# Appendix D

# RF Test Data for 5.8G WLAN (Conducted Measurement)

**Product Name: Remote Control Car**

**Trade Mark: HELIWAY**

**Test Model: F6BC**

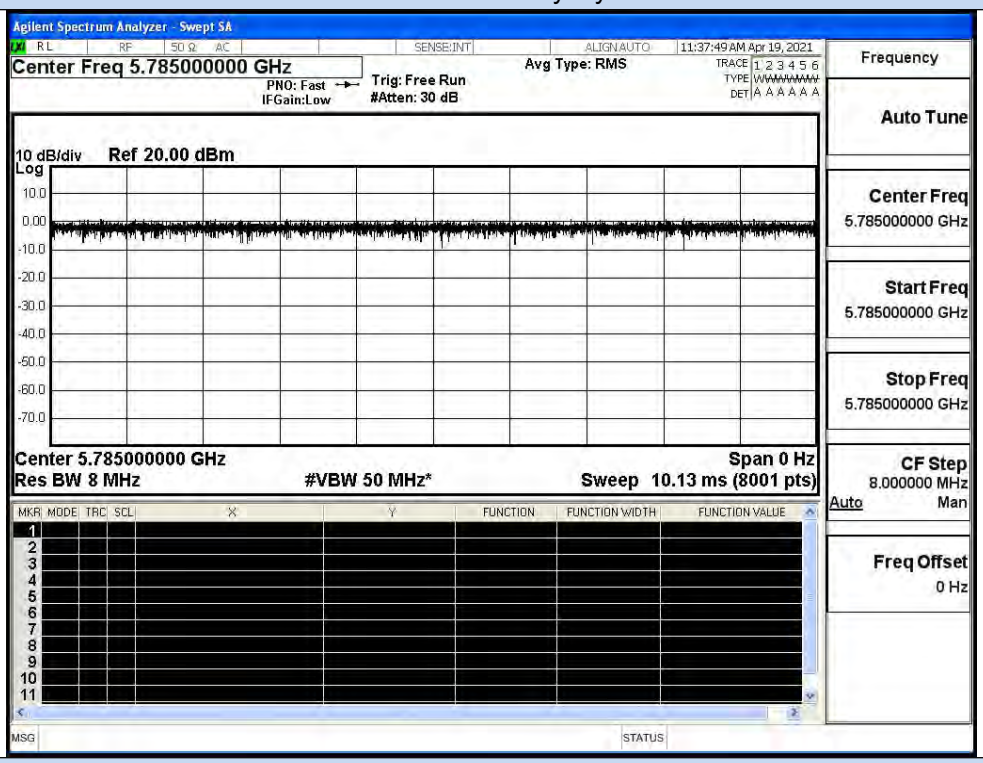
**Environmental Conditions**

| | |
|---|---|
| Temperature: | 24.6° C |
| Relative Humidity: | 54.1% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | Jay Li |
| Supervised by: | Li Huan |

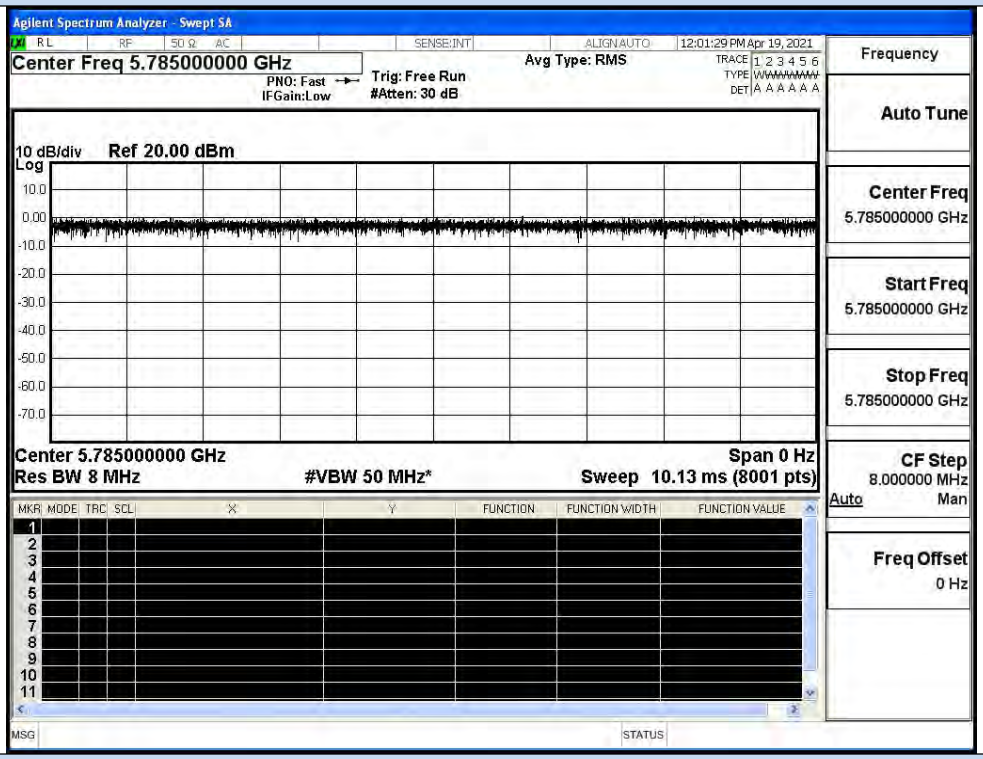
## D.1 Duty Cycle

| Test Mode | Test Frequency (MHz) | Duty Cycle (%) | 10log(1/x) Factor (dB) | 1/B Minimum VBW(KHz) |
|---|---|---|---|---|
| 11A | 5785 | 100 | 0.00 | 0.01 |
| 11N20 SISO | 5785 | 100 | 0.00 | 0.01 |
| 11N40 SISO | 5755 | 100 | 0.00 | 0.01 |
| 11AC20 SISO | 5785 | 100 | 0.00 | 0.01 |
| 11AC40 SISO | 5755 | 100 | 0.00 | 0.01 |
| 11AC80 SISO | 5775 | 100 | 0.00 | 0.01 |

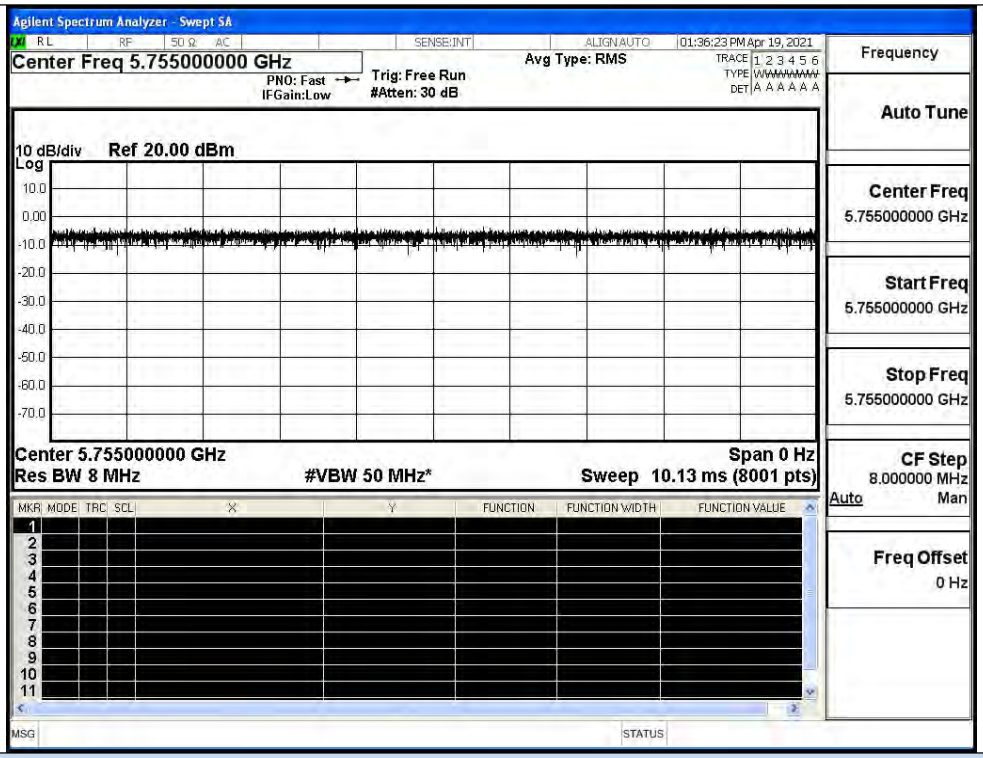
On Time and Duty Cycle



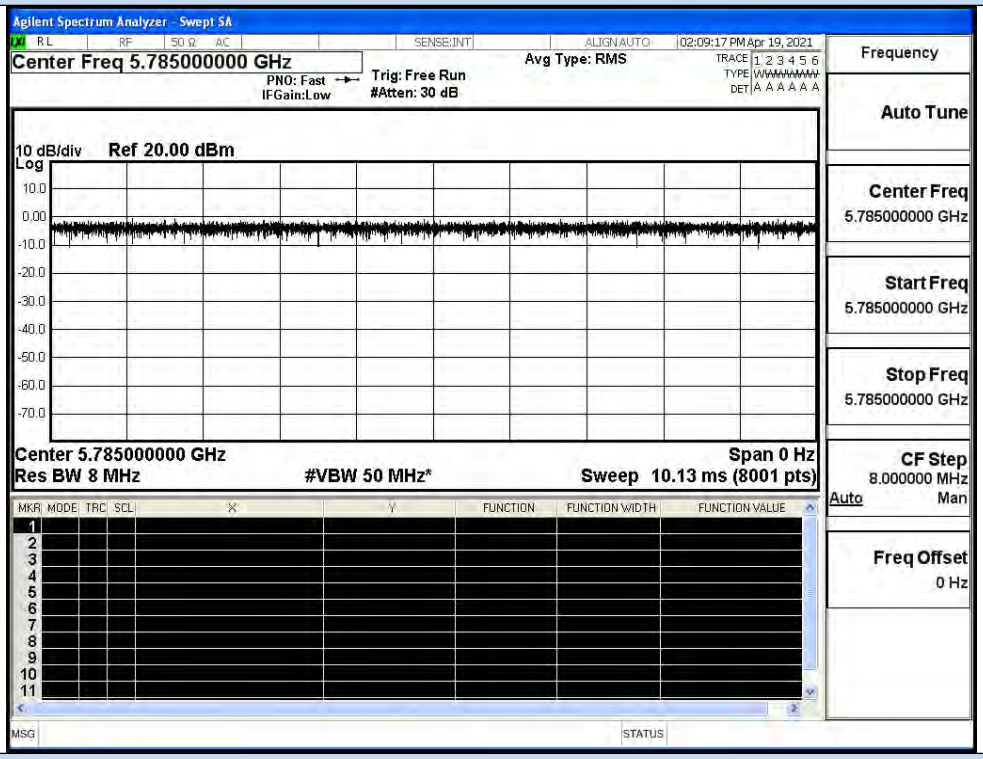

IEEE 802.11a



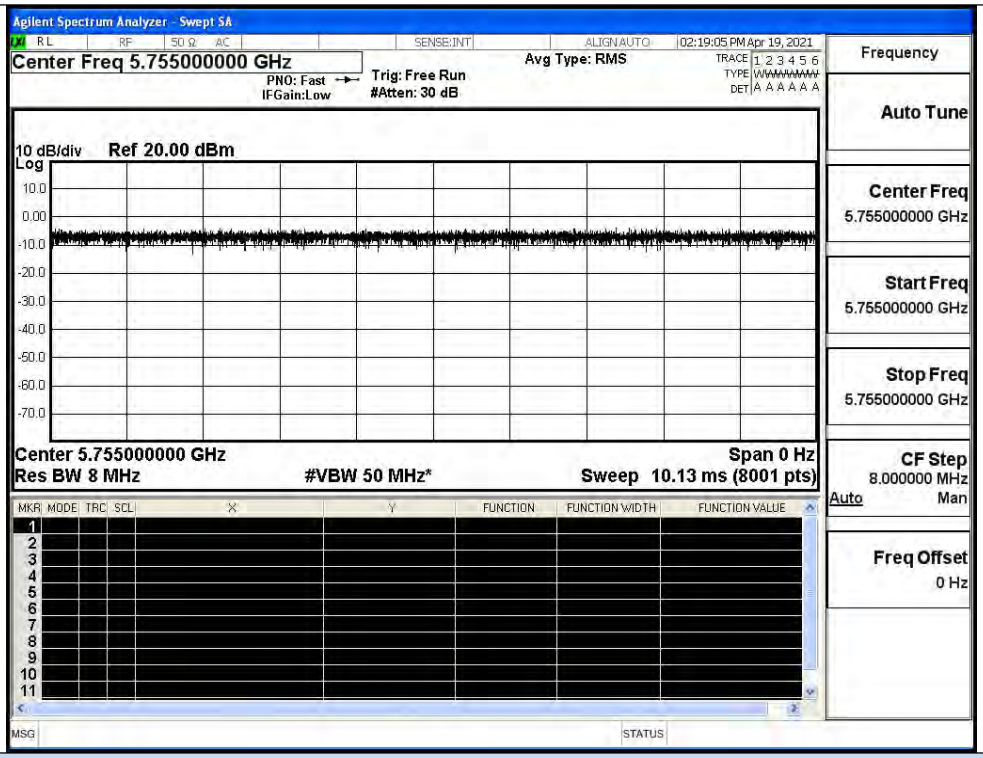

IEEE 802.11n HT20



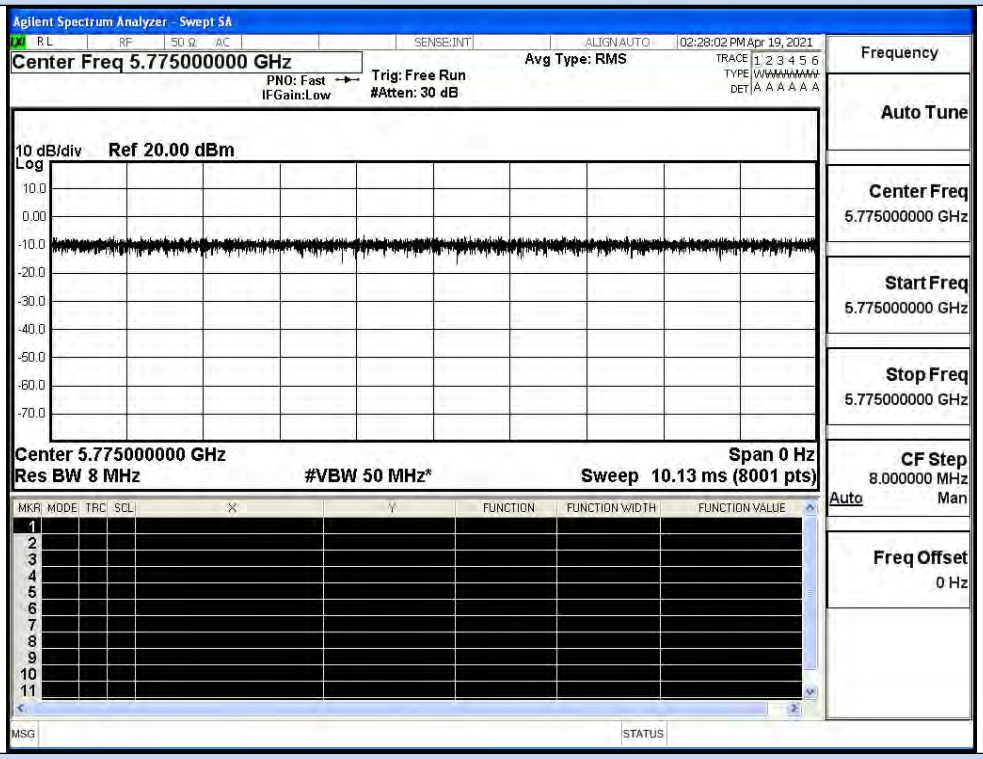

IEEE 802.11n HT40




IEEE 802.11AC20




IEEE 802.11AC40




IEEE 802.11AC80

## D.2 Maximum Conduct Output Power

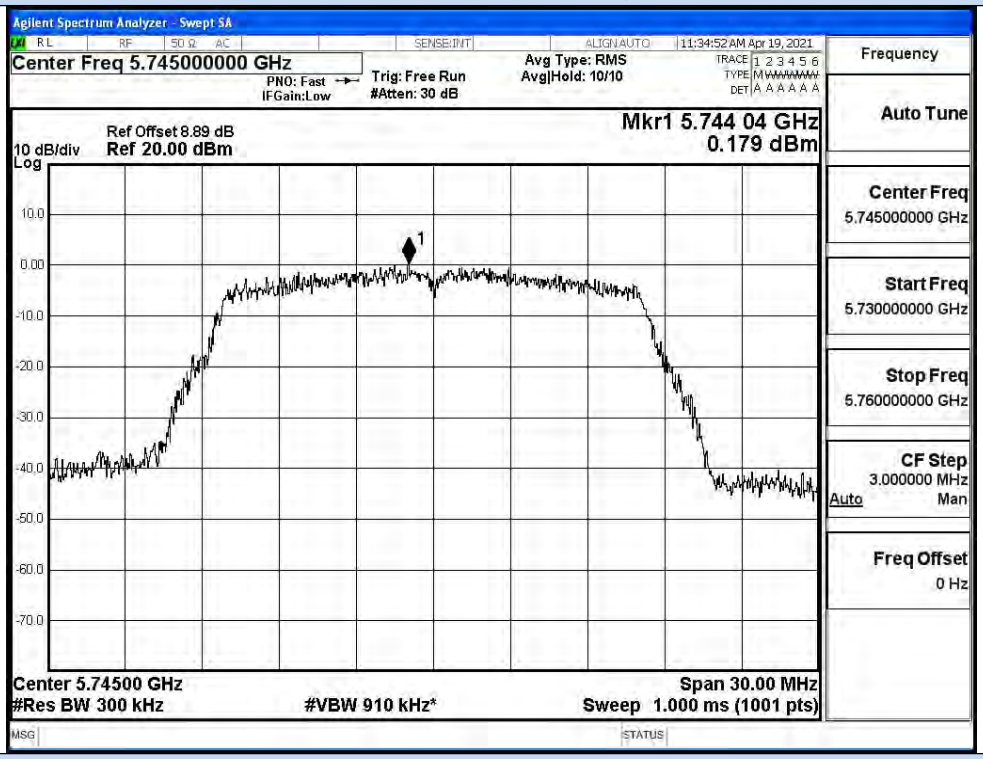
| Test Mode | Channel | Frequency (MHz) | AVG Conducted Power (dBm) | Duty Cycle Factor(dB) | Report Conducted Power(dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|---|
| 11A | 149 | 5745 | 13.98 | 0 | 13.98 | 30 | Pass |
| | 157 | 5785 | 13.93 | 0 | 13.93 | | Pass |
| | 165 | 5825 | 14.11 | 0 | **14.11** | | Pass |
| 11N20 SISO | 149 | 5745 | 12.96 | 0 | 12.96 | 30 | Pass |
| | 157 | 5785 | 13.59 | 0 | 13.59 | | Pass |
| | 165 | 5825 | 13.54 | 0 | 13.54 | | Pass |
| 11N40 SISO | 151 | 5755 | 12.42 | 0 | 12.42 | 30 | Pass |
| | 159 | 5795 | 12.82 | 0 | 12.82 | | Pass |
| 11AC20 SISO | 149 | 5745 | 12.60 | 0 | 12.60 | 30 | Pass |
| | 157 | 5785 | 12.03 | 0 | 12.03 | | Pass |
| | 165 | 5825 | 11.63 | 0 | 11.63 | | Pass |
| 11AC40 SISO | 151 | 5755 | 13.18 | 0 | 13.18 | 30 | Pass |
| | 159 | 5795 | 12.78 | 0 | 12.78 | | Pass |
| 11AC80 SISO | 155 | 5775 | 12.66 | 0 | 12.66 | 30 | Pass |

