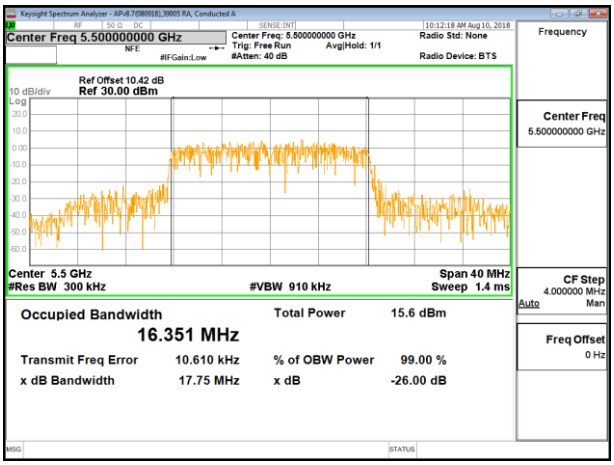
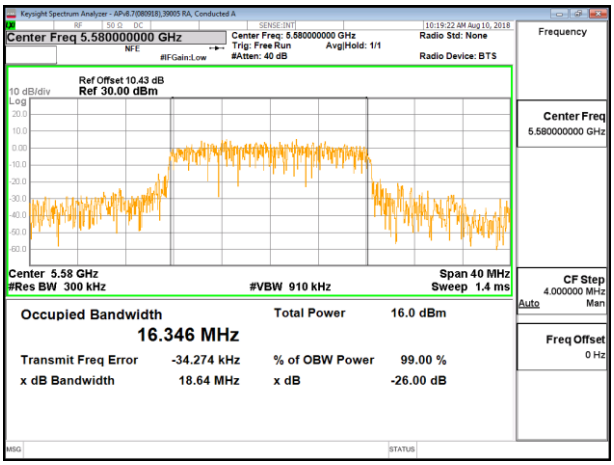
## 9.3.9. 802.11a MODE IN THE 5.6 GHz BAND

**1TX Antenna 1 MODE**

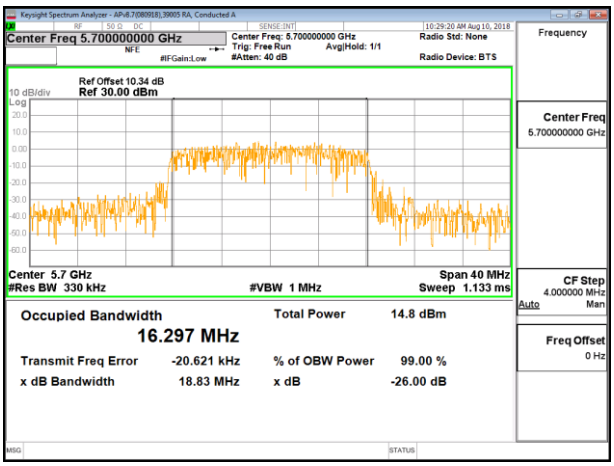
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 5500 | 16.3510 |
| Mid | 5580 | 16.3460 |
| High | 5700 | 16.2970 |
| 144 | 5720 | 16.2830 |



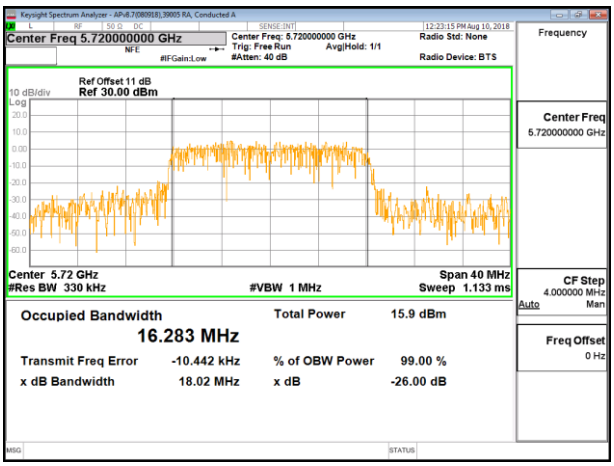

**LOW CHANNEL**




**MID CHANNEL**




**HIGH CHANNEL**

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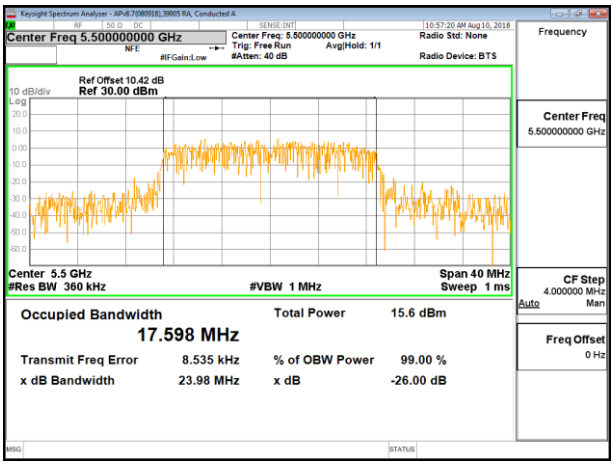
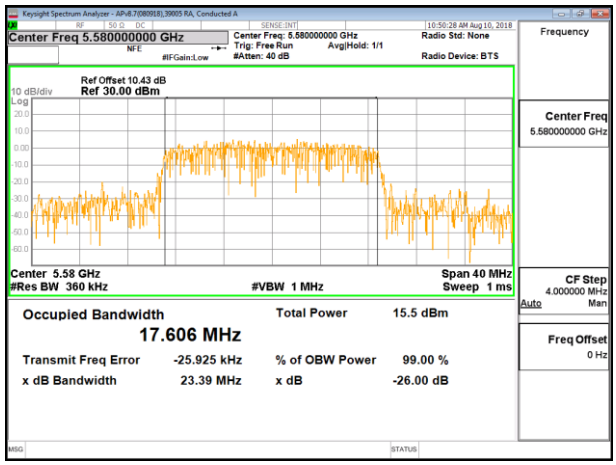
## 9.3.10. 802.11n HT20 MODE IN THE 5.6 GHz BAND

**1TX Antenna 1 MODE**

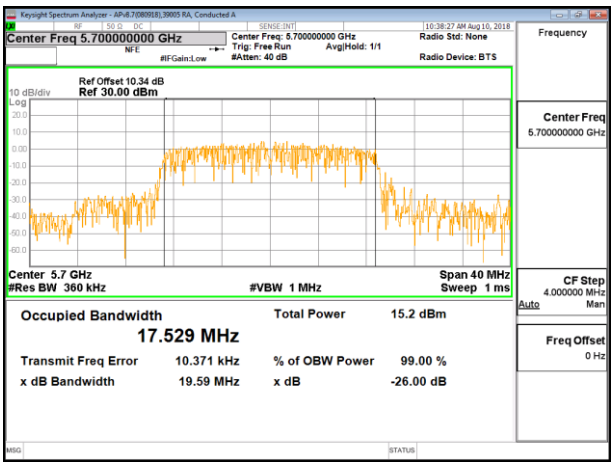
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 5500 | 17.5980 |
| Mid | 5580 | 17.6060 |
| High | 5700 | 17.5290 |
| 144 | 5720 | 17.5170 |



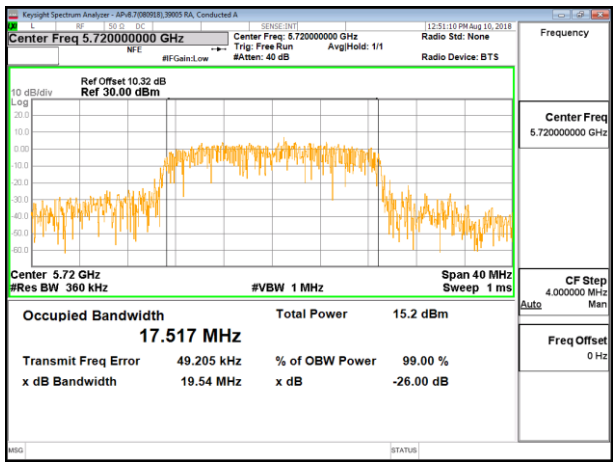

**LOW CHANNEL**




**MID CHANNEL**




**HIGH CHANNEL**

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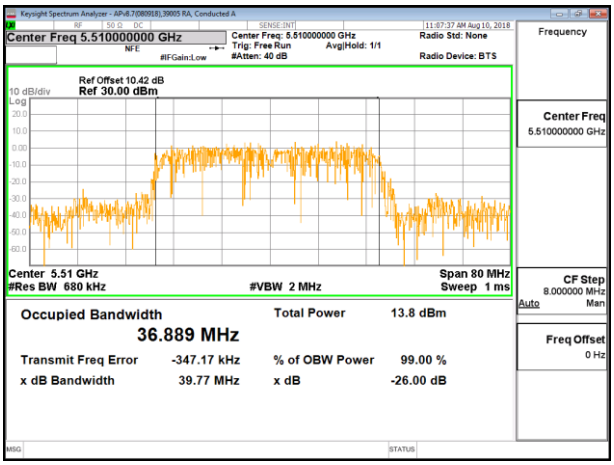
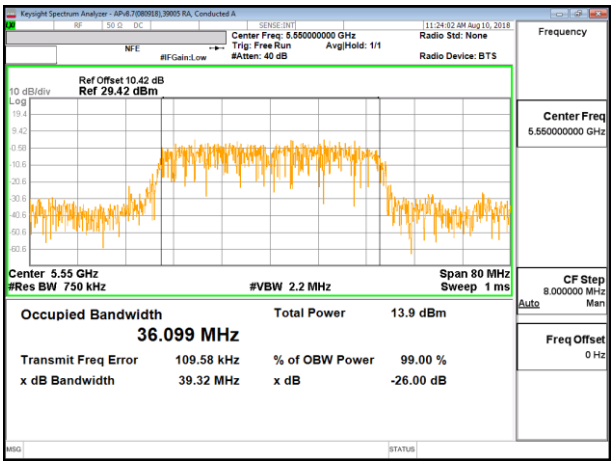
### 9.3.11. 802.11n HT40 MODE IN THE 5.6 GHz BAND

**1TX Antenna 1 MODE**

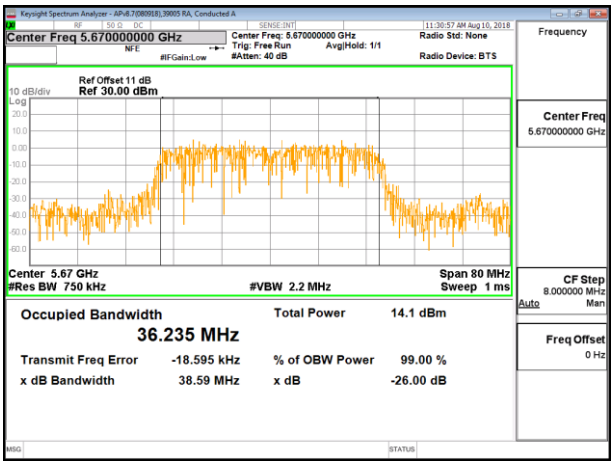
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 5510 | 36.8890 |
| Mid | 5550 | 36.0990 |
| High | 5670 | 36.2350 |
| 142 | 5710 | 36.0100 |



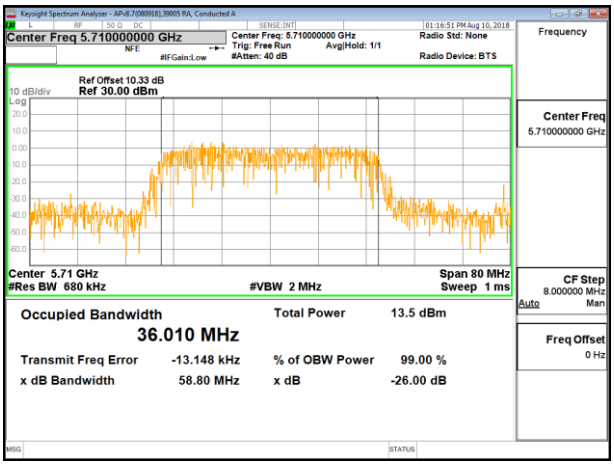

**LOW CHANNEL**




**MID CHANNEL**




**HIGH CHANNEL**

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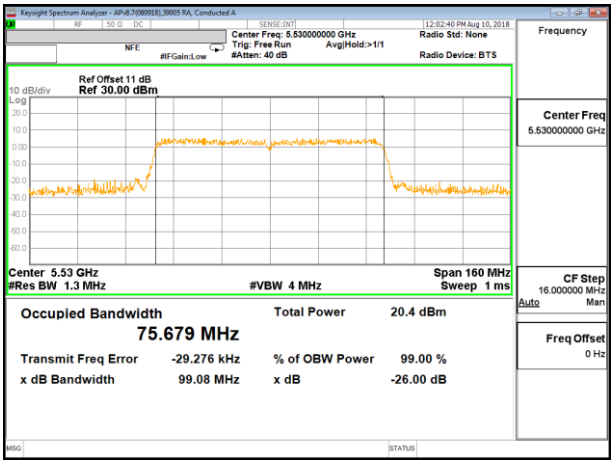
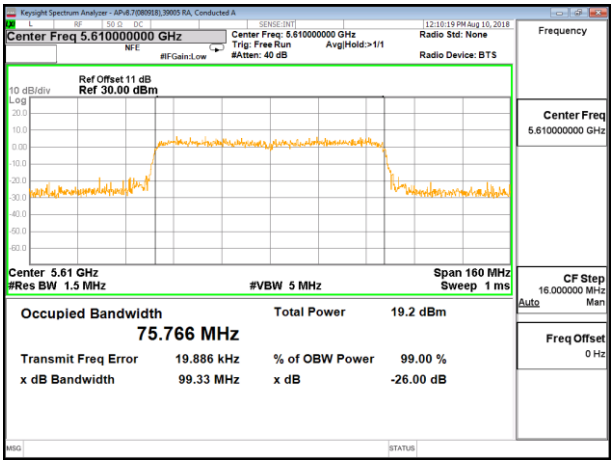
## 9.3.12. 802.11ac VHT80 MODE IN THE 5.6 GHz BAND

**1TX Antenna 1 MODE**

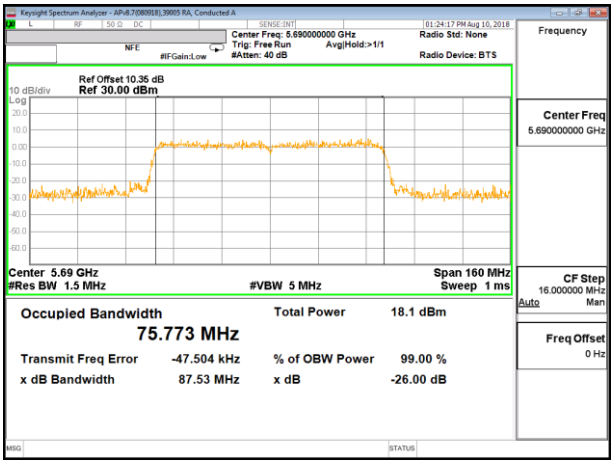
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 5530 | 75.6790 |
| High | 5610 | 75.7660 |
| 138 | 5690 | 75.7730 |




**LOW CHANNEL**




**HIGH CHANNEL**

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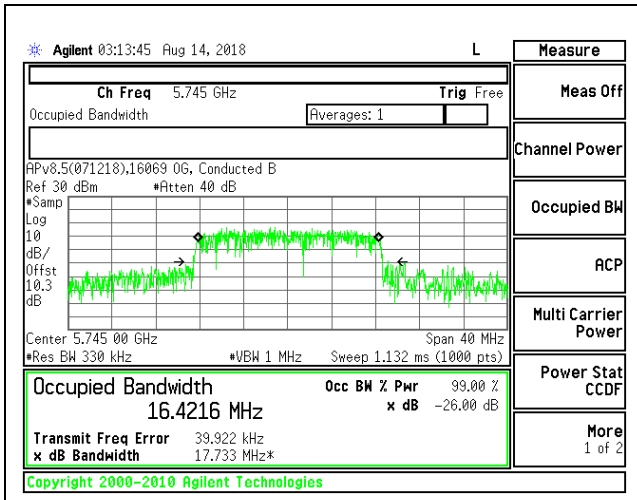
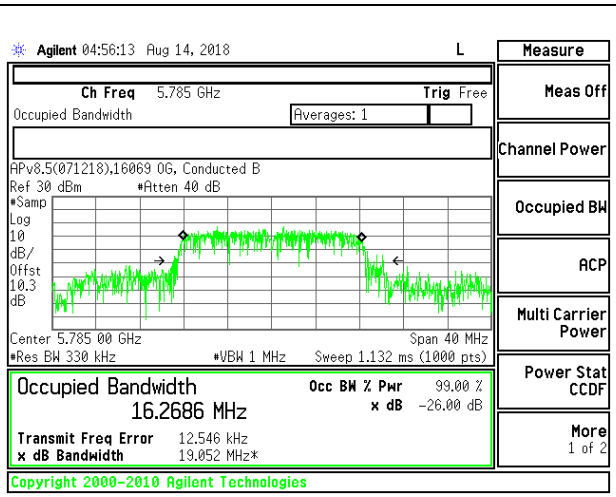
### 9.3.13. 802.11a MODE IN THE 5.8 GHz BAND

