



**FCC 47 CFR PART 15 SUBPART E**

**UNII**

**CERTIFICATION TEST REPORT**

**FOR**

**GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n, ANT+ and NFC**

**MODEL NUMBER : SM-A605FN/DS, SM-A605FN, SM-A605X**

**FCC ID: A3LSMA605FN**

**REPORT NUMBER: 4788372835-E4V3**

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**TL-637**

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## TABLE OF CONTENTS

|                                               |           |
|-----------------------------------------------|-----------|
| <b>1. ATTESTATION OF TEST RESULTS</b>         | <b>6</b>  |
| <b>2. TEST METHODOLOGY</b>                    | <b>7</b>  |
| <b>3. FACILITIES AND ACCREDITATION</b>        | <b>7</b>  |
| <b>4. CALIBRATION AND UNCERTAINTY</b>         | <b>7</b>  |
| 4.1. MEASURING INSTRUMENT CALIBRATION         | 7         |
| 4.2. SAMPLE CALCULATION                       | 7         |
| 4.3. MEASUREMENT UNCERTAINTY                  | 8         |
| <b>5. EQUIPMENT UNDER TEST</b>                | <b>9</b>  |
| 5.1. DESCRIPTION OF EUT                       | 9         |
| 5.2. MAXIMUM OUTPUT POWER                     | 9         |
| 5.3. DESCRIPTION OF AVAILABLE ANTENNAS        | 10        |
| 5.4. WORST-CASE CONFIGURATION AND MODE        | 10        |
| 5.5. DESCRIPTION OF TEST SETUP                | 11        |
| <b>6. TEST AND MEASUREMENT EQUIPMENT</b>      | <b>13</b> |
| <b>7. SUMMARY TABLE</b>                       | <b>14</b> |
| <b>8. MEASUREMENT METHODS</b>                 | <b>15</b> |
| <b>9. REFERENCE MEASUREMENTS RESULTS</b>      | <b>16</b> |
| 9.1. ON TIME AND DUTY CYCLE RESULTS           | 16        |
| 9.2. DUTY CYCLE PLOTS                         | 16        |
| 9.3. 26 dB BANDWIDTH                          | 18        |
| 9.3.1. 802.11a MODE IN THE 5.2 GHz BAND       | 18        |
| 9.3.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND  | 18        |
| 9.3.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND  | 18        |
| 9.3.4. 802.11a MODE IN THE 5.3 GHz BAND       | 19        |
| 9.3.5. 802.11n HT20 MODE IN THE 5.3 GHz BAND  | 19        |
| 9.3.6. 802.11n HT40 MODE IN THE 5.3 GHz BAND  | 19        |
| 9.3.7. 802.11a MODE IN THE 5.5 GHz BAND       | 19        |
| 9.3.8. 802.11n HT20 MODE IN THE 5.5 GHz BAND  | 19        |
| 9.3.9. 802.11n HT40 MODE IN THE 5.5 GHz BAND  | 20        |
| 9.3.10. 802.11a MODE IN THE 5.8 GHz BAND      | 20        |
| 9.3.11. 802.11n HT20 MODE IN THE 5.8 GHz BAND | 20        |
| 9.3.12. 802.11n HT40 MODE IN THE 5.8 GHz BAND | 20        |
| 9.3.13. 26 dB BANDWIDTH PLOTS                 | 21        |
| 9.4. 99% BANDWIDTH                            | 33        |

|            |                                                          |           |
|------------|----------------------------------------------------------|-----------|
| 9.4.1.     | 802.11a MODE IN THE 5.2 GHz BAND .....                   | 33        |
| 9.4.2.     | 802.11n HT20 MODE IN THE 5.2 GHz BAND .....              | 33        |
| 9.4.3.     | 802.11n HT40 MODE IN THE 5.2 GHz BAND .....              | 33        |
| 9.4.4.     | 802.11a MODE IN THE 5.3 GHz BAND .....                   | 34        |
| 9.4.5.     | 802.11n HT20 MODE IN THE 5.3 GHz BAND .....              | 34        |
| 9.4.6.     | 802.11n HT40 MODE IN THE 5.3 GHz BAND .....              | 34        |
| 9.4.7.     | 802.11a MODE IN THE 5.5 GHz BAND .....                   | 34        |
| 9.4.8.     | 802.11n HT20 MODE IN THE 5.5 GHz BAND .....              | 35        |
| 9.4.9.     | 802.11n HT40 MODE IN THE 5.5 GHz BAND .....              | 35        |
| 9.4.10.    | 802.11a MODE IN THE 5.8 GHz BAND .....                   | 35        |
| 9.4.11.    | 802.11n HT20 MODE IN THE 5.8 GHz BAND .....              | 35        |
| 9.4.12.    | 802.11n HT40 MODE IN THE 5.8 GHz BAND .....              | 35        |
| 9.4.13.    | 99% BANDWIDTH PLOTS .....                                | 36        |
| <b>10.</b> | <b>ANTENNA PORT TEST RESULTS .....</b>                   | <b>48</b> |
| 10.1.      | 6 dB BANDWIDTH .....                                     | 48        |
| 10.1.1.    | 802.11a MODE IN THE 5.8 GHz BAND .....                   | 48        |
| 10.1.2.    | 802.11n HT20 MODE IN THE 5.8 GHz BAND .....              | 48        |
| 10.1.3.    | 802.11n HT40 MODE IN THE 5.8 GHz BAND .....              | 48        |
| 10.1.4.    | 6 dB BANDWIDTH PLOTS .....                               | 49        |
| 10.2.      | OUTPUT POWER AND PPSD .....                              | 52        |
| 10.2.1.    | 802.11a MODE IN THE 5.2 GHz BAND .....                   | 53        |
| 10.2.2.    | 802.11n HT20 MODE IN THE 5.2 GHz BAND .....              | 54        |
| 10.2.3.    | 802.11n HT40 MODE IN THE 5.2 GHz BAND .....              | 55        |
| 10.2.4.    | 802.11a MODE IN THE 5.3 GHz BAND .....                   | 56        |
| 10.2.5.    | 802.11n HT20 MODE IN THE 5.3 GHz BAND .....              | 57        |
| 10.2.6.    | 802.11n HT40 MODE IN THE 5.3 GHz BAND .....              | 58        |
| 10.2.7.    | 802.11a MODE IN THE 5.5 GHz BAND .....                   | 59        |
| 10.2.8.    | 802.11n HT20 MODE IN THE 5.5 GHz BAND .....              | 60        |
| 10.2.9.    | 802.11n HT40 MODE IN THE 5.5 GHz BAND .....              | 61        |
| 10.2.10.   | 802.11a MODE IN THE 5.8 GHz BAND .....                   | 62        |
| 10.2.11.   | 802.11n HT20 MODE IN THE 5.8 GHz BAND .....              | 63        |
| 10.2.12.   | 802.11n HT40 MODE IN THE 5.8 GHz BAND .....              | 64        |
| 10.2.13.   | PPSD PLOTS .....                                         | 65        |
| <b>11.</b> | <b>TRANSMITTER ABOVE 1 GHz .....</b>                     | <b>77</b> |
| 11.1.      | 5.2 GHz .....                                            | 79        |
| 11.1.1.    | TX Above 1GHz 802.11a MODE IN THE 5.2GHz BAND .....      | 79        |
| 11.1.2.    | TX Above 1GHz 802.11n HT20 MODE IN THE 5.2GHz BAND ..... | 87        |
| 11.1.3.    | TX Above 1GHz 802.11n HT40 MODE IN THE 5.2GHz BAND ..... | 95        |
| 11.2.      | 5.3 GHz .....                                            | 101       |
| 11.2.1.    | TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND .....    | 101       |
| 11.2.2.    | TX ABOVE 1GHz 802.11n HT20 MODE IN THE 5.3GHz BAND ..... | 109       |
| 11.2.3.    | TX ABOVE 1GHz 802.11n HT40 MODE IN THE 5.3GHz BAND ..... | 117       |
| 11.3.      | 5.5-5.6 GHz .....                                        | 123       |
| 11.3.1.    | TX ABOVE 1 GHz 802.11a MODE IN THE 5.5 GHz BAND .....    | 123       |
| 11.3.2.    | TX ABOVE 1GHz 802.11n HT20 MODE IN THE 5.5GHz BAND ..... | 133       |
| 11.3.3.    | TX ABOVE 1GHz 802.11n HT40 MODE IN THE 5.5GHz BAND ..... | 143       |

|         |                                                          |            |
|---------|----------------------------------------------------------|------------|
| 11.4.   | 5.8 GHz.....                                             | 153        |
| 11.4.1. | TX ABOVE 1GHz 802.11a MODE IN THE 5.8GHz BAND .....      | 153        |
| 11.4.2. | TX ABOVE 1GHz 802.11n HT20 MODE IN THE 5.8GHz BAND ..... | 163        |
| 11.4.3. | TX ABOVE 1GHz 802.11n HT40 MODE IN THE 5.8GHz BAND ..... | 173        |
| 12.     | <b>WORST-CASE BELOW 1 GHz (in the 5.3 GHz Band).....</b> | <b>181</b> |
| 13.     | <b>AC POWER LINE CONDUCTED EMISSIONS.....</b>            | <b>183</b> |
| 14.     | <b>DYNAMIC FREQUENCY SELECTION.....</b>                  | <b>186</b> |
| 14.1.   | <i>OVERVIEW.....</i>                                     | <i>186</i> |
| 14.1.1. | LIMITS.....                                              | 186        |
| 14.1.1. | TEST AND MEASUREMENT SYSTEM .....                        | 190        |
| 14.1.2. | SETUP OF EUT .....                                       | 193        |
| 14.1.3. | DESCRIPTION OF EUT.....                                  | 194        |
| 14.2.   | <i>RESULTS FOR 20 MHz BANDWIDTH.....</i>                 | <i>195</i> |
| 14.2.1. | TEST CHANNEL .....                                       | 195        |
| 14.2.2. | RADAR WAVEFORM AND TRAFFIC .....                         | 195        |
| 14.2.3. | OVERLAPPING CHANNEL TESTS .....                          | 197        |
| 14.2.4. | MOVE AND CLOSING TIME .....                              | 197        |
| 14.3.   | <i>RESULTS FOR 40 MHz BANDWIDTH.....</i>                 | <i>200</i> |
| 14.3.1. | TEST CHANNEL .....                                       | 200        |
| 14.3.2. | RADAR WAVEFORM AND TRAFFIC .....                         | 200        |
| 14.3.3. | OVERLAPPING CHANNEL TESTS .....                          | 202        |
| 14.3.4. | MOVE AND CLOSING TIME .....                              | 202        |
| 15.     | <b>SETUP PHOTOS.....</b>                                 | <b>205</b> |

## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.

**EUT DESCRIPTION:** GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n, ANT+ and NFC

**MODEL NUMBER:** SM-A605FN/DS, SM-A605FN, SM-A600X

**SERIAL NUMBER:** R38K108QG5F, R38K104R4WF (RADIATED);  
R38K104QEYH (CONDUCTED)

**DATE TESTED:** FEB 22, 2018 - MAR 12, 2018

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

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

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UL Korea, Ltd.

Tested By:



Junwhan Lee  
Suwon Lab Engineer  
UL Korea, Ltd.

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 789033 D02 General UNII Test Procedures New Rules v02r01
4. KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02
5. KDB 905462 D03 UNII Clients Without Radar Detection New Rules v01r02
6. ANSI C63.10-2013.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

| 218 Maeyeong-ro                     |           |
|-------------------------------------|-----------|
| <input checked="" type="checkbox"/> | Chamber 1 |
| <input type="checkbox"/>            | Chamber 2 |
| <input type="checkbox"/>            | Chamber 3 |

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <http://www.iasonline.org/PDF/TL/TL-637.pdf>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

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

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

### 4.3. MEASUREMENT UNCERTAINTY

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

| PARAMETER                             | UNCERTAINTY |
|---------------------------------------|-------------|
| Conducted Disturbance, 0.15 to 30 MHz | 2.32 dB     |
| Radiated Disturbance, Below 1GHz      | 3.86 dB     |
| Radiated Disturbance, Above 1 GHz     | 5.97 dB     |

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n, ANT+ and NFC.  
This test report addresses the NII (UNII) operational mode.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum total conducted average output power as follows:

| Frequency Range [MHz] | Mode         | Output Power [dBm] | Output Power [mW] |
|-----------------------|--------------|--------------------|-------------------|
| 5180 - 5240           | 802.11a      | 18.40              | 69.18             |
|                       | 802.11n HT20 | 18.00              | 63.10             |
| 5190 - 5230           | 802.11n HT40 | 15.48              | 35.32             |
| 5260 - 5320           | 802.11a      | 18.31              | 67.76             |
|                       | 802.11n HT20 | 18.41              | 69.34             |
| 5270 - 5310           | 802.11n HT40 | 15.04              | 31.92             |
| 5500 - 5700           | 802.11a      | 18.36              | 68.55             |
|                       | 802.11n HT20 | 18.38              | 68.87             |
| 5510 - 5690           | 802.11n HT40 | 15.23              | 33.34             |
| 5745 - 5825           | 802.11a      | 18.19              | 65.92             |
|                       | 802.11n HT20 | 18.09              | 64.42             |
| 5755 - 5795           | 802.11n HT40 | 14.98              | 31.48             |

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an internal antenna, with a maximum gain of:

| Frequency Range<br>[MHz] | Antenna Gain<br>[dBi] |
|--------------------------|-----------------------|
| UNII 1<br>5150 – 5250    | -1.41                 |
| UNII 2A<br>5250 – 5350   | -2.72                 |
| UNII 2C<br>5470 – 5725   | -3.66                 |
| UNII 3<br>5725 – 5850    | -5.64                 |

### 5.4. WORST-CASE CONFIGURATION AND MODE

Radiated emission below 1GHz and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Radiated emission above 1GHz was performed with the EUT set to transmit low/mid/high channels.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that the X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in the X orientation.

Based on the baseline scan, the worst-case data rates were:

802.11a mode: 6 Mbps  
802.11n HT20 mode: MCS0  
802.11n HT40 mode: MCS0

Note : All radiated and power line conducted tests were performed connected with earphone and charger for evaluation of worst case mode.

