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# FCC Test Report

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Report No.: AGC12319220502FE06

**FCC ID** : QV7-GC88752-75

**APPLICATION PURPOSE** : Original Equipment

**PRODUCT DESIGNATION** : Drone

**BRAND NAME** : N/A

**MODEL NAME** : Please see the page 7.

**APPLICANT** : GUANGDONG SYMA MODEL AIRCRAFT INDUSTRIAL CO., LTD

**DATE OF ISSUE** : Jul. 04, 2022

**STANDARD(S)** : FCC Part 15.407

**TEST PROCEDURE(S)** : KDB 789033 D02 v02r01

**REPORT VERSION** : V1.0

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**REPORT REVISE RECORD**

| Report Version | Revise Time | Issued Date   | Valid Version | Notes           |
|----------------|-------------|---------------|---------------|-----------------|
| V1.0           | /           | Jul. 04, 2022 | Valid         | Initial Release |

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## 1. VERIFICATION OF CONFORMITY

|                                  |                                                                        |
|----------------------------------|------------------------------------------------------------------------|
| <b>Applicant</b>                 | GUANGDONG SYMA MODEL AIRCRAFT INDUSTRIAL CO., LTD                      |
| <b>Address</b>                   | NO.2 WEST XINGYE ROAD LAIMEI INDUSTRIAL AREA CHENGHAI , Shantou, China |
| <b>Manufacturer</b>              | GUANGDONG SYMA MODEL AIRCRAFT INDUSTRIAL CO., LTD                      |
| <b>Address</b>                   | NO.2 WEST XINGYE ROAD LAIMEI INDUSTRIAL AREA CHENGHAI , Shantou, China |
| <b>Factory</b>                   | GUANGDONG SYMA MODEL AIRCRAFT INDUSTRIAL CO., LTD                      |
| <b>Address</b>                   | NO.2 WEST XINGYE ROAD LAIMEI INDUSTRIAL AREA CHENGHAI , Shantou, China |
| <b>Product Designation</b>       | Drone                                                                  |
| <b>Brand Name</b>                | N/A                                                                    |
| <b>Test Model</b>                | X650                                                                   |
| <b>Series Model</b>              | Please see the page 7.                                                 |
| <b>Declaration of Difference</b> | Only the color of appearance is different, and others are consistent.  |
| <b>Date of test</b>              | May 19, 2022 to Jul. 04, 2022                                          |
| <b>Deviation</b>                 | No any deviation from the test method                                  |
| <b>Condition of Test Sample</b>  | Normal                                                                 |
| <b>Test Result</b>               | Pass                                                                   |
| <b>Report Template</b>           | AGCRT-US-BGN/RF                                                        |

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with requirement of FCC Part 15 Rules requirement.

Prepared By



Alan Duan  
(Project Engineer)

Jul. 04, 2022

Reviewed By



Calvin Liu  
(Reviewer)

Jul. 04, 2022

Approved By



Max Zhang  
(Authorized Officer)

Jul. 04, 2022

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## 2. GENERAL INFORMATION

### 2.1. PRODUCT DESCRIPTION

The EUT is designed as “Drone”. It is designed by way of utilizing the OFDM technology to achieve the system operation.

A major technical description of EUT is described as following

|                                 |                                                                                                                  |                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <b>Equipment Type</b>           | <input type="checkbox"/> Outdoor access points<br><input type="checkbox"/> Fixed P2P access points               | <input type="checkbox"/> Indoor access points<br><input checked="" type="checkbox"/> Client devices                |
| <b>Operation Frequency</b>      | <input type="checkbox"/> U-NII 1:5150MHz~5250MHz<br><input checked="" type="checkbox"/> U-NII 2C:5470MHz~5725MHz | <input checked="" type="checkbox"/> U-NII 2A: 5250MHz~5350MHz<br><input type="checkbox"/> U-NII 3: 5725MHz~5850MHz |
| <b>DFS Design Type</b>          | <input type="checkbox"/> Master <input type="checkbox"/> Slave with radar detection                              | <input checked="" type="checkbox"/> Slave without radar detection                                                  |
| <b>TPC Function</b>             | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                              |                                                                                                                    |
| <b>Test Frequency Range:</b>    | For 802.11a/n-HT20/ac-VHT20: 5250~5350MHz, 5470~5725MHz                                                          |                                                                                                                    |
| <b>Output Power</b>             | IEEE 802.11a:12.89dBm; IEEE 802.11n-HT20:12.54dBm;                                                               |                                                                                                                    |
| <b>Output Power_MIMO</b>        | IEEE 802.11n(20):15.35dBm                                                                                        |                                                                                                                    |
| <b>Modulation</b>               | BPSK, QPSK, 16QAM, 64QAM, 128QAM, 256QAM, OFDM                                                                   |                                                                                                                    |
| <b>Data Rate</b>                | 802.11a: 6/9/12/18/24/36/48/54Mbps<br>802.11n: up to 300Mbps<br>802.11ac: up to 400Mbps                          |                                                                                                                    |
| <b>Number of channels</b>       | 7 channels of U-NII 2A Band<br>21 channels of U-NII 2C Band                                                      |                                                                                                                    |
| <b>Hardware Version</b>         | W3RXT                                                                                                            |                                                                                                                    |
| <b>Software Version</b>         | iOS system: 1.16<br>Android system: 22.02.24                                                                     |                                                                                                                    |
| <b>Antenna Designation</b>      | The brass Antenna (Comply with requirements of the FCC part 15.203)                                              |                                                                                                                    |
| <b>Number of transmit chain</b> | 2(802.a/11n/ac all used two antennas, but 802.11a support SISO and 802.11n/ac support MIMO)                      |                                                                                                                    |
| <b>Antenna Gain</b>             | Refer to Chapter 2.8 of the report.                                                                              |                                                                                                                    |
| <b>Power Supply</b>             | DC 7.6V by battery                                                                                               |                                                                                                                    |

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|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Model</b>   | X650                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Series Model</b> | X20, X300, X400, X500, X500PRO, X600, X600W, X700, X700W, TF1001, TG1001, X21W, X100, X800, X800W, X200, X200W, X110, X110W, X220, X220W, X330, X330W, X440, X440W, X550, X550W, X660, X660W, X770, X770W, X880, X880W, X990, X990W, X710W, X720W, X730W, X740W, X750W, X760W, X780W, X790W, X810W, X820W, X830W, X840W, X850W, X860W, X870W, X890W, X900W, X910W, X920W, X930W, X940W, X950W, X960W, X970W, X980W, S100, S107H-E, S39, S37, S40, S50H, S51H, S52H, S53H, S54H, S55H, S56H, S57H, S58H, S59H, S60H, S61H, S62H, S63H, S64H, S65H, Q7, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q21, Q22, Q23, Q24, Q25 |

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## 2.2. TABLE OF CARRIER FREQUENCIES

For 5260~5320MHz:

4 channels are provided for 802.11a, 802.11n (HT20):

| Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|
| 52      | 5260 MHz  | 60      | 5300 MHz  |
| 56      | 5280 MHz  | 64      | 5320 MHz  |

For 5500~5720MHz:

12 channels are provided for 802.11a, 802.11n (HT20):

| Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|
| 100     | 5500 MHz  | 124     | 5620 MHz  |
| 104     | 5520 MHz  | 128     | 5640 MHz  |
| 108     | 5540 MHz  | 132     | 5660 MHz  |
| 112     | 5560 MHz  | 136     | 5680 MHz  |
| 116     | 5580 MHz  | 140     | 5700 MHz  |
| 120     | 5600 MHz  |         |           |

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### 2.3. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: QV7-GC88752-75** filing to comply with the FCC Part 15 requirements.

### 2.4. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013).

Radiated testing was performed at an antenna to EUT distance 3 meters.

Others testing (listed at item 5.3) was performed according to the procedures in FCC Part 15.407 rules KDB 789033 D02

### 2.5. SPECIAL ACCESSORIES

Refer to section 5.2.

### 2.6. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

### 2.7. ANTENNA REQUIREMENT

This intentional radiator is designed with a permanently attached antenna of an antenna to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

For more information of the antenna, please refer to the APPENDIX B: PHOTOGRAPHS OF EUT.

## 2.8. DESCRIPTION OF AVAILABLE ANTENNAS

| Antenna Type                                   | Frequency Band (MHz) | TX Paths | Bandwidth (MHz) | Max Peak Gain (dBi) |       | Max Directional Gain (dBi) |
|------------------------------------------------|----------------------|----------|-----------------|---------------------|-------|----------------------------|
|                                                |                      |          |                 | Ant 1               | Ant 2 |                            |
| 5G WIFI The Brass Antenna List (5GHz 2*2 MIMO) |                      |          |                 |                     |       |                            |
| The Brass Antenna                              | 5250 ~ 5350          | 2        | 20              | 2                   | 2     | 5.01                       |
|                                                | 5470 ~ 5725          | 2        | 20              | 2                   | 2     | 5.01                       |

Note 1: The EUT supports Cyclic Delay Diversity (CDD) technology for 802.11n mode.

Note 2: The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

If all antennas have the same gain,  $G_{ANT}$ , Directional gain =  $G_{ANT}$  + Array Gain, where Array Gain is as follows.

- For power spectral density (PSD) measurements on devices:

$$\text{Array Gain} = 10 \log (N_{ANT} / N_{SS}) \text{ dB} = 3.01;$$

- For power measurements on IEEE 802.11 devices:

$$\text{Array Gain} = 0 \text{ dB for } N_{ANT} \leq 4;$$

$$\text{Array Gain} = 0 \text{ dB (i.e., no array gain) for channel widths } \geq 40 \text{ MHz for any } N_{ANT};$$

$$\text{Array Gain} = 5 \log(N_{ANT}/N_{SS}) \text{ dB or } 3 \text{ dB, whichever is less, for } 20 \text{ MHz channel widths with } N_{ANT} \geq 5.$$

If antenna gains are not equal, Directional gain may be calculated by using the formulas applicable to equal gain antennas with  $G_{ANT}$  set equal to the gain of the antenna having the highest gain.

### 3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95%.

| Item                                          | Measurement Uncertainty    |
|-----------------------------------------------|----------------------------|
| Uncertainty of Conducted Emission for AC Port | $U_c = \pm 3.1 \text{ dB}$ |
| Uncertainty of Radiated Emission below 1GHz   | $U_c = \pm 4.0 \text{ dB}$ |
| Uncertainty of Radiated Emission above 1GHz   | $U_c = \pm 4.8 \text{ dB}$ |
| Uncertainty of total RF power, conducted      | $U_c = \pm 0.8 \text{ dB}$ |
| Uncertainty of RF power density, conducted    | $U_c = \pm 2.6 \text{ dB}$ |
| Uncertainty of spurious emissions, conducted  | $U_c = \pm 2 \%$           |
| Uncertainty of Occupied Channel Bandwidth     | $U_c = \pm 2 \%$           |

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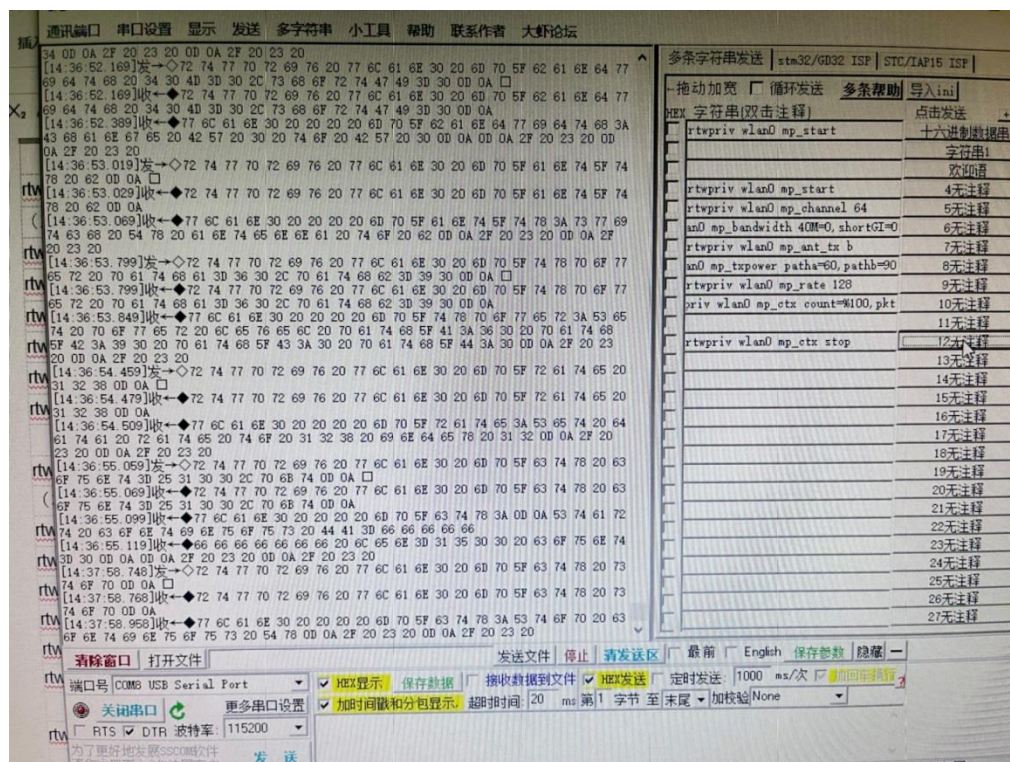
#### 4. DESCRIPTION OF TEST MODES

| Mode           | Available channel                   | Tested channel           | Modulation | Date rate (Mbps) |
|----------------|-------------------------------------|--------------------------|------------|------------------|
| 802.11a/n/ac20 | 36,40,44,48,<br>149,153,157,161,165 | 36,40,48,<br>149,157,165 | OFDM       | 6Mbps/MCS0       |

##### Note:

- The EUT has been set to operate continuously on tested channel individually, and the EUT is operating at its maximum duty cycle>or equal 98%.
- All modes under which configure applicable have been tested and the worst mode test data recording in the test report, if no other mode data.

##### Test software

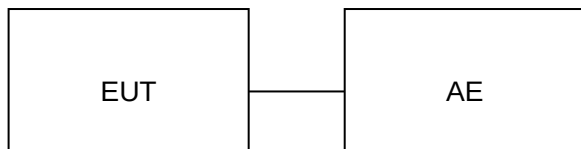


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## 5. SYSTEM TEST CONFIGURATION

### 5.1. CONFIGURATION OF EUT SYSTEM

Configure 1:



### 5.2. EQUIPMENT USED IN EUT SYSTEM

| Item | Equipment | Model No. | ID or Specification | Remark |
|------|-----------|-----------|---------------------|--------|
| 1    | Drone     | X650      | QV7-GC88752-75      | EUT    |

### 5.3. SUMMARY OF TEST RESULTS

| FCC RULES | DESCRIPTION OF TEST                    | RESULT         |
|-----------|----------------------------------------|----------------|
| §15.407   | 6dB Bandwidth                          | Compliant      |
| §15.407   | Emission Bandwidth                     | Compliant      |
| §15.407   | Maximum conducted output power         | Compliant      |
| §15.407   | Conducted Spurious Emission            | Compliant      |
| §15.407   | Maximum Conducted Output Power Density | Compliant      |
| §15.209   | Radiated Emission                      | Compliant      |
| §15.407   | Band Edges                             | Compliant      |
| §15.207   | Line Conduction Emission               | Not applicable |

Note: The conducted emission tests at AC port are not required for devices which only employ battery power for operation.

## 6. TEST FACILITY

|                                          |                                                                                                                                          |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Site</b>                         | Attestation of Global Compliance (Shenzhen) Co., Ltd                                                                                     |
| <b>Location</b>                          | 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China |
| <b>Designation Number</b>                | CN1259                                                                                                                                   |
| <b>FCC Test Firm Registration Number</b> | 975832                                                                                                                                   |
| <b>A2LA Cert. No.</b>                    | 5054.02                                                                                                                                  |
| <b>Description</b>                       | Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA                                                                |

### TEST EQUIPMENT OF CONDUCTED EMISSION TEST

| Equipment     | Manufacturer | Model                | S/N    | Cal. Date     | Cal. Due      |
|---------------|--------------|----------------------|--------|---------------|---------------|
| TEST RECEIVER | R&S          | ESPI                 | 101206 | Mar. 28, 2022 | Mar. 27, 2023 |
| LISN          | R&S          | ESH2-Z5              | 100086 | Jun. 08, 2022 | Jun. 07, 2023 |
| Test software | R&S          | ES-K1<br>(Ver V1.71) | N/A    | N/A           | N/A           |

### TEST EQUIPMENT OF RADIATED EMISSION TEST

| Equipment                         | Manufacturer   | Model                | S/N        | Cal. Date     | Cal. Due      |
|-----------------------------------|----------------|----------------------|------------|---------------|---------------|
| TEST RECEIVER                     | R&S            | ESCI                 | 10096      | Mar. 28, 2022 | Mar. 27, 2023 |
| EXA Signal Analyzer               | Aglient        | N9010A               | MY53470504 | Nov. 17, 2021 | Nov. 16, 2022 |
| Power sensor                      | Aglient        | U2021XA              | MY54110007 | Mar. 04, 2022 | Mar. 03, 2023 |
| 5GHz Fliter                       | EM Electronics | 5150-5880MHz         | N/A        | Mar. 22, 2022 | Mar. 21, 2024 |
| Attenuator                        | ZHINAN         | E-002                | N/A        | Sep. 03, 2020 | Sep. 02, 2022 |
| Horn antenna                      | SCHWARZBECK    | BBHA 9170            | #768       | Oct. 31, 2021 | Oct. 30, 2023 |
| Active loop antenna<br>(9K-30MHz) | ZHINAN         | ZN30900C             | 18051      | Mar. 12, 2022 | Mar. 21, 2024 |
| Double-Ridged Waveguide Horn      | ETS LINDGREN   | 3117                 | 00034609   | Apr. 23, 2021 | Apr. 22, 2023 |
| Broadband Preamplifier            | ETS LINDGREN   | 3117PA               | 00225134   | Sep. 03, 2020 | Sep. 02, 2022 |
| ANTENNA                           | SCHWARZBECK    | VULB9168             | 494        | Jan. 08, 2020 | Jan. 07, 2023 |
| Test software                     | Tonscend       | JS32-RE<br>(Ver.2.5) | N/A        | N/A           | N/A           |

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## 7. MAXIMUM CONDUCTED OUTPUT POWER

### 7.1. MEASUREMENT PROCEDURE

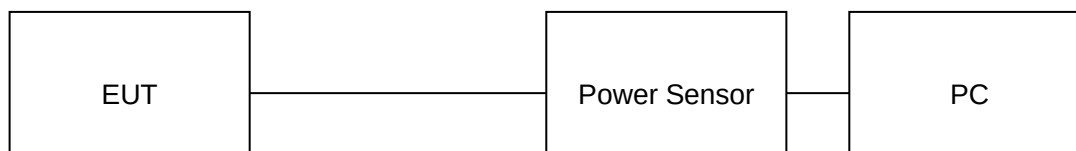
For average power test:

1. Connect EUT RF output port to power sensor through an RF attenuator.
2. Connect the power sensor to the PC.
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Record the maximum power from the software.

**Note :** The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

### 7.2. TEST SET-UP

#### AVERAGE POWER SETUP



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### 7.3. LIMITS AND MEASUREMENT RESULT

| Test Data of Conducted Output Power for band 5.25-5.35 GHz-antenna 1 |                    |                     |              |              |
|----------------------------------------------------------------------|--------------------|---------------------|--------------|--------------|
| Test Mode                                                            | Test Channel (MHz) | Average Power (dBm) | Limits (dBm) | Pass or Fail |
| 802.11a                                                              | 5260               | 11.22               | 23.98        | Pass         |
|                                                                      | 5300               | 10.17               | 23.98        | Pass         |
|                                                                      | 5320               | 9.44                | 23.98        | Pass         |
| 802.11n20                                                            | 5260               | 9.46                | 23.98        | Pass         |
|                                                                      | 5300               | 9.01                | 23.98        | Pass         |
|                                                                      | 5320               | 8.95                | 23.98        | Pass         |

| Test Data of Conducted Output Power for band 5.25-5.35 GHz-antenna 2 |                    |                     |              |              |
|----------------------------------------------------------------------|--------------------|---------------------|--------------|--------------|
| Test Mode                                                            | Test Channel (MHz) | Average Power (dBm) | Limits (dBm) | Pass or Fail |
| 802.11a                                                              | 5260               | 10.36               | 23.98        | Pass         |
|                                                                      | 5300               | 9.55                | 23.98        | Pass         |
|                                                                      | 5320               | 11.64               | 23.98        | Pass         |
| 802.11n20                                                            | 5260               | 10.70               | 23.98        | Pass         |
|                                                                      | 5300               | 10.48               | 23.98        | Pass         |
|                                                                      | 5320               | 9.82                | 23.98        | Pass         |

| Test Data of Conducted Output Power for band 5.25-5.35 GHz-antenna 1+2 |                    |                     |              |              |
|------------------------------------------------------------------------|--------------------|---------------------|--------------|--------------|
| Test Mode                                                              | Test Channel (MHz) | Average Power (dBm) | Limits (dBm) | Pass or Fail |
| 802.11n20                                                              | 5260               | 13.13               | 23.98        | Pass         |
|                                                                        | 5300               | 12.82               | 23.98        | Pass         |
|                                                                        | 5320               | 12.42               | 23.98        | Pass         |

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| Test Data of Conducted Output Power for band 5.47-5.725 GHz-antenna 1 |                    |                     |              |              |
|-----------------------------------------------------------------------|--------------------|---------------------|--------------|--------------|
| Test Mode                                                             | Test Channel (MHz) | Average Power (dBm) | Limits (dBm) | Pass or Fail |
| 802.11a                                                               | 5500               | 12.71               | 23.98        | Pass         |
|                                                                       | 5600               | 11.31               | 23.98        | Pass         |
|                                                                       | 5700               | 10.86               | 23.98        | Pass         |
| 802.11n20                                                             | 5500               | 12.13               | 23.98        | Pass         |
|                                                                       | 5600               | 11.79               | 23.98        | Pass         |
|                                                                       | 5700               | 8.50                | 23.98        | Pass         |

| Test Data of Conducted Output Power for band 5.47-5.725 GHz-antenna 2 |                    |                     |              |              |
|-----------------------------------------------------------------------|--------------------|---------------------|--------------|--------------|
| Test Mode                                                             | Test Channel (MHz) | Average Power (dBm) | Limits (dBm) | Pass or Fail |
| 802.11a                                                               | 5500               | 12.89               | 23.98        | Pass         |
|                                                                       | 5600               | 11.43               | 23.98        | Pass         |
|                                                                       | 5700               | 8.97                | 23.98        | Pass         |
| 802.11n20                                                             | 5500               | 12.54               | 23.98        | Pass         |
|                                                                       | 5600               | 11.16               | 23.98        | Pass         |
|                                                                       | 5700               | 8.50                | 23.98        | Pass         |

| Test Data of Conducted Output Power for band 5.47-5.725 GHz-antenna 1+2 |                    |                     |              |              |
|-------------------------------------------------------------------------|--------------------|---------------------|--------------|--------------|
| Test Mode                                                               | Test Channel (MHz) | Average Power (dBm) | Limits (dBm) | Pass or Fail |
| 802.11n20                                                               | 5500               | 15.35               | 23.98        | Pass         |
|                                                                         | 5600               | 14.50               | 23.98        | Pass         |
|                                                                         | 5700               | 11.51               | 23.98        | Pass         |

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## 8. BANDWIDTH

### 8.1. MEASUREMENT PROCEDURE

-6dB bandwidth (DTS bandwidth):

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on operation frequency individually.
3. Set RBW = 100kHz.
4. Set the VBW  $\geq 3 \times$  RBW. Detector = Peak. Trace mode = max hold.
5. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.

