

## **Appendix A - Conducted Data for FCC Part 15 E**

Attached is the test report (13179116-E5) containing the reference data form the parent model as detailed in section 7.5. This data will only be included in the report submitted for FCC filing



# **TEST REPORT**

**Report Number:** 13179116-E5V2

**Applicant :** APPLE, INC.  
1 APPLE PARK WAY  
CUPERTINO, CA 95014, U.S.A.

**Model :** A2172

**FCC ID :** BCG-E3542A

**EUT Description :** SMARTPHONE

**Test Standard(s) :** FCC 47 CFR PART 15 SUBPART E

**Date Of Issue:**  
September 08, 2020

**Prepared by:**  
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NVLAP Lab code: 200065-0

## REPORT REVISION HISTORY

| Rev. | Issue Date | Revisions               | Revised By |
|------|------------|-------------------------|------------|
| V1   | 8/26/2020  | Initial issue           | Chin Pang  |
| V2   | 9/8/2020   | Address TCB's Questions | Chin Pang  |
|      |            |                         |            |

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** APPLE, INC.  
1 APPLE PARK WAY  
CUPERTINO, CA 95014, U.S.A.

**EUT DESCRIPTION:** SMARTPHONE

**MODEL:** A2172

**SERIAL NUMBER:** G6TZX04APT5N, G6TCQ01XQ5HX

**DATE TESTED:** FEBUARY 19, 2020 – AUGUST 21, 2020

| APPLICABLE STANDARDS     |              |
|--------------------------|--------------|
| STANDARD                 | TEST RESULTS |
| CFR 47 Part 15 Subpart E | Complies     |

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released For  
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## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC KDB 662911 D01 v02r01, FCC KDB 789033 D02 v02r01, ANSI C63.10-2013, RSS-GEN Issue 5, and RSS-247 Issue 2

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

| 47173 Benicia Street                                         | 47266 Benicia Street                                         | 47658 Kato Rd                                                |
|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|
| <input checked="" type="checkbox"/> Chamber A (ISED:2324B-1) | <input type="checkbox"/> Chamber D (ISED:22541-1)            | <input type="checkbox"/> Chamber I (ISED:2324A-5)            |
| <input type="checkbox"/> Chamber B (ISED:2324B-2)            | <input checked="" type="checkbox"/> Chamber E (ISED:22541-2) | <input checked="" type="checkbox"/> Chamber J (ISED:2324A-6) |
| <input type="checkbox"/> Chamber C (ISED:2324B-3)            | <input type="checkbox"/> Chamber F (ISED:22541-3)            | <input type="checkbox"/> Chamber K (ISED:2324A-1)            |
|                                                              | <input type="checkbox"/> Chamber G (ISED:22541-4)            | <input checked="" type="checkbox"/> Chamber L (ISED:2324A-3) |
|                                                              | <input checked="" type="checkbox"/> Chamber H (ISED:22541-5) |                                                              |

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

## 4. DECISION RULES AND MEASUREMENT UNCERTAINTY

### 4.1. METROLOGICAL TRACEABILITY

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER                                           | U <sub>Lab</sub> |
|-----------------------------------------------------|------------------|
| Worst Case Conducted Disturbance, 9KHz to 0.15 MHz  | 3.39 dB          |
| Worst Case Conducted Disturbance, 0.15 to 30 MHz    | 3.07 dB          |
| Worst Case Radiated Disturbance, 9KHz to 30 MHz     | 2.52 dB          |
| Worst Case Radiated Disturbance, 30 to 1000 MHz     | 4.88 dB          |
| Worst Case Radiated Disturbance, 1000 to 18000 MHz  | 4.24 dB          |
| Worst Case Radiated Disturbance, 18000 to 26000 MHz | 4.37 dB          |
| Worst Case Radiated Disturbance, 26000 to 40000 MHz | 5.17 dB          |

Uncertainty figures are valid to a confidence level of 95%.

## 5. EQUIPMENT UNDER TEST

### 5.1. EUT DESCRIPTION

The Apple iPhone is a smartphone with multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, 5G, CDMA, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wideband, GPS, NFC and WPT. All models support at least one UICC based SIM. The second SIM is either an UICC based p-SIM (physical SIM) or e-SIM (electronic SIM). The device supports a built-in inductive charging transmitter and receiver. The rechargeable battery is not user accessible.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

#### 5.2 GHz BAND (FCC)

| Frequency Range (MHz)    | Mode                           | Output Power (dBm)                | Output Power (mW) |
|--------------------------|--------------------------------|-----------------------------------|-------------------|
| <b>5.2 GHz band, 1TX</b> |                                |                                   |                   |
| 5180-5240                | 802.11a                        | Covered by 802.11n HT20 1TX       |                   |
| 5180-5240                | 802.11n HT20                   | 19.85                             | 96.61             |
| 5190-5230                | 802.11n HT40                   | 20.65                             | 116.14            |
| 5180-5240                | 802.11ac VHT20                 | Covered by 802.11n HT20 1TX       |                   |
| 5190-5230                | 802.11ac VHT40                 | Covered by 802.11n HT40 1TX       |                   |
| 5210                     | 802.11ac VHT80                 | 16.45                             | 44.16             |
| 5180-5240                | 802.11ax HE20, 242-Tones       | 19.82                             | 95.94             |
| 5180-5240                | 802.11ax HE20, 26-Tones        | 11.96                             | 15.70             |
| 5190-5230                | 802.11ax HE40, 484-Tones       | 20.74                             | 118.58            |
| 5190-5230                | 802.11ax HE40, 26-Tones        | 11.89                             | 15.45             |
| 5210                     | 802.11ax HE80, 996 Tones       | 15.60                             | 36.31             |
| 5210                     | 802.11ax HE80, 26 Tones        | 11.95                             | 15.67             |
| <b>5.2 GHz band, 2TX</b> |                                |                                   |                   |
| 5180-5240                | 802.11n HT20 CDD               | 19.72                             | 93.76             |
| 5180-5240                | 802.11n HT20 SDM/STBC          | Covered by 802.11n HT20 2TX CDD   |                   |
| 5190-5230                | 802.11n HT40 CDD               | 22.09                             | 161.81            |
| 5190-5230                | 802.11n HT40 SDM/STBC          | Covered by 802.11n HT40 2TX CDD   |                   |
| 5180-5240                | 802.11ac VHT20 SDM/STBC/CDD    | Covered by 802.11n HT20 2TX CDD   |                   |
| 5190-5230                | 802.11ac VHT40 SDM/STBC/CDD    | Covered by 802.11n HT40 2TX CDD   |                   |
| 5210                     | 802.11ac VHT80 CDD             | 18.36                             | 68.55             |
| 5210                     | 802.11ac VHT80 SDM/STBC        | Covered by 802.11ac VHT80 2TX CDD |                   |
| 5180-5240                | 802.11ax HE20 OFDMA, 242-Tones | 19.90                             | 97.72             |
| 5180-5240                | 802.11ax HE20 OFDMA, 26-Tones  | 11.77                             | 15.03             |
| 5190-5230                | 802.11ax HE40 OFDMA, 484-Tones | 22.25                             | 167.88            |
| 5190-5230                | 802.11ax HE40 OFDMA, 26-Tones  | 11.76                             | 15.00             |
| 5210                     | 802.11ax HE80 OFDMA, 996-Tones | 15.96                             | 39.45             |
| 5210                     | 802.11ax HE80 OFDMA, 26-Tones  | 21.73                             | 148.94            |

### 5.3 GHz BAND (FCC)

| Frequency Range (MHz)    | Mode                           | Output Power (dBm)                | Output Power (mW) |
|--------------------------|--------------------------------|-----------------------------------|-------------------|
| <b>5.3 GHz band, 1TX</b> |                                |                                   |                   |
| 5260 - 5320              | 802.11a                        | Covered by 802.11n HT20 1TX       |                   |
| 5260 - 5320              | 802.11n HT20                   | 19.95                             | 98.86             |
| 5270 - 5310              | 802.11n HT40                   | 20.54                             | 113.24            |
| 5260 - 5320              | 802.11ac VHT20                 | Covered by 802.11n HT20 1TX       |                   |
| 5270 - 5310              | 802.11ac VHT40                 | Covered by 802.11n HT40 1TX       |                   |
| 5290                     | 802.11ac VHT80                 | 16.48                             | 44.46             |
| 5260 - 5320              | 802.11ax HE20, 242-Tones       | 19.96                             | 99.08             |
| 5260 - 5320              | 802.11ax HE20, 26-Tones        | 11.98                             | 15.78             |
| 5270 - 5310              | 802.11ax HE40, 484-Tones       | 20.78                             | 119.67            |
| 5270 - 5310              | 802.11ax HE40, 26-Tones        | 11.81                             | 15.17             |
| 5290                     | 802.11ax HE80, 996-Tones       | 15.96                             | 39.45             |
| 5290                     | 802.11ax HE80, 26-Tones        | 11.94                             | 15.63             |
| <b>5.3 GHz band, 2TX</b> |                                |                                   |                   |
| 5260 - 5320              | 802.11n HT20 CDD               | 19.95                             | 98.86             |
| 5260 - 5320              | 802.11n HT20 SDM/STBC          | Covered by 802.11n HT40 2TX CDD   |                   |
| 5270 - 5310              | 802.11n HT40 CDD               | 21.98                             | 157.76            |
| 5270 - 5310              | 802.11n HT40 SDM/STBC          | Covered by 802.11n HT40 2TX CDD   |                   |
| 5260 - 5320              | 802.11ac VHT20 SDM/STBC/CDD    | Covered by 802.11n HT20 2TX CDD   |                   |
| 5270 - 5310              | 802.11ac VHT40 SDM/STBC/CDD    | Covered by 802.11n HT40 2TX CDD   |                   |
| 5290                     | 802.11ac VHT80 CDD             | 18.26                             | 66.99             |
| 5290                     | 802.11ac VHT80 SDM/STBC        | Covered by 802.11ac VHT80 2TX CDD |                   |
| 5260 - 5320              | 802.11ax HE20 OFDMA, 242-Tones | 19.84                             | 96.38             |
| 5260 - 5320              | 802.11ax HE20 OFDMA, 26-Tones  | 11.94                             | 15.63             |
| 5270 - 5310              | 802.11ax HE40 OFDMA, 484-Tones | 21.84                             | 152.76            |
| 5270 - 5310              | 802.11ax HE40 OFDMA, 26-Tones  | 11.90                             | 15.49             |
| 5290                     | 802.11ax HE80 OFDMA, 996-Tones | 17.86                             | 61.09             |
| 5290                     | 802.11ax HE80 OFDMA, 26-Tones  | 11.95                             | 15.67             |

### 5.6 GHz BAND (FCC)

| Frequency Range (MHz)    | Mode                           | Output Power (dBm)                | Output Power (mW) |
|--------------------------|--------------------------------|-----------------------------------|-------------------|
| <b>5.6 GHz band, 1TX</b> |                                |                                   |                   |
| 5500-5720                | 802.11a                        | Covered by 802.11n HT20 1TX       |                   |
| 5500-5720                | 802.11n HT20                   | 19.96                             | 99.08             |
| 5510-5710                | 802.11n HT40                   | 20.88                             | 122.46            |
| 5500-5720                | 802.11ac VHT20                 | Covered by 802.11n HT20 1TX       |                   |
| 5510-5710                | 802.11ac VHT40                 | Covered by 802.11n HT40 1TX       |                   |
| 5530-5690                | 802.11ac VHT80                 | 21.54                             | 142.56            |
| 5500-5720                | 802.11ax HE20, 242-Tones       | 19.99                             | 99.77             |
| 5500-5720                | 802.11ax HE20, 26-Tones        | 11.98                             | 15.78             |
| 5510-5710                | 802.11ax HE40, 484-Tones       | 20.98                             | 125.31            |
| 5510-5710                | 802.11ax HE40, 26-Tones        | 11.96                             | 15.70             |
| 5530-5690                | 802.11ax HE80, 996-Tones       | 21.45                             | 139.64            |
| 5530-5690                | 802.11ax HE80, 26-Tones        | 11.96                             | 15.70             |
| <b>5.6 GHz band, 2TX</b> |                                |                                   |                   |
| 5500-5720                | 802.11n HT20 CDD               | 19.68                             | 92.90             |
| 5500-5720                | 802.11n HT20 SDM/STBC          | Covered by 802.11n HT40 2TX CDD   |                   |
| 5510-5710                | 802.11n HT40 CDD               | 21.57                             | 143.55            |
| 5510-5710                | 802.11n HT40 SDM/STBC          | Covered by 802.11n HT40 2TX CDD   |                   |
| 5500-5720                | 802.11ac VHT20 SDM/STBC/CDD    | Covered by 802.11n HT20 2TX CDD   |                   |
| 5510-5710                | 802.11ac VHT40 SDM/STBC/CDD    | Covered by 802.11n HT40 2TX CDD   |                   |
| 5530-5690                | 802.11ac VHT80 CDD             | 21.73                             | 148.94            |
| 5530-5690                | 802.11ac VHT80 SDM/STBC        | Covered by 802.11ac VHT80 2TX CDD |                   |
| 5500-5720                | 802.11ax HE20 OFDMA, 242-Tones | 19.74                             | 94.19             |
| 5500-5720                | 802.11ax HE20 OFDMA, 26-Tones  | 11.94                             | 15.63             |
| 5510-5710                | 802.11ax HE40 OFDMA, 484-Tones | 21.58                             | 143.88            |
| 5510-5710                | 802.11ax HE40 OFDMA, 26-Tones  | 11.95                             | 15.67             |
| 5530-5690                | 802.11ax HE80 OFDMA, 996-Tones | 21.59                             | 144.21            |
| 5530-5690                | 802.11ax HE80 OFDMA, 26-Tones  | 11.96                             | 15.70             |

### 5.8 GHz BAND (FCC)

| Frequency Range (MHz)    | Mode                           | Output Power (dBm)                | Output Power (mW) |
|--------------------------|--------------------------------|-----------------------------------|-------------------|
| <b>5.8 GHz band, 1TX</b> |                                |                                   |                   |
| 5745-5825                | 802.11a                        | Covered by 802.11n HT20 1TX       |                   |
| 5745-5825                | 802.11n HT20                   | 21.43                             | 139.00            |
| 5755-5795                | 802.11n HT40                   | 20.94                             | 124.17            |
| 5745-5825                | 802.11ac VHT20                 | Covered by 802.11n HT20 1TX       |                   |
| 5755-5795                | 802.11ac VHT40                 | Covered by 802.11n HT40 1TX       |                   |
| 5775                     | 802.11ac VHT80                 | 20.42                             | 110.15            |
| 5745-5825                | 802.11ax HE20, 242-Tones       | 21.46                             | 139.96            |
| 5745-5825                | 802.11ax HE20, 26-Tones        | 21.47                             | 140.28            |
| 5755-5795                | 802.11ax HE40, 484-Tones       | 20.93                             | 123.88            |
| 5755-5795                | 802.11ax HE40, 26-Tones        | 20.94                             | 124.17            |
| 5775                     | 802.11ax HE80, 996-Tones       | 20.44                             | 110.66            |
| 5775                     | 802.11ax HE80, 26-Tones        | 21.47                             | 140.28            |
| <b>5.8 GHz band, 2TX</b> |                                |                                   |                   |
| 5745-5825                | 802.11n HT20 CDD               | 23.06                             | 202.30            |
| 5745-5825                | 802.11n HT20 SDM/STBC          | Covered by 802.11n HT40 2TX CDD   |                   |
| 5755-5795                | 802.11n HT40 CDD               | 22.69                             | 185.78            |
| 5755-5795                | 802.11n HT40 SDM/STBC          | Covered by 802.11n HT40 2TX CDD   |                   |
| 5745-5825                | 802.11ac VHT20 STM/STBC/CDD    | Covered by 802.11n HT20 2TX CDD   |                   |
| 5755-5795                | 802.11ac VHT40 STM/STBC/CDD    | Covered by 802.11n HT40 2TX CDD   |                   |
| 5775                     | 802.11ac VHT80 CDD             | 22.03                             | 159.59            |
| 5775                     | 802.11ac VHT80 SDM/STBC        | Covered by 802.11ac VHT80 2TX CDD |                   |
| 5745-5825                | 802.11ax HE20 OFDMA, 242-Tones | 23.04                             | 201.37            |
| 5745-5825                | 802.11ax HE20 OFDMA, 26-Tones  | 23.08                             | 203.24            |
| 5755-5795                | 802.11ax HE40 OFDMA, 484-Tones | 22.65                             | 184.08            |
| 5755-5795                | 802.11ax HE40 OFDMA, 26-Tones  | 22.71                             | 186.64            |
| 5775                     | 802.11ax HE80 OFDMA, 996-Tones | 22.07                             | 161.06            |
| 5775                     | 802.11ax HE80 OFDMA, 26-Tones  | 22.08                             | 161.44            |

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

| Frequency Range | ANT 6 (Core 0) | ANT 5 (Core 1) |
|-----------------|----------------|----------------|
| 5180 - 5240     | 0.9            | -4.3           |
| 5260 – 5320     | 1.8            | -3.0           |
| 5500 - 5720     | 2.2            | -1.4           |
| 5745 - 5825     | -1.1           | -2.9           |

### 5.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was WiFi FW Version: 20\_10\_619\_14

### 5.5. WORST-CASE CONFIGURATION AND MODE

The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z on Ant 6 (Core 0) and Ant 5 (Core 1). It was determined that X (Flatbed) orientation was the worst-case orientation for Ant 6; and Y (Landscape) orientation was the worst case for Ant 5 and Y (Landscape) for 2TX.

For radiated harmonics spurious below 1GHz, 1-18GHz L/M/H channels, 18-40GHz, and power line conducted emissions were performed with the EUT set at the 2TX CDD mode among the CDD/SDM modes with power setting equal or higher than SISO modes as worst-case scenario.

Radiated band edge, harmonic, and spurious emissions from 1GHz to 18GHz were performed with the EUT was set to transmit at highest power on Low/Middle/High channels.

Below 1GHz tests were performed with EUT connected to AC power adapter as the worst case; and for above 1GHz, the worst-case configuration reported was tested with EUT only. For AC line conducted emission, test was investigated with AC power adapter and with laptop.

There were no emissions found below 30MHz within 20dB of the limit.

The output power and psd for the 802.11 ax mode were investigated between all different tones, and we found that the highest tone had the highest output power and lowest tone had the highest PSD readings. Therefore, full testing was performed on both the highest and lowest tones.

For simultaneous transmission with the Bluetooth was investigated, no noticeable emission was found.

