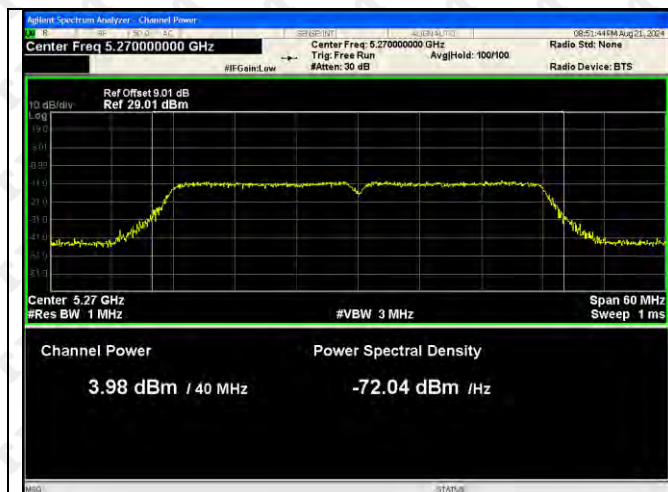
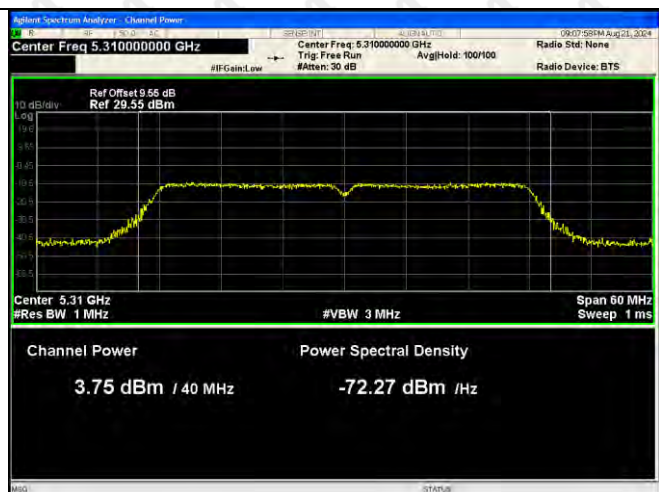
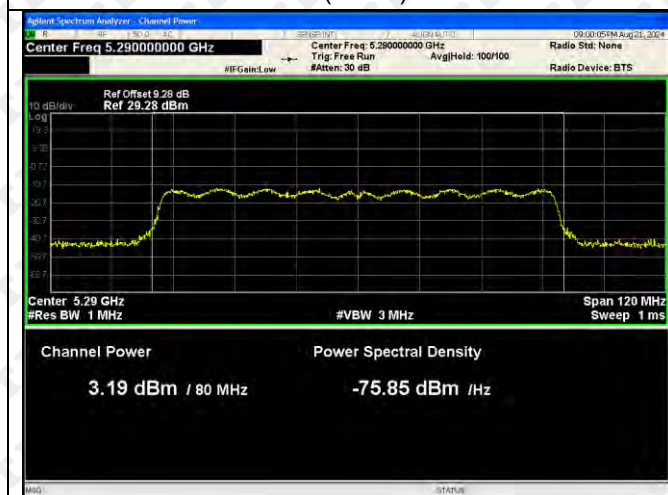




802.11ac(VH80)-5290



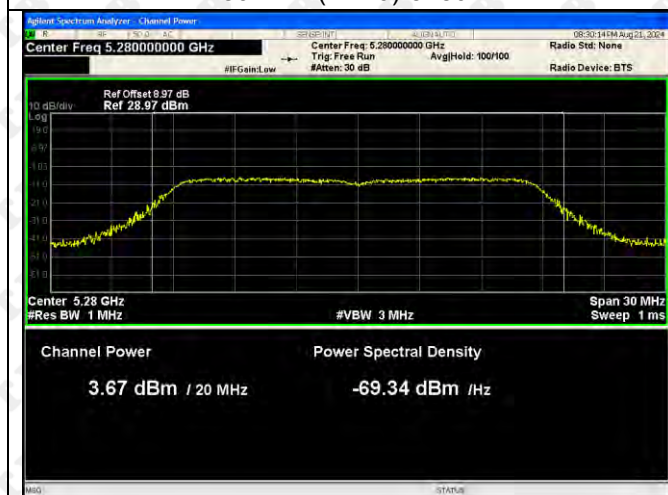
802.11n(HT20)-5260



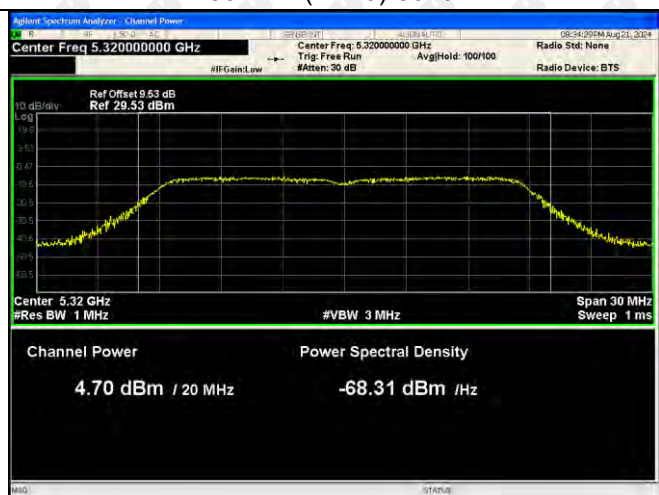
802.11n(HT20)-5280



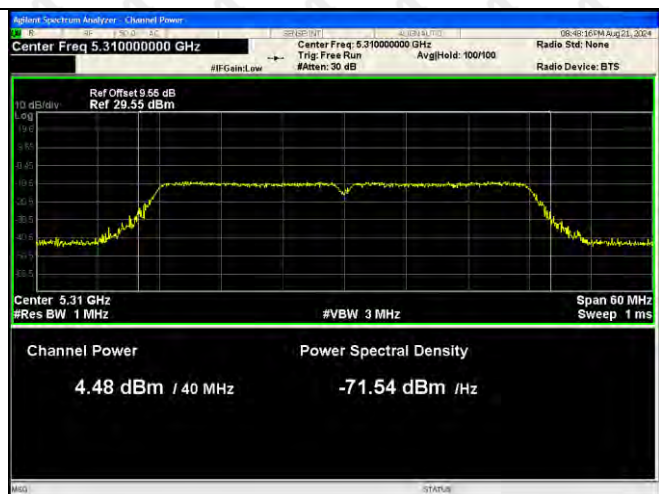
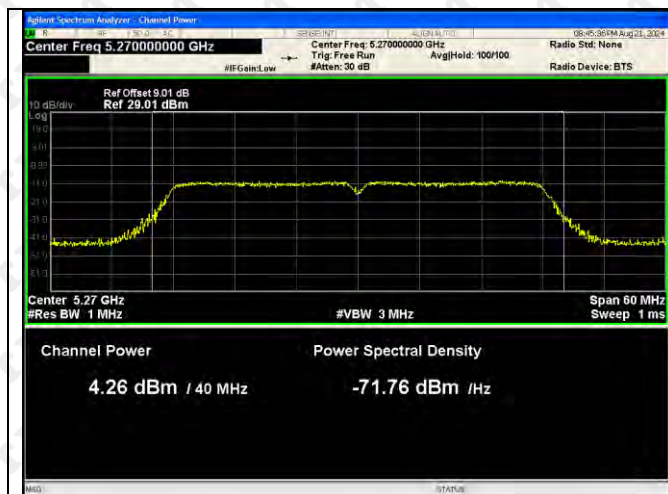
802.11n(HT20)-5320



