# FCC Test Report

| | | |
|---|---|---|
| Client Name | : | Actions Microelectronics Co., Ltd. |
| Address | : | 201, No.9 Building, Software Park, KeJiZhong Er Road, GaoXinQu, NanShan, Shenzhen, China |
| Product Name | : | MiniBox |
| Date | : | Apr. 22, 2020 |

## Shenzhen Anbotek Compliance Laboratory Limited

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# TEST REPORT

| | | |
|---|---|---|
| Applicant | : | Actions Microelectronics Co., Ltd. |
| Manufacturer | : | Actions Microelectronics Co., Ltd. |
| Product Name | : | MiniBox |
| Model No. | : | MiniBox |
| Trade Mark | : | EZCast |
| Rating(s) | : | Input: DC 5V, 2A(via adapter Input: AC 100-240V, 50/60Hz, 0.3A; Output: DC 5V, 2A) |
| **Test Standard(s)** | **:** | **FCC Part15 Subpart E, Paragraph 15.407** |
| **Test Method(s)** | **:** | **ANSI C63.10: 2013,**<br>**KDB 789033 D02 General UNII Test Procedures New Rules v02r01** |

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart E requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

| | |
|---|---|
| Date of Receipt | Feb. 29, 2020 |
| Date of Test | Feb. 29~Apr. 18, 2020 |

Prepared By

(Engineer / Dolly Mo)

Reviewer

(Supervisor / Bibo Zhang)

Approved & Authorized Signer

(Manager / Tom Chen)

# 1. General Information

## 1.1. Client Information

| | | |
|---|---|---|
| Applicant | : | Actions Microelectronics Co., Ltd. |
| Address | : | 201, No.9 Building, Software Park, KeJiZhong Er Road, GaoXinQu, NanShan, Shenzhen, China |
| Manufacturer | : | Actions Microelectronics Co., Ltd. |
| Address | : | 201, No.9 Building, Software Park, KeJiZhong Er Road, GaoXinQu, NanShan, Shenzhen, China |
| Factory | : | Actions Microelectronics Co., Ltd. |
| Address | : | 201, No.9 Building, Software Park, KeJiZhong Er Road, GaoXinQu, NanShan, Shenzhen, China |

## 1.2. Description of Device (EUT)

| | | | |
|---|---|---|---|
| Product Name | : | MiniBox | |
| Model No. | : | MiniBox | |
| Trade Mark | : | EZCast | |
| Test Power Supply | : | AC 120V, 60Hz for adapter | |
| Test Sample No. | : | 1-2-1(Normal Sample), 1-2-2(Engineering Sample) | |
| Product Description | : | Operation Frequency: | 5180MHz~5240MHz |
| | | Number of Channel: | 4 Channels for 802.11a<br>4 Channels for 802.11n(HT20)<br>4 Channels for 802.11ac(HT20)<br>2 Channels for 802.11n(HT40)<br>2 Channels for 802.11ac(HT40)<br>1 Channels for 802.11ac(HT80) |
| | | Modulation Type: | OFDM with BPSK/QPSK/16QAM/64QAM/256QAM |
| | | Antenna Type: | Columnar Antenna |
| | | Antenna Gain(Peak): | 3 dBi |
| | | The directional gain: | 6.01 dBi |

Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2) This report is for WiFi 5.1G module.

## 1.3. Auxiliary Equipment Used During Test

| | | |
|---|---|---|
| Adapter | : | Manufacturer: Shenzhen Shi Ying Yuan Electronics Co.，Ltd. |
| | | M/N: ICP12-050-20000B<br>Input: 100-240V~ 50/60Hz, 0.3A<br>Output: DC 5V, 2000mA |

## 1.4. Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Mode | Test channel | Frequency (MHz) |
|---|---|---|
| OFDM(802.11a/n20/ac20) | CH 36 | 5180MHz |
| | CH 40 | 5200MHz |
| | CH 48 | 5240MHz |
| OFDM(802.11n40/ac40) | CH 38 | 5190MHz |
| | CH 46 | 5230MHz |
| OFDM(802.11ac80) | CH 42 | 5210MHz |

Note:

1. The measurements are performed at the highest, middle, lowest available channels.
2. The EUT has been tested as an independent unit. And Continual Transmitting in maximum power.
3. For the relevant Conducted Measurement, the temporary antenna connector is used during the measurement. Antenna Connector Impedance: 50Ω, Cable Loss: 1.0 dB
4. The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is more than 98%

## 1.5. List of channels

802.11a/n20/ac20

| Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|---|---|---|---|
| 36 | 5180 | 44 | 5220 |
| 40 | 5200 | 48 | 5240 |


Address: 1/F., Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.
Tel:(86) 755-26066440 Fax: (86) 755-26014772 Email: service@anbotek.com
Hotline 400-003-0500
www.anbotek.com

802.11n40/ac40

| Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|---|---|---|---|
| 38 | 5190 | 46 | 5230 |

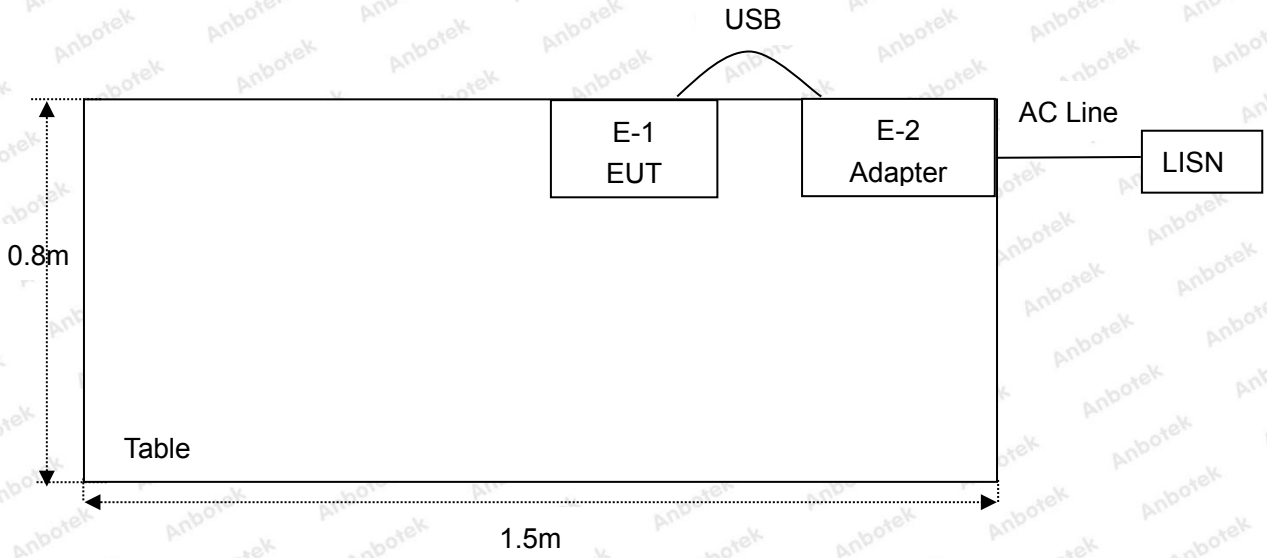
802.11ac80

| Channel | Freq. (MHz) |
|---|---|
| 42 | 5210 |

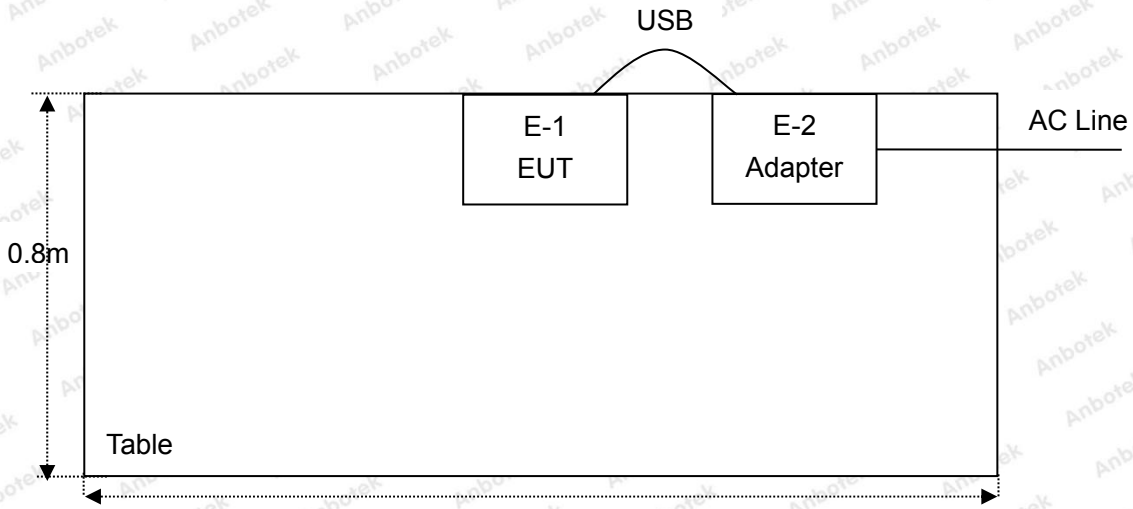

Address: 1/F., Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.
Tel:(86) 755-26066440 Fax: (86) 755-26014772 Email: service@anbotek.com
Hotline 400-003-0500
www.anbotek.com

## 1.6. Description Of Test Setup

CE




RE



## 1.7. Test Equipment List

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|
| 1. | L.I.S.N. Artificial Mains Network | Rohde & Schwarz | ENV216 | 100055 | Nov. 04, 2019 | 1 Year |
| 2. | EMI Test Receiver | Rohde & Schwarz | ESPI3 | 101604 | Nov. 04, 2019 | 1 Year |
| 3. | RF Switching Unit | Compliance Direction | RSU-M2 | 38303 | Nov. 04, 2019 | 1 Year |
| 4. | MAX Spectrum Analysis | Agilent | N9020A | MY51170037 | Nov. 04, 2019 | 1 Year |
| 5. | Preamplifier | SKET Electronic | BK1G18G30D | KD17503 | Nov. 04, 2019 | 1 Year |
| 6. | Double Ridged Horn Antenna | Instruments corporation | GTH-0118 | 351600 | Nov. 01, 2019 | 1 Year |
| 7. | Bilog Broadband Antenna | Schwarzbeck | VULB9163 | VULB 9163-289 | Nov. 01, 2019 | 1 Year |
| 8. | Loop Antenna | Schwarzbeck | FMZB1519B | 00053 | Nov. 01, 2019 | 1 Year |
| 9. | Horn Antenna | A-INFO | LB-180400-KF | J211060628 | Nov. 01, 2019 | 1 Year |
| 10. | Pre-amplifier | SONOMA | 310N | 186860 | Nov. 04, 2019 | 1 Year |
| 11. | EMI Test Software EZ-EMC | SHURPLE | N/A | N/A | N/A | N/A |
| 12. | RF Test Control System | YIHENG | YH3000 | 2017430 | Nov. 04, 2019 | 1 Year |
| 13. | Power Sensor | DAER | RPR3006W | 15I00041SN045 | Nov. 04, 2019 | 1 Year |
| 14. | Power Sensor | DAER | RPR3006W | 15I00041SN046 | Nov. 04, 2019 | 1 Year |
| 15. | MXA Spectrum Analysis | Agilent | N9020A | MY51170037 | Nov. 04, 2019 | 1 Year |
| 16. | MXG RF Vector Signal Generator | Agilent | N5182A | MY48180656 | Nov. 04, 2019 | 1 Year |
| 17. | Signal Generator | Agilent | E4421B | MY41000743 | Nov. 04, 2019 | 1 Year |
| 18. | DC Power Supply | LW | TPR-6420D | 374470 | Nov. 04, 2019 | 1 Year |
| 19. | Constant Temperature Humidity Chamber | ZHONGJIAN | ZJ-KHWS80B | N/A | Nov. 04, 2019 | 1 Year |

## 1.8. Measurement Uncertainty

| | | |
|---|---|---|
| Radiation Uncertainty | : | Ur = 3.9 dB (Horizontal) |
| | | Ur = 3.8 dB (Vertical) |
| | | |
| Conduction Uncertainty | : | Uc = 3.4 dB |

## 1.9. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

**FCC-Registration No.: 184111**

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registed and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 184111, September 27, 2019.

**ISED-Registration No.: 8058A**

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A, March 07, 2019.

**Test Location**

Shenzhen Anbotek Compliance Laboratory Limited.
1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102

# 2. Summary of Test Results

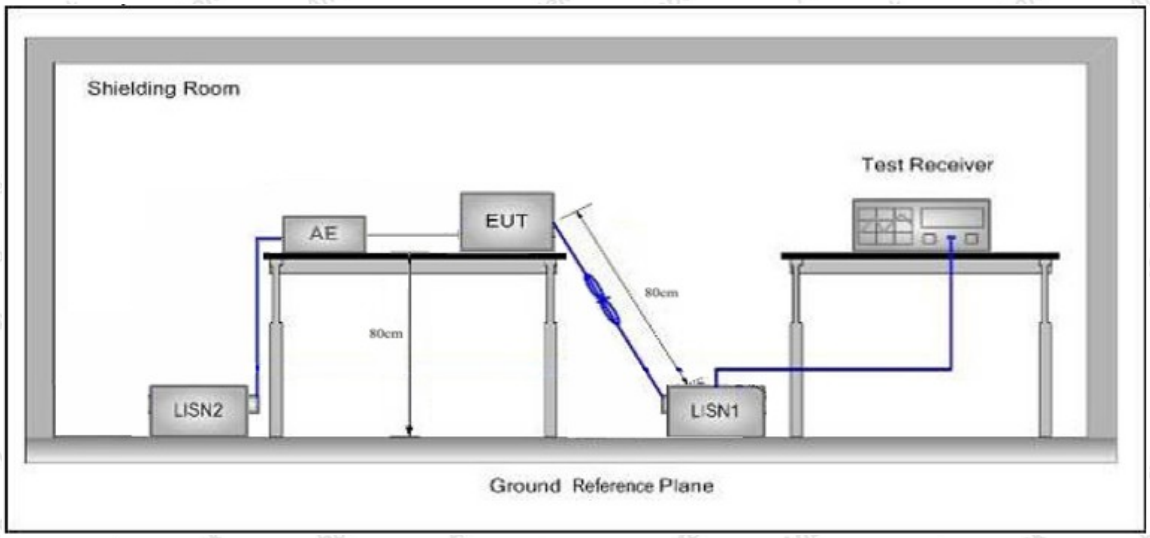
| Standard | Test Type | Result |
|---|---|---|
| 15.207 & 15.407 | Conducted Emission | PASS |
| 15.205/15.209 | Spurious Emission | PASS |
| 15.407(b) | Band Edge | PASS |
| 15.407(a)(5) | Occupy Bandwidth | PASS |
| 15.407(a)(1)(3) | Maximum Conducted Output Power | PASS |
| 15.407(a)(1) | Peak Power Spectral Density | PASS |
| 15.203/15.407g | Antenna Requirement | PASS |

# 3. Conducted Emission Test

## 3.1. Test Standard and Limit

| Test Standard | FCC Part15 Section 15.207&15.407 | | |
|---|---|---|---|
| Test Limit | Frequency | Maximum RF Line Voltage (dBuV) | |
| | | Quasi-peak Level | Average Level |
| | 150kHz~500kHz | 66 ~ 56 * | 56 ~ 46 * |
| | 500kHz~5MHz | 56 | 46 |
| | 5MHz~30MHz | 60 | 50 |
| **Remark:** (1) *Decreasing linearly with logarithm of the frequency.<br>(2) The lower limit shall apply at the transition frequency. | | | |

## 3.2. Test Setup




## 3.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10-2013 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

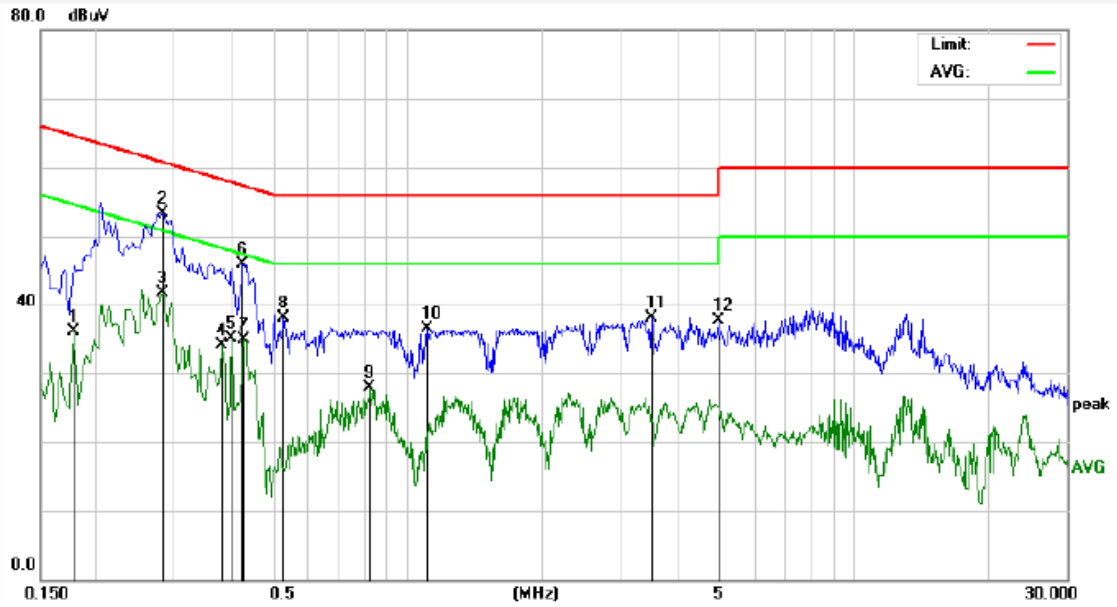
The frequency range from 150kHz to 30MHz is checked.

## 3.4. Test Data

During the test, pre-scan all modes, and found the 802.11ac20 CH36 of ANT A which is the worst case, only the worst case is recorded in the report.

**Conducted Emission Test Data**

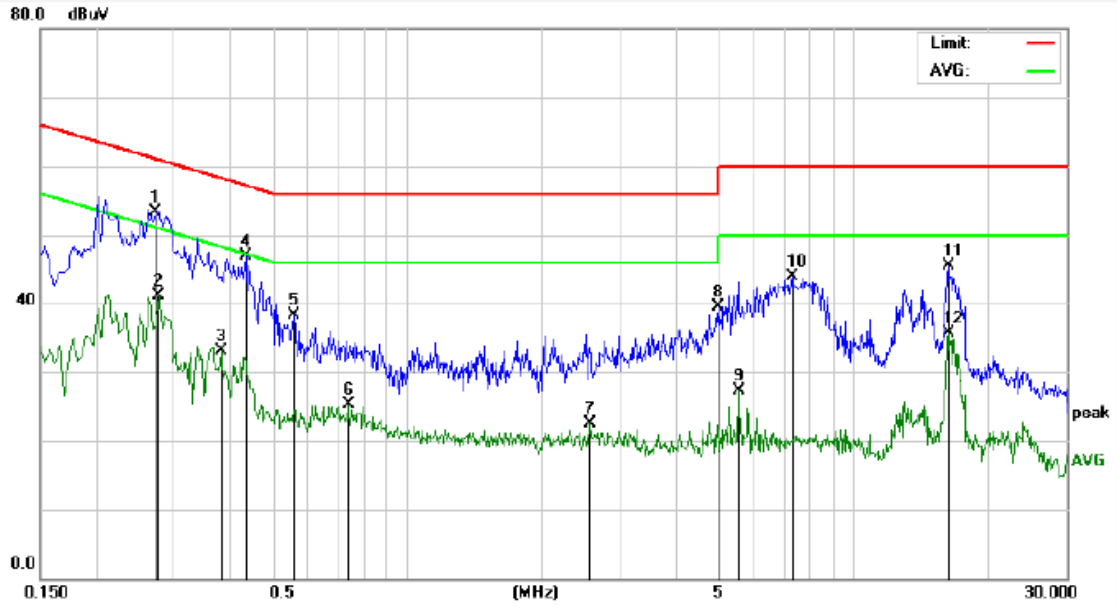
Test Site: 1# Shielded Room
Operating Condition: 802.11ac20 CH36
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
Tem.: 26℃ Hum.: 53%




| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB) | Result (dBuV) | Limit (dBuV) | Over Limit (dB) | Detector | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.1779 | 16.26 | 19.90 | 36.16 | 54.58 | -18.42 | AVG | |
| 2 | 0.2816 | 33.38 | 19.89 | 53.27 | 60.77 | -7.50 | QP | |
| 3 | 0.2816 | 21.76 | 19.89 | 41.65 | 50.77 | -9.12 | AVG | |
| 4 | 0.3820 | 14.11 | 19.93 | 34.04 | 48.23 | -14.19 | AVG | |
| 5 | 0.4020 | 15.15 | 19.94 | 35.09 | 47.81 | -12.72 | AVG | |
| 6 | 0.4259 | 25.90 | 19.95 | 45.85 | 57.33 | -11.48 | QP | |
| 7 | 0.4299 | 14.97 | 19.95 | 34.92 | 47.25 | -12.33 | AVG | |
| 8 | 0.5262 | 18.17 | 19.99 | 38.16 | 56.00 | -17.84 | QP | |
| 9 | 0.8257 | 7.87 | 20.07 | 27.94 | 46.00 | -18.06 | AVG | |
| 10 | 1.1100 | 16.36 | 20.12 | 36.48 | 56.00 | -19.52 | QP | |
| 11 | 3.5219 | 17.90 | 20.17 | 38.07 | 56.00 | -17.93 | QP | |
| 12 | 4.9698 | 17.49 | 20.21 | 37.70 | 56.00 | -18.30 | QP | |

**Conducted Emission Test Data**

Test Site: 1# Shielded Room
Operating Condition: 802.11ac20 CH36
Test Specification: AC 120V, 60Hz for adapter
Comment: Neutral Line
Tem.: 26℃ Hum.: 53%




| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB) | Result (dBuV) | Limit (dBuV) | Over Limit (dB) | Detector | Remark |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.2740 | 33.42 | 19.89 | 53.31 | 60.99 | -7.68 | QP | |
| 2 | 0.2779 | 21.13 | 19.89 | 41.02 | 50.88 | -9.86 | AVG | |
| 3 | 0.3820 | 13.26 | 19.93 | 33.19 | 48.23 | -15.04 | AVG | |
| 4 | 0.4339 | 26.87 | 19.95 | 46.82 | 57.18 | -10.36 | QP | |
| 5 | 0.5580 | 18.39 | 20.00 | 38.39 | 56.00 | -17.61 | QP | |
| 6 | 0.7378 | 5.25 | 20.05 | 25.30 | 46.00 | -20.70 | AVG | |
| 7 | 2.5659 | 2.44 | 20.15 | 22.59 | 46.00 | -23.41 | AVG | |
| 8 | 4.9977 | 19.30 | 20.21 | 39.51 | 56.00 | -16.49 | QP | |
| 9 | 5.5339 | 7.15 | 20.22 | 27.37 | 50.00 | -22.63 | AVG | |
| 10 | 7.2899 | 23.57 | 20.27 | 43.84 | 60.00 | -16.16 | QP | |
| 11 | 16.2377 | 25.18 | 20.28 | 45.46 | 60.00 | -14.54 | QP | |
| 12 | 16.2377 | 15.37 | 20.28 | 35.65 | 50.00 | -14.35 | AVG | |

# 4. Radiation Spurious Emission and Band Edge

## 4.1. Test Standard and Limit

| Test Standard | FCC Part15 C Section 15.209, 15.205 and 15.407 | | | | |
|---|---|---|---|---|---|
| Test Limit | Frequency (MHz) | Field strength (microvolt/meter) | Limit (dBuV/m) | Remark | Measurement distance (m) |
| | 0.009MHz~0.490MHz | 2400/F(kHz) | - | - | 300 |
| | 0.490MHz-1.705MHz | 24000/F(kHz) | - | - | 30 |
| | 1.705MHz-30MHz | 30 | - | - | 30 |
| | 30MHz~88MHz | 100 | 40.0 | Quasi-peak | 3 |
| | 88MHz~216MHz | 150 | 43.5 | Quasi-peak | 3 |
| | 216MHz~960MHz | 200 | 46.0 | Quasi-peak | 3 |
| | 960MHz~1000MHz | 500 | 54.0 | Quasi-peak | 3 |
| | Above 1000MHz | 500 | 54.0 | Average | 3 |
| | | - | 68.2 | Peak | 3 |

**Remark:**

(1)The lower limit shall apply at the transition frequency.

(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

(3)Above 1GHz limit:E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m, for EIPR[dBm]=-27dBm.

## 4.2. Test Setup

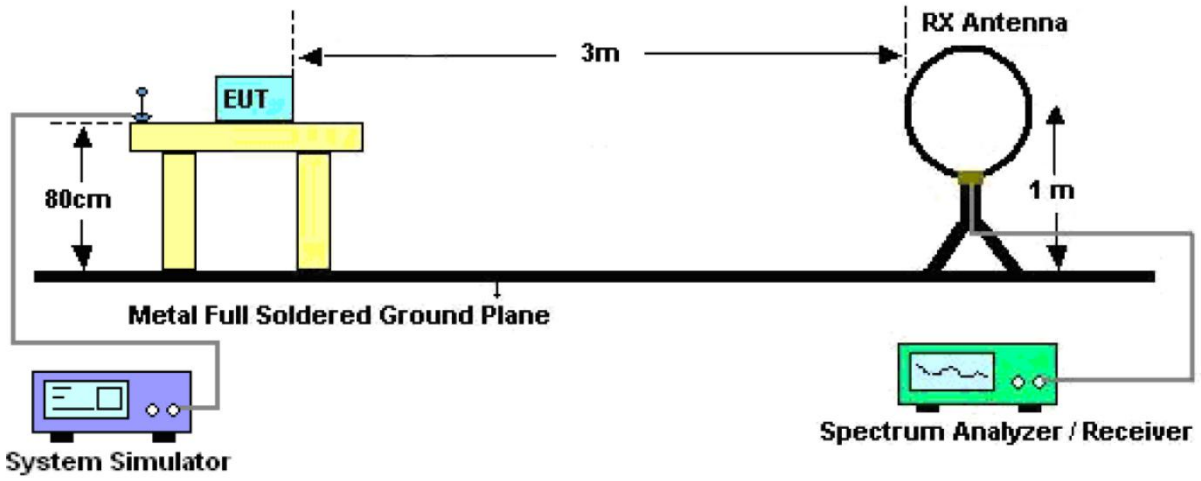



Figure 1. Below 30MHz

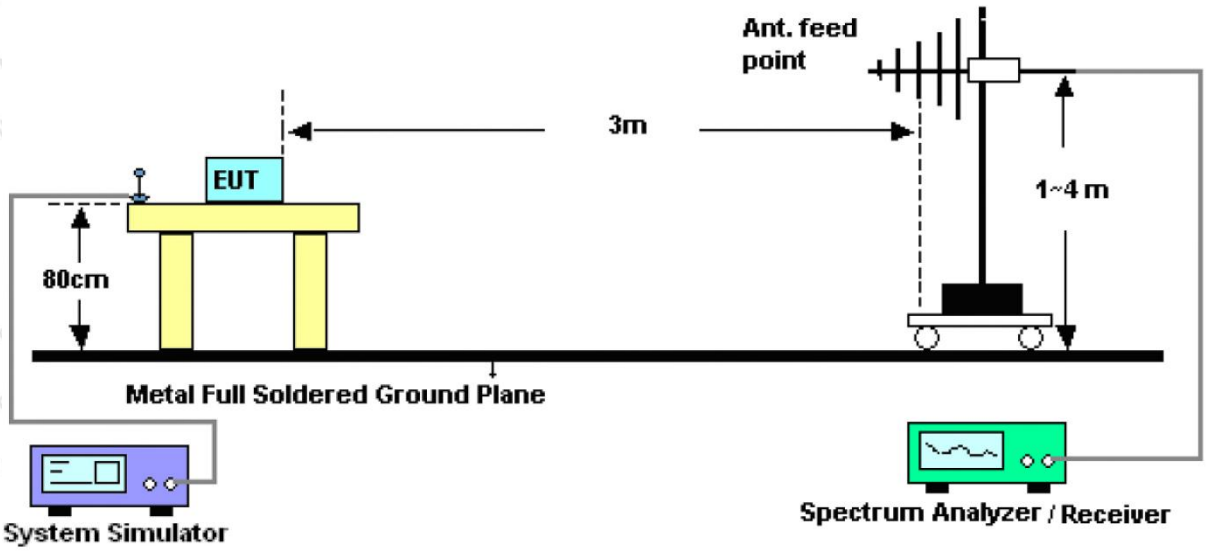



Figure 2. 30MHz to 1GHz

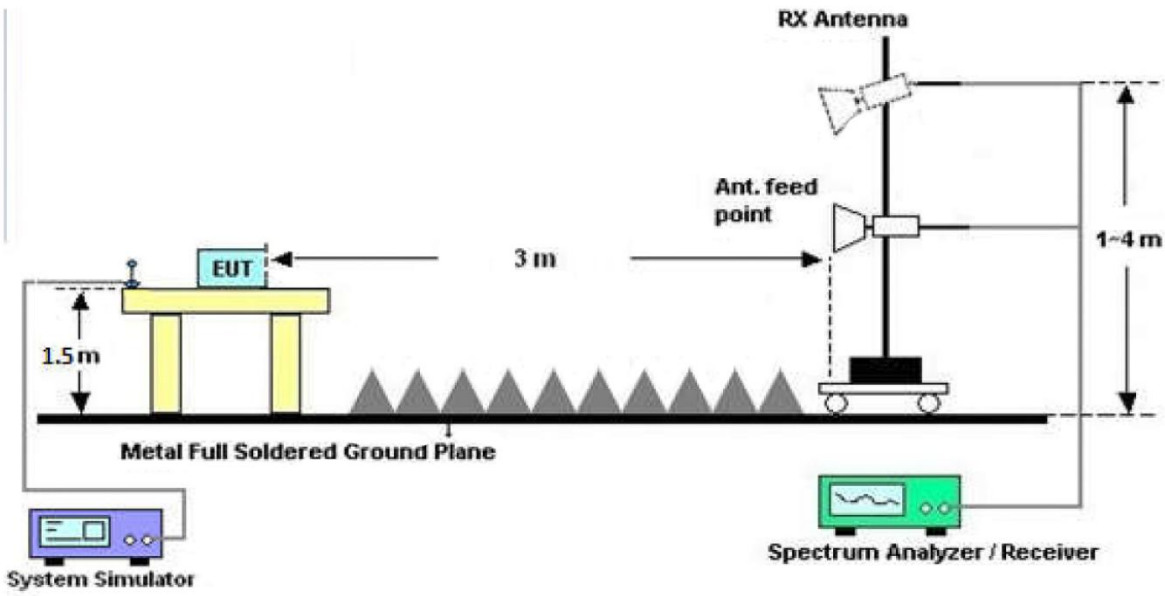



Figure 3. Above 1 GHz

## 4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.

For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.

The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.

For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

For 9kHz to 150kHz, Set the spectrum analyzer as:
RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:
RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:
RBW = 100kHz, VBW =300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.
.
For above 1GHz, Set the spectrum analyzer as:
RBW =1MHz, VBW =1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.
RBW =1MHz, VBW =10Hz, Detector= Average, Trace mode= Max hold, Sweep- auto couple.

## 4.4. Test Data

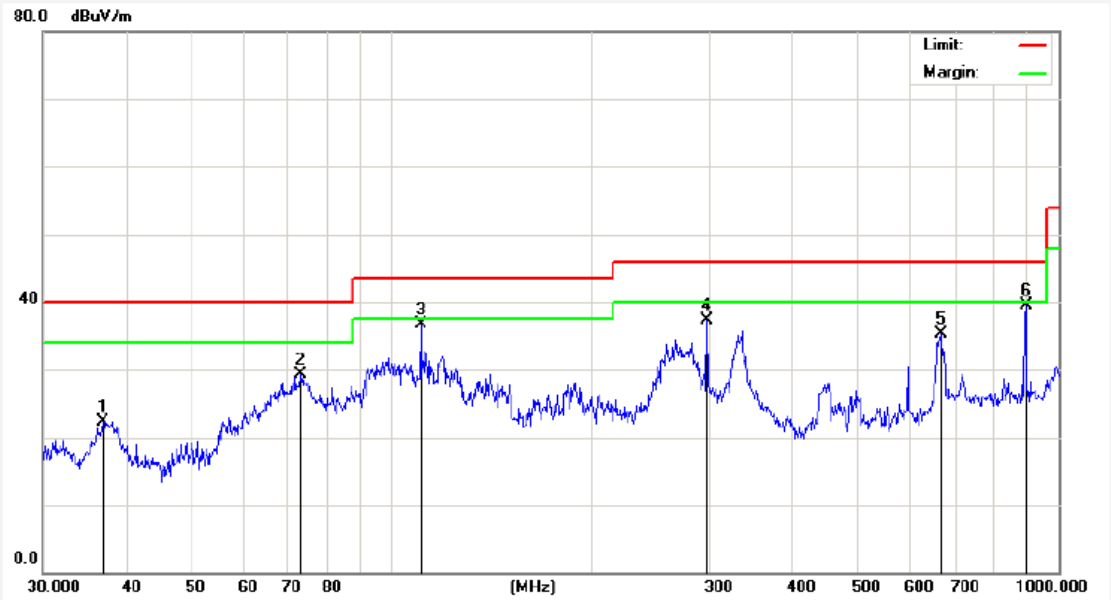
**PASS**

The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

During the test, pre-scan all modes, and found the 802.11ac20 CH36 of ANT A which is the worst case, only the worst case is recorded in the report.

