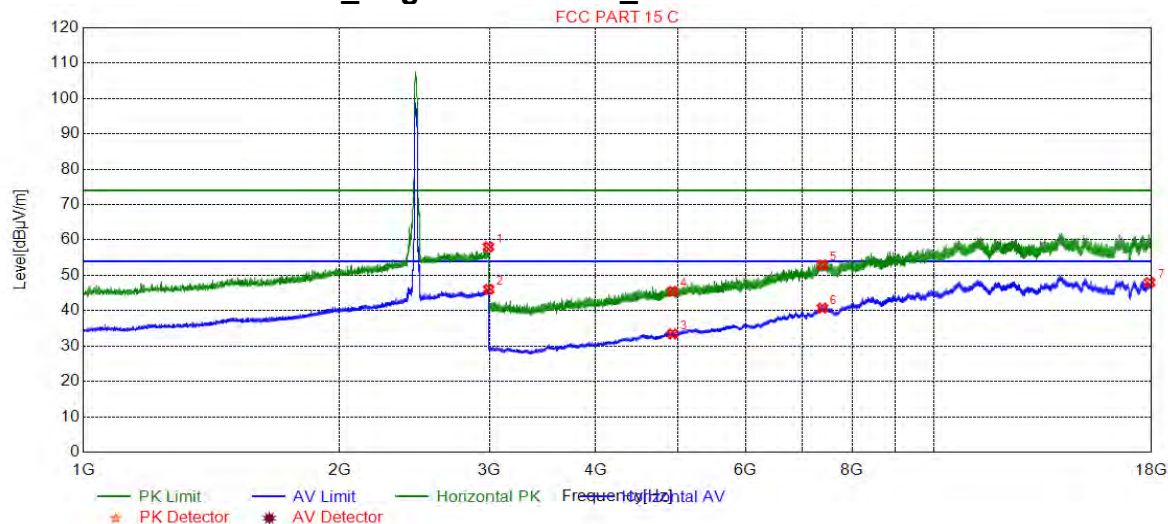
#### 4.9.2.1.17 802.11N20\_ Middle Channel\_ Horizontal



| Suspected List |             |                |             |                |             |             |           |            |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
| 1              | 2975.9940   | 57.36          | 11.72       | 74.00          | 16.64       | 150         | 204       | Horizontal |
| 2              | 2981.9955   | 46.07          | 11.75       | 54.00          | 7.93        | 150         | 3         | Horizontal |
| 3              | 4874.0000   | 33.11          | -14.68      | 54.00          | 20.89       | 150         | 154       | Horizontal |
| 4              | 4874.0000   | 44.63          | -14.68      | 74.00          | 29.37       | 150         | 126       | Horizontal |
| 5              | 7311.0000   | 52.14          | -6.24       | 74.00          | 21.86       | 150         | 99        | Horizontal |
| 6              | 7311.0000   | 39.70          | -6.24       | 54.00          | 14.30       | 150         | 342       | Horizontal |
| 7              | 17858.4929  | 47.55          | 2.14        | 54.00          | 6.45        | 150         | 342       | Horizontal |



#### 4.9.2.1.18 802.11N20\_ Highest Channel\_ Horizontal



| Suspected List |             |                |             |                |             |             |           |            |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
| 1              | 2992.4981   | 58.06          | 11.79       | 74.00          | 15.94       | 150         | 273       | Horizontal |
| 2              | 2994.4986   | 46.05          | 11.80       | 54.00          | 7.95        | 150         | 68        | Horizontal |
| 3              | 4924.0000   | 33.43          | -14.43      | 54.00          | 20.57       | 150         | 341       | Horizontal |
| 4              | 4924.0000   | 45.47          | -14.43      | 74.00          | 28.53       | 150         | 287       | Horizontal |
| 5              | 7386.0000   | 52.96          | -5.71       | 74.00          | 21.04       | 150         | 260       | Horizontal |
| 6              | 7386.0000   | 40.74          | -5.71       | 54.00          | 13.26       | 150         | 18        | Horizontal |
| 7              | 17904.4952  | 48.00          | 2.65        | 54.00          | 6.00        | 150         | 45        | Horizontal |

#### Remark:

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

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

2) Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz and 18GHz to 25GHz was very low, and the above harmonics were the highest point could be found when testing, The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

4) All Modes have been tested, but only the worst case data displayed in this report.



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## 4.10 Restricted bands around fundamental frequency

