**MEASUREMENT REPORT**  
**FCC PART 15.407 UNII 802.11a/n/ac****Applicant Name:**LG Electronics USA, Inc.  
1000 Sylvan Avenue  
Englewood Cliffs, NJ 07632  
United States**Date of Testing:**

12/11/2018 - 1/18/2019

**Test Site/Location:**

PCTEST Lab. Columbia, MD, USA

**Test Report Serial No.:**

1M1812060222-06.ZNF

**FCC ID:****ZNFQ850QM****APPLICANT:****LG Electronics USA, Inc.****Application Type:**

Certification

**Model:**

LM-Q850QM

**Additional Model(s):**LMQ850QM, Q850QM, LM-Q850QM5, LMQ850QM5, Q850QM5,  
LMQ850QM6, LMQ850QM6, Q850QM6**EUT Type:**

Portable Handset

**Frequency Range:**

5180 – 5825MHz

**FCC Classification:**

Unlicensed National Information Infrastructure (UNII)

**FCC Rule Part(s):**

Part 15 Subpart E (15.407)

**Test Procedure(s):**ANSI C63.10-2013, KDB 789033 D02 v02r0,  
KDB 662911 D01 v02r01

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.

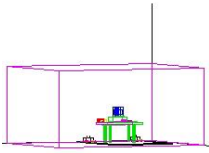
  
Randy Ortanez  
President

|                                                |                                                                                     |                                              |                                                                                       |                                        |
|------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
| <b>FCC ID:</b> ZNFQ850QM                       |  | <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |  | <b>Approved by:</b><br>Quality Manager |
| <b>Test Report S/N:</b><br>1M1812060222-06.ZNF | <b>Test Dates:</b><br>12/11/2018 - 1/18/2019                                        | <b>EUT Type:</b><br>Portable Handset         |                                                                                       | Page 1 of 170                          |

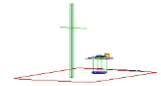
# TABLE OF CONTENTS

|        |                                                               |     |
|--------|---------------------------------------------------------------|-----|
| 1.0    | INTRODUCTION.....                                             | 4   |
| 1.1    | Scope .....                                                   | 4   |
| 1.2    | PCTEST 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    | Test Configuration.....                                       | 7   |
| 2.4    | EMI Suppression Device(s)/Modifications .....                 | 7   |
| 3.0    | DESCRIPTION OF TESTS .....                                    | 8   |
| 3.1    | Evaluation Procedure.....                                     | 8   |
| 3.2    | AC Line Conducted Emissions .....                             | 8   |
| 3.3    | Radiated Emissions .....                                      | 9   |
| 3.4    | Environmental Conditions .....                                | 9   |
| 4.0    | ANTENNA REQUIREMENTS .....                                    | 10  |
| 5.0    | MEASUREMENT UNCERTAINTY.....                                  | 11  |
| 6.0    | TEST EQUIPMENT CALIBRATION DATA.....                          | 12  |
| 7.0    | TEST RESULTS .....                                            | 13  |
| 7.1    | Summary.....                                                  | 13  |
| 7.2    | 26dB Bandwidth Measurement – 802.11«anac» .....               | 14  |
| 7.3    | 6dB Bandwidth Measurement – 802.11«anac» .....                | 47  |
| 7.4    | UNII Output Power Measurement – 802.11«anac» .....            | 58  |
| 7.5    | Maximum Power Spectral Density – 802.11«anac» .....           | 67  |
| 7.6    | Radiated Spurious Emission Measurements – Above 1GHz.....     | 112 |
| 7.7.1  | Antenna-1 Radiated Spurious Emission Measurements.....        | 115 |
| 7.7.2  | Antenna-2 Radiated Spurious Emission Measurements.....        | 124 |
| 7.7.3  | Simultaneous Tx Radiated Spurious Emissions Measurements..... | 133 |
| 7.7.4  | Antenna-1 Radiated Band Edge Measurements (20MHz BW).....     | 139 |
| 7.7.5  | Antenna-1 Radiated Band Edge Measurements (40MHz BW).....     | 141 |
| 7.7.6  | Antenna-1 Radiated Band Edge Measurements (80MHz BW).....     | 143 |
| 7.7.7  | Antenna-2 Radiated Band Edge Measurements (20MHz BW).....     | 145 |
| 7.7.8  | Antenna-2 Radiated Band Edge Measurements (40MHz BW).....     | 147 |
| 7.7.9  | Antenna-2 Radiated Band Edge Measurements (80MHz BW).....     | 149 |
| 7.7.10 | MIMO Radiated Band Edge Measurements (20MHz BW).....          | 151 |
| 7.7.11 | Antenna-2 Radiated Band Edge Measurements (40MHz BW).....     | 153 |
| 7.7.12 | Antenna-2 Radiated Band Edge Measurements (80MHz BW).....     | 155 |
| 7.7    | Radiated Spurious Emissions Measurements – Below 1GHz .....   | 159 |
| 7.8    | Line-Conducted Test Data .....                                | 164 |
| 8.0    | CONCLUSION .....                                              | 170 |

|                                         |                                                                                     |                                       |                                                                                       |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset         | Page 2 of 170                                                                         |                                 |



## MEASUREMENT REPORT



| UNII Band | Channel Bandwidth (MHz) | Tx Frequency (MHz) | ANT1            |                  | ANT2            |                  | MIMO            |                  |
|-----------|-------------------------|--------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
|           |                         |                    | Max. Power (mW) | Max. Power (dBm) | Max. Power (mW) | Max. Power (dBm) | Max. Power (mW) | Max. Power (dBm) |
| 1         | 20                      | 5180 - 5240        | 60.534          | 17.82            | 60.395          | 17.81            | 120.929         | 20.83            |
| 2A        |                         | 5260 - 5320        | 59.979          | 17.78            | 59.979          | 17.78            | 118.593         | 20.74            |
| 2C        |                         | 5500 - 5720        | 60.814          | 17.84            | 60.534          | 17.82            | 121.069         | 20.83            |
| 3         |                         | 5745 - 5825        | 54.702          | 17.38            | 55.847          | 17.47            | 108.403         | 20.35            |
| 1         | 40                      | 5190 - 5230        | 39.628          | 15.98            | 37.584          | 15.75            | 79.164          | 18.99            |
| 2A        |                         | 5270 - 5310        | 39.719          | 15.99            | 38.019          | 15.80            | 79.347          | 19.00            |
| 2C        |                         | 5510 - 5710        | 39.719          | 15.99            | 37.154          | 15.70            | 79.347          | 19.00            |
| 3         |                         | 5755 - 5795        | 39.719          | 15.99            | 34.995          | 15.44            | 79.256          | 18.99            |
| 1         | 80                      | 5210               | 29.376          | 14.68            | 30.061          | 14.78            | 59.437          | 17.74            |
| 2A        |                         | 5290               | 28.973          | 14.62            | 30.479          | 14.84            | 59.452          | 17.74            |
| 2C        |                         | 5530 - 5690        | 27.669          | 14.42            | 31.550          | 14.99            | 59.029          | 17.71            |
| 3         |                         | 5775               | 27.227          | 14.35            | 31.477          | 14.98            | 58.704          | 17.69            |

### EUT Overview

|                                         |                                                                                     |                                    |                                                                                       |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  | MEASUREMENT REPORT (CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset      | Page 3 of 170                                                                         |                                 |

## 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 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

### 1.3 Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 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.
- PCTEST 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).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISSED.

|                                         |                                                                                     |                                       |                                                                                       |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset         |                                                                                       | Page 4 of 170                   |

## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFQ850QM**. The test data contained in this report pertains only to the emissions due to the EUT's UNII transmitter.

**Test Device Serial No.:** 00356, 00265, 00364

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n/ac WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE), NFC

| Band 1 |                 | Band 2A |                 | Band 2C |                 | Band 3 |                 |
|--------|-----------------|---------|-----------------|---------|-----------------|--------|-----------------|
| Ch.    | Frequency (MHz) | Ch.     | Frequency (MHz) | Ch.     | Frequency (MHz) | Ch.    | Frequency (MHz) |
| 36     | 5180            | 52      | 5260            | 100     | 5500            | 149    | 5745            |
| :      | :               | :       | :               | :       | :               | :      | :               |
| 42     | 5210            | 56      | 5280            | 120     | 5600            | 157    | 5785            |
| :      | :               | :       | :               | :       | :               | :      | :               |
| 48     | 5240            | 64      | 5320            | 144     | 5720            | 165    | 5825            |

**Table 2-1. 802.11a / 802.11n / 802.11ac (20MHz) Frequency / Channel Operations**

| Band 1 |                 | Band 2A |                 | Band 2C |                 | Band 3 |                 |
|--------|-----------------|---------|-----------------|---------|-----------------|--------|-----------------|
| Ch.    | Frequency (MHz) | Ch.     | Frequency (MHz) | Ch.     | Frequency (MHz) | Ch.    | Frequency (MHz) |
| 38     | 5190            | 54      | 5270            | 102     | 5510            | 151    | 5755            |
| :      | :               | :       | :               | :       | :               | :      | :               |
| 46     | 5230            | 62      | 5310            | 118     | 5590            | 159    | 5795            |
|        |                 |         |                 | :       | :               |        |                 |
|        |                 |         |                 | 142     | 5710            |        |                 |

**Table 2-2. 802.11n / 802.11ac (40MHz BW) Frequency / Channel Operations**

| Band 1 |                 | Band 2A |                 | Band 2C |                 | Band 3 |                 |
|--------|-----------------|---------|-----------------|---------|-----------------|--------|-----------------|
| Ch.    | Frequency (MHz) | Ch.     | Frequency (MHz) | Ch.     | Frequency (MHz) | Ch.    | Frequency (MHz) |
| 42     | 5210            | 58      | 5290            | 106     | 5530            | 155    | 5775            |
|        |                 |         |                 | :       | :               |        |                 |
|        |                 |         |                 | 138     | 5690            |        |                 |

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

|                                                |                                                                                     |                                               |                                                                                       |                                        |
|------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------|
| <b>FCC ID:</b> ZNFQ850QM                       |  | <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |  | <b>Approved by:</b><br>Quality Manager |
| <b>Test Report S/N:</b><br>1M1812060222-06-ZNF | <b>Test Dates:</b><br>12/11/2018 - 1/18/2019                                        | <b>EUT Type:</b><br>Portable Handset          | Page 5 of 170                                                                         |                                        |

#### Notes:

- 5GHz 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) of ANSI C63.10-2013 and KDB 789033 D02 v02r01. 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:

| Maximum Achievable Duty Cycles |           |                |      |       |
|--------------------------------|-----------|----------------|------|-------|
| 802.11 Mode/Band               |           | Duty Cycle [%] |      |       |
|                                |           | ANT1           | ANT2 | MIMO  |
| 5GHz                           | a         | 95.1           | 95.3 | 95.04 |
|                                | n (HT20)  | 95.0           | 95.0 | 94.7  |
|                                | ac (HT20) | 94.5           | 94.5 | 94.3  |
|                                | n (HT40)  | 93.4           | 92.7 | 92.3  |
|                                | ac (HT40) | 92.8           | 92.0 | 92.9  |
|                                | ac (HT80) | 92.1           | 92.1 | 92.4  |

**Table 2-4. Measured Duty Cycles**

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

| WiFi Configurations |                | SISO |      | SDM  |      | CDD/MIMO |      |
|---------------------|----------------|------|------|------|------|----------|------|
|                     |                | ANT1 | ANT2 | ANT1 | ANT2 | ANT1     | ANT2 |
| 5GHz                | 11a            | ✓    | ✓    | ✗    | ✗    | ✓        | ✓    |
|                     | 11n/ac (20MHz) | ✓    | ✓    | ✓    | ✓    | ✓        | ✓    |
|                     | 11n/ac (40MHz) | ✓    | ✓    | ✓    | ✓    | ✓        | ✓    |
|                     | 11ac (80MHz)   | ✓    | ✓    | ✓    | ✓    | ✓        | ✓    |

**Table 2-5. Frequency / Channel Operations**

✓ = Support ; ✗ = NOT Support

**SISO** = Single Input Single Output

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

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

Data Rate(s) Tested: 6, 9, 12, 18, 24, 36, 48, 54Mbps (802.11a)  
 6.5/7.2, 13/14.4, 19.5/21.7, 26/28.9, 39/43.3, 52/57.8, 58.5/65, 65/72.2 (n – 20MHz)  
 13.5/15, 27/30, 40.5/45, 54/60, 81/90, 108/120, 121.5/135, 135/150 (n – 40MHz BW)  
 29.3/32.5, 58.5/65, 87.8/97.5, 117/130, 175.5/195, 234/260, 263.3/292.5, 292.5/325, 351/390, 390/433.3 (ac – 80MHz BW)  
 13/14.4, 26.28.9, 39/43.3, 52/57.8, 78/86.7, 104/115.6, 117/130, 130/144.4Mbps (MIMO n/ac – 20MHz)  
 156/173Mbps (MIMO ac – 20MHz)  
 27/30, 54/60, 81/90, 108/120, 162/180, 216/240, 243/270, 270/300Mbps (MIMO n/ac – 40MHz) 324/360, 360/400Mbps (MIMO ac – 40MHz)  
 58.5/65, 117/130, 175.5/195, 234/260, 351/390, 468/520, 526.5/585, 585/650, 702/780, 780/866.7Mbps (MIMO ac – 80MHz)

|                                         |                                                                                                                                                                                                                         |                               |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                               | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                                                                                                                                                                   | EUT Type:<br>Portable Handset | Page 6 of 170                   |

## 2.3 Test Configuration

The EUT was tested per the guidance of KDB 789033 D02 v02r01. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

## 2.4 EMI Suppression Device(s)/Modifications

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

|                                                |                                                                                                                                   |                                               |                                                                                                 |                                        |
|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------|
| <b>FCC ID:</b> ZNFQ850QM                       |  <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |  <b>LG</b> | <b>Approved by:</b><br>Quality Manager |
| <b>Test Report S/N:</b><br>1M1812060222-06.ZNF | <b>Test Dates:</b><br>12/11/2018 - 1/18/2019                                                                                      | <b>EUT Type:</b><br>Portable Handset          | Page 7 of 170                                                                                   |                                        |

## 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 10'x16'x9' shielded enclosure. The shielded enclosure is manufactured by ETS Lindgren RF Enclosures. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-5. 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 an ETS Lindgren Model LPRX-4X30 (100dB Attenuation, 14kHz-18GHz) and the two EMI/RFI filters are ETS Lindgren Model LRW-2030-S1 (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 groundplane. 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 Line-Conducted Test Data. The EMI Receiver mode of the Agilent MXE was used to perform AC line conducted emissions testing.

|                                         |                                                                                     |                                       |                                                                                       |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset         |                                                                                       | Page 8 of 170                   |



### 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.

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.

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 474788 D01.

### 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).

|                                         |                                                                                     |                                       |                                                                                       |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset         | Page 9 of 170                                                                         |                                 |

## 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.

|                                         |                                                                                     |                                       |                                                                                       |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset         |                                                                                       | Page 10 of 170                  |

## 5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. 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 | 1.13                             |
| Line Conducted Disturbance       | 3.09                             |
| Radiated Disturbance (<1GHz)     | 4.98                             |
| Radiated Disturbance (>1GHz)     | 5.07                             |
| Radiated Disturbance (>18GHz)    | 5.09                             |

|                                         |                                                                                     |                                       |                                                                                       |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset         |                                                                                       | Page 11 of 170                  |

## 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 |
|-----------------|---------------|--------------------------------------|------------|--------------|------------|---------------|
| -               | WL40-1        | Conducted Cable Set (40GHz)          | 1/23/2018  | Annual       | 1/23/2019  | WL40-1        |
| Agilent         | N9020A        | MXA Signal Analyzer                  | 1/24/2018  | Annual       | 1/24/2019  | US46470561    |
| Agilent         | N9038A        | MXE EMI Receiver                     | 6/11/2018  | Annual       | 6/11/2019  | MY51210133    |
| Com-Power       | AL-130        | 9kHz - 30MHz Loop Antenna            | 10/10/2017 | Biennial     | 10/10/2019 | 121034        |
| COM-Power       | PAM-103       | Pre-Amplifier (1-1000MHz)            | 9/17/2018  | Annual       | 9/17/2019  | 441119        |
| Emco            | 3115          | Horn Antenna (1-18GHz)               | 3/28/2018  | Biennial     | 3/28/2020  | 9704-5182     |
| EMCO            | 3160-10       | Small Horn (26.5 - 40GHz)            | 8/9/2018   | Biennial     | 8/9/2020   | 130993        |
| EMCO            | 3160-09       | Small Horn (18 - 26.5GHz)            | 8/9/2018   | Biennial     | 8/9/2020   | 135427        |
| ETS-Lindgren    | 3816/2NM      | Line Impedance Stabilization Network | 6/18/2018  | Biennial     | 6/18/2020  | 114451        |
| Huber + Suhner  | Sucoflex 102A | 40GHz Radiated Cable Set             | 1/23/2018  | Annual       | 1/23/2019  | 251425001     |
| Rohde & Schwarz | TS-PR26       | 18-26.5 GHz Pre-Amplifier            | 1/24/2018  | Annual       | 1/24/2019  | 100040        |
| Rohde & Schwarz | ESU26         | EMI Test Receiver (26.5GHz)          | 5/21/2018  | Annual       | 5/21/2019  | 100342        |
| Rohde & Schwarz | TS-PR40       | 26.5-40 GHz Pre-Amplifier            | 1/24/2018  | Annual       | 1/24/2019  | 100037        |
| Rohde & Schwarz | ESU40         | EMI Test Receiver (40GHz)            | 8/9/2018   | Annual       | 8/9/2019   | 100348        |
| Rohde & Schwarz | ESW44         | EMI Test Receiver                    | 11/20/2018 | Annual       | 11/20/2019 | 101570        |
| Rohde & Schwarz | SFUNIT-Rx     | Shielded Filter Unit                 | 7/2/2018   | Annual       | 7/2/2019   | 102131        |
| Rohde & Schwarz | SFUNIT-Rx     | Shielded Filter Unit                 | 6/18/2018  | Annual       | 6/18/2019  | 102134        |
| Sunol           | DRH-118       | Horn Antenna (1-18GHz)               | 8/11/2017  | Biennial     | 8/11/2019  | A050307       |
| Sunol           | JB5           | Bi-Log Antenna (30M - 5GHz)          | 4/19/2018  | Biennial     | 4/19/2020  | A051107       |

**Table 6-1. Annual Test Equipment Calibration Schedule**

### 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: ZNFQ850QM                       |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset         | Page 12 of 170                                                                        |                                 |

## 7.0 TEST RESULTS

### 7.1 Summary

Company Name: LG Electronics USA, Inc.  
 FCC ID: ZNFQ850QM  
 FCC Classification: Unlicensed National Information Infrastructure (UNII)

| FCC Part Section(s)                | RSS Section(s) | Test Description                                                              | Test Limit                                                                                     | Test Condition | Test Result | Reference           |
|------------------------------------|----------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------|-------------|---------------------|
| N/A                                | RSS-Gen [6.6]  | 26dB Bandwidth                                                                | N/A                                                                                            | CONDUCTED      | PASS        | Section 7.2         |
| 15.407(e)                          | RSS-Gen [6.6]  | 6dB Bandwidth                                                                 | >500kHz(5725-5850MHz)                                                                          |                | PASS        | Section 7.3         |
| 15.407 (a.1.iv), (a.2), (a.3)      | RSS-247 [6.2]  | Maximum Conducted Output Power                                                | Maximum conducted powers must meet the limits detailed in 15.407 (a) (RSS-247 [6.2])           |                | PASS        | Section 7.4         |
| 15.407 (a.1.iv), (a.2), (a.3)      | RSS-247 [6.2]  | Maximum Power Spectral Density                                                | Maximum power spectral density must meet the limits detailed in 15.407 (a) (RSS-247 [6.2])     |                | PASS        | Section 7.5         |
| 15.407(h)                          | RSS-247 [6.3]  | Dynamic Frequency Selection                                                   | See DFS Test Report                                                                            |                | PASS        | See DFS Test Report |
| 15.407(b.1), (2), (3), (4)         | RSS-247 [6.2]  | Undesirable Emissions                                                         | Undesirable emissions must meet the limits detailed in 15.407(b) (RSS-247 [6.2])               | RADIATED       | PASS        | Sections 7.6, 7.7   |
| 15.205, 15.407(b.1), (4), (5), (6) | 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 7.5         |
| 15.407                             | RSS-Gen [8.8]  | AC Conducted Emissions 150kHz – 30MHz                                         | < FCC 15.207 (RSS-Gen [8.8]) limits                                                            | LINE CONDUCTED | PASS        | Section 7.8         |

**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 PCTEST "UNII Automation," Version 4.6.
- 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 PCTEST "Chamber Automation," Version 0.2.16.

|                                         |                                                                                     |                                       |                                                                                       |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset         | Page 13 of 170                                                                        |                                 |

## 7.2 26dB Bandwidth Measurement – 802.11a/n

RSS-Gen [6.2]

### 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.

*The 26dB bandwidth is used to determine the conducted power limits.*

### 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

None.

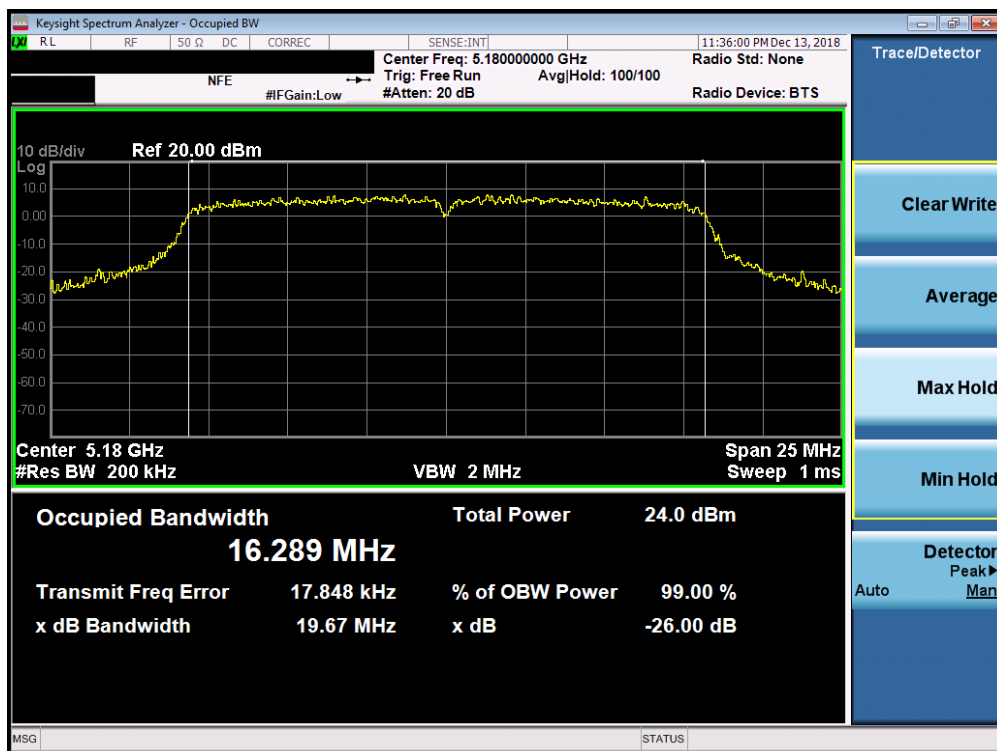
|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 14 of 170                  |

## SISO Antenna-1 26 dB Bandwidth Measurements

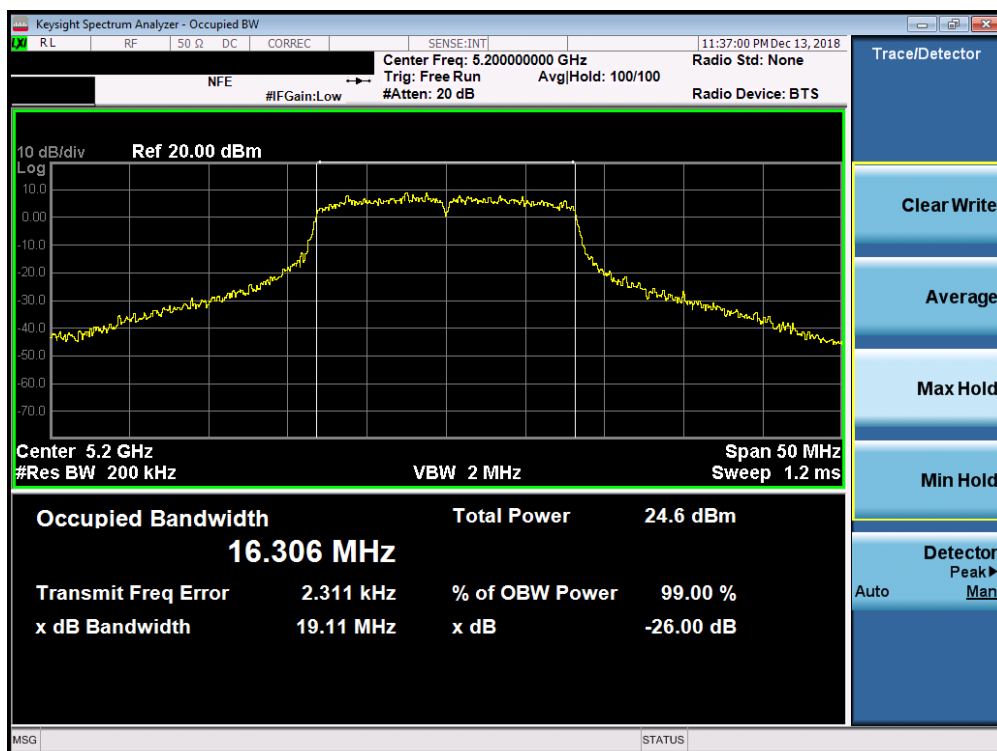
|         | Frequency [MHz] | Channel No. | 802.11 Mode | Data Rate [Mbps] | Measured 26dB Bandwidth [MHz] |
|---------|-----------------|-------------|-------------|------------------|-------------------------------|
| Band 1  | 5180            | 36          | a           | 6                | 19.67                         |
|         | 5200            | 40          | a           | 6                | 19.11                         |
|         | 5240            | 48          | a           | 6                | 18.97                         |
|         | 5180            | 36          | n (20MHz)   | 6.5/7.2 (MCS0)   | 19.45                         |
|         | 5200            | 40          | n (20MHz)   | 6.5/7.2 (MCS0)   | 19.69                         |
|         | 5240            | 48          | n (20MHz)   | 6.5/7.2 (MCS0)   | 19.67                         |
|         | 5190            | 38          | n (40MHz)   | 13.5/15 (MCS0)   | 40.26                         |
|         | 5230            | 46          | n (40MHz)   | 13.5/15 (MCS0)   | 39.56                         |
|         | 5210            | 42          | ac (80MHz)  | 29.3/32.5 (MCS0) | 83.27                         |
| Band 2A | 5260            | 52          | a           | 6                | 19.55                         |
|         | 5280            | 56          | a           | 6                | 19.15                         |
|         | 5320            | 64          | a           | 6                | 18.60                         |
|         | 5260            | 52          | n (20MHz)   | 6.5/7.2 (MCS0)   | 20.41                         |
|         | 5280            | 56          | n (20MHz)   | 6.5/7.2 (MCS0)   | 19.76                         |
|         | 5320            | 64          | n (20MHz)   | 6.5/7.2 (MCS0)   | 19.74                         |
|         | 5270            | 54          | n (40MHz)   | 13.5/15 (MCS0)   | 40.09                         |
|         | 5310            | 62          | n (40MHz)   | 13.5/15 (MCS0)   | 39.83                         |
|         | 5290            | 58          | ac (80MHz)  | 29.3/32.5 (MCS0) | 82.47                         |
| Band 2C | 5500            | 100         | a           | 6                | 19.45                         |
|         | 5600            | 120         | a           | 6                | 18.72                         |
|         | 5720            | 144         | a           | 6                | 18.97                         |
|         | 5500            | 100         | n (20MHz)   | 6.5/7.2 (MCS0)   | 19.48                         |
|         | 5600            | 120         | n (20MHz)   | 6.5/7.2 (MCS0)   | 19.81                         |
|         | 5720            | 144         | n (20MHz)   | 6.5/7.2 (MCS0)   | 19.78                         |
|         | 5510            | 102         | n (40MHz)   | 13.5/15 (MCS0)   | 40.38                         |
|         | 5590            | 118         | n (40MHz)   | 13.5/15 (MCS0)   | 39.73                         |
|         | 5710            | 142         | n (40MHz)   | 13.5/15 (MCS0)   | 39.88                         |
|         | 5530            | 106         | ac (80MHz)  | 29.3/32.5 (MCS0) | 81.70                         |
|         | 5610            | 122         | ac (80MHz)  | 29.3/32.5 (MCS0) | 82.00                         |
|         | 5690            | 138         | ac (80MHz)  | 29.3/32.5 (MCS0) | 81.68                         |

**Table 7-2. Conducted Bandwidth Measurements SISO ANT1**

|                                         |                                                                                     |                                       |                                                                                       |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset         |                                                                                       | Page 15 of 170                  |



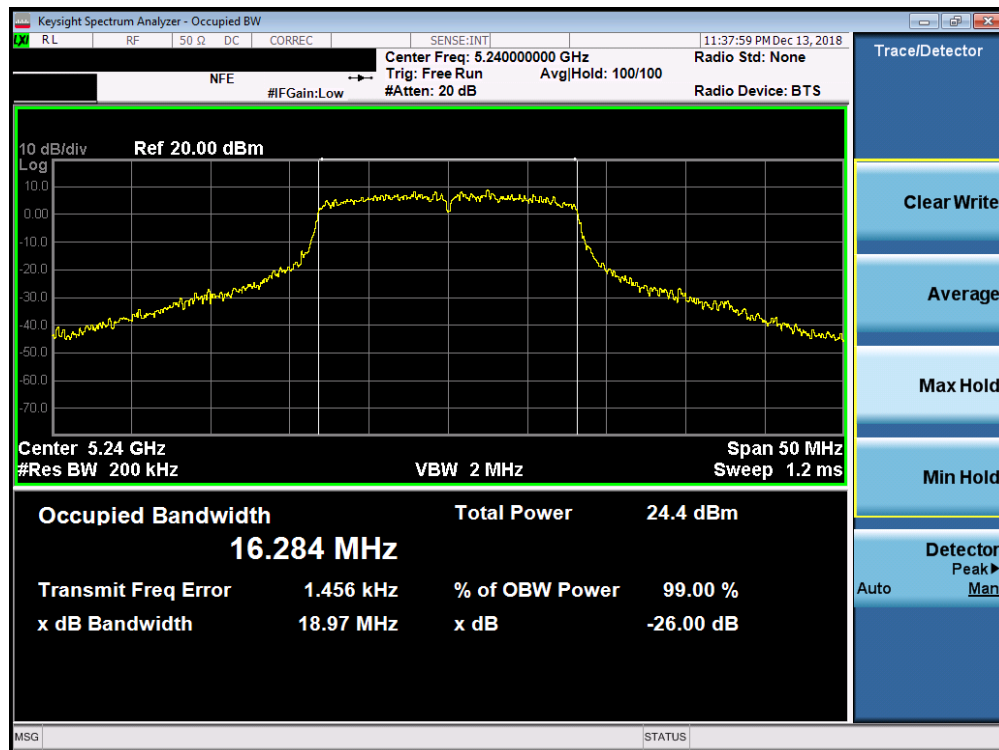
Plot 7-1. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 1) – Ch. 36)



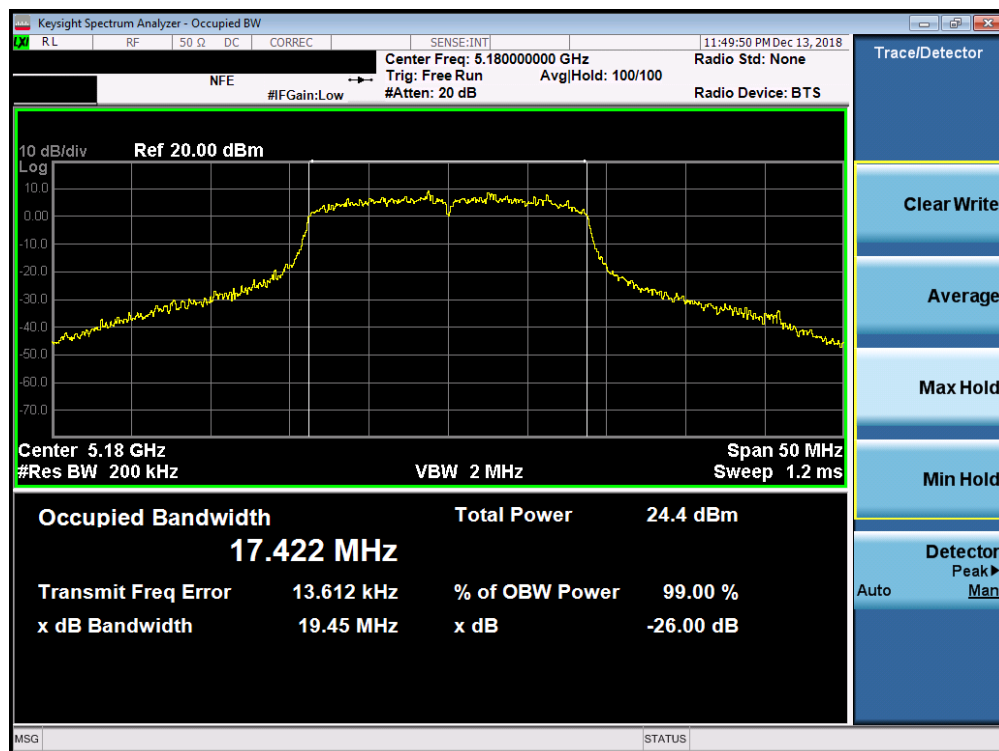
Plot 7-2. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 1) – Ch. 40)

|                                         |                                               |                                       |           |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|-----------|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>LG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |           | Page 16 of 170                  |



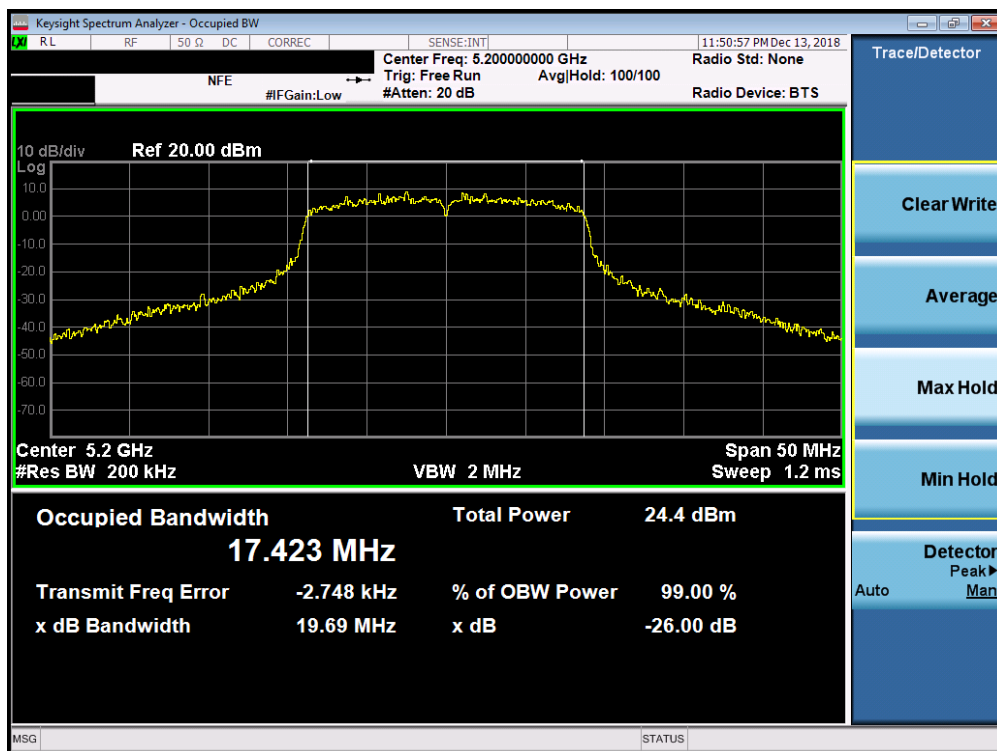


Plot 7-3. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 1) – Ch. 48)

