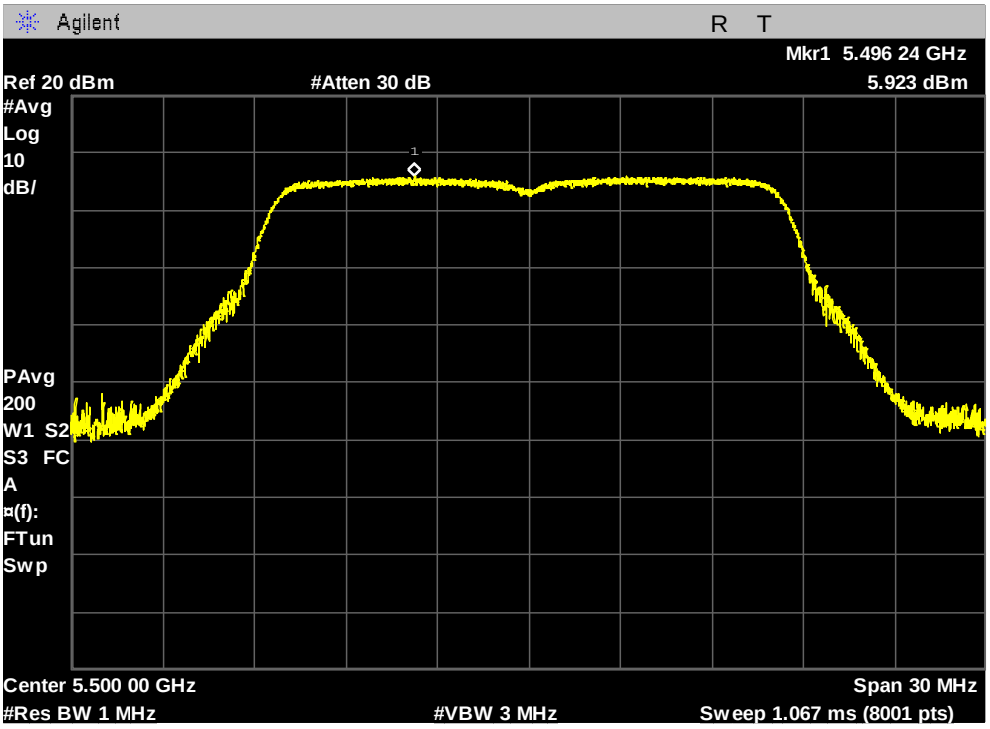
# PLOTS OF EMISSIONS

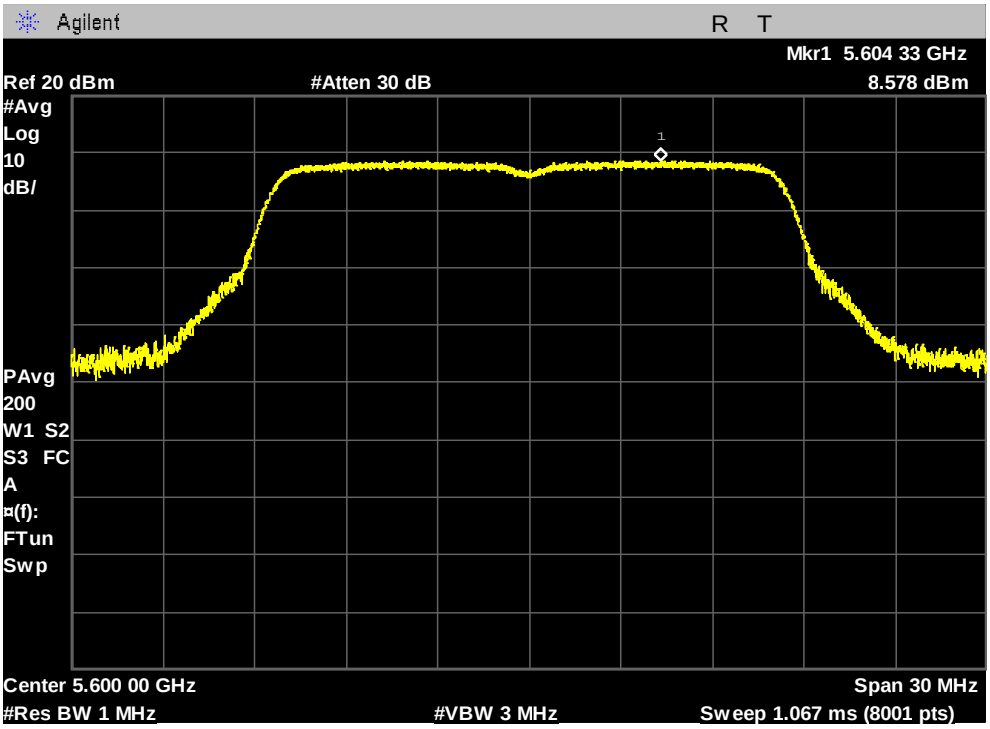
***802.11a mode***

***Chain 2 (1TX)***

***Maximum Power Spectral Density, Lowest Channel (5500 MHz)***

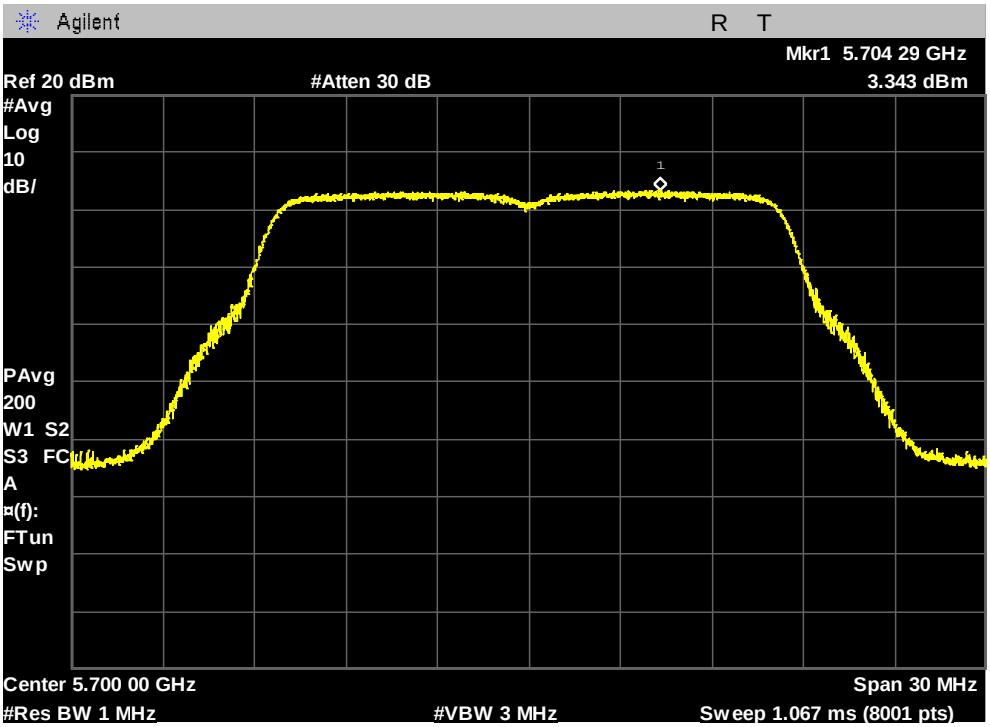



***Maximum Power Spectral Density, Middle Channel (5600 MHz)***

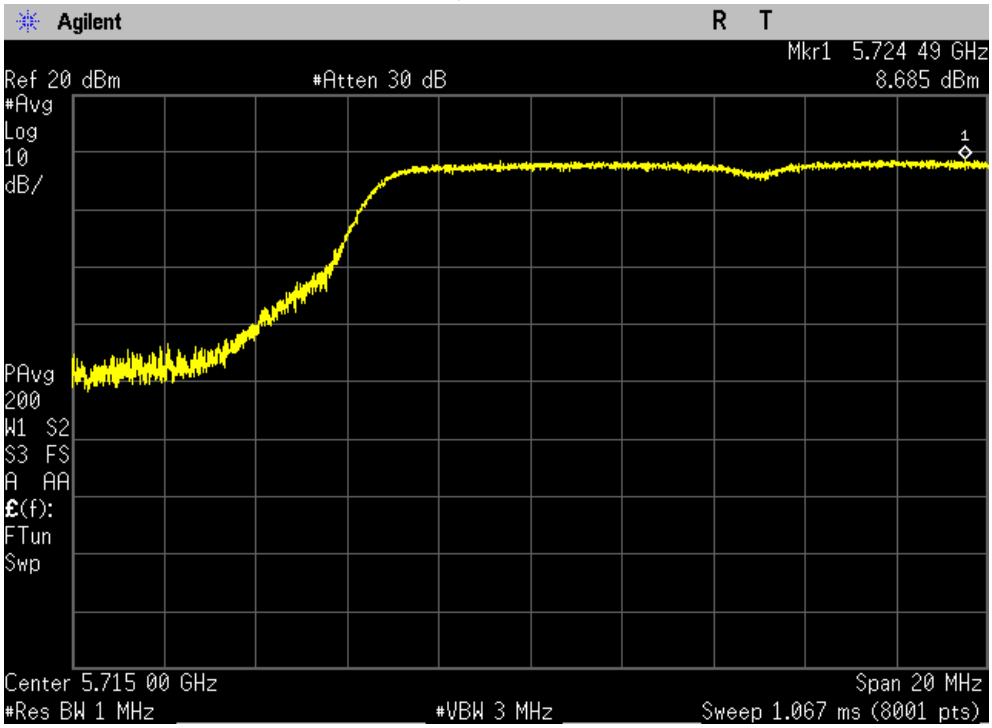


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Highest Channel (5700 MHz)



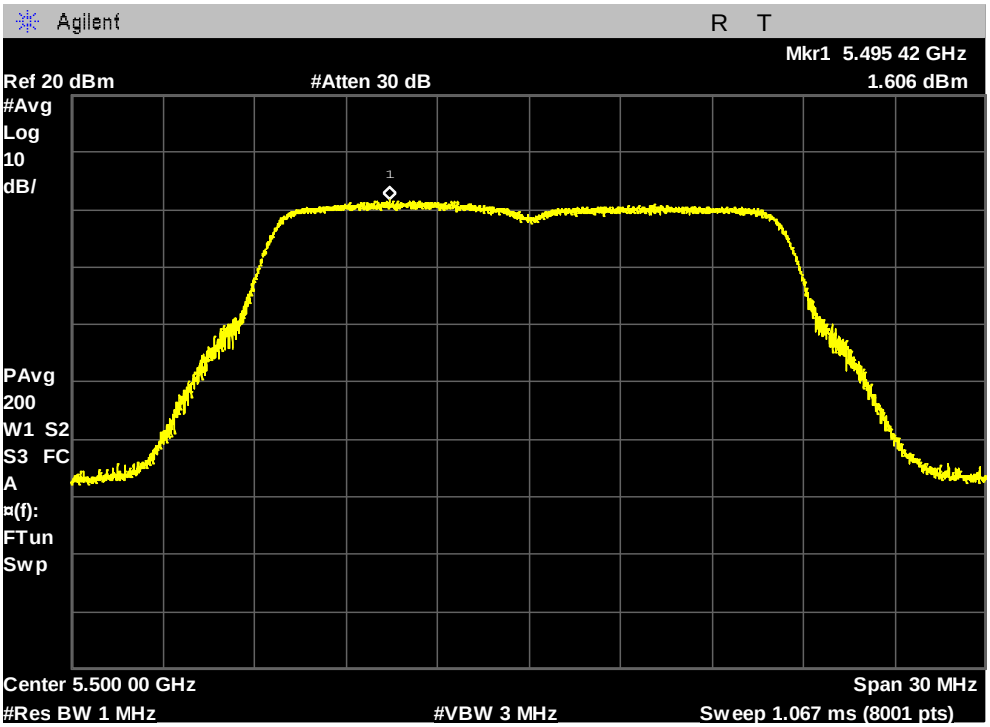

### Maximum Power Spectral Density, Straddle Channel (5720 MHz)



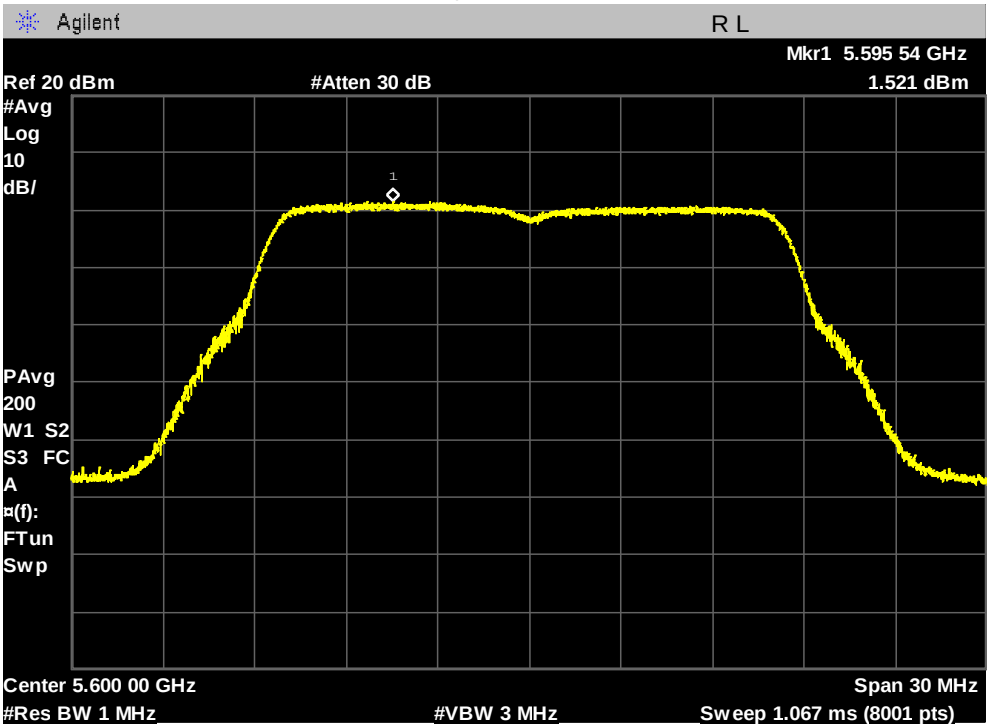
# PLOTS OF EMISSIONS

## Chain 2 (4TX)

### Maximum Power Spectral Density, Lowest Channel (5500 MHz)

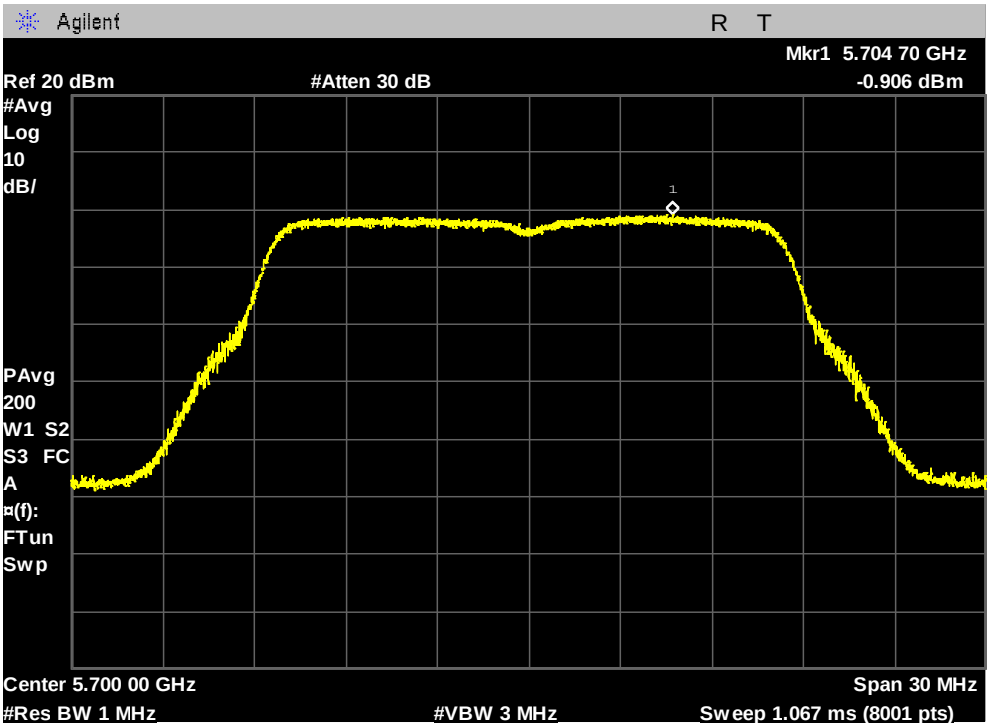



### Maximum Power Spectral Density, Middle Channel (5600 MHz)

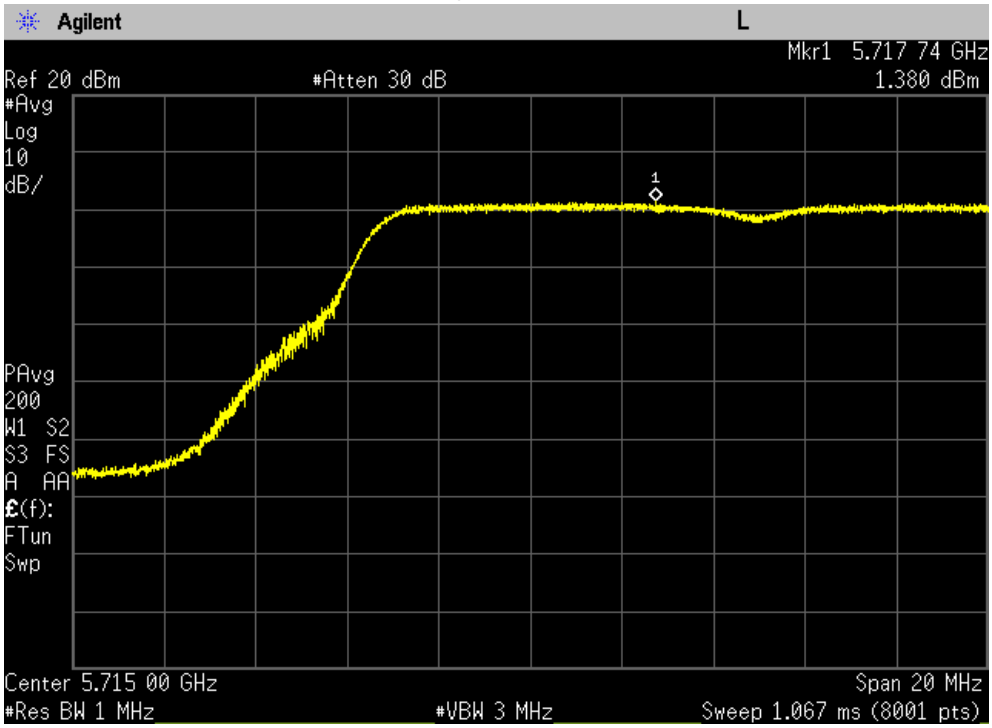


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Highest Channel (5700 MHz)




### Maximum Power Spectral Density, Straddle Channel (5720 MHz)

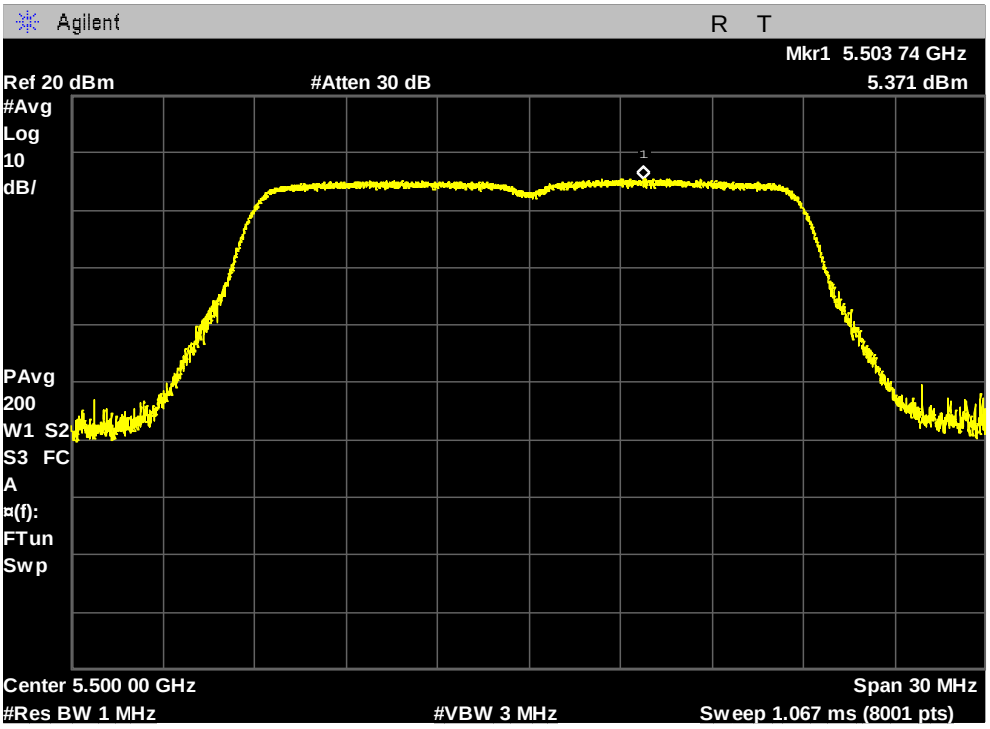


# PLOTS OF EMISSIONS

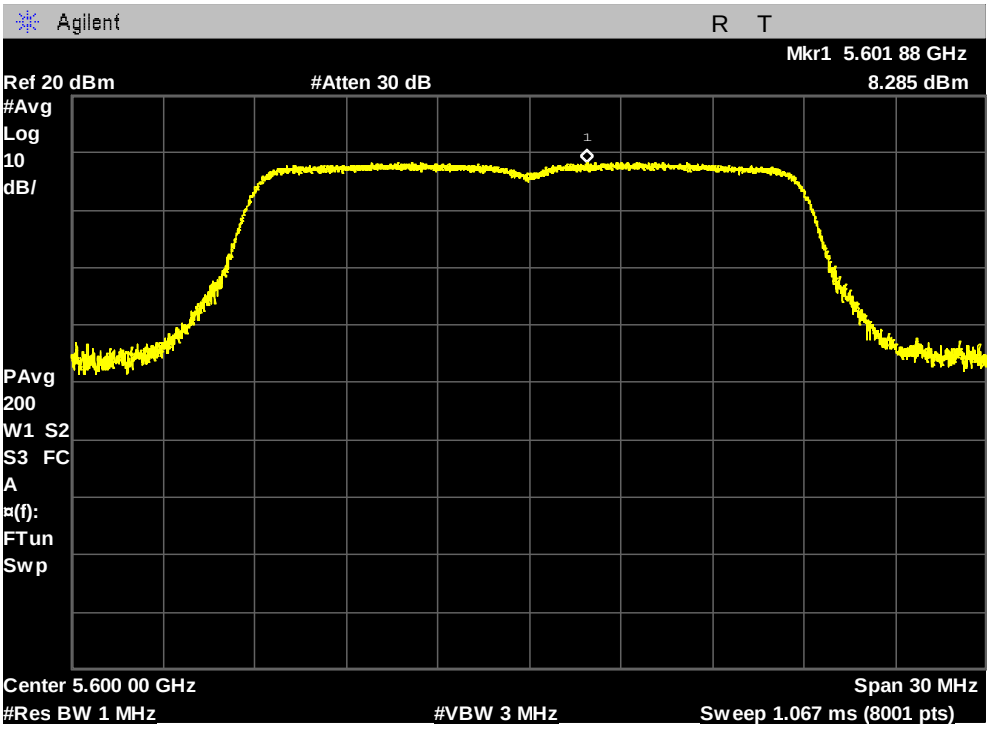
***802.11n (20 MHz) mode***

***Chain 2 (1TX)***

***Maximum Power Spectral Density, Lowest Channel (5500 MHz)***

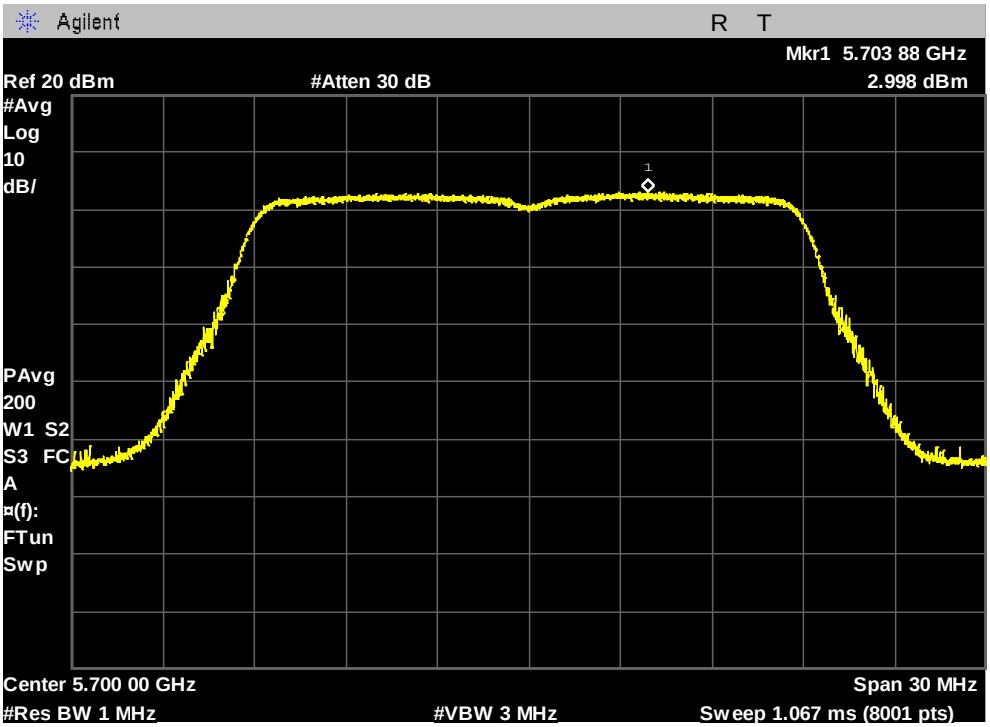



***Maximum Power Spectral Density, Middle Channel (5600 MHz)***

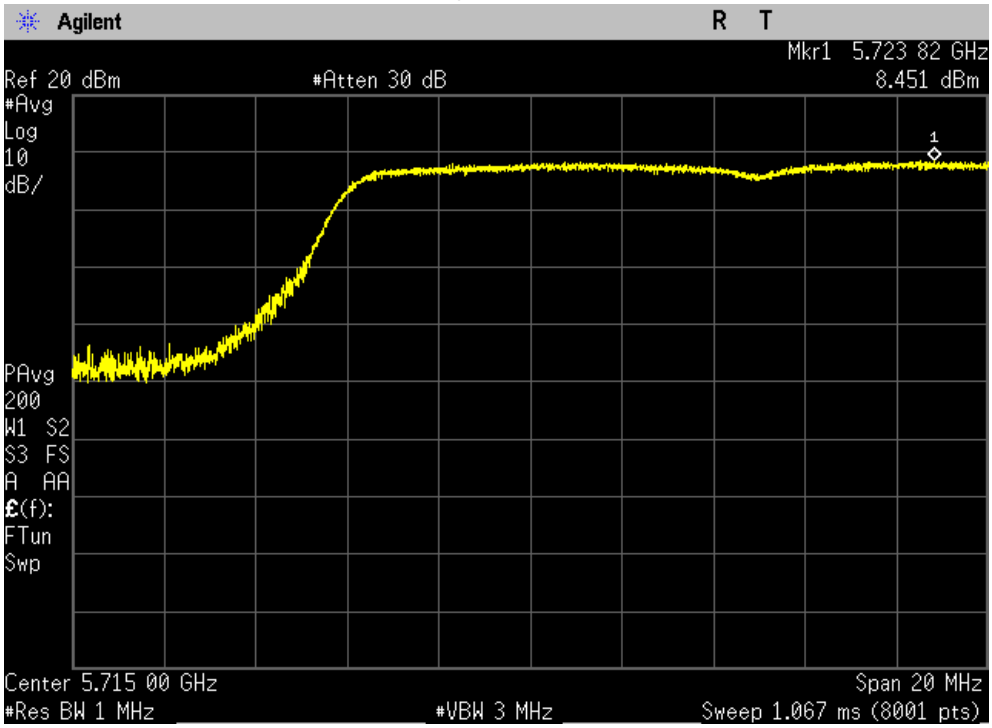


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Highest Channel (5700 MHz)



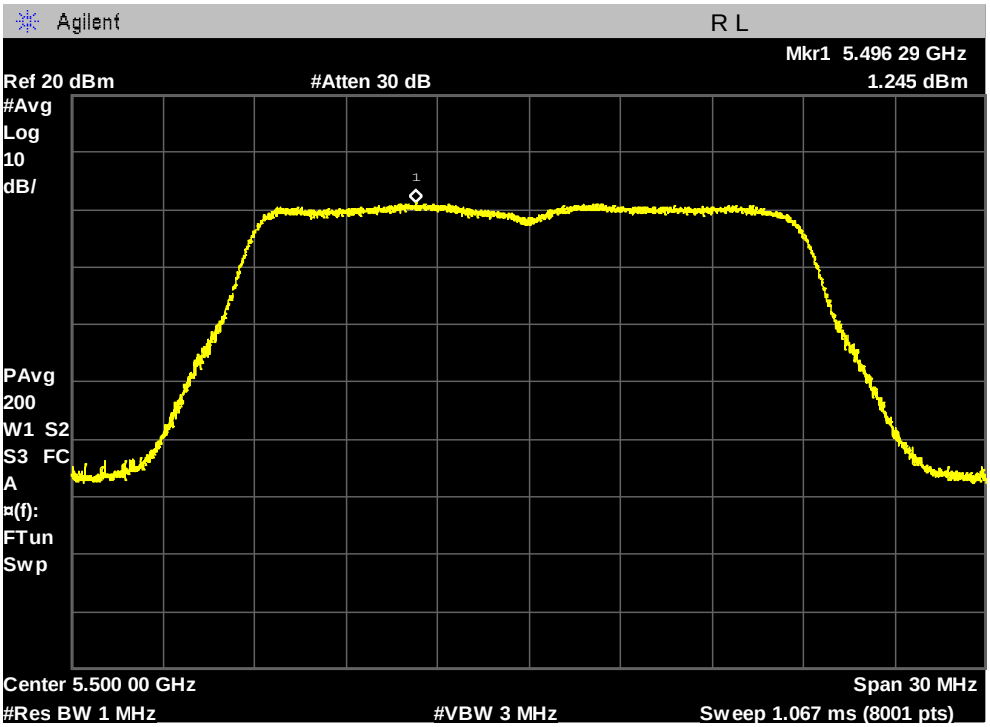

### Maximum Power Spectral Density, Straddle Channel (5720 MHz)



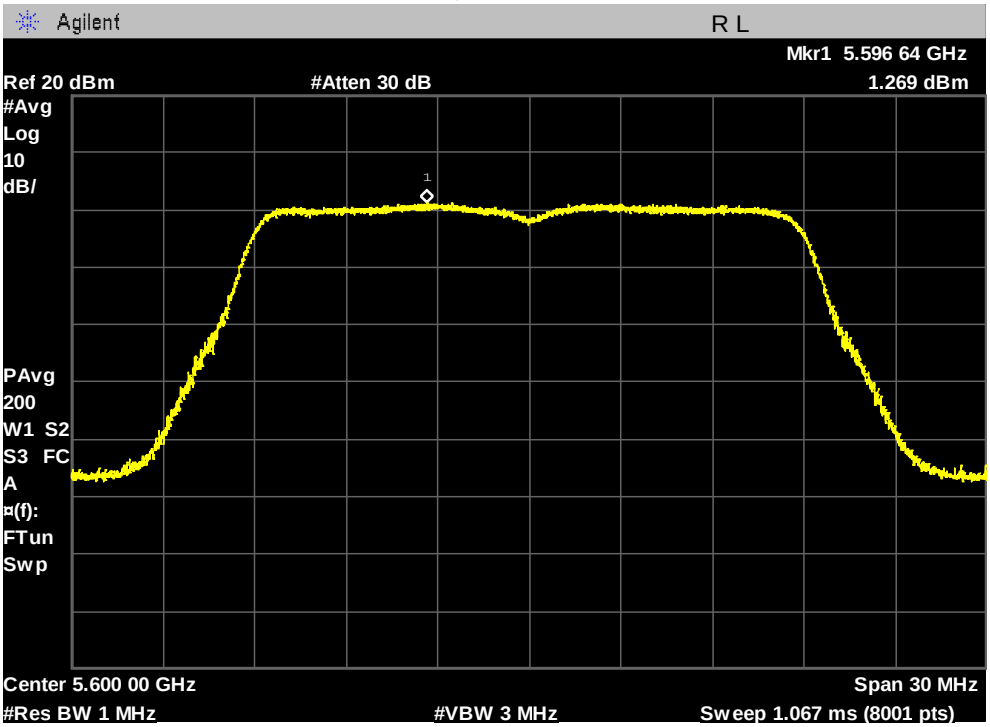
# PLOTS OF EMISSIONS

## Chain 2 (4TX)

### Maximum Power Spectral Density, Lowest Channel (5500 MHz)

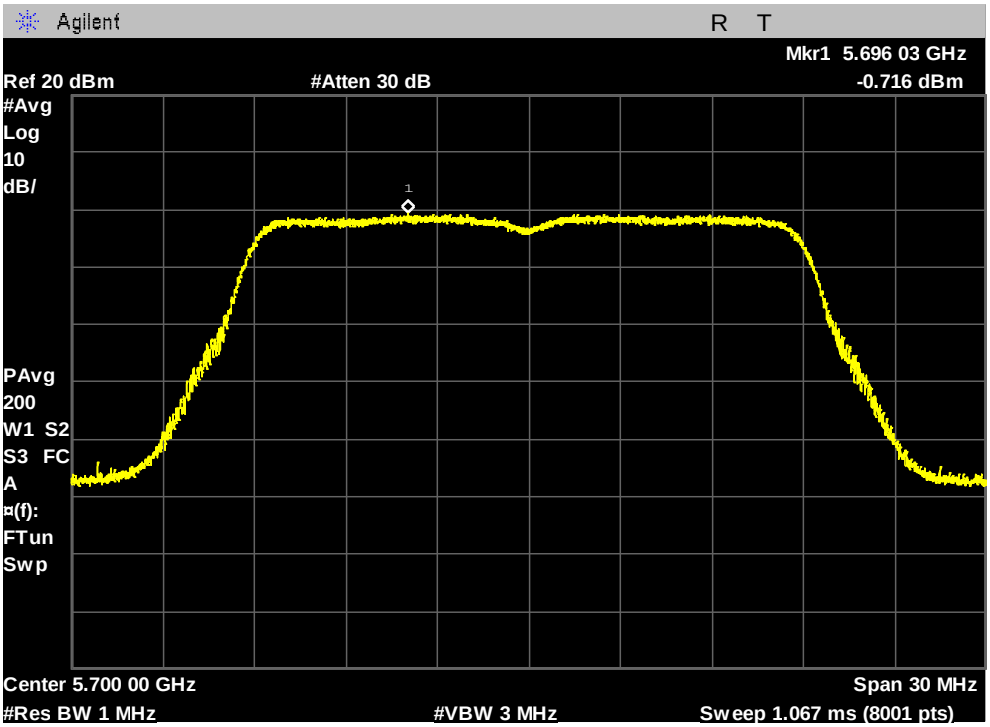



### Maximum Power Spectral Density, Middle Channel (5600 MHz)

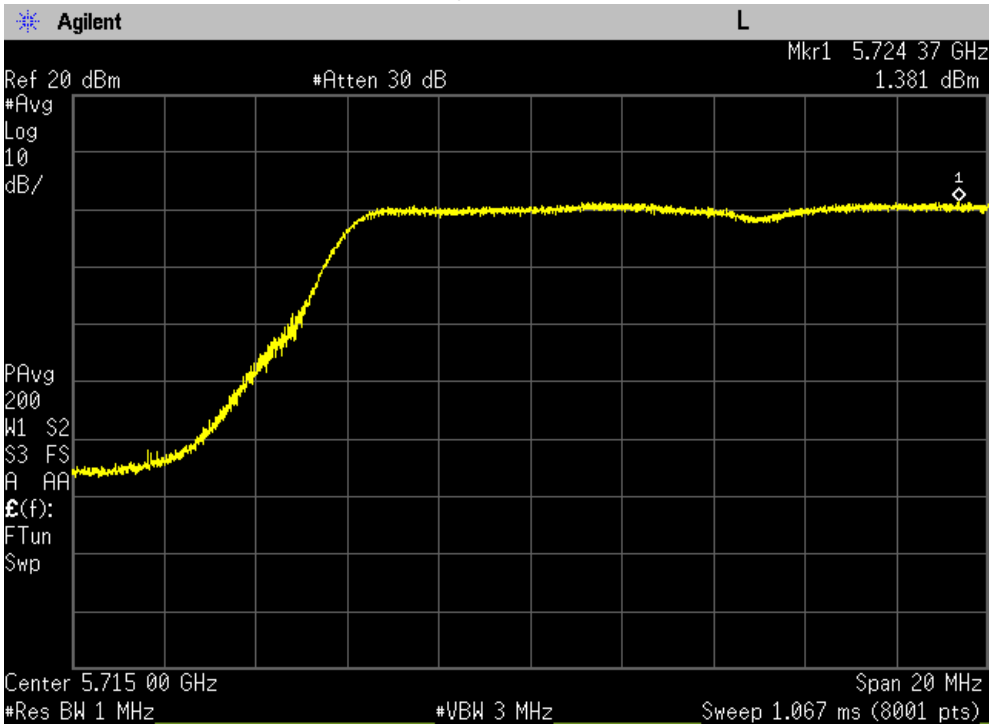


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Highest Channel (5700 MHz)