802.11n(HT40)-5270



802.11n(HT40)-5310



ANT2

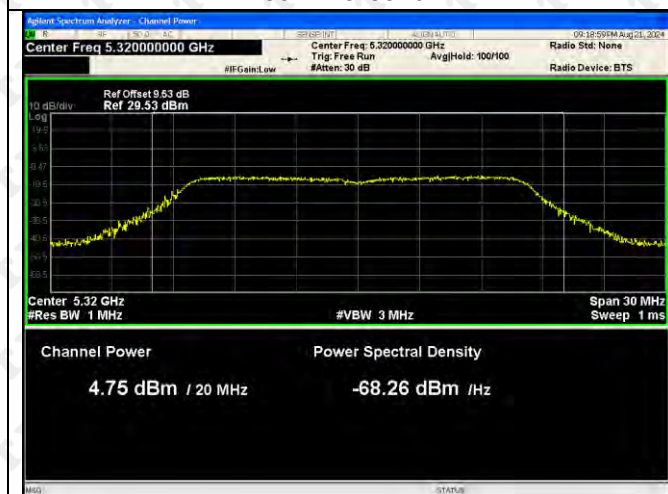
802.11a-5260



802.11a-5280



802.11a-5320



802.11ac(VH20)-5260

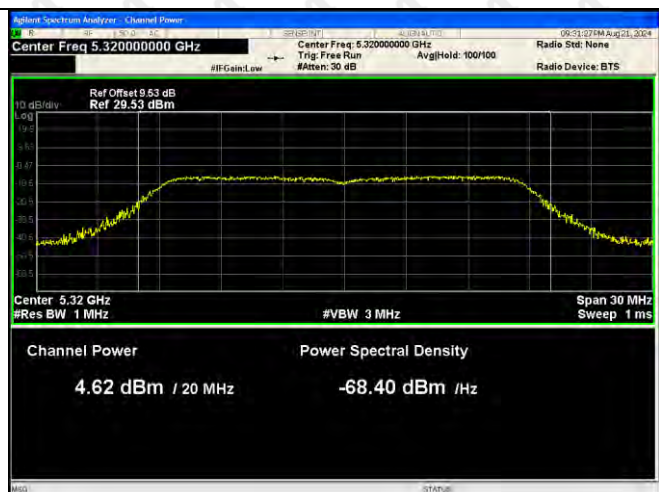


802.11ac(VH20)-5280

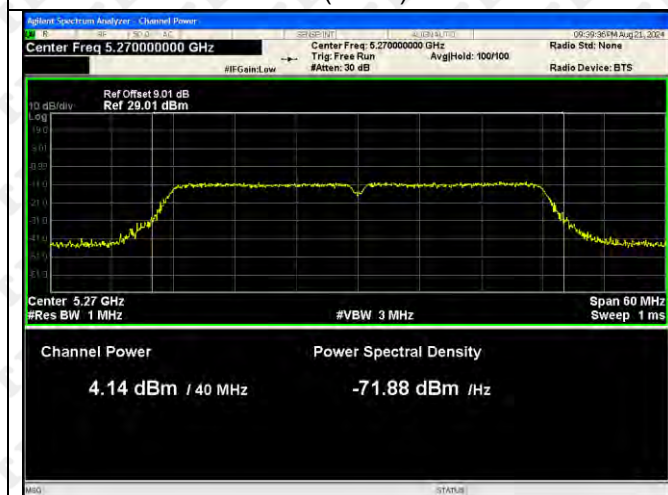
802.11ac(VH20)-5320



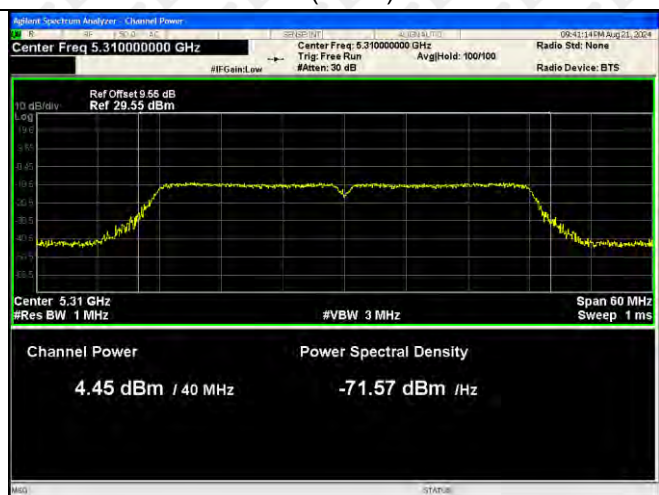
802.11ac(VH40)-5270



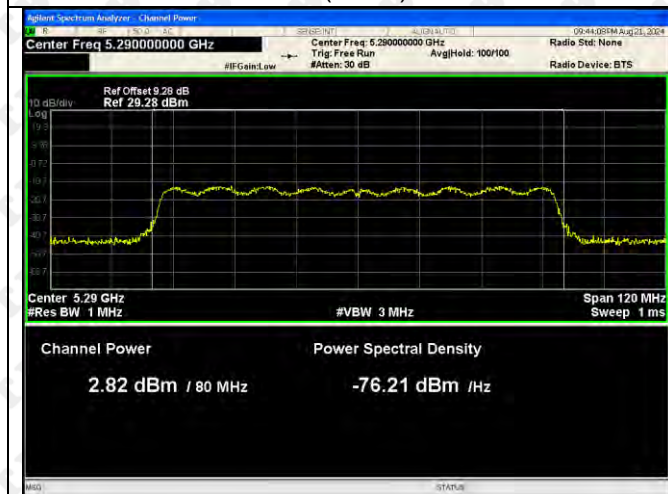