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

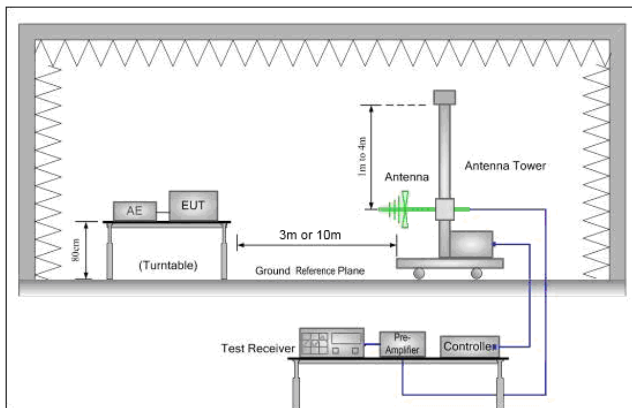


Figure 1. 30MHz to 1GHz

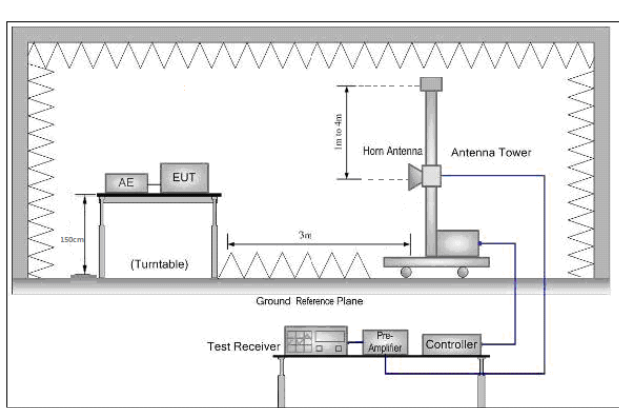


Figure 2. Above 1 GHz

|                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Test Procedure:</p>        | <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>k. Use the following spectrum analyzer settings:</p> <p>(1) Span shall wide enough to fully capture the emission being measured;</p> <p>(2) Set RBW=100 kHz for <math>f &lt; 1 \text{ GHz}</math>, RBW=1MHz for <math>f &gt; 1 \text{ GHz}</math> ;<br/>VBW <math>\geq</math> RBW; Sweep = auto;<br/>Detector function = peak; Trace = max hold for peak</p> <p>(3) For average measurement: use duty cycle correction factor method per 15.35(c).</p> <p style="padding-left: 40px;">Duty cycle = On time/100 milliseconds</p> <p style="padding-left: 40px;">On time = <math>N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n</math></p> <p>Where <math>N_1</math> is number of type 1 pulses, <math>L_1</math> is length of type 1 pulses, etc.</p> <p>Average Emission Level = Peak Emission Level + <math>20 * \log(\text{Duty cycle})</math></p> <p>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.</p> <p>f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>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</p> <p>h. Test the EUT in the lowest 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> |
| <p>Exploratory Test Mode:</p> | <p>Transmitting with all kind of modulations, data rates.</p> <p>Charge + Transmitting mode.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>Final Test Mode:</p>       | <p>Pretest the EUT at Charge +Transmitting mode.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

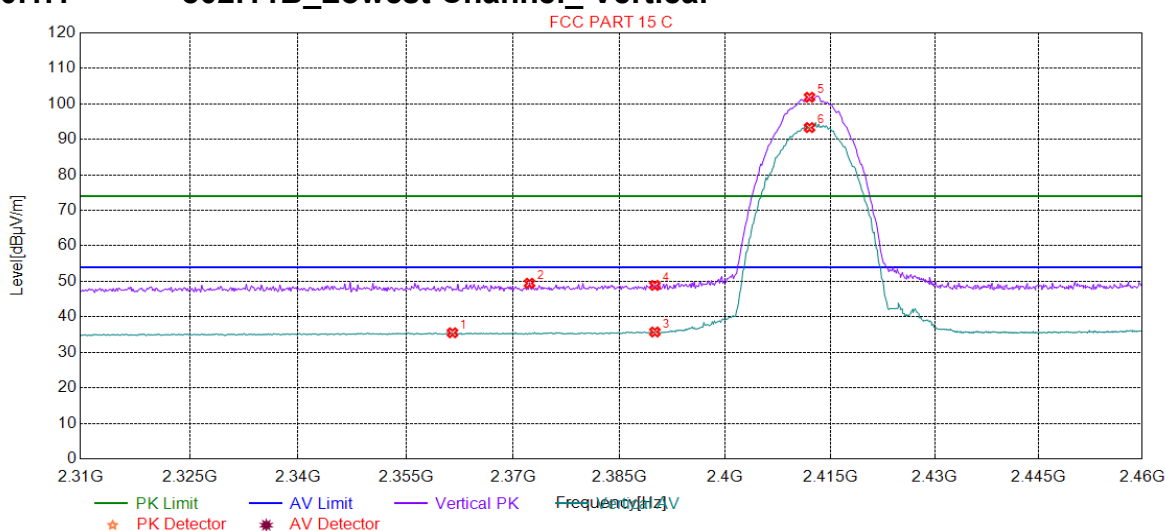




|                   |                                                                                                                                                                                                                                    |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   | Through Pre-scan, find the<br>1Mbps of rate is the worst case of 802.11B;<br>6Mbps of rate is the worst case of 802.11G ;<br>6.5Mbps of rate is the worst case of 802.11N(HT20);<br>Only the worst case is recorded in the report. |
| Instruments Used: | Refer to section 5.10 for details                                                                                                                                                                                                  |
| Test Results:     | Pass                                                                                                                                                                                                                               |

#### 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   | 2361.5015   | 35.52          | 9.61        | 54.00          | 18.48       | 150         | 326       | Vertical |
| 2   | 2372.3123   | 49.46          | 9.62        | 74.00          | 24.54       | 150         | 140       | Vertical |
| 3   | 2390.0000   | 35.74          | 9.65        | 54.00          | 18.26       | 150         | 305       | Vertical |
| 4   | 2390.0000   | 48.86          | 9.65        | 74.00          | 25.14       | 150         | 318       | Vertical |
| 5   | 2412.0000   | 101.87         | 9.74        | 74.00          | -27.87      | 150         | 322       | Vertical |
| 6   | 2412.0000   | 93.33          | 9.74        | 54.00          | -39.33      | 150         | 318       | Vertical |

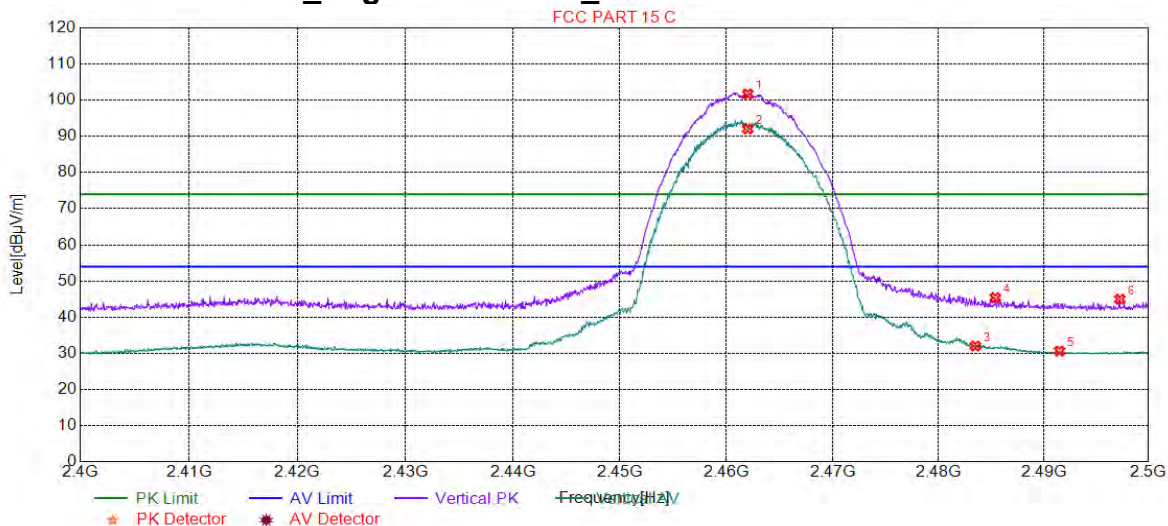


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#### 4.10.1.2 802.11B\_ Highest Channel\_ Vertical

