

## Appendix B

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

Product Name: Wireless Module for Portable Scanner

Trade Mark: N/A

Test Model: ZGFreeBox-T

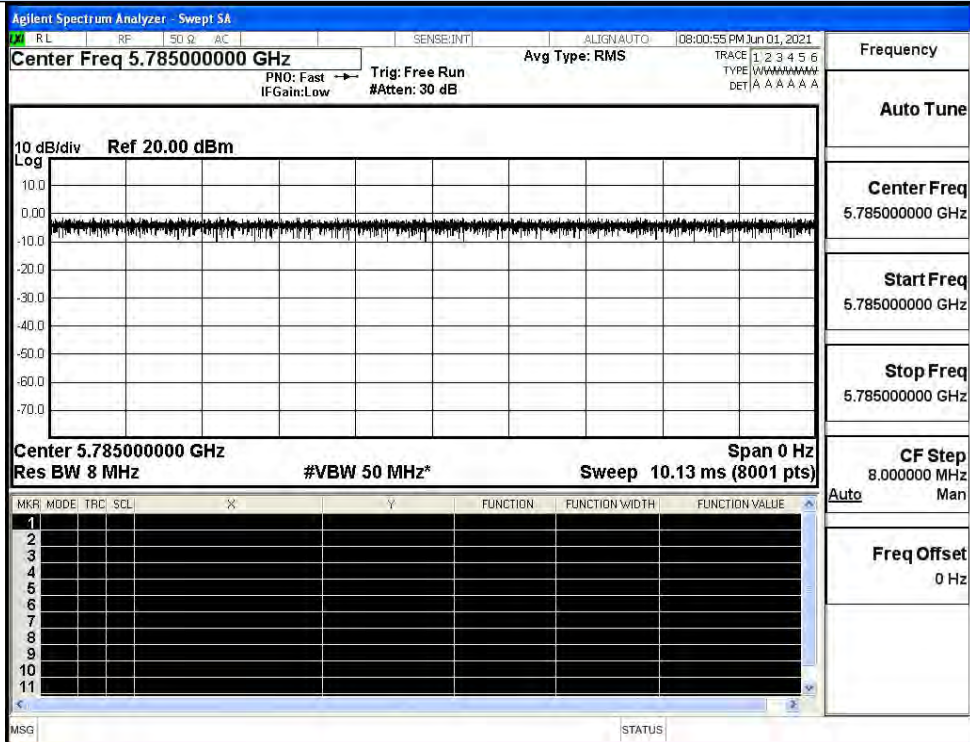
#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 21.5° C   |
| Relative Humidity: | 51.3%     |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | Carl Fu   |
| Supervised by:     | Li Huan   |

