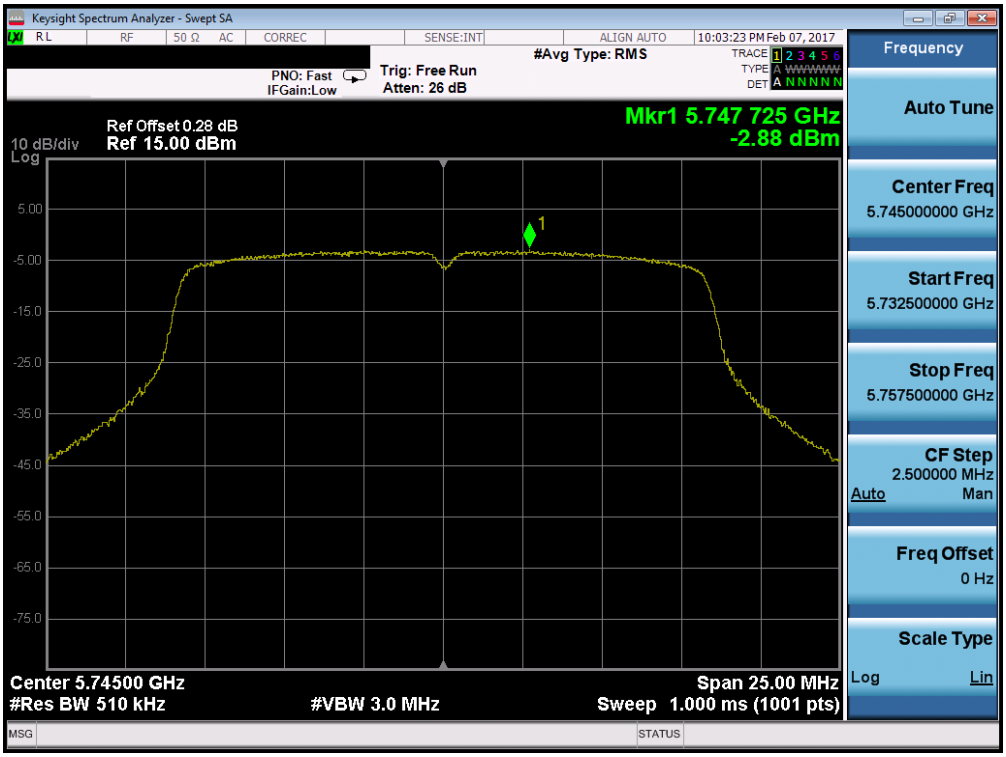
| | Frequency [MHz] | Channel No. | 802.11 Mode | Data Rate [Mbps] | Measured Power Density [dBm] | Max Permissible Power Density [dBm/500kHz] | Margin [dB] | Pass / Fail |
|---|---|---|---|---|---|---|---|---|
| Band 3 | 5745 | 149 | a | 6 | -2.88 | 30.0 | -32.88 | Pass |
| | 5785 | 157 | a | 6 | -1.90 | 30.0 | -31.90 | Pass |
| | 5825 | 165 | a | 6 | -2.67 | 30.0 | -32.67 | Pass |
| | 5745 | 149 | n (20MHz) | 6.5/7.2 (MCS0) | -3.31 | 30.0 | -33.31 | Pass |
| | 5785 | 157 | n (20MHz) | 6.5/7.2 (MCS0) | -2.06 | 30.0 | -32.06 | Pass |
| | 5825 | 165 | n (20MHz) | 6.5/7.2 (MCS0) | -3.02 | 30.0 | -33.02 | Pass |
| | 5755 | 151 | n (40MHz) | 13.5/15 (MCS0) | -5.68 | 30.0 | -35.68 | Pass |
| | 5795 | 159 | n (40MHz) | 13.5/15 (MCS0) | -4.67 | 30.0 | -34.67 | Pass |
| | 5775 | 155 | ac (80MHz) | 29.3/32.5 (MCS0) | -6.94 | 30.0 | -36.94 | Pass |

**Table 7-18. Band 3 Conducted Power Spectral Density Measurements**




**Plot 7-109. Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 149)**

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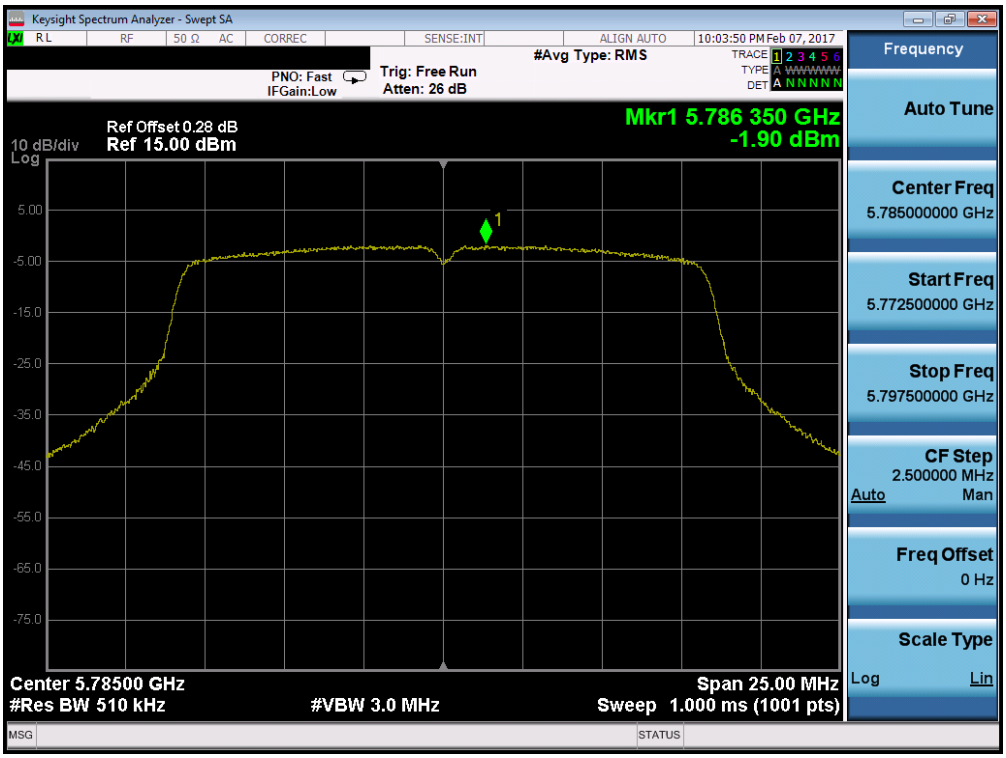
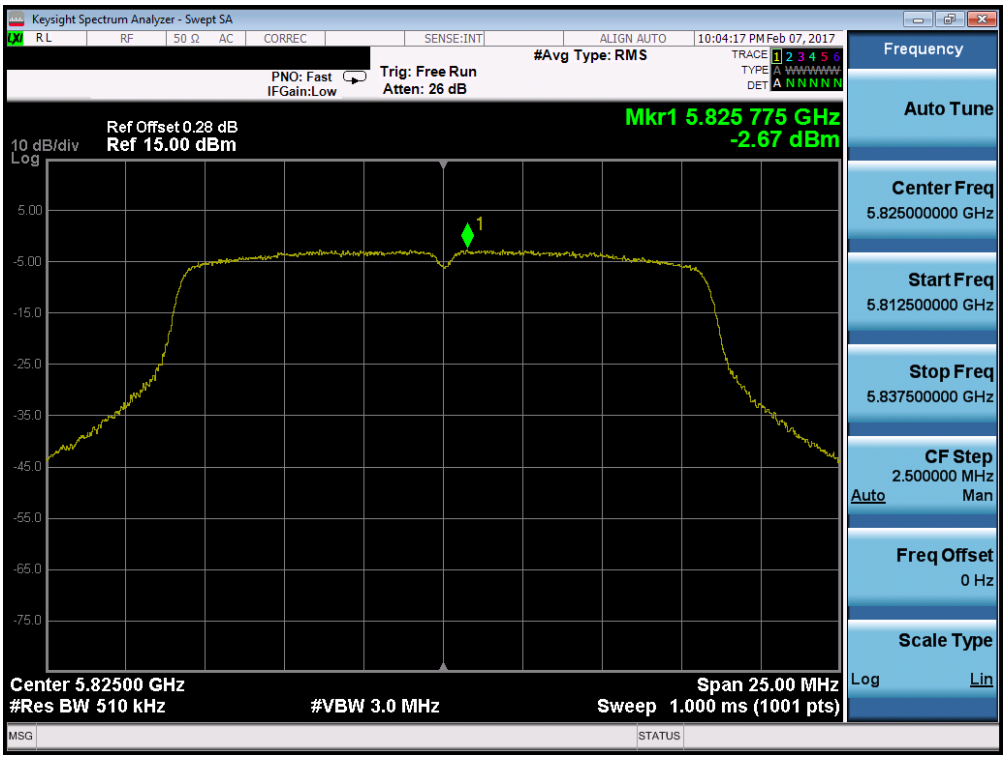



**Plot 7-110. Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 157)**




**Plot 7-111. Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 165)**



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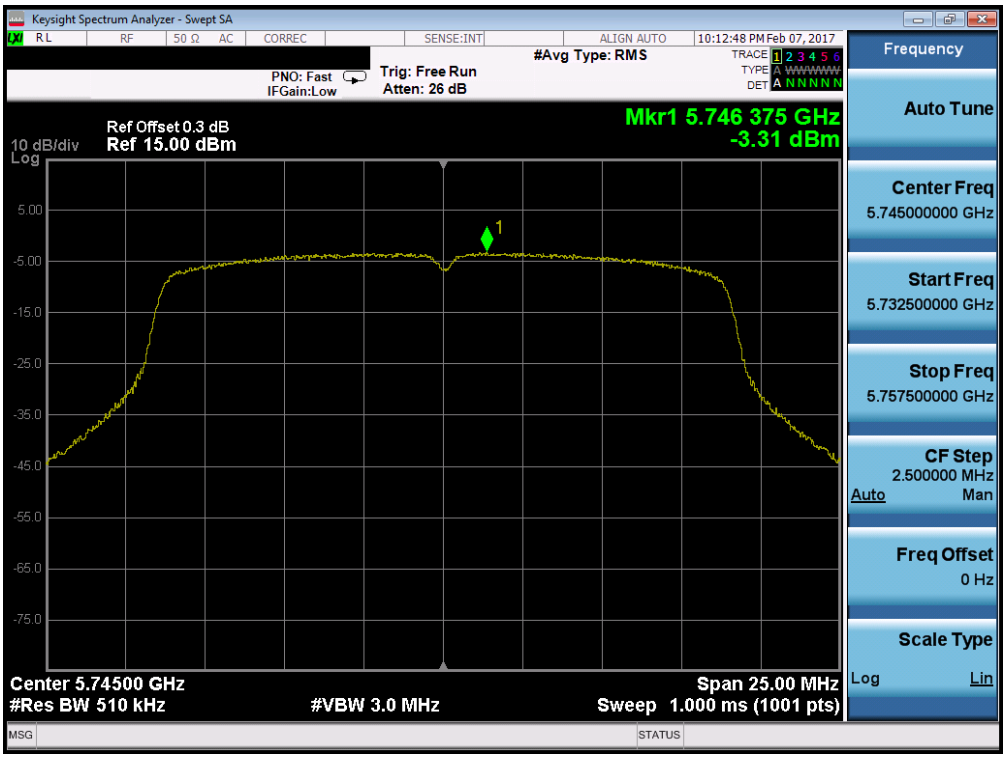
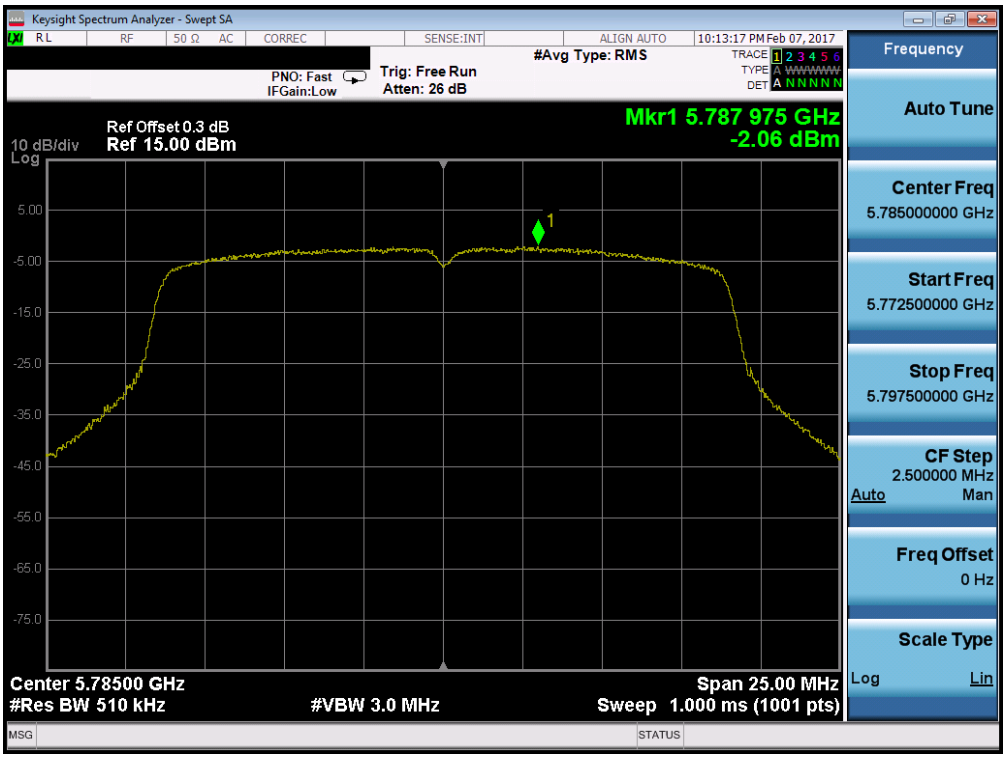



**Plot 7-112. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 149)**




**Plot 7-113. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 157)**

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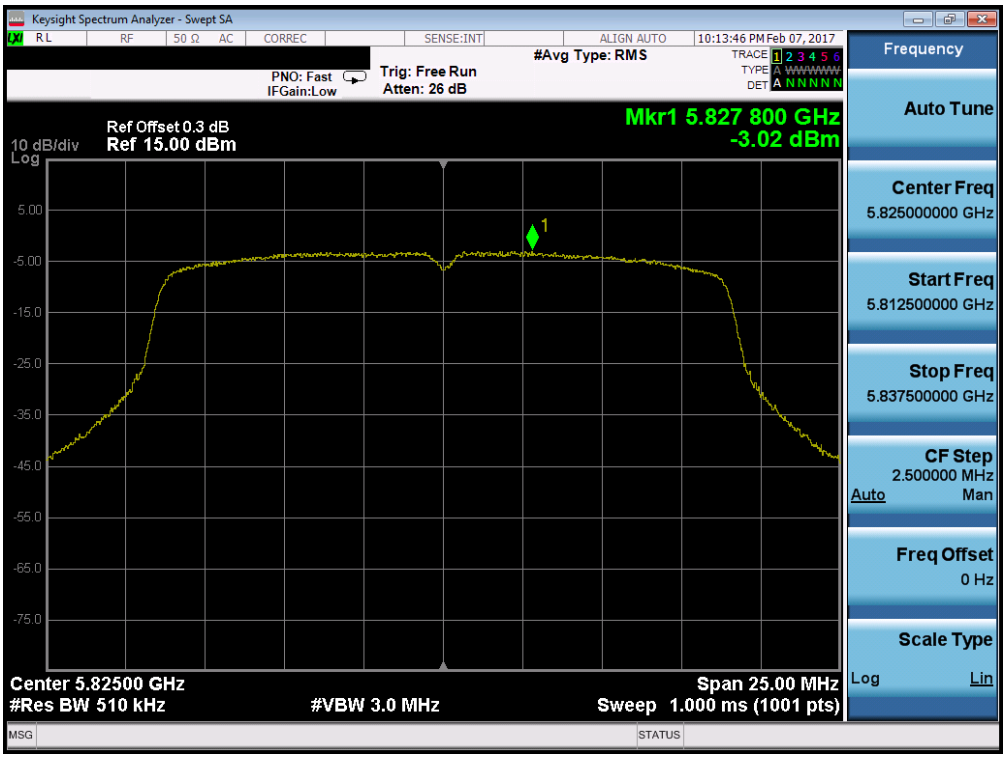
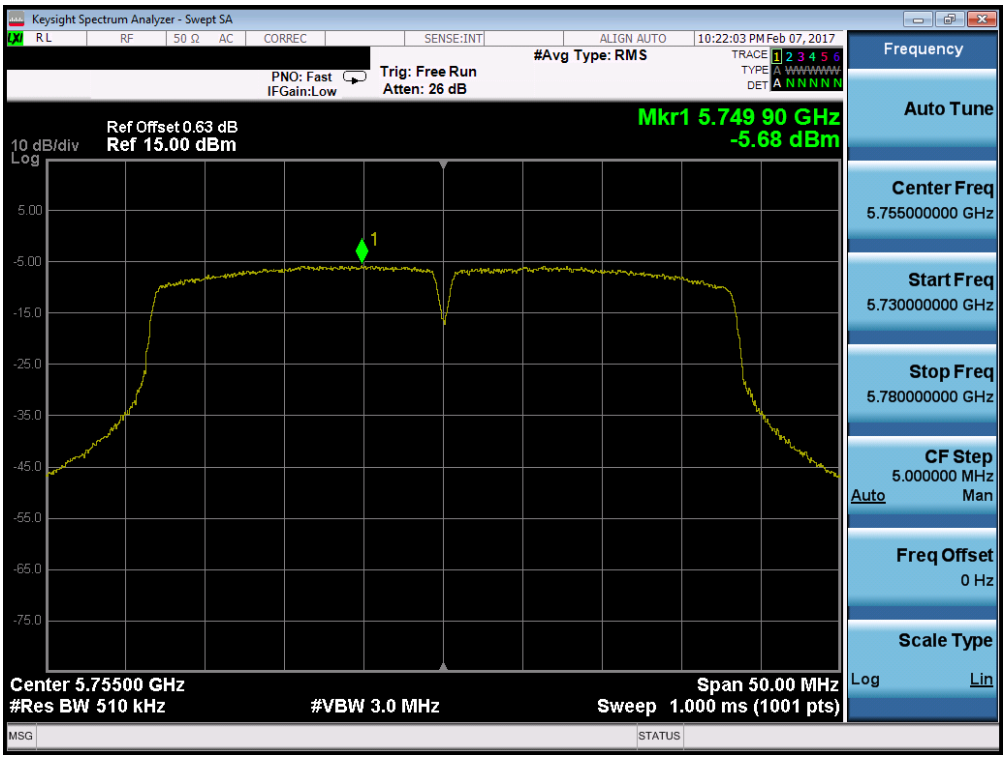



**Plot 7-114. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 165)**




**Plot 7-115. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 151)**



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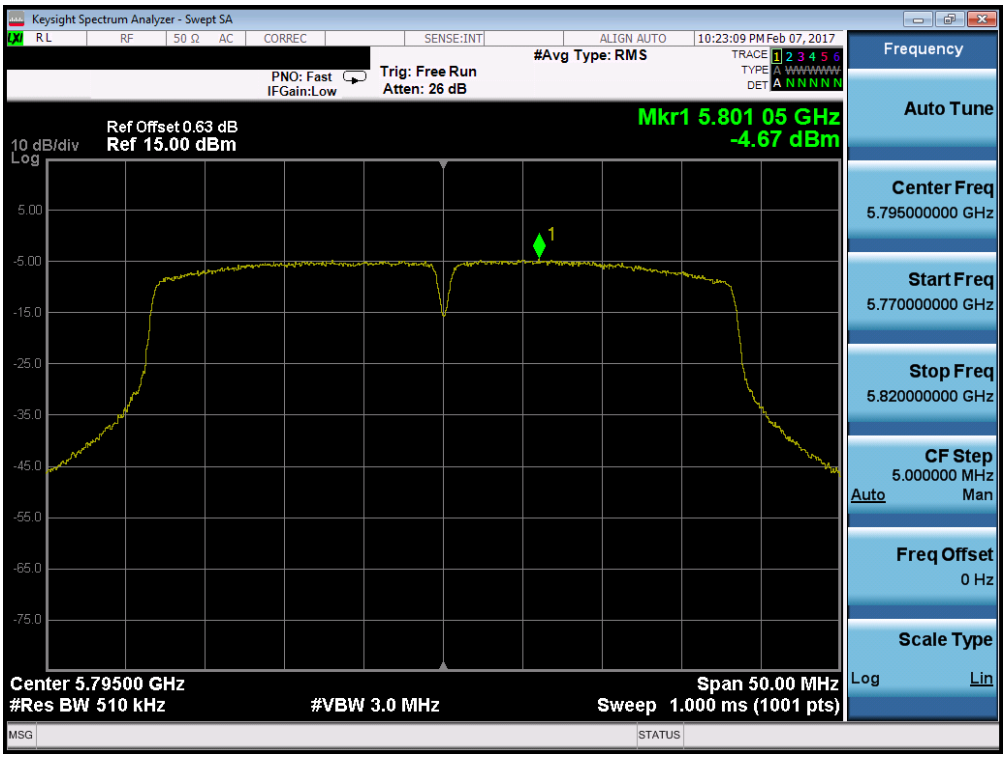
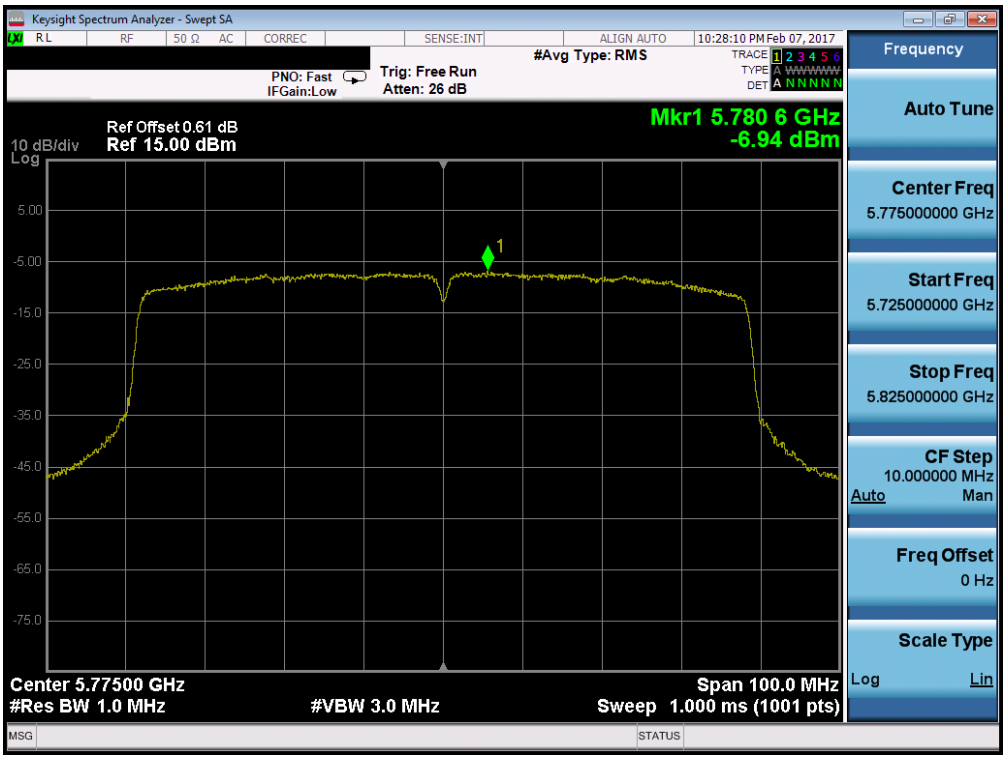



**Plot 7-116. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 159)**




**Plot 7-117. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 3) – Ch. 155)**

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## Antenna-2 Power Spectral Density Measurements

| | Frequency [MHz] | Channel No. | 802.11 Mode | Data Rate [Mbps] | Measured Power Density [dBm] | Max Permissible Power Density [dBm/MHz] | Margin [dB] | Pass / Fail |
|---|---|---|---|---|---|---|---|---|
| Band 1 | 5180 | 36 | a | 6 | -0.26 | 11.0 | -11.26 | Pass |
| | 5200 | 40 | a | 6 | -0.48 | 11.0 | -11.48 | Pass |
| | 5240 | 48 | a | 6 | -0.12 | 11.0 | -11.12 | Pass |
| | 5180 | 36 | n (20MHz) | 6.5/7.2 (MCS0) | -1.76 | 11.0 | -12.76 | Pass |
| | 5200 | 40 | n (20MHz) | 6.5/7.2 (MCS0) | -1.79 | 11.0 | -12.79 | Pass |
| | 5240 | 48 | n (20MHz) | 6.5/7.2 (MCS0) | -1.54 | 11.0 | -12.54 | Pass |
| | 5190 | 38 | n (40MHz) | 13.5/15 (MCS0) | -3.17 | 11.0 | -14.17 | Pass |
| | 5230 | 46 | n (40MHz) | 13.5/15 (MCS0) | -2.08 | 11.0 | -13.08 | Pass |
| | 5210 | 42 | ac (80MHz) | 29.3/32.5 (MCS0) | -6.81 | 11.0 | -17.81 | Pass |
| Band 2A | 5260 | 52 | a | 6 | -0.48 | 11.0 | -11.48 | Pass |
| | 5280 | 56 | a | 6 | -0.72 | 11.0 | -11.72 | Pass |
| | 5320 | 64 | a | 6 | -0.94 | 11.0 | -11.94 | Pass |
| | 5260 | 52 | n (20MHz) | 6.5/7.2 (MCS0) | -1.83 | 11.0 | -12.83 | Pass |
| | 5280 | 56 | n (20MHz) | 6.5/7.2 (MCS0) | -1.06 | 11.0 | -12.06 | Pass |
| | 5320 | 64 | n (20MHz) | 6.5/7.2 (MCS0) | -0.94 | 11.0 | -11.94 | Pass |
| | 5270 | 54 | n (40MHz) | 13.5/15 (MCS0) | -3.45 | 11.0 | -14.45 | Pass |
| | 5310 | 62 | n (40MHz) | 13.5/15 (MCS0) | -3.25 | 11.0 | -14.25 | Pass |
| | 5290 | 58 | ac (80MHz) | 29.3/32.5 (MCS0) | -7.20 | 11.0 | -18.20 | Pass |
| Band 2C | 5500 | 100 | a | 6 | -0.33 | 11.0 | -11.33 | Pass |
| | 5600 | 120 | a | 6 | -0.37 | 11.0 | -11.37 | Pass |
| | 5720 | 144 | a | 6 | -0.46 | 11.0 | -11.46 | Pass |
| | 5500 | 100 | n (20MHz) | 6.5/7.2 (MCS0) | -0.74 | 11.0 | -11.74 | Pass |
| | 5600 | 120 | n (20MHz) | 6.5/7.2 (MCS0) | -0.80 | 11.0 | -11.80 | Pass |
| | 5720 | 144 | n (20MHz) | 6.5/7.2 (MCS0) | -0.93 | 11.0 | -11.93 | Pass |
| | 5510 | 102 | n (40MHz) | 13.5/15 (MCS0) | -3.42 | 11.0 | -14.42 | Pass |
| | 5590 | 118 | n (40MHz) | 13.5/15 (MCS0) | -3.44 | 11.0 | -14.44 | Pass |
| | 5710 | 142 | n (40MHz) | 13.5/15 (MCS0) | -3.26 | 11.0 | -14.26 | Pass |
| | 5530 | 106 | ac (80MHz) | 29.3/32.5 (MCS0) | -6.96 | 11.0 | -17.96 | Pass |
| | 5610 | 122 | ac (80MHz) | 29.3/32.5 (MCS0) | -7.04 | 11.0 | -18.04 | Pass |
| | 5690 | 138 | ac (80MHz) | 29.3/32.5 (MCS0) | -10.09 | 11.0 | -21.09 | Pass |

**Table 7-19. Conducted Power Spectral Density Measurements**




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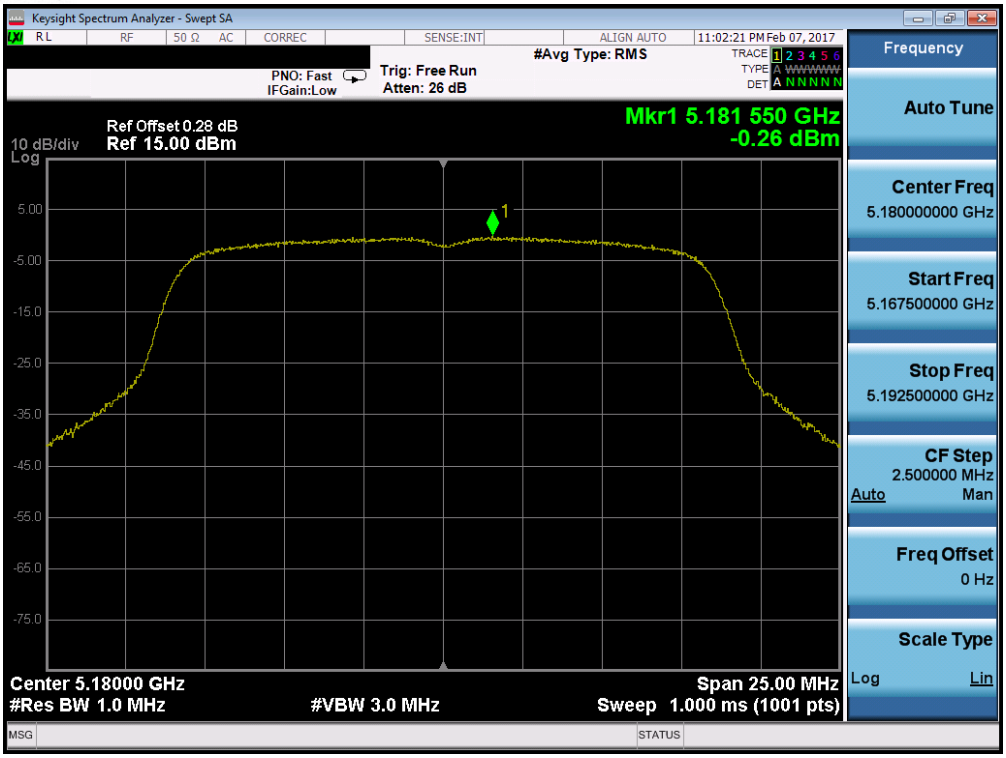
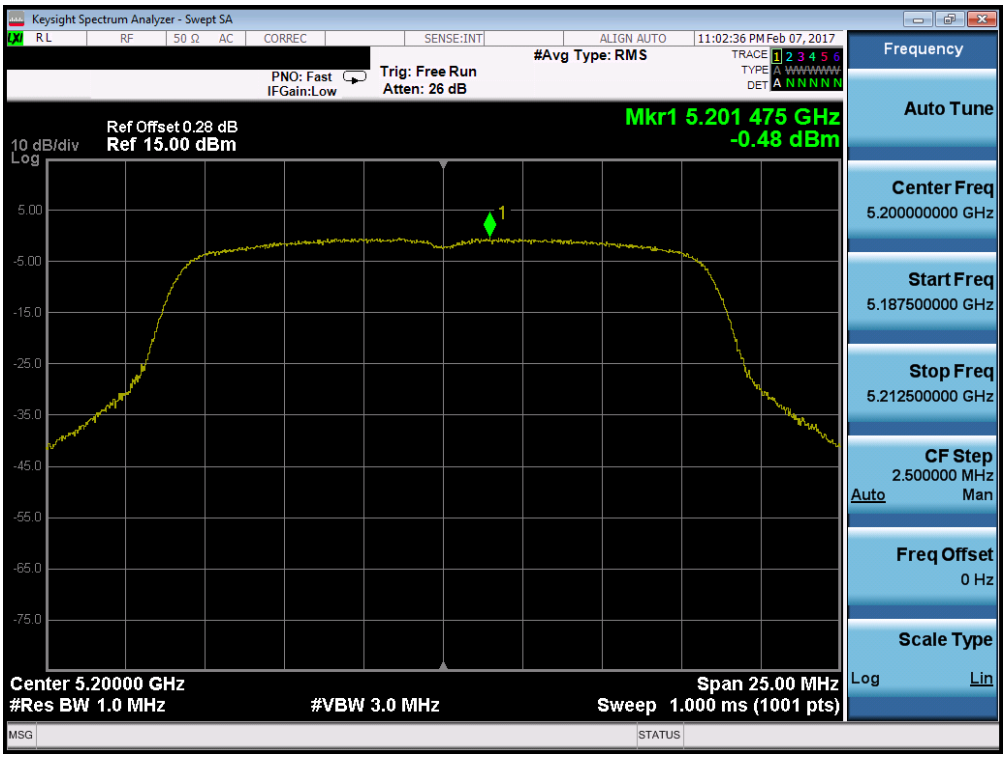



**Plot 7-118. Power Spectral Density Plot (802.11a (UNII Band 1) – Ch. 36)**




**Plot 7-119. Power Spectral Density Plot (802.11a (UNII Band 1) – Ch. 40)**

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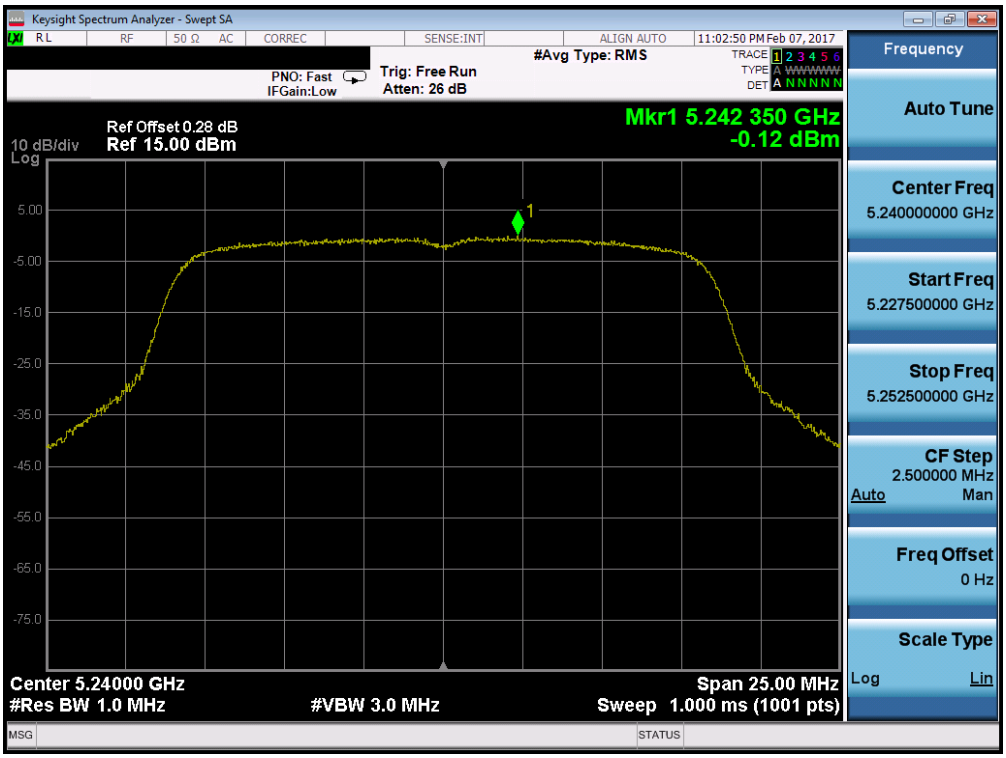
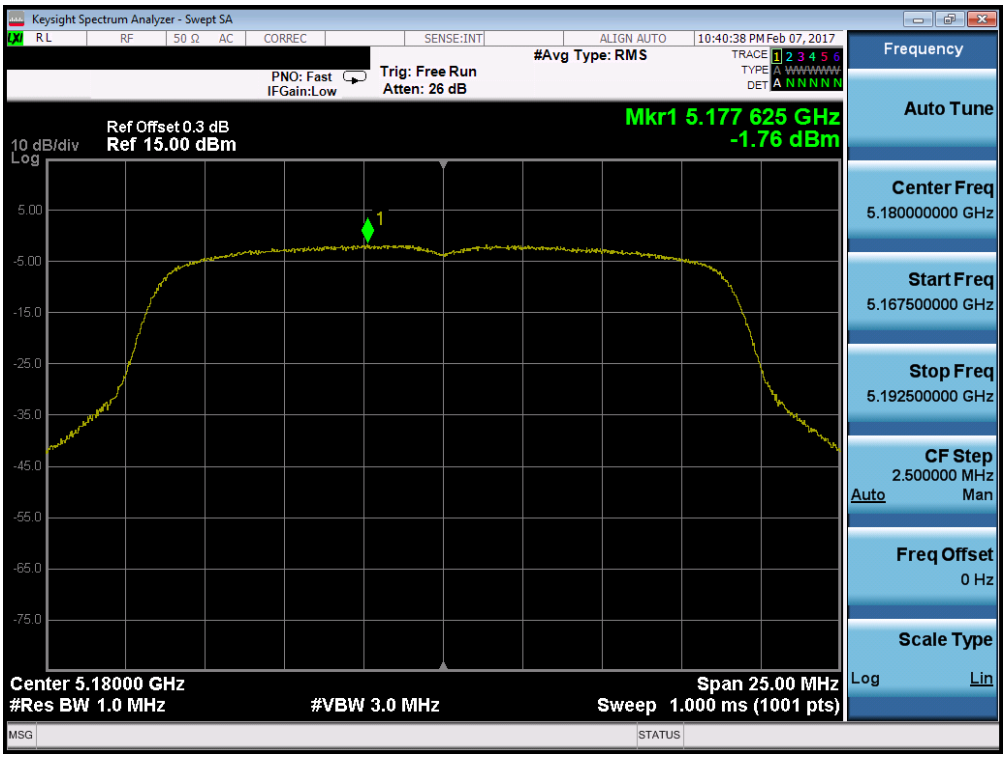



**Plot 7-120. Power Spectral Density Plot (802.11a (UNII Band 1) – Ch. 48)**




**Plot 7-121. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 36)**

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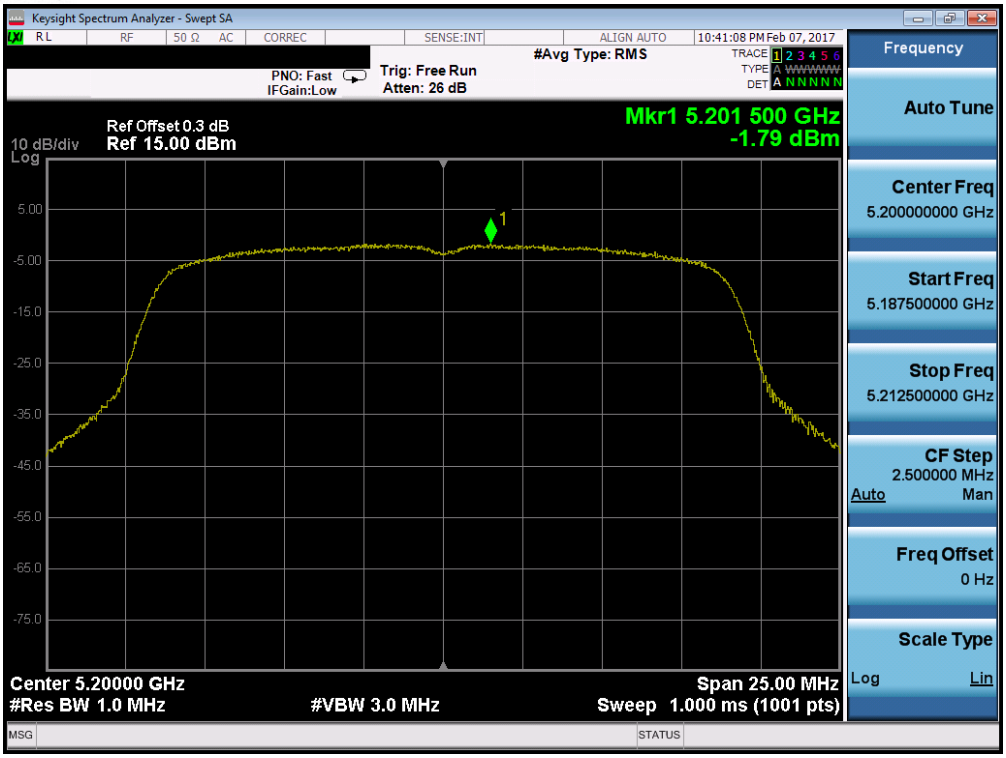
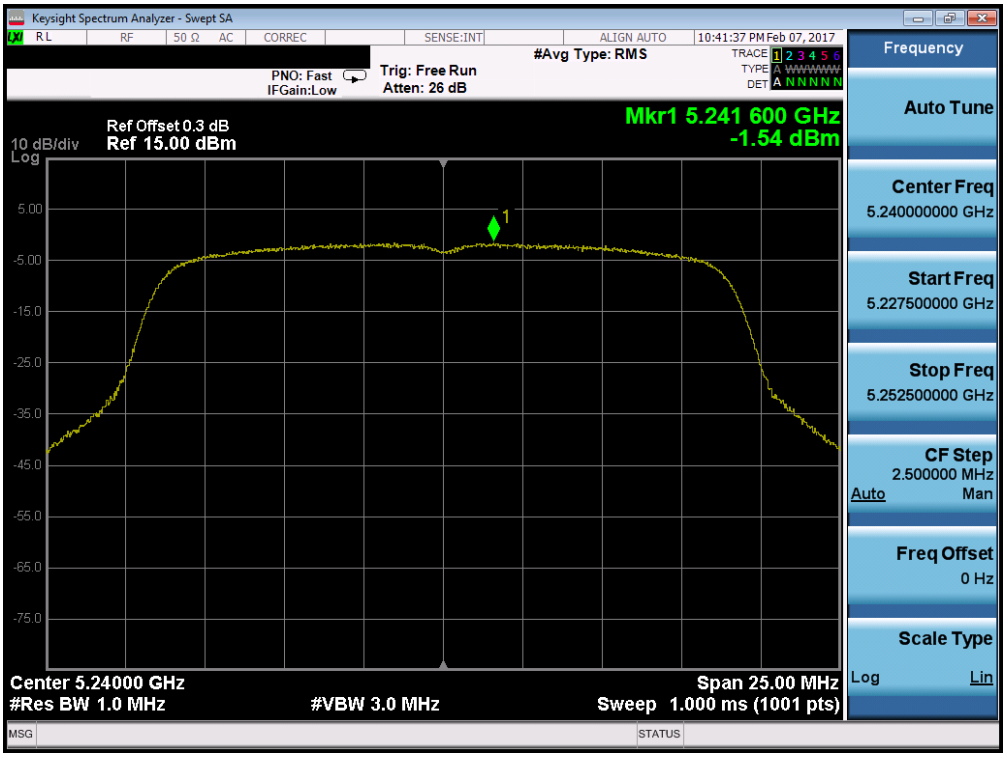



**Plot 7-122. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 40)**




**Plot 7-123. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 48)**

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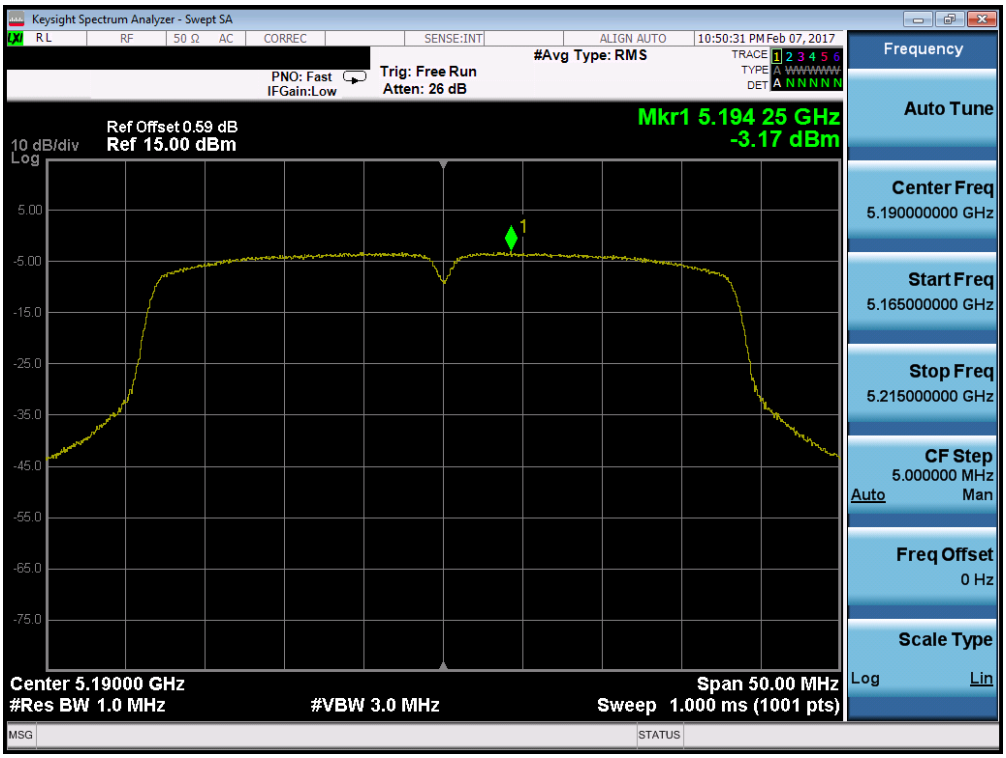
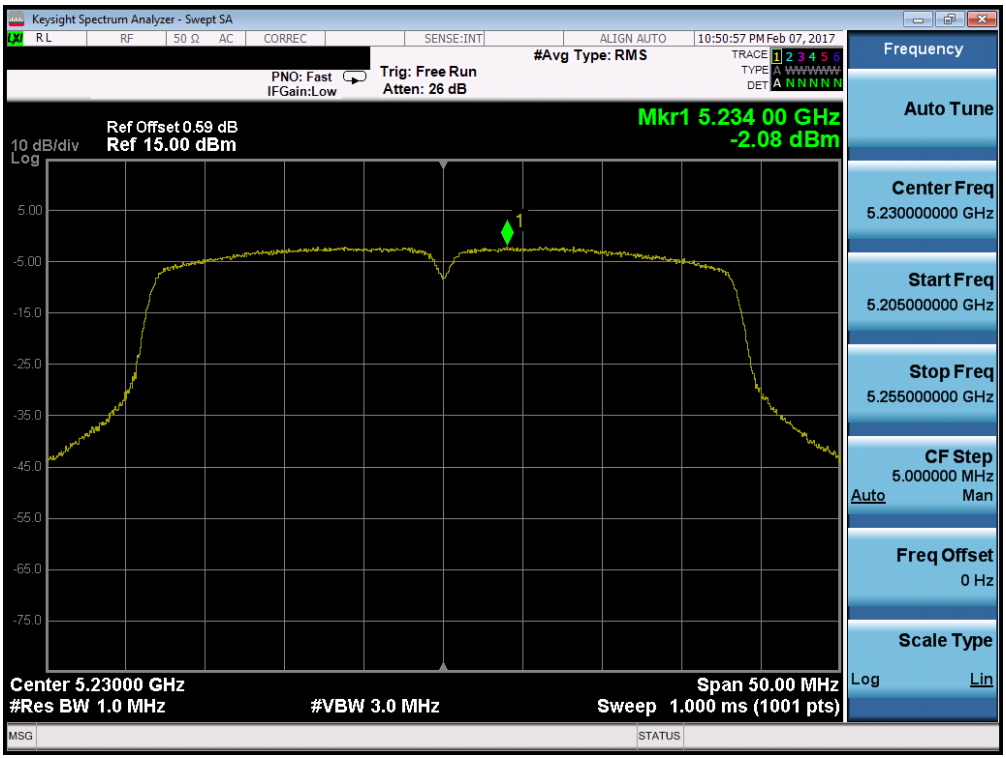