## D.3 Power Spectral Density

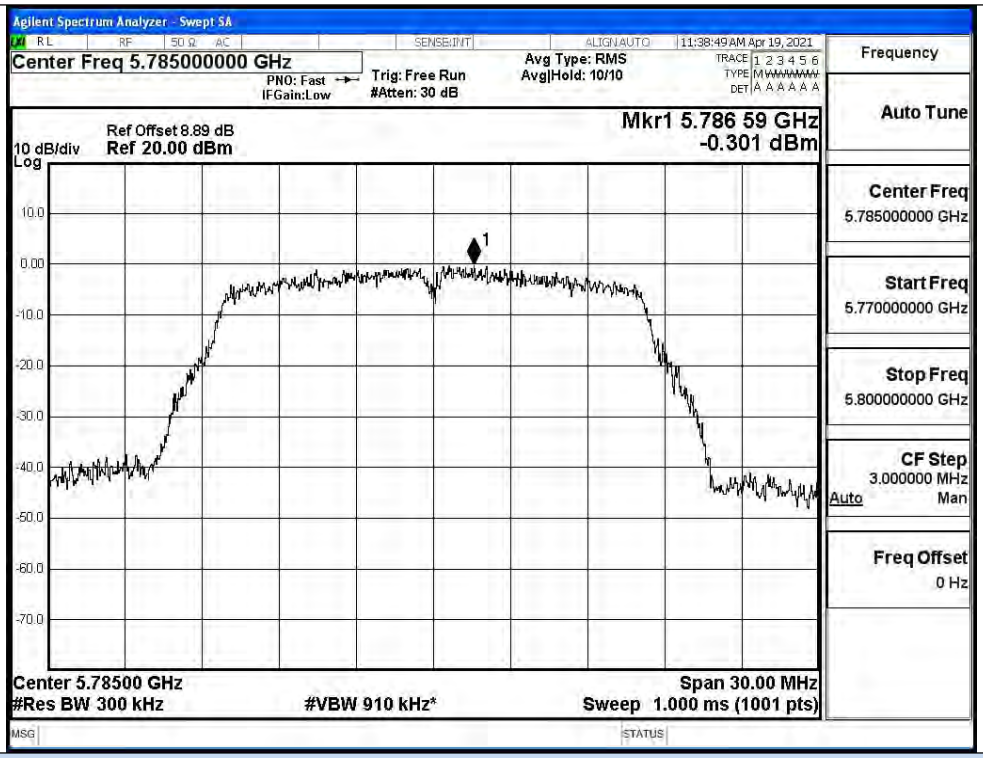
| Test Mode | Channel | Frequency (MHz) | Power Density (dBm/300KHz) | Duty Cycle Factor (dB) | RBW Factor (dB) | Report Power Density (dBm/500KHz) | Limit (dBm/500KHz) | Verdict |
|---|---|---|---|---|---|---|---|---|
| 11A | 149 | 5745 | 0.18 | 0 | 2.218 | 2.40 | 30 | Pass |
| | 157 | 5785 | -0.30 | 0 | 2.218 | 1.92 | | Pass |
| | 165 | 5825 | 0.20 | 0 | 2.218 | 2.41 | | Pass |
| 11N20 SISO | 149 | 5745 | -0.53 | 0 | 2.218 | 1.69 | 30 | Pass |
| | 157 | 5785 | -0.77 | 0 | 2.218 | 1.45 | | Pass |
| | 165 | 5825 | -0.51 | 0 | 2.218 | 1.71 | | Pass |
| 11N40 SISO | 151 | 5755 | -4.66 | 0 | 2.218 | -2.44 | 30 | Pass |
| | 159 | 5795 | -4.40 | 0 | 2.218 | -2.18 | | Pass |
| 11AC20 SISO | 149 | 5745 | -1.76 | 0 | 2.218 | 0.46 | 30 | Pass |
| | 157 | 5785 | -1.34 | 0 | 2.218 | 0.88 | | Pass |
| | 165 | 5825 | -1.25 | 0 | 2.218 | 0.97 | | Pass |
| 11AC40 SISO | 151 | 5755 | -4.32 | 0 | 2.218 | -2.10 | 30 | Pass |
| | 159 | 5795 | -4.89 | 0 | 2.218 | -2.67 | | Pass |
| 11AC80 SISO | 155 | 5775 | -7.55 | 0 | 2.218 | -5.33 | 30 | Pass |

1) Report conducted PSD = measured conducted PSD + Duty Cycle factor + RBW factor;
2) RBW factor = 10 log (500 KHz / 300 KHz) = 2.218 dB.