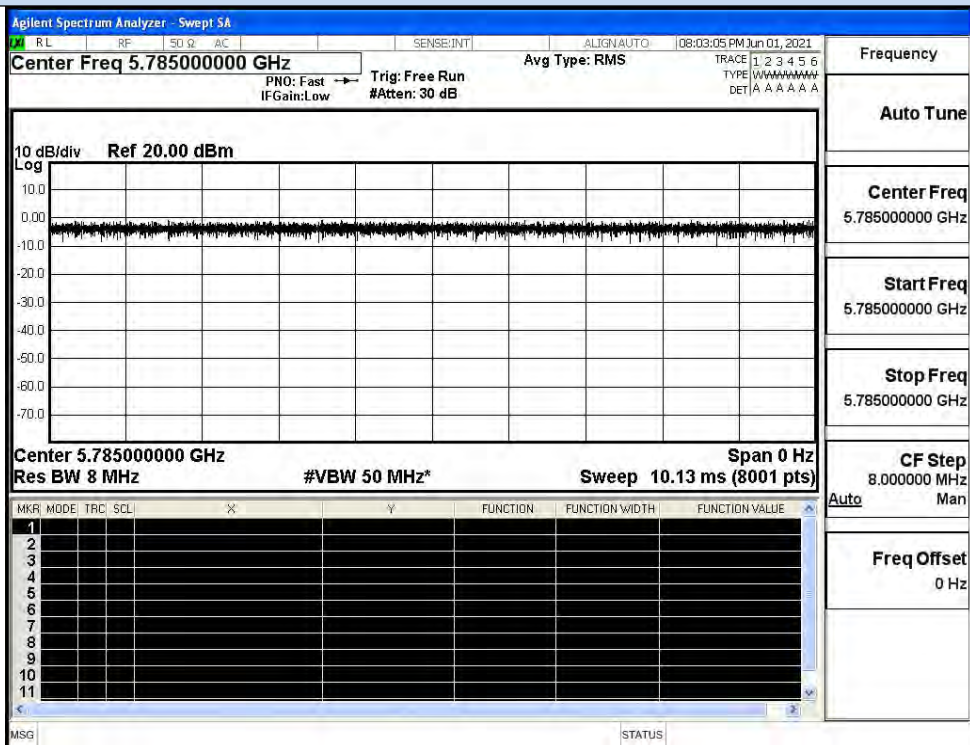
#### B.1 Duty Cycle

| 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                 |

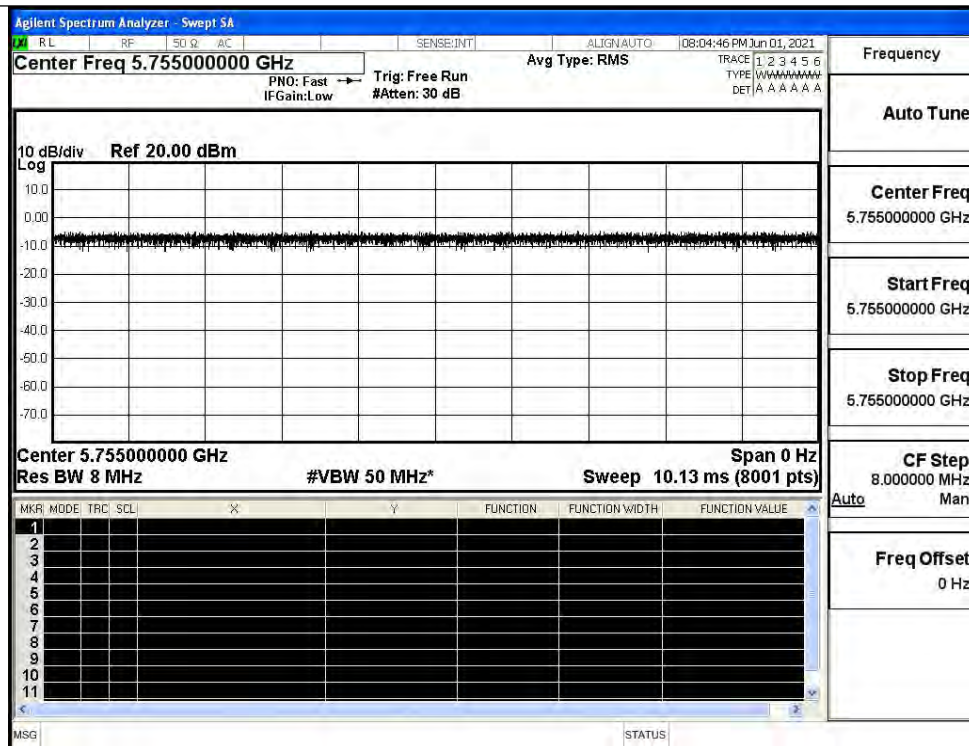
### On Time and Duty Cycle



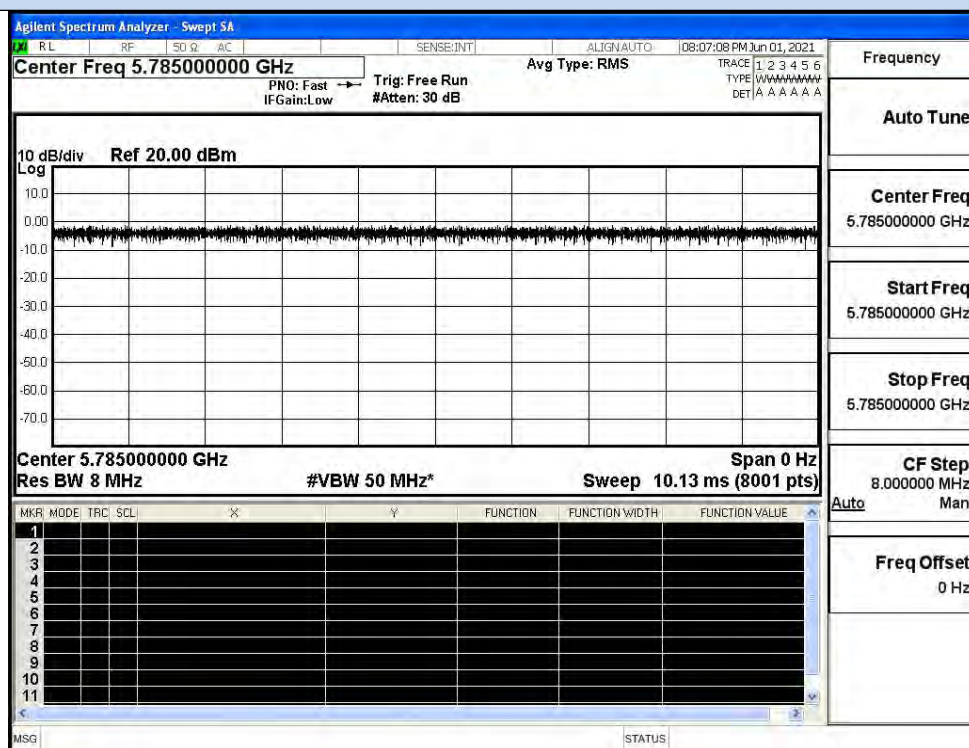
### IEEE 802.11a



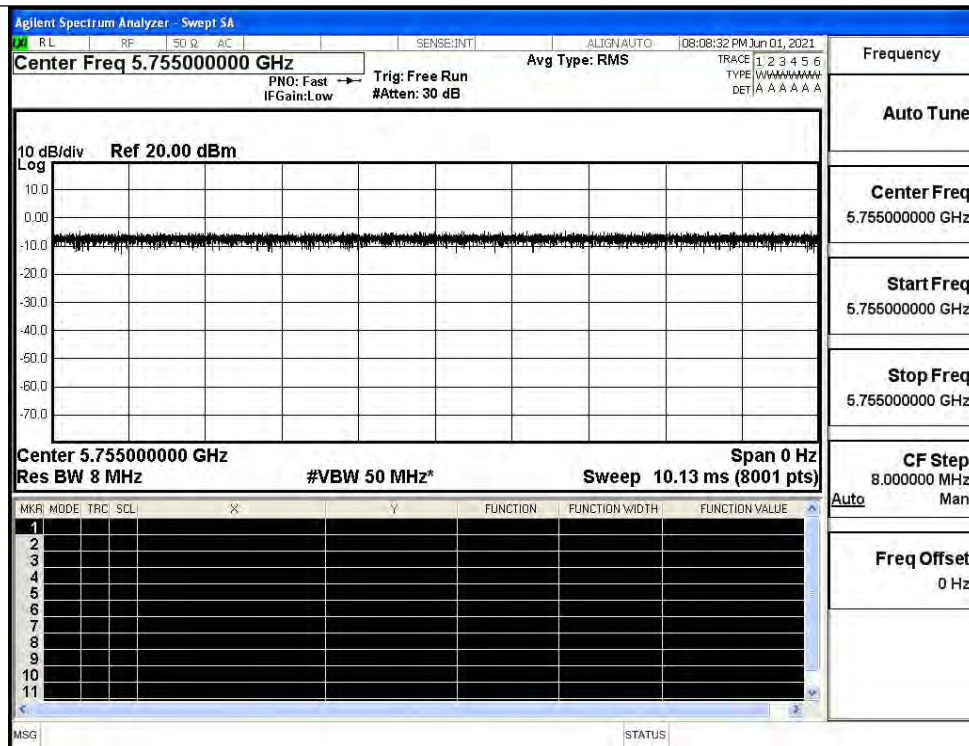
### IEEE 802.11n HT20



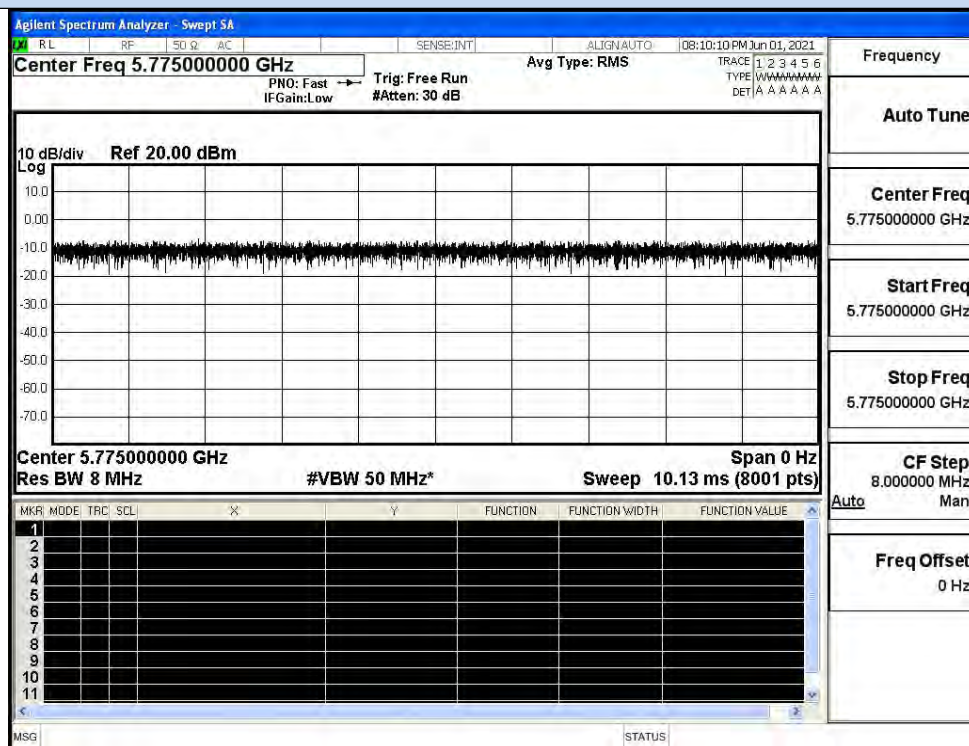
IEEE 802.11n HT40



IEEE 802.11AC20



IEEE 802.11AC40



IEEE 802.11AC80

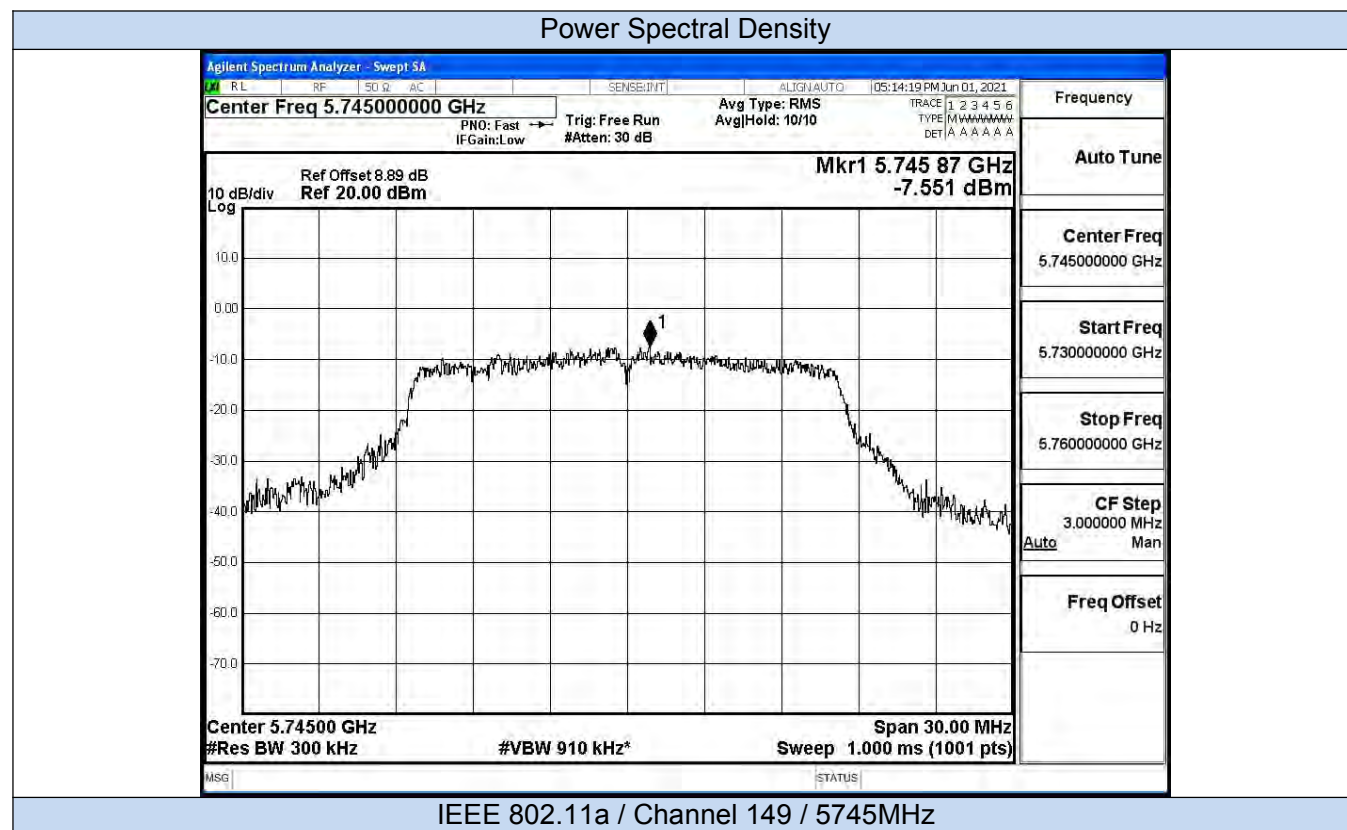
## B.2 Maximum Conduct Output Power

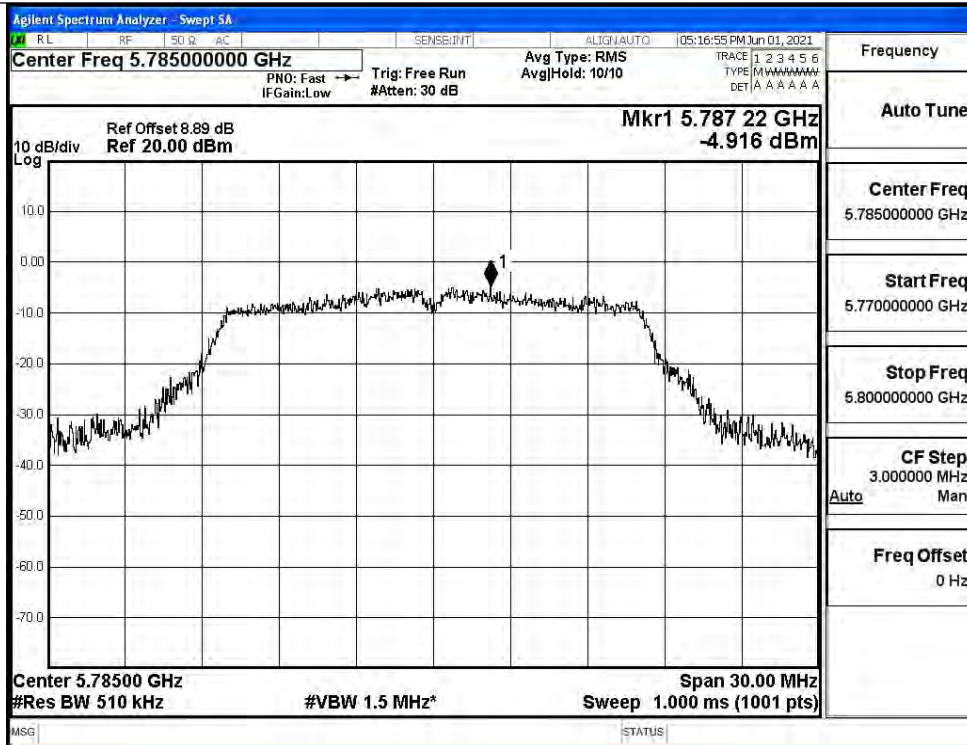
| Test Mode   | Channel | Frequency (MHz) | AVG Conducted Power (dBm) | Duty Cycle Factor(dB) | Report Conducted Power(dBm) | Limit (dBm) | Verdict |
|-------------|---------|-----------------|---------------------------|-----------------------|-----------------------------|-------------|---------|
| 11A         | 149     | 5745            | 6.36                      | 0                     | 6.36                        | 30          | Pass    |
|             | 157     | 5785            | 7.37                      | 0                     | 7.37                        |             | Pass    |
|             | 165     | 5825            | 8.68                      | 0                     | 8.68                        |             | Pass    |
| 11N20 SISO  | 149     | 5745            | 6.26                      | 0                     | 6.26                        | 30          | Pass    |
|             | 157     | 5785            | 6.62                      | 0                     | 6.62                        |             | Pass    |
|             | 165     | 5825            | 7.87                      | 0                     | 7.87                        |             | Pass    |
| 11N40 SISO  | 151     | 5755            | 6.54                      | 0                     | 6.54                        | 30          | Pass    |
|             | 159     | 5795            | 7.21                      | 0                     | 7.21                        |             | Pass    |
| 11AC20 SISO | 149     | 5745            | 9.76                      | 0                     | 9.76                        | 30          | Pass    |
|             | 157     | 5785            | 10.12                     | 0                     | 10.12                       |             | Pass    |
|             | 165     | 5825            | 9.13                      | 0                     | 9.13                        |             | Pass    |
| 11AC40 SISO | 151     | 5755            | 10.08                     | 0                     | 10.08                       | 30          | Pass    |
|             | 159     | 5795            | 9.41                      | 0                     | 9.41                        |             | Pass    |
| 11AC80 SISO | 155     | 5775            | 7.33                      | 0                     | 7.33                        | 30          | Pass    |

### B.3 Power Spectral Density

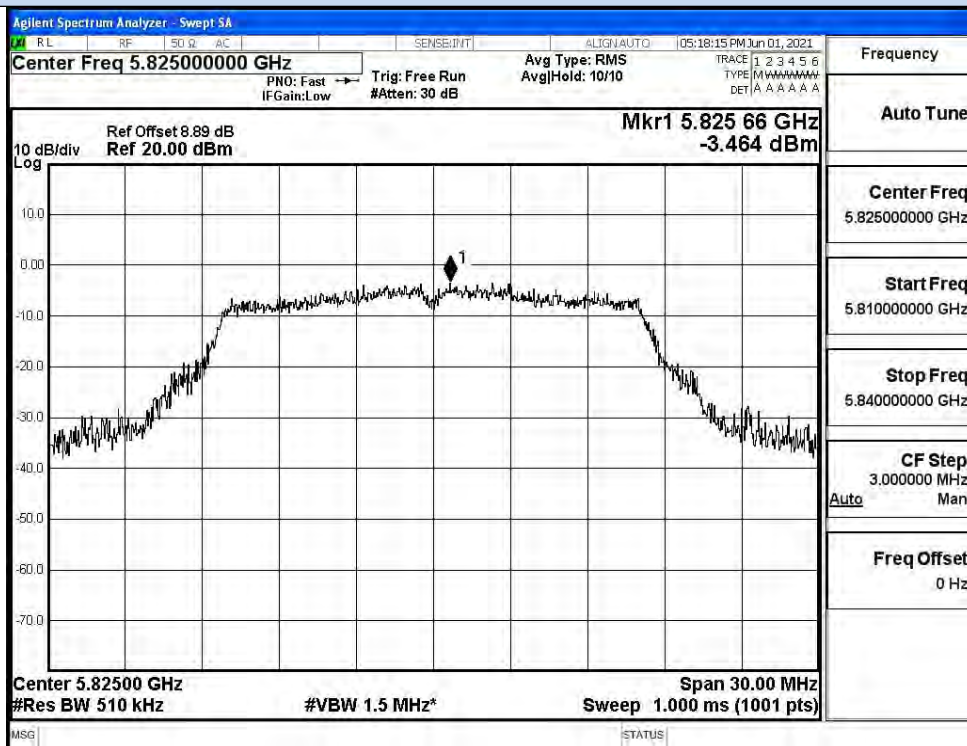
| Test Mode   | Channel | Frequency (MHz) | Power Density (dBm/300KHz) | Duty Cycle Factor (dB) | RBW Factor (dB) | Report Power Density (dBm/500KHz) | Limit (dBm/500KHz) | Verdict |
|-------------|---------|-----------------|----------------------------|------------------------|-----------------|-----------------------------------|--------------------|---------|
| 11A         | 149     | 5745            | -7.55                      | 0                      | 2.218           | -5.33                             | 30                 | Pass    |
|             | 157     | 5785            | -4.92                      | 0                      | 2.218           | -2.70                             |                    | Pass    |
|             | 165     | 5825            | -3.46                      | 0                      | 2.218           | -1.24                             |                    | Pass    |
| 11N20 SISO  | 149     | 5745            | -6.15                      | 0                      | 2.218           | -3.93                             | 30                 | Pass    |
|             | 157     | 5785            | -5.44                      | 0                      | 2.218           | -3.22                             |                    | Pass    |
|             | 165     | 5825            | -4.53                      | 0                      | 2.218           | -2.31                             |                    | Pass    |
| 11N40 SISO  | 151     | 5755            | -9.19                      | 0                      | 2.218           | -6.97                             | 30                 | Pass    |
|             | 159     | 5795            | -8.76                      | 0                      | 2.218           | -6.54                             |                    | Pass    |
| 11AC20 SISO | 149     | 5745            | -5.51                      | 0                      | 2.218           | -3.29                             | 30                 | Pass    |
|             | 157     | 5785            | -4.98                      | 0                      | 2.218           | -2.76                             |                    | Pass    |
|             | 165     | 5825            | -3.72                      | 0                      | 2.218           | -1.50                             |                    | Pass    |
| 11AC40 SISO | 151     | 5755            | -9.01                      | 0                      | 2.218           | -6.79                             | 30                 | Pass    |
|             | 159     | 5795            | -7.52                      | 0                      | 2.218           | -5.30                             |                    | Pass    |
| 11AC80 SISO | 155     | 5775            | -11.10                     | 0                      | 2.218           | -8.88                             | 30                 | Pass    |

Note: Report conducted PSD = measured conducted PSD + Duty Cycle factor + RBW factor;  
 RBW factor =  $10 \log (500 \text{ KHz} / 300 \text{ KHz}) = 2.218 \text{ dB}$ .