**1TX Antenna 1 MODE**

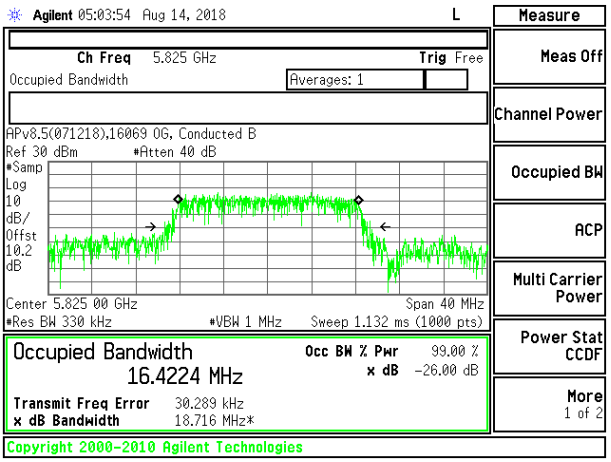
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 5745 | 16.4216 |
| Mid | 5785 | 16.2686 |
| High | 5825 | 16.4220 |




**LOW CHANNEL**




**MID CHANNEL**




**HIGH CHANNEL**



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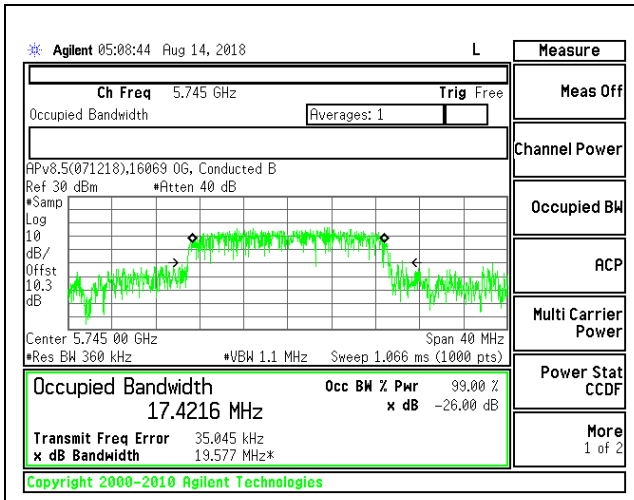
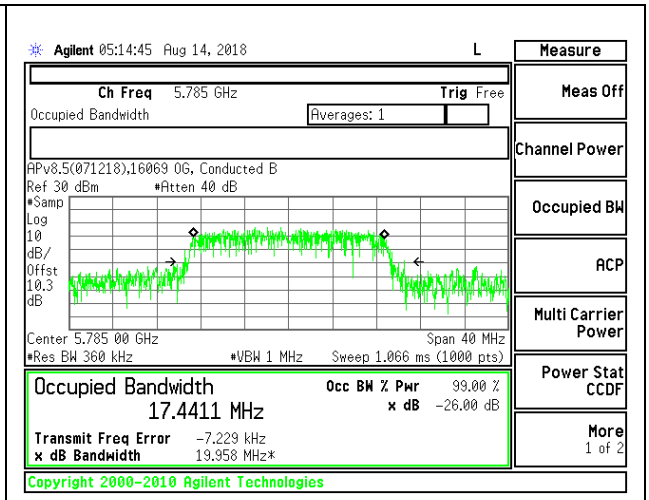
### 9.3.14. 802.11n HT20 MODE IN THE 5.8 GHz BAND

**1TX Antenna 1 MODE**

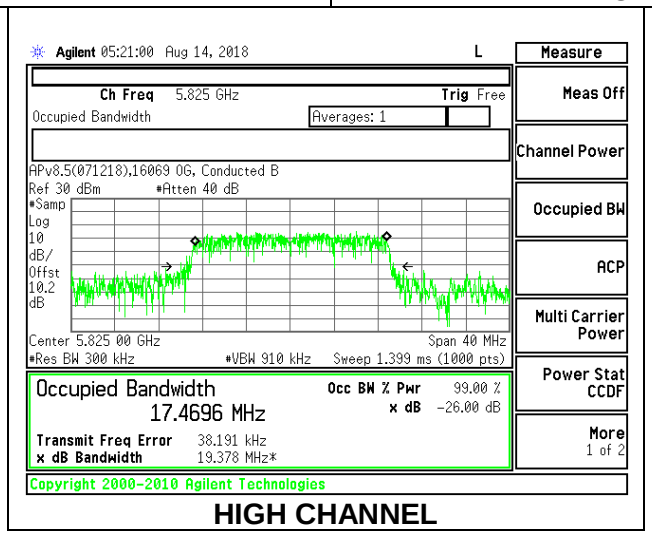
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 5745 | 17.4216 |
| Mid | 5785 | 17.4411 |
| High | 5825 | 17.4700 |




**LOW CHANNEL**




**MID CHANNEL**

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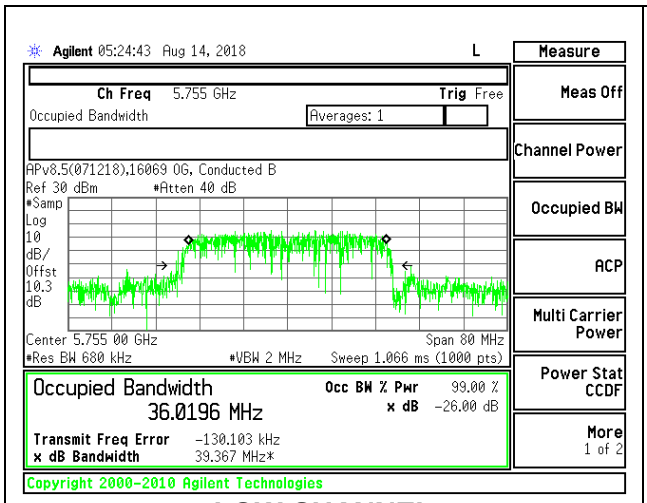
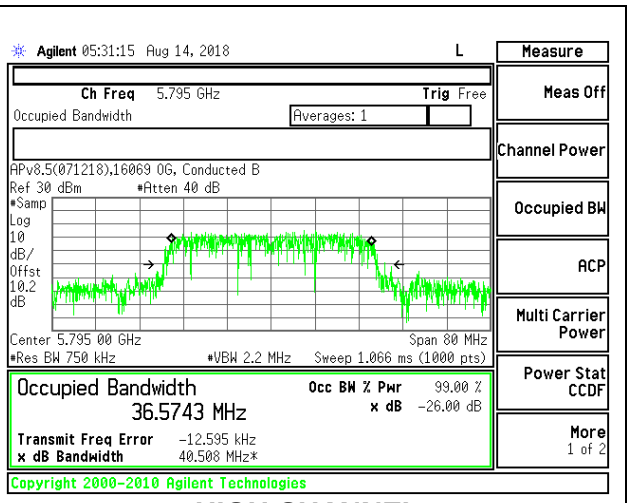
### 9.3.15. 802.11n HT40 MODE IN THE 5.8 GHz BAND

**1TX Antenna 1 MODE**

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Low | 5755 | 36.0196 |
| High | 5795 | 36.5743 |




**LOW CHANNEL**




**HIGH CHANNEL**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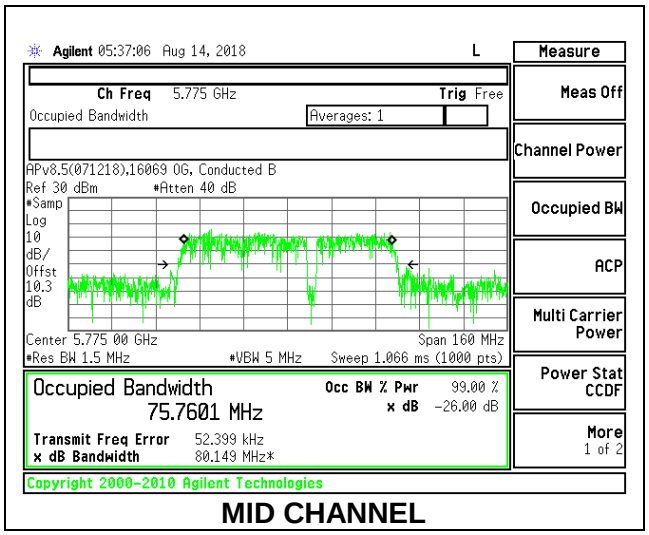
### 9.3.16. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

**1TX Antenna 1 MODE**

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---|---|---|
| Mid | 5775 | 75.7601 |




**MID CHANNEL**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## 9.4. 6 dB BANDWIDTH

**LIMITS**

FCC §15.407 (e)

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

**RESULTS**


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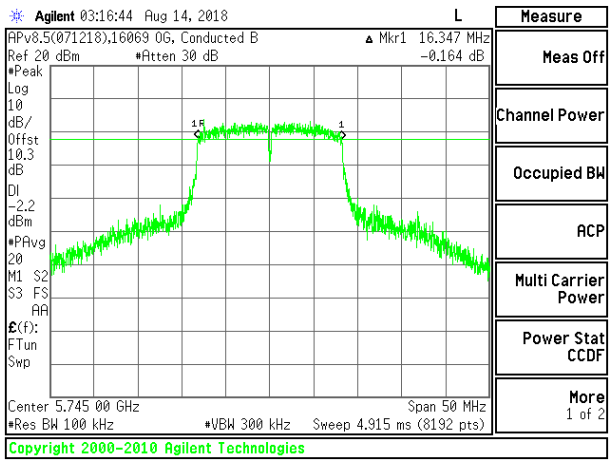
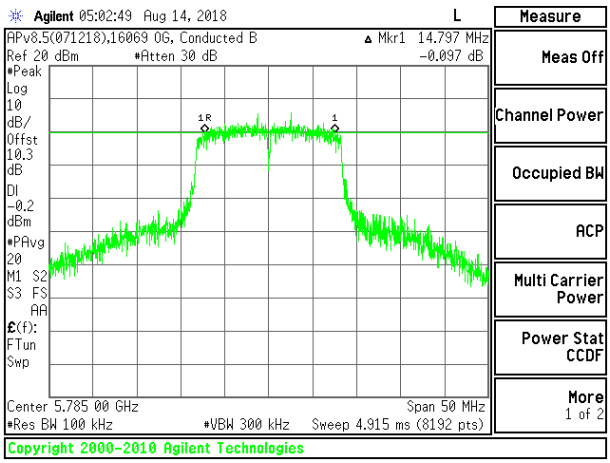
### 9.4.1. 802.11a MODE IN THE 5.8 GHz BAND

**1TX Antenna 1 MODE**

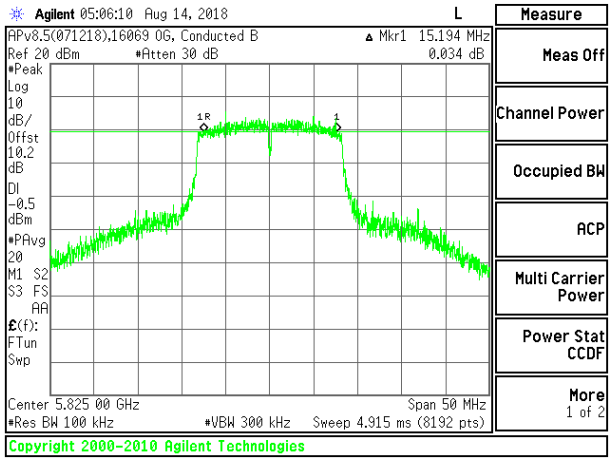
| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---|---|---|---|
| Low | 5745 | 16.3470 | 0.5 |
| Mid | 5785 | 14.7970 | 0.5 |
| High | 5825 | 15.1940 | 0.5 |
| 144 | 5720 | 3.1700 | 0.5 |



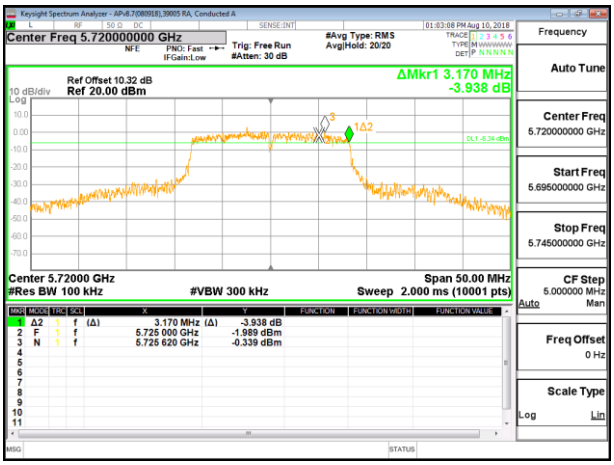

**LOW CHANNEL**




**MID CHANNEL**




**HIGH CHANNEL**

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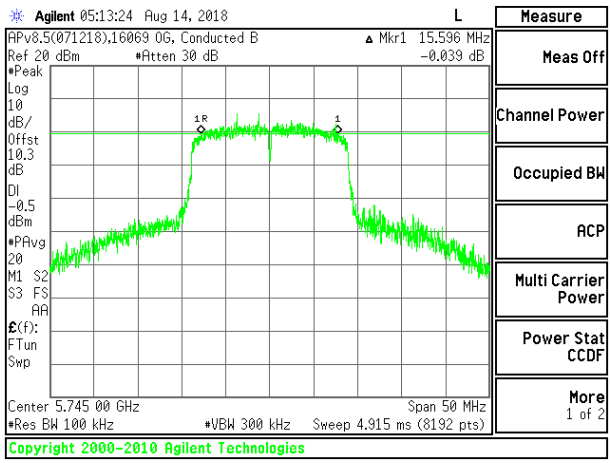
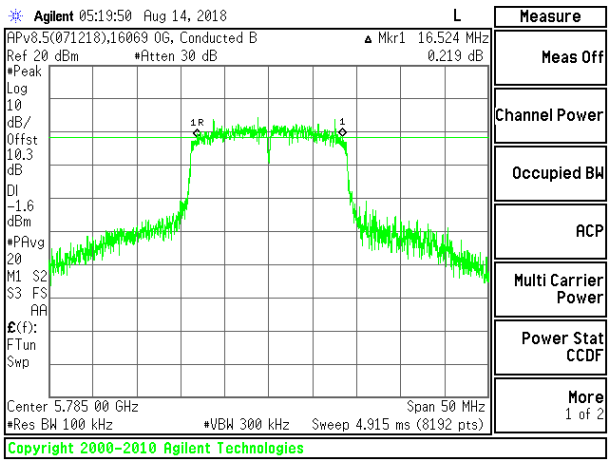
## 9.4.2. 802.11n HT20 MODE IN THE 5.8 GHz BAND

**1TX Antenna 1 MODE**

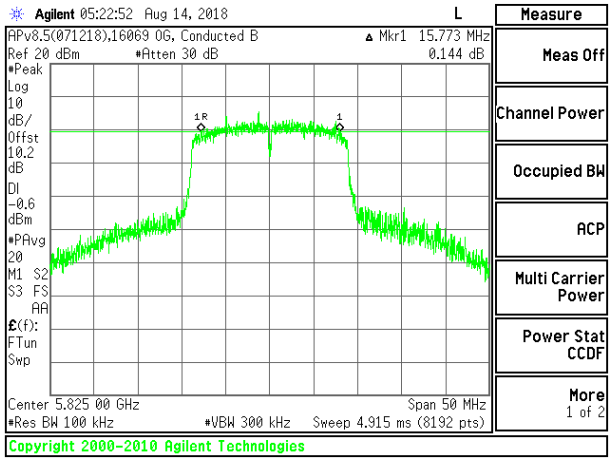
| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---|---|---|---|
| Low | 5745 | 15.5960 | 0.5 |
| Mid | 5785 | 16.5240 | 0.5 |
| High | 5825 | 15.7730 | 0.5 |
| 144 | 5720 | 3.5250 | 0.5 |