**Plot 7-124. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 1) – Ch. 38)**




**Plot 7-125. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 1) – Ch. 46)**

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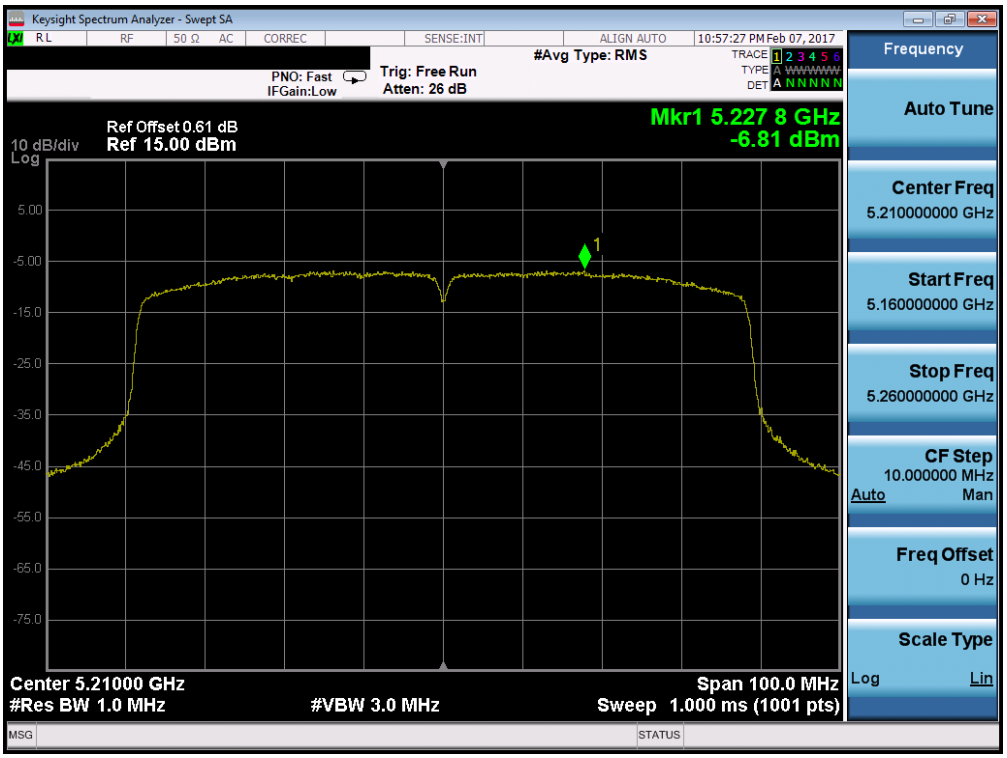
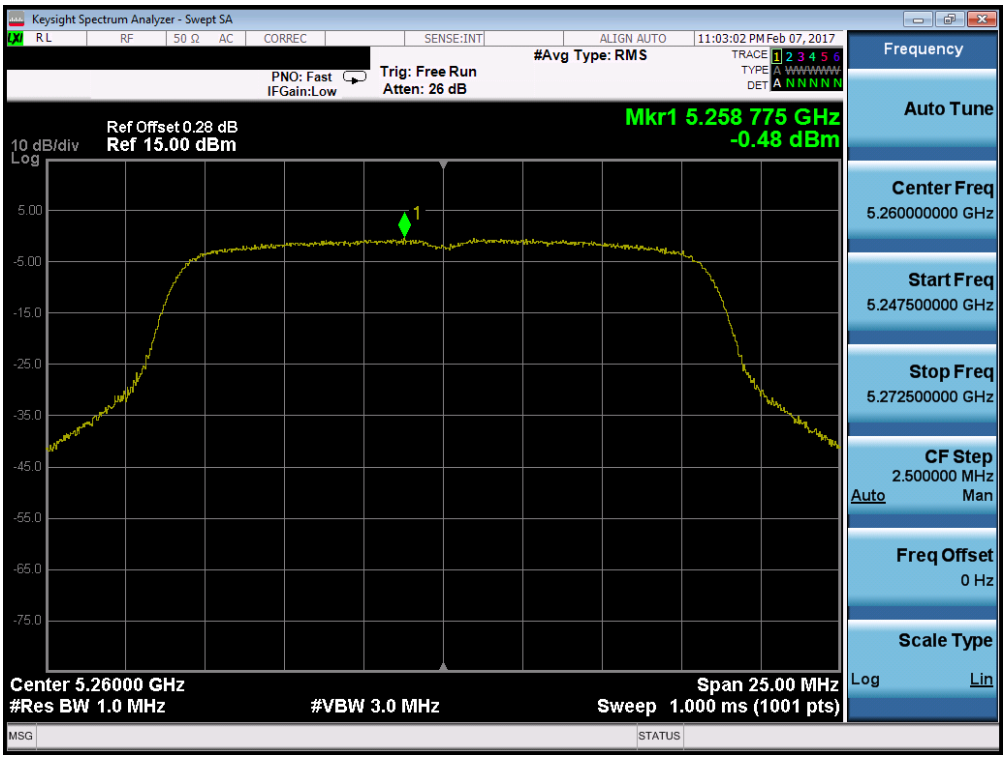



**Plot 7-126. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 1) – Ch. 42)**




**Plot 7-127. Power Spectral Density Plot (802.11a (UNII Band 2A) – Ch. 52)**

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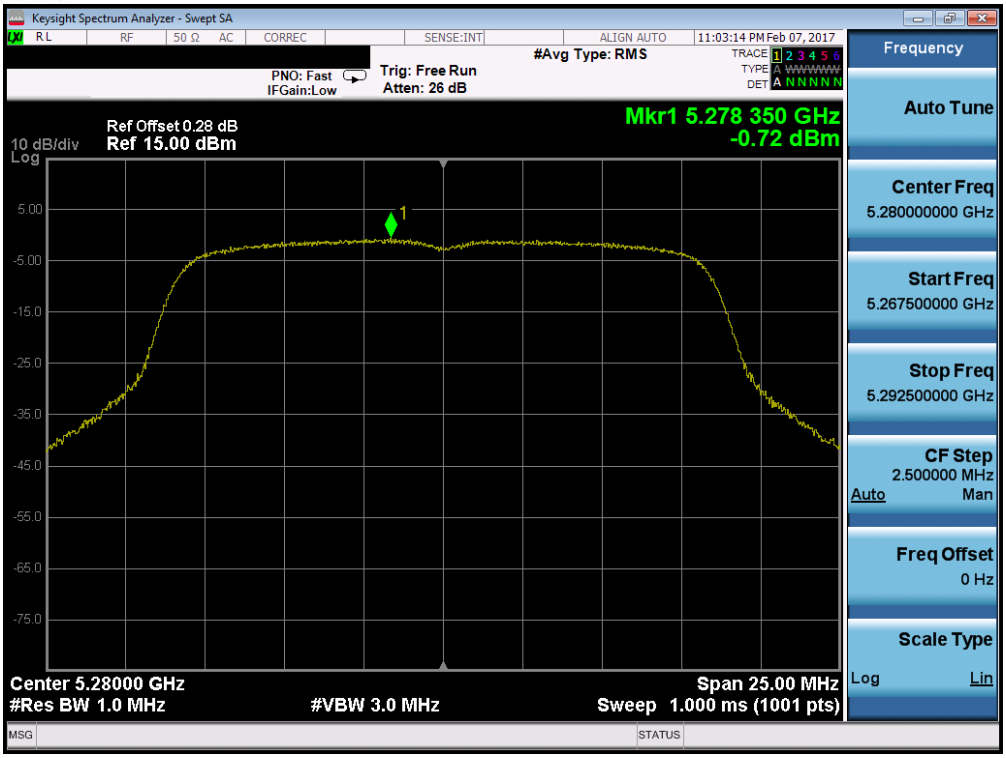
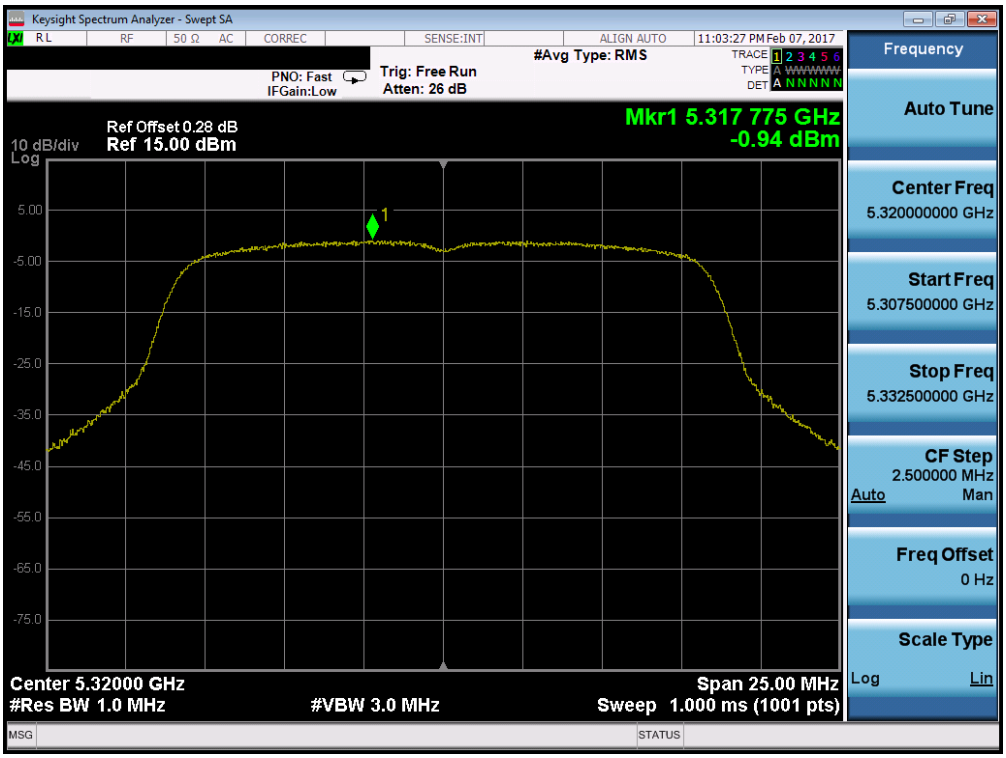



**Plot 7-128. Power Spectral Density Plot (802.11a (UNII Band 2A) – Ch. 56)**




**Plot 7-129. Power Spectral Density Plot (802.11a (UNII Band 2A) – Ch. 64)**

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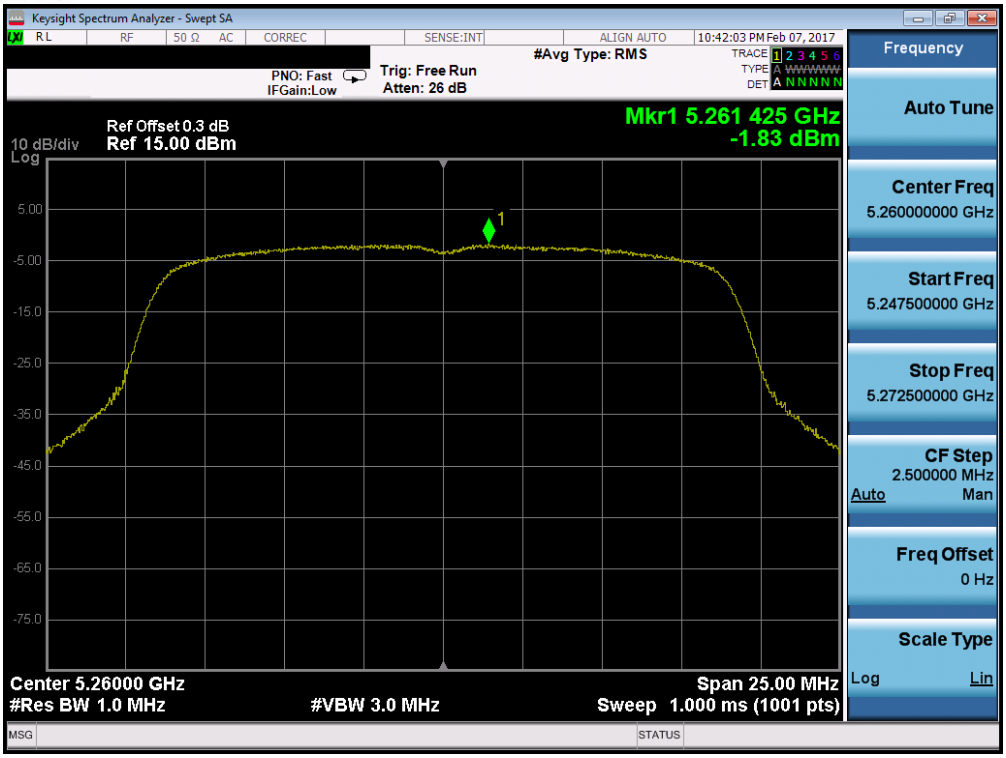
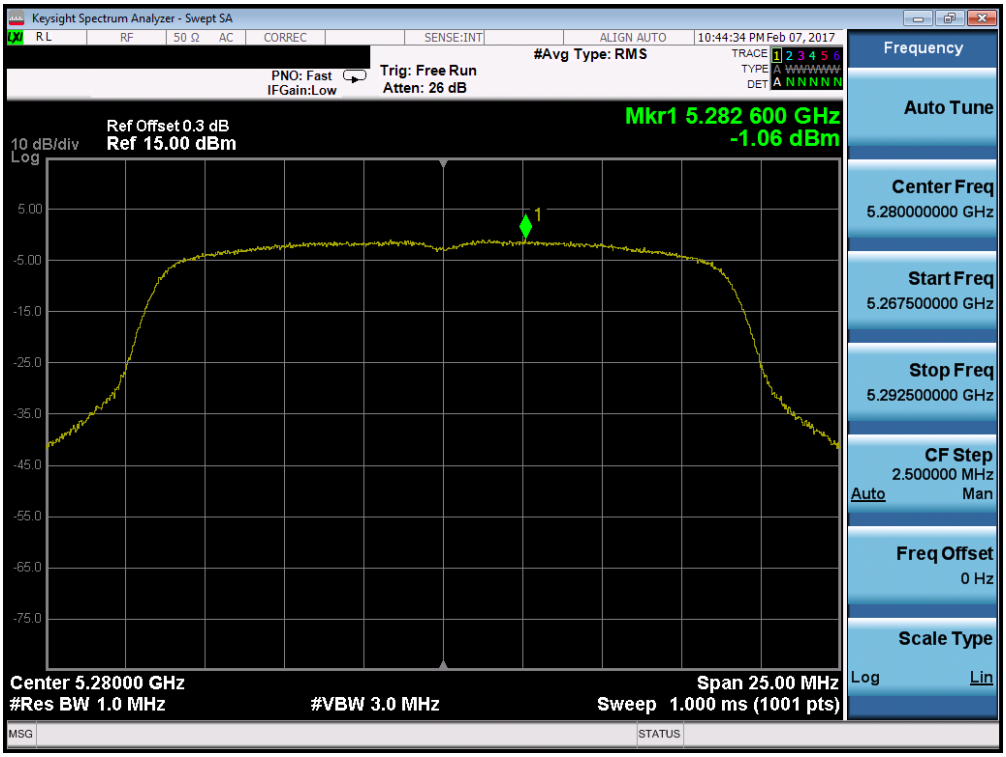



**Plot 7-130. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 52)**




**Plot 7-131. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 56)**



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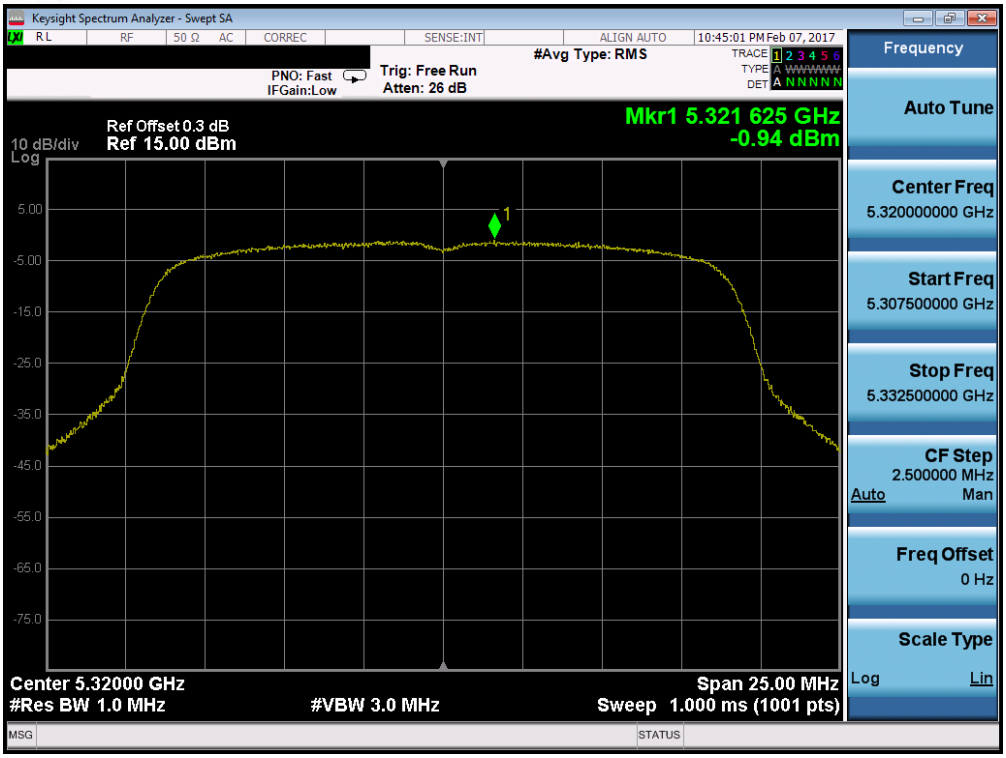
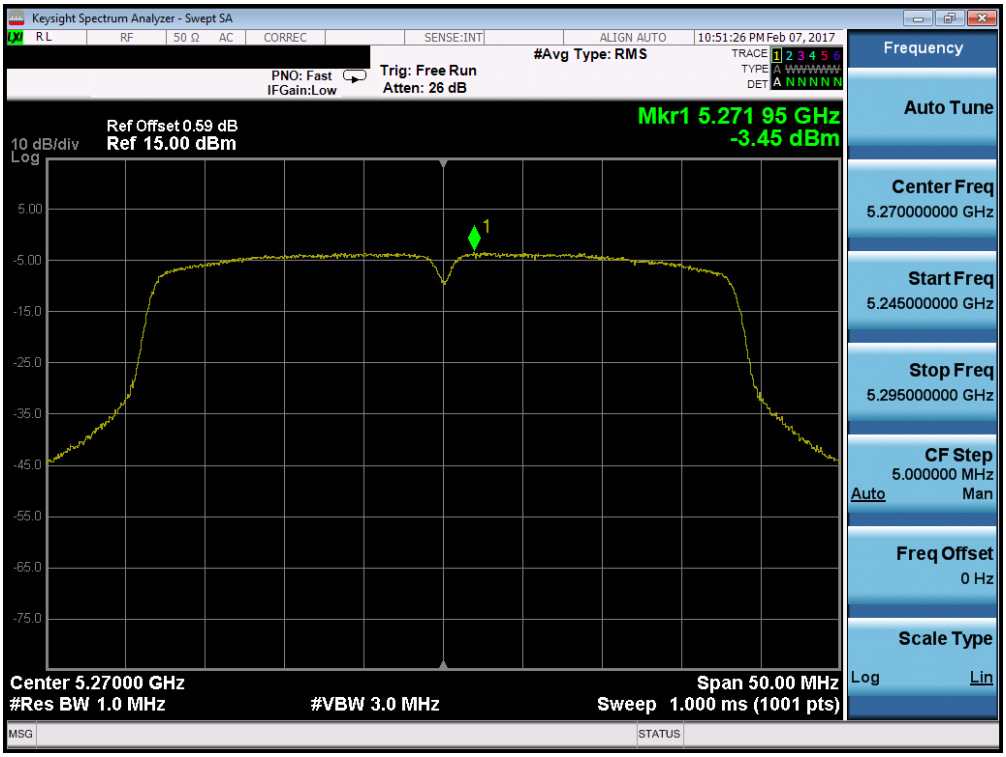



**Plot 7-132. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 64)**




**Plot 7-133. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2A) – Ch. 54)**

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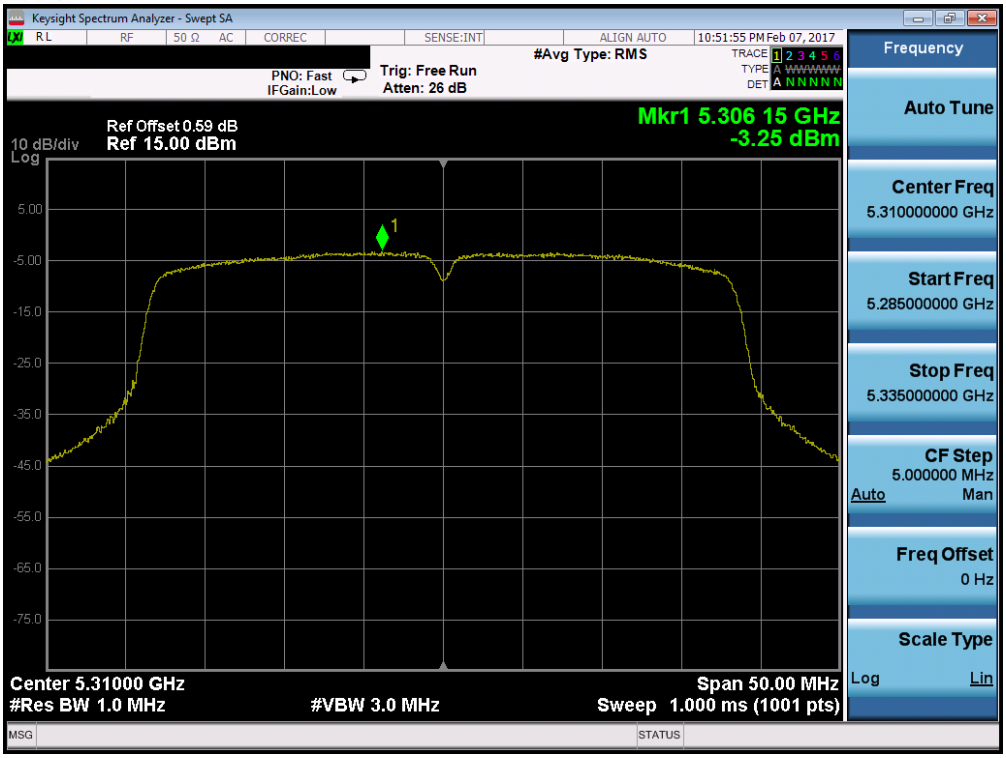
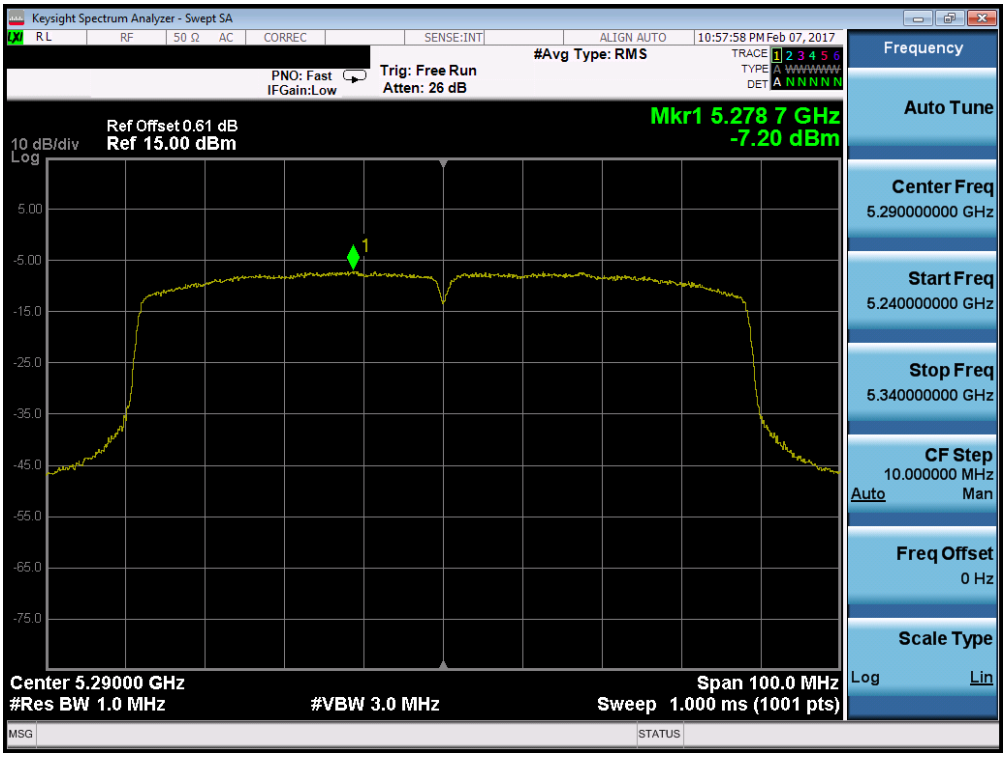



**Plot 7-134. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2A) – Ch. 62)**




**Plot 7-135. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2A) – Ch. 58)**

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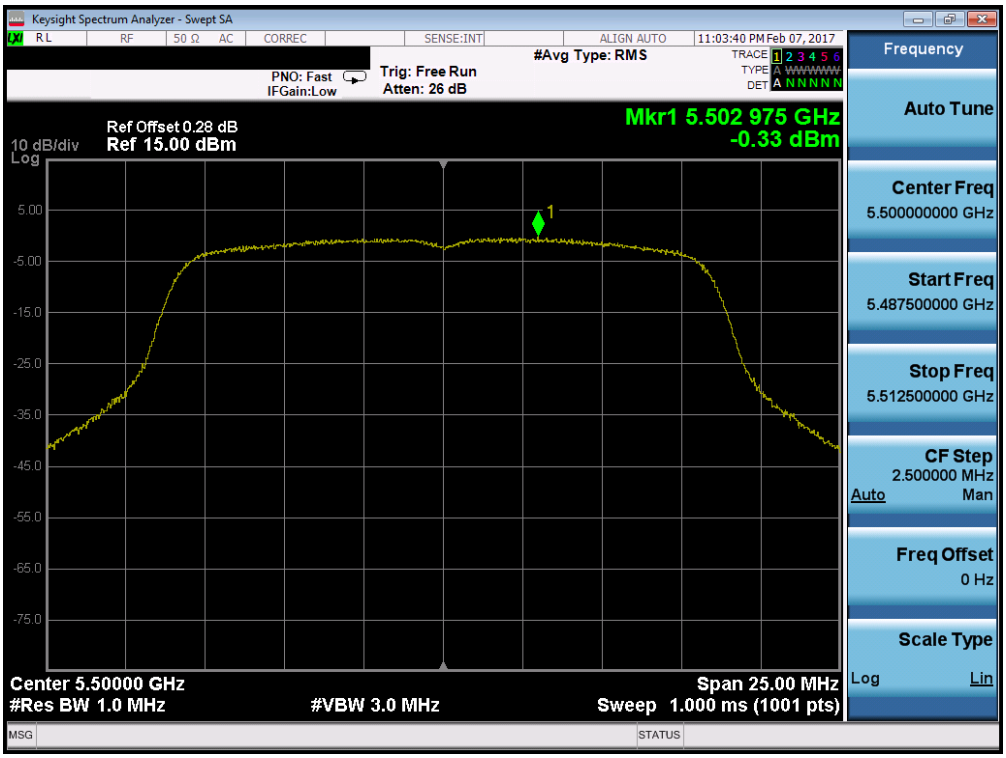
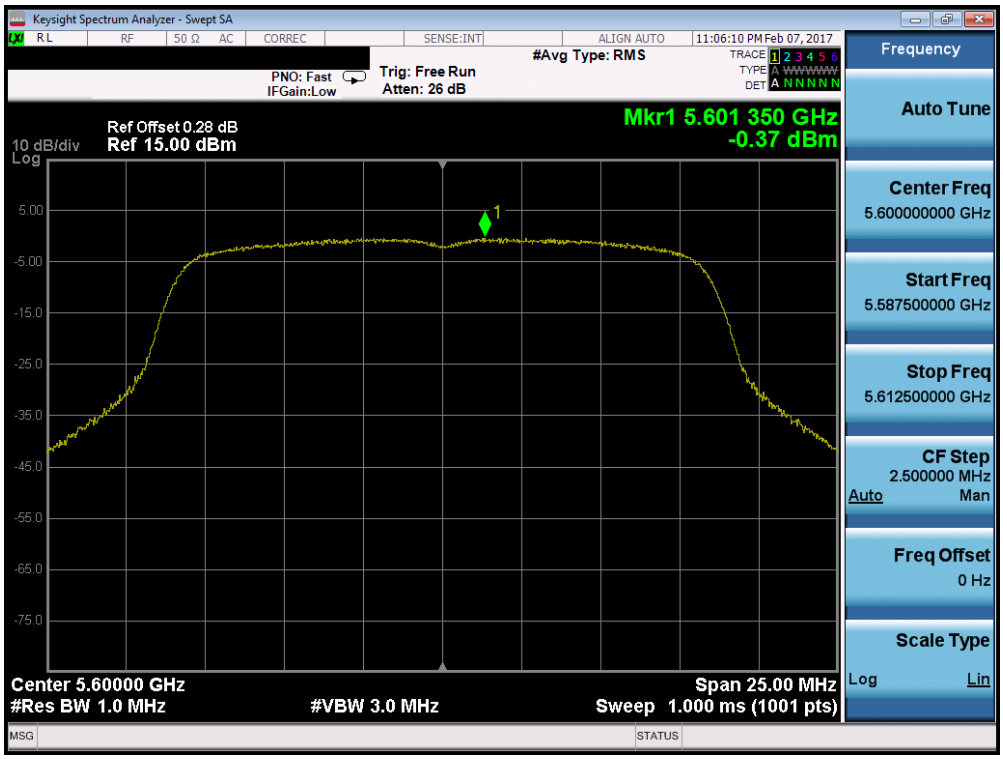



**Plot 7-136. Power Spectral Density Plot (802.11a (UNII Band 2C) – Ch. 100)**




**Plot 7-137. Power Spectral Density Plot (802.11a (UNII Band 2C) – Ch. 120)**

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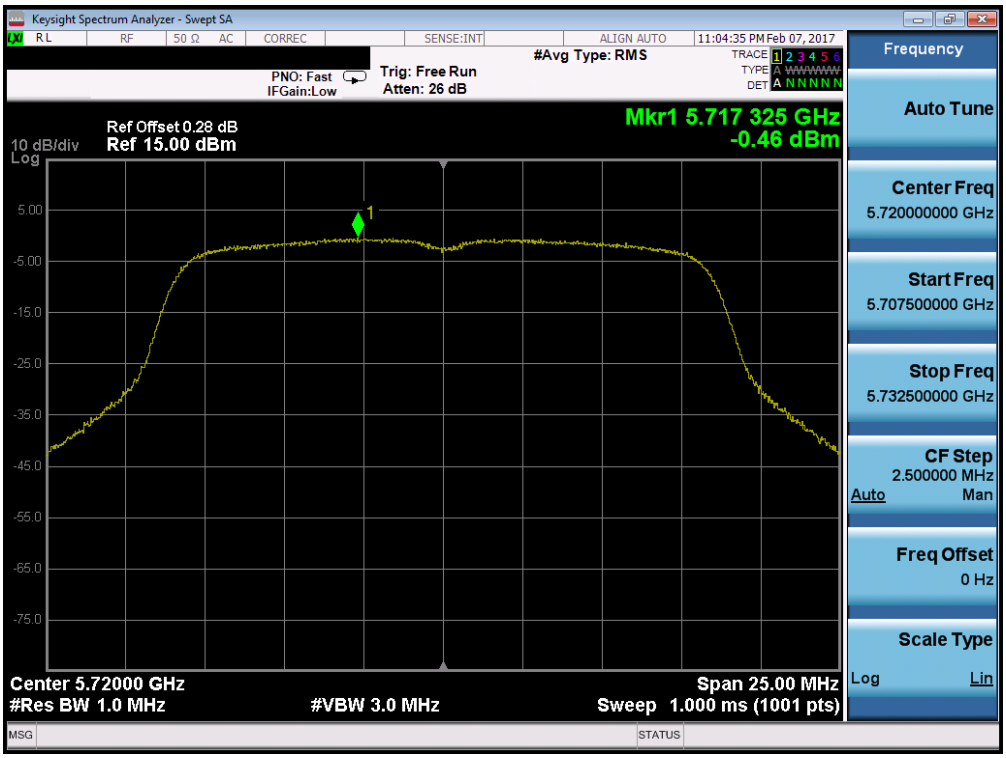
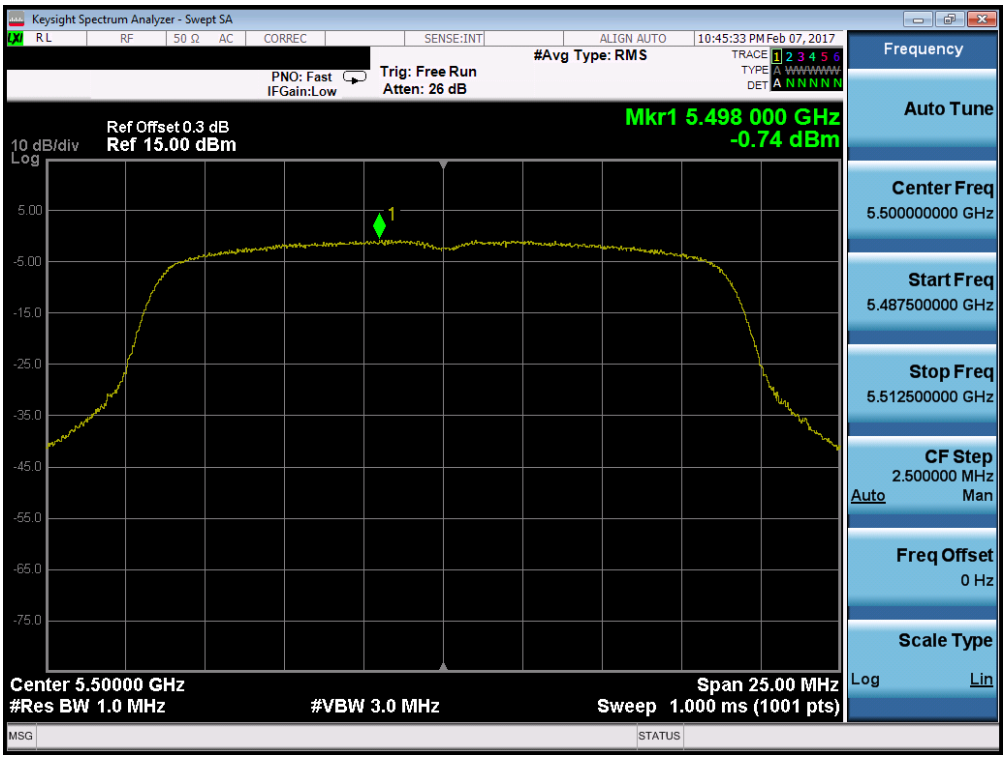



**Plot 7-138. Power Spectral Density Plot (802.11a (UNII Band 2C) – Ch. 144)**




**Plot 7-139. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 100)**

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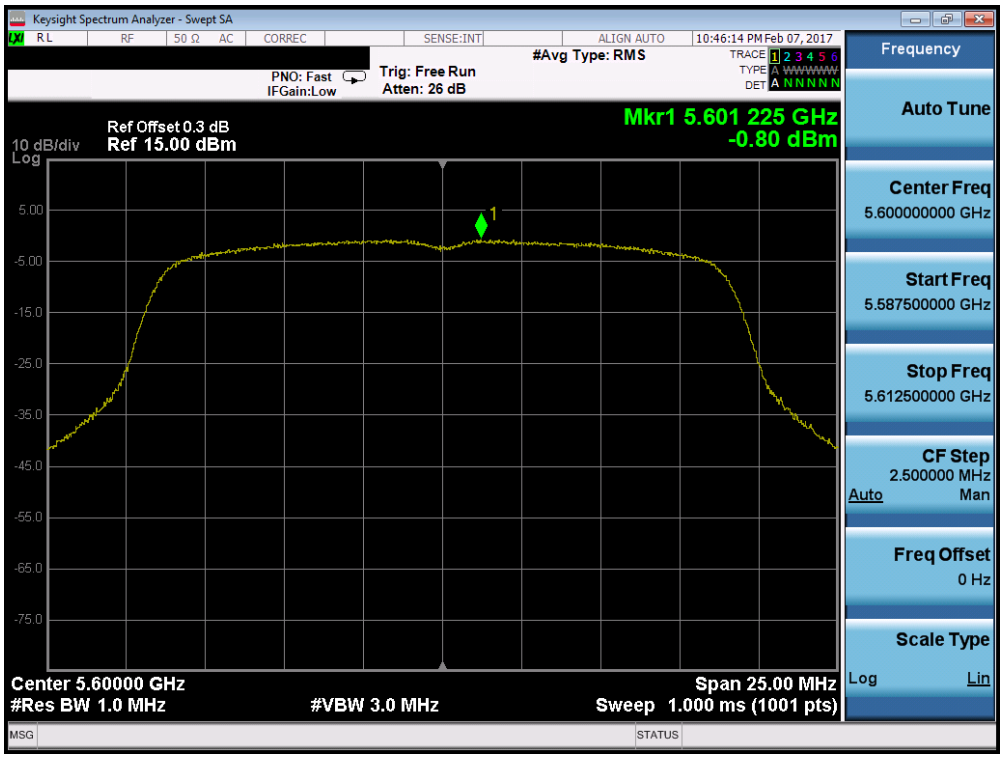
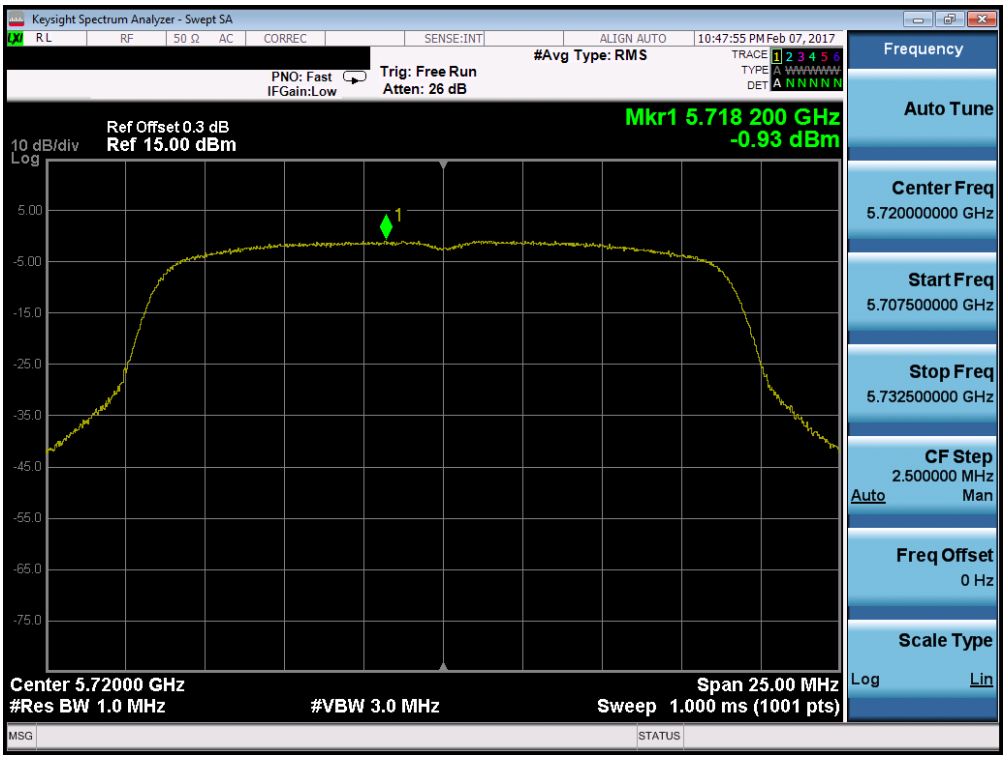



**Plot 7-140. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 120)**




**Plot 7-141. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 144)**

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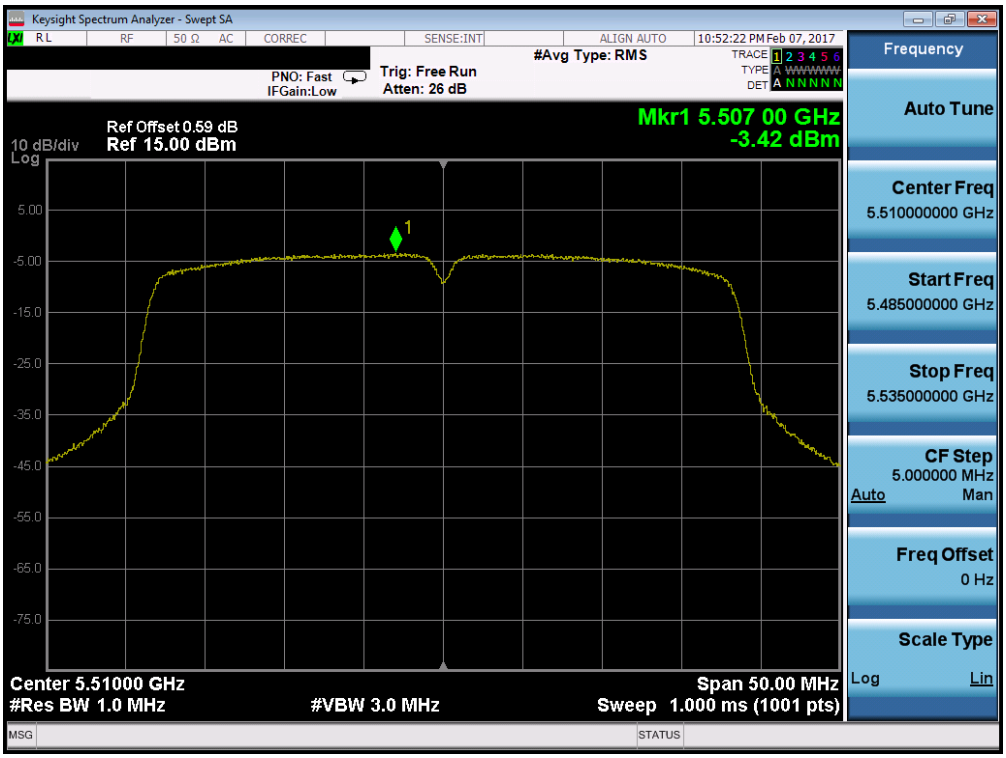
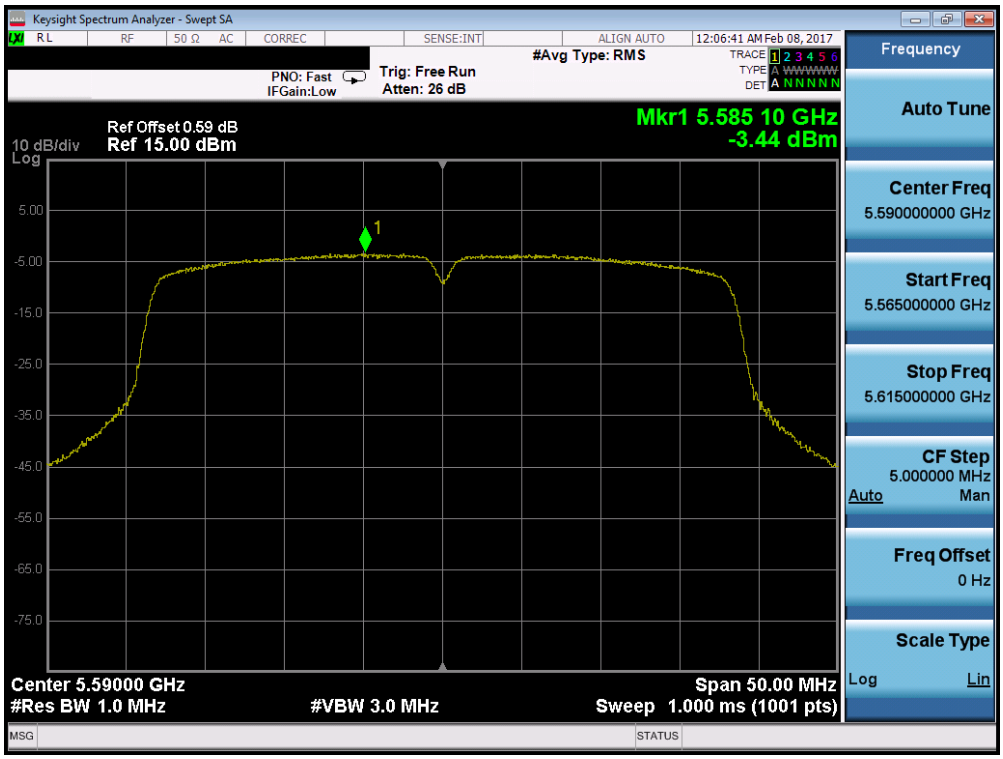



**Plot 7-142. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 102)**




**Plot 7-143. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 118)**

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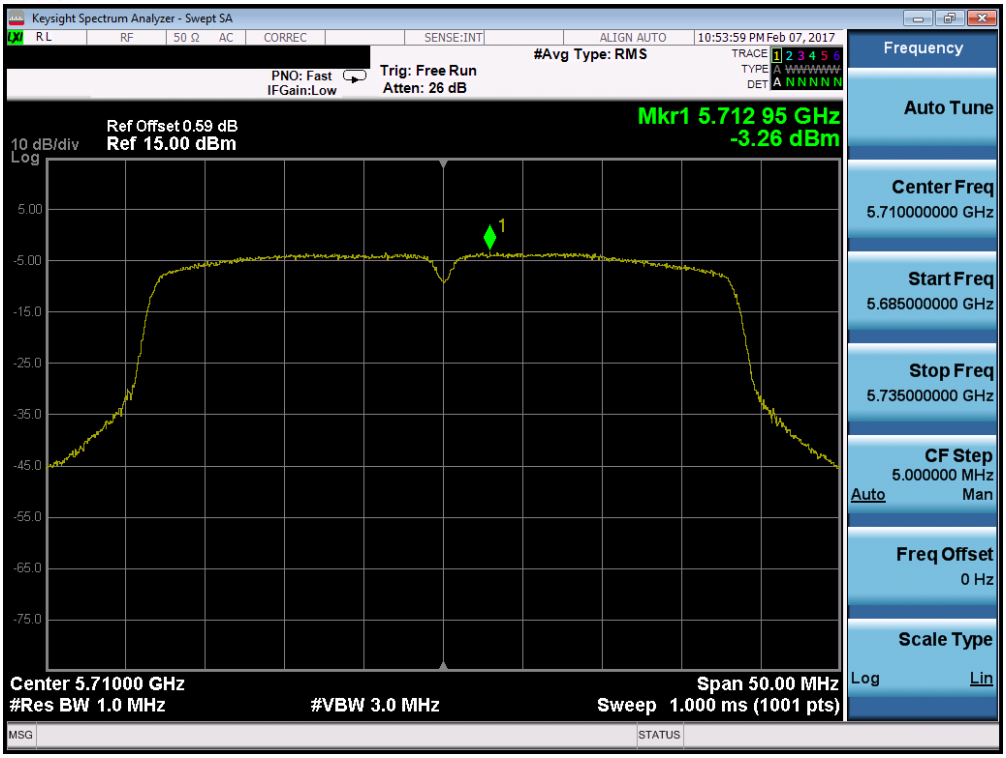
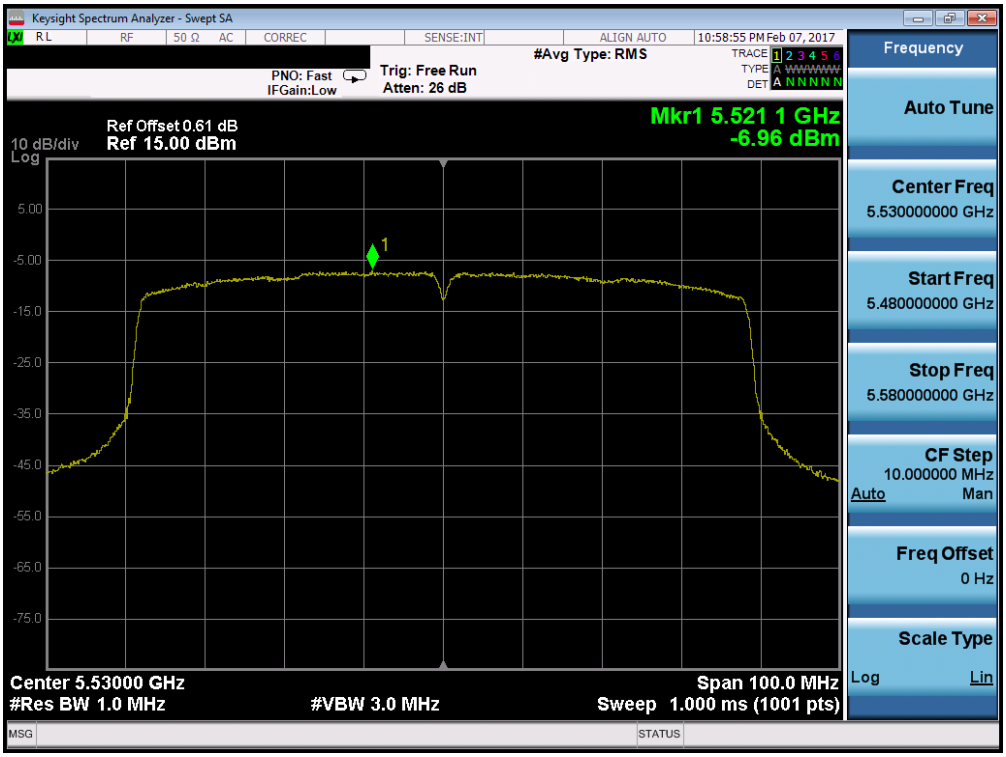



