

7 26 dB BANDWIDTH MEASUREMENT

7.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

| Item | Type | Manufacturer | Model No. | Serial No. | Cal. Date | Cal. Interval |
|------|-------------------|---------------|-----------------|----------------|------------|---------------|
| 4. | Spectrum Analyzer | Agilent | N9010A | MY52221182 | 2021.09.16 | 1 Year |
| 5. | Coaxial Cable | WOKEN | SFL402-105F LEX | F02-150819-045 | 2022.06.06 | 1 Year |
| 6. | 20 dB Attenuator | Mini-Circuits | VAT-20+ | 001 | 2021.08.06 | 1 Year |

7.2 Block Diagram of Test Setup

The Same as Section. 6.2

7.3 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

7.4 Test Procedure

The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

The test procedure is defined in KDB789033 D02 (the clause II.C.1 Measurement Procedure “Emission Bandwidth (EBW)” was used).

7.5 Test Results

PASSED.

All the test results are attached in next pages.

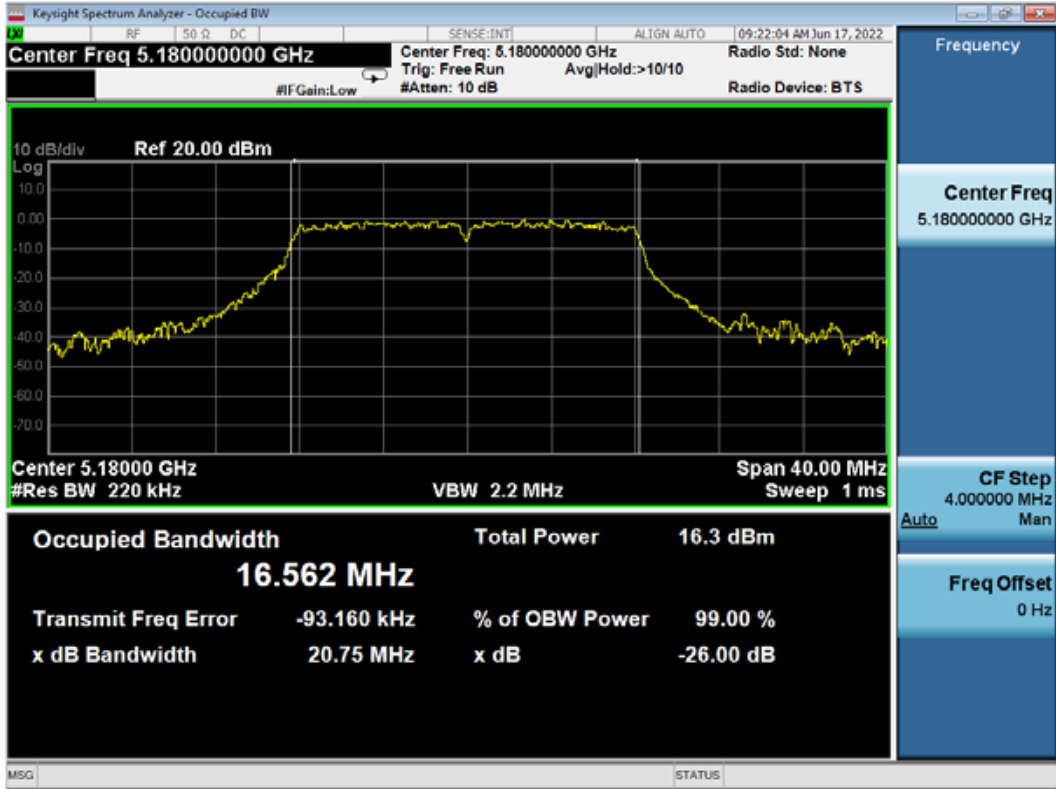
(Test Date: 2022.06.17 Temperature: 23°C Humidity: 51 %)

| Modulation | Channel | Frequency (MHz) | 26 dB Bandwidth (MHz) | Limit |
|------------|---------|-----------------|-----------------------|-------|
| 802.11a | 36 | 5180 | 20.75 | N/A |
| | 40 | 5200 | 20.29 | N/A |
| | 48 | 5240 | 20.64 | N/A |
| | 52 | 5260 | 20.69 | N/A |
| | 60 | 5300 | 20.83 | N/A |
| | 64 | 5320 | 20.67 | N/A |
| | 100 | 5500 | 20.48 | N/A |
| | 120 | 5600 | 20.63 | N/A |
| | 140 | 5700 | 20.62 | N/A |
| | 149 | 5745 | 20.67 | N/A |
| | 157 | 5785 | 20.43 | N/A |
| | 165 | 5825 | 20.58 | N/A |

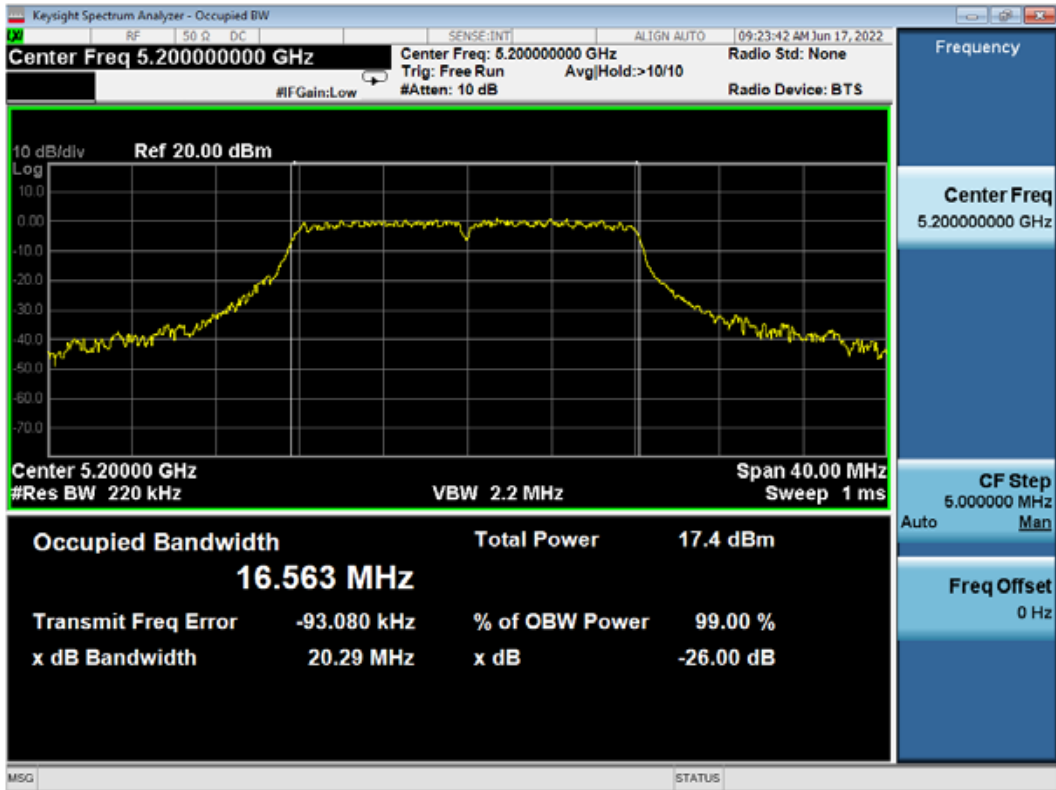
| Modulation | Channel | Frequency (MHz) | 26 dB Bandwidth (MHz) | Limit |
|------------|---------|-----------------|-----------------------|-------|
| 802.11n20 | 36 | 5180 | 21.56 | N/A |
| | 40 | 5200 | 21.41 | N/A |
| | 48 | 5240 | 21.35 | N/A |
| | 52 | 5260 | 21.44 | N/A |
| | 60 | 5300 | 21.34 | N/A |
| | 64 | 5320 | 21.52 | N/A |
| | 100 | 5500 | 21.29 | N/A |
| | 120 | 5600 | 21.16 | N/A |
| | 140 | 5700 | 21.34 | N/A |
| | 149 | 5745 | 21.39 | N/A |
| | 157 | 5785 | 21.47 | N/A |
| | 165 | 5825 | 21.17 | N/A |

| Modulation | Channel | Frequency (MHz) | 26 dB Bandwidth (MHz) | Limit |
|------------|---------|-----------------|-----------------------|-------|
| 802.11n40 | 38 | 5190 | 38.73 | N/A |
| | 46 | 5230 | 38.5 | N/A |
| | 54 | 5270 | 38.64 | N/A |
| | 62 | 5310 | 38.6 | N/A |
| | 102 | 5510 | 38.69 | N/A |
| | 118 | 5590 | 38.73 | N/A |
| | 134 | 5670 | 38.36 | N/A |
| | 151 | 5755 | 38.68 | N/A |
| | 159 | 5795 | 38.73 | N/A |

