

## DATA REFERENCE REPORT

### FCC PART 15.407 / ISSED RSS-248 UNII 802.11ax OFDMA WIFI 6E

**Applicant Name:**

Apple Inc.  
One Apple Park Way  
Cupertino, CA 95014  
United States

**Date of Testing:**

5/30/2022 - 9/16/2022

**Test Site/Location:**

Element Washington DC LLC, Morgan Hill, CA, USA

**Test Report Serial No.:**

1C2205090026-21.BCG

**FCC ID:**

BCGA2761

**IC:**

579C-A2761

**APPLICANT:**

Apple Inc.

**Reference Model/HVIN:**

A2435

**Variant Model/HVIN:**

A2761(A2762)

**EUT Type:**

Tablet Device

**Frequency Range:**

5955 – 7125MHz

**Modulation Type:**

OFDMA

**FCC Classification:**

15E 6GHz Low Power Indoor Client (6XD)

**FCC Rule Part(s):**

Part 15 Subpart E (15.407)

**ISSED Specification:**

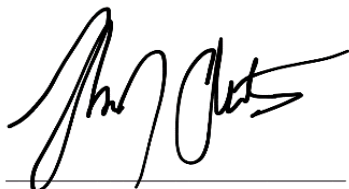
RSS-248 Issue 1

**Test Procedure(s):**

ANSI C63.10-2013, KDB 789033 D02 v02r01  
KDB 662911 D01 v02r01, KDB 987594 D02 v01r01  
KDB 987594 D04 v01

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013 and KDB 789033 D02 v02r01. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



RJ Ortanez  
Executive Vice President



|                                         |                                                                                     |                                          |                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|
| FCC ID: BCGA2761<br>IC: 579C-A2761      |  | DATA REFERENCE REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090026-21.BCG | Test Dates:<br>5/30/2022 - 9/16/2022                                                | EUT Type:<br>Tablet Device               | Page 1 of 21                      |

## TABLE OF CONTENTS

|     |                                               |    |
|-----|-----------------------------------------------|----|
| 1.0 | INTRODUCTION .....                            | 3  |
| 1.1 | Scope .....                                   | 3  |
| 1.2 | Element Washington DC LLC Test Location ..... | 3  |
| 1.3 | Test Facility / Accreditations .....          | 3  |
| 2.0 | PRODUCT INFORMATION.....                      | 4  |
| 2.1 | Equipment Description .....                   | 4  |
| 2.2 | Device Capabilities .....                     | 4  |
| 2.3 | Antenna Description .....                     | 7  |
| 2.4 | Test Support Equipment.....                   | 8  |
| 2.5 | Test Configuration .....                      | 8  |
| 2.6 | Software and Firmware .....                   | 9  |
| 2.7 | EMI Suppression Device(s)/Modifications ..... | 9  |
| 3.0 | DESCRIPTION OF TESTS .....                    | 10 |
| 3.1 | Evaluation Procedure .....                    | 10 |
| 3.2 | Radiated Emissions.....                       | 10 |
| 3.3 | Environmental Conditions.....                 | 11 |
| 4.0 | ANTENNA REQUIREMENTS .....                    | 12 |
| 5.0 | MEASUREMENT UNCERTAINTY .....                 | 13 |
| 6.0 | TEST EQUIPMENT CALIBRATION DATA .....         | 14 |
| 7.0 | TEST RESULTS (SPOT-CHECK DATA) .....          | 15 |
| 7.1 | Summary .....                                 | 15 |
| 7.2 | Radiated Spurious Emissions.....              | 16 |
| 8.0 | CONCLUSION.....                               | 20 |
| 9.0 | APPENDIX A: REFERENCE MODEL TEST REPORT.....  | 21 |

|                                                  |                                                                                     |                                                  |                                          |
|--------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------|
| <b>FCC ID:</b> BCGA2761<br><b>IC:</b> 579C-A2761 |  | <b>DATA REFERENCE REPORT<br/>(CERTIFICATION)</b> | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1C2205090026-21.BCG   | <b>Test Dates:</b><br>5/30/2022 - 9/16/2022                                         | <b>EUT Type:</b><br>Tablet Device                | Page 2 of 21                             |

## 1.0 INTRODUCTION

### 1.1 Scope

Per manufacturer declaration, there are two tablet device models, A2435 and A2761(A2762), with high degree of similarity, reference model FCC ID: BCGA2435 / IC: 579C-A2435 and variant model **FCC ID: BCGA2761 / IC: 579C-A2761**. The reference models support mmWave operations, while the variant models have the mmWave components/antennas removed. Both models share the same material, form factor, circuit design, and components, including antennas and their locations. The reference and variant models use the same power tables and have same tune-up tolerances.

Per FCC/ISED approved Data Referencing Test Plan, testing was done fully on the reference model FCC ID: BCGA2435 / IC: 579C-A2435, while radiated and conducted spot-check verification has been performed on variant model **FCC ID: BCGA2761 / IC: 579C-A2761**. Spot-check measurements were conducted, all measurements were investigated and found to be within acceptable tolerance.

| Equipment Class | Reference Model<br>FCC ID & IC | Reference Report       | Report Title                    |
|-----------------|--------------------------------|------------------------|---------------------------------|
| 6XD             | BCGA2435<br>579C-A2435         | 1C2205090025-22-R2.BCG | RF UNII 6E OFDMA<br>Test Report |

**Table 1-1. Reference Model Details**

Reference model FCC ID: BCGA2435 / IC: 579C-A2435 test report has been included in Appendix A.

### 1.2 Element Washington DC LLC Test Location

These measurement tests were conducted at the Element Washington DC LLC facility located at 18855 Adams Court, Morgan Hill, CA 95037. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014 and KDB 414788 D01 v01r01.

### 1.3 Test Facility / Accreditations

**Measurements were performed at Element Washington DC LLC located in Morgan Hill, CA 95037, U.S.A.**

- Element Washington DC LLC is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.02 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- Element Washington DC LLC TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- Element Washington DC LLC facility is a registered (22831) test laboratory with the site description on file with ISED.

|                                         |                                                                                     |                                          |                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|
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| Test Report S/N:<br>1C2205090026-21.BCG | Test Dates:<br>5/30/2022 - 9/16/2022                                                | EUT Type:<br>Tablet Device               | Page 3 of 21                      |

## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Apple Tablet Device FCC ID: BCGA2761** and **IC: 579C-A2761**.

**Test Device Serial No.:** DLX2254004Z21NF15, W7NCJD7FYQ, X3JD904MC6

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (FR1), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII, 802.11a/ax WIFI 6E, Bluetooth (1x, EDR, LE1M, LE2M, HDR4, HDR8), WPT, NB UNII (1x, HDR4, HDR8)

This device supports BT Beamforming

| Band 5 |                 | Band 6 |                 | Band 7 |                 | Band 8 |                 |
|--------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|
| Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) |
| 1      | 5955            | 97     | 6435            | 117    | 6535            | 189    | 6895            |
| :      | :               | :      | :               | :      | :               | :      | :               |
| 45     | 6175            | 105    | 6475            | 149    | 6695            | 209    | 6995            |
| :      | :               | :      | :               | :      | :               | :      | :               |
| 93     | 6415            | 113    | 6515            | 185    | 6875            | 229    | 7095            |

Table 2-1. 802.11a / 802.11ax (20MHz) Frequency / Channel Operations

| Band 5 |                 | Band 6 |                 | Band 7 |                 | Band 8 |                 |
|--------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|
| Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) |
| 3      | 5965            | 99     | 6445            | 123    | 6565            | 187    | 6885            |
| :      | :               | :      | :               | :      | :               | :      | :               |
| 43     | 6165            | 107    | 6485            | 155    | 6725            | 211    | 7005            |
| :      | :               | :      | :               | :      | :               | :      | :               |
| 91     | 6405            | 115    | 6525            | 179    | 6845            | 227    | 7085            |

Table 2-2. 802.11ax (40MHz BW) Frequency / Channel Operations

| Band 5 |                 | Band 6 |                 | Band 7 |                 | Band 8 |                 |
|--------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|
| Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) |
| 7      | 5985            | 103    | 6465            | 119    | 6545            | 199    | 6945            |
| :      | :               |        |                 | :      | :               | :      | :               |
| 39     | 6145            |        |                 | 151    | 6705            | 215    | 7025            |
| :      | :               |        |                 | :      | :               |        |                 |
| 87     | 6385            |        |                 | 183    | 6865            |        |                 |

Table 2-3. 802.11ax (80MHz BW) Frequency / Channel Operations

|                                         |                                                                                                                                     |                            |                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|
| FCC ID: BCGA2761<br>IC: 579C-A2761      |  <b>DATA REFERENCE REPORT</b><br>(CERTIFICATION) |                            | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090026-21.BCG | Test Dates:<br>5/30/2022 - 9/16/2022                                                                                                | EUT Type:<br>Tablet Device | Page 4 of 21                      |

| Band 5 |                 | Band 6 |                 | Band 7 |                 | Band 8 |                 |
|--------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|
| Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) |
| 15     | 6025            | 111    | 6505            | 143    | 6665            | 207    | 6985            |
| :      | :               |        |                 | :      | :               |        |                 |
| 47     | 6185            |        |                 | 175    | 6825            |        |                 |
| :      | :               |        |                 |        |                 |        |                 |
| 79     | 6345            |        |                 |        |                 |        |                 |

**Table 2-4. 802.11ax (160MHz BW) Frequency / Channel Operations**

**Notes:**

- 6GHz NII operation is possible in 20MHz, and 40MHz, 80MHz and 160MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section B)2)b) KDB 789033 D02 v02r01 and ANSI C63.10-2013. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

| 802.11 Mode / Band |                        | Duty Cycle [%] |            |      |
|--------------------|------------------------|----------------|------------|------|
|                    |                        | Antenna 5b     | Antenna 4a | SDM  |
| 6GHz               | 11ax(RU26) (20MHz)     | 84.2           | 87.7       | 87.7 |
|                    | 11ax(RU242) (20MHz)    | 95.4           | 96.1       | 96.1 |
|                    | 11ax(RU26) (40MHz)     | 89.5           | 89.6       | 89.3 |
|                    | 11ax(RU484) (40MHz)    | 91.7           | 92.9       | 93.1 |
|                    | 11ax(RU26) (80MHz)     | 89.2           | 89.0       | 89.3 |
|                    | 11ax(RU996) (80MHz)    | 86.8           | 88.4       | 88.4 |
|                    | 11ax(RU26) (160MHz)    | 89.0           | 88.6       | 89.2 |
|                    | 11ax(RU996x2) (160MHz) | 83.5           | 83.7       | 83.1 |

**Table 2-5. Measured Duty Cycles**

- The device employs MIMO technology. Below are the possible configurations.

| WiFi Configurations |                   | SISO       |            | CDD        |            | SDM        |            | STBC       |            |
|---------------------|-------------------|------------|------------|------------|------------|------------|------------|------------|------------|
|                     |                   | Antenna 5b | Antenna 4a | Antenna 5b | Antenna 4a | Antenna 5b | Antenna 4a | Antenna 5b | Antenna 4a |
| 6GHz                | 11ax(RU) (20MHz)  | ✓          | ✓          | ✓          | ✓          | ✓          | ✓          | ✗          | ✗          |
|                     | 11ax(RU) (40MHz)  | ✓          | ✓          | ✓          | ✓          | ✓          | ✓          | ✗          | ✗          |
|                     | 11ax(RU) (80MHz)  | ✓          | ✓          | ✓          | ✓          | ✓          | ✓          | ✗          | ✗          |
|                     | 11ax(RU) (160MHz) | ✓          | ✓          | ✓          | ✓          | ✓          | ✓          | ✗          | ✗          |

**Table 2-6. WIFI Configurations**

✓ = Support ; ✗ = NOT Support

**SISO** = Single Input Single Output

**SDM** = Spatial Diversity Multiplexing – MIMO function

**CDD** = Cyclic Delay Diversity - 2Tx Function

**STBC** = Space-Time Block Coding – 2Tx Function

|                                         |                                                                                                                                     |                            |                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|
| FCC ID: BCGA2761<br>IC: 579C-A2761      |  <b>DATA REFERENCE REPORT</b><br>(CERTIFICATION) |                            | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090026-21.BCG | Test Dates:<br>5/30/2022 - 9/16/2022                                                                                                | EUT Type:<br>Tablet Device | Page 5 of 21                      |

Data Rate(s) Tested: 8/8.6, 16/17.2, 24/25.8, 33/34.4, 49/51.6, 65/68.8, 73/77.4, 81/86.0, 98/103.2, 108/114.7, 122/129.0, 135/143.4 (ax – 20MHz)  
 16/17.2, 33/34.4, 49/51.6, 65/68.8, 98/103.2, 130/137.6, 146/154.9, 163/172.1, 195/206.5, 217/229.4, 244/258.1, 271/286.8 (ax – 40MHz BW)  
 34/36.0, 68/72.1, 102/108.1, 136/144.1, 204/216.2, 272/288.2, 306/324.4, 340/360.3, 408/432.4, 453/480.4, 510/540.4, 567/600.5 (ax – 80MHz BW)  
 34/36, 68.1/72.1, 102.1/108.1, 136.1/144.1, 204.2/216.2, 272.2/288.2, 306.3/324.3, 340.3/360.3, 408.3/432.4, 453.7/480.4, 510.4/540.4, 567.1/600.5 (ax – 160MHz BW)  
 16.3/17.2, 32.5/34.4, 48.8/51.6, 65/68.8, 97.5/103.2, 130/137.6, 146.3/154.9, 162.5/172.1, 195/206.5, 216.7/229.4, 243.8/258.1, 270.8/286.8 (ax – 20MHz MIMO)  
 32.5/34.4, 65/68.8, 97.5/103.2, 130/137.6, 195/206.5, 260/275.3, 292.5/309.7, 325/344.1, 390/412.9, 433.3/458.8, 487.5/516.2, 541.7/573.5 (ax – 40MHz MIMO)  
 68.1/72.1, 136.1/144.1, 204.2/216.2, 272.2/288.2, 408.3/432.4, 544.4/576.5, 612.5/648.5, 680.6/720.6, 816.7/864.7, 907.4/960.8, 1020.8/1080.9, 1134.3/1201 (ax – 80/160MHz MIMO)  
 136.2/144.2, 272.2/288.2, 408.4/432.4, 544.4/576.4, 816.6/864.8, 1088.8/1153, 1225/1297, 1361.2/1441.2, 1633.4/1729.4, 1814.8/1921.6, 2041.6/2161.8, 2268.6/2402 (ax – 160MHz MIMO)

3. This device supports simultaneous transmission operations, which allows for multiple transmitters to transmit simultaneously on the same antenna. The table below shows all configurations possible.

| Antenna | Simultaneous Tx Config | WiFi 2.4GHz     | Bluetooth                | NB UNII     | WiFi 5GHz        | WiFi 6GHz   | LTE / FR1 NR    |
|---------|------------------------|-----------------|--------------------------|-------------|------------------|-------------|-----------------|
|         |                        | 802.11 b/g/n/ax | BDR, EDR, HDR4/8, LE1/2M | BDR, HDR4/8 | 802.11 a/n/ac/ax | 802.11 a/ax | Ultra High Band |
| 2a      | Config 1               | ✓               | ✗                        | ✗           | ✗                | ✗           | ✓               |
| 2a      | Config 2               | ✗               | ✓                        | ✗           | ✗                | ✗           | ✓               |
| 4a      | Config 3               | ✓               | ✗                        | ✓           | ✗                | ✗           | ✗               |
| 4a      | Config 4               | ✗               | ✓                        | ✗           | ✓                | ✗           | ✗               |

**Table 2-7. Simultaneous Transmission Configurations**

✓ = Support; ✗ = Not Support

4. All the above simultaneous transmission configurations have been tested and the worst-case configuration was found to be Config 2 and reported in Bluetooth and Part 96 RF test reports.
5. Wi-Fi 2.4GHz and Bluetooth 2.4 GHz can transmit simultaneously on separate antennas. For BT (2.4 GHz) in connected mode and Wi-Fi (2.4 GHz) – Wi-Fi max power will not exceed minimum of (13.5dBm, SAR max cap, Reg max cap) power. For BT (2.4 GHz) in disconnected mode and Wi-Fi (2.4 GHz) – BT will be using iPA only and Wi-Fi max power will not exceed minimum of (SAR max cap, Reg max cap) power.

|                                         |                                                                                                                                      |                            |                                   |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|
| FCC ID: BCGA2761<br>IC: 579C-A2761      |  <b>DATA REFERENCE REPORT<br/>(CERTIFICATION)</b> |                            | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090026-21.BCG | Test Dates:<br>5/30/2022 - 9/16/2022                                                                                                 | EUT Type:<br>Tablet Device | Page 6 of 21                      |

## 2.3 Antenna Description

Following antenna gains were provided by the manufacturer.

| Frequency (MHz) | Antenna Gain (dBi) |     |            |      |
|-----------------|--------------------|-----|------------|------|
|                 | Antenna 5b         |     | Antenna 4a |      |
|                 | H                  | V   | H          | V    |
| 5955            | 4.2                | 2.4 | -4.0       | -0.7 |
| 6075            | 3.9                | 1.9 | -3.7       | -0.9 |
| 6110            | 3.9                | 1.5 | -3.7       | -0.9 |
| 6135            | 3.9                | 1.5 | -2.3       | -0.6 |
| 6185            | 3.9                | 1.5 | -2.3       | -0.6 |
| 6215            | 3.9                | 1.5 | -2.3       | -0.6 |
| 6255            | 4.1                | 1.9 | -1.1       | 0.6  |
| 6260            | 4.2                | 1.8 | -1.1       | 0.6  |
| 6375            | 4.2                | 1.8 | -0.5       | 1.0  |
| 6430            | 4.2                | 1.8 | -0.5       | 1.0  |
| 6435            | 4.3                | 2.0 | -0.3       | 1.2  |
| 6455            | 3.4                | 1.4 | -0.7       | -0.3 |
| 6505            | 3.4                | 1.4 | -0.7       | -0.3 |
| 6555            | 3.4                | 1.4 | -0.7       | -0.3 |
| 6580            | 3.4                | 1.4 | -1.9       | -1.6 |
| 6590            | 3.4                | 1.4 | -1.9       | -1.6 |
| 6665            | 3.4                | 1.4 | -1.9       | -1.6 |
| 6675            | 4.2                | 2.8 | -1.9       | -1.6 |
| 6695            | 4.2                | 2.8 | -1.9       | -1.6 |
| 6735            | 4.1                | 3.3 | -1.9       | -1.5 |
| 6740            | 4.7                | 2.4 | -2.4       | -2.7 |
| 6855            | 4.7                | 2.4 | -2.4       | -2.7 |
| 6910            | 4.2                | 2.0 | -3.3       | -4.8 |
| 6935            | 4.2                | 2.0 | -3.3       | -4.8 |
| 6975            | 4.2                | 2.0 | -3.3       | -4.8 |
| 6985            | 4.2                | 2.0 | -4.9       | -5.9 |
| 7035            | 4.1                | 2.4 | -4.9       | -5.9 |
| 7060            | 4.1                | 2.4 | -4.9       | -6.2 |
| 7115            | 4.1                | 3.0 | -4.9       | -6.2 |

**Table 2-8. Highest Antenna Gain**

Some antenna gains in the table were chosen from the worst between two frequencies as confirmed by manufacturer

|                                         |                                                                                                                                      |                            |                                   |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|
| FCC ID: BCGA2761<br>IC: 579C-A2761      |  <b>DATA REFERENCE REPORT<br/>(CERTIFICATION)</b> |                            | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090026-21.BCG | Test Dates:<br>5/30/2022 - 9/16/2022                                                                                                 | EUT Type:<br>Tablet Device | Page 7 of 21                      |

## 2.4 Test Support Equipment

|   |                   |                 |                   |
|---|-------------------|-----------------|-------------------|
| 1 | Apple MacBook Pro | Model: A2141    | S/N: C02DV7VKMD6T |
|   | w/AC/DC Adapter   | Model: A2166    | S/N: N/A          |
| 2 | Apple USB-C Cable | Model: Spartan  | S/N: 000MKTR02U   |
| 3 | USB-C Cable       | Model: A246     | S/N: N/A          |
|   | w/ AC Adapter     | Model: A2305    | S/N: N/A          |
| 4 | Apple Pencil      | Model: N/A      | S/N: GQXGSXBJKM9  |
| 5 | DC Power Supply   | Model: KPS3010D | S/N: N/A          |
| 6 | Netgear Nighthawk | Model : RAXE450 | S/N: 6JX215GA10A5 |

Table 2-9. Test Support Equipment List

## 2.5 Test Configuration

The EUT was tested per the guidance of ANSI C63.10-2013, KDB 789033 D02 v02r01 and KDB 987594 D02 v01r01. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions. See Section 3.2 for radiated emissions test setups.