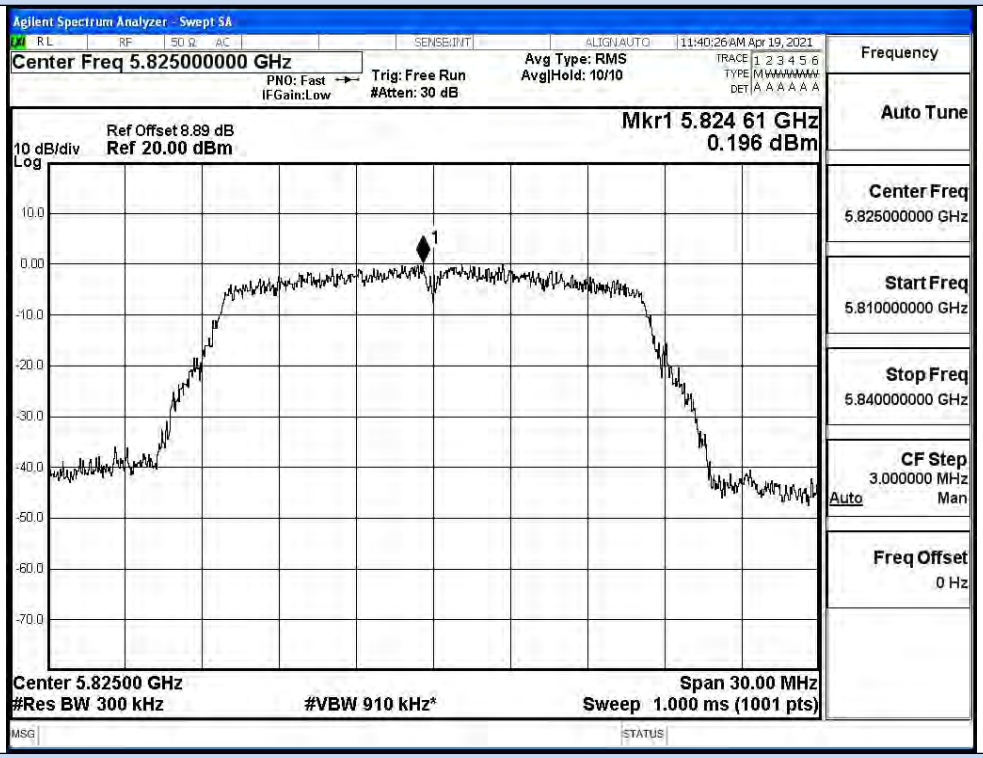
Power Spectral Density




IEEE 802.11a / Channel 149 / 5745MHz

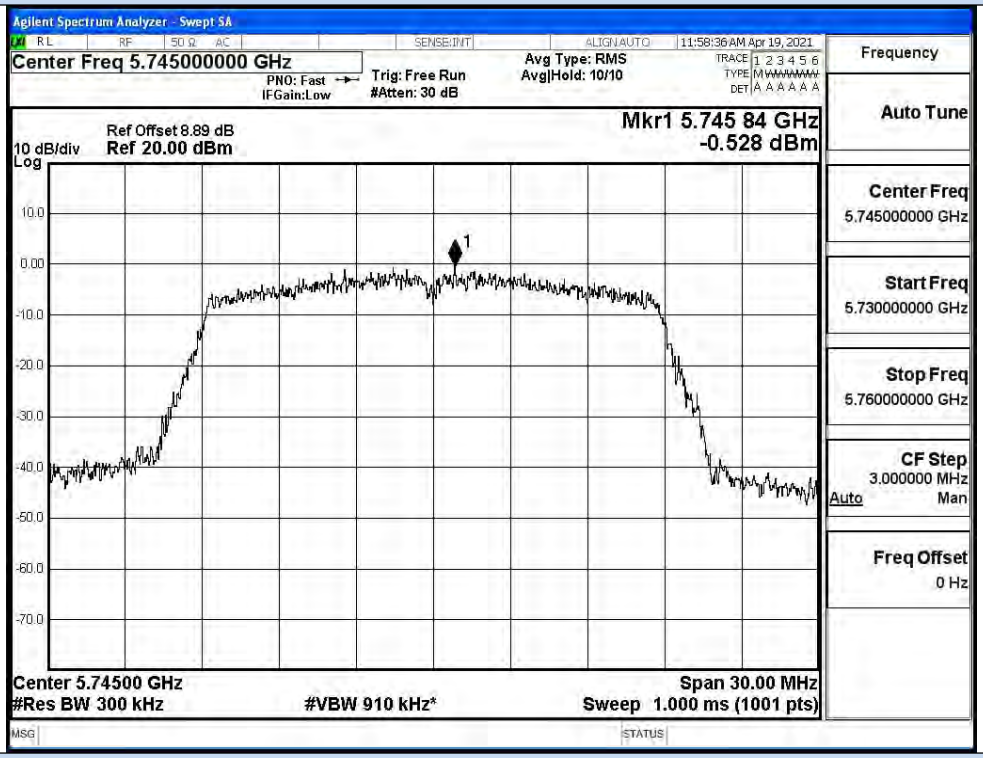



IEEE 802.11na / Channel 157 / 5785MHz

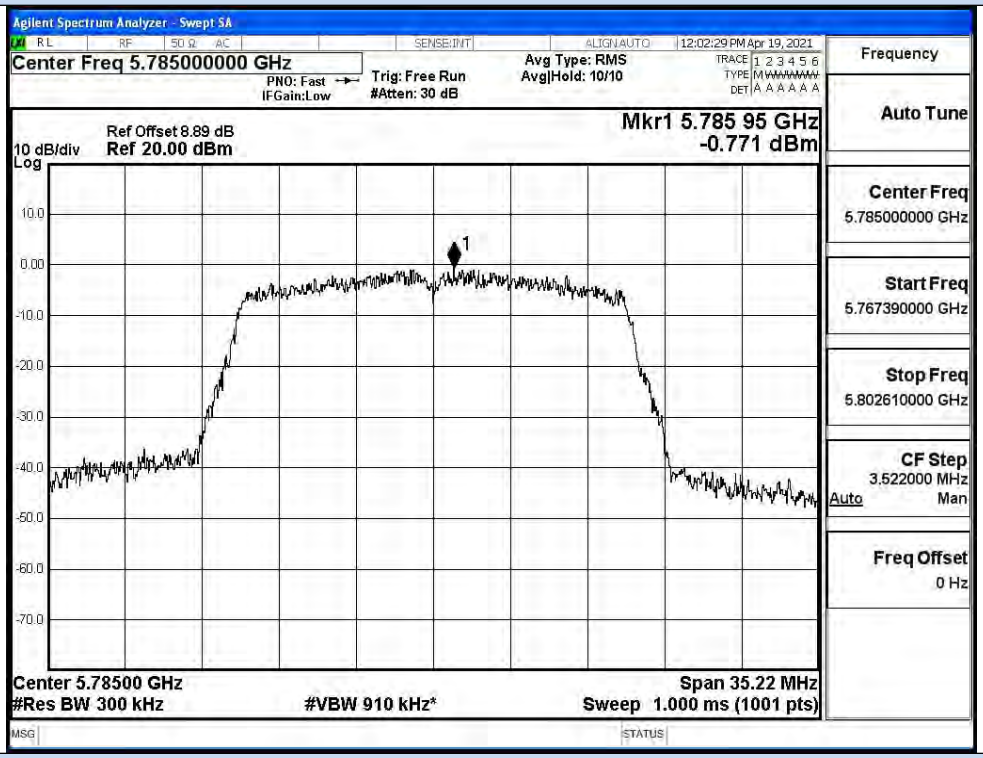



IEEE 802.11na / Channel 165 / 5825MHz

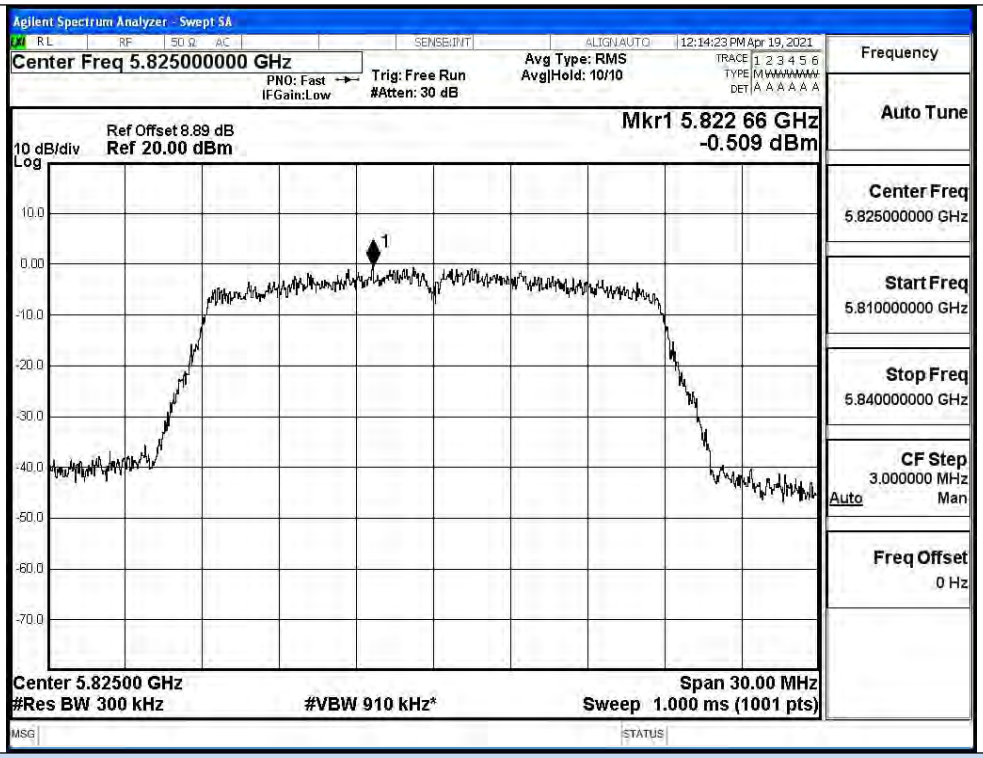
Power Spectral Density




IEEE 802.11n20 / Channel 149 / 5745MHz

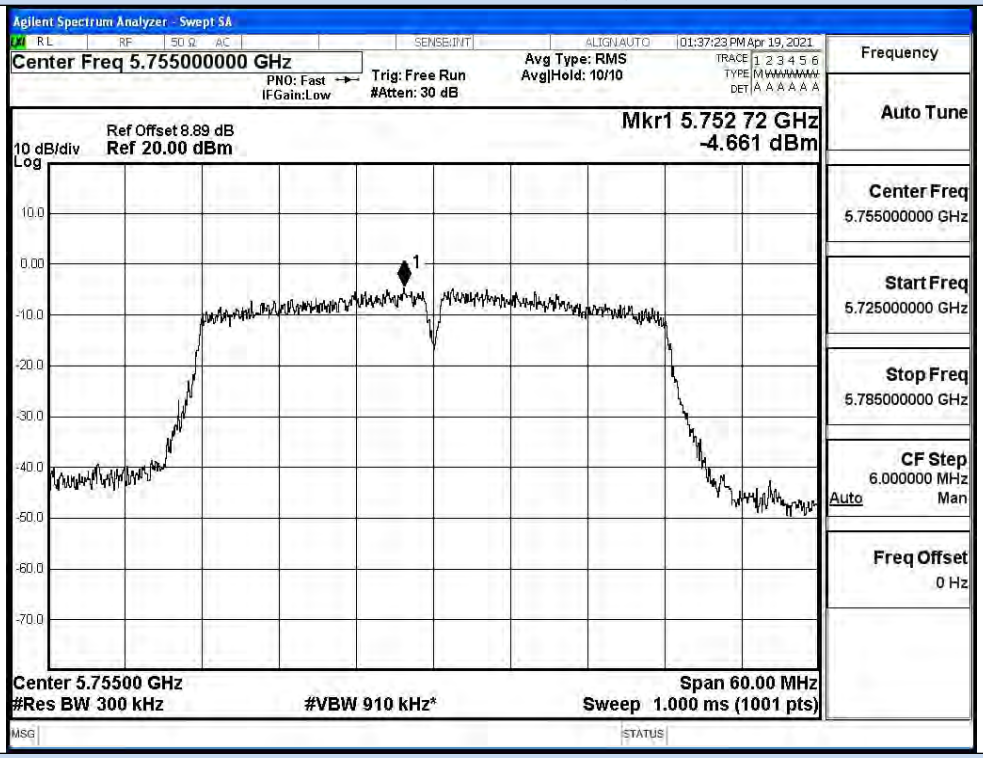



IEEE 802.11n20 / Channel 157 / 5785MHz

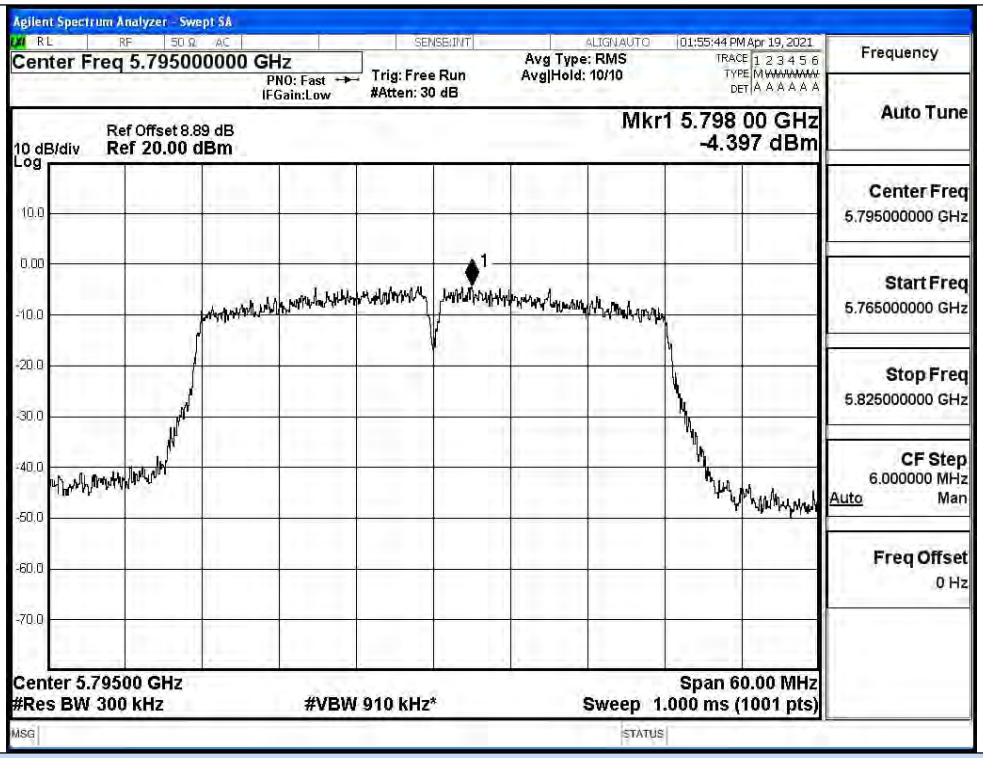



IEEE 802.11n20 / Channel 165 / 5825MHz

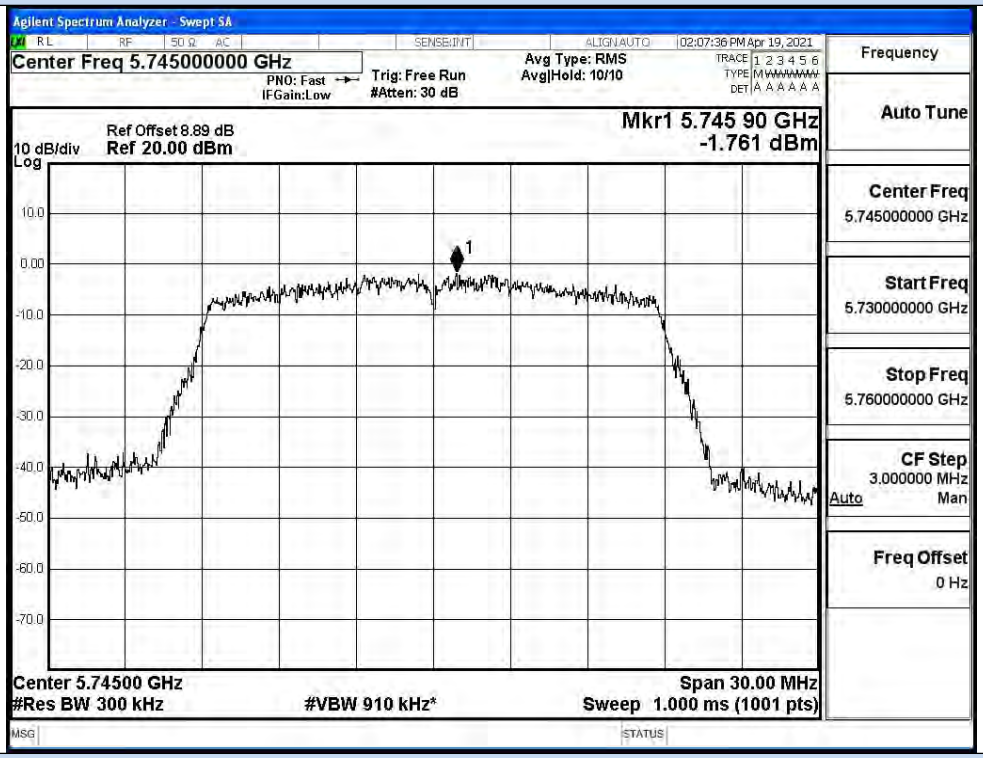
Power Spectral Density



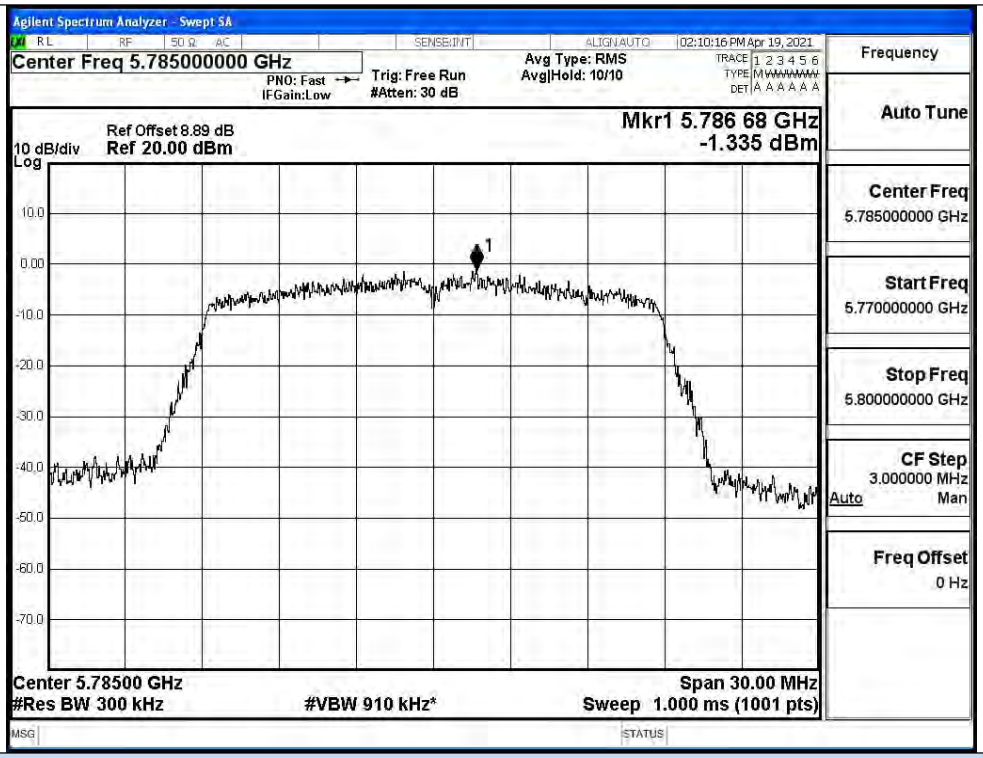

IEEE 802.11n40 / Channel 151 / 5755MHz



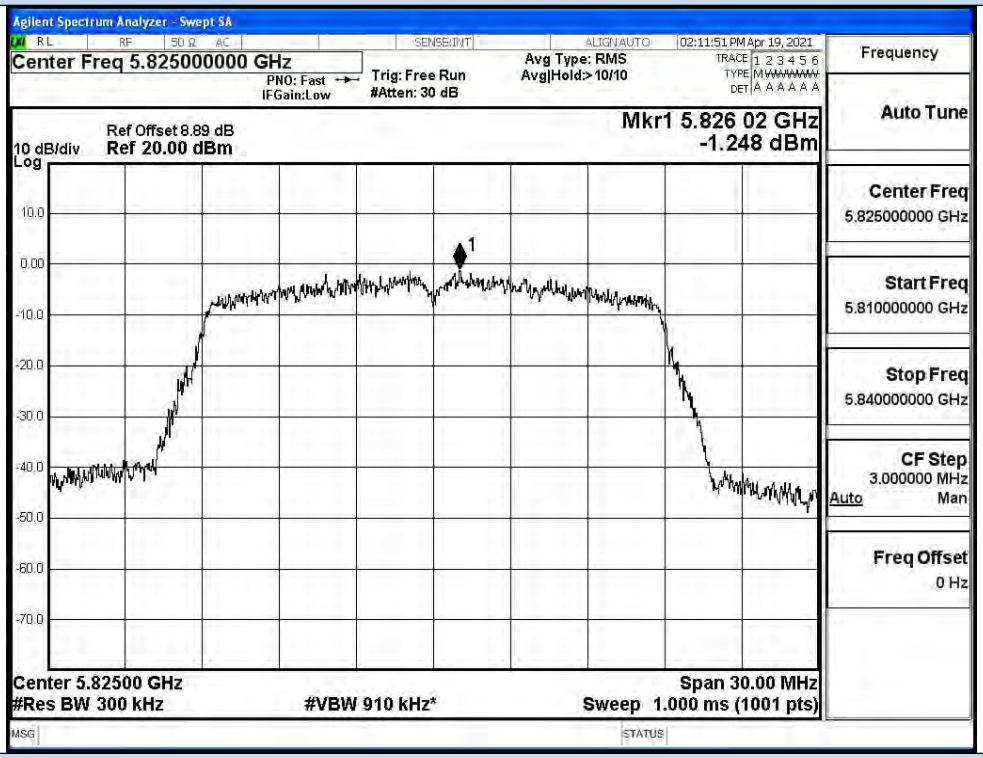

IEEE 802.11n40 / Channel 159 / 5795MHz



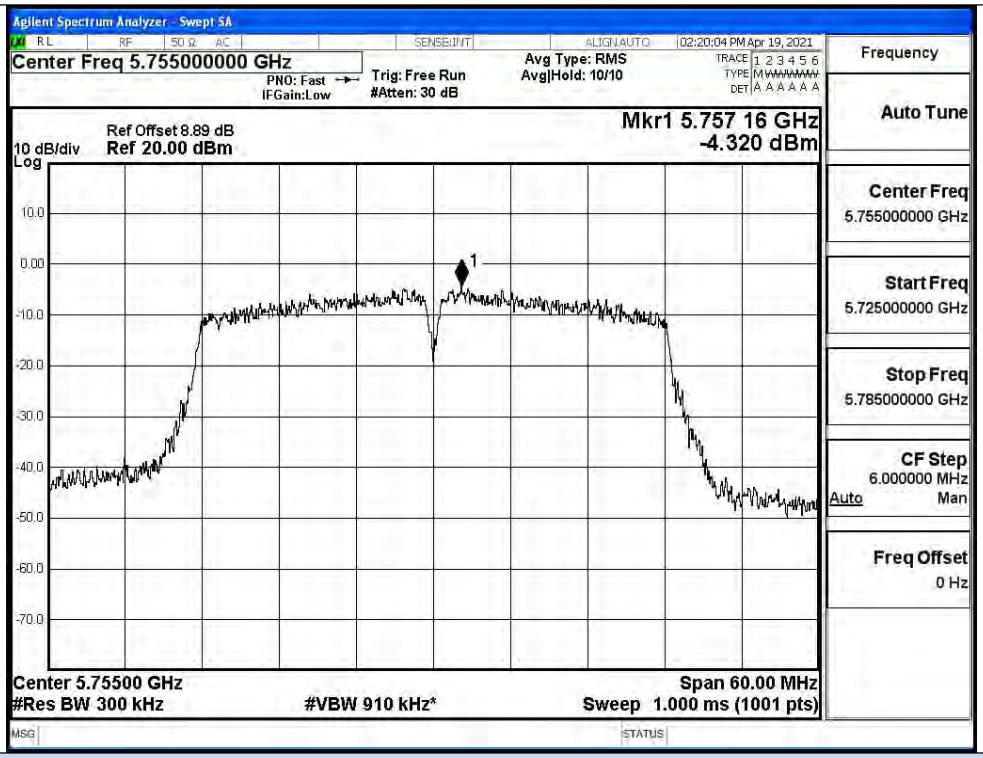

IEEE 802.11ac20 / Channel 149 / 5745MHz



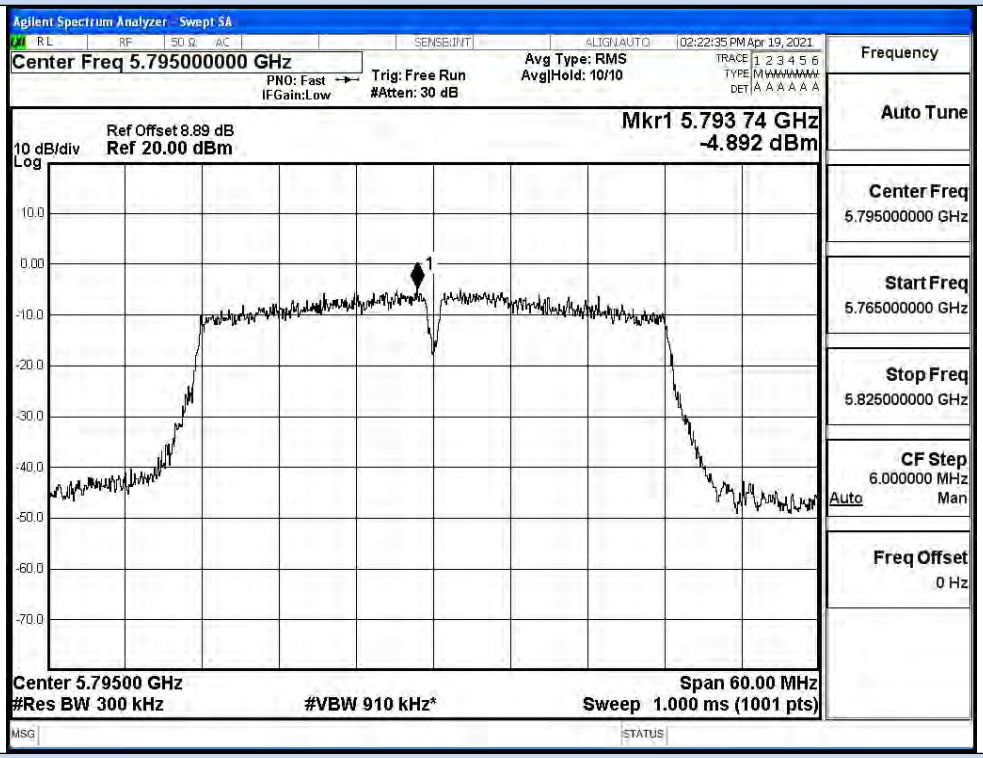

IEEE 802.11ac20 / Channel 157 / 5785MHz



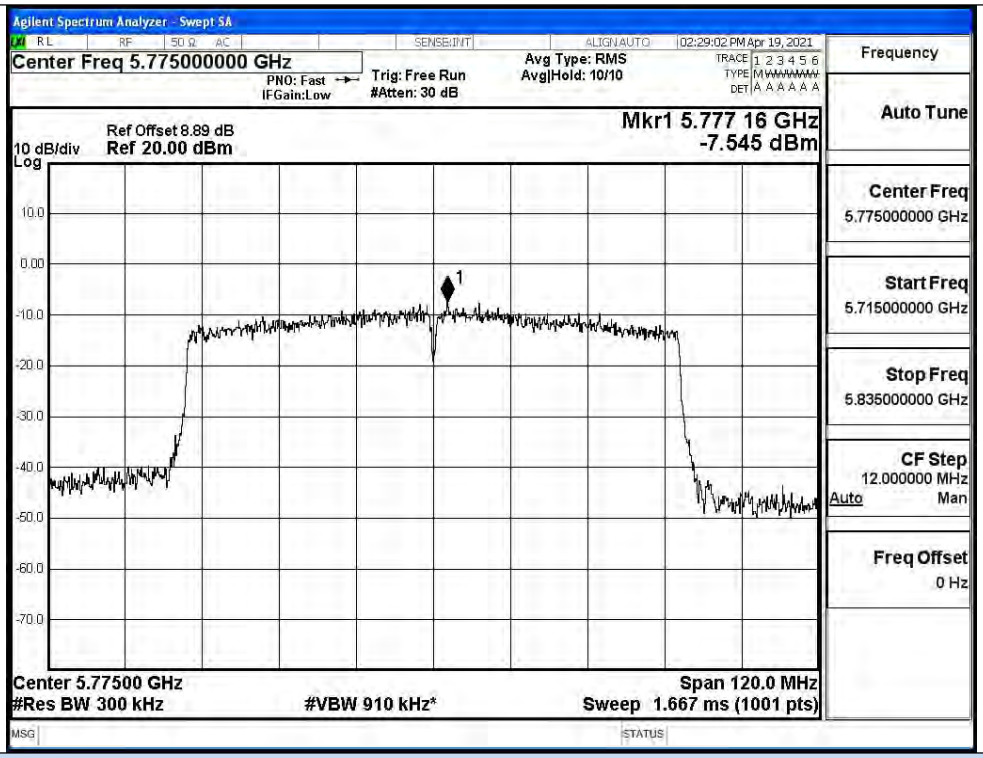

IEEE 802.11ac20 / Channel 165 / 5825MHz




IEEE 802.11ac40 / Channel 151 / 5755MHz




IEEE 802.11ac40 / Channel 159 / 5795MHz

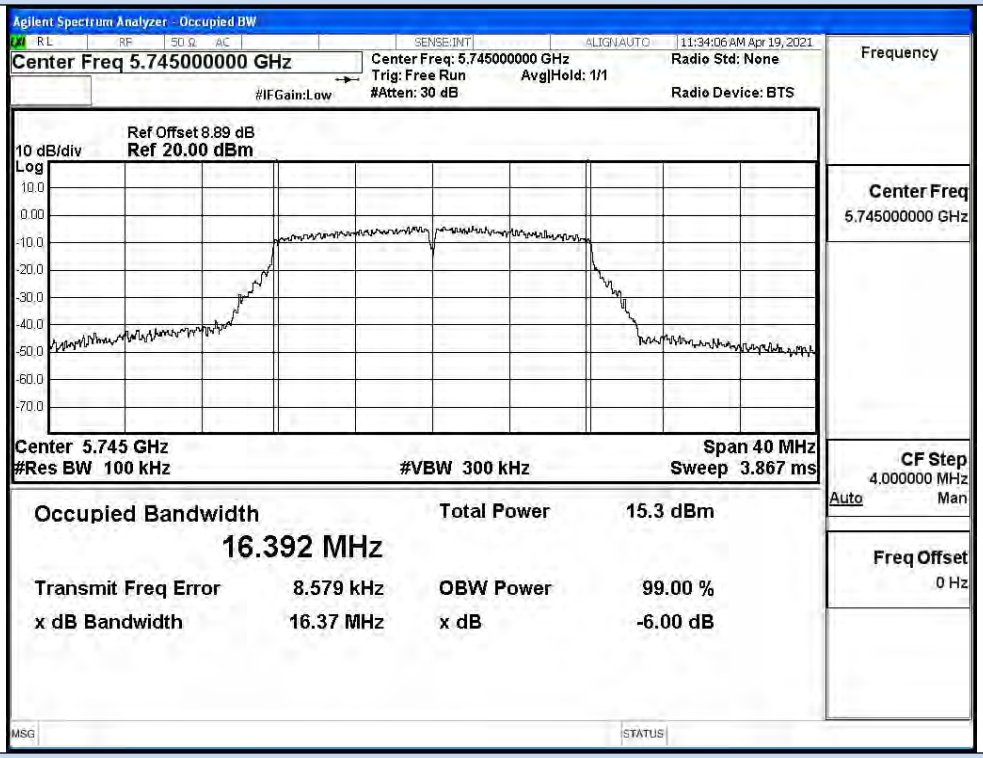



IEEE 802.11ac80 / Channel 155/ 5775MHz

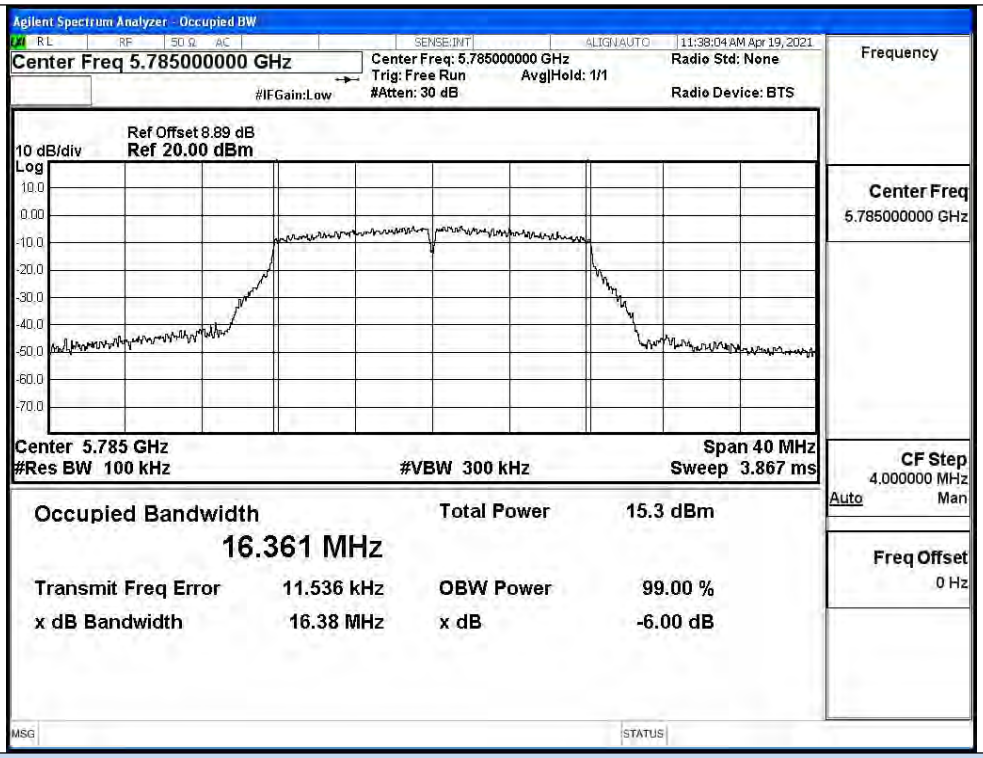
## D.4 Emission Bandwidth

| Test Mode | Channel | Frequency (MHz) | 6dB Bandwidth (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|---|
| 11A | 149 | 5745 | 16.37 | >=0.5 | Pass |
| | 157 | 5785 | 16.38 | | Pass |
| | 165 | 5825 | 16.37 | | Pass |
| 11N20 SISO | 149 | 5745 | 17.60 | >=0.5 | Pass |
| | 157 | 5785 | 17.61 | | Pass |
| | 165 | 5825 | 17.62 | | Pass |
| 11N40 SISO | 151 | 5755 | 36.36 | >=0.5 | Pass |
| | 159 | 5795 | 36.09 | | Pass |
| 11AC20S ISO | 149 | 5745 | 17.62 | >=0.5 | Pass |
| | 157 | 5785 | 17.62 | | Pass |
| | 165 | 5825 | 17.60 | | Pass |
| 11AC40S ISO | 151 | 5755 | 35.65 | >=0.5 | Pass |
| | 159 | 5795 | 36.33 | | Pass |
| 11AC80S ISO | 155 | 5775 | 76.40 | >=0.5 | Pass |

