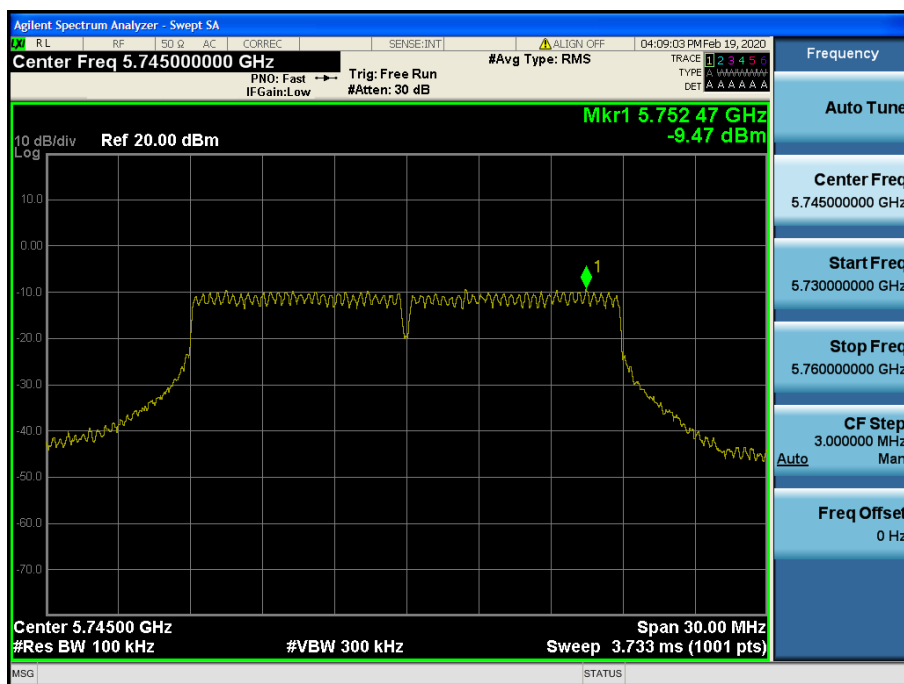


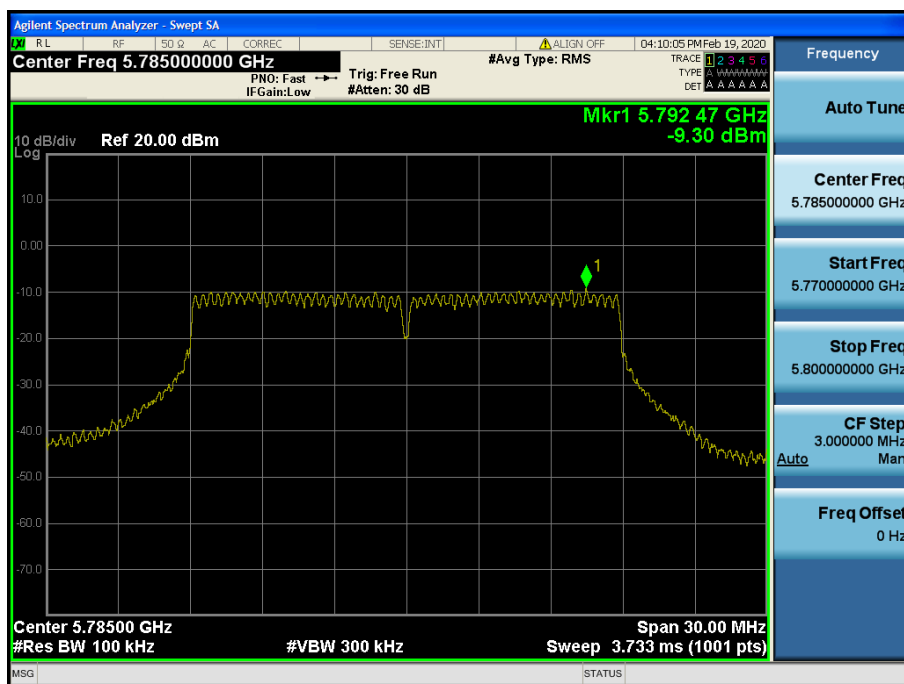
## Maximum Power Spectral Density

Test Mode: 802.11n HT20 &amp; Ch.149



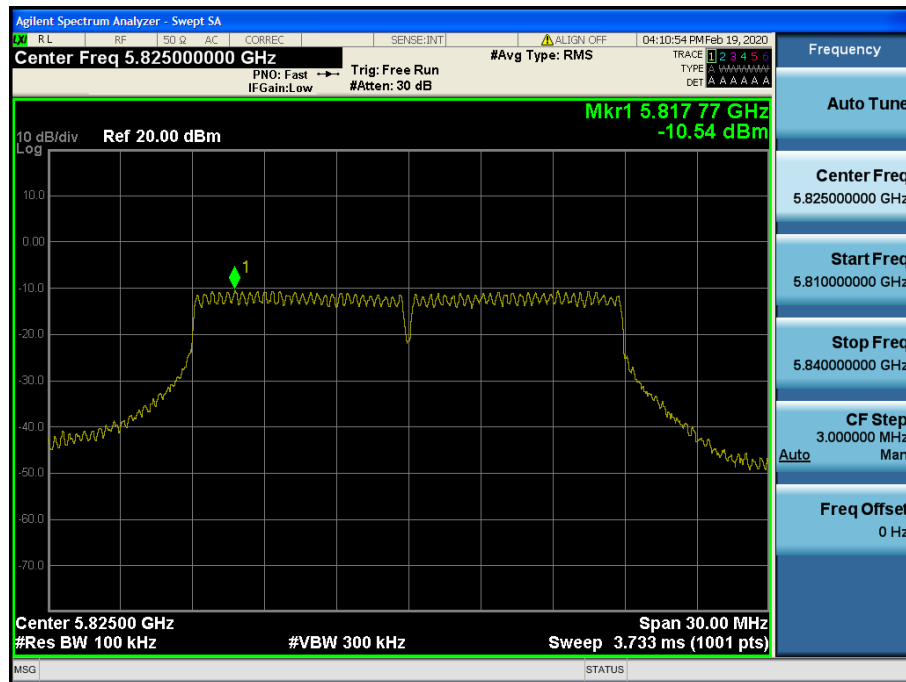
## Maximum Power Spectral Density

Test Mode: 802.11n HT20 &amp; Ch.157



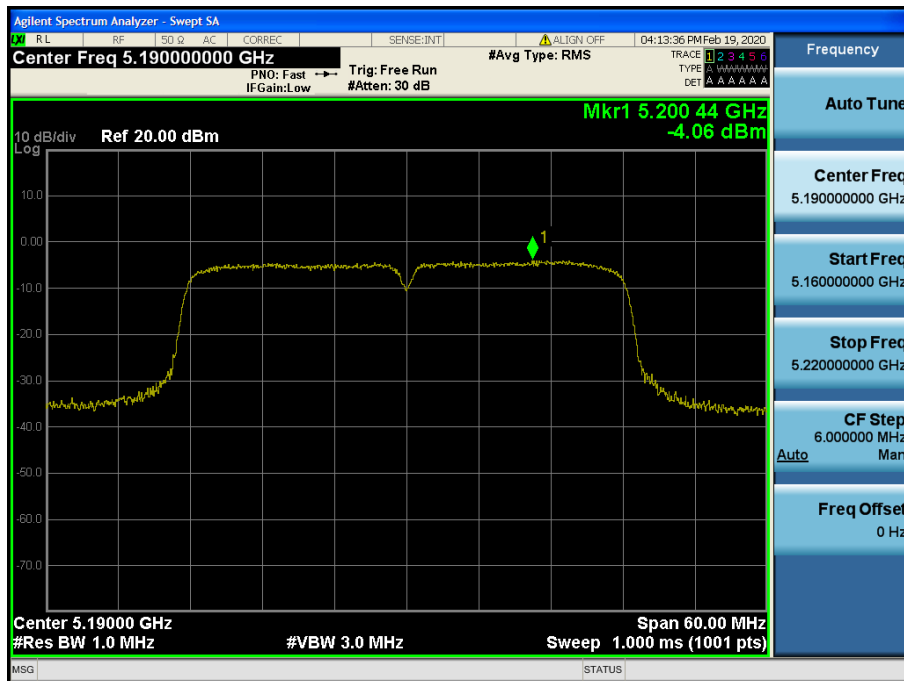
# Maximum Power Spectral Density

Test Mode: 802.11n HT20 & Ch.165



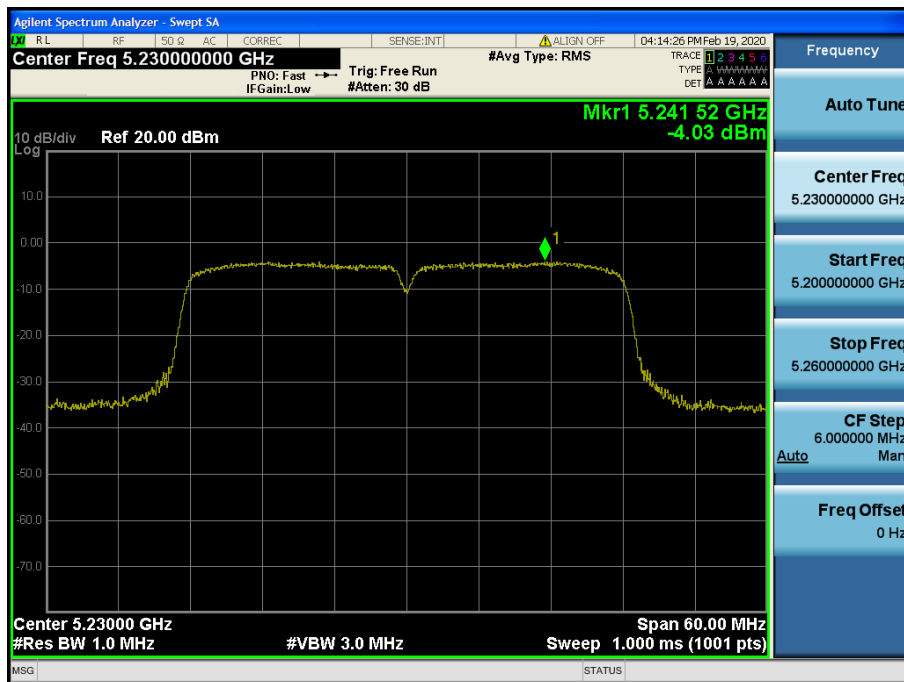
## Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.38



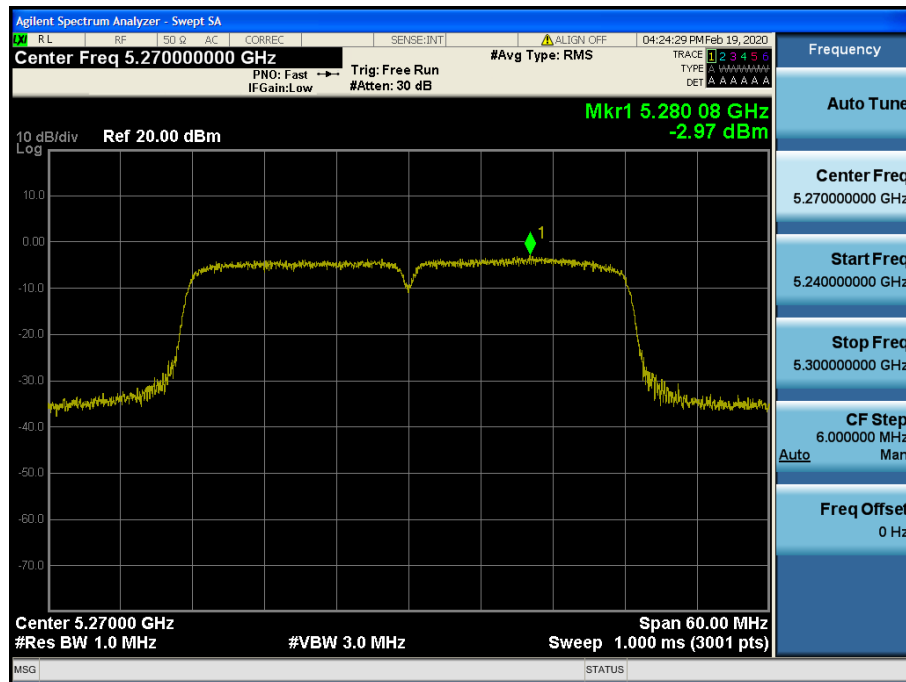
## Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.46



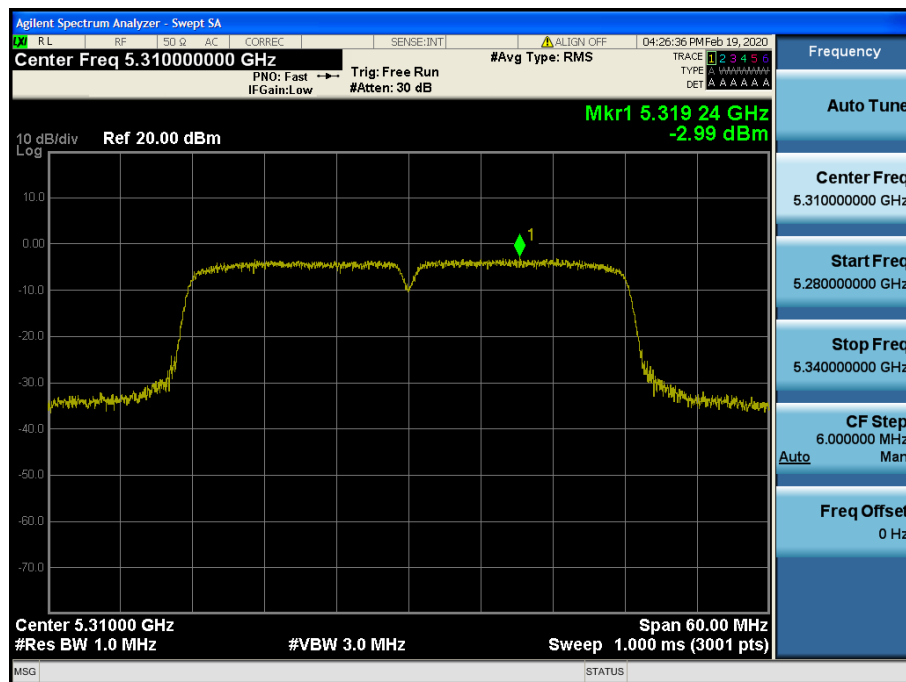
# Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.54



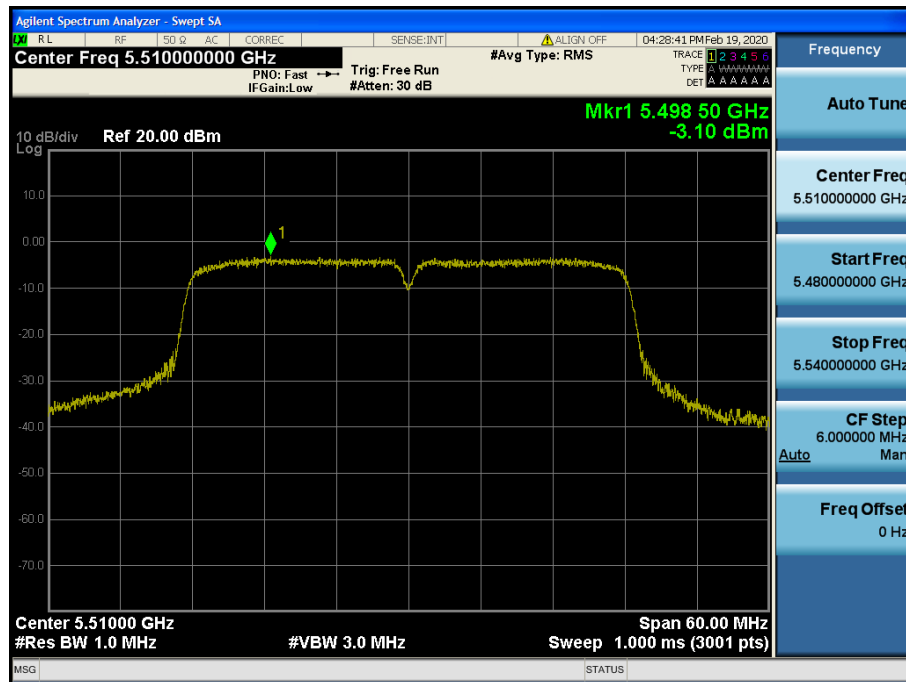
# Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.62



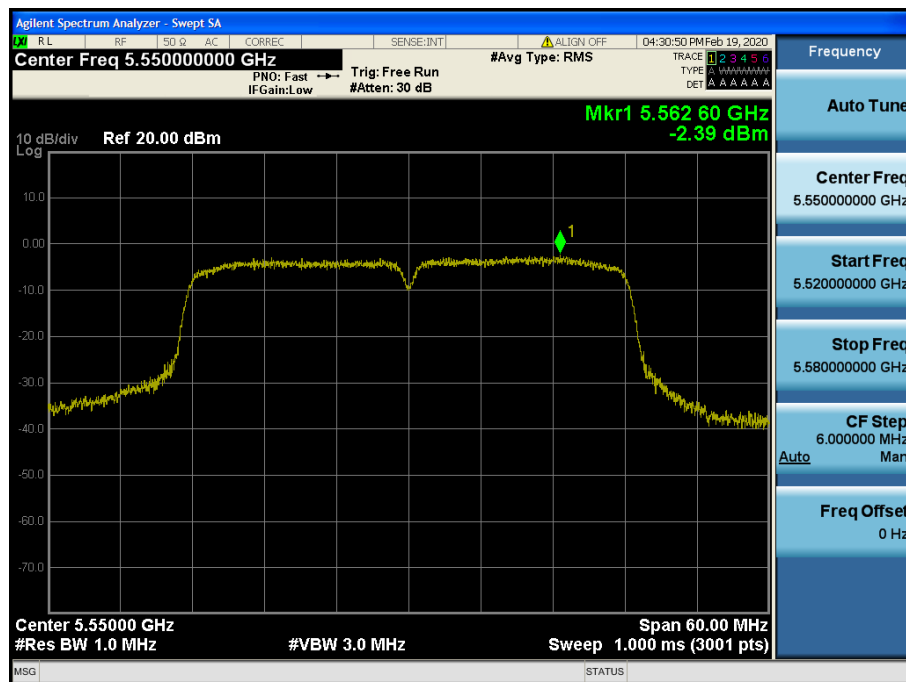
## Maximum Power Spectral Density

Test Mode: 802.11n HT40 &amp; Ch.102



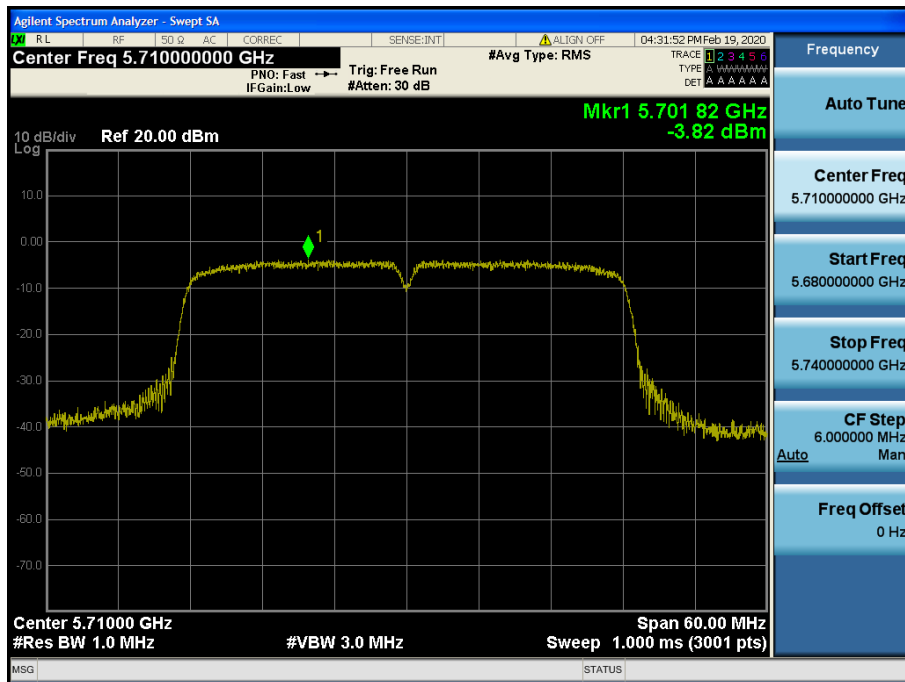
## Maximum Power Spectral Density

Test Mode: 802.11n HT40 &amp; Ch.110



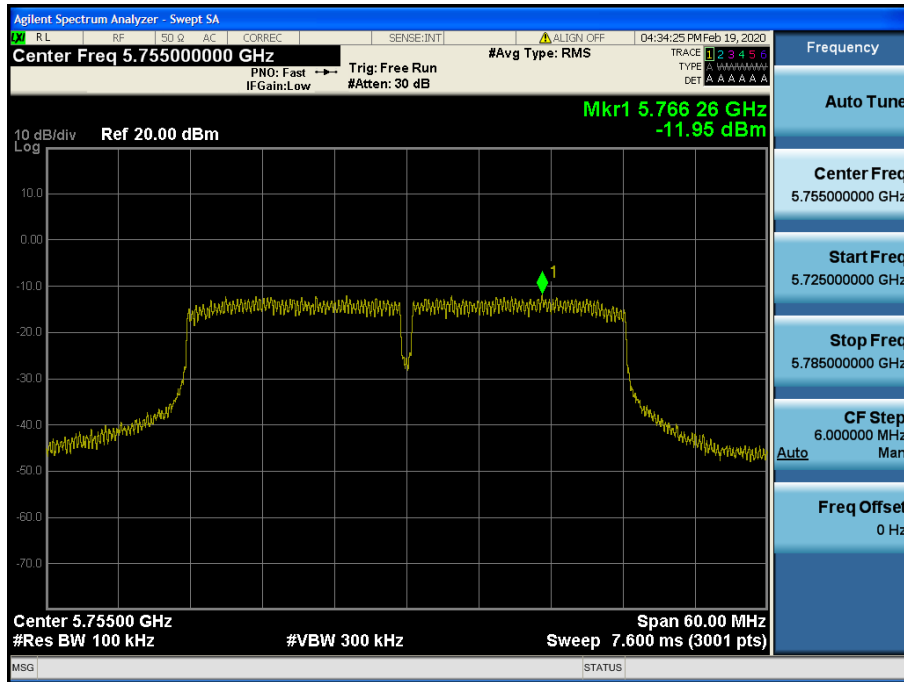
# Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.142