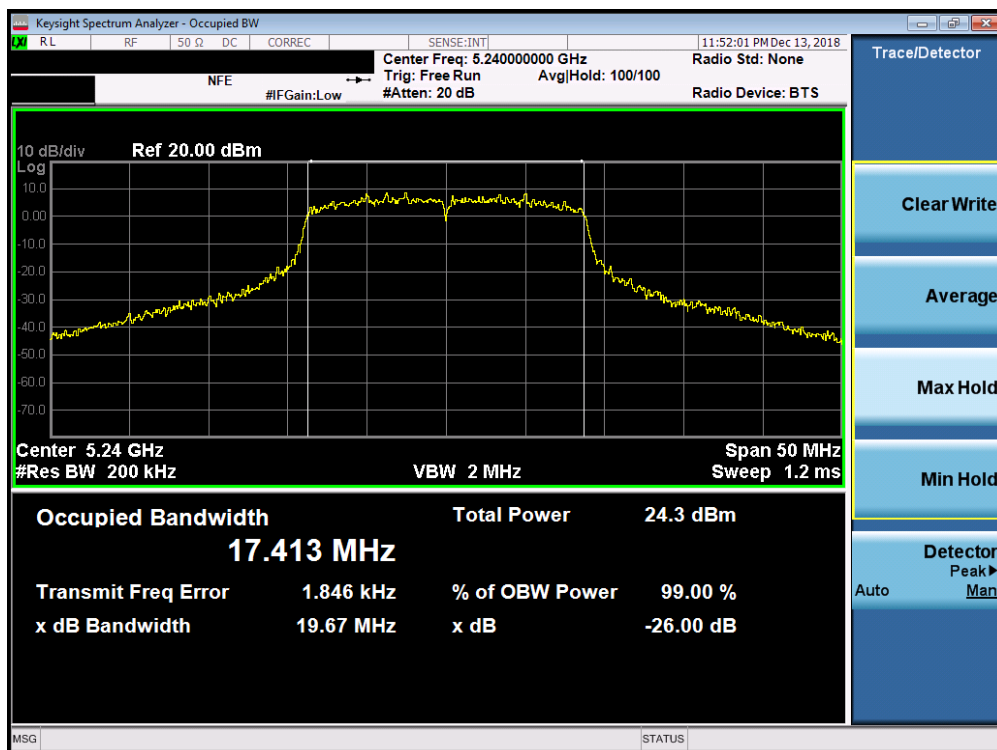


Plot 7-4. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) – Ch. 36)

|                                         |                                              |                               |                |                                 |
|-----------------------------------------|----------------------------------------------|-------------------------------|----------------|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |                               |                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019        | EUT Type:<br>Portable Handset | Page 17 of 170 |                                 |

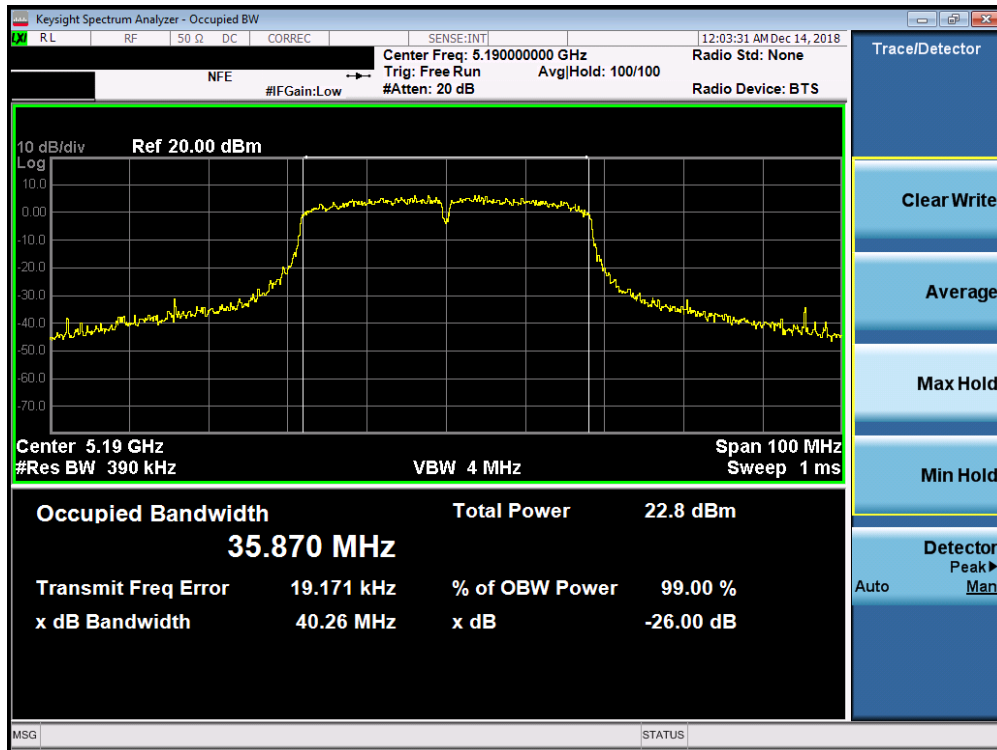


Plot 7-5. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) – Ch. 40)

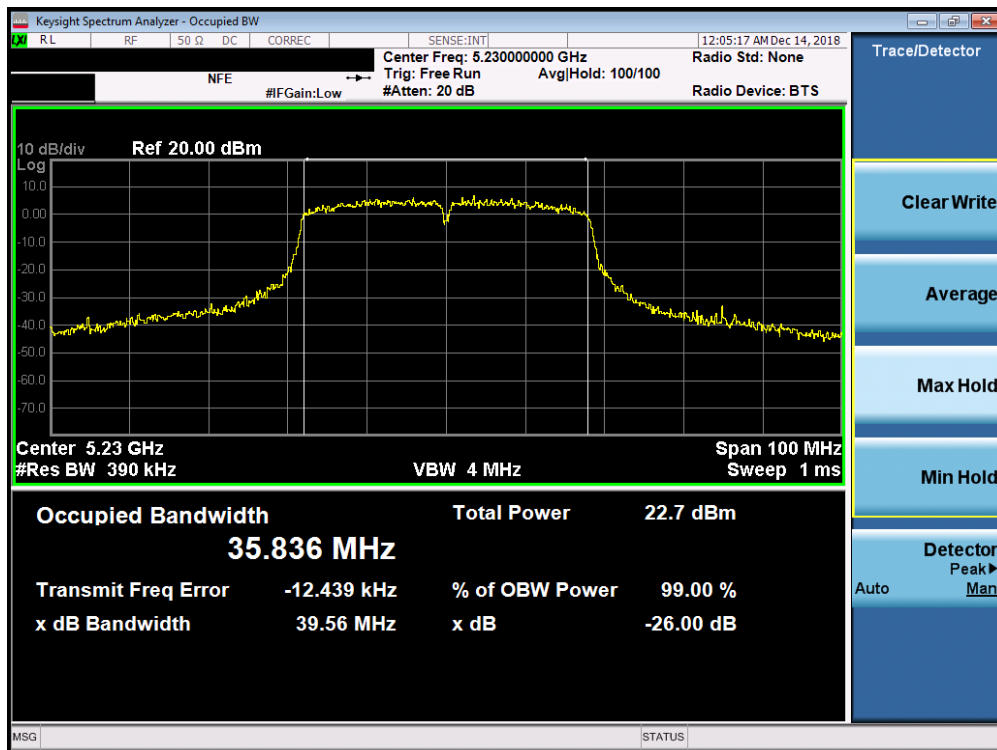


Plot 7-6. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) – Ch. 48)

|                                         |                                               |                               |  |                                 |
|-----------------------------------------|-----------------------------------------------|-------------------------------|--|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                               |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset |  | Page 18 of 170                  |

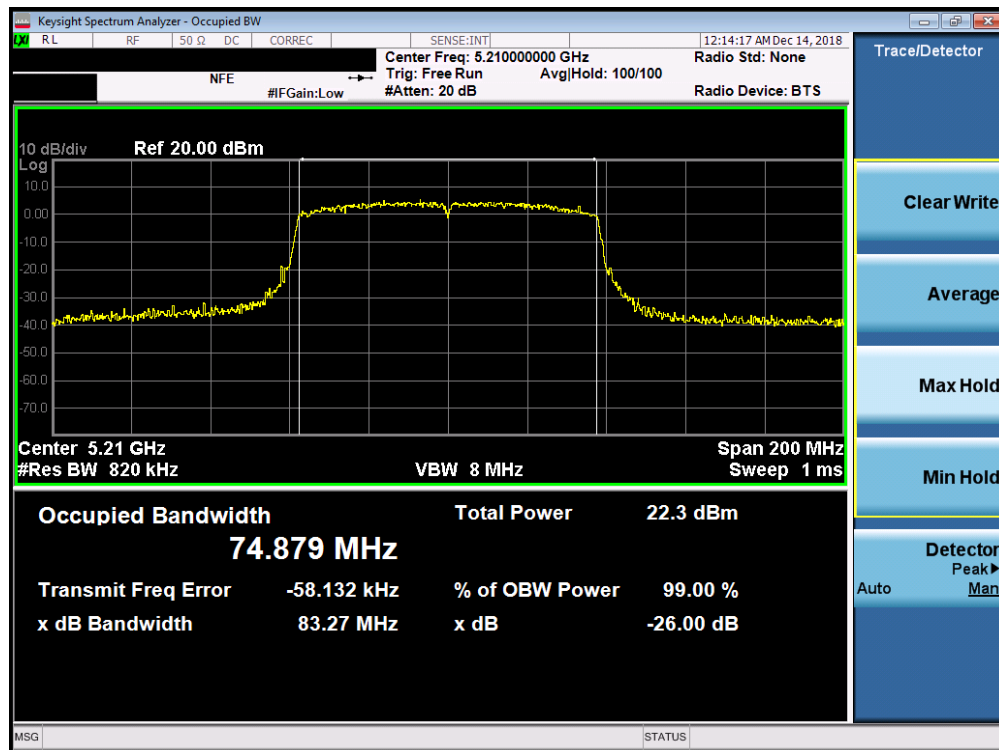


Plot 7-7. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 1) – Ch. 38)

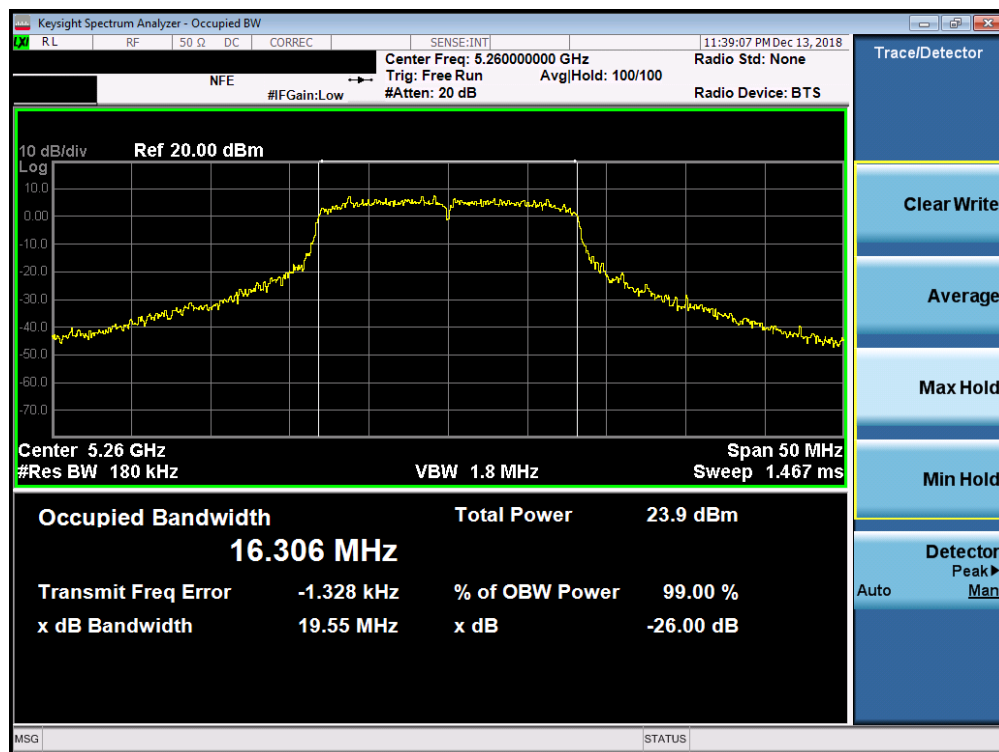


Plot 7-8. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 1) – Ch. 46)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 19 of 170                  |

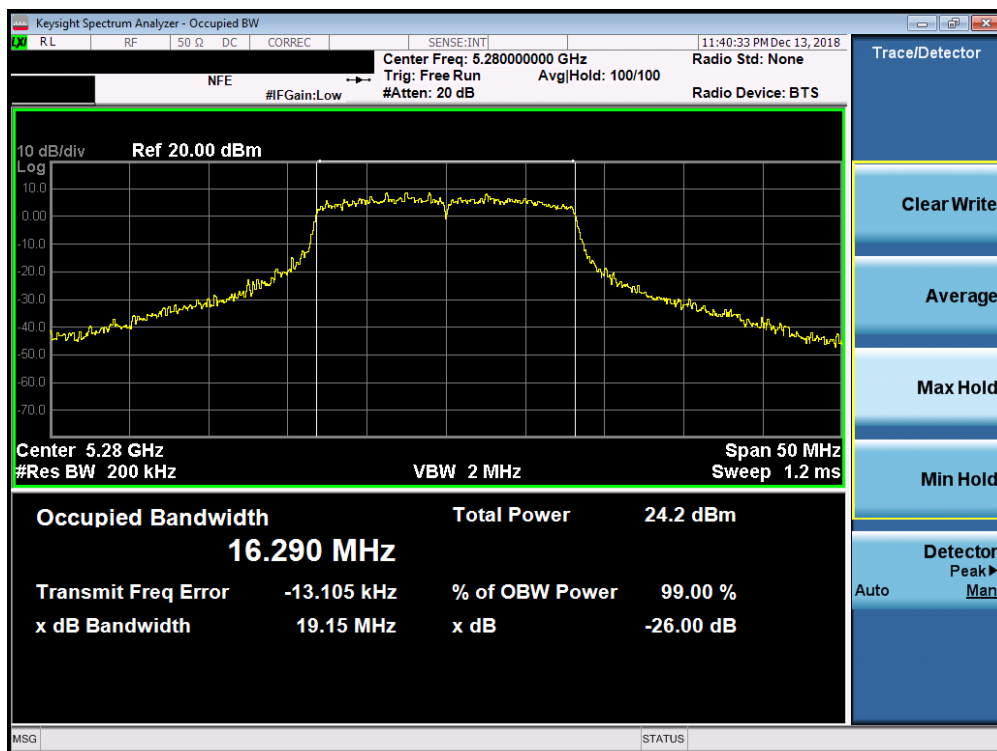


Plot 7-9. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 1) – Ch. 42)

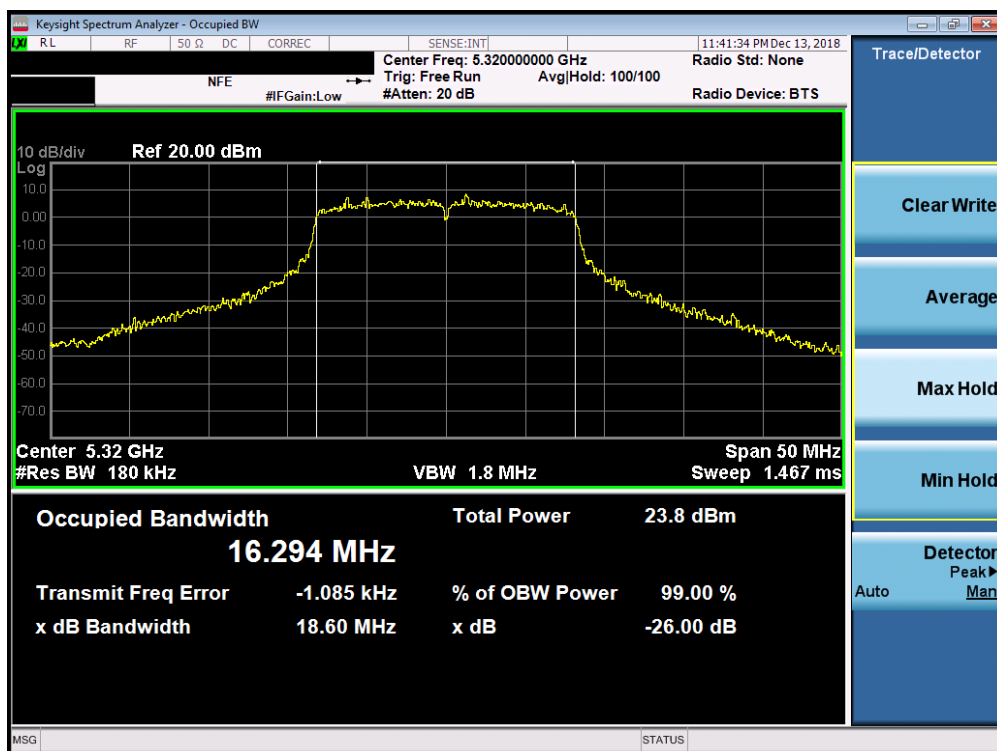


Plot 7-10. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 2A) – Ch. 52)

|                                         |                                              |                               |                |                                 |
|-----------------------------------------|----------------------------------------------|-------------------------------|----------------|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |                               |                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019        | EUT Type:<br>Portable Handset | Page 20 of 170 |                                 |

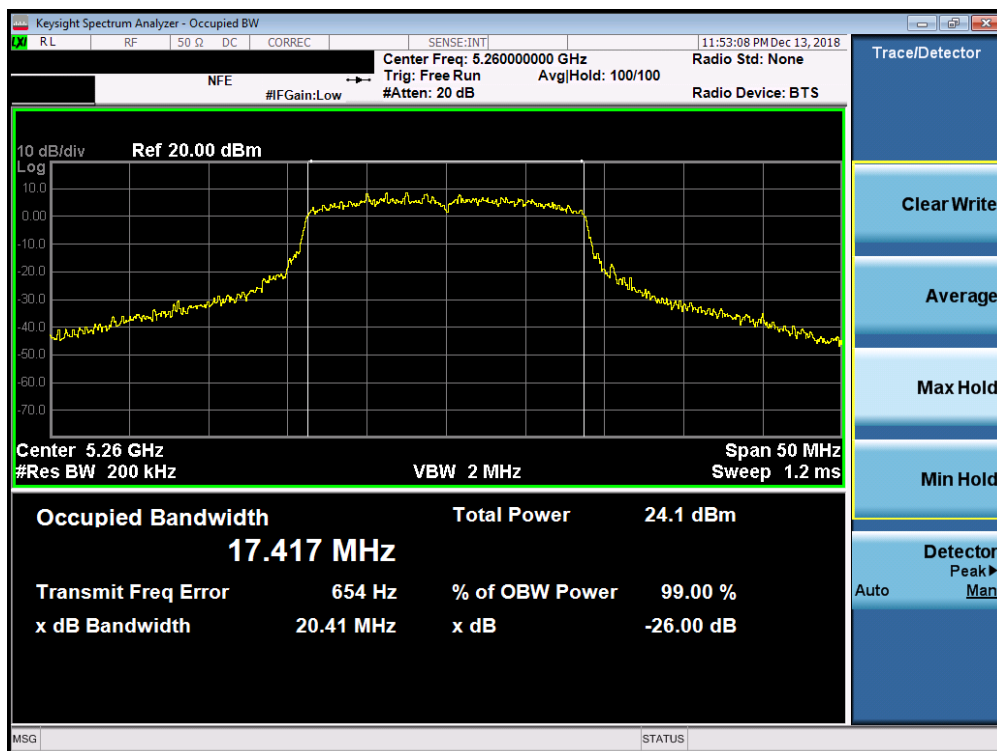


Plot 7-11. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 2A) – Ch. 56)

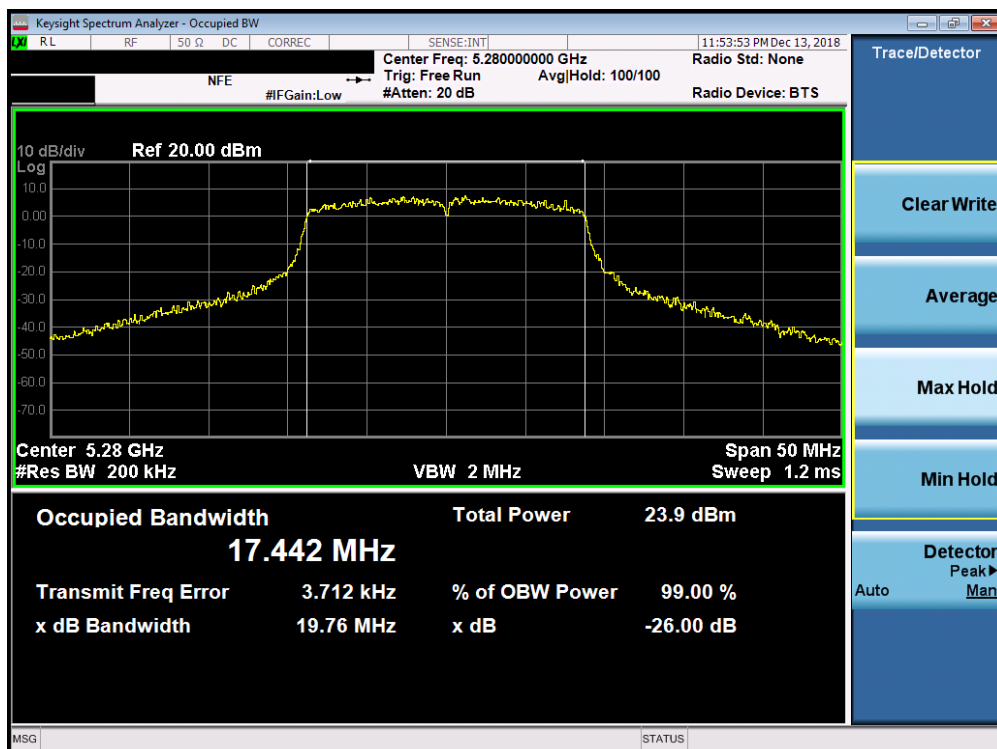


Plot 7-12. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 2A) – Ch. 64)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 21 of 170                  |



Plot 7-13. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) – Ch. 52)

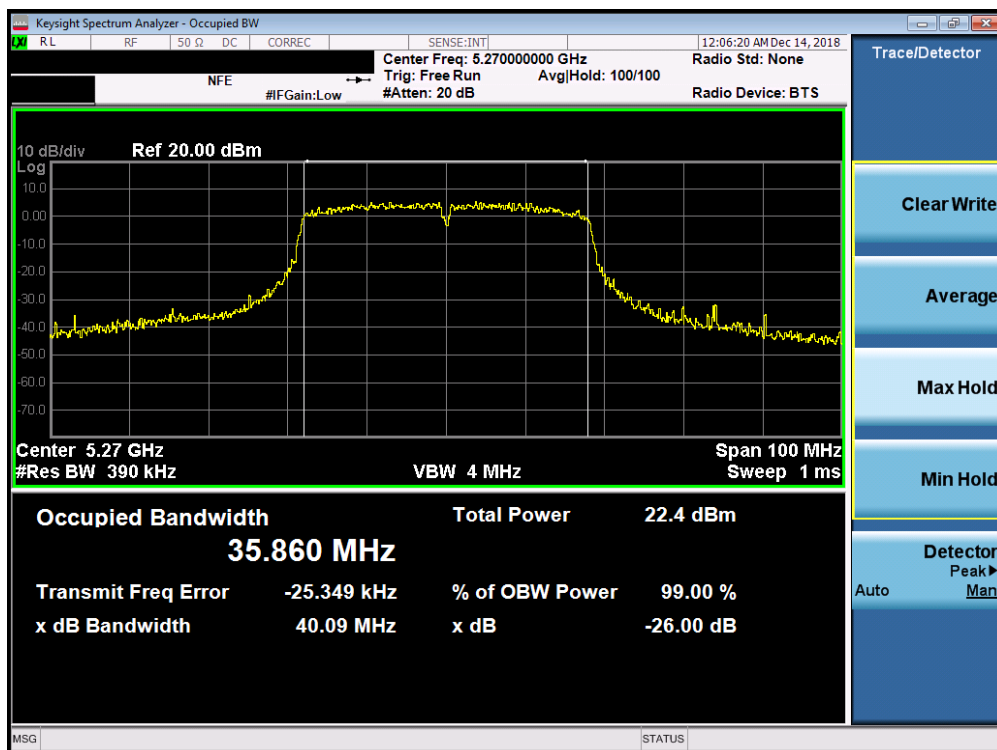


Plot 7-14. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) – Ch. 56)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 22 of 170                  |



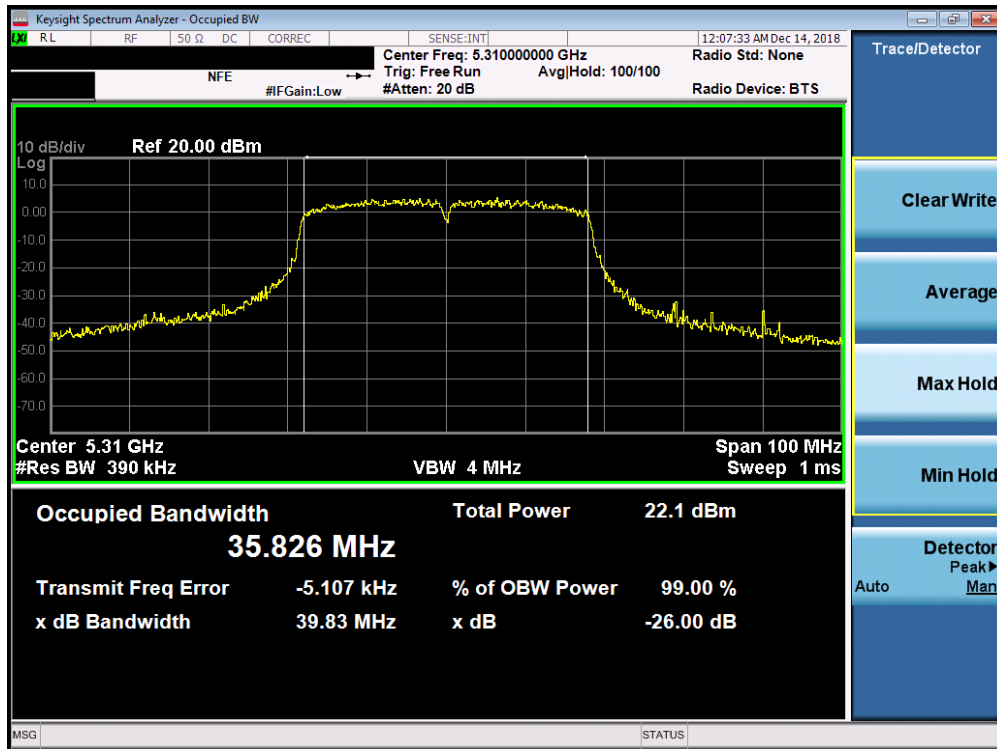
Plot 7-15. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) – Ch. 64)



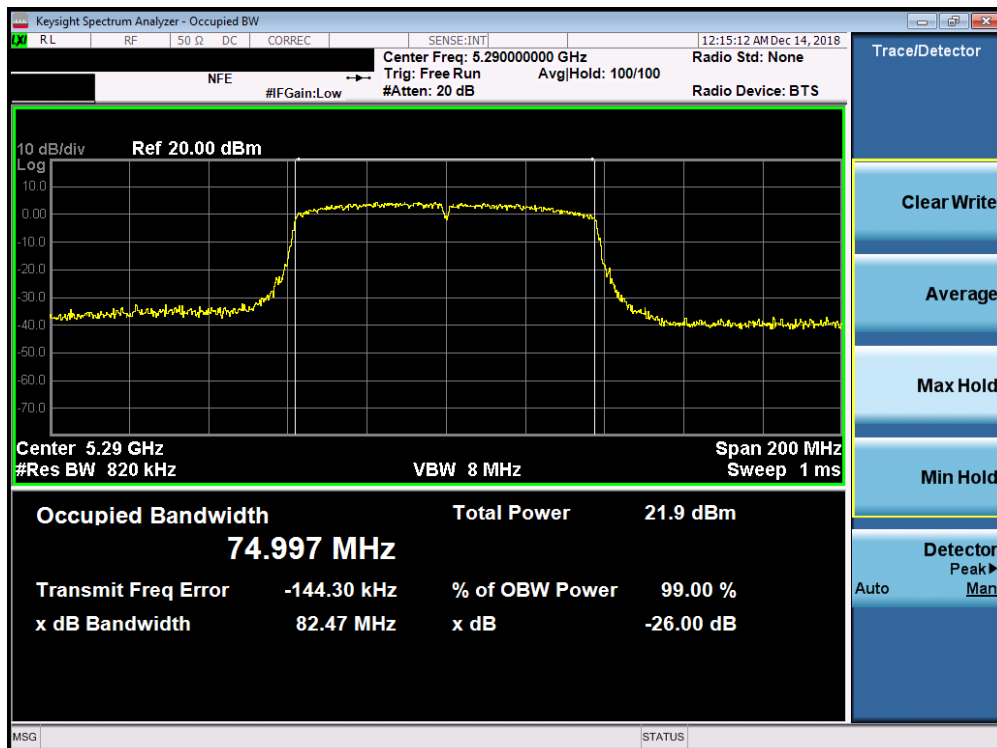
Plot 7-16. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2A) – Ch. 54)

|                                         |                                              |                               |  |                                 |
|-----------------------------------------|----------------------------------------------|-------------------------------|--|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |                               |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019        | EUT Type:<br>Portable Handset |  | Page 23 of 170                  |





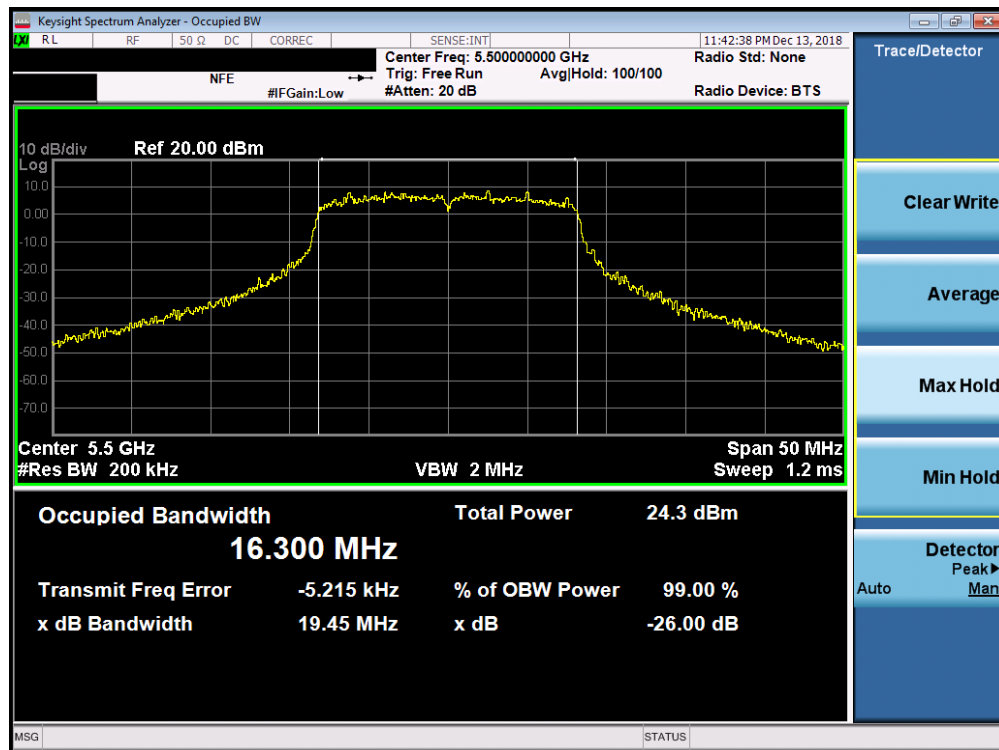
Plot 7-17. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2A) – Ch. 62)



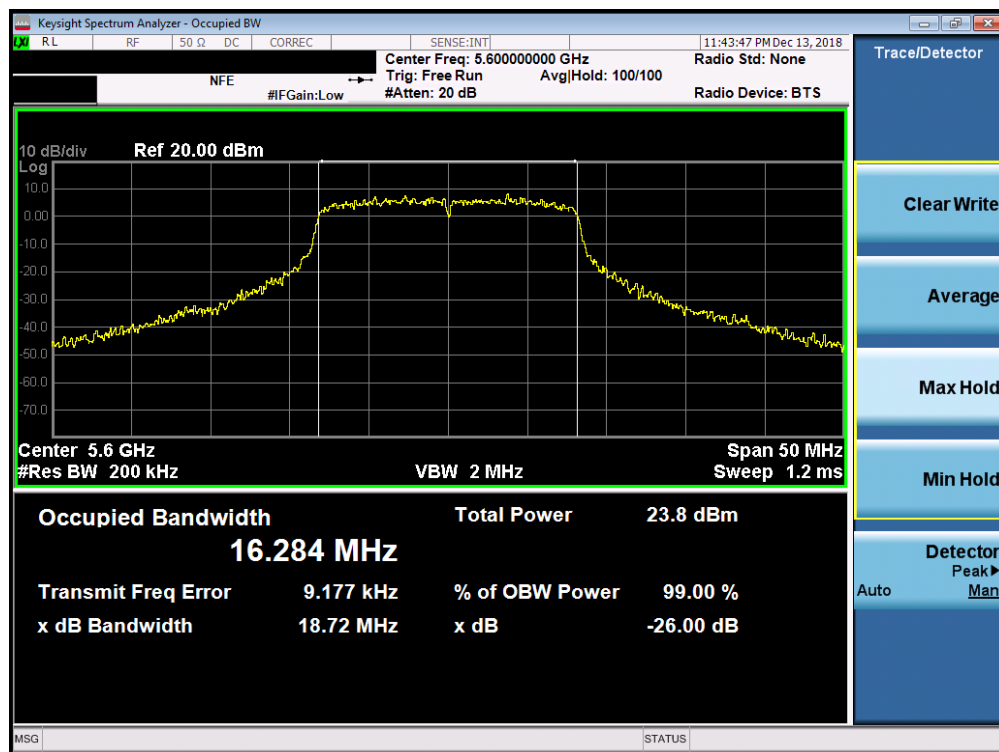
Plot 7-18. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2A) – Ch. 58)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 24 of 170                  |