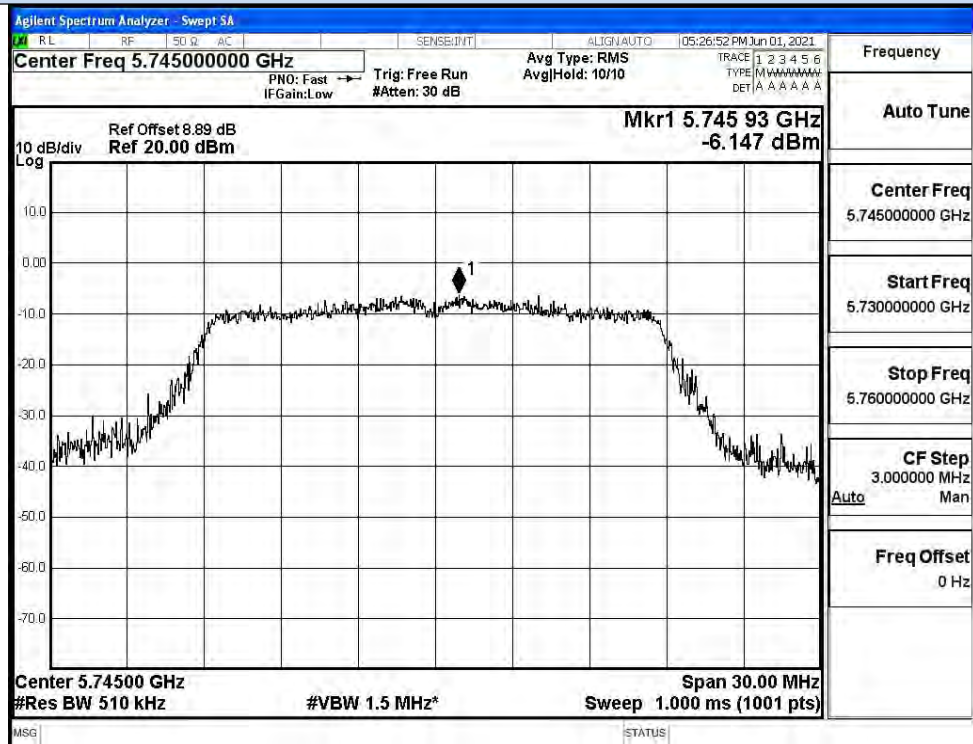


IEEE 802.11na / Channel 157 / 5785MHz

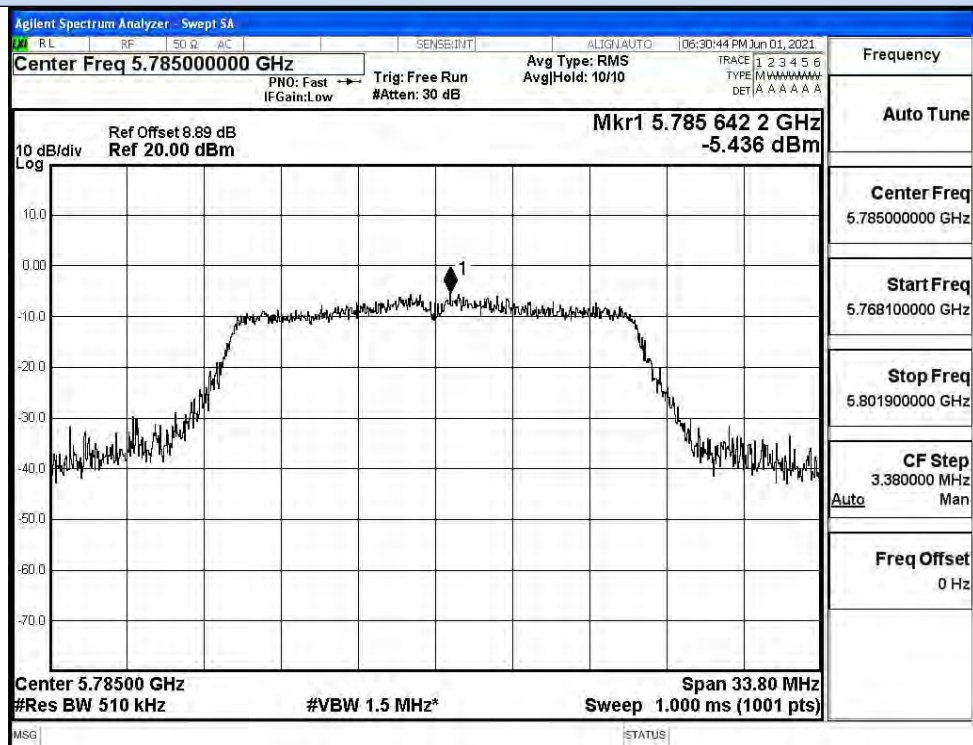


IEEE 802.11na / Channel 165 / 5825MHz

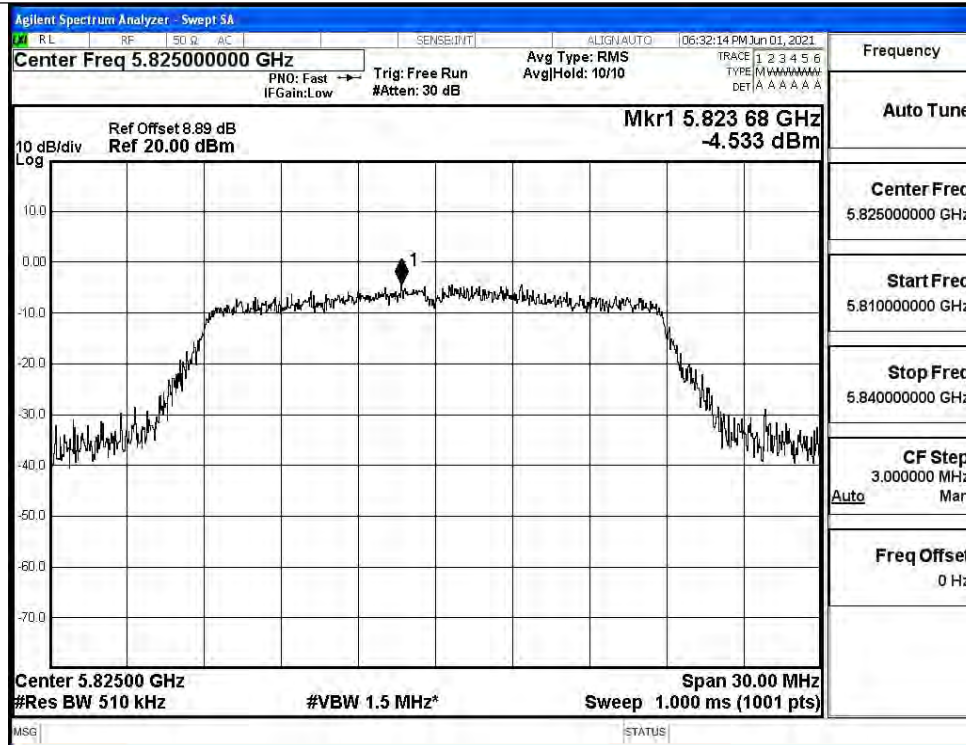
### Power Spectral Density



### IEEE 802.11n20 / Channel 149 / 5745MHz

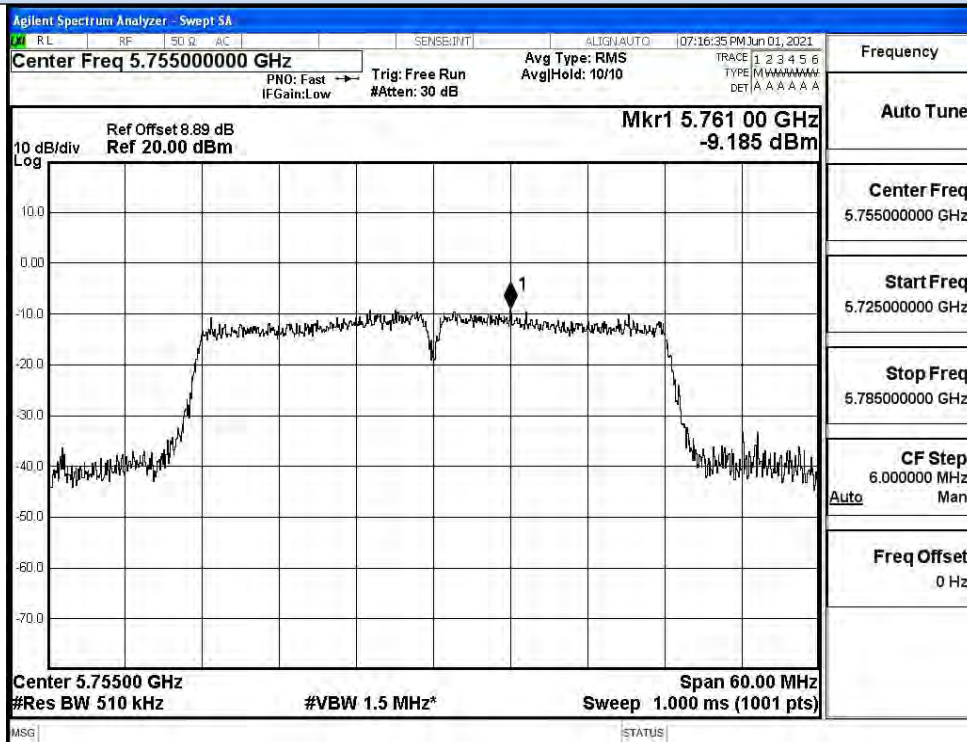


### IEEE 802.11n20 / Channel 157 / 5785MHz

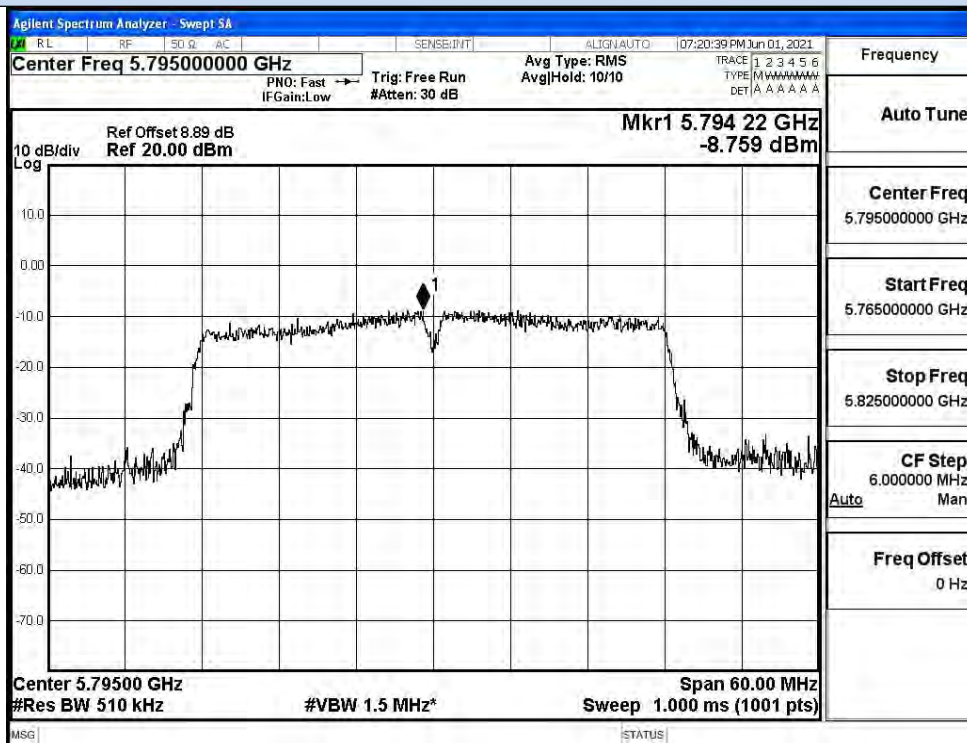


IEEE 802.11n20 / Channel 165 / 5825MHz

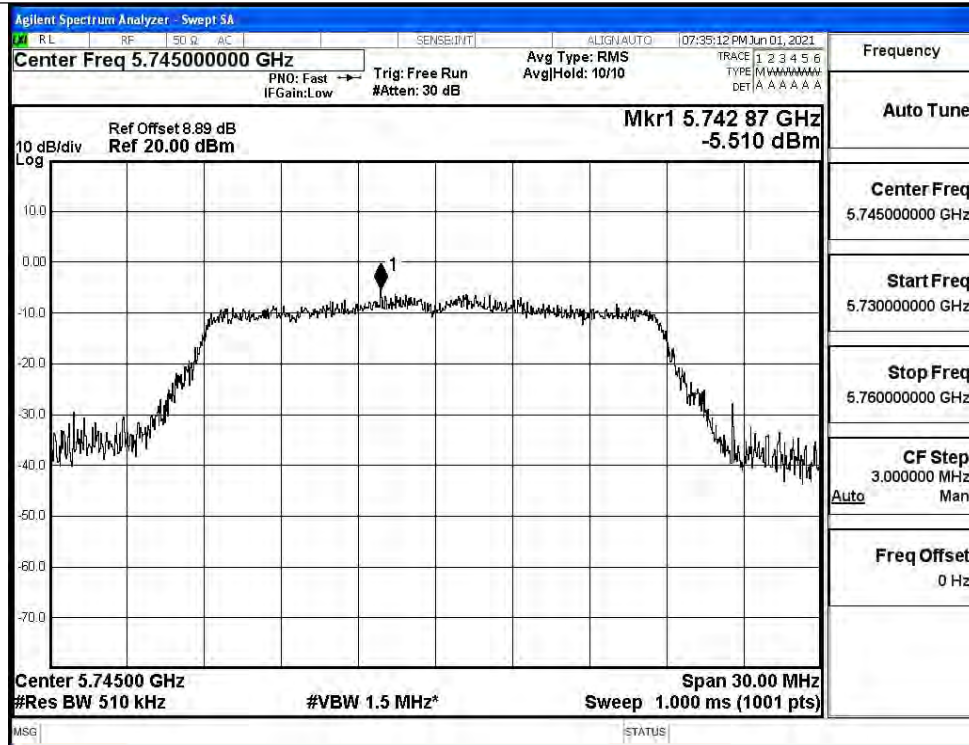
# Power Spectral Density



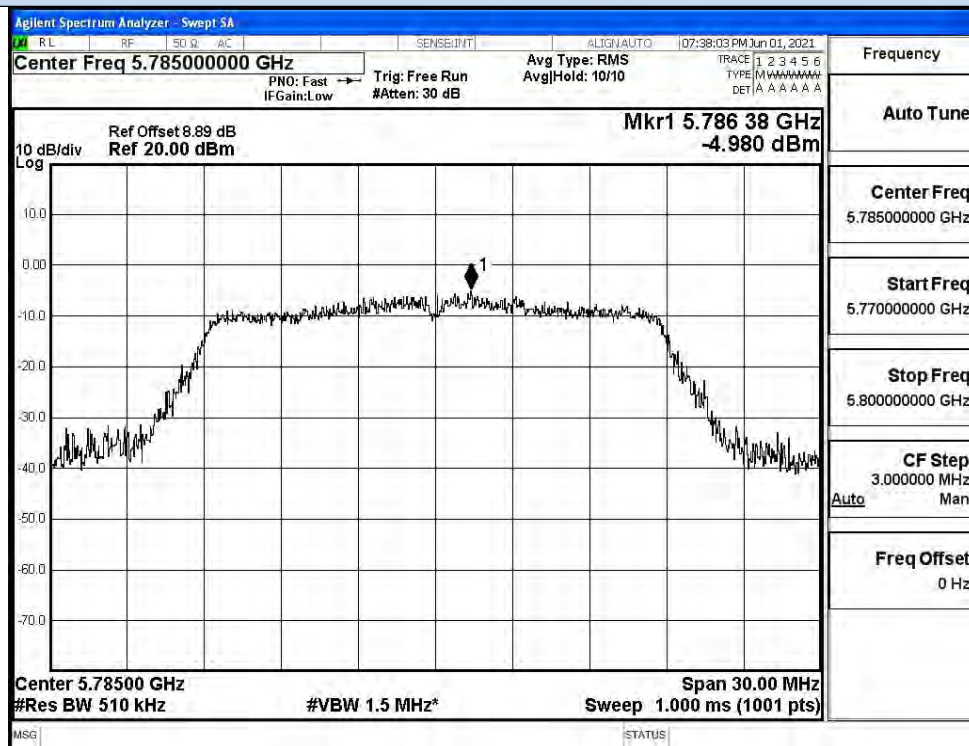
IEEE 802.11n40 / Channel 151 / 5755MHz



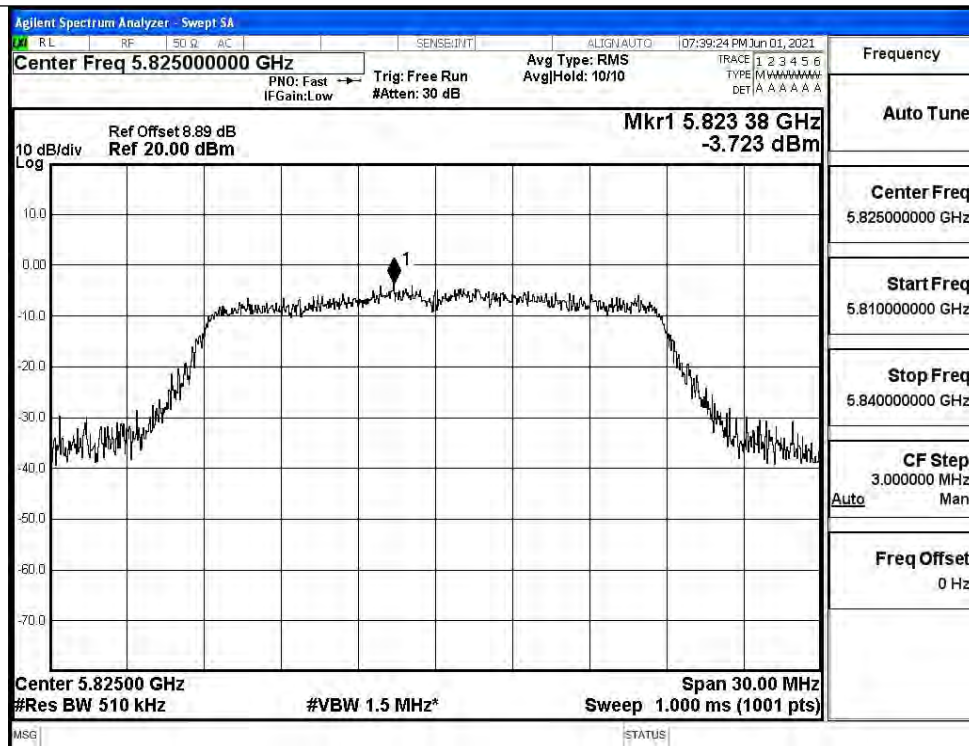
IEEE 802.11n40 / Channel 159 / 5795MHz



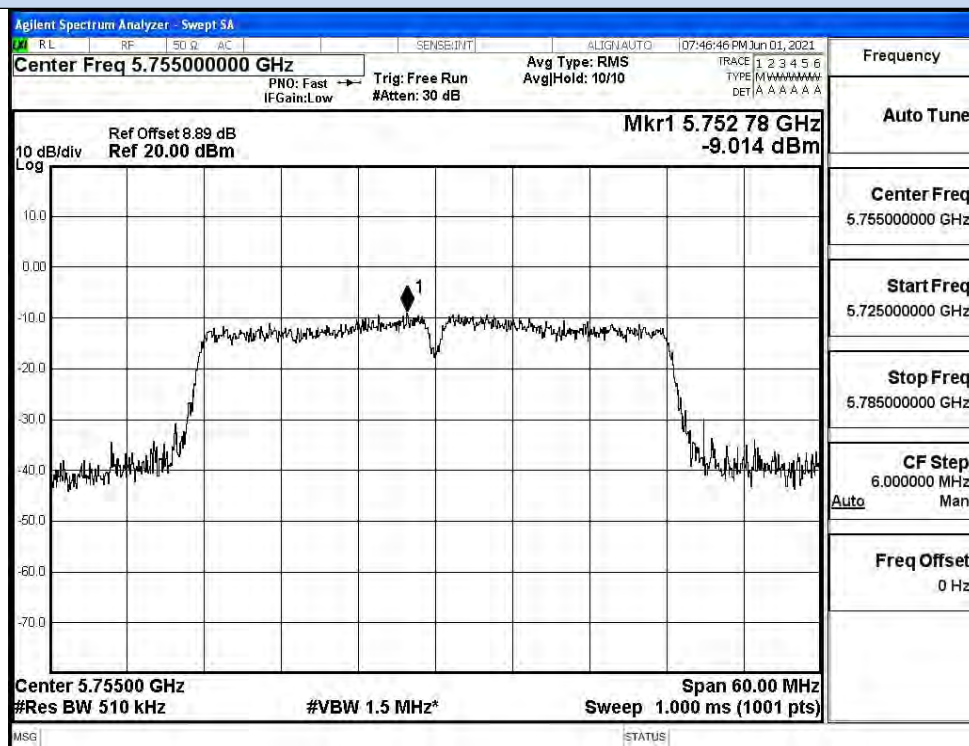
IEEE 802.11ac20 / Channel 149 / 5745MHz



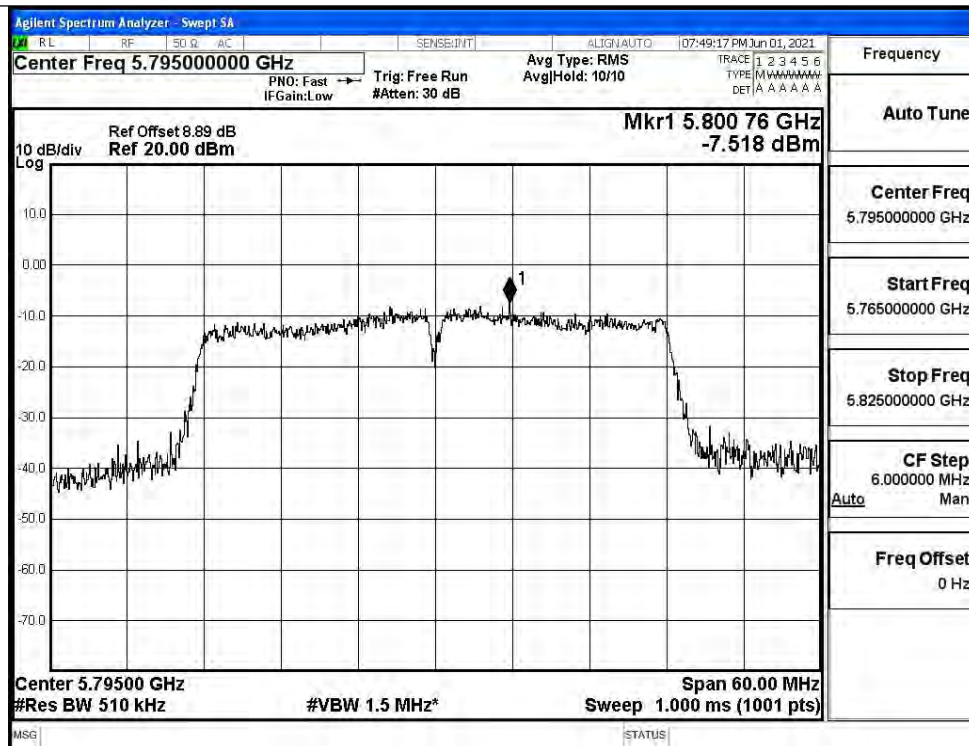
IEEE 802.11ac20 / Channel 157 / 5785MHz



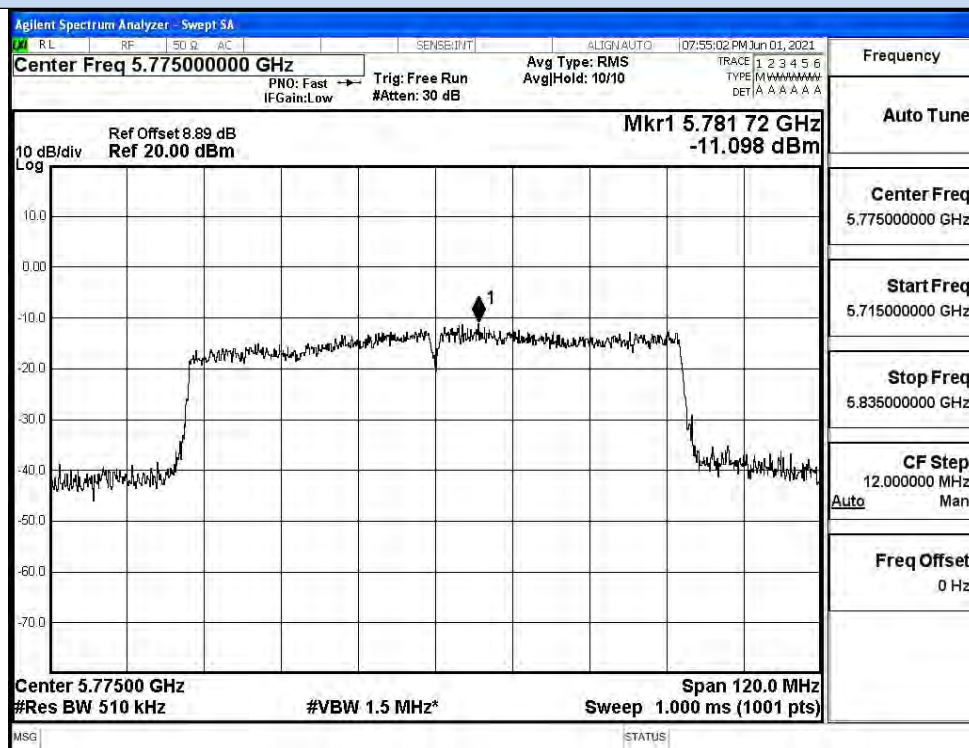
IEEE 802.11ac20 / Channel 165 / 5825MHz



IEEE 802.11ac40 / Channel 151 / 5755MHz



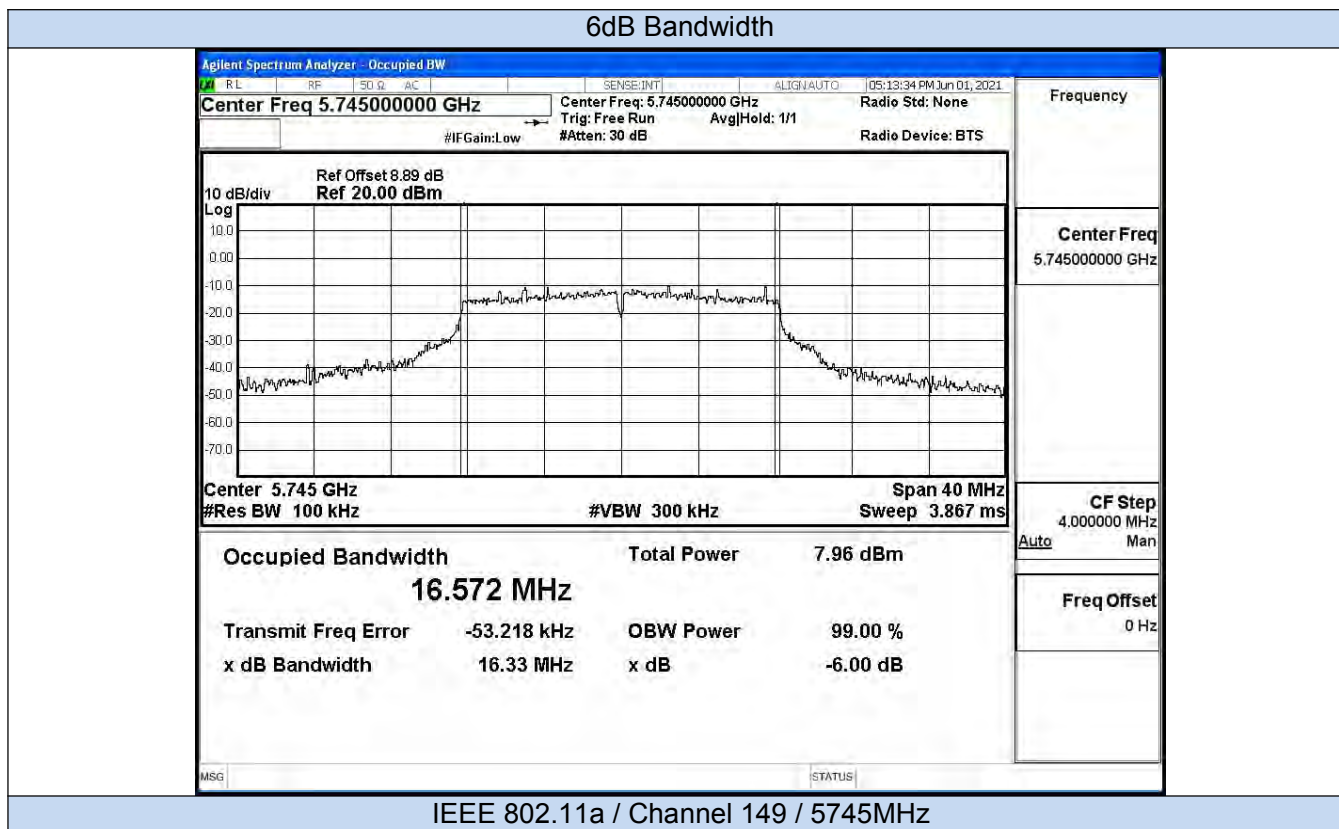
IEEE 802.11ac40 / Channel 159 / 5795MHz

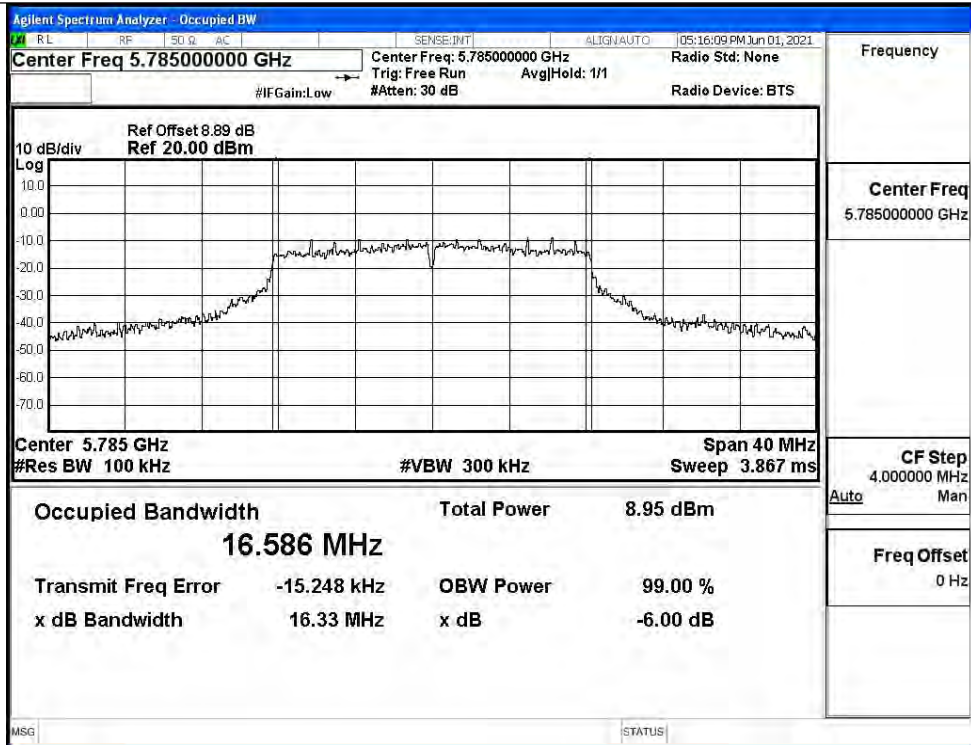


IEEE 802.11ac80 / Channel 155/ 5775MHz

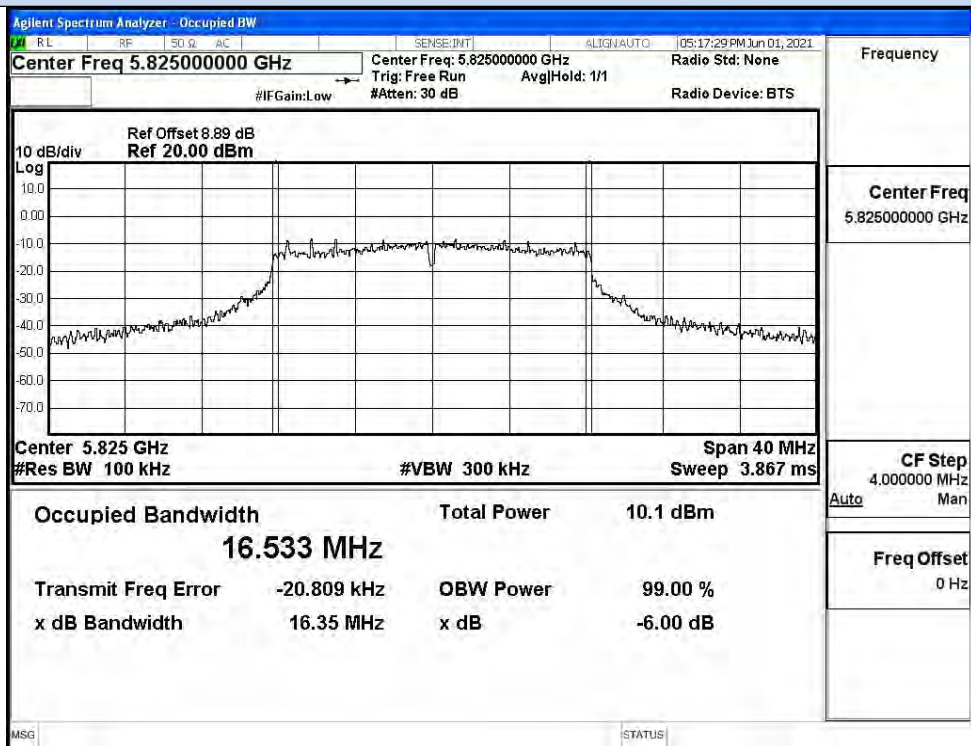
## B.4 Emission Bandwidth

| Test Mode   | Channel | Frequency (MHz) | 6dB Bandwidth (MHz) | Limit (MHz) | Verdict |
|-------------|---------|-----------------|---------------------|-------------|---------|
| 11A         | 149     | 5745            | 16.33               | >=0.5       | Pass    |
|             | 157     | 5785            | 16.33               |             | Pass    |
|             | 165     | 5825            | 16.35               |             | Pass    |