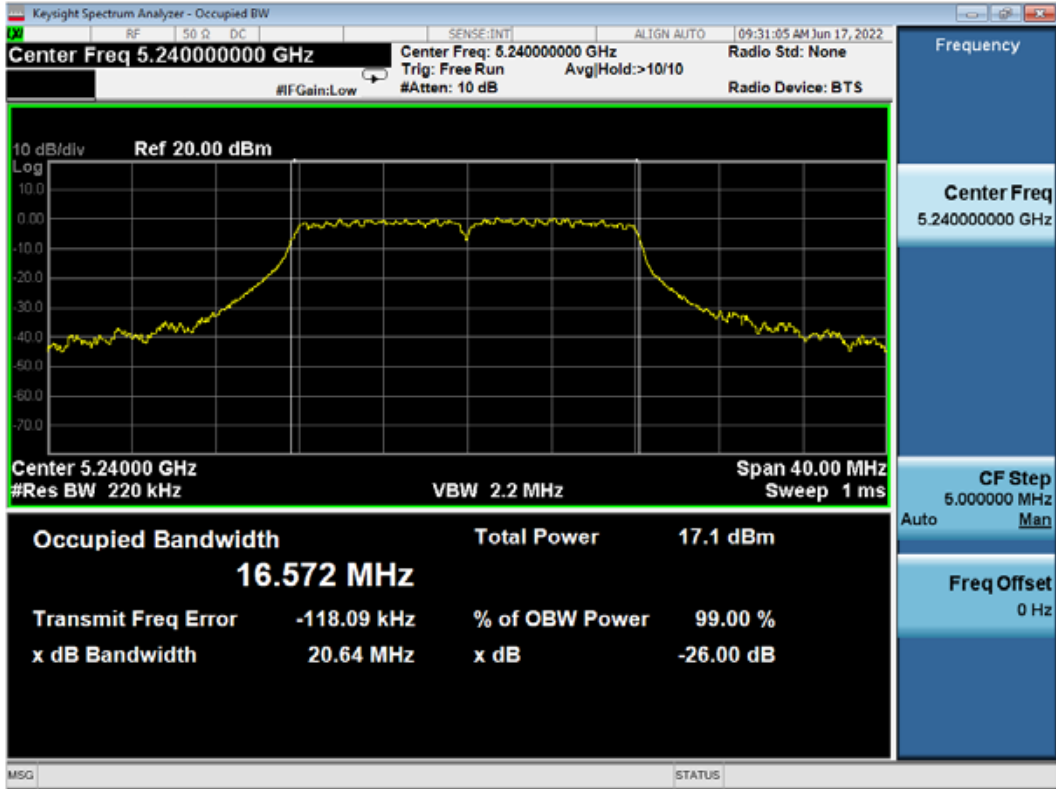
802.11a CH5180MHz



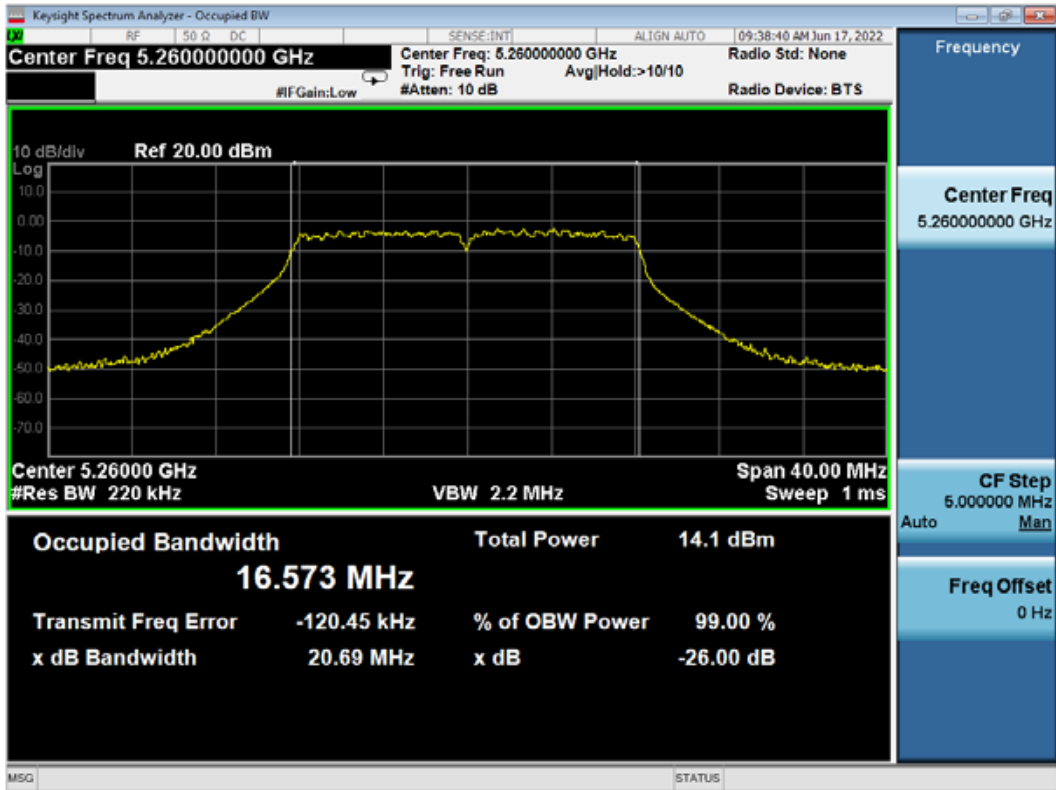
802.11a CH5200MHz



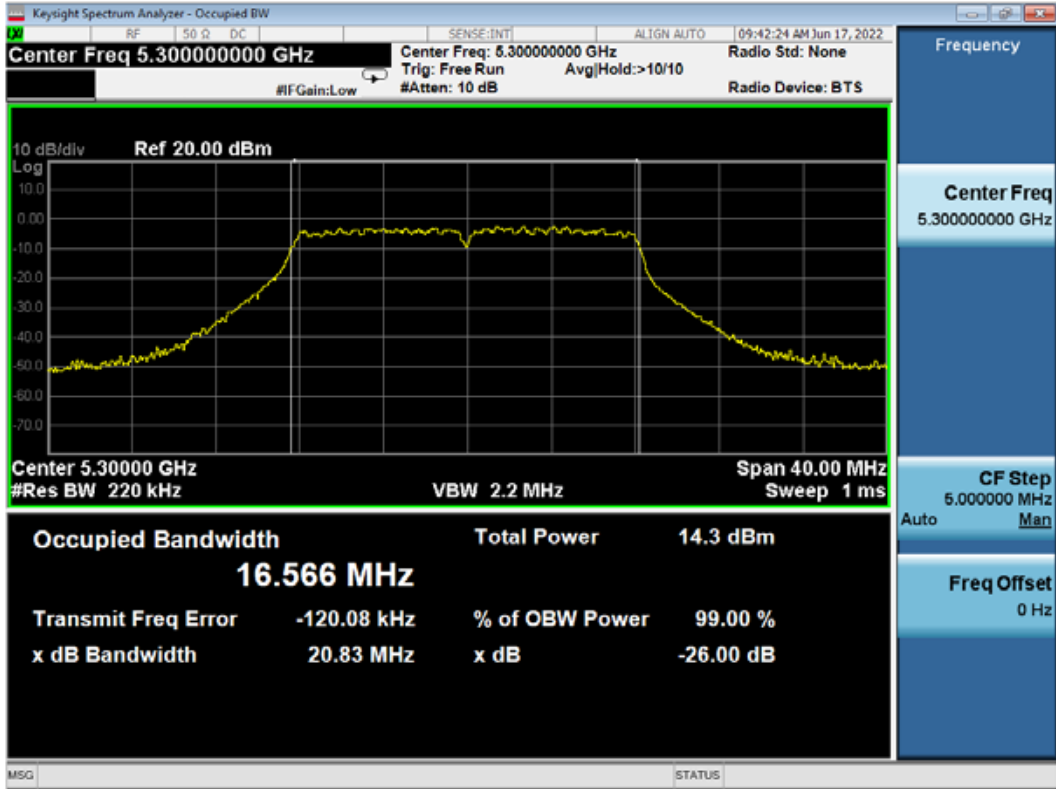
802.11a CH5240MHz



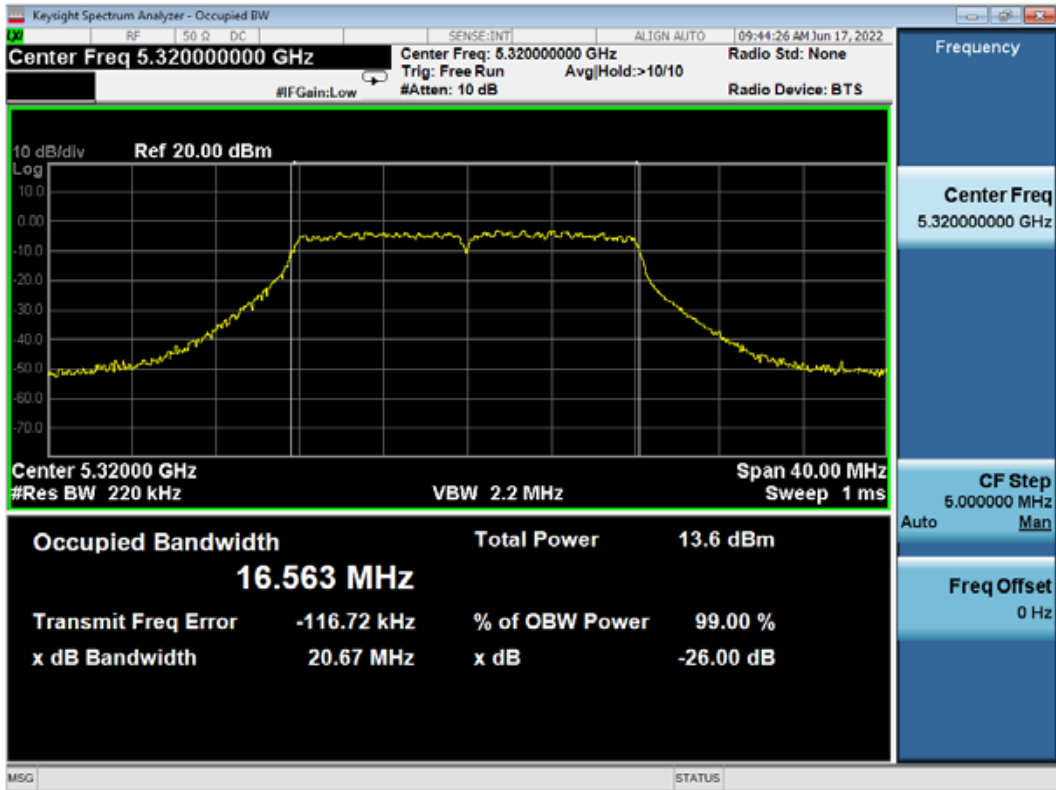
802.11a CH5260MHz



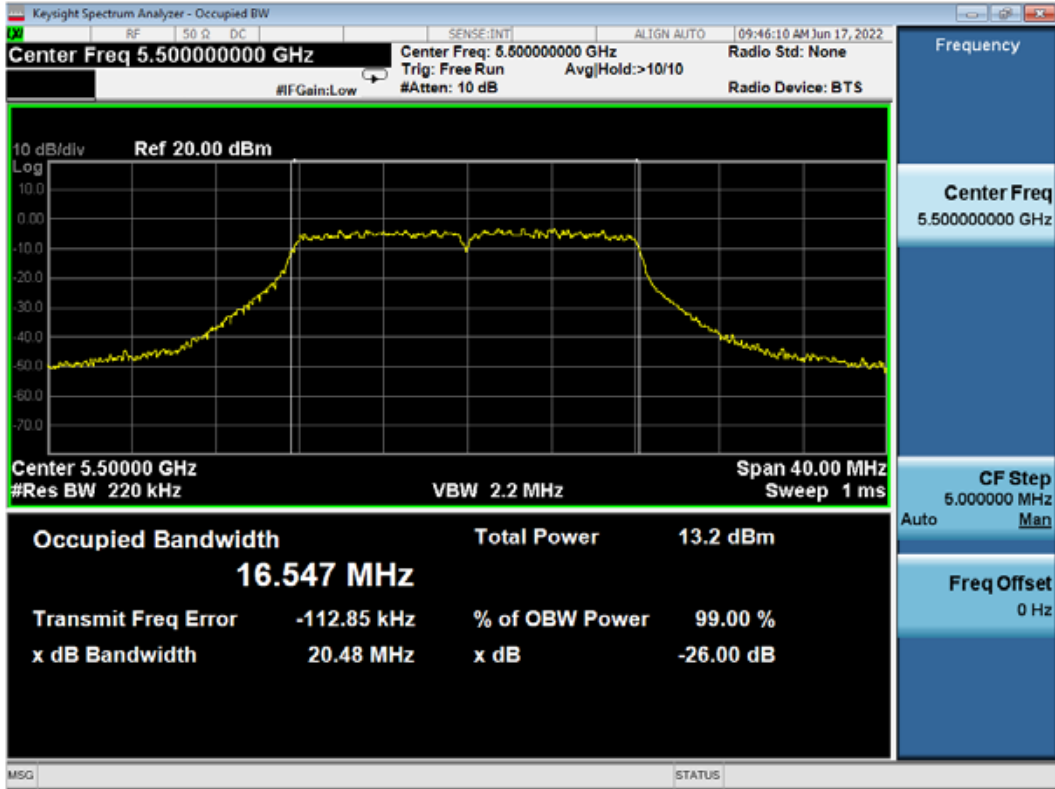
802.11a CH5300MHz



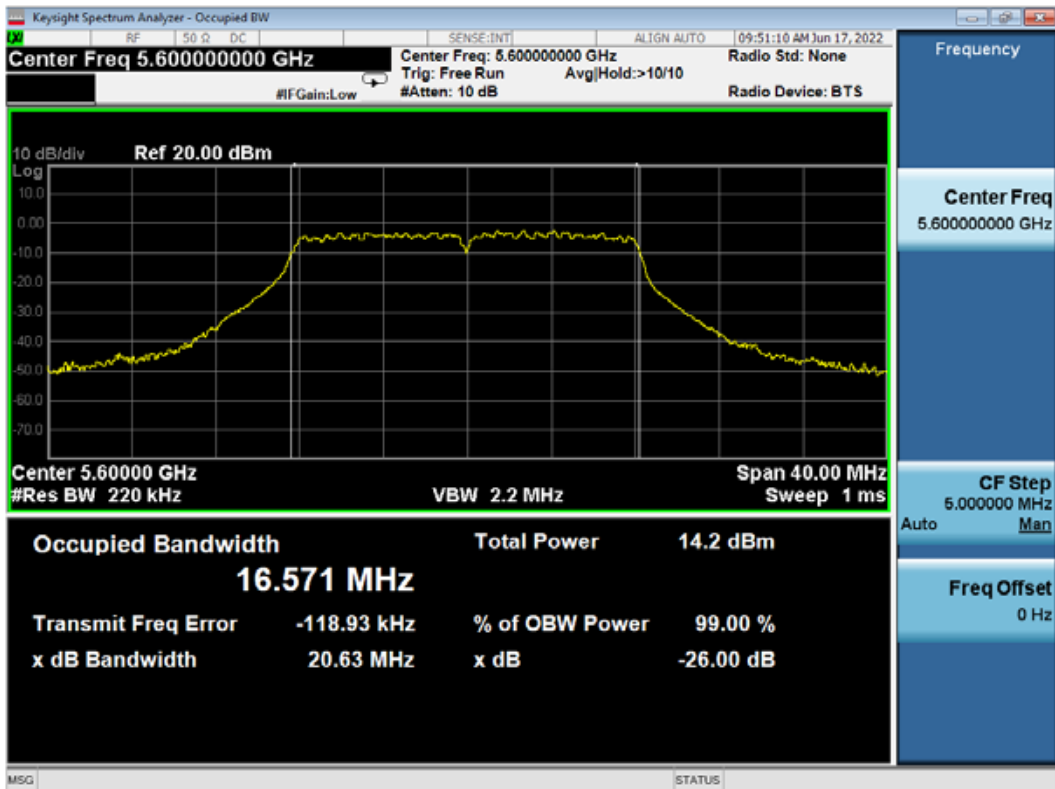
802.11a CH5320MHz



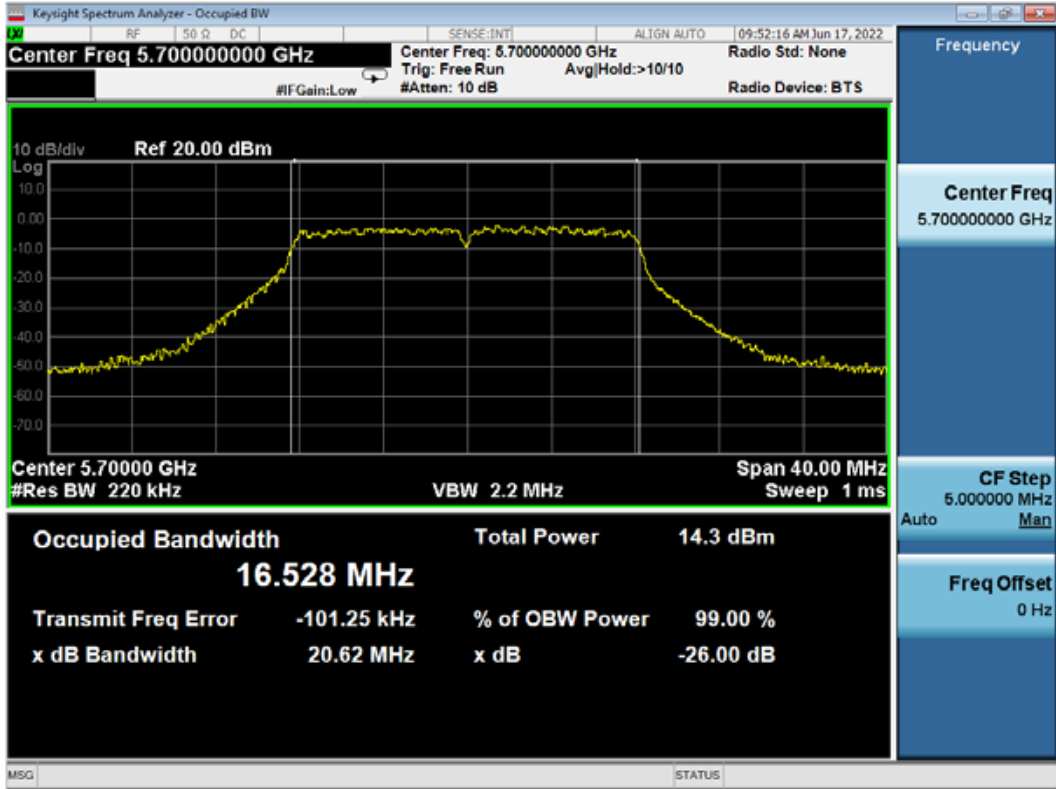
802.11a CH5500MHz



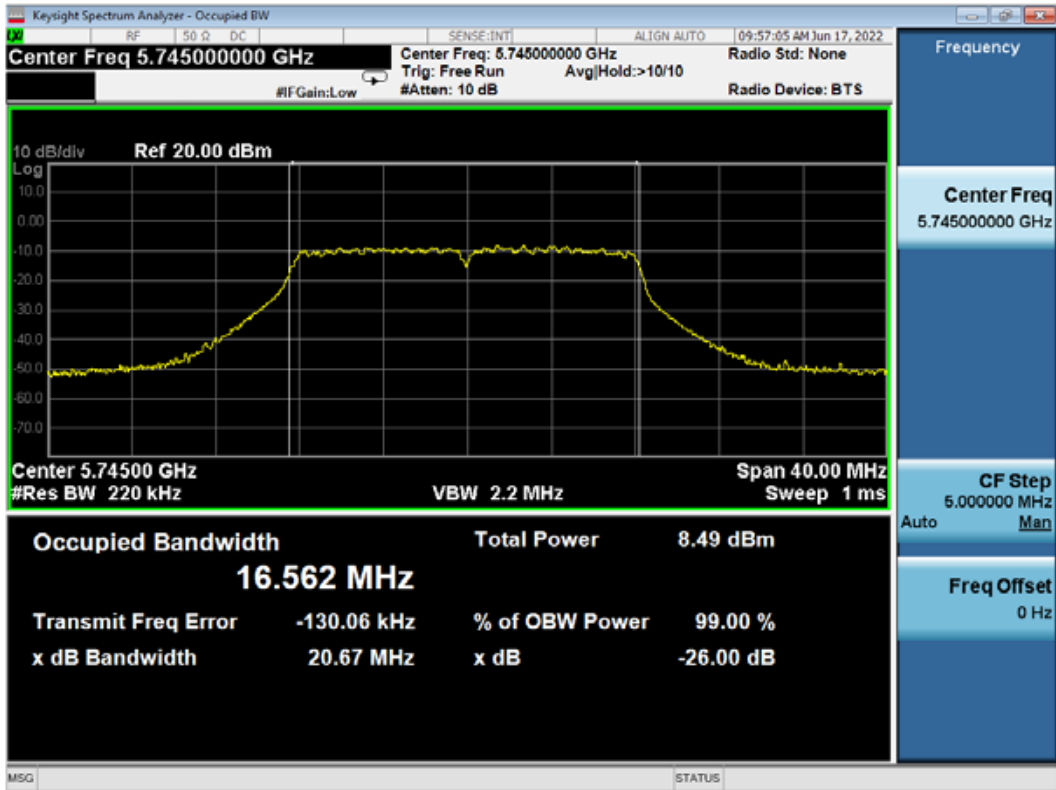
802.11a CH5600MHz



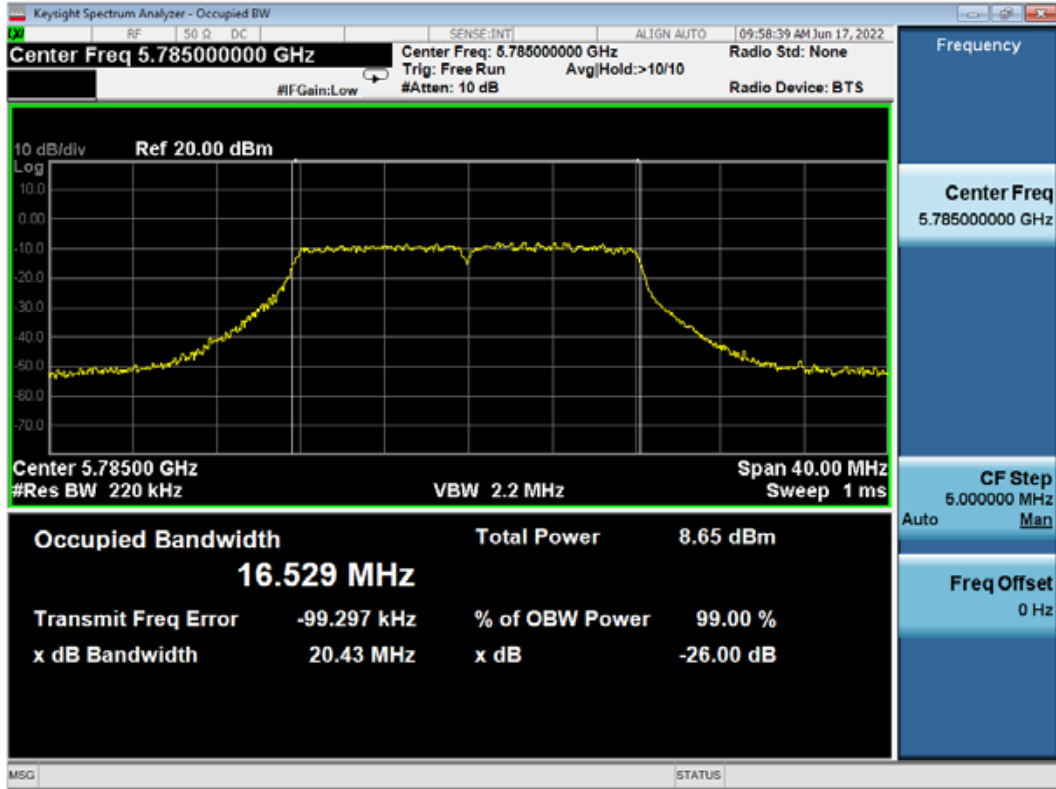
802.11a CH5700MHz



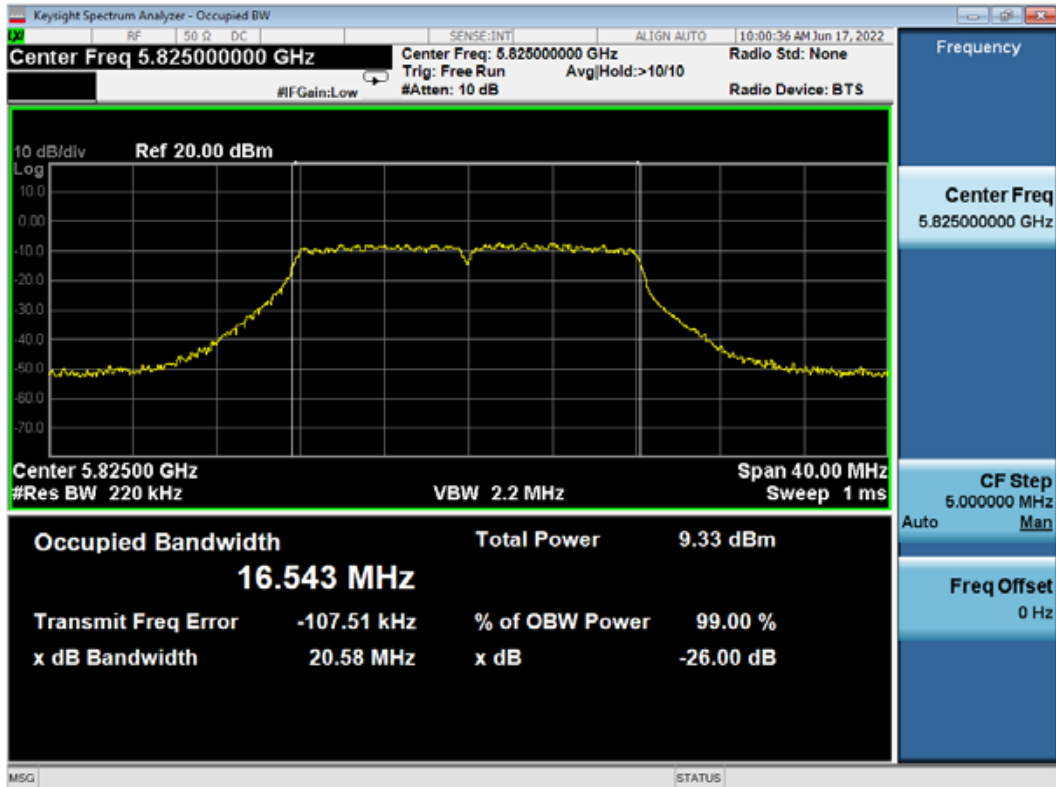
802.11a CH5745MHz



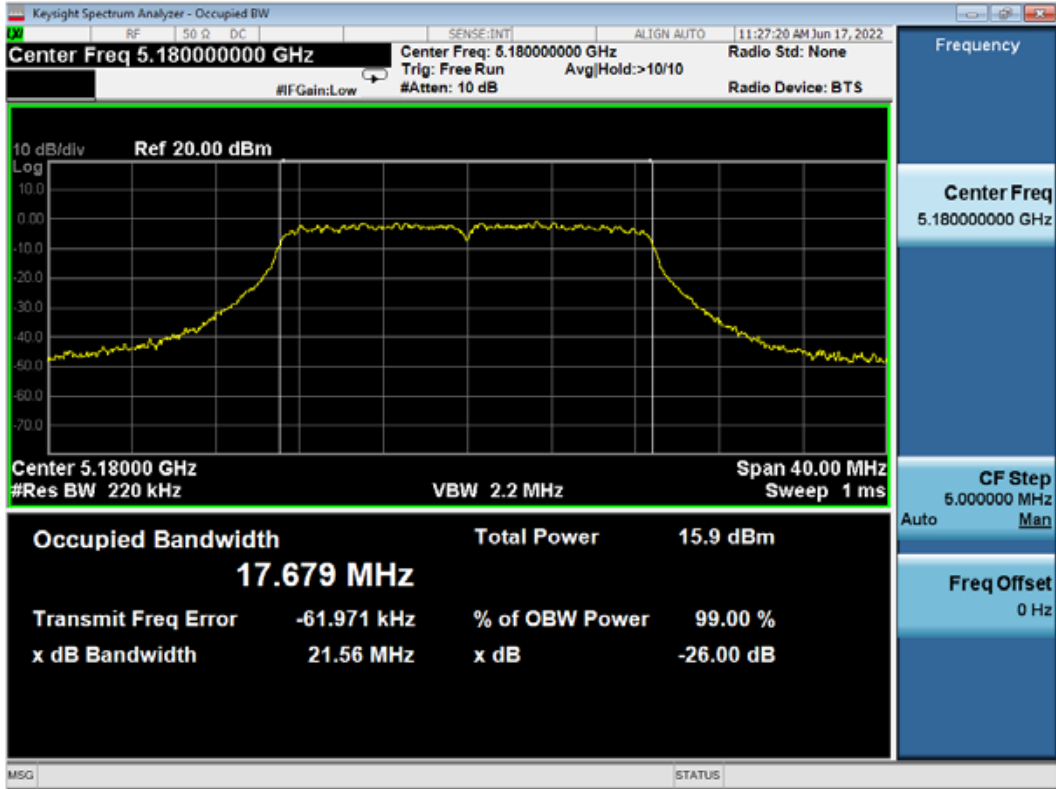
802.11a CH5785MHz



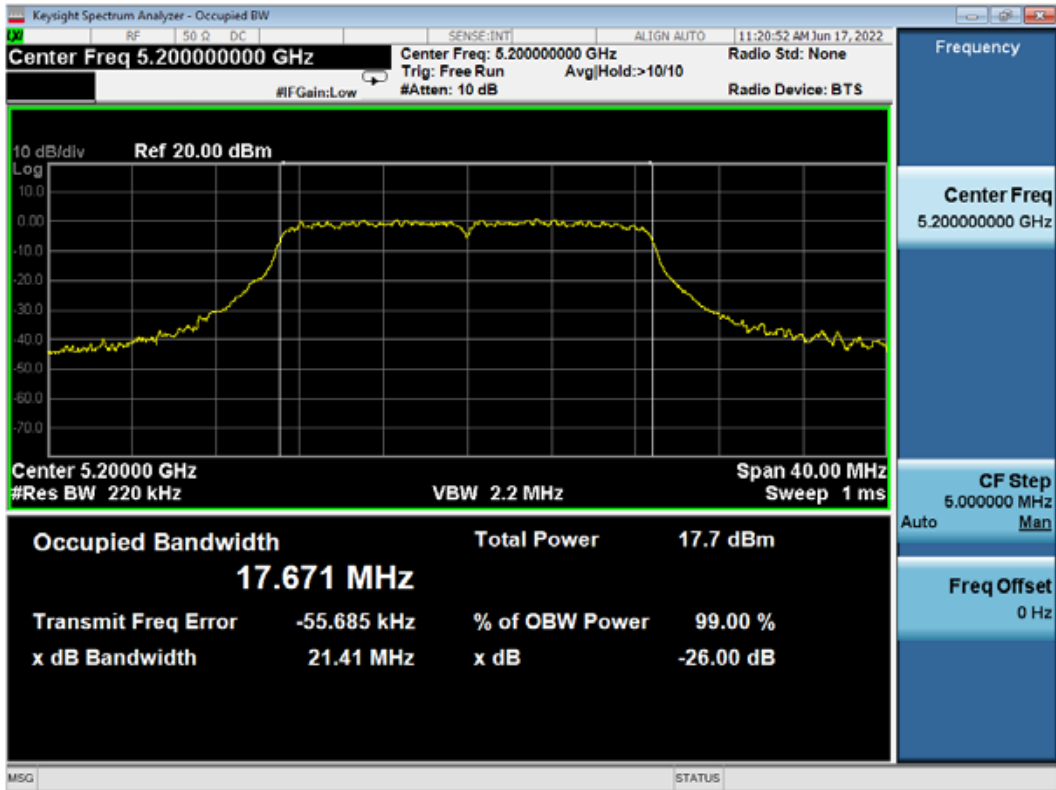
802.11a CH5825MHz



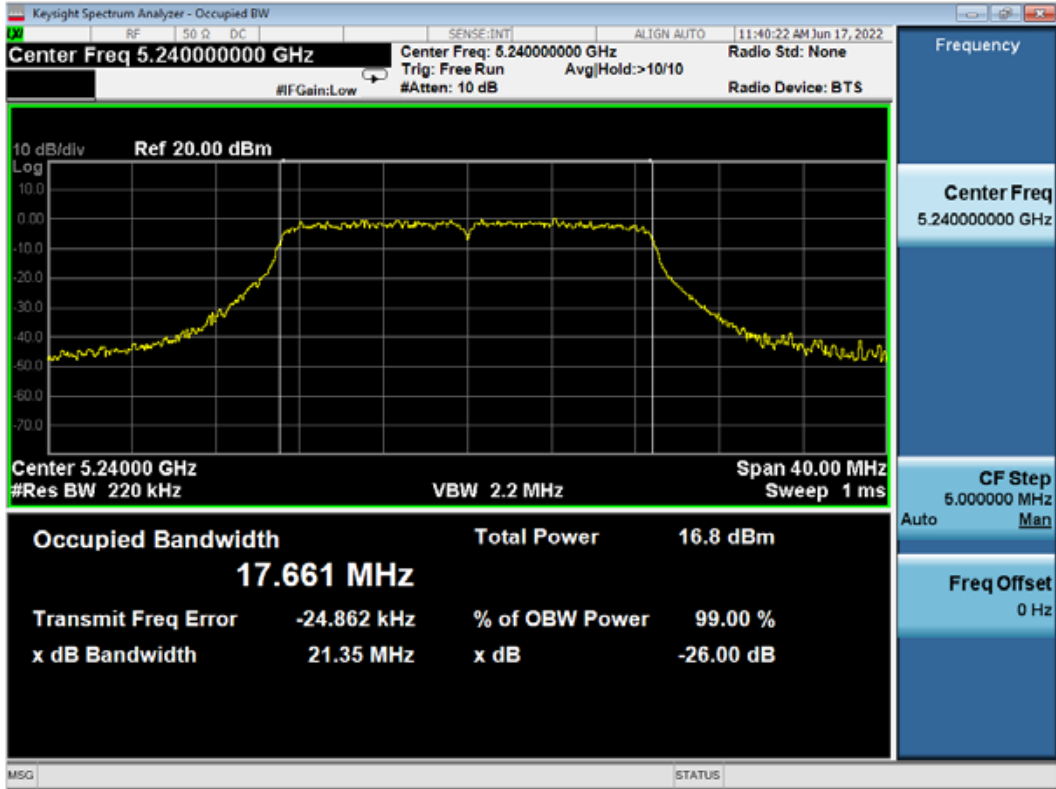
801.11n20 CH5180MHz



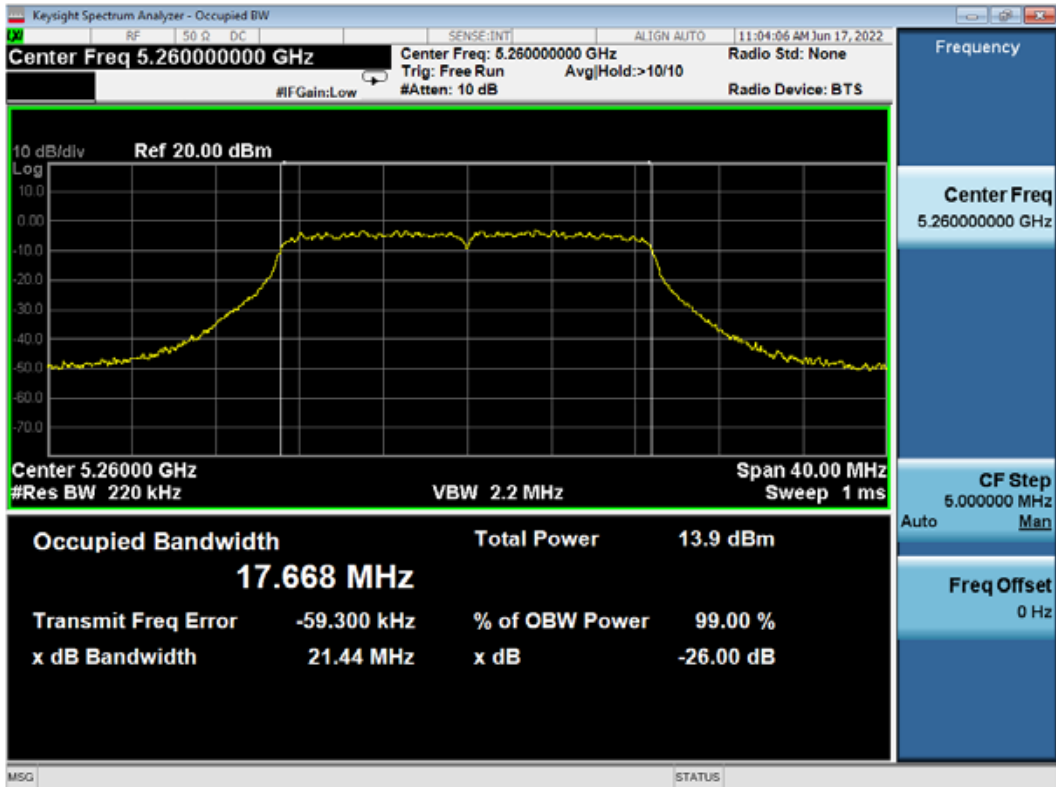
801.11n20 CH5200MHz



