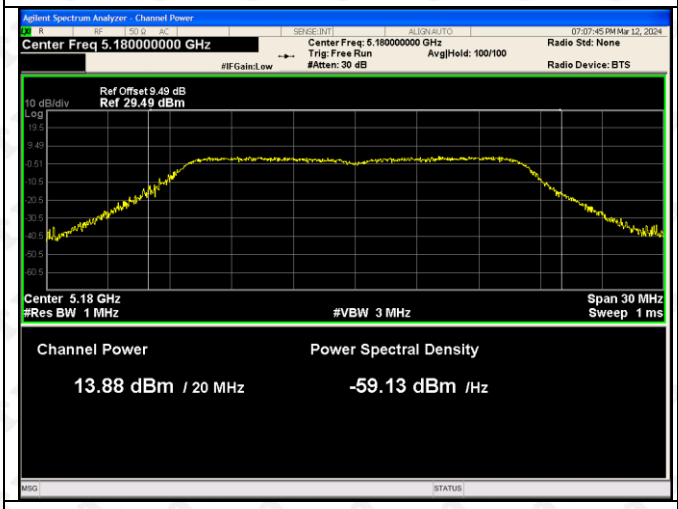
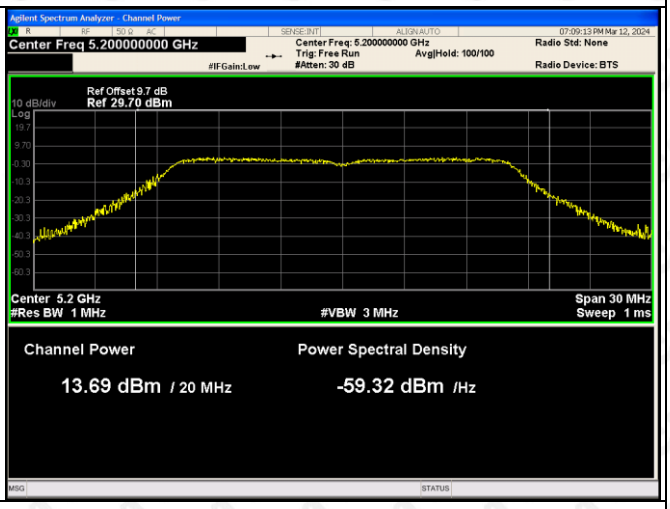
ANT1:
5180-5240MHz-Power