**Test Results (30~1000MHz)**

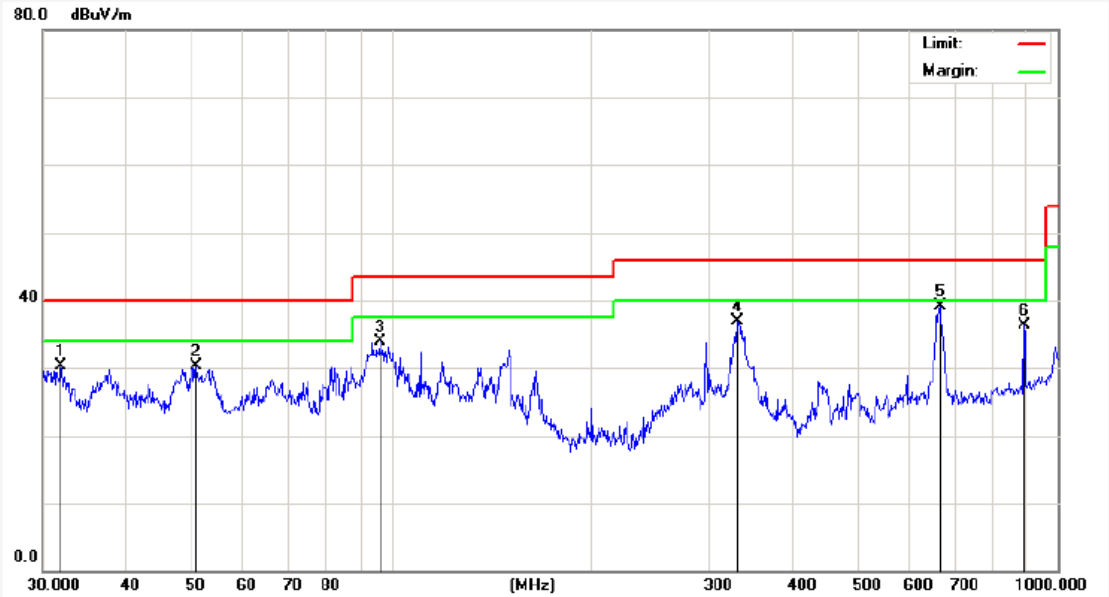
| | | | |
|---|---|---|---|
| Job No.: | 18220WC00011102 | Temp.(℃)/Hum.(%RH): | 22.3℃/50%RH |
| Standard: | FCC PART 15C | Power Source: | AC 120V, 60Hz for adapter |
| Test Mode: | 802.11ac20 CH36 | Polarization: | Horizontal |




| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Detector | Height (cm) | degree (deg) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 36.8952 | 41.03 | -18.64 | 22.39 | 40.00 | -17.61 | QP | 100 | 0 | |
| 2 | 73.1025 | 52.13 | -22.92 | 29.21 | 40.00 | -10.79 | QP | 100 | 360 | |
| 3 | 110.5687 | 60.15 | -23.42 | 36.73 | 43.50 | -6.77 | QP | 100 | 0 | |
| 4 | 297.2241 | 57.08 | -19.77 | 37.31 | 46.00 | -8.69 | QP | 100 | 360 | |
| 5 | 665.8034 | 46.41 | -11.11 | 35.30 | 46.00 | -10.70 | QP | 100 | 0 | |
| 6 | 893.8567 | 45.95 | -6.52 | 39.43 | 46.00 | -6.57 | QP | 100 | 360 | |

**Test Results (30~1000MHz)**

| | | | |
|---|---|---|---|
| Job No.: | 18220WC00011102 | Temp.(℃)/Hum.(%RH): | 22.3℃/50%RH |
| Standard: | FCC PART 15C | Power Source: | AC 120V, 60Hz for adapter |
| Test Mode: | 802.11ac20 CH36 | Polarization: | Vertical |




| No. | Freq. (MHz) | Reading (dBuV) | Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Detector | Height (cm) | degree (deg) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 31.9543 | 48.53 | -18.23 | 30.30 | 40.00 | -9.70 | QP | 100 | 0 | |
| 2 | 50.9420 | 47.36 | -17.12 | 30.24 | 40.00 | -9.76 | QP | 100 | 360 | |
| 3 | 96.0986 | 50.74 | -16.80 | 33.94 | 43.50 | -9.56 | QP | 100 | 0 | |
| 4 | 330.1949 | 52.76 | -15.91 | 36.85 | 46.00 | -9.15 | QP | 100 | 360 | |
| 5 | 665.8034 | 49.53 | -10.42 | 39.11 | 46.00 | -6.89 | QP | 100 | 0 | |
| 6 | 890.7278 | 41.87 | -5.59 | 36.28 | 46.00 | -9.72 | QP | 100 | 360 | |

**Test Results (Above 1000MHz)**

| Test mode: | IEEE 802.11a | Test channel: | Low CH |
|---|---|---|---|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10360.00 | 40.19 | 31.98 | 17.08 | 33.91 | 55.34 | 68.20 | -12.86 | V |
| 15540.00 | 41.00 | 32.65 | 20.03 | 34.85 | 58.83 | 68.20 | -9.37 | V |
| 10360.00 | 39.82 | 31.98 | 17.08 | 33.91 | 54.97 | 68.20 | -13.23 | H |
| 15540.00 | 39.58 | 32.65 | 20.03 | 34.85 | 57.41 | 68.20 | -10.79 | H |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10360.00 | 29.50 | 31.98 | 17.08 | 33.91 | 44.65 | 54.00 | -9.35 | V |
| 15540.00 | 28.14 | 32.65 | 20.03 | 34.85 | 45.97 | 54.00 | -8.03 | V |
| 10360.00 | 29.26 | 31.98 | 17.08 | 33.91 | 44.41 | 54.00 | -9.59 | H |
| 15540.00 | 28.32 | 32.65 | 20.03 | 34.85 | 46.15 | 54.00 | -7.85 | H |

| Test mode: | IEEE 802.11a | Test channel: | Mid CH |
|---|---|---|---|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10400.00 | 40.71 | 32.44 | 17.18 | 33.91 | 56.42 | 68.20 | -11.78 | V |
| 15600.00 | 39.60 | 32.78 | 20.12 | 34.86 | 57.64 | 68.20 | -10.56 | V |
| 10400.00 | 40.76 | 32.44 | 17.18 | 33.91 | 56.47 | 68.20 | -11.73 | H |
| 15600.00 | 39.53 | 32.78 | 20.12 | 34.86 | 57.57 | 68.20 | -10.63 | H |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10400.00 | 29.68 | 32.44 | 17.18 | 33.91 | 45.39 | 54.00 | -8.61 | V |
| 15600.00 | 27.58 | 32.78 | 20.12 | 34.86 | 45.62 | 54.00 | -8.38 | V |
| 10400.00 | 27.57 | 32.44 | 17.18 | 33.91 | 43.28 | 54.00 | -10.72 | H |
| 15600.00 | 28.46 | 32.78 | 20.12 | 34.86 | 46.50 | 54.00 | -7.50 | H |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| Test mode: | IEEE 802.11a | Test channel: | High CH |
|---|---|---|---|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10480.00 | 40.11 | 32.59 | 18.02 | 33.92 | 56.80 | 68.20 | -11.40 | V |
| 15720.00 | 41.24 | 32.87 | 20.15 | 34.88 | 59.38 | 68.20 | -8.82 | V |
| 10480.00 | 40.55 | 32.59 | 18.02 | 33.92 | 57.24 | 68.20 | -10.96 | H |
| 15720.00 | 41.23 | 32.87 | 20.15 | 34.88 | 59.37 | 68.20 | -8.83 | H |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10480.00 | 29.52 | 32.59 | 18.02 | 33.92 | 46.21 | 54.00 | -7.79 | V |
| 15720.00 | 27.23 | 32.87 | 20.15 | 34.88 | 45.37 | 54.00 | -8.63 | V |
| 10480.00 | 28.48 | 32.59 | 18.02 | 33.92 | 45.17 | 54.00 | -8.83 | H |
| 15720.00 | 27.68 | 32.87 | 20.15 | 34.88 | 45.82 | 54.00 | -8.18 | H |

| Test mode: | IEEE 802.11n(HT20) | Test channel: | Low CH |
|---|---|---|---|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10360.00 | 41.34 | 31.98 | 17.08 | 33.91 | 56.49 | 68.20 | -11.71 | V |
| 15540.00 | 40.42 | 32.65 | 20.03 | 34.85 | 58.25 | 68.20 | -9.95 | V |
| 10360.00 | 39.32 | 31.98 | 17.08 | 33.91 | 54.47 | 68.20 | -13.73 | H |
| 15540.00 | 41.43 | 32.65 | 20.03 | 34.85 | 59.26 | 68.20 | -8.94 | H |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10360.00 | 28.41 | 31.98 | 17.08 | 33.91 | 43.56 | 54.00 | -10.44 | V |
| 15540.00 | 27.24 | 32.65 | 20.03 | 34.85 | 45.07 | 54.00 | -8.93 | V |
| 10360.00 | 27.88 | 31.98 | 17.08 | 33.91 | 43.03 | 54.00 | -10.97 | H |
| 15540.00 | 27.26 | 32.65 | 20.03 | 34.85 | 45.09 | 54.00 | -8.91 | H |

| Test mode: | IEEE 802.11n(HT20) | Test channel: | Mid CH |
|---|---|---|---|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10400.00 | 39.31 | 32.44 | 17.18 | 33.91 | 55.02 | 68.20 | -13.18 | V |
| 15600.00 | 40.58 | 32.78 | 20.12 | 34.86 | 58.62 | 68.20 | -9.58 | V |
| 10400.00 | 42.00 | 32.44 | 17.18 | 33.91 | 57.71 | 68.20 | -10.49 | H |
| 15600.00 | 39.14 | 32.78 | 20.12 | 34.86 | 57.18 | 68.20 | -11.02 | H |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10400.00 | 28.70 | 32.44 | 17.18 | 33.91 | 44.41 | 54.00 | -9.59 | V |
| 15600.00 | 27.20 | 32.78 | 20.12 | 34.86 | 45.24 | 54.00 | -8.76 | V |
| 10400.00 | 27.17 | 32.44 | 17.18 | 33.91 | 42.88 | 54.00 | -11.12 | H |
| 15600.00 | 29.82 | 32.78 | 20.12 | 34.86 | 47.86 | 54.00 | -6.14 | H |

| Test mode: | IEEE 802.11n(HT20) | Test channel: | High CH |
|---|---|---|---|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10480.00 | 40.01 | 32.59 | 18.02 | 33.92 | 56.70 | 68.20 | -11.50 | V |
| 15720.00 | 39.16 | 32.87 | 20.15 | 34.88 | 57.30 | 68.20 | -10.90 | V |
| 10480.00 | 40.83 | 32.59 | 18.02 | 33.92 | 57.52 | 68.20 | -10.68 | H |
| 15720.00 | 41.29 | 32.87 | 20.15 | 34.88 | 59.43 | 68.20 | -8.77 | H |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10480.00 | 29.02 | 32.59 | 18.02 | 33.92 | 45.71 | 54.00 | -8.29 | V |
| 15720.00 | 28.15 | 32.87 | 20.15 | 34.88 | 46.29 | 54.00 | -7.71 | V |
| 10480.00 | 29.34 | 32.59 | 18.02 | 33.92 | 46.03 | 54.00 | -7.97 | H |
| 15720.00 | 28.48 | 32.87 | 20.15 | 34.88 | 46.62 | 54.00 | -7.38 | H |

| Test mode: | IEEE 802.11ac(HT20) | Test channel: | Low CH |
|---|---|---|---|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10360.00 | 40.71 | 31.98 | 17.08 | 33.91 | 55.86 | 68.20 | -12.34 | V |
| 15540.00 | 40.79 | 32.65 | 20.03 | 34.85 | 58.62 | 68.20 | -9.58 | V |
| 10360.00 | 39.50 | 31.98 | 17.08 | 33.91 | 54.65 | 68.20 | -13.55 | H |
| 15540.00 | 39.74 | 32.65 | 20.03 | 34.85 | 57.57 | 68.20 | -10.63 | H |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10360.00 | 29.99 | 31.98 | 17.08 | 33.91 | 45.14 | 54.00 | -8.86 | V |
| 15540.00 | 27.20 | 32.65 | 20.03 | 34.85 | 45.03 | 54.00 | -8.97 | V |
| 10360.00 | 29.29 | 31.98 | 17.08 | 33.91 | 44.44 | 54.00 | -9.56 | H |
| 15540.00 | 28.55 | 32.65 | 20.03 | 34.85 | 46.38 | 54.00 | -7.62 | H |

| Test mode: | IEEE 802.11ac(HT20) | Test channel: | Mid CH |
|---|---|---|---|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10400.00 | 40.26 | 32.44 | 17.18 | 33.91 | 55.97 | 68.20 | -12.23 | V |
| 15600.00 | 41.25 | 32.78 | 20.12 | 34.86 | 59.29 | 68.20 | -8.91 | V |
| 10400.00 | 39.95 | 32.44 | 17.18 | 33.91 | 55.66 | 68.20 | -12.54 | H |
| 15600.00 | 41.04 | 32.78 | 20.12 | 34.86 | 59.08 | 68.20 | -9.12 | H |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10400.00 | 27.02 | 32.44 | 17.18 | 33.91 | 42.73 | 54.00 | -11.27 | V |
| 15600.00 | 28.94 | 32.78 | 20.12 | 34.86 | 46.98 | 54.00 | -7.02 | V |
| 10400.00 | 28.91 | 32.44 | 17.18 | 33.91 | 44.62 | 54.00 | -9.38 | H |
| 15600.00 | 29.75 | 32.78 | 20.12 | 34.86 | 47.79 | 54.00 | -6.21 | H |

| Test mode: | IEEE 802.11ac(HT20) | Test channel: | High CH |
|---|---|---|---|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10480.00 | 41.44 | 32.59 | 18.02 | 33.92 | 58.13 | 68.20 | -10.07 | V |
| 15720.00 | 41.15 | 32.87 | 20.15 | 34.88 | 59.29 | 68.20 | -8.91 | V |
| 10480.00 | 39.03 | 32.59 | 18.02 | 33.92 | 55.72 | 68.20 | -12.48 | H |
| 15720.00 | 40.46 | 32.87 | 20.15 | 34.88 | 58.60 | 68.20 | -9.60 | H |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10480.00 | 27.35 | 32.59 | 18.02 | 33.92 | 44.04 | 54.00 | -9.96 | V |
| 15720.00 | 29.30 | 32.87 | 20.15 | 34.88 | 47.44 | 54.00 | -6.56 | V |
| 10480.00 | 28.05 | 32.59 | 18.02 | 33.92 | 44.74 | 54.00 | -9.26 | H |
| 15720.00 | 29.73 | 32.87 | 20.15 | 34.88 | 47.87 | 54.00 | -6.13 | H |

| Test mode: | IEEE 802.11n(HT40) | Test channel: | Low CH |
|---|---|---|---|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10380.00 | 40.19 | 31.98 | 17.08 | 33.91 | 55.34 | 68.20 | -12.86 | V |
| 15570.00 | 41.52 | 32.65 | 20.03 | 34.85 | 59.35 | 68.20 | -8.85 | V |
| 10380.00 | 40.59 | 31.98 | 17.08 | 33.91 | 55.74 | 68.20 | -12.46 | H |
| 15570.00 | 39.97 | 32.65 | 20.03 | 34.85 | 57.80 | 68.20 | -10.40 | H |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10380.00 | 28.81 | 31.98 | 17.08 | 33.91 | 43.96 | 54.00 | -10.04 | V |
| 15570.00 | 27.88 | 32.65 | 20.03 | 34.85 | 45.71 | 54.00 | -8.29 | V |
| 10380.00 | 27.65 | 31.98 | 17.08 | 33.91 | 42.80 | 54.00 | -11.20 | H |
| 15570.00 | 27.57 | 32.65 | 20.03 | 34.85 | 45.40 | 54.00 | -8.60 | H |

| Test mode: | IEEE 802.11n(HT40) | Test channel: | High CH |
|---|---|---|---|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10460.00 | 41.43 | 32.59 | 18.02 | 33.92 | 58.12 | 68.20 | -10.08 | V |
| 15690.00 | 40.28 | 32.87 | 20.15 | 34.88 | 58.42 | 68.20 | -9.78 | V |
| 10460.00 | 39.55 | 32.59 | 18.02 | 33.92 | 56.24 | 68.20 | -11.96 | H |
| 15690.00 | 40.11 | 32.87 | 20.15 | 34.88 | 58.25 | 68.20 | -9.95 | H |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10460.00 | 30.00 | 32.59 | 18.02 | 33.92 | 46.69 | 54.00 | -7.31 | V |
| 15690.00 | 28.19 | 32.87 | 20.15 | 34.88 | 46.33 | 54.00 | -7.67 | V |
| 10460.00 | 27.24 | 32.59 | 18.02 | 33.92 | 43.93 | 54.00 | -10.07 | H |
| 15690.00 | 29.00 | 32.78 | 20.12 | 34.86 | 47.04 | 54.00 | -6.96 | H |

| Test mode: | IEEE 802.11ac(HT40) | Test channel: | Low CH |
|---|---|---|---|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10380.00 | 41.05 | 31.98 | 17.08 | 33.91 | 56.20 | 68.20 | -12.00 | V |
| 15570.00 | 39.77 | 32.65 | 20.03 | 34.85 | 57.60 | 68.20 | -10.60 | V |
| 10380.00 | 39.01 | 31.98 | 17.08 | 33.91 | 54.16 | 68.20 | -14.04 | H |
| 15570.00 | 41.28 | 32.65 | 20.03 | 34.85 | 59.11 | 68.20 | -9.09 | H |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10380.00 | 27.95 | 31.98 | 17.08 | 33.91 | 43.10 | 54.00 | -10.90 | V |
| 15570.00 | 27.68 | 32.65 | 20.03 | 34.85 | 45.51 | 54.00 | -8.49 | V |
| 10380.00 | 27.41 | 31.98 | 17.08 | 33.91 | 42.56 | 54.00 | -11.44 | H |
| 15570.00 | 27.14 | 32.65 | 20.03 | 34.85 | 44.97 | 54.00 | -9.03 | H |

| Test mode: | IEEE 802.11ac(HT40) | Test channel: | High CH |
|---|---|---|---|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10460.00 | 39.03 | 32.59 | 18.02 | 33.92 | 55.72 | 68.20 | -12.48 | V |
| 15690.00 | 40.16 | 32.87 | 20.15 | 34.88 | 58.30 | 68.20 | -9.90 | V |
| 10460.00 | 40.65 | 32.59 | 18.02 | 33.92 | 57.34 | 68.20 | -10.86 | H |
| 15690.00 | 39.06 | 32.87 | 20.15 | 34.88 | 57.20 | 68.20 | -11.00 | H |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10460.00 | 29.23 | 32.59 | 18.02 | 33.92 | 45.92 | 54.00 | -8.08 | V |
| 15690.00 | 27.78 | 32.87 | 20.15 | 34.88 | 45.92 | 54.00 | -8.08 | V |
| 10460.00 | 28.52 | 32.59 | 18.02 | 33.92 | 45.21 | 54.00 | -8.79 | H |
| 15690.00 | 28.56 | 32.78 | 20.12 | 34.86 | 46.60 | 54.00 | -7.40 | H |

| Test mode: | IEEE 802.11ac(HT80) | Test channel: | |
|---|---|---|---|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10420.00 | 40.75 | 32.44 | 17.18 | 33.91 | 56.46 | 68.20 | -11.74 | V |
| 15630.00 | 39.34 | 32.78 | 20.12 | 34.86 | 57.38 | 68.20 | -10.82 | V |
| 10420.00 | 40.46 | 32.44 | 17.18 | 33.91 | 56.17 | 68.20 | -12.03 | H |
| 15630.00 | 40.13 | 32.78 | 20.12 | 34.86 | 58.17 | 68.20 | -10.03 | H |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Pol. |
|---|---|---|---|---|---|---|---|---|
| 10420.00 | 28.22 | 32.44 | 17.18 | 33.91 | 43.93 | 54.00 | -10.07 | V |
| 15630.00 | 27.40 | 32.78 | 20.12 | 34.86 | 45.44 | 54.00 | -8.56 | V |
| 10420.00 | 29.30 | 32.44 | 17.18 | 33.91 | 45.01 | 54.00 | -8.99 | H |
| 15630.00 | 27.90 | 32.78 | 20.12 | 34.86 | 45.94 | 54.00 | -8.06 | H |

Note:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss–Preamplifier Factor


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**Radiated Band Edge:**

| Test Mode: 802.11a | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Peak Value | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. |
| 5150.00 | 48.82 | 28.65 | 13.58 | 31.04 | 60.01 | 68.20 | -8.19 | H |
| 5350.00 | 45.27 | 29.16 | 14.68 | 31.96 | 57.15 | 68.20 | -11.05 | H |
| 5150.00 | 46.44 | 28.65 | 13.58 | 31.04 | 57.63 | 68.20 | -10.57 | V |
| 5350.00 | 48.99 | 29.16 | 14.68 | 31.96 | 60.87 | 68.20 | -7.33 | V |
| Average Value | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. |
| 5150.00 | 33.55 | 28.65 | 13.58 | 31.04 | 44.74 | 54.00 | -9.26 | H |
| 5350.00 | 34.13 | 29.16 | 14.68 | 31.96 | 46.01 | 54.00 | -7.99 | H |
| 5150.00 | 33.36 | 28.65 | 13.58 | 31.04 | 44.55 | 54.00 | -9.45 | V |
| 5350.00 | 32.45 | 29.16 | 14.68 | 31.96 | 44.33 | 54.00 | -9.67 | V |

| Test Mode: 802.11n20 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Peak Value | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. |
| 5150.00 | 48.81 | 28.65 | 13.58 | 31.04 | 60.00 | 68.20 | -8.20 | H |
| 5350.00 | 48.45 | 29.16 | 14.68 | 31.96 | 60.33 | 68.20 | -7.87 | H |
| 5150.00 | 46.21 | 28.65 | 13.58 | 31.04 | 57.40 | 68.20 | -10.80 | V |
| 5350.00 | 47.79 | 29.16 | 14.68 | 31.96 | 59.67 | 68.20 | -8.53 | V |
| Average Value | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. |
| 5150.00 | 33.90 | 28.65 | 13.58 | 31.04 | 45.09 | 54.00 | -8.91 | H |
| 5350.00 | 32.20 | 29.16 | 14.68 | 31.96 | 44.08 | 54.00 | -9.92 | H |
| 5150.00 | 33.06 | 28.65 | 13.58 | 31.04 | 44.25 | 54.00 | -9.75 | V |
| 5350.00 | 32.78 | 29.16 | 14.68 | 31.96 | 44.66 | 54.00 | -9.34 | V |

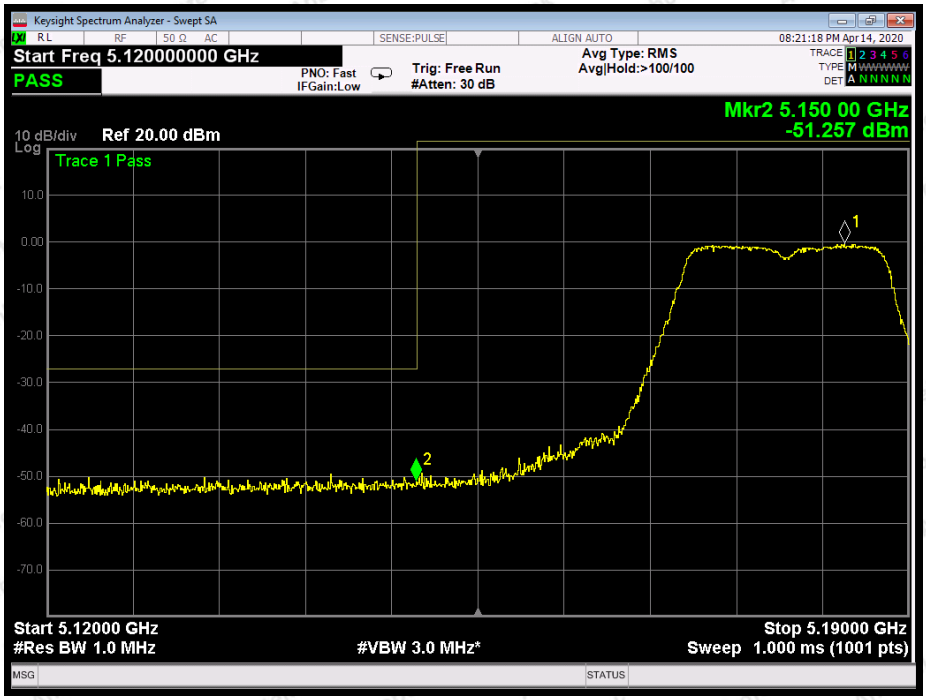
| Test Mode: 802.11ac20 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Peak Value | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. |
| 5150.00 | 47.94 | 28.65 | 13.58 | 31.04 | 59.13 | 68.20 | -9.07 | H |
| 5350.00 | 46.49 | 29.16 | 14.68 | 31.96 | 58.37 | 68.20 | -9.83 | H |
| 5150.00 | 47.16 | 28.65 | 13.58 | 31.04 | 58.35 | 68.20 | -9.85 | V |
| 5350.00 | 46.53 | 29.16 | 14.68 | 31.96 | 58.41 | 68.20 | -9.79 | V |
| Average Value | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. |
| 5150.00 | 33.12 | 28.65 | 13.58 | 31.04 | 44.31 | 54.00 | -9.69 | H |
| 5350.00 | 32.71 | 29.16 | 14.68 | 31.96 | 44.59 | 54.00 | -9.41 | H |
| 5150.00 | 34.89 | 28.65 | 13.58 | 31.04 | 46.08 | 54.00 | -7.92 | V |
| 5350.00 | 32.79 | 29.16 | 14.68 | 31.96 | 44.67 | 54.00 | -9.33 | V |

| Test Mode: 802.11n40 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Peak Value | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. |
| 5150.00 | 48.08 | 28.65 | 13.58 | 31.04 | 59.27 | 68.20 | -8.93 | H |
| 5350.00 | 47.19 | 29.16 | 14.68 | 31.96 | 59.07 | 68.20 | -9.13 | H |
| 5150.00 | 48.44 | 28.65 | 13.58 | 31.04 | 59.63 | 68.20 | -8.57 | V |
| 5350.00 | 48.66 | 29.16 | 14.68 | 31.96 | 60.54 | 68.20 | -7.66 | V |
| Average Value | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. |
| 5150.00 | 33.72 | 28.65 | 13.58 | 31.04 | 44.91 | 54.00 | -9.09 | H |
| 5350.00 | 34.58 | 29.16 | 14.68 | 31.96 | 46.46 | 54.00 | -7.54 | H |
| 5150.00 | 34.27 | 28.65 | 13.58 | 31.04 | 45.46 | 54.00 | -8.54 | V |
| 5350.00 | 32.69 | 29.16 | 14.68 | 31.96 | 44.57 | 54.00 | -9.43 | V |

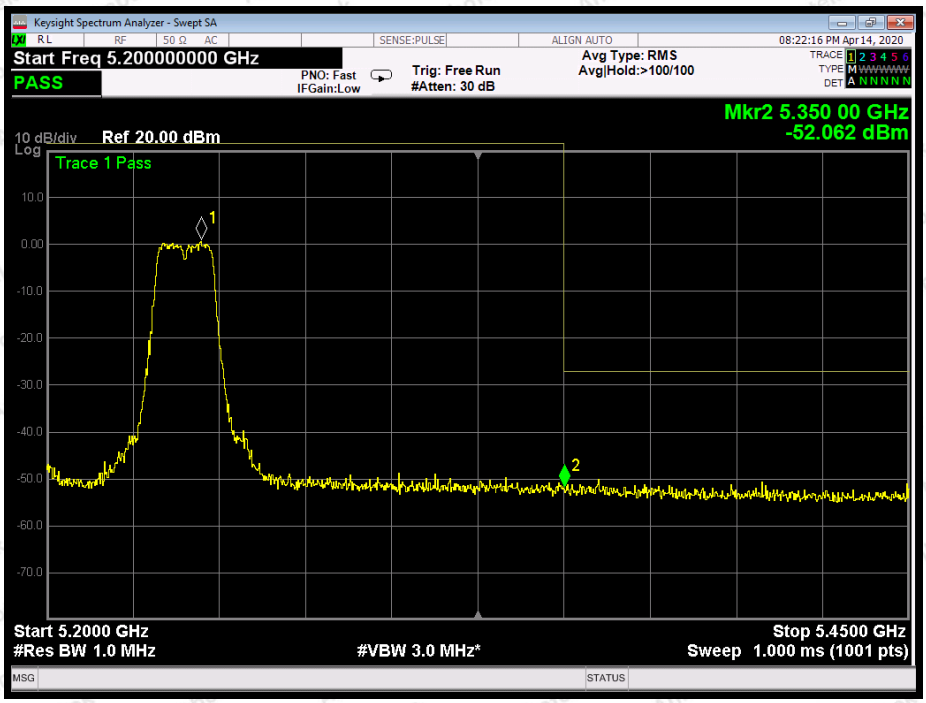
| Test Mode: 802.11ac40 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Peak Value | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. |
| 5150.00 | 46.80 | 28.65 | 13.58 | 31.04 | 57.99 | 68.20 | -10.21 | H |
| 5350.00 | 47.36 | 29.16 | 14.68 | 31.96 | 59.24 | 68.20 | -8.96 | H |
| 5150.00 | 46.99 | 28.65 | 13.58 | 31.04 | 58.18 | 68.20 | -10.02 | V |
| 5350.00 | 47.96 | 29.16 | 14.68 | 31.96 | 59.84 | 68.20 | -8.36 | V |
| Average Value | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. |
| 5150.00 | 32.95 | 28.65 | 13.58 | 31.04 | 44.14 | 54.00 | -9.86 | H |
| 5350.00 | 33.81 | 29.16 | 14.68 | 31.96 | 45.69 | 54.00 | -8.31 | H |
| 5150.00 | 33.07 | 28.65 | 13.58 | 31.04 | 44.26 | 54.00 | -9.74 | V |
| 5350.00 | 34.82 | 29.16 | 14.68 | 31.96 | 46.70 | 54.00 | -7.30 | V |

| Test Mode: 802.11ac80 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Peak Value | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. |
| 5150.00 | 46.44 | 28.65 | 13.58 | 31.04 | 57.63 | 68.20 | -10.57 | H |
| 5350.00 | 47.08 | 29.16 | 14.68 | 31.96 | 58.96 | 68.20 | -9.24 | H |
| 5150.00 | 48.81 | 28.65 | 13.58 | 31.04 | 60.00 | 68.20 | -8.20 | V |
| 5350.00 | 47.49 | 29.16 | 14.68 | 31.96 | 59.37 | 68.20 | -8.83 | V |
| Average Value | | | | | | | | |
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Pol. |
| 5150.00 | 34.80 | 28.65 | 13.58 | 31.04 | 45.99 | 54.00 | -8.01 | H |
| 5350.00 | 33.53 | 29.16 | 14.68 | 31.96 | 45.41 | 54.00 | -8.59 | H |
| 5150.00 | 32.59 | 28.65 | 13.58 | 31.04 | 43.78 | 54.00 | -10.22 | V |
| 5350.00 | 33.11 | 29.16 | 14.68 | 31.96 | 44.99 | 54.00 | -9.01 | V |