**Plot 7-144. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 142)**




**Plot 7-145. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 106)**



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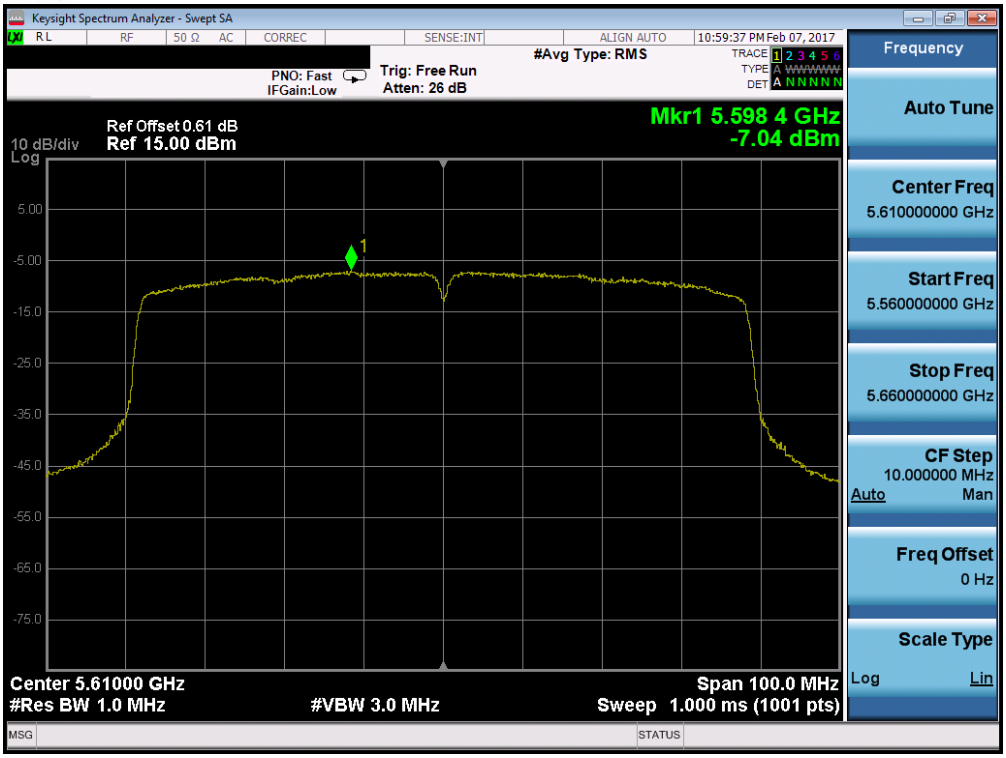
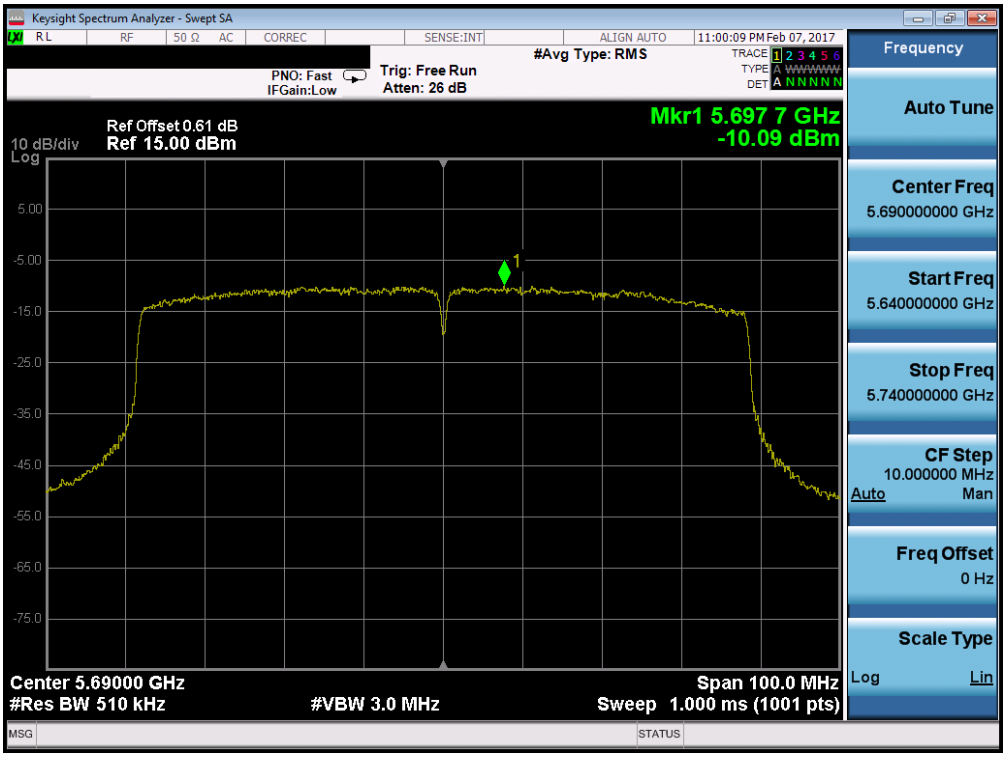



**Plot 7-146. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 122)**




**Plot 7-147. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 138)**

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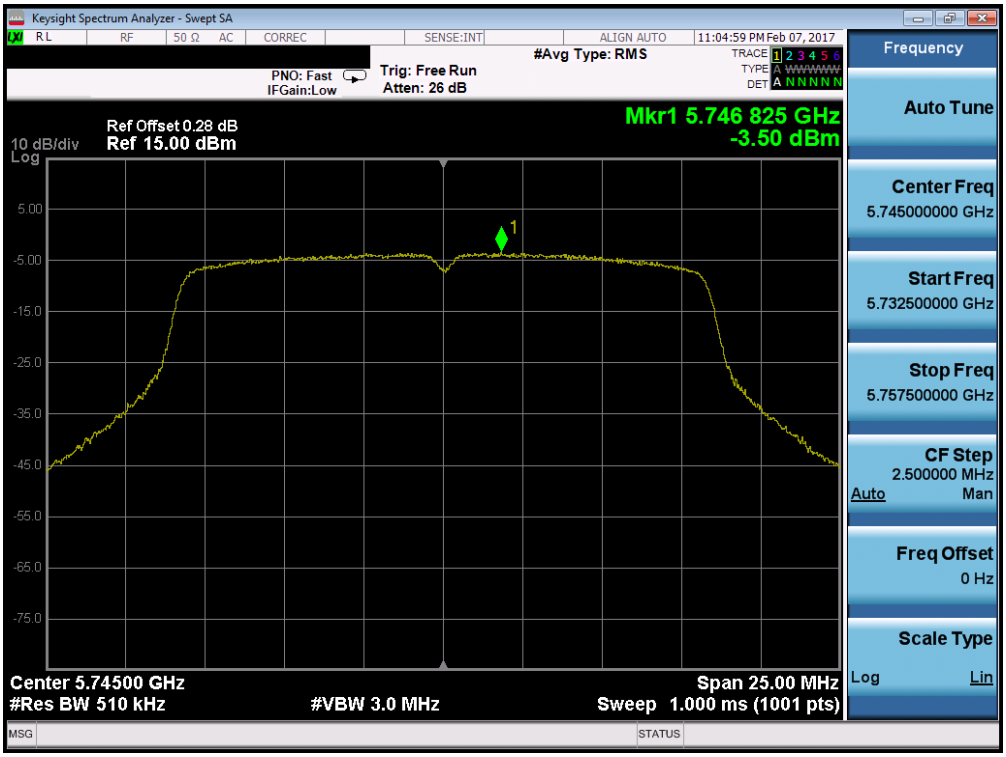
| | Frequency [MHz] | Channel No. | 802.11 Mode | Data Rate [Mbps] | Measured Power Density [dBm] | Max Permissible Power Density [dBm/500kHz] | Margin [dB] | Pass / Fail |
|---|---|---|---|---|---|---|---|---|
| Band 3 | 5745 | 149 | a | 6 | -3.50 | 30.0 | -33.50 | Pass |
| | 5785 | 157 | a | 6 | -2.72 | 30.0 | -32.72 | Pass |
| | 5825 | 165 | a | 6 | -3.48 | 30.0 | -33.48 | Pass |
| | 5745 | 149 | n (20MHz) | 6.5/7.2 (MCS0) | -3.72 | 30.0 | -33.72 | Pass |
| | 5785 | 157 | n (20MHz) | 6.5/7.2 (MCS0) | -3.10 | 30.0 | -33.10 | Pass |
| | 5825 | 165 | n (20MHz) | 6.5/7.2 (MCS0) | -3.72 | 30.0 | -33.72 | Pass |
| | 5755 | 151 | n (40MHz) | 13.5/15 (MCS0) | -6.29 | 30.0 | -36.29 | Pass |
| | 5795 | 159 | n (40MHz) | 13.5/15 (MCS0) | -5.85 | 30.0 | -35.85 | Pass |
| | 5775 | 155 | ac (80MHz) | 29.3/32.5 (MCS0) | -7.22 | 30.0 | -37.22 | Pass |

**Table 7-20. Band 3 Conducted Power Spectral Density Measurements**




**Plot 7-148. Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 149)**

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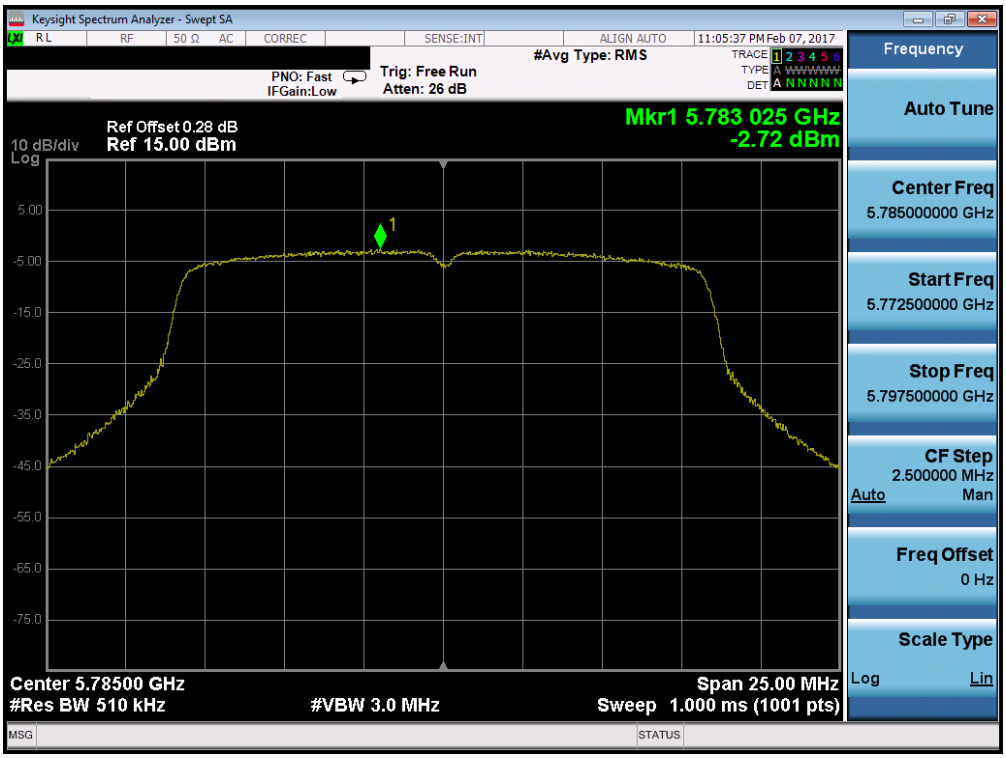
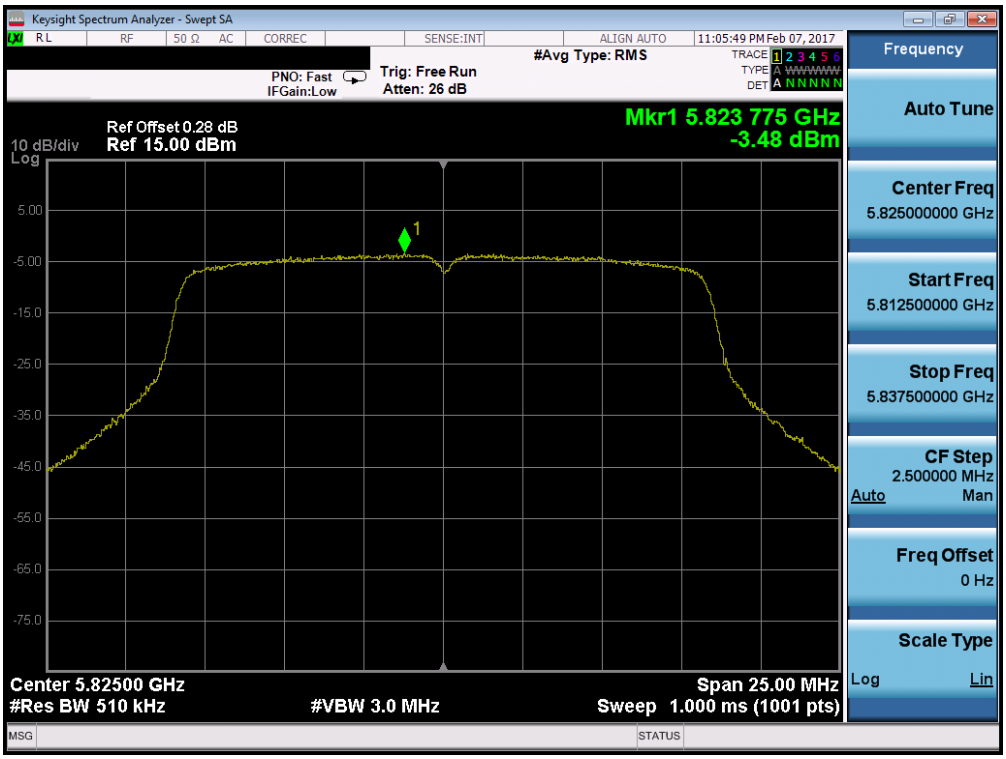



**Plot 7-149. Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 157)**




**Plot 7-150. Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 165)**



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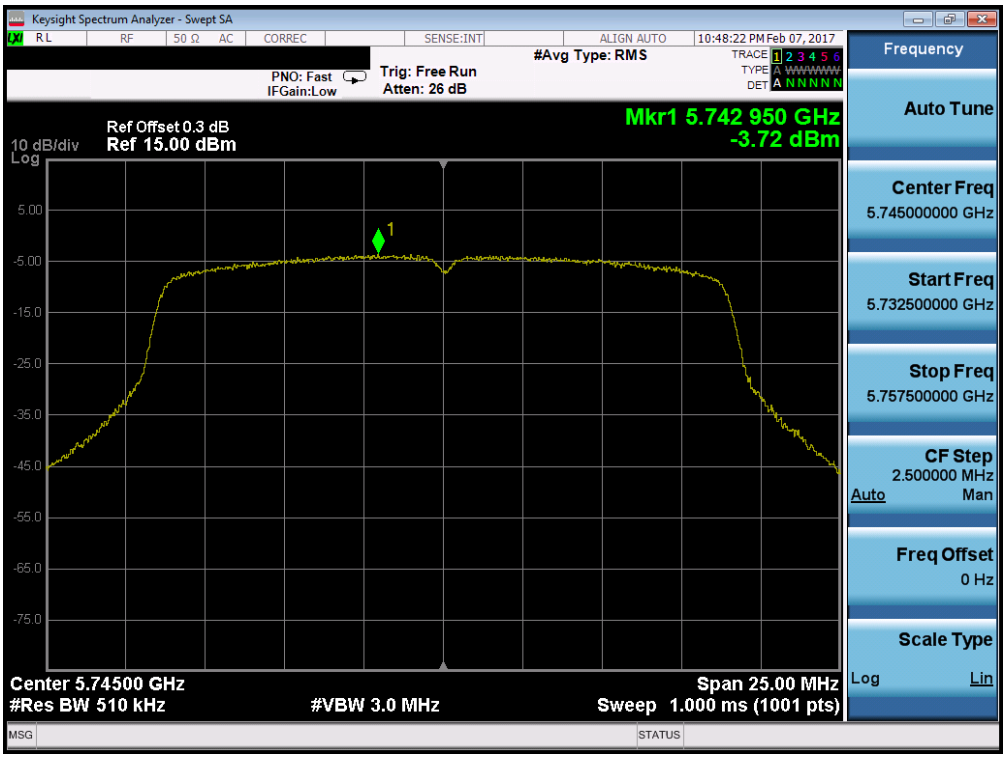
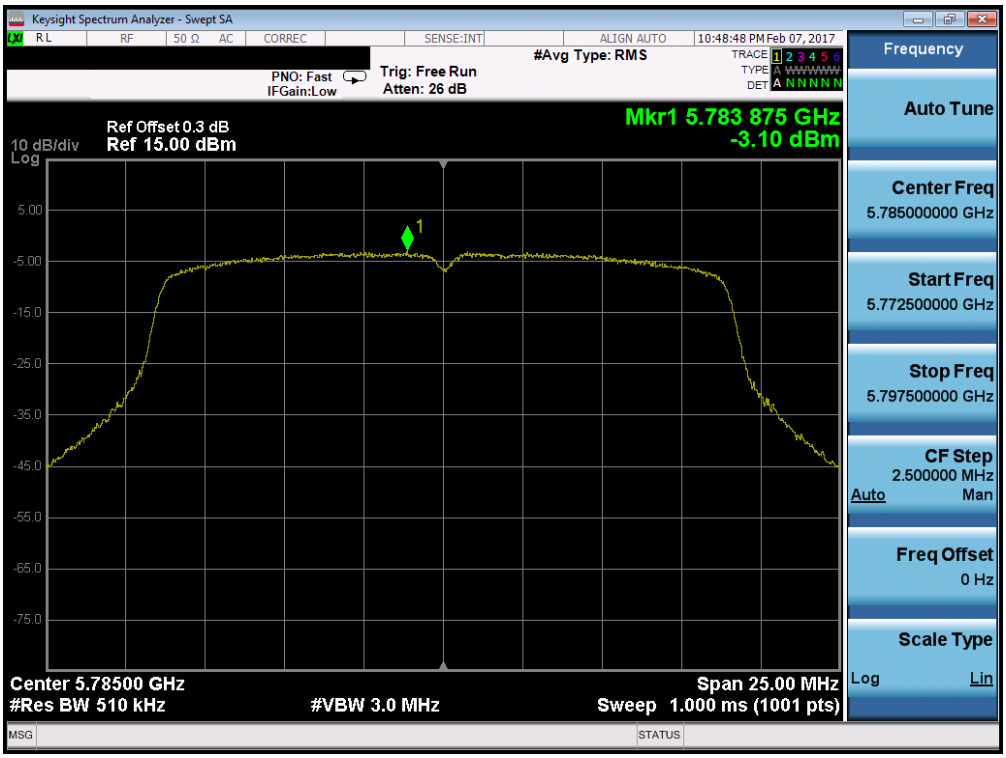



**Plot 7-151. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 149)**




**Plot 7-152. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 157)**

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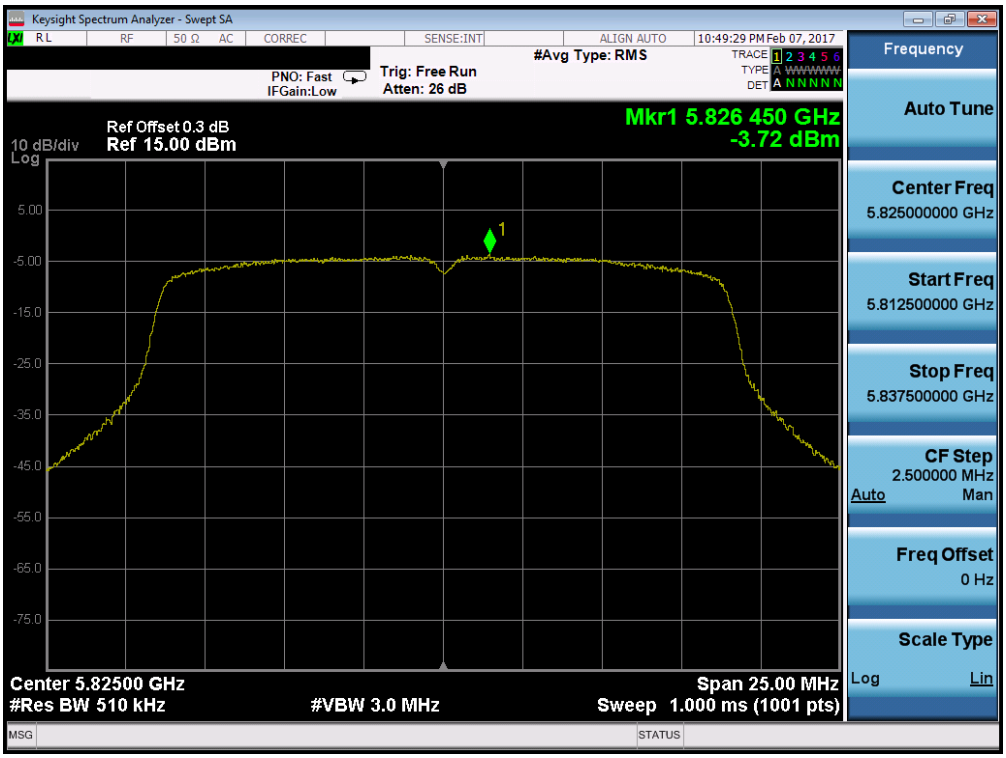
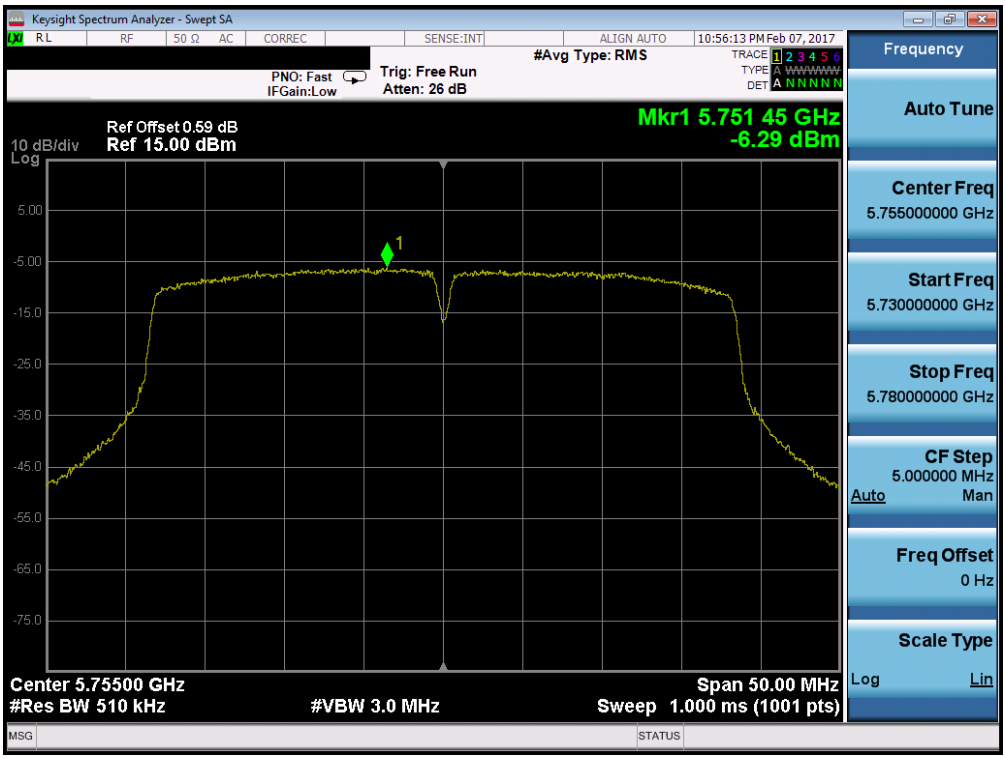



**Plot 7-153. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 165)**




**Plot 7-154. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 151)**

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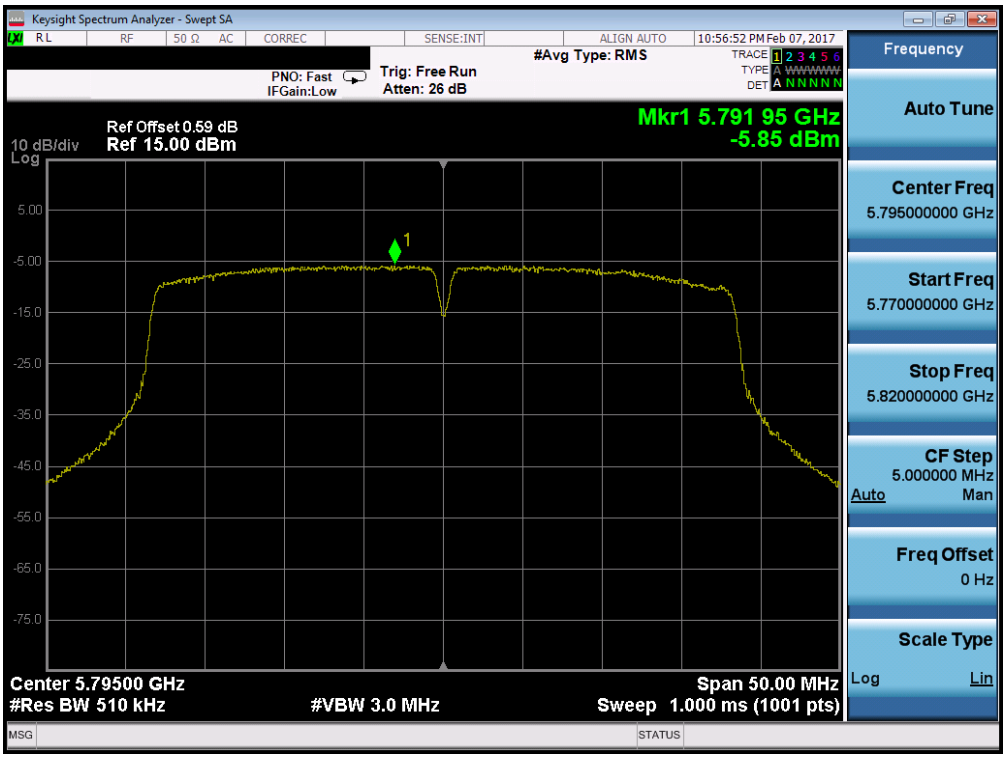


**Plot 7-155. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 159)**

**Plot 7-156. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 3) – Ch. 155)**




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## Summed MIMO Power Spectral Density Measurements

| | Frequency [MHz] | Channel No. | 802.11 Mode | Data Rate [Mbps] | Antenn-1 Power Density [dBm] | Antenn-2 Power Density [dBm] | Summed MIMO Power Density [dBm] | Max Permissible Power Density [dBm/MHz] | Margin [dB] | Pass / Fail |
|---|---|---|---|---|---|---|---|---|---|---|
| Band 1 | 5180 | 36 | n (20MHz) | 6.5/7.2 (MCS0) | -0.50 | -1.76 | 1.92 | 11.0 | -9.08 | Pass |
| | 5200 | 40 | n (20MHz) | 6.5/7.2 (MCS0) | -0.29 | -1.79 | 2.03 | 11.0 | -8.97 | Pass |
| | 5240 | 48 | n (20MHz) | 6.5/7.2 (MCS0) | -0.25 | -1.54 | 2.16 | 11.0 | -8.84 | Pass |
| | 5190 | 38 | n (40MHz) | 13.5/15 (MCS0) | -2.82 | -3.17 | 0.02 | 11.0 | -10.98 | Pass |
| | 5230 | 46 | n (40MHz) | 13.5/15 (MCS0) | -2.08 | -2.08 | 0.93 | 11.0 | -10.07 | Pass |
| | 5210 | 42 | ac (80MHz) | 29.3/32.5 (MCS0) | -6.73 | -6.81 | -3.76 | 11.0 | -14.76 | Pass |
| Band 2A | 5260 | 52 | n (20MHz) | 6.5/7.2 (MCS0) | -0.29 | -1.83 | 2.02 | 11.0 | -8.98 | Pass |
| | 5280 | 56 | n (20MHz) | 6.5/7.2 (MCS0) | 0.03 | -1.06 | 2.53 | 11.0 | -8.47 | Pass |
| | 5320 | 64 | n (20MHz) | 6.5/7.2 (MCS0) | -0.34 | -0.94 | 2.38 | 11.0 | -8.62 | Pass |
| | 5270 | 54 | n (40MHz) | 13.5/15 (MCS0) | -2.67 | -3.45 | -0.03 | 11.0 | -11.03 | Pass |
| | 5310 | 62 | n (40MHz) | 13.5/15 (MCS0) | -2.86 | -3.25 | -0.04 | 11.0 | -11.04 | Pass |
| | 5290 | 58 | ac (80MHz) | 29.3/32.5 (MCS0) | -6.37 | -7.20 | -3.76 | 11.0 | -14.76 | Pass |
| Band 2C | 5500 | 100 | n (20MHz) | 6.5/7.2 (MCS0) | -0.18 | -0.74 | 2.56 | 11.0 | -8.44 | Pass |
| | 5600 | 120 | n (20MHz) | 6.5/7.2 (MCS0) | -0.11 | -0.80 | 2.57 | 11.0 | -8.43 | Pass |
| | 5720 | 144 | n (20MHz) | 6.5/7.2 (MCS0) | -0.27 | -0.93 | 2.42 | 11.0 | -8.58 | Pass |
| | 5510 | 102 | n (40MHz) | 13.5/15 (MCS0) | -2.69 | -3.42 | -0.03 | 11.0 | -11.03 | Pass |
| | 5590 | 118 | n (40MHz) | 13.5/15 (MCS0) | -2.69 | -3.44 | -0.04 | 11.0 | -11.04 | Pass |
| | 5710 | 142 | n (40MHz) | 13.5/15 (MCS0) | -2.72 | -3.26 | 0.03 | 11.0 | -10.97 | Pass |
| | 5530 | 106 | ac (80MHz) | 29.3/32.5 (MCS0) | -6.96 | -6.96 | -3.95 | 11.0 | -14.95 | Pass |
| | 5610 | 122 | ac (80MHz) | 29.3/32.5 (MCS0) | -6.65 | -7.04 | -3.83 | 11.0 | -14.83 | Pass |
| | 5690 | 138 | ac (80MHz) | 29.3/32.5 (MCS0) | -9.40 | -10.09 | -6.72 | 11.0 | -17.72 | Pass |

**Table 7-21. Bands 1, 2A, 2C MIMO Conducted Power Spectral Density Measurements**

| | Frequency [MHz] | Channel No. | 802.11 Mode | Data Rate [Mbps] | Antenn-1 Power Density [dBm] | Antenn-2 Power Density [dBm] | Summed MIMO Power Density [dBm] | Max Permissible Power Density [dBm/500kHz] | Margin [dB] | Pass / Fail |
|---|---|---|---|---|---|---|---|---|---|---|
| Band 3 | 5745 | 149 | n (20MHz) | 6.5/7.2 (MCS0) | -3.31 | -3.72 | -0.50 | 30.0 | -30.50 | Pass |
| | 5785 | 157 | n (20MHz) | 6.5/7.2 (MCS0) | -2.06 | -3.10 | 0.46 | 30.0 | -29.54 | Pass |
| | 5825 | 165 | n (20MHz) | 6.5/7.2 (MCS0) | -3.02 | -3.72 | -0.35 | 30.0 | -30.35 | Pass |
| | 5755 | 151 | n (40MHz) | 13.5/15 (MCS0) | -5.68 | -6.29 | -2.97 | 30.0 | -32.97 | Pass |
| | 5795 | 159 | n (40MHz) | 13.5/15 (MCS0) | -4.67 | -5.85 | -2.21 | 30.0 | -32.21 | Pass |
| | 5775 | 155 | ac (80MHz) | 29.3/32.5 (MCS0) | -6.94 | -7.22 | -4.07 | 30.0 | -34.07 | Pass |

**Table 7-22. Band 3 MIMO Conducted Power Spectral Density Measurements**

**Note:**

Per KDB 662911 v02r01 Section E)2), the power spectral density at Antenna 1 and Antenna 2 were first measured separately as shown in the section above. The measured values were then summed in linear power units then converted back to dBm.

**Sample MIMO Calculation:**

At 5180MHz the average conducted power spectral density was measured to be -0.50 dBm for Antenna-1 and -1.76 dBm for Antenna-2.

Antenna 1 + Antenna 2 = MIMO

(-0.50 dBm + -1.76 dBm) = (0.89 mW + 0.67 mW) = 1.56 mW = 1.92 dBm




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## 7.6 Frequency Stability

**§15.407(g)**

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between -30°C and +50°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded. Data for the worst case channel is shown below.

OPERATING FREQUENCY: 5,180,000,000 Hz

CHANNEL: 36

REFERENCE VOLTAGE: 3.85 VDC

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100 % | 3.85 | + 20 (Ref) | 5,179,999,600 | -400 | -0.00000772 |
| 100 % | | - 30 | 5,179,999,697 | -303 | -0.00000585 |
| 100 % | | - 20 | 5,179,999,814 | -186 | -0.00000359 |
| 100 % | | - 10 | 5,180,000,211 | 211 | 0.00000407 |
| 100 % | | 0 | 5,179,999,876 | -124 | -0.00000239 |
| 100 % | | + 10 | 5,180,000,352 | 352 | 0.00000680 |
| 100 % | | + 20 | 5,180,000,269 | 269 | 0.00000519 |
| 100 % | | + 30 | 5,179,999,907 | -93 | -0.00000180 |
| 100 % | | + 40 | 5,179,999,860 | -140 | -0.00000270 |
| 100 % | | + 50 | 5,179,999,940 | -60 | -0.00000116 |
| BATT. ENDPOINT | 3.45 | + 20 | 5,180,000,114 | 114 | 0.00000220 |

**Table 7-23. Frequency Stability Measurements for UNII Band 1 (Ch. 36)**

**Note:**

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.




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## Frequency Stability
**§15.407(g)**

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between -30°C and +50°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded. Data for the worst case channel is shown below.

OPERATING FREQUENCY: 5,260,000,000 Hz

CHANNEL: 52

REFERENCE VOLTAGE: 3.85 VDC

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100 % | 3.85 | + 20 (Ref) | 5,259,999,819 | -181 | -0.00000344 |
| 100 % | | - 30 | 5,259,999,930 | -70 | -0.00000133 |
| 100 % | | - 20 | 5,260,000,183 | 183 | 0.00000348 |
| 100 % | | - 10 | 5,260,000,264 | 264 | 0.00000502 |
| 100 % | | 0 | 5,259,999,970 | -30 | -0.00000057 |
| 100 % | | + 10 | 5,259,999,957 | -43 | -0.00000082 |
| 100 % | | + 20 | 5,260,000,036 | 36 | 0.00000068 |
| 100 % | | + 30 | 5,259,999,995 | -5 | -0.00000010 |
| 100 % | | + 40 | 5,259,999,855 | -145 | -0.00000276 |
| 100 % | | + 50 | 5,260,000,055 | 55 | 0.00000105 |
| BATT. ENDPOINT | 3.45 | + 20 | 5,259,999,967 | -33 | -0.00000063 |

**Table 7-24. Frequency Stability Measurements for UNII Band 2A (Ch. 52)**

**Note:**

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.




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## Frequency Stability
**§15.407(g)**

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between -30°C and +50°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded. Data for the worst case channel is shown below.

OPERATING FREQUENCY: 5,500,000,000 Hz

CHANNEL: 100

REFERENCE VOLTAGE: 3.85 VDC

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100 % | 3.85 | + 20 (Ref) | 5,500,000,213 | 213 | 0.00000387 |
| 100 % | | - 30 | 5,500,000,210 | 210 | 0.00000382 |
| 100 % | | - 20 | 5,499,999,696 | -304 | -0.00000553 |
| 100 % | | - 10 | 5,499,999,960 | -40 | -0.00000073 |
| 100 % | | 0 | 5,499,999,810 | -190 | -0.00000345 |
| 100 % | | + 10 | 5,499,999,912 | -88 | -0.00000160 |
| 100 % | | + 20 | 5,499,999,991 | -9 | -0.00000016 |
| 100 % | | + 30 | 5,499,999,924 | -76 | -0.00000138 |
| 100 % | | + 40 | 5,500,000,189 | 189 | 0.00000344 |
| 100 % | | + 50 | 5,500,000,083 | 83 | 0.00000151 |
| BATT. ENDPOINT | 3.45 | + 20 | 5,499,999,965 | -35 | -0.00000064 |

**Table 7-25. Frequency Stability Measurements for UNII Band 2C (Ch. 100)**

**Note:**

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.




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## Frequency Stability
**§15.407(g)**

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between -30°C and +50°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded. Data for the worst case channel is shown below.

OPERATING FREQUENCY: 5,745,000,000 Hz

CHANNEL: 149

REFERENCE VOLTAGE: 3.85 VDC

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100 % | 3.85 | + 20 (Ref) | 5,744,999,902 | -98 | -0.00000171 |
| 100 % | | - 30 | 5,744,999,687 | -313 | -0.00000545 |
| 100 % | | - 20 | 5,745,000,029 | 29 | 0.00000050 |
| 100 % | | - 10 | 5,745,000,058 | 58 | 0.00000101 |
| 100 % | | 0 | 5,745,000,365 | 365 | 0.00000635 |
| 100 % | | + 10 | 5,745,000,139 | 139 | 0.00000242 |
| 100 % | | + 20 | 5,745,000,063 | 63 | 0.00000110 |
| 100 % | | + 30 | 5,745,000,376 | 376 | 0.00000654 |
| 100 % | | + 40 | 5,744,999,904 | -96 | -0.00000167 |
| 100 % | | + 50 | 5,745,000,005 | 5 | 0.00000009 |
| BATT. ENDPOINT | 3.45 | + 20 | 5,744,999,961 | -39 | -0.00000068 |

**Table 7-26. Frequency Stability Measurements for UNII Band 3 (Ch. 149)**

**Note:**

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.




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## 7.7 Radiated Spurious Emission Measurements – Above 1GHz

**§15.407(b) §15.205 §15.209**

**Test Overview and Limit**

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in KDB 789033 D02 v01r03, and at the appropriate frequencies. All channels, modes (e.g. 802.11a, 802.11n (20MHz BW), 802.11n (40MHz BW), and 802.11ac (80MHz)), and modulations/data rates were investigated among all UNII bands. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

***For transmitters operating in the 5.15-5.25 GHz and 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of −27 dBm/MHz.***

***For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.***

***For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.***

***All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 7-27 per Section 15.209.***

| Frequency | Field Strength [μV/m] | Measured Distance [Meters] |
|---|---|---|
| Above 960.0 MHz | 500 | 3 |

**Table 7-27. Radiated Limits**

**Test Procedures Used**

KDB 789033 D02 v01r03 – Section G

**Test Settings**

**Average Measurements above 1GHz (Method AD)**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = power average (RMS)
5. Number of measurement points = 1001 (Number of points must be ≥ 2 x span/RBW)
6. Averaging type = power (RMS)
7. Sweep time = auto couple
8. Trace was averaged over 100 sweeps




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**Peak Measurements above 1GHz**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

**Peak Measurements below 1GHz**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = 120kHz
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

**Test Setup**

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

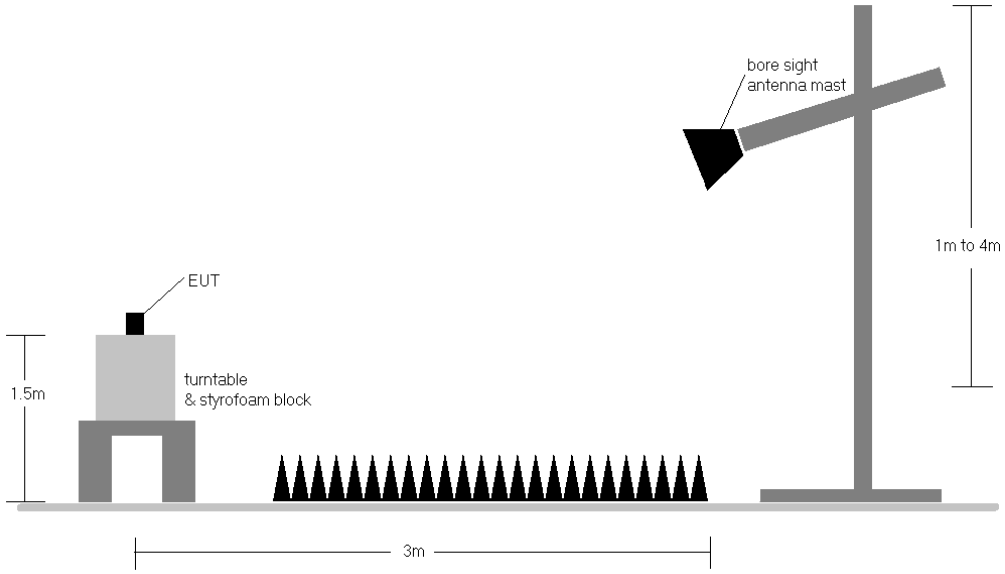


**Figure 7-5. Test Instrument & Measurement Setup**



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## Test Notes

1. All radiated spurious emissions levels were measured in a radiated test setup per the guidance of KDB 789033 D02 v01r03 Section G.
2. All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 7-27.
3. All spurious emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 7-27. All spurious emissions that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions of 68.2dBμV/m.
4. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
5. This unit was tested with its standard battery.
6. The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average and peak measurements were taken using linearly polarized horn antennas. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
7. Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
8. Radiated spurious emissions were investigated while operating in MIMO mode, however, it was determined that single antenna operation produced the worst case emissions. Since the emissions produced from MIMO operation were found to be more than 20dB below the limit, the MIMO emissions are not reported.
9. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. Any emissions found to be within 20dB of the limit are fully investigated and the results are shown in this section. Rohde & Schwarz EMC32, Version 9.15.00 automated test software was used to perform the Radiated Spurious Emissions Pre-Scan testing.
10. The "-" shown in the following RSE tables are used to denote a noise floor measurement.




