

**Test Results**

| Voltage (V) | Temperature (°C) | U-NII-1 Test Results |             |             |             |
|-------------|------------------|----------------------|-------------|-------------|-------------|
|             |                  | 5200MHz              |             |             |             |
|             |                  | 1min                 | 2min        | 5min        | 10min       |
| 3.87        | 0                | 5200.001293          | 5199.999592 | 5199.998082 | 5199.988264 |
| 3.87        | 5                | 5199.999441          | 5199.998968 | 5199.995746 | 5199.986861 |
| 3.87        | 10               | 5199.998321          | 5199.998730 | 5199.988620 | 5199.986743 |
| 3.87        | 15               | 5199.994880          | 5199.998384 | 5199.988508 | 5199.980515 |
| 3.87        | 20               | 5199.993385          | 5199.995388 | 5199.984059 | 5199.970736 |
| 3.87        | 25               | 5199.986100          | 5199.991732 | 5199.979243 | 5199.969853 |
| 3.87        | 30               | 5199.978349          | 5199.990836 | 5199.977773 | 5199.965795 |
| 3.87        | 35               | 5199.971830          | 5199.984946 | 5199.976257 | 5199.955962 |
| 3.6         | 20               | 5199.969548          | 5199.977134 | 5199.970890 | 5199.952702 |
| 4.45        | 20               | 5199.962433          | 5199.968492 | 5199.969444 | 5199.948462 |
| Max. ΔMHz   |                  | -0.037567            | -0.031508   | -0.030556   | -0.051538   |
| PPM         |                  | -7.224481            | -6.059267   | -5.876246   | -9.911214   |

| Voltage (V) | Temperature (°C) | U-NII-2A Test Results |             |             |             |
|-------------|------------------|-----------------------|-------------|-------------|-------------|
|             |                  | 5300MHz               |             |             |             |
|             |                  | 1min                  | 2min        | 5min        | 10min       |
| 3.87        | 0                | 5299.993478           | 5299.985633 | 5299.984600 | 5299.980642 |
| 3.87        | 5                | 5299.989853           | 5299.985026 | 5299.980854 | 5299.972688 |
| 3.87        | 10               | 5299.981973           | 5299.981144 | 5299.979801 | 5299.972256 |
| 3.87        | 15               | 5299.980697           | 5299.973074 | 5299.979403 | 5299.967480 |
| 3.87        | 20               | 5299.973858           | 5299.964842 | 5299.969410 | 5299.959005 |
| 3.87        | 25               | 5299.967850           | 5299.963980 | 5299.966377 | 5299.956623 |
| 3.87        | 30               | 5299.960986           | 5299.957787 | 5299.959760 | 5299.949638 |
| 3.87        | 35               | 5299.954624           | 5299.951759 | 5299.956655 | 5299.947434 |
| 3.6         | 20               | 5299.950391           | 5299.942249 | 5299.949529 | 5299.941257 |
| 4.45        | 20               | 5299.940956           | 5299.933624 | 5299.943297 | 5299.939009 |
| Max. ΔMHz   |                  | -0.059044             | -0.066376   | -0.056703   | -0.060991   |
| PPM         |                  | -11.140411            | -12.523864  | -10.698655  | -11.507774  |



| Voltage (V) | Temperature (°C) | U-NII-2C Test Results |             |             |             |
|-------------|------------------|-----------------------|-------------|-------------|-------------|
|             |                  | 5580MHz               |             |             |             |
|             |                  | 1min                  | 2min        | 5min        | 10min       |
| 3.87        | 0                | 5579.999737           | 5579.994462 | 5579.987544 | 5579.986518 |
| 3.87        | 5                | 5579.991837           | 5579.988420 | 5579.983437 | 5579.981312 |
| 3.87        | 10               | 5579.984139           | 5579.979004 | 5579.974693 | 5579.977057 |
| 3.87        | 15               | 5579.983913           | 5579.970871 | 5579.968292 | 5579.976592 |
| 3.87        | 20               | 5579.979478           | 5579.961703 | 5579.958299 | 5579.971057 |
| 3.87        | 25               | 5579.978666           | 5579.954185 | 5579.954550 | 5579.964995 |
| 3.87        | 30               | 5579.970726           | 5579.952995 | 5579.951315 | 5579.957024 |
| 3.87        | 35               | 5579.963634           | 5579.948864 | 5579.944561 | 5579.952291 |
| 3.6         | 20               | 5579.961433           | 5579.948678 | 5579.941585 | 5579.942348 |
| 4.45        | 20               | 5579.960923           | 5579.945122 | 5579.935922 | 5579.937054 |
| Max. ΔMHz   |                  | -0.039077             | -0.054878   | -0.064078   | -0.062946   |
| PPM         |                  | -7.002977             | -9.834679   | -11.483430  | -11.280647  |

| Voltage (V) | Temperature (°C) | U-NII-3 Test Results |             |             |             |
|-------------|------------------|----------------------|-------------|-------------|-------------|
|             |                  | 5785MHz              |             |             |             |
|             |                  | 1min                 | 2min        | 5min        | 10min       |
| 3.87        | 0                | 5784.991236          | 5784.983896 | 5784.980198 | 5784.976563 |
| 3.87        | 5                | 5784.985365          | 5784.978247 | 5784.971454 | 5784.968207 |
| 3.87        | 10               | 5784.979029          | 5784.971591 | 5784.966780 | 5784.963912 |
| 3.87        | 15               | 5784.978239          | 5784.968034 | 5784.961790 | 5784.957303 |
| 3.87        | 20               | 5784.971997          | 5784.961977 | 5784.957821 | 5784.954843 |
| 3.87        | 25               | 5784.964066          | 5784.957564 | 5784.953011 | 5784.949345 |
| 3.87        | 30               | 5784.963318          | 5784.955978 | 5784.951909 | 5784.949285 |
| 3.87        | 35               | 5784.953765          | 5784.952611 | 5784.948179 | 5784.948348 |
| 3.6         | 20               | 5784.950461          | 5784.948032 | 5784.946212 | 5784.938955 |
| 4.45        | 20               | 5784.946590          | 5784.944729 | 5784.937083 | 5784.935307 |
| Max. ΔMHz   |                  | -0.053410            | -0.055271   | -0.062917   | -0.064693   |
| PPM         |                  | -9.232541            | -9.554276   | -10.875835  | -11.182895  |

## 5.4. Power Spectral Density

### Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C ~25°C  | 45%~50%           | 101.5kPa |

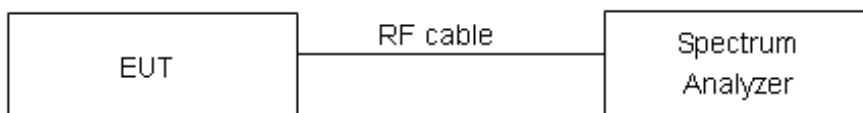
### Method of Measurement

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable.

Set RBW = 1MHz, VBW =3MHz for the band 5.150-5.250GHz, 5.250-5.350GHz, 5.470-5.725GHz.  
 Set RBW = 470kHz, VBW =1.5MHz for the band 5.725-5.850GHz

The conducted PSD is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically.

### Test setup



### Limits

Rule FCC Part 15.407(a)(1)/ Part 15.407(a)(2) / Part 15.407(a)(3)

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the



amount in dB that the directional gain of the antenna exceeds 6 dBi.

| Frequency Bands/MHz              | Limits       |
|----------------------------------|--------------|
| 5150-5250                        | 11dBm/MHz    |
| 5.25-5.35 GHz and 5.47-5.725 GHz | 11dBm/MHz    |
| 5725-5850                        | 30dBm/500kHz |

### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 0.75\text{dB}$ .

**Test Results:**

Note: Power Spectral Density =Read Value+Duty cycle correction factor

**U-NII-1**

| Mode           | Channel Number | Read Value (dBm /MHz) | Power Spectral Density (dBm /MHz) | Limit (dBm /MHz) | Conclusion |
|----------------|----------------|-----------------------|-----------------------------------|------------------|------------|
| 802.11a        | 36             | -8.86                 | -8.86                             | 11               | PASS       |
|                | 40             | 9.26                  | 9.26                              | 11               | PASS       |
|                | 48             | 8.72                  | 8.72                              | 11               | PASS       |
| 802.11n HT20   | 36             | 4.57                  | 4.57                              | 11               | PASS       |
|                | 40             | 8.24                  | 8.24                              | 11               | PASS       |
|                | 48             | 7.85                  | 7.85                              | 11               | PASS       |
| 802.11n HT40   | 38             | -4.37                 | -4.18                             | 11               | PASS       |
|                | 46             | 4.00                  | 4.19                              | 11               | PASS       |
| 802.11ac VHT20 | 36             | 4.69                  | 4.69                              | 11               | PASS       |
|                | 40             | 8.27                  | 8.27                              | 11               | PASS       |
|                | 48             | 7.62                  | 7.62                              | 11               | PASS       |
| 802.11ac VHT40 | 38             | -4.37                 | -4.18                             | 11               | PASS       |
|                | 46             | 4.00                  | 4.19                              | 11               | PASS       |
| 802.11ac VHT80 | 42             | -8.78                 | -8.46                             | 11               | PASS       |

**U-NII-2A**

| Mode         | Channel Number | Read Value (dBm /MHz) | Power Spectral Density (dBm /MHz) | Limit (dBm /MHz) | Conclusion |
|--------------|----------------|-----------------------|-----------------------------------|------------------|------------|
| 802.11a      | 52             | 8.41                  | 8.41                              | 11               | PASS       |
|              | 60             | 8.57                  | 8.57                              | 11               | PASS       |
|              | 64             | 5.63                  | 5.63                              | 11               | PASS       |
| 802.11n HT20 | 52             | 7.85                  | 7.85                              | 11               | PASS       |
|              | 60             | 8.72                  | 8.72                              | 11               | PASS       |
|              | 64             | 5.71                  | 5.71                              | 11               | PASS       |
| 802.11n HT40 | 54             | 4.03                  | 4.22                              | 11               | PASS       |
|              | 62             | -3.78                 | -3.59                             | 11               | PASS       |
| 802.11ac     | 52             | 8.48                  | 8.48                              | 11               | PASS       |



|                   |    |       |       |    |      |
|-------------------|----|-------|-------|----|------|
| VHT20             | 60 | 8.39  | 8.39  | 11 | PASS |
|                   | 64 | 5.37  | 5.37  | 11 | PASS |
| 802.11ac<br>VHT40 | 54 | 4.05  | 4.24  | 11 | PASS |
|                   | 62 | -3.58 | -3.39 | 11 | PASS |
| 802.11ac VHT80    | 58 | -9.14 | -8.82 | 11 | PASS |

## U-NII-2C

| Mode              | Channel Number | Read Value (dBm /MHz) | Power Spectral Density (dBm /MHz) | Limit (dBm /MHz) | Conclusion |
|-------------------|----------------|-----------------------|-----------------------------------|------------------|------------|
| 802.11a           | 100            | 6.90                  | 6.90                              | 11               | PASS       |
|                   | 104            | 7.57                  | 7.57                              | 11               | PASS       |
|                   | 120            | 7.78                  | 7.78                              | 11               | PASS       |
|                   | 136            | 8.34                  | 8.34                              | 11               | PASS       |
|                   | 140            | 4.46                  | 4.46                              | 11               | PASS       |
| 802.11n<br>HT20   | 100            | 6.96                  | 6.96                              | 11               | PASS       |
|                   | 104            | 7.62                  | 7.62                              | 11               | PASS       |
|                   | 120            | 7.77                  | 7.77                              | 11               | PASS       |
|                   | 136            | 8.13                  | 8.13                              | 11               | PASS       |
|                   | 140            | 3.92                  | 3.92                              | 11               | PASS       |
| 802.11n<br>HT40   | 102            | -3.91                 | -3.72                             | 11               | PASS       |
|                   | 110            | 2.60                  | 2.79                              | 11               | PASS       |
|                   | 118            | 3.64                  | 3.83                              | 11               | PASS       |
|                   | 126            | 3.17                  | 3.36                              | 11               | PASS       |
|                   | 134            | 3.80                  | 3.99                              | 11               | PASS       |
|                   | 142            | 3.78                  | 3.97                              | 11               | PASS       |
| 802.11ac<br>VHT20 | 100            | 7.08                  | 7.08                              | 11               | PASS       |
|                   | 104            | 7.84                  | 7.84                              | 11               | PASS       |
|                   | 120            | 7.44                  | 7.44                              | 11               | PASS       |
|                   | 136            | 8.00                  | 8.00                              | 11               | PASS       |
|                   | 140            | 4.11                  | 4.11                              | 11               | PASS       |
| 802.11ac<br>VHT40 | 102            | -3.84                 | -3.65                             | 11               | PASS       |
|                   | 110            | 3.96                  | 4.15                              | 11               | PASS       |
|                   | 118            | 3.96                  | 4.15                              | 11               | PASS       |
|                   | 126            | 3.71                  | 3.90                              | 11               | PASS       |



|                |     |       |       |    |      |
|----------------|-----|-------|-------|----|------|
|                | 134 | 4.28  | 4.47  | 11 | PASS |
|                | 142 | 4.07  | 4.26  | 11 | PASS |
| 802.11ac VHT80 | 106 | -7.38 | -7.06 | 11 | PASS |
|                | 122 | 0.13  | 0.45  | 11 | PASS |
|                | 138 | 0.74  | 1.06  | 11 | PASS |

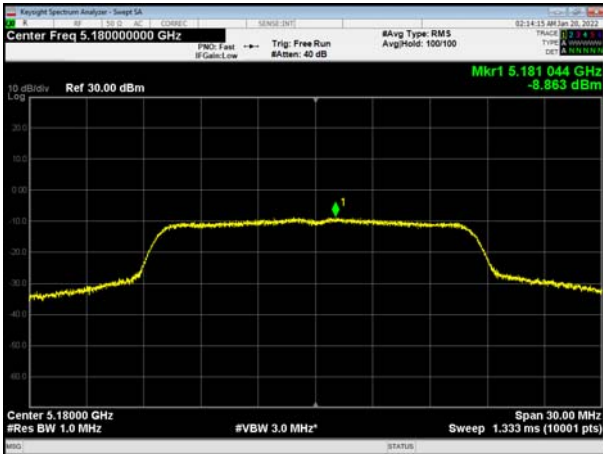
## U-NII-3

| Mode           | Channel Number | Read Value (dBm/470kHz) | Power Spectral Density (dBm/500kHz) | Limit (dBm/500kHz) | Conclusion |
|----------------|----------------|-------------------------|-------------------------------------|--------------------|------------|
| 802.11a        | 149            | 5.67                    | 5.94                                | 30                 | PASS       |
|                | 157            | 5.35                    | 5.62                                | 30                 | PASS       |
|                | 165            | 5.16                    | 5.43                                | 30                 | PASS       |
| 802.11n HT20   | 149            | 4.64                    | 4.91                                | 30                 | PASS       |
|                | 157            | 4.38                    | 4.65                                | 30                 | PASS       |
|                | 165            | 4.17                    | 4.44                                | 30                 | PASS       |
| 802.11n HT40   | 151            | -0.26                   | 0.20                                | 30                 | PASS       |
|                | 159            | -0.38                   | 0.08                                | 30                 | PASS       |
| 802.11ac VHT20 | 149            | 4.35                    | 4.62                                | 30                 | PASS       |
|                | 157            | 4.13                    | 4.40                                | 30                 | PASS       |
|                | 165            | 3.89                    | 4.16                                | 30                 | PASS       |
| 802.11ac VHT40 | 151            | -0.04                   | 0.42                                | 30                 | PASS       |
|                | 159            | -0.38                   | 0.08                                | 30                 | PASS       |
| 802.11ac VHT80 | 155            | -3.67                   | -3.08                               | 30                 | PASS       |

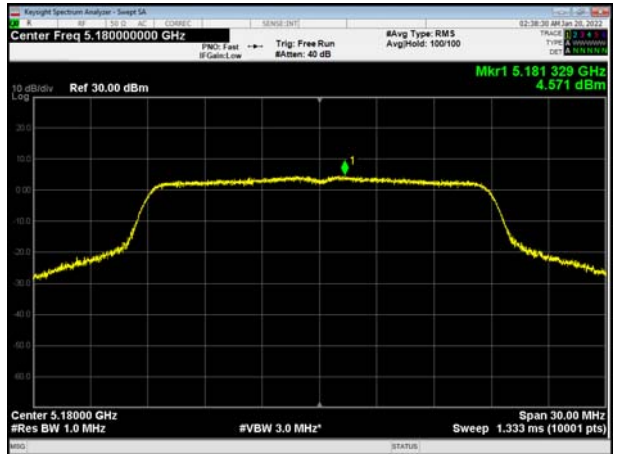
Note: PSD=Read Value+Duty cycle+10\*LOG(500/470) correction factor