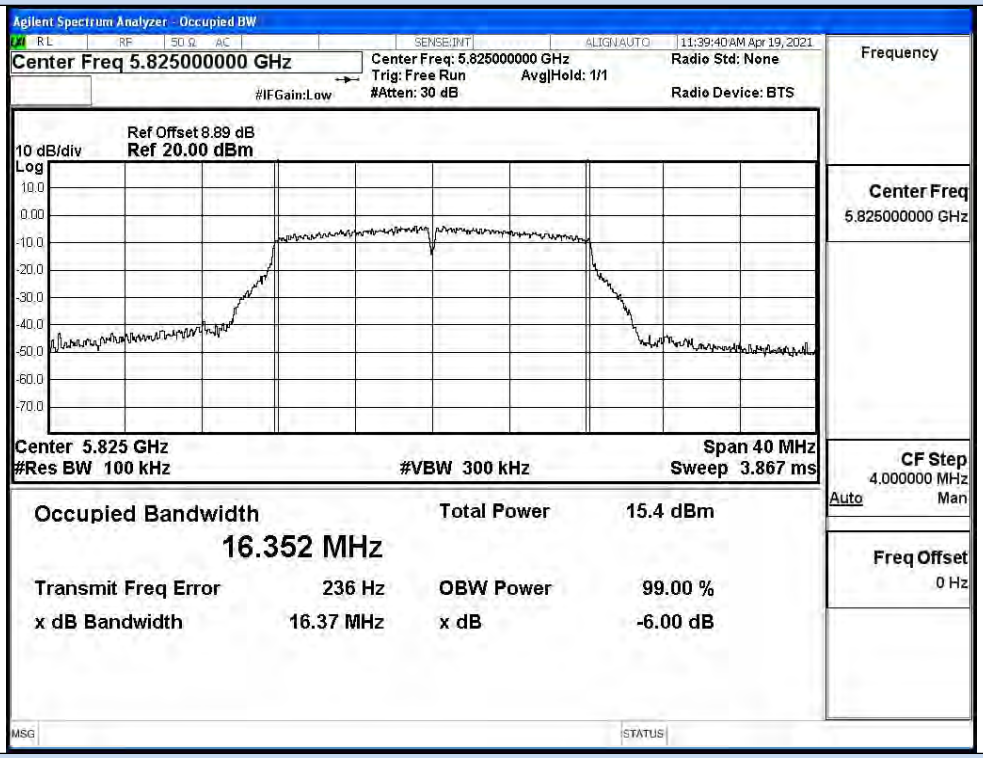
6dB Bandwidth




IEEE 802.11a / Channel 149 / 5745MHz

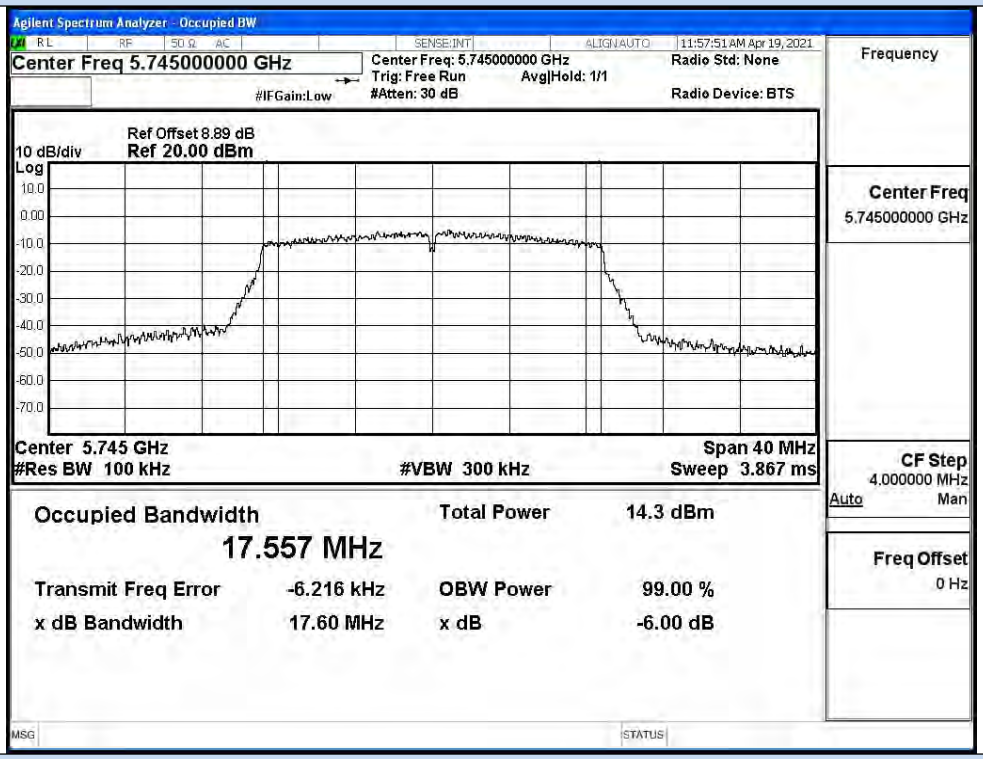



IEEE 802.11a / Channel 157 / 5785MHz

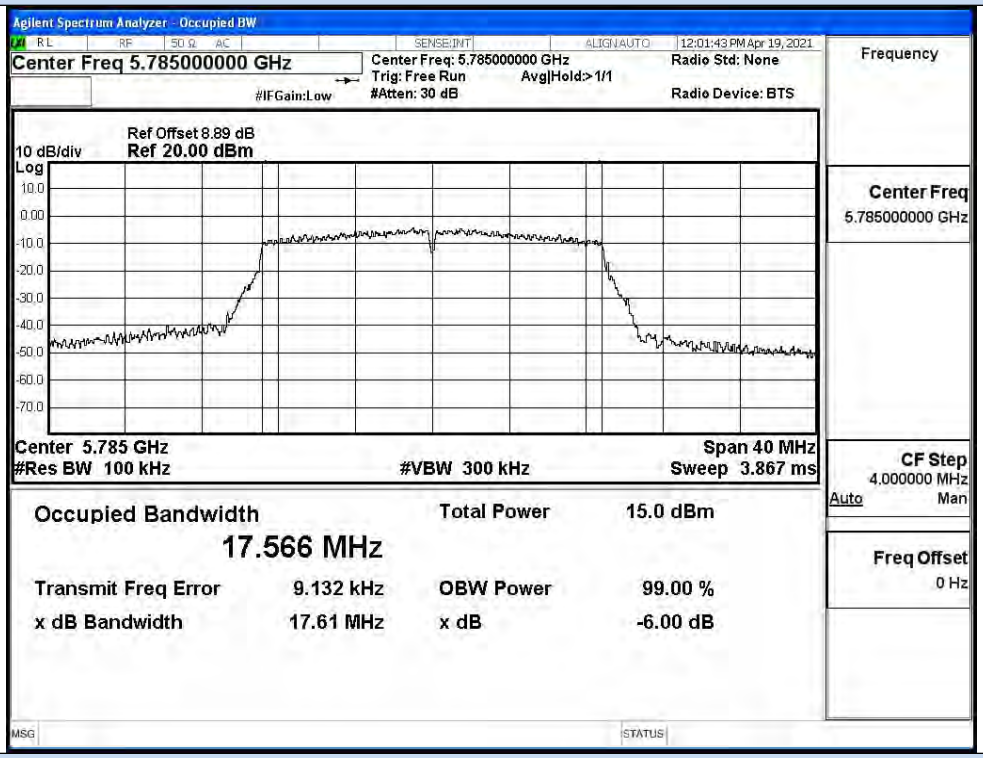



IEEE 802.11a / Channel 165 / 5825MHz

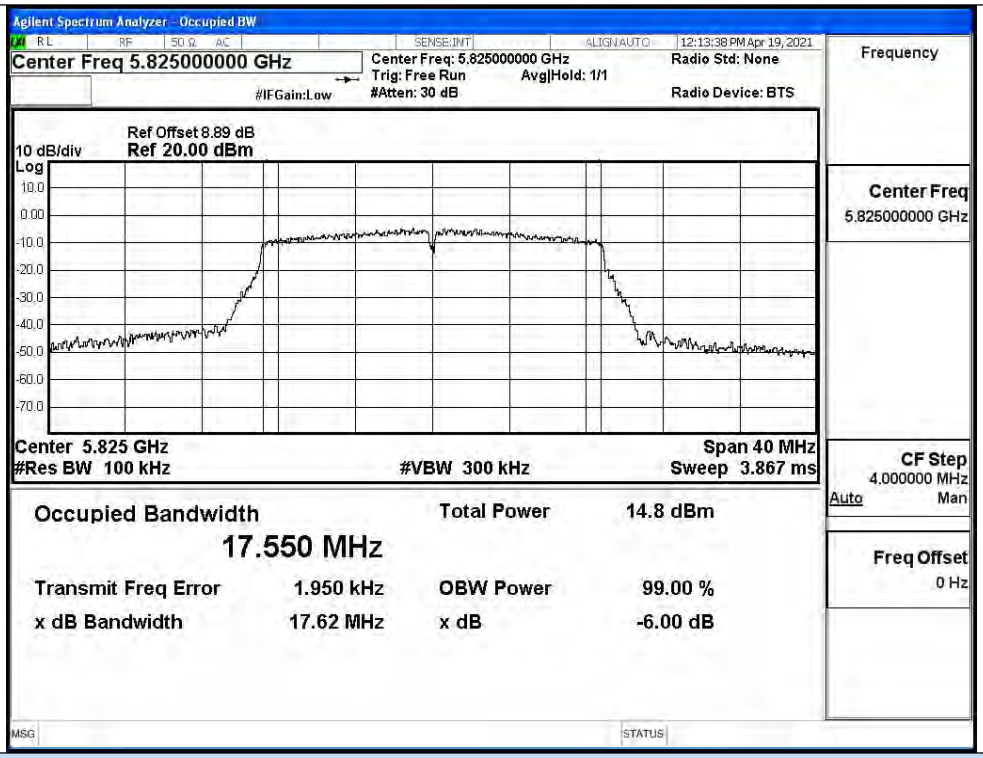
6dB Bandwidth




IEEE 802.11n20 / Channel 149 / 5745MHz

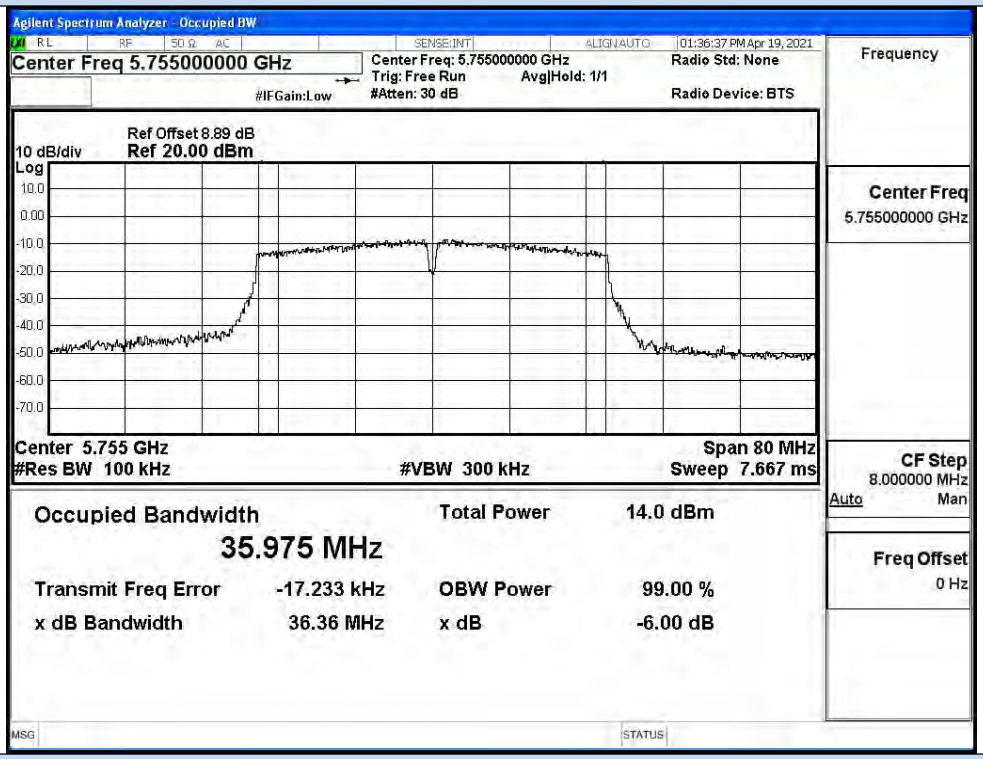



IEEE 802.11n20 / Channel 157 / 5785MHz

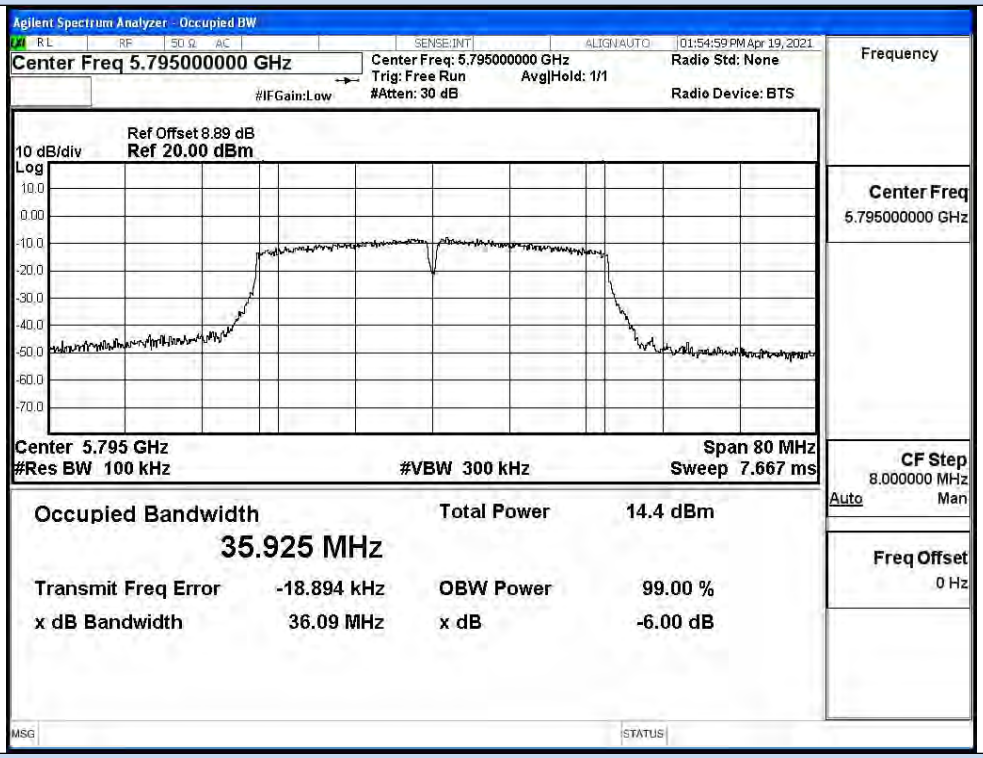



IEEE 802.11n20 / Channel 165 / 5825MHz

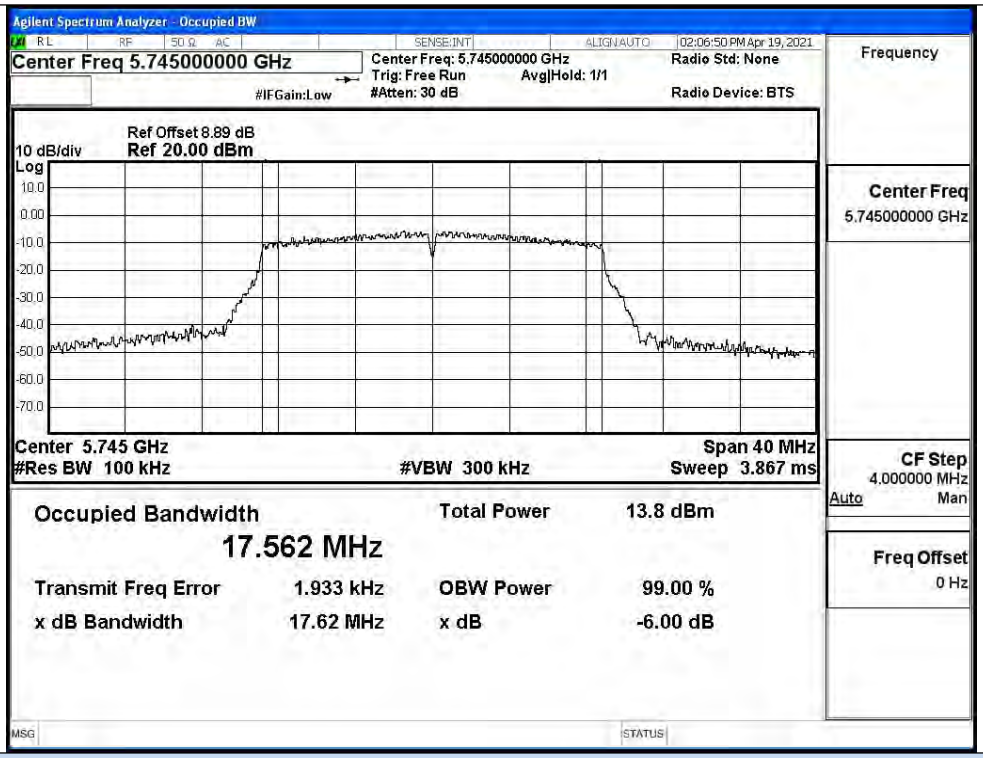
6dB Bandwidth



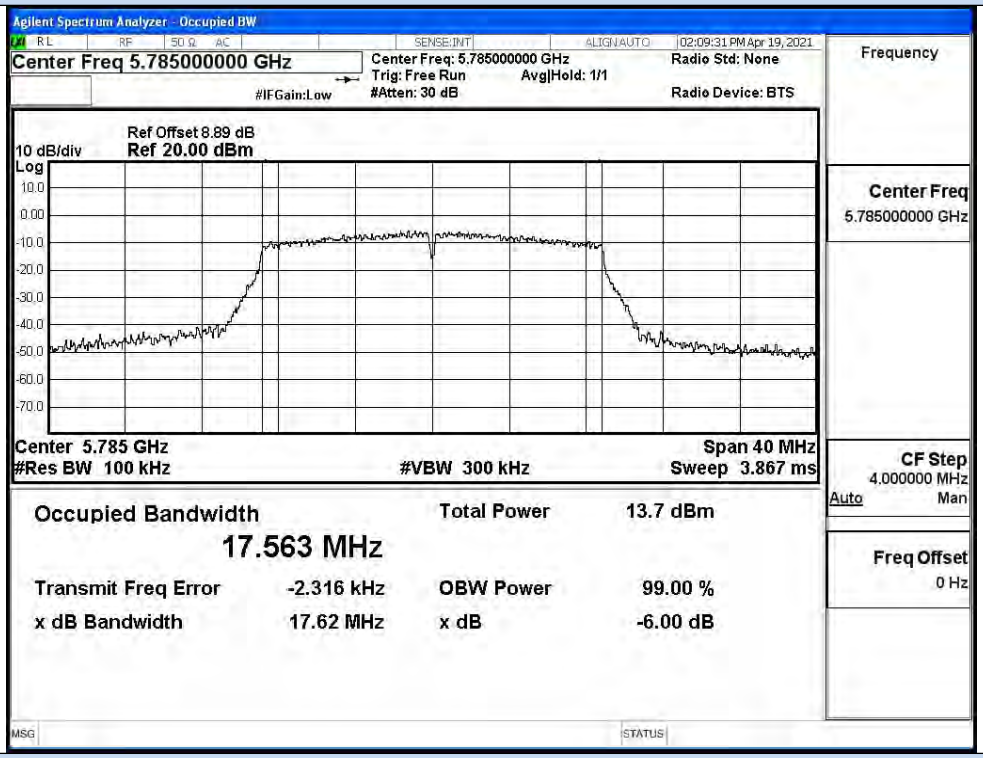

IEEE 802.11n40 / Channel 151 / 5755MHz



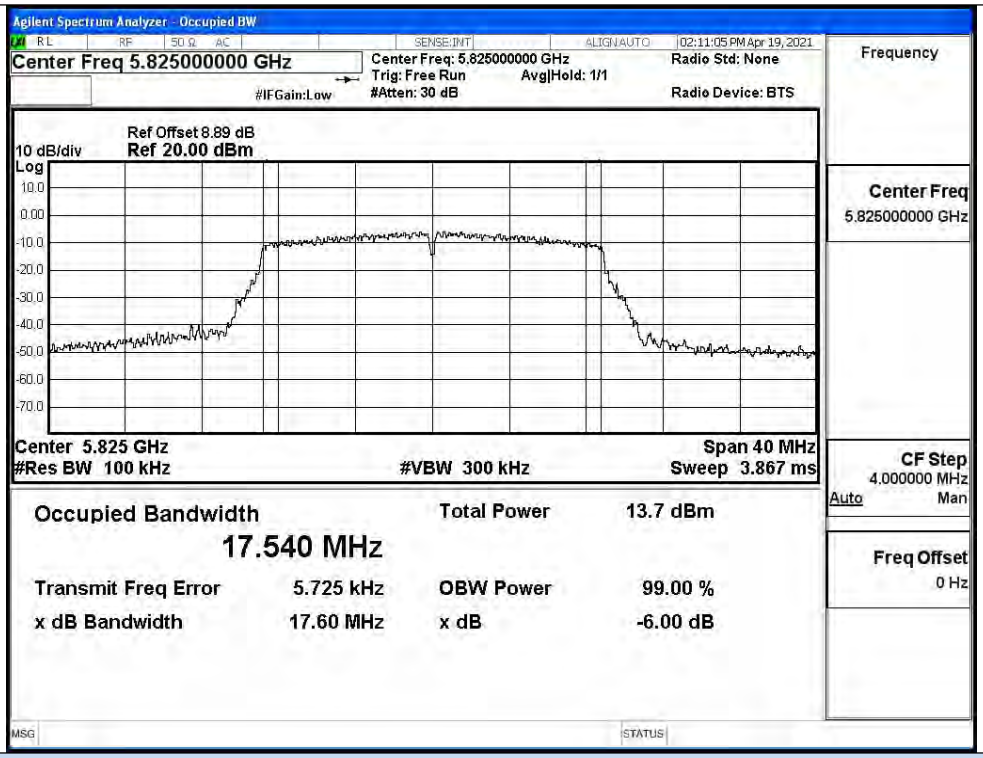

IEEE 802.11n40 / Channel 159 / 5795MHz



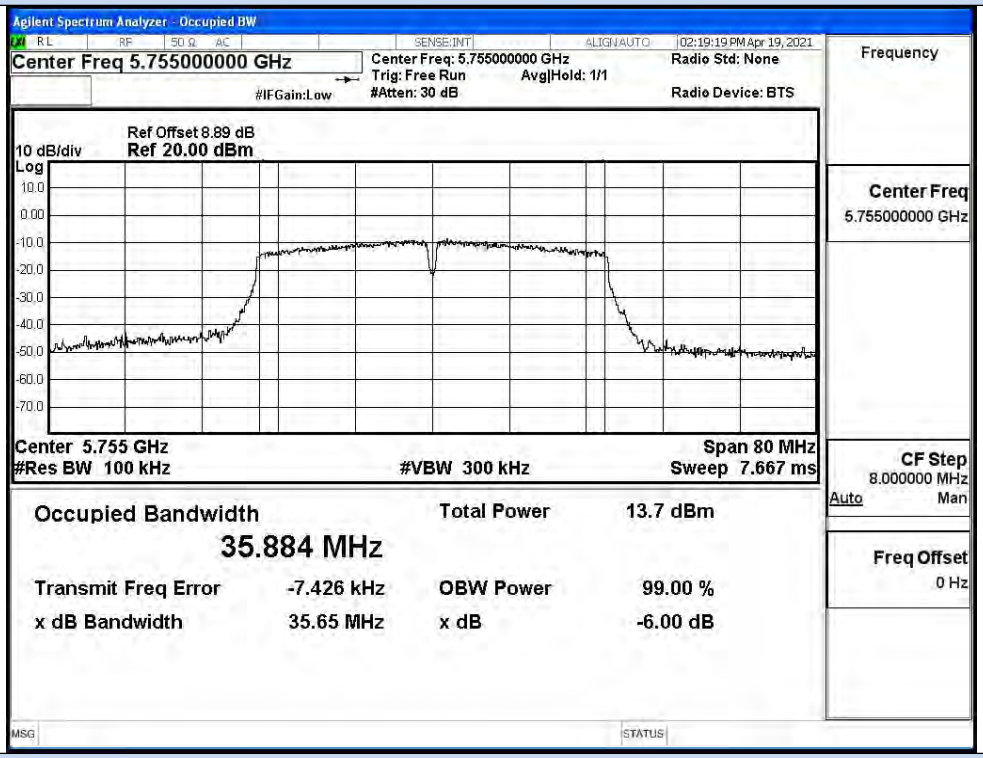

IEEE 802.11ac20 / Channel 149 / 5745MHz



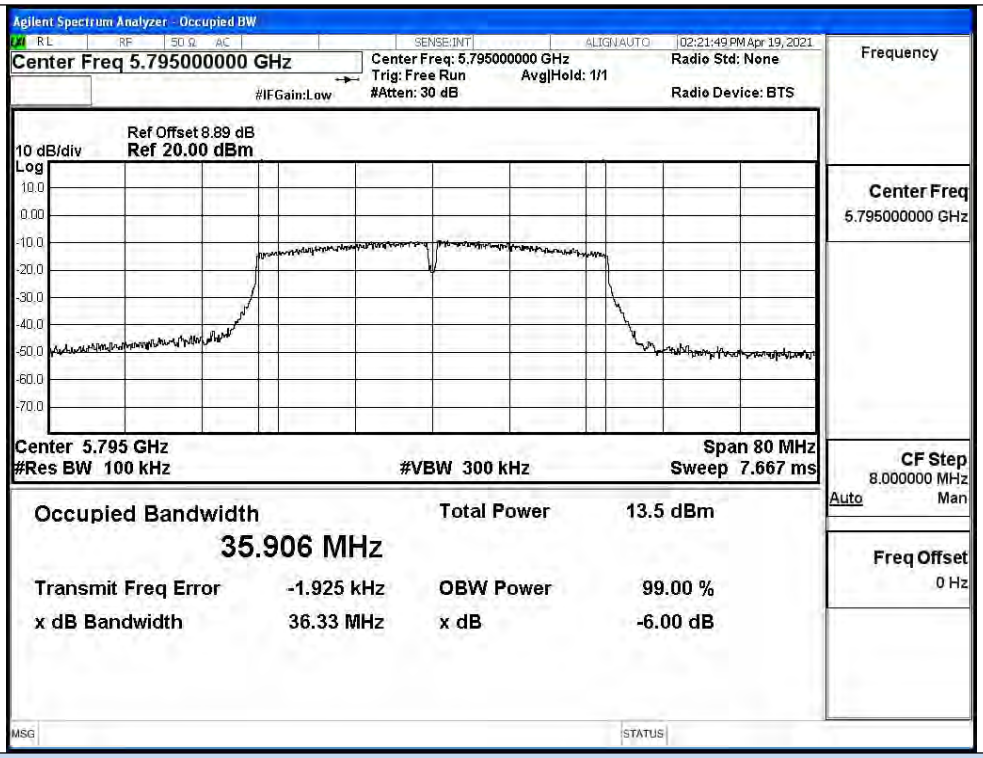

IEEE 802.11ac20 / Channel 157/ 5785MHz



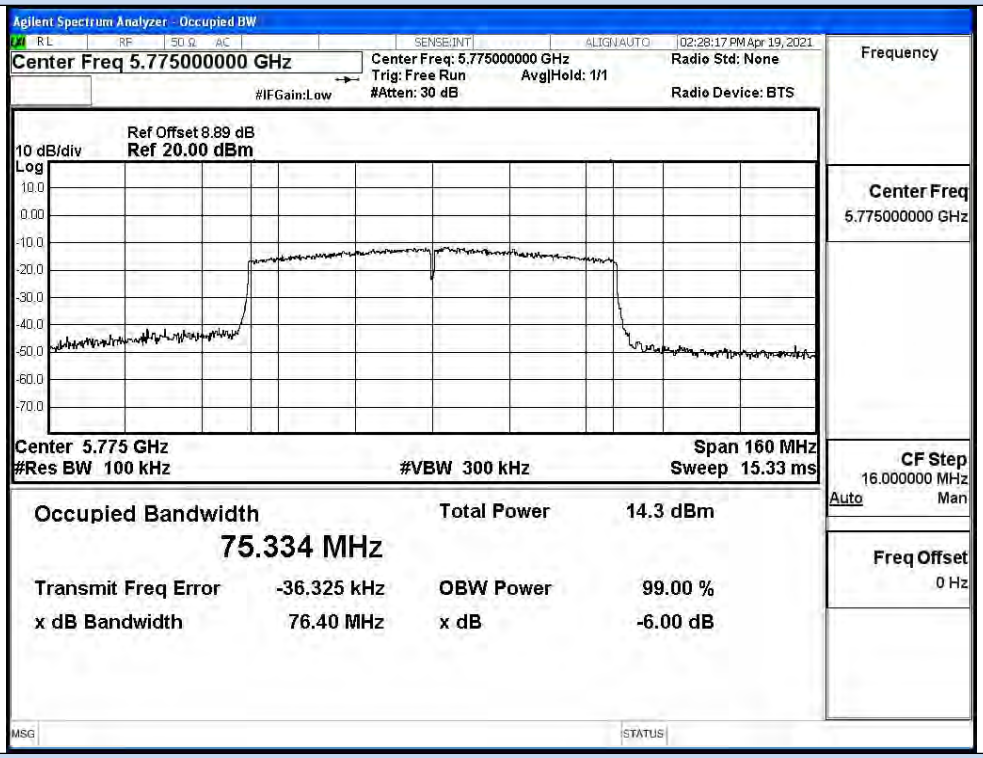

IEEE 802.11ac20 / Channel 165 / 5825MHz




IEEE 802.11ac40 / Channel 151 / 5755MHz




IEEE 802.11ac40 / Channel 159 / 5795MHz



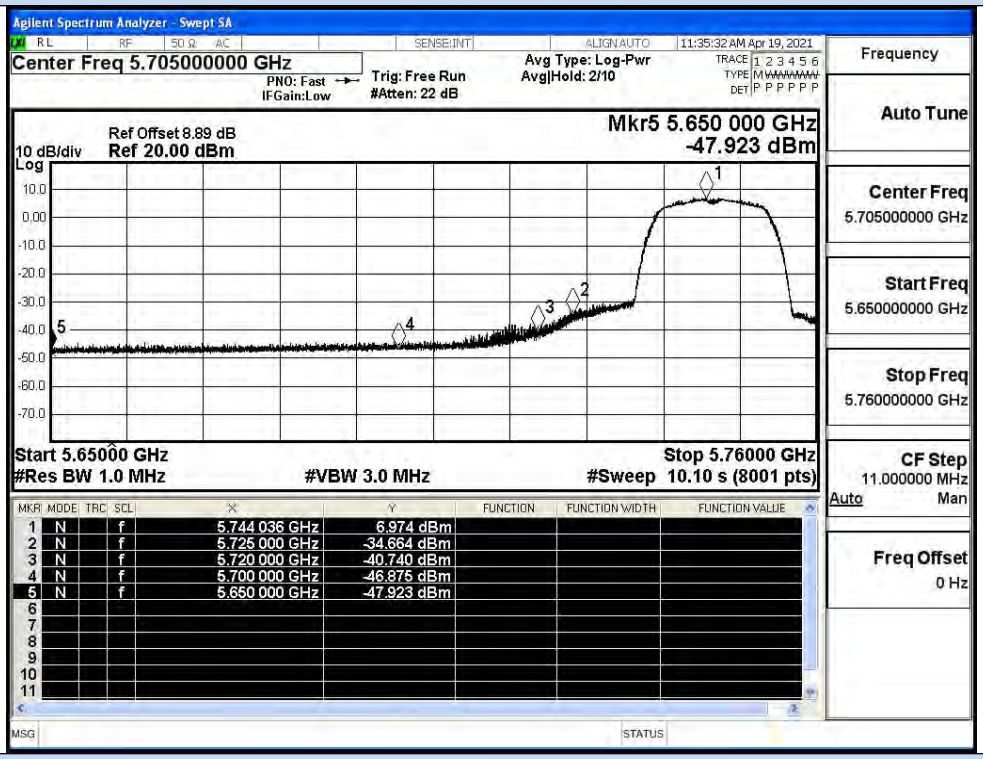

IEEE 802.11ac80 / Channel 155 / 5775MHz

## D.5 Undesirable Emissions Measurement

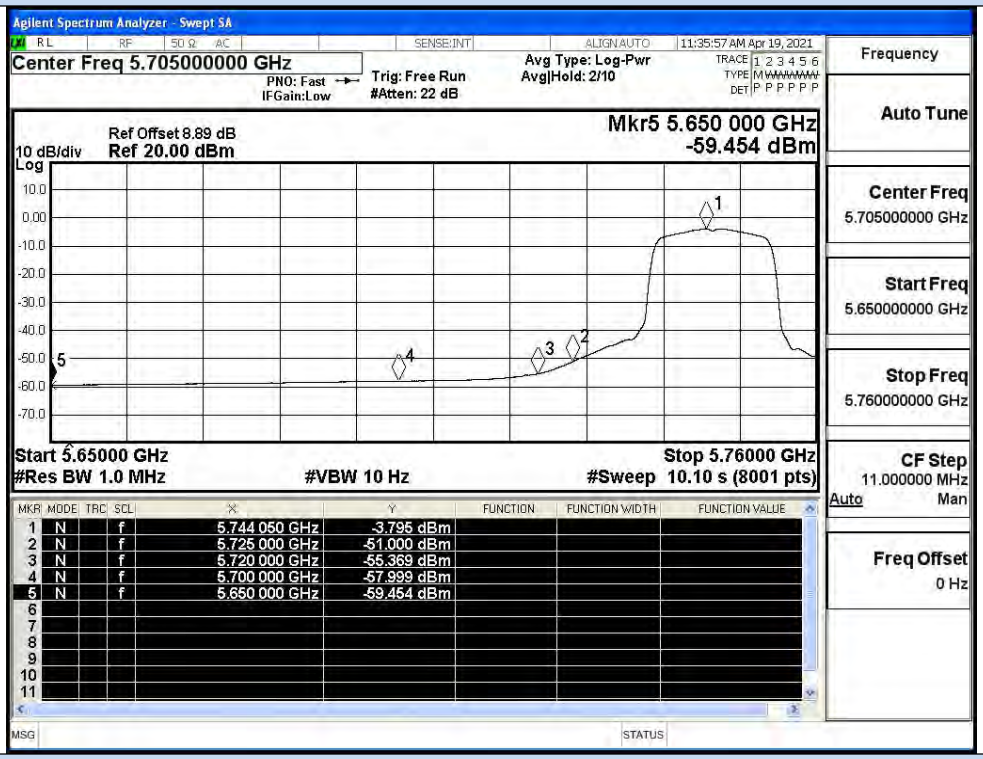
| Test Mode | Channel | Frequency (MHz) | Conducted Power (dBm) | Antenna Gain (dBi) | EIRP (dBm/MHz) | Detector | Limit (dBm/MHz) | Verdict |
|---|---|---|---|---|---|---|---|---|
| 11A | 149 | 5650.0 | -47.92 | 2.00 | -45.92 | Peak | -27.0 | Pass |
| | | 5650.0 | -59.45 | 2.00 | -57.45 | Average | -27.0 | Pass |
| | | 5700.0 | -46.88 | 2.00 | -44.88 | Peak | 10 | Pass |
| | | 5700.0 | -58.00 | 2.00 | -56.00 | Average | 10 | Pass |
| | | 5720.0 | -40.74 | 2.00 | -38.74 | Peak | 15.6 | Pass |