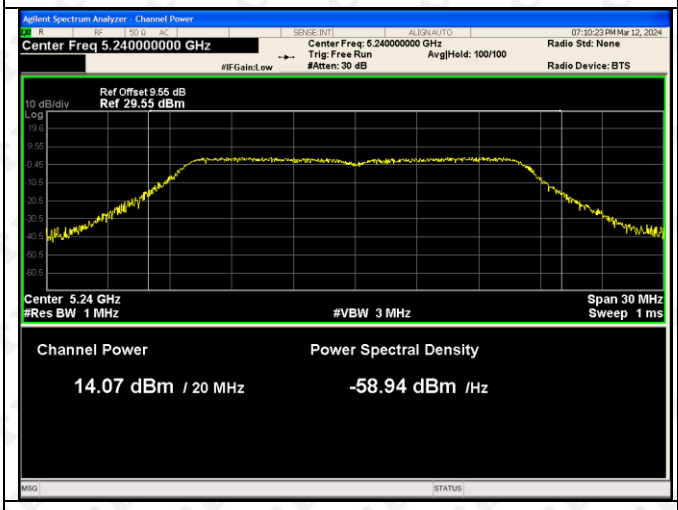
802.11a-5180



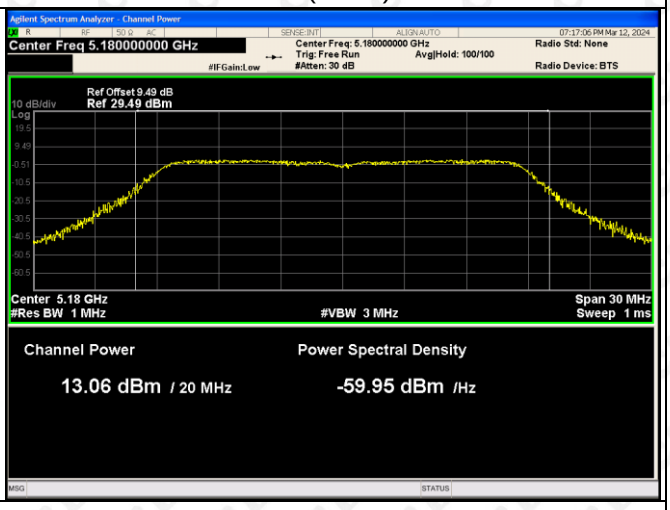
802.11a-5200



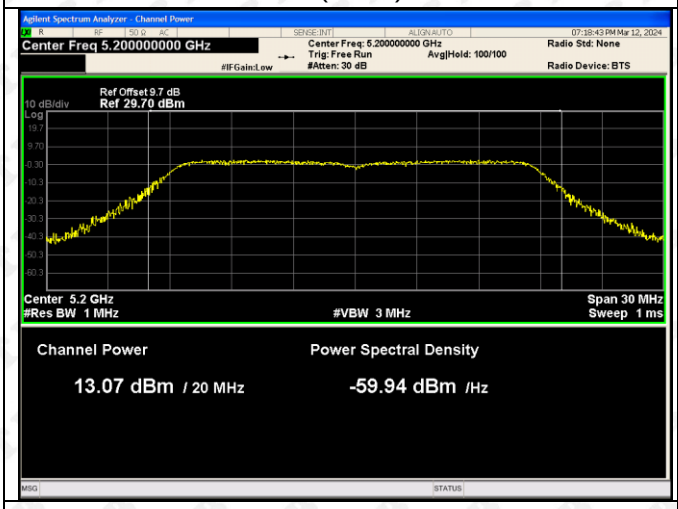
802.11a-5240



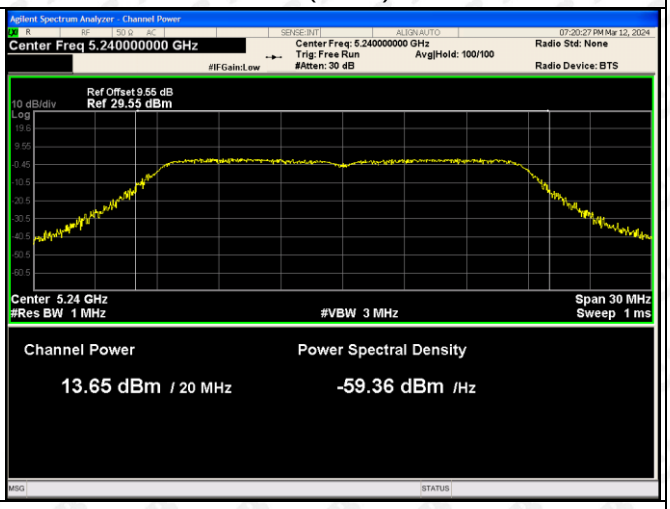
802.11ac(VH20)-5180



802.11ac(VH20)-5200

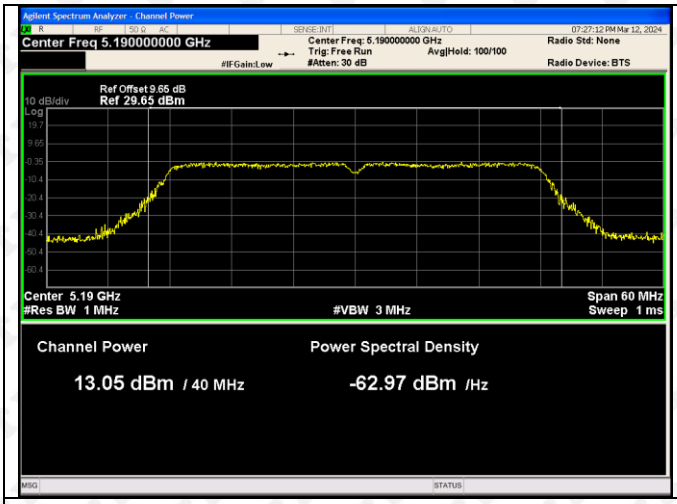


802.11ac(VH20)-5240

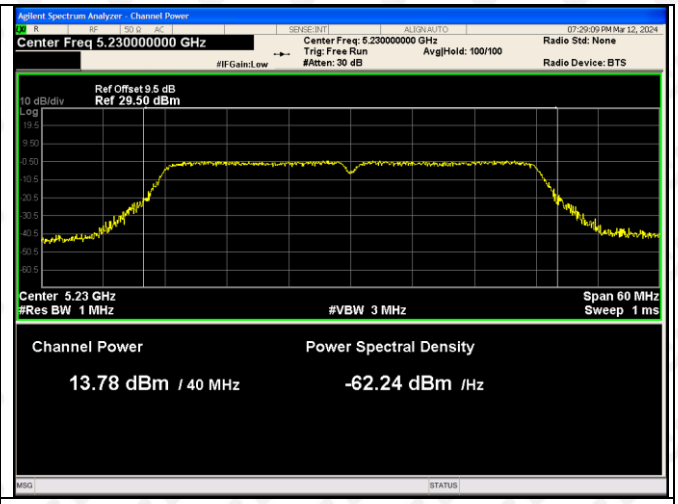


802.11ac(VH40)-5190

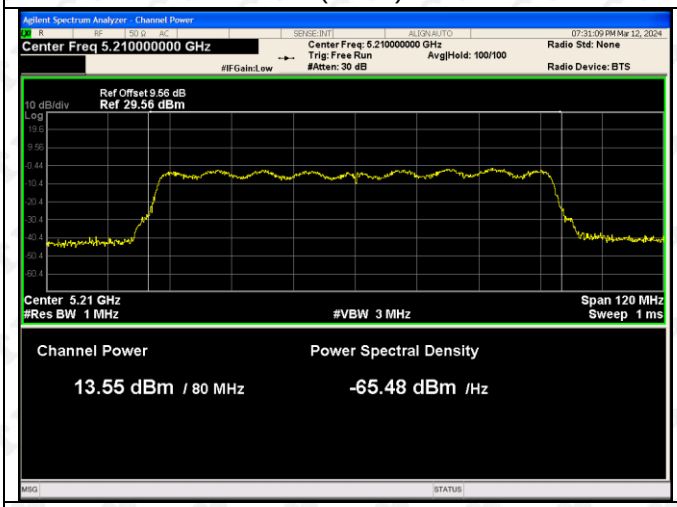
802.11ac(VH40)-5230



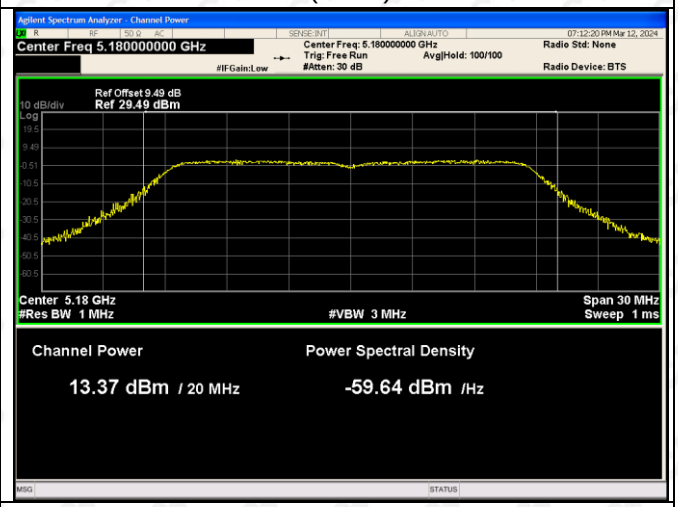
802.11ac(VH80)-5210



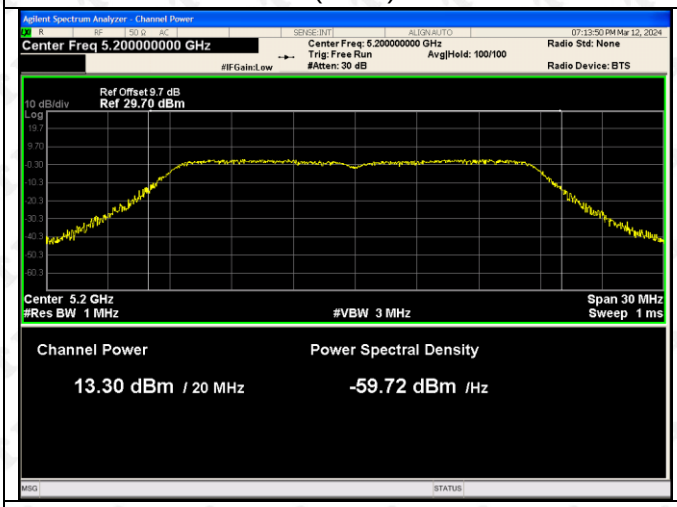
802.11n(HT20)-5180