## 5.5. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

| Support Equipment List |              |            |                |        |
|------------------------|--------------|------------|----------------|--------|
| Description            | Manufacturer | Model      | Serial Number  | FCC ID |
| Charger                | SAMSUNG      | EP-TA50EWE | DW3J719AS/A- E | N/A    |
| Data Cable             | SAMSUNG      | ECB-DU68WE | N/A            | N/A    |
| Earphone               | SAMSUNG      | EHS61ASFWE | N/A            | N/A    |

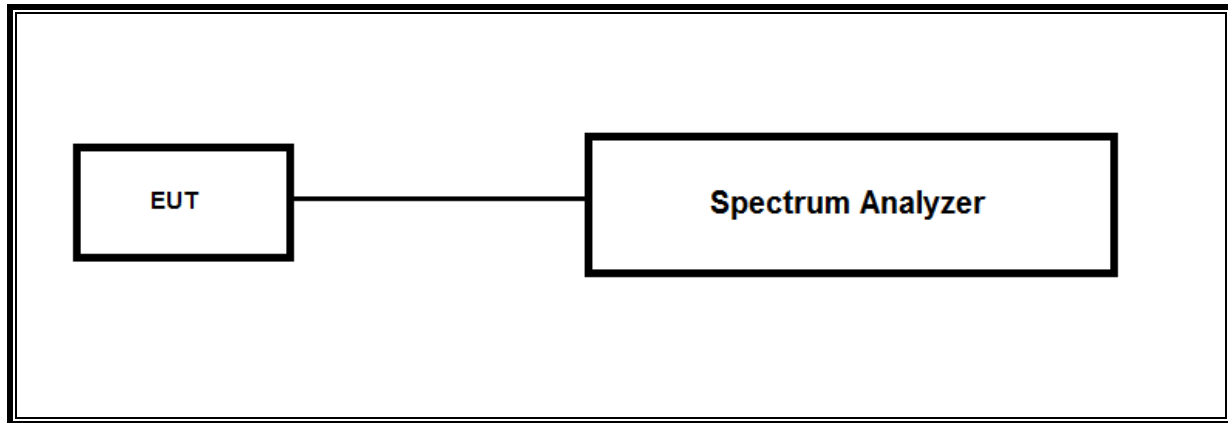
### I/O CABLES

| I/O Cable List |          |                      |                |            |                  |         |
|----------------|----------|----------------------|----------------|------------|------------------|---------|
| Cable No       | Port     | # of identical ports | Connector Type | Cable Type | Cable Length (m) | Remarks |
| 1              | DC Power | 1                    | Mini-USB       | Shielded   | 1.2m             | N/A     |
| 2              | Audio    | 2                    | Mini-Jack      | Unshielded | 1.2m             | N/A     |

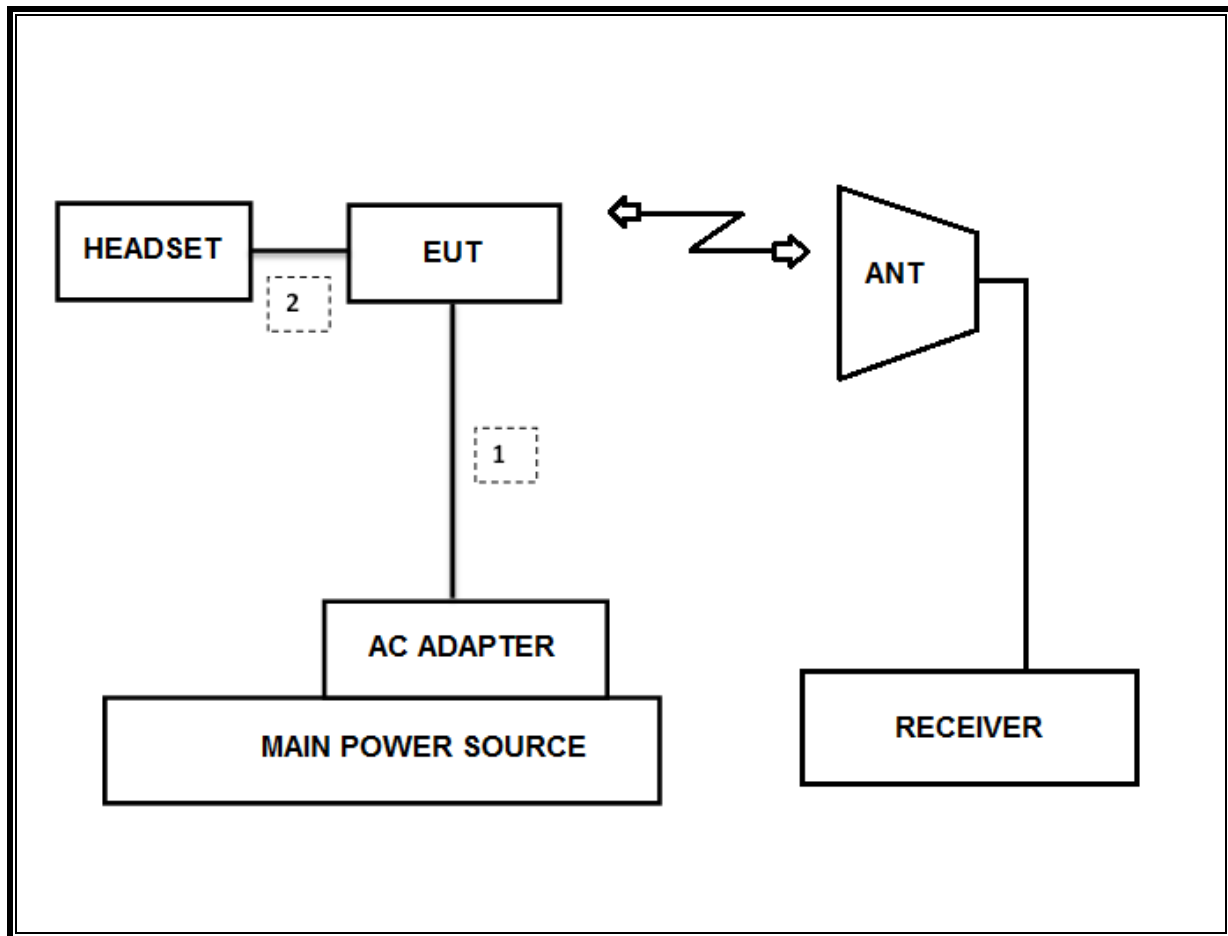
### TEST SETUP

The EUT is a stand-alone unit during the tests.  
Test software in hidden menu exercised the EUT to enable NII mode.

**SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)**



**SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)**



## 6. TEST AND MEASUREMENT EQUIPMENT

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

| Test Equipment List        |               |                        |            |          |
|----------------------------|---------------|------------------------|------------|----------|
| Description                | Manufacturer  | Model                  | S/N        | Cal Due  |
| Antenna, Bilog, 30MHz-1GHz | SCHWARZBECK   | VULB9163               | 750        | 08-31-19 |
| Antenna, Bilog, 30MHz-1GHz | SCHWARZBECK   | VULB9163               | 749        | 09-14-19 |
| Antenna, Bilog, 30MHz-1GHz | SCHWARZBECK   | VULB9163               | 845        | 08-31-19 |
| Antenna, Horn, 18 GHz      | ETS           | 3115                   | 00167211   | 10-14-18 |
| Antenna, Horn, 18 GHz      | ETS           | 3115                   | 00161451   | 03-10-19 |
| Antenna, Horn, 18 GHz      | ETS           | 3117                   | 00168724   | 05-31-19 |
| Antenna, Horn, 18 GHz      | ETS           | 3117                   | 00168717   | 05-31-19 |
| Antenna, Horn, 18 GHz      | ETS           | 3117                   | 00205959   | 11-29-18 |
| Antenna, Horn, 40 GHz      | ETS           | 3116C                  | 00166155   | 12-04-19 |
| Antenna, Horn, 40 GHz      | ETS           | 3116C                  | 00168645   | 12-04-19 |
| Antenna, Horn, 40 GHz      | ETS           | 3116C-PA               | 00168841   | 11-13-19 |
| Preamplifier, 1000 MHz     | Sonoma        | 310N                   | 341282     | 08-09-18 |
| Preamplifier, 1000 MHz     | Sonoma        | 310N                   | 351741     | 08-07-18 |
| Preamplifier, 1000 MHz     | Sonoma        | 310N                   | 370599     | 08-10-18 |
| Preamplifier, 18 GHz       | Miteq         | AFS42-00101800-25-S-42 | 1876511    | 08-08-18 |
| Preamplifier, 18 GHz       | Miteq         | AFS42-00101800-25-S-42 | 1896138    | 08-08-18 |
| Preamplifier, 18 GHz       | Miteq         | AFS42-00101800-25-S-42 | 2029169    | 08-11-18 |
| Spectrum Analyzer, 44 GHz  | Agilent / HP  | N9030A                 | MY54170614 | 08-08-18 |
| Spectrum Analyzer, 44 GHz  | Agilent / HP  | N9030A                 | MY54490312 | 08-08-18 |
| Average Power Sensor       | Agilent / HP  | U2000                  | MY54270007 | 08-08-18 |
| Attenuator                 | PASTERNAK     | PE7087-10              | A001       | 08-08-18 |
| Attenuator                 | PASTERNAK     | PE7087-10              | A008       | 08-08-18 |
| Attenuator                 | PASTERNAK     | PE7087-10              | 2          | 08-10-18 |
| Attenuator                 | PASTERNAK     | PE7087-10              | A009       | 08-08-18 |
| EMI Test Receive, 40 GHz   | R&S           | ESU40                  | 100439     | 08-08-18 |
| EMI Test Receive, 40 GHz   | R&S           | ESU40                  | 100457     | 08-08-18 |
| EMI Test Receive, 44 GHz   | R&S           | ESW44                  | 101590     | 08-09-18 |
| EMI Test Receive, 3 GHz    | R&S           | ESR3                   | 101832     | 08-07-18 |
| Low Pass Filter 5GHz       | Micro-Tronics | LPS17541               | 009        | 08-08-18 |
| Low Pass Filter 5GHz       | Micro-Tronics | LPS17541               | 015        | 08-08-18 |
| Low Pass Filter 5GHz       | Micro-Tronics | LPS17541               | 020        | 08-11-18 |
| High Pass Filter 3GHz      | Micro-Tronics | HPM17543               | 010        | 08-08-18 |
| High Pass Filter 3GHz      | Micro-Tronics | HPM17543               | 015        | 08-08-18 |
| High Pass Filter 3GHz      | Micro-Tronics | HPM17543               | 020        | 08-11-18 |
| High Pass Filter 6GHz      | Micro-Tronics | HPS17542               | 009        | 08-08-18 |
| High Pass Filter 6GHz      | Micro-Tronics | HPS17542               | 016        | 08-08-18 |
| High Pass Filter 6GHz      | Micro-Tronics | HPS17542               | 021        | 08-11-18 |
| LISN                       | R&S           | ENV-216                | 101837     | 08-09-18 |
| UL Software                |               |                        |            |          |
| Description                | Manufacturer  | Model                  | Version    |          |
| Radiated software          | UL            | UL EMC                 | Ver 9.5    |          |
| AC Line Conducted software | UL            | UL EMC                 | Ver 9.5    |          |

## 7. SUMMARY TABLE

| FCC Part Section    | Test Description                                 | Test Limit               | Test Condition | Test Result |
|---------------------|--------------------------------------------------|--------------------------|----------------|-------------|
| 15.407(e)           | 6dB Band width (5.8Ghz)                          | 500KHz                   | Condcuted      | PASS        |
| 15.407 (a)(2)       | TX Cond. Power 5.15-2.25, 5.25-5.35 & 5.47-5.725 | <24dBm or 11+10Log(OBW)  |                | PASS        |
| 15.407 (a)(3)       | TX Cond. Power 5.725-5.825                       | < 30dBm or 17+10Log(OBW) |                | PASS        |
| 15.407 (a)(5)       | PSD (5.2,5.3,5.5GHz)                             | <11dBm                   |                | PASS        |
| 15.407 (a)(5)       | PSD (5.8GHz)                                     | 30dBm per 500kHz         |                | PASS        |
| 15.207 (a)          | AC Power Line conducted emissions                | Section 10               | Radiated       | PASS        |
| 15.407 (b) & 15.209 | Radiated Spurious Emission                       | < 54dBuV/m               |                | PASS        |
| 15.407 (h)(2)       | Dynamic Frequency Selection                      | N/A                      | Condcuted      | PASS        |

## 8. MEASUREMENT METHODS

On-Time and Duty Cycle : KDB 789033 D02 v02r01, Section B.

6dB Emission BW : KDB 789033 D02 v02r01, Section C.2.

26dB Emission BW : KDB 789033 D02 v02r01, Section C.1.

99% Occupied BW : KDB 789033 D02 v02r01, Section D.

Conducted Output Power : KDB 789033 D02 v02r01, Section E.3.a(Method PM)

Power Spectral Density : KDB 789033 D02 v02r01, Section F.

Unwanted emissions in restricted bands : KDB 789033 D02 v02r01, Section G.

Unwanted emissions in non-restricted bands : KDB 789033 D02 v02r01, Section G.

AC Power Line Conducted Emission : ANSI C63.10-2013, Section 6.2.

## 9. REFERENCE MEASUREMENTS RESULTS

### LIMITS

None; for reporting purposes only.