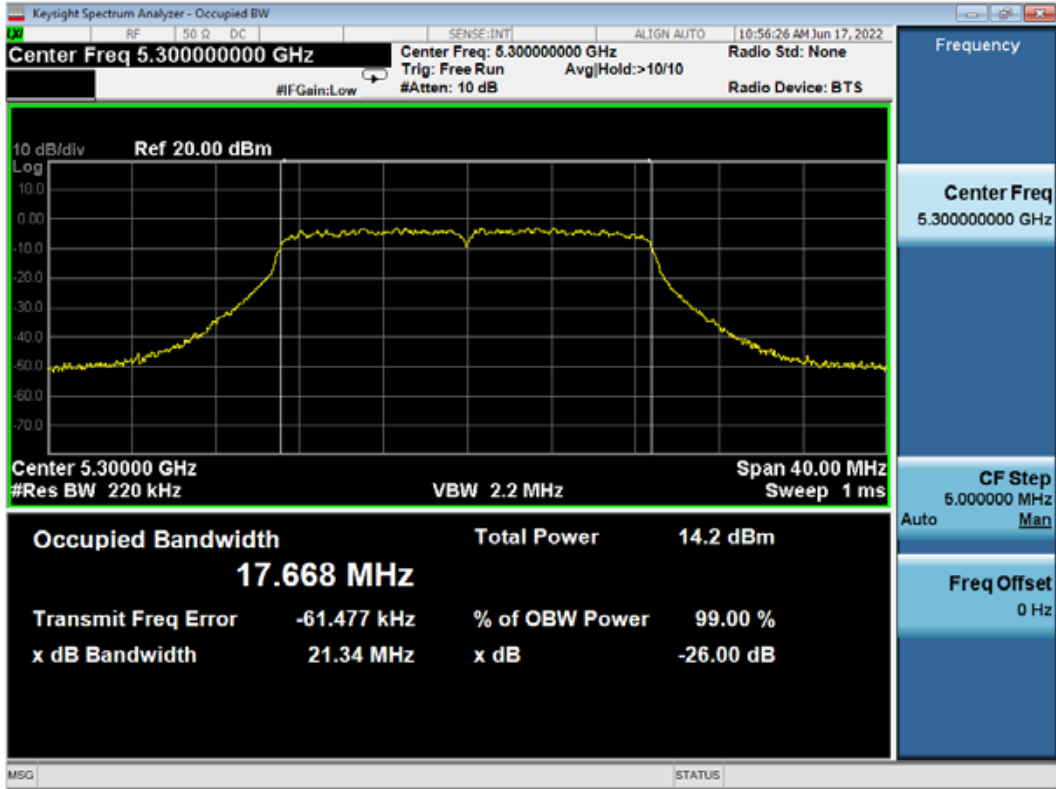
801.11n20 CH5240MHz



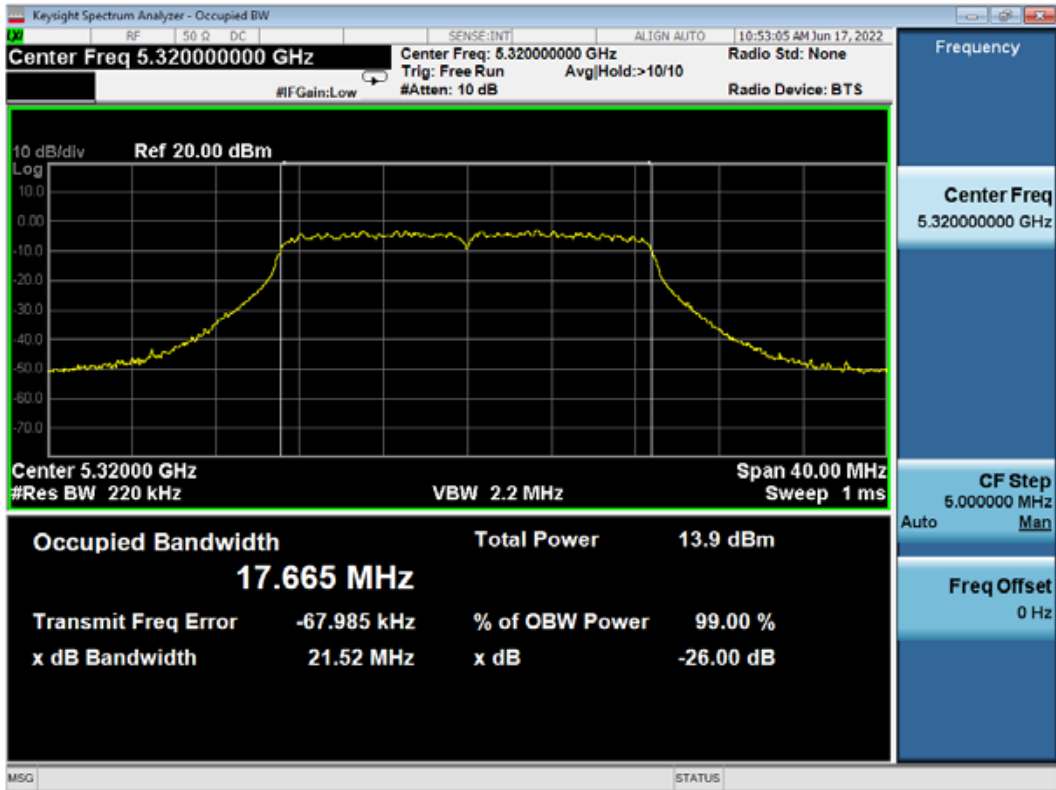
801.11n-HT20 CH5260MHz



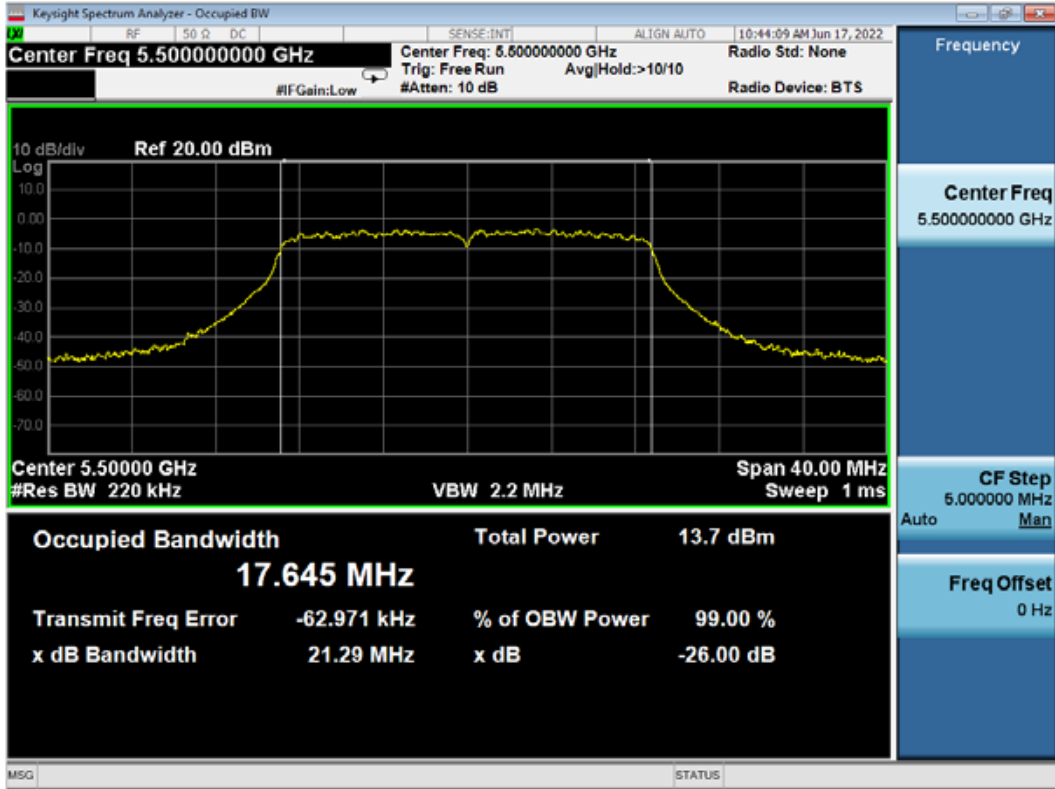
801.11n20 CH5300MHz



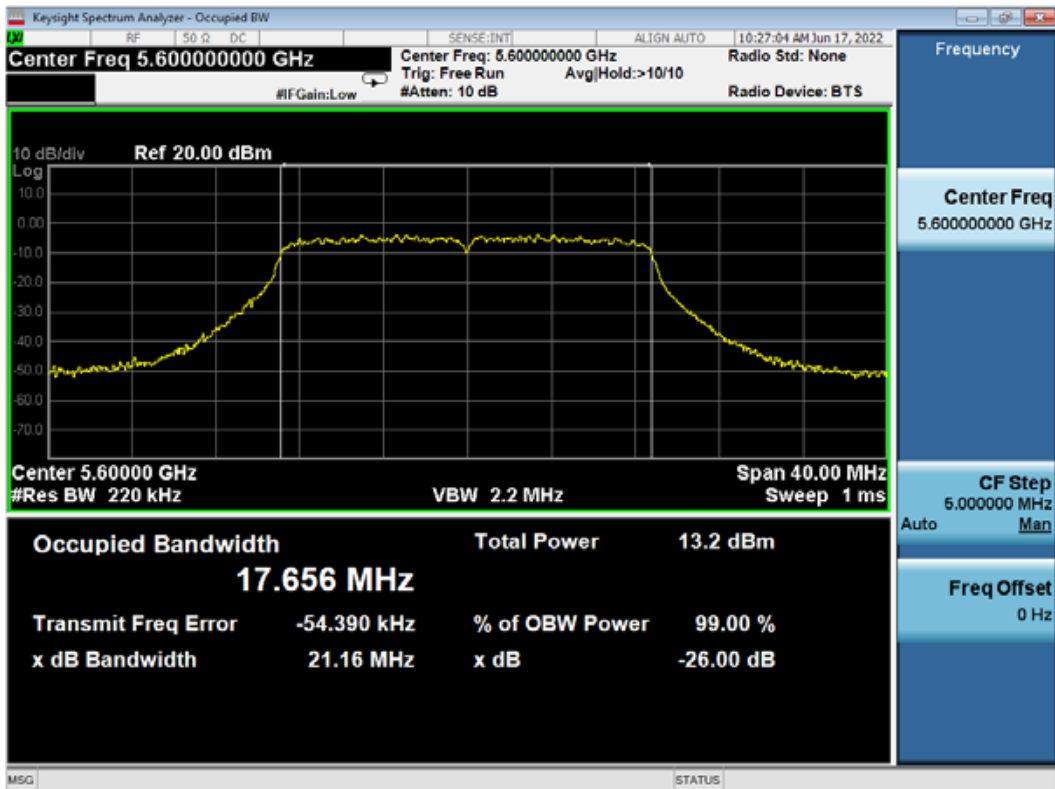
801.11n20 CH5320MHz



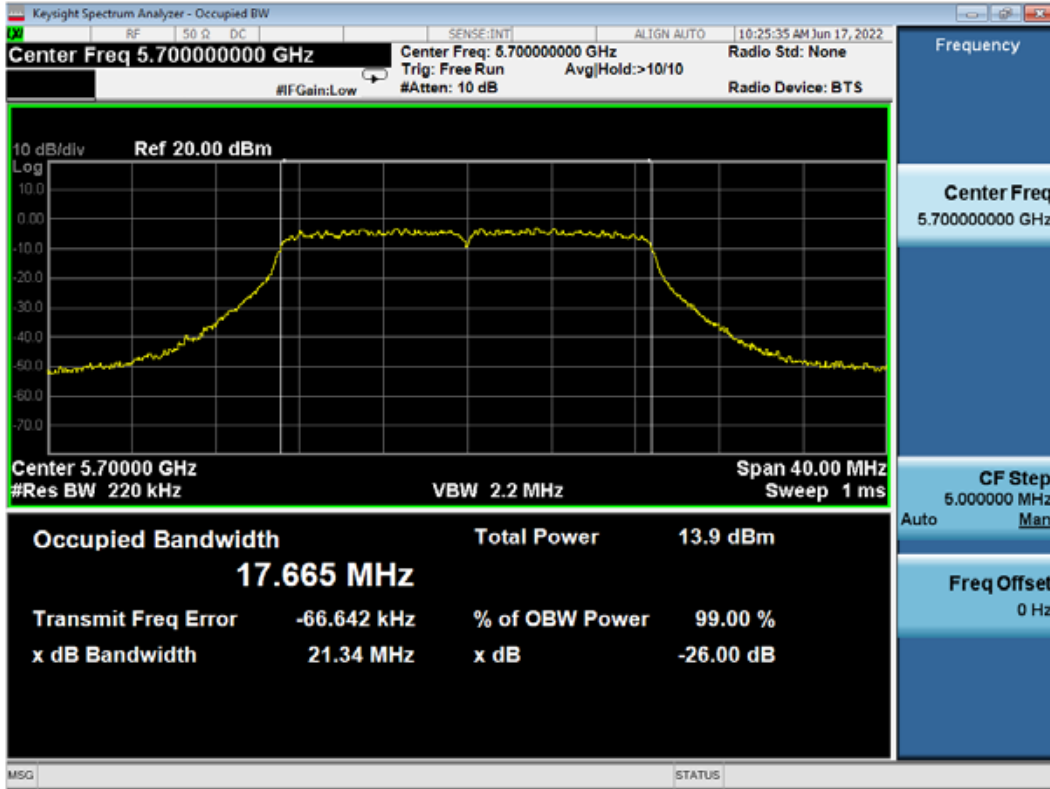
801.11n20 CH5500MHz



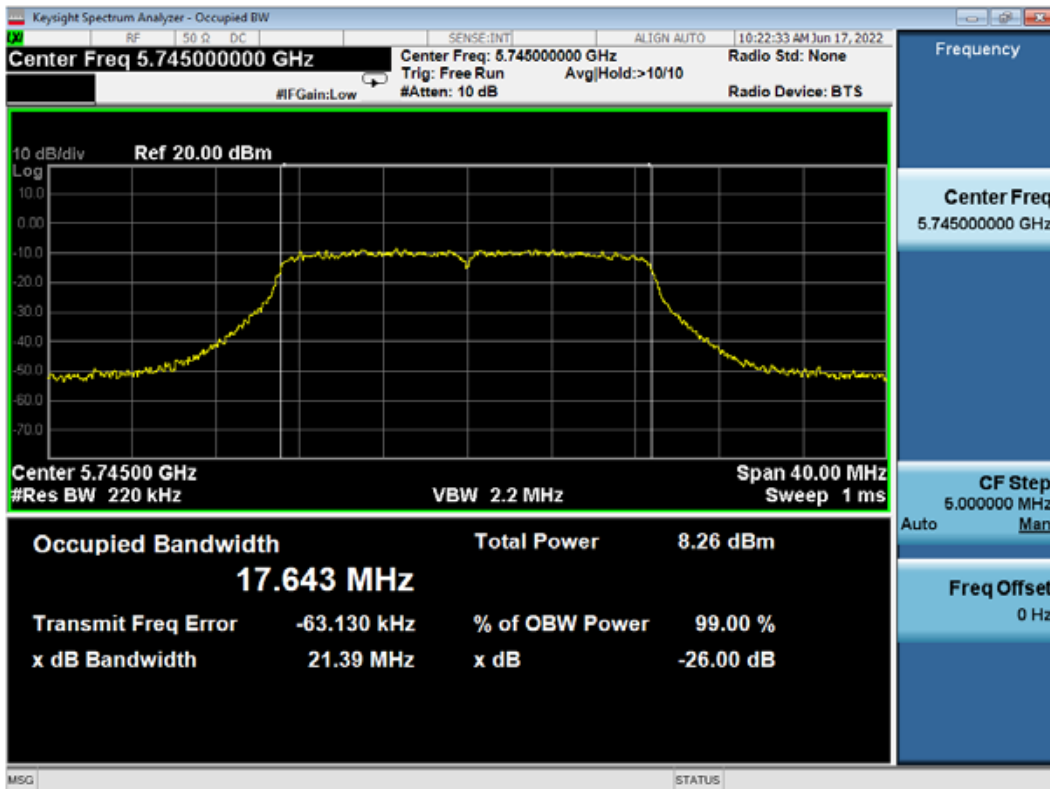
801.11n20 CH5600MHz



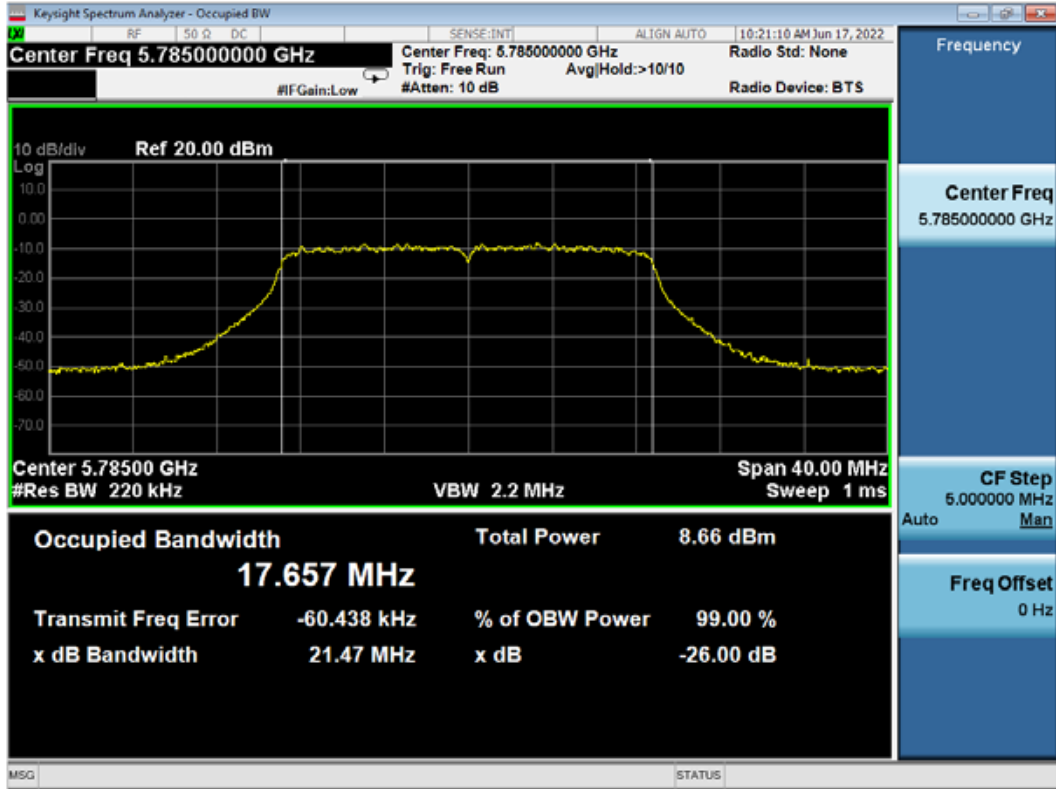
801.11n20 CH5700MHz



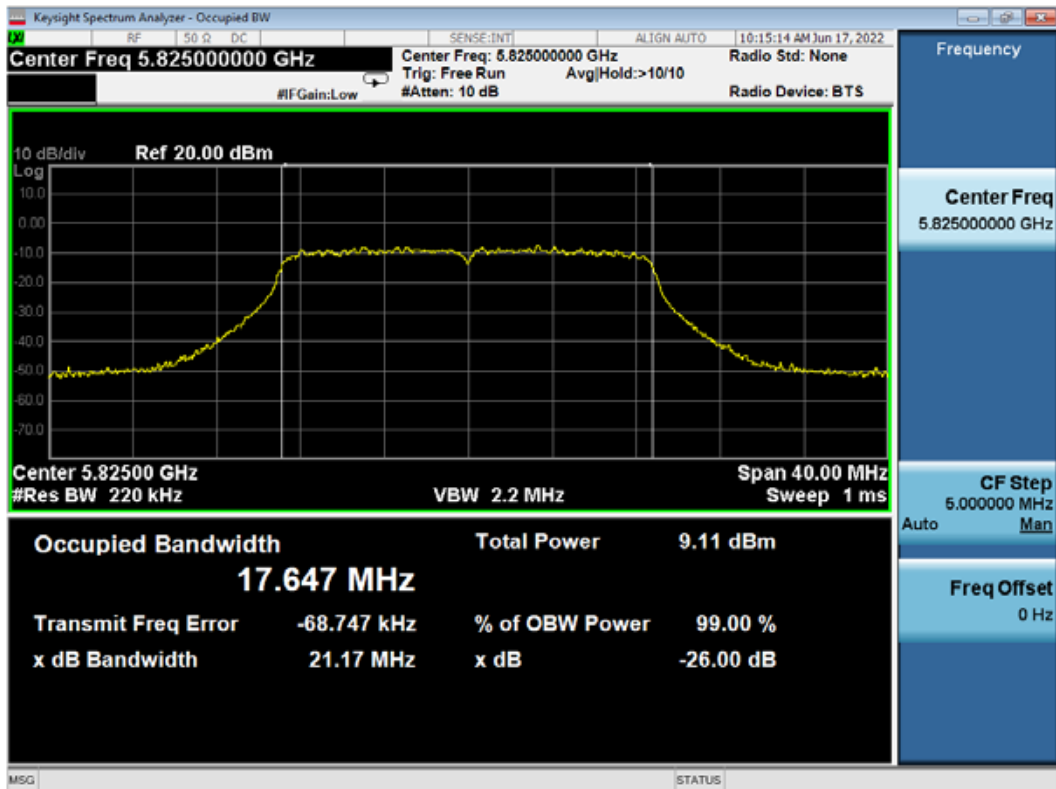
801.11n20 CH5745MHz



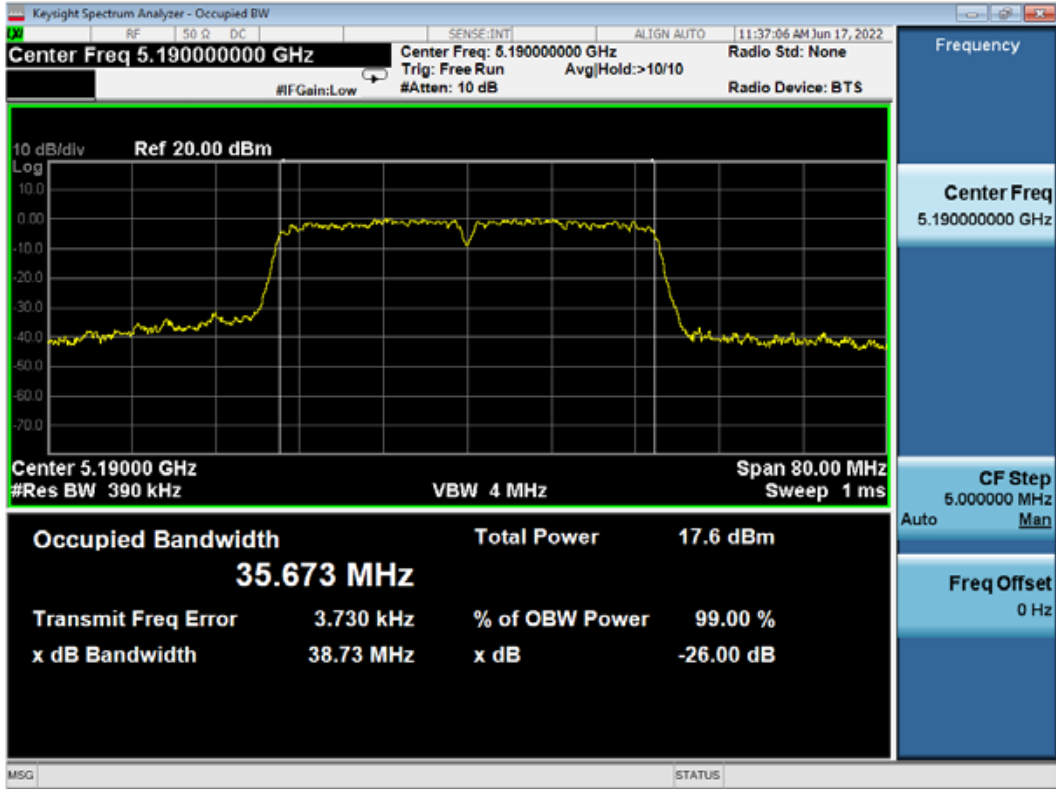
801.11n20 CH5785MHz



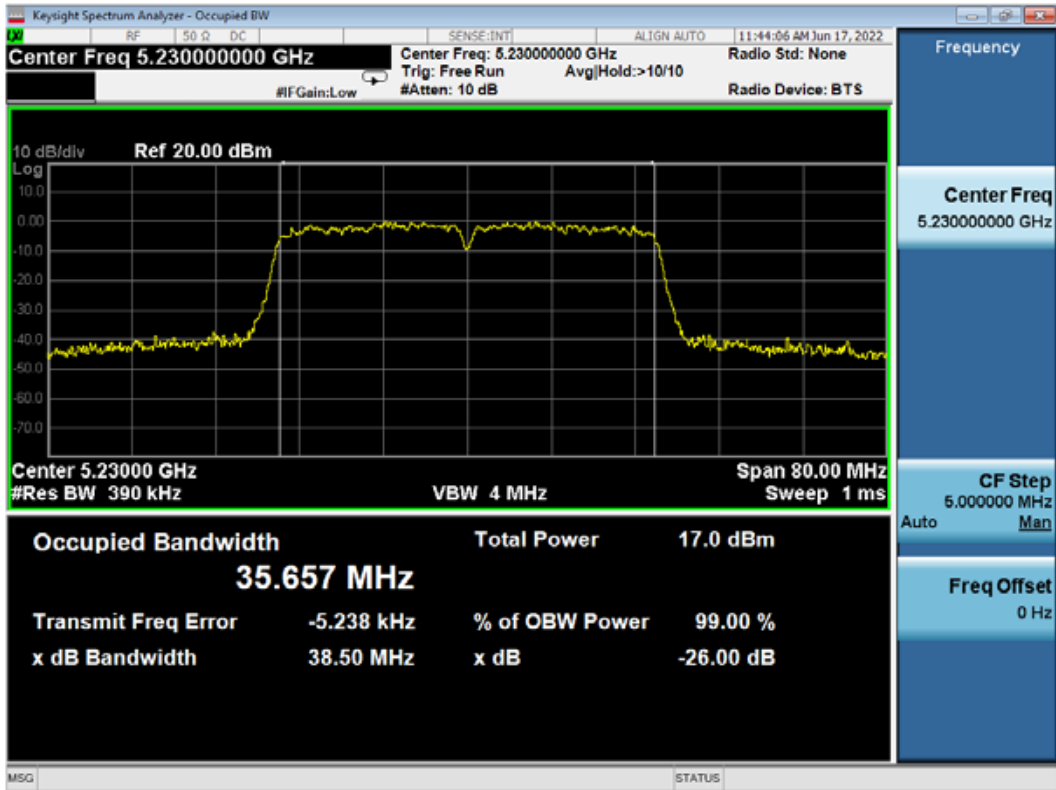
801.11n20 CH5825MHz



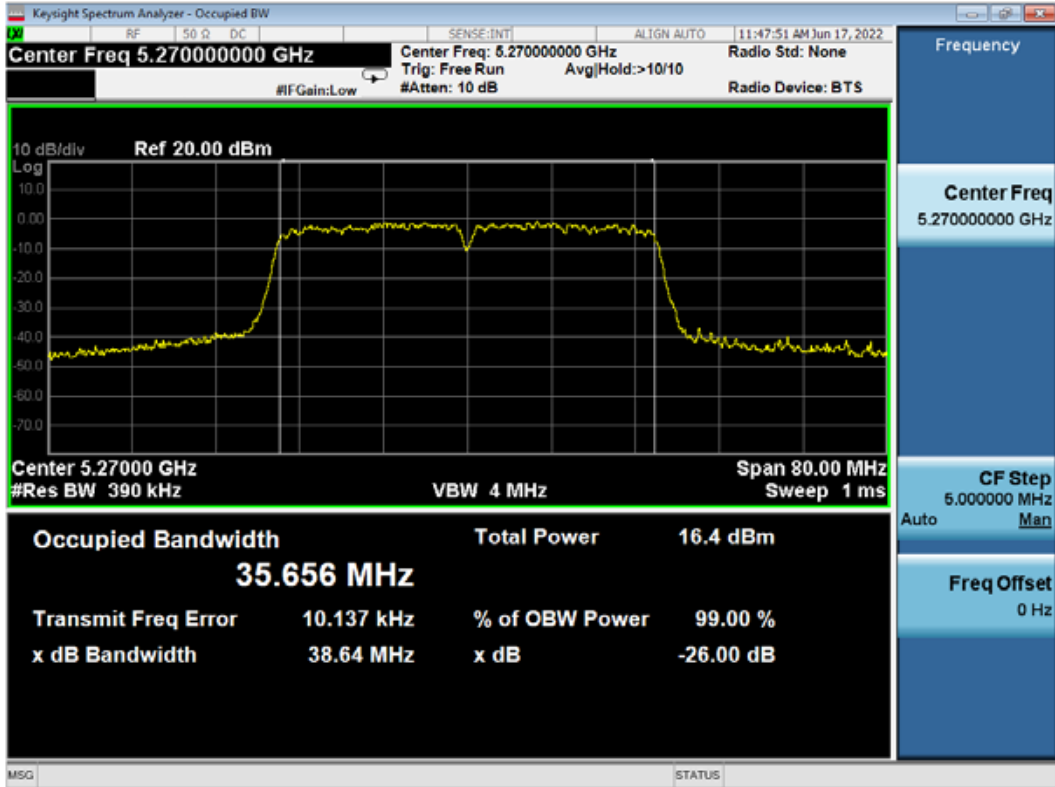
801.11n40 CH5190MHz



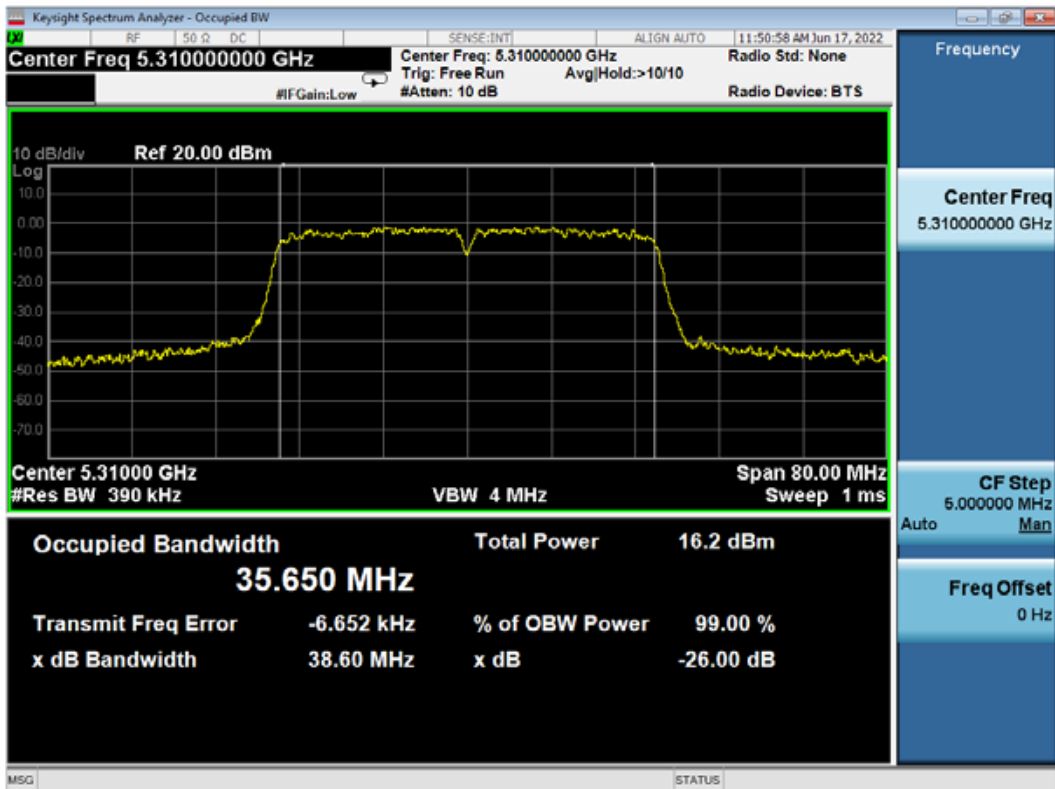
801.11n40 CH5230MHz



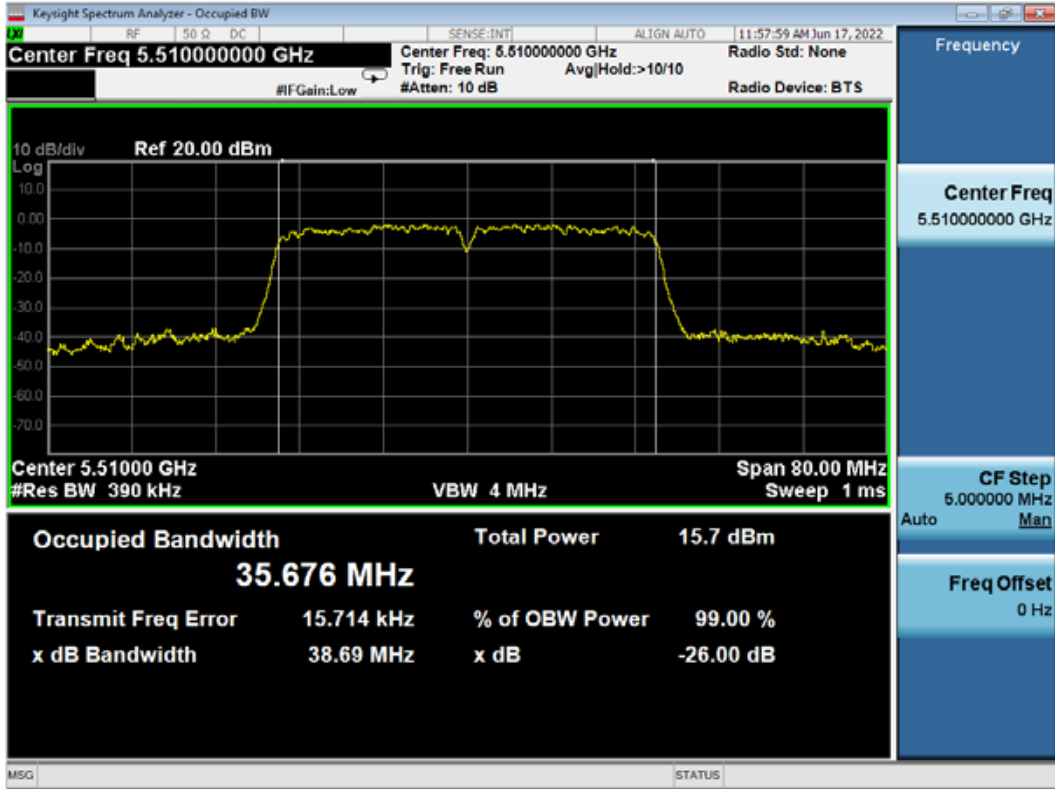
801.11n40 CH5270MHz



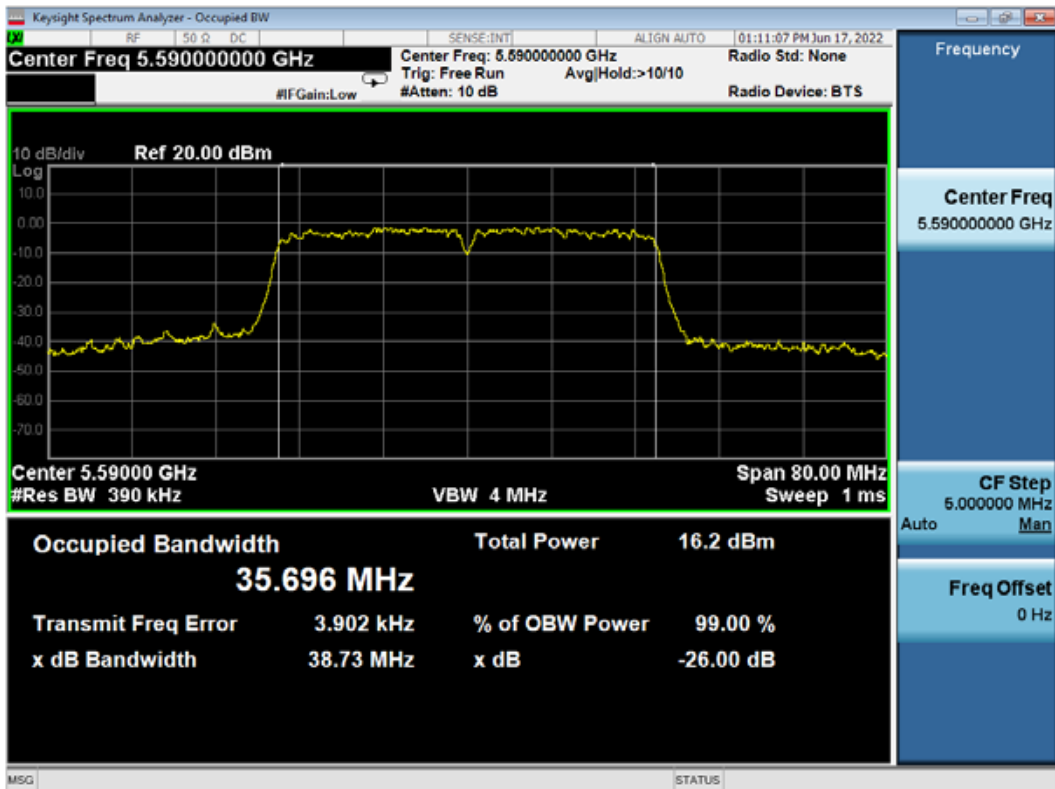
801.11n40 CH5310MHz