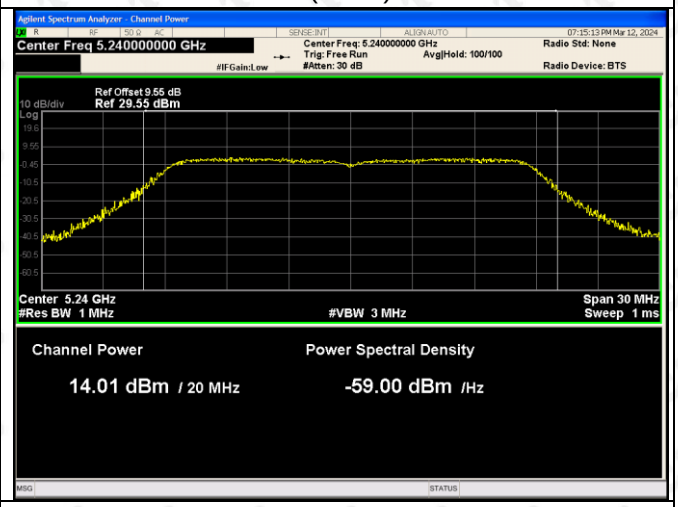
802.11n(HT20)-5200



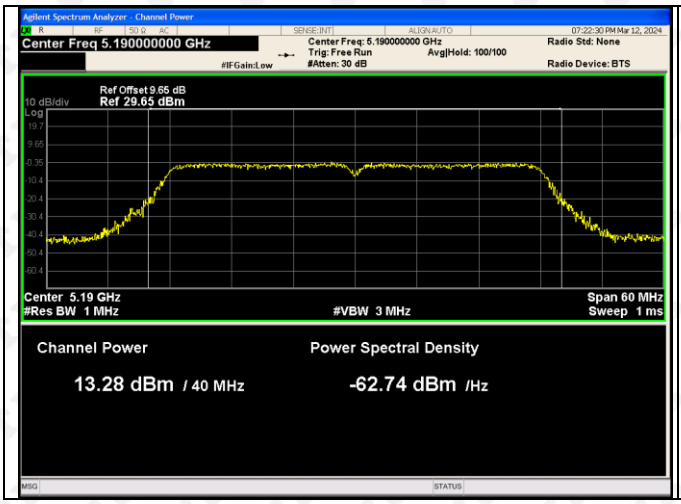
802.11n(HT20)-5240

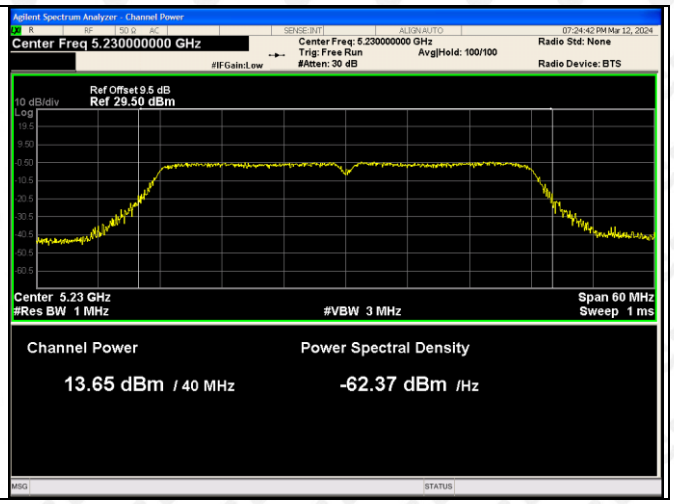


802.11n(HT40)-5190



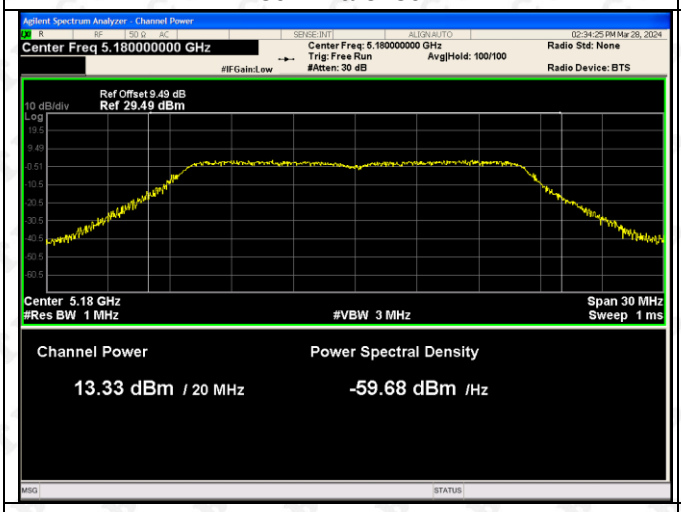
802.11n(HT40)-5230



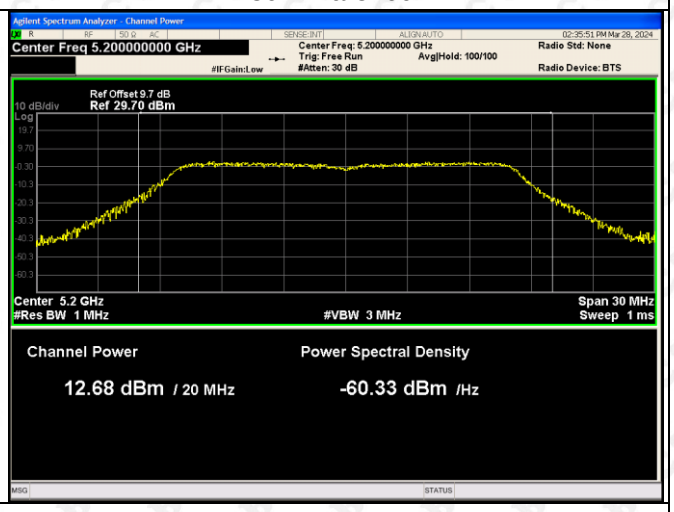


ANT2:
5180-5240MHz-Power

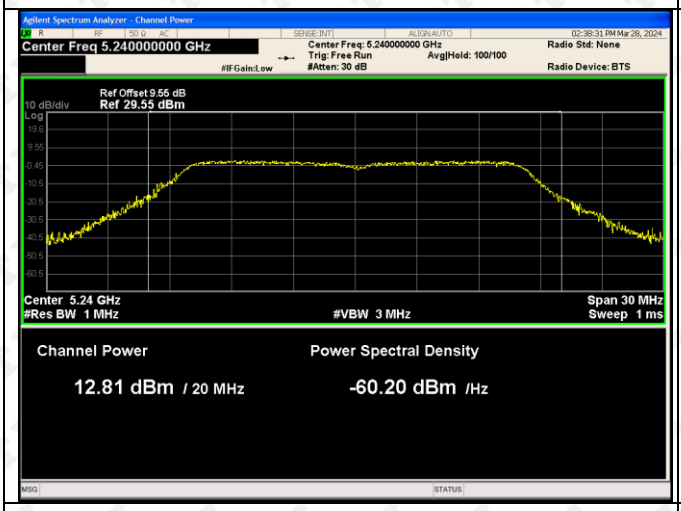
802.11a-5180



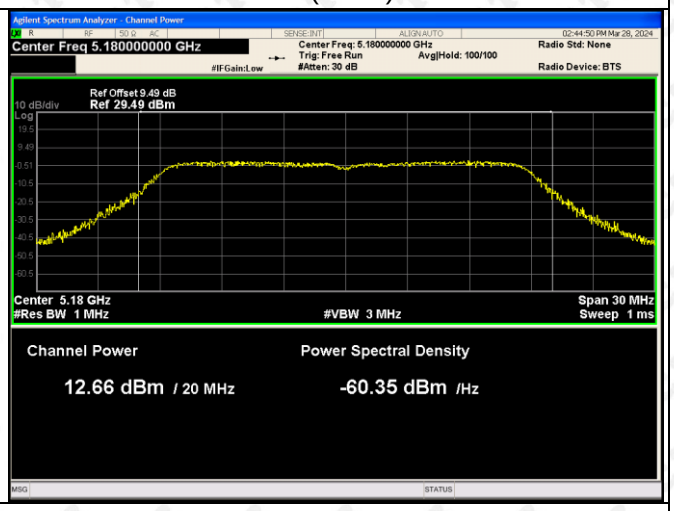
802.11a-5200



802.11a-5240

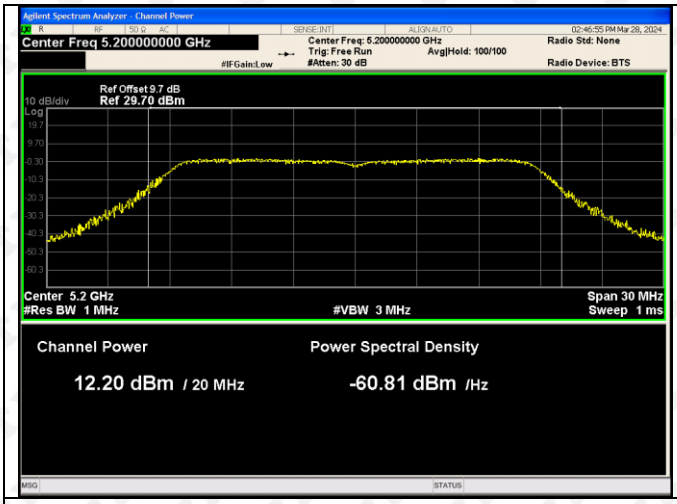


802.11ac(VH20)-5180

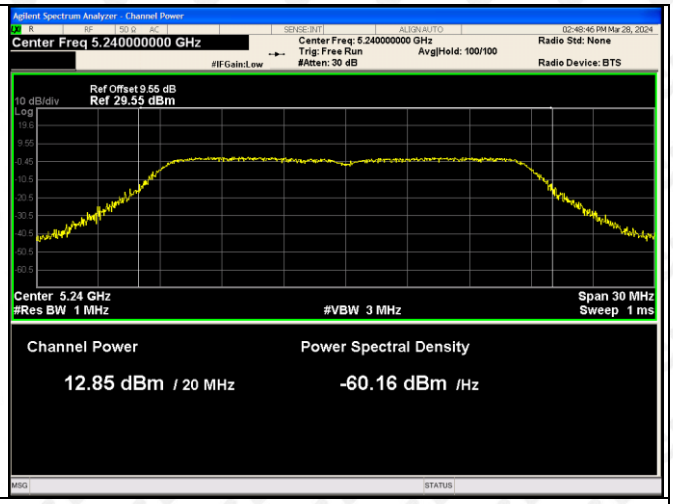


802.11ac(VH20)-5200