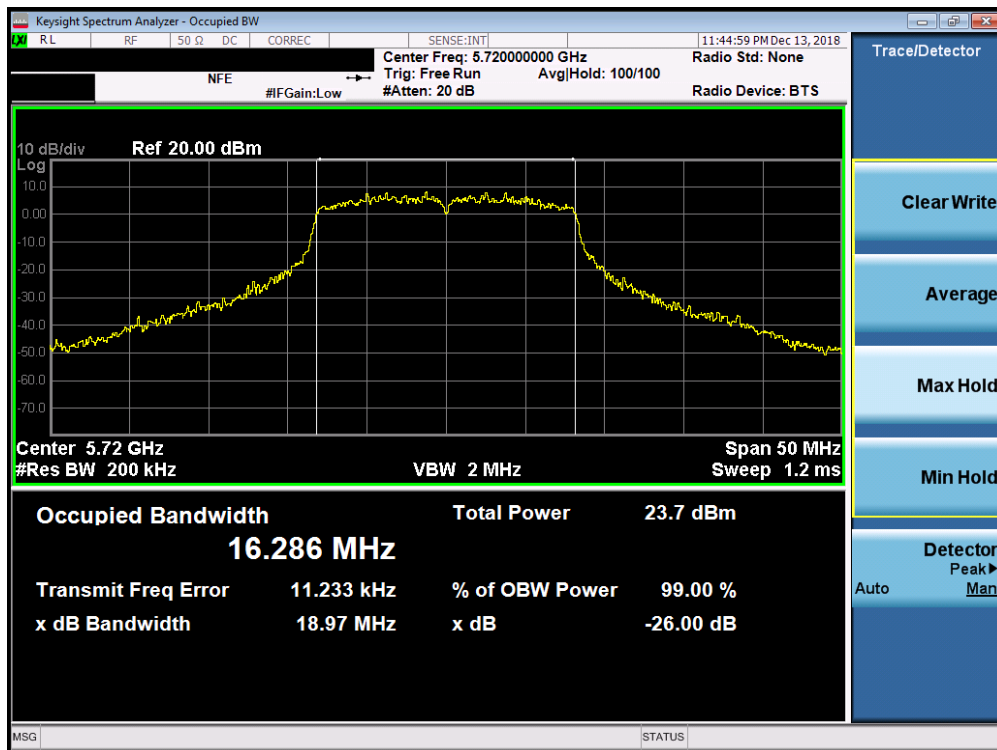


Plot 7-19. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 2C) – Ch. 100)

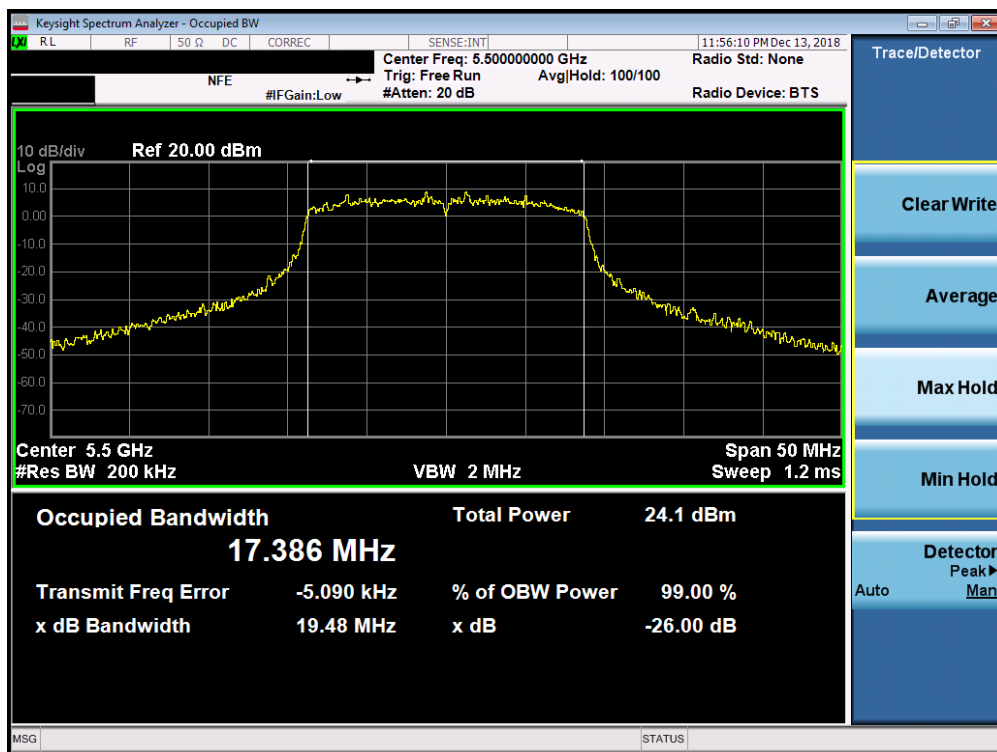


Plot 7-20. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 2C) – Ch. 120)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 25 of 170                  |

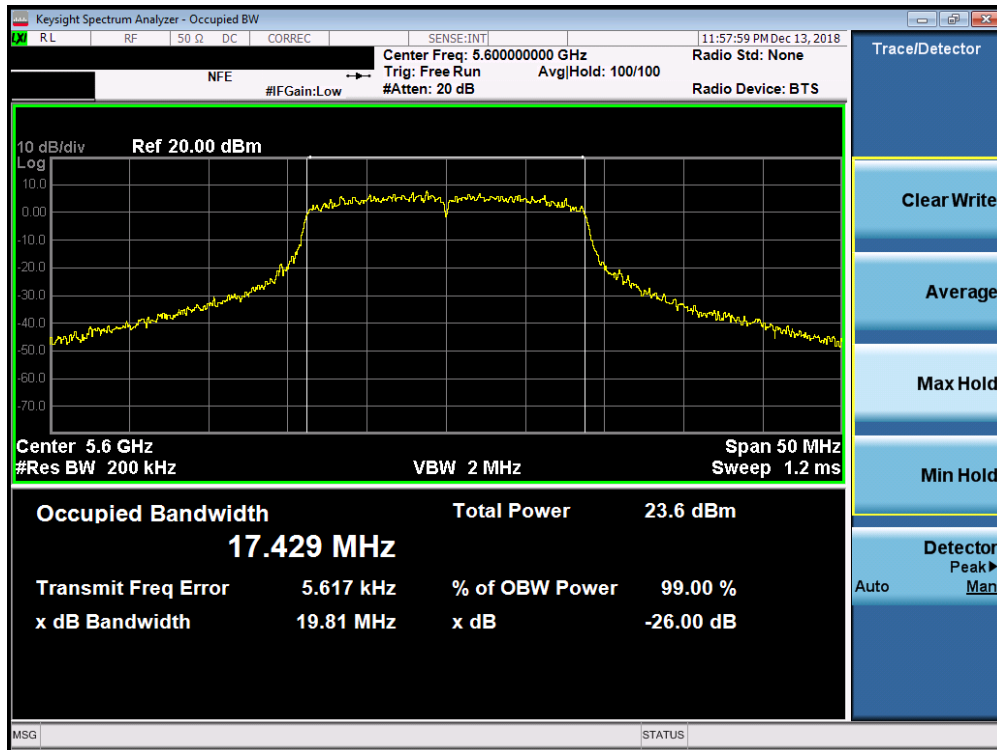


Plot 7-21. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 2C) – Ch. 144)

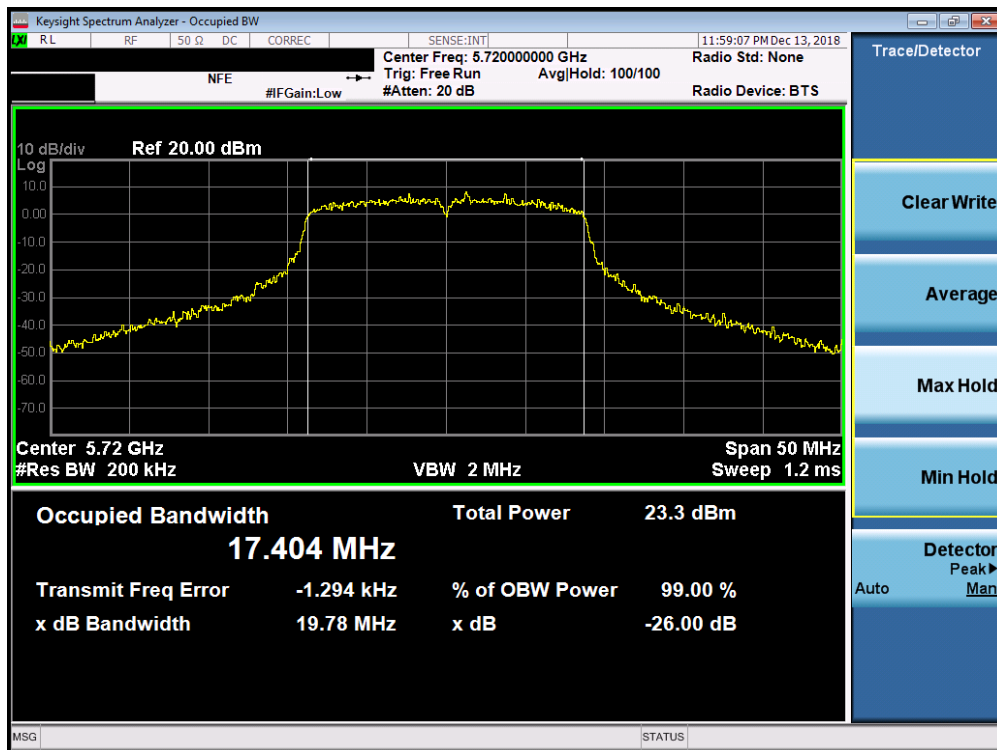


Plot 7-22. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2C) – Ch. 100)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 26 of 170                  |

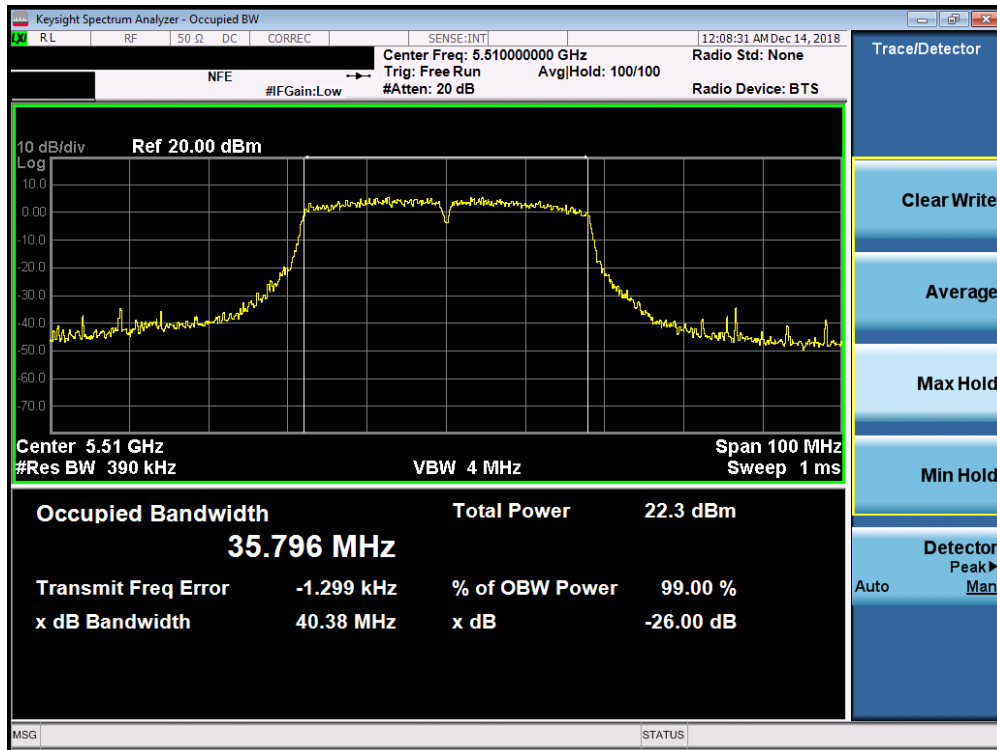


Plot 7-23. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2C) – Ch. 120)

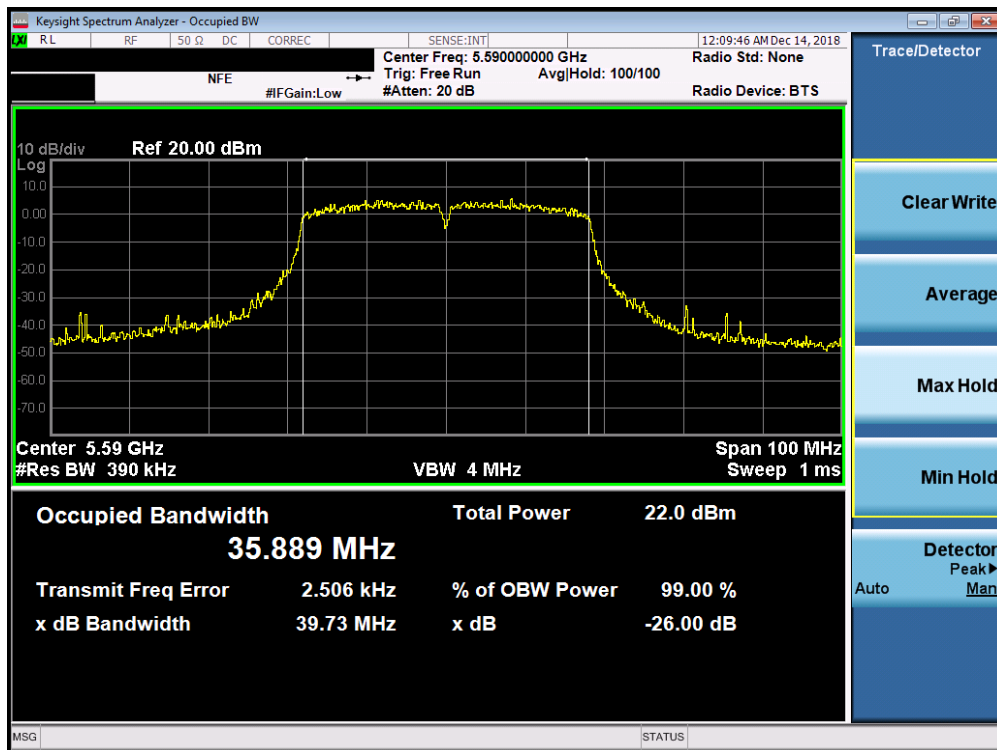


Plot 7-24. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2C) – Ch. 144)

|                                         |                                              |                               |  |                                 |
|-----------------------------------------|----------------------------------------------|-------------------------------|--|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |                               |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019        | EUT Type:<br>Portable Handset |  | Page 27 of 170                  |

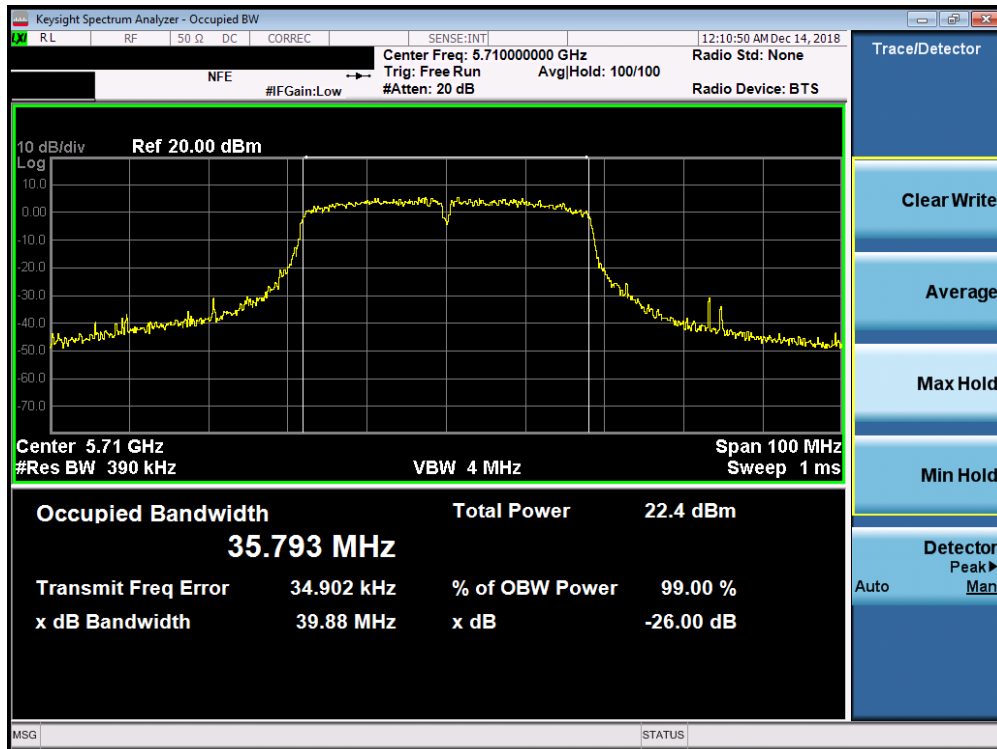


Plot 7-25. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) – Ch. 102)

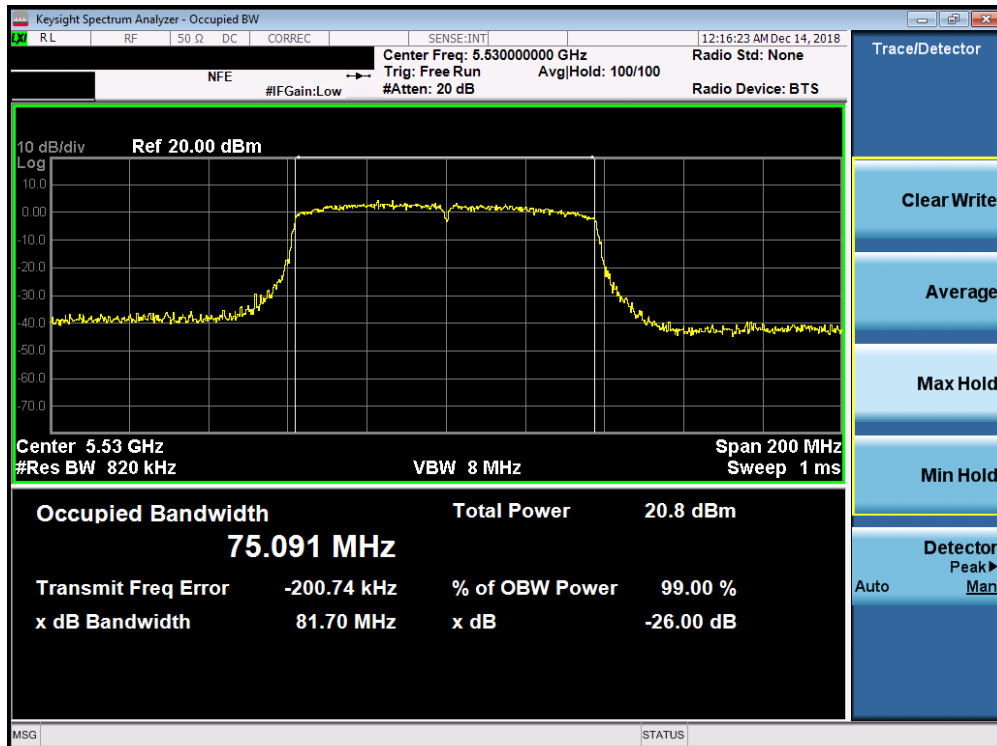


Plot 7-26. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) – Ch. 118)

|                                         |                                              |                               |                |                                 |
|-----------------------------------------|----------------------------------------------|-------------------------------|----------------|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |                               |                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019        | EUT Type:<br>Portable Handset | Page 28 of 170 |                                 |

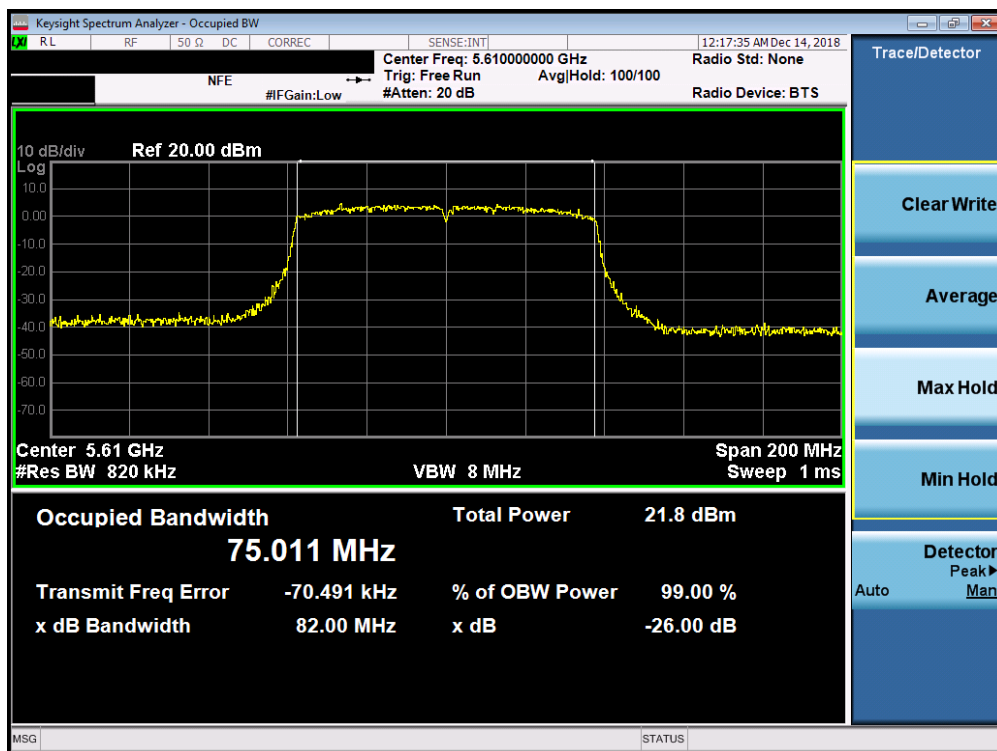


Plot 7-27. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) – Ch. 142)

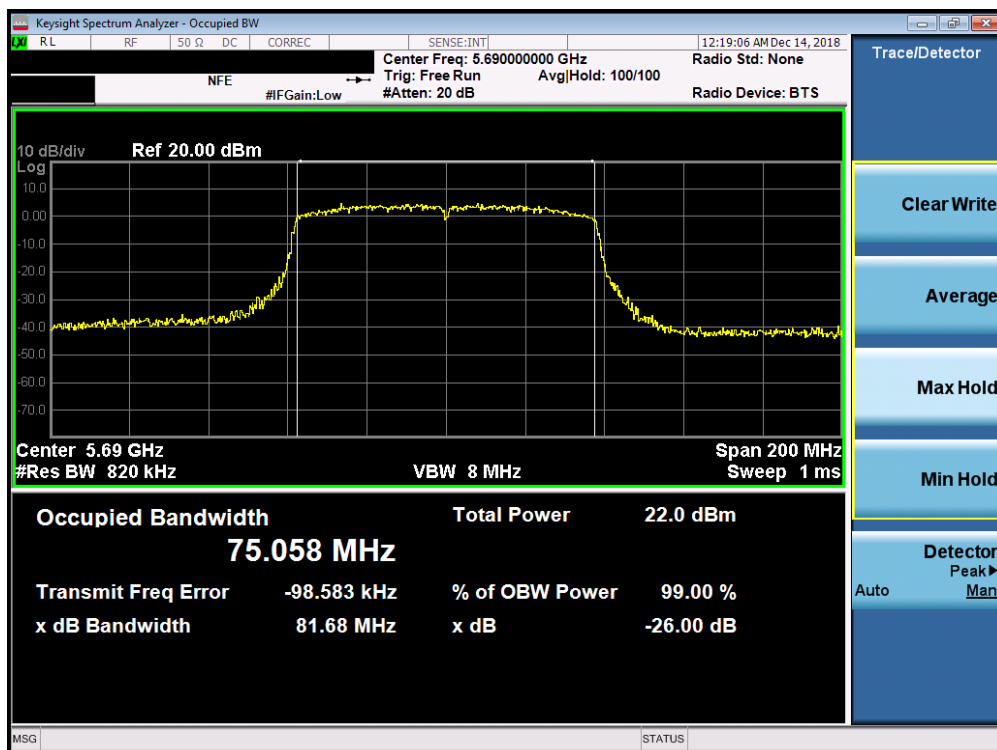


Plot 7-28. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2C) – Ch. 106)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 29 of 170                  |



Plot 7-29. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2C) – Ch. 122)



Plot 7-30. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2C) – Ch. 138)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 30 of 170                  |

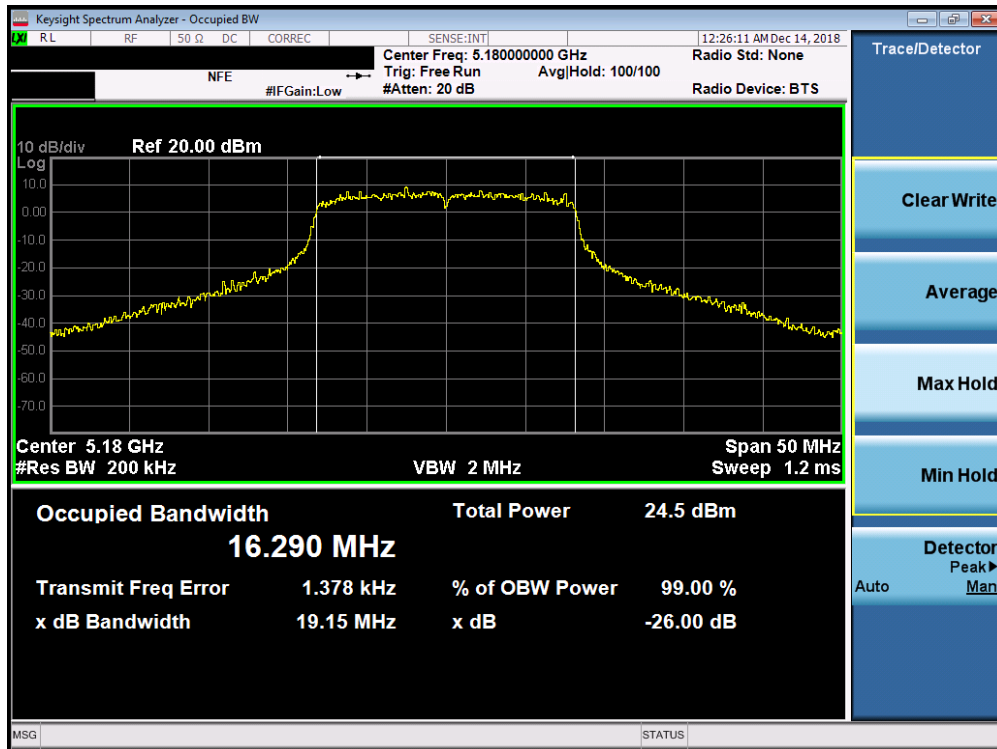
## SISO Antenna-2 26dB Bandwidth Measurements

|         | Frequency [MHz] | Channel No. | 802.11 Mode | Data Rate [Mbps] | Measured 26dB Bandwidth [MHz] |
|---------|-----------------|-------------|-------------|------------------|-------------------------------|
| Band 1  | 5180            | 36          | a           | 6                | 19.15                         |
|         | 5200            | 40          | a           | 6                | 19.56                         |
|         | 5240            | 48          | a           | 6                | 18.96                         |
|         | 5180            | 36          | n (20MHz)   | 6.5/7.2 (MCS0)   | 20.11                         |
|         | 5200            | 40          | n (20MHz)   | 6.5/7.2 (MCS0)   | 19.68                         |
|         | 5240            | 48          | n (20MHz)   | 6.5/7.2 (MCS0)   | 19.52                         |
|         | 5190            | 38          | n (40MHz)   | 13.5/15 (MCS0)   | 39.79                         |
|         | 5230            | 46          | n (40MHz)   | 13.5/15 (MCS0)   | 40.24                         |
|         | 5210            | 42          | ac (80MHz)  | 29.3/32.5 (MCS0) | 81.55                         |
| Band 2A | 5260            | 52          | a           | 6                | 19.50                         |
|         | 5280            | 56          | a           | 6                | 19.09                         |
|         | 5320            | 64          | a           | 6                | 18.96                         |
|         | 5260            | 52          | n (20MHz)   | 6.5/7.2 (MCS0)   | 19.75                         |
|         | 5280            | 56          | n (20MHz)   | 6.5/7.2 (MCS0)   | 19.62                         |
|         | 5320            | 64          | n (20MHz)   | 6.5/7.2 (MCS0)   | 19.41                         |
|         | 5270            | 54          | n (40MHz)   | 13.5/15 (MCS0)   | 39.55                         |
|         | 5310            | 62          | n (40MHz)   | 13.5/15 (MCS0)   | 39.42                         |
|         | 5290            | 58          | ac (80MHz)  | 29.3/32.5 (MCS0) | 81.62                         |
| Band 2C | 5500            | 100         | a           | 6                | 19.77                         |
|         | 5600            | 120         | a           | 6                | 19.53                         |
|         | 5720            | 144         | a           | 6                | 19.33                         |
|         | 5500            | 100         | n (20MHz)   | 6.5/7.2 (MCS0)   | 20.28                         |
|         | 5600            | 120         | n (20MHz)   | 6.5/7.2 (MCS0)   | 19.93                         |
|         | 5720            | 144         | n (20MHz)   | 6.5/7.2 (MCS0)   | 19.47                         |
|         | 5510            | 102         | n (40MHz)   | 13.5/15 (MCS0)   | 39.38                         |
|         | 5590            | 118         | n (40MHz)   | 13.5/15 (MCS0)   | 40.04                         |
|         | 5710            | 142         | n (40MHz)   | 13.5/15 (MCS0)   | 39.94                         |
|         | 5530            | 106         | ac (80MHz)  | 29.3/32.5 (MCS0) | 81.49                         |
|         | 5610            | 122         | ac (80MHz)  | 29.3/32.5 (MCS0) | 81.30                         |
|         | 5690            | 138         | ac (80MHz)  | 29.3/32.5 (MCS0) | 81.91                         |

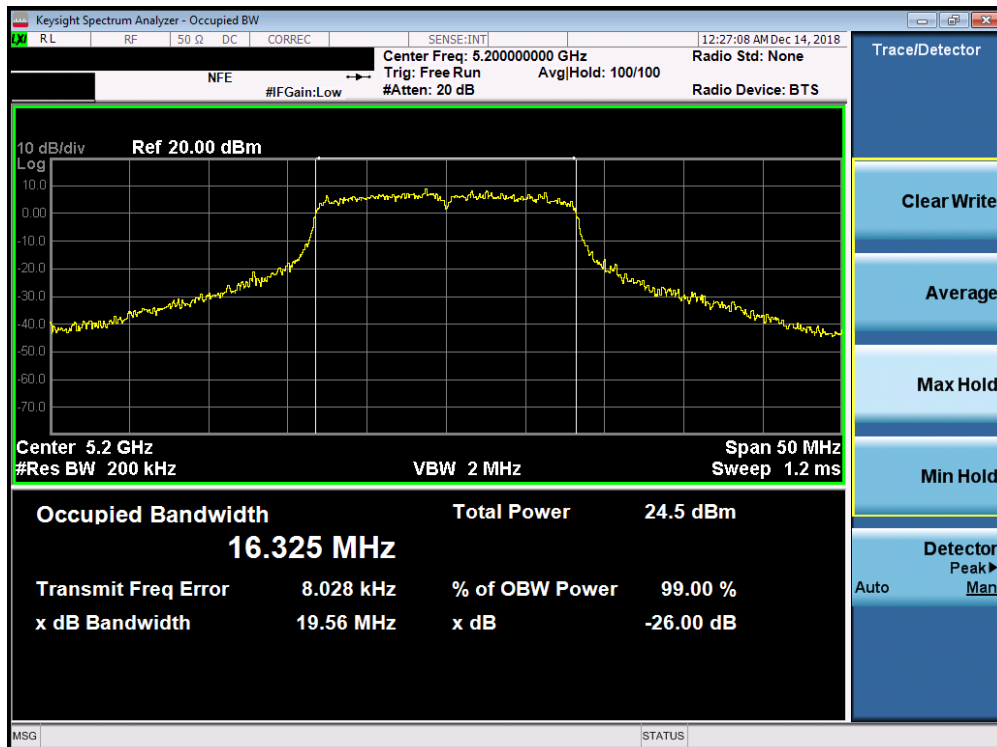
**Table 7-3. Conducted Bandwidth Measurements SISO ANT2**

|                                         |                                                                                     |                                       |                                                                                       |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset         |                                                                                       | Page 31 of 170                  |





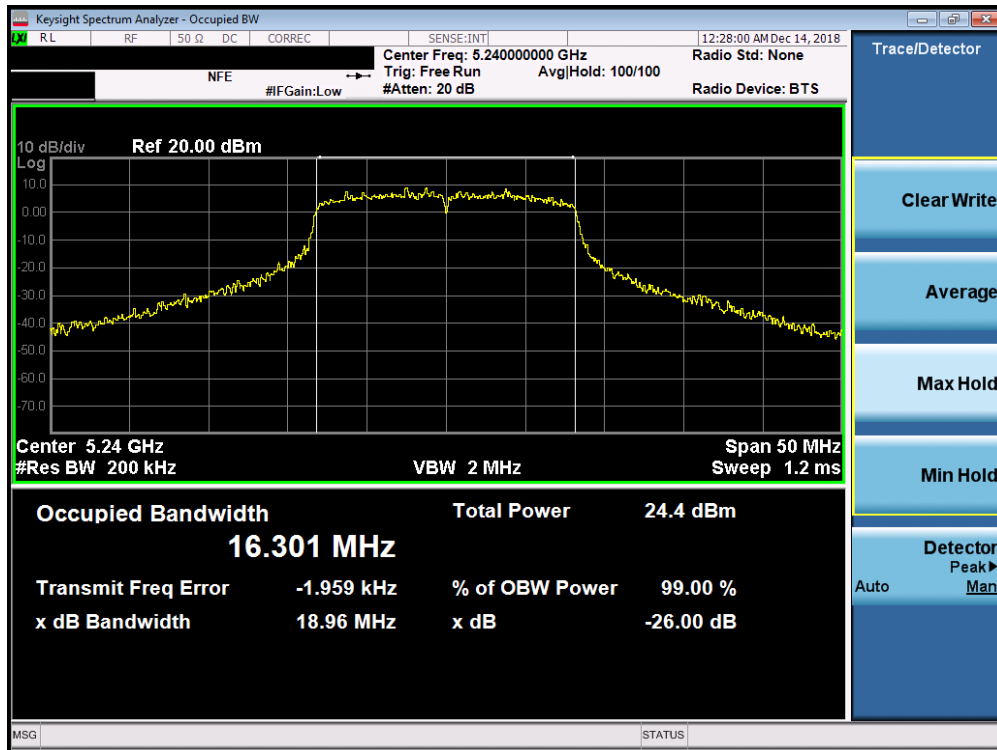
Plot 7-31. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 1) – Ch. 36)



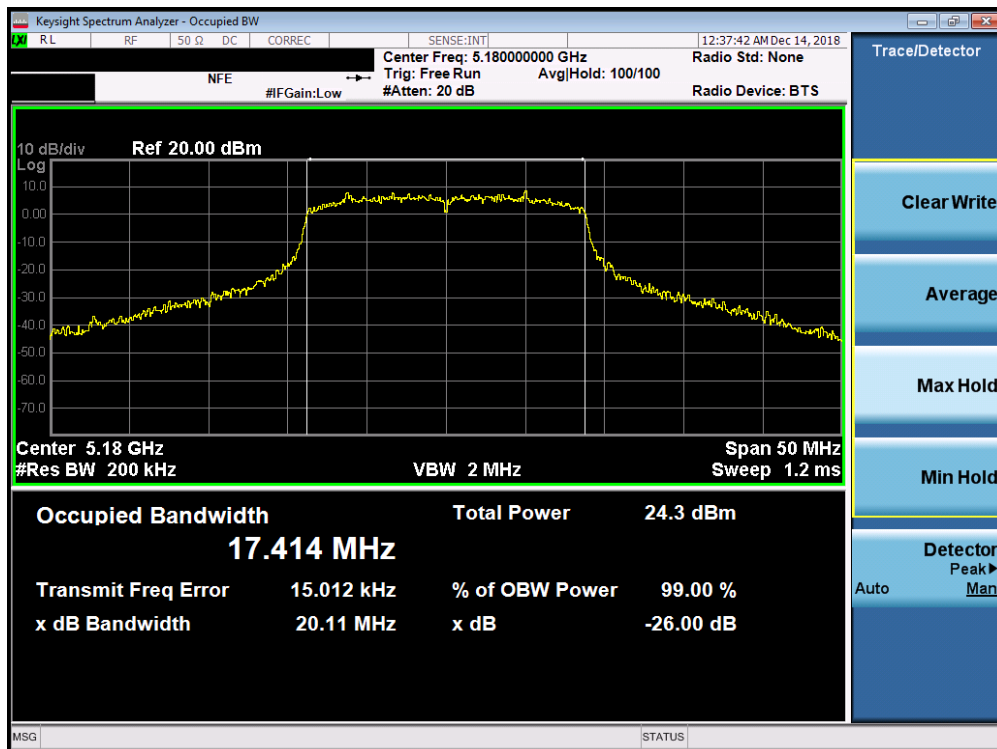
Plot 7-32. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 1) – Ch. 40)

|                                         |                                              |                               |  |                                 |
|-----------------------------------------|----------------------------------------------|-------------------------------|--|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |                               |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019        | EUT Type:<br>Portable Handset |  | Page 32 of 170                  |