Investigated worst-case data rates as listed below were:

802.11n HT20 mode: MCS0  
802.11n HT40 mode: MCS0  
802.11ac VHT80 mode: MCS0  
802.11ax HE20/HE40/HE80 FULL RU & RU26

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

| Support Equipment List          |                   |       |                   |          |
|---------------------------------|-------------------|-------|-------------------|----------|
| Description                     | Manufacturer      | Model | Serial Number     | FCC ID   |
| Laptop                          | Apple             | A1989 | C02YL3ZMJHC8      | BCGA1989 |
| Laptop 61W USBC-C AC/DC adapter | Liteon Technology | A1718 | C4N711404U3GN8RAW | NA       |
| EUT AC Adapter                  | Apple             | A2305 | D292365CDYADHLHC3 | NA       |

### I/O CABLES

| I/O Cable List |         |                      |                |             |                  |                      |
|----------------|---------|----------------------|----------------|-------------|------------------|----------------------|
| Cable No       | Port    | # of identical ports | Connector Type | Cable Type  | Cable Length (m) | Remarks              |
| 1              | Antenna | 1                    | SMA            | Un-Shielded | 0.2              | To spectrum Analyzer |
| 2              | USB     | 1                    | USB            | Shielded    | 1                | N/A                  |
| 3              | AC      | 1                    | AC             | Un-shielded | 2                | N/A                  |

### I/O CABLES (RADIATED ABOVE 1 GHZ)

| I/O Cable List |      |                      |                |            |                  |         |
|----------------|------|----------------------|----------------|------------|------------------|---------|
| Cable No       | Port | # of identical ports | Connector Type | Cable Type | Cable Length (m) | Remarks |
| NA             |      |                      |                |            |                  |         |

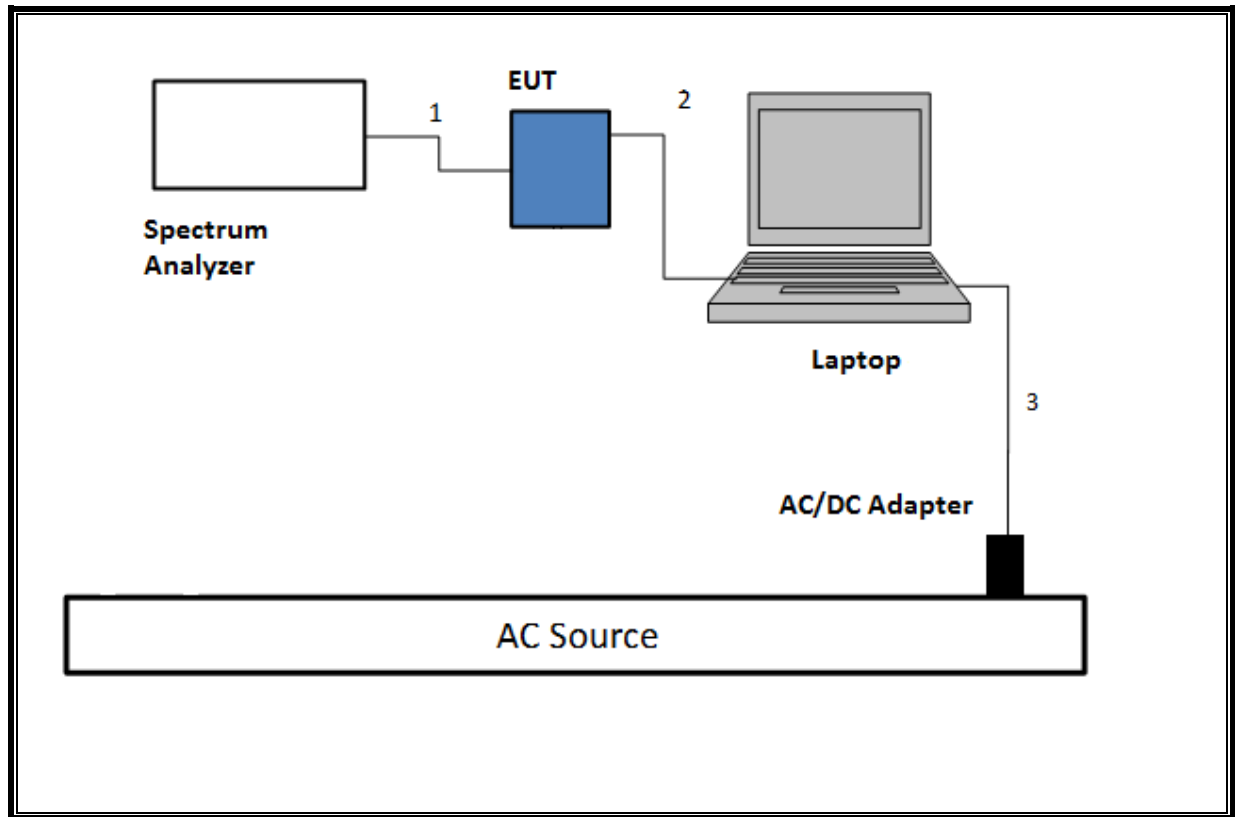
### I/O CABLES (BELOW 1GHz AND AC POWER LINE TEST WITH ADAPTER AND LAPTOP)

| I/O Cable List |      |                |                |             |                  |         |
|----------------|------|----------------|----------------|-------------|------------------|---------|
| Cable No       | Port | # of identical | Connector Type | Cable Type  | Cable Length (m) | Remarks |
| 1              | AC   | 1              | AC             | Un-shielded | 2                | N/A     |
| 2              | USB  | 1              | USB            | Shielded    | 1                | N/A     |

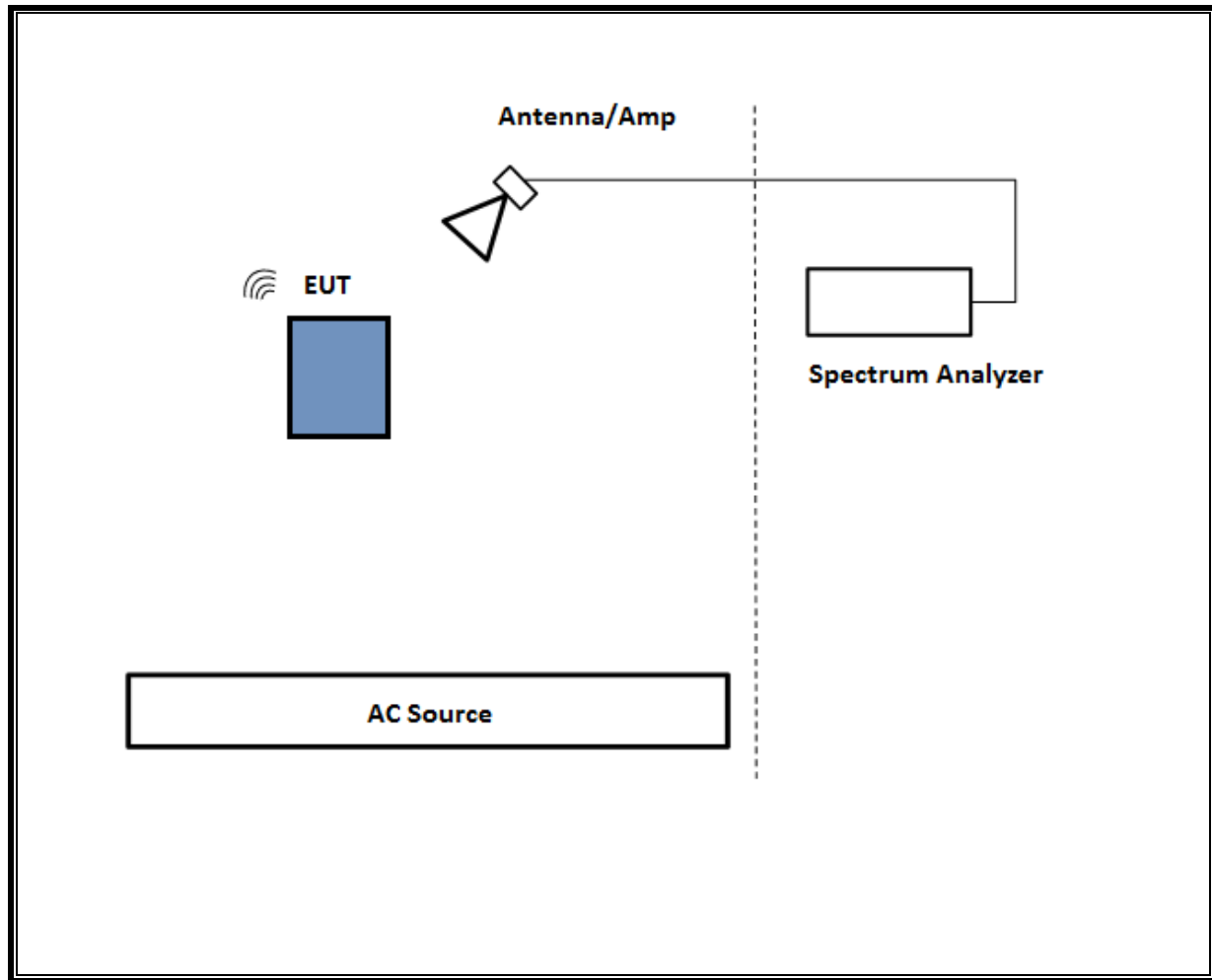
### **TEST SETUP - CONDUCTED TESTS**

The EUT was tested connected to a host Laptop via USB cable adapter and spectrum analyzer to antenna port. Test software exercised the EUT.

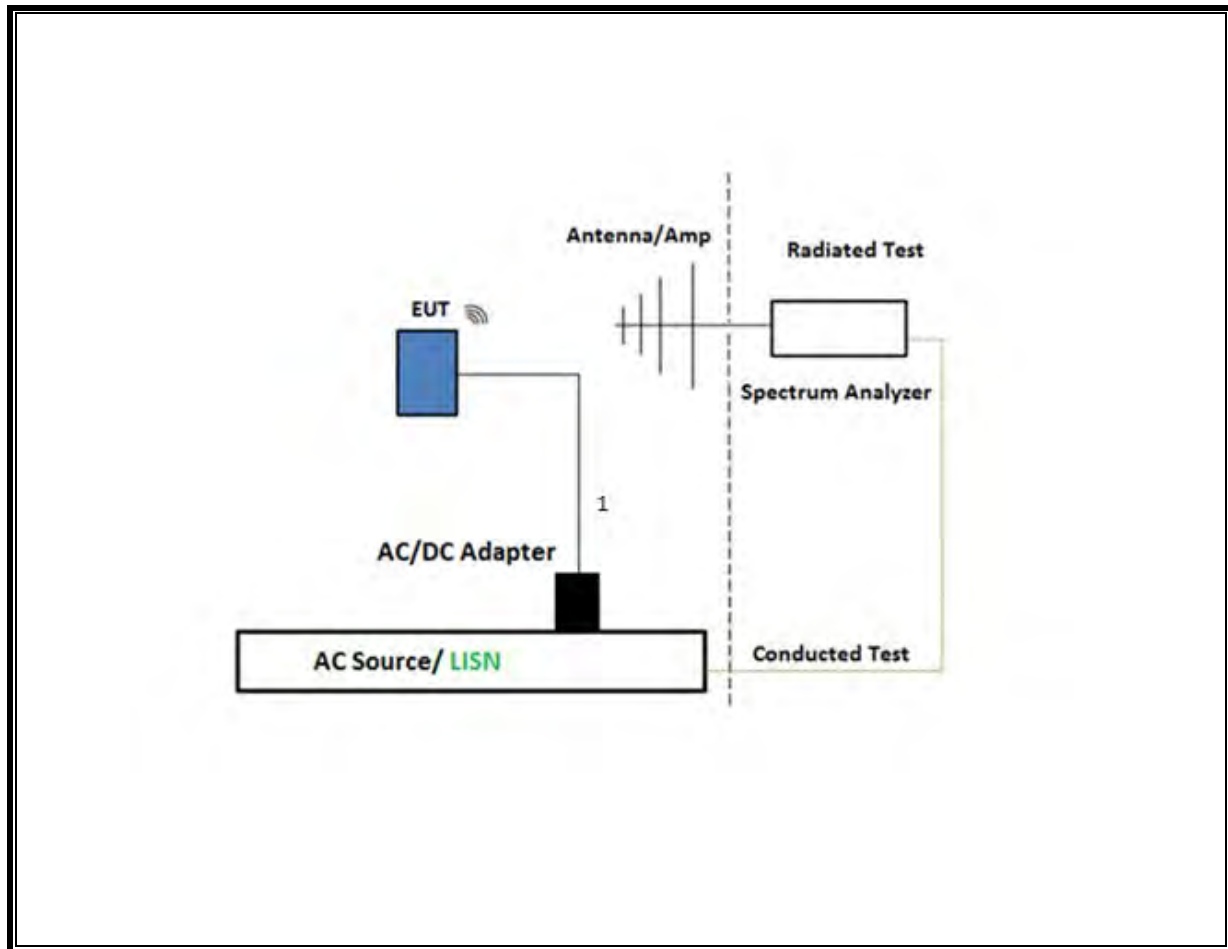
### **SETUP DIAGRAM**



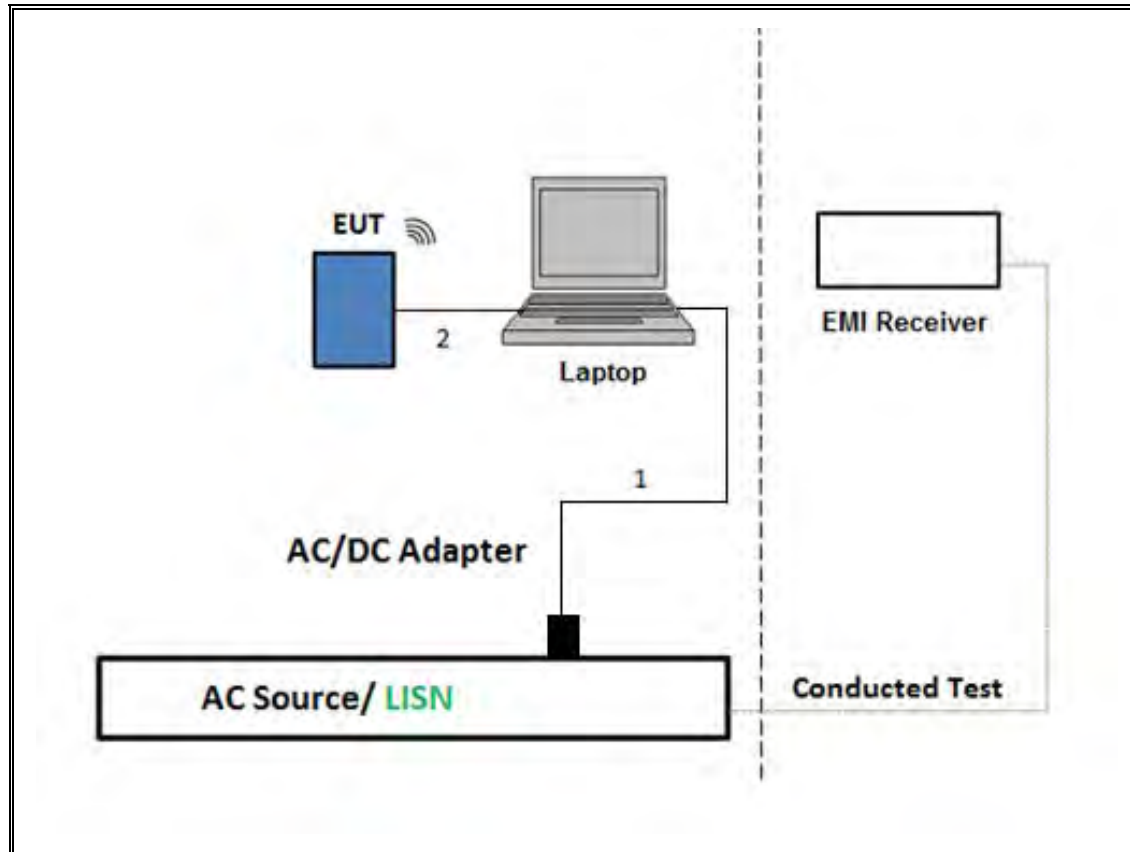
**SETUP DIAGRAM FOR RADIATED TESTS Above 1GHz**



**SETUP DIAGRAM FOR Below 1GHz and AC LINE CONDUCTED TEST**



**TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION**



## 6. MEASUREMENT METHOD

| Test Item                                      | Test Method                                                                                                                                  |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| On Time and Duty Cycle:                        | KDB 789033 D02 v02r01, Section B.                                                                                                            |
| 6 dB Emission BW:                              | KDB 789033 D02 v02r01, Section C.2                                                                                                           |
| 26 dB Emission BW                              | KDB 789033 D02 v02r01, Section C.1                                                                                                           |
| 99% Occupied BW                                | KDB 789033 D02 v02r01, Section D.                                                                                                            |
| Conducted Output Power                         | KDB 789033 D02 v02r01, Section E.3.b (Method PM-G) and<br>KDB 789033 D02 v02r01, Section E.2.b (Method SA-1),<br>Section E.2.d (Method SA-2) |
| Power Spectral Density                         | KDB 789033 D02 v02r01, Section F                                                                                                             |
| Unwanted emissions in<br>restricted bands:     | KDB 789033 D02 v02r01, Sections G.3, G.4, G.5, and G.6.                                                                                      |
| Unwanted emissions in non-<br>restricted bands | KDB 789033 D02 v02r01, Sections G.3, G.4, and G.5.                                                                                           |
| Band-edge                                      | ANSI C63.10-2013, Section 6.2.                                                                                                               |
| AC Power Line Conducted<br>Emissions           | <u>ANSI C63.10-2013 Section 6.4</u>                                                                                                          |

## 7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment were utilized for the tests documented in this report:

| TEST EQUIPMENT LIST                         |                                 |                        |            |            |
|---------------------------------------------|---------------------------------|------------------------|------------|------------|
| Description                                 | Manufacturer                    | Model                  | ID Num     | Cal Due    |
| Antenna, Horn 1-18GHz                       | ETS-Lindgren                    | 3117                   | T712       | 3/9/2021   |
| Amplifier, 1 to 18GHz, 35dB                 | Miteq                           | AFS42-00101800-25-S-42 | 138301     | 3/3/2021   |
| Spectrum Analyzer, PXA, 3Hz to 44GHz        | Agilent (Keysight) Technologies | N9030A                 | T1466      | 1/23/2021  |
| Antenna, Horn 1-18GHz                       | ETS-Lindgren                    | 3117                   | T863       | 11/1/2020  |
| Amplifier, 1 to 18GHz, 35dB                 | Miteq                           | AFS42-00101800-25-S-42 | T1567      | 1/24/2021  |
| Spectrum Analyzer, PXA, 3Hz to 44GHz        | Agilent (Keysight) Technologies | N9030A                 | T1210      | 1/21/2021  |
| Antenna, Horn 1-18GHz                       | A.H Systems Inc.                | SAS-571                | T963       | 1/25/2021  |
| Amplifier, 1 to 18GHz, 35dB                 | Miteq                           | AFS42-00101800-25-S-42 | T1567      | 01/24/2021 |
| EMI Test Receiver                           | Rohde & Schwarz                 | ESW44                  | PRE0179372 | 2/25/2021  |
| Antenna, Horn 1-18GHz                       | ETS-Lindgren                    | 3117                   | T344       | 5/26/2021  |
| Amplifier, 1 to 18GHz, 35dB                 | Miteq                           | AFS42-00101800-25-S-42 | T1568      | 4/14/2021  |
| EMI Test Receiver                           | Rohde & Schwarz                 | ESW44                  | PRE0179367 | 2/26/2021  |
| Antenna, Broadband Hybrid, 30MHz to 3000MHz | Sunol Sciences Corp.            | JB3                    | PRE0184052 | 11/12/2020 |
| Amplifier, 100KHz to 1GHz, 32dB             | Keysight Technologies           | 8447D                  | T15        | 10/26/2020 |
| Spectrum Analyzer, PXA, 3Hz to 44GHz        | Agilent (Keysight) Technologies | N9030A                 | T907       | 1/22/2021  |
| EMI Test Receiver                           | Rohde & Schwarz                 | ESW44                  | PRE0179522 | 2/20/2021  |
| Antenna Horn, 18 to 26GHz                   | ARA                             | SWH-28                 | T125       | 4/17/2021  |
| Pre-Amp 18-26GHz                            | Agilent Technology              | 8449B                  | T404       | 4/8/2021   |
| Spectrum Analyzer, PXA, 3Hz to 44GHz        | Agilent (Keysight) Technologies | N9030A                 | T905       | 1/24/2021  |
| Spectrum Analyzer, PXA, 3Hz to 44GHz        | Agilent (Keysight) Technologies | N9030A                 | T339       | 1/21/2021  |
| Power Meter, P-series single channel        | Keysight                        | N1911A                 | PRE0177682 | 01/21/2021 |
| Power Sensor                                | Keysight                        | N1921A                 | T1226      | 02/13/2021 |
| Antenna, Active Loop 9KHz to 30MHz          | ETS-Lindgren                    | 6502                   | T757       | 10/01/2020 |

\*Testing is completed before equipment expiration date.

| AC Line Conducted                     |                 |                |                       |            |
|---------------------------------------|-----------------|----------------|-----------------------|------------|
| Description                           | Manufacturer    | Model          | ID Num                | Cal Due    |
| EMI Test Receiver 9Khz-7GHz           | Rohde & Schwarz | ESCI7          | T1436                 | 02/20/2021 |
| Power Cable, Line Conducted Emissions | UL              | PG1            | T861                  | 10/27/2020 |
| LISN for Conducted Emissions CISPR-16 | Fischer         | 50/250-25-2-01 | T1310                 | 01/23/2021 |
| UL AUTOMATION SOFTWARE                |                 |                |                       |            |
| Radiated Software                     | UL              | UL EMC         | Rev 9.5, 30 Apr, 2020 |            |
| Conducted Software                    | UL              | UL EMC         | AP2020.8.6            |            |
| AC Line Conducted Software            | UL              | UL EMC         | Rev 9.5, 21 Feb 2020  |            |

## 8. ANTENNA PORT TEST RESULTS

### 8.1. ON TIME AND DUTY CYCLE

#### LIMITS

None; for reporting purposes only.

#### PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

#### ON TIME AND DUTY CYCLE RESULTS

| Mode                       | ON Time<br>B<br>(msec) | Period<br>(msec) | Duty Cycle<br>x<br>(linear) | Duty<br>Cycle<br>(%) | Duty Cycle<br>Correction Factor<br>(dB) | 1/B<br>Minimum VBW<br>(kHz) |
|----------------------------|------------------------|------------------|-----------------------------|----------------------|-----------------------------------------|-----------------------------|
| <b>5GHz Band</b>           |                        |                  |                             |                      |                                         |                             |
| 802.11n HT20 1Tx MCS0      | 1.930                  | 1.950            | 0.990                       | 98.97%               | 0.00                                    | 0.010                       |
| 802.11n HT20 1Tx MCS7      | 0.231                  | 0.251            | 0.920                       | 92.04%               | 0.36                                    | 4.325                       |
| 802.11n HT20 CDD MCS0      | 1.930                  | 1.960            | 0.985                       | 98.47%               | 0.00                                    | 0.010                       |
| 802.11n HT20 CDD MCS7      | 0.232                  | 0.252            | 0.921                       | 92.06%               | 0.36                                    | 4.310                       |
| 802.11n HT40 1Tx MCS0      | 0.951                  | 0.972            | 0.978                       | 97.84%               | 0.09                                    | 1.052                       |
| 802.11n HT40 1Tx MCS7      | 0.132                  | 0.152            | 0.868                       | 86.80%               | 0.61                                    | 7.605                       |
| 802.11n HT40 CDD MCS0      | 0.951                  | 0.972            | 0.978                       | 97.84%               | 0.09                                    | 1.052                       |
| 802.11n HT40 CDD MCS7      | 0.132                  | 0.152            | 0.868                       | 86.80%               | 0.61                                    | 7.605                       |
| 802.11ac VHT80 1Tx MCS0    | 0.458                  | 0.478            | 0.958                       | 95.82%               | 0.19                                    | 2.182                       |
| 802.11ac VHT80 1Tx MCS9    | 0.071                  | 0.091            | 0.783                       | 78.29%               | 1.06                                    | 14.006                      |
| 802.11ac VHT80 CDD MCS0    | 0.460                  | 0.480            | 0.959                       | 95.85%               | 0.18                                    | 2.174                       |
| 802.11ac VHT80 CDD MCS9    | 0.071                  | 0.092            | 0.776                       | 77.60%               | 1.10                                    | 14.085                      |
| 802.11ax HE20 1Tx, MCS0    | 1.560                  | 1.580            | 0.987                       | 98.73%               | 0.00                                    | 0.010                       |
| 802.11ax HE20 1Tx, MCS11   | 1.560                  | 1.580            | 0.987                       | 98.73%               | 0.00                                    | 0.010                       |
| 802.11ax HE20 OFDMA, MCS0  | 1.560                  | 1.580            | 0.987                       | 98.73%               | 0.00                                    | 0.010                       |
| 802.11ax HE20 OFDMA, MCS11 | 1.560                  | 1.580            | 0.987                       | 98.73%               | 0.00                                    | 0.010                       |
| 802.11ax HE40 1Tx, MCS0    | 1.545                  | 1.565            | 0.987                       | 98.72%               | 0.00                                    | 0.010                       |
| 802.11ax HE40 1Tx, MCS11   | 1.545                  | 1.565            | 0.987                       | 98.72%               | 0.00                                    | 0.010                       |
| 802.11ax HE40 OFDMA, MCS0  | 1.545                  | 1.565            | 0.987                       | 98.72%               | 0.00                                    | 0.010                       |
| 802.11ax HE40 OFDMA, MCS11 | 1.540                  | 1.565            | 0.984                       | 98.40%               | 0.00                                    | 0.010                       |
| 802.11ax HE80 1Tx, MCS0    | 1.470                  | 1.495            | 0.983                       | 98.33%               | 0.00                                    | 0.010                       |
| 802.11ax HE80 1Tx, MCS11   | 1.475                  | 1.495            | 0.987                       | 98.66%               | 0.00                                    | 0.010                       |
| 802.11ax HE80 OFDMA, MCS0  | 1.475                  | 1.495            | 0.987                       | 98.66%               | 0.00                                    | 0.010                       |
| 802.11ax HE80 OFDMA, MCS11 | 1.475                  | 1.495            | 0.987                       | 98.66%               | 0.00                                    | 0.010                       |

## DUTY CYCLE PLOTS



DUTY CYCLE 802.11n HT20 1TX MODE MCS0



DUTY CYCLE 802.11n HT20 1TX MODE MCS7



DUTY CYCLE 802.11n HT20 CDD MODE MCS0



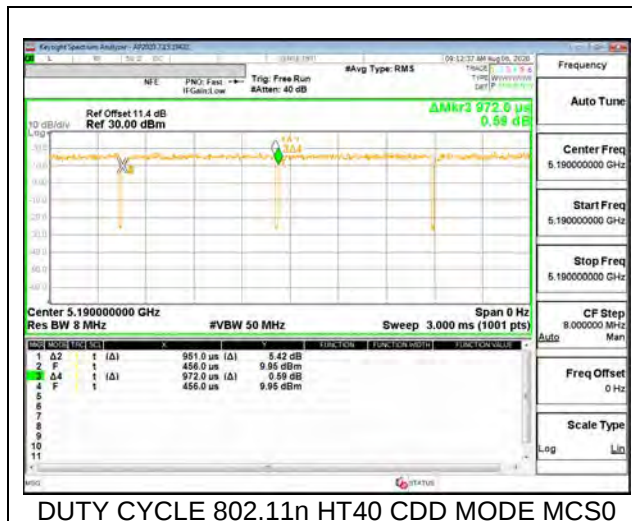
DUTY CYCLE 802.11n HT20 CDD MODE MCS7



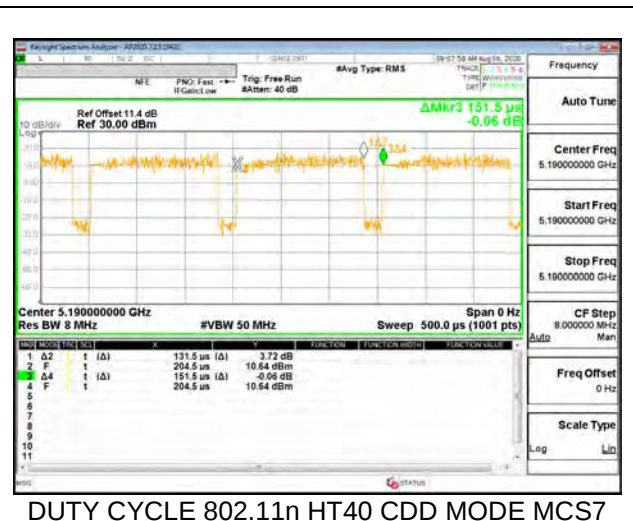
DUTY CYCLE 802.11n HT40 1TX MODE MCS0



DUTY CYCLE 802.11n HT40 1TX MODE MCS7



DUTY CYCLE 802.11n HT40 CDD MODE MCS0



DUTY CYCLE 802.11n HT40 CDD MODE MCS7



DUTY CYCLE 802.11ac VHT80 1TX MODE MCS0



DUTY CYCLE 802.11ac VHT80 1TX MODE MCS9



DUTY CYCLE 802.11ac VHT80 CDD MODE  
MCS0



DUTY CYCLE 802.11ac VHT80 CDD MODE  
MCS9



802.11ax HE20 1Tx, MCS0



802.11ax HE20 1Tx, MCS11



802.11ax HE20 OFDMA, MCS0



802.11ax HE20 OFDMA, MCS11



802.11ax HE40 1Tx, MCS0



802.11ax HE40 1Tx, MCS11



802.11ax HE40 OFDMA, MCS0



802.11ax HE40 OFDMA, MCS11



802.11ax HE80 1Tx, MCS0



802.11ax HE80 1Tx, MCS11



802.11ax HE80 OFDMA, MCS0



802.11ax HE80 OFDMA, MCS11

## **8.2. 26 dB & 99% BANDWIDTH**

### **LIMITS**

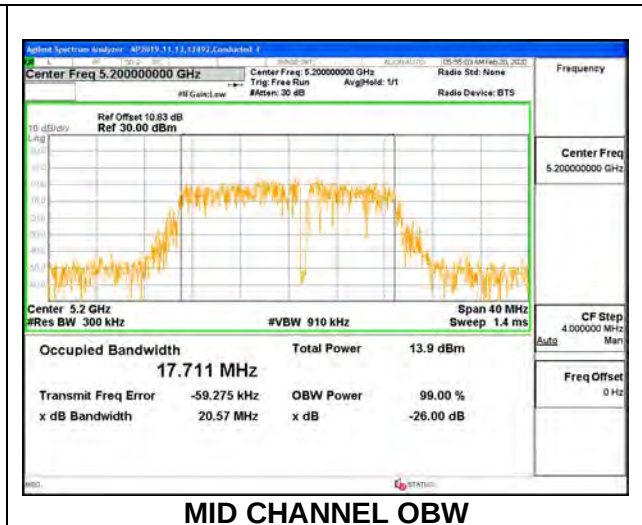
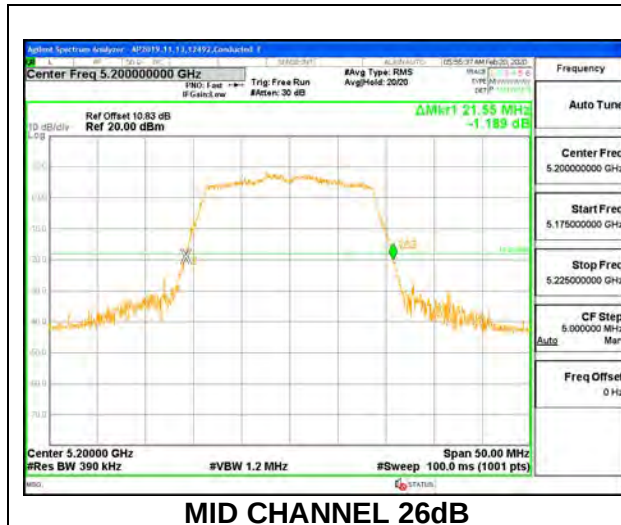
None; for reporting purposes only.

### **RESULTS**

## 8.2.1. 802.11n HT20 MODE IN THE 5.2 GHz BAND

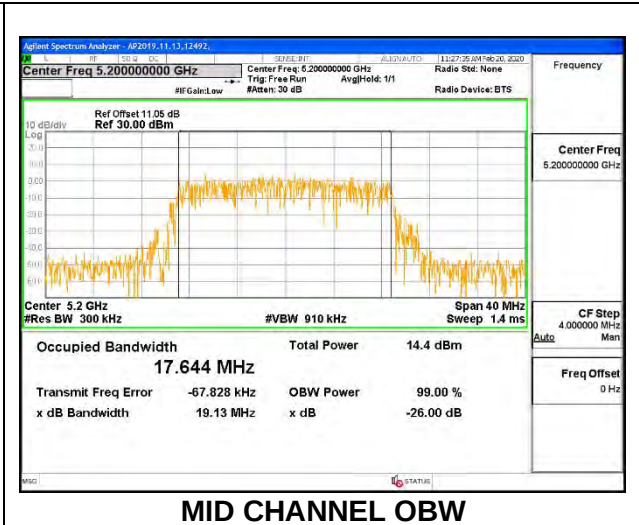
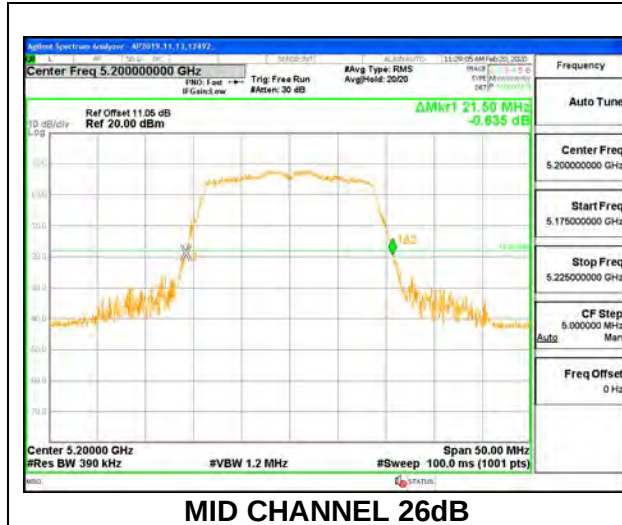
### 1TX ANT 6 MODE

| Channel | Frequency<br>(MHz) | 26dB Bandwidth<br>(MHz) | 99% Bandwidth<br>(MHz) |
|---------|--------------------|-------------------------|------------------------|
| Low     | 5180               | 21.60                   | 17.6680                |
| Mid     | 5200               | 21.55                   | 17.7110                |
| High    | 5240               | 21.40                   | 17.7190                |



# **1TX ANT 5 MODE**

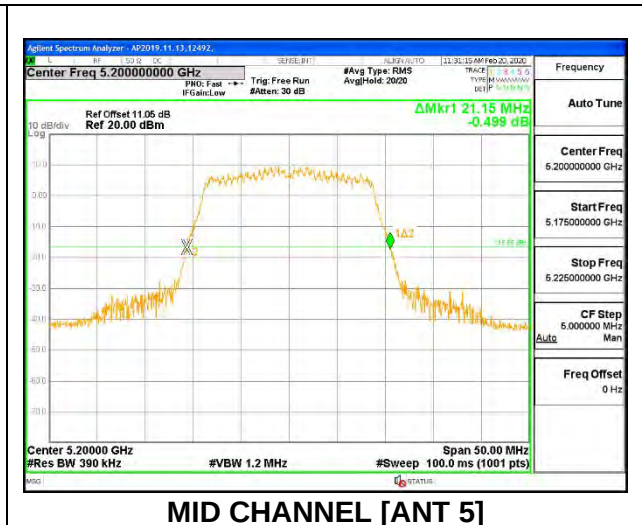
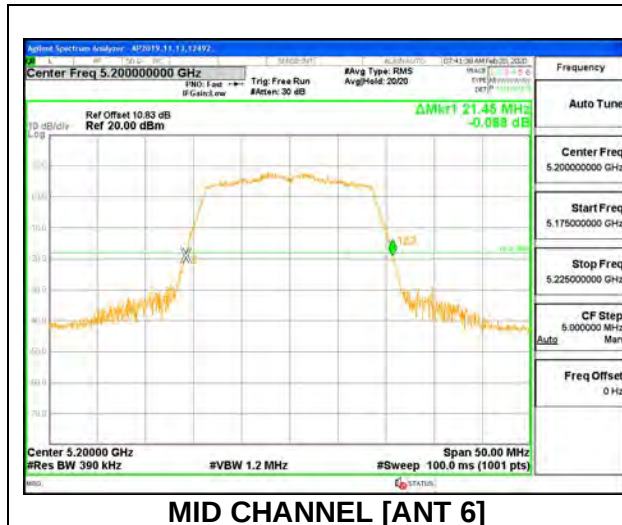
| Channel | Frequency | 26dB Bandwidth | 99% Bandwidth |
|---------|-----------|----------------|---------------|
|         | (MHz)     | (MHz)          | (MHz)         |
| Low     | 5180      | 21.60          | 17.7330       |
| Mid     | 5200      | 21.50          | 17.6440       |
| High    | 5240      | 21.50          | 17.6290       |