| | | 5720.0 | -55.37 | 2.00 | -53.37 | Average | 15.6 | Pass |
| | | 5725.0 | -34.66 | 2.00 | -32.66 | Peak | 27.0 | Pass |
| | | 5725.0 | -51.00 | 2.00 | -49.00 | Average | 27.0 | Pass |
| | 165 | 5850.0 | -43.00 | 2.00 | -41.00 | Peak | 27.0 | Pass |
| | | 5850.0 | -55.62 | 2.00 | -53.62 | Average | 27.0 | Pass |
| | | 5855.0 | -45.35 | 2.00 | -43.35 | Peak | 15.6 | Pass |
| | | 5855.0 | -56.74 | 2.00 | -54.74 | Average | 15.6 | Pass |
| | | 5875.0 | -45.33 | 2.00 | -43.33 | Peak | 10 | Pass |
| | | 5875.0 | -58.14 | 2.00 | -56.14 | Average | 10 | Pass |
| | | 5925.0 | -47.56 | 2.00 | -45.56 | Peak | -27.0 | Pass |
| | | 5925.0 | -59.52 | 2.00 | -57.52 | Average | -27.0 | Pass |
| 11N20 SISO | 149 | 5650.0 | -47.91 | 2.00 | -45.91 | Peak | -27.0 | Pass |
| | | 5650.0 | -59.47 | 2.00 | -57.47 | Average | -27.0 | Pass |
| | | 5700.0 | -45.91 | 2.00 | -43.91 | Peak | 10 | Pass |
| | | 5700.0 | -55.54 | 2.00 | -53.54 | Average | 10 | Pass |
| | | 5720.0 | -40.05 | 2.00 | -38.05 | Peak | 15.6 | Pass |
| | | 5720.0 | -58.01 | 2.00 | -56.01 | Average | 15.6 | Pass |
| | | 5725.0 | -34.44 | 2.00 | -32.44 | Peak | 27.0 | Pass |
| | | 5725.0 | -51.22 | 2.00 | -49.22 | Average | 27.0 | Pass |
| | 165 | 5850.0 | -44.53 | 2.00 | -42.53 | Peak | 27.0 | Pass |
| | | 5850.0 | -55.66 | 2.00 | -53.66 | Average | 27.0 | Pass |
| | | 5855.0 | -44.86 | 2.00 | -42.86 | Peak | 15.6 | Pass |
| | | 5855.0 | -56.91 | 2.00 | -54.91 | Average | 15.6 | Pass |
| | | 5875.0 | -46.29 | 2.00 | -44.29 | Peak | 10 | Pass |
| | | 5875.0 | -58.33 | 2.00 | -56.33 | Average | 10 | Pass |
| | | 5925.0 | -48.10 | 2.00 | -46.10 | Peak | -27.0 | Pass |
| | | 5925.0 | -59.56 | 2.00 | -57.56 | Average | -27.0 | Pass |