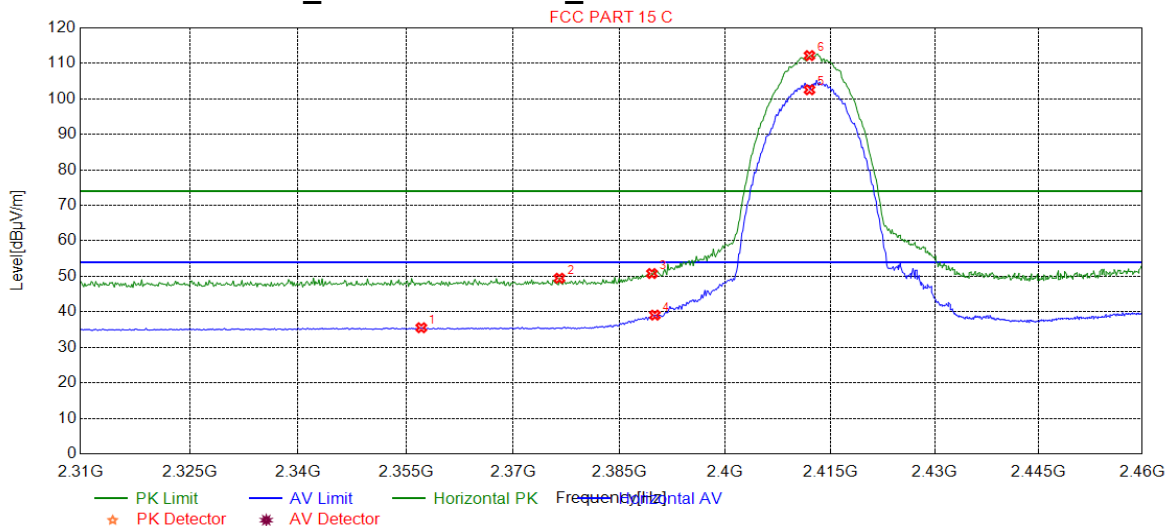


| Suspected List |             |                |             |                |             |             |           |          |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1              | 2462.0000   | 101.74         | 10.03       | 74.00          | -27.74      | 150         | 322       | Vertical |
| 2              | 2462.0000   | 92.05          | 10.03       | 54.00          | -38.05      | 150         | 284       | Vertical |
| 3              | 2483.5000   | 32.02          | 10.10       | 54.00          | 21.98       | 150         | 316       | Vertical |
| 4              | 2485.3927   | 45.39          | 10.10       | 74.00          | 28.61       | 150         | 289       | Vertical |
| 5              | 2491.4957   | 30.64          | 10.12       | 54.00          | 23.36       | 150         | 316       | Vertical |
| 6              | 2497.2486   | 44.95          | 10.14       | 74.00          | 29.05       | 150         | 289       | Vertical |





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



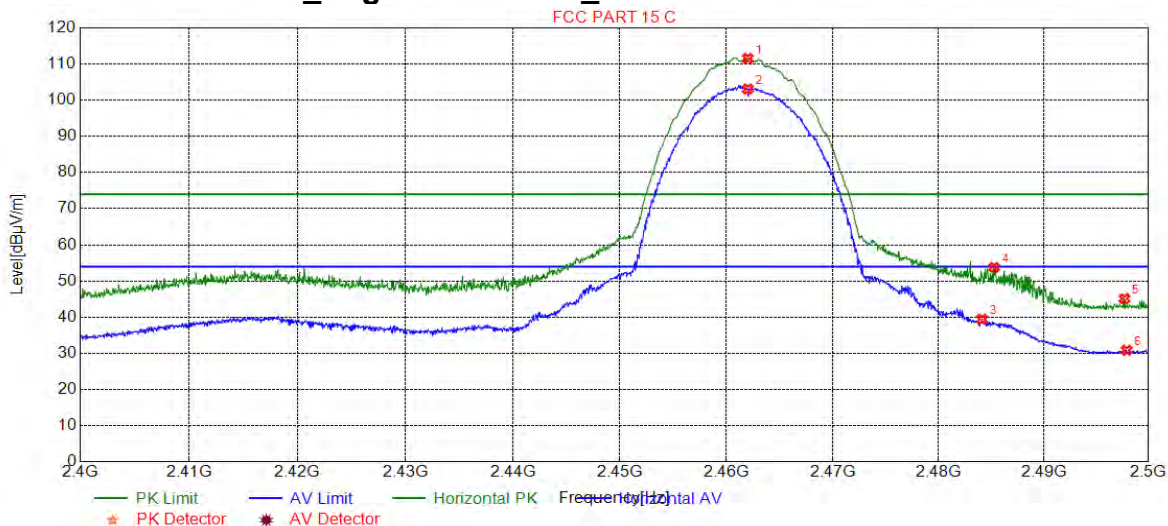
| Suspected List |             |                |             |                |             |             |           |            |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
| 1              | 2357.1471   | 35.53          | 9.60        | 54.00          | 18.47       | 150         | 128       | Horizontal |
| 2              | 2376.5165   | 49.48          | 9.63        | 74.00          | 24.52       | 150         | 0         | Horizontal |
| 3              | 2389.5796   | 50.80          | 9.65        | 74.00          | 23.20       | 150         | 207       | Horizontal |
| 4              | 2390.0000   | 39.09          | 9.65        | 54.00          | 14.91       | 150         | 207       | Horizontal |
| 5              | 2412.0000   | 102.56         | 9.74        | 54.00          | -48.56      | 150         | 203       | Horizontal |
| 6              | 2412.0000   | 112.19         | 9.74        | 74.00          | -38.19      | 150         | 207       | Horizontal |