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## Sample Calculations

### Determining Spurious Emissions Levels

- Field Strength Level [dBμV/m] = Analyzer Level [dBm] + 107 + AFCL [dB/m]
- AFCL [dB/m] = Antenna Factor [dB/m] + Cable Loss [dB]
- Margin [dB] = Field Strength Level [dBμV/m] – Limit [dBμV/m]

### Radiated Band Edge Measurement Offset

- The amplitude offset shown in the radiated restricted band edge plots in Section 7.7 was calculated using the formula:

  Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) – Preamplifier Gain




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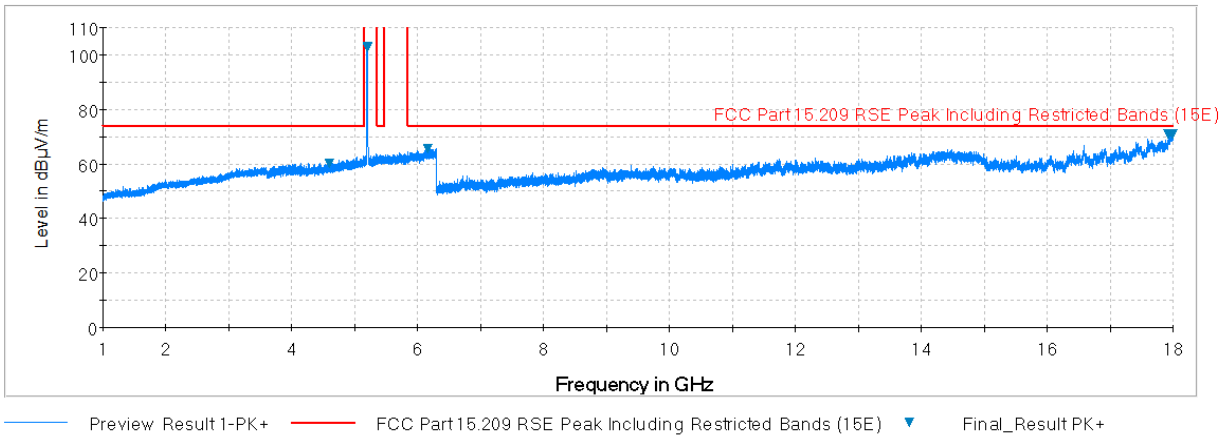
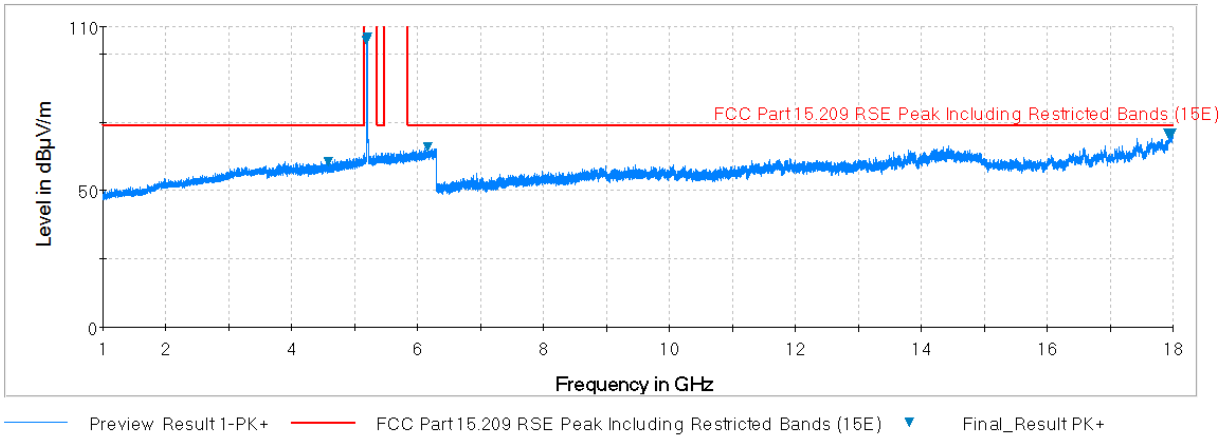
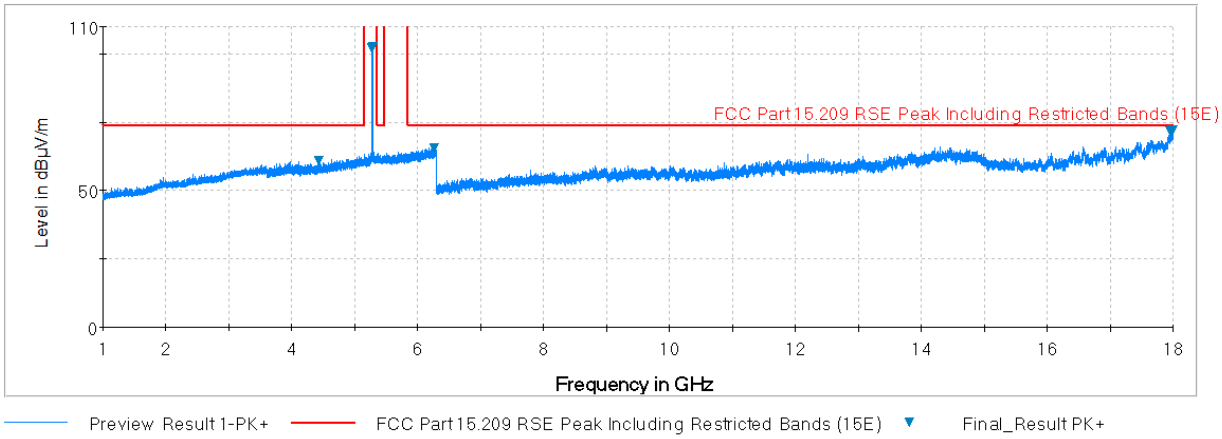
### 7.7.1 Antenna-1 Radiated Spurious Emission Measurements




**Plot 7-157. Radiated Spurious Plot above 1GHz (802.11a – U1 Ch. 40, Ant. Pol. H)**




**Plot 7-158. Radiated Spurious Plot above 1GHz (802.11a – U1 Ch. 40, Ant. Pol. V)**




**Plot 7-159. Radiated Spurious Plot above 1GHz (802.11a – U2A Ch. 56, Ant. Pol. H)**



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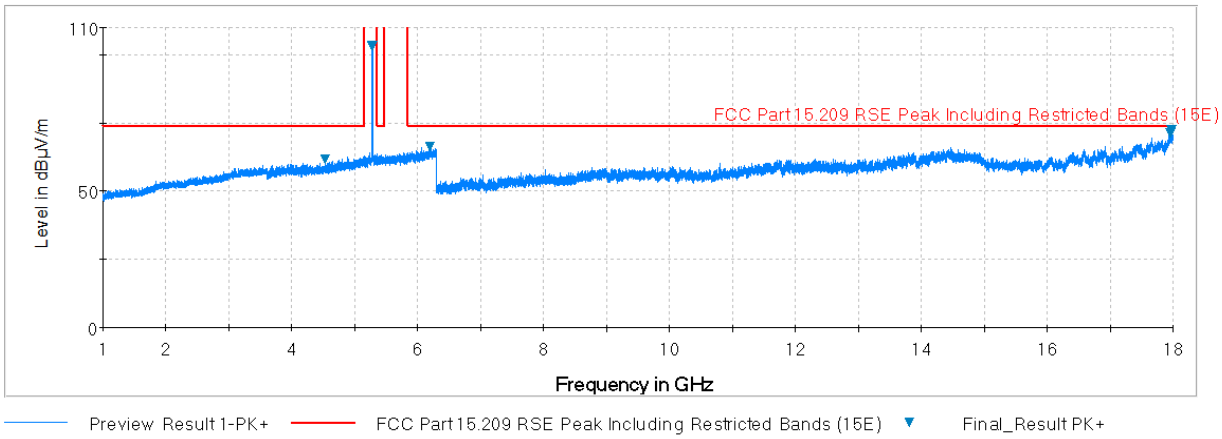
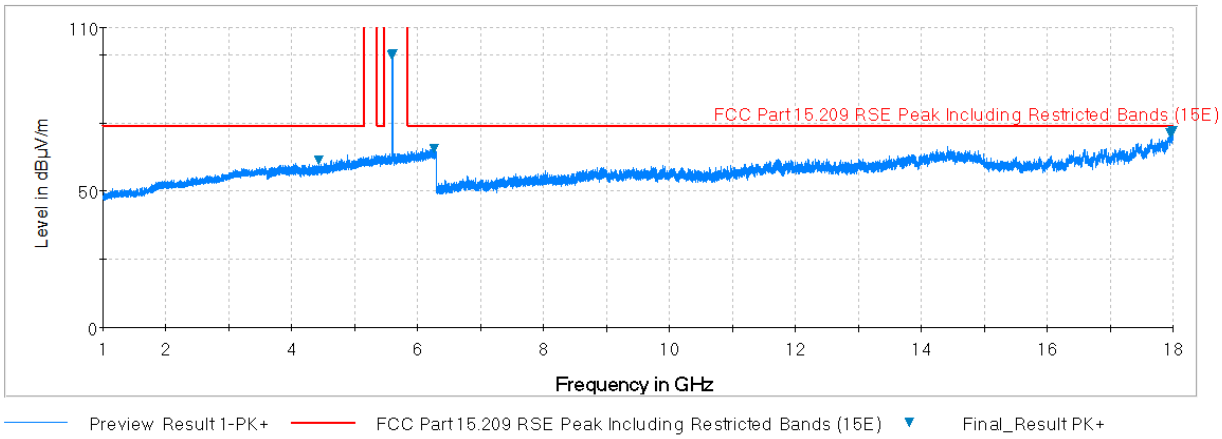
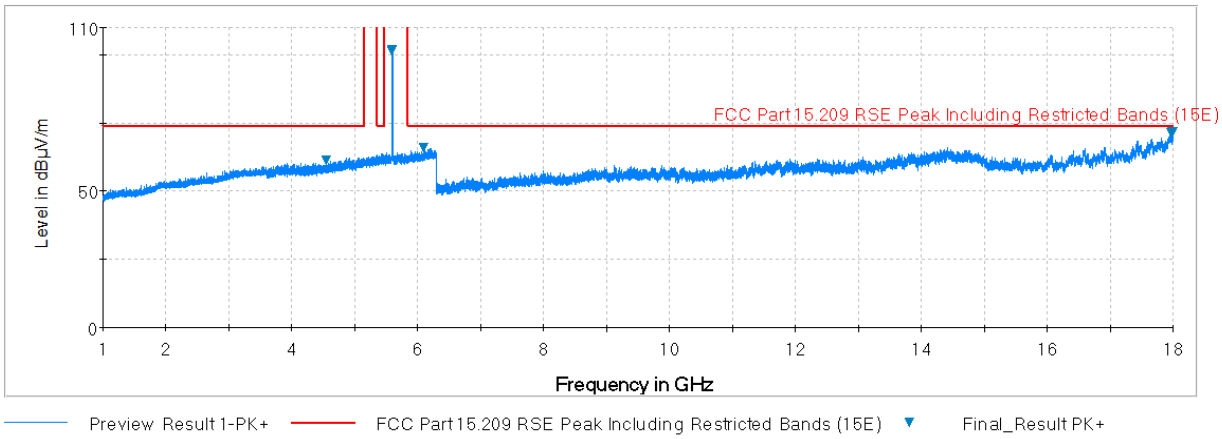



**Plot 7-160. Radiated Spurious Plot above 1GHz (802.11a – U2A Ch. 56, Ant. Pol. V)**




**Plot 7-161. Radiated Spurious Plot above 1GHz (802.11a – U2C Ch. 120, Ant. Pol. H)**




**Plot 7-162. Radiated Spurious Plot above 1GHz (802.11a – U2C Ch. 120, Ant. Pol. V)**

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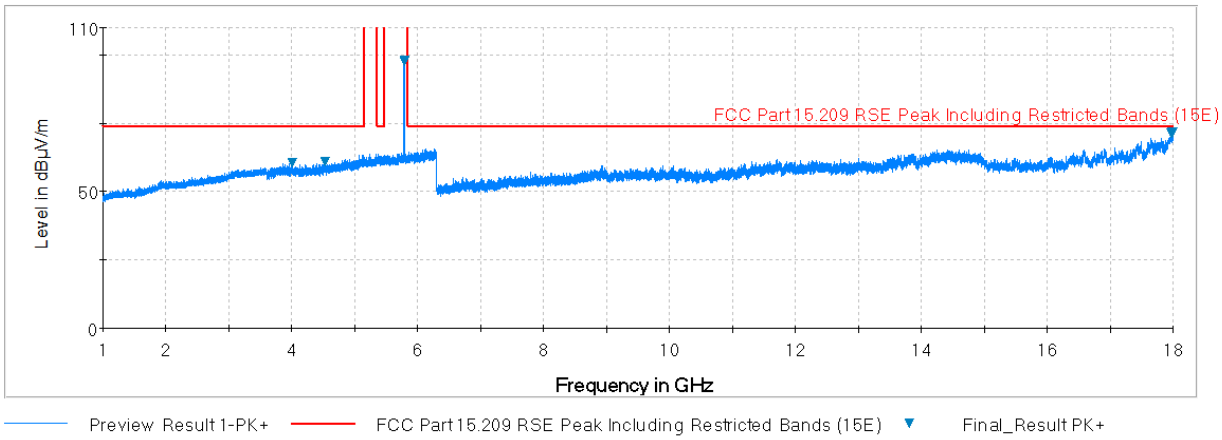
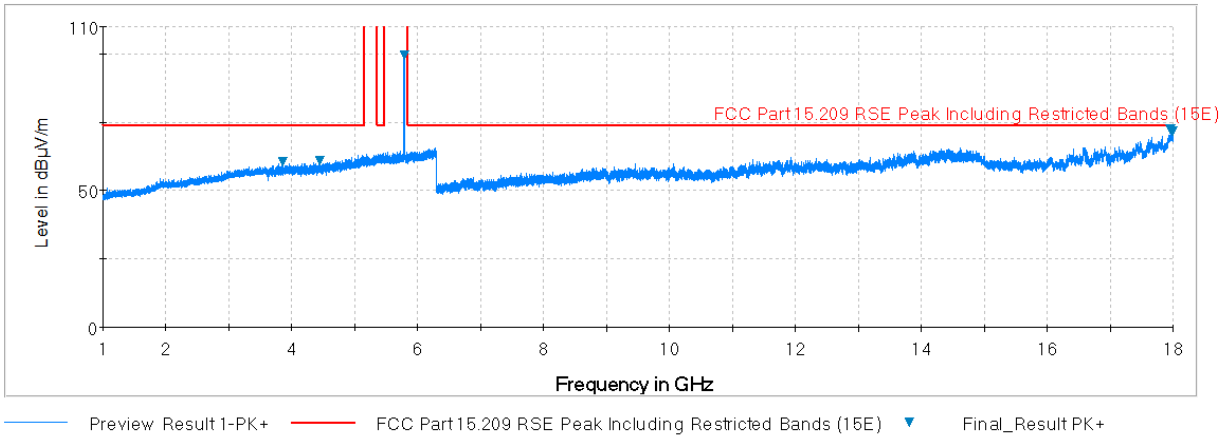



**Plot 7-163. Radiated Spurious Plot above 1GHz (802.11a – U3 Ch. 157, Ant. Pol. H)**




**Plot 7-164. Radiated Spurious Plot above 1GHz (802.11a – U3 Ch. 157, Ant. Pol. V)**

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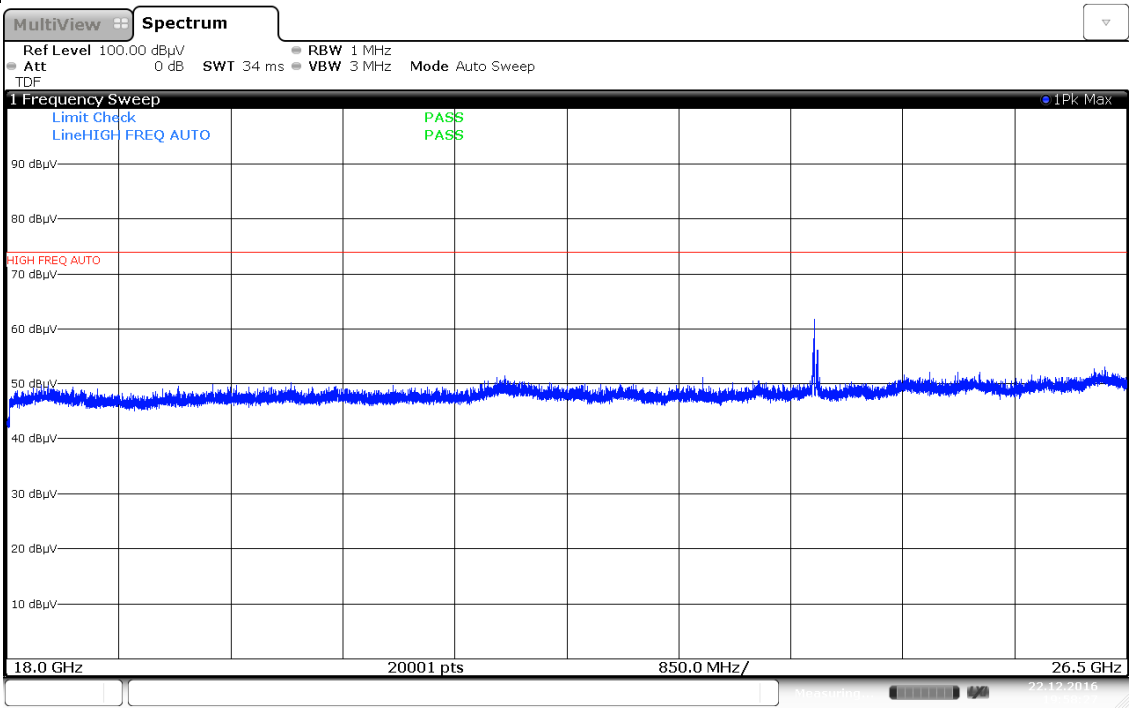
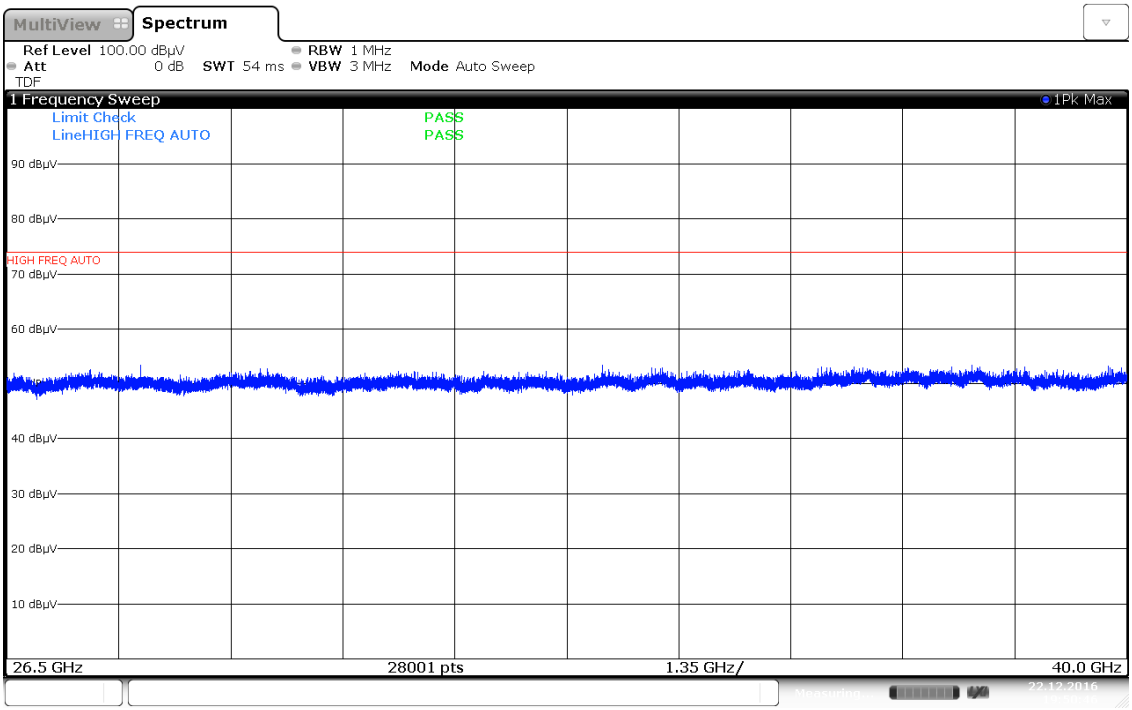
# Antenna-1 Radiated Spurious Emissions Measurements (Above 18GHz)

**§15.209**




19:58:27 22.12.2016

**Plot 7-165. Radiated Spurious Plot above 18GHz (802.11a – Ant. Pol. H)**




19:50:47 22.12.2016

**Plot 7-166. Radiated Spurious Plot above 26.5GHz (802.11a – Ant. Pol. H)**



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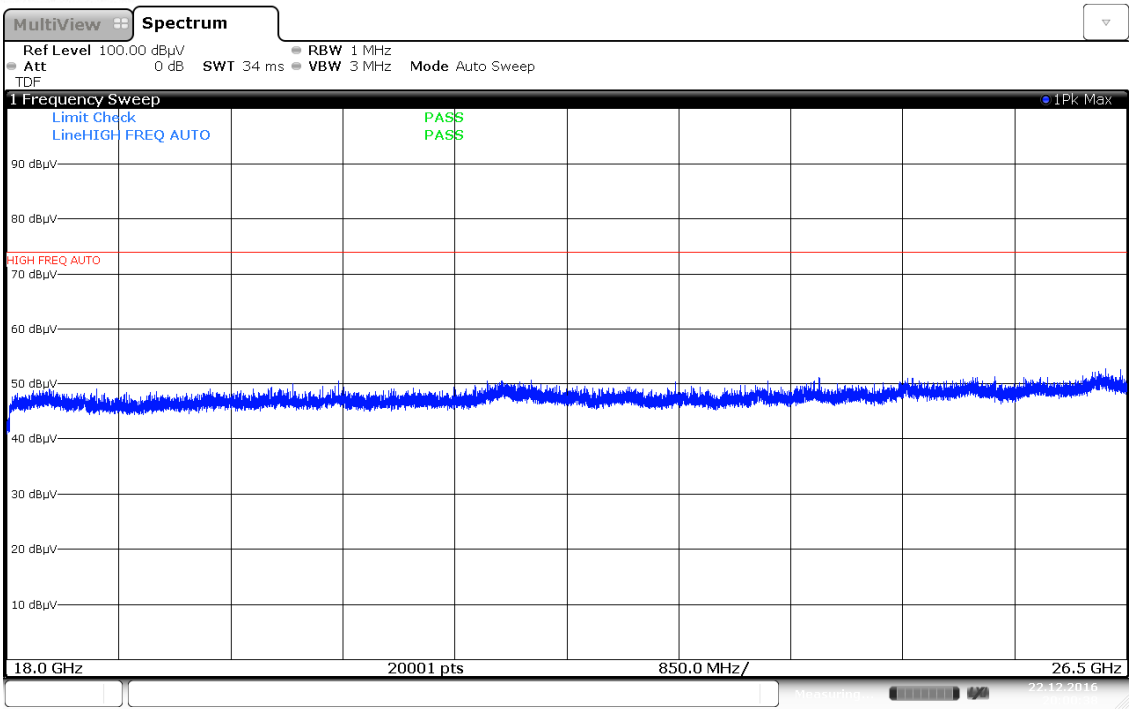
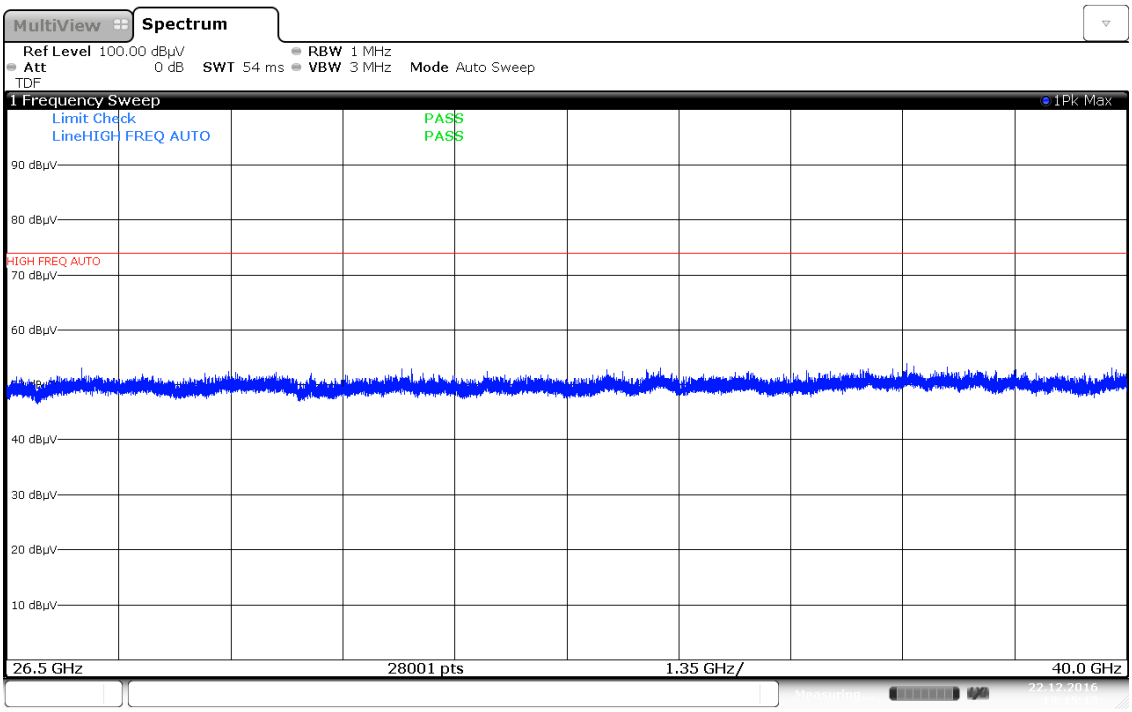



**20:00:39 22.12.2016**

**Plot 7-167. Radiated Spurious Plot above 18GHz (802.11a – Ant. Pol. V)**




**19:45:14 22.12.2016**

**Plot 7-168. Radiated Spurious Plot above 26.5GHz (802.11a – Ant. Pol. H)**

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# Antenna-1 Radiated Spurious Emission Measurements

§15.247(d) §15.205 & §15.209

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5180MHz
Channel: 36

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10360.00 | Peak | H | - | - | -60.29 | 12.69 | 0.00 | 59.40 | 68.20 | -8.80 |
| * | 15540.00 | Average | H | - | - | -71.88 | 15.58 | 0.00 | 50.70 | 53.98 | -3.28 |
| * | 15540.00 | Peak | H | - | - | -59.14 | 15.58 | 0.00 | 63.44 | 73.98 | -10.54 |
| * | 20720.00 | Average | H | - | - | -112.46 | 44.42 | -9.54 | 29.42 | 53.98 | -24.56 |
| * | 20720.00 | Peak | H | - | - | -101.14 | 44.42 | -9.54 | 40.74 | 73.98 | -33.24 |
| | 25900.00 | Peak | H | - | - | -100.08 | 45.16 | -9.54 | 42.54 | 68.20 | -25.66 |

**Table 7-28. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5200MHz
Channel: 40

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10400.00 | Peak | H | - | - | -58.31 | 13.01 | 0.00 | 61.70 | 68.20 | -6.50 |
| * | 15600.00 | Average | H | - | - | -72.34 | 15.45 | 0.00 | 50.11 | 53.98 | -3.87 |
| * | 15600.00 | Peak | H | - | - | -60.26 | 15.45 | 0.00 | 62.19 | 73.98 | -11.79 |
| * | 20800.00 | Average | H | - | - | -112.23 | 44.43 | -9.54 | 29.66 | 53.98 | -24.32 |
| * | 20800.00 | Peak | H | - | - | -100.74 | 44.43 | -9.54 | 41.15 | 73.98 | -32.83 |
| | 26000.00 | Peak | H | - | - | -100.28 | 45.14 | -9.54 | 42.32 | 68.20 | -25.88 |

**Table 7-29. Radiated Measurements**



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Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5240MHz
Channel: 48

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10480.00 | Peak | H | - | - | -58.40 | 12.88 | 0.00 | 61.48 | 68.20 | -6.72 |
| * | 15720.00 | Average | H | - | - | -72.27 | 15.90 | 0.00 | 50.63 | 53.98 | -3.35 |
| * | 15720.00 | Peak | H | - | - | -60.18 | 15.90 | 0.00 | 62.72 | 73.98 | -11.26 |
| * | 20960.00 | Average | H | - | - | -112.77 | 44.44 | -9.54 | 29.13 | 53.98 | -24.85 |
| * | 20960.00 | Peak | H | - | - | -102.32 | 44.44 | -9.54 | 39.58 | 73.98 | -34.40 |
| | 26200.00 | Peak | H | - | - | -100.53 | 45.08 | -9.54 | 42.00 | 68.20 | -26.20 |

**Table 7-30. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5260MHz
Channel: 52

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10520.00 | Peak | H | - | - | -58.40 | 12.81 | 0.00 | 61.41 | 68.20 | -6.79 |
| * | 15780.00 | Average | H | - | - | -72.05 | 15.62 | 0.00 | 50.57 | 53.98 | -3.41 |
| * | 15780.00 | Peak | H | - | - | -59.87 | 15.62 | 0.00 | 62.75 | 73.98 | -11.23 |
| * | 21040.00 | Average | H | - | - | -101.55 | 44.43 | -9.54 | 40.34 | 53.98 | -13.64 |
| * | 21040.00 | Peak | H | - | - | -101.35 | 44.43 | -9.54 | 40.54 | 73.98 | -33.44 |
| | 26300.00 | Peak | H | - | - | -100.14 | 45.06 | -9.54 | 42.37 | 68.20 | -25.83 |

**Table 7-31. Radiated Measurements**



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Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5280MHz
Channel: 56

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10560.00 | Peak | H | - | - | -58.62 | 13.19 | 0.00 | 61.57 | 68.20 | -6.63 |
| * | 15840.00 | Average | H | - | - | -72.50 | 16.14 | 0.00 | 50.64 | 53.98 | -3.34 |
| * | 15840.00 | Peak | H | - | - | -60.22 | 16.14 | 0.00 | 62.92 | 73.98 | -11.06 |
| * | 21120.00 | Average | H | - | - | -112.14 | 44.41 | -9.54 | 29.72 | 53.98 | -24.26 |
| * | 21120.00 | Peak | H | - | - | -101.89 | 44.41 | -9.54 | 39.97 | 73.98 | -34.01 |
| | 26400.00 | Peak | H | - | - | -100.16 | 45.06 | -9.54 | 42.35 | 68.20 | -25.85 |

**Table 7-32. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5320MHz
Channel: 64

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 10640.00 | Average | H | - | - | -71.13 | 13.63 | 0.00 | 49.50 | 53.98 | -4.48 |
| * | 10640.00 | Peak | H | - | - | -58.98 | 13.63 | 0.00 | 61.65 | 73.98 | -12.33 |
| * | 15960.00 | Average | H | - | - | -72.35 | 15.91 | 0.00 | 50.56 | 53.98 | -3.42 |
| * | 15960.00 | Peak | H | - | - | -60.31 | 15.91 | 0.00 | 62.60 | 73.98 | -11.38 |
| * | 21280.00 | Average | H | - | - | -112.37 | 44.37 | -9.54 | 29.47 | 53.98 | -24.51 |
| * | 21280.00 | Peak | H | - | - | -102.32 | 44.37 | -9.54 | 39.52 | 73.98 | -34.46 |
| | 26600.00 | Peak | H | - | - | -102.13 | 47.71 | -9.54 | 43.04 | 68.20 | -25.16 |

**Table 7-33. Radiated Measurements**



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Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5500MHz
Channel: 100

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11000.00 | Average | H | - | - | -71.03 | 13.98 | 0.00 | 49.95 | 53.98 | -4.03 |
| * | 11000.00 | Peak | H | - | - | -58.58 | 13.98 | 0.00 | 62.40 | 73.98 | -11.58 |
| | 16500.00 | Peak | H | - | - | -60.46 | 17.93 | 0.00 | 64.47 | 68.20 | -3.73 |
| | 22000.00 | Peak | H | - | - | -101.44 | 44.64 | -9.54 | 40.66 | 68.20 | -27.54 |
| | 27500.00 | Peak | H | - | - | -103.13 | 48.13 | -9.54 | 42.46 | 68.20 | -25.74 |

**Table 7-34. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5600MHz
Channel: 120

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11200.00 | Average | H | - | - | -70.97 | 14.55 | 0.00 | 50.58 | 53.98 | -3.40 |
| * | 11200.00 | Peak | H | - | - | -58.90 | 14.55 | 0.00 | 62.65 | 73.98 | -11.33 |
| | 16800.00 | Peak | H | - | - | -61.40 | 19.29 | 0.00 | 64.89 | 68.20 | -3.31 |
| * | 22400.00 | Average | H | - | - | -112.82 | 44.59 | -9.54 | 29.23 | 53.98 | -24.75 |
| * | 22400.00 | Peak | H | - | - | -102.17 | 44.59 | -9.54 | 39.88 | 73.98 | -34.10 |
| | 28000.00 | Peak | H | - | - | -103.71 | 48.22 | -9.54 | 41.97 | 68.20 | -26.23 |

**Table 7-35. Radiated Measurements**



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Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5720MHz
Channel: 144

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11440.00 | Average | H | - | - | -70.77 | 14.66 | 0.00 | 50.89 | 53.98 | -3.09 |
| * | 11440.00 | Peak | H | - | - | -58.31 | 14.66 | 0.00 | 63.35 | 73.98 | -10.63 |
| | 17160.00 | Peak | H | - | - | -61.13 | 18.95 | 0.00 | 64.82 | 68.20 | -3.38 |
| * | 22880.00 | Average | H | - | - | -112.92 | 44.63 | -9.54 | 29.17 | 53.98 | -24.81 |
| * | 22880.00 | Peak | H | - | - | -101.94 | 44.63 | -9.54 | 40.15 | 73.98 | -33.83 |
| | 28600.00 | Peak | H | - | - | -103.80 | 48.41 | -9.54 | 42.07 | 68.20 | -26.13 |

**Table 7-36. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5745MHz
Channel: 149

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11490.00 | Average | H | - | - | -70.99 | 14.10 | 0.00 | 50.11 | 53.98 | -3.87 |
| * | 11490.00 | Peak | H | - | - | -58.83 | 14.10 | 0.00 | 62.27 | 73.98 | -11.71 |
| | 17235.00 | Peak | H | - | - | -60.81 | 18.02 | 0.00 | 64.21 | 68.20 | -3.99 |
| * | 22980.00 | Average | H | - | - | -112.74 | 44.72 | -9.54 | 29.43 | 53.98 | -24.55 |
| * | 22980.00 | Peak | H | - | - | -101.41 | 44.72 | -9.54 | 40.76 | 73.98 | -33.22 |
| | 28725.00 | Peak | H | - | - | -103.55 | 48.08 | -9.54 | 41.99 | 68.20 | -26.21 |

**Table 7-37. Radiated Measurements**



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Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5785MHz
Channel: 157

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11570.00 | Average | H | - | - | -70.86 | 14.26 | 0.00 | 50.40 | 53.98 | -3.58 |
| * | 11570.00 | Peak | H | - | - | -58.23 | 14.26 | 0.00 | 63.03 | 73.98 | -10.95 |
| | 17355.00 | Peak | H | - | - | -60.53 | 18.34 | 0.00 | 64.81 | 68.20 | -3.39 |
| | 23140.00 | Peak | H | - | - | -101.34 | 44.84 | -9.54 | 40.95 | 68.20 | -27.25 |
| | 28925.00 | Peak | H | - | - | -103.11 | 48.09 | -9.54 | 42.44 | 68.20 | -25.76 |

**Table 7-38. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5825MHz
Channel: 165

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11650.00 | Average | H | - | - | -70.87 | 14.60 | 0.00 | 50.73 | 53.98 | -3.25 |
| * | 11650.00 | Peak | H | - | - | -57.46 | 14.60 | 0.00 | 64.14 | 73.98 | -9.84 |
| | 17475.00 | Peak | H | - | - | -60.38 | 17.82 | 0.00 | 64.44 | 68.20 | -3.76 |
| | 23300.00 | Peak | H | - | - | -101.44 | 44.86 | -9.54 | 40.88 | 68.20 | -27.32 |
| | 29125.00 | Peak | H | - | - | -103.39 | 48.09 | -9.54 | 42.16 | 68.20 | -26.04 |

**Table 7-39. Radiated Measurements**



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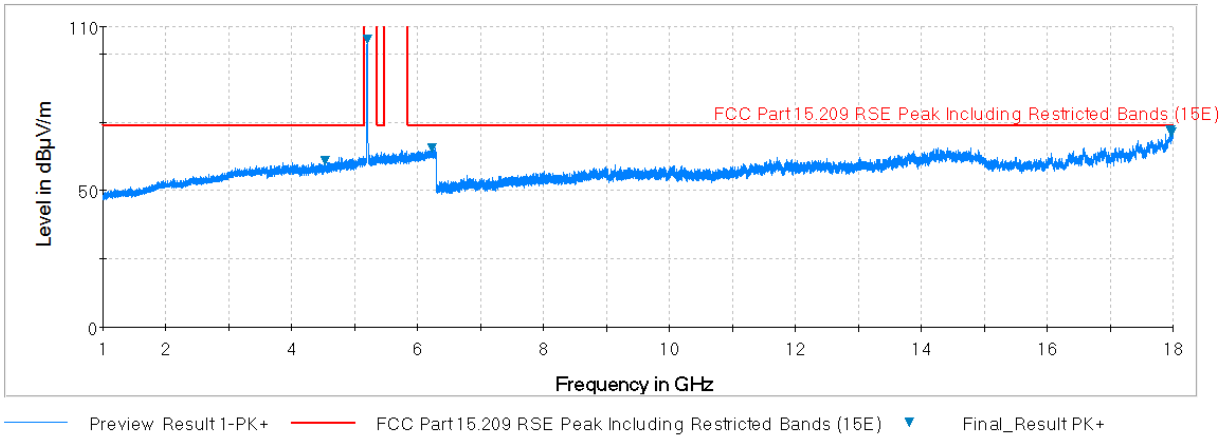
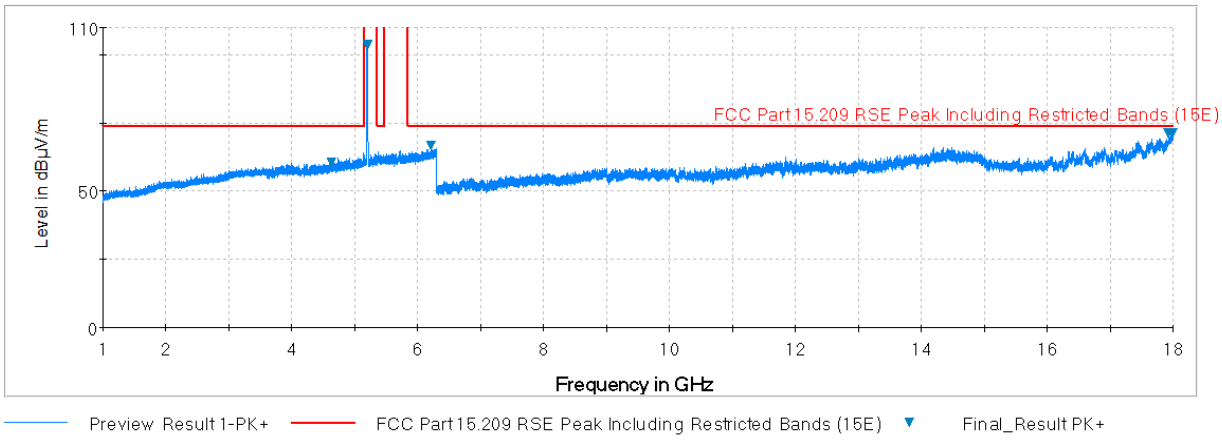
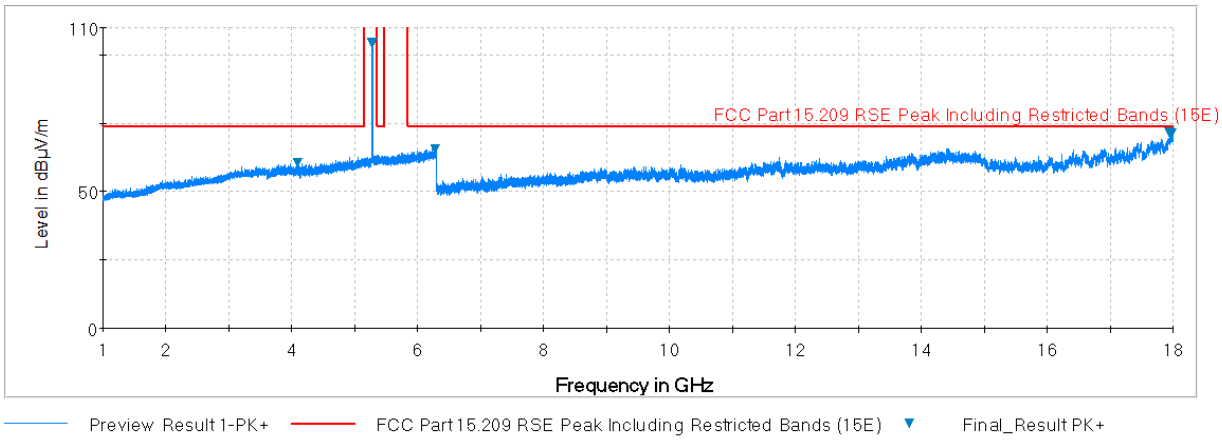
### 7.7.2 Antenna-2 Radiated Spurious Emission Measurements




**Plot 7-169. Radiated Spurious Plot above 1GHz (802.11a – U1 Ch. 40, Ant. Pol. H)**




**Plot 7-170. Radiated Spurious Plot above 1GHz (802.11a – U1 Ch. 40, Ant. Pol. V)**




**Plot 7-171. Radiated Spurious Plot above 1GHz (802.11a – U2A Ch. 56, Ant. Pol. H)**



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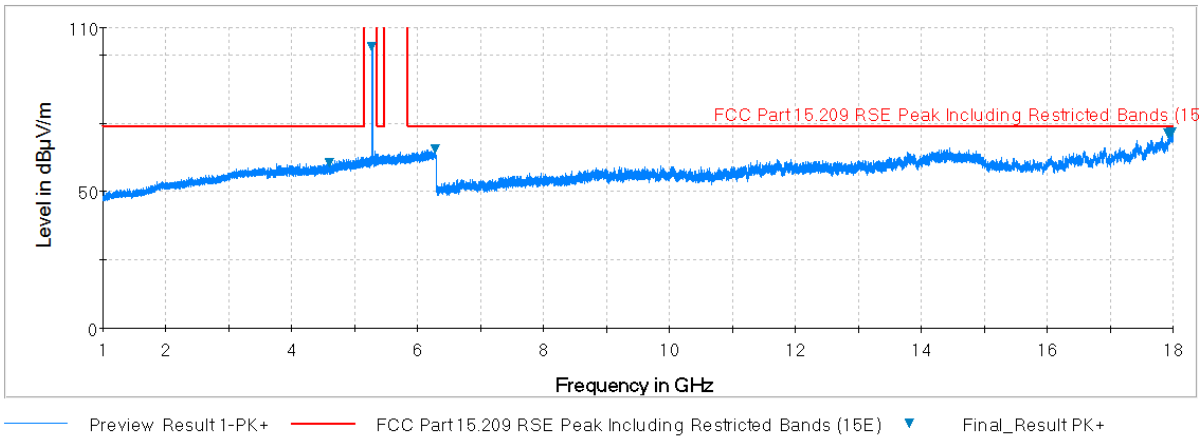
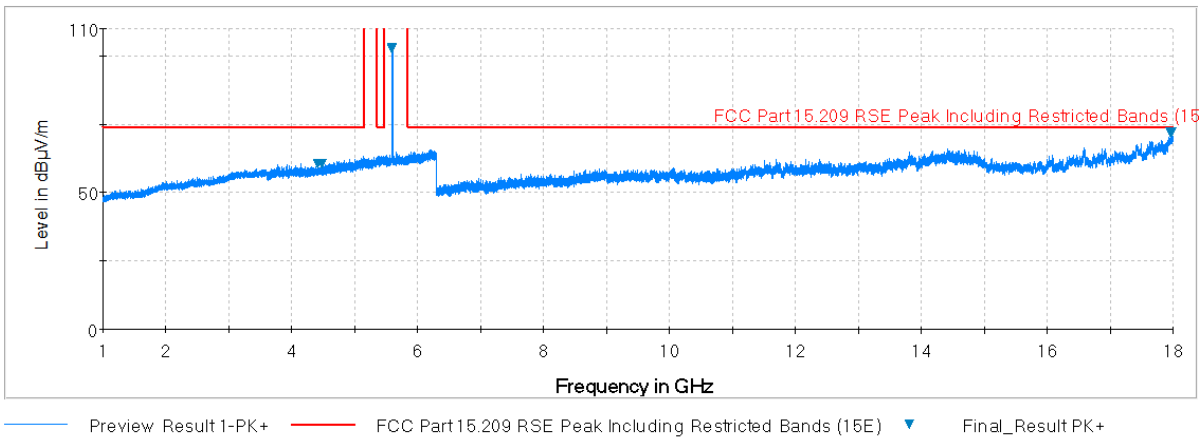
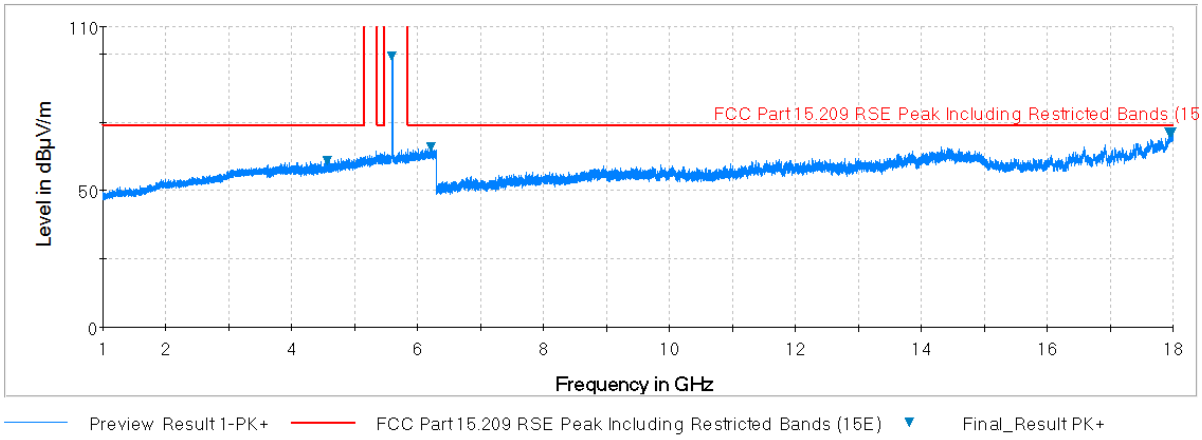



**Plot 7-172. Radiated Spurious Plot above 1GHz (802.11a – U2A Ch. 56, Ant. Pol. V)**




**Plot 7-173. Radiated Spurious Plot above 1GHz (802.11a – U2C Ch. 120, Ant. Pol. H)**




**Plot 7-174. Radiated Spurious Plot above 1GHz (802.11a – U2C Ch. 120, Ant. Pol. V)**

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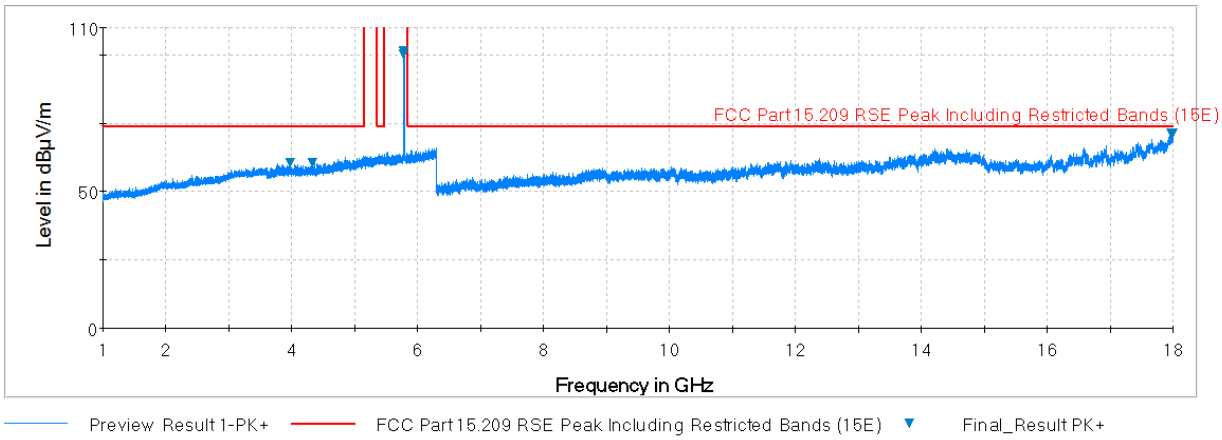
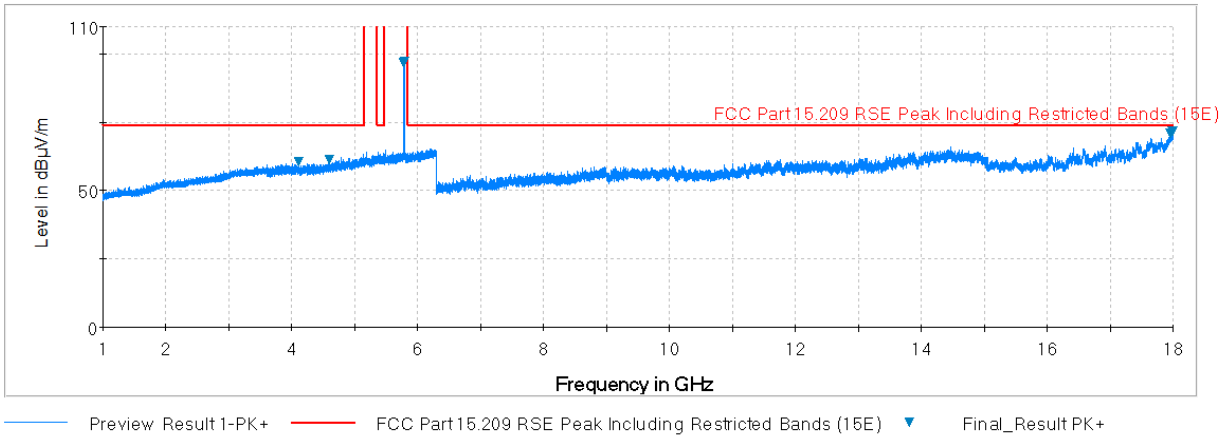



**Plot 7-175. Radiated Spurious Plot above 1GHz (802.11a – U3 Ch. 157, Ant. Pol. H)**




**Plot 7-176. Radiated Spurious Plot above 1GHz (802.11a – U3 Ch. 157, Ant. Pol. V)**

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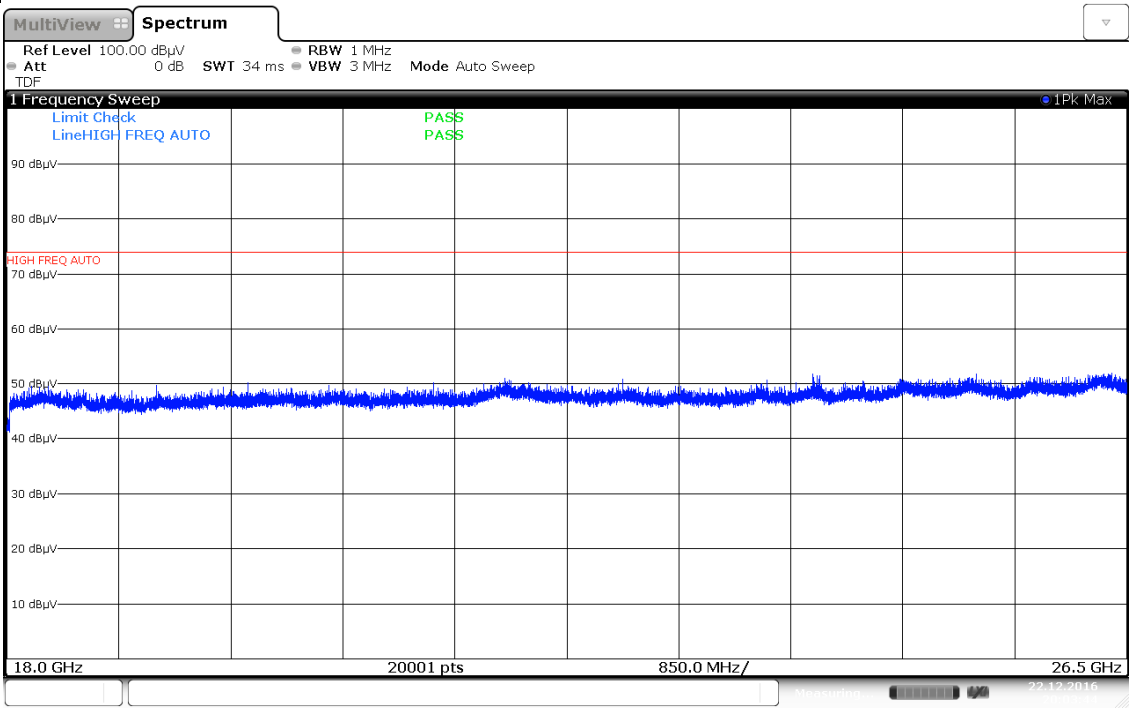
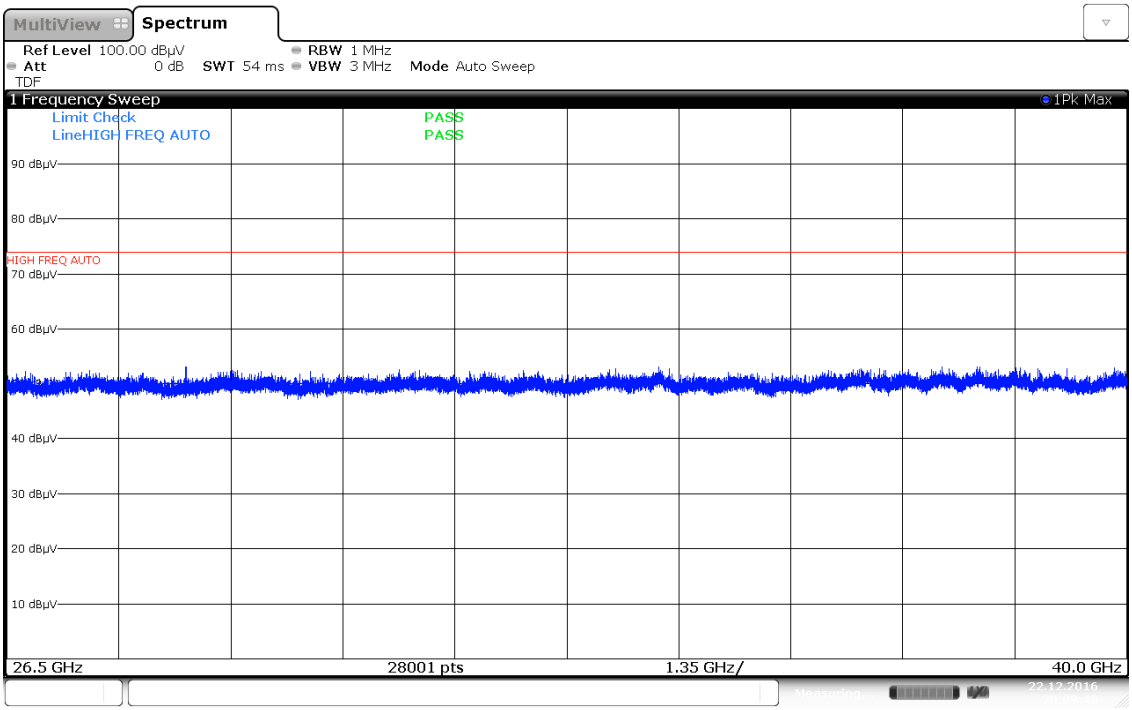
# Antenna-2 Radiated Spurious Emissions Measurements (Above 18GHz)