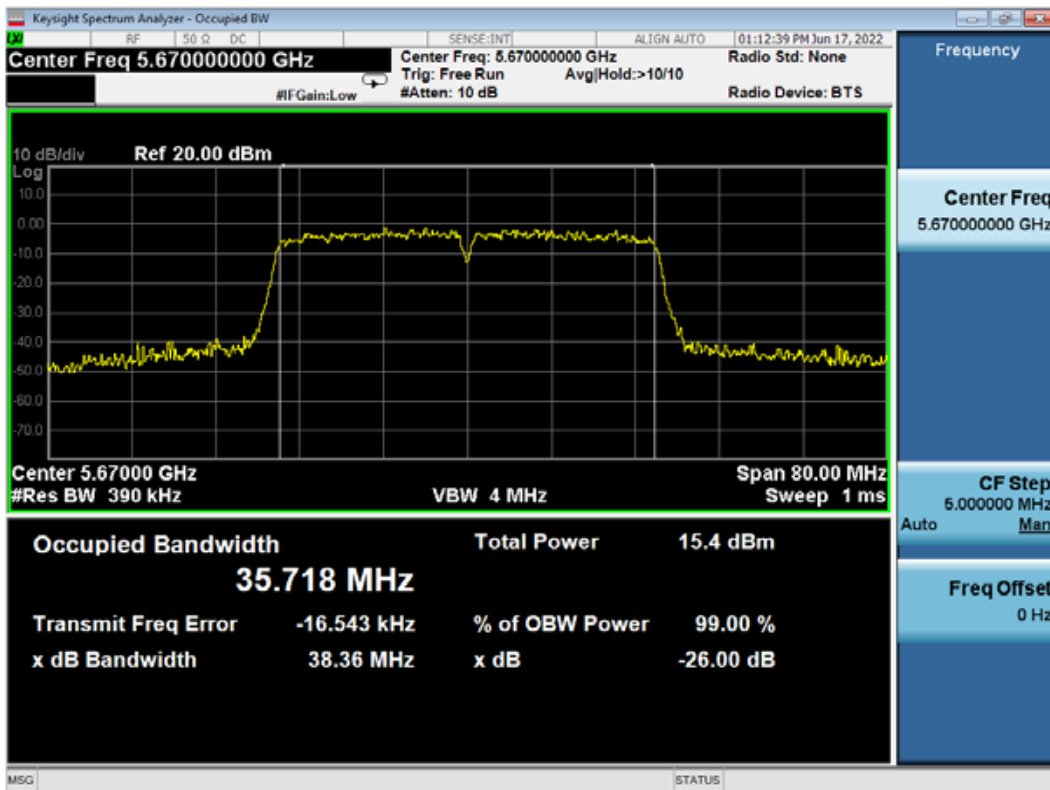
801.11n40 CH5510MHz



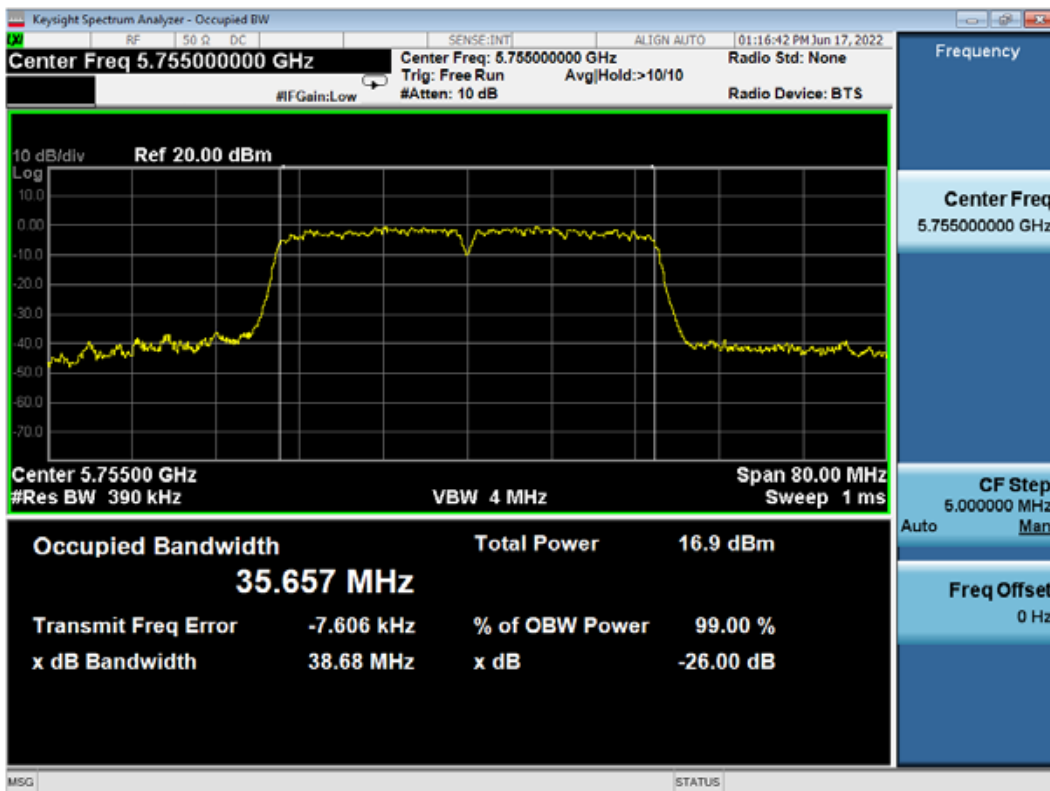
801.11n40 CH5590MHz



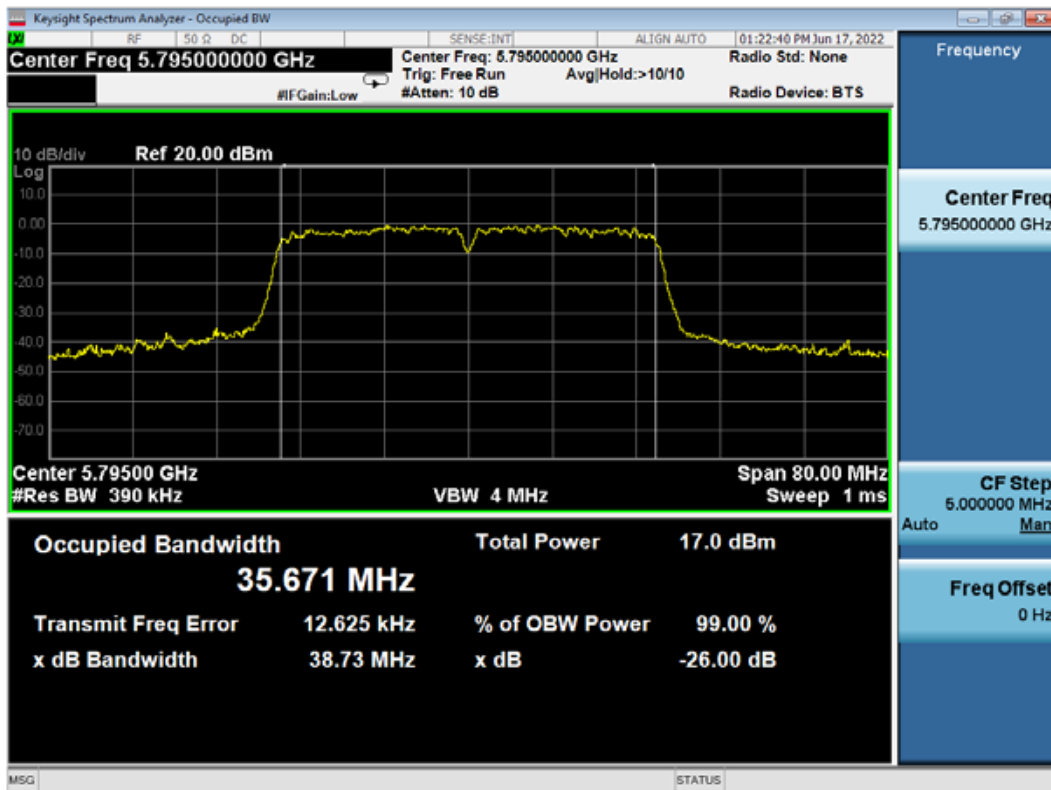
801.11n40 CH5670MHz



801.11n40 CH5755MHz



801.11n40 CH5795MHz



8 MAXIMUM CONDUCTED OUTPUT POWER

MEASUREMENT

8.1 Test Equipment

The following test equipment was used during the maximum peak output power measurement:

| Item | Type | Manufacturer | Model No. | Serial No. | Cal. Date | Cal. Interval |
|------|-------------------|---------------|-----------------|----------------|------------|---------------|
| 1. | Spectrum Analyzer | Agilent | N9010A | MY52221182 | 2021.09.16 | 1 Year |
| 2. | Coaxial Cable | WOKEN | SFL402-105F LEX | F02-150819-045 | 2022.06.06 | 1 Year |
| 3. | 20 dB Attenuator | Mini-Circuits | VAT-20+ | 001 | 2021.08.06 | 1 Year |

8.2 Block Diagram of Test Setup

The Same as Section. 6.2.