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#### 4.10.1.4 802.11B\_ Highest Channel\_ Horizontal

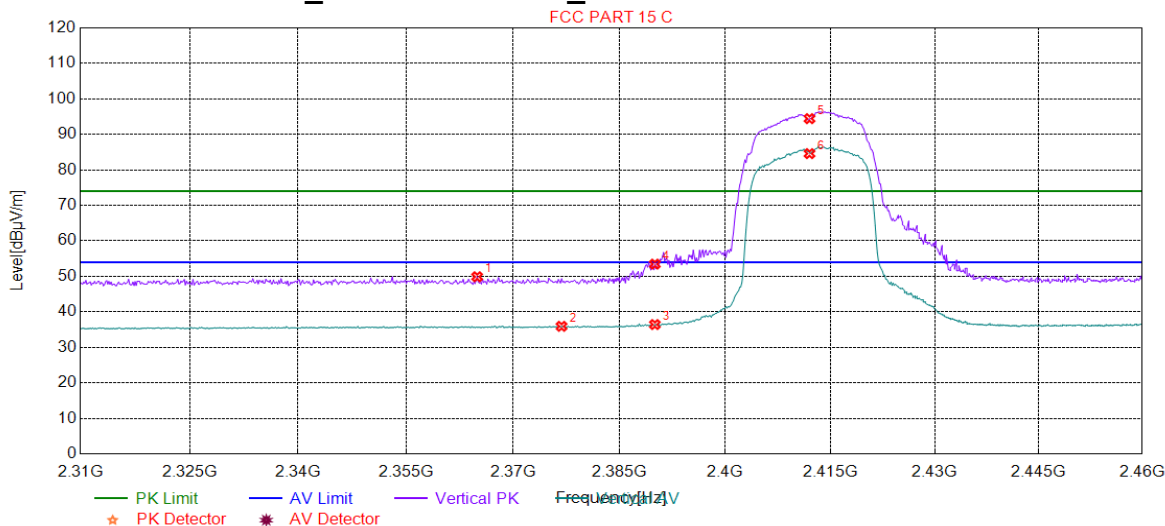


| Suspected List |             |                |             |                |             |             |           |            |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
| 1              | 2462.0000   | 111.56         | 10.03       | 74.00          | -37.56      | 150         | 199       | Horizontal |
| 2              | 2462.0000   | 103.09         | 10.03       | 54.00          | -49.09      | 150         | 194       | Horizontal |
| 3              | 2484.1421   | 39.44          | 10.10       | 54.00          | 14.56       | 150         | 204       | Horizontal |
| 4              | 2485.2926   | 53.78          | 10.10       | 74.00          | 20.22       | 150         | 199       | Horizontal |
| 5              | 2497.6988   | 45.12          | 10.14       | 74.00          | 28.88       | 150         | 23        | Horizontal |
| 6              | 2497.8989   | 30.83          | 10.14       | 54.00          | 23.17       | 150         | 194       | Horizontal |





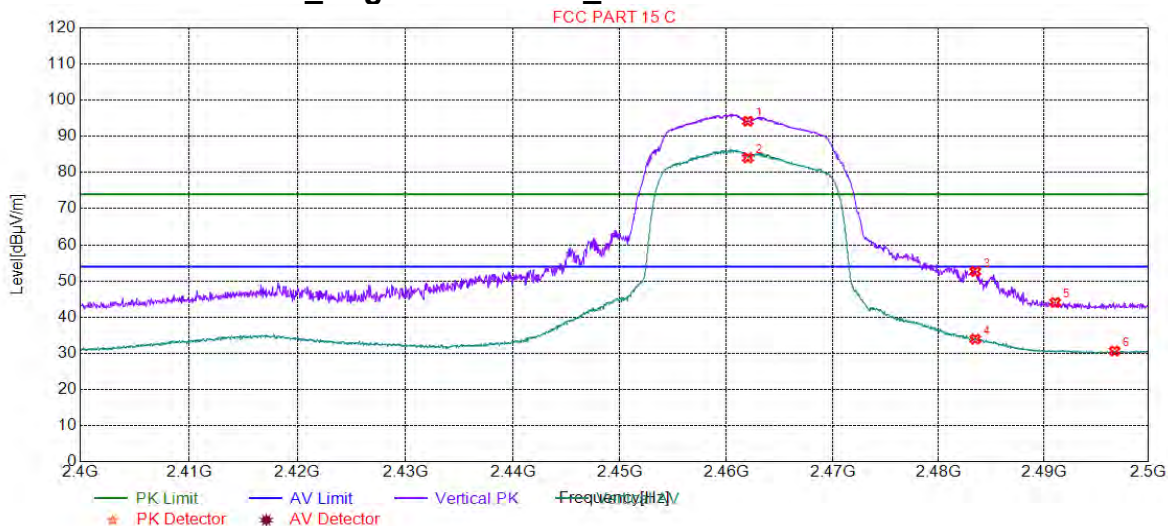
#### 4.10.1.5 802.11G\_Lowest Channel\_Vertical



| Suspected List |             |                |             |                |             |             |           |          |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1              | 2364.9550   | 49.89          | 9.61        | 74.00          | 24.11       | 150         | 316       | Vertical |
| 2              | 2376.8168   | 35.93          | 9.63        | 54.00          | 18.07       | 150         | 354       | Vertical |
| 3              | 2390.0000   | 36.43          | 9.65        | 54.00          | 17.57       | 150         | 190       | Vertical |
| 4              | 2390.0000   | 53.45          | 9.65        | 74.00          | 20.55       | 150         | 91        | Vertical |
| 5              | 2412.0000   | 94.43          | 9.74        | 74.00          | -20.43      | 150         | 91        | Vertical |
| 6              | 2412.0000   | 84.58          | 9.74        | 54.00          | -30.58      | 150         | 91        | Vertical |