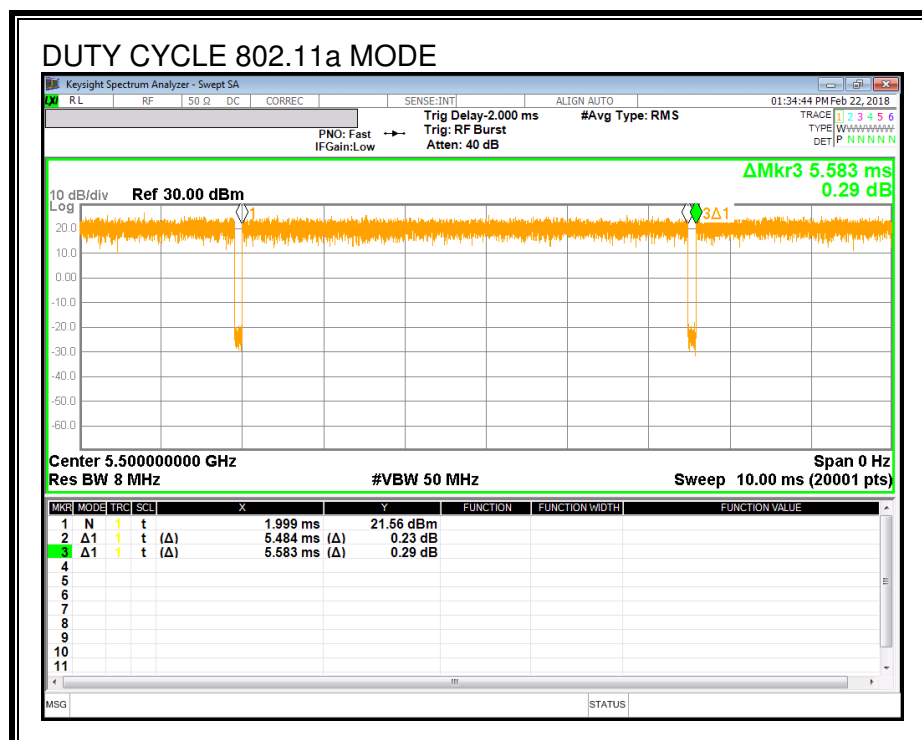
### PROCEDURE

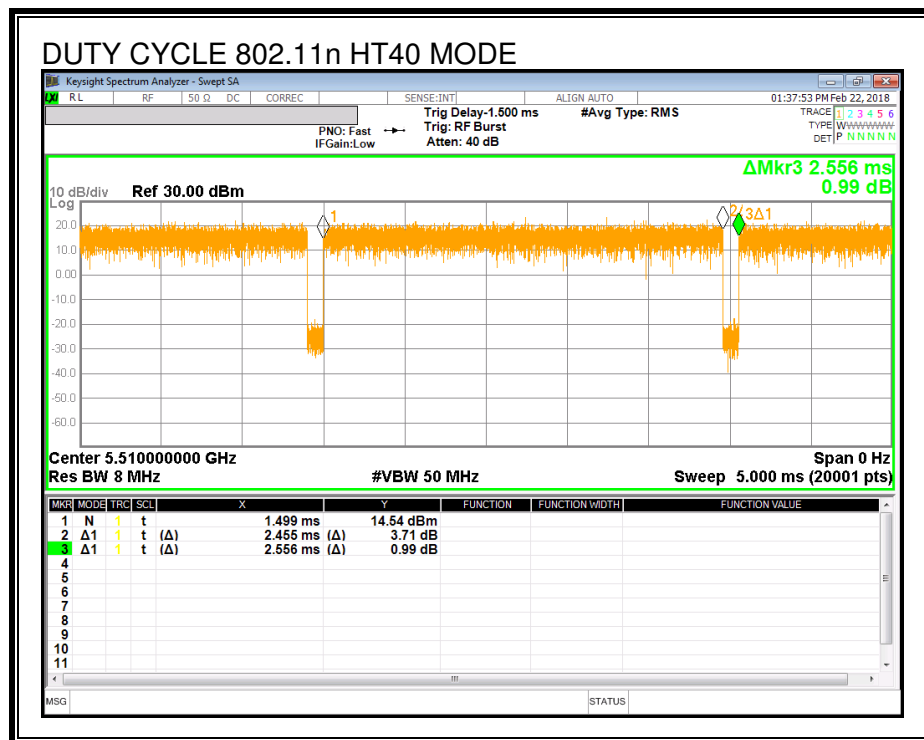
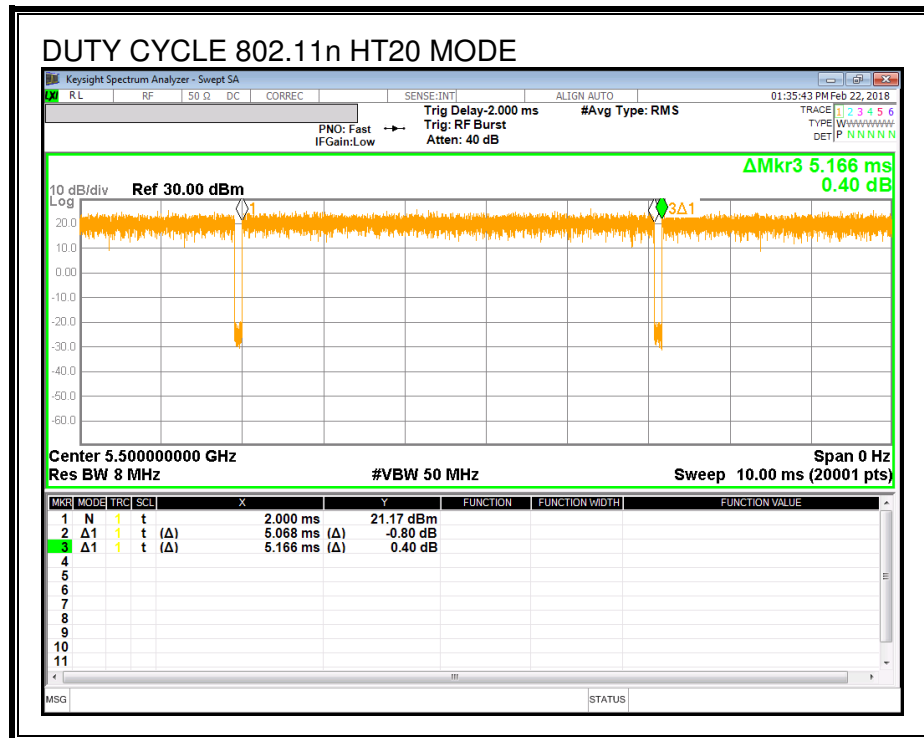
KDB 789033 D02 v02r01 Zero-Span Spectrum Analyzer Method.

### 9.1. ON TIME AND DUTY CYCLE RESULTS

| Mode         | ON Time<br>B<br>[msec] | Period<br>[msec] | Duty Cycle<br>x<br>[linear] | Duty<br>Cycle<br>[%] | Duty Cycle<br>Correction Factor<br>[dB] | 1/T<br>Minimum VBW<br>[kHz] |
|--------------|------------------------|------------------|-----------------------------|----------------------|-----------------------------------------|-----------------------------|
| 802.11a      | 5.484                  | 5.583            | 0.982                       | 98.2%                | 0.00                                    | 0.010                       |
| 802.11n HT20 | 5.068                  | 5.166            | 0.981                       | 98.1%                | 0.00                                    | 0.010                       |
| 802.11n HT40 | 2.455                  | 2.556            | 0.960                       | 96.0%                | 0.18                                    | 0.407                       |

### 9.2. DUTY CYCLE PLOTS





### 9.3. 26 dB BANDWIDTH

#### LIMITS

None; for reporting purposes only.

#### TEST PROCEDURE

Reference to 789033 D02 General UNII Test Procedures New Rules v02r01: The transmitter output is connected to a spectrum analyzer with the RBW set to approximately 1% of EBW, the VBW > RBW, peak detector and max hold.

#### RESULTS

##### 9.3.1. 802.11a MODE IN THE 5.2 GHz BAND

| Channel | Frequency [MHz] | 26 dB Bandwidth [MHz] |
|---------|-----------------|-----------------------|
| Low     | 5180            | 19.89                 |
| Mid     | 5200            | 19.69                 |
| High    | 5240            | 19.40                 |
| Worst   |                 | 19.89                 |

##### 9.3.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

| Channel | Frequency [MHz] | 26 dB Bandwidth [MHz] |
|---------|-----------------|-----------------------|
| Low     | 5180            | 20.27                 |
| Mid     | 5200            | 20.48                 |
| High    | 5240            | 20.42                 |
| Worst   |                 | 20.48                 |

##### 9.3.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

| Channel | Frequency [MHz] | 26 dB Bandwidth [MHz] |
|---------|-----------------|-----------------------|
| Low     | 5190            | 40.12                 |
| High    | 5230            | 39.30                 |
| Worst   |                 | 40.12                 |

#### 9.3.4. 802.11a MODE IN THE 5.3 GHz BAND

| Channel | Frequency [MHz] | 26 dB Bandwidth [MHz] |
|---------|-----------------|-----------------------|
| Low     | 5260            | 19.27                 |
| Mid     | 5300            | 19.53                 |
| High    | 5320            | 19.91                 |
| Worst   |                 | 19.91                 |

#### 9.3.5. 802.11n HT20 MODE IN THE 5.3 GHz BAND

| Channel | Frequency [MHz] | 26 dB Bandwidth [MHz] |
|---------|-----------------|-----------------------|
| Low     | 5260            | 20.26                 |
| Mid     | 5300            | 20.18                 |
| High    | 5320            | 20.04                 |
| Worst   |                 | 20.26                 |

#### 9.3.6. 802.11n HT40 MODE IN THE 5.3 GHz BAND

| Channel | Frequency [MHz] | 26 dB Bandwidth [MHz] |
|---------|-----------------|-----------------------|
| Low     | 5270            | 40.09                 |
| High    | 5310            | 40.06                 |
| Worst   |                 | 40.09                 |

#### 9.3.7. 802.11a MODE IN THE 5.5 GHz BAND

| Channel | Frequency [MHz] | 26 dB Bandwidth [MHz] |
|---------|-----------------|-----------------------|
| Low     | 5500            | 19.50                 |
| Mid     | 5580            | 19.88                 |
| High    | 5700            | 20.38                 |
| Worst   |                 | 20.38                 |

#### 9.3.8. 802.11n HT20 MODE IN THE 5.5 GHz BAND

| Channel | Frequency [MHz] | 26 dB Bandwidth [MHz] |
|---------|-----------------|-----------------------|
| Low     | 5500            | 20.24                 |
| Mid     | 5580            | 20.79                 |
| High    | 5700            | 21.50                 |
| Worst   |                 | 21.50                 |

### 9.3.9. 802.11n HT40 MODE IN THE 5.5 GHz BAND

| Channel | Frequency [MHz] | 26 dB Bandwidth [MHz] |
|---------|-----------------|-----------------------|
| Low     | 5510            | 39.89                 |
| Mid     | 5550            | 39.64                 |
| High    | 5670            | 40.05                 |
| Worst   |                 | 40.05                 |

### 9.3.10. 802.11a MODE IN THE 5.8 GHz BAND

| Channel | Frequency [MHz] | 26 dB Bandwidth [MHz] |
|---------|-----------------|-----------------------|
| Low     | 5745            | 21.55                 |
| Mid     | 5785            | 21.98                 |
| High    | 5825            | 21.70                 |
| Worst   |                 | 21.98                 |

### 9.3.11. 802.11n HT20 MODE IN THE 5.8 GHz BAND

| Channel | Frequency [MHz] | 26 dB Bandwidth [MHz] |
|---------|-----------------|-----------------------|
| Low     | 5745            | 22.19                 |
| Mid     | 5785            | 23.63                 |
| High    | 5825            | 22.93                 |
| Worst   |                 | 23.63                 |

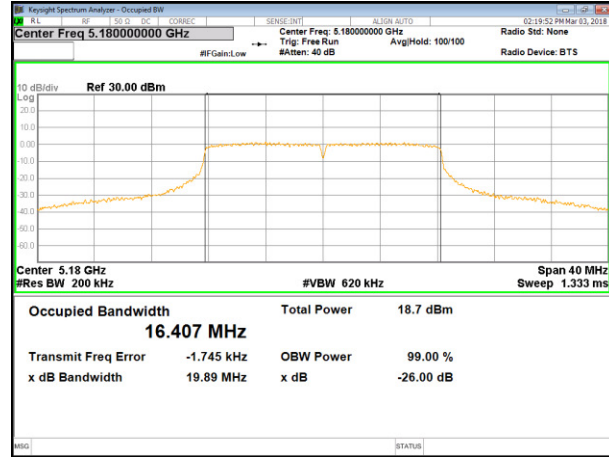
### 9.3.12. 802.11n HT40 MODE IN THE 5.8 GHz BAND

| Channel | Frequency [MHz] | 26 dB Bandwidth [MHz] |
|---------|-----------------|-----------------------|
| Low     | 5755            | 39.78                 |
| High    | 5795            | 39.76                 |
| Worst   |                 | 39.78                 |

