



## FCC AND ISCED CERTIFICATION TEST REPORT

|                             |                                                                             |
|-----------------------------|-----------------------------------------------------------------------------|
| <b>Applicant:</b>           | Guangzhou Shikun Electronics Co., Ltd                                       |
| <b>Address:</b>             | NO.6 Liankun Road, Huangpu District, Guangzhou, China                       |
| <b>Manufacturer:</b>        | Guangzhou Shikun Electronics Co., Ltd                                       |
| <b>Address:</b>             | NO.6 Liankun Road, Huangpu District, Guangzhou, China                       |
| <b>Product Description:</b> | IEEE 802.11b/g/n/a/ac/ax 2T2R USB WiFi Module Integrated BT 2.1+EDR/4.2/5.2 |
| <b>Brand Name:</b>          | N/A                                                                         |
| <b>Tested Model:</b>        | SKI.WB920TU.2                                                               |
| <b>FCC ID:</b>              | 2AR82-SKIWB920TU2                                                           |
| <b>IC:</b>                  | 24728-SKIWB920TU2                                                           |
| <b>Report No.:</b>          | JCF230821202-003                                                            |
| <b>Received Date:</b>       | Aug. 24, 2023                                                               |
| <b>Tested Date:</b>         | Aug. 24, 2023 - Sep. 22, 2023                                               |
| <b>Issued Date:</b>         | Oct. 20, 2023                                                               |
| <b>Test Standards:</b>      | FCC Rules and Regulations Part 15 Subpart C, RSS-247 Issue 3, Aug. 2023.    |
| <b>Test Procedure:</b>      | ANSI C63.10:2013, RSS-Gen Issue 5, A2 (February 2021)                       |
| <b>Test Result:</b>         | Pass                                                                        |

**Prepared By:**

*Kennys Zhang*

Kennys Zhang/Engineer

**Date:** Oct. 20, 2023

**Reviewed By:**

*Roger Li*

Roger Li/Engineer

**Date:** Oct. 20, 2023



**Approved By:**

*Talent Zhang*

Talent Zhang/Engineer

**Date:** Oct. 20, 2023

Note: The test results in this report apply exclusively to the tested model / sample. Without written approval of Guangzhou Jingce Testing Technology Co., Ltd. the test report shall not be reproduced except in full.

**Report Revise Record**

| Report Version | Revise Time | Issued Date   | Valid Version   | Notes |
|----------------|-------------|---------------|-----------------|-------|
| V1.0           | /           | Oct. 20, 2023 | Original Report | /     |

## Table of Contents

|                                                                |            |
|----------------------------------------------------------------|------------|
| <b>1. Test Report Declare</b> .....                            | <b>5</b>   |
| <b>2. Summary of Test Results</b> .....                        | <b>6</b>   |
| <b>3. Test Laboratory</b> .....                                | <b>6</b>   |
| <b>4. Equipment Under Test</b> .....                           | <b>7</b>   |
| 4.1. Description of EUT .....                                  | 7          |
| 4.2. Channel List .....                                        | 7          |
| 4.3. Test Channel Configuration .....                          | 8          |
| 4.4. Test environment conditions .....                         | 8          |
| 4.5. Description of Available Antennas .....                   | 8          |
| 4.6. Description of Available Antennas .....                   | 9          |
| <b>5. Description of Test Setup</b> .....                      | <b>9</b>   |
| 5.1. Accessory .....                                           | 9          |
| 5.2. Support Equipment .....                                   | 9          |
| 5.3. Test Setup .....                                          | 10         |
| 5.4. Setup Diagram for Tests .....                             | 10         |
| <b>6. Measurement Uncertainty</b> .....                        | <b>10</b>  |
| <b>7. Measuring Instrument and Software Used</b> .....         | <b>10</b>  |
| <b>8. On Time and Duty Cycle</b> .....                         | <b>12</b>  |
| 8.1. Block diagram of test setup .....                         | 12         |
| 8.2. Limits .....                                              | 12         |
| 8.3. Procedure .....                                           | 12         |
| 8.4. Results .....                                             | 12         |
| 8.5. Original test data .....                                  | 14         |
| <b>9. 6 dB DTS Bandwidth and 99 % Occupied Bandwidth</b> ..... | <b>26</b>  |
| 9.1. Block diagram of test setup .....                         | 26         |
| 9.2. Limits .....                                              | 26         |
| 9.3. Test Procedure .....                                      | 26         |
| 9.4. Results .....                                             | 27         |
| 9.5. Original test data .....                                  | 29         |
| <b>10. Conducted Output Power</b> .....                        | <b>53</b>  |
| 10.1. Block diagram of test setup .....                        | 53         |
| 10.2. Limits .....                                             | 53         |
| 10.3. Test Procedure .....                                     | 53         |
| 10.4. Results .....                                            | 53         |
| 10.5. Original test data .....                                 | 55         |
| <b>11. Power Spectral Density</b> .....                        | <b>67</b>  |
| 11.1. Block diagram of test setup .....                        | 67         |
| 11.2. Limits .....                                             | 67         |
| 11.3. Test Procedure .....                                     | 67         |
| 11.4. Results .....                                            | 67         |
| 11.5. Original test data .....                                 | 69         |
| <b>12. Conducted Band edge and Spurious Emissions</b> .....    | <b>81</b>  |
| 12.1. Block diagram of test setup .....                        | 81         |
| 12.2. Limits .....                                             | 81         |
| 12.3. Test Procedure .....                                     | 81         |
| 12.4. Test result .....                                        | 82         |
| 12.5. Original test data .....                                 | 85         |
| <b>13. Radiated Emission</b> .....                             | <b>129</b> |
| 13.1. Block diagram of test setup .....                        | 129        |
| 13.2. Limit .....                                              | 130        |
| 13.3. Test Procedure .....                                     | 132        |
| 13.4. Results .....                                            | 135        |

|                                                                  |            |
|------------------------------------------------------------------|------------|
| 13.5. Original test data .....                                   | 135        |
| <b>14. AC Power Line Conducted Emissions .....</b>               | <b>136</b> |
| 14.1. Block diagram of test setup .....                          | 136        |
| 14.2. Limits .....                                               | 136        |
| 14.3. Test procedure .....                                       | 136        |
| 14.4. Test result .....                                          | 137        |
| <b>15. Antenna Requirements .....</b>                            | <b>138</b> |
| 15.1. Applicable Requirements .....                              | 138        |
| 15.2. Result .....                                               | 138        |
| <b>APPENDIX A – Radiated Emission Below 1GHz Test Data .....</b> | <b>139</b> |
| <b>APPENDIX B – Radiated Emission Above 1GHz Test Data .....</b> | <b>141</b> |

## 1. Test Report Declare

|                                |                                                                             |
|--------------------------------|-----------------------------------------------------------------------------|
| <b>Applicant:</b>              | Guangzhou Shikun Electronics Co., Ltd                                       |
| <b>Address:</b>                | NO.6 Liankun Road, Huangpu District, Guangzhou, China                       |
| <b>Manufacturer:</b>           | Guangzhou Shikun Electronics Co., Ltd                                       |
| <b>Address:</b>                | NO.6 Liankun Road, Huangpu District, Guangzhou, China                       |
| <b>Product Name:</b>           | IEEE 802.11b/g/n/a/ac/ax 2T2R USB WiFi Module Integrated BT 2.1+EDR/4.2/5.2 |
| <b>Brand Name:</b>             | N/A                                                                         |
| <b>Model Name:</b>             | SKI.WB920TU.2                                                               |
| <b>Difference Description:</b> | N/A                                                                         |

### We Declare:

The equipment described above is tested by Guangzhou Jingce Testing Technology Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Guangzhou Jingce Testing Technology Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

## 2. Summary of Test Results

| Summary of Test Results |                                           |                                                                                                       |              |
|-------------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------|--------------|
| Clause                  | Test Items                                | FCC/ISED Rules                                                                                        | Test Results |
| 1                       | 6dB Bandwidth and 99 % Occupied Bandwidth | FCC Part 15.247 (a) (2)<br>RSS-247 Clause 5.2 (a)<br>ISED RSS-Gen Clause 6.7                          | Pass         |
| 2                       | Peak Conducted Output Power               | FCC Part 15.247 (b) (3)<br>RSS-247 Clause 5.4 (d)                                                     | Pass         |
| 3                       | Power Spectral Density                    | FCC Part 15.247 (e)<br>RSS-247 Clause 5.2 (b)                                                         | Pass         |
| 4                       | Conducted Bandedge and Spurious Emission  | FCC Part 15.247 (d)<br>RSS-247 Clause 5.5                                                             | Pass         |
| 5                       | Radiated Bandedge and Spurious Emission   | FCC Part 15.247 (d)<br>FCC Part 15.209<br>FCC Part 15.205<br>RSS-247 Clause 5.5<br>RSS-GEN Clause 8.9 | Pass         |
| 6                       | Conducted Emission Test For AC Power Port | FCC Part 15.207<br>RSS-GEN Clause 8.8                                                                 | N/A          |
| 7                       | Antenna Requirement                       | FCC Part 15.203<br>RSS-GEN Clause 6.8                                                                 | Pass         |

## 3. Test Laboratory

Guangzhou Jingce Testing Technology Co., Ltd.

Add.: No.192, Kezhu Road, Huangpu District, Guangzhou, Guangdong, China

Association for Laboratory Accreditation(A2LA). Certificate Number: 6594.01

FCC Designation Number: CN1331. Test Firm Registration Number: 360543

IC Test Firm Registration Number: 28796

Conformity Assessment Body identifier: CN0138

## 4. Equipment Under Test

### 4.1. Description of EUT

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EUT Name:</b>                 | IEEE 802.11b/g/n/a/ac/ax 2T2R USB WiFi Module Integrated BT 2.1+EDR/4.2/5.2                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Model Number:</b>             | SKI.WB920TU.2                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>EUT Function Description:</b> | Please reference user's manual                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Power Supply:</b>             | DC 3.3V+/-0.3                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Hardware Version:</b>         | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Software Version:</b>         | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Radio Specification:</b>      | IEEE802.11b/g/n/ax                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Operation Frequency:</b>      | IEEE 802.11b: 2412MHz—2462MHz<br>IEEE 802.11g: 2412MHz—2462MHz<br>IEEE 802.11n HT20: 2412MHz—2462MHz<br>IEEE 802.11n HT40: 2422MHz—2452MHz<br>IEEE 802.11ax HE20: 2412MHz—2462MHz<br>IEEE 802.11ax HE40: 2422MHz—2452MHz                                                                                                                                                                                                                                                   |
| <b>Modulation:</b>               | IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)<br>IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)<br>IEEE 802.11n (HT20/40): OFDM (64QAM, 16QAM, QPSK, BPSK)<br>IEEE 802.11ax (HE20/40): OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)                                                                                                                                                                                                                                           |
| <b>Data Rate:</b>                | IEEE 802.11b: 1, 2, 5.5, 11 Mbps<br>IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps<br>IEEE 802.11n HT20: 14.4, 28.9, 43.3, 57.8, 86.7, 115.6, 130.0, 144.4Mbps<br>IEEE 802.11n HT40: 30.0, 60.0, 90.0, 120.0, 180.0, 240.0, 270.0, 300.0 Mbps<br>IEEE 802.11ax HE20: 17.2, 34.4, 51.6, 68.8, 103.2, 137.6, 154.8, 172.1, 206.5, 229.4, 258.1, 286.8Mbps<br>IEEE 802.11ax HE40: 34.4, 51.6, 68.8, 103.2, 137.6, 206.5, 275.3, 309.7, 344.1, 412.9, 458.8, 516.2, 573.5Mbps |
| <b>Antenna Type:</b>             | External Antenna, MAX. Gain: 3.86 dBi                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Note 1: EUT is the ab. of equipment under test.

Note 2: The antenna gain is declared by the customer and the laboratory is not responsible for the accuracy of the antenna gain.

### 4.2. Channel List

| Channel List for 802.11b/g/n/ax (20 MHz) |                 |         |                 |         |                 |         |                 |
|------------------------------------------|-----------------|---------|-----------------|---------|-----------------|---------|-----------------|
| Channel                                  | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 1                                        | 2412            | 5       | 2432            | 9       | 2452            | /       | /               |
| 2                                        | 2417            | 6       | 2437            | 10      | 2457            | /       | /               |
| 3                                        | 2422            | 7       | 2442            | 11      | 2462            | /       | /               |
| 4                                        | 2427            | 8       | 2447            | /       | /               | /       | /               |

| Channel List for 802.11n/ax (40 MHz) |                 |         |                |         |                 |
|--------------------------------------|-----------------|---------|----------------|---------|-----------------|
| Channel                              | Frequency (MHz) | Channel | Frequency(MHz) | Channel | Frequency (MHz) |
| 3                                    | 2422            | 7       | 2442           | /       | /               |

|   |      |   |      |   |   |
|---|------|---|------|---|---|
| 4 | 2427 | 8 | 2447 | / | / |
| 5 | 2432 | 9 | 2452 | / | / |
| 6 | 2437 | / | /    | / | / |

### 4.3. Test Channel Configuration

| Tested mode, channel and rand data rate information |                                |             |                    |
|-----------------------------------------------------|--------------------------------|-------------|--------------------|
| Mode                                                | Data rate (Mbps)<br>(see Note) | Channel     | Frequency<br>(MHz) |
| 802.11b                                             | 1MHz                           | Low: CH1    | 2412               |
|                                                     | 1MHz                           | Middle: CH6 | 2437               |
|                                                     | 1MHz                           | High: CH11  | 2462               |
| 802.11g                                             | 6 MHz                          | Low: CH1    | 2412               |
|                                                     | 6 MHz                          | Middle: CH6 | 2437               |
|                                                     | 6 MHz                          | High: CH11  | 2462               |
| 802.11n HT20                                        | MCS8                           | Low: CH1    | 2412               |
|                                                     | MCS8                           | Middle: CH6 | 2437               |
|                                                     | MCS8                           | High: CH11  | 2462               |
| 802.11n HT40                                        | MCS8                           | Low: CH3    | 2422               |
|                                                     | MCS8                           | Middle: CH6 | 2437               |
|                                                     | MCS8                           | High: CH9   | 2452               |
| 802.11ax HE20                                       | MCS0                           | Low: CH1    | 2412               |
|                                                     | MCS0                           | Middle: CH6 | 2437               |
|                                                     | MCS0                           | High: CH11  | 2462               |
| 802.11ax HE40                                       | MCS0                           | Low: CH3    | 2422               |
|                                                     | MCS0                           | Middle: CH6 | 2437               |
|                                                     | MCS0                           | High: CH9   | 2452               |

Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.

### 4.4. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

|                    |            |
|--------------------|------------|
| Temperature range: | 21-25 °C   |
| Humidity range:    | 40-75%     |
| Pressure range:    | 86-106 kPa |

### 4.5. Description of Available Antennas

| The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band |                         |                             |      |         |
|--------------------------------------------------------------------|-------------------------|-----------------------------|------|---------|
| Test Software                                                      |                         | QATool_Dbg.exe              |      |         |
| Modulation Mode                                                    | Transmit Antenna Number | Test Software Setting Value |      |         |
|                                                                    |                         | ANT1                        | ANT2 | Channel |
| 802.11b                                                            | 2                       | 14                          | 14   | CH1     |
|                                                                    |                         | 14                          | 14   | CH6     |
|                                                                    |                         | 14                          | 14   | CH11    |



|               |   |    |    |      |
|---------------|---|----|----|------|
| 802.11g       | 2 | 10 | 10 | CH1  |
|               |   | 10 | 10 | CH6  |
|               |   | 10 | 10 | CH11 |
| 802.11HT20    | 2 | 0E | 0E | CH1  |
|               |   | 0E | 0E | CH6  |
|               |   | 0E | 0E | CH11 |
| 802.11n HT40  | 2 | 0E | 0E | CH3  |
|               |   | 0E | 0E | CH6  |
|               |   | 0E | 0E | CH9  |
| 802.11ax HE20 | 2 | 0E | 0E | CH1  |
|               |   | 0E | 0E | CH6  |
|               |   | 0E | 0E | CH11 |
| 802.11ax HE40 | 2 | 0E | 0E | CH3  |
|               |   | 0E | 0E | CH6  |
|               |   | 0E | 0E | CH9  |

#### 4.6. Description of Available Antennas

| Test Mode     | Transmit and Receive Mode                    | Description                                                   |
|---------------|----------------------------------------------|---------------------------------------------------------------|
| 802.11b       | <input checked="" type="checkbox"/> 2TX, 2RX | ANT 1 and ANT2 can be used as transmitting/receiving antenna. |
| 802.11g       | <input checked="" type="checkbox"/> 2TX, 2RX | ANT 1 and ANT2 can be used as transmitting/receiving antenna. |
| 802.11n HT20  | <input checked="" type="checkbox"/> 2TX, 2RX | ANT 1 and ANT2 can be used as transmitting/receiving antenna. |
| 802.11n HT40  | <input checked="" type="checkbox"/> 2TX, 2RX | ANT 1 and ANT2 can be used as transmitting/receiving antenna. |
| 802.11ax HE20 | <input checked="" type="checkbox"/> 2TX, 2RX | ANT 1 and ANT2 can be used as transmitting/receiving antenna. |
| 802.11ax HE40 | <input checked="" type="checkbox"/> 2TX, 2RX | ANT 1 and ANT2 can be used as transmitting/receiving antenna. |

Note:

- Only 802.11n HT20/HT40 and 802.11ax HE20/HE40 support MIMO mode
- WLAN 2.4 GHz & WLAN 5G can't transmit simultaneously. (declared by client)

### 5. Description of Test Setup

#### 5.1. Accessory

| Description of Accessories | Manufacturer | Model Number | Description | Remark |
|----------------------------|--------------|--------------|-------------|--------|
| /                          | /            | /            | /           | /      |

#### 5.2. Support Equipment

| Equipment | Brand Name | Model Name | P/N |
|-----------|------------|------------|-----|
| PC        | Lenovo     | T480       | /   |

### 5.3. Test Setup

The EUT can work in Fixed Frequency mode.

### 5.4. Setup Diagram for Tests



## 6. Measurement Uncertainty

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

| Test Item                    | Uncertainty |
|------------------------------|-------------|
| AC Power Conduction emission | 1.37 dB     |
| All Radiated emissions       | 5.4dB       |
| Conducted emissions          | 3.09 dB     |
| Occupied Channel Bandwidth   | 1.1%        |
| Conducted Output power       | 0.82dB      |
| Power Spectral Density       | 0.82dB      |

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k = 2.

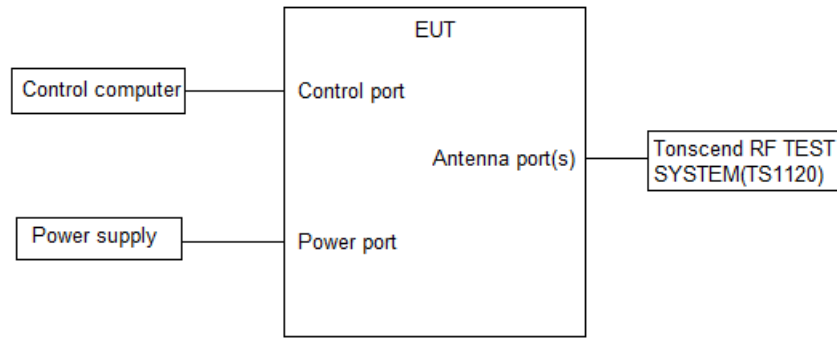
## 7. Measuring Instrument and Software Used

| TS Test System                      |                                     |              |           |            |               |               |
|-------------------------------------|-------------------------------------|--------------|-----------|------------|---------------|---------------|
| Used                                | Equipment                           | Manufacturer | Model No. | Serial No. | Last Cal.     | Due. Date     |
| <input checked="" type="checkbox"/> | Spectrum Analyzer                   | Keysight     | N9030B    | MY56320512 | Sep. 12, 2023 | Sep. 11, 2024 |
| <input checked="" type="checkbox"/> | Vector Signal Generator             | Keysight     | N5182B    | MY57300334 | Sep. 12, 2023 | Sep. 11, 2024 |
| <input checked="" type="checkbox"/> | Signal Generator                    | Keysight     | N5171B    | MY57280639 | Sep. 12, 2023 | Sep. 11, 2024 |
| <input checked="" type="checkbox"/> | DC POWER                            | Keysight     | E342A     | MY59020356 | Jul. 14, 2023 | Jul. 13, 2024 |
| <input checked="" type="checkbox"/> | Incubator thermometer               | GWS          | EL-02JA   | 21107288   | Sep. 12, 2023 | Sep. 11, 2024 |
| <input checked="" type="checkbox"/> | Control unit(Power sensor)          | Tonscend     | JS0806-2  | /          | Sep. 12, 2023 | Sep. 11, 2024 |
| <input checked="" type="checkbox"/> | Wideband radio communication tester | R&S          | CMW500    | 163478     | Jul. 11, 2023 | Jul. 10, 2024 |
| <input checked="" type="checkbox"/> | Spectrum Analyzer                   | Keysight     | N9020B    | MY60112206 | Sep. 12, 2023 | Sep. 12, 2024 |
| <input checked="" type="checkbox"/> | Control unit(Power sensor)          | Tonscend     | JS0806-2  | 21H8060465 | Sep. 12, 2023 | Sep. 12, 2024 |
| Software                            |                                     |              |           |            |               |               |
| Used                                | Description                         | Manufacturer | Name      |            | Version       |               |
| <input checked="" type="checkbox"/> | Test software                       | TS+          | JS1120-3  |            | V3.3.10       |               |
| RSE Test System                     |                                     |              |           |            |               |               |

| Used                                      | Equipment                 | Manufacturer | Model No.    | Serial No.  | Last Cal.     | Due. Date     |
|-------------------------------------------|---------------------------|--------------|--------------|-------------|---------------|---------------|
| <input checked="" type="checkbox"/>       | EMI Receiver              | R&S          | ESW          | 101685      | Jul. 12, 2023 | Jul. 11, 2024 |
| <input checked="" type="checkbox"/>       | Bilog Antenna             | Schwarzbeck  | VULB 9163    | 01416       | Mar. 21, 2023 | Mar. 20, 2024 |
| <input checked="" type="checkbox"/>       | Horn Antenna 1            | Schwarzbeck  | BBHA 9120 D  | 02411       | May. 25, 2023 | May. 24, 2024 |
| <input checked="" type="checkbox"/>       | Horn Antenna 2            | ETS          | BBHA 9170    | 1090        | Sep. 04, 2023 | Sep. 03, 2024 |
| <input checked="" type="checkbox"/>       | loop-antenna              | Schwarzbeck  | FMZB 1513-60 | 00030       | Jan.14,2023   | Jan.13,2024   |
| <input checked="" type="checkbox"/>       | Signal Pre-Amplifier      | Tonscend     | TAP01018050  | AP21C806122 | Jul. 10, 2023 | Jul. 09, 2024 |
| <input checked="" type="checkbox"/>       | Signal Pre-Amplifier      | Tonscend     | TAP9K3G32    | AP20K806104 | Jul. 10, 2023 | Jul. 09, 2024 |
| <input checked="" type="checkbox"/>       | Signal Pre-Amplifier      | ETS          | 3116C-PA     | 00217677    | Aug. 24, 2023 | Aug. 23, 2024 |
| <input checked="" type="checkbox"/>       | 3m Fully-anechoic Chamber | ETS          | RFD-100      | /           | Apr. 24, 2021 | Apr. 23, 2024 |
| Software                                  |                           |              |              |             |               |               |
| Used                                      | Description               | Manufacturer | Name         |             | Version       |               |
| <input checked="" type="checkbox"/>       | Test software             | TS+          | TS+          |             | V3.0.0.4      |               |
| Conducted Emission Test For AC Power Port |                           |              |              |             |               |               |
| Used                                      | Equipment                 | Manufacturer | Model No.    | Serial No.  | Last Cal.     | Due. Date     |
| <input checked="" type="checkbox"/>       | LISN                      | R&S          | ENV216       | 102154      | Jul. 10, 2023 | Jul. 09, 2024 |
| <input checked="" type="checkbox"/>       | EMI Receiver              | R&S          | ESR3         | 102509      | Jul. 12, 2023 | Jul. 11, 2024 |
| Software                                  |                           |              |              |             |               |               |
| Used                                      | Description               | Manufacturer | Name         |             | Version       |               |
| <input checked="" type="checkbox"/>       | Test software             | EZ           | EZ-EMC       |             | EMEC-3A1      |               |
| Other Instrument                          |                           |              |              |             |               |               |
| Used                                      | Equipment                 | Manufacturer | Model No.    | Serial No.  | Last Cal.     | Due. Date     |
| <input checked="" type="checkbox"/>       | Temperature & Humidity    | Temperature  | HTC-1        | /           | Nov. 25, 2022 | Nov. 24, 2023 |

## 8. On Time and Duty Cycle

### 8.1. Block diagram of test setup



### 8.2. Limits

None; for reporting purposes only

### 8.3. Procedure

KDB 558074 Zero-Span Spectrum Analyzer Method

### 8.4. Results

| Test Mode  | Ant. | Freq. (MHz) | Transmission Duration (ms) | Transmission Period (ms) | Duty Cycle (%) |
|------------|------|-------------|----------------------------|--------------------------|----------------|
| 11B        | Ant1 | 2412        | 8.38                       | 8.76                     | 95.66          |
|            | Ant2 | 2412        | 8.38                       | 8.74                     | 95.88          |
|            | Ant1 | 2437        | 8.39                       | 8.75                     | 95.89          |
|            | Ant2 | 2437        | 8.39                       | 8.75                     | 95.89          |
|            | Ant1 | 2462        | 8.38                       | 8.75                     | 95.77          |
|            | Ant2 | 2462        | 8.39                       | 8.76                     | 95.78          |
| 11G        | Ant1 | 2412        | 1.39                       | 1.77                     | 78.53          |
|            | Ant2 | 2412        | 1.39                       | 1.77                     | 78.53          |
|            | Ant1 | 2437        | 1.39                       | 1.77                     | 78.53          |
|            | Ant2 | 2437        | 1.39                       | 1.77                     | 78.53          |
|            | Ant1 | 2462        | 1.39                       | 1.77                     | 78.53          |
|            | Ant2 | 2462        | 1.39                       | 1.77                     | 78.53          |
| 11N20MIMO  | Ant1 | 2412        | 0.67                       | 1.04                     | 64.42          |
|            | Ant2 | 2412        | 0.67                       | 1.04                     | 64.42          |
|            | Ant1 | 2437        | 0.67                       | 1.04                     | 64.42          |
|            | Ant2 | 2437        | 0.67                       | 1.04                     | 64.42          |
|            | Ant1 | 2462        | 0.67                       | 1.04                     | 64.42          |
|            | Ant2 | 2462        | 0.67                       | 1.04                     | 64.42          |
| 11N40MIMO  | Ant1 | 2422        | 0.35                       | 0.74                     | 47.30          |
|            | Ant2 | 2422        | 0.35                       | 0.74                     | 47.30          |
|            | Ant1 | 2437        | 0.35                       | 0.74                     | 47.30          |
|            | Ant2 | 2437        | 0.35                       | 0.73                     | 47.95          |
|            | Ant1 | 2452        | 0.34                       | 0.73                     | 46.58          |
|            | Ant2 | 2452        | 0.35                       | 0.74                     | 47.30          |
| 11AX20MIMO | Ant1 | 2412        | 0.20                       | 0.40                     | 50.00          |
|            | Ant2 | 2412        | 0.20                       | 0.40                     | 50.00          |
|            | Ant1 | 2437        | 0.20                       | 0.40                     | 50.00          |
|            | Ant2 | 2437        | 0.20                       | 0.40                     | 50.00          |

|            |      |      |      |      |       |
|------------|------|------|------|------|-------|
|            | Ant1 | 2462 | 0.20 | 0.40 | 50.00 |
|            | Ant2 | 2462 | 0.21 | 0.42 | 50.00 |
| 11AX40MIMO | Ant1 | 2422 | 0.20 | 0.43 | 46.51 |
|            | Ant2 | 2422 | 0.20 | 0.42 | 47.62 |
|            | Ant1 | 2437 | 0.20 | 0.42 | 47.62 |
|            | Ant2 | 2437 | 0.20 | 0.43 | 46.51 |
|            | Ant1 | 2452 | 0.20 | 0.42 | 47.62 |
|            | Ant2 | 2452 | 0.20 | 0.58 | 34.48 |

Note: Duty Cycle Correction Factor =  $10\log(1/x)$ .