### Maximum Power Spectral Density, Straddle Channel (5720 MHz)

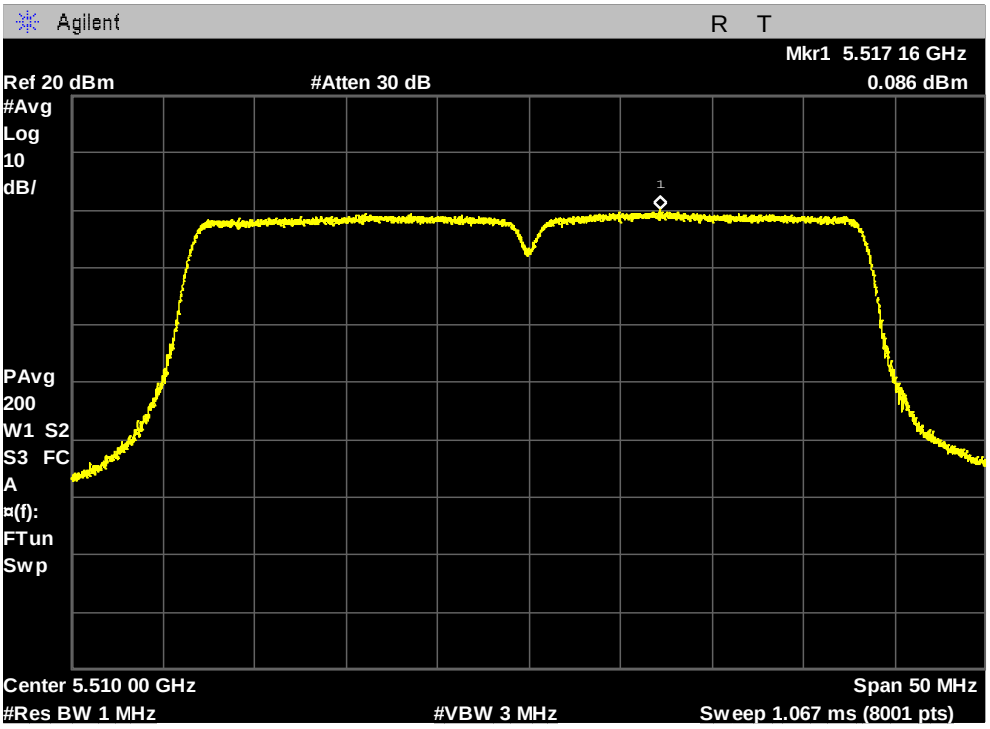


# PLOTS OF EMISSIONS

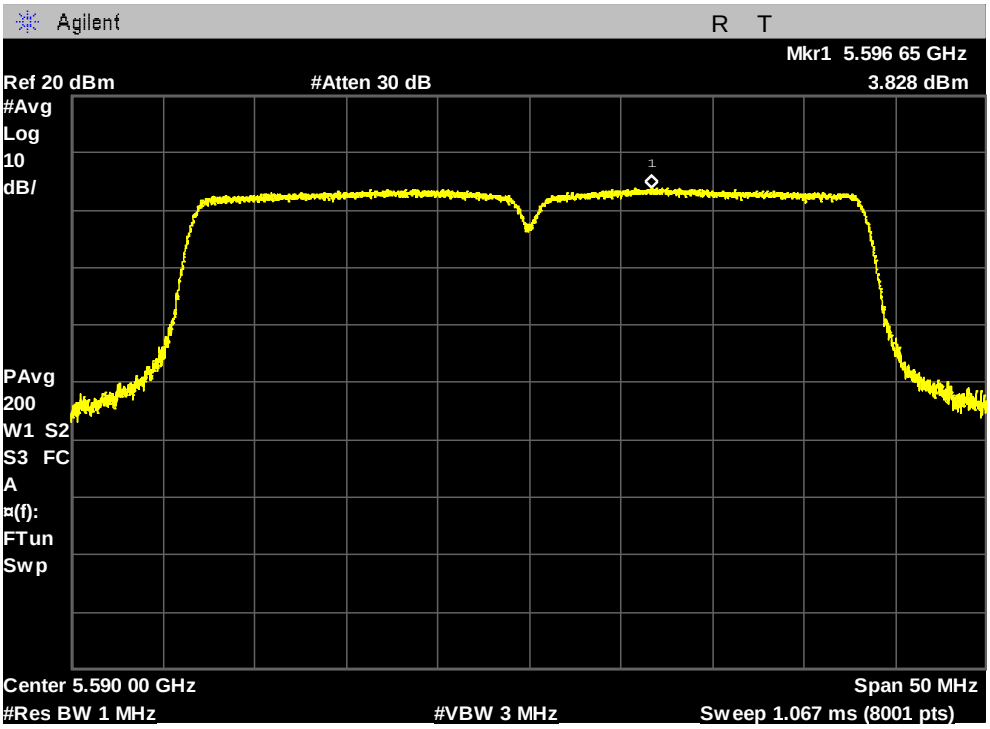
***802.11n (40 MHz) mode***

***Chain 2 (1TX)***

***Maximum Power Spectral Density, Lowest Channel (5510 MHz)***

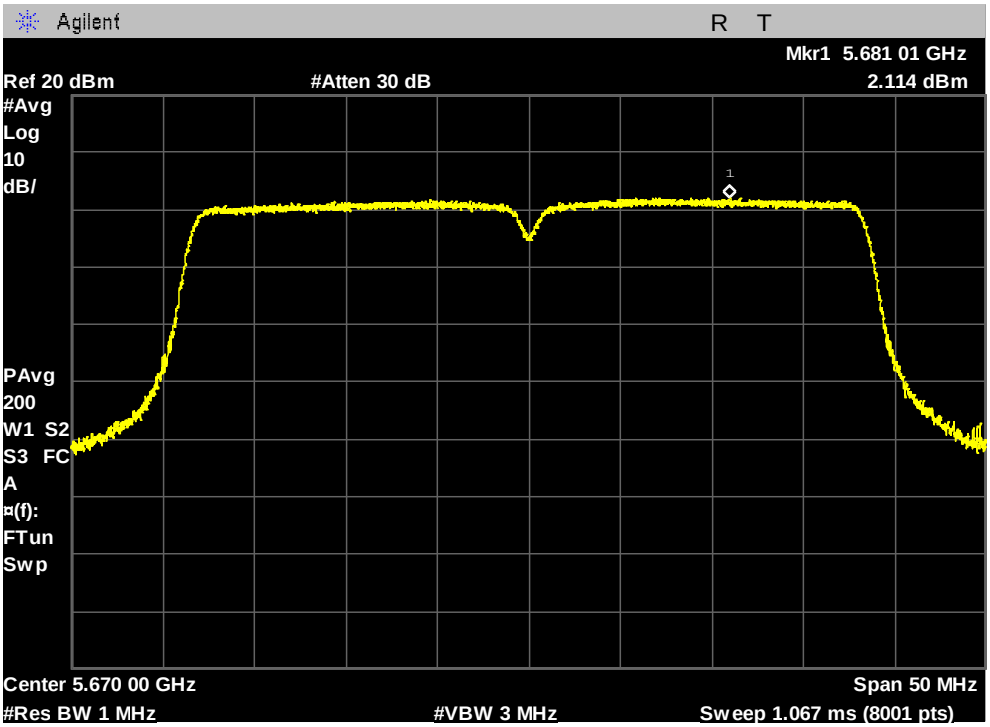



***Maximum Power Spectral Density, Middle Channel (5590 MHz)***

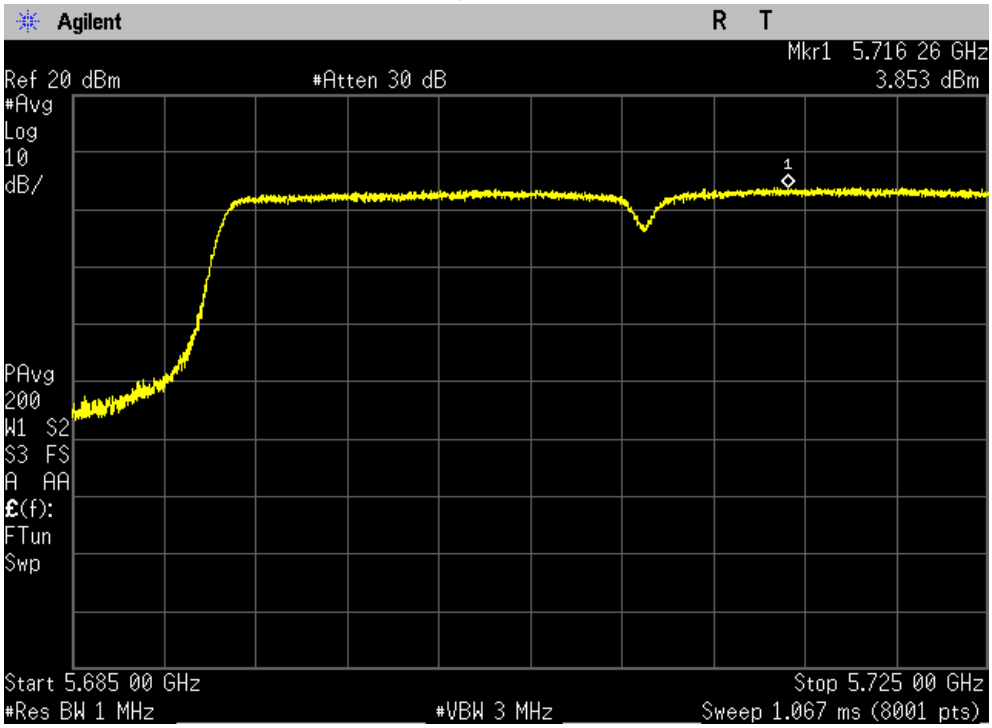


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Highest Channel (5670 MHz)



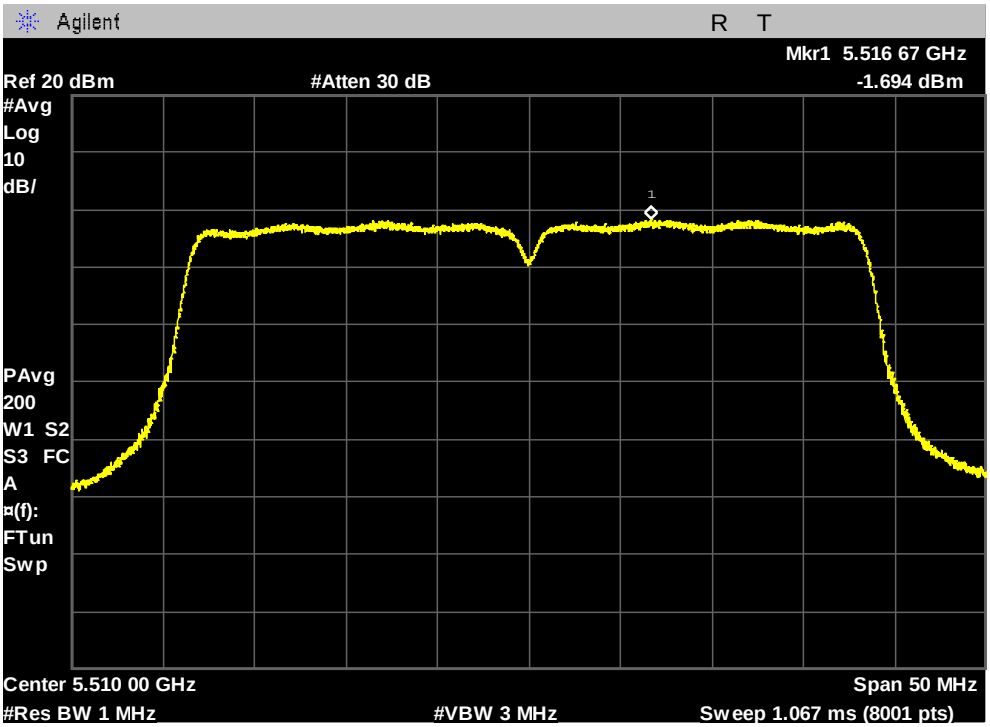

### Maximum Power Spectral Density, Straddle Channel (5710 MHz)



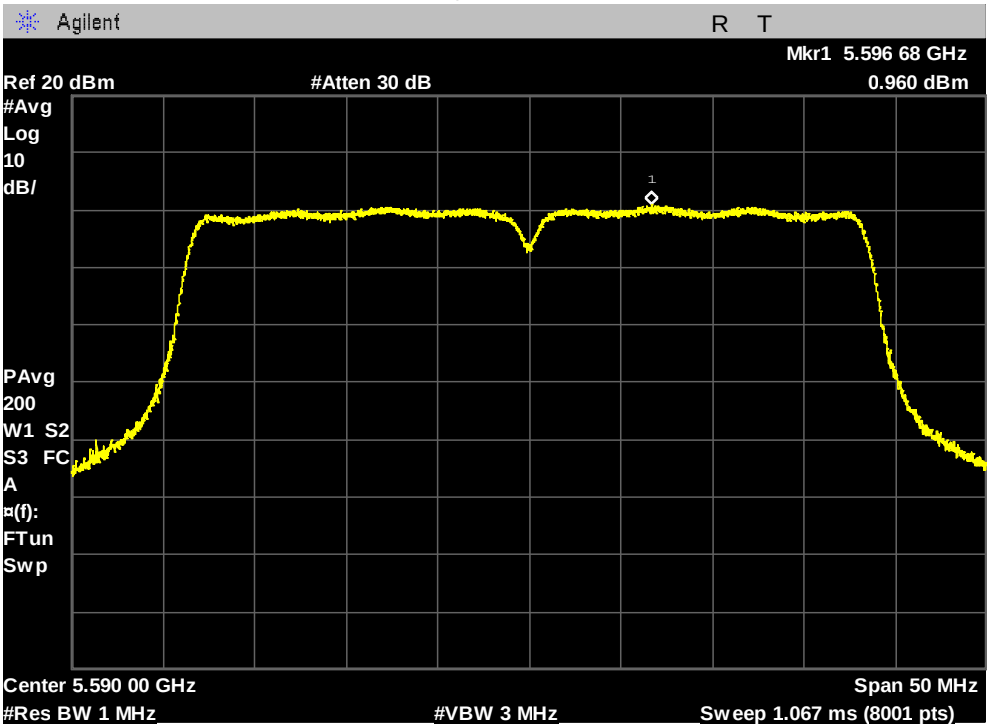
# PLOTS OF EMISSIONS

## Chain 2 (4TX)

### Maximum Power Spectral Density, Lowest Channel (5510 MHz)

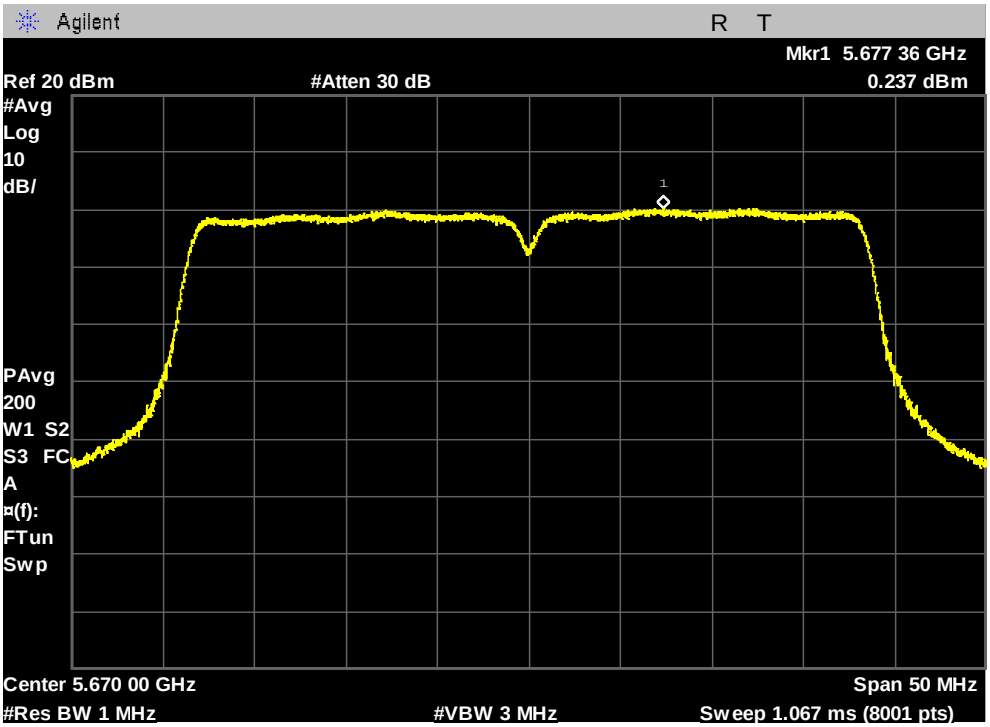



### Maximum Power Spectral Density, Middle Channel (5590 MHz)

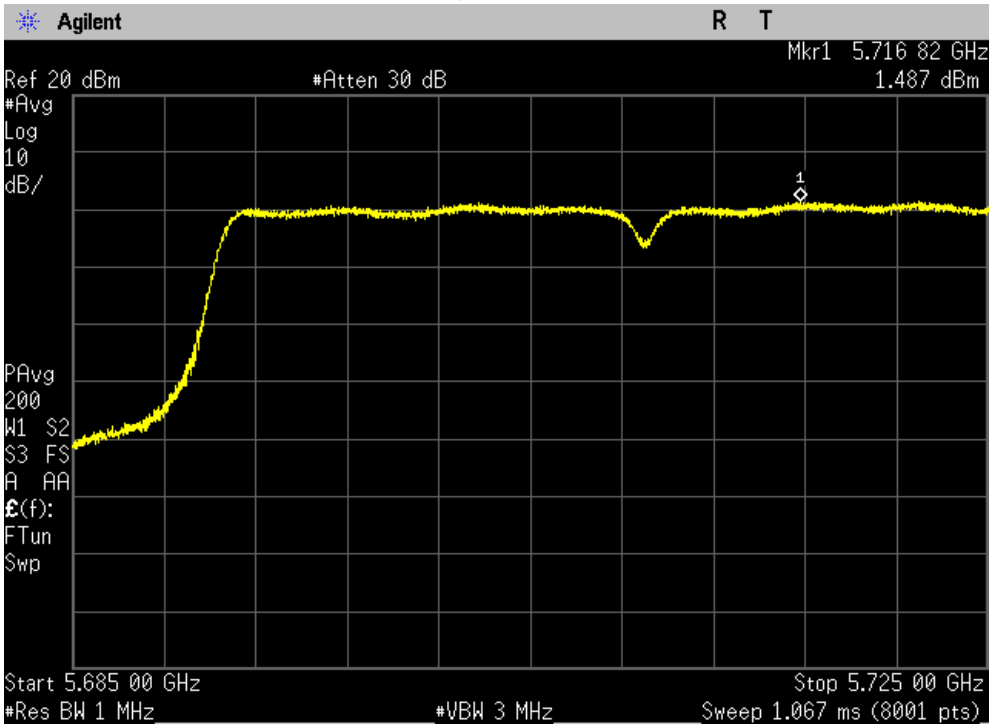


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Highest Channel (5670 MHz)




### Maximum Power Spectral Density, Straddle Channel (5710 MHz)

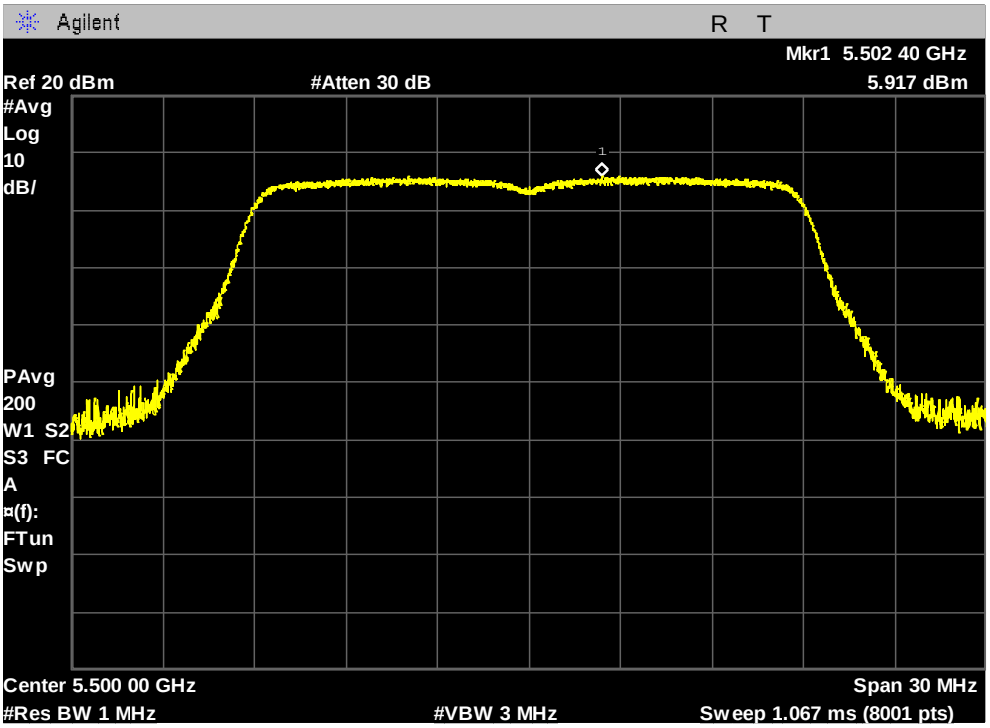


# PLOTS OF EMISSIONS

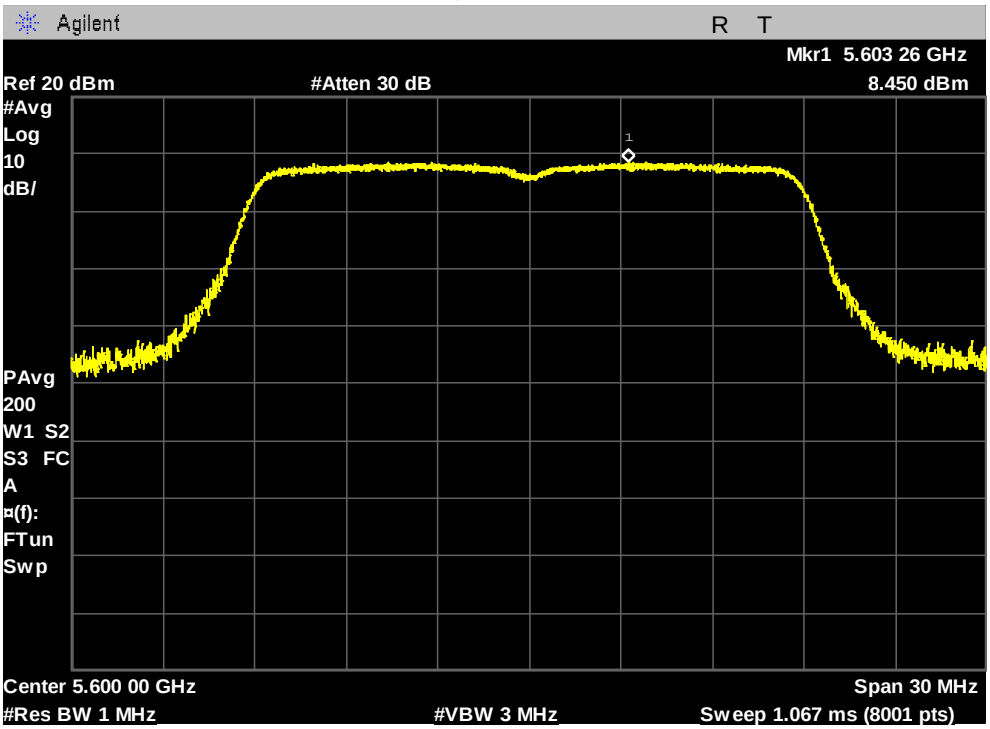
***802.11ac (20 MHz) mode***

***Chain 2 (1TX)***

***Maximum Power Spectral Density, Lowest Channel (5500 MHz)***

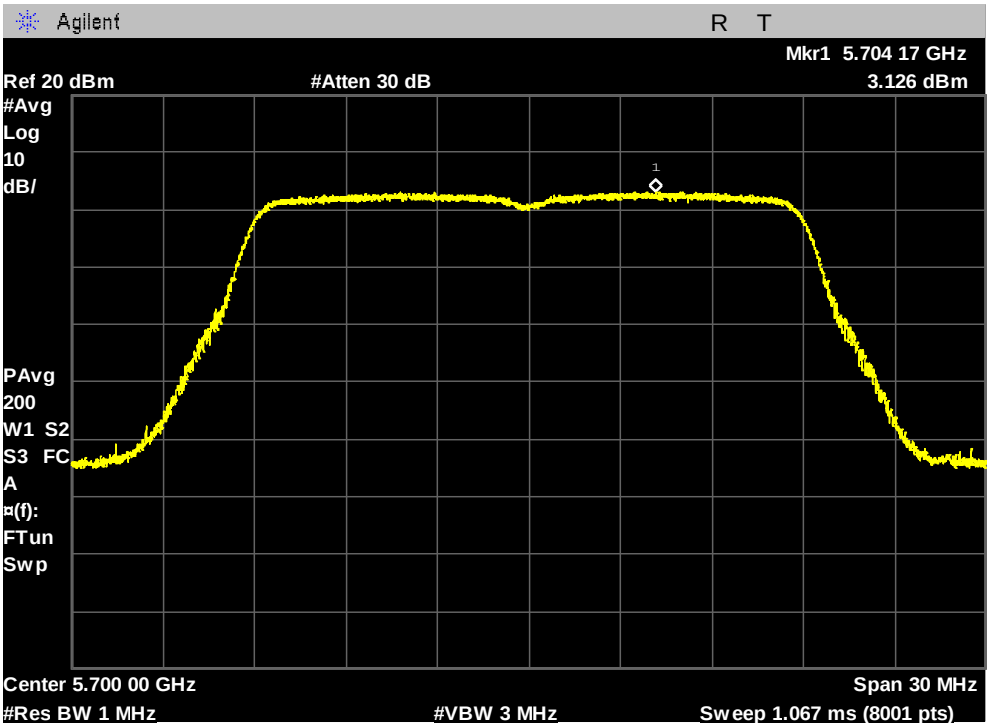



***Maximum Power Spectral Density, Middle Channel (5600 MHz)***

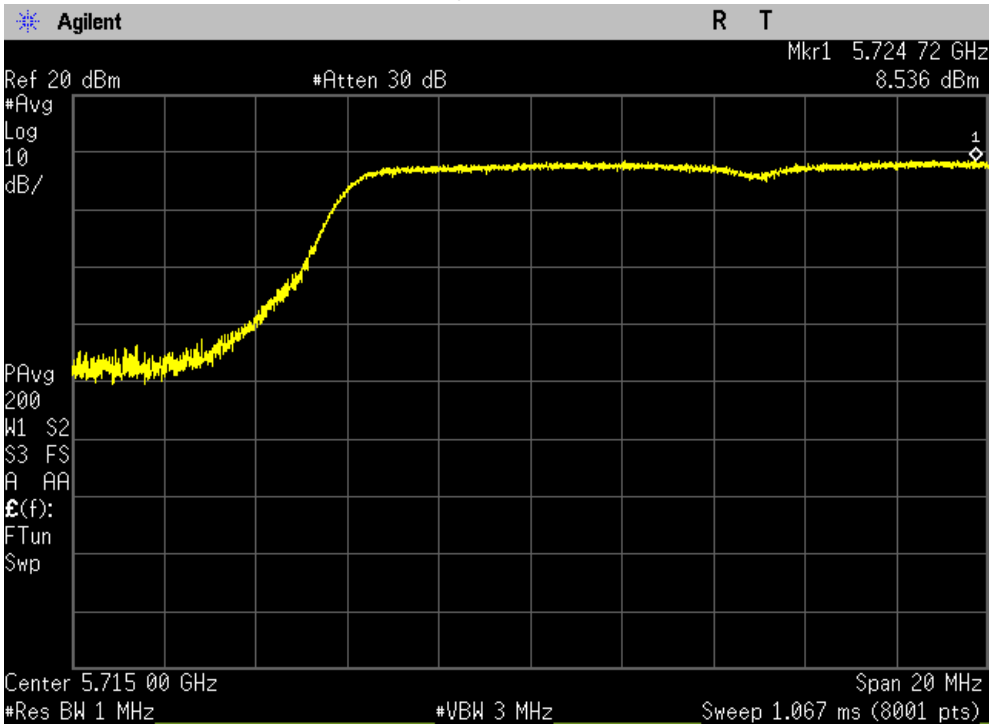


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Highest Channel (5700 MHz)



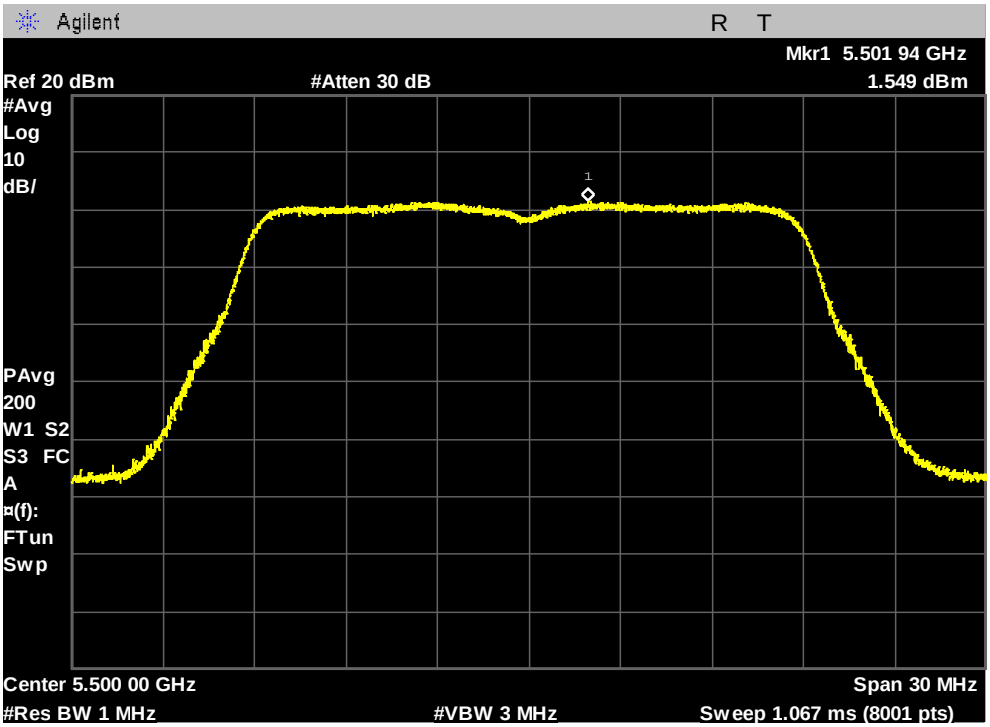

### Maximum Power Spectral Density, Straddle Channel (5720 MHz)



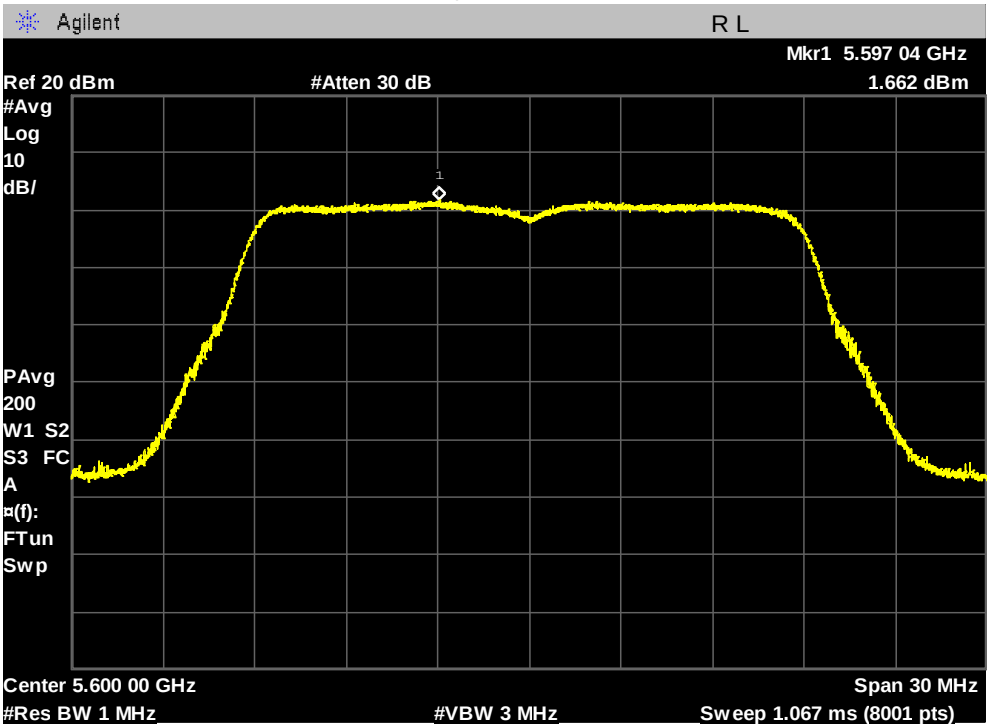
# PLOTS OF EMISSIONS

## Chain 2 (4TX)

### Maximum Power Spectral Density, Lowest Channel (5500 MHz)

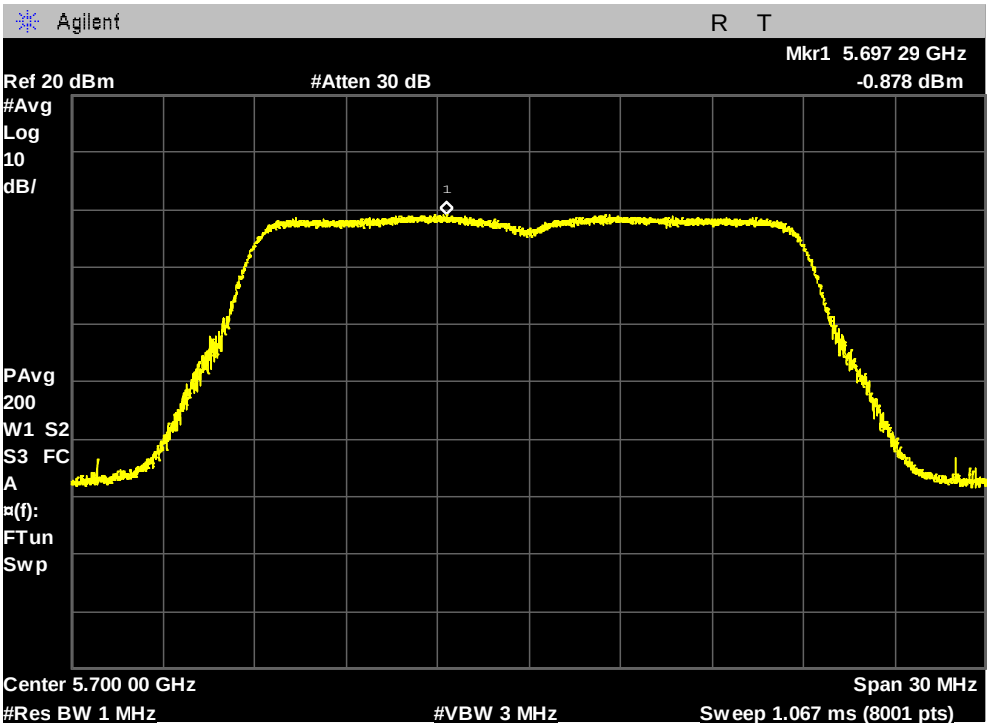



### Maximum Power Spectral Density, Middle Channel (5600 MHz)

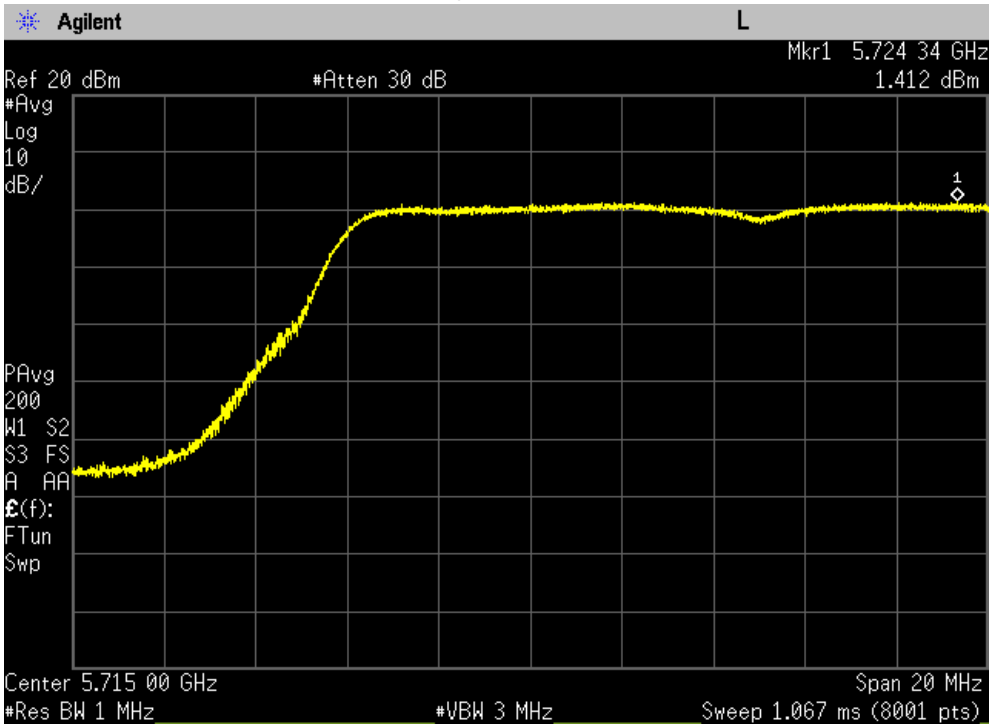


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Highest Channel (5700 MHz)