#### 4.10.1.6 802.11G\_ Highest Channel\_ Vertical



| Suspected List |             |                |             |                |             |             |           |          |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1              | 2462.0000   | 94.20          | 10.03       | 74.00          | -20.20      | 150         | 321       | Vertical |
| 2              | 2462.0000   | 84.09          | 10.03       | 54.00          | -30.09      | 150         | 321       | Vertical |
| 3              | 2483.5000   | 52.62          | 10.10       | 74.00          | 21.38       | 150         | 67        | Vertical |
| 4              | 2483.5000   | 33.93          | 10.10       | 54.00          | 20.07       | 150         | 277       | Vertical |
| 5              | 2491.0955   | 44.07          | 10.12       | 74.00          | 29.93       | 150         | 354       | Vertical |
| 6              | 2496.7484   | 30.64          | 10.14       | 54.00          | 23.36       | 150         | 57        | Vertical |



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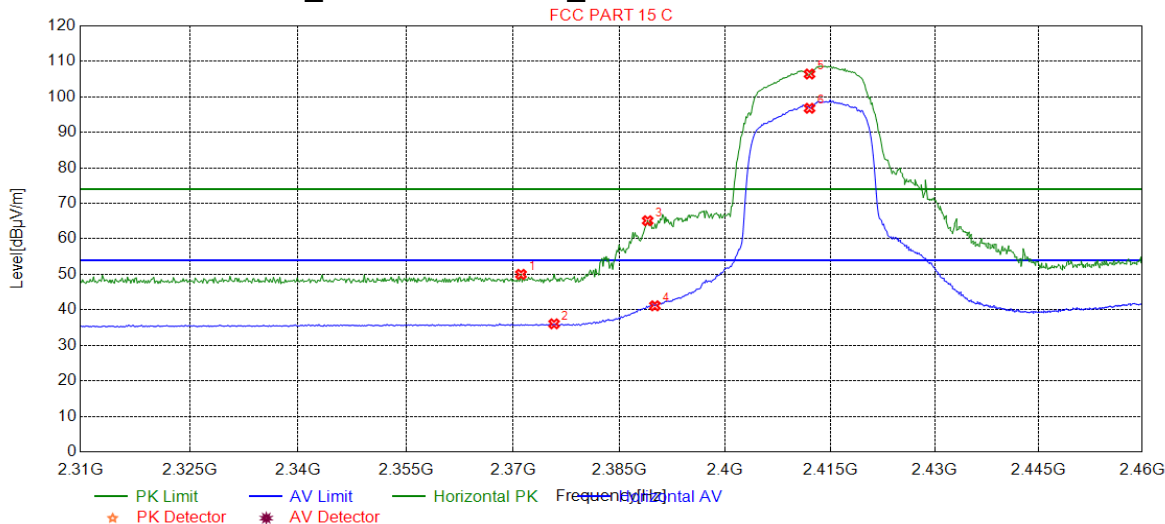
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#### 4.10.1.7 802.11G\_Lowest Channel\_ Horizontal

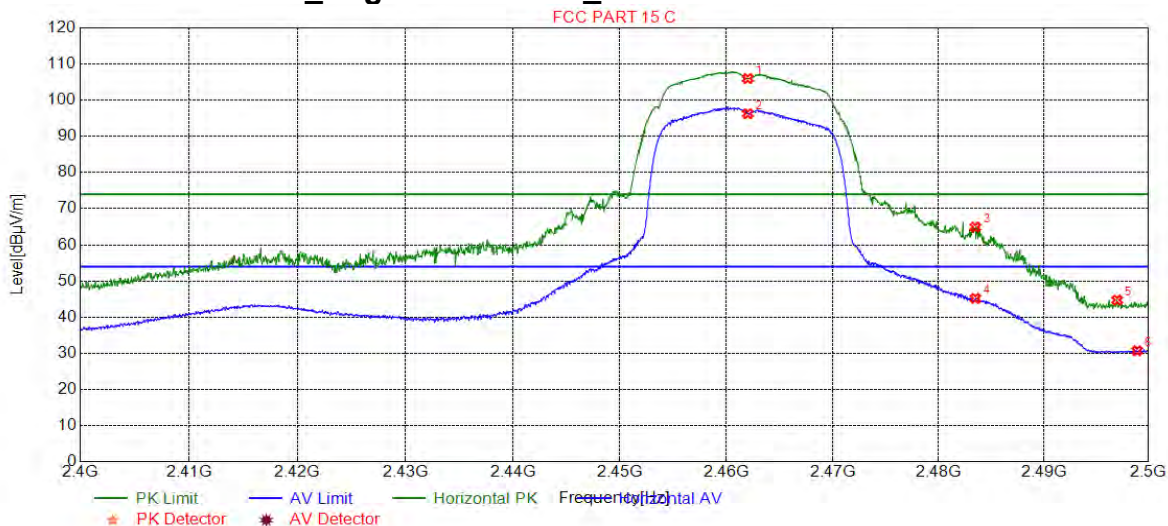


#### Suspected List

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| 1   | 2371.1111   | 50.01          | 9.62        | 74.00          | 23.99       | 150         | 219       | Horizontal |
| 2   | 2375.7658   | 36.07          | 9.63        | 54.00          | 17.93       | 150         | 257       | Horizontal |
| 3   | 2388.9790   | 65.11          | 9.64        | 74.00          | 8.89        | 150         | 199       | Horizontal |
| 4   | 2390.0000   | 41.15          | 9.65        | 54.00          | 12.85       | 150         | 203       | Horizontal |
| 5   | 2412.0000   | 106.43         | 9.74        | 74.00          | -32.43      | 150         | 203       | Horizontal |
| 6   | 2412.0000   | 96.79          | 9.74        | 54.00          | -42.79      | 150         | 199       | Horizontal |