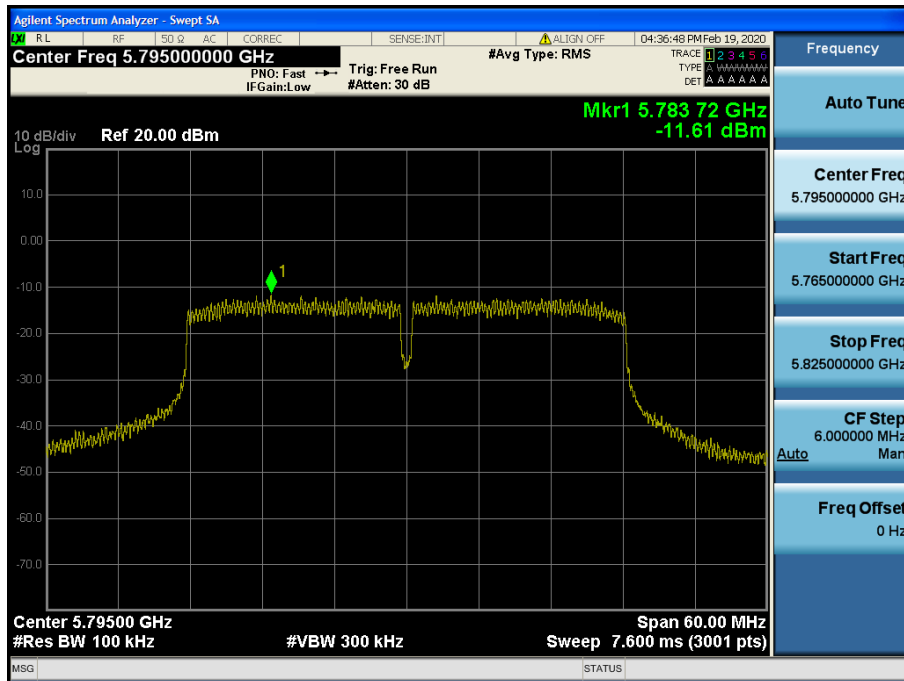
## Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.151



## Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.159



## 8.5 Radiated Spurious Emission Measurements

### ■ Test Requirements

#### • FCC Part 15.209(a) and (b)

| Frequency (MHz) | Limit (uV/m)  | Measurement Distance (meter) |
|-----------------|---------------|------------------------------|
| 0.009 – 0.490   | 2 400/F(KHz)  | 300                          |
| 0.490 – 1.705   | 24 000/F(KHz) | 30                           |
| 1.705 – 30.0    | 30            | 30                           |
| 30 ~ 88         | 100 **        | 3                            |
| 88 ~ 216        | 150 **        | 3                            |
| 216 ~ 960       | 200 **        | 3                            |
| Above 960       | 500           | 3                            |

\*\* Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 MHz - 72 MHz, 76 MHz - 88 MHz, 174 MHz - 216 MHz or 470 MHz - 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

#### • FCC Part 15.205 (a): Only spurious emissions are permitted in any of the frequency bands listed below:

| MHz                 | MHz                   | MHz            | MHz               | GHz          | GHz           |
|---------------------|-----------------------|----------------|-------------------|--------------|---------------|
| 0.009 ~ 0.110       | 8.414 25 ~ 8.414 75   | 108 ~ 121.94   | 1 300 ~ 1 427     | 4.5 ~ 5.15   | 14.47 ~ 14.5  |
| 0.495 ~ 0.505       | 12.29 ~ 12.293        | 123 ~ 138      | 1 435 ~ 1 626.5   | 5.35 ~ 5.46  | 15.35 ~ 16.2  |
| 2.173 5 ~ 2.190 5   | 12.519 75 ~ 12.520 25 | 149.9 ~ 150.05 | 1 645.5 ~ 1 646.5 | 7.25 ~ 7.75  | 17.7 ~ 21.4   |
| 4.125 ~ 4.128       | 12.576 75 ~ 12.577 25 | 160.524 75 ~   | 1 660 ~ 1 710     | 8.025 ~ 8.5  | 22.01 ~ 23.12 |
| 4.177 25 ~ 4.177 75 | 13.36 ~ 13.41         | 160.525 25     | 1 718.8 ~ 1 722.2 | 9.0 ~ 9.2    | 23.6 ~ 24.0   |
| 4.207 25 ~ 4.207 75 | 16.42 ~ 16.423        | 160.7 ~ 160.9  | 2 200 ~ 2 300     | 9.3 ~ 9.5    | 31.2 ~ 31.8   |
| 6.215 ~ 6.218       | 16.694 75 ~ 16.695 25 | 162.0125 ~     | 2 310 ~ 2 390     | 10.6 ~ 12.7  | 36.43 ~ 36.5  |
| 6.267 75 ~ 6.268 25 | 16.804 25 ~ 16.804 75 | 167.17         | 2 483.5 ~ 2 500   | 13.25 ~ 13.4 | Above 38.6    |
| 6.311 75 ~ 6.312 25 | 25.5 ~ 25.67          | 167.72 ~ 173.2 | 2 655 ~ 2 900     |              |               |
| 8.291 ~ 8.294       | 37.5 ~ 38.25          | 240 ~ 285      | 3 260 ~ 3 267     |              |               |
| 8.362 ~ 8.366       | 73 ~ 74.6             | 322 ~ 335.4    | 3 332 ~ 3 339     |              |               |
| 8.376 25 ~ 8.386 75 | 74.8 ~ 75.2           | 399.90 ~ 410   | 3 345.8 ~ 3 358   |              |               |
|                     |                       | 608 ~ 614      | 3 600 ~ 4 000     |              |               |
|                     |                       | 960 ~ 1240     |                   |              |               |

• **FCC Part 15.205(b):** The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1 000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1 000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

• **FCC Part 15.407 (b):** Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the **5.15 GHz - 5.25 GHz band**: all emissions outside of the **5.15 GHz - 5.35 GHz band** shall not exceed an **EIRP of -27 dBm/MHz**.
- (2) For transmitters operating in the **5.25 GHz - 5.35 GHz band**: all emissions outside of the **5.15 GHz - 5.35 GHz band** shall not exceed an **EIRP of -27 dBm/MHz**.
- (3) For transmitters operating in the **5.47 GHz - 5.725 GHz band**: all emissions outside of the **5.47 GHz - 5.725 GHz band** shall not exceed an **EIRP of -27 dBm/MHz**.
- (4) For transmitters operating in the **5.725 GHz - 5.85 GHz 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.
- (5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
- (6) Unwanted emissions **below 1 GHz** must comply with the general field strength limits set forth in **Section 15.209**. Further, any U-NII devices using an **AC power line** are required to comply also with the conducted limits set forth in **Section 15.207**.
- (7) The provisions of §15.205 apply to intentional radiators operating under this section
- (8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

## ■ Test Configuration

Refer to the APPENDIX I.

## ■ Test Procedure

1. The EUT is placed on a non-conductive table. For emission measurements at or below 1 GHz, the table height is 80 cm. For emission measurements above 1 GHz, the table height is 1.5 m.
2. The turn table shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 1m or 3 m away from the receiving antenna, which is varied from 1m to 4 m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

Radiated spurious emission measured using following Measurement Procedure of **KDB789033 D02v02r01**

### ► General Requirements for Unwanted Emissions Measurements

The following requirements apply to all unwanted emissions measurements, both in and outside of the restricted bands:

#### ▪ EUT Duty Cycle

- (1) The EUT shall be configured or modified to **transmit continuously** except as stated in (ii), below. The intent is to test at 100 percent duty cycle; however a small reduction in duty cycle (**to no lower than 98 percent**) is permitted if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.
- (2) If **continuous transmission (or at least 98 percent duty cycle) cannot be achieved** due to hardware limitations of the EUT (e.g., overheating), the following additions to the measurement and reporting procedures are required:
  - The EUT shall be configured to operate at the maximum achievable duty cycle.
  - Measure the duty cycle, x, of the transmitter output signal.
  - Adjustments to measurement procedures (e.g., increasing test time and number of traces averaged) shall be performed as described in the procedures below.
  - The test report shall include the following additional information:
    - The reason for the duty cycle limitation.
    - The duty cycle achieved for testing and the associated transmit duration and interval between transmissions.
    - The sweep time and the amount of time used for trace stabilization during max-hold measurements for peak emission measurements.
- (3) Reduction of the measured emission amplitude levels to account for operational duty factor is not permitted. Compliance is based on emission levels occurring during transmission - not on an average across on and off times of the transmitter.

► **Measurements below 1 000 MHz**

- a) Follow the requirements in section II.G.3, "General Requirements for Unwanted Emissions Measurements".
- b) Compliance shall be demonstrated using **CISPR quasi-peak detection**; however, **peak detection** is permitted as an alternative to quasi-peak detection.

► **Measurements Above 1 000 MHz (Peak)**

- a) Follow the requirements in section II.G.3, "General Requirements for Unwanted Emissions Measurements".
- b) Peak emission levels are measured by setting the analyzer as follows:
  - (i) **RBW = 1 MHz.**
  - (ii) **VBW ≥ 3 MHz.**
  - (iii) **Detector = Peak.**
  - (iv) Sweep time = Auto.
  - (v) Trace mode = Max hold.
  - (vi) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle. For example, at 50 percent duty cycle, the measurement time will increase by a factor of two relative to measurement time for continuous transmission.

► **Measurements Above 1000 MHz (Method AD)**

- (i) **RBW = 1 MHz.**
- (ii) **VBW ≥ 3 MHz.**
- (iii) **Detector = RMS**, if  $\text{span} / (\# \text{ of points in sweep}) \leq \text{RBW} / 2$ . Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, the detector mode shall be set to peak.
- (iv) Averaging type = power (i.e., RMS)
  - As an alternative, the detector and averaging type may be set for linear voltage averaging. Some analyzers require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.
- (v) Sweep time = Auto.
- (vi) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, the number of traces shall be increased by a factor of 1/x, where x is the duty cycle. For example, with 50 percent duty cycle, at least 200 traces shall be averaged.
- (vii) If tests are performed with the EUT transmitting at a duty cycle less than 98 percent, a correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
  - **If power averaging (RMS) mode was used in step (iv) above, the correction factor is  $10 \log(1/x)$ , where x is the duty cycle.** For example, if the transmit duty cycle was 50 percent, then 3 dB must be added to the measured emission levels.
  - If linear voltage averaging mode was used in step (iv) above, the correction factor is  $20 \log(1/x)$ , where x is the duty cycle. For example, if the transmit duty cycle was 50 percent, then 6 dB must be added to the measured emission levels.
  - If a specific emission is demonstrated to be continuous (100 percent duty cycle) rather than turning on and off with the transmit cycle, no duty cycle correction is required for that emission.

Please refer to Appendix II for the duty correction factor

## Test Results: Comply

### Test Notes

1. No other spurious and harmonic emissions were found greater than listed emissions on below table.

2. Sample Calculation.

$$\text{Margin} = \text{Limit} - \text{Result} \quad / \quad \text{Result} = \text{Reading} + \text{T.F} + \text{DCCF} + \text{DCF} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,

DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor

3. Information of Distance Factor

For finding emissions, the test distance might be reduced from 3m to 1m. In this case, the distance factor(-9.54dB) is applied to the result.

- Calculation of distance factor =  $20 \log(\text{applied distance} / \text{required distance}) = 20 \log(1 \text{ m} / 3 \text{ m}) = -9.54 \text{ dB}$

When distance factor is "N/A", the distance is 3 m and distance factor is not applied.

4. The limit is converted to field strength.

$$E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 \text{ dB} = -27 \text{ dBm} + 95.2 = 68.2 \text{ dBuV/m}$$

### Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : 802.11a

| Band     | Tested Channel    | Freq. (MHz) | ANT Pol | EUT Position (Axis) | Detector Mode | Reading (dBuV) | T.F (dB/m) | DCCF (dB) | DCF (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|----------|-------------------|-------------|---------|---------------------|---------------|----------------|------------|-----------|----------|-----------------|----------------|-------------|
| U-NII 1  | 36<br>(5 180 MHz) | 5 149.60    | V       | X                   | PK            | 57.87          | 1.99       | N/A       | N/A      | 59.86           | 74.00          | 14.14       |
|          |                   | 5 149.72    | V       | X                   | AV            | 47.62          | 1.99       | 0.62      | N/A      | 50.23           | 54.00          | 3.77        |
|          |                   | 10 360.23   | V       | Z                   | PK            | 43.31          | 10.82      | N/A       | N/A      | 54.13           | 68.20          | 14.07       |
|          | 40<br>(5 200 MHz) | 10 399.88   | V       | Z                   | PK            | 43.04          | 10.63      | N/A       | N/A      | 53.67           | 68.20          | 14.53       |
|          |                   | 10 479.79   | V       | Z                   | PK            | 43.24          | 10.62      | N/A       | N/A      | 53.86           | 68.20          | 14.34       |
| U-NII 2A | 52<br>(5 260 MHz) | 10 520.25   | V       | Z                   | PK            | 43.51          | 10.72      | N/A       | N/A      | 54.23           | 68.20          | 13.97       |
|          | 60<br>(5 300 MHz) | 10 600.31   | V       | Z                   | PK            | 43.37          | 10.74      | N/A       | N/A      | 54.11           | 74.00          | 19.89       |
|          |                   | 10 600.19   | V       | Z                   | AV            | 33.21          | 10.74      | 0.62      | N/A      | 44.57           | 54.00          | 9.43        |
|          | 64<br>(5 320 MHz) | 5 350.91    | V       | X                   | PK            | 57.14          | 3.03       | N/A       | N/A      | 60.17           | 74.00          | 13.83       |
|          |                   | 5 350.72    | V       | X                   | AV            | 45.90          | 3.03       | 0.62      | N/A      | 49.55           | 54.00          | 4.45        |
|          |                   | 10 640.38   | V       | Z                   | PK            | 42.52          | 10.82      | N/A       | N/A      | 53.34           | 74.00          | 20.66       |
|          |                   | 10 640.15   | V       | Z                   | AV            | 32.26          | 10.82      | 0.62      | N/A      | 43.70           | 54.00          | 10.30       |

**Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : 802.11a**

| Band     | Tested Channel     | Freq. (MHz) | ANT Pol | EUT Position (Axis) | Detector Mode | Reading (dBuV) | T.F (dB/m) | DCCF (dB) | DCF (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|----------|--------------------|-------------|---------|---------------------|---------------|----------------|------------|-----------|----------|-----------------|----------------|-------------|
| U-NII 2C | 100<br>(5 500 MHz) | 5 459.34    | V       | X                   | PK            | 55.14          | 3.15       | N/A       | N/A      | 58.29           | 74.00          | 15.71       |
|          |                    | 5 459.62    | V       | X                   | AV            | 42.12          | 3.15       | 0.62      | N/A      | 45.89           | 54.00          | 8.11        |
|          |                    | 5 469.21    | V       | X                   | PK            | 57.34          | 3.17       | N/A       | N/A      | 60.51           | 68.20          | 7.69        |
|          |                    | 10 999.73   | V       | Z                   | PK            | 43.75          | 10.95      | N/A       | N/A      | 54.70           | 74.00          | 19.30       |
|          |                    | 10 999.86   | V       | Z                   | AV            | 33.30          | 10.95      | 0.62      | N/A      | 44.87           | 54.00          | 9.13        |
|          | 116<br>(5 580 MHz) | 11 159.65   | V       | Z                   | PK            | 43.47          | 10.97      | N/A       | N/A      | 54.44           | 74.00          | 19.56       |
|          |                    | 11 159.53   | V       | Z                   | AV            | 33.33          | 10.97      | 0.62      | N/A      | 44.92           | 54.00          | 9.08        |
|          | 144<br>(5 720 MHz) | 11 439.73   | V       | Z                   | PK            | 44.08          | 11.14      | N/A       | N/A      | 55.22           | 74.00          | 18.78       |
|          |                    | 11 439.89   | V       | Z                   | AV            | 32.86          | 11.14      | 0.62      | N/A      | 44.62           | 54.00          | 9.38        |
| U-NII 3  | 149<br>(5 745 MHz) | 5 713.85    | V       | X                   | PK            | 58.14          | 3.17       | N/A       | N/A      | 61.31           | 68.20          | 6.89        |
|          |                    | 5 724.37    | V       | X                   | AV            | 67.47          | 2.98       | 0.62      | N/A      | 71.07           | 78.20          | 7.13        |
|          |                    | 11 489.98   | V       | Z                   | PK            | 43.16          | 11.32      | N/A       | N/A      | 54.48           | 74.00          | 19.52       |
|          |                    | 11 489.81   | V       | Z                   | AV            | 33.18          | 11.32      | 0.62      | N/A      | 45.12           | 54.00          | 8.88        |
|          | 157<br>(5 785 MHz) | 11 570.07   | V       | Z                   | PK            | 44.19          | 11.63      | N/A       | N/A      | 55.82           | 74.00          | 18.18       |
|          |                    | 11 569.73   | V       | Z                   | AV            | 34.08          | 11.63      | 0.62      | N/A      | 46.33           | 54.00          | 7.67        |
|          | 165<br>(5 825 MHz) | 5 850.51    | V       | X                   | PK            | 61.42          | 3.68       | N/A       | N/A      | 65.10           | 78.20          | 13.10       |
|          |                    | 5 861.20    | V       | X                   | AV            | 54.80          | 3.70       | 0.62      | N/A      | 59.12           | 68.20          | 9.08        |
|          |                    | 11 650.12   | V       | Z                   | PK            | 44.39          | 11.85      | N/A       | N/A      | 56.24           | 74.00          | 17.76       |
|          |                    | 11 650.17   | V       | Z                   | AV            | 33.77          | 11.85      | 0.62      | N/A      | 46.24           | 54.00          | 7.76        |

**Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : 802.11n(HT20)**

| Band     | Tested Channel   | Freq. (MHz) | ANT Pol | EUT Position (Axis) | Detector Mode | Reading (dBuV) | T.F (dB/m) | DCCF (dB) | DCF (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|----------|------------------|-------------|---------|---------------------|---------------|----------------|------------|-----------|----------|-----------------|----------------|-------------|
| U-NII 1  | 36<br>(5180 MHz) | 5 149.56    | V       | X                   | PK            | 59.76          | 1.99       | N/A       | N/A      | 61.75           | 74.00          | 12.25       |
|          |                  | 5 149.44    | V       | X                   | AV            | 48.24          | 1.99       | 0.67      | N/A      | 50.90           | 54.00          | 3.10        |
|          |                  | 10 360.34   | V       | Z                   | PK            | 43.27          | 10.82      | N/A       | N/A      | 54.09           | 68.20          | 14.11       |
|          | 40<br>(5200 MHz) | 10 399.81   | V       | Z                   | PK            | 43.05          | 10.63      | N/A       | N/A      | 53.68           | 68.20          | 14.52       |
|          | 48<br>(5240 MHz) | 10 480.26   | V       | Z                   | PK            | 44.65          | 10.62      | N/A       | N/A      | 55.27           | 68.20          | 12.93       |
| U-NII 2A | 52<br>(5260 MHz) | 10 519.85   | V       | Z                   | PK            | 44.00          | 10.72      | N/A       | N/A      | 54.72           | 68.20          | 13.48       |
|          | 60<br>(5300 MHz) | 10 600.06   | V       | Z                   | PK            | 44.00          | 10.74      | N/A       | N/A      | 54.74           | 74.00          | 19.26       |
|          |                  | 10 600.43   | V       | Z                   | AV            | 33.25          | 10.74      | 0.67      | N/A      | 44.66           | 54.00          | 9.34        |
|          | 64<br>(5320 MHz) | 5 351.49    | V       | X                   | PK            | 57.21          | 3.03       | N/A       | N/A      | 60.24           | 74.00          | 13.76       |
|          |                  | 5 350.82    | V       | X                   | AV            | 46.43          | 3.03       | 0.67      | N/A      | 50.13           | 54.00          | 3.87        |
|          |                  | 10 639.85   | V       | Z                   | PK            | 42.43          | 10.82      | N/A       | N/A      | 53.25           | 74.00          | 20.75       |
|          |                  | 10 639.79   | V       | Z                   | AV            | 32.38          | 10.82      | 0.67      | N/A      | 43.87           | 54.00          | 10.13       |

**Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : 802.11n(HT20)**

| Band     | Tested Channel    | Freq. (MHz) | ANT Pol | EUT Position (Axis) | Detector Mode | Reading (dBuV) | T.F (dB/m) | DCCF (dB) | DCF (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|----------|-------------------|-------------|---------|---------------------|---------------|----------------|------------|-----------|----------|-----------------|----------------|-------------|
| U-NII 2C | 100<br>(5500 MHz) | 5459.43     | V       | X                   | PK            | 54.81          | 3.15       | N/A       | N/A      | 57.96           | 74.00          | 16.04       |
|          |                   | 5459.17     | V       | X                   | AV            | 41.01          | 3.15       | 0.67      | N/A      | 44.83           | 54.00          | 9.17        |
|          |                   | 5469.58     | V       | X                   | PK            | 58.12          | 3.17       | N/A       | N/A      | 61.29           | 68.20          | 6.91        |
|          |                   | 11000.37    | V       | Z                   | PK            | 44.02          | 10.95      | N/A       | N/A      | 54.97           | 74.00          | 19.03       |
|          |                   | 11000.12    | V       | Z                   | AV            | 33.46          | 10.95      | 0.67      | N/A      | 45.08           | 54.00          | 8.92        |
|          | 116<br>(5580 MHz) | 11160.05    | V       | Z                   | PK            | 44.10          | 10.97      | N/A       | N/A      | 55.07           | 74.00          | 18.93       |
|          |                   | 11160.28    | V       | Z                   | AV            | 33.37          | 10.97      | 0.67      | N/A      | 45.01           | 54.00          | 8.99        |
|          | 144<br>(5720 MHz) | 11440.39    | V       | Z                   | PK            | 43.60          | 11.14      | N/A       | N/A      | 54.74           | 74.00          | 19.26       |
|          |                   | 11440.07    | V       | Z                   | AV            | 33.10          | 11.14      | 0.67      | N/A      | 44.91           | 54.00          | 9.09        |
| U-NII 3  | 149<br>(5745 MHz) | 5711.56     | V       | X                   | PK            | 58.54          | 3.17       | N/A       | N/A      | 61.71           | 68.20          | 6.49        |
|          |                   | 5724.37     | V       | X                   | PK            | 69.15          | 2.98       | N/A       | N/A      | 72.13           | 78.20          | 6.07        |
|          |                   | 11490.11    | V       | Z                   | PK            | 43.93          | 11.32      | N/A       | N/A      | 55.25           | 74.00          | 18.75       |
|          |                   | 11490.24    | V       | Z                   | AV            | 33.09          | 11.32      | 0.67      | N/A      | 45.08           | 54.00          | 8.92        |
|          | 157<br>(5785 MHz) | 11570.18    | V       | Z                   | PK            | 44.62          | 11.63      | N/A       | N/A      | 56.25           | 74.00          | 17.75       |
|          |                   | 11570.29    | V       | Z                   | AV            | 33.80          | 11.63      | 0.67      | N/A      | 46.10           | 54.00          | 7.90        |
|          | 165<br>(5825 MHz) | 5850.72     | V       | X                   | PK            | 61.60          | 3.68       | N/A       | N/A      | 65.28           | 78.20          | 12.92       |
|          |                   | 5862.27     | V       | X                   | PK            | 55.78          | 3.67       | N/A       | N/A      | 59.45           | 68.20          | 8.75        |
|          |                   | 11649.71    | V       | Z                   | PK            | 44.27          | 11.85      | N/A       | N/A      | 56.12           | 74.00          | 17.88       |
|          |                   | 11649.71    | V       | Z                   | AV            | 33.58          | 11.85      | 0.67      | N/A      | 46.10           | 54.00          | 7.90        |

**Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : 802.11n(HT40)**

| Band     | Tested Channel   | Freq. (MHz) | ANT Pol | EUT Position (Axis) | Detector Mode | Reading (dBuV) | T.F (dB/m) | DCCF (dB) | DCF (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|----------|------------------|-------------|---------|---------------------|---------------|----------------|------------|-----------|----------|-----------------|----------------|-------------|
| U-NII 1  | 38<br>(5190 MHz) | 5149.07     | V       | X                   | PK            | 60.48          | 1.99       | N/A       | N/A      | 62.47           | 74.00          | 11.53       |
|          |                  | 5149.77     | V       | X                   | AV            | 48.22          | 1.99       | 1.23      | N/A      | 51.44           | 54.00          | 2.56        |
|          |                  | 10380.42    | V       | Z                   | PK            | 43.30          | 10.72      | N/A       | N/A      | 54.02           | 68.20          | 14.18       |
| U-NII 2A | 46<br>(5230 MHz) | 10459.88    | V       | Z                   | PK            | 44.10          | 10.59      | N/A       | N/A      | 54.69           | 68.20          | 13.51       |
|          | 54<br>(5270 MHz) | 10540.07    | V       | Z                   | PK            | 43.74          | 10.80      | N/A       | N/A      | 54.54           | 68.20          | 13.66       |
|          | 62<br>(5310 MHz) | 5350.23     | V       | X                   | PK            | 59.16          | 3.03       | N/A       | N/A      | 62.19           | 74.00          | 11.81       |
|          |                  | 5350.28     | V       | X                   | AV            | 47.27          | 3.03       | 1.23      | N/A      | 51.53           | 54.00          | 2.47        |
|          |                  | 10620.32    | V       | Z                   | PK            | 43.35          | 10.78      | N/A       | N/A      | 54.13           | 74.00          | 19.87       |
|          |                  | 10620.17    | V       | Z                   | AV            | 32.57          | 10.78      | 1.23      | N/A      | 44.58           | 54.00          | 9.42        |

**Radiated Spurious Emissions data(9 kHz ~ 40 GHz) : 802.11n(HT40)**

| Band     | Tested Channel    | Freq. (MHz) | ANT Pol | EUT Position (Axis) | Detector Mode | Reading (dBuV) | T.F (dB/m) | DCCF (dB) | DCF (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|----------|-------------------|-------------|---------|---------------------|---------------|----------------|------------|-----------|----------|-----------------|----------------|-------------|
| U-NII 2C | 102<br>(5510 MHz) | 5458.75     | V       | X                   | PK            | 53.83          | 3.15       | N/A       | N/A      | 56.98           | 74.00          | 17.02       |
|          |                   | 5459.31     | V       | X                   | AV            | 43.46          | 3.15       | 1.23      | N/A      | 47.84           | 54.00          | 6.16        |
|          |                   | 5469.32     | V       | X                   | PK            | 59.43          | 3.17       | N/A       | N/A      | 62.60           | 74.00          | 11.40       |
|          |                   | 11019.84    | V       | Z                   | PK            | 44.53          | 10.90      | N/A       | N/A      | 55.43           | 74.00          | 18.57       |
|          |                   | 11019.95    | V       | Z                   | AV            | 34.02          | 10.90      | 1.23      | N/A      | 46.15           | 54.00          | 7.85        |
|          | 110<br>(5550 MHz) | 11099.73    | V       | Z                   | PK            | 44.06          | 10.91      | N/A       | N/A      | 54.97           | 74.00          | 19.03       |
|          |                   | 11099.56    | V       | Z                   | AV            | 33.56          | 10.91      | 1.23      | N/A      | 45.70           | 54.00          | 8.30        |
|          | 142<br>(5710 MHz) | 11419.80    | V       | Z                   | PK            | 44.09          | 11.07      | N/A       | N/A      | 55.16           | 74.00          | 18.84       |
|          |                   | 11419.96    | V       | Z                   | AV            | 33.33          | 11.07      | 1.23      | N/A      | 45.63           | 54.00          | 8.37        |
| U-NII 3  | 151<br>(5755 MHz) | 5714.27     | V       | X                   | PK            | 61.45          | 3.17       | N/A       | N/A      | 64.62           | 68.20          | 3.58        |
|          |                   | 5723.83     | V       | X                   | PK            | 65.86          | 2.99       | N/A       | N/A      | 68.85           | 78.20          | 9.35        |
|          |                   | 11509.92    | V       | Z                   | PK            | 43.83          | 11.39      | N/A       | N/A      | 55.22           | 74.00          | 18.78       |
|          |                   | 11509.89    | V       | Z                   | AV            | 33.42          | 11.39      | 1.23      | N/A      | 46.04           | 54.00          | 7.96        |
|          | 159<br>(5795 MHz) | 5851.23     | V       | X                   | PK            | 52.47          | 3.68       | N/A       | N/A      | 56.15           | 78.20          | 22.05       |
|          |                   | 5860.40     | V       | X                   | AV            | 51.17          | 3.72       | 1.23      | N/A      | 56.12           | 68.20          | 12.08       |
|          |                   | 11590.13    | V       | Z                   | PK            | 44.18          | 11.74      | N/A       | N/A      | 55.92           | 74.00          | 18.08       |
|          |                   | 11590.38    | V       | Z                   | AV            | 33.43          | 11.74      | 1.23      | N/A      | 46.40           | 54.00          | 7.60        |

## 8.6 AC Conducted Emissions

### ■ Test Requirements and limit, §15.207

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN).

| Frequency Range (MHz) | Conducted Limit (dBuV) |            |
|-----------------------|------------------------|------------|
|                       | Quasi-Peak             | Average    |
| 0.15 ~ 0.5            | 66 to 56 *             | 56 to 46 * |
| 0.5 ~ 5               | 56                     | 46         |
| 5 ~ 30                | 60                     | 50         |

\* Decreases with the logarithm of the frequency

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

### ■ Test Configuration

See test photographs for the actual connections between EUT and support equipment.

### ■ Test Procedure

Conducted emissions from the EUT were measured according to the ANSI C63.10-2013.

1. The test procedure is performed in a 6.5 m  $\times$  3.5 m  $\times$  3.5 m (L  $\times$  W  $\times$  H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W)  $\times$  1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
4. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

### ■ Test Results: **Comply**

Note 1: See next pages for actual measured spectrum plots and data for worst case result.

## AC Line Conducted Emissions (Graph)

Test Mode: U-NII 1 & 802.11a & 5.240 MHz

## Results of Conducted Emission

DTNC

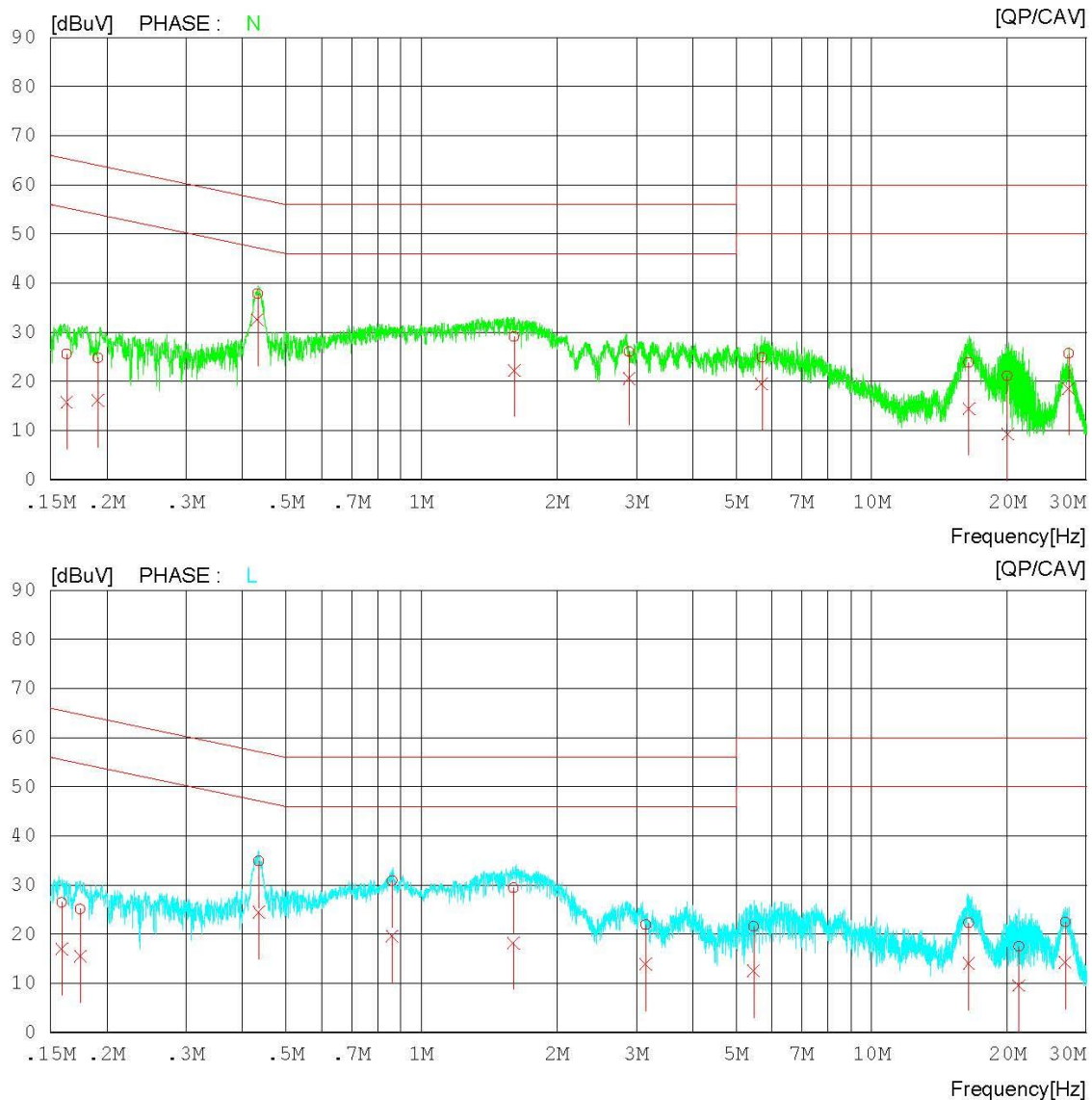
Date 2020-02-07

Order No.  
Model No. SP500  
Serial No.  
Test Condition 5.1G WLAN

Reference No.  
Power Supply 120 V, 60 Hz  
Temp/Humi. 23 °C / 35 %  
Operator Jungwoo Kim

Memo

LIMIT : FCC P15.207 QP  
FCC P15.207 AV



## AC Line Conducted Emissions (Data List)

Test Mode: U-NII 1 & 802.11a & 5 240 MHz

## Results of Conducted Emission

DTNC

Date 2020-02-07

Order No.  
Model No. SP500  
Serial No.  
Test Condition 5.1G WLAN

Reference No.  
Power Supply 120 V, 60 Hz  
Temp/Humi. 23 'C / 35 %  
Operator Jungwoo Kim

Memo

LIMIT : FCC P15.207 QP  
FCC P15.207 AV

| NO | FREQ<br>[MHz] | READING      |               | C. FACTOR<br>[dB] | RESULT       |               | LIMIT        |               | MARGIN       |               | PHASE |
|----|---------------|--------------|---------------|-------------------|--------------|---------------|--------------|---------------|--------------|---------------|-------|
|    |               | QP<br>[dBuV] | CAV<br>[dBuV] |                   | QP<br>[dBuV] | CAV<br>[dBuV] | QP<br>[dBuV] | CAV<br>[dBuV] | QP<br>[dBuV] | CAV<br>[dBuV] |       |
| 1  | 0.16294       | 15.65        | 5.78          | 9.94              | 25.59        | 15.72         | 65.31        | 55.31         | 39.72        | 39.59         | N     |
| 2  | 0.19095       | 14.82        | 6.12          | 9.94              | 24.76        | 16.06         | 64.00        | 54.00         | 39.24        | 37.94         | N     |
| 3  | 0.43224       | 27.92        | 22.60         | 9.95              | 37.87        | 32.55         | 57.21        | 47.21         | 19.34        | 14.66         | N     |
| 4  | 1.60750       | 19.10        | 12.25         | 10.01             | 29.11        | 22.26         | 56.00        | 46.00         | 26.89        | 23.74         | N     |
| 5  | 2.89190       | 16.01        | 10.59         | 10.07             | 26.08        | 20.66         | 56.00        | 46.00         | 29.92        | 25.34         | N     |
| 6  | 5.70410       | 14.71        | 9.31          | 10.18             | 24.89        | 19.49         | 60.00        | 50.00         | 35.11        | 30.51         | N     |
| 7  | 16.42949      | 13.40        | 3.93          | 10.51             | 23.91        | 14.44         | 60.00        | 50.00         | 36.09        | 35.56         | N     |
| 8  | 20.00690      | 10.55        | -1.29         | 10.55             | 21.10        | 9.26          | 60.00        | 50.00         | 38.90        | 40.74         | N     |
| 9  | 27.34091      | 14.97        | 7.91          | 10.70             | 25.67        | 18.61         | 60.00        | 50.00         | 34.33        | 31.39         | N     |
| 10 | 0.15905       | 16.47        | 7.03          | 9.94              | 26.41        | 16.97         | 65.51        | 55.51         | 39.10        | 38.54         | L     |
| 11 | 0.17465       | 15.12        | 5.49          | 9.94              | 25.06        | 15.43         | 64.74        | 54.74         | 39.68        | 39.31         | L     |
| 12 | 0.43525       | 24.87        | 14.50         | 9.95              | 34.82        | 24.45         | 57.15        | 47.15         | 22.33        | 22.70         | L     |
| 13 | 0.86089       | 20.86        | 9.59          | 9.97              | 30.83        | 19.56         | 56.00        | 46.00         | 25.17        | 26.44         | L     |
| 14 | 1.59981       | 19.41        | 8.16          | 10.01             | 29.42        | 18.17         | 56.00        | 46.00         | 26.58        | 27.83         | L     |
| 15 | 3.14808       | 11.83        | 3.82          | 10.06             | 21.89        | 13.88         | 56.00        | 46.00         | 34.11        | 32.12         | L     |
| 16 | 5.46376       | 11.32        | 2.33          | 10.18             | 21.50        | 12.51         | 60.00        | 50.00         | 38.50        | 37.49         | L     |
| 17 | 16.41885      | 11.79        | 3.51          | 10.48             | 22.27        | 13.99         | 60.00        | 50.00         | 37.73        | 36.01         | L     |
| 18 | 21.20206      | 6.88         | -1.06         | 10.56             | 17.44        | 9.50          | 60.00        | 50.00         | 42.56        | 40.50         | L     |
| 19 | 26.88122      | 11.79        | 3.53          | 10.67             | 22.46        | 14.20         | 60.00        | 50.00         | 37.54        | 35.80         | L     |

**AC Line Conducted Emissions (Graph)**

Test Mode: U-NII 2A &amp; 802.11a &amp; 5.300 MHz

**Results of Conducted Emission**

DTNC

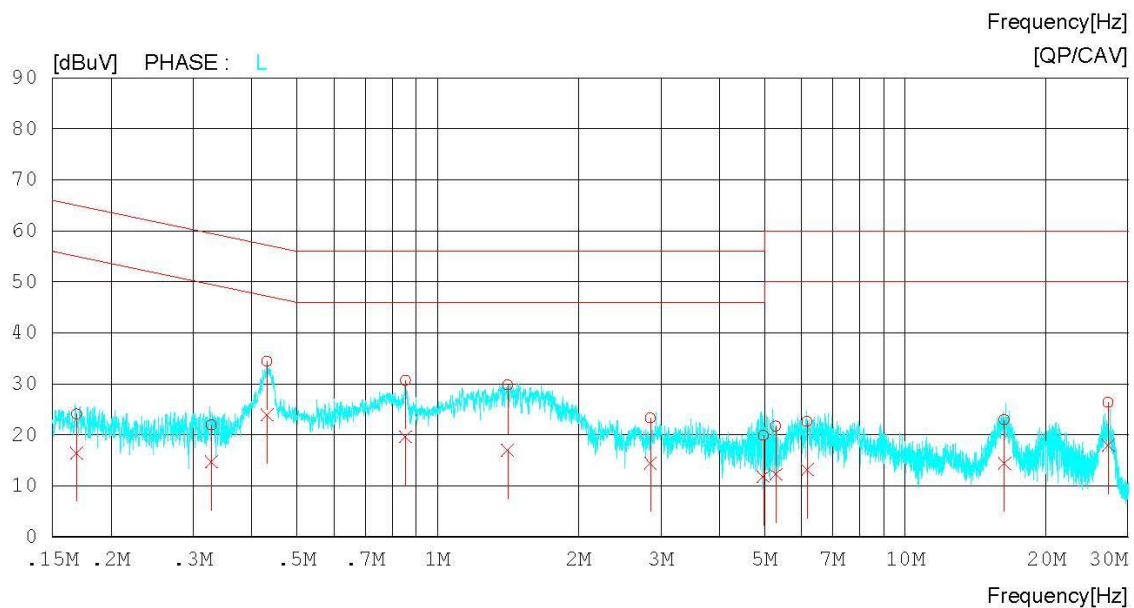
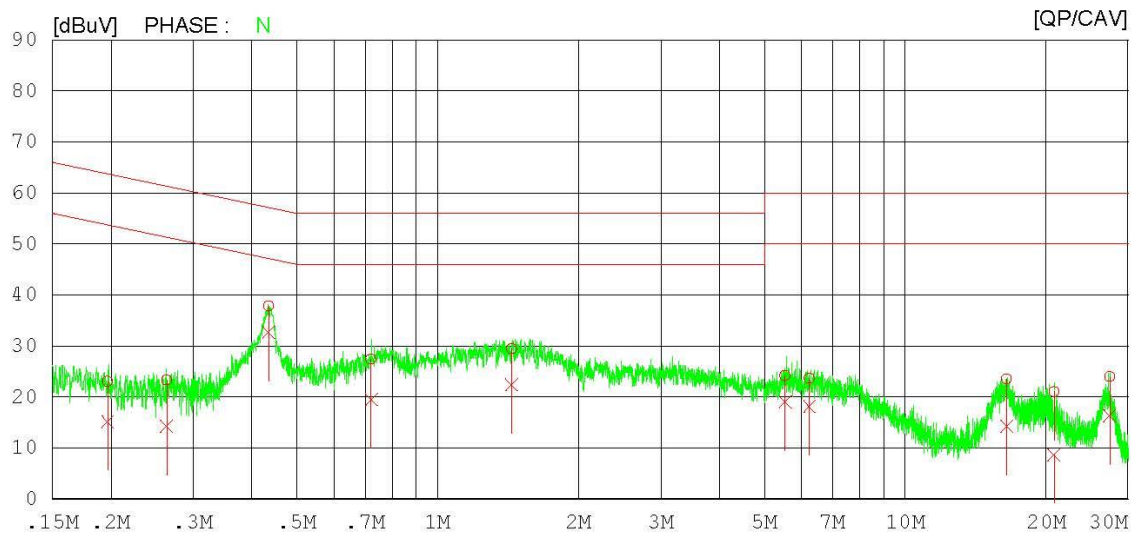
Date 2020-02-07

Order No.  
Model No. SP500  
Serial No.  
Test Condition 5.3G WLAN

Reference No.  
Power Supply 120 V, 60 Hz  
Temp/Humi. 23 'C / 35 %  
Operator Jungwoo Kim

Memo

LIMIT : FCC P15.207 QP  
FCC P15.207 AV



## AC Line Conducted Emissions (Data List)

Test Mode: U-NII 2A & 802.11a & 5 300 MHz

## Results of Conducted Emission

DTNC

Date 2020-02-07

Order No.  
Model No. SP500  
Serial No.  
Test Condition 5.3G WLAN

Reference No.  
Power Supply 120 V, 60 Hz  
Temp/Humi. 23 'C / 35 %  
Operator Jungwoo Kim