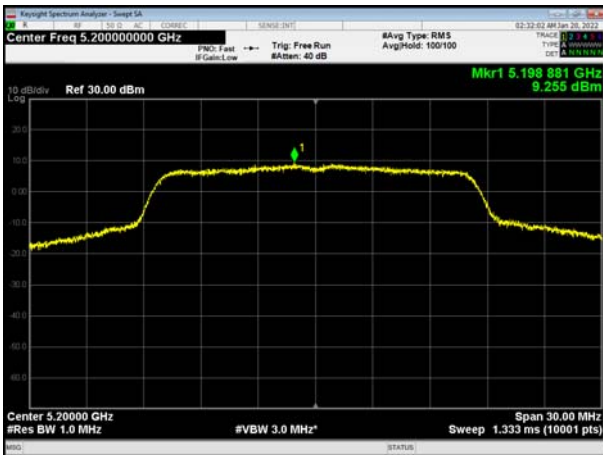
U-NII-1, 802.11a, Channel No.: 36



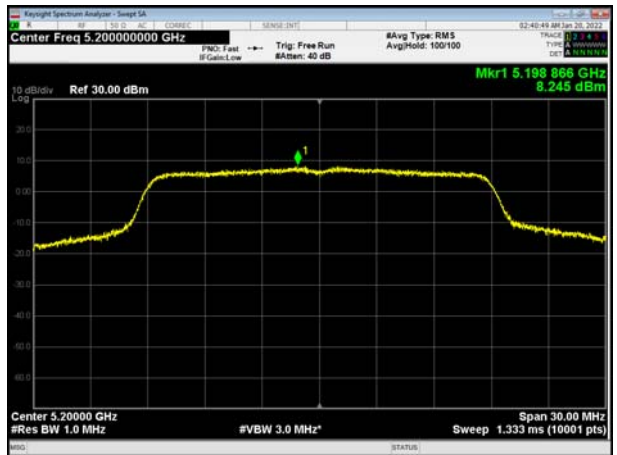
U-NII-1, 802.11n HT20, Channel No.: 36



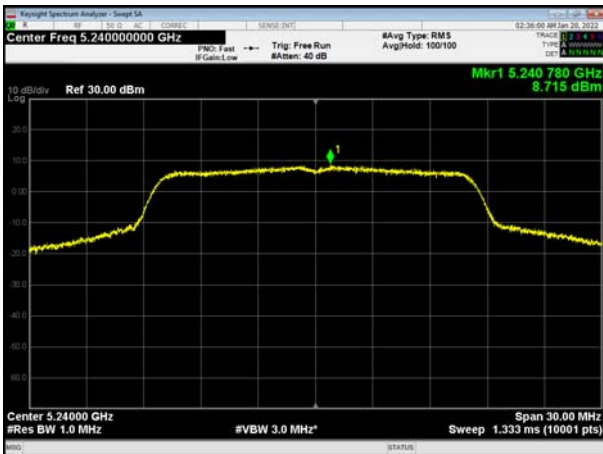
U-NII-1, 802.11a, Channel No.: 40



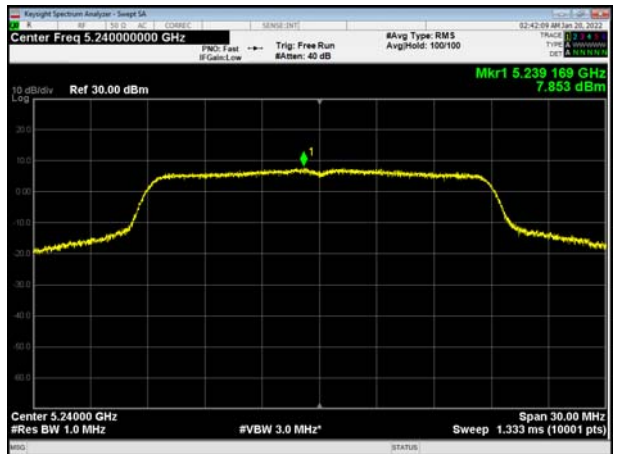
U-NII-1, 802.11n HT20, Channel No.: 40



U-NII-1, 802.11a, Channel No.: 48



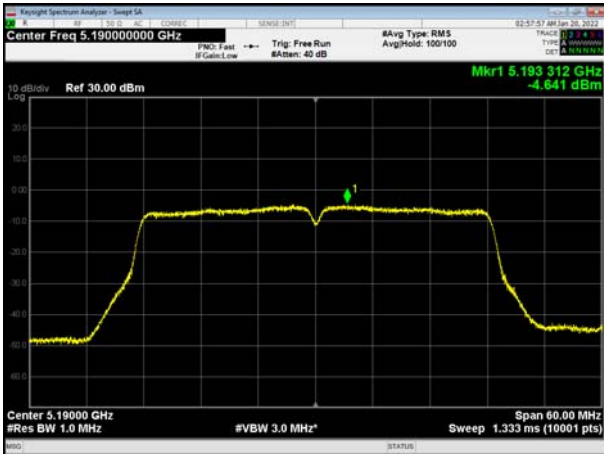
U-NII-1, 802.11n HT20, Channel No.: 48



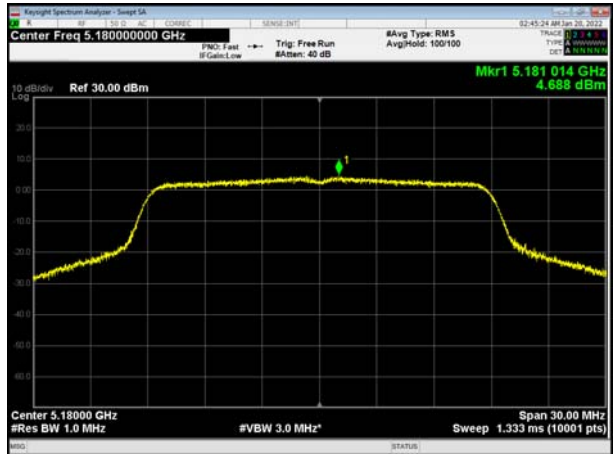




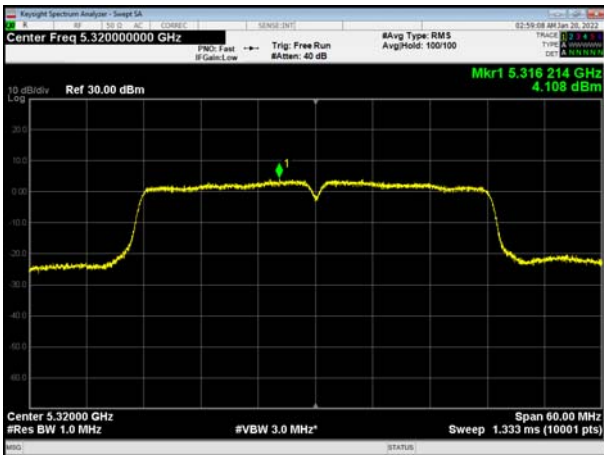
U-NII-1, 802.11n HT40, Channel No.: 38



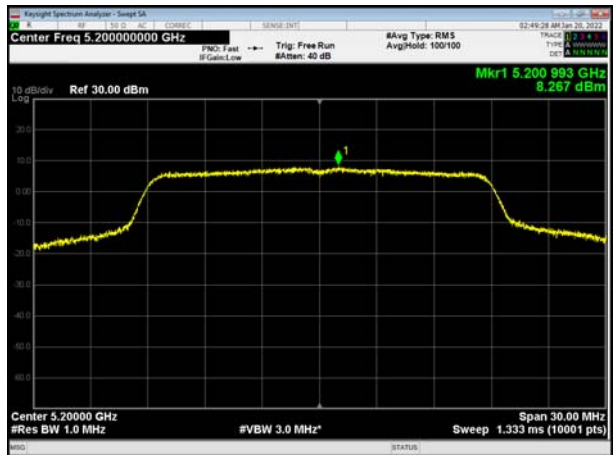
U-NII-1, 802.11ac VHT20, Channel No.: 36



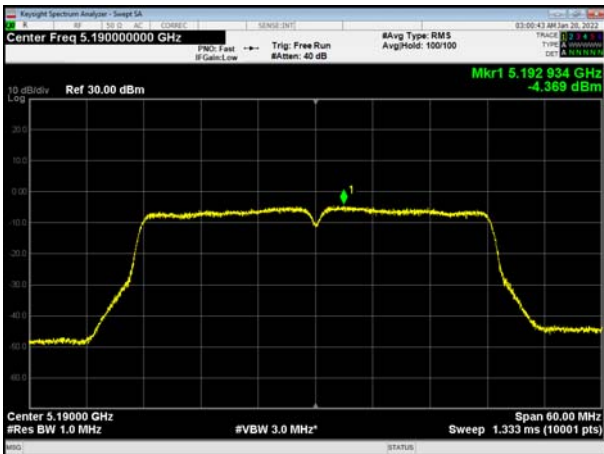
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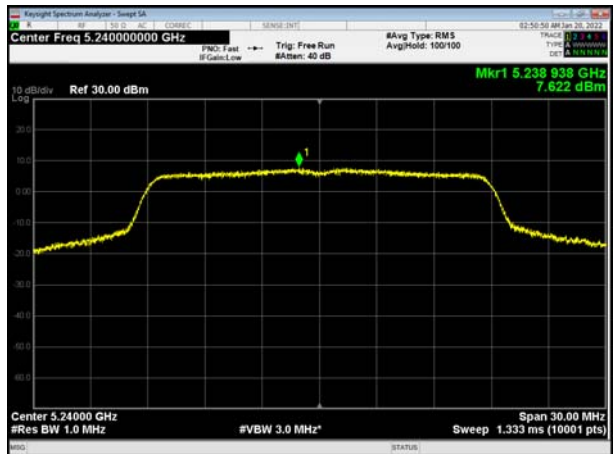
U-NII-1, 802.11ac VHT20, Channel No.: 40



U-NII-1, 802.11ac VHT40, Channel No.: 38

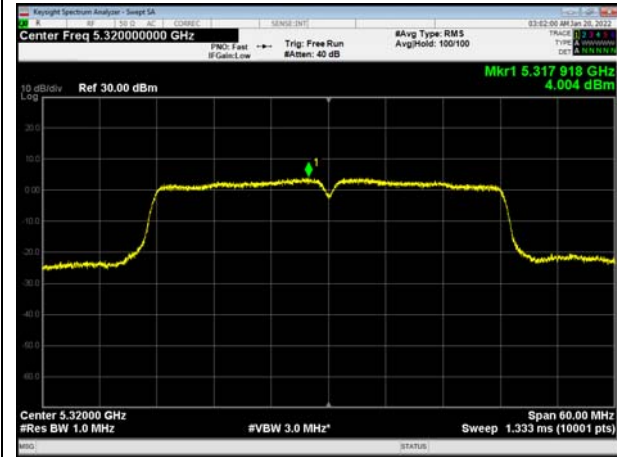


U-NII-1, 802.11ac VHT20, Channel No.: 48

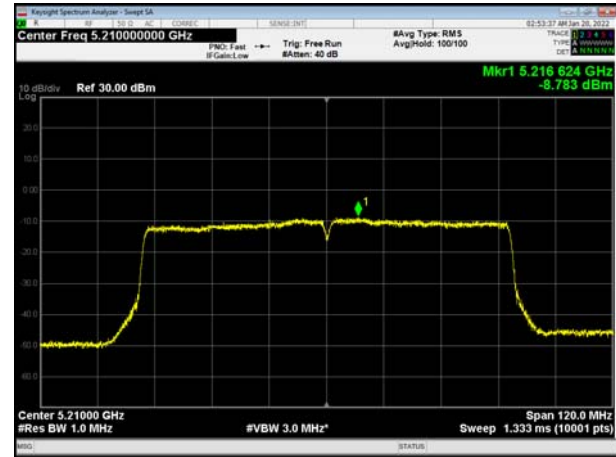




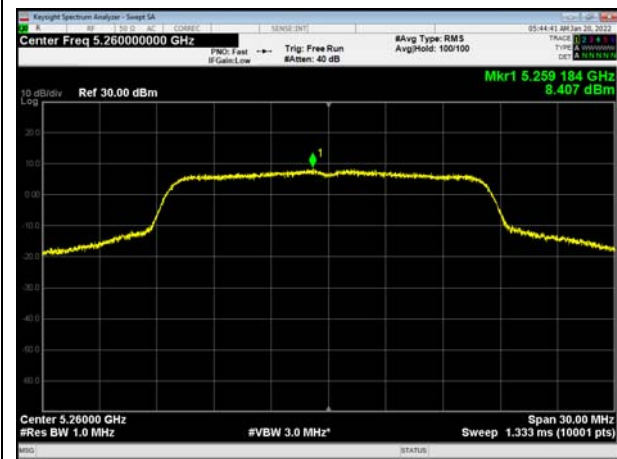
U-NII-1, 802.11ac VHT40, Channel No.: 46



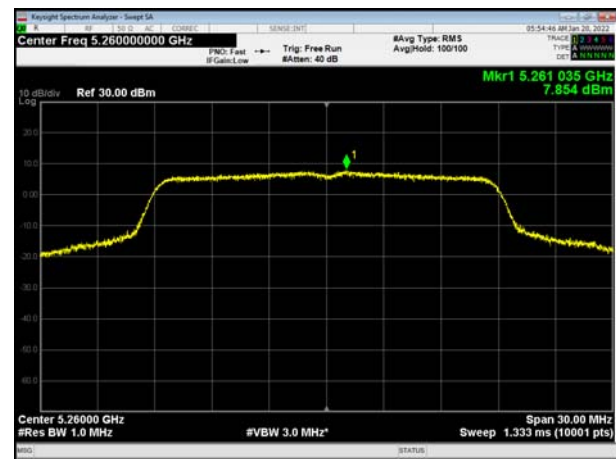
U-NII-1, 802.11ac VHT80, Channel No.: 42



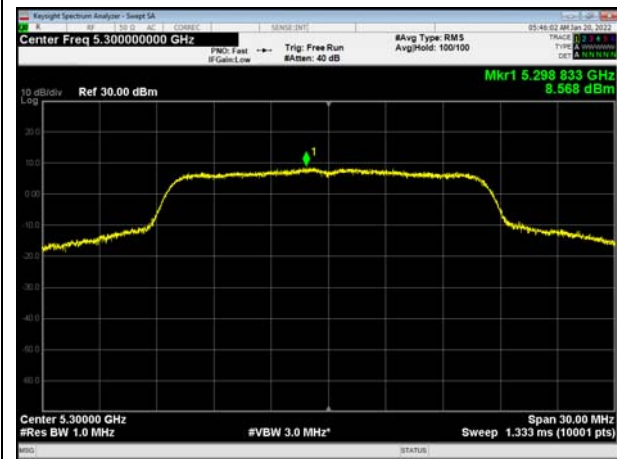
U-NII-2A, 802.11a, Channel No.: 52



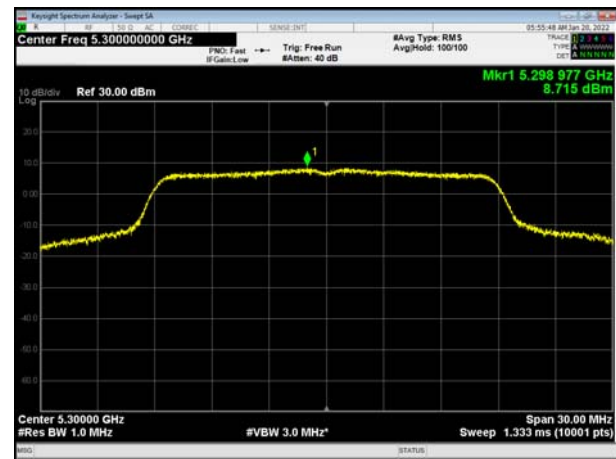
U-NII-2A, 802.11n HT20, Channel No.: 52



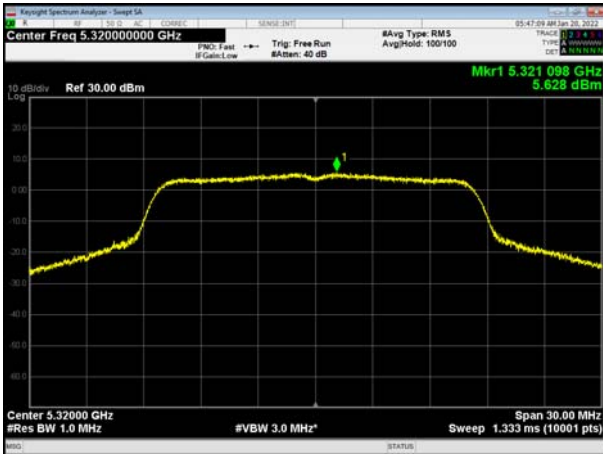
U-NII-2A, 802.11a, Channel No.: 60



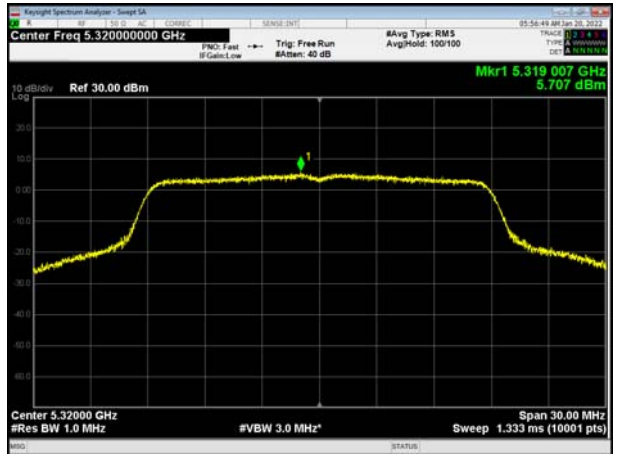
U-NII-2A, 802.11n HT20, Channel No.: 60



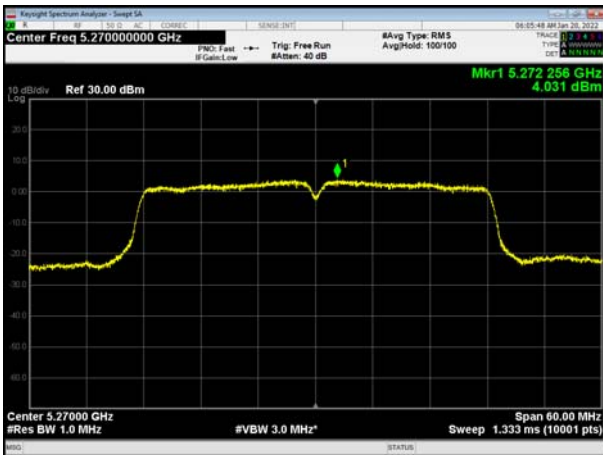
U-NII-2A, 802.11a, Channel No.: 64



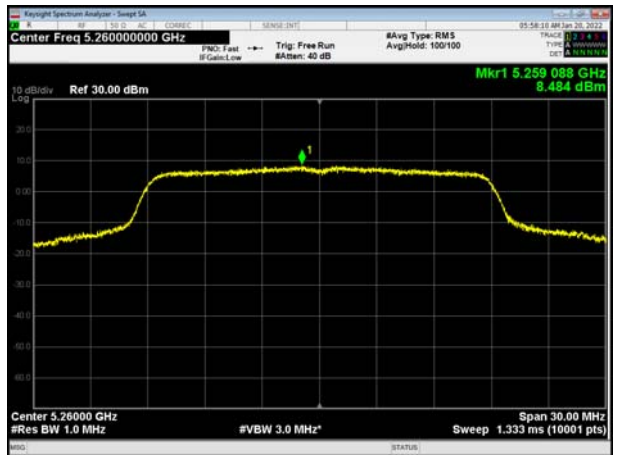
U-NII-2A, 802.11n HT20, Channel No.: 64



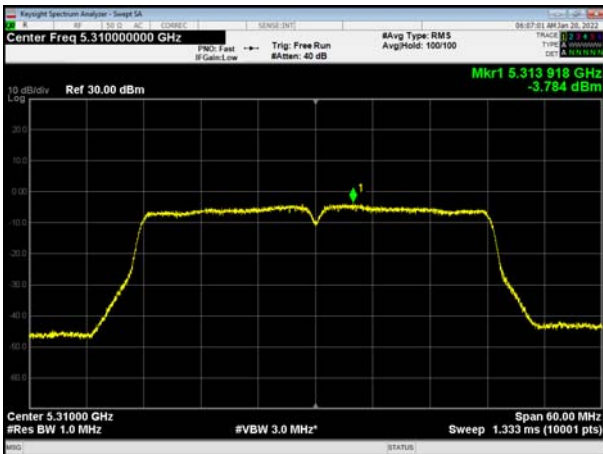
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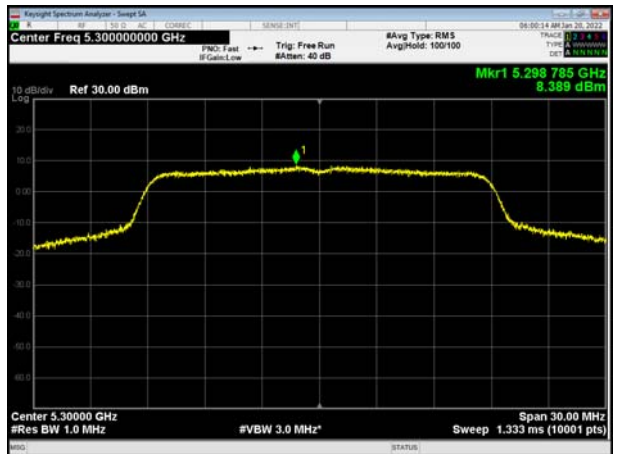
U-NII-2A, 802.11ac VHT20, Channel No.: 52