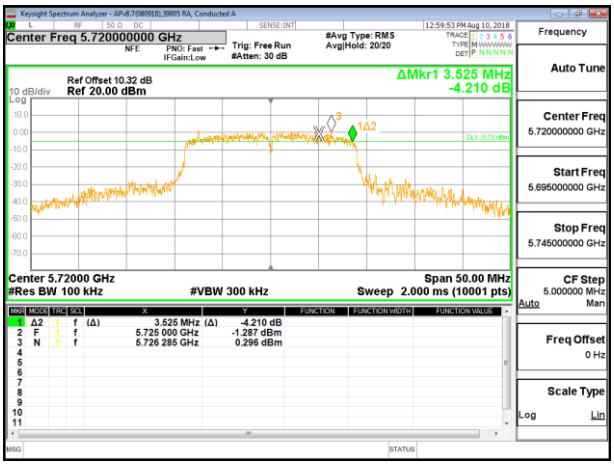

**LOW CHANNEL**




**MID CHANNEL**




**HIGH CHANNEL**

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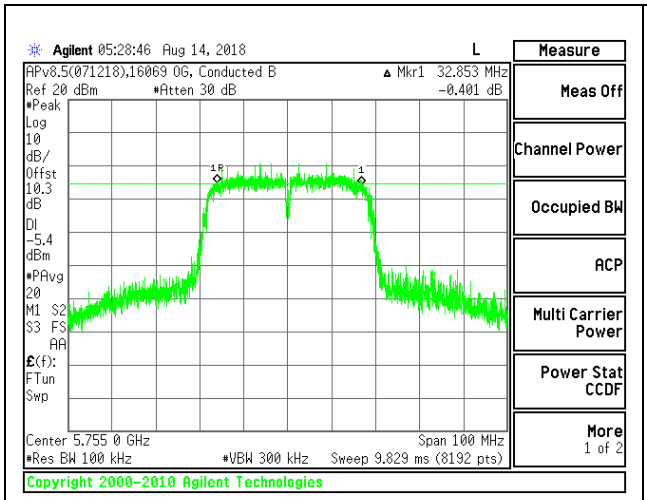
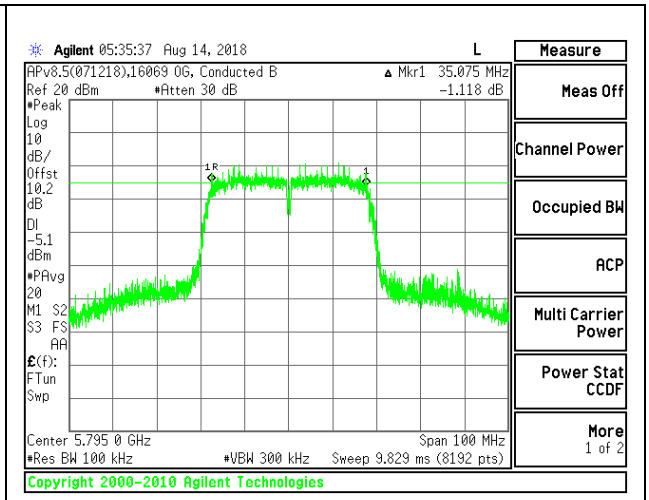
### 9.4.3. 802.11n HT40 MODE IN THE 5.8 GHz BAND

**1TX Antenna 1 MODE**

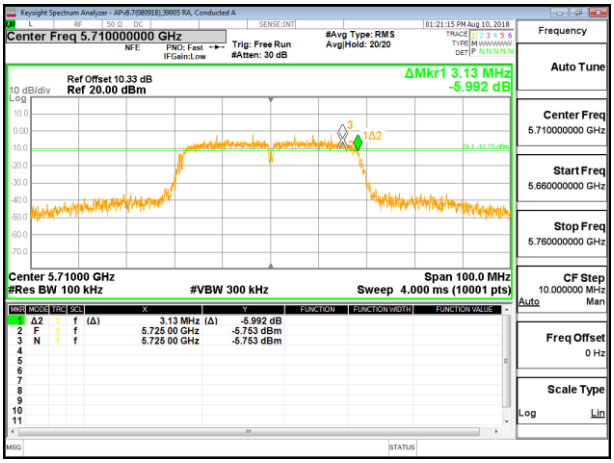
| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---|---|---|---|
| Low | 5755 | 32.8530 | 0.5 |
| High | 5795 | 35.0750 | 0.5 |
| 142 | 5710 | 3.1300 | 0.5 |




**LOW CHANNEL**




**HIGH CHANNEL**

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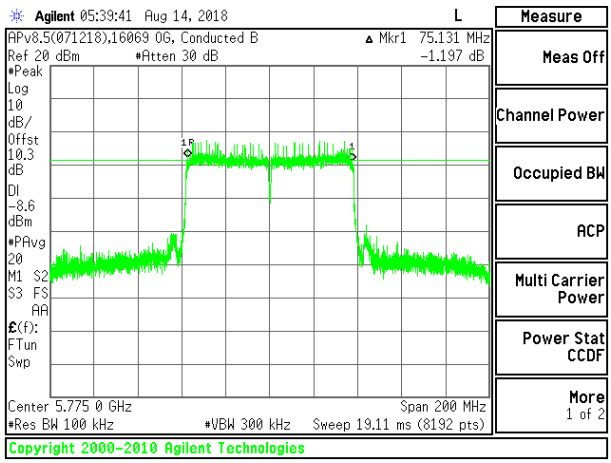
### 9.4.4. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

**1TX Antenna 1 MODE**

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---|---|---|---|
| Mid | 5775 | 75.1310 | 0.5 |
| 138 | 5690 | 3.2200 | 0.5 |




**MID CHANNEL**

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## 9.5. OUTPUT POWER AND PSD

**LIMITS**

### FCC §15.407

**Band 5.15–5.25 GHz**

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Bands 5.25-5.35 GHz and 5.47-5.725 GHz**

The maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.



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**Band 5.725-5.85 GHz**

The maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information.

**TEST PROCEDURE**

The measurement method used for output power is KDB 789033 D02 v02r01, Section E.3.b (Method PM-G) and for straddles channels KDB 789033 D02 v02r01, Section E.2.b (Method SA-1) was used.

The measurement method used for power spectral density is KDB 789033 D02 v02r01, Section F

**DIRECTIONAL ANTENNA GAIN**

For 1 TX:
There is only one transmitter output therefore the directional gain is equal to the antenna gain.

**RESULTS**


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### 9.5.1. 802.11a MODE IN THE 5.2 GHz BAND

**1TX Antenna 1 MODE**

**Antenna Gain and Limits**

| Channel | Frequency (MHz) | Directional Gain (dBi) | Power Limit (dBm) | PSD Limit (dBm/ 1MHz) |
|---|---|---|---|---|
| Low | 5180 | -6.90 | 24.00 | 11.00 |
| Mid | 5200 | -6.90 | 24.00 | 11.00 |
| High | 5240 | -6.90 | 24.00 | 11.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | **Included in Calculations of Corr'd PSD** |

**Output Power Results**

| Channel | Frequency (MHz) | Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5180 | 15.40 | 15.40 | 24.00 | -8.60 |
| Mid | 5200 | 15.28 | 15.28 | 24.00 | -8.72 |
| High | 5240 | 15.62 | 15.62 | 24.00 | -8.38 |

**PSD Results**

| Channel | Frequency (MHz) | Meas PSD (dBm/1MHz) | Total Corr'd PSD (dBm/1MHz) | PSD Limit (dBm/ 1MHz) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5180 | 5.776 | 5.78 | 11.00 | -5.22 |
| Mid | 5200 | 5.818 | 5.82 | 11.00 | -5.18 |
| High | 5240 | 5.416 | 5.42 | 11.00 | -5.58 |


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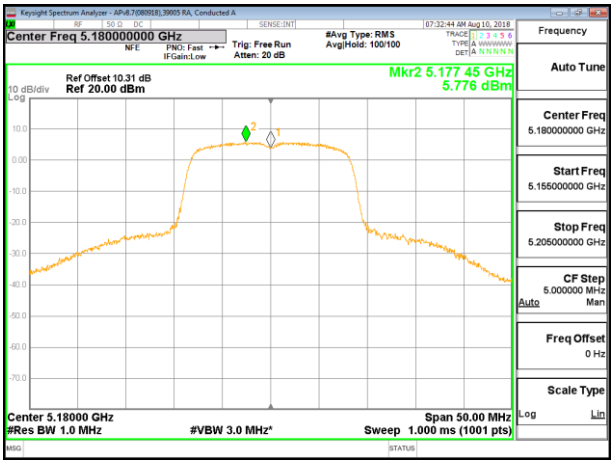
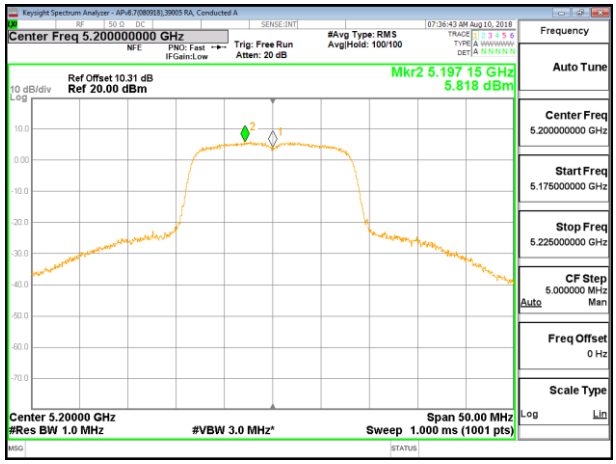



**LOW CHANNEL**

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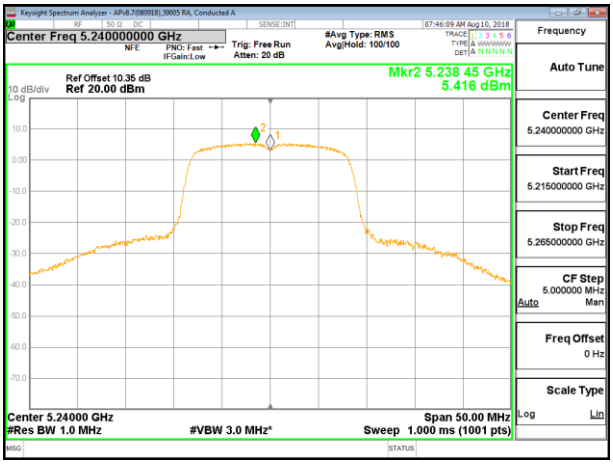


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## 9.5.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

**1TX Antenna 1 MODE**

**Antenna Gain and Limits**

| Channel | Frequency (MHz) | Directional Gain (dBi) | Power Limit (dBm) | PSD Limit (dBm/ 1MHz) |
|---|---|---|---|---|
| Low | 5180 | -6.90 | 24.00 | 11.00 |
| Mid | 5200 | -6.90 | 24.00 | 11.00 |
| High | 5240 | -6.90 | 24.00 | 11.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | **Included in Calculations of Corr'd PSD** |

**Output Power Results**

| Channel | Frequency (MHz) | Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5180 | 15.33 | 15.33 | 24.00 | -8.67 |
| Mid | 5200 | 15.31 | 15.31 | 24.00 | -8.69 |
| High | 5240 | 15.68 | 15.68 | 24.00 | -8.32 |

**PSD Results**

| Channel | Frequency (MHz) | Meas PSD (dBm/1MHz) | Total Corr'd PSD (dBm/1MHz) | PSD Limit (dBm/ 1MHz) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5180 | 5.289 | 5.29 | 11.00 | -5.71 |
| Mid | 5200 | 5.145 | 5.15 | 11.00 | -5.86 |
| High | 5240 | 5.410 | 5.41 | 11.00 | -5.59 |


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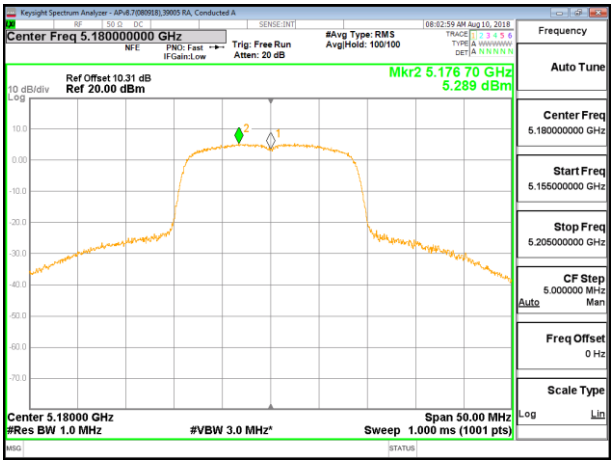
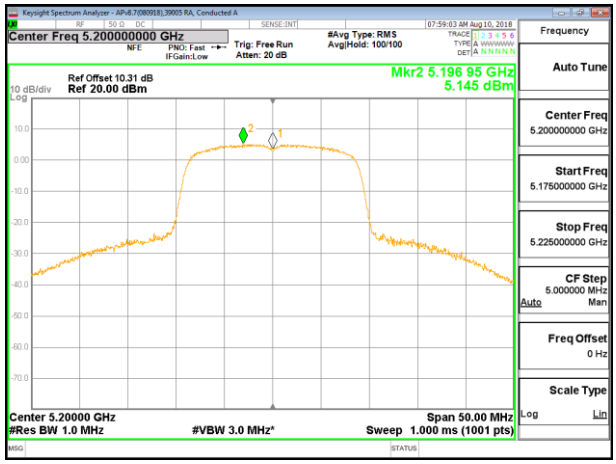
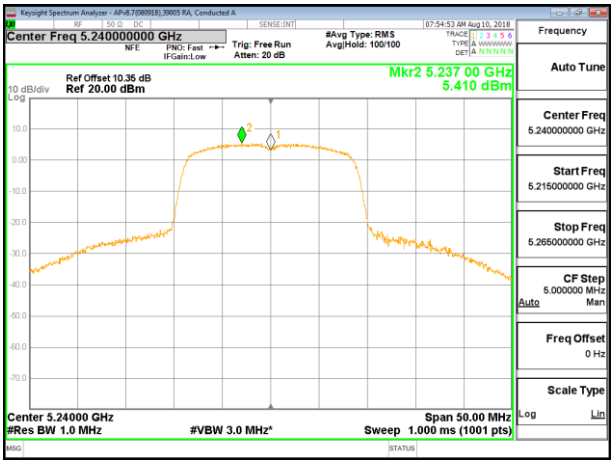



**LOW CHANNEL**




**MID CHANNEL**

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## 9.5.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

**1TX Antenna 1 MODE**

**Antenna Gain and Limits**

| Channel | Frequency (MHz) | Directional Gain for Power (dBi) | Power Limit (dBm) | PSD Limit (dBm/ 1MHz) |
|---|---|---|---|---|
| Low | 5190 | -6.90 | 24.00 | 11.00 |
| High | 5230 | -6.90 | 24.00 | 11.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.17 | **Included in Calculations of Corr'd Power & PSD** |

**Output Power Results**

| Channel | Frequency (MHz) | Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5190 | 13.61 | 13.61 | 24.00 | -10.39 |
| High | 5230 | 13.54 | 13.54 | 24.00 | -10.46 |

**PSD Results**

| Channel | Frequency (MHz) | Meas PSD (dBm/1MHz) | Total Corr'd PSD (dBm/1MHz) | PSD Limit (dBm/ 1MHz) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5190 | -0.551 | -0.38 | 11.00 | -11.38 |
| High | 5230 | -0.294 | -0.12 | 11.00 | -11.12 |