Memo

LIMIT : FCC P15.207 QP  
FCC P15.207 AV

| NO | FREQ<br>[MHz] | READING      |               | C.FACTOR<br>[dB] | RESULT       |               | LIMIT        |               | MARGIN       |               | PHASE |
|----|---------------|--------------|---------------|------------------|--------------|---------------|--------------|---------------|--------------|---------------|-------|
|    |               | QP<br>[dBuV] | CAV<br>[dBuV] |                  | QP<br>[dBuV] | CAV<br>[dBuV] | QP<br>[dBuV] | CAV<br>[dBuV] | QP<br>[dBuV] | CAV<br>[dBuV] |       |
| 1  | 0.19679       | 13.18        | 5.23          | 9.94             | 23.12        | 15.17         | 63.74        | 53.74         | 40.62        | 38.57         | N     |
| 2  | 0.26310       | 13.37        | 4.35          | 9.94             | 23.31        | 14.29         | 61.33        | 51.33         | 38.02        | 37.04         | N     |
| 3  | 0.43477       | 27.95        | 22.69         | 9.95             | 37.90        | 32.64         | 57.16        | 47.16         | 19.26        | 14.52         | N     |
| 4  | 0.72057       | 17.39        | 9.54          | 9.97             | 27.36        | 19.51         | 56.00        | 46.00         | 28.64        | 26.49         | N     |
| 5  | 1.44021       | 19.42        | 12.43         | 9.99             | 29.41        | 22.42         | 56.00        | 46.00         | 26.59        | 23.58         | N     |
| 6  | 5.53696       | 14.02        | 8.83          | 10.18            | 24.20        | 19.01         | 60.00        | 50.00         | 35.80        | 30.99         | N     |
| 7  | 6.23430       | 13.39        | 7.91          | 10.20            | 23.59        | 18.11         | 60.00        | 50.00         | 36.41        | 31.89         | N     |
| 8  | 16.48859      | 12.98        | 3.73          | 10.51            | 23.49        | 14.24         | 60.00        | 50.00         | 36.51        | 35.76         | N     |
| 9  | 20.80412      | 10.51        | -1.85         | 10.56            | 21.07        | 8.71          | 60.00        | 50.00         | 38.93        | 41.29         | N     |
| 10 | 27.34064      | 13.31        | 5.65          | 10.70            | 24.01        | 16.35         | 60.00        | 50.00         | 35.99        | 33.65         | N     |
| 11 | 0.16899       | 14.13        | 6.47          | 9.94             | 24.07        | 16.41         | 65.01        | 55.01         | 40.94        | 38.60         | L     |
| 12 | 0.32828       | 11.91        | 4.69          | 9.94             | 21.85        | 14.63         | 59.49        | 49.49         | 37.64        | 34.86         | L     |
| 13 | 0.43097       | 24.44        | 13.95         | 9.95             | 34.39        | 23.90         | 57.23        | 47.23         | 22.84        | 23.33         | L     |
| 14 | 0.85344       | 20.66        | 9.65          | 9.97             | 30.63        | 19.62         | 56.00        | 46.00         | 25.37        | 26.38         | L     |
| 15 | 1.41140       | 19.68        | 6.94          | 9.99             | 29.67        | 16.93         | 56.00        | 46.00         | 26.33        | 29.07         | L     |
| 16 | 2.85131       | 13.24        | 4.37          | 10.06            | 23.30        | 14.43         | 56.00        | 46.00         | 32.70        | 31.57         | L     |
| 17 | 4.97191       | 9.71         | 1.60          | 10.16            | 19.87        | 11.76         | 56.00        | 46.00         | 36.13        | 34.24         | L     |
| 18 | 5.28376       | 11.52        | 2.06          | 10.16            | 21.68        | 12.22         | 60.00        | 50.00         | 38.32        | 37.78         | L     |
| 19 | 6.16749       | 12.33        | 3.03          | 10.20            | 22.53        | 13.23         | 60.00        | 50.00         | 37.47        | 36.77         | L     |
| 20 | 16.29923      | 12.44        | 3.89          | 10.48            | 22.92        | 14.37         | 60.00        | 50.00         | 37.08        | 35.63         | L     |
| 21 | 27.15768      | 15.69        | 7.32          | 10.67            | 26.36        | 17.99         | 60.00        | 50.00         | 33.64        | 32.01         | L     |

## AC Line Conducted Emissions (Graph)

Test Mode: U-NII 2C & 802.11a & 5 500 MHz

## Results of Conducted Emission

DTNC

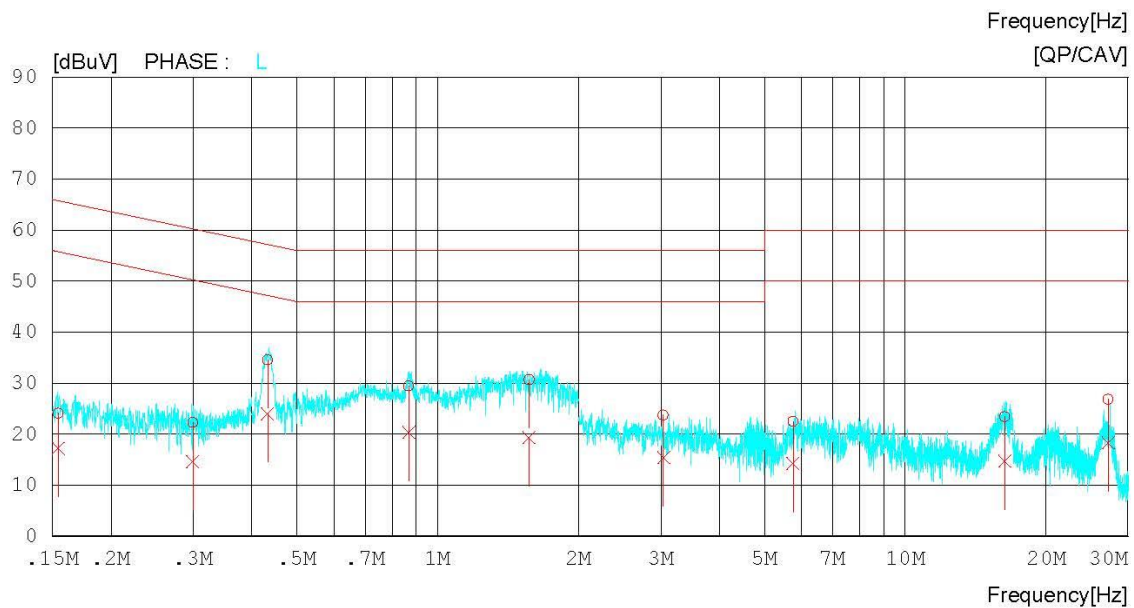
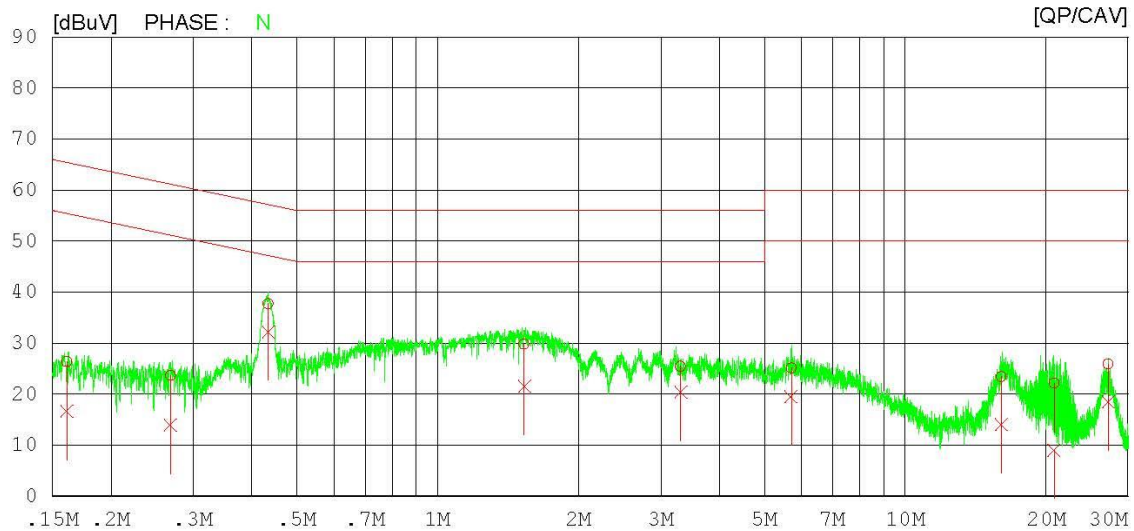
Date 2020-02-07

Order No.  
Model No. SP500  
Serial No.  
Test Condition 5.5G WLAN

Reference No.  
Power Supply 120 V, 60 Hz  
Temp/Humi. 23 'C / 35 %  
Operator Jungwoo Kim

Memo

LIMIT : FCC P15.207 QP  
FCC P15.207 AV



## AC Line Conducted Emissions (Data List)

Test Mode: U-NII 2C & 802.11a & 5 500 MHz

## Results of Conducted Emission

DTNC

Date 2020-02-07

Order No.  
Model No. SP500  
Serial No.  
Test Condition 5.5G WLAN

Reference No.  
Power Supply 120 V, 60 Hz  
Temp/Humi. 23 'C / 35 %  
Operator Jungwoo Kim

Memo

LIMIT : FCC P15.207 QP  
FCC P15.207 AV

| NO | FREQ<br>[MHz] | READING      |               | C. FACTOR<br>[dB] | RESULT       |               | LIMIT        |               | MARGIN       |               | PHASE |
|----|---------------|--------------|---------------|-------------------|--------------|---------------|--------------|---------------|--------------|---------------|-------|
|    |               | QP<br>[dBuV] | CAV<br>[dBuV] |                   | QP<br>[dBuV] | CAV<br>[dBuV] | QP<br>[dBuV] | CAV<br>[dBuV] | QP<br>[dBuV] | CAV<br>[dBuV] |       |
| 1  | 0.16090       | 16.44        | 6.68          | 9.94              | 26.38        | 16.62         | 65.42        | 55.42         | 39.04        | 38.80         | N     |
| 2  | 0.26850       | 13.68        | 3.94          | 9.94              | 23.62        | 13.88         | 61.16        | 51.16         | 37.54        | 37.28         | N     |
| 3  | 0.43437       | 27.75        | 22.23         | 9.95              | 37.70        | 32.18         | 57.17        | 47.17         | 19.47        | 14.99         | N     |
| 4  | 1.53127       | 19.82        | 11.52         | 10.01             | 29.83        | 21.53         | 56.00        | 46.00         | 26.17        | 24.47         | N     |
| 5  | 3.30940       | 15.42        | 10.33         | 10.09             | 25.51        | 20.42         | 56.00        | 46.00         | 30.49        | 25.58         | N     |
| 6  | 5.69908       | 14.92        | 9.34          | 10.18             | 25.10        | 19.52         | 60.00        | 50.00         | 34.90        | 30.48         | N     |
| 7  | 16.06109      | 12.92        | 3.49          | 10.50             | 23.42        | 13.99         | 60.00        | 50.00         | 36.58        | 36.01         | N     |
| 8  | 20.79854      | 11.55        | -1.57         | 10.56             | 22.11        | 8.99          | 60.00        | 50.00         | 37.89        | 41.01         | N     |
| 9  | 27.15923      | 15.17        | 7.80          | 10.70             | 25.87        | 18.50         | 60.00        | 50.00         | 34.13        | 31.50         | N     |
| 10 | 0.15454       | 14.07        | 7.26          | 9.94              | 24.01        | 17.20         | 65.75        | 55.75         | 41.74        | 38.55         | L     |
| 11 | 0.29935       | 12.31        | 4.62          | 9.94              | 22.25        | 14.56         | 60.26        | 50.26         | 38.01        | 35.70         | L     |
| 12 | 0.43256       | 24.60        | 14.07         | 9.95              | 34.55        | 24.02         | 57.20        | 47.20         | 22.65        | 23.18         | L     |
| 13 | 0.86699       | 19.45        | 10.40         | 9.97              | 29.42        | 20.37         | 56.00        | 46.00         | 26.58        | 25.63         | L     |
| 14 | 1.56769       | 20.62        | 9.29          | 10.01             | 30.63        | 19.30         | 56.00        | 46.00         | 25.37        | 26.70         | L     |
| 15 | 3.03731       | 13.69        | 5.29          | 10.06             | 23.75        | 15.35         | 56.00        | 46.00         | 32.25        | 30.65         | L     |
| 16 | 5.75291       | 12.23        | 4.00          | 10.18             | 22.41        | 14.18         | 60.00        | 50.00         | 37.59        | 35.82         | L     |
| 17 | 16.30962      | 12.92        | 4.18          | 10.48             | 23.40        | 14.66         | 60.00        | 50.00         | 36.60        | 35.34         | L     |
| 18 | 27.15864      | 16.13        | 7.62          | 10.67             | 26.80        | 18.29         | 60.00        | 50.00         | 33.20        | 31.71         | L     |

## AC Line Conducted Emissions (Graph)

Test Mode: U-NII 3 & 802.11a & 5.745 MHz

## Results of Conducted Emission

DTNC

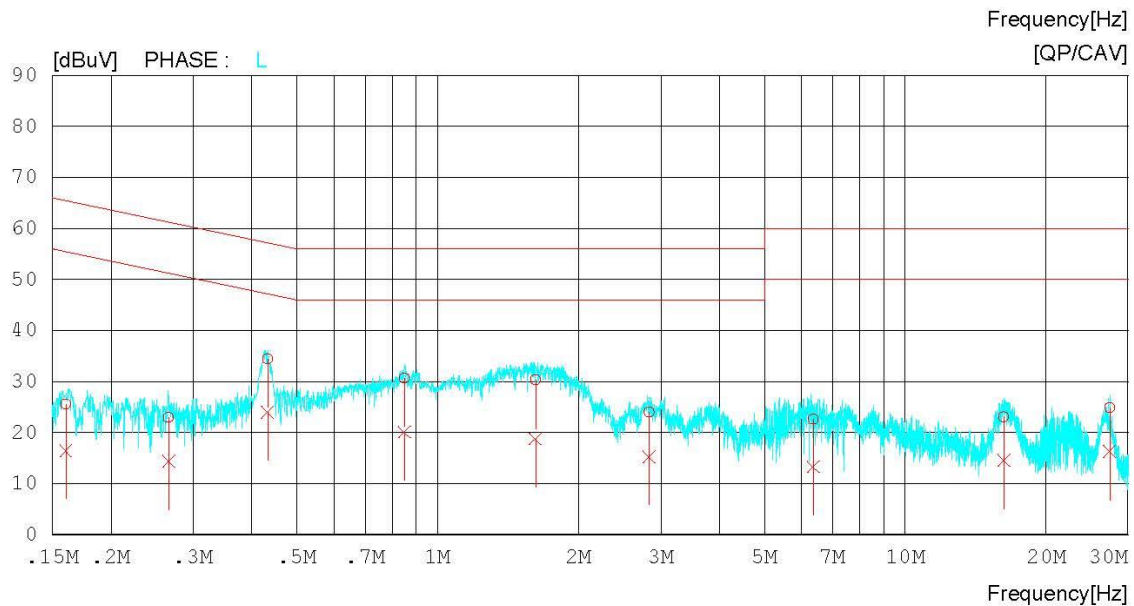
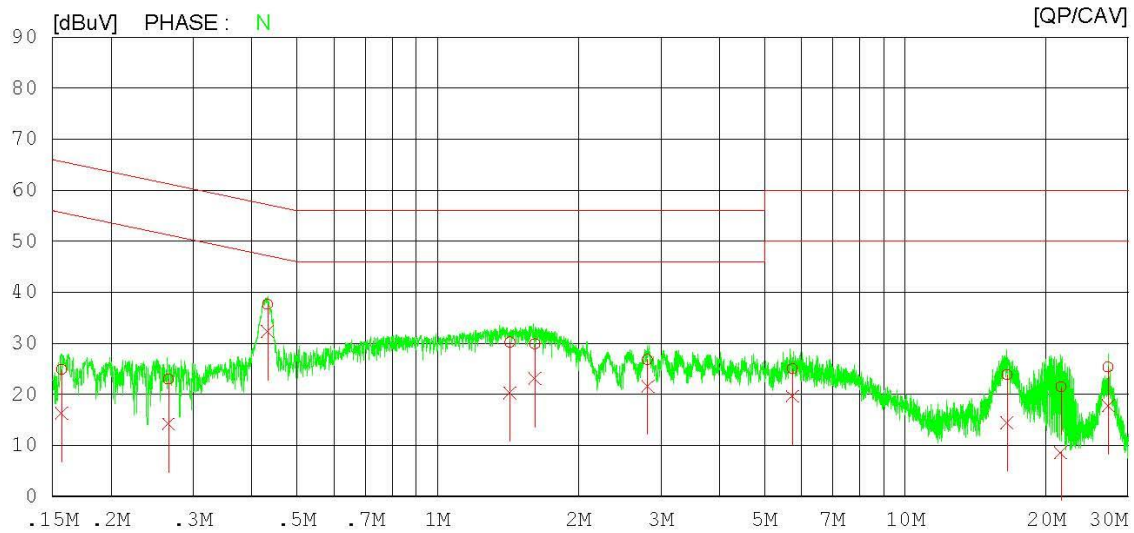
Date 2020-02-07

Order No.  
Model No. SP500  
Serial No.  
Test Condition 5.7G WLAN

Reference No.  
Power Supply 120 V, 60 Hz  
Temp/Humi. 23 'C / 35 %  
Operator Jungwoo Kim

Memo

LIMIT : FCC P15.207 QP  
FCC P15.207 AV



## AC Line Conducted Emissions (Data List)

Test Mode: U-NII 3 & 802.11a & 5 745 MHz

## Results of Conducted Emission

DTNC

Date 2020-02-07

Order No.  
Model No. SP500  
Serial No.  
Test Condition 5.7G WLAN

Reference No.  
Power Supply 120 V, 60 Hz  
Temp/Humi. 23 'C / 35 %  
Operator Jungwoo Kim

Memo

LIMIT : FCC P15.207 QP  
FCC P15.207 AV

| NO | FREQ<br>[MHz] | READING      |               | C.FACTOR<br>[dB] | RESULT       |               | LIMIT        |               | MARGIN       |               | PHASE |
|----|---------------|--------------|---------------|------------------|--------------|---------------|--------------|---------------|--------------|---------------|-------|
|    |               | QP<br>[dBuV] | CAV<br>[dBuV] |                  | QP<br>[dBuV] | CAV<br>[dBuV] | QP<br>[dBuV] | CAV<br>[dBuV] | QP<br>[dBuV] | CAV<br>[dBuV] |       |
| 1  | 0.15680       | 14.93        | 6.36          | 9.94             | 24.87        | 16.30         | 65.63        | 55.63         | 40.76        | 39.33         | N     |
| 2  | 0.26550       | 13.03        | 4.28          | 9.94             | 22.97        | 14.22         | 61.26        | 51.26         | 38.29        | 37.04         | N     |
| 3  | 0.43242       | 27.72        | 22.40         | 9.95             | 37.67        | 32.35         | 57.21        | 47.21         | 19.54        | 14.86         | N     |
| 4  | 1.42683       | 20.20        | 10.31         | 9.99             | 30.19        | 20.30         | 56.00        | 46.00         | 25.81        | 25.70         | N     |
| 5  | 1.61322       | 19.87        | 13.09         | 10.01            | 29.88        | 23.10         | 56.00        | 46.00         | 26.12        | 22.90         | N     |
| 6  | 2.81342       | 16.77        | 11.52         | 10.07            | 26.84        | 21.59         | 56.00        | 46.00         | 29.16        | 24.41         | N     |
| 7  | 5.73839       | 14.85        | 9.48          | 10.18            | 25.03        | 19.66         | 60.00        | 50.00         | 34.97        | 30.34         | N     |
| 8  | 16.51103      | 13.33        | 3.99          | 10.51            | 23.84        | 14.50         | 60.00        | 50.00         | 36.16        | 35.50         | N     |
| 9  | 21.52394      | 10.89        | -1.96         | 10.58            | 21.47        | 8.62          | 60.00        | 50.00         | 38.53        | 41.38         | N     |
| 10 | 27.15827      | 14.60        | 7.07          | 10.70            | 25.30        | 17.77         | 60.00        | 50.00         | 34.70        | 32.23         | N     |
| 11 | 0.16012       | 15.56        | 6.47          | 9.94             | 25.50        | 16.41         | 65.46        | 55.46         | 39.96        | 39.05         | L     |
| 12 | 0.26593       | 13.02        | 4.42          | 9.94             | 22.96        | 14.36         | 61.24        | 51.24         | 38.28        | 36.88         | L     |
| 13 | 0.43245       | 24.44        | 14.07         | 9.95             | 34.39        | 24.02         | 57.21        | 47.21         | 22.82        | 23.19         | L     |
| 14 | 0.84874       | 20.74        | 10.09         | 9.96             | 30.70        | 20.05         | 56.00        | 46.00         | 25.30        | 25.95         | L     |
| 15 | 1.61750       | 20.25        | 8.69          | 10.01            | 30.26        | 18.70         | 56.00        | 46.00         | 25.74        | 27.30         | L     |
| 16 | 2.83092       | 13.84        | 5.21          | 10.06            | 23.90        | 15.27         | 56.00        | 46.00         | 32.10        | 30.73         | L     |
| 17 | 6.36048       | 12.38        | 3.05          | 10.20            | 22.58        | 13.25         | 60.00        | 50.00         | 37.42        | 36.75         | L     |
| 18 | 16.24090      | 12.54        | 4.04          | 10.47            | 23.01        | 14.51         | 60.00        | 50.00         | 36.99        | 35.49         | L     |
| 19 | 27.34412      | 14.21        | 5.59          | 10.67            | 24.88        | 16.26         | 60.00        | 50.00         | 35.12        | 33.74         | L     |