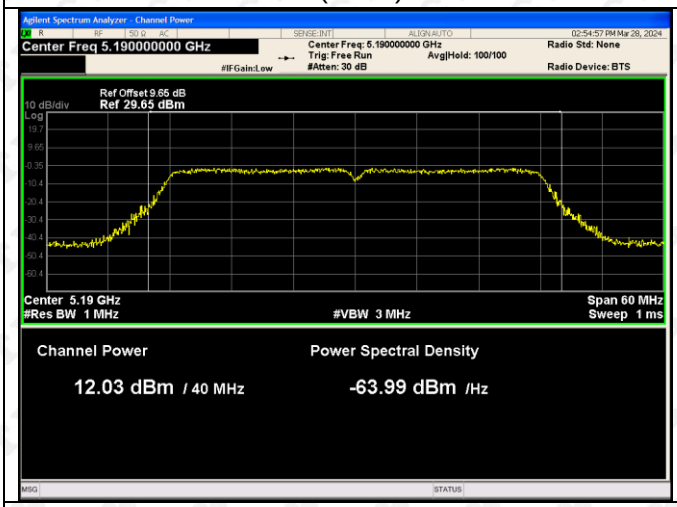
802.11ac(VH20)-5240



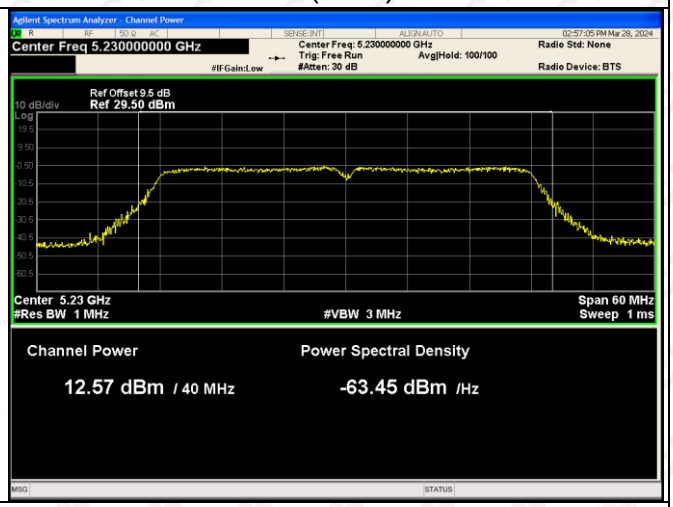
802.11ac(VH40)-5190



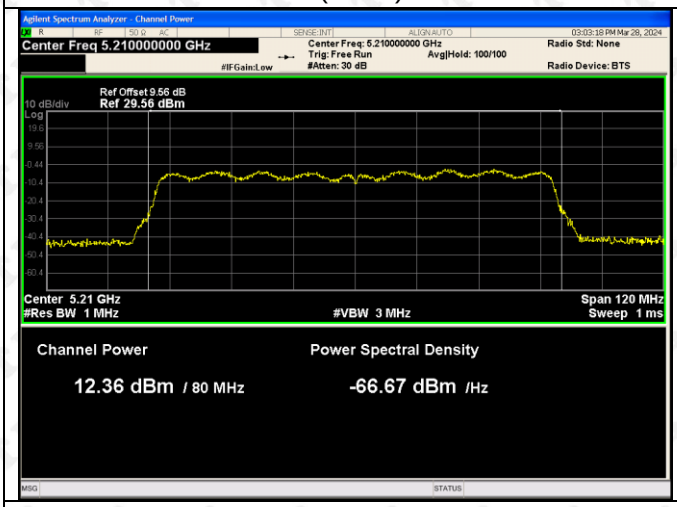
802.11ac(VH40)-5230



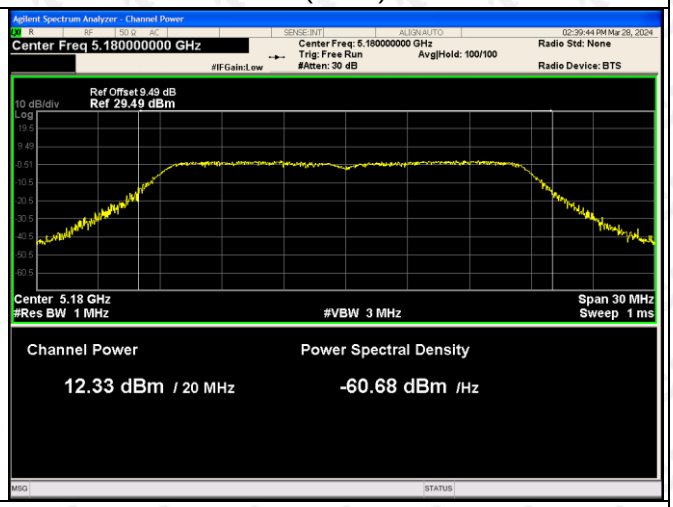
802.11ac(VH80)-5210



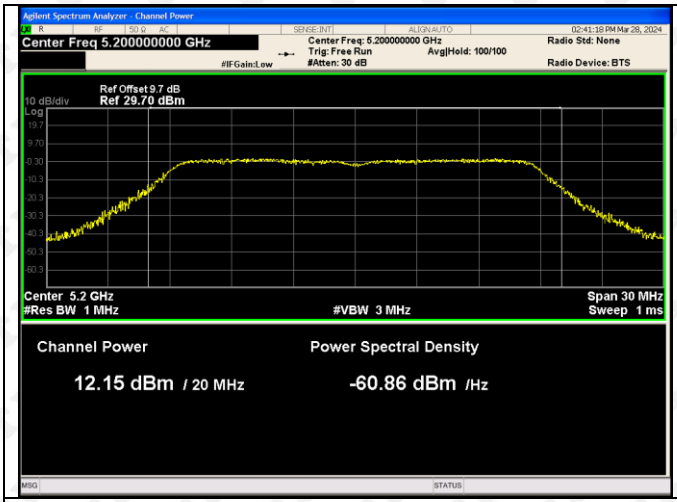
802.11n(HT20)-5180



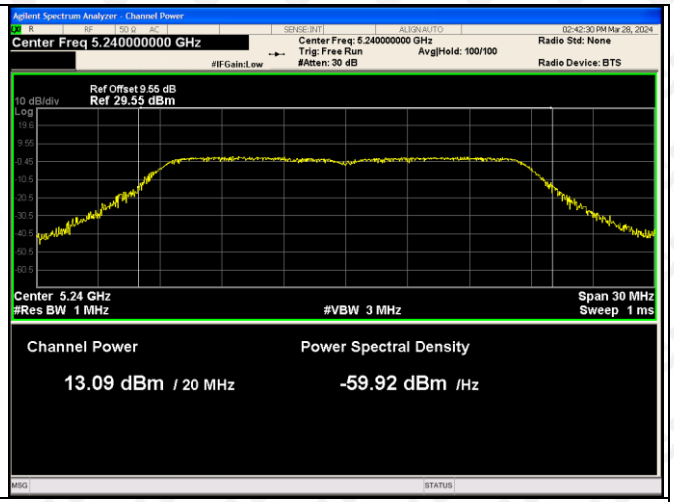
802.11n(HT20)-5200



802.11n(HT20)-5240



802.11n(HT40)-5190



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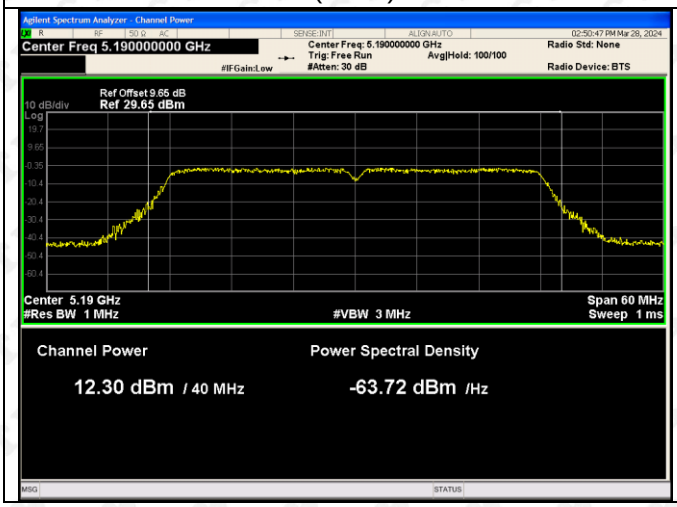
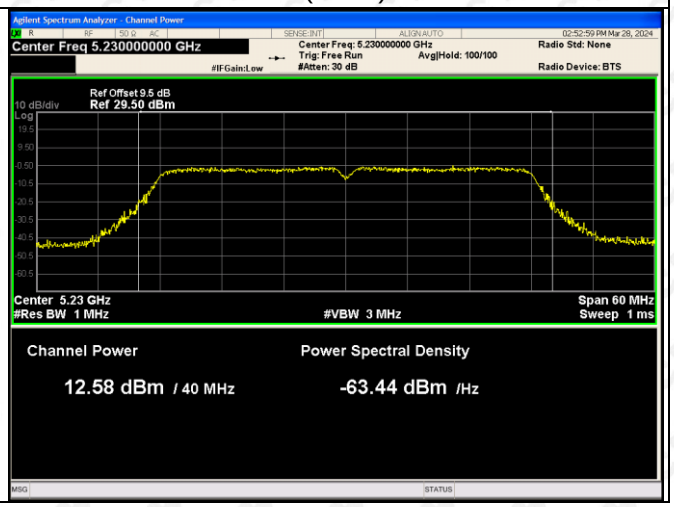
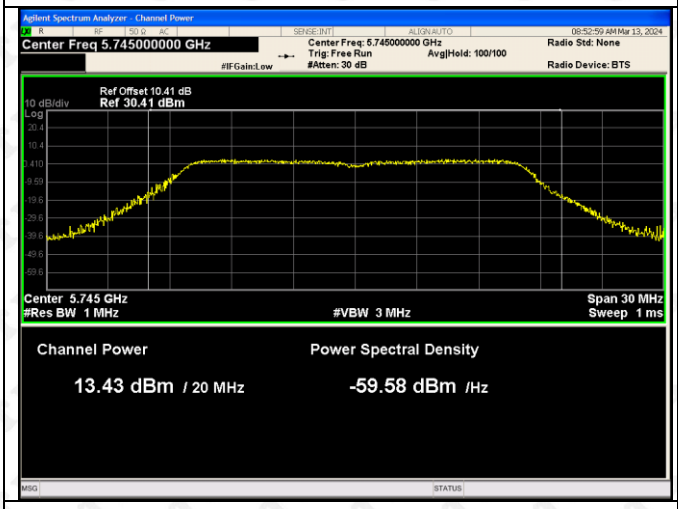