802.11ac(VH40)-5310



802.11ac(VH80)-5290



802.11n(HT20)-5260



802.11n(HT20)-5280



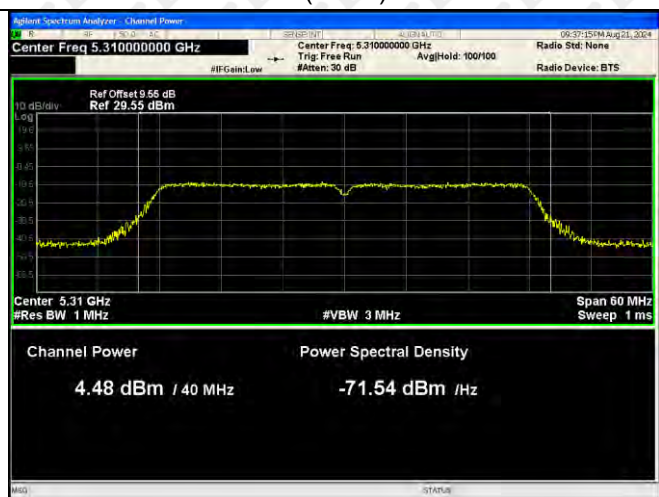
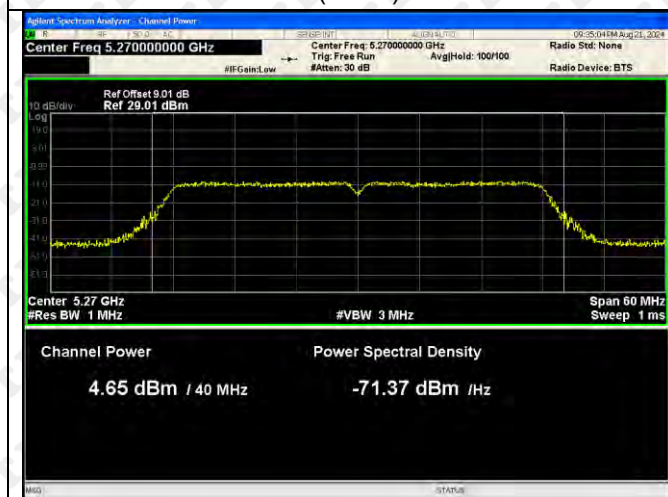
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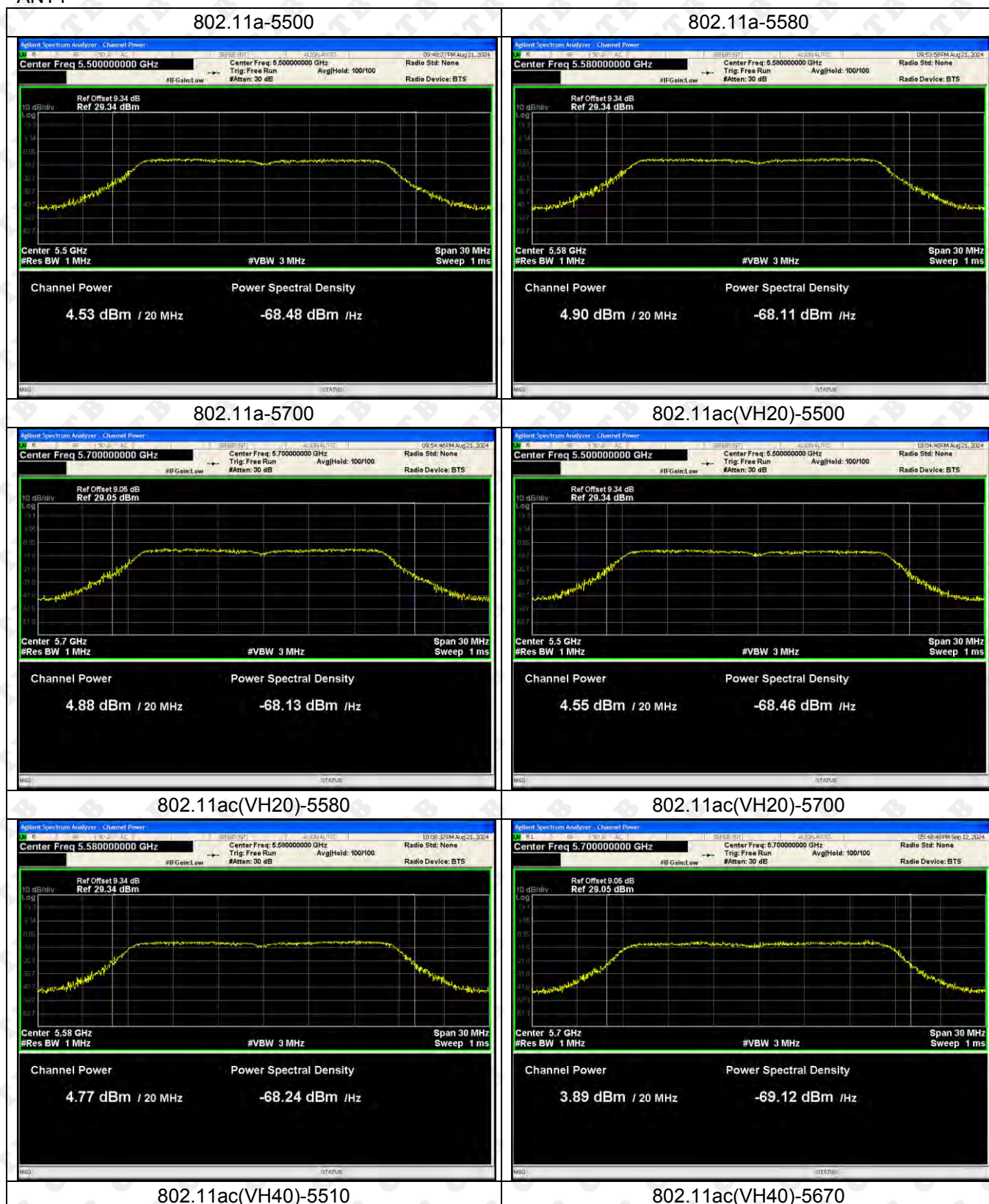
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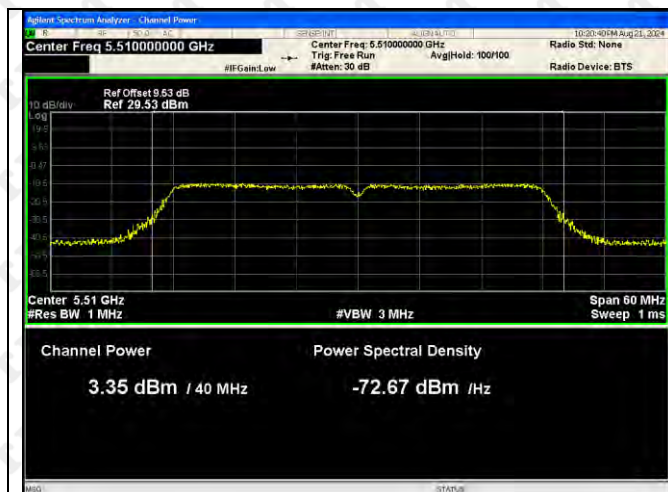