## 9. LIST OF TEST EQUIPMENT

| Type                                | Manufacturer           | Model                       | Cal.Date<br>(yy/mm/dd) | Next.Cal.Date<br>(yy/mm/dd) | S/N                |
|-------------------------------------|------------------------|-----------------------------|------------------------|-----------------------------|--------------------|
| Spectrum Analyzer                   | Agilent Technologies   | N9020A                      | 19/12/16               | 20/12/16                    | MY50410357         |
| Spectrum Analyzer                   | Agilent Technologies   | N9020A                      | 19/12/16               | 20/12/16                    | MY48011700         |
| Spectrum Analyzer                   | Agilent Technologies   | N9020A                      | 19/12/16               | 20/12/16                    | MY46471251         |
| Spectrum Analyzer                   | Agilent Technologies   | N9030A                      | 19/12/16               | 20/12/16                    | MY53310140         |
| Multimeter                          | FLUKE                  | 17B                         | 19/12/16               | 20/12/16                    | 26030065WS         |
| Signal Generator                    | Rohde Schwarz          | SMBV100A                    | 19/12/16               | 20/12/16                    | 255571             |
| Signal Generator                    | ANRITSU                | MG3695C                     | 19/12/16               | 20/12/16                    | 173501             |
| Thermohygrometer                    | BODYCOM                | BJ5478                      | 19/12/18               | 20/12/18                    | 120612-1           |
| Thermohygrometer                    | BODYCOM                | BJ5478                      | 19/12/18               | 20/12/18                    | 120612-2           |
| Thermohygrometer                    | BODYCOM                | BJ5478                      | 19/07/03               | 20/07/03                    | N/A                |
| HYGROMETER                          | TESTO                  | 608-H1                      | 20/01/21               | 21/01/21                    | 34862883           |
| Loop Antenna                        | ETS-Lindgren           | 6502                        | 19/09/18               | 21/09/18                    | 00226186           |
| BILOG ANTENNA                       | Schwarzbeck            | VULB 9160                   | 19/04/23               | 21/04/23                    | 9160-3362          |
| Horn Antenna                        | ETS-Lindgren           | 3115                        | 19/01/11               | 21/01/11                    | 9202-3820          |
| Horn Antenna                        | A.H.Systems Inc.       | SAS-574                     | 19/07/03               | 21/07/03                    | 155                |
| PreAmplifier                        | tsj                    | MLA-0118-B01-40             | 19/12/16               | 20/12/16                    | 1852267            |
| PreAmplifier                        | tsj                    | MLA-1840-J02-45             | 19/06/27               | 20/06/27                    | 16966-10728        |
| PreAmplifier                        | H.P                    | 8447D                       | 19/12/16               | 20/12/16                    | 2944A07774         |
| Attenuator                          | Aeroflex/Weinschel     | 20515                       | 19/06/27               | 20/06/27                    | Y2370              |
| Attenuator                          | SMAJK                  | SMAJK-2-3                   | 19/06/27               | 20/06/27                    | 2                  |
| Attenuator                          | SRTechnology           | F01-B0606-01                | 19/06/27               | 20/06/27                    | 13092403           |
| Attenuator                          | Hefei Shunze           | SS5T2.92-10-40              | 19/06/27               | 20/06/27                    | 16012202           |
| Attenuator                          | SMAJK                  | SMAJK-50-10                 | 19/08/07               | 20/08/07                    | 15081901           |
| High Pass Filter                    | Wainwright Instruments | WHNX8.0/26.5-6SS            | 19/06/27               | 20/06/27                    | 3                  |
| High Pass Filter                    | Wainwright Instruments | WHKX12-935-1000-15000-40SS  | 19/06/26               | 20/06/26                    | 8                  |
| High Pass Filter                    | Wainwright Instruments | WHKX10-2838-3300-18000-60SS | 19/06/26               | 20/06/26                    | 1                  |
| Power Meter & Wide Bandwidth Sensor | Anritsu                | ML2496A<br>MA2411B          | 19/12/16               | 20/12/16                    | 1338004<br>1306053 |
| EMI Receiver                        | ROHDE&SCHWARZ          | ESW44                       | 19/07/30               | 20/07/30                    | 101645             |
| EMI Test Receiver                   | Rohde Schwarz          | ESC17                       | 20/01/20               | 21/01/20                    | 100910             |
| PULSE LIMITER                       | Rohde Schwarz          | ESH3-Z2                     | 19/09/17               | 20/09/17                    | 101333             |
| LISN                                | SCHWARZBECK            | NNLK 8121                   | 19/03/19               | 20/03/19                    | 06183              |
| Cable                               | Junkosha               | MWX241                      | 20/01/13               | 21/01/13                    | G-04               |
| Cable                               | Junkosha               | MWX241                      | 20/01/13               | 21/01/13                    | G-07               |
| Cable                               | DT&C                   | Cable                       | 20/01/13               | 21/01/13                    | G-13               |
| Cable                               | DT&C                   | Cable                       | 20/01/13               | 21/01/13                    | G-14               |
| Cable                               | HUBER+SUHNER           | SUCOFLEX 104                | 20/01/13               | 21/01/13                    | G-15               |
| Cable                               | Radiall                | TESTPRO3                    | 20/01/16               | 21/01/16                    | M-01               |
| Cable                               | Junkosha               | MWX315                      | 20/01/16               | 21/01/16                    | M-05               |
| Cable                               | Junkosha               | MWX221                      | 20/01/16               | 21/01/16                    | M-06               |
| Cable                               | DT&C                   | Cable                       | 20/01/16               | 21/01/16                    | RF-82              |

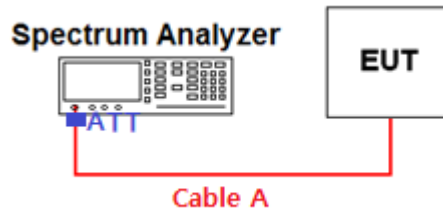
Note1: The measurement antennas were calibrated in accordance to the requirements of ANSI C63.5-2017

Note2: The cable is not a regular calibration item, so it has been calibrated by DT & C itself.

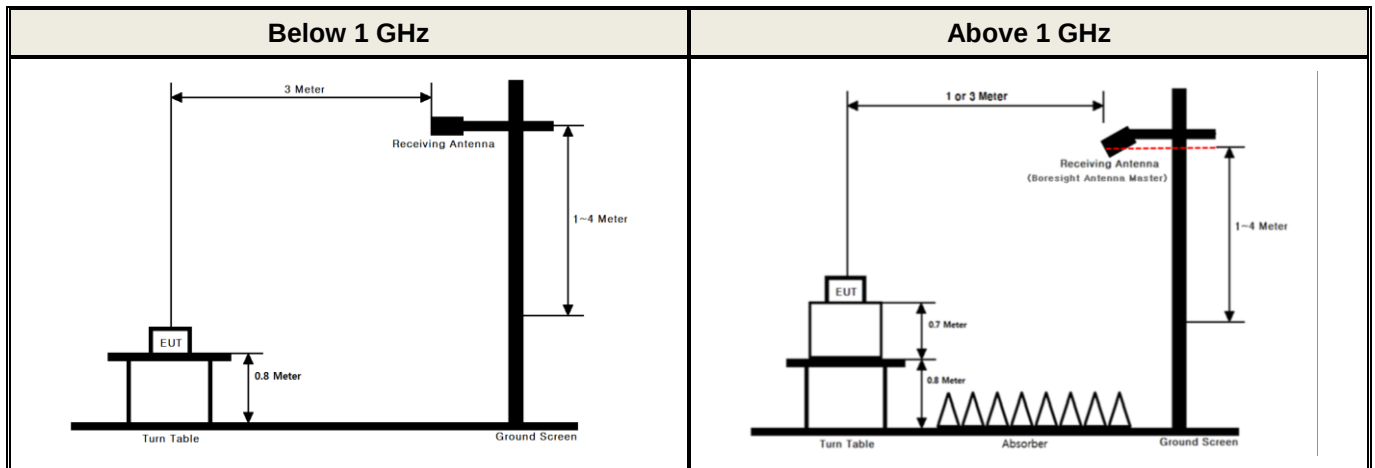
## APPENDIX I

### Test set up Diagram

#### ▪ Conducted Measurement



#### ▪ Radiated Measurement



## APPENDIX II

### Duty Cycle Information

#### ■ Test Procedure

**Duty Cycle  $[X = \text{On Time} / (\text{On} + \text{Off time})]$**  is measured using Measurement Procedure of **KDB789033 D02v02r01**

1. Set the center frequency of the spectrum analyzer to the center frequency of the transmission.
2. Set RBW  $\geq$  EBW if possible; otherwise, set RBW to the largest available value.
3. Set VBW  $\geq$  RBW. Set detector = peak.
4. Note : The zero-span measurement method shall not be used unless both **RBW and VBW are  $> 50/T$** , where  $T$  is defined in section II.B.1.a), and **the number of sweep points across duration  $T$  exceeds 100**. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if  $T \leq 16.7$  microseconds.)

$T$  : The minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

( $T = \text{On time}$  of the above table since the EUT operates with above fixed Duty Cycle and it is the minimum On time)

#### ■ Test Results:

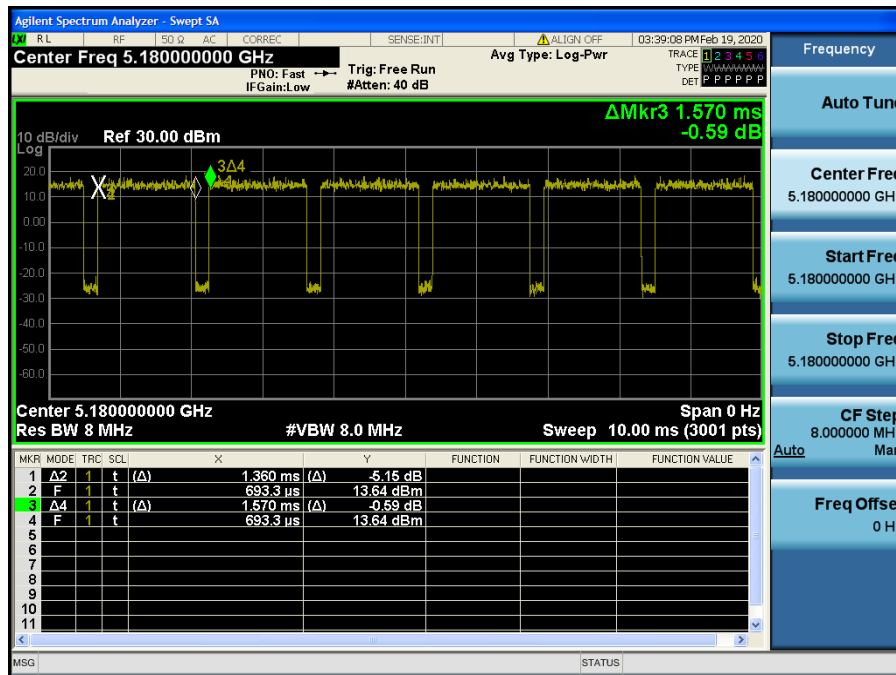
##### Duty cycle

| Mode           | Data Rate | Tested Frequency [MHz] | Maximum Achievable Duty Cycle ( $x$ ) = On / (On+Off) |                    |         | Duty Cycle Correction Factor [dB] | 50/ $T$ [kHz] |
|----------------|-----------|------------------------|-------------------------------------------------------|--------------------|---------|-----------------------------------|---------------|
|                |           |                        | On Time [ms]                                          | (On+Off) Time [ms] | $x$     |                                   |               |
| 802.11a        | 6Mbps     | 5 180                  | 1.360                                                 | 1.570              | 0.866 2 | 0.62                              | 36.77         |
| 802.11n (HT20) | MCS0      | 5 180                  | 1.269                                                 | 1.480              | 0.857 4 | 0.67                              | 39.40         |
| 802.11n (HT40) | MCS0      | 5 190                  | 0.633                                                 | 0.840              | 0.753 9 | 1.23                              | 78.99         |

## Single Transmit

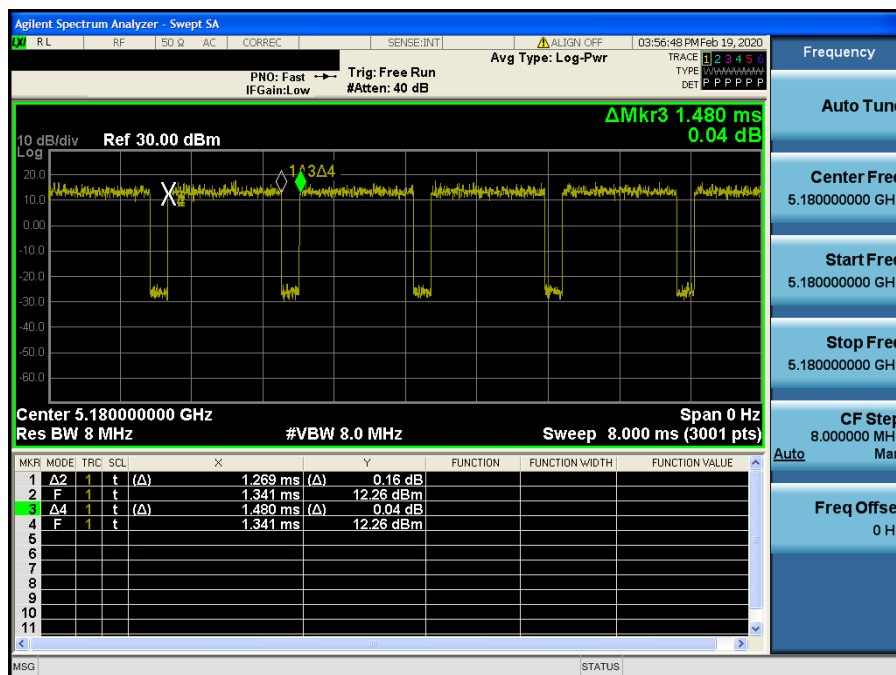
## Duty Cycle

Test Mode: 802.11a &amp; Ch.36



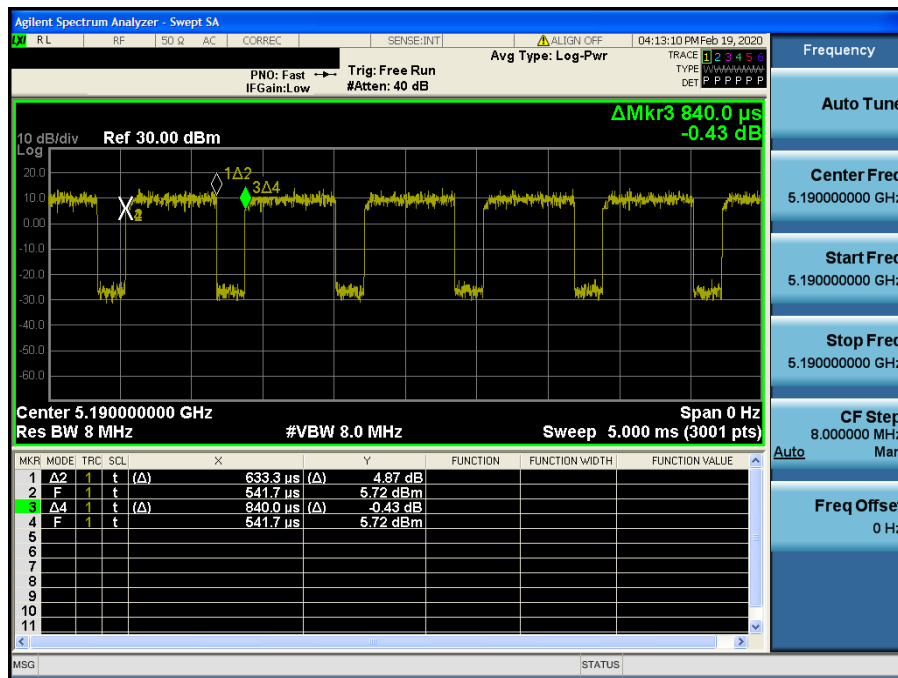
## Duty Cycle

Test Mode: 802.11n HT20 &amp; Ch.36



# Duty Cycle

Test Mode: 802.11n HT40 & Ch.38

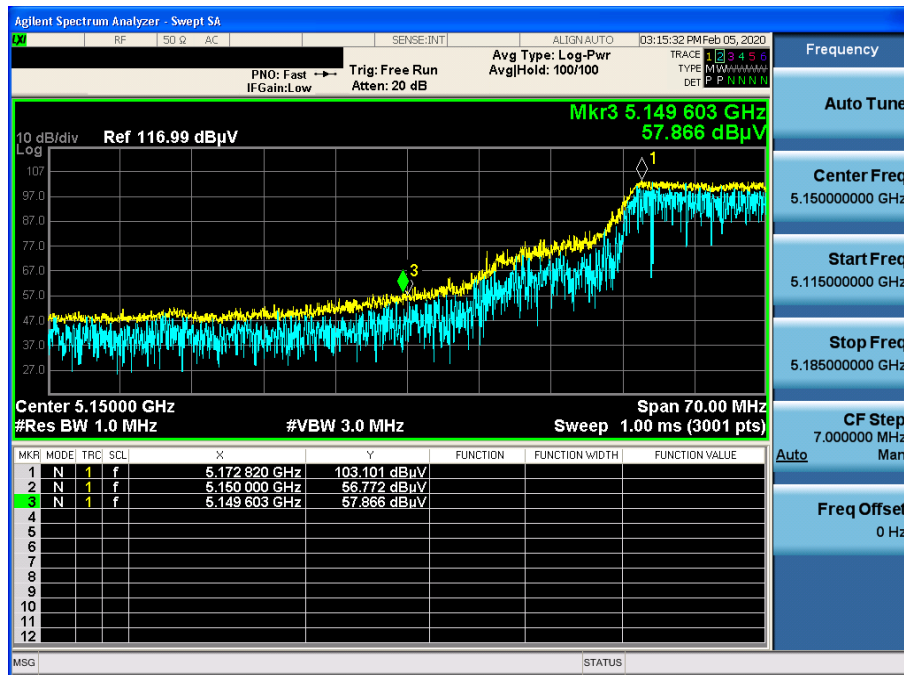


## APPENDIX III

## Unwanted Emissions (Radiated) Test Plot

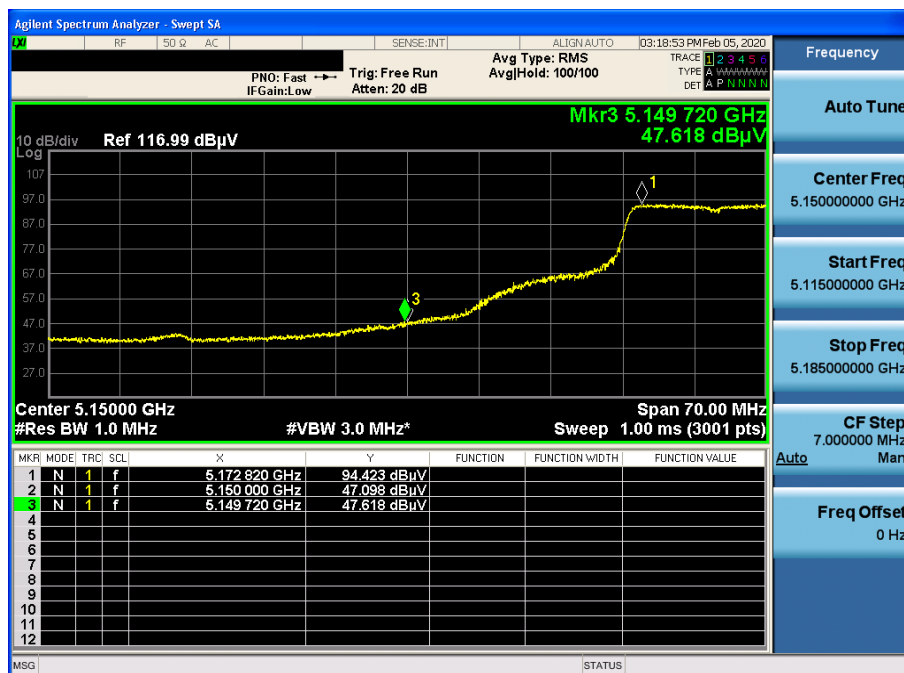
802.11a &amp; U-NII 1 &amp; Ch.36 &amp; X axis &amp; Ver

Detector Mode : PK



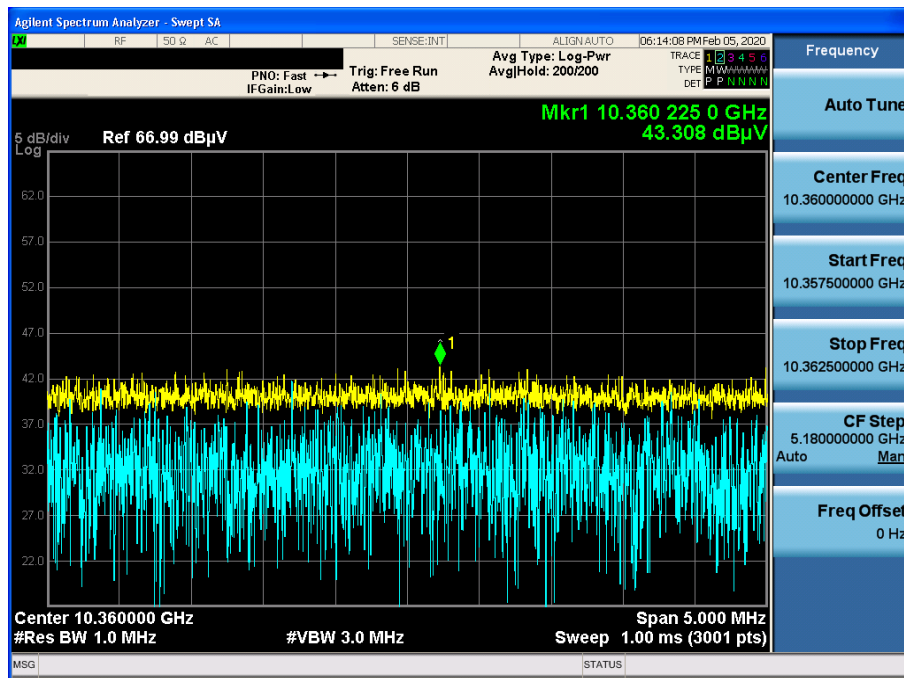
802.11a &amp; U-NII 1 &amp; Ch.36 &amp; X axis &amp; Ver