| 11N20 SISO  | 149     | 5745            | 16.73               | >=0.5       | Pass    |
|             | 157     | 5785            | 16.90               |             | Pass    |
|             | 165     | 5825            | 17.36               |             | Pass    |
| 11N40 SISO  | 151     | 5755            | 35.67               | >=0.5       | Pass    |
|             | 159     | 5795            | 35.53               |             | Pass    |
| 11AC20S ISO | 149     | 5745            | 17.28               | >=0.5       | Pass    |
|             | 157     | 5785            | 16.95               |             | Pass    |
|             | 165     | 5825            | 17.08               |             | Pass    |
| 11AC40S ISO | 151     | 5755            | 35.89               | >=0.5       | Pass    |
|             | 159     | 5795            | 35.77               |             | Pass    |
| 11AC80S ISO | 155     | 5775            | 75.51               | >=0.5       | Pass    |



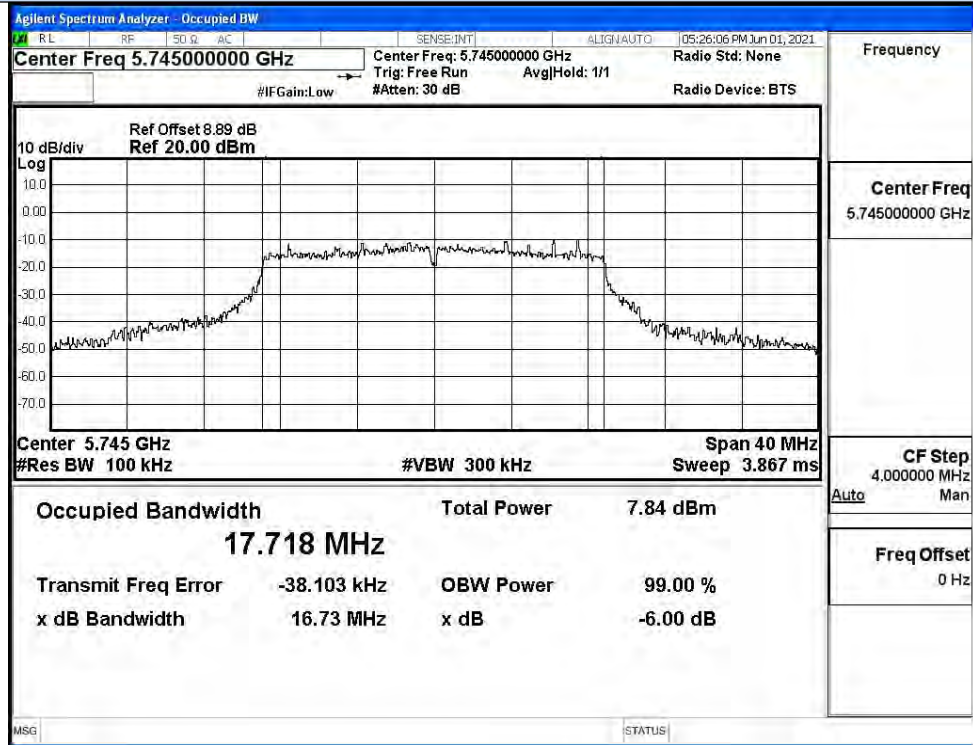


IEEE 802.11a / Channel 157 / 5785MHz

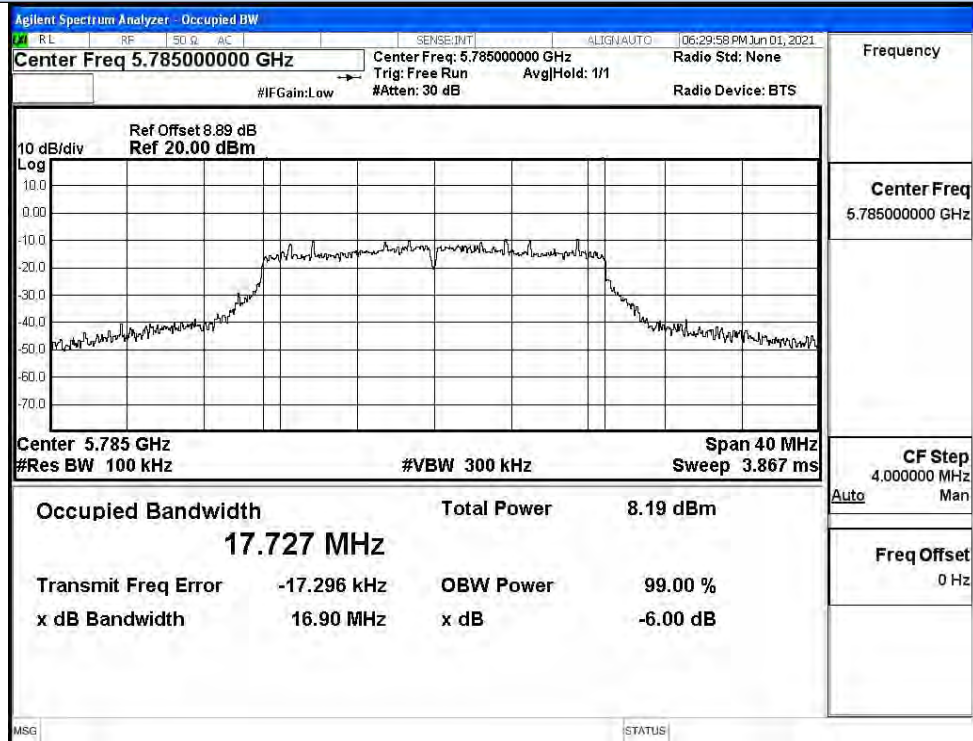


IEEE 802.11a / Channel 165 / 5825MHz

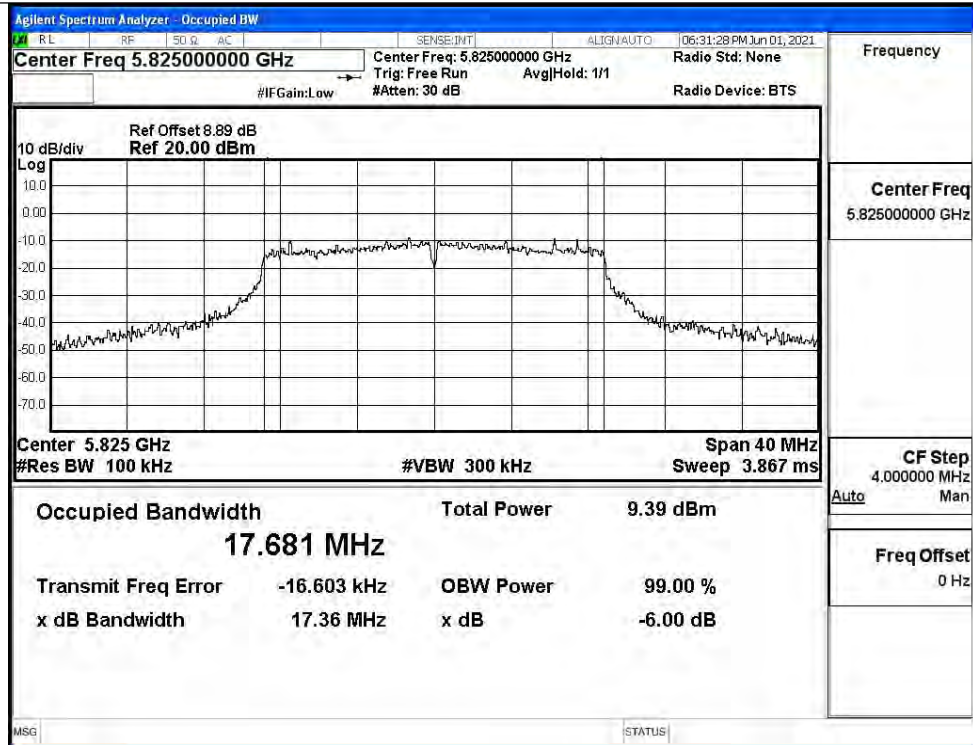
### 6dB Bandwidth



### IEEE 802.11n20 / Channel 149 / 5745MHz

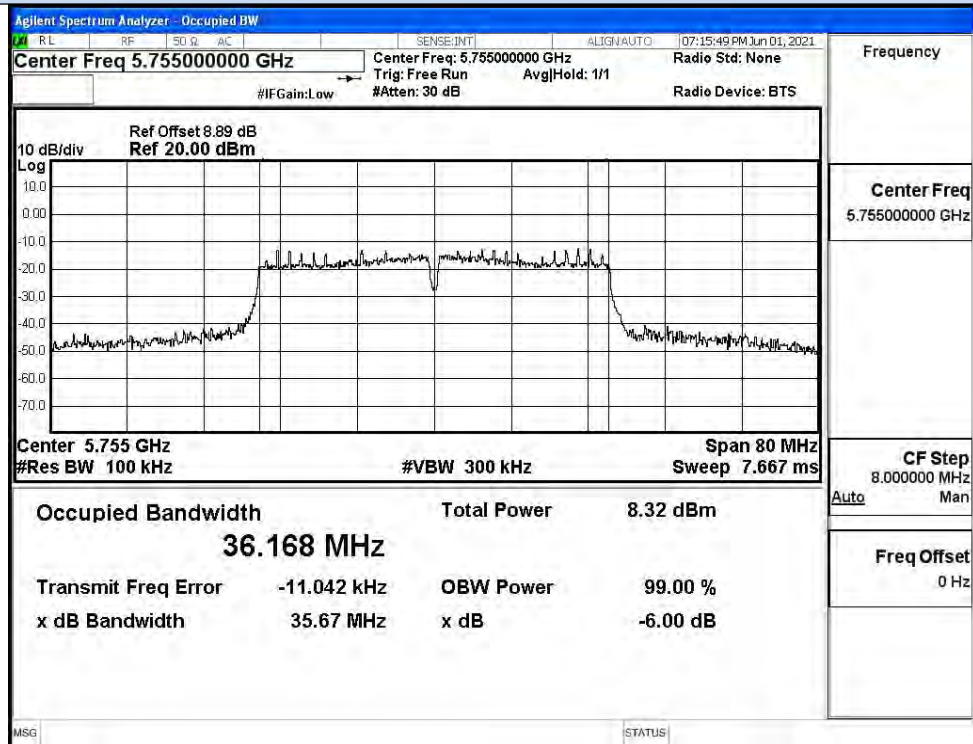


### IEEE 802.11n20 / Channel 157 / 5785MHz

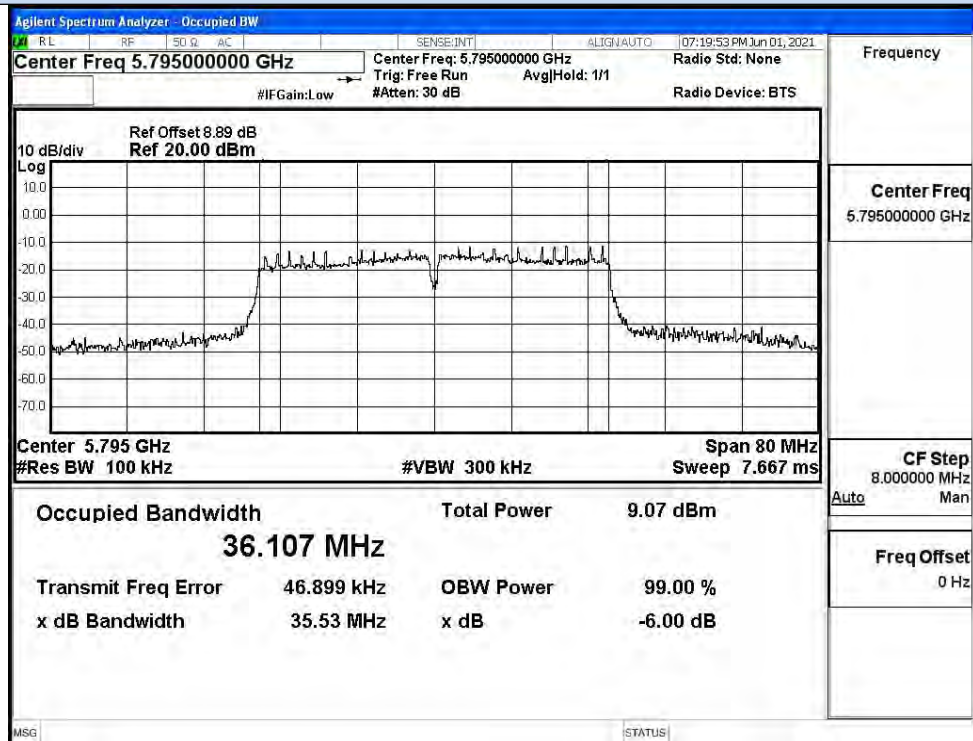


IEEE 802.11n20 / Channel 165 / 5825MHz

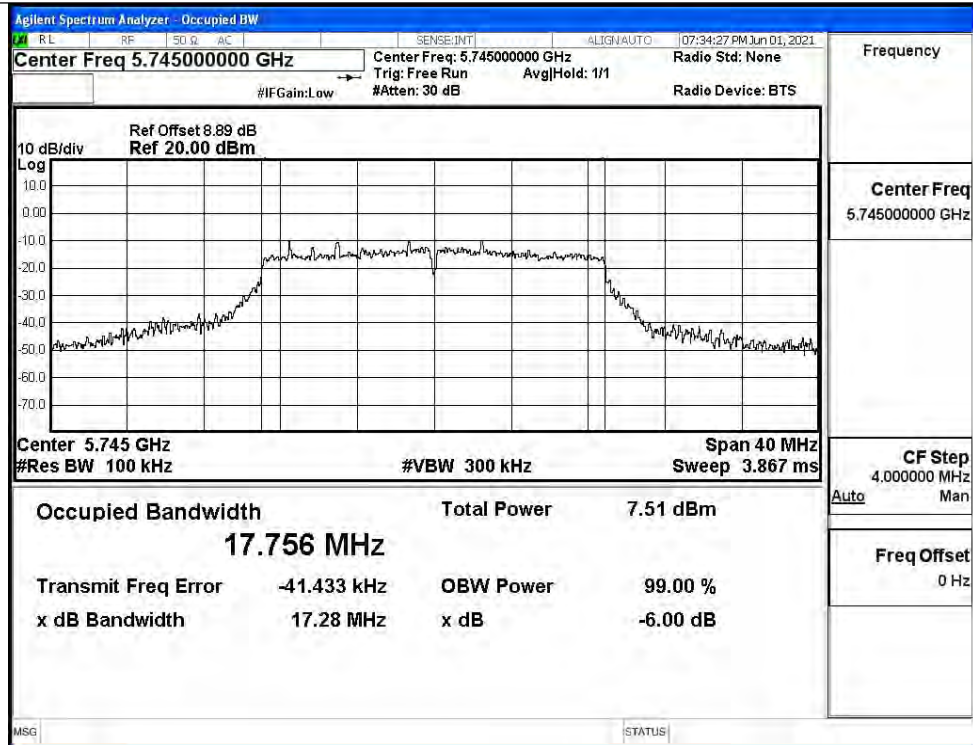
## 26dB Bandwidth



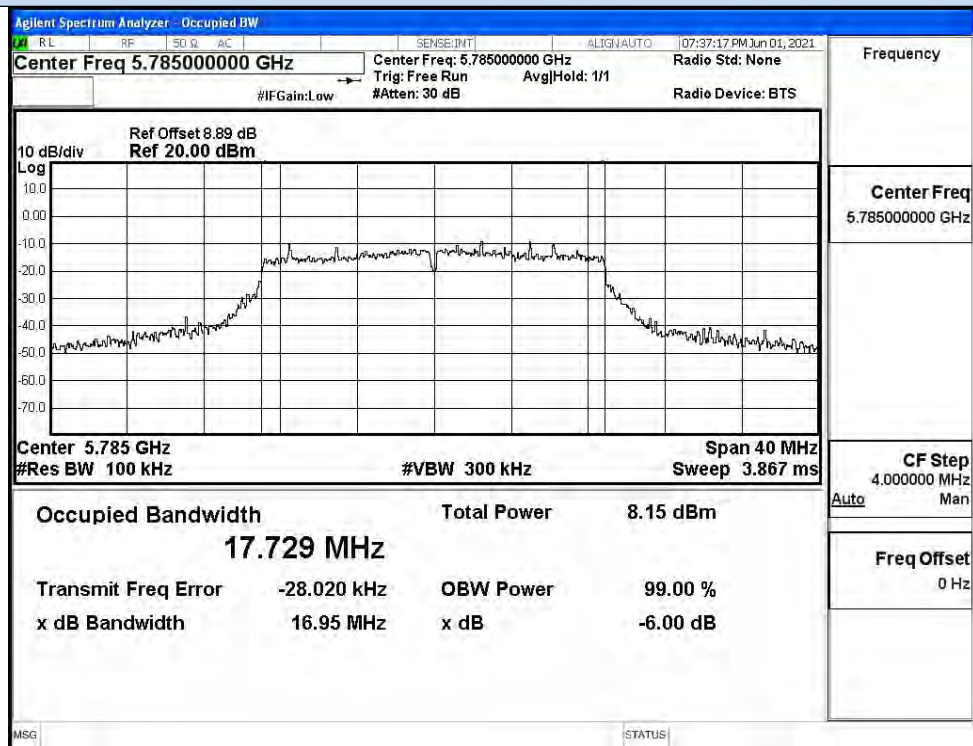
## IEEE 802.11n40 / Channel 151 / 5755MHz