802.11n(HT40)-5310

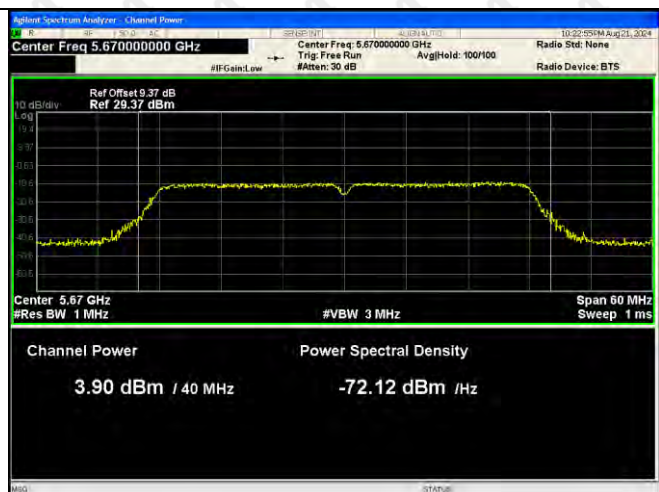


5470-5725MHz-Power ANT1

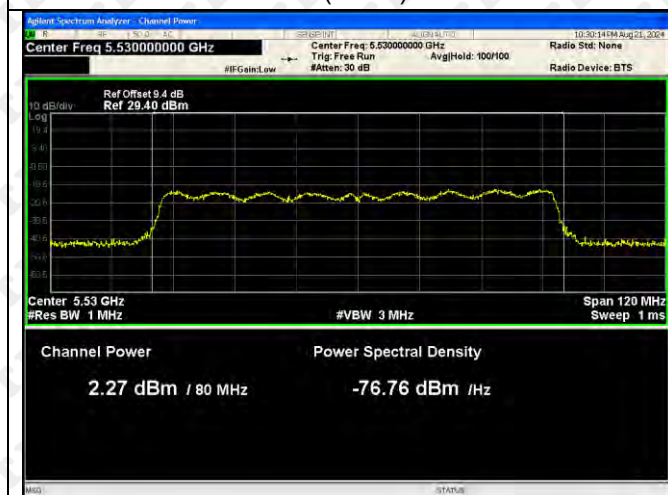




802.11ac(VH80)-5530



802.11n(HT20)-5500



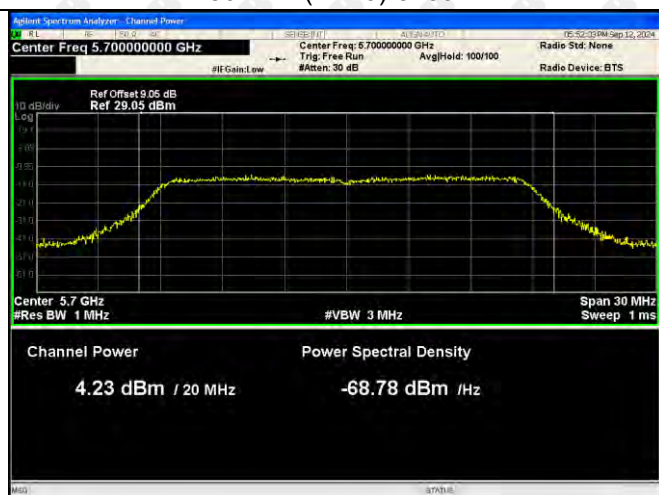
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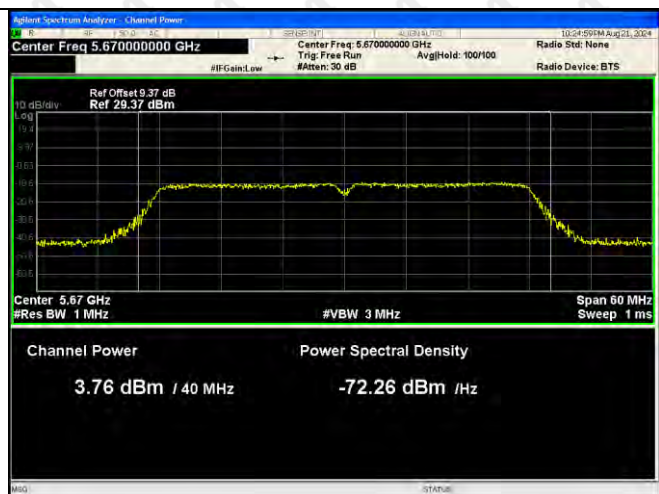
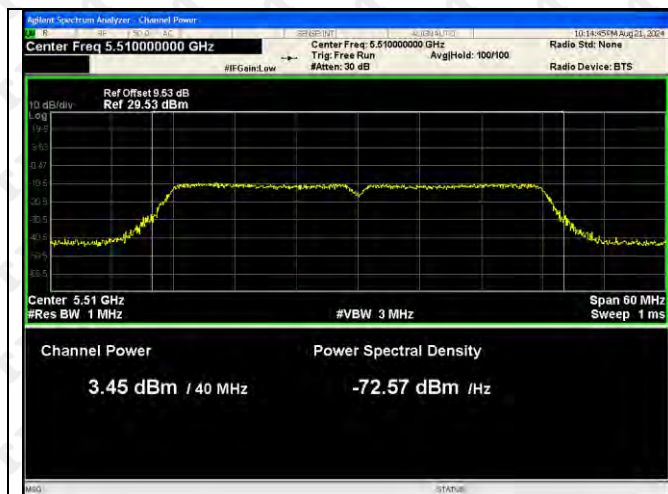
802.11n(HT20)-5700



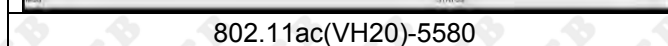
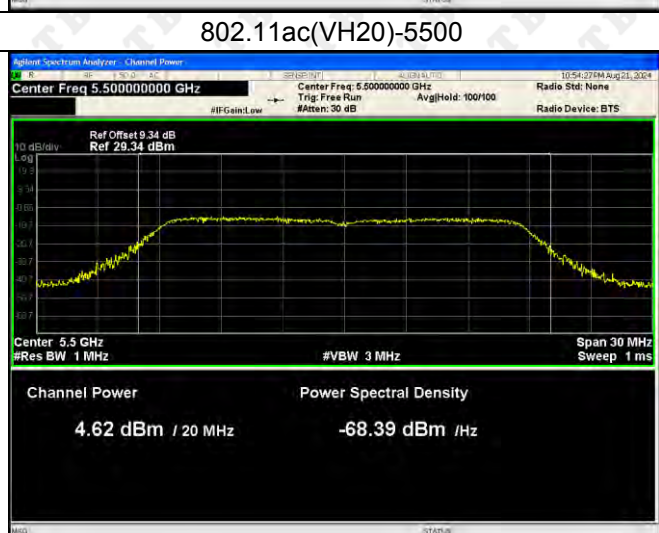
802.11n(HT40)-5510