There are two vendors of the WiFi/Bluetooth radio modules, variant 1 and variant 2. Both radio modules have the same mechanical outline, same on-board antenna matching circuit, identical antenna structure, and are built and tested to conform to the same specifications and to operate within the same tolerances. The worst case configuration was found between the two variants. The EUT was also investigated with and without charger.

For emissions from 1GHz – 18GHz, low, mid, and high channels were tested with highest power and worst case configuration. The emissions below 1GHz and above 18GHz were tested with the highest transmitting power and the worst case channel.

The EUT was manipulated through three orthogonal planes of X-orientation (flatbed), Y-orientation (landscape), and Z-orientation (portrait) during the testing. Only the worst case emissions were reported in this test report.

Per FCC/ISED Approved Data Referencing Test Plan, spot-check measurements have been conducted and reported. Spot-Check Test Plan can be referred to below Table 2-10.

| Technology            | Test Case                   | FCC ID: BCGA2761<br>IC: 579C-A2761                           |         |
|-----------------------|-----------------------------|--------------------------------------------------------------|---------|
|                       |                             | Mode                                                         | Channel |
| WiFi 6E<br>(802.11ax) | Radiated Spurious Emissions | MIMO Max Power<br>WiFi 6E (UNII 5/6/7/8): 11ax<br>20MHz RU26 | M       |

Table 2-10. FCC/ISED Approved Spot-Check Test Plan

Output powers were measured and confirmed to be consistent between Reference and Variant models prior to testing.

|                                         |                                                                                     |                                          |                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|
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| Test Report S/N:<br>1C2205090026-21.BCG | Test Dates:<br>5/30/2022 - 9/16/2022                                                | EUT Type:<br>Tablet Device               | Page 8 of 21                      |





## 2.6 Software and Firmware

The test was conducted with firmware version 20A8359 installed on the EUT.

## 2.7 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

|                                                  |                                                                                     |                                                  |                                          |
|--------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------|
| <b>FCC ID:</b> BCGA2761<br><b>IC:</b> 579C-A2761 |  | <b>DATA REFERENCE REPORT<br/>(CERTIFICATION)</b> | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1C2205090026-21.BCG   | <b>Test Dates:</b><br>5/30/2022 - 9/16/2022                                         | <b>EUT Type:</b><br>Tablet Device                | Page 9 of 21                             |

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V 1.0 03/13/2021

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## 3.0 DESCRIPTION OF TESTS

### 3.1 Evaluation Procedure

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) and the guidance provided in KDB 789033 D02 v02r01 were used in the measurement of the EUT.

**Deviation from measurement procedure.....None**

### 3.2 Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. An 80cm tall test table made of Styrodur is placed on top of the turn table. For measurements above 1GHz, an additional Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

Per KDB 414788, radiated emission test sites other than open-field test sites (e.g., shielded anechoic chambers), may be employed for emission measurements below 30MHz if characterized so that the measurements correspond to those obtained at an open-field test site. To determine test site equivalency, a reference sample transmitting at 149kHz was measured on an open field test site (asphalt with no ground plane) and then measured in the 3m semi-anechoic chamber. A calibrated 60cm loop antenna was rotated about its vertical axis while the reference device was rotated through the X, Y and Z axis in order to capture the worst case level. A maximum deviation of 2.77dB at 149kHz was measured when comparing the 3 meter semi-anechoic chamber to the open field site.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33 depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions.

|                                         |                                                                                     |                                          |                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|
| FCC ID: BCGA2761<br>IC: 579C-A2761      |  | DATA REFERENCE REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090026-21.BCG | Test Dates:<br>5/30/2022 - 9/16/2022                                                | EUT Type:<br>Tablet Device               | Page 10 of 21                     |

### 3.3 Environmental Conditions

The temperature is controlled within range of 15°C to 35°C. The relative humidity is controlled within range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

|                                                  |                                                                                     |                                                 |                                          |
|--------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------|------------------------------------------|
| <b>FCC ID:</b> BCGA2761<br><b>IC:</b> 579C-A2761 |  | <b>DATA REFERENCE REPORT</b><br>(CERTIFICATION) | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1C2205090026-21.BCG   | <b>Test Dates:</b><br>5/30/2022 - 9/16/2022                                         | <b>EUT Type:</b><br>Tablet Device               | Page 11 of 21                            |

## 4.0 ANTENNA REQUIREMENTS

### Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- The antenna(s) of the EUT are **permanently attached**.
- There are no provisions for connection to an external antenna.

### Conclusion:

The EUT complies with the requirement of §15.203.

|                                                  |                                                                                     |                                                  |                                          |
|--------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------|
| <b>FCC ID:</b> BCGA2761<br><b>IC:</b> 579C-A2761 |  | <b>DATA REFERENCE REPORT<br/>(CERTIFICATION)</b> | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1C2205090026-21.BCG   | <b>Test Dates:</b><br>5/30/2022 - 9/16/2022                                         | <b>EUT Type:</b><br>Tablet Device                | Page 12 of 21                            |

## 5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.23-2012. All measurement uncertainty values are shown with a coverage factor of  $k = 2$  to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the  $U_{\text{CISPR}}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

| Contribution                        | Expanded Uncertainty ( $\pm$ dB) |
|-------------------------------------|----------------------------------|
| Radiated Disturbance (<30MHz)       | 4.38                             |
| Radiated Disturbance (30MHz - 1GHz) | 4.75                             |
| Radiated Disturbance (1 - 18GHz)    | 5.20                             |
| Radiated Disturbance (>18GHz)       | 4.72                             |

|                                         |                                                                                     |                                          |                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|
| FCC ID: BCGA2761<br>IC: 579C-A2761      |  | DATA REFERENCE REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090026-21.BCG | Test Dates:<br>5/30/2022 - 9/16/2022                                                | EUT Type:<br>Tablet Device               | Page 13 of 21                     |

## 6.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurement antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

| Manufacturer          | Model       | Description                                 | Cal Date   | Cal Interval | Cal Due    | Serial Number |
|-----------------------|-------------|---------------------------------------------|------------|--------------|------------|---------------|
| Agilent Technologies  | N9030A      | 3Hz-44GHz PXA Signal Analyzer               | 6/10/2022  | Annual       | 6/10/2023  | MY49430244    |
| Agilent Technologies  | N9020A      | MXA Signal Analyzer                         | 4/26/2022  | Annual       | 4/26/2023  | MY56470202    |
| Anritsu               | ML2496A     | Power Meter                                 | 11/29/2021 | Annual       | 11/29/2022 | 1840005       |
| Anritsu               | MA2411B     | Pulse Power Sensor                          | 11/30/2021 | Annual       | 11/30/2022 | 1726261       |
| Anritsu               | MA2411B     | Pulse Power Sensor                          | 11/30/2021 | Annual       | 11/30/2022 | 1726262       |
| ATM                   | 180-442A-KF | 20dB Nominal Gain Horn Antenna              | 1/19/2022  | Annual       | 1/19/2023  | T058701-02    |
| Com-Power Corporation | LIN-120A    | Line Impedance Stabilization Network (LISN) | 3/7/2022   | Annual       | 3/7/2023   | 241296        |
| ETS-Lindgren          | 3142E       | Biconilog Antenna (26-6000MHz)              | 10/21/2021 | Annual       | 10/21/2022 | 208204        |
| ETS-Lindgren          | 3117        | Double Ridged Guide Horn Antenna (1-18GHz)  | 10/25/2021 | Annual       | 10/25/2022 | 227597        |
| Keysight Technology   | N9040B      | UXA Signal Analyzer                         | 2/8/2022   | Annual       | 2/8/2023   | MY57212015    |
| Rohde & Schwarz       | TS-PR8      | Pre-Amplifier (30MHz-6GHz)                  | 1/6/2022   | Annual       | 1/6/2023   | 102328        |
| Rohde & Schwarz       | ESW26       | EMI Test Receiver                           | 5/19/2022  | Annual       | 5/19/2023  | 101299        |
| Rohde & Schwarz       | ESW44       | EMI Test Receiver                           | 12/2/2021  | Annual       | 12/2/2022  | 101570        |
| Rohde & Schwarz       | FSV40       | Signal Analyzer (10Hz-40GHz)                | 3/4/2022   | Annual       | 3/4/2023   | 101619        |
| Rohde & Schwarz       | FSVA3044    | Signal Analyzer (up to 44 GHz)              | 5/12/2022  | Annual       | 5/12/2023  | 101098        |
| Rohde & Schwarz       | HFH2-Z2     | Loop Antenna                                | 4/3/2022   | Annual       | 4/3/2023   | 100546        |
| Rohde & Schwarz       | SMB100A     | Signal Generator 100KHz-40GHz               | 1/10/2022  | Annual       | 1/10/2023  | 180080        |
| Rohde & Schwarz       | TC-TA18     | Cross-Polarized Antenna 400MHz-18GHz        | 1/25/2022  | Annual       | 1/25/2023  | 101063        |
| Rohde & Schwarz       | TS-PR18     | Pre-Amplifier (1GHz-18GHz)                  | 1/6/2022   | Annual       | 1/6/2023   | 101639        |
| Rohde & Schwarz       | TS-PR1840   | Pre-Amplifier (18GHz-40GHz)                 | 4/18/2022  | Annual       | 4/18/2023  | 100050        |

**Table 6-1. Test Equipment List**

### **Note:**

For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

|                                         |                                                                                     |                                          |                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|
| FCC ID: BCGA2761<br>IC: 579C-A2761      |  | DATA REFERENCE REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090026-21.BCG | Test Dates:<br>5/30/2022 - 9/16/2022                                                | EUT Type:<br>Tablet Device               | Page 14 of 21                     |

## 7.0 TEST RESULTS (SPOT-CHECK DATA)

### 7.1 Summary

Company Name: Apple Inc.  
 FCC ID: BCGA2761  
 IC: 579C-A2761  
 FCC Classification: 15E 6GHz Low Power Indoor Client (6XD)

| Technology          | Test Configurations               |         |                             | Reference Model                    |                  | Variant Model                      |                  | Delta     |              |
|---------------------|-----------------------------------|---------|-----------------------------|------------------------------------|------------------|------------------------------------|------------------|-----------|--------------|
|                     | Test Description                  | Channel | Measurement Frequency [MHz] | FCC ID: BCGA2435<br>IC: 579C-A2435 |                  | FCC ID: BCGA2761<br>IC: 579C-A2761 |                  |           |              |
|                     |                                   |         |                             | Peak [dBµV/m]                      | Average [dBµV/m] | Peak [dBµV/m]                      | Average [dBµV/m] | Peak [dB] | Average [dB] |
| WiFi 6E<br>802.11ax | Radiated<br>Spurious<br>Emissions | 45      | 12350                       | 52.46                              | 40.87            | 53.41                              | 41.90            | 0.95      | 1.03         |
|                     |                                   | 105     | 12950                       | -                                  | 41.57            | -                                  | 41.51            | -         | 0.06         |
|                     |                                   | 149     | 13390                       | 52.66                              | 41.18            | 52.43                              | 41.06            | 0.23      | 0.12         |
|                     |                                   | 209     | 13990                       | -                                  | 41.43            | -                                  | 41.41            | -         | 0.02         |

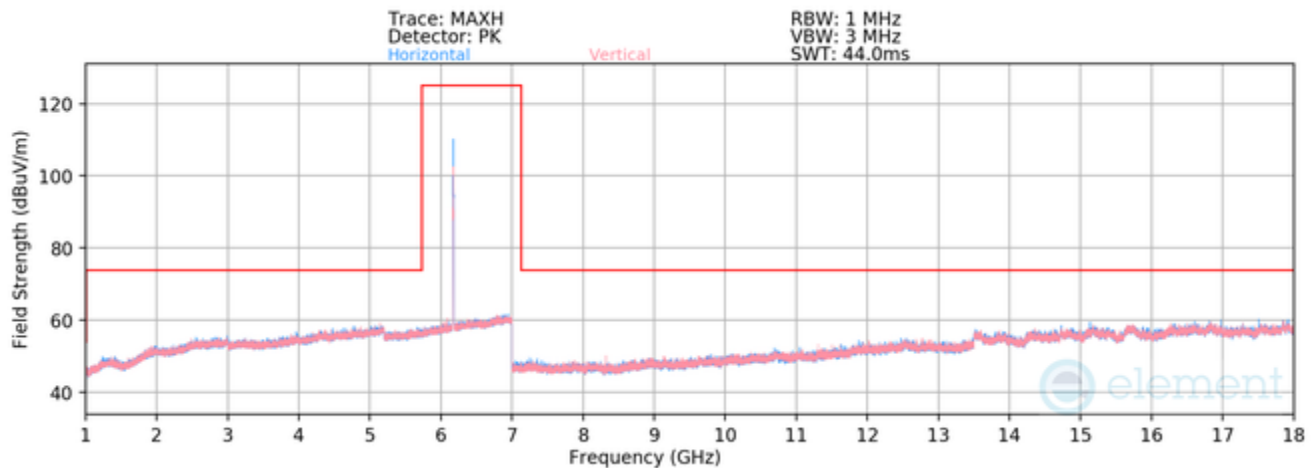
**Table 7-1. Worst Case Spot-check Results**

Spot-checks were conducted, all measurements were investigated and found to be within acceptable tolerance in accordance with FCC/ISED Approved Data Referencing Test Plan.

|                                         |                                                                                                                                      |                            |                                   |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|
| FCC ID: BCGA2761<br>IC: 579C-A2761      |  <b>DATA REFERENCE REPORT<br/>(CERTIFICATION)</b> |                            | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090026-21.BCG | Test Dates:<br>5/30/2022 - 9/16/2022                                                                                                 | EUT Type:<br>Tablet Device | Page 15 of 21                     |

## 7.2 Radiated Spurious Emissions

§15.407(b) §15.205 §15.209; RSS-Gen [8.9]



**Plot 7-1. Radiated Spurious Emissions above 1GHz SDM (802.11ax – Ch. 45 – RU26)**

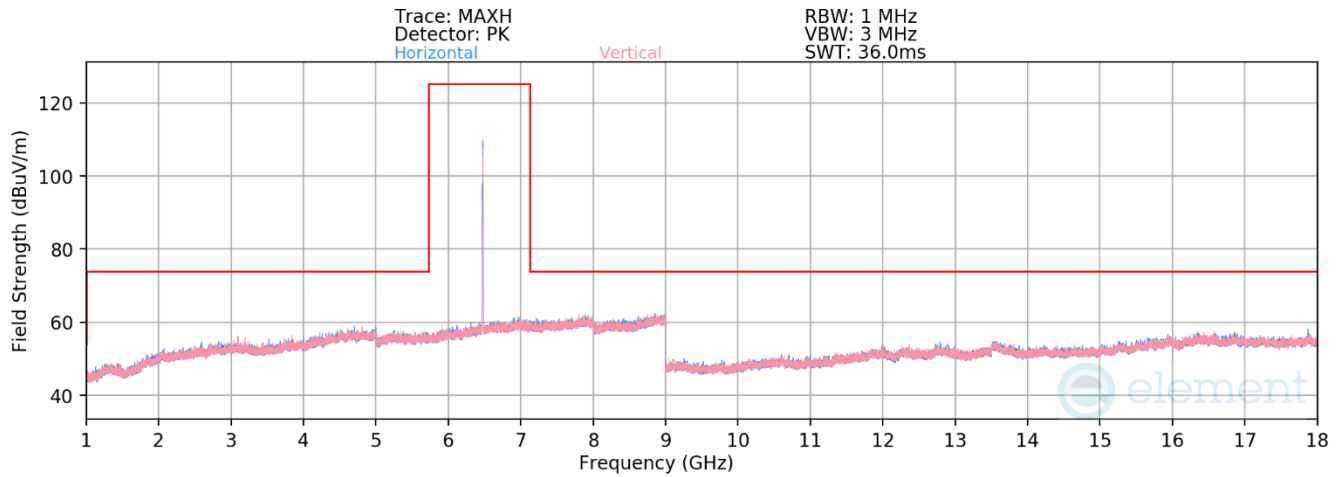
|                           |          |
|---------------------------|----------|
| Mode:                     | 802.11ax |
| Data Rate:                | MCS0     |
| Distance of Measurements: | 3 Meters |
| Operating Frequency:      | 6175MHz  |
| Channel:                  | 45       |

| Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBuV/m] | Limit [dBuV/m] | Margin [dB] |
|-----------------|----------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------|----------------|-------------|
| 12350.00        | Peak     | H               | -                   | -                          | -71.99               | 18.70       | 53.71                   | 73.98          | -20.27      |
| 12350.00        | Average  | H               | -                   | -                          | -83.80               | 18.70       | 41.90                   | 53.98          | -12.08      |