Detector Mode : AV



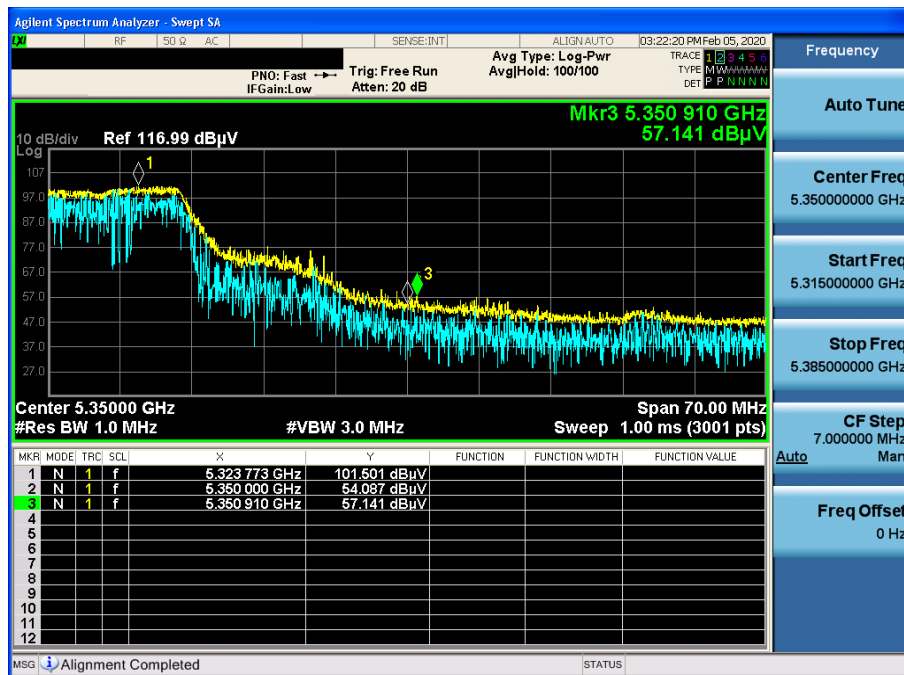
802.11a &amp; U-NII 1 &amp; Ch.36 &amp; Z axis &amp; Ver

Detector Mode : PK



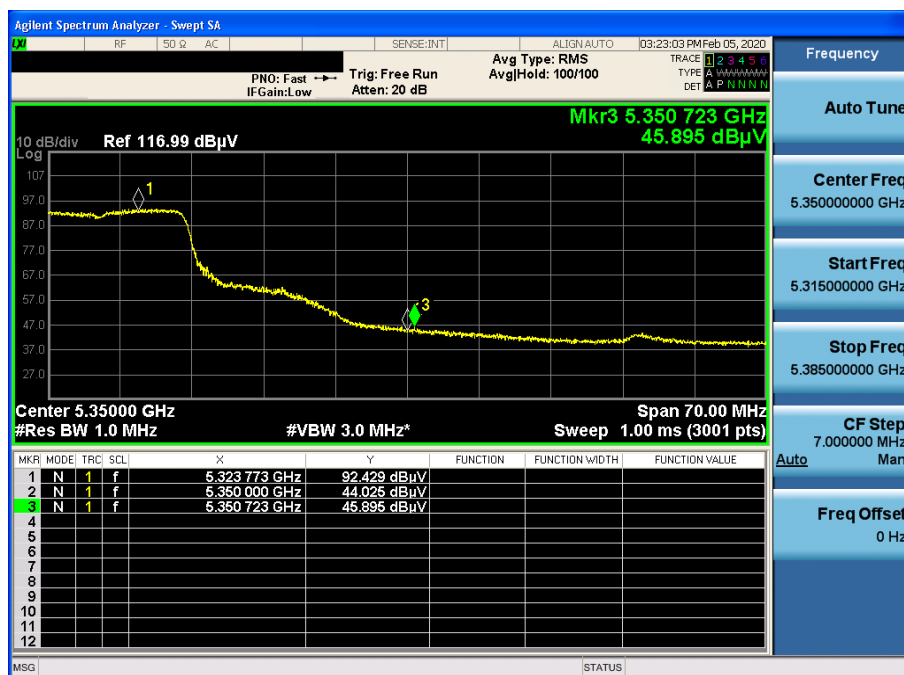
802.11a &amp; U-NII 2A &amp; Ch.64 &amp; X axis &amp; Ver

Detector Mode : PK



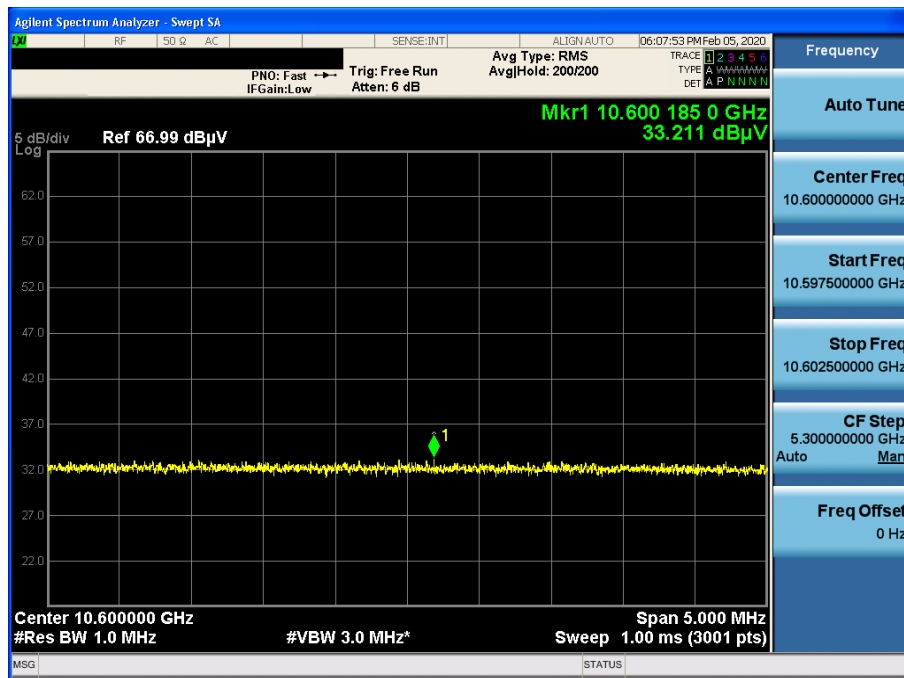
802.11a &amp; U-NII 2A &amp; Ch.64 &amp; X axis &amp; Ver

Detector Mode : AV



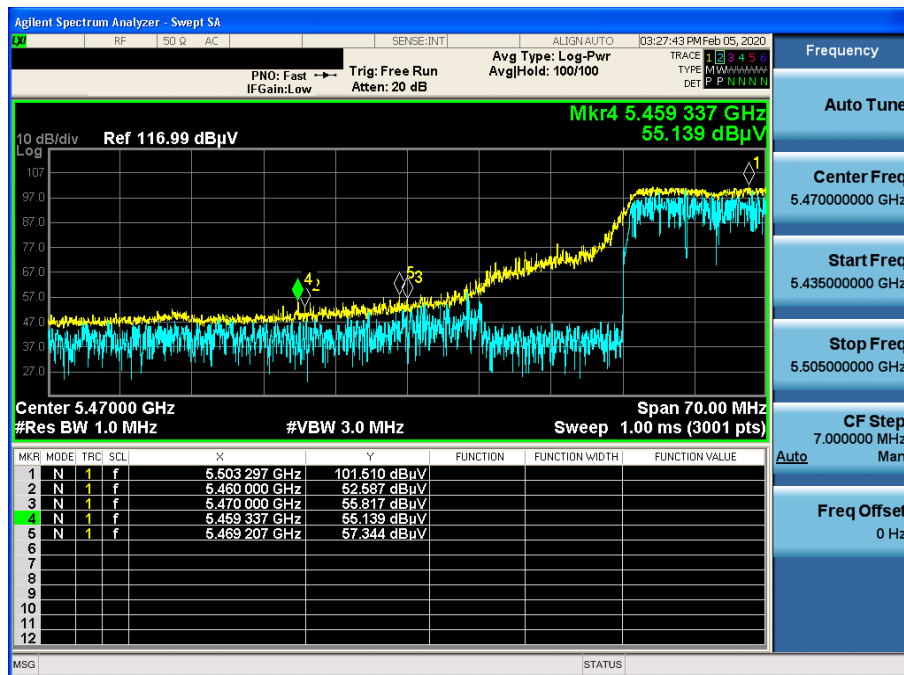
802.11a &amp; U-NII 2A &amp; Ch.60 &amp; Z axis &amp; Ver

Detector Mode : AV



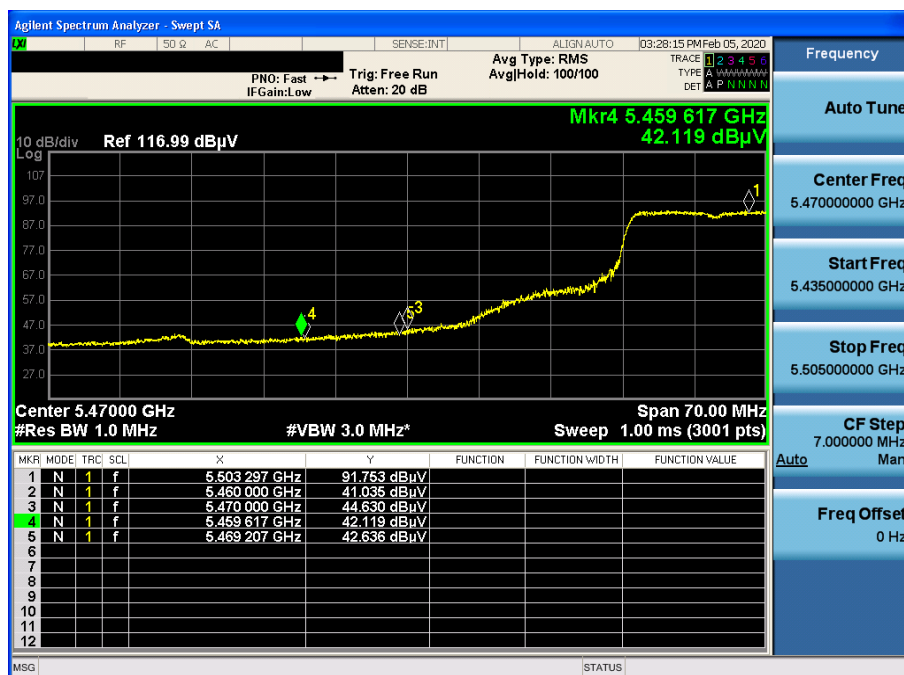
802.11a &amp; U-NII 2C &amp; Ch.100 &amp; X axis &amp; Ver

Detector Mode : PK



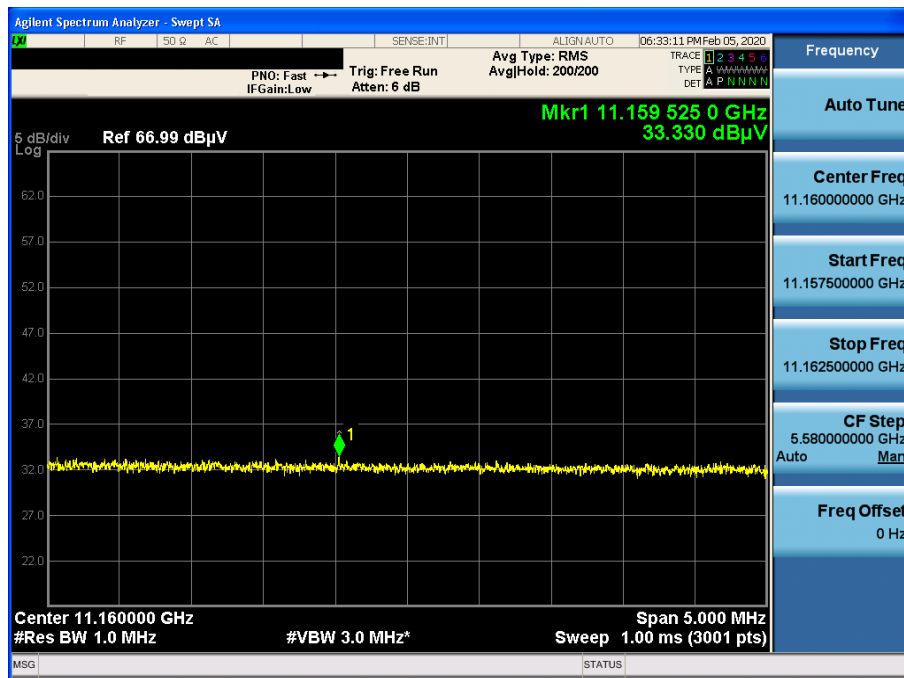
802.11a &amp; U-NII 2C &amp; Ch.100 &amp; X axis &amp; Ver

Detector Mode : AV



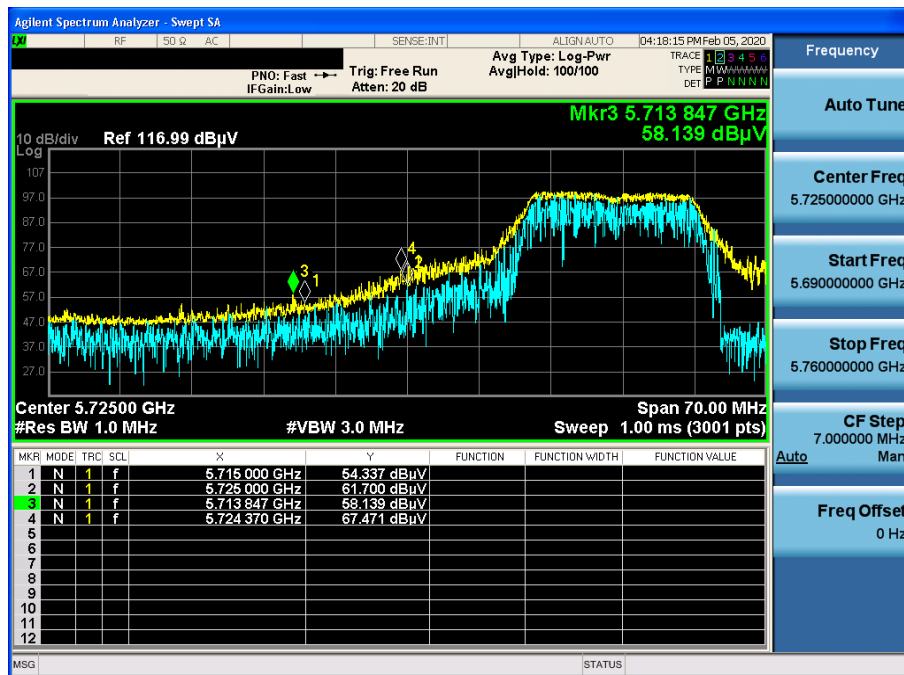
802.11a & U-NII 2C & Ch.116 & Z axis & Ver

Detector Mode : AV



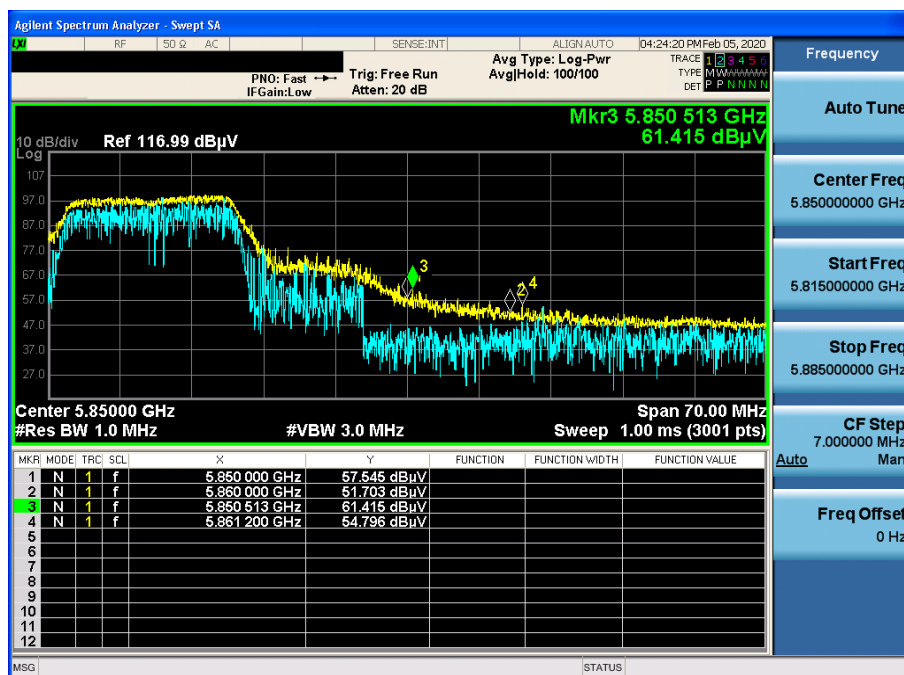
## 802.11a &amp; U-NII 3 &amp; Ch.149 &amp; X axis &amp; Ver

Detector Mode : PK



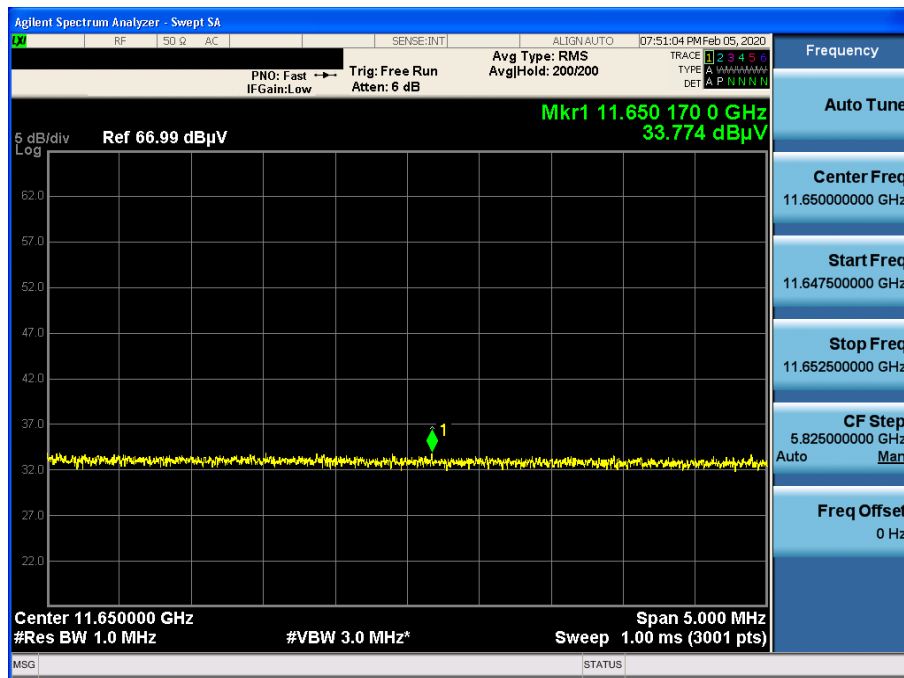
## 802.11a &amp; U-NII 3 &amp; Ch.165 &amp; X axis &amp; Ver

Detector Mode : PK



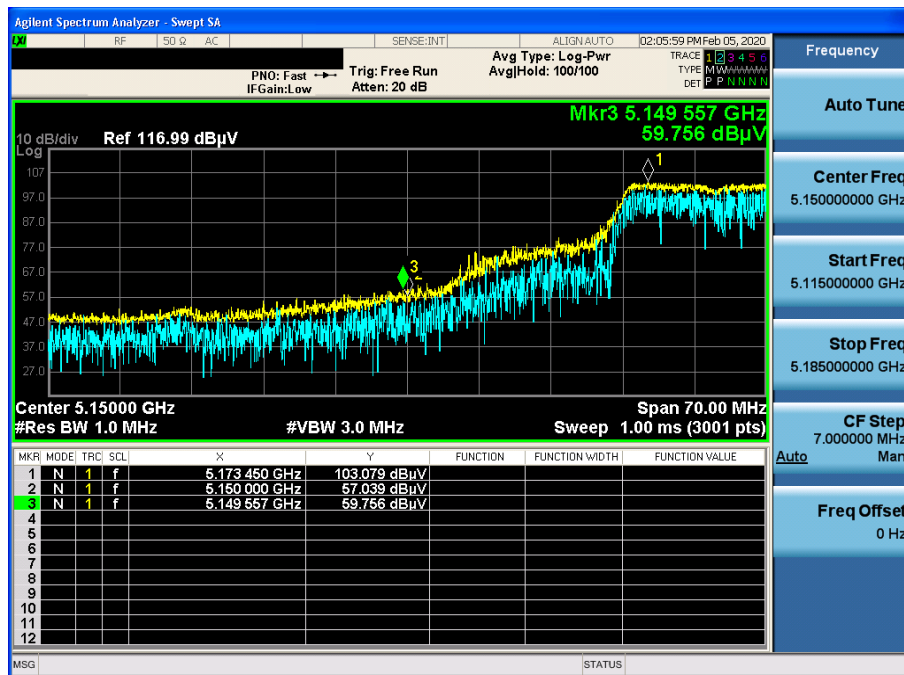
802.11a & U-NII 3 & Ch.165 & Z axis & Ver