99% occupied bandwidth:

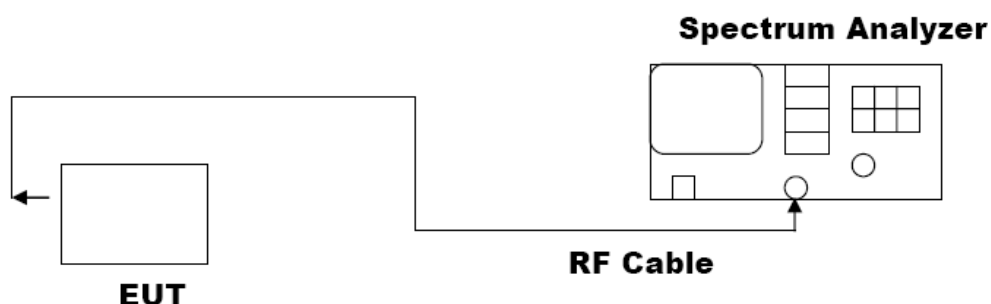
1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set Span = approximately 1.5 to 5 times the OBW, centered on a nominal channel  
The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

-26dB Bandwidth:

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW  $>$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission.  
Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

**Note:** The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

### 8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



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### 8.3. LIMITS AND MEASUREMENT RESULTS

| Test Data of Occupied Bandwidth and -26dB Bandwidth for band 5.25-5.35 GHz-antenna 1 |                    |                              |                       |              |
|--------------------------------------------------------------------------------------|--------------------|------------------------------|-----------------------|--------------|
| Test Mode                                                                            | Test Channel (MHz) | 99% Occupied Bandwidth (MHz) | -26dB Bandwidth (MHz) | Pass or Fail |
| 802.11a                                                                              | 5260               | 16.324                       | 18.43                 | Pass         |
|                                                                                      | 5300               | 16.323                       | 18.34                 | Pass         |
|                                                                                      | 5320               | 16.319                       | 18.46                 | Pass         |
| 802.11n20                                                                            | 5260               | 17.506                       | 19.34                 | Pass         |
|                                                                                      | 5300               | 17.517                       | 19.23                 | Pass         |
|                                                                                      | 5320               | 17.484                       | 19.21                 | Pass         |

| Test Data of Occupied Bandwidth and -26dB Bandwidth for band 5.25-5.35 GHz-antenna 2 |                    |                              |                       |              |
|--------------------------------------------------------------------------------------|--------------------|------------------------------|-----------------------|--------------|
| Test Mode                                                                            | Test Channel (MHz) | 99% Occupied Bandwidth (MHz) | -26dB Bandwidth (MHz) | Pass or Fail |
| 802.11a                                                                              | 5260               | 16.330                       | 18.38                 | Pass         |
|                                                                                      | 5300               | 16.329                       | 18.32                 | Pass         |
|                                                                                      | 5320               | 16.309                       | 18.32                 | Pass         |
| 802.11n20                                                                            | 5260               | 17.509                       | 19.32                 | Pass         |
|                                                                                      | 5300               | 17.493                       | 19.26                 | Pass         |
|                                                                                      | 5320               | 17.496                       | 19.19                 | Pass         |

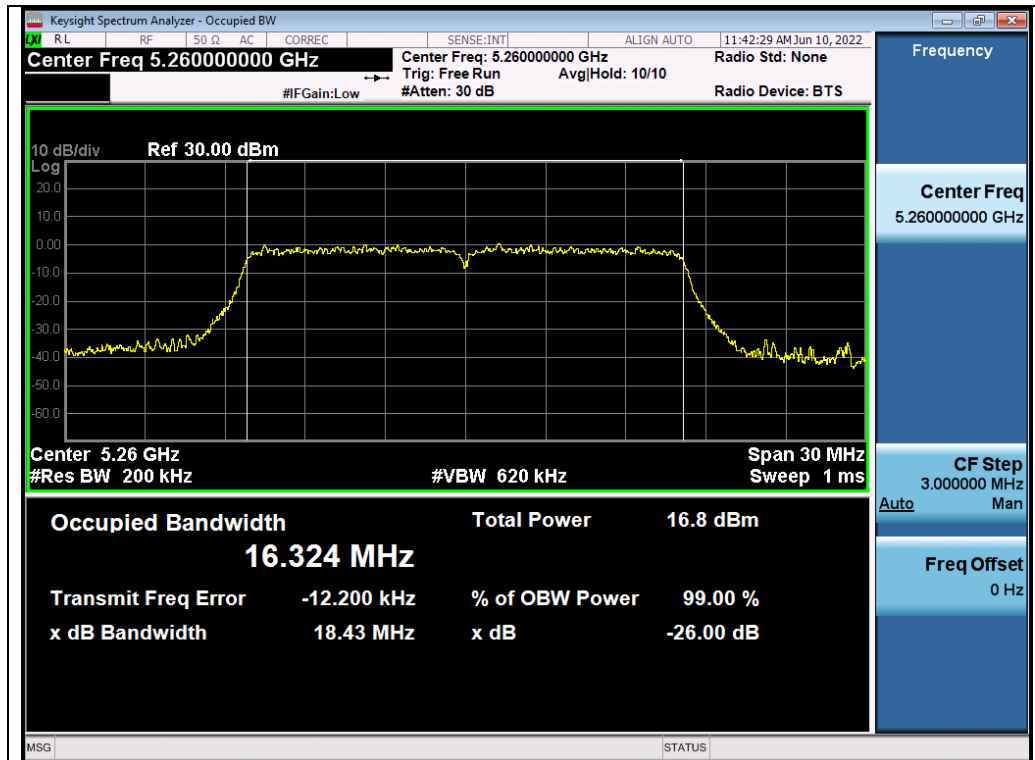
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| Test Data of Occupied Bandwidth and DTS Bandwidth for band 5.47-5.725 GHz-antenna 1 |                    |                              |                     |              |
|-------------------------------------------------------------------------------------|--------------------|------------------------------|---------------------|--------------|
| Test Mode                                                                           | Test Channel (MHz) | 99% Occupied Bandwidth (MHz) | DTS Bandwidth (MHz) | Pass or Fail |
| 802.11a                                                                             | 5500               | 16.330                       | 18.39               | Pass         |
|                                                                                     | 5600               | 16.345                       | 18.51               | Pass         |
|                                                                                     | 5700               | 16.336                       | 18.41               | Pass         |
| 802.11n20                                                                           | 5500               | 17.498                       | 19.28               | Pass         |
|                                                                                     | 5600               | 17.499                       | 19.34               | Pass         |
|                                                                                     | 5700               | 17.533                       | 19.29               | Pass         |

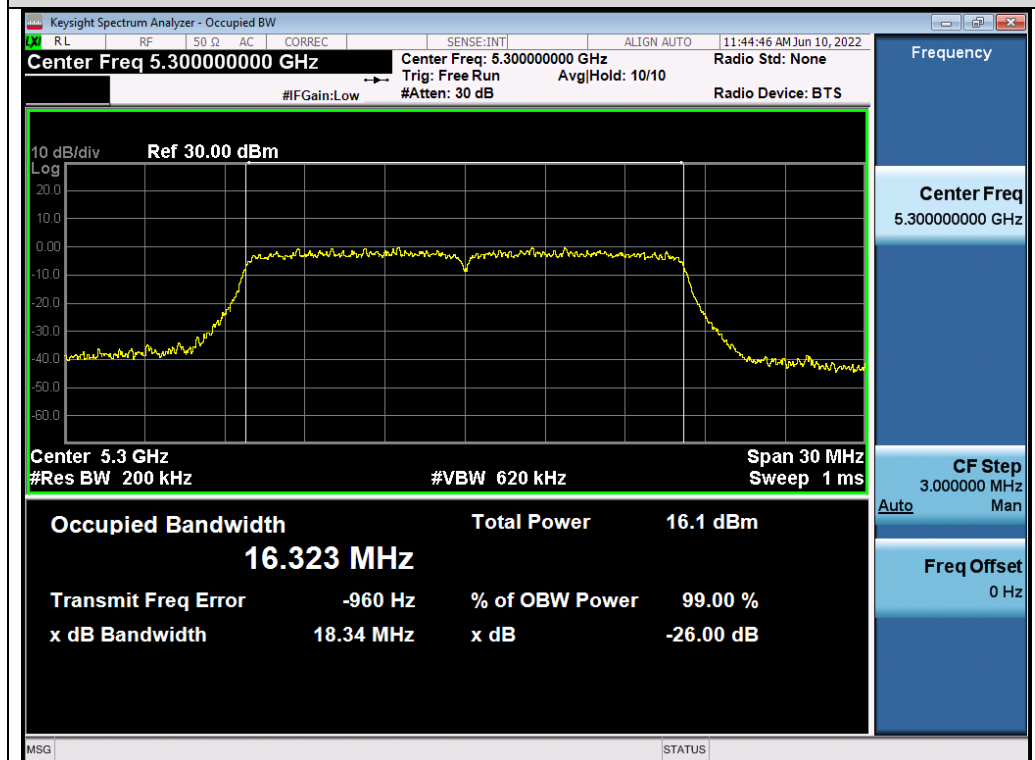
| Test Data of Occupied Bandwidth and DTS Bandwidth for band 5.47-5.725 GHz-antenna 2 |                    |                              |                     |              |
|-------------------------------------------------------------------------------------|--------------------|------------------------------|---------------------|--------------|
| Test Mode                                                                           | Test Channel (MHz) | 99% Occupied Bandwidth (MHz) | DTS Bandwidth (MHz) | Pass or Fail |
| 802.11a                                                                             | 5500               | 16.317                       | 18.32               | Pass         |
|                                                                                     | 5600               | 16.319                       | 18.46               | Pass         |
|                                                                                     | 5700               | 16.325                       | 18.34               | Pass         |
| 802.11n20                                                                           | 5500               | 17.504                       | 19.35               | Pass         |
|                                                                                     | 5600               | 17.509                       | 19.30               | Pass         |
|                                                                                     | 5700               | 17.493                       | 19.20               | Pass         |

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### Test Graphs of Occupied Bandwidth and -26dB Bandwidth for band 5.25-5.35 GHz



Test\_Graph\_802.11a\_ANT1\_5260\_6Mbps\_OBW



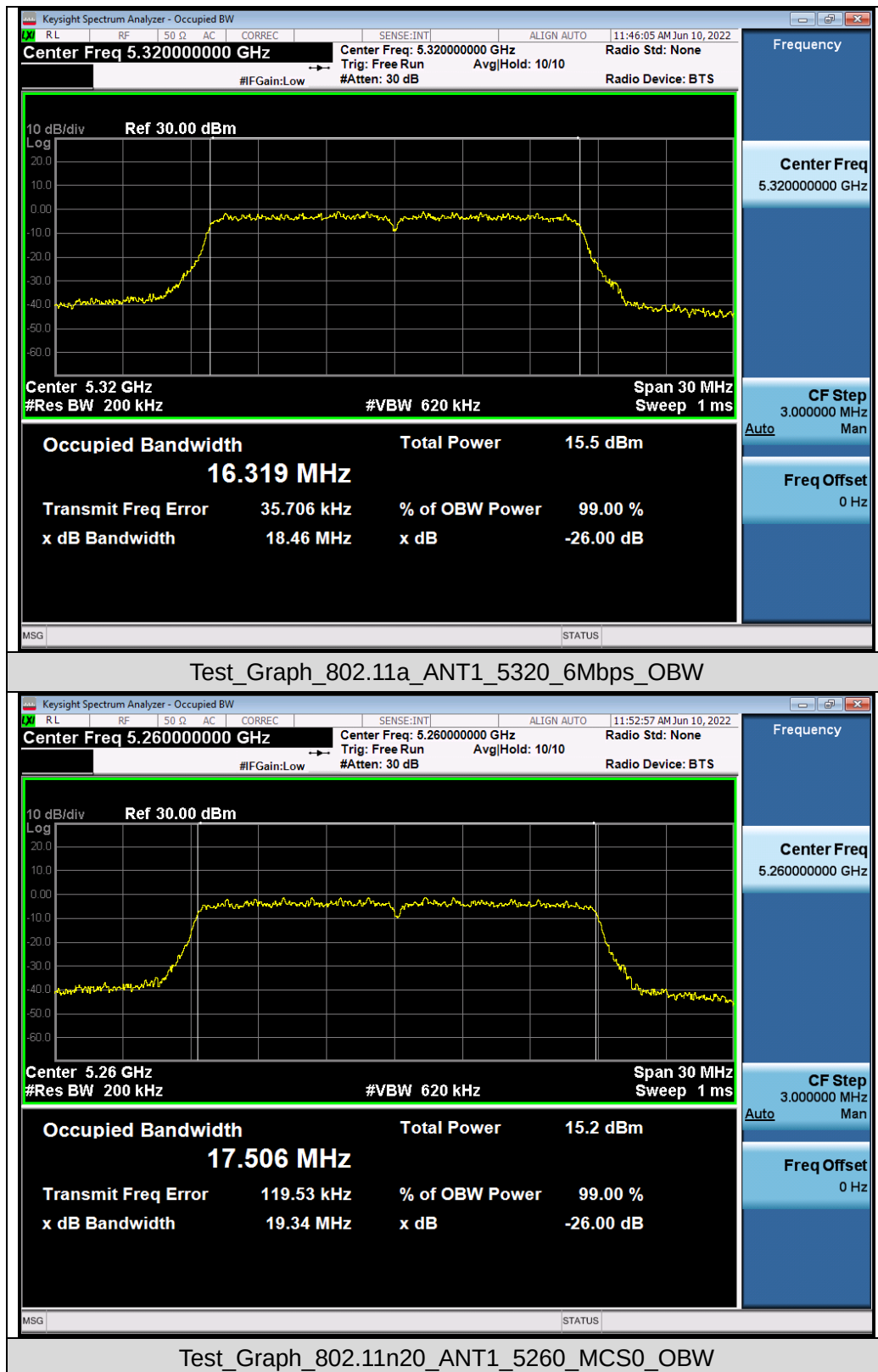
Test\_Graph\_802.11a\_ANT1\_5300\_6Mbps\_OBW

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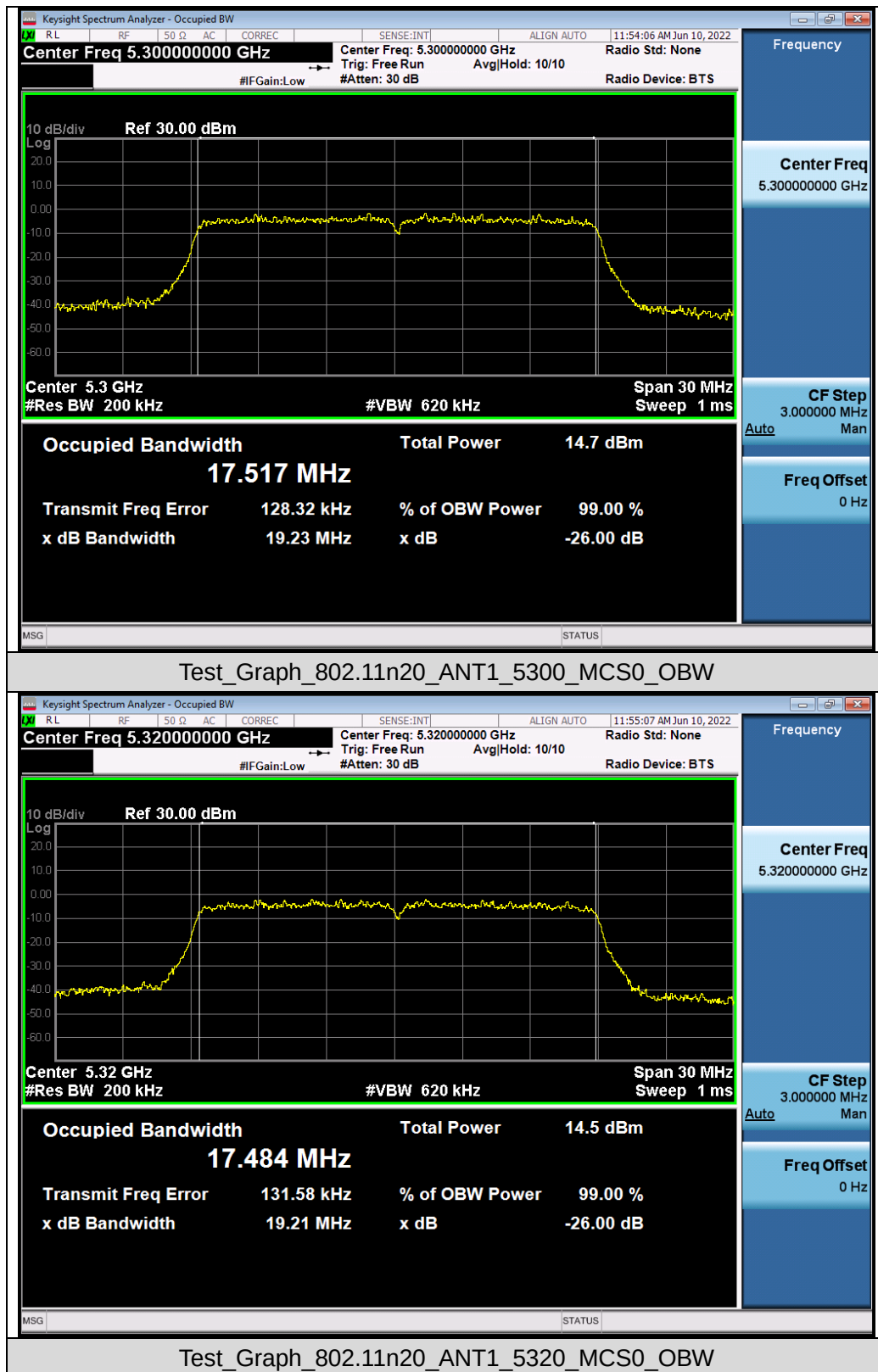


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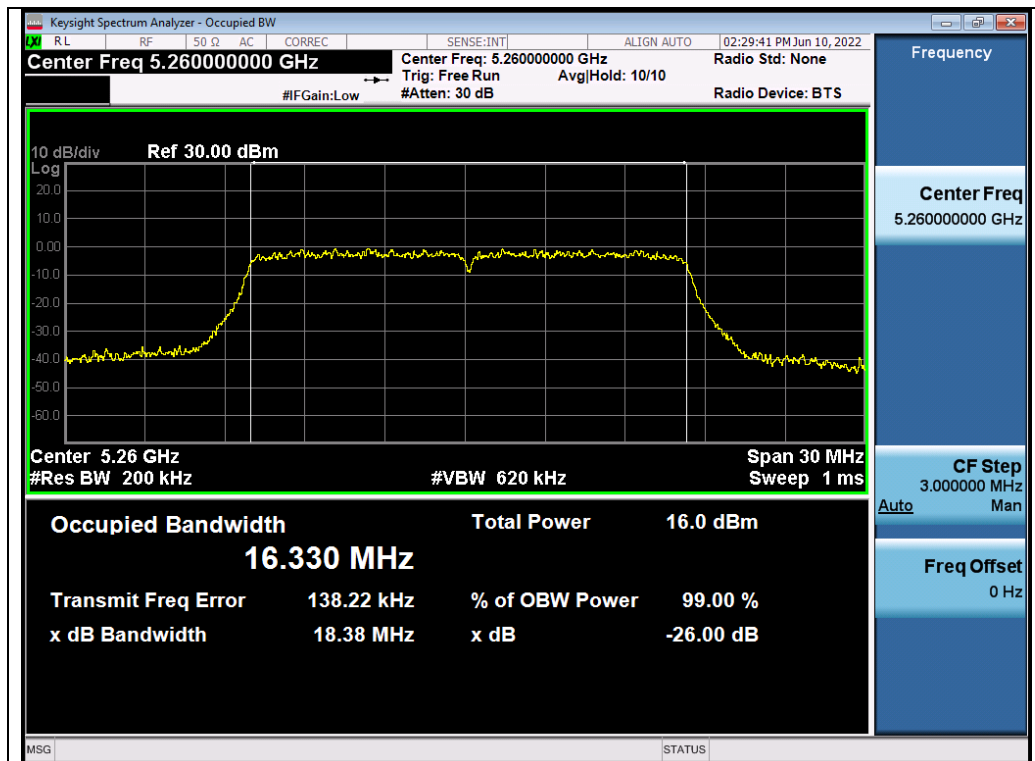
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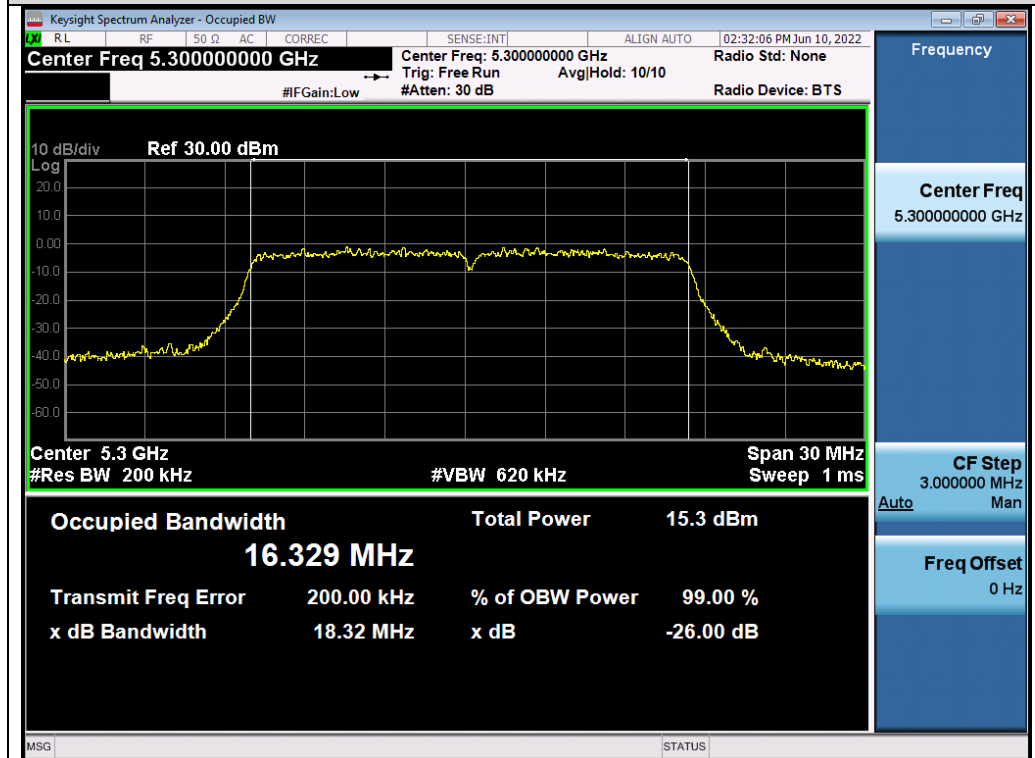


