

7.4. Output Power Measurement

7.4.1. Test Limit

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.

$$5150\sim 5250\text{MHz: Limit (dBm)} = 30\text{dBm} - (10.96\text{dBi} - 6\text{dBi}) = 25.04\text{dBm}$$

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (23.98dBm) or 11dBm +10 log (26dB BW).

$$5250\sim 5350\text{MHz: Limit (dBm)} = 23.98\text{dBm} - (10.92\text{dBi} - 6\text{dBi}) = 19.06\text{dBm}$$

$$5470\sim 5725\text{MHz: Limit (dBm)} = 23.98\text{dBm} - (10.81\text{dBi} - 6\text{dBi}) = 19.17\text{dBm}$$

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm).

$$5725\sim 5850\text{MHz: Limit (dBm)} = 30\text{dBm} - (10.55\text{dBi} - 6\text{dBi}) = 25.45\text{dBm}$$

If transmitting antennas of directional gain greater than 6dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

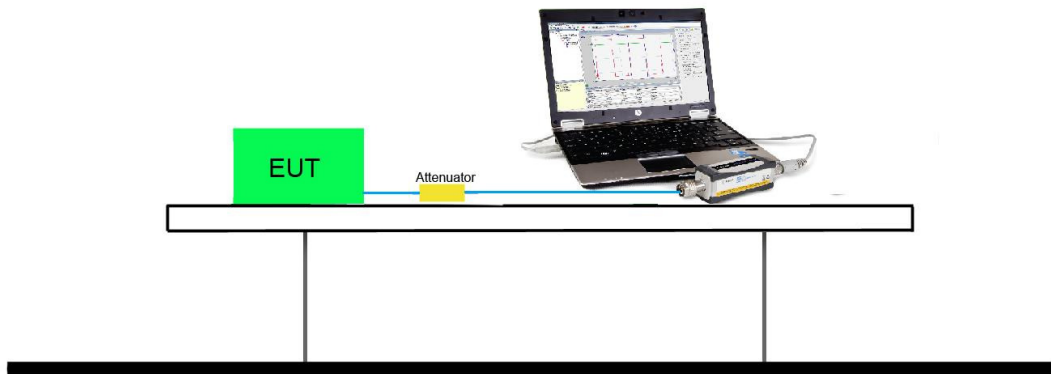
7.4.2. Test Procedure Used

KDB 789033 D02v01 - Section E) 3) b) Method PM-G

7.4.3. Test Setting

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

7.4.4. Test Setup



7.4.5. Test Result

Power output test was verified over all data rates of each mode shown as below, and then choose the maximum power output (yellow marker) for final test of each channel.

| N _{Tx} | 802.11a | MCS Index for 802.11n | Data Rate (Mbps) | | | |
|-----------------|---------|-----------------------|------------------|----------|-----------------|----------|
| | | | 20MHz Bandwidth | | 40MHz Bandwidth | |
| | | | 800ns GI | 400ns GI | 800ns GI | 400ns GI |
| 4 | 6 | 24 | 26 | 28.8 | 54 | 60 |
| 4 | 9 | 25 | 52 | 57.8 | 108 | 120 |
| 4 | 12 | 26 | 78 | 86.6 | 162 | 180 |
| 4 | 18 | 27 | 104 | 115.6 | 216 | 240 |
| 4 | 24 | 28 | 156 | 173.4 | 324 | 360 |
| 4 | 36 | 29 | 208 | 231.2 | 432 | 480 |
| 4 | 48 | 30 | 234 | 260 | 486 | 540 |
| 4 | 54 | 31 | 260 | 288.8 | 540 | 600 |

| N _{Tx} | MCS Index for 802.11ac | Data Rate (Mbps) | | | | | |
|-----------------|------------------------|------------------|----------|-----------------|----------|-----------------|----------|
| | | 20MHz Bandwidth | | 40MHz Bandwidth | | 80MHz Bandwidth | |
| | | 800ns GI | 400ns GI | 800ns GI | 400ns GI | 800ns GI | 400ns GI |
| 4 | 0 | 26 | 28.8 | 54 | 60 | 117.2 | 130 |
| 4 | 1 | 52 | 57.6 | 108 | 120 | 234 | 260 |
| 4 | 2 | 78 | 86.8 | 162 | 180 | 351.2 | 390 |
| 4 | 3 | 104 | 115.6 | 216 | 240 | 468 | 520 |
| 4 | 4 | 156 | 173.2 | 324 | 360 | 702 | 780 |
| 4 | 5 | 208 | 231.2 | 432 | 480 | 936 | 1040 |
| 4 | 6 | 234 | 260 | 486 | 540 | 1053.2 | 1170 |
| 4 | 7 | 260 | 288.8 | 540 | 600 | 1170 | 1300 |
| 4 | 8 | 312 | 346.8 | 648 | 720 | 1404 | 1560 |
| 4 | 9 | -- | -- | 720 | 800 | 1560 | 1733.2 |

Note: Power output test was verified over all data rates of each mode shown as above, and then choose the maximum power output (yellow marker) for final test of each channel.

Output power at various data rates for Ant 0 / Ant 0 + 1 + 2 + 3:

| Test Mode | Bandwidth (MHz) | Channel | Frequency (MHz) | Data Rate (Mbps) | Average Power (dBm) |
|-----------|-----------------|---------|-----------------|------------------|---------------------|
| 802.11a | 20 | 60 | 5300 | 6 | 11.97 |
| | | | | 24 | 11.73 |
| | | | | 54 | 11.58 |
| 802.11n | 20 | 60 | 5300 | 26 | 12.24 |
| | | | | 28.8 | 12.15 |
| | | | | 156 | 12.06 |
| | | | | 173.4 | 11.98 |
| | | | | 260 | 11.76 |
| | | | | 288.8 | 11.53 |
| 802.11n | 40 | 62 | 5310 | 54 | 12.21 |
| | | | | 60 | 12.15 |
| | | | | 324 | 12.06 |
| | | | | 360 | 11.93 |
| | | | | 540 | 11.86 |
| | | | | 600 | 11.79 |
| 802.11ac | 20 | 60 | 5300 | 26 | 12.20 |
| | | | | 28.8 | 12.08 |
| | | | | 156 | 11.93 |
| | | | | 173.2 | 11.86 |
| | | | | 312 | 11.76 |
| | | | | 346.8 | 11.54 |
| 802.11ac | 40 | 62 | 5310 | 54 | 12.15 |
| | | | | 60 | 12.09 |
| | | | | 324 | 11.87 |
| | | | | 360 | 11.73 |
| | | | | 720 | 11.62 |
| | | | | 800 | 11.48 |

| | | | | | |
|----------|----|----|------|--------|-------|
| 802.11ac | 80 | 58 | 5290 | 117.2 | 11.86 |
| | | | | 130 | 11.79 |
| | | | | 702 | 11.63 |
| | | | | 780 | 11.57 |
| | | | | 1560 | 11.36 |
| | | | | 1733.2 | 11.17 |

| Test Mode | Data Rate (Mbps) | Channel No. | Freq. (MHz) | Ant 0 Average Power (dBm) | Ant 1 Average Power (dBm) | Ant 2 Average Power (dBm) | Ant 3 Average Power (dBm) | Total Average Power (dBm) | Average Power Limit (dBm) | Result |
|--------------|------------------|-------------|-------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------|
| 802.11a | 6 | 36 | 5180 | 18.33 | 18.84 | 18.34 | 18.75 | 24.59 | ≤ 25.04 | Pass |
| 802.11a | 6 | 44 | 5220 | 18.45 | 18.86 | 18.27 | 18.80 | 24.62 | ≤ 25.04 | Pass |
| 802.11a | 6 | 48 | 5240 | 18.43 | 18.89 | 18.24 | 18.70 | 24.59 | ≤ 25.04 | Pass |
| 802.11a | 6 | 52 | 5260 | 12.22 | 12.76 | 11.88 | 12.51 | 18.38 | ≤ 19.06 | Pass |
| 802.11a | 6 | 60 | 5300 | 11.97 | 12.54 | 11.76 | 12.52 | 18.23 | ≤ 19.06 | Pass |
| 802.11a | 6 | 64 | 5320 | 11.52 | 12.44 | 11.73 | 12.02 | 17.96 | ≤ 19.06 | Pass |
| 802.11a | 6 | 100 | 5500 | 11.71 | 11.73 | 11.44 | 11.79 | 17.69 | ≤ 19.17 | Pass |
| 802.11a | 6 | 120 | 5600 | 11.69 | 11.47 | 10.88 | 10.89 | 17.27 | ≤ 19.17 | Pass |
| 802.11a | 6 | 140 | 5700 | 11.59 | 10.89 | 10.14 | 10.34 | 16.80 | ≤ 19.17 | Pass |
| 802.11a | 6 | 149 | 5745 | 19.74 | 18.52 | 17.94 | 18.32 | 24.70 | ≤ 25.45 | Pass |
| 802.11a | 6 | 157 | 5785 | 19.72 | 18.55 | 17.72 | 18.33 | 24.66 | ≤ 25.45 | Pass |
| 802.11a | 6 | 165 | 5825 | 19.74 | 18.98 | 17.94 | 18.71 | 24.91 | ≤ 25.45 | Pass |
| 802.11n-HT20 | 26 | 36 | 5180 | 18.06 | 18.56 | 18.08 | 18.54 | 24.34 | ≤ 25.04 | Pass |
| 802.11n-HT20 | 26 | 44 | 5220 | 18.15 | 18.75 | 17.84 | 18.54 | 24.35 | ≤ 25.04 | Pass |
| 802.11n-HT20 | 26 | 48 | 5240 | 18.07 | 18.81 | 17.84 | 18.53 | 24.35 | ≤ 25.04 | Pass |
| 802.11n-HT20 | 26 | 52 | 5260 | 12.31 | 12.95 | 12.02 | 12.78 | 18.55 | ≤ 19.06 | Pass |
| 802.11n-HT20 | 26 | 60 | 5300 | 12.24 | 12.68 | 12.00 | 12.81 | 18.47 | ≤ 19.06 | Pass |
| 802.11n-HT20 | 26 | 64 | 5320 | 11.68 | 12.67 | 12.06 | 12.46 | 18.25 | ≤ 19.06 | Pass |
| 802.11n-HT20 | 26 | 100 | 5500 | 11.95 | 11.98 | 11.64 | 12.01 | 17.92 | ≤ 19.17 | Pass |
| 802.11n-HT20 | 26 | 120 | 5600 | 11.41 | 11.45 | 10.66 | 10.72 | 17.10 | ≤ 19.17 | Pass |
| 802.11n-HT20 | 26 | 140 | 5700 | 11.67 | 11.04 | 10.22 | 10.64 | 16.95 | ≤ 19.17 | Pass |
| 802.11n-HT20 | 26 | 149 | 5745 | 19.42 | 18.25 | 17.67 | 18.13 | 24.44 | ≤ 25.45 | Pass |
| 802.11n-HT20 | 26 | 157 | 5785 | 19.99 | 18.89 | 18.03 | 18.76 | 25.00 | ≤ 25.45 | Pass |
| 802.11n-HT20 | 26 | 165 | 5825 | 19.48 | 18.73 | 17.71 | 18.54 | 24.68 | ≤ 25.45 | Pass |



| Test Mode | Data Rate (Mbps) | Channel No. | Freq. (MHz) | Ant 0 Average Power (dBm) | Ant 1 Average Power (dBm) | Ant 2 Average Power (dBm) | Ant 3 Average Power (dBm) | Total Average Power (dBm) | Average Power Limit (dBm) | Result |
|----------------|------------------|-------------|-------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------|
| 802.11n-HT40 | 54 | 38 | 5190 | 18.22 | 18.65 | 18.21 | 18.59 | 24.44 | ≤ 25.04 | Pass |
| 802.11n-HT40 | 54 | 46 | 5230 | 18.28 | 18.75 | 18.09 | 18.50 | 24.43 | ≤ 25.04 | Pass |
| 802.11n-HT40 | 54 | 54 | 5270 | 12.39 | 12.81 | 12.07 | 12.71 | 18.53 | ≤ 19.06 | Pass |
| 802.11n-HT40 | 54 | 62 | 5310 | 12.21 | 12.71 | 11.87 | 12.69 | 18.40 | ≤ 19.06 | Pass |
| 802.11n-HT40 | 54 | 102 | 5510 | 12.33 | 12.37 | 12.27 | 12.42 | 18.37 | ≤ 19.17 | Pass |
| 802.11n-HT40 | 54 | 118 | 5590 | 12.65 | 12.89 | 12.09 | 12.54 | 18.57 | ≤ 19.17 | Pass |
| 802.11n-HT40 | 54 | 134 | 5670 | 12.78 | 12.39 | 11.66 | 11.65 | 18.17 | ≤ 19.17 | Pass |
| 802.11n-HT40 | 54 | 151 | 5755 | 19.49 | 18.57 | 17.78 | 18.11 | 24.56 | ≤ 25.45 | Pass |
| 802.11n-HT40 | 54 | 159 | 5795 | 19.47 | 18.59 | 17.76 | 18.21 | 24.57 | ≤ 25.45 | Pass |
| 802.11ac-VHT20 | 26 | 36 | 5180 | 18.03 | 18.54 | 18.11 | 18.62 | 24.35 | ≤ 25.04 | Pass |
| 802.11ac-VHT20 | 26 | 44 | 5220 | 18.20 | 18.79 | 18.09 | 18.61 | 24.45 | ≤ 25.04 | Pass |
| 802.11ac-VHT20 | 26 | 48 | 5240 | 18.11 | 18.81 | 18.02 | 18.58 | 24.41 | ≤ 25.04 | Pass |
| 802.11ac-VHT20 | 26 | 52 | 5260 | 12.34 | 12.91 | 12.07 | 12.87 | 18.58 | ≤ 19.06 | Pass |
| 802.11ac-VHT20 | 26 | 60 | 5300 | 12.20 | 12.67 | 12.07 | 12.84 | 18.48 | ≤ 19.06 | Pass |
| 802.11ac-VHT20 | 26 | 64 | 5320 | 11.67 | 12.72 | 12.03 | 12.41 | 18.25 | ≤ 19.06 | Pass |
| 802.11ac-VHT20 | 26 | 100 | 5500 | 12.43 | 12.44 | 12.04 | 12.63 | 18.41 | ≤ 19.17 | Pass |
| 802.11ac-VHT20 | 26 | 120 | 5600 | 11.67 | 11.78 | 11.03 | 11.11 | 17.43 | ≤ 19.17 | Pass |
| 802.11ac-VHT20 | 26 | 140 | 5700 | 11.71 | 11.07 | 10.33 | 10.59 | 16.98 | ≤ 19.17 | Pass |
| 802.11ac-VHT20 | 26 | 144 | 5720 | 12.11 | 11.32 | 10.34 | 11.16 | 17.30 | ≤ 19.17 | Pass |
| 802.11ac-VHT20 | 26 | 149 | 5745 | 19.87 | 18.72 | 18.09 | 18.69 | 24.91 | ≤ 25.45 | Pass |
| 802.11ac-VHT20 | 26 | 157 | 5785 | 19.93 | 18.76 | 17.98 | 18.72 | 24.93 | ≤ 25.45 | Pass |
| 802.11ac-VHT20 | 26 | 165 | 5825 | 19.49 | 18.78 | 17.82 | 18.60 | 24.73 | ≤ 25.45 | Pass |