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

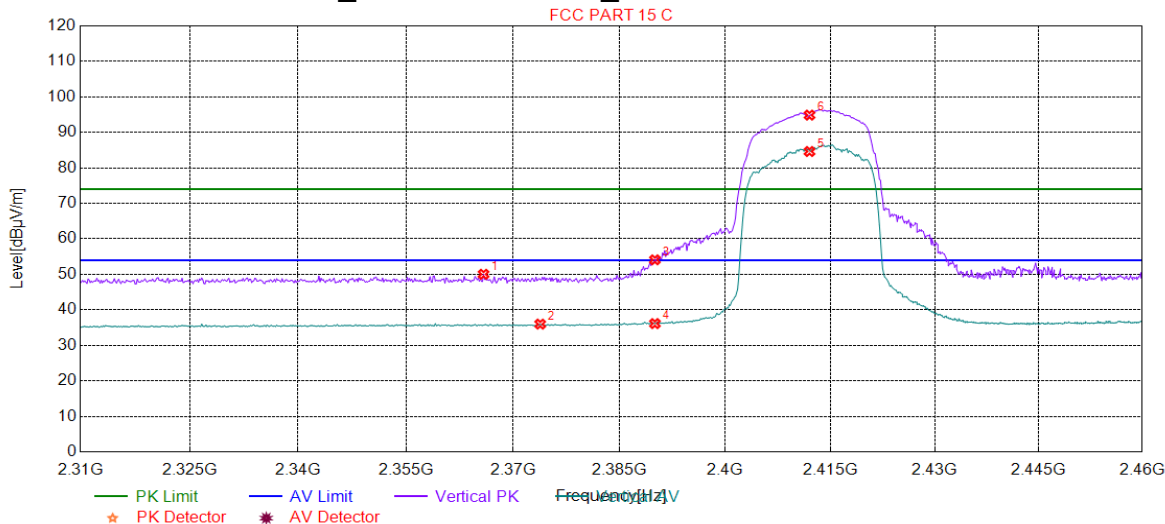


| Suspected List |             |                |             |                |             |             |           |            |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
| 1              | 2462.0000   | 105.99         | 10.03       | 74.00          | -31.99      | 150         | 244       | Horizontal |
| 2              | 2462.0000   | 96.26          | 10.03       | 54.00          | -42.26      | 150         | 200       | Horizontal |
| 3              | 2483.5000   | 64.90          | 10.10       | 74.00          | 9.10        | 150         | 244       | Horizontal |
| 4              | 2483.5000   | 45.20          | 10.10       | 54.00          | 8.80        | 150         | 244       | Horizontal |
| 5              | 2496.9985   | 44.72          | 10.14       | 74.00          | 29.28       | 150         | 140       | Horizontal |
| 6              | 2498.8995   | 30.71          | 10.15       | 54.00          | 23.29       | 150         | 310       | 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              | 2365.8559   | 50.04          | 9.61        | 74.00          | 23.96       | 150         | 287       | Vertical |
| 2              | 2373.8138   | 35.99          | 9.62        | 54.00          | 18.01       | 150         | 115       | Vertical |
| 3              | 2390.0000   | 54.10          | 9.65        | 74.00          | 19.90       | 150         | 99        | Vertical |
| 4              | 2390.0000   | 36.14          | 9.65        | 54.00          | 17.86       | 150         | 66        | Vertical |
| 5              | 2412.0000   | 84.62          | 9.74        | 54.00          | -30.62      | 150         | 99        | Vertical |
| 6              | 2412.0000   | 94.86          | 9.74        | 74.00          | -20.86      | 150         | 102       | Vertical |

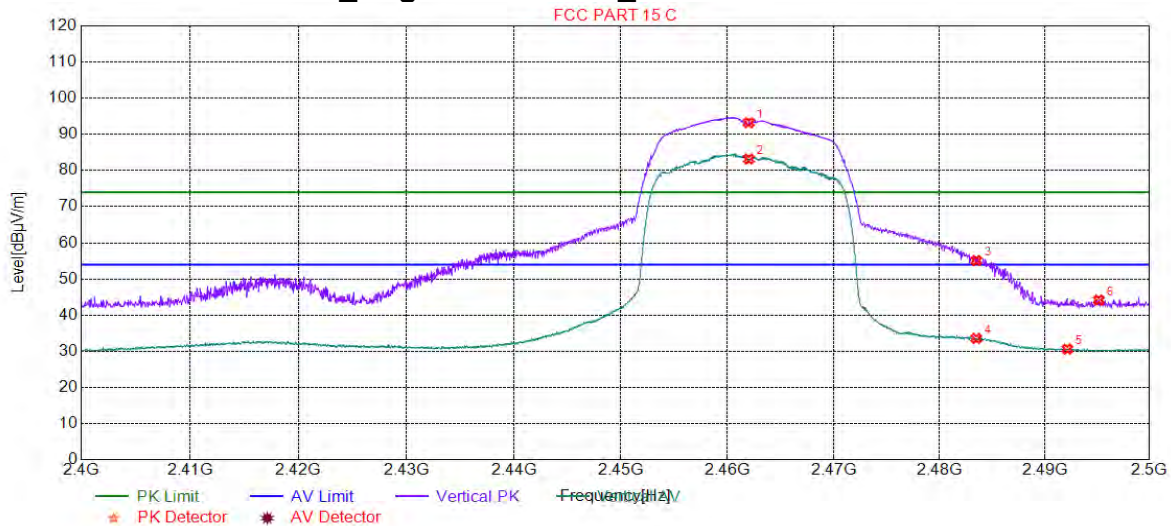


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## 4.10.1.10 802.11N20\_ Highest Channel\_ Vertical