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Test\_Graph\_802.11a\_ANT2\_5260\_6Mbps\_OBW



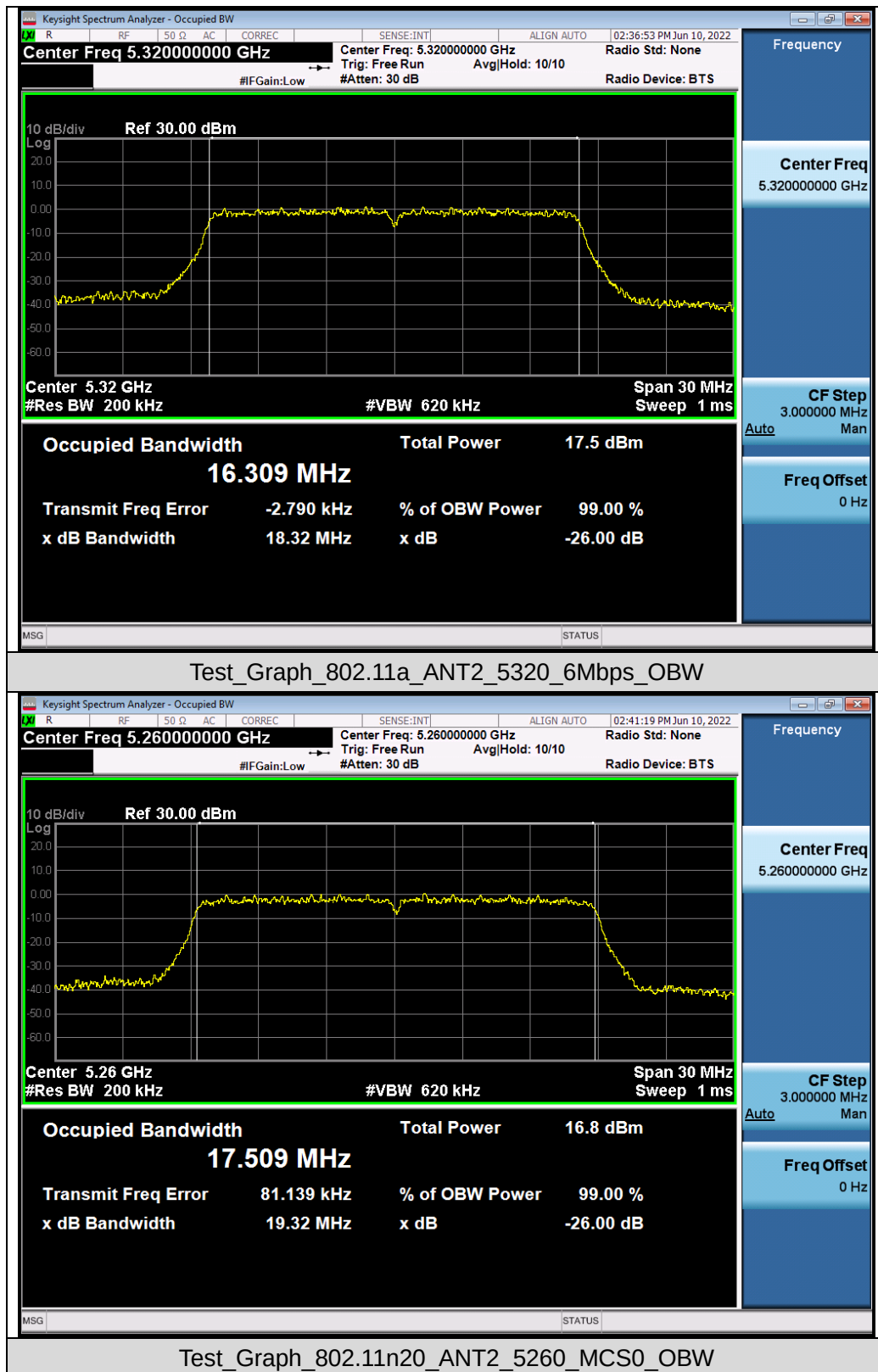
Test\_Graph\_802.11a\_ANT2\_5300\_6Mbps\_OBW

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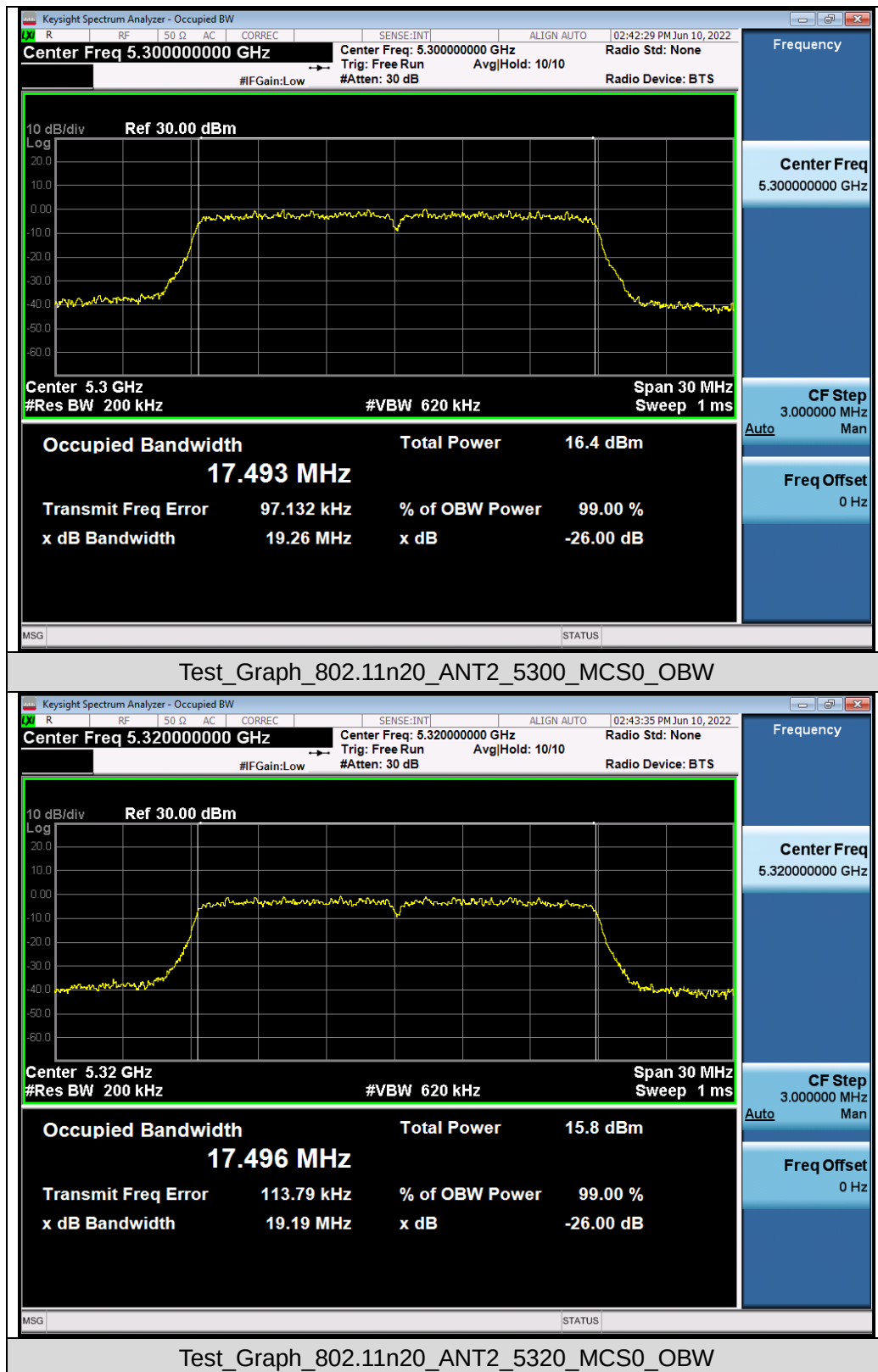
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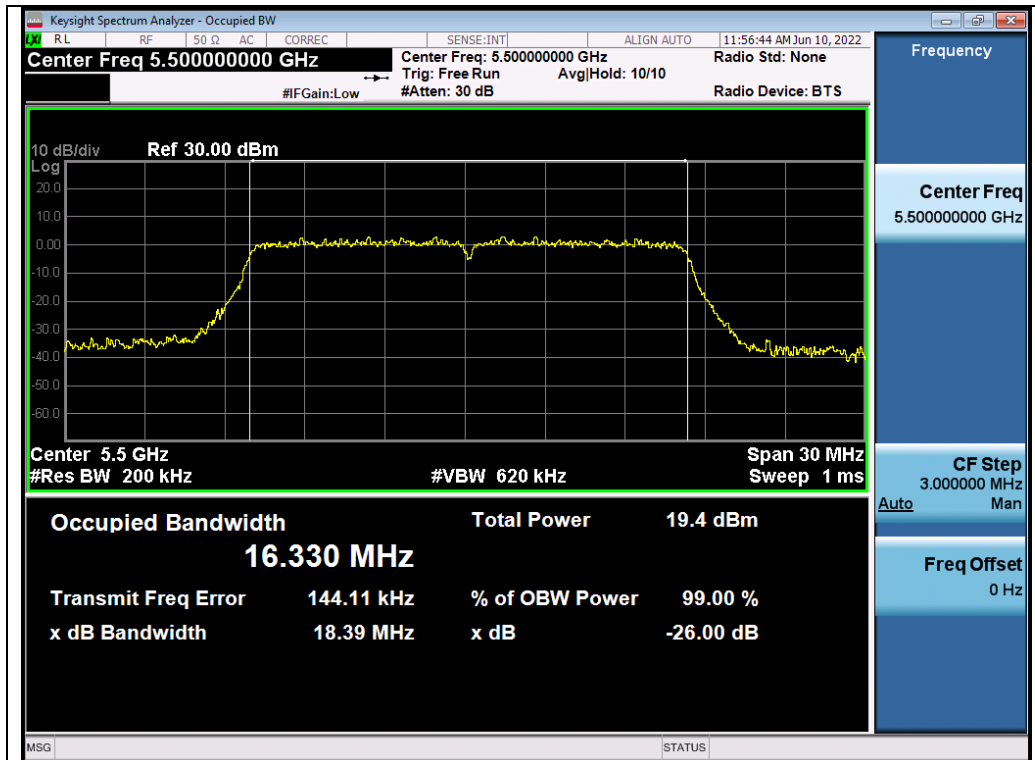


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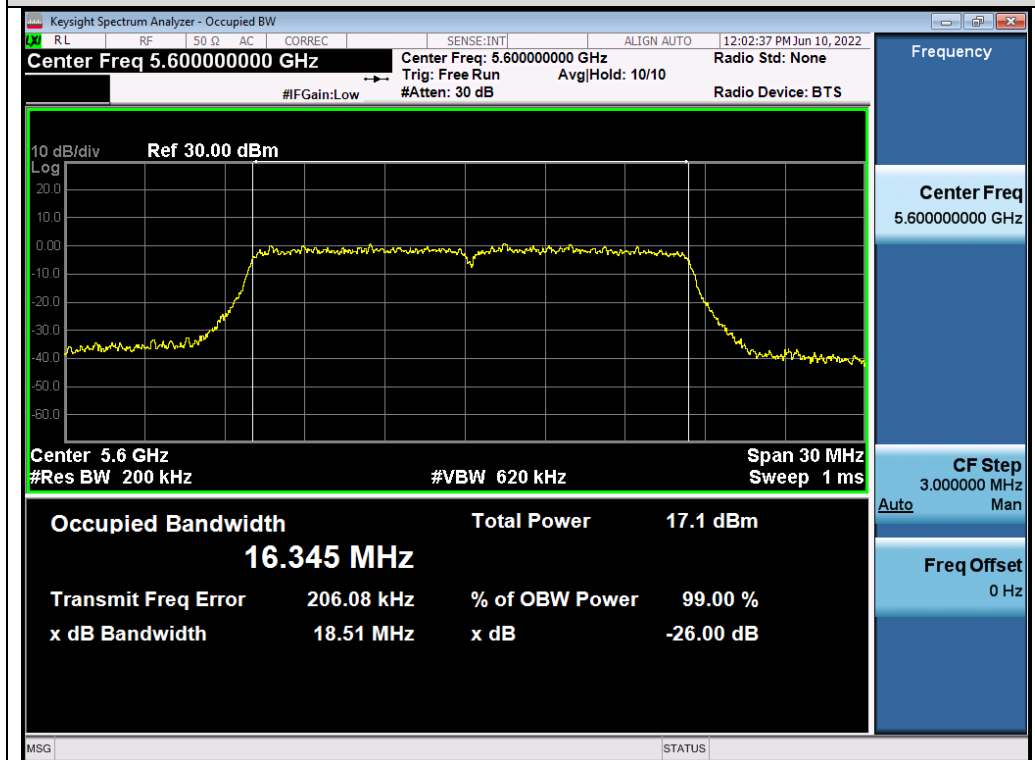


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### Test Graphs of Occupied Bandwidth for band 5.725-5.85 GHz



Test\_Graph\_802.11a\_ANT1\_5500\_6Mbps\_OBW



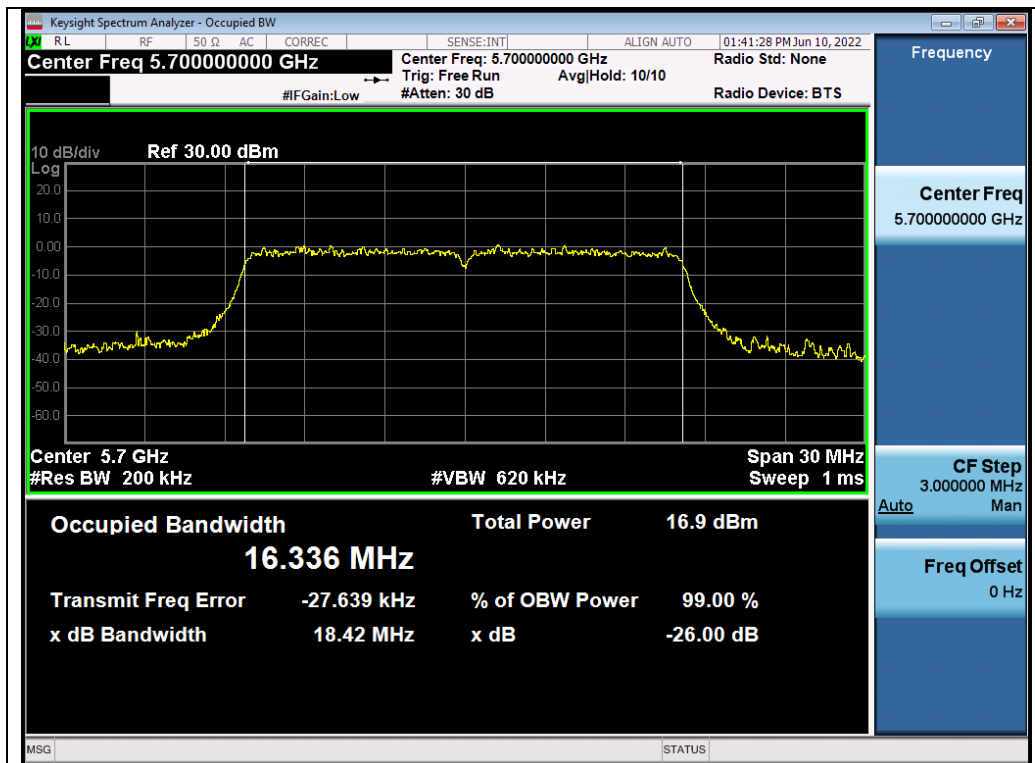
Test\_Graph\_802.11a\_ANT1\_5600\_6Mbps\_OBW

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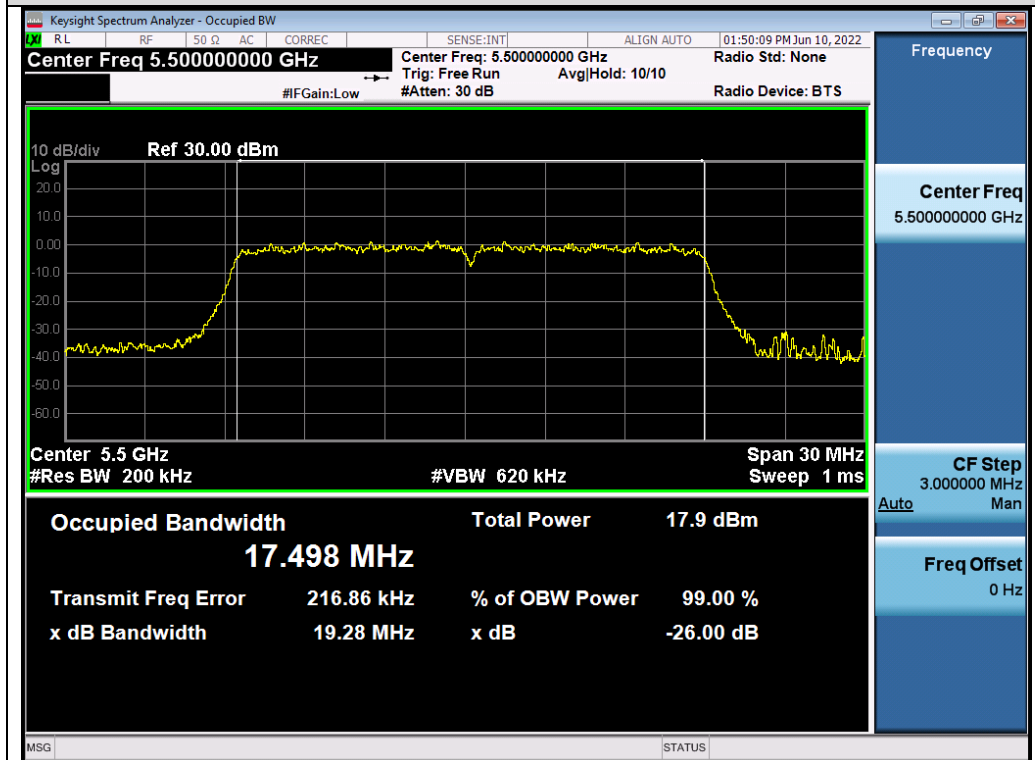
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Test\_Graph\_802.11a\_ANT1\_5700\_6Mbps\_OBW