| Test Mode | Data Rate (Mbps) | Channel No. | Freq. (MHz) | Ant 0 Average Power (dBm) | Ant 1 Average Power (dBm) | Ant 2 Average Power (dBm) | Ant 3 Average Power (dBm) | Total Average Power (dBm) | Average Power Limit (dBm) | Result |
|----------------|------------------|-------------|-------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------|
| 802.11ac-VHT40 | 54 | 38 | 5190 | 18.08 | 18.79 | 18.17 | 18.62 | 24.45 | ≤ 25.04 | Pass |
| 802.11ac-VHT40 | 54 | 46 | 5230 | 18.22 | 18.92 | 18.09 | 18.64 | 24.50 | ≤ 25.04 | Pass |
| 802.11ac-VHT40 | 54 | 54 | 5270 | 12.29 | 12.83 | 12.07 | 12.66 | 18.49 | ≤ 19.06 | Pass |
| 802.11ac-VHT40 | 54 | 62 | 5310 | 12.15 | 12.76 | 12.00 | 12.70 | 18.44 | ≤ 19.06 | Pass |
| 802.11ac-VHT40 | 54 | 102 | 5510 | 12.38 | 12.52 | 12.26 | 12.42 | 18.42 | ≤ 19.17 | Pass |
| 802.11ac-VHT40 | 54 | 118 | 5590 | 12.51 | 13.04 | 12.09 | 12.47 | 18.56 | ≤ 19.17 | Pass |
| 802.11ac-VHT40 | 54 | 134 | 5670 | 13.17 | 13.00 | 12.22 | 12.16 | 18.68 | ≤ 19.17 | Pass |
| 802.11ac-VHT40 | 54 | 142 | 5710 | 13.11 | 12.63 | 11.90 | 12.04 | 18.47 | ≤ 19.17 | Pass |
| 802.11ac-VHT40 | 54 | 151 | 5755 | 20.00 | 18.97 | 18.27 | 18.61 | 25.03 | ≤ 25.45 | Pass |
| 802.11ac-VHT40 | 54 | 159 | 5795 | 19.98 | 19.06 | 18.14 | 18.59 | 25.02 | ≤ 25.45 | Pass |
| 802.11ac-VHT80 | 117.2 | 42 | 5210 | 17.96 | 18.59 | 17.94 | 18.27 | 24.22 | ≤ 25.04 | Pass |
| 802.11ac-VHT80 | 117.2 | 58 | 5290 | 11.86 | 12.52 | 11.61 | 12.40 | 18.13 | ≤ 19.06 | Pass |
| 802.11ac-VHT80 | 117.2 | 106 | 5530 | 12.52 | 12.80 | 12.32 | 12.71 | 18.61 | ≤ 19.17 | Pass |
| 802.11ac-VHT80 | 117.2 | 122 | 5610 | 12.48 | 12.69 | 11.98 | 11.87 | 18.29 | ≤ 19.17 | Pass |
| 802.11ac-VHT80 | 117.2 | 138 | 5690 | 12.92 | 12.67 | 11.93 | 11.85 | 18.39 | ≤ 19.17 | Pass |
| 802.11ac-VHT80 | 117.2 | 155 | 5775 | 17.67 | 16.76 | 15.99 | 16.43 | 22.78 | ≤ 25.45 | Pass |

Note: The Total Average Power (dBm) = $10 \cdot \log\{10^{(\text{Ant 0 Average Power} / 10)} + 10^{(\text{Ant 1 Average Power} / 10)} + 10^{(\text{Ant 2 Average Power} / 10)} + 10^{(\text{Ant 3 Average Power} / 10)}\}$.

7.5. Transmit Power Control

7.5.1. Test Limit

The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm.

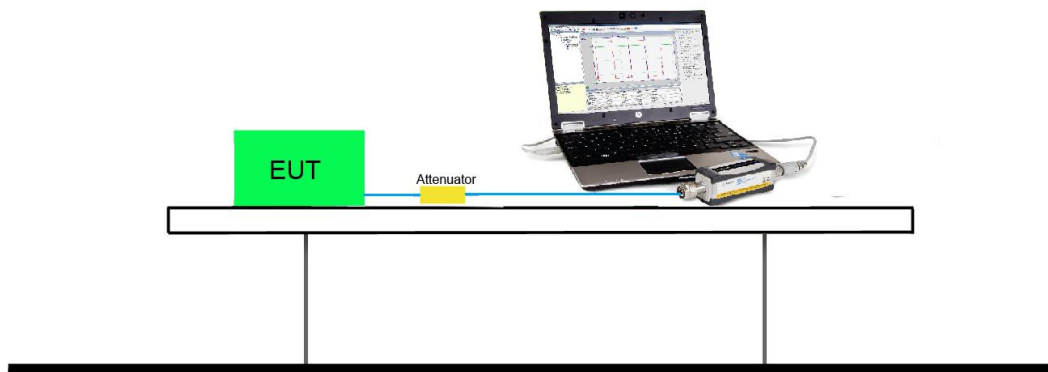
7.5.2. Test Procedure Used

KDB 789033 D02v01 - Section E) 3) b) Method PM-G

7.5.3. Test Setting

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

7.5.4. Test Setup



7.5.5. Test Result

| Test Mode | Data Rate (Mbps) | Channel No. | Freq. (MHz) | Ant 0 TPC Power (dBm) | Ant 1 TPC Power (dBm) | Ant 2 TPC Power (dBm) | Ant 3 TPC Power (dBm) | Total EIRP TPC Power (dBm) | Limit (dBm) | Result |
|----------------|------------------|-------------|-------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------------|-------------|--------|
| 802.11a | 6 | 52 | 5260 | 5.72 | 6.25 | 5.47 | 6.06 | 22.83 | ≤ 24 | Pass |
| 802.11a | 6 | 60 | 5300 | 5.54 | 6.11 | 5.26 | 5.95 | 22.67 | ≤ 24 | Pass |
| 802.11a | 6 | 64 | 5320 | 5.18 | 5.89 | 5.39 | 5.62 | 22.47 | ≤ 24 | Pass |
| 802.11a | 6 | 100 | 5500 | 5.30 | 5.32 | 4.95 | 5.20 | 22.03 | ≤ 24 | Pass |
| 802.11a | 6 | 120 | 5600 | 5.37 | 5.06 | 4.45 | 4.55 | 21.70 | ≤ 24 | Pass |
| 802.11a | 6 | 140 | 5700 | 5.23 | 4.29 | 3.76 | 4.00 | 21.19 | ≤ 24 | Pass |
| 802.11n-HT20 | 26 | 52 | 5260 | 5.77 | 6.46 | 5.49 | 6.19 | 22.93 | ≤ 24 | Pass |
| 802.11n-HT20 | 26 | 60 | 5300 | 5.81 | 6.24 | 5.53 | 6.44 | 22.96 | ≤ 24 | Pass |
| 802.11n-HT20 | 26 | 64 | 5320 | 5.34 | 6.18 | 5.65 | 5.88 | 22.71 | ≤ 24 | Pass |
| 802.11n-HT20 | 26 | 100 | 5500 | 5.46 | 5.46 | 5.07 | 5.68 | 22.25 | ≤ 24 | Pass |
| 802.11n-HT20 | 26 | 120 | 5600 | 5.03 | 5.08 | 4.31 | 4.22 | 21.51 | ≤ 24 | Pass |
| 802.11n-HT20 | 26 | 140 | 5700 | 5.28 | 4.63 | 3.74 | 4.18 | 21.33 | ≤ 24 | Pass |
| 802.11n-HT40 | 54 | 54 | 5270 | 6.04 | 6.33 | 5.62 | 6.34 | 23.03 | ≤ 24 | Pass |
| 802.11n-HT40 | 54 | 62 | 5310 | 5.83 | 6.32 | 5.46 | 6.31 | 22.94 | ≤ 24 | Pass |
| 802.11n-HT40 | 54 | 102 | 5510 | 5.94 | 5.98 | 5.70 | 5.83 | 22.69 | ≤ 24 | Pass |
| 802.11n-HT40 | 54 | 118 | 5590 | 6.16 | 6.51 | 5.64 | 6.08 | 22.94 | ≤ 24 | Pass |
| 802.11n-HT40 | 54 | 134 | 5670 | 6.35 | 5.81 | 5.19 | 5.28 | 22.51 | ≤ 24 | Pass |
| 802.11ac-VHT20 | 26 | 52 | 5260 | 5.95 | 6.55 | 5.71 | 6.44 | 23.12 | ≤ 24 | Pass |
| 802.11ac-VHT20 | 26 | 60 | 5300 | 5.72 | 6.22 | 5.53 | 6.39 | 22.92 | ≤ 24 | Pass |
| 802.11ac-VHT20 | 26 | 64 | 5320 | 5.28 | 6.24 | 5.57 | 6.09 | 22.75 | ≤ 24 | Pass |
| 802.11ac-VHT20 | 26 | 100 | 5500 | 6.08 | 6.01 | 5.46 | 6.20 | 22.78 | ≤ 24 | Pass |
| 802.11ac-VHT20 | 26 | 120 | 5600 | 5.35 | 5.32 | 4.48 | 4.60 | 21.79 | ≤ 24 | Pass |
| 802.11ac-VHT20 | 26 | 140 | 5700 | 5.15 | 4.64 | 3.78 | 4.12 | 21.28 | ≤ 24 | Pass |
| 802.11ac-VHT20 | 26 | 144 | 5720 | 5.73 | 4.75 | 3.84 | 4.80 | 21.66 | ≤ 24 | Pass |

| Test Mode | Data Rate (Mbps) | Channel No. | Freq. (MHz) | Ant 0 TPC Power (dBm) | Ant 1 TPC Power (dBm) | Ant 2 TPC Power (dBm) | Ant 3 TPC Power (dBm) | Total EIRP TPC Power (dBm) | Limit (dBm) | Result |
|----------------|------------------|-------------|-------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------------|-------------|--------|
| 802.11ac-VHT40 | 54 | 54 | 5270 | 5.76 | 6.26 | 5.55 | 6.32 | 22.93 | ≤ 24 | Pass |
| 802.11ac-VHT40 | 54 | 62 | 5310 | 5.70 | 6.39 | 5.67 | 6.27 | 22.96 | ≤ 24 | Pass |
| 802.11ac-VHT40 | 54 | 102 | 5510 | 5.95 | 6.12 | 5.90 | 6.01 | 22.83 | ≤ 24 | Pass |
| 802.11ac-VHT40 | 54 | 118 | 5590 | 5.99 | 6.64 | 5.53 | 5.92 | 22.87 | ≤ 24 | Pass |
| 802.11ac-VHT40 | 54 | 134 | 5670 | 6.67 | 6.42 | 5.79 | 5.72 | 23.00 | ≤ 24 | Pass |
| 802.11ac-VHT40 | 54 | 142 | 5710 | 6.52 | 6.12 | 5.44 | 5.65 | 22.78 | ≤ 24 | Pass |
| 802.11ac-VHT80 | 117.2 | 58 | 5290 | 5.46 | 6.19 | 5.23 | 5.97 | 22.67 | ≤ 24 | Pass |
| 802.11ac-VHT80 | 117.2 | 106 | 5530 | 6.14 | 6.40 | 5.81 | 6.33 | 23.01 | ≤ 24 | Pass |
| 802.11ac-VHT80 | 117.2 | 122 | 5610 | 6.08 | 6.14 | 5.49 | 5.33 | 22.61 | ≤ 24 | Pass |
| 802.11ac-VHT80 | 117.2 | 138 | 5690 | 6.36 | 6.30 | 5.45 | 5.51 | 22.76 | ≤ 24 | Pass |

Note: Total EIRP TPC Power (dBm) = $10 \cdot \log\{10^{(\text{Ant 0 TPC Power} / 10)} + 10^{(\text{Ant 1 TPC Power} / 10)} + 10^{(\text{Ant 2 TPC Power} / 10)} + 10^{(\text{Ant 3 TPC Power} / 10)}\} + \text{Directional Antenna Gain (dBi)}$.