**Table 7-2. Radiated Spurious Emission Measurements SDM – RU26**

|                                         |                                                                                     |                                          |                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|
| FCC ID: BCGA2761<br>IC: 579C-A2761      |  | DATA REFERENCE REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090026-21.BCG | Test Dates:<br>5/30/2022 - 9/16/2022                                                | EUT Type:<br>Tablet Device               | Page 16 of 21                     |





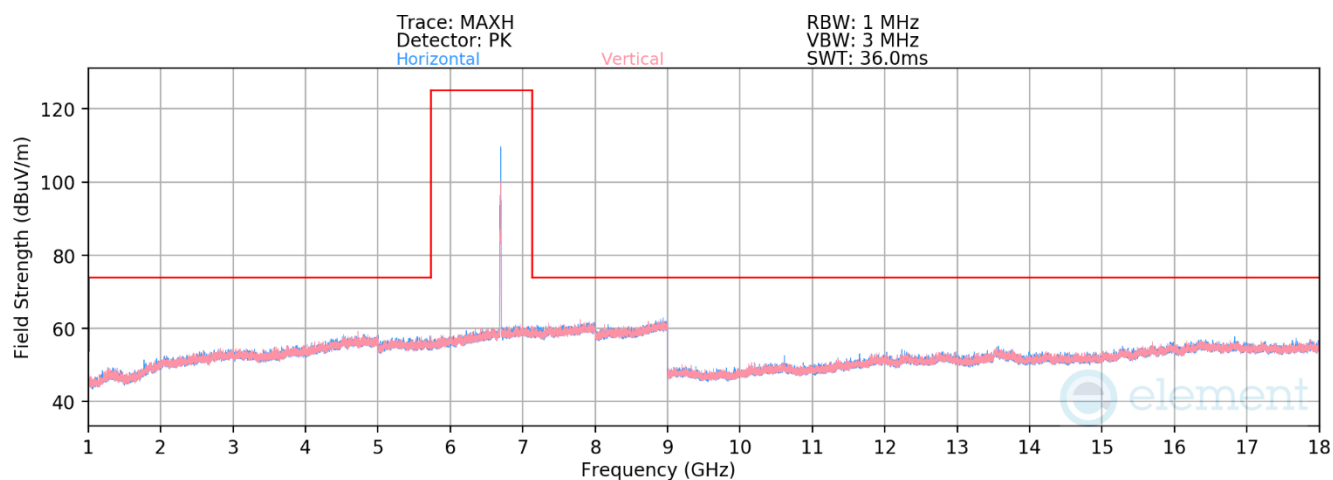
**Plot 7-2. Radiated Spurious Emissions above 1GHz SDM (802.11ax – Ch. 105 – RU26)**

Mode: 802.11ax  
Data Rate: MCS0  
Distance of Measurements: 3 Meters  
Operating Frequency: 6475MHz  
Channel: 105

| Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBuV/m] | Limit [dBuV/m] | Margin [dB] |
|-----------------|----------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------|----------------|-------------|
| 12950.00        | Average  | H               | -                   | -                          | -83.63               | 18.14       | 41.51                   | 68.20          | -26.69      |

**Table 7-3. Radiated Spurious Emission Measurements SDM – RU26**

|                                         |                                                                                     |                                          |                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|
| FCC ID: BCGA2761<br>IC: 579C-A2761      |  | DATA REFERENCE REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090026-21.BCG | Test Dates:<br>5/30/2022 - 9/16/2022                                                | EUT Type:<br>Tablet Device               | Page 17 of 21                     |



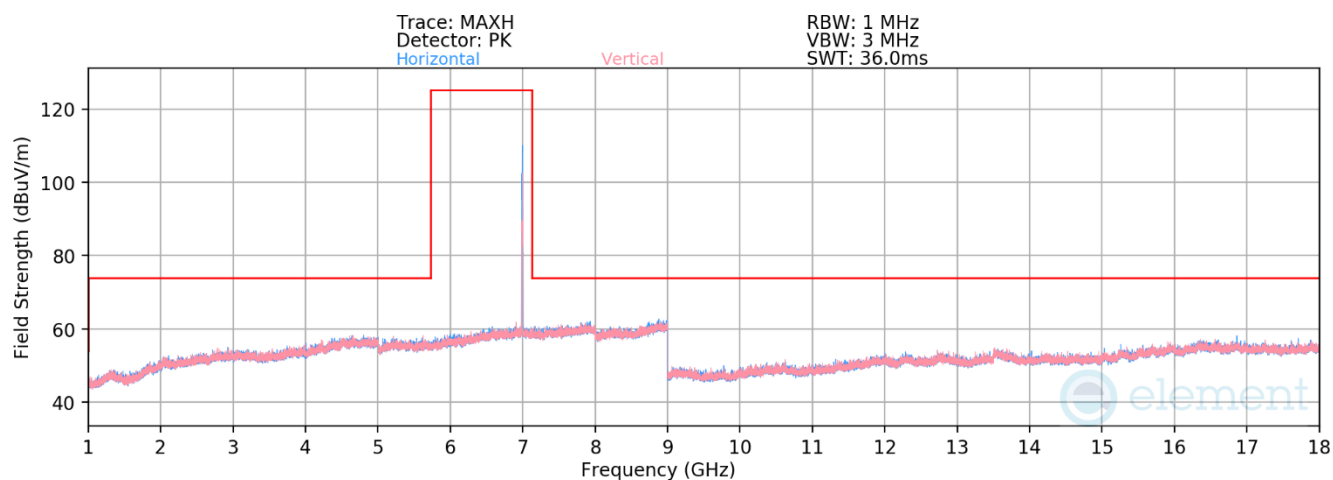
**Plot 7-3. Radiated Spurious Emissions above 1GHz SDM (802.11ax – Ch. 149 – RU26)**

Mode: 802.11ax  
Data Rate: MCS0  
Distance of Measurements: 3 Meters  
Operating Frequency: 6695MHz  
Channel: 149

| Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBμV/m] | Limit [dBμV/m] | Margin [dB] |
|-----------------|----------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------|----------------|-------------|
| 13390.00        | Peak     | H               | -                   | -                          | -72.69               | 18.12       | 52.43                   | 73.98          | -21.55      |
| 13390.00        | Average  | H               | -                   | -                          | -84.06               | 18.12       | 41.06                   | 53.98          | -12.92      |

**Table 7-4. Radiated Spurious Emission Measurements SDM – RU26**

|                                         |                                                                                     |                                          |                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|-----------------------------------|
| FCC ID: BCGA2761<br>IC: 579C-A2761      |  | DATA REFERENCE REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090026-21.BCG | Test Dates:<br>5/30/2022 - 9/16/2022                                                | EUT Type:<br>Tablet Device               | Page 18 of 21                     |



**Plot 7-4. Radiated Spurious Emissions above 1GHz SDM (802.11ax – Ch. 209 – RU26)**

Mode: 802.11ax  
Data Rate: MCS0  
Distance of Measurements: 3 Meters  
Operating Frequency: 6995MHz  
Channel: 209

| Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Field Strength [dBuV/m] | Limit [dBuV/m] | Margin [dB] |
|-----------------|----------|-----------------|---------------------|----------------------------|----------------------|-------------|-------------------------|----------------|-------------|
| 13990.00        | Average  | H               | -                   | -                          | -83.44               | 17.85       | 41.41                   | 68.20          | -26.79      |

**Table 7-5. Radiated Spurious Emission Measurements SDM – RU26**

|                                         |                                                                                     |                                          |  |                                   |
|-----------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|--|-----------------------------------|
| FCC ID: BCGA2761<br>IC: 579C-A2761      |  | DATA REFERENCE REPORT<br>(CERTIFICATION) |  | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090026-21.BCG | Test Dates:<br>5/30/2022 - 9/16/2022                                                | EUT Type:<br>Tablet Device               |  | Page 19 of 21                     |

## 8.0 CONCLUSION

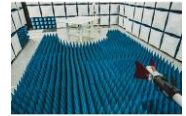
The spot-check data measured for variant model **FCC ID: BCGA2761 / IC: 579C-A2761** is in tolerance with reference model FCC ID: BCGA2435 / IC: 579C-A2435 per FCC/ISED Approved Data Referencing Test Plan.

|                                                  |                                                                                     |                                                  |                                          |
|--------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------|
| <b>FCC ID:</b> BCGA2761<br><b>IC:</b> 579C-A2761 |  | <b>DATA REFERENCE REPORT<br/>(CERTIFICATION)</b> | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1C2205090026-21.BCG   | <b>Test Dates:</b><br>5/30/2022 - 9/16/2022                                         | <b>EUT Type:</b><br>Tablet Device                | Page 20 of 21                            |

## 9.0 APPENDIX A: REFERENCE MODEL TEST REPORT

Attached is the test report (1C2205090025-22-R2.BCG) from reference model FCC ID: BCGA2435 / IC: 579C-A2435, which includes referenced data results.

|                                                  |                                                                                     |                                                  |                                          |
|--------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------|
| <b>FCC ID:</b> BCGA2761<br><b>IC:</b> 579C-A2761 |  | <b>DATA REFERENCE REPORT<br/>(CERTIFICATION)</b> | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1C2205090026-21.BCG   | <b>Test Dates:</b><br>5/30/2022 - 9/16/2022                                         | <b>EUT Type:</b><br>Tablet Device                | Page 21 of 21                            |



## MEASUREMENT REPORT

### FCC PART 15.407 / ISSED RSS-248 UNII 802.11ax OFDMA WIFI 6E

**Applicant Name:**

Apple Inc.  
One Apple Park Way  
Cupertino, CA 95014  
United States

**Date of Testing:**

05/27/2022 - 9/12/2022

**Test Site/Location:**

Element Washington DC LLC, Morgan Hill, CA, USA

**Test Report Serial No.:**

1C2205090025-22-R2.BCG

**FCC ID:**

BCGA2435

**IC:**

579C-A2435

**APPLICANT:**

Apple Inc.

**Application Type:**

Certification

**Model/HVIN:**

A2435

**EUT Type:**

Tablet Device

**Frequency Range:**

5955 – 7125MHz

**Modulation Type:**

OFDMA

**FCC Classification:**

15E 6GHz Low Power Indoor Client (6XD)

**FCC Rule Part(s):**

Part 15 Subpart E (15.407)

**ISED Specification:**

RSS-248 Issue 1

**Test Procedure(s):**

ANSI C63.10-2013, KDB 789033 D02 v02r01  
KDB 662911 D01 v02r01, KDB 987594 D02 v01r01  
KDB 987594 D04 v01

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013 and KDB 789033 D02 v02r01. Test results reported herein relate only to the item(s) tested.

This revised Test Report (S/N: 1C2205090025-22-R2.BCG) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



RJ Ortanez

Executive Vice President

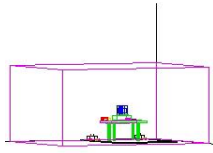


|                                                   |                                                                                     |                                              |                                          |
|---------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------|
| <b>FCC ID:</b> BCGA2435<br><b>IC:</b> 579C-A2435  |  | <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1C2205090025-22-R2.BCG | <b>Test Dates:</b><br>05/27/2022 - 9/12/2022                                        | <b>EUT Type:</b><br>Tablet Device            | Page 1 of 323                            |

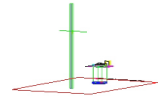
## TABLE OF CONTENTS

|     |                                                                       |     |
|-----|-----------------------------------------------------------------------|-----|
| 1.0 | INTRODUCTION.....                                                     | 4   |
| 1.1 | Scope .....                                                           | 4   |
| 1.2 | Element Washington DC LLC Test Location .....                         | 4   |
| 1.3 | Test Facility / Accreditations .....                                  | 4   |
| 2.0 | PRODUCT INFORMATION .....                                             | 5   |
| 2.1 | Equipment Description .....                                           | 5   |
| 2.2 | Device Capabilities.....                                              | 5   |
| 2.3 | Antenna Description.....                                              | 8   |
| 2.4 | Test Support Equipment .....                                          | 9   |
| 2.5 | Test Configuration.....                                               | 10  |
| 2.6 | Software and Firmware .....                                           | 10  |
| 2.7 | EMI Suppression Device(s)/Modifications .....                         | 10  |
| 3.0 | DESCRIPTION OF TESTS .....                                            | 11  |
| 3.1 | Evaluation Procedure.....                                             | 11  |
| 3.2 | AC Line Conducted Emissions .....                                     | 11  |
| 3.3 | Radiated Emissions .....                                              | 12  |
| 3.4 | Environmental Conditions .....                                        | 12  |
| 4.0 | ANTENNA REQUIREMENTS.....                                             | 13  |
| 5.0 | MEASUREMENT UNCERTAINTY.....                                          | 14  |
| 6.0 | TEST EQUIPMENT CALIBRATION DATA.....                                  | 15  |
| 7.0 | TEST RESULTS .....                                                    | 16  |
| 7.1 | Summary.....                                                          | 16  |
| 7.2 | 26dB & 99% Bandwidth Measurement – 802.11ax OFDMA .....               | 17  |
| 7.3 | Conducted Output Power and Max EIRP Measurement – 802.11ax OFDMA..... | 44  |
| 7.4 | Maximum Power Spectral Density – 802.11ax OFDMA .....                 | 63  |
| 7.5 | In-Band Emissions – 802.11ax OFDMA .....                              | 115 |
| 7.6 | Contention Based Protocol – 802.11ax OFDMA .....                      | 161 |
| 7.7 | Radiated Spurious Emissions – Above 1GHz.....                         | 181 |
| 7.8 | Radiated Spurious Emissions – Below 1GHz .....                        | 312 |
| 7.9 | AC Line-Conducted Emissions Measurement .....                         | 317 |
| 8.0 | CONCLUSION .....                                                      | 323 |

|                                                   |                                                                                                                                   |                                   |                                          |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|------------------------------------------|
| <b>FCC ID:</b> BCGA2435<br><b>IC:</b> 579C-A2435  |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                                   | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1C2205090025-22-R2.BCG | <b>Test Dates:</b><br>05/27/2022 - 9/12/2022                                                                                      | <b>EUT Type:</b><br>Tablet Device | Page 2 of 323                            |



## MEASUREMENT REPORT



| UNII Band | Channel Bandwidth (MHz) | Mode     | Tx Frequency (MHz) | SISO            |                  |                 |                  | SDM             |                  |                 |                  |                 |                  |
|-----------|-------------------------|----------|--------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
|           |                         |          |                    | ANT 5b          |                  | ANT 4a          |                  | ANT 5b          |                  | ANT 4a          |                  | Summed          |                  |
|           |                         |          |                    | Max. Power (mW) | Max. Power (dBm) | Max. Power (mW) | Max. Power (dBm) | Max. Power (mW) | Max. Power (dBm) | Max. Power (mW) | Max. Power (dBm) | Max. Power (mW) | Max. Power (dBm) |
| 5         | 20                      | 802.11ax | 5955 - 6415        | 2.113           | 3.25             | 2.065           | 3.15             | 1.578           | 1.98             | 1.538           | 1.87             | 3.119           | 4.94             |
| 6         |                         | 802.11ax | 6435 - 6515        | 1.963           | 2.93             | 1.995           | 3.00             | 1.327           | 1.23             | 1.330           | 1.24             | 2.630           | 4.20             |
| 7         |                         | 802.11ax | 6535 - 6875        | 1.875           | 2.73             | 1.884           | 2.75             | 1.387           | 1.42             | 1.413           | 1.50             | 2.799           | 4.47             |
| 8         |                         | 802.11ax | 6895 - 7095        | 2.104           | 3.23             | 2.018           | 3.05             | 1.770           | 2.48             | 1.766           | 2.47             | 3.540           | 5.49             |
| 5         | 40                      | 802.11ax | 5965 - 6405        | 4.188           | 6.22             | 4.159           | 6.19             | 3.083           | 4.89             | 3.069           | 4.87             | 6.152           | 7.89             |
| 6         |                         | 802.11ax | 6445 - 6525        | 3.954           | 5.97             | 3.945           | 5.96             | 2.649           | 4.23             | 2.606           | 4.16             | 5.236           | 7.19             |
| 7         |                         | 802.11ax | 6565 - 6845        | 3.750           | 5.74             | 3.656           | 5.63             | 2.805           | 4.48             | 2.805           | 4.48             | 5.572           | 7.46             |
| 8         |                         | 802.11ax | 6885 - 7085        | 4.111           | 6.14             | 4.159           | 6.19             | 3.548           | 5.50             | 3.491           | 5.43             | 6.966           | 8.43             |
| 5         | 80                      | 802.11ax | 5985 - 6385        | 8.337           | 9.21             | 8.356           | 9.22             | 6.053           | 7.82             | 5.957           | 7.75             | 12.023          | 10.80            |
| 6         |                         | 802.11ax | 6465               | 7.603           | 8.81             | 7.638           | 8.83             | 5.272           | 7.22             | 5.272           | 7.22             | 10.544          | 10.23            |
| 7         |                         | 802.11ax | 6545 - 6865        | 7.311           | 8.64             | 7.228           | 8.59             | 5.572           | 7.46             | 5.495           | 7.40             | 11.066          | 10.44            |
| 8         |                         | 802.11ax | 6945 - 7025        | 8.375           | 9.23             | 8.414           | 9.25             | 6.998           | 8.45             | 6.839           | 8.35             | 13.836          | 11.41            |
| 5         | 160                     | 802.11ax | 6025 - 6345        | 21.135          | 13.25            | 14.191          | 11.52            | 14.588          | 11.64            | 14.355          | 11.57            | 28.973          | 14.62            |
| 6         |                         | 802.11ax | 6505               | 18.365          | 12.64            | 12.735          | 11.05            | 12.972          | 11.13            | 12.794          | 11.07            | 25.763          | 14.11            |
| 7         |                         | 802.11ax | 6665 - 6825        | 18.836          | 12.75            | 13.900          | 11.43            | 14.125          | 11.50            | 13.996          | 11.46            | 28.119          | 14.49            |
| 8         |                         | 802.11ax | 6985               | 18.707          | 12.72            | 15.849          | 12.00            | 15.488          | 11.90            | 15.276          | 11.84            | 30.761          | 14.88            |

### EUT Overview

|                                            |  |                                                                                                                                   |                            |                                   |
|--------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                            | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG |  | Test Dates:<br>05/27/2022 - 9/12/2022                                                                                             | EUT Type:<br>Tablet Device | Page 3 of 323                     |



## 1.0 INTRODUCTION

### 1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.

### 1.2 Element Washington DC LLC Test Location

These measurement tests were conducted at the Element facility located at 18855 Adams Court, Morgan Hill, CA 95037. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014 and KDB 414788 D01 v01r01.