U-NII-2A, 802.11n HT40, Channel No.: 62

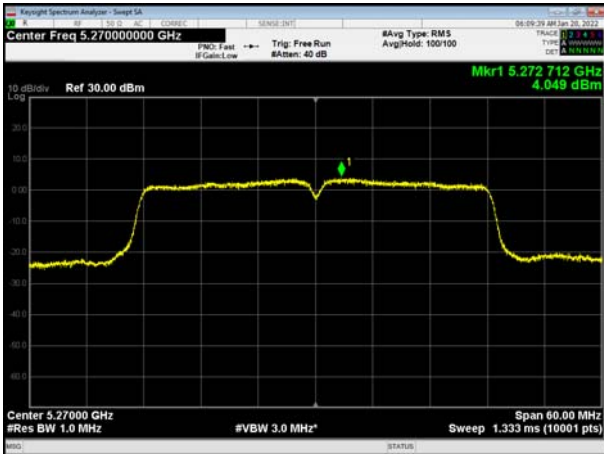


U-NII-2A, 802.11ac VHT20, Channel No.: 60

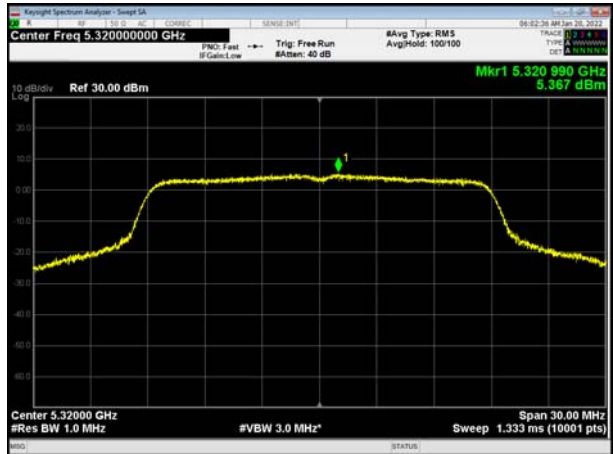




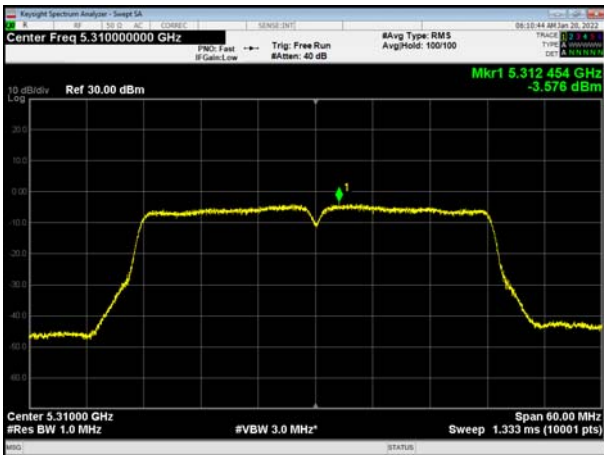
U-NII-2A, 802.11ac VHT40, Channel No.: 54



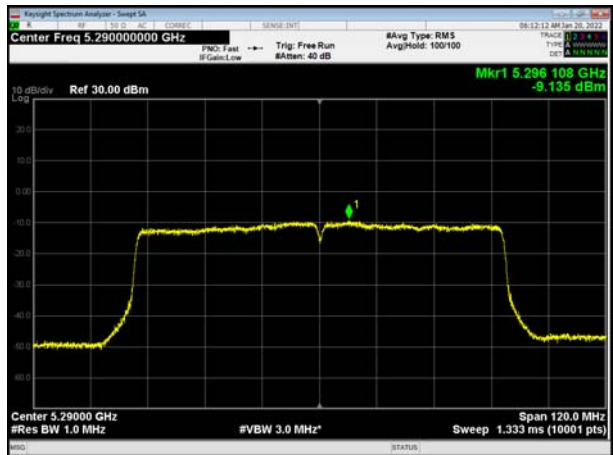
U-NII-2A, 802.11ac VHT20, Channel No.: 64



U-NII-2A, 802.11ac VHT40, Channel No.: 62

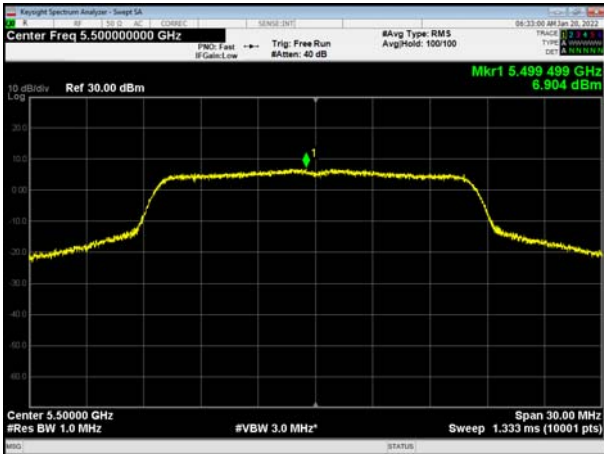


U-NII-2A, 802.11ac VHT80, Channel No.: 58

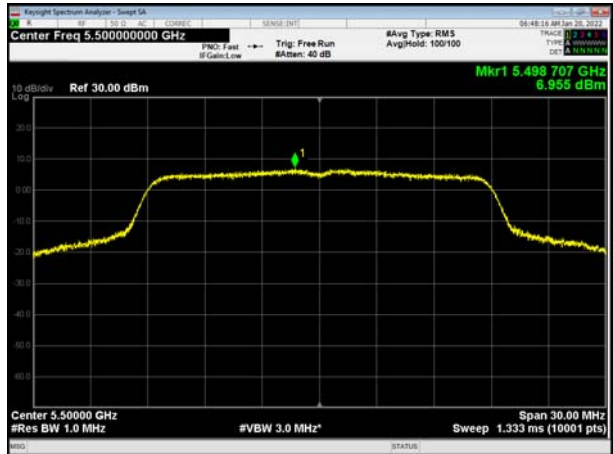




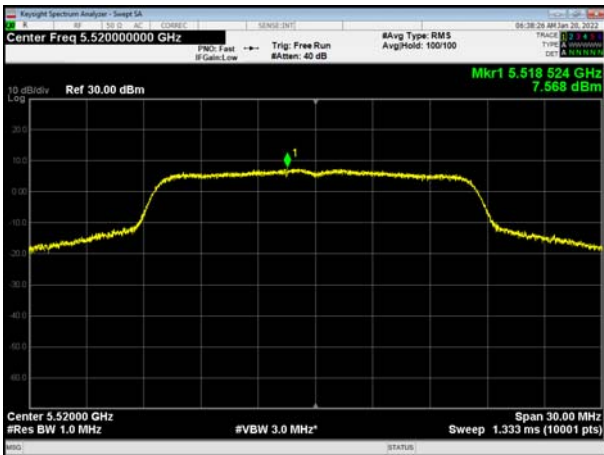
U-NII-2C, 802.11a, Channel No.: 100



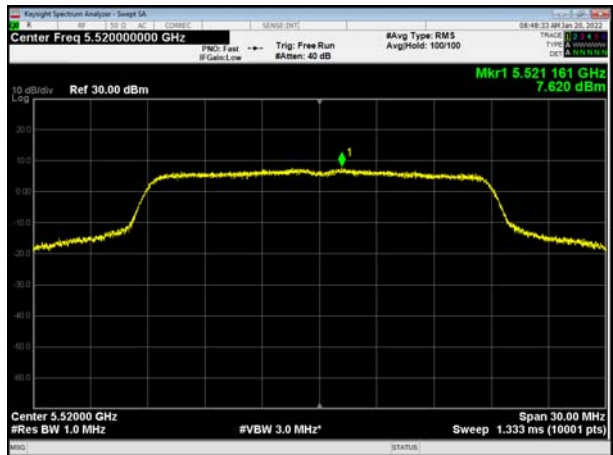
U-NII-2C, 802.11n HT20, Channel No.: 100



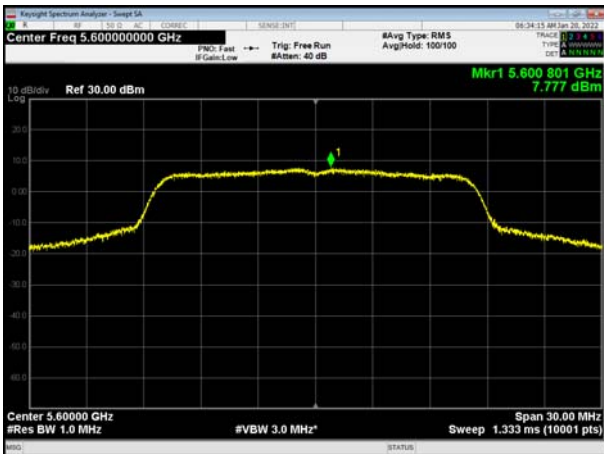
U-NII-2C, 802.11a, Channel No.: 104



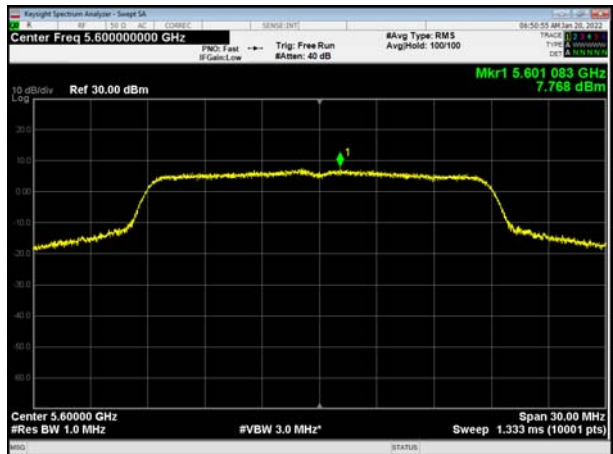
U-NII-2C, 802.11n HT20, Channel No.: 104



U-NII-2C, 802.11a, Channel No.: 120

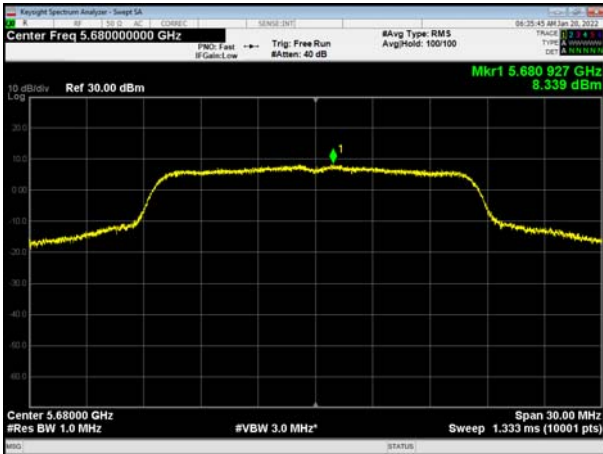


U-NII-2C, 802.11n HT20, Channel No.: 120

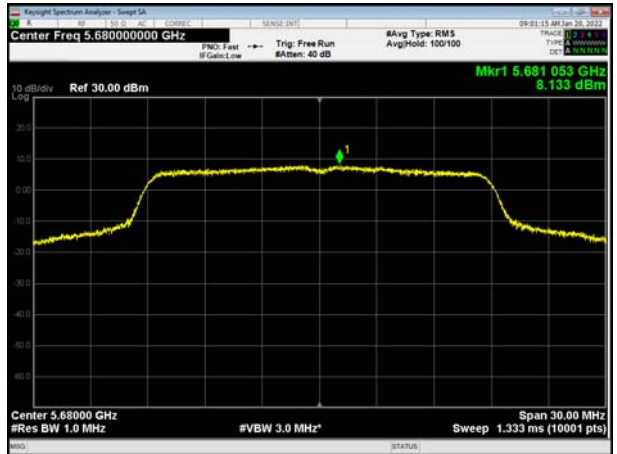




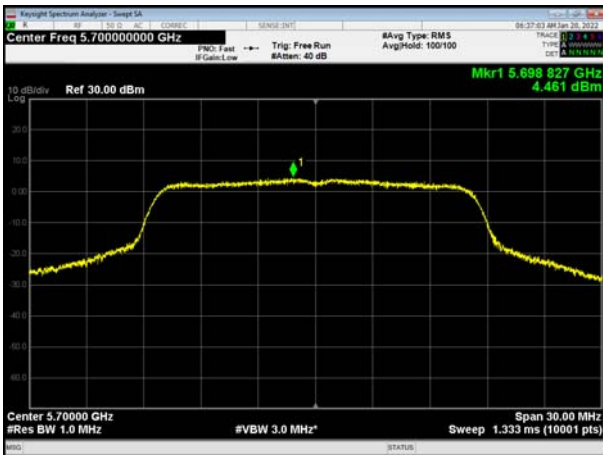
U-NII-2C, 802.11a, Channel No.: 136



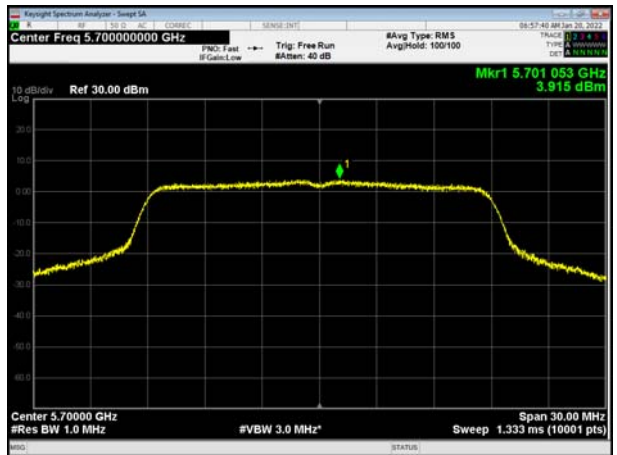
U-NII-2C, 802.11n HT20, Channel No.: 136



U-NII-2C, 802.11a, Channel No.: 140

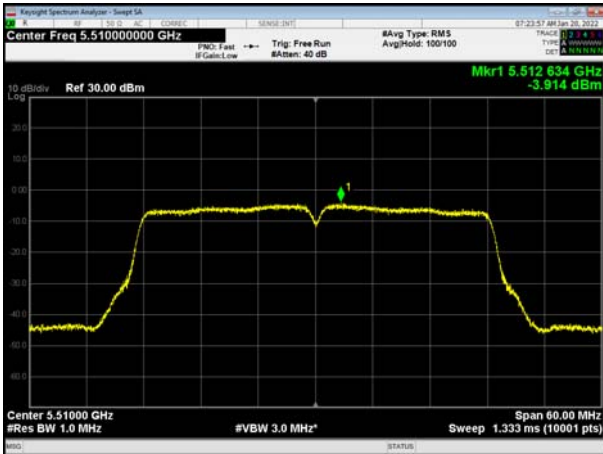


U-NII-2C, 802.11n HT20, Channel No.: 140

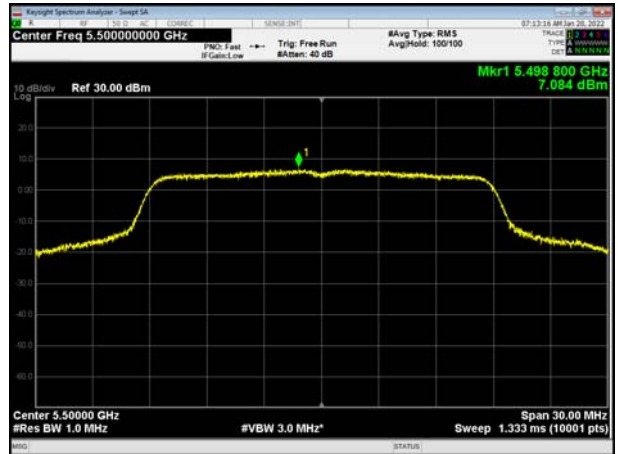




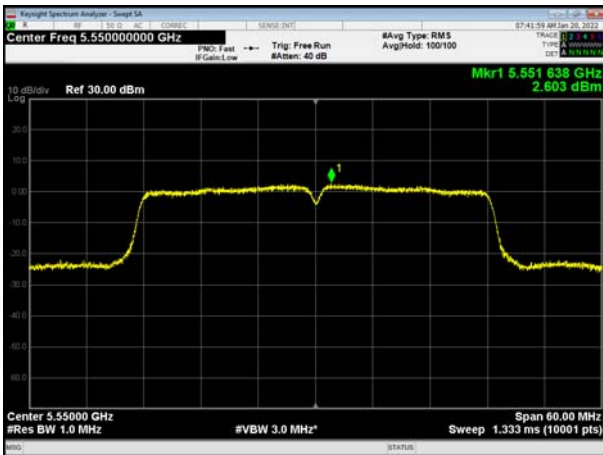
U-NII-2C, 802.11n HT40, Channel No.: 102