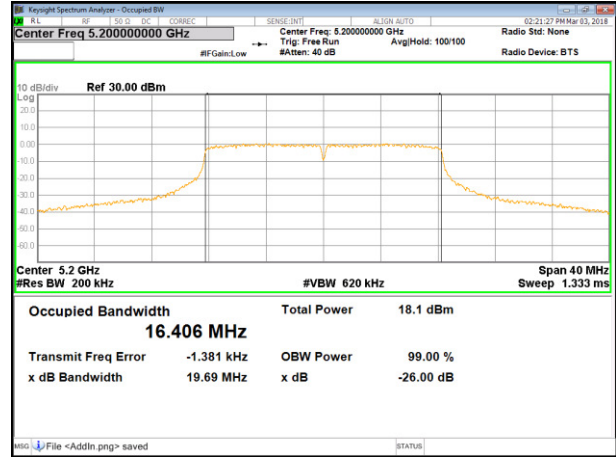
### 9.3.13. 26 dB BANDWIDTH PLOTS

#### UNII 5.2 GHz IEEE 802.11a mode

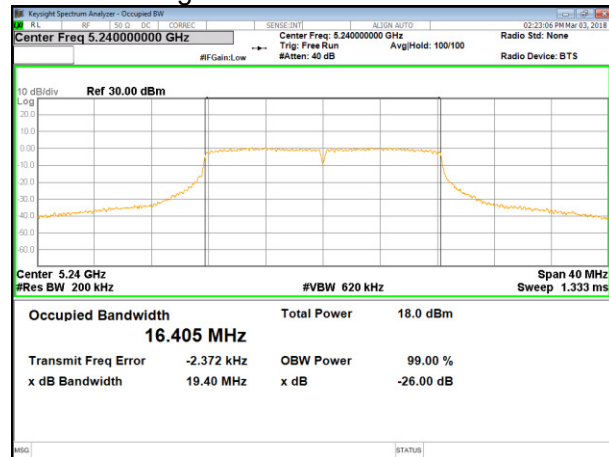
##### 11a Mode Low Channel



##### 11a Mode Middle Channel

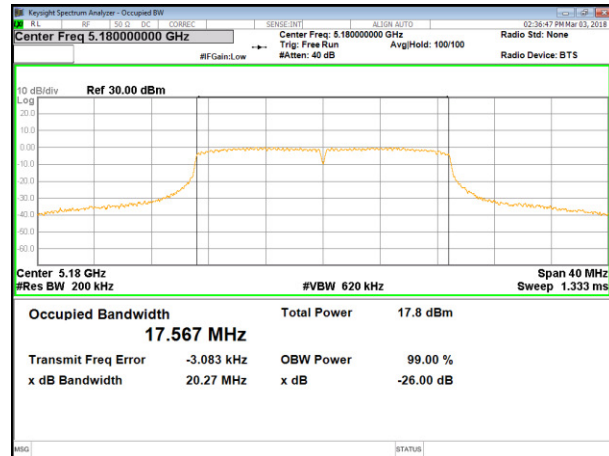


##### 11a Mode High Channel

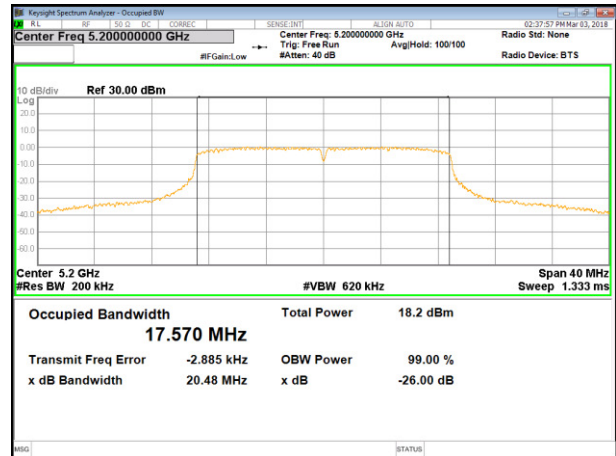


## UNII 5.2 GHz IEEE 802.11n HT20 mode

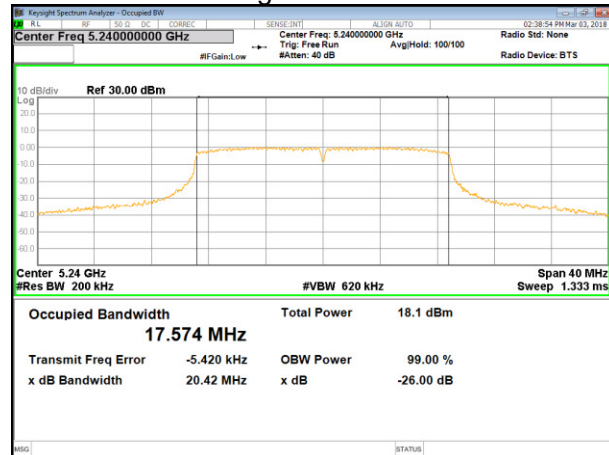
### 11n HT20 Mode Low Channel



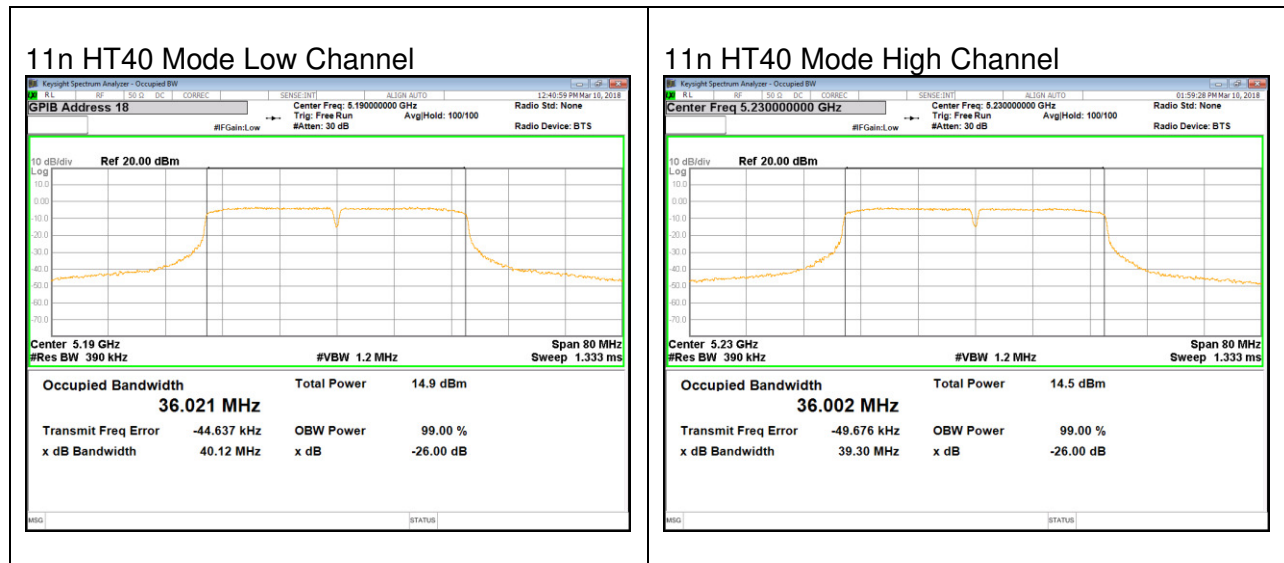
### 11n HT20 Mode Middle Channel



### 11n HT20 Mode High Channel

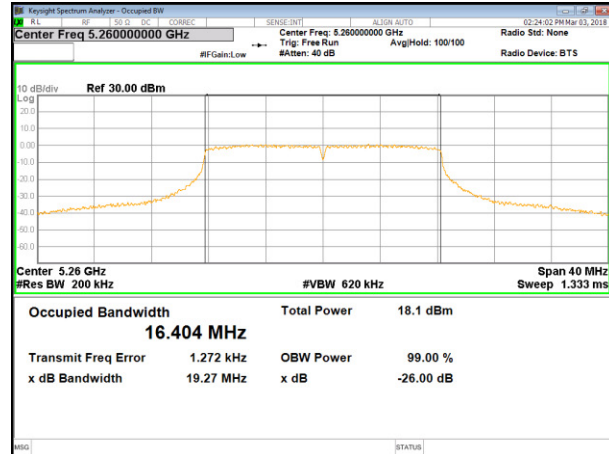


## UNII 5.2 GHz IEEE 802.11n HT40 mode

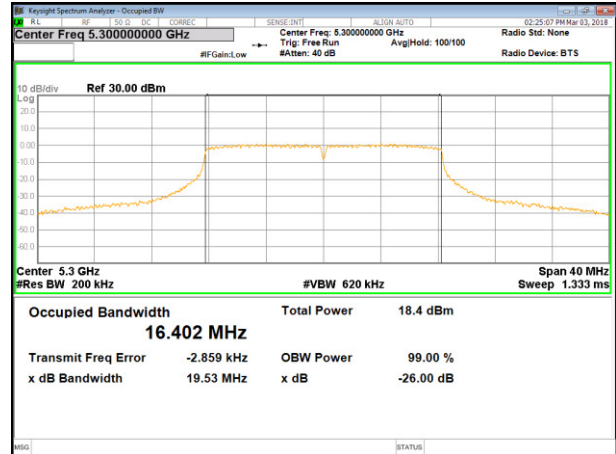


## UNII 5.3 GHz IEEE 802.11a mode

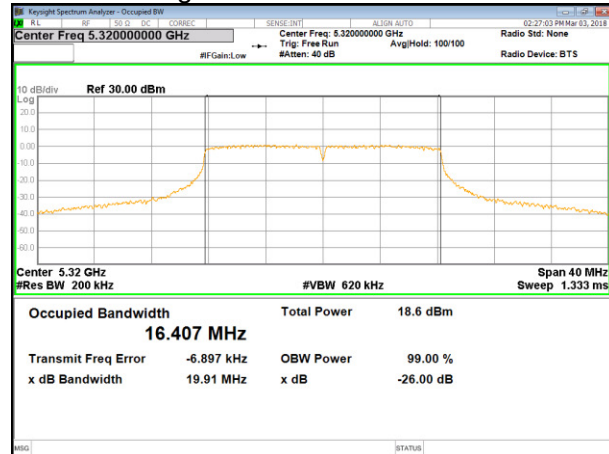
### 11a Mode Low Channel



### 11a Mode Middle Channel

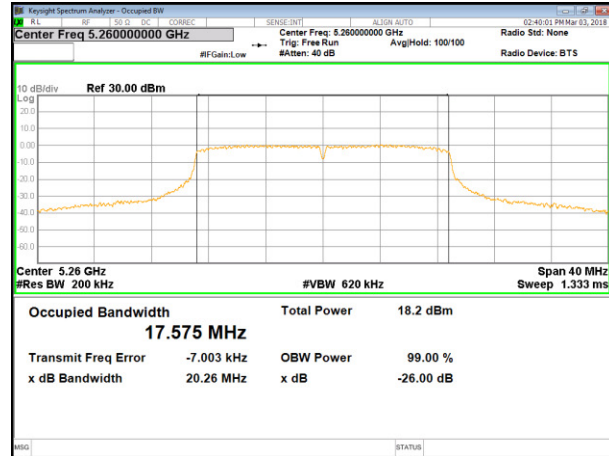


### 11a Mode High Channel

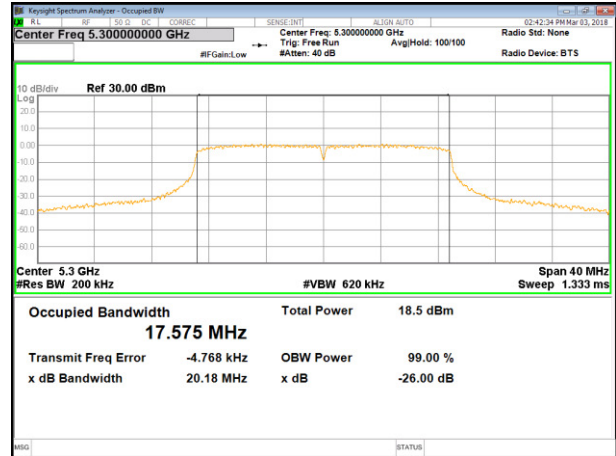


## UNII 5.3 GHz IEEE 802.11n HT20 mode

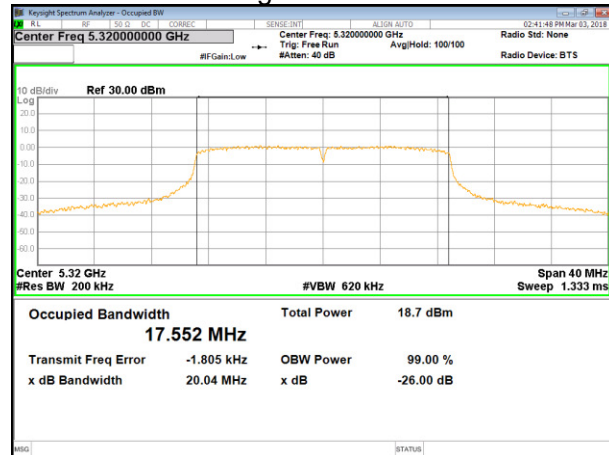
### 11n HT20 Mode Low Channel



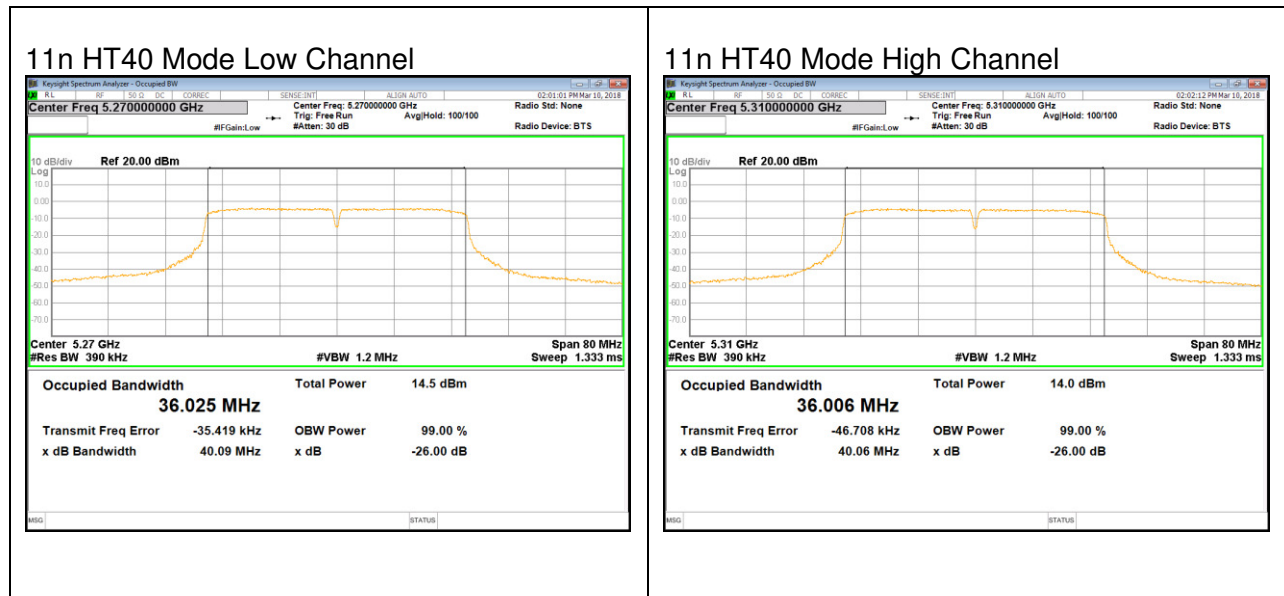
### 11n HT20 Mode Middle Channel



### 11n HT20 Mode High Channel

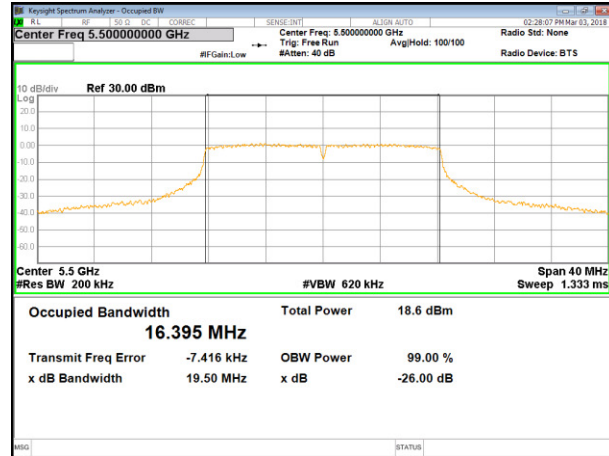


## UNII 5.3 GHz IEEE 802.11n HT40 mode

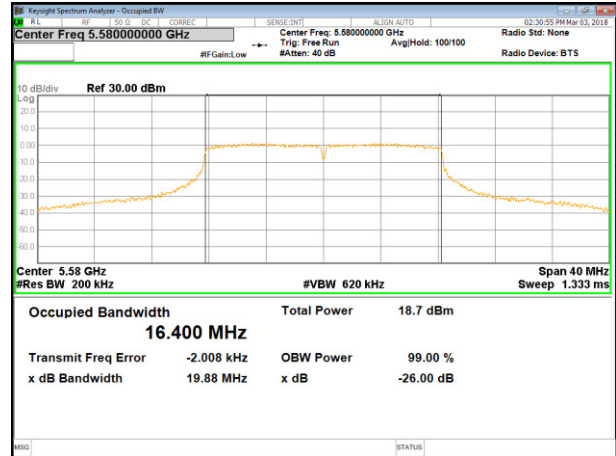


## UNII 5.5 GHz IEEE 802.11a mode

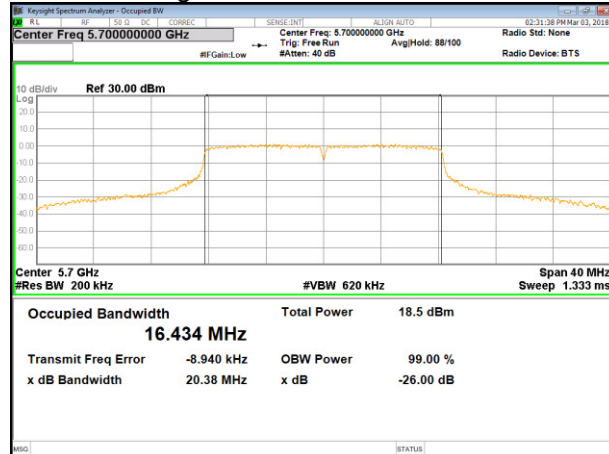
### 11a Mode Low Channel



### 11a Mode Middle Channel

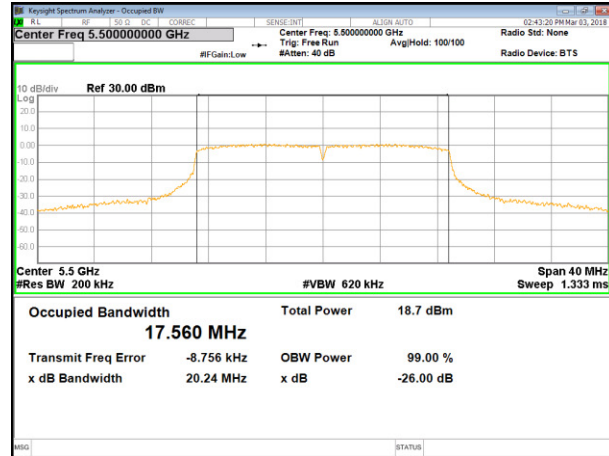