### Maximum Power Spectral Density, Straddle Channel (5720 MHz)

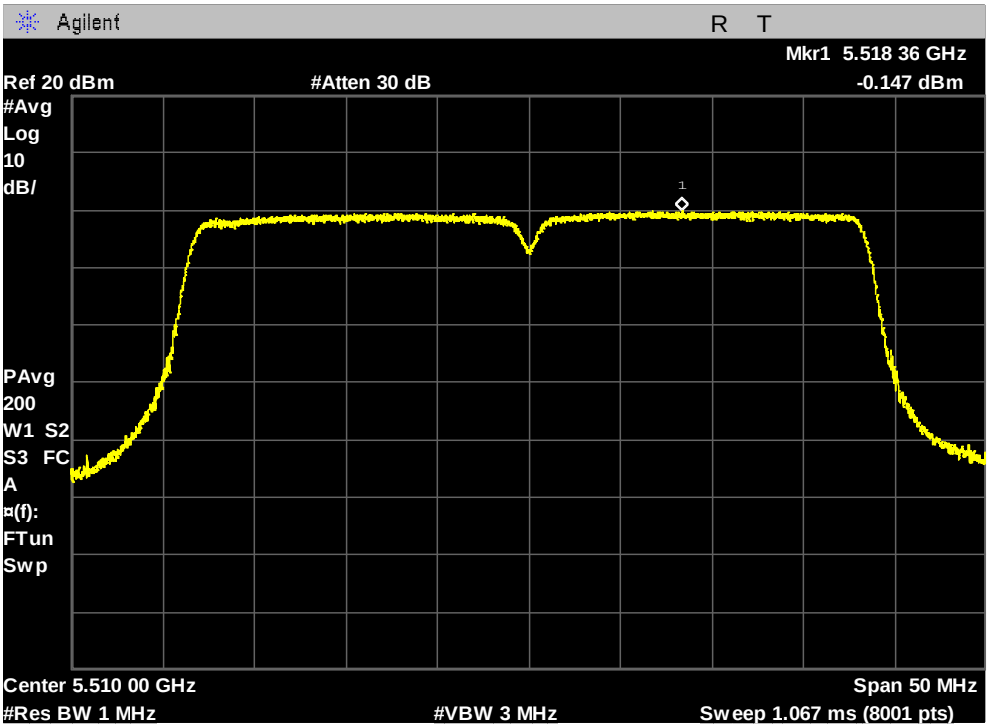


# PLOTS OF EMISSIONS

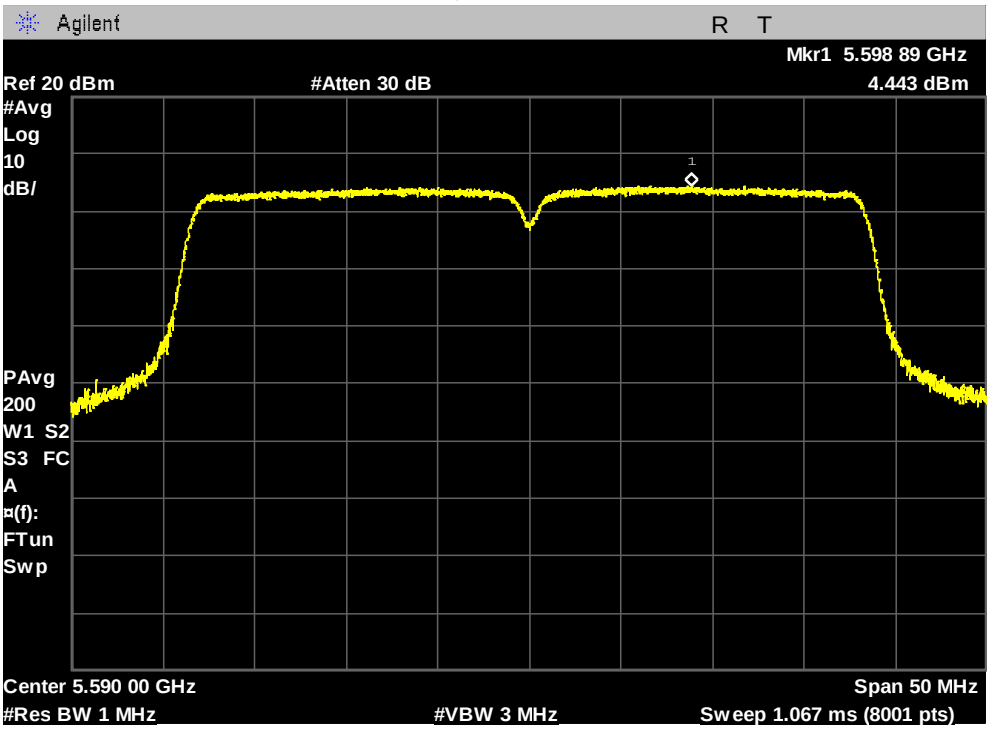
***802.11ac (40 MHz) mode***

***Chain 2 (1TX)***

***Maximum Power Spectral Density, Lowest Channel (5510 MHz)***

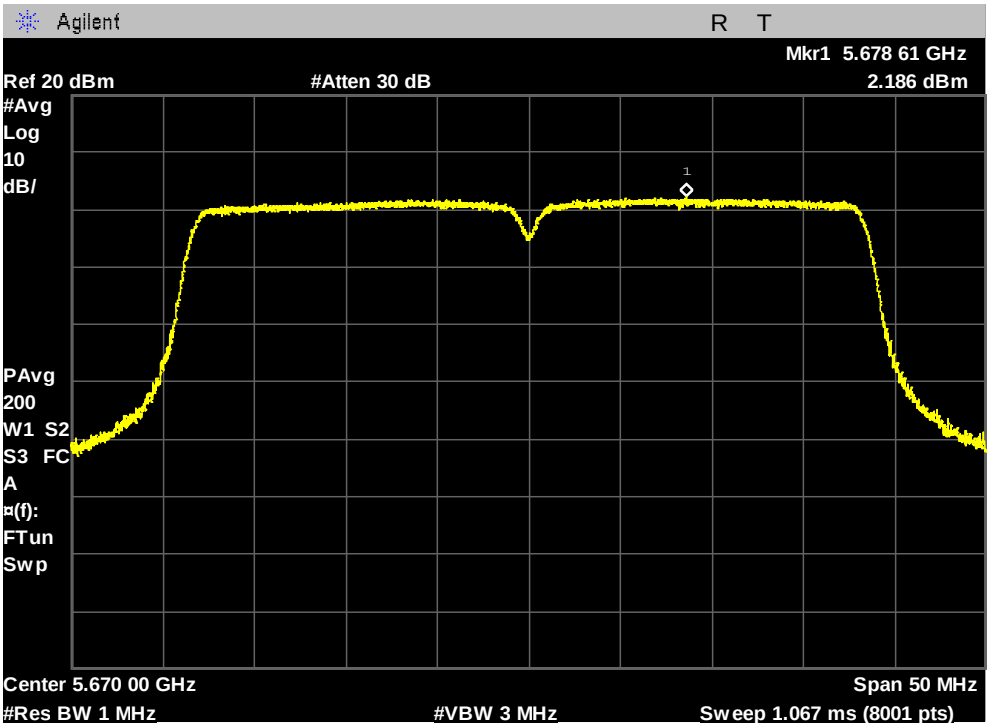



***Maximum Power Spectral Density, Middle Channel (5590 MHz)***

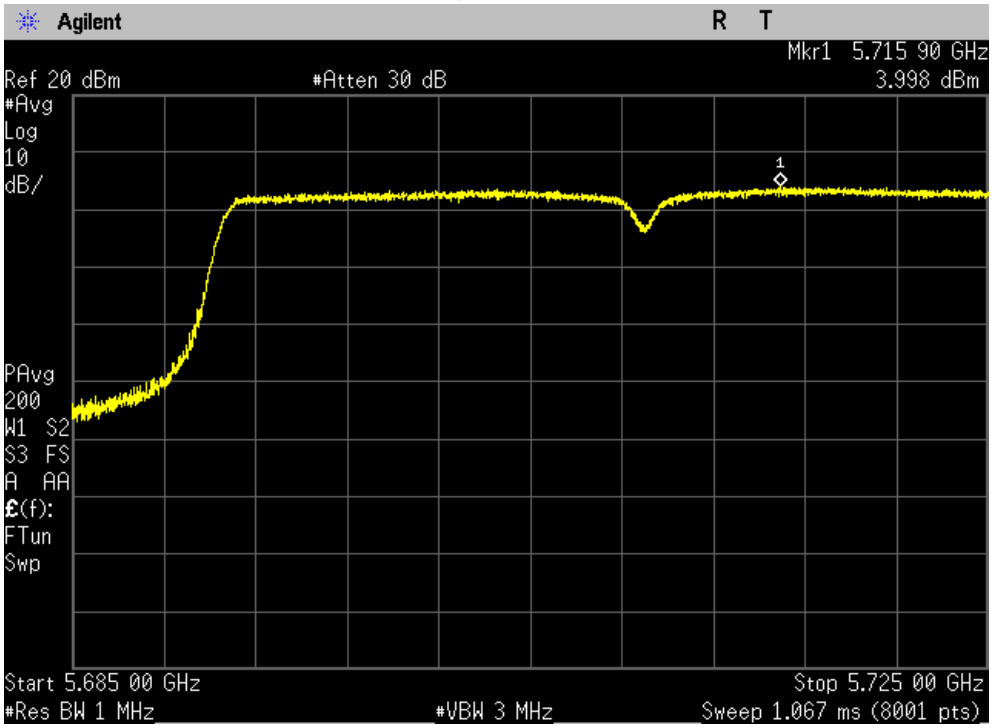


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Highest Channel (5670 MHz)



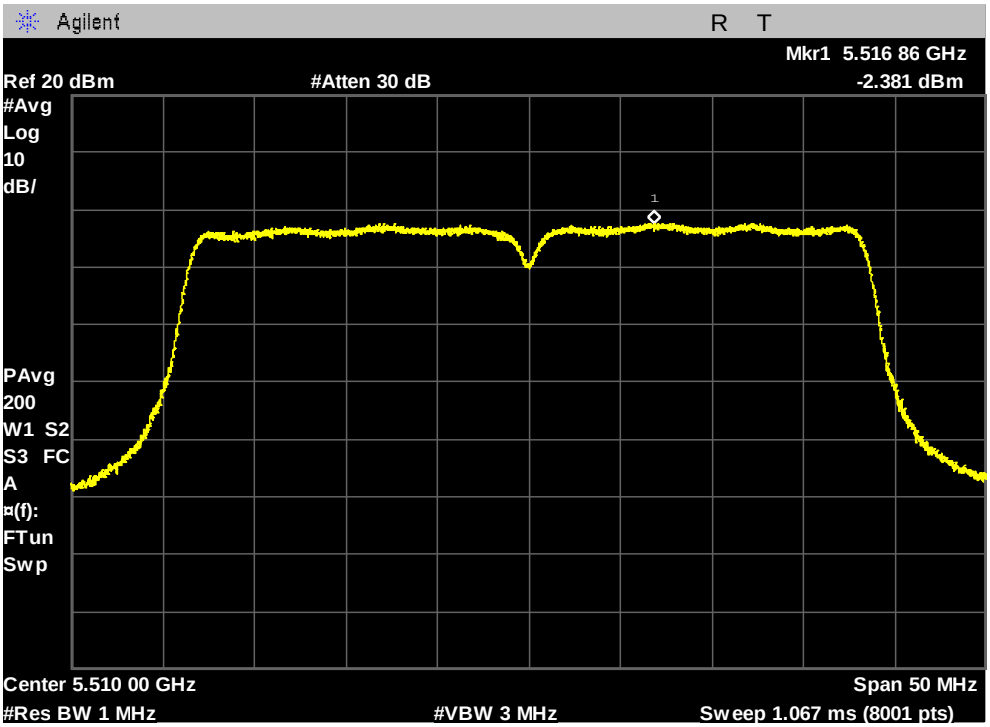

### Maximum Power Spectral Density, Straddle Channel (5710 MHz)



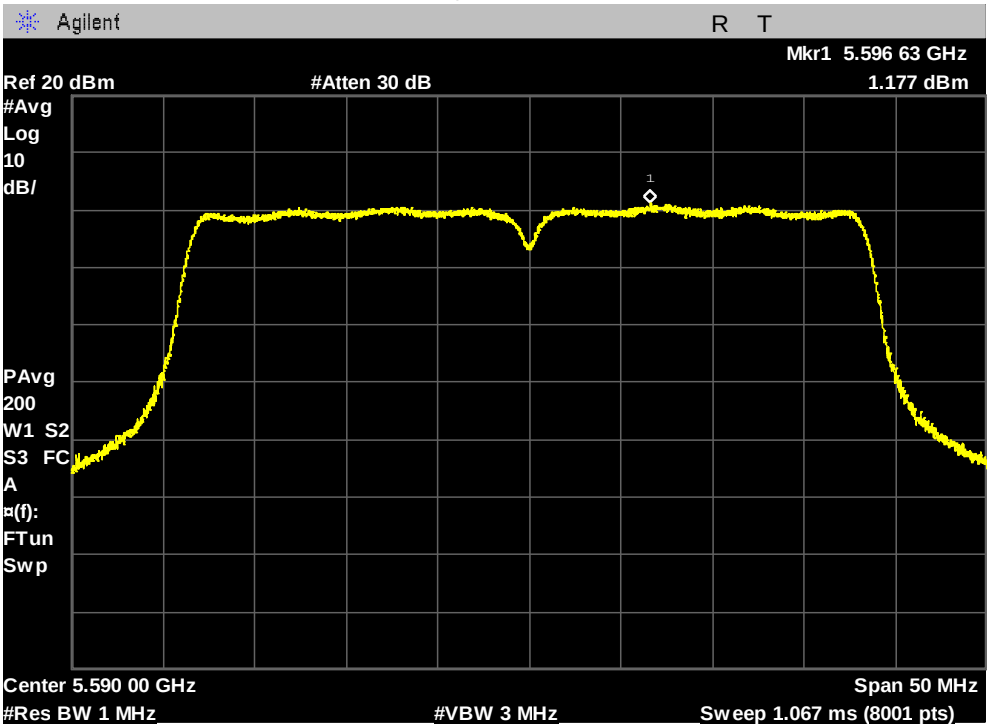
# PLOTS OF EMISSIONS

## Chain 2 (4TX)

### Maximum Power Spectral Density, Lowest Channel (5510 MHz)

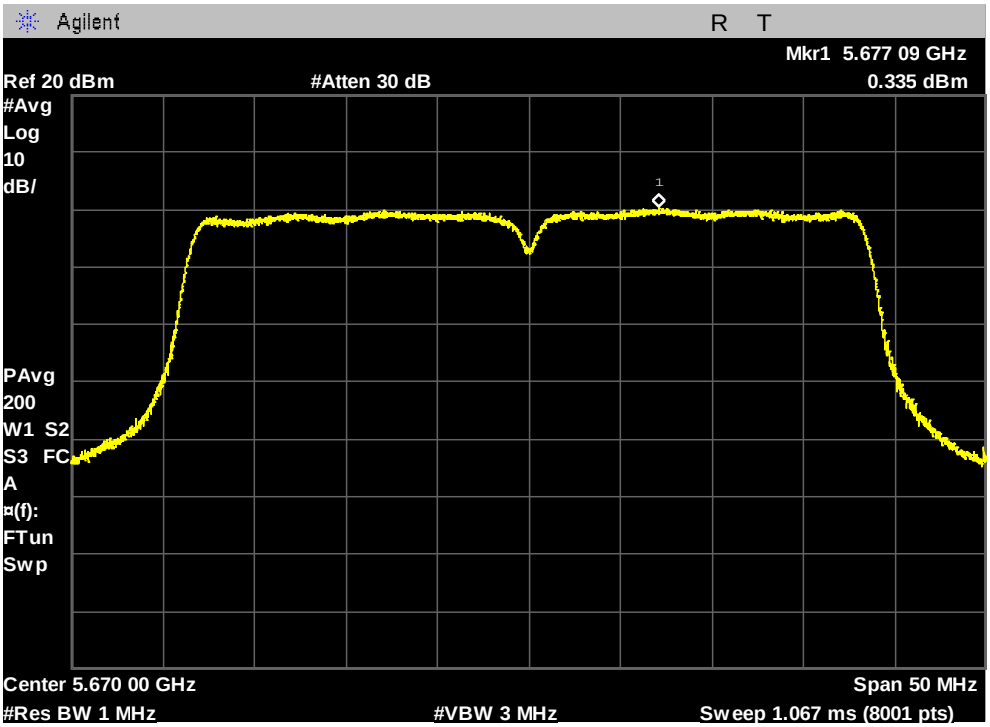



### Maximum Power Spectral Density, Middle Channel (5590 MHz)

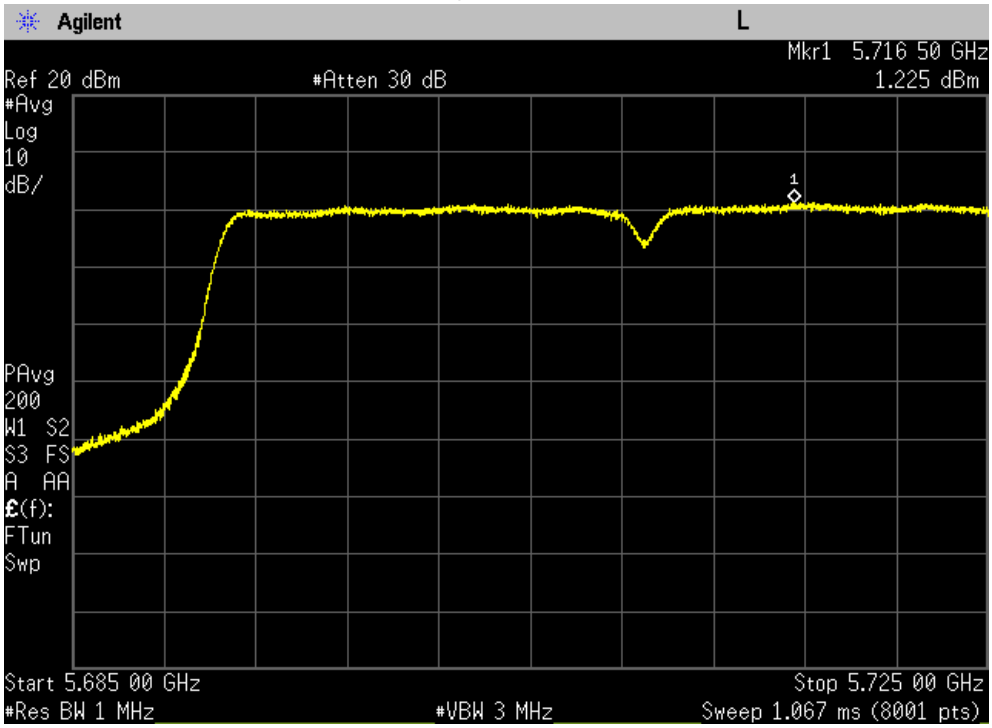


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Highest Channel (5670 MHz)




### Maximum Power Spectral Density, Straddle Channel (5710 MHz)

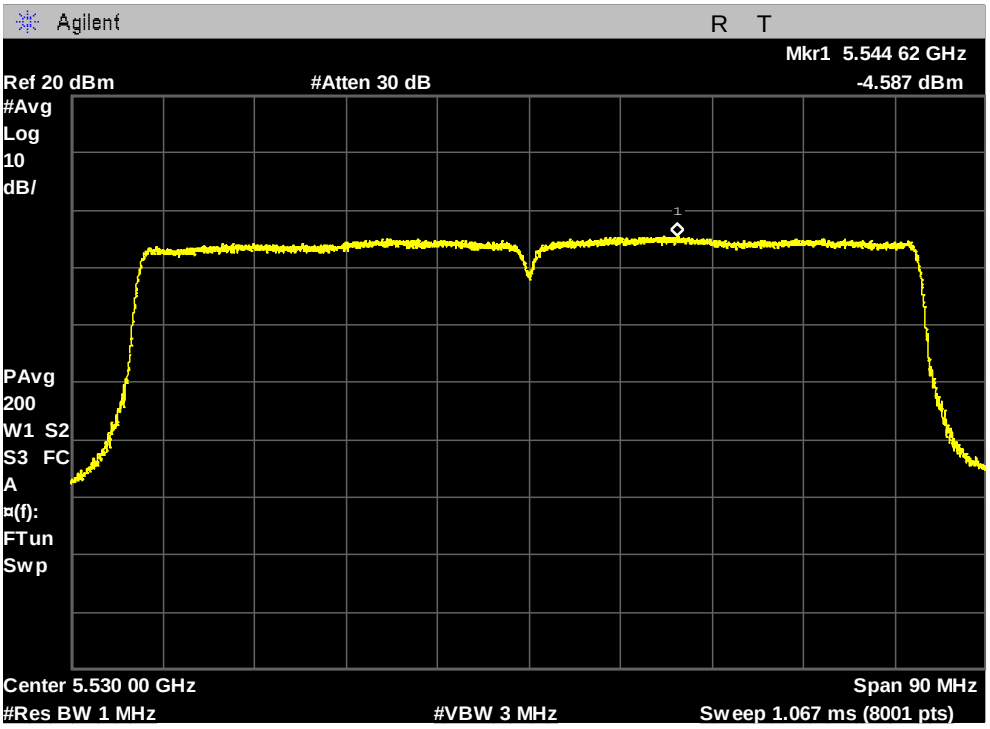


# PLOTS OF EMISSIONS

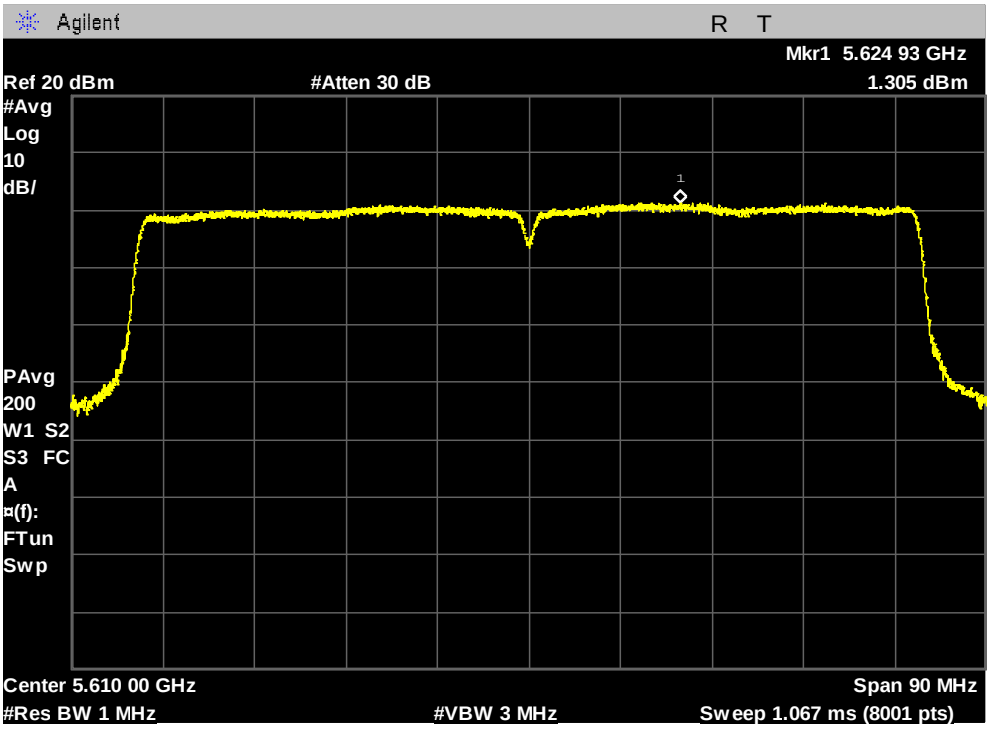
## 802.11ac (80 MHz) mode

## Chain 2 (1TX)

### Maximum Power Spectral Density, Lowest Channel (5530 MHz)

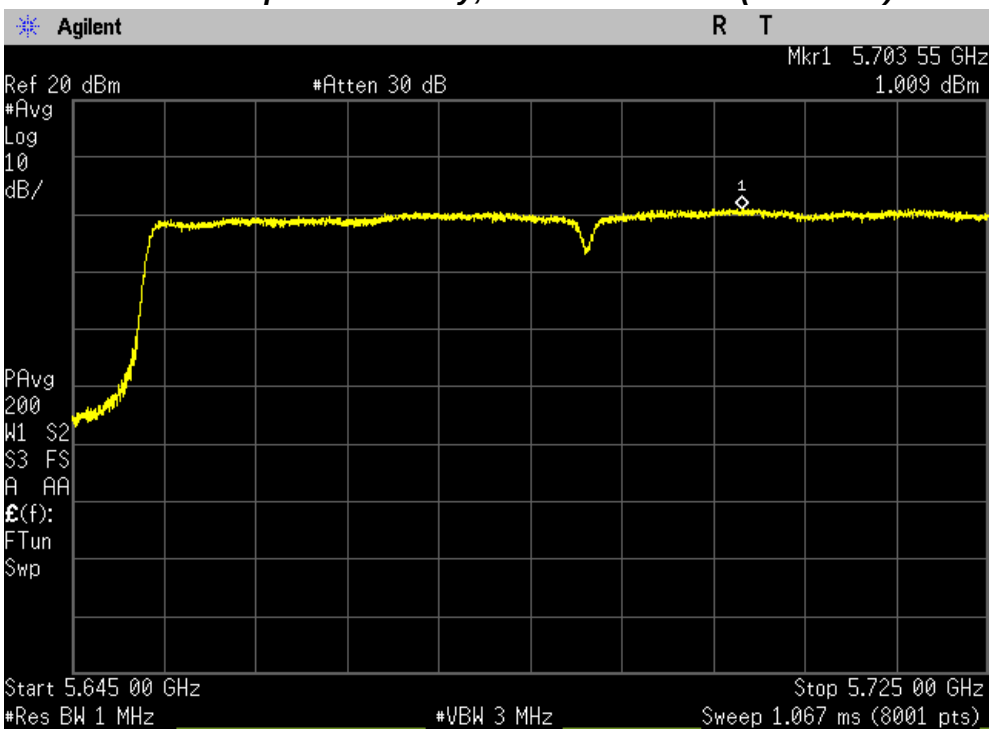



### Maximum Power Spectral Density, Highest Channel (5610 MHz)



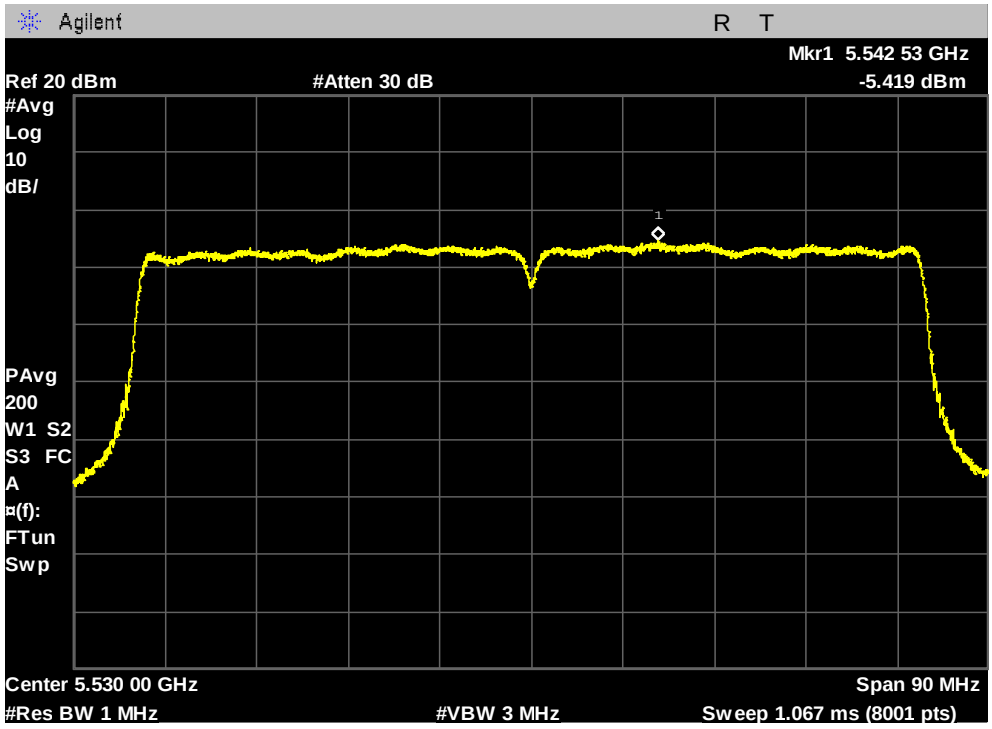
# PLOTS OF EMISSIONS

***Maximum Power Spectral Density, Straddle Channel (5690 MHz)***



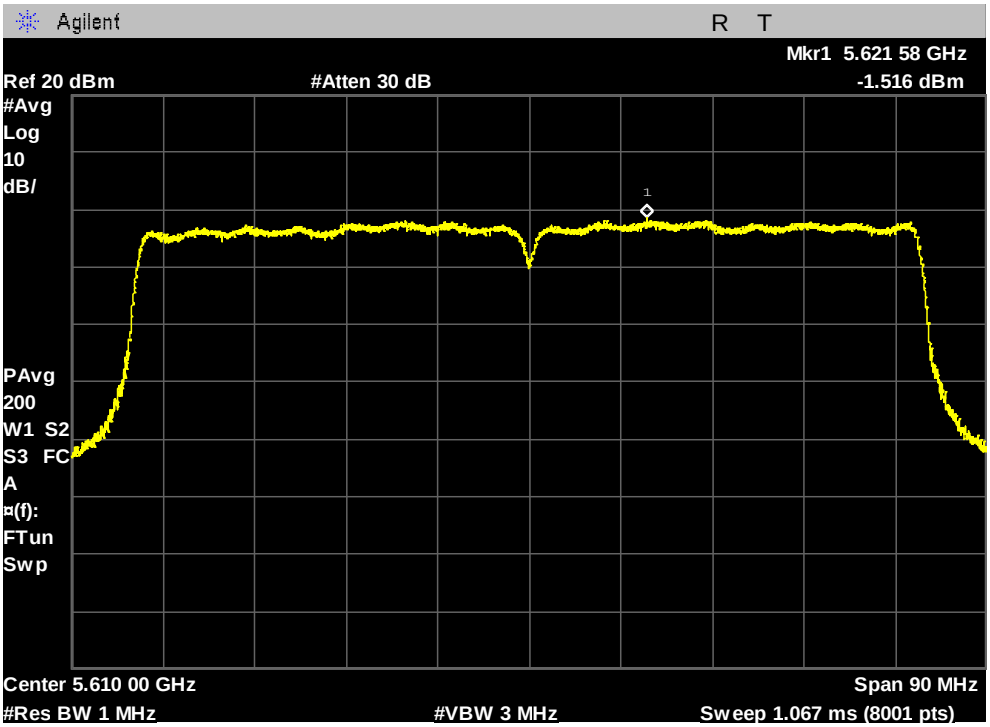

***<u>Chain 2 (4TX)</u>***

***Maximum Power Spectral Density, Lowest Channel (5530 MHz)***

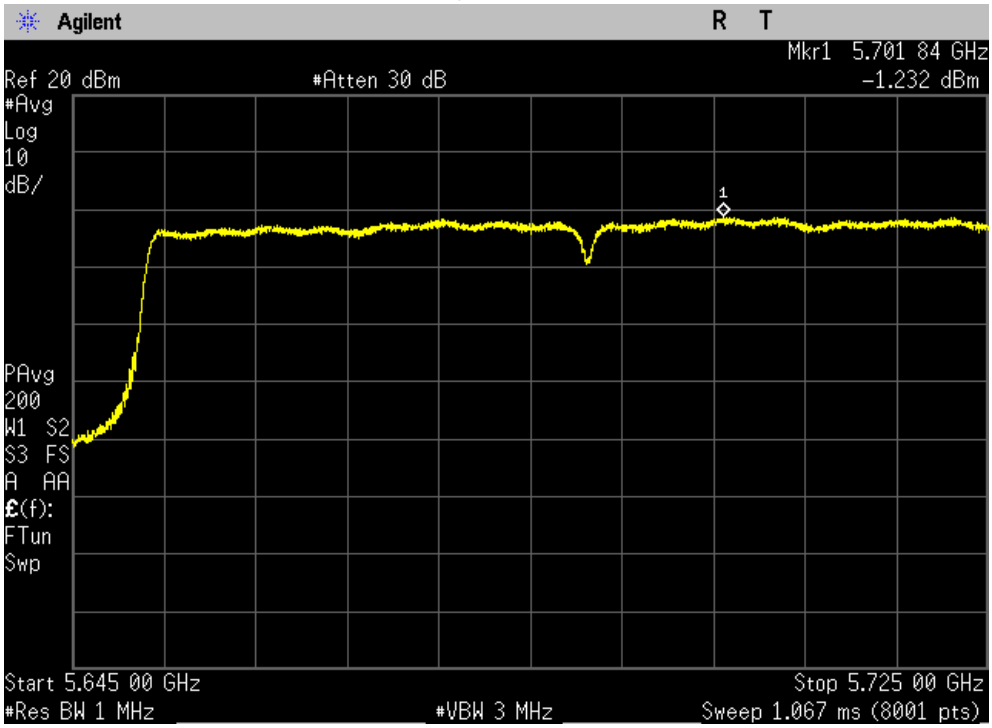


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Highest Channel (5610 MHz)




### Maximum Power Spectral Density, Straddle Channel (5690 MHz)



## 8.6.4 Maximum Power Spectral Density – U-NII-3 band

**FCC §15.407(a)**

**Test Mode : Set to Straddle channel, Lowest channel, Middle channel and Highest channel**

**802.11a mode – 1TX**

| Channel | Frequency (MHz) | Measured PSD (dBm/500kHz) | Duty Factor (dB) | Maximum PSD (dBm/500kHz) | FCC Limit (dBm/ 500kHz) |
|---|---|---|---|---|---|
| | | Chain 2 | | | |
| Straddle | 5720 | 5.52 | 0.22 | 5.74 | 30.00 |
| Lowest | 5745 | 5.20 | 0.22 | 5.42 | 30.00 |
| Middle | 5785 | 5.29 | 0.22 | 5.51 | 30.00 |
| Highest | 5825 | 5.28 | 0.22 | 5.50 | 30.00 |

**802.11a mode – 4TX**

| Channel | Frequency (MHz) | Measured PSD (dBm/500kHz) | Duty Factor (dB) | Maximum PSD (dBm/500kHz) | FCC Limit (dBm/ 500kHz) |
|---|---|---|---|---|---|
| | | Chain 2 | | Total PSD | |
| Straddle | 5720 | -0.14 | 0.22 | 6.10 | 27.98 |
| Lowest | 5745 | 3.47 | 0.22 | 9.71 | 27.98 |
| Middle | 5785 | 3.62 | 0.22 | 9.86 | 27.98 |
| Highest | 5825 | 3.76 | 0.22 | 10.00 | 27.98 |

# TEST DATA

**802.11n (20MHz) mode – 1TX**

| Channel | Frequency (MHz) | Measured PSD (dBm/500kHz) | Duty Factor (dB) | Maximum PSD (dBm/500kHz) | FCC Limit (dBm/ 500kHz) |
|---|---|---|---|---|---|
| | | Chain 2 | | | |
| Straddle | 5720 | 5.44 | 0.22 | 5.66 | 30.00 |
| Lowest | 5745 | 4.12 | 0.22 | 4.34 | 30.00 |
| Middle | 5785 | 4.21 | 0.22 | 4.43 | 30.00 |
| Highest | 5825 | 4.59 | 0.22 | 4.81 | 30.00 |

**802.11n (20MHz) mode – 4TX**

| Channel | Frequency (MHz) | Measured PSD (dBm/500kHz) | Duty Factor (dB) | Maximum PSD (dBm/500kHz) | FCC Limit (dBm/ 500kHz) |
|---|---|---|---|---|---|
| | | Chain 2 | | Total PSD | |
| Straddle | 5720 | -0.04 | 0.22 | 6.20 | 27.98 |
| Lowest | 5745 | 3.33 | 0.22 | 9.57 | 27.98 |
| Middle | 5785 | 3.07 | 0.22 | 9.31 | 27.98 |
| Highest | 5825 | 3.21 | 0.22 | 9.45 | 27.98 |

# TEST DATA

**802.11n (40MHz) mode – 1TX**

| Channel | Frequency (MHz) | Measured PSD (dBm/500kHz) | Duty Factor (dB) | Maximum PSD (dBm/500kHz) | FCC Limit (dBm/ 500kHz) |
|---|---|---|---|---|---|
| | | Chain 2 | | | |
| Straddle | 5710 | 0.46 | 0.43 | 0.89 | 30.00 |
| Lowest | 5755 | 0.69 | 0.43 | 1.12 | 30.00 |
| Highest | 5795 | 1.13 | 0.43 | 1.56 | 30.00 |

**802.11n (40MHz) mode – 4TX**

| Channel | Frequency (MHz) | Measured PSD (dBm/500kHz) | Duty Factor (dB) | Maximum PSD (dBm/500kHz) | FCC Limit (dBm/ 500kHz) |
|---|---|---|---|---|---|
| | | Chain 2 | | Total PSD | |
| Straddle | 5710 | -1.89 | 0.43 | 4.56 | 27.98 |
| Lowest | 5755 | -0.27 | 0.43 | 6.18 | 27.98 |
| Highest | 5795 | 0.07 | 0.43 | 6.52 | 27.98 |

**802.11ac (20MHz) mode – 1TX**

| Channel | Frequency (MHz) | Measured PSD (dBm/500kHz) | Duty Factor (dB) | Maximum PSD (dBm/500kHz) | FCC Limit (dBm/ 500kHz) |
|---|---|---|---|---|---|
| | | Chain 2 | | | |
| Straddle | 5720 | 5.40 | 0.07 | 5.47 | 30.00 |
| Lowest | 5745 | 4.63 | 0.07 | 4.70 | 30.00 |
| Middle | 5785 | 4.74 | 0.07 | 4.81 | 30.00 |
| Highest | 5825 | 4.60 | 0.07 | 4.67 | 30.00 |

# TEST DATA

**802.11ac (20MHz) mode – 4TX**

| Channel | Frequency (MHz) | Measured PSD (dBm/500kHz) | Duty Factor (dB) | Maximum PSD (dBm/500kHz) | FCC Limit (dBm/ 500kHz) |
|---|---|---|---|---|---|
| | | Chain 2 | | Total PSD | |
| Straddle | 5720 | 0.09 | 0.07 | 6.18 | 27.98 |
| Lowest | 5745 | 3.06 | 0.07 | 9.15 | 27.98 |
| Middle | 5785 | 3.16 | 0.07 | 9.25 | 27.98 |
| Highest | 5825 | 3.12 | 0.07 | 9.21 | 27.98 |