Where: x is Duty Cycle (Linear)

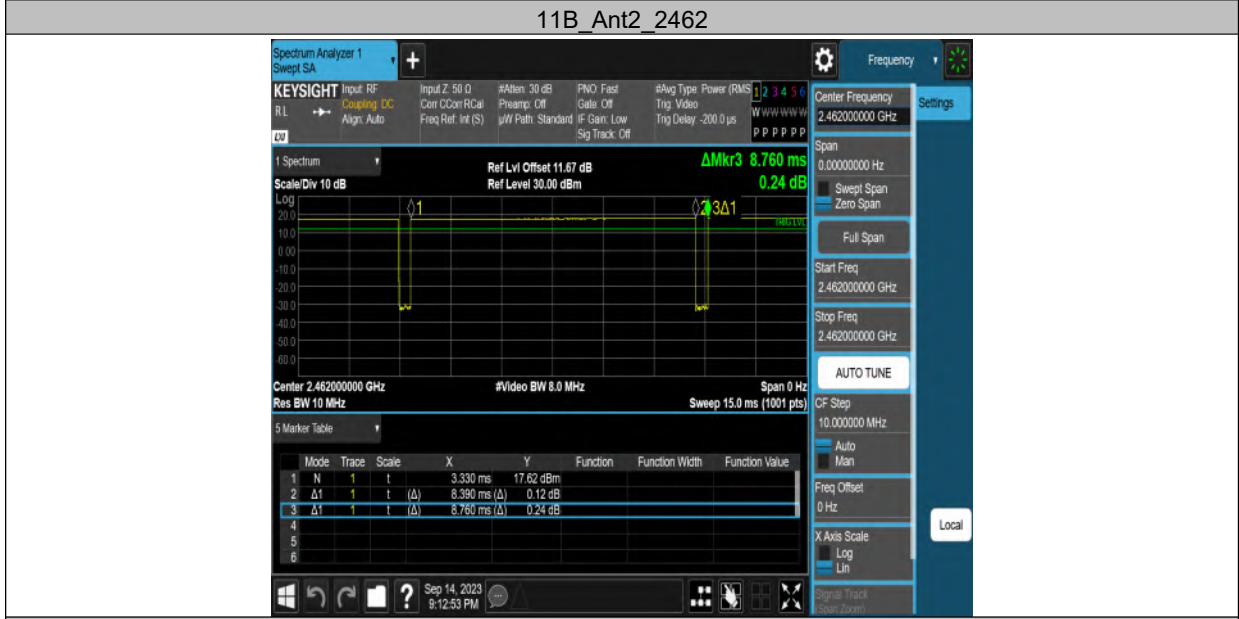
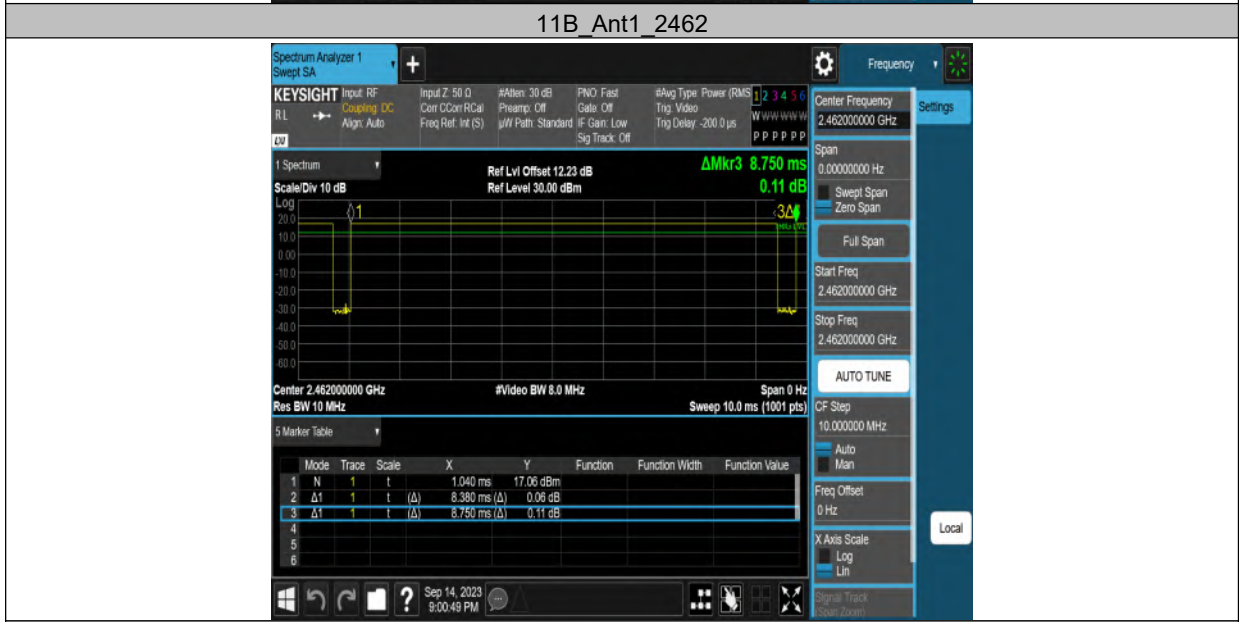
Where: T is On Time

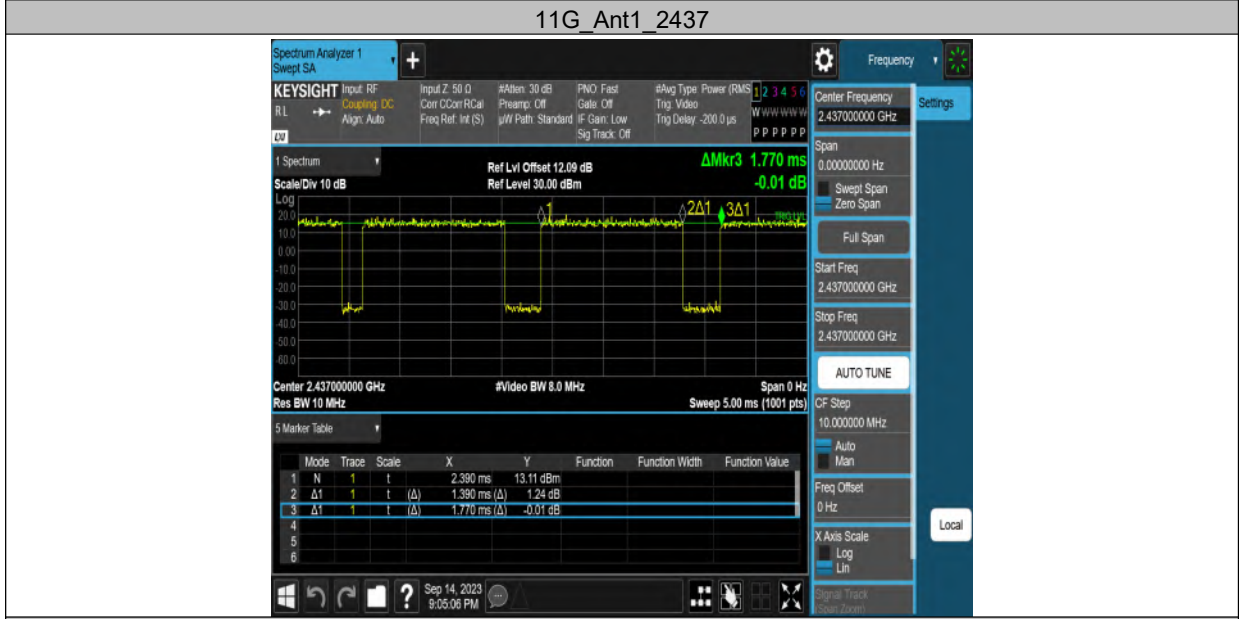
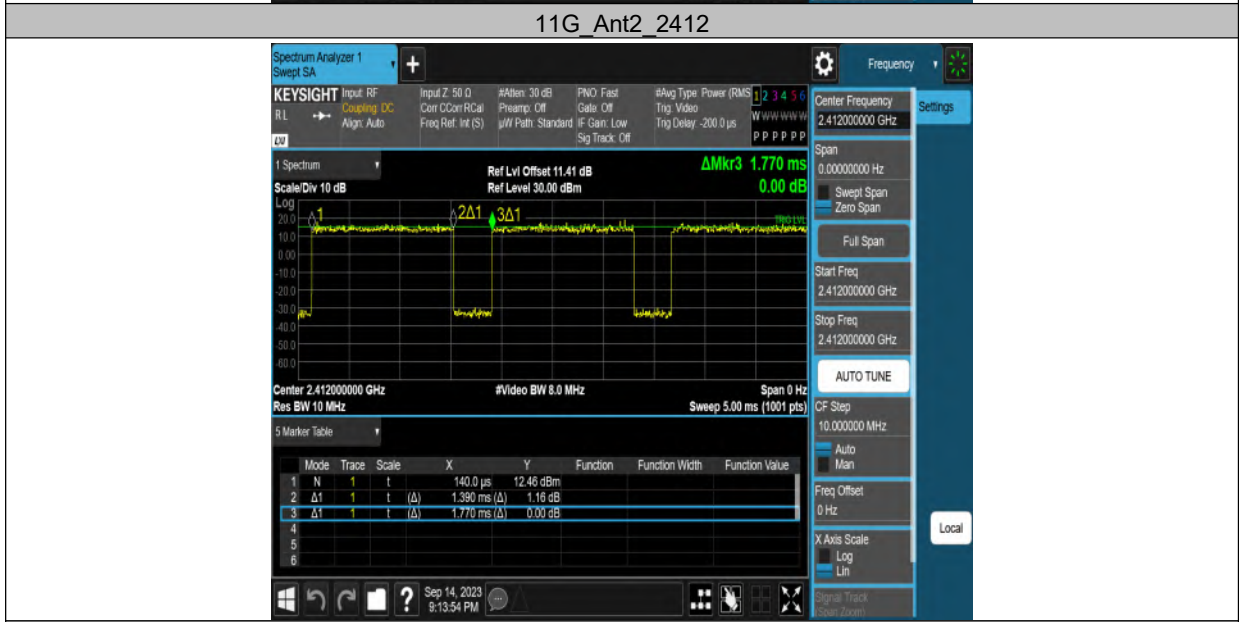
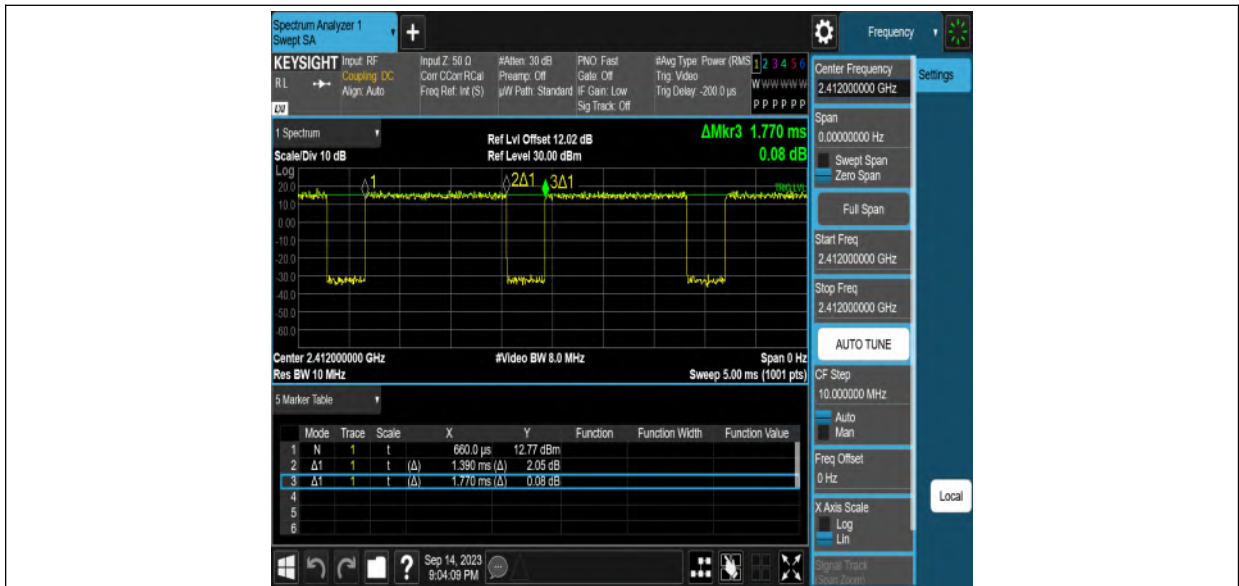
If that calculated VBW is not available on the analyzer, then the next higher value should be used.

For mode 11b, the duty cycle is greater than 98 %, so it can set VBW to 10 Hz.

### 8.5. Original test data



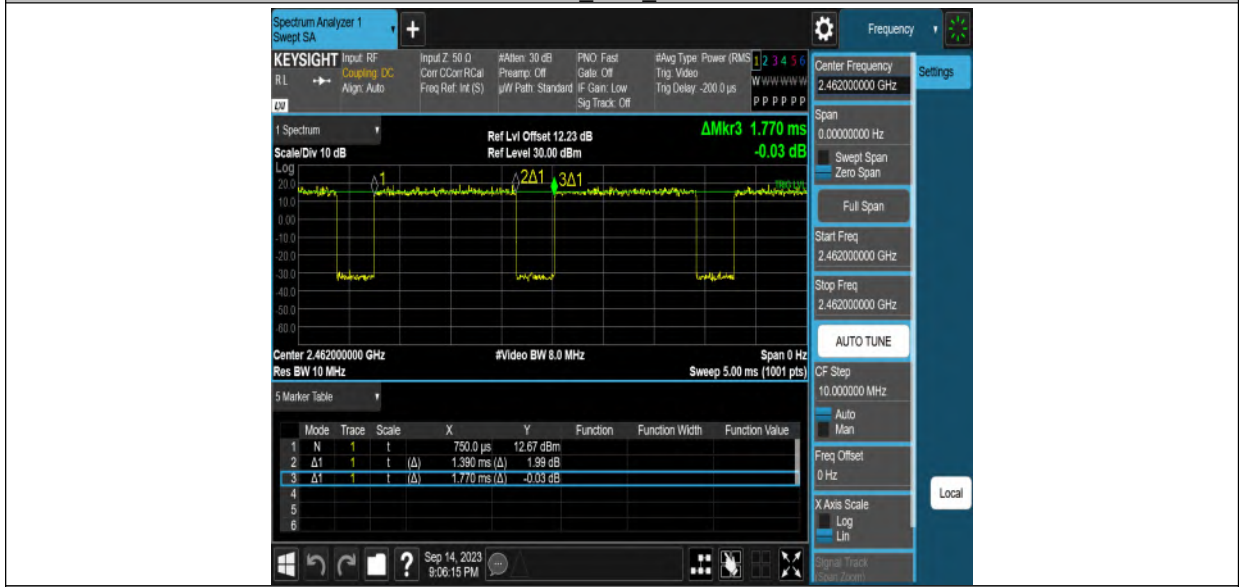




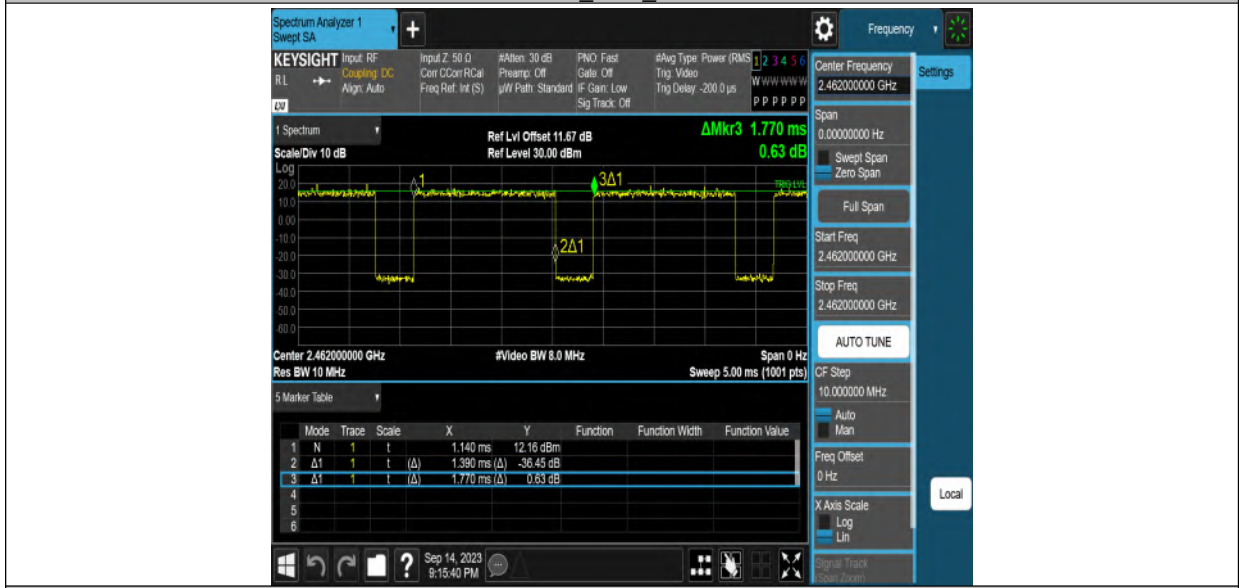




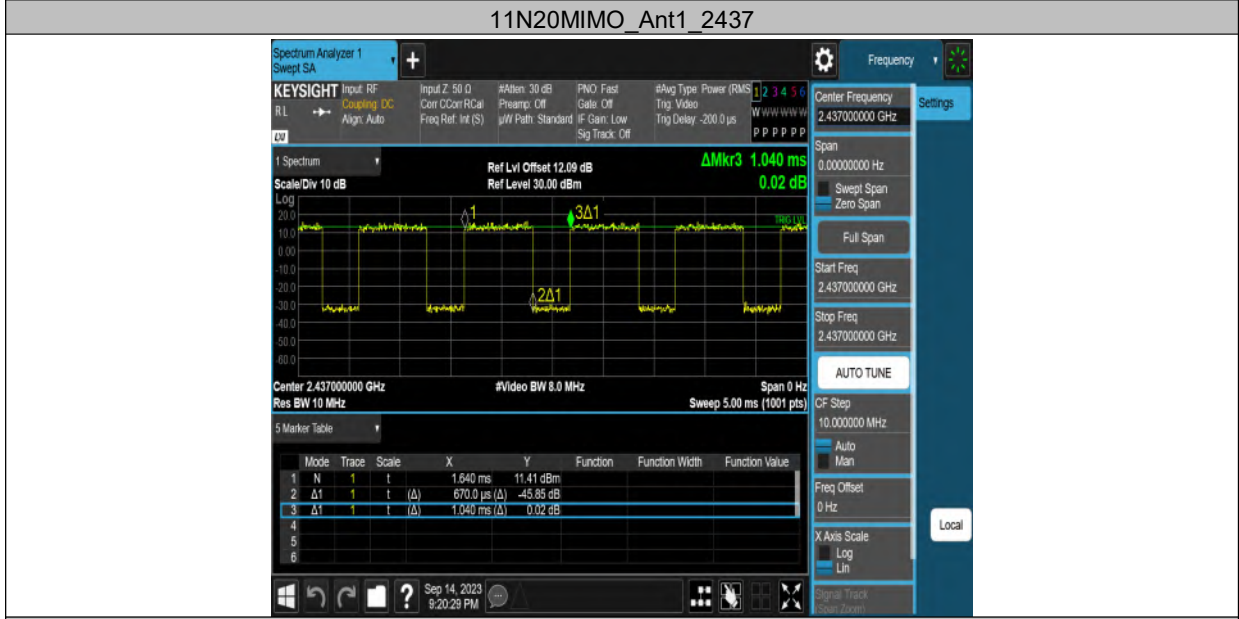
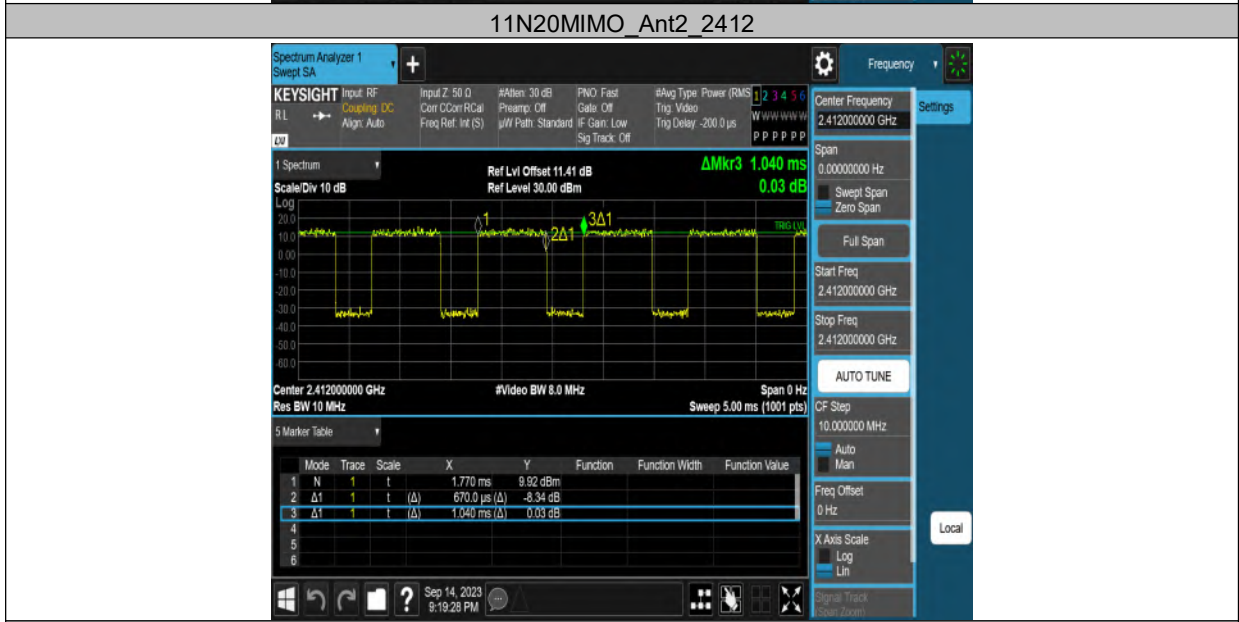
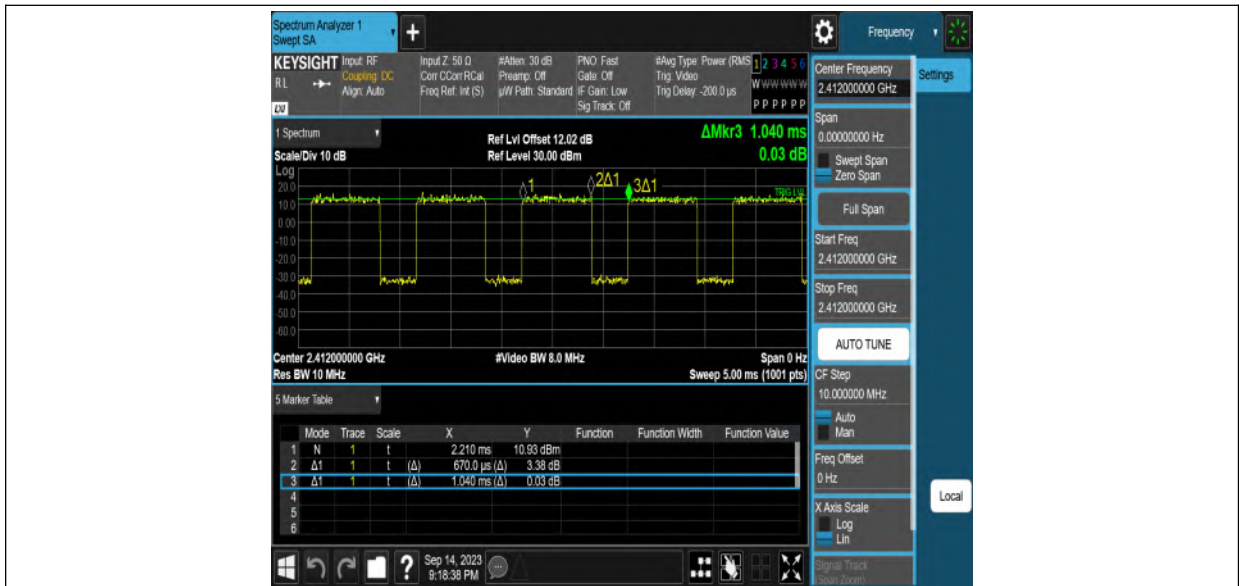
11G\_Ant1\_2462