8.3 Specification Limits ((§15.407(a))

(1) For the band 5.15-5.25 GHz.

(iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

(2) 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 or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.

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

8.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

8.5 Test Procedure

The transmitter output was connected to the spectrum analyzer.

(i) Measure the duty cycle, x, of the transmitter output signal.

(ii) Set span to encompass the 99% occupied bandwidth of the signal.

(iii) Set RBW = 1 MHz.

(iv) Set VBW \geq 3 MHz.

(v) Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$. (This ensures that bin-to-bin spacing is $\leq \text{RBW}/2$, so that narrowband signals are not lost between frequency bins.)

(vi) Sweep time = auto.

(vii) Detector = power averaging (rms).

(viii) Allow the sweep to “free run.”

(ix) Trace average at least 100 traces in power averaging (rms) mode; however,

the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.

(x) Compute power by integrating the spectrum across the 99% occupied bandwidth of the signal using the instrument's band power measurement function with band limits set equal to the occupied bandwidth band edges.

(xi) Add $10 \log (1/x)$, 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 $10 \log (1/0.25) = 6$ dB if the duty cycle is 25%.

The test procedure is defined in KDB789033 D02 (the clause II.E.2.d) Measurement Procedure "Method SA-2" was used).

8.6 Test Results

PASSED.

All the test results are listed below.

(Test Date: 2022.06.18 Temperature: 23°C Humidity: 51 %)

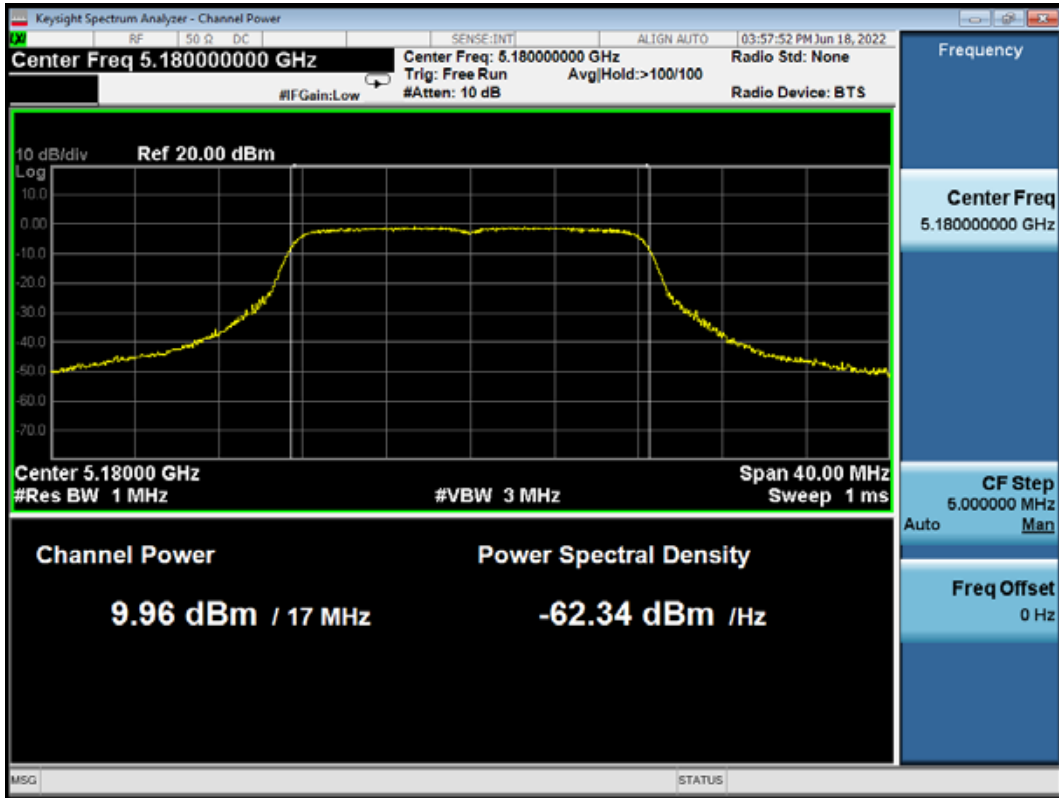
| Modulation | Transmission Duration (ms) | Transmission Period (ms) | Duty Cycle (%) | Correct Factor (dB) |
|------------|----------------------------|--------------------------|----------------|---------------------|
| 802.11a | ∞ | ∞ | 100 | 0 |
| 802.11n20 | ∞ | ∞ | 100 | 0 |
| 802.11n40 | ∞ | ∞ | 100 | 0 |

| Modulation | Channel | Frequency (MHz) | Average Conducted Output Power (dBm) | Maximum Conducted Output Power (dBm) | Limit (dBm) |
|------------|---------|-----------------|--------------------------------------|--------------------------------------|-------------|
| 802.11a | 36 | 5180 | 9.96 | 9.96 | 24 |
| | 40 | 5200 | 11.06 | 11.06 | 24 |
| | 48 | 5240 | 10.03 | 10.03 | 24 |
| | 52 | 5260 | 7.64 | 7.64 | 24 |
| | 60 | 5300 | 7.64 | 7.64 | 24 |
| | 64 | 5320 | 7.41 | 7.41 | 24 |
| | 100 | 5500 | 7.04 | 7.04 | 24 |
| | 120 | 5600 | 7.43 | 7.43 | 24 |
| | 140 | 5700 | 8.02 | 8.02 | 24 |
| | 149 | 5745 | 2.39 | 2.39 | 30 |
| | 157 | 5785 | 2.6 | 2.6 | 30 |
| | 165 | 5825 | 2.67 | 2.67 | 30 |

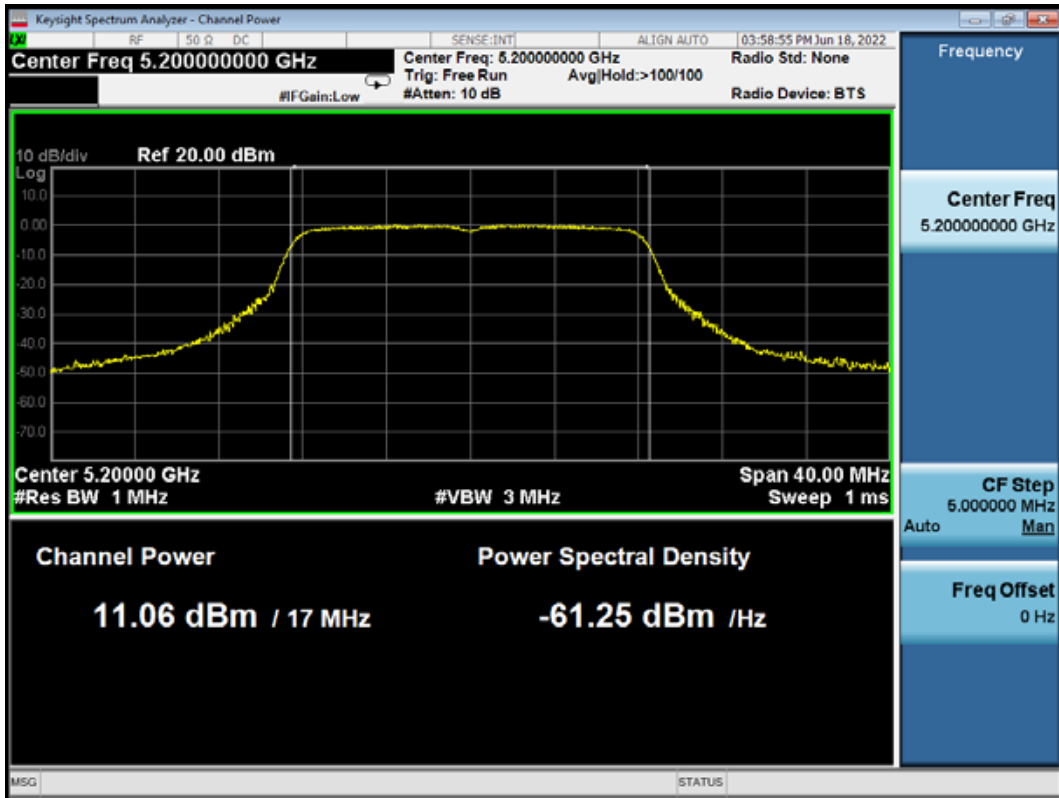
| Modulation | Channel | Frequency (MHz) | Average Conducted Output Power (dBm) | Maximum Conducted Output Power (dBm) | Limit (dBm) |
|------------|---------|-----------------|--------------------------------------|--------------------------------------|-------------|
| 802.11n20 | 36 | 5180 | 9.42 | 9.42 | 24 |
| | 40 | 5200 | 11.33 | 11.33 | 24 |
| | 48 | 5240 | 10.75 | 10.75 | 24 |
| | 52 | 5260 | 7.55 | 7.55 | 24 |
| | 60 | 5300 | 7.51 | 7.51 | 24 |
| | 64 | 5320 | 7.39 | 7.39 | 24 |
| | 100 | 5500 | 7.4 | 7.4 | 24 |
| | 120 | 5600 | 7.47 | 7.47 | 24 |
| | 140 | 5700 | 8.25 | 8.25 | 24 |
| | 149 | 5745 | 2.09 | 2.09 | 30 |
| | 157 | 5785 | 2.36 | 2.36 | 30 |
| | 165 | 5825 | 2.34 | 2.34 | 30 |

| Modulation | Channel | Frequency (MHz) | Average Conducted Output Power (dBm) | Maximum Conducted Output Power (dBm) | Limit (dBm) |
|------------|---------|-----------------|--------------------------------------|--------------------------------------|-------------|
| 802.11n40 | 38 | 5190 | 10.68 | 10.68 | 24 |
| | 46 | 5230 | 10.59 | 10.59 | 24 |
| | 54 | 5270 | 9.5 | 9.5 | 24 |
| | 62 | 5310 | 9.41 | 9.41 | 24 |
| | 102 | 5510 | 9.12 | 9.12 | 24 |
| | 118 | 5590 | 9.49 | 9.49 | 24 |
| | 134 | 5670 | 9.57 | 9.57 | 24 |
| | 151 | 5755 | 9.91 | 9.91 | 30 |
| | 159 | 5795 | 10.19 | 10.19 | 30 |