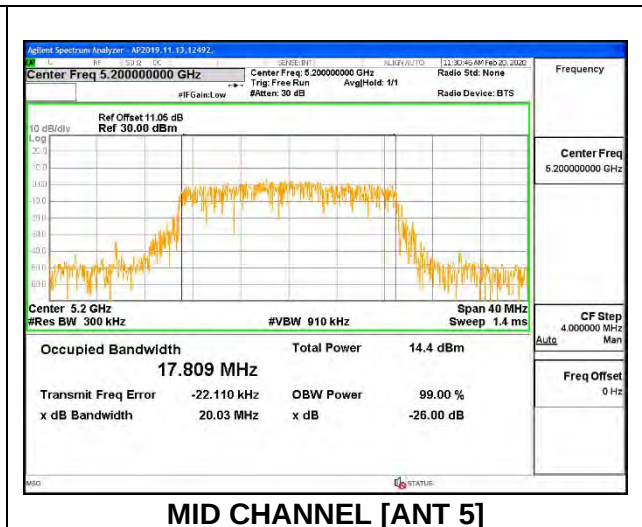
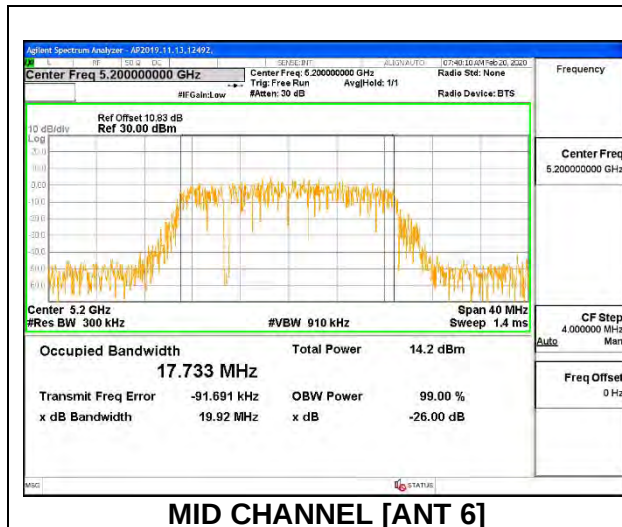
**2TX ANT 6 + ANT 5 CDD MODE**

| Channel | Frequency<br>(MHz) | 26dB Bandwidth<br>Antenna 6<br>(MHz) | 26dB Bandwidth<br>Antenna 5<br>(MHz) | 99% Bandwidth<br>Antenna 6<br>(MHz) | 99% Bandwidth<br>Antenna 5<br>(MHz) |
|---------|--------------------|--------------------------------------|--------------------------------------|-------------------------------------|-------------------------------------|
| Low     | 5180               | 21.55                                | 21.05                                | 17.6920                             | 17.6470                             |
| Mid     | 5200               | 21.45                                | 21.15                                | 17.7330                             | 17.8090                             |
| High    | 5240               | 21.55                                | 21.15                                | 17.6290                             | 17.6300                             |

**MID CHANNEL 26dB**



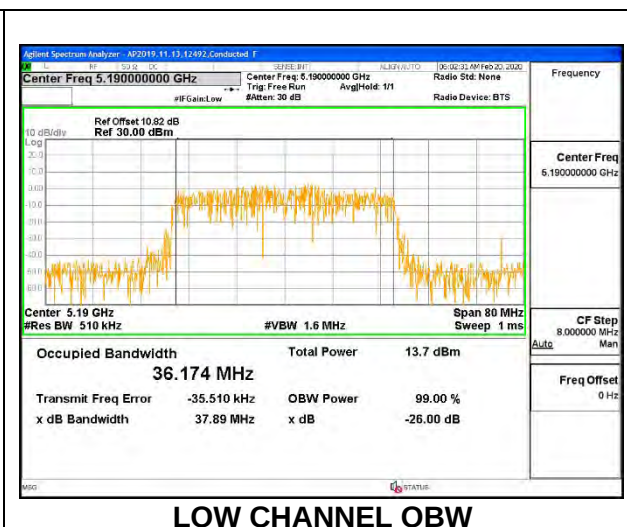
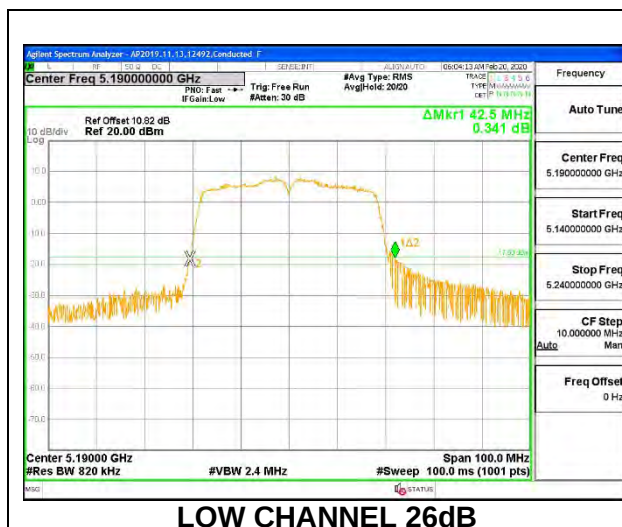
**MID CHANNEL OBW**



## 8.2.2. 802.11n HT40 MODE IN THE 5.2 GHz BAND

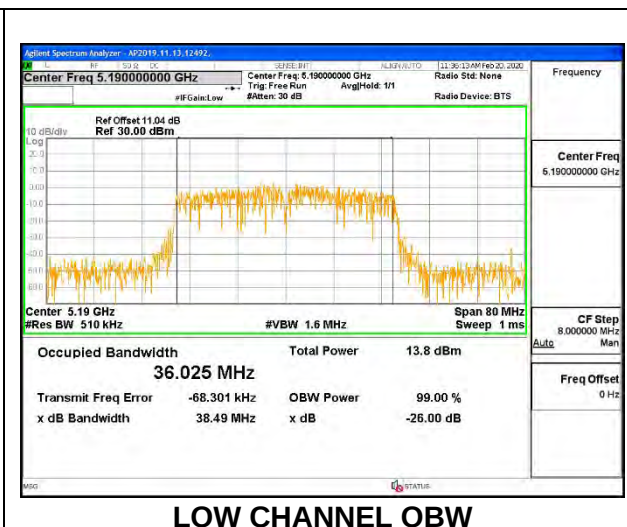
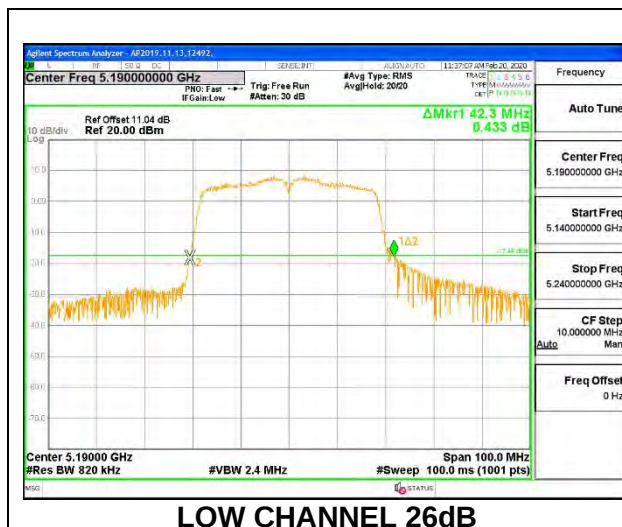
### 1TX ANT 6 MODE

| Channel | Frequency<br>(MHz) | 26dB Bandwidth<br>(MHz) | 99% Bandwidth<br>(MHz) |
|---------|--------------------|-------------------------|------------------------|
| Low     | 5190               | 42.50                   | 36.1740                |
| High    | 5230               | 43.90                   | 36.0100                |



### 1TX ANT 5 MODE

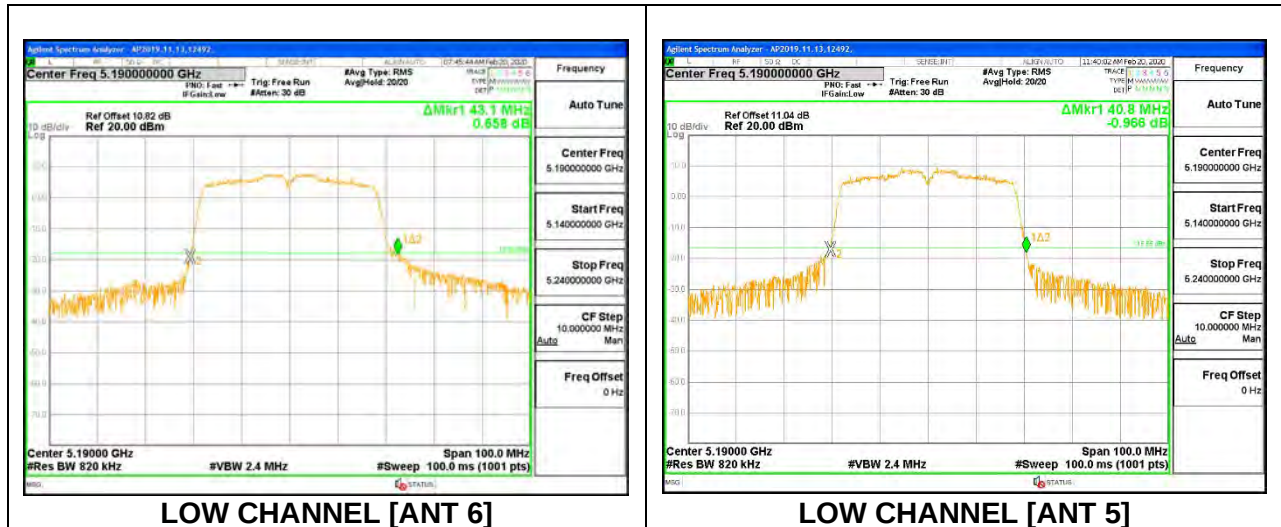
| Channel | Frequency<br>(MHz) | 26dB Bandwidth<br>(MHz) | 99% Bandwidth<br>(MHz) |
|---------|--------------------|-------------------------|------------------------|
| Low     | 5190               | 42.30                   | 36.0250                |
| High    | 5230               | 42.90                   | 36.1460                |



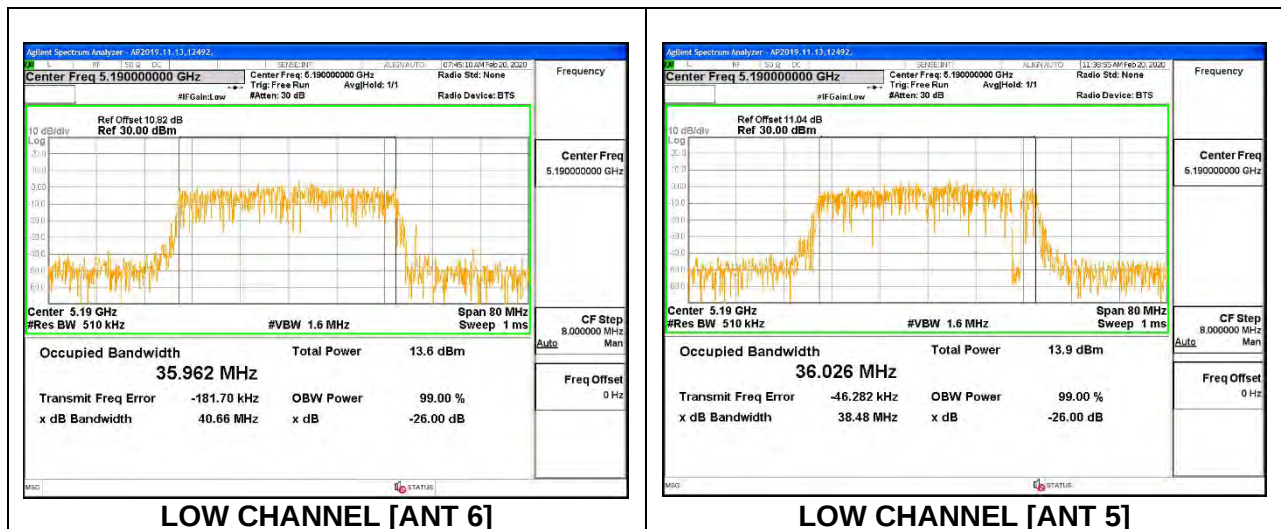
## 2TX ANT 6 + ANT 5 CDD MODE

| Channel | Frequency<br>(MHz) | 26dB Bandwidth<br>Antenna 6<br>(MHz) | 26dB Bandwidth<br>Antenna 5<br>(MHz) | 99% Bandwidth<br>Antenna 6<br>(MHz) | 99% Bandwidth<br>Antenna 5<br>(MHz) |
|---------|--------------------|--------------------------------------|--------------------------------------|-------------------------------------|-------------------------------------|
| Low     | 5190               | 43.10                                | 40.80                                | 35.962                              | 36.026                              |
| High    | 5230               | 43.00                                | 40.70                                | 36.175                              | 36.113                              |

## LOW CHANNEL 26dB



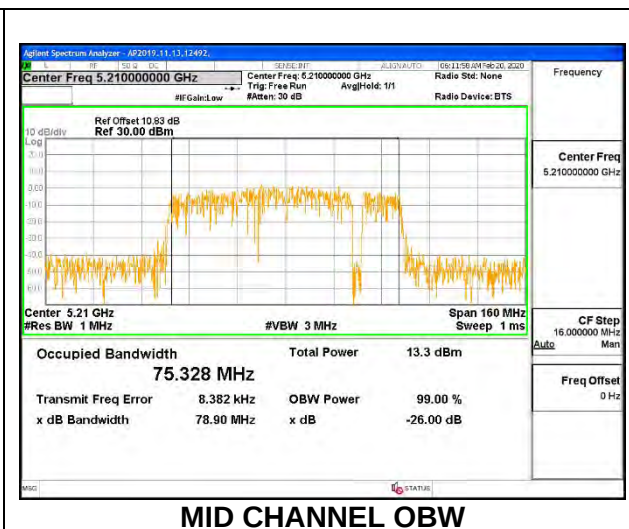
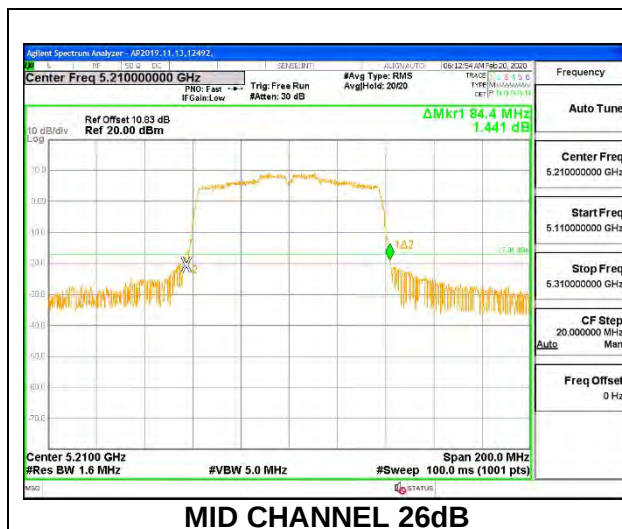
## LOW CHANNEL OBW



### 8.2.3. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

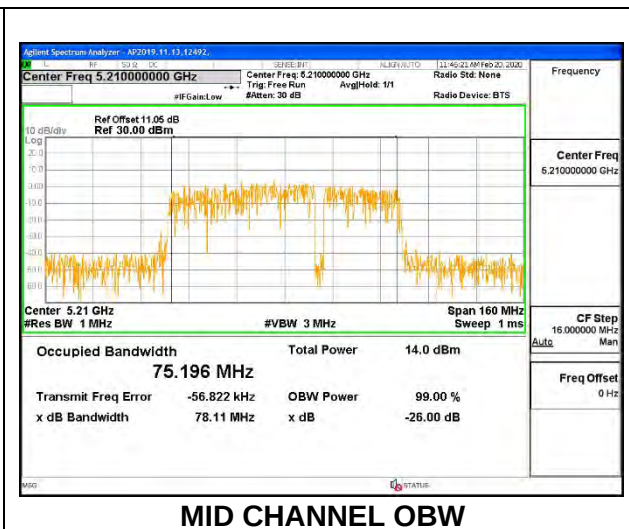
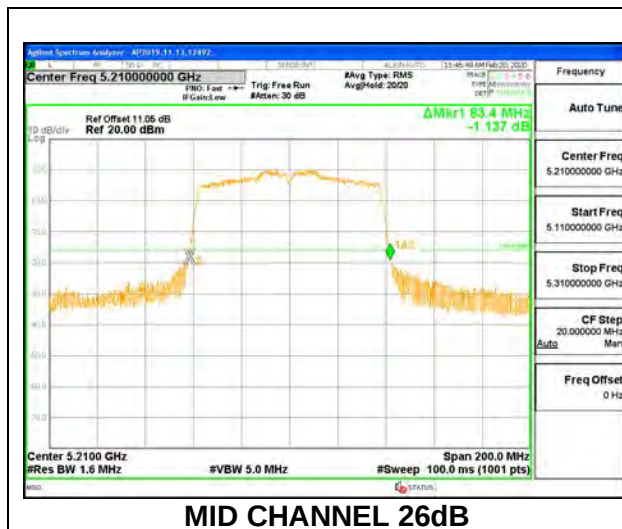
#### 1TX ANT 6 MODE

| Channel | Frequency | 26dB Bandwidth | 99% Bandwidth |
|---------|-----------|----------------|---------------|
|         | (MHz)     | (MHz)          | (MHz)         |
| Mid     | 5210      | 84.40          | 75.3280       |



#### 1TX ANT 5 MODE

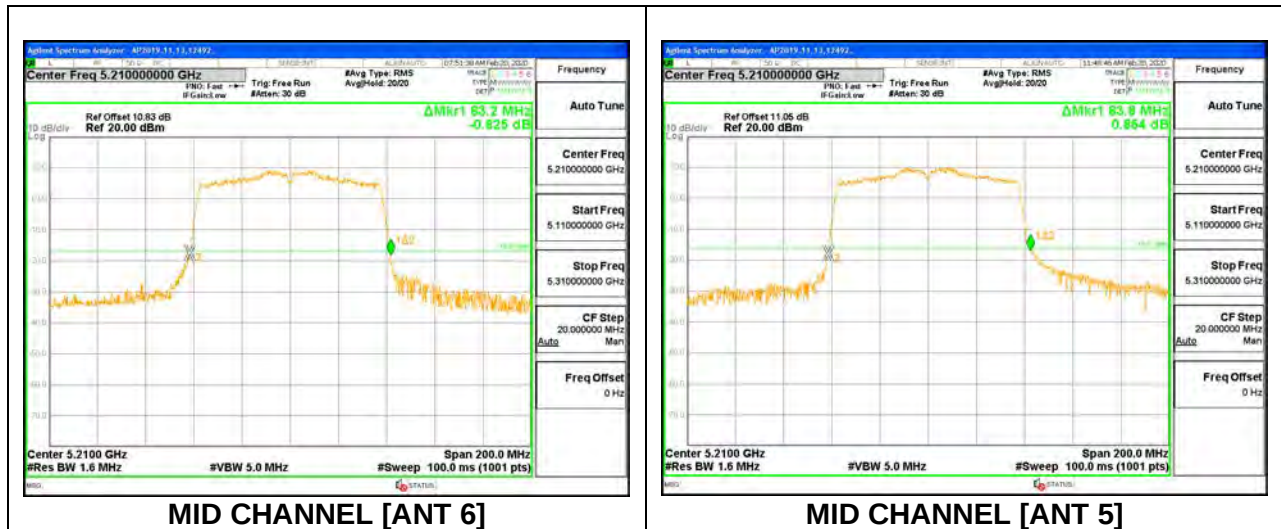
| Channel | Frequency | 26dB Bandwidth | 99% Bandwidth |
|---------|-----------|----------------|---------------|
|         | (MHz)     | (MHz)          | (MHz)         |
| Mid     | 5210      | 83.40          | 75.1960       |