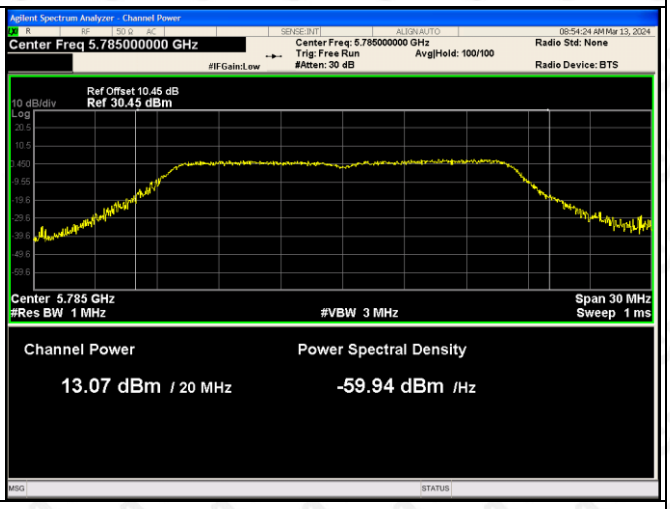


ANT1:
5745-5825MHz-Power

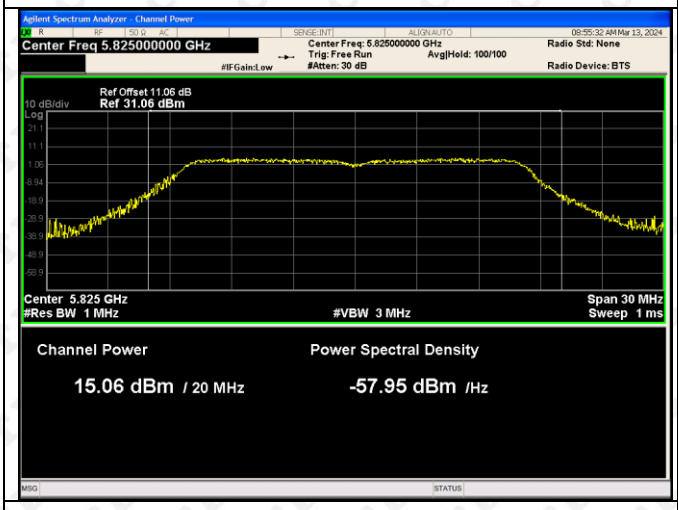
802.11a-5745



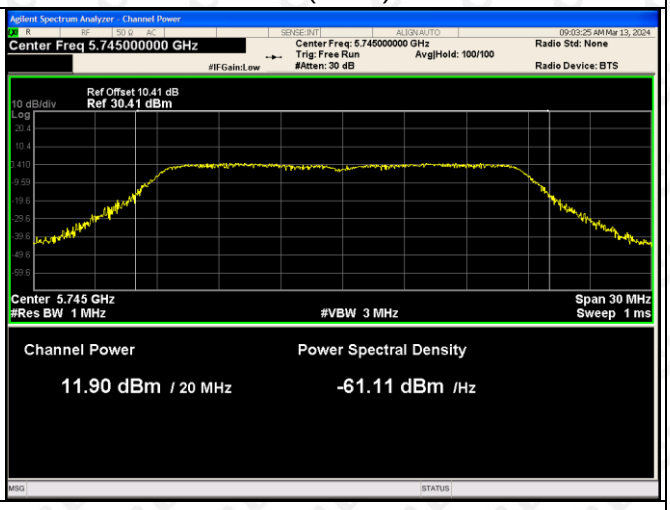
802.11a-5785



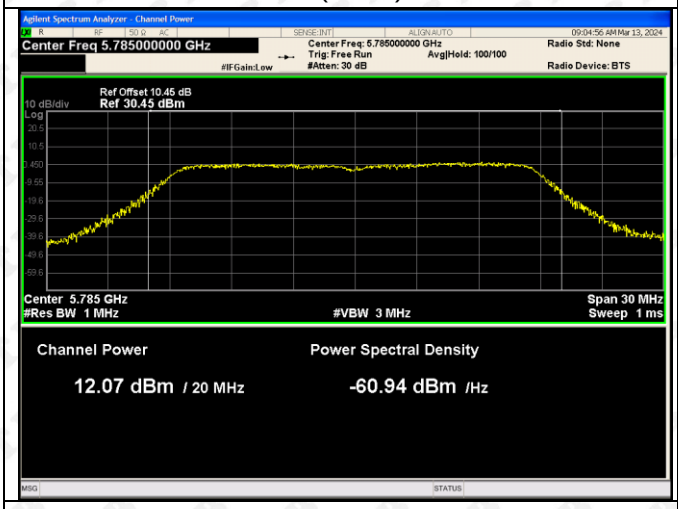
802.11a-5825



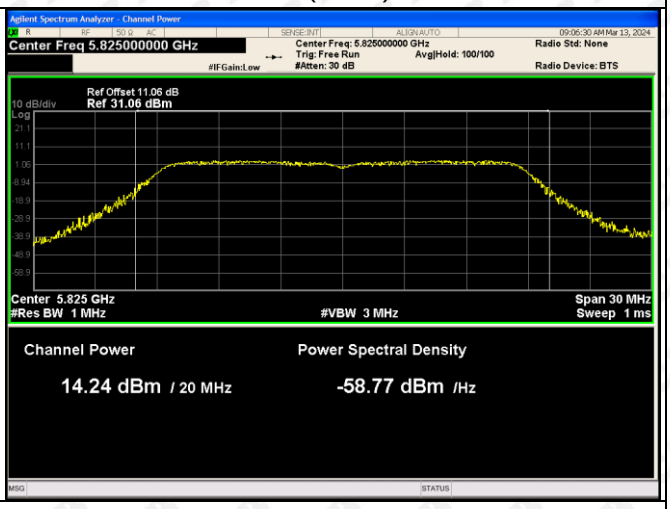
802.11ac(VH20)-5745



802.11ac(VH20)-5785

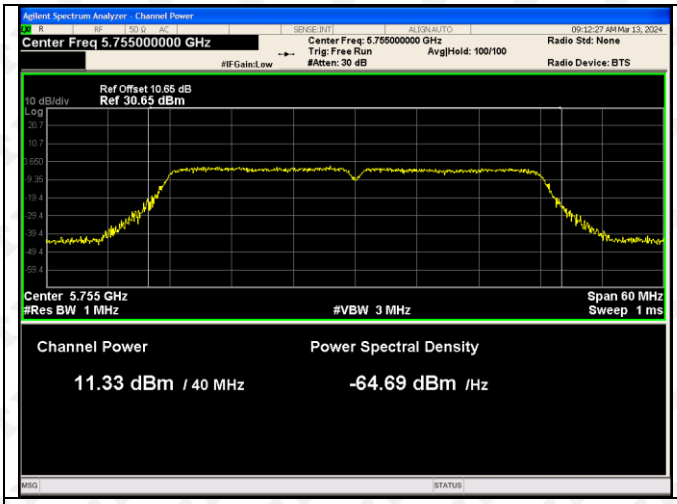


802.11ac(VH20)-5825

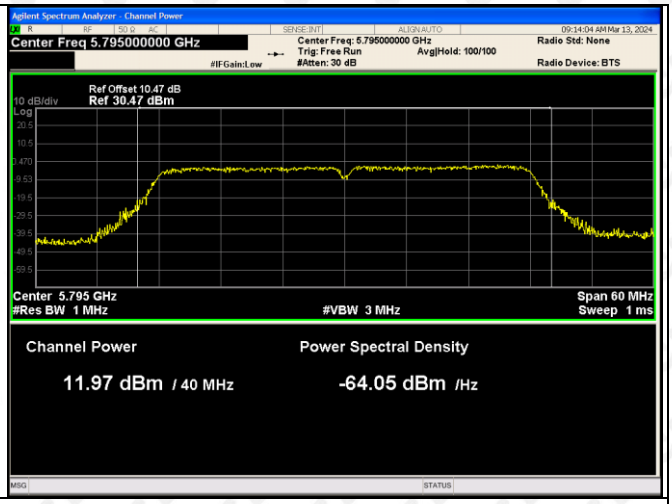


802.11ac(VH40)-5755

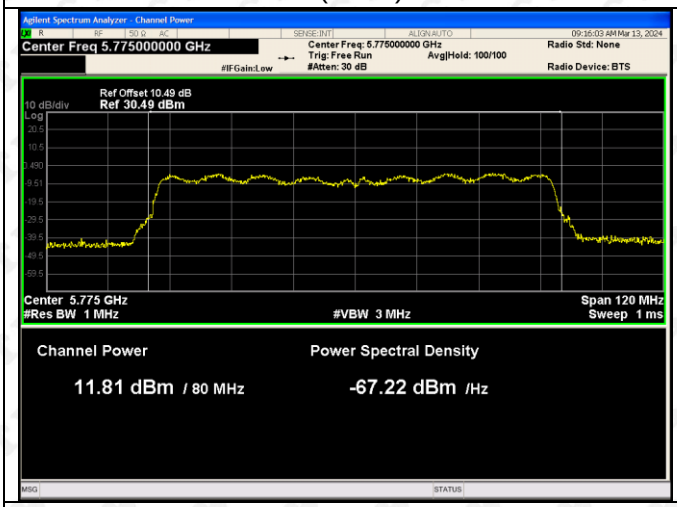
802.11ac(VH40)-5795



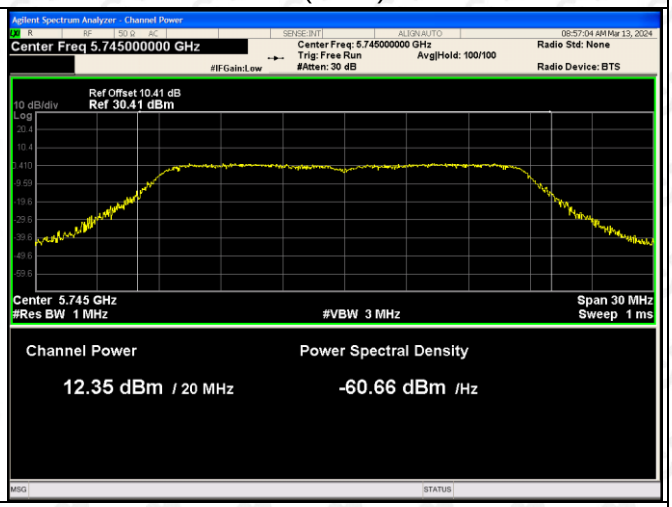
802.11ac(VH80)-5775



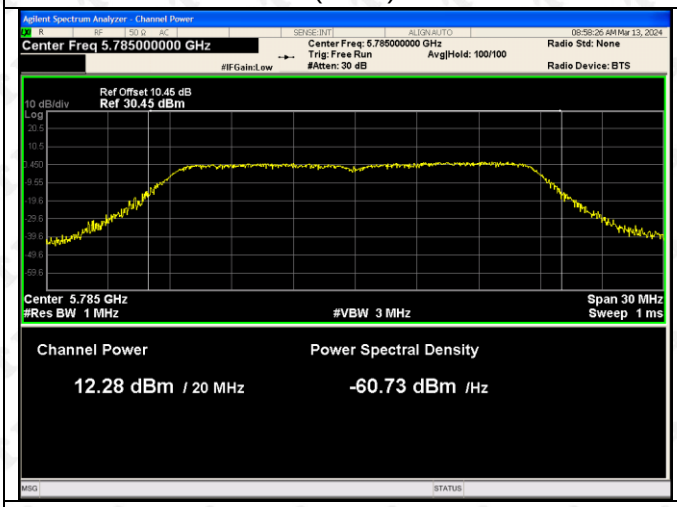
802.11n(HT20)-5745



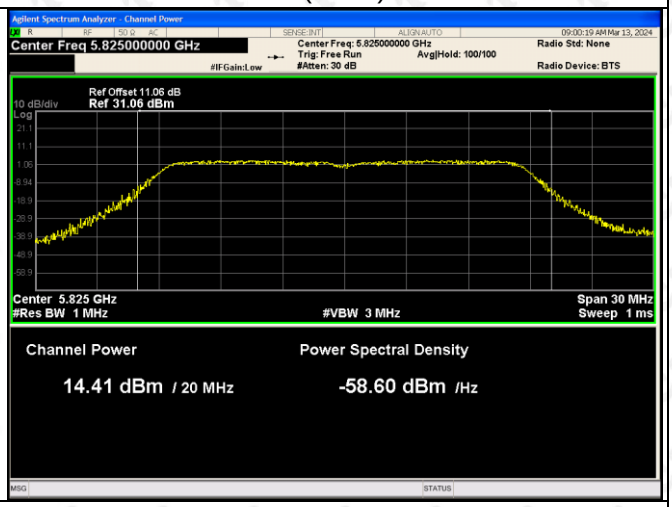
802.11n(HT20)-5785



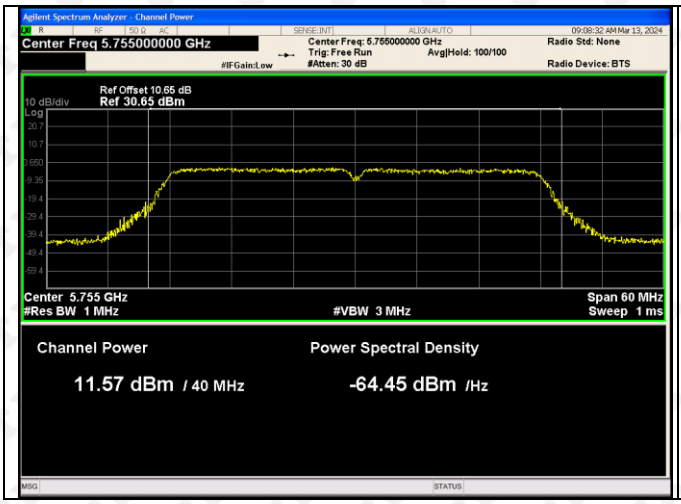
802.11n(HT20)-5825

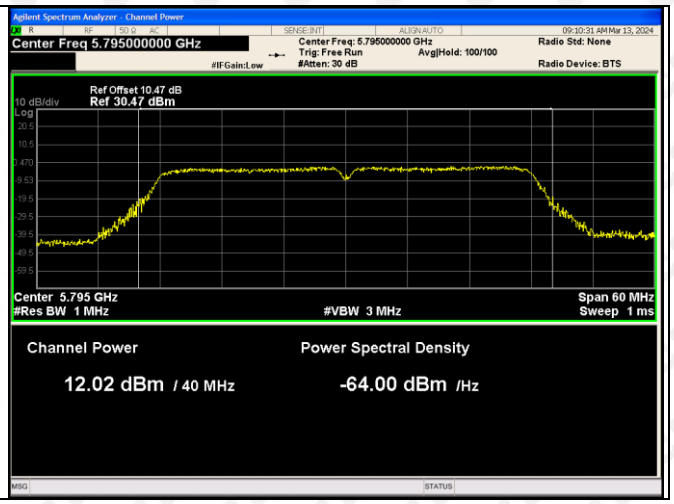


5802.11n(HT40)-5755



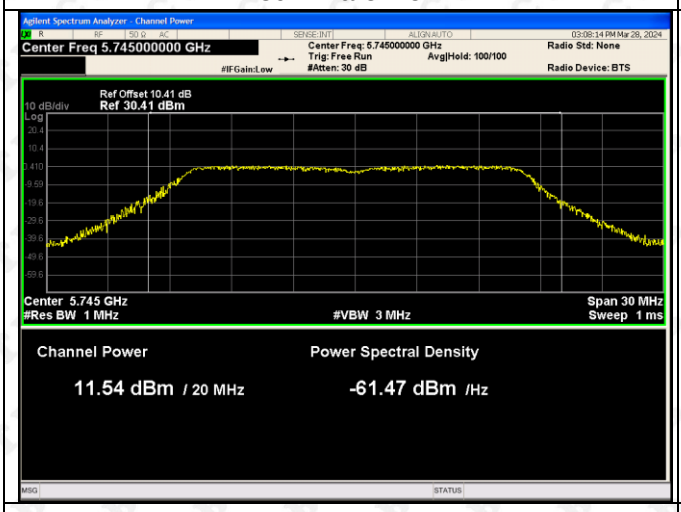
802.11n(HT40)-5795



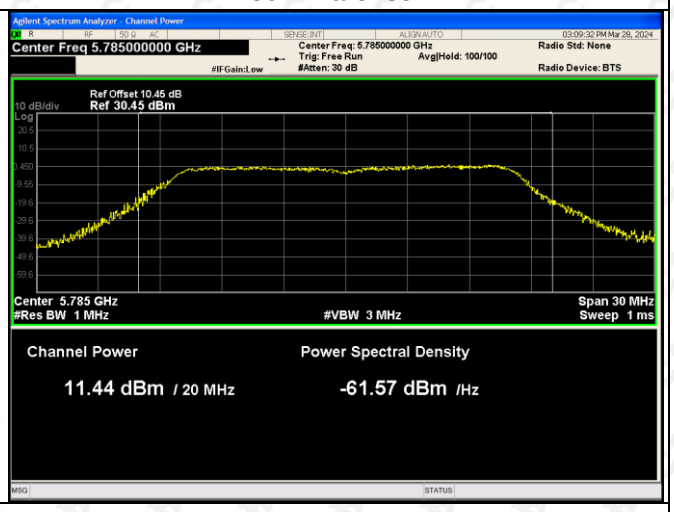


ANT2:
5745-5825MHz-Power

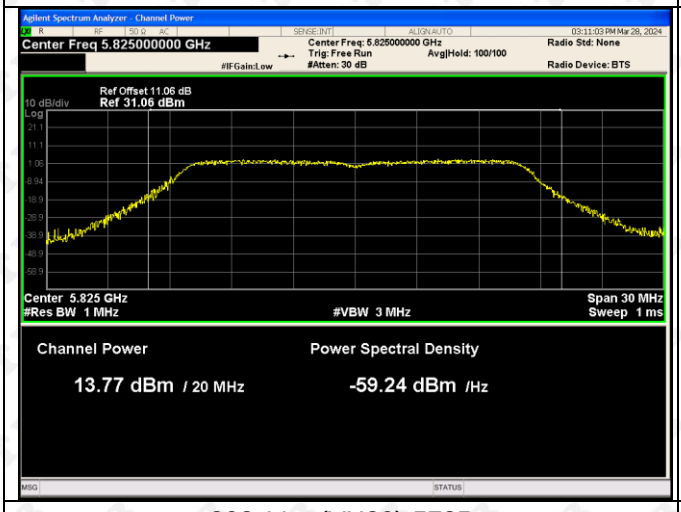
802.11a-5745



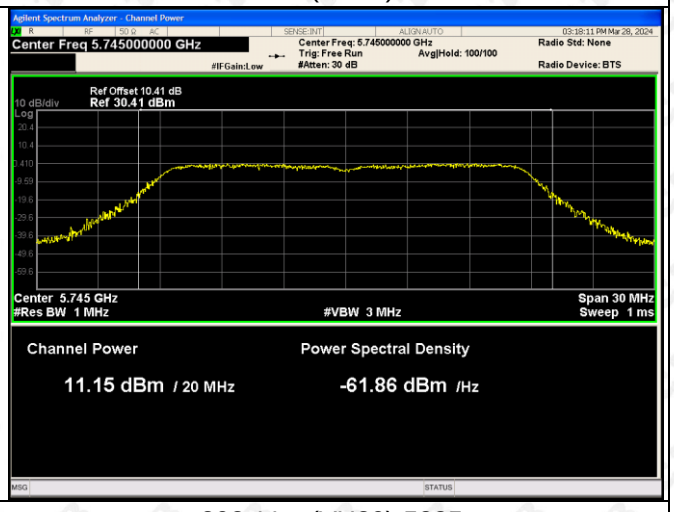
802.11a-5785



802.11a-5825

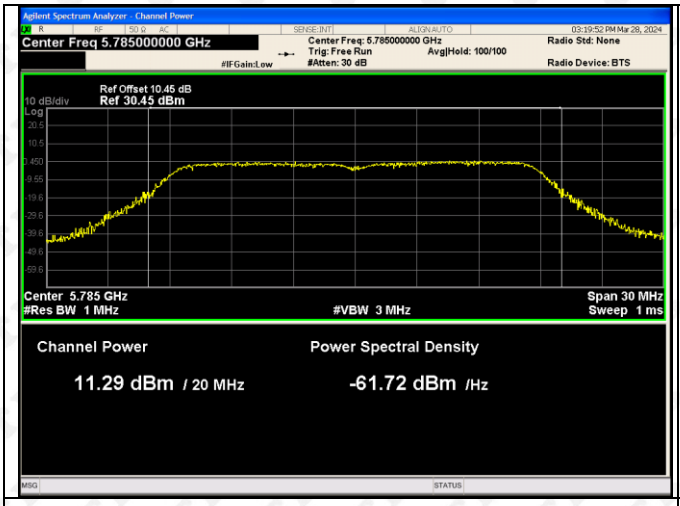


802.11ac(VH20)-5745

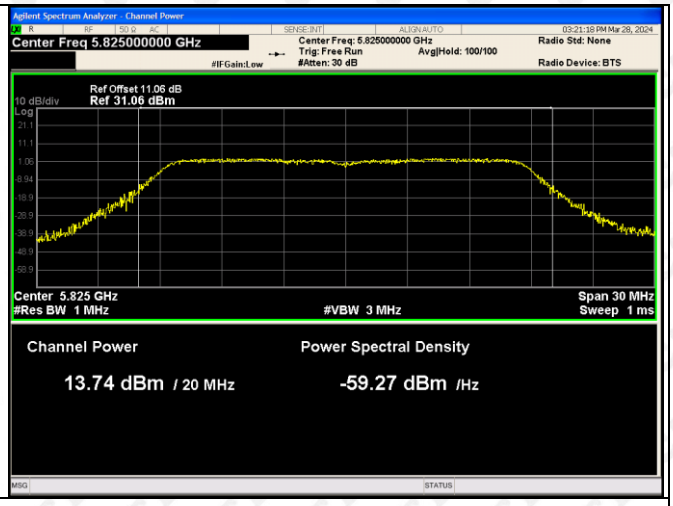


802.11ac(VH20)-5785

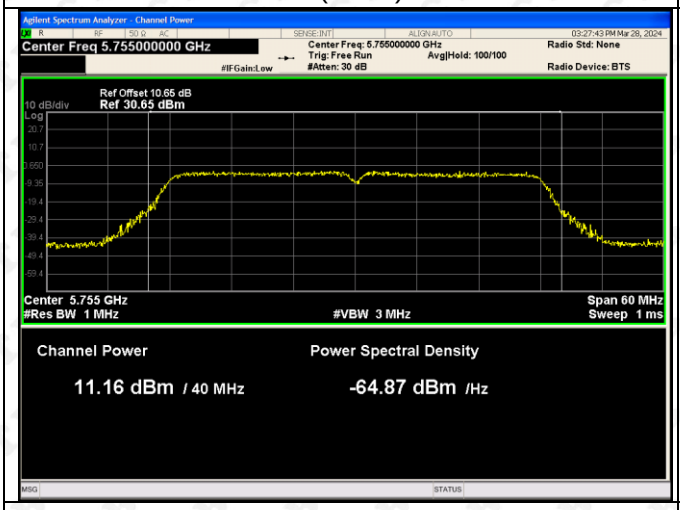
802.11ac(VH20)-5825



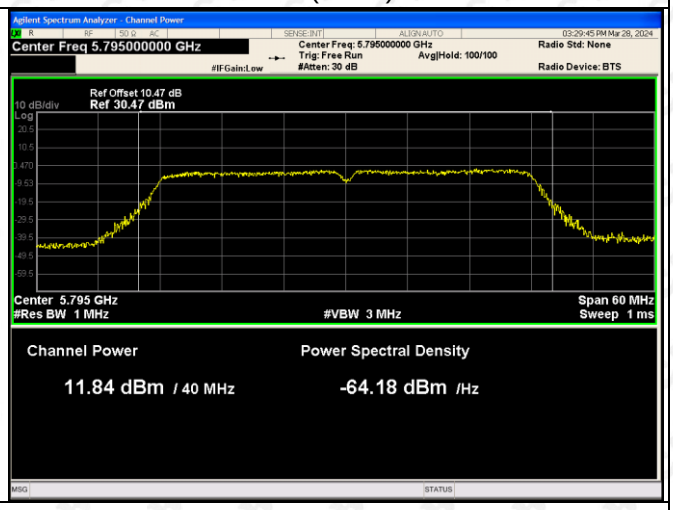
802.11ac(VH40)-5755



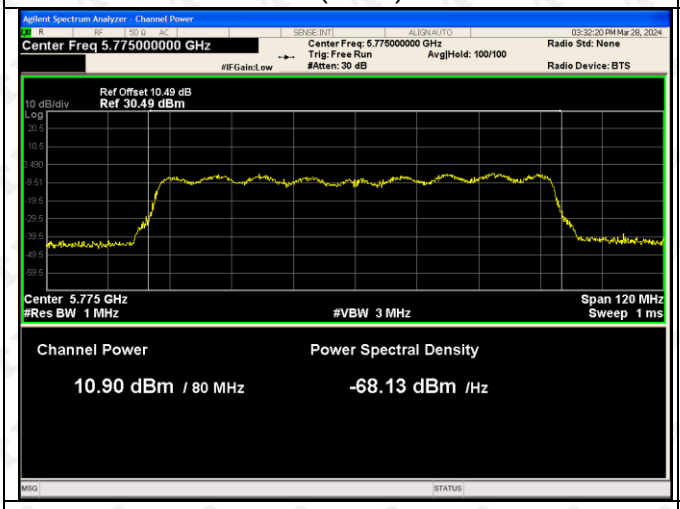
802.11ac(VH40)-5795



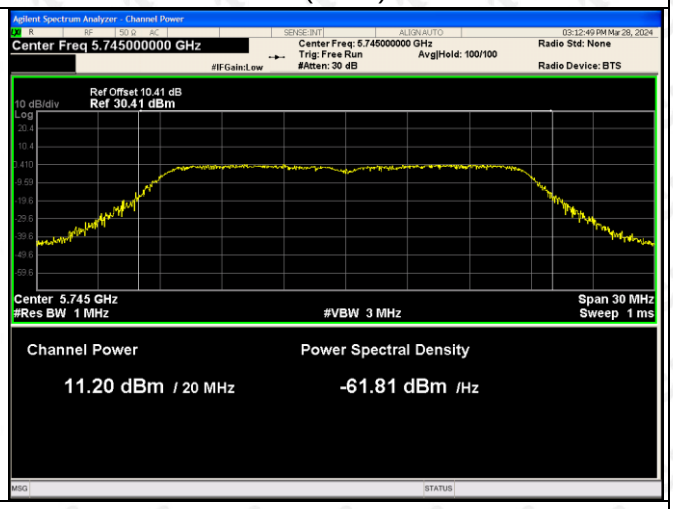
802.11ac(VH80)-5775



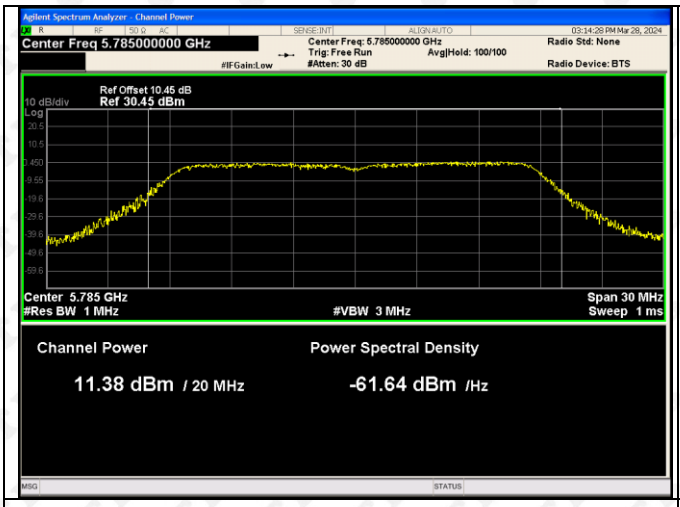
802.11n(HT20)-5745



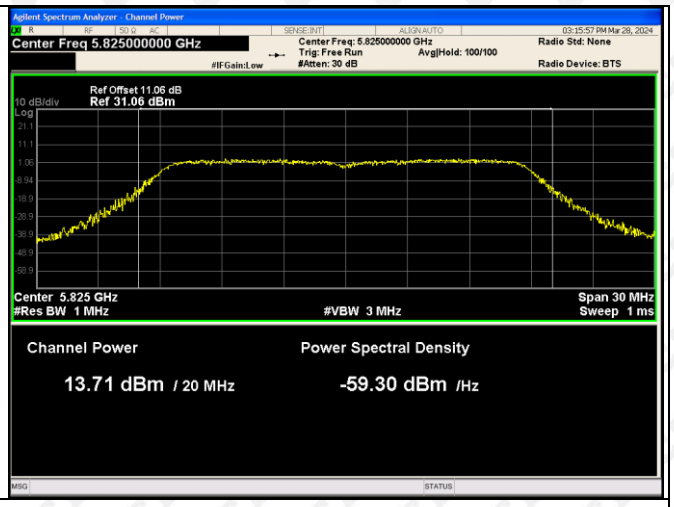
802.11n(HT20)-5785



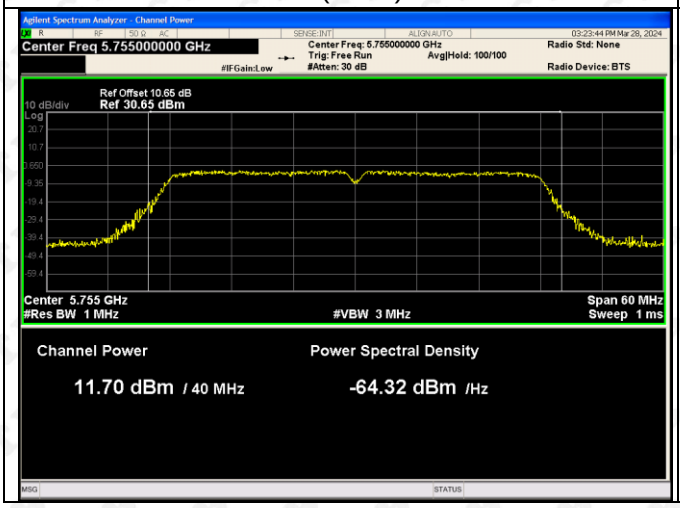
802.11n(HT20)-5825

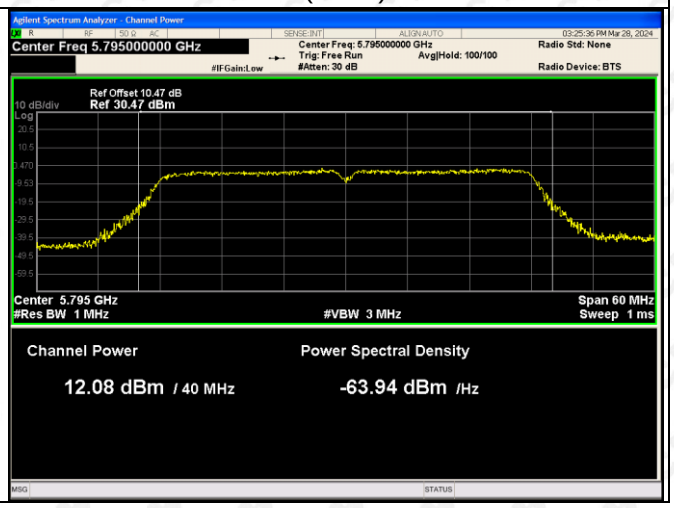


5802.11n(HT40)-5755



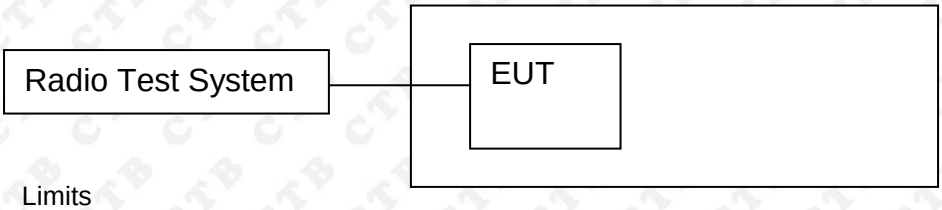