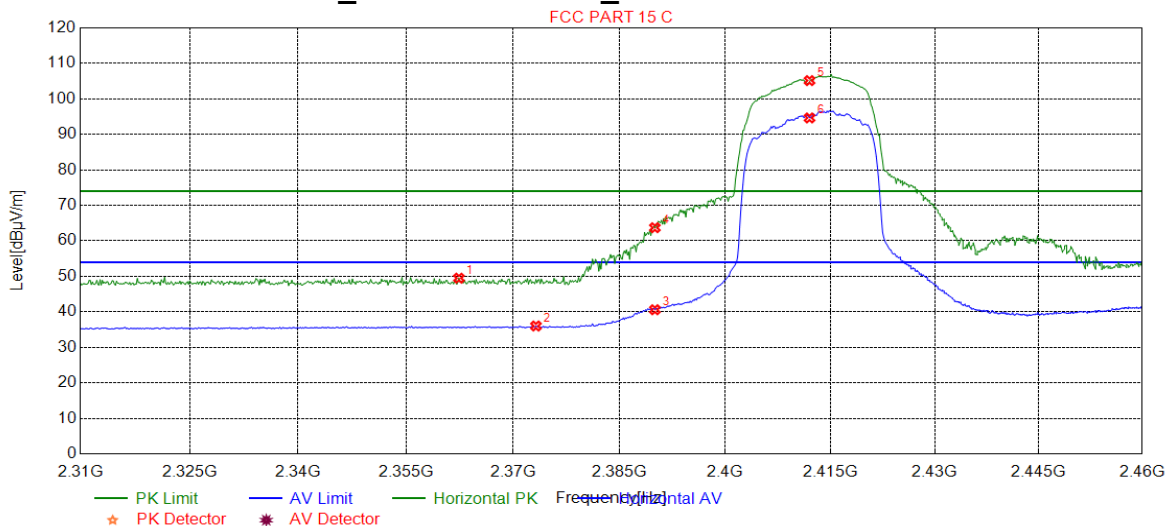
## Suspected List

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|----------|
| 1   | 2462.0000   | 93.22          | 10.03       | 74.00          | -19.22      | 150         | 143       | Vertical |
| 2   | 2462.0000   | 83.17          | 10.03       | 54.00          | -29.17      | 150         | 137       | Vertical |
| 3   | 2483.5000   | 55.09          | 10.10       | 74.00          | 18.91       | 150         | 236       | Vertical |
| 4   | 2483.5000   | 33.57          | 10.10       | 54.00          | 20.43       | 150         | 148       | Vertical |
| 5   | 2492.1461   | 30.62          | 10.12       | 54.00          | 23.38       | 150         | 148       | Vertical |
| 6   | 2495.1476   | 44.19          | 10.13       | 74.00          | 29.81       | 150         | 40        | Vertical |





#### 4.10.1.11 802.11N20\_Lowest Channel\_ Horizontal



#### Suspected List

| NO. | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
|-----|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| 1   | 2362.4024   | 49.50          | 9.61        | 74.00          | 24.50       | 150         | 13        | Horizontal |
| 2   | 2373.2132   | 36.02          | 9.62        | 54.00          | 17.98       | 150         | 25        | Horizontal |
| 3   | 2390.0000   | 40.61          | 9.65        | 54.00          | 13.39       | 150         | 195       | Horizontal |
| 4   | 2390.0000   | 63.71          | 9.65        | 74.00          | 10.29       | 150         | 204       | Horizontal |
| 5   | 2412.0000   | 105.15         | 9.74        | 74.00          | -31.15      | 150         | 245       | Horizontal |
| 6   | 2412.0000   | 94.63          | 9.74        | 54.00          | -40.63      | 150         | 195       | Horizontal |

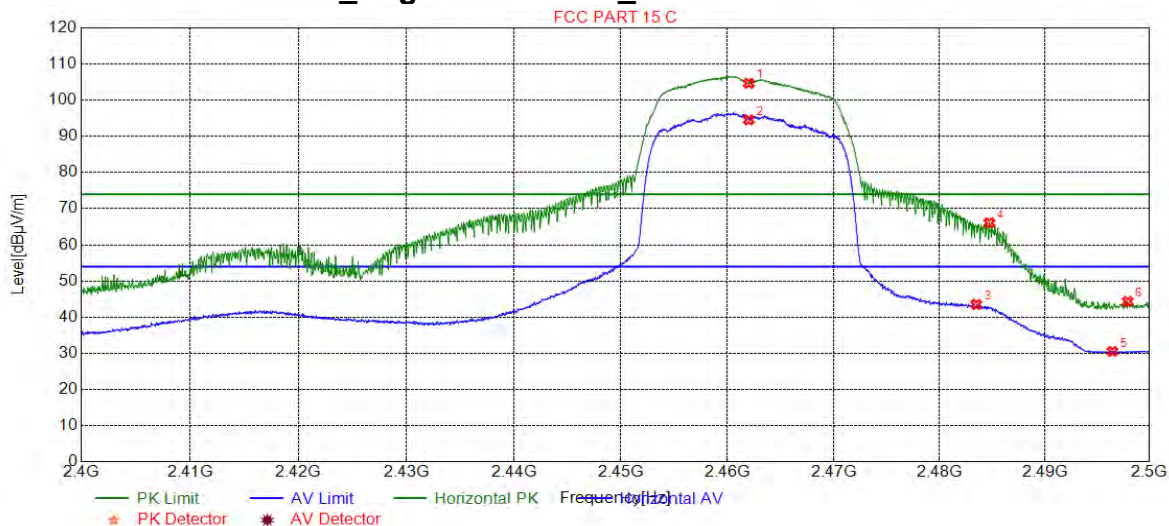


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#### 4.10.1.12 802.11N20\_ Highest Channel\_ Horizontal