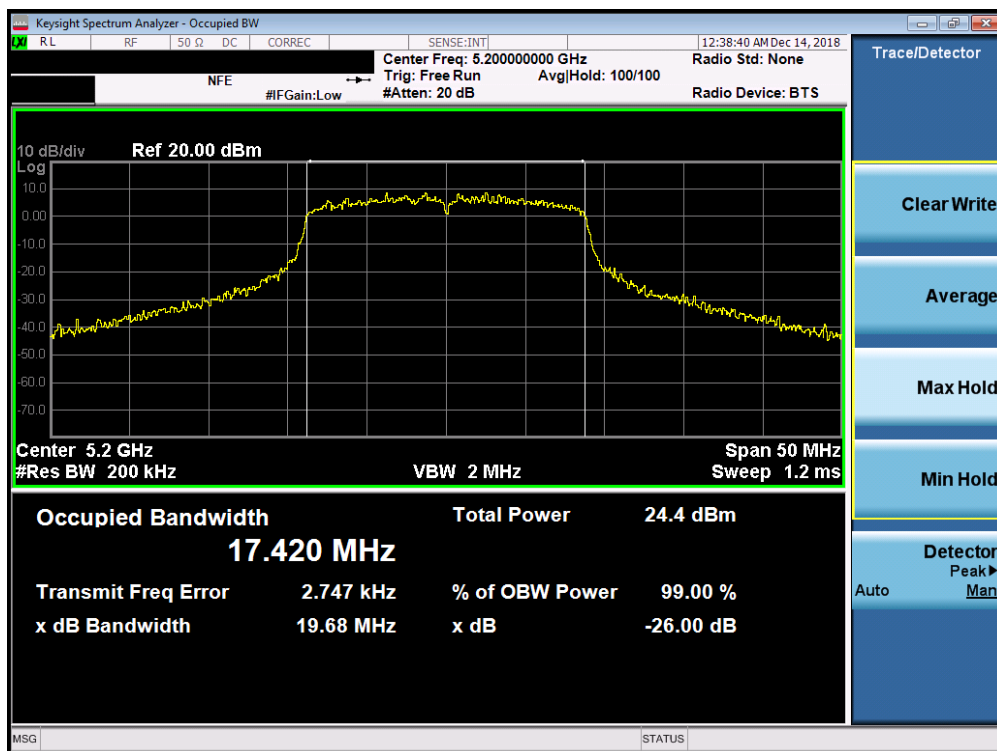


Plot 7-33. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 1) – Ch. 48)

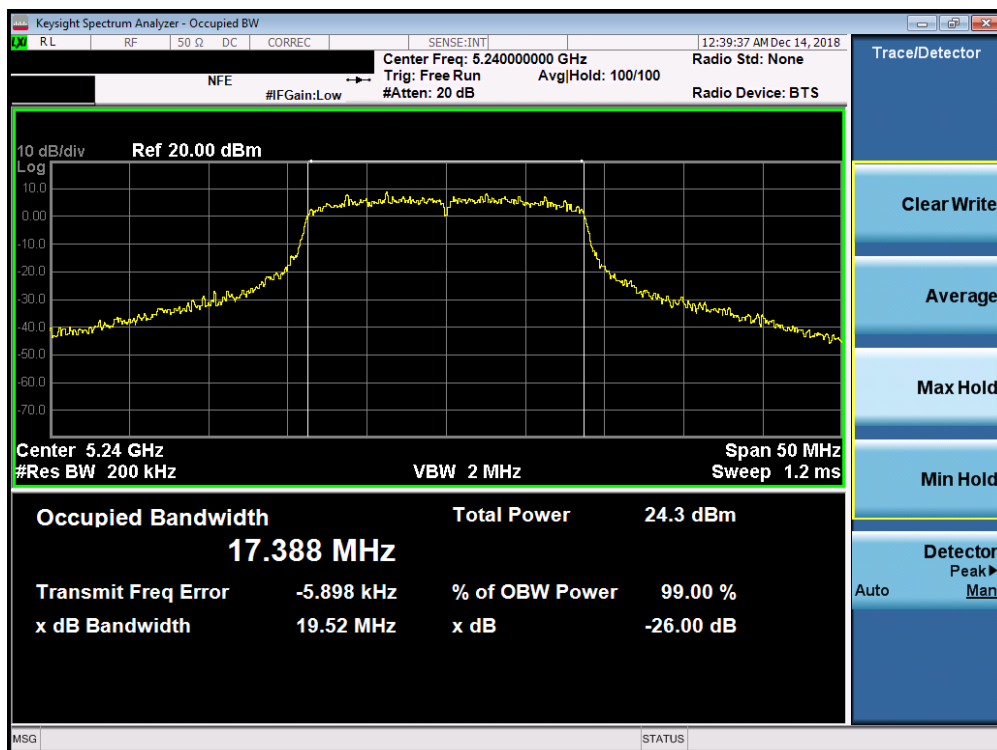


Plot 7-34. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 1) – Ch. 36)

|                                         |                                              |                               |                |                                 |
|-----------------------------------------|----------------------------------------------|-------------------------------|----------------|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |                               |                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019        | EUT Type:<br>Portable Handset | Page 33 of 170 |                                 |

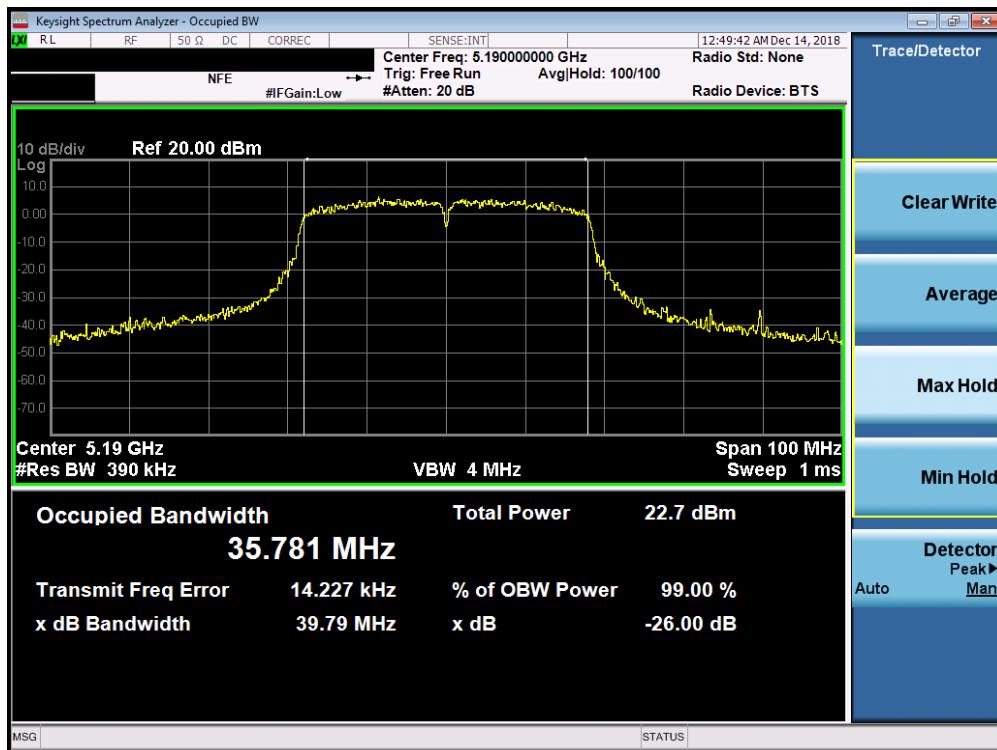


Plot 7-35. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 1) – Ch. 40)

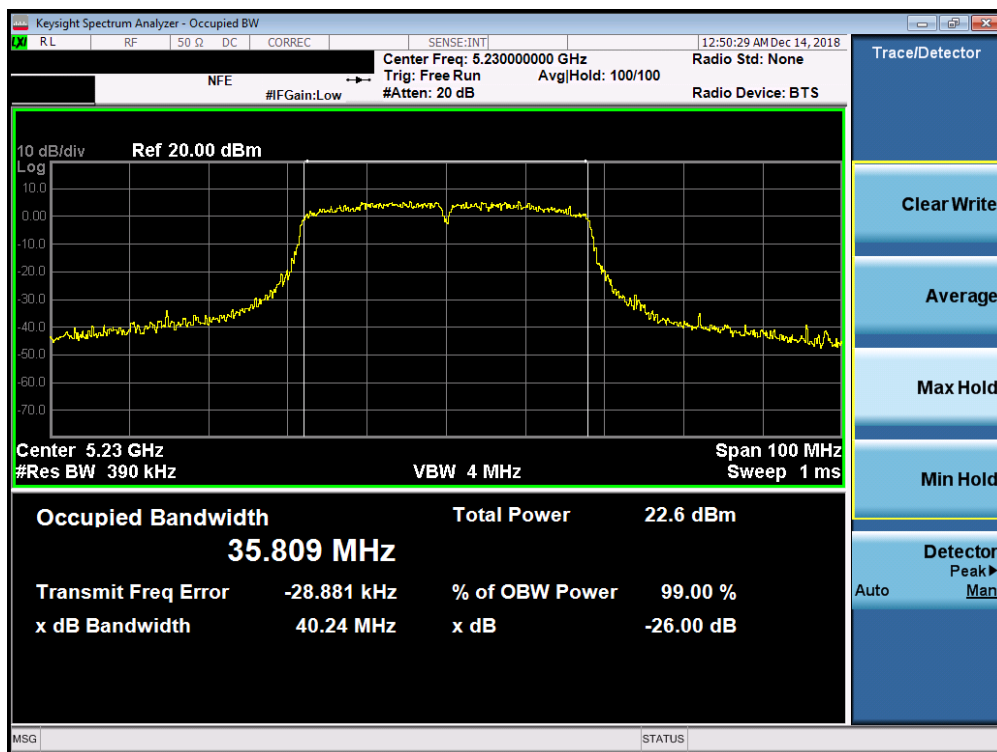


Plot 7-36. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 1) – Ch. 48)

|                                         |                                              |                               |  |                                 |
|-----------------------------------------|----------------------------------------------|-------------------------------|--|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |                               |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019        | EUT Type:<br>Portable Handset |  | Page 34 of 170                  |

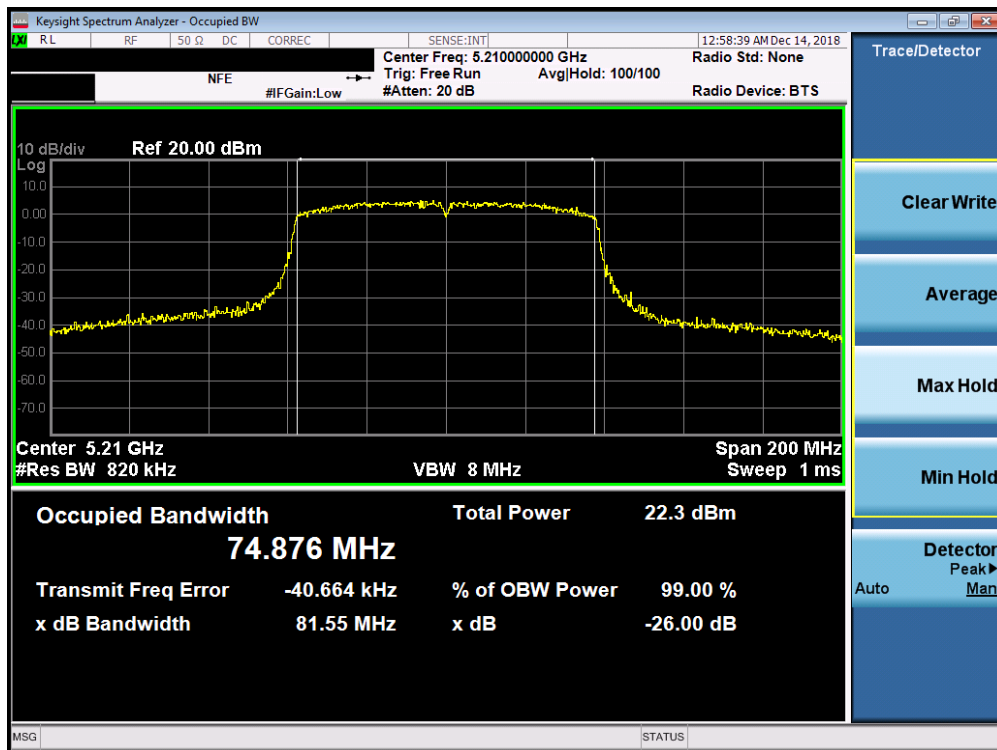


Plot 7-37. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 1) – Ch. 38)

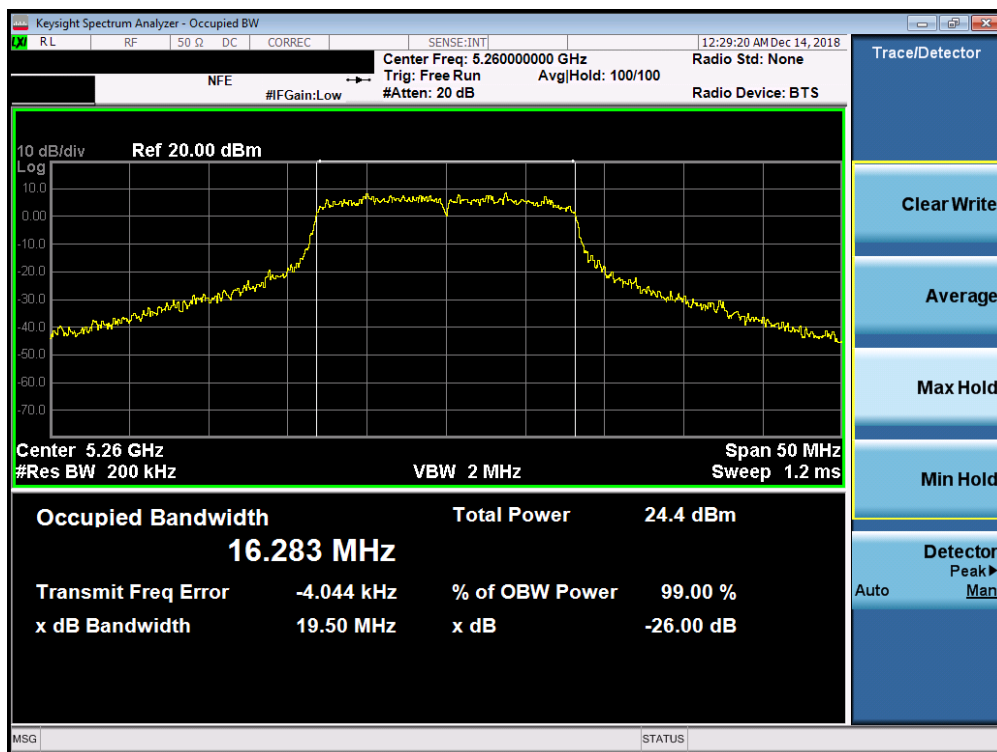


Plot 7-38. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 1) – Ch. 46)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 35 of 170                  |

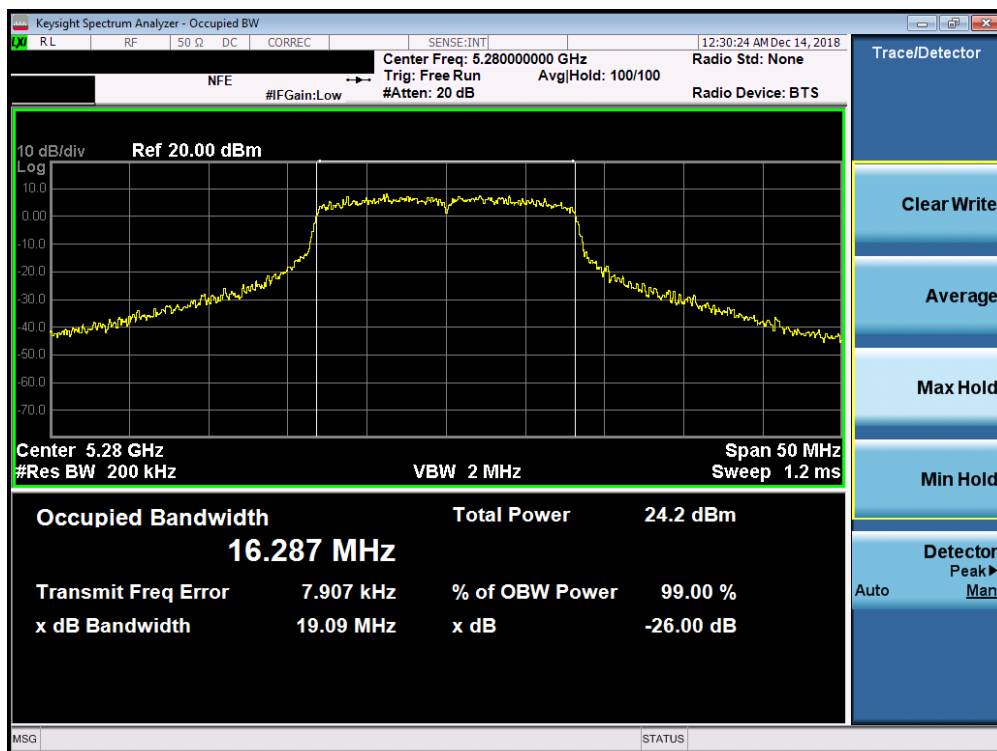


Plot 7-39. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 1) – Ch. 42)

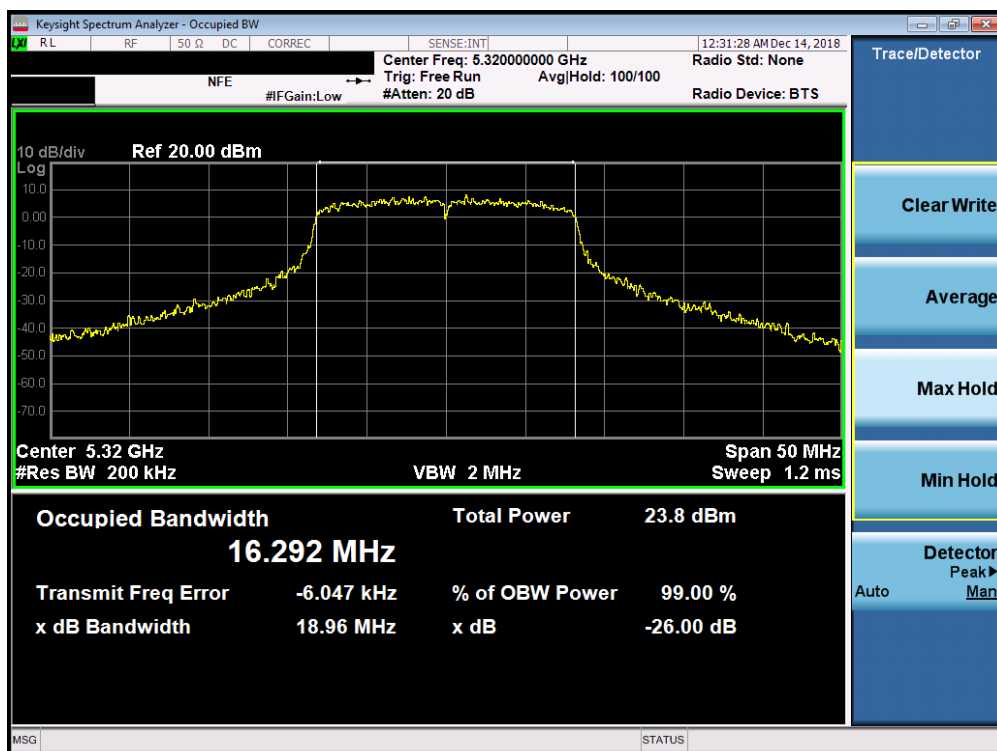


Plot 7-40. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2A) – Ch. 52)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 36 of 170                  |

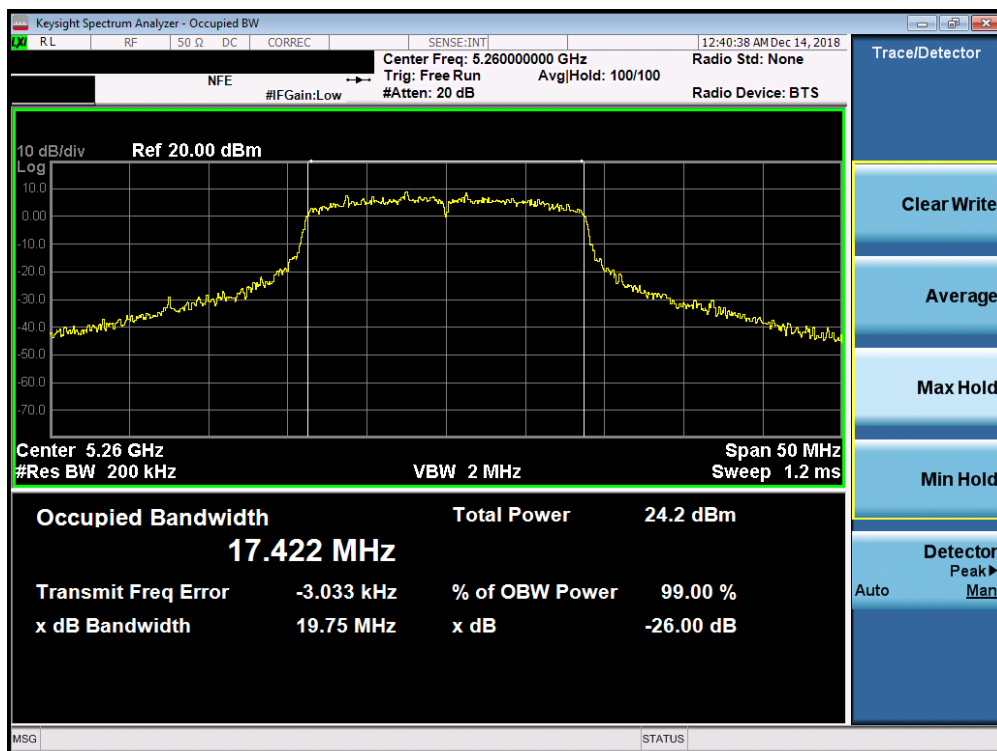


Plot 7-41. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2A) – Ch. 56)

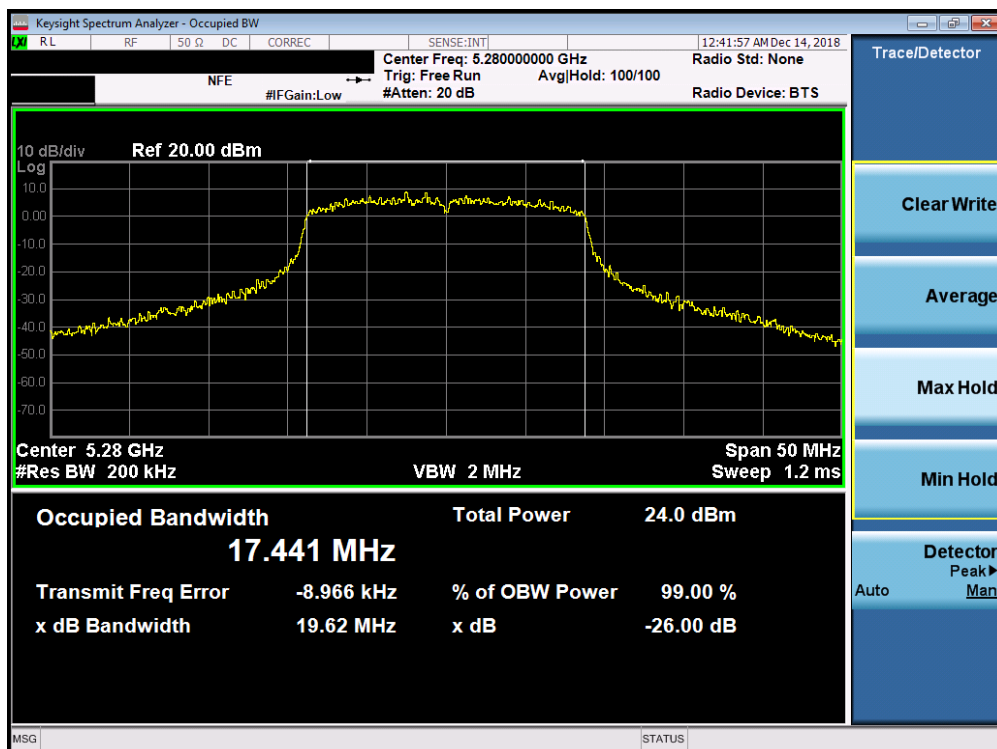


Plot 7-42. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2A) – Ch. 64)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 37 of 170                  |

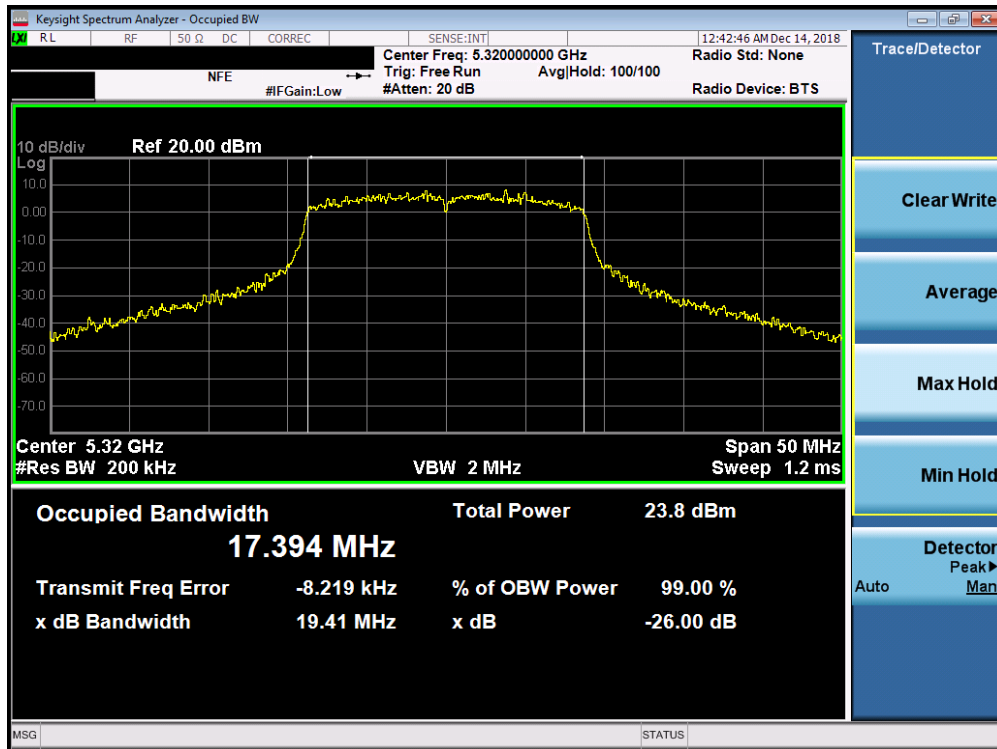


Plot 7-43. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2A) – Ch. 52)

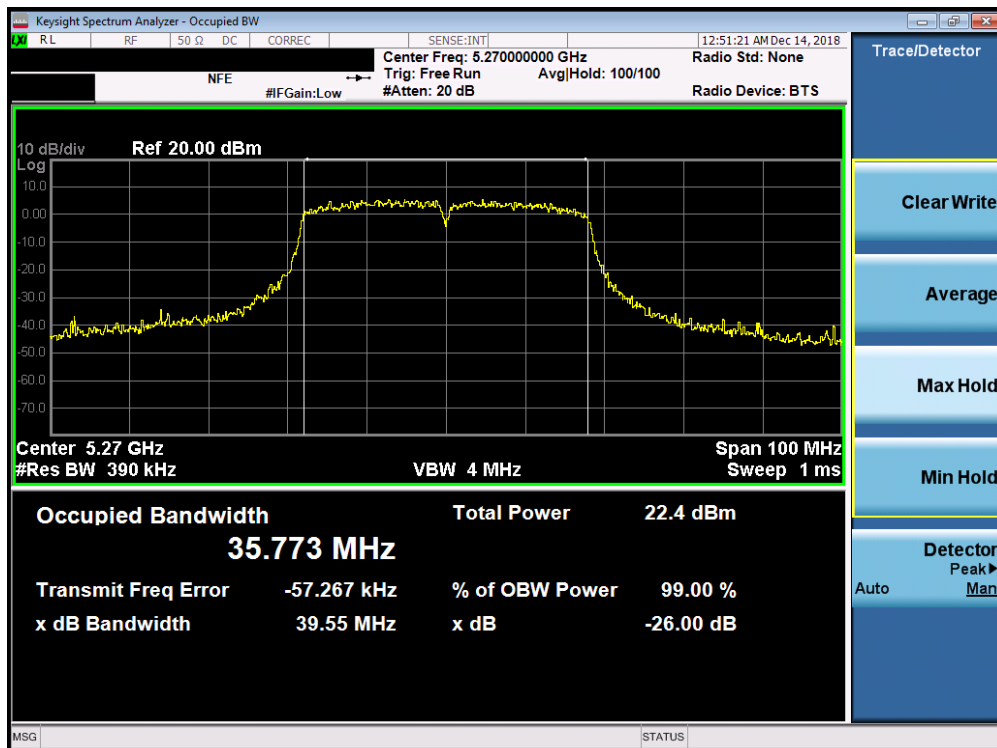


Plot 7-44. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2A) – Ch. 56)

|                                         |                                               |                               |  |                                 |
|-----------------------------------------|-----------------------------------------------|-------------------------------|--|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                               |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset |  | Page 38 of 170                  |



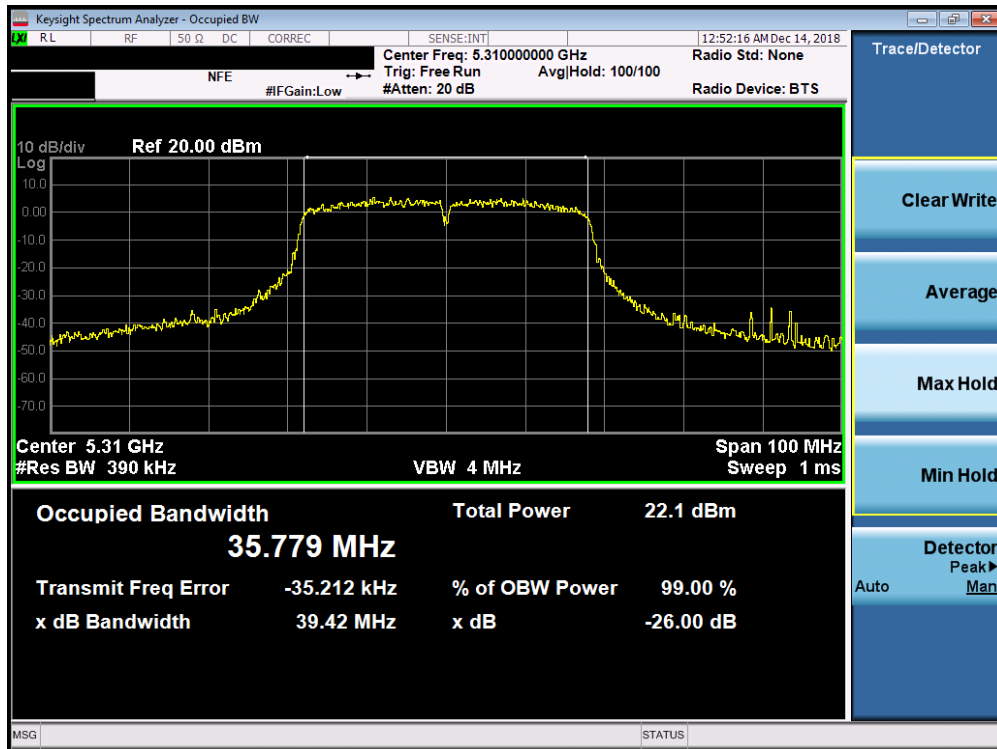
Plot 7-45. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2A) – Ch. 64)



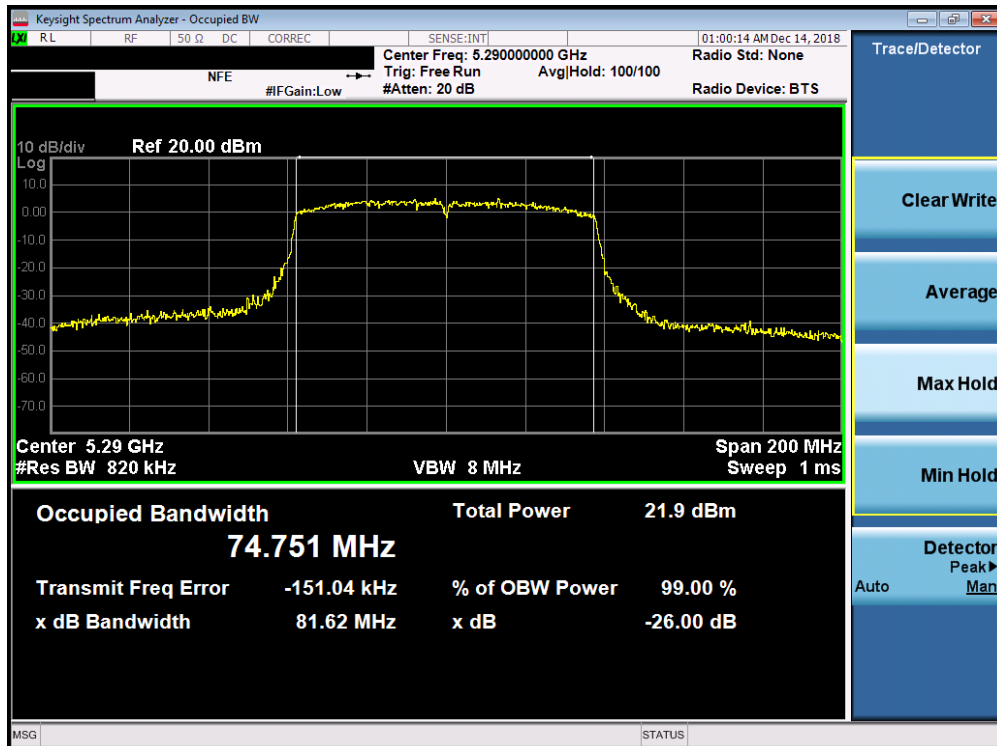
Plot 7-46. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2A) – Ch. 54)

|                                         |                                              |                               |  |                                 |
|-----------------------------------------|----------------------------------------------|-------------------------------|--|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |                               |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019        | EUT Type:<br>Portable Handset |  | Page 39 of 170                  |