### 1.3 Test Facility / Accreditations

Measurements were performed at Element located in Morgan Hill, CA 95037, U.S.A.

- Element Washington DC LLC is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.02 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- Element Washington DC LLC TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISSED Standards (RSS).
- Element Washington DC LLC facility is a registered (22831) test laboratory with the site description on file with ISSED.

|                                                   |                                                                                     |                                               |                                          |
|---------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------|------------------------------------------|
| <b>FCC ID:</b> BCGA2435<br><b>IC:</b> 579C-A2435  |  | <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1C2205090025-22-R2.BCG | <b>Test Dates:</b><br>05/27/2022 - 9/12/2022                                        | <b>EUT Type:</b><br>Tablet Device             | Page 4 of 323                            |

## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Apple Tablet Device FCC ID: BCGA2435** and **IC: 579C-A2435**. The test data contained in this report pertains only to the emissions due to the EUT's UNII transmitter while operating in the 6GHz band.

**Test Device Serial No.:** MR9YXC9T9R, Q994673JFG, N6FT9Q03C0, XYDYJQJ5Y7, M7QHHW6VGQ

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (FR1/FR2), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII, 802.11a/ax WiFi 6E, Bluetooth (1x, EDR, LE1M, LE2M, HDR4, HDR8), WPT, NB UNII (1x, HDR4, HDR8)

This device supports BT Beamforming

| Band 5 |                 | Band 6 |                 | Band 7 |                 | Band 8 |                 |
|--------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|
| Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) |
| 1      | 5955            | 97     | 6435            | 117    | 6535            | 189    | 6895            |
| :      | :               | :      | :               | :      | :               | :      | :               |
| 45     | 6175            | 105    | 6475            | 149    | 6695            | 209    | 6995            |
| :      | :               | :      | :               | :      | :               | :      | :               |
| 93     | 6415            | 113    | 6515            | 185    | 6875            | 233    | 7115            |

Table 2-1. 802.11a / 802.11ax (20MHz) Frequency / Channel Operations

| Band 5 |                 | Band 6 |                 | Band 7 |                 | Band 8 |                 |
|--------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|
| Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) |
| 3      | 5965            | 99     | 6445            | 123    | 6565            | 187    | 6885            |
| :      | :               | :      | :               | :      | :               | :      | :               |
| 43     | 6165            | 107    | 6485            | 155    | 6725            | 211    | 7005            |
| :      | :               | :      | :               | :      | :               | :      | :               |
| 91     | 6405            | 115    | 6525            | 179    | 6845            | 227    | 7085            |

Table 2-2. 802.11ax (40MHz BW) Frequency / Channel Operations

| Band 5 |                 | Band 6 |                 | Band 7 |                 | Band 8 |                 |
|--------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|
| Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) |
| 7      | 5985            | 103    | 6465            | 119    | 6545            | 199    | 6945            |
| :      | :               |        |                 | :      | :               | :      | :               |
| 39     | 6145            |        |                 | 151    | 6705            | 215    | 7025            |
| :      | :               |        |                 | :      | :               |        |                 |
| 87     | 6385            |        |                 | 183    | 6865            |        |                 |

Table 2-3. 802.11ax (80MHz BW) Frequency / Channel Operations

|                                            |                                                                                                                                   |                            |                                   |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                            | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                                                                             | EUT Type:<br>Tablet Device | Page 5 of 323                     |

| Band 5 |                 | Band 6 |                 | Band 7 |                 | Band 8 |                 |
|--------|-----------------|--------|-----------------|--------|-----------------|--------|-----------------|
| Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) | Ch.    | Frequency (MHz) |
| 15     | 6025            | 111    | 6505            | 143    | 6665            | 207    | 6985            |
| :      | :               |        |                 | :      | :               |        |                 |
| 47     | 6185            |        |                 | 175    | 6825            |        |                 |
| :      | :               |        |                 |        |                 |        |                 |
| 79     | 6345            |        |                 |        |                 |        |                 |

**Table 2-4. 802.11ax (160MHz BW) Frequency / Channel Operations**

**Notes:**

- 6GHz NII operation is possible in 20MHz, and 40MHz, and 80MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section B)2)b) KDB 789033 D02 v02r01 and ANSI C63.10-2013. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

| 802.11 Mode / Band |                        | Duty Cycle [%] |            |      |
|--------------------|------------------------|----------------|------------|------|
|                    |                        | Antenna 5b     | Antenna 4a | SDM  |
| 6GHz               | 11ax(RU26) (20MHz)     | 84.2           | 87.7       | 87.7 |
|                    | 11ax(RU242) (20MHz)    | 95.4           | 96.1       | 96.1 |
|                    | 11ax(RU26) (40MHz)     | 89.5           | 89.6       | 89.3 |
|                    | 11ax(RU484) (40MHz)    | 91.7           | 92.9       | 93.1 |
|                    | 11ax(RU26) (80MHz)     | 89.2           | 89.0       | 89.3 |
|                    | 11ax(RU996) (80MHz)    | 86.8           | 88.4       | 88.4 |
|                    | 11ax(RU26) (160MHz)    | 89.0           | 88.6       | 89.2 |
|                    | 11ax(RU996x2) (160MHz) | 83.5           | 83.7       | 83.1 |

**Table 2-5. Measured Duty Cycles**

- The device employs MIMO technology. Below are the possible configurations.

| WiFi Configurations |                   | SISO       |            | CDD        |            | SDM        |            | STBC       |            |
|---------------------|-------------------|------------|------------|------------|------------|------------|------------|------------|------------|
|                     |                   | Antenna 5b | Antenna 4a | Antenna 5b | Antenna 4a | Antenna 5b | Antenna 4a | Antenna 5b | Antenna 4a |
| 6GHz                | 11ax(RU) (20MHz)  | ✓          | ✓          | ✓          | ✓          | ✓          | ✓          | ✗          | ✗          |
|                     | 11ax(RU) (40MHz)  | ✓          | ✓          | ✓          | ✓          | ✓          | ✓          | ✗          | ✗          |
|                     | 11ax(RU) (80MHz)  | ✓          | ✓          | ✓          | ✓          | ✓          | ✓          | ✗          | ✗          |
|                     | 11ax(RU) (160MHz) | ✓          | ✓          | ✓          | ✓          | ✓          | ✓          | ✗          | ✗          |

**Table 2-6. WIFI Configurations**

✓ = Support ; ✗ = NOT Support

**SISO** = Single Input Single Output

**SDM** = Spatial Diversity Multiplexing – MIMO function

**CDD** = Cyclic Delay Diversity - 2Tx Function

**STBC** = Space-Time Block Coding – 2Tx Function

|                                            |                                                                                                                                   |                            |                                   |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                            | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                                                                             | EUT Type:<br>Tablet Device | Page 6 of 323                     |

Data Rate(s) Tested: 8/8.6, 16/17.2, 24/25.8, 33/34.4, 49/51.6, 65/68.8, 73/77.4, 81/86.0, 98/103.2, 108/114.7, 122/129.0, 135/143.4 (ax – 20MHz)  
 16/17.2, 33/34.4, 49/51.6, 65/68.8, 98/103.2, 130/137.6, 146/154.9, 163/172.1, 195/206.5, 217/229.4, 244/258.1, 271/286.8 (ax – 40MHz BW)  
 34/36.0, 68/72.1, 102/108.1, 136/144.1, 204/216.2, 272/288.2, 306/324.4, 340/360.3, 408/432.4, 453/480.4, 510/540.4, 567/600.5 (ax – 80MHz BW)  
 34/36, 68.1/72.1, 102.1/108.1, 136.1/144.1, 204.2/216.2, 272.2/288.2, 306.3/324.3, 340.3/360.3, 408.3/432.4, 453.7/480.4, 510.4/540.4, 567.1/600.5 (ax – 160MHz BW)  
 16.3/17.2, 32.5/34.4, 48.8/51.6, 65/68.8, 97.5/103.2, 130/137.6, 146.3/154.9, 162.5/172.1, 195/206.5, 216.7/229.4, 243.8/258.1, 270.8/286.8 (ax – 20MHz MIMO)  
 32.5/34.4, 65/68.8, 97.5/103.2, 130/137.6, 195/206.5, 260/275.3, 292.5/309.7, 325/344.1, 390/412.9, 433.3/458.8, 487.5/516.2, 541.7/573.5 (ax – 40MHz MIMO)  
 68.1/72.1, 136.1/144.1, 204.2/216.2, 272.2/288.2, 408.3/432.4, 544.4/576.5, 612.5/648.5, 680.6/720.6, 816.7/864.7, 907.4/960.8, 1020.8/1080.9, 1134.3/1201 (ax – 80/160MHz MIMO)  
 136.2/144.2, 272.2/288.2, 408.4/432.4, 544.4/576.4, 816.6/864.8, 1088.8/1153, 1225/1297, 1361.2/1441.2, 1633.4/1729.4, 1814.8/1921.6, 2041.6/2161.8, 2268.6/2402 (ax – 160MHz MIMO)

3. This device supports simultaneous transmission operations, which allows for multiple transmitters to transmit simultaneously on the same antenna. The table below shows all configurations possible.

| Antenna | Simultaneous Tx Config | WiFi 2.4GHz     | Bluetooth                | NB UNII     | WiFi 5GHz        | WiFi 6GHz   | LTE / FR1 NR    |
|---------|------------------------|-----------------|--------------------------|-------------|------------------|-------------|-----------------|
|         |                        | 802.11 b/g/n/ax | BDR, EDR, HDR4/8, LE1/2M | BDR, HDR4/8 | 802.11 a/n/ac/ax | 802.11 a/ax | Ultra High Band |
| 2a      | Config 1               | ✓               | ✗                        | ✗           | ✗                | ✗           | ✓               |
| 2a      | Config 2               | ✗               | ✓                        | ✗           | ✗                | ✗           | ✓               |
| 4a      | Config 3               | ✓               | ✗                        | ✓           | ✗                | ✗           | ✗               |
| 4a      | Config 4               | ✗               | ✓                        | ✗           | ✓                | ✗           | ✗               |

**Table 2-7. Simultaneous Transmission Configurations**

✓ = Support; ✗ = Not Support

Note: All the above simultaneous transmission configurations have been tested and the worst-case configuration was found to be Config 2 and reported in Bluetooth and Part 96 RF test reports.

4. Wi-Fi 2.4GHz and Bluetooth 2.4 GHz can transmit simultaneously on separate antennas. For BT (2.4 GHz) in connected mode and Wi-Fi (2.4 GHz) – Wi-Fi max power will not exceed minimum of (13.5dBm, SAR max cap, Reg max cap) power. For BT (2.4 GHz) in disconnected mode and Wi-Fi (2.4 GHz) – BT will be using iPA only and Wi-Fi max power will not exceed minimum of (SAR max cap, Reg max cap) power.

|                                            |                                                                                                                                   |                            |                                   |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                            | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                                                                             | EUT Type:<br>Tablet Device | Page 7 of 323                     |

## 2.3 Antenna Description

Following antenna gains were provided by the manufacturer.

| Frequency (MHz) | Antenna Gain (dBi) |     |            |      |
|-----------------|--------------------|-----|------------|------|
|                 | Antenna 5b         |     | Antenna 4a |      |
|                 | H                  | V   | H          | V    |
| 5955            | 4.2                | 2.4 | -4         | -0.7 |
| 6075            | 3.9                | 1.9 | -3.7       | -0.9 |
| 6110            | 3.9                | 1.5 | -3.7       | -0.9 |
| 6135            | 3.9                | 1.5 | -2.3       | -0.6 |
| 6185            | 3.9                | 1.5 | -2.3       | -0.6 |
| 6215            | 3.9                | 1.5 | -2.3       | -0.6 |
| 6255            | 4.1                | 1.9 | -1.1       | 0.6  |
| 6260            | 4.2                | 1.8 | -1.1       | 0.6  |
| 6375            | 4.2                | 1.8 | -0.5       | 1    |
| 6430            | 4.2                | 1.8 | -0.5       | 1    |
| 6435            | 4.3                | 2   | -0.3       | 1.2  |
| 6455            | 3.4                | 1.4 | -0.7       | -0.3 |
| 6505            | 3.4                | 1.4 | -0.7       | -0.3 |
| 6555            | 3.4                | 1.4 | -0.7       | -0.3 |
| 6580            | 3.4                | 1.4 | -1.9       | -1.6 |
| 6590            | 3.4                | 1.4 | -1.9       | -1.6 |
| 6665            | 3.4                | 1.4 | -1.9       | -1.6 |
| 6675            | 4.2                | 2.8 | -1.9       | -1.6 |
| 6695            | 4.2                | 2.8 | -1.9       | -1.6 |
| 6735            | 4.1                | 3.3 | -1.9       | -1.5 |
| 6740            | 4.7                | 2.4 | -2.4       | -2.7 |
| 6855            | 4.7                | 2.4 | -2.4       | -2.7 |
| 6910            | 4.2                | 2   | -3.3       | -4.8 |
| 6935            | 4.2                | 2   | -3.3       | -4.8 |
| 6975            | 4.2                | 2   | -3.3       | -4.8 |
| 6985            | 4.2                | 2   | -4.9       | -5.9 |
| 7035            | 4.1                | 2.4 | -4.9       | -5.9 |
| 7060            | 4.1                | 2.4 | -4.9       | -6.2 |
| 7115            | 4.1                | 3   | -4.9       | -6.2 |

**Table 2-8. Antenna Gain**

Some antenna gains in the table were chosen from the worst between two frequencies as confirmed by manufacturer

|                                            |                                                                                                                                   |                            |                                   |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                            | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                                                                             | EUT Type:<br>Tablet Device | Page 8 of 323                     |

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V 10.5 12/15/2021

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## 2.4 Test Support Equipment

|   |                   |                 |                   |
|---|-------------------|-----------------|-------------------|
| 1 | Apple MacBook Pro | Model: A2141    | S/N: C02DV7VKMD6T |
|   | w/AC/DC Adapter   | Model: A2166    | S/N: N/A          |
| 2 | Apple USB-C Cable | Model: Spartan  | S/N: 000MKTR02U   |
| 3 | USB-C Cable       | Model: A246     | S/N: N/A          |
|   | w/ AC Adapter     | Model: A2305    | S/N: N/A          |
| 4 | Apple Pencil      | Model: N/A      | S/N: GQXGSXBJKM9  |
| 5 | DC Power Supply   | Model: KPS3010D | S/N: N/A          |
| 6 | Netgear Nighthawk | Model : RAXE450 | S/N: 6JX215GA10A5 |

**Table 2-9. Test Support Equipment List**

|                                            |                                                                                     |                                       |                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                               | EUT Type:<br>Tablet Device            | Page 9 of 323                     |

## 2.5 Test Configuration

The EUT was tested per the guidance of ANSI C63.10-2013, KDB 789033 D02 v02r01 and KDB 987594 D02 v01r01. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing. See Sections 3.2 for AC line conducted emissions test setups, 3.3 for radiated emissions test setups, and 7.2, 7.3, 7.4, 7.5 and 7.6 for antenna port conducted emissions test setups.

There are two vendors of the WiFi/Bluetooth radio modules, variant 1 and variant 2. Both radio modules have the same mechanical outline, same on-board antenna matching circuit, identical antenna structure, and are built and tested to conform to the same specifications and to operate within the same tolerances. The worst case configuration was found between the two variants. The EUT was also investigated with and without charger.

For emissions from 1GHz – 18GHz, low, mid, and high channels were tested with highest power and worst case configuration. The emissions below 1GHz and above 18GHz were tested with the highest transmitting power and the worst case channel.

The EUT was manipulated through three orthogonal planes of X-orientation (flatbed), Y-orientation (landscape), and Z-orientation (portrait) during the testing. Only the worst case emissions were reported in this test report.

For AC line conducted and radiated test below 1GHz, following configuration were investigated and EUT powered by AC/DC was the worst case.

- EUT powered by AC/DC adaptor via USB-C cable with wire charger
- EUT powered by host PC via USB-C cable with wire charger

For 802.11ax-RU test results, see separate UNII 6E OFDM report, 1C2205090025-21.BCG.

## 2.6 Software and Firmware

The test was conducted with firmware version 20A8359 installed on the EUT.

## 2.7 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

|                                                   |                                                                                     |                                               |                                          |
|---------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------|------------------------------------------|
| <b>FCC ID:</b> BCGA2435<br><b>IC:</b> 579C-A2435  |  | <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1C2205090025-22-R2.BCG | <b>Test Dates:</b><br>05/27/2022 - 9/12/2022                                        | <b>EUT Type:</b><br>Tablet Device             | Page 10 of 323                           |

## 3.0 DESCRIPTION OF TESTS

### 3.1 Evaluation Procedure

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) and the guidance provided in KDB 789033 D02 v02r01 were used in the measurement of the EUT.

Deviation from measurement procedure.....None

### 3.2 AC Line Conducted Emissions

The line-conducted facility is located inside a 7m x 3.66m x 2.7m shielded enclosure. The shielded enclosure is manufactured by AP Americas. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-6. A 1m x 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50μH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. The external power line filter is EPCOS 2X60A Power Line Filter (100dB Attenuation, 14kHz-18GHz) and the two EPCOs 2X48A filters (100dB Minimum Insertion Loss, 14kHz - 10GHz). These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The spectrum was scanned from 150kHz to 30MHz with a spectrum analyzer. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions is used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

Line conducted emissions test results are shown in Section 7.9. Automated test software was used to perform the AC line conducted emissions testing. Automated measurement software utilized is Rohde & Schwarz EMC32, Version 10.50.40.

|                                            |                                                                                     |                                       |                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                               | EUT Type:<br>Tablet Device            | Page 11 of 323                    |



### 3.3 Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. An 80cm tall test table made of Styrodur is placed on top of the turn table. For measurements above 1GHz, an additional Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

Per KDB 414788, radiated emission test sites other than open-field test sites (e.g., shielded anechoic chambers), may be employed for emission measurements below 30MHz if characterized so that the measurements correspond to those obtained at an open-field test site. To determine test site equivalency, a reference sample transmitting at 149kHz was measured on an open field test site (asphalt with no ground plane) and then measured in the 3m semi-anechoic chamber. A calibrated 60cm loop antenna was used while the reference device was rotated through the X, Y and Z axis in order to capture the worst case level. A maximum deviation of 2.77dB at 149kHz was measured when comparing the 3 meter semi-anechoic chamber to the open field site.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33 depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions.