Detector Mode : AV



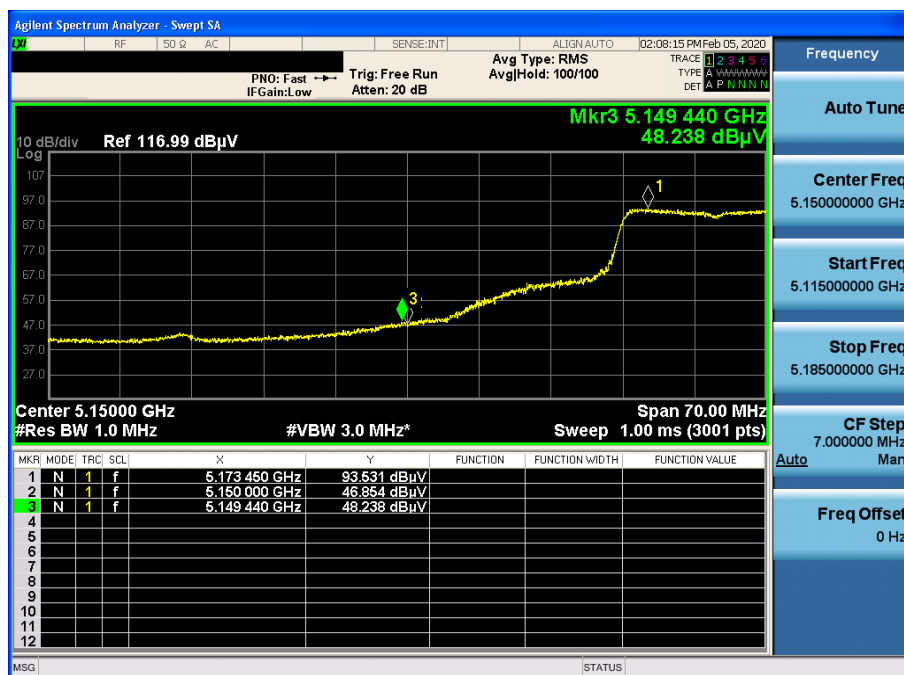
802.11n(HT20) &amp; U-NII 1 &amp; Ch.36 &amp; X axis &amp; Ver

Detector Mode : PK



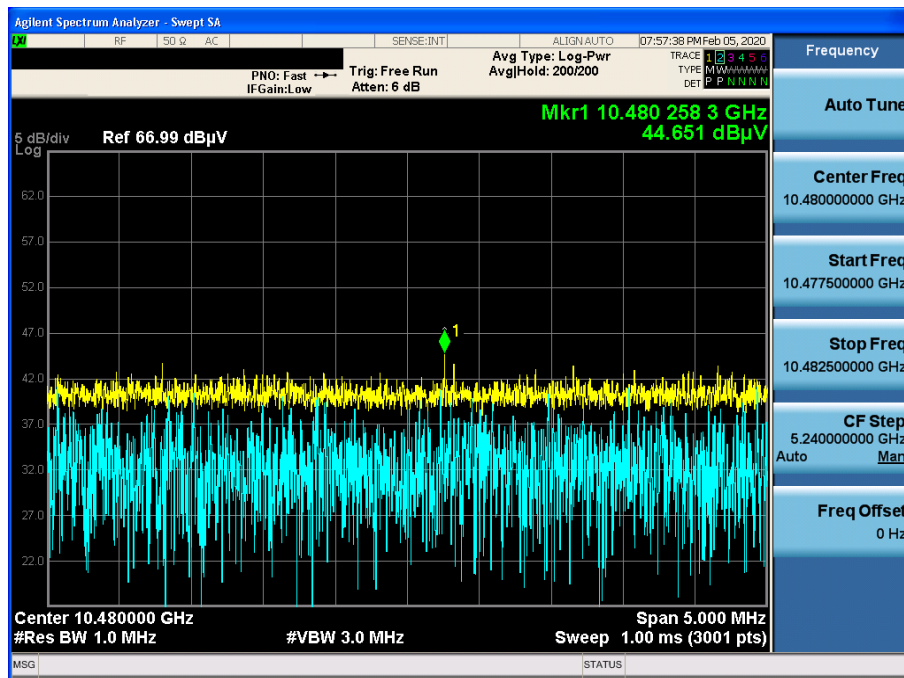
802.11n(HT20) &amp; U-NII 1 &amp; Ch.36 &amp; X axis &amp; Ver

Detector Mode : AV



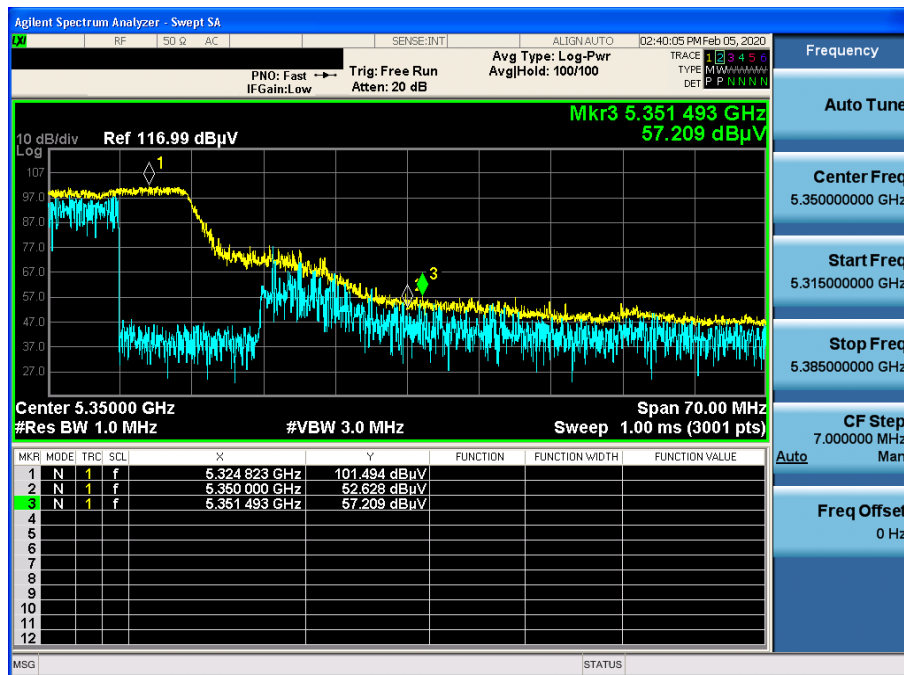
802.11n(HT20) &amp; U-NII 1 &amp; Ch.48 &amp; Z axis &amp; Ver

Detector Mode : PK



802.11n(HT20) &amp; U-NII 2A &amp; Ch.64 &amp; X axis &amp; Ver

Detector Mode : PK



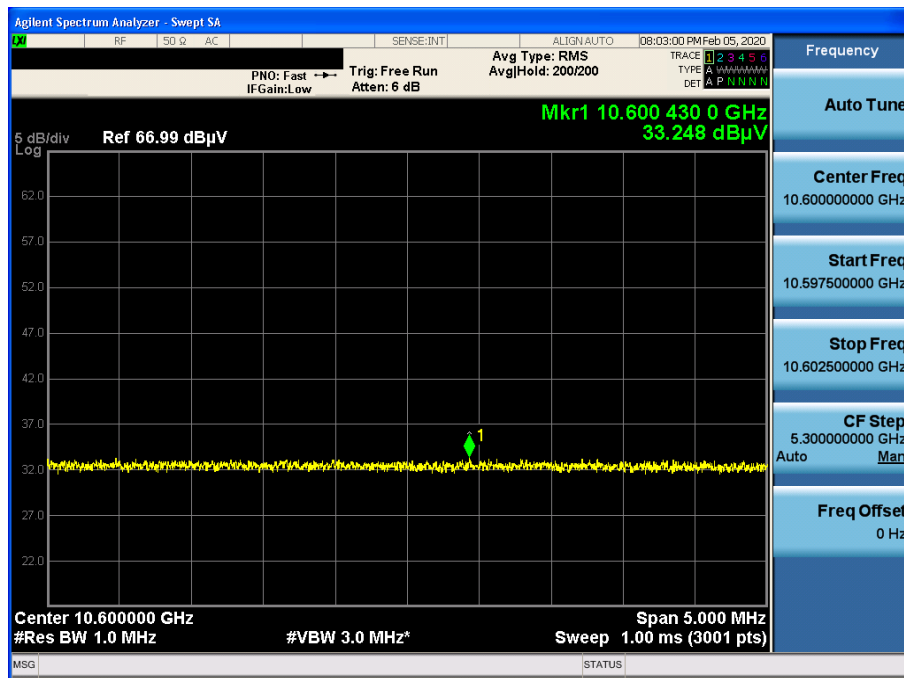
802.11n(HT20) &amp; U-NII 2A &amp; Ch.64 &amp; X axis &amp; Ver

Detector Mode : AV



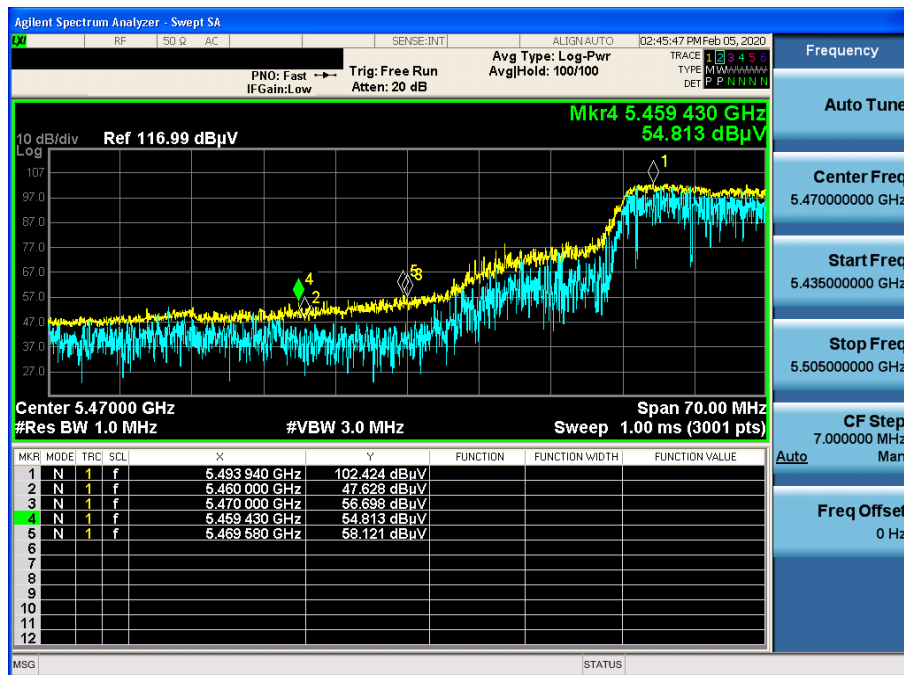
802.11n(HT20) & U-NII 2A & Ch.60 & Z axis & Ver

Detector Mode : AV



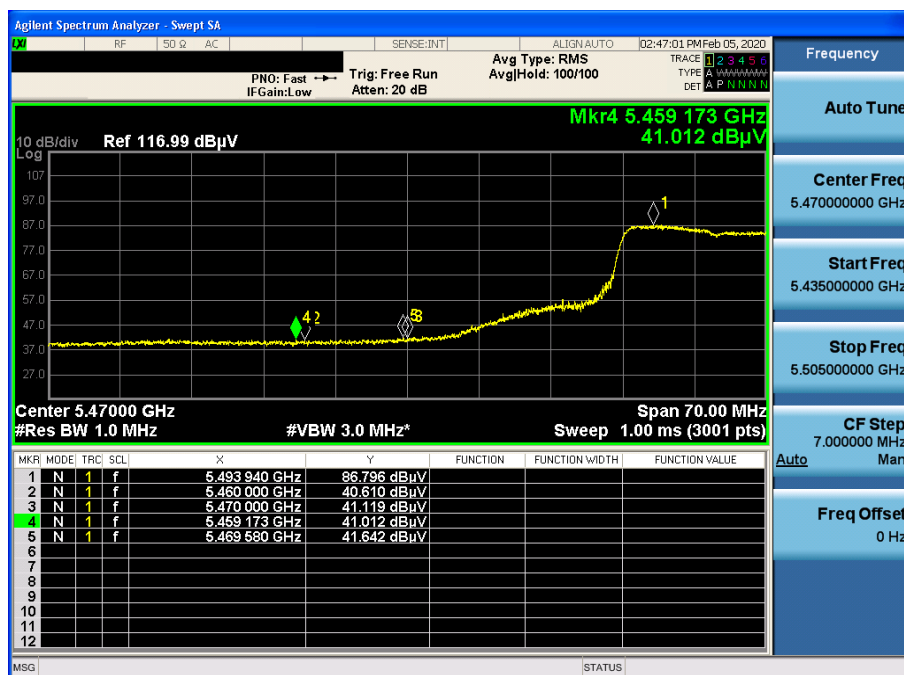
802.11n(HT20) &amp; U-NII 2C &amp; Ch.100 &amp; X axis &amp; Ver

Detector Mode : PK



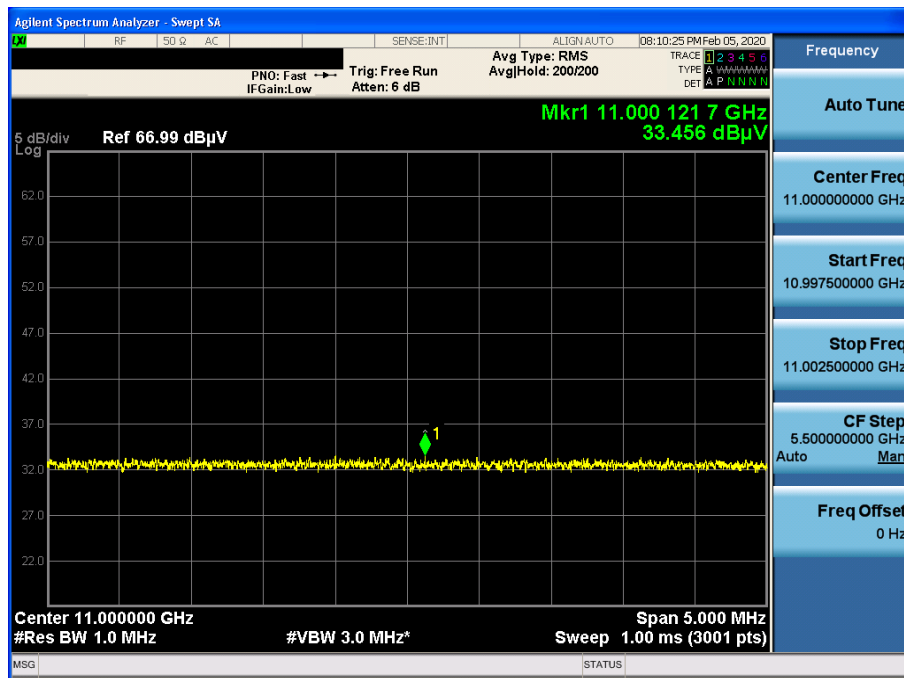
802.11n(HT20) &amp; U-NII 2C &amp; Ch.100 &amp; X axis &amp; Ver

Detector Mode : AV



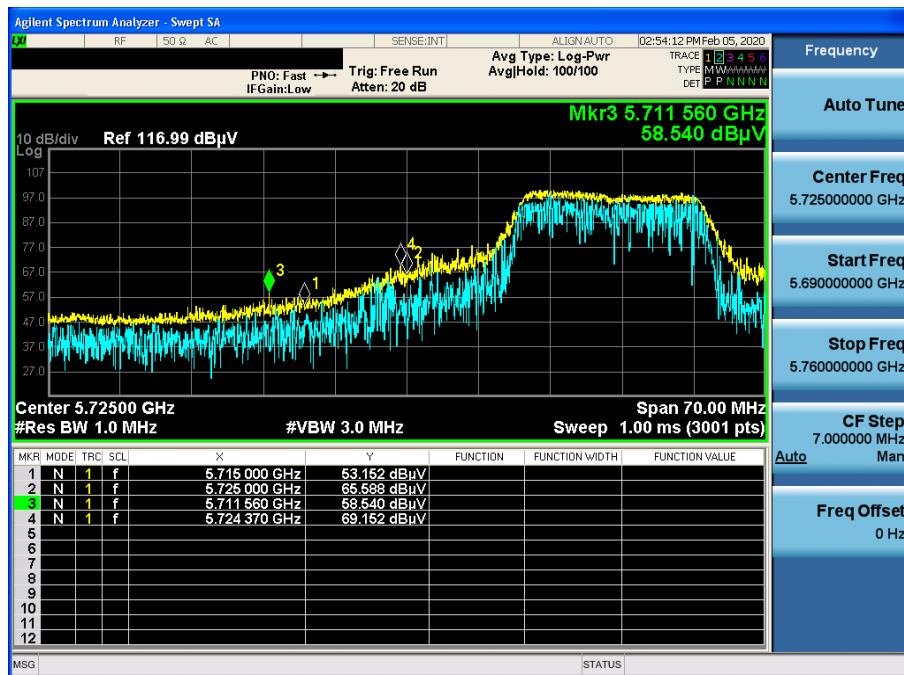
802.11n(HT20) &amp; U-NII 2C &amp; Ch.100 &amp; Z axis &amp; Ver

Detector Mode : PK



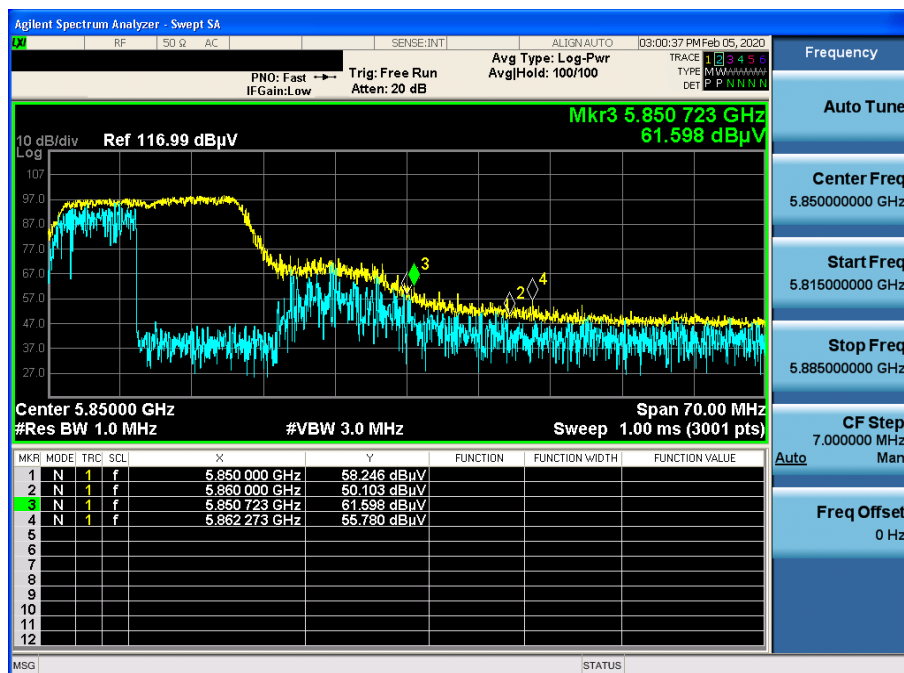
802.11n(HT20) &amp; U-NII 3 &amp; Ch.149 &amp; X axis &amp; Ver

Detector Mode : PK



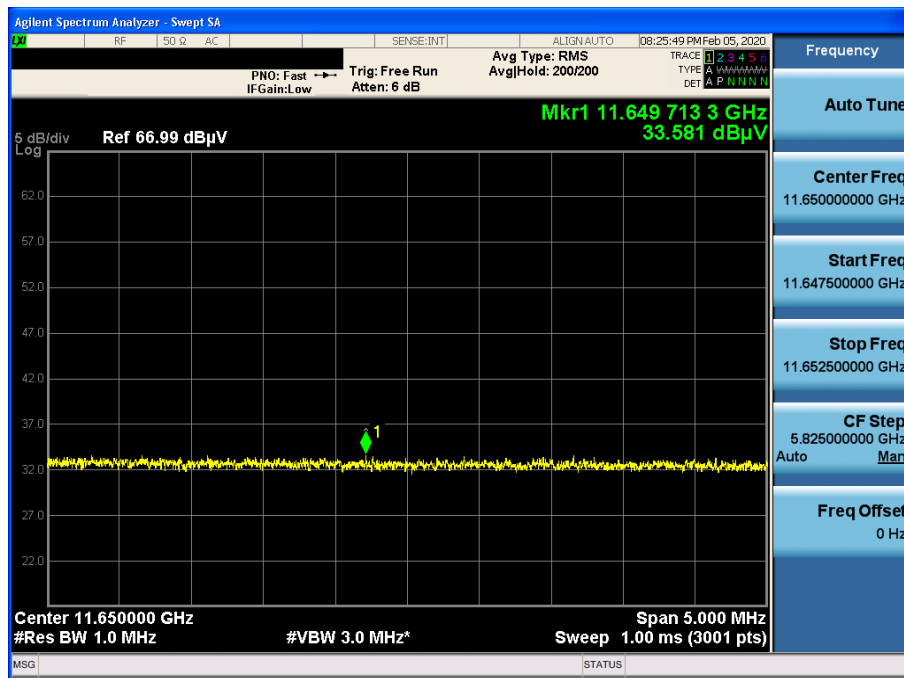
802.11n(HT20) &amp; U-NII 3 &amp; Ch.165 &amp; X axis &amp; Ver

Detector Mode : PK



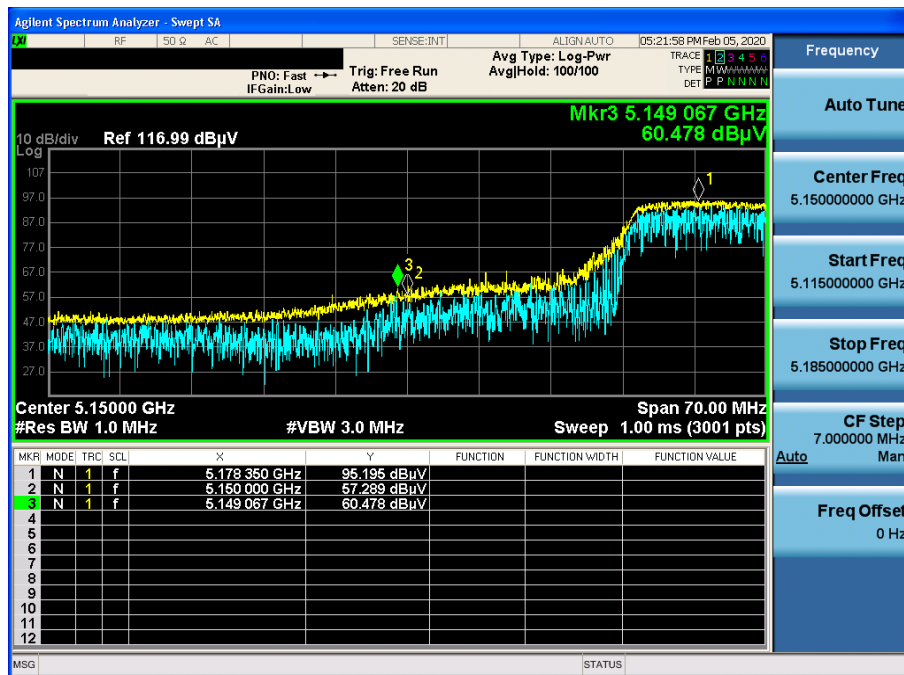
802.11n(HT20) & U-NII 3 & Ch.165 & Z axis & Ver