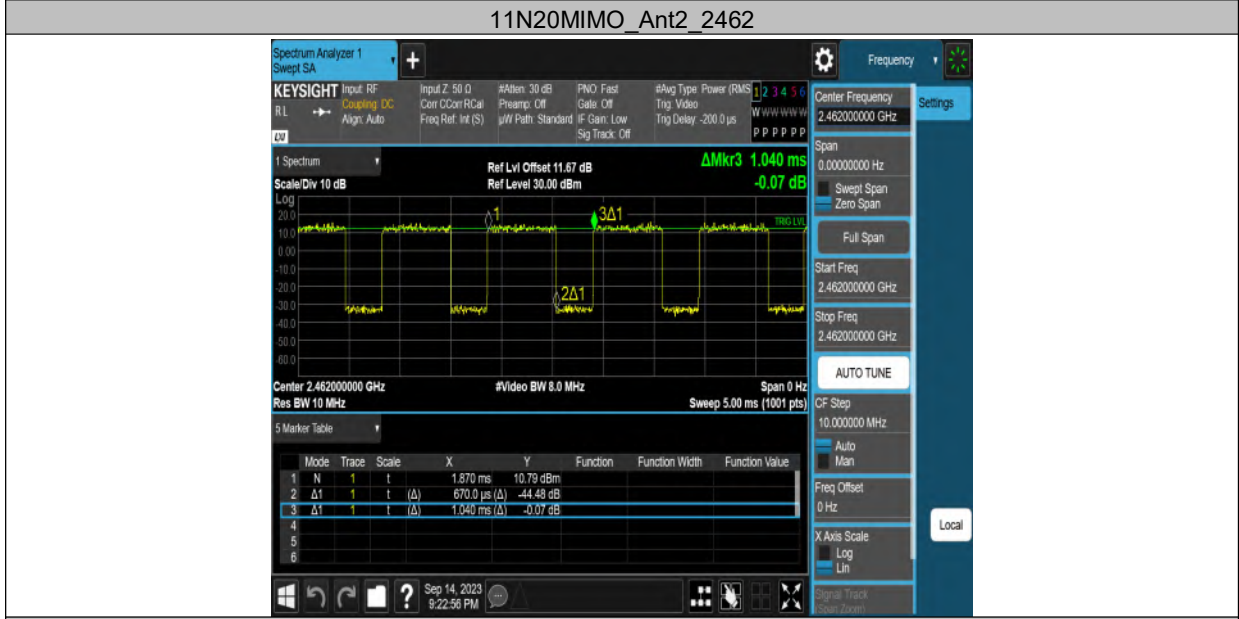
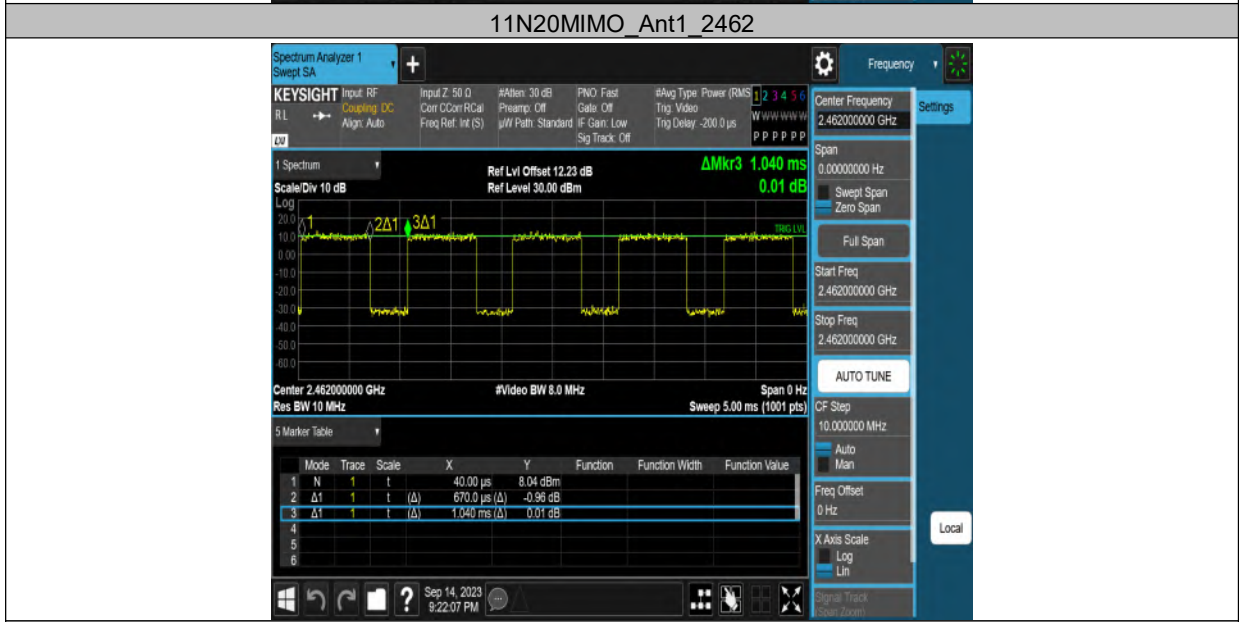


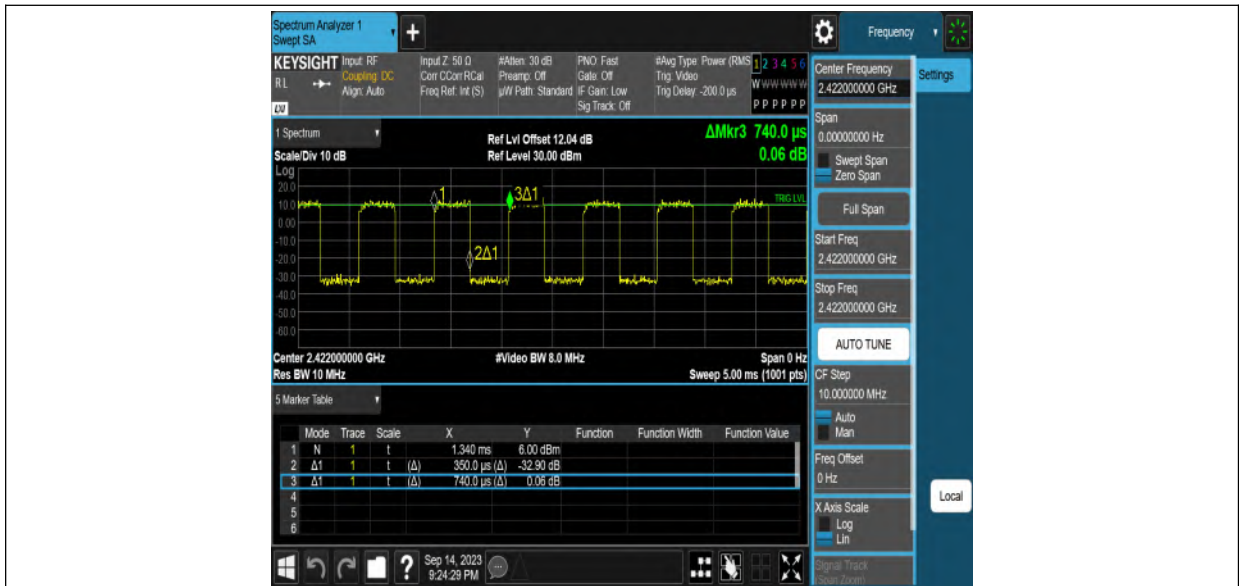
11G\_Ant2\_2462



11N20MIMO\_Ant1\_2412







11N40MIMO\_Ant2\_2422



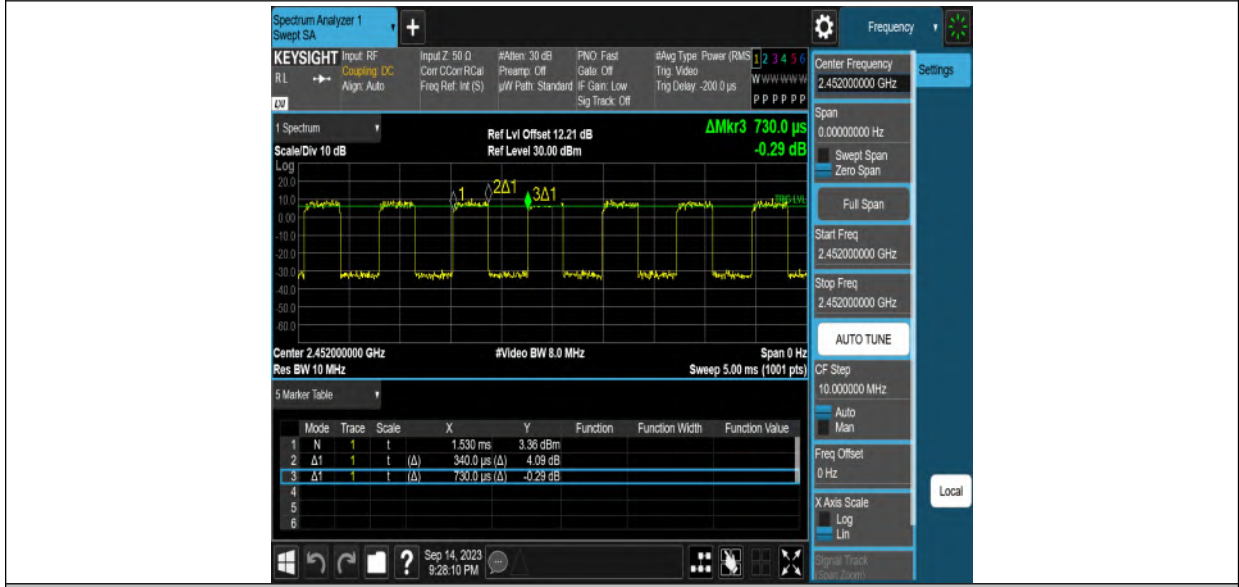
11N40MIMO\_Ant1\_2437



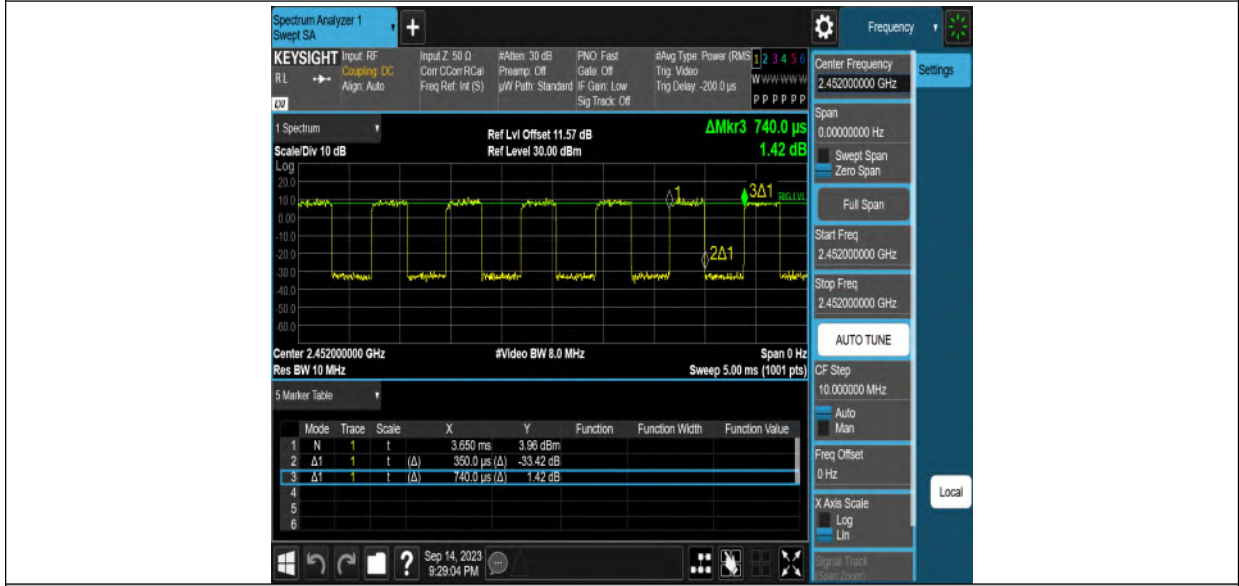
11N40MIMO\_Ant2\_2437



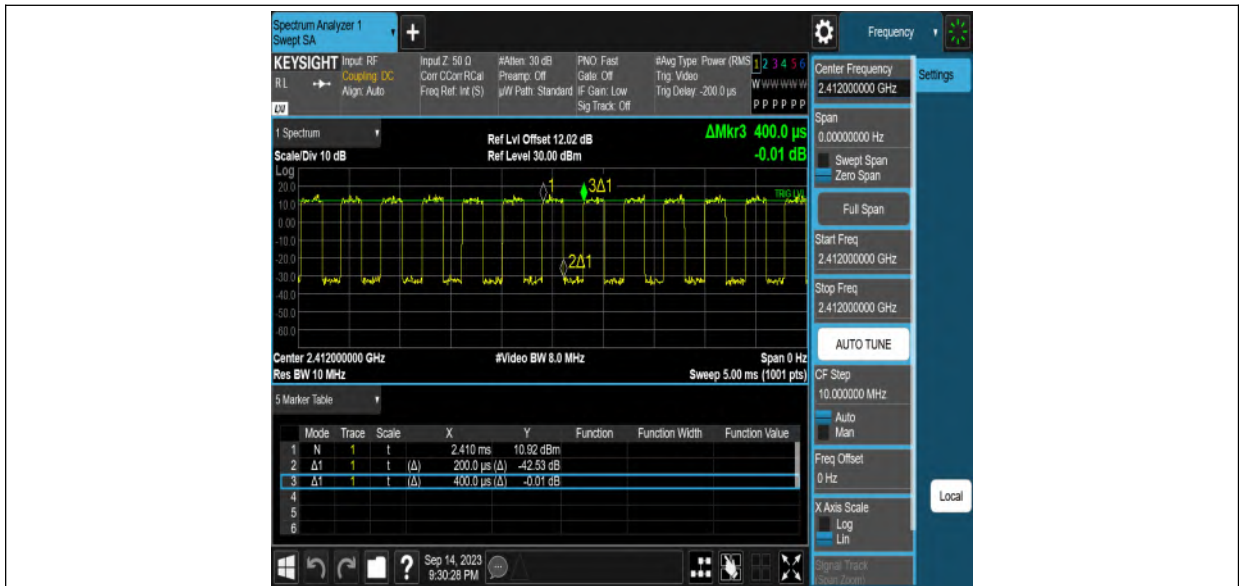
11N40MIMO\_Ant1\_2452



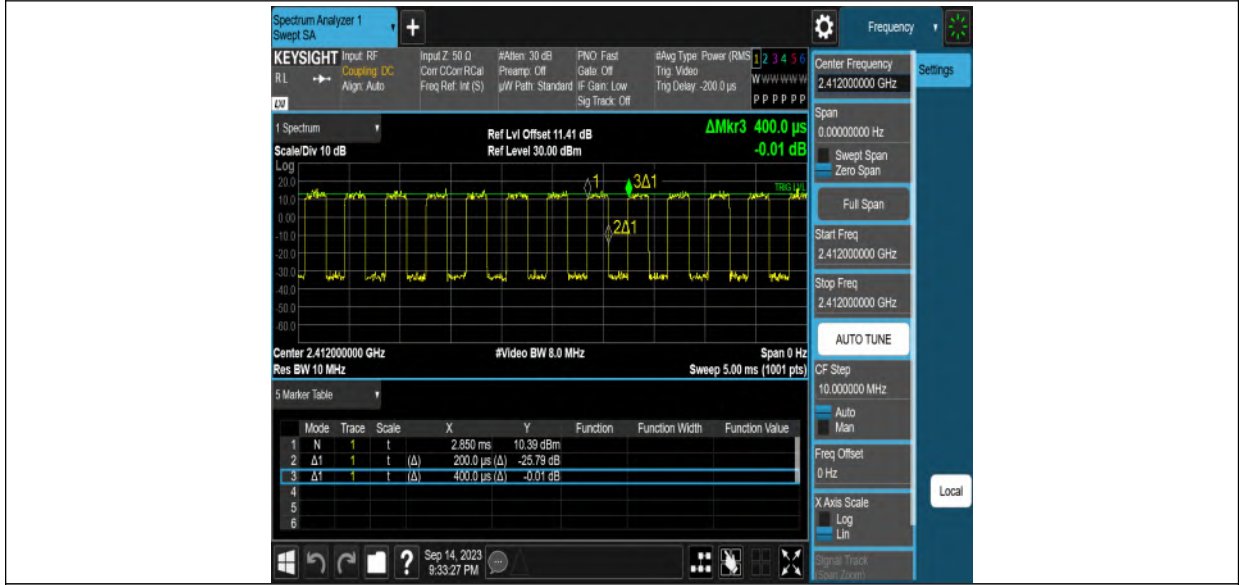
11N40MIMO\_Ant2\_2452



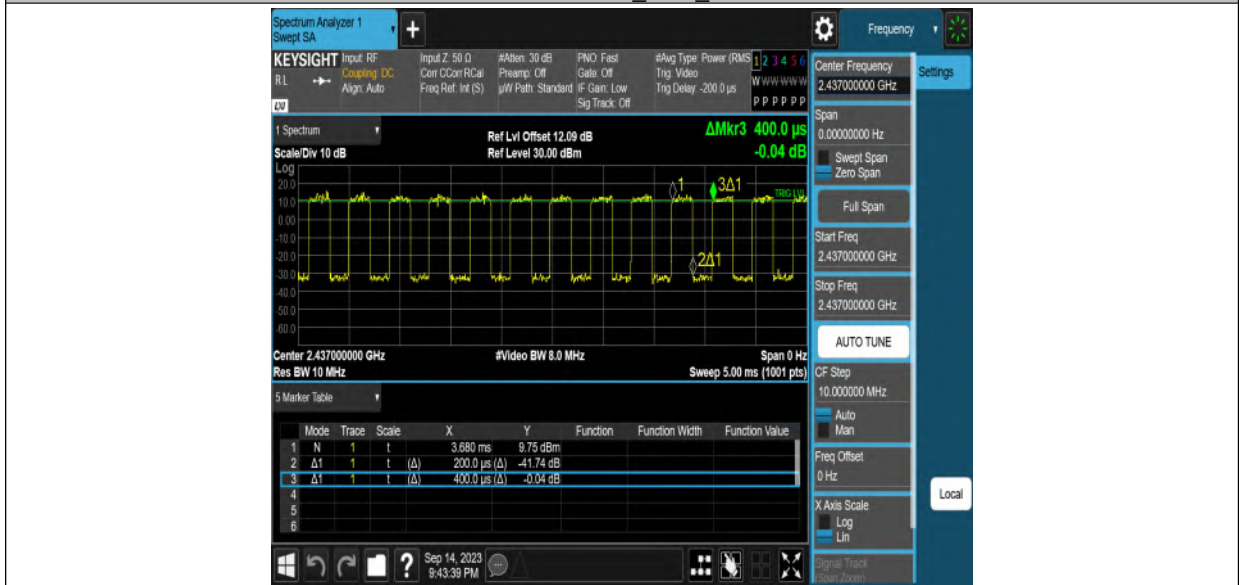
11AX20MIMO\_Ant1\_2412



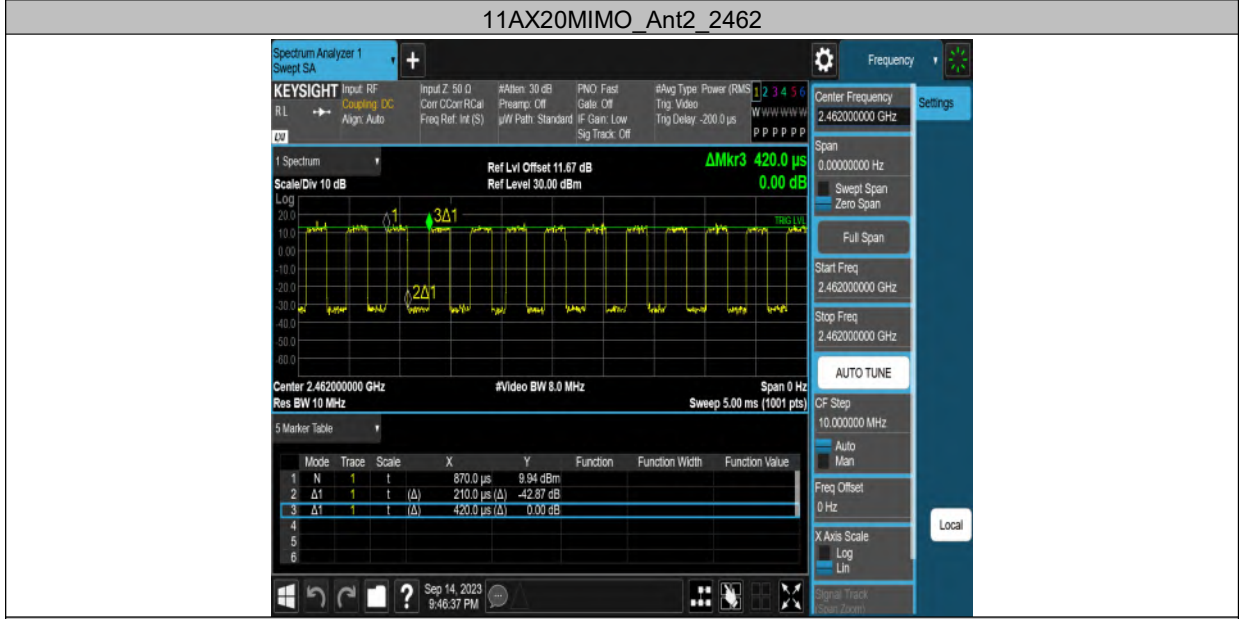
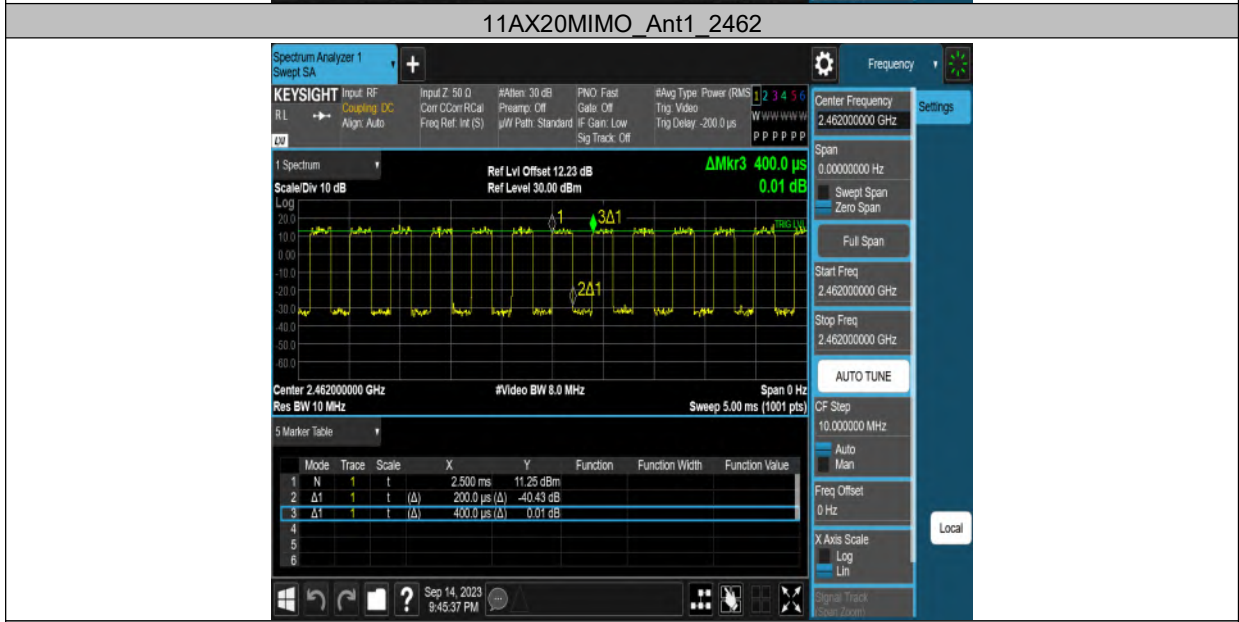
11AX20MIMO\_Ant2\_2412