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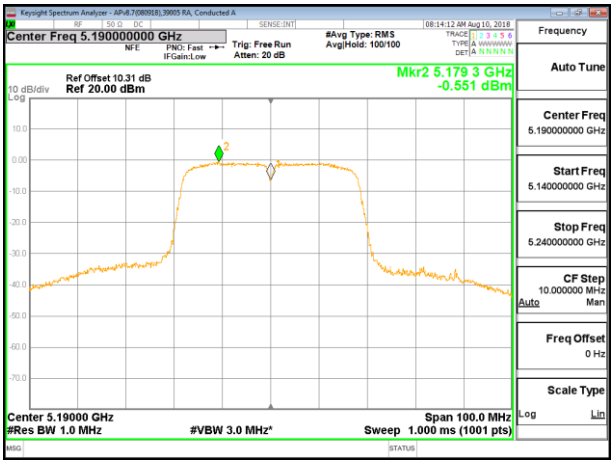
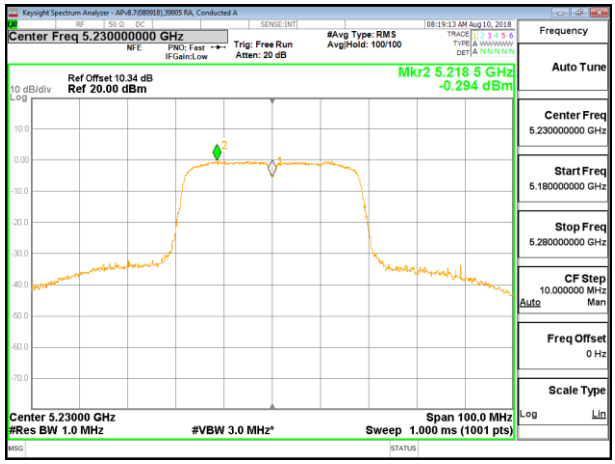



**LOW CHANNEL**

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## 9.5.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

**1TX Antenna 1 MODE**

**Antenna Gain and Limits**

| Channel | Frequency (MHz) | Directional Gain (dBi) | Power Limit (dBm) | PSD Limit (dBm/ 1MHz) |
|---|---|---|---|---|
| Mid | 5210 | -6.90 | 24.00 | 11.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.33 | Included in Calculations of Corr'd Power & PSD |

**Output Power Results**

| Channel | Frequency (MHz) | Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Mid | 5210 | 9.47 | 9.47 | 24.00 | -14.53 |

**PSD Results**

| Channel | Frequency (MHz) | Meas PSD (dBm/ 1MHz) | Total Corr'd PSD (dBm/ 1MHz) | PSD Limit (dBm/ 1MHz) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Mid | 5210 | -4.360 | -4.03 | 11.00 | -15.03 |


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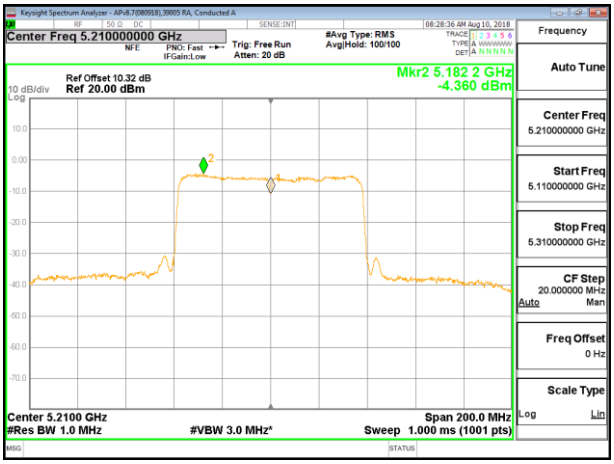


**MID CHANNEL**



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## 9.5.5. 802.11a MODE IN THE 5.3 GHz BAND

**1TX Antenna 1 MODE**

**Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Directional Gain (dBi) | Power Limit (dBm) | PSD Limit (dBm/1MHz) |
|---|---|---|---|---|---|
| Low | 5260 | 29.55 | -6.90 | 24.00 | 11.00 |
| Mid | 5300 | 26.00 | -6.90 | 24.00 | 11.00 |
| High | 5320 | 27.25 | -6.90 | 24.00 | 11.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd PSD |

**Output Power Results**

| Channel | Frequency (MHz) | Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5260 | 14.88 | 14.88 | 24.00 | -9.12 |
| Mid | 5300 | 14.95 | 14.95 | 24.00 | -9.05 |
| High | 5320 | 14.87 | 14.87 | 24.00 | -9.13 |

**PSD Results**

| Channel | Frequency (MHz) | Meas PSD (dBm/1MHz) | Total Corr'd PSD (dBm/1MHz) | PSD Limit (dBm/1MHz) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5260 | 5.320 | 5.32 | 11.00 | -5.68 |
| Mid | 5300 | 4.820 | 4.82 | 11.00 | -6.18 |
| High | 5320 | 5.011 | 5.01 | 11.00 | -5.99 |


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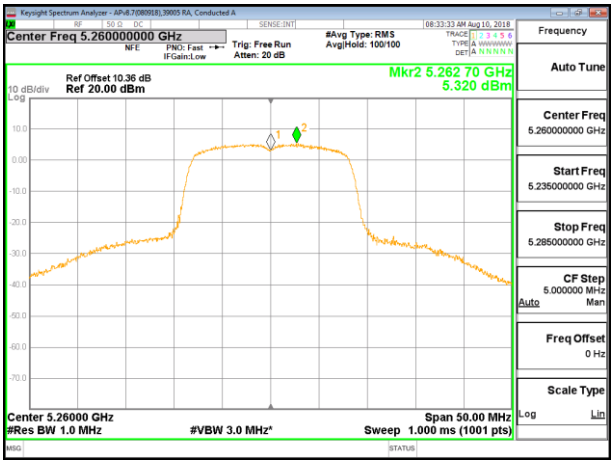
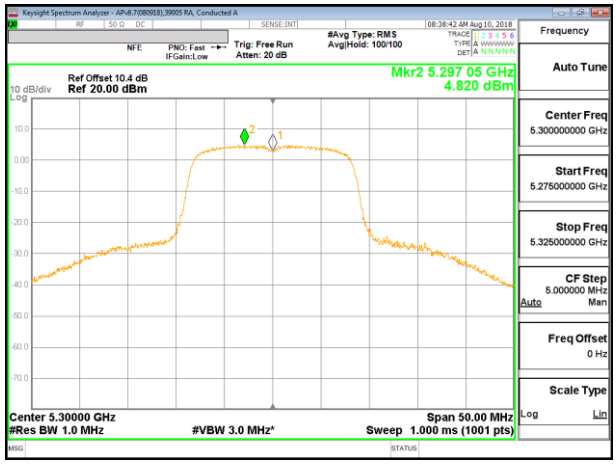
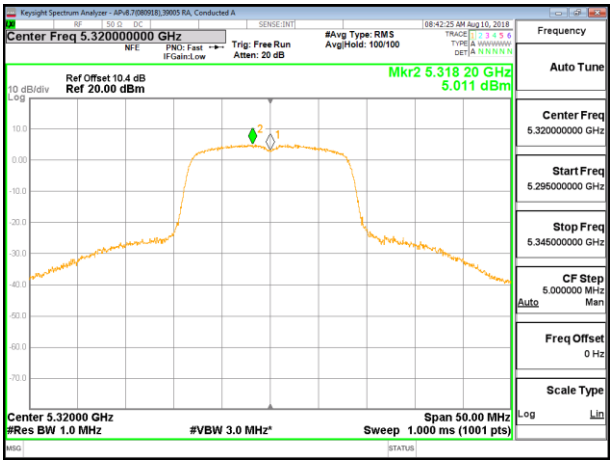



**LOW CHANNEL**




**MID CHANNEL**

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## 9.5.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND

**1TX Antenna 1 MODE**

**Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Directional Gain (dBi) | Power Limit (dBm) | PSD Limit (dBm/1MHz) |
|---|---|---|---|---|---|
| Low | 5260 | 33.85 | -6.90 | 24.00 | 11.00 |
| Mid | 5300 | 32.65 | -6.90 | 24.00 | 11.00 |
| High | 5320 | 31.65 | -6.90 | 24.00 | 11.00 |

| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd PSD |
|---|---|---|

**Output Power Results**

| Channel | Frequency (MHz) | Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5260 | 14.76 | 14.76 | 24.00 | -9.24 |
| Mid | 5300 | 14.79 | 14.79 | 24.00 | -9.21 |
| High | 5320 | 14.69 | 14.69 | 24.00 | -9.31 |

**PSD Results**

| Channel | Frequency (MHz) | Meas PSD (dBm/1MHz) | Total Corr'd PSD (dBm/1MHz) | PSD Limit (dBm/1MHz) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5260 | 5.200 | 5.20 | 11.00 | -5.80 |
| Mid | 5300 | 4.645 | 4.65 | 11.00 | -6.36 |
| High | 5320 | 4.903 | 4.90 | 11.00 | -6.10 |


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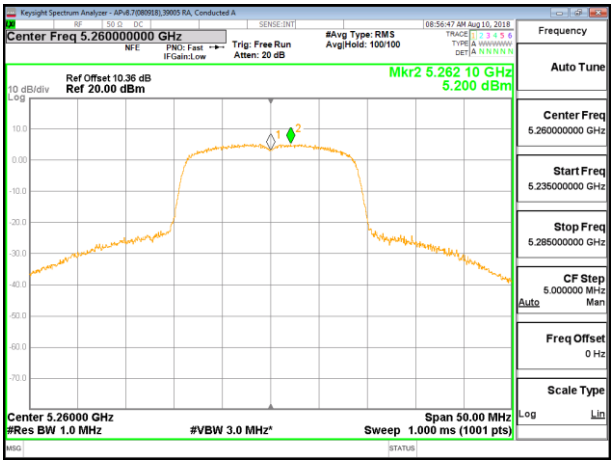
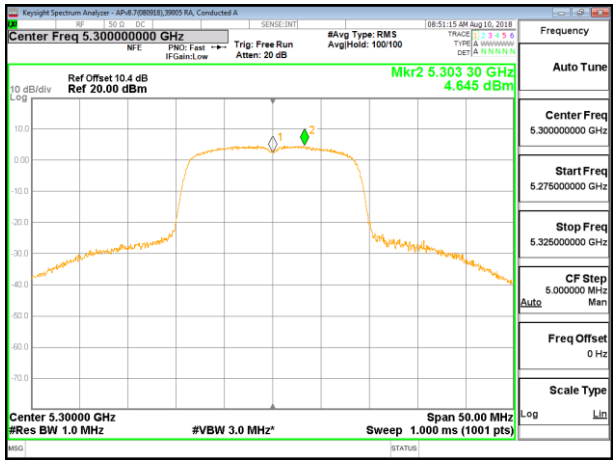
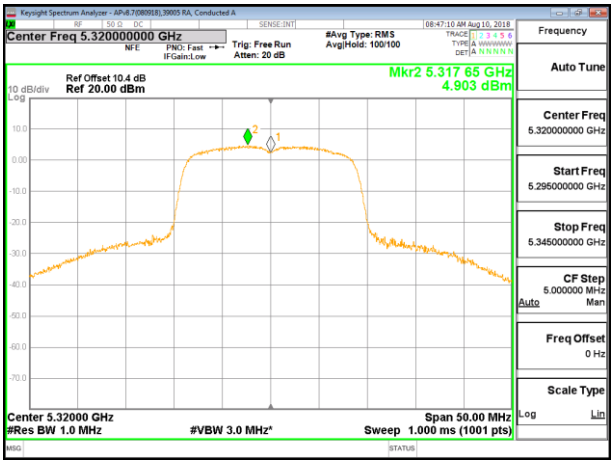



**LOW CHANNEL**




**MID CHANNEL**

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## 9.5.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND

**1TX Antenna 1 MODE**

**Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Directional Gain (dBi) | Power Limit (dBm) | PSD Limit (dBm/1MHz) |
|---|---|---|---|---|---|
| Low | 5270 | 61.30 | -6.90 | 24.00 | 11.00 |
| High | 5310 | 73.90 | -6.90 | 24.00 | 11.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.17 | Included in Calculations of Corr'd PSD |

**Output Power Results**

| Channel | Frequency (MHz) | Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5270 | 13.75 | 13.75 | 24.00 | -10.25 |
| High | 5310 | 13.86 | 13.86 | 24.00 | -10.14 |

**PSD Results**

| Channel | Frequency (MHz) | Meas PSD (dBm/1MHz) | Total Corr'd PSD (dBm/1MHz) | PSD Limit (dBm/1MHz) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5270 | -0.989 | -0.82 | 11.00 | -11.82 |
| High | 5310 | -0.592 | -0.42 | 11.00 | -11.42 |


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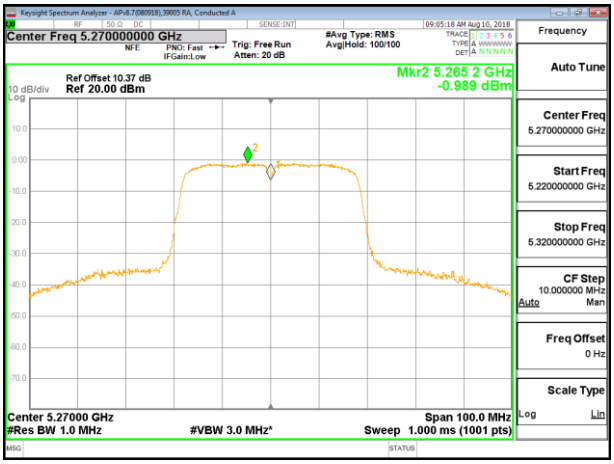
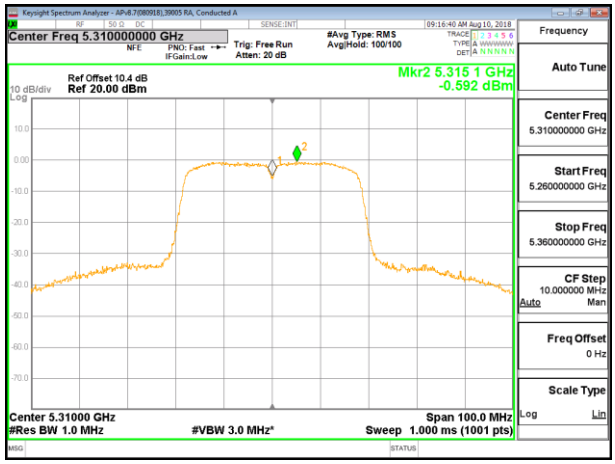



**LOW CHANNEL**

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## 9.5.8. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

**1TX Antenna 1 MODE**

**Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Directional Gain (dBi) | Power Limit (dBm) | PSD Limit (dBm/1MHz) |
|---|---|---|---|---|---|
| Mid | 5290 | 122.40 | -6.90 | 24.00 | 11.00 |

| Duty Cycle CF (dB) | 0.33 | Included in Calculations of Corr'd PSD |
|---|---|---|

**Output Power Results**

| Channel | Frequency (MHz) | Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Mid | 5290 | 12.62 | 12.62 | 24.00 | -11.38 |

**PSD Results**

| Channel | Frequency (MHz) | Meas PSD (dBm/1MHz) | Total Corr'd PSD (dBm/1MHz) | PSD Limit (dBm/1MHz) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Mid | 5290 | -4.930 | -4.60 | 11.00 | -15.60 |


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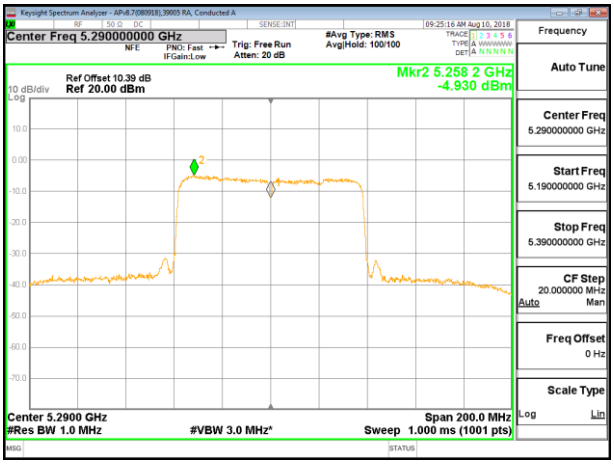


**MID CHANNEL**



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## 9.5.9. 802.11a MODE IN THE 5.6 GHz BAND

**1TX Antenna 1 MODE**

**Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Directional Gain (dBi) | Power Limit (dBm) | PSD Limit (dBm/ 1MHz) |
|---|---|---|---|---|---|
| Low | 5500 | 26.35 | -4.31 | 24.00 | 11.00 |
| Mid | 5580 | 25.80 | -4.31 | 24.00 | 11.00 |
| High | 5700 | 25.85 | -4.31 | 24.00 | 11.00 |
| 144 | 5720 | 17.18 | -4.31 | 23.35 | 11.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd Power & PSD |