**802.11ac (40MHz) mode – 1TX**

| Channel | Frequency (MHz) | Measured PSD (dBm/500kHz) | Duty Factor (dB) | Maximum PSD (dBm/500kHz) | FCC Limit (dBm/ 500kHz) |
|---|---|---|---|---|---|
| | | Chain 2 | | | |
| Straddle | 5710 | 0.72 | 0.14 | 0.86 | 30.00 |
| Lowest | 5755 | 0.59 | 0.14 | 0.73 | 30.00 |
| Highest | 5795 | 1.29 | 0.14 | 1.43 | 30.00 |

**802.11ac (40MHz) mode – 4TX**

| Channel | Frequency (MHz) | Measured PSD (dBm/500kHz) | Duty Factor (dB) | Maximum PSD (dBm/500kHz) | FCC Limit (dBm/ 500kHz) |
|---|---|---|---|---|---|
| | | Chain 2 | | Total PSD | |
| Straddle | 5710 | -1.77 | 0.14 | 4.39 | 27.98 |
| Lowest | 5755 | -0.27 | 0.14 | 5.89 | 27.98 |
| Highest | 5795 | 0.10 | 0.14 | 6.26 | 27.98 |

# TEST DATA

**802.11ac (80MHz) mode – 1TX**

| Channel | Frequency (MHz) | Measured PSD (dBm/500kHz) | Duty Factor (dB) | Maximum PSD (dBm/500kHz) | FCC Limit (dBm/ 500kHz) |
|---|---|---|---|---|---|
| | | Chain 2 | | | |
| Straddle | 5690 | -2.36 | 0.27 | -2.09 | 30.00 |
| Lowest | 5775 | -1.45 | 0.27 | -1.18 | 30.00 |

**802.11ac (80MHz) mode – 4TX**

| Channel | Frequency (MHz) | Measured PSD (dBm/500kHz) | Duty Factor (dB) | Maximum PSD (dBm/500kHz) | FCC Limit (dBm/ 500kHz) |
|---|---|---|---|---|---|
| | | Chain 2 | | Total PSD | |
| Straddle | 5690 | -4.32 | 0.27 | 1.97 | 27.98 |
| Lowest | 5775 | -2.40 | 0.27 | 3.89 | 27.98 |

# TEST DATA

***Note:***

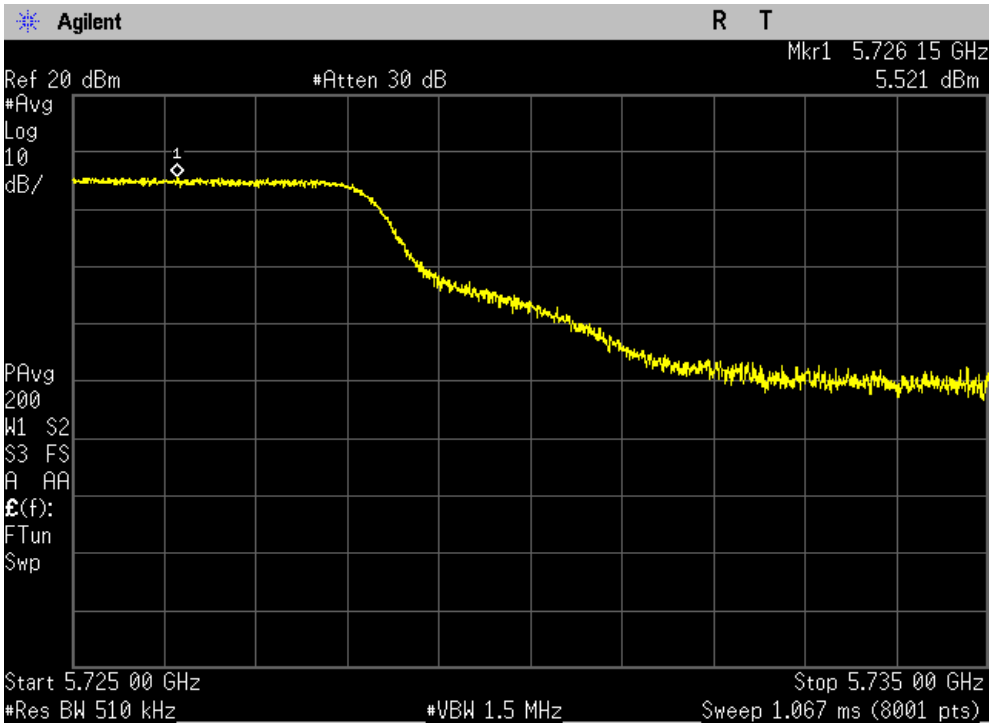
1. *Maximum PSD = Measured PSD + Duty Factor*
2. *"Measure and add 10 log($N_{ANT}$) dB, where $N_{ANT}$ is the number of outputs" was used for measuring in-band Total PSD.*
   *Total PSD = Chain 3 PSD + duty factor + 10 log($N_{ANT}$)*
3. *For CDD transmission, directional gain is.* ***8.02 dBi***
   *For MIMO transmission, directional gain is* ***5.01 dBi****.*
   *Directional gain was calculated according to KDB662911 D01 Multiple Transmitter Output v02r01.*
   *For power spectral density (PSD) measurements on all devices employing CDD, directional gain is as follows,*
   ***Directional gain = GANT + Array Gain = 2 dBi + 6.02 dB = 8.02 dBi***
   ***Array Gain = 10 log($N_{ANT}$/$N_{SS}$) dB = 10 log(4/1) = 6.02 dB.***
   *where $N_{SS}$ = the number of independent spatial streams of data and GANT is the antenna gain in dBi.*
   *For CDD mode of this device, NSS=1.*
   *For power spectral density (PSD) measurements on all devices employing MIMO, directional gain is as follows,*
   ***Directional gain = $G_{ANT}$ + 10 log($N_{ANT}$/$N_{SS}$) dBi = 2 dBi + 10 log(4/2) dB = 5.01 dBi****.*
   *where $N_{SS}$ = the number of independent spatial streams of data and $G_{ANT}$ is the antenna gain in dBi*
   *For this device, MIMO mode means SM-MIMO(Spatial Multiplexing) transmission and the lowest $N_{SS}$=2 with beamforming.*
4. *For FCC PSD Limit, If transmitting antennas of directional gain greater than 6 dBi was used, maximum power spectral density was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.*
5. *Power Spectral Density(PSD) was measured by same method with conducted output power according to II.F.1 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01.*
6. *The following equation was used for spectrum offset:*
   *Spectrum offset (dB) = Attenuator (dB) + Cable Loss (dB) + SMA Type Connector Loss (dB)*

# PLOTS OF EMISSIONS

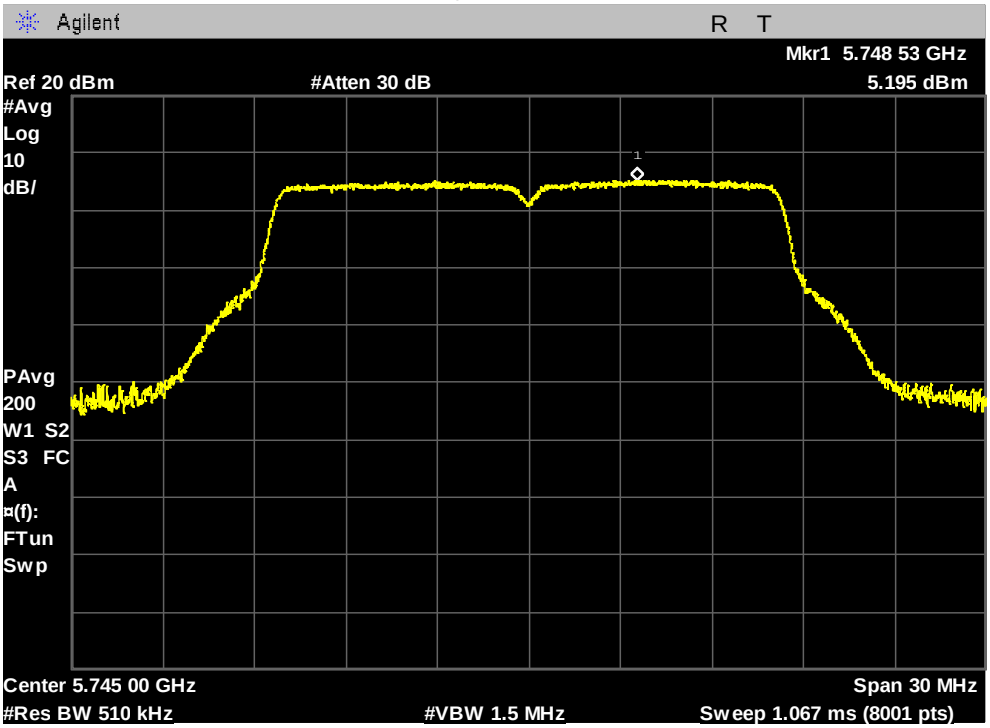
***802.11a mode***

***Chain 2 (1TX)***

***Maximum Power Spectral Density, Straddle Channel (5720 MHz)***

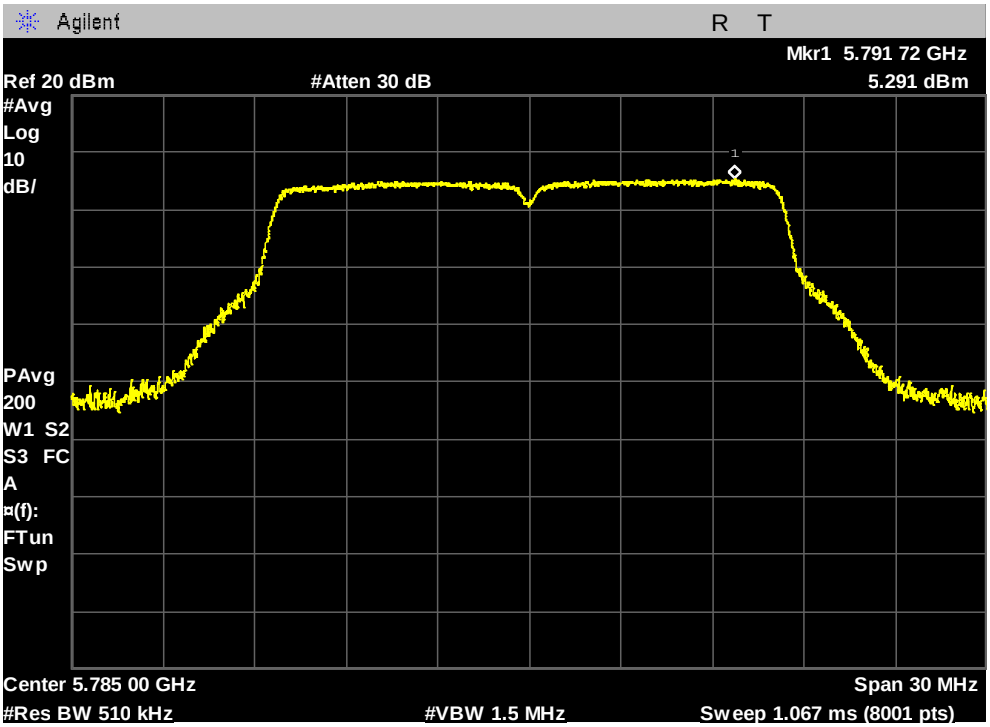



***Maximum Power Spectral Density, Lowest Channel (5745 MHz)***

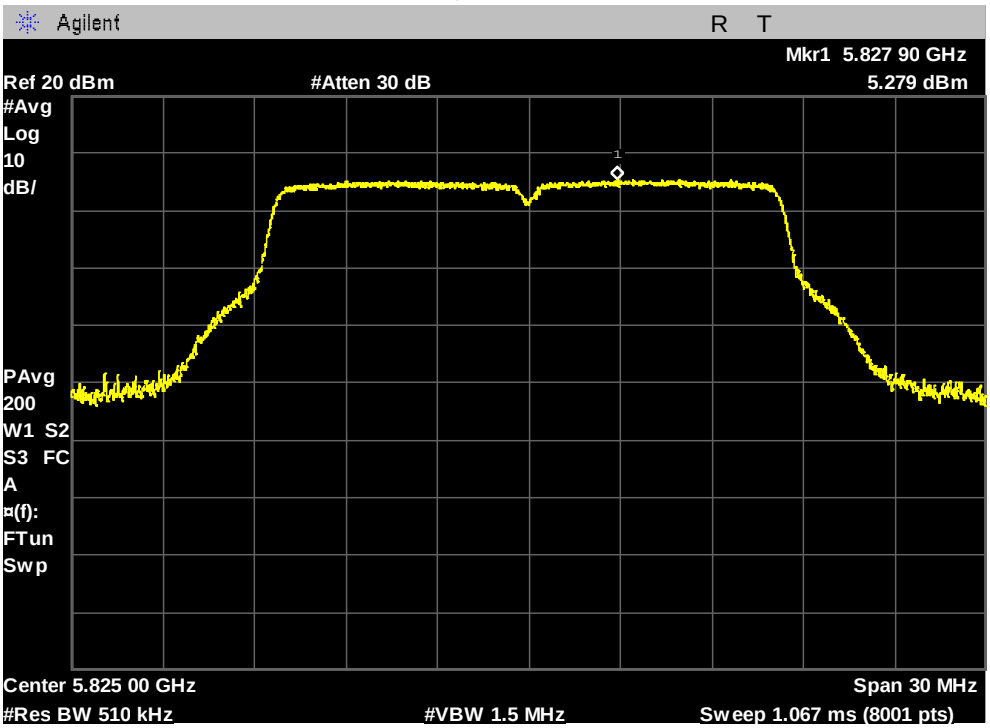


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Middle Channel (5785 MHz)



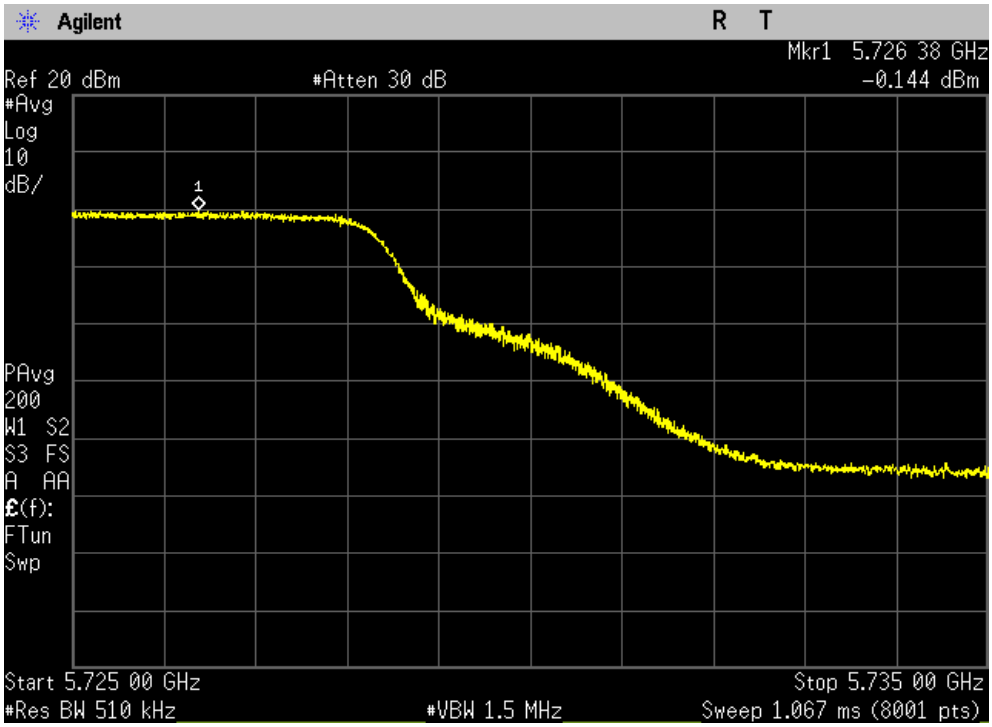

### Maximum Power Spectral Density, Highest Channel (5825 MHz)



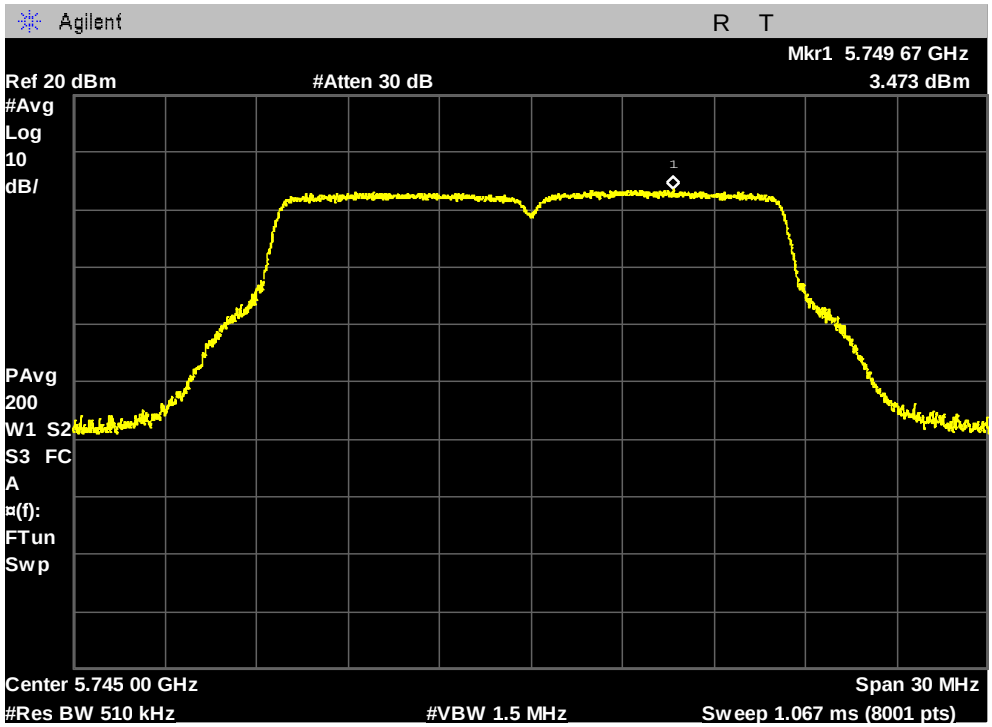
# PLOTS OF EMISSIONS

## Chain 2 (4TX)

### Maximum Power Spectral Density, Straddle Channel (5720 MHz)

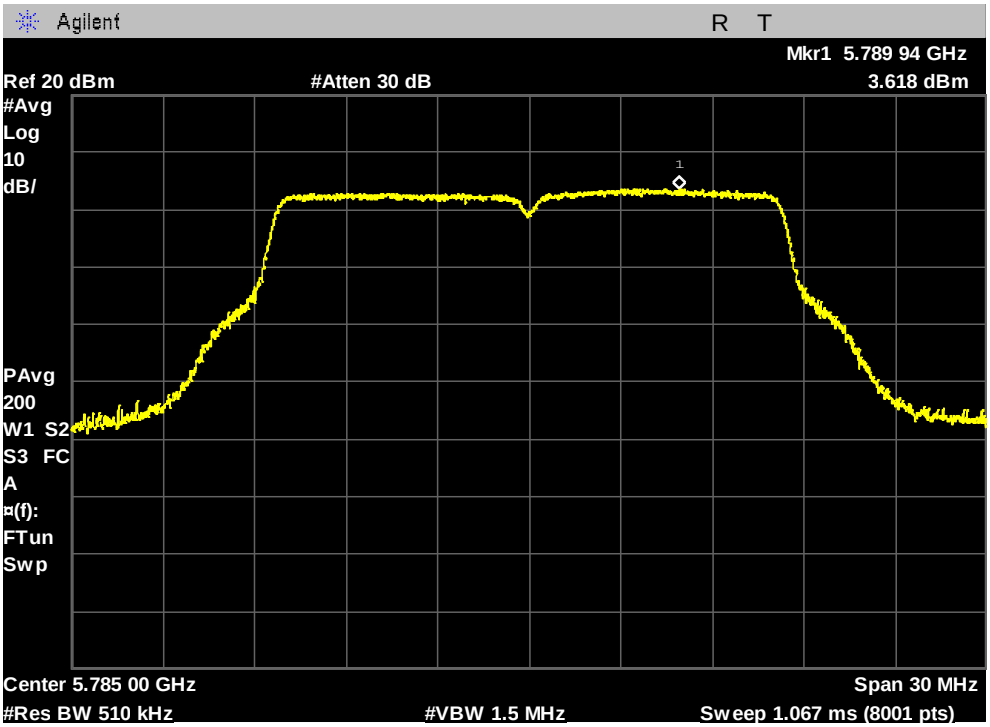



### Maximum Power Spectral Density, Lowest Channel (5745 MHz)

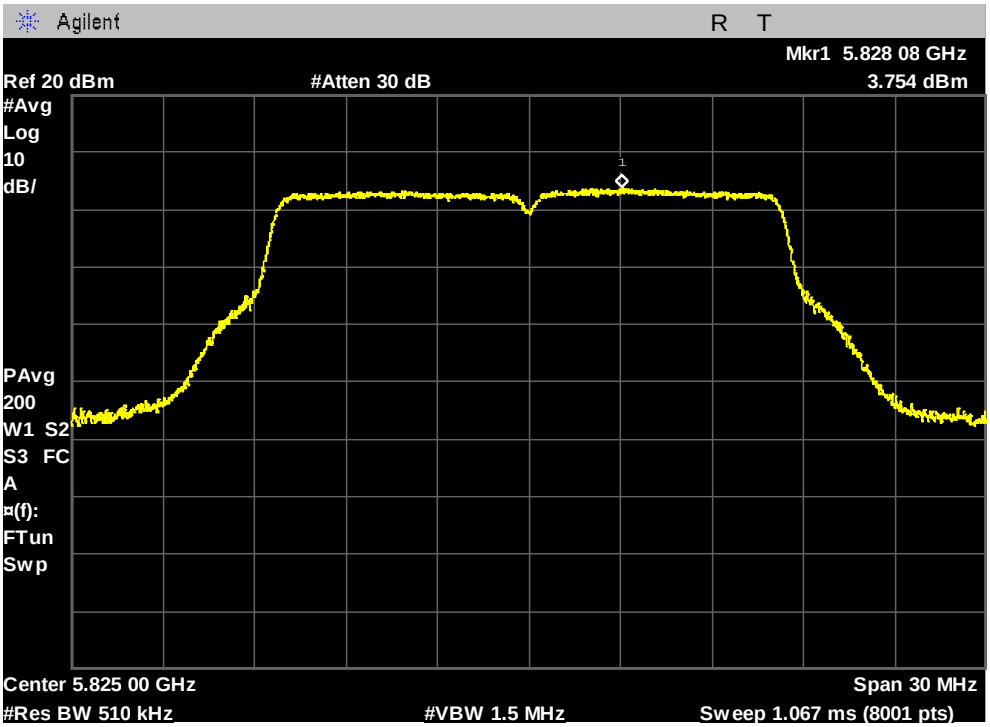


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Middle Channel (5785 MHz)




### Maximum Power Spectral Density, Highest Channel (5825 MHz)

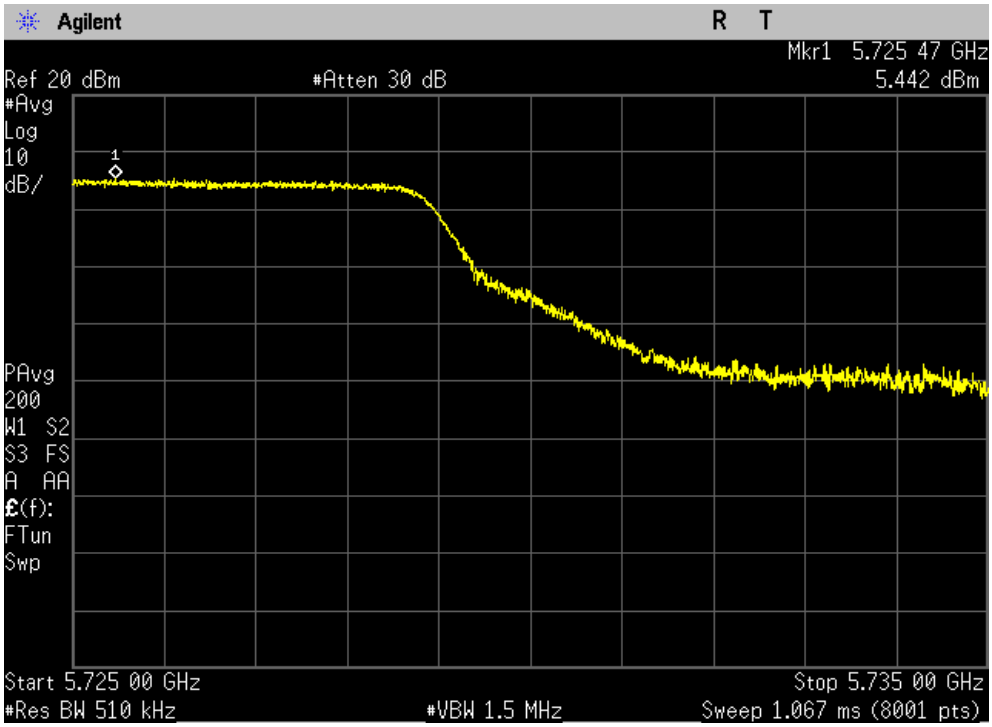


# PLOTS OF EMISSIONS

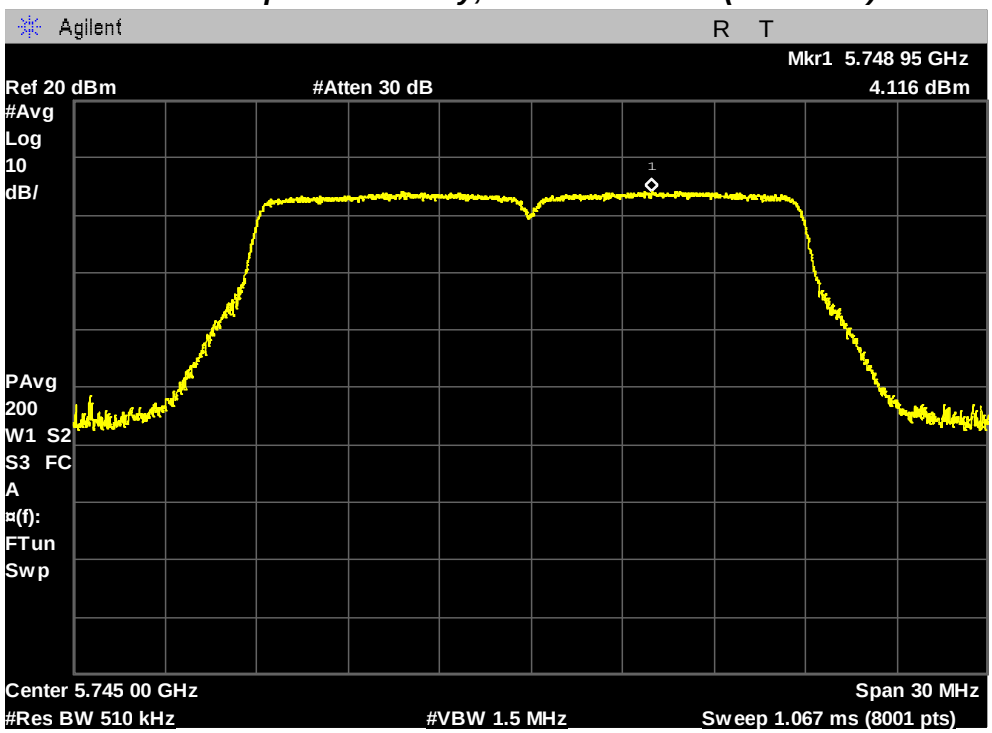
***802.11n (20 MHz) mode***

***Chain 2 (1TX)***

***Maximum Power Spectral Density, Straddle Channel (5720 MHz)***

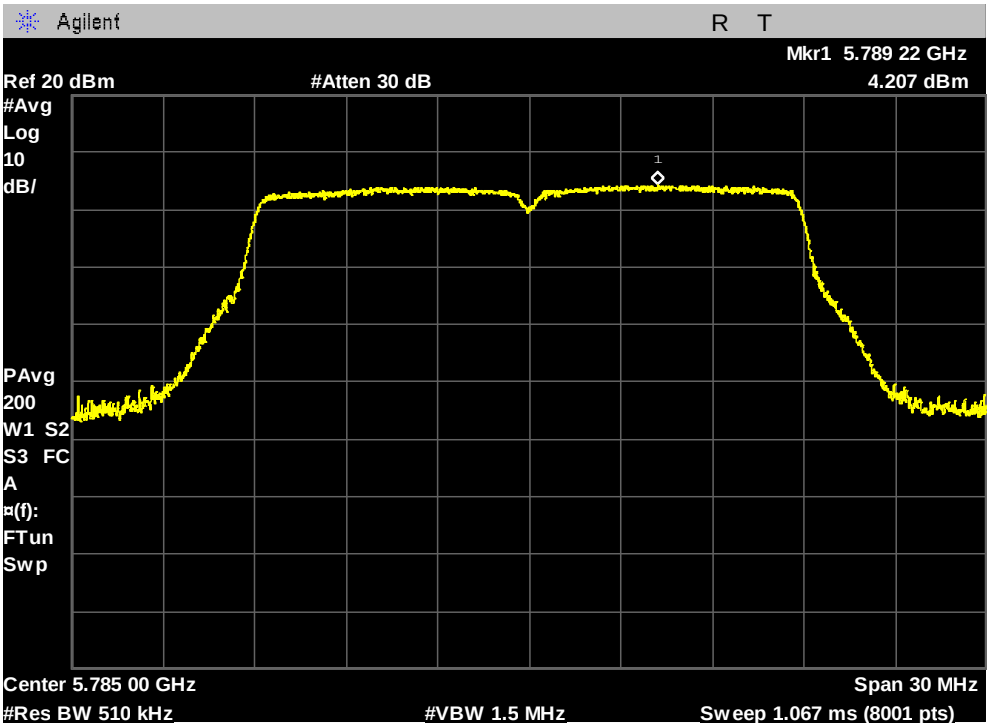



***Maximum Power Spectral Density, Lowest Channel (5745 MHz)***

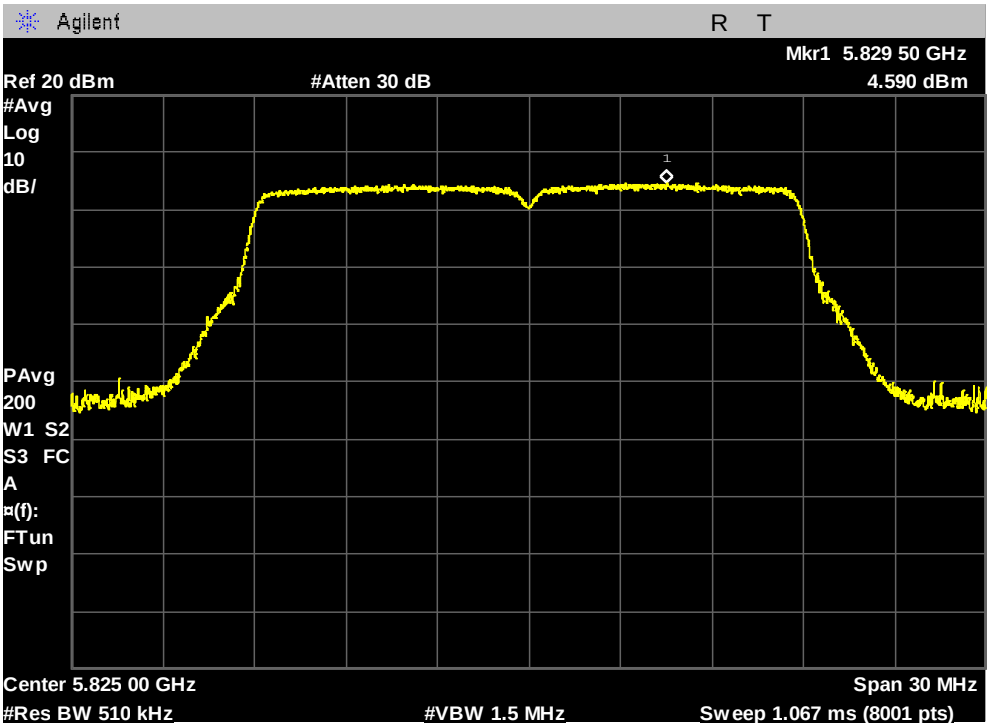


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Middle Channel (5785 MHz)



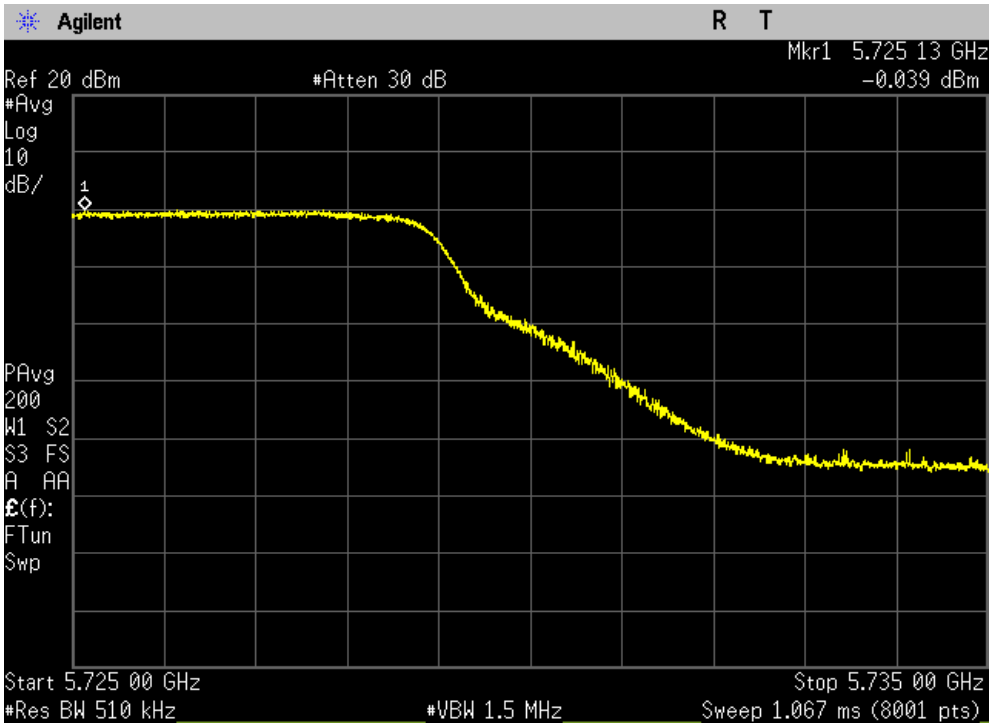

### Maximum Power Spectral Density, Highest Channel (5825 MHz)



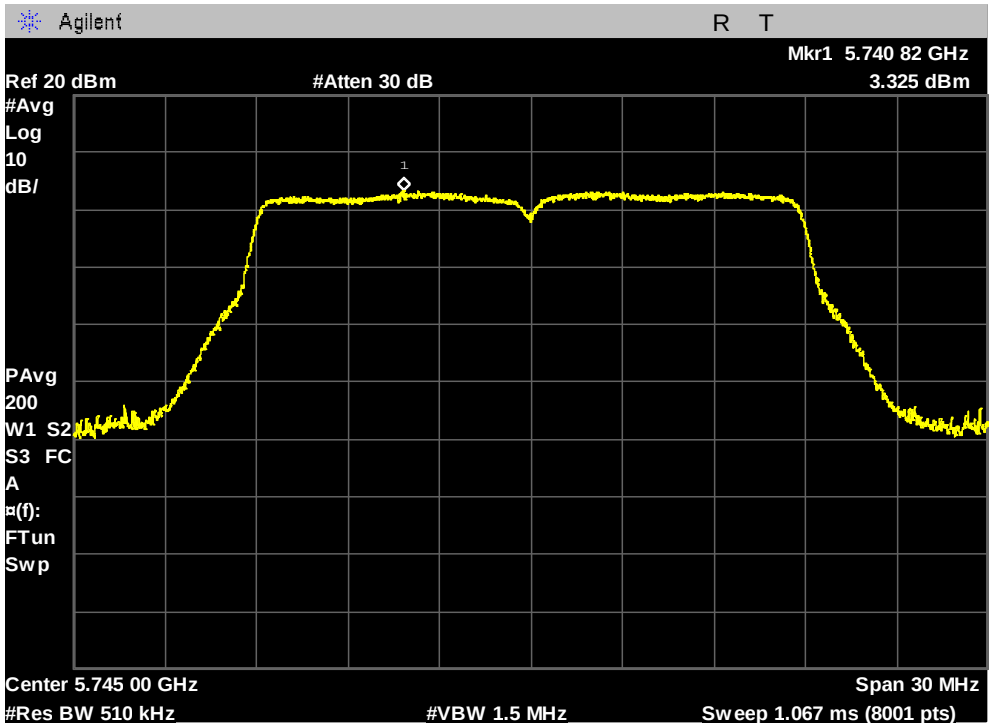
# PLOTS OF EMISSIONS

## Chain 2 (4TX)

### Maximum Power Spectral Density, Straddle Channel (5720 MHz)

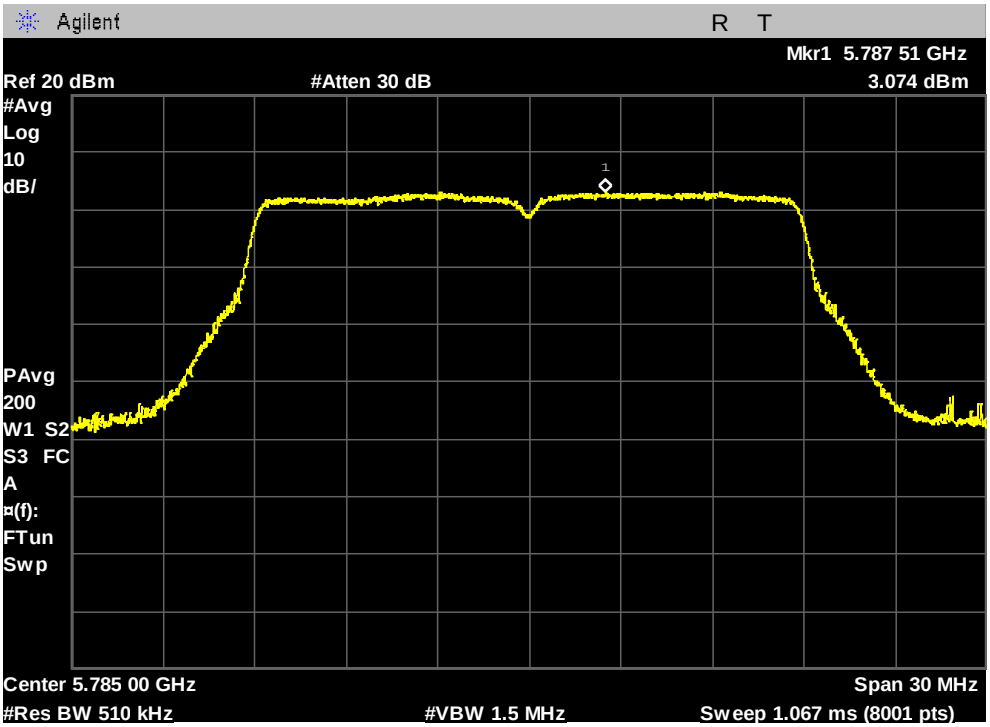



### Maximum Power Spectral Density, Lowest Channel (5745 MHz)

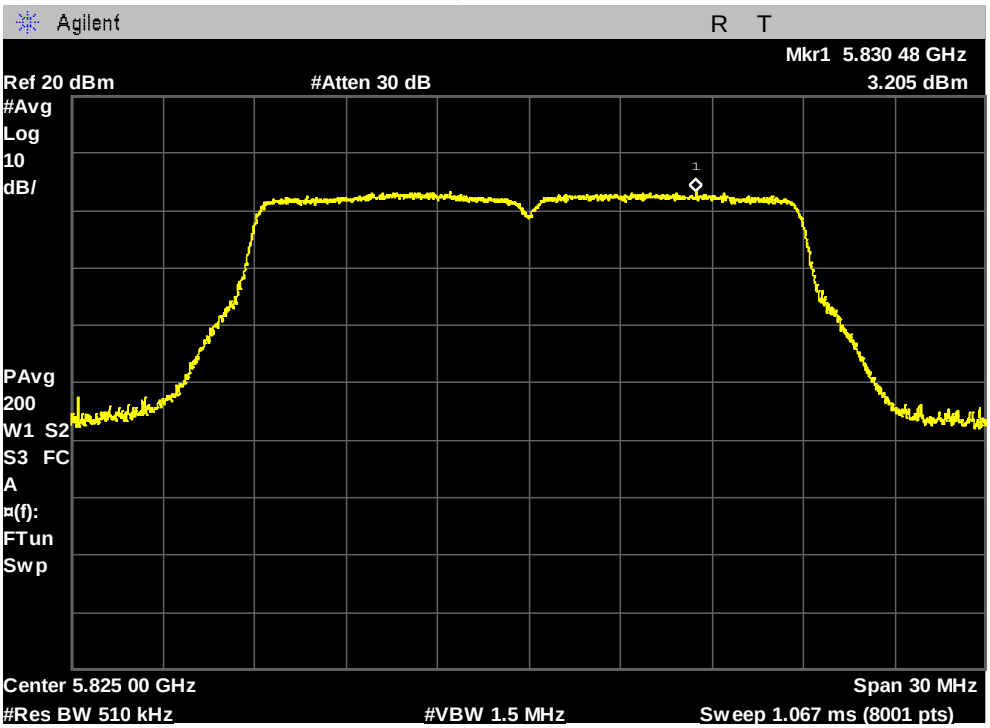


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Middle Channel (5785 MHz)