### 3.4 Environmental Conditions

The temperature is controlled within range of 15°C to 35°C. The relative humidity is controlled within range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

|                                                   |                                                                                     |                                               |                                          |
|---------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------|------------------------------------------|
| <b>FCC ID:</b> BCGA2435<br><b>IC:</b> 579C-A2435  |  | <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1C2205090025-22-R2.BCG | <b>Test Dates:</b><br>05/27/2022 - 9/12/2022                                        | <b>EUT Type:</b><br>Tablet Device             | Page 12 of 323                           |

## 4.0 ANTENNA REQUIREMENTS

### Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- The antennas of the EUT are **permanently attached**.
- There are no provisions for connection to an external antenna.

### Conclusion:

The EUT complies with the requirement of §15.203.

|                                                   |                                                                                     |                                               |                                          |
|---------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------|------------------------------------------|
| <b>FCC ID:</b> BCGA2435<br><b>IC:</b> 579C-A2435  |  | <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> | <b>Approved by:</b><br>Technical Manager |
| <b>Test Report S/N:</b><br>1C2205090025-22-R2.BCG | <b>Test Dates:</b><br>05/27/2022 - 9/12/2022                                        | <b>EUT Type:</b><br>Tablet Device             | Page 13 of 323                           |

## 5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.23-2012. All measurement uncertainty values are shown with a coverage factor of  $k = 2$  to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the  $U_{\text{CISPR}}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

| Contribution                        | Expanded Uncertainty ( $\pm$ dB) |
|-------------------------------------|----------------------------------|
| Conducted Bench Top Measurements    | 1.77                             |
| Line Conducted Disturbance          | 2.70                             |
| Radiated Disturbance (<30MHz)       | 4.38                             |
| Radiated Disturbance (30MHz - 1GHz) | 4.75                             |
| Radiated Disturbance (1 - 18GHz)    | 5.20                             |
| Radiated Disturbance (>18GHz)       | 4.72                             |

|                                            |                                                                                     |                                       |                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                               | EUT Type:<br>Tablet Device            | Page 14 of 323                    |

## 6.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

| Manufacturer          | Model       | Description                                 | Cal Date   | Cal Interval | Cal Due    | Serial Number |
|-----------------------|-------------|---------------------------------------------|------------|--------------|------------|---------------|
| Agilent Technologies  | N9030A      | 3Hz-44GHz PXA Signal Analyzer               | 6/10/2022  | Annual       | 6/10/2023  | MY49430244    |
| Agilent Technologies  | N9020A      | MXA Signal Analyzer                         | 4/26/2022  | Annual       | 4/26/2023  | MY56470202    |
| Anritsu               | ML2496A     | Power Meter                                 | 11/29/2021 | Annual       | 11/29/2022 | 1840005       |
| Anritsu               | MA2411B     | Pulse Power Sensor                          | 11/30/2021 | Annual       | 11/30/2022 | 1726261       |
| Anritsu               | MA2411B     | Pulse Power Sensor                          | 11/30/2021 | Annual       | 11/30/2022 | 1726262       |
| ATM                   | 180-442A-KF | 20dB Nominal Gain Horn Antenna              | 1/19/2022  | Annual       | 1/19/2023  | T058701-02    |
| Com-Power Corporation | LIN-120A    | Line Impedance Stabilization Network (LISN) | 3/7/2022   | Annual       | 3/7/2023   | 241296        |
| ETS-Lindgren          | 3142E       | Biconilog Antenna (26-6000MHz)              | 10/21/2021 | Annual       | 10/21/2022 | 208204        |
| ETS-Lindgren          | 3117        | Double Ridged Guide Horn Antenna (1-18GHz)  | 10/25/2021 | Annual       | 10/25/2022 | 227597        |
| Keysight Technology   | N9040B      | UXA Signal Analyzer                         | 2/8/2022   | Annual       | 2/8/2023   | MY57212015    |
| Rohde & Schwarz       | TS-PR8      | Pre-Amplifier (30MHz-6GHz)                  | 1/6/2022   | Annual       | 1/6/2023   | 102328        |
| Rohde & Schwarz       | ESW26       | EMI Test Receiver                           | 5/19/2022  | Annual       | 5/19/2023  | 101299        |
| Rohde & Schwarz       | ESW44       | EMI Test Receiver                           | 12/2/2021  | Annual       | 12/2/2022  | 101570        |
| Rohde & Schwarz       | FSV40       | Signal Analyzer (10Hz-40GHz)                | 3/4/2022   | Annual       | 3/4/2023   | 101619        |
| Rohde & Schwarz       | FSVA3044    | Signal Analyzer (up to 44 GHz)              | 5/12/2022  | Annual       | 5/12/2023  | 101098        |
| Rohde & Schwarz       | HFH2-Z2     | Loop Antenna                                | 4/3/2022   | Annual       | 4/3/2023   | 100546        |
| Rohde & Schwarz       | SMB100A     | Signal Generator 100KHz-40GHz               | 1/10/2022  | Annual       | 1/10/2023  | 180080        |
| Rohde & Schwarz       | TC-TA18     | Cross-Polarized Antenna 400MHz-18GHz        | 1/25/2022  | Annual       | 1/25/2023  | 101063        |
| Rohde & Schwarz       | TS-PR18     | Pre-Amplifier (1GHz-18GHz)                  | 1/6/2022   | Annual       | 1/6/2023   | 101639        |
| Rohde & Schwarz       | TS-PR1840   | Pre-Amplifier (18GHz-40GHz)                 | 4/18/2022  | Annual       | 4/18/2023  | 100050        |

**Table 6-1. Test Equipment List**

**Note:**

For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

|                                            |                                                                                     |                                       |                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                               | EUT Type:<br>Tablet Device            | Page 15 of 323                    |

## 7.0 TEST RESULTS

### 7.1 Summary

Company Name: Apple Inc.  
 FCC ID: BCGA2435  
 IC: 579C-A2435  
 FCC Classification: 15E 6GHz Low Power Indoor Client (6XD)

| FCC Part Section(s)   | RSS Section(s)               | Test Description                                                              | Test Limit                                                                                                                                      | Test Condition | Test Result | Reference        |
|-----------------------|------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------|------------------|
| 2.1049, 15.407(a)(10) | RSS Gen [6.7], RSS-248 [4.4] | Occupied Bandwidth/ 26dB Bandwidth                                            | 99% of the occupied bandwidth of any channel must be contained within each of its respective U-NII sub bands<br><br>< 320MHz (5.925 - 7.125GHz) | CONDUCTED      | PASS        | Section 7.2      |
| 15.407(a)(8)          | RSS-248 [4.6.3]              | Maximum Power Spectral Density                                                | < -1dBm/MHz e.i.r.p.                                                                                                                            |                | PASS        | Section 7.4      |
| 15.407(a)(8)          | RSS-248 [4.6]                | Maximum Radiated Output Power                                                 | < 24dBm over the frequency band of operation                                                                                                    |                | PASS        | Section 7.3      |
| 15.407(b)(7)          | RSS-248 [4.7.2]              | In-Band Emissions                                                             | EUT must meet the limits detailed in 15.407(b)(7) and RSS-248 [4.7.2]b                                                                          |                | PASS        | Section 7.5      |
| 15.407(d)(6)          | RSS-248 [4.8]                | Contention Based Protocol                                                     | EUT must detect AWGN signal with 90% (or better) certainty                                                                                      |                | PASS        | Section 7.6      |
| 15.407(b)(6)          | RSS-248 [4.7.2]              | Undesirable Emissions                                                         | < -27dBm/MHz e.i.r.p. outside of the 5.925 – 7.125GHz band                                                                                      | RADIATED       | PASS        | Section 7.7      |
| 15.205, 15.209        | RSS-Gen [8.9]                | General Field Strength Limits (Restricted Bands and Radiated Emission Limits) | Emissions in restricted bands must meet the radiated limits detailed in 15.209 (RSS-Gen [8.9])                                                  |                | PASS        | Section 7.7, 7.8 |
| 15.207                | RSS-Gen [8.8]                | AC Conducted Emissions (150kHz – 30MHz)                                       | < FCC 15.207 (RSS-Gen [8.8]) limits                                                                                                             | LINE CONDUCTED | PASS        | Section 7.9      |

**Table 7-1. Summary of Test Results**

#### Notes:

- 1) All channels, modes, and modulations/data rates were investigated among all UNII bands. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is Element EMC Software Tool v1.2.
- 5) For radiated band edge, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is Element "Chamber Automation," Version 1.3.2.

|                                            |                                                                                                                                   |                            |                                   |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                            | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                                                                             | EUT Type:<br>Tablet Device | Page 16 of 323                    |

## 7.2 26dB & 99% Bandwidth Measurement – 802.11ax OFDMA

§2.1049; §15.407(a)(10); RSS-Gen [6.7]; RSS-248 [4.4]

### Test Overview and Limit

The bandwidth at 26dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10-2013 and KDB 789033 D02 v02r01, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26dB bandwidth.

### Test Procedure Used

ANSI C63.10-2013 – Section 12.4  
KDB 789033 D02 v02r01 – Section C

### Test Settings

1. The signal analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to  $X = 26$ . The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = approximately 1% of the emission bandwidth
3.  $VBW \geq 3 \times RBW$
4. Detector = Peak
5. Trace mode = max hold

### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.



**Figure 7-1. Test Instrument & Measurement Setup**

### Test Notes

1. All antenna configurations and data rates were investigated and only the worst case are reported.
2. All RU's were investigated and only worst case partially-loaded and fully-loaded RU's were reported.
3. Low, mid, and high channels were tested and tabular data has been reported. Only mid channel bandwidth plots have been reported.

|                                            |                                                                                                                                   |                            |                                   |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                            | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                                                                             | EUT Type:<br>Tablet Device | Page 17 of 323                    |

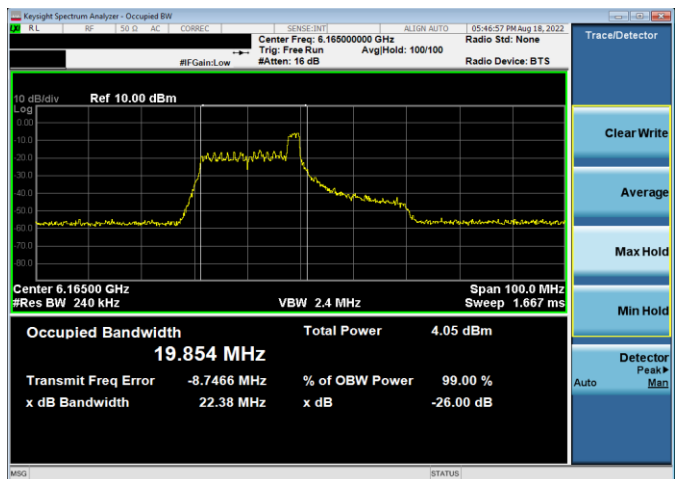
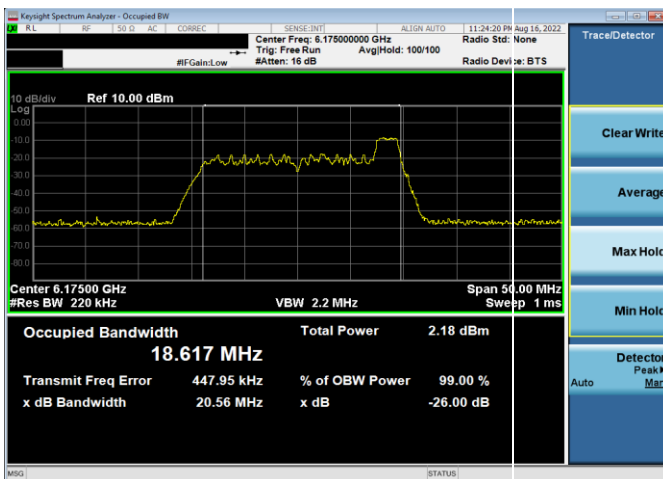
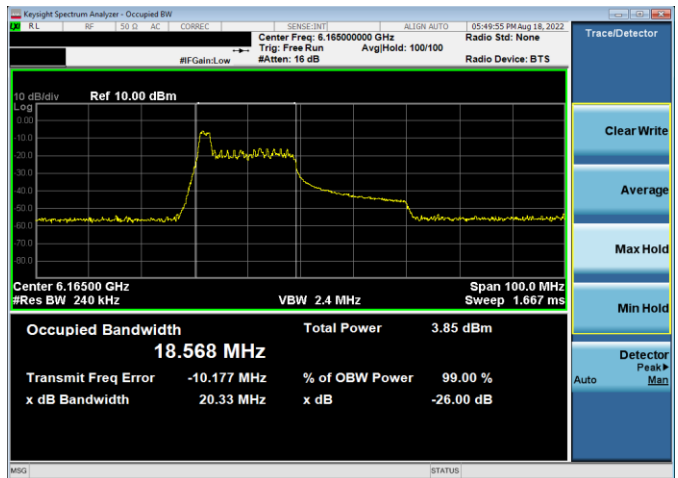
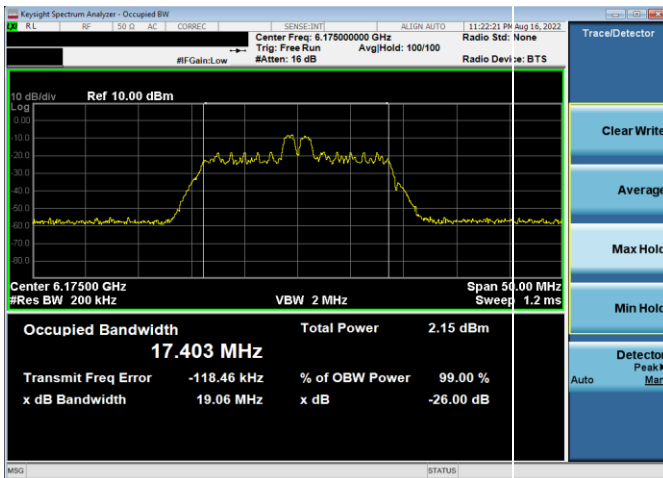
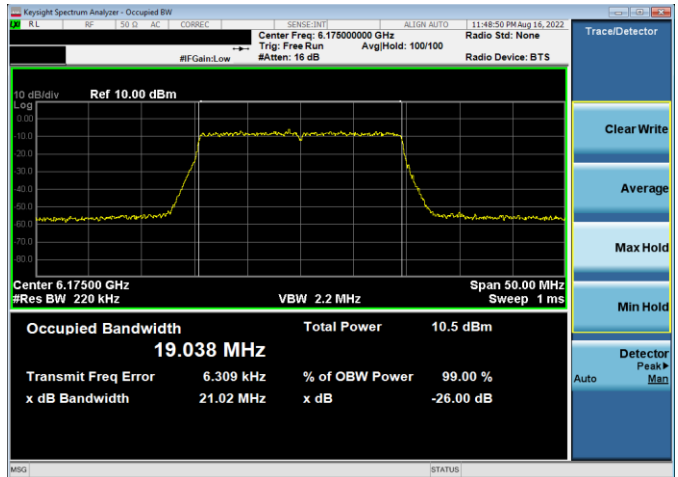
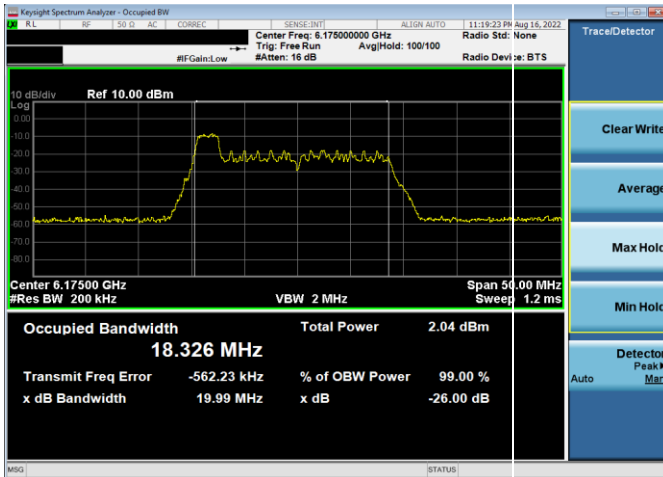