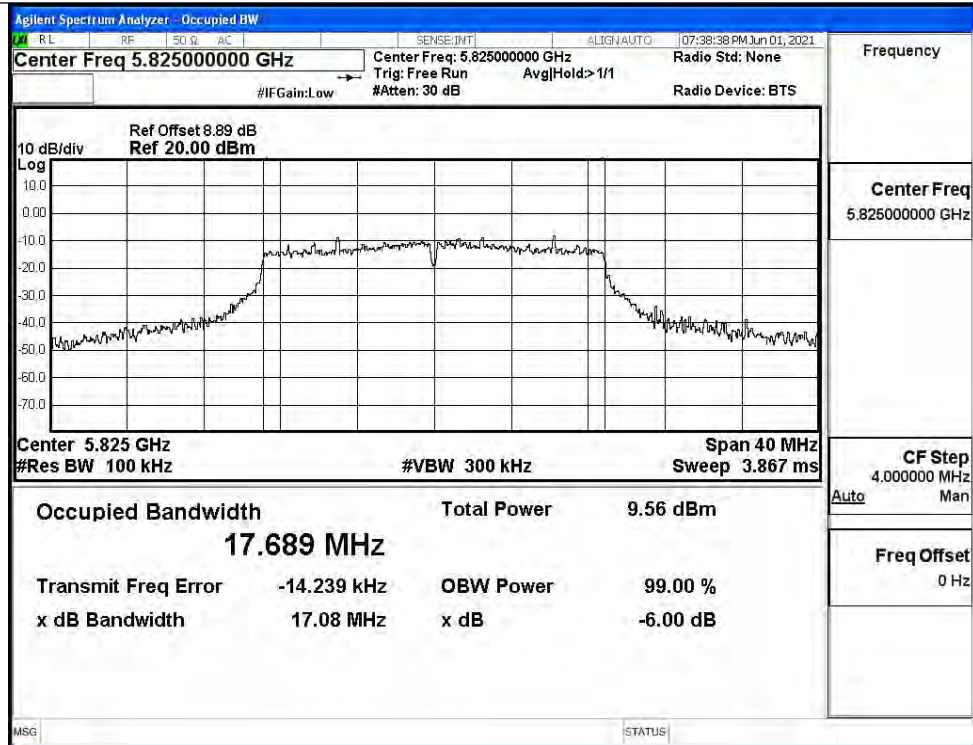
## IEEE 802.11n40 / Channel 159 / 5795MHz