Test\_Graph\_802.11n20\_ANT1\_5500\_MCS0\_OBW

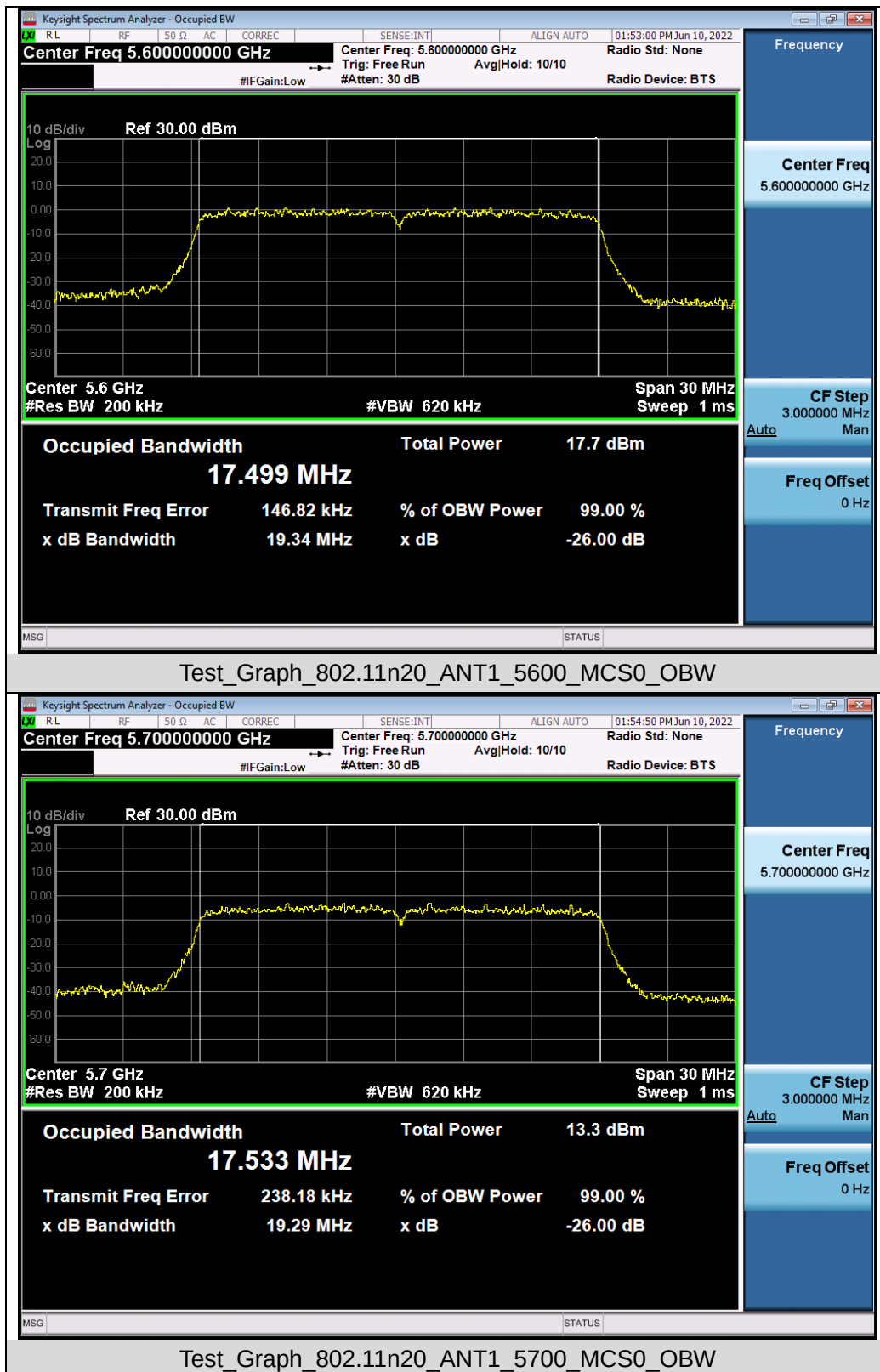
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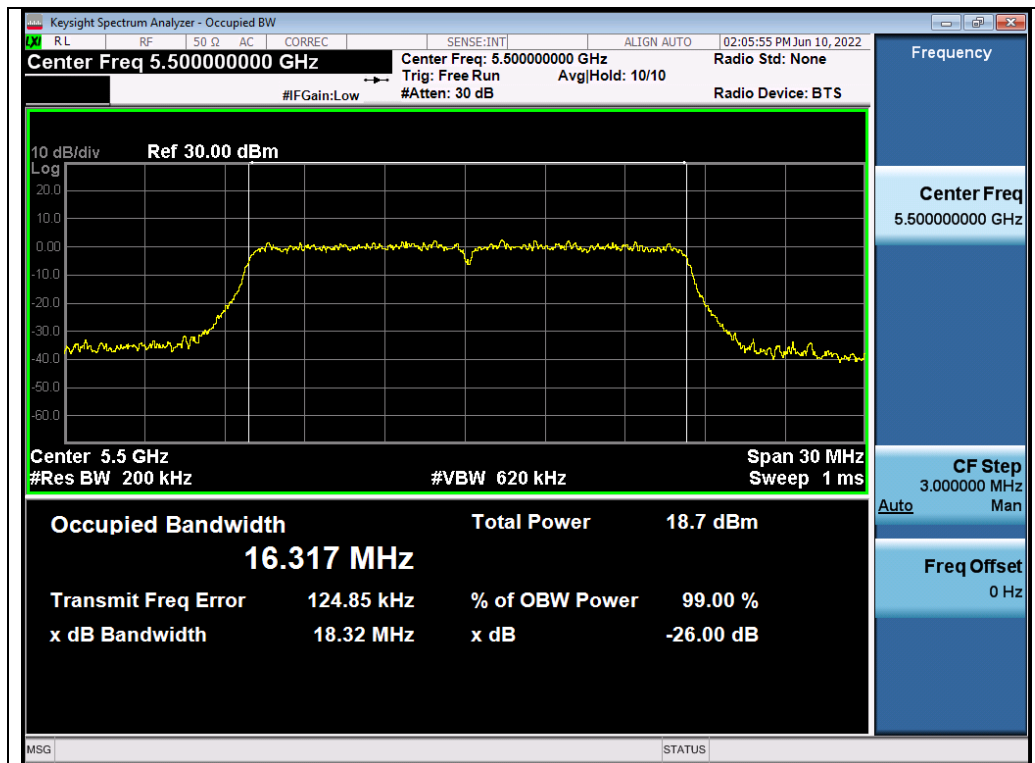
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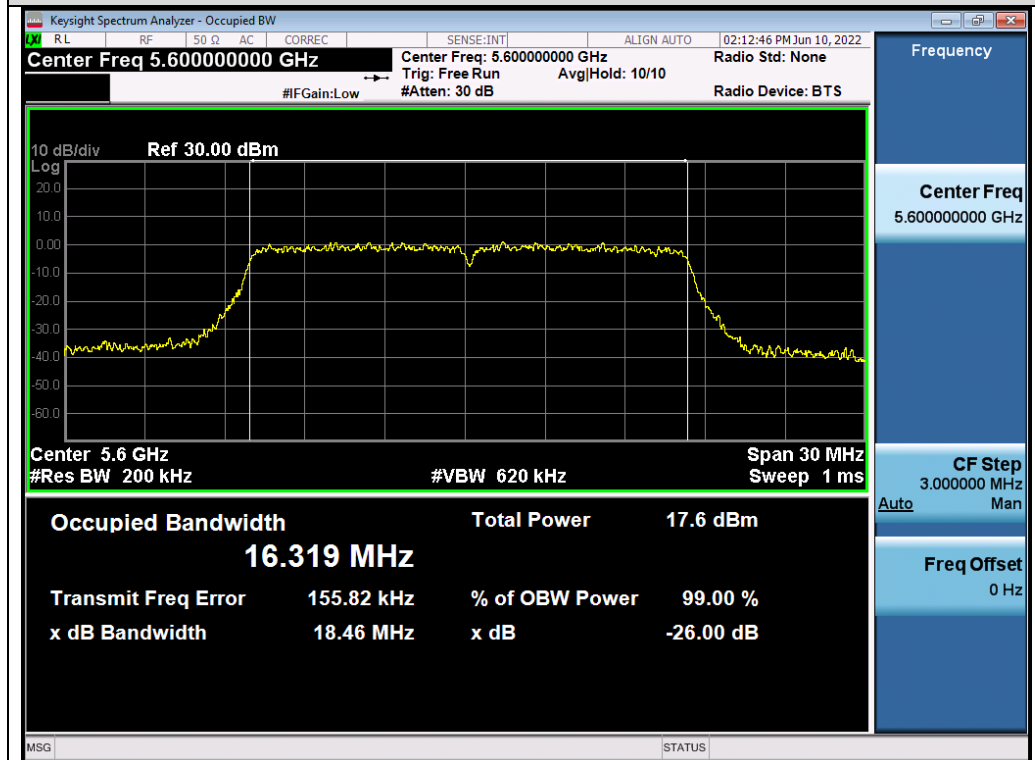




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Test\_Graph\_802.11a\_ANT2\_5500\_6Mbps\_OBW



Test\_Graph\_802.11a\_ANT2\_5600\_6Mbps\_OBW

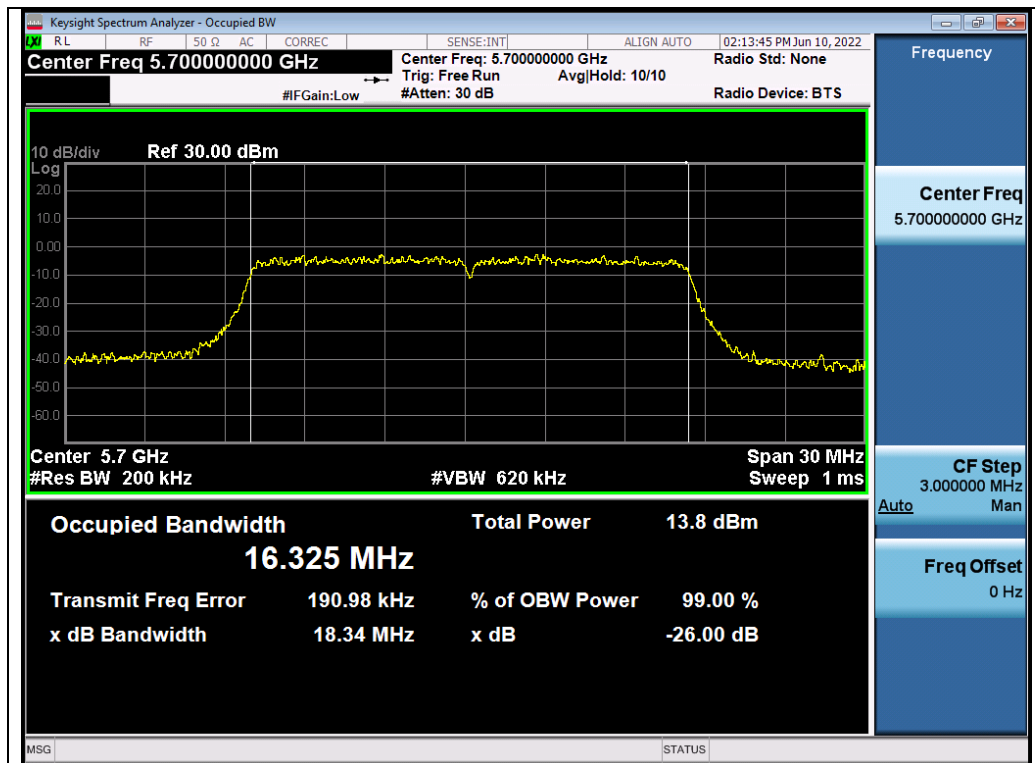
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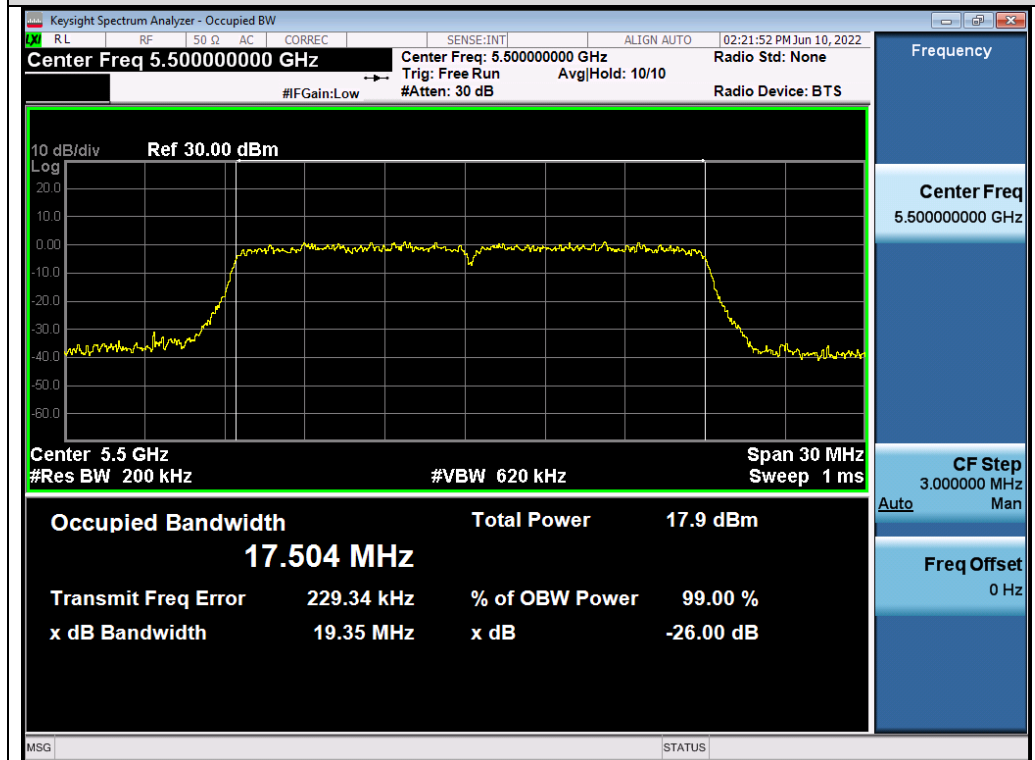
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Test\_Graph\_802.11a\_ANT2\_5700\_6Mbps\_OBW



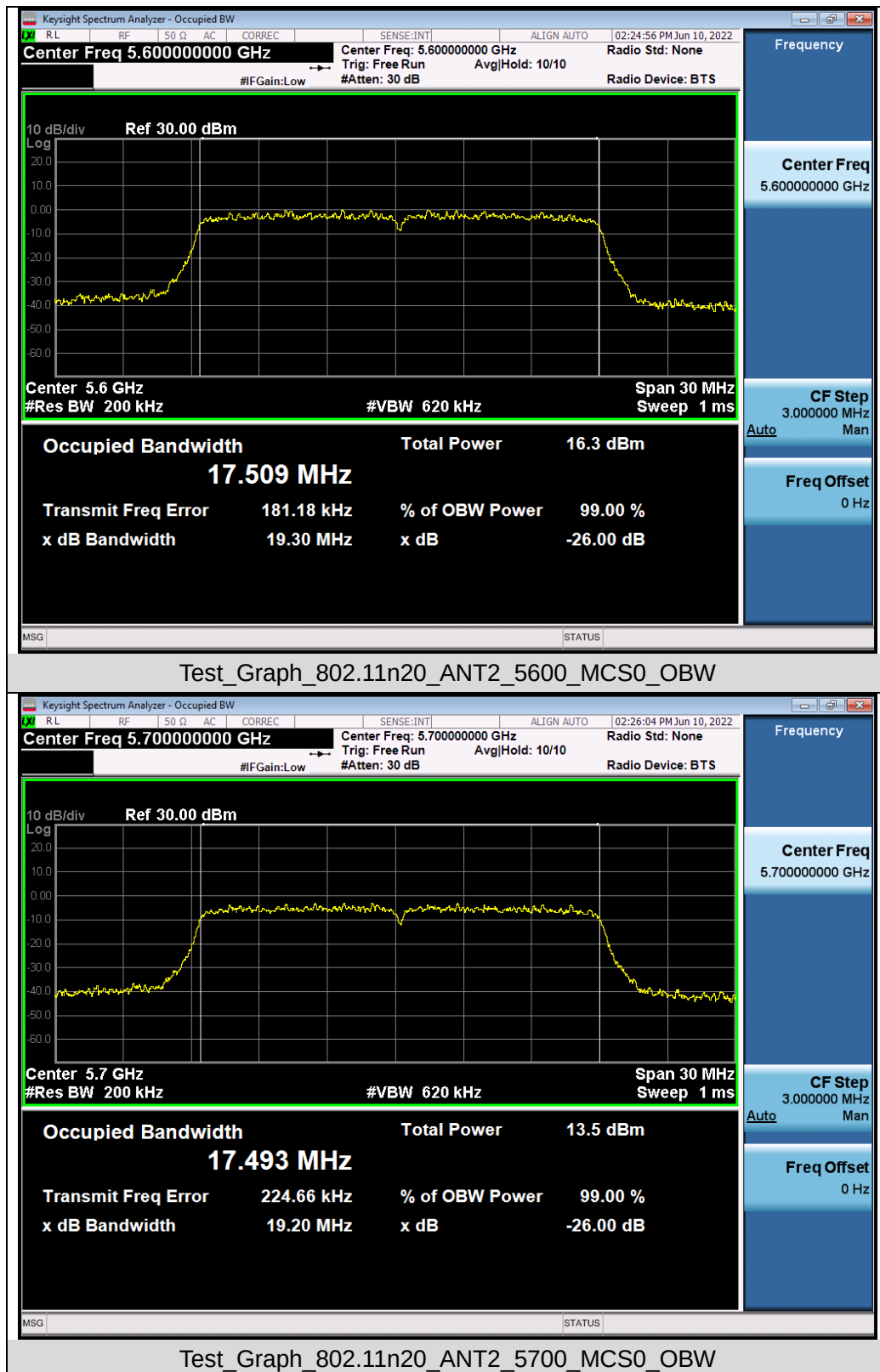
Test\_Graph\_802.11n20\_ANT2\_5500\_MCS0\_OBW

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## 9. MAXIMUM CONDUCTED OUTPUT AVERAGE POWER SPECTRAL DENSITY

### 9.1. MEASUREMENT PROCEDURE

Refer to KDB 789033 section F

### 9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

Refer to Section 8.2.

### 9.3. MEASUREMENT EQUIPMENT USED

Refer to Section 6.

### 9.4. LIMITS AND MEASUREMENT RESULT

| Test Data of Conducted Output Power Density for band 5.15-5.25 GHz-antenna 1 |                    |                                 |                  |              |
|------------------------------------------------------------------------------|--------------------|---------------------------------|------------------|--------------|
| Test Mode                                                                    | Test Channel (MHz) | Average Power Density (dBm/MHz) | Limits (dBm/MHz) | Pass or Fail |
| 802.11a                                                                      | 5260               | 0.208                           | 11               | Pass         |
|                                                                              | 5300               | -0.930                          | 11               | Pass         |
|                                                                              | 5320               | -1.666                          | 11               | Pass         |
| 802.11n20                                                                    | 5260               | -1.826                          | 11               | Pass         |
|                                                                              | 5300               | -2.358                          | 11               | Pass         |
|                                                                              | 5320               | -2.285                          | 11               | Pass         |

| Test Data of Conducted Output Power Density for band 5.15-5.25 GHz-antenna 2 |                    |                                 |                  |              |
|------------------------------------------------------------------------------|--------------------|---------------------------------|------------------|--------------|
| Test Mode                                                                    | Test Channel (MHz) | Average Power Density (dBm/MHz) | Limits (dBm/MHz) | Pass or Fail |
| 802.11a                                                                      | 5260               | -0.686                          | 11               | Pass         |
|                                                                              | 5300               | -1.396                          | 11               | Pass         |
|                                                                              | 5320               | 0.469                           | 11               | Pass         |
| 802.11n20                                                                    | 5260               | -0.633                          | 11               | Pass         |
|                                                                              | 5300               | -0.762                          | 11               | Pass         |
|                                                                              | 5320               | -1.551                          | 11               | Pass         |

| Test Data of Conducted Output Power Density for band 5.15-5.25 GHz-antenna 1+2 |                    |                                 |                  |              |
|--------------------------------------------------------------------------------|--------------------|---------------------------------|------------------|--------------|
| Test Mode                                                                      | Test Channel (MHz) | Average Power Density (dBm/MHz) | Limits (dBm/MHz) | Pass or Fail |
| 802.11n20                                                                      | 5260               | 1.82                            | 11               | Pass         |
|                                                                                | 5300               | 1.52                            | 11               | Pass         |
|                                                                                | 5320               | 1.11                            | 11               | Pass         |

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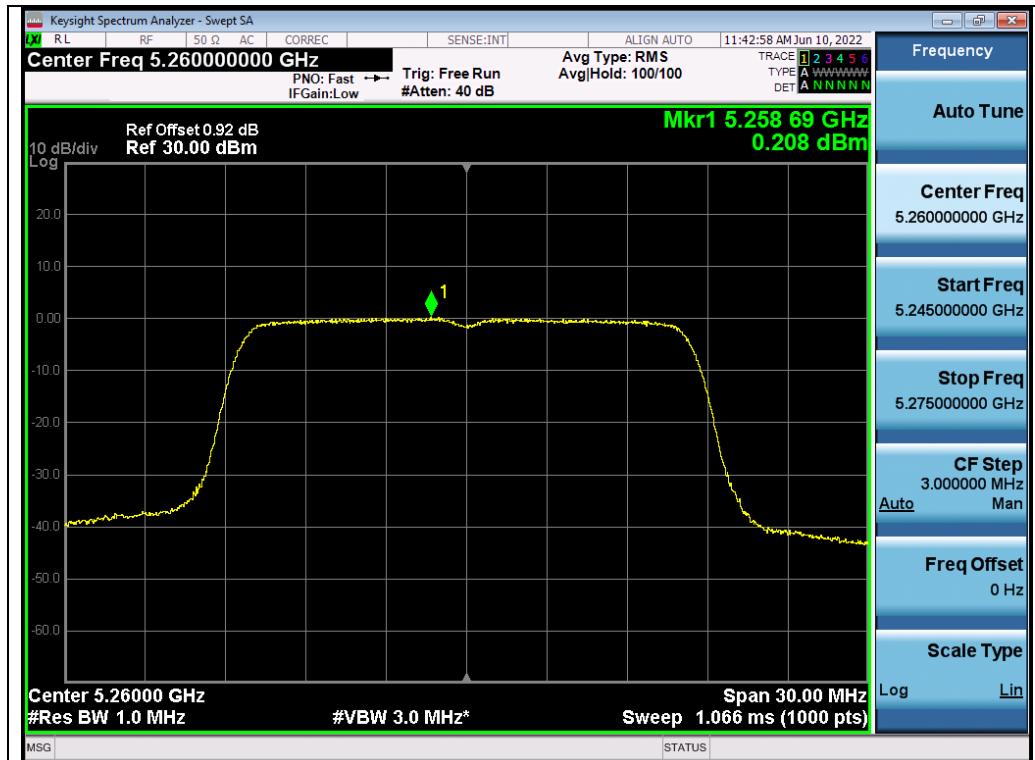
| Test Data of Conducted Output Power Density for band 5.47-5.725 GHz-antenna 1 |                    |                                 |                  |              |
|-------------------------------------------------------------------------------|--------------------|---------------------------------|------------------|--------------|
| Test Mode                                                                     | Test Channel (MHz) | Average Power Density (dBm/MHz) | Limits (dBm/MHz) | Pass or Fail |
| 802.11a                                                                       | 5500               | 1.778                           | 11               | Pass         |
|                                                                               | 5600               | -11.189                         | 11               | Pass         |
|                                                                               | 5700               | -0.411                          | 11               | Pass         |
| 802.11n20                                                                     | 5500               | 0.869                           | 11               | Pass         |
|                                                                               | 5600               | 0.622                           | 11               | Pass         |
|                                                                               | 5700               | -2.977                          | 11               | Pass         |

| Test Data of Conducted Output Power Density for band 5.47-5.725 GHz-antenna 2 |                    |                                 |                  |              |
|-------------------------------------------------------------------------------|--------------------|---------------------------------|------------------|--------------|
| Test Mode                                                                     | Test Channel (MHz) | Average Power Density (dBm/MHz) | Limits (dBm/MHz) | Pass or Fail |
| 802.11a                                                                       | 5500               | 1.901                           | 11               | Pass         |
|                                                                               | 5600               | 0.423                           | 11               | Pass         |
|                                                                               | 5700               | -2.057                          | 11               | Pass         |
| 802.11n20                                                                     | 5500               | 1.061                           | 11               | Pass         |
|                                                                               | 5600               | -0.207                          | 11               | Pass         |
|                                                                               | 5700               | -9.952                          | 11               | Pass         |