### 11a Mode High Channel

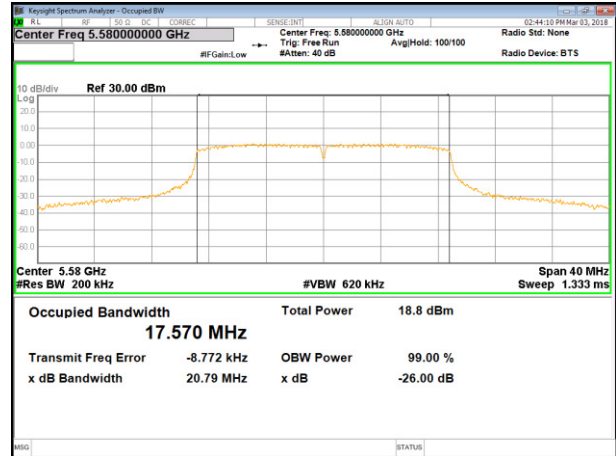


## UNII 5.5 GHz IEEE 802.11n HT20 mode

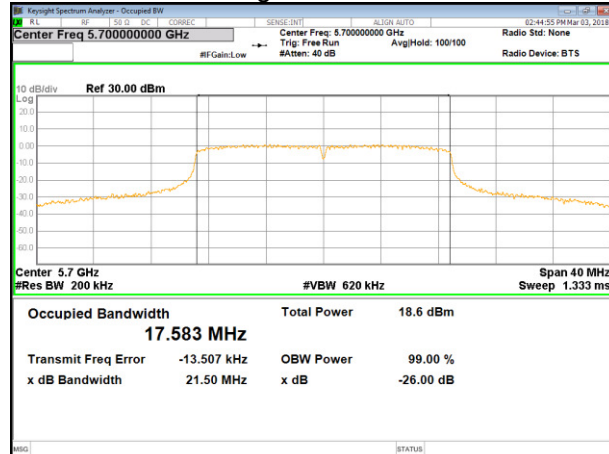
### 11n HT20 Mode Low Channel



### 11n HT20 Mode Middle Channel

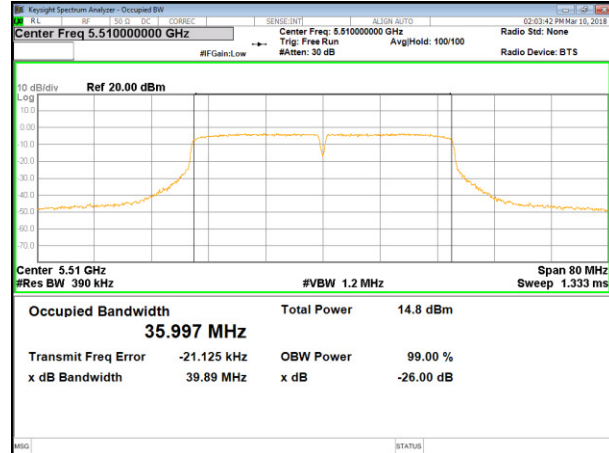


### 11n HT20 Mode High Channel

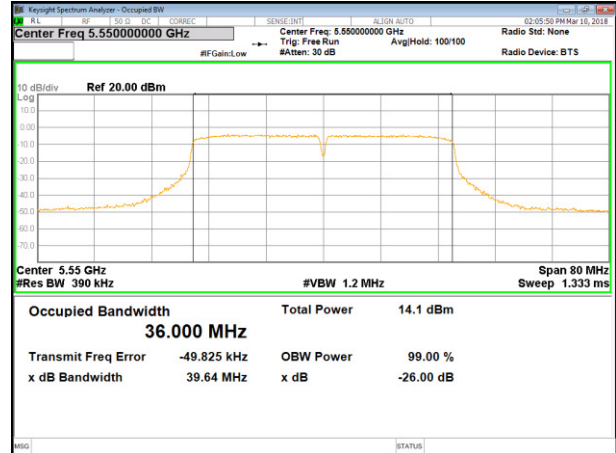


## UNII 5.5 GHz IEEE 802.11n HT40 mode

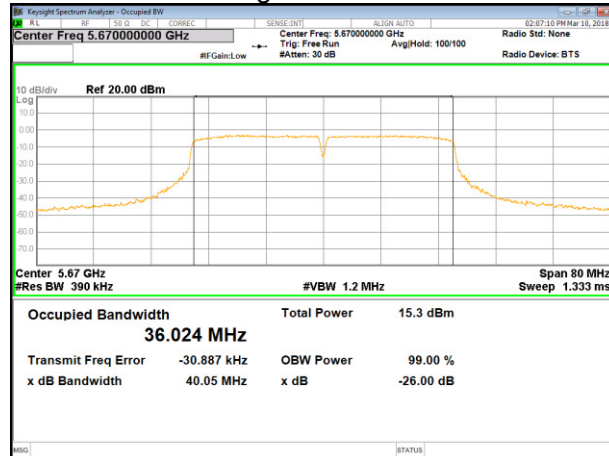
### 11n HT40 Mode Low Channel



### 11n HT40 Mode Middle Channel

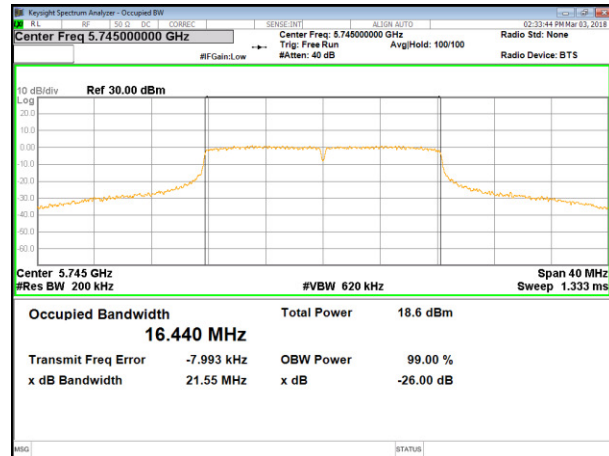


### 11n HT40 Mode High Channel

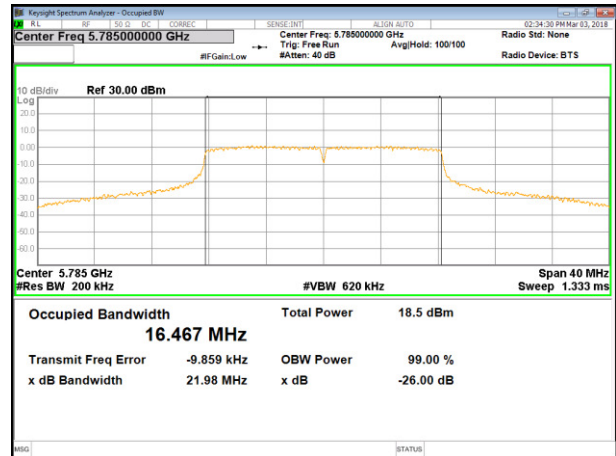


## UNII 5.8 GHz IEEE 802.11a mode

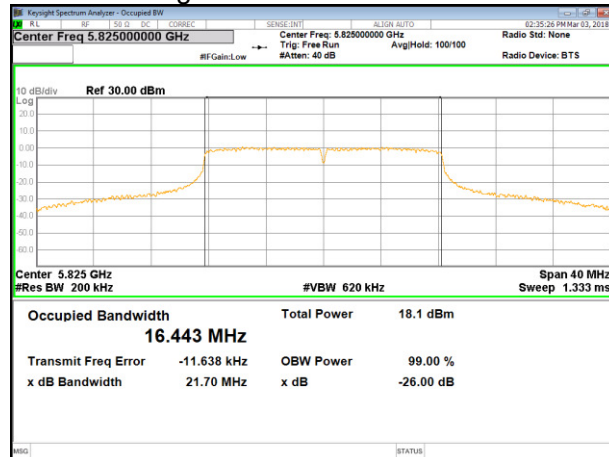
### 11a Mode Low Channel



### 11a Mode Middle Channel

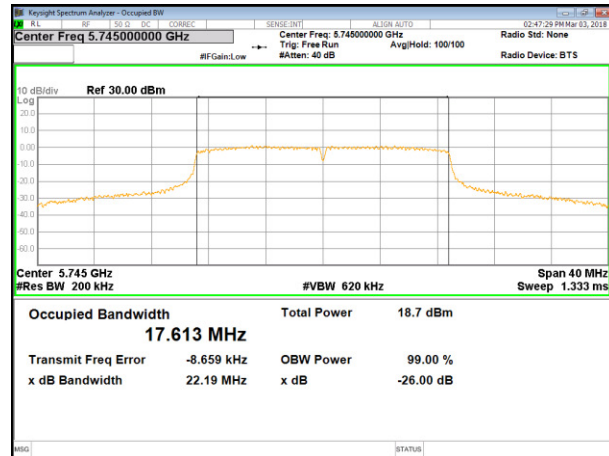


### 11a Mode High Channel

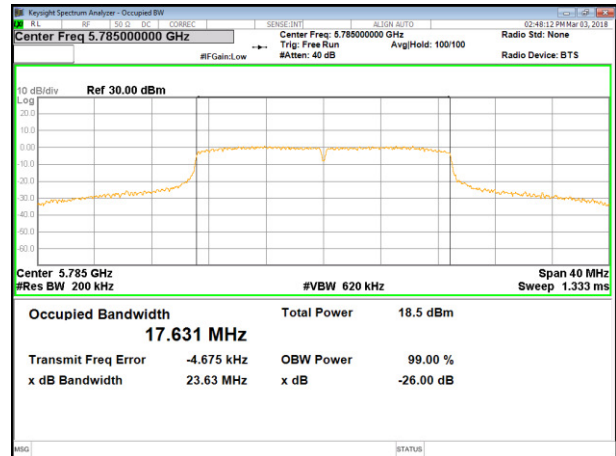


## UNII 5.8 GHz IEEE 802.11n HT20 mode

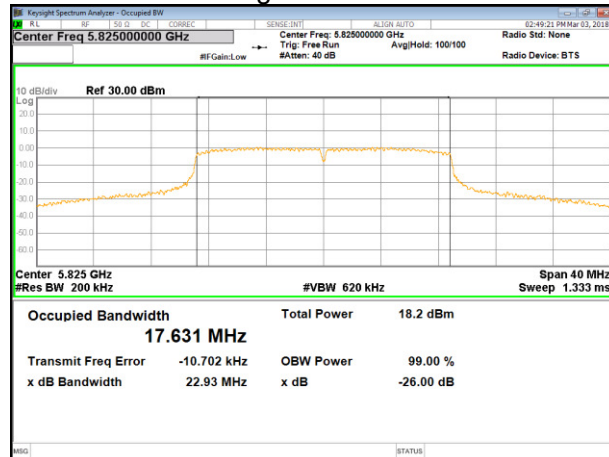
### 11n HT20 Mode Low Channel



### 11n HT20 Mode Middle Channel

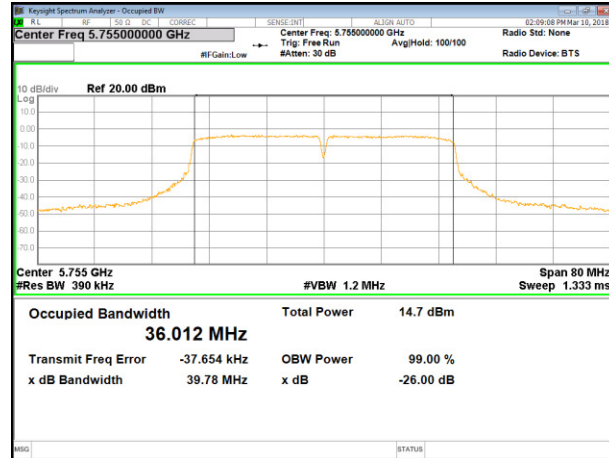


### 11n HT20 Mode High Channel

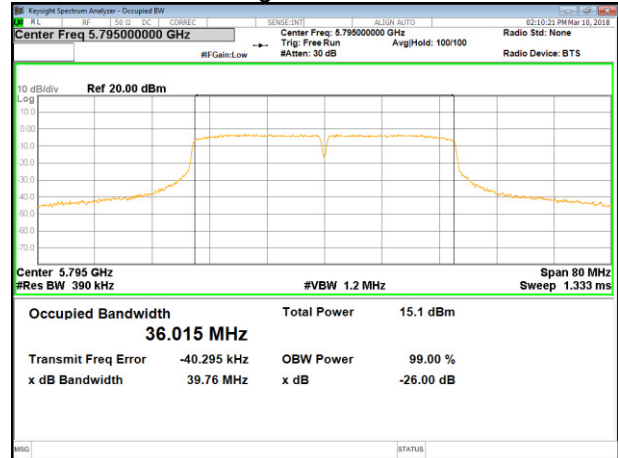


## UNII 5.8 GHz IEEE 802.11n HT40 mode

### 11n HT40 Mode Low Channel



### 11n HT40 Mode High Channel



## 9.4. 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

Reference to 789033 D02 General UNII Test Procedures New Rules v02r01: The transmitter output is connected to a spectrum analyzer with the RBW set to approximately 1% of EBW, the VBW > RBW, peak detector and max hold.