### Maximum Power Spectral Density, Highest Channel (5825 MHz)

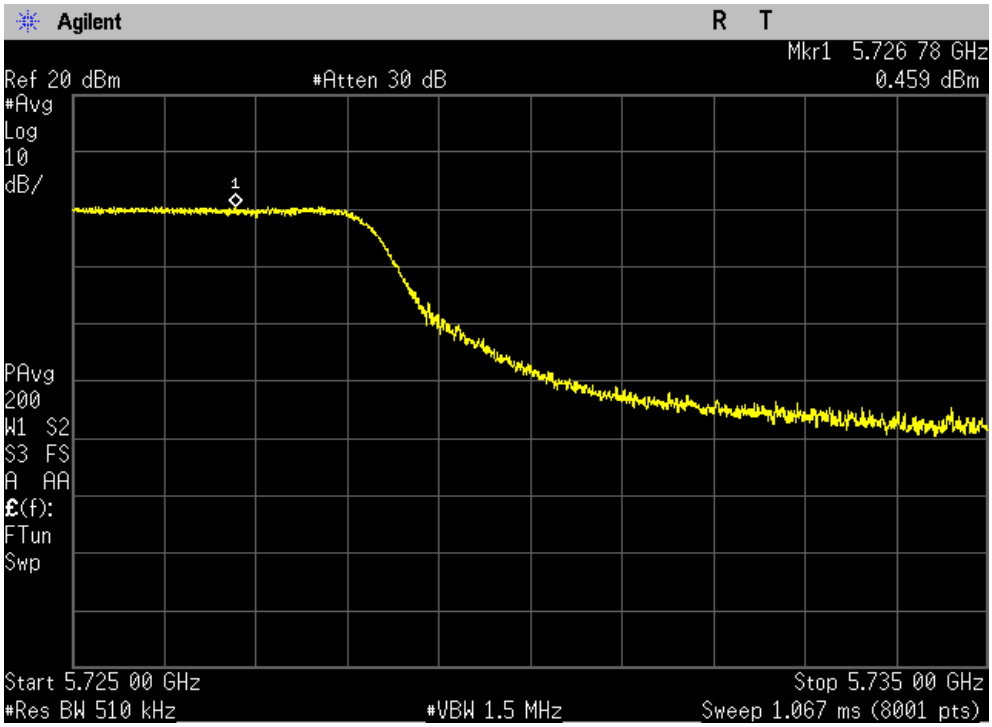


# PLOTS OF EMISSIONS

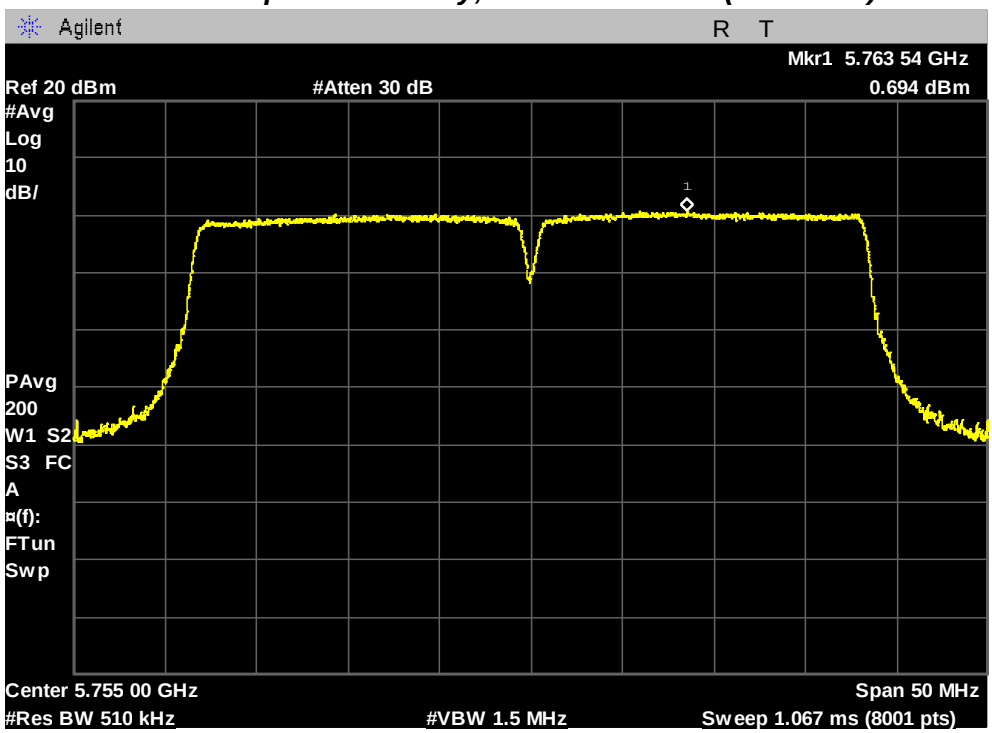
***802.11n (40 MHz) mode***

***Chain 2 (1TX)***

***Maximum Power Spectral Density, Straddle Channel (5710 MHz)***

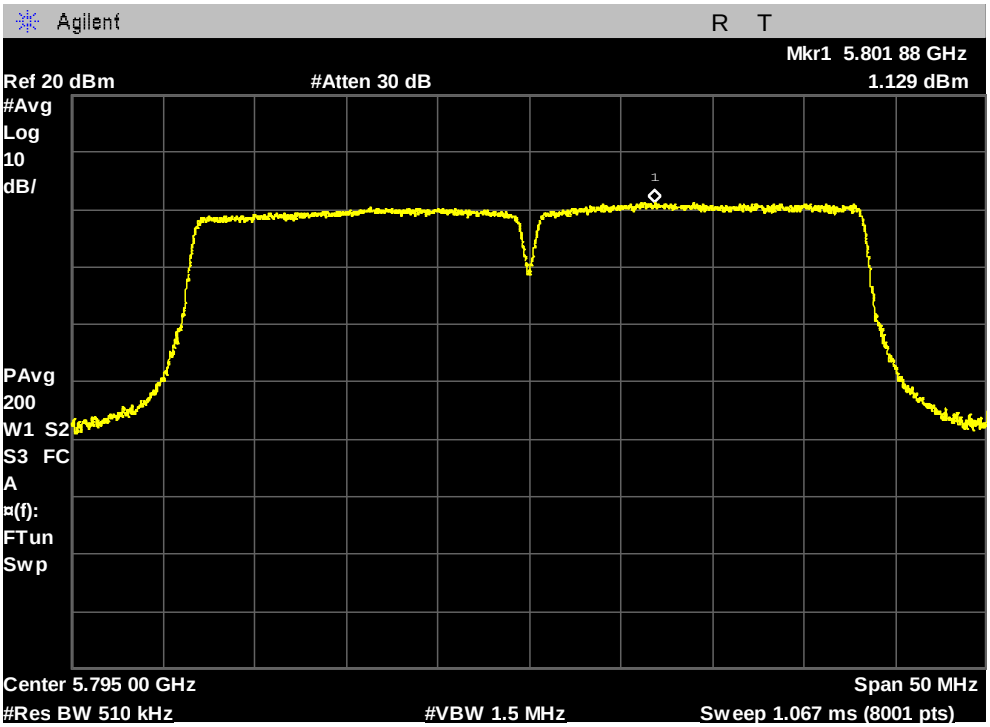



***Maximum Power Spectral Density, Lowest Channel (5755 MHz)***



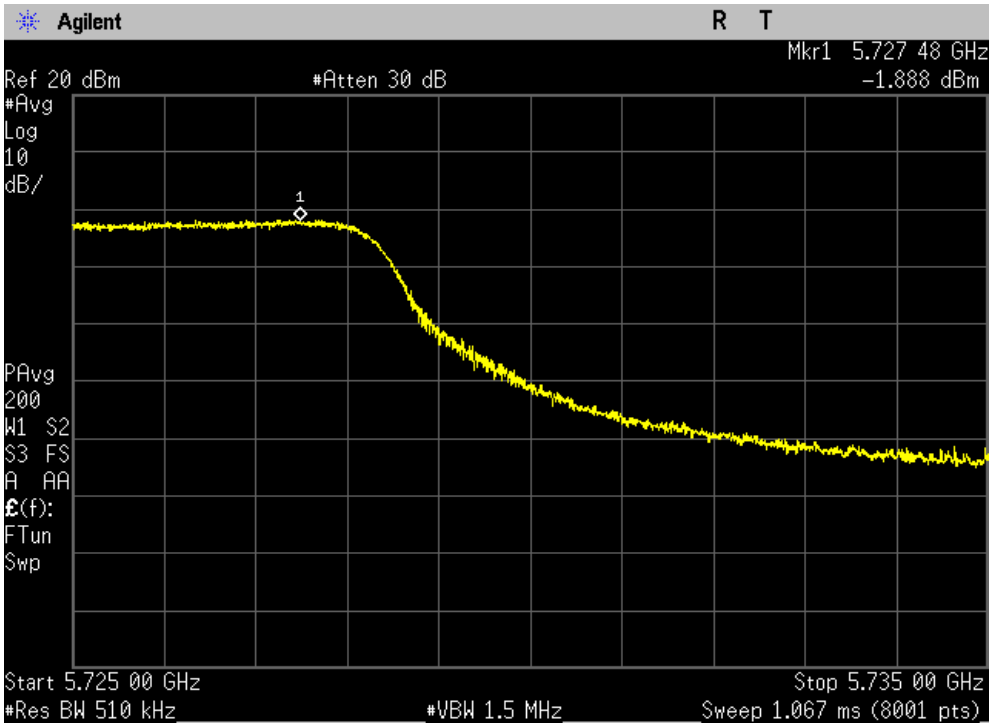
# PLOTS OF EMISSIONS

***Maximum Power Spectral Density, Highest Channel (5795 MHz)***



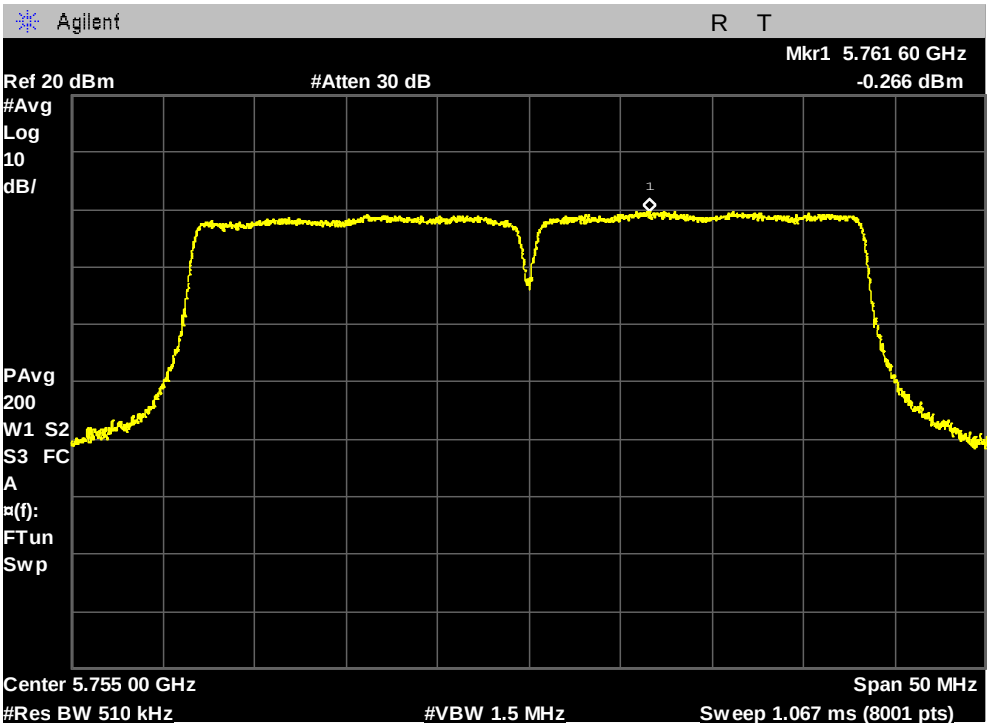

***Chain 2 (4TX)***

***Maximum Power Spectral Density, Straddle Channel (5710 MHz)***

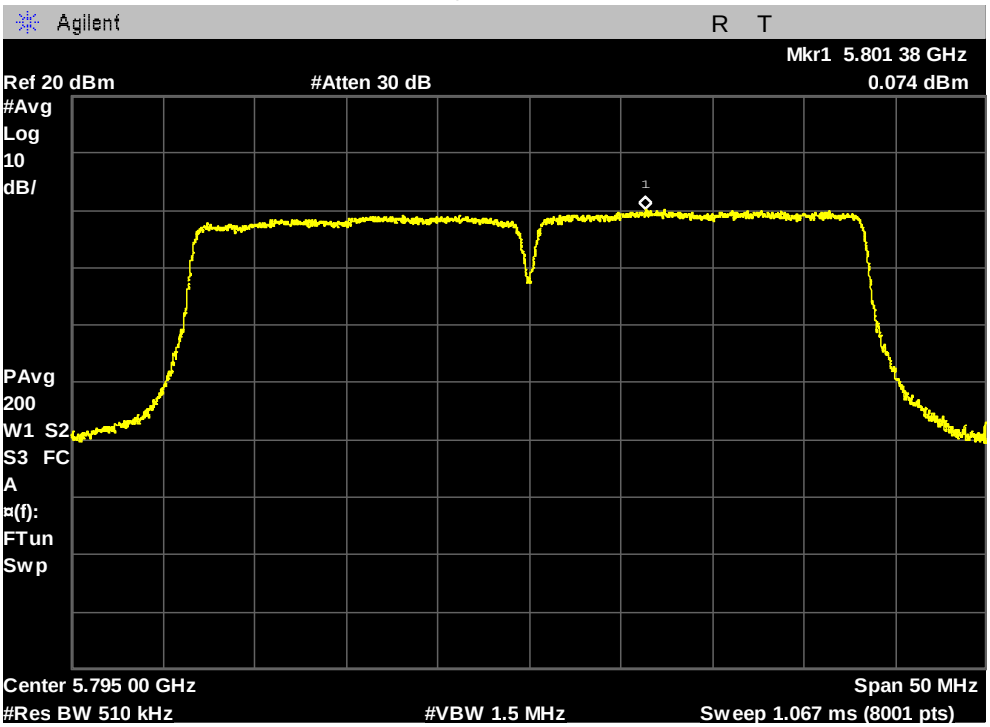


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Lowest Channel (5755 MHz)




### Maximum Power Spectral Density, Highest Channel (5795 MHz)

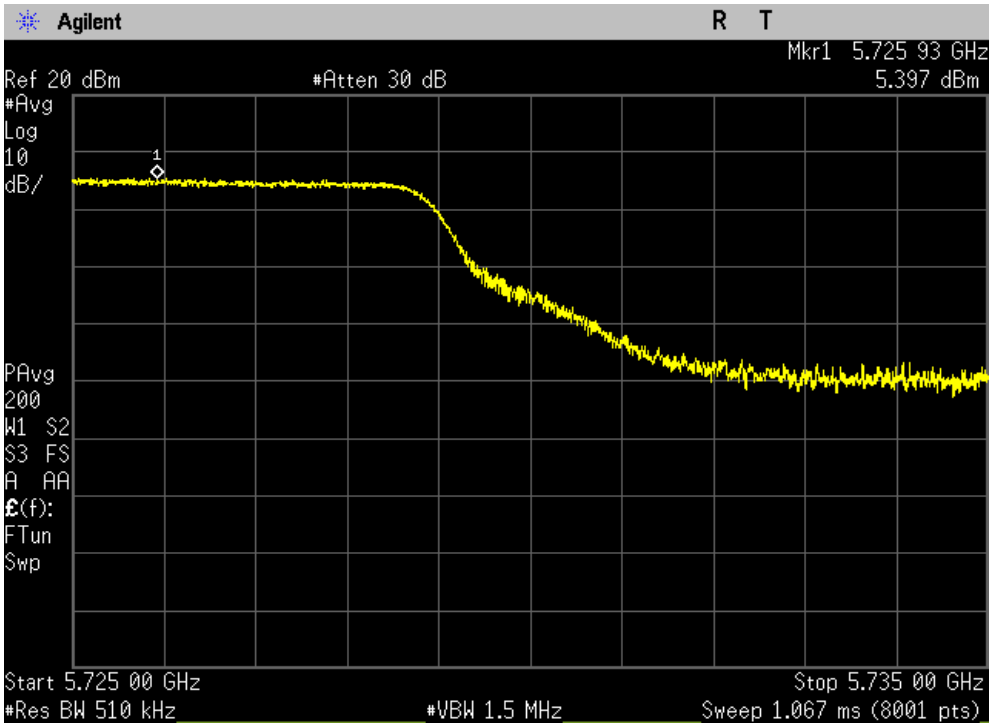


# PLOTS OF EMISSIONS

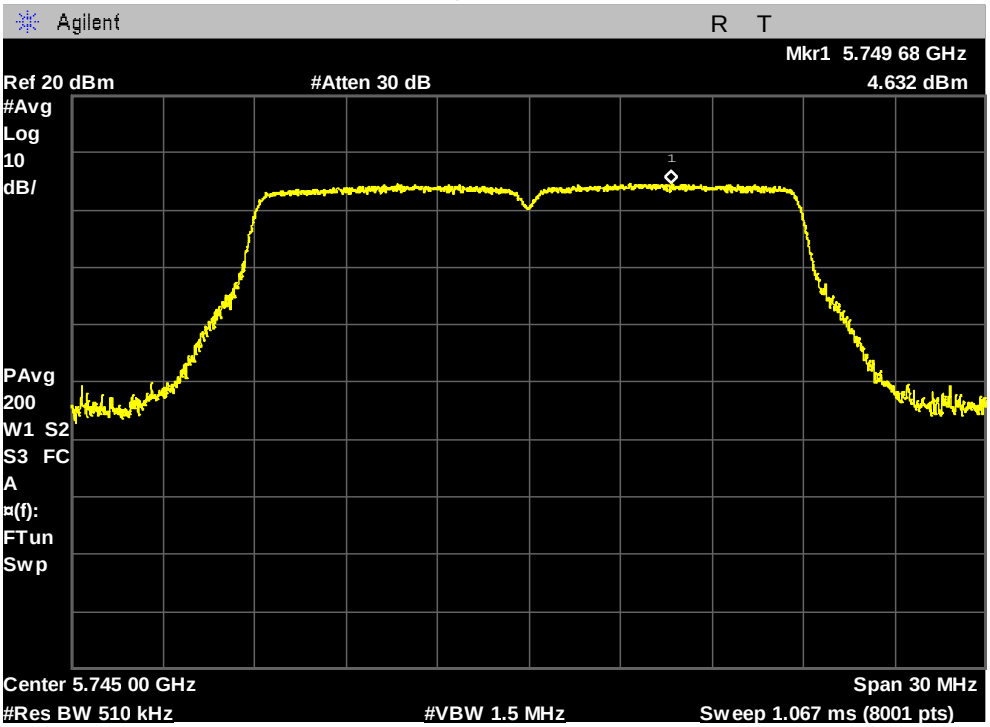
***802.11ac (20 MHz) mode***

***Chain 2 (1TX)***

***Maximum Power Spectral Density, Straddle Channel (5720 MHz)***

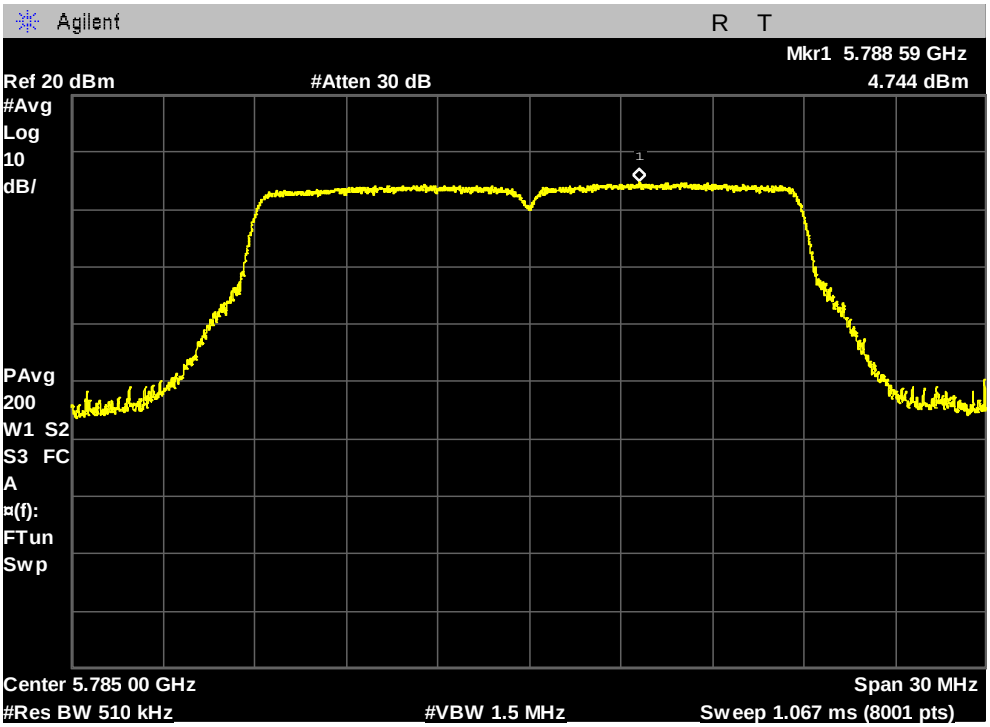



***Maximum Power Spectral Density, Lowest Channel (5745 MHz)***

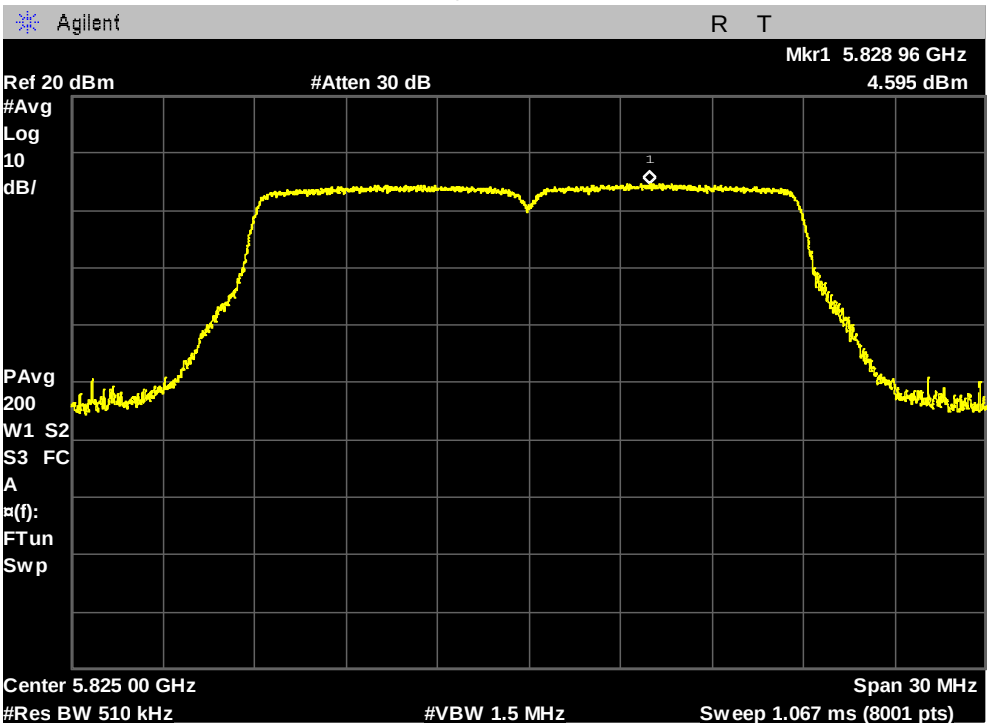


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Middle Channel (5785 MHz)



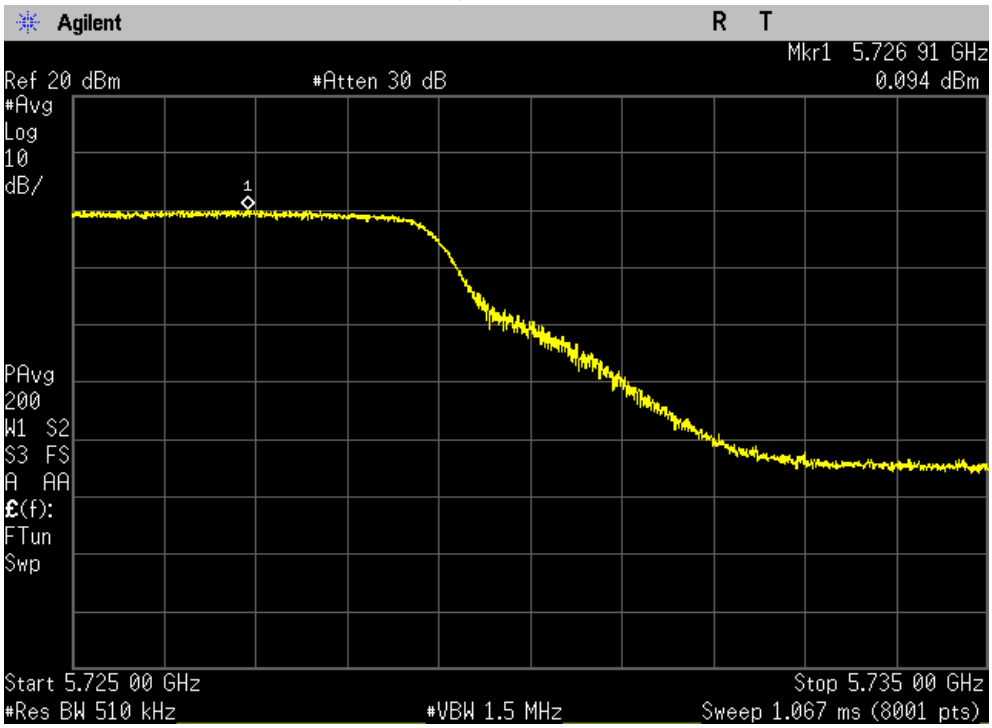

### Maximum Power Spectral Density, Highest Channel (5825 MHz)



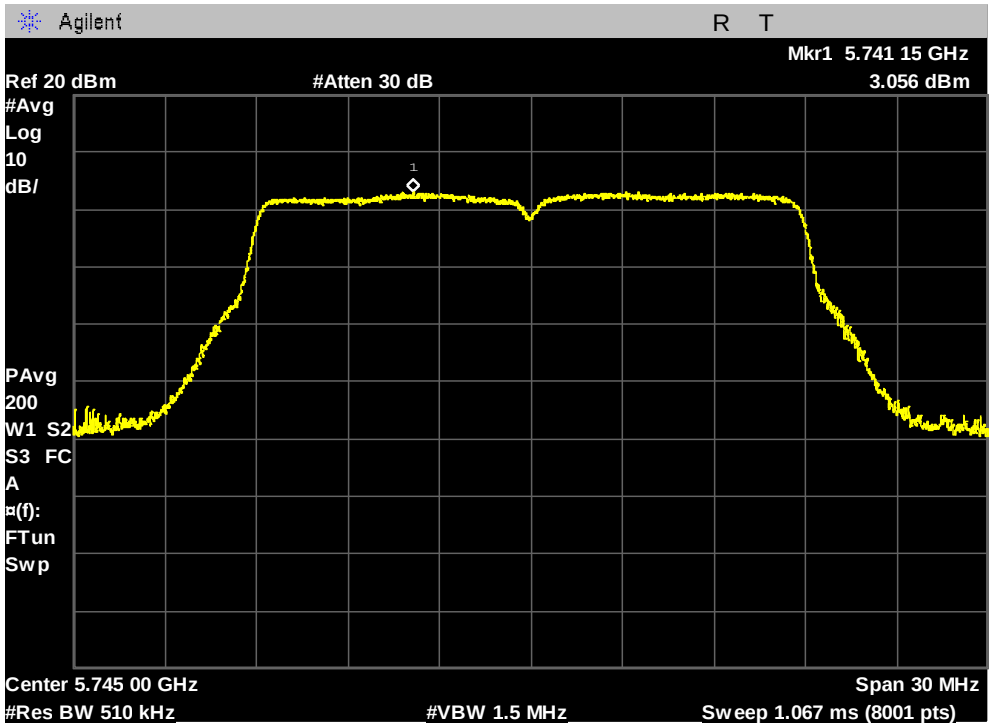
# PLOTS OF EMISSIONS

## Chain 2 (4TX)

### Maximum Power Spectral Density, Straddle Channel (5720 MHz)

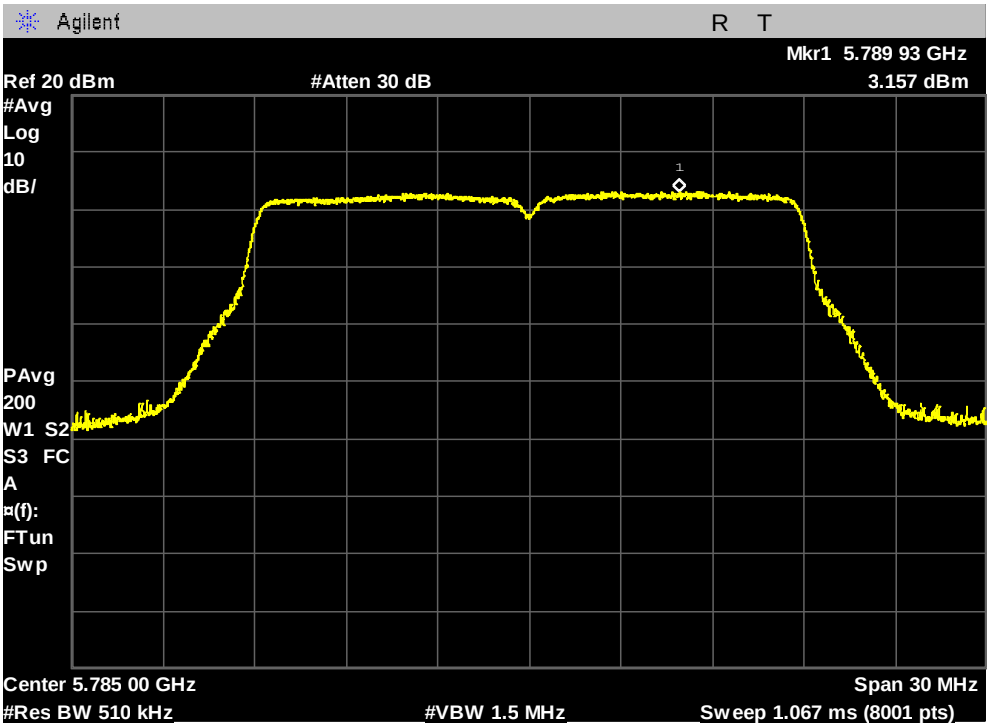



### Maximum Power Spectral Density, Lowest Channel (5745 MHz)

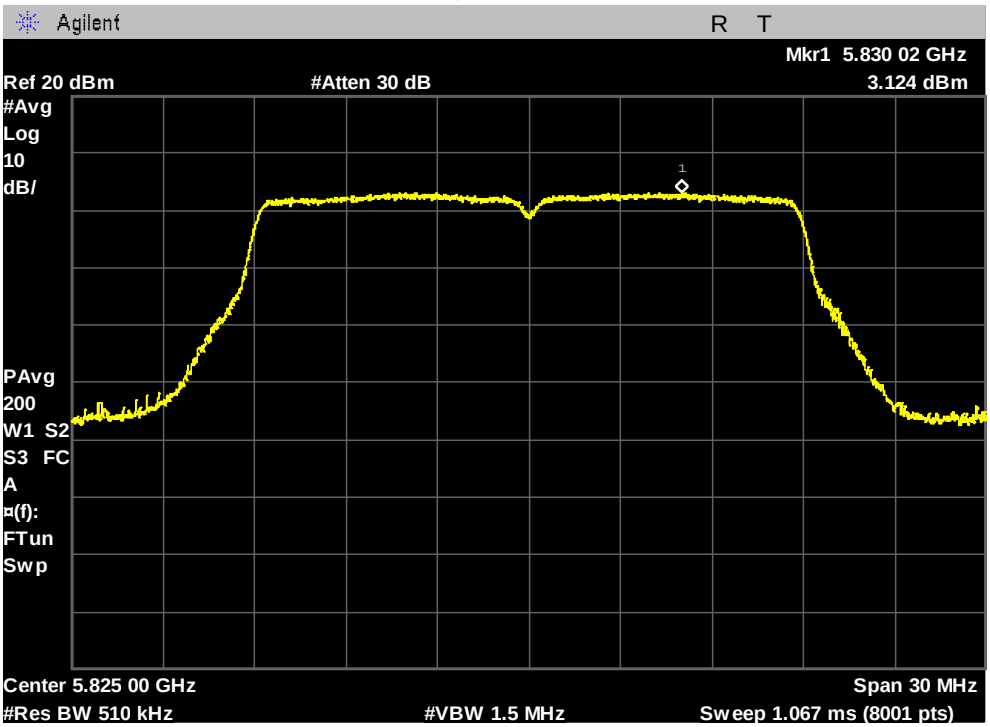


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Middle Channel (5785 MHz)