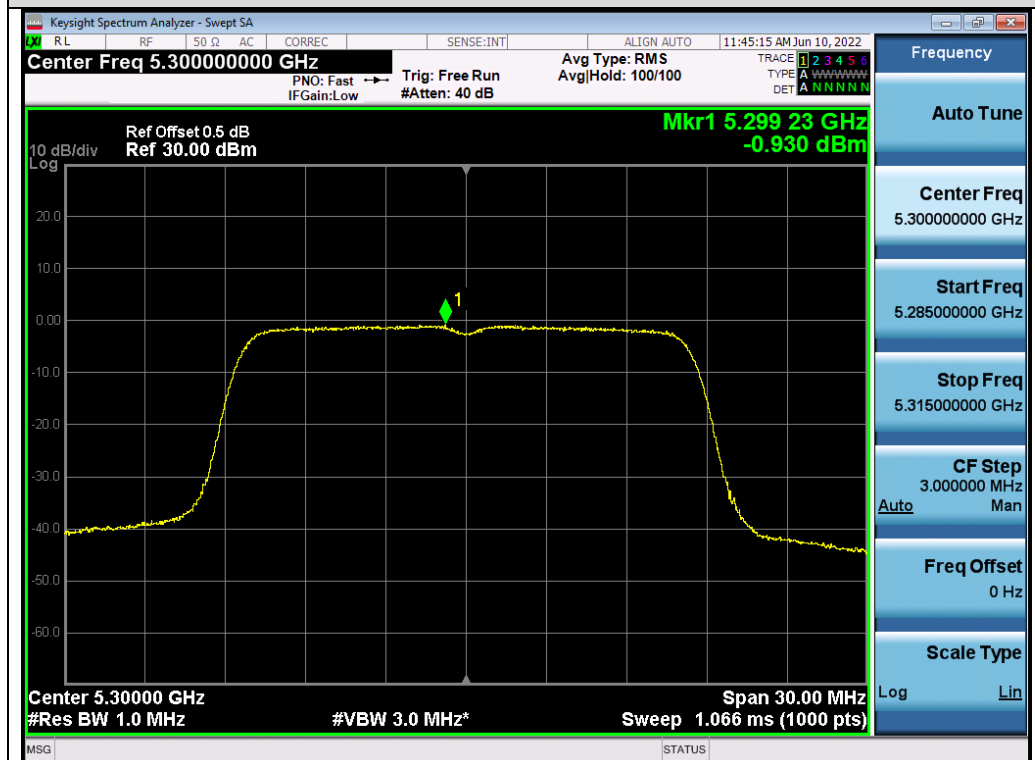
| Test Data of Conducted Output Power Density for band 5.47-5.725 GHz-antenna 1+2 |                    |                                 |                  |              |
|---------------------------------------------------------------------------------|--------------------|---------------------------------|------------------|--------------|
| Test Mode                                                                       | Test Channel (MHz) | Average Power Density (dBm/MHz) | Limits (dBm/MHz) | Pass or Fail |
| 802.11n20                                                                       | 5500               | 3.976                           | 11               | Pass         |
|                                                                                 | 5600               | 3.238                           | 11               | Pass         |
|                                                                                 | 5700               | -2.183                          | 11               | Pass         |

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### Test Graphs of Conducted Output Power Spectral Density for band 5.25-5.35 GHz

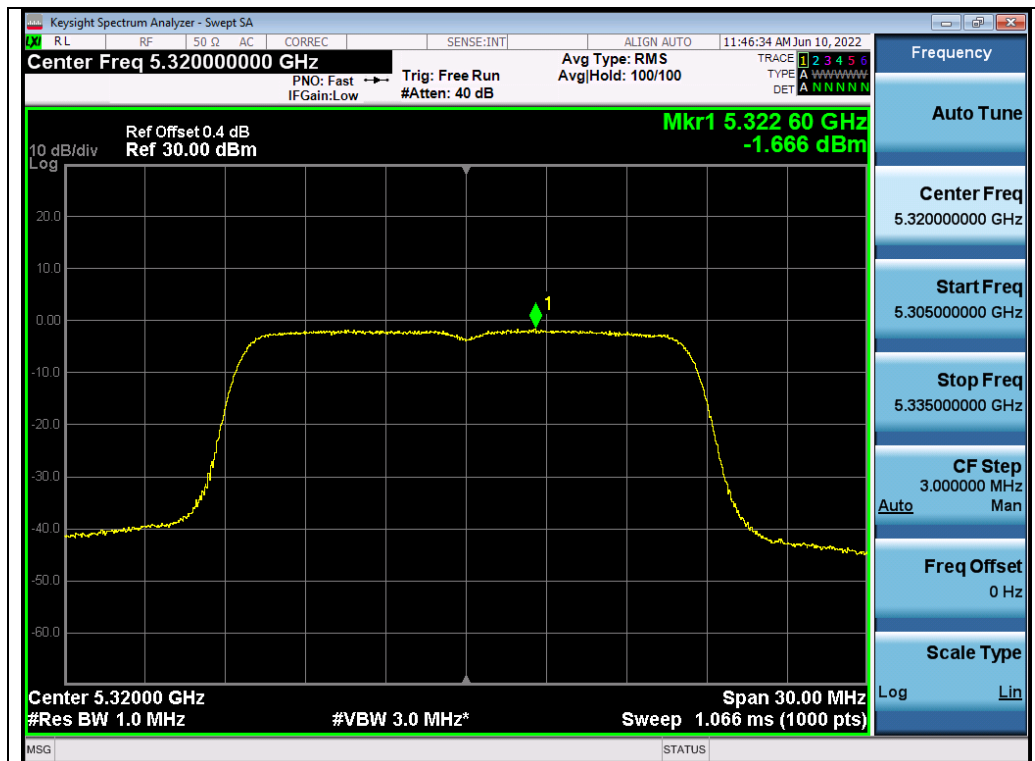


Test\_Graph\_802.11a\_ANT1\_5260\_6Mbps\_PSD



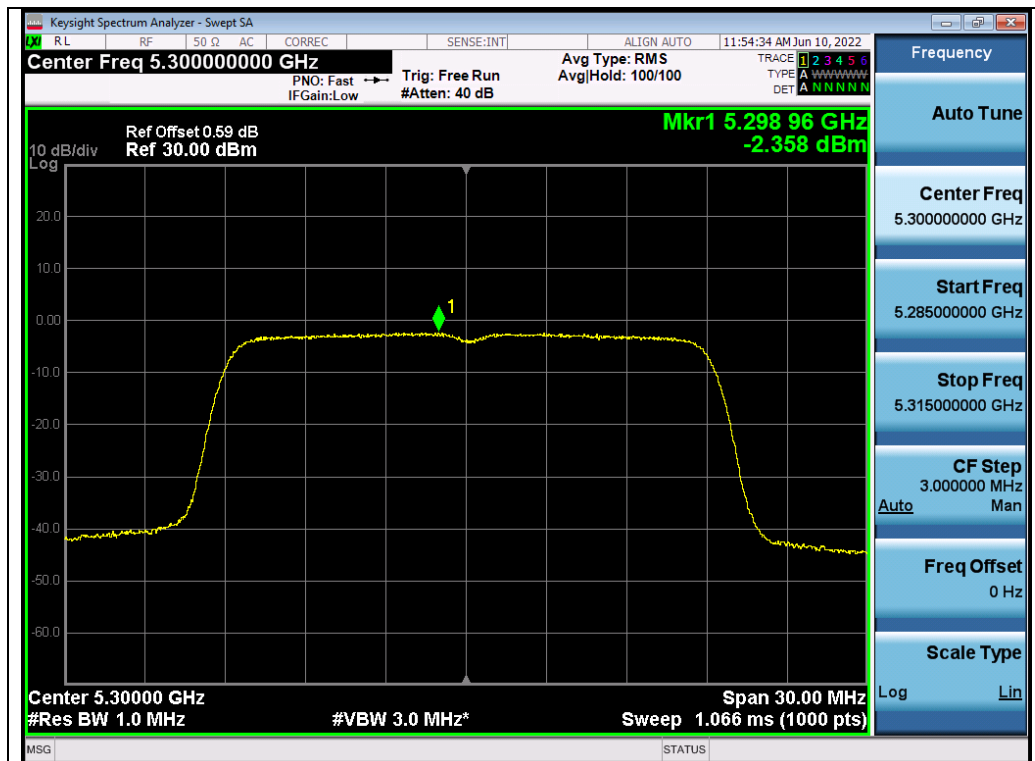
Test\_Graph\_802.11a\_ANT1\_5300\_6Mbps\_PSD

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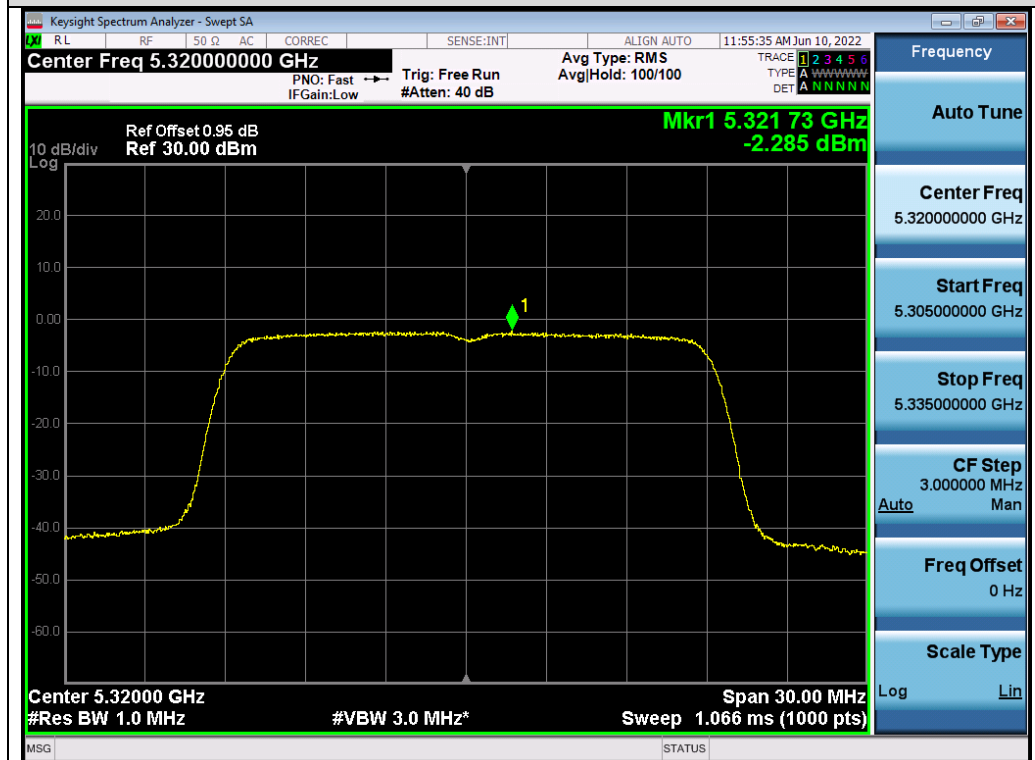


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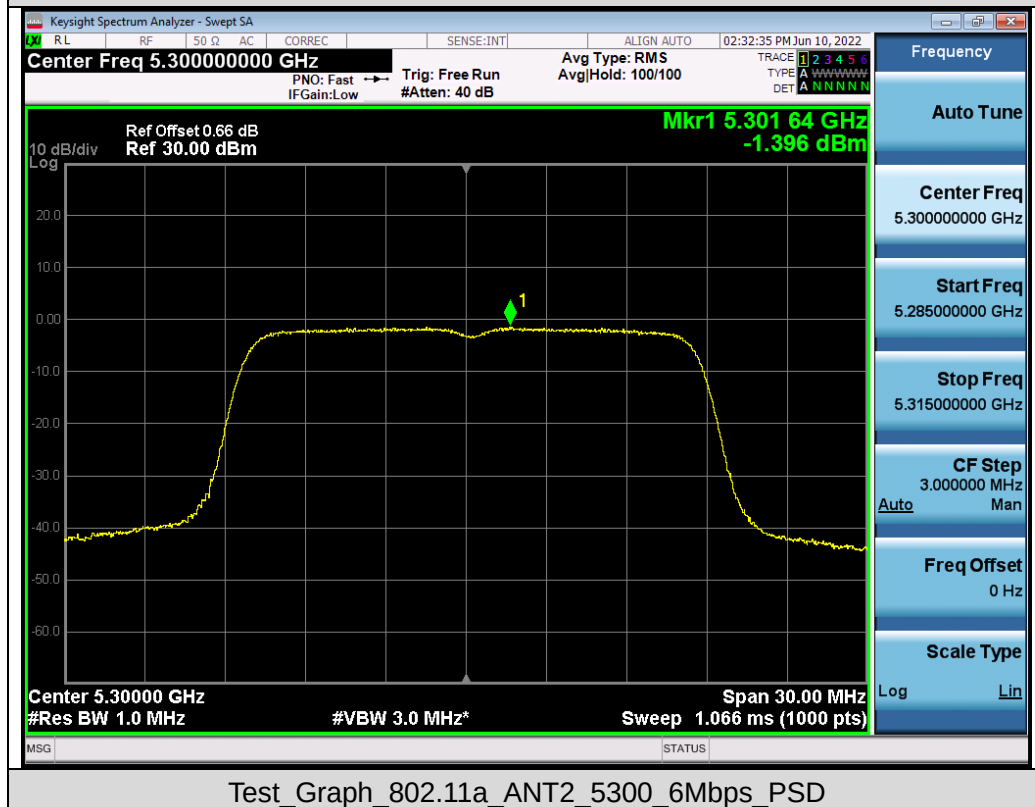
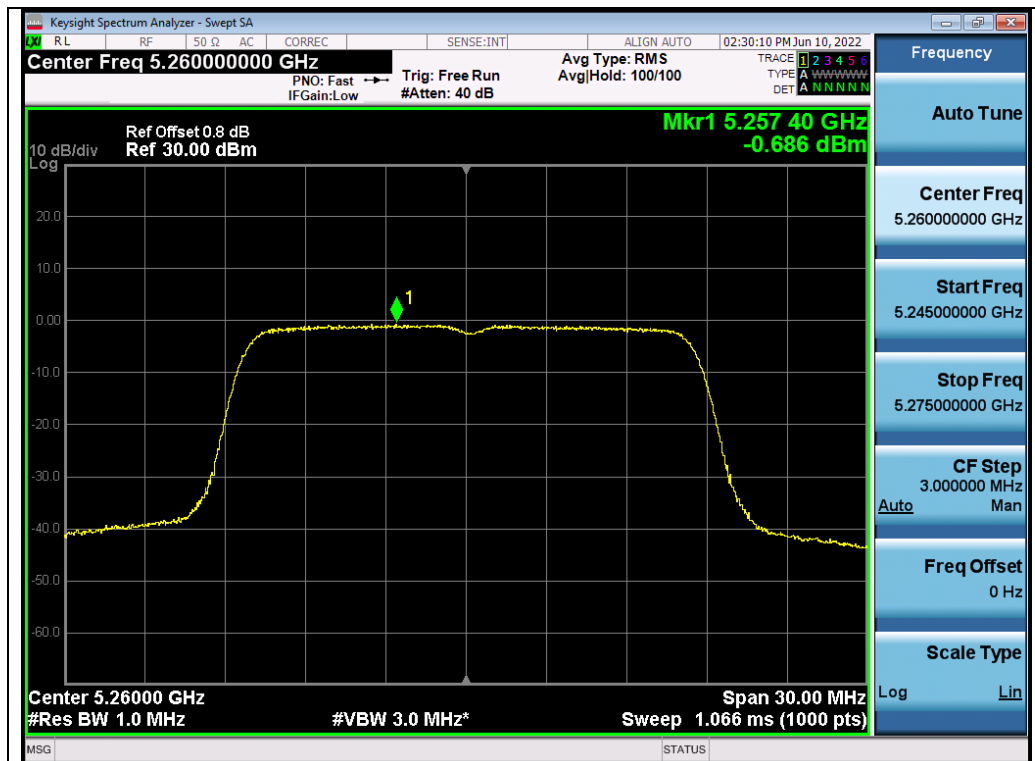
Test\_Graph\_802.11n20\_ANT1\_5300\_MCS0\_PSD



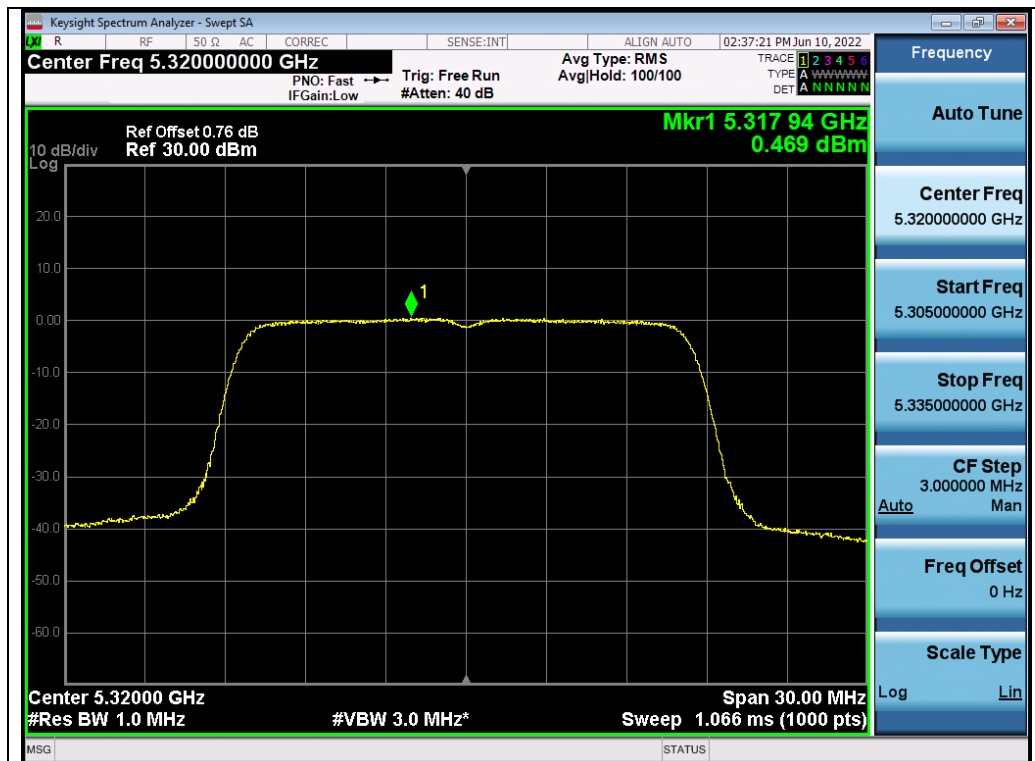
Test\_Graph\_802.11n20\_ANT1\_5320\_MCS0\_PSD

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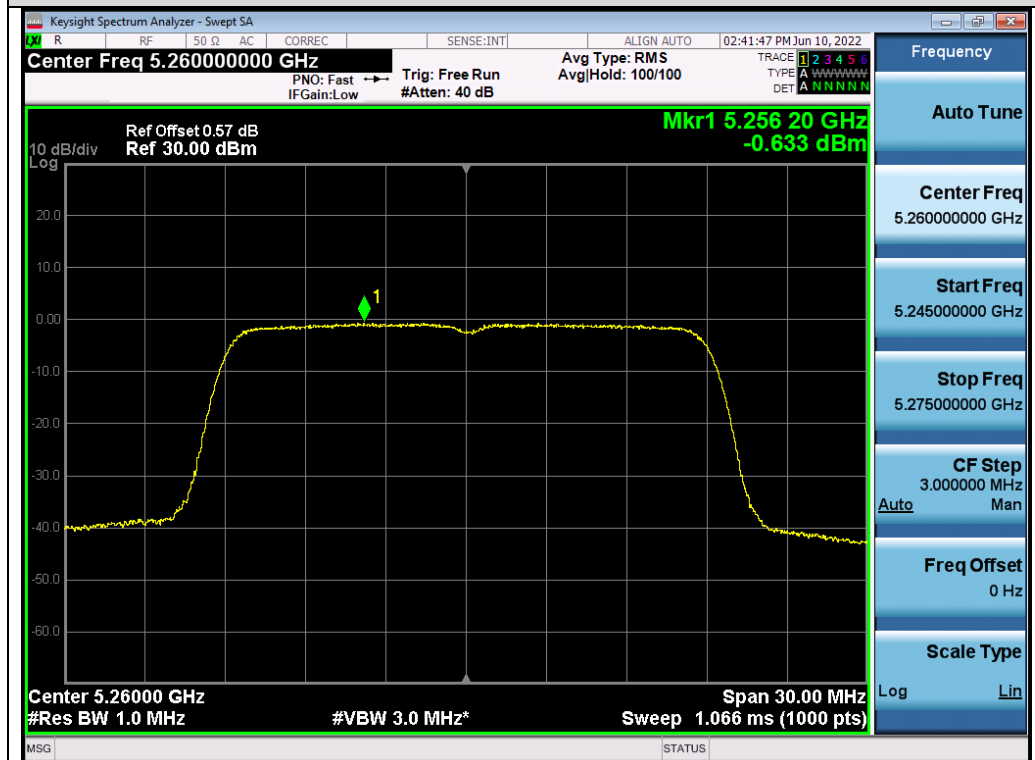