|        | Frequency [MHz] | Channel | 802.11 MODE | RU Size | RU Index | Data Rate [Mbps]    | Measured 99% Occupied Bandwidth [MHz] | Measured 26dB Bandwidth [MHz] | Maximum Bandwidth Limit [MHz] | Pass / Fail |
|--------|-----------------|---------|-------------|---------|----------|---------------------|---------------------------------------|-------------------------------|-------------------------------|-------------|
| Band 5 | 5955            | 1       | ax (20MHz)  | 242     | 61       | 121.9/143.4 (MCS11) | 18.95                                 | 21.01                         | 320                           | Pass        |
|        | 6175            | 45      | ax (20MHz)  | 242     | 61       | 121.9/143.4 (MCS11) | 19.04                                 | 21.02                         | 320                           | Pass        |
|        | 6415            | 93      | ax (20MHz)  | 242     | 61       | 121.9/143.4 (MCS11) | 19.01                                 | 21.09                         | 320                           | Pass        |
|        | 5965            | 3       | ax (40MHz)  | 484     | 65       | 243.8/286.8 (MCS11) | 37.96                                 | 41.89                         | 320                           | Pass        |
|        | 6165            | 43      | ax (40MHz)  | 484     | 65       | 243.8/286.8 (MCS11) | 38.02                                 | 42.00                         | 320                           | Pass        |
|        | 6405            | 91      | ax (40MHz)  | 484     | 65       | 243.8/286.8 (MCS11) | 37.95                                 | 42.07                         | 320                           | Pass        |
|        | 5985            | 7       | ax (80MHz)  | 996     | 67       | 510.4/600.5 (MCS11) | 77.11                                 | 81.70                         | 320                           | Pass        |
|        | 6145            | 39      | ax (80MHz)  | 996     | 67       | 510.4/600.5 (MCS11) | 77.12                                 | 81.92                         | 320                           | Pass        |
|        | 6385            | 87      | ax (80MHz)  | 996     | 67       | 510.4/600.5 (MCS11) | 77.20                                 | 81.45                         | 320                           | Pass        |
|        | 6025            | 15      | ax (160MHz) | 996     | 68       | 1020.8/1201 (MCS11) | 156.36                                | 167.23                        | 320                           | Pass        |
| Band 6 | 6185            | 47      | ax (160MHz) | 996     | 68       | 1020.8/1201 (MCS11) | 157.31                                | 169.62                        | 320                           | Pass        |
|        | 6345            | 79      | ax (160MHz) | 996     | 68       | 1020.8/1201 (MCS11) | 156.47                                | 167.20                        | 320                           | Pass        |
|        | 6435            | 97      | ax (20MHz)  | 242     | 61       | 121.9/143.4 (MCS11) | 19.03                                 | 21.32                         | 320                           | Pass        |
|        | 6475            | 105     | ax (20MHz)  | 242     | 61       | 121.9/143.4 (MCS11) | 19.05                                 | 21.30                         | 320                           | Pass        |
|        | 6515            | 113     | ax (20MHz)  | 242     | 61       | 121.9/143.4 (MCS11) | 19.01                                 | 21.27                         | 320                           | Pass        |
|        | 6445            | 99      | ax (40MHz)  | 484     | 65       | 243.8/286.8 (MCS11) | 37.97                                 | 42.01                         | 320                           | Pass        |
|        | 6485            | 107     | ax (40MHz)  | 484     | 65       | 243.8/286.8 (MCS11) | 37.98                                 | 41.96                         | 320                           | Pass        |
|        | 6525            | 115     | ax (40MHz)  | 484     | 65       | 243.8/286.8 (MCS11) | 37.93                                 | 41.91                         | 320                           | Pass        |
| Band 7 | 6465            | 103     | ax (80MHz)  | 996     | 67       | 510.4/600.5 (MCS11) | 77.13                                 | 82.12                         | 320                           | Pass        |
|        | 6505            | 111     | ax (160MHz) | 996     | 68       | 1020.8/1201 (MCS11) | 156.67                                | 168.09                        | 320                           | Pass        |
|        | 6535            | 117     | ax (20MHz)  | 242     | 61       | 121.9/143.4 (MCS11) | 19.01                                 | 21.24                         | 320                           | Pass        |
|        | 6695            | 149     | ax (20MHz)  | 242     | 61       | 121.9/143.4 (MCS11) | 19.03                                 | 21.38                         | 320                           | Pass        |
|        | 6875            | 185     | ax (20MHz)  | 242     | 61       | 121.9/143.4 (MCS11) | 19.04                                 | 21.18                         | 320                           | Pass        |
|        | 6565            | 123     | ax (40MHz)  | 484     | 65       | 243.8/286.8 (MCS11) | 37.99                                 | 41.93                         | 320                           | Pass        |
|        | 6725            | 155     | ax (40MHz)  | 484     | 65       | 243.8/286.8 (MCS11) | 37.97                                 | 41.96                         | 320                           | Pass        |
|        | 6845            | 179     | ax (40MHz)  | 484     | 65       | 243.8/286.8 (MCS11) | 37.95                                 | 41.92                         | 320                           | Pass        |
|        | 6545            | 119     | ax (80MHz)  | 996     | 67       | 510.4/600.5 (MCS11) | 77.10                                 | 82.20                         | 320                           | Pass        |
|        | 6545            | 119     | ax (80MHz)  | 996     | 67       | 510.4/600.5 (MCS11) | 77.10                                 | 82.20                         | 320                           | Pass        |
|        | 6545            | 119     | ax (80MHz)  | 996     | 67       | 510.4/600.5 (MCS11) | 77.10                                 | 82.20                         | 320                           | Pass        |
|        | 6705            | 151     | ax (80MHz)  | 996     | 67       | 510.4/600.5 (MCS11) | 77.01                                 | 82.19                         | 320                           | Pass        |
|        | 6705            | 151     | ax (80MHz)  | 996     | 67       | 510.4/600.5 (MCS11) | 77.01                                 | 82.19                         | 320                           | Pass        |
|        | 6705            | 151     | ax (80MHz)  | 996     | 67       | 510.4/600.5 (MCS11) | 77.01                                 | 82.19                         | 320                           | Pass        |
|        | 6865            | 183     | ax (80MHz)  | 996     | 67       | 510.4/600.5 (MCS11) | 77.19                                 | 81.75                         | 320                           | Pass        |
|        | 6865            | 183     | ax (80MHz)  | 996     | 67       | 510.4/600.5 (MCS11) | 77.19                                 | 81.75                         | 320                           | Pass        |
|        | 6865            | 183     | ax (80MHz)  | 996     | 67       | 510.4/600.5 (MCS11) | 77.19                                 | 81.75                         | 320                           | Pass        |
|        | 6665            | 143     | ax (160MHz) | 996     | 68       | 1020.8/1201 (MCS11) | 156.54                                | 167.59                        | 320                           | Pass        |
|        | 6665            | 143     | ax (160MHz) | 996     | 68       | 1020.8/1201 (MCS11) | 156.54                                | 167.59                        | 320                           | Pass        |
|        | 6665            | 143     | ax (160MHz) | 996     | 68       | 1020.8/1201 (MCS11) | 156.54                                | 167.59                        | 320                           | Pass        |
|        | 6825            | 175     | ax (160MHz) | 996     | 68       | 1020.8/1201 (MCS11) | 156.58                                | 166.91                        | 320                           | Pass        |
| Band 8 | 6825            | 175     | ax (160MHz) | 996     | 68       | 1020.8/1201 (MCS11) | 156.58                                | 166.91                        | 320                           | Pass        |
|        | 6825            | 175     | ax (160MHz) | 996     | 68       | 1020.8/1201 (MCS11) | 156.58                                | 166.91                        | 320                           | Pass        |
|        | 6895            | 189     | ax (20MHz)  | 242     | 61       | 121.9/143.4 (MCS11) | 19.05                                 | 21.24                         | 320                           | Pass        |
|        | 6995            | 209     | ax (20MHz)  | 242     | 61       | 121.9/143.4 (MCS11) | 19.01                                 | 20.94                         | 320                           | Pass        |
|        | 7095            | 229     | ax (20MHz)  | 242     | 61       | 121.9/143.4 (MCS11) | 19.03                                 | 21.15                         | 320                           | Pass        |
|        | 6885            | 187     | ax (40MHz)  | 484     | 65       | 243.8/286.8 (MCS11) | 37.98                                 | 42.06                         | 320                           | Pass        |
|        | 7005            | 211     | ax (40MHz)  | 484     | 65       | 243.8/286.8 (MCS11) | 37.88                                 | 41.89                         | 320                           | Pass        |
|        | 7085            | 227     | ax (40MHz)  | 484     | 65       | 243.8/286.8 (MCS11) | 37.94                                 | 41.50                         | 320                           | Pass        |
|        | 6945            | 199     | ax (80MHz)  | 996     | 67       | 510.4/600.5 (MCS11) | 77.08                                 | 82.21                         | 320                           | Pass        |
|        | 7025            | 215     | ax (80MHz)  | 996     | 67       | 510.4/600.5 (MCS11) | 77.26                                 | 82.12                         | 320                           | Pass        |
|        | 6985            | 207     | ax (160MHz) | 996     | 68       | 1020.8/1201 (MCS11) | 157.11                                | 167.12                        | 320                           | Pass        |

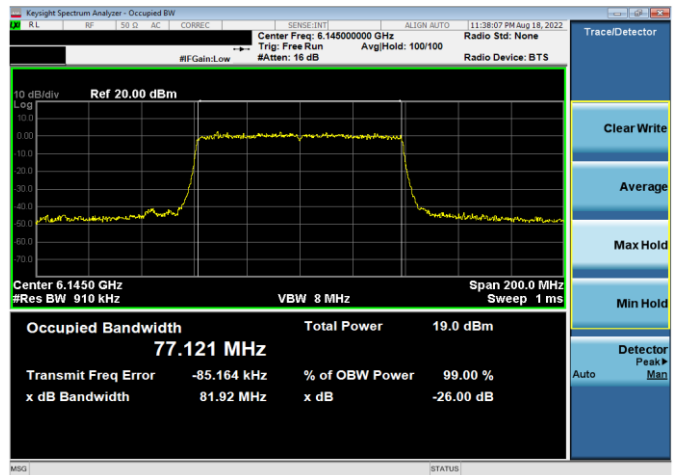
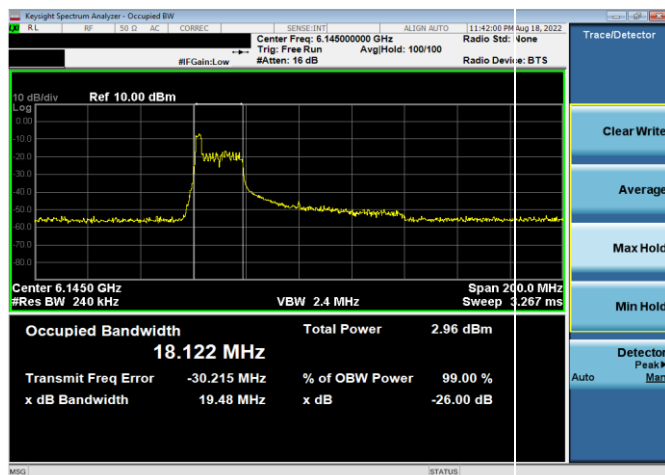
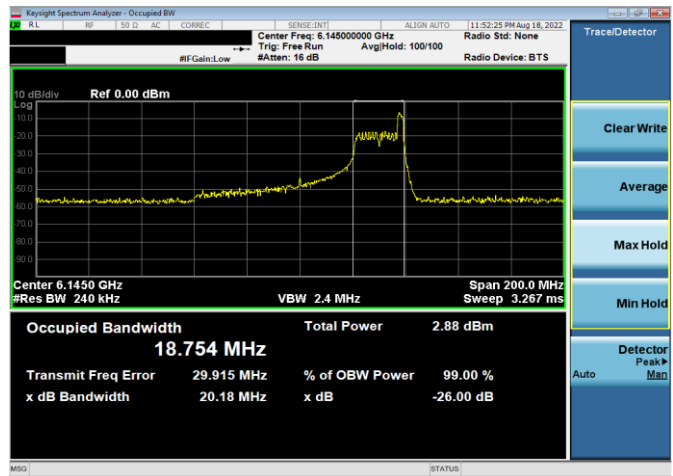
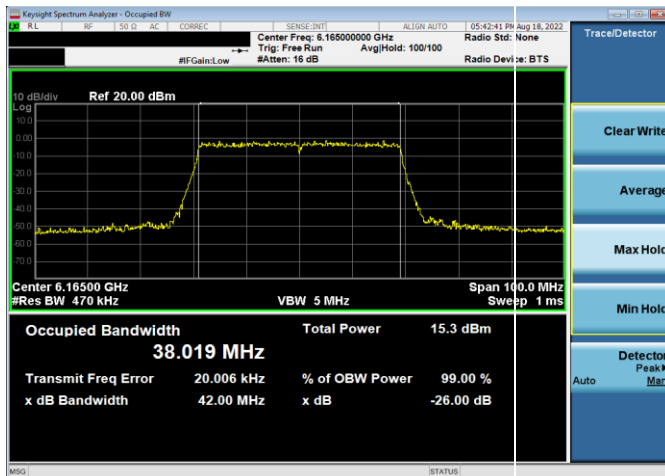
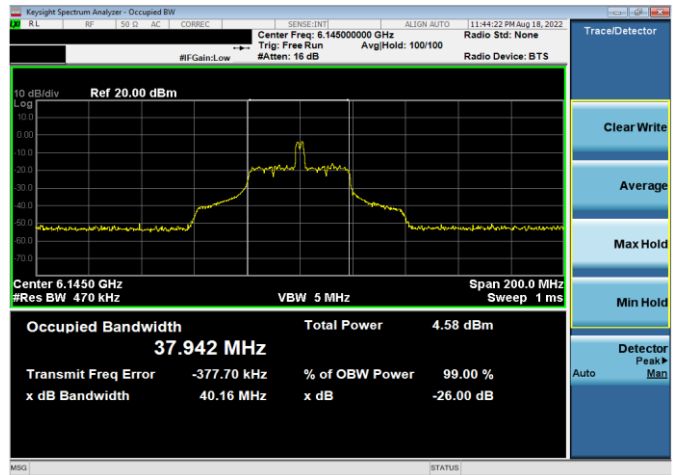
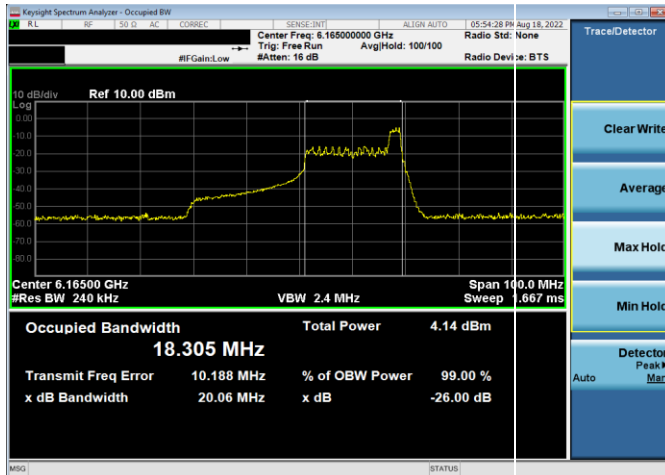
**Table 7-3. Conducted Bandwidth Measurements Antenna 5b (Fully – Loaded RU)**

|                                            |                                                                                     |                                       |                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                               | EUT Type:<br>Tablet Device            | Page 19 of 323                    |

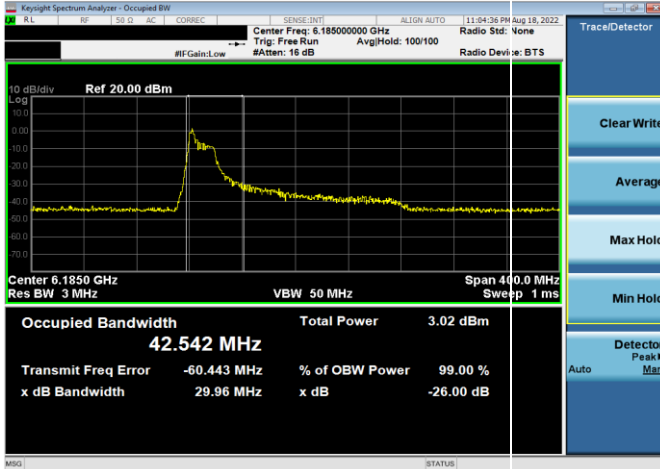




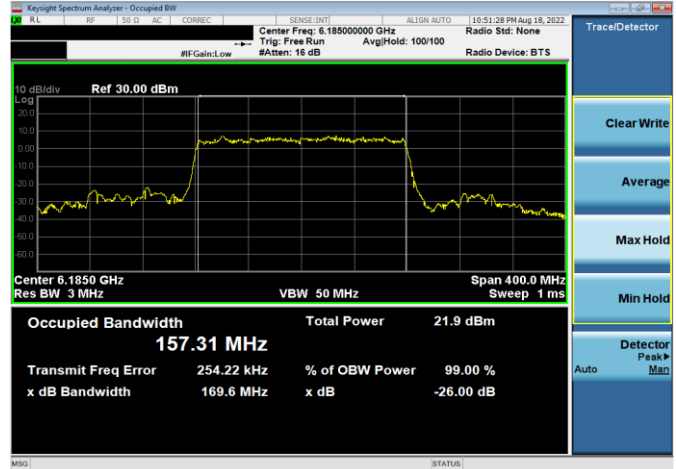
|                                            |                                                                                     |                                       |                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                               | EUT Type:<br>Tablet Device            | Page 20 of 323                    |



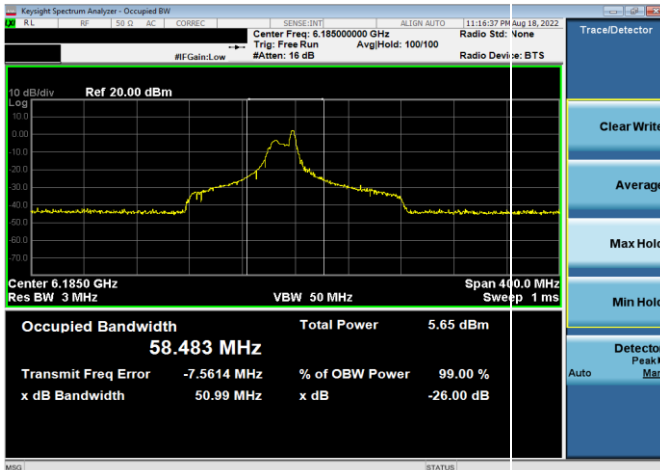
|                                            |                                                                                     |                                       |                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                               | EUT Type:<br>Tablet Device            | Page 21 of 323                    |



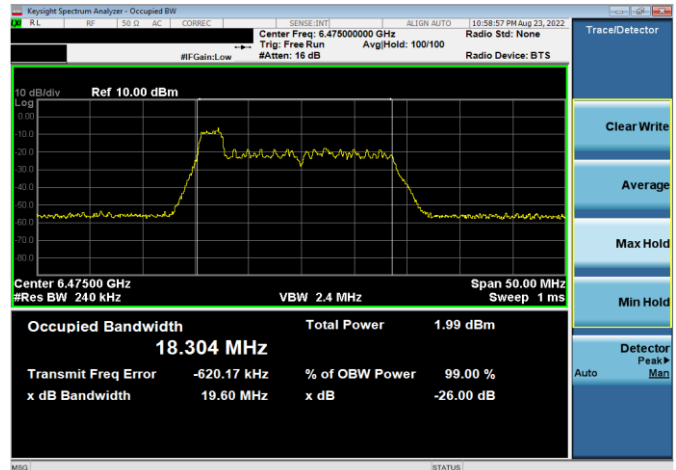
Plot 7-13. 26dB & 99% Bandwidth Plot Antenna 5b (160MHz 802.11ax RU26 (UNII Band 5) – Ch. 47)