Detector Mode : AV



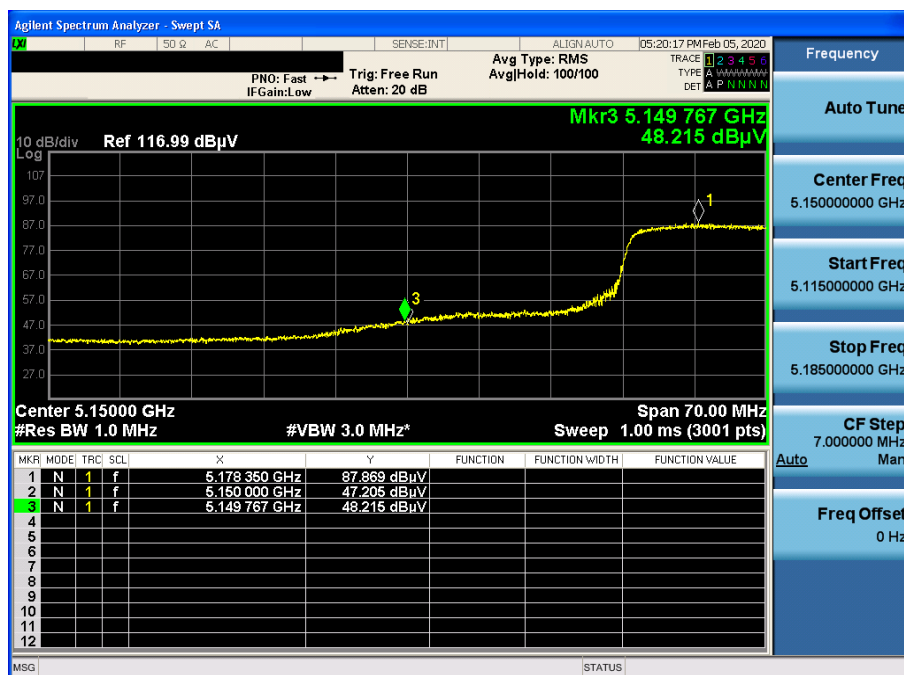
802.11n(HT40) &amp; U-NII 1 &amp; Ch.38 &amp; X axis &amp; Ver

Detector Mode : PK



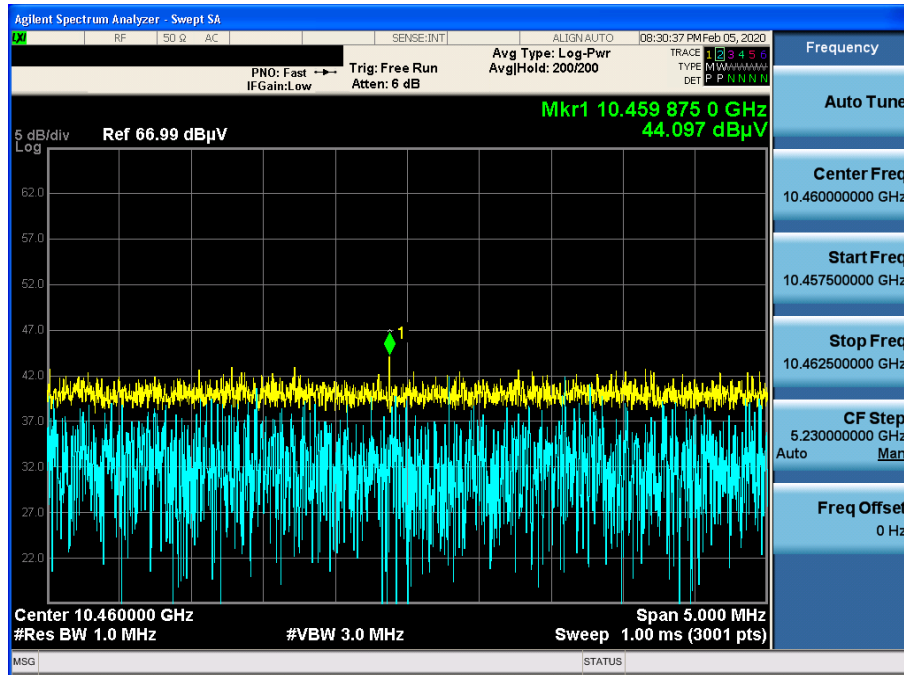
802.11n(HT40) &amp; U-NII 1 &amp; Ch.38 &amp; X axis &amp; Ver

Detector Mode : AV



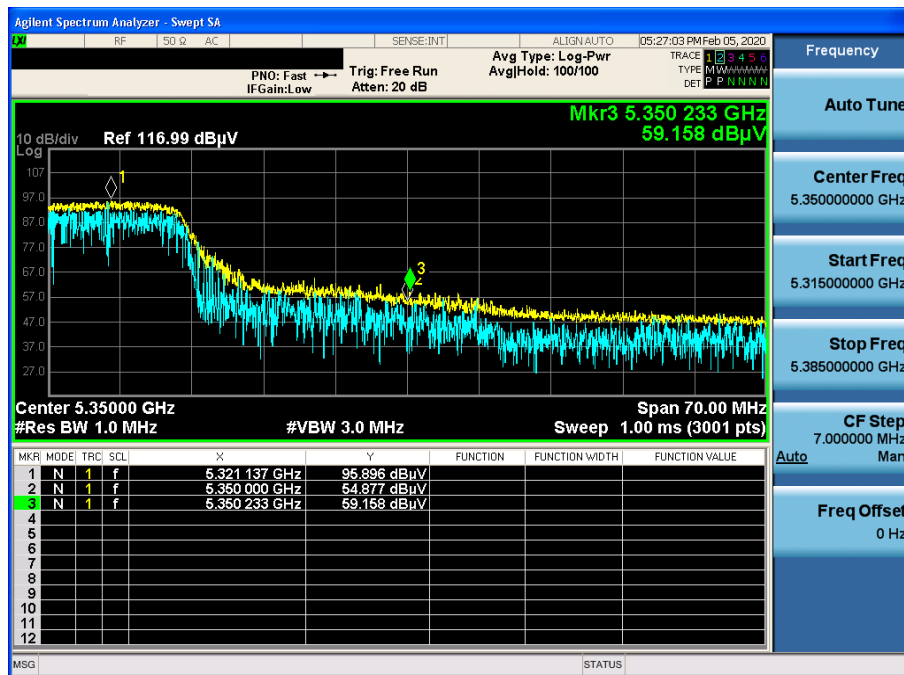
802.11n(HT40) &amp; U-NII 1 &amp; Ch.38 &amp; Z axis &amp; Ver

Detector Mode : PK



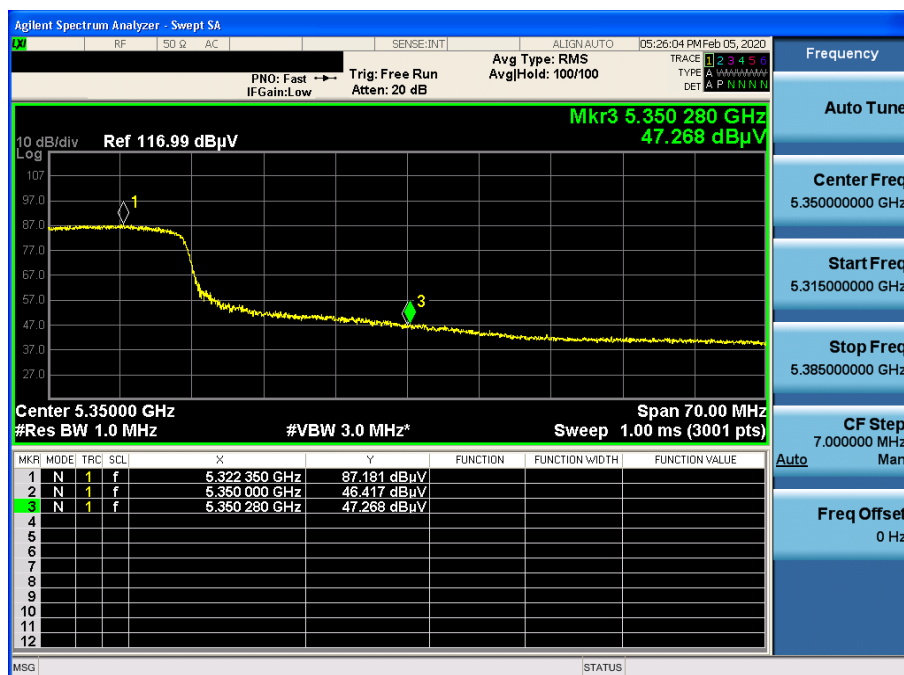
802.11n(HT40) &amp; U-NII 2A &amp; Ch.62 &amp; X axis &amp; Ver

Detector Mode : PK



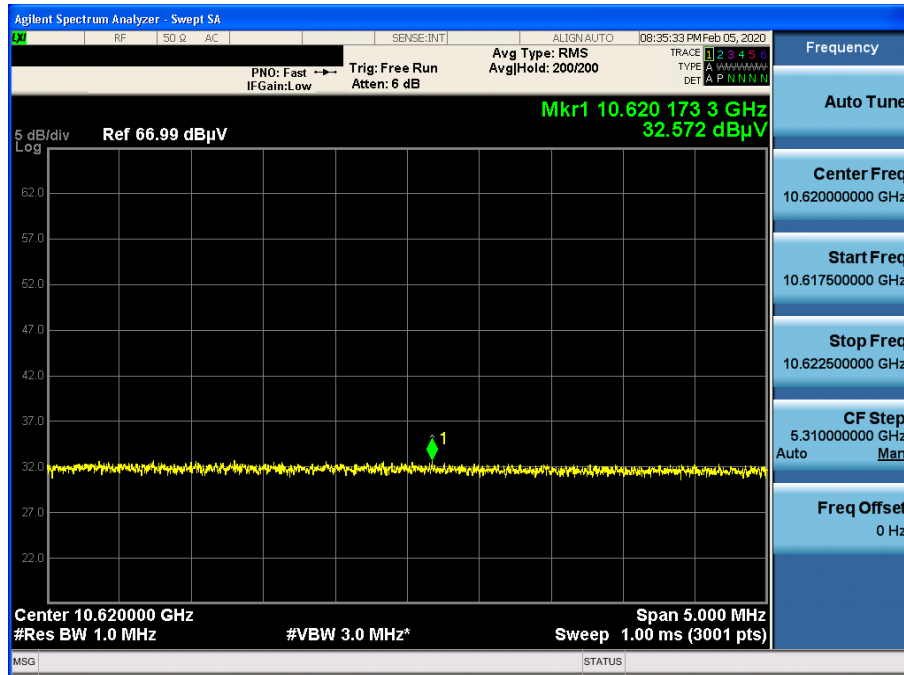
802.11n(HT40) &amp; U-NII 2A &amp; Ch.62 &amp; X axis &amp; Ver

Detector Mode : AV



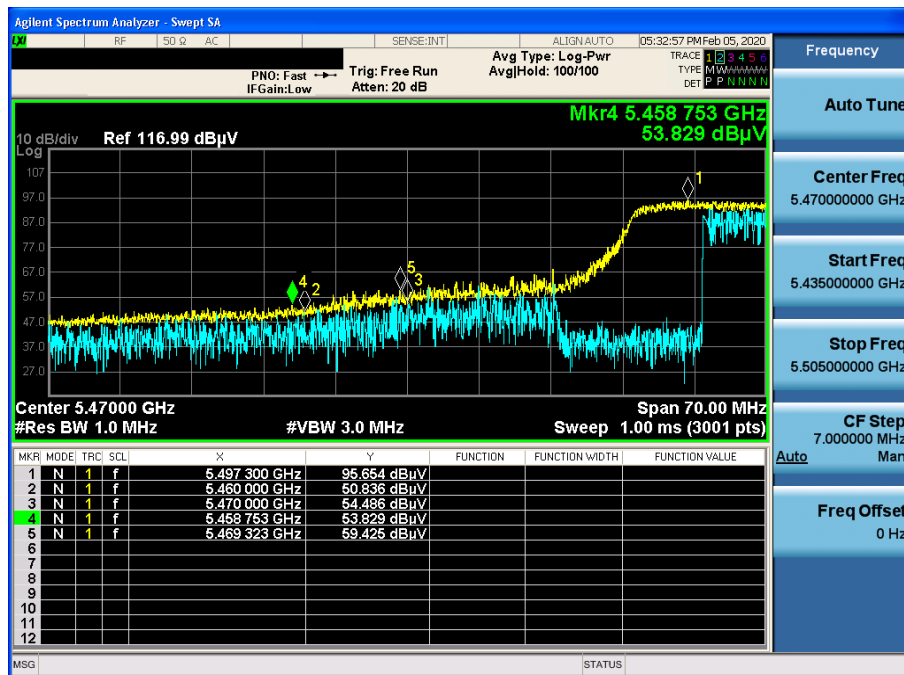
802.11n(HT40) & U-NII 2A & Ch.62 & Z axis & Ver

Detector Mode : AV



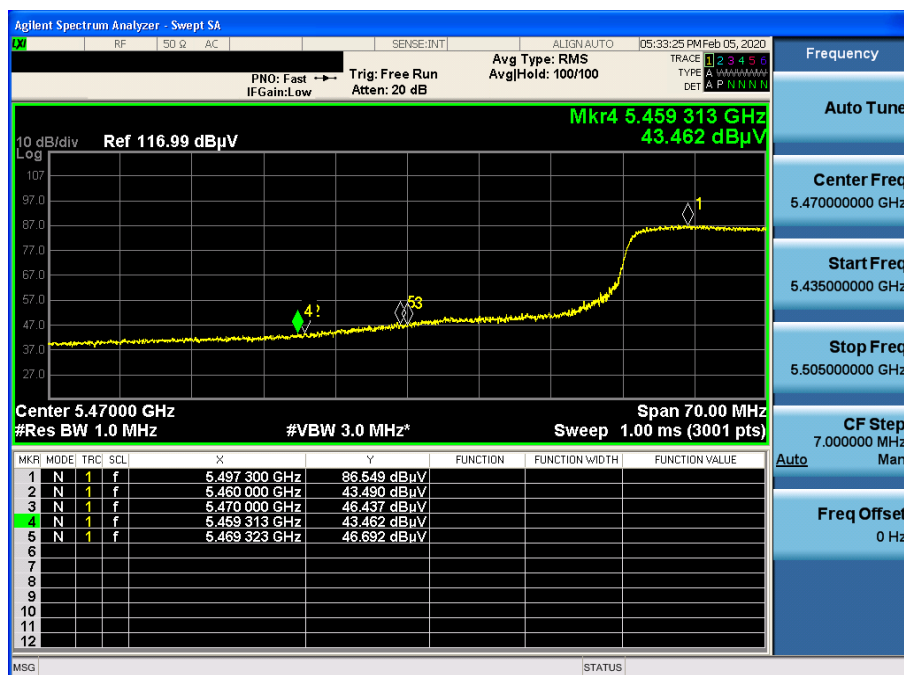
802.11n(HT40) &amp; U-NII 2C &amp; Ch.102 &amp; X axis &amp; Ver

Detector Mode : PK



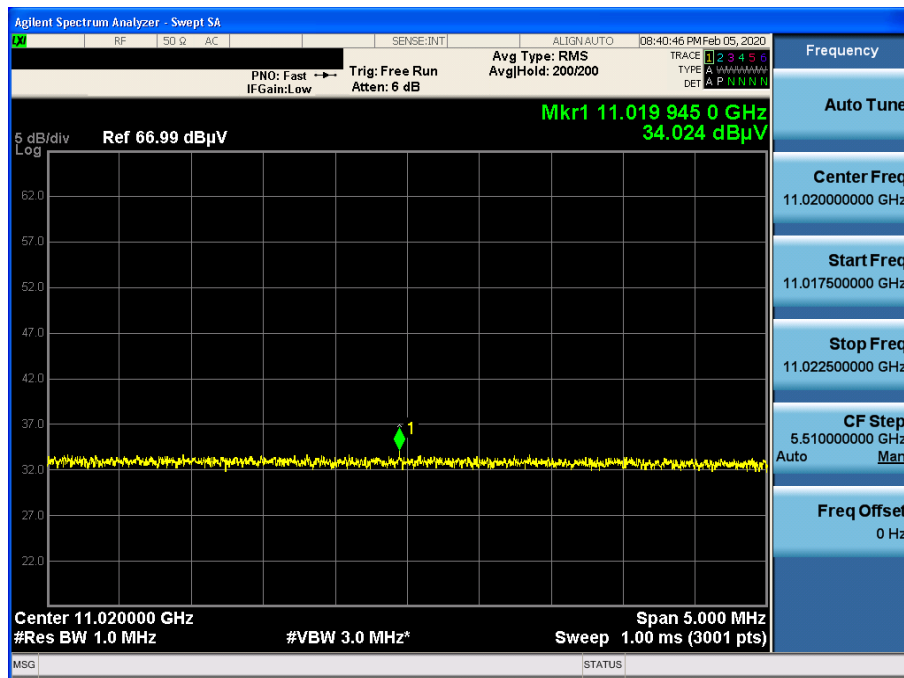
802.11n(HT40) &amp; U-NII 2C &amp; Ch.102 &amp; X axis &amp; Ver

Detector Mode : AV



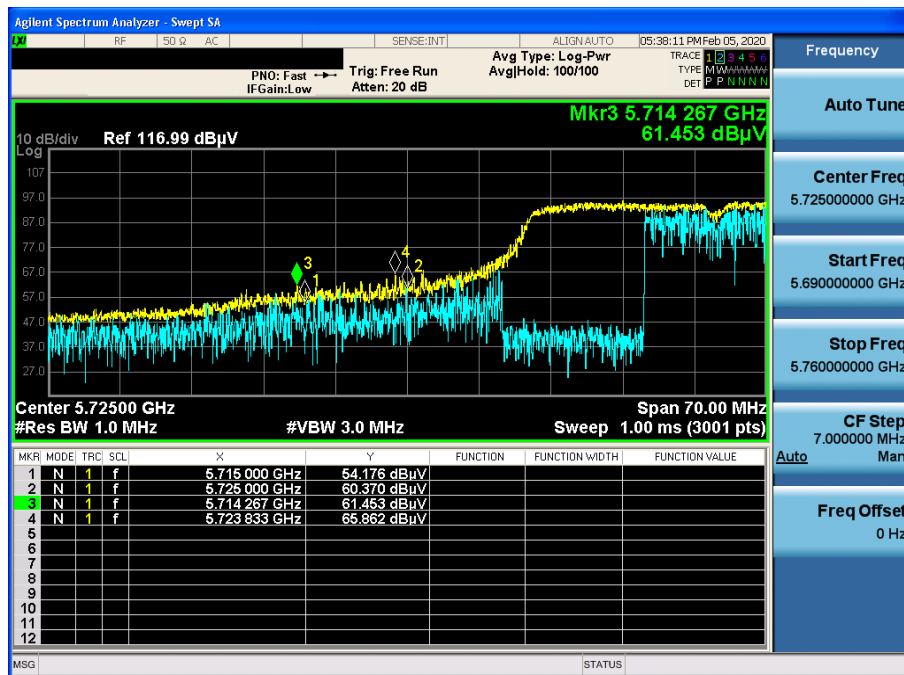
802.11n(HT40) &amp; U-NII 2C &amp; Ch.102 &amp; Z axis &amp; Ver

Detector Mode : AV



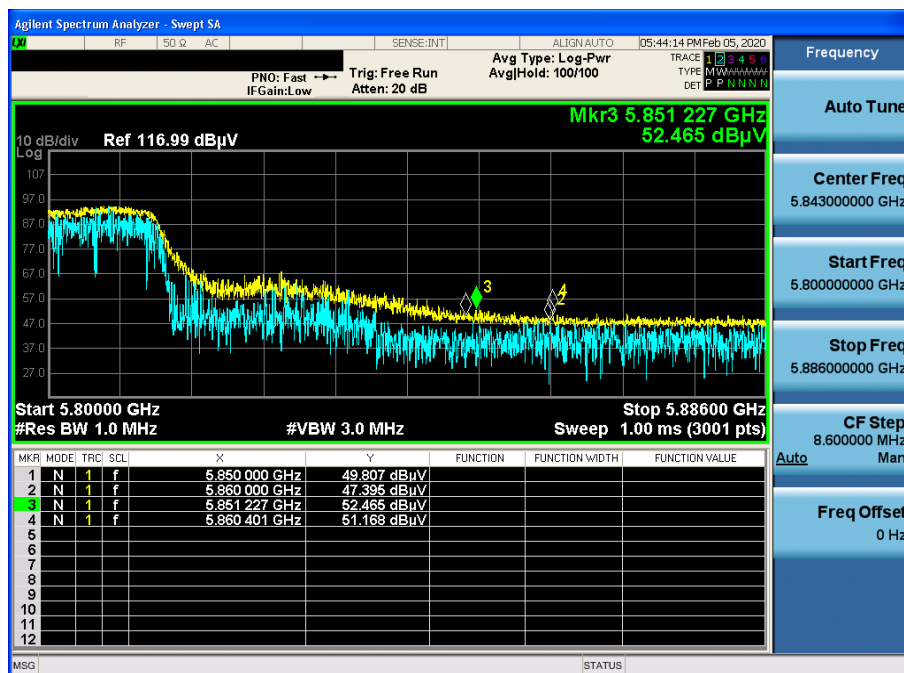
802.11n(HT40) &amp; U-NII 3 &amp; Ch.151 &amp; X axis &amp; Ver

Detector Mode : PK



802.11n(HT40) &amp; U-NII 3 &amp; Ch.159 &amp; X axis &amp; Ver

Detector Mode : PK



802.11n(HT40) & U-NII 3 & Ch.159 & Z axis & Ver

Detector Mode : AV