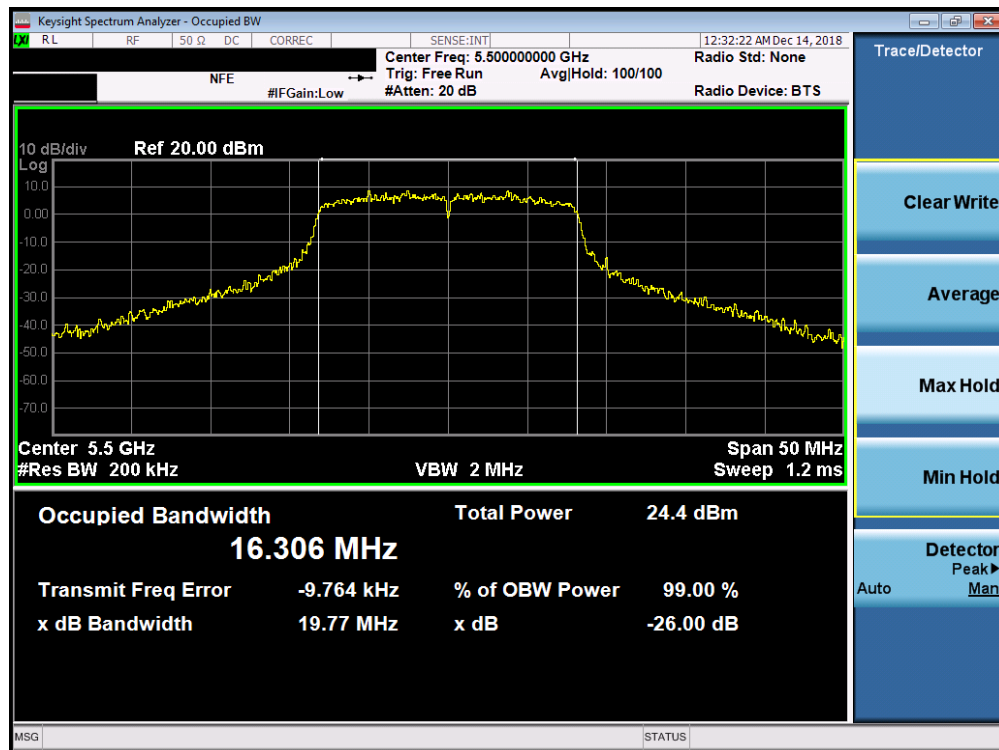
Plot 7-47. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2A) – Ch. 62)



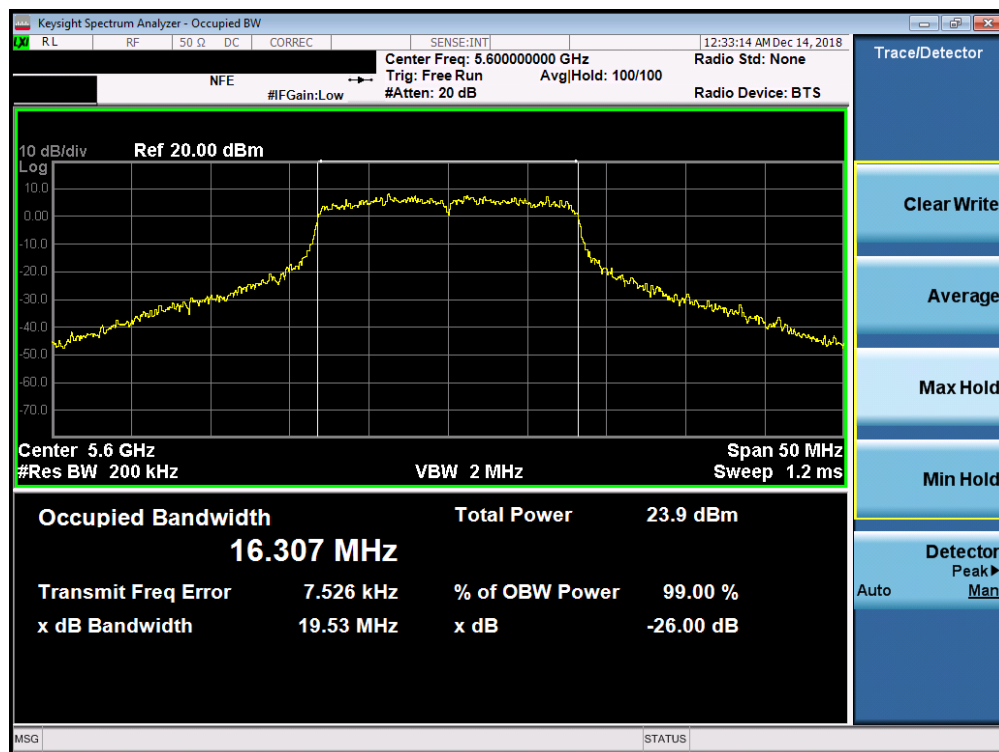
Plot 7-48. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2A) – Ch. 58)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 40 of 170                  |



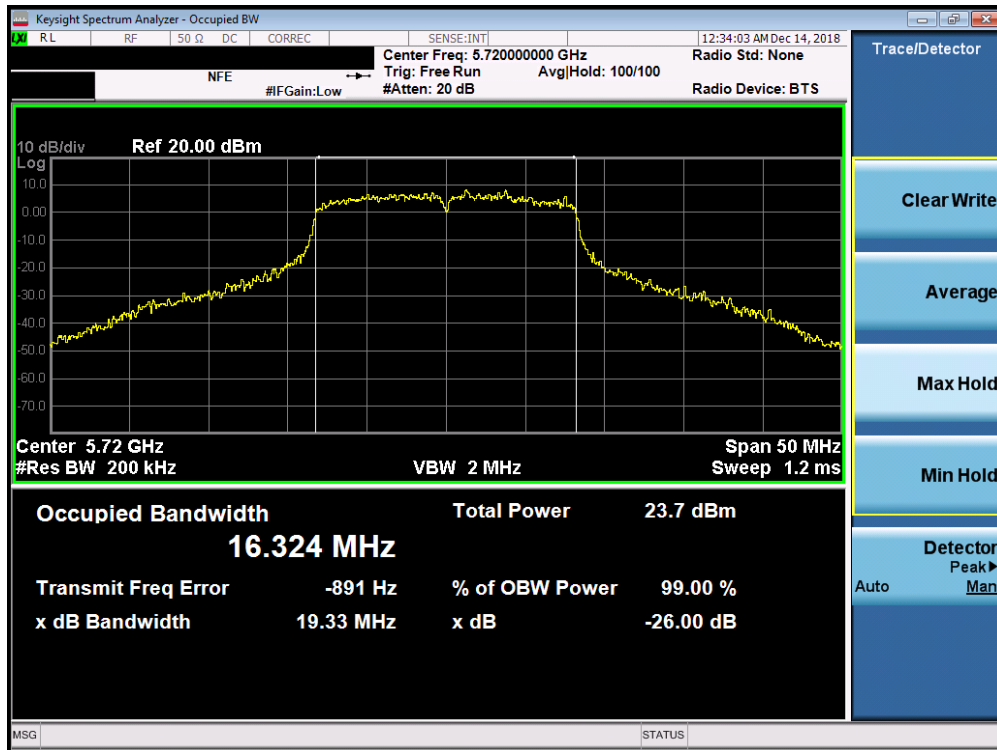


Plot 7-49. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2C) – Ch. 100)

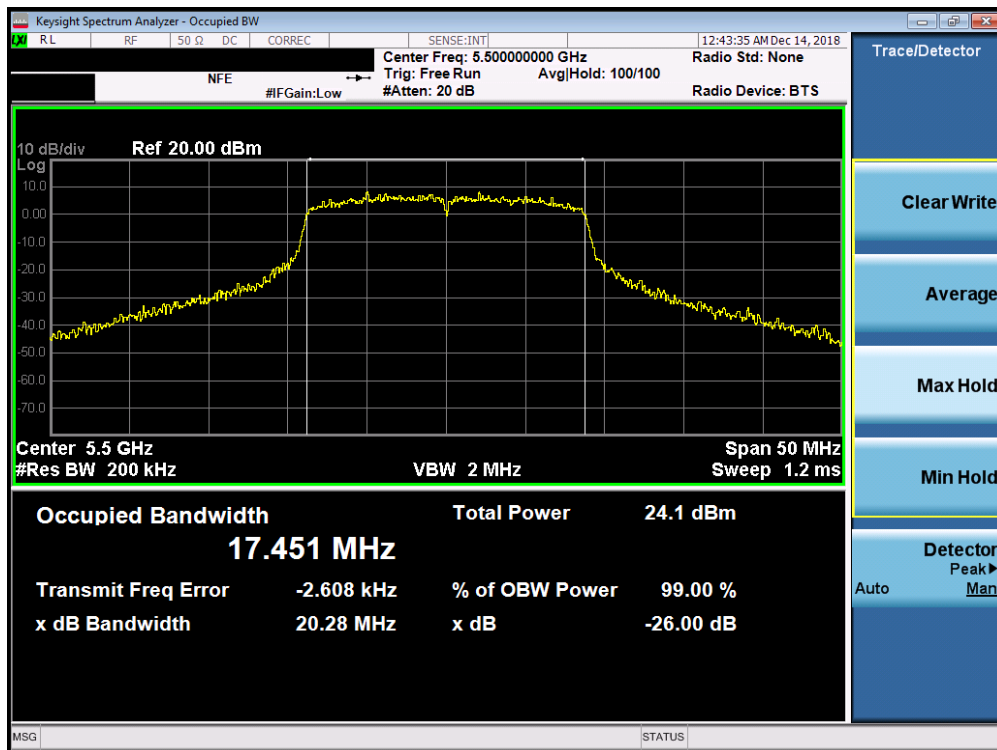


Plot 7-50. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2C) – Ch. 120)

|                                         |                                              |                               |  |                                 |
|-----------------------------------------|----------------------------------------------|-------------------------------|--|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |                               |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019        | EUT Type:<br>Portable Handset |  | Page 41 of 170                  |

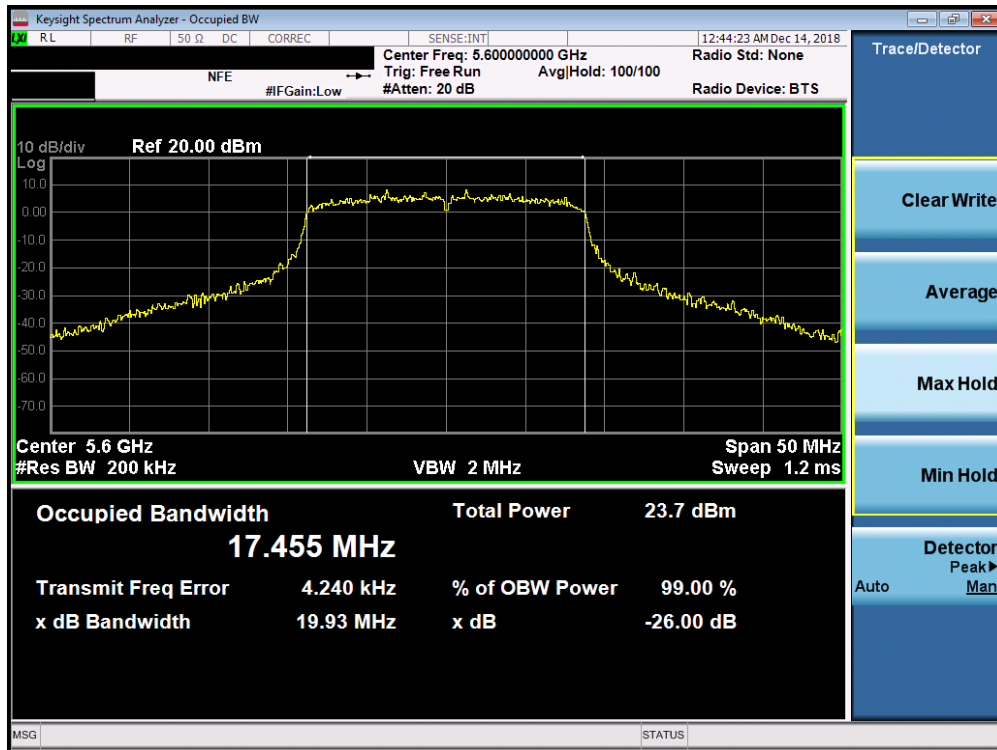


Plot 7-51. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2C) – Ch. 144)

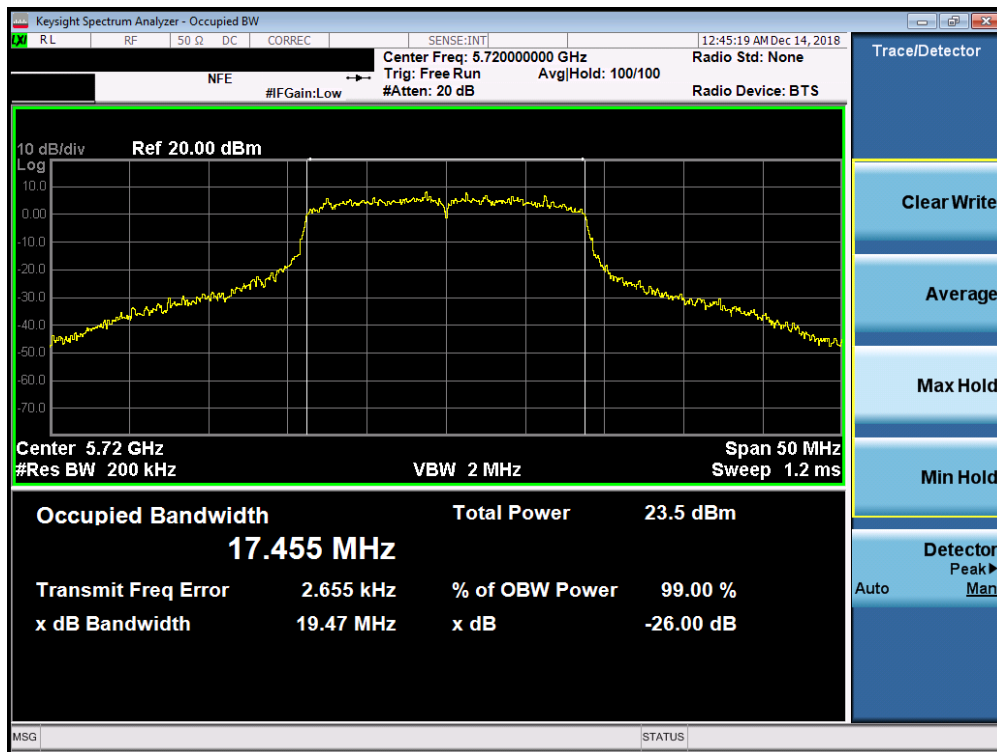


Plot 7-52. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2C) – Ch. 100)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 42 of 170                  |

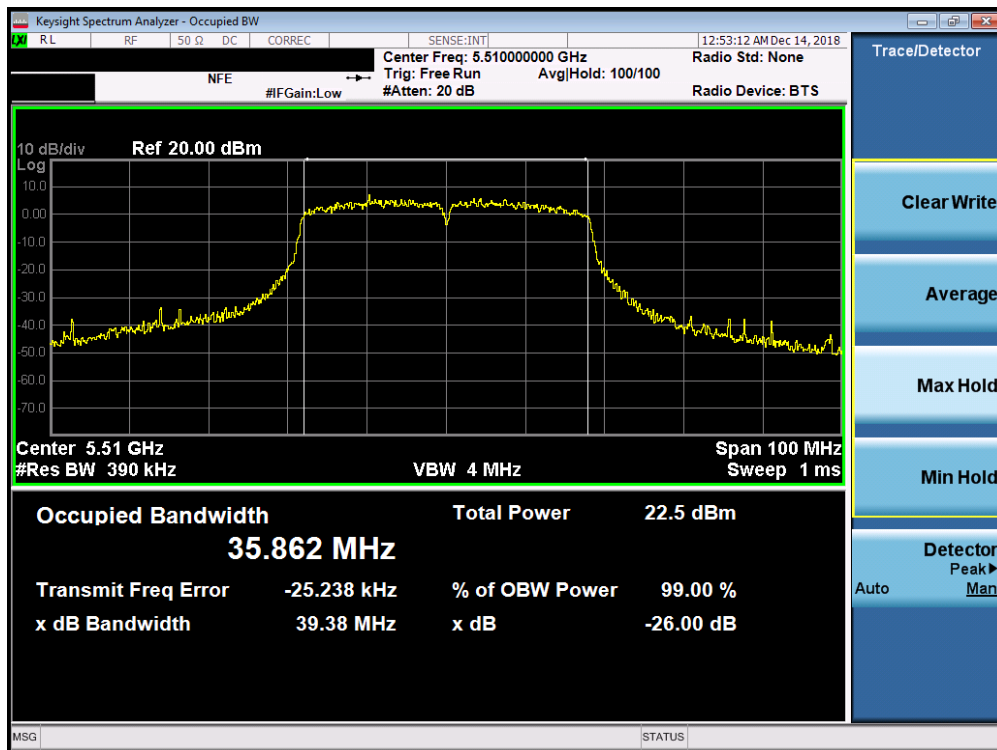


Plot 7-53. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2C) – Ch. 120)

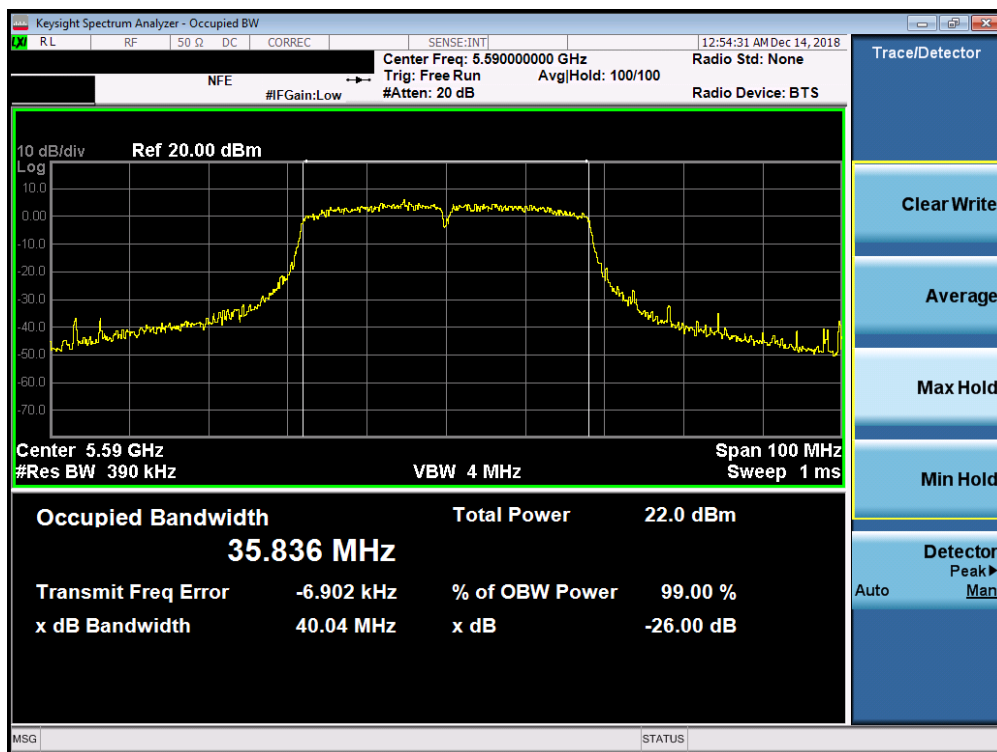


Plot 7-54. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2C) – Ch. 144)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 43 of 170                  |

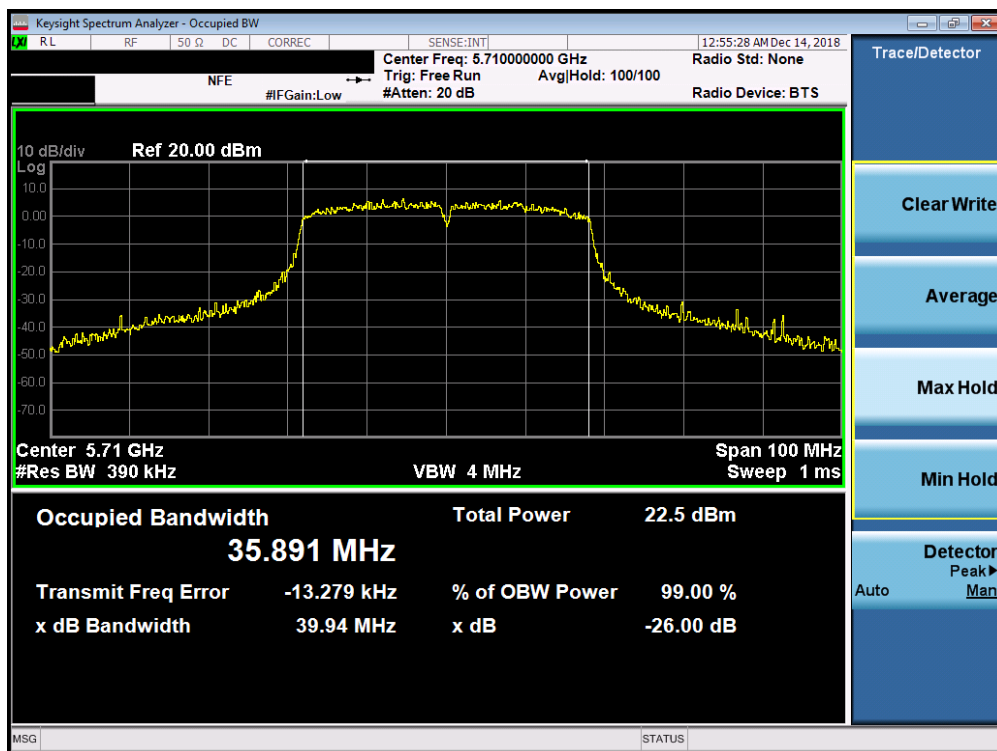


Plot 7-55. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2C) – Ch. 102)

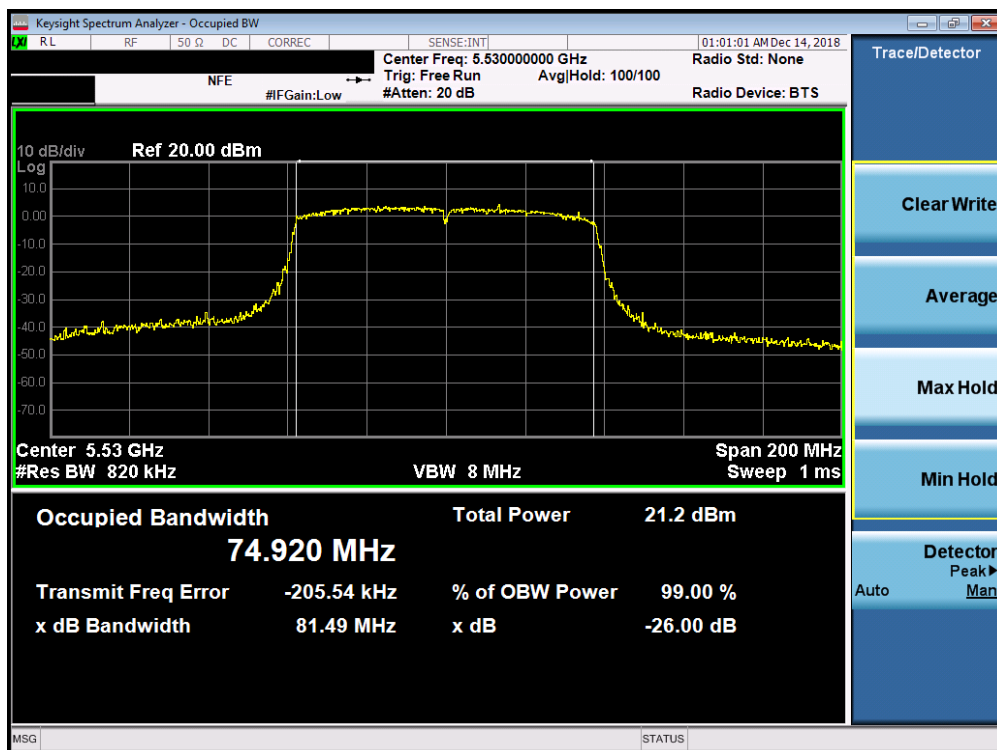


Plot 7-56. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2C) – Ch. 118)

|                                         |                                              |                               |                |                                 |
|-----------------------------------------|----------------------------------------------|-------------------------------|----------------|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |                               |                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019        | EUT Type:<br>Portable Handset | Page 44 of 170 |                                 |

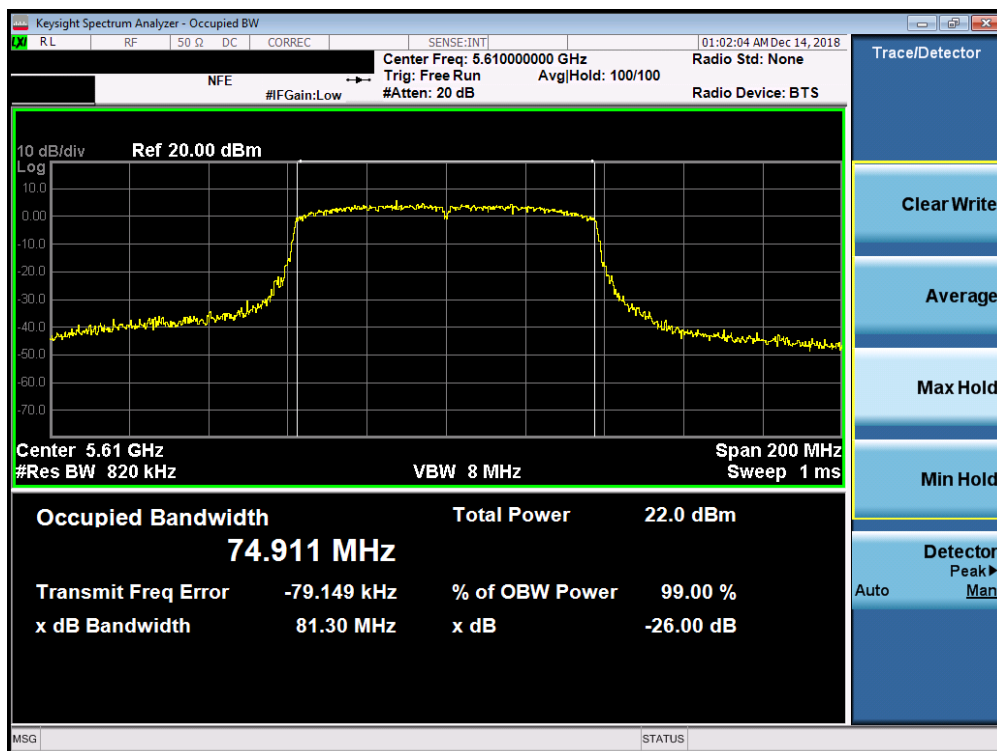


Plot 7-57. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2C) – Ch. 142)

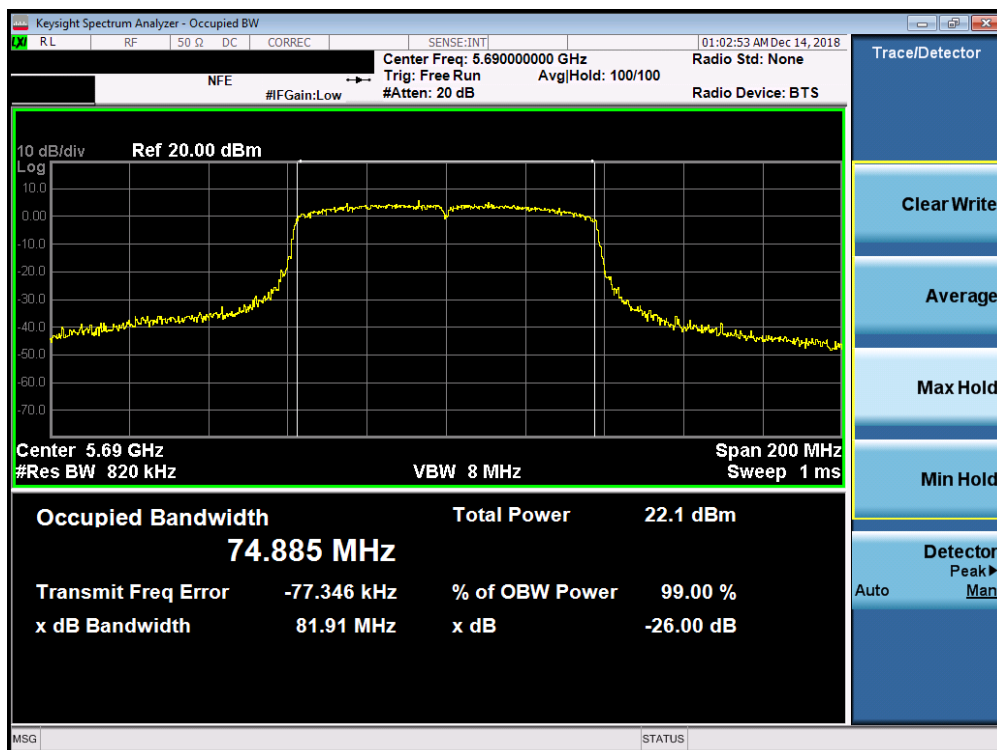


Plot 7-58. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2C) – Ch. 106)

|                                         |                                              |                               |  |                                 |
|-----------------------------------------|----------------------------------------------|-------------------------------|--|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |                               |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019        | EUT Type:<br>Portable Handset |  | Page 45 of 170                  |



Plot 7-59. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2C) – Ch. 122)



Plot 7-60. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2C) – Ch. 138)

|                                         |                                              |                               |  |                                 |
|-----------------------------------------|----------------------------------------------|-------------------------------|--|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |                               |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019        | EUT Type:<br>Portable Handset |  | Page 46 of 170                  |

## 7.3 6dB Bandwidth Measurement – 802.11a/n §15.407 (e); RSS-Gen [6.2]

### Test Overview and Limit

The bandwidth at 6dB 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 6dB bandwidth.

***In the 5.725 – 5.850GHz band, the 6dB bandwidth must be  $\geq 500$  kHz.***

### Test Procedure Used

ANSI C63.10-2013 – Section 6.9.2  
KDB 789033 D02 v02r01 – Section C

### Test Settings

1. The signal analyzers' automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to  $X = 6$ . 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 = 100 kHz
3. VBW  $\geq 3 \times$  RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple

### Test Setup

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



**Figure 7-2. Test Instrument & Measurement Setup**

### Test Notes

None.

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 47 of 170                  |



## SISO Antenna-1 6 dB Bandwidth Measurements

|        | Frequency [MHz] | Channel No. | 802.11 Mode | Data Rate [Mbps] | Measured 6dB Bandwidth [MHz] |
|--------|-----------------|-------------|-------------|------------------|------------------------------|
| Band 3 | 5745            | 149         | a           | 6                | 14.55                        |
|        | 5785            | 157         | a           | 6                | 15.10                        |
|        | 5825            | 165         | a           | 6                | 15.26                        |
|        | 5745            | 149         | n (20MHz)   | 6.5/7.2 (MCS0)   | 16.27                        |
|        | 5785            | 157         | n (20MHz)   | 6.5/7.2 (MCS0)   | 15.20                        |
|        | 5825            | 165         | n (20MHz)   | 6.5/7.2 (MCS0)   | 15.19                        |
|        | 5755            | 151         | n (40MHz)   | 13.5/15 (MCS0)   | 33.71                        |
|        | 5795            | 159         | n (40MHz)   | 13.5/15 (MCS0)   | 32.99                        |
|        | 5775            | 155         | ac (80MHz)  | 29.3/32.5 (MCS0) | 75.40                        |

Table 7-4. Conducted Bandwidth Measurements SISO ANT1



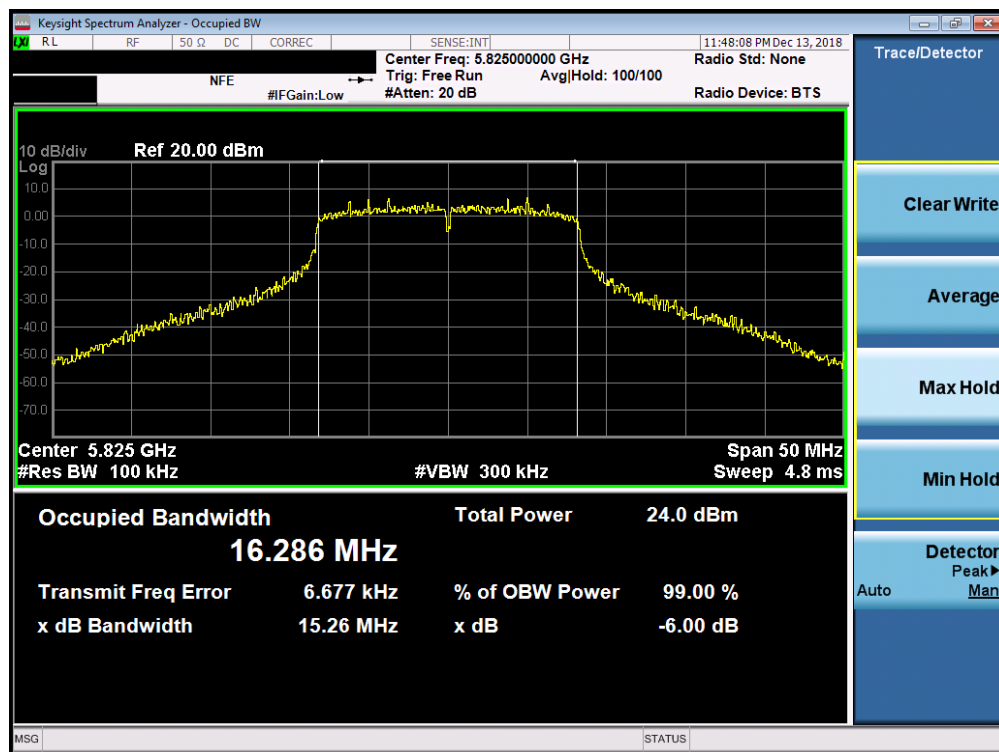
Plot 7-61. 6dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 3) - Ch. 149)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06-ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 48 of 170                  |



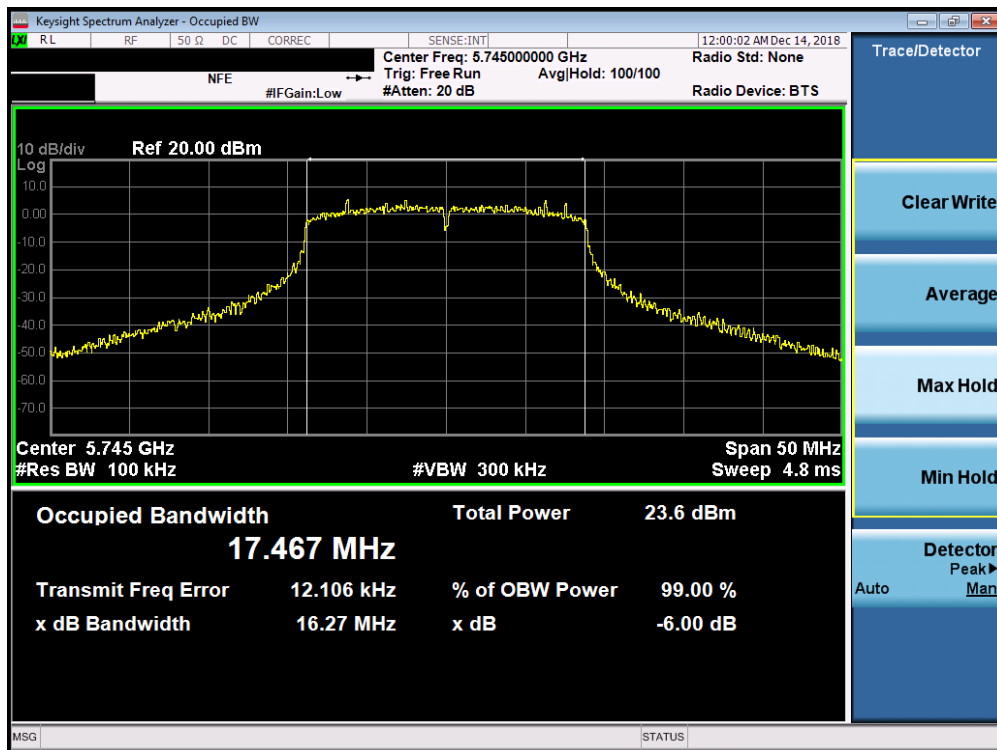


Plot 7-62. 6dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 3) – Ch. 157)