**§15.209**




20:03:44 22.12.2016

**Plot 7-177. Radiated Spurious Plot above 18GHz (802.11a – Ant. Pol. H)**




20:09:48 22.12.2016

**Plot 7-178. Radiated Spurious Plot above 26.5GHz (802.11a – Ant. Pol. H)**



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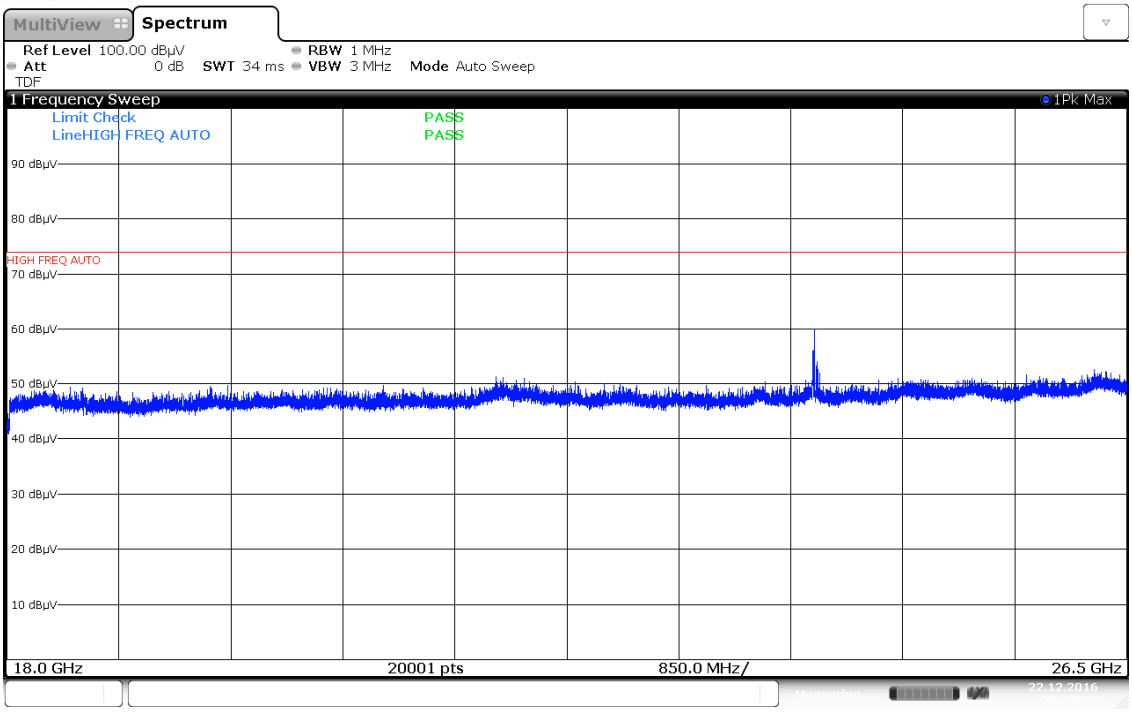
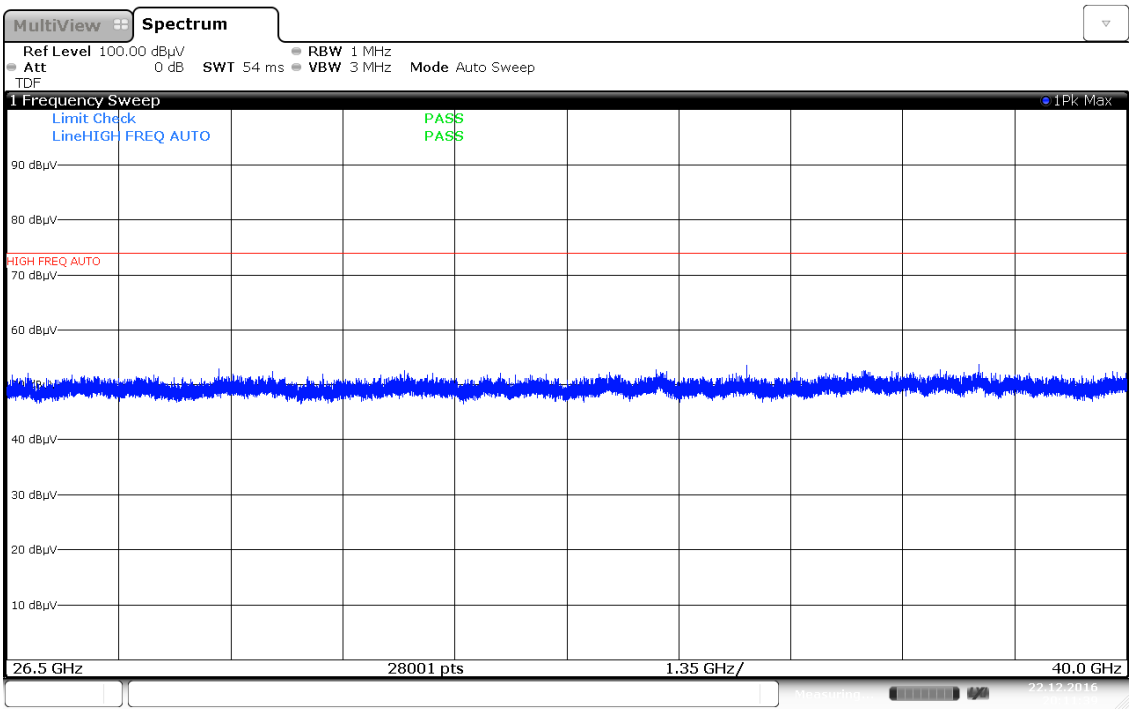



**20:05:52 22.12.2016**

**Plot 7-179. Radiated Spurious Plot above 18GHz (802.11a – Ant. Pol. V)**




**20:11:39 22.12.2016**

**Plot 7-180. Radiated Spurious Plot above 26.5GHz (802.11a – Ant. Pol. V)**

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# Antenna-2 Radiated Spurious Emission Measurements

§15.247(d) §15.205 & §15.209

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5180MHz
Channel: 36

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10360.00 | Peak | H | - | - | -59.37 | 12.69 | 0.00 | 60.32 | 68.20 | -7.88 |
| * | 15540.00 | Average | H | - | - | -71.99 | 15.58 | 0.00 | 50.59 | 53.98 | -3.39 |
| * | 15540.00 | Peak | H | - | - | -59.76 | 15.58 | 0.00 | 62.82 | 73.98 | -11.16 |
| * | 20720.00 | Average | H | - | - | -112.54 | 44.42 | -9.54 | 29.34 | 53.98 | -24.64 |
| * | 20720.00 | Peak | H | - | - | -102.35 | 44.42 | -9.54 | 39.53 | 73.98 | -34.45 |
| | 25900.00 | Peak | H | - | - | -101.06 | 45.16 | -9.54 | 41.56 | 68.20 | -26.64 |

**Table 7-40. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5200MHz
Channel: 40

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10400.00 | Peak | H | - | - | -58.17 | 13.01 | 0.00 | 61.84 | 68.20 | -6.36 |
| * | 15600.00 | Average | H | - | - | -72.42 | 15.45 | 0.00 | 50.03 | 53.98 | -3.95 |
| * | 15600.00 | Peak | H | - | - | -59.56 | 15.45 | 0.00 | 62.89 | 73.98 | -11.09 |
| * | 20800.00 | Average | H | - | - | -112.51 | 44.43 | -9.54 | 29.38 | 53.98 | -24.60 |
| * | 20800.00 | Peak | H | - | - | -101.73 | 44.43 | -9.54 | 40.16 | 73.98 | -33.82 |
| | 26000.00 | Peak | H | - | - | -101.40 | 45.14 | -9.54 | 41.20 | 68.20 | -27.00 |

**Table 7-41. Radiated Measurements**



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Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5240MHz
Channel: 48

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10480.00 | Peak | H | - | - | -59.57 | 12.88 | 0.00 | 60.31 | 68.20 | -7.89 |
| * | 15720.00 | Average | H | - | - | -72.43 | 15.90 | 0.00 | 50.47 | 53.98 | -3.51 |
| * | 15720.00 | Peak | H | - | - | -60.42 | 15.90 | 0.00 | 62.48 | 73.98 | -11.50 |
| * | 20960.00 | Average | H | - | - | -112.80 | 44.44 | -9.54 | 29.10 | 53.98 | -24.88 |
| * | 20960.00 | Peak | H | - | - | -101.70 | 44.44 | -9.54 | 40.20 | 73.98 | -33.78 |
| | 26200.00 | Peak | H | - | - | -101.00 | 45.08 | -9.54 | 41.53 | 68.20 | -26.67 |

**Table 7-42. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5260MHz
Channel: 52

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10520.00 | Peak | H | - | - | -59.79 | 12.81 | 0.00 | 60.02 | 68.20 | -8.18 |
| * | 15780.00 | Average | H | - | - | -71.86 | 15.62 | 0.00 | 50.76 | 53.98 | -3.22 |
| * | 15780.00 | Peak | H | - | - | -59.99 | 15.62 | 0.00 | 62.63 | 73.98 | -11.35 |
| * | 21040.00 | Average | H | 100 | 90 | -112.30 | 44.43 | -9.54 | 29.59 | 53.98 | -24.39 |
| * | 21040.00 | Peak | H | 100 | 90 | -101.96 | 44.43 | -9.54 | 39.93 | 73.98 | -34.05 |
| | 26300.00 | Peak | H | - | - | -100.47 | 45.06 | -9.54 | 42.04 | 68.20 | -26.16 |

**Table 7-43. Radiated Measurements**



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Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5280MHz
Channel: 56

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10560.00 | Peak | H | - | - | -58.27 | 13.19 | 0.00 | 61.92 | 68.20 | -6.28 |
| * | 15840.00 | Average | H | - | - | -72.52 | 16.14 | 0.00 | 50.62 | 53.98 | -3.36 |
| * | 15840.00 | Peak | H | - | - | -60.58 | 16.14 | 0.00 | 62.56 | 73.98 | -11.42 |
| * | 21120.00 | Average | H | - | - | -111.96 | 44.41 | -9.54 | 29.90 | 53.98 | -24.08 |
| * | 21120.00 | Peak | H | - | - | -101.35 | 44.41 | -9.54 | 40.51 | 73.98 | -33.47 |
| | 26400.00 | Peak | H | - | - | -100.46 | 45.06 | -9.54 | 42.05 | 68.20 | -26.15 |

**Table 7-44. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5320MHz
Channel: 64

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 10640.00 | Average | H | - | - | -71.28 | 13.63 | 0.00 | 49.35 | 53.98 | -4.63 |
| * | 10640.00 | Peak | H | - | - | -59.32 | 13.63 | 0.00 | 61.31 | 73.98 | -12.67 |
| * | 15960.00 | Average | H | - | - | -72.65 | 15.91 | 0.00 | 50.26 | 53.98 | -3.72 |
| * | 15960.00 | Peak | H | - | - | -61.21 | 15.91 | 0.00 | 61.70 | 73.98 | -12.28 |
| * | 21280.00 | Average | H | - | - | -112.38 | 44.37 | -9.54 | 29.46 | 53.98 | -24.52 |
| * | 21280.00 | Peak | H | - | - | -102.00 | 44.37 | -9.54 | 39.84 | 73.98 | -34.14 |
| | 26600.00 | Peak | H | - | - | -103.18 | 47.71 | -9.54 | 41.99 | 68.20 | -26.21 |

**Table 7-45. Radiated Measurements**



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Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5500MHz
Channel: 100

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11000.00 | Average | H | - | - | -71.41 | 13.98 | 0.00 | 49.57 | 53.98 | -4.41 |
| * | 11000.00 | Peak | H | - | - | -61.18 | 13.98 | 0.00 | 59.80 | 73.98 | -14.18 |
| | 16500.00 | Peak | H | - | - | -60.85 | 17.93 | 0.00 | 64.08 | 68.20 | -4.12 |
| | 22000.00 | Peak | H | - | - | -101.66 | 44.64 | -9.54 | 40.44 | 68.20 | -27.76 |
| | 27500.00 | Peak | H | - | - | -102.29 | 48.13 | -9.54 | 43.30 | 68.20 | -24.90 |

**Table 7-46. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5600MHz
Channel: 120

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11200.00 | Average | H | - | - | -71.10 | 14.55 | 0.00 | 50.45 | 53.98 | -3.53 |
| * | 11200.00 | Peak | H | - | - | -60.31 | 14.55 | 0.00 | 61.24 | 73.98 | -12.74 |
| | 16800.00 | Peak | H | - | - | -61.77 | 19.29 | 0.00 | 64.52 | 68.20 | -3.68 |
| * | 22400.00 | Average | H | - | - | -112.91 | 44.59 | -9.54 | 29.14 | 53.98 | -24.84 |
| * | 22400.00 | Peak | H | - | - | -102.67 | 44.59 | -9.54 | 39.38 | 73.98 | -34.60 |
| | 28000.00 | Peak | H | - | - | -101.51 | 48.22 | -9.54 | 44.17 | 68.20 | -24.03 |

**Table 7-47. Radiated Measurements**



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Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5720MHz
Channel: 144

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11440.00 | Average | H | - | - | -70.86 | 14.66 | 0.00 | 50.80 | 53.98 | -3.18 |
| * | 11440.00 | Peak | H | - | - | -59.05 | 14.66 | 0.00 | 62.61 | 73.98 | -11.37 |
| | 17160.00 | Peak | H | - | - | -62.01 | 18.95 | 0.00 | 63.94 | 68.20 | -4.26 |
| * | 22880.00 | Average | H | - | - | -113.03 | 44.63 | -9.54 | 29.06 | 53.98 | -24.92 |
| * | 22880.00 | Peak | H | - | - | -102.50 | 44.63 | -9.54 | 39.59 | 73.98 | -34.39 |
| | 28600.00 | Peak | H | - | - | -102.82 | 48.41 | -9.54 | 43.05 | 68.20 | -25.15 |

**Table 7-48. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5745MHz
Channel: 149

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11490.00 | Average | H | - | - | -70.88 | 14.10 | 0.00 | 50.22 | 53.98 | -3.76 |
| * | 11490.00 | Peak | H | - | - | -58.41 | 14.10 | 0.00 | 62.69 | 73.98 | -11.29 |
| | 17235.00 | Peak | H | - | - | -60.79 | 18.02 | 0.00 | 64.23 | 68.20 | -3.97 |
| * | 22980.00 | Average | H | - | - | -112.71 | 44.72 | -9.54 | 29.46 | 53.98 | -24.52 |
| * | 22980.00 | Peak | H | - | - | -101.57 | 44.72 | -9.54 | 40.60 | 73.98 | -33.38 |
| | 28725.00 | Peak | H | - | - | -102.64 | 48.08 | -9.54 | 42.90 | 68.20 | -25.30 |

**Table 7-49. Radiated Measurements**



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Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5785MHz
Channel: 157

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11570.00 | Average | H | - | - | -70.84 | 14.26 | 0.00 | 50.42 | 53.98 | -3.56 |
| * | 11570.00 | Peak | H | - | - | -58.91 | 14.26 | 0.00 | 62.35 | 73.98 | -11.63 |
| | 17355.00 | Peak | H | - | - | -60.33 | 18.34 | 0.00 | 65.01 | 68.20 | -3.19 |
| | 23140.00 | Peak | H | - | - | -101.06 | 44.84 | -9.54 | 41.23 | 68.20 | -26.97 |
| | 28925.00 | Peak | H | - | - | -102.91 | 48.09 | -9.54 | 42.64 | 68.20 | -25.56 |

**Table 7-50. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5825MHz
Channel: 165

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11650.00 | Average | H | - | - | -70.88 | 14.60 | 0.00 | 50.72 | 53.98 | -3.26 |
| * | 11650.00 | Peak | H | - | - | -58.60 | 14.60 | 0.00 | 63.00 | 73.98 | -10.98 |
| | 17475.00 | Peak | H | - | - | -60.47 | 17.82 | 0.00 | 64.35 | 68.20 | -3.85 |
| | 23300.00 | Peak | H | - | - | -102.19 | 44.86 | -9.54 | 40.13 | 68.20 | -28.07 |
| | 29125.00 | Peak | H | - | - | -103.71 | 48.09 | -9.54 | 41.84 | 68.20 | -26.36 |

**Table 7-51. Radiated Measurements**



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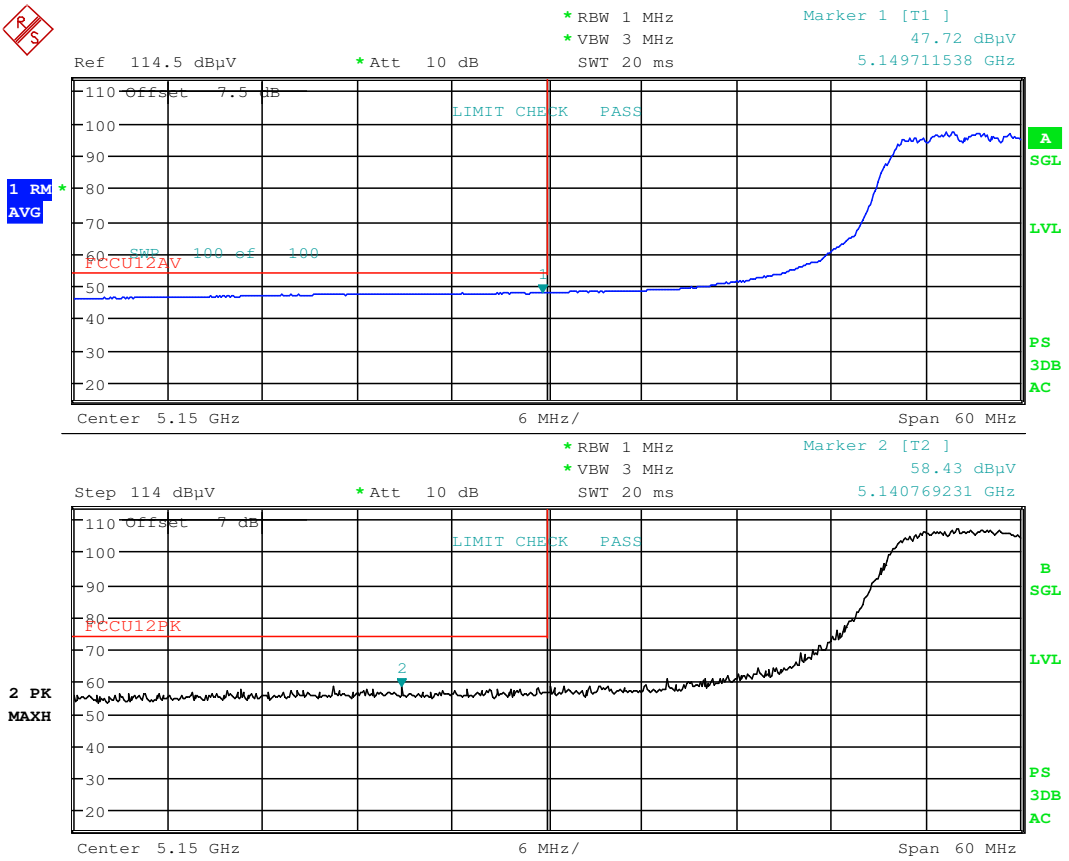
## 7.7.3 Antenna-1 Radiated Band Edge Measurements (20MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11a |
| Worst Case Transfer Rate: | 6 Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5180MHz |
| Channel: | 36 |




Date: 13.DEC.2016 21:47:13

**Plot 7-181. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 1)**

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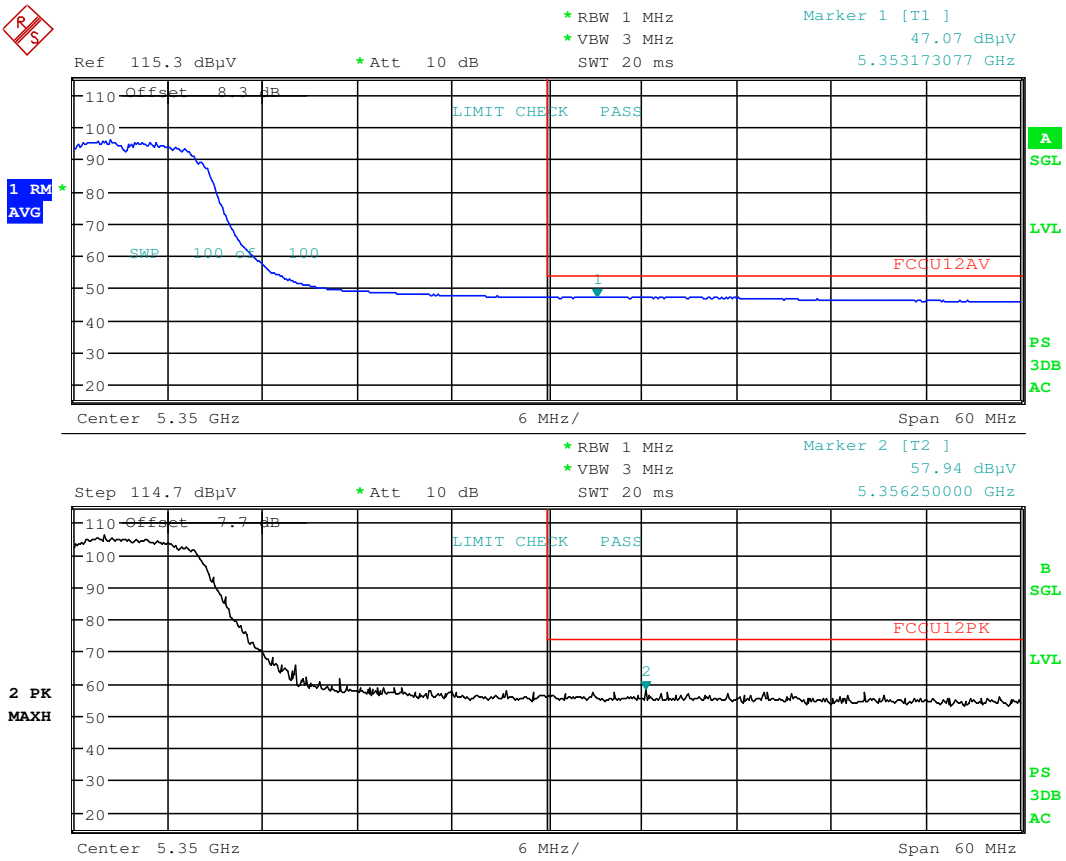
# Antenna-1 Radiated Band Edge Measurements (20MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11a |
| Worst Case Transfer Rate: | 6 Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5320MHz |
| Channel: | 64 |




Date: 13.DEC.2016 21:52:37

**Plot 7-182. Radiated Restricted Upper Band Edge Plot (Average & Peak – UNII Band 2A)**

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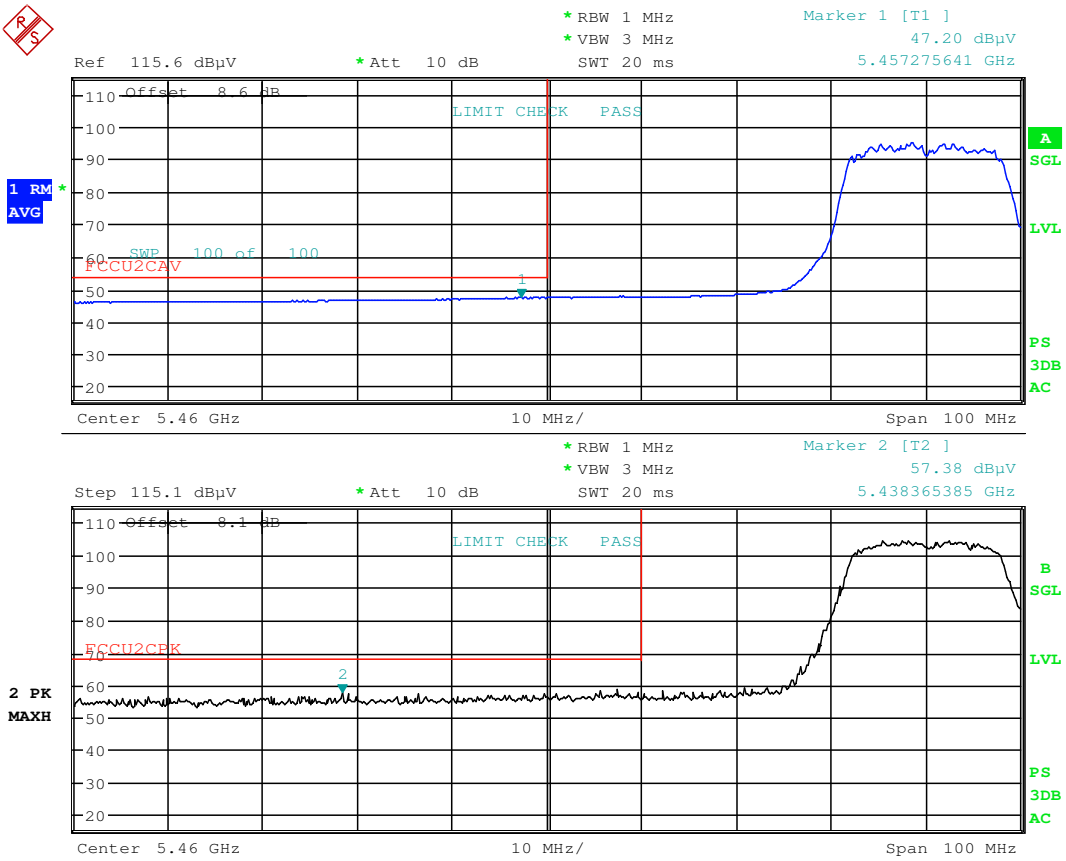
# Antenna-1 Radiated Band Edge Measurements (20MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11a |
| Worst Case Transfer Rate: | 6 Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5500MHz |
| Channel: | 100 |




Date: 13.DEC.2016 21:56:45

**Plot 7-183. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 2C)**

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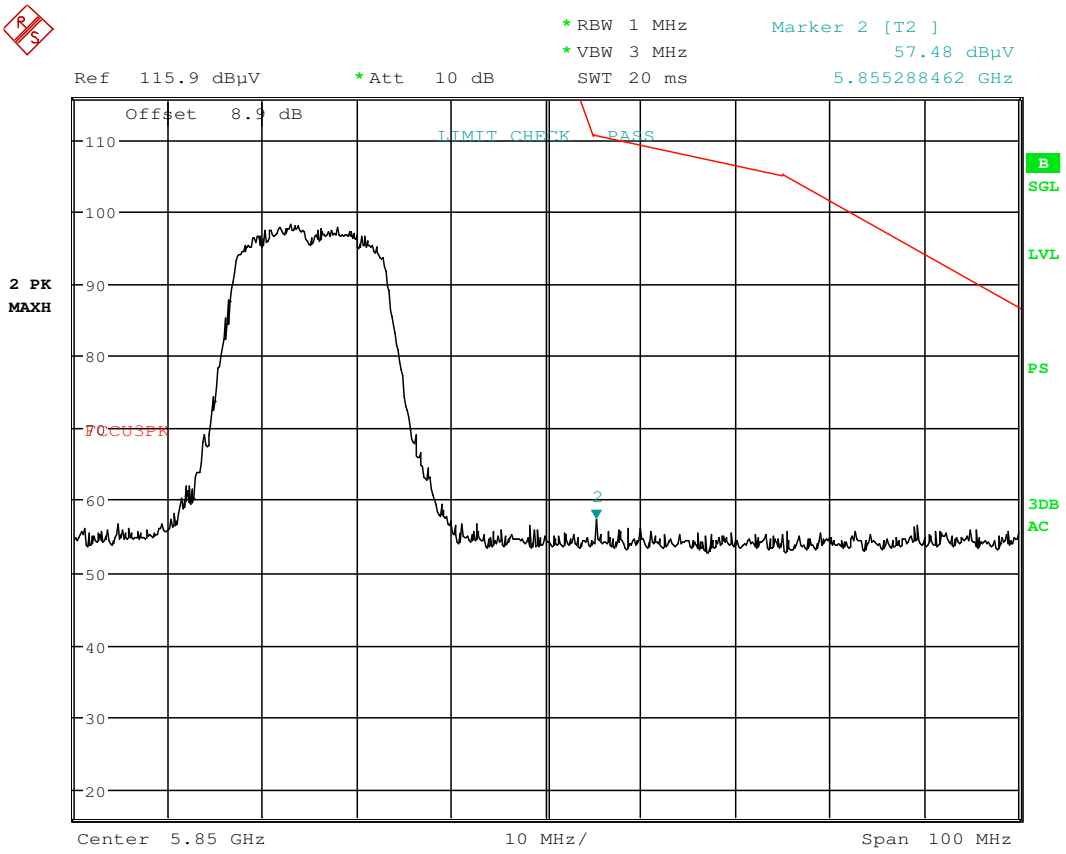
# Antenna-1 Radiated Band Edge Measurements (20MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11a |
| Worst Case Transfer Rate: | 6 Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5825MHz |
| Channel: | 165 |




Date: 14.DEC.2016 22:15:09

**Plot 7-184. Radiated Upper Band Edge Plot (Peak – UNII Band 3)**

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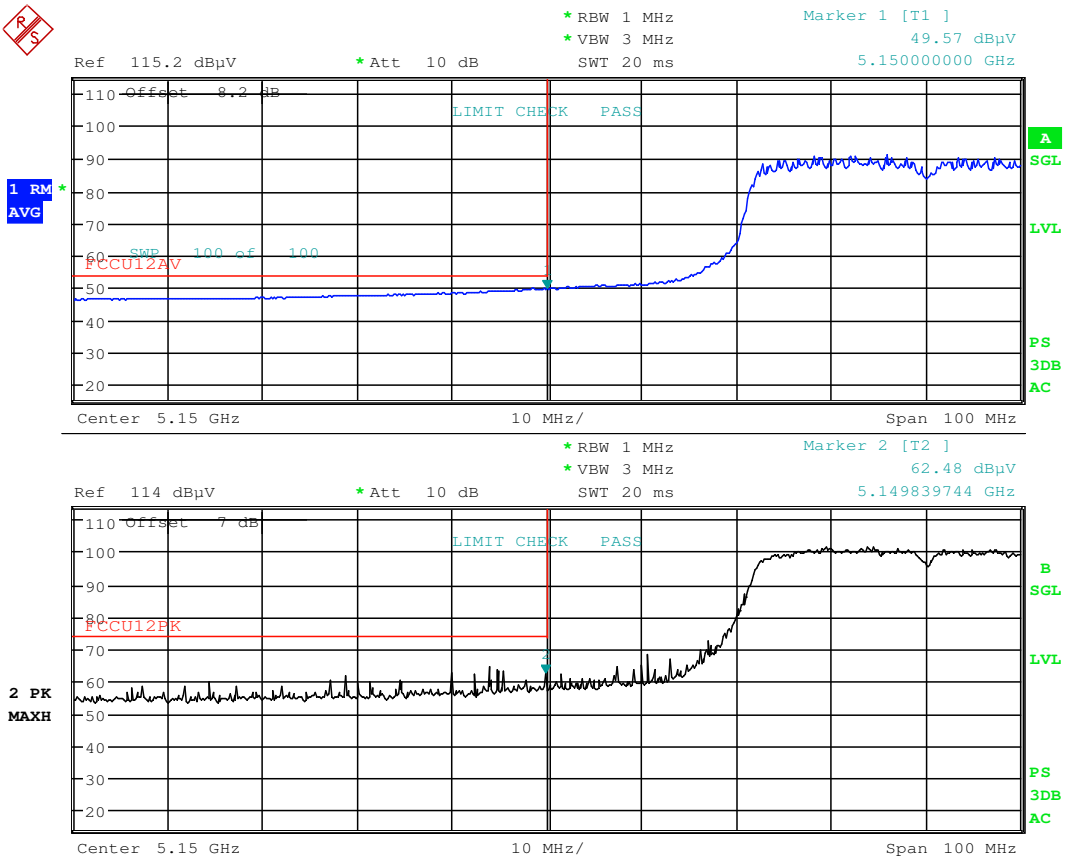
## 7.7.4 Antenna-1 Radiated Band Edge Measurements (40MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5190MHz |
| Channel: | 38 |




Date: 13.DEC.2016 22:10:51

**Plot 7-185. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 1)**

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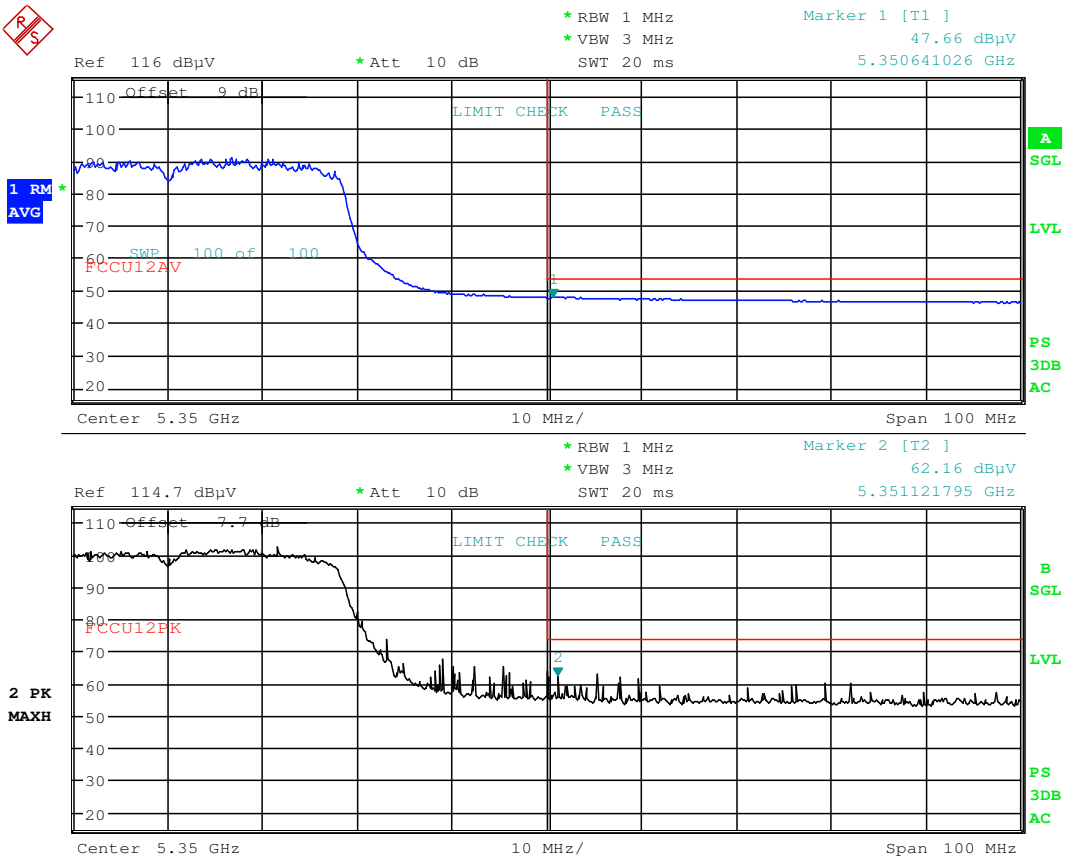
# Antenna-1 Radiated Band Edge Measurements (40MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5310MHz |
| Channel: | 62 |




Date: 13.DEC.2016 22:14:39

**Plot 7-186. Radiated Restricted Upper Band Edge Plot (Average & Peak – UNII Band 2A)**

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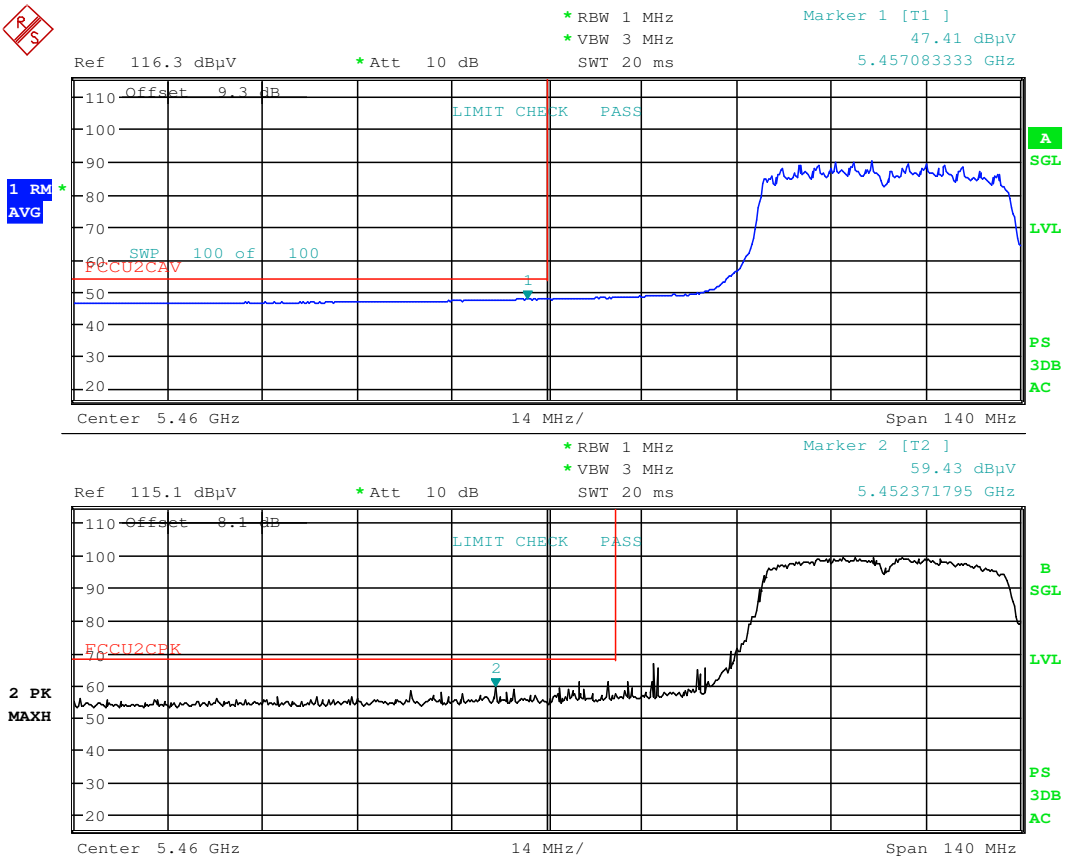
# Antenna-1 Radiated Band Edge Measurements (40MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5510MHz |
| Channel: | 102 |




Date: 13.DEC.2016 22:18:26

**Plot 7-187. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 2C)**

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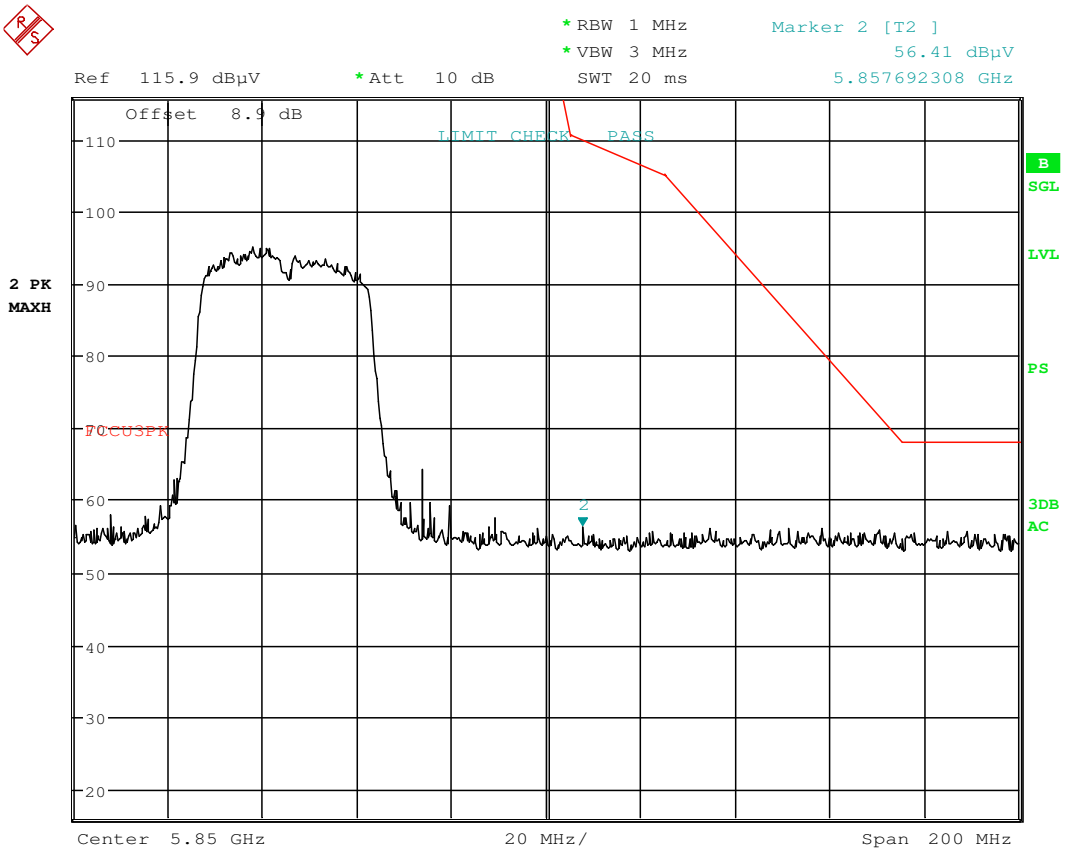
# Antenna-1 Radiated Band Edge Measurements (40MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5795MHz |
| Channel: | 159 |




Date: 14.DEC.2016 22:16:24

**Plot 7-188. Radiated Upper Band Edge Plot (Peak – UNII Band 3)**

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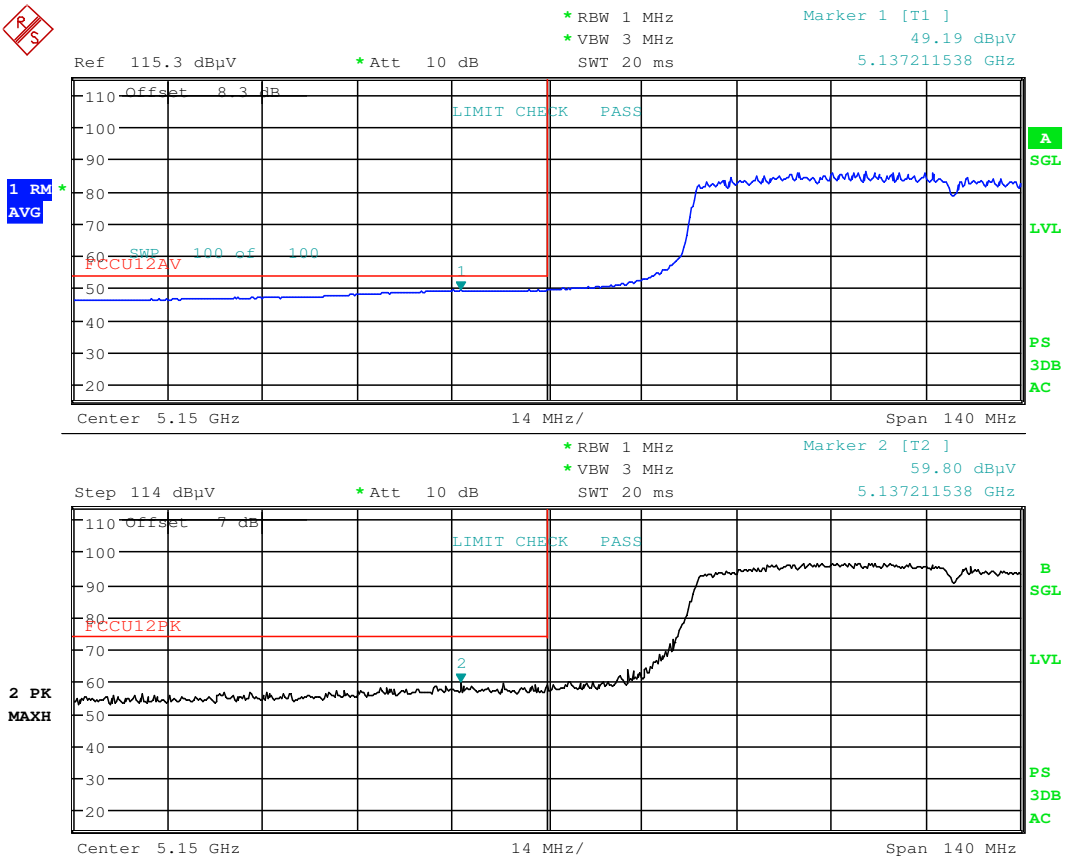
## 7.7.5 Antenna-1 Radiated Band Edge Measurements (80MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11ac (80MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5210MHz |
| Channel: | 42 |