### RESULTS

#### 9.4.1. 802.11a MODE IN THE 5.2 GHz BAND

| Channel | Frequency [MHz] | 99% Bandwidth [MHz] |
|---------|-----------------|---------------------|
| Low     | 5180            | 16.45               |
| Mid     | 5200            | 16.46               |
| High    | 5240            | 16.45               |
| Worst   |                 | 16.46               |

#### 9.4.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

| Channel | Frequency [MHz] | 99% Bandwidth [MHz] |
|---------|-----------------|---------------------|
| Low     | 5180            | 17.55               |
| Mid     | 5200            | 17.57               |
| High    | 5240            | 17.59               |
| Worst   |                 | 17.59               |

#### 9.4.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

| Channel | Frequency [MHz] | 99% Bandwidth [MHz] |
|---------|-----------------|---------------------|
| Low     | 5190            | 35.97               |
| High    | 5230            | 36.06               |
| Worst   |                 | 36.06               |

#### 9.4.4. 802.11a MODE IN THE 5.3 GHz BAND

| Channel | Frequency [MHz] | 99% Bandwidth [MHz] |
|---------|-----------------|---------------------|
| Low     | 5260            | 16.45               |
| Mid     | 5300            | 16.44               |
| High    | 5320            | 16.45               |
| Worst   |                 | 16.45               |

#### 9.4.5. 802.11n HT20 MODE IN THE 5.3 GHz BAND

| Channel | Frequency [MHz] | 99% Bandwidth [MHz] |
|---------|-----------------|---------------------|
| Low     | 5260            | 17.55               |
| Mid     | 5300            | 17.61               |
| High    | 5320            | 17.60               |
| Worst   |                 | 17.61               |

#### 9.4.6. 802.11n HT40 MODE IN THE 5.3 GHz BAND

| Channel | Frequency [MHz] | 99% Bandwidth [MHz] |
|---------|-----------------|---------------------|
| Low     | 5270            | 36.04               |
| High    | 5310            | 36.10               |
| Worst   |                 | 36.10               |

#### 9.4.7. 802.11a MODE IN THE 5.5 GHz BAND

| Channel | Frequency [MHz] | 99% Bandwidth [MHz] |
|---------|-----------------|---------------------|
| Low     | 5500            | 16.42               |
| Mid     | 5580            | 16.45               |
| High    | 5700            | 16.51               |
| Worst   |                 | 16.51               |

#### 9.4.8. 802.11n HT20 MODE IN THE 5.5 GHz BAND

| Channel | Frequency [MHz] | 99% Bandwidth [MHz] |
|---------|-----------------|---------------------|
| Low     | 5500            | 17.60               |
| Mid     | 5580            | 17.60               |
| High    | 5700            | 17.63               |
| Worst   |                 | 17.63               |

#### 9.4.9. 802.11n HT40 MODE IN THE 5.5 GHz BAND

| Channel | Frequency [MHz] | 99% Bandwidth [MHz] |
|---------|-----------------|---------------------|
| Low     | 5510            | 36.01               |
| Mid     | 5590            | 35.95               |
| High    | 5670            | 36.05               |
| Worst   |                 | 36.05               |

#### 9.4.10. 802.11a MODE IN THE 5.8 GHz BAND

| Channel | Frequency [MHz] | 99% Bandwidth [MHz] |
|---------|-----------------|---------------------|
| Low     | 5745            | 16.52               |
| Mid     | 5785            | 16.48               |
| High    | 5825            | 16.53               |
| Worst   |                 | 16.53               |

#### 9.4.11. 802.11n HT20 MODE IN THE 5.8 GHz BAND

| Channel | Frequency [MHz] | 99% Bandwidth [MHz] |
|---------|-----------------|---------------------|
| Low     | 5745            | 17.67               |
| Mid     | 5785            | 17.66               |
| High    | 5825            | 17.66               |
| Worst   |                 | 17.67               |

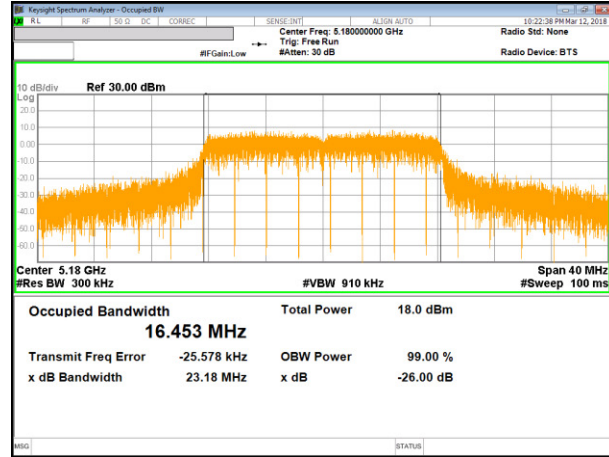
#### 9.4.12. 802.11n HT40 MODE IN THE 5.8 GHz BAND

| Channel | Frequency [MHz] | 99% Bandwidth [MHz] |
|---------|-----------------|---------------------|
| Low     | 5755            | 36.04               |
| High    | 5795            | 36.08               |
| Worst   |                 | 36.08               |