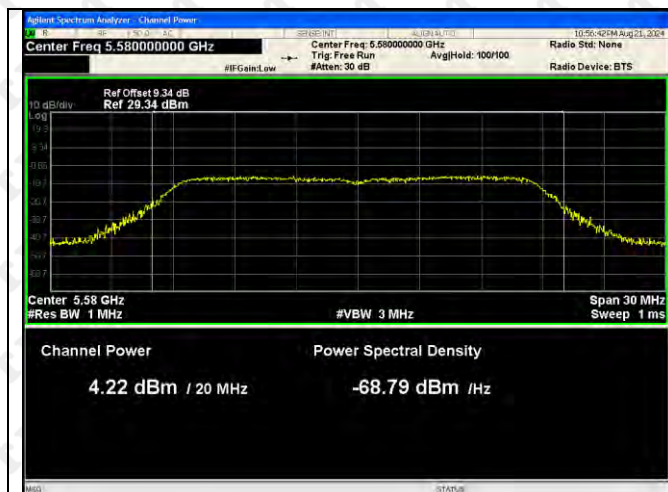


802.11n(HT40)-5670

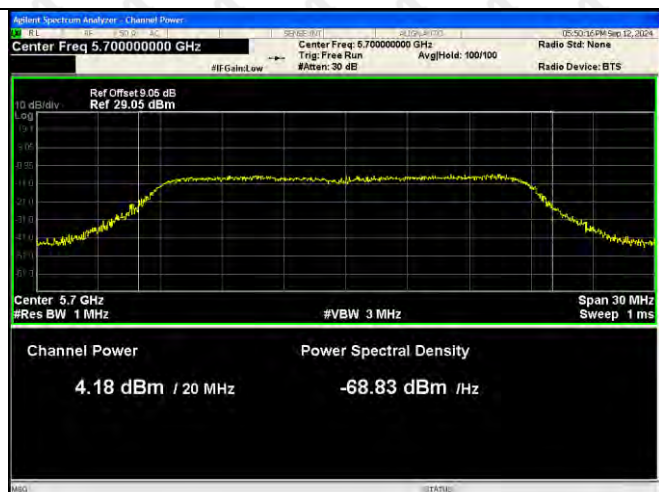


ANT2

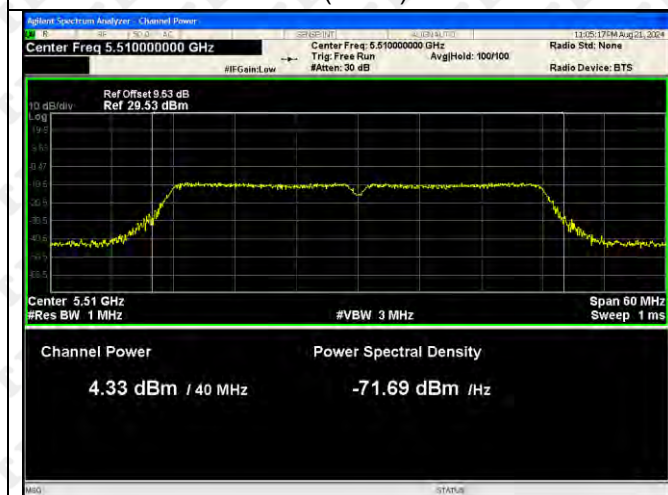




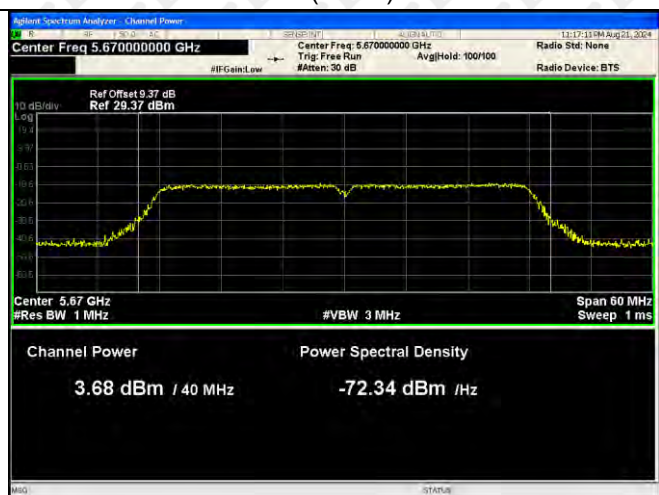
802.11ac(VH40)-5510



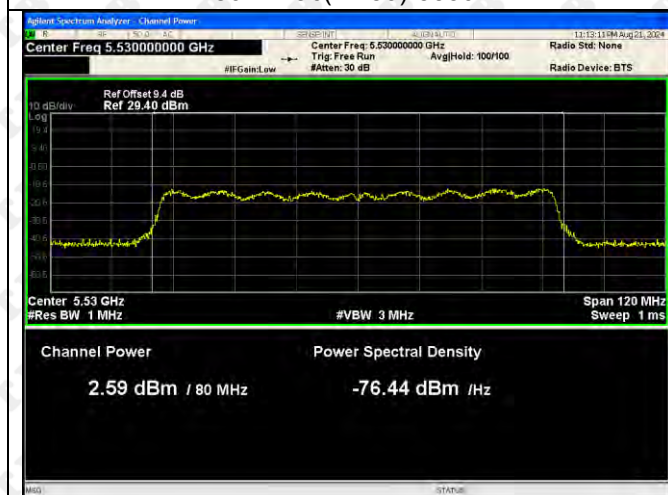
802.11ac(VH40)-5670



802.11ac(VH80)-5530



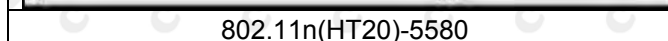
802.11ac(VH80)-5670



802.11n(HT20)-5530



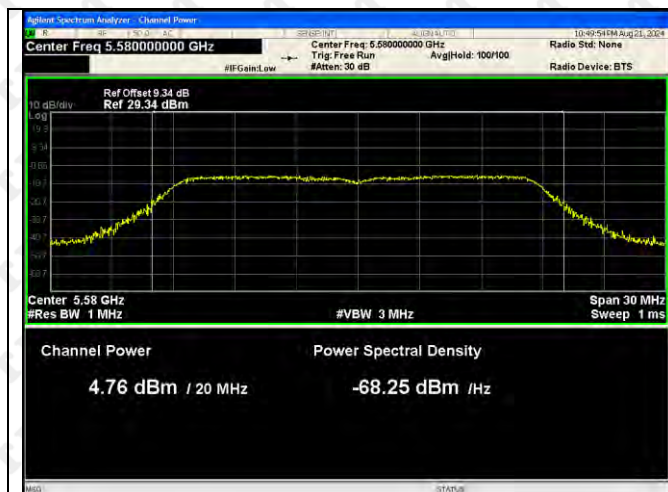
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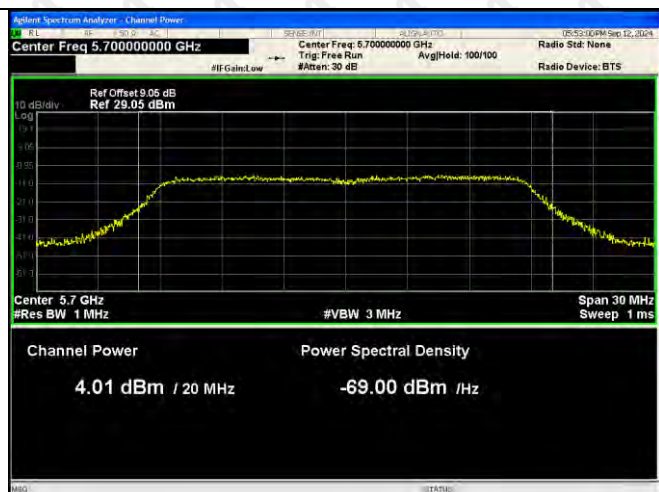
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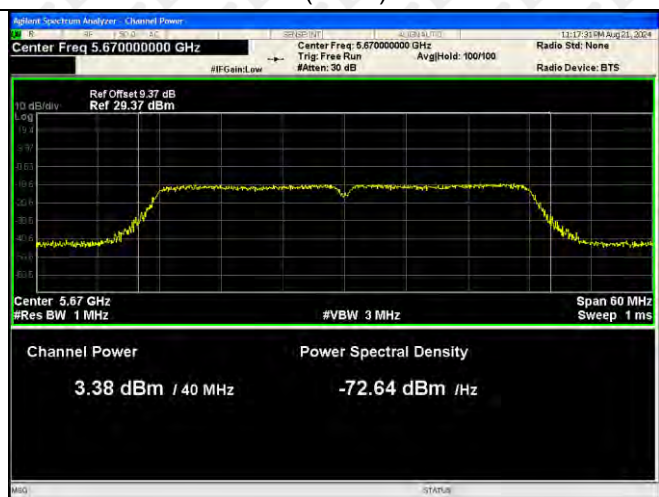
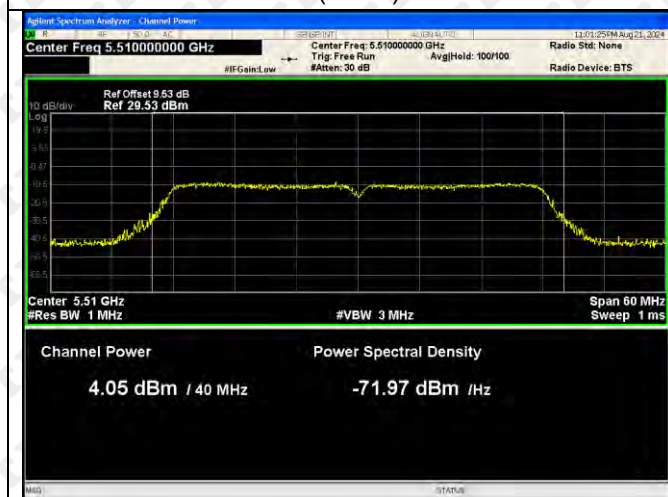
802.11n(HT20)-5700