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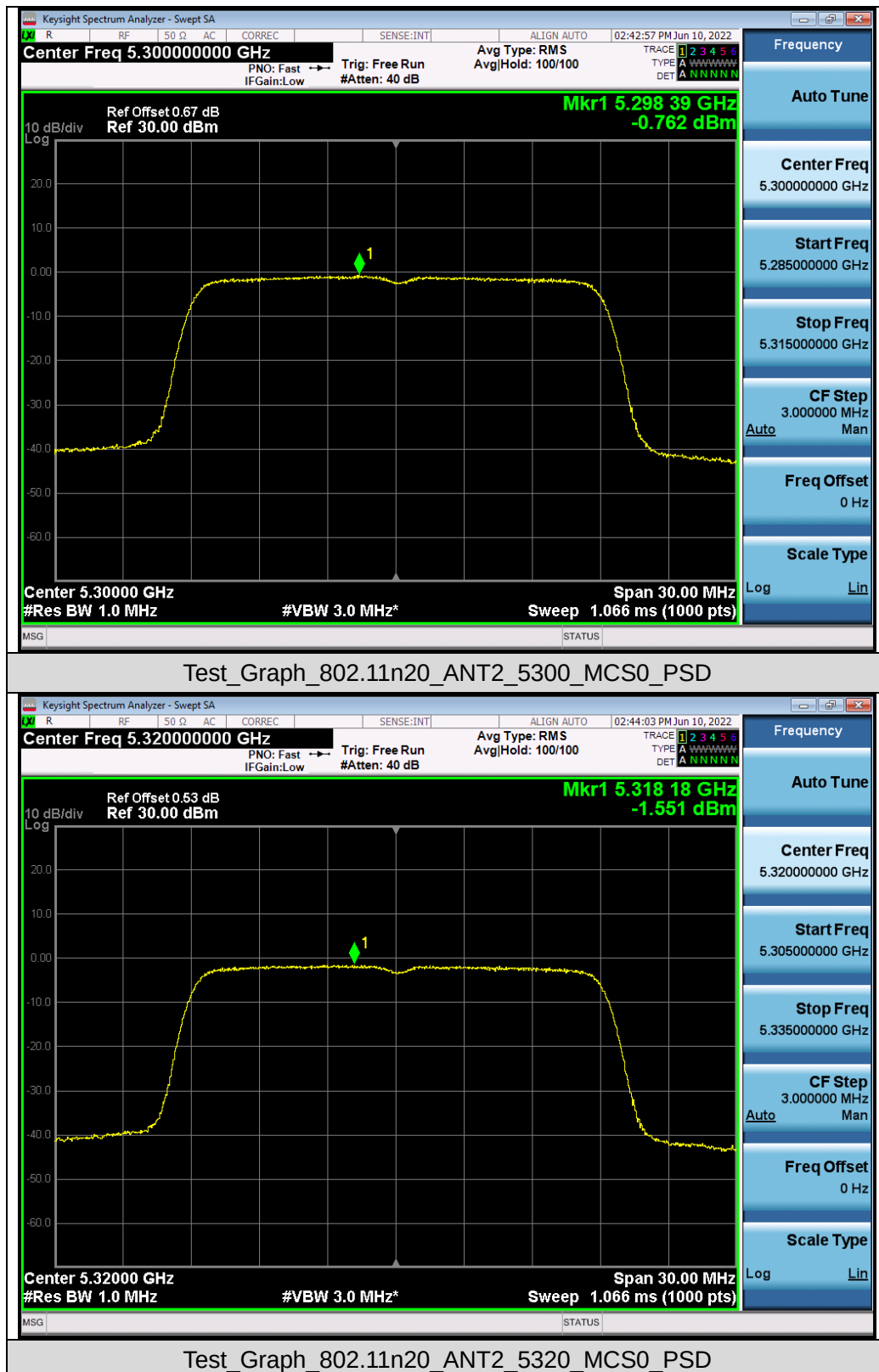


Test\_Graph\_802.11a\_ANT2\_5320\_6Mbps\_PSD



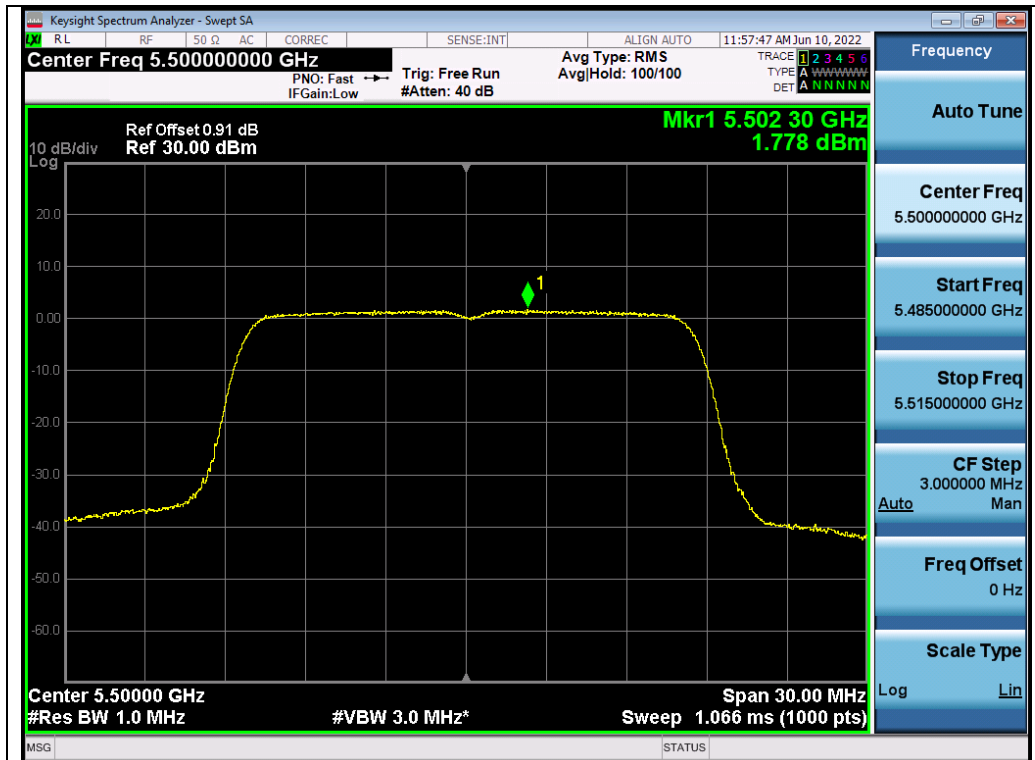
Test\_Graph\_802.11n20\_ANT2\_5260\_MCS0\_PSD

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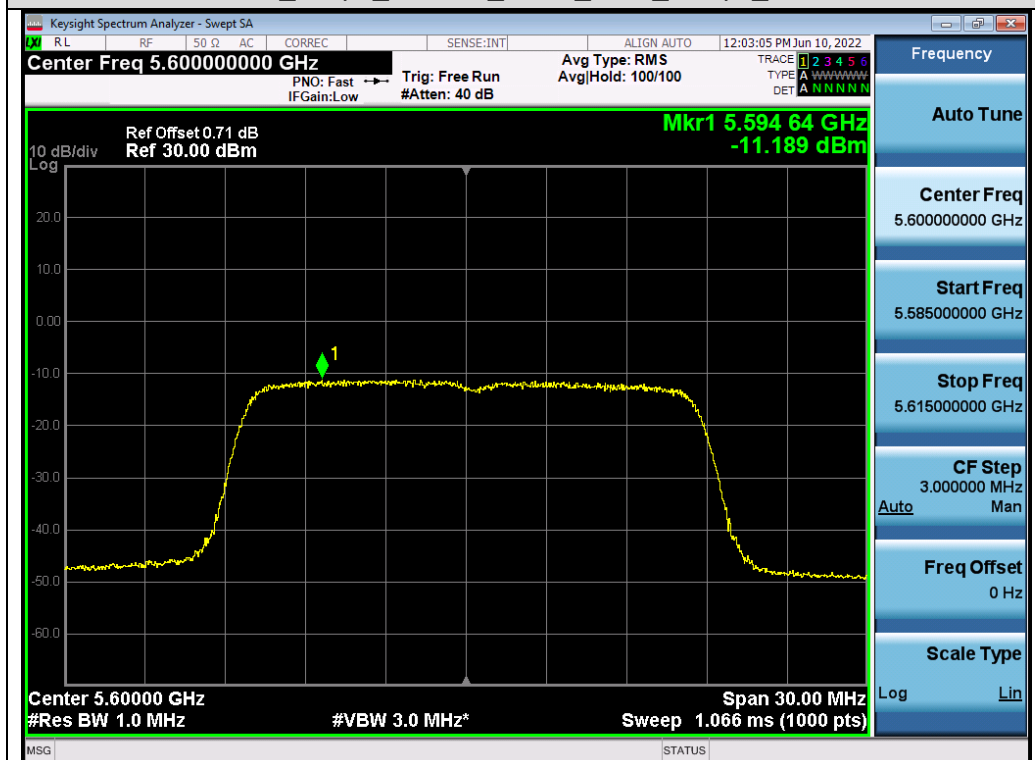


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### Test Graphs of Conducted Output Power Spectral Density for band 5.47-5.725 GHz

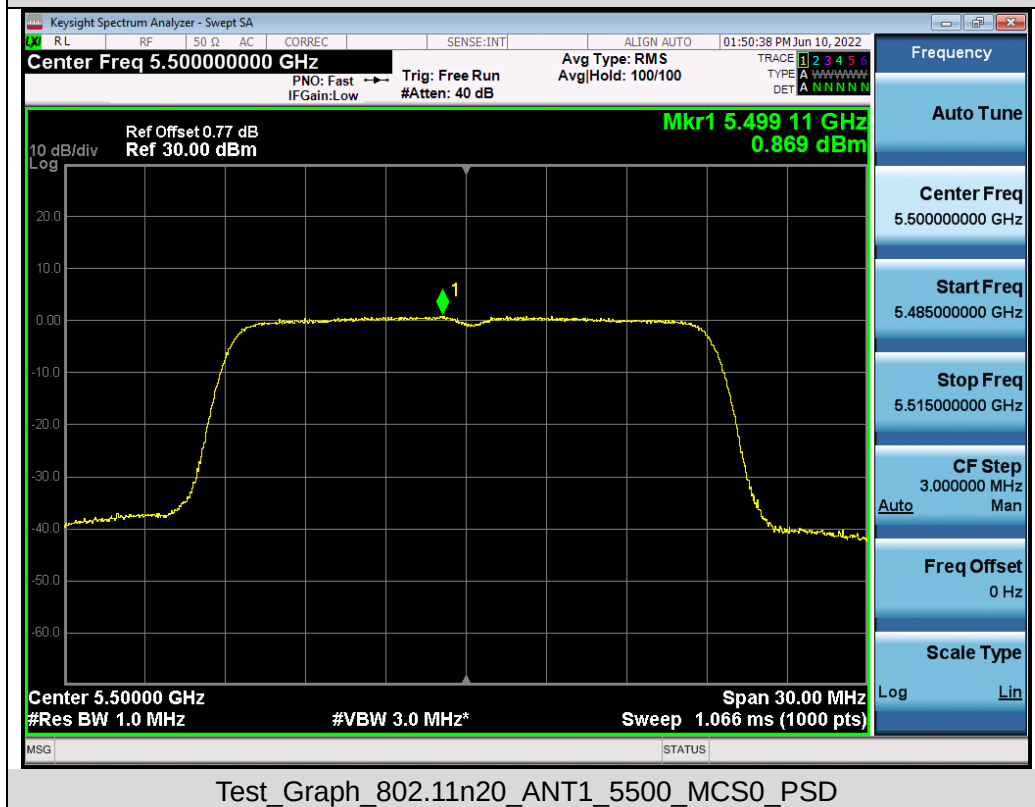


Test\_Graph\_802.11a\_ANT1\_5500\_6Mbps\_PSD



Test\_Graph\_802.11a\_ANT1\_5600\_6Mbps\_PSD

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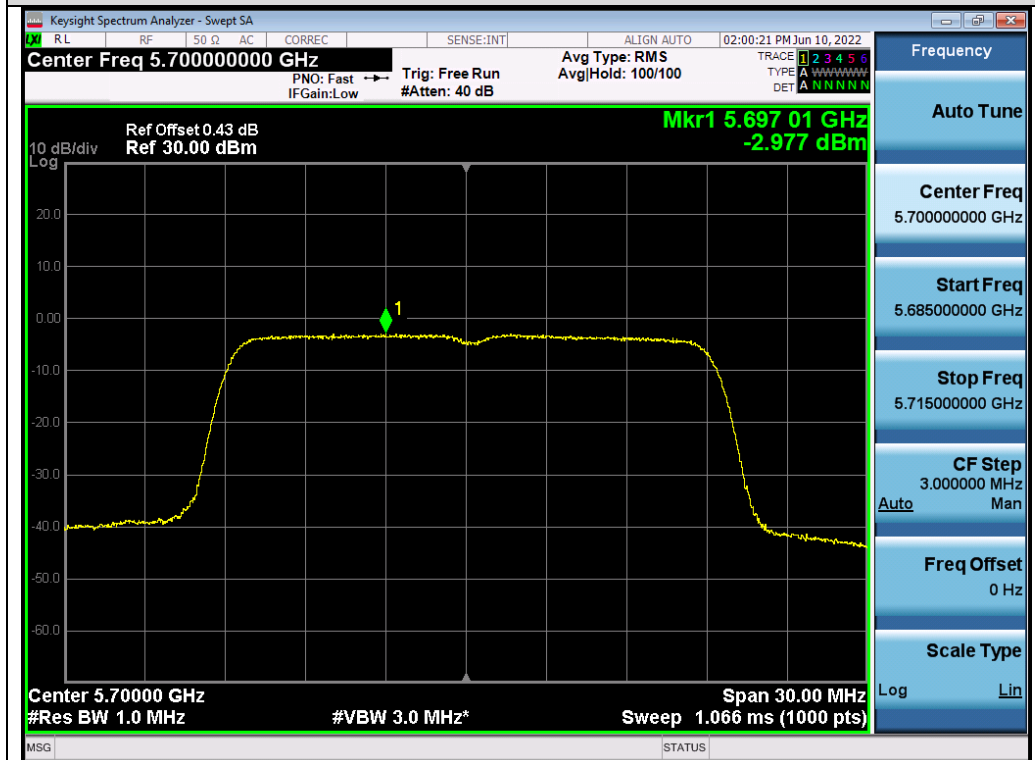


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Test\_Graph\_802.11n20\_ANT1\_5600\_MCS0\_PSD



Test\_Graph\_802.11n20\_ANT1\_5700\_MCS0\_PSD

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Test\_Graph\_802.11a\_ANT2\_5500\_6Mbps\_PSD

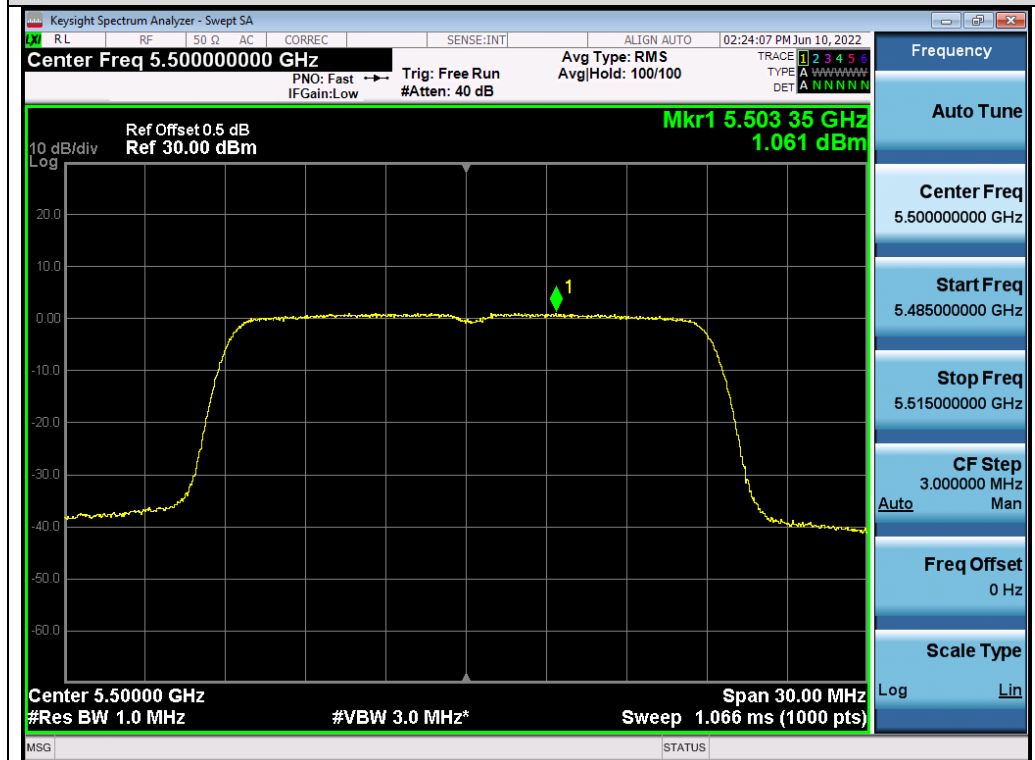


Test\_Graph\_802.11a\_ANT2\_5600\_6Mbps\_PSD

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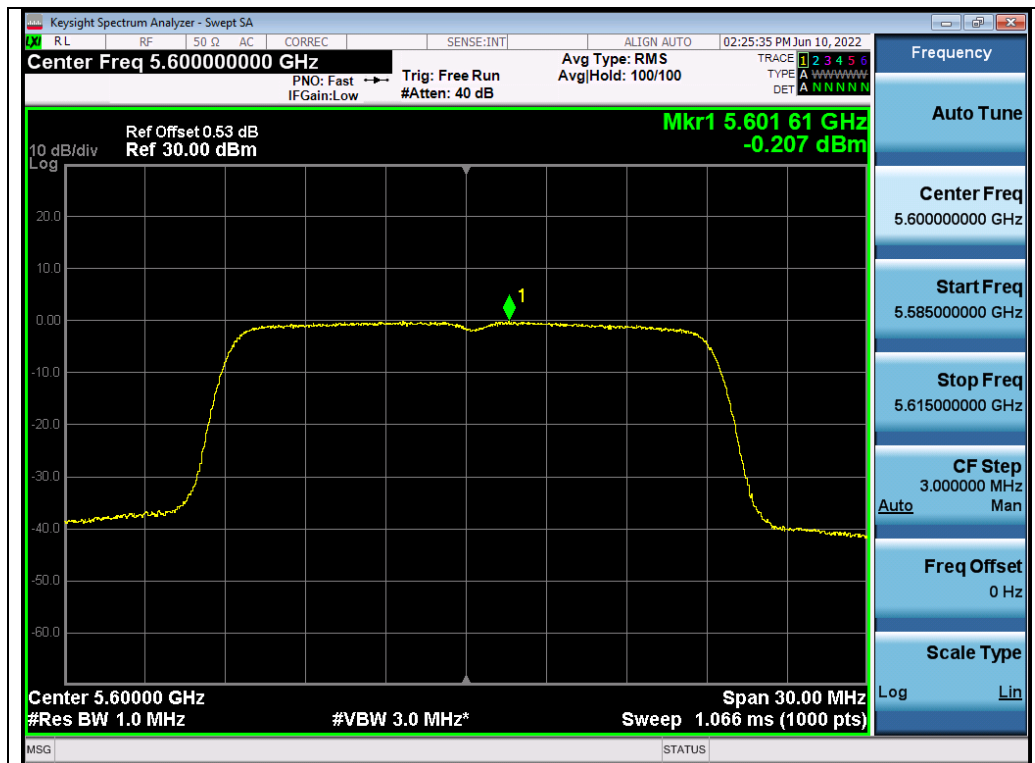


Test\_Graph\_802.11a\_ANT2\_5700\_6Mbps\_PSD

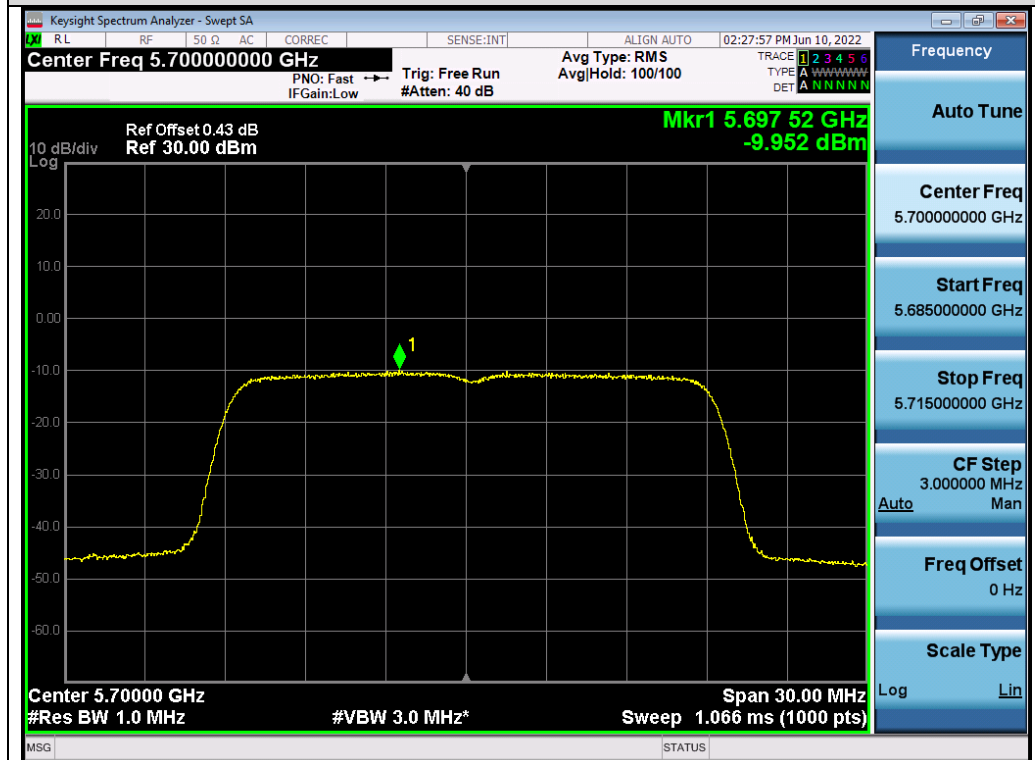


Test\_Graph\_802.11n20\_ANT2\_5500\_MCS0\_PSD

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Test\_Graph\_802.11n20\_ANT2\_5600\_MCS0\_PSD



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## 10. CONDUCTED SPURIOUS EMISSION

### 10.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Trace 1 Max hold, then View.

**Note:** The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

### 10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 8.2.

### 10.3. MEASUREMENT EQUIPMENT USED

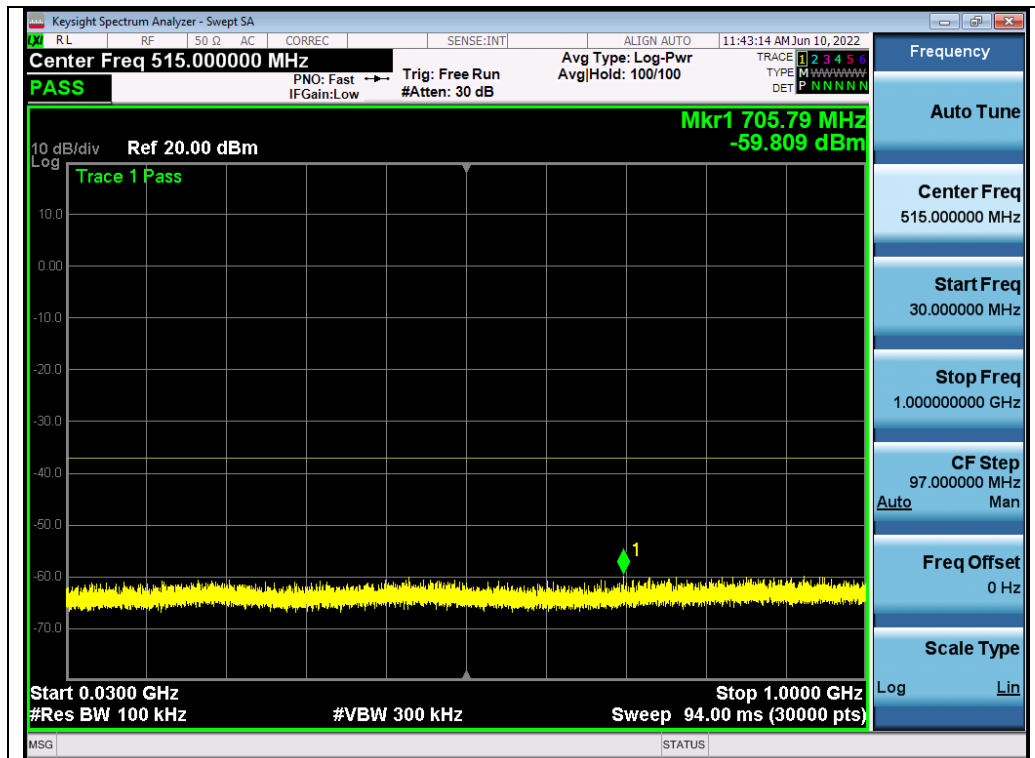
The same as described in section 6.