### Maximum Power Spectral Density, Highest Channel (5825 MHz)

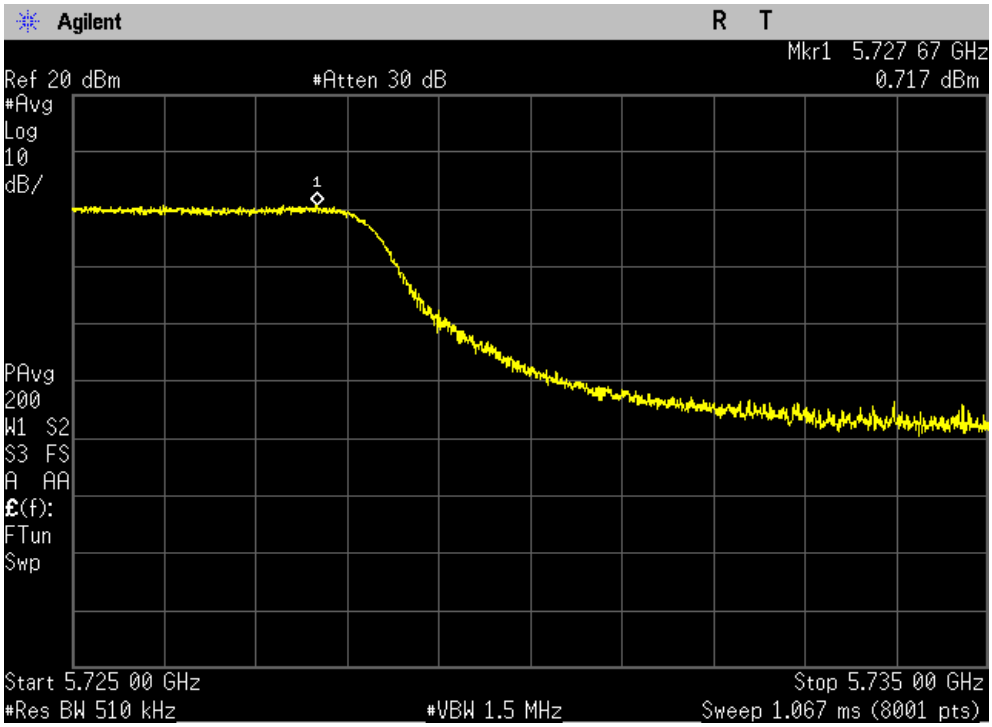


# PLOTS OF EMISSIONS

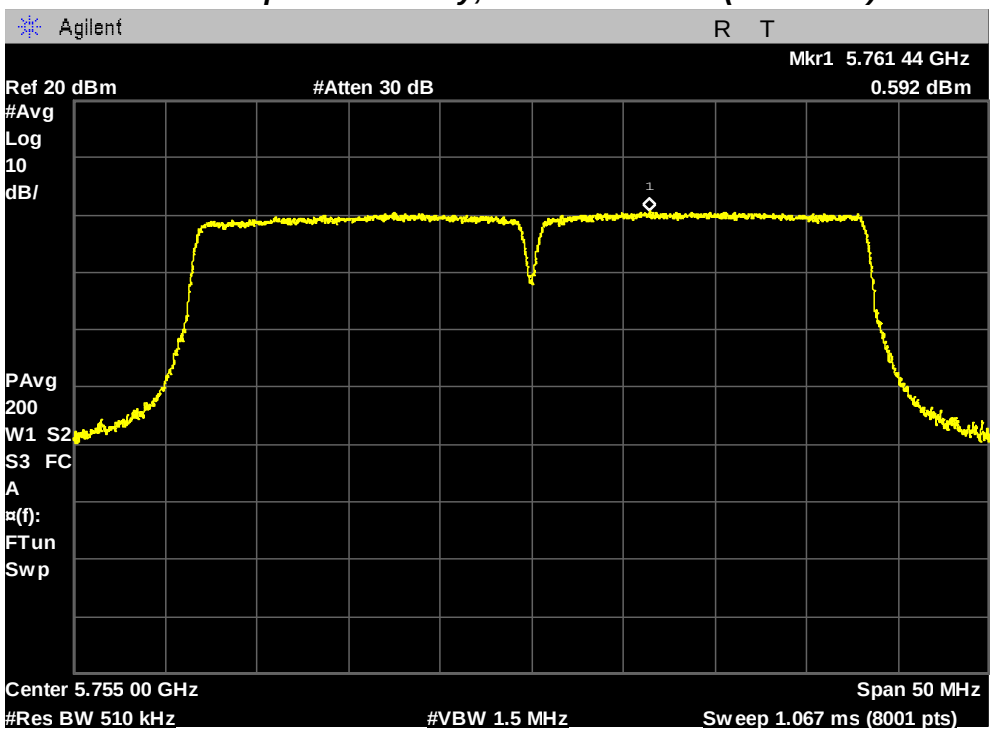
***802.11ac (40 MHz) mode***

***Chain 2 (1TX)***

***Maximum Power Spectral Density, Straddle Channel (5710 MHz)***

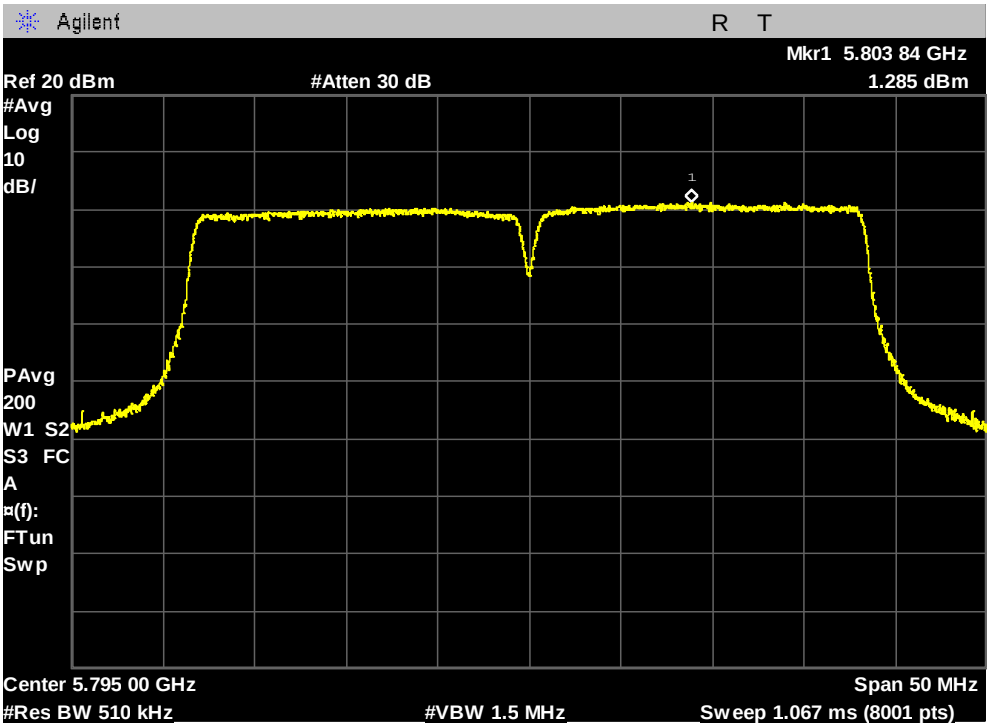



***Maximum Power Spectral Density, Lowest Channel (5755 MHz)***



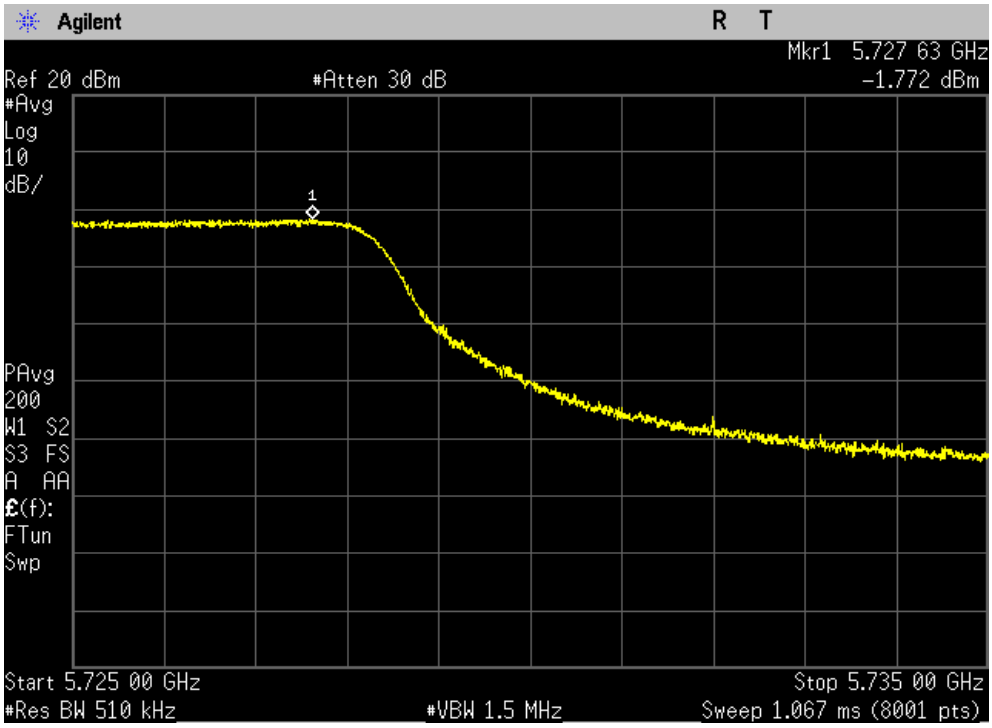
# PLOTS OF EMISSIONS

***Maximum Power Spectral Density, Highest Channel (5795 MHz)***



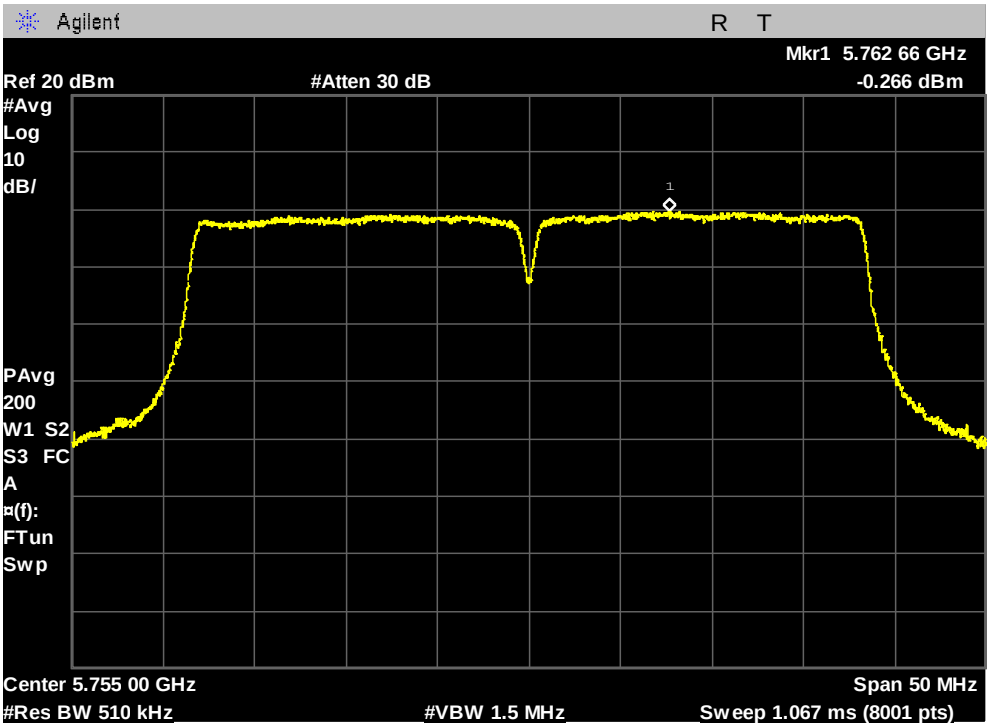

***Chain 2 (4TX)***

***Maximum Power Spectral Density, Straddle Channel (5710 MHz)***

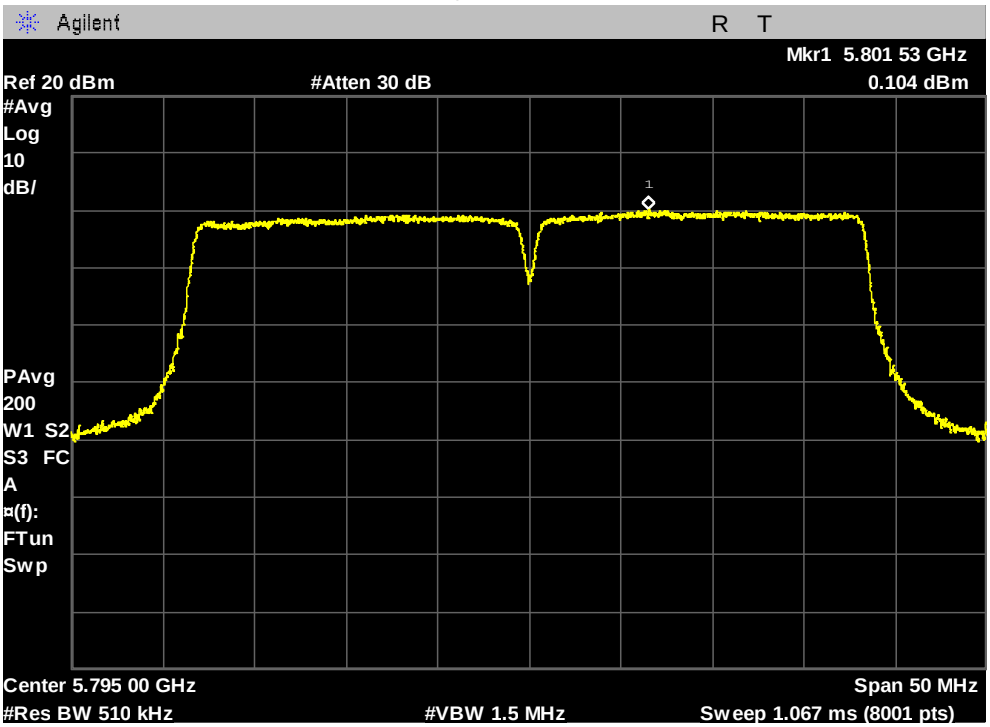


# PLOTS OF EMISSIONS

### Maximum Power Spectral Density, Lowest Channel (5755 MHz)




### Maximum Power Spectral Density, Highest Channel (5795 MHz)

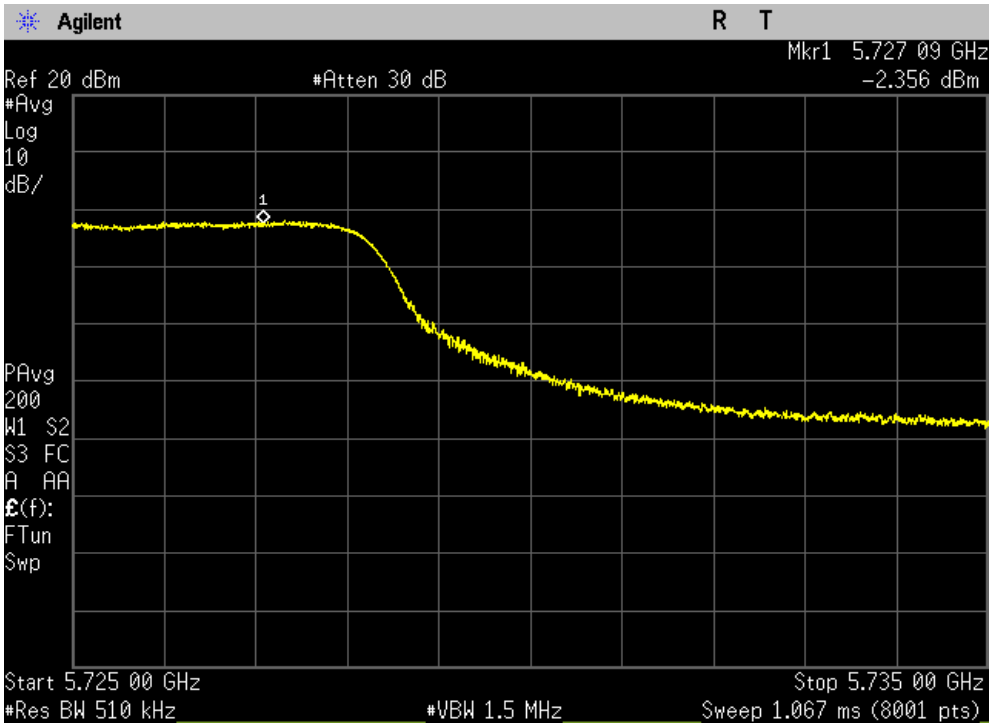


# PLOTS OF EMISSIONS

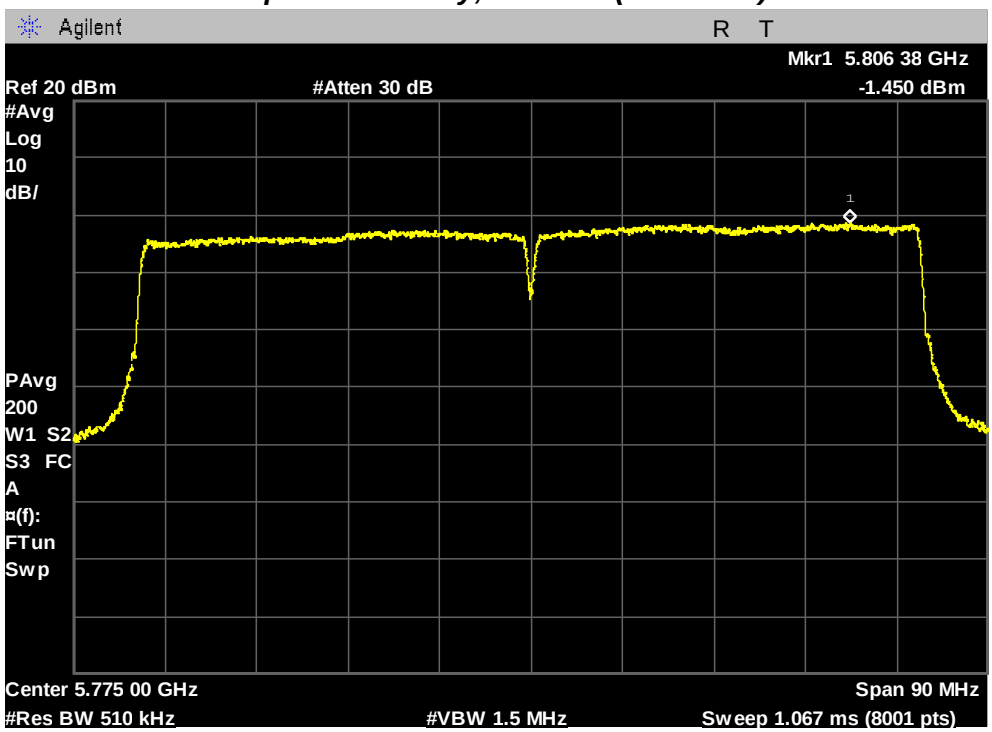
***802.11ac (80 MHz) mode***

***Chain 2 (1TX)***

***Maximum Power Spectral Density, Straddle Channel (5690 MHz)***



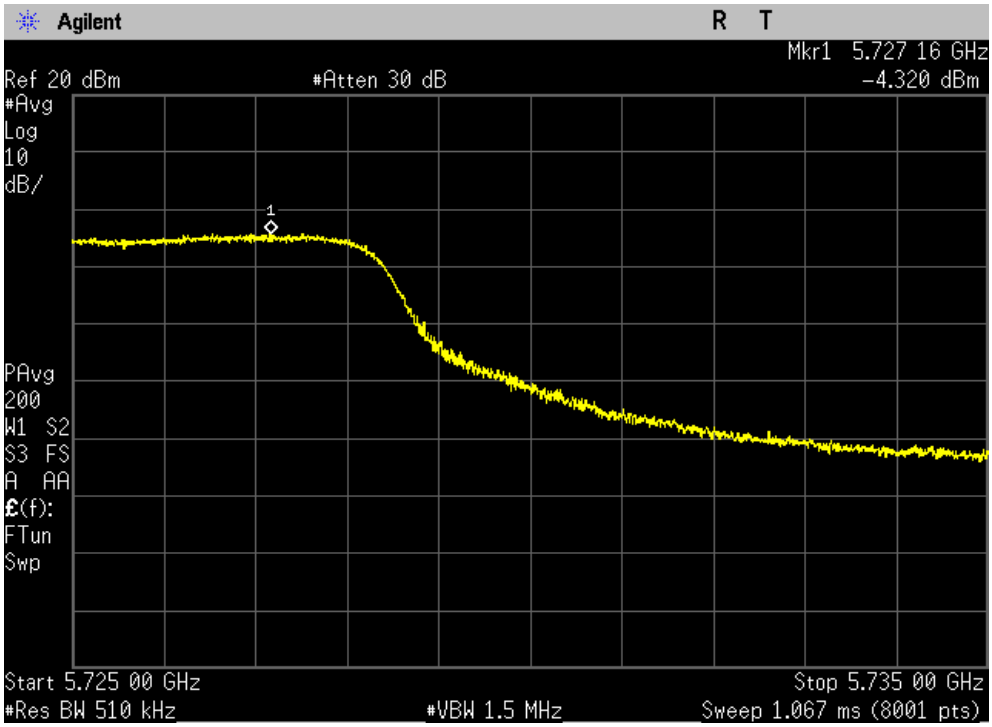

***Maximum Power Spectral Density, Channel (5775 MHz)***



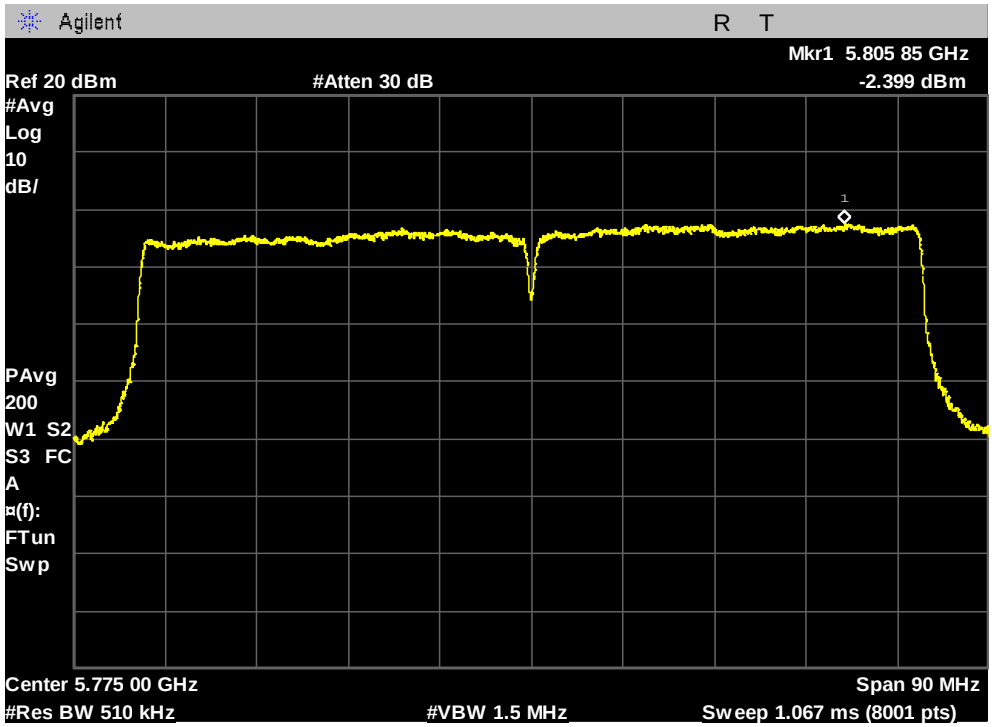
# PLOTS OF EMISSIONS

## Chain 2 (4TX)

### Maximum Power Spectral Density, Straddle Channel (5690 MHz)




### Maximum Power Spectral Density, Channel (5775 MHz)



# TEST DATA

## 8.7 Radiated Spurious Emissions

### 8.7.1 Radiated Spurious Emissions – U-NII-1 band

**FCC §15.407(b)**

**Test Mode : Set to Lowest channel, Middle channel and Highest channel**

**802.11ac (20MHz) mode**

**Lowest Channel (5180 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5400.00 | 53.0 | H | peak | 0.5 | 53.5 | 68.2 | 14.7 |
| 6907.00*** | 48.1 | H | peak | 5.4 | 53.5 | 68.2 | 14.7 |

**Middle Channel (5220 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5400.00 | 53.3 | H | peak | 0.5 | 53.8 | 68.2 | 14.4 |
| 10443.00*** | 42.5 | H | peak | 11.9 | 54.4 | 68.2 | 13.8 |

**Highest Channel (5240 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5399.50 | 53.3 | H | peak | 0.5 | 53.8 | 68.2 | 14.4 |
| 6986.50*** | 46.7 | H | peak | 5.7 | 52.4 | 68.2 | 15.8 |
| 10485.00*** | 42.4 | H | peak | 11.9 | 54.3 | 68.2 | 13.9 |

# TEST DATA

***Note:***

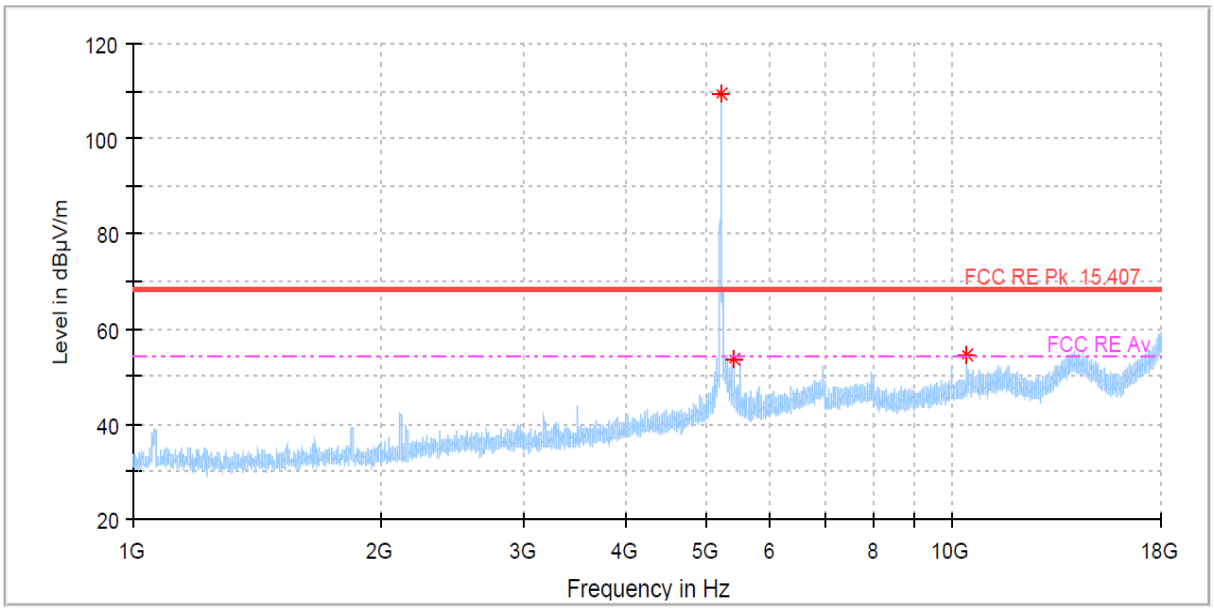
1. *Pol. H = Horizontal V = Vertical
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. At frequencies above 1 GHz, peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
4. As the EUT was configured to transmit with duty cycles < 98 percent, at frequencies above 1 GHz, average emission levels were measured using the "Method VB" by setting the analyzer RBW = 1 MHz, VBW = 10 kHz (VBW ≥ 1/T), Detector = Peak.
5. The spectrum is measured from 9 kHz to $10^{th}$ harmonic and the worst-case emissions are reported. No significant emissions were found beyond the Second harmonic for this device.
6. ***For outside of the restricted band, the peak limit is applied according to Part 15.407(b). Peak limit is 68.2 dBμV/m. ( E[dBμV/m] = EIRP[dBm/MHz] + 95.2 = 68.2 dBuV/m, for EIPR[dBm/MHz] = -27dBm. )
7. For restricted band, the peak limit is 68.2 dBμV/m, the average limit is 54 dBμV/m per FCC §15.209.
8. Middle channel(5220MHz) in ac (20MHz) mode was the worst channel with respect to spurious emission.
9. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.
10. At frequencies above 1 GHz, EUT was placed at a height of 1.5m above the floor on a support according to ANSI 63.10-2013.

# PLOTS OF EMISSIONS

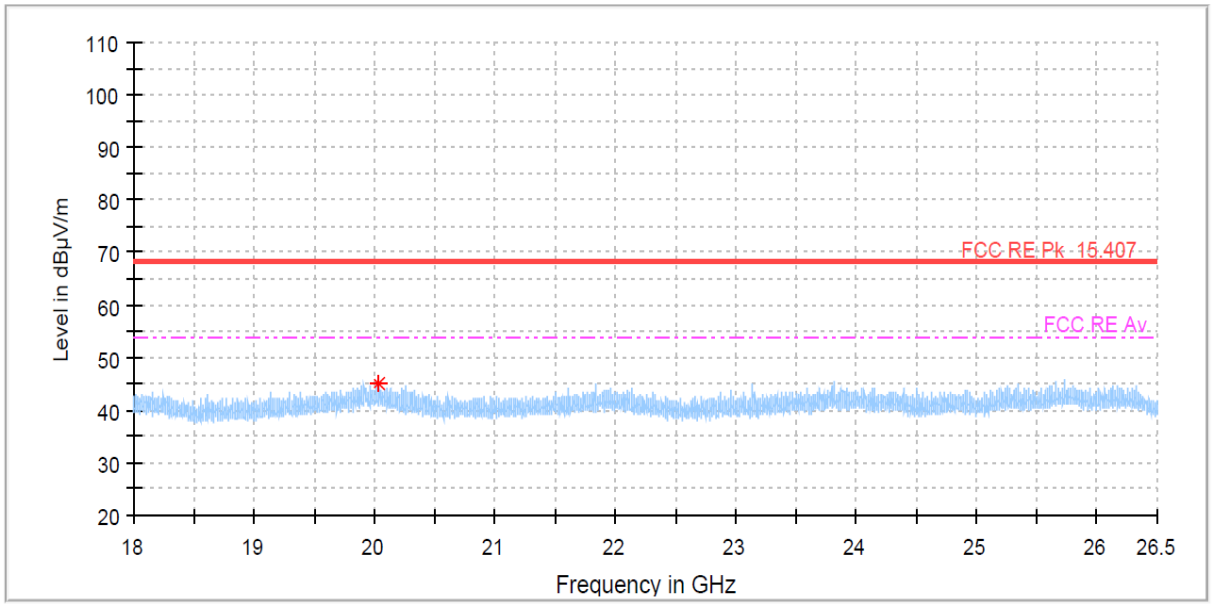
***Worst Case***

***802.11ac (20MHz) mode***

***Middle channel : 1 GHz to 18 GHz_Peak***

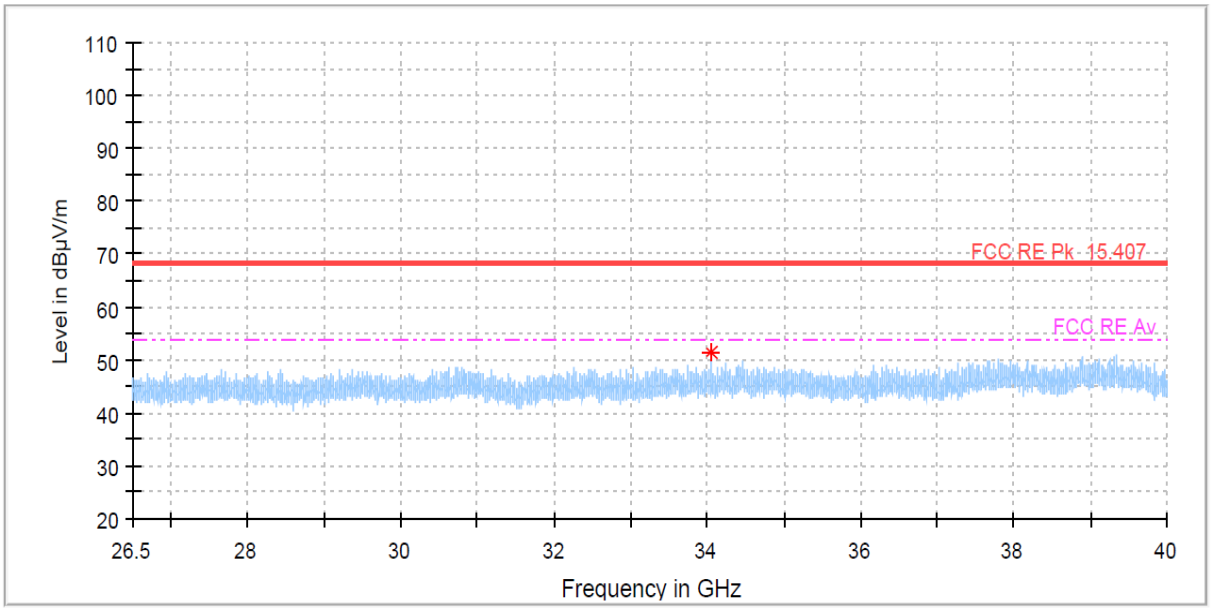



***Middle channel : 18 GHz to 26.5 GHz_Peak***



# PLOTS OF EMISSIONS

***Middle channel : 26.5 GHz to 40 GHz_Peak***



# TEST DATA

## 8.7.2 Radiated Spurious Emissions – U-NII-2A band

**FCC §15.407(b)**

**Test Mode : Set to Lowest channel, Middle channel and Highest channel**

**802.11ac (20MHz) mode**

**Lowest Channel (5260 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5400.00 | 54.2 | H | peak | 0.5 | 54.7 | 68.2 | 13.5 |
| 5400.02 | 50.4 | H | average | 0.5 | 50.9 | 54.0 | 3.1 |
| 5558.00*** | 53.7 | H | peak | 0.9 | 54.6 | 68.2 | 13.6 |
| 10518.50*** | 45.5 | H | peak | 11.9 | 57.4 | 68.2 | 10.8 |
| 15780.50 | 45.3 | H | peak | 13.9 | 59.2 | 68.2 | 9.0 |
| 15781.50 | 31.6 | H | average | 13.9 | 45.5 | 54.0 | 8.5 |

**Middle Channel (5300 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5372.00 | 58.4 | H | peak | 0.3 | 58.7 | 68.2 | 9.5 |
| 5372.00 | 44.8 | H | average | 0.3 | 45.1 | 54.0 | 8.9 |
| 5400.00 | 55.1 | H | peak | 0.5 | 55.6 | 68.2 | 12.6 |
| 5399.91 | 49.6 | H | average | 0.5 | 50.1 | 54.0 | 3.9 |
| 10596.50*** | 48.2 | V | peak | 12.1 | 60.3 | 68.2 | 7.9 |

**Highest Channel (5320 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5400.00 | 53.3 | H | peak | 0.5 | 53.8 | 68.2 | 14.4 |
| 11591.50 | 39.5 | H | peak | 13.1 | 52.6 | 68.2 | 15.6 |

# TEST DATA

***Note:***

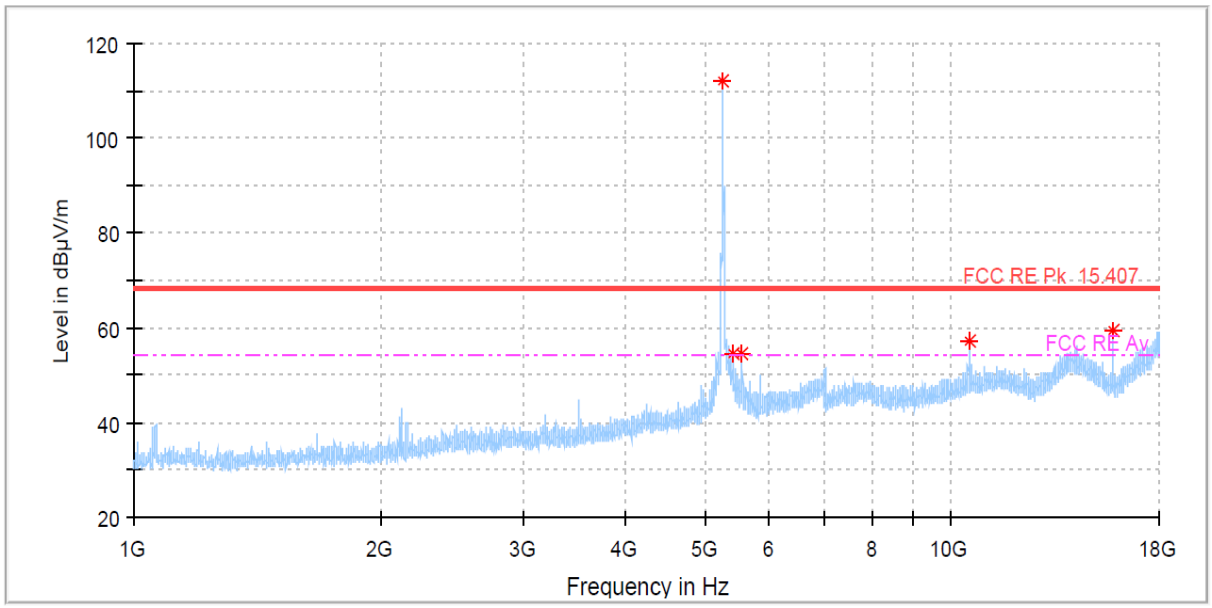
1. *Pol. H = Horizontal V = Vertical
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. At frequencies above 1 GHz, peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
4. As the EUT was configured to transmit with duty cycles < 98 percent, at frequencies above 1 GHz, average emission levels were measured using the "Method VB" by setting the analyzer RBW = 1 MHz, VBW = 10 kHz (VBW ≥ 1/T), Detector = Peak.
5. The spectrum is measured from 9 kHz to $10^{th}$ harmonic and the worst-case emissions are reported. No significant emissions were found beyond the Third harmonic for this device.
6. ***For outside of the restricted band, the peak limit is applied according to Part 15.407(b). Peak limit is 68.2 dBμV/m. ( E[dBμV/m] = EIRP[dBm/MHz] + 95.2 = 68.2 dBuV/m, for EIPR[dBm/MHz] = -27dBm. )
7. For restricted band, the peak limit is 68.2 dBμV/m, the average limit is 54 dBμV/m per FCC §15.209.
8. Lowest channel(5260MHz) in ac (20MHz) mode was the worst channel with respect to spurious emission.
9. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.
10. At frequencies above 1 GHz, EUT was placed at a height of 1.5m above the floor on a support according to ANSI 63.10-2013.