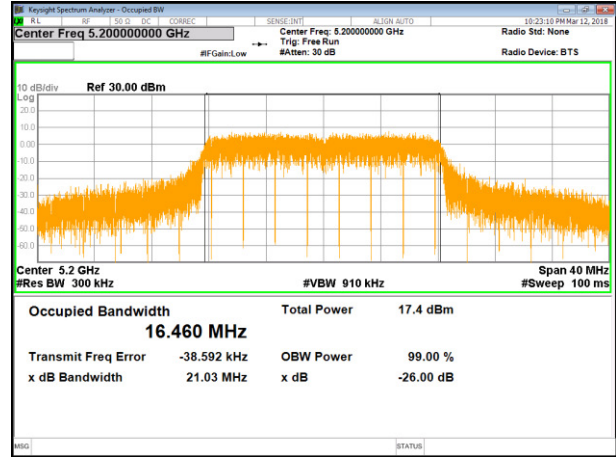
## 9.4.13. 99% BANDWIDTH PLOTS

### UNII 5.2 GHz IEEE 802.11a mode

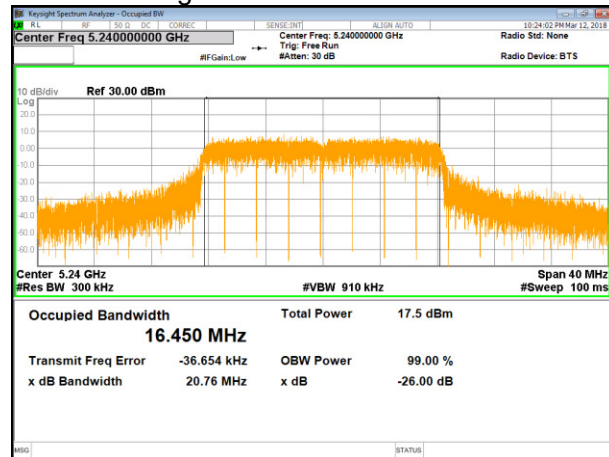
#### 11a Mode Low Channel



#### 11a Mode Middle Channel

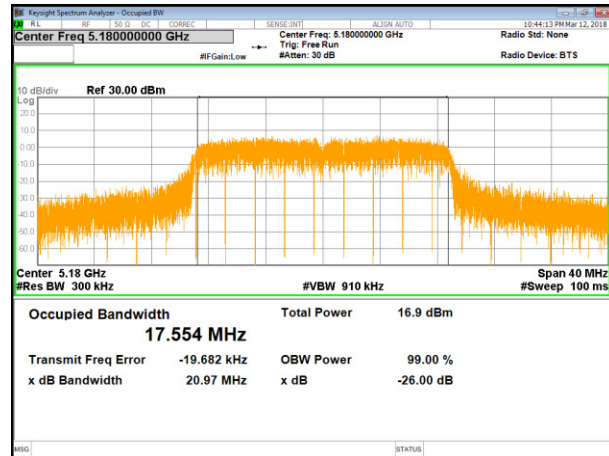


#### 11a Mode High Channel

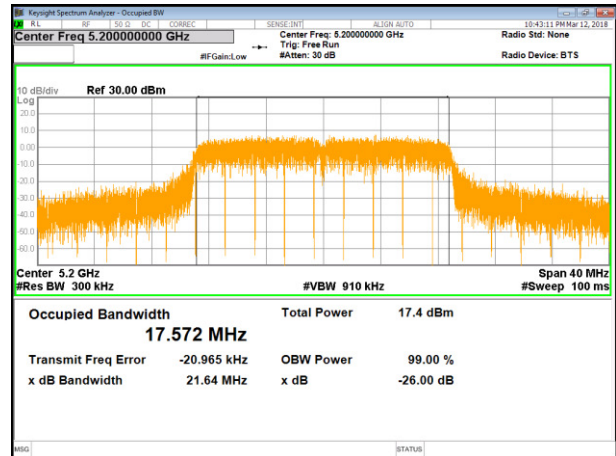


## UNII 5.2 GHz IEEE 802.11n HT20 mode

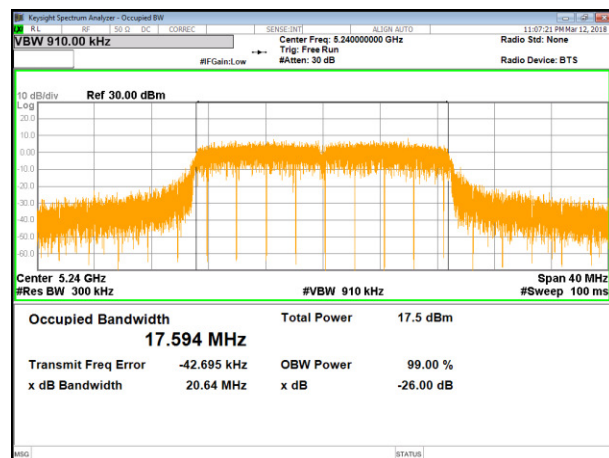
### 11n HT20 Mode Low Channel



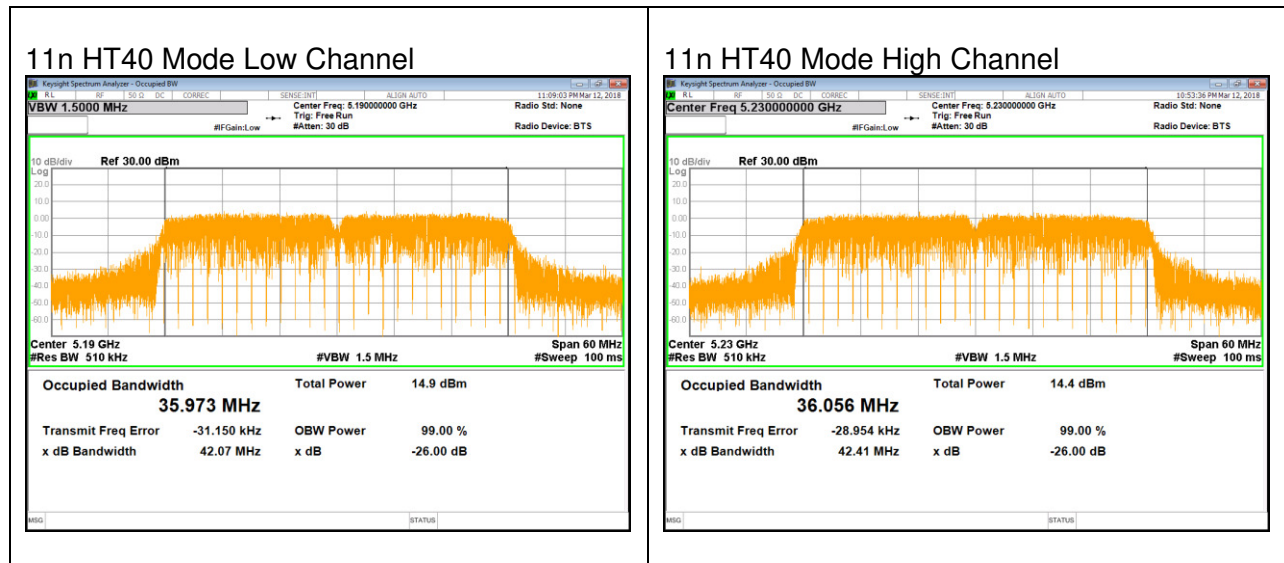
### 11n HT20 Mode Middle Channel



### 11n HT20 Mode High Channel

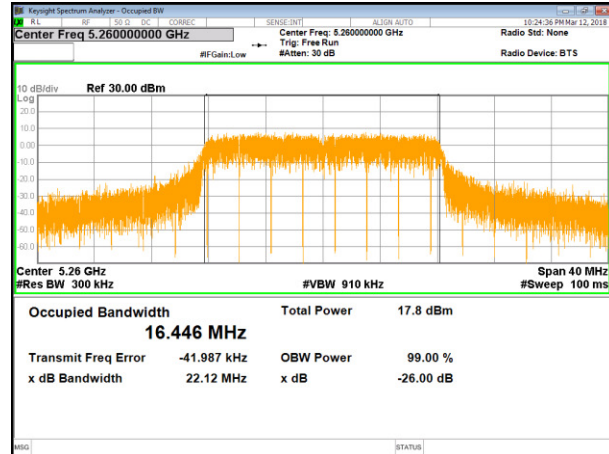


## UNII 5.2 GHz IEEE 802.11n HT40 mode

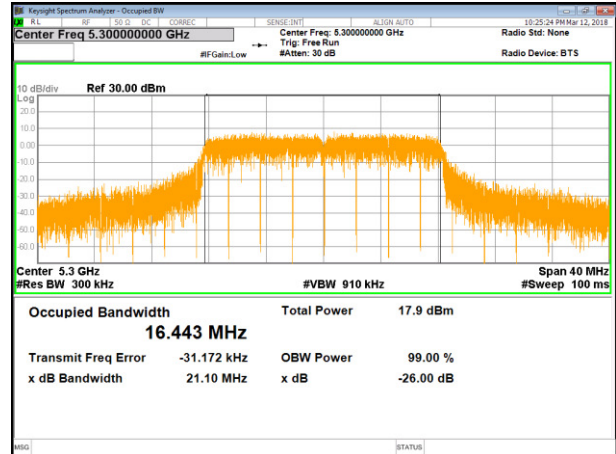


## UNII 5.3 GHz IEEE 802.11a mode

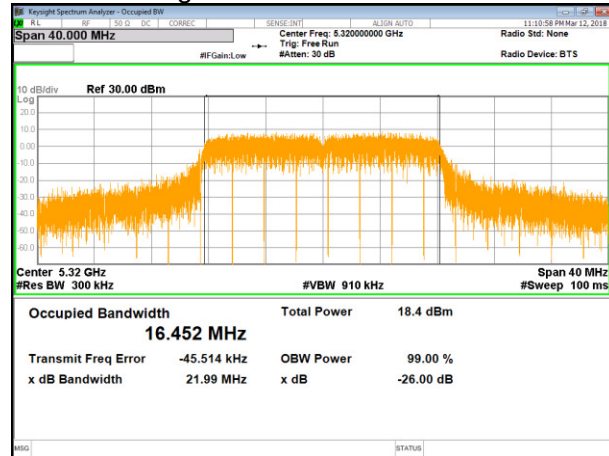
### 11a Mode Low Channel



### 11a Mode Middle Channel

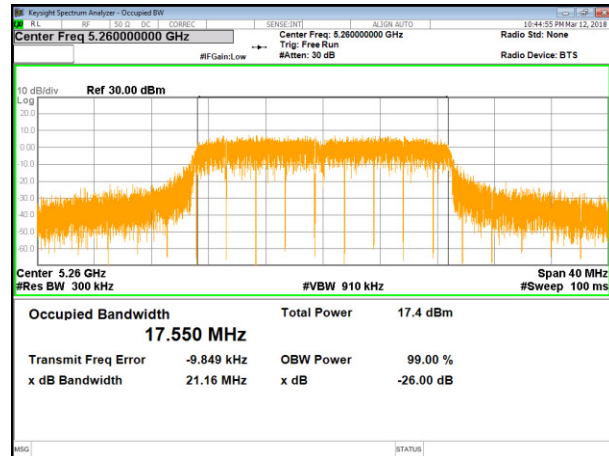


### 11a Mode High Channel

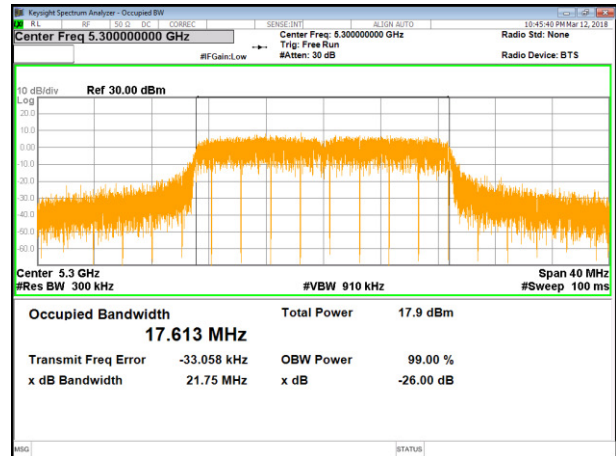


## UNII 5.3 GHz IEEE 802.11n HT20 mode

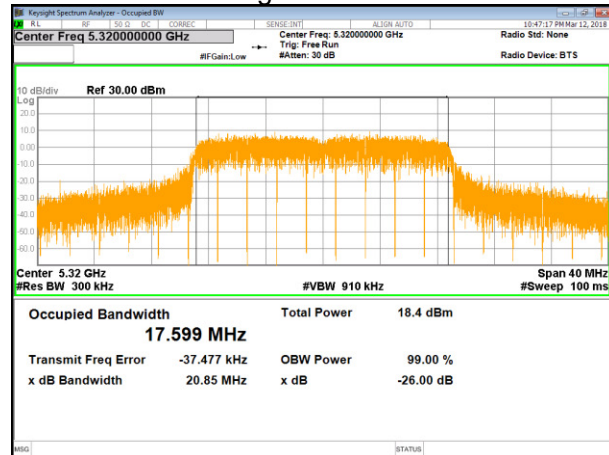
11n HT20 Mode Low Channel



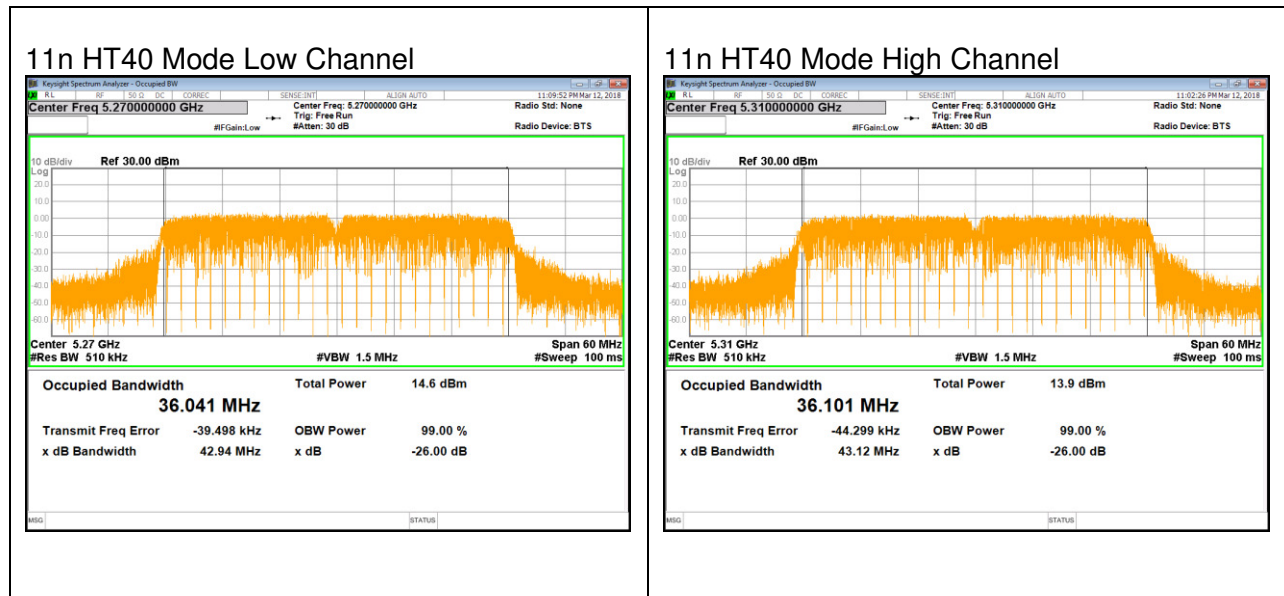
11n HT20 Mode Middle Channel



11n HT20 Mode High Channel

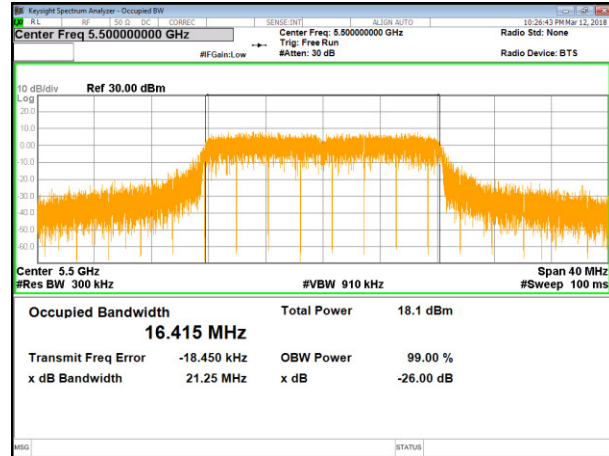


## UNII 5.3 GHz IEEE 802.11n HT40 mode

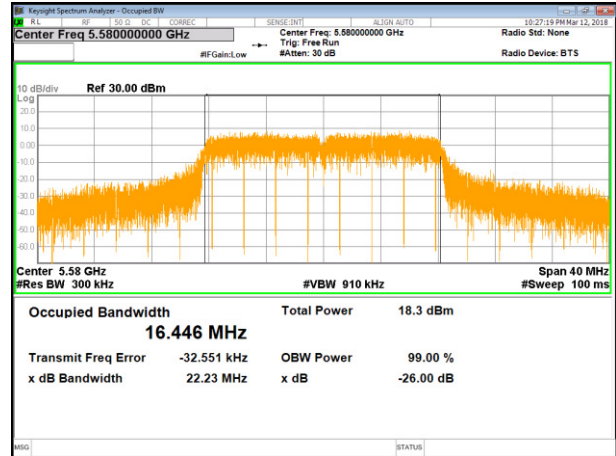


## UNII 5.5 GHz IEEE 802.11a mode

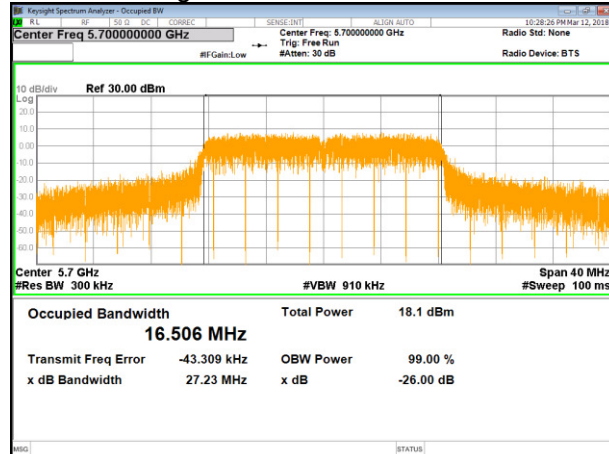
### 11a Mode Low Channel



### 11a Mode Middle Channel

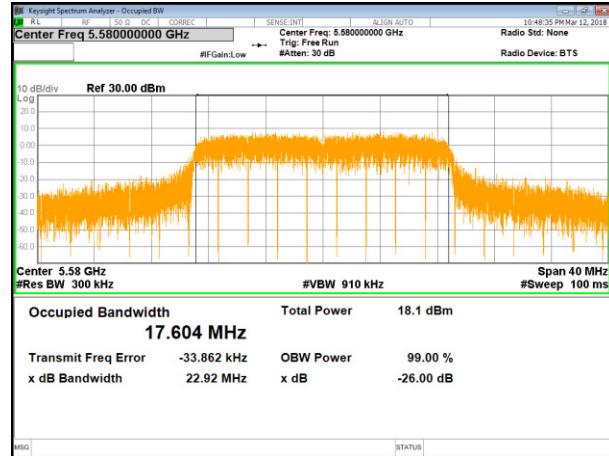


### 11a Mode High Channel

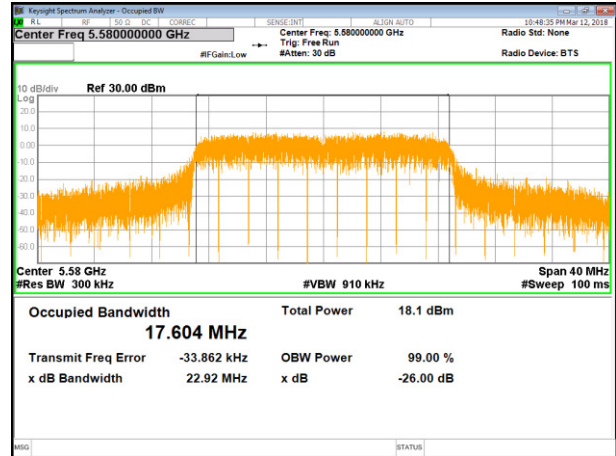


## UNII 5.5 GHz IEEE 802.11n HT20 mode

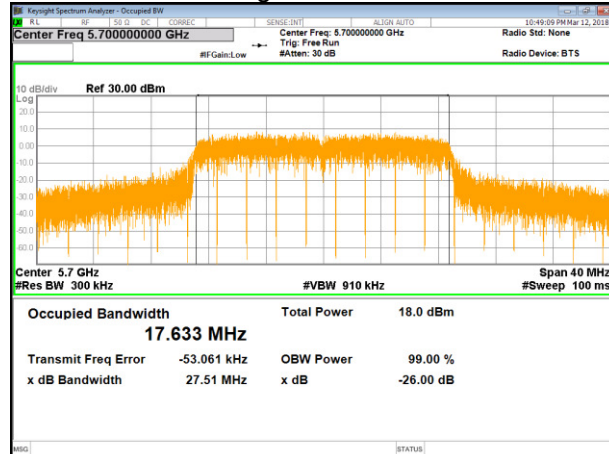
### 11n HT20 Mode Low Channel



### 11n HT20 Mode Middle Channel

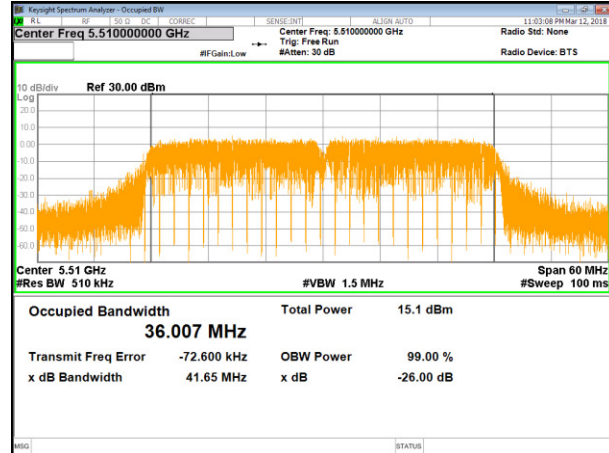


### 11n HT20 Mode High Channel

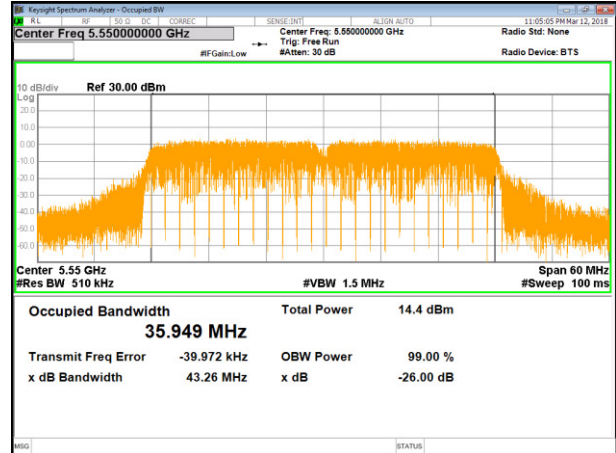


## UNII 5.5 GHz IEEE 802.11n HT40 mode

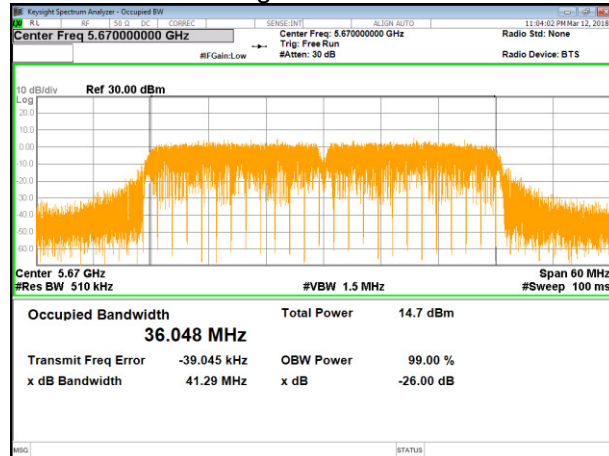
### 11n HT40 Mode Low Channel



### 11n HT40 Mode Middle Channel

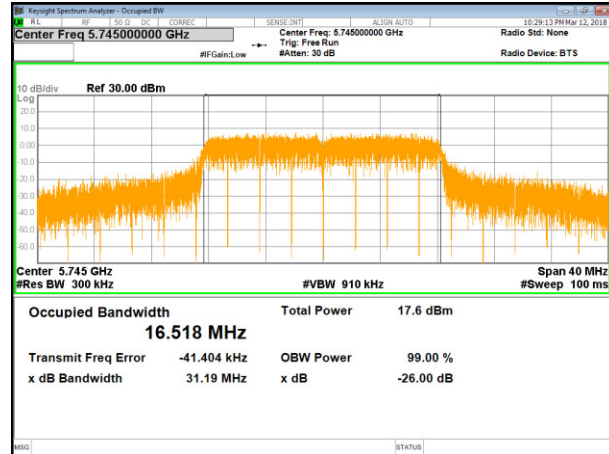


### 11n HT40 Mode High Channel

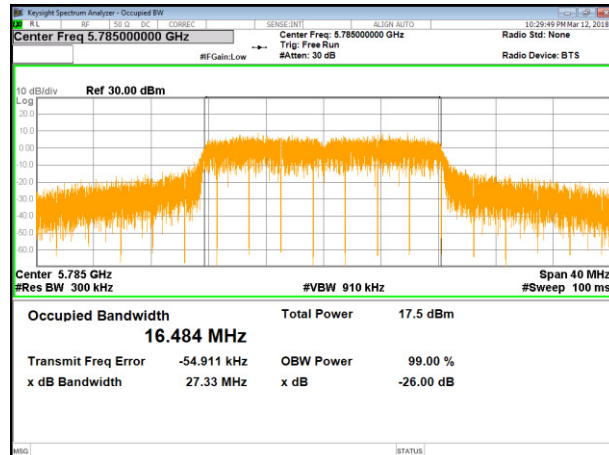


## UNII 5.8 GHz IEEE 802.11a mode

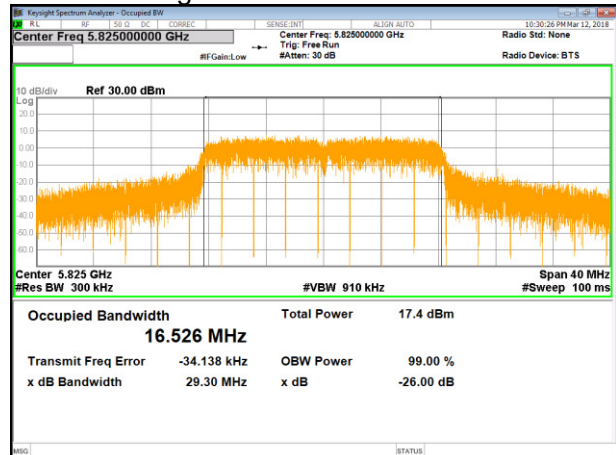
### 11a Mode Low Channel



### 11a Mode Middle Channel

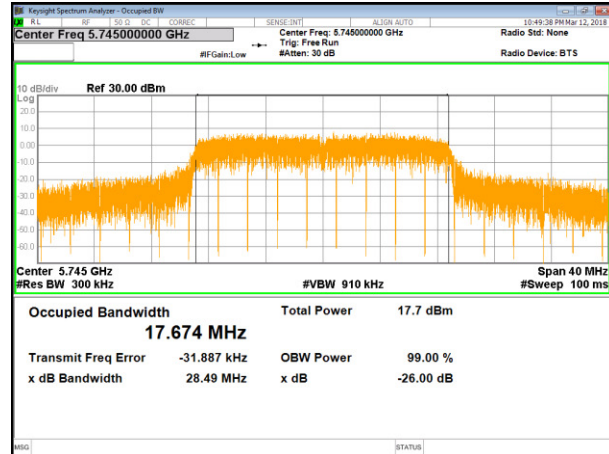


### 11a Mode High Channel

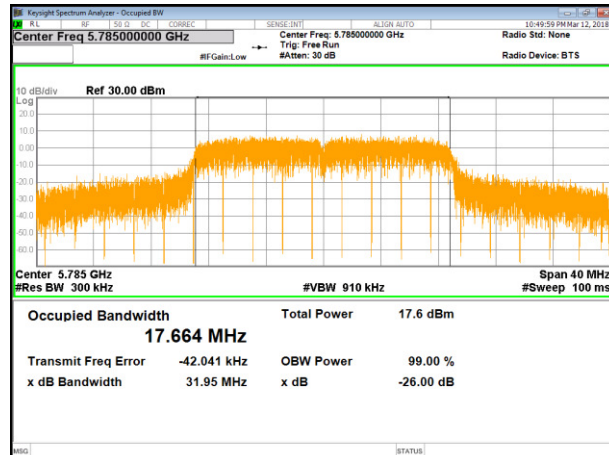


## UNII 5.8 GHz IEEE 802.11n HT20 mode

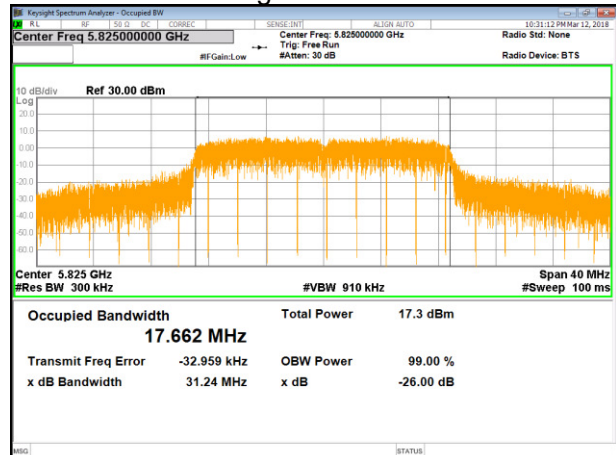