**Output Power Results**

| Channel | Frequency (MHz) | Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5500 | 15.05 | 15.05 | 24.00 | -8.95 |
| Mid | 5580 | 15.02 | 15.02 | 24.00 | -8.98 |
| High | 5700 | 15.12 | 15.12 | 24.00 | -8.88 |
| 144 | 5720 | 14.98 | 14.98 | 23.35 | -8.37 |

**PSD Results**

| Channel | Frequency (MHz) | Meas PSD (dBm/ 1MHz) | Total Corr'd PSD (dBm/ 1MHz) | PSD Limit (dBm/ 1MHz) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5500 | 4.874 | 4.87 | 11.00 | -6.13 |
| Mid | 5580 | 5.253 | 5.25 | 11.00 | -5.75 |
| High | 5700 | 4.962 | 4.96 | 11.00 | -6.04 |
| 144 | 5720 | 3.690 | 3.69 | 11.00 | -7.31 |


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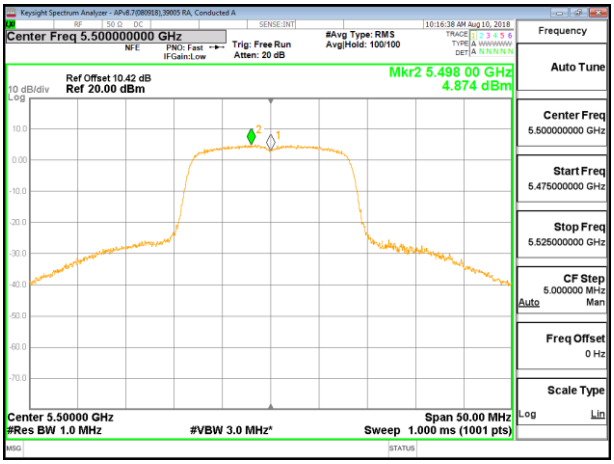
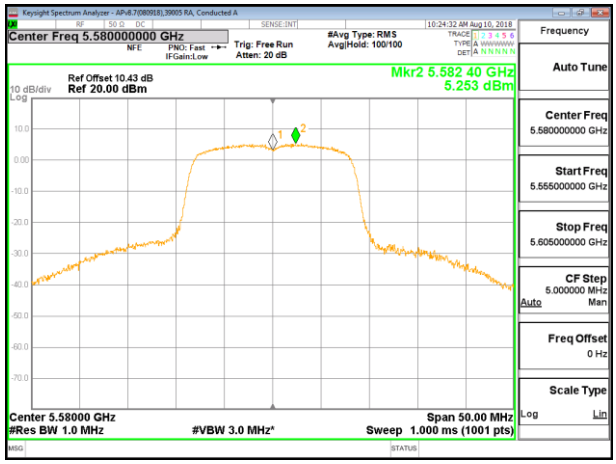
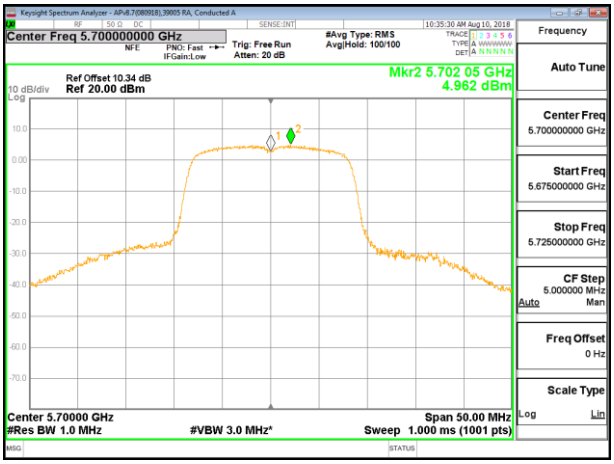


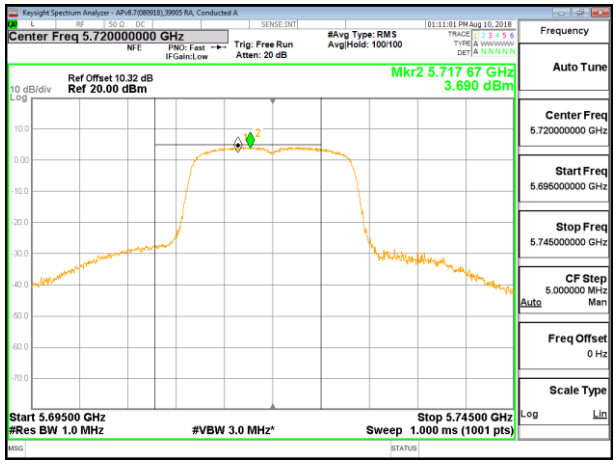

**LOW CHANNEL**




**MID CHANNEL**




**HIGH CHANNEL**




**CHANNEL 144**



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## 9.5.10. 802.11n HT20 MODE IN THE 5.6 GHz BAND

**1TX Antenna 1 MODE**

**Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Directional Gain (dBi) | Power Limit (dBm) | PSD Limit (dBm/ 1MHz) |
|---|---|---|---|---|---|
| Low | 5500 | 31.5 | -4.31 | 24.00 | 11.00 |
| Mid | 5580 | 30.2 | -4.31 | 24.00 | 11.00 |
| High | 5700 | 30.75 | -4.31 | 24.00 | 11.00 |
| 144 | 5720 | 30.10 | -4.31 | 24.00 | 11.00 |

| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd Power & PSD |
|---|---|---|

**Output Power Results**

| Channel | Frequency (MHz) | Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5500 | 14.66 | 14.66 | 24.00 | -9.34 |
| Mid | 5580 | 14.81 | 14.81 | 24.00 | -9.19 |
| High | 5700 | 14.96 | 14.96 | 24.00 | -9.04 |
| 144 | 5720 | 15.01 | 15.01 | 24.00 | -8.99 |

**PSD Results**

| Channel | Frequency (MHz) | Meas PSD (dBm/ 1MHz) | Total Corr'd PSD (dBm/ 1MHz) | PSD Limit (dBm/ 1MHz) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5500 | 4.505 | 4.51 | 11.00 | -6.50 |
| Mid | 5580 | 4.605 | 4.61 | 11.00 | -6.40 |
| High | 5700 | 4.605 | 4.61 | 11.00 | -6.40 |
| 144 | 5720 | 3.637 | 3.64 | 11.00 | -7.36 |


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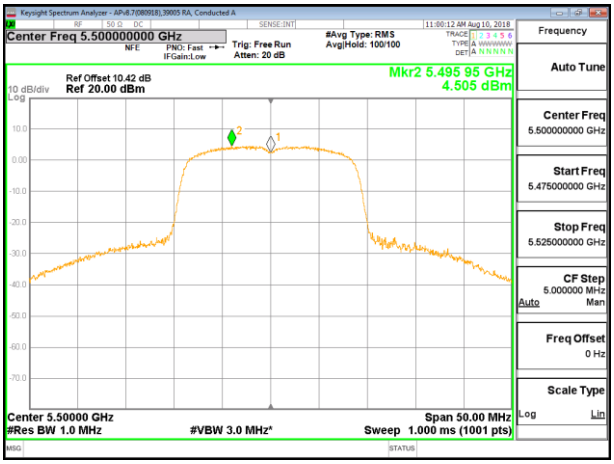
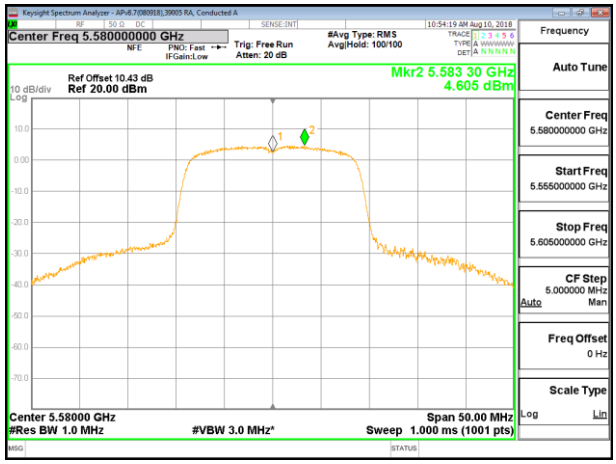
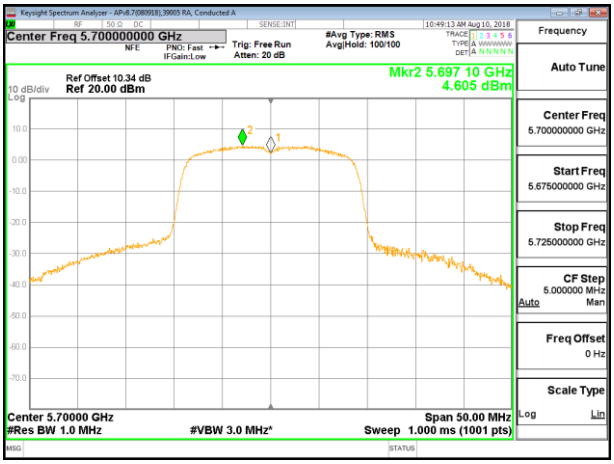


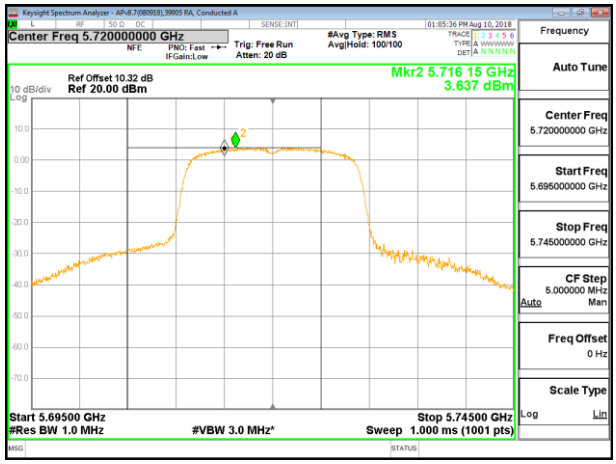

LOW CHANNEL




MID CHANNEL




HIGH CHANNEL




CHANNEL 144



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## 9.5.11. 802.11n HT40 MODE IN THE 5.6 GHz BAND

**1TX Antenna 1 MODE**

**Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Directional Gain (dBi) | Power Limit (dBm) | PSD Limit (dBm/ 1MHz) |
|---|---|---|---|---|---|
| Low | 5510 | 61.8 | -4.31 | 24.00 | 11.00 |
| Mid | 5550 | 61.2 | -4.31 | 24.00 | 11.00 |
| High | 5670 | 60.8 | -4.31 | 24.00 | 11.00 |
| 142 | 5710 | 44.20 | -4.31 | 24.00 | 11.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.17 | Included in Calculations of Corr'd Power & PSD |

**Output Power Results**

| Channel | Frequency (MHz) | Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5510 | 13.39 | 13.39 | 24.00 | -10.61 |
| Mid | 5550 | 13.57 | 13.57 | 24.00 | -10.43 |
| High | 5670 | 13.77 | 13.77 | 24.00 | -10.23 |
| 142 | 5710 | 13.71 | 13.88 | 24.00 | -10.12 |

**PSD Results**

| Channel | Frequency (MHz) | Meas PSD (dBm/ 1MHz) | Total Corr'd PSD (dBm/ 1MHz) | PSD Limit (dBm/ 1MHz) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5510 | -0.675 | -0.51 | 11.00 | -11.51 |
| Mid | 5550 | -0.658 | -0.49 | 11.00 | -11.49 |
| High | 5670 | -0.642 | -0.47 | 11.00 | -11.47 |
| 142 | 5710 | -2.335 | -2.17 | 11.00 | -13.17 |


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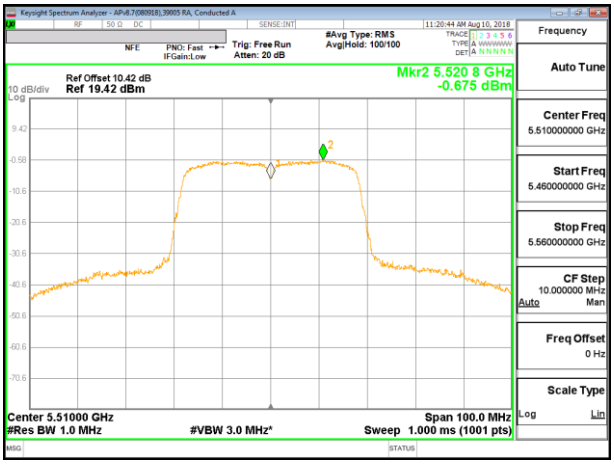
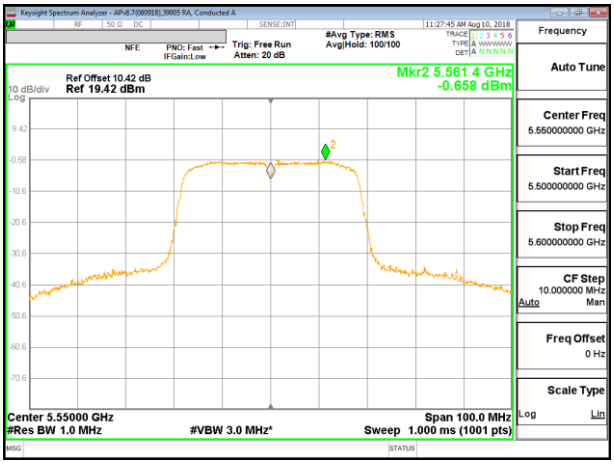
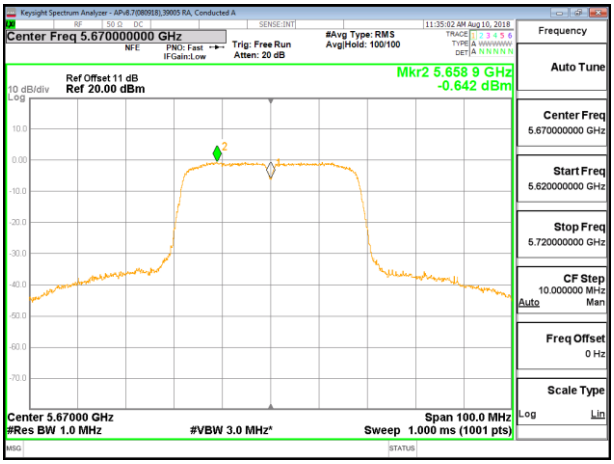


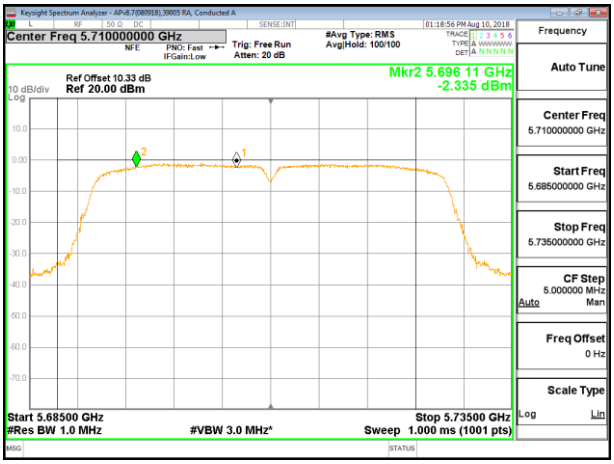

**LOW CHANNEL**




**MID CHANNEL**




**HIGH CHANNEL**




**CHANNEL 142**



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## 9.5.12. 802.11ac VHT80 MODE IN THE 5.6 GHz BAND

**1TX Antenna 1 MODE**

**Bandwidth, Antenna Gain, and Limits**

| Channel | Frequency (MHz) | Min 26 dB BW (MHz) | Directional Gain (dBi) | Power Limit (dBm) | PSD Limit (dBm/ 1MHz) |
|---|---|---|---|---|---|
| Low | 5530 | 114.2 | -4.31 | 24.00 | 11.00 |
| High | 5610 | 114.4 | -4.31 | 24.00 | 11.00 |
| 138 | 5690 | 114.20 | -4.31 | 24.00 | 11.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.33 | **Included in Calculations of Corr'd Power & PSD** |

**Output Power Results**

| Channel | Frequency (MHz) | Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5530 | 12.86 | 12.86 | 24.00 | -11.14 |
| High | 5610 | 12.91 | 12.91 | 24.00 | -11.09 |
| 138 | 5690 | 12.94 | 13.27 | 24.00 | -10.73 |