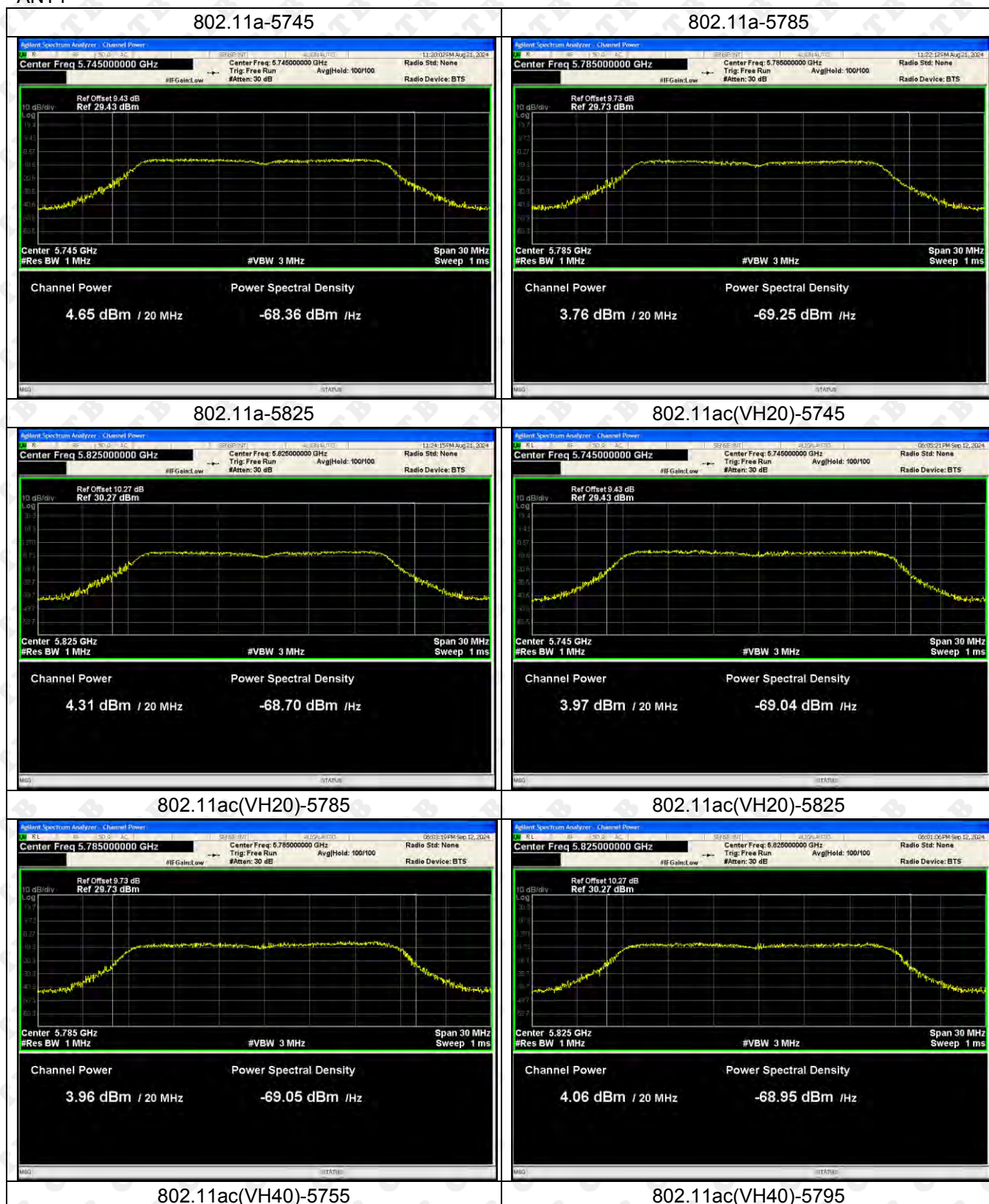
802.11n(HT40)-5510

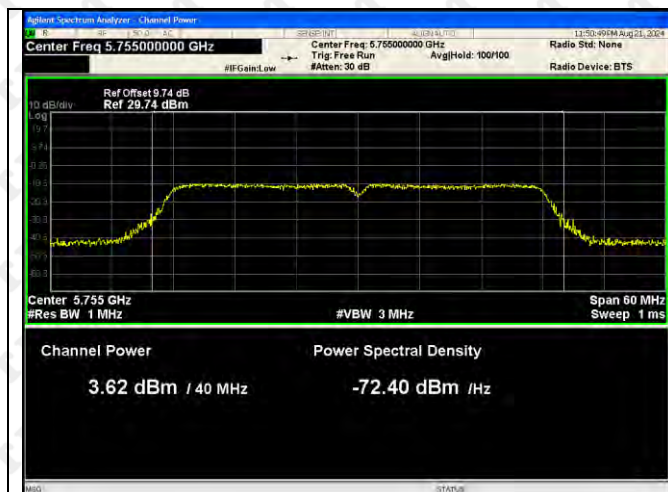


802.11n(HT40)-5670

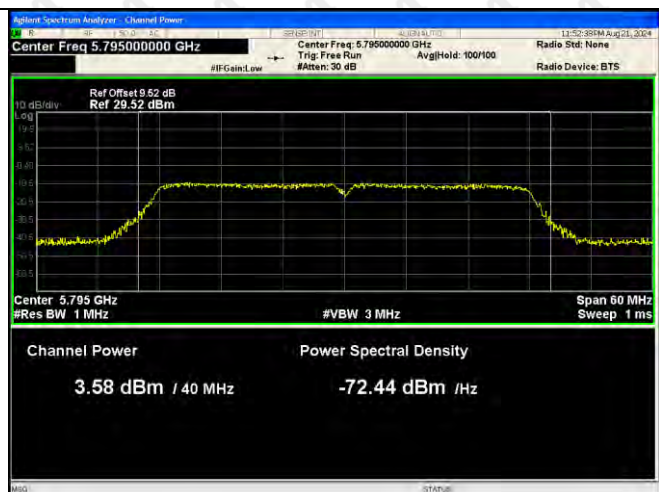


5725-5850MHz:-Power ANT1

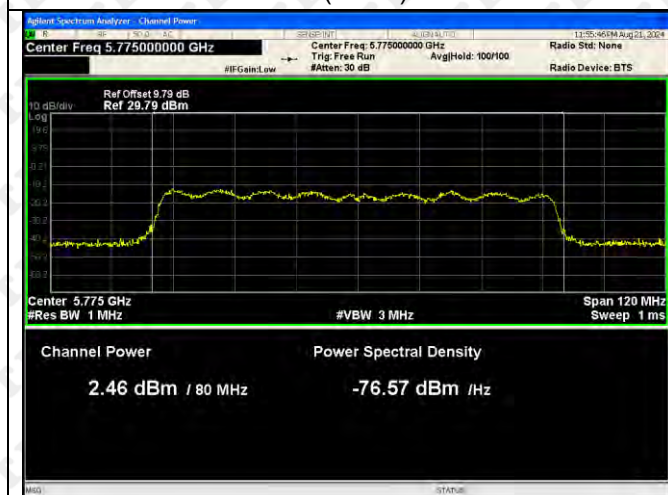




802.11ac(VH80)-5775