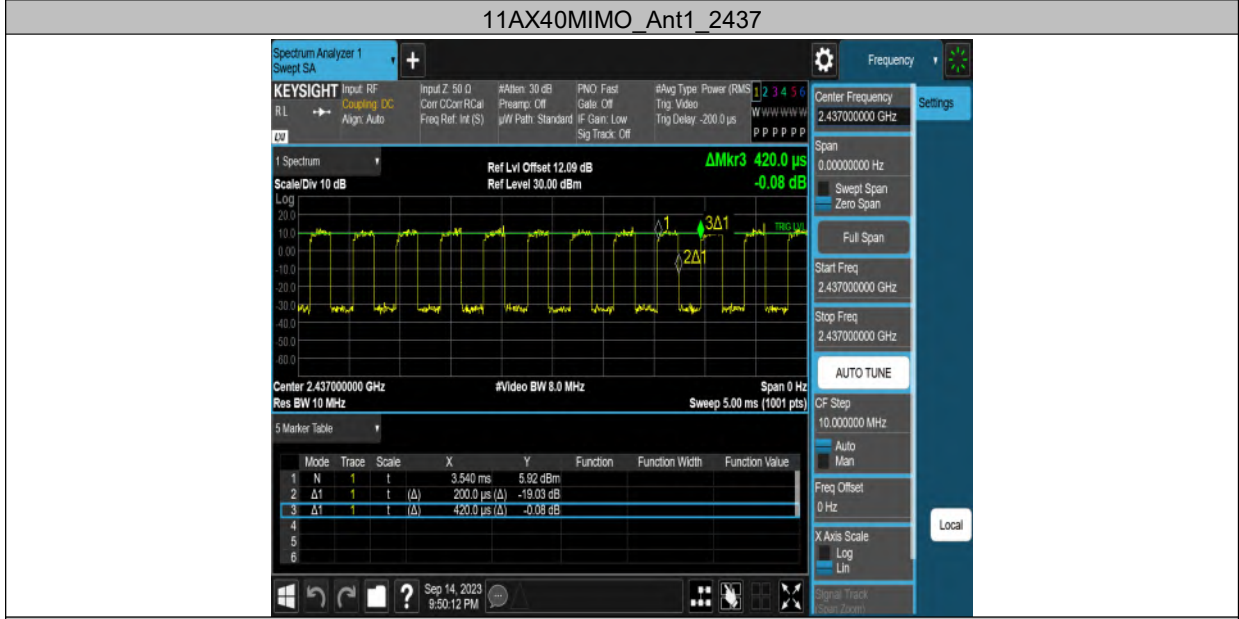
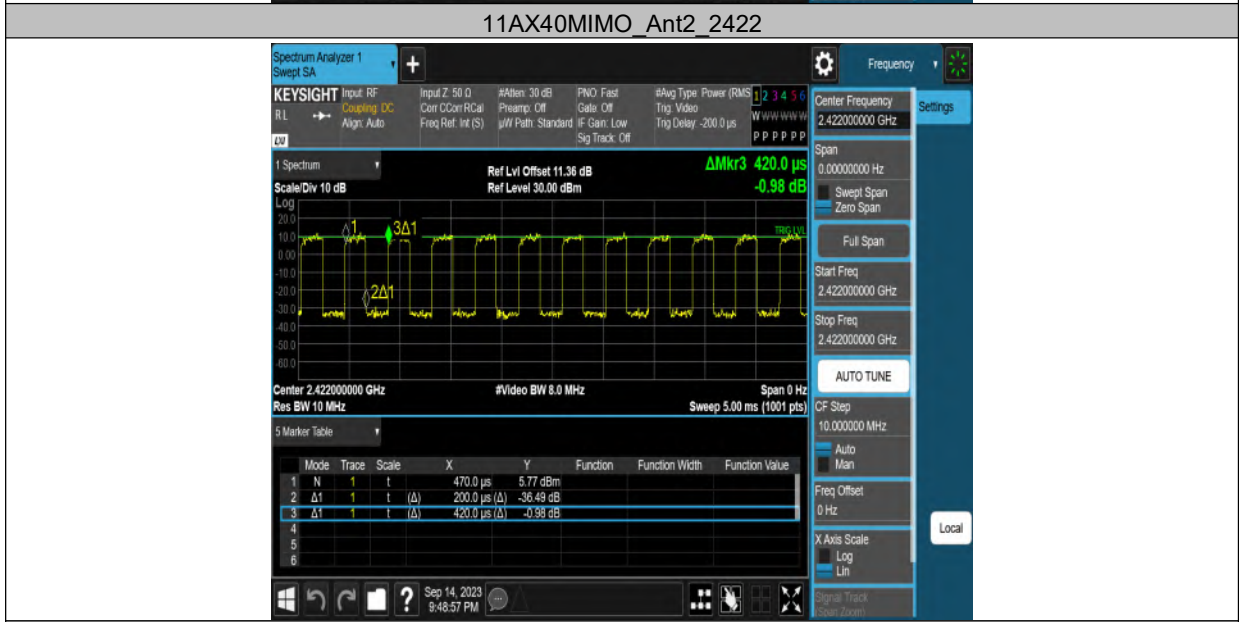
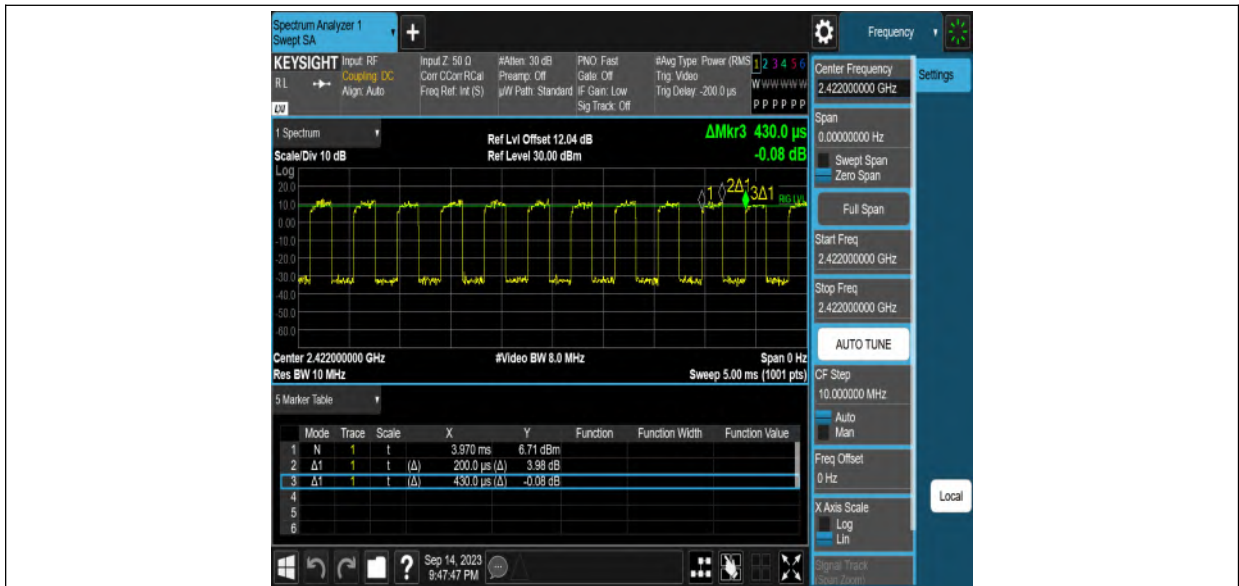


11AX20MIMO\_Ant1\_2437

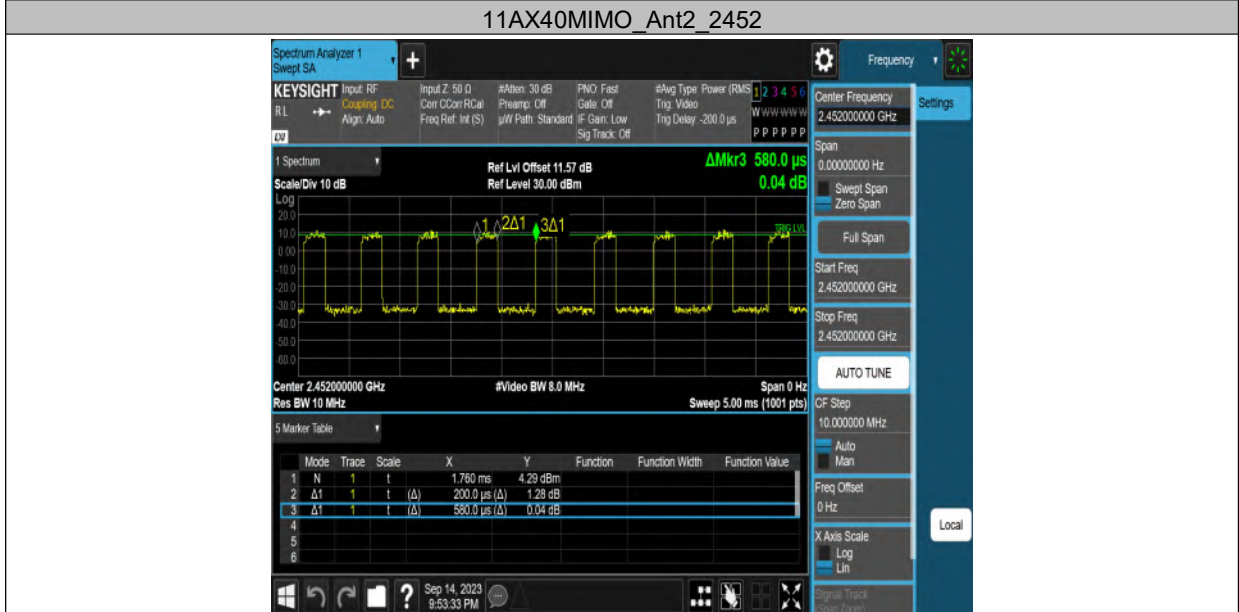
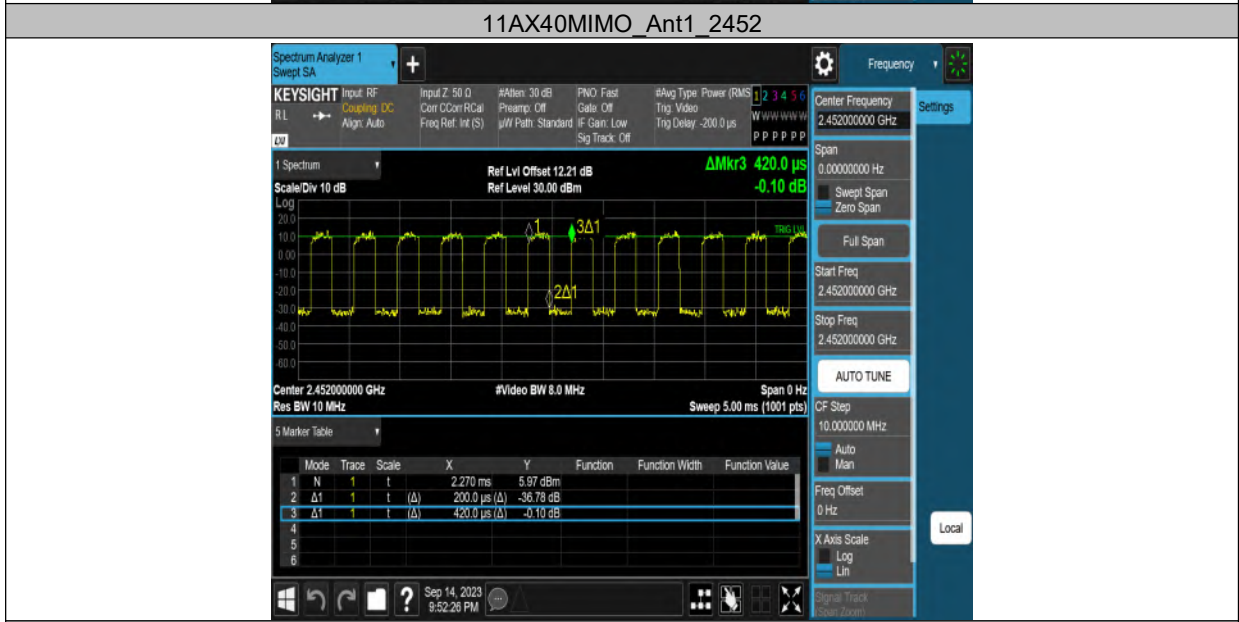
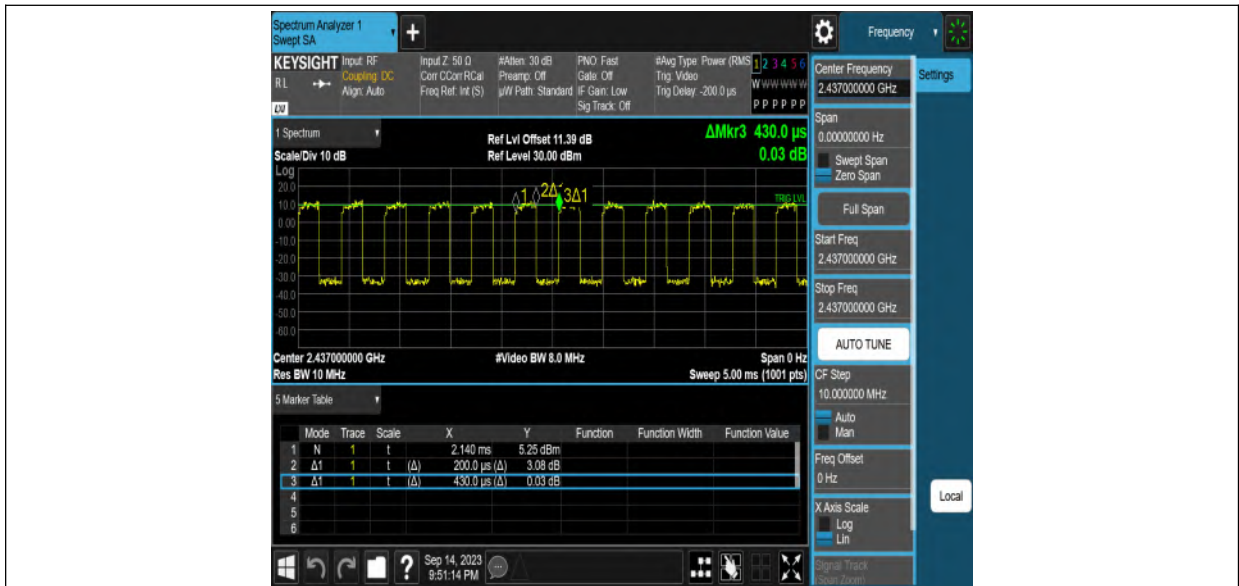


11AX20MIMO\_Ant2\_2437









## 9. 6 dB DTS Bandwidth and 99 % Occupied Bandwidth

### 9.1. Block diagram of test setup

Same as section 8.1

### 9.2. Limits

| CFR 47 FCC Part15 (15.247) Subpart C<br>ISED RSS-247 ISSUE 3 |                         |                              |                       |
|--------------------------------------------------------------|-------------------------|------------------------------|-----------------------|
| Section                                                      | Test Item               | Limit                        | Frequency Range (MHz) |
| CFR 47 FCC 15.247(a)(2)<br>ISED RSS-247 5.2 (a)              | 6 dB Bandwidth          | $\geq 500$ kHz               | 2400-2483.5           |
| ISED RSS-Gen Clause 6.7                                      | 99 % Occupied Bandwidth | For reporting purposes only. | 2400-2483.5           |

### 9.3. Test Procedure

Connect the UUT to the spectrum analyzer and use the following settings:

|                  |                                                                                                  |
|------------------|--------------------------------------------------------------------------------------------------|
| Center Frequency | The center frequency of the channel under test                                                   |
| Detector         | Peak                                                                                             |
| RBW              | For 6 dB Bandwidth :100 kHz<br>For 99 % Occupied Bandwidth :1 % to 5 % of the occupied bandwidth |
| VBW              | For 6 dB Bandwidth: $\geq 3 \times$ RBW<br>For 99 % Occupied Bandwidth : $\geq 3 \times$ RBW     |
| Trace            | Max hold                                                                                         |
| Sweep            | Auto couple                                                                                      |

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB and 99 % relative to the maximum level measured in the fundamental emission.

## 9.4. Results

6dB bandwidth:

| Test Mode  | Ant. | Freq. (MHz) | DTS BW (MHz) | FL (MHz) | FH (MHz) | Limit (MHz) | Verdict |
|------------|------|-------------|--------------|----------|----------|-------------|---------|
| 11B        | Ant1 | 2412        | 7.200        | 2408.520 | 2415.720 | 0.5         | PASS    |
|            | Ant2 | 2412        | 8.280        | 2408.240 | 2416.520 | 0.5         | PASS    |
|            | Ant1 | 2437        | 7.560        | 2432.960 | 2440.520 | 0.5         | PASS    |
|            | Ant2 | 2437        | 6.400        | 2433.480 | 2439.880 | 0.5         | PASS    |
|            | Ant1 | 2462        | 6.680        | 2458.440 | 2465.120 | 0.5         | PASS    |
|            | Ant2 | 2462        | 7.040        | 2458.000 | 2465.040 | 0.5         | PASS    |
| 11G        | Ant1 | 2412        | 16.280       | 2403.840 | 2420.120 | 0.5         | PASS    |
|            | Ant2 | 2412        | 16.320       | 2403.840 | 2420.160 | 0.5         | PASS    |
|            | Ant1 | 2437        | 15.920       | 2429.240 | 2445.160 | 0.5         | PASS    |
|            | Ant2 | 2437        | 16.400       | 2428.760 | 2445.160 | 0.5         | PASS    |
|            | Ant1 | 2462        | 16.320       | 2453.840 | 2470.160 | 0.5         | PASS    |
|            | Ant2 | 2462        | 16.360       | 2453.840 | 2470.200 | 0.5         | PASS    |
| 11N20MIMO  | Ant1 | 2412        | 17.560       | 2403.200 | 2420.760 | 0.5         | PASS    |
|            | Ant2 | 2412        | 15.440       | 2404.680 | 2420.120 | 0.5         | PASS    |
|            | Ant1 | 2437        | 17.320       | 2428.440 | 2445.760 | 0.5         | PASS    |
|            | Ant2 | 2437        | 17.280       | 2428.200 | 2445.480 | 0.5         | PASS    |
|            | Ant1 | 2462        | 17.160       | 2453.600 | 2470.760 | 0.5         | PASS    |
|            | Ant2 | 2462        | 16.920       | 2453.840 | 2470.760 | 0.5         | PASS    |
| 11N40MIMO  | Ant1 | 2422        | 30.000       | 2409.440 | 2439.440 | 0.5         | PASS    |
|            | Ant2 | 2422        | 28.880       | 2406.960 | 2435.840 | 0.5         | PASS    |
|            | Ant1 | 2437        | 29.120       | 2422.920 | 2452.040 | 0.5         | PASS    |
|            | Ant2 | 2437        | 25.040       | 2420.760 | 2445.800 | 0.5         | PASS    |
|            | Ant1 | 2452        | 31.920       | 2435.120 | 2467.040 | 0.5         | PASS    |
|            | Ant2 | 2452        | 35.760       | 2434.400 | 2470.160 | 0.5         | PASS    |
| 11AX20MIMO | Ant1 | 2412        | 15.720       | 2404.360 | 2420.080 | 0.5         | PASS    |
|            | Ant2 | 2412        | 16.000       | 2403.760 | 2419.760 | 0.5         | PASS    |
|            | Ant1 | 2437        | 13.840       | 2429.440 | 2443.280 | 0.5         | PASS    |
|            | Ant2 | 2437        | 16.200       | 2428.280 | 2444.480 | 0.5         | PASS    |
|            | Ant1 | 2462        | 15.520       | 2453.240 | 2468.760 | 0.5         | PASS    |
|            | Ant2 | 2462        | 16.360       | 2454.440 | 2470.800 | 0.5         | PASS    |
| 11AX40MIMO | Ant1 | 2422        | 29.520       | 2408.800 | 2438.320 | 0.5         | PASS    |
|            | Ant2 | 2422        | 32.640       | 2403.200 | 2435.840 | 0.5         | PASS    |
|            | Ant1 | 2437        | 35.120       | 2420.680 | 2455.800 | 0.5         | PASS    |
|            | Ant2 | 2437        | 32.560       | 2419.480 | 2452.040 | 0.5         | PASS    |
|            | Ant1 | 2452        | 35.040       | 2434.400 | 2469.440 | 0.5         | PASS    |
|            | Ant2 | 2452        | 36.320       | 2433.200 | 2469.520 | 0.5         | PASS    |

99 % bandwidth:

| Test Mode  | Ant. | Channel Freq. (MHz) | OCB (MHz) | FL (MHz)  | FH (MHz)  |
|------------|------|---------------------|-----------|-----------|-----------|
| 11B        | Ant1 | 2412                | 12.617    | 2405.6922 | 2418.3092 |
|            | Ant2 | 2412                | 12.603    | 2405.7053 | 2418.3083 |
|            | Ant1 | 2437                | 12.575    | 2430.6917 | 2443.2667 |
|            | Ant2 | 2437                | 12.550    | 2430.5782 | 2443.1282 |
|            | Ant1 | 2462                | 12.568    | 2455.6941 | 2468.2621 |
|            | Ant2 | 2462                | 12.520    | 2455.8601 | 2468.3801 |
| 11G        | Ant1 | 2412                | 17.044    | 2403.4571 | 2420.5011 |
|            | Ant2 | 2412                | 17.014    | 2403.5328 | 2420.5468 |
|            | Ant1 | 2437                | 16.885    | 2428.4893 | 2445.3743 |
|            | Ant2 | 2437                | 16.868    | 2428.3958 | 2445.2638 |
|            | Ant1 | 2462                | 16.877    | 2453.5623 | 2470.4393 |
|            | Ant2 | 2462                | 17.133    | 2453.5085 | 2470.6415 |
| 11N20MIMO  | Ant1 | 2412                | 18.205    | 2402.9140 | 2421.1190 |
|            | Ant2 | 2412                | 17.993    | 2403.0489 | 2421.0419 |
|            | Ant1 | 2437                | 18.105    | 2427.9122 | 2446.0172 |
|            | Ant2 | 2437                | 17.983    | 2427.9410 | 2445.9240 |
|            | Ant1 | 2462                | 18.114    | 2452.8917 | 2471.0057 |
|            | Ant2 | 2462                | 18.020    | 2453.0382 | 2471.0582 |
| 11N40MIMO  | Ant1 | 2422                | 35.908    | 2404.0055 | 2439.9135 |
|            | Ant2 | 2422                | 35.884    | 2403.9354 | 2439.8194 |
|            | Ant1 | 2437                | 35.921    | 2419.0532 | 2454.9742 |
|            | Ant2 | 2437                | 35.849    | 2418.8984 | 2454.7474 |
|            | Ant1 | 2452                | 35.993    | 2433.9538 | 2469.9468 |
|            | Ant2 | 2452                | 36.369    | 2433.6992 | 2470.0682 |
| 11AX20MIMO | Ant1 | 2412                | 18.867    | 2402.4945 | 2421.3615 |
|            | Ant2 | 2412                | 18.911    | 2402.4796 | 2421.3906 |
|            | Ant1 | 2437                | 18.896    | 2427.5049 | 2446.4009 |
|            | Ant2 | 2437                | 18.900    | 2427.4934 | 2446.3934 |
|            | Ant1 | 2462                | 18.878    | 2452.4996 | 2471.3776 |
|            | Ant2 | 2462                | 18.954    | 2452.5453 | 2471.4993 |
| 11AX40MIMO | Ant1 | 2422                | 37.638    | 2403.1784 | 2440.8164 |
|            | Ant2 | 2422                | 37.658    | 2403.0979 | 2440.7559 |
|            | Ant1 | 2437                | 37.633    | 2418.2760 | 2455.9090 |
|            | Ant2 | 2437                | 37.338    | 2418.1383 | 2455.4763 |
|            | Ant1 | 2452                | 37.676    | 2433.0850 | 2470.7610 |
|            | Ant2 | 2452                | 37.958    | 2432.9677 | 2470.9257 |

### 9.5. Original test data

6dB bandwidth:



11B\_Ant2\_2437



11B\_Ant1\_2462



11B\_Ant2\_2462



11G\_Ant1\_2412



11G\_Ant2\_2412



11G\_Ant1\_2437



11G\_Ant2\_2437



11G\_Ant1\_2462



11G\_Ant2\_2462



11N20MIMO\_Ant1\_2412





11N20MIMO\_Ant2\_2412



11N20MIMO\_Ant1\_2437



11N20MIMO\_Ant2\_2437



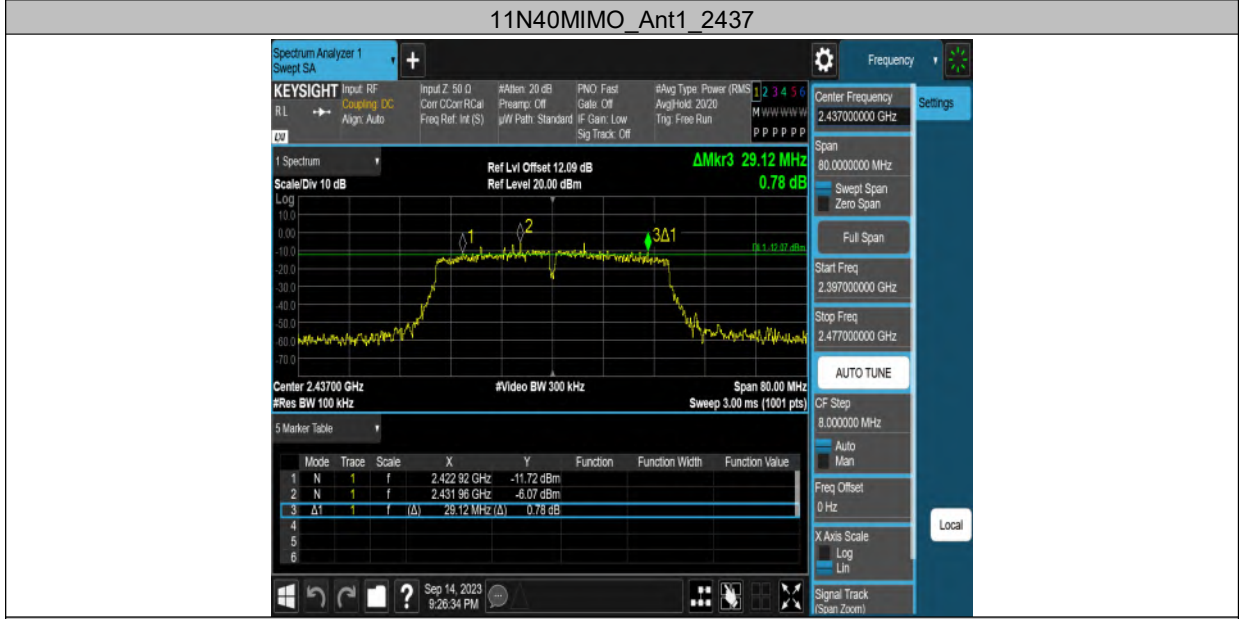
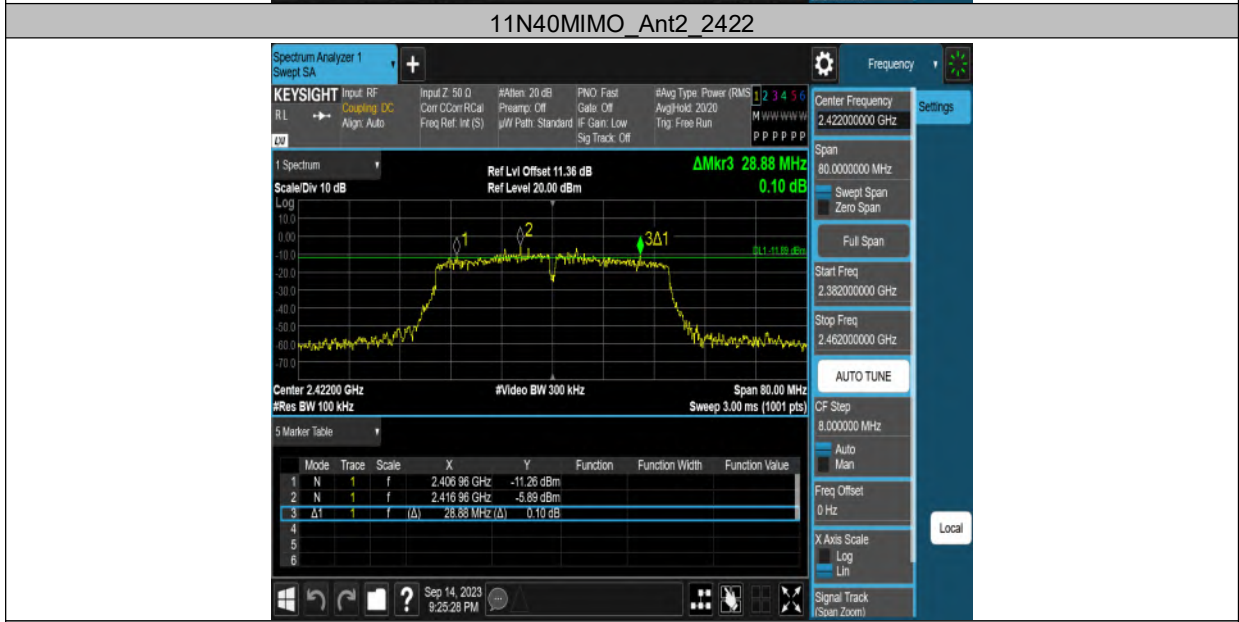
11N20MIMO\_Ant1\_2462

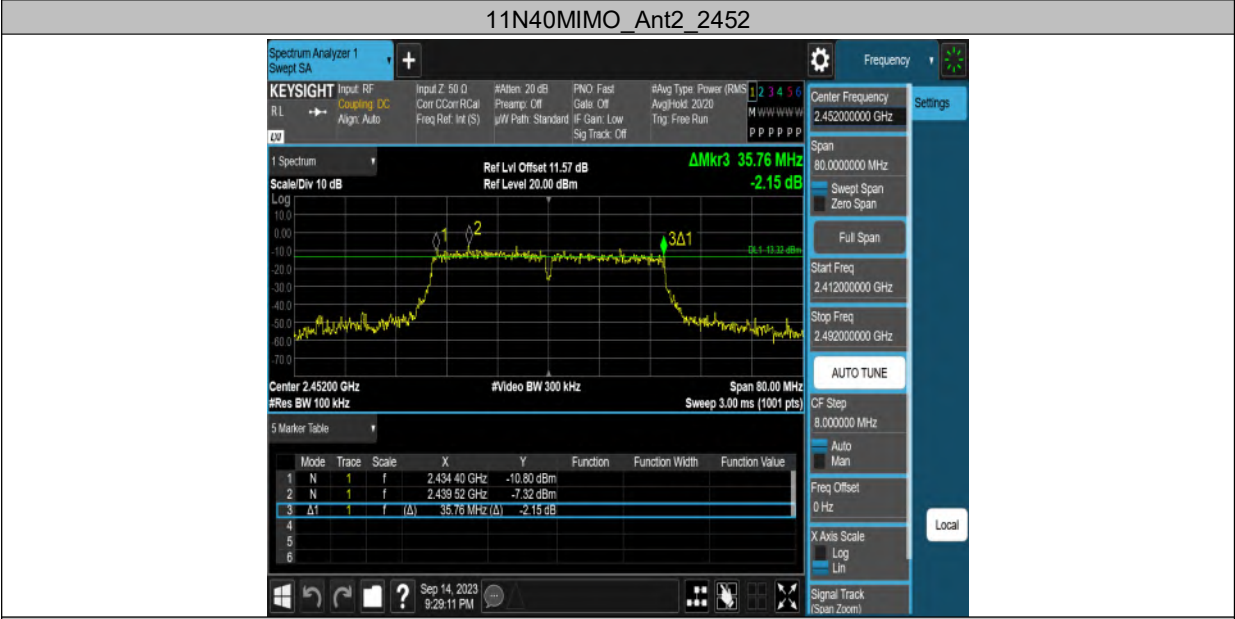
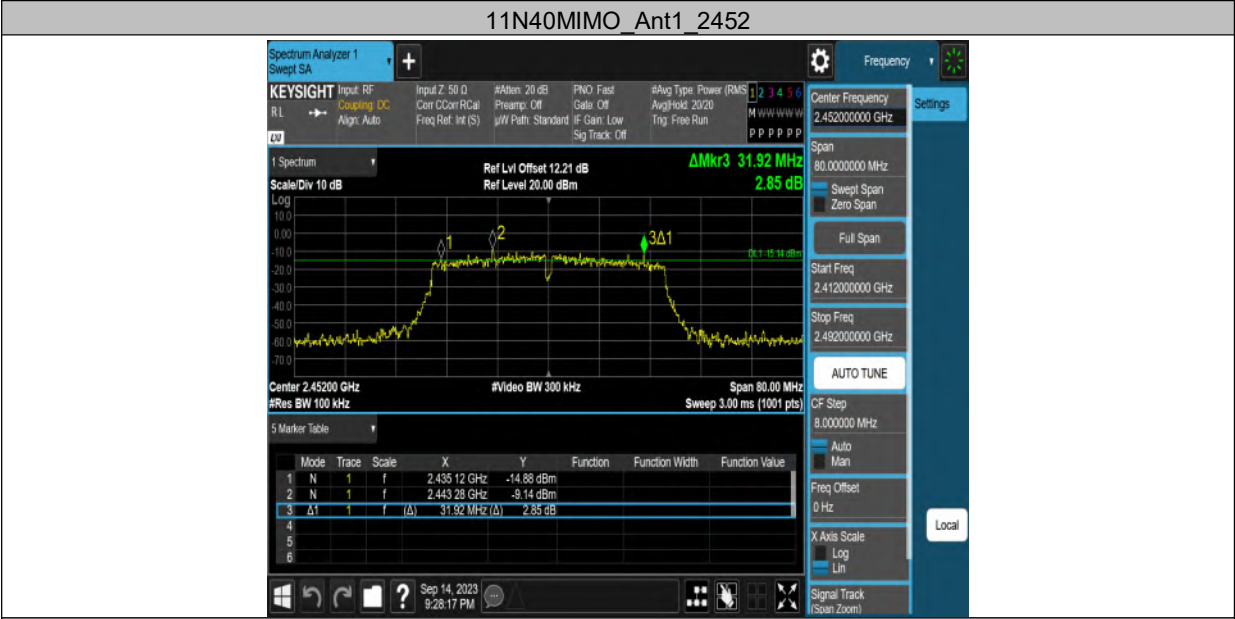


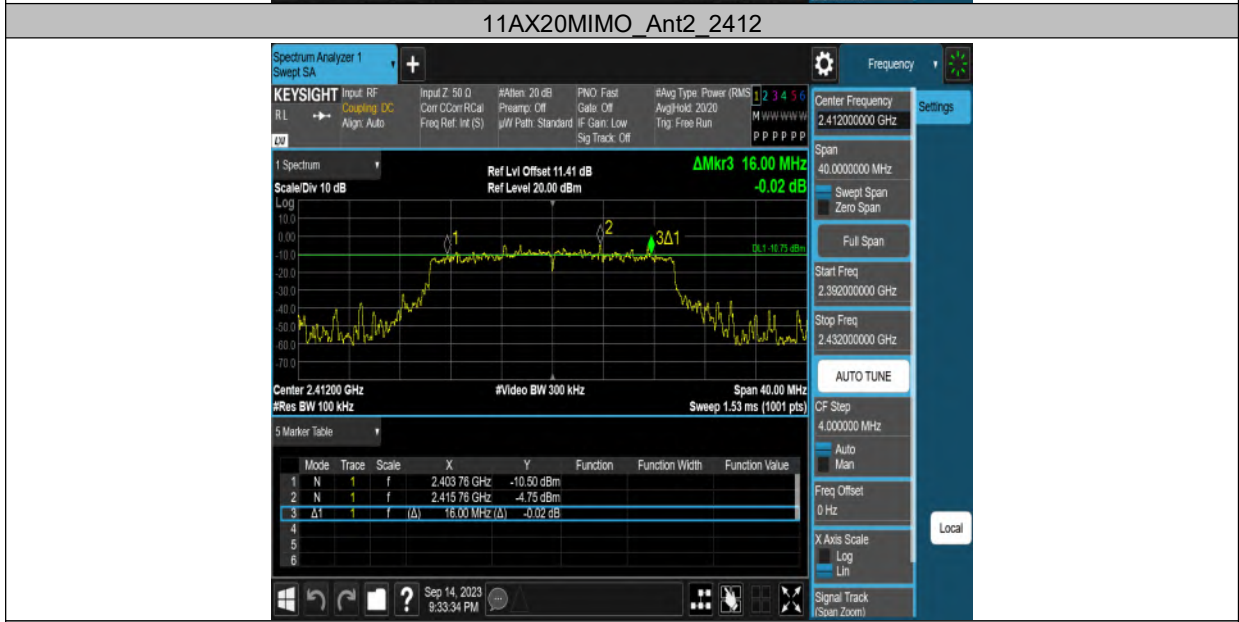
11N20MIMO\_Ant2\_2462

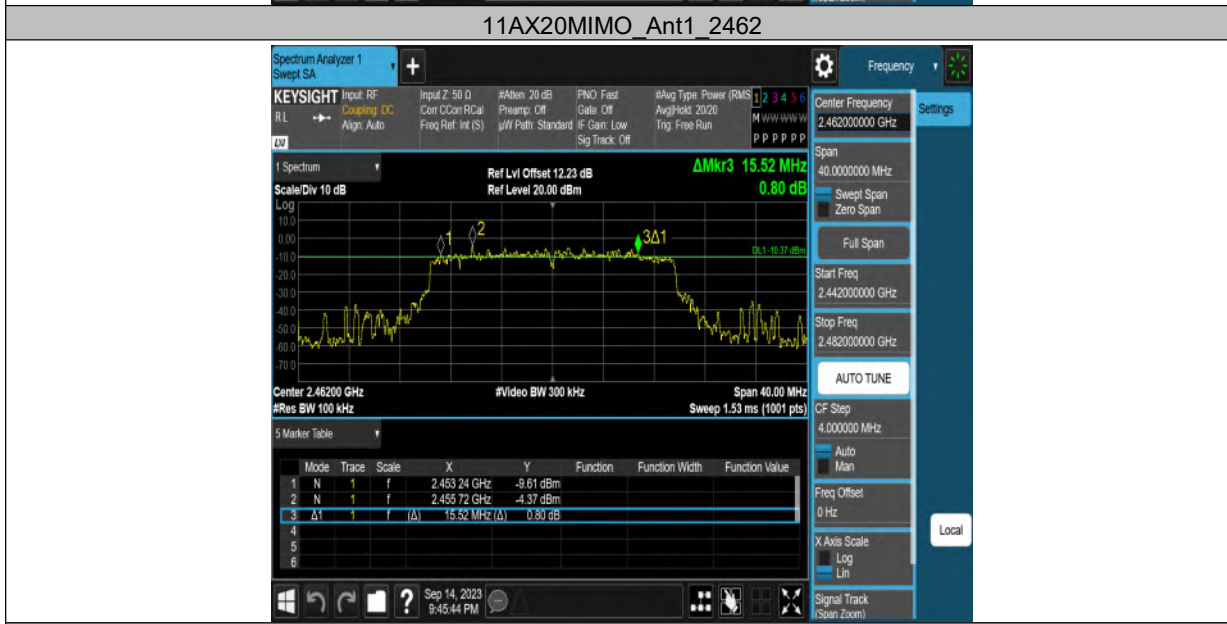


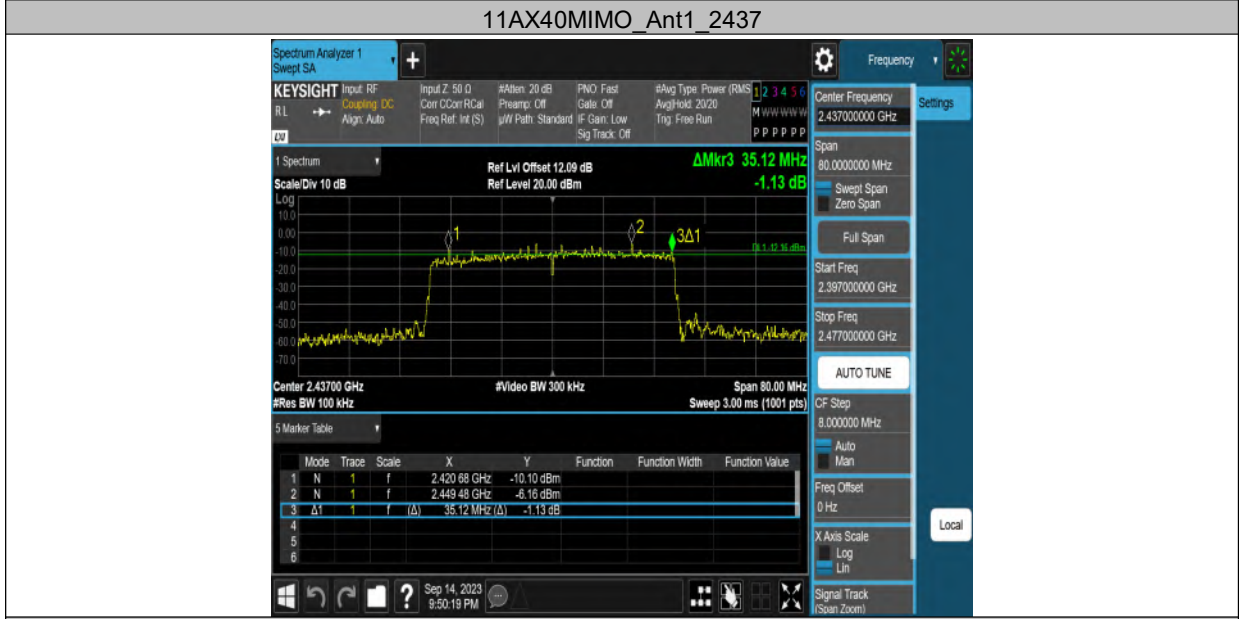
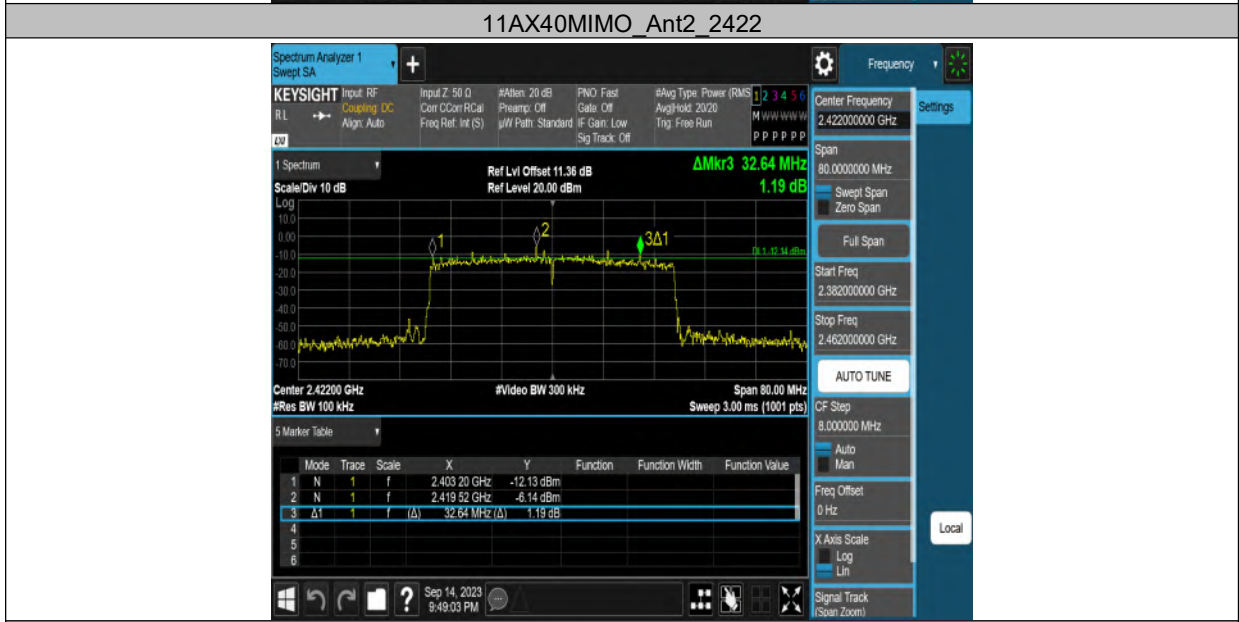
11N40MIMO\_Ant1\_2422













11AX40MIMO\_Ant1\_2452

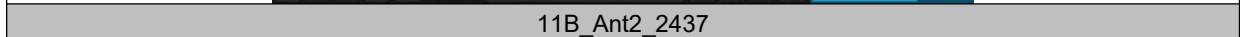
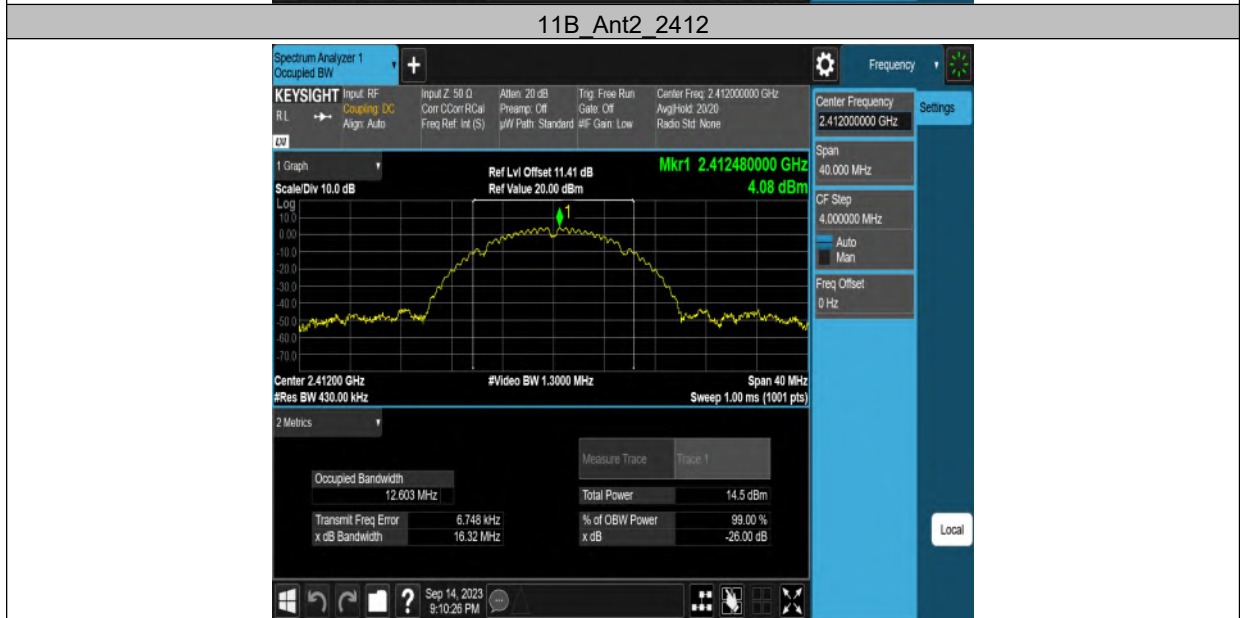
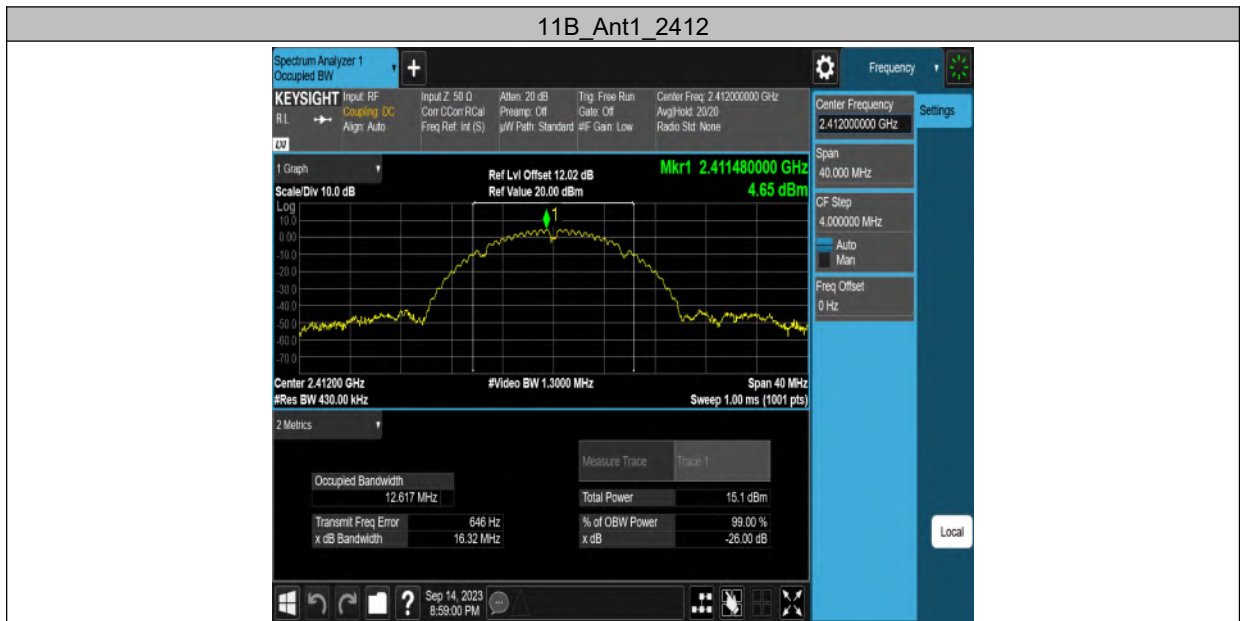