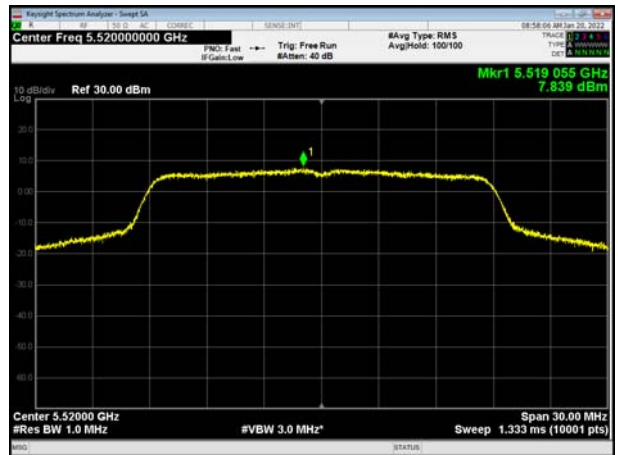
U-NII-2C, 802.11ac VHT20, Channel No.: 100



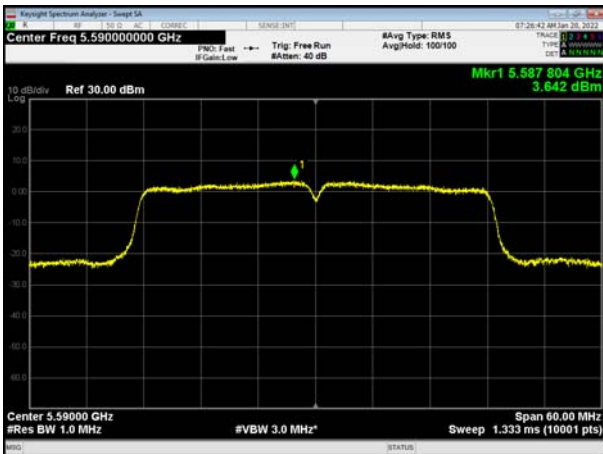
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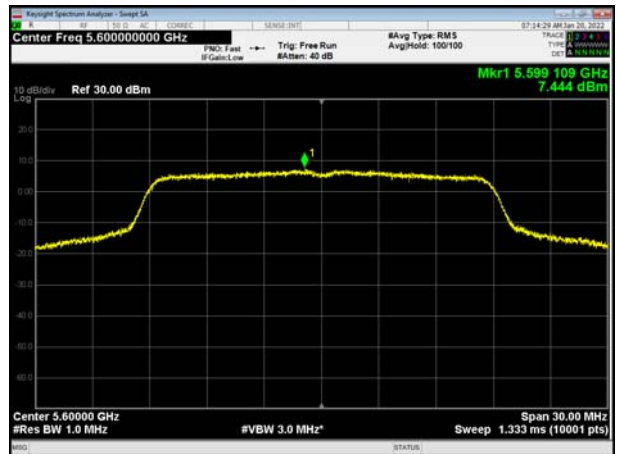
U-NII-2C, 802.11ac VHT20, Channel No.: 104



U-NII-2C, 802.11n HT40, Channel No.: 118

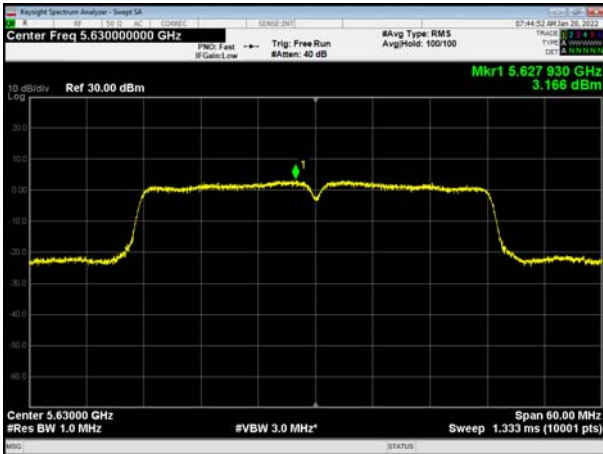


U-NII-2C, 802.11ac VHT20, Channel No.: 120

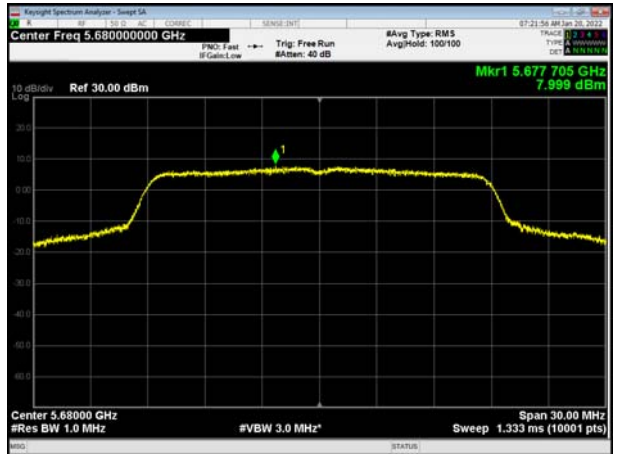




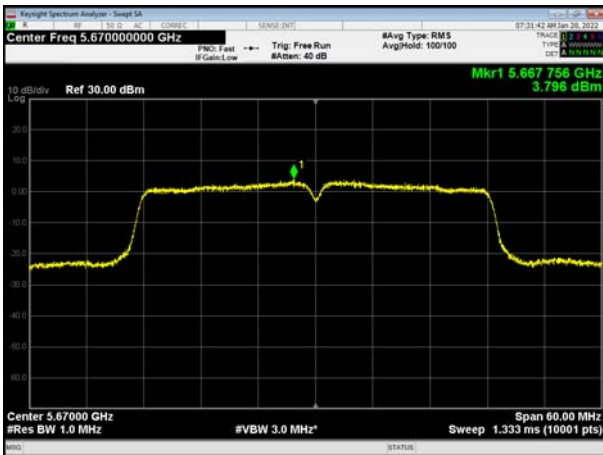
U-NII-2C, 802.11n HT40, Channel No.: 126



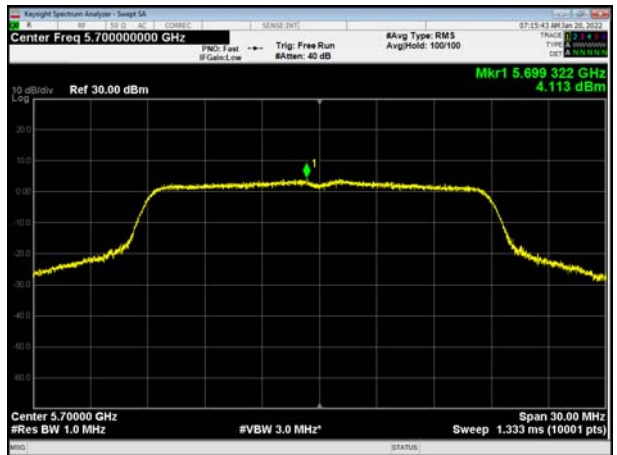
U-NII-2C, 802.11ac VHT20, Channel No.: 136



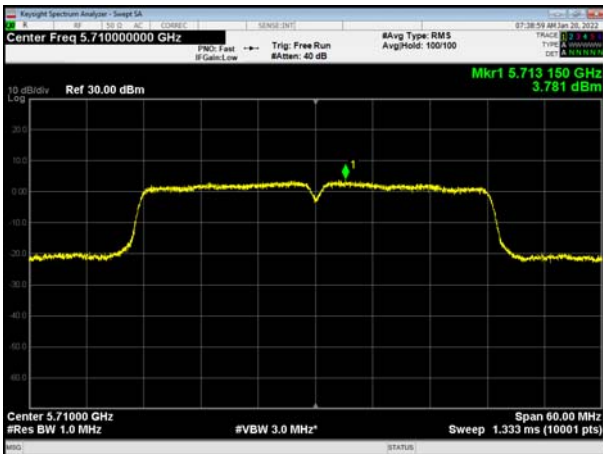
U-NII-2C, 802.11n HT40, Channel No.: 134



U-NII-2C, 802.11ac VHT20, Channel No.: 140



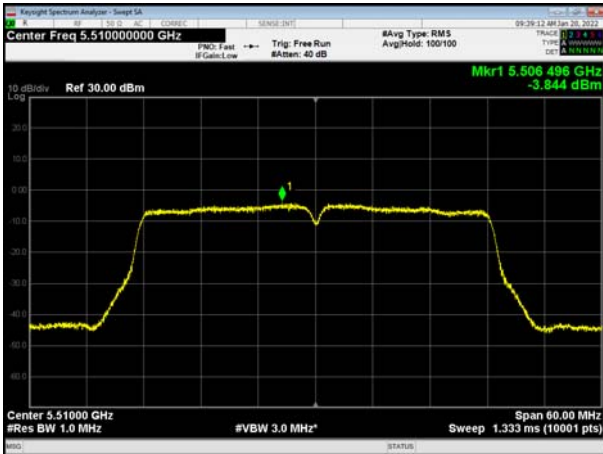
U-NII-2C, 802.11n HT40, Channel No.: 142



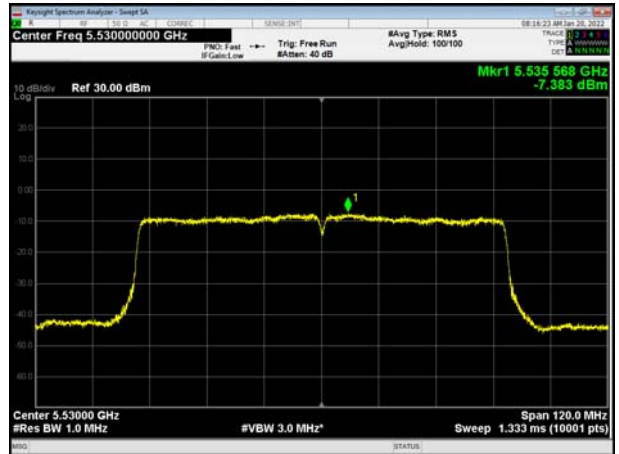




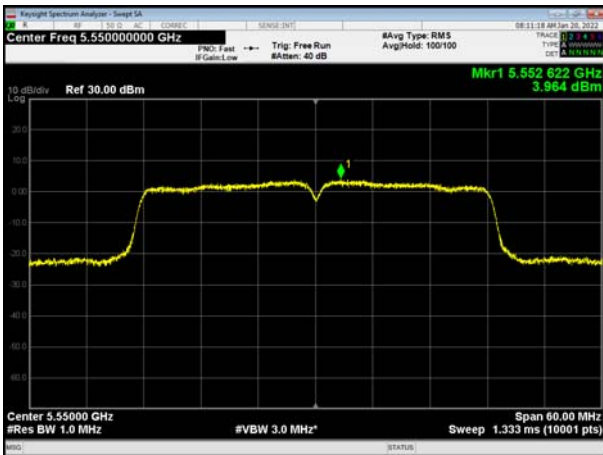
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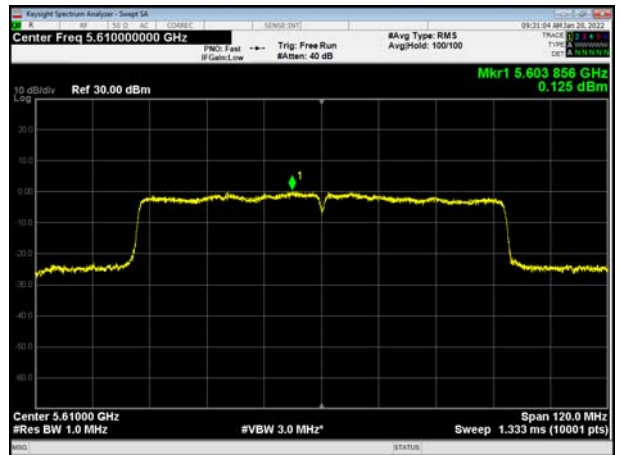
U-NII-2C, 802.11ac VHT80, Channel No.: 106



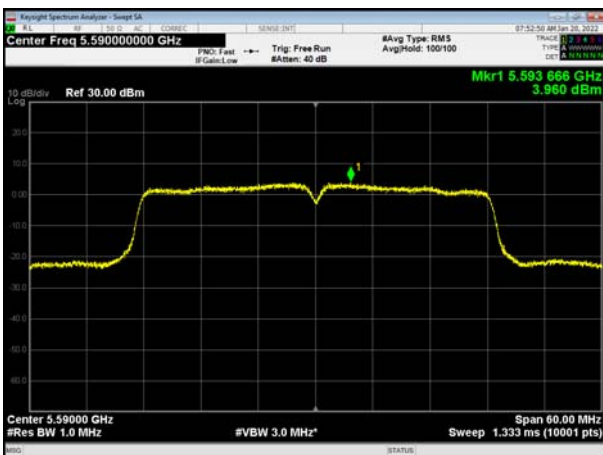
U-NII-2C, 802.11ac VHT40, Channel No.: 110



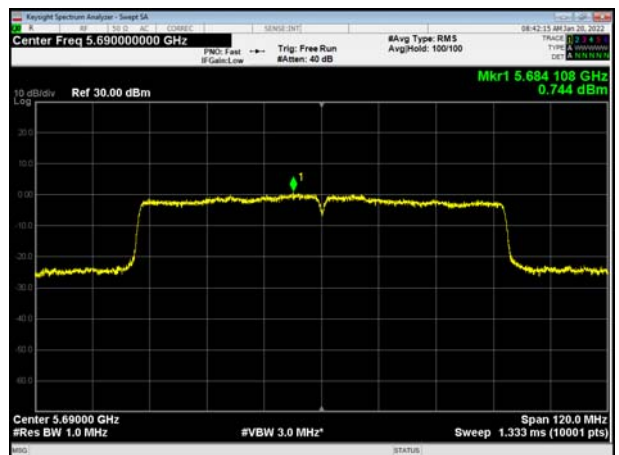
U-NII-2C, 802.11ac VHT80, Channel No.: 122



U-NII-2C, 802.11ac VHT40, Channel No.: 118

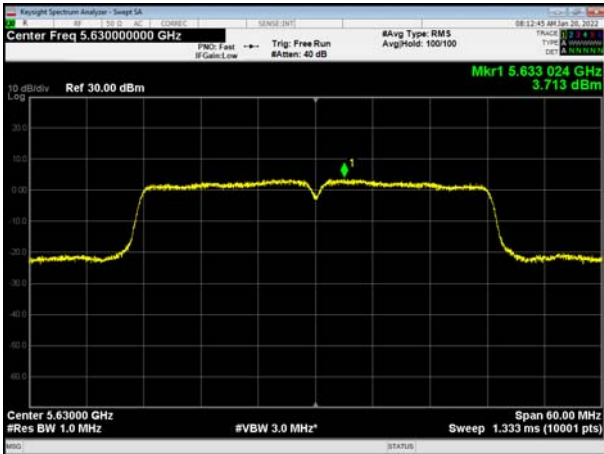


U-NII-2C, 802.11ac VHT80, Channel No.: 138

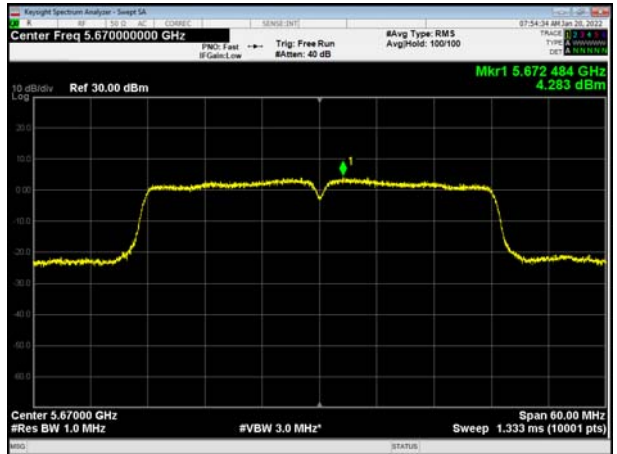




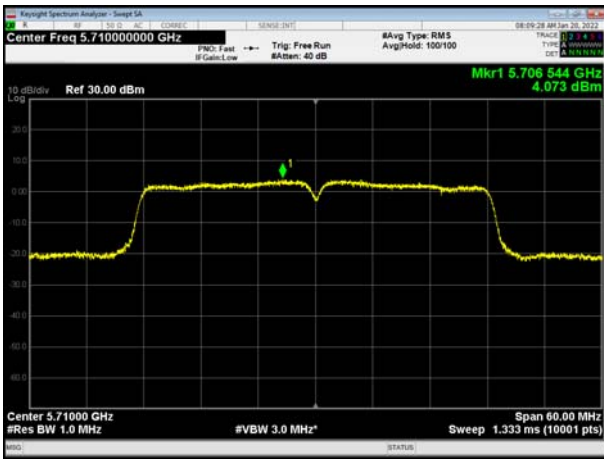
U-NII-2C, 802.11ac VHT40, Channel No.: 126



U-NII-2C, 802.11ac VHT40, Channel No.: 134

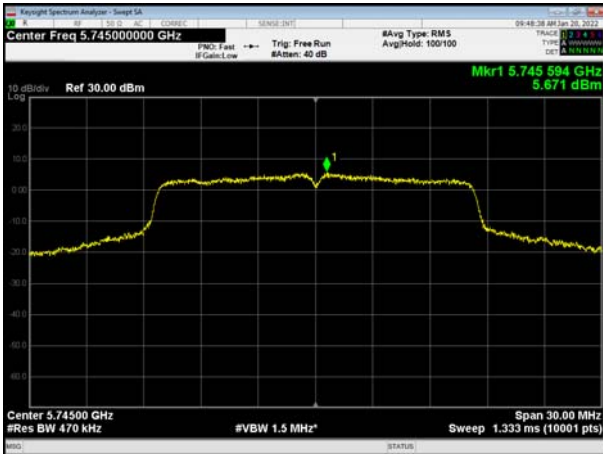


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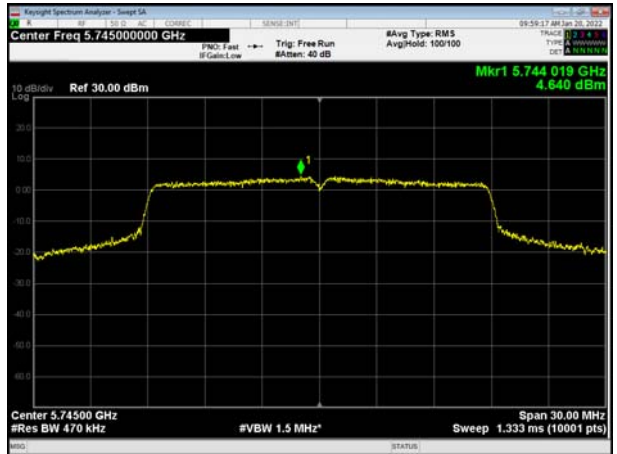