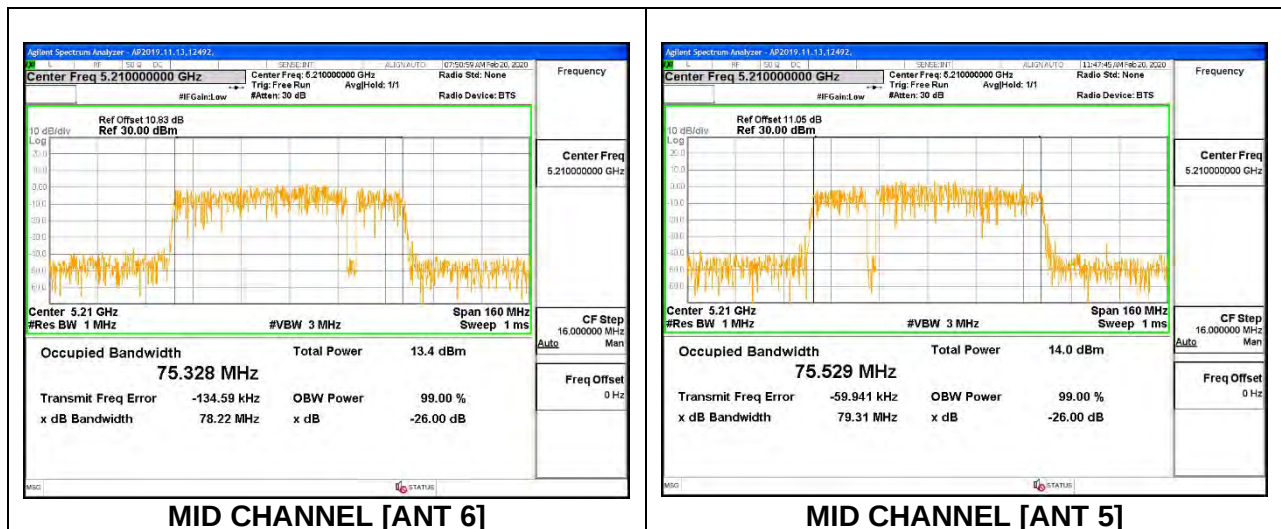
**2TX ANT 6 + ANT 5 CDD MODE**

| Channel | Frequency | 26dB Bandwidth<br>Antenna 6<br>(MHz) | 26dB Bandwidth<br>Antenna 5<br>(MHz) | 99% Bandwidth<br>Antenna 6<br>(MHz) | 99% Bandwidth<br>Antenna 5<br>(MHz) |
|---------|-----------|--------------------------------------|--------------------------------------|-------------------------------------|-------------------------------------|
| Mid     | 5210      | 83.20                                | 83.80                                | 75.3280                             | 75.5290                             |

**MID CHANNEL 26dB**



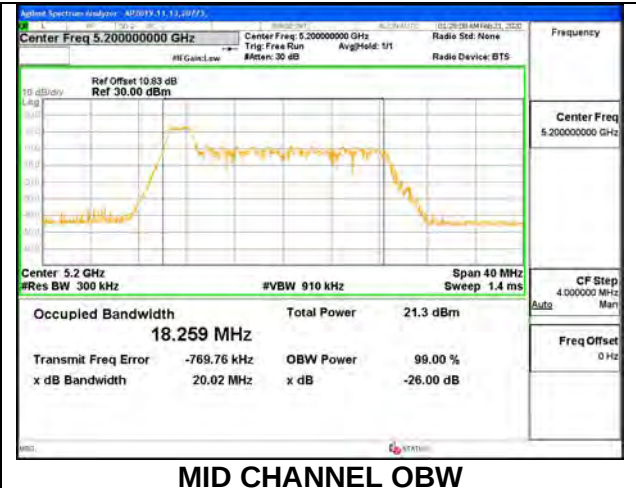
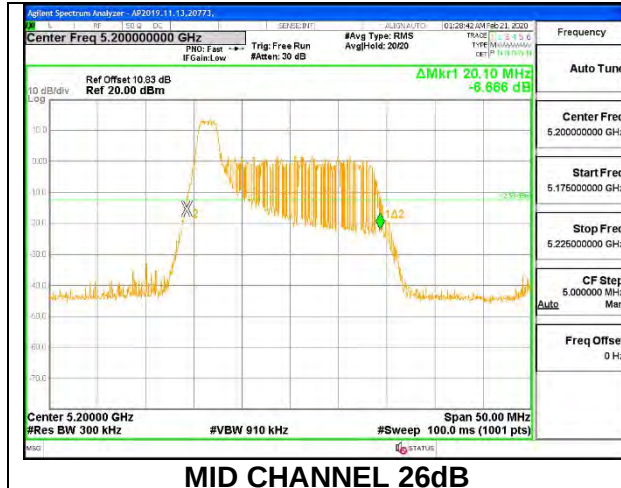
**MID CHANNEL OBW**



## 8.2.4. 802.11ax HE20 MODE IN THE 5.2 GHz BAND

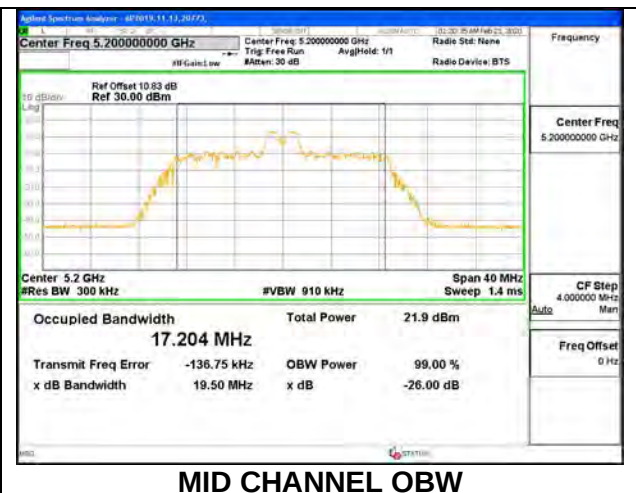
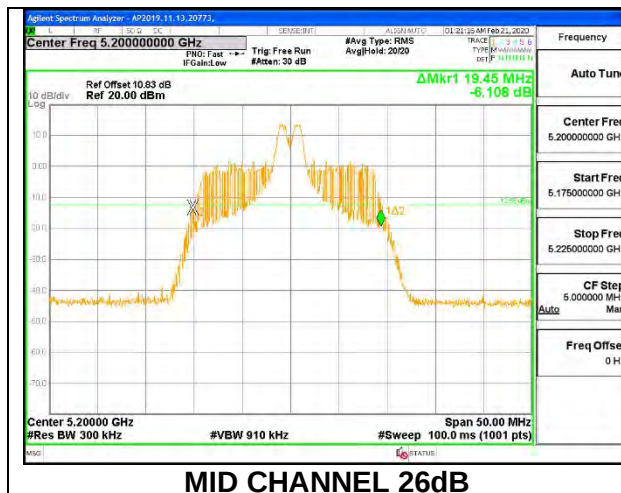
### 1TX ANT 6 MODE: 26 Tones, RU Index 0

| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Low     | 5180      | 20.30           | 18.3950       |
| Mid     | 5200      | 20.10           | 18.2590       |
| High    | 5240      | 20.25           | 18.2790       |



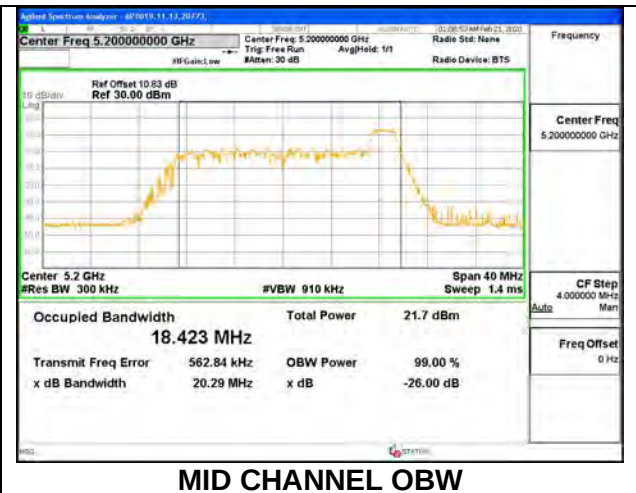
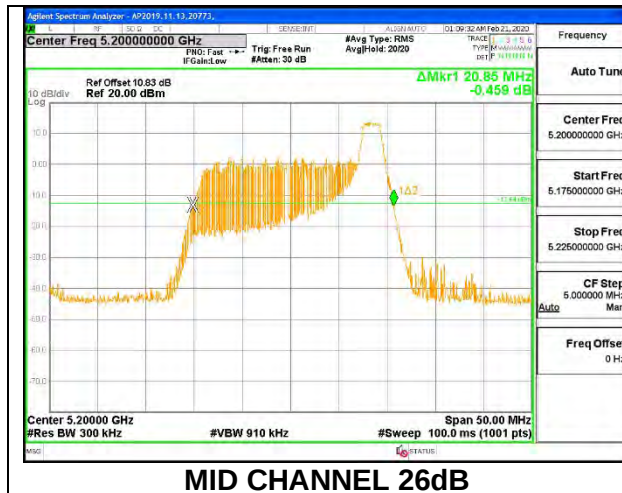
### 1TX ANT 6 MODE: 26 Tones, RU Index 4

| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Low     | 5180      | 19.30           | 17.2420       |
| Mid     | 5200      | 19.45           | 17.2040       |
| High    | 5240      | 19.35           | 17.1800       |



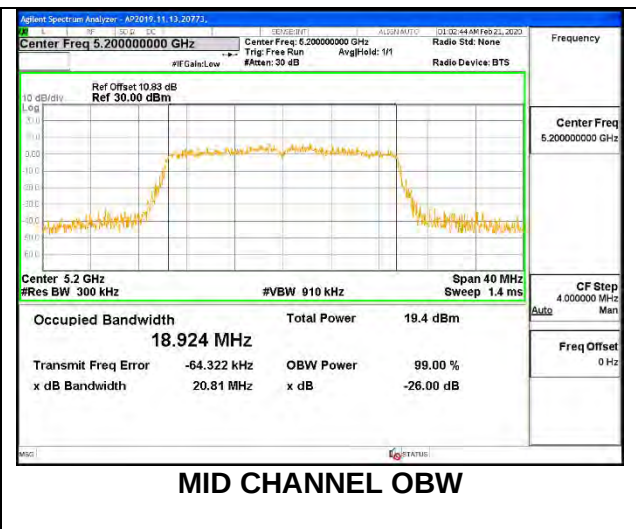
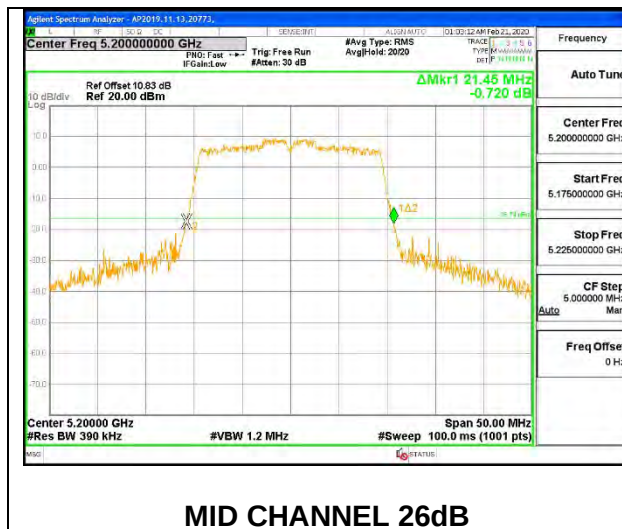
**1TX ANT 6 MODE: 26 Tones, RU Index 4**

| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Low     | 5180      | 20.55           | 18.5410       |
| Mid     | 5200      | 20.85           | 18.4230       |
| High    | 5240      | 20.80           | 18.5560       |



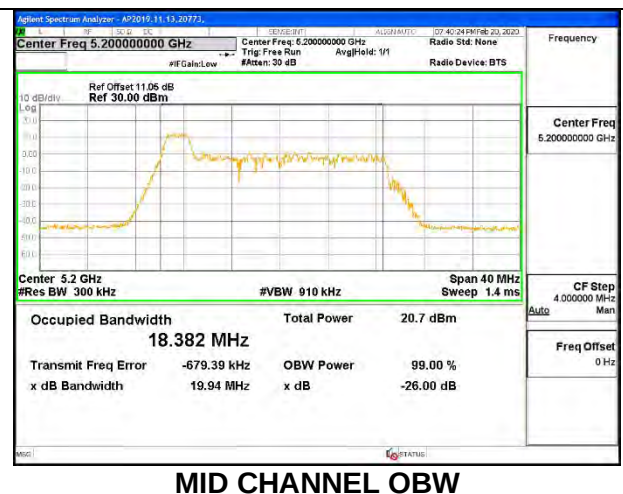
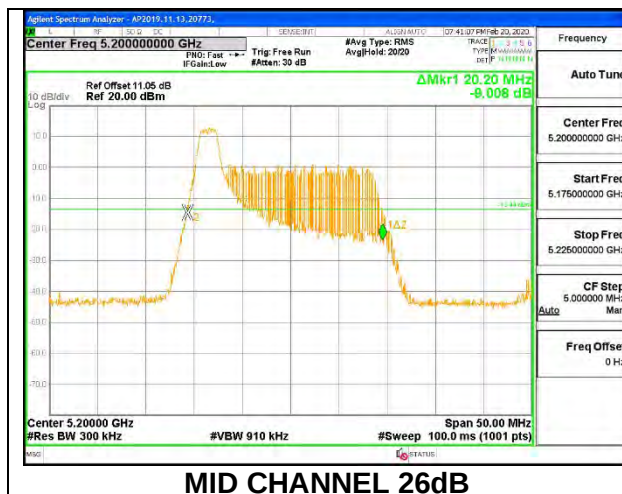
**1TX ANT 6 MODE: 242 Tones, RU Index 61**

| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Low     | 5180      | 21.45           | 18.8360       |
| Mid     | 5200      | 21.45           | 18.9240       |
| High    | 5240      | 21.45           | 18.8200       |



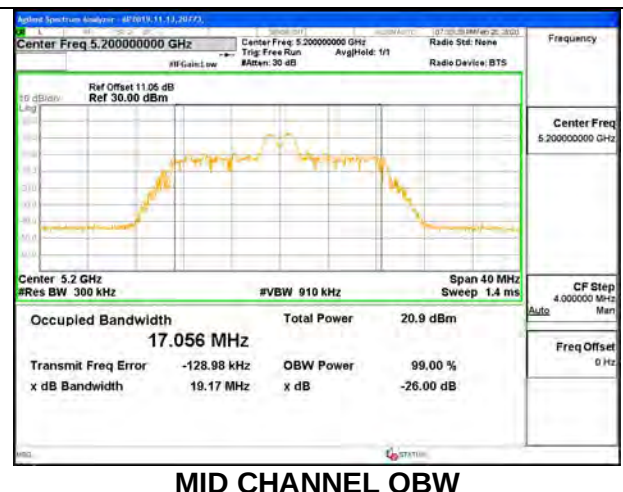
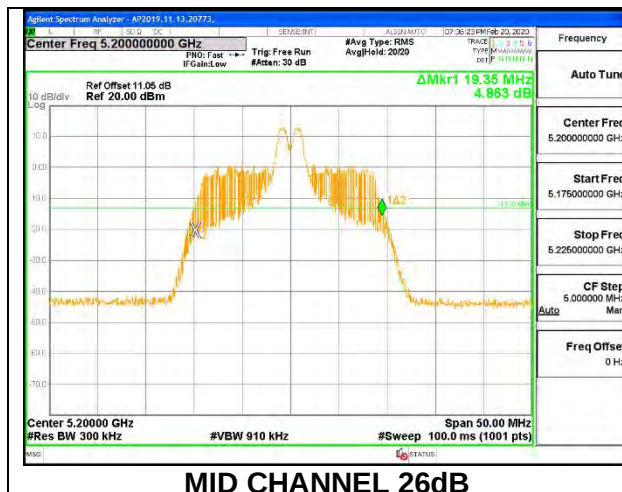
**1TX ANT 5 MODE: 26 Tones, RU Index 0**

| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Low     | 5180      | 20.10           | 18.3730       |
| Mid     | 5200      | 20.20           | 18.3820       |
| High    | 5240      | 20.15           | 18.2860       |



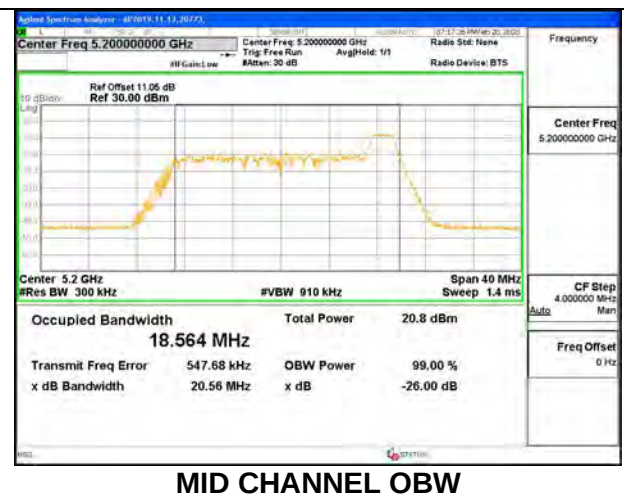
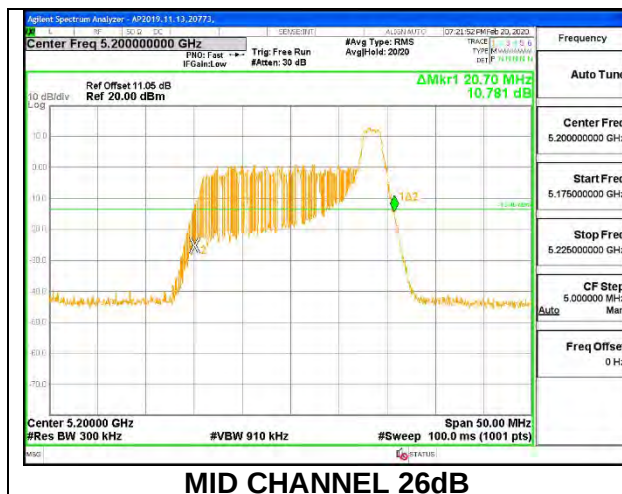
**1TX ANT 5 MODE: 26 Tones, RU Index 4**

| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Low     | 5180      | 19.40           | 17.1940       |
| Mid     | 5200      | 19.35           | 17.0560       |
| High    | 5240      | 19.25           | 17.1620       |