| Test Mode | Channel | Frequency (MHz) | Conducted Power (dBm) | Antenna Gain (dBi) | EIRP (dBm/MHz) | Detector | Limit (dBm/MHz) | Verdict |
|---|---|---|---|---|---|---|---|---|
| 11N40 SISO | 151 | 5650.0 | -47.55 | 2.00 | -45.55 | Peak | -27.0 | Pass |
| | | 5650.0 | -59.52 | 2.00 | -57.52 | Average | -27.0 | Pass |
| | | 5700.0 | -45.46 | 2.00 | -43.46 | Peak | 10 | Pass |
| | | 5700.0 | -57.62 | 2.00 | -55.62 | Average | 10 | Pass |
| | | 5720.0 | -37.15 | 2.00 | -35.15 | Peak | 15.6 | Pass |
| | | 5720.0 | -49.91 | 2.00 | -47.91 | Average | 15.6 | Pass |
| | | 5725.0 | -35.57 | 2.00 | -33.57 | Peak | 27.0 | Pass |
| | | 5725.0 | -47.72 | 2.00 | -45.72 | Average | 27.0 | Pass |
| | 159 | 5850.0 | -46.30 | 2.00 | -44.30 | Peak | 27.0 | Pass |
| | | 5850.0 | -57.49 | 2.00 | -55.49 | Average | 27.0 | Pass |
| | | 5855.0 | -45.19 | 2.00 | -43.19 | Peak | 15.6 | Pass |
| | | 5855.0 | -57.80 | 2.00 | -55.80 | Average | 15.6 | Pass |
| | | 5875.0 | -46.69 | 2.00 | -44.69 | Peak | 10 | Pass |
| | | 5875.0 | -58.50 | 2.00 | -56.50 | Average | 10 | Pass |
| | | 5925.0 | -47.21 | 2.00 | -45.21 | Peak | -27.0 | Pass |
| | | 5925.0 | -59.61 | 2.00 | -57.61 | Average | -27.0 | Pass |
| 11AC20 SISO | 149 | 5650.0 | -47.25 | 2.00 | -45.25 | Peak | -27.0 | Pass |
| | | 5650.0 | -59.59 | 2.00 | -57.59 | Average | -27.0 | Pass |
| | | 5700.0 | -46.57 | 2.00 | -44.57 | Peak | 10 | Pass |
| | | 5700.0 | -55.65 | 2.00 | -53.65 | Average | 10 | Pass |
| | | 5720.0 | -43.53 | 2.00 | -41.53 | Peak | 15.6 | Pass |
| | | 5720.0 | -58.26 | 2.00 | -56.26 | Average | 15.6 | Pass |
| | | 5725.0 | -34.82 | 2.00 | -32.82 | Peak | 27.0 | Pass |
| | | 5725.0 | -51.66 | 2.00 | -49.66 | Average | 27.0 | Pass |
| | 165 | 5850.0 | -44.26 | 2.00 | -42.26 | Peak | 27.0 | Pass |
| | | 5850.0 | -56.22 | 2.00 | -54.22 | Average | 27.0 | Pass |
| | | 5855.0 | -45.02 | 2.00 | -43.02 | Peak | 15.6 | Pass |
| | | 5855.0 | -57.15 | 2.00 | -55.15 | Average | 15.6 | Pass |
| | | 5875.0 | -46.79 | 2.00 | -44.79 | Peak | 10 | Pass |
| | | 5875.0 | -58.46 | 2.00 | -56.46 | Average | 10 | Pass |
| | | 5925.0 | -47.43 | 2.00 | -45.43 | Peak | -27.0 | Pass |
| | | 5925.0 | -59.59 | 2.00 | -57.59 | Average | -27.0 | Pass |
| 11AC40 SISO | 151 | 5650.0 | -48.30 | 2.00 | -46.30 | Peak | -27.0 | Pass |
| | | 5650.0 | -59.54 | 2.00 | -57.54 | Average | -27.0 | Pass |
| | | 5700.0 | -45.42 | 2.00 | -43.42 | Peak | 10 | Pass |
| | | 5700.0 | -57.65 | 2.00 | -55.65 | Average | 10 | Pass |
| | | 5720.0 | -37.08 | 2.00 | -35.08 | Peak | 15.6 | Pass |
| | | 5720.0 | -49.72 | 2.00 | -47.72 | Average | 15.6 | Pass |
| | | 5725.0 | -33.70 | 2.00 | -31.70 | Peak | 27.0 | Pass |
| | | 5725.0 | -47.50 | 2.00 | -45.50 | Average | 27.0 | Pass |
| | 159 | 5850.0 | -46.02 | 2.00 | -44.02 | Peak | 27.0 | Pass |
| | | 5850.0 | -57.61 | 2.00 | -55.61 | Average | 27.0 | Pass |
| | | 5855.0 | -46.69 | 2.00 | -44.69 | Peak | 15.6 | Pass |
| | | 5855.0 | -57.88 | 2.00 | -55.88 | Average | 15.6 | Pass |
| | | 5875.0 | -46.77 | 2.00 | -44.77 | Peak | 10 | Pass |
| | | 5875.0 | -58.54 | 2.00 | -56.54 | Average | 10 | Pass |
| | | 5925.0 | -46.96 | 2.00 | -44.96 | Peak | -27.0 | Pass |
| | | 5925.0 | -59.54 | 2.00 | -57.54 | Average | -27.0 | Pass |
| 11AC80 SISO | 155 | 5725.0 | -43.81 | 2.00 | -41.81 | Peak | 27.0 | Pass |
| | | 5720.0 | -44.00 | 2.00 | -42.00 | Peak | 15.6 | Pass |
| | | 5700.0 | -47.22 | 2.00 | -45.22 | Peak | 10 | Pass |
| | | 5650.0 | -48.03 | 2.00 | -46.03 | Peak | -27.0 | Pass |
| | | 5725.0 | -55.47 | 2.00 | -53.47 | Average | 27.0 | Pass |
| | | 5720.0 | -55.95 | 2.00 | -53.95 | Average | 15.6 | Pass |
| | | 5700.0 | -57.91 | 2.00 | -55.91 | Average | 10 | Pass |
| | | 5650.0 | -59.27 | 2.00 | -57.27 | Average | -27.0 | Pass |
| | | 5850.0 | -43.81 | 2.00 | -41.81 | Peak | 27.0 | Pass |
| | | 5855.0 | -44.00 | 2.00 | -42.00 | Peak | 15.6 | Pass |
| | | 5875.0 | -47.22 | 2.00 | -45.22 | Peak | 10 | Pass |
| | | 5925.0 | -48.03 | 2.00 | -46.03 | Peak | -27.0 | Pass |
| | | 5850.0 | -55.47 | 2.00 | -53.47 | Average | 27.0 | Pass |
| | | 5855.0 | -55.95 | 2.00 | -53.95 | Average | 15.6 | Pass |
| | | 5875.0 | -57.91 | 2.00 | -55.91 | Average | 10 | Pass |
| | | 5925.0 | -59.27 | 2.00 | -57.27 | Average | -27.0 | Pass |