Date: 14.DEC.2016 22:05:42

**Plot 7-189. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 1)**

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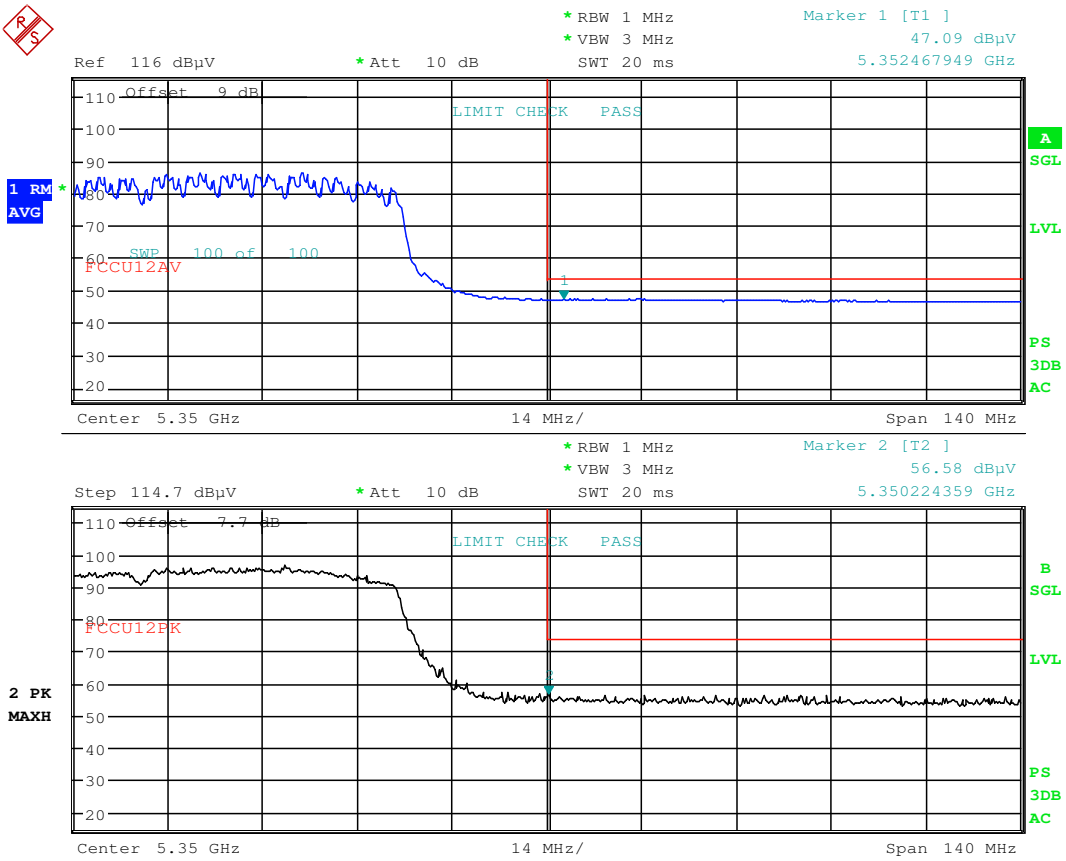
# Antenna-1 Radiated Band Edge Measurements (80MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11ac (80MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5290MHz |
| Channel: | 58 |




Date: 14.DEC.2016 22:11:32

**Plot 7-190. Radiated Restricted Upper Band Edge Plot (Average & Peak – UNII Band 2A)**

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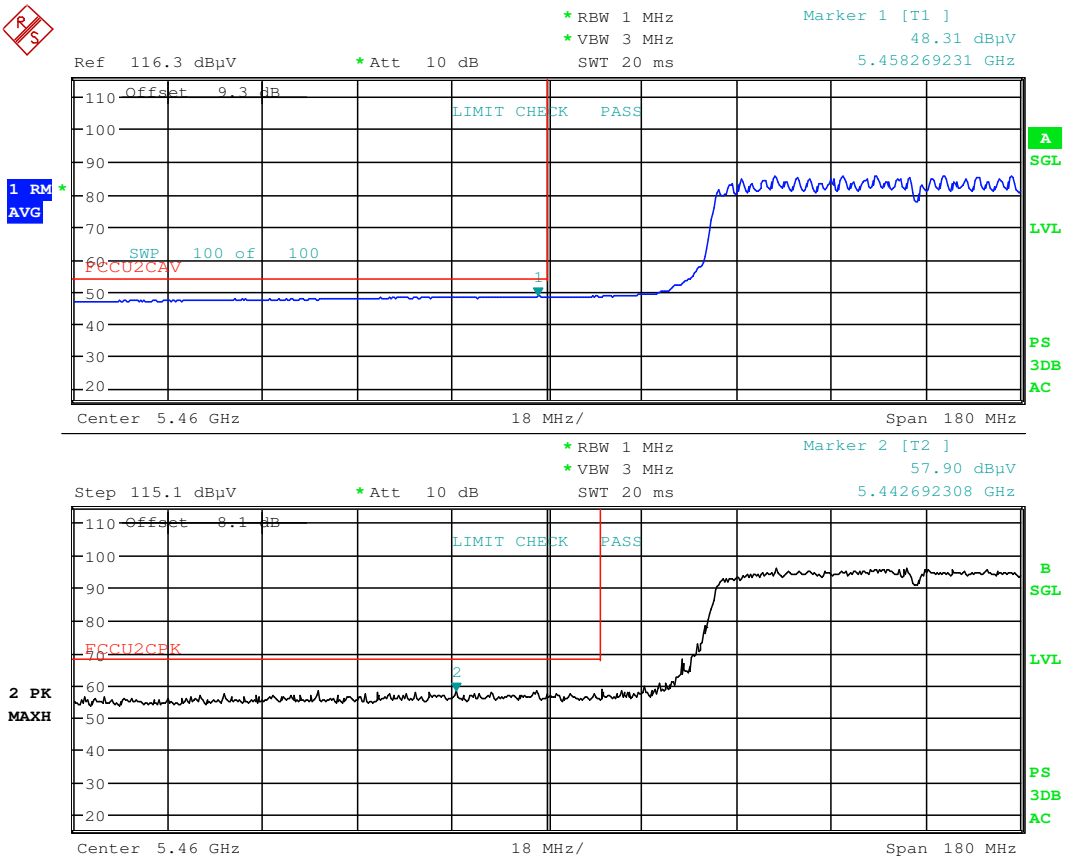
# Antenna-1 Radiated Band Edge Measurements (80MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11ac (80MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5530MHz |
| Channel: | 106 |




Date: 14.DEC.2016 22:12:54

**Plot 7-191. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 2C)**

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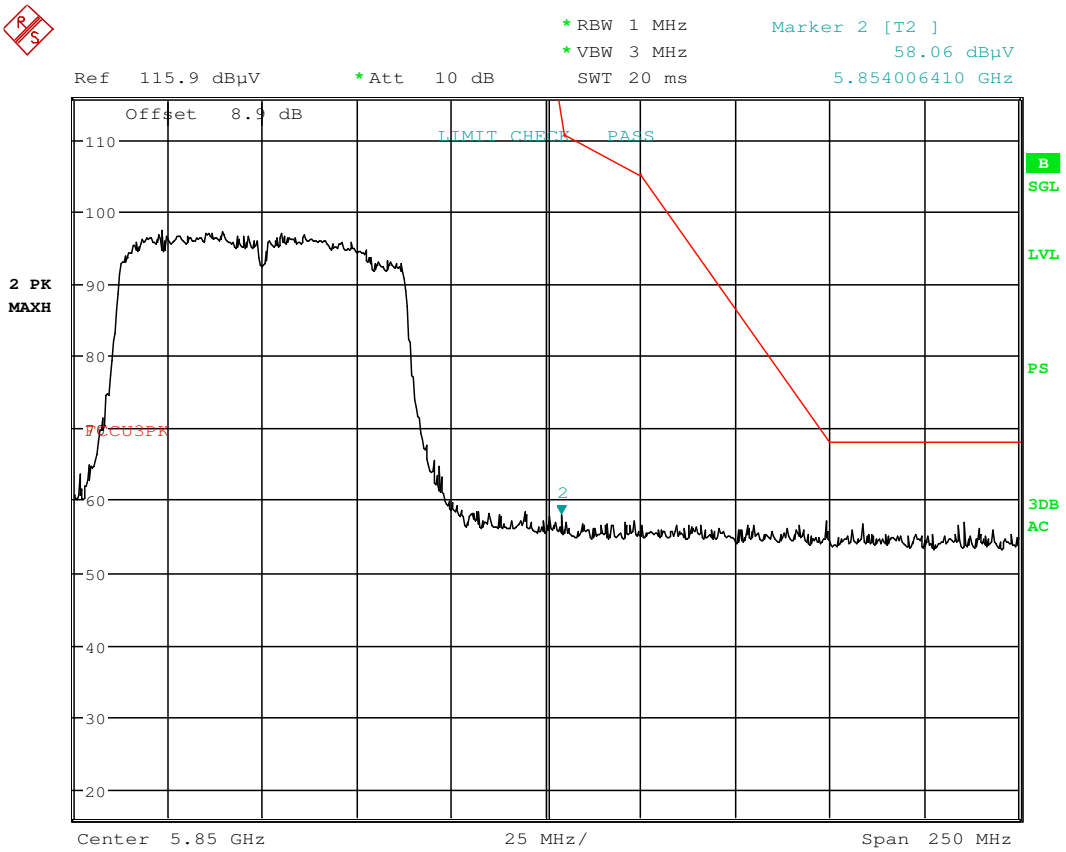
# Antenna-1 Radiated Band Edge Measurements (80MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11ac (80MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5775MHz |
| Channel: | 155 |




Date: 14.DEC.2016 21:59:24

**Plot 7-192. Radiated Upper Band Edge Plot (Peak – UNII Band 3)**

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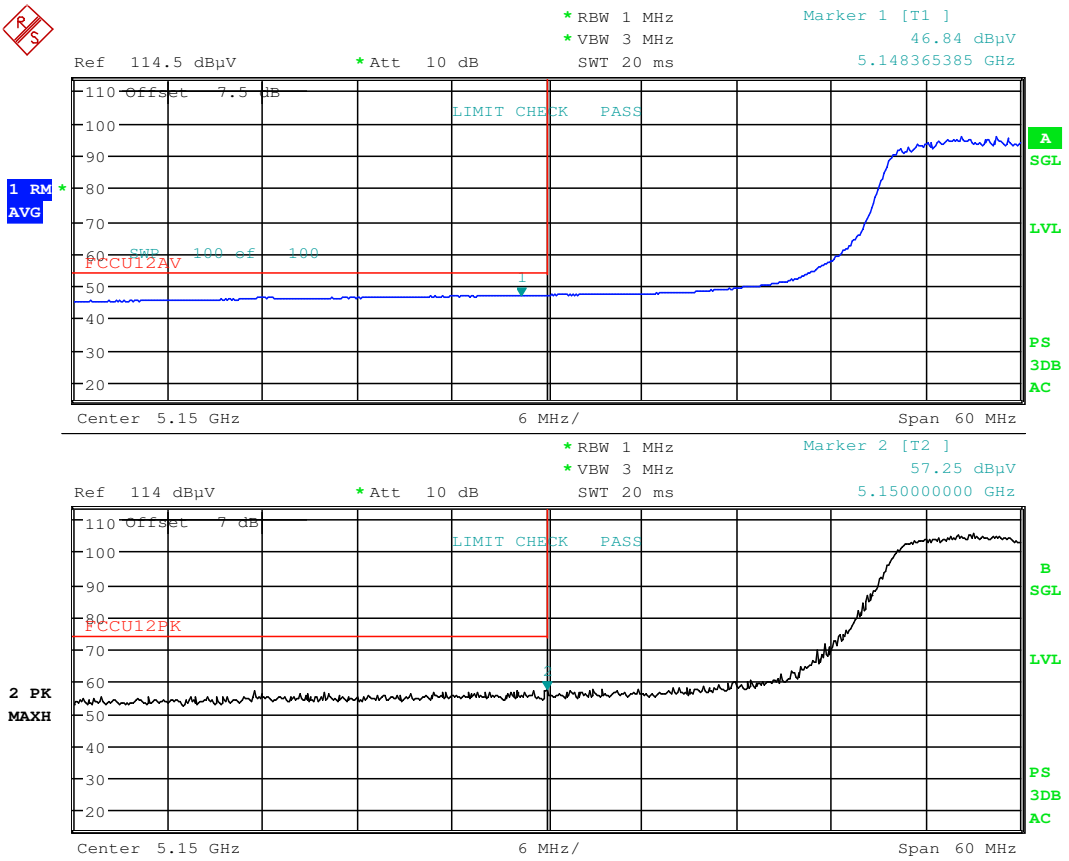
## 7.7.6 Antenna-2 Radiated Band Edge Measurements (20MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11a |
| Worst Case Transfer Rate: | 6 Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5180MHz |
| Channel: | 36 |




Date: 13.DEC.2016 22:39:07

**Plot 7-193. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 1)**

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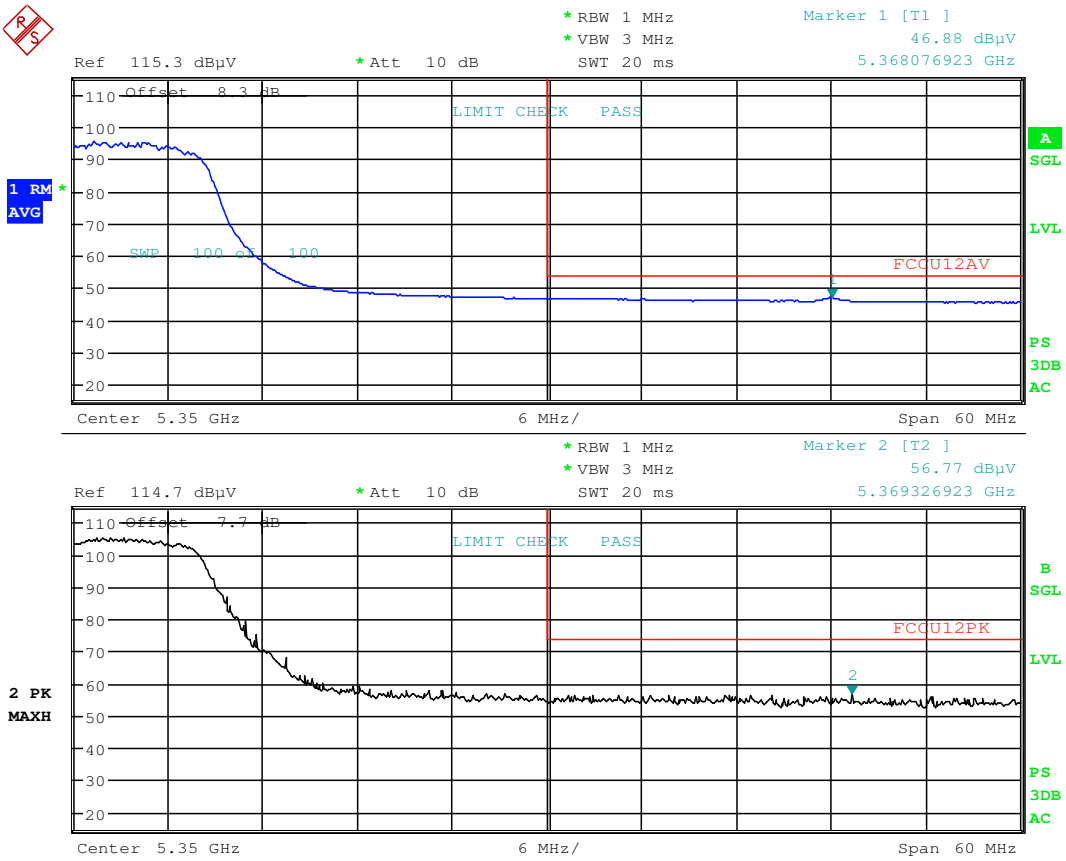
# Antenna-2 Radiated Band Edge Measurements (20MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11a |
| Worst Case Transfer Rate: | 6 Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5320MHz |
| Channel: | 64 |




Date: 13.DEC.2016 22:48:56

**Plot 7-194. Radiated Restricted Upper Band Edge Plot (Average & Peak – UNII Band 2A)**

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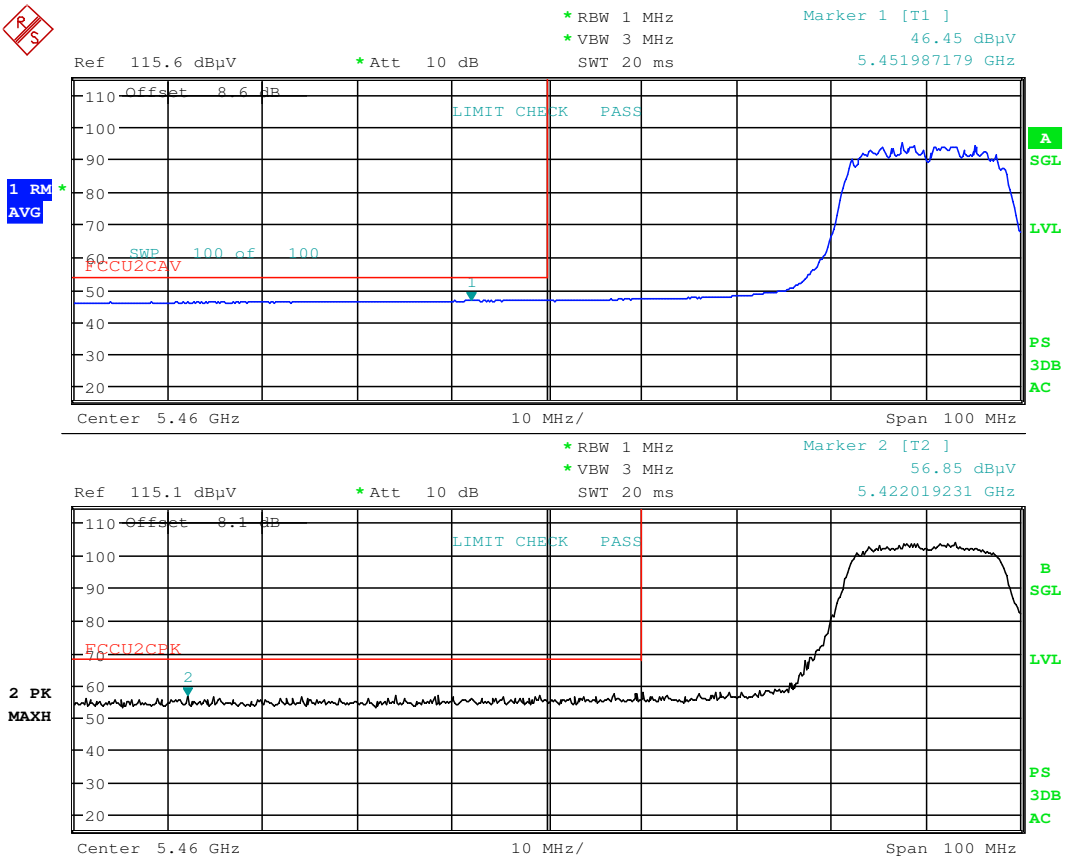
# Antenna-2 Radiated Band Edge Measurements (20MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11a |
| Worst Case Transfer Rate: | 6 Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5500MHz |
| Channel: | 100 |




Date: 13.DEC.2016 22:57:23

**Plot 7-195. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 2C)**

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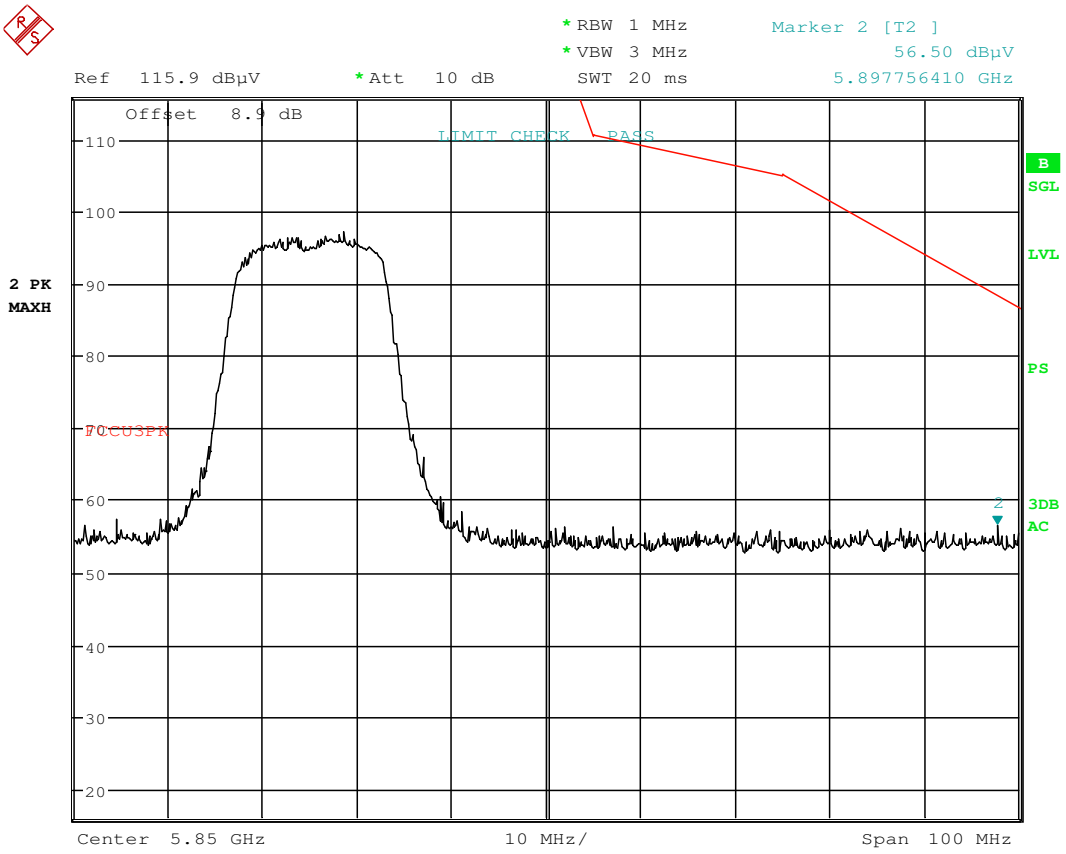
# Antenna-2 Radiated Band Edge Measurements (20MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11a |
| Worst Case Transfer Rate: | 6 Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5825MHz |
| Channel: | 165 |




Date: 14.DEC.2016 22:33:56

**Plot 7-196. Radiated Upper Band Edge Plot (Peak – UNII Band 3)**

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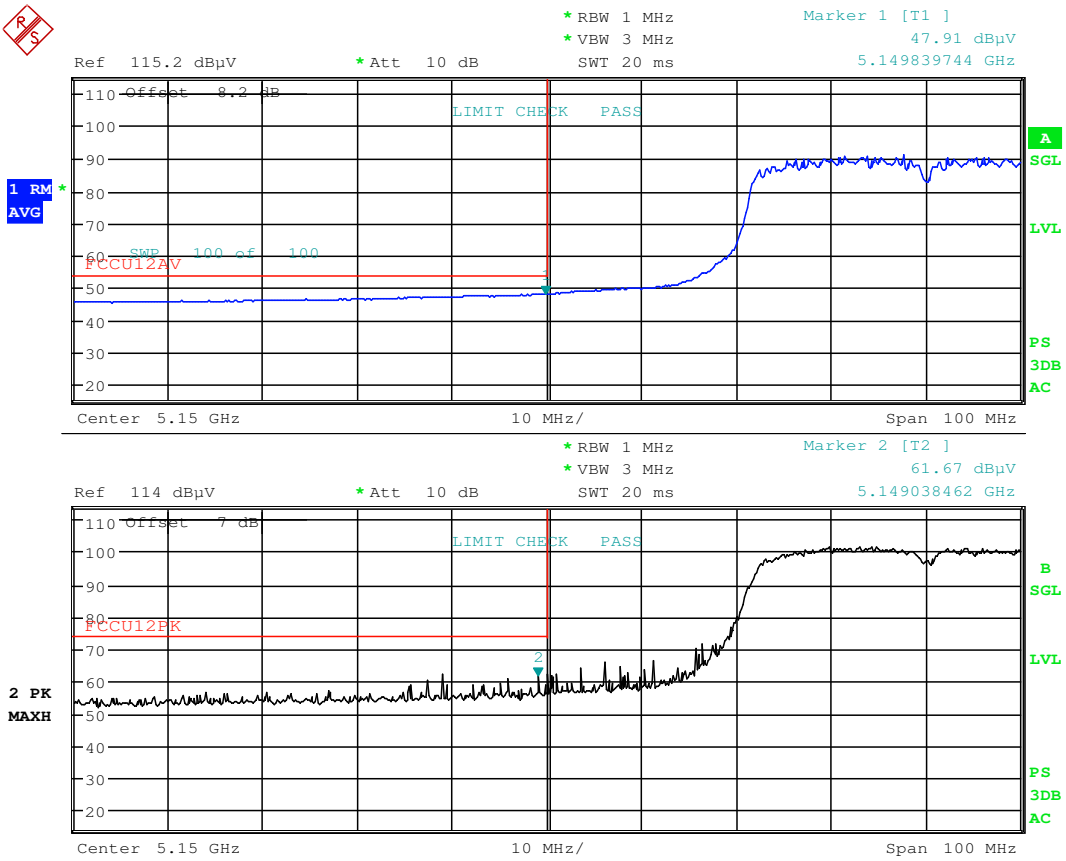
## 7.7.7 Antenna-2 Radiated Band Edge Measurements (40MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5190MHz |
| Channel: | 38 |




Date: 13.DEC.2016 23:03:49

**Plot 7-197. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 1)**

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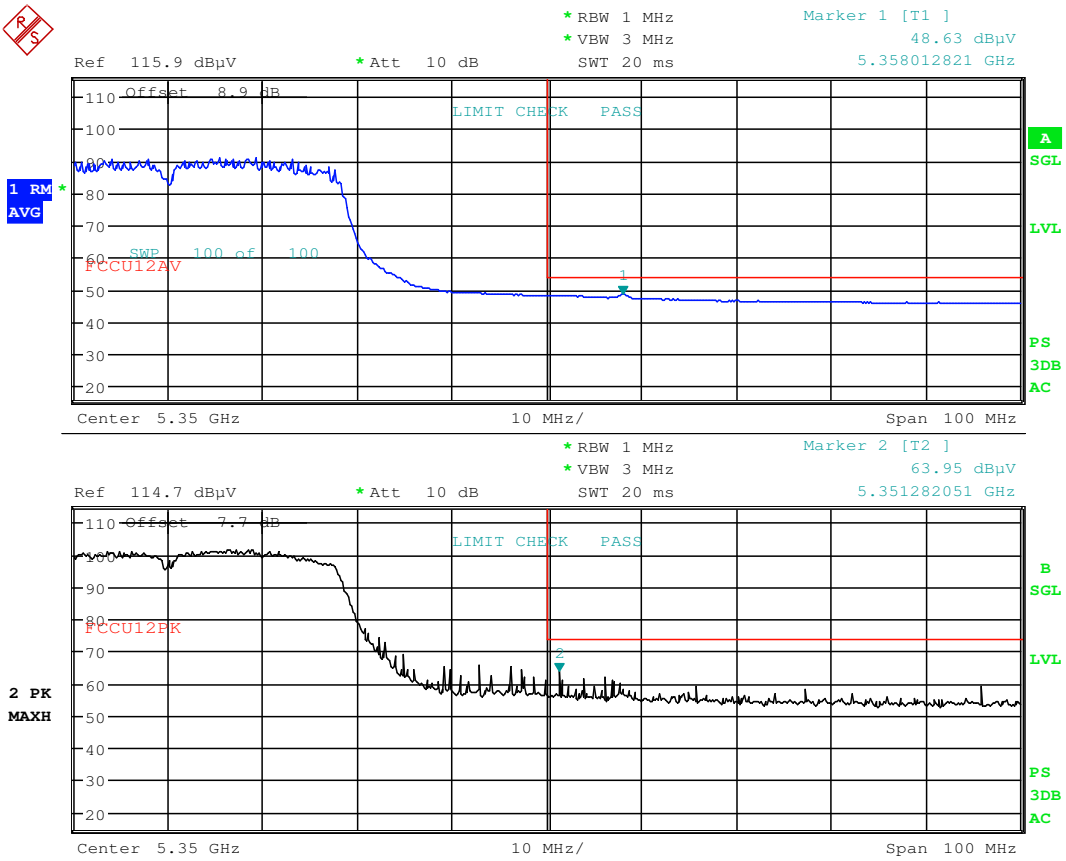
# Antenna-2 Radiated Band Edge Measurements (40MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5310MHz |
| Channel: | 62 |




Date: 13.DEC.2016 23:05:07

**Plot 7-198. Radiated Restricted Upper Band Edge Plot (Average & Peak – UNII Band 2A)**

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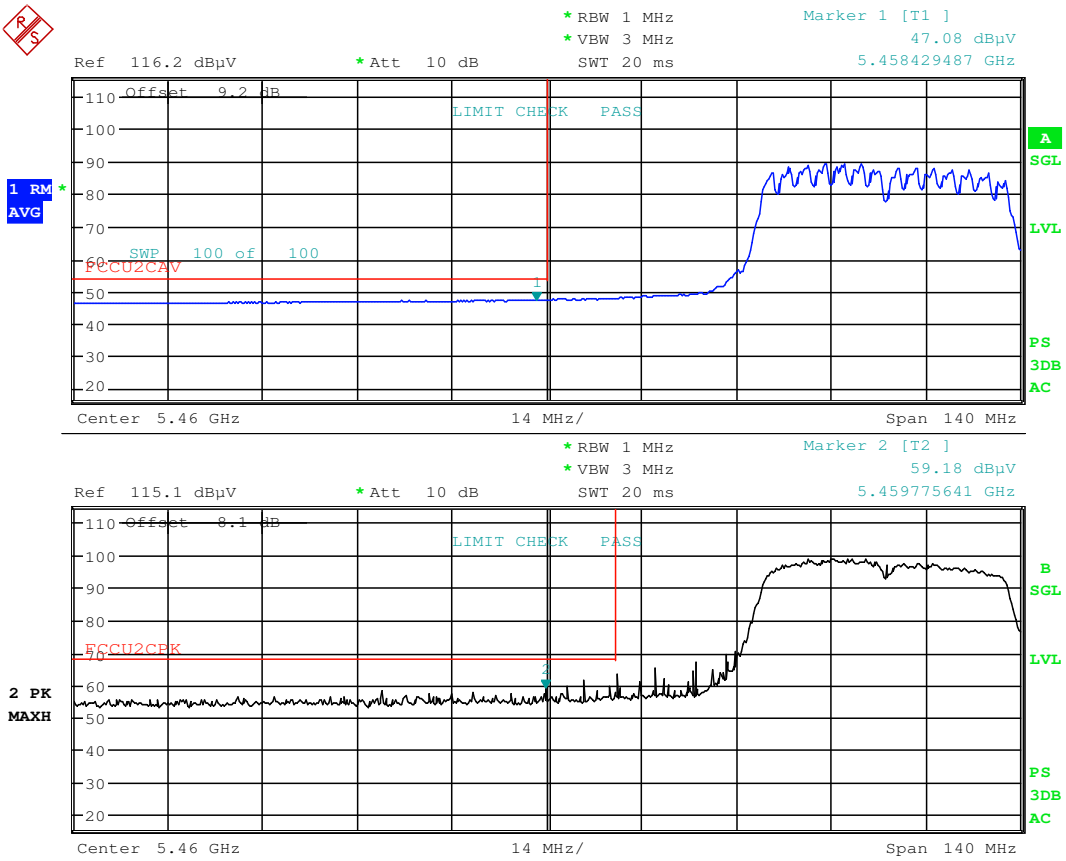
# Antenna-2 Radiated Band Edge Measurements (40MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5510MHz |
| Channel: | 102 |




Date: 13.DEC.2016 23:09:16

**Plot 7-199. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 2C)**

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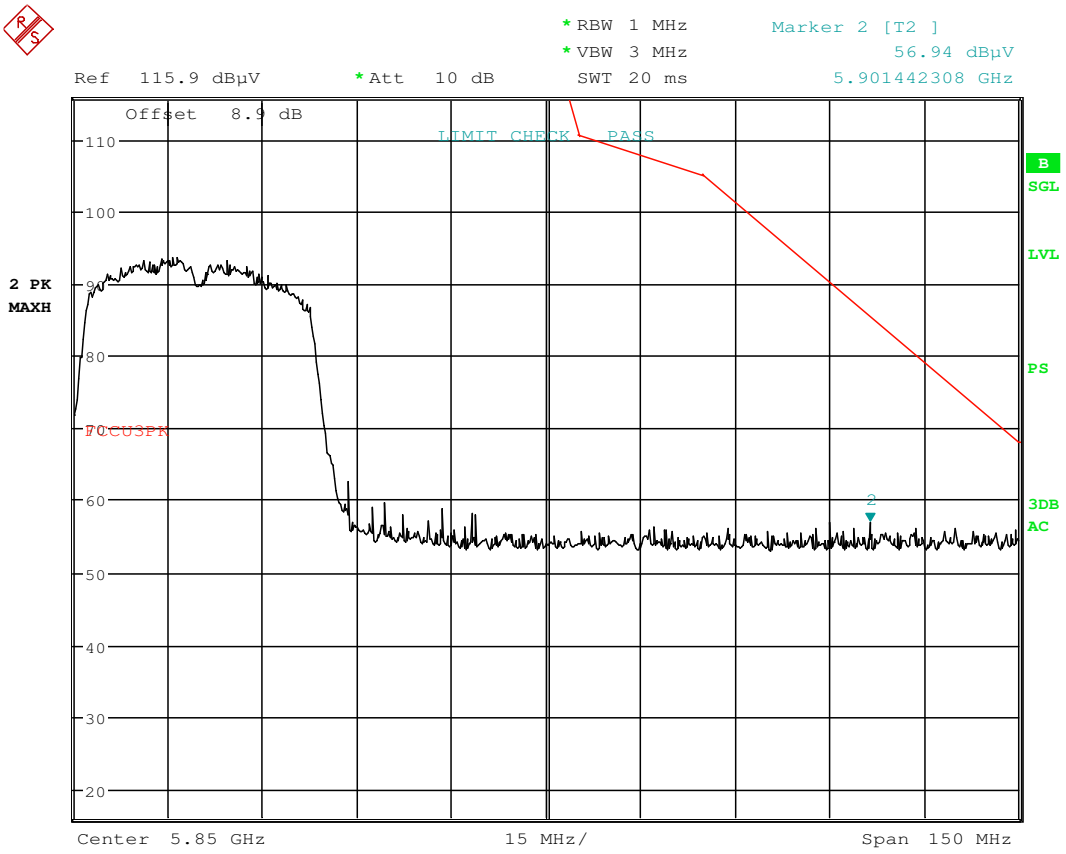
# Antenna-2 Radiated Band Edge Measurements (40MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5795MHz |
| Channel: | 159 |




Date: 14.DEC.2016 22:35:57

**Plot 7-200. Radiated Upper Band Edge Plot (Peak – UNII Band 3)**

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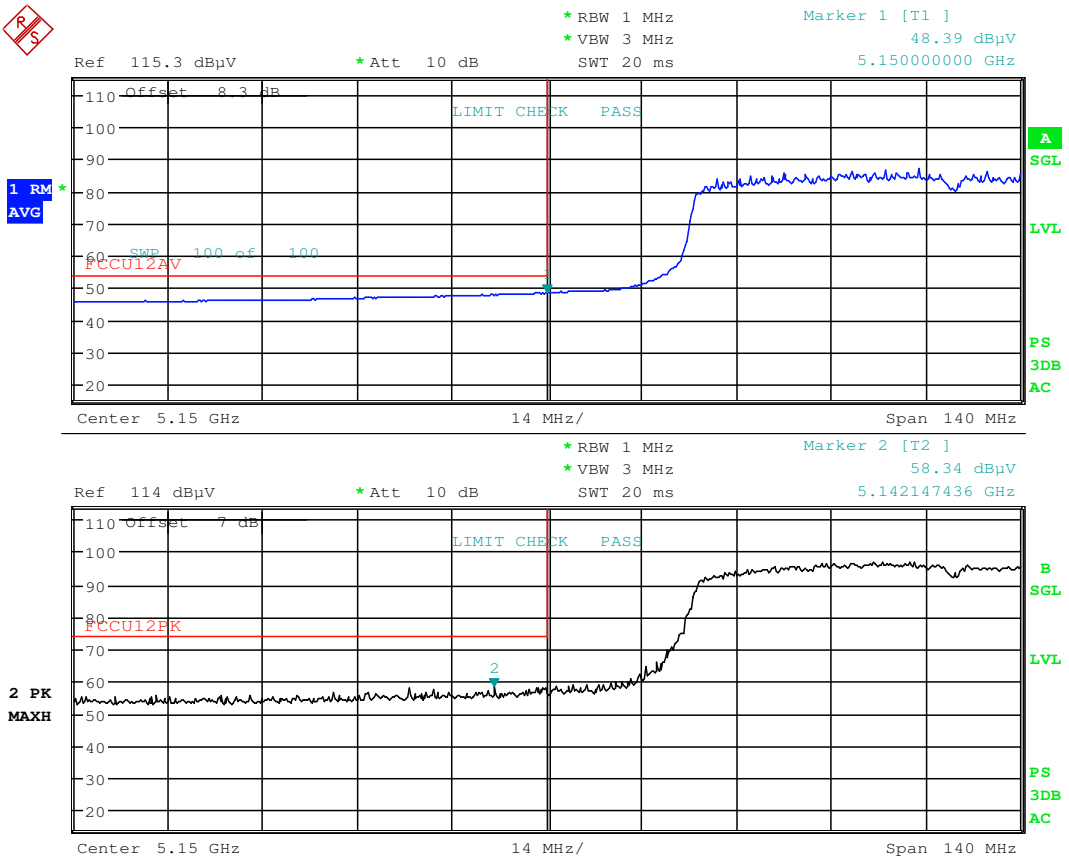
## 7.7.8 Antenna-2 Radiated Band Edge Measurements (80MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11ac (80MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5210MHz |
| Channel: | 42 |




Date: 14.DEC.2016 22:43:02

**Plot 7-201. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 1)**

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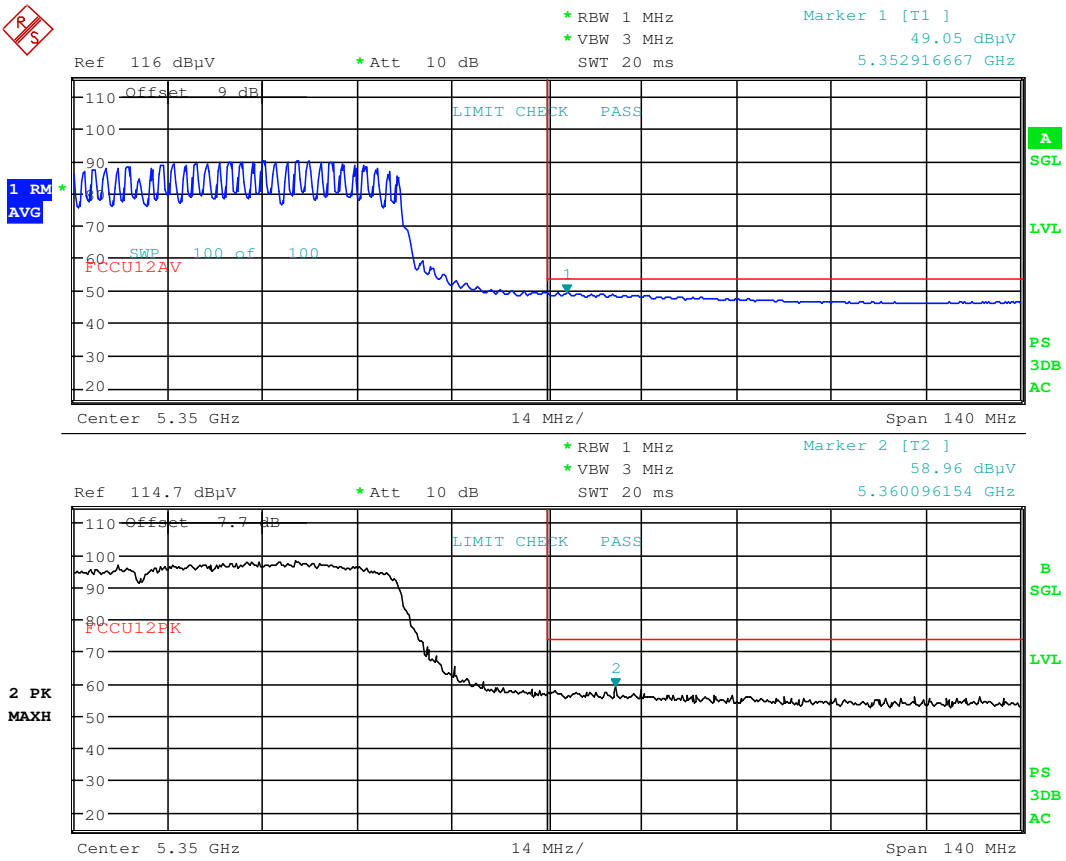
# Antenna-2 Radiated Band Edge Measurements (80MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11ac (80MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5290MHz |
| Channel: | 58 |




Date: 14.DEC.2016 22:47:38

**Plot 7-202. Radiated Restricted Upper Band Edge Plot (Average & Peak – UNII Band 2A)**

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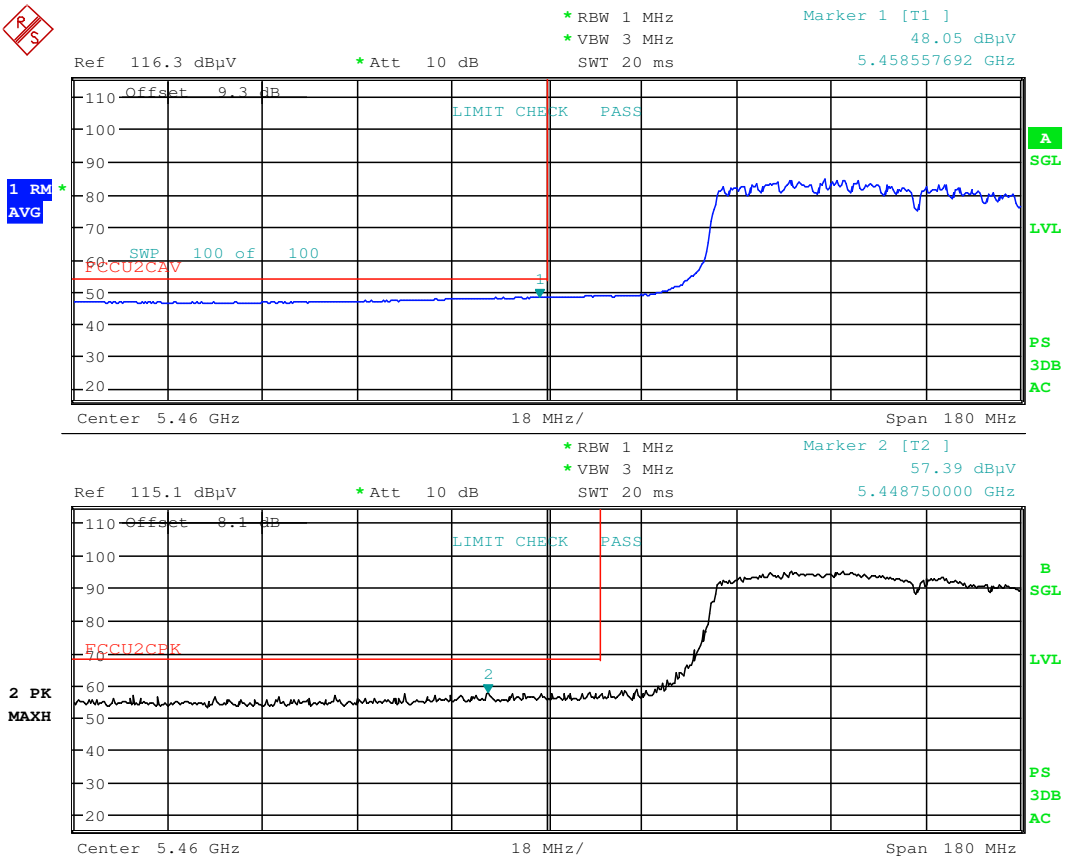
# Antenna-2 Radiated Band Edge Measurements (80MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11ac (80MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5530MHz |
| Channel: | 106 |




Date: 14.DEC.2016 22:54:29

**Plot 7-203. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 2C)**

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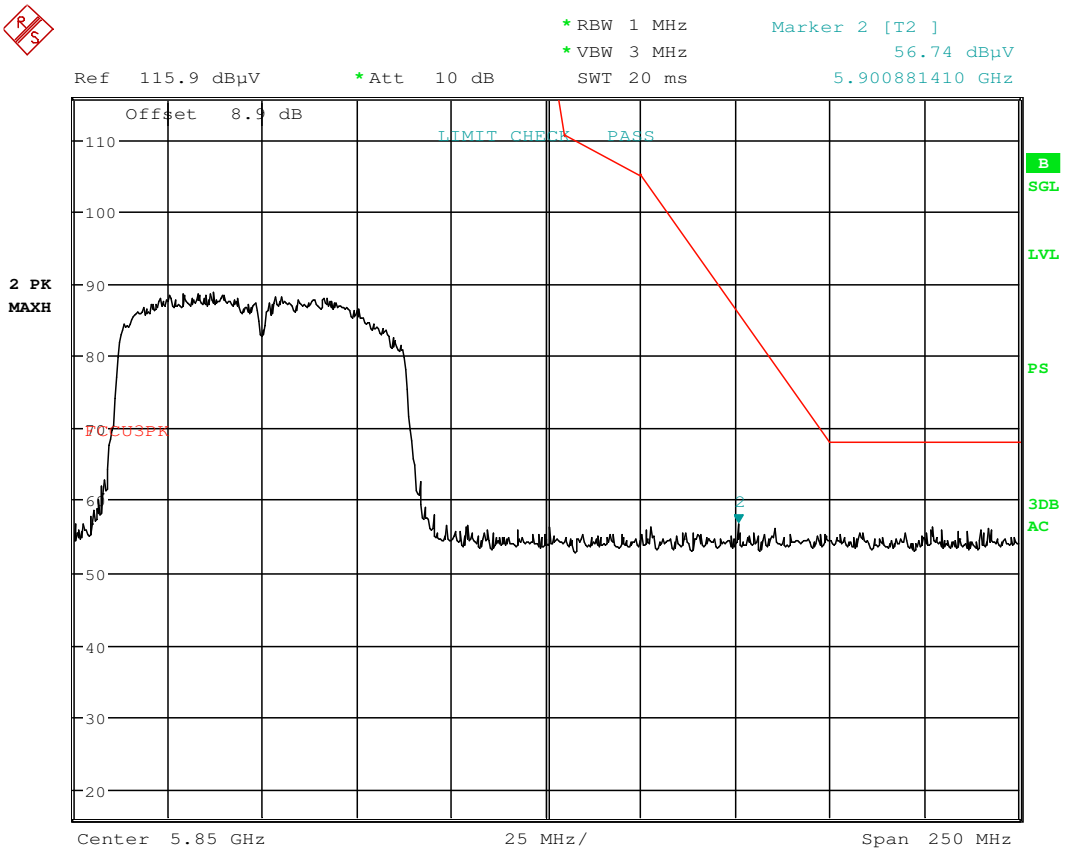
# Antenna-2 Radiated Band Edge Measurements (80MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11ac (80MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5775MHz |
| Channel: | 155 |




Date: 14.DEC.2016 22:37:23

**Plot 7-204. Radiated Upper Band Edge Plot (Peak – UNII Band 3)**

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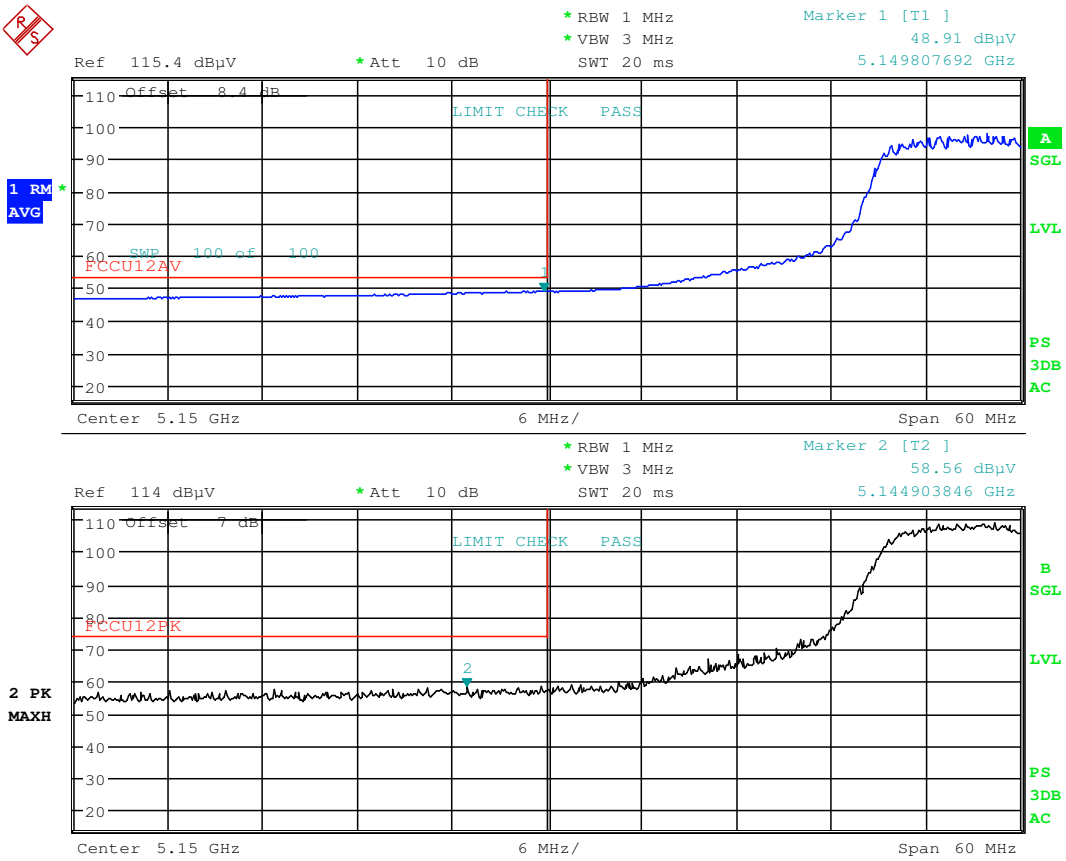
## 7.7.9 MIMO Radiated Band Edge Measurements (20MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n (20MHz) |
| Worst Case Transfer Rate: | MCS8 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5180MHz |
| Channel: | 36 |