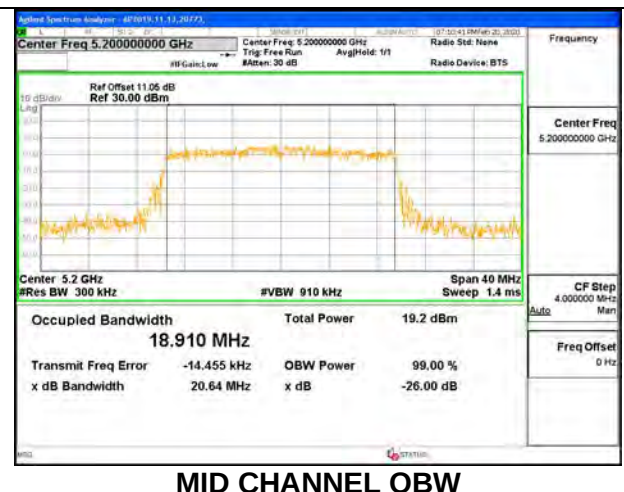
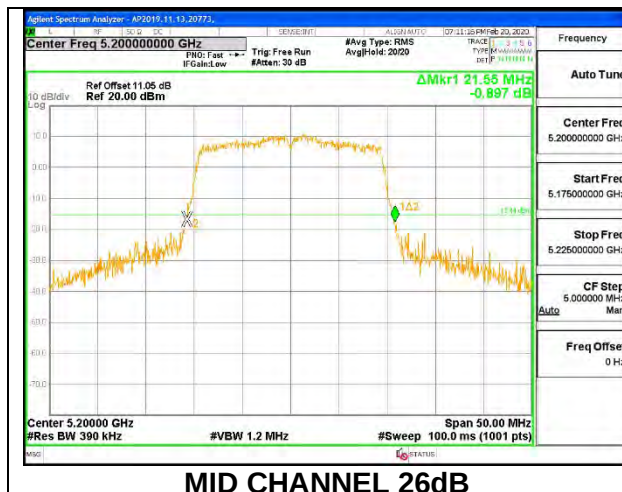
**1TX ANT 5 MODE: 26 Tones, RU Index 4**

| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Low     | 5180      | 20.65           | 18.5100       |
| Mid     | 5200      | 20.70           | 18.5640       |
| High    | 5240      | 20.55           | 18.2140       |



**1TX ANT 5 MODE: 242 Tones, RU Index 61**

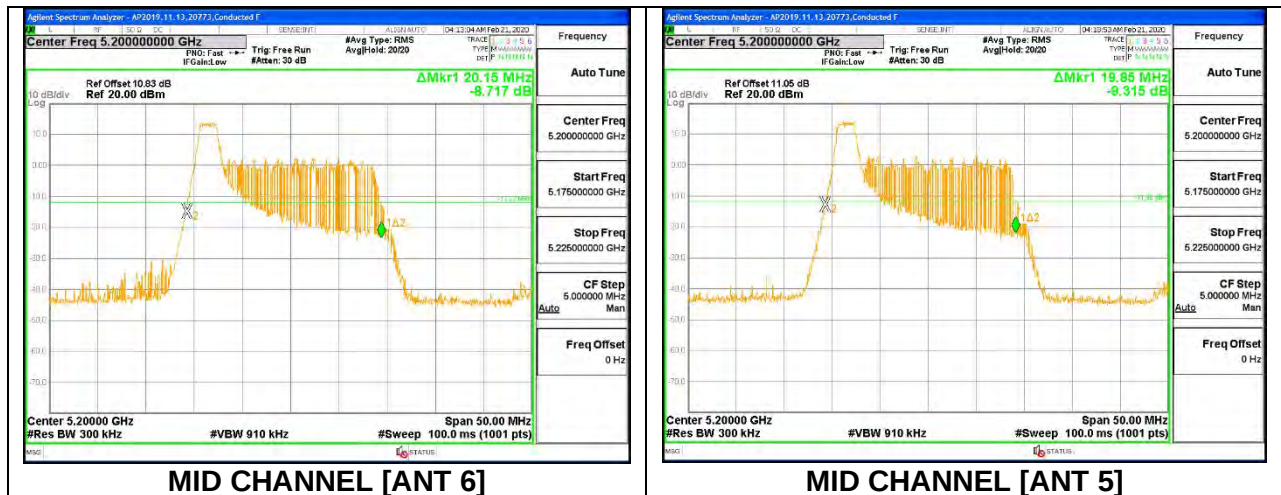
| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Low     | 5180      | 21.45           | 18.7880       |
| Mid     | 5200      | 21.55           | 18.9100       |
| High    | 5240      | 21.35           | 19.0250       |



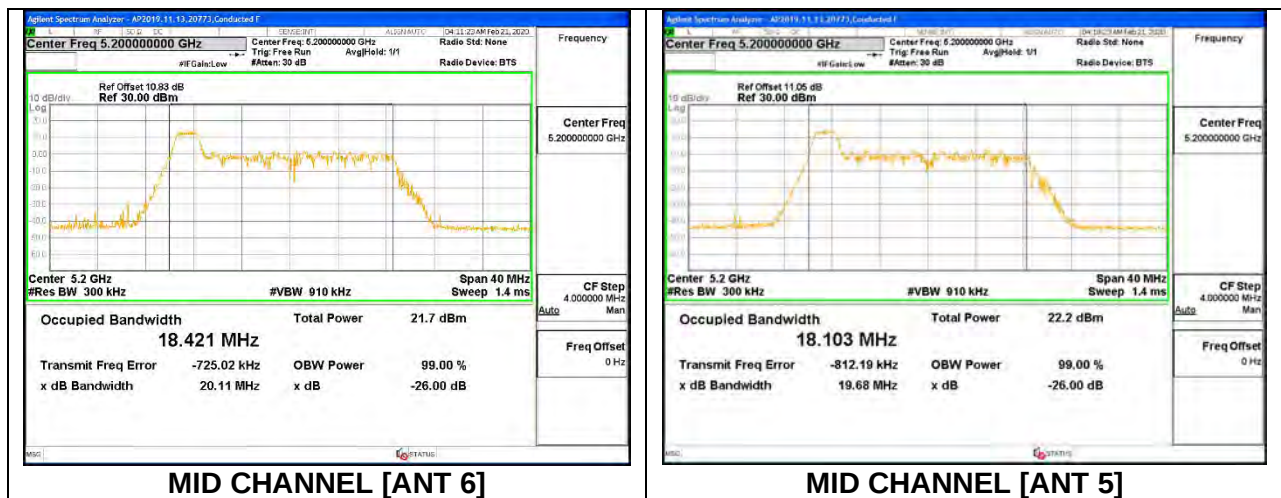
**2TX ANT 6 + ANT 5 OFDMA MODE: 26 Tones, RU Index 0**

| Channel | Frequency<br>(MHz) | 26 dB Bandwidth<br>Antenna 6<br>(MHz) | 26 dB Bandwidth<br>Antenna 5<br>(MHz) | 99% Bandwidth<br>Antenna 6<br>(MHz) | 99% Bandwidth<br>Antenna 5<br>(MHz) |
|---------|--------------------|---------------------------------------|---------------------------------------|-------------------------------------|-------------------------------------|
| Low     | 5180               | 20.05                                 | 19.85                                 | 18.2260                             | 18.2970                             |
| Mid     | 5200               | 20.15                                 | 19.85                                 | 18.4210                             | 18.1030                             |
| High    | 5240               | 20.20                                 | 20.10                                 | 18.3730                             | 18.3230                             |

**MID CHANNEL 26dB**



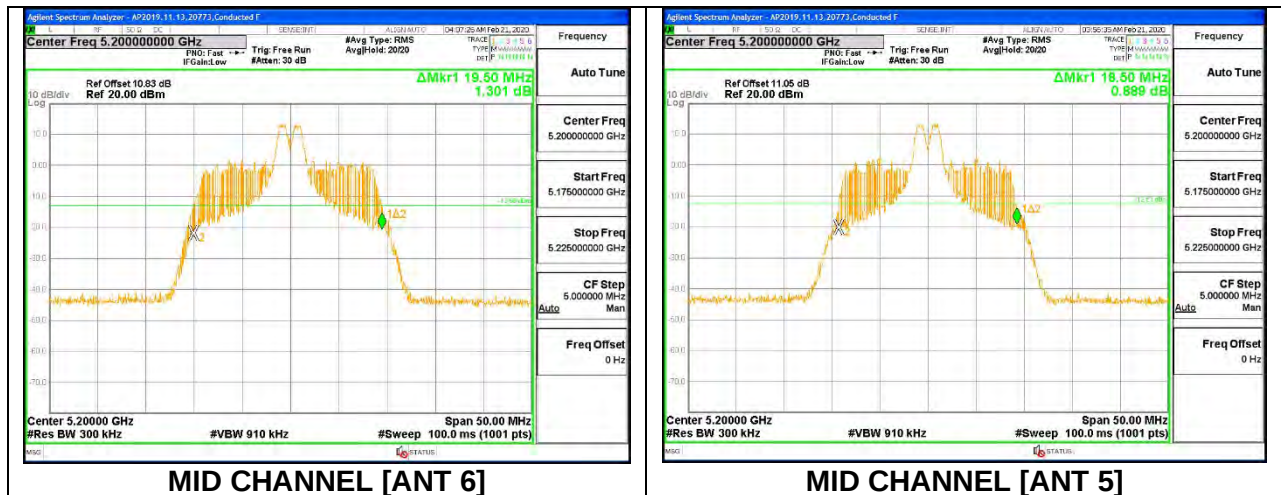
**MID CHANNEL OBW**



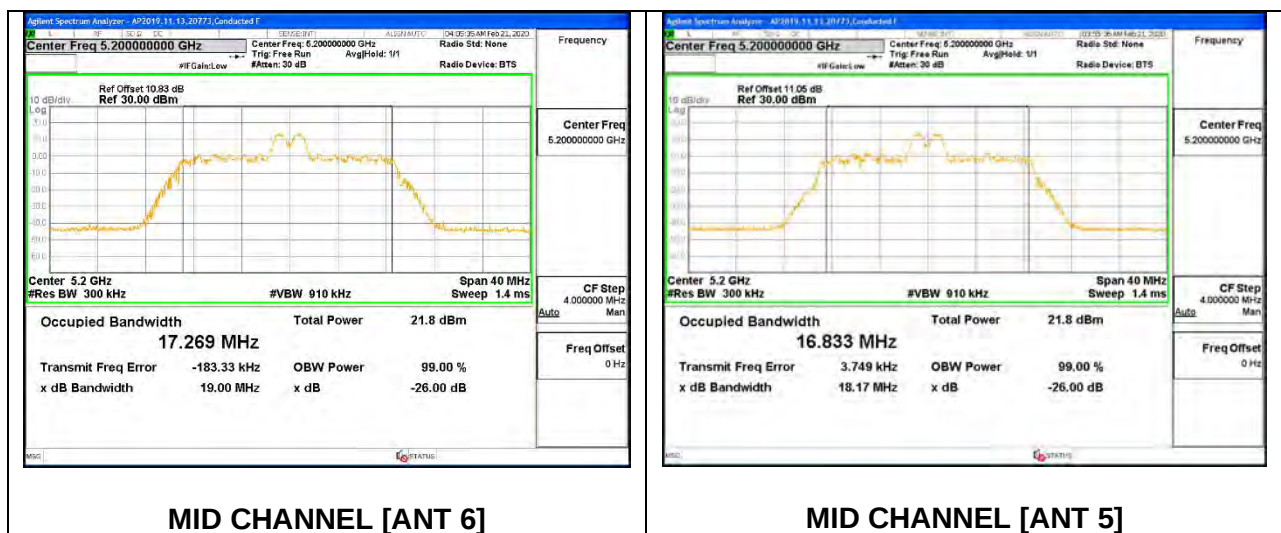
**2TX ANT 6 + ANT 5 OFDMA MODE: 26 Tones, RU Index 4**

| Channel | Frequency<br>(MHz) | 26 dB Bandwidth<br>Antenna 6<br>(MHz) | 26 dB Bandwidth<br>Antenna 5<br>(MHz) | 99% Bandwidth<br>Antenna 6<br>(MHz) | 99% Bandwidth<br>Antenna 5<br>(MHz) |
|---------|--------------------|---------------------------------------|---------------------------------------|-------------------------------------|-------------------------------------|
| Low     | 5180               | 19.30                                 | 18.45                                 | 17.0290                             | 17.0130                             |
| Mid     | 5200               | 19.50                                 | 18.50                                 | 17.2690                             | 16.8330                             |
| High    | 5240               | 19.40                                 | 18.30                                 | 17.2310                             | 17.0140                             |

**MID CHANNEL 26dB**



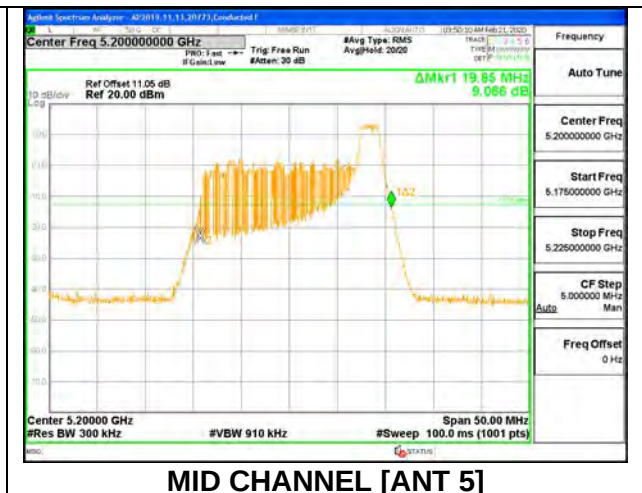
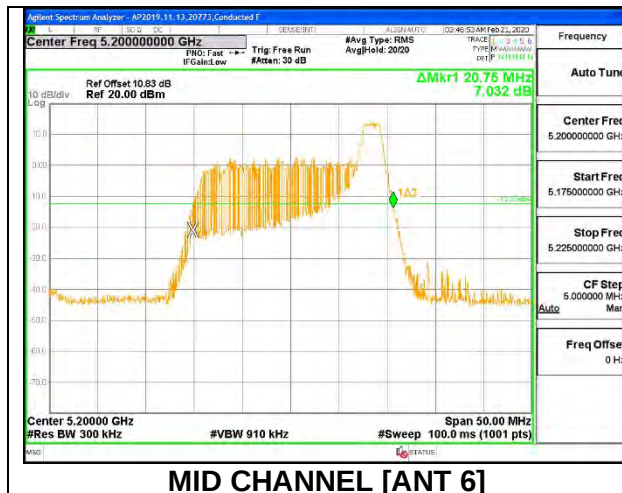
**MID CHANNEL OBW**



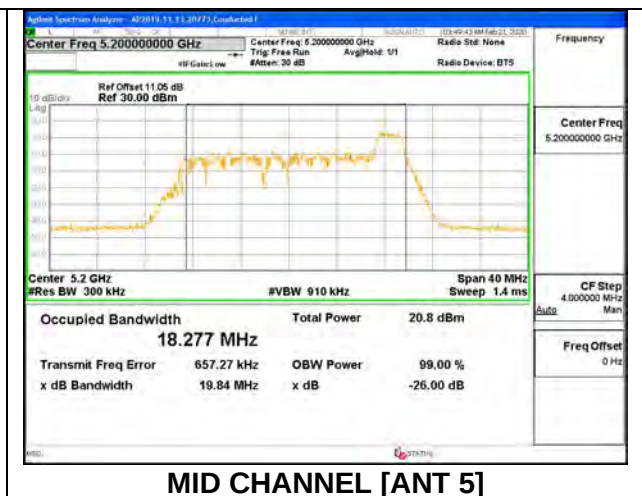
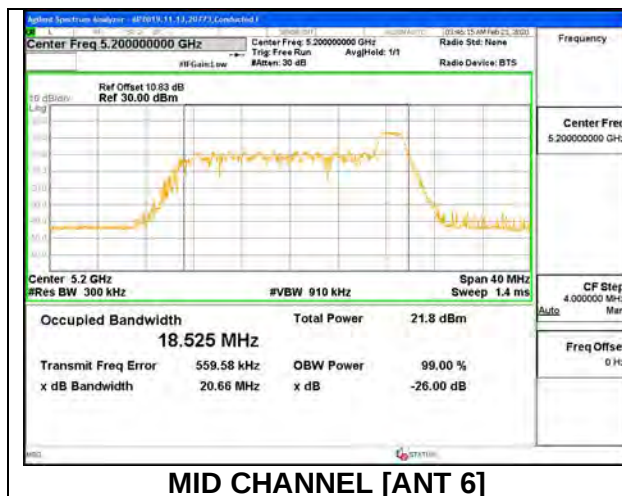
**2TX ANT 6 + ANT 5 OFDMA MODE: 26 Tones, RU Index 8**

| Channel | Frequency<br>(MHz) | 26 dB Bandwidth<br>Antenna 6<br>(MHz) | 26 dB Bandwidth<br>Antenna 5<br>(MHz) | 99% Bandwidth<br>Antenna 6<br>(MHz) | 99% Bandwidth<br>Antenna 5<br>(MHz) |
|---------|--------------------|---------------------------------------|---------------------------------------|-------------------------------------|-------------------------------------|
| Low     | 5180               | 20.55                                 | 19.95                                 | 18.3970                             | 18.2690                             |
| Mid     | 5200               | 20.75                                 | 19.85                                 | 18.5250                             | 18.2770                             |
| High    | 5240               | 20.50                                 | 19.85                                 | 18.4830                             | 18.1530                             |

**MID CHANNEL 26dB**



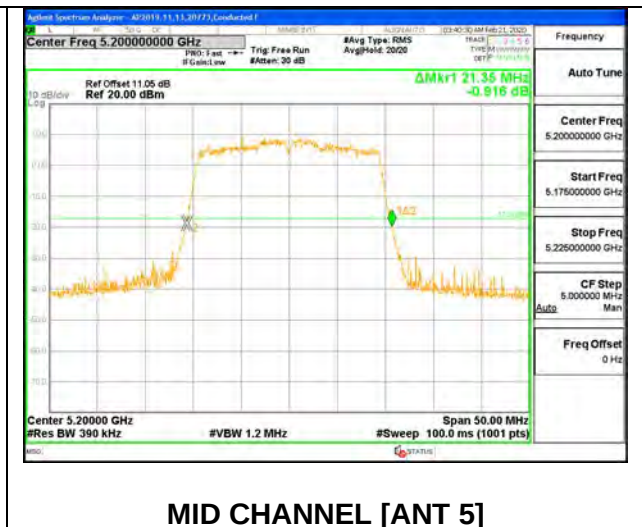
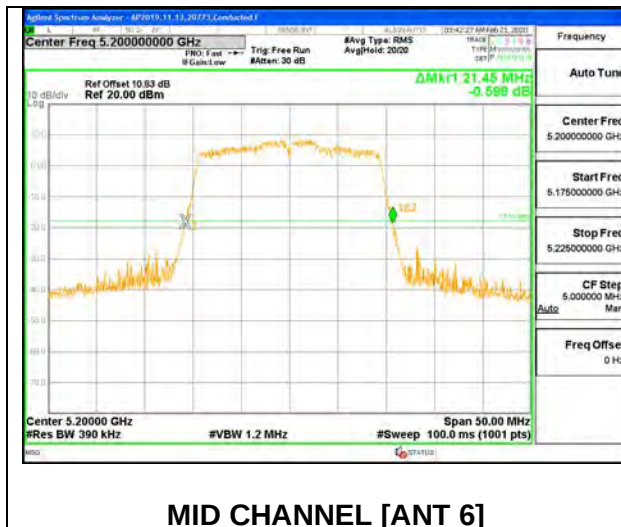
**MID CHANNEL OBW**