**PSD Results**

| Channel | Frequency (MHz) | Meas PSD (dBm/ 1MHz) | Total Corr'd PSD (dBm/ 1MHz) | PSD Limit (dBm/ 1MHz) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5530 | -4.484 | -4.15 | 11.00 | -15.15 |
| High | 5610 | -4.816 | -4.49 | 11.00 | -15.49 |
| 138 | 5690 | -7.018 | -6.69 | 11.00 | -17.69 |


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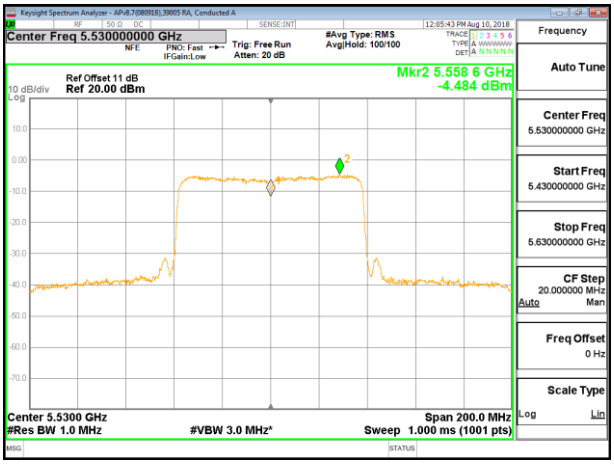
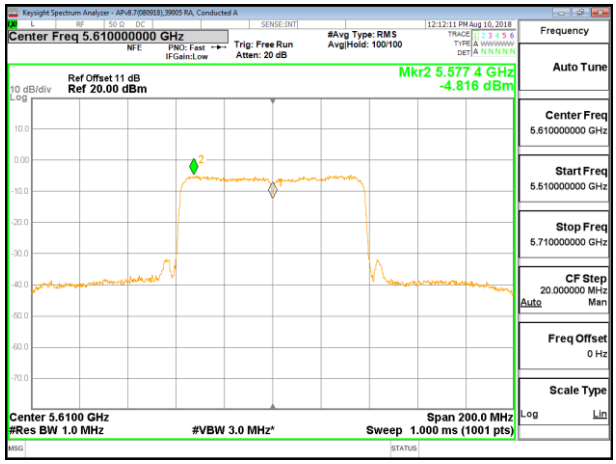
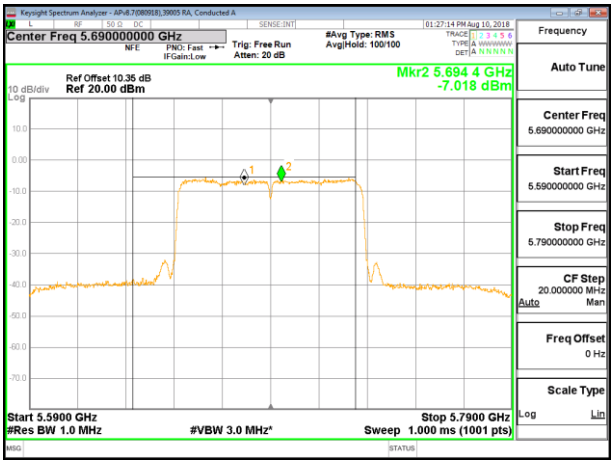



**LOW CHANNEL**




**HIGH CHANNEL**




**CHANNEL 138**



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## 9.5.13. 802.11a MODE IN THE 5.8 GHz BAND

**1TX Antenna 1 MODE**

**Antenna Gain and Limit**

| Channel | Frequency (MHz) | Directional Gain (dBi) | Power Limit (dBm) | PSD Limit (dBm/ 1MHz) |
|---|---|---|---|---|
| Low | 5745 | -5.88 | 30.00 | 30.00 |
| Mid | 5785 | -5.88 | 30.00 | 30.00 |
| High | 5825 | -5.88 | 30.00 | 30.00 |

| | | |
|---|---|---|
| **Duty Cycle CF (dB)** | 0.00 | **Included in Calculations of Corr'd Power & PSD** |

**Output Power Results**

| Channel | Frequency (MHz) | Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5745 | 15.10 | 15.10 | 30.00 | -14.90 |
| Mid | 5785 | 15.05 | 15.05 | 30.00 | -14.95 |
| High | 5825 | 15.01 | 15.01 | 30.00 | -14.99 |

**PSD Results**

| Channel | Frequency (MHz) | Meas PSD (dBm/ 1MHz) | Total Corr'd PSD (dBm/ 1MHz) | PSD Limit (dBm/ 1MHz) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5745 | 3.797 | 3.797 | 30.00 | -26.20 |
| Mid | 5785 | 3.453 | 3.453 | 30.00 | -26.55 |
| High | 5825 | 3.820 | 3.820 | 30.00 | -26.18 |


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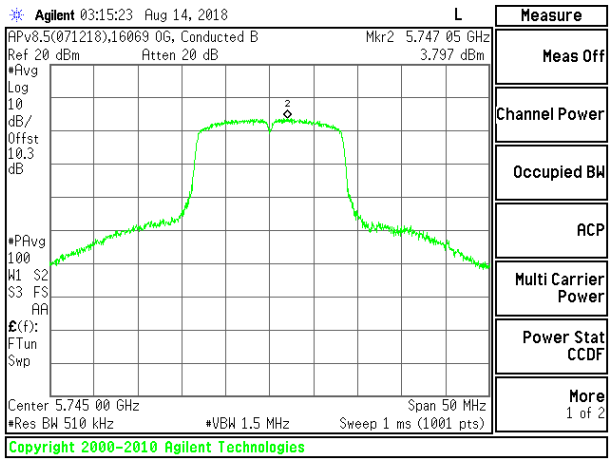
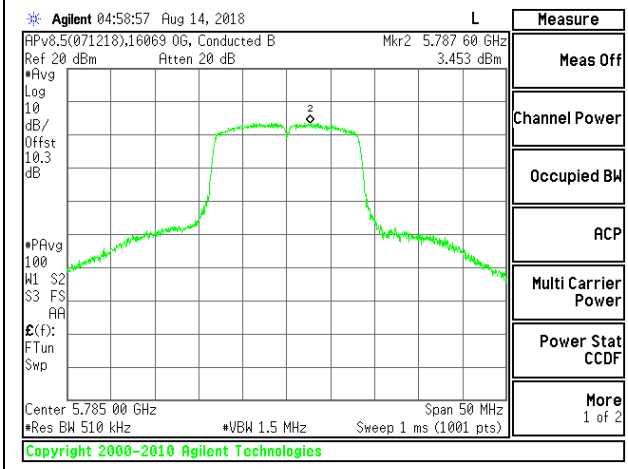
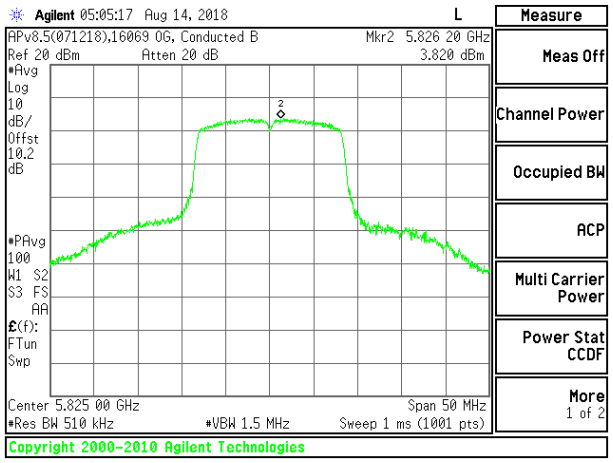



**LOW CHANNEL**




**MID CHANNEL**




**HIGH CHANNEL**



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## 9.5.14. 802.11n HT20 MODE IN THE 5.8 GHz BAND

**1TX Antenna 1 MODE**

**Antenna Gain and Limit**

| Channel | Frequency (MHz) | Directional Gain (dBi) | Power Limit (dBm) | PSD Limit (dBm/ 1MHz) |
|---|---|---|---|---|
| Low | 5745 | -5.88 | 30.00 | 30.00 |
| Mid | 5785 | -5.88 | 30.00 | 30.00 |
| High | 5825 | -5.88 | 30.00 | 30.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd Power & PSD |

**Output Power Results**

| Channel | Frequency (MHz) | Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5745 | 14.84 | 14.84 | 30.00 | -15.16 |
| Mid | 5785 | 14.88 | 14.88 | 30.00 | -15.12 |
| High | 5825 | 14.95 | 14.95 | 30.00 | -15.05 |

**PSD Results**

| Channel | Frequency (MHz) | Meas PSD (dBm/ 1MHz) | Total Corr'd PSD (dBm/ 1MHz) | PSD Limit (dBm/ 1MHz) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5745 | 3.321 | 3.321 | 30.00 | -26.68 |
| Mid | 5785 | 3.547 | 3.547 | 30.00 | -26.45 |
| High | 5825 | 3.398 | 3.398 | 30.00 | -26.60 |


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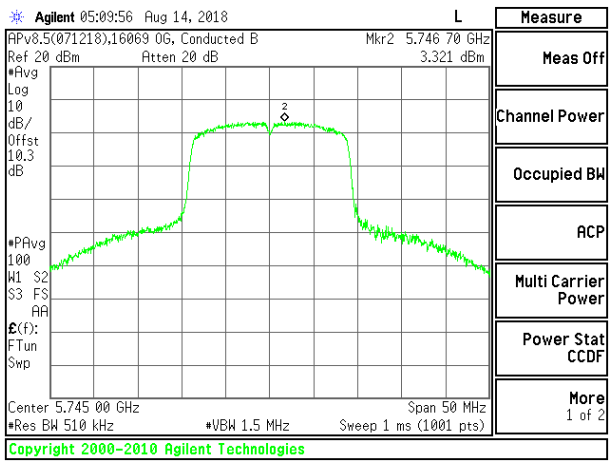
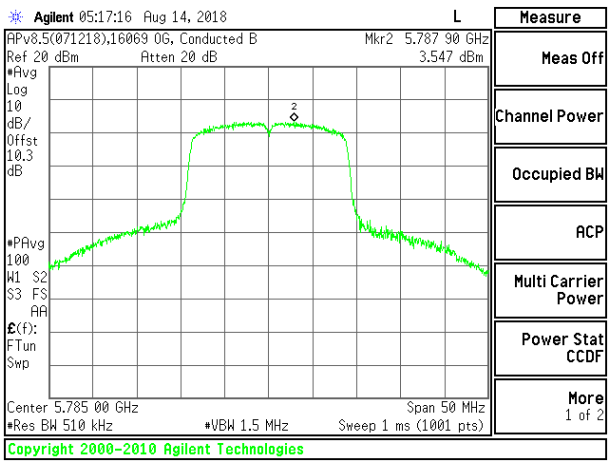
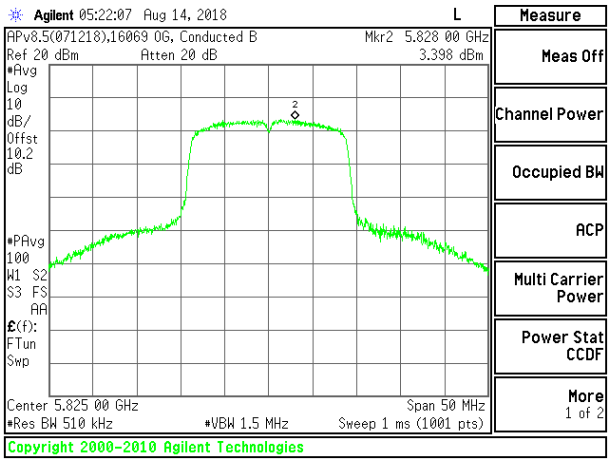



**LOW CHANNEL**




**MID CHANNEL**




**HIGH CHANNEL**



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## 9.5.15. 802.11n HT40 MODE IN THE 5.8 GHz BAND

**1TX Antenna 1 MODE**

**Antenna Gain and Limit**

| Channel | Frequency (MHz) | Directional Gain (dBi) | Power Limit (dBm) | PSD Limit (dBm/ 1MHz) |
|---|---|---|---|---|
| Low | 5755 | -5.88 | 30.00 | 30.00 |
| High | 5795 | -5.88 | 30.00 | 30.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.17 | Included in Calculations of Corr'd Power & PSD |

**Output Power Results**

| Channel | Frequency (MHz) | Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Low | 5755 | 13.44 | 13.44 | 30.00 | -16.56 |
| High | 5795 | 13.57 | 13.57 | 30.00 | -16.43 |

**PSD Results**

| Channel | Frequency (MHz) | Meas PSD (dBm) | Total Corr'd PSD (dBm) | PSD Limit (dBm) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Low | 5755 | -1.614 | -1.444 | 30.00 | -31.44 |
| High | 5795 | -1.729 | -1.559 | 30.00 | -31.56 |


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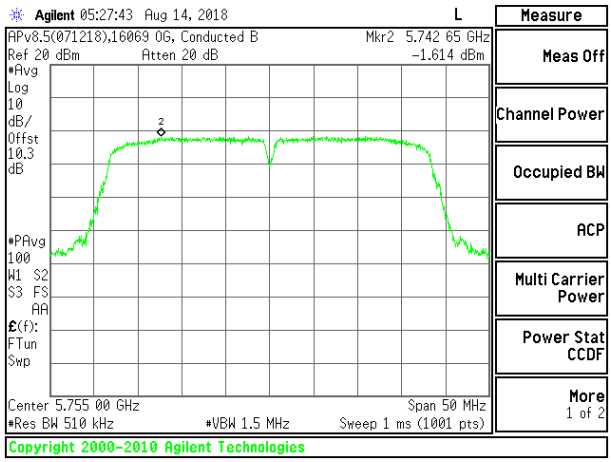
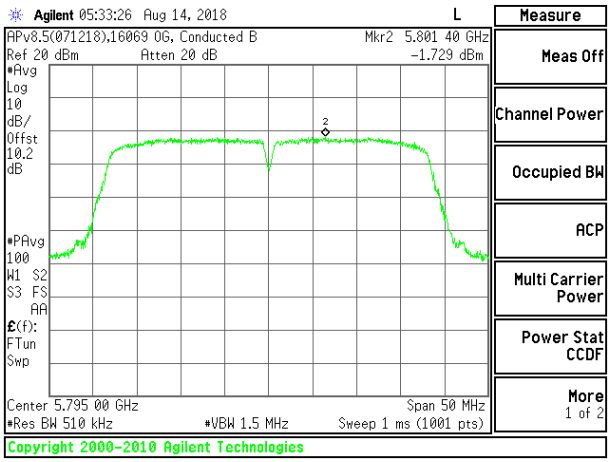



**LOW CHANNEL**




**HIGH CHANNEL**



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## 9.5.16. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

**1TX Antenna 1 MODE**

**Antenna Gain and Limit**

| Channel | Frequency (MHz) | Directional Gain (dBi) | Power Limit (dBm) | PSD Limit (dBm/ 1MHz) |
|---|---|---|---|---|
| Mid | 5775 | -5.88 | 30.00 | 30.00 |

| | | |
|---|---|---|
| Duty Cycle CF (dB) | 0.33 | Included in Calculations of Corr'd Power & PSD |

**Output Power Results**

| Channel | Frequency (MHz) | Meas Power (dBm) | Total Corr'd Power (dBm) | Power Limit (dBm) | Power Margin (dB) |
|---|---|---|---|---|---|
| Mid | 5775 | 12.81 | 12.81 | 30.00 | -17.19 |

**PSD Results**

| Channel | Frequency (MHz) | Meas PSD (dBm/ 1MHz) | Total Corr'd PSD (dBm/ 1MHz) | PSD Limit (dBm/ 1MHz) | PSD Margin (dB) |
|---|---|---|---|---|---|
| Mid | 5775 | -5.718 | -5.388 | 30.00 | -35.39 |


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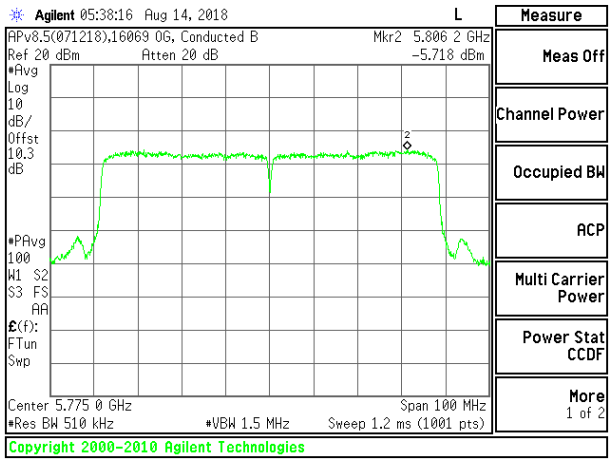


**MID CHANNEL**



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# 10. RADIATED TEST RESULTS

**LIMITS**

FCC §15.205 and §15.209 -Restriced bands

FCC §15.407(b)(1-3) -Un-Restriced bands

| Frequency Range (MHz) | Field Strength Limit (uV/m) at 3 m | Field Strength Limit (dBuV/m) at 3 m |
|---|---|---|
| 30 - 88 | 100 | 40 |
| 88 - 216 | 150 | 43.5 |
| 216 - 960 | 200 | 46 |
| Above 960 | 500 | 54 |

**TEST PROCEDURE**

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

The spectrum from 30 MHz to 1GHz and 18GHz to 40 GHz is investigated with the transmitter set to transmit at the channel with highest output power as worst-case scenario. 1GHz to 18GHz was set to the lowest, middle, and highest channels in the 5 GHz bands.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.