Undesirable Emissions Measurement

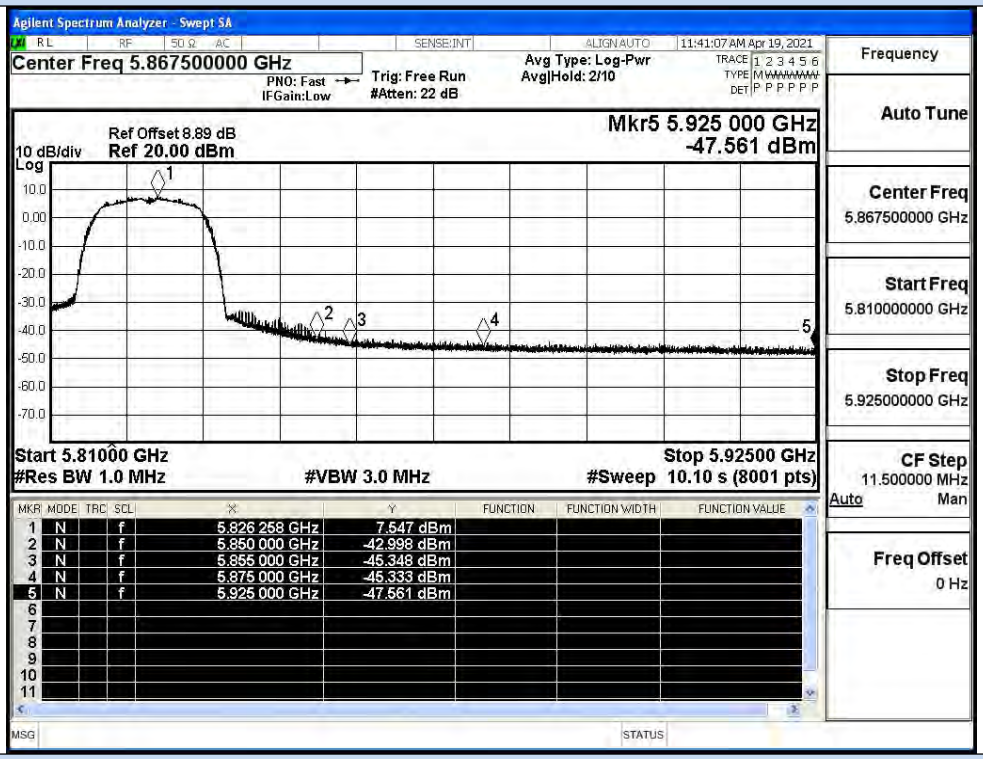



IEEE 802.11a / Channel 149 / 5745MHz / Peak

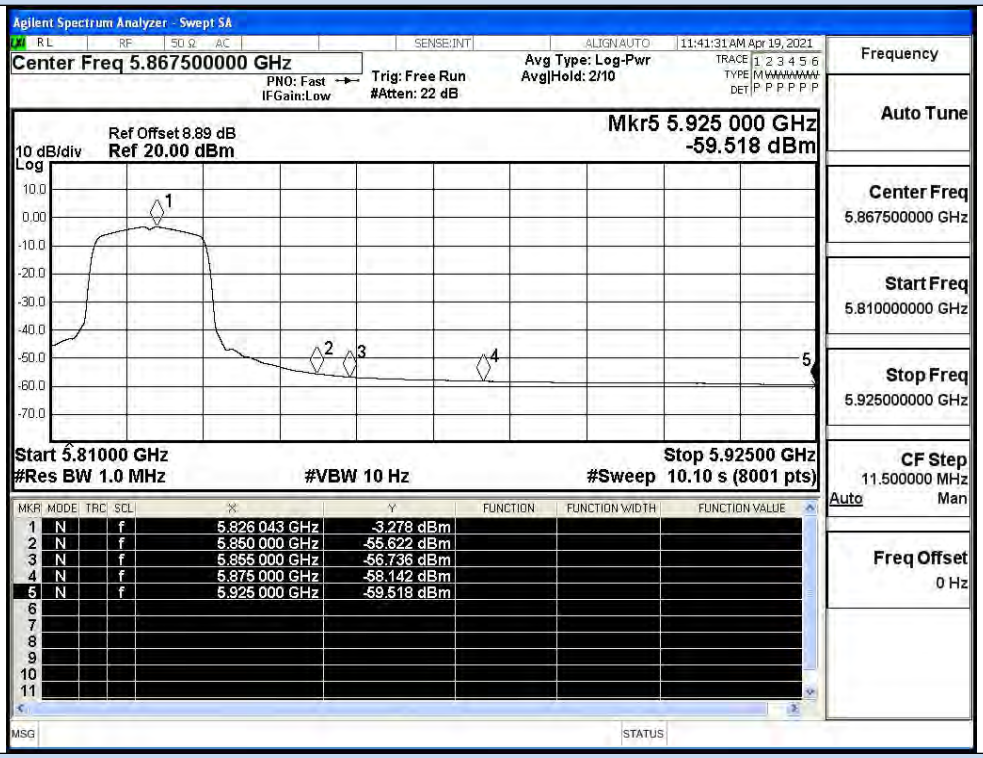



IEEE 802.11a / Channel 148 / 5745MHz / Average

Undesirable Emissions Measurement

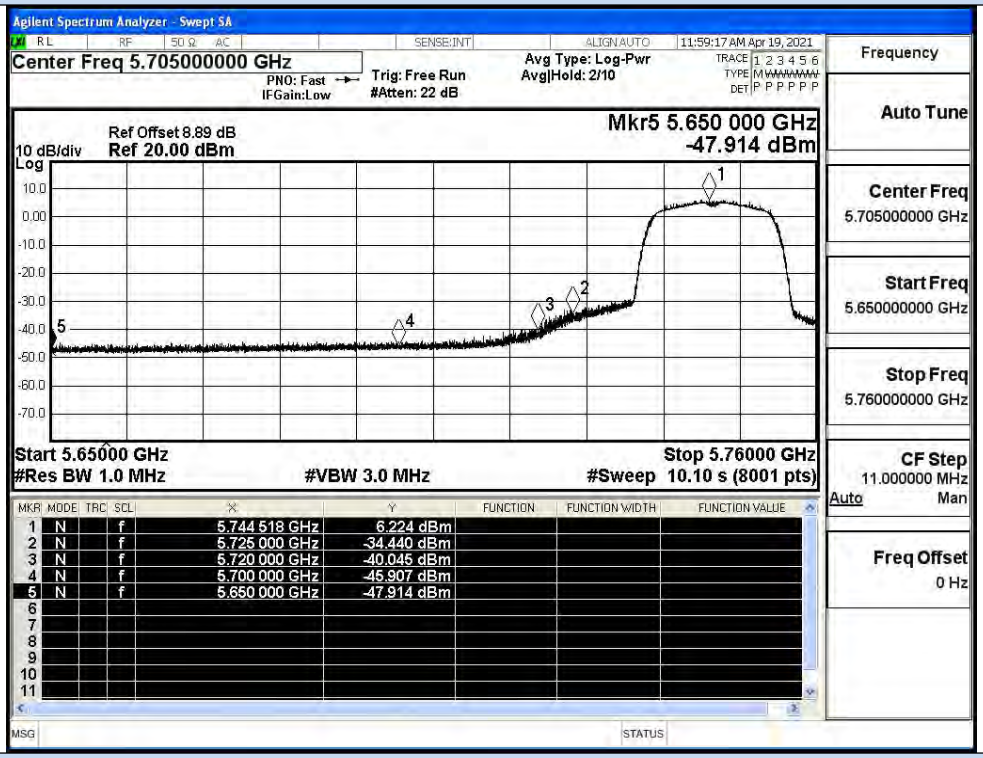



IEEE 802.11a / Channel 165 / 5825MHz / Peak

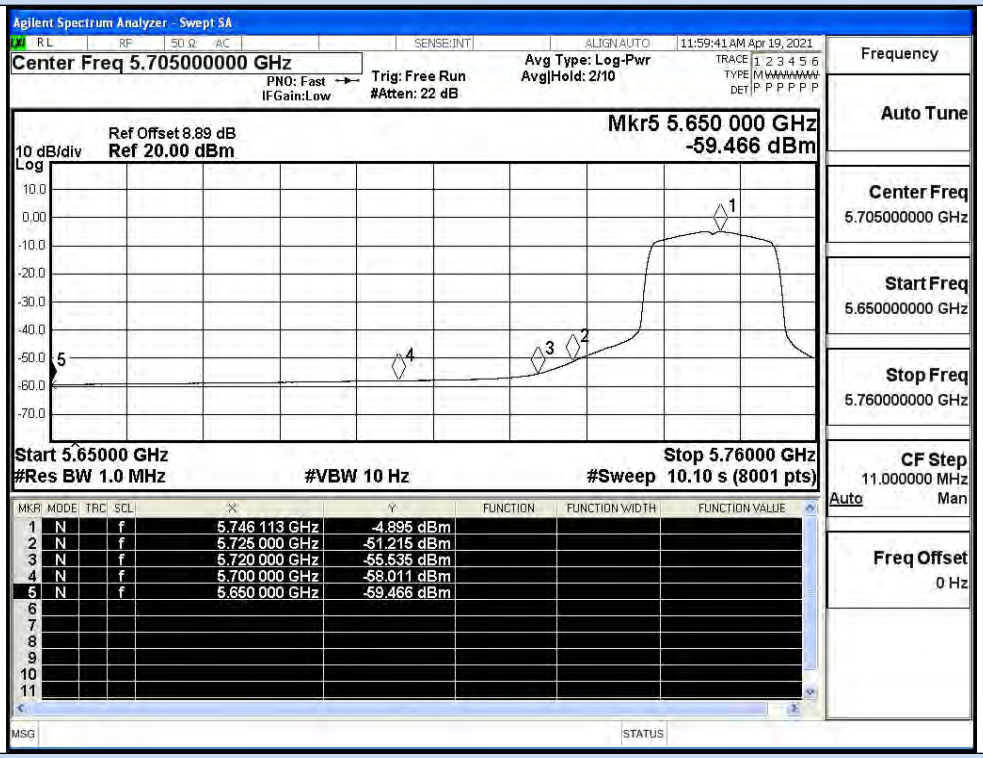



IEEE 802.11a / Channel 165 / 5825MHz / Average

Undesirable Emissions Measurement

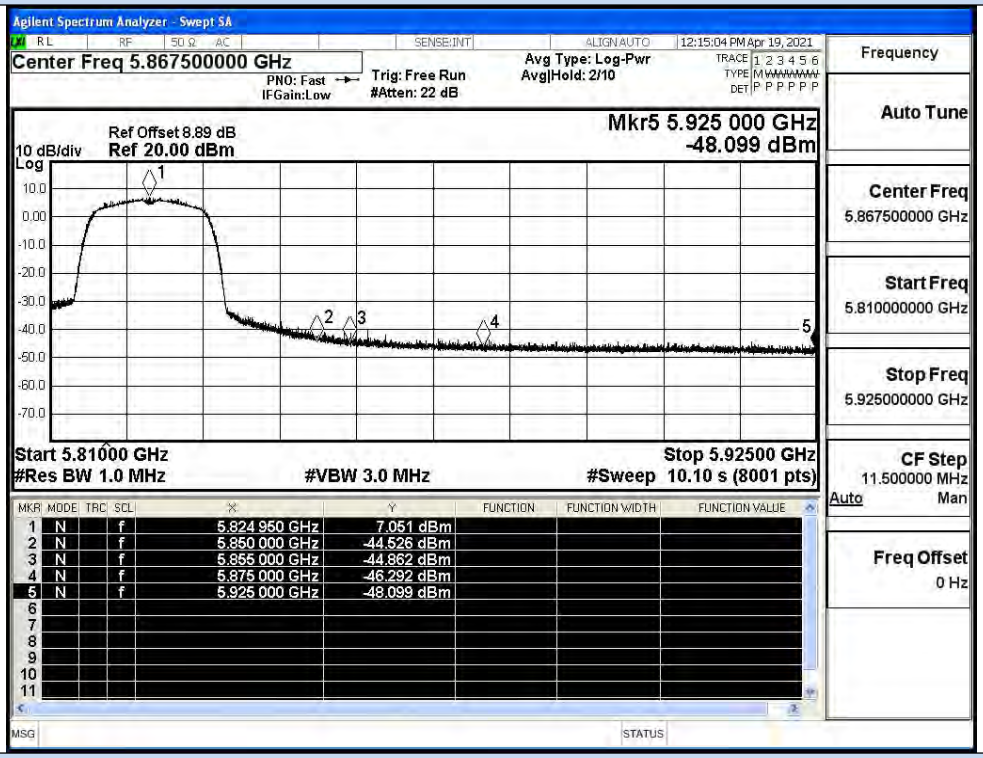



IEEE 802.11n20 / Channel 149 / 5745MHz / Peak

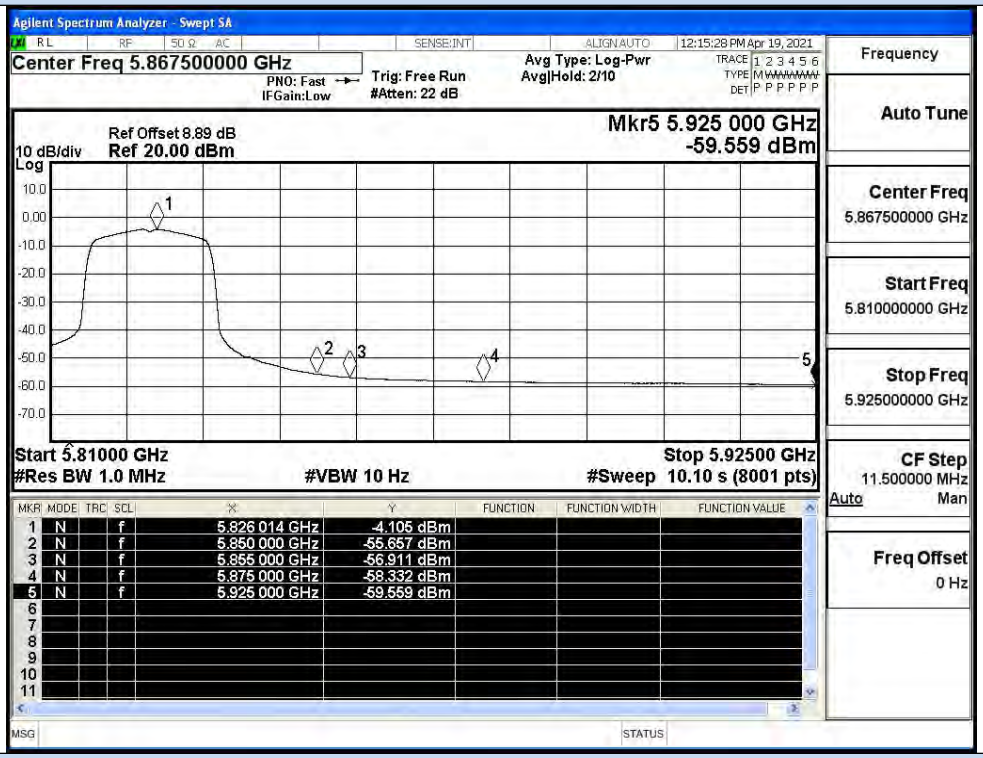



IEEE 802.11n20 / Channel 149 / 5745MHz / Average

Undesirable Emissions Measurement

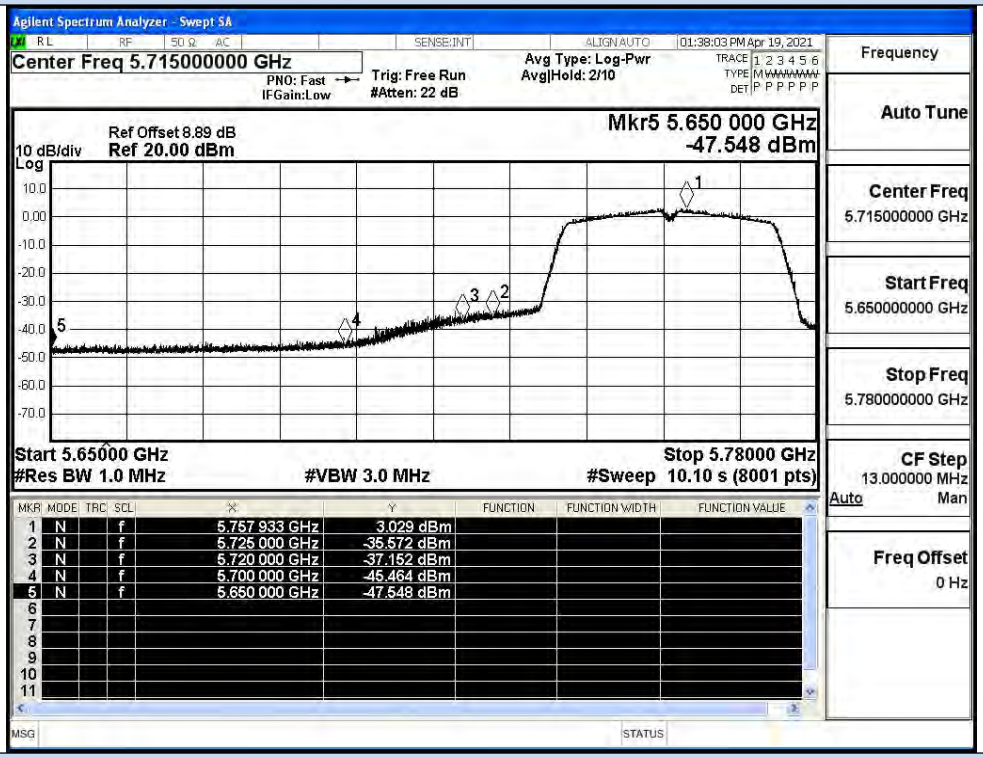



IEEE 802.11n20 / Channel 165 / 5825MHz / Peak

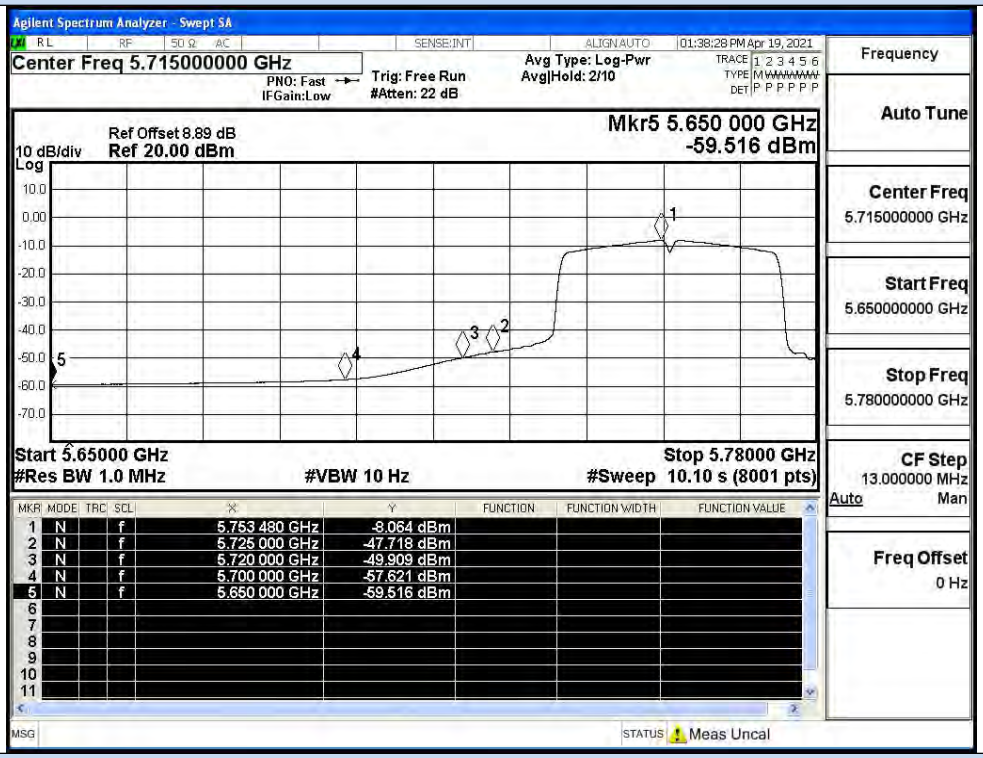



IEEE 802.11n20 / Channel 165 / 5825MHz / Average

Undesirable Emissions Measurement

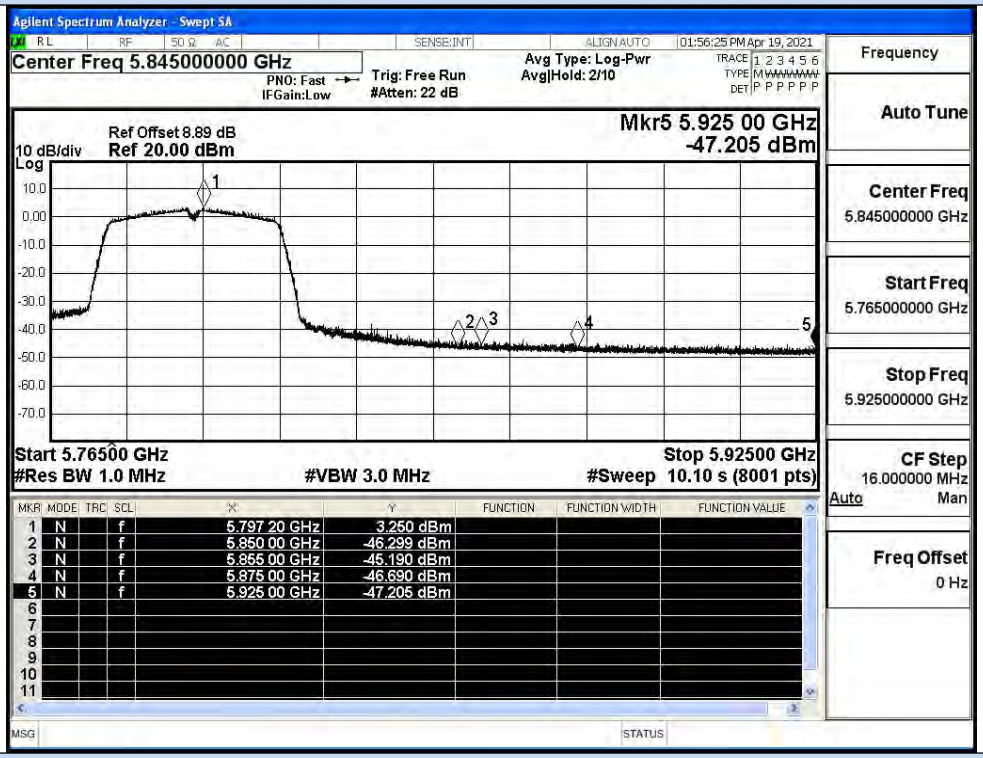



IEEE 802.11n40 / Channel 151 / 5755MHz / Peak

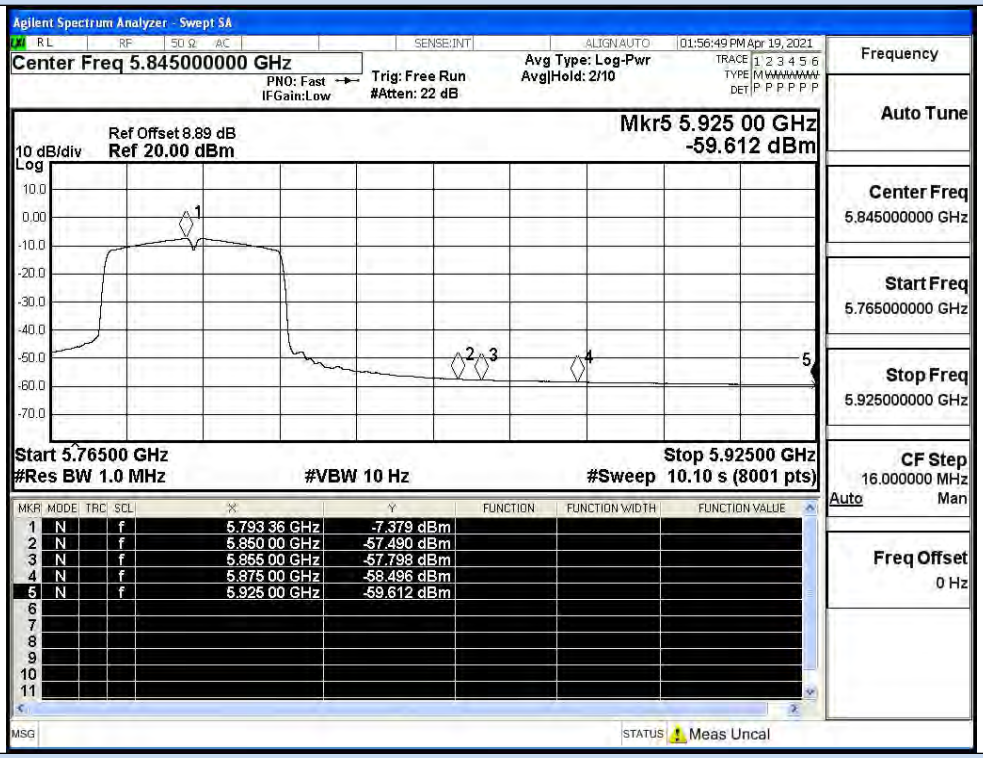



IEEE 802.11n40 / Channel 151 / 5755MHz / Average

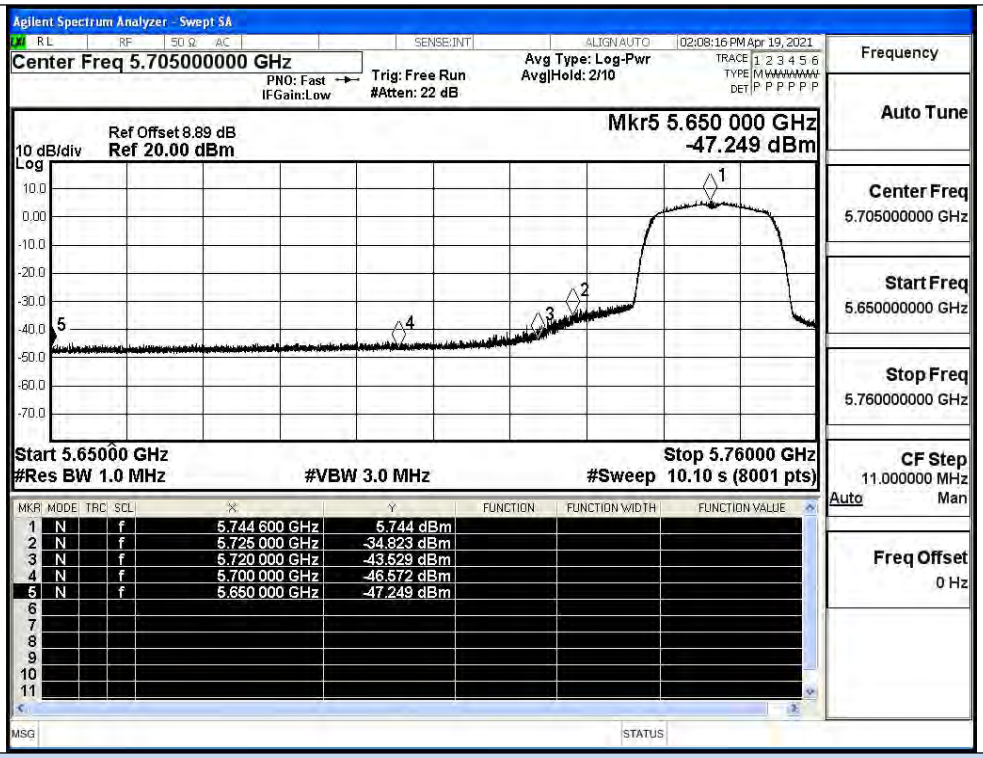
Undesirable Emissions Measurement