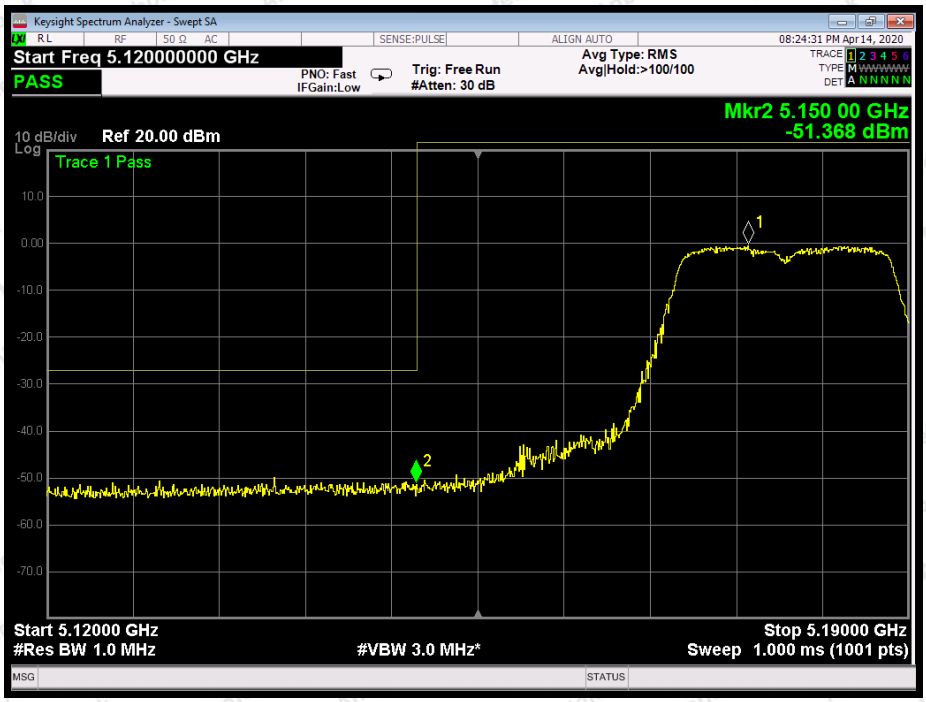
**For conducted test:**



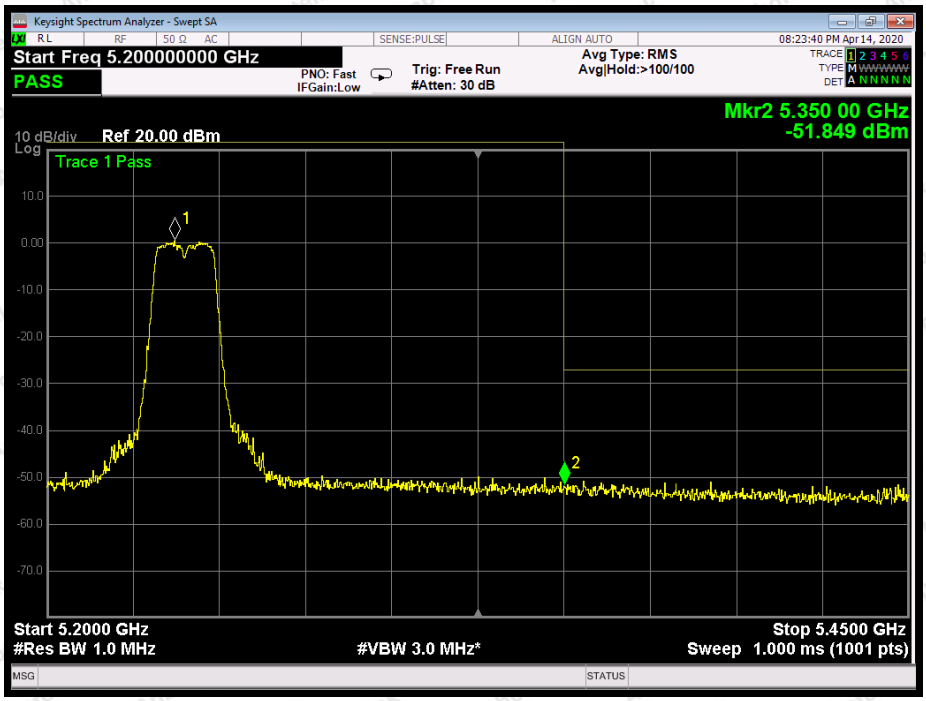

802.11a: Band Edge, Left Side



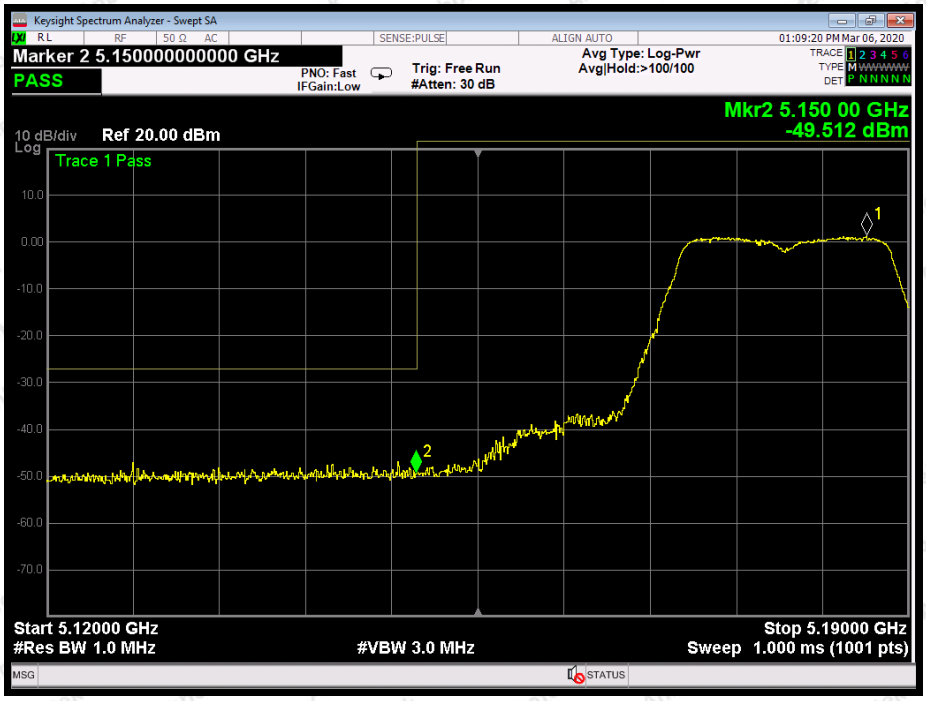

802.11a: Band Edge, Right Side



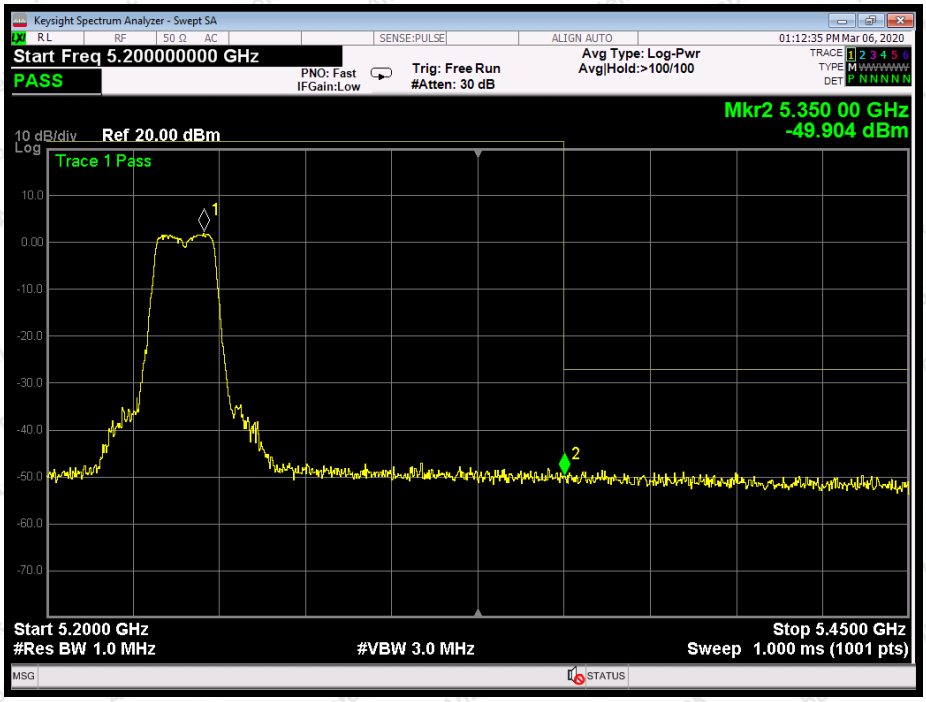

802.11n(20): Band Edge, Left Side



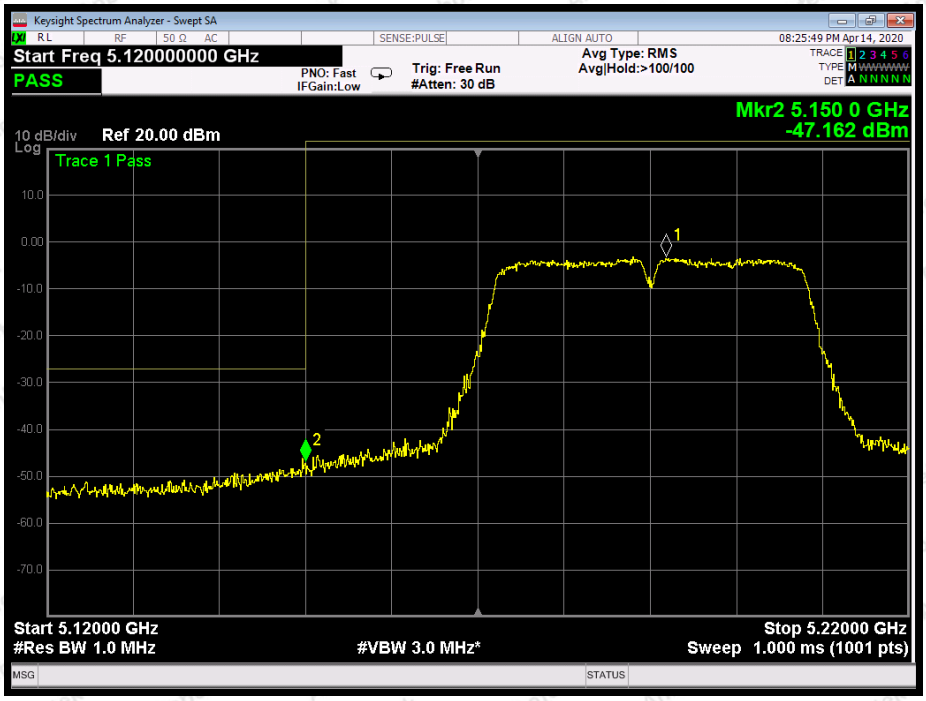

802.11n(20): Band Edge, Right Side



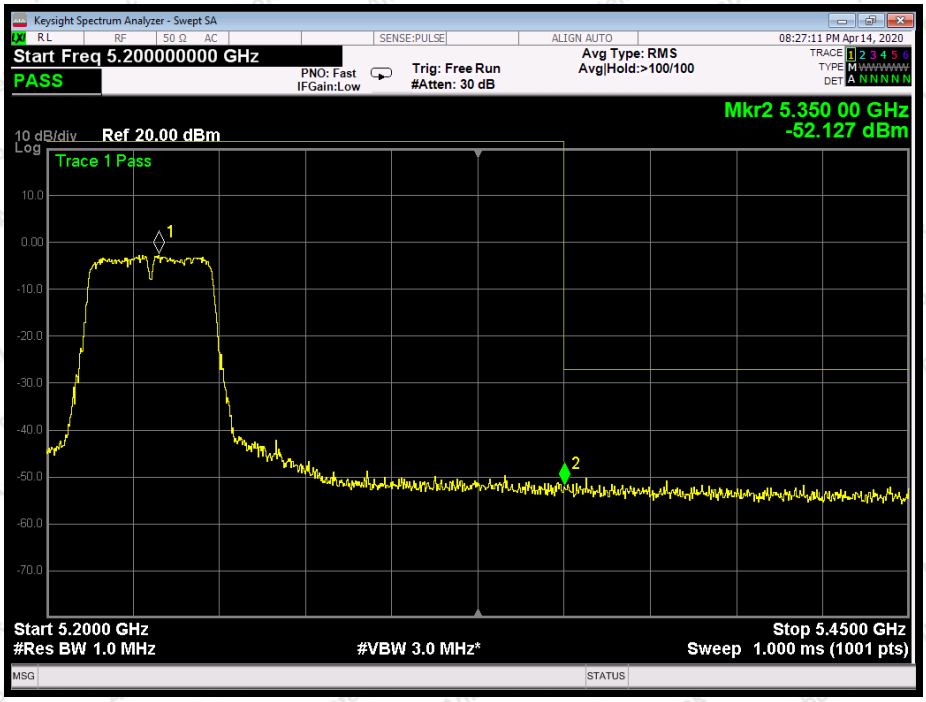

802.11ac(20): Band Edge, Left Side



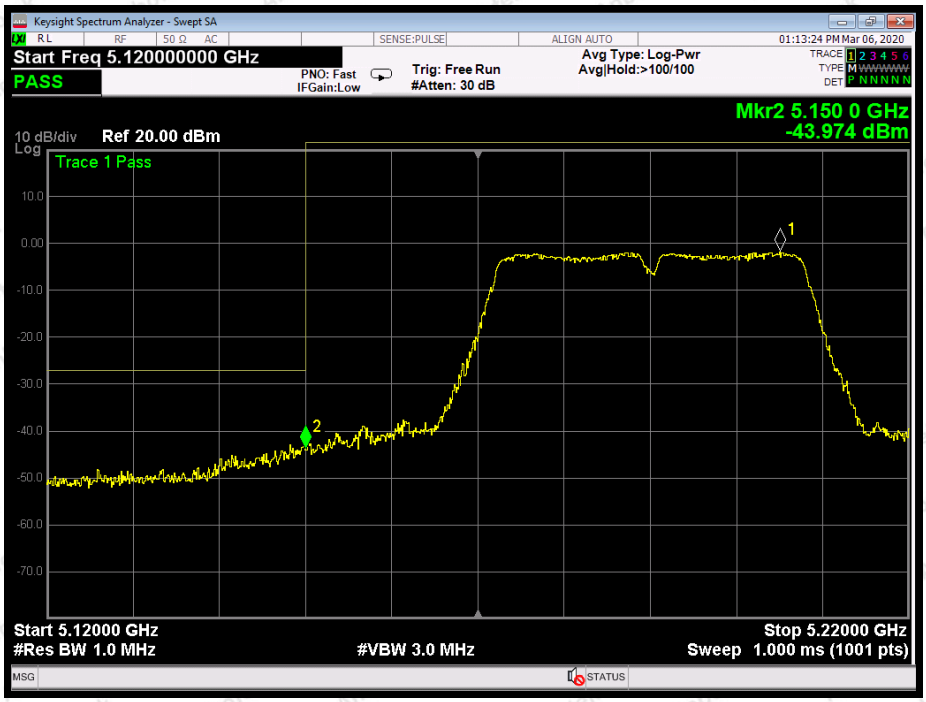

802.11ac(20): Band Edge, Right Side



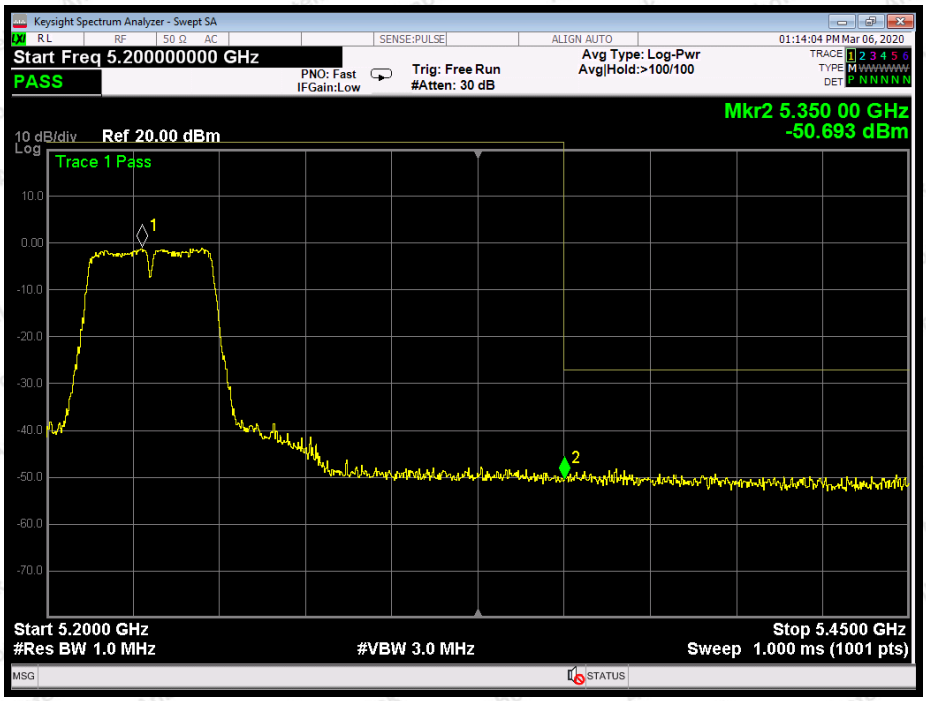

802.11n(40): Band Edge, Left Side



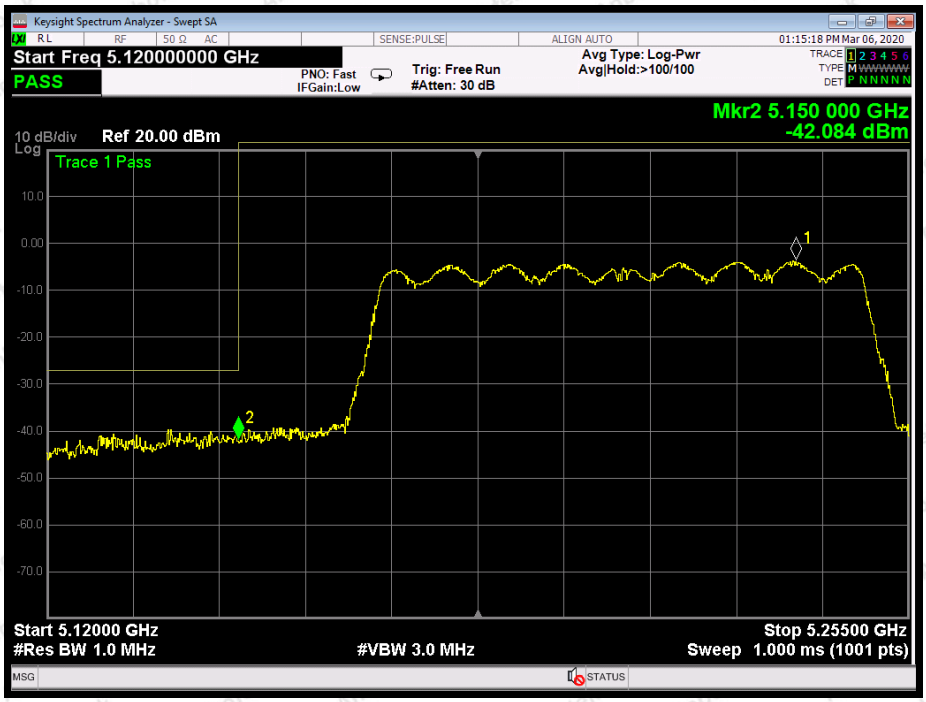

802.11n(40): Band Edge, Right Side



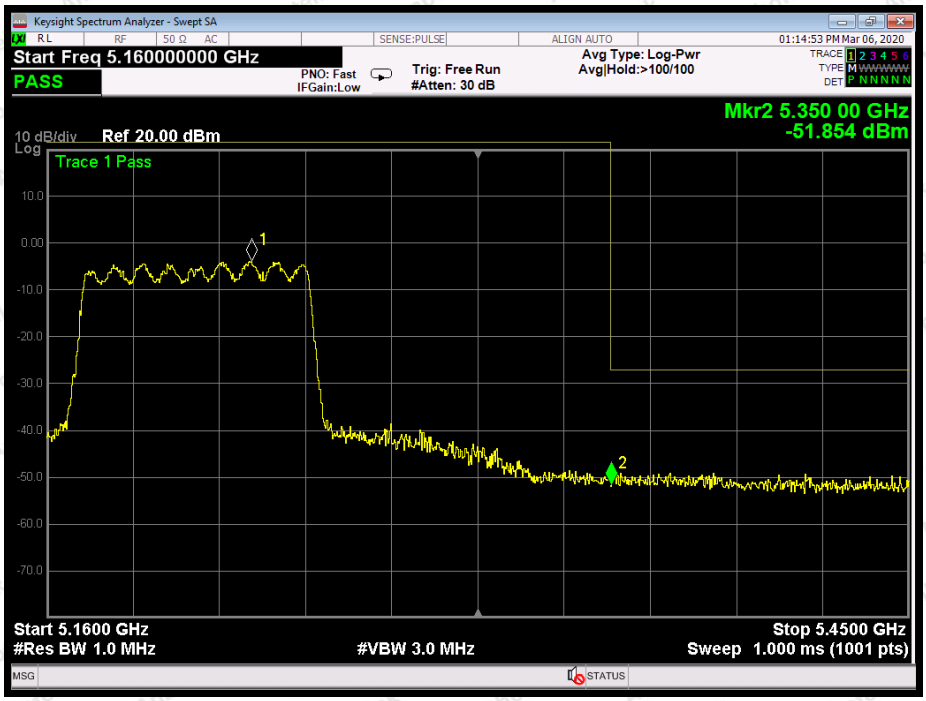

802.11ac(40): Band Edge, Left Side




802.11ac(40): Band Edge, Right Side




802.11ac(80): Band Edge




802.11ac(80): Band Edge

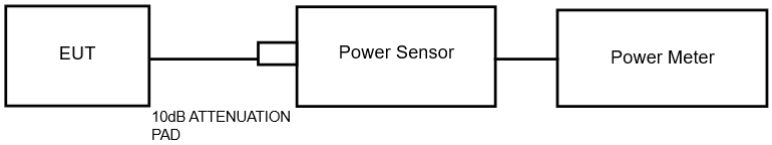
Remark: 1.the plots provided now is the worst case

# 5. Maximum Peak Output Power Test

## 5.1. Test Standard and Limit

| | |
|---|---|
| Test Standard | FCC Part15 C Section 15.407（a）（1）（ii） |
| Test Limit | 30dBm |

## 5.2. Test Setup




## 5.3. Test Procedure

1. The Transmitter output (antenna port) was connected to the power meter.
2. Turn on the EUT and power meter and then record the power value.
3. Repeat above procedures on all channels needed to be tested.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

## 5.4. Test Data

| | | | | | |
|---|---|---|---|---|---|
| Test Item | : | Max. peak output power | Test Mode | : | CH Low ~ CH High |
| Test Voltage | : | AC 120V, 60Hz for adapter | Temperature | : | 24℃ |
| Test Result | : | PASS | Humidity | : | 55%RH |

ANT A

| Mode | Channel Frequency (MHz) | Peak Power output (dBm) | Correctional Limit (dBm) | Results |
|---|---|---|---|---|
| 802.11a | 5180 | 12.43 | 30 | PASS |
| | 5200 | 13.01 | 30 | PASS |
| | 5240 | 13.19 | 30 | PASS |
| 802.11n20 | 5180 | 13.21 | 30 | PASS |
| | 5200 | 13.32 | 30 | PASS |
| | 5240 | 13.57 | 30 | PASS |
| 802.11ac20 | 5180 | 13.25 | 30 | PASS |
| | 5200 | 13.84 | 30 | PASS |
| | 5240 | 11.60 | 30 | PASS |
| 802.11n40 | 5190 | 12.77 | 30 | PASS |
| | 5230 | 13.41 | 30 | PASS |
| 802.11ac40 | 5190 | 11.87 | 30 | PASS |
| | 5230 | 12.77 | 30 | PASS |
| 802.11ac80 | 5210 | 12.58 | 30 | PASS |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Hotline 400-003-0500
www.anbotek.com

ANT B

| Mode | Channel Frequency (MHz) | Peak Power output (dBm) | Correctional Limit (dBm) | Results |
|---|---|---|---|---|
| 802.11a | 5180 | 12.96 | 30 | PASS |
| | 5200 | 12.80 | 30 | PASS |
| | 5240 | 13.45 | 30 | PASS |
| 802.11n20 | 5180 | 13.33 | 30 | PASS |
| | 5200 | 13.11 | 30 | PASS |
| | 5240 | 13.55 | 30 | PASS |
| 802.11ac20 | 5180 | 11.88 | 30 | PASS |
| | 5200 | 12.25 | 30 | PASS |
| | 5240 | 12.97 | 30 | PASS |
| 802.11n40 | 5190 | 13.13 | 30 | PASS |
| | 5230 | 13.46 | 30 | PASS |
| 802.11ac40 | 5190 | 12.15 | 30 | PASS |
| | 5230 | 12.72 | 30 | PASS |
| 802.11ac80 | 5210 | 12.16 | 30 | PASS |

ANT A+ANT B

| Mode | Channel Frequency (MHz) | Peak Power output (dBm) | Correctional Limit (dBm) | Results |
|---|---|---|---|---|
| 802.11n20 | 5180 | 16.28 | 30 | PASS |
| | 5200 | 16.23 | 30 | PASS |
| | 5240 | 16.57 | 30 | PASS |
| 802.11ac20 | 5180 | 15.63 | 30 | PASS |
| | 5200 | 16.13 | 30 | PASS |
| | 5240 | 15.35 | 30 | PASS |
| 802.11n40 | 5190 | 15.96 | 30 | PASS |
| | 5230 | 16.45 | 30 | PASS |
| 802.11ac40 | 5190 | 15.02 | 30 | PASS |
| | 5230 | 15.76 | 30 | PASS |
| 802.11ac80 | 5210 | 15.39 | 30 | PASS |

Note: The EUT is Belongs to 15.407（a）（1）（ii）


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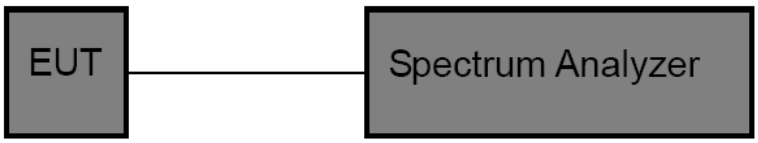
# 6. Occupy Bandwidth Test

## 6.1. Test Standard

| | |
|---|---|
| Test Standard | FCC Part15 C Section 15.407 (a)(5) |

## 6.2. Test Setup




## 6.3. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

3. Set the spectrum analyzer as:

**26 dB &99%bandwidth**

RBW = approximately 1% of the emission bandwidth;
Set the VBW＞RBW;
Detector= Peak
Trace mode= Max hold.
Sweep- auto couple.

**6 dB bandwidth**

RBW = 100kHz;
Set the video bandwidth (VBW) ≥ 3 RBW;
Detector= Peak
Trace mode= Max hold.
Sweep- auto couple.

4. Measure the maximum width of the emission that is 26dB /6dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer.

5. Repeat until all the rest channels are investigated.

## 6.4. Test Data

| | | | | | |
|---|---|---|---|---|---|
| Test Item | : | 6dB &26dB BW | Test Mode | : | CH Low ~ CH High |
| Test Voltage | : | AC 120V, 60Hz for adapter | Temperature | : | 24℃ |
| Test Result | : | PASS | Humidity | : | 55%RH |

ANT A

| Mode | Channel Frequency (MHz) | 6dB BW(MHz) | Limit | Results |
|---|---|---|---|---|
| 802.11a | 5180 | 16.52 | >0.5MHz | PASS |
| | 5200 | 16.55 | | PASS |
| | 5240 | 16.52 | | PASS |
| 802.11n20 | 5180 | 17.64 | | PASS |
| | 5200 | 17.65 | | PASS |
| | 5240 | 17.64 | | PASS |
| 802.11ac20 | 5180 | 17.64 | | PASS |
| | 5200 | 17.62 | | PASS |
| | 5240 | 17.60 | | PASS |
| 802.11n40 | 5190 | 36.48 | | PASS |
| | 5230 | 36.41 | | PASS |
| 802.11ac40 | 5190 | 36.43 | | PASS |
| | 5230 | 36.43 | | PASS |
| 802.11ac80 | 5210 | 76.20 | | PASS |

| Mode | Channel Frequency (MHz) | 26dB BW(MHz) | 99% Bandwidth (MHz) |
|---|---|---|---|
| 802.11a | 5180 | 19.86 | 16.521 |
| | 5200 | 20.02 | 16.516 |
| | 5240 | 20.05 | 16.455 |
| 802.11n20 | 5180 | 20.86 | 17.607 |
| | 5200 | 20.82 | 17.604 |
| | 5240 | 20.63 | 17.576 |
| 802.11ac20 | 5180 | 21.60 | 17.619 |
| | 5200 | 21.47 | 17.624 |
| | 5240 | 21.58 | 17.643 |
| 802.11n40 | 5190 | 41.43 | 36.075 |
| | 5230 | 41.10 | 36.037 |
| 802.11ac40 | 5190 | 39.27 | 36.182 |
| | 5230 | 39.09 | 36.154 |
| 802.11ac80 | 5210 | 81.04 | 75.565 |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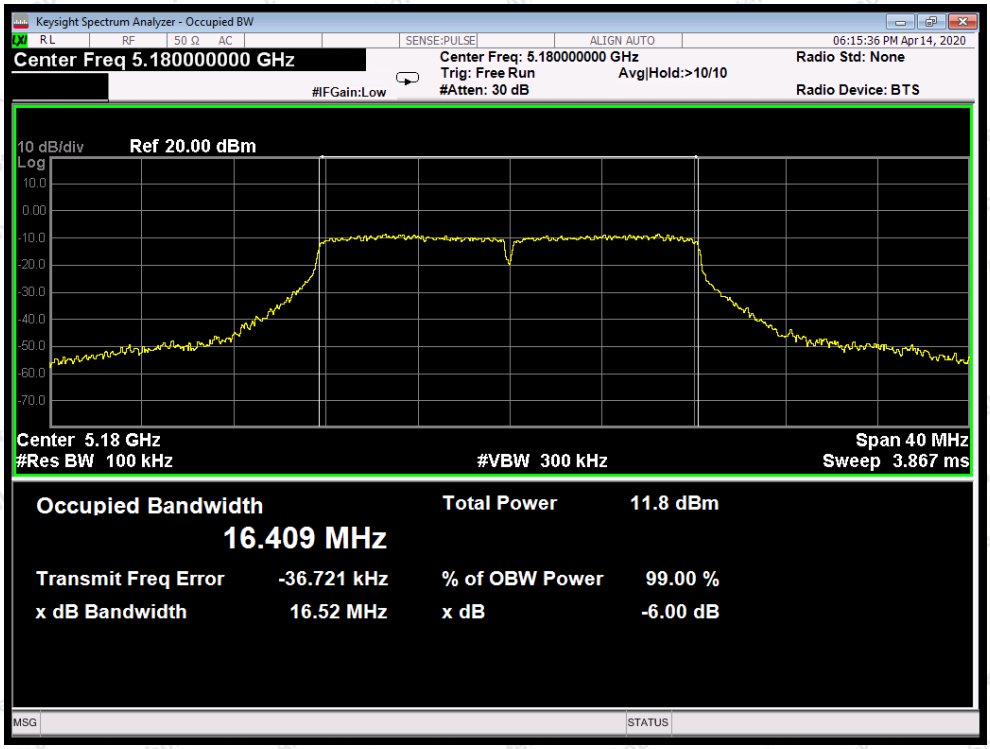
ANT B

| Mode | Channel Frequency (MHz) | 6dB BW(MHz) | Limit | Results |
|---|---|---|---|---|
| 802.11a | 5180 | 16.51 | >0.5MHz | PASS |
| | 5200 | 16.50 | | PASS |
| | 5240 | 16.48 | | PASS |
| 802.11n20 | 5180 | 17.66 | | PASS |
| | 5200 | 17.64 | | PASS |
| | 5240 | 17.68 | | PASS |
| 802.11ac20 | 5180 | 17.61 | | PASS |
| | 5200 | 17.62 | | PASS |
| | 5240 | 17.60 | | PASS |
| 802.11n40 | 5190 | 36.38 | | PASS |
| | 5230 | 36.46 | | PASS |
| 802.11ac40 | 5190 | 36.40 | | PASS |
| | 5230 | 36.47 | | PASS |
| 802.11ac80 | 5210 | 76.14 | | PASS |

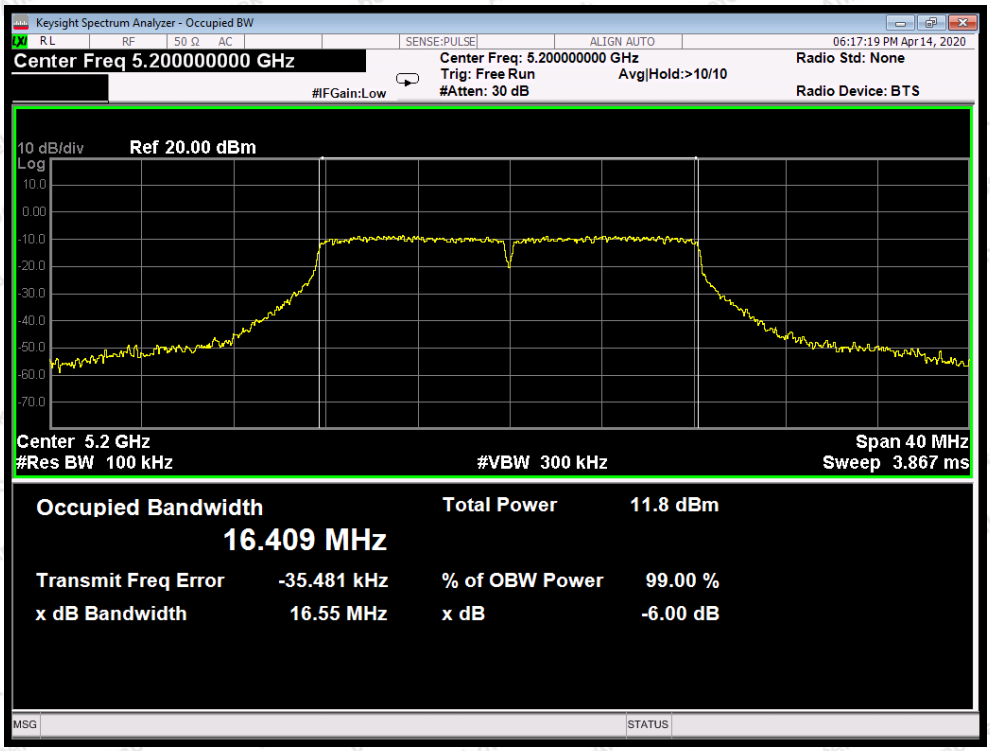
| Mode | Channel Frequency (MHz) | 26dB BW(MHz) | 99% Bandwidth (MHz) |
|---|---|---|---|
| 802.11a | 5180 | 19.85 | 16.514 |
| | 5200 | 20.08 | 16.528 |
| | 5240 | 19.83 | 16.522 |
| 802.11n20 | 5180 | 20.60 | 17.591 |
| | 5200 | 20.67 | 17.608 |
| | 5240 | 20.62 | 17.615 |
| 802.11ac20 | 5180 | 21.34 | 17.835 |
| | 5200 | 21.19 | 17.789 |
| | 5240 | 21.29 | 17.787 |
| 802.11n40 | 5190 | 41.06 | 36.038 |
| | 5230 | 41.73 | 36.054 |
| 802.11ac40 | 5190 | 39.63 | 36.234 |
| | 5230 | 39.45 | 36.180 |
| 802.11ac80 | 5210 | 81.23 | 75.514 |