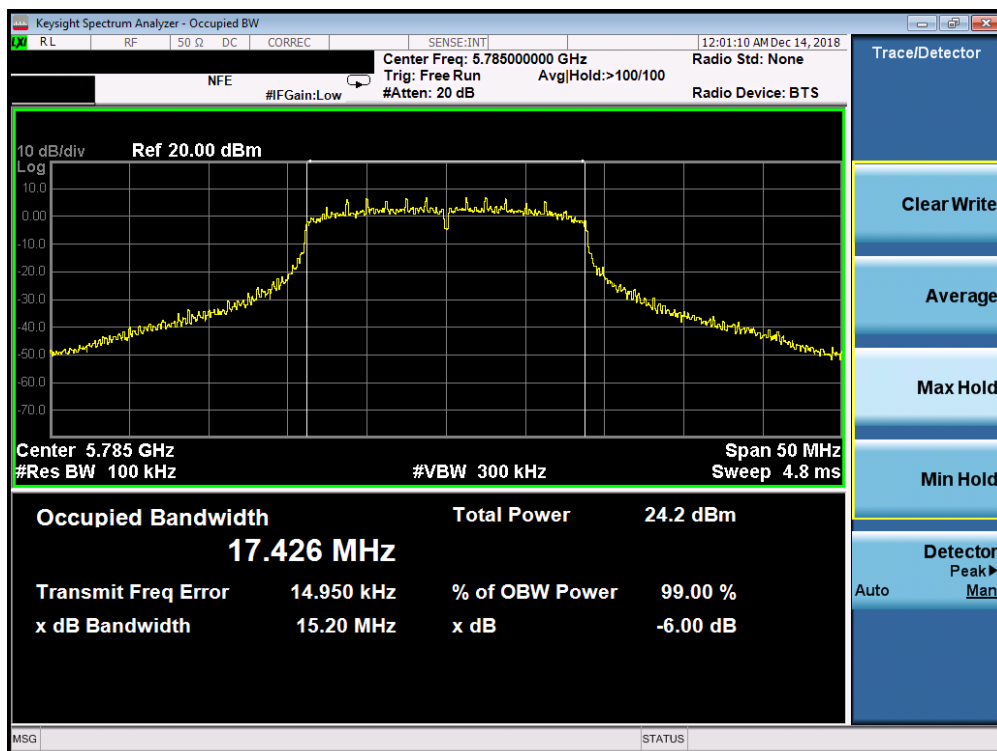


Plot 7-63. 6dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 3) – Ch. 165)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 49 of 170                  |



Plot 7-64. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) – Ch. 149)

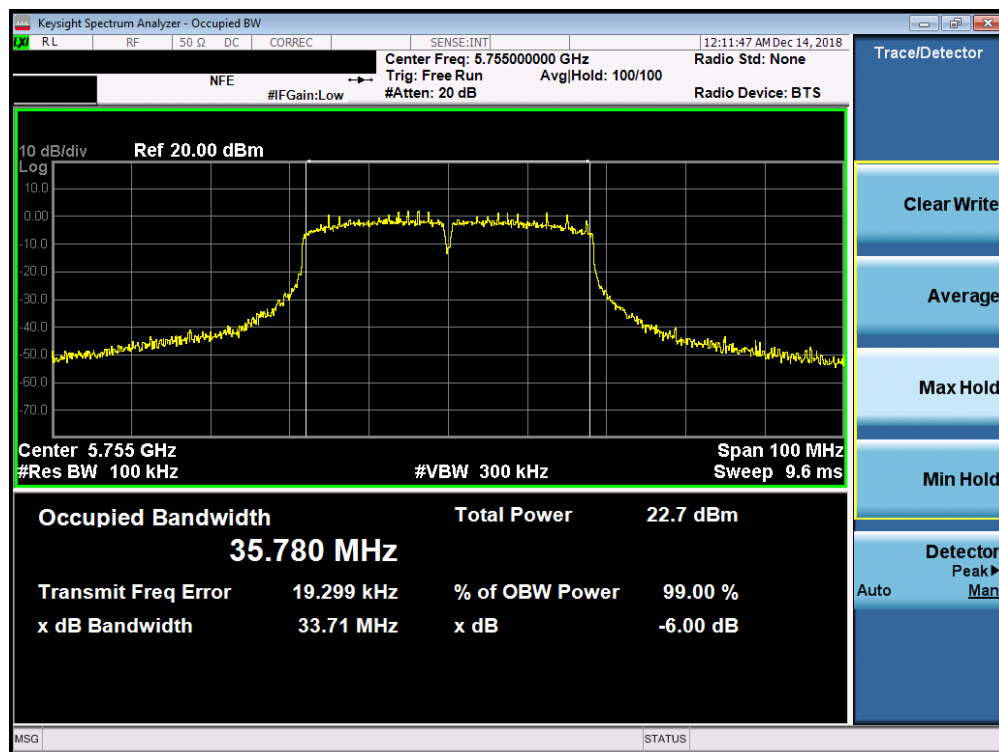


Plot 7-65. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) – Ch. 157)

|                                         |                                              |                               |                |                                 |
|-----------------------------------------|----------------------------------------------|-------------------------------|----------------|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |                               |                | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019        | EUT Type:<br>Portable Handset | Page 50 of 170 |                                 |

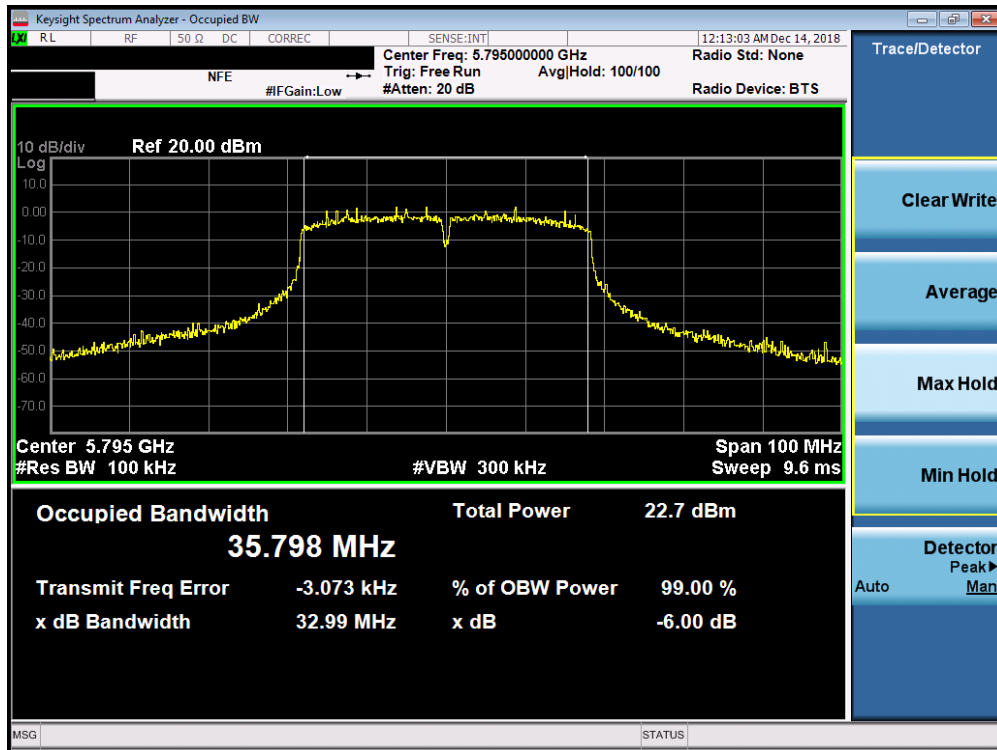


Plot 7-66. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) – Ch. 165)

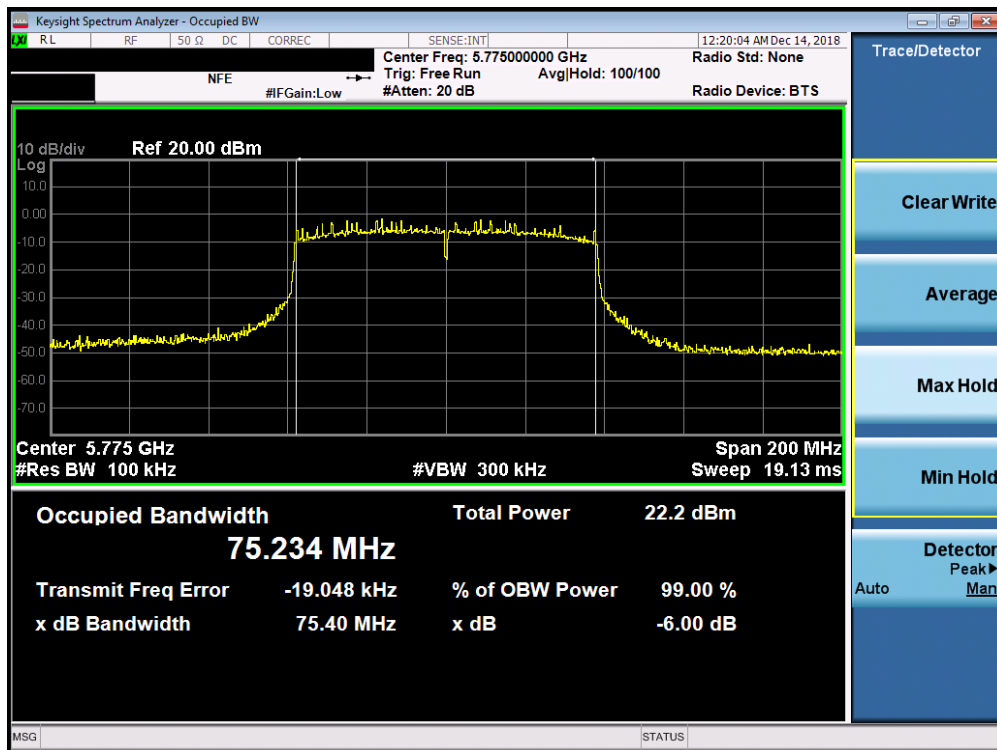


Plot 7-67. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 3) – Ch. 151)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 51 of 170                  |



Plot 7-68. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 3) – Ch. 159)



Plot 7-69. 6dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 3) – Ch. 155)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 52 of 170                  |

## SISO Antenna-2 6dB Bandwidth Measurements

|               | Frequency [MHz] | Channel No. | 802.11 Mode | Data Rate [Mbps] | Measured 6dB Bandwidth [MHz] |
|---------------|-----------------|-------------|-------------|------------------|------------------------------|
| <b>Band 3</b> | 5745            | 149         | a           | 6                | 15.28                        |
|               | 5785            | 157         | a           | 6                | 14.47                        |
|               | 5825            | 165         | a           | 6                | 15.32                        |
|               | 5745            | 149         | n (20MHz)   | 6.5/7.2 (MCS0)   | 14.48                        |
|               | 5785            | 157         | n (20MHz)   | 6.5/7.2 (MCS0)   | 15.41                        |
|               | 5825            | 165         | n (20MHz)   | 6.5/7.2 (MCS0)   | 15.17                        |
|               | 5755            | 151         | n (40MHz)   | 13.5/15 (MCS0)   | 34.54                        |
|               | 5795            | 159         | n (40MHz)   | 13.5/15 (MCS0)   | 35.16                        |
|               | 5775            | 155         | ac (80MHz)  | 29.3/32.5 (MCS0) | 71.50                        |

Table 7-5. Conducted Bandwidth Measurements SISO ANT2

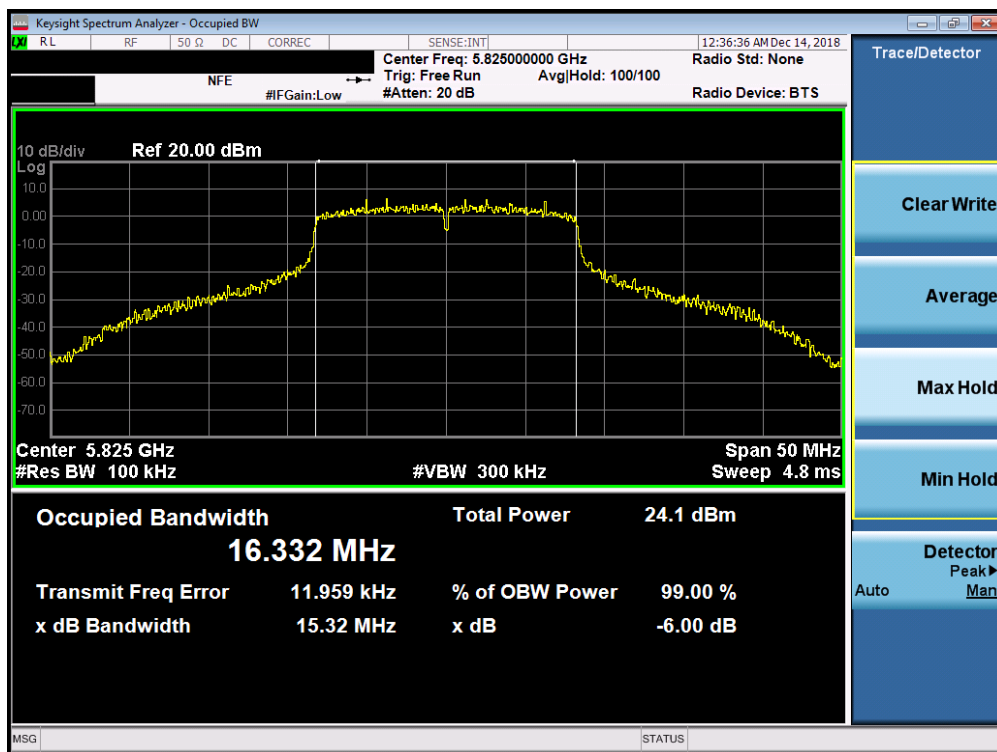


Plot 7-70. 6dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 3) – Ch. 149)

|                                         |                                               |                                       |           |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|-----------|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>LG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06-ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |           | Page 53 of 170                  |

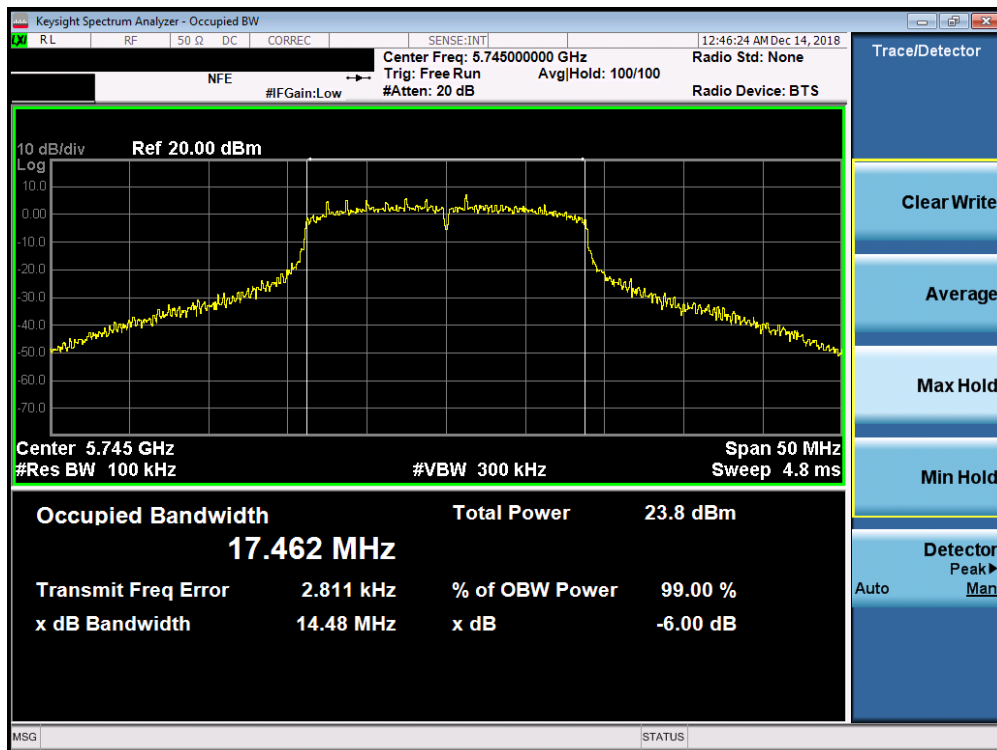


Plot 7-71. 6dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 3) – Ch. 157)



Plot 7-72. 6dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 3) – Ch. 165)

|                                         |                                                                                                                                  |                               |                                                                                       |                                 |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |                               |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                                                                            | EUT Type:<br>Portable Handset |                                                                                       | Page 54 of 170                  |



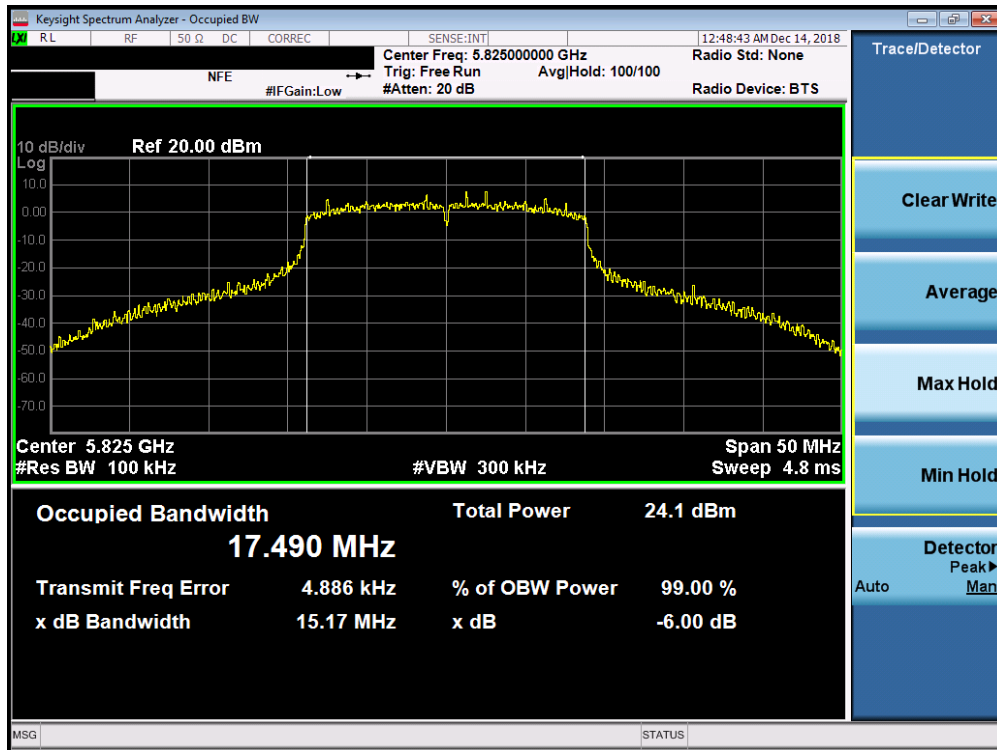
Plot 7-73. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 3) – Ch. 149)



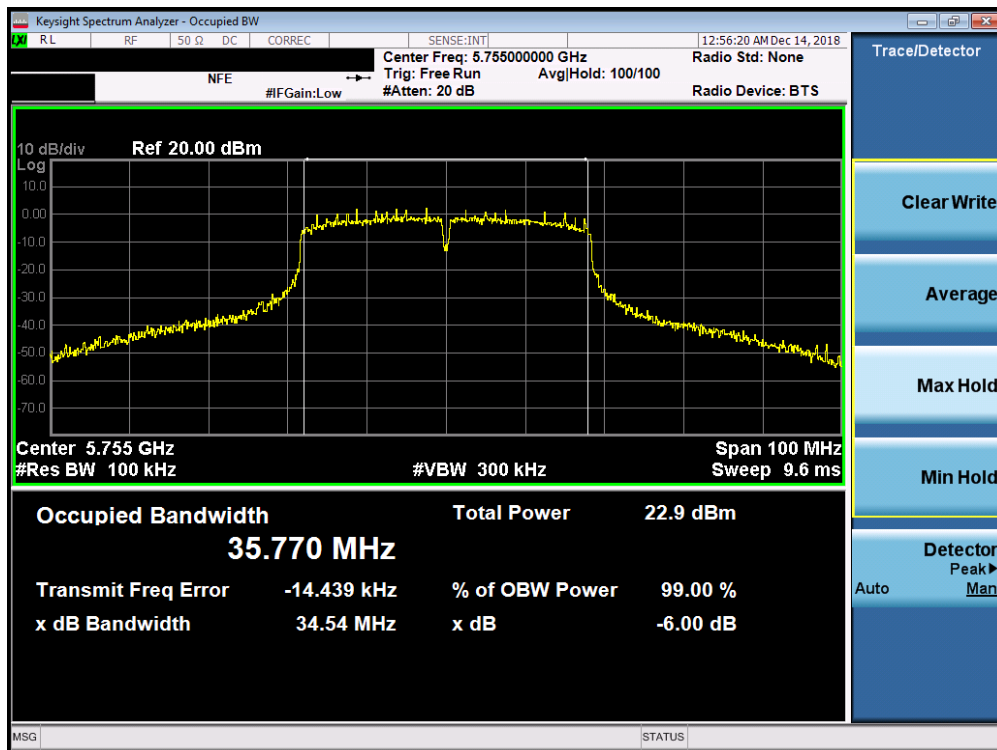
Plot 7-74. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 3) – Ch. 157)

|                                         |                                                                                                                                  |                               |                                                                                       |                                 |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  <b>MEASUREMENT REPORT</b><br>(CERTIFICATION) |                               |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                                                                            | EUT Type:<br>Portable Handset |                                                                                       | Page 55 of 170                  |





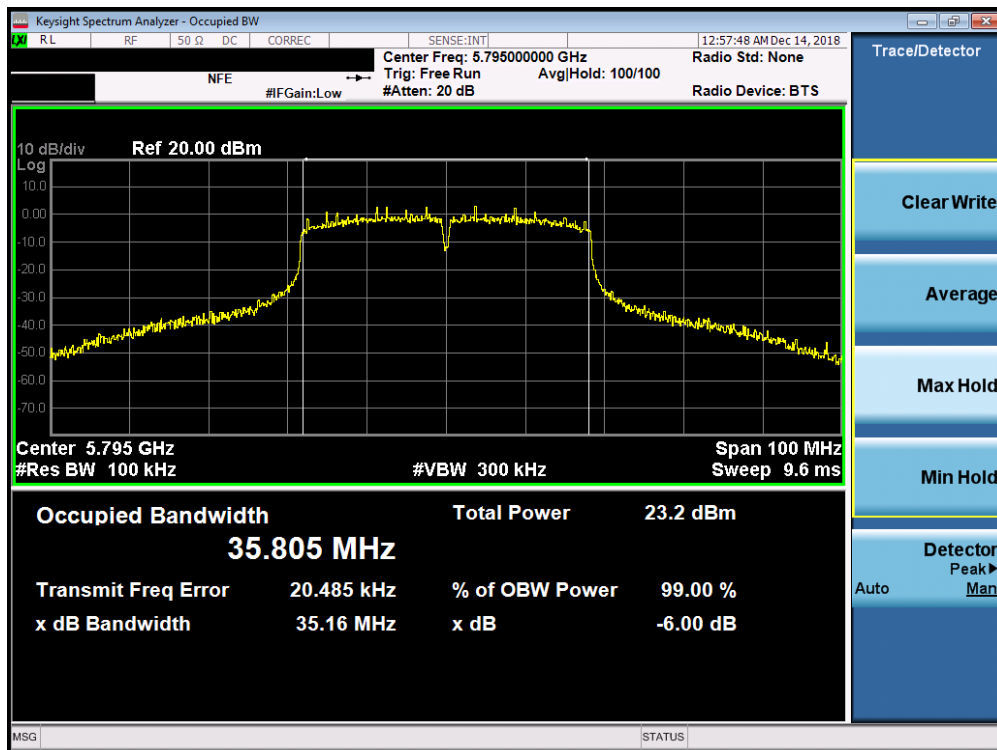
Plot 7-75. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 3) – Ch. 165)



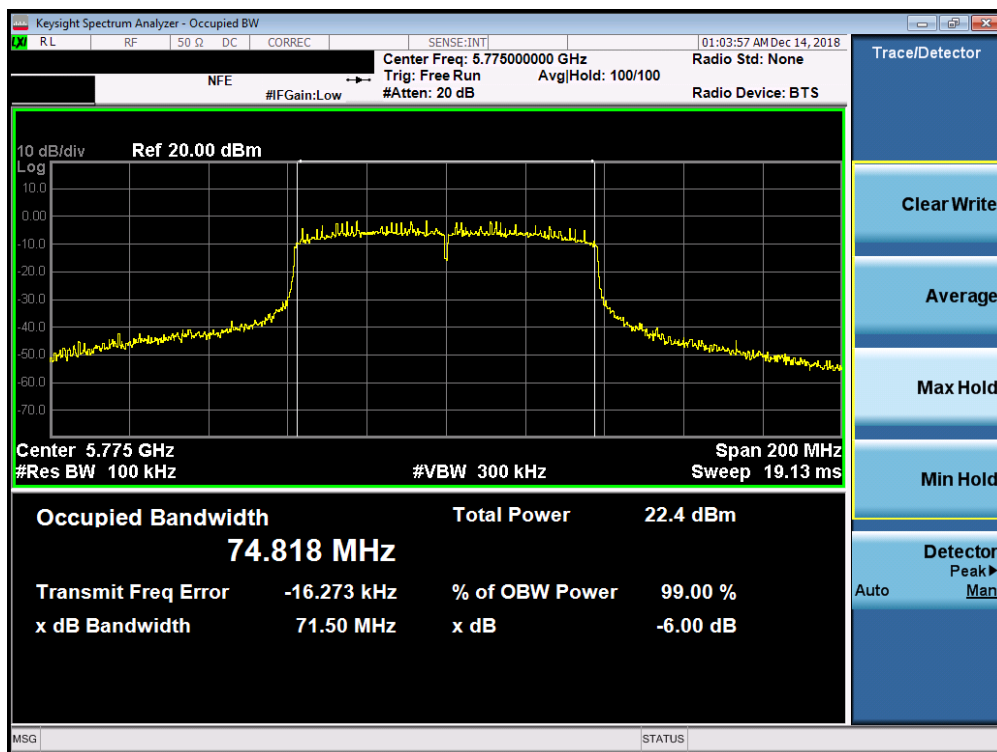
Plot 7-76. 6dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 3) – Ch. 151)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 56 of 170                  |





Plot 7-77. 6dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 3) – Ch. 159)



Plot 7-78. 6dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 3) – Ch. 155)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 57 of 170                  |

## 7.4 UNII Output Power Measurement – 802.11a/n

§15.407(a.1.iv) §15.407(a.2) §15.407(a.3); RSS-247 [6.2]

### Test Overview and Limits

A transmitter antenna terminal of the EUT is connected to the input of an RF pulse power sensor. Measurement is made using a broadband average power meter 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.

***In the 5.15 – 5.25GHz band, the maximum permissible conducted output power is 250mW (23.98dBm). The maximum e.i.r.p. shall not exceed the lesser of 200 mW or  $10 + 10 \log_{10}B$ , dBm.***

***In the 5.25 – 5.35GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) and  $11 \text{ dBm} + 10\log_{10}(26\text{dB BW}) = 11 \text{ dBm} + 10\log_{10}(18.60) = 23.70\text{dBm}$ . The maximum e.i.r.p. shall not exceed the lesser of 1.0 W or  $17 + 10 \log_{10}B$ , dBm.***

***In the 5.47 – 5.725GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) and  $11 \text{ dBm} + 10\log_{10}(26\text{dB BW}) = 11 \text{ dBm} + 10\log_{10}(18.72) = 23.72\text{dBm}$ . The maximum e.i.r.p. shall not exceed the lesser of 1.0 W or  $17 + 10 \log_{10}B$ , dBm.***

***In the 5.725 – 5.850GHz band, the maximum permissible conducted output power is 1W (30dBm). The maximum e.i.r.p. is 36 dBm.***

### Test Procedure Used

ANSI C63.10-2013 – Section 12.3.3.2 Method PM-G  
KDB 789033 D02 v02r01 – Section E3)b) Method PM-G  
ANSI C63.10-2013 – Section 14.2 Measure-and-Sum Technique  
KDB 662911 v02r01 – Section E1) Measure-and-Sum Technique

### Test Settings

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

### Test Setup

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



**Figure 7-3. Test Instrument & Measurement Setup**

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 58 of 170                  |

## SISO Antenna-1 Conducted Output Power Measurements

| 5GHz (20MHz Bandwidth) | Freq [MHz] | Channel | Detector | IEEE Transmission Mode |         |          | Conducted Power Limit [dBm] | Conducted Power Margin [dB] |
|------------------------|------------|---------|----------|------------------------|---------|----------|-----------------------------|-----------------------------|
|                        |            |         |          | 802.11a                | 802.11n | 802.11ac |                             |                             |
|                        | 5180       | 36      | AVG      | 17.71                  | 17.56   | 17.43    | 23.98                       | -6.27                       |
|                        | 5200       | 40      | AVG      | 17.76                  | 17.45   | 17.26    | 23.98                       | -6.22                       |
|                        | 5220       | 44      | AVG      | 17.68                  | 17.51   | 17.34    | 23.98                       | -6.30                       |
|                        | 5240       | 48      | AVG      | 17.82                  | 17.64   | 17.65    | 23.98                       | -6.16                       |
|                        | 5260       | 52      | AVG      | 17.73                  | 17.50   | 17.45    | 23.98                       | -6.25                       |
|                        | 5280       | 56      | AVG      | 17.70                  | 17.54   | 17.52    | 23.98                       | -6.28                       |
|                        | 5300       | 60      | AVG      | 17.72                  | 17.46   | 17.43    | 23.98                       | -6.26                       |
|                        | 5320       | 64      | AVG      | 17.78                  | 17.48   | 17.32    | 23.98                       | -6.20                       |
|                        | 5500       | 100     | AVG      | 17.75                  | 17.51   | 17.56    | 23.98                       | -6.23                       |
|                        | 5600       | 120     | AVG      | 17.77                  | 17.55   | 17.44    | 23.98                       | -6.21                       |
|                        | 5620       | 124     | AVG      | 17.84                  | 17.57   | 17.47    | 23.98                       | -6.14                       |
|                        | 5720       | 144     | AVG      | 17.28                  | 17.16   | 17.12    | 23.98                       | -6.70                       |
|                        | 5745       | 149     | AVG      | 17.38                  | 17.09   | 16.97    | 30.00                       | -12.62                      |
|                        | 5785       | 157     | AVG      | 17.27                  | 17.16   | 17.01    | 30.00                       | -12.73                      |
|                        | 5825       | 165     | AVG      | 17.37                  | 17.12   | 17.08    | 30.00                       | -12.63                      |

Table 7-6. SISO ANT1 20MHz BW (UNII) Maximum Conducted Output Power

| 5GHz (40MHz Bandwidth) | Freq [MHz] | Channel | Detector | IEEE Transmission Mode |          | Conducted Power Limit [dBm] | Conducted Power Margin [dB] |
|------------------------|------------|---------|----------|------------------------|----------|-----------------------------|-----------------------------|
|                        |            |         |          | 802.11n                | 802.11ac |                             |                             |
|                        | 5190       | 38      | AVG      | 15.87                  | 15.98    | 23.98                       | -8.00                       |
|                        | 5230       | 46      | AVG      | 15.98                  | 15.97    | 23.98                       | -8.00                       |
|                        | 5270       | 54      | AVG      | 15.99                  | 15.98    | 23.98                       | -7.99                       |
|                        | 5310       | 62      | AVG      | 15.99                  | 15.97    | 23.98                       | -7.99                       |
|                        | 5510       | 102     | AVG      | 15.75                  | 15.86    | 23.98                       | -8.12                       |
|                        | 5590       | 118     | AVG      | 15.89                  | 15.90    | 23.98                       | -8.08                       |
|                        | 5630       | 126     | AVG      | 15.98                  | 15.97    | 23.98                       | -8.00                       |
|                        | 5710       | 142     | AVG      | 15.98                  | 15.99    | 23.98                       | -7.99                       |
|                        | 5755       | 151     | AVG      | 15.99                  | 15.97    | 30.00                       | -14.01                      |
|                        | 5795       | 159     | AVG      | 15.99                  | 15.97    | 30.00                       | -14.01                      |

Table 7-7. SISO ANT1 40MHz BW (UNII) Maximum Conducted Output Power

|                                                |                                                                                                                                                                                                                         |                                      |                                        |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------------------|
| FCC ID: ZNFQ850QM                              |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                                      | <b>Approved by:</b><br>Quality Manager |
| <b>Test Report S/N:</b><br>1M1812060222-06.ZNF | <b>Test Dates:</b><br>12/11/2018 - 1/18/2019                                                                                                                                                                            | <b>EUT Type:</b><br>Portable Handset | Page 59 of 170                         |

| 5GHz (80MHz Bandwidth) | Freq [MHz] | Channel | Detector | IEEE<br>Transmission<br>Mode | Conducted<br>Power Limit<br>[dBm] | Conducted<br>Power<br>Margin [dB] |
|------------------------|------------|---------|----------|------------------------------|-----------------------------------|-----------------------------------|
|                        |            |         |          | 802.11ac                     |                                   |                                   |
|                        | 5210       | 42      | AVG      | 14.68                        | 23.98                             | -9.30                             |
|                        | 5290       | 58      | AVG      | 14.62                        | 23.98                             | -9.36                             |
|                        | 5530       | 106     | AVG      | 13.68                        | 23.98                             | -10.30                            |
|                        | 5610       | 122     | AVG      | 14.42                        | 23.98                             | -9.56                             |
|                        | 5690       | 138     | AVG      | 14.39                        | 23.98                             | -9.59                             |
|                        | 5775       | 155     | AVG      | 14.35                        | 30.00                             | -15.65                            |

Table 7-8. SISO ANT1 80MHz BW (UNII) Maximum Conducted Output Power

|                                         |                                                                                                                                   |                               |                                                                                       |                                 |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                               |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                                                                             | EUT Type:<br>Portable Handset |                                                                                       | Page 60 of 170                  |

## SISO Antenna-2 Conducted Output Power Measurements

| 5GHz (20MHz Bandwidth) | Freq [MHz] | Channel | Detector | IEEE Transmission Mode |         |          | Conducted Power Limit [dBm] | Conducted Power Margin [dB] |
|------------------------|------------|---------|----------|------------------------|---------|----------|-----------------------------|-----------------------------|
|                        |            |         |          | 802.11a                | 802.11n | 802.11ac |                             |                             |
|                        | 5180       | 36      | AVG      | 17.68                  | 17.48   | 17.12    | 23.98                       | -6.30                       |
|                        | 5200       | 40      | AVG      | 17.71                  | 17.54   | 17.33    | 23.98                       | -6.27                       |
|                        | 5220       | 44      | AVG      | 17.67                  | 17.51   | 17.27    | 23.98                       | -6.31                       |
|                        | 5240       | 48      | AVG      | 17.81                  | 17.43   | 17.56    | 23.98                       | -6.17                       |
|                        | 5260       | 52      | AVG      | 17.61                  | 17.65   | 17.47    | 23.98                       | -6.33                       |
|                        | 5280       | 56      | AVG      | 17.67                  | 17.67   | 17.62    | 23.98                       | -6.31                       |
|                        | 5300       | 60      | AVG      | 17.54                  | 17.78   | 17.76    | 23.98                       | -6.20                       |
|                        | 5320       | 64      | AVG      | 17.68                  | 17.54   | 17.62    | 23.98                       | -6.30                       |
|                        | 5500       | 100     | AVG      | 17.72                  | 17.75   | 17.79    | 23.98                       | -6.19                       |
|                        | 5600       | 120     | AVG      | 17.66                  | 17.82   | 17.77    | 23.98                       | -6.16                       |
|                        | 5620       | 124     | AVG      | 17.80                  | 17.72   | 17.72    | 23.98                       | -6.18                       |
|                        | 5720       | 144     | AVG      | 17.22                  | 17.46   | 17.16    | 23.98                       | -6.52                       |
|                        | 5745       | 149     | AVG      | 17.21                  | 17.21   | 17.37    | 30.00                       | -12.63                      |
|                        | 5785       | 157     | AVG      | 17.39                  | 17.47   | 17.41    | 30.00                       | -12.53                      |
|                        | 5825       | 165     | AVG      | 17.31                  | 17.43   | 17.47    | 30.00                       | -12.53                      |