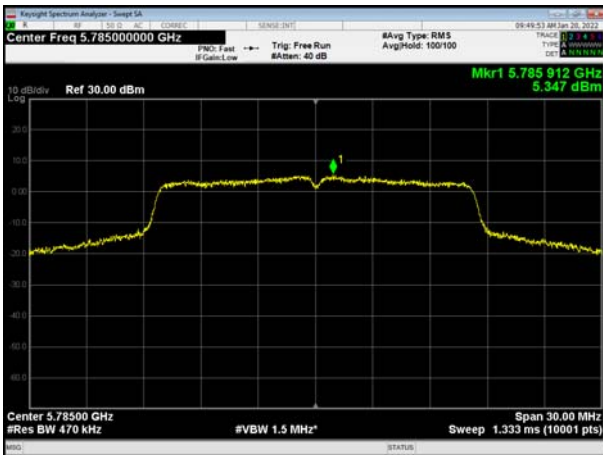
U-NII-3, 802.11a, Channel No.: 149



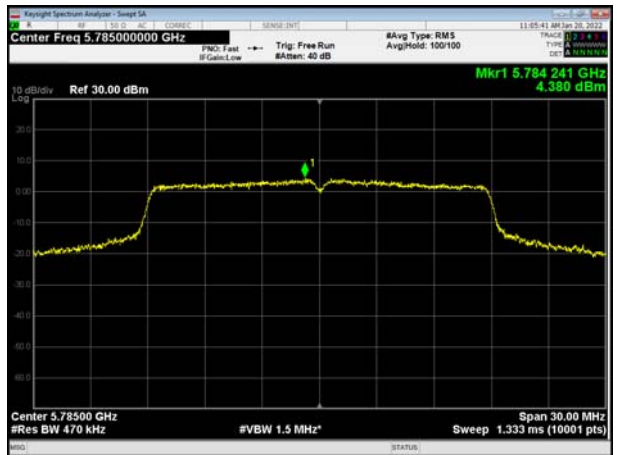
U-NII-3, 802.11n HT20, Channel No.: 149



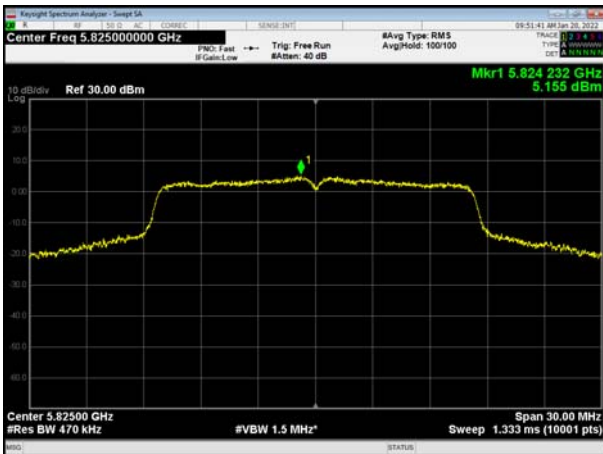
U-NII-3, 802.11a, Channel No.: 157



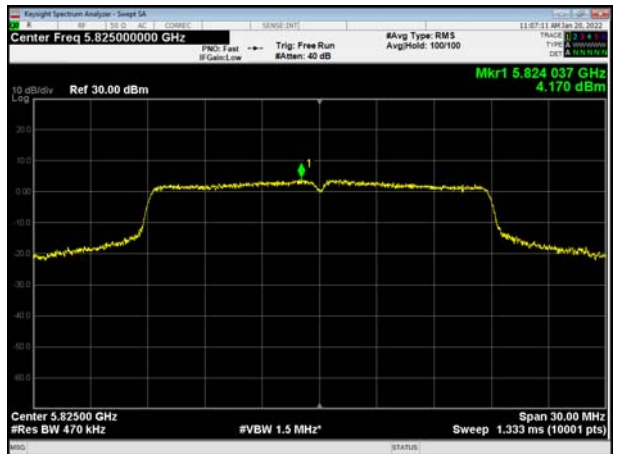
U-NII-3, 802.11n HT20, Channel No.: 157



U-NII-3, 802.11a, Channel No.: 165

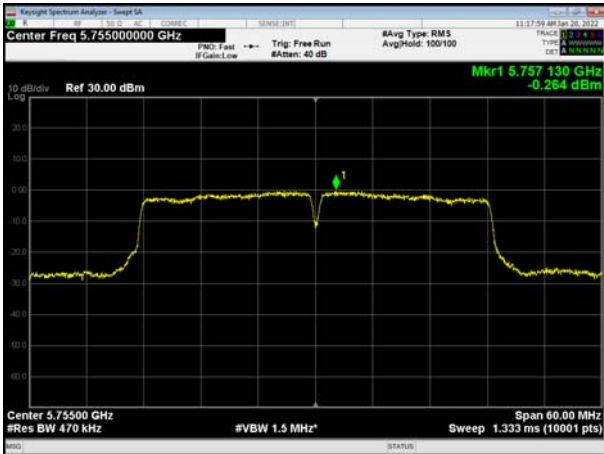


U-NII-3, 802.11n HT20, Channel No.: 165

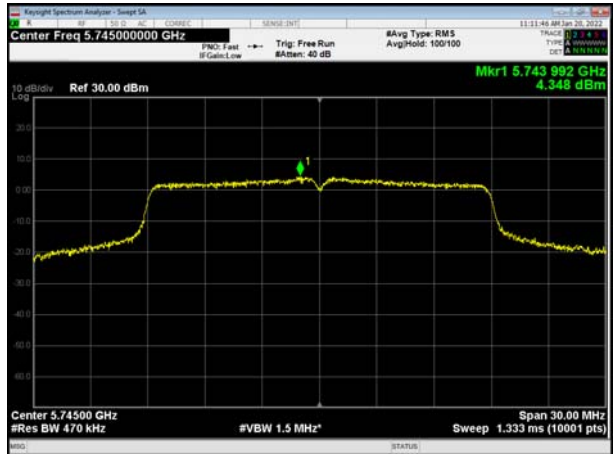




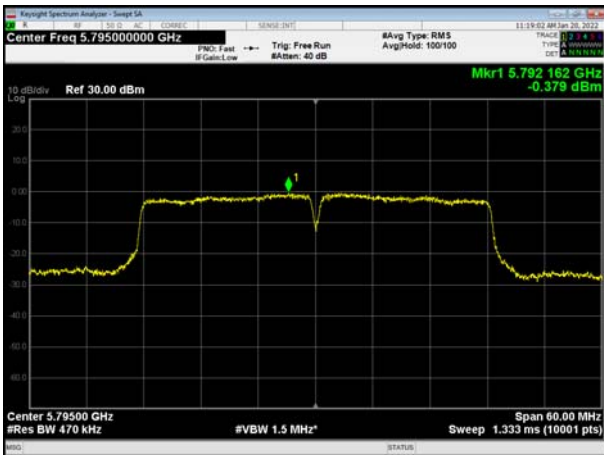
U-NII-3, 802.11n HT40, Channel No.: 151



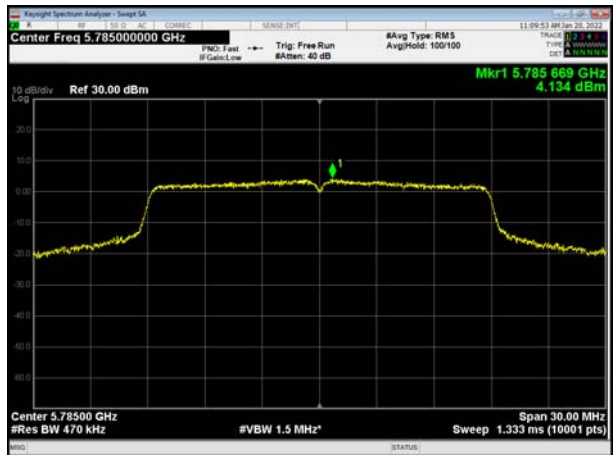
U-NII-3, 802.11ac VHT20, Channel No.: 149



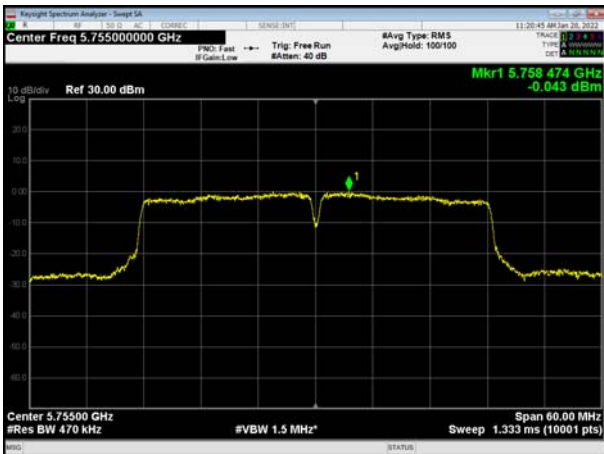
U-NII-3, 802.11n HT40, Channel No.: 159



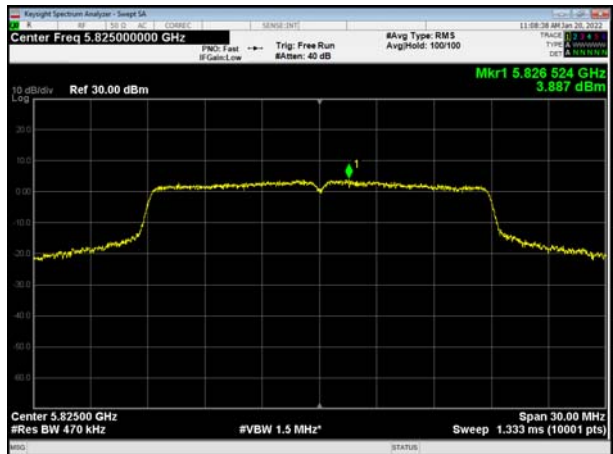
U-NII-3, 802.11ac VHT20, Channel No.: 157

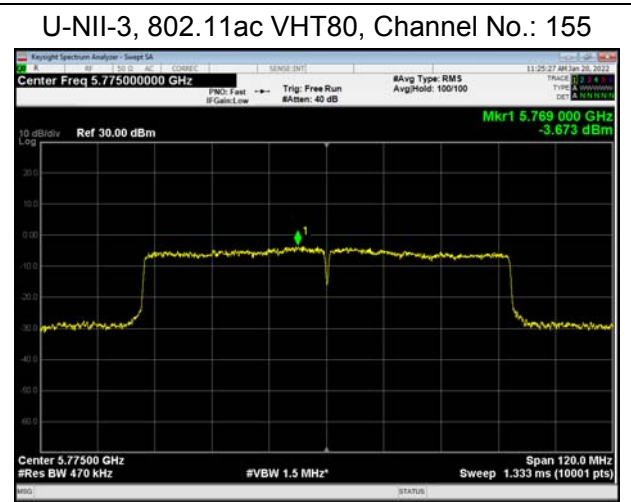
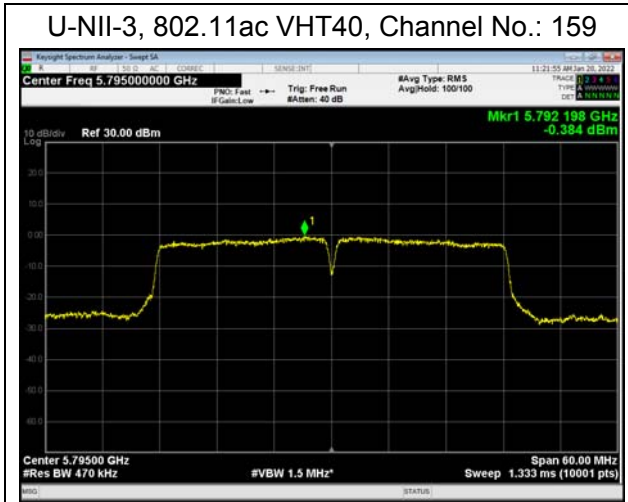


U-NII-3, 802.11ac VHT40, Channel No.: 151



U-NII-3, 802.11ac VHT20, Channel No.: 165





## 5.5. Unwanted Emission

### Ambient condition

| Temperature | Relative humidity | Pressure |
|-------------|-------------------|----------|
| 23°C ~25°C  | 45%~50%           | 101.5kPa |

### Method of Measurement

The test set-up was made in accordance to the general provisions of ANSI C63.10. The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The radiated emissions measurements were made in a typical installation configuration.

Sweep the whole frequency band range from 9kHz to the 10th harmonic of the carrier, and the emissions less than 20 dB below the permissible value are reported.

During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.

Set the spectrum analyzer in the following:

9kHz~150 kHz

RBW=200Hz, VBW=1kHz/ Sweep=AUTO

150 kHz~30MHz

RBW=9KHz, VBW=30KHz,/ Sweep=AUTO

Below 1GHz

RBW=100kHz / VBW=300kHz / Sweep=AUTO

a) Peak emission levels are measured by setting the instrument as follows:

Above 1GHz

PEAK: RBW=1MHz VBW=3MHz/ Sweep=AUTO

b) Average emission levels are measured by setting the instrument as follows:

Above 1GHz

AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO

c) Detector: The measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)

e) Sweep time = auto.

f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of  $1 / D$ , where  $D$  is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific



emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)

g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is  $[10 \log (1 / D)]$ , where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.

2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is  $[20 \log (1 / D)]$ , where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.

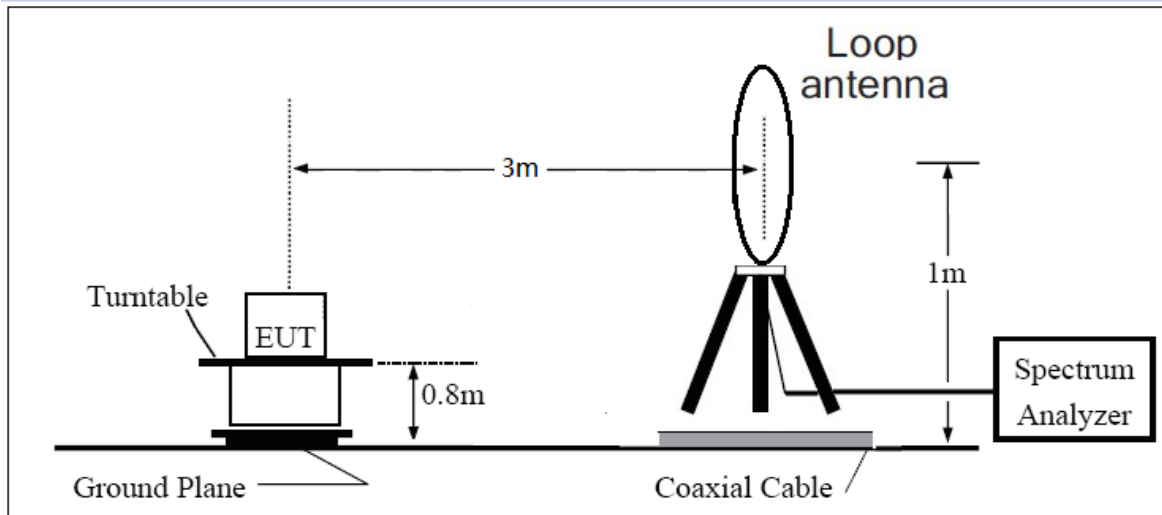
3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

Reduce the video bandwidth until no significant variations in the displayed signal are observed in subsequent traces, provided the video bandwidth is no less than 1 Hz. For regulatory requirements that specify averaging only over the transmit duration (e.g., digital transmission system [DTS] and Unlicensed National Information Infrastructure [U-NII]), the video bandwidth shall be greater than  $[1 / (\text{minimum transmitter on time})]$  and no less than 1 Hz.

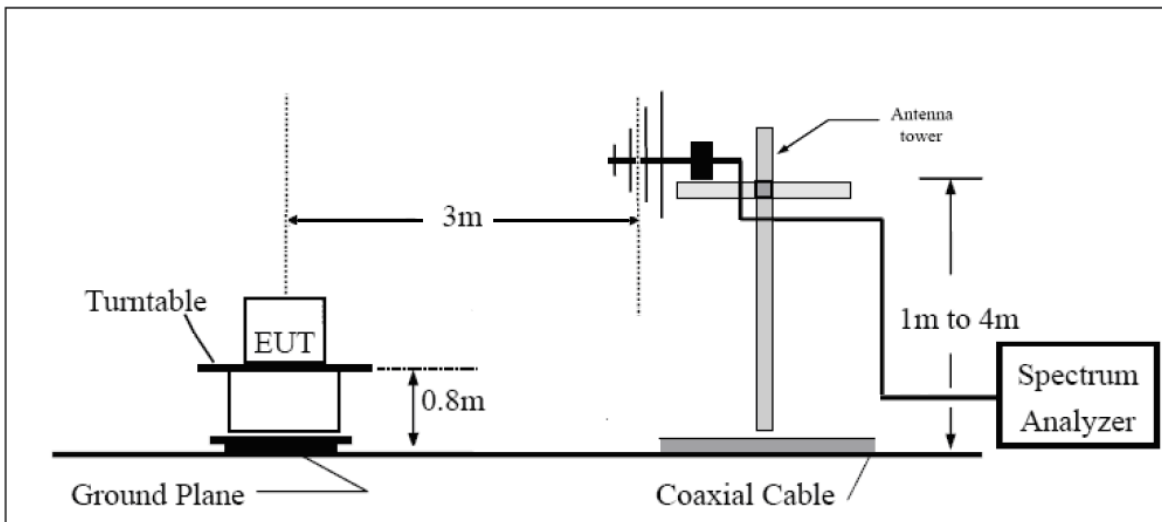
The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the loop antenna is vertical, others antenna are vertical and horizontal.