ANT A

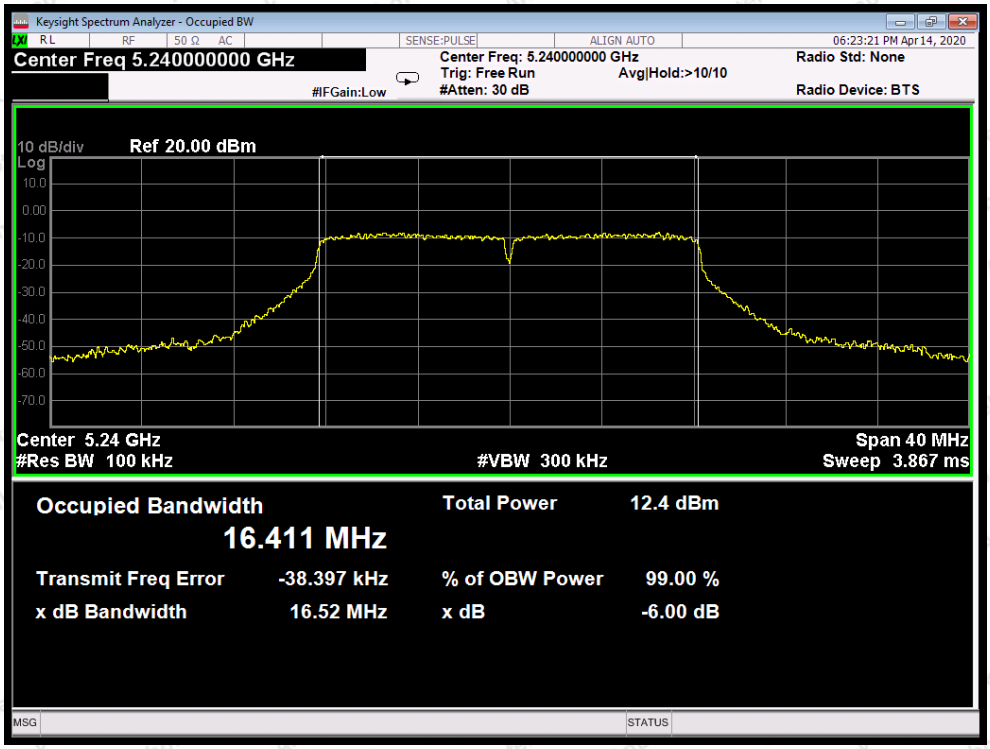
## 6dB Bandwidth



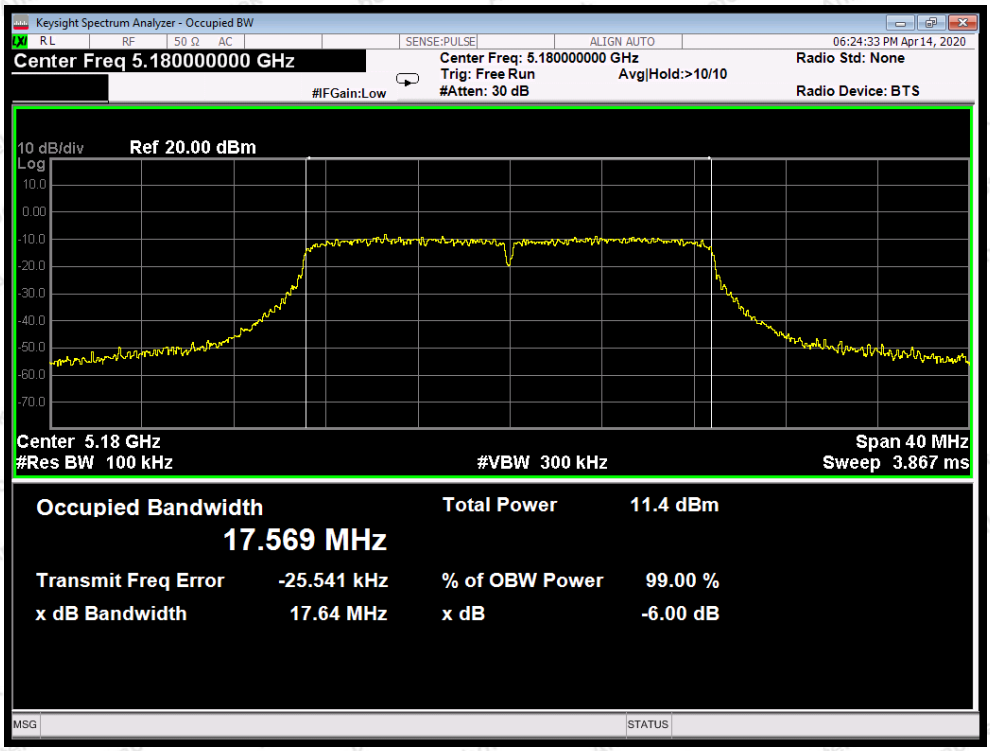

Test Mode: 802.11a--Low



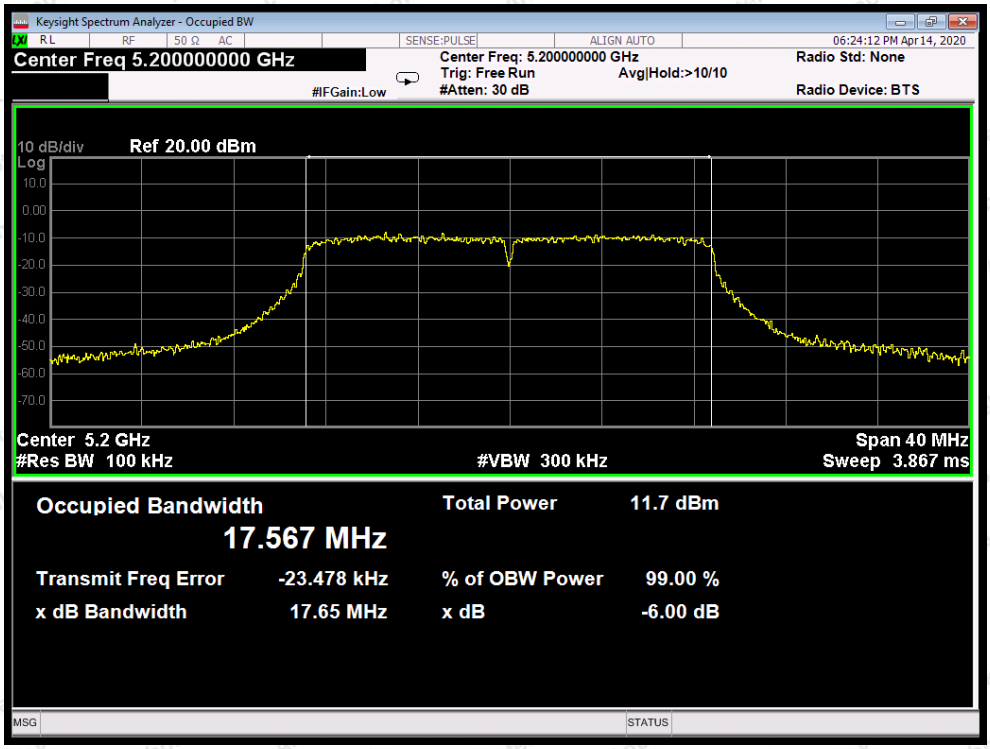

Test Mode: 802.11a---Middle



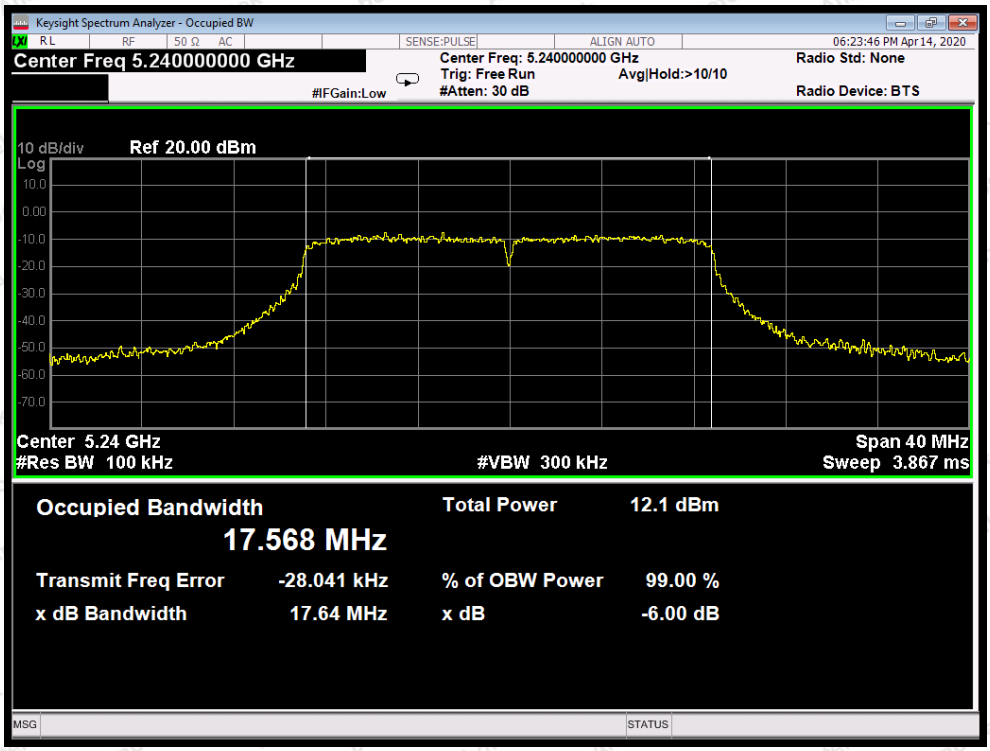

Test Mode: 802.11a---High



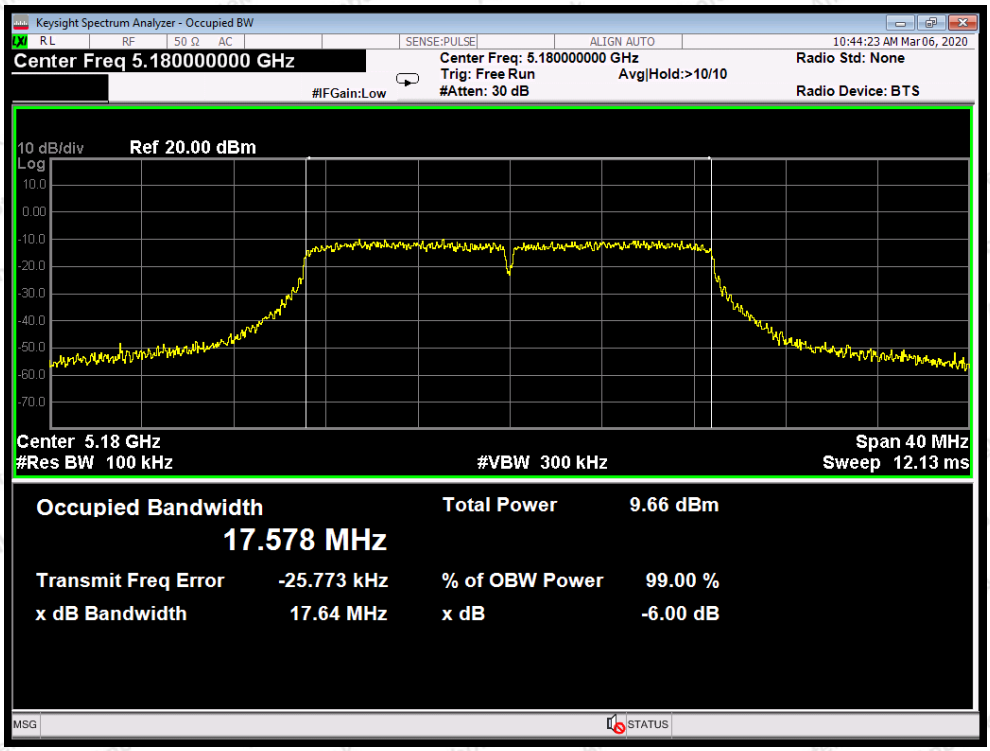

Test Mode: 802.11n20---Low



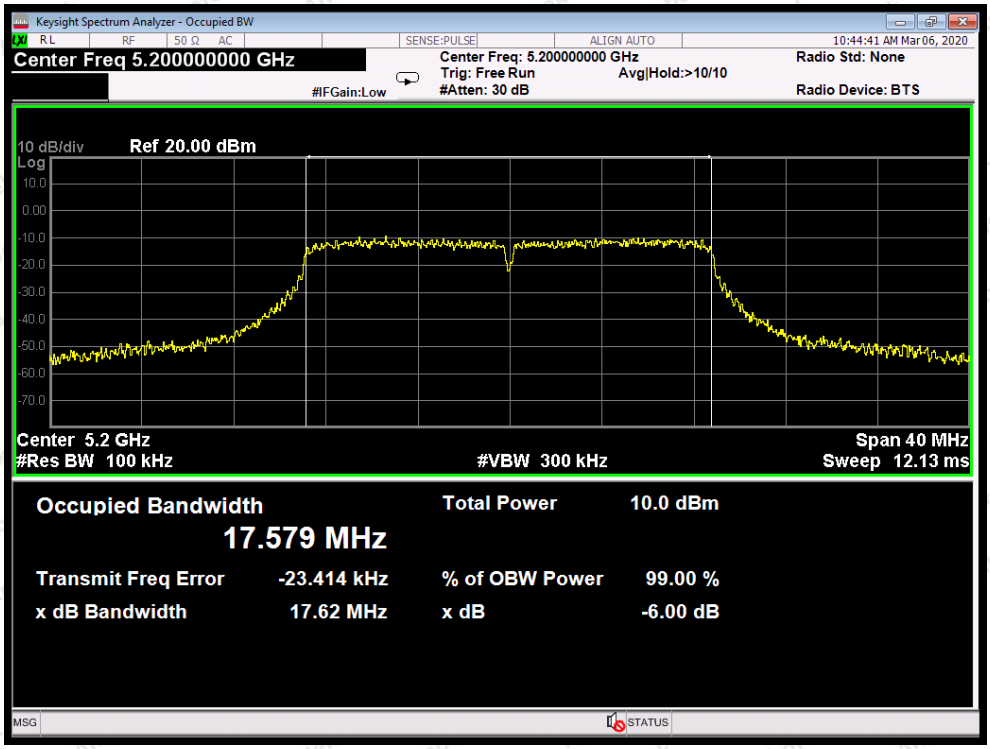

Test Mode: 802.11n20---Middle



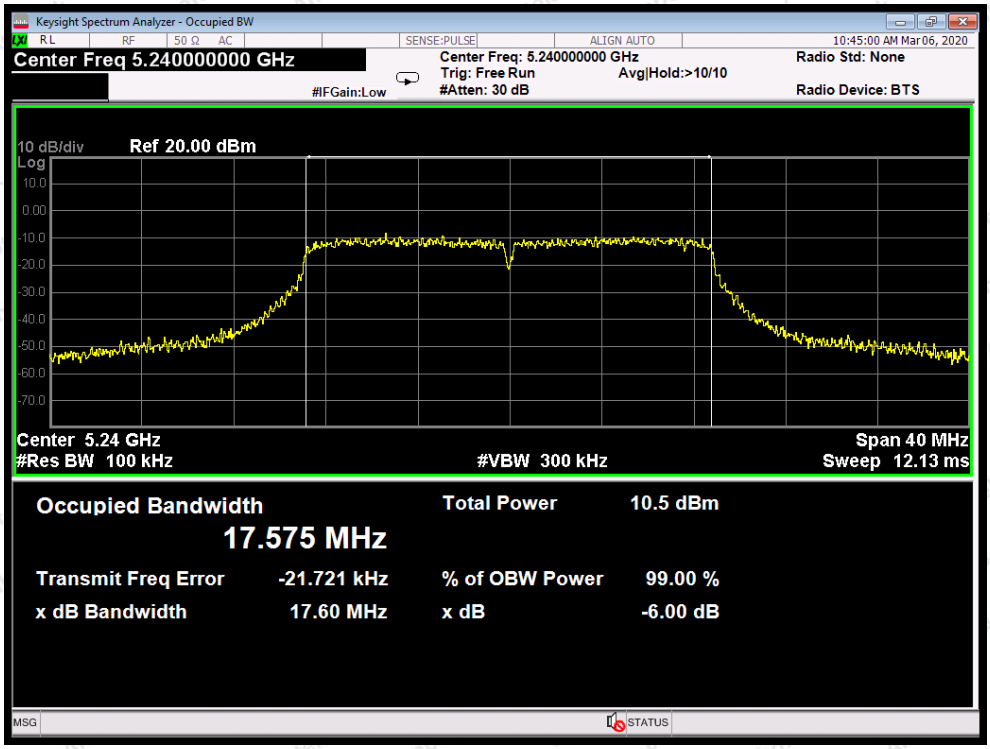

Test Mode: 802.11n20---High



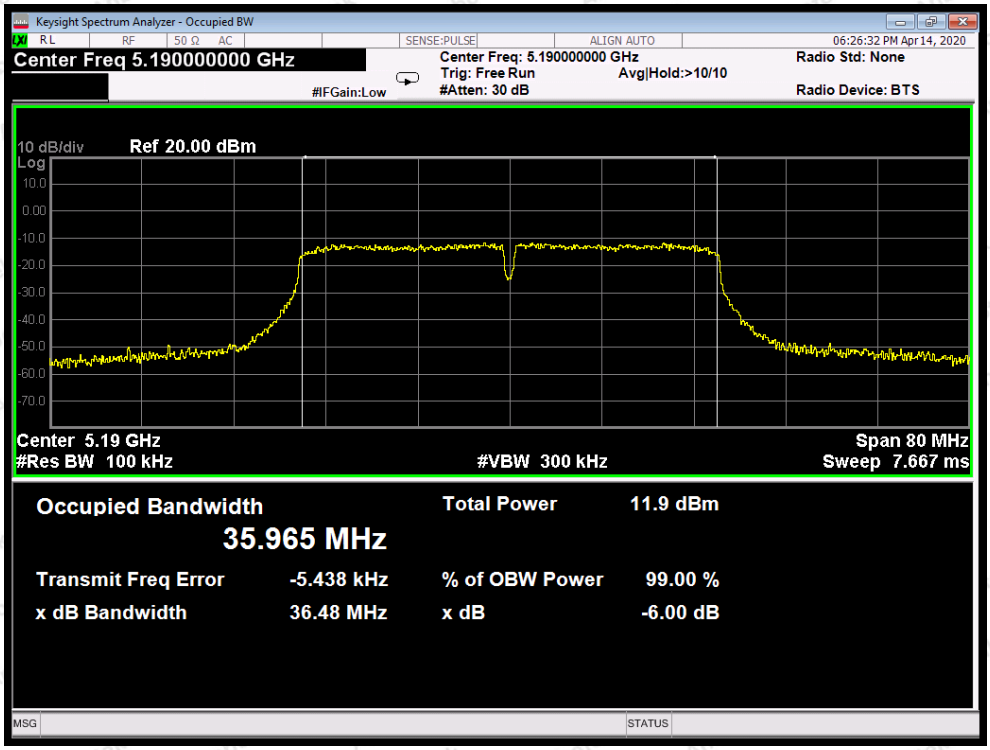

Test Mode: 802.11ac20--Low



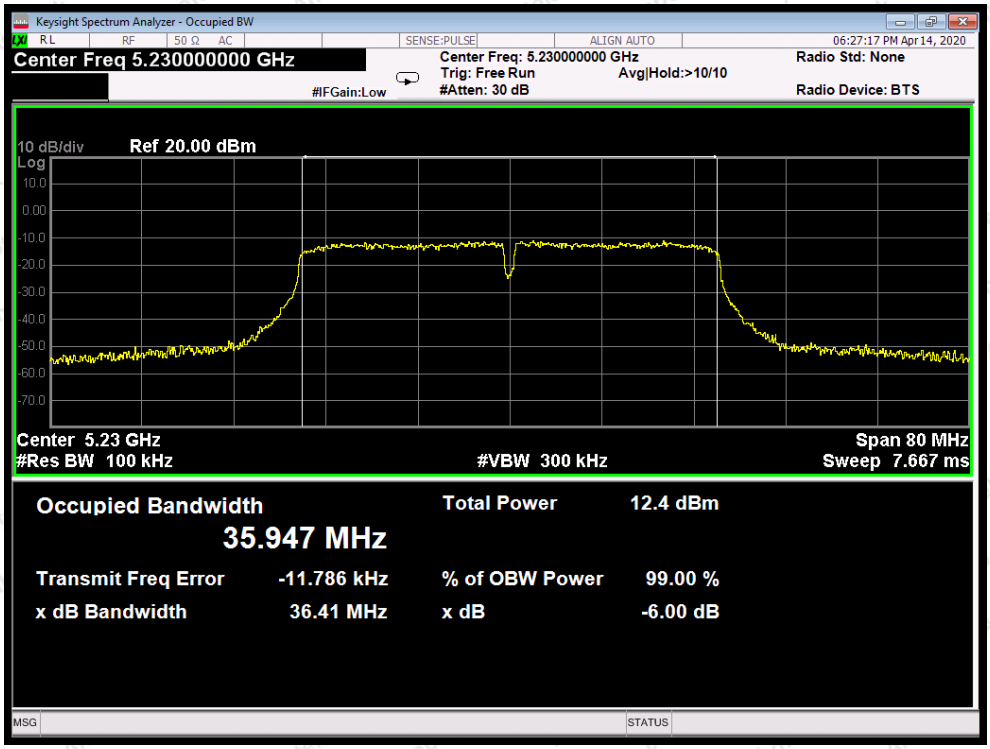

Test Mode: 802.11ac20---Middle



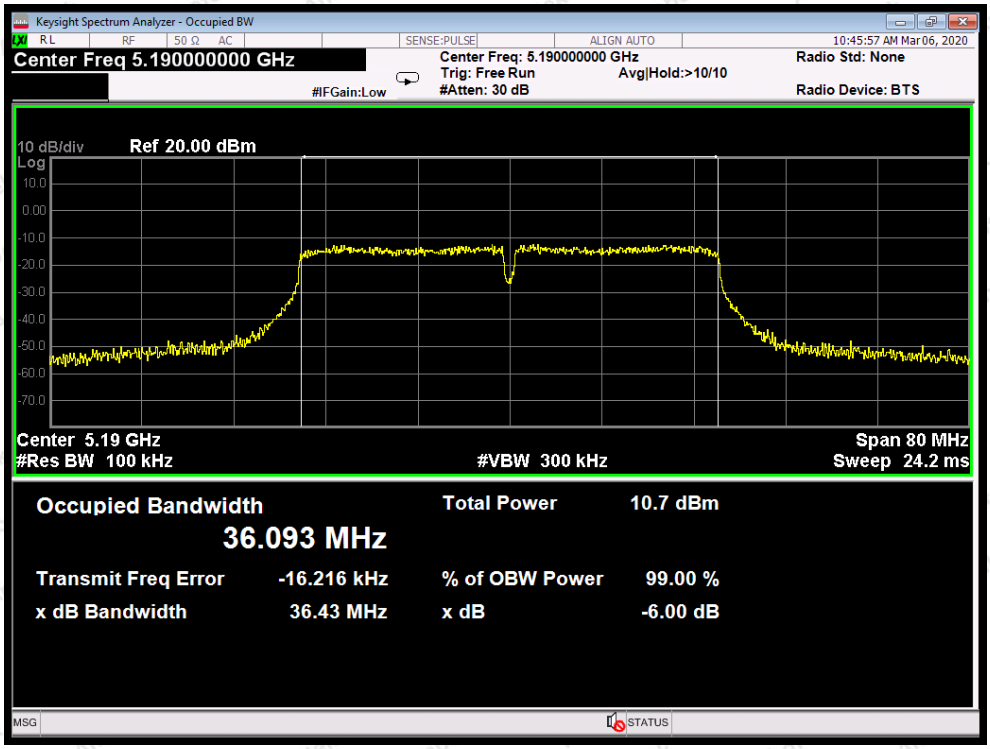

Test Mode: 802.11ac20---High



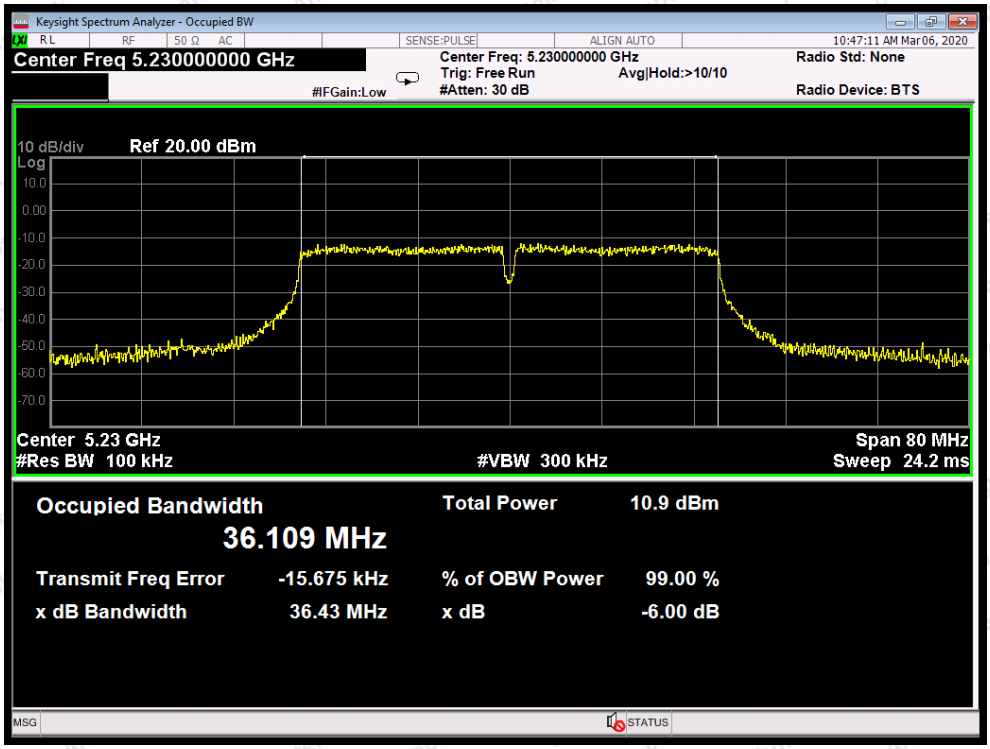

Test Mode: 802.11n40---Low



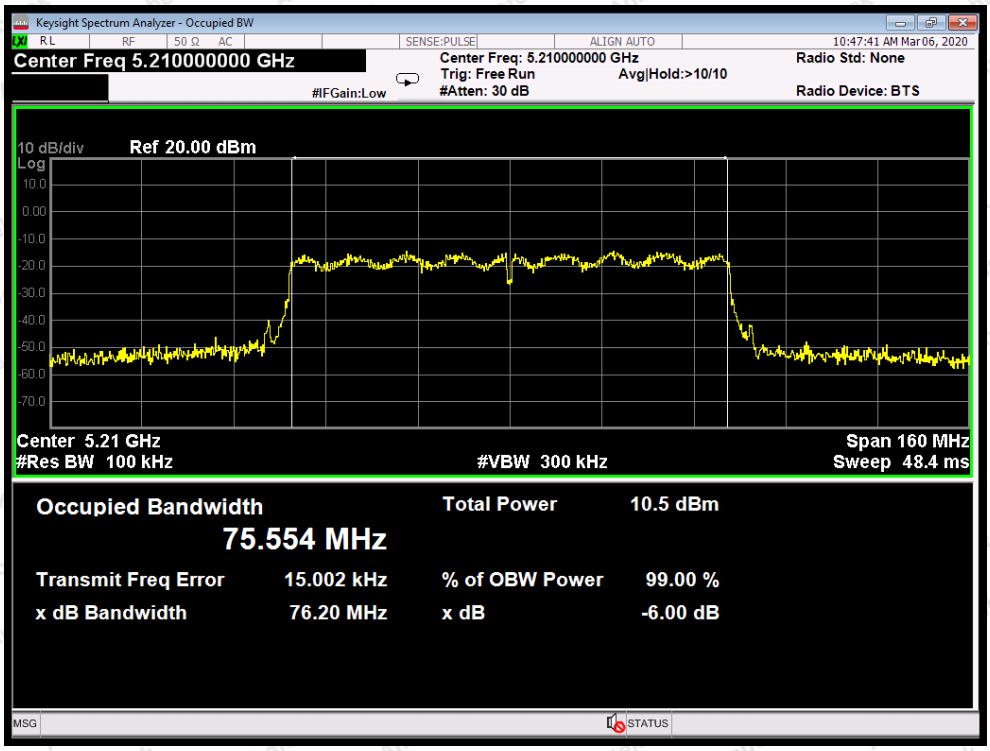

Test Mode: 802.11n40---High




Test Mode: 802.11ac40---Low

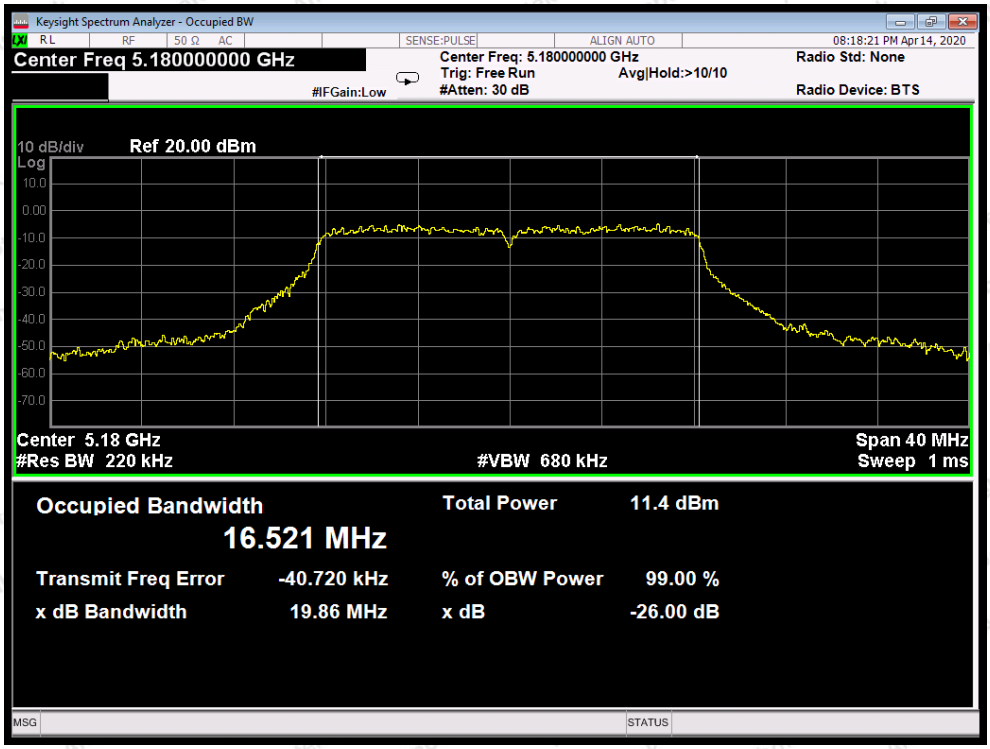



Test Mode: 802.11ac40---High

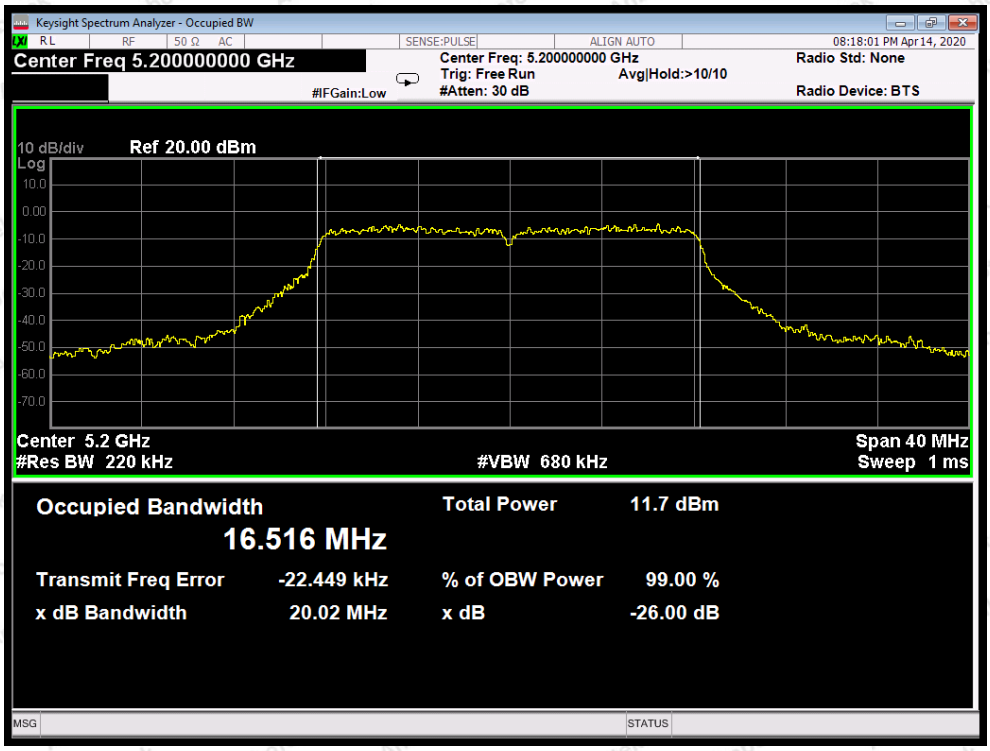



Test Mode: 802.11ac80

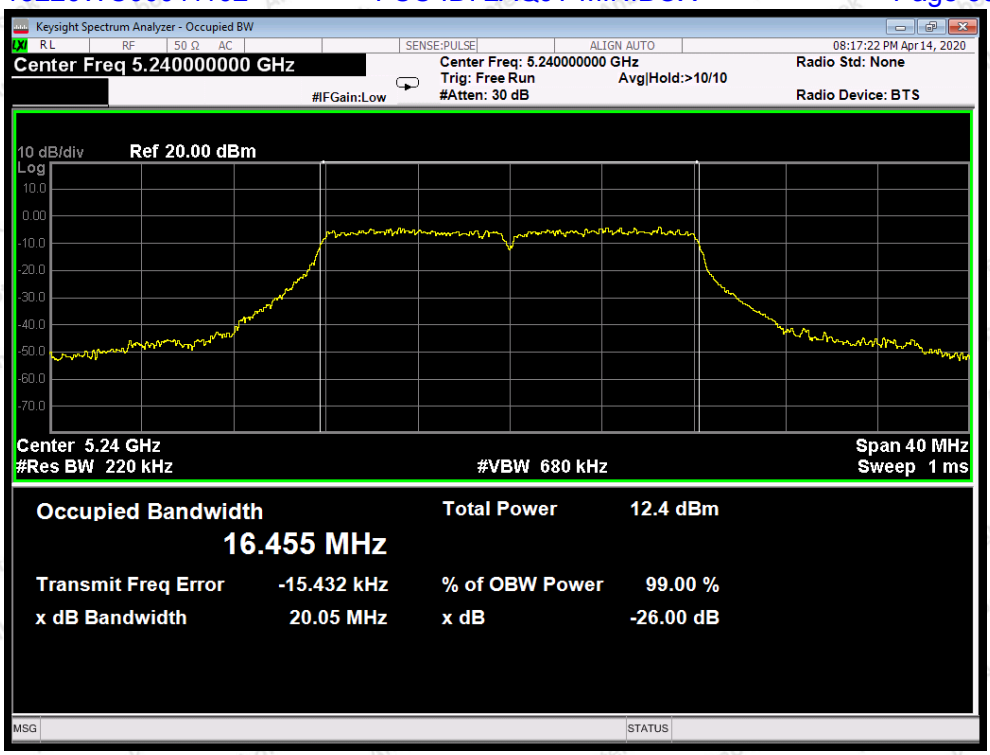
**26dB & 99% Bandwidth**



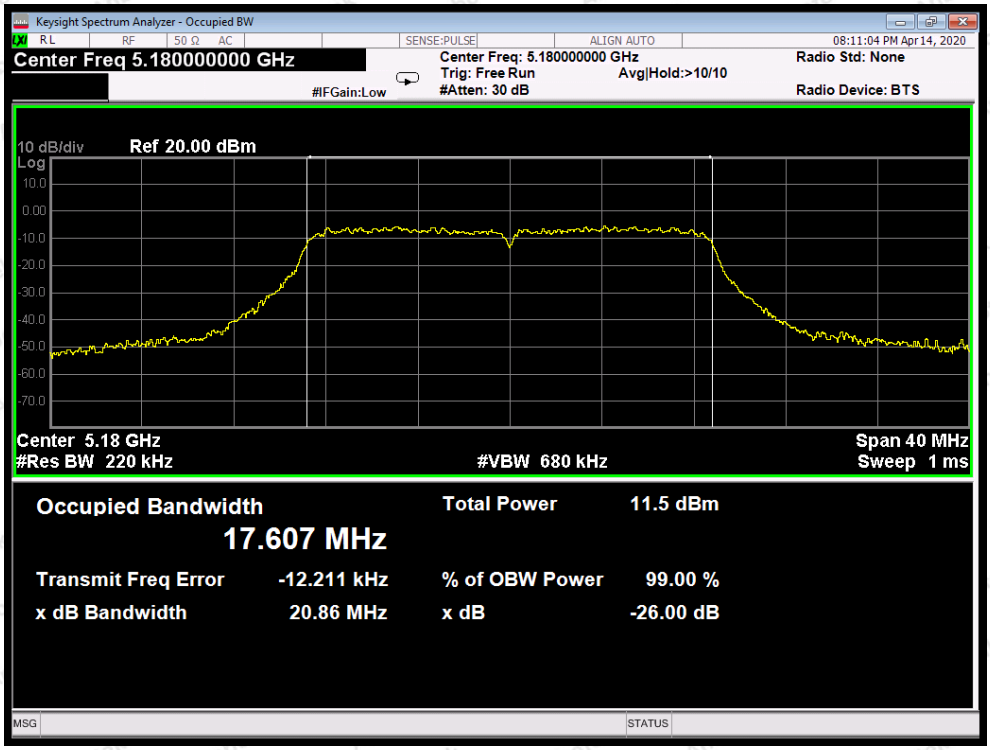

Test Mode: 802.11a--Low



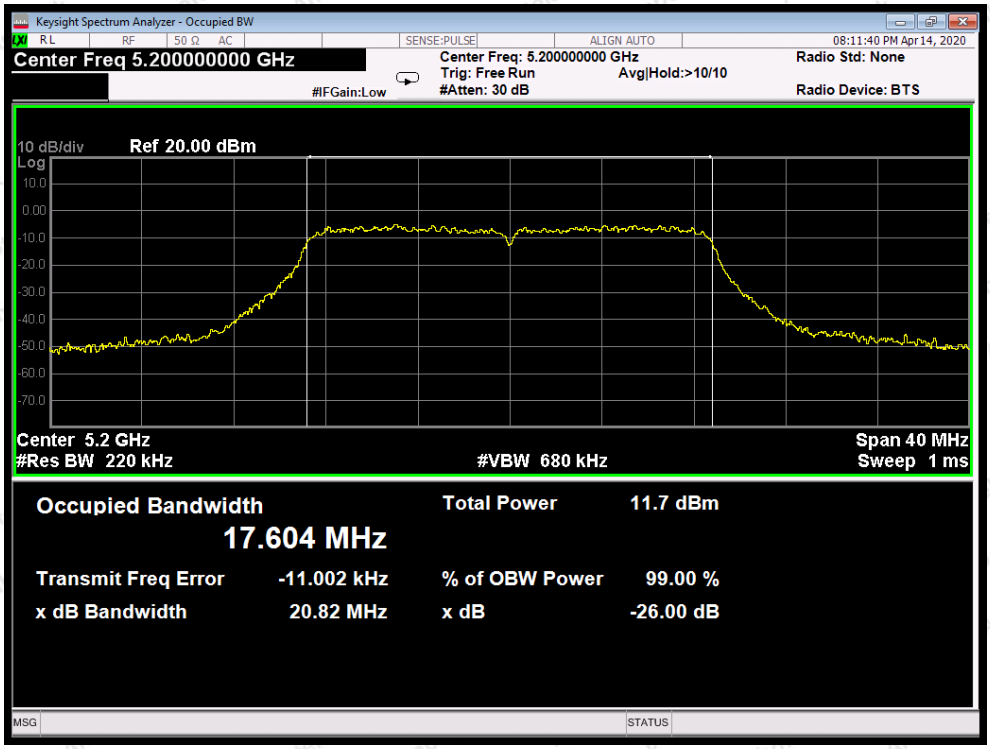

Test Mode: 802.11a---Middle



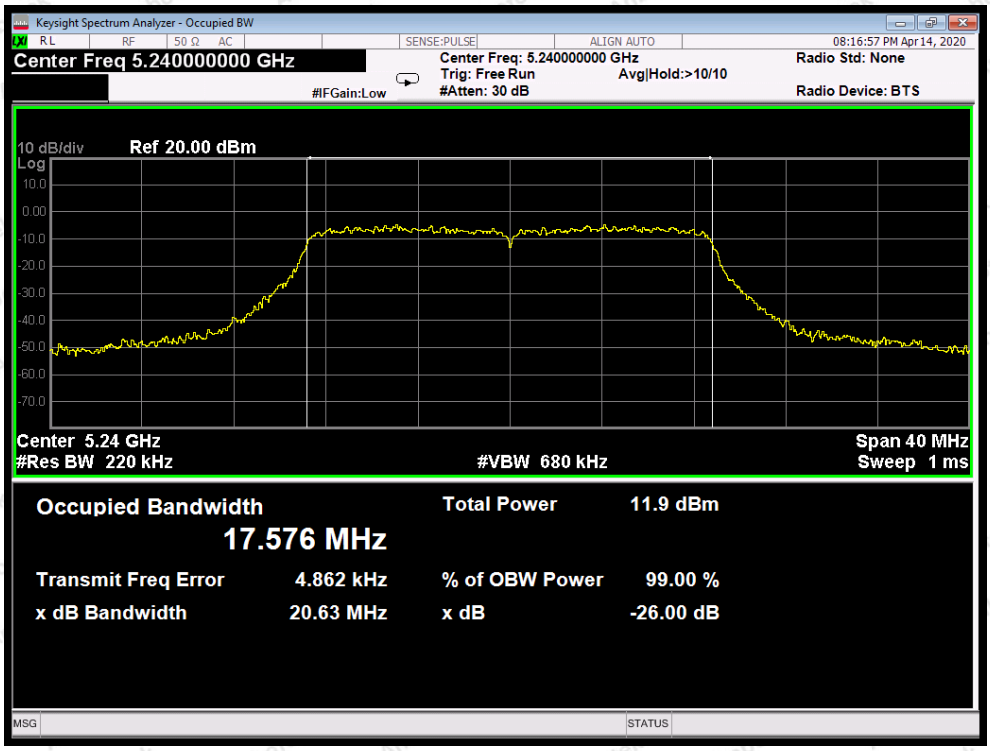

Test Mode: 802.11a---High



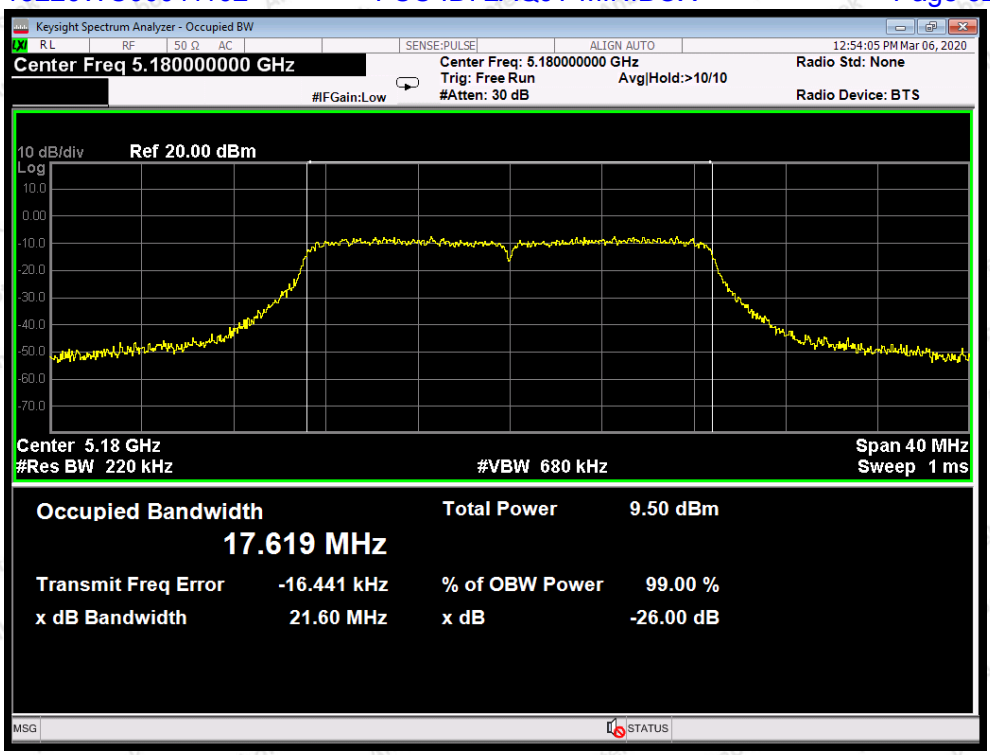

Test Mode: 802.11n20---Low



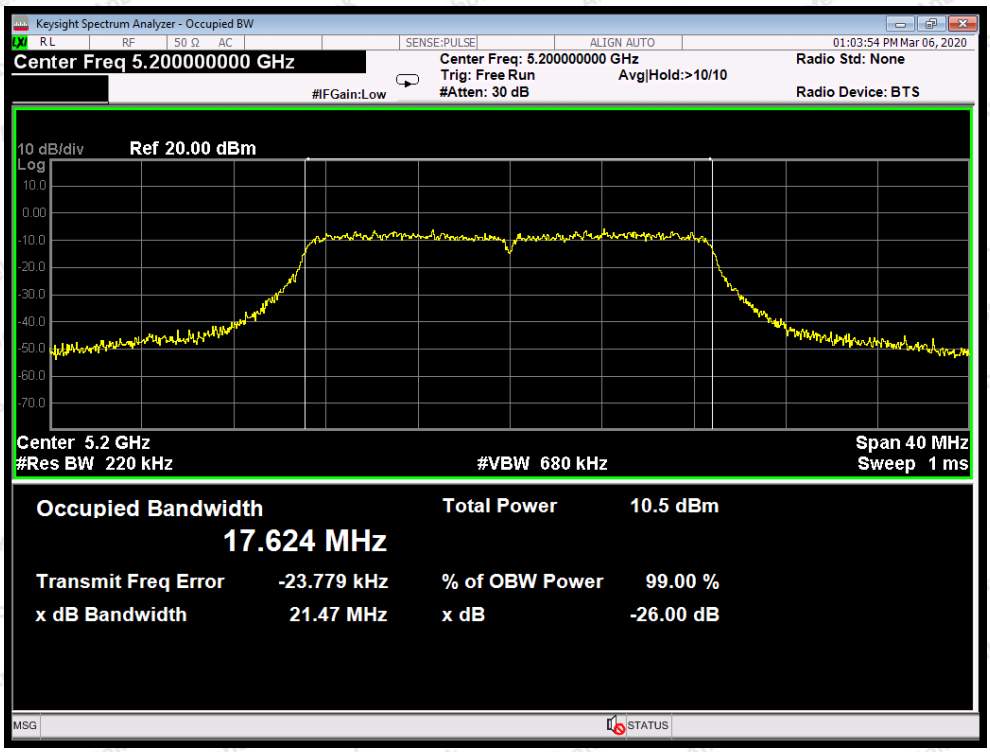

Test Mode: 802.11n20---Middle