Table 7-9. SISO ANT2 20MHz BW (UNII) Maximum Conducted Output Power

| 5GHz (40MHz Bandwidth) | Freq [MHz] | Channel | Detector | IEEE Transmission Mode |          | Conducted Power Limit [dBm] | Conducted Power Margin [dB] |
|------------------------|------------|---------|----------|------------------------|----------|-----------------------------|-----------------------------|
|                        |            |         |          | 802.11n                | 802.11ac |                             |                             |
|                        | 5190       | 38      | AVG      | 15.72                  | 15.75    | 23.98                       | -8.23                       |
|                        | 5230       | 46      | AVG      | 15.74                  | 15.75    | 23.98                       | -8.23                       |
|                        | 5270       | 54      | AVG      | 15.80                  | 15.79    | 23.98                       | -8.18                       |
|                        | 5310       | 62      | AVG      | 15.66                  | 15.65    | 23.98                       | -8.32                       |
|                        | 5510       | 102     | AVG      | 15.69                  | 15.70    | 23.98                       | -8.28                       |
|                        | 5590       | 118     | AVG      | 15.38                  | 15.38    | 23.98                       | -8.60                       |
|                        | 5630       | 126     | AVG      | 15.33                  | 15.45    | 23.98                       | -8.53                       |
|                        | 5710       | 142     | AVG      | 15.34                  | 15.36    | 23.98                       | -8.62                       |
|                        | 5755       | 151     | AVG      | 15.34                  | 15.31    | 30.00                       | -14.66                      |
|                        | 5795       | 159     | AVG      | 15.42                  | 15.44    | 30.00                       | -14.56                      |

Table 7-10. SISO ANT2 40MHz BW (UNII) Maximum Conducted Output Power

|                                         |                                                                                                                                                                                                                         |                               |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b>  |                               | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                                                                                                                                                                   | EUT Type:<br>Portable Handset | Page 61 of 170                  |

| 5GHz (80MHz Bandwidth) | Freq [MHz] | Channel | Detector | IEEE<br>Transmission<br>Mode | Conducted<br>Power Limit<br>[dBm] | Conducted<br>Power<br>Margin [dB] |
|------------------------|------------|---------|----------|------------------------------|-----------------------------------|-----------------------------------|
|                        |            |         |          | 802.11ac                     |                                   |                                   |
|                        | 5210       | 42      | AVG      | 14.78                        | 23.98                             | -9.20                             |
|                        | 5290       | 58      | AVG      | 14.84                        | 23.98                             | -9.14                             |
|                        | 5530       | 106     | AVG      | 14.02                        | 23.98                             | -9.96                             |
|                        | 5610       | 122     | AVG      | 14.89                        | 23.98                             | -9.09                             |
|                        | 5690       | 138     | AVG      | 14.99                        | 23.98                             | -8.99                             |
|                        | 5775       | 155     | AVG      | 14.98                        | 30.00                             | -15.02                            |

Table 7-11. SISO ANT2 80MHz BW (UNII) Maximum Conducted Output Power

|                                         |                                                                                                                                   |                               |                                                                                       |                                 |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  <b>MEASUREMENT REPORT<br/>(CERTIFICATION)</b> |                               |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                                                                             | EUT Type:<br>Portable Handset |                                                                                       | Page 62 of 170                  |

## MIMO/CDD Maximum Conducted Output Power Measurements

| 5GHz (20MHz Bandwidth) | Freq [MHz] | Channel | Detector | Conducted Power [dBm] |       |       | Conducted Power Limit [dBm] | Conducted Power Margin [dB] |
|------------------------|------------|---------|----------|-----------------------|-------|-------|-----------------------------|-----------------------------|
|                        |            |         |          | ANT1                  | ANT2  | MIMO  |                             |                             |
|                        | 5180       | 36      | AVG      | 17.71                 | 17.68 | 20.71 | 23.98                       | -3.27                       |
|                        | 5200       | 40      | AVG      | 17.76                 | 17.71 | 20.75 | 23.98                       | -3.23                       |
|                        | 5220       | 44      | AVG      | 17.68                 | 17.67 | 20.69 | 23.98                       | -3.29                       |
|                        | 5240       | 48      | AVG      | 17.82                 | 17.81 | 20.83 | 23.98                       | -3.15                       |
|                        | 5260       | 52      | AVG      | 17.73                 | 17.61 | 20.68 | 23.98                       | -3.30                       |
|                        | 5280       | 56      | AVG      | 17.70                 | 17.67 | 20.70 | 23.98                       | -3.28                       |
|                        | 5300       | 60      | AVG      | 17.72                 | 17.54 | 20.64 | 23.98                       | -3.34                       |
|                        | 5320       | 64      | AVG      | 17.78                 | 17.68 | 20.74 | 23.98                       | -3.24                       |
|                        | 5500       | 100     | AVG      | 17.75                 | 17.72 | 20.75 | 23.98                       | -3.23                       |
|                        | 5600       | 120     | AVG      | 17.77                 | 17.66 | 20.73 | 23.98                       | -3.25                       |
|                        | 5620       | 124     | AVG      | 17.84                 | 17.80 | 20.83 | 23.98                       | -3.15                       |
|                        | 5720       | 144     | AVG      | 17.28                 | 17.22 | 20.26 | 23.98                       | -3.72                       |
|                        | 5745       | 149     | AVG      | 17.38                 | 17.21 | 20.31 | 30.00                       | -9.69                       |
|                        | 5785       | 157     | AVG      | 17.27                 | 17.39 | 20.34 | 30.00                       | -9.66                       |
|                        | 5825       | 165     | AVG      | 17.37                 | 17.31 | 20.35 | 30.00                       | -9.65                       |

Table 7-12. CDD 20MHz BW 802.11a (UNII) Maximum Conducted Output Power

| 5GHz (20MHz Bandwidth) | Freq [MHz] | Channel | Detector | Conducted Power [dBm] |       |       | Conducted Power Limit [dBm] | Conducted Power Margin [dB] |
|------------------------|------------|---------|----------|-----------------------|-------|-------|-----------------------------|-----------------------------|
|                        |            |         |          | ANT1                  | ANT2  | MIMO  |                             |                             |
|                        | 5180       | 36      | AVG      | 17.56                 | 17.56 | 17.56 | 23.98                       | -6.42                       |
|                        | 5200       | 40      | AVG      | 17.45                 | 17.45 | 17.45 | 23.98                       | -6.53                       |
|                        | 5220       | 44      | AVG      | 17.51                 | 17.51 | 17.51 | 23.98                       | -6.47                       |
|                        | 5240       | 48      | AVG      | 17.64                 | 17.64 | 17.64 | 23.98                       | -6.34                       |
|                        | 5260       | 52      | AVG      | 17.50                 | 17.50 | 17.50 | 23.98                       | -6.48                       |
|                        | 5280       | 56      | AVG      | 17.54                 | 17.54 | 17.54 | 23.98                       | -6.44                       |
|                        | 5300       | 60      | AVG      | 17.46                 | 17.46 | 17.46 | 23.98                       | -6.52                       |
|                        | 5320       | 64      | AVG      | 17.48                 | 17.48 | 17.48 | 23.98                       | -6.50                       |
|                        | 5500       | 100     | AVG      | 17.51                 | 17.51 | 17.51 | 23.98                       | -6.47                       |
|                        | 5600       | 120     | AVG      | 17.55                 | 17.55 | 17.55 | 23.98                       | -6.43                       |
|                        | 5620       | 124     | AVG      | 17.57                 | 17.57 | 17.57 | 23.98                       | -6.41                       |
|                        | 5720       | 144     | AVG      | 17.16                 | 17.16 | 17.16 | 23.98                       | -6.82                       |
|                        | 5745       | 149     | AVG      | 17.09                 | 17.09 | 17.09 | 30.00                       | -12.91                      |
|                        | 5785       | 157     | AVG      | 17.16                 | 17.16 | 17.16 | 30.00                       | -12.84                      |
|                        | 5825       | 165     | AVG      | 17.12                 | 17.12 | 17.12 | 30.00                       | -12.88                      |

Table 7-13. MIMO 20MHz BW 802.11n (UNII) Maximum Conducted Output Power

|                                         |                                                                                     |                               |                                       |                                                                                       |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  |                               | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset |                                       |                                                                                       | Page 63 of 170                  |

| 5GHz (20MHz Bandwidth) | Freq [MHz] | Channel | Detector | Conducted Power [dBm] |       |       | Conducted Power Limit [dBm] | Conducted Power Margin [dB] |
|------------------------|------------|---------|----------|-----------------------|-------|-------|-----------------------------|-----------------------------|
|                        |            |         |          | ANT1                  | ANT2  | MIMO  |                             |                             |
|                        | 5180       | 36      | AVG      | 17.43                 | 17.43 | 20.44 | 23.98                       | -3.54                       |
|                        | 5200       | 40      | AVG      | 17.26                 | 17.26 | 20.27 | 23.98                       | -3.71                       |
|                        | 5220       | 44      | AVG      | 17.34                 | 17.34 | 20.35 | 23.98                       | -3.63                       |
|                        | 5240       | 48      | AVG      | 17.65                 | 17.65 | 20.66 | 23.98                       | -3.32                       |
|                        | 5260       | 52      | AVG      | 17.45                 | 17.45 | 20.46 | 23.98                       | -3.52                       |
|                        | 5280       | 56      | AVG      | 17.52                 | 17.52 | 20.53 | 23.98                       | -3.45                       |
|                        | 5300       | 60      | AVG      | 17.43                 | 17.43 | 20.44 | 23.98                       | -3.54                       |
|                        | 5320       | 64      | AVG      | 17.32                 | 17.32 | 20.33 | 23.98                       | -3.65                       |
|                        | 5500       | 100     | AVG      | 17.56                 | 17.56 | 20.57 | 23.98                       | -3.41                       |
|                        | 5600       | 120     | AVG      | 17.44                 | 17.44 | 20.45 | 23.98                       | -3.53                       |
|                        | 5620       | 124     | AVG      | 17.47                 | 17.47 | 20.48 | 23.98                       | -3.50                       |
|                        | 5720       | 144     | AVG      | 17.12                 | 17.12 | 20.13 | 23.98                       | -3.85                       |
|                        | 5745       | 149     | AVG      | 16.97                 | 16.97 | 19.98 | 30.00                       | -10.02                      |
|                        | 5785       | 157     | AVG      | 17.01                 | 17.01 | 20.02 | 30.00                       | -9.98                       |
|                        | 5825       | 165     | AVG      | 17.08                 | 17.08 | 20.09 | 30.00                       | -9.91                       |

Table 7-14. MIMO 20MHz BW 802.11ac (UNII) Maximum Conducted Output Power

| 5GHz (40MHz Bandwidth) | Freq [MHz] | Channel | Detector | Conducted Power [dBm] |       |       | Conducted Power Limit [dBm] | Conducted Power Margin [dB] |
|------------------------|------------|---------|----------|-----------------------|-------|-------|-----------------------------|-----------------------------|
|                        |            |         |          | ANT1                  | ANT2  | MIMO  |                             |                             |
|                        | 5190       | 38      | AVG      | 15.87                 | 15.98 | 18.94 | 23.98                       | -5.04                       |
|                        | 5230       | 46      | AVG      | 15.98                 | 15.97 | 18.99 | 23.98                       | -4.99                       |
|                        | 5270       | 54      | AVG      | 15.99                 | 15.98 | 19.00 | 23.98                       | -4.98                       |
|                        | 5310       | 62      | AVG      | 15.99                 | 15.97 | 18.99 | 23.98                       | -4.99                       |
|                        | 5510       | 102     | AVG      | 15.75                 | 15.86 | 18.82 | 23.98                       | -5.16                       |
|                        | 5590       | 118     | AVG      | 15.89                 | 15.90 | 18.91 | 23.98                       | -5.07                       |
|                        | 5630       | 126     | AVG      | 15.98                 | 15.97 | 18.99 | 23.98                       | -4.99                       |
|                        | 5710       | 142     | AVG      | 15.98                 | 15.99 | 19.00 | 23.98                       | -4.98                       |
|                        | 5755       | 151     | AVG      | 15.99                 | 15.97 | 18.99 | 30.00                       | -11.01                      |
|                        | 5795       | 159     | AVG      | 15.99                 | 15.97 | 18.99 | 30.00                       | -11.01                      |

Table 7-15. MIMO 40MHz BW 802.11n (UNII) Maximum Conducted Output Power

|                                         |                                                                                     |                               |                                       |                                                                                       |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  |                               | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset |                                       |                                                                                       | Page 64 of 170                  |



| 5GHz (40MHz Bandwidth) | Freq [MHz] | Channel | Detector | Conducted Power [dBm] |       |       | Conducted Power Limit [dBm] | Conducted Power Margin [dB] |
|------------------------|------------|---------|----------|-----------------------|-------|-------|-----------------------------|-----------------------------|
|                        |            |         |          | ANT1                  | ANT2  | MIMO  |                             |                             |
|                        | 5190       | 38      | AVG      | 15.98                 | 15.75 | 18.88 | 23.98                       | -5.10                       |
|                        | 5230       | 46      | AVG      | 15.97                 | 15.75 | 18.87 | 23.98                       | -5.11                       |
|                        | 5270       | 54      | AVG      | 15.98                 | 15.79 | 18.90 | 23.98                       | -5.08                       |
|                        | 5310       | 62      | AVG      | 15.97                 | 15.65 | 18.82 | 23.98                       | -5.16                       |
|                        | 5510       | 102     | AVG      | 15.86                 | 15.70 | 18.79 | 23.98                       | -5.19                       |
|                        | 5590       | 118     | AVG      | 15.90                 | 15.38 | 18.66 | 23.98                       | -5.32                       |
|                        | 5630       | 126     | AVG      | 15.97                 | 15.45 | 18.73 | 23.98                       | -5.25                       |
|                        | 5710       | 142     | AVG      | 15.99                 | 15.36 | 18.70 | 23.98                       | -5.28                       |
|                        | 5755       | 151     | AVG      | 15.97                 | 15.31 | 18.66 | 30.00                       | -11.34                      |
|                        | 5795       | 159     | AVG      | 15.97                 | 15.44 | 18.72 | 30.00                       | -11.28                      |

Table 7-16. MIMO 40MHz BW 802.11ac (UNII) Maximum Conducted Output Power

| 5GHz (40MHz Bandwidth) | Freq [MHz] | Channel | Detector | Conducted Power [dBm] |       |       | Conducted Power Limit [dBm] | Conducted Power Margin [dB] |
|------------------------|------------|---------|----------|-----------------------|-------|-------|-----------------------------|-----------------------------|
|                        |            |         |          | ANT1                  | ANT2  | MIMO  |                             |                             |
|                        | 5190       | 38      | AVG      | 15.98                 | 15.75 | 18.88 | 23.98                       | -5.10                       |
|                        | 5230       | 46      | AVG      | 15.97                 | 15.75 | 18.87 | 23.98                       | -5.11                       |
|                        | 5270       | 54      | AVG      | 15.98                 | 15.79 | 18.90 | 23.98                       | -5.08                       |
|                        | 5310       | 62      | AVG      | 15.97                 | 15.65 | 18.82 | 23.98                       | -5.16                       |
|                        | 5510       | 102     | AVG      | 15.86                 | 15.70 | 18.79 | 23.98                       | -5.19                       |
|                        | 5590       | 118     | AVG      | 15.90                 | 15.38 | 18.66 | 23.98                       | -5.32                       |
|                        | 5630       | 126     | AVG      | 15.97                 | 15.45 | 18.73 | 23.98                       | -5.25                       |
|                        | 5710       | 142     | AVG      | 15.99                 | 15.36 | 18.70 | 23.98                       | -5.28                       |
|                        | 5755       | 151     | AVG      | 15.97                 | 15.31 | 18.66 | 30.00                       | -11.34                      |
|                        | 5795       | 159     | AVG      | 15.97                 | 15.44 | 18.72 | 30.00                       | -11.28                      |

Table 7-17. MIMO 80MHz BW 802.11ac (UNII) Maximum Conducted Output Power

|                                         |                                                                                     |                               |                                    |                                                                                       |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------|-------------------------------|------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  |                               | MEASUREMENT REPORT (CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset |                                    |                                                                                       | Page 65 of 170                  |

**Note:**

Per ANSI C63.10-2013 and KDB 662911 v02r01 Section E)1), the conducted powers at Antenna 1 and Antenna 2 were first measured separately during MIMO transmission as shown in the section above. The measured values were then summed in linear power units then converted back to dBm.

**Sample MIMO Calculation:**

At 5180MHz in 802.11n (20MHz BW) mode, the average conducted output power was measured to be 17.56 dBm for Antenna-1 and 17.56 dBm for Antenna-2.

Antenna 1 + Antenna 2 = MIMO

$$(17.56 \text{ dBm} + 17.56 \text{ dBm}) = (57.02 \text{ mW} + 57.02 \text{ mW}) = 114.03 \text{ mW} = 17.56 \text{ dBm}$$

|                                         |                                                                                     |                                       |                                                                                       |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset         | Page 66 of 170                                                                        |                                 |

## 7.5 Maximum Power Spectral Density – 802.11a/n §15.407(a.1.iv) §15.407(a.2) §15.407(a.3); RSS-247 [6.2]

### Test Overview and Limit

The spectrum analyzer was connected to the antenna terminal while the EUT was 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. Method SA-1, as defined in ANSI C63.10-2013 and KDB 789033 D02 v02r01, was used to measure the power spectral density.

***In the 5.15 – 5.25GHz, 5.25 – 5.35GHz, 5.47 – 5.725GHz bands, the maximum permissible power spectral density is 11dBm/MHz.***

***In the 5.725 – 5.850GHz band, the maximum permissible power spectral density is 30dBm/500kHz.***

### Test Procedure Used

ANSI C63.10-2013 – Section 12.3.2.2

KDB 789033 D02 v02r01 – Section F

ANSI C63.10-2013 – Section 14.3.2.2 Measure-and-Sum Technique

KDB 662911 v02r01 – Section E)2) Measure-and-Sum Technique

### Test Settings

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire emission bandwidth of the signal
3. RBW = 1MHz
4. VBW = 3MHz
5. Number of sweep points  $\geq 2 \times (\text{span/RBW})$
6. Sweep time = auto
7. Detector = power averaging (RMS)
8. Trigger was set to free run for all modes
9. Trace was averaged over 100 sweeps
10. The peak search function of the spectrum analyzer was used to find the peak of the spectrum.

### Test Setup

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



**Figure 7-4. Test Instrument & Measurement Setup**

### Test Notes

None

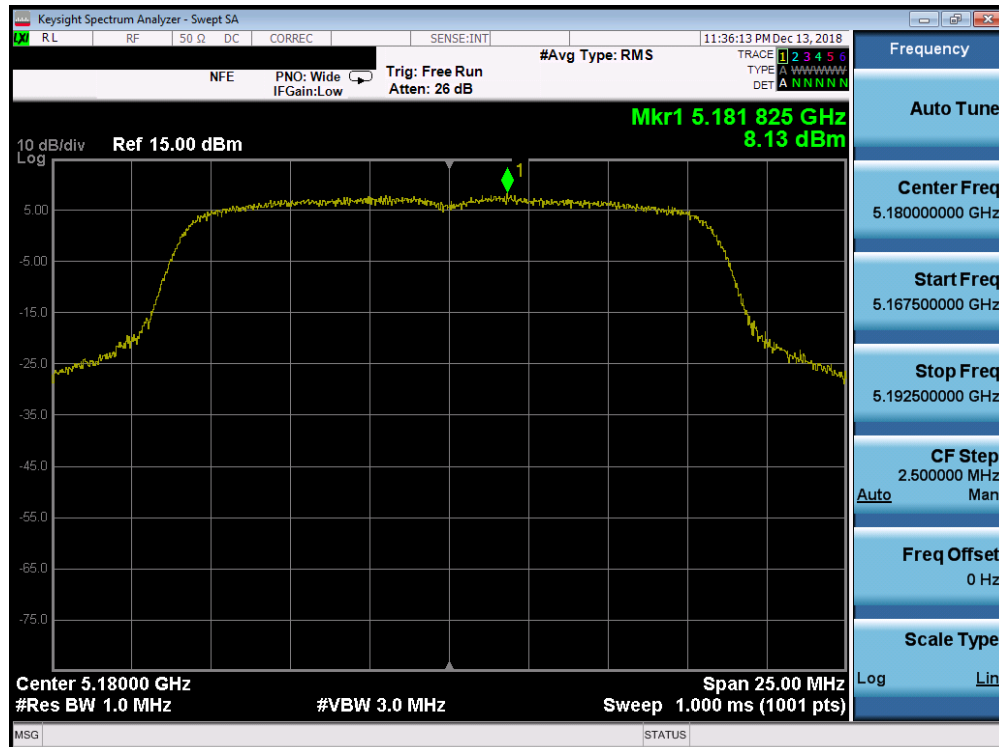
|                                         |                                                                                     |                                       |                                                                                       |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset         |                                                                                       | Page 67 of 170                  |

## SISO Antenna-1 Power Spectral Density Measurements

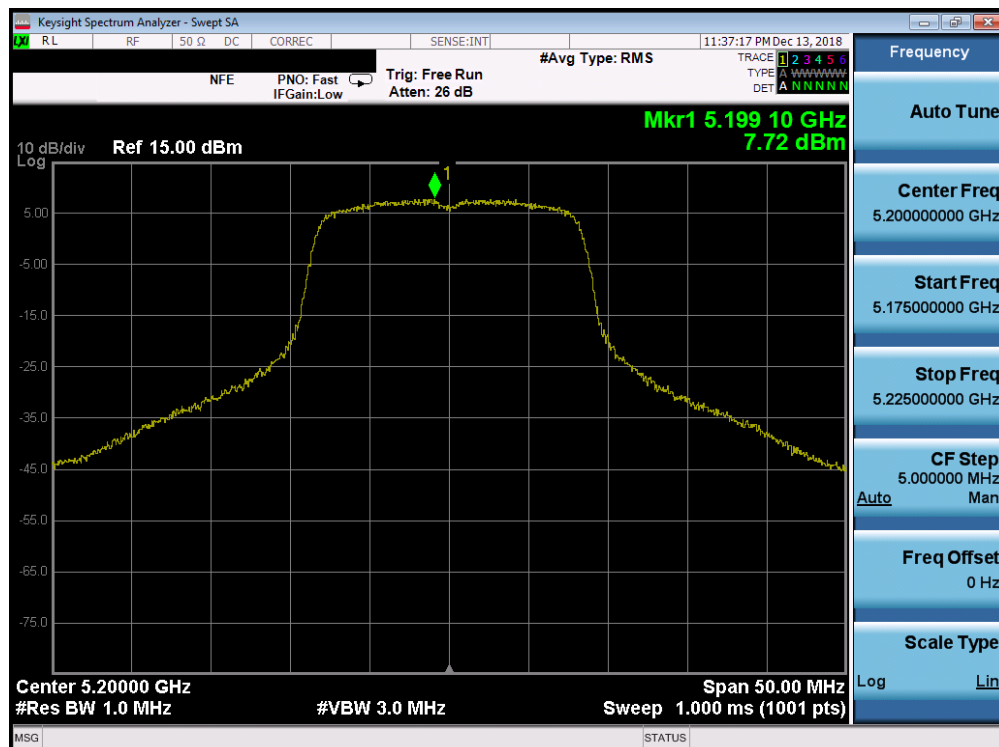
|         | Frequency [MHz] | Channel No. | 802.11 Mode | Data Rate [Mbps] | Measured Power Density [dBm] | Max Power Density [dBm/MHz] | Margin [dB] |
|---------|-----------------|-------------|-------------|------------------|------------------------------|-----------------------------|-------------|
| Band 1  | 5180            | 36          | a           | 6                | 8.13                         | 11.0                        | -2.87       |
|         | 5200            | 40          | a           | 6                | 7.72                         | 11.0                        | -3.28       |
|         | 5240            | 48          | a           | 6                | 7.79                         | 11.0                        | -3.21       |
|         | 5180            | 36          | n (20MHz)   | 6.5/7.2 (MCS0)   | 7.30                         | 11.0                        | -3.70       |
|         | 5200            | 40          | n (20MHz)   | 6.5/7.2 (MCS0)   | 7.36                         | 11.0                        | -3.64       |
|         | 5240            | 48          | n (20MHz)   | 6.5/7.2 (MCS0)   | 7.60                         | 11.0                        | -3.40       |
|         | 5190            | 38          | n (40MHz)   | 13.5/15 (MCS0)   | 2.30                         | 11.0                        | -8.70       |
|         | 5230            | 46          | n (40MHz)   | 13.5/15 (MCS0)   | 2.13                         | 11.0                        | -8.87       |
|         | 5210            | 42          | ac (80MHz)  | 29.3/32.5 (MCS0) | -2.10                        | 11.0                        | -13.10      |
| Band 2A | 5260            | 52          | a           | 6                | 7.68                         | 11.0                        | -3.32       |
|         | 5280            | 56          | a           | 6                | 7.65                         | 11.0                        | -3.35       |
|         | 5320            | 64          | a           | 6                | 7.10                         | 11.0                        | -3.90       |
|         | 5260            | 52          | n (20MHz)   | 6.5/7.2 (MCS0)   | 7.69                         | 11.0                        | -3.31       |
|         | 5280            | 56          | n (20MHz)   | 6.5/7.2 (MCS0)   | 6.93                         | 11.0                        | -4.07       |
|         | 5320            | 64          | n (20MHz)   | 6.5/7.2 (MCS0)   | 6.68                         | 11.0                        | -4.32       |
|         | 5270            | 54          | n (40MHz)   | 13.5/15 (MCS0)   | 2.01                         | 11.0                        | -8.99       |
|         | 5310            | 62          | n (40MHz)   | 13.5/15 (MCS0)   | 1.75                         | 11.0                        | -9.25       |
|         | 5290            | 58          | ac (80MHz)  | 29.3/32.5 (MCS0) | -2.61                        | 11.0                        | -13.61      |
| Band 2C | 5500            | 100         | a           | 6                | 7.66                         | 11.0                        | -3.34       |
|         | 5600            | 120         | a           | 6                | 6.95                         | 11.0                        | -4.05       |
|         | 5720            | 144         | a           | 6                | 6.82                         | 11.0                        | -4.18       |
|         | 5500            | 100         | n (20MHz)   | 6.5/7.2 (MCS0)   | 7.50                         | 11.0                        | -3.50       |
|         | 5600            | 120         | n (20MHz)   | 6.5/7.2 (MCS0)   | 6.71                         | 11.0                        | -4.29       |
|         | 5720            | 144         | n (20MHz)   | 6.5/7.2 (MCS0)   | 6.61                         | 11.0                        | -4.39       |
|         | 5510            | 102         | n (40MHz)   | 13.5/15 (MCS0)   | 1.96                         | 11.0                        | -9.04       |
|         | 5590            | 118         | n (40MHz)   | 13.5/15 (MCS0)   | 1.74                         | 11.0                        | -9.26       |
|         | 5710            | 142         | n (40MHz)   | 13.5/15 (MCS0)   | 2.12                         | 11.0                        | -8.88       |
|         | 5530            | 106         | ac (80MHz)  | 29.3/32.5 (MCS0) | -3.52                        | 11.0                        | -14.52      |
|         | 5610            | 122         | ac (80MHz)  | 29.3/32.5 (MCS0) | -2.70                        | 11.0                        | -13.70      |
|         | 5690            | 138         | ac (80MHz)  | 29.3/32.5 (MCS0) | -5.36                        | 11.0                        | -16.36      |

Table 7-18. Bands 1, 2A, 2C Conducted Power Spectral Density Measurements SISO ANT1

|                                         |                                                                                     |                                       |                                                                                       |                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFQ850QM                       |  | MEASUREMENT REPORT<br>(CERTIFICATION) |  | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019                                               | EUT Type:<br>Portable Handset         |                                                                                       | Page 68 of 170                  |

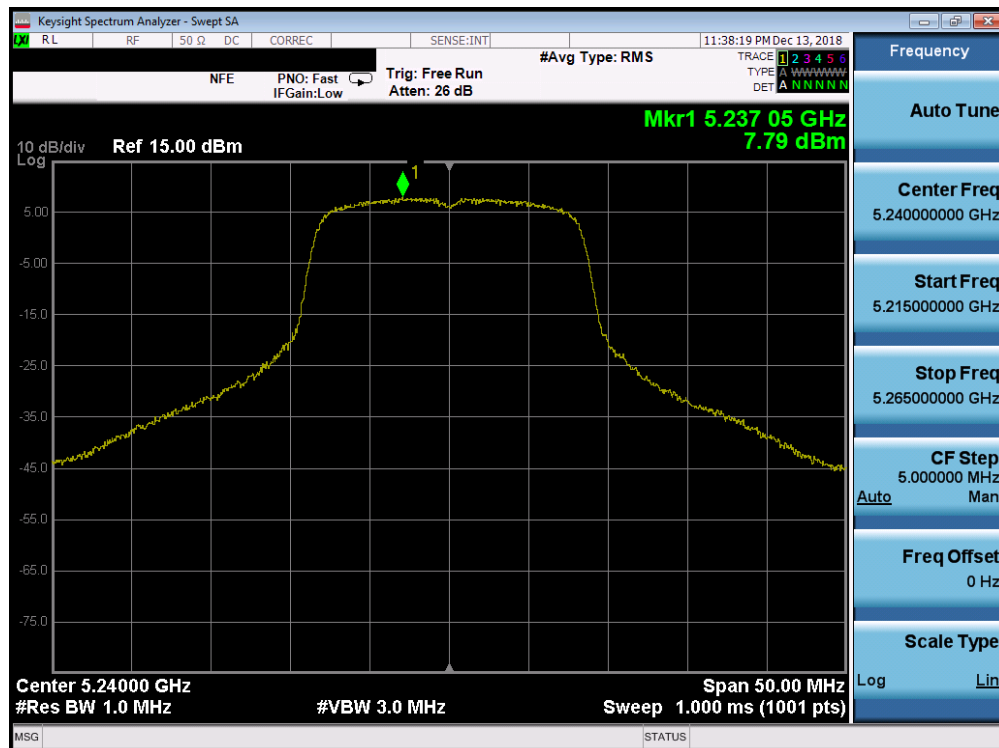


Plot 7-79. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 1) – Ch. 36)

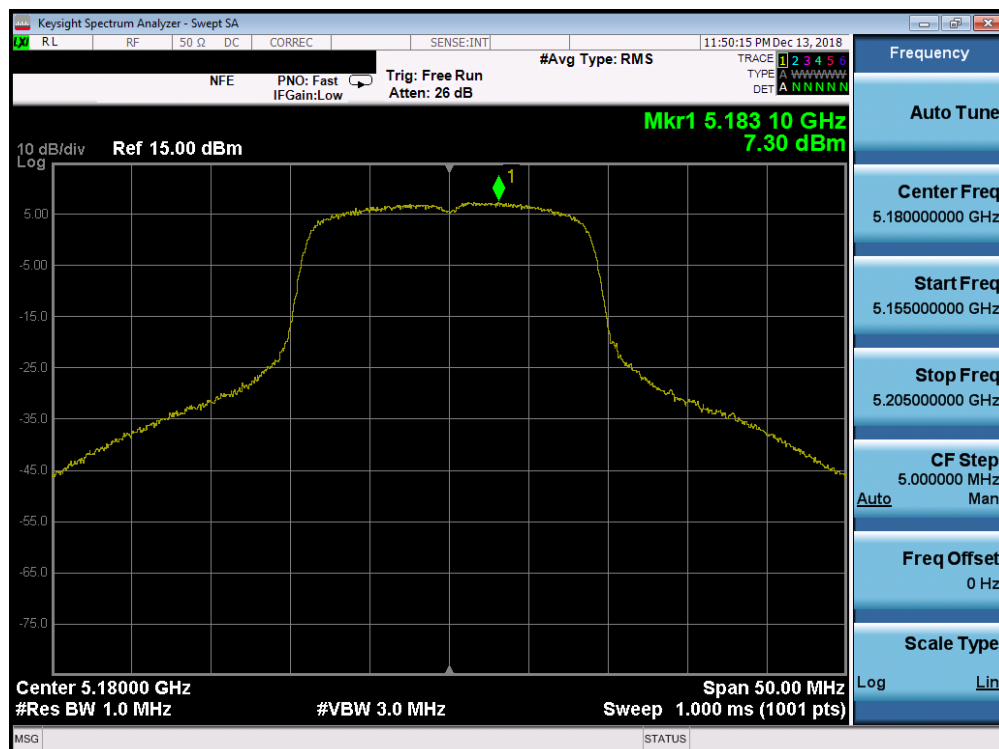


Plot 7-80. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 1) – Ch. 40)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 69 of 170                  |

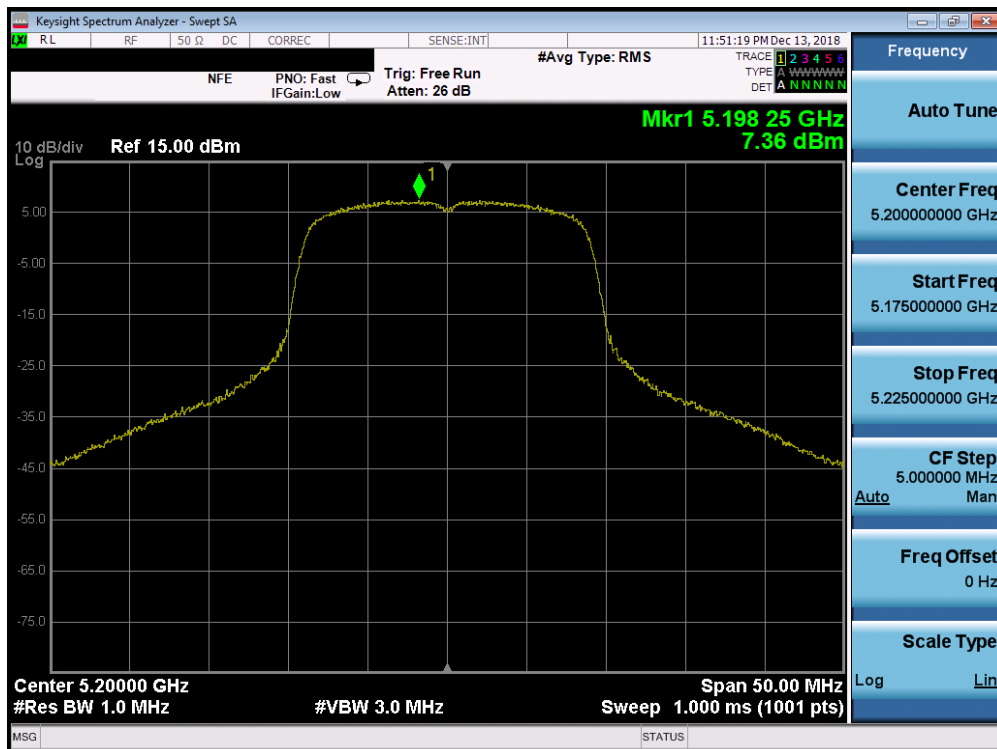


Plot 7-81. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 1) – Ch. 48)