| Suspected List |             |                |             |                |             |             |           |            |
|----------------|-------------|----------------|-------------|----------------|-------------|-------------|-----------|------------|
| NO.            | Freq. [MHz] | Level [dBμV/m] | Factor [dB] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
| 1              | 2462.0000   | 104.68         | 10.03       | 74.00          | -30.68      | 150         | 245       | Horizontal |
| 2              | 2462.0000   | 94.56          | 10.03       | 54.00          | -40.56      | 150         | 245       | Horizontal |
| 3              | 2483.5000   | 43.53          | 10.10       | 54.00          | 10.47       | 150         | 245       | Horizontal |
| 4              | 2484.7424   | 66.10          | 10.10       | 74.00          | 7.90        | 150         | 206       | Horizontal |
| 5              | 2496.4482   | 30.53          | 10.14       | 54.00          | 23.47       | 150         | 195       | Horizontal |
| 6              | 2497.8989   | 44.32          | 10.14       | 74.00          | 29.68       | 150         | 212       | 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)

| 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     | 2019/7/14    | 2020/7/14     |
| LISN                 | ETS-LINDGREN                       | Feb-16          | SEM007-02     | 2019/4/1     | 2020/3/31     |
| Measurement Software | AUDIX                              | e3 V5.4.1221d   | N/A           | N/A          | N/A           |
| Coaxial Cable        | SGS                                | N/A             | SEM024-01     | 2019/6/12    | 2020/6/11     |
| 2 Line ISN           | Fischer Custom Communications Inc. | FCC-TLISN-T2-02 | EMC0122       | 2019/2/11    | 2020/2/10     |
| EMI Test Receiver    | Rohde & Schwarz                    | ESCI            | SEM004-02     | 2019/3/2     | 2020/3/1      |

| RF conducted test   |                          |                  |               |              |               |
|---------------------|--------------------------|------------------|---------------|--------------|---------------|
| Test Equipment      | Manufacturer             | Model No.        | Inventory No. | Cal. date    | Cal. Due date |
|                     |                          |                  |               | (yyyy-mm-dd) | (yyyy-mm-dd)  |
| DC Power Supply     | Agilent Technologies Inc | 66311B           | W009-09       | 2019/7/15    | 2020/7/15     |
| Signal Analyzer     | Rohde & Schwarz          | FSV              | W025-05       | 2019/1/13    | 2020/1/12     |
| Coaxial Cable       | SGS                      | N/A              | SEM031-01     | 2019/6/12    | 2020/6/11     |
| Attenuator          | Weinschel Associates     | WA41             | SEM021-09     | N/A          | N/A           |
| Signal Generator    | KEYSIGHT                 | N5173B           | SEM006-05     | 2019/7/14    | 2020/7/14     |
| Temperature Chamber | GIANT FORCE              | ICT-150-40-CP-AR | W027-03       | 2019/10/27   | 2020/10/27    |
| Power Meter         | Rohde & Schwarz          | NRVS             | SEM014-02     | 2019/7/14    | 2020/7/14     |

| RE in Chamber                  |                      |                 |               |              |               |
|--------------------------------|----------------------|-----------------|---------------|--------------|---------------|
| Test Equipment                 | Manufacturer         | Model No.       | Inventory No. | Cal. date    | Cal. Due date |
|                                |                      |                 |               | (yyyy-mm-dd) | (yyyy-mm-dd)  |
| 3m Semi-Anechoic Chamber       | ETS-LINDGREN         | N/A             | SEM001-01     | 2017/8/5     | 2020/8/4      |
| Measurement Software           | AUDIX                | e3 V8.2014-6-27 | N/A           | N/A          | N/A           |
| Coaxial Cable                  | SGS                  | N/A             | SEM025-01     | 2019/6/12    | 2020/6/11     |
| MXE EMI Receiver (20Hz-8.4GHz) | Agilent Technologies | N9038A          | SEM004-05     | 2019/7/14    | 2020/7/14     |
| BiConiLog Antenna (26-3000MHz) | ETS-LINDGREN         | 3142C           | SEM003-01     | 2017/6/27    | 2020/6/26     |
| Pre-amplifier (0.1-1.3GHz)     | Agilent Technologies | 8447D           | SEM005-01     | 2019/3/2     | 2020/3/1      |

| RE in Chamber                      |                          |                   |               |              |               |
|------------------------------------|--------------------------|-------------------|---------------|--------------|---------------|
| Test Equipment                     | Manufacturer             | Model No.         | Inventory No. | Cal. date    | Cal. Due date |
|                                    |                          |                   |               | (yyyy-mm-dd) | (yyyy-mm-dd)  |
| 3m Semi-Anechoic Chamber           | AUDIX                    | N/A               | SEM001-02     | 2018/3/13    | 2021/3/12     |
| Measurement Software               | AUDIX                    | e3V8.2014-6-27    | N/A           | N/A          | N/A           |
| Coaxial Cable                      | SGS                      | N/A               | SEM026-01     | 2019/6/12    | 2020/6/11     |
| EXA Signal Analyzer (10Hz-26.5GHz) | Agilent Technologies Inc | N9010A            | SEM004-09     | 2019/3/12    | 2020/3/11     |
| BiConiLog Antenna (26-3000MHz)     | ETS-Lindgren             | 3142C             | SEM003-01     | 2017/6/27    | 2020/6/26     |
| Horn Antenna (0.8-18GHz)           | Rohde & Schwarz          | HF907             | SEM003-07     | 2018/4/13    | 2021/4/12     |
| Pre-amplifier(0.1-1.3GHz)          | HP                       | 8447D             | SEM005-02     | 2019/7/14    | 2020/7/14     |
| Low Noise Amplifier(100MHz-18GHz)  | Black Diamond Series     | BDLNA-0118-352810 | SEM005-05     | 2019/9/3     | 2020/9/2      |
| Horn Antenna (15-40GHz)            | Schwarzbeck              | BBHA 9170         | SEM003-15     | 2017/10/17   | 2020/10/16    |
| Pre-amplifier(18-26GHz)            | Rohde & Schwarz          | CH14-H052         | SEM005-17     | 2019/3/2     | 2020/3/1      |
| Band filter                        | N/A                      | N/A               | SEM023-01     | N/A          | N/A           |



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

## 7 Photographs

Refer to Appendix A - Photographs of Set-up for ZR/2019/B0024.

The End