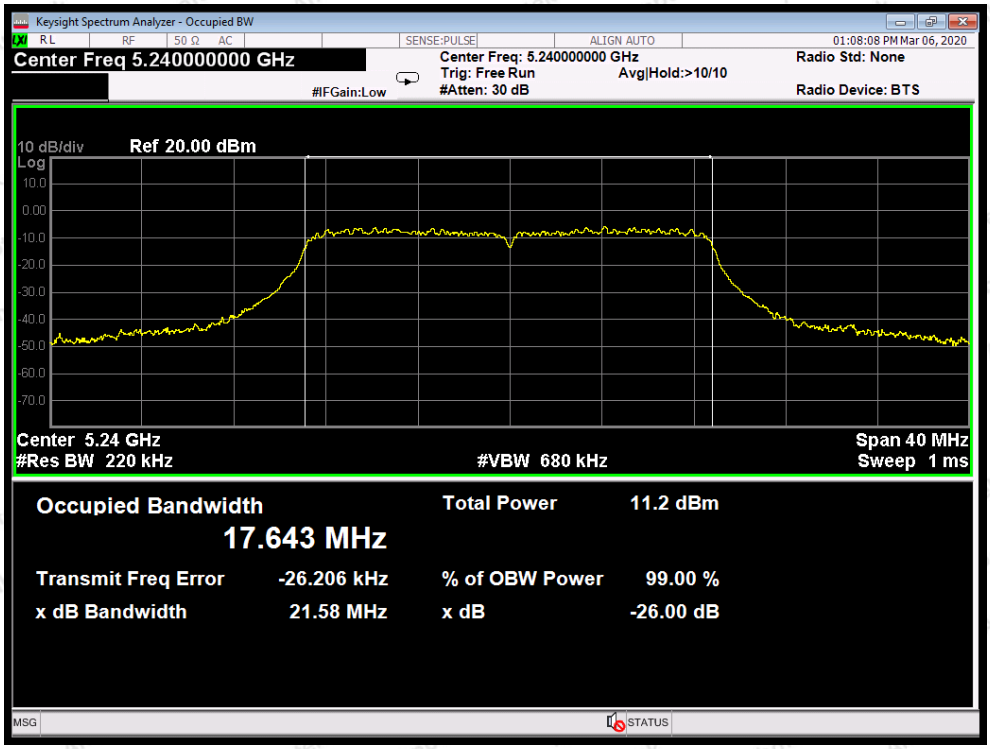

Test Mode: 802.11n20---High



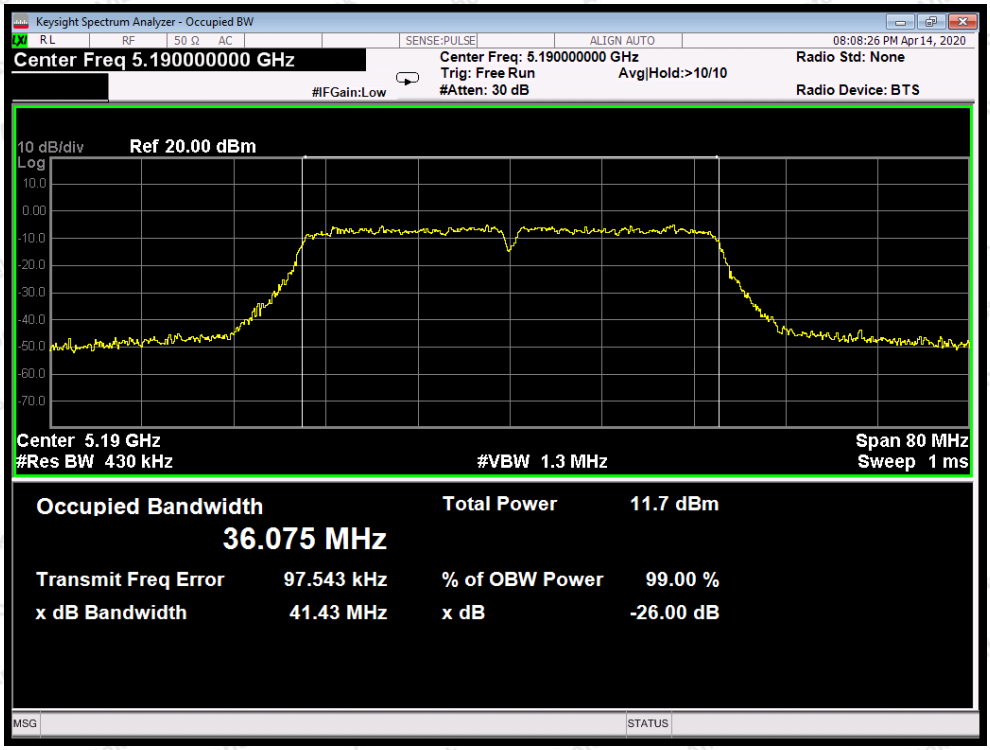

Test Mode: 802.11ac20--Low



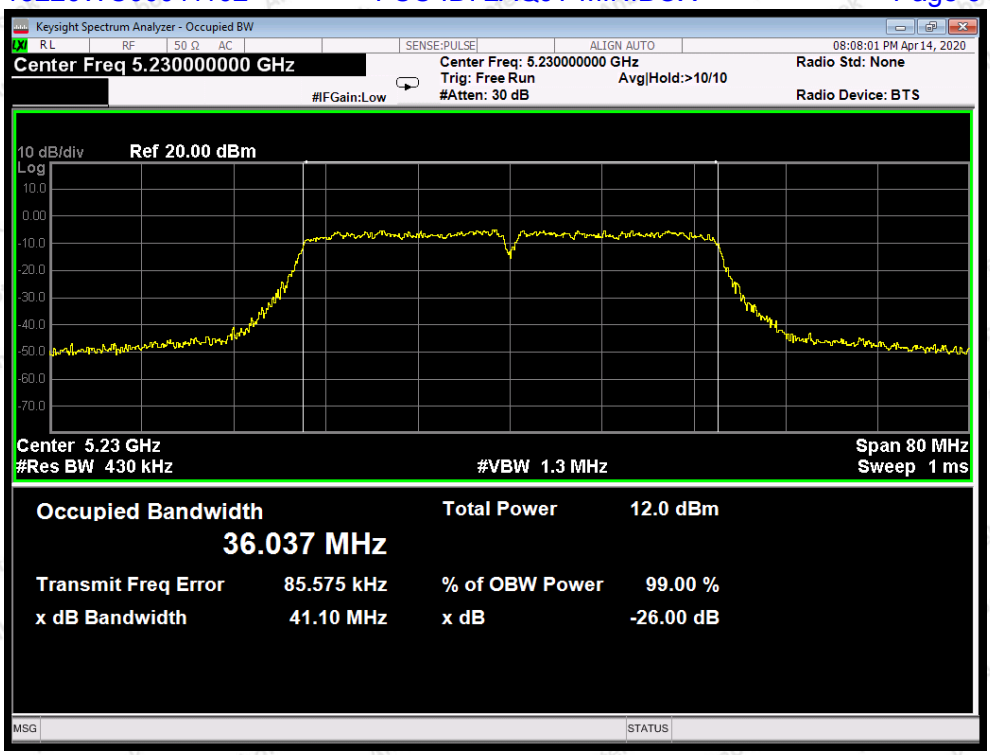

Test Mode: 802.11ac20---Middle



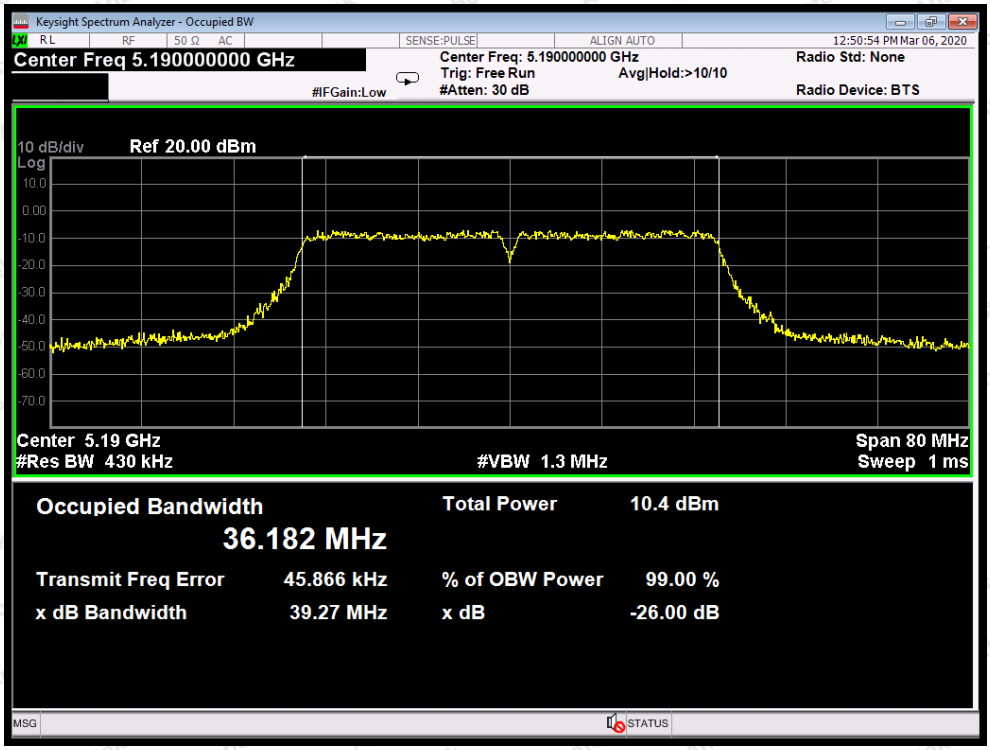

Test Mode: 802.11ac20---High



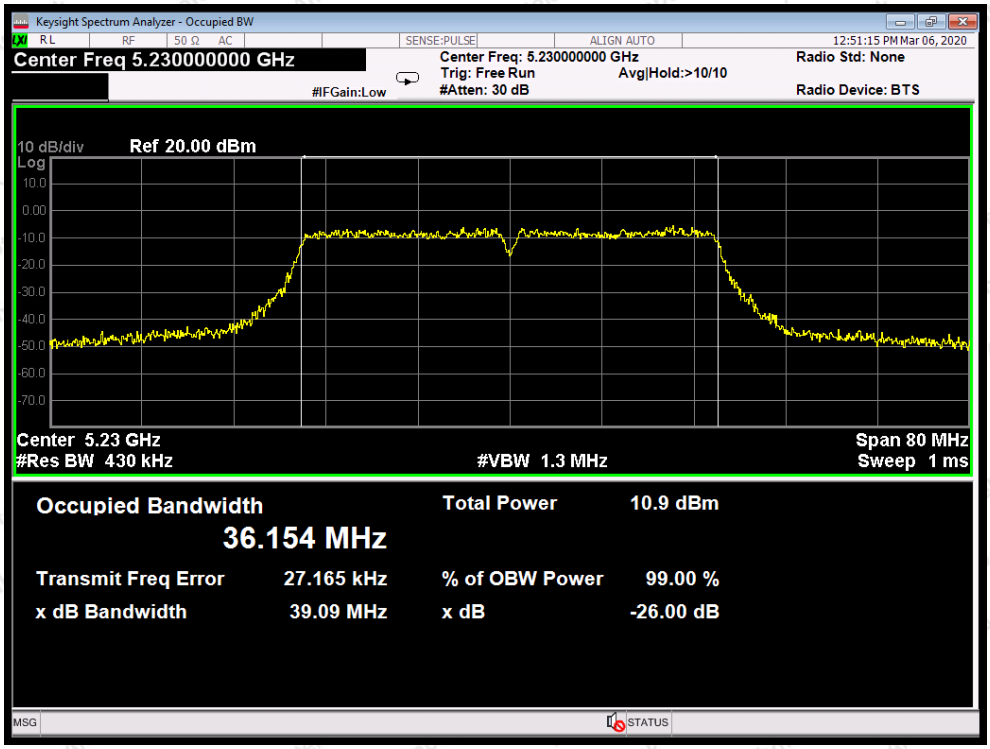

Test Mode: 802.11n40---Low



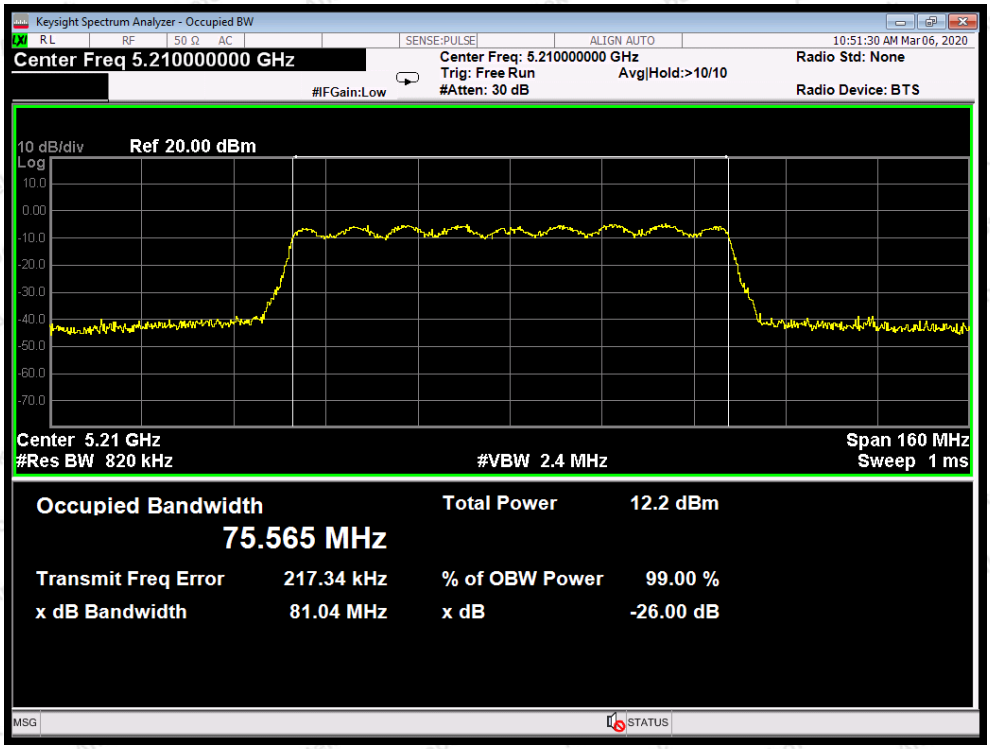

Test Mode: 802.11n40---High




Test Mode: 802.11ac40---Low

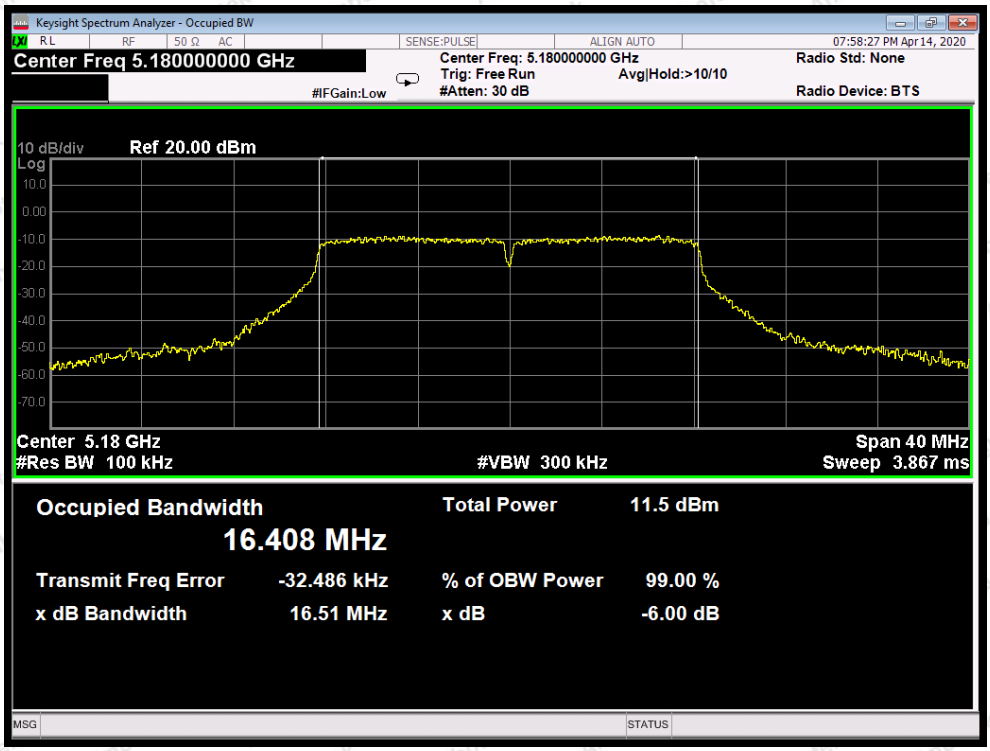



Test Mode: 802.11ac40---High

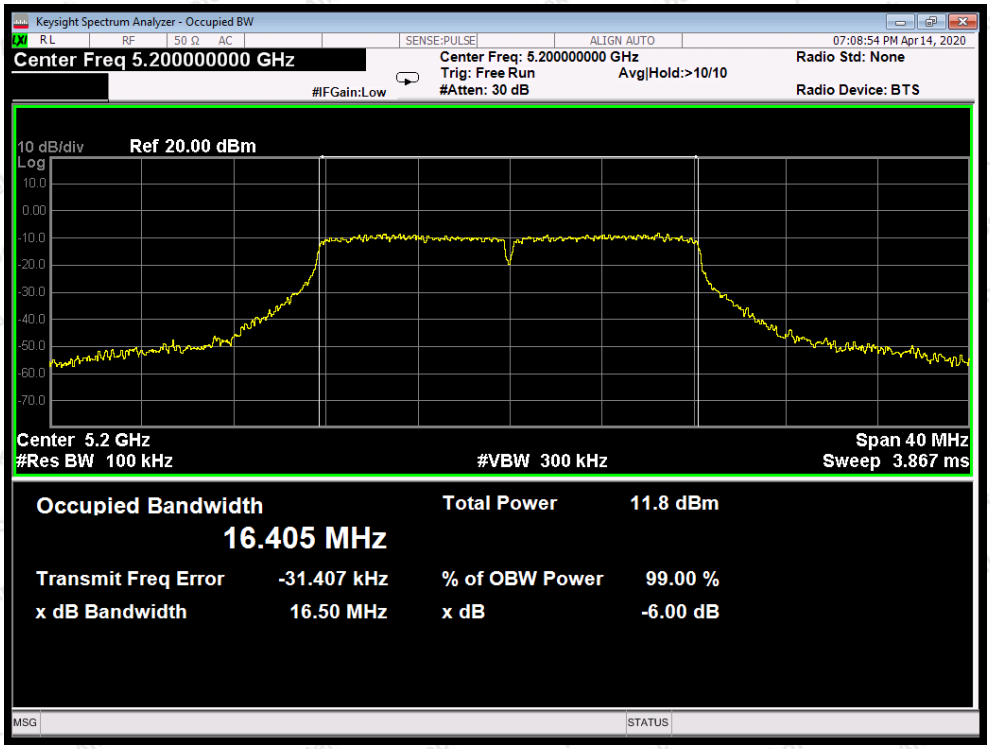



Test Mode: 802.11ac80

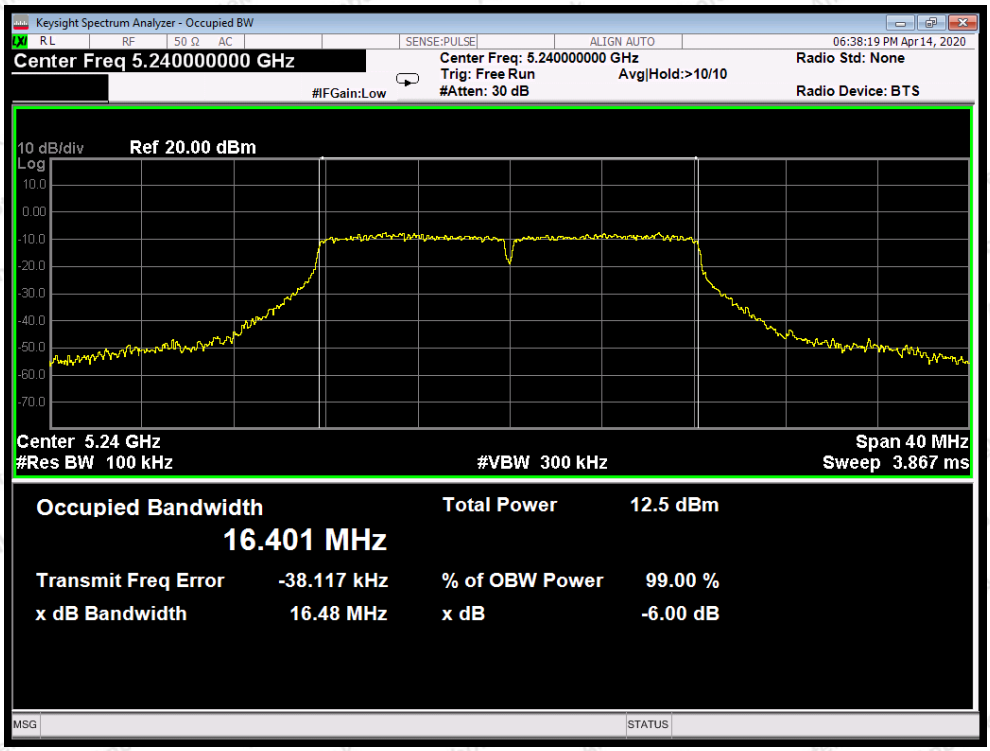
ANT B



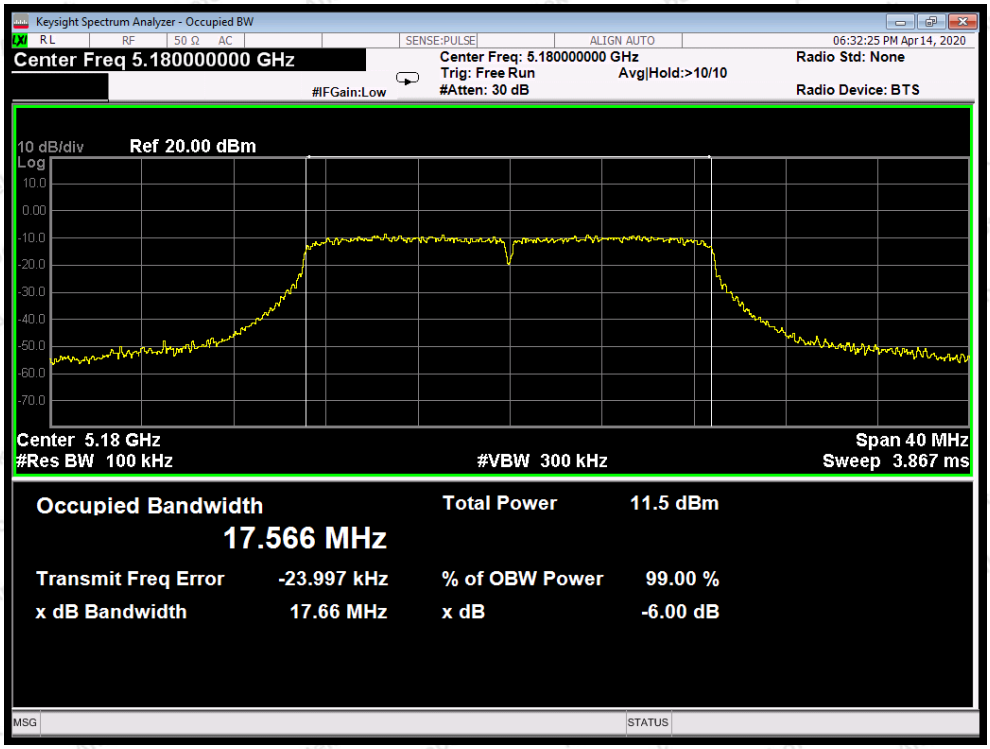

Test Mode: 802.11a--Low



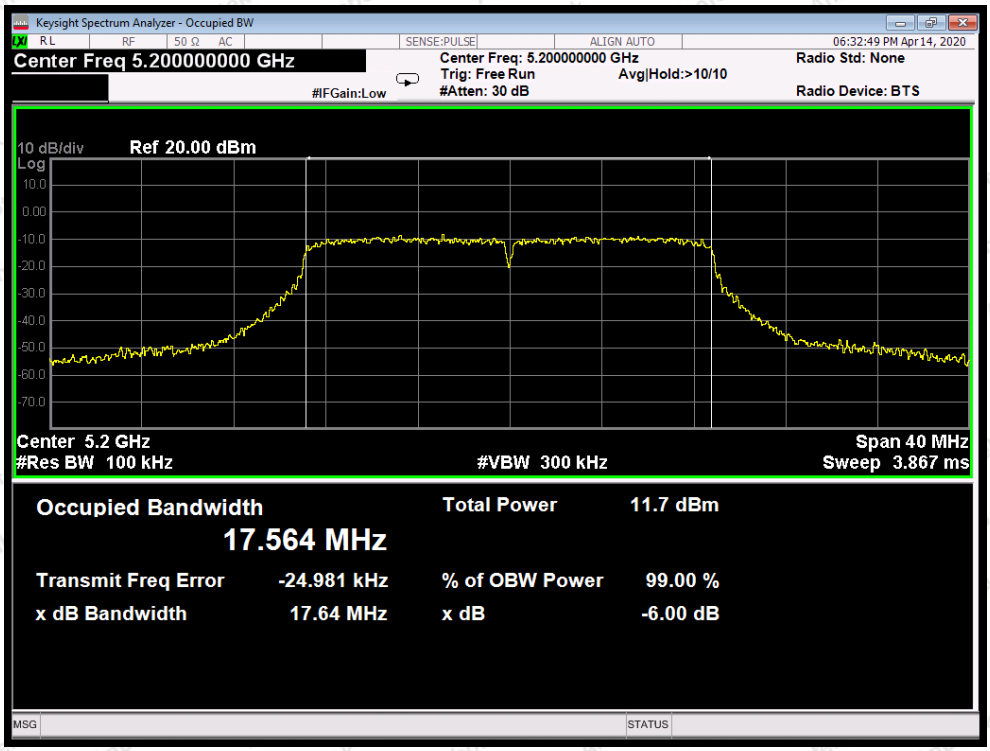

Test Mode: 802.11a---Middle



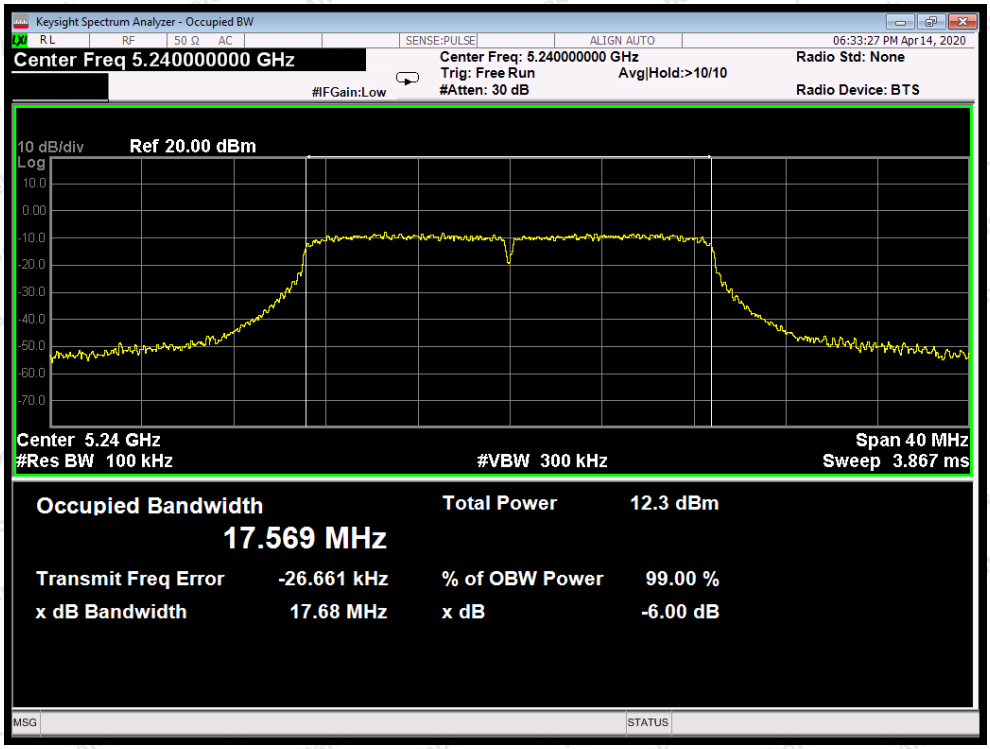

Test Mode: 802.11a---High



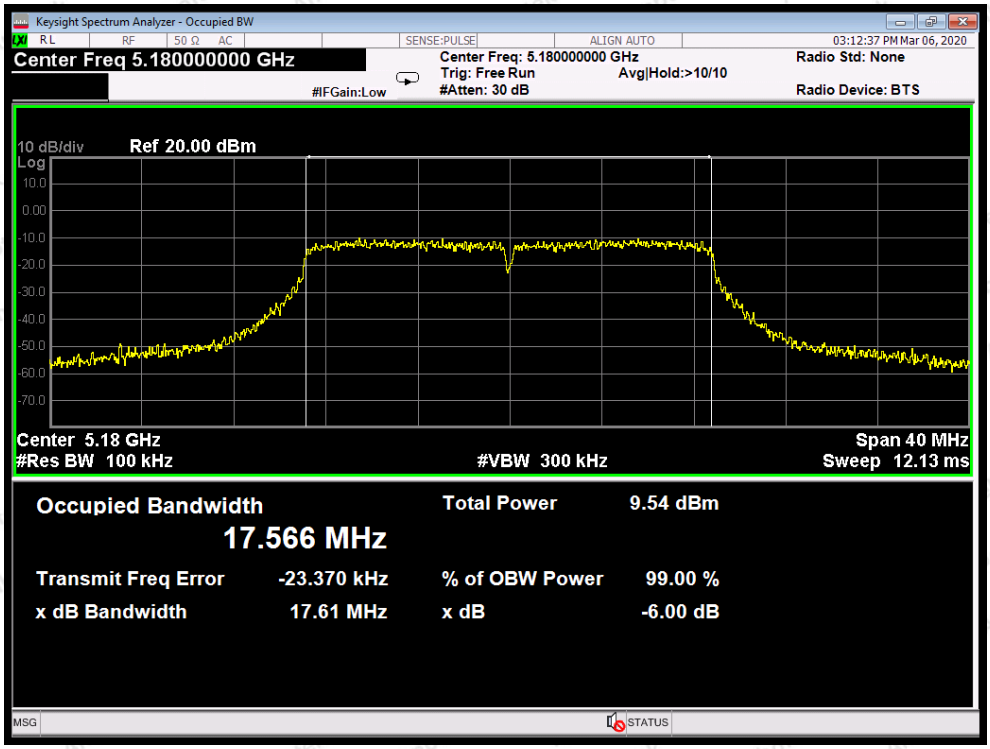

Test Mode: 802.11n20---Low



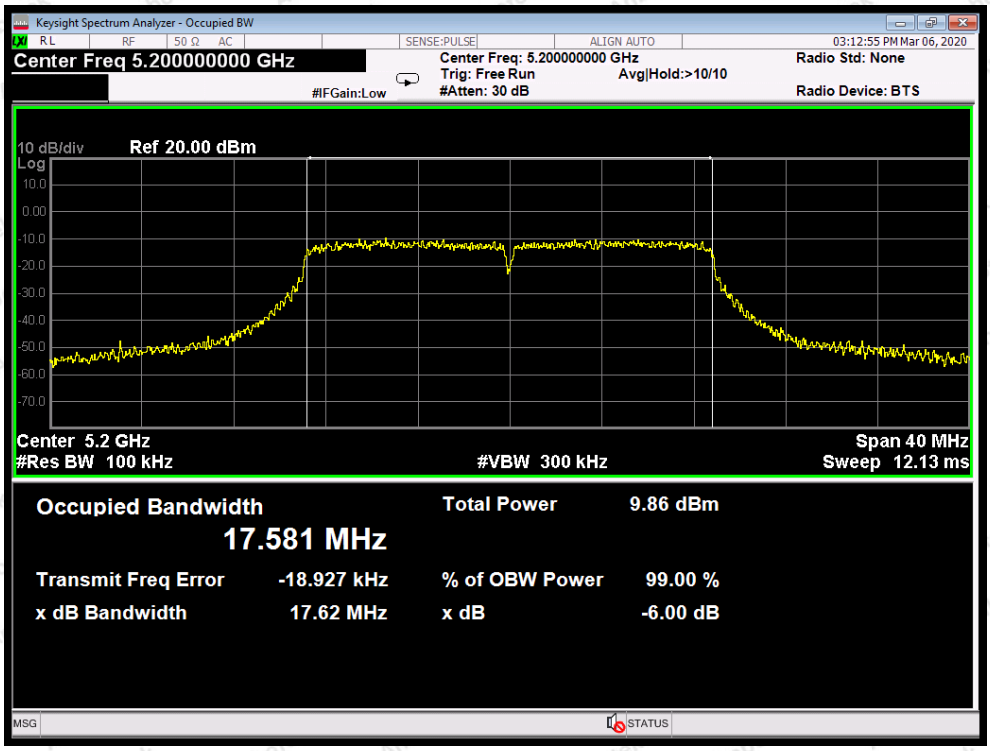

Test Mode: 802.11n20---Middle



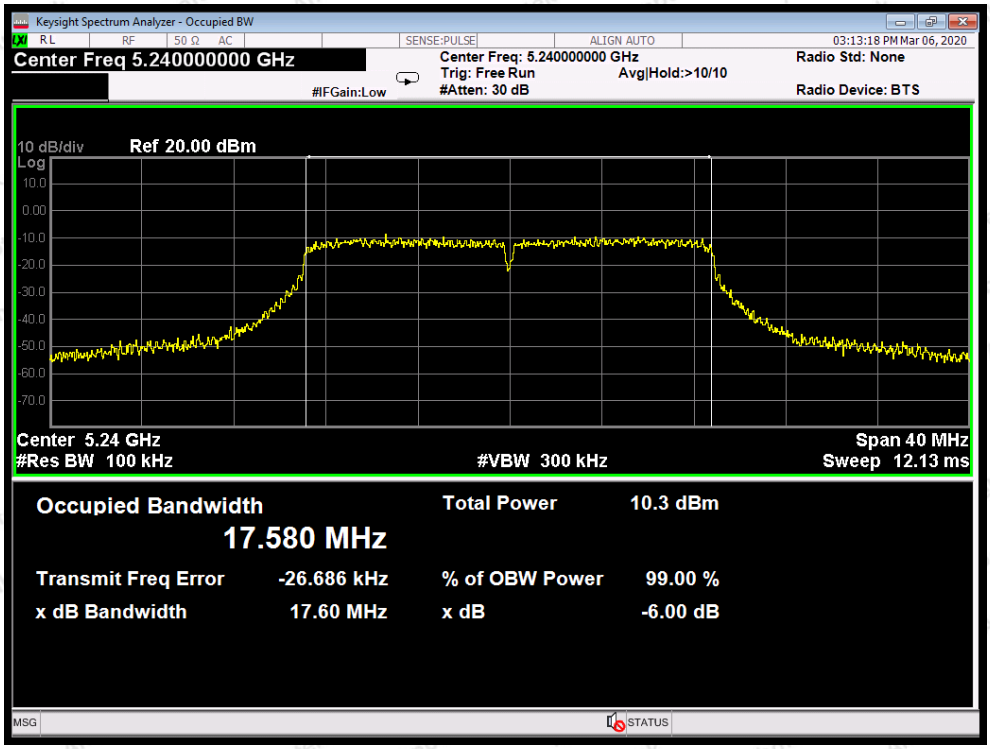

Test Mode: 802.11n20---High



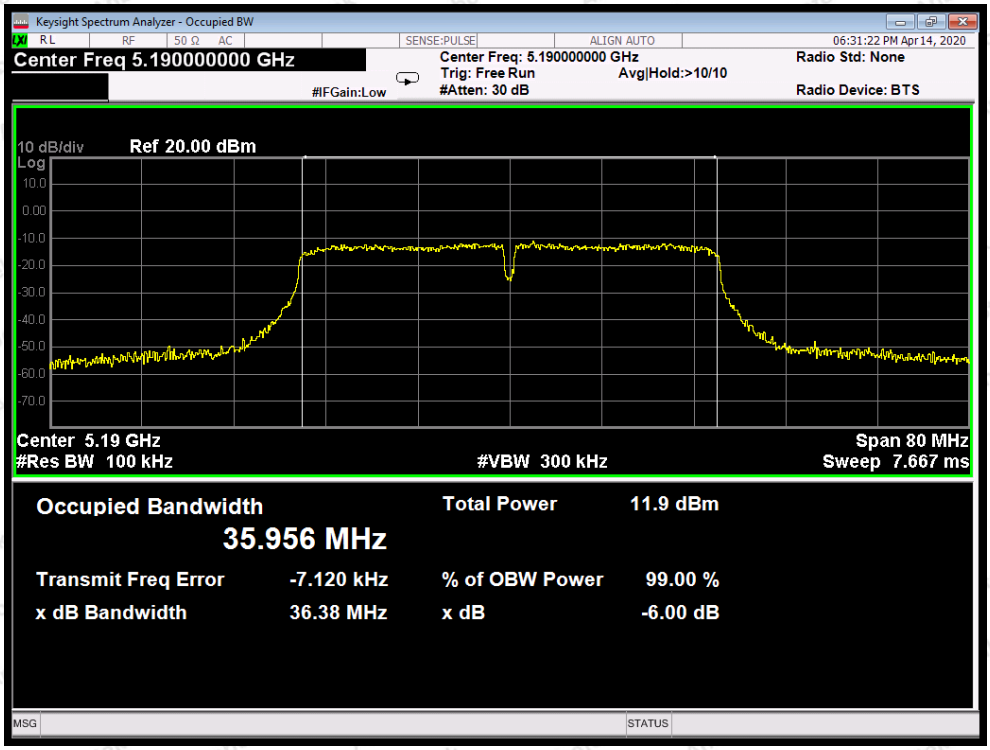

Test Mode: 802.11ac20--Low



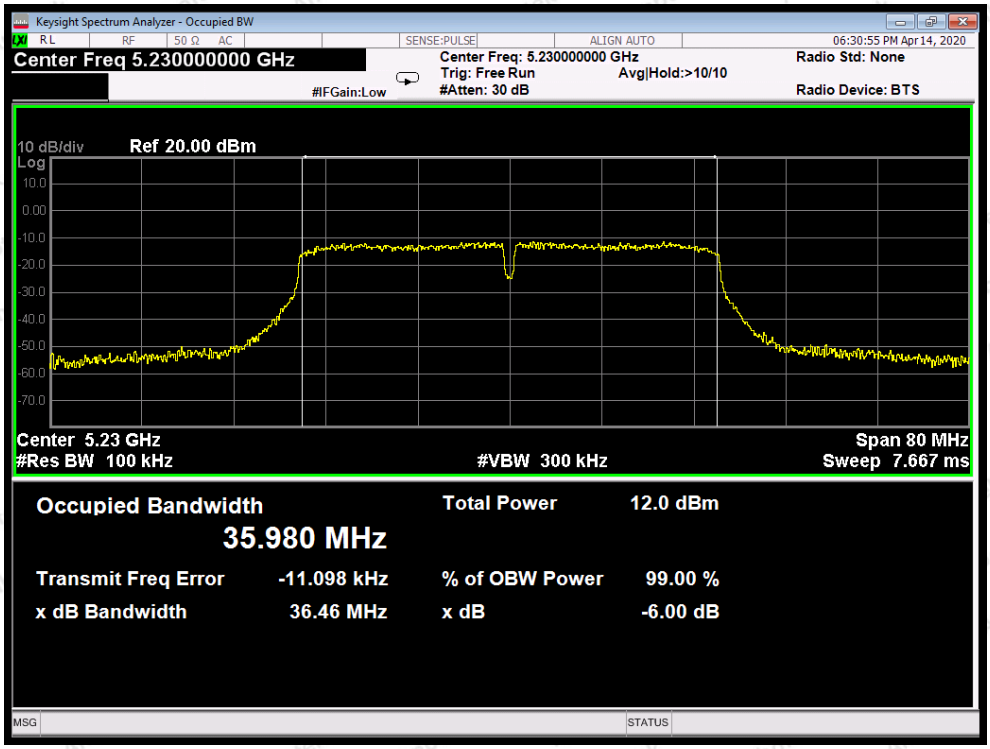

Test Mode: 802.11ac20---Middle



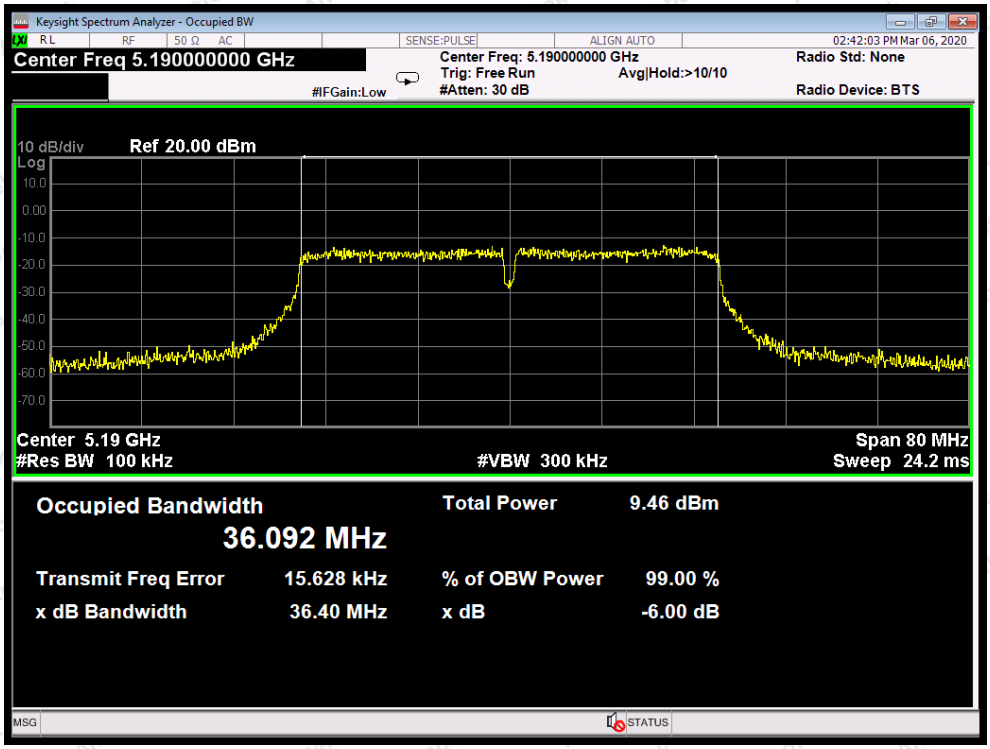

Test Mode: 802.11ac20---High



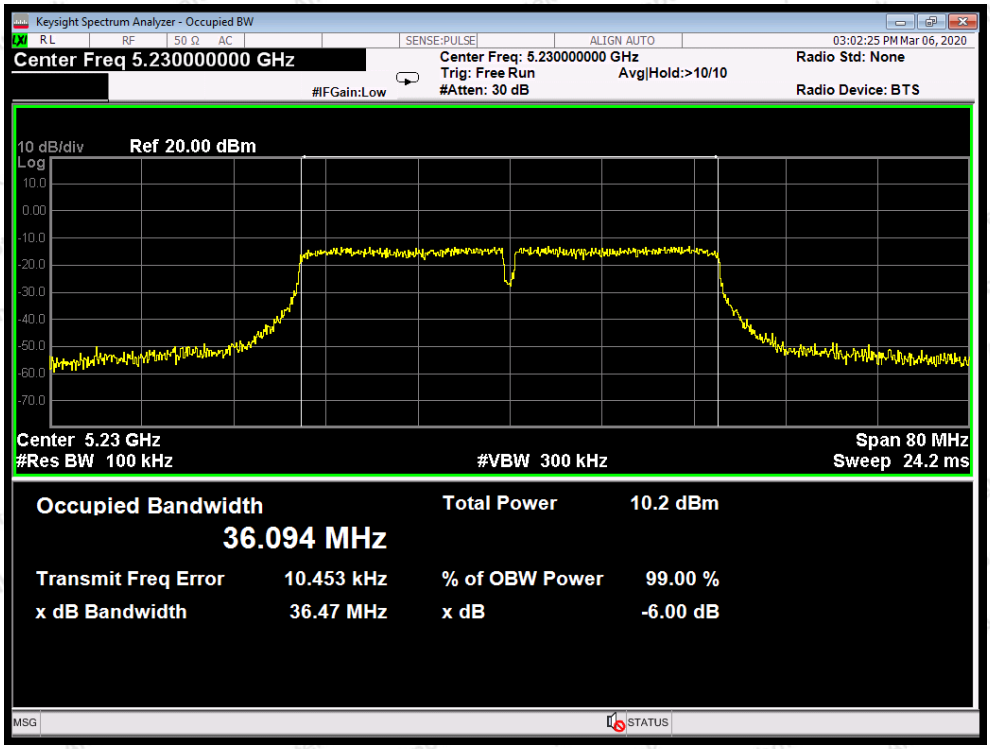

Test Mode: 802.11n40---Low



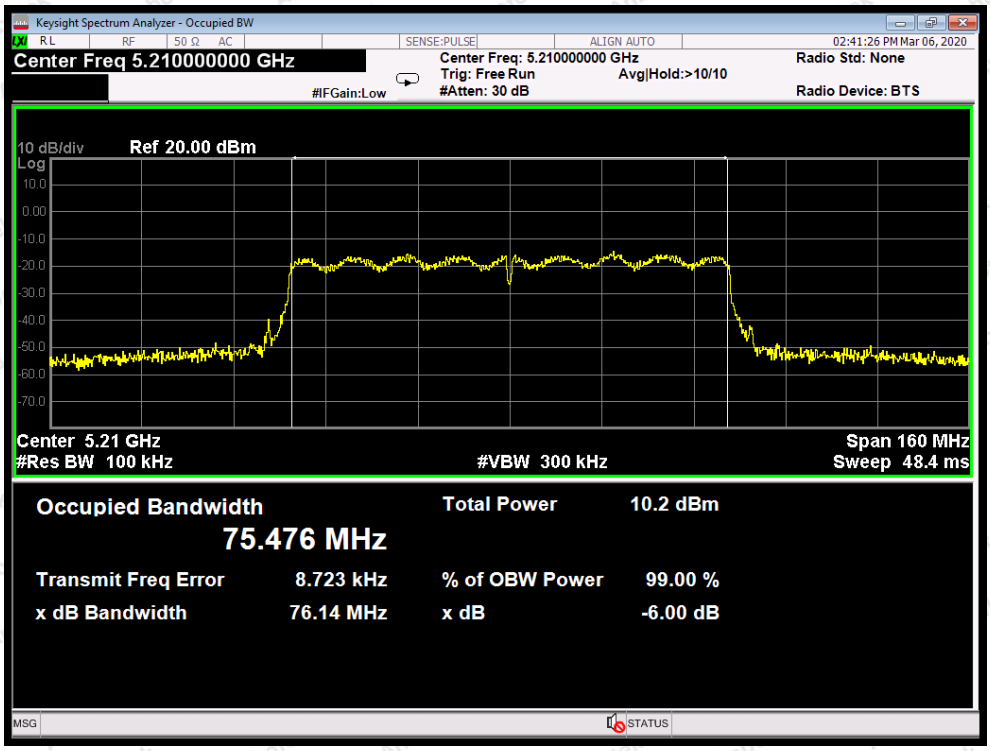

Test Mode: 802.11n40---High