### 10.4. LIMITS AND MEASUREMENT RESULT

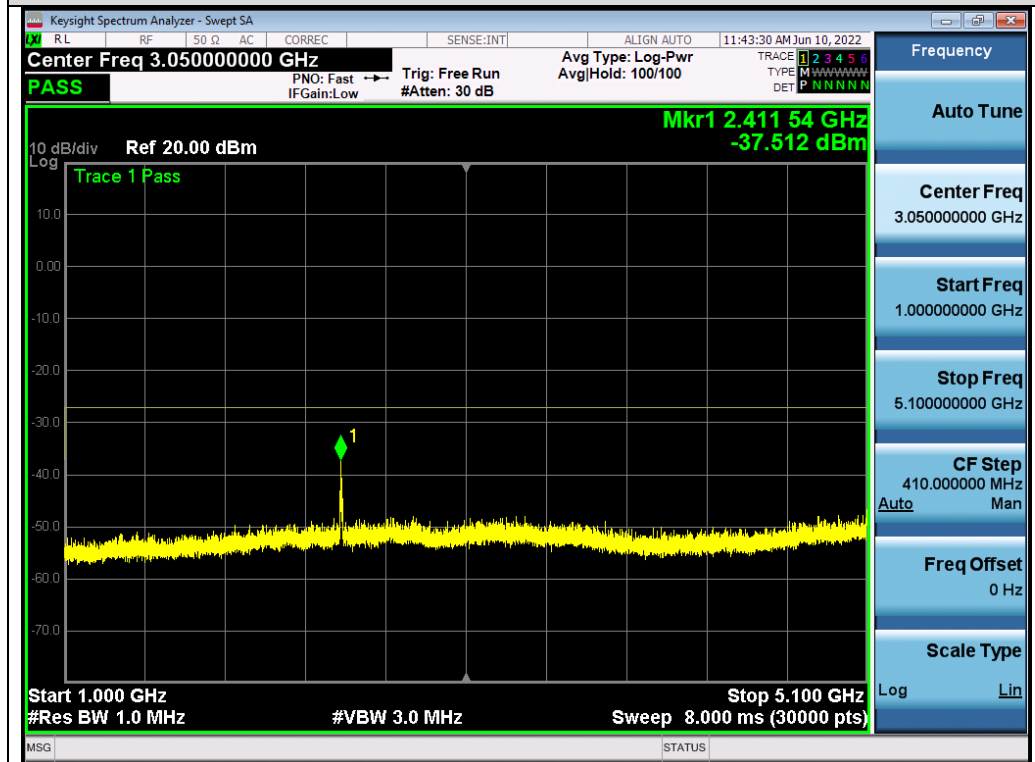
| LIMITS AND MEASUREMENT RESULT                                                                                                                                                                                                                                                                                                                                                                                                   |                    |          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|
| Applicable Limits                                                                                                                                                                                                                                                                                                                                                                                                               | Measurement Result |          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                 | Test channel       | Criteria |
| -27dBm/MHz                                                                                                                                                                                                                                                                                                                                                                                                                      | 5150MHz-5250MHz    | PASS     |
| All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. | 5725MHz-5850MHz    | PASS     |

Note: All the 20MHz bandwidth modulation had been tested, the 802.11a20 was the worst case and record in his test report. All the 40MHz bandwidth modulation had been tested, the 802.11N40 was the worst case and record in his test report. All the 80MHz bandwidth modulation had been tested, the 802.11AC80 was the worst case and record in his test report.

## Test Graphs of Spurious Emissions outside of the 5.15-5.35 GHz band for transmitters operating in the 5.25-5.35 GHz band

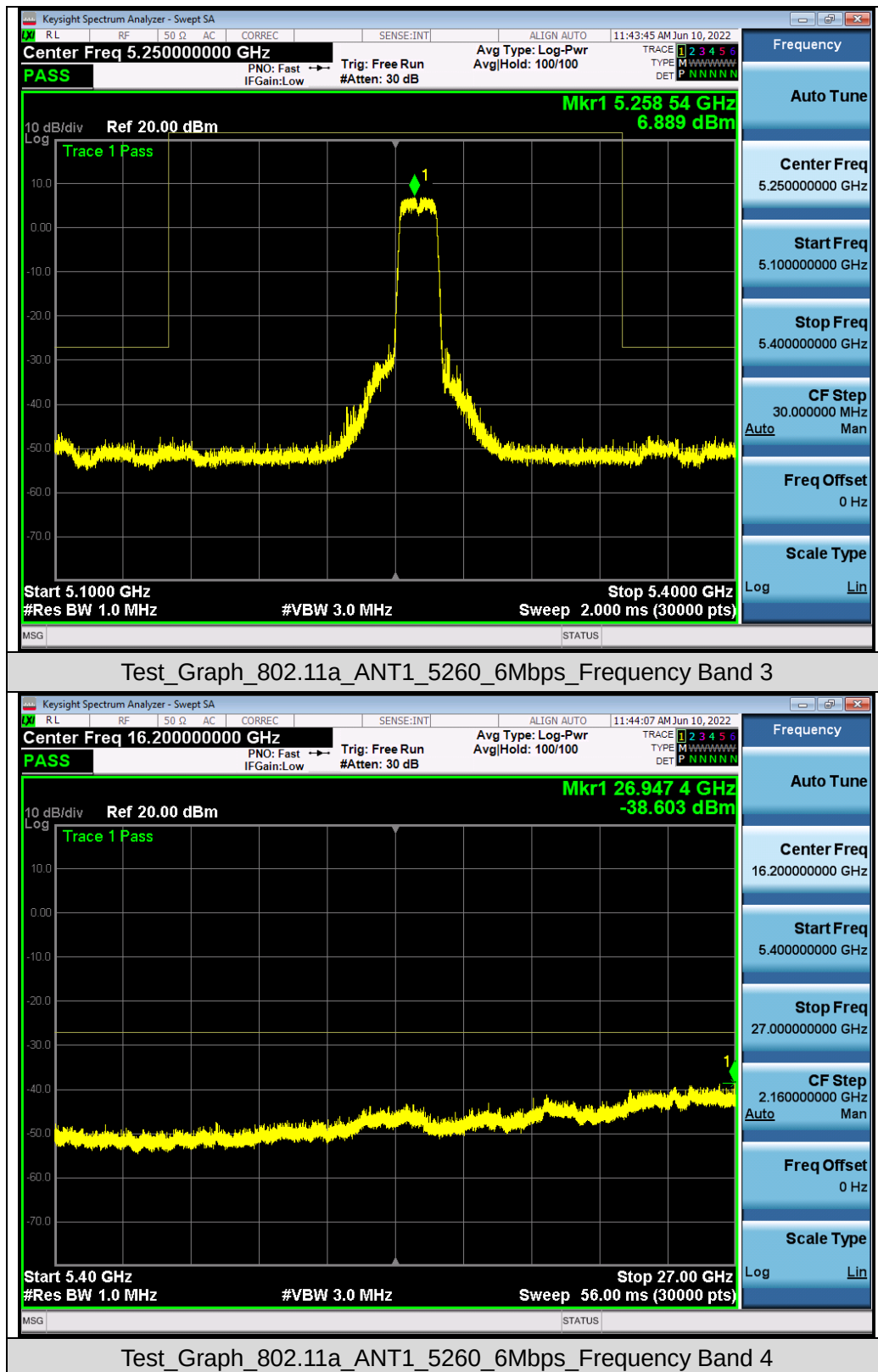


Test\_Graph\_802.11a\_ANT1\_5260\_6Mbps\_Frequency Band 1



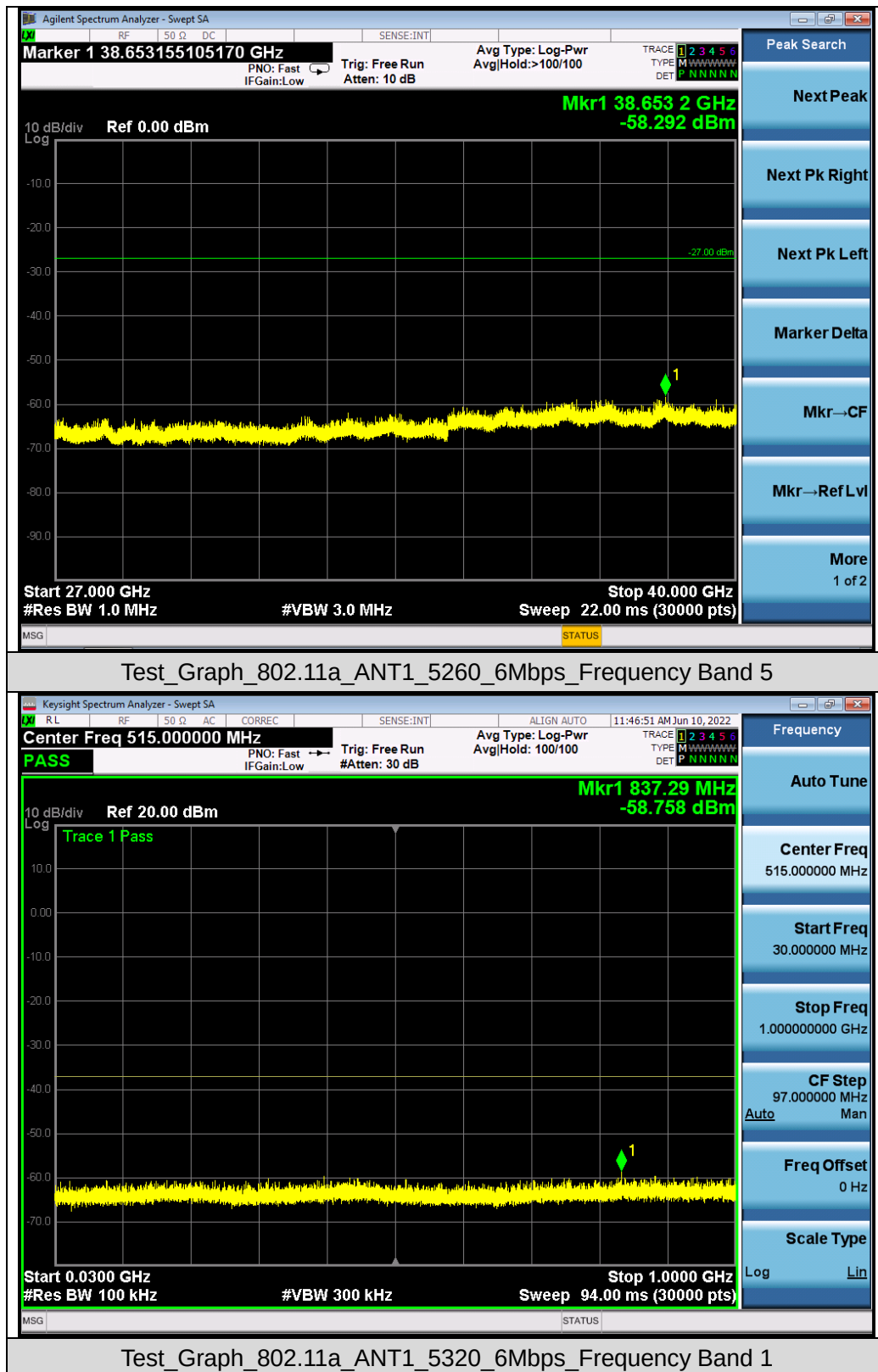
Test\_Graph\_802.11a\_ANT1\_5260\_6Mbps\_Frequency Band 2

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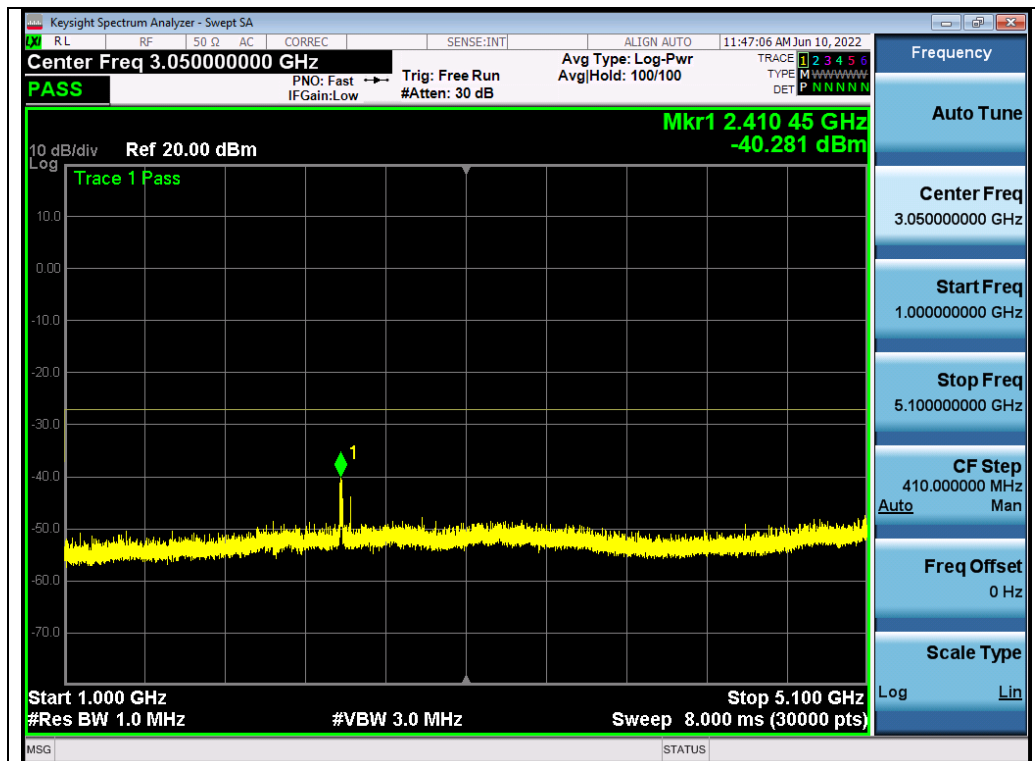


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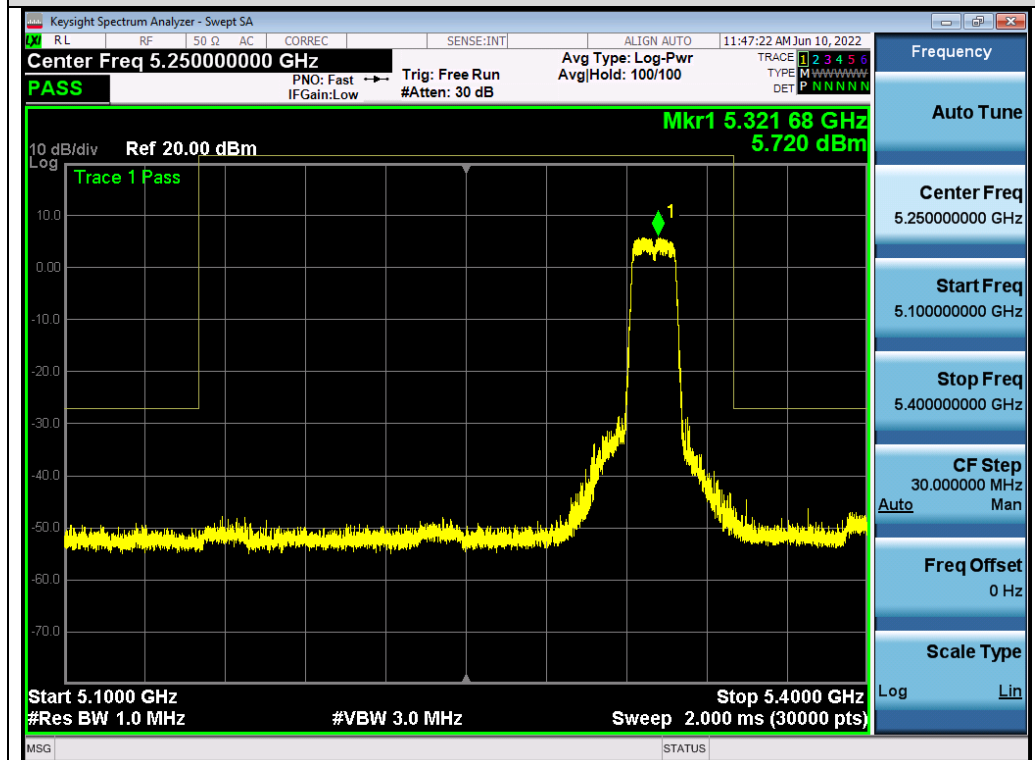




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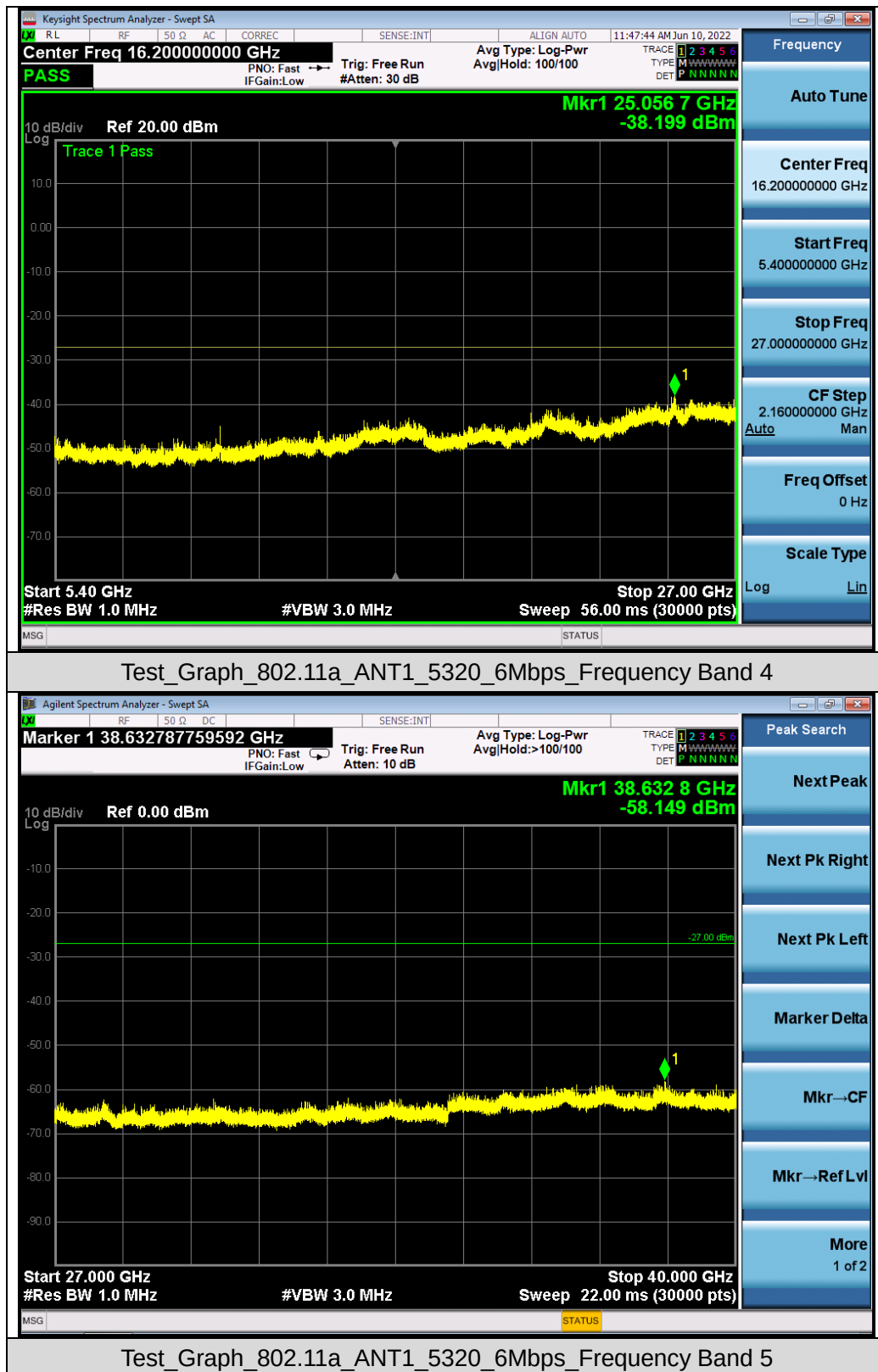