802.11n(HT40)-5795





10. EMISSION BANDWIDTH& OCCUPIED BANDWIDTH

10.1 Block Diagram Of Test Setup



10.2 Limits

(1) For the band 5.15-5.25 GHz.

(iv) For mobile and portable 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. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 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. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(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. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
(e) Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

10.3 Test Procedure

According to KDB789033 D02v02r01 sectionE, the following is the measurement procedure.

1. Emission Bandwidth (EBW)
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%.
2. Minimum Emission Bandwidth for the band 5.725−5.85 GHz
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 kHz for the band 5.725−5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 * RBW.
c) Detector = Peak.
d) Trace mode = max hold.

e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described in this section. For devices that use channel aggregation refer to III.A and III.C for determining emission bandwidth.

D. 99% Occupied Bandwidth

The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. Measurement of the 99% occupied bandwidth is *required* only as a condition for using the optional band-edge measurement techniques described in II.G.3.d). Measurements of 99% occupied bandwidth may also optionally be used in lieu of the EBW to define the minimum frequency range over which the 789033 D02 General UNII Test Procedures New Rules v02r01 Page 4 spectrum is integrated when measuring maximum conducted output power as described in II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with Section 15.407(a).
The following procedure shall be used for measuring (99%) power bandwidth:
1. Set center frequency to the nominal EUT channel center frequency.

2. Set span = 1.5 times to 5.0 times the OBW.

3. Set RBW = 1% to 5% of the OBW

4. Set VBW ≥ 3 * RBW

5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.

6. Use the 99% power bandwidth function of the instrument (if available).

7. If the instrument does not have a 99% power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

10.4 Test Results

Test mode ANT1	Test Channel (MHz)	26dB Bandwidth (MHz)
802.11a	5180	20.631
	5200	20.879
	5240	20.688
802.11ac20	5180	21.247
	5200	21.437
	5240	21.282
802.11ac40	5190	41.468
	5230	41.271
802.11ac80	5210	79.963
802.11n(HT20)	5180	21.418
	5200	21.203
	5240	21.5
802.11n(HT40)	5190	41.002
	5230	40.832

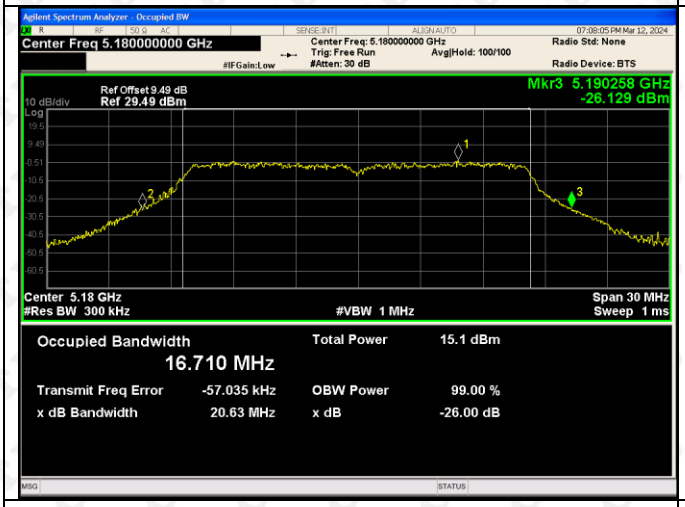
Test mode ANT2	Test Channel (MHz)	26dB Bandwidth (MHz)
802.11a	5180	20.745
	5200	20.431
	5240	20.733
802.11ac20	5180	21.1
	5200	21.294
	5240	21.199
802.11ac40	5190	40.881
	5230	41.209
802.11ac80	5210	79.666
802.11n(HT20)	5180	21.419
	5200	21.413
	5240	21.338
802.11n(HT40)	5190	41.138
	5230	41.341

Test mode ANT1	Test Channel (MHz)	6dB Bandwidth (MHz)
802.11a	5745	16.53
	5785	16.5
	5825	16.542
802.11ac20	5745	17.686
	5785	17.71
	5825	17.699
802.11ac40	5755	36.464
	5795	36.44
802.11ac80	5775	76.42
802.11n(HT20)	5745	17.726
	5785	17.75
	5825	17.726
802.11n(HT40)	5755	36.464
	5795	36.419

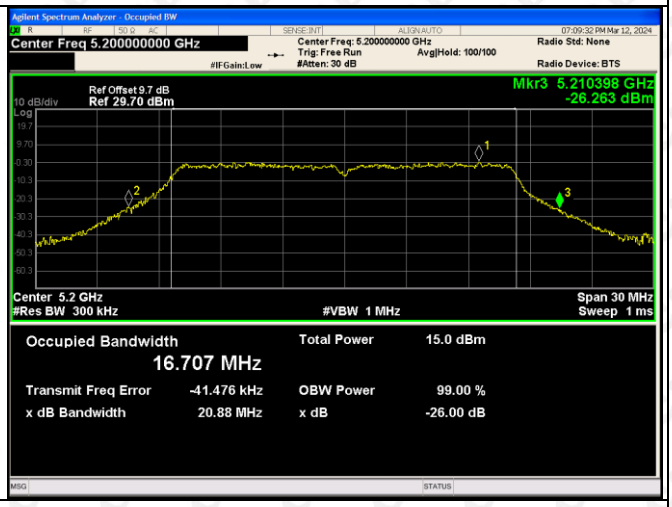
Test mode ANT2	Test Channel (MHz)	6dB Bandwidth (MHz)
802.11a	5745	16.552
	5785	16.517
	5825	16.533
802.11ac20	5745	17.708
	5785	17.714
	5825	17.68
802.11ac40	5755	36.447
	5795	36.43
802.11ac80	5775	76.459
802.11n(HT20)	5745	17.759
	5785	17.747
	5825	17.698
802.11n(HT40)	5755	36.441
	5795	36.42