802.11n(HT20)-5745



802.11ac(VH80)-5775



802.11n(HT20)-5745



802.11n(HT20)-5785



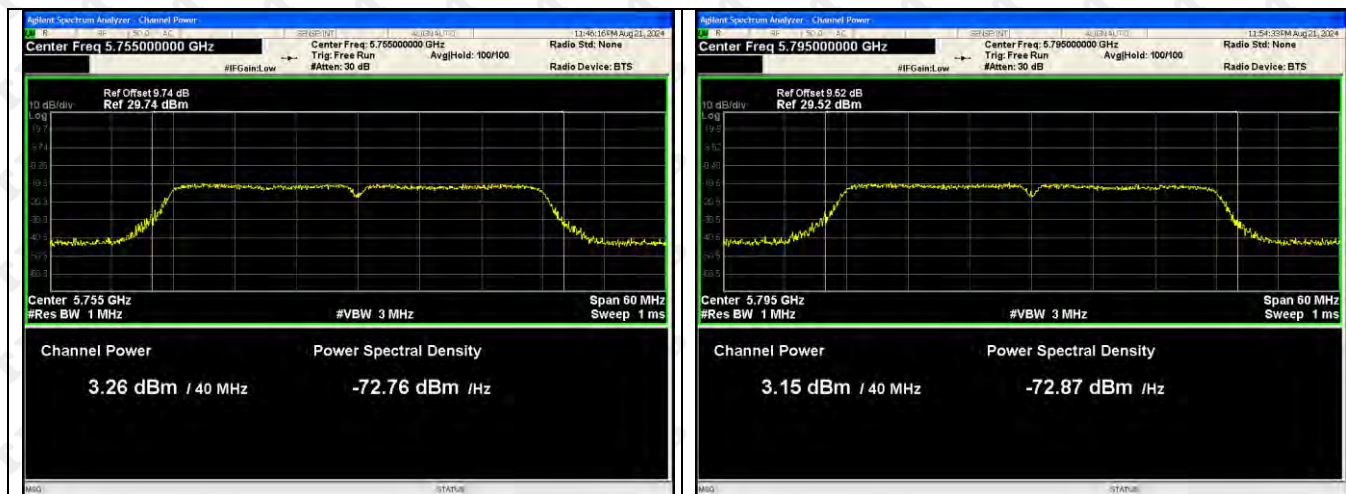
802.11n(HT20)-5825



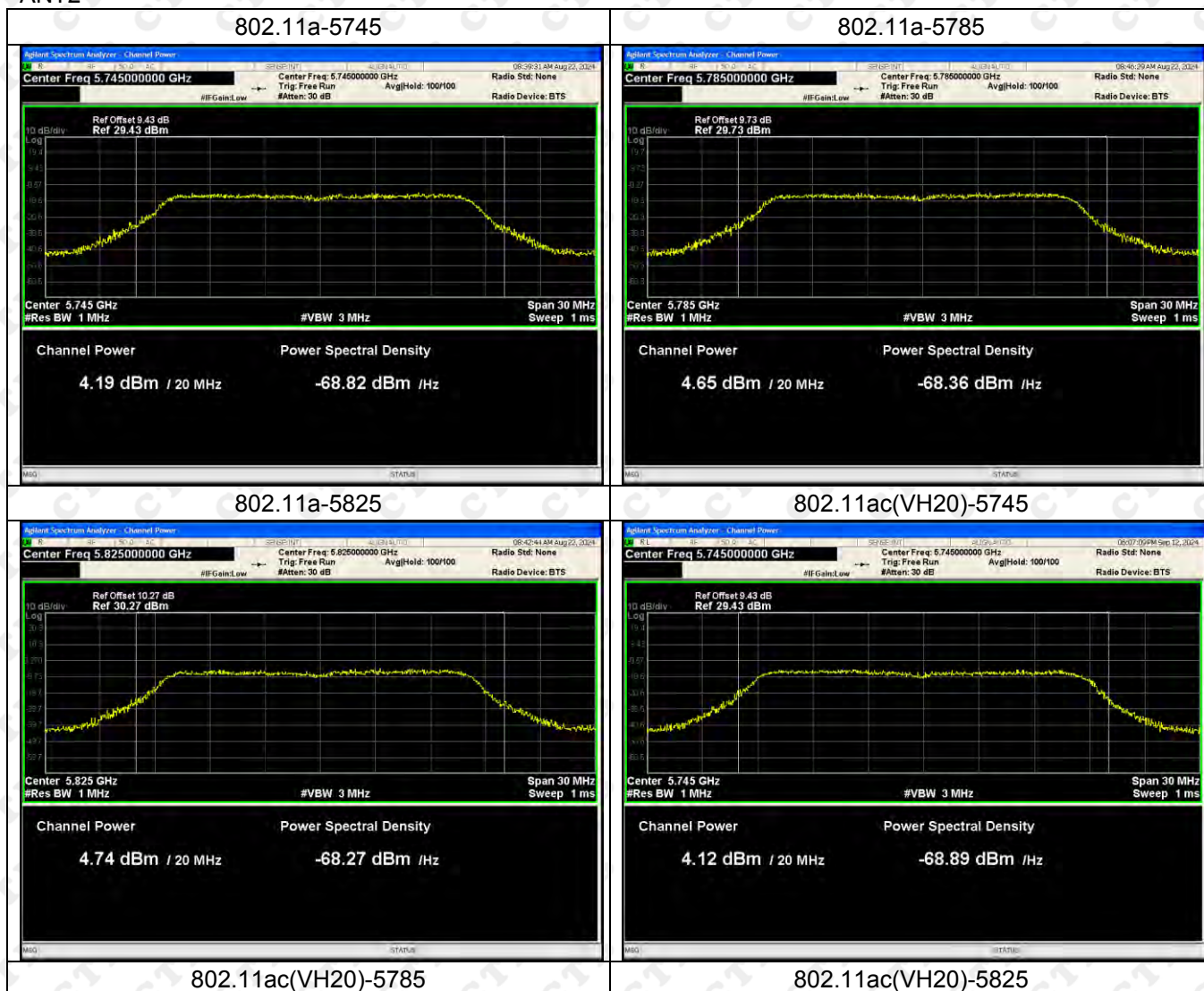
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802.11n(HT40)-5825