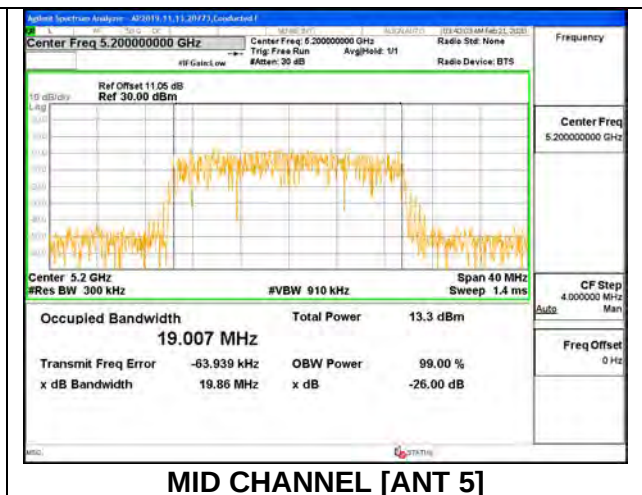
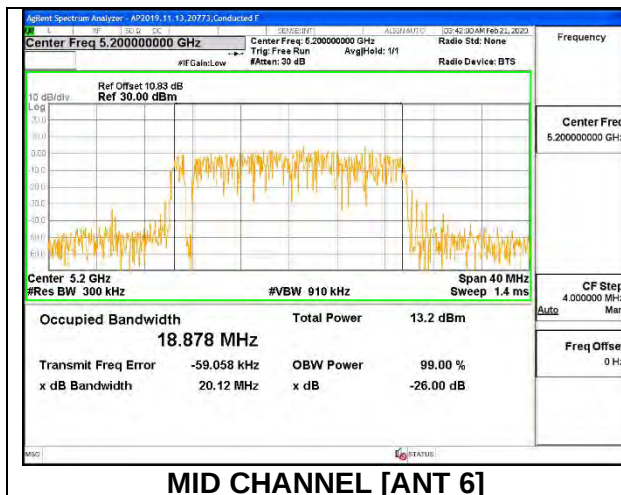
**2TX ANT 6 + ANT 5 OFDMA MODE: 242 Tones, RU Index 61**

| Channel | Frequency<br>(MHz) | 26 dB Bandwidth<br>Antenna 6<br>(MHz) | 26 dB Bandwidth<br>Antenna 5<br>(MHz) | 99% Bandwidth<br>Antenna 6<br>(MHz) | 99% Bandwidth<br>Antenna 5<br>(MHz) |
|---------|--------------------|---------------------------------------|---------------------------------------|-------------------------------------|-------------------------------------|
| Low     | 5180               | 21.40                                 | 21.40                                 | 18.9400                             | 18.9080                             |
| Mid     | 5200               | 21.45                                 | 21.35                                 | 18.8780                             | 19.0070                             |
| High    | 5240               | 21.45                                 | 21.00                                 | 18.8590                             | 18.9110                             |

**MID CHANNEL 26dB**



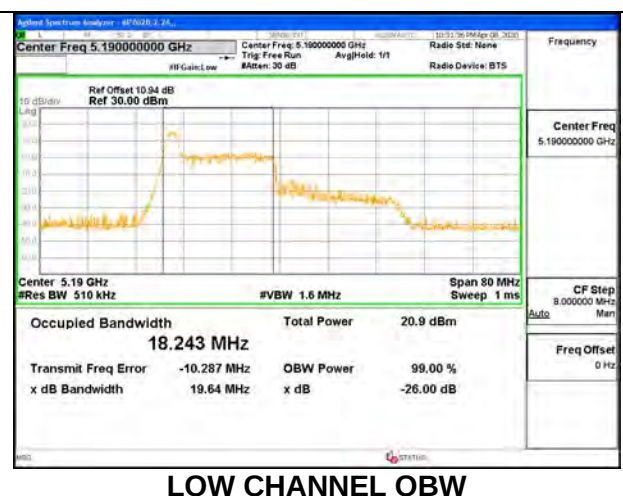
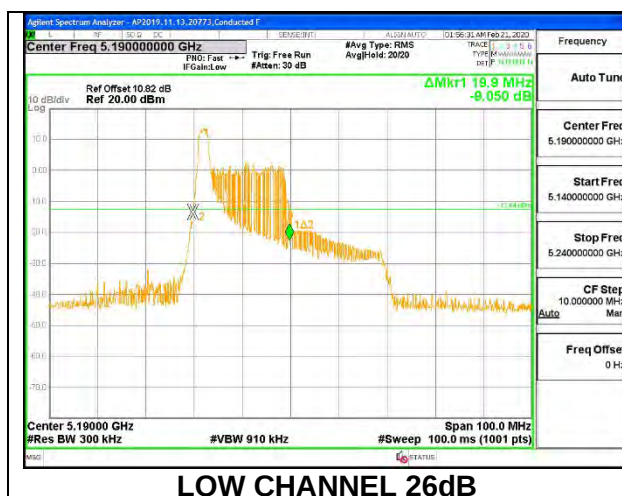
**MID CHANNEL OBW**



## 8.2.5. 802.11ax HE40 MODE IN THE 5.2 GHz BAND

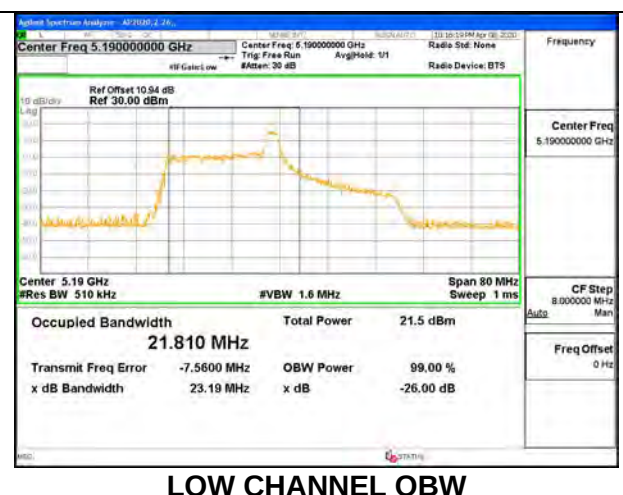
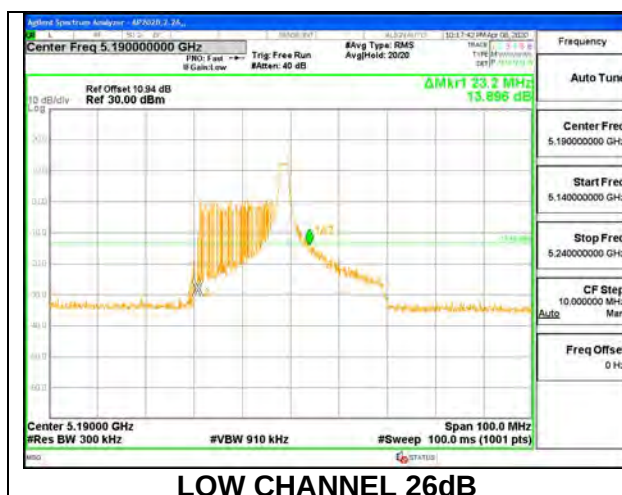
### 1TX ANT 6 MODE: 26 Tones, RU Index 0

| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Low     | 5190      | 19.90           | 18.2430       |
| High    | 5230      | 19.90           | 18.1520       |



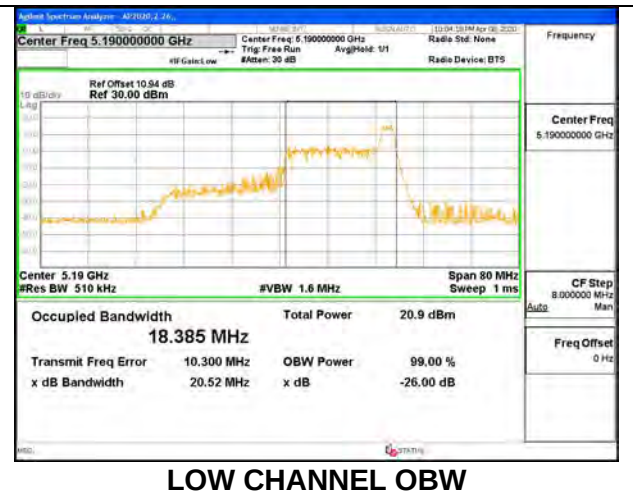
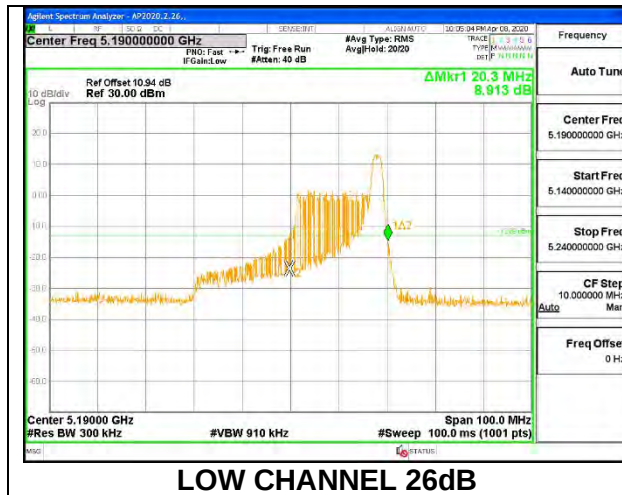
### 1TX ANT 6 MODE: 26 Tones, RU Index 8

| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Low     | 5190      | 23.20           | 21.8100       |
| High    | 5230      | 22.70           | 21.2610       |



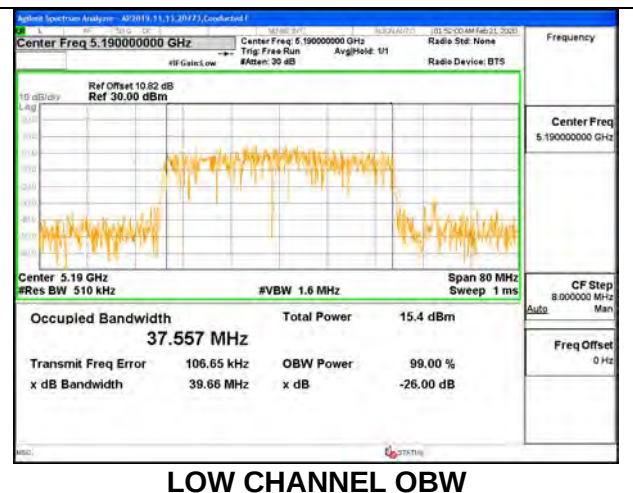
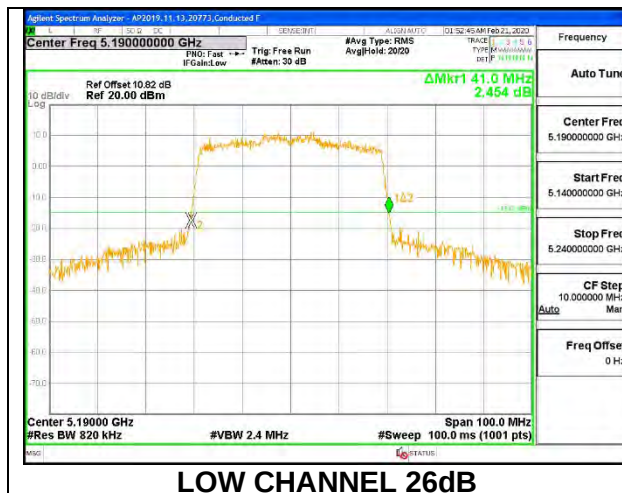
**1TX ANT 6 MODE: 26 Tones, RU Index 17**

| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Low     | 5190      | 20.30           | 18.3850       |
| High    | 5230      | 20.20           | 18.4540       |



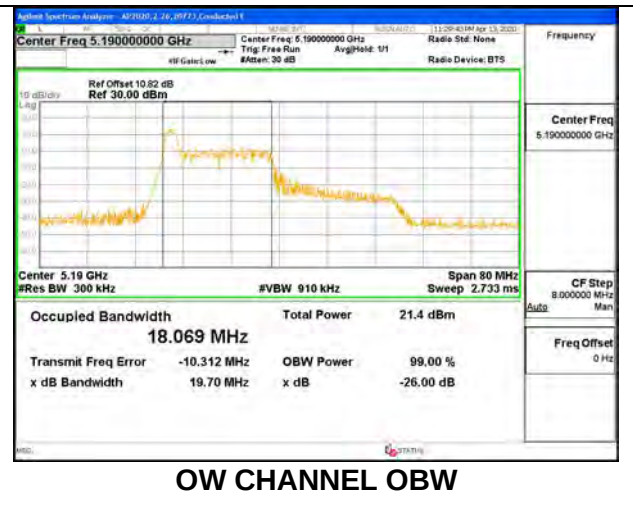
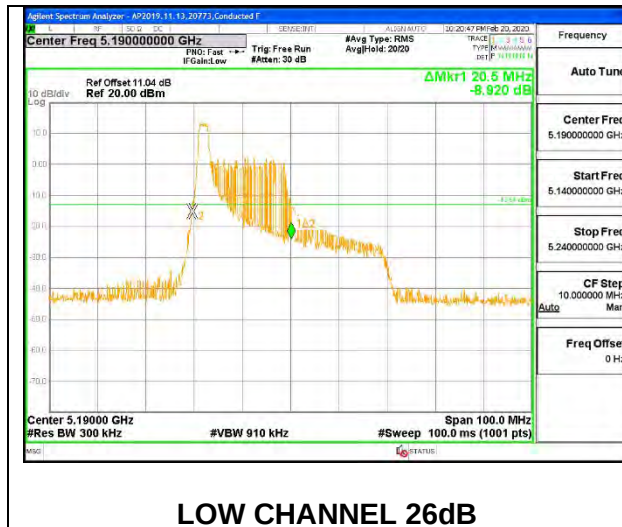
**1TX ANT 6 MODE: 484 Tones, RU Index 65**

| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Low     | 5190      | 41.00           | 37.5570       |
| High    | 5230      | 41.10           | 37.5430       |



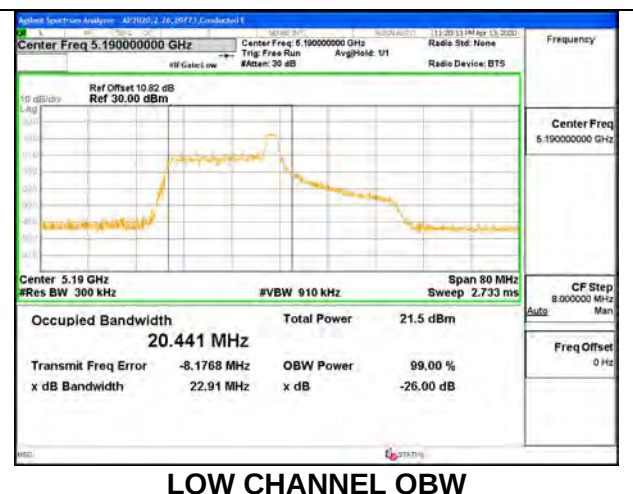
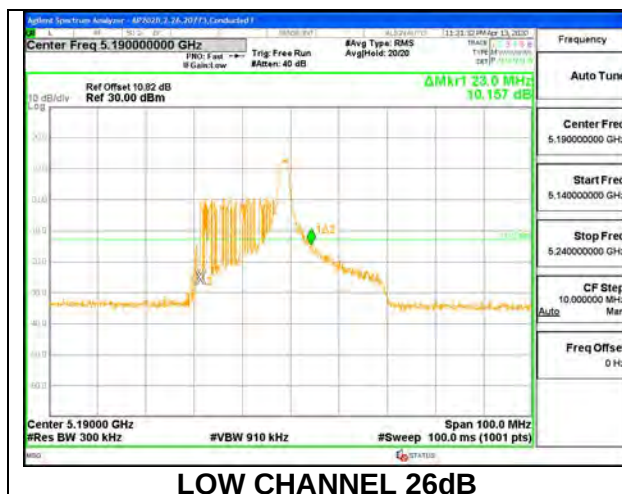
**1TX ANT 5 MODE: 26 Tones, RU Index 0**

| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Low     | 5190      | 20.50           | 18.0690       |
| High    | 5230      | 20.10           | 18.0380       |



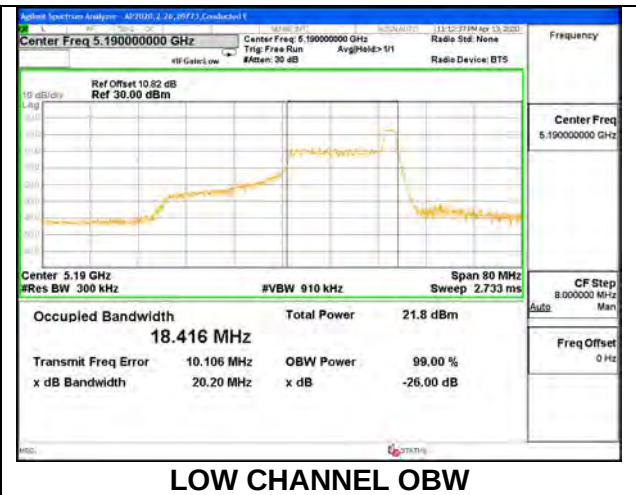
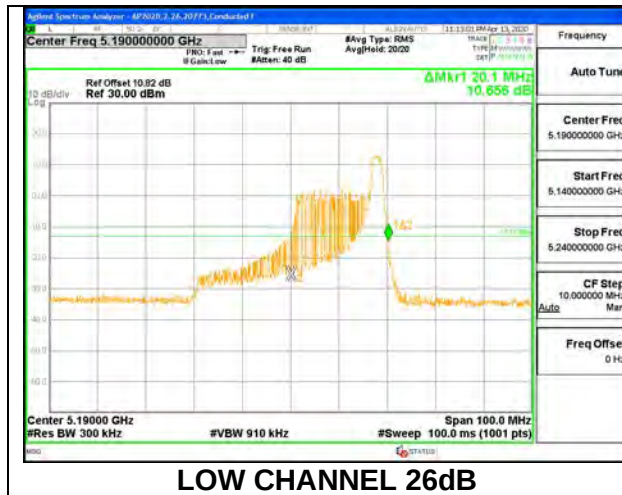
**1TX ANT 5 MODE: 26 Tones, RU Index 4**

| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Low     | 5190      | 23.00           | 20.4410       |
| High    | 5230      | 22.90           | 20.6790       |



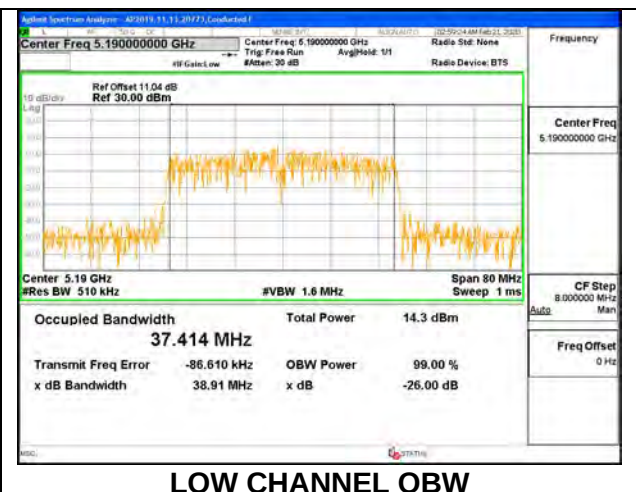
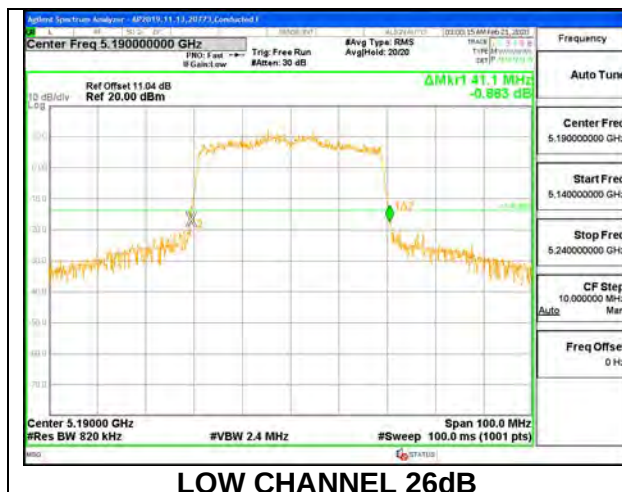
**1TX ANT 5 MODE: 26 Tones, RU Index 17**

| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Low     | 5190      | 20.10           | 18.4160       |
| High    | 5230      | 20.30           | 18.0470       |