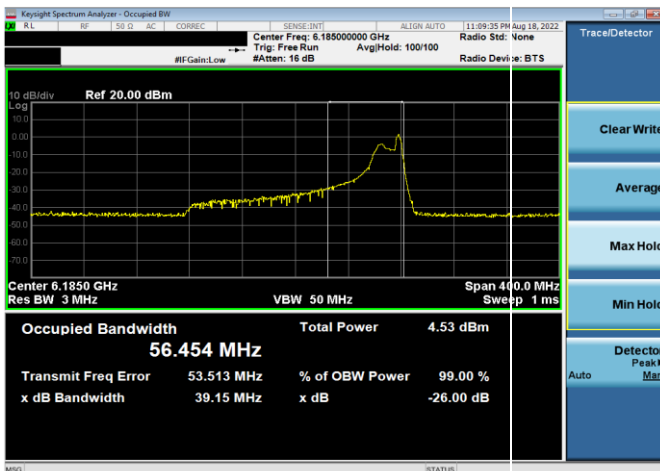
Plot 7-16. 26dB & 99% Bandwidth Plot Antenna 5b (160MHz 802.11ax RU484 (UNII Band 5) – Ch. 47)



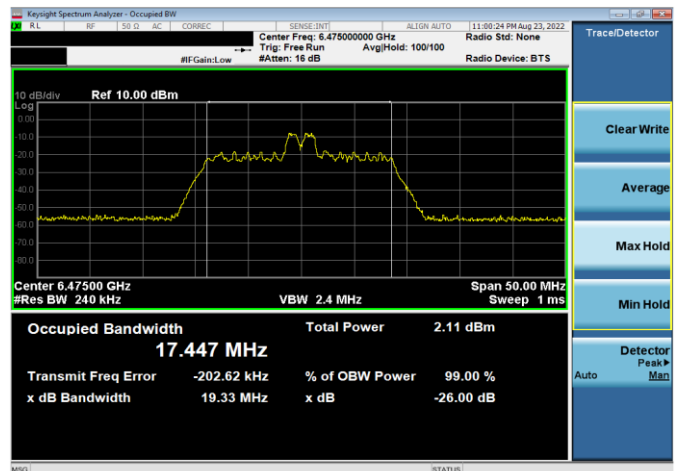
Plot 7-14. 26dB & 99% Bandwidth Plot Antenna 5b (160MHz 802.11ax RU26 (UNII Band 5) – Ch. 47)



Plot 7-17. 26dB & 99% Bandwidth Plot Antenna 5b (20MHz 802.11ax RU26 (UNII Band 6) – Ch. 105)

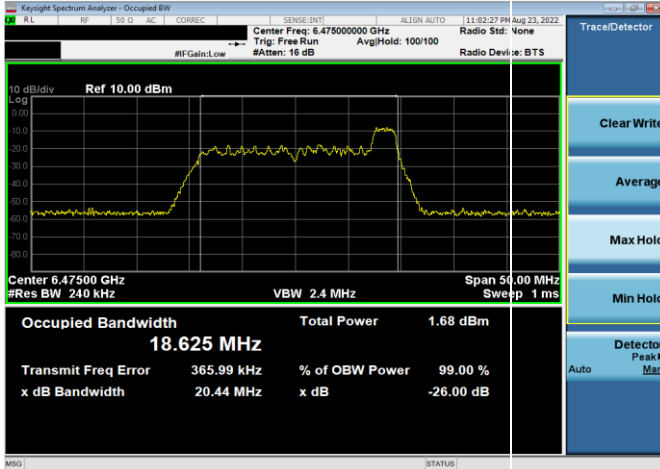


Plot 7-15. 26dB & 99% Bandwidth Plot Antenna 5b (160MHz 802.11ax RU26 (UNII Band 5) – Ch. 47)

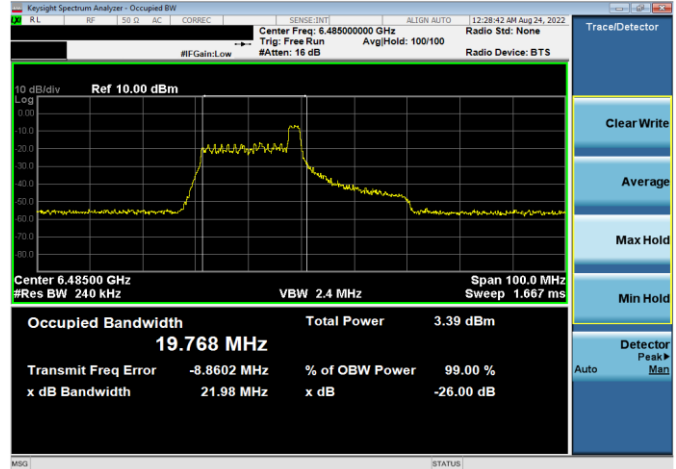


Plot 7-18. 26dB & 99% Bandwidth Plot Antenna 5b (20MHz 802.11ax RU26 (UNII Band 6) – Ch. 105)

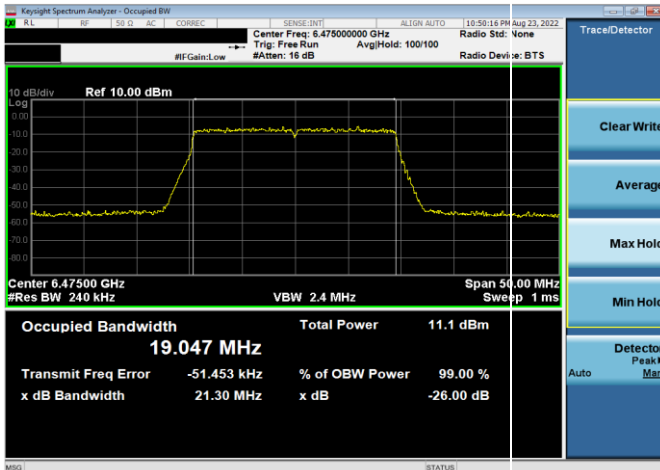
|                                            |                                                                                     |                                       |                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                               | EUT Type:<br>Tablet Device            | Page 22 of 323                    |



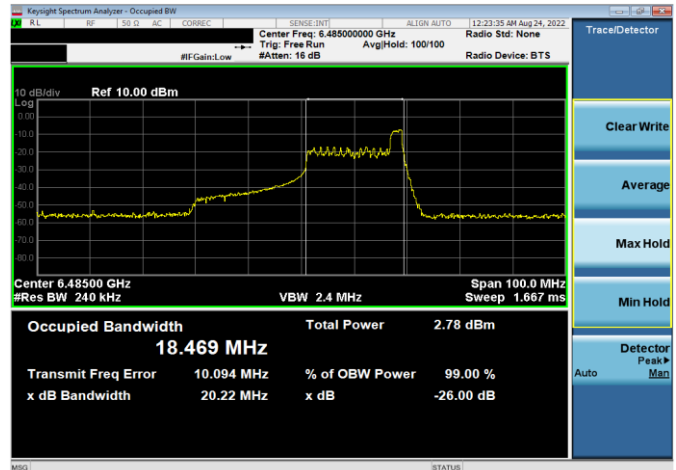
Plot 7-19. 26dB & 99% Bandwidth Plot Antenna 5b (20MHz 802.11ax RU26 (UNII Band 6) – Ch. 105)



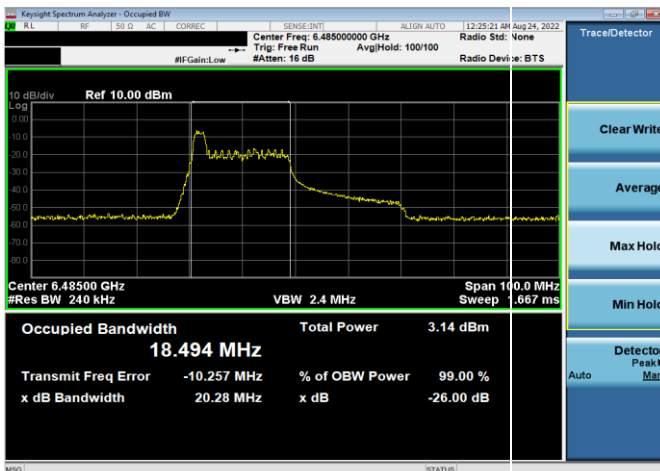
Plot 7-22. 26dB & 99% Bandwidth Plot Antenna 5b (40MHz 802.11ax RU26 (UNII Band 6) – Ch. 107)



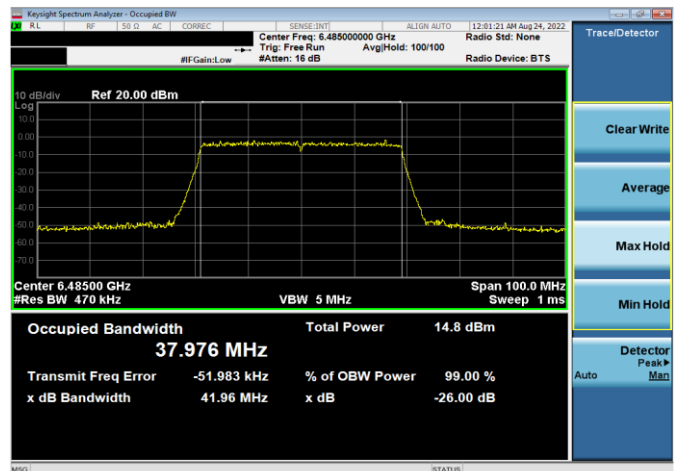
Plot 7-20. 26dB & 99% Bandwidth Plot Antenna 5b (20MHz 802.11ax RU242 (UNII Band 6) – Ch. 105)



Plot 7-23. 26dB & 99% Bandwidth Plot Antenna 5b (40MHz 802.11ax RU26 (UNII Band 6) – Ch. 107)

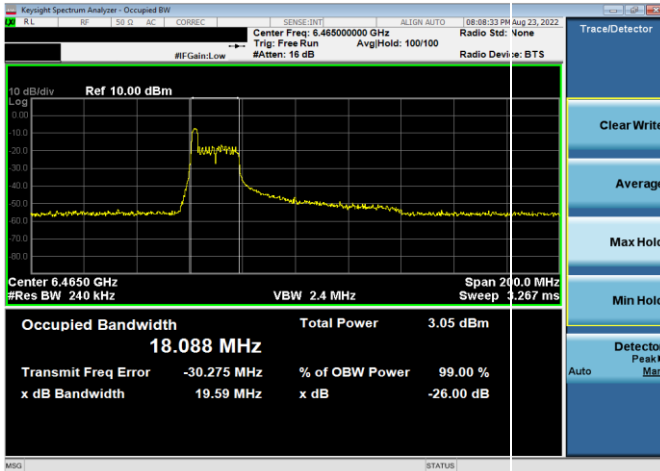


Plot 7-21. 26dB & 99% Bandwidth Plot Antenna 5b (40MHz 802.11ax RU26 (UNII Band 6) – Ch. 107)

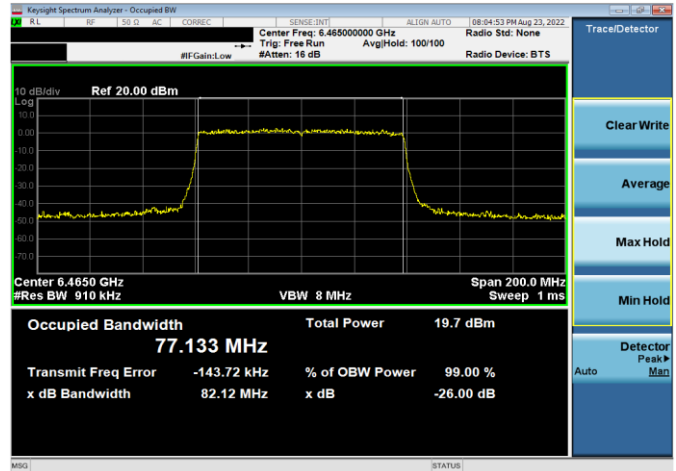


Plot 7-24. 26dB & 99% Bandwidth Plot Antenna 5b (40MHz 802.11ax RU484 (UNII Band 6) – Ch. 107)

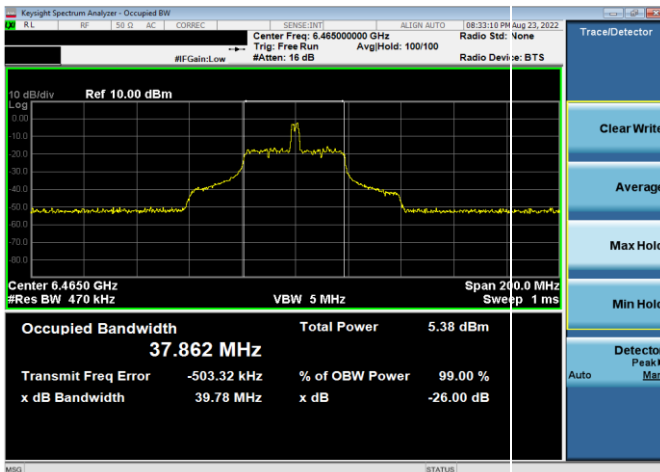
|                                            |                                                                                     |                                       |                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                               | EUT Type:<br>Tablet Device            | Page 23 of 323                    |



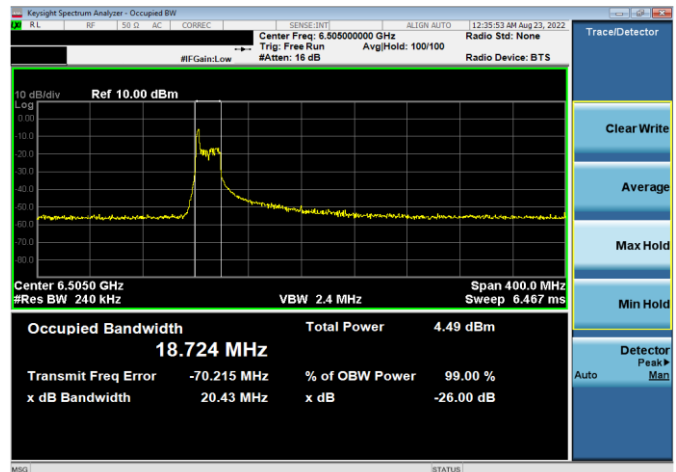
Plot 7-25. 26dB & 99% Bandwidth Plot Antenna 5b (80MHz 802.11ax RU26 (UNII Band 6) – Ch. 103)



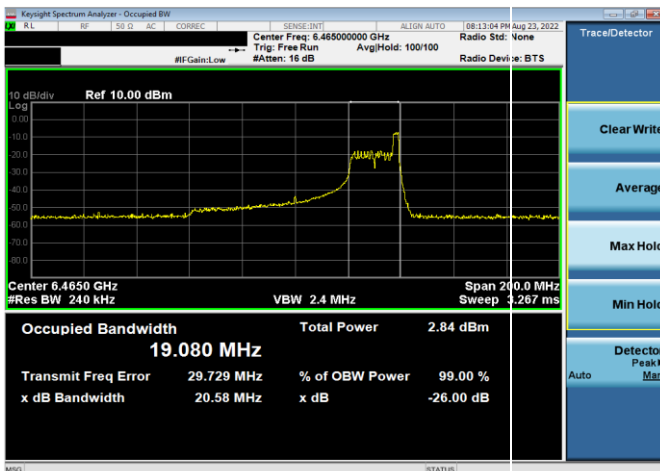
Plot 7-28. 26dB & 99% Bandwidth Plot Antenna 5b (80MHz 802.11ax RU996 (UNII Band 6) – Ch. 103)



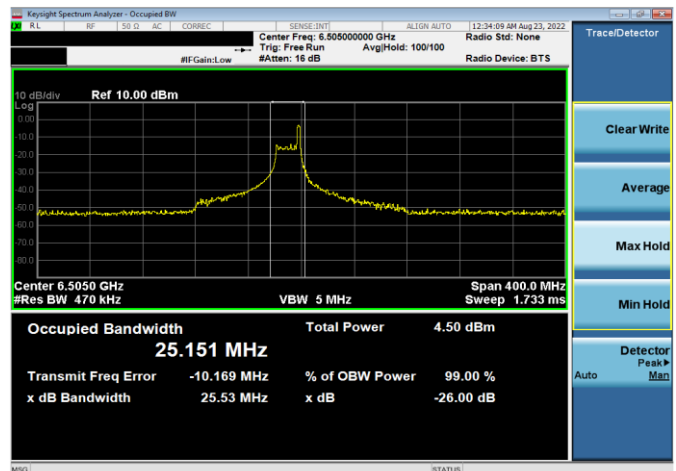
Plot 7-26. 26dB & 99% Bandwidth Plot Antenna 5b (80MHz 802.11ax RU26 (UNII Band 6) – Ch. 103)



Plot 7-29. 26dB & 99% Bandwidth Plot Antenna 5b (160MHz 802.11ax RU26 (UNII Band 6) – Ch. 111)

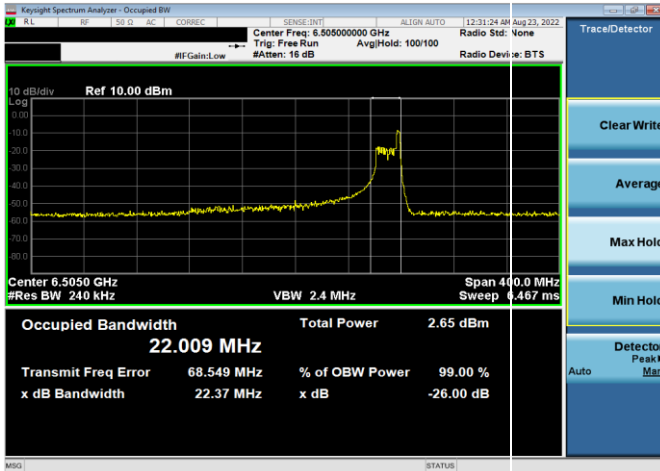


Plot 7-27. 26dB & 99% Bandwidth Plot Antenna 5b (80MHz 802.11ax RU26 (UNII Band 6) – Ch. 103)

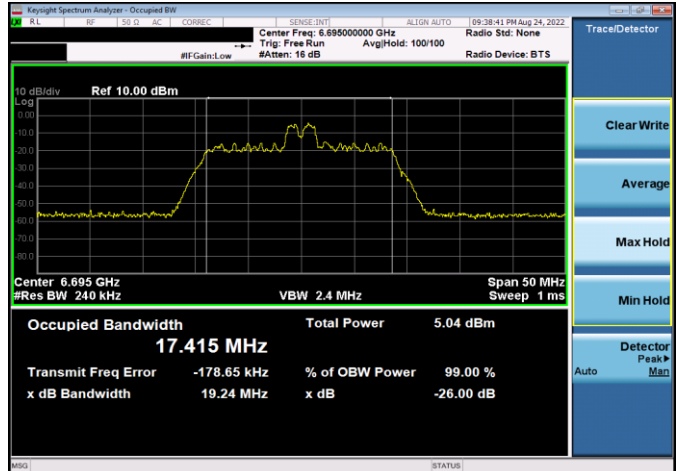


Plot 7-30. 26dB & 99% Bandwidth Plot Antenna 5b (160MHz 802.11ax RU26 (UNII Band 6) – Ch. 111)