# PLOTS OF EMISSIONS

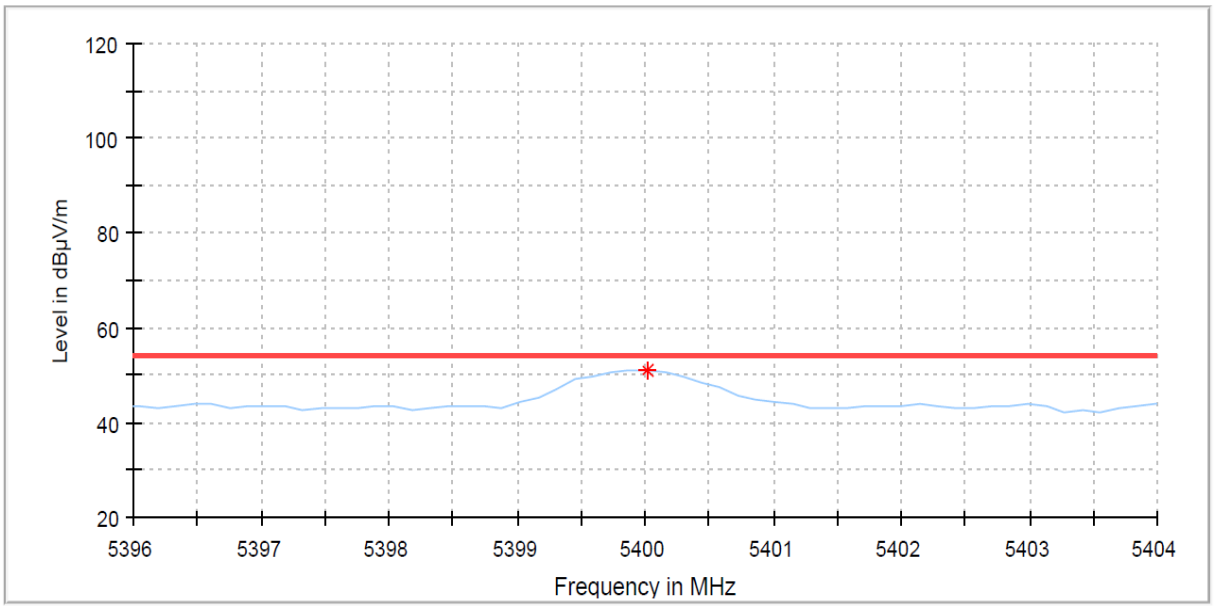
***Worst Case***

***802.11ac (20MHz) mode***

***Lowest channel : 1 GHz to 18 GHz_Peak***

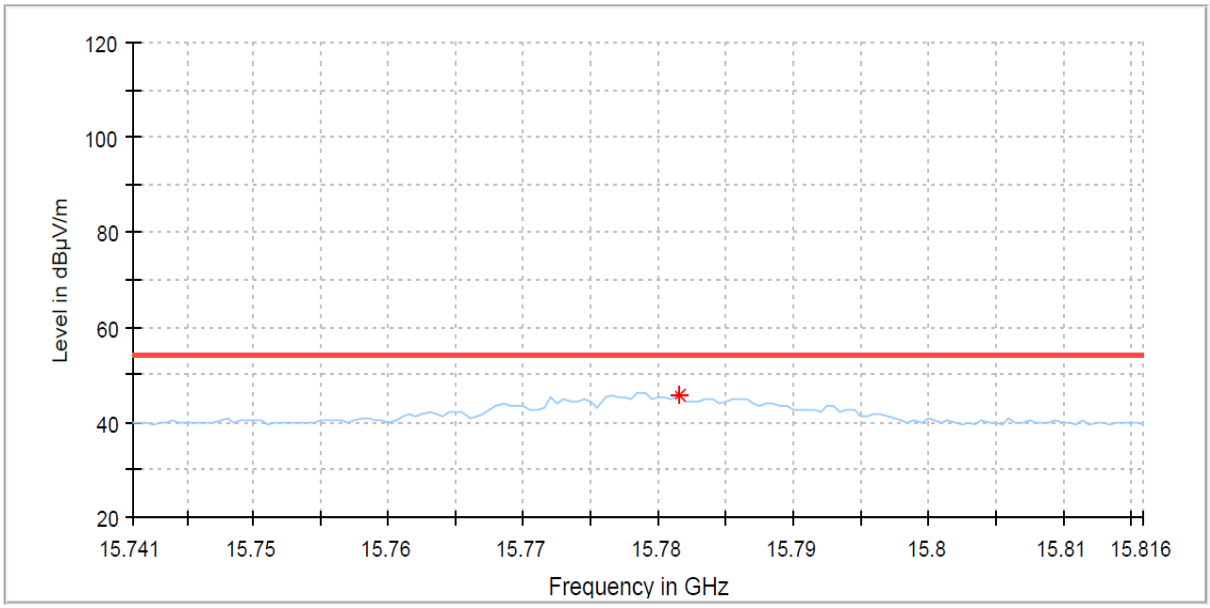



***Lowest channel : 5400MHz_Average***

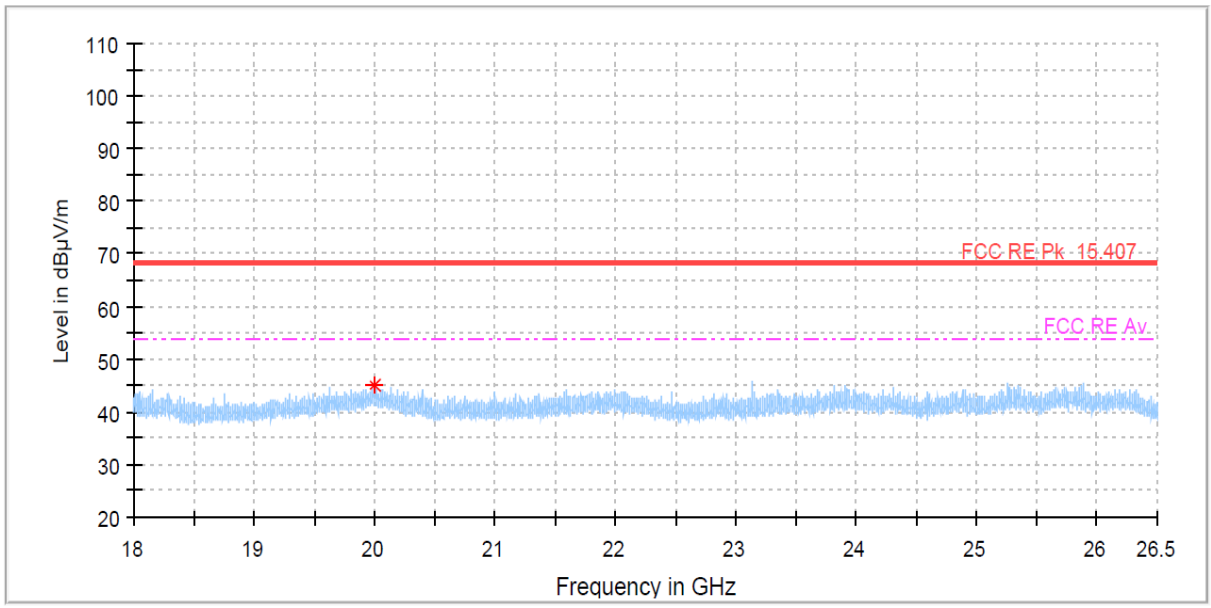


# PLOTS OF EMISSIONS

***Lowest channel : 3rd Harmonic_Average***

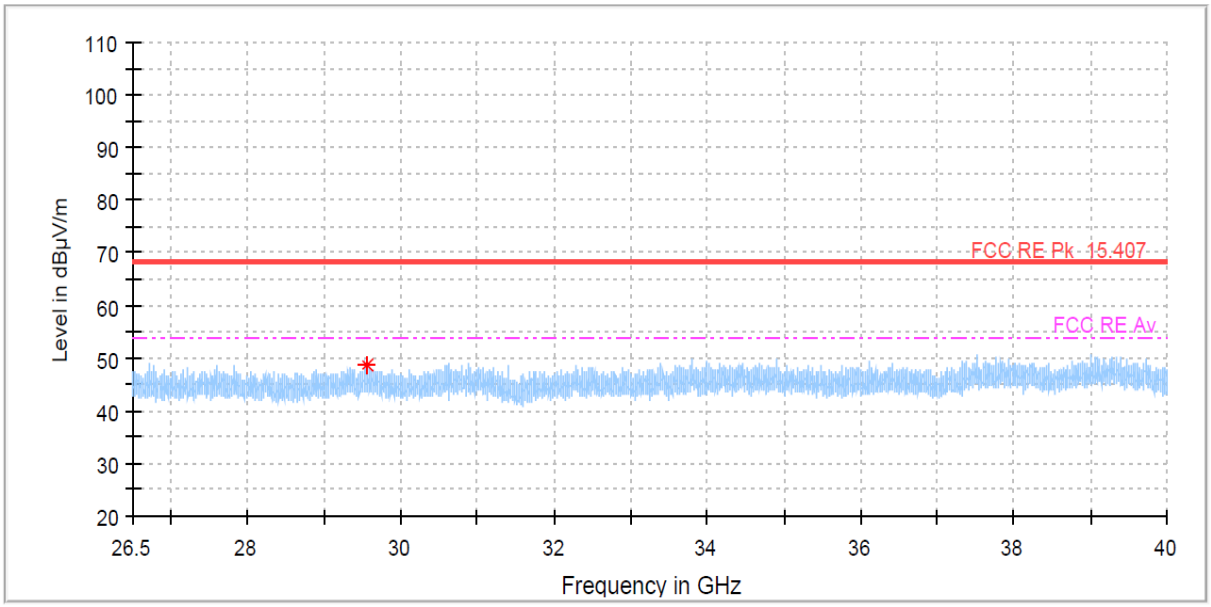



***Lowest channel : 18 GHz to 26.5 GHz_Peak***



# PLOTS OF EMISSIONS

***Lowest channel : 26.5 GHz to 40 GHz_Peak***



## 8.7.3 Radiated Spurious Emissions – U-NII-2C band

**FCC §15.407(b)**

**Test Mode : Set to Lowest channel, Middle channel and Highest channel, Straddle channel**

**802.11ac (20MHz) mode**

**Lowest Channel (5500 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5655.00*** | 57.5 | H | peak | 1.0 | 58.5 | 68.2 | 9.7 |
| 5736.50*** | 57.7 | H | peak | 1.1 | 58.8 | 68.2 | 9.4 |
| 5965.00*** | 54.2 | H | peak | 1.6 | 55.8 | 68.2 | 12.4 |

**Middle Channel (5600 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5445.00 | 55.4 | H | peak | 0.7 | 56.1 | 68.2 | 12.1 |
| 5399.85 | 49.5 | H | average | 0.5 | 50.0 | 54.0 | 4.0 |
| 5753.00*** | 60.8 | H | peak | 1.1 | 61.9 | 68.2 | 6.3 |
| 5825.50*** | 60.7 | H | peak | 1.2 | 61.9 | 68.2 | 6.3 |
| 5842.00*** | 60.7 | H | peak | 1.3 | 62.0 | 68.2 | 6.2 |
| 6066.00*** | 56.0 | H | peak | 2.0 | 58.0 | 68.2 | 10.2 |
| 11200.00 | 42.1 | V | peak | 12.8 | 54.9 | 68.2 | 13.3 |
| 11200.73 | 33.6 | V | average | 12.8 | 46.4 | 54.0 | 7.6 |

**Highest Channel (5700 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5852.50*** | 55.7 | H | peak | 1.3 | 57.0 | 68.2 | 11.2 |
| 5945.00*** | 57.2 | H | peak | 1.6 | 58.8 | 68.2 | 9.4 |

# TEST DATA

**Straddle Channel (5720 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5875.00*** | 61.3 | H | peak | 1.5 | 62.8 | 68.2 | 5.4 |
| 5966.00*** | 63.6 | H | peak | 1.6 | 65.2 | 68.2 | 3.0 |
| 11434.00 | 40.0 | V | peak | 13.2 | 53.2 | 68.2 | 15.0 |
| 17155.50*** | 42.8 | H | peak | 18.5 | 61.3 | 68.2 | 6.9 |

***Note:***

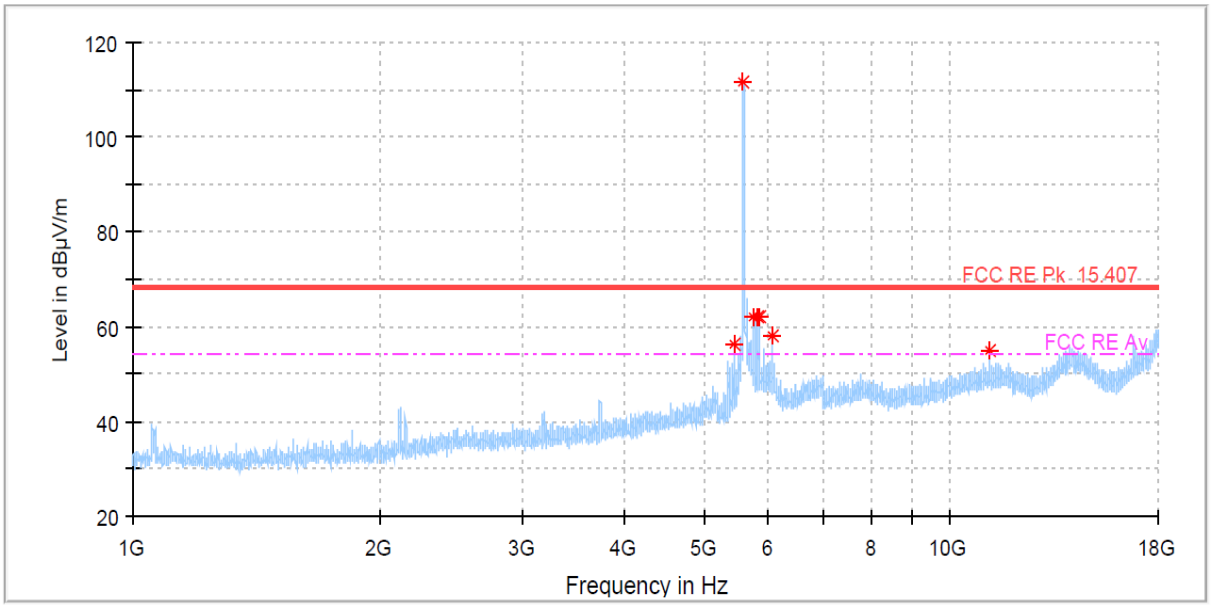
1. *Pol. H = Horizontal V = Vertical
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. At frequencies above 1 GHz, peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
4. As the EUT was configured to transmit with duty cycles < 98 percent, at frequencies above 1 GHz, average emission levels were measured using the "Method VB" by setting the analyzer RBW = 1 MHz, VBW = 10 kHz (VBW ≥ 1/T), Detector = Peak.
5. The spectrum is measured from 9 kHz to $10^{th}$ harmonic and the worst-case emissions are reported. No significant emissions were found beyond the Third harmonic for this device.
6. ***For outside of the restricted band, the peak limit is applied according to Part 15.407(b). Peak limit is 68.2 dBμV/m. ( E[dBμV/m] = EIRP[dBm/MHz] + 95.2 = 68.2 dBuV/m, for EIPR[dBm/MHz] = -27dBm. )
7. For restricted band, the peak limit is 68.2 dBμV/m, the average limit is 54 dBμV/m per FCC §15.209.
8. Middle channel(5600MHz) in ac (20MHz) mode was the worst channel with respect to spurious emission.
9. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.
10. At frequencies above 1 GHz, EUT was placed at a height of 1.5m above the floor on a support according to ANSI 63.10-2013.

# PLOTS OF EMISSIONS

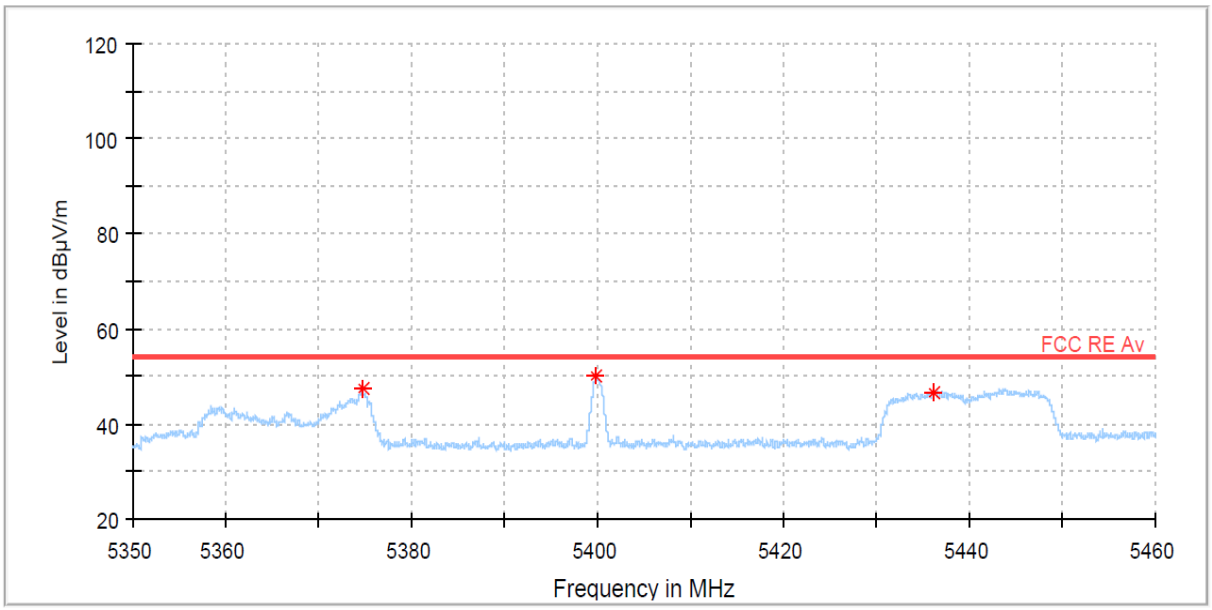
***Worst Case***

***802.11ac (20MHz) mode***

***Middle channel : 1 GHz to 18 GHz_Peak***

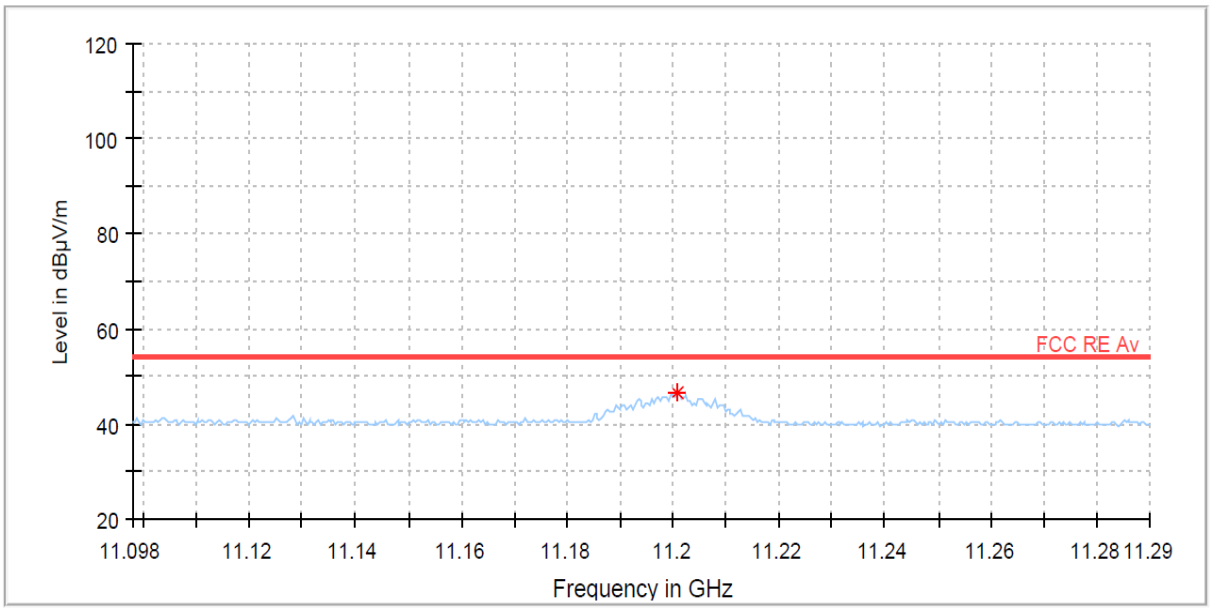



***Middle channel : 5400MHz_Average***

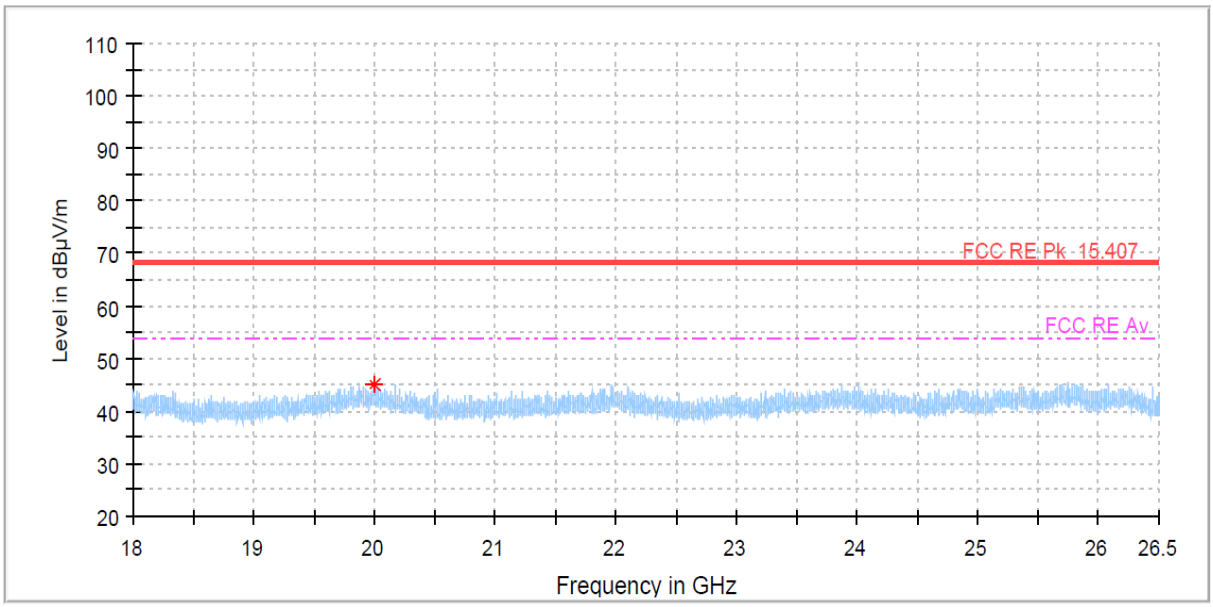


# PLOTS OF EMISSIONS

***Lowest channel : 2nd Harmonic_Average***

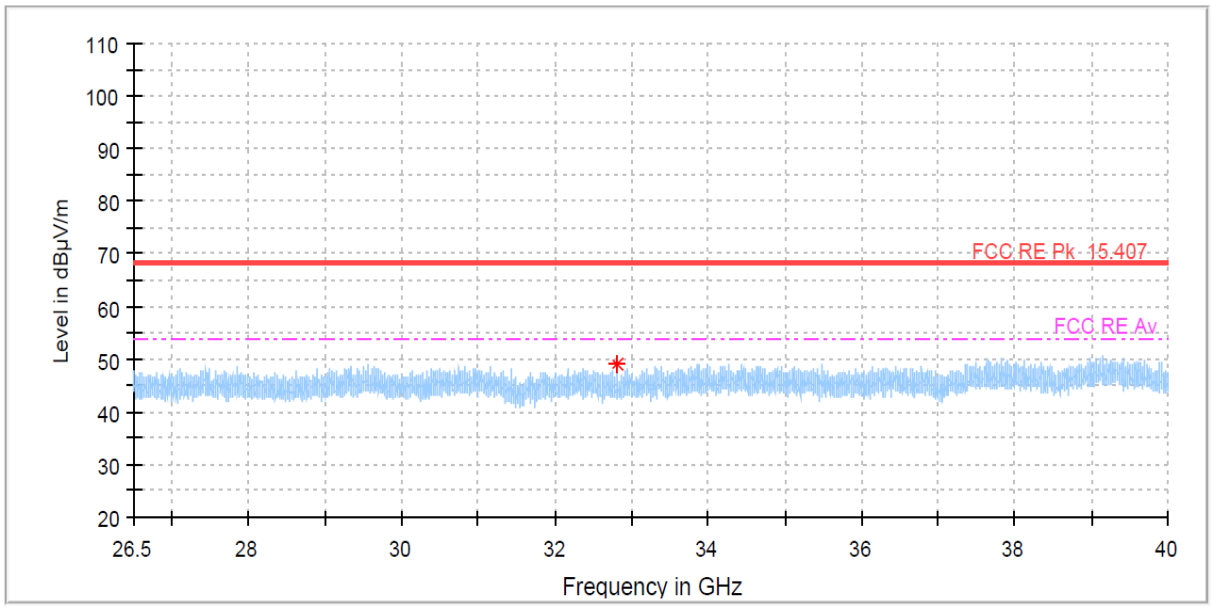



***Lowest channel : 18 GHz to 26.5 GHz_Peak***



# PLOTS OF EMISSIONS

***Lowest channel : 26.5 GHz to 40 GHz_Peak***



# TEST DATA

## 8.7.4 Radiated Spurious Emissions – U-NII-3 band

**FCC §15.407(b)**

**Test Mode : Set to Lowest channel, Middle channel and Highest channel**

**802.11ac (20MHz) mode**

**Lowest Channel (5745 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5977.5*** | 59.2 | H | peak | 1.6 | 60.8 | 68.2 | 7.4 |
| 11481.50 | 40.4 | V | peak | 13.3 | 53.7 | 68.2 | 14.5 |

**Middle Channel (5785 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5940.50*** | 55.1 | H | peak | 1.6 | 56.7 | 68.2 | 11.5 |
| 6034.00*** | 61.0 | H | peak | 1.9 | 62.9 | 68.2 | 5.3 |
| 11574.00 | 40.6 | V | peak | 13.2 | 53.8 | 68.2 | 14.4 |

**Highest Channel (5825 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 6075.50*** | 58.3 | H | peak | 2.1 | 60.4 | 68.2 | 7.8 |
| 11650.00 | 41.5 | H | peak | 13.1 | 54.6 | 68.2 | 13.6 |
| 11650.55 | 34.3 | V | average | 13.1 | 47.4 | 54.0 | 6.6 |

# TEST DATA

***Note:***

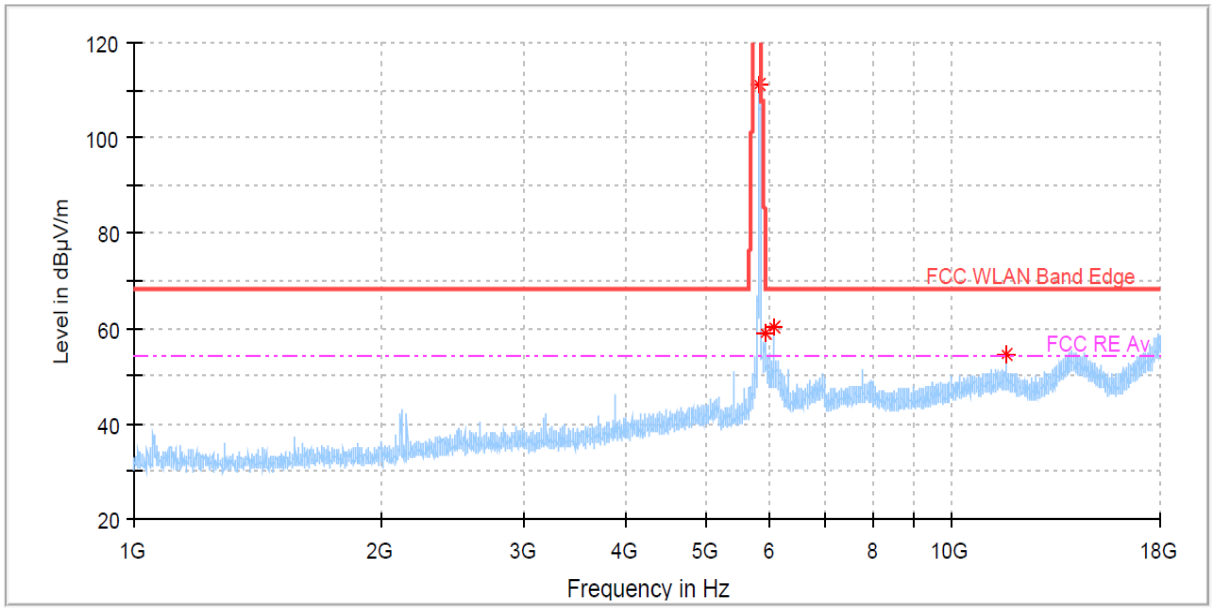
1. *Pol. H = Horizontal V = Vertical
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. At frequencies above 1 GHz, peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
4. As the EUT was configured to transmit with duty cycles < 98 percent, at frequencies above 1 GHz, average emission levels were measured using the "Method VB" by setting the analyzer RBW = 1 MHz, VBW = 10 kHz (VBW ≥ 1/T), Detector = Peak.
5. The spectrum is measured from 9 kHz to $10^{th}$ harmonic and the worst-case emissions are reported. No significant emissions were found beyond the Third harmonic for this device.
6. ***For outside of the restricted band, the peak limit is applied according to Part 15.407(b). Peak limit is 68.2 dBμV/m. ( E[dBμV/m] = EIRP[dBm/MHz] + 95.2 = 68.2 dBuV/m, for EIPR[dBm/MHz] = -27dBm. )
7. For restricted band, the peak limit is 68.2 dBμV/m, the average limit is 54 dBμV/m per FCC §15.209.
8. Highest channel(5825MHz) in ac (20MHz) mode was the worst channel with respect to spurious emission.
9. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.
10. At frequencies above 1 GHz, EUT was placed at a height of 1.5m above the floor on a support according to ANSI 63.10-2013.

# PLOTS OF EMISSIONS

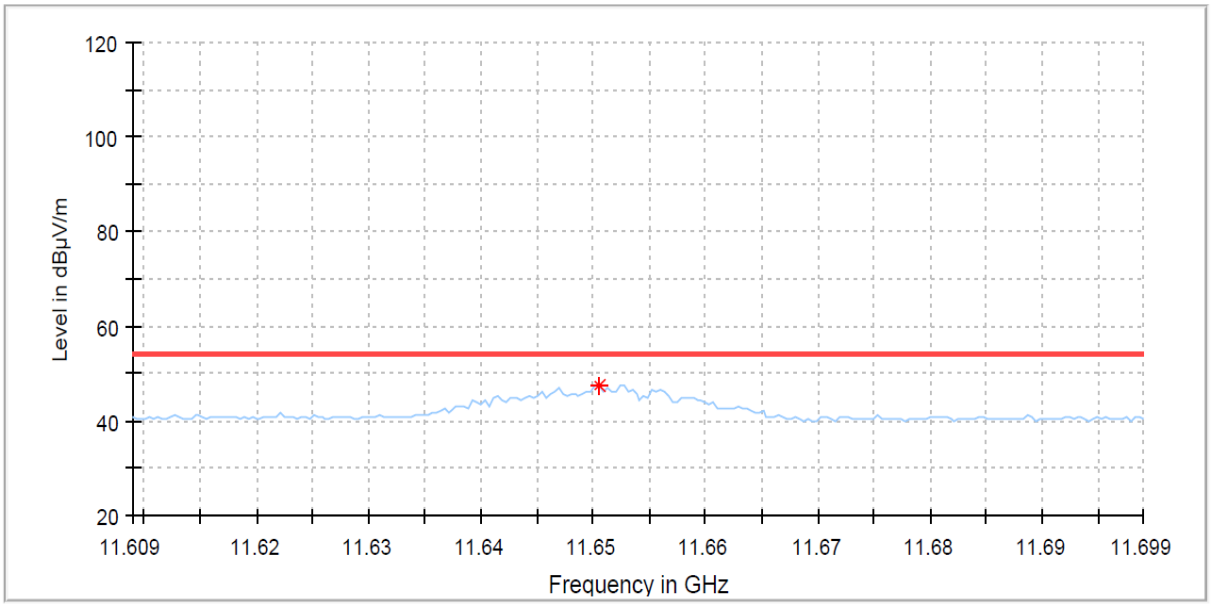
***Worst Case***

***802.11ac (20MHz) mode***

***Highest channel : 1 GHz to 18 GHz_Peak***

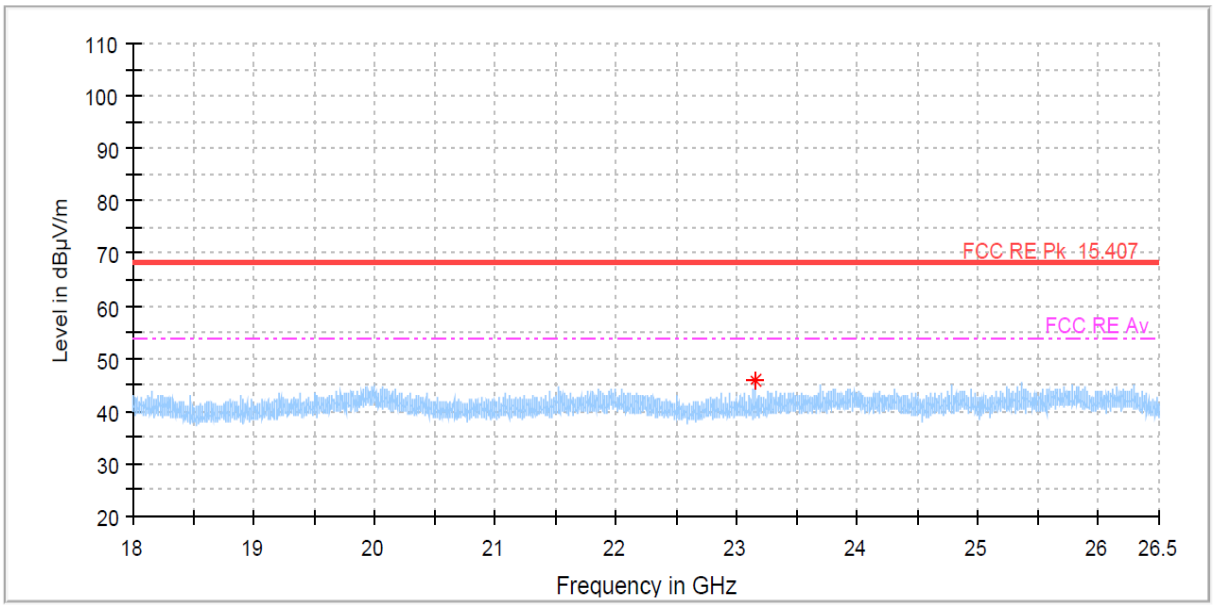



***Highest channel : 3rd Harmonic_Average***

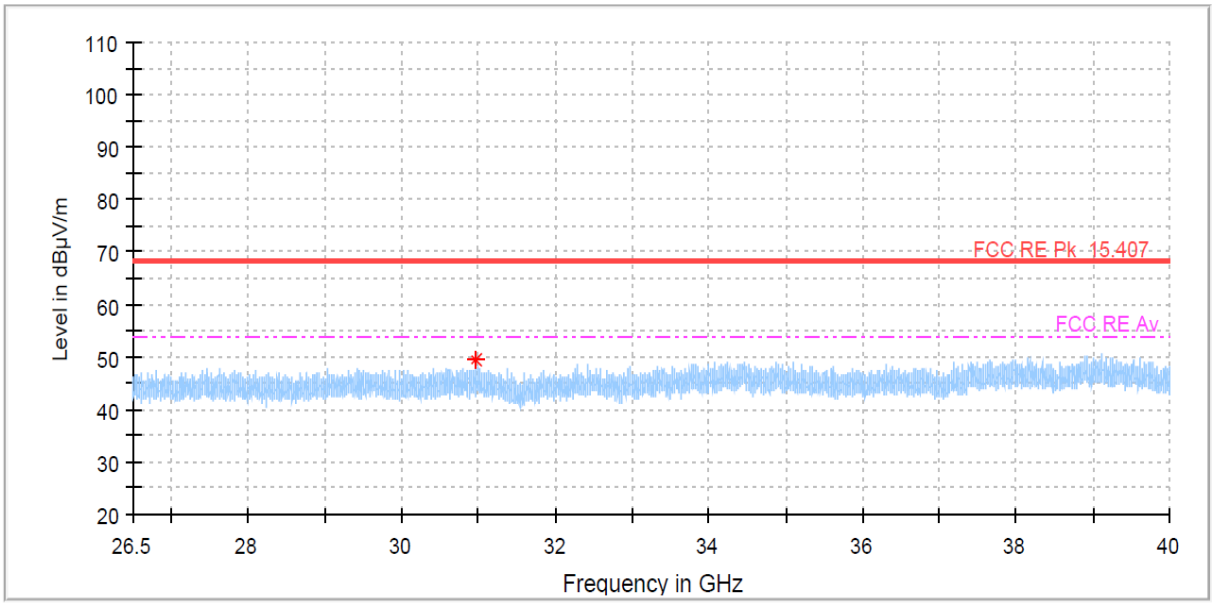


# PLOTS OF EMISSIONS

***Highest channel : 18 GHz to 26.5 GHz_Peak***




***Highest channel : 26.5 GHz to 40 GHz_Peak***



# TEST DATA

## 8.8 Radiated Band Edge

### 8.8.1 Radiated Band Edge – U-NII-1 band and UNII-2A band

**FCC §15.407(b)**

**Test Mode : Set to Lowest channel and Highest channel**

**802.11ac (20MHz) mode**

**Lowest Channel (5180 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5149.77 | 64.5 | H | peak | 0.2 | 64.7 | 68.2 | 3.5 |
| 5148.77 | 43.0 | H | average | 0.2 | 43.2 | 54.0 | 10.8 |
| 5150.00 | 56.2 | H | peak | 0.2 | 56.4 | 68.2 | 11.8 |
| 5150.00 | 41.6 | H | average | 0.2 | 41.8 | 54.0 | 12.2 |

**Highest Channel (5320 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5350.01 | 58.5 | H | peak | 0.3 | 58.8 | 68.2 | 9.4 |
| 5350.00 | 45.6 | H | average | 0.3 | 45.9 | 54.0 | 8.1 |
| 5350.77 | 64.7 | H | peak | 0.3 | 65.0 | 68.2 | 3.2 |
| 5399.94 | 51.3 | H | average | 0.5 | 51.8 | 54.0 | 2.2 |

**802.11ac (40 MHz) mode**

**Lowest Channel (5190 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5149.33 | 65.5 | H | peak | 0.2 | 65.7 | 68.2 | 2.5 |
| 5150.00 | 60.3 | H | peak | 0.2 | 60.5 | 68.2 | 7.7 |
| 5150.00 | 46.0 | H | average | 0.2 | 46.2 | 54.0 | 7.8 |