**1TX ANT 5 MODE: 484 Tones, RU Index 65**

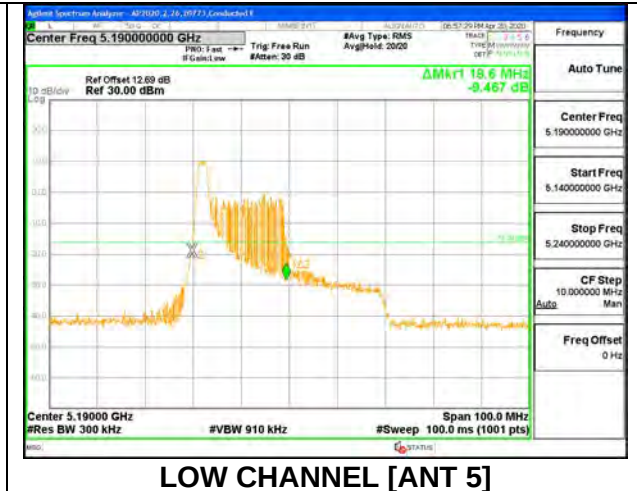
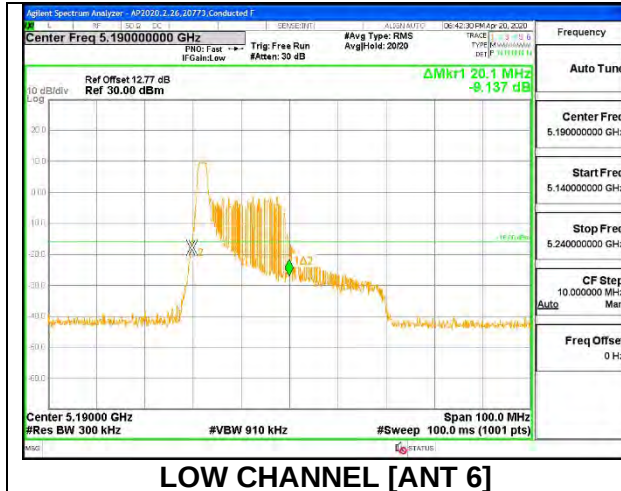
| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Low     | 5190      | 41.10           | 37.4140       |
| High    | 5230      | 40.90           | 37.4530       |



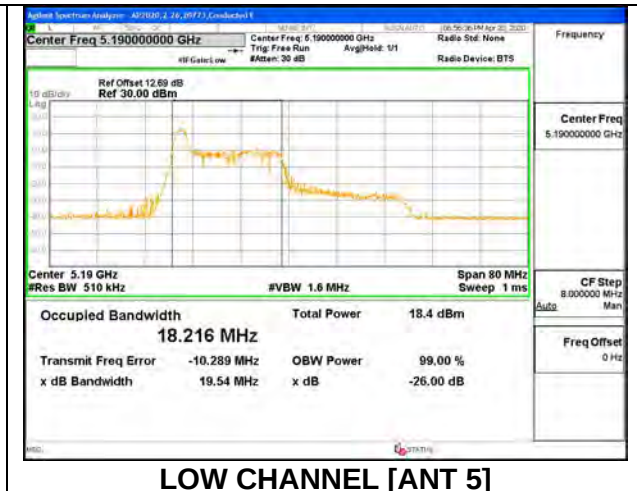
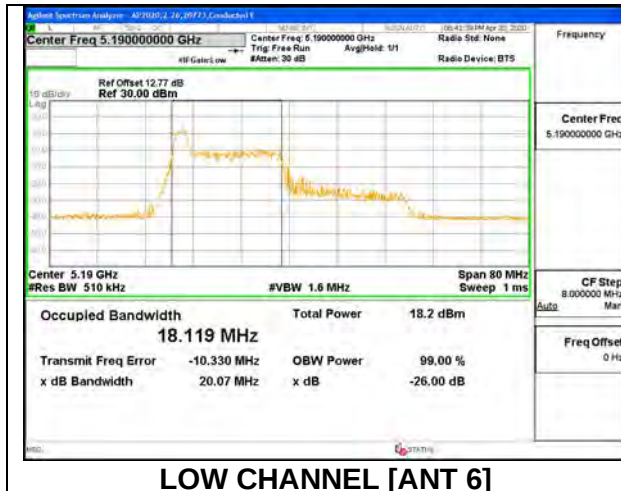
**2TX ANT 6 + ANT 5 OFDMA MODE: 26 Tones, RU Index 0**

| Channel | Frequency<br>(MHz) | 26 dB Bandwidth<br>Antenna 6<br>(MHz) | 26 dB Bandwidth<br>Antenna 5<br>(MHz) | 99% Bandwidth<br>Antenna 6<br>(MHz) | 99% Bandwidth<br>Antenna 5<br>(MHz) |
|---------|--------------------|---------------------------------------|---------------------------------------|-------------------------------------|-------------------------------------|
| Low     | 5190               | 20.10                                 | 19.60                                 | 18.1190                             | 18.2160                             |
| High    | 5230               | 20.20                                 | 19.80                                 | 18.1080                             | 18.1870                             |

**LOW CHANNEL 26dB**



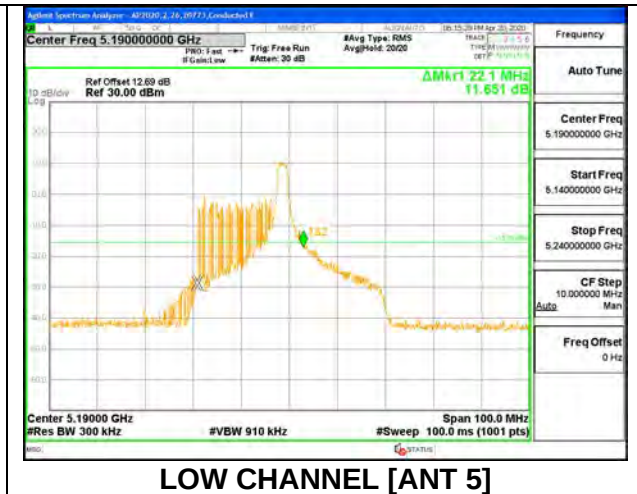
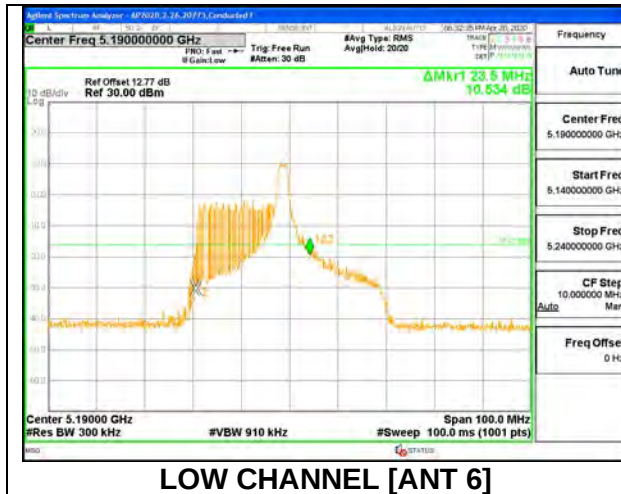
**LOW CHANNEL OBW**



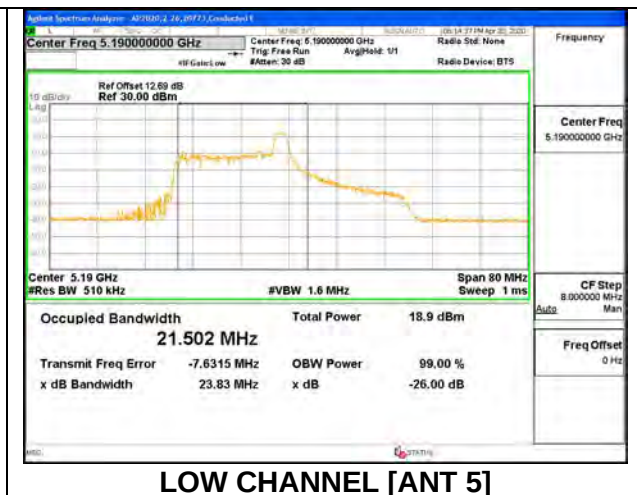
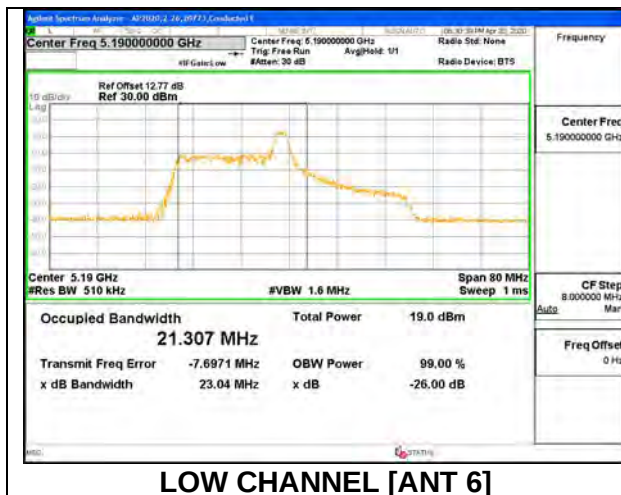
**2TX ANT 6 + ANT 5 OFDMA MODE: 26 Tones, RU Index 8**

| Channel | Frequency | 26 dB Bandwidth<br>Antenna 6<br>(MHz) | 26 dB Bandwidth<br>Antenna 5<br>(MHz) | 99% Bandwidth<br>Antenna 6<br>(MHz) | 99% Bandwidth<br>Antenna 5<br>(MHz) |
|---------|-----------|---------------------------------------|---------------------------------------|-------------------------------------|-------------------------------------|
| Low     | 5190      | 23.50                                 | 22.10                                 | 21.3070                             | 21.5020                             |
| High    | 5230      | 22.60                                 | 22.50                                 | 21.9990                             | 21.8550                             |

**LOW CHANNEL 26dB**



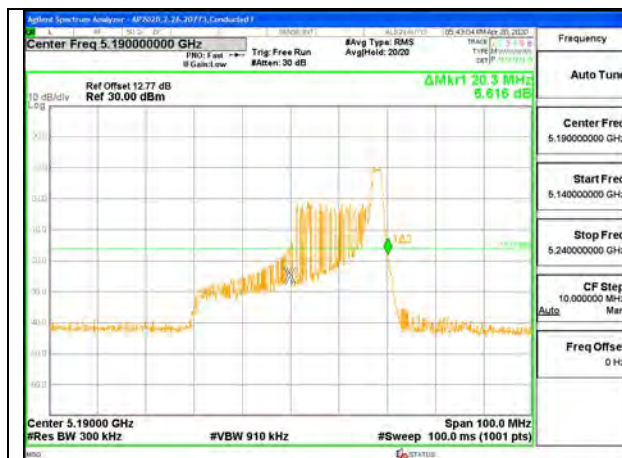
**LOW CHANNEL OBW**



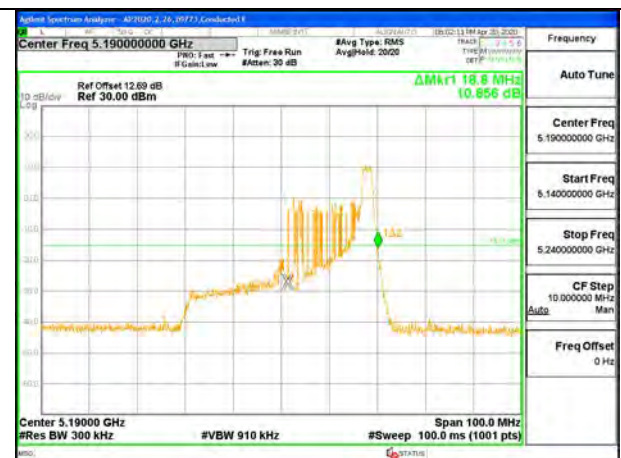
**2TX ANT 6 + ANT 5 OFDMA MODE: 26 Tones, RU Index 17**

| Channel | Frequency | 26 dB Bandwidth<br>Antenna 6<br>(MHz) | 26 dB Bandwidth<br>Antenna 5<br>(MHz) | 99% Bandwidth<br>Antenna 6<br>(MHz) | 99% Bandwidth<br>Antenna 5<br>(MHz) |
|---------|-----------|---------------------------------------|---------------------------------------|-------------------------------------|-------------------------------------|
| Low     | 5190      | 20.30                                 | 18.80                                 | 18.5180                             | 18.2210                             |
| High    | 5230      | 20.00                                 | 19.20                                 | 18.3800                             | 18.3010                             |

**LOW CHANNEL 26dB**

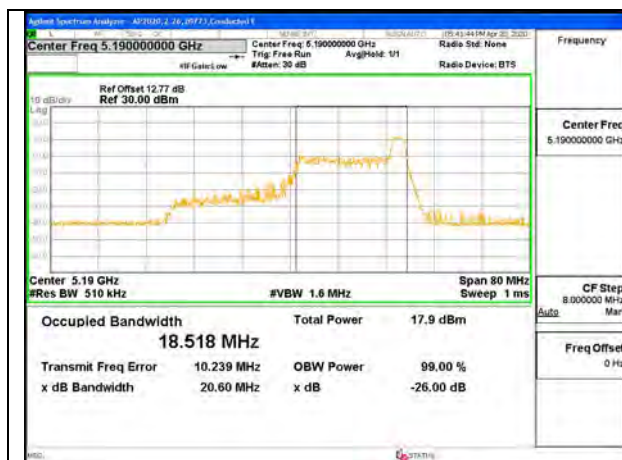


**LOW CHANNEL [ANT 6]**



**LOW CHANNEL [ANT 5]**

**LOW CHANNEL OBW**



**LOW CHANNEL [ANT 6]**



**LOW CHANNEL [ANT 5]**

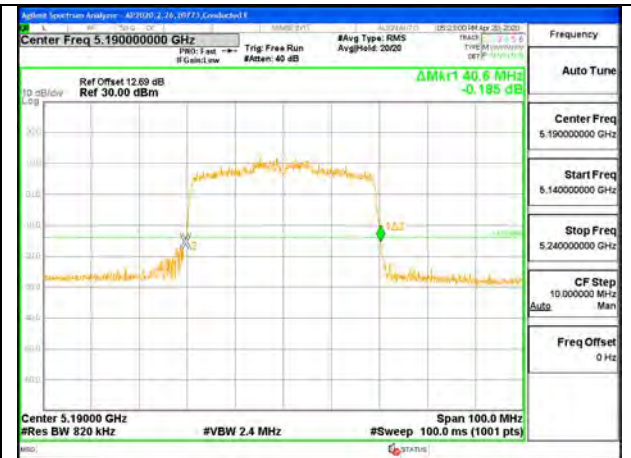
**2TX ANT 6 + ANT 5 OFDMA MODE: 242 Tones, RU Index 65**

| Channel | Frequency | 26 dB Bandwidth<br>Antenna 6<br>(MHz) | 26 dB Bandwidth<br>Antenna 5<br>(MHz) | 99% Bandwidth<br>Antenna 6<br>(MHz) | 99% Bandwidth<br>Antenna 5<br>(MHz) |
|---------|-----------|---------------------------------------|---------------------------------------|-------------------------------------|-------------------------------------|
| Low     | 5190      | 41.00                                 | 40.60                                 | 37.3360                             | 37.6680                             |
| High    | 5230      | 41.00                                 | 40.80                                 | 37.7100                             | 37.6350                             |

**LOW CHANNEL 26dB**



**LOW CHANNEL [ANT 6]**



**LOW CHANNEL [ANT 5]**

**LOW CHANNEL OBW**



**LOW CHANNEL [ANT 6]**

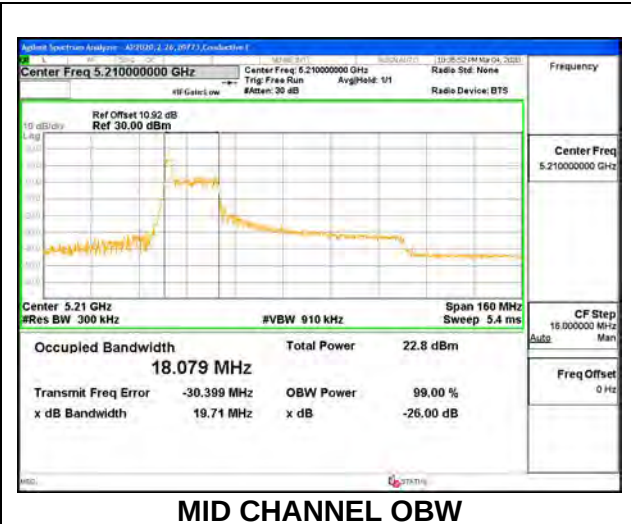
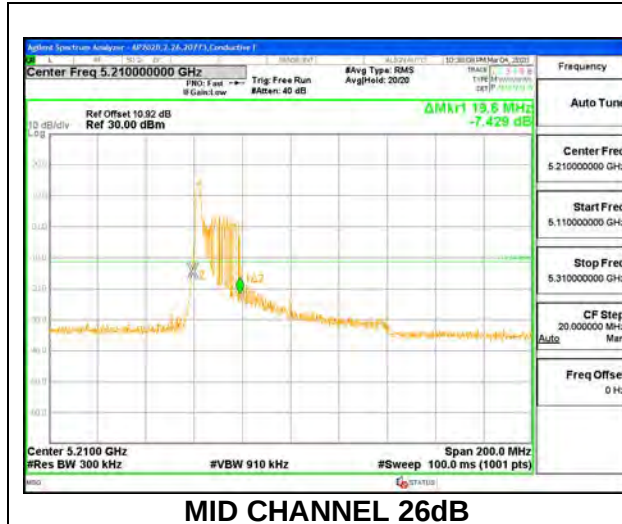


**LOW CHANNEL [ANT 5]**

## 8.2.6. 802.11ax HE80 MODE IN THE 5.2 GHz BAND

### 1TX ANT 6 MODE: 26 Tones, RU Index 0

| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Mid     | 5210      | 19.60           | 18.0790       |



### 1TX ANT 6 MODE: 26 Tones, RU Index 18

| Channel | Frequency | 26 dB Bandwidth | 99% Bandwidth |
|---------|-----------|-----------------|---------------|
|         | (MHz)     | (MHz)           | (MHz)         |
| Mid     | 5210      | 40.00           | 36.6750       |