Test Mode: 802.11ac40---Low

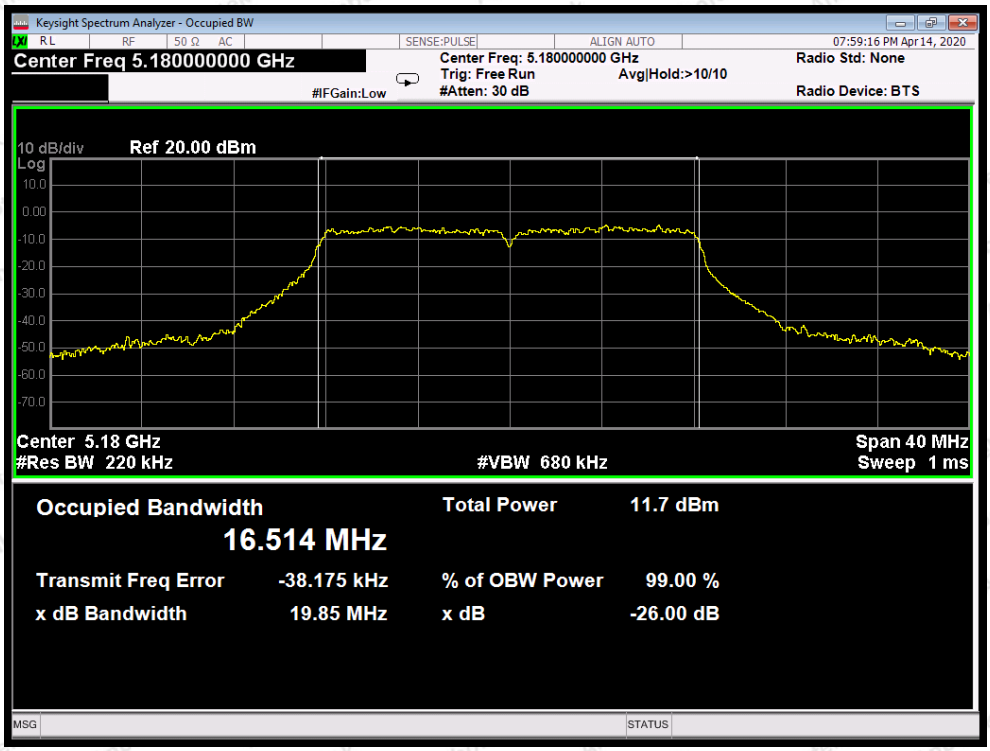



Test Mode: 802.11ac40---High

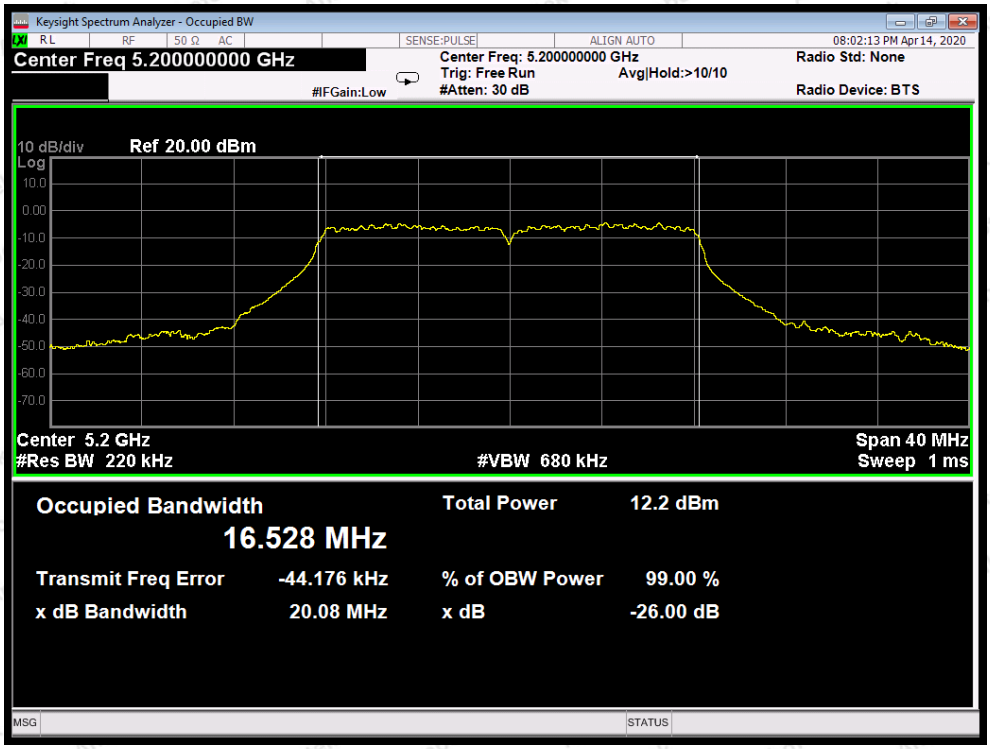



Test Mode: 802.11ac80

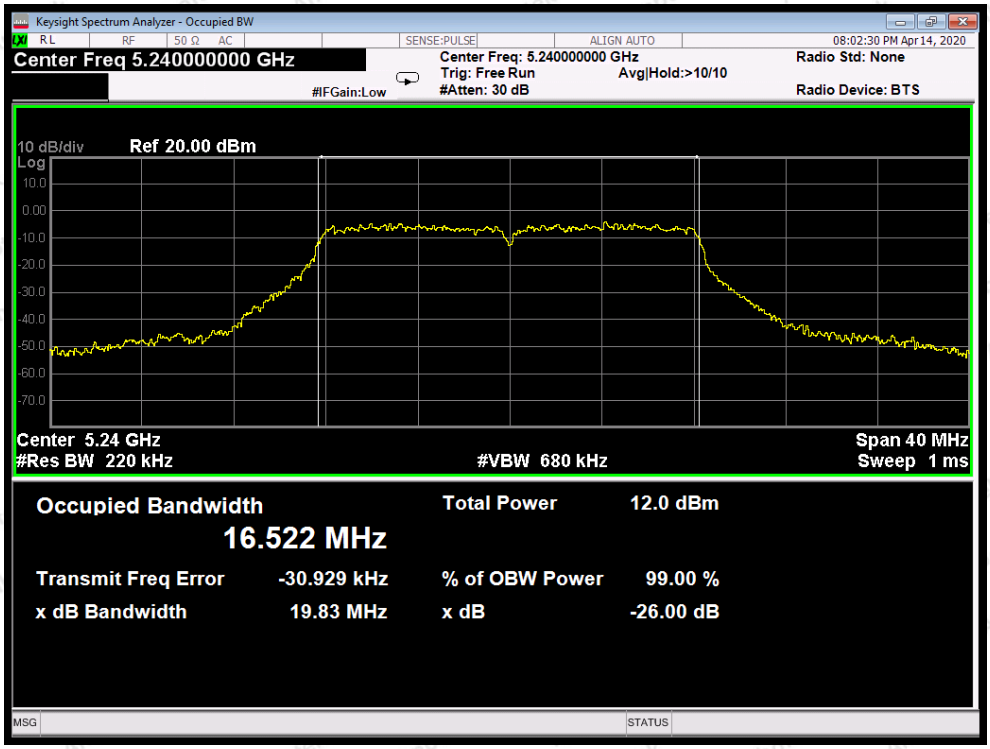
**26dB & 99% Bandwidth**



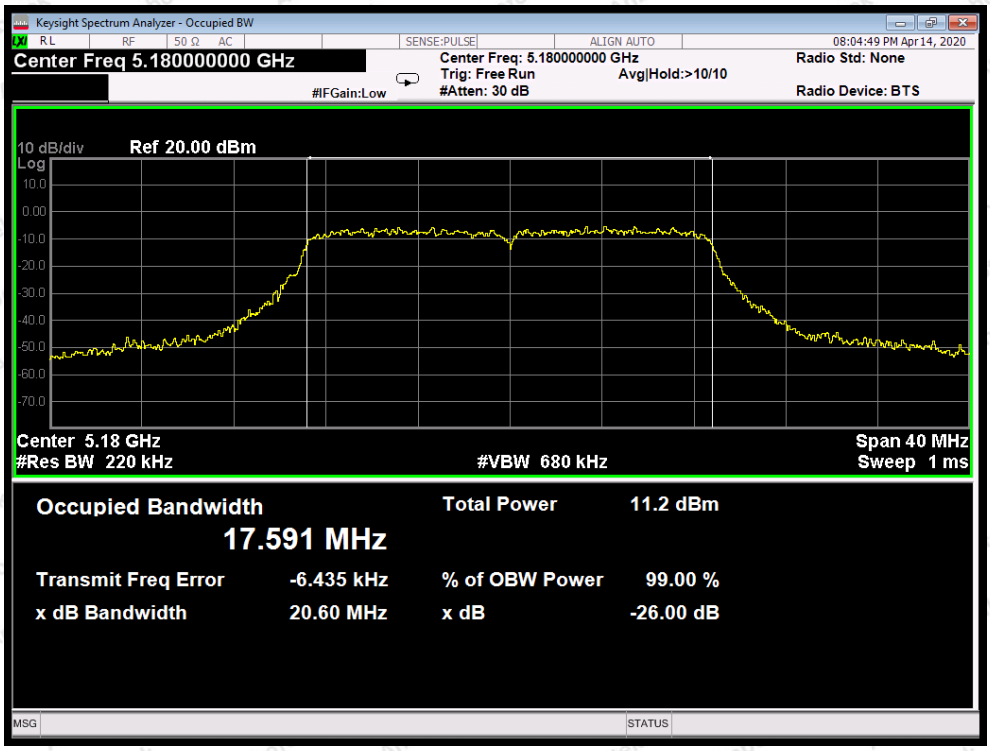

Test Mode: 802.11a--Low



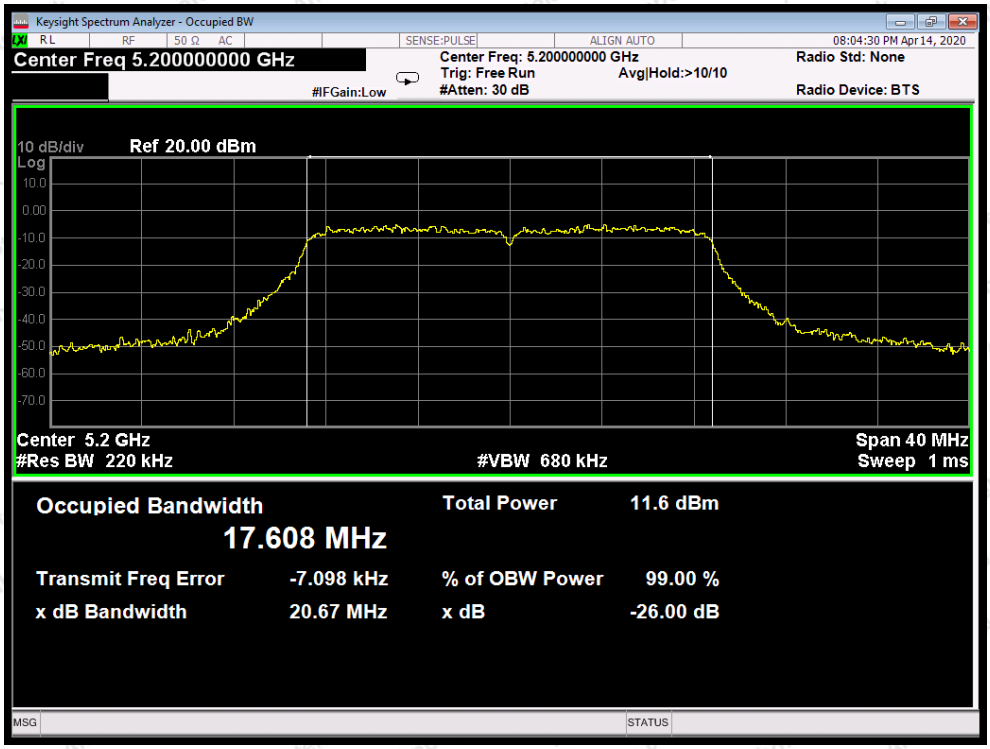

Test Mode: 802.11a---Middle



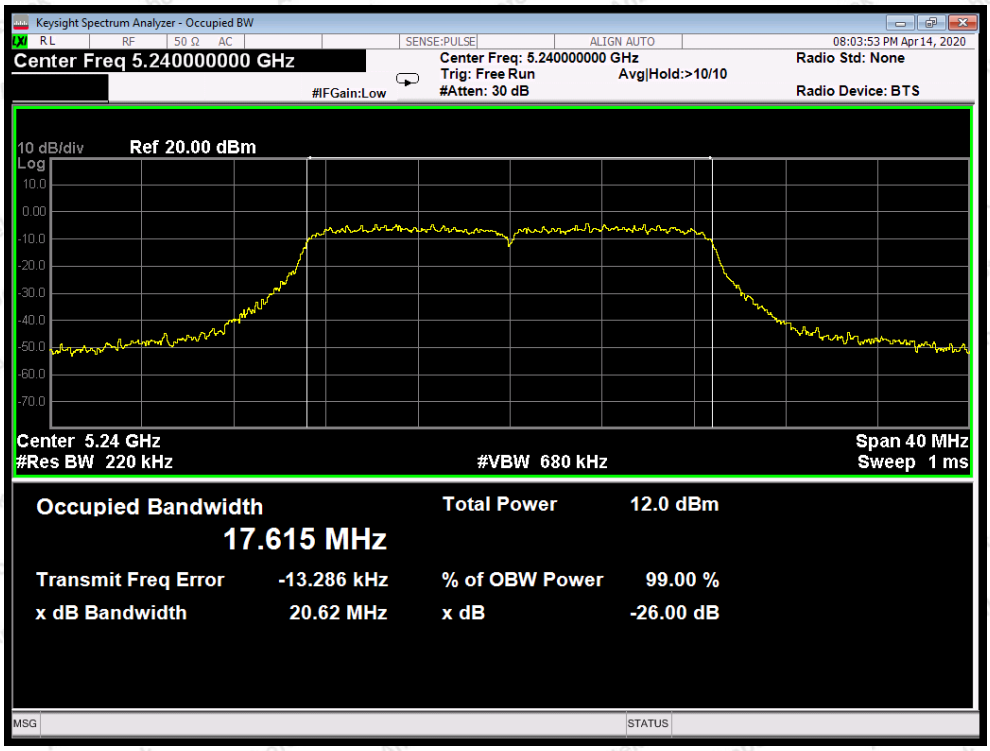

Test Mode: 802.11a---High



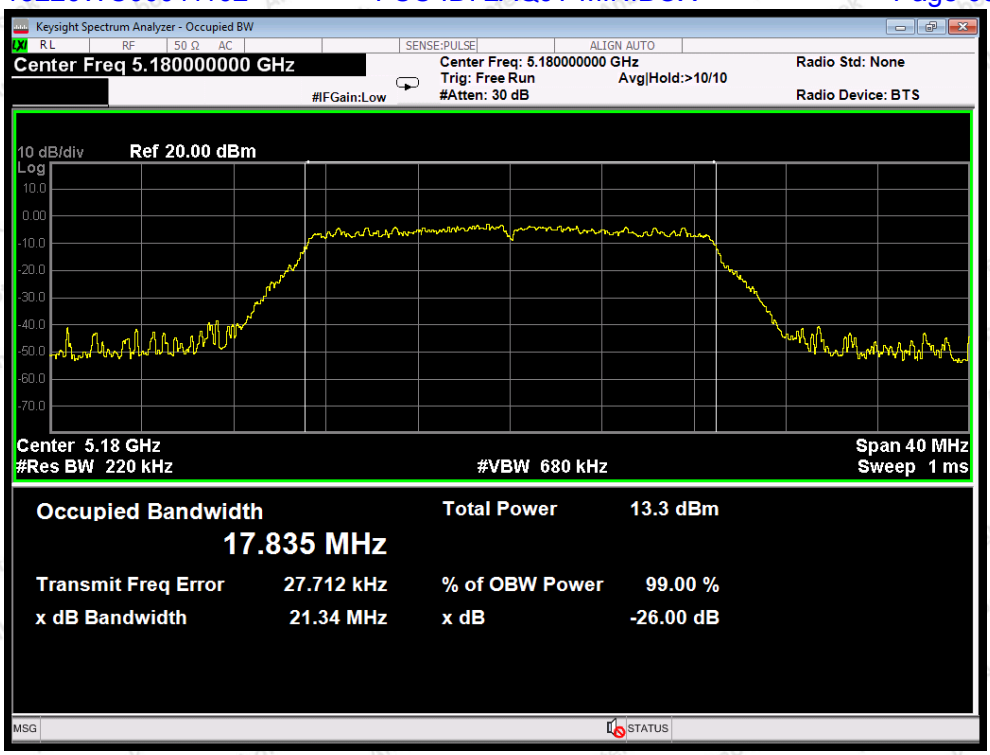

Test Mode: 802.11n20---Low



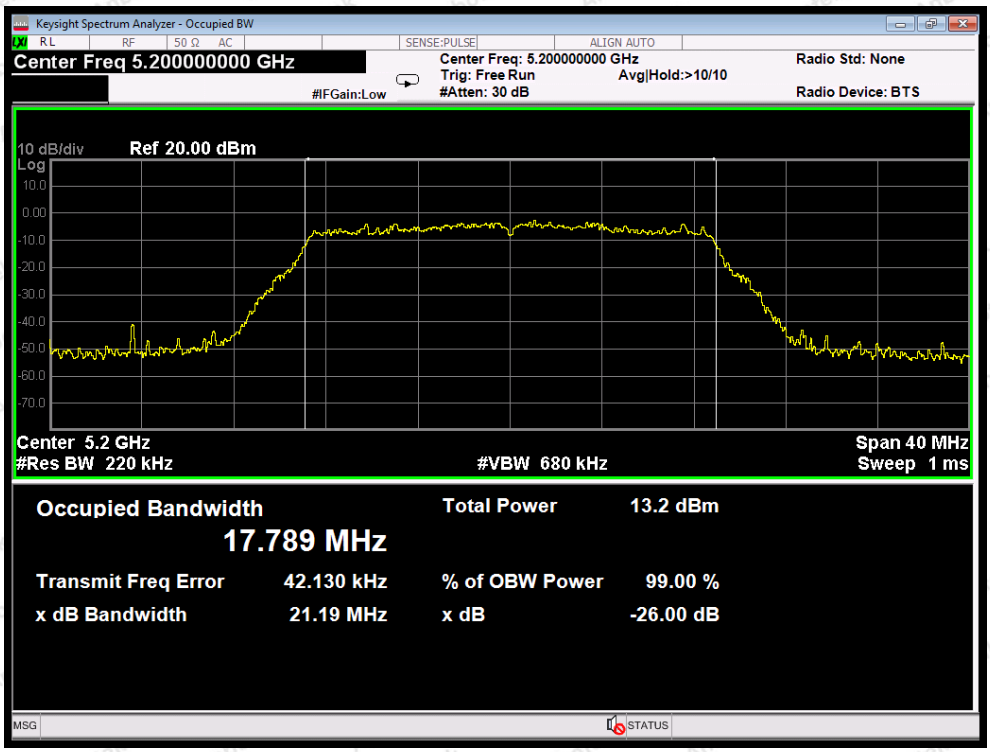

Test Mode: 802.11n20---Middle



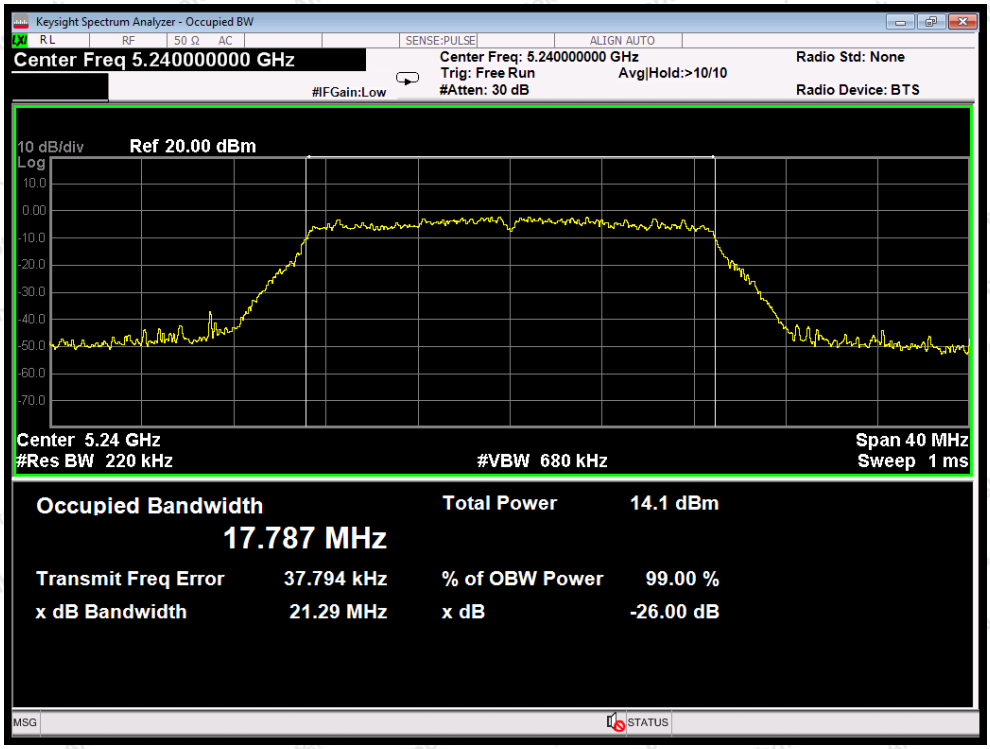

Test Mode: 802.11n20---High



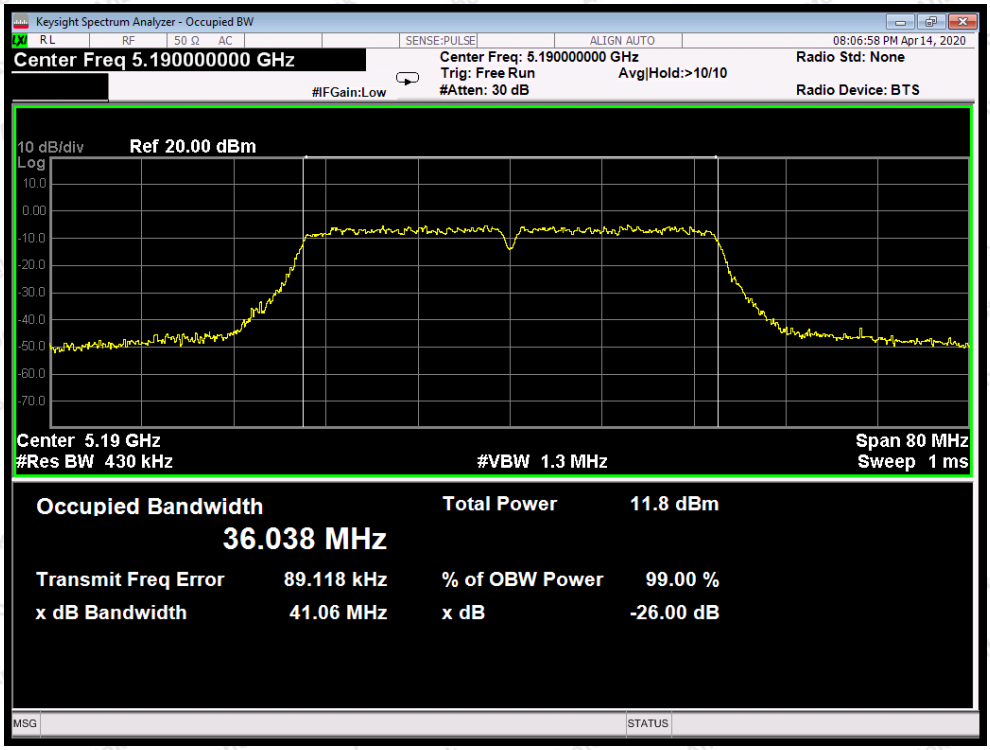

Test Mode: 802.11ac20--Low



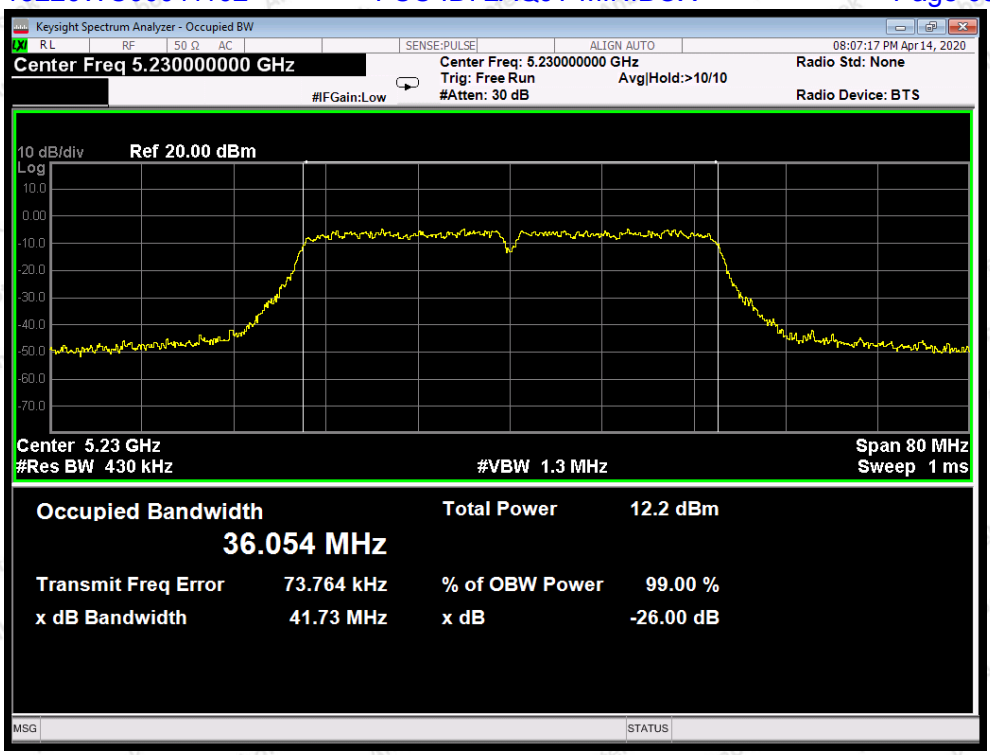

Test Mode: 802.11ac20---Middle



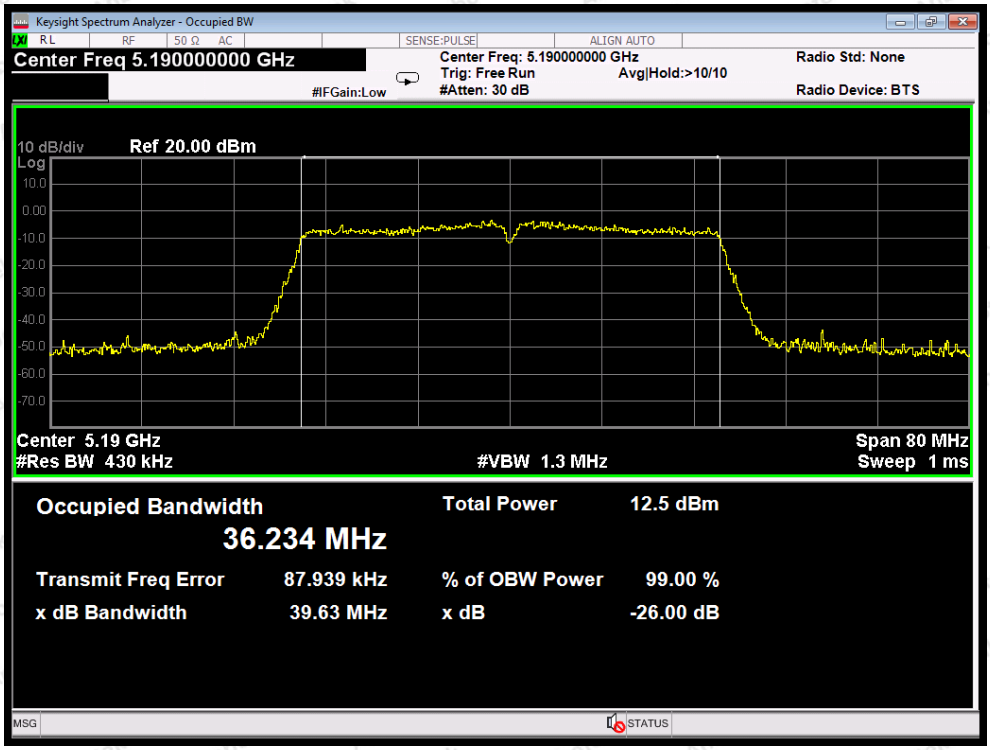

Test Mode: 802.11ac20---High



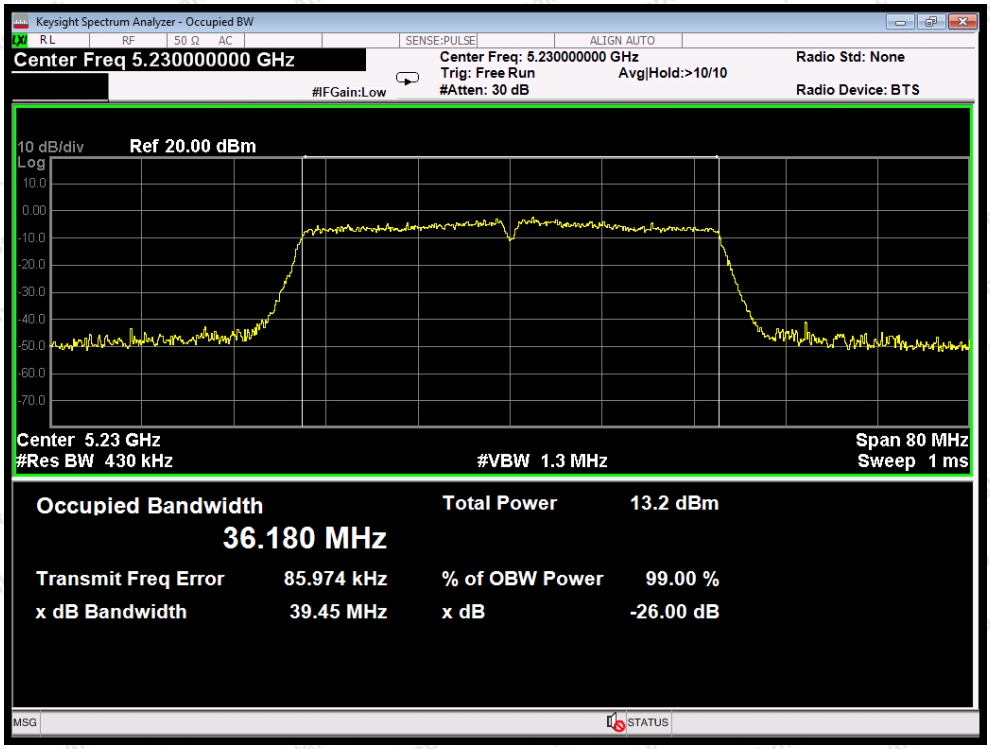

Test Mode: 802.11n40---Low



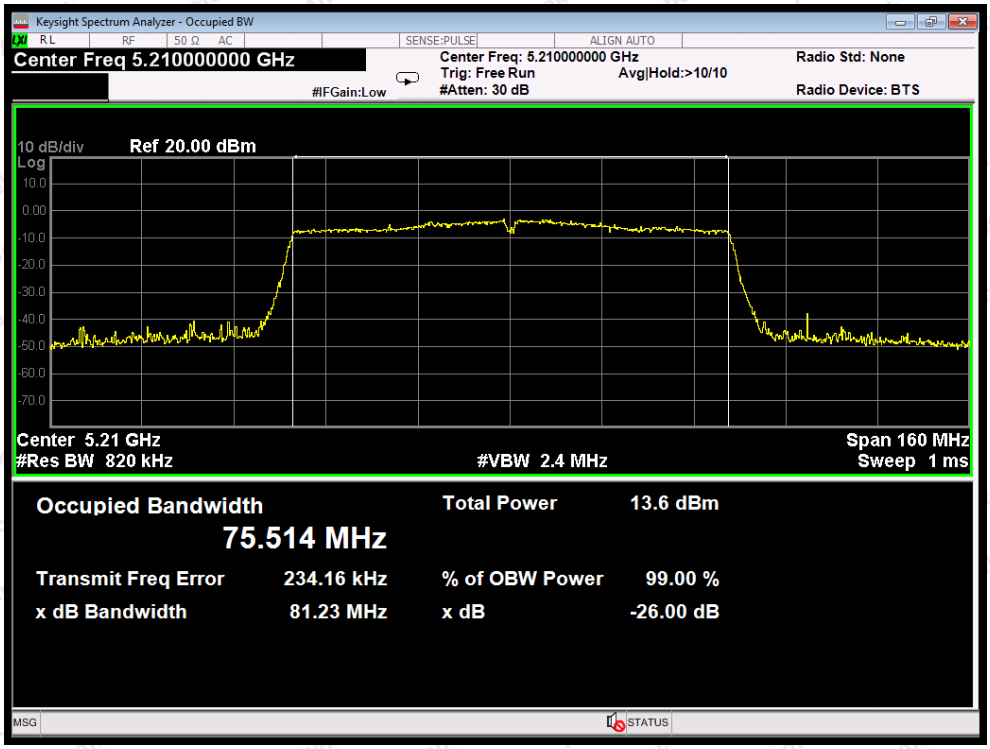

Test Mode: 802.11n40---High




Test Mode: 802.11ac40---Low




Test Mode: 802.11ac40---High



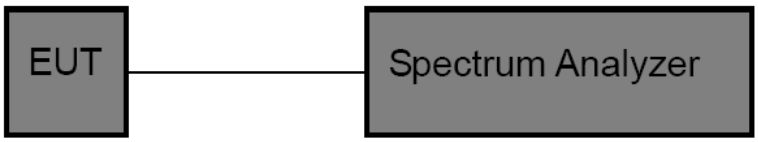

Test Mode: 802.11ac80

# 7. Power Spectral Density Test

## 7.1. Test Standard and Limit

| | |
|---|---|
| Test Standard | FCC Part15 C Section 15.407 (a) (1) |
| Test Limit | 17 dBm/MHz |

## 7.2. Test Setup




## 7.3. Test Procedure

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz).