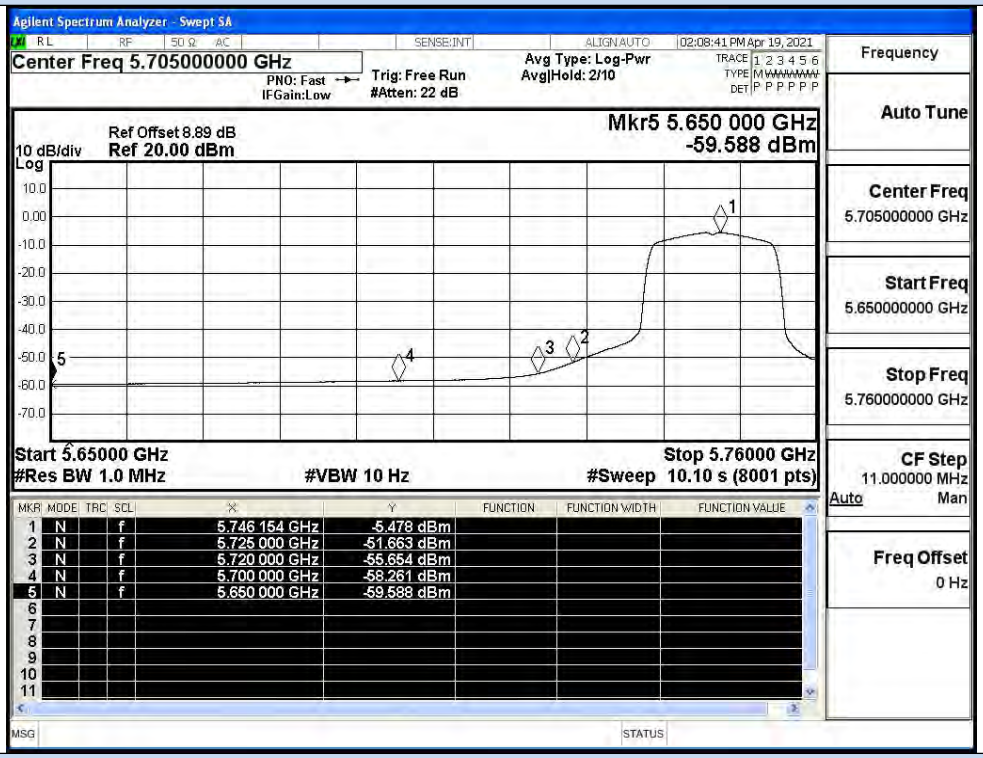

IEEE 802.11n40 / Channel 159 / 5795MHz / Peak



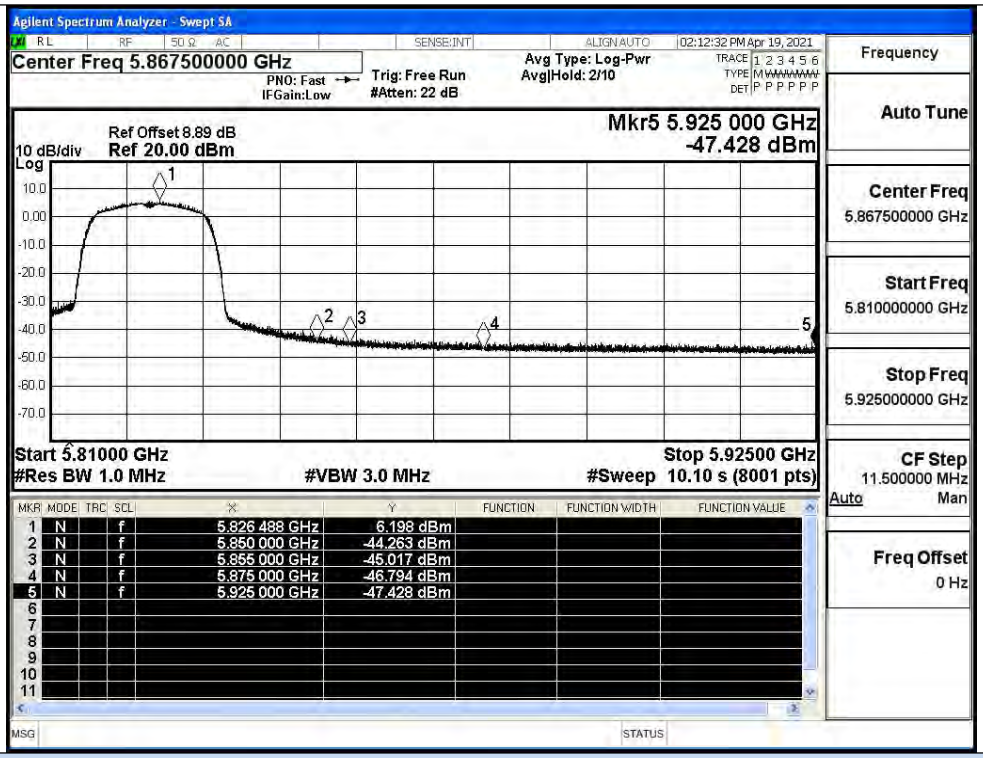

IEEE 802.11n40 / Channel 159 / 5795MHz / Average



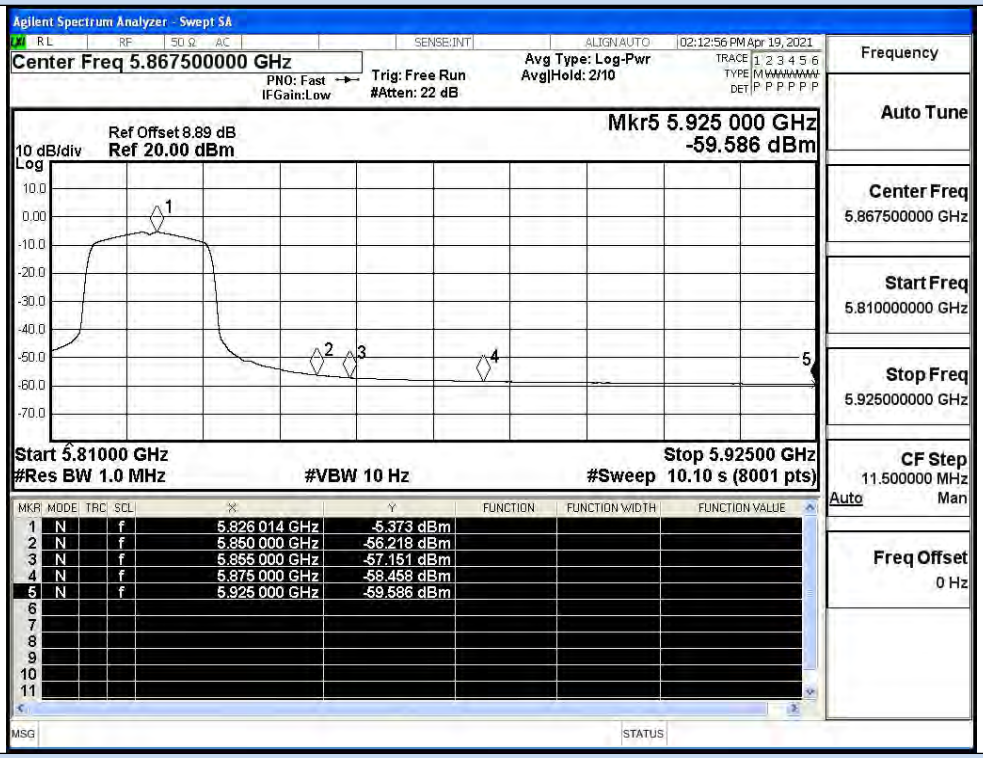

IEEE 802.11ac20 / Channel 149 / 5745MHz / Peak



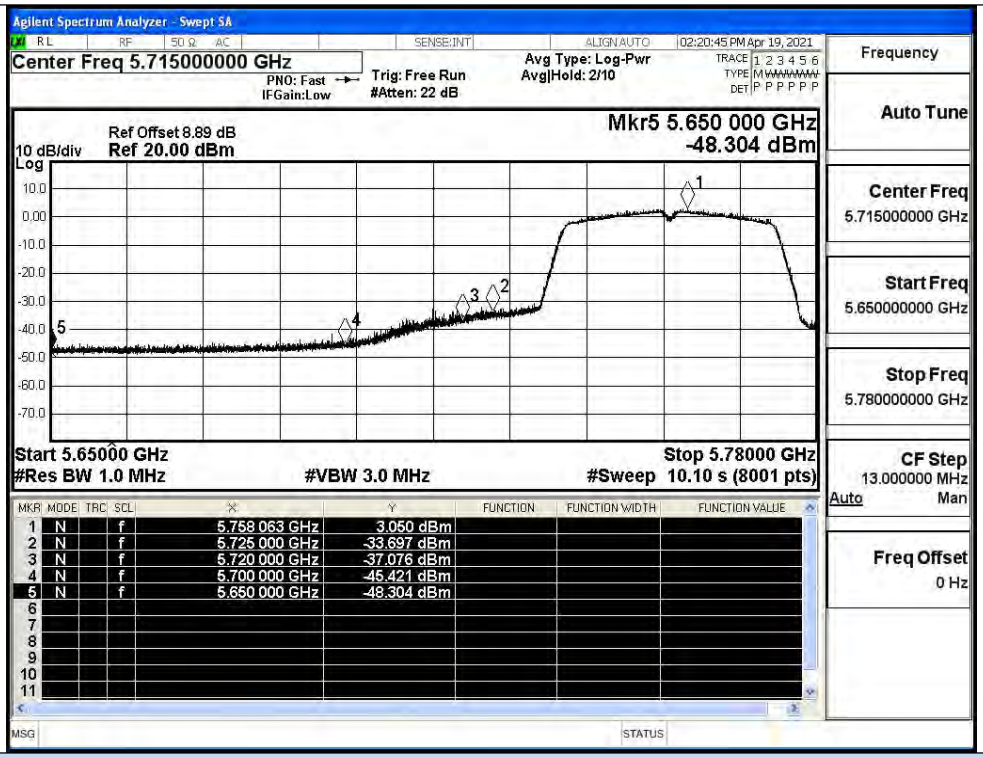

IEEE 802.11ac20 / Channel 149 / 5745MHz / Average



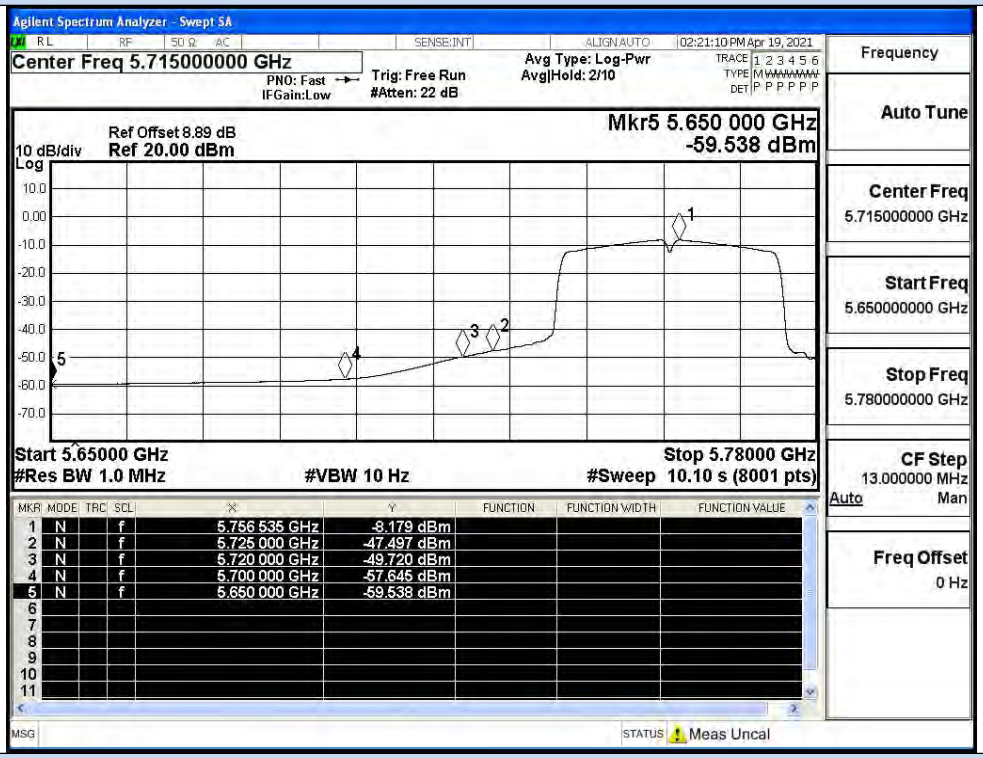

IEEE 802.11ac20 / Channel 165 / 5825MHz / Peak



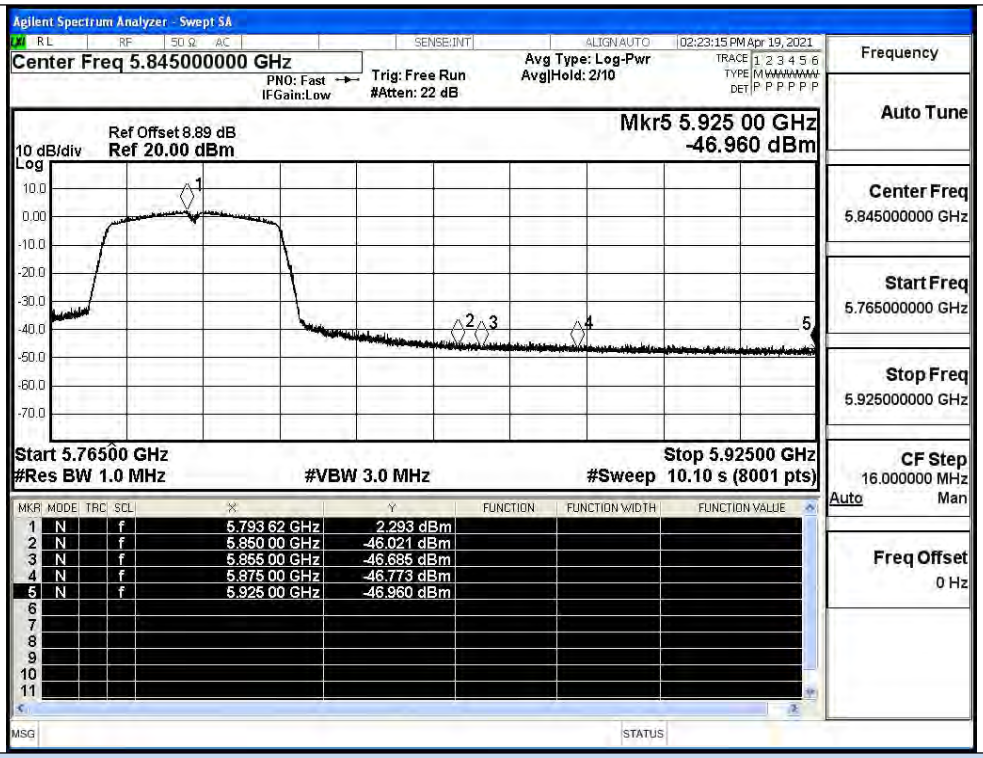

IEEE 802.11ac20 / Channel 165 / 5825MHz / Average



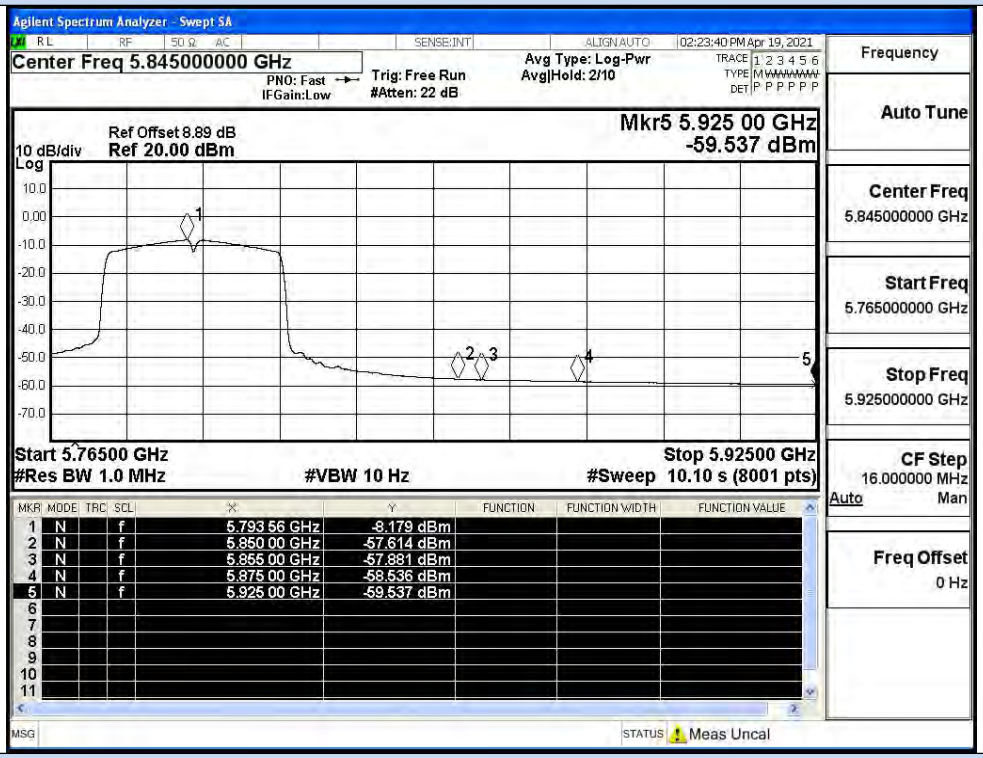

IEEE 802.11ac40 / Channel 151 / 5755MHz / Peak



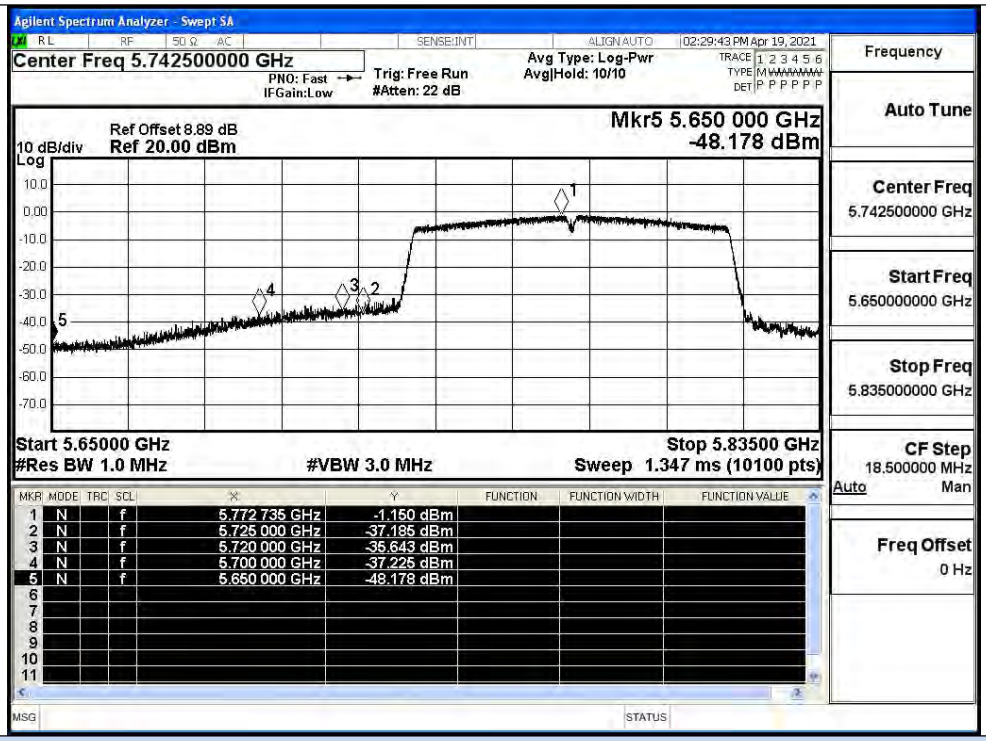

IEEE 802.11ac40 / Channel 151 / 5755MHz / Average



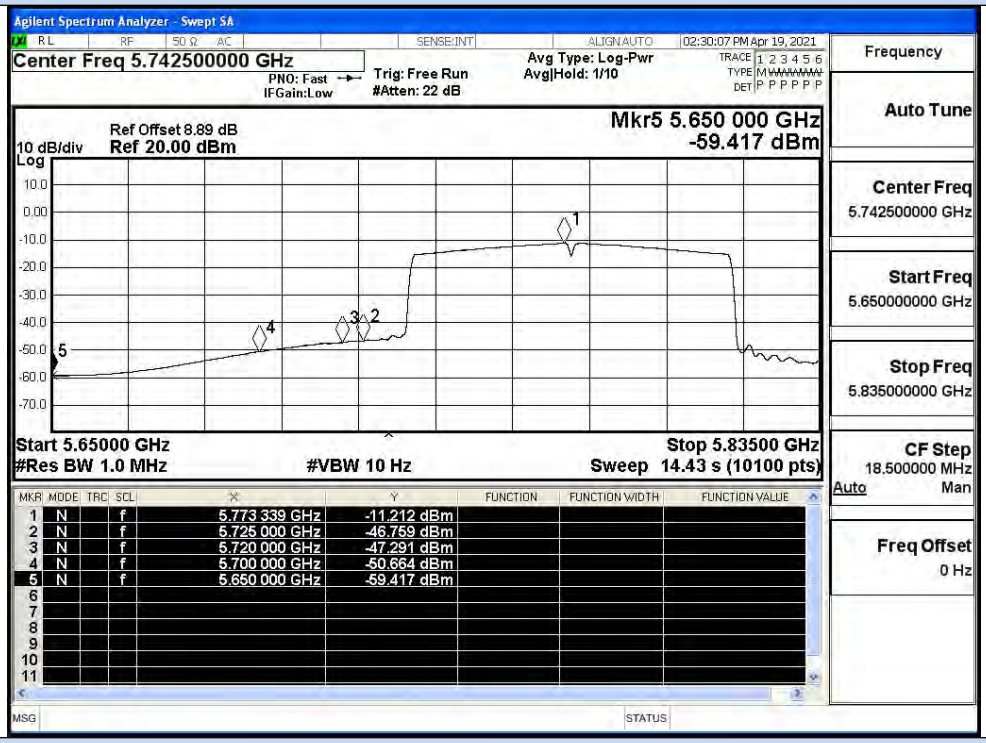

IEEE 802.11ac40 / Channel 159 / 5795MHz / Peak



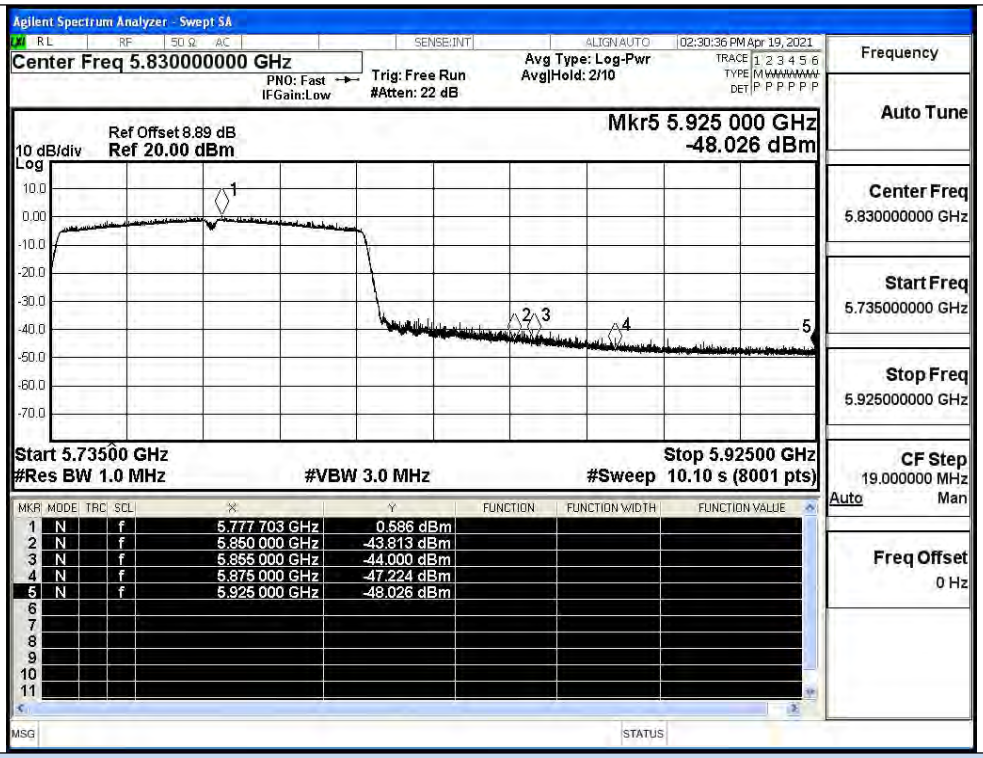

IEEE 802.11ac40 / Channel 159 / 5795MHz / Average



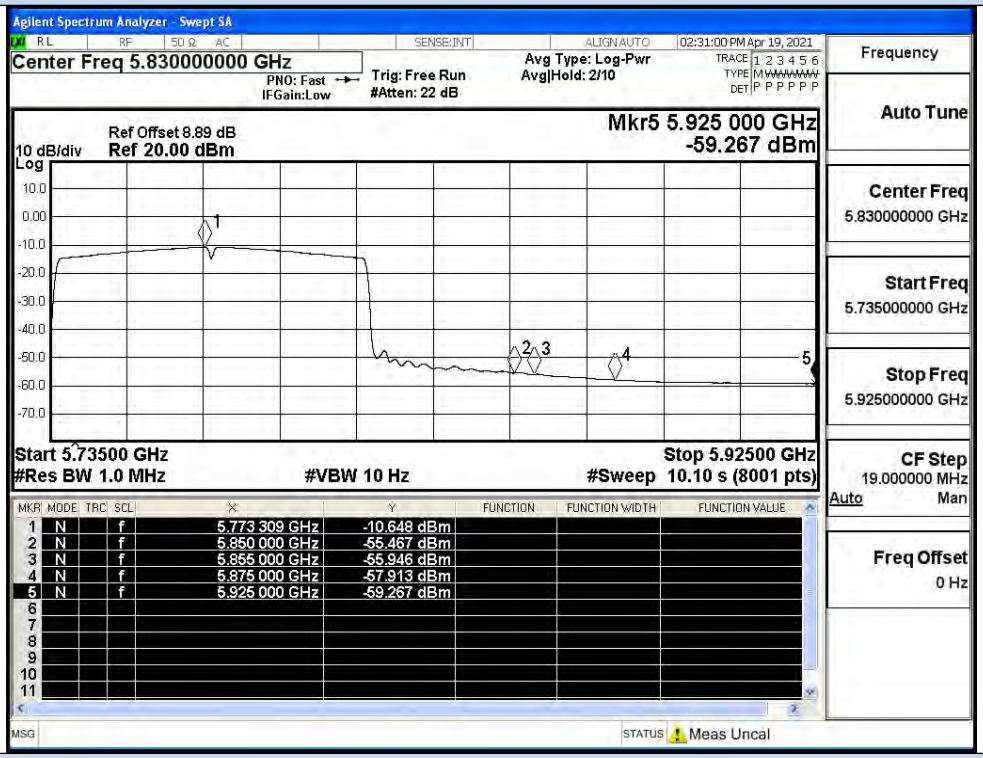

IEEE 802.11ac80 / Channel 155 / 5775MHz / Peak




IEEE 802.11ac80 / Channel 155 / 5775MHz / Average




IEEE 802.11ac80 / Channel 155/ 5775MHz / Peak




IEEE 802.11ac80 / Channel 155 / 5775MHz / Average