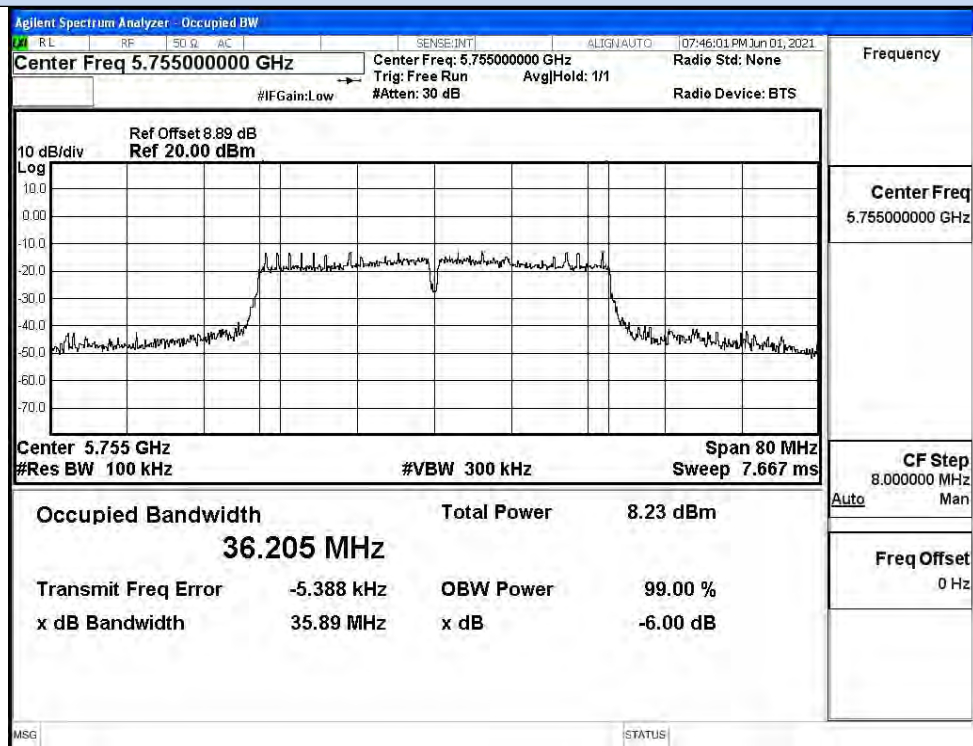
IEEE 802.11ac20 / Channel 149 / 5745MHz



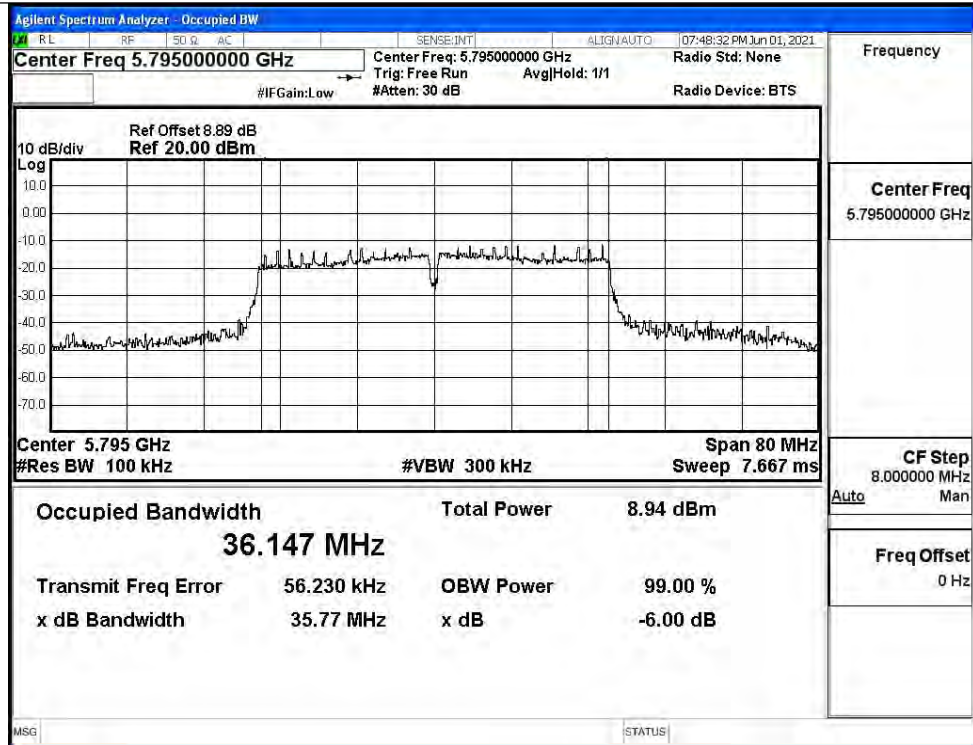
IEEE 802.11ac20 / Channel 157/ 5785MHz



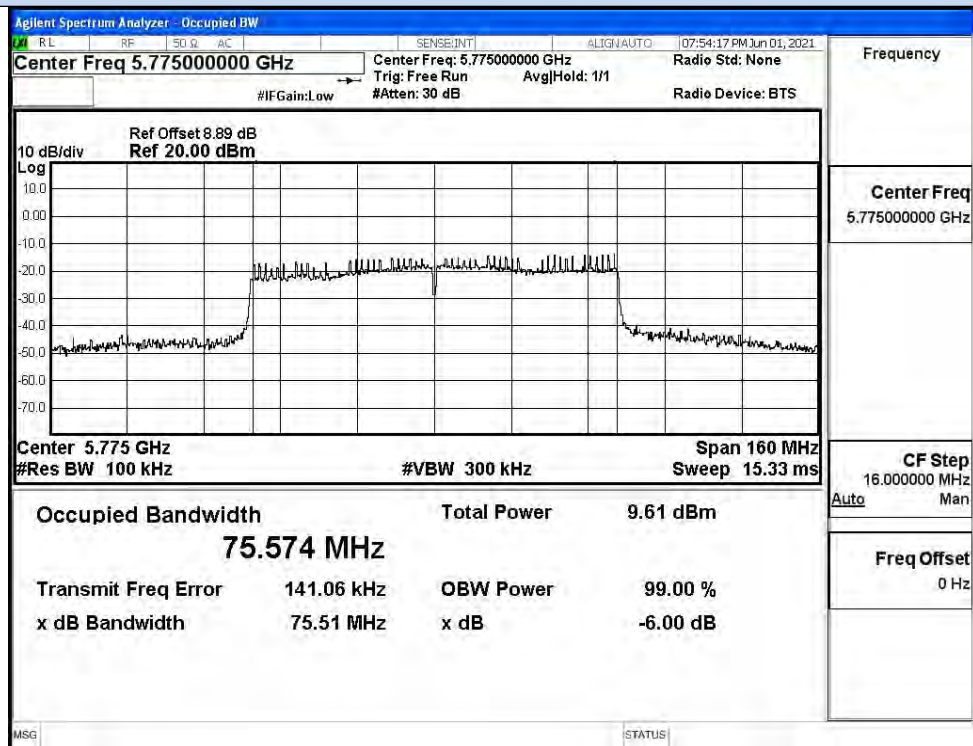
IEEE 802.11ac20 / Channel 165 / 5825MHz



IEEE 802.11ac40 / Channel 151 / 5755MHz



IEEE 802.11ac40 / Channel 159 / 5795MHz



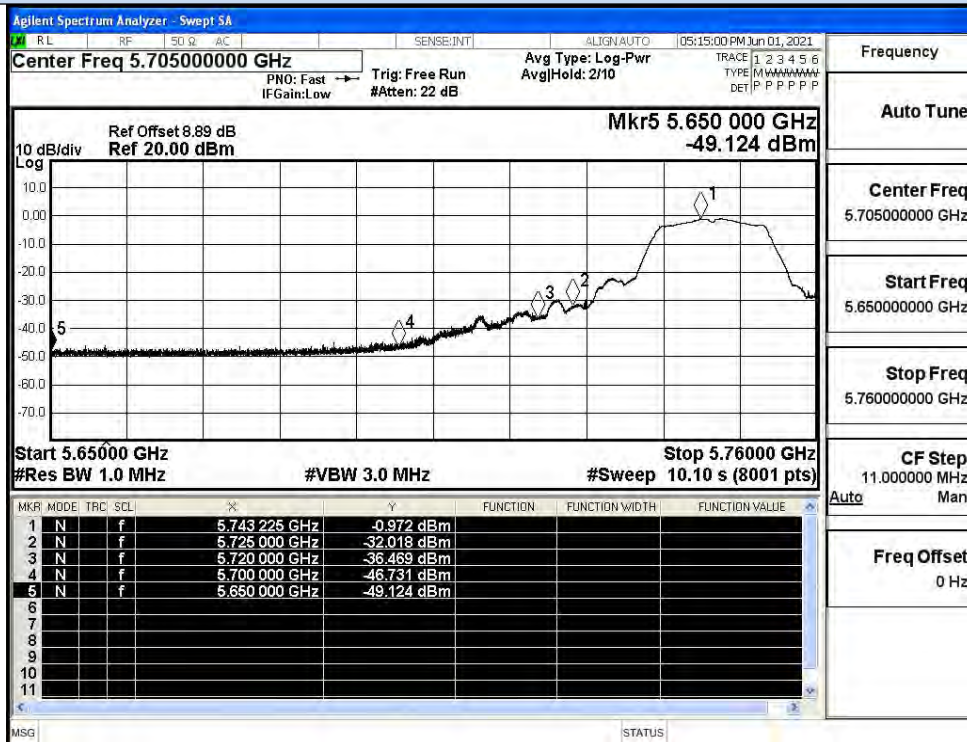
IEEE 802.11ac80 / Channel 155 / 5775MHz

## B.5 Undesirable Emissions Measurement

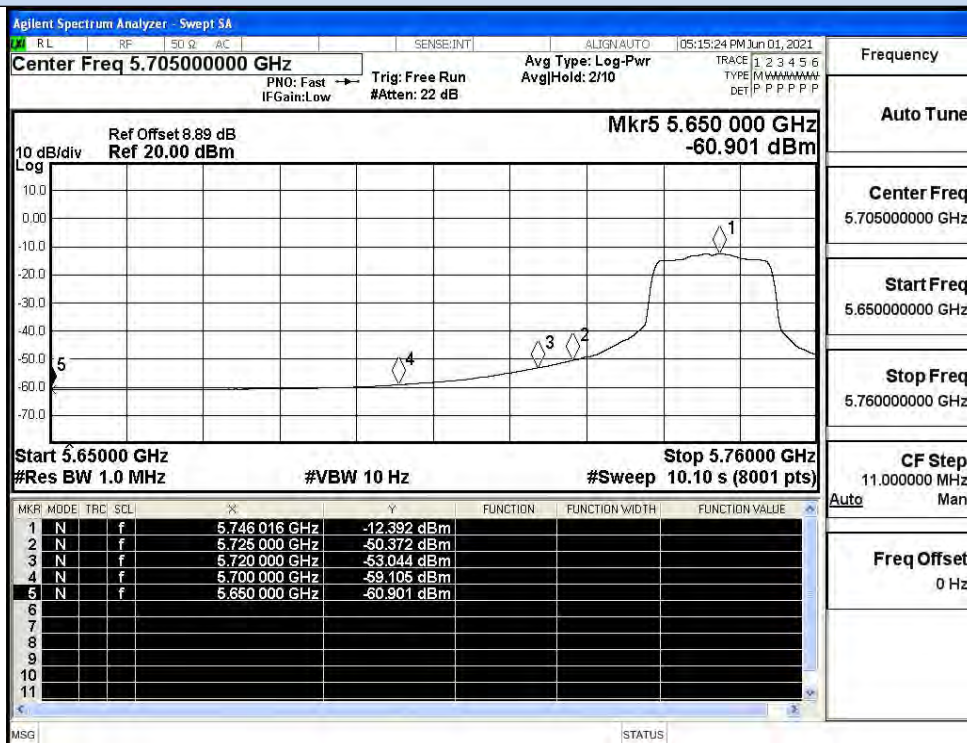
| Test Mode  | Channel | Frequency (MHz) | Conducted Power (dBm) | Antenna Gain (dBi) | EIRP (dBm/MHz) | Detector | Limit (dBm/MHz) | Verdict |
|------------|---------|-----------------|-----------------------|--------------------|----------------|----------|-----------------|---------|
| 11A        | 149     | 5650.0          | -49.12                | 5.00               | -44.12         | Peak     | -27.0           | Pass    |
|            |         | 5650.0          | -60.90                | 5.00               | -55.90         | Average  | -27.0           | Pass    |
|            |         | 5700.0          | -46.73                | 5.00               | -41.73         | Peak     | 10              | Pass    |
|            |         | 5700.0          | -59.11                | 5.00               | -54.11         | Average  | 10              | Pass    |
|            |         | 5720.0          | -36.47                | 5.00               | -31.47         | Peak     | 15.6            | Pass    |
|            |         | 5720.0          | -53.04                | 5.00               | -48.04         | Average  | 15.6            | Pass    |
|            |         | 5725.0          | -32.02                | 5.00               | -27.02         | Peak     | 27.0            | Pass    |
|            |         | 5725.0          | -50.37                | 5.00               | -45.37         | Average  | 27.0            | Pass    |
|            | 165     | 5850.0          | -33.85                | 5.00               | -28.85         | Peak     | 27.0            | Pass    |
|            |         | 5850.0          | -50.66                | 5.00               | -45.66         | Average  | 27.0            | Pass    |
|            |         | 5855.0          | -38.88                | 5.00               | -33.88         | Peak     | 15.6            | Pass    |
|            |         | 5855.0          | -53.11                | 5.00               | -48.11         | Average  | 15.6            | Pass    |
|            |         | 5875.0          | -46.11                | 5.00               | -41.11         | Peak     | 10              | Pass    |
|            |         | 5875.0          | -58.87                | 5.00               | -53.87         | Average  | 10              | Pass    |
|            |         | 5925.0          | -48.47                | 5.00               | -43.47         | Peak     | -27.0           | Pass    |
|            |         | 5925.0          | -60.70                | 5.00               | -55.70         | Average  | -27.0           | Pass    |
| 11N20 SISO | 149     | 5650.0          | -48.75                | 5.00               | -43.75         | Peak     | -27.0           | Pass    |
|            |         | 5650.0          | -60.88                | 5.00               | -55.88         | Average  | -27.0           | Pass    |
|            |         | 5700.0          | -46.32                | 5.00               | -41.32         | Peak     | 10              | Pass    |
|            |         | 5700.0          | -55.03                | 5.00               | -50.03         | Average  | 10              | Pass    |
|            |         | 5720.0          | -36.54                | 5.00               | -31.54         | Peak     | 15.6            | Pass    |
|            |         | 5720.0          | -59.49                | 5.00               | -54.49         | Average  | 15.6            | Pass    |
|            |         | 5725.0          | -35.76                | 5.00               | -30.76         | Peak     | 27.0            | Pass    |
|            |         | 5725.0          | -53.29                | 5.00               | -48.29         | Average  | 27.0            | Pass    |
|            | 165     | 5850.0          | -38.03                | 5.00               | -33.03         | Peak     | 27.0            | Pass    |
|            |         | 5850.0          | -54.14                | 5.00               | -49.14         | Average  | 27.0            | Pass    |
|            |         | 5855.0          | -40.61                | 5.00               | -35.61         | Peak     | 15.6            | Pass    |
|            |         | 5855.0          | -55.88                | 5.00               | -50.88         | Average  | 15.6            | Pass    |
|            |         | 5875.0          | -47.58                | 5.00               | -42.58         | Peak     | 10              | Pass    |
|            |         | 5875.0          | -59.55                | 5.00               | -54.55         | Average  | 10              | Pass    |
|            |         | 5925.0          | -48.16                | 5.00               | -43.16         | Peak     | -27.0           | Pass    |
|            |         | 5925.0          | -60.71                | 5.00               | -55.71         | 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          | -49.18                | 5.00               | -44.18         | Peak     | -27.0           | Pass    |
|              |         | 5650.0          | -60.49                | 5.00               | -55.49         | Average  | -27.0           | Pass    |
|              |         | 5700.0          | -43.57                | 5.00               | -38.57         | Peak     | 10              | Pass    |
|              |         | 5700.0          | -57.14                | 5.00               | -52.14         | Average  | 10              | Pass    |
|              |         | 5720.0          | -35.30                | 5.00               | -30.30         | Peak     | 15.6            | Pass    |
|              |         | 5720.0          | -49.90                | 5.00               | -44.90         | Average  | 15.6            | Pass    |
|              |         | 5725.0          | -31.80                | 5.00               | -26.80         | Peak     | 27.0            | Pass    |
|              |         | 5725.0          | -49.75                | 5.00               | -44.75         | Average  | 27.0            | Pass    |
|              | 159     | 5850.0          | -43.22                | 5.00               | -38.22         | Peak     | 27.0            | Pass    |
|              |         | 5850.0          | -56.67                | 5.00               | -51.67         | Average  | 27.0            | Pass    |
|              |         | 5855.0          | -44.64                | 5.00               | -39.64         | Peak     | 15.6            | Pass    |
|              |         | 5855.0          | -57.22                | 5.00               | -52.22         | Average  | 15.6            | Pass    |
|              |         | 5875.0          | -47.23                | 5.00               | -42.23         | Peak     | 10              | Pass    |
|              |         | 5875.0          | -58.80                | 5.00               | -53.80         | Average  | 10              | Pass    |
|              |         | 5925.0          | -49.31                | 5.00               | -44.31         | Peak     | -27.0           | Pass    |
|              |         | 5925.0          | -60.17                | 5.00               | -55.17         | Average  | -27.0           | Pass    |
| 11AC2 0 SISO | 149     | 5650.0          | -48.70                | 5.00               | -43.70         | Peak     | -27.0           | Pass    |
|              |         | 5650.0          | -60.89                | 5.00               | -55.89         | Average  | -27.0           | Pass    |
|              |         | 5700.0          | -47.52                | 5.00               | -42.52         | Peak     | 10              | Pass    |
|              |         | 5700.0          | -55.23                | 5.00               | -50.23         | Average  | 10              | Pass    |
|              |         | 5720.0          | -37.77                | 5.00               | -32.77         | Peak     | 15.6            | Pass    |
|              |         | 5720.0          | -59.52                | 5.00               | -54.52         | Average  | 15.6            | Pass    |
|              |         | 5725.0          | -27.90                | 5.00               | -22.90         | Peak     | 27.0            | Pass    |
|              |         | 5725.0          | -53.52                | 5.00               | -48.52         | Average  | 27.0            | Pass    |
|              | 165     | 5850.0          | -38.05                | 5.00               | -33.05         | Peak     | 27.0            | Pass    |
|              |         | 5850.0          | -54.37                | 5.00               | -49.37         | Average  | 27.0            | Pass    |
|              |         | 5855.0          | -41.63                | 5.00               | -36.63         | Peak     | 15.6            | Pass    |
|              |         | 5855.0          | -56.13                | 5.00               | -51.13         | Average  | 15.6            | Pass    |
|              |         | 5875.0          | -47.49                | 5.00               | -42.49         | Peak     | 10              | Pass    |
|              |         | 5875.0          | -59.51                | 5.00               | -54.51         | Average  | 10              | Pass    |
|              |         | 5925.0          | -48.68                | 5.00               | -43.68         | Peak     | -27.0           | Pass    |
|              |         | 5925.0          | -60.69                | 5.00               | -55.69         | Average  | -27.0           | Pass    |
| 11AC4 0 SISO | 151     | 5650.0          | -47.94                | 5.00               | -42.94         | Peak     | -27.0           | Pass    |
|              |         | 5650.0          | -60.51                | 5.00               | -55.51         | Average  | -27.0           | Pass    |
|              |         | 5700.0          | -40.41                | 5.00               | -35.41         | Peak     | 10              | Pass    |
|              |         | 5700.0          | -57.13                | 5.00               | -52.13         | Average  | 10              | Pass    |
|              |         | 5720.0          | -34.22                | 5.00               | -29.22         | Peak     | 15.6            | Pass    |
|              |         | 5720.0          | -49.97                | 5.00               | -44.97         | Average  | 15.6            | Pass    |
|              |         | 5725.0          | -32.71                | 5.00               | -27.71         | Peak     | 27.0            | Pass    |
|              |         | 5725.0          | -49.45                | 5.00               | -44.45         | Average  | 27.0            | Pass    |
|              | 159     | 5850.0          | -43.37                | 5.00               | -38.37         | Peak     | 27.0            | Pass    |
|              |         | 5850.0          | -56.77                | 5.00               | -51.77         | Average  | 27.0            | Pass    |
|              |         | 5855.0          | -42.19                | 5.00               | -37.19         | Peak     | 15.6            | Pass    |
|              |         | 5855.0          | -57.27                | 5.00               | -52.27         | Average  | 15.6            | Pass    |
|              |         | 5875.0          | -47.38                | 5.00               | -42.38         | Peak     | 10              | Pass    |
|              |         | 5875.0          | -58.82                | 5.00               | -53.82         | Average  | 10              | Pass    |
|              |         | 5925.0          | -48.34                | 5.00               | -43.34         | Peak     | -27.0           | Pass    |
|              |         | 5925.0          | -60.14                | 5.00               | -55.14         | Average  | -27.0           | Pass    |
| 11AC8 0 SISO | 155     | 5725.0          | -36.47                | 5.00               | -31.47         | Peak     | 27.0            | Pass    |
|              |         | 5720.0          | -37.04                | 5.00               | -32.04         | Peak     | 15.6            | Pass    |
|              |         | 5700.0          | -43.16                | 5.00               | -38.16         | Peak     | 10              | Pass    |
|              |         | 5650.0          | -47.76                | 5.00               | -42.76         | Peak     | -27.0           | Pass    |
|              |         | 5725.0          | -51.04                | 5.00               | -46.04         | Average  | 27.0            | Pass    |
|              |         | 5720.0          | -52.13                | 5.00               | -47.13         | Average  | 15.6            | Pass    |
|              |         | 5700.0          | -55.71                | 5.00               | -50.71         | Average  | 10              | Pass    |
|              |         | 5650.0          | -59.02                | 5.00               | -54.02         | Average  | -27.0           | Pass    |
|              |         | 5850.0          | -36.47                | 5.00               | -31.47         | Peak     | 27.0            | Pass    |
|              |         | 5855.0          | -37.04                | 5.00               | -32.04         | Peak     | 15.6            | Pass    |
|              |         | 5875.0          | -43.16                | 5.00               | -38.16         | Peak     | 10              | Pass    |
|              |         | 5925.0          | -47.76                | 5.00               | -42.76         | Peak     | -27.0           | Pass    |
|              |         | 5850.0          | -51.04                | 5.00               | -46.04         | Average  | 27.0            | Pass    |
|              |         | 5855.0          | -52.13                | 5.00               | -47.13         | Average  | 15.6            | Pass    |
|              |         | 5875.0          | -55.71                | 5.00               | -50.71         | Average  | 10              | Pass    |
|              |         | 5925.0          | -59.02                | 5.00               | -54.02         | Average  | -27.0           | Pass    |