The test is in transmitting mode.

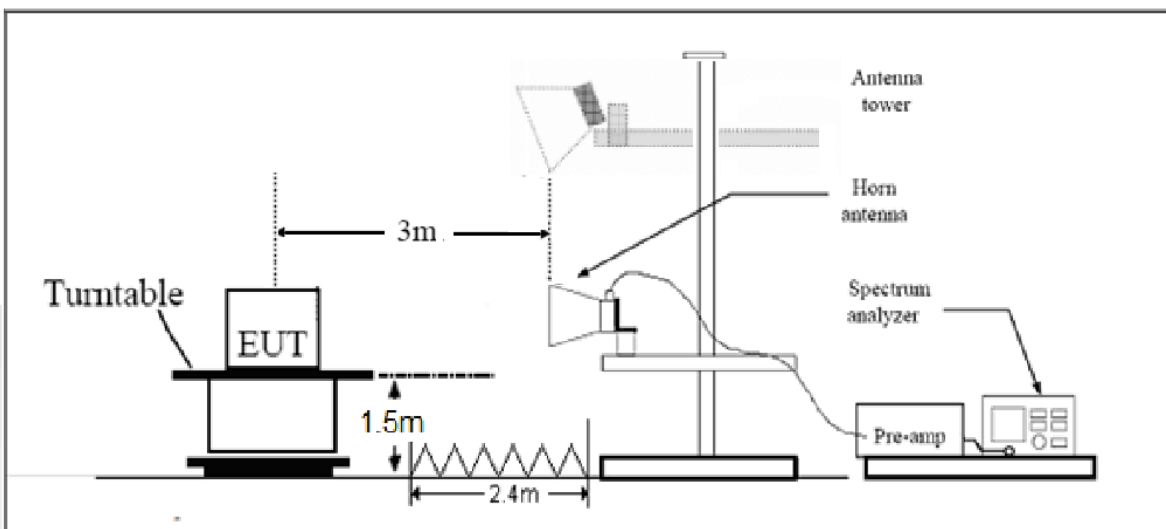
9KHz~~~30MHz



30MHz~~~ 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m



**Limits**

- (1) For transmitters operating in the 5725-5850 MHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
- (2) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz(68.2dBμV/m).
- (3) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz(68.2dBμV/m).
- (4) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz(68.2dBμV/m).

Note: the following formula is used to convert the EIRP to field strength

§1、  $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] - 20 \log(d[\text{meters}]) + 104.77$ , where E = field strength and

d = distance at which field strength limit is specified in the rules;

§2、  $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2$ , for d = 3 meters

- (5) Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table.

| Frequency of emission (MHz) | Field strength(uV/m) | Field strength(dBuV/m) |
|-----------------------------|----------------------|------------------------|
| 0.009–0.490                 | 2400/F(kHz)          | /                      |
| 0.490–1.705                 | 24000/F(kHz)         | /                      |
| 1.705–30.0                  | 30                   | /                      |
| 30-88                       | 100                  | 40                     |
| 88-216                      | 150                  | 43.5                   |
| 216-960                     | 200                  | 46                     |
| Above960                    | 500                  | 54                     |



| MHz                 | MHz                   | MHz             | GHz              |
|---------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110       | 16.42 - 16.423        | 399.9 - 410     | 4.5 - 5.15       |
| 0.495 - 0.505       | 16.69475 - 16.69525   | 608 - 614       | 5.35 - 5.46      |
| 2.1735 - 2.1905     | 16.80425 - 16.80475   | 960 - 1240      | 7.25 - 7.75      |
| 4.125 - 4.128       | 25.5 - 25.67          | 1300 - 1427     | 8.025 - 8.5      |
| 4.17725 - 4.17775   | 37.5 - 38.25          | 1435 - 1626.5   | 9.0 - 9.2        |
| 4.20725 - 4.20775   | 73 - 74.6             | 1645.5 - 1646.5 | 9.3 - 9.5        |
| 6.215 - 6.218       | 74.8 - 75.2           | 1660 - 1710     | 10.6 - 12.7      |
| 6.26775 - 6.26825   | 108 - 121.94          | 1718.8 - 1722.2 | 13.25 - 13.4     |
| 6.31175 - 6.31225   | 123 - 138             | 2200 - 2300     | 14.47 - 14.5     |
| 8.291 - 8.294       | 149.9 - 150.05        | 2310 - 2390     | 15.35 - 16.2     |
| 8.362 - 8.366       | 156.52475 - 156.52525 | 2483.5 - 2500   | 17.7 - 21.4      |
| 8.37625 - 8.38675   | 156.7 - 156.9         | 2690 - 2900     | 22.01 - 23.12    |
| 8.41425 - 8.41475   | 162.0125 - 167.17     | 3260 - 3267     | 23.6 - 24.0      |
| 12.29 - 12.293      | 167.72 - 173.2        | 3332 - 3339     | 31.2 - 31.8      |
| 12.51975 - 12.52025 | 240 - 285             | 3345.8 - 3358   | 36.43 - 36.5     |
| 12.57675 - 12.57725 | 322 - 335.4           | 3600 - 4400     | ( <sup>2</sup> ) |
| 13.36 - 13.41       |                       |                 |                  |

### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ .

| Frequency     | Uncertainty |
|---------------|-------------|
| 9KHz-30MHz    | 3.55 dB     |
| 30MHz-200MHz  | 4.17 dB     |
| 200MHz-1GHz   | 4.84 dB     |
| 1-18GHz       | 4.35 dB     |
| 18-26.5GHz    | 5.90 dB     |
| 26.5GHz~40GHz | 5.92 dB     |



**Test Results:**

The modulation and bandwidth are similar for 802.11n mode for 20MHz/40MHz and 802.11ac mode for V20MHz/V40MHz, therefore investigated worst case to representative mode in test report.

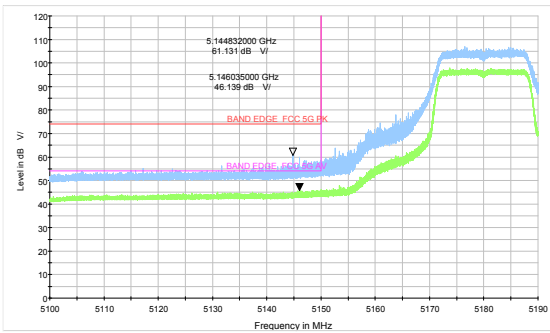
A font (Level in dB $\mu$ V/m) in the test plot =(level in dB  $\mu$  V/m)

A font (Level in dB $\mu$ V) in the test plot =(level in dB  $\mu$  V/m)

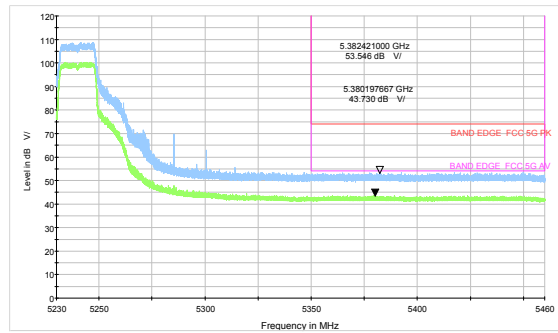
The signal beyond the limit is carrier.

**U-NII-1**

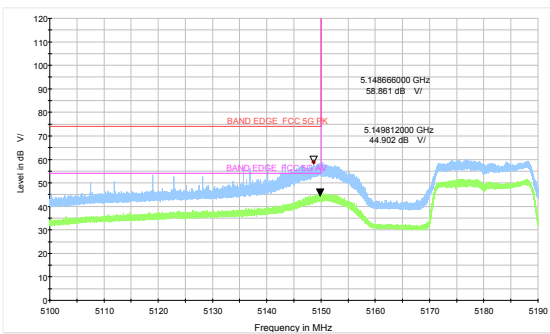
**802.11a-Channel 36: Peak + Average**



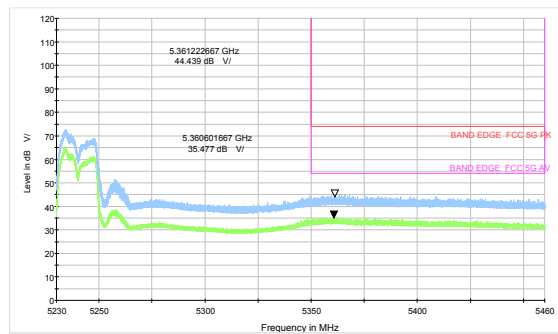
**802.11a-Channel 48: Peak + Average**



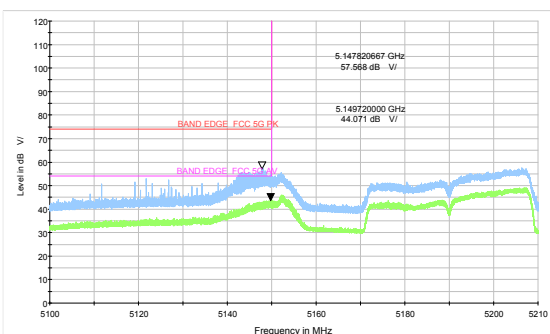
**802.11ac VHT20 -Channel 36: Peak + Average**



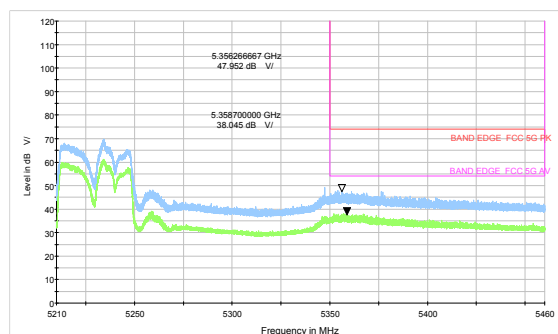
**802.11ac VHT20 -Channel 48: Peak + Average**



**802.11ac VHT40-Channel 38: Peak + Average**

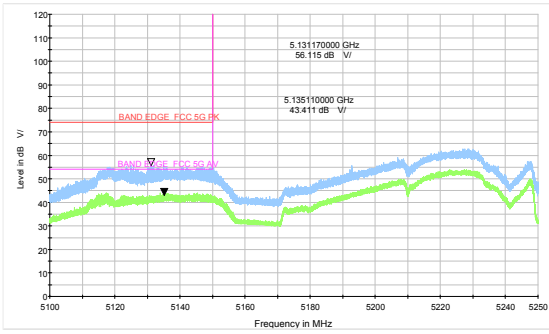


**802.11ac VHT40-Channel 46: Peak + Average**



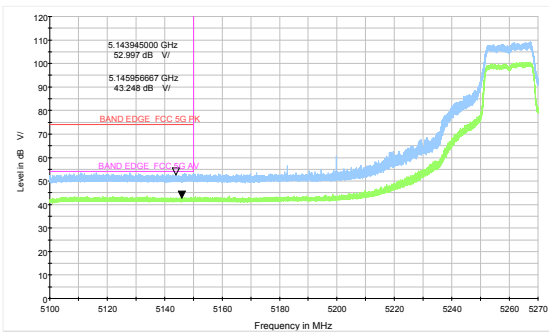


### 802.11ac VHT80 –Channel 42: Peak + Average

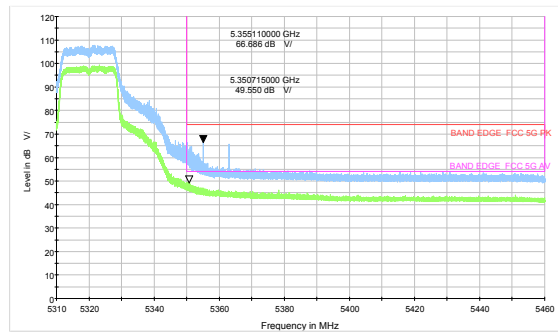


### U-NII-2A

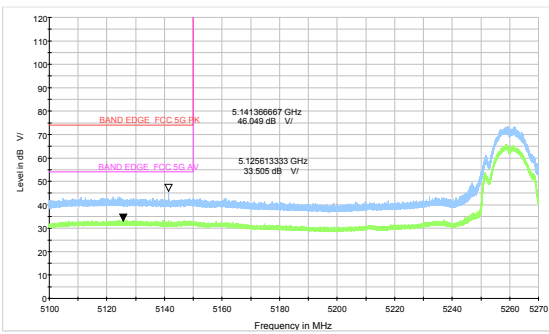
#### 802.11a-Channel 52: Peak + Average



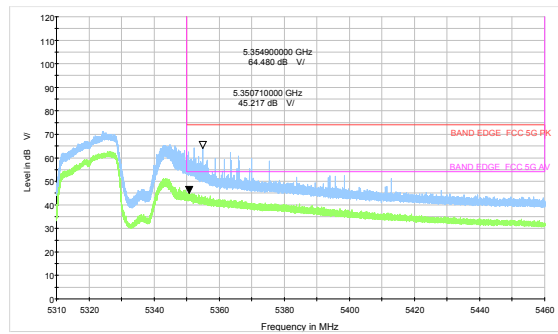
#### 802.11a-Channel 64: Peak + Average



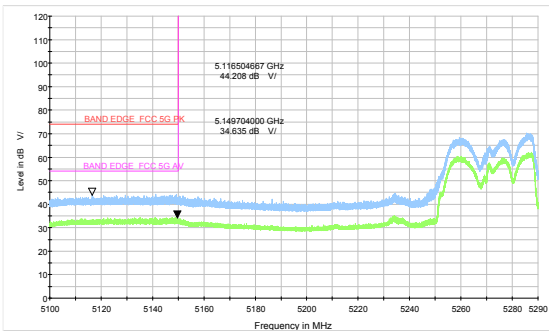
#### 802.11ac VHT20 -Channel 52: Peak + Average



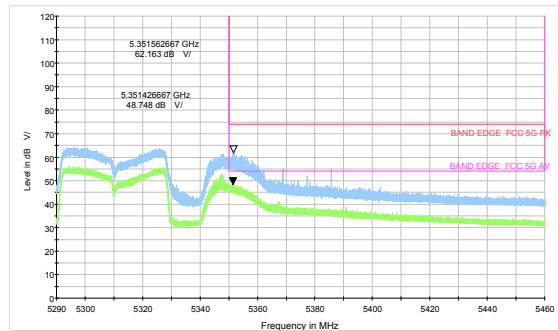
#### 802.11ac VHT20 -Channel 64: Peak + Average



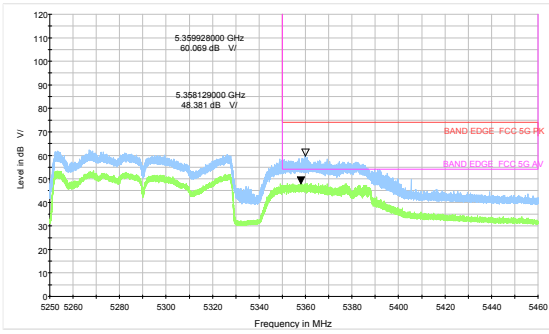
#### 802.11ac VHT40-Channel 54: Peak + Average



#### 802.11ac VHT40-Channel 62: Peak + Average

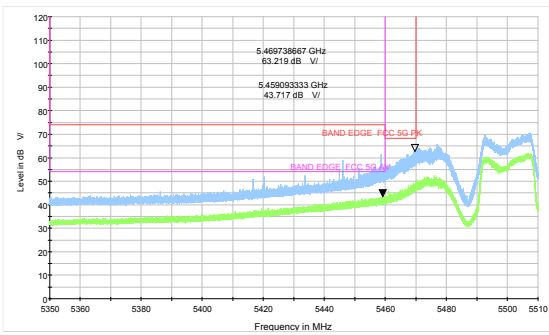


**802.11ac VHT80 –Channel 58: Peak + Average**

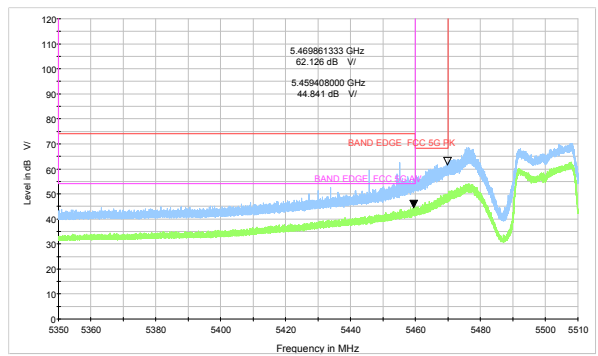


**U-NII-2C**

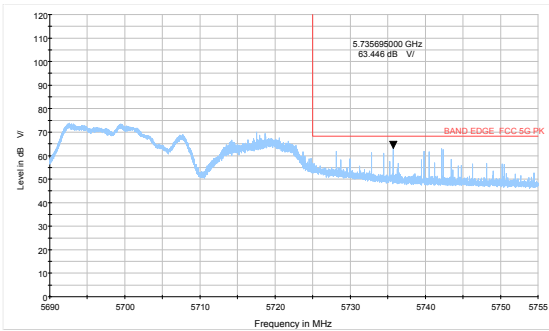
**802.11a-Channel 100: Peak + Average**



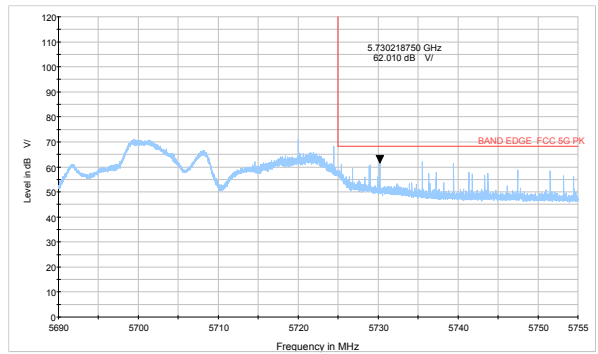
**802.11ac VHT20 -Channel 100: Peak + Average**