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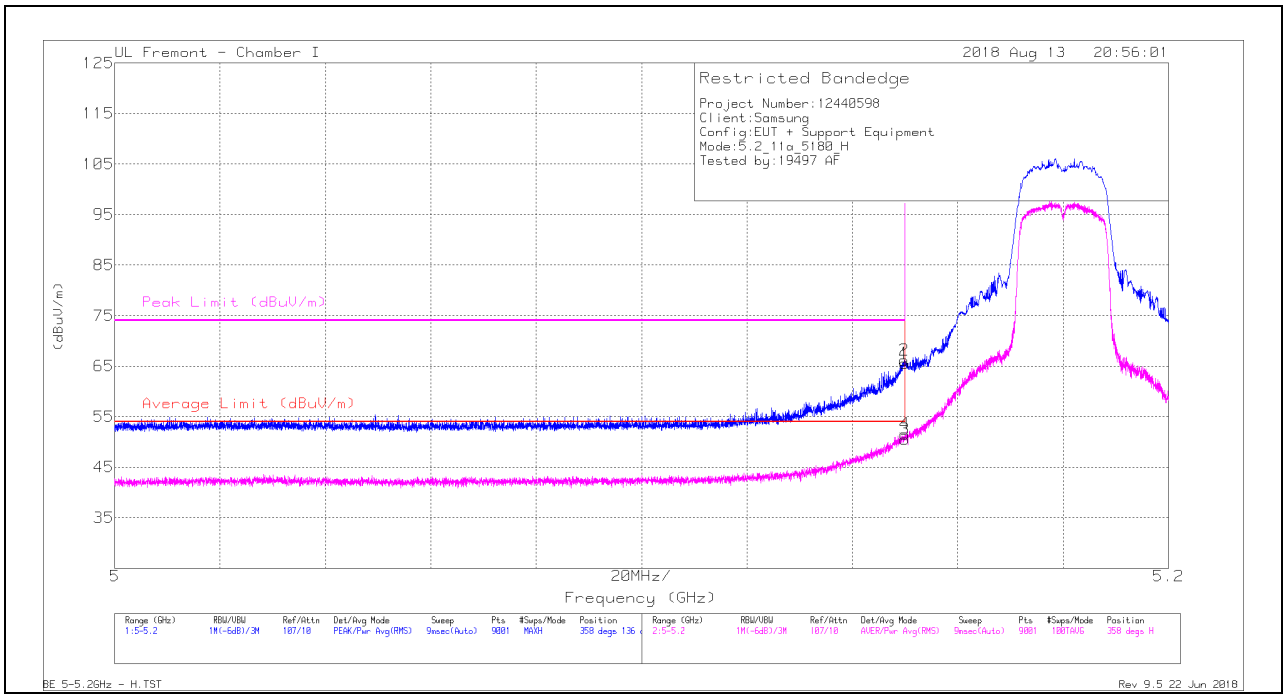
# 10.1. TRANSMITTER ABOVE 1 GHz

## 10.1.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND

**1TX Antenna 1 MODE**

### BANDEDGE (LOW CHANNEL)

### HORIZONTAL RESULT




Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T862 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 5.15 | 50.11 | Pk | 34.4 | -19 | 0 | 65.51 | - | - | 74 | -8.49 | 358 | 136 | H |
| 2 | * 5.15 | 50.74 | Pk | 34.4 | -19 | 0 | 66.14 | - | - | 74 | -7.86 | 358 | 136 | H |
| 3 | * 5.15 | 35.09 | RMS | 34.4 | -19 | 0 | 50.49 | 54 | -3.51 | - | - | 358 | 136 | H |
| 4 | * 5.15 | 36.19 | RMS | 34.4 | -19 | 0 | 51.59 | 54 | -2.41 | - | - | 358 | 136 | H |

* - indicates frequency in CFR47 Pt 15 Restricted Band
Pk - Peak detector
RMS - RMS detection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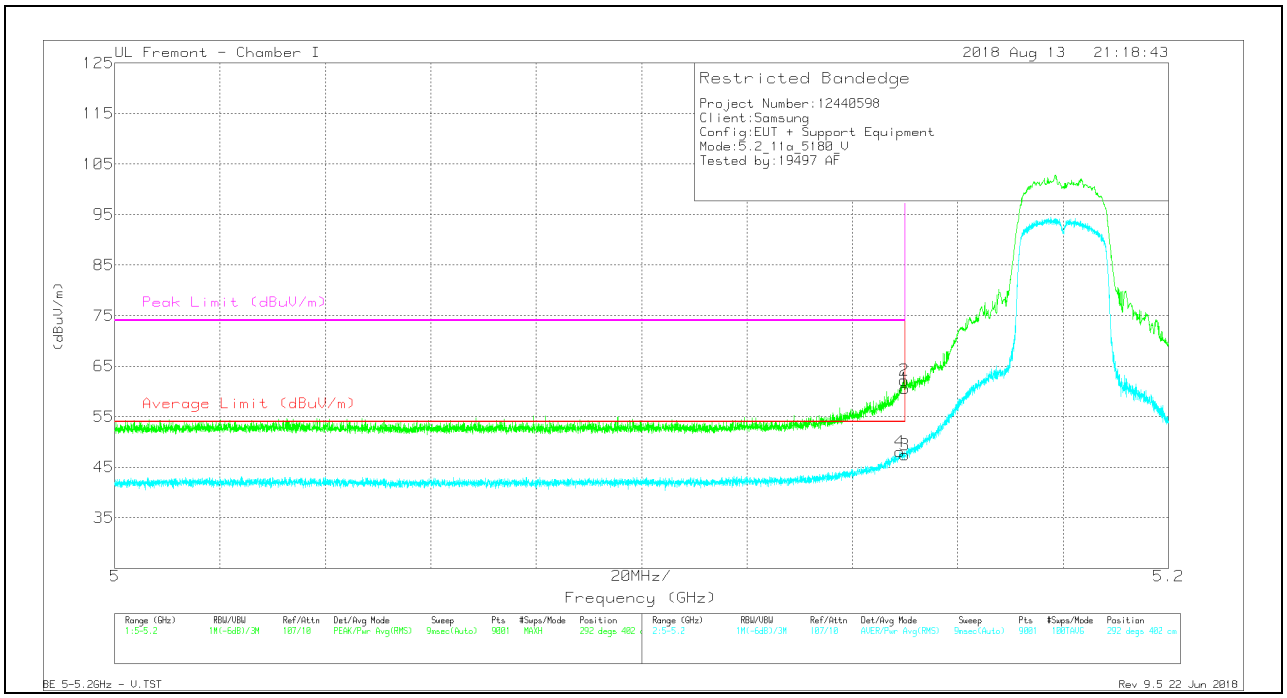
# VERTICAL RESULT




## Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T862 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 5.15 | 45.17 | Pk | 34.4 | -19 | 60.57 | - | - | 74 | -13.43 | 292 | 402 | V |
| 2 | * 5.15 | 46.77 | Pk | 34.4 | -19 | 62.17 | - | - | 74 | -11.83 | 292 | 402 | V |
| 3 | * 5.15 | 32.09 | RMS | 34.4 | -19 | 47.49 | 54 | -6.51 | - | - | 292 | 402 | V |
| 4 | * 5.149 | 32.66 | RMS | 34.4 | -19 | 48.06 | 54 | -5.94 | - | - | 292 | 402 | V |

* - indicates frequency in CFR47 Pt 15 Restricted Band
Pk - Peak detector
RMS - RMS detection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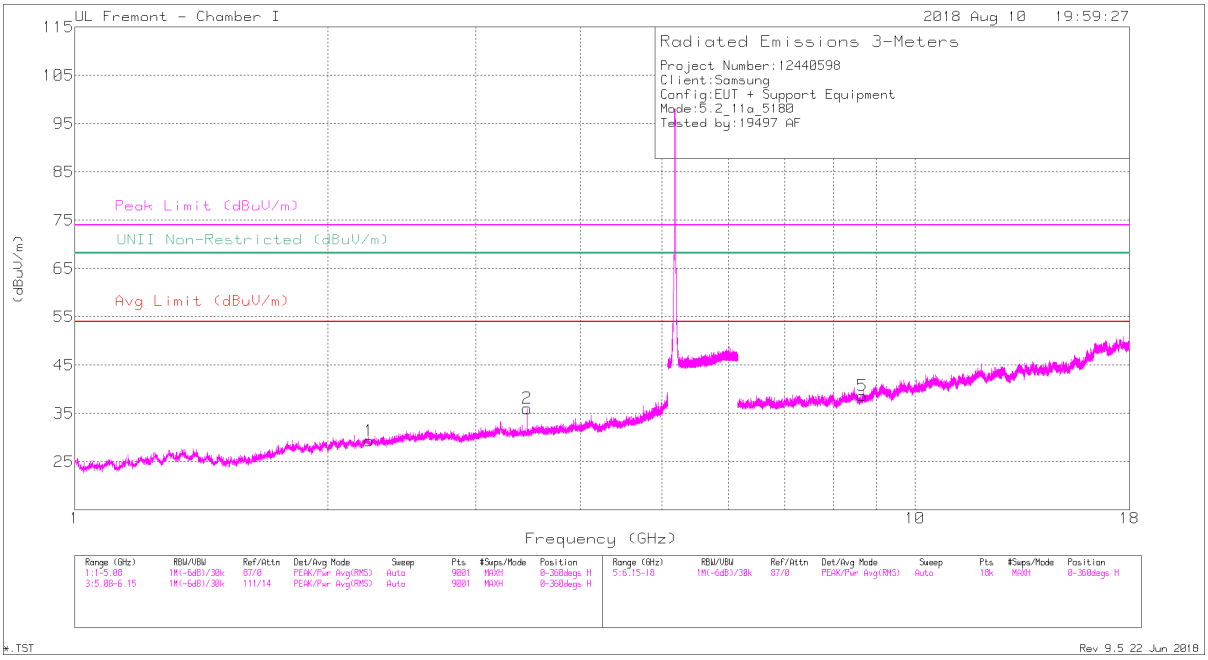
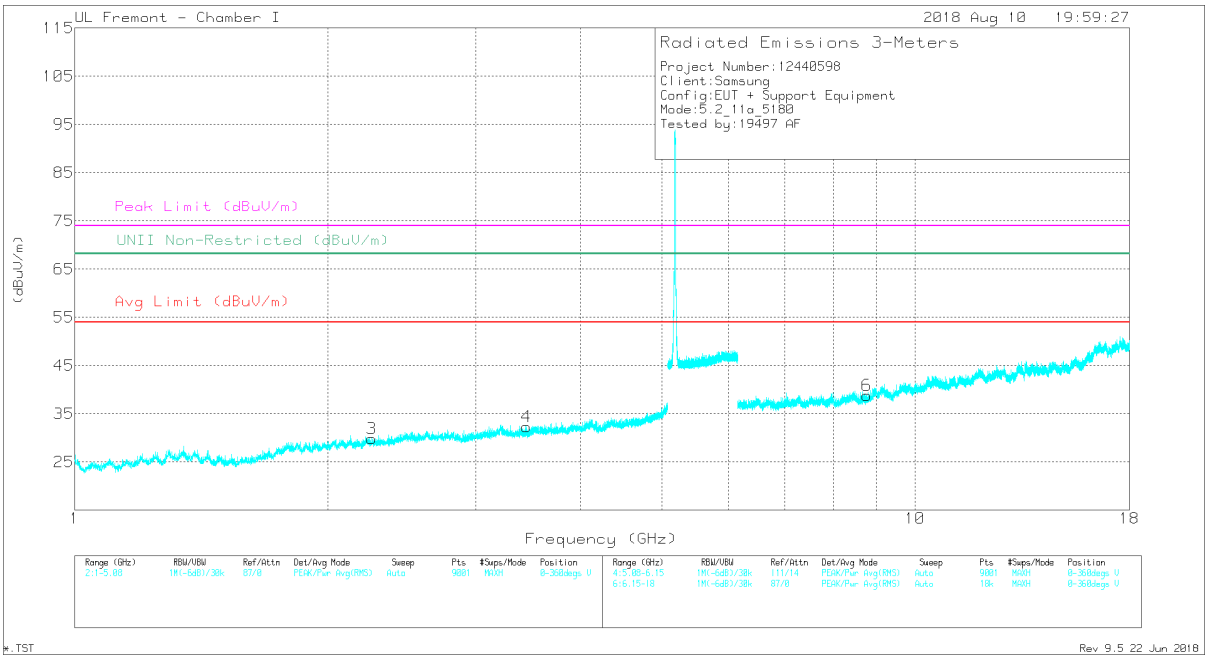
## HARMONICS AND SPURIOUS EMISSIONS

### LOW CHANNEL RESULTS




**HORIZONTAL**




**VERTICAL**



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## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T862 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | UNII Non-Restricted (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.24 | 37.17 | PK-U | 31.5 | -32 | 36.67 | - | - | 74 | -37.33 | - | - | 353 | 169 | H |
| | * 2.242 | 28 | ADR | 31.5 | -32 | 27.5 | 54 | -26.5 | - | - | - | - | 353 | 169 | H |
| 2 | 3.453 | 38.13 | PK-U | 32.7 | -30.4 | 40.43 | - | - | - | - | 68.2 | -27.77 | 4 | 203 | H |
| 3 | * 2.259 | 36.96 | PK-U | 31.4 | -31.8 | 36.56 | - | - | 74 | -37.44 | - | - | 209 | 242 | V |
| | * 2.258 | 27.74 | ADR | 31.4 | -31.8 | 27.34 | 54 | -26.66 | - | - | - | - | 209 | 242 | V |
| 4 | 3.448 | 36.01 | PK-U | 32.7 | -30.3 | 38.41 | - | - | - | - | 68.2 | -29.79 | 299 | 376 | V |
| 5 | 8.661 | 28.76 | PK-U | 35.9 | -18.4 | 46.26 | - | - | - | - | 68.2 | -21.94 | 302 | 350 | H |
| 6 | 8.766 | 28.54 | PK-U | 36 | -18.9 | 45.64 | - | - | - | - | 68.2 | -22.56 | 147 | 116 | V |

* - indicates frequency in CFR47 Pt 15 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average