Date: 15.DEC.2016 00:39:42

**Plot 7-205. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 1)**

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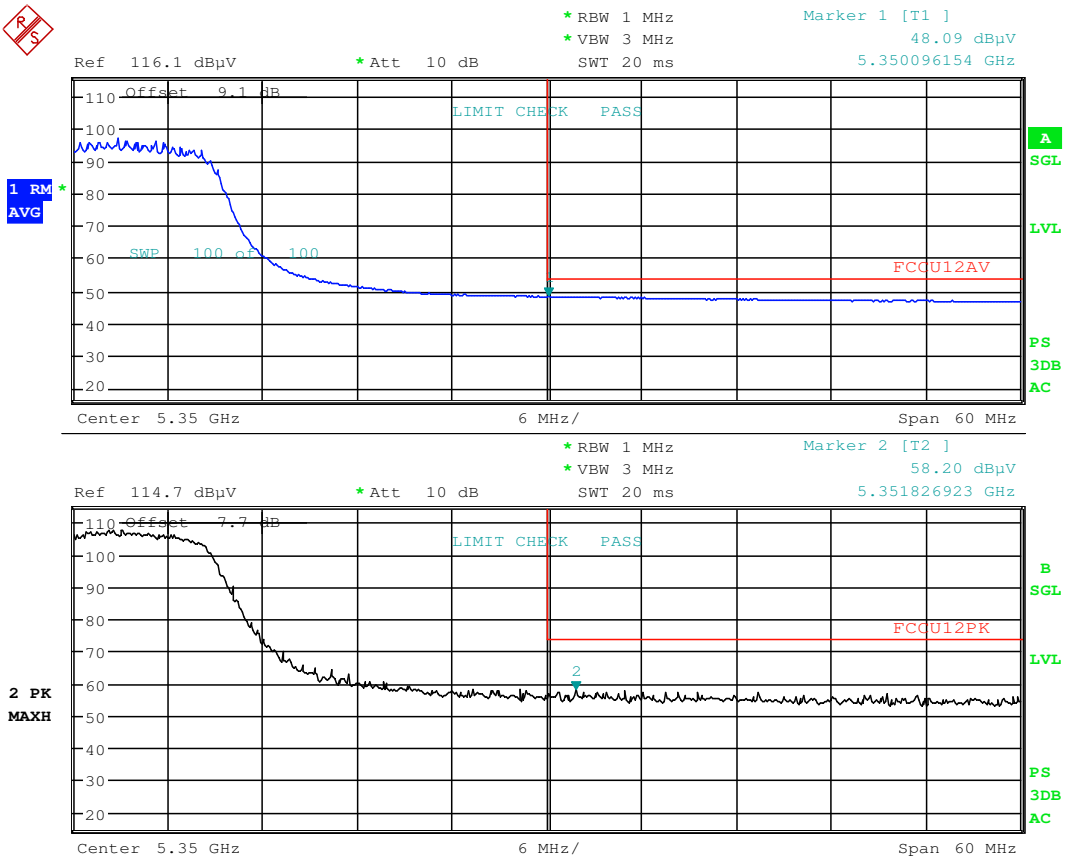
# MIMO Radiated Band Edge Measurements (20MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n (20MHz) |
| Worst Case Transfer Rate: | MCS8 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5320MHz |
| Channel: | 64 |




Date: 15.DEC.2016 00:49:59

**Plot 7-206. Radiated Restricted Upper Band Edge Plot (Average & Peak – UNII Band 2A)**

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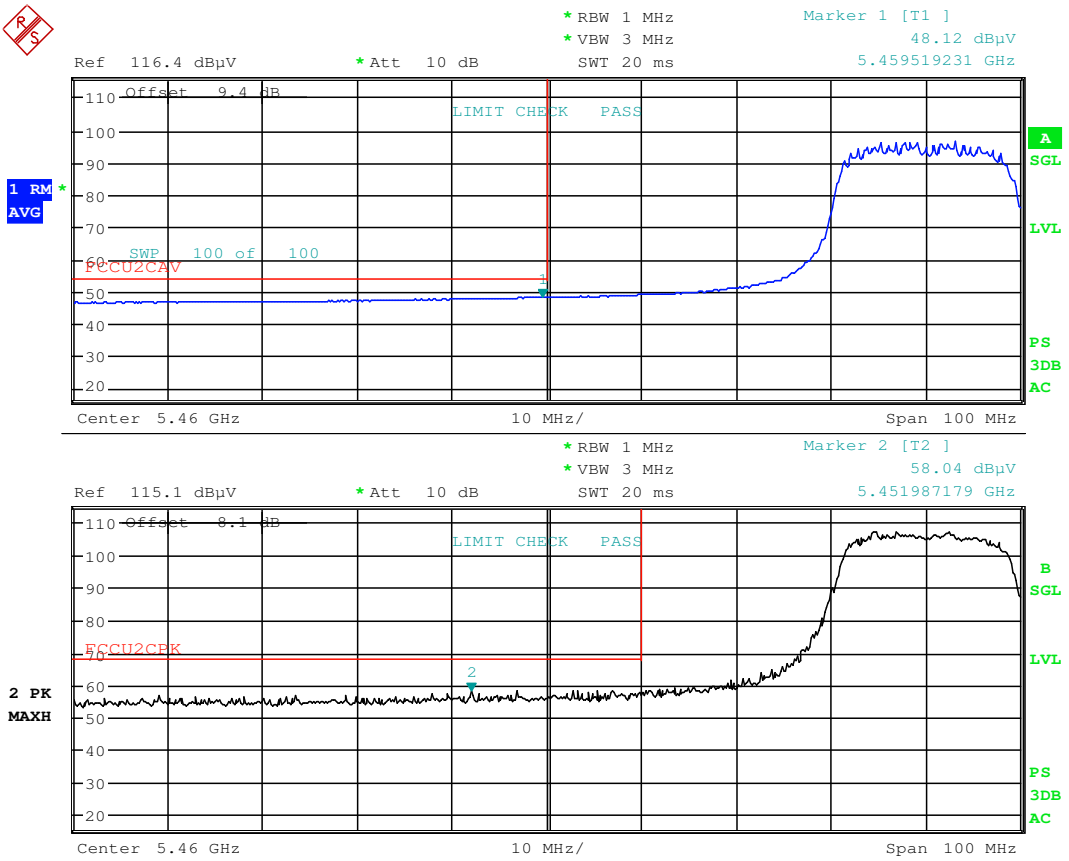
# MIMO Radiated Band Edge Measurements (20MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n (20MHz) |
| Worst Case Transfer Rate: | MCS8 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5500MHz |
| Channel: | 100 |




Date: 15.DEC.2016 00:48:28

**Plot 7-207. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 2C)**

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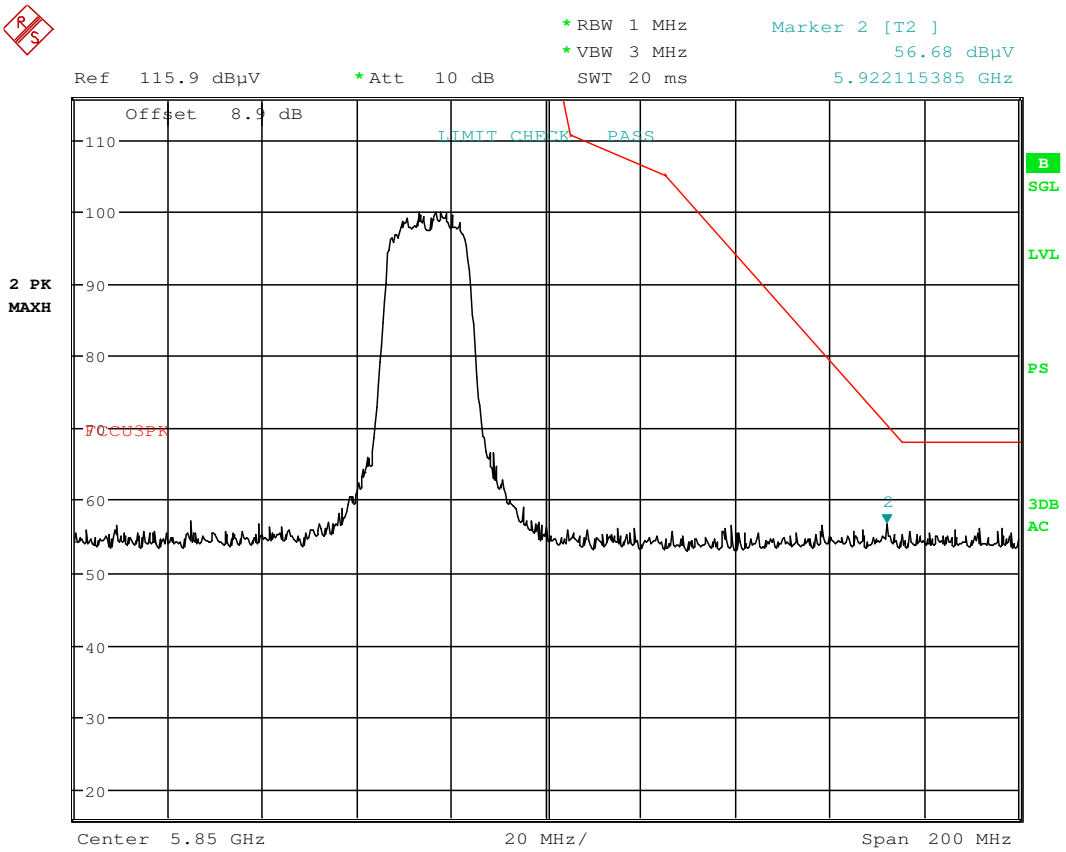
# MIMO Radiated Band Edge Measurements (20MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n (20MHz) |
| Worst Case Transfer Rate: | MCS8 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5825MHz |
| Channel: | 165 |




Date: 15.DEC.2016 00:50:59

**Plot 7-208. Radiated Upper Band Edge Plot (Peak – UNII Band 3)**

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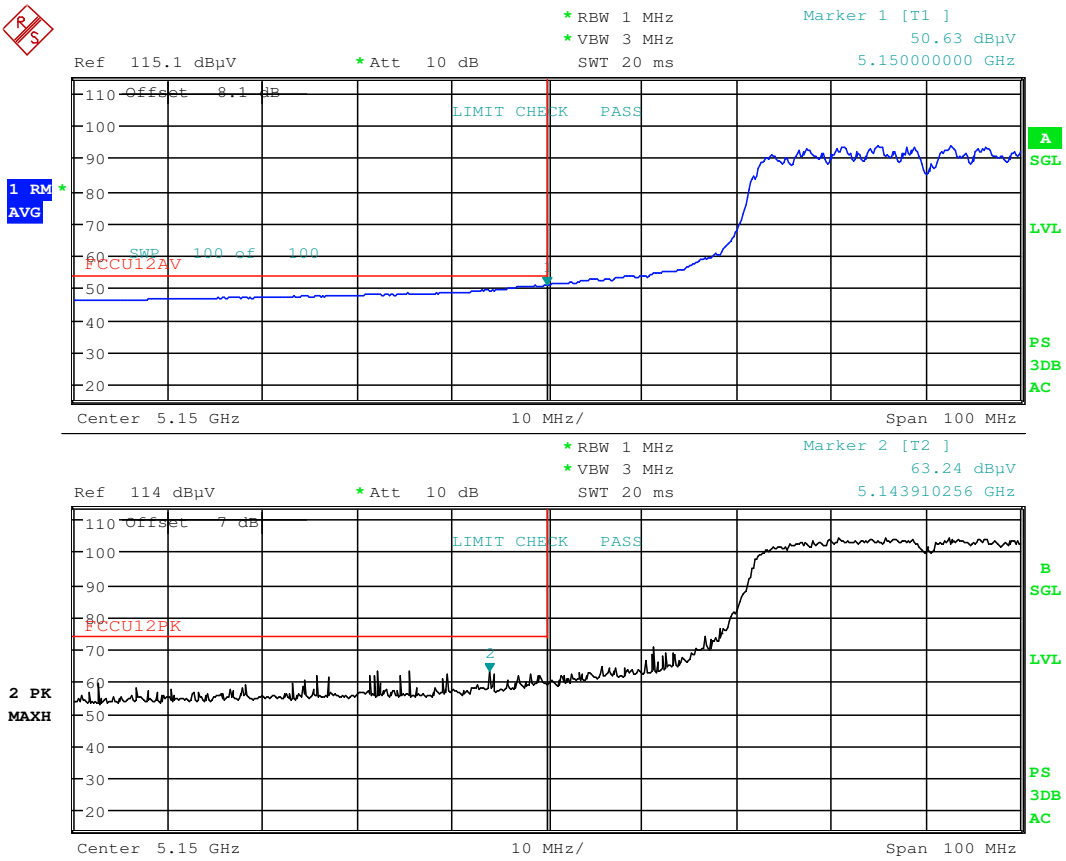
## 7.7.10 MIMO Radiated Band Edge Measurements (40MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS8 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5190MHz |
| Channel: | 38 |




Date: 15.DEC.2016 00:59:39

**Plot 7-209. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 1)**

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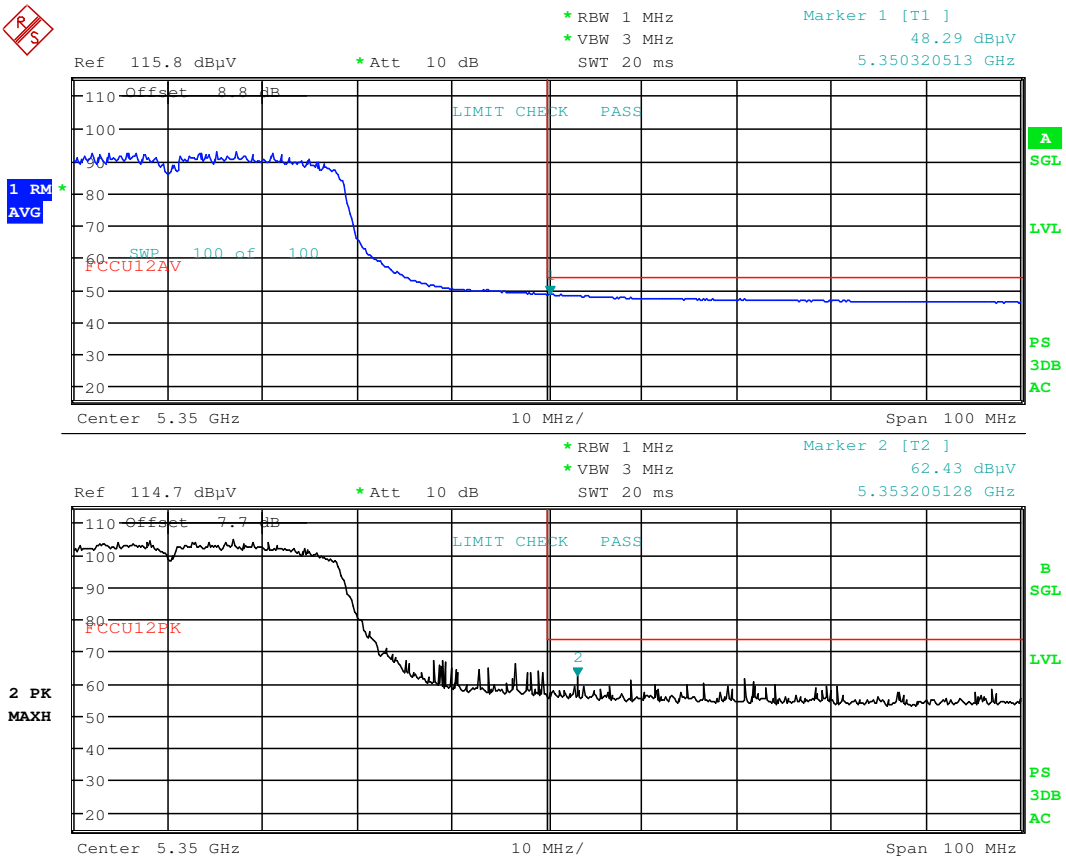
# MIMO Radiated Band Edge Measurements (40MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS8 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5310MHz |
| Channel: | 62 |




Date: 15.DEC.2016 01:00:52

**Plot 7-210. Radiated Restricted Upper Band Edge Plot (Average & Peak – UNII Band 2A)**

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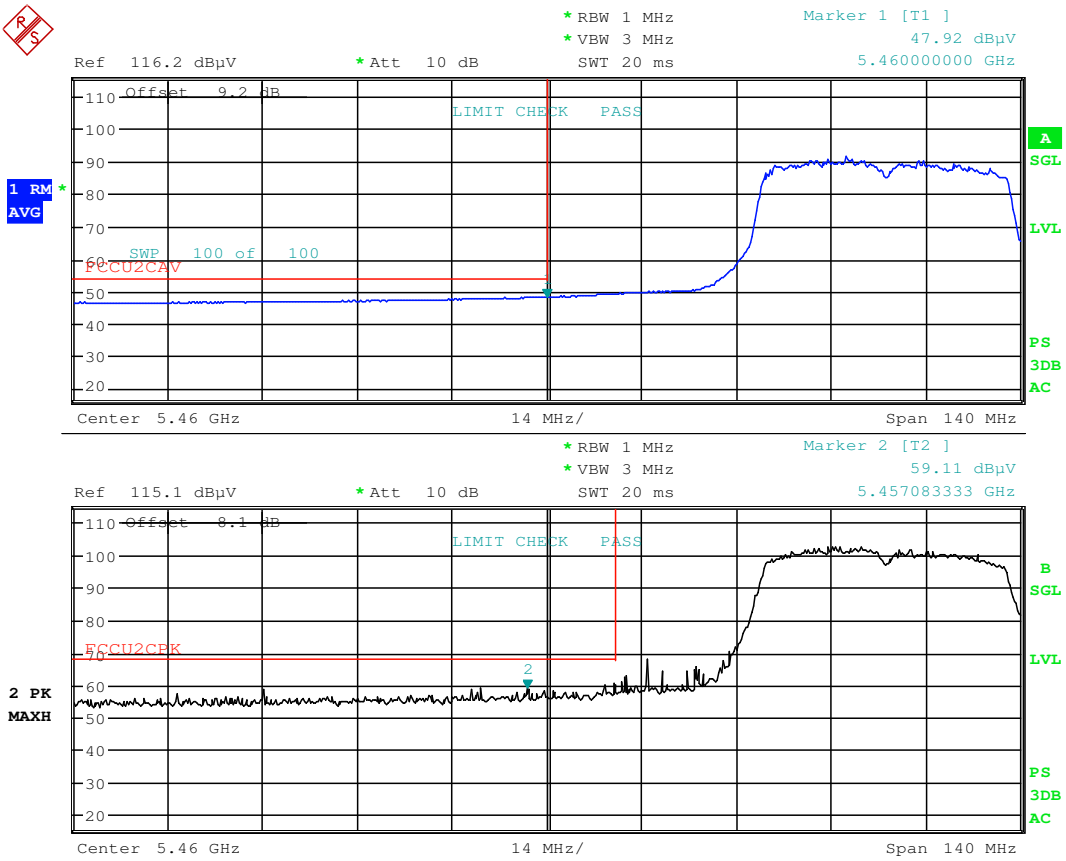
# MIMO Radiated Band Edge Measurements (40MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS8 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5510MHz |
| Channel: | 102 |




Date: 15.DEC.2016 01:04:54

**Plot 7-211. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 2C)**

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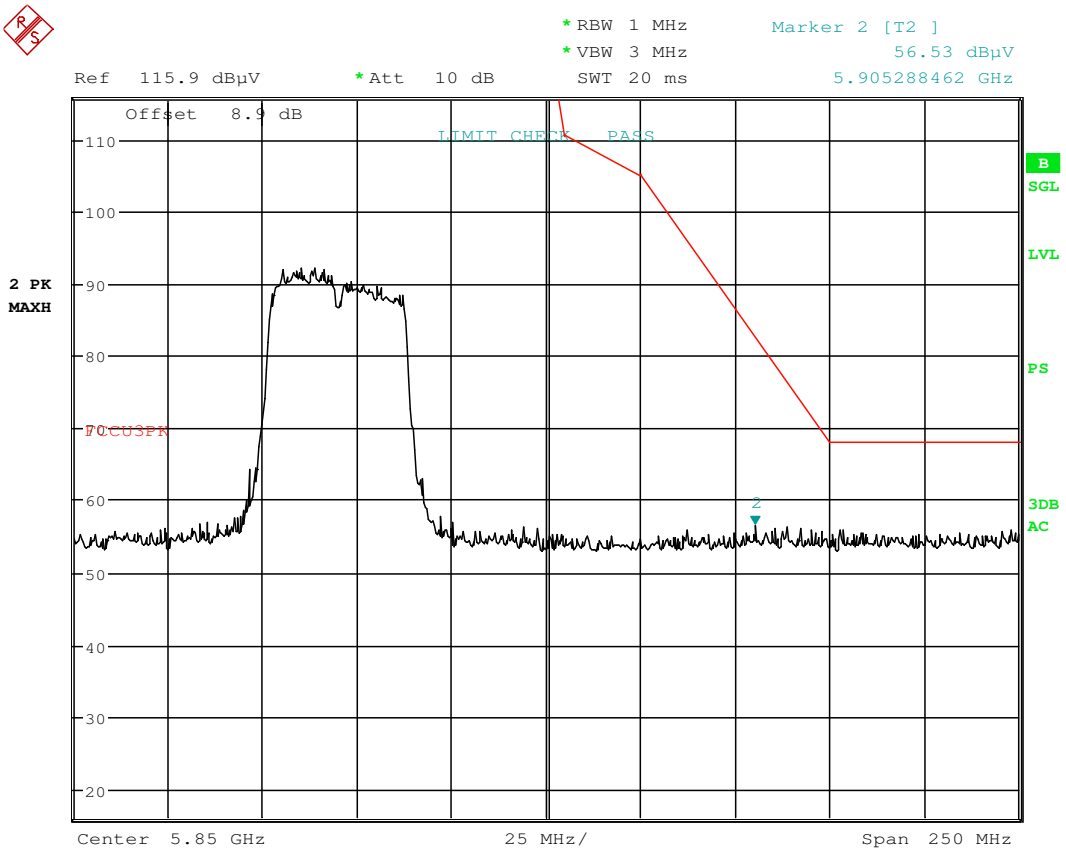
# MIMO Radiated Band Edge Measurements (40MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11n (40MHz) |
| Worst Case Transfer Rate: | MCS8 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5795MHz |
| Channel: | 159 |




Date: 15.DEC.2016 01:05:41

**Plot 7-212. Radiated Upper Band Edge Plot (Peak – UNII Band 3)**

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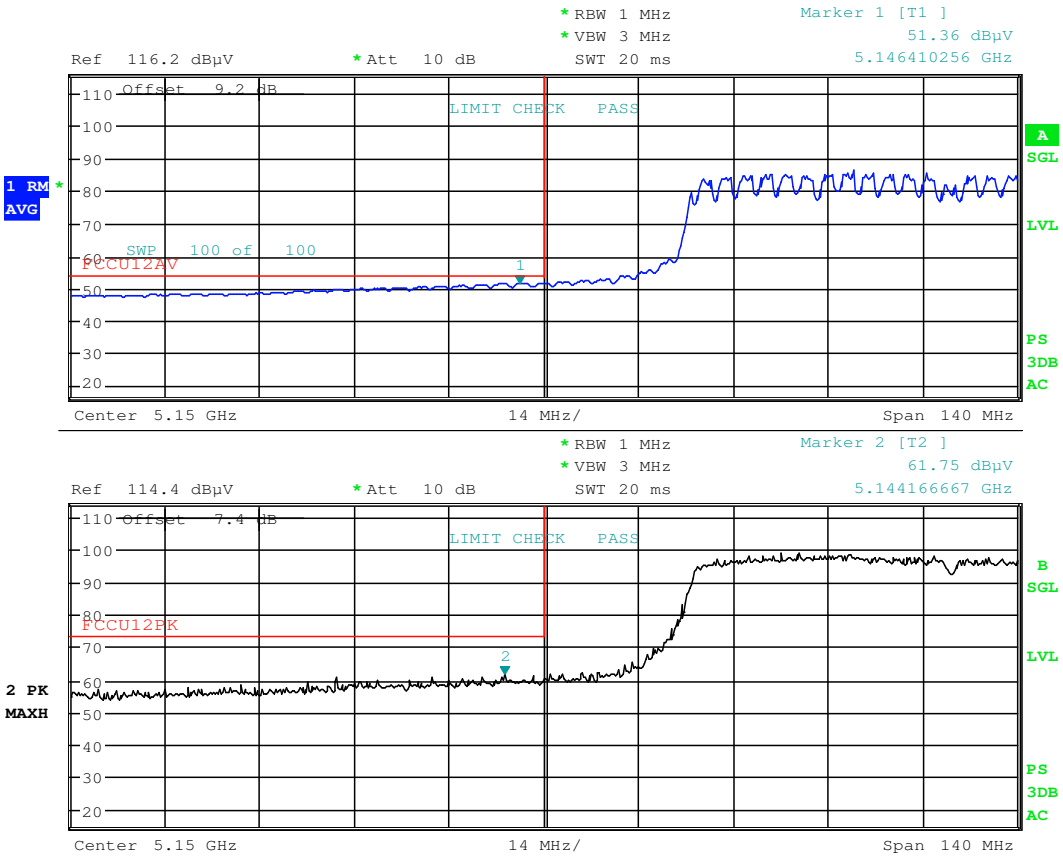
## 7.7.11 MIMO Radiated Band Edge Measurements (80MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11ac (80MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5210MHz |
| Channel: | 42 |




Date: 15.DEC.2016 21:53:07

**Plot 7-213. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 1)**

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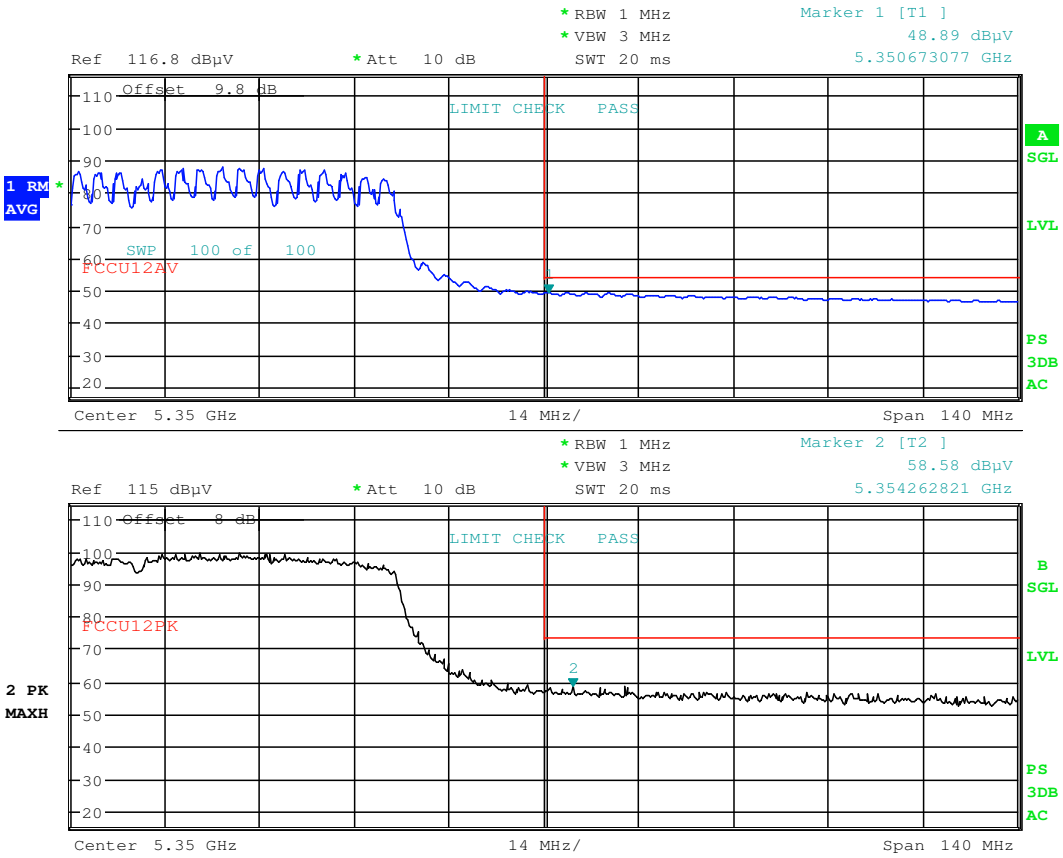
# MIMO Radiated Band Edge Measurements (80MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11ac (80MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5290MHz |
| Channel: | 58 |




Date: 15.DEC.2016 22:12:06

**Plot 7-214. Radiated Restricted Upper Band Edge Plot (Average & Peak – UNII Band 2A)**

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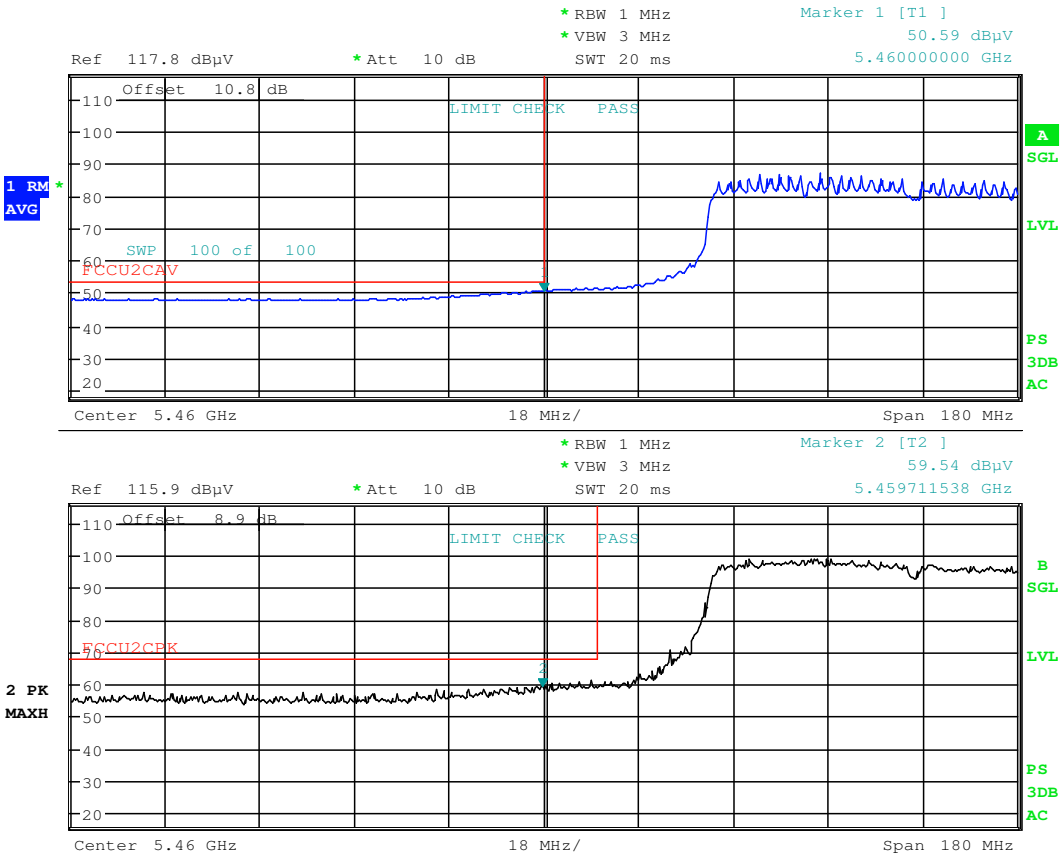
# MIMO Radiated Band Edge Measurements (80MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11ac (80MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5530MHz |
| Channel: | 106 |




Date: 15.DEC.2016 22:17:16

**Plot 7-215. Radiated Restricted Lower Band Edge Plot (Average & Peak – UNII Band 2C)**

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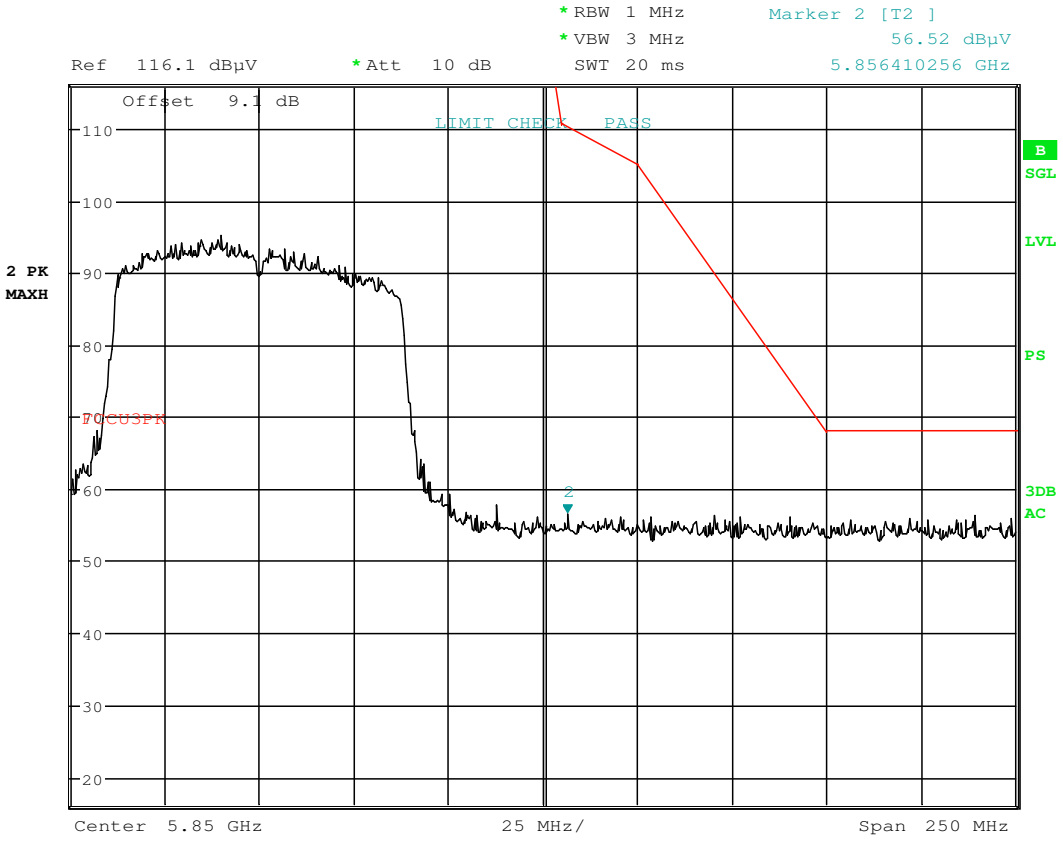
# MIMO Radiated Band Edge Measurements (80MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11ac (80MHz) |
| Worst Case Transfer Rate: | MCS0 |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5775MHz |
| Channel: | 155 |




Date: 15.DEC.2016 22:18:18

**Plot 7-216. Radiated Upper Band Edge Plot (Peak – UNII Band 3)**

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## 7.8 Radiated Spurious Emissions Measurements – Below 1GHz

**§15.209**

**Test Overview and Limit**

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

***All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 7-52 per Section 15.209.***

| Frequency | Field Strength [µV/m] | Measured Distance [Meters] |
|---|---|---|
| 0.009 – 0.490 MHz | 2400/F (kHz) | 300 |
| 0.490 – 1.705 MHz | 24000/F (kHz) | 30 |
| 1.705 – 30.00 MHz | 30 | 30 |
| 30.00 – 88.00 MHz | 100 | 3 |
| 88.00 – 216.0 MHz | 150 | 3 |
| 216.0 – 960.0 MHz | 200 | 3 |
| Above 960.0 MHz | 500 | 3 |

**Table 7-52. Radiated Limits**

**Test Procedures Used**

ANSI C63.10-2013

**Test Settings**

**Quasi-Peak Field Strength Measurements**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize




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## Test Setup

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

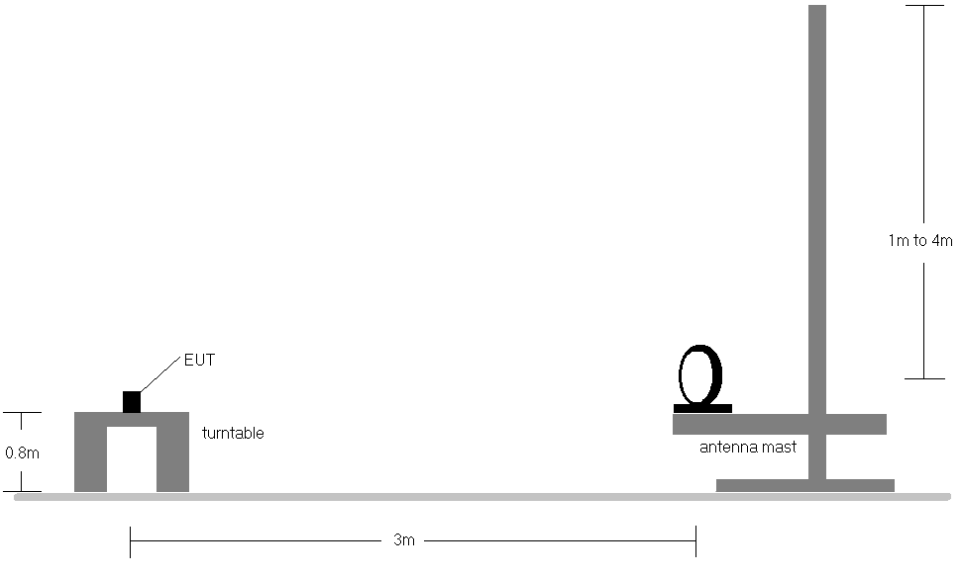


**Figure 7-6. Radiated Test Setup < 30MHz**

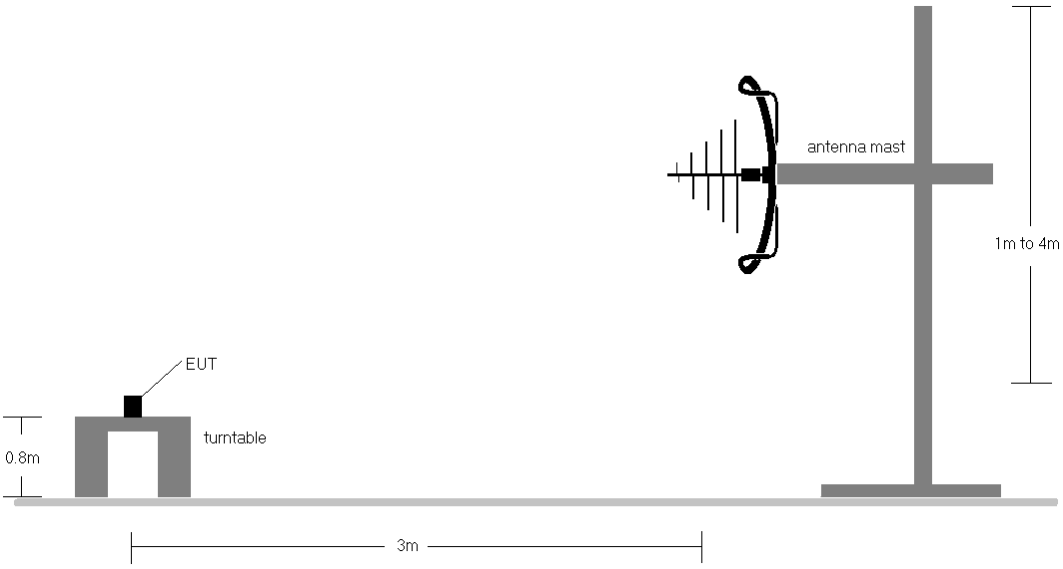


**Figure 7-7. Radiated Test Setup < 1GHz**

## Test Notes

1. All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 7-52.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes.
3. This unit was tested with its standard battery.




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4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
5. Emissions were measured at a 3 meter test distance.
6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
7. No spurious emissions were detected within 20dB of the limit below 30MHz.
8. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
9. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. There were no emissions detected in the 30MHz – 1GHz frequency range, as shown in the subsequent plots.




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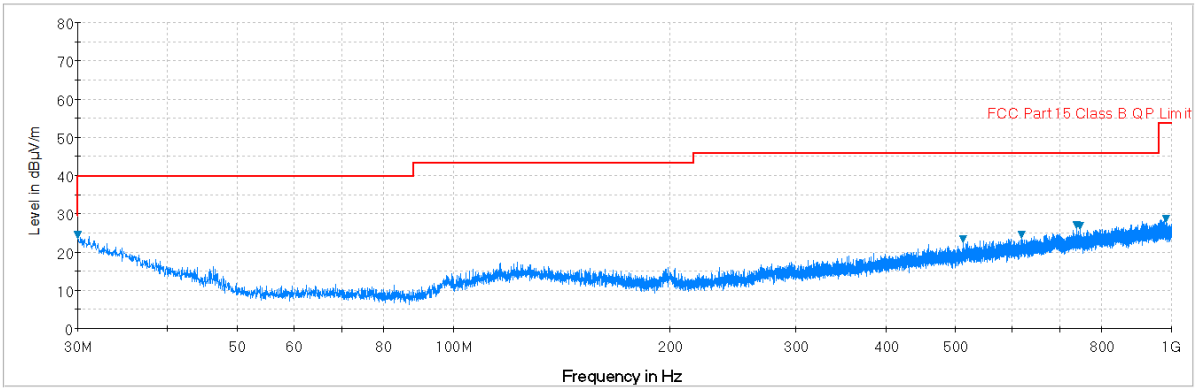
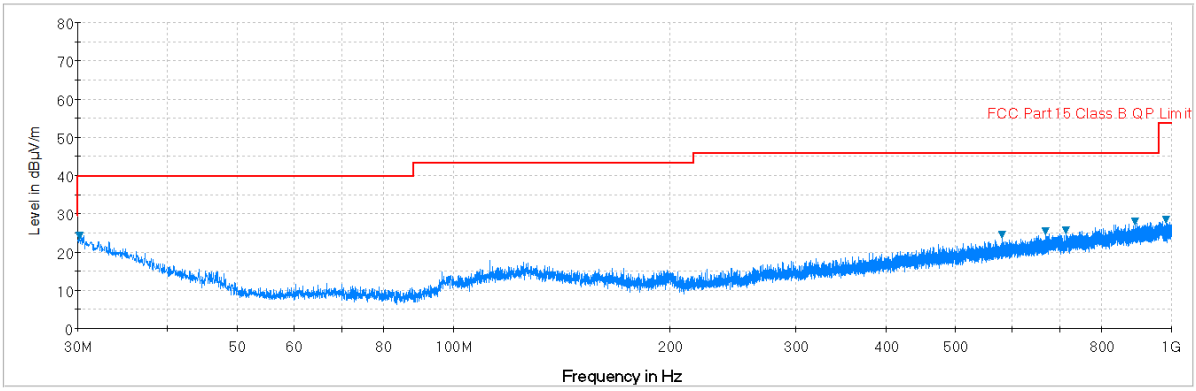
# Antenna-1 Radiated Spurious Emissions Measurements (Below 1GHz)

**§15.209**




**Plot 7-217. Radiated Spurious Plot below 1GHz (802.11a – U3 Ch. 157, Ant. Pol. H)**




**Plot 7-218. Radiated Spurious Plot below 1GHz (802.11a – U3 Ch. 157, Ant. Pol. V)**



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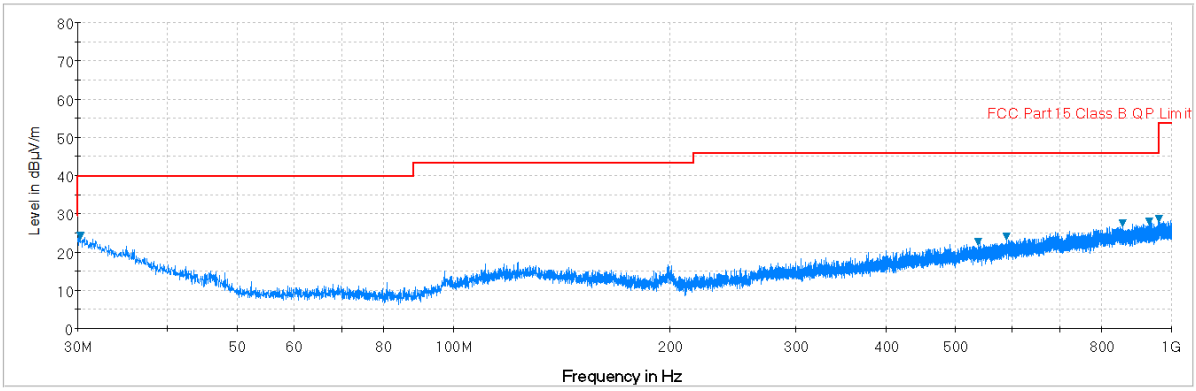
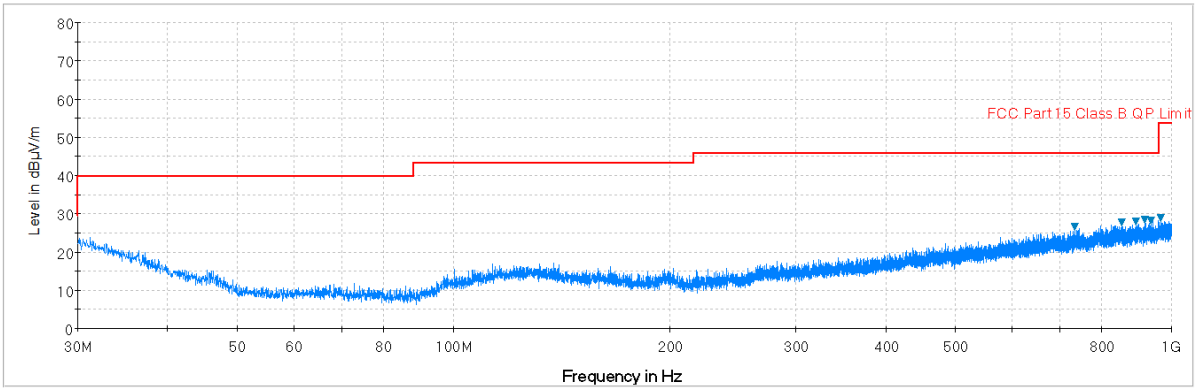
# Antenna-2 Radiated Spurious Emissions Measurements (Below 1GHz)

**§15.209**




**Plot 7-219. Radiated Spurious Plot below 1GHz (802.11a – U3 Ch. 157, Ant. Pol. H)**




**Plot 7-220. Radiated Spurious Plot below 1GHz (802.11a – U3 Ch. 157, Ant. Pol. V)**



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## 7.9 Line-Conducted Test Data

**§15.407**

**Test Overview and Limit**

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section.

***All conducted emissions must not exceed the limits shown in the table below, per Section 15.207.***

| Frequency of emission (MHz) | Conducted Limit (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 – 0.5 | 66 to 56* | 56 to 46* |
| 0.5 – 5 | 56 | 46 |
| 5 – 30 | 60 | 50 |

**Table 7-53. Conducted Limits**

*Decreases with the logarithm of the frequency.