Test\_Graph\_802.11a\_ANT1\_5320\_6Mbps\_Frequency Band 2



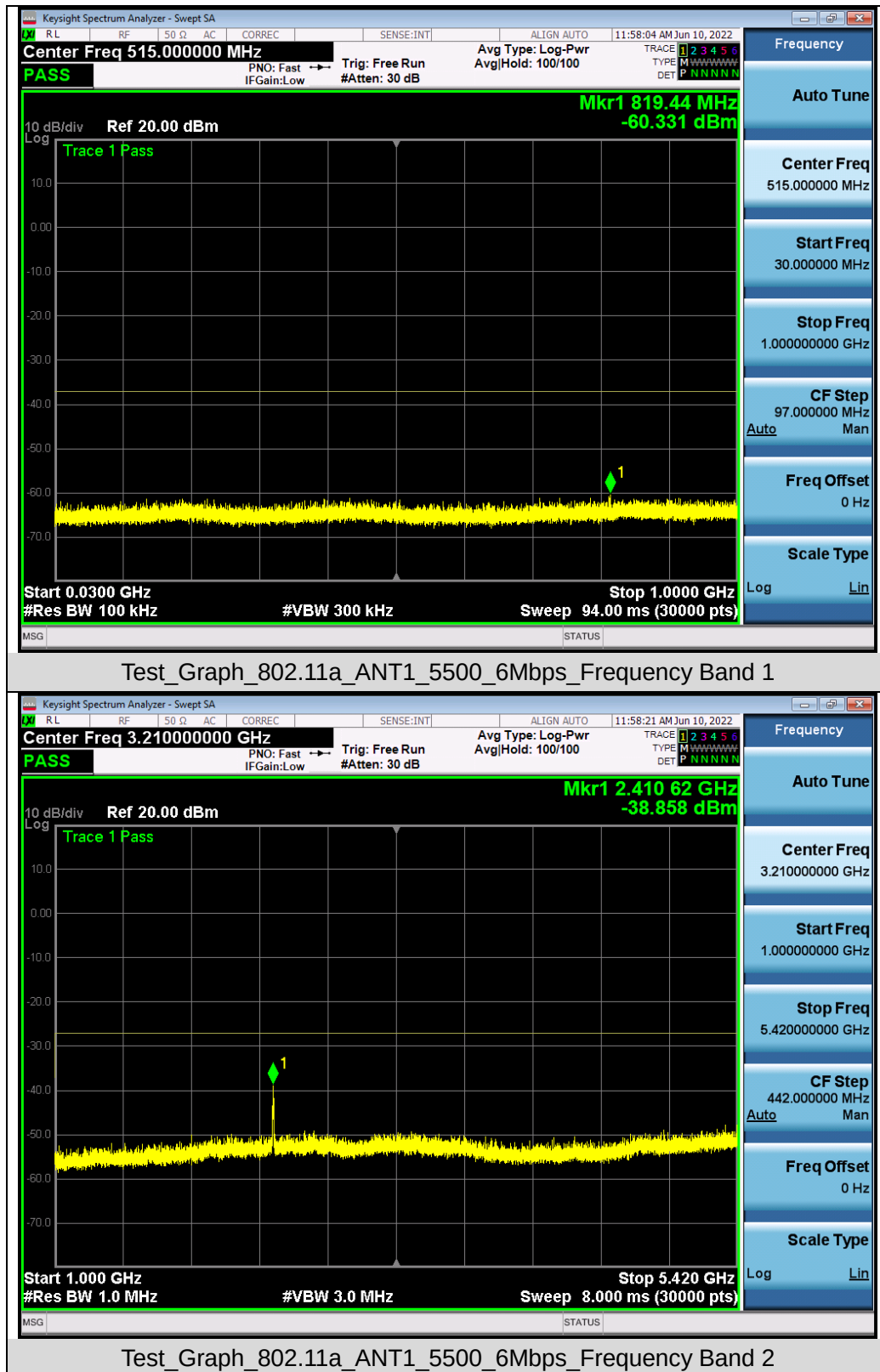
Test\_Graph\_802.11a\_ANT1\_5320\_6Mbps\_Frequency Band 3

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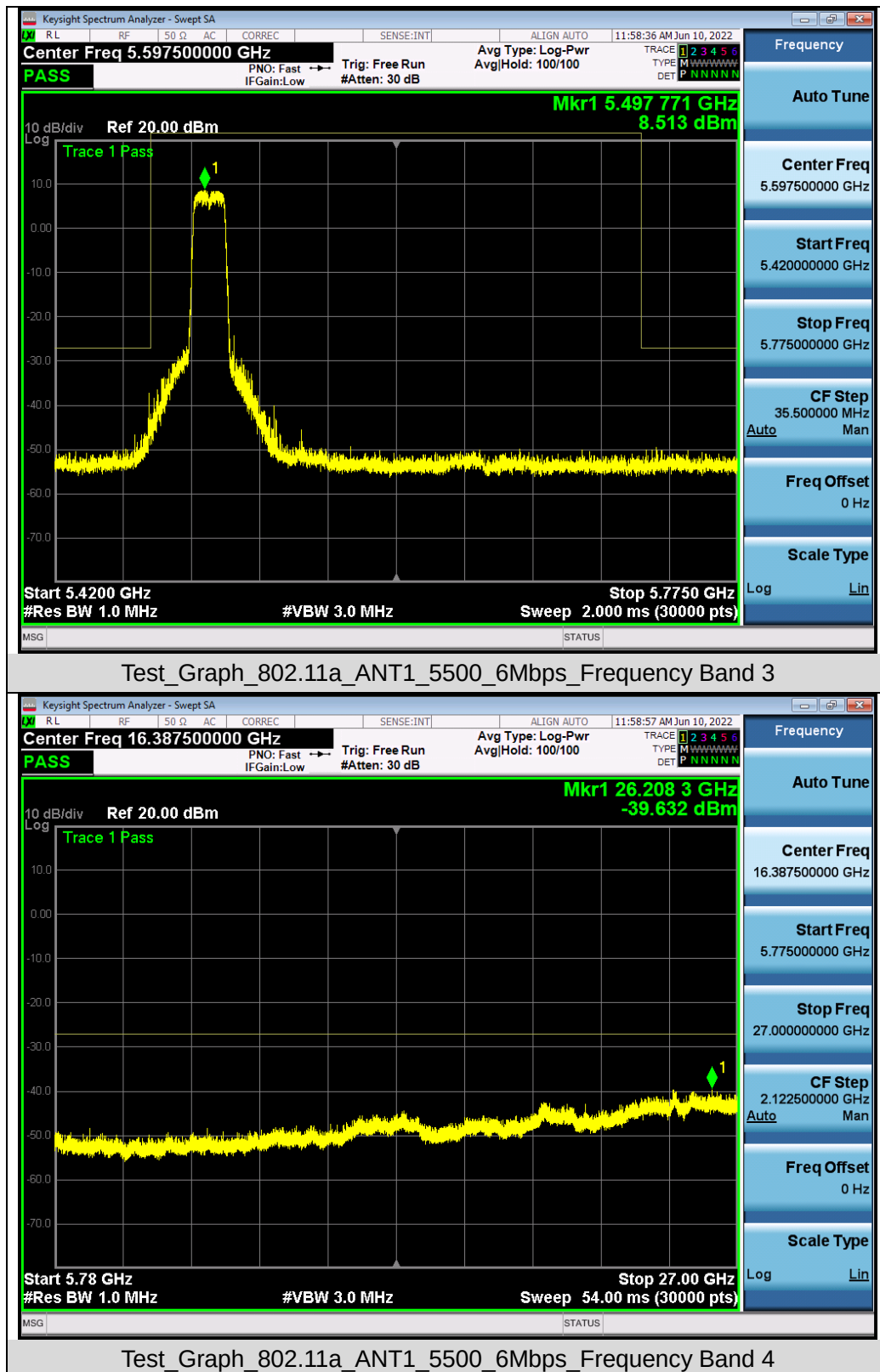


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## Test Graphs of Spurious Emissions outside of the 5.47-5.725 GHz band for transmitters operating in the 5.47-5.725 GHz band

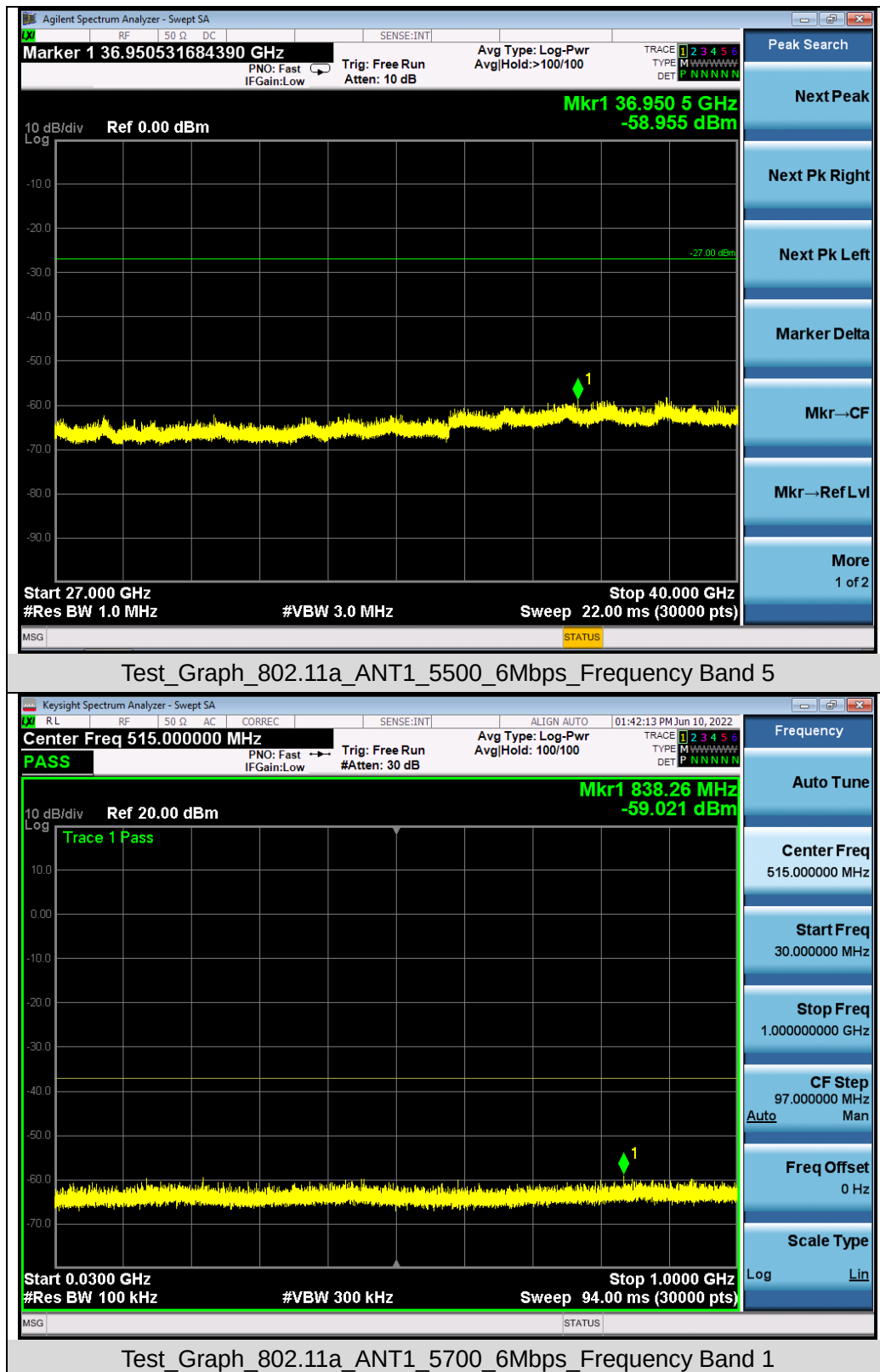


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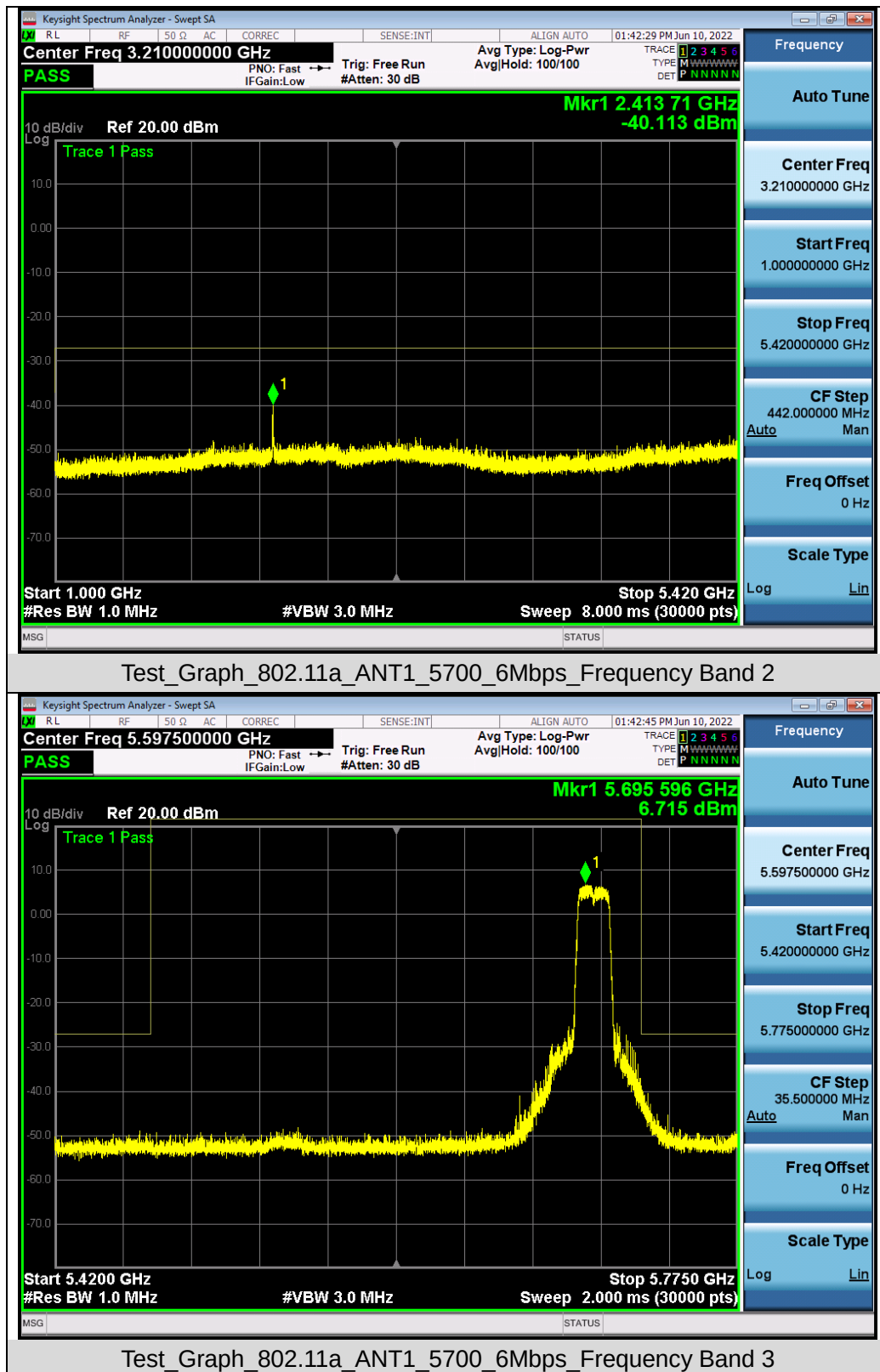
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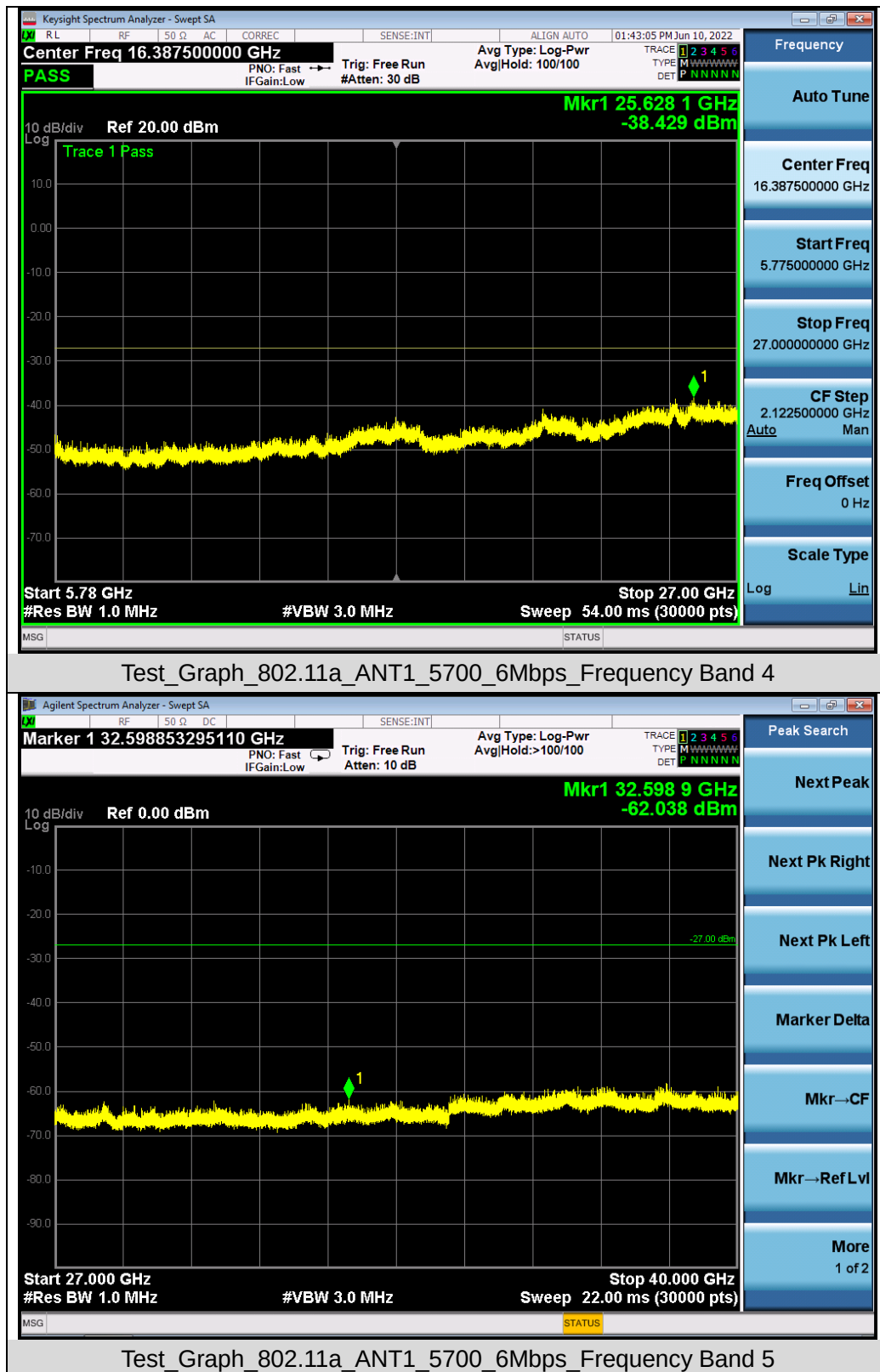


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Note: All the antennas have been pre-tested, and all modes of each antenna are tested. The antenna 1 in 802.11a mode is the worst case and recorded in the test report. For the 802.11n, the worst case Antenna 1 has more than 3dB margins, so the MIMO mode also compliance the limit.

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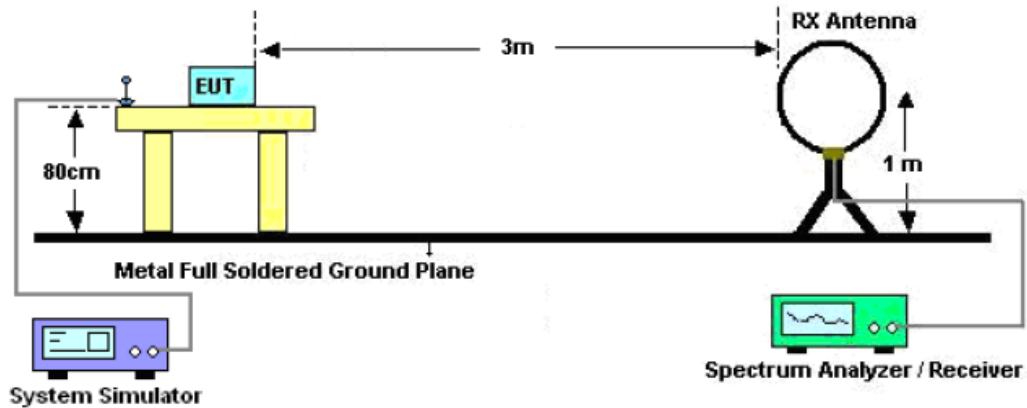
## 11. RADIATED EMISSION

### 11.1. MEASUREMENT PROCEDURE

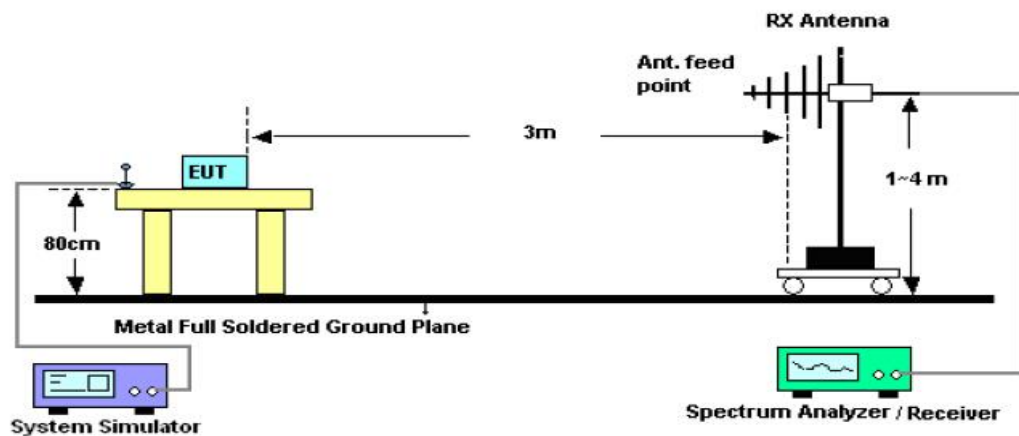
1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3M VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

## 11.2. TEST SETUP

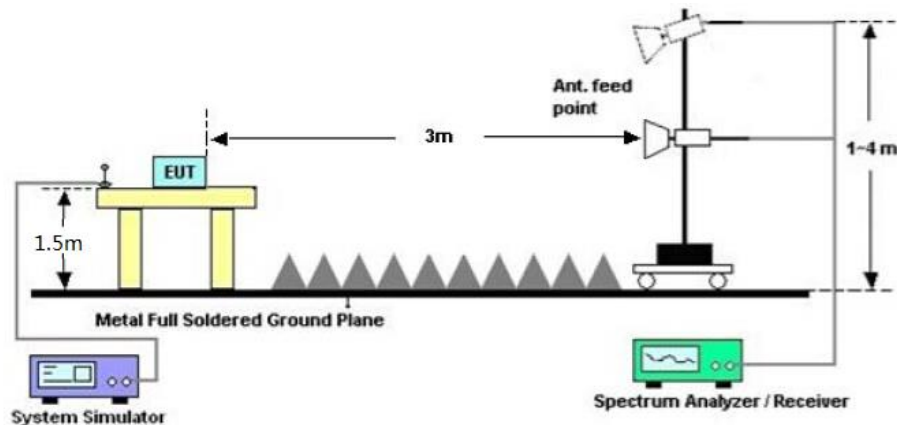
### Radiated Emission Test-Setup Frequency Below 30MHz



### RADIATED EMISSION TEST SETUP 30MHz-1000MHz



### RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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