# Undesirable Emissions Measurement

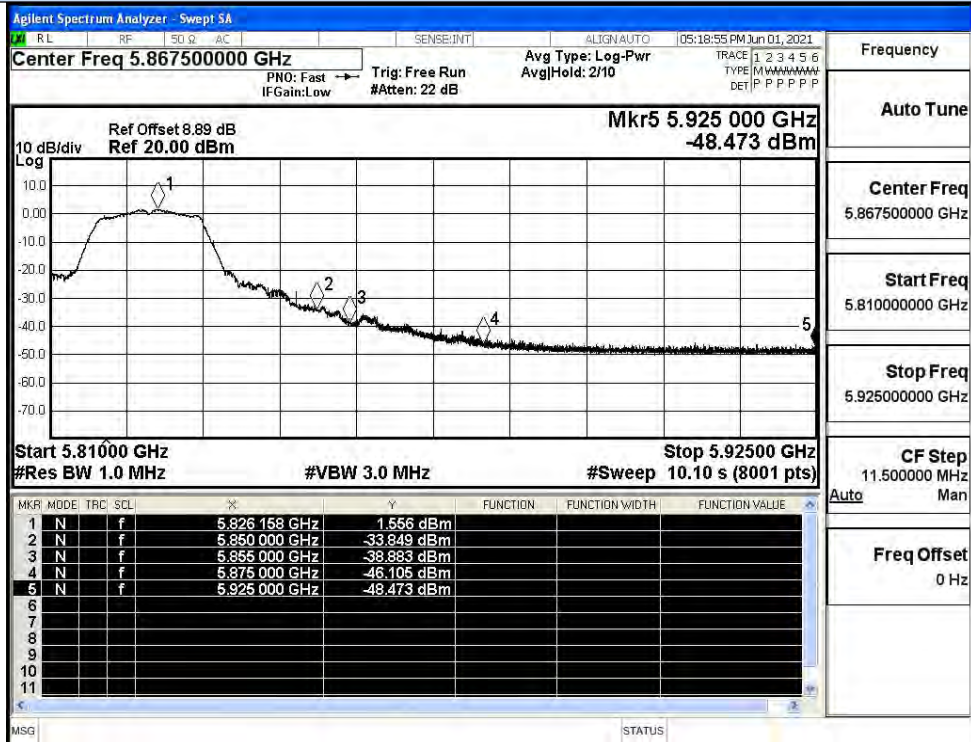


## IEEE 802.11a / Channel 149 / 5745MHz / Peak

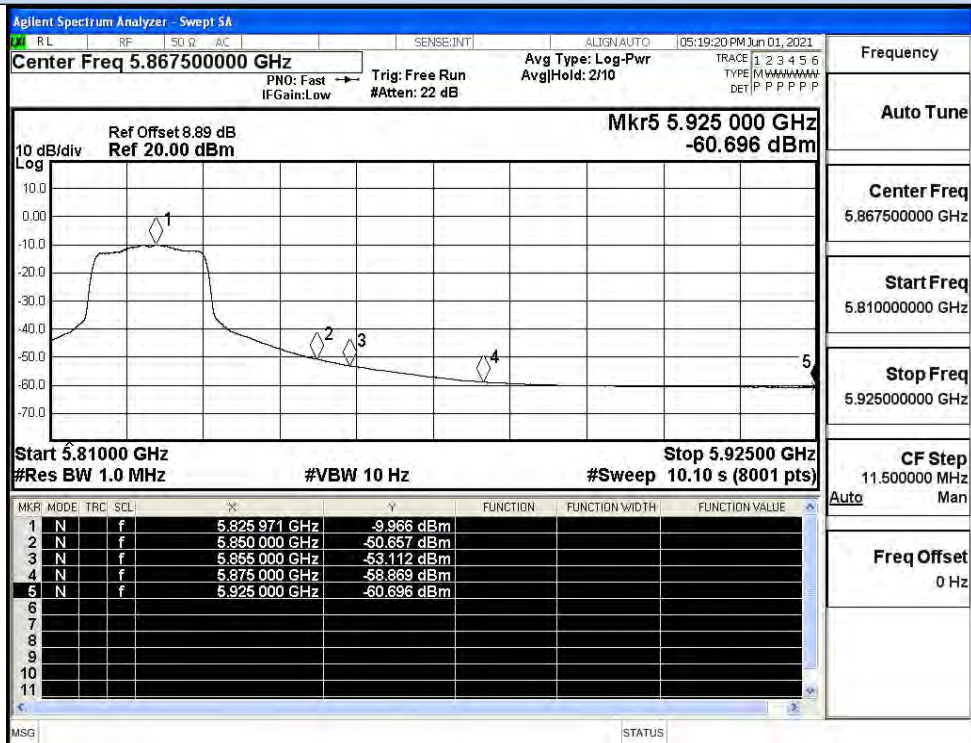


## IEEE 802.11a / Channel 148 / 5745MHz / Average

### Undesirable Emissions Measurement

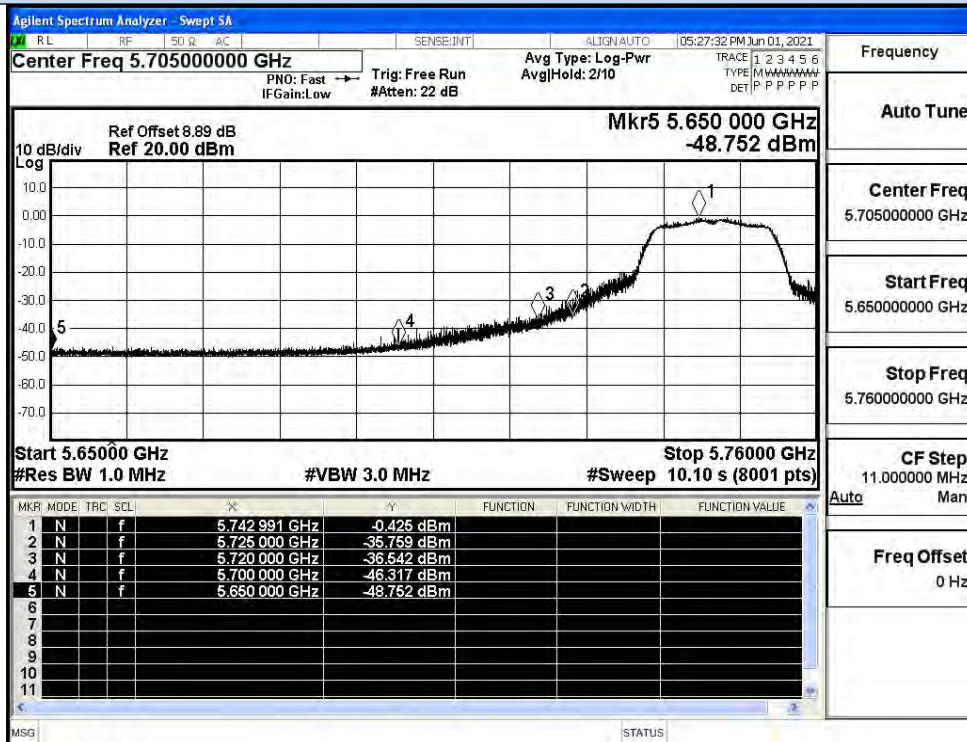


### IEEE 802.11a / Channel 165 / 5825MHz / Peak

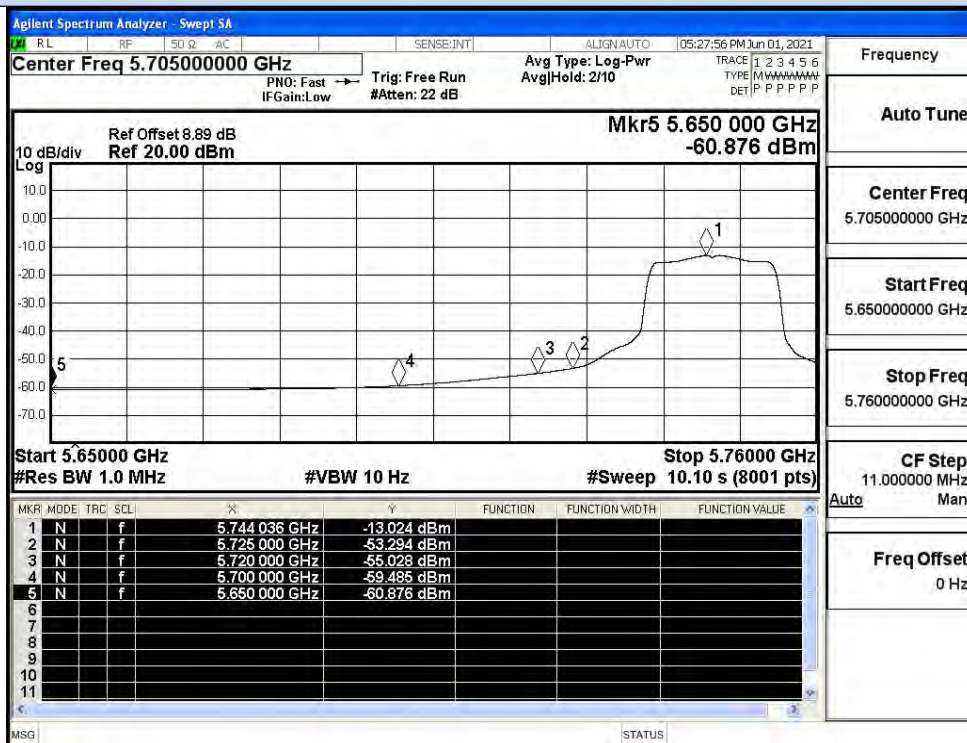


### IEEE 802.11a / Channel 165 / 5825MHz / Average

# Undesirable Emissions Measurement

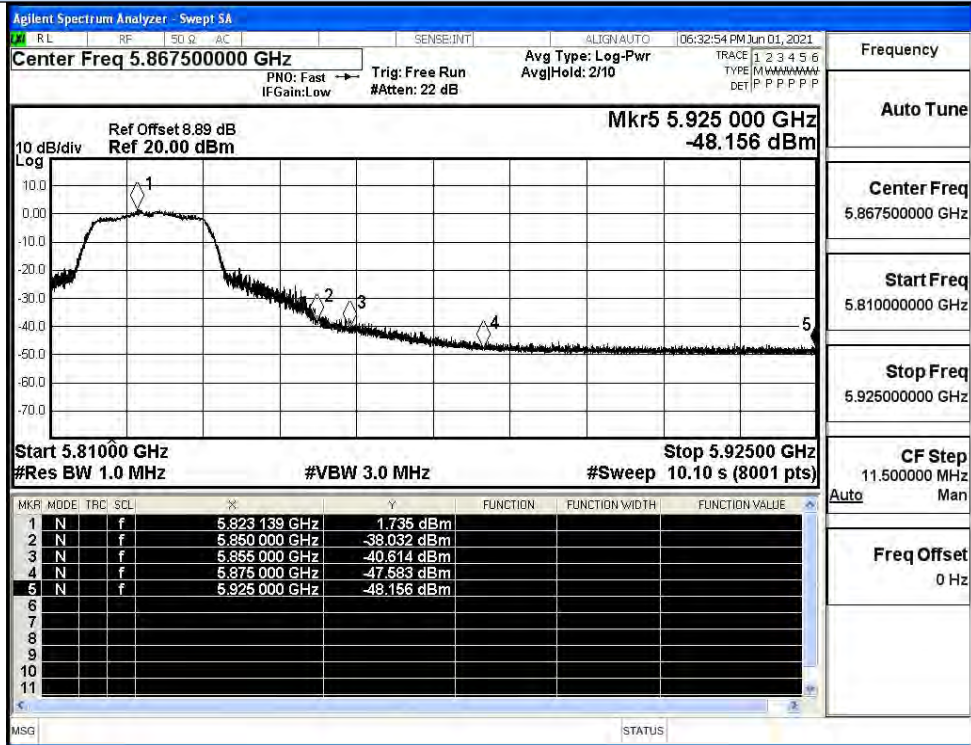


## IEEE 802.11n20 / Channel 149 / 5745MHz / Peak

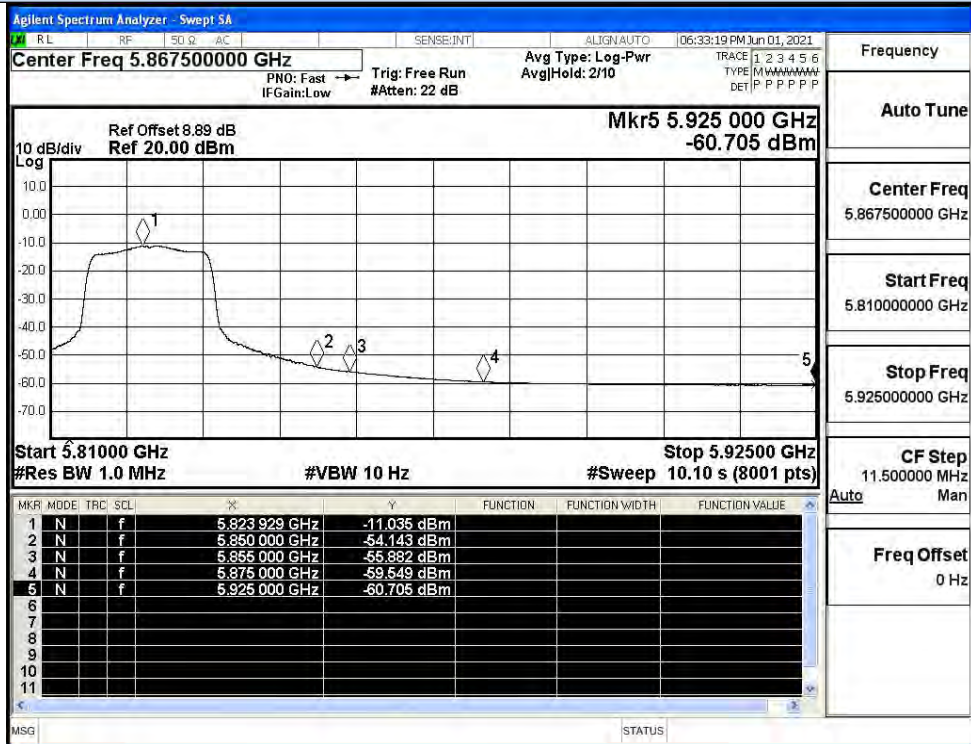


## IEEE 802.11n20 / Channel 149 / 5745MHz / Average

### Undesirable Emissions Measurement

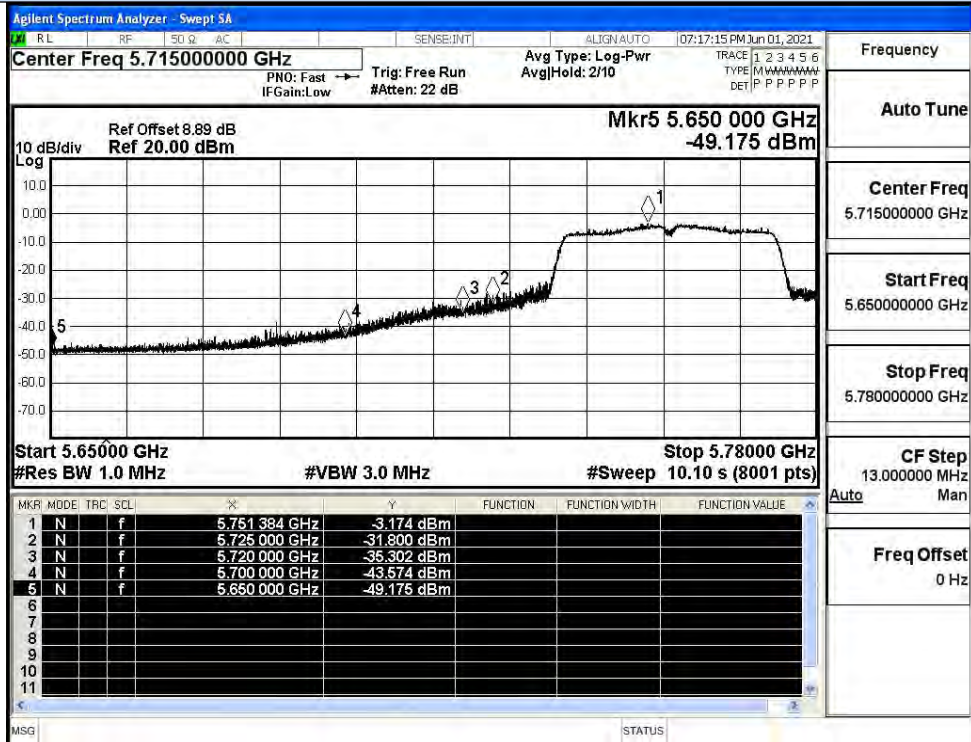


### IEEE 802.11n20 / Channel 165 / 5825MHz / Peak

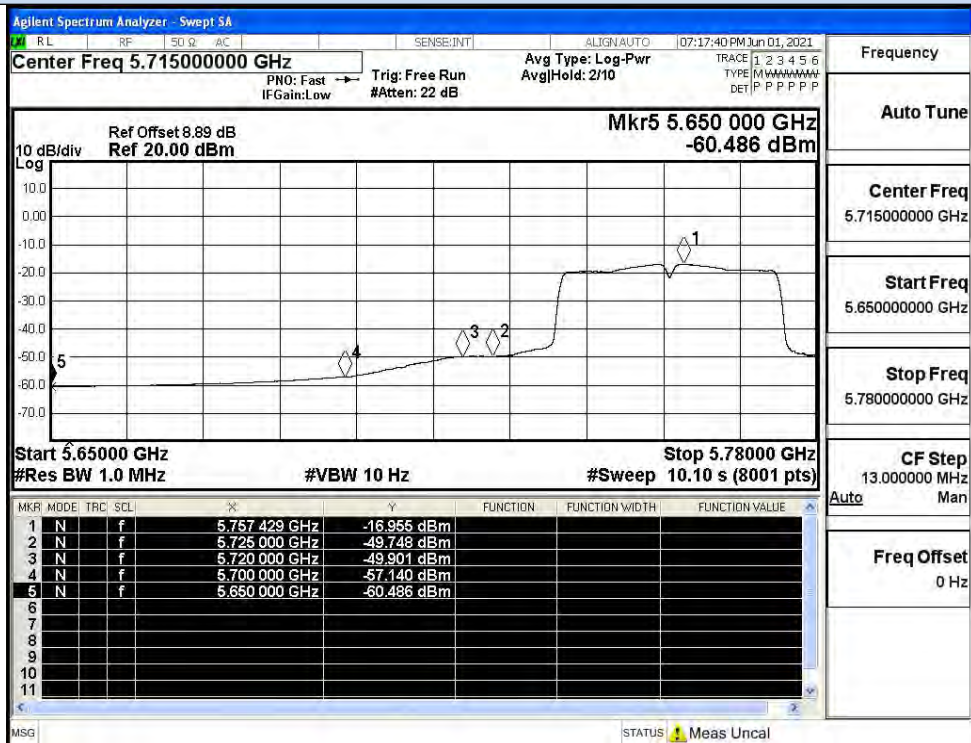


### IEEE 802.11n20 / Channel 165 / 5825MHz / Average

### Undesirable Emissions Measurement

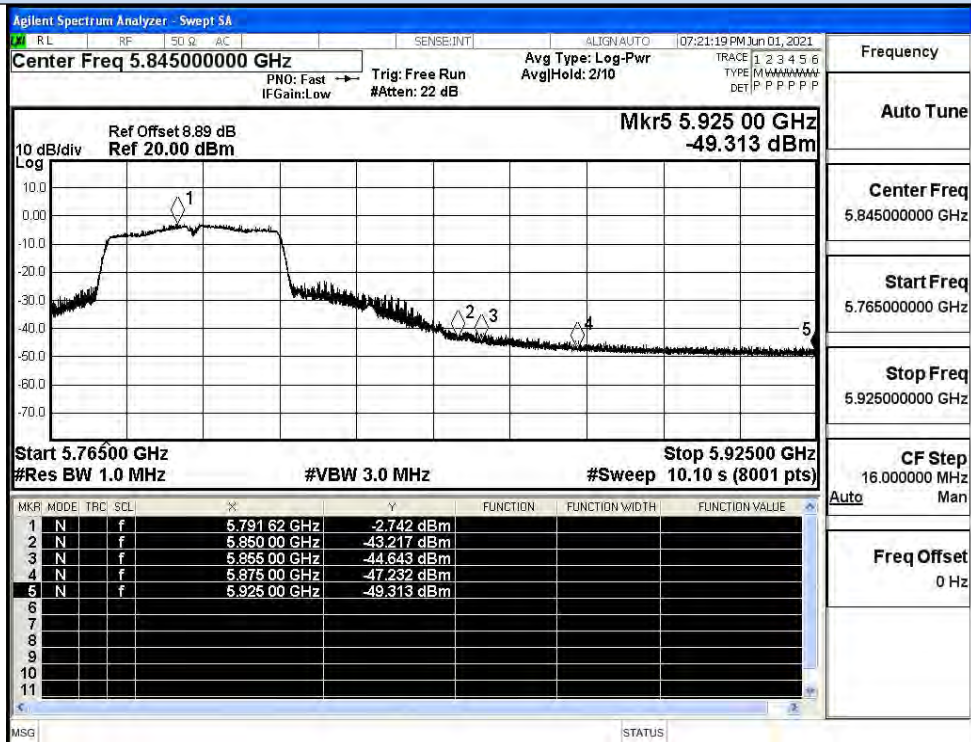


### IEEE 802.11n40 / Channel 151 / 5755MHz / Peak

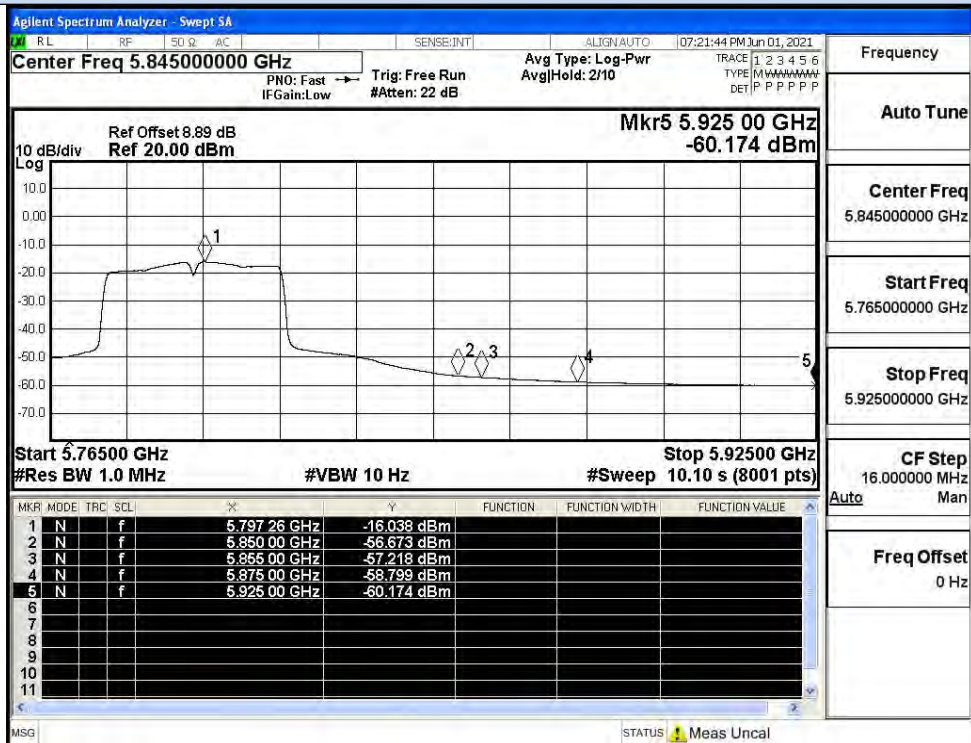


### IEEE 802.11n40 / Channel 151 / 5755MHz / Average

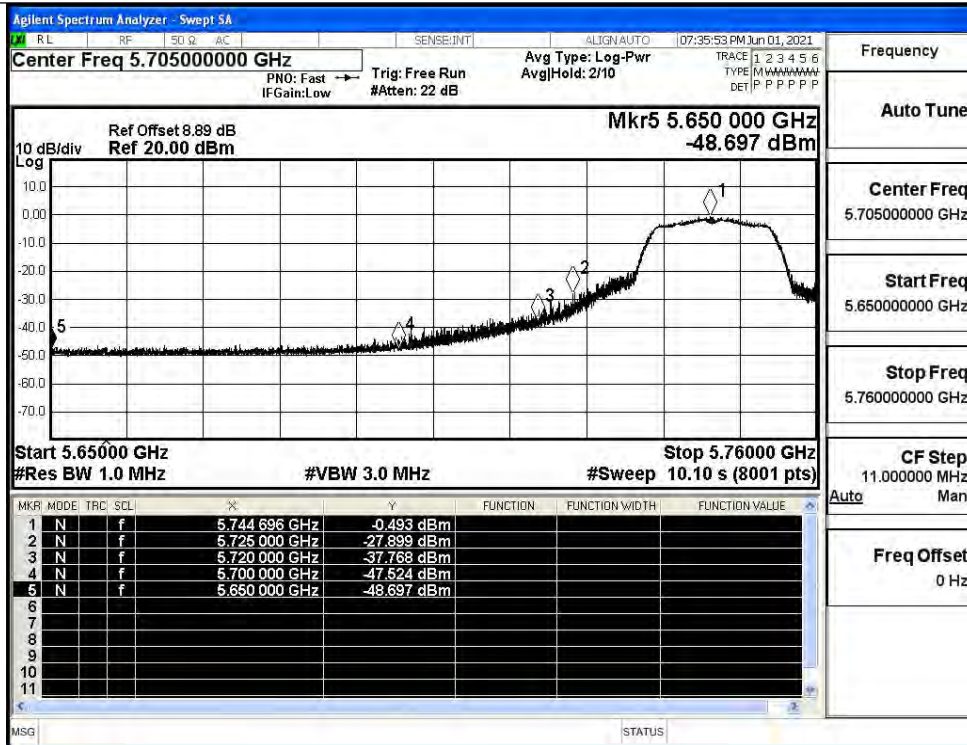
### Undesirable Emissions Measurement



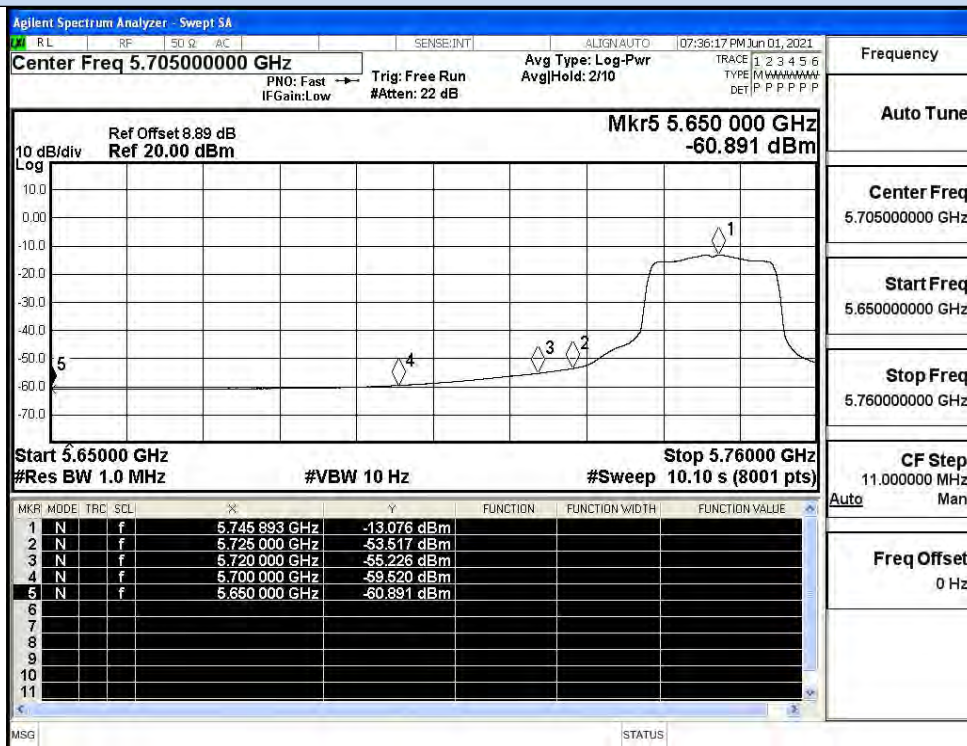
### IEEE 802.11n40 / Channel 159 / 5795MHz / Peak