7.6. Power Spectral Density Measurement

7.6.1. Test Limit

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.

$$5150\sim 5250\text{MHz: Limit (dBm/MHz)} = 17\text{dBm} - (10.96\text{dBi} - 6\text{dBi}) = 12.04\text{dBm/MHz}$$

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

$$5250\sim 5350\text{MHz: Limit (dBm/MHz)} = 11\text{dBm/MHz} - (10.92\text{dBi} - 6\text{dBi}) = 6.08\text{dBm/MHz}$$

$$5470\sim 5725\text{MHz: Limit (dBm/MHz)} = 11\text{dBm/MHz} - (10.81\text{dBi} - 6\text{dBi}) = 6.19\text{dBm/MHz}$$

For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

$$5725\sim 5850\text{MHz: Limit (dBm/500KHz)} = 30\text{dBm/KHz} - (10.55\text{dBi} - 6\text{dBi}) = 25.45\text{dBm/500KHz}$$

If transmitting antennas of directional gain greater than 6dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

7.6.2. Test Procedure Used

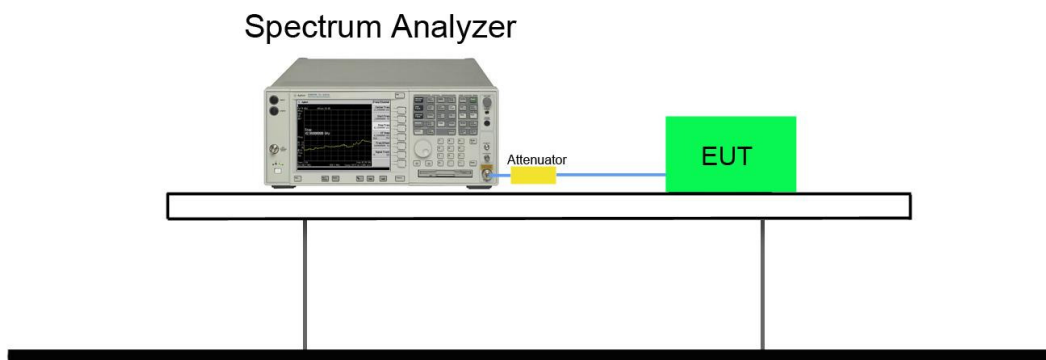
KDB 789033 D02v01 - Section F

7.6.3. Test Setting

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire 26dB EBW of the signal.
3. RBW = 1MHz, if measurement bandwidth of Maximum PSD is specified in 500 kHz,
RBW = 100 kHz
4. VBW = 3MHz
5. Number of sweep points $\geq 2 \times (\text{span} / \text{RBW})$
6. Detector = power averaging (Average)
7. Sweep time = auto
8. Trigger = free run
9. Use the peak search function on the instrument to find the peak of the spectrum and record its value.

10. Add $10 \cdot \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add $10 \cdot \log(1/0.25) = 6$ dB if the duty cycle is 25 percent.
11. When the measurement bandwidth of Maximum PSD is specified in 500 kHz, add a constant factor $10 \cdot \log(500\text{kHz}/100\text{kHz}) = 7$ dB to the measured result

7.6.4. Test Setup



7.6.5. Test Result

| Test Mode | Data Rate (Mbps) | Channel No. | Freq. (MHz) | Ant 0 PSD (dBm/MHz) | Ant 1 PSD (dBm/MHz) | Ant 2 PSD (dBm/MHz) | Ant 3 PSD (dBm/MHz) | Duty Cycle (%) | Total PSD (dBm/MHz) | PSD Limit (dBm/MHz) | Result |
|-----------|------------------|-------------|-------------|---------------------|---------------------|---------------------|---------------------|----------------|---------------------|---------------------|--------|
| 11a | 6 | 36 | 5180 | 4.85 | 5.31 | 3.03 | 5.25 | 95.88 | 10.91 | ≤ 12.04 | Pass |
| 11a | 6 | 44 | 5220 | 2.70 | 5.83 | 4.81 | 4.98 | 95.88 | 10.93 | ≤ 12.04 | Pass |
| 11a | 6 | 48 | 5240 | 4.41 | 5.95 | 4.98 | 5.37 | 95.88 | 11.42 | ≤ 12.04 | Pass |
| 11a | 6 | 52 | 5260 | -1.21 | -0.35 | -1.25 | -0.79 | 95.88 | 5.32 | ≤ 6.08 | Pass |
| 11a | 6 | 60 | 5300 | -1.39 | -0.08 | -1.57 | -0.43 | 95.88 | 5.38 | ≤ 6.08 | Pass |
| 11a | 6 | 64 | 5320 | -1.17 | -0.31 | -0.96 | -0.80 | 95.88 | 5.41 | ≤ 6.08 | Pass |
| 11a | 6 | 100 | 5500 | -0.56 | -0.79 | -0.62 | -0.72 | 95.88 | 5.53 | ≤ 6.19 | Pass |
| 11a | 6 | 120 | 5600 | -0.46 | -0.32 | -1.07 | -1.00 | 95.88 | 5.50 | ≤ 6.19 | Pass |
| 11a | 6 | 140 | 5700 | -0.05 | -0.39 | -1.00 | -1.20 | 95.88 | 5.57 | ≤ 6.19 | Pass |
| 11n-HT20 | 26 | 36 | 5180 | 4.48 | 5.05 | 4.66 | 5.14 | 98.23 | 10.86 | ≤ 12.04 | Pass |
| 11n-HT20 | 26 | 44 | 5220 | 4.78 | 5.28 | 4.19 | 5.18 | 98.23 | 10.90 | ≤ 12.04 | Pass |
| 11n-HT20 | 26 | 48 | 5240 | 4.97 | 4.27 | 4.42 | 4.89 | 98.23 | 10.67 | ≤ 12.04 | Pass |
| 11n-HT20 | 26 | 52 | 5260 | -1.75 | -0.45 | -1.31 | -0.60 | 98.23 | 5.02 | ≤ 6.08 | Pass |
| 11n-HT20 | 26 | 60 | 5300 | -1.15 | -0.34 | -0.92 | -0.12 | 98.23 | 5.41 | ≤ 6.08 | Pass |
| 11n-HT20 | 26 | 64 | 5320 | -1.77 | -2.77 | -1.18 | -0.42 | 98.23 | 4.57 | ≤ 6.08 | Pass |
| 11n-HT20 | 26 | 100 | 5500 | -0.82 | -0.59 | -0.69 | -0.67 | 98.23 | 5.33 | ≤ 6.19 | Pass |
| 11n-HT20 | 26 | 120 | 5600 | -0.90 | -0.43 | -1.35 | -1.06 | 98.23 | 5.10 | ≤ 6.19 | Pass |
| 11n-HT20 | 26 | 140 | 5700 | 0.27 | 0.06 | -0.73 | -1.02 | 98.23 | 5.70 | ≤ 6.19 | Pass |
| 11n-HT40 | 54 | 38 | 5190 | 0.89 | 2.63 | 1.80 | 2.32 | 95.60 | 8.17 | ≤ 12.04 | Pass |
| 11n-HT40 | 54 | 46 | 5230 | 1.83 | 2.53 | 1.99 | 2.44 | 95.60 | 8.42 | ≤ 12.04 | Pass |
| 11n-HT40 | 54 | 54 | 5270 | -3.91 | -2.96 | -3.71 | -3.63 | 95.60 | 2.68 | ≤ 6.08 | Pass |
| 11n-HT40 | 54 | 62 | 5310 | -4.02 | -2.82 | -3.73 | -2.91 | 95.60 | 2.88 | ≤ 6.08 | Pass |
| 11n-HT40 | 54 | 102 | 5510 | -3.45 | -2.52 | -3.15 | -2.82 | 95.60 | 3.25 | ≤ 6.19 | Pass |
| 11n-HT40 | 54 | 118 | 5590 | -2.42 | -1.59 | -2.92 | -2.37 | 95.60 | 3.92 | ≤ 6.19 | Pass |
| 11n-HT40 | 54 | 134 | 5670 | -1.89 | -2.11 | -2.78 | -2.92 | 95.60 | 3.81 | ≤ 6.19 | Pass |

| Test Mode | Data Rate (Mbps) | Channel No. | Freq. (MHz) | Ant 0 PSD (dBm/MHz) | Ant 1 PSD (dBm/MHz) | Ant 2 PSD (dBm/MHz) | Ant 3 PSD (dBm/MHz) | Duty Cycle (%) | Total PSD (dBm/MHz) | PSD Limit (dBm/MHz) | Result |
|------------|------------------|-------------|-------------|---------------------|---------------------|---------------------|---------------------|----------------|---------------------|---------------------|--------|
| 11ac-VHT20 | 26 | 36 | 5180 | 3.87 | 4.81 | 4.27 | 4.81 | 98.23 | 10.48 | ≤ 12.04 | Pass |
| 11ac-VHT20 | 26 | 44 | 5220 | 4.27 | 5.34 | 4.58 | 5.04 | 98.23 | 10.85 | ≤ 12.04 | Pass |
| 11ac-VHT20 | 26 | 48 | 5240 | 4.73 | 4.91 | 4.52 | 5.27 | 98.23 | 10.89 | ≤ 12.04 | Pass |
| 11ac-VHT20 | 26 | 52 | 5260 | -1.15 | -0.47 | -1.40 | -0.53 | 98.23 | 5.15 | ≤ 6.08 | Pass |
| 11ac-VHT20 | 26 | 60 | 5300 | -0.88 | -0.58 | -1.23 | -0.29 | 98.23 | 5.29 | ≤ 6.08 | Pass |
| 11ac-VHT20 | 26 | 64 | 5320 | -1.52 | -0.15 | -1.21 | -0.63 | 98.23 | 5.18 | ≤ 6.08 | Pass |
| 11ac-VHT20 | 26 | 100 | 5500 | -0.89 | -0.40 | -1.00 | -0.38 | 98.23 | 5.36 | ≤ 6.19 | Pass |
| 11ac-VHT20 | 26 | 120 | 5600 | -0.30 | -0.01 | -1.14 | -0.94 | 98.23 | 5.45 | ≤ 6.19 | Pass |
| 11ac-VHT20 | 26 | 140 | 5700 | 0.20 | -0.12 | -0.96 | -0.76 | 98.23 | 5.64 | ≤ 6.19 | Pass |
| 11ac-VHT20 | 26 | 144 | 5720 | -0.44 | -0.10 | -1.42 | -0.76 | 98.23 | 5.37 | ≤ 6.19 | Pass |
| 11ac-VHT40 | 54 | 38 | 5190 | 1.48 | 1.72 | 1.98 | 2.32 | 95.62 | 8.10 | ≤ 12.04 | Pass |
| 11ac-VHT40 | 54 | 46 | 5230 | 1.68 | 1.13 | 0.74 | 2.56 | 95.62 | 7.80 | ≤ 12.04 | Pass |
| 11ac-VHT40 | 54 | 54 | 5270 | -4.29 | -3.55 | -4.29 | -4.06 | 95.62 | 2.18 | ≤ 6.08 | Pass |
| 11ac-VHT40 | 54 | 62 | 5310 | -4.18 | -4.00 | -4.50 | -3.85 | 95.62 | 2.09 | ≤ 6.08 | Pass |
| 11ac-VHT40 | 54 | 102 | 5510 | -3.49 | -2.79 | -3.55 | -3.02 | 95.62 | 3.01 | ≤ 6.19 | Pass |
| 11ac-VHT40 | 54 | 118 | 5590 | -3.00 | -2.37 | -3.69 | -2.88 | 95.62 | 3.26 | ≤ 6.19 | Pass |
| 11ac-VHT40 | 54 | 134 | 5670 | -4.28 | -2.14 | -2.95 | -3.13 | 95.62 | 3.16 | ≤ 6.19 | Pass |
| 11ac-VHT40 | 54 | 142 | 5710 | -3.61 | -1.65 | -2.55 | -2.69 | 95.62 | 3.65 | ≤ 6.19 | Pass |
| 11ac-VHT80 | 117.2 | 42 | 5210 | 0.50 | 1.50 | 0.91 | 1.14 | 94.00 | 7.32 | ≤ 12.04 | Pass |
| 11ac-VHT80 | 117.2 | 58 | 5290 | -7.53 | -6.69 | -7.56 | -7.24 | 94.00 | -0.95 | ≤ 6.08 | Pass |
| 11ac-VHT80 | 117.2 | 106 | 5530 | -9.28 | -7.05 | -6.87 | -7.44 | 94.00 | -1.27 | ≤ 6.19 | Pass |
| 11ac-VHT80 | 117.2 | 122 | 5610 | -10.07 | -6.05 | -8.16 | -6.71 | 94.00 | -1.20 | ≤ 6.19 | Pass |
| 11ac-VHT80 | 117.2 | 138 | 5690 | -5.17 | -5.29 | -6.27 | -6.25 | 94.00 | 0.58 | ≤ 6.19 | Pass |

Note 1: When EUT duty cycle ≥ 98%, the Total PSD (dBm/MHz) = $10 \cdot \log\{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)} + 10^{(\text{Ant 2 PSD}/10)} + 10^{(\text{Ant 3 PSD}/10)}\}$.

Note 2: When EUT duty cycle < 98%, the Total PSD (dBm/MHz) = $10 \cdot \log\{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)} + 10^{(\text{Ant 2 PSD}/10)} + 10^{(\text{Ant 3 PSD}/10)}\} + 10 \cdot \log(1/\text{Duty Cycle})$.