1. The EUT is directly connected to the spectrum analyzer;
2. Set RBW =1MHz;
3. Set VBW ≥ 3 RBW=3MHz;
3. Set the span to encompass the entire emissions bandwidth (EBW) of the signal;
5. Detector=RMS;
6. Sweep time= auto couple;
7. Trace mode=max. hold;

## 7.4. Test Data

| | | | | | |
|---|---|---|---|---|---|
| Test Item | : | Power Spectral Density | Test Mode | : | CH Low ~ CH High |
| Test Voltage | : | AC 120V, 60Hz for adapter | Temperature | : | 24℃ |
| Test Result | : | PASS | Humidity | : | 55%RH |

ANT A

| Test Mode | Channel Frequency (MHz) | Final Power Spectral Density (dBm/MHz) | Correctional Limit (dBm/MHz) | Results |
|---|---|---|---|---|
| 802.11a | 5180 | -0.487 | 17 | PASS |
| | 5200 | -0.085 | 17 | PASS |
| | 5240 | 0.297 | 17 | PASS |
| 802.11n20 | 5180 | -0.401 | 17 | PASS |
| | 5200 | -0.243 | 17 | PASS |
| | 5240 | 0.226 | 17 | PASS |
| 802.11ac20 | 5180 | -1.567 | 17 | PASS |
| | 5200 | -2.708 | 17 | PASS |
| | 5240 | -2.771 | 17 | PASS |
| 802.11n40 | 5190 | -3.501 | 17 | PASS |
| | 5230 | -3.105 | 17 | PASS |
| 802.11ac40 | 5190 | -5.475 | 17 | PASS |
| | 5230 | -4.794 | 17 | PASS |
| 802.11ac80 | 5210 | -6.213 | 17 | PASS |

ANT B

| Test Mode | Channel Frequency (MHz) | Final Power Spectral Density (dBm/MHz) | Correctional Limit (dBm/MHz) | Results |
|---|---|---|---|---|
| 802.11a | 5180 | -0.517 | 17 | PASS |
| | 5200 | -0.117 | 17 | PASS |
| | 5240 | 0.017 | 17 | PASS |
| 802.11n20 | 5180 | -0.280 | 17 | PASS |
| | 5200 | -0.070 | 17 | PASS |
| | 5240 | 0.583 | 17 | PASS |
| 802.11ac20 | 5180 | -1.355 | 17 | PASS |
| | 5200 | -1.506 | 17 | PASS |
| | 5240 | -0.750 | 17 | PASS |
| 802.11n40 | 5190 | -3.007 | 17 | PASS |
| | 5230 | -3.011 | 17 | PASS |
| 802.11ac40 | 5190 | -3.815 | 17 | PASS |
| | 5230 | -3.272 | 17 | PASS |
| 802.11ac80 | 5210 | -6.912 | 17 | PASS |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Hotline 400-003-0500
www.anbotek.com

ANT A+ANT B

| Test Mode | Channel Frequency (MHz) | Final Power Spectral Density (dBm/MHz) | Correctional Limit (dBm/MHz) | Results |
|---|---|---|---|---|
| 802.11n20 | 5180 | 2.670 | 17 | PASS |
| | 5200 | 2.855 | 17 | PASS |
| | 5240 | 3.418 | 17 | PASS |
| 802.11ac20 | 5180 | 1.551 | 17 | PASS |
| | 5200 | 0.945 | 17 | PASS |
| | 5240 | 1.366 | 17 | PASS |
| 802.11n40 | 5190 | -0.237 | 17 | PASS |
| | 5230 | -0.047 | 17 | PASS |
| 802.11ac40 | 5190 | -1.556 | 17 | PASS |
| | 5230 | -0.956 | 17 | PASS |
| 802.11ac80 | 5210 | -3.538 | 17 | PASS |


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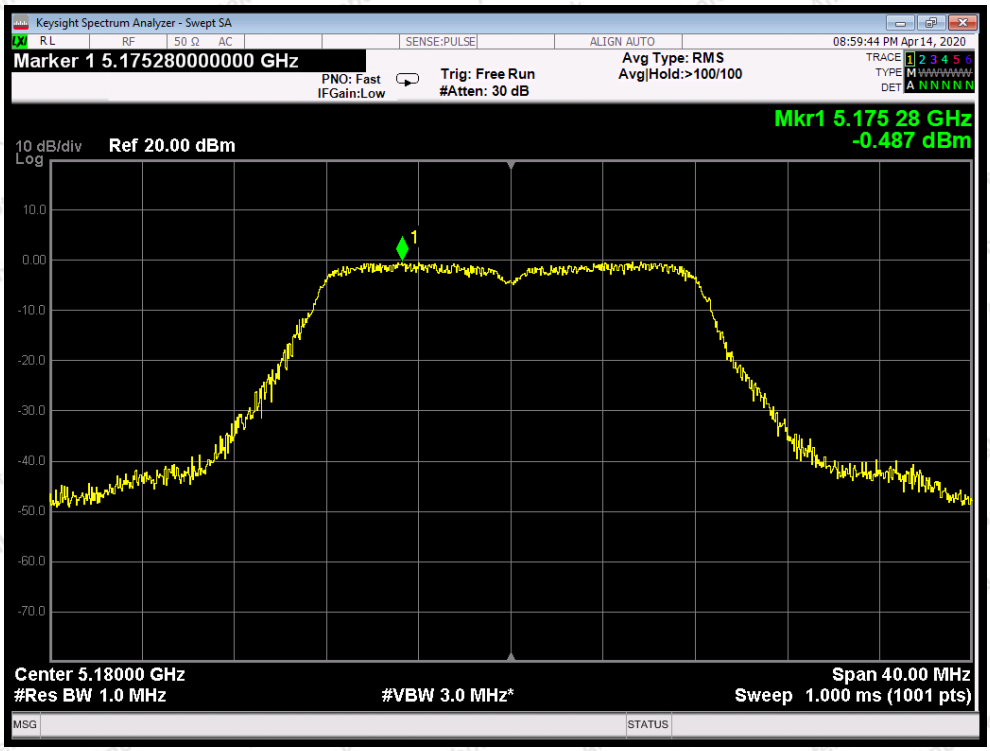
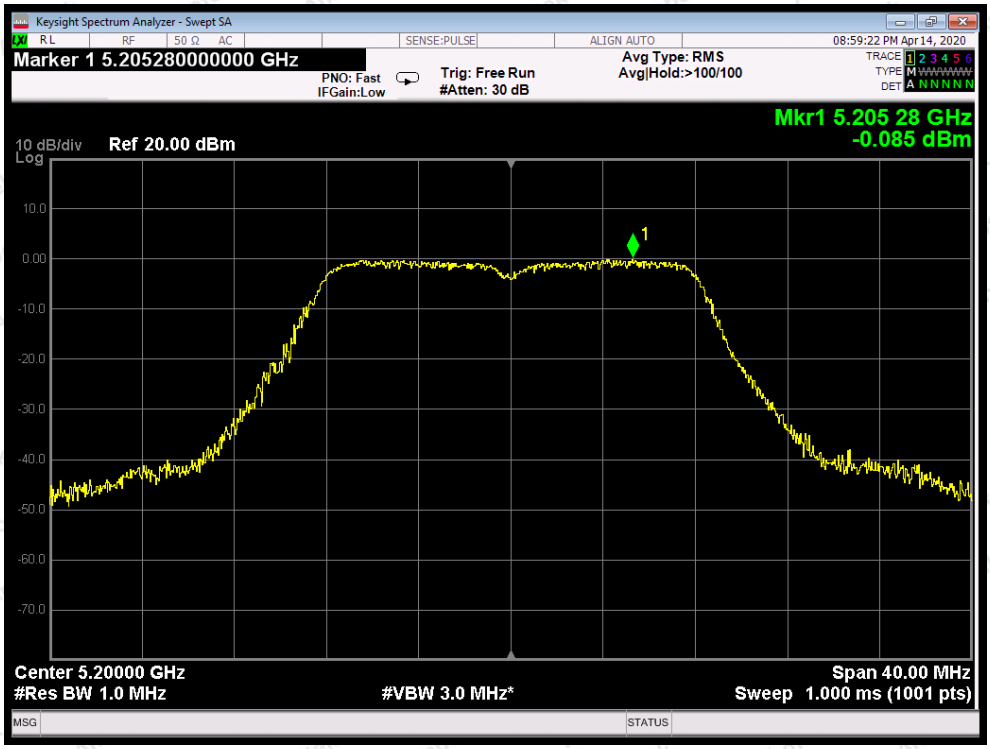
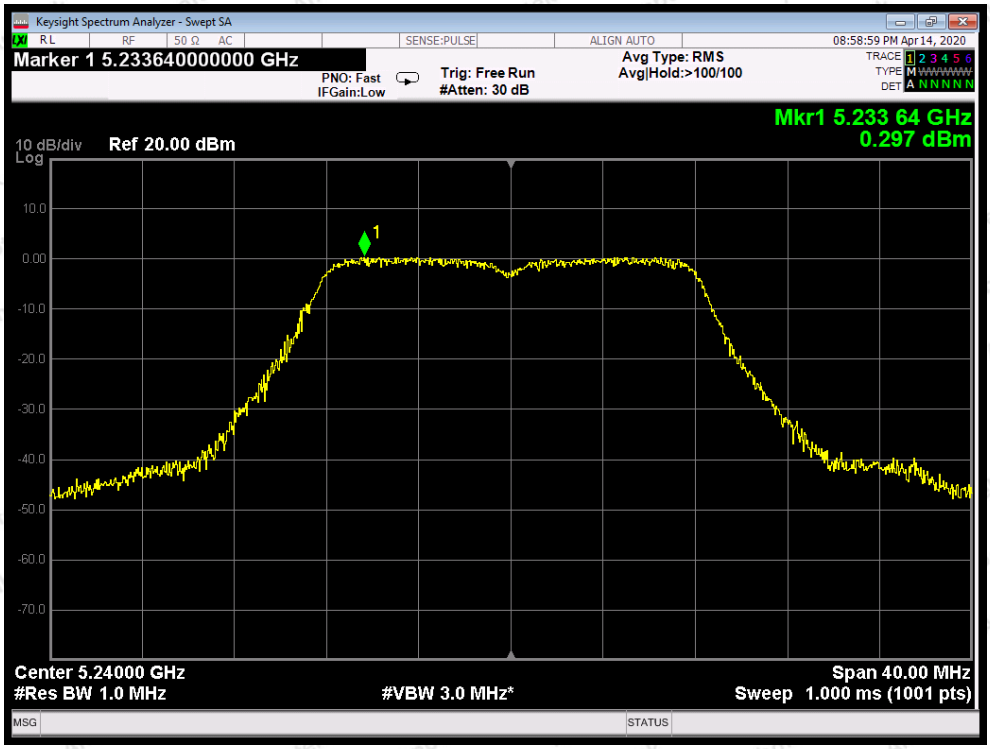
ANT A