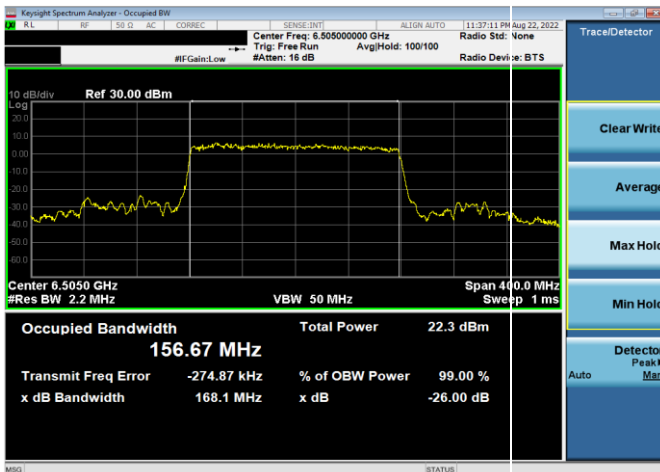
|                                            |                                                                                     |                                       |                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                               | EUT Type:<br>Tablet Device            | Page 24 of 323                    |



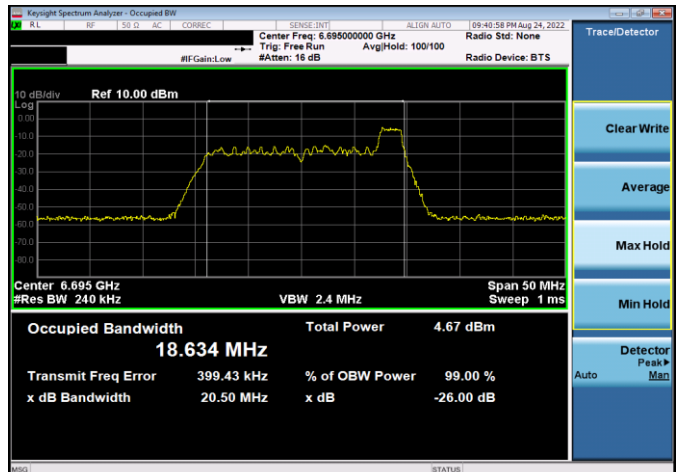
Plot 7-31. 26dB & 99% Bandwidth Plot Antenna 5b (160MHz 802.11ax RU26 (UNII Band 6) – Ch. 111)



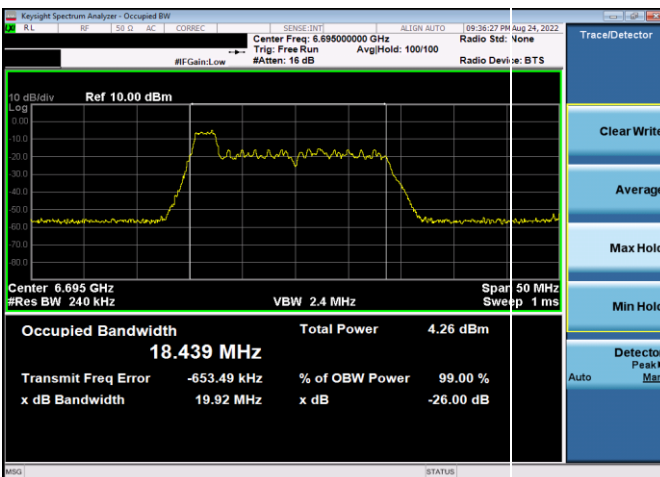
Plot 7-34. 26dB & 99% Bandwidth Plot Antenna 5b (20MHz 802.11ax RU26 (UNII Band 7) – Ch. 149)



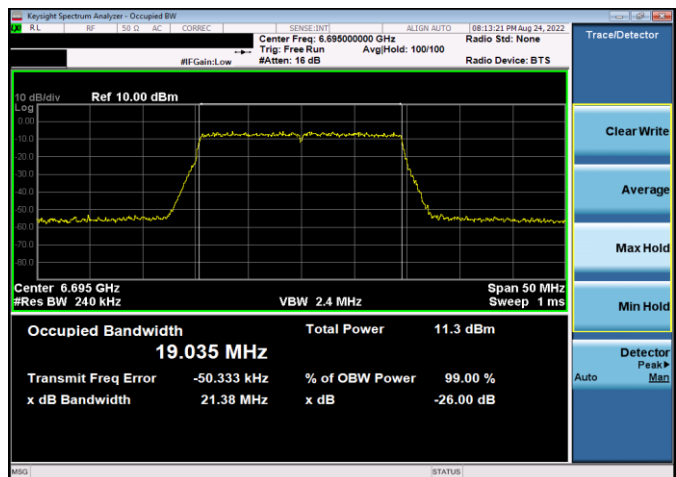
Plot 7-32. 26dB & 99% Bandwidth Plot Antenna 5b (160MHz 802.11ax RU484 (UNII Band 6) – Ch. 111)



Plot 7-35. 26dB & 99% Bandwidth Plot Antenna 5b (20MHz 802.11ax RU26 (UNII Band 7) – Ch. 149)



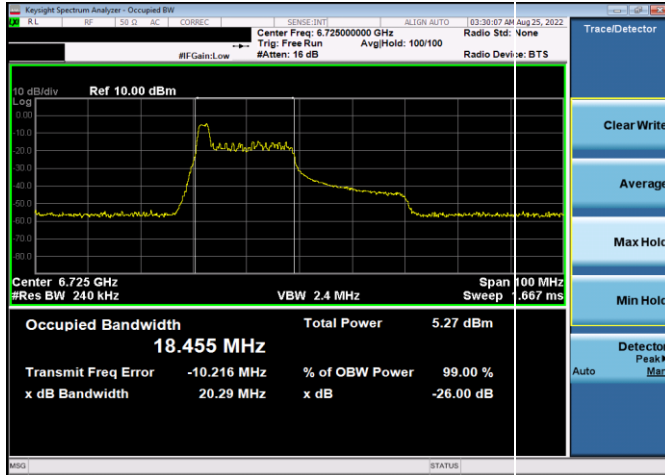
Plot 7-33. 26dB & 99% Bandwidth Plot Antenna 5b (20MHz 802.11ax RU26 (UNII Band 7) – Ch. 149)



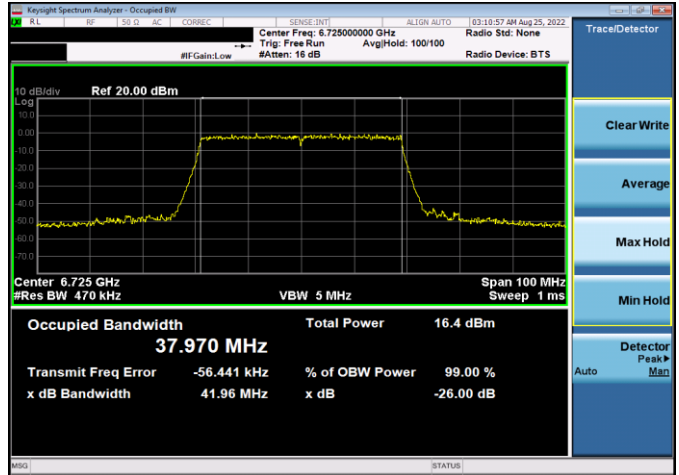
Plot 7-36. 26dB & 99% Bandwidth Plot Antenna 5b (20MHz 802.11ax RU242 (UNII Band 7) – Ch. 149)

|                                            |                                                                                     |                                       |                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                               | EUT Type:<br>Tablet Device            | Page 25 of 323                    |

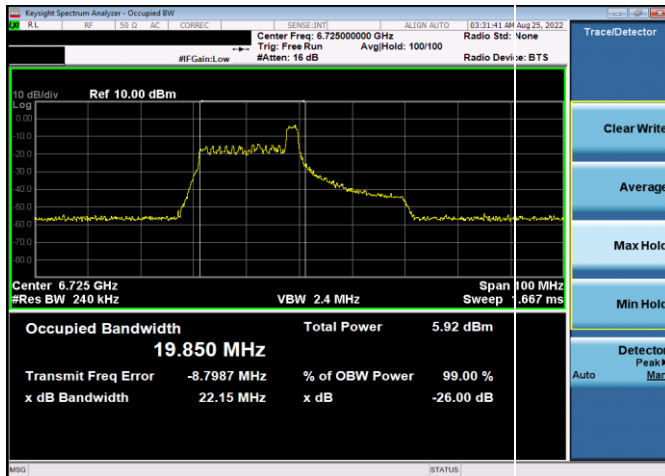




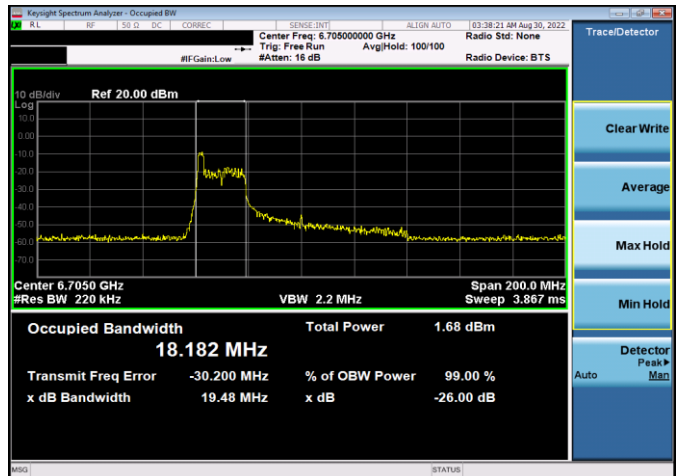
Plot 7-37. 26dB & 99% Bandwidth Plot Antenna 5b (40MHz 802.11ax RU26 (UNII Band 7) – Ch. 155)



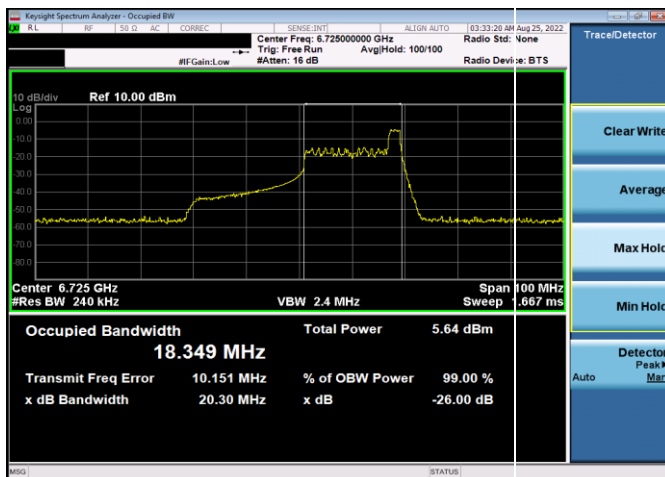
Plot 7-40. 26dB & 99% Bandwidth Plot Antenna 5b (40MHz 802.11ax RU484 (UNII Band 7) – Ch. 155)



Plot 7-38. 26dB & 99% Bandwidth Plot Antenna 5b (40MHz 802.11ax RU26 (UNII Band 7) – Ch. 155)



Plot 7-41. 26dB & 99% Bandwidth Plot Antenna 5b (80MHz 802.11ax RU26 (UNII Band 7) – Ch. 151)

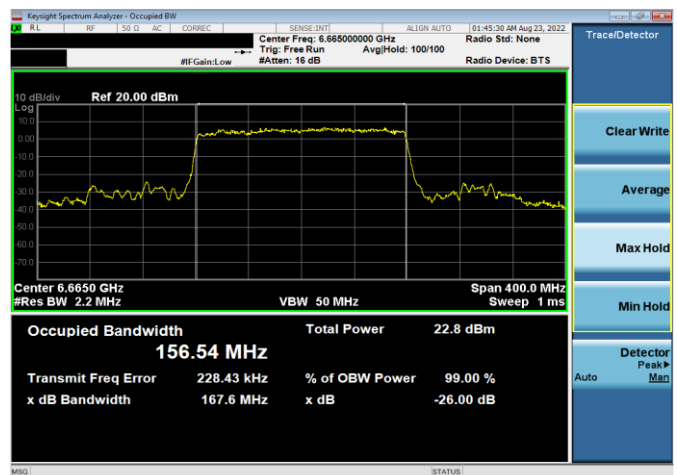
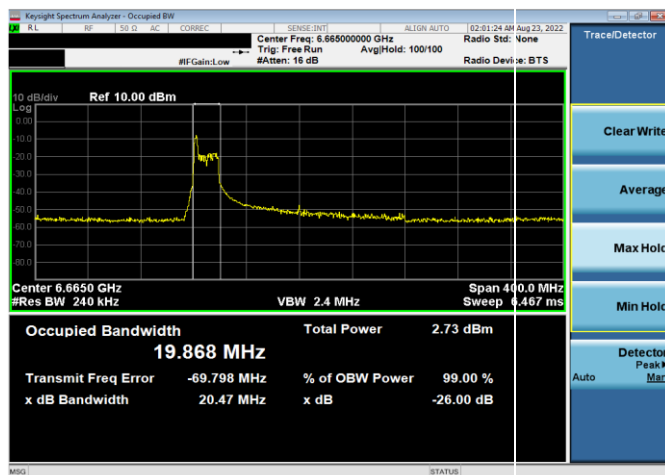
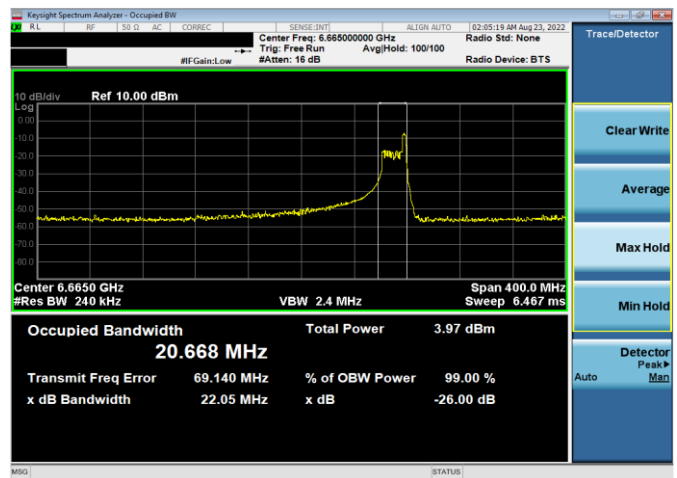
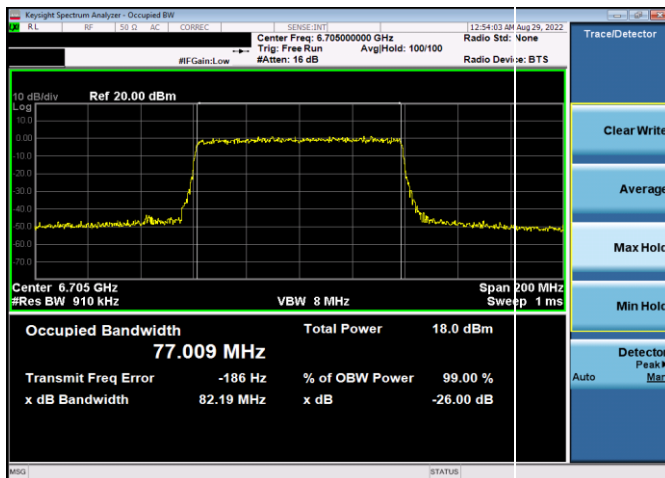
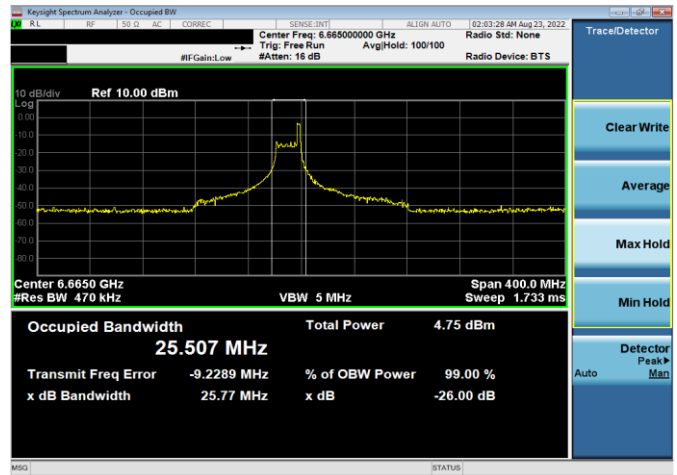
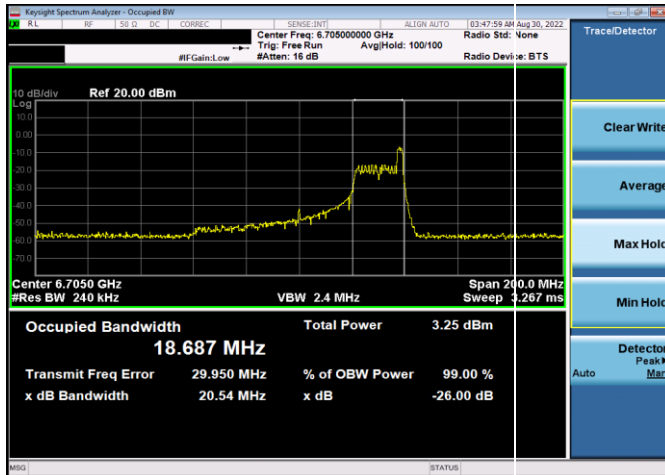


Plot 7-39. 26dB & 99% Bandwidth Plot Antenna 5b (40MHz 802.11ax RU26 (UNII Band 7) – Ch. 155)



Plot 7-42. 26dB & 99% Bandwidth Plot Antenna 5b (80MHz 802.11ax RU26 (UNII Band 7) – Ch. 151)

|                                            |                                                                                     |                                       |                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  | MEASUREMENT REPORT<br>(CERTIFICATION) | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                               | EUT Type:<br>Tablet Device            | Page 26 of 323                    |



|                                            |                                                                                                                                   |                            |                                   |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|
| FCC ID: BCGA2435<br>IC: 579C-A2435         |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                            | Approved by:<br>Technical Manager |
| Test Report S/N:<br>1C2205090025-22-R2.BCG | Test Dates:<br>05/27/2022 - 9/12/2022                                                                                             | EUT Type:<br>Tablet Device | Page 27 of 323                    |