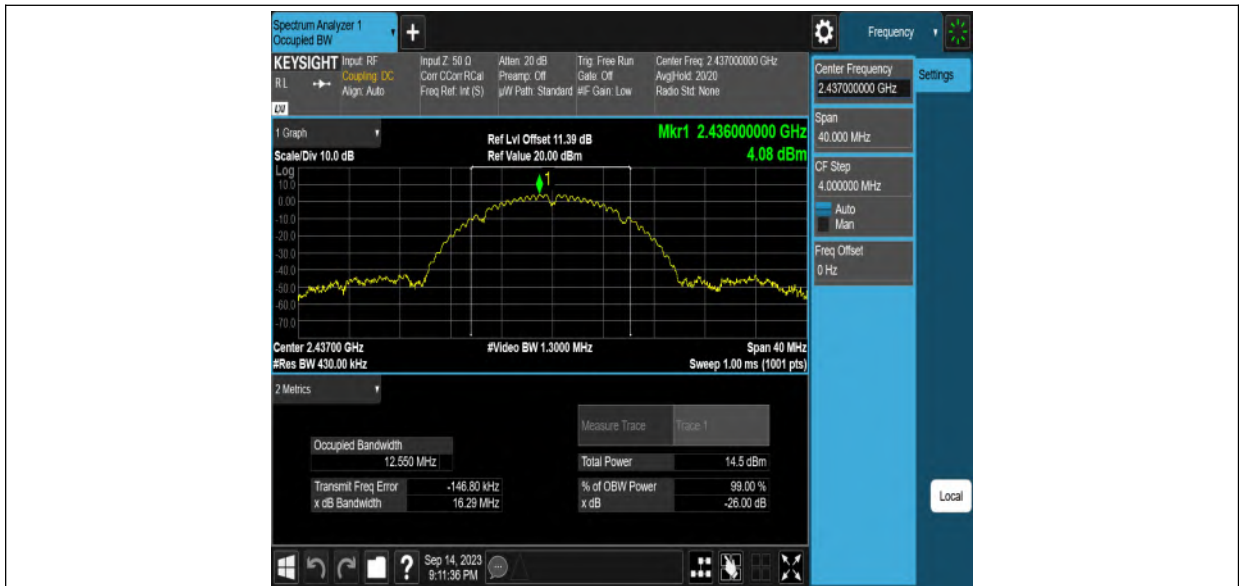
11AX40MIMO\_Ant2\_2452





99 % bandwidth:





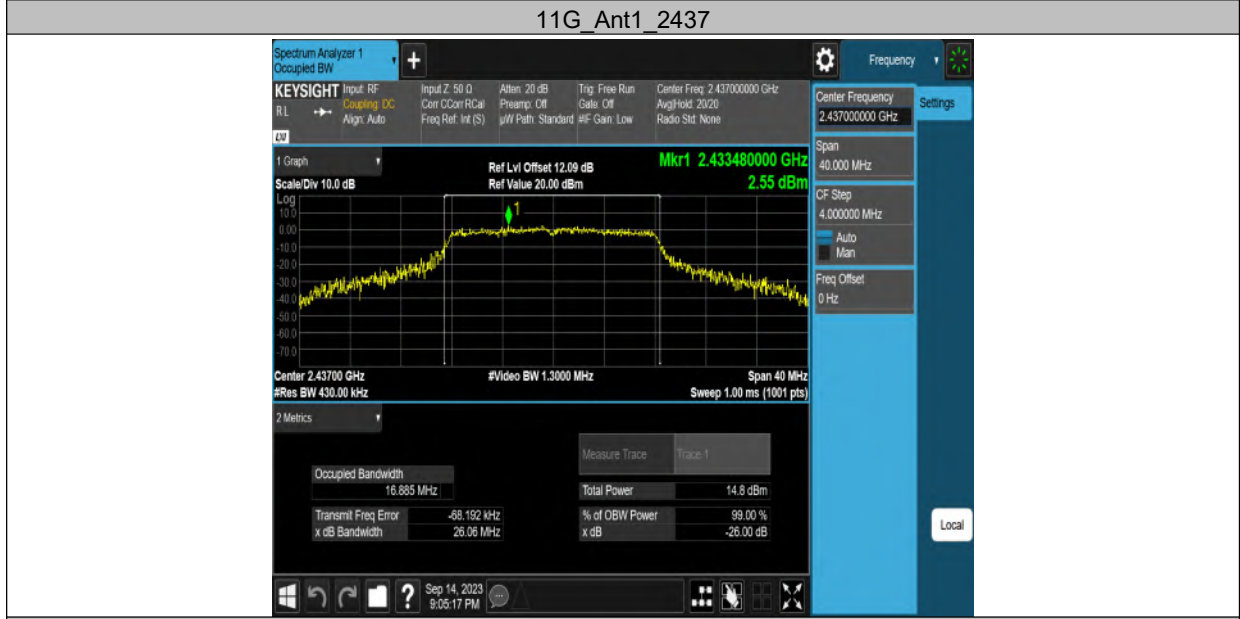
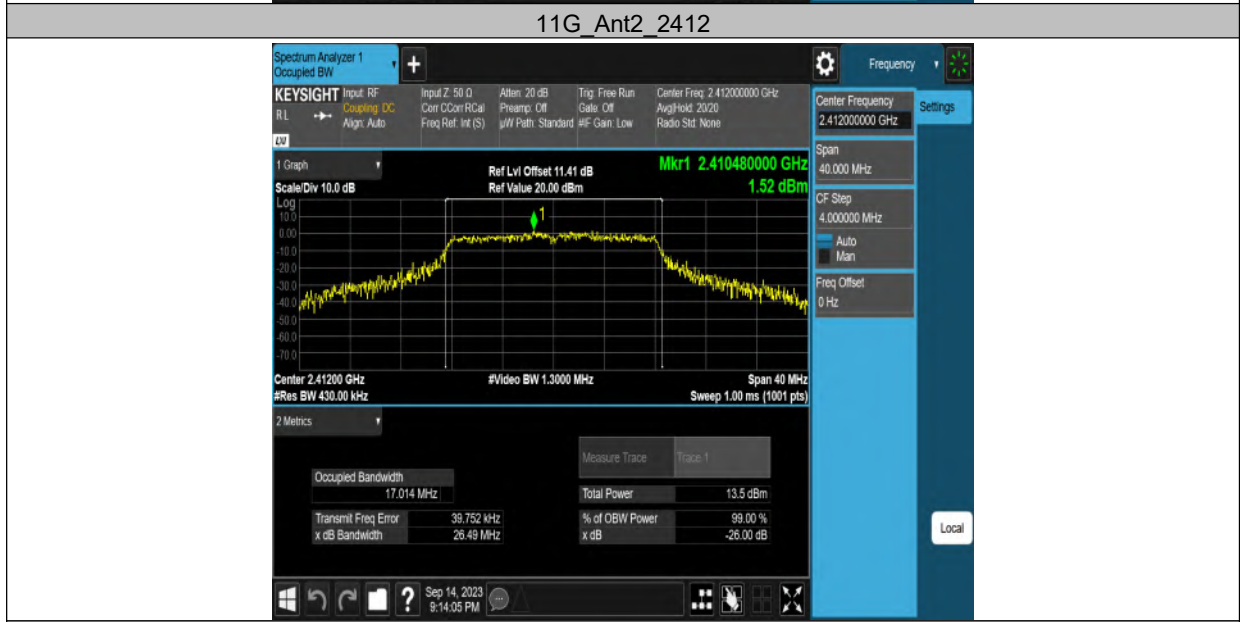
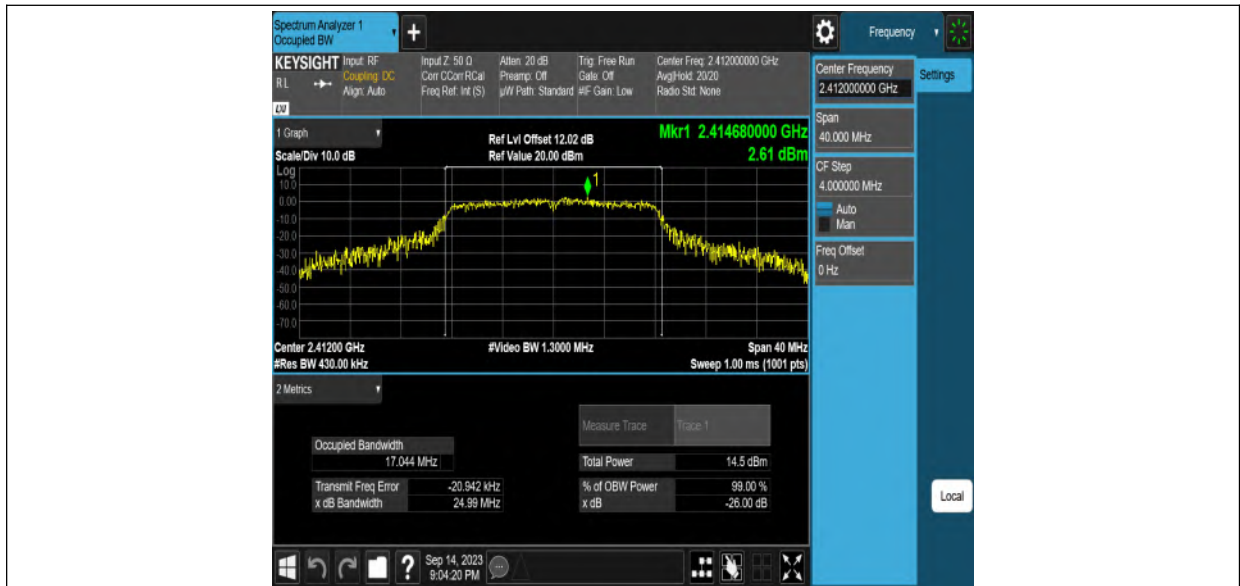
11B\_Ant1\_2462

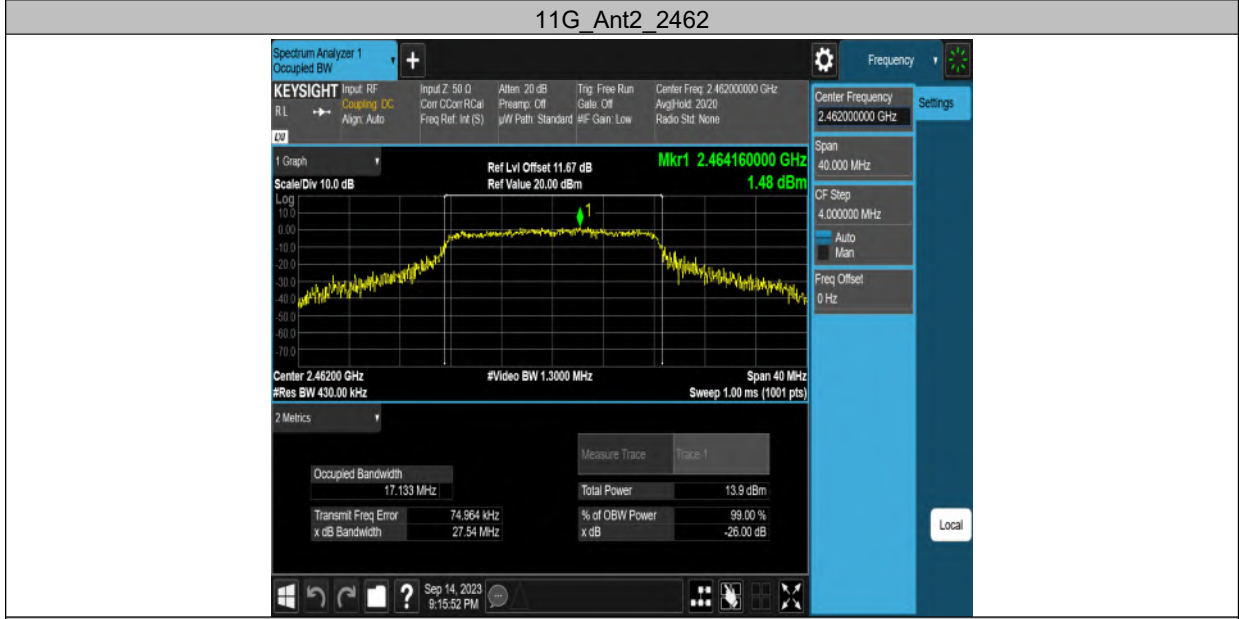
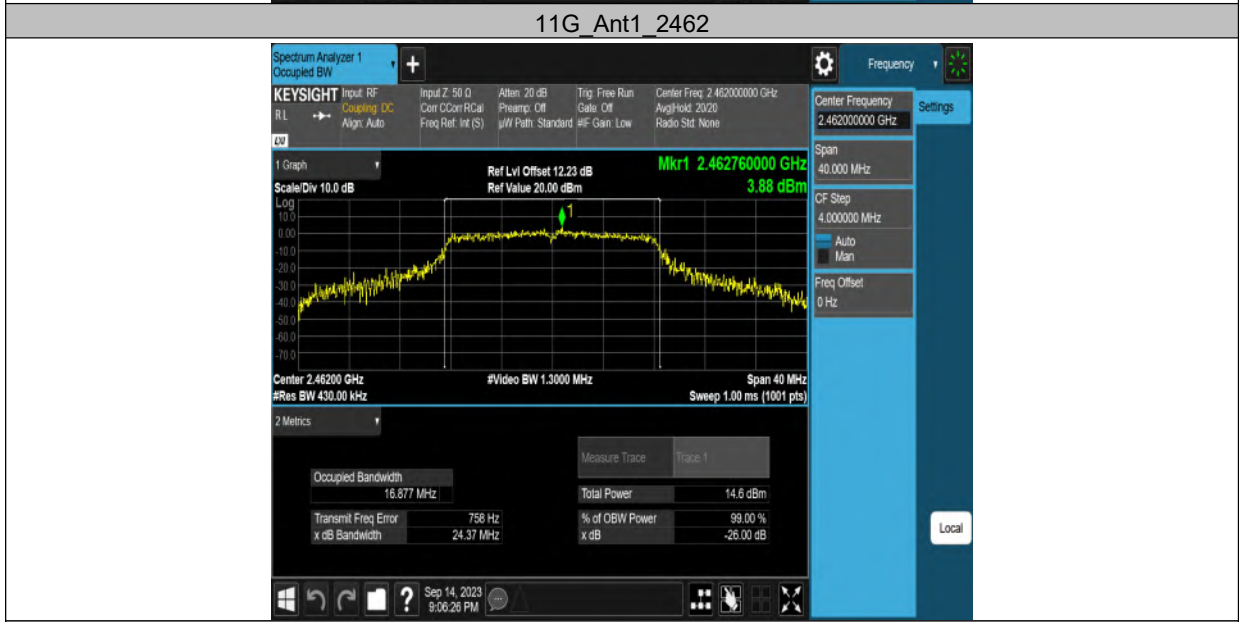


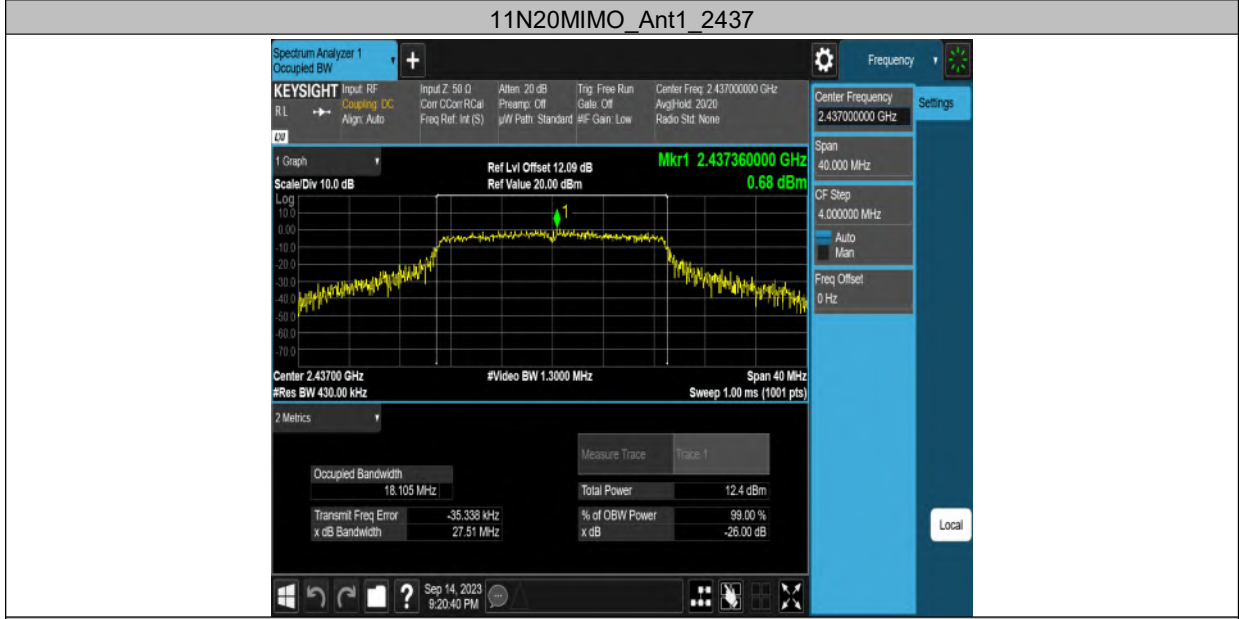
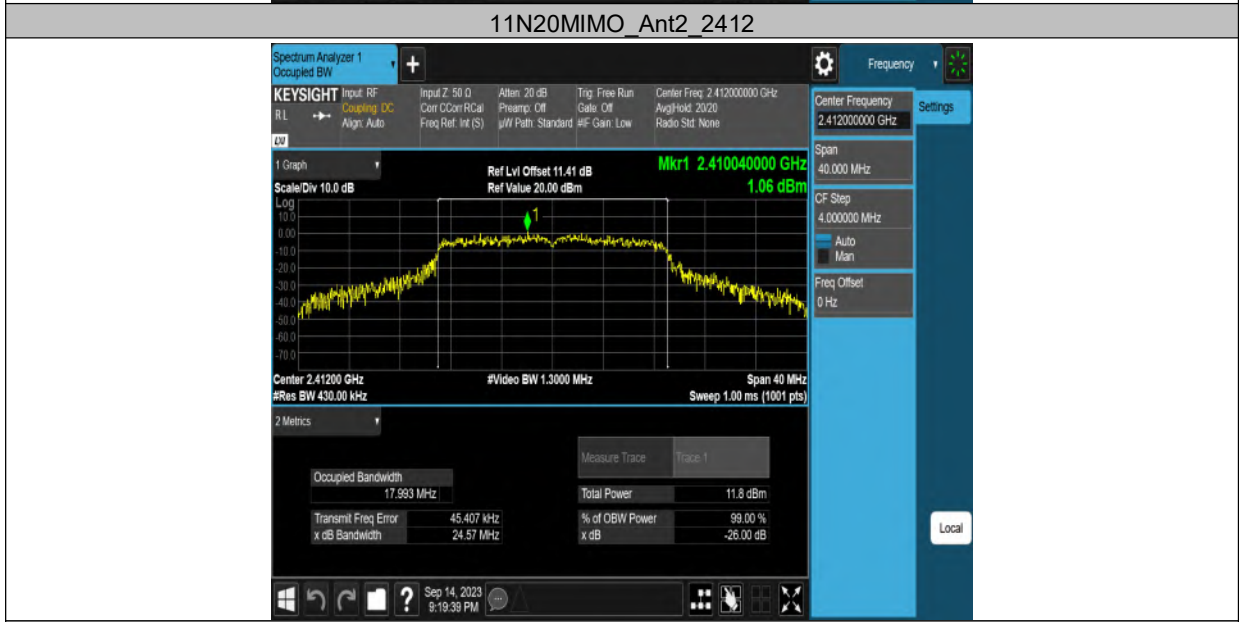
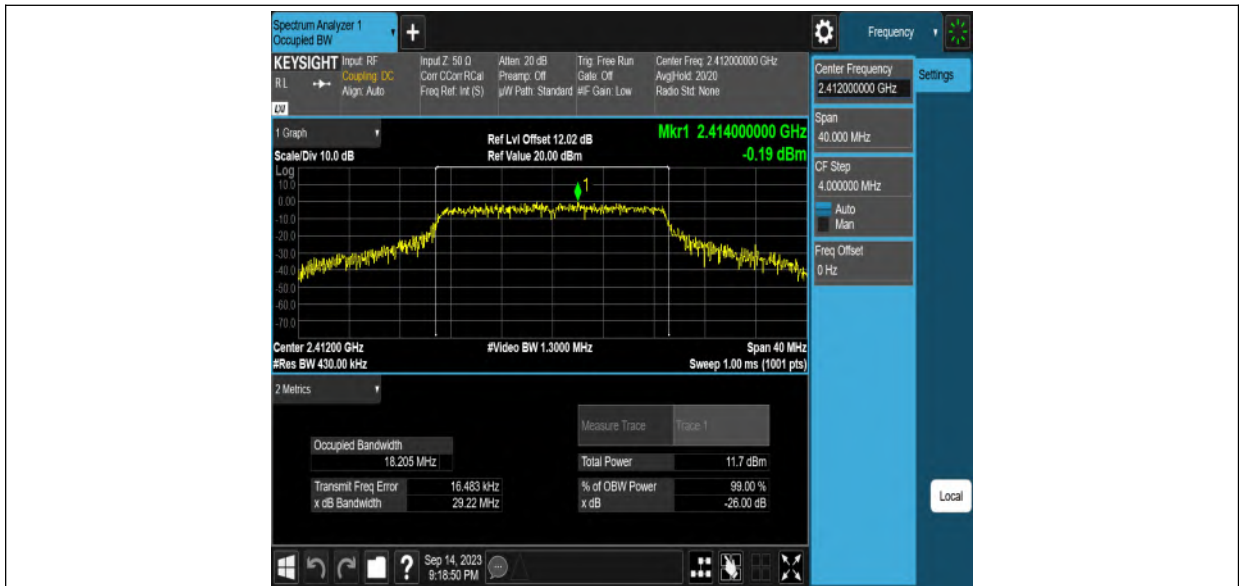
11B\_Ant2\_2462