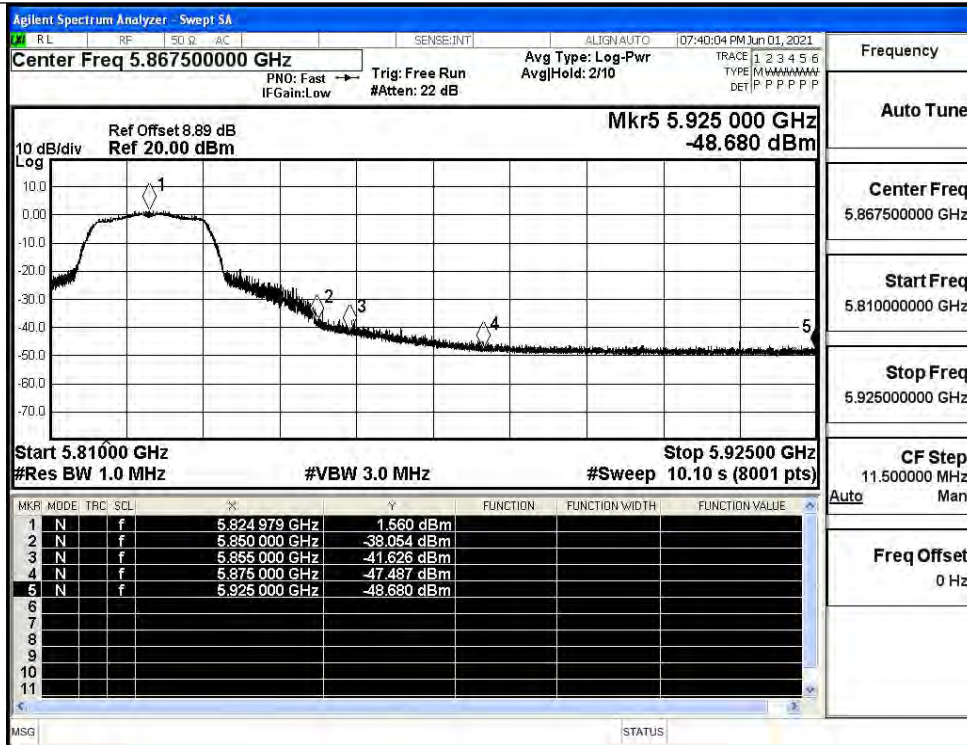
### IEEE 802.11n40 / Channel 159 / 5795MHz / Average



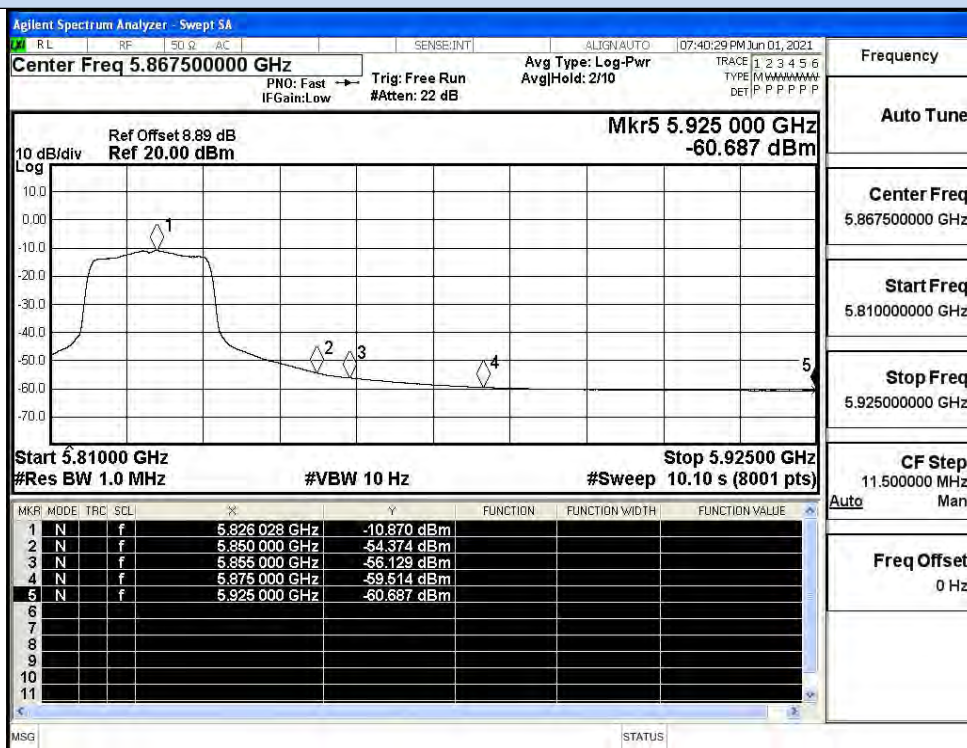
IEEE 802.11ac20 / Channel 149 / 5745MHz / Peak



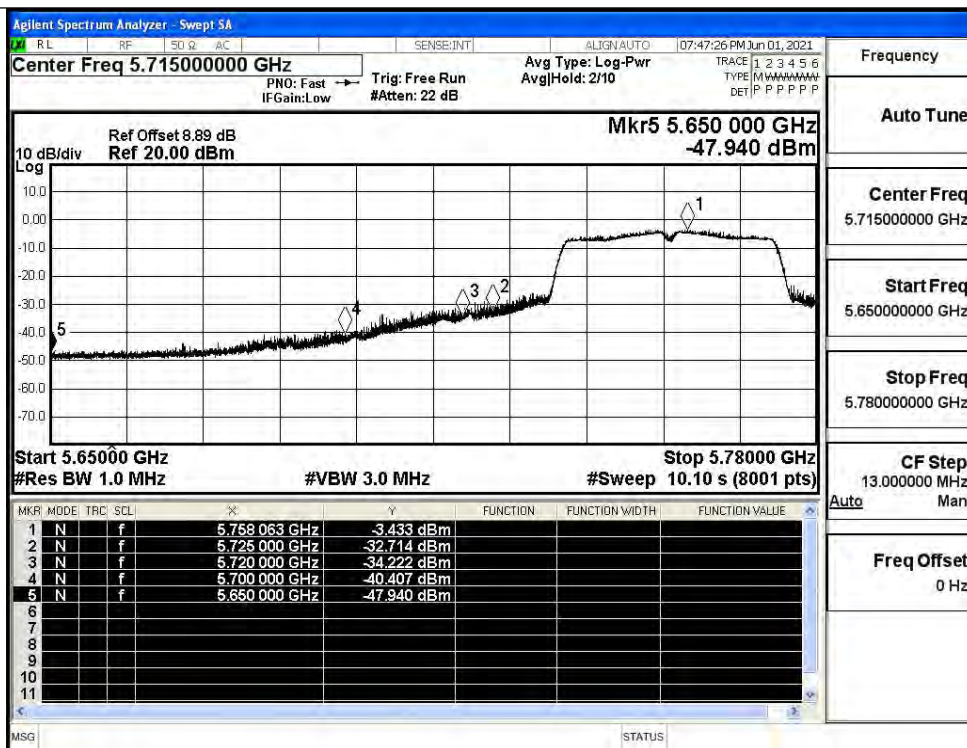
IEEE 802.11ac20 / Channel 149 / 5745MHz / Average



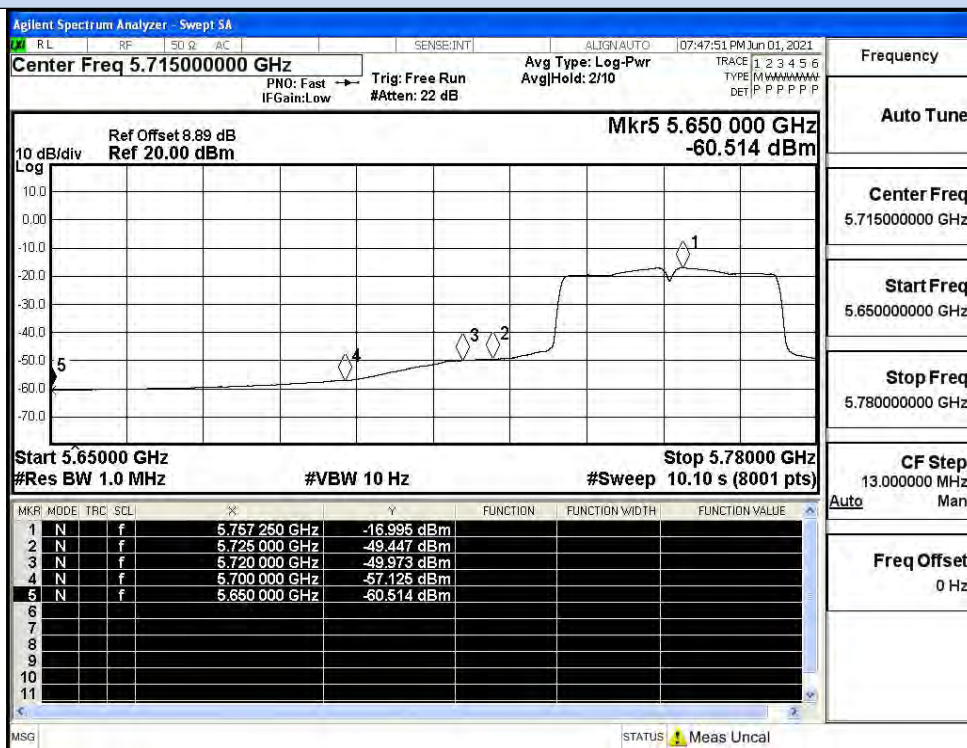
IEEE 802.11ac20 / Channel 165 / 5825MHz / Peak



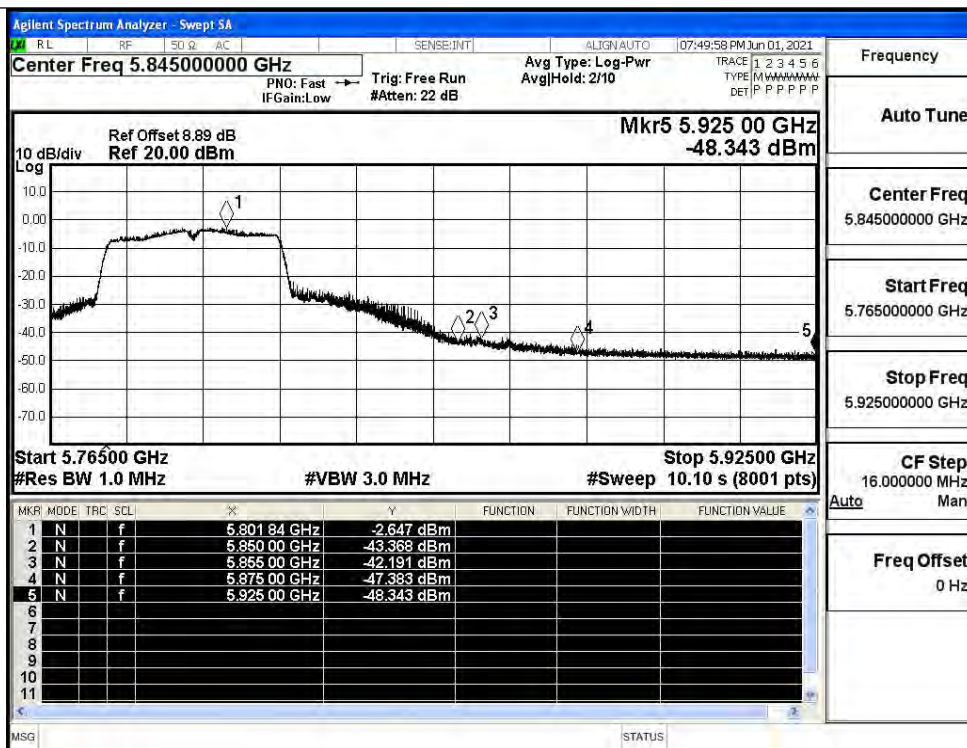
IEEE 802.11ac20 / Channel 165 / 5825MHz / Average



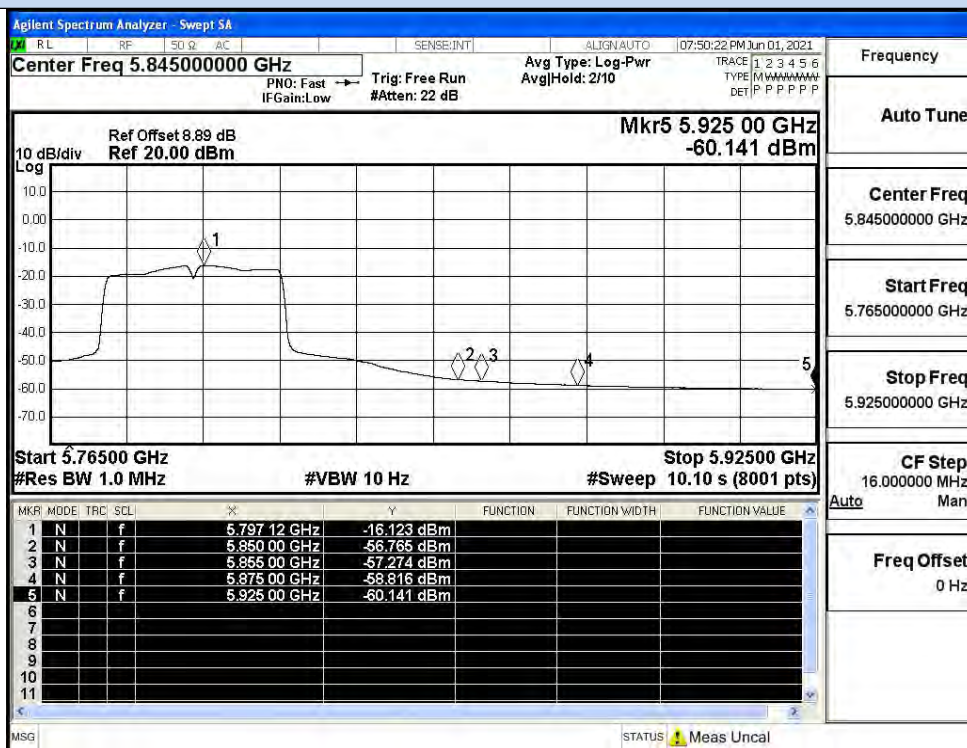
IEEE 802.11ac40 / Channel 151 / 5755MHz / Peak



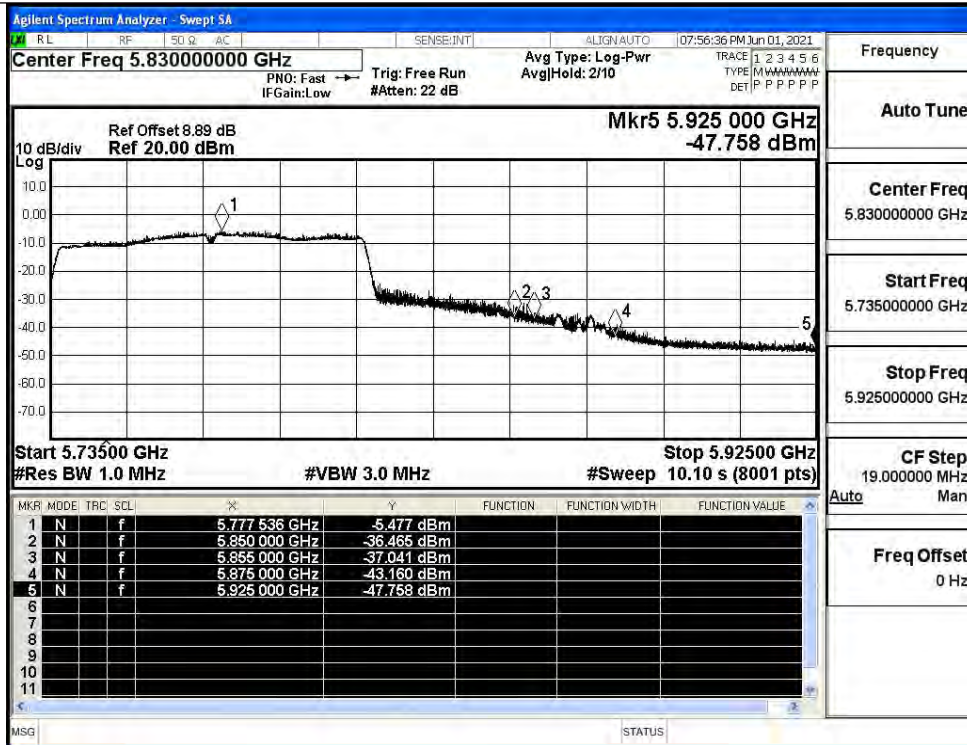
IEEE 802.11ac40 / Channel 151 / 5755MHz / Average



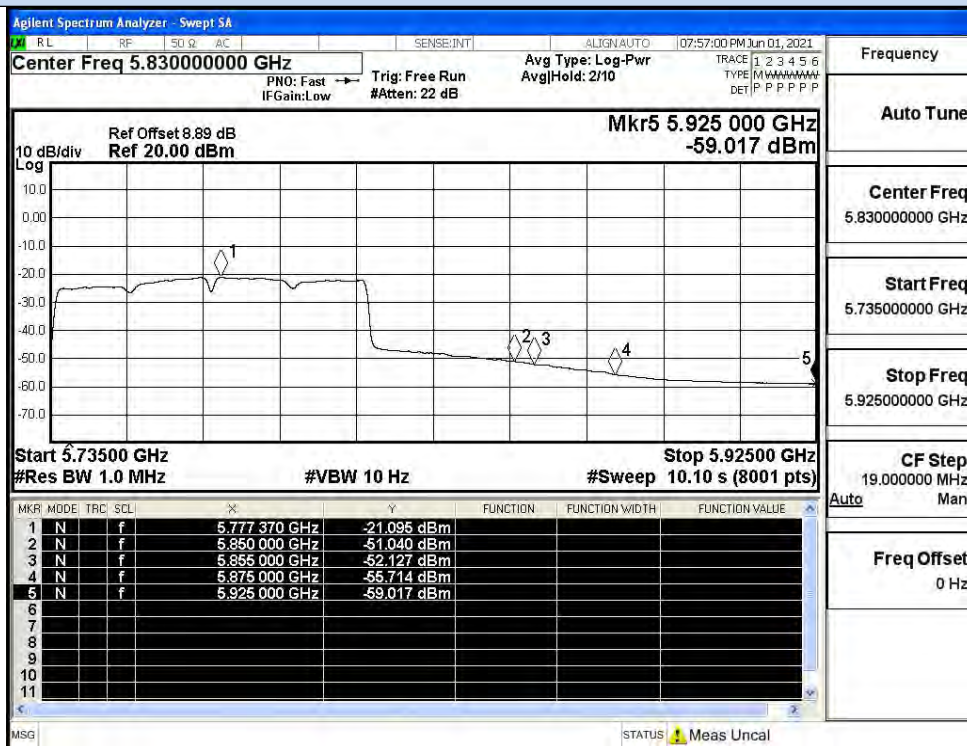
IEEE 802.11ac40 / Channel 159 / 5795MHz / Peak



IEEE 802.11ac40 / Channel 159 / 5795MHz / Average



IEEE 802.11ac80 / Channel 155 / 5775MHz / Peak



IEEE 802.11ac80 / Channel 155 / 5775MHz / Average