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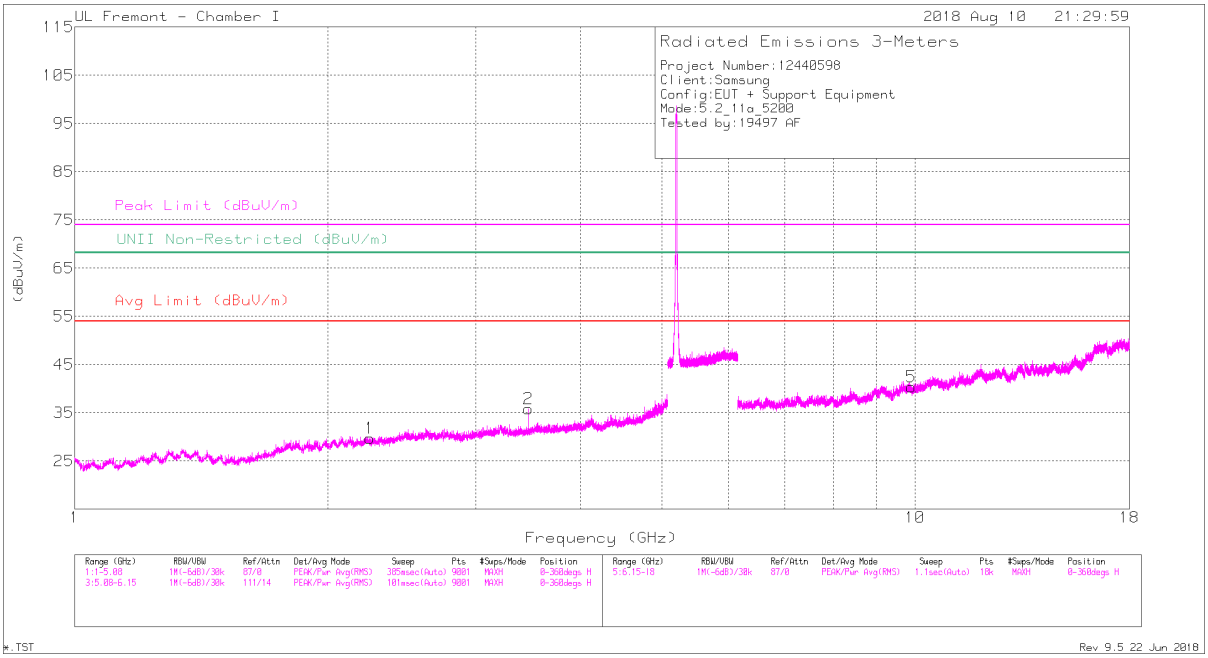
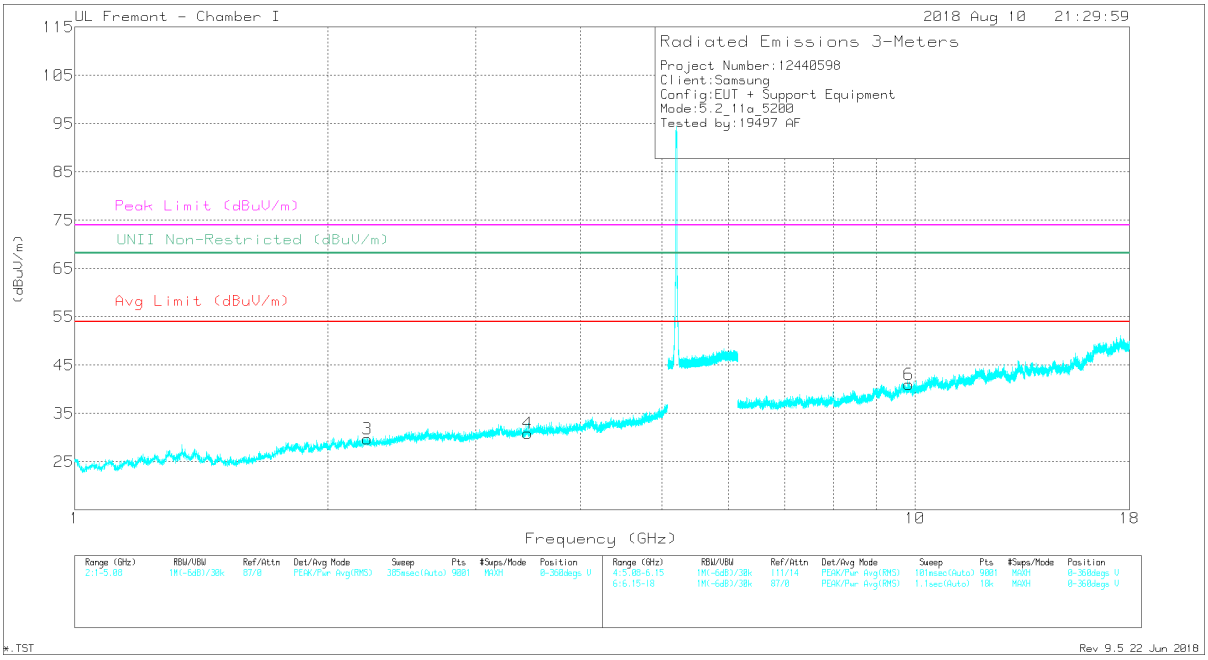
# MID CHANNEL RESULTS




**HORIZONTAL**




**VERTICAL**



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## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T862 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | UNII Non-Restricted (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 2.245 | 37.32 | PK-U | 31.5 | -32 | 36.82 | - | - | 74 | -37.18 | - | - | 6 | 149 | H |
| | * 2.245 | 27.41 | ADR | 31.5 | -32 | 26.91 | 54 | -27.09 | - | - | - | - | 6 | 149 | H |
| 2 | 3.467 | 38.83 | PK-U | 32.7 | -30.6 | 40.93 | - | - | - | - | 68.2 | -27.27 | 21 | 304 | H |
| 3 | * 2.229 | 38.02 | PK-U | 31.5 | -31.8 | 37.72 | - | - | 74 | -36.28 | - | - | 6 | 258 | V |
| | * 2.232 | 27.76 | ADR | 31.5 | -31.9 | 27.36 | 54 | -26.64 | - | - | - | - | 6 | 258 | V |
| 4 | 3.46 | 36.02 | PK-U | 32.7 | -30.5 | 38.22 | - | - | - | - | 68.2 | -29.98 | 201 | 336 | V |
| 5 | 9.899 | 28.02 | PK-U | 37 | -17.6 | 47.42 | - | - | - | - | 68.2 | -20.78 | 260 | 389 | H |
| 6 | 9.835 | 28.77 | PK-U | 37 | -17 | 48.77 | - | - | - | - | 68.2 | -19.43 | 111 | 343 | V |

* - indicates frequency in CFR47 Pt 15 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average


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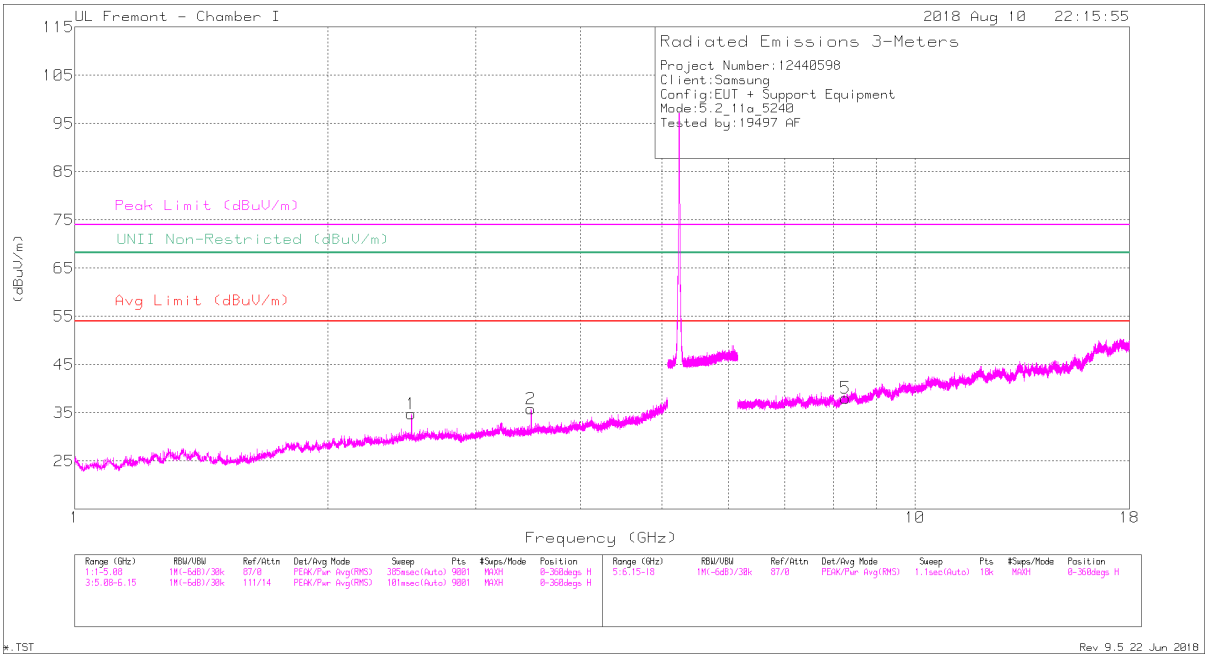
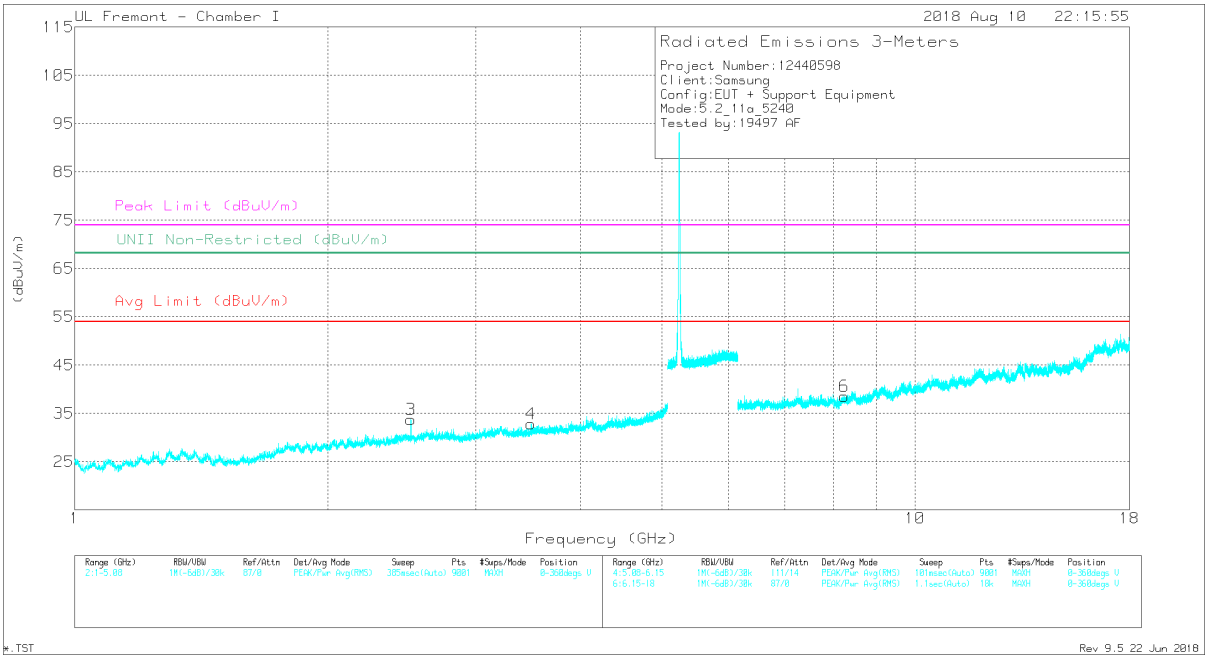
# HIGH CHANNEL RESULTS




**HORIZONTAL**




**VERTICAL**



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## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T862 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | UNII Non-Restricted (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.515 | 37.35 | PK-U | 32.4 | -31.7 | 38.05 | - | - | - | - | 68.2 | -30.15 | 299 | 250 | H |
| 2 | 3.493 | 39.27 | PK-U | 32.8 | -30.3 | 41.77 | - | - | - | - | 68.2 | -26.43 | 353 | 141 | H |
| 3 | 2.511 | 40.02 | PK-U | 32.4 | -31.6 | 40.82 | - | - | - | - | 68.2 | -27.38 | 0 | 297 | V |
| 4 | 3.493 | 36.19 | PK-U | 32.8 | -30.3 | 38.69 | - | - | - | - | 68.2 | -29.51 | 168 | 107 | V |
| 5 | * 8.271 | 29.21 | PK-U | 35.8 | -19.6 | 45.41 | - | - | 74 | -28.59 | - | - | 87 | 153 | H |
| | * 8.271 | 19.65 | ADR | 35.8 | -19.6 | 35.85 | 54 | -18.15 | - | - | - | - | 87 | 153 | H |
| 6 | * 8.237 | 29.1 | PK-U | 35.7 | -19.5 | 45.3 | - | - | 74 | -28.7 | - | - | 189 | 260 | V |
| | * 8.237 | 20.13 | ADR | 35.7 | -19.5 | 36.33 | 54 | -17.67 | - | - | - | - | 189 | 260 | V |

* - indicates frequency in CFR47 Pt 15 Restricted Band
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average


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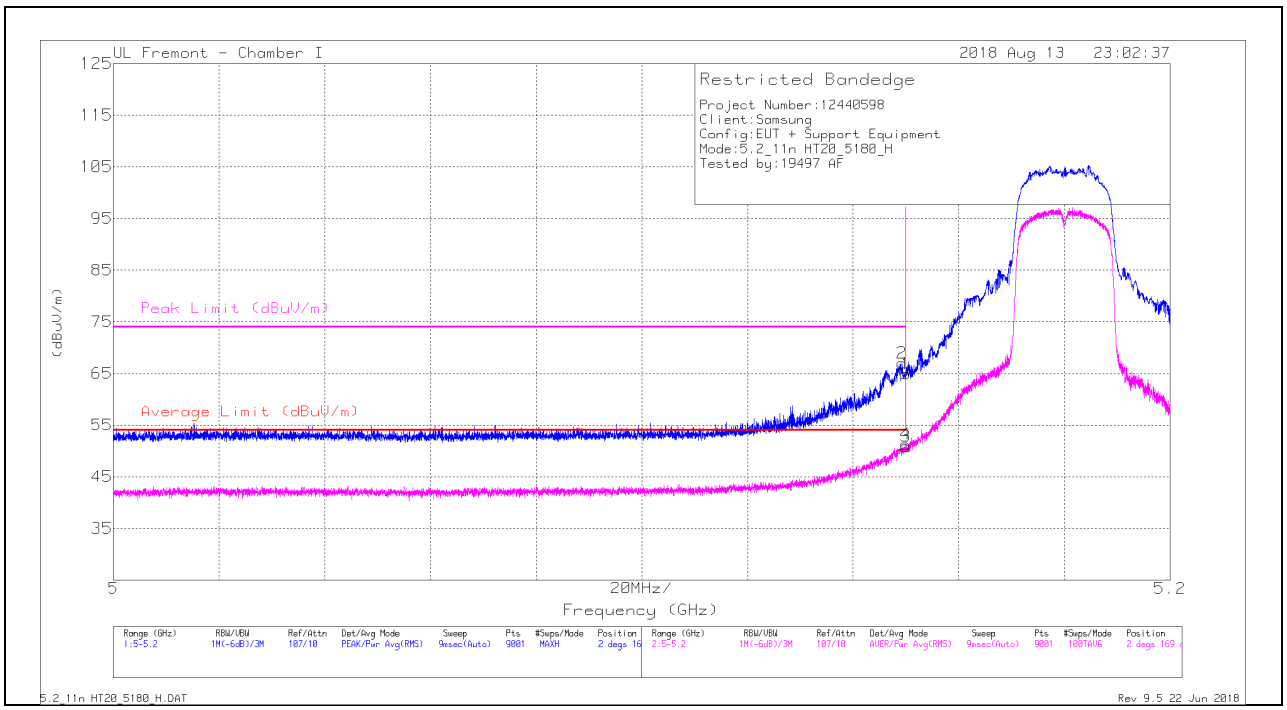
## 10.1.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND

**1TX Antenna 1 MODE**

### BANDEDGE (LOW CHANNEL)

### HORIZONTAL RESULT




Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T862 (dB/m) | Amp/Cbl/Fltr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | * 5.15 | 49.53 | Pk | 34.4 | -19 | 0 | 64.93 | - | - | 74 | -9.07 | 2 | 169 | H |
| 2 | * 5.149 | 51.58 | Pk | 34.4 | -19 | 0 | 66.98 | - | - | 74 | -7.02 | 2 | 169 | H |
| 3 | * 5.15 | 35.49 | RMS | 34.4 | -19 | 0 | 50.89 | 54 | -3.11 | - | - | 2 | 169 | H |
| 4 | * 5.15 | 35.88 | RMS | 34.4 | -19 | 0 | 51.28 | 54 | -2.72 | - | - | 2 | 169 | H |

* - indicates frequency in CFR47 Pt 15 Restricted Band
Pk - Peak detector
RMS - RMS detection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