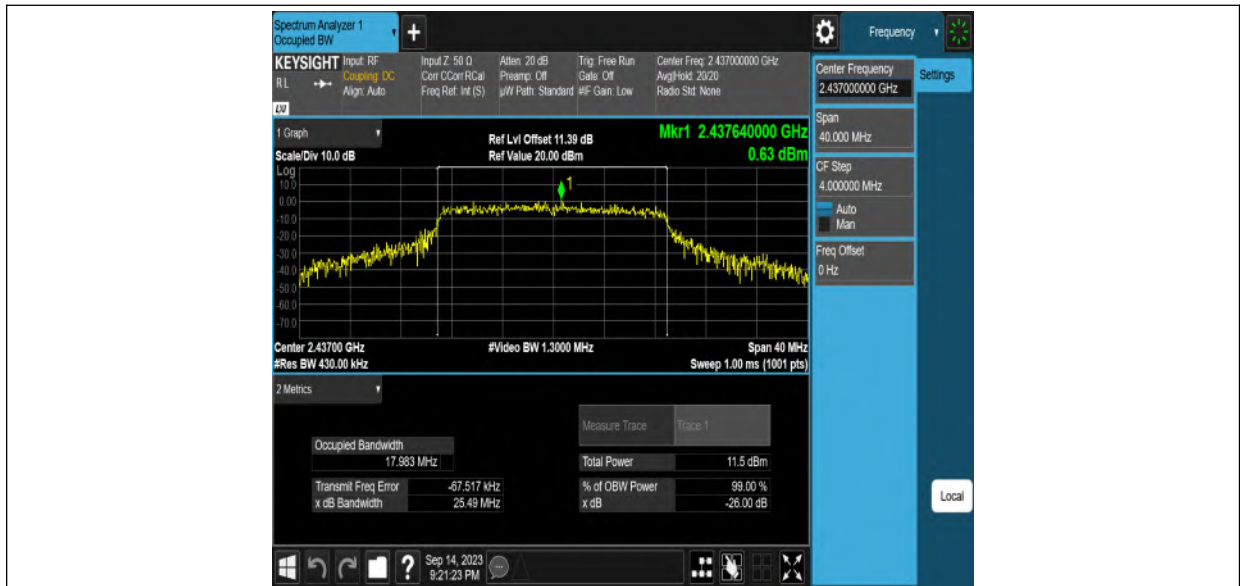


11G\_Ant1\_2412

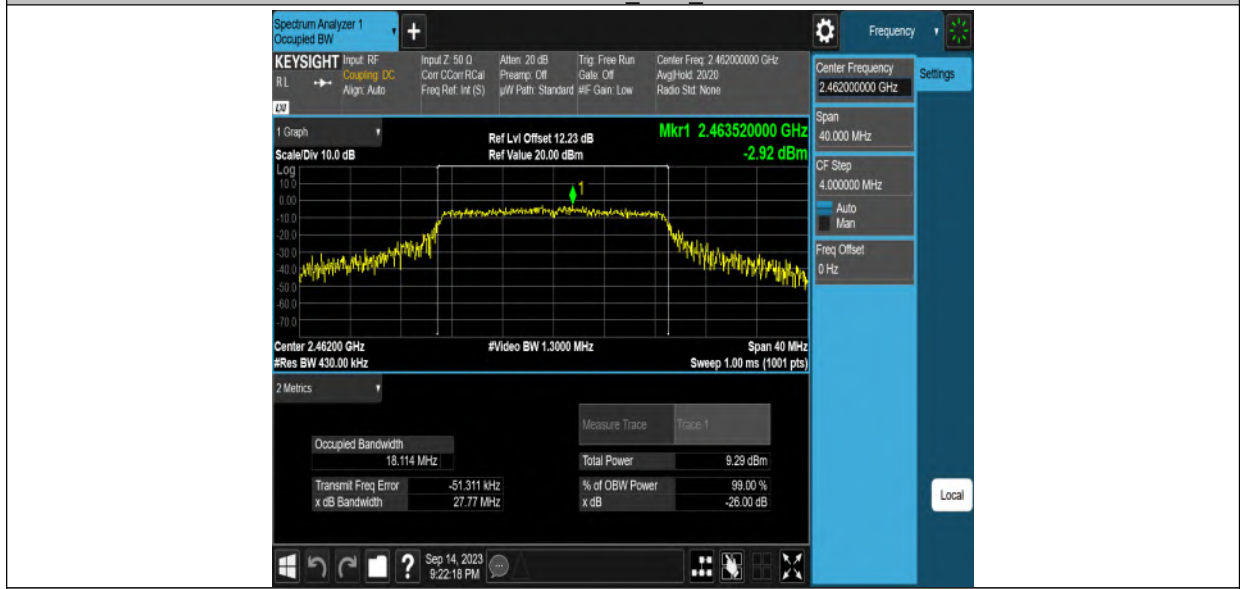








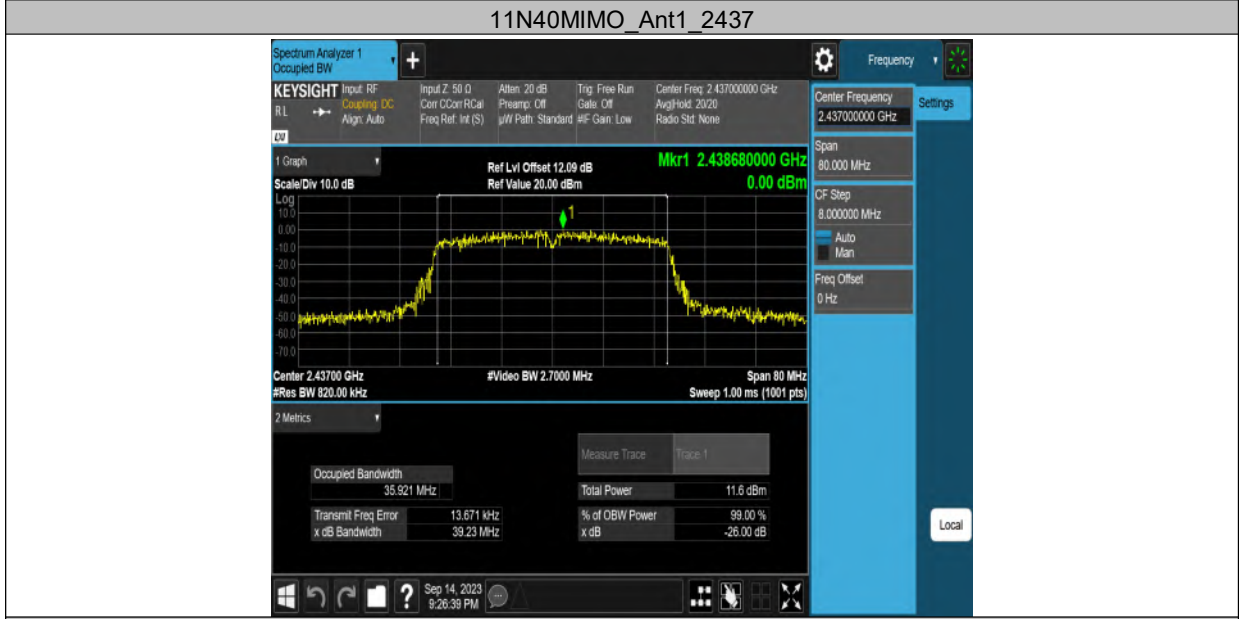
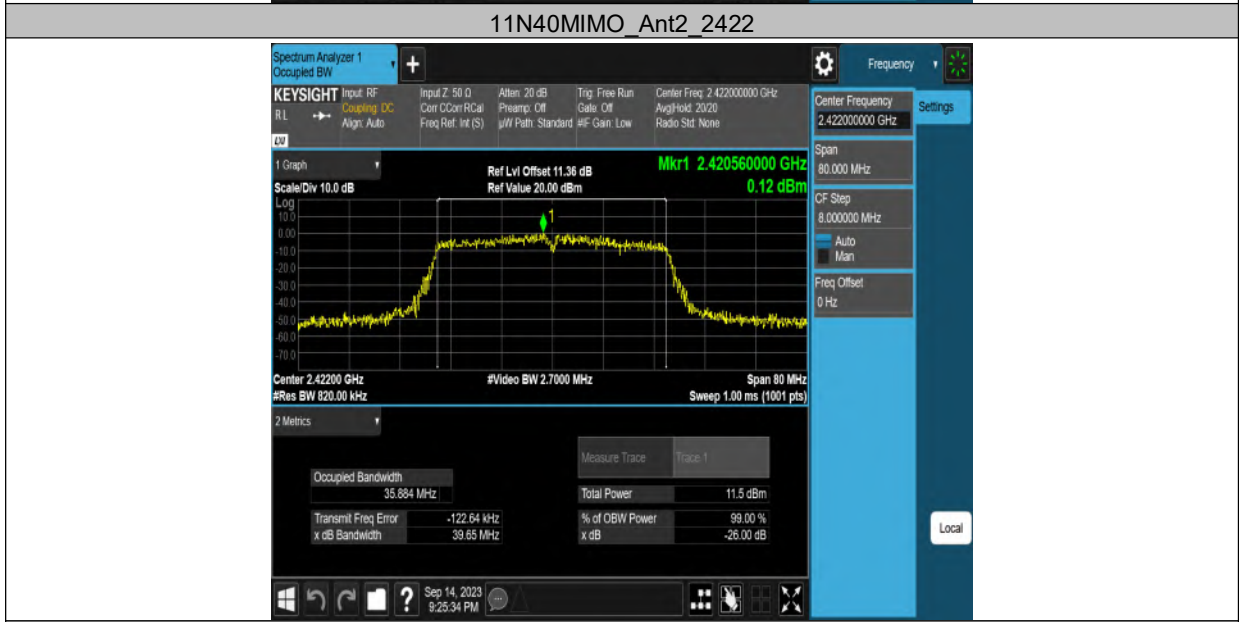
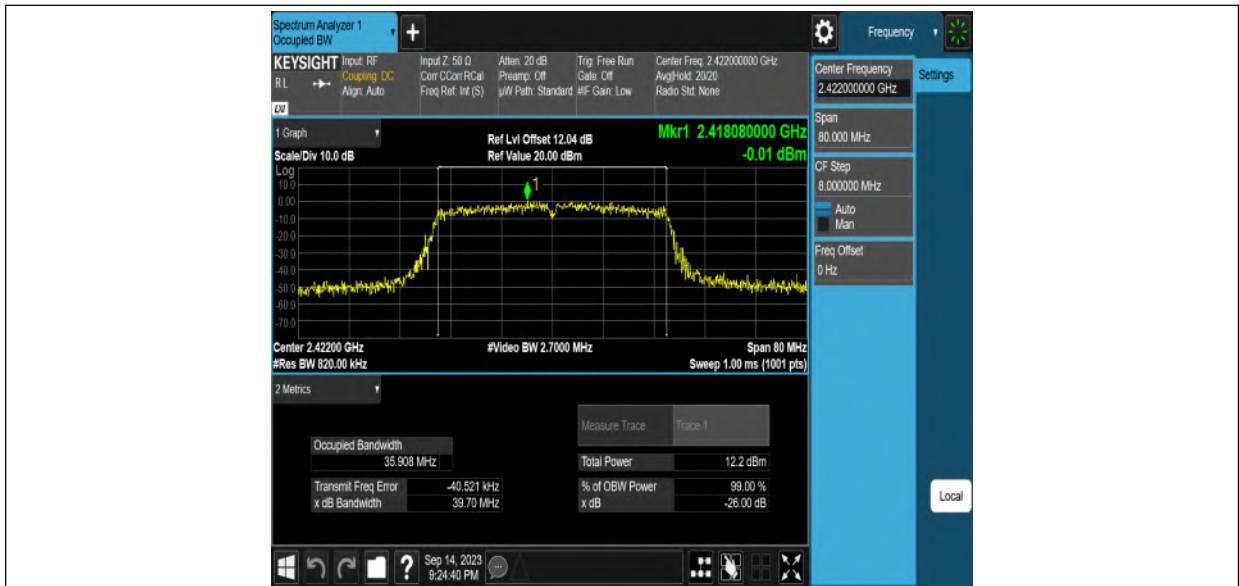
11N20MIMO\_Ant1\_2462

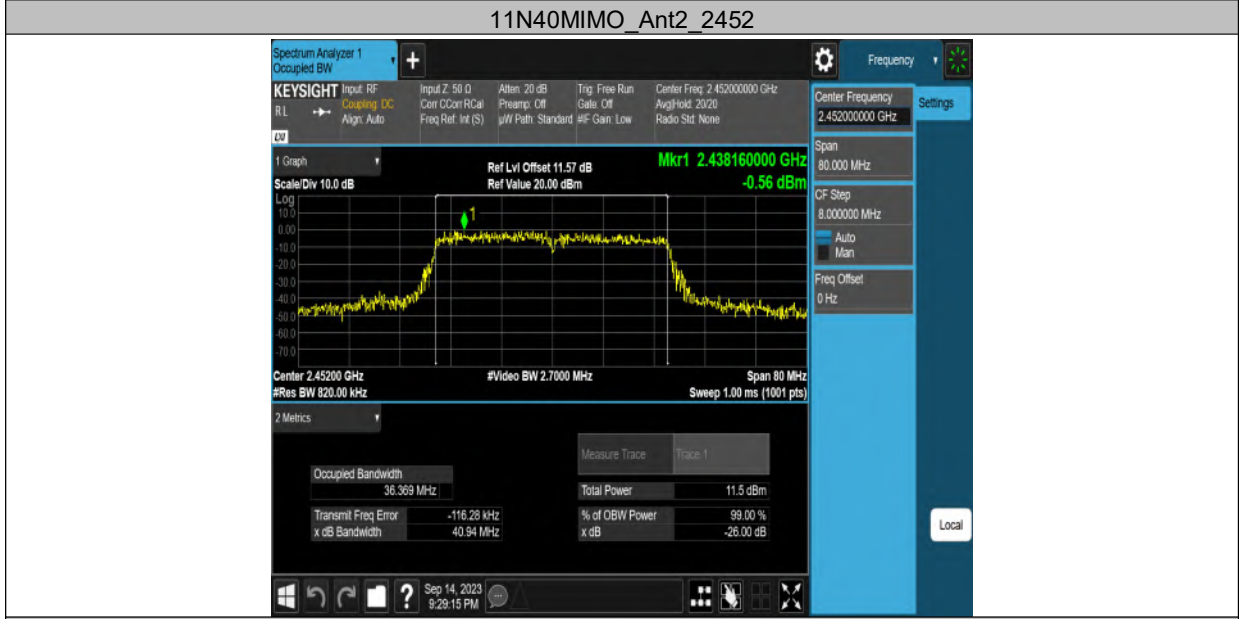
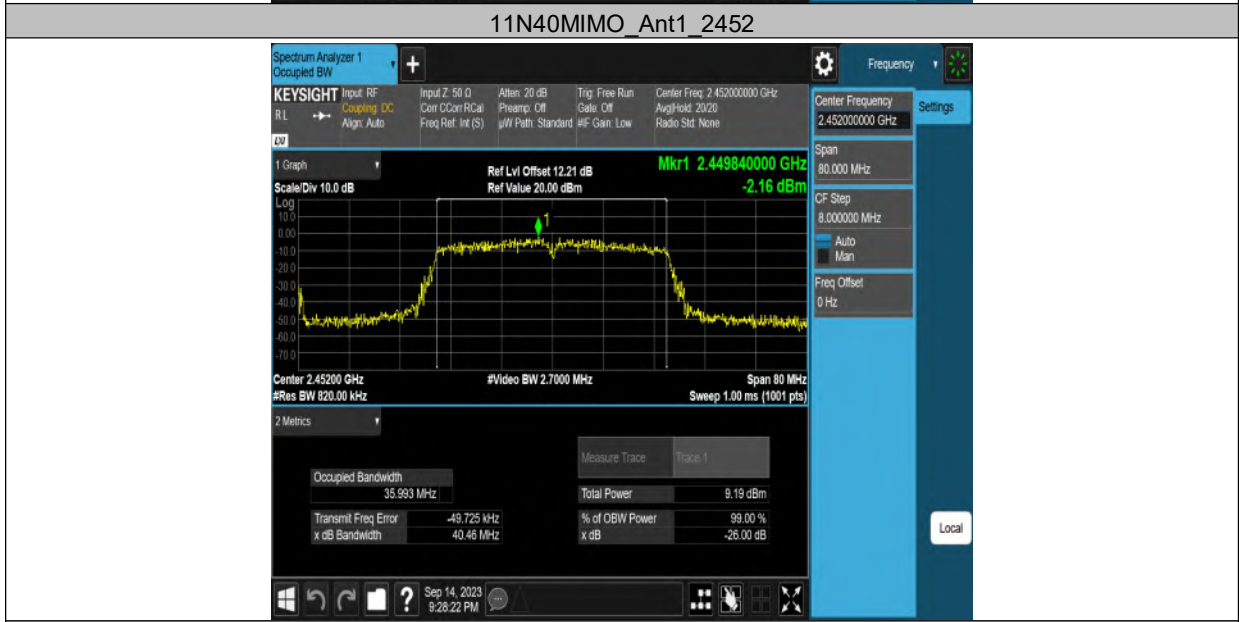
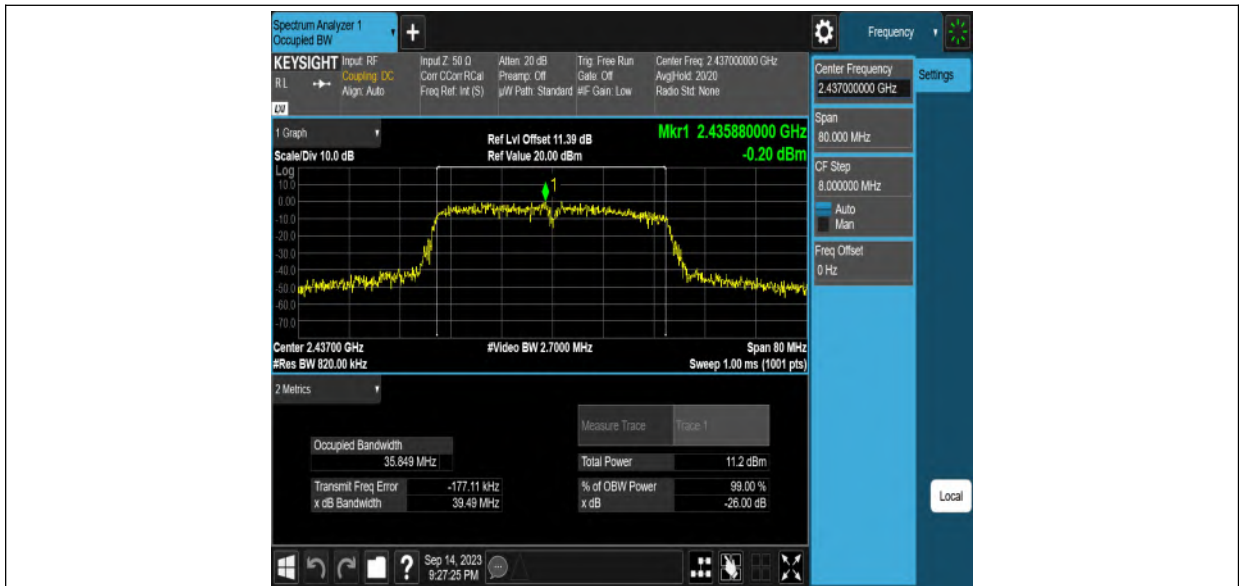