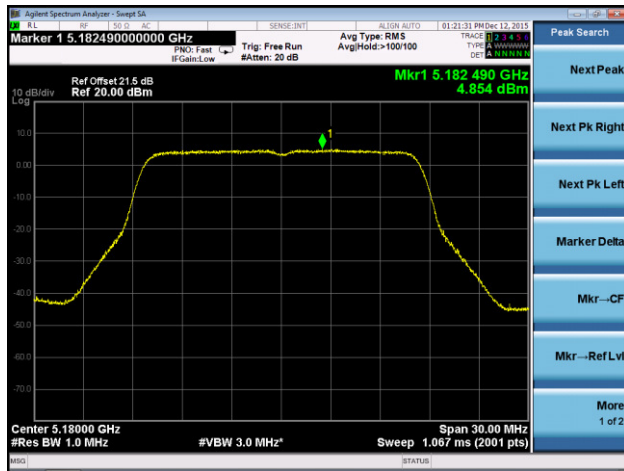
| Test Mode | Data Rate (Mbps) | Channel No. | Freq. (MHz) | Ant 0 PSD (dBm/MHz) | Ant 1 PSD (dBm/MHz) | Ant 2 PSD (dBm/MHz) | Ant 3 PSD (dBm/MHz) | Duty Cycle (%) | Constant Factor | Total PSD (dBm/500kHz) | Limit (dBm/500kHz) | Result |
|------------|------------------|-------------|-------------|---------------------|---------------------|---------------------|---------------------|----------------|-----------------|------------------------|--------------------|--------|
| 11a | 6 | 149 | 5745 | -0.48 | -1.59 | -1.94 | -1.69 | 95.88 | 7.00 | 11.81 | ≤ 25.45 | Pass |
| 11a | 6 | 157 | 5785 | -0.25 | -1.29 | -2.32 | -1.71 | 95.88 | 7.00 | 11.87 | ≤ 25.45 | Pass |
| 11a | 6 | 165 | 5825 | -0.68 | -1.08 | -1.60 | -1.42 | 95.88 | 7.00 | 12.01 | ≤ 25.45 | Pass |
| 11n-HT20 | 26 | 149 | 5745 | -0.84 | -1.86 | -2.37 | -2.11 | 98.23 | 7.00 | 11.26 | ≤ 25.45 | Pass |
| 11n-HT20 | 26 | 157 | 5785 | -0.97 | -0.88 | -1.80 | -1.40 | 98.23 | 7.00 | 11.76 | ≤ 25.45 | Pass |
| 11n-HT20 | 26 | 165 | 5825 | -1.80 | -1.55 | -2.52 | -4.14 | 98.23 | 7.00 | 10.62 | ≤ 25.45 | Pass |
| 11n-HT40 | 54 | 151 | 5755 | -4.66 | -4.36 | -5.59 | -7.32 | 95.60 | 7.00 | 7.87 | ≤ 25.45 | Pass |
| 11n-HT40 | 54 | 159 | 5795 | -4.50 | -4.41 | -5.43 | -5.46 | 95.60 | 7.00 | 8.29 | ≤ 25.45 | Pass |
| 11ac-VHT20 | 26 | 149 | 5745 | 0.05 | -1.03 | -1.67 | -1.27 | 98.23 | 7.00 | 12.08 | ≤ 25.45 | Pass |
| 11ac-VHT20 | 26 | 157 | 5785 | -0.58 | -1.03 | -1.45 | -0.94 | 98.23 | 7.00 | 12.02 | ≤ 25.45 | Pass |
| 11ac-VHT20 | 26 | 165 | 5825 | -1.09 | -1.26 | -2.24 | -1.54 | 98.23 | 7.00 | 11.50 | ≤ 25.45 | Pass |
| 11ac-VHT40 | 54 | 151 | 5755 | -3.19 | -3.65 | -4.44 | -4.72 | 95.62 | 7.00 | 9.25 | ≤ 25.45 | Pass |
| 11ac-VHT40 | 54 | 159 | 5795 | -2.75 | -3.71 | -4.22 | -4.74 | 95.62 | 7.00 | 9.41 | ≤ 25.45 | Pass |
| 11ac-VHT80 | 117.2 | 155 | 5775 | -8.56 | -9.32 | -9.56 | -9.19 | 94.00 | 7.00 | 4.14 | ≤ 25.45 | Pass |

Note 1: When EUT duty cycle ≥ 98%, the Total PSD (dBm/MHz) = $10 \cdot \log\{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)} + 10^{(\text{Ant 2 PSD}/10)} + 10^{(\text{Ant 3 PSD}/10)}\}$.

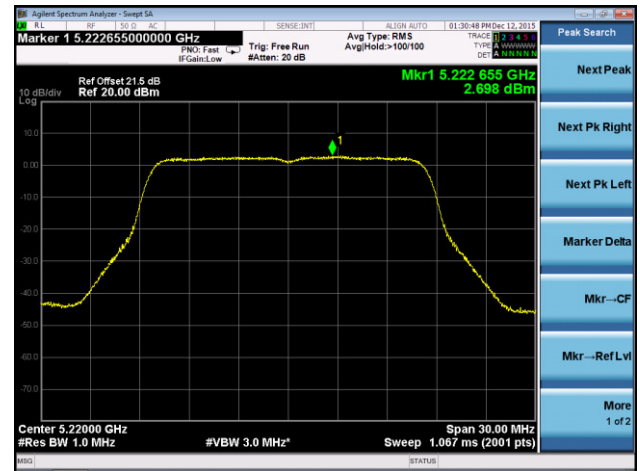
Note 2: When EUT duty cycle < 98%, the Total PSD (dBm/MHz) = $10 \cdot \log\{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)} + 10^{(\text{Ant 2 PSD}/10)} + 10^{(\text{Ant 3 PSD}/10)}\} + 10 \cdot \log(1/\text{Duty Cycle})$.

802.11a Power Spectral Density - Ant 0 / Ant 0 + 1 + 2 + 3

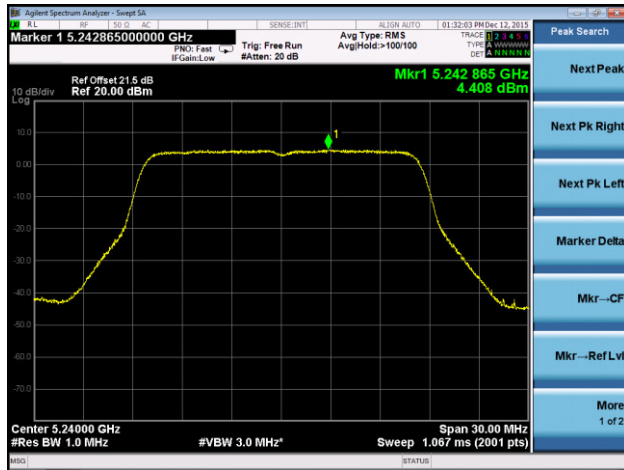
Channel 36 (5180MHz)



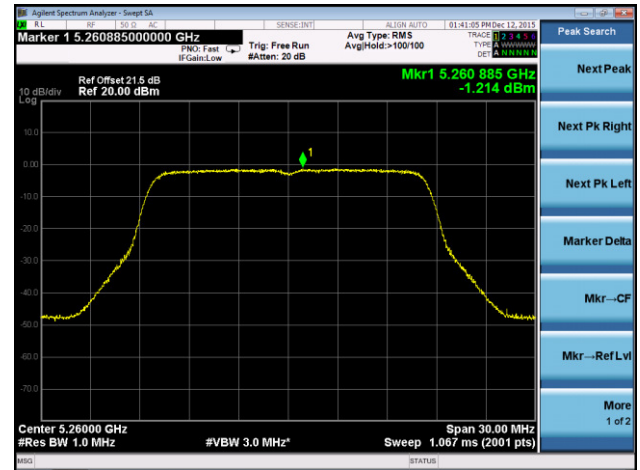
Channel 44 (5220MHz)



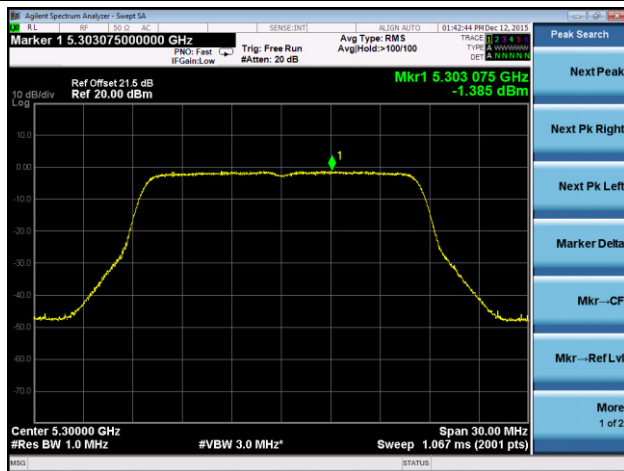
Channel 48 (5240MHz)



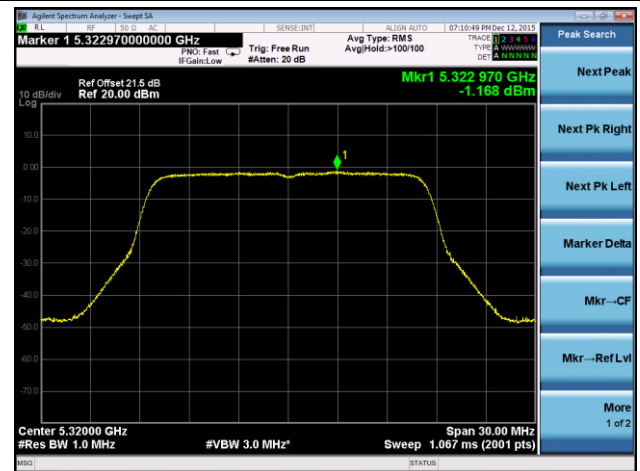
Channel 52 (5260MHz)

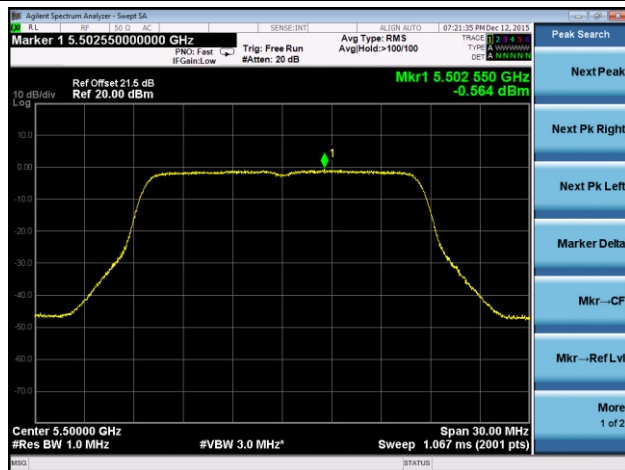
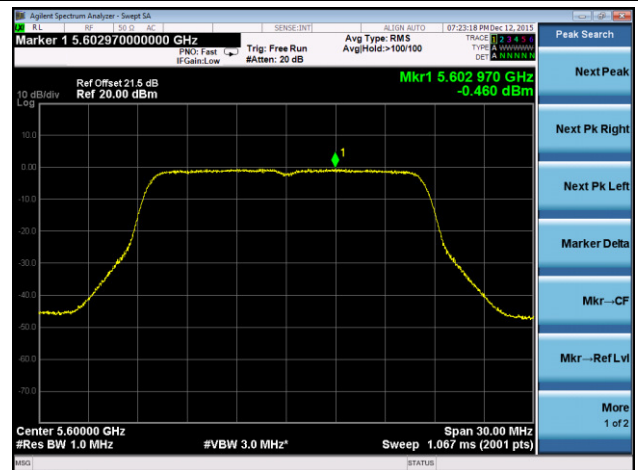
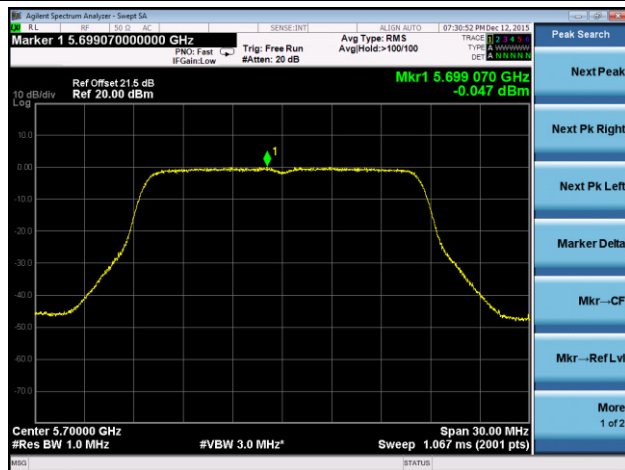
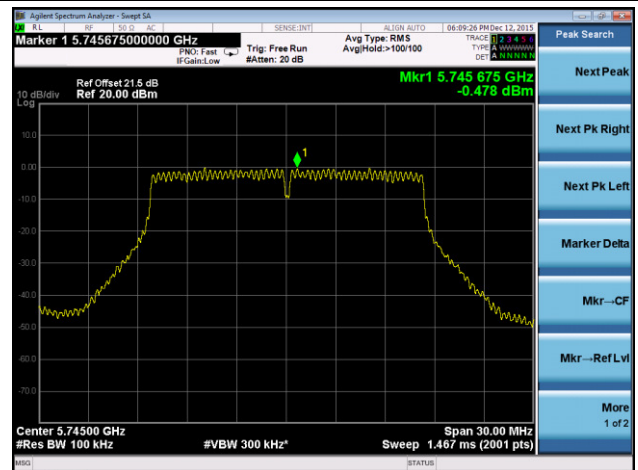
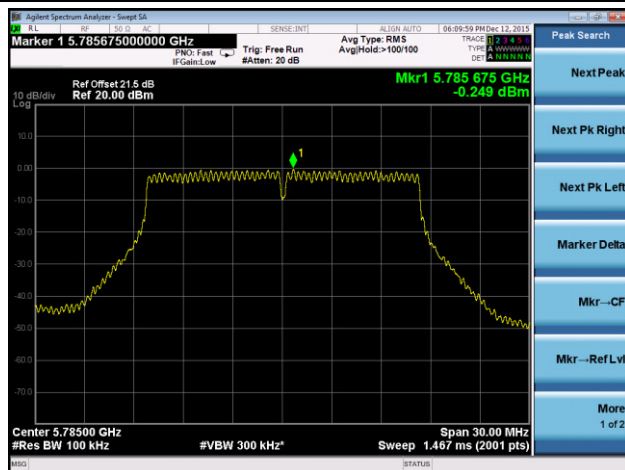
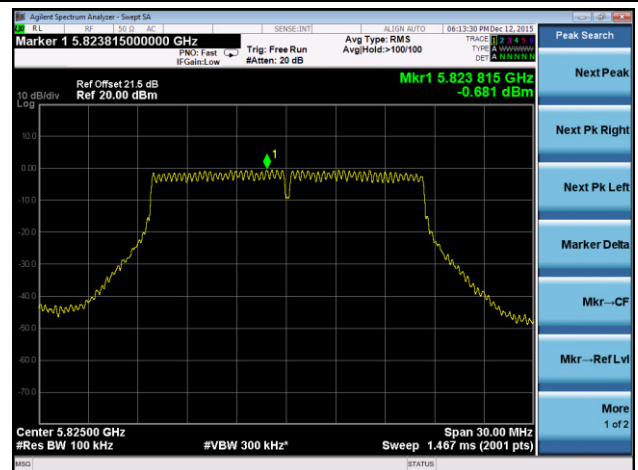