# TEST DATA

**Highest Channel (5310 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5350.01 | 59.6 | H | peak | 0.3 | 59.9 | 68.2 | 8.3 |
| 5350.00 | 43.4 | H | average | 0.3 | 43.7 | 54.0 | 10.3 |
| 5350.21 | 64.3 | H | peak | 0.3 | 64.6 | 68.2 | 3.6 |
| 5353.78 | 45.1 | H | average | 0.3 | 45.4 | 54.0 | 8.6 |
| 5399.93 | 51.1 | H | average | 0.5 | 51.6 | 54.0 | 2.4 |

**802.11ac (80MHz) mode**

**Lowest Channel (5210 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5147.71 | 63.9 | H | peak | 0.2 | 64.1 | 68.2 | 4.1 |
| 5148.68 | 45.5 | H | average | 0.2 | 45.7 | 54.0 | 8.3 |
| 5150.00 | 59.8 | H | peak | 0.2 | 60.0 | 68.2 | 8.2 |
| 5150.00 | 45.2 | H | average | 0.2 | 45.4 | 54.0 | 8.6 |

**Highest Channel (5290 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5350.00 | 58.5 | H | peak | 0.3 | 58.8 | 68.2 | 9.4 |
| 5350.00 | 44.7 | H | average | 0.3 | 45.0 | 54.0 | 9.0 |
| 5356.93 | 63.8 | H | peak | 0.3 | 64.1 | 68.2 | 4.1 |
| 5399.96 | 50.8 | H | average | 0.5 | 51.3 | 54.0 | 2.7 |

# TEST DATA

## 8.8.2 Radiated Band Edge – UNII-2C band

**FCC §15.407(b)**

**Test Mode : Set to Lowest channel and Highest channel, Straddle channel**

**802.11ac (20MHz) mode**

**Lowest Channel (5500 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5469.81 | 64.9 | H | peak | 0.8 | 65.7 | 68.2 | 2.5 |
| 5470.00 | 63.8 | H | peak | 0.8 | 64.6 | 68.2 | 3.6 |

**Highest Channel (5700 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5725.00 | 55.2 | H | peak | 1.2 | 56.4 | 68.2 | 11.8 |
| 5729.16 | 63.6 | H | peak | 1.1 | 64.7 | 68.2 | 3.5 |

**Straddle Channel (5720 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5470.00 | 44.7 | H | peak | 0.8 | 45.5 | 68.2 | 22.7 |
| 5850.01 | 52.3 | H | peak | 1.3 | 53.6 | 68.2 | 14.6 |
| 5876.65 | 63.1 | H | peak | 1.5 | 64.6 | 68.2 | 3.6 |

# TEST DATA

**802.11ac (40MHz) mode**

**Lowest Channel (5510 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5469.16 | 64.9 | H | peak | 0.8 | 65.7 | 68.2 | 2.5 |
| 5470.00 | 55.0 | H | peak | 0.8 | 55.8 | 68.2 | 12.4 |

**Highest Channel (5670 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5725.00 | 58.5 | H | peak | 1.2 | 59.7 | 68.2 | 8.5 |
| 5725.10 | 64.0 | H | peak | 1.2 | 65.2 | 68.2 | 3.0 |

**Straddle Channel (5710 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5470.00 | 43.9 | H | peak | 0.8 | 44.7 | 68.2 | 23.5 |
| 5850.01 | 51.7 | H | peak | 1.3 | 53.0 | 68.2 | 15.2 |
| 5871.88 | 61.0 | H | peak | 1.5 | 62.5 | 68.2 | 5.7 |

**802.11ac (80MHz) mode**

**Lowest Channel (5530 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5468.73 | 64.7 | H | peak | 0.8 | 65.5 | 68.2 | 2.7 |
| 5469.99 | 61.4 | H | peak | 0.8 | 62.2 | 68.2 | 6.0 |

# TEST DATA

**Highest Channel (5610 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5466.56 | 57.1 | H | peak | 0.8 | 57.9 | 68.2 | 10.3 |
| 5469.99 | 50.9 | H | peak | 0.8 | 51.7 | 68.2 | 16.5 |
| 5725.01 | 53.3 | H | peak | 1.2 | 54.5 | 68.2 | 13.7 |
| 5733.97 | 61.1 | H | peak | 1.1 | 62.2 | 68.2 | 6.0 |

**Straddle Channel (5690 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5464.33 | 49.6 | H | peak | 0.8 | 50.4 | 68.2 | 17.8 |
| 5470.00 | 45.7 | H | peak | 0.8 | 46.5 | 68.2 | 21.7 |
| 5850.01 | 55.2 | H | peak | 1.3 | 56.5 | 68.2 | 11.7 |
| 5854.52 | 63.4 | H | peak | 1.4 | 64.8 | 68.2 | 3.4 |

# TEST DATA

## 8.8.3 Radiated Band Edge – U-NII-3 band

**FCC §15.407(b)**

**Test Mode : Set to Lowest channel and Highest channel**

**802.11ac (20MHz) mode**

**Lowest Channel (5745 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5724.58 | 77.9 | H | peak | 1.2 | 79.1 | 121.3 | 42.1 |
| 5724.99 | 70.9 | H | peak | 1.2 | 72.1 | 122.2 | 50.1 |

**Highest Channel (5825 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5850.01 | 68.9 | H | peak | 1.3 | 70.2 | 122.2 | 52.0 |
| 5852.12 | 71.3 | H | peak | 1.3 | 72.6 | 117.4 | 44.8 |

**802.11ac (40 MHz) mode**

**Lowest Channel (5755 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5717.91 | 77.7 | H | peak | 1.2 | 78.9 | 110.2 | 31.3 |
| 5724.98 | 70.5 | H | peak | 1.2 | 71.7 | 122.2 | 50.5 |

**Highest Channel (5795 MHz)**

| Frequency (MHz) | Reading (dBμV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5850.01 | 67.1 | H | peak | 1.3 | 68.4 | 122.2 | 53.8 |

# TEST DATA

**802.11ac (80 MHz) mode**

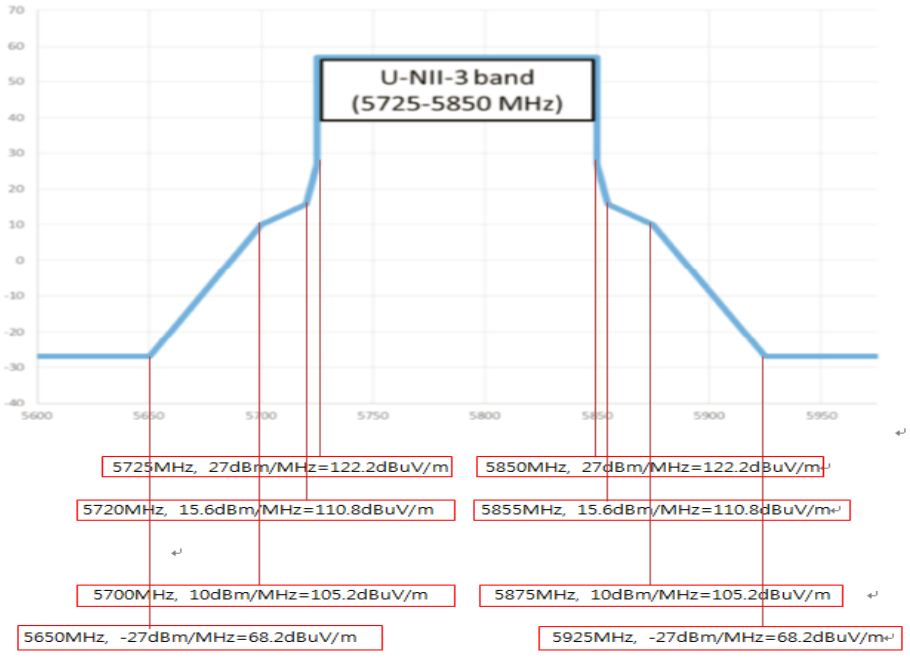
**Lowest Channel (5775 MHz)**

| Frequency (MHz) | Reading (dBµV) | Pol* (H/V) | mode | AF+CL+Amp (dB)** | Result (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 5724.99 | 74.4 | H | peak | 1.2 | 75.6 | 122.2 | 46.6 |
| 5850.01 | 71.8 | H | peak | 1.3 | 73.1 | 122.2 | 49.1 |

# TEST DATA

***Note:***

1. *Pol. H = Horizontal V = Vertical
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. ***Average measurement was not performed because peak-detected emission complies with the average limit.
4. At frequencies above 1 GHz, peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
5. As the EUT was configured to transmit with duty cycles < 98 percent, at frequencies above 1 GHz, average emission levels were measured using the "Method VB" by setting the analyzer RBW = 1 MHz, VBW = 10kHz (VBW ≥ 1/T), Detector = Peak.
6. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.
7. At frequencies above 1 GHz, EUT was placed at a height of 1.5m above the floor on a support according to ANSI 63.10-2013.
8. Lowest channel (5190MHz) in ac (40MHz) mode for UNII-1 band, Highest channel (5320MHz) in ac (20MHz) mode for UNII-2A band, Lowest channel (5500MHz) in ac (20MHz) mode and Straddle channel (5690MHz) in ac (80MHz) mode for UNII-2C band, Lowest channel (5755MHz) in ac (40MHz) mode for UNII-3 band were the worst channels in each band.
9. For restricted band, the peak limit is 68.2 dBμV/m, the average limit is 54 dBμV/m per FCC §15.209.
10. For outside of the restricted band, the peak limit is applied according to Part 15.407(b).
    For UNII-1, UNII-2A, UNII-2C band, peak limit is 68.2 dBμV/m. ( E[dBμV/m] = EIRP[dBm/MHz] + 95.2 = 68.2 dBuV/m,for EIPR[dBm/MHz] = -27dBm. )
    For UNII 3 band, the peak limit of bandedge to 75MHz above or below bandedge is specified in 15.407(b)(4)(i) as below.



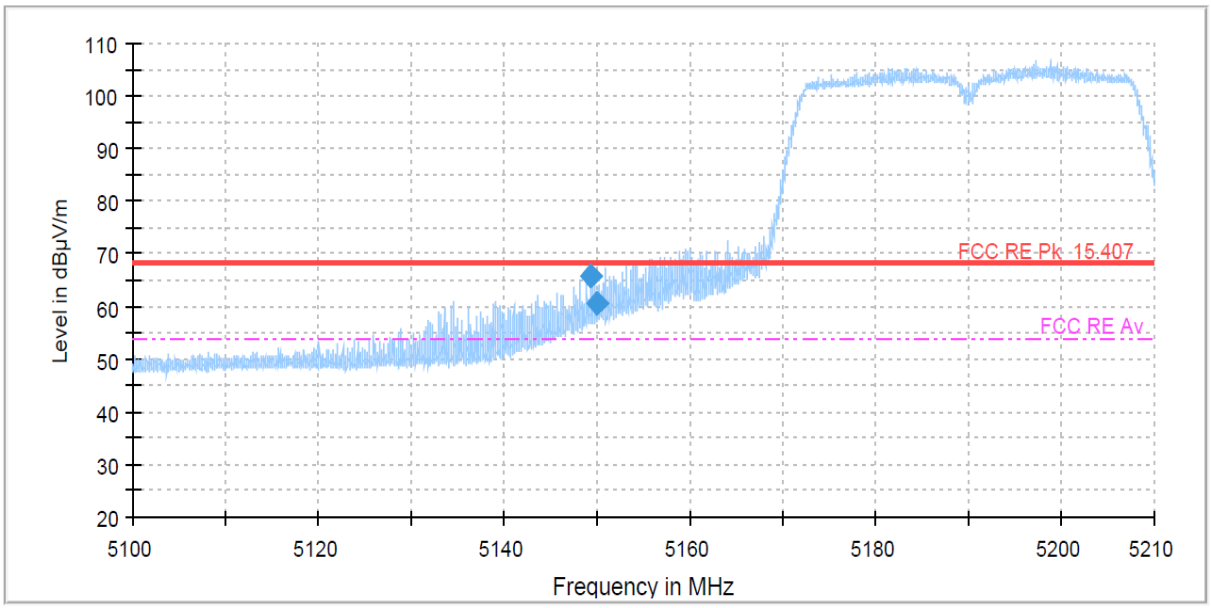
# PLOTS OF EMISSIONS

***Worst Case***

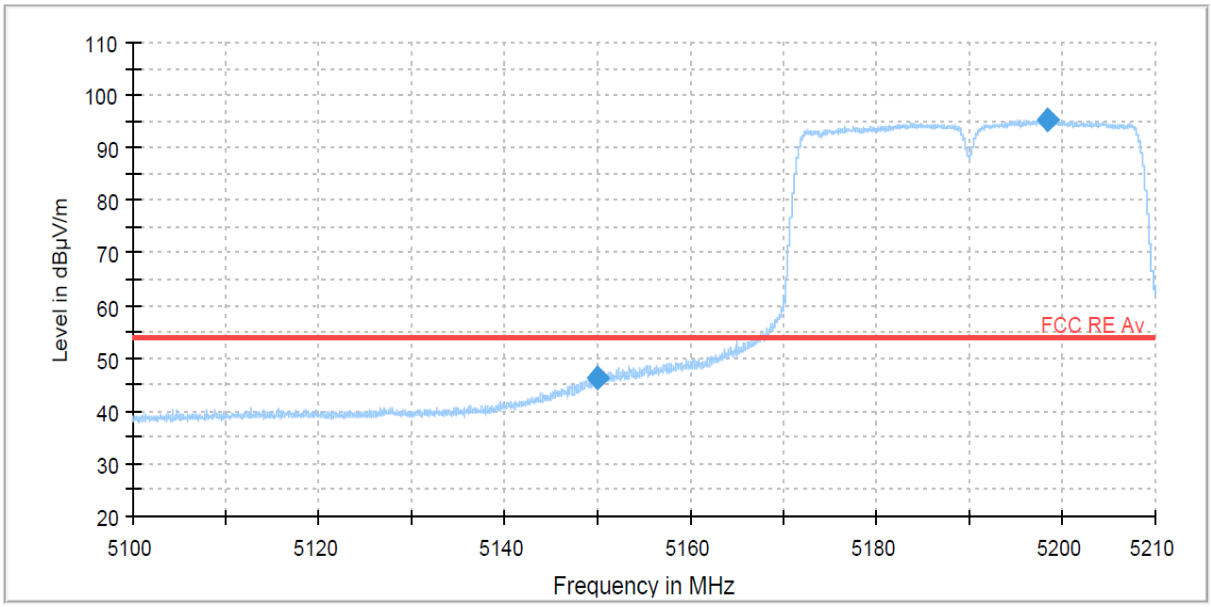
***Radiated Band Edge – U-NII-1 band***

***802.11ac (40MHz) mode***

***Lowest channel (5190 MHz) _Peak***




***Lowest channel (5190 MHz) _Average***

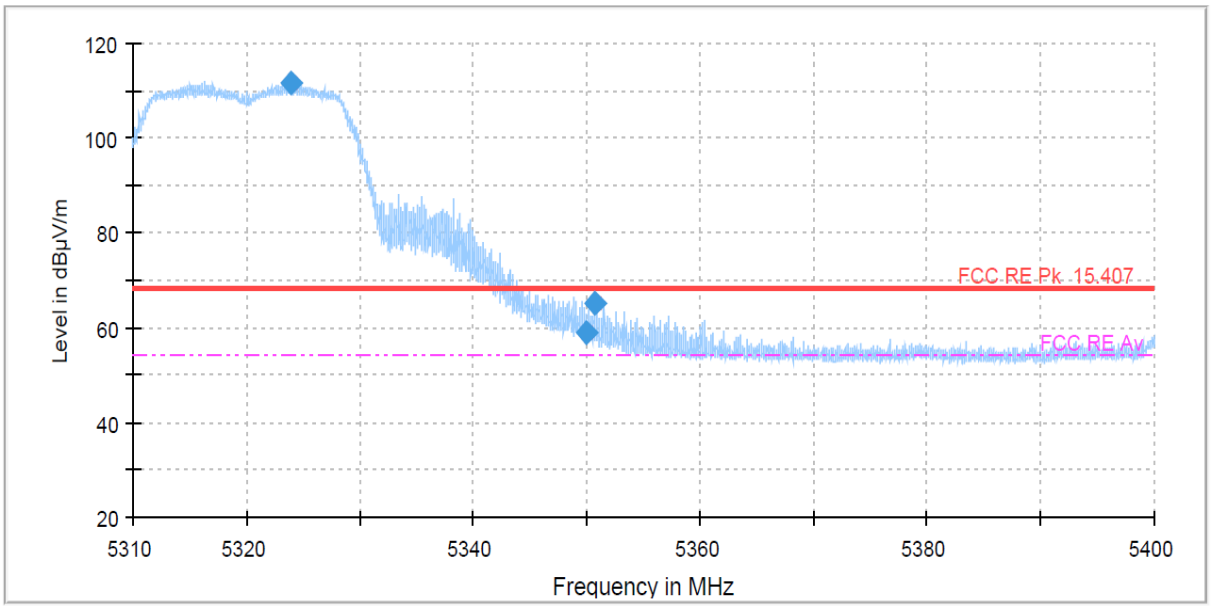


# PLOTS OF EMISSIONS

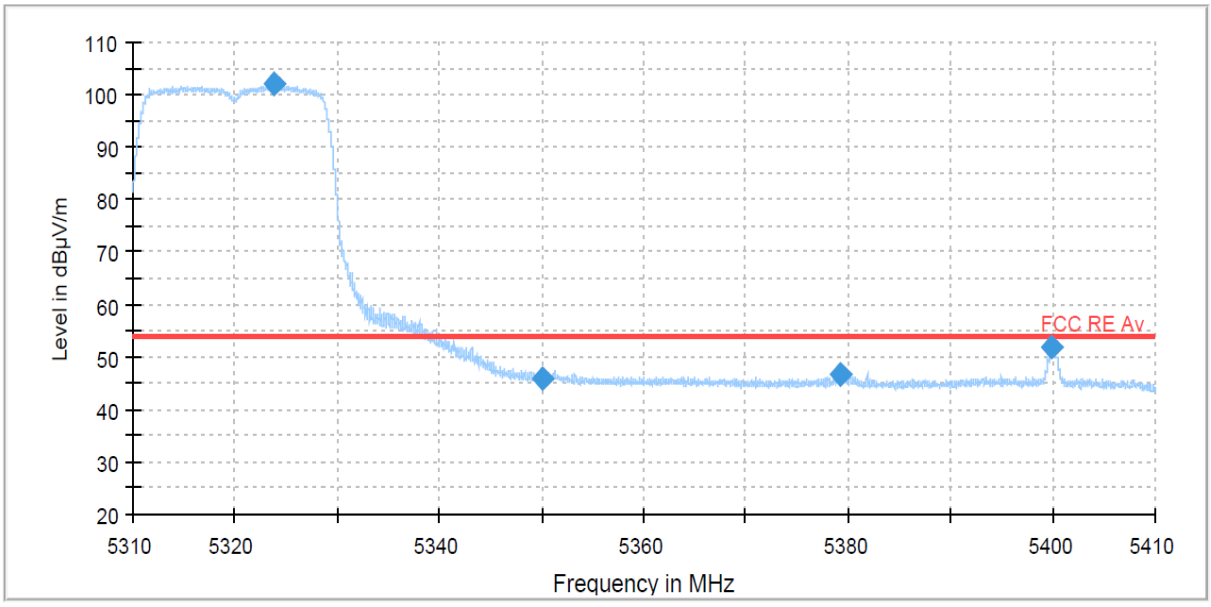
***Radiated Band Edge – U-NII-2A band***

***802.11ac (20MHz) mode***

***Highest channel (5320 MHz) _Peak***




***Highest channel (5320 MHz) _Average***

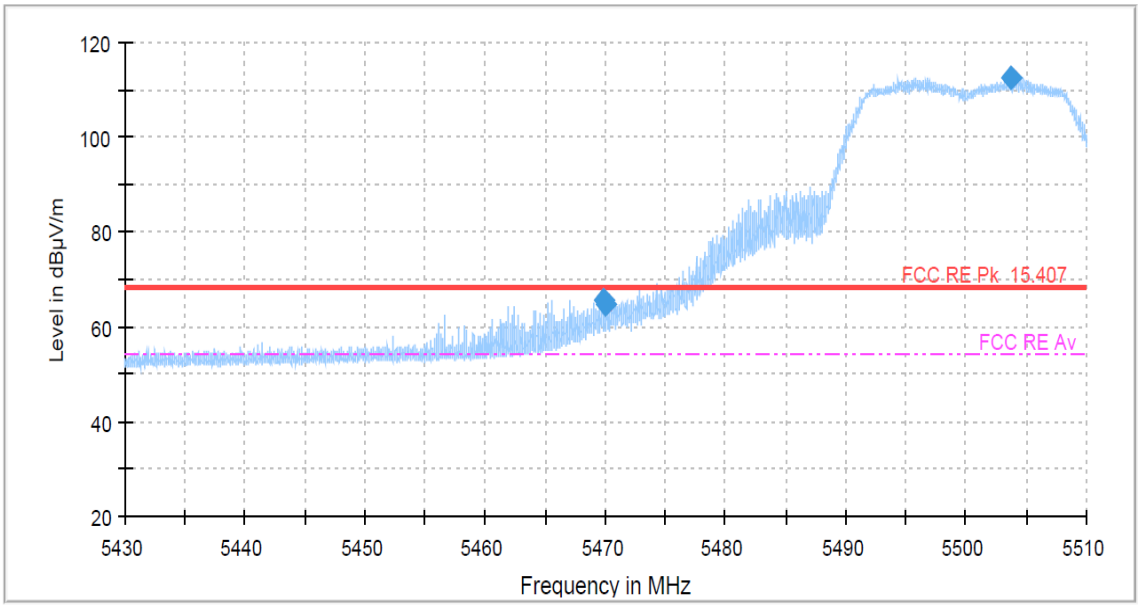


# PLOTS OF EMISSIONS

***Radiated Band Edge – U-NII-2C band***

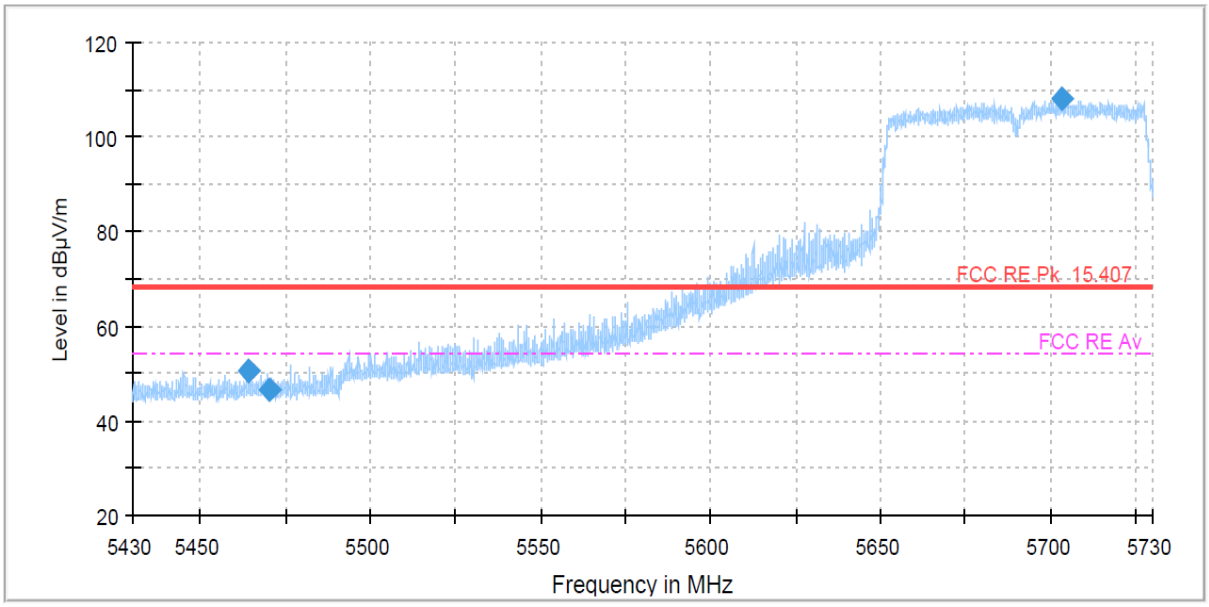
***802.11ac (20MHz) mode***

***Lowest channel (5500 MHz) _Peak***



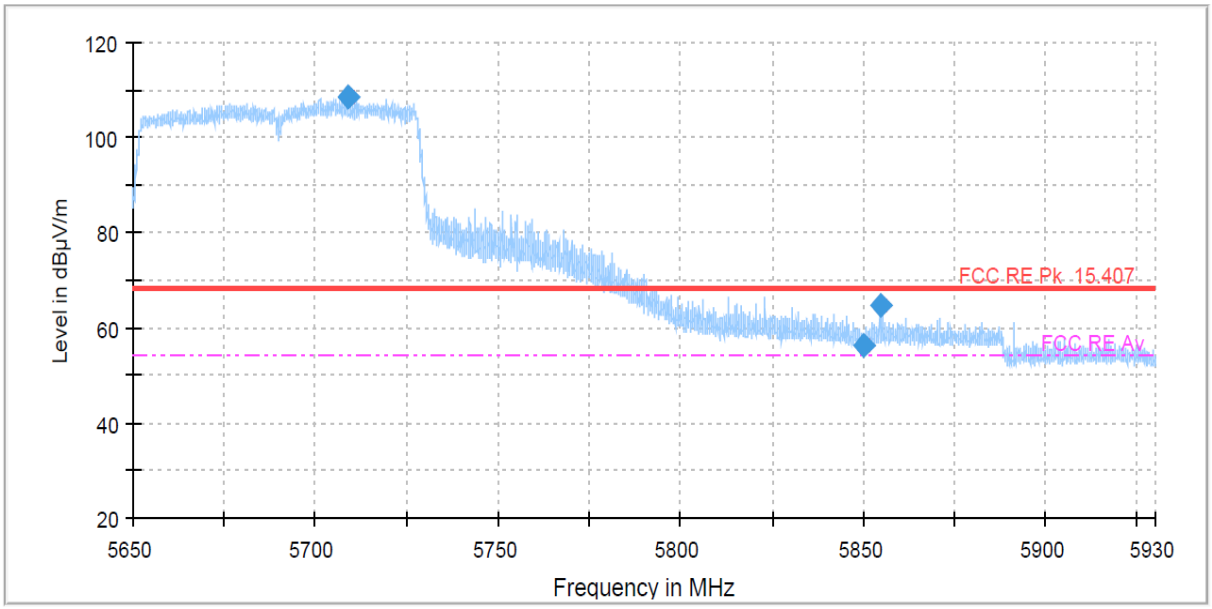

***802.11ac (80MHz) mode***

***Straddle channel (5690 MHz) _Peak***



# PLOTS OF EMISSIONS

***Straddle channel (5690 MHz) _Peak***

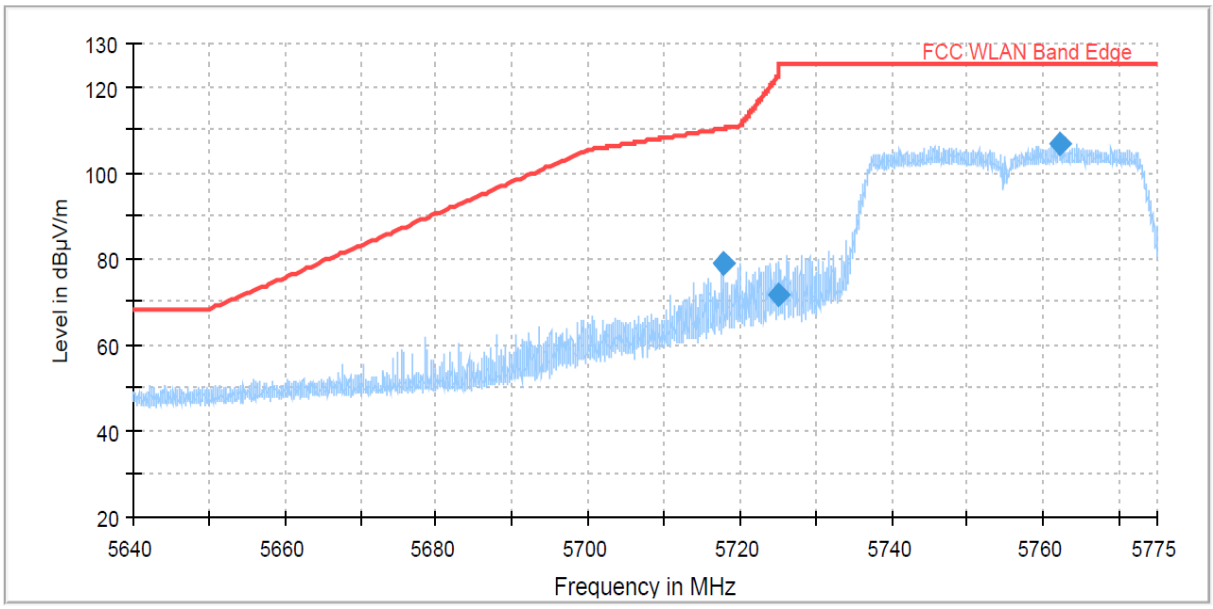


# PLOTS OF EMISSIONS

***Radiated Band Edge – U-NII-3 band***

***802.11ac mode(40MHz)***

***Lowest channel Lower (5755 MHz) _Peak***



# 9. TEST EQUIPMENT

| No. | Instrument | Manufacturer | Model | Serial No. | Calibration Date | Calibration Interval |
|---|---|---|---|---|---|---|
| 1 | *Test Receiver | R & S | ESU 40 | 100202 | Apr. 02 2019 | 1 year |
| 2 | *Test Receiver | R & S | ESCS30 | 100302 | Oct. 11 2018 | 1 year |
| 3 | Attenuator | PASTERNACK | PE7395-10 | 1441-1 | Jul. 11 2019 | 1 year |
| 4 | *Attenuator | FAIRVIEW | SA3N5W-06 | N/A | Apr. 03 2019 | 1 year |
| 5 | *Attenuator | FAIRVIEW | SA3N5W-10 | N/A | Apr. 03 2019 | 1 year |
| 6 | *Attenuator | WEINSCHEL | 56-10 | 58765 | Oct. 12 2018 | 1 year |
| 7 | *Amplifier | R & S | SCU 01 | 10029 | Apr. 02 2019 | 1 year |
| 8 | *Amplifier | R & S | SCU18F | 180025 | Apr. 02 2019 | 1 year |
| 9 | *Amplifier | R & S | SCU26 | 10011 | Jul. 15 2019 | 1 year |
| 10 | *Amplifier | R & S | SCU40 | 100380 | Jul. 15 2019 | 1 year |
| 11 | Pre Amplifier | HP | 8449B | 3008A00107 | Jan. 08 2019 | 1 year |
| 12 | Spectrum Analyzer | R & S | FSW43 | 100732 | Apr. 02 2019 | 1 year |
| 13 | *Spectrum Analyzer | Agilent | E4440A | MY44303257 | Oct. 11 2018 | 1 year |
| 14 | *Spectrum Analyzer | R & S | FSW43 | 104084 | Apr. 02 2019 | 1 year |
| 15 | *Loop Antenna | R & S | HFH2-Z2 | 100279 | Feb. 13 2019 | 2 year |
| 16 | *Horn Antenna | SCHWARZBECK | BBHA9120D | 9120D-474 | Jun. 28 2019 | 2 year |
| 17 | *Horn Antenna | Q-par Angus | QSH20S20 | 8179 | Jul. 15 2019 | 2 year |
| 18 | *Horn Antenna | Q-par Angus | QSH22K20 | 8180 | Jul. 15 2019 | 2 year |
| 19 | *Trilog-Broadband Antenna | SCHWARZBECK | VULB 9163 | 946 | May. 18 2019 | 2 year |
| 20 | *LISN | R & S | ESH3-Z5 | 833874/006 | Oct. 12 2018 | 1 year |
| 21 | *Position Controller | INNCO | CO2000 | 12480406/L | N/A | N/A |
| 22 | *Controller | INNCO | CO3000 | CO3000/937/38330516/L | N/A | N/A |
| 23 | *Turn Table | INNCO | DS1200S | N/A | N/A | N/A |
| 24 | *Turn Table | INNCO | DT2000-2t | N/A | N/A | N/A |
| 25 | *Antenna Mast | INNCO | MA4000 | N/A | N/A | N/A |
| 26 | *TILT Antenna Mast | INNCO | MA4640-XP-EP | N/A | N/A | N/A |
| 27 | *Open Switch And Control Unit | R & S | OSP-120 | 100081 | N/A | N/A |
| 28 | *Open Switch And Control Unit | R & S | OSP-120 | 101766 | N/A | N/A |
| 29 | *Shielded Room | Seo-Young EMC | N/A | N/A | N/A | N/A |
| 30 | *Anechoic Chamber | Seo-Young EMC | N/A | N/A | N/A | N/A |
| 31 | *WiFi Filter Bank | R & S | U083 | N/A | N/A | N/A |
| 32 | *WiFi Filter Bank | R & S | U082 | N/A | N/A | N/A |

*) Test equipment used during the test

# 10. ACCURACY OF MEASUREMENT

The Measurement Uncertainties stated were calculated in accordance with the requirements of measurement uncertainty contained in CISPR 16-4-2 with the confidence level of 95%

## 1. Conducted Uncertainty Calculation

| Source of Uncertainty | Xi | Uncertainty of Xi | | Coverage factor k | u(Xi) (dB) | Ci | Ci u(Xi) (dB) |
|---|---|---|---|---|---|---|---|
| | | Value (dB) | Probability Distribution | | | | |
| Receiver reading | RI | ± 0.1 | normal 1 | 1.000 | 0.1 | 1 | 0.1 |
| Attenuation AMN-Receiver | LC | ± 0.08 | normal 2 | 2.000 | 0.04 | 1 | 0.04 |
| AMN Voltage division factor | LAMN | ± 0.8 | normal 2 | 2.000 | 0.4 | 1 | 0.4 |
| Sine wave voltage | dVSW | ± 2.00 | normal 2 | 2.000 | 1.00 | 1 | 1.00 |
| Pulse amplitude response | dVPA | ± 1.50 | rectangular | 1.732 | 0.87 | 1 | 0.87 |
| Pulse repetition rate response | dVPR | ± 1.50 | rectangular | 1.732 | 0.87 | 1 | 0.87 |
| Noise floor proximity | dVNF | ± 0.00 | - | - | 0.00 | 1 | 0.00 |
| AMN Impedance | dZ | ± 1.80 | triangular | 2.449 | 0.73 | 1 | 0.73 |
| ⓐ Mismatch | M | + 0.70 | U-Shaped | 1.414 | 0.49 | 1 | 0.49 |
| ⓑ Mismatch | M | - 0.80 | U-Shaped | 1.414 | - 0.56 | 1 | - 0.56 |
| Measurement System Repeatability | RS | 0.05 | normal 1 | 1.000 | 0.05 | 1 | 0.05 |
| Remark | ⓐ: AMN-Receiver Mismatch : +<br>ⓑ: AMN-Receiver Mismatch : - | | | | | | |
| Combined Standard Uncertainty | Normal | | | ± 1.88 | | | |
| Expended Uncertainty U | Normal ($k$ = 2) | | | ± 3.76 | | | |

## 2. Radiation Uncertainty Calculation

| Source of Uncertainty | Xi | Uncertainty of Xi | | Coverage factor k | u(Xi) (dB) | Ci | Ci u(Xi) (dB) |
|---|---|---|---|---|---|---|---|
| | | Value (dB) | Probability Distribution | | | | |
| Measurement System Repeatability | **RS** | 0.34 | normal 1 | 1.00 | 0.34 | 1 | 0.34 |
| Receiver reading | **Ri** | ± 0.02 | normal 2 | 2.00 | 0.01 | 1 | 0.01 |
| Sine wave voltage | **dVsw** | ± 0.17 | normal 2 | 2.00 | 0.09 | 1 | 0.09 |
| Pulse amplitude response | **dVpa** | ± 0.92 | normal 2 | 2.00 | 0.46 | 1 | 0.46 |
| Pulse repetition rate response | **dVpr** | ± 0.35 | normal 2 | 2.00 | 0.18 | 1 | 0.18 |
| Noise floor proximity | **dVnf** | ± 0.50 | normal 2 | 2.00 | 0.25 | 1 | 0.25 |
| Antenna Factor Calibration | **AF** | ± 2.00 | rectangular | $\sqrt{3}$ | 1.15 | 1 | 1.15 |
| Cable Loss | **CL** | ± 1.00 | normal 2 | 2.00 | 0.50 | 1 | 0.50 |
| Antenna Directivity | **AD** | ± 0.00 | rectangular | $\sqrt{3}$ | 0.00 | 1 | 0.00 |
| Antenna Factor Height Dependence | **AH** | ± 2.00 | rectangular | $\sqrt{3}$ | 1.15 | 1 | 1.15 |
| Antenna Phase Centre Variation | **AP** | ± 0.20 | rectangular | $\sqrt{3}$ | 0.12 | 1 | 0.12 |
| Antenna Factor Frequency Interpolation | **Ai** | ± 0.25 | rectangular | $\sqrt{3}$ | 0.14 | 1 | 0.14 |
| Site Imperfections | **Si** | ± 4.00 | triangular | $\sqrt{6}$ | 1.63 | 1 | 1.63 |
| Measurement Distance Variation | **DV** | ± 0.60 | rectangular | $\sqrt{3}$ | 0.35 | 1 | 0.35 |
| Antenna Balance | **Dbal** | ± 0.90 | rectangular | $\sqrt{3}$ | 0.52 | 1 | 0.52 |
| Cross Polarisation | **DCross** | ± 0.00 | rectangular | $\sqrt{3}$ | 0.00 | 1 | 0.18 |
| Mismatch | **M** | + 0.98<br>- 1.11 | U-Shaped | $\sqrt{2}$ | 0.74 | 1 | 0.74 |
| EUT Volume Diameter | **Vd** | 0.33 | normal 1 | 1.00 | 0.33 | 1 | 0.11 |
| Remark | | | | | | | |
| Combined Standard Uncertainty | Normal | | | | | | |
| Expended Uncertainty U | Normal ($k$ = 2) | | | | | | |