Test Graph
ANT1:
5180-5240MHz

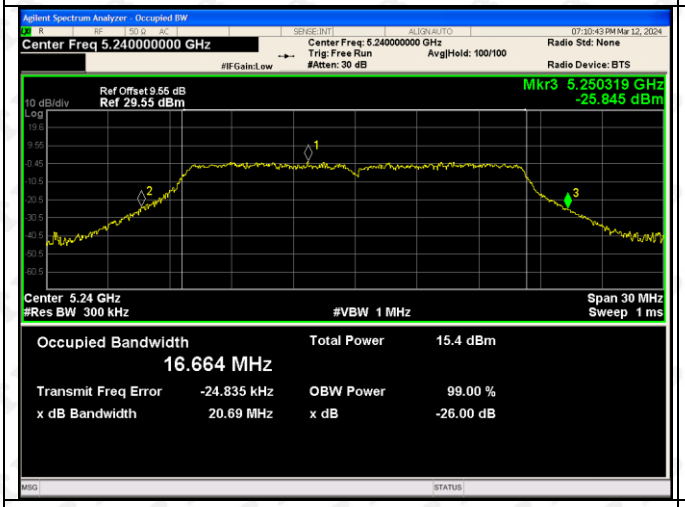
802.11a-5180



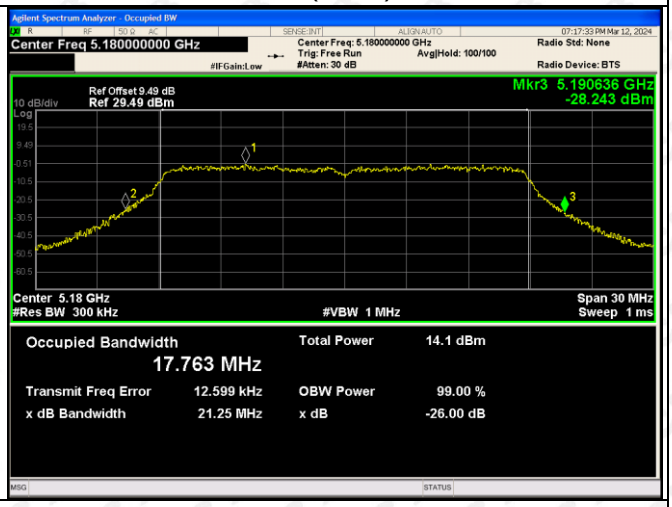
802.11a-5200



802.11a-5240



802.11ac(VH20)-5180



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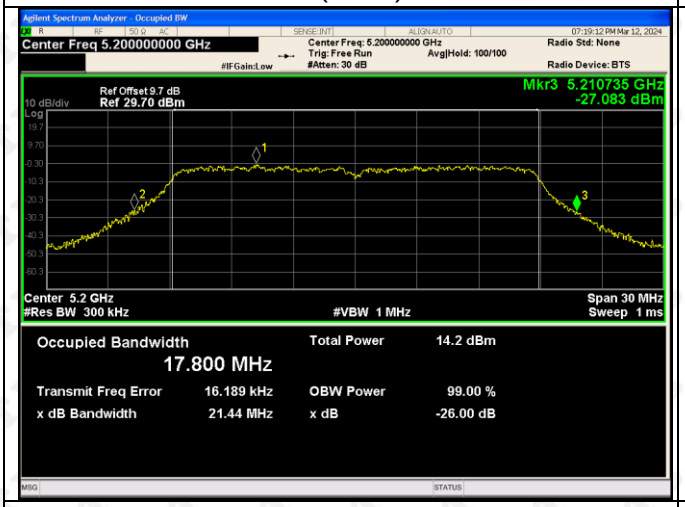

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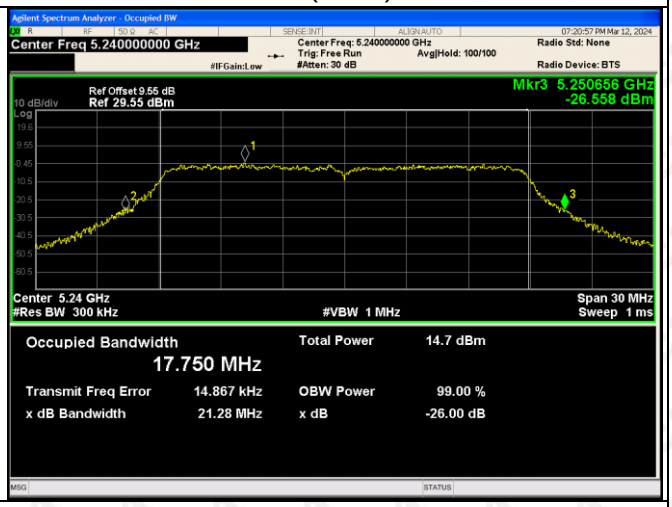

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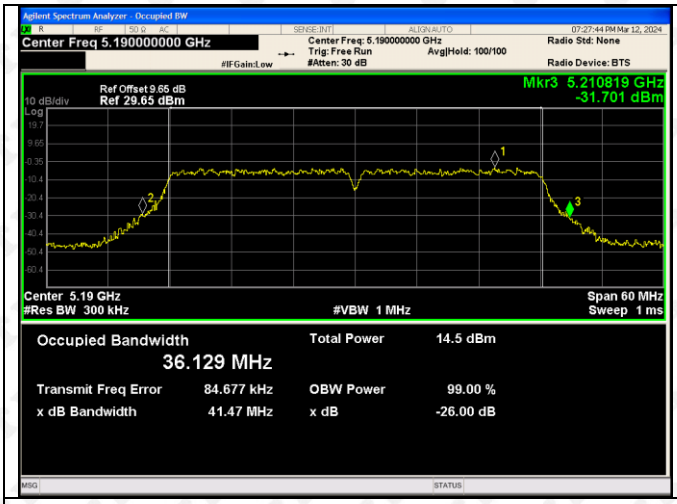

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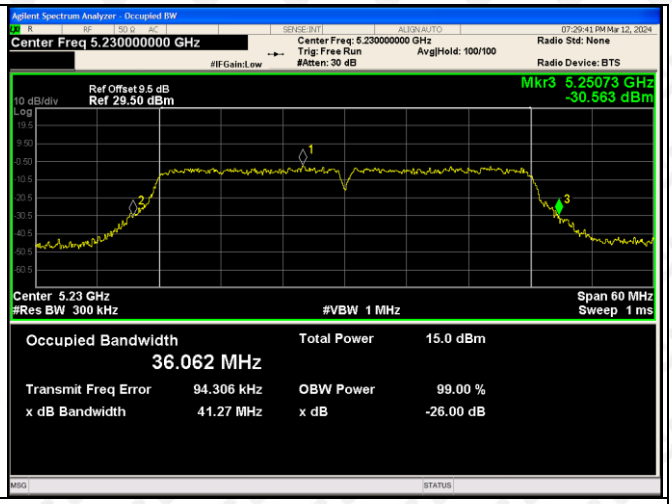
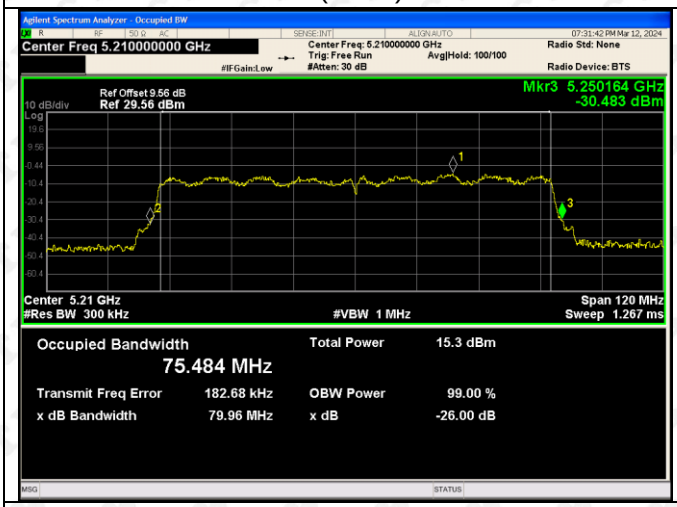


802.11n(HT20)-5180



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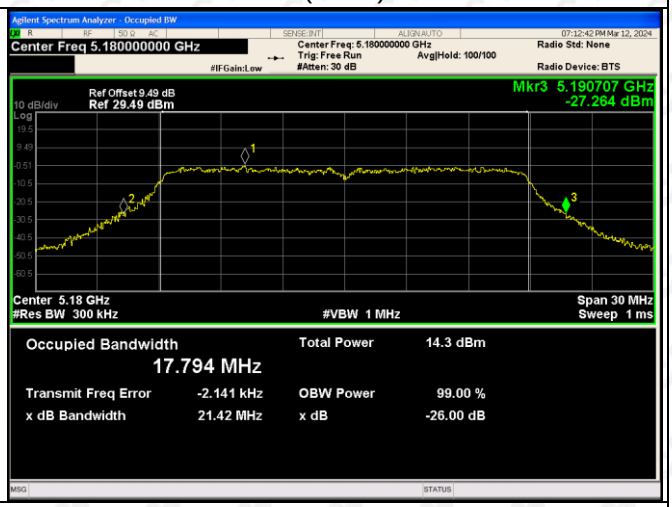

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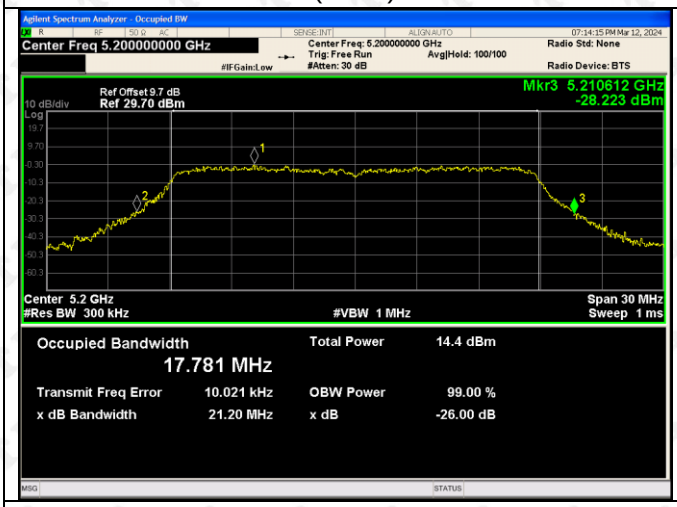

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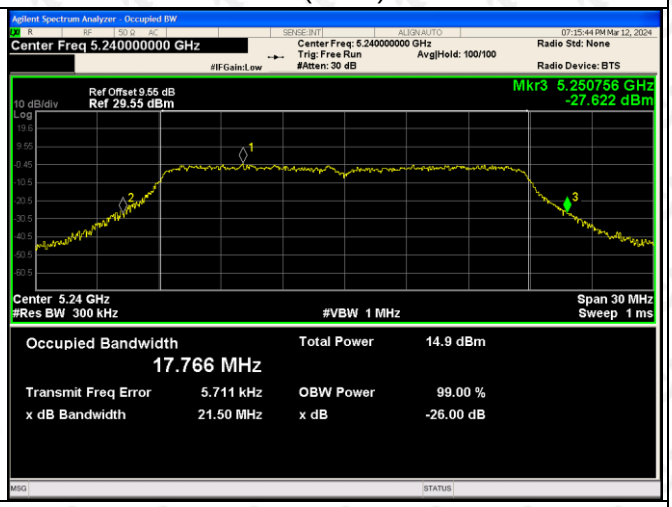

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