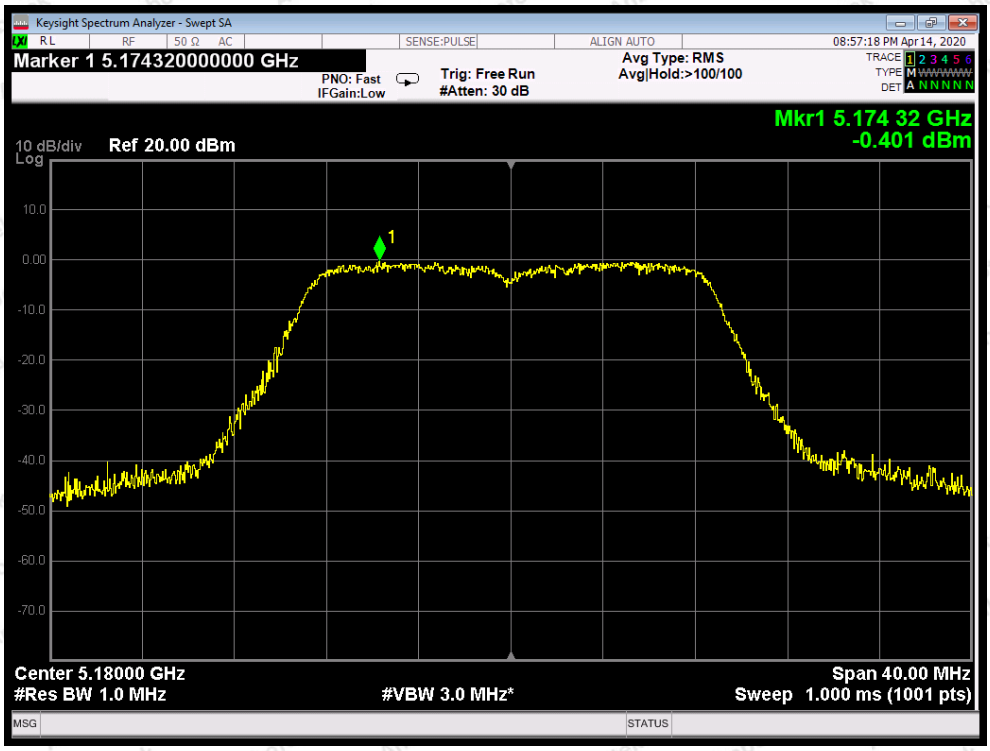

Test Mode: 802.11a--Low



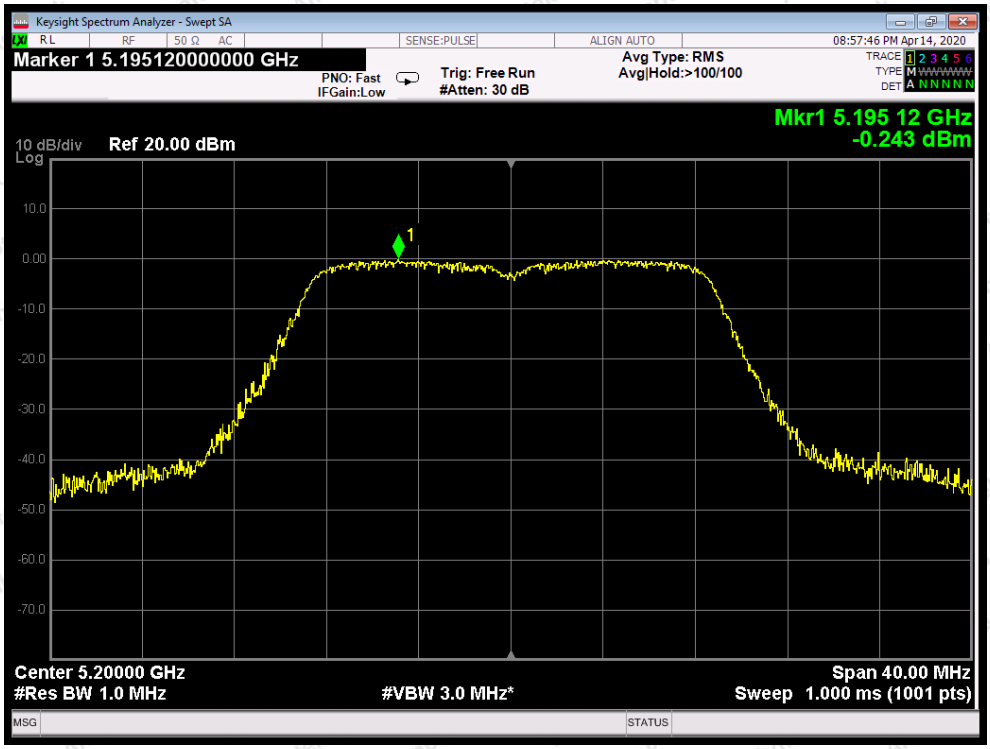

Test Mode: 802.11a---Middle



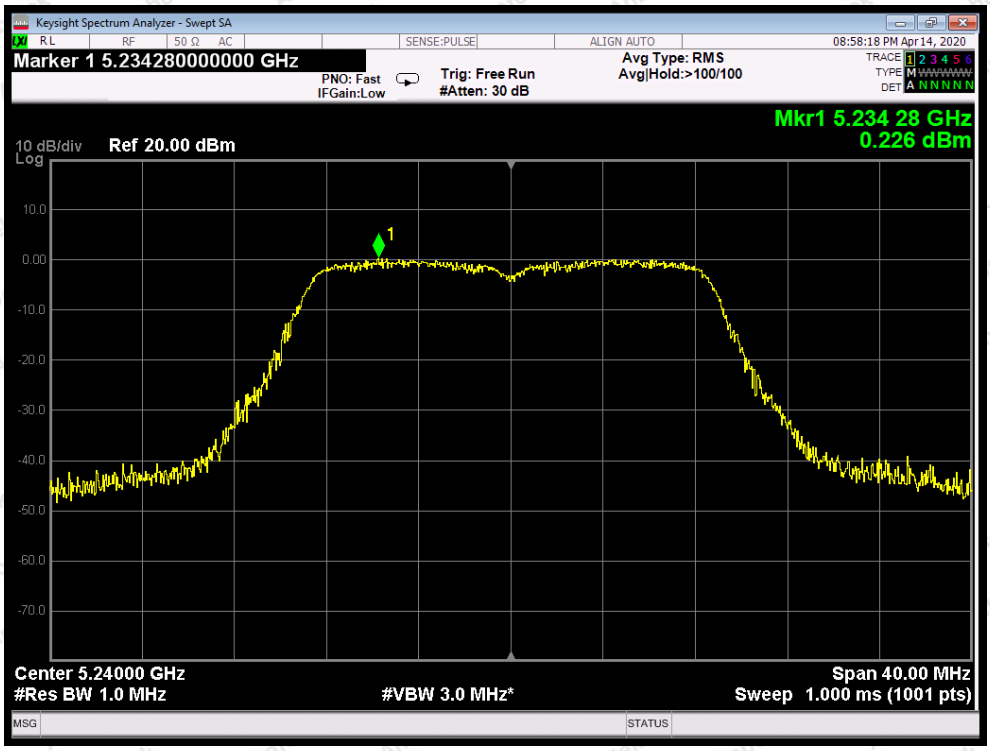

Test Mode: 802.11a---High



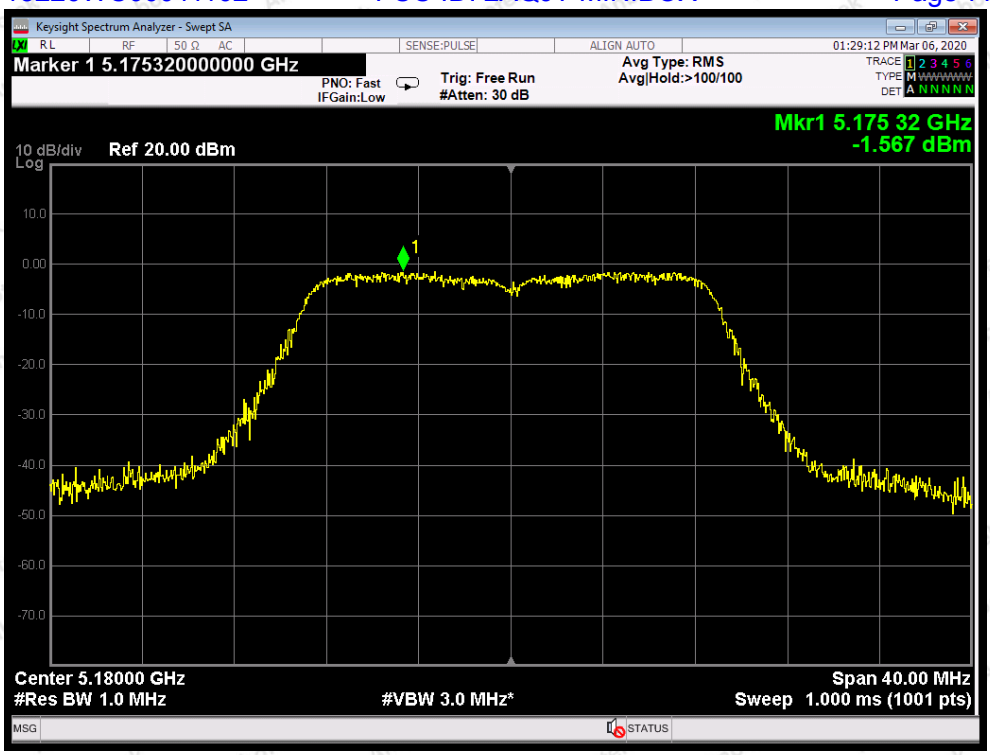

Test Mode: 802.11n20---Low



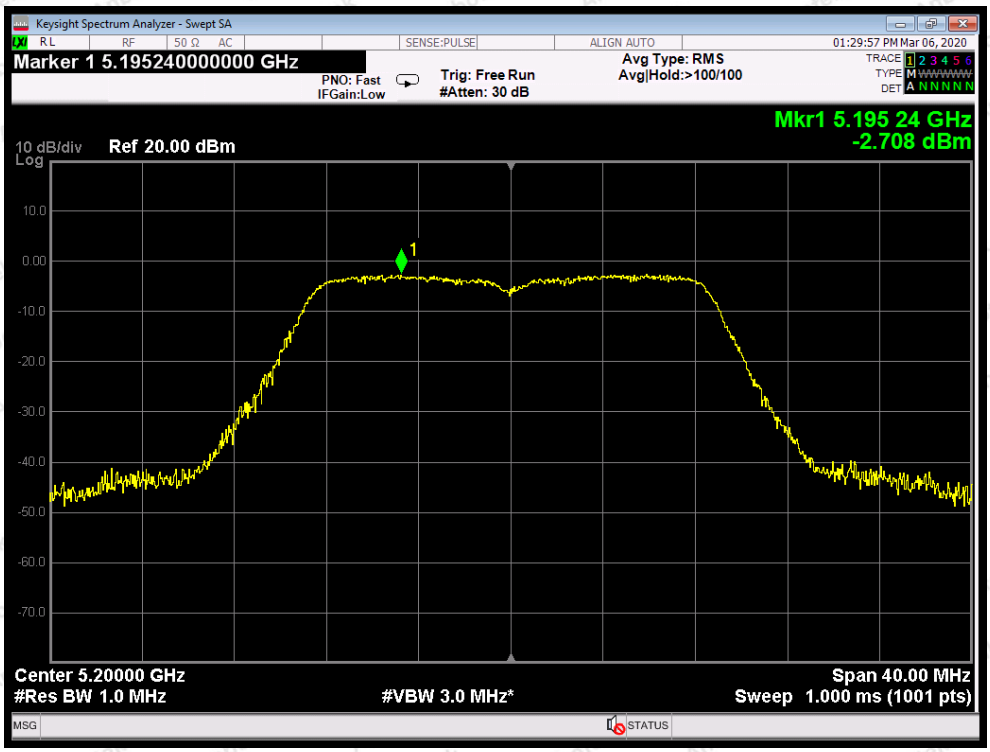

Test Mode: 802.11n20---Middle



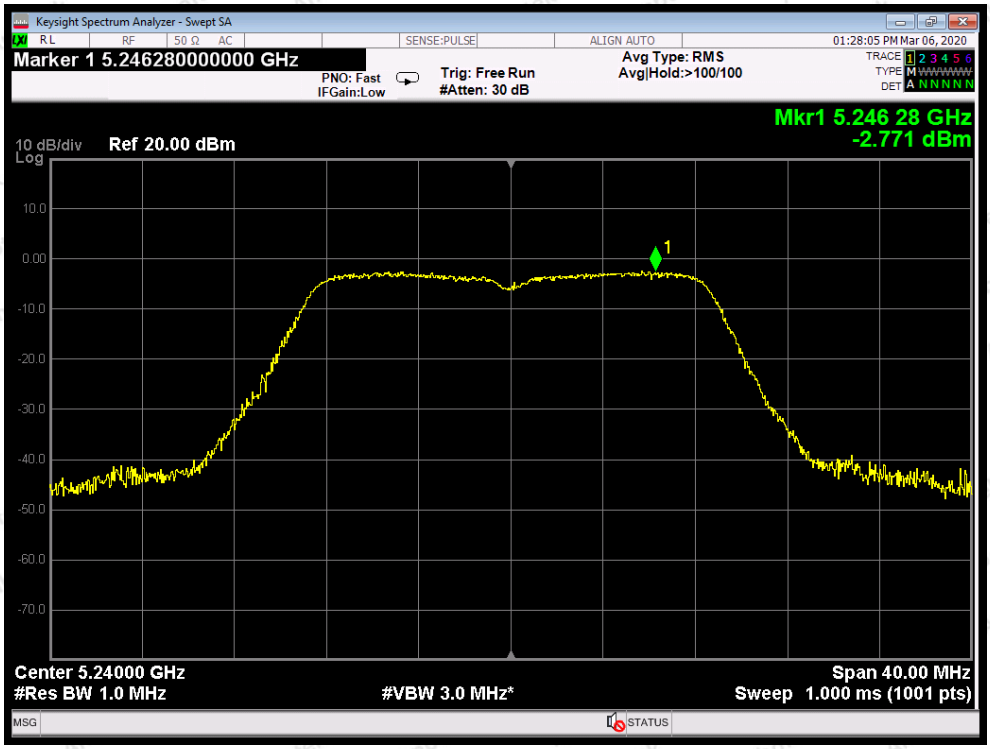

Test Mode: 802.11n20---High



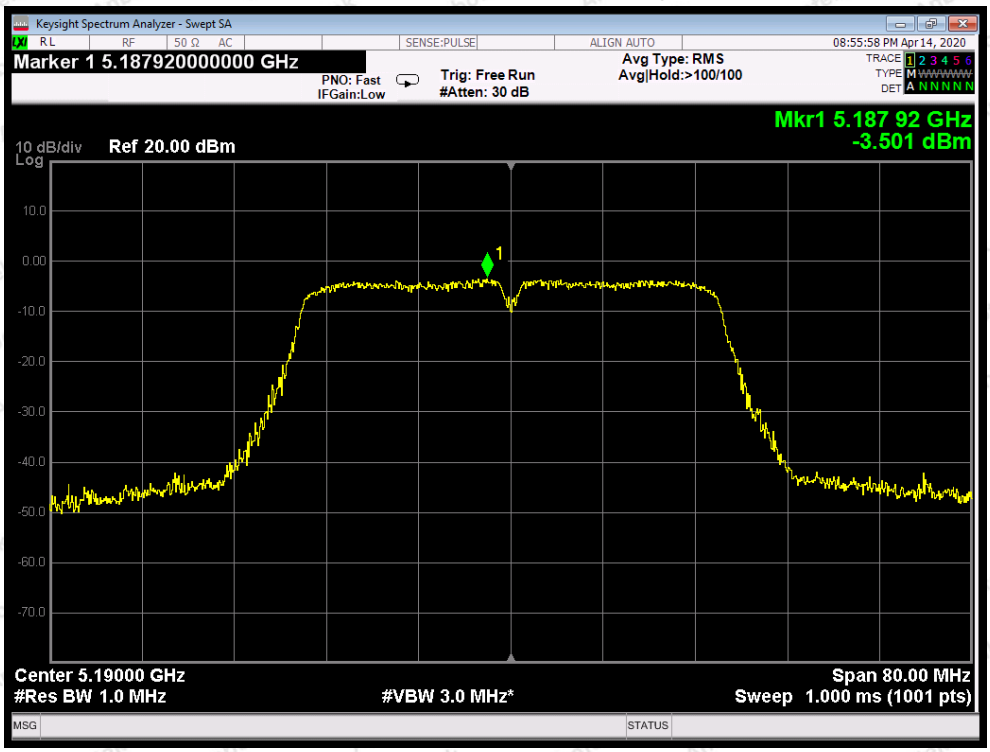

Test Mode: 802.11ac20--Low



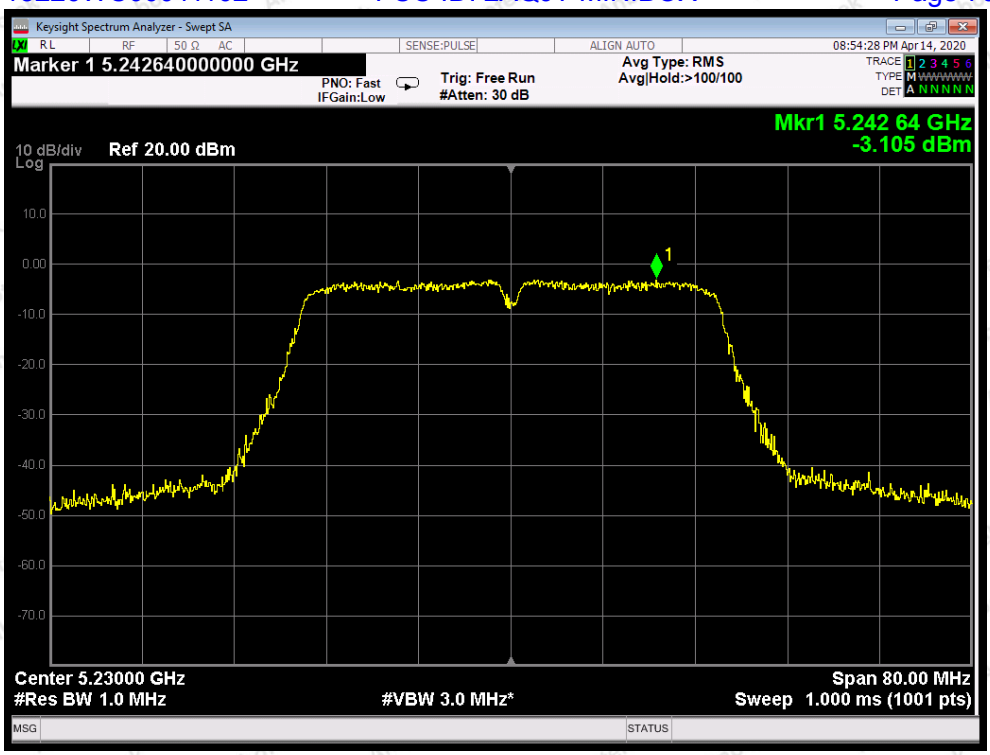

Test Mode: 802.11ac20---Middle



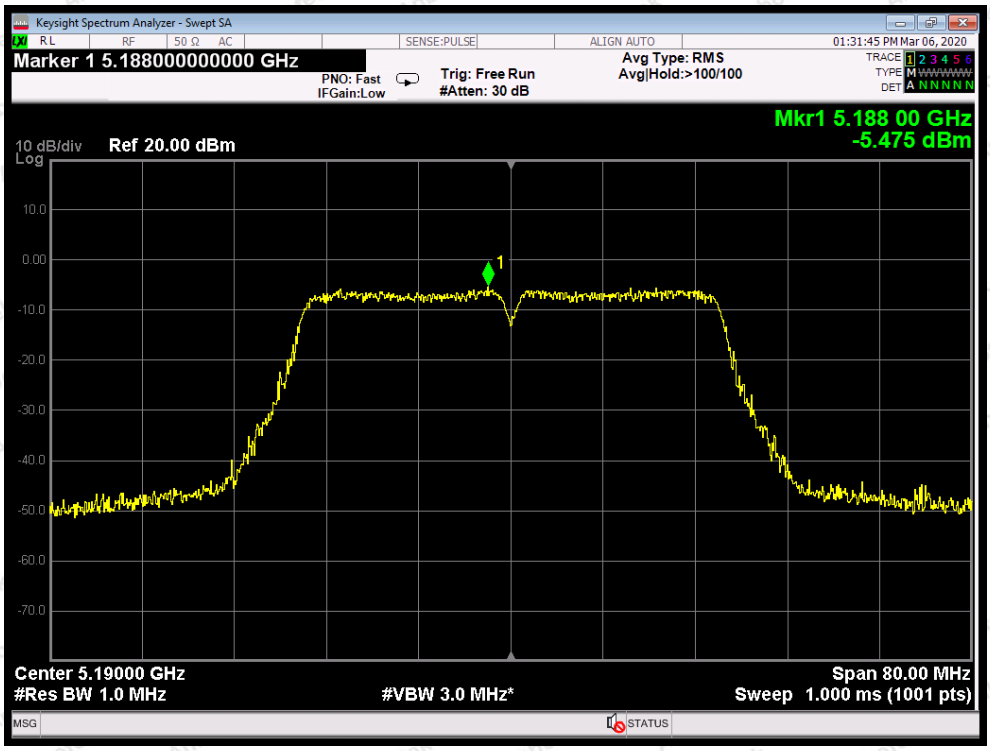

Test Mode: 802.11ac20---High



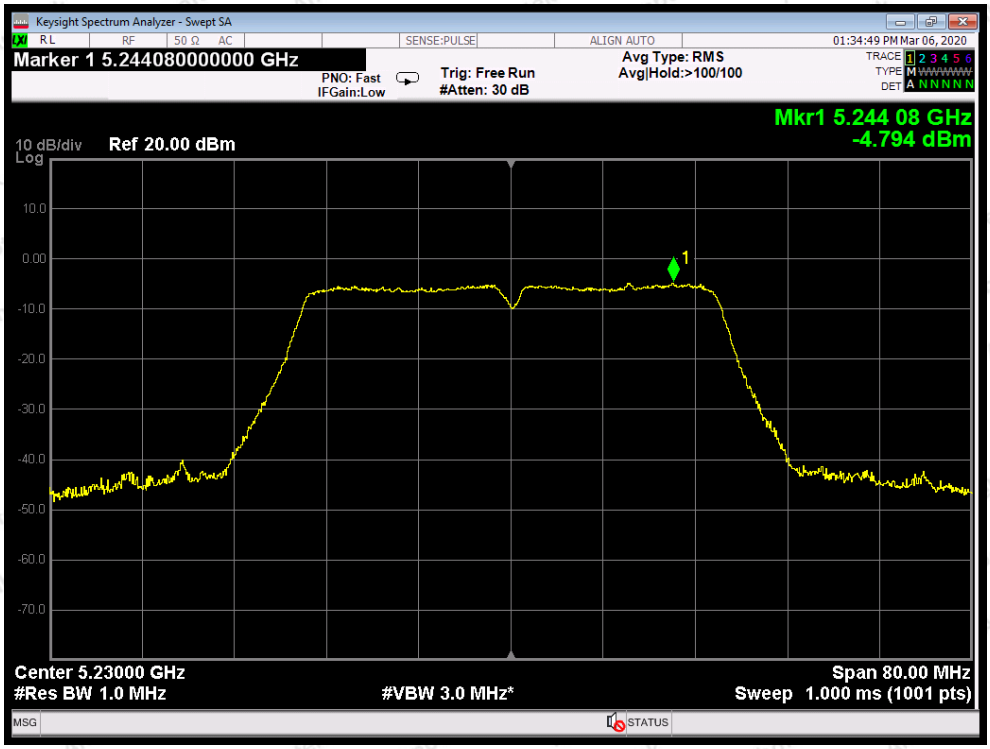

Test Mode: 802.11n40---Low



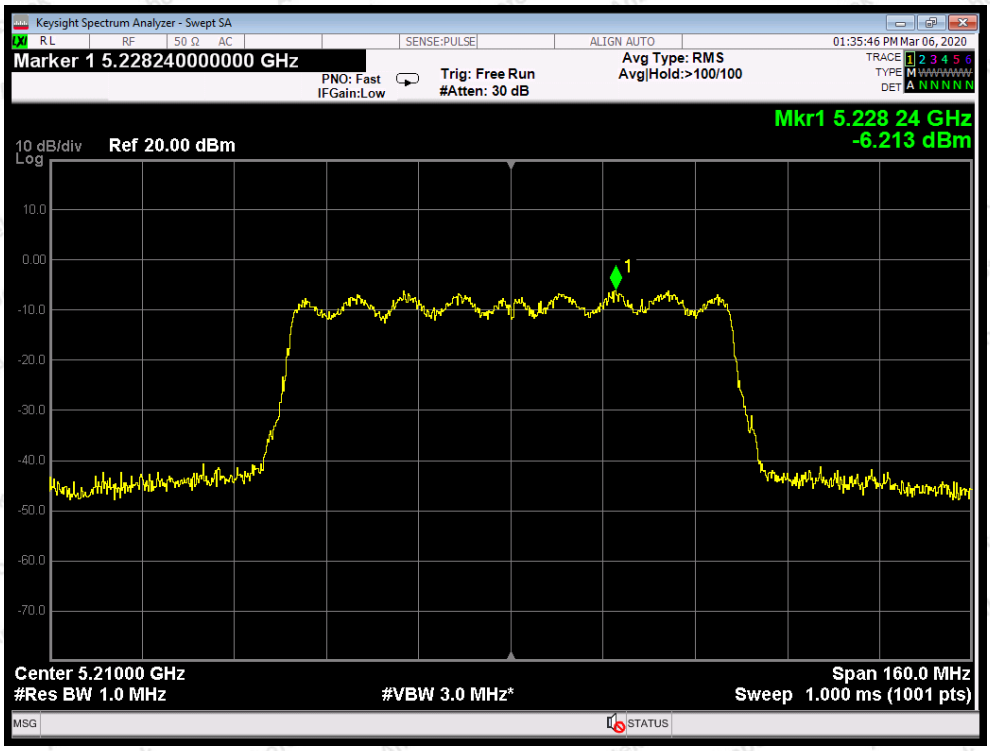

Test Mode: 802.11n40---High




Test Mode: 802.11ac40---Low

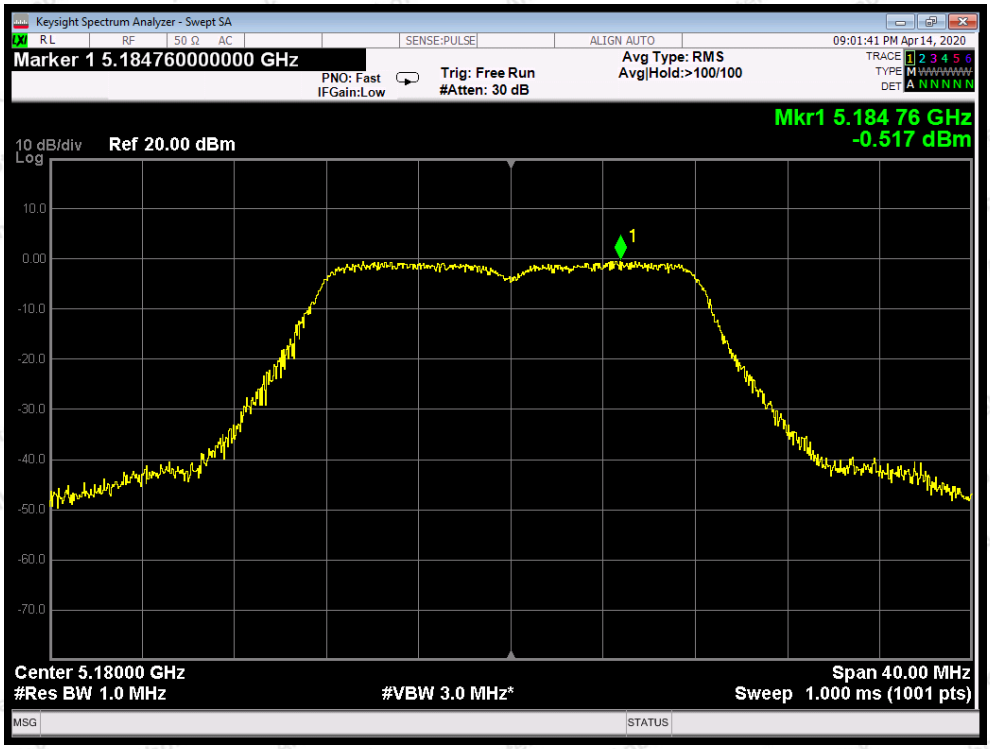



Test Mode: 802.11ac40---High

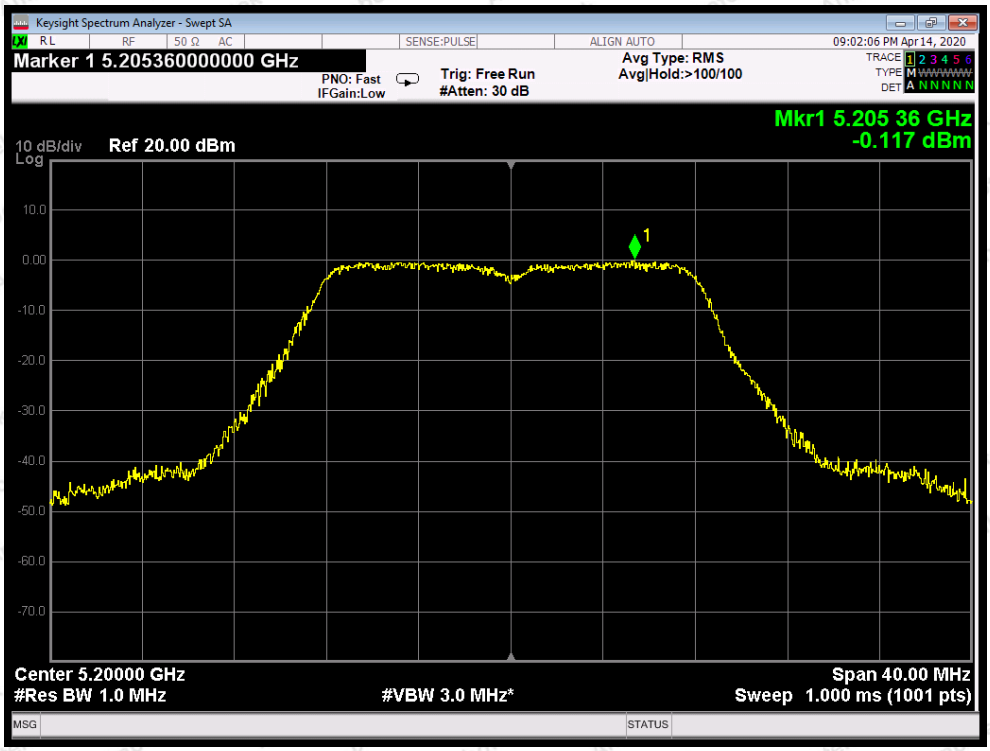



Test Mode: 802.11ac80

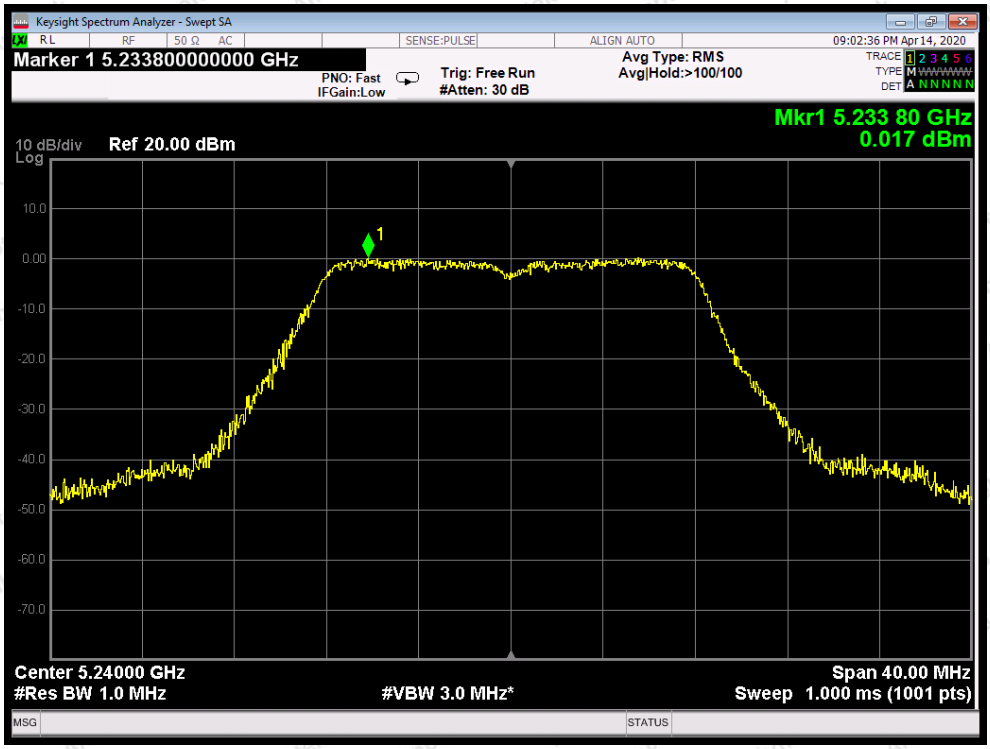
ANT B



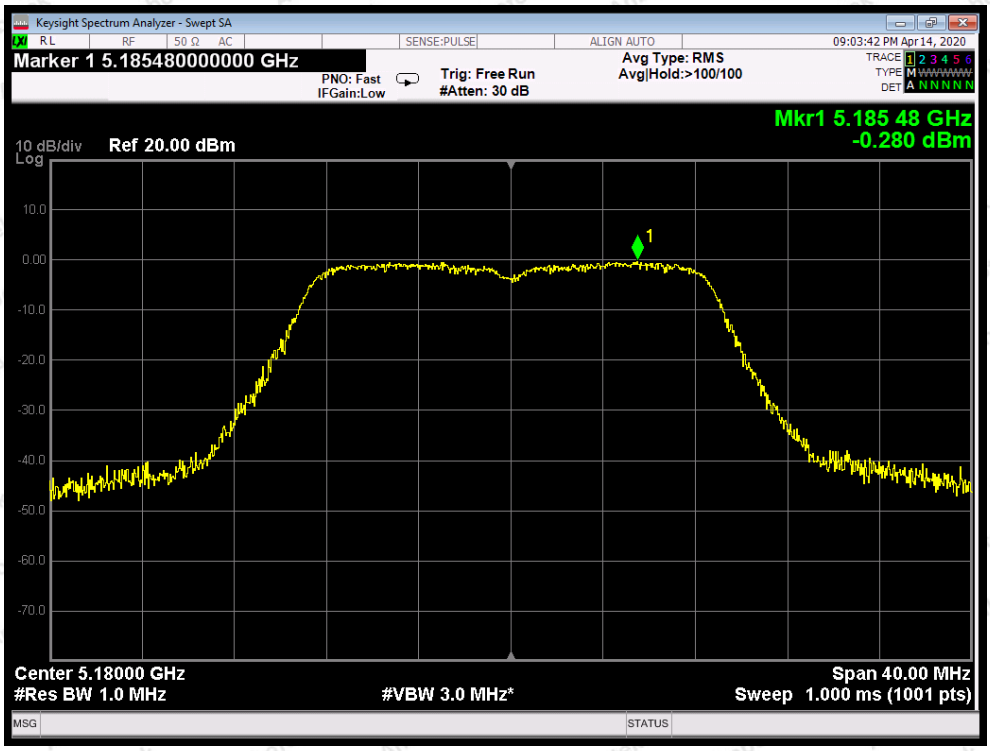

Test Mode: 802.11a--Low



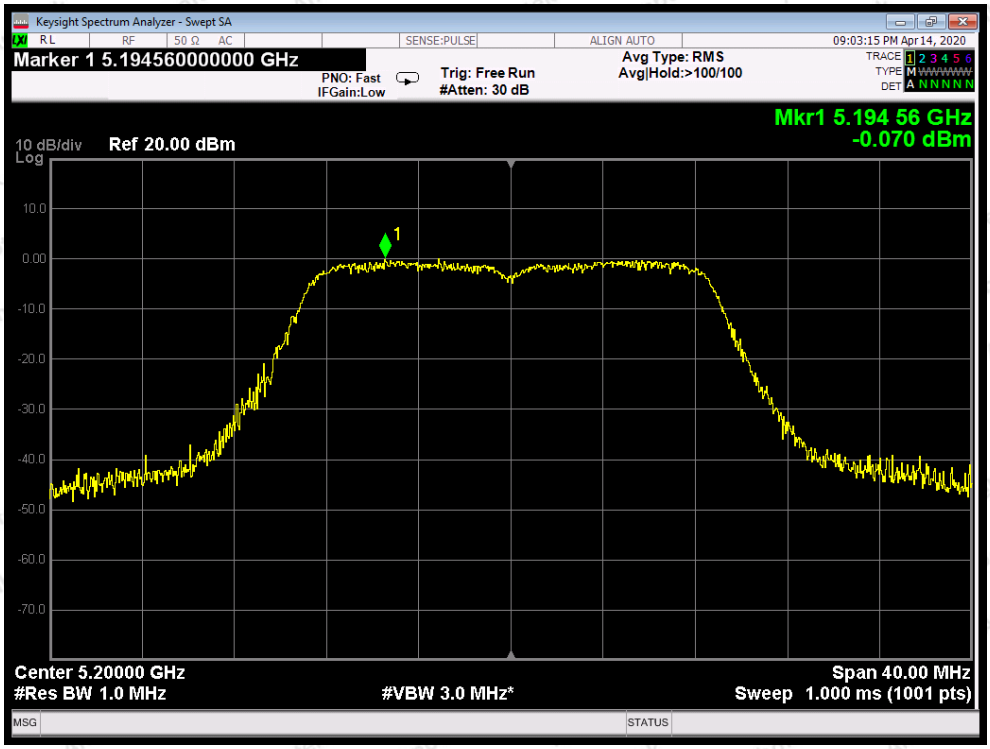

Test Mode: 802.11a---Middle



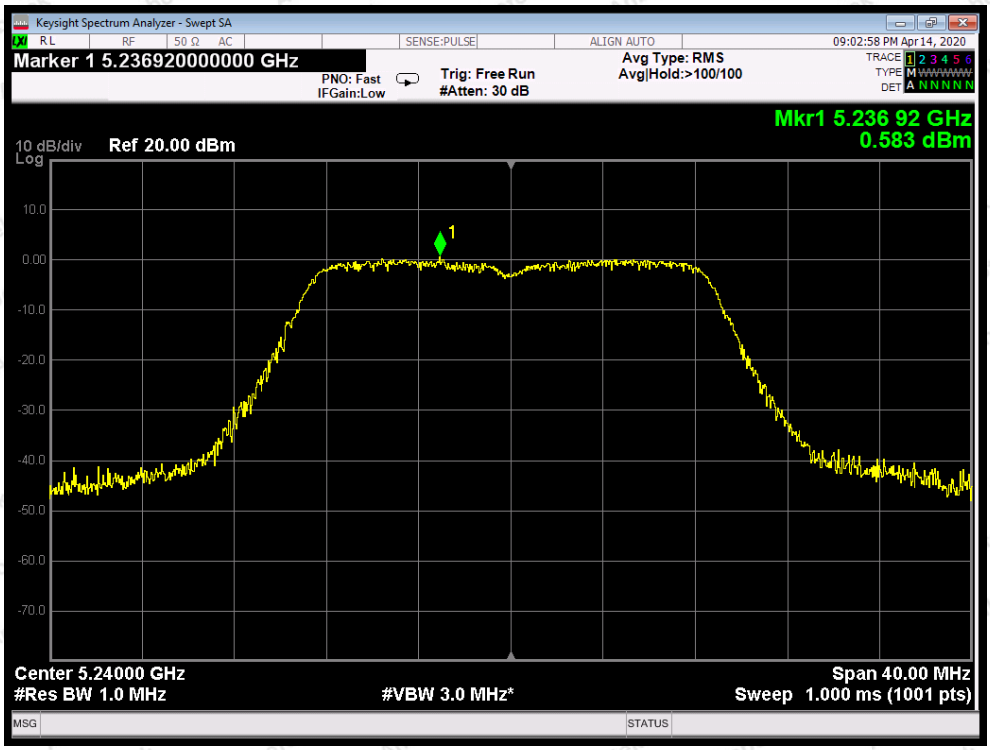

Test Mode: 802.11a---High



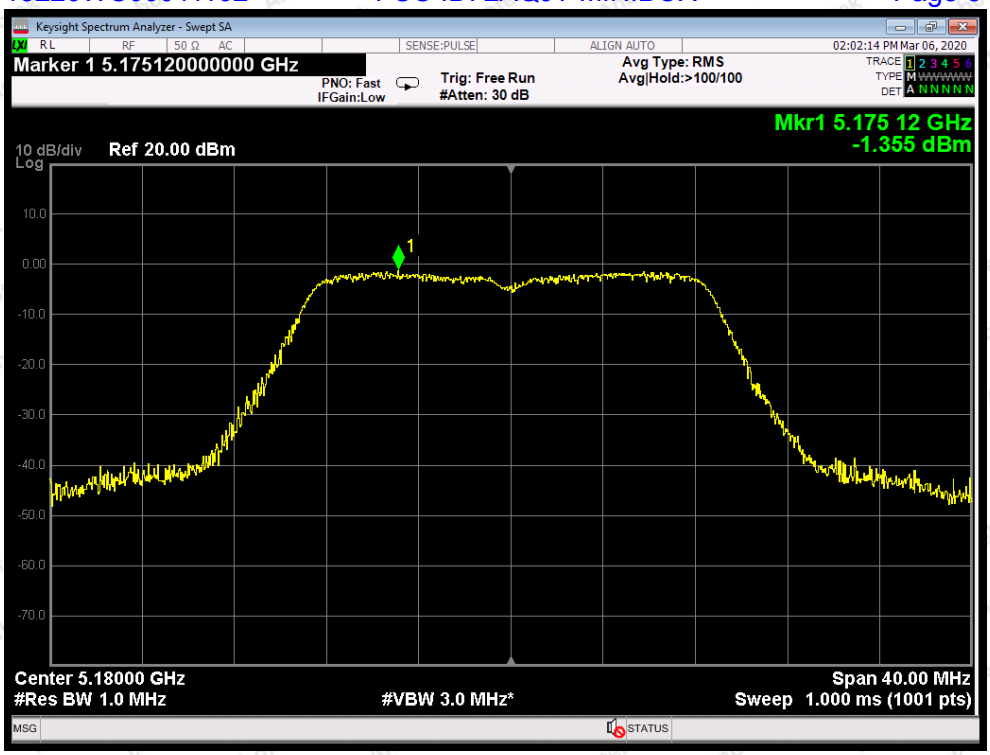

Test Mode: 802.11n20---Low



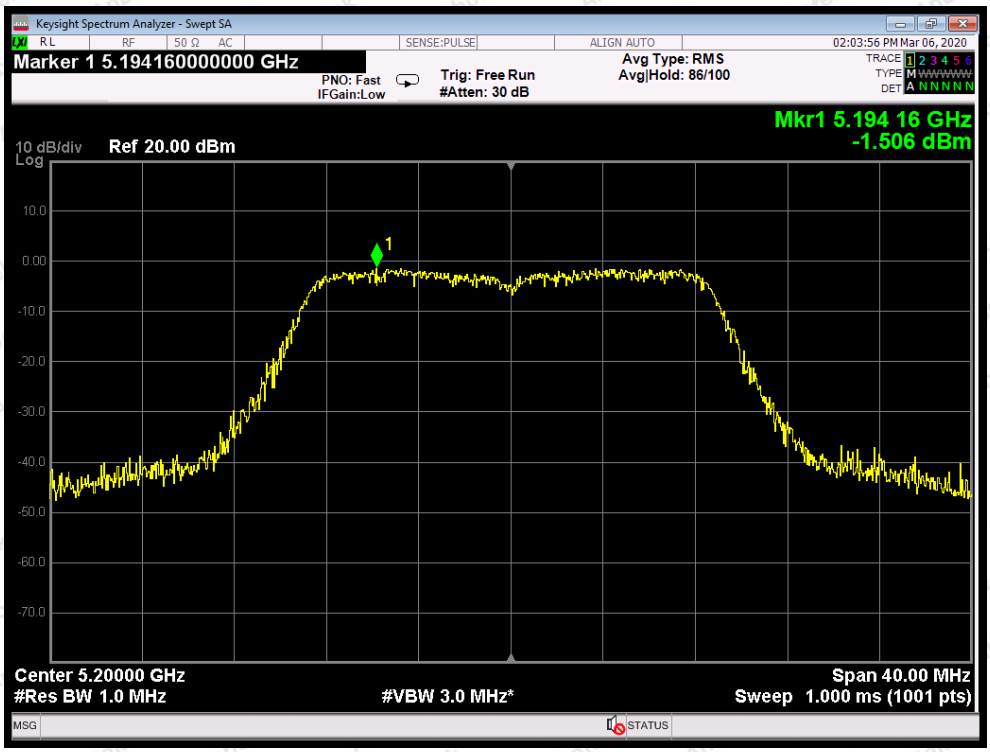

Test Mode: 802.11n20---Middle



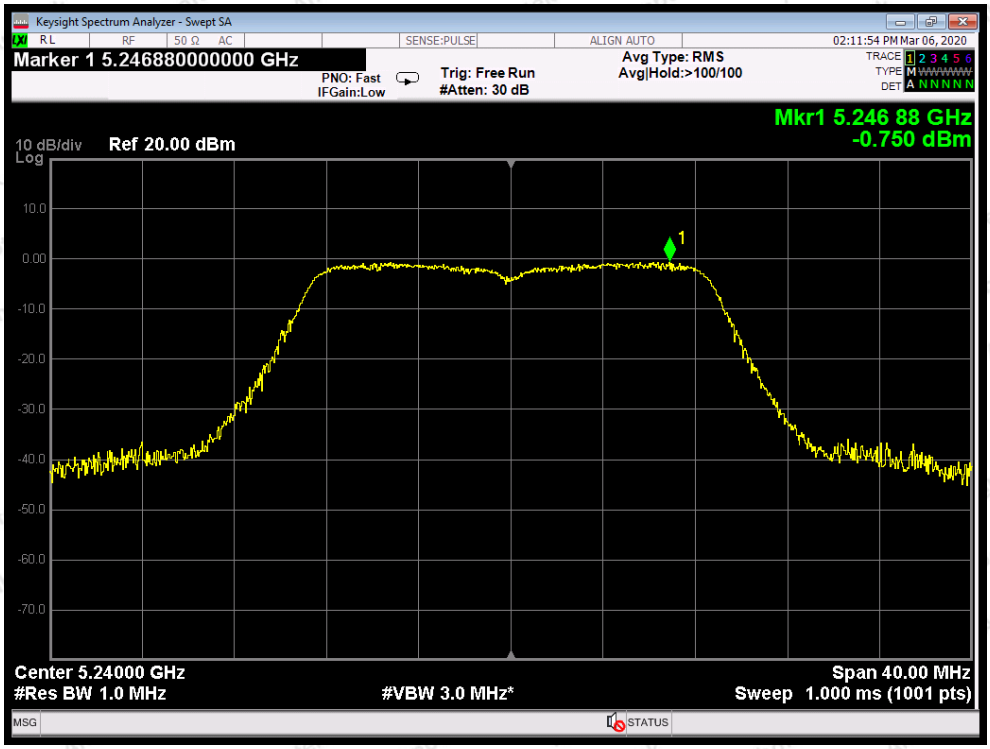

Test Mode: 802.11n20---High



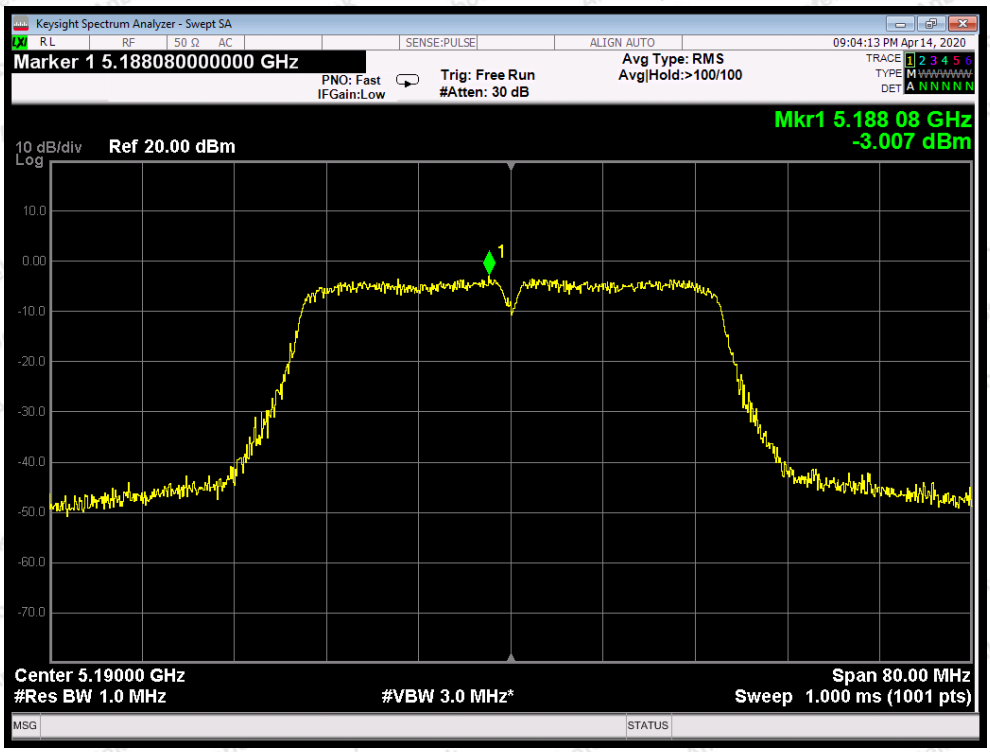

Test Mode: 802.11ac20--Low



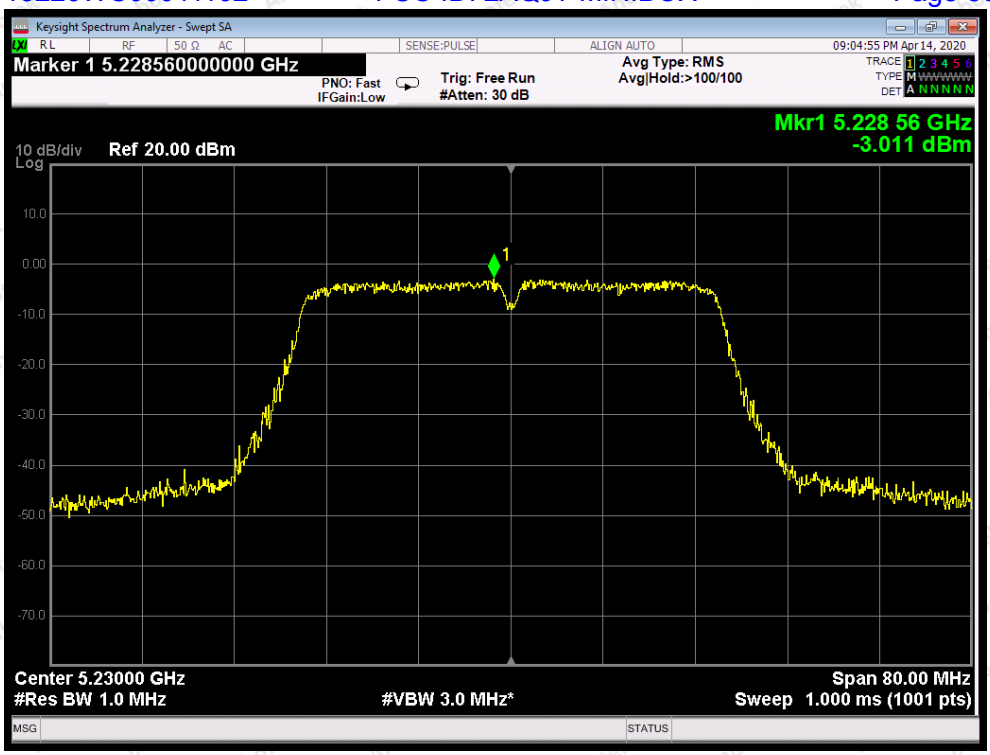

Test Mode: 802.11ac20---Middle



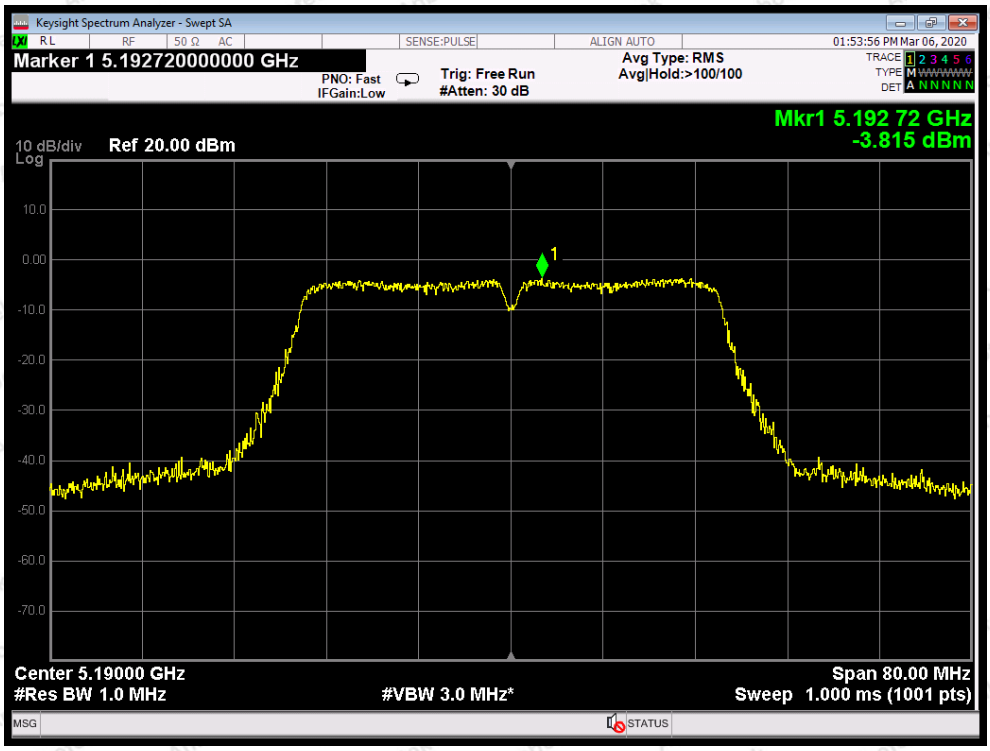

Test Mode: 802.11ac20---High



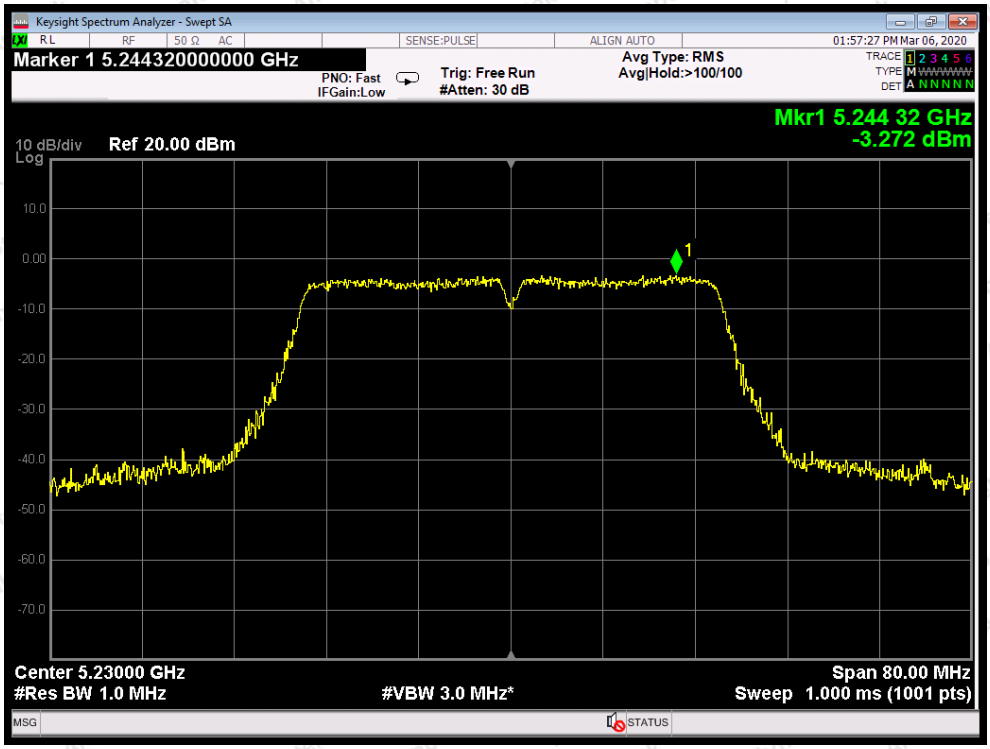

Test Mode: 802.11n40---Low



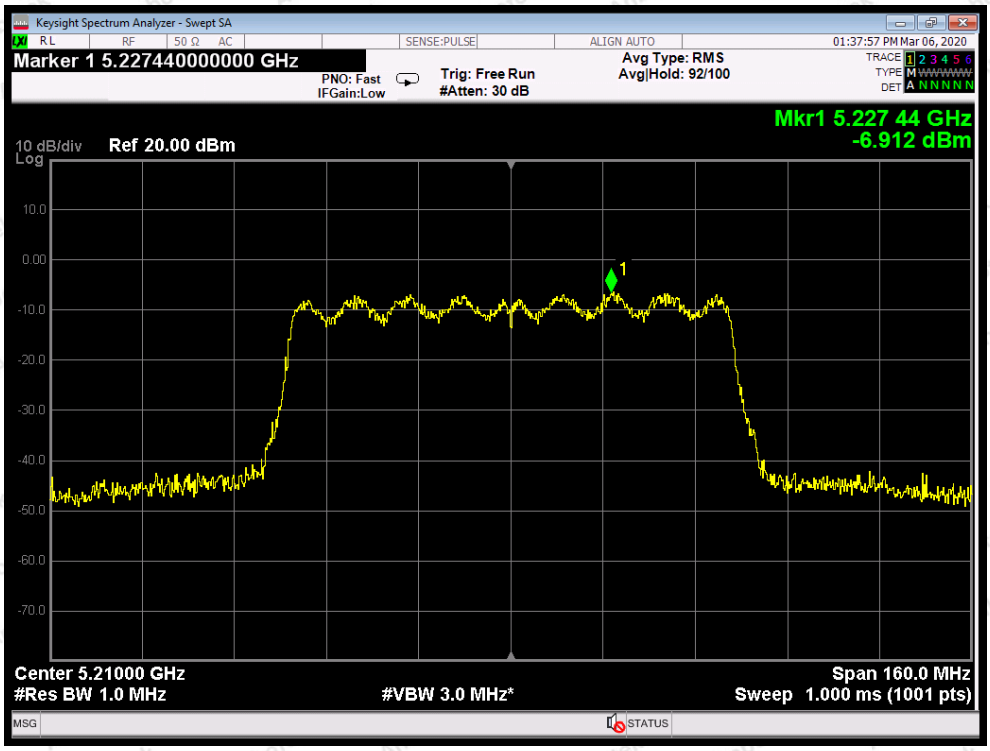

Test Mode: 802.11n40---High




Test Mode: 802.11ac40---Low




Test Mode: 802.11ac40---High




Test Mode: 802.11ac80

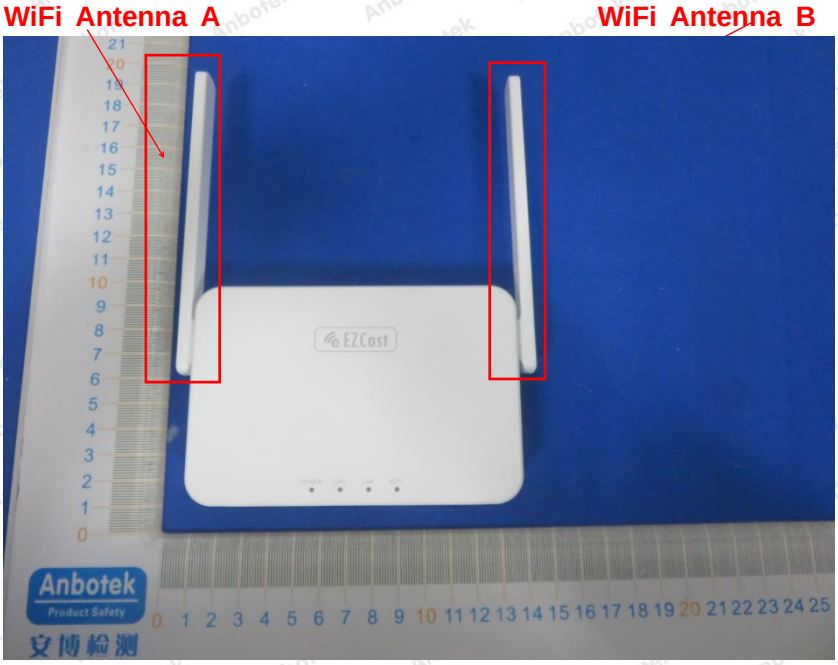
# 8. Antenna Requirement

## 8.1. Test Standard and Requirement

| | |
|---|---|
| Test Standard | FCC Part15 Section 15.203 /15.407 |
| Requirement | 1) 15.203 requirement:<br>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.<br>2) 15.407 requirement:<br>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded. |

## 8.2. Antenna Connected Construction

The antenna is a Columnar Antenna which permanently attached, and the best case gain of the antenna is 3 dBi. It complies with the standard requirement.



# APPENDIX I -- PHOTOGRAPH

Reference to the test report 18220WC00011101.

---------- End of Report ----------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