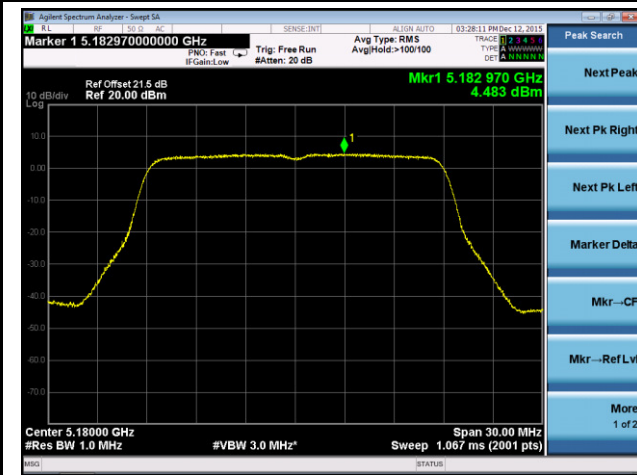
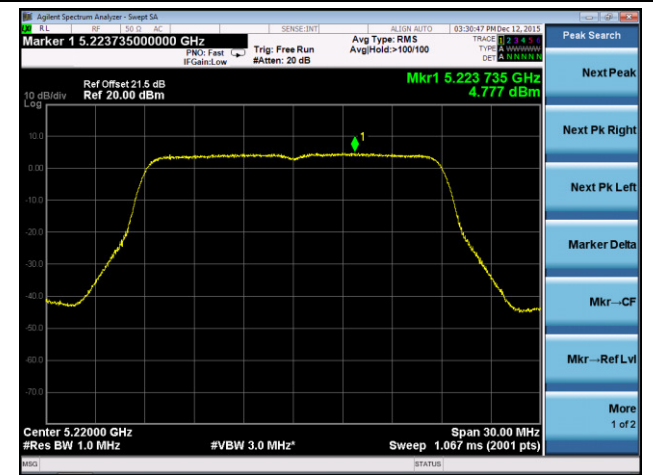
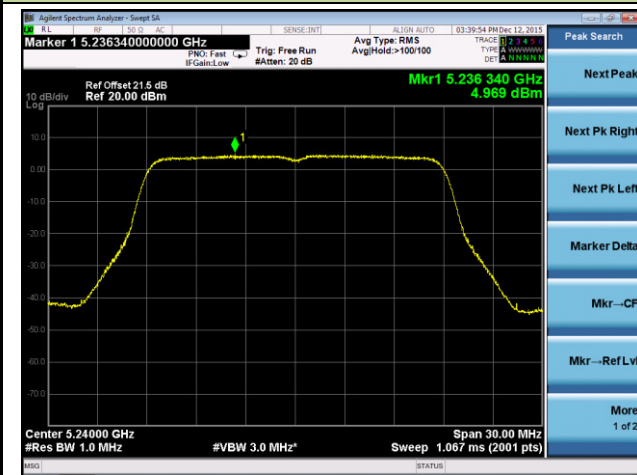
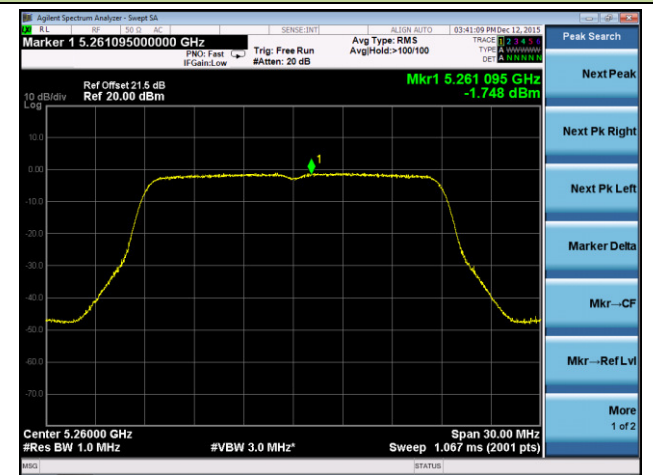
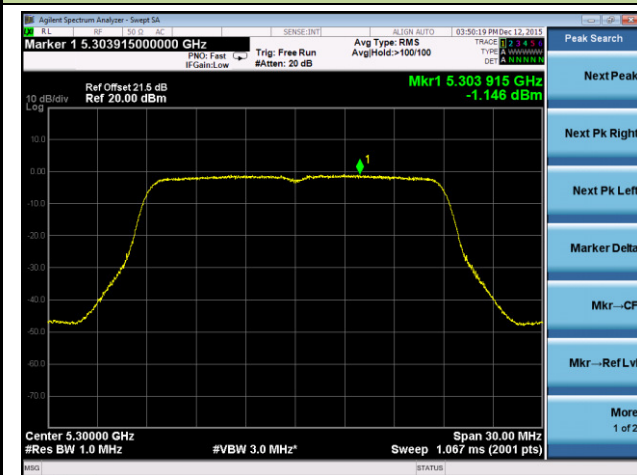
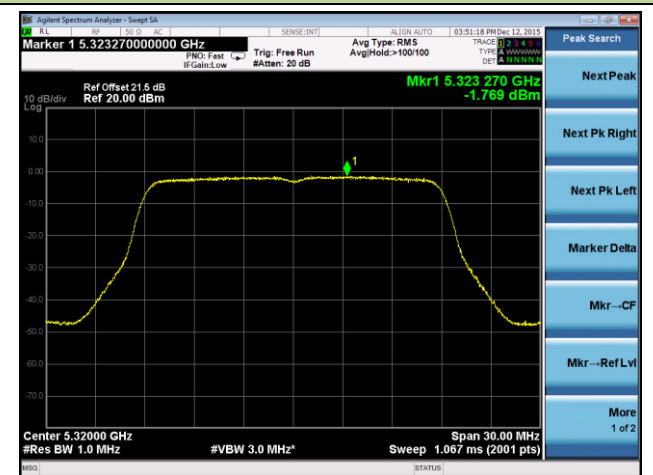
Channel 60 (5300MHz)

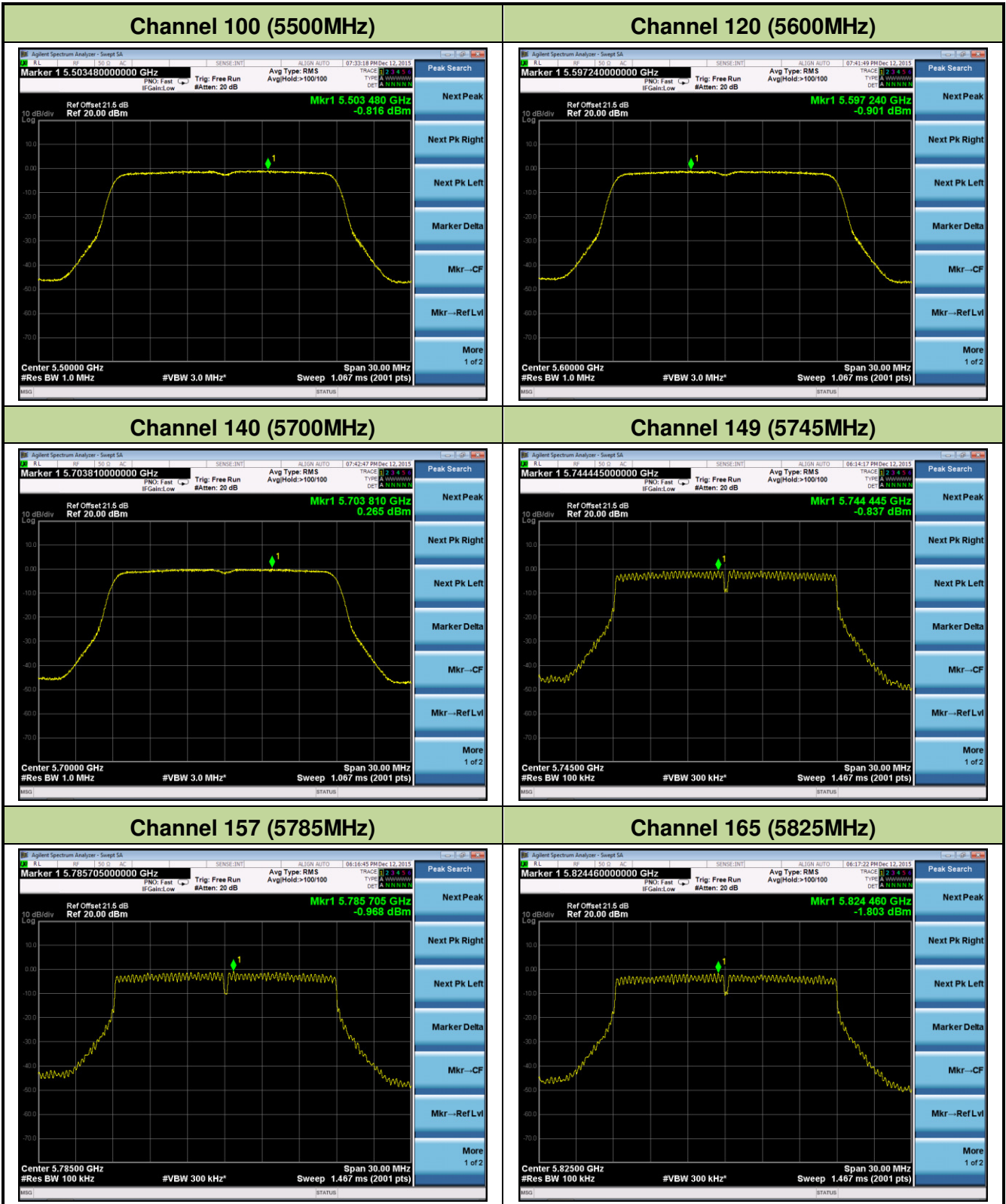


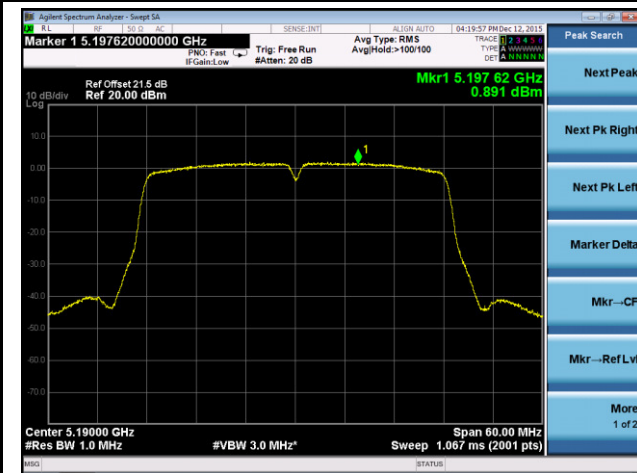
Channel 64 (5320MHz)