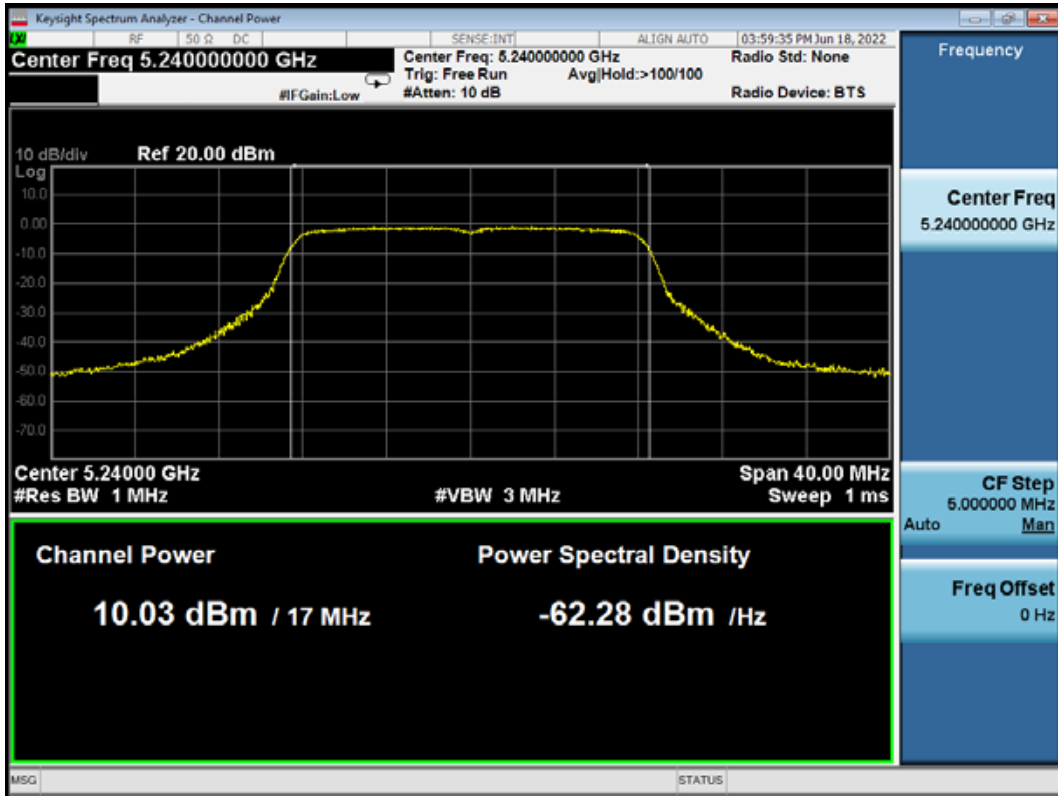
802.11a CH5180MHz



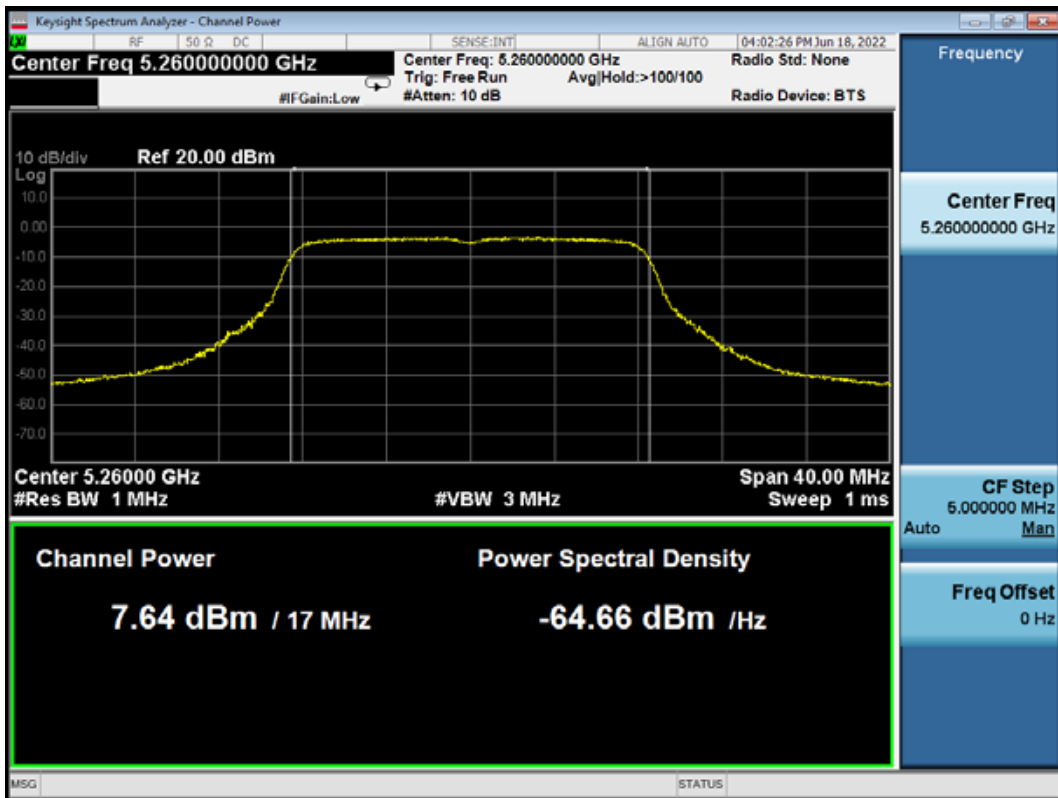
802.11a CH5200MHz



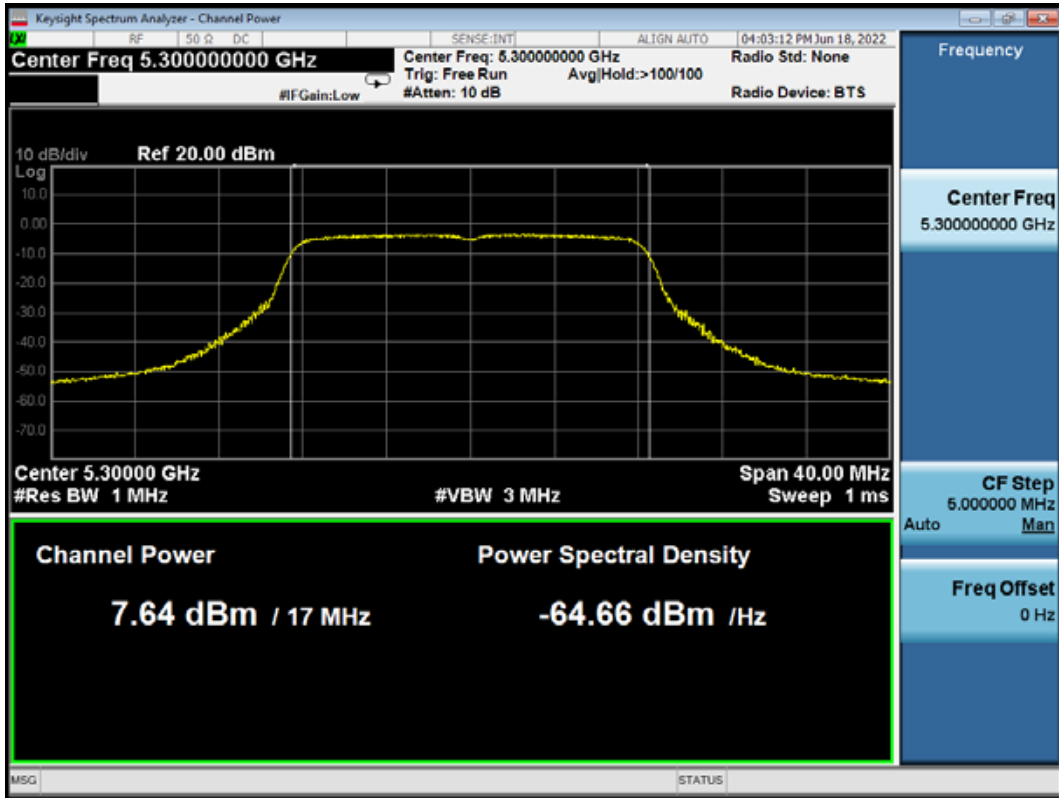
802.11a CH5240MHz



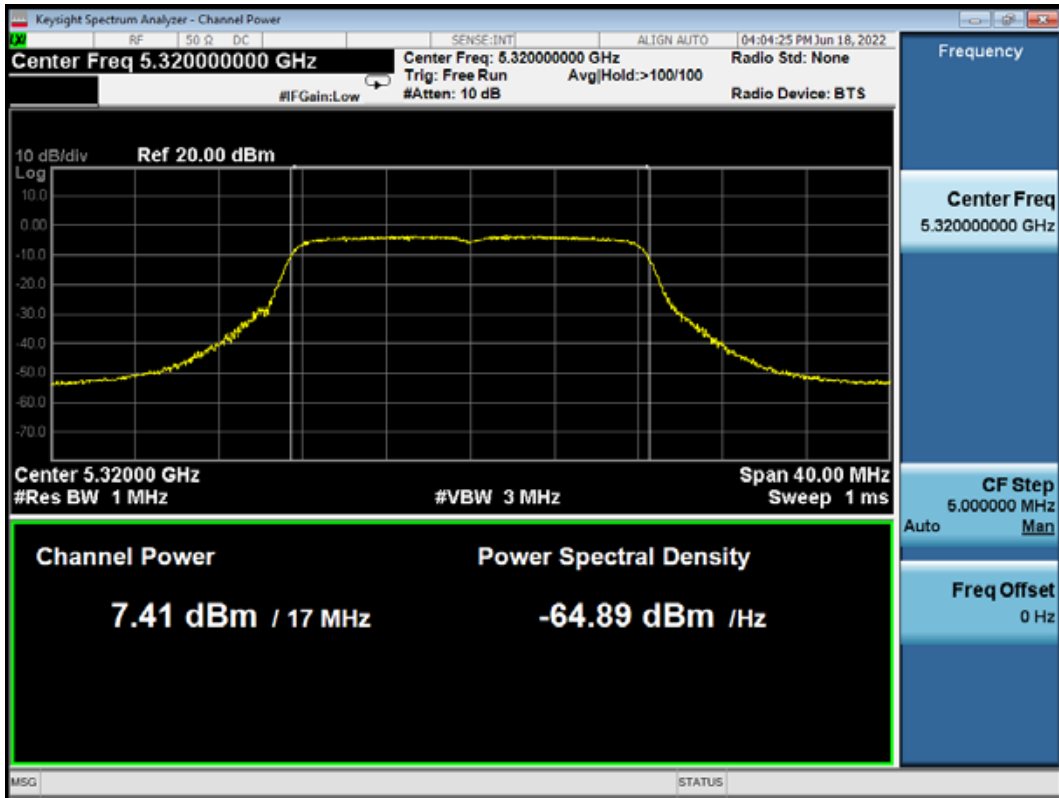
802.11a CH5260MHz



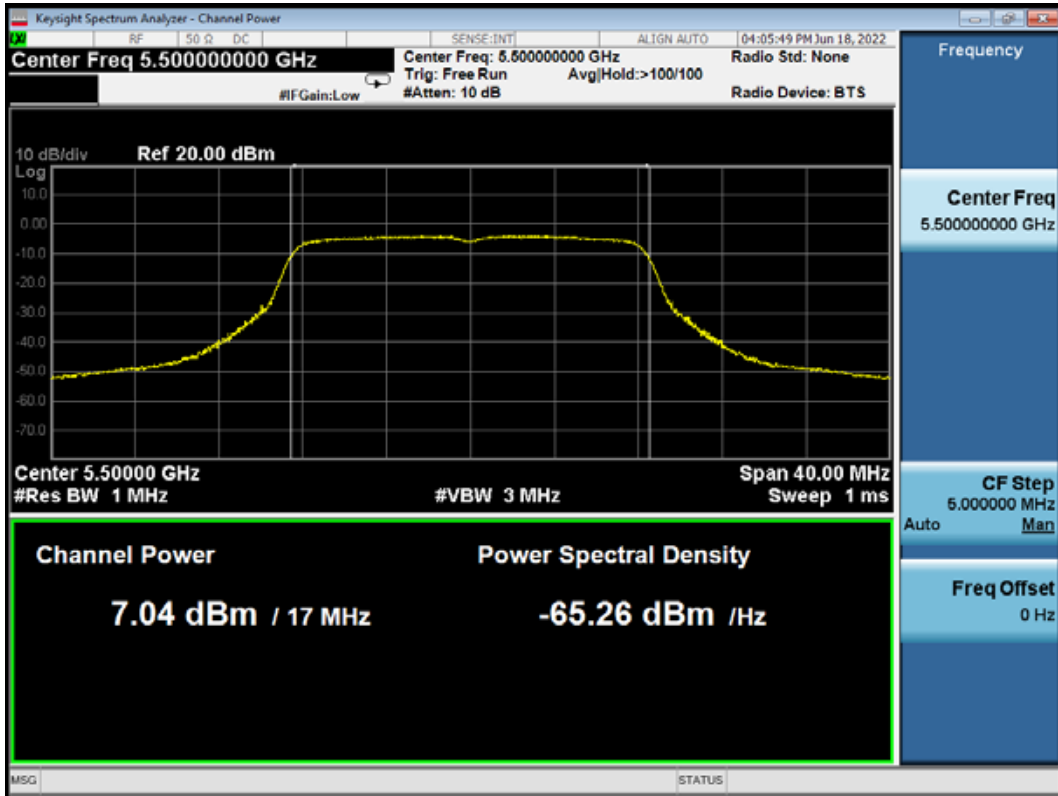
802.11a CH5300MHz



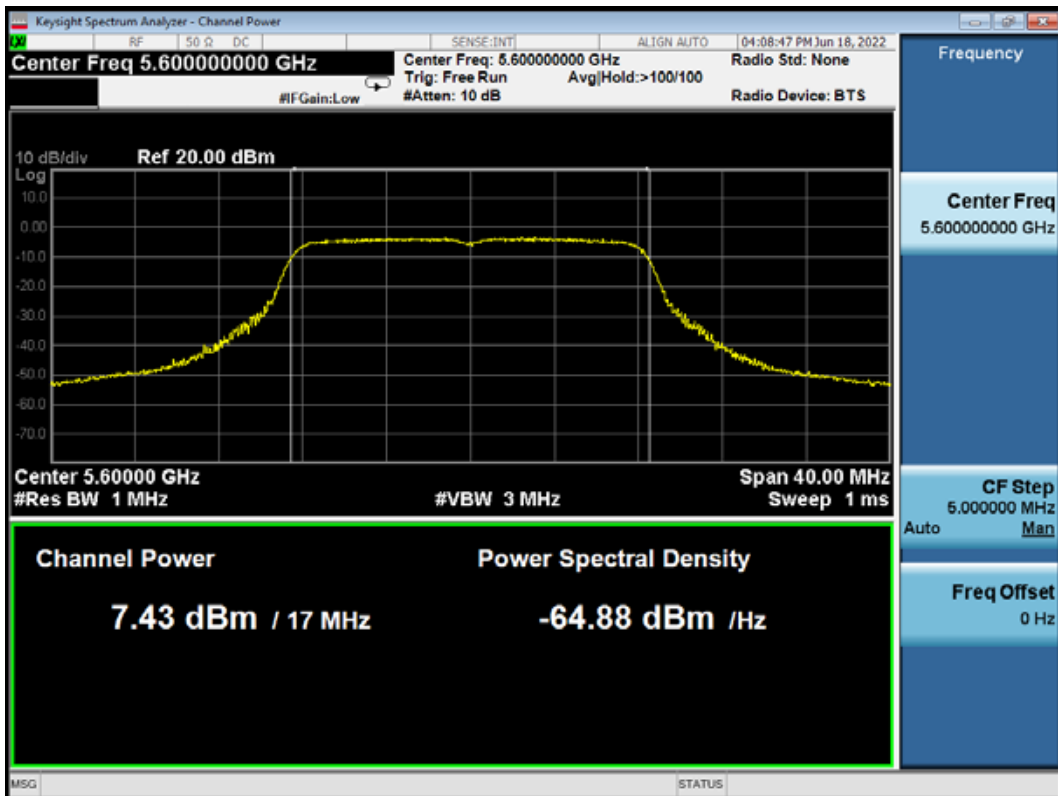
802.11a CH5320MHz



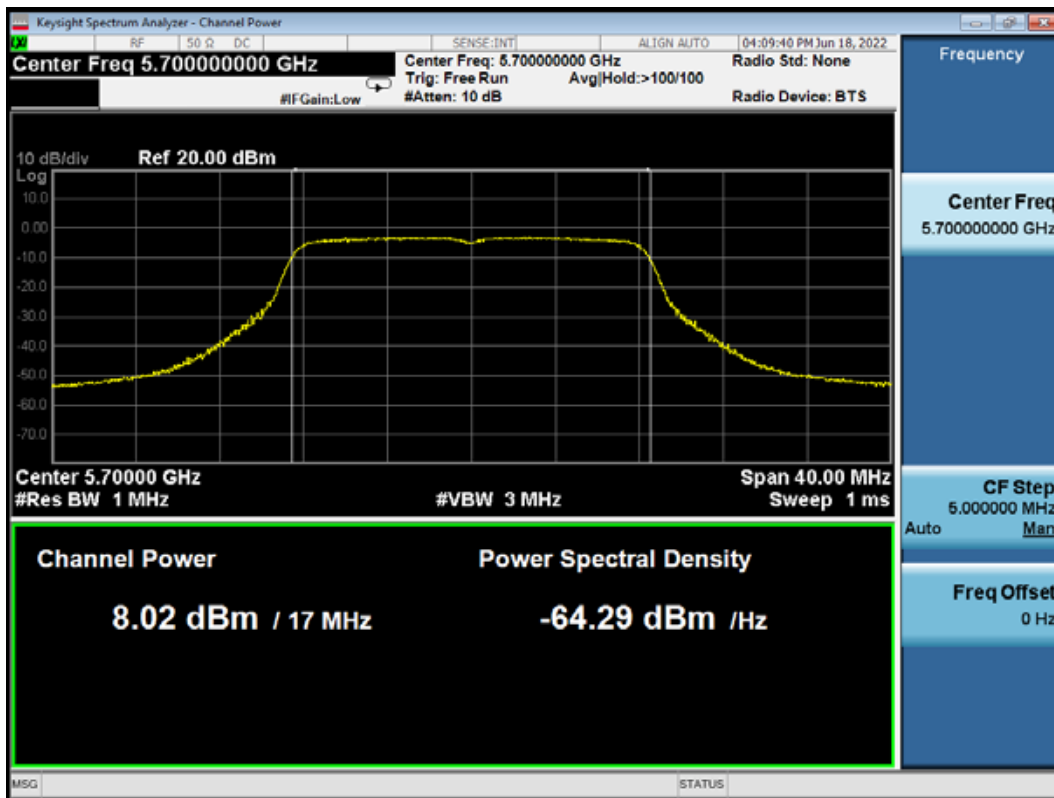
802.11a CH5500MHz



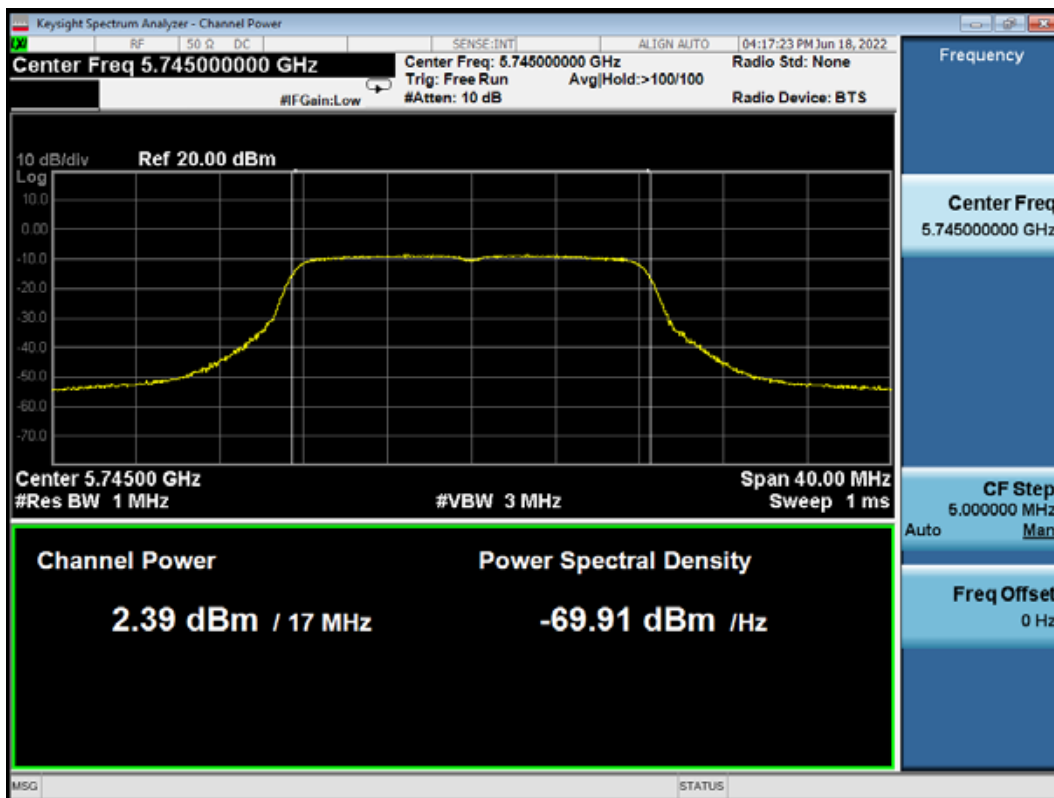
802.11a CH5600MHz



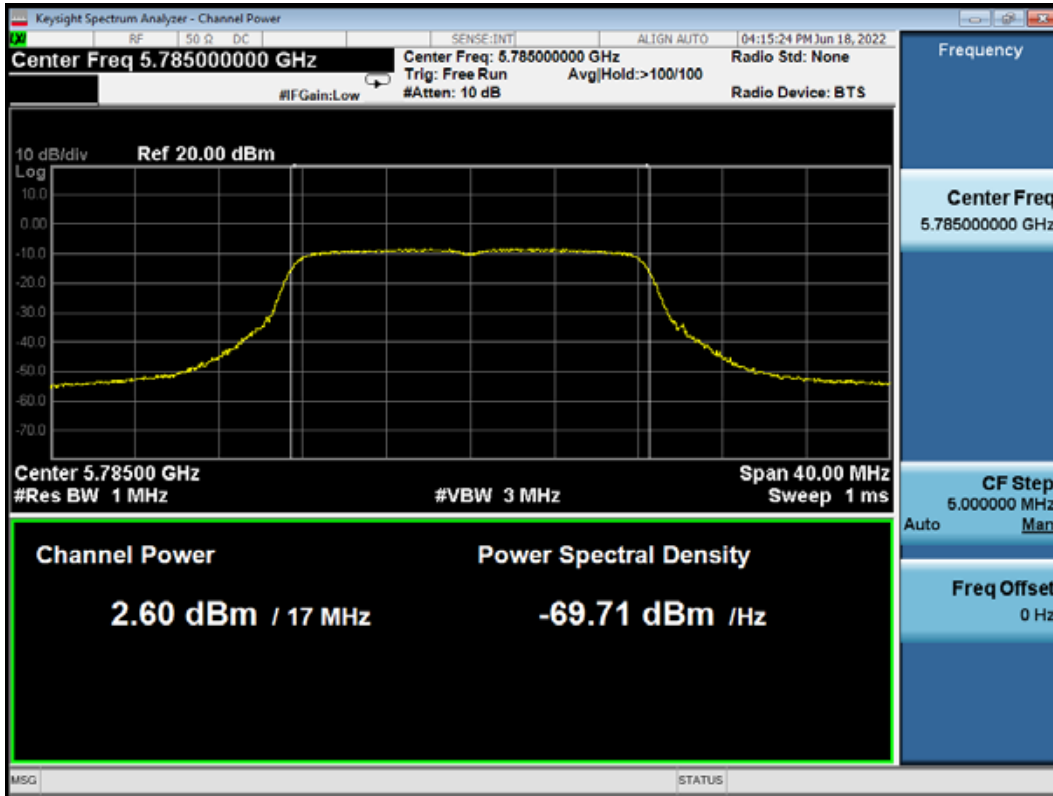
802.11a CH5700MHz



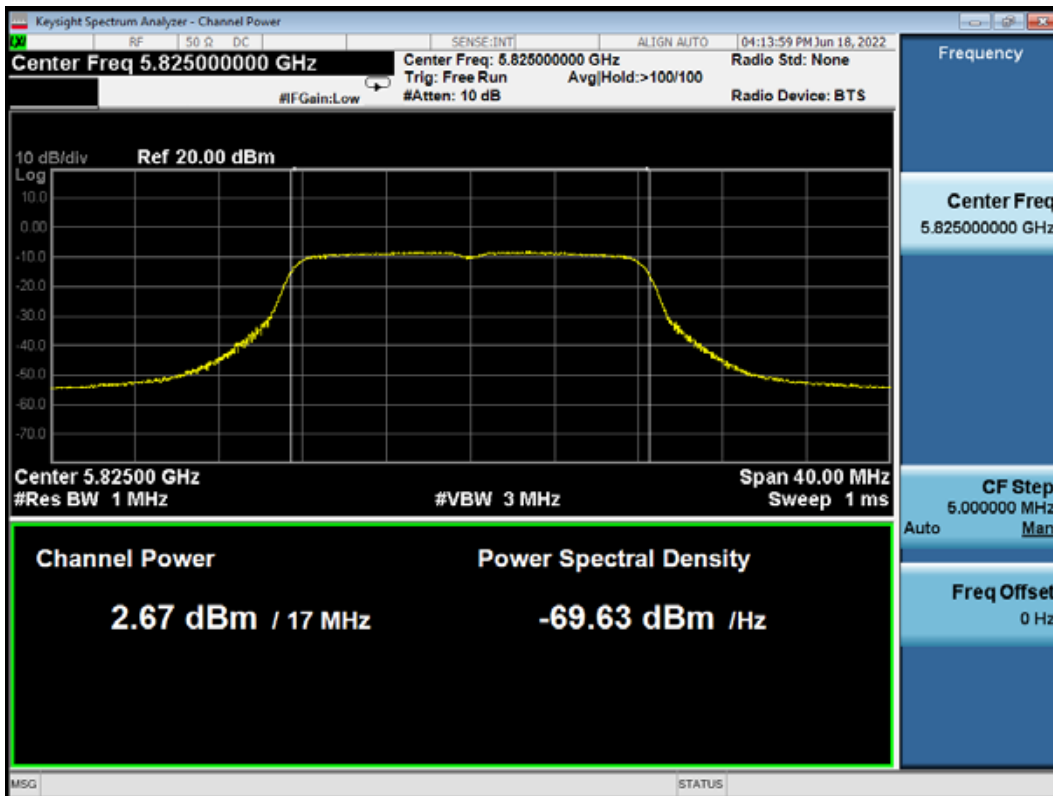
802.11a CH5745MHz



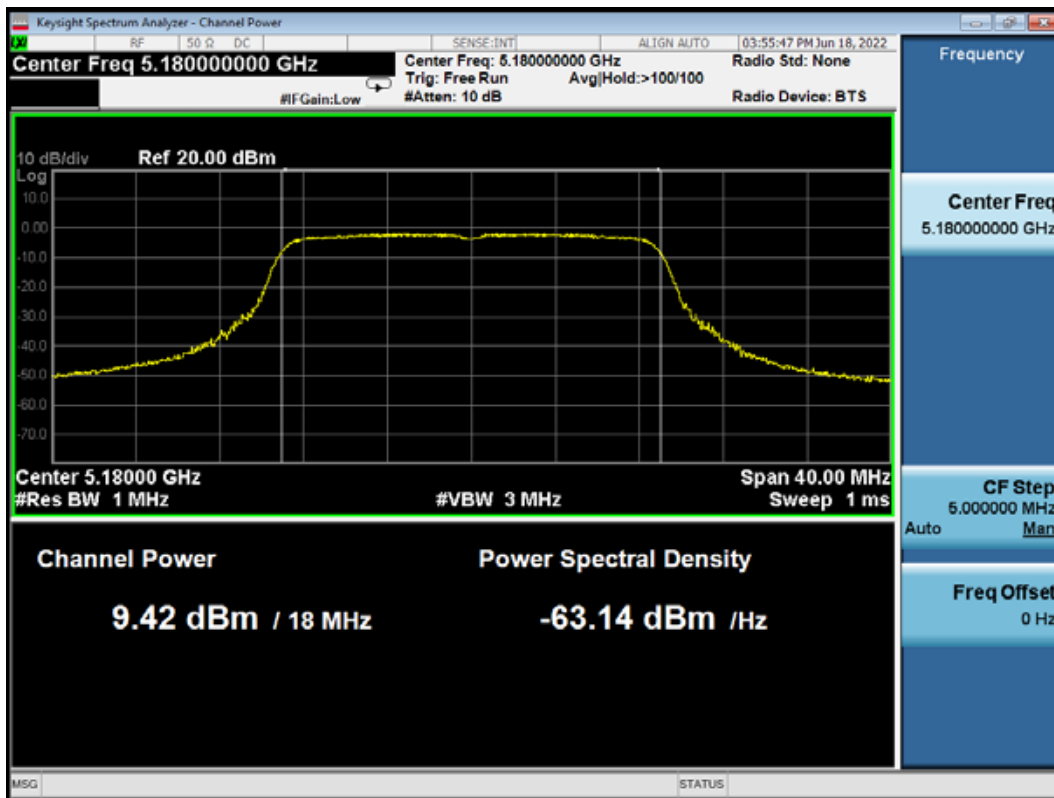
802.11a CH5785MHz



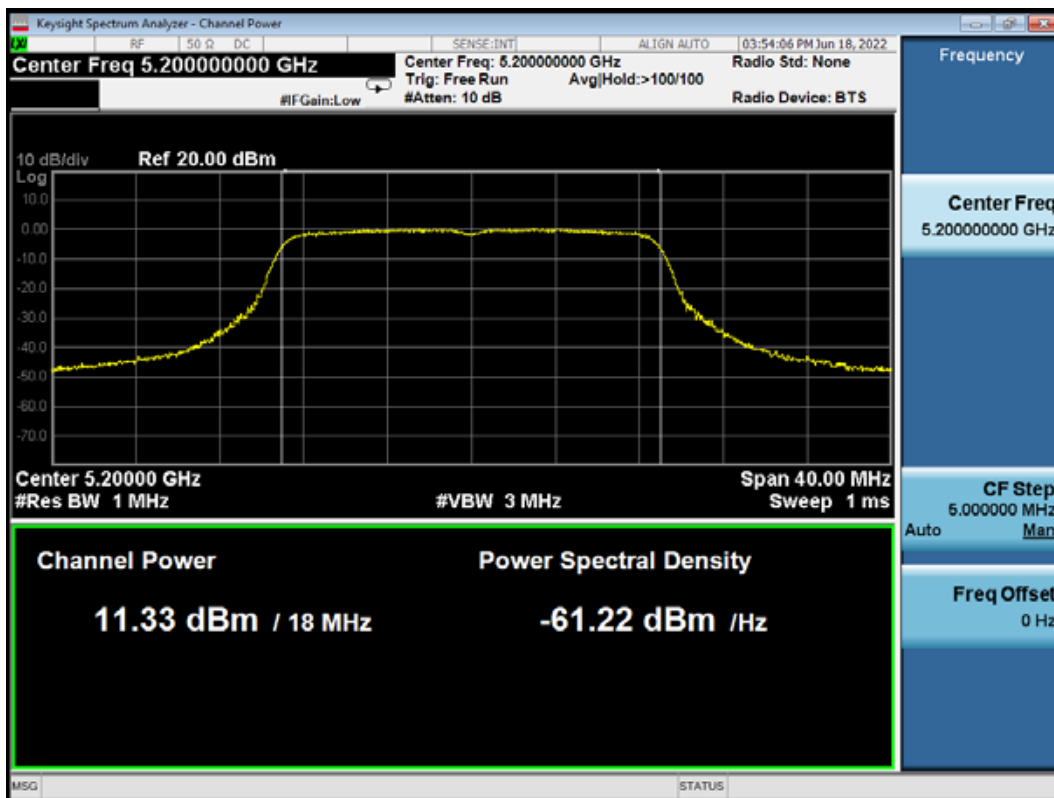
802.11a CH5825MHz