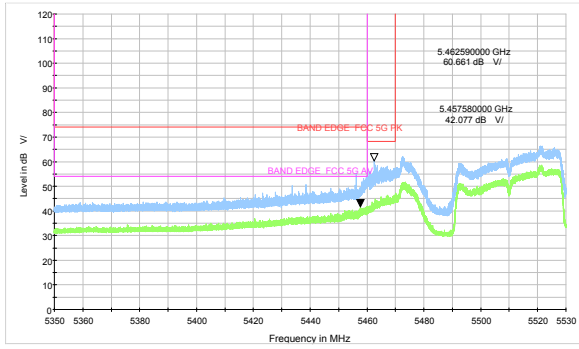
**802.11a-Channel 140: Peak**



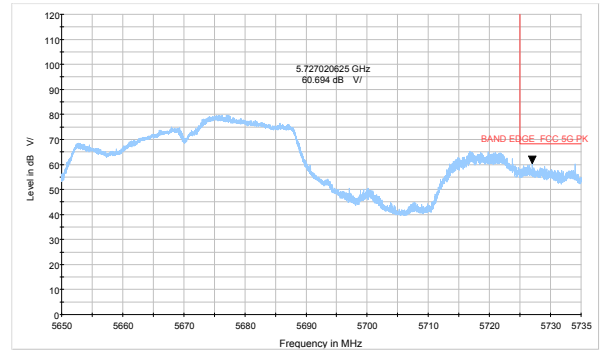
**802.11ac VHT20 -Channel 140: Peak**



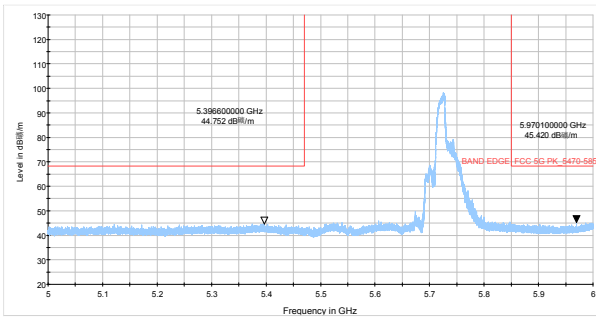
### 802.11ac VHT40-Channel 102: Peak + Average



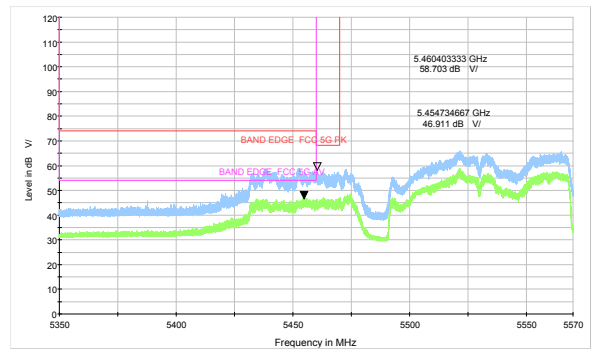
### 802.11ac VHT40-Channel 134: Peak + Average



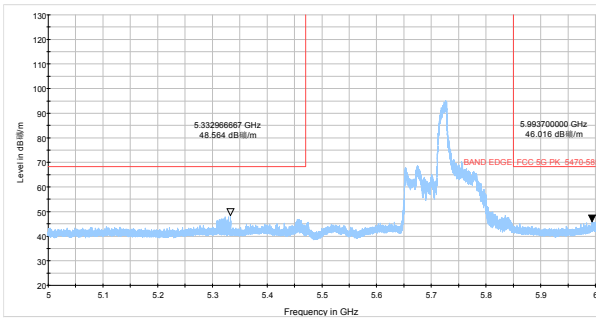
### 802.11ac VHT40-Channel 142: Peak



### 802.11ac VHT80 -Channel 106: Peak + Average



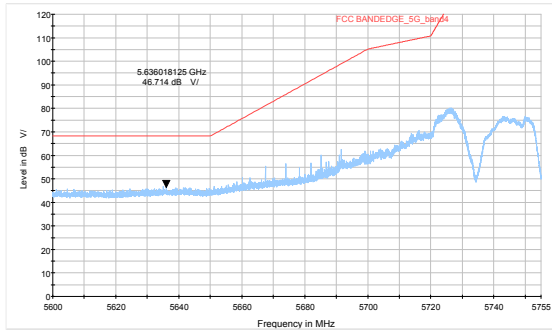
### 802.11ac VHT80 -Channel 138: Peak



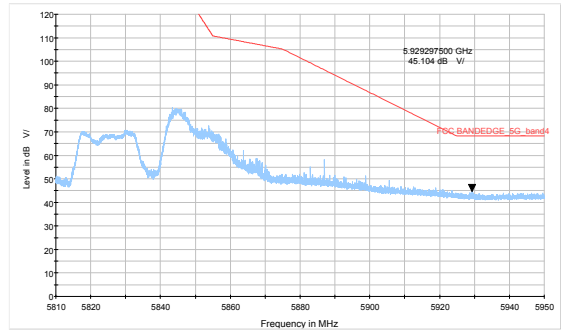


U-NII-3

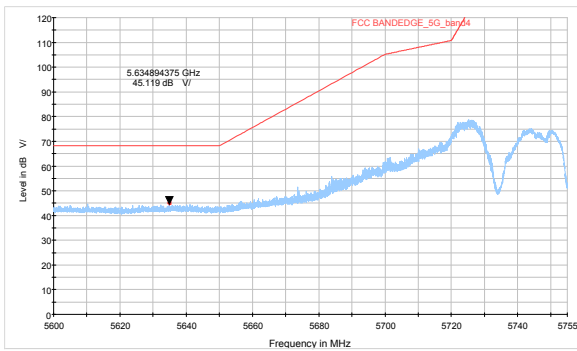
802.11a-Channel 149: Peak



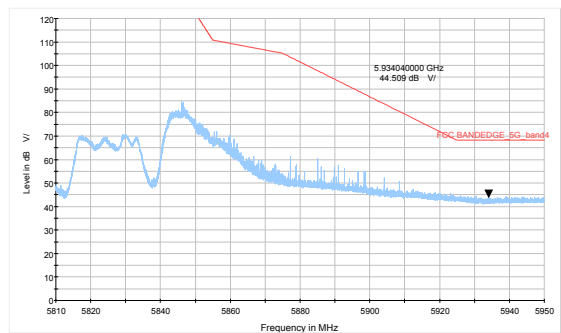
802.11a-Channel 165: Peak



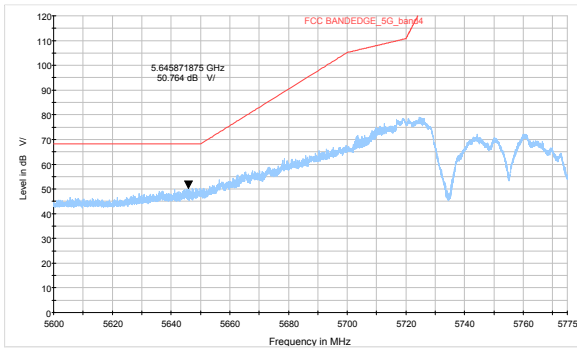
802.11ac VHT20-Channel 149: Peak



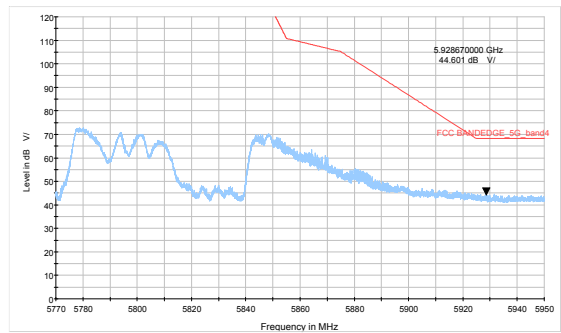
802.11ac VHT20-Channel 165: Peak



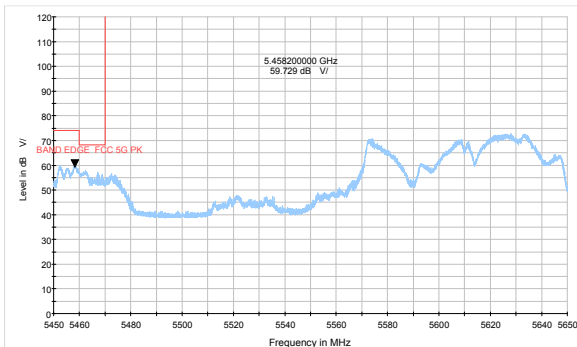
802.11ac VHT40-Channel 151: Peak



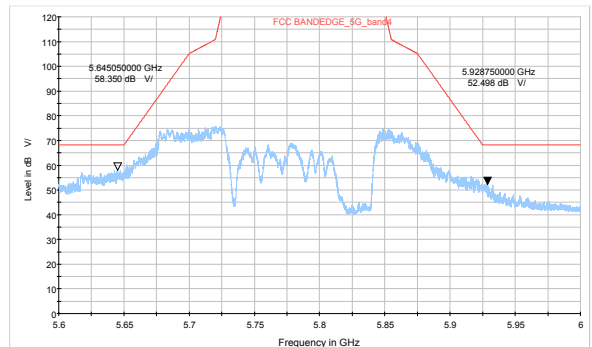
802.11ac VHT40-Channel 159: Peak



802.11ac VHT80- Channel 122: Peak



802.11ac VHT80- Channel 155: Peak





### Result of RE

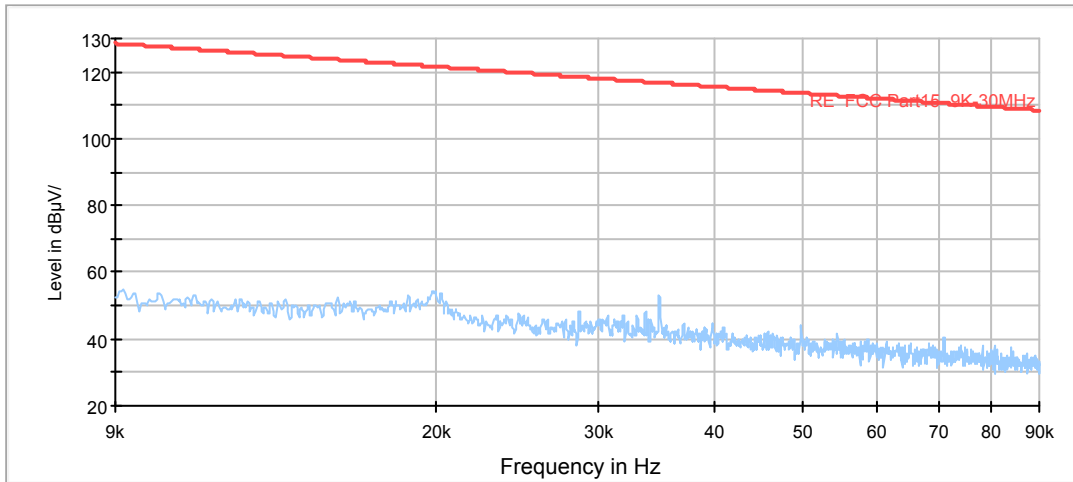
#### Test result

A font ( Level in dB $\mu$ V/ ) in the test plot =(level in dB  $\mu$  V/m)

During the test, the Radiates Emission from 30MHz to 1GHz was performed in all modes with all channels, 802.11a, Channel 64 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

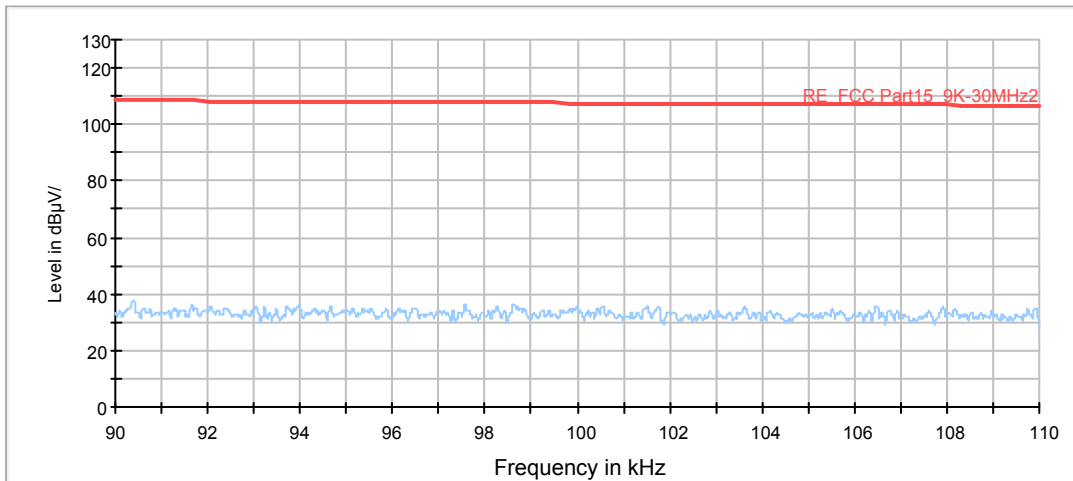
#### Continuous TX mode:

FCC RE 9K-90KHz AV



Radiates Emission from 9KHz to 90KHz

FCC RE 90K-110KHz QP

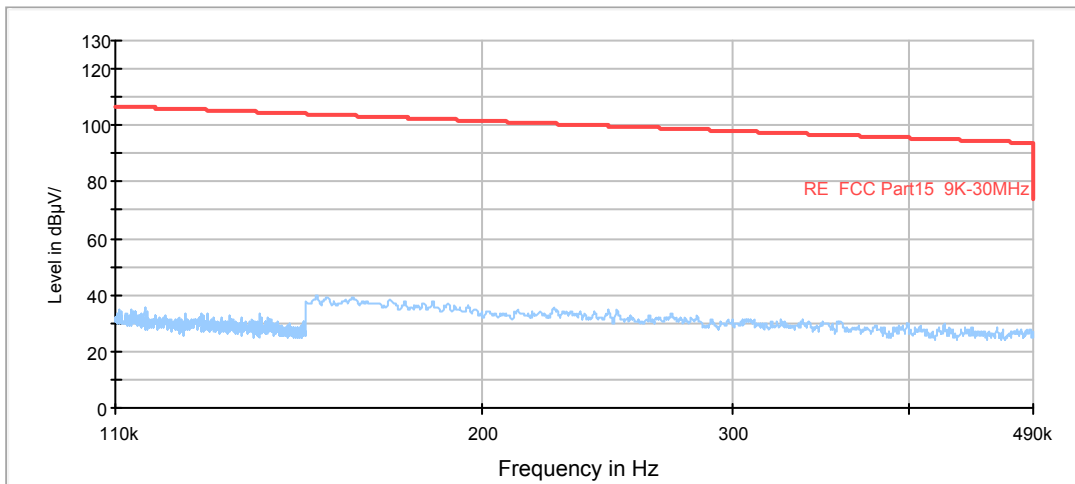


Radiates Emission from 90KHz to 110KHz



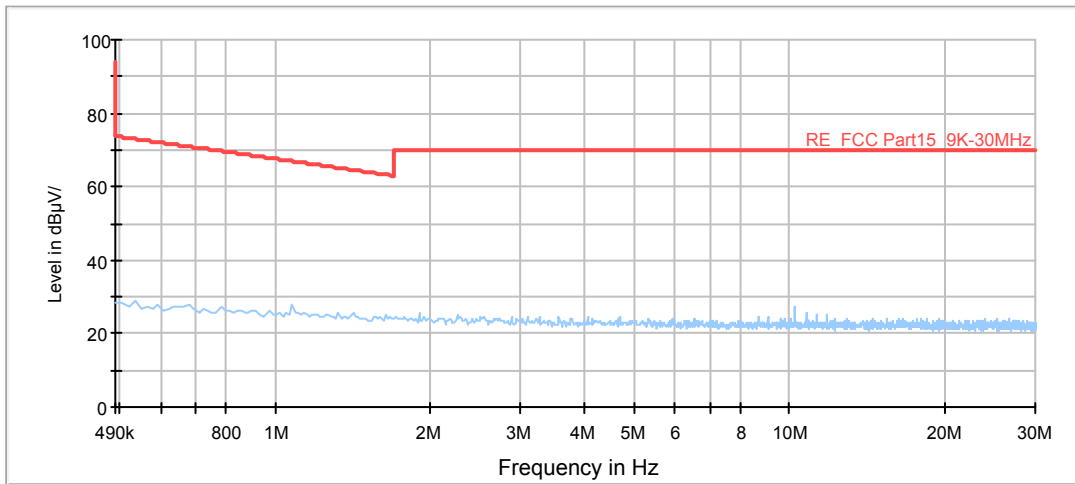


FCC RE 110K-490KHz AV

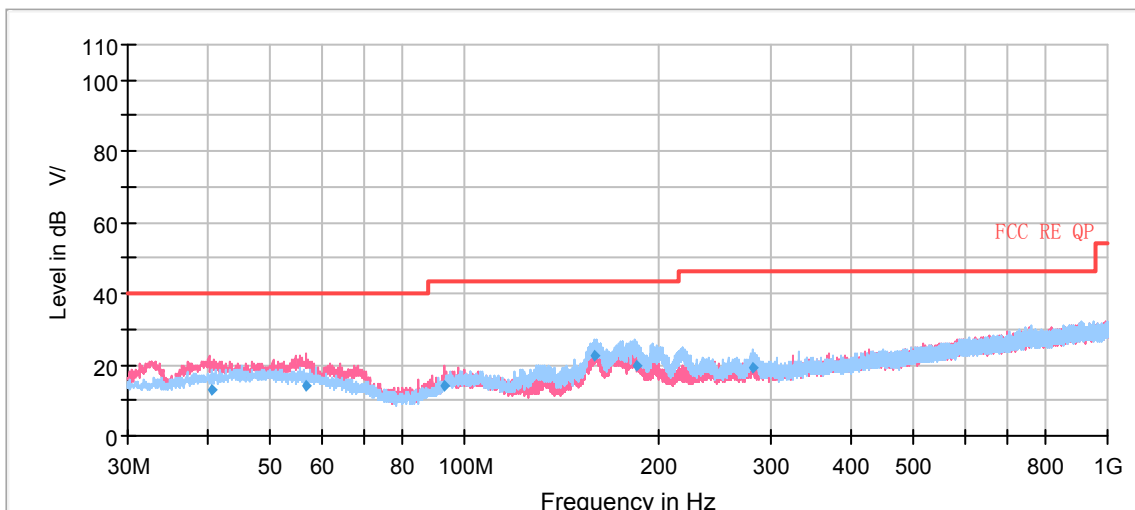


Radiates Emission from 110KHz to 490KHz

FCC RE 490K-30MHz QP



Radiates Emission from 490KHz to 30MHz



Radiates Emission from 30MHz to 1GHz

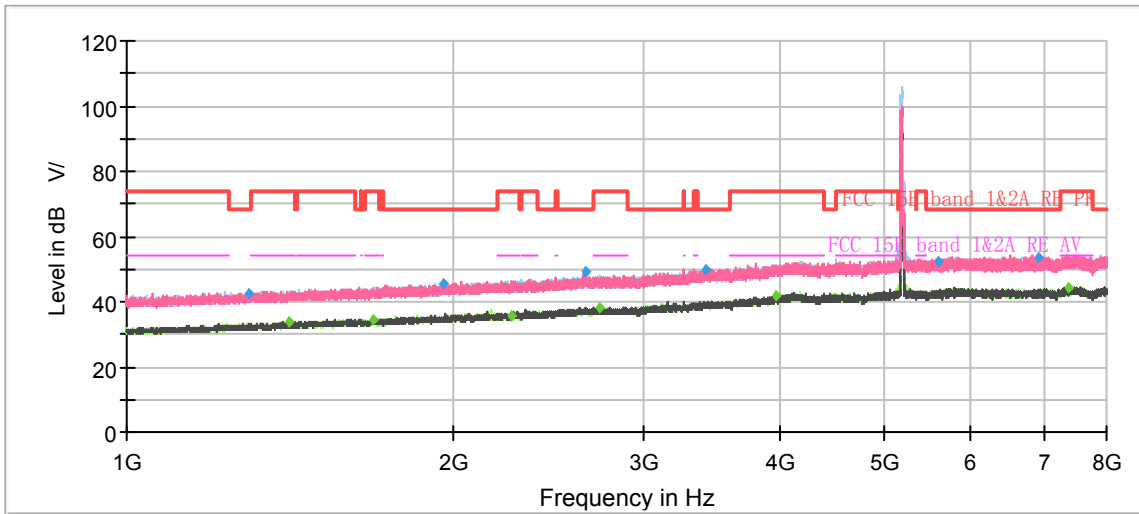
| Frequency (MHz) | Quasi-Peak (dBuV/m) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) | Margin (dB) | Limit (dBuV/m) |
|-----------------|---------------------|-------------|--------------|---------------|---------------------|-------------|----------------|
| 40.600333       | 12.86               | 185.0       | V            | 206.0         | 20                  | 27.14       | 40.00          |
| 56.819667       | 14.38               | 100.0       | V            | 41.0          | 20                  | 25.62       | 40.00          |
| 93.381000       | 14.07               | 100.0       | V            | 161.0         | 17                  | 29.43       | 43.50          |
| 159.642333      | 22.77               | 175.0       | H            | 222.0         | 15                  | 20.73       | 43.50          |
| 184.759333      | 19.65               | 184.0       | H            | 65.0          | 17                  | 23.85       | 43.50          |
| 281.521000      | 19.00               | 109.0       | H            | 68.0          | 20                  | 27.00       | 46.00          |

Remark: 1. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)

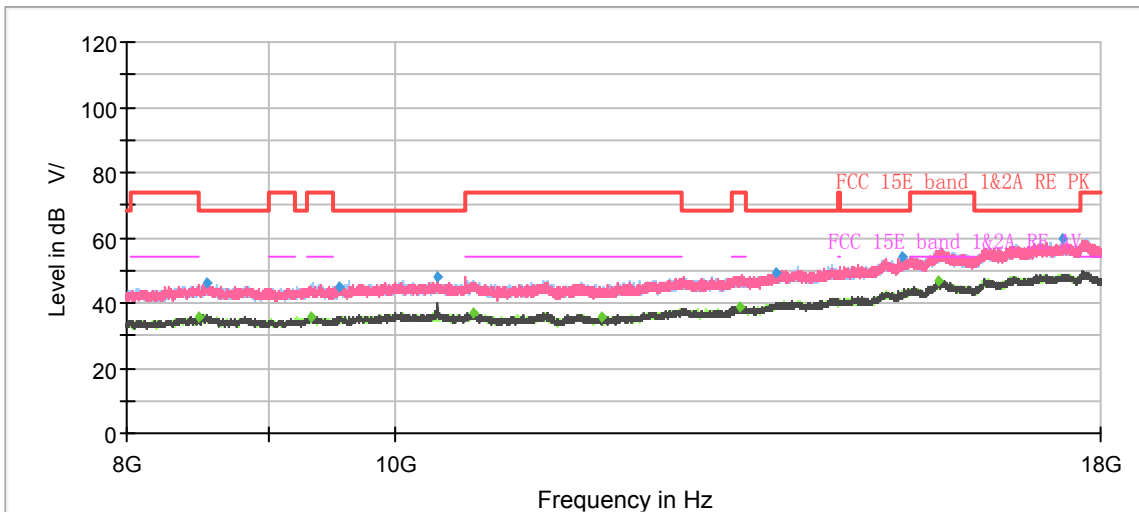
2. Margin = Limit – Quasi-Peak



802.11a CH36



Radiates Emission from 1GHz to 8GHz



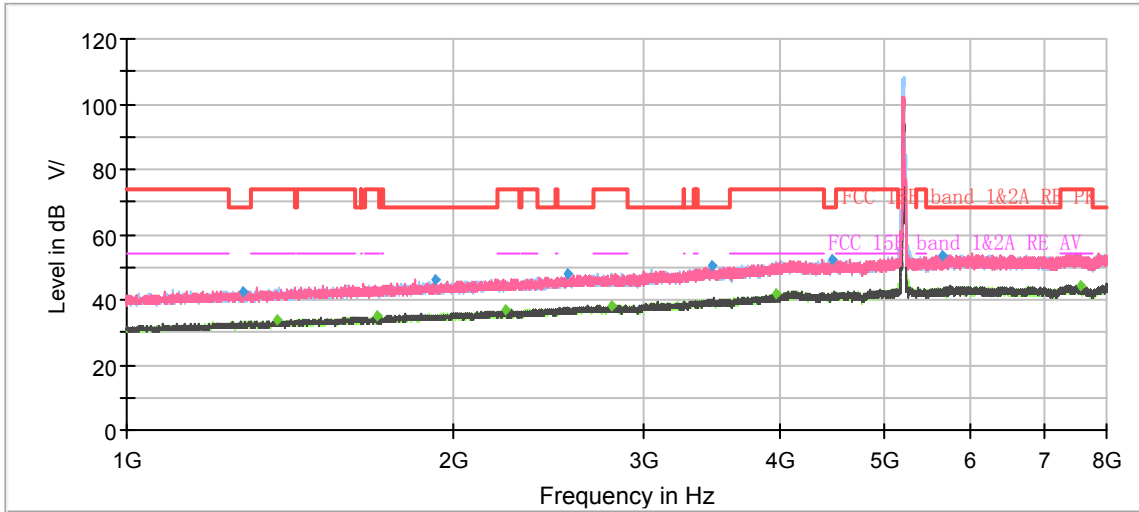
Note: The signal beyond the limit is carrier.  
Radiates Emission from 8GHz to 18GHz



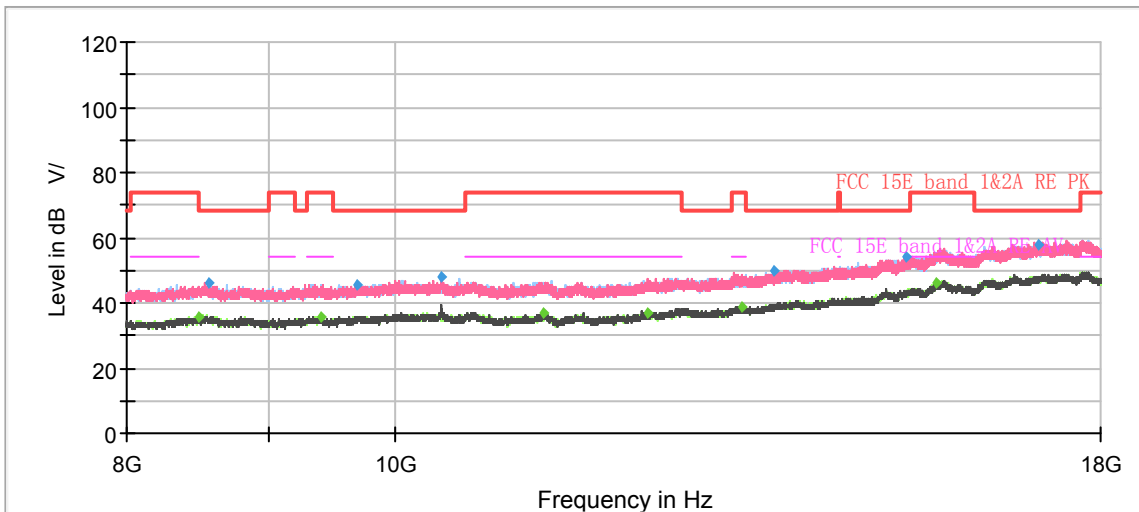
| Frequency (MHz) | Peak (dBuV/m) | Average (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) |
|-----------------|---------------|------------------|----------------|-------------|-------------|--------------|---------------|---------------------|
| 1294.933333     | 42.73         | ---              | 68.20          | 25.47       | 100.0       | H            | 68.0          | -7                  |
| 1414.166667     | ---           | 33.78            | 54.00          | 20.22       | 100.0       | H            | 174.0         | -6                  |
| 1686.233333     | ---           | 34.67            | 54.00          | 19.33       | 100.0       | V            | 233.0         | -5                  |
| 1958.300000     | 45.77         | ---              | 68.20          | 22.43       | 200.0       | H            | 270.0         | -3                  |
| 2258.133333     | ---           | 35.45            | 54.00          | 18.55       | 200.0       | H            | 209.0         | -2                  |
| 2652.466667     | 48.98         | ---              | 68.20          | 19.22       | 200.0       | H            | 170.0         | 0                   |
| 2725.966667     | ---           | 38.02            | 54.00          | 15.98       | 200.0       | H            | 255.0         | 1                   |
| 3412.200000     | 50.13         | ---              | 68.20          | 18.07       | 100.0       | V            | 233.0         | 4                   |
| 3962.633333     | ---           | 41.85            | 54.00          | 12.15       | 100.0       | H            | 196.0         | 6                   |
| 5599.233333     | 52.54         | ---              | 68.20          | 15.66       | 200.0       | V            | 21.0          | 10                  |
| 6918.033333     | 53.76         | ---              | 68.20          | 14.44       | 200.0       | H            | 86.0          | 11                  |
| 7371.400000     | ---           | 44.37            | 54.00          | 9.63        | 200.0       | H            | 209.0         | 11                  |

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

802.11a CH40



Radiates Emission from 1GHz to 8GHz



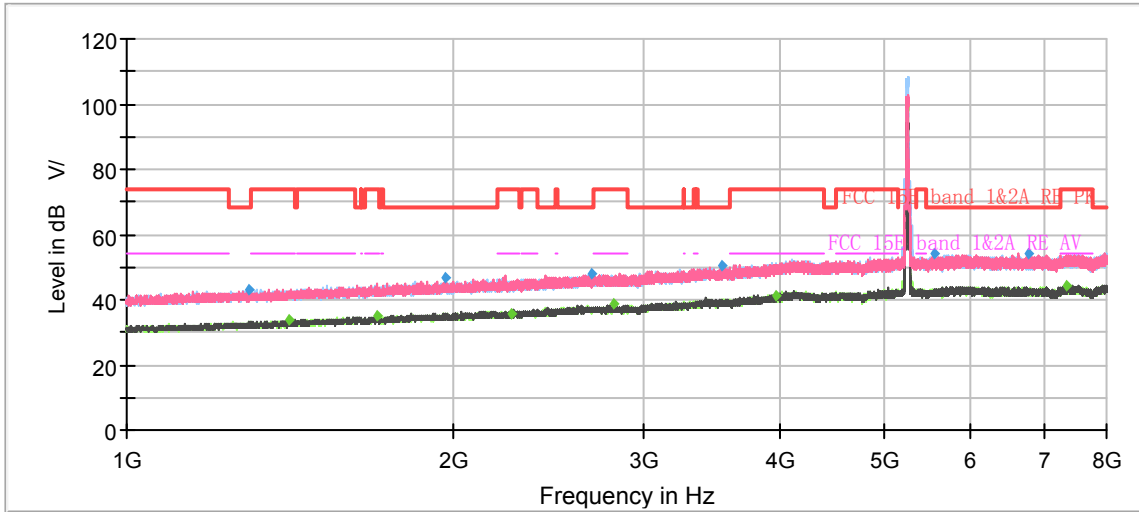
Note: The signal beyond the limit is carrier.  
Radiates Emission from 8GHz to 18GHz



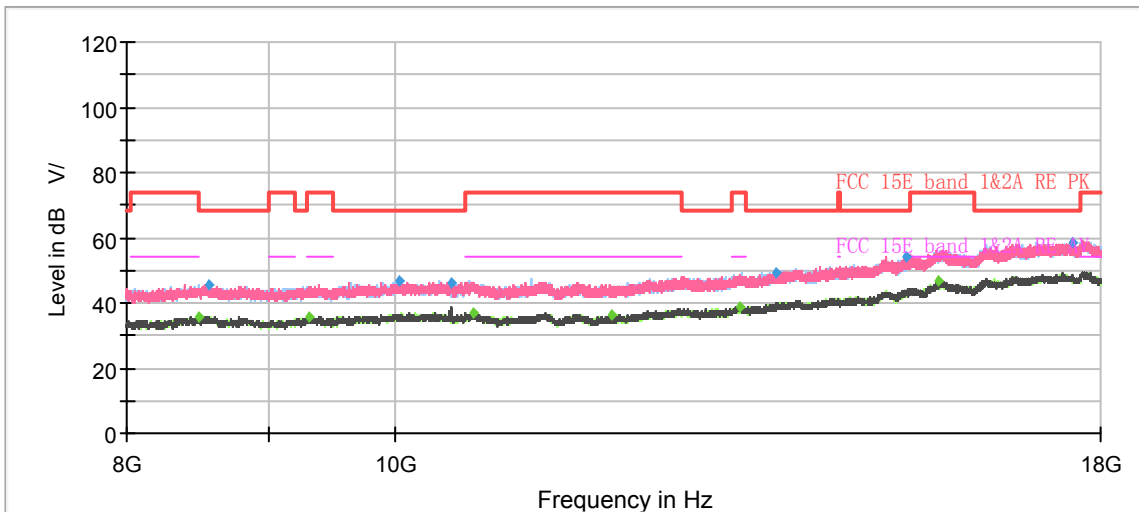
| Frequency (MHz) | Peak (dBuV/m) | Average (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) |
|-----------------|---------------|------------------|----------------|-------------|-------------|--------------|---------------|---------------------|
| 1281.866667     | 42.44         | ---              | 68.20          | 25.76       | 100.0       | V            | 261.0         | -7                  |
| 1377.533333     | ---           | 33.74            | 54.00          | 20.26       | 100.0       | H            | 173.0         | -6                  |
| 1700.233333     | ---           | 34.78            | 54.00          | 19.22       | 200.0       | H            | 263.0         | -5                  |
| 1921.900000     | 46.14         | ---              | 68.20          | 22.06       | 100.0       | V            | 145.0         | -3                  |
| 2238.066667     | ---           | 36.88            | 54.00          | 17.12       | 200.0       | V            | 85.0          | -2                  |
| 2550.500000     | 48.21         | ---              | 68.20          | 19.99       | 200.0       | V            | 77.0          | 0                   |
| 2796.200000     | ---           | 38.05            | 54.00          | 15.95       | 200.0       | H            | 330.0         | 1                   |
| 3458.866667     | 50.16         | ---              | 68.20          | 18.04       | 200.0       | H            | 164.0         | 4                   |
| 3957.733333     | ---           | 41.69            | 54.00          | 12.31       | 100.0       | V            | 224.0         | 6                   |
| 4469.433333     | 52.21         | ---              | 68.20          | 15.99       | 200.0       | V            | 145.0         | 7                   |
| 5654.533333     | 53.60         | ---              | 68.20          | 14.60       | 200.0       | H            | 263.0         | 10                  |
| 7566.000000     | ---           | 44.39            | 54.00          | 9.61        | 200.0       | H            | 308.0         | 11                  |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**

802.11a CH48



Radiates Emission from 1GHz to 8GHz



Note: The signal beyond the limit is carrier.  
Radiates Emission from 8GHz to 18GHz



| Frequency (MHz) | Peak (dBuV/m) | Average (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Height (cm) | Polarization | Azimuth (deg) | Correct Factor (dB) |
|-----------------|---------------|------------------|----------------|-------------|-------------|--------------|---------------|---------------------|
| 1297.500000     | 43.12         | ---              | 68.20          | 25.08       | 200.0       | V            | 30.0          | -7                  |
| 1410.200000     | ---           | 33.69            | 54.00          | 20.31       | 200.0       | V            | 53.0          | -6                  |
| 1701.866667     | ---           | 34.79            | 54.00          | 19.21       | 100.0       | V            | 102.0         | -5                  |
| 1964.133333     | 46.48         | ---              | 68.20          | 21.72       | 200.0       | V            | 173.0         | -3                  |
| 2262.333333     | ---           | 35.84            | 54.00          | 18.16       | 200.0       | V            | 128.0         | -2                  |
| 2680.000000     | 48.23         | ---              | 68.20          | 19.97       | 200.0       | H            | 255.0         | 0                   |
| 2812.300000     | ---           | 38.61            | 54.00          | 15.39       | 100.0       | V            | 335.0         | 1                   |
| 3536.566667     | 50.44         | ---              | 68.20          | 17.76       | 100.0       | V            | 276.0         | 4                   |
| 3970.333333     | ---           | 41.43            | 54.00          | 12.57       | 200.0       | H            | 232.0         | 6                   |
| 5554.900000     | 54.01         | ---              | 68.20          | 14.19       | 100.0       | H            | 248.0         | 10                  |
| 6786.200000     | 53.88         | ---              | 68.20          | 14.32       | 200.0       | V            | 120.0         | 10                  |
| 7354.133333     | ---           | 44.37            | 54.00          | 9.63        | 100.0       | H            | 248.0         | 11                  |

**Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)**