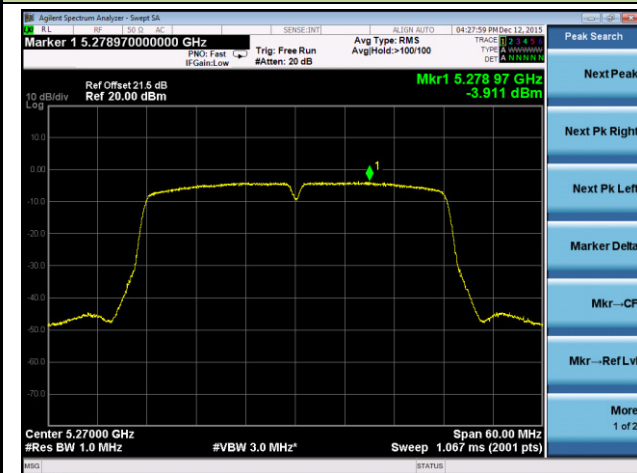
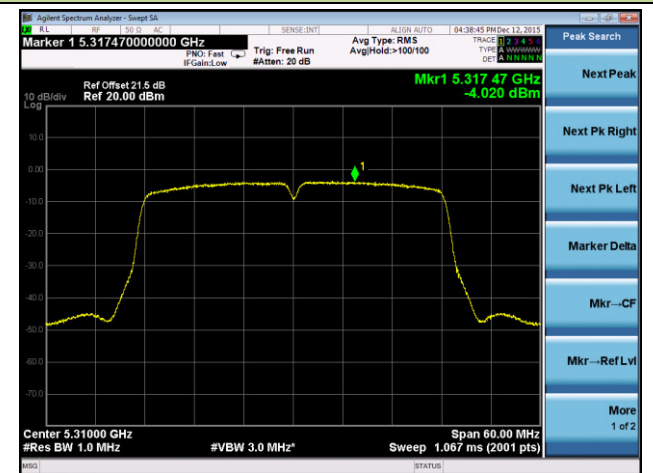
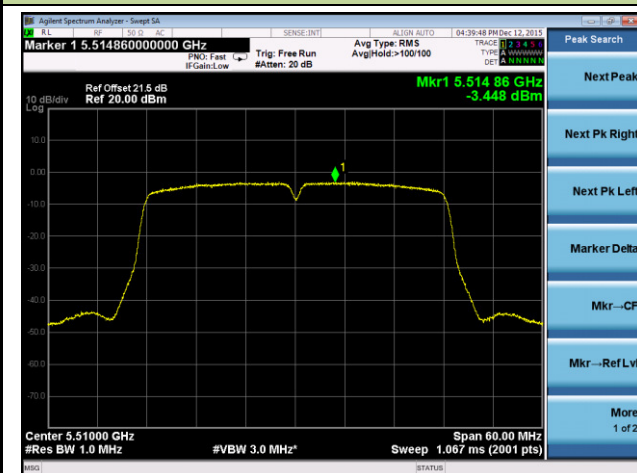
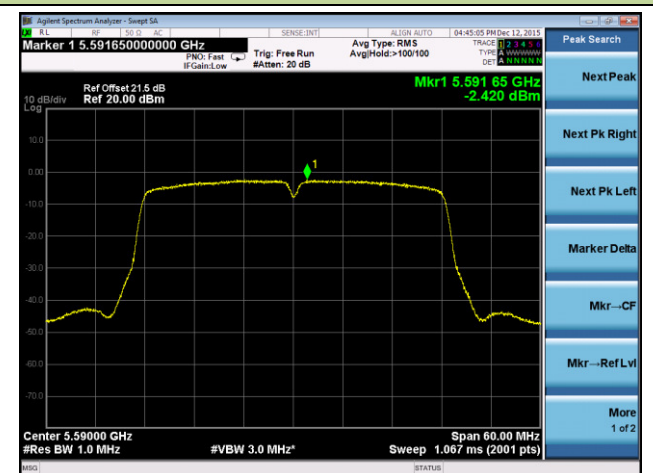


Channel 100 (5500MHz)

Channel 120 (5600MHz)

Channel 140 (5700MHz)

Channel 149 (5745MHz)

Channel 157 (5785MHz)

Channel 165 (5825MHz)


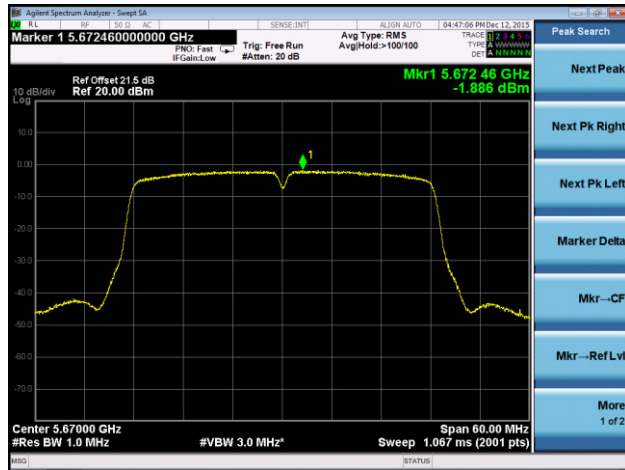
802.11n-HT20 Power Spectral Density - Ant 0 / Ant 0 + 1 + 2 + 3
Channel 36 (5180MHz)

Channel 44 (5220MHz)

Channel 48 (5240MHz)

Channel 52 (5260MHz)

Channel 60 (5300MHz)

Channel 64 (5320MHz)




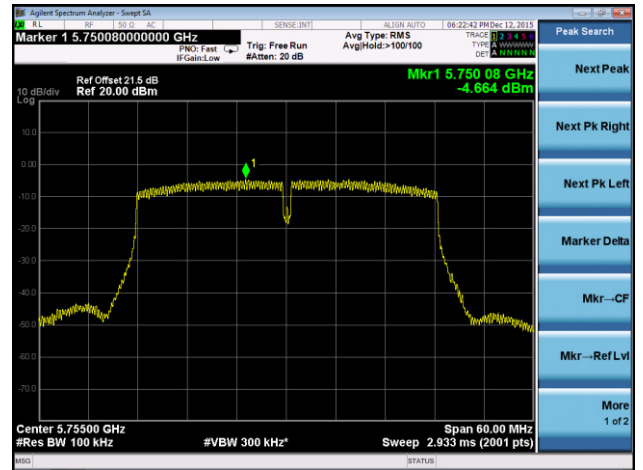
802.11n-HT40 Power Spectral Density - Ant 0 / Ant 0 + 1 + 2 + 3
Channel 38 (5190MHz)

Channel 46 (5230MHz)

Channel 54 (5270MHz)

Channel 62 (5310MHz)

Channel 102 (5510MHz)

Channel 118 (5590MHz)


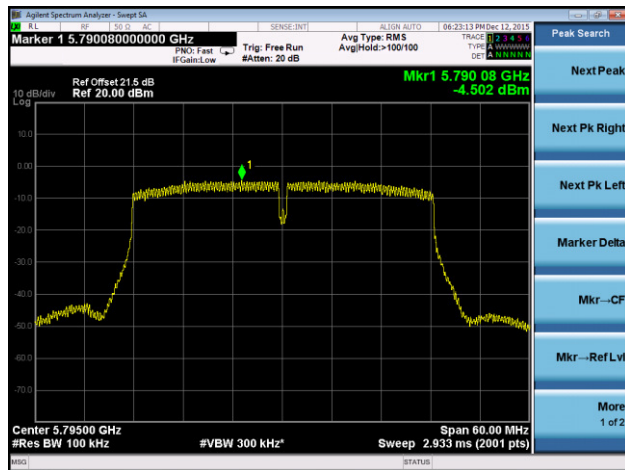
Channel 134 (5670MHz)

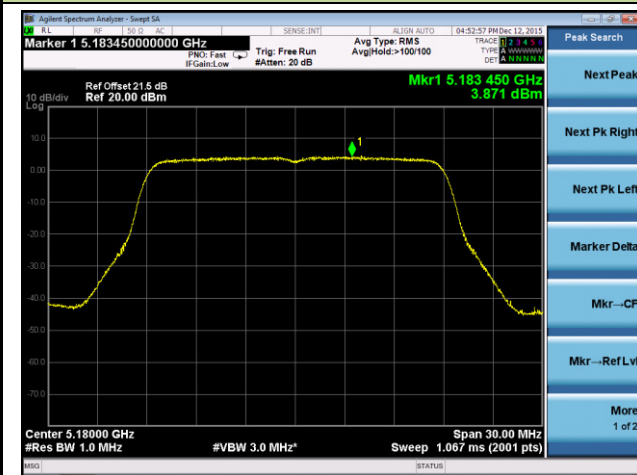
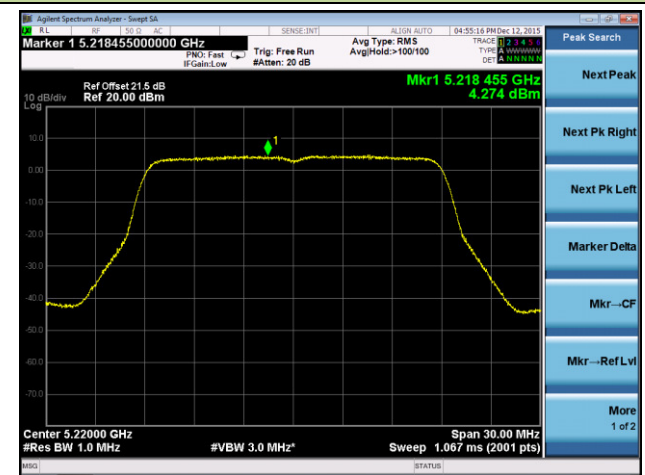
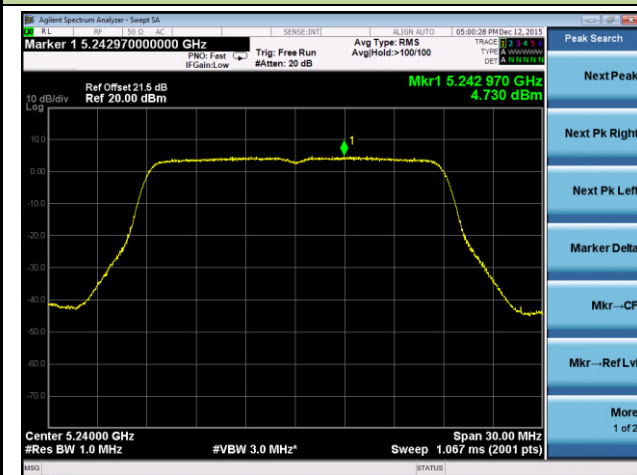
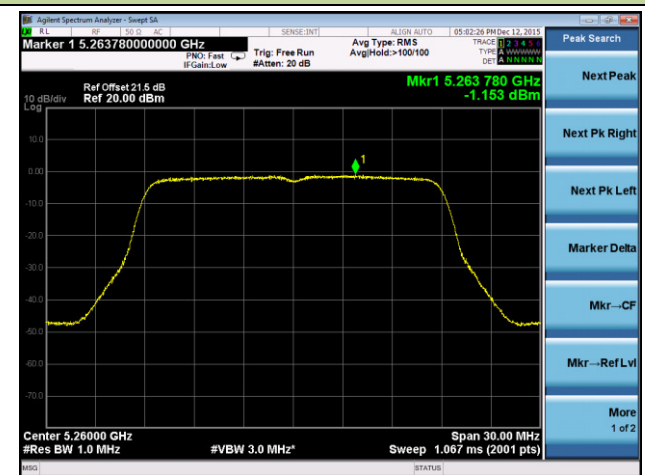
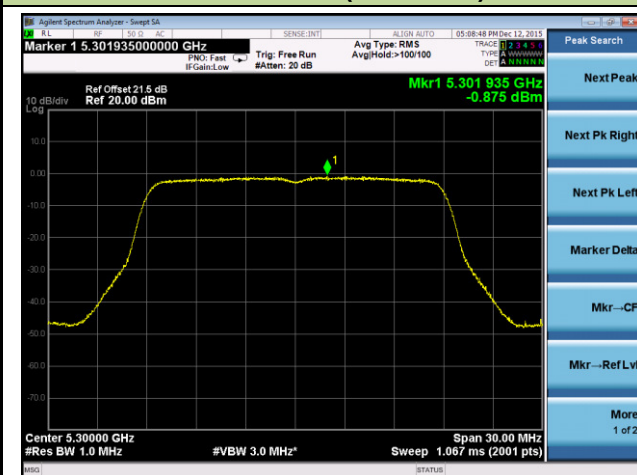
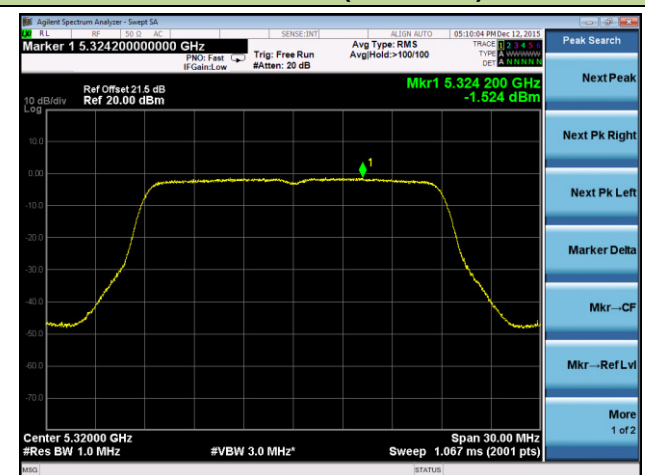