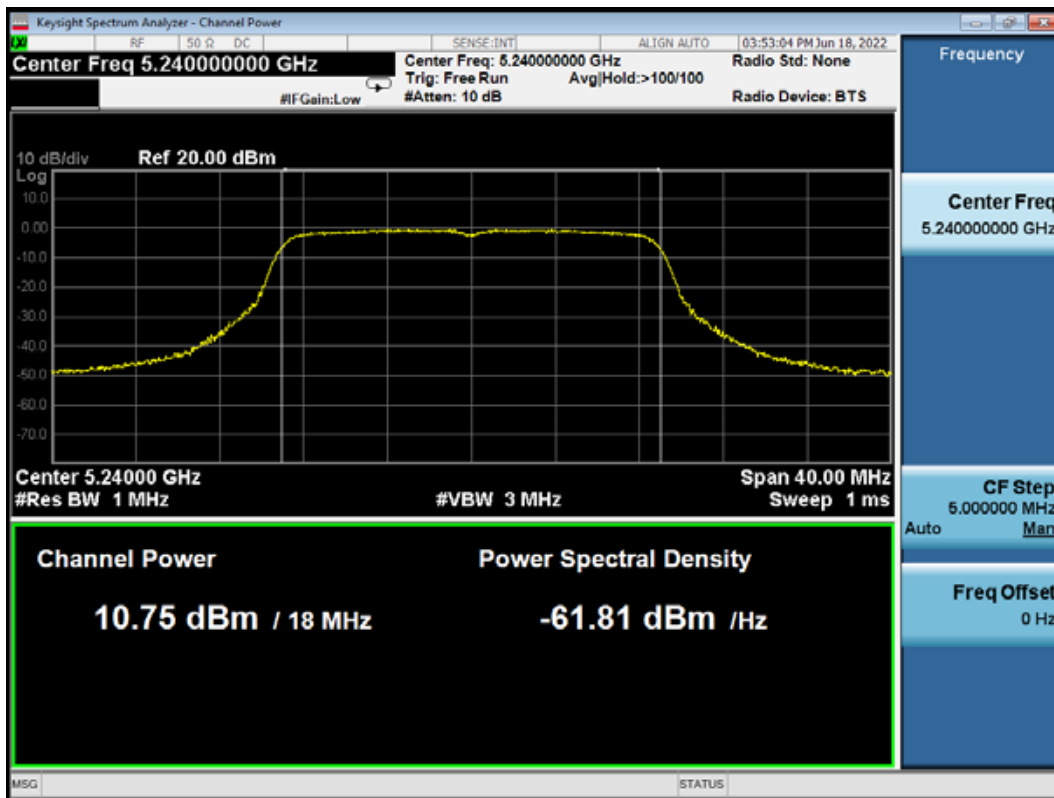
801.11n20 CH5180MHz



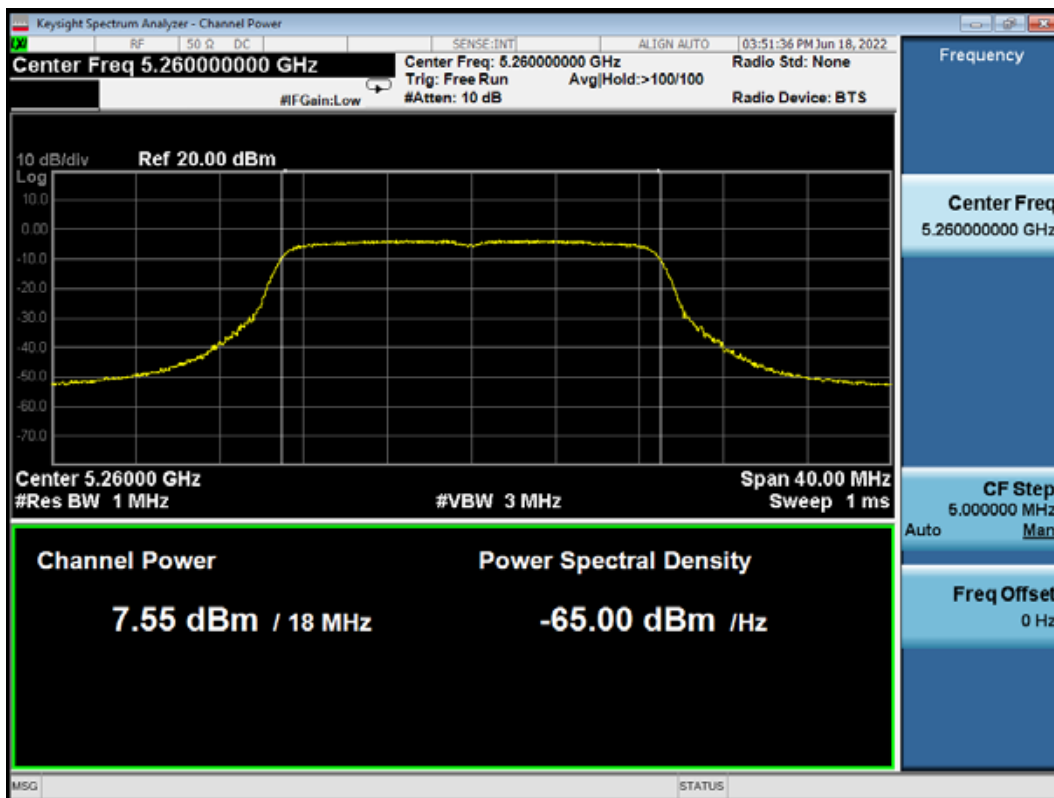
801.11n20 CH5200MHz



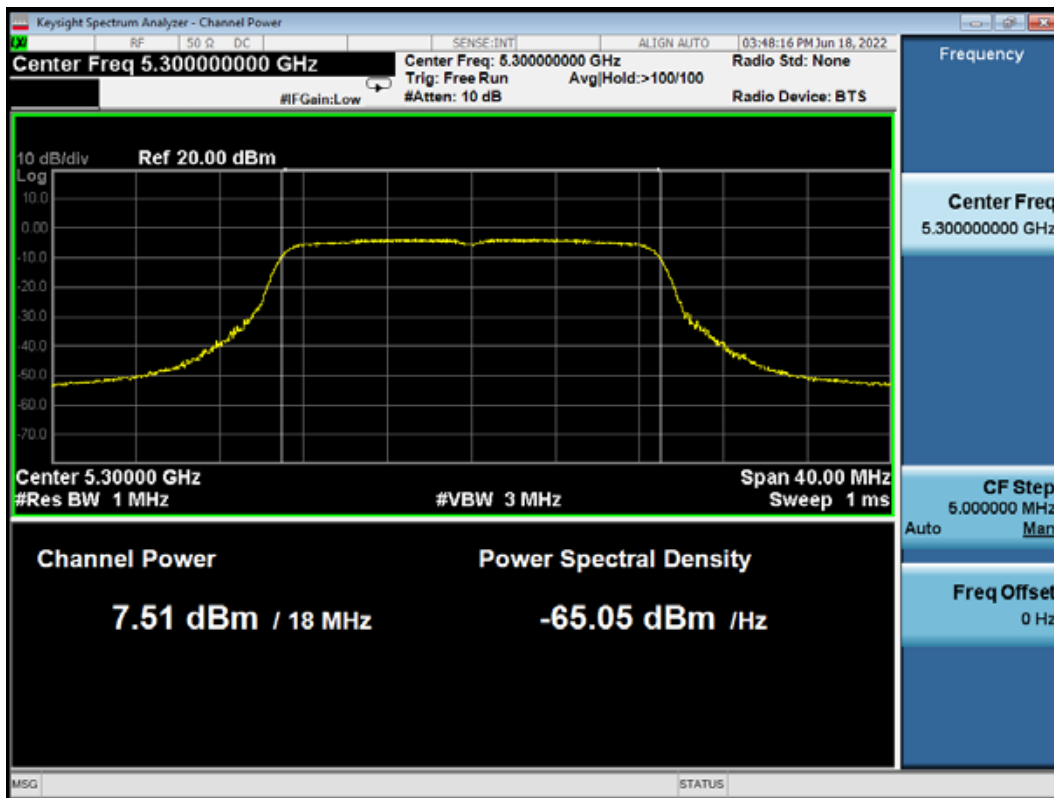
801.11n-HT20 CH5240MHz



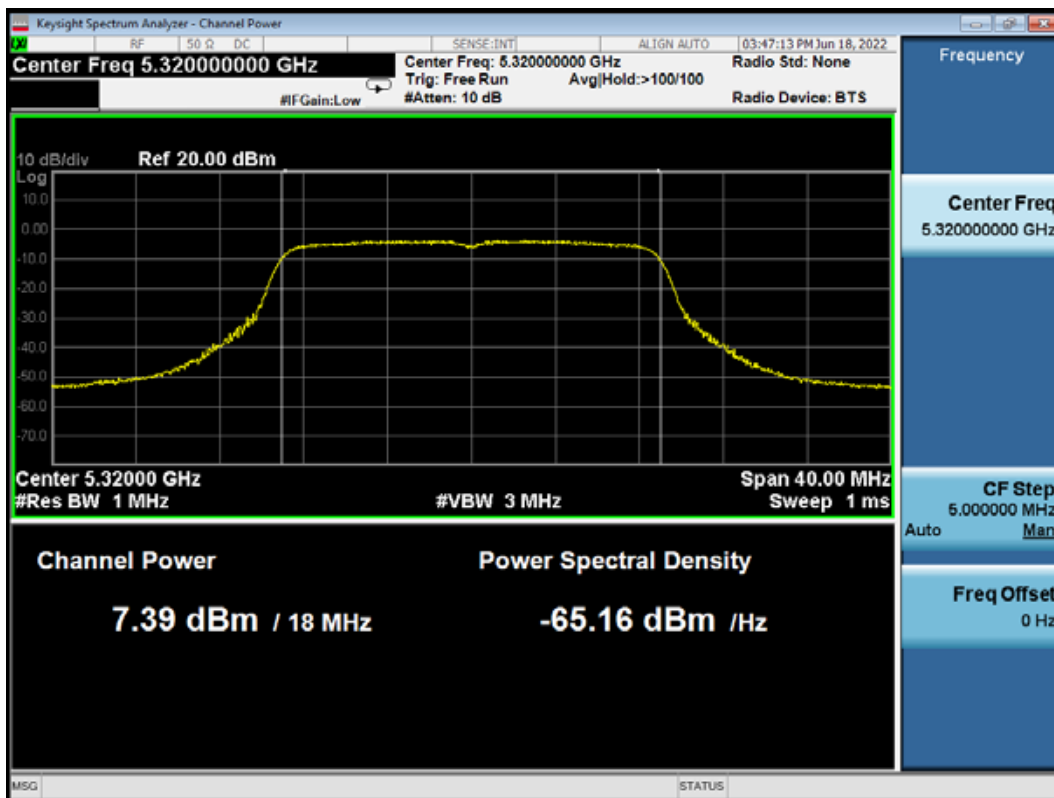
801.11n20 CH5260MHz



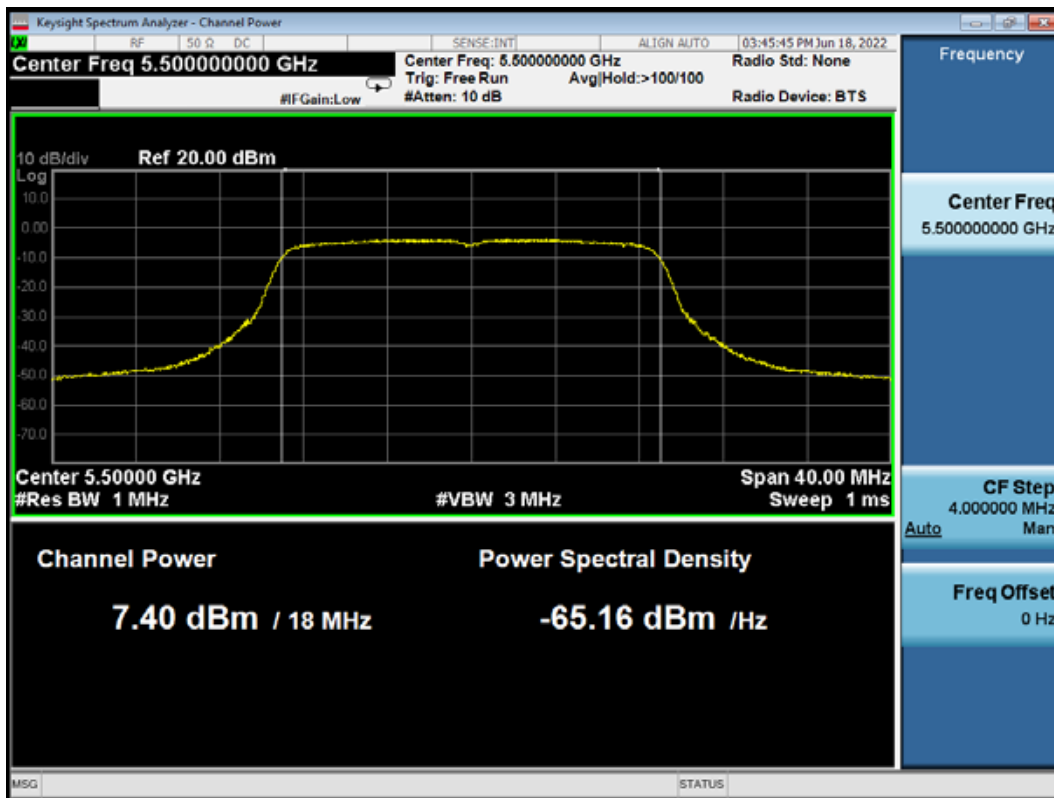
801.11n20 CH5300MHz



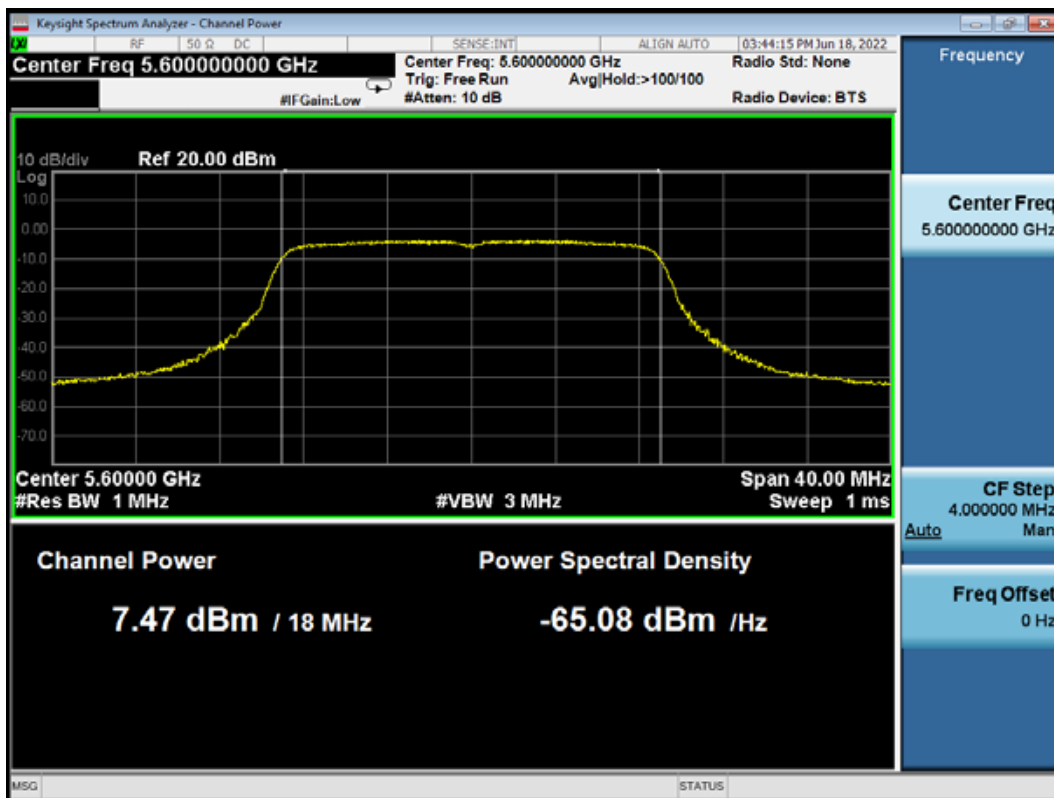
801.11n20 CH5320MHz



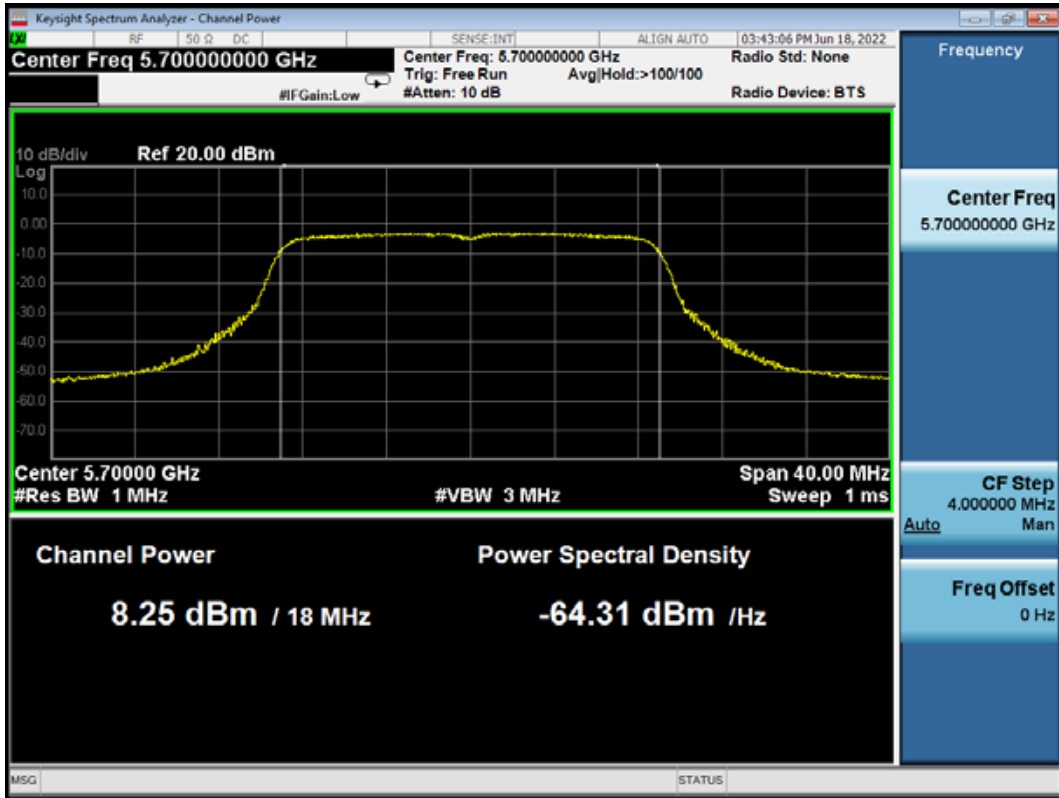
801.11n20 CH5500MHz



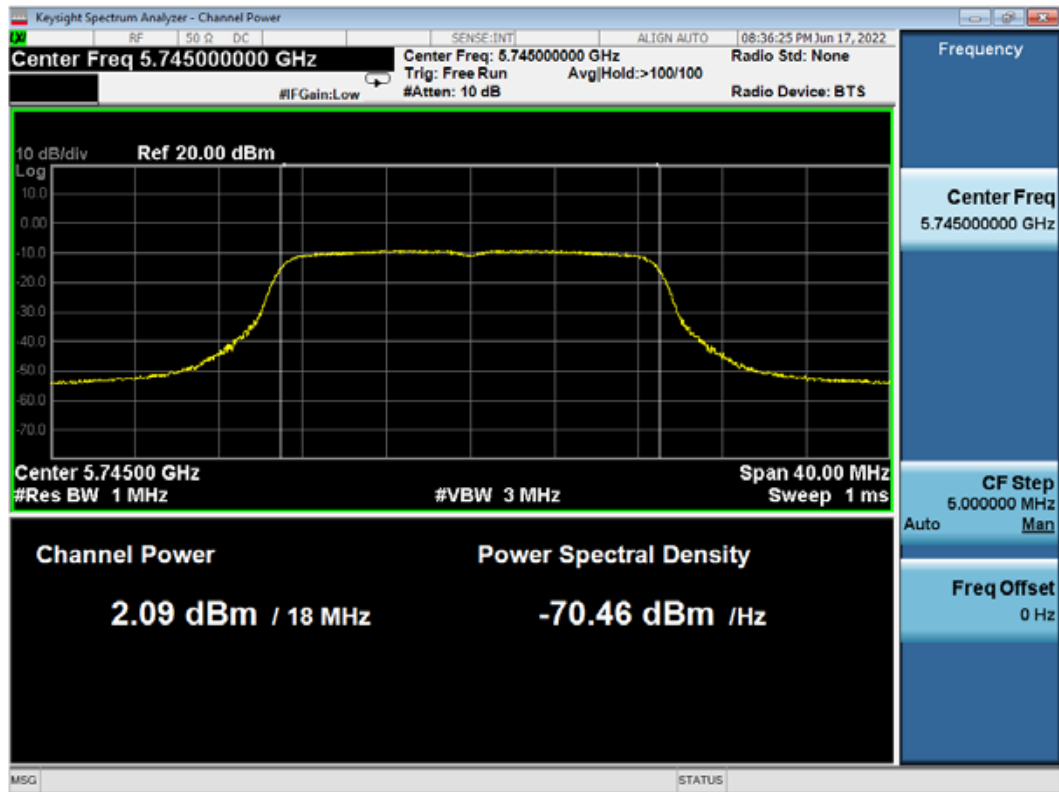
801.11n20 CH5600MHz



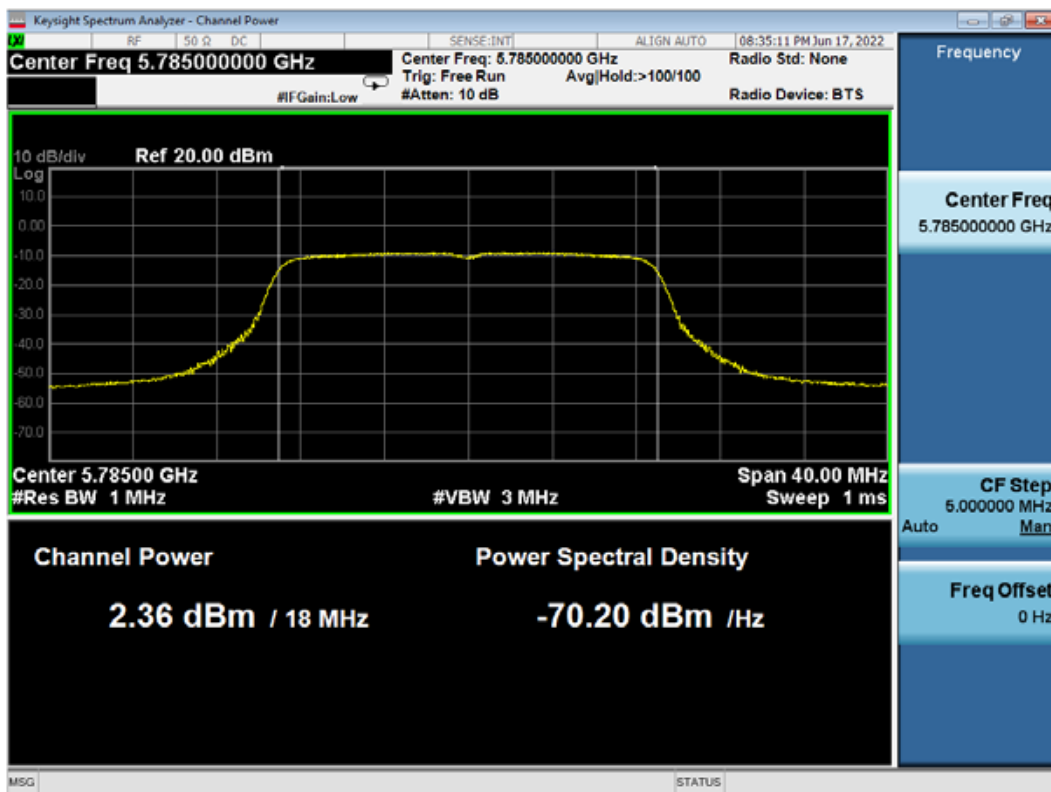
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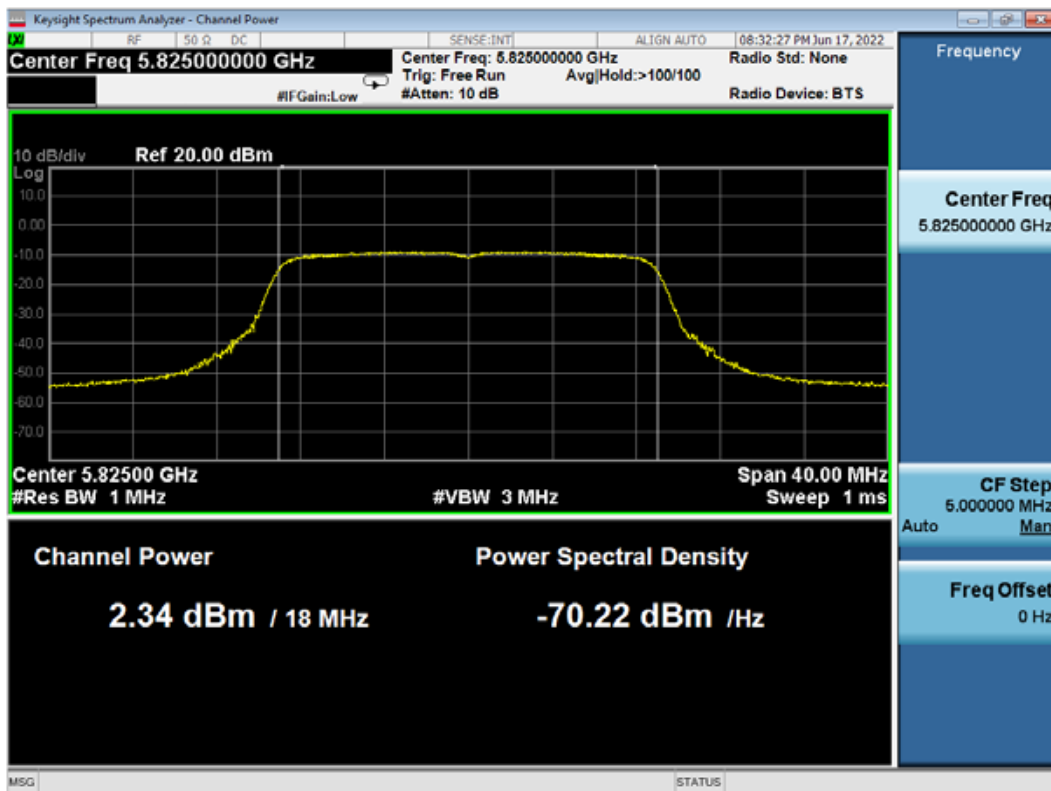
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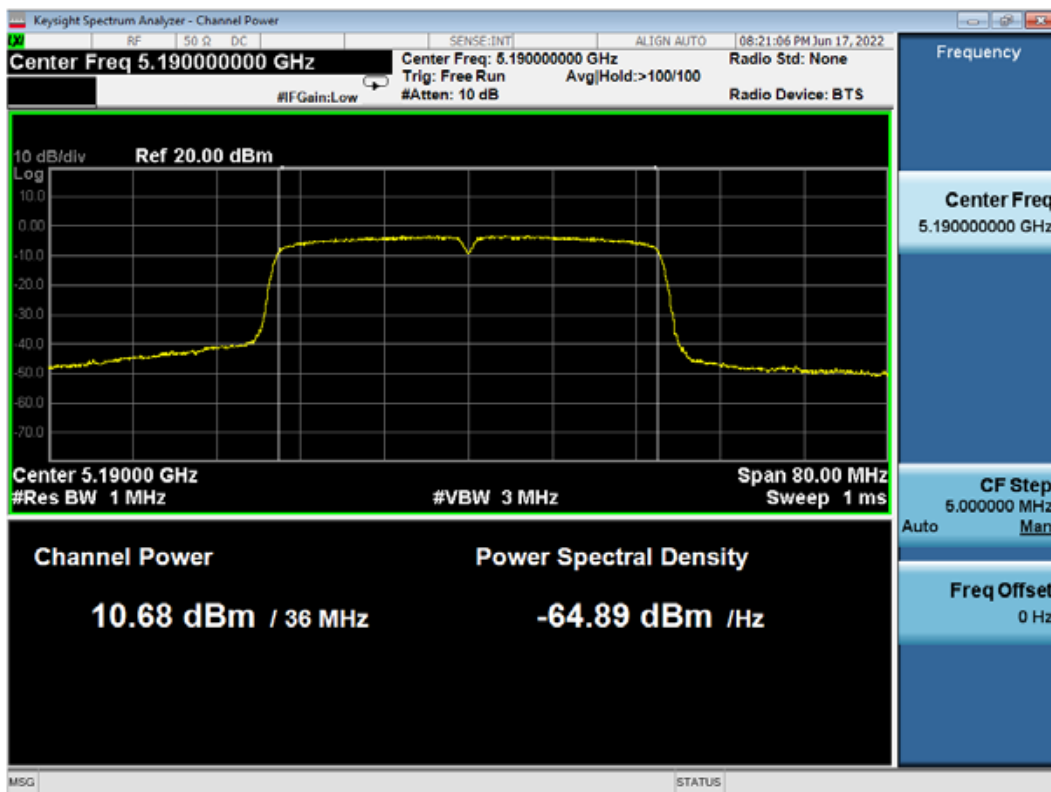