11N20MIMO\_Ant2\_2462

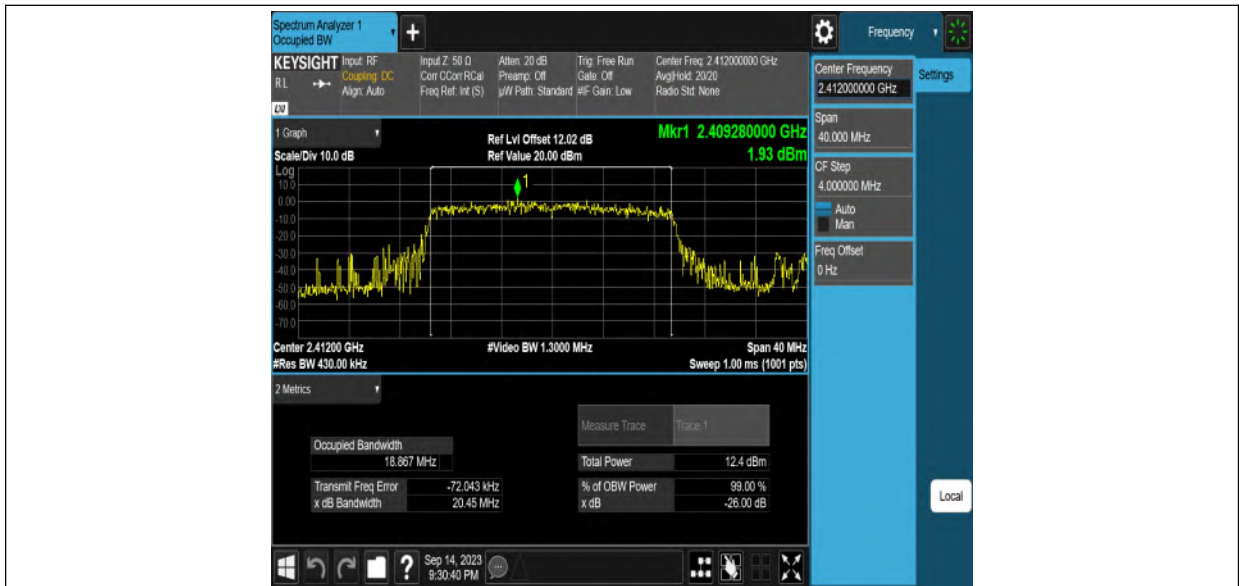


11N40MIMO\_Ant1\_2422

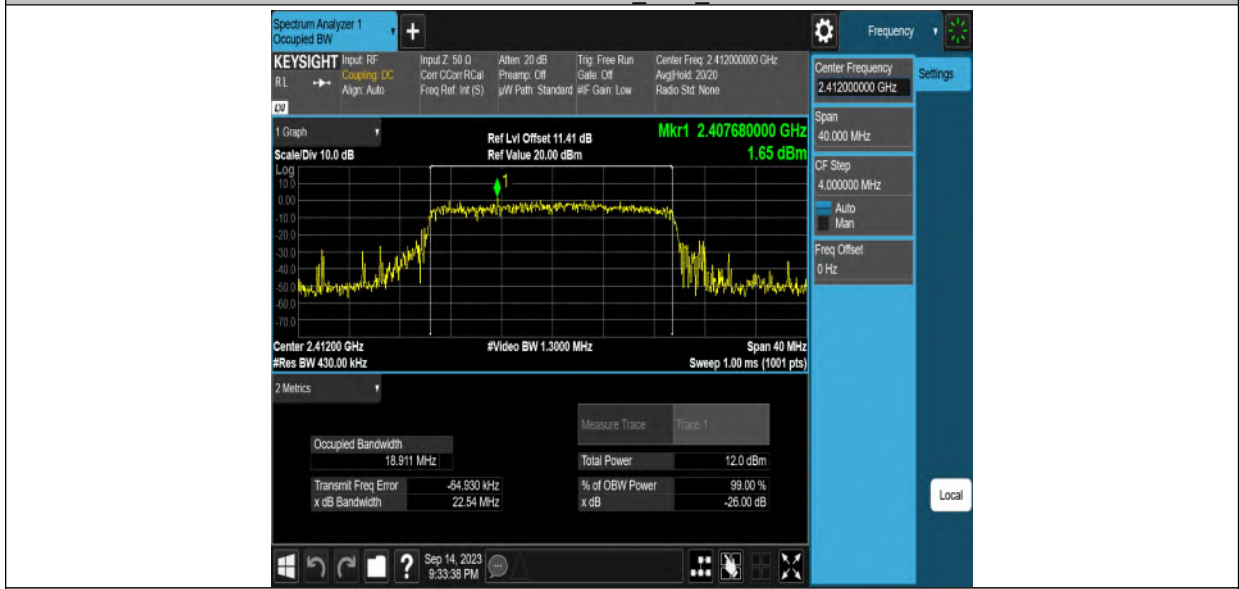




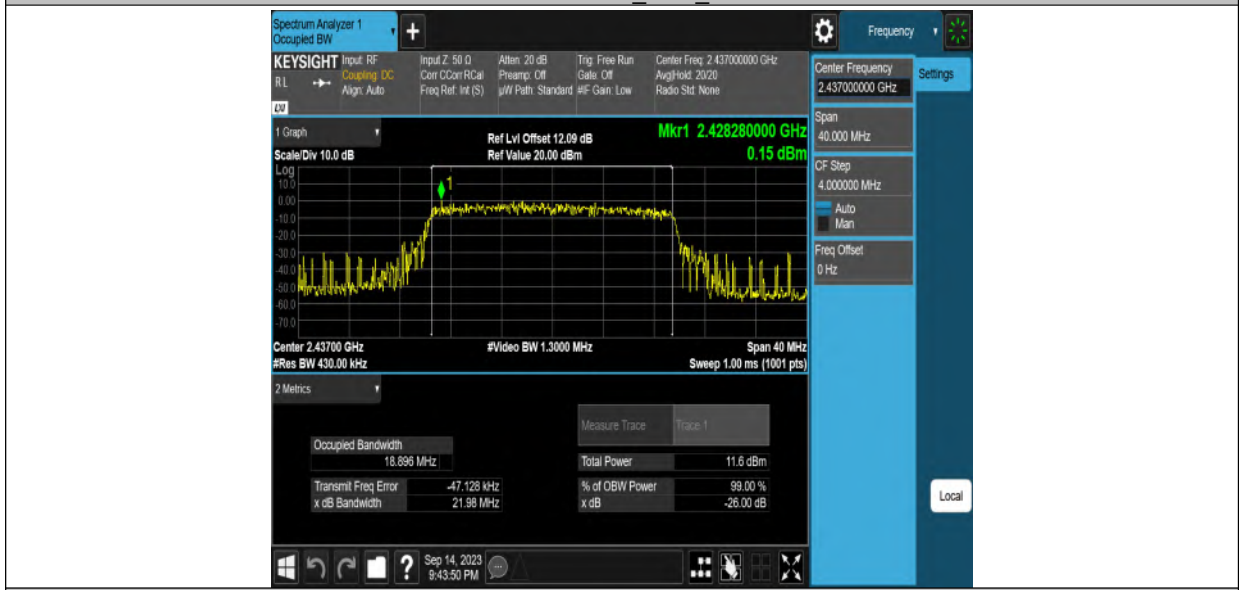




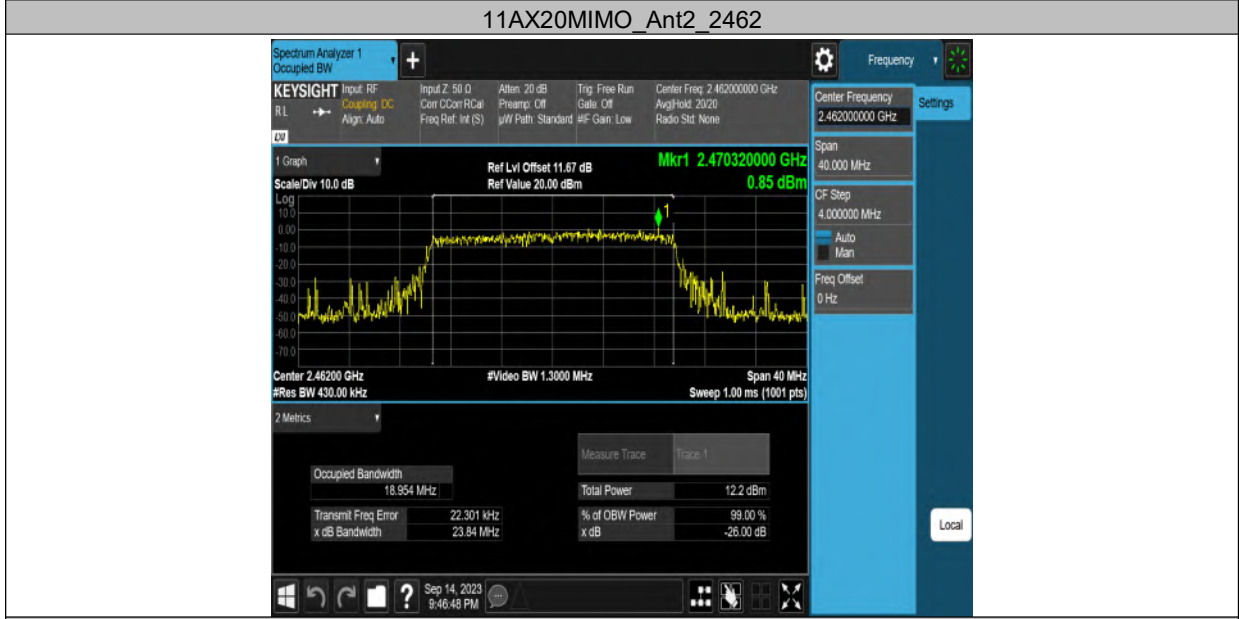
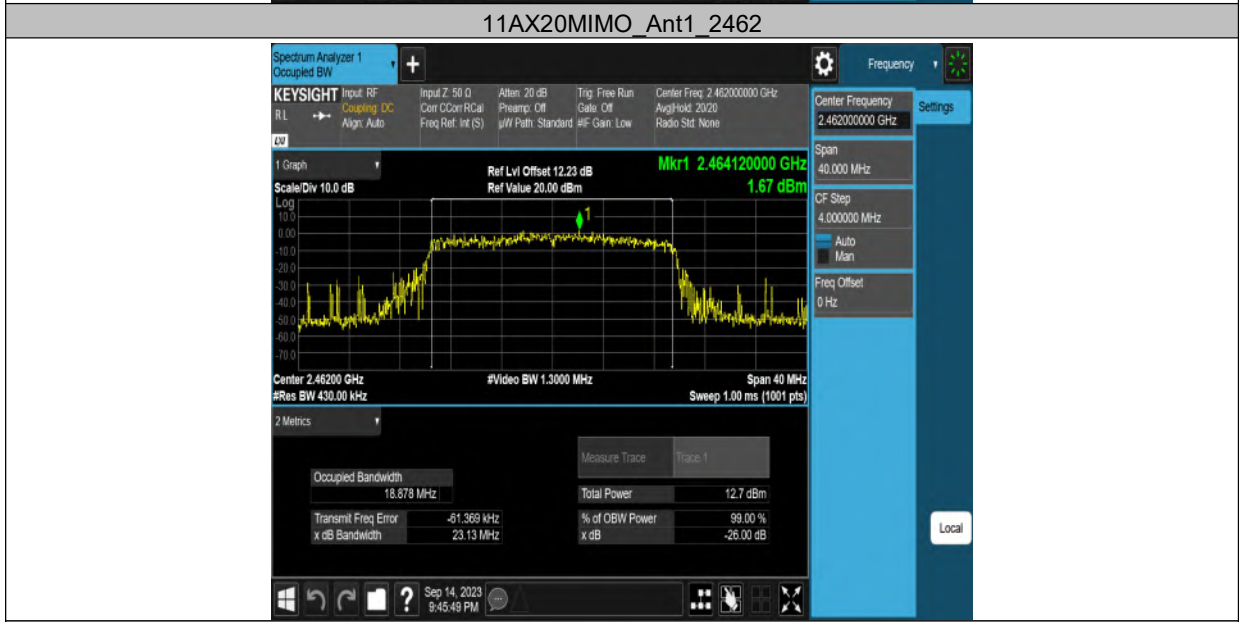
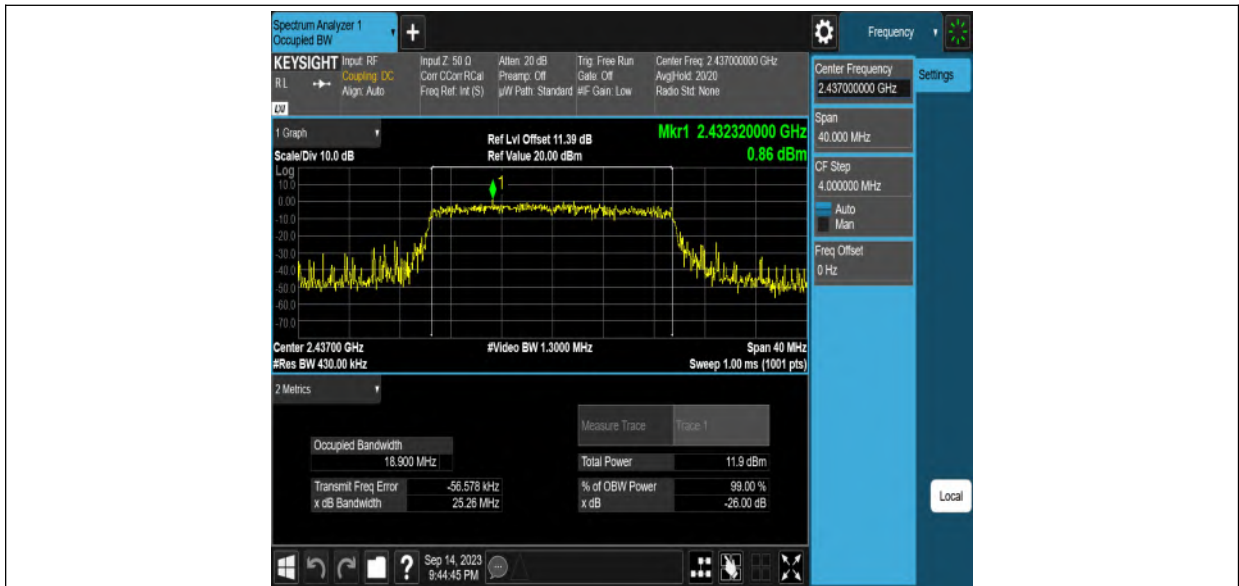
11AX20MIMO\_Ant2\_2412

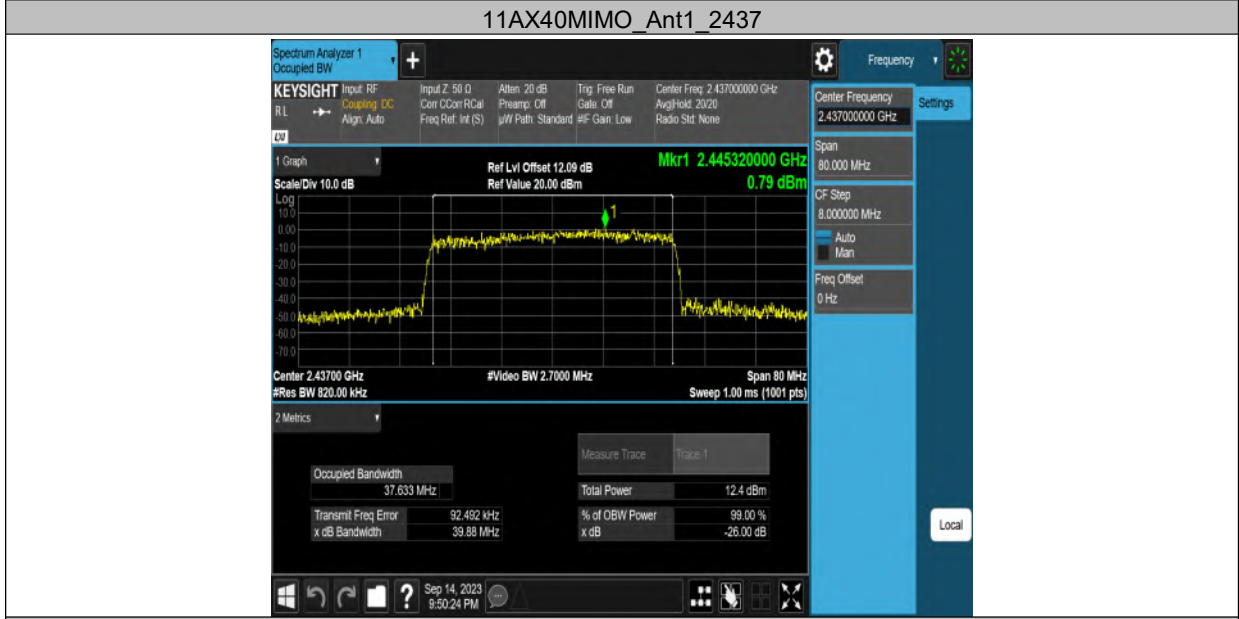
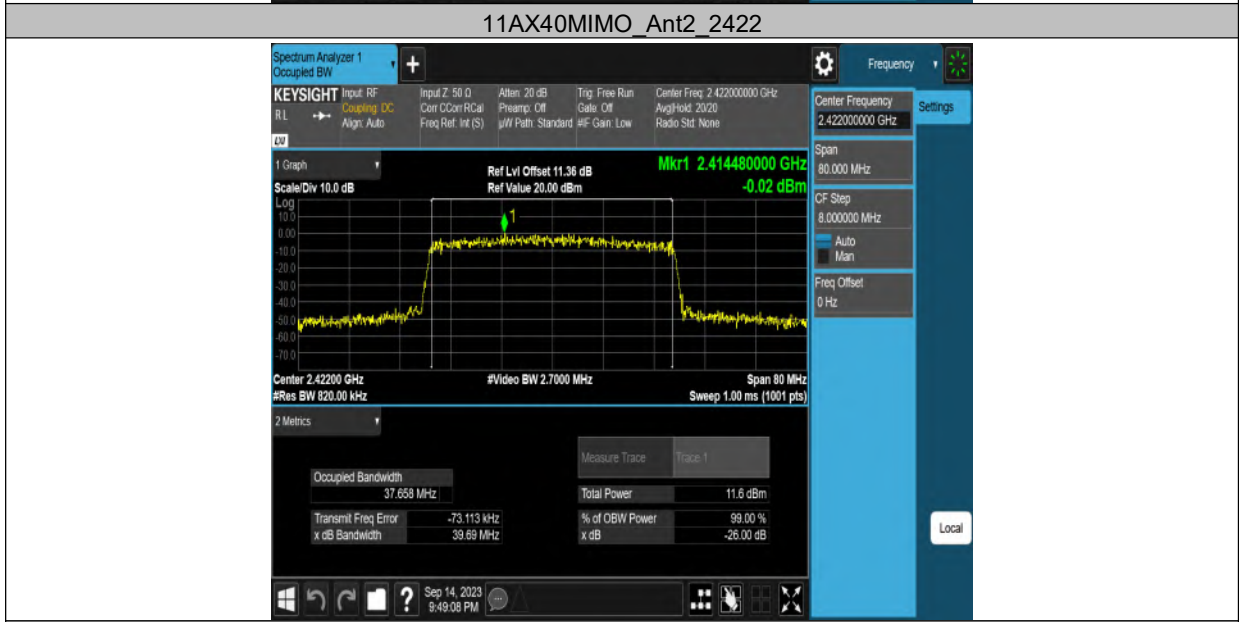
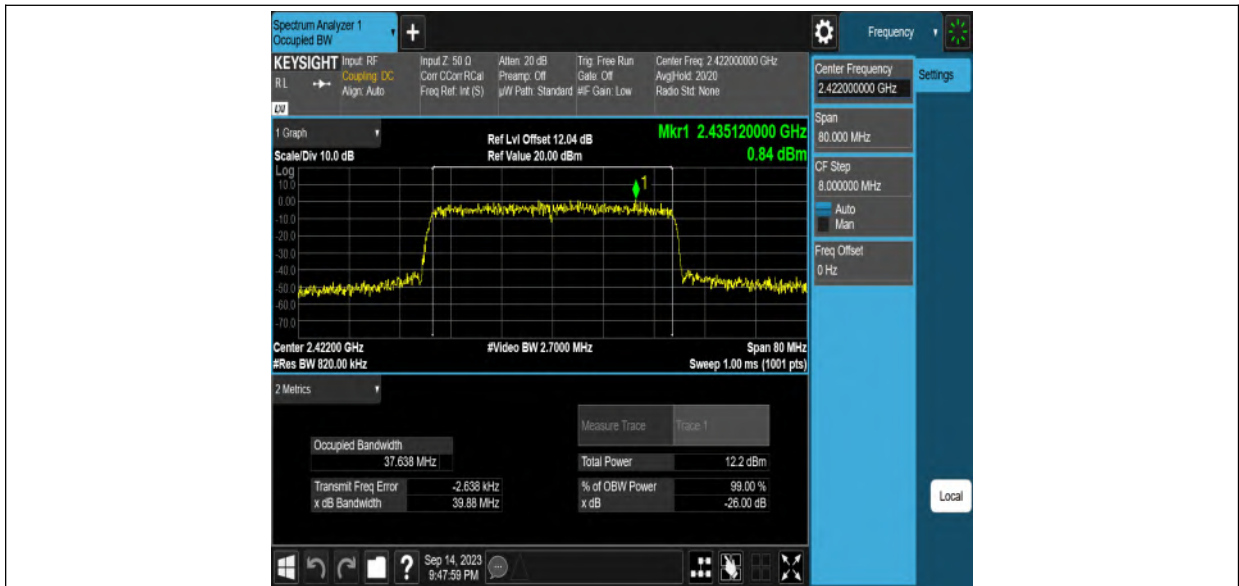


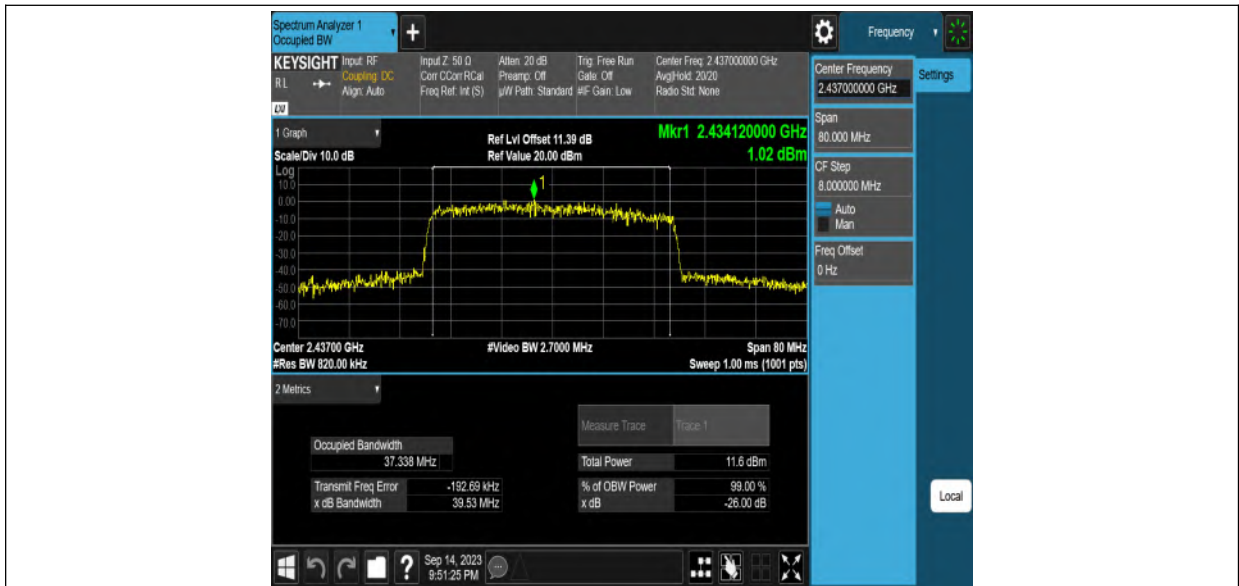
11AX20MIMO\_Ant1\_2437



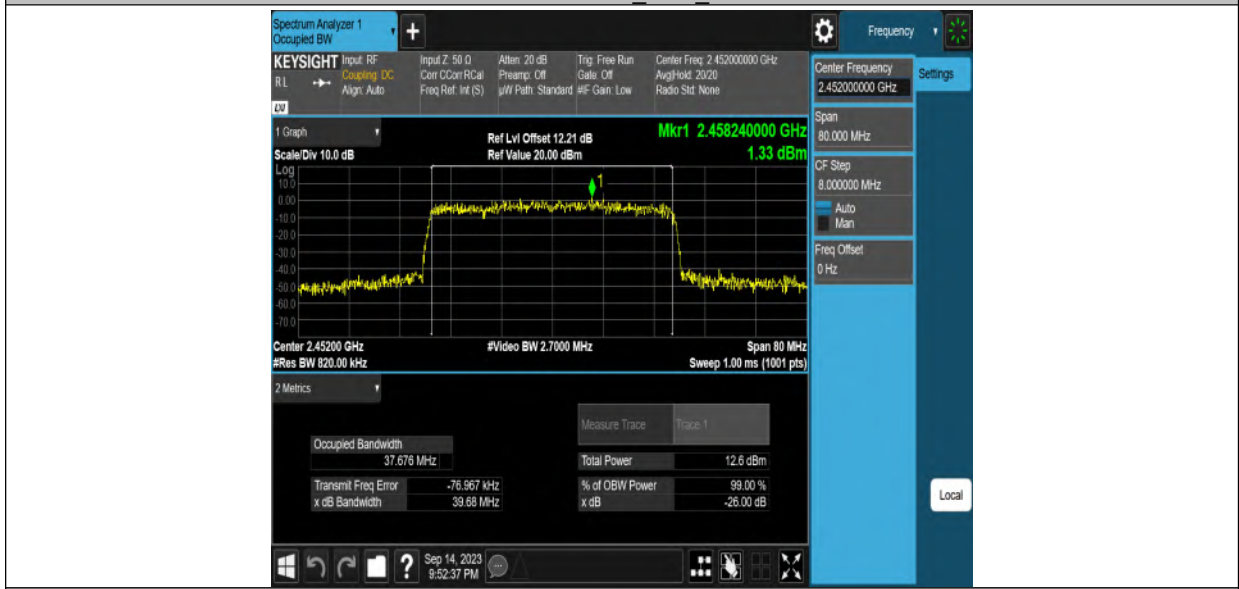
11AX20MIMO\_Ant2\_2437



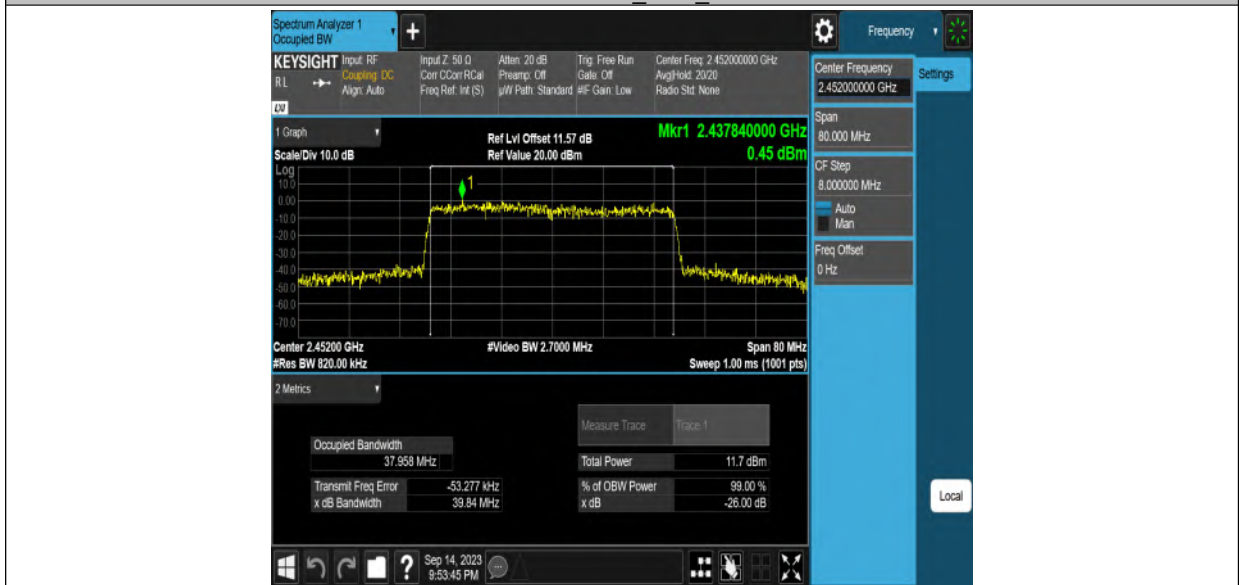




11AX40MIMO\_Ant1\_2452



11AX40MIMO\_Ant2\_2452



## 10. Conducted Output Power

### 10.1. Block diagram of test setup

Same as section 8.1

### 10.2. Limits

| CFR 47 FCC Part15 (15.247) Subpart C<br>ISED RSS-247 ISSUE 3 |                   |                  |                       |
|--------------------------------------------------------------|-------------------|------------------|-----------------------|
| Section                                                      | Test Item         | Limit            | Frequency Range (MHz) |
| CFR 47 FCC 15.247(b)(3)<br>ISED RSS-247 5.4 (d)              | Peak Output Power | 1 watt or 30 dBm | 2400-2483.5           |

### 10.3. Test Procedure

Place the EUT on the table and set it in the transmitting mode.

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.

Measure peak power each channel.

Peak Detector use for Peak result.

AVG Detector use for AVG result.

### 10.4. Results

| Test Mode | Ant.  | Freq. (MHz) | Peak Power (dBm) | Conducted Limit (dBm) | EIRP (dBm) | EIRP Limit (dBm) | Verdict |
|-----------|-------|-------------|------------------|-----------------------|------------|------------------|---------|
| 11B       | Ant1  | 2412        | 14.71            | ≤30.00                | 18.57      | ≤36.00           | PASS    |
|           | Ant2  | 2412        | 14.30            | ≤30.00                | 18.16      | ≤36.00           | PASS    |
|           | Ant1  | 2437        | 15.00            | ≤30.00                | 18.86      | ≤36.00           | PASS    |
|           | Ant2  | 2437        | 13.74            | ≤30.00                | 17.60      | ≤36.00           | PASS    |
|           | Ant1  | 2462        | 14.54            | ≤30.00                | 18.40      | ≤36.00           | PASS    |
|           | Ant2  | 2462        | 14.17            | ≤30.00                | 18.03      | ≤36.00           | PASS    |
| 11G       | Ant1  | 2412        | 15.52            | ≤30.00                | 19.38      | ≤36.00           | PASS    |
|           | Ant2  | 2412        | 14.74            | ≤30.00                | 18.60      | ≤36.00           | PASS    |
|           | Ant1  | 2437        | 15.42            | ≤30.00                | 19.28      | ≤36.00           | PASS    |
|           | Ant2  | 2437        | 14.63            | ≤30.00                | 18.49      | ≤36.00           | PASS    |
|           | Ant1  | 2462        | 15.57            | ≤30.00                | 19.43      | ≤36.00           | PASS    |
|           | Ant2  | 2462        | 14.82            | ≤30.00                | 18.68      | ≤36.00           | PASS    |
| 11N20MIMO | Ant1  | 2412        | 12.93            | ≤30.00                | 16.79      | ≤36.00           | PASS    |
|           | Ant2  | 2412        | 11.98            | ≤30.00                | 15.84      | ≤36.00           | PASS    |
|           | total | 2412        | 15.49            | ≤30.00                | 19.35      | ≤36.00           | PASS    |
|           | Ant1  | 2437        | 13.24            | ≤30.00                | 17.10      | ≤36.00           | PASS    |
|           | Ant2  | 2437        | 12.39            | ≤30.00                | 16.25      | ≤36.00           | PASS    |
|           | total | 2437        | 15.85            | ≤30.00                | 19.71      | ≤36.00           | PASS    |
|           | Ant1  | 2462        | 9.85             | ≤30.00                | 13.71      | ≤36.00           | PASS    |
|           | Ant2  | 2462        | 13.11            | ≤30.00                | 16.97      | ≤36.00           | PASS    |
|           | total | 2462        | 14.79            | ≤30.00                | 18.65      | ≤36.00           | PASS    |
| 11N40MIMO | Ant1  | 2422        | 12.49            | ≤30.00                | 16.35      | ≤36.00           | PASS    |
|           | Ant2  | 2422        | 11.42            | ≤30.00                | 15.28      | ≤36.00           | PASS    |
|           | total | 2422        | 15.00            | ≤30.00                | 18.86      | ≤36.00           | PASS    |
|           | Ant1  | 2437        | 12.03            | ≤30.00                | 15.89      | ≤36.00           | PASS    |
|           | Ant2  | 2437        | 11.18            | ≤30.00                | 15.04      | ≤36.00           | PASS    |
|           | total | 2437        | 14.64            | ≤30.00                | 18.50      | ≤36.00           | PASS    |
|           | Ant1  | 2452        | 9.71             | ≤30.00                | 13.57      | ≤36.00           | PASS    |

|            |       |       |        |        |        |        |      |
|------------|-------|-------|--------|--------|--------|--------|------|
|            | Ant2  | 2452  | 12.27  | ≤30.00 | 16.13  | ≤36.00 | PASS |
|            | total | 2452  | 14.19  | ≤30.00 | 18.05  | ≤36.00 | PASS |
| 11AX20MIMO | Ant1  | 2412  | 12.53  | ≤30.00 | 16.39  | ≤36.00 | PASS |
|            | Ant2  | 2412  | 12.44  | ≤30.00 | 16.30  | ≤36.00 | PASS |
|            | total | 2412  | 15.50  | ≤30.00 | 19.36  | ≤36.00 | PASS |
|            | Ant1  | 2437  | 11.39  | ≤30.00 | 15.25  | ≤36.00 | PASS |
|            | Ant2  | 2437  | 12.41  | ≤30.00 | 16.27  | ≤36.00 | PASS |
|            | total | 2437  | 14.94  | ≤30.00 | 18.80  | ≤36.00 | PASS |
|            | Ant1  | 2462  | 12.68  | ≤30.00 | 16.54  | ≤36.00 | PASS |
|            | Ant2  | 2462  | 12.62  | ≤30.00 | 16.48  | ≤36.00 | PASS |
|            | total | 2462  | 15.66  | ≤30.00 | 19.52  | ≤36.00 | PASS |
| 11AX40MIMO | Ant1  | 2422  | 12.24  | ≤30.00 | 16.10  | ≤36.00 | PASS |
|            | Ant2  | 2422  | 12.03  | ≤30.00 | 15.89  | ≤36.00 | PASS |
|            | total | 2422  | 15.15  | ≤30.00 | 19.01  | ≤36.00 | PASS |
|            | Ant1  | 2437  | 12.79  | ≤30.00 | 16.65  | ≤36.00 | PASS |
|            | Ant2  | 2437  | 11.95  | ≤30.00 | 15.81  | ≤36.00 | PASS |
|            | total | 2437  | 15.40  | ≤30.00 | 19.26  | ≤36.00 | PASS |
|            | Ant1  | 2452  | 12.96  | ≤30.00 | 16.82  | ≤36.00 | PASS |
|            | Ant2  | 2452  | 12.22  | ≤30.00 | 16.08  | ≤36.00 | PASS |
| total      | 2452  | 15.62 | ≤30.00 | 19.48  | ≤36.00 | PASS   |      |