**Test Procedures Used**

ANSI C63.10-2013, Section 6.2

**Test Settings**

**Quasi-Peak Field Strength Measurements**

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

**Average Field Strength Measurements**

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = RMS
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize




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## Test Setup

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

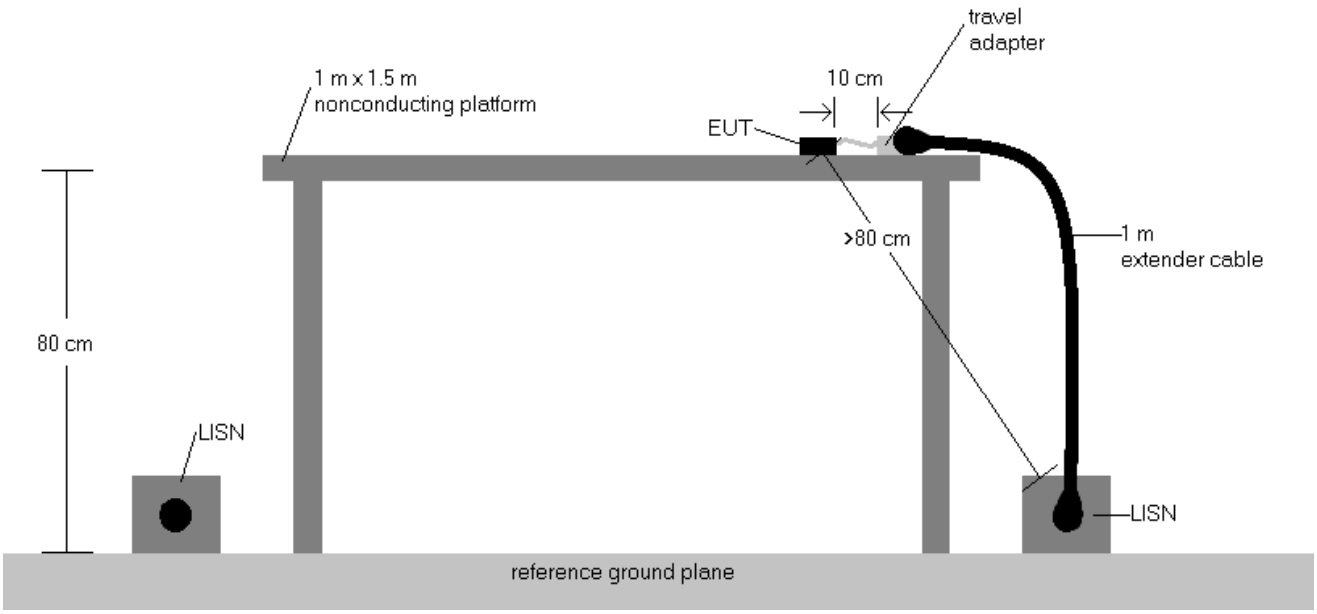


**Figure 7-8. Test Instrument & Measurement Setup**

## Test Notes

1. All modes of operation were investigated and the worst-case emissions are reported using mid channel. The emissions found were not affected by the choice of channel used during testing.
2. The limit for an intentional radiator from 150kHz to 30MHz are specified in 15.207.
3. Corr. (dB) = Cable loss (dB) + LISN insertion factor (dB)
4. QP/AV Level (dBμV) = QP/AV Analyzer/Receiver Level (dBμV) + Corr. (dB)
5. Margin (dB) = QP/AV Limit (dBμV) - QP/AV Level (dBμV)
6. Traces shown in plot are made using a peak detector.
7. Deviations to the Specifications: None.




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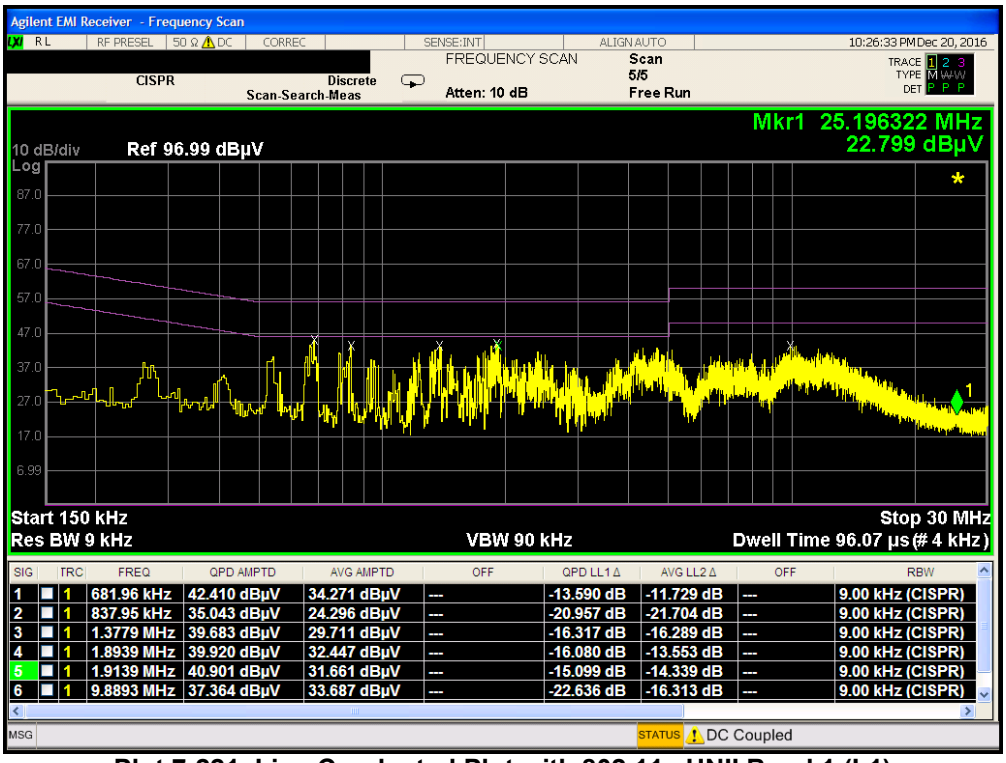
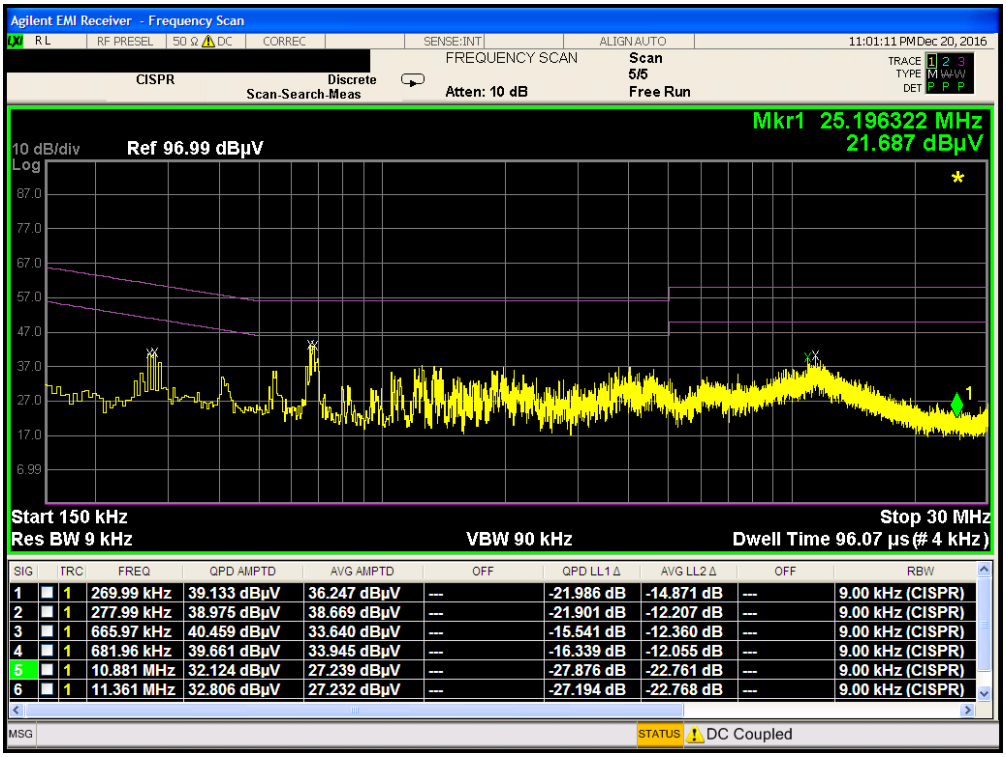
# Line-Conducted Test Data

**§15.407**




| SIG | TRC | FREQ | QPD AMPTD | AVG AMPTD | OFF | QPD LL1 Δ | AVG LL2 Δ | OFF | RBW |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 681.96 kHz | 42.410 dBµV | 34.271 dBµV | --- | -13.590 dB | -11.729 dB | --- | 9.00 kHz (CISPR) |
| 2 | 1 | 837.95 kHz | 35.043 dBµV | 24.296 dBµV | --- | -20.957 dB | -21.704 dB | --- | 9.00 kHz (CISPR) |
| 3 | 1 | 1.3779 MHz | 39.683 dBµV | 29.711 dBµV | --- | -16.317 dB | -16.289 dB | --- | 9.00 kHz (CISPR) |
| 4 | 1 | 1.8939 MHz | 39.920 dBµV | 32.447 dBµV | --- | -16.080 dB | -13.553 dB | --- | 9.00 kHz (CISPR) |
| 5 | 1 | 1.9139 MHz | 40.901 dBµV | 31.661 dBµV | --- | -15.099 dB | -14.339 dB | --- | 9.00 kHz (CISPR) |
| 6 | 1 | 9.8893 MHz | 37.364 dBµV | 33.687 dBµV | --- | -22.636 dB | -16.313 dB | --- | 9.00 kHz (CISPR) |

**Plot 7-221. Line Conducted Plot with 802.11a UNII Band 1 (L1)**




| SIG | TRC | FREQ | QPD AMPTD | AVG AMPTD | OFF | QPD LL1 Δ | AVG LL2 Δ | OFF | RBW |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 269.99 kHz | 39.133 dBµV | 36.247 dBµV | --- | -21.986 dB | -14.871 dB | --- | 9.00 kHz (CISPR) |
| 2 | 1 | 277.99 kHz | 38.975 dBµV | 38.669 dBµV | --- | -21.901 dB | -12.207 dB | --- | 9.00 kHz (CISPR) |
| 3 | 1 | 665.97 kHz | 40.459 dBµV | 33.640 dBµV | --- | -15.541 dB | -12.360 dB | --- | 9.00 kHz (CISPR) |
| 4 | 1 | 681.96 kHz | 39.661 dBµV | 33.945 dBµV | --- | -16.339 dB | -12.055 dB | --- | 9.00 kHz (CISPR) |
| 5 | 1 | 10.881 MHz | 32.124 dBµV | 27.239 dBµV | --- | -27.876 dB | -22.761 dB | --- | 9.00 kHz (CISPR) |
| 6 | 1 | 11.361 MHz | 32.806 dBµV | 27.232 dBµV | --- | -27.194 dB | -22.768 dB | --- | 9.00 kHz (CISPR) |

**Plot 7-222. Line Conducted Plot with 802.11a UNII Band 1 (N)**



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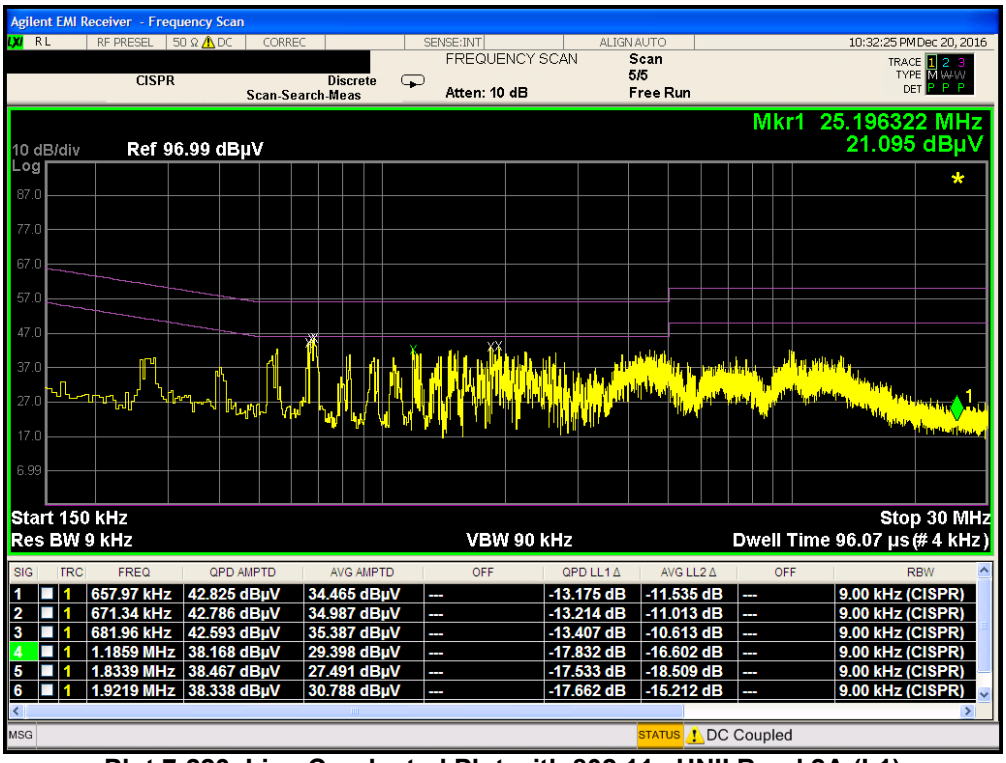
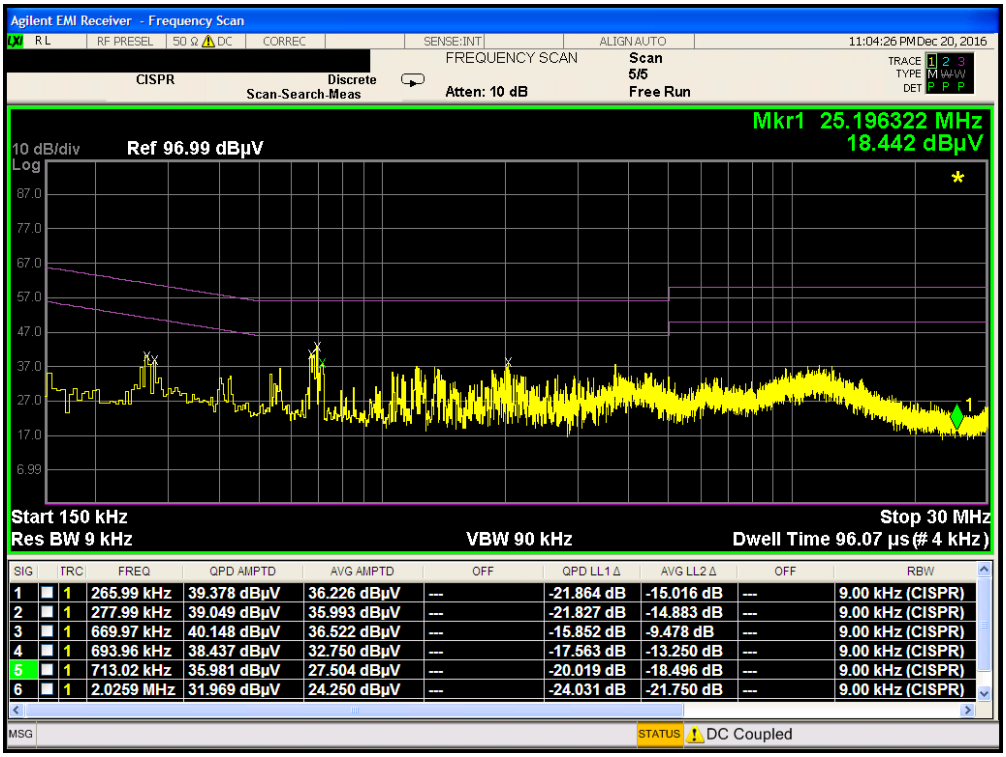
# Line-Conducted Test Data

**§15.407**




**Plot 7-223. Line Conducted Plot with 802.11a UNII Band 2A (L1)**




**Plot 7-224. Line Conducted Plot with 802.11a UNII Band 2A (N)**



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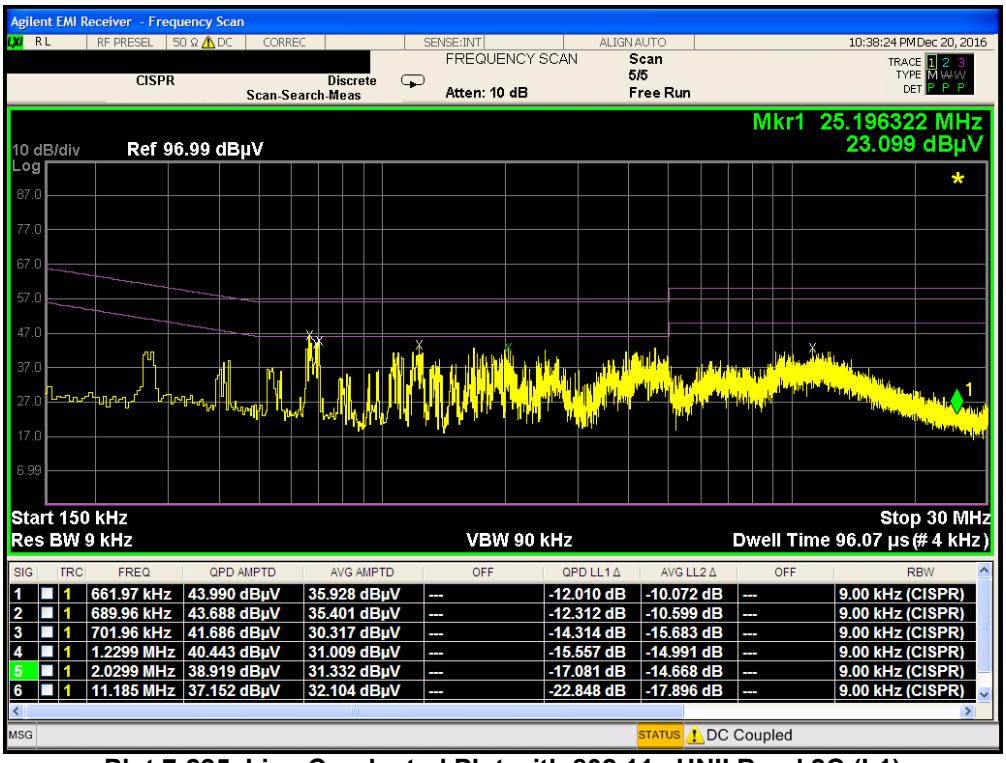
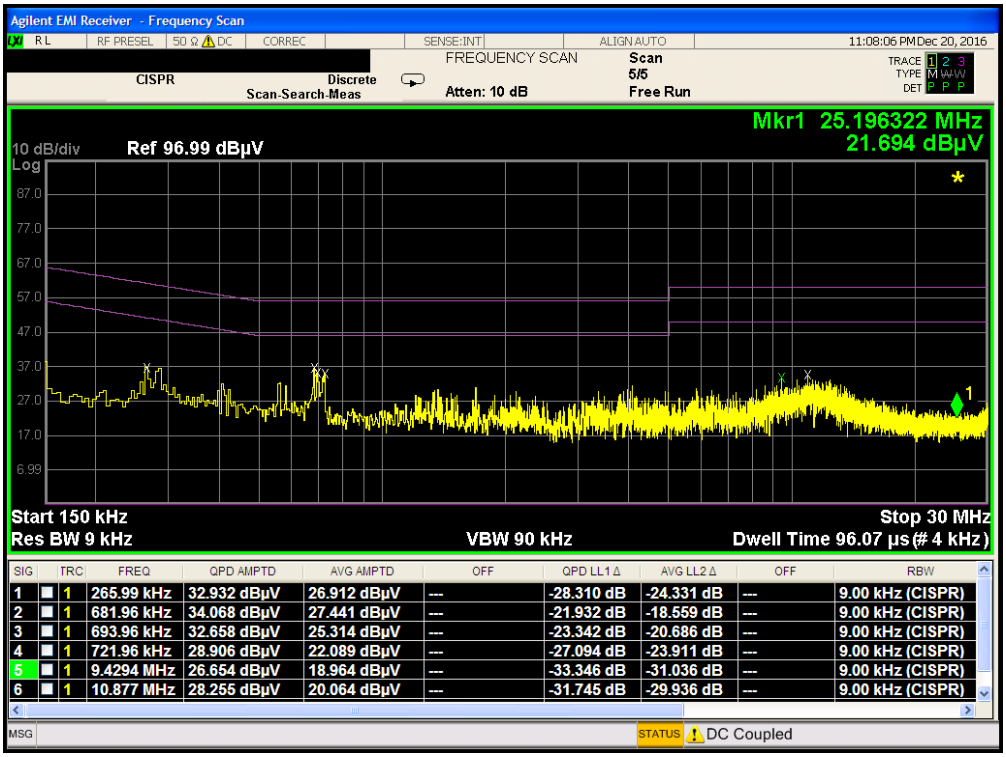
# Line-Conducted Test Data

**§15.407**




| SIG | TRC | FREQ | QPD AMPTD | AVG AMPTD | OFF | QPD LL1 Δ | AVG LL2 Δ | OFF | RBW |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 661.97 kHz | 43.990 dBµV | 35.928 dBµV | --- | -12.010 dB | -10.072 dB | --- | 9.00 kHz (CISPR) |
| 2 | 1 | 689.96 kHz | 43.688 dBµV | 35.401 dBµV | --- | -12.312 dB | -10.599 dB | --- | 9.00 kHz (CISPR) |
| 3 | 1 | 701.96 kHz | 41.686 dBµV | 30.317 dBµV | --- | -14.314 dB | -15.683 dB | --- | 9.00 kHz (CISPR) |
| 4 | 1 | 1.2299 MHz | 40.443 dBµV | 31.009 dBµV | --- | -15.557 dB | -14.991 dB | --- | 9.00 kHz (CISPR) |
| 5 | 1 | 2.0299 MHz | 38.919 dBµV | 31.332 dBµV | --- | -17.081 dB | -14.668 dB | --- | 9.00 kHz (CISPR) |
| 6 | 1 | 11.185 MHz | 37.152 dBµV | 32.104 dBµV | --- | -22.848 dB | -17.896 dB | --- | 9.00 kHz (CISPR) |

**Plot 7-225. Line Conducted Plot with 802.11a UNII Band 2C (L1)**




| SIG | TRC | FREQ | QPD AMPTD | AVG AMPTD | OFF | QPD LL1 Δ | AVG LL2 Δ | OFF | RBW |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 265.99 kHz | 32.932 dBµV | 26.912 dBµV | --- | -28.310 dB | -24.331 dB | --- | 9.00 kHz (CISPR) |
| 2 | 1 | 681.96 kHz | 34.068 dBµV | 27.441 dBµV | --- | -21.932 dB | -18.559 dB | --- | 9.00 kHz (CISPR) |
| 3 | 1 | 693.96 kHz | 32.658 dBµV | 25.314 dBµV | --- | -23.342 dB | -20.686 dB | --- | 9.00 kHz (CISPR) |
| 4 | 1 | 721.96 kHz | 28.906 dBµV | 22.089 dBµV | --- | -27.094 dB | -23.911 dB | --- | 9.00 kHz (CISPR) |
| 5 | 1 | 9.4294 MHz | 26.654 dBµV | 18.964 dBµV | --- | -33.346 dB | -31.036 dB | --- | 9.00 kHz (CISPR) |
| 6 | 1 | 10.877 MHz | 28.255 dBµV | 20.064 dBµV | --- | -31.745 dB | -29.936 dB | --- | 9.00 kHz (CISPR) |

**Plot 7-226. Line Conducted Plot with 802.11a UNII Band 2C (N)**



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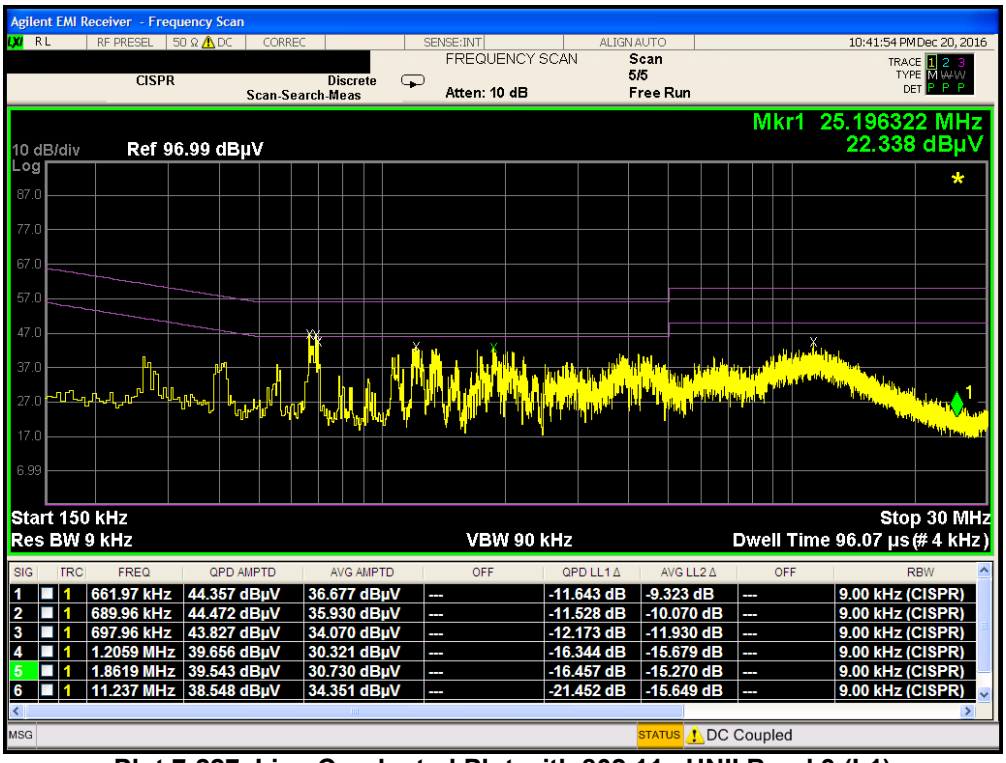
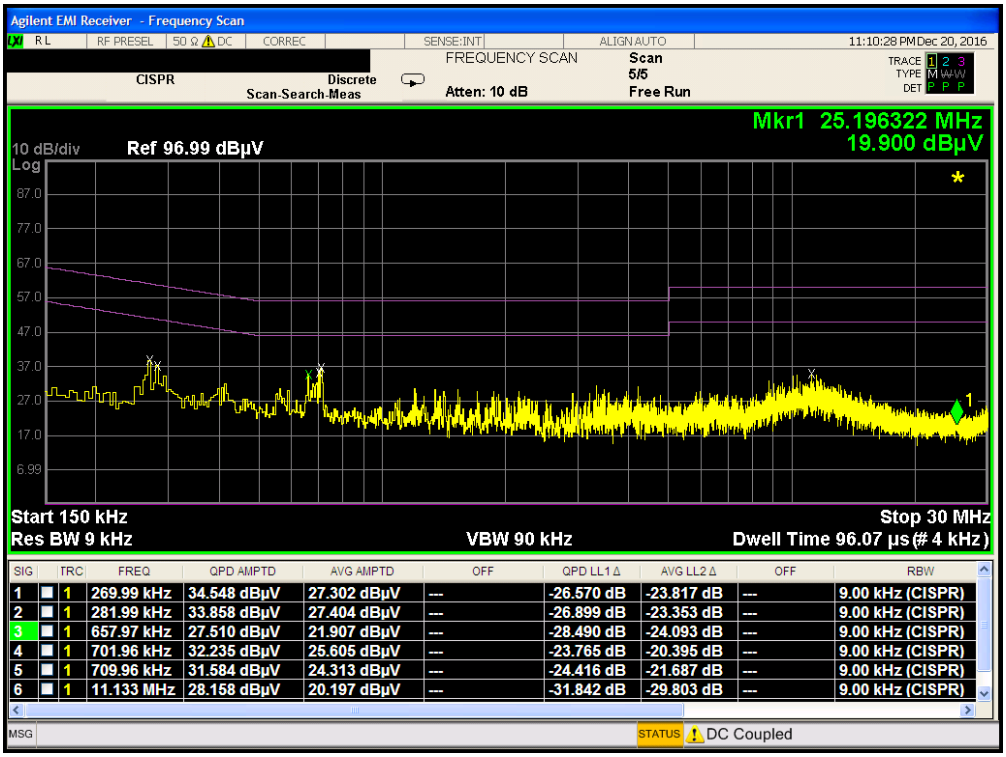
# Line-Conducted Test Data

**§15.407**




**Plot 7-227. Line Conducted Plot with 802.11a UNII Band 3 (L1)**




**Plot 7-228. Line Conducted Plot with 802.11a UNII Band 3 (N)**



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# 8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Samsung Portable Tablet FCC ID: A3LSMT825N0** is in compliance with Part 15E of the FCC Rules.




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# APPENDIX A. 802.11A DUAL TX

## A.1 Summary

| FCC Part Section(s) | Test Description | Test Limit | Test Condition | Test Result | Reference |
|---|---|---|---|---|---|
| **TRANSMITTER MODE (TX)** | | | | | |
| 15.407 (a.1) | Maximum Conducted Output Power | Maximum conducted powers must meet the limits detailed in 15.407(a) | CONDUCTED | PASS | Section A.2 |
| 15.407 (a.1), (5) | Maximum Power Spectral Density | Maximum conducted powers must meet the limits detailed in 15.407(a) | | PASS | Section A.3 |
| 15.205, 15.407(b.1),(5),(6) | General Field Strength Limits (Restricted Bands and Radiated Emission Limits) | Emissions in restricted bands must meet the radiated limits detailed in 15.209 | | PASS | Section A.4 |

**Table A.1-1. Summary of Test Results**

**Notes:**

1) This device employs dual transmission in 802.11a and 802.11g modes using CDD. For all test cases, the device was set to transmit from both antennas simultaneously. The data in this section demonstrates compliance to the dual-transmission requirements specified in KDB 662911 v02r01.
2) All data found in this section is compiled from plots found in the main body of this test report.
3) Since this device is able to transmit the same data through both of its antennas in a given symbol period, then, by the definition specified in KDB 662911 v02r01 Section F)1), the transmission symbols are correlated.
4) Since two antennas are supported in this device and a minimum of $N_{ss}$ = 1 antenna can operate at any given time, the maximum array gain for two correlated signals is $10\log_{10}(N_{ant}/N_{ss})$ = 3dB, where $N_{ss}$ is the number of spatial streams and $N_{ant}$ is the total number of antennas.
5) For conducted spurious emissions, per KDB 662911 v02r01 Section E)3)b), the emissions on each individual output complied with its corresponding relative limit for that output, so additional testing was not required for dual transmission operation.



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## A.2 Output Power Measurement

§15.247(b.3)

### Test Overview

Using the "Measure and Sum" technique, the measured conducted power values were summed in linear power units then converted back to dBm. Original measured values are found in Section 7.4 of this report.

| Freq [MHz] | Channel | Detector | 5GHz (20MHz) Conducted Power [dBm] | | |
|---|---|---|---|---|---|
| | | | IEEE Transmission Mode | | |
| | | | ANT1 | ANT2 | CDD |
| 5180 | 36 | AVG | 10.69 | 10.70 | 13.71 |
| 5200 | 40 | AVG | 10.82 | 10.56 | 13.70 |
| 5220 | 44 | AVG | 10.39 | 10.52 | 13.47 |
| 5240 | 48 | AVG | 10.75 | 10.63 | 13.70 |
| 5260 | 52 | AVG | 10.91 | 10.49 | 13.72 |
| 5280 | 56 | AVG | 10.06 | 10.27 | 13.18 |
| 5300 | 60 | AVG | 10.53 | 10.54 | 13.55 |
| 5320 | 64 | AVG | 10.66 | 10.12 | 13.41 |
| 5500 | 100 | AVG | 10.79 | 10.21 | 13.52 |
| 5520 | 104 | AVG | 10.88 | 10.36 | 13.64 |
| 5540 | 108 | AVG | 10.58 | 10.35 | 13.48 |
| 5560 | 112 | AVG | 10.69 | 10.31 | 13.51 |
| 5580 | 116 | AVG | 10.78 | 10.27 | 13.54 |
| 5600 | 120 | AVG | 10.89 | 10.28 | 13.61 |
| 5620 | 124 | AVG | 10.06 | 10.86 | 13.49 |
| 5640 | 128 | AVG | 10.81 | 10.95 | 13.89 |
| 5660 | 132 | AVG | 10.89 | 10.29 | 13.61 |
| 5680 | 136 | AVG | 10.83 | 10.23 | 13.55 |
| 5700 | 140 | AVG | 10.77 | 10.30 | 13.55 |
| 5720 | 144 | AVG | 10.74 | 10.27 | 13.52 |
| 5745 | 149 | AVG | 10.69 | 10.89 | 13.80 |
| 5765 | 153 | AVG | 10.67 | 10.69 | 13.69 |
| 5785 | 157 | AVG | 10.65 | 10.75 | 13.71 |
| 5805 | 161 | AVG | 10.07 | 10.89 | 13.51 |
| 5825 | 165 | AVG | 10.86 | 10.08 | 13.50 |

**Table A2-1. Dual Tx 802.11a-mode Conducted Output Power Measurements**




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## A.3 Power Spectral Density

**§15.247(e)**

### Test Overview

Using the "Measure and Sum" technique, the measured conducted power density values were summed in linear power units then converted back to dBm.

| | Frequency [MHz] | Channel No. | 802.11 Mode | Data Rate [Mbps] | Antenn-1 Power Density [dBm] | Antenn-2 Power Density [dBm] | Summed CDD Power Density [dBm] | Max Permissible Power Density [dBm/MHz] | Margin [dB] | Pass / Fail |
|---|---|---|---|---|---|---|---|---|---|---|
| Band 1 | 5180 | 36 | a | 6 | 0.01 | -0.26 | 2.89 | 11.0 | -8.11 | Pass |
| | 5200 | 40 | a | 6 | 0.04 | -0.48 | 2.80 | 11.0 | -8.20 | Pass |
| | 5240 | 48 | a | 6 | -0.02 | -0.12 | 2.94 | 11.0 | -8.06 | Pass |
| Band 2A | 5260 | 52 | a | 6 | 0.31 | -0.48 | 2.94 | 11.0 | -8.06 | Pass |
| | 5280 | 56 | a | 6 | 0.36 | -0.72 | 2.86 | 11.0 | -8.14 | Pass |
| | 5320 | 64 | a | 6 | 0.04 | -0.94 | 2.59 | 11.0 | -8.41 | Pass |
| Band 2C | 5500 | 100 | a | 6 | 0.14 | -0.33 | 2.92 | 11.0 | -8.08 | Pass |
| | 5600 | 120 | a | 6 | 0.63 | -0.37 | 3.17 | 11.0 | -7.83 | Pass |
| | 5720 | 144 | a | 6 | 0.01 | -0.46 | 2.79 | 11.0 | -8.21 | Pass |
| Band 3 | 5745 | 149 | a | 6 | -2.88 | -3.50 | -0.17 | 11.0 | -11.17 | Pass |
| | 5785 | 157 | a | 6 | -1.90 | -2.72 | 0.72 | 11.0 | -10.28 | Pass |
| | 5825 | 165 | a | 6 | -2.67 | -3.48 | -0.05 | 11.0 | -11.05 | Pass |

**Table A3-3.802.11a Dual Tx Conducted Power Density Measurements**




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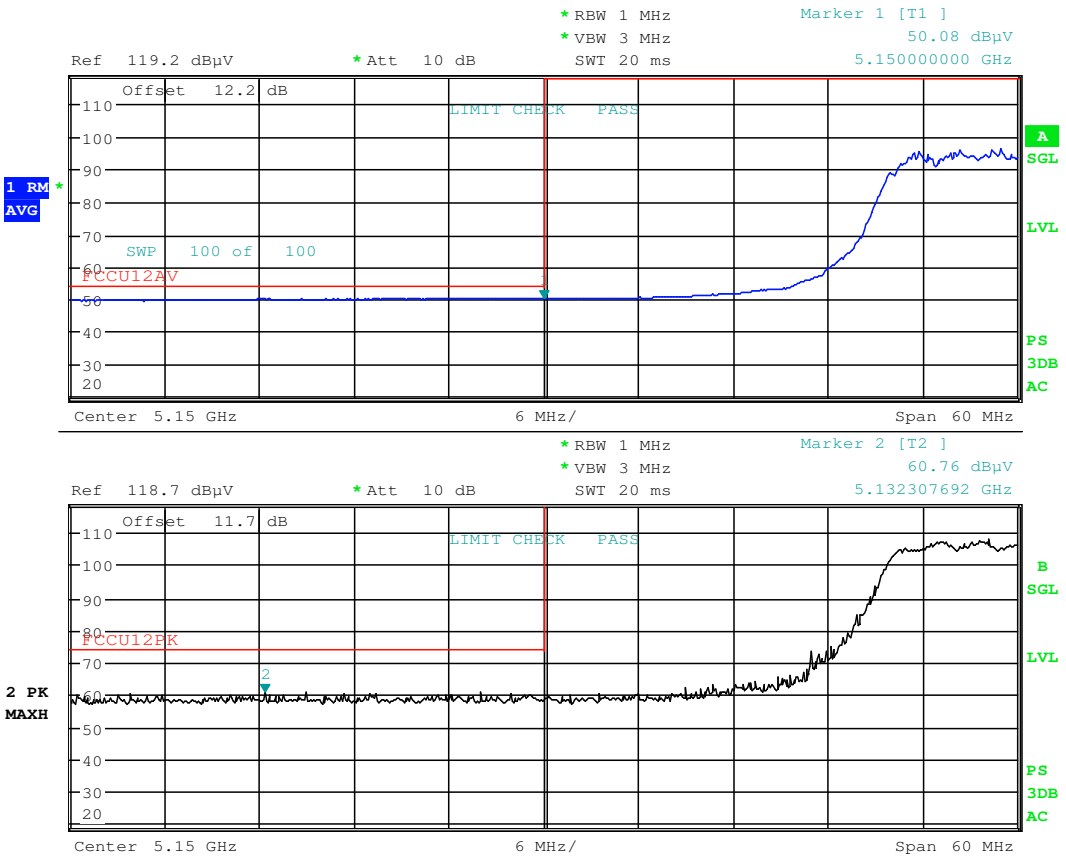
## A.4 Dual Tx Radiated Restricted Band Edge Measurements

**§15.407(b.1)(b.2) §15.205 §15.209**

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting on both outputs in 802.11a mode.

| | |
|---|---|
| Worst Case Mode: | 802.11a |
| Worst Case Transfer Rate: | 6Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5180MHz |
| Channel: | 36 |




Date: 23.DEC.2016 17:20:08

**Plot A.4-1. Radiated Restricted Lower Band Edge Plot (Average/Peak – UNII Band 1)**

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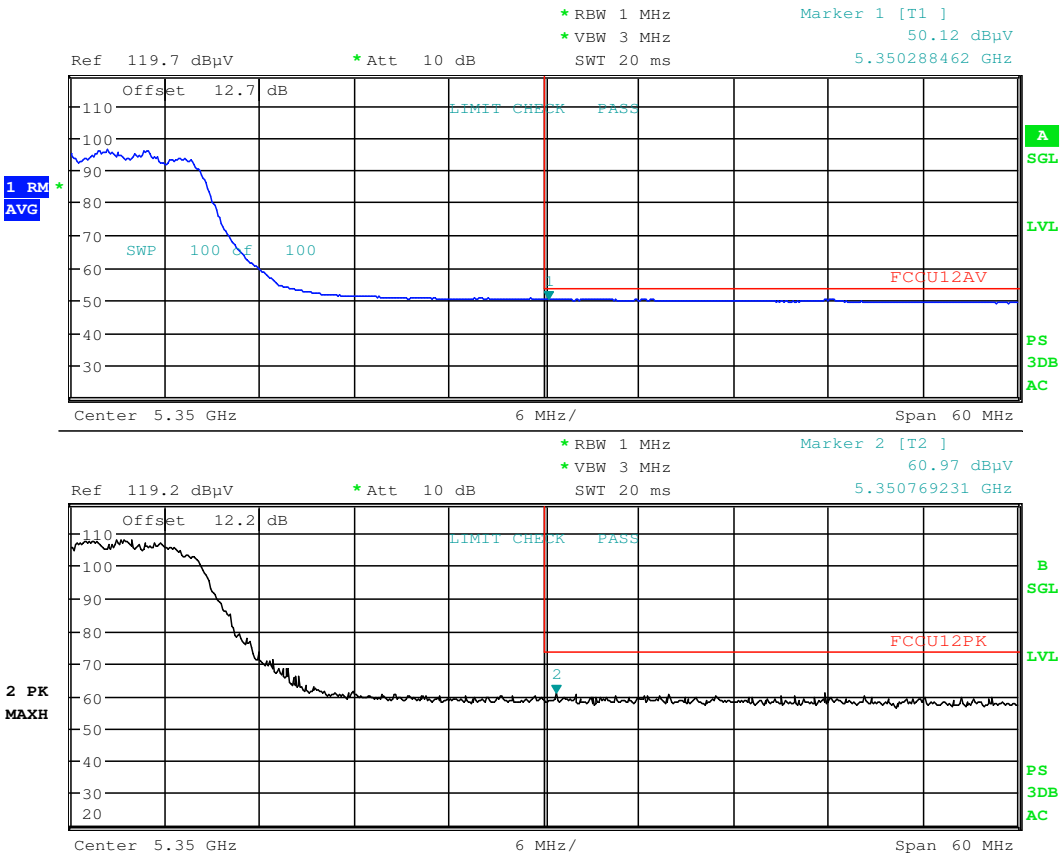
# Dual Tx Radiated Restricted Band Edge Measurements

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11a |
| Worst Case Transfer Rate: | 6Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5320MHz |
| Channel: | 64 |




Date: 23.DEC.2016 17:24:42

**Plot A.4-3. Radiated Restricted Upper Band Edge Plot (Average/Peak – UNII Band 2A)**

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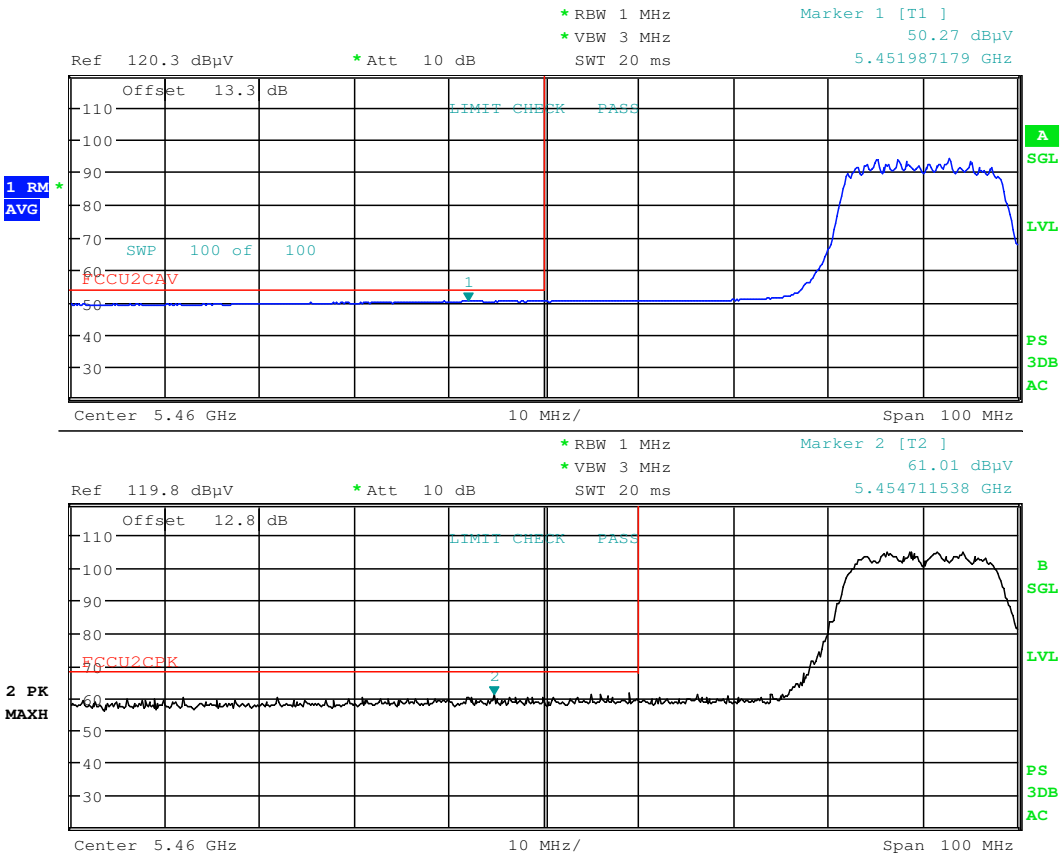
# Dual Tx Radiated Restricted Band Edge Measurements

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11a |
| Worst Case Transfer Rate: | 6Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5500MHz |
| Channel: | 100 |




Date: 23.DEC.2016 17:25:46

**Plot A.4-5. Radiated Restricted Lower Band Edge Plot (Average/Peak – UNII Band 2C)**

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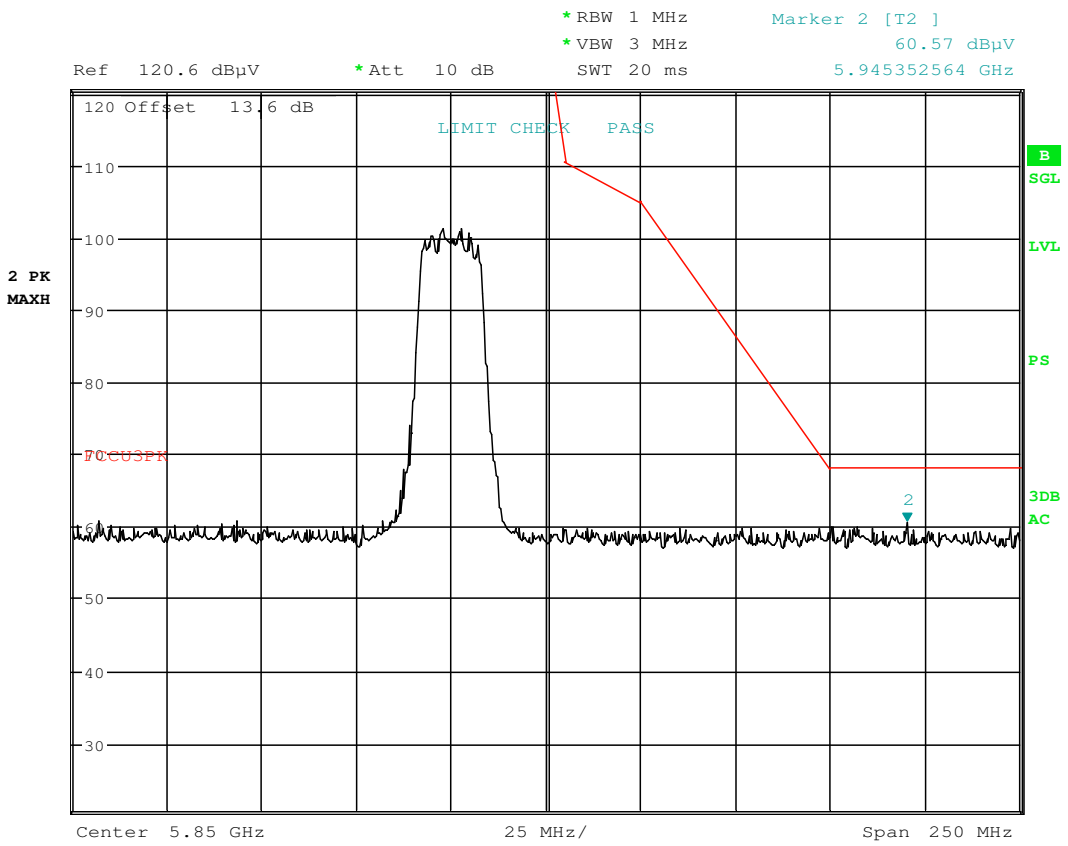
# Dual Tx Radiated Restricted Band Edge Measurements

**§15.407(b.1)(b.2) §15.205 §15.209**

| | |
|---|---|
| Worst Case Mode: | 802.11a |
| Worst Case Transfer Rate: | 6Mbps |
| Distance of Measurements: | 3 Meters |
| Operating Frequency: | 5825MHz |
| Channel: | 165 |




Date: 23.DEC.2016 17:26:45

**Plot A.4-7. Radiated Upper Band Edge Plot (Peak – UNII Band 3)**

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