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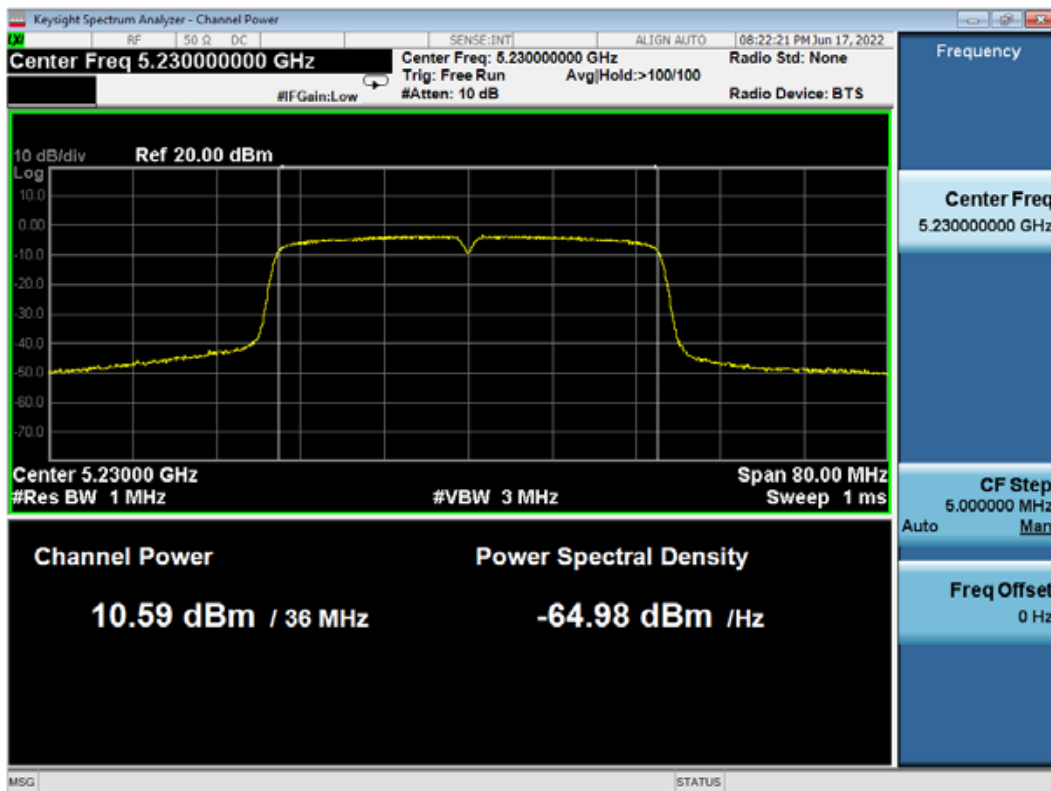
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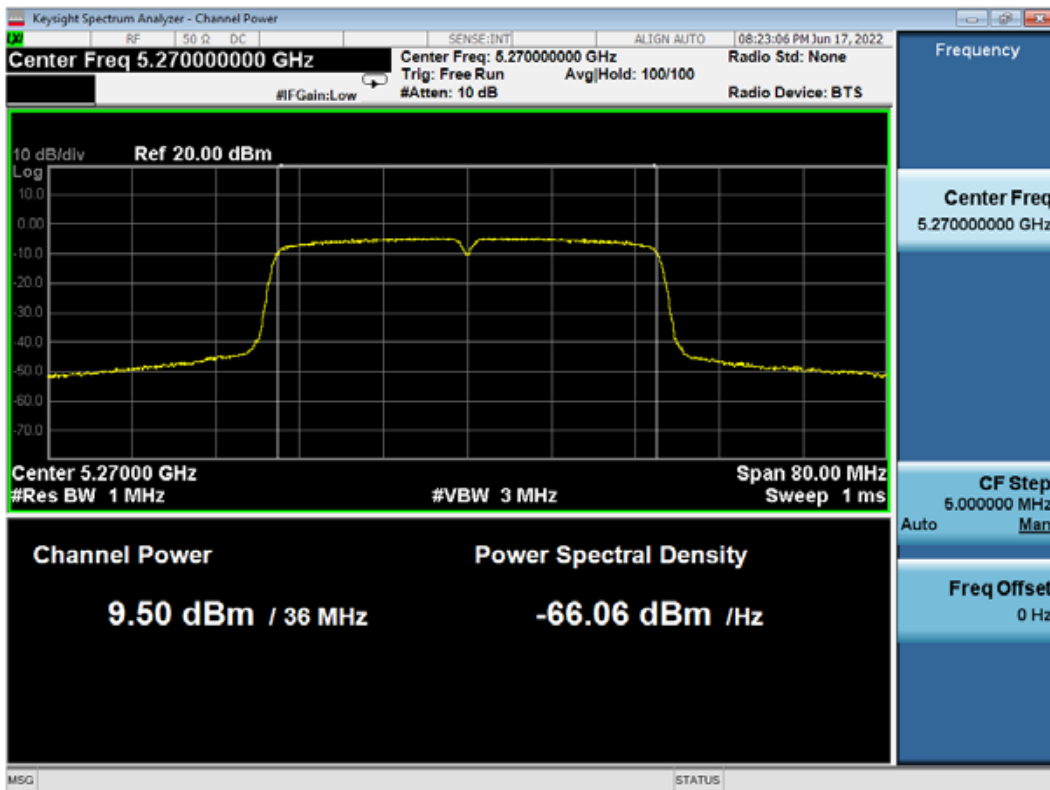
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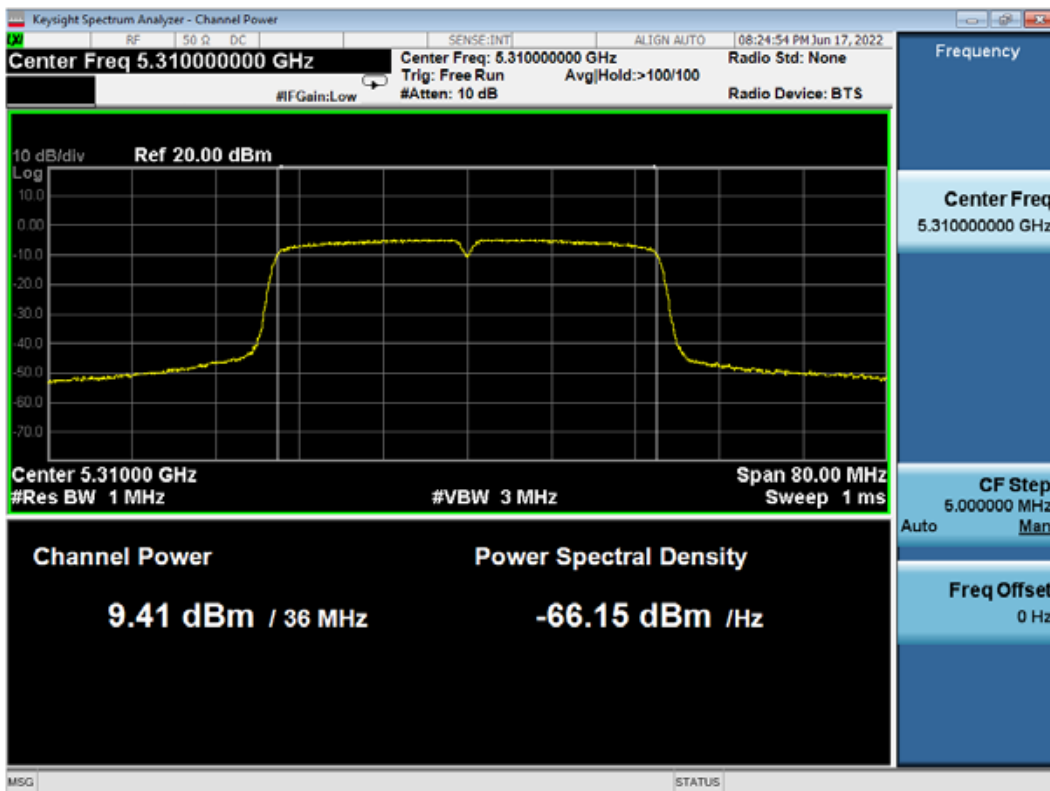
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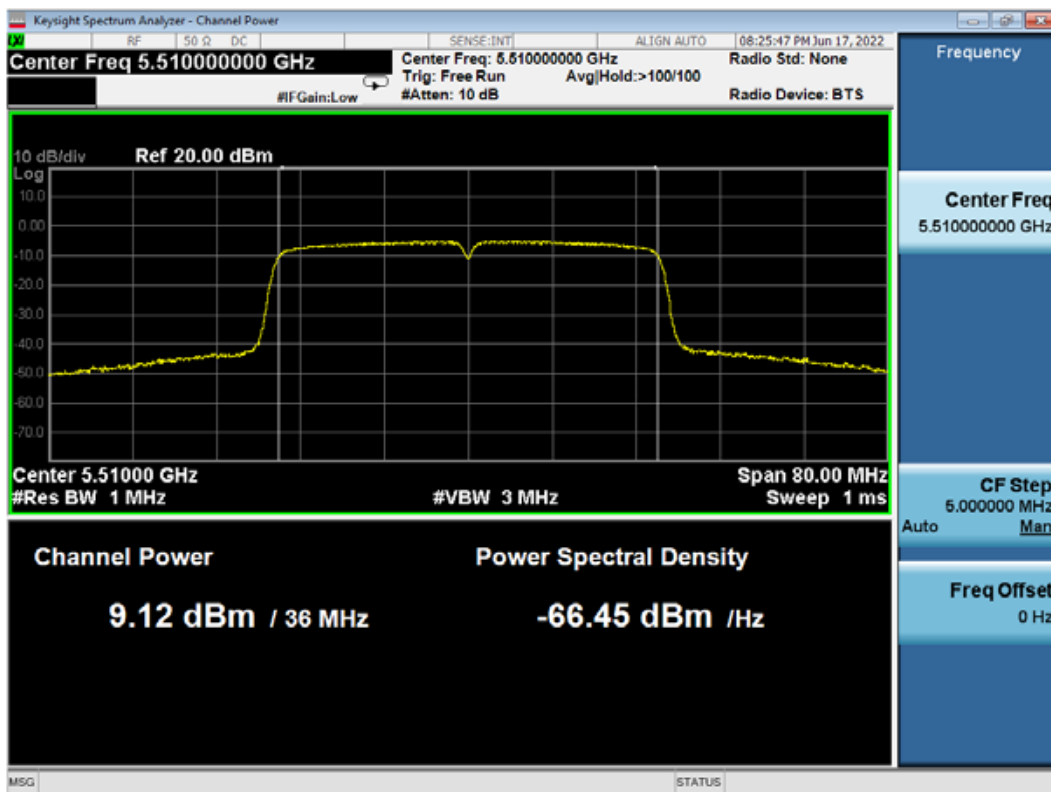
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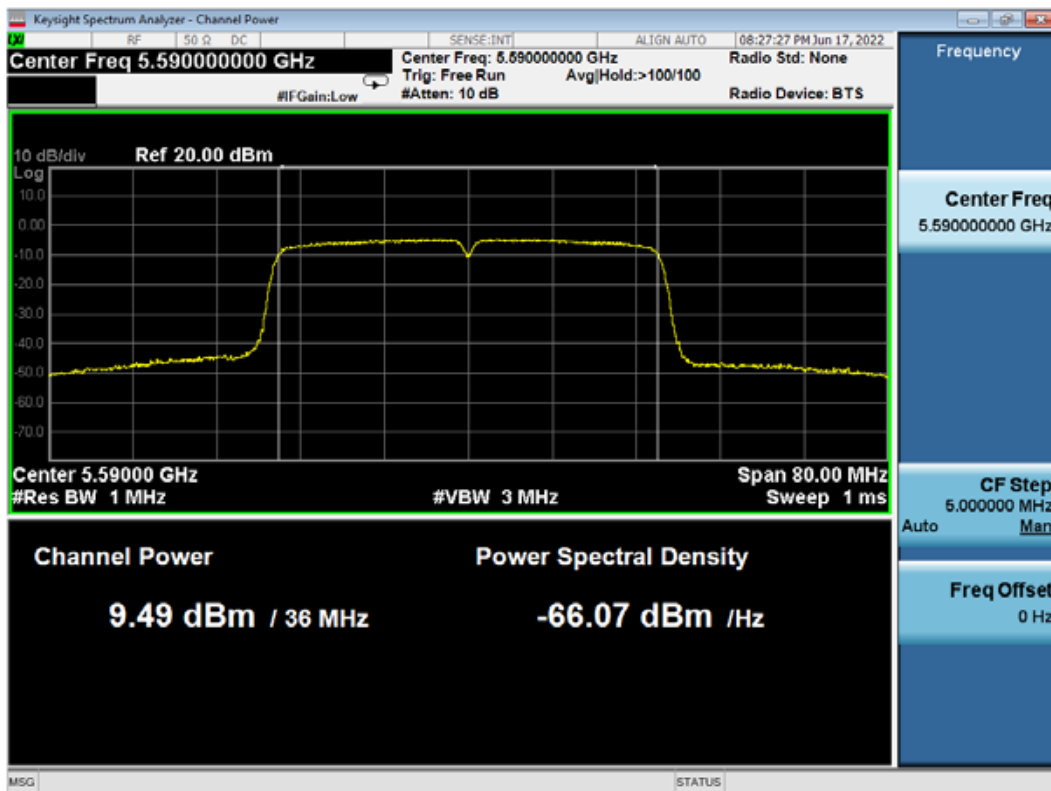
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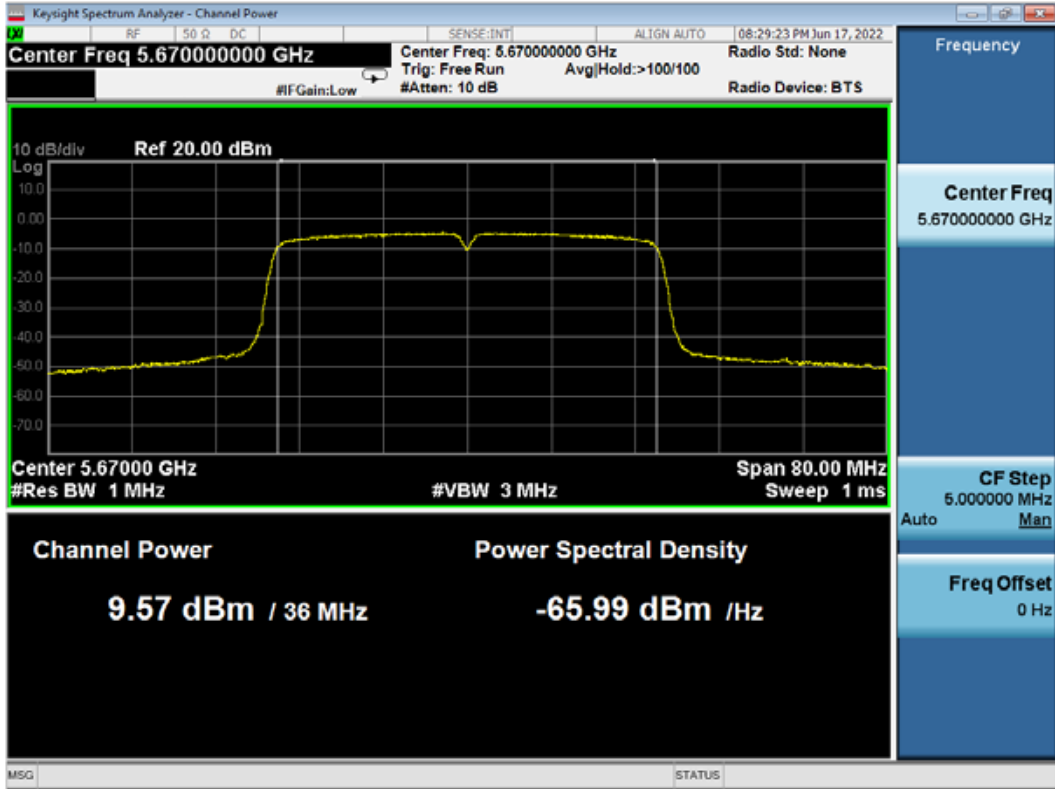
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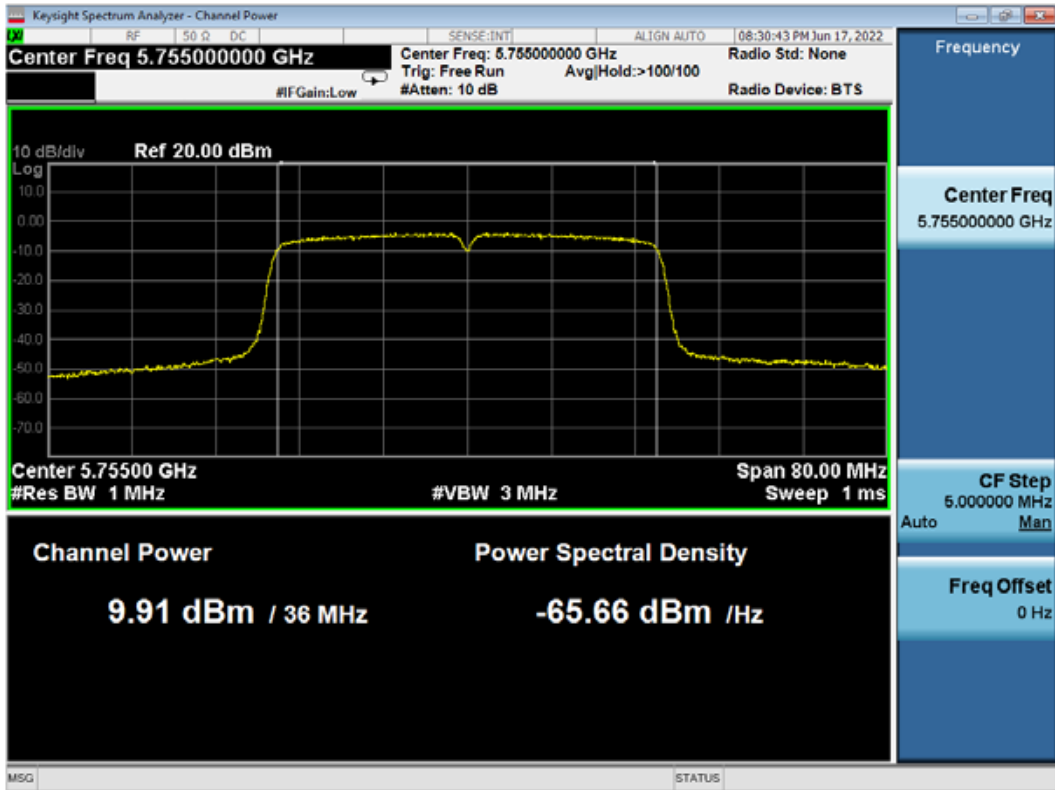
801.11n40 CH5590MHz



801.11n40 CH5670MHz



801.11n40 CH5755MHz



801.11n40 CH5795MHz