### 11n HT20 Mode Low Channel



### 11n HT20 Mode Middle Channel

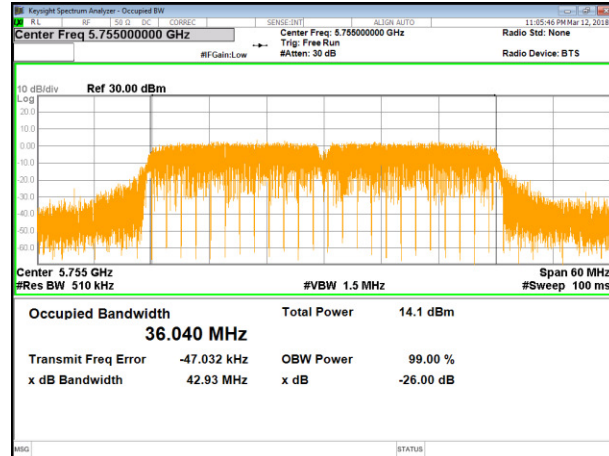


### 11n HT20 Mode High Channel

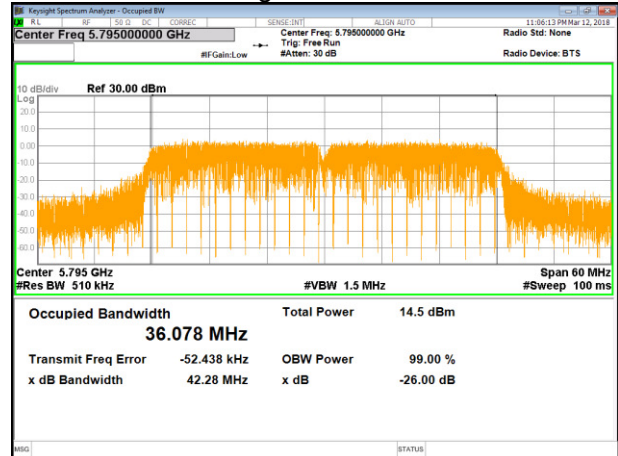


## UNII 5.8 GHz IEEE 802.11n HT40 mode

11n HT40 Mode Low Channel



11n HT40 Mode High Channel



## 10. ANTENNA PORT TEST RESULTS

### 10.1. 6 dB BANDWIDTH

#### LIMITS

FCC §15.407 (e)

The minimum 6 dB bandwidth shall be at least 500 kHz.

#### TEST PROCEDURE

Reference to 789033 D02 General UNII Test Procedures New Rules v02r01: The transmitter output is connected to a spectrum analyzer with the RBW set to 100kHz, the VBW  $\geq 3 \times$  RBW, peak detector and max hold.

#### RESULTS

##### 10.1.1. 802.11a MODE IN THE 5.8 GHz BAND

| Channel | Frequency [MHz] | 6 dB Bandwidth [MHz] | Minimum Limit [MHz] |
|---------|-----------------|----------------------|---------------------|
| Low     | 5745            | 16.320               | 0.5                 |
| Mid     | 5785            | 16.300               | 0.5                 |
| High    | 5825            | 16.280               | 0.5                 |
| Worst   |                 | 16.280               |                     |

##### 10.1.2. 802.11n HT20 MODE IN THE 5.8 GHz BAND

| Channel | Frequency [MHz] | 6 dB Bandwidth [MHz] | Minimum Limit [MHz] |
|---------|-----------------|----------------------|---------------------|
| Low     | 5745            | 15.640               | 0.5                 |
| Mid     | 5785            | 17.290               | 0.5                 |
| High    | 5825            | 17.260               | 0.5                 |
| Worst   |                 | 15.640               |                     |

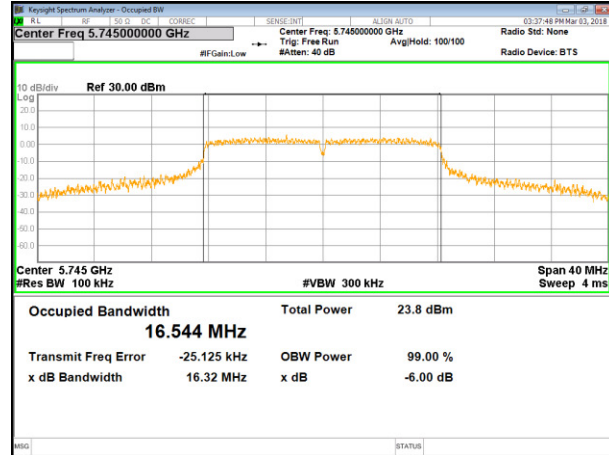
##### 10.1.3. 802.11n HT40 MODE IN THE 5.8 GHz BAND

| Channel | Frequency [MHz] | 6 dB Bandwidth [MHz] | Minimum Limit [MHz] |
|---------|-----------------|----------------------|---------------------|
| Low     | 5755            | 39.250               | 0.5                 |
| High    | 5795            | 39.490               | 0.5                 |
| Worst   |                 | 39.250               |                     |

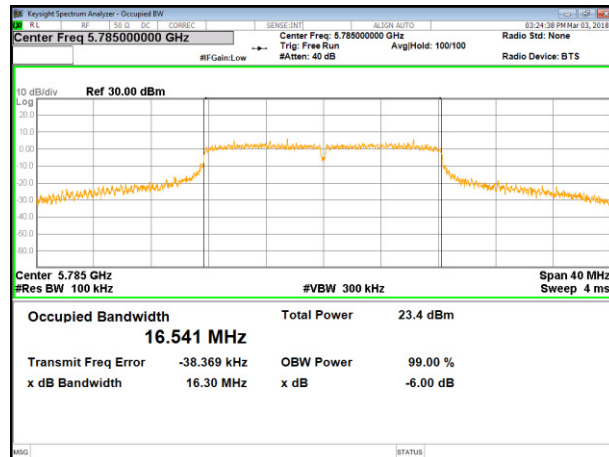
## 10.1.4. 6 dB BANDWIDTH PLOTS

### UNII 5.8 GHz IEEE 802.11a mode

#### 11a Mode Low Channel



#### 11a Mode Middle Channel



#### 11a Mode High Channel