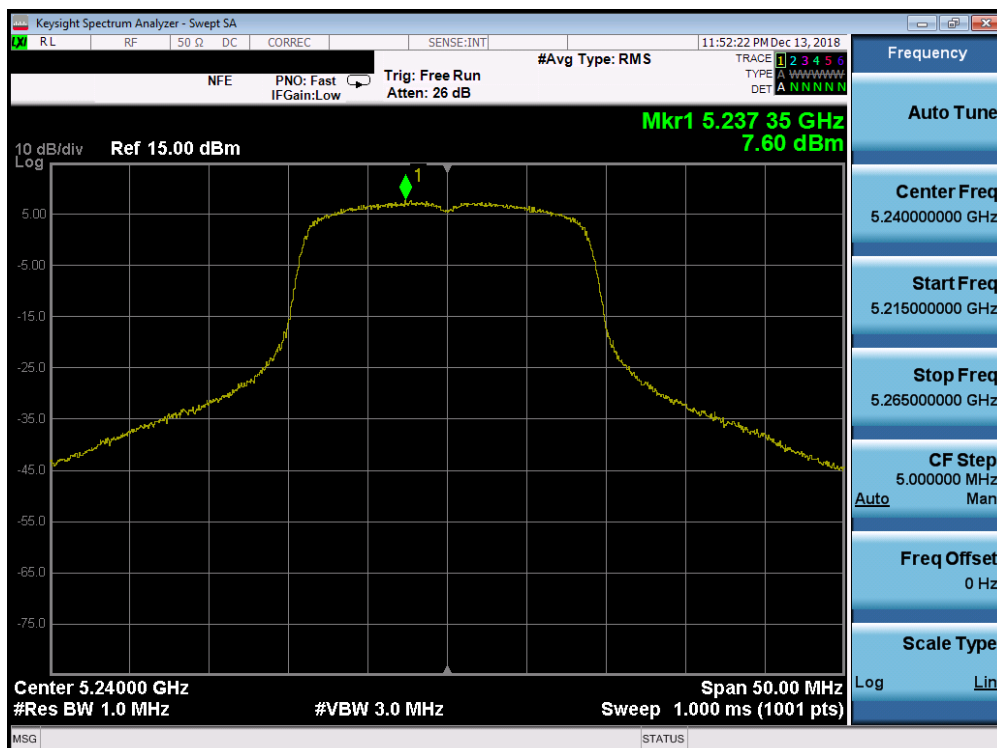


Plot 7-82. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) – Ch. 36)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 70 of 170                  |

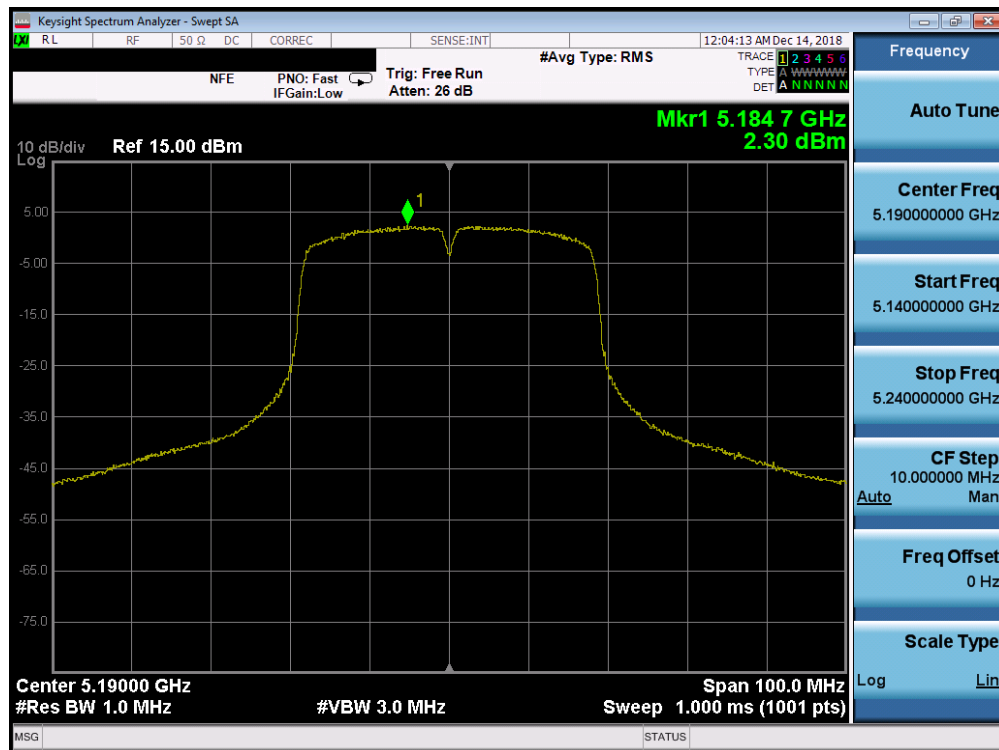


Plot 7-83. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) – Ch. 40)

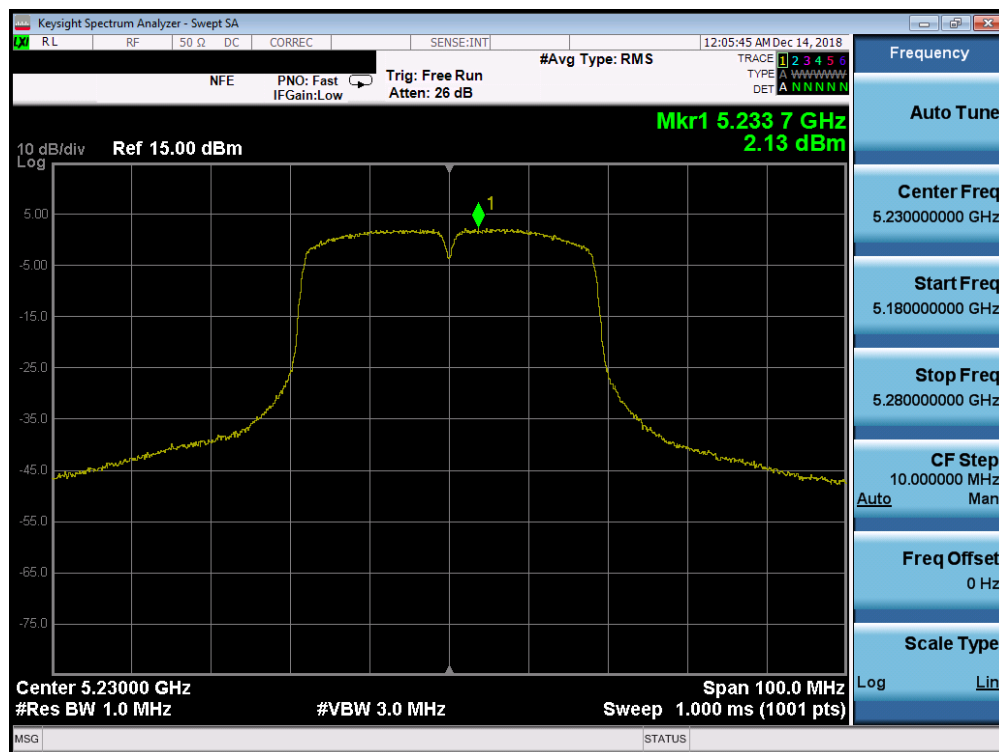


Plot 7-84. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) – Ch. 48)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 71 of 170                  |



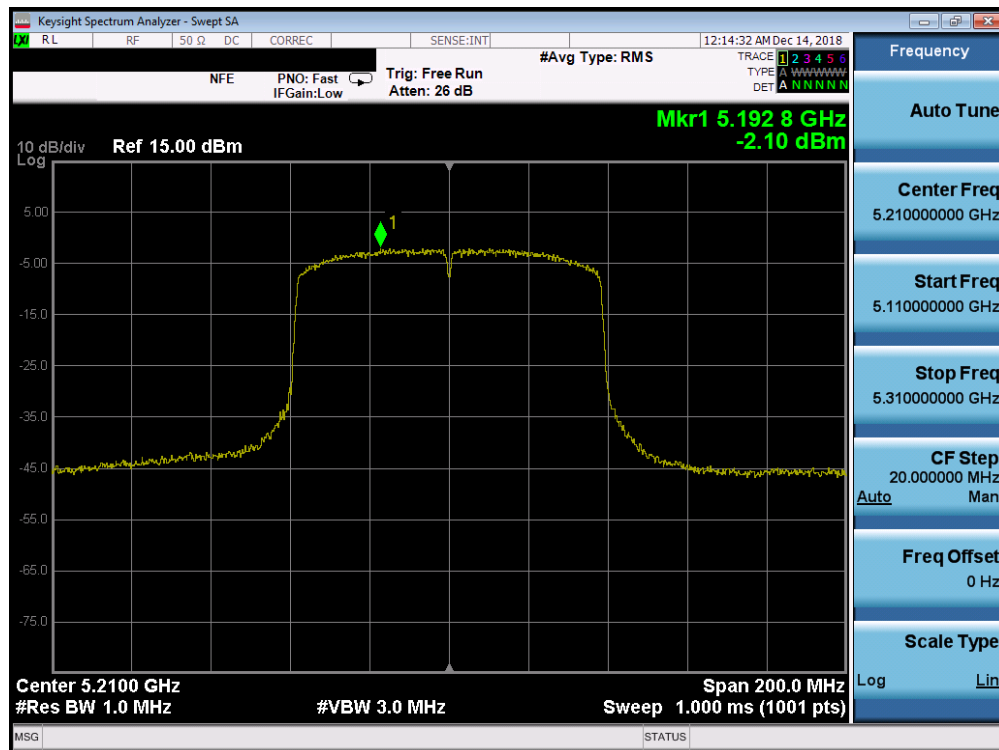
Plot 7-85. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 1) – Ch. 38)



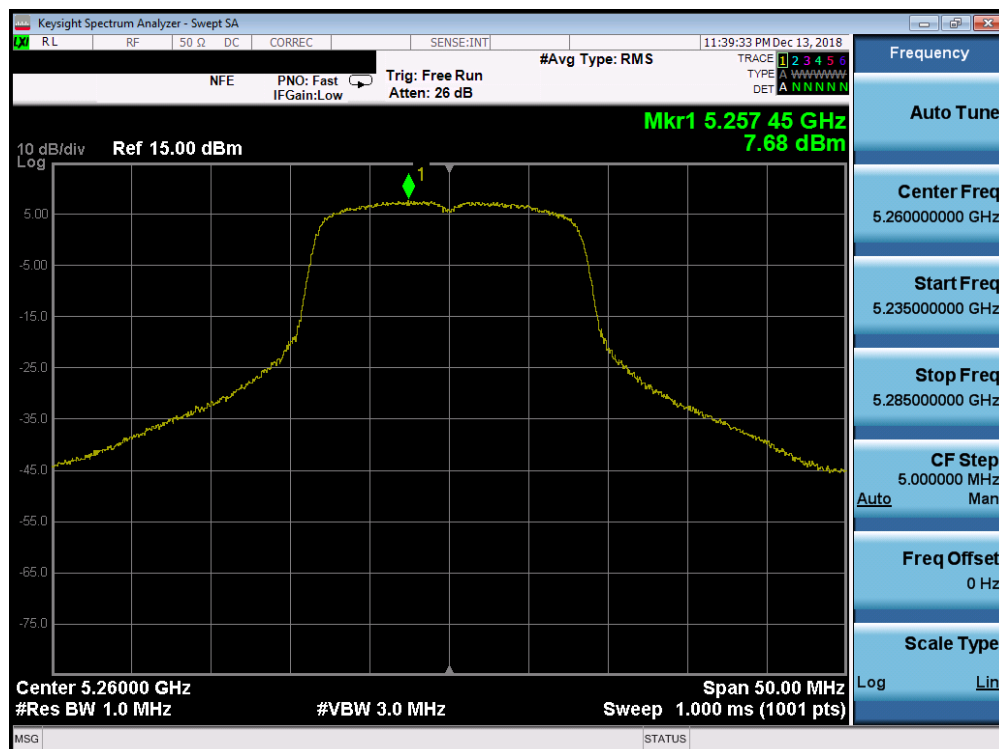
Plot 7-86. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 1) – Ch. 46)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 72 of 170                  |



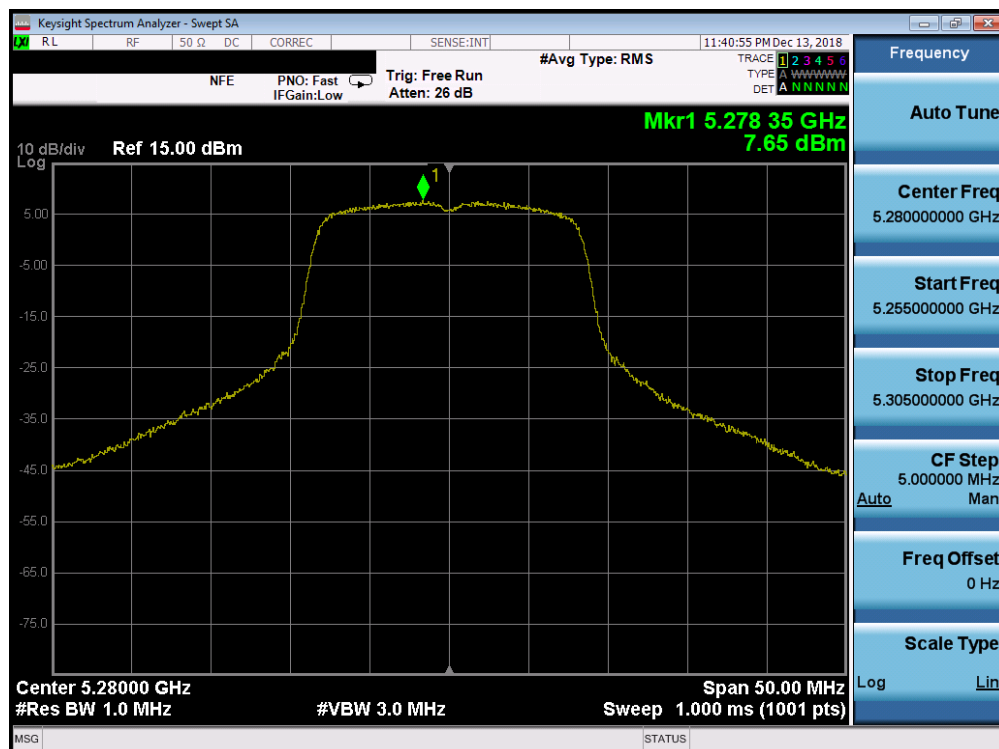


Plot 7-87. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 1) – Ch. 42)

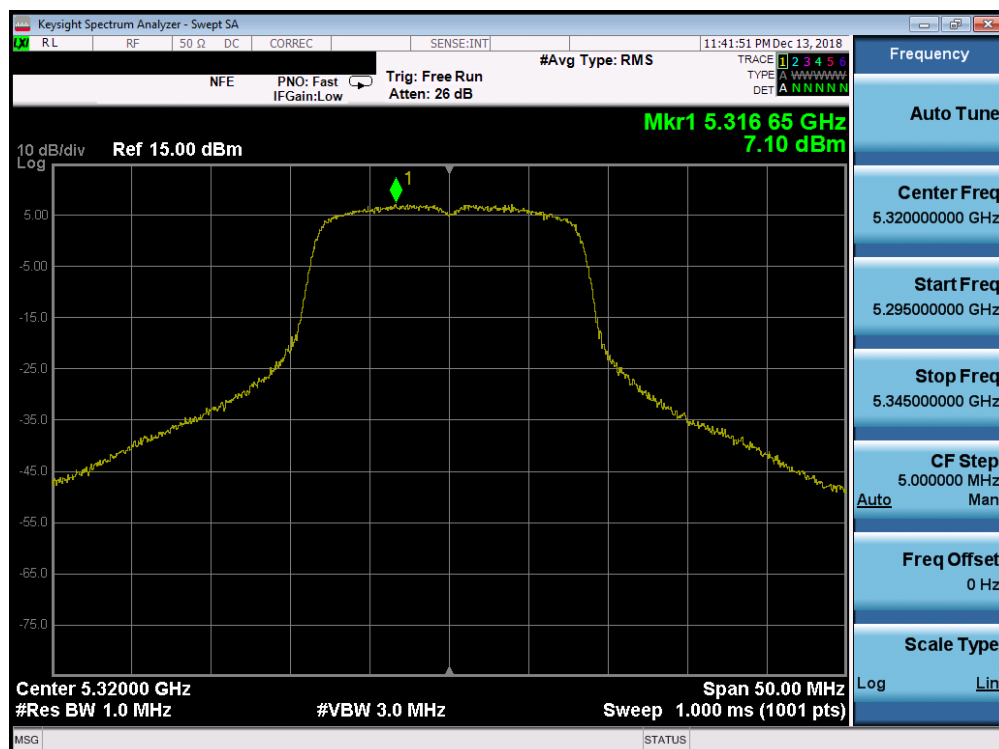


Plot 7-88. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2A) – Ch. 52)

|                                         |                                               |                                       |           |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|-----------|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | <b>LG</b> | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |           | Page 73 of 170                  |

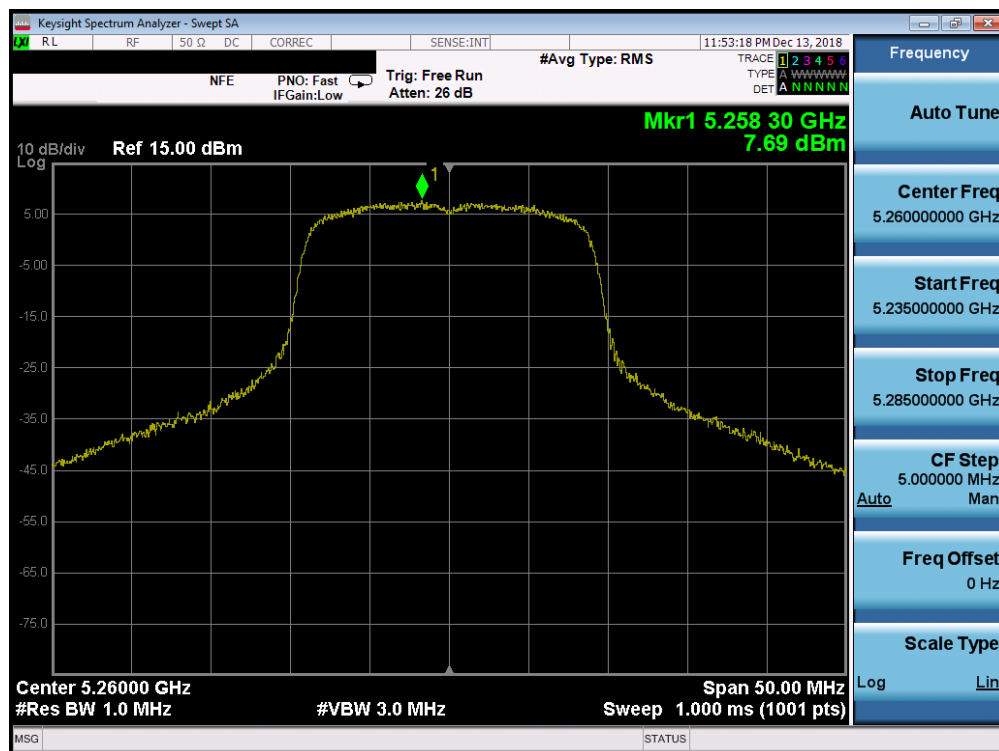


Plot 7-89. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2A) – Ch. 56)

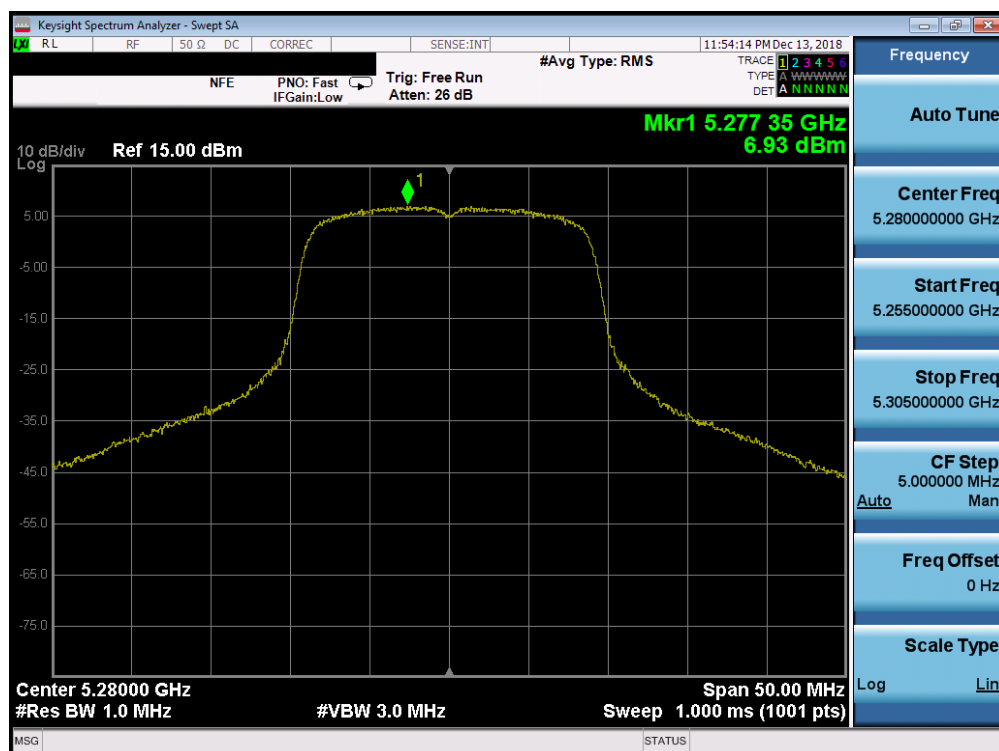


Plot 7-90. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2A) – Ch. 64)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 74 of 170                  |

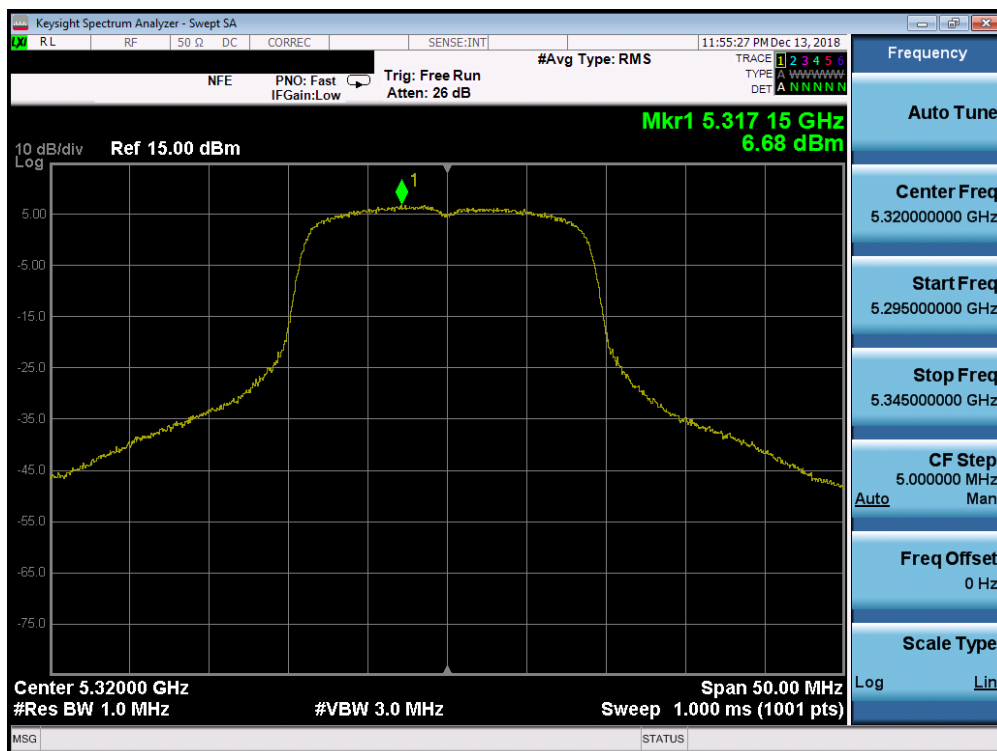


Plot 7-91. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) – Ch. 52)

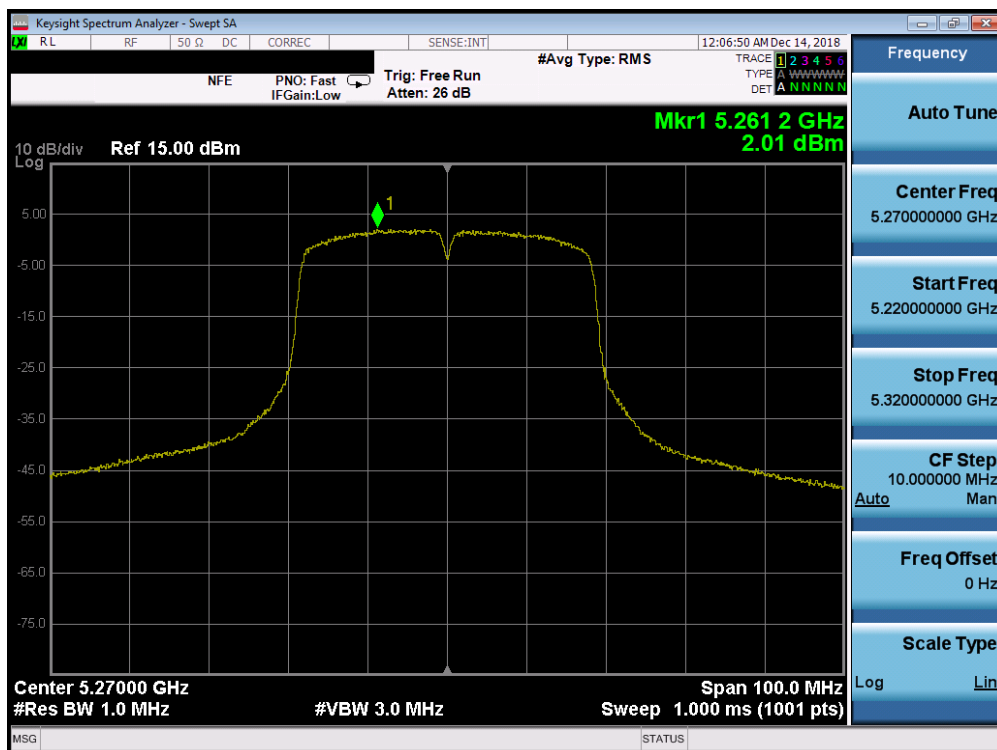


Plot 7-92. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) – Ch. 56)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 75 of 170                  |

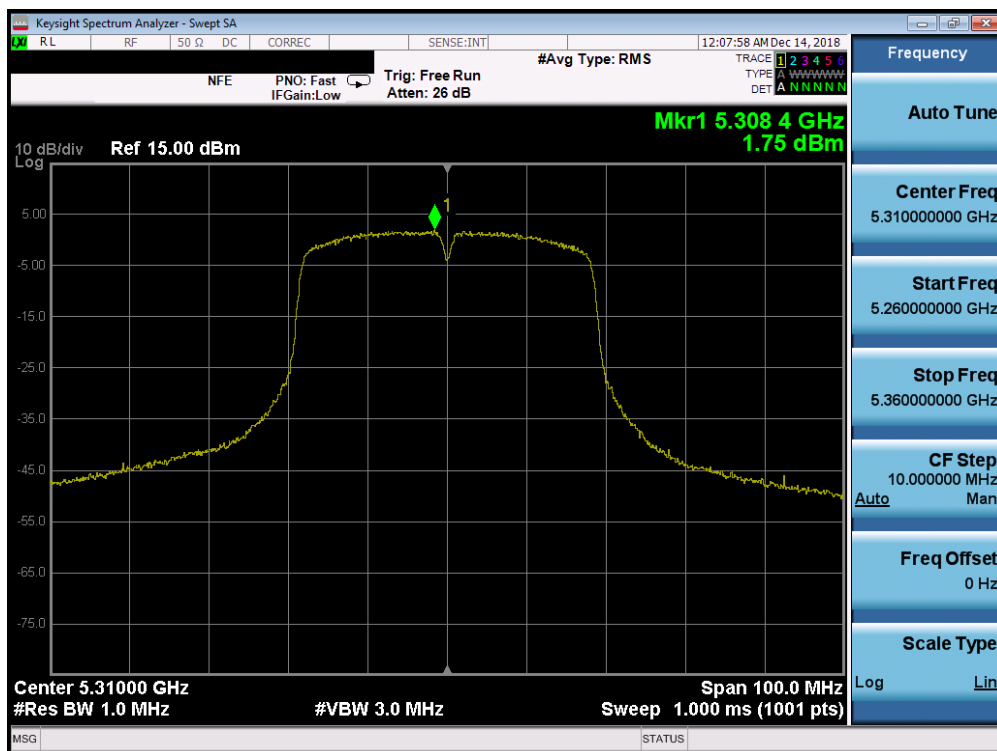


Plot 7-93. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) – Ch. 64)

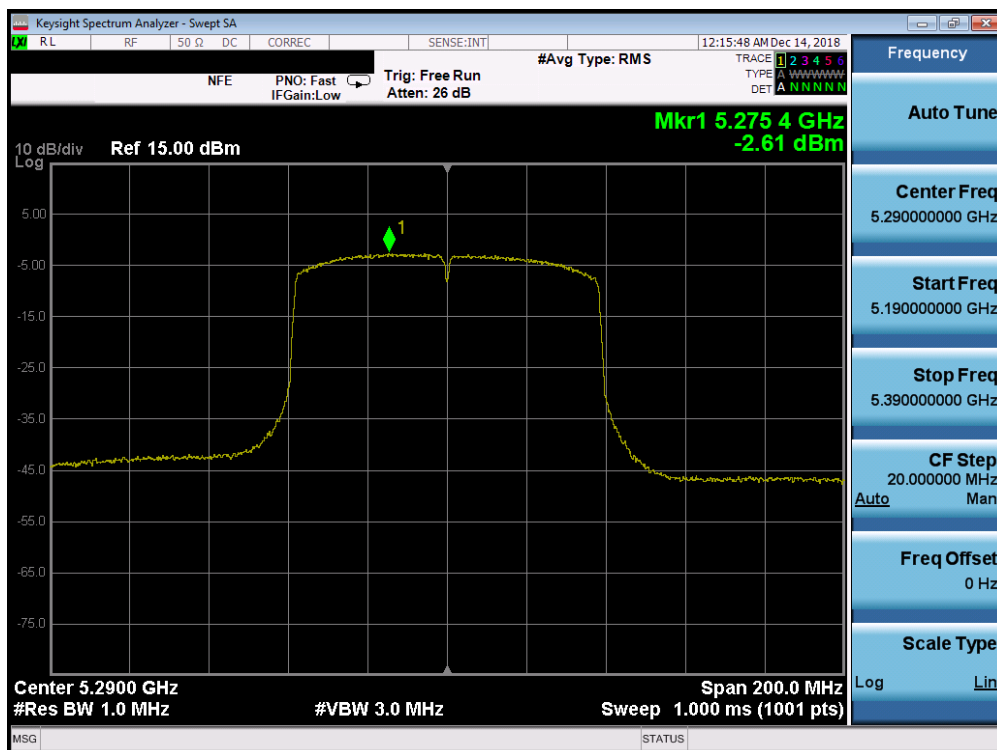


Plot 7-94. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2A) – Ch. 54)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 76 of 170                  |

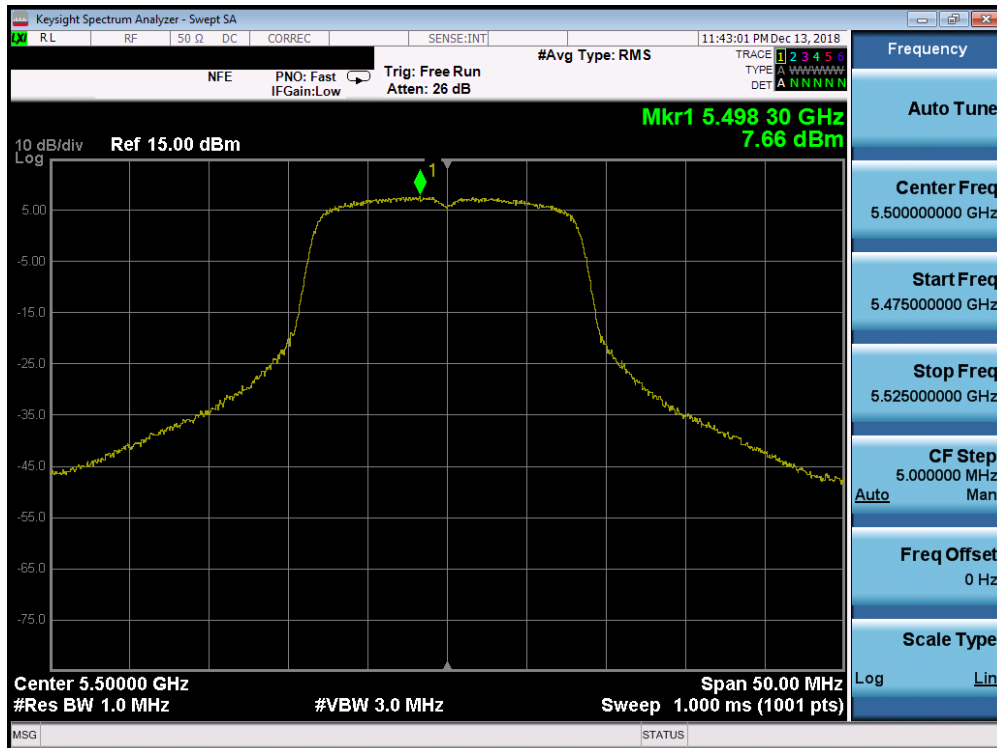


Plot 7-95. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2A) – Ch. 62)

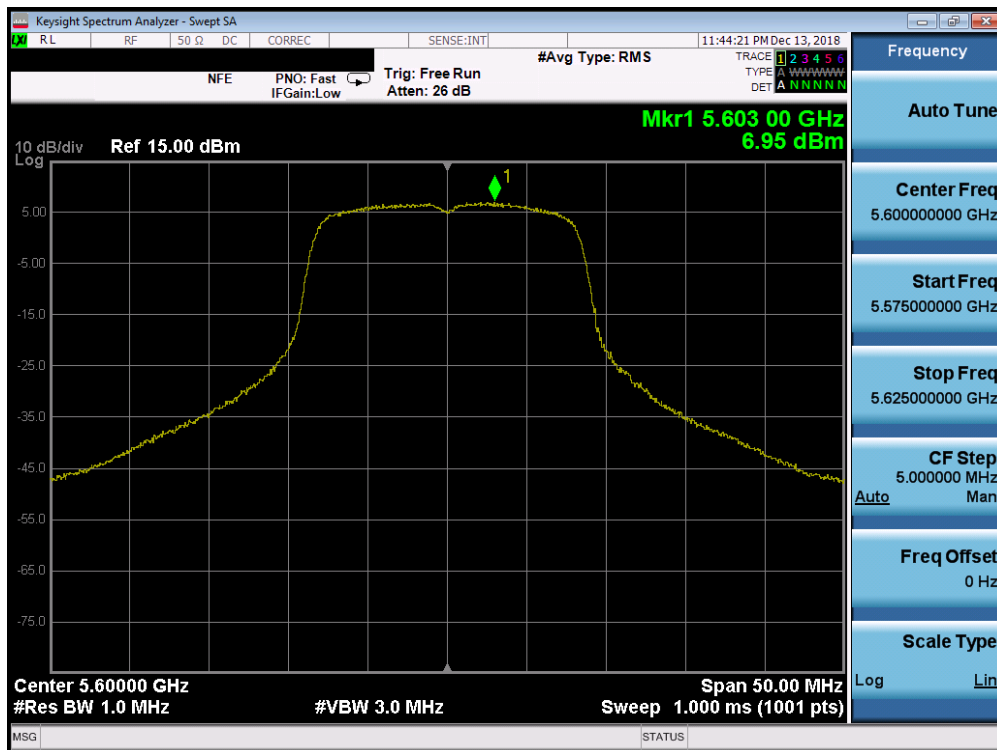


Plot 7-96. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2A) – Ch. 58)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 77 of 170                  |



Plot 7-97. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2C) – Ch. 100)



Plot 7-98. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2C) – Ch. 120)

|                                         |                                               |                                       |    |                                 |
|-----------------------------------------|-----------------------------------------------|---------------------------------------|----|---------------------------------|
| FCC ID: ZNFQ850QM                       | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | MEASUREMENT REPORT<br>(CERTIFICATION) | LG | Approved by:<br>Quality Manager |
| Test Report S/N:<br>1M1812060222-06.ZNF | Test Dates:<br>12/11/2018 - 1/18/2019         | EUT Type:<br>Portable Handset         |    | Page 78 of 170                  |