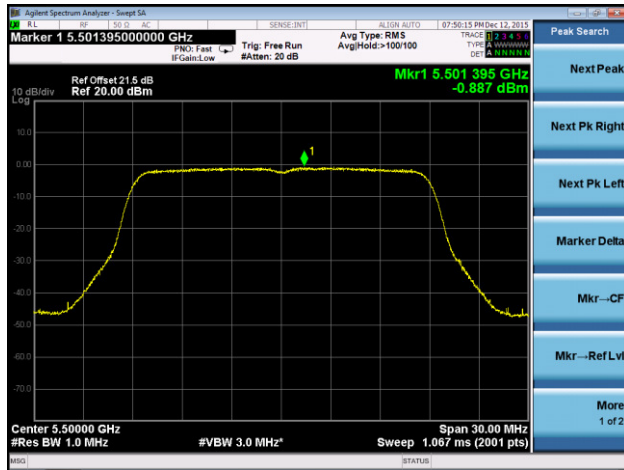
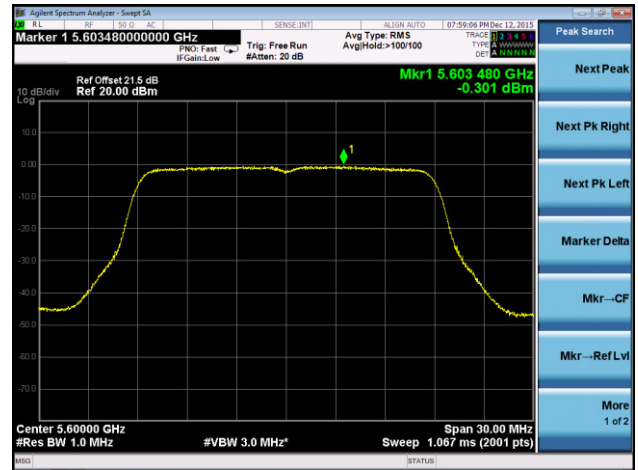
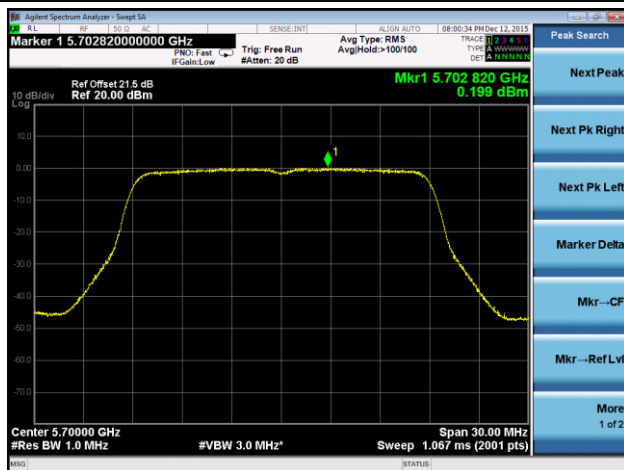
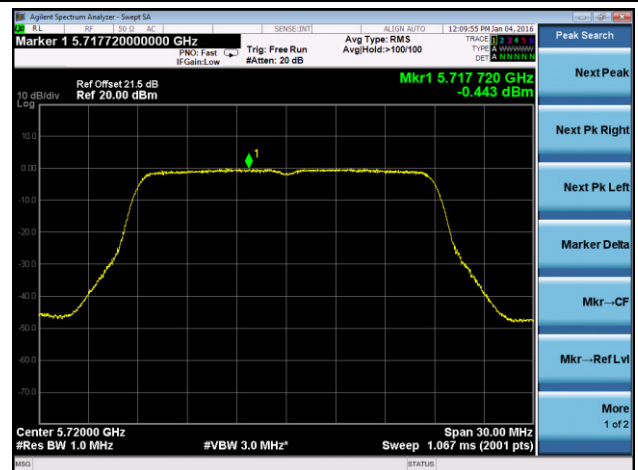
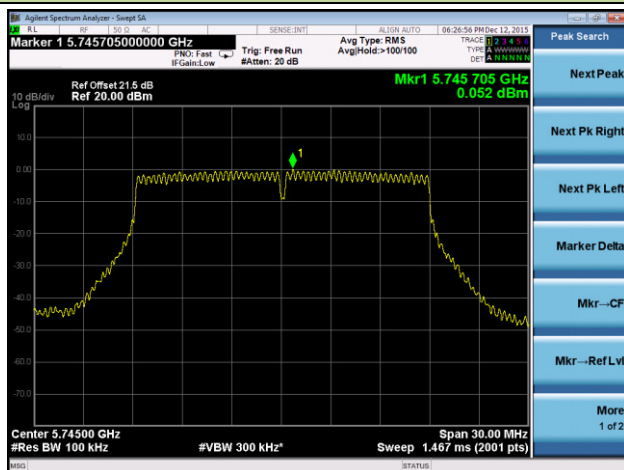
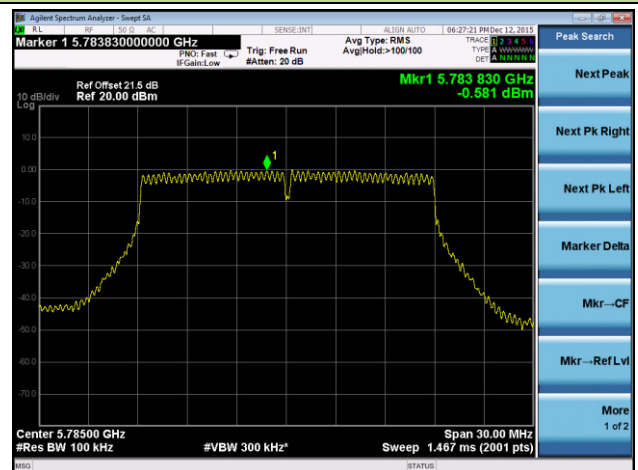
Channel 151 (5755MHz)

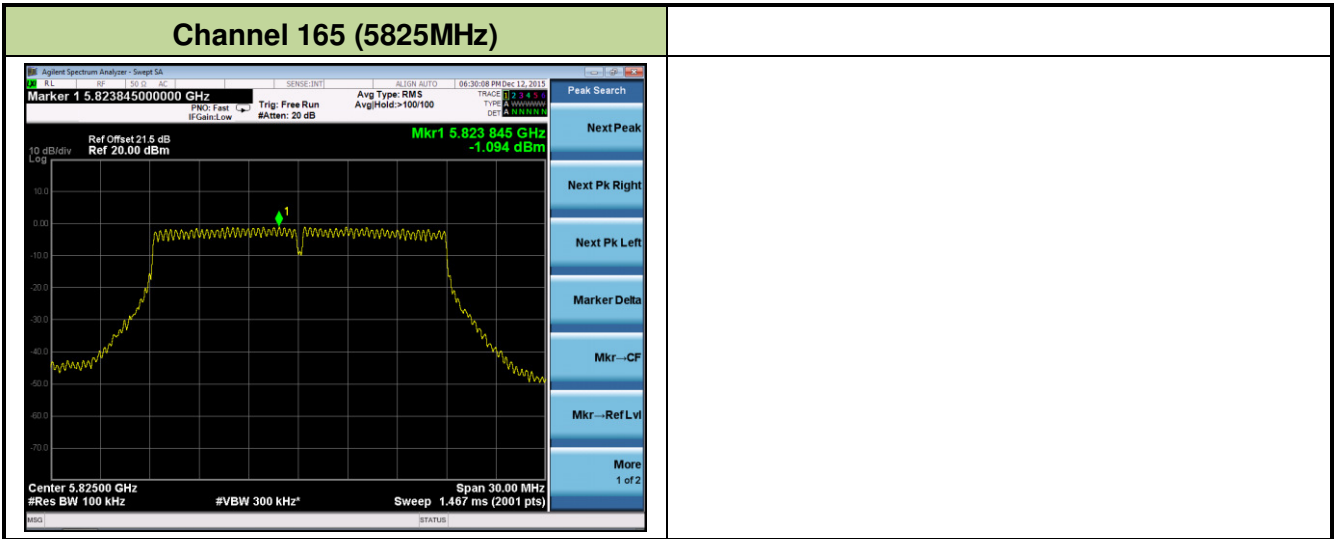


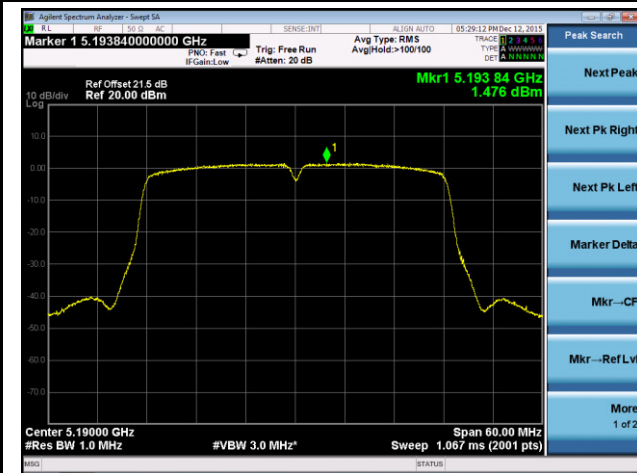
Channel 159 (5795MHz)

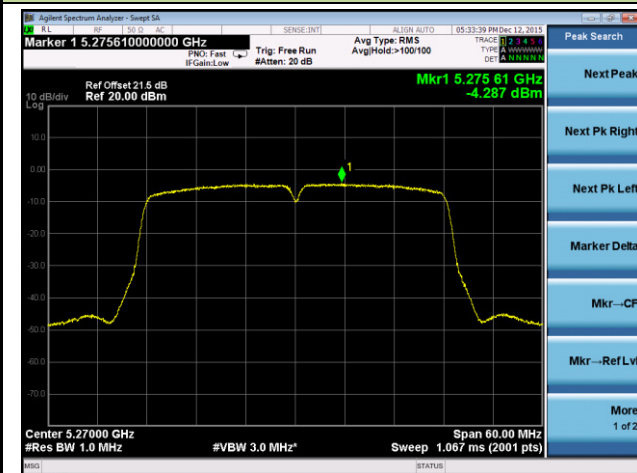
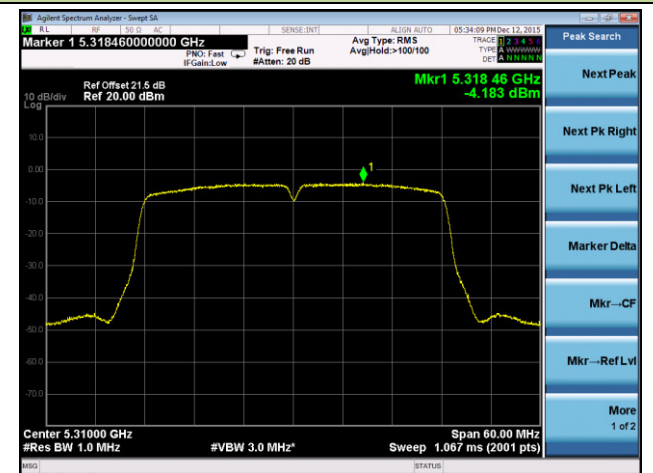
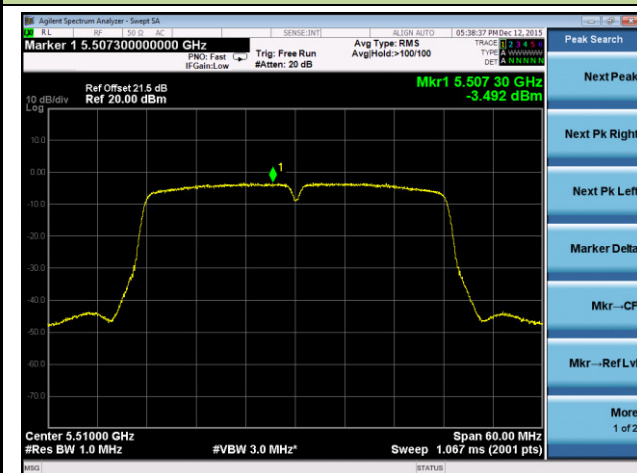
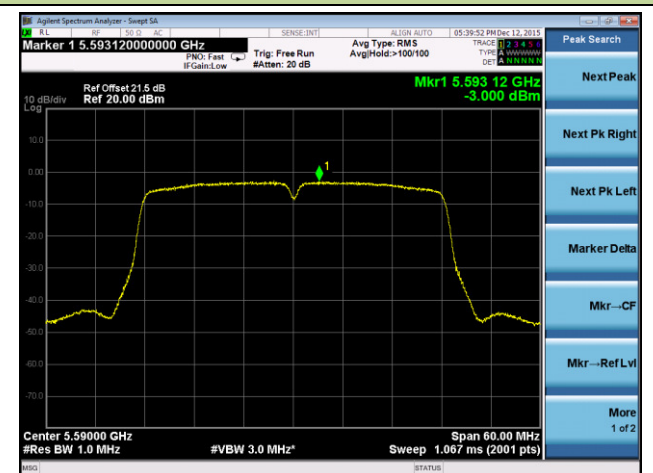


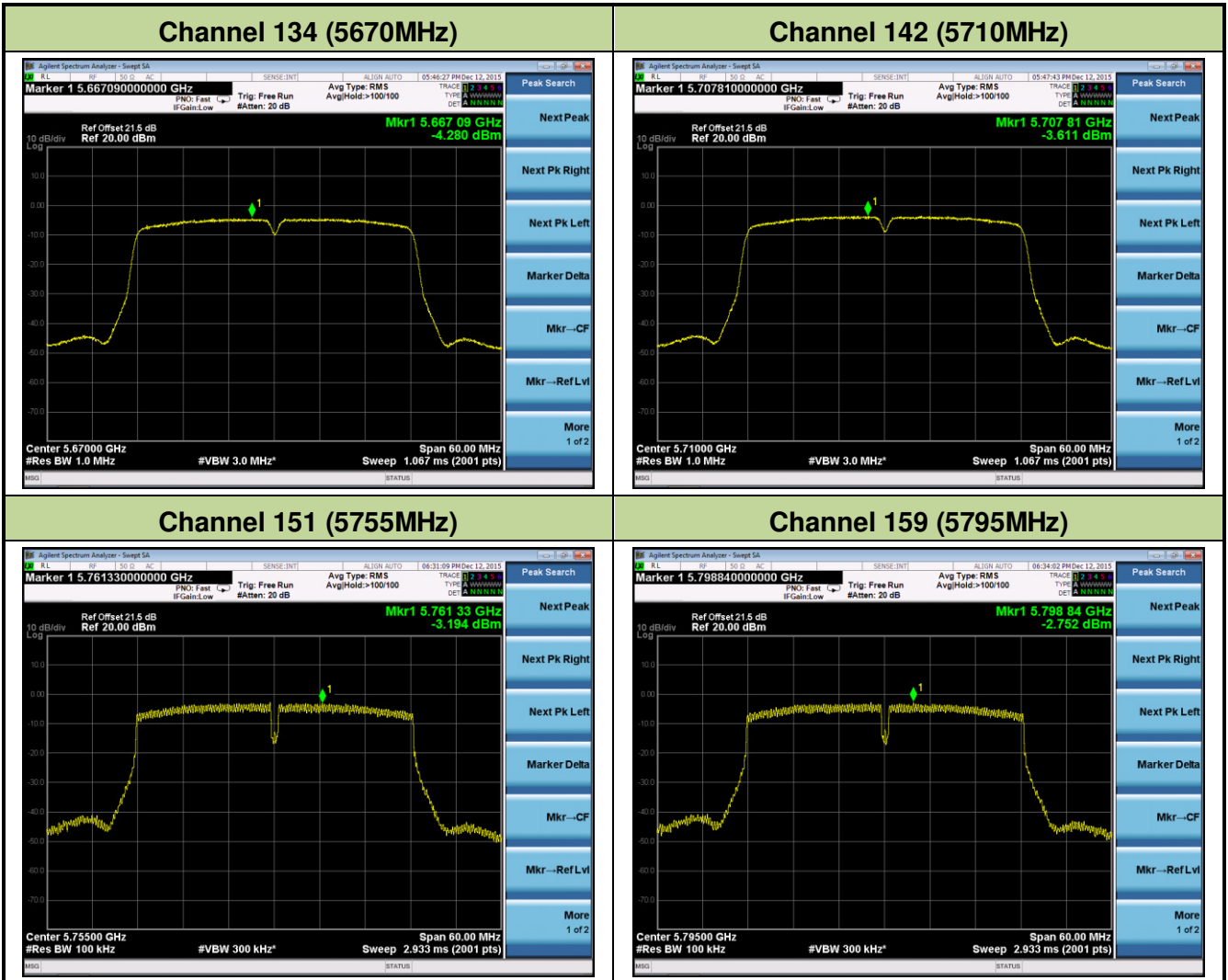
802.11ac-VHT20 Power Spectral Density - Ant 0 / Ant 0 + 1 + 2 + 3
Channel 36 (5180MHz)

Channel 44 (5220MHz)

Channel 48 (5240MHz)

Channel 52 (5260MHz)

Channel 60 (5300MHz)

Channel 64 (5320MHz)


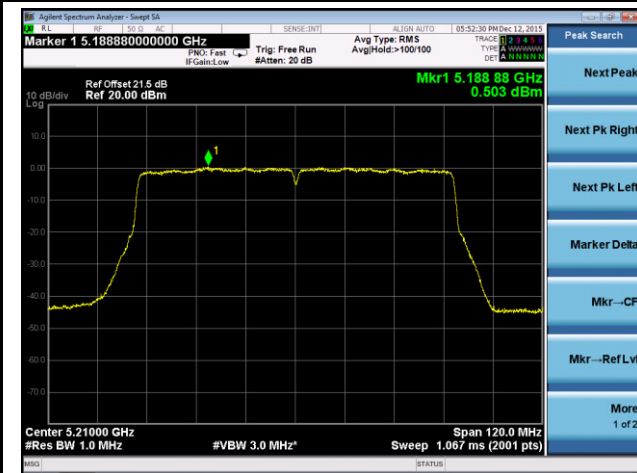
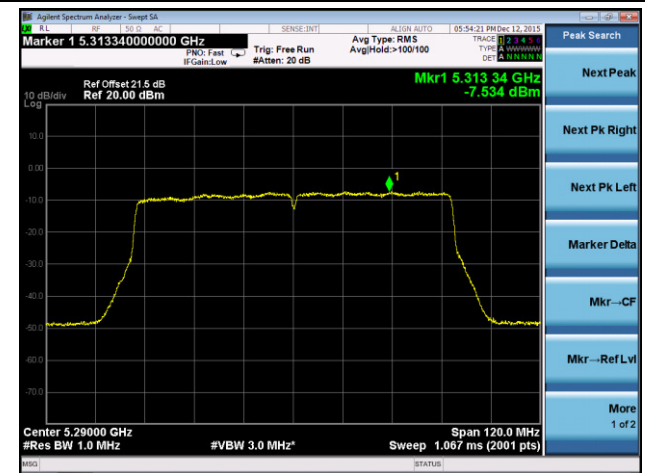
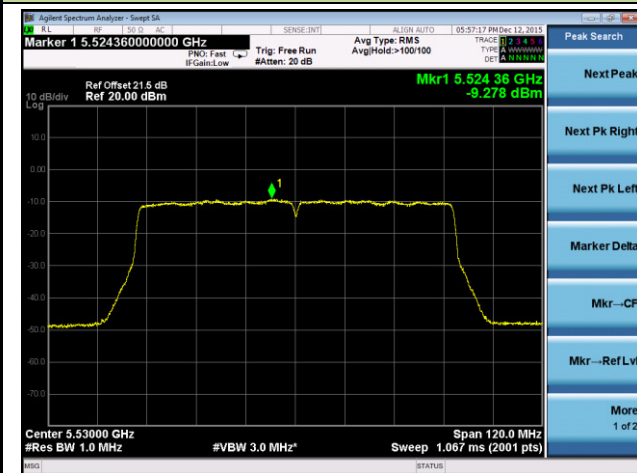
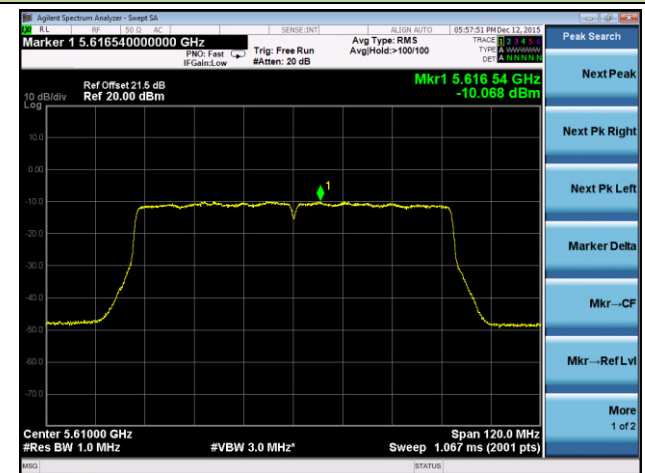
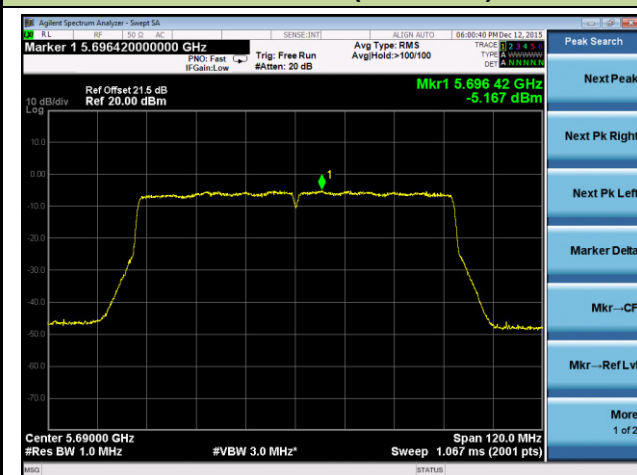
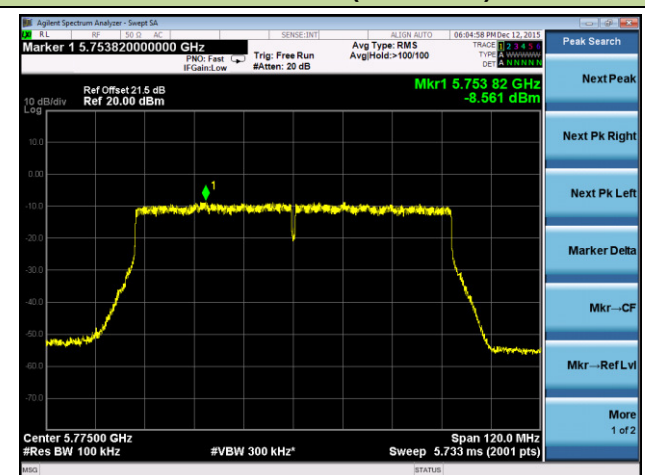
Channel 100 (5500MHz)

Channel 120 (5600MHz)

Channel 140 (5700MHz)

Channel 144 (5720MHz)

Channel 149 (5745MHz)

Channel 157 (5785MHz)




802.11ac-VHT40 Power Spectral Density - Ant 0 / Ant 0 + 1 + 2 + 3
Channel 38 (5190MHz)

Channel 46 (5230MHz)

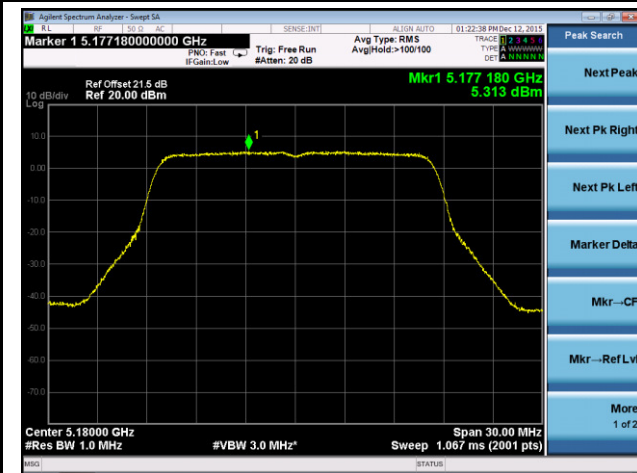
Channel 54 (5270MHz)

Channel 62 (5310MHz)

Channel 102 (5510MHz)

Channel 118 (5590MHz)




802.11ac-VHT80 Power Spectral Density - Ant 0 / Ant 0 + 1 + 2 + 3
Channel 42 (5210MHz)

Channel 58 (5290MHz)

Channel 106 (5530MHz)

Channel 122 (5610MHz)

Channel 138 (5690MHz)

Channel 155 (5775MHz)


802.11a Power Spectral Density - Ant 1 / Ant 0 + 1 + 2 + 3

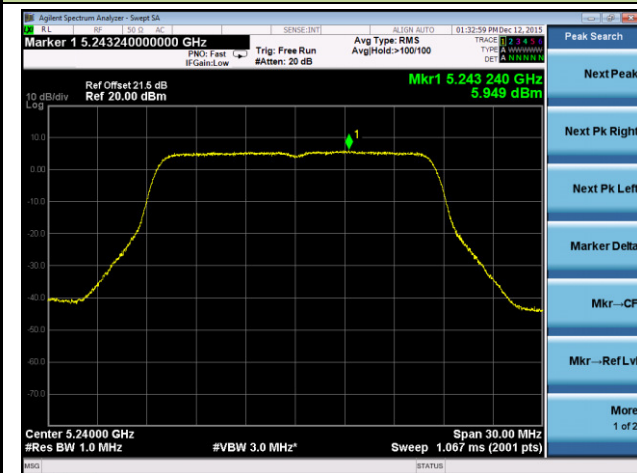
Channel 36 (5180MHz)



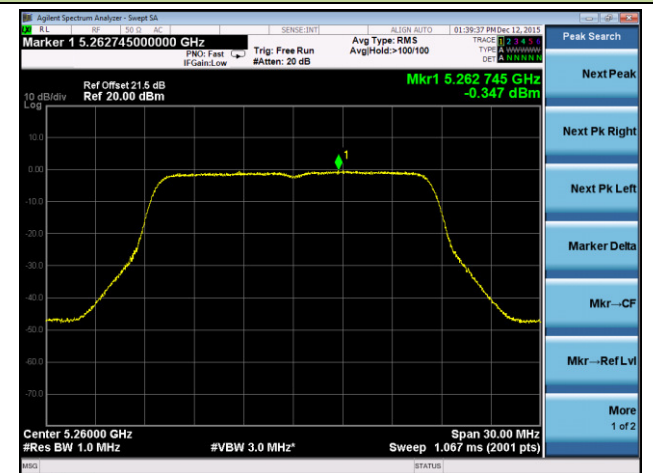
Channel 44 (5220MHz)



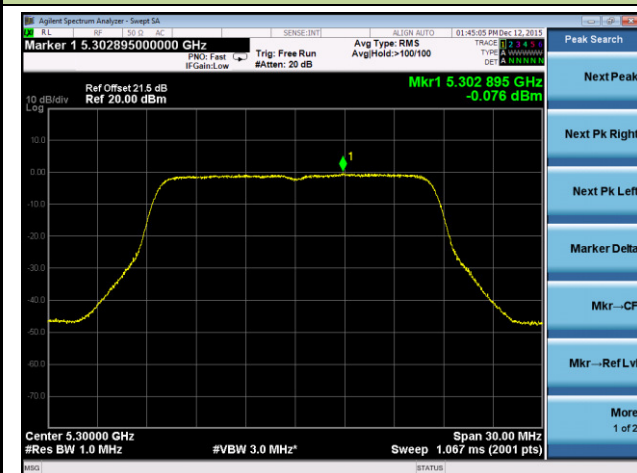
Channel 48 (5240MHz)



Channel 52 (5260MHz)



Channel 60 (5300MHz)



Channel 64 (5320MHz)