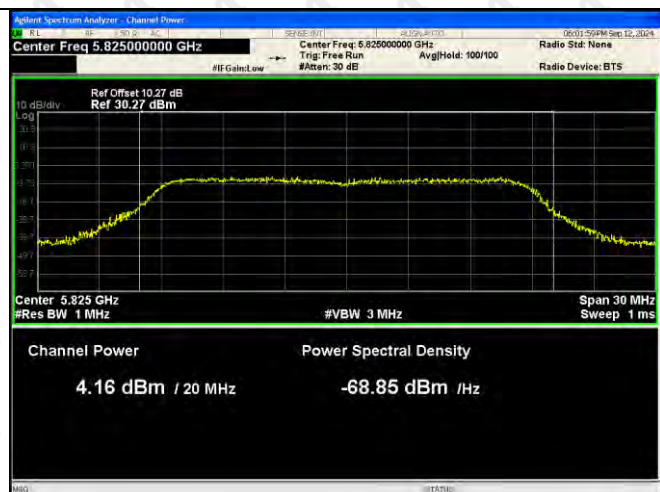


ANT2

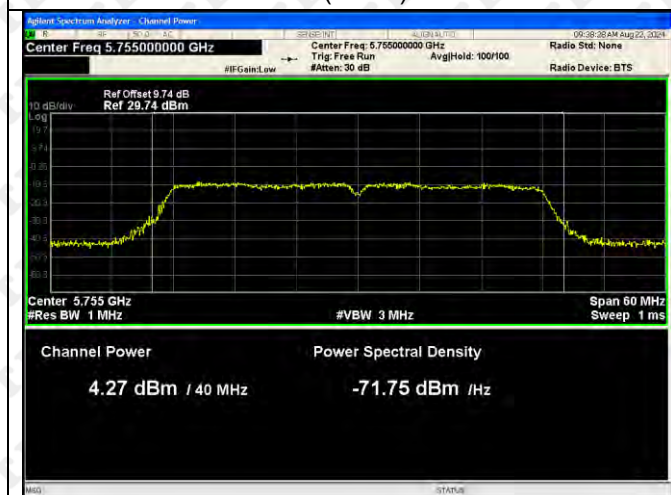




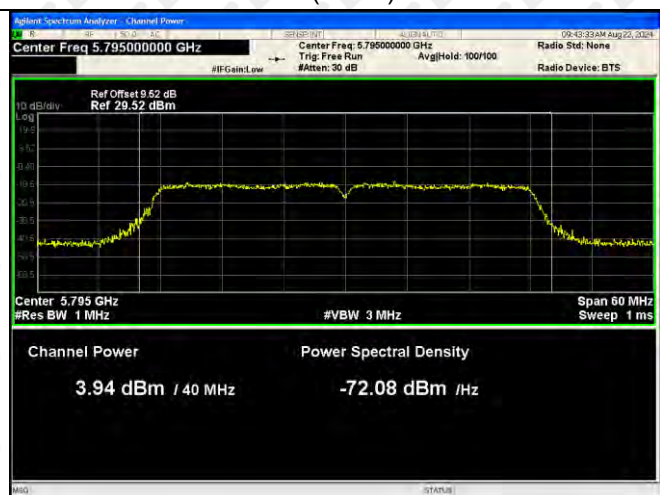
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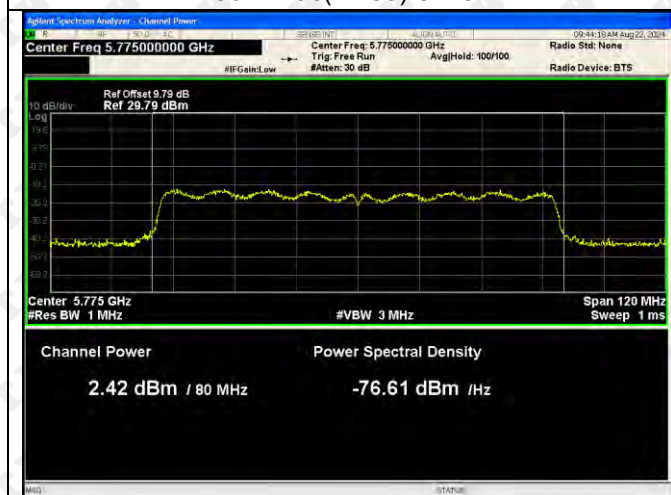
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802.11ac(VH80)-5775



802.11n(HT20)-5745



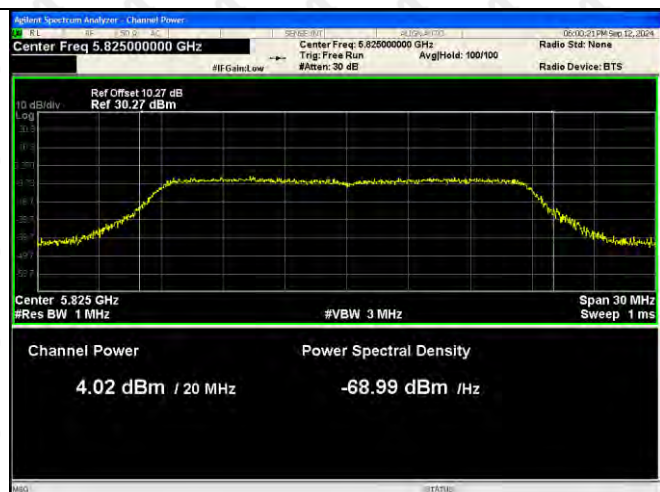
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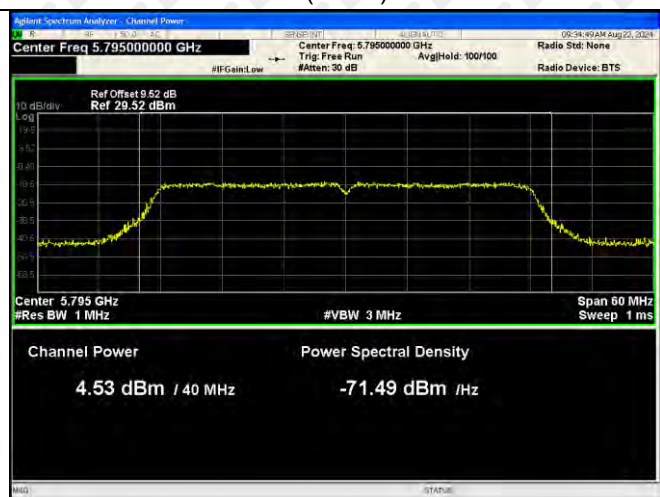
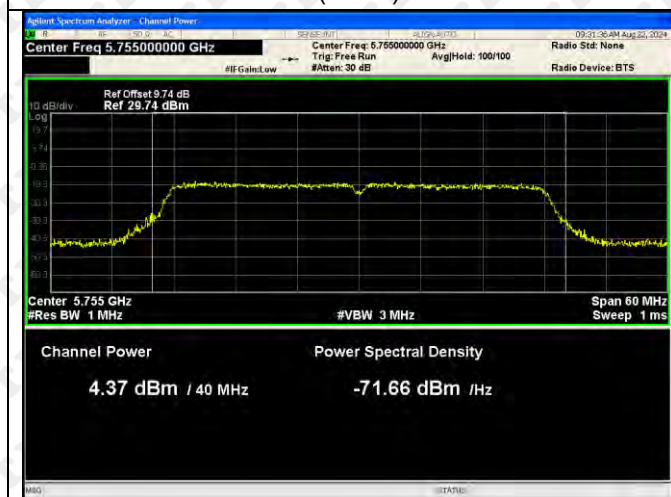
802.11n(HT20)-5825



802.11n(HT40)-5795

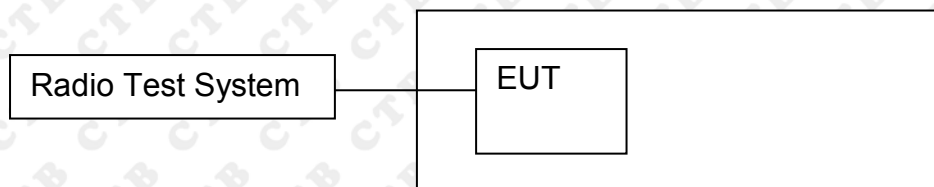


802.11n(HT40)-5825



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 $11 \text{ dBm} + 10 \log B$, 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) $\geq 3 * \text{RBW}$.

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 $\geq 3 * RBW$
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

5150-5250MHz:

Test mode	Test Channel (MHz)	26dB Bandwidth (MHz)&ANT1	26dB Bandwidth (MHz)&ANT2
802.11a	5180	21.508	21.425
	5200	21.330	21.302
	5240	21.399	21.194
802.11ac20	5180	21.562	21.75
	5200	21.487	21.962
	5240	21.951	21.843
802.11ac40	5190	41.746	41.726
	5230	42.069	41.176
802.11ac80	5210	82.215	81.807
802.11n(HT20)	5180	21.862	21.836
	5200	21.751	21.712
	5240	21.933	21.555
802.11n(HT40)	5190	41.737	42.322
	5230	41.339	41.252

5250-5350 MHz:

Test mode	Test Channel (MHz)	26dB Bandwidth (MHz)&ANT1	26dB Bandwidth (MHz)&ANT2
802.11a	5260	21.282	21.154
	5280	20.920	21.376
	5320	21.392	21.215
802.11ac20	5260	21.972	21.707
	5280	21.832	21.588
	5320	21.675	22.014
802.11ac40	5270	41.270	41.153
	5310	41.823	42.239
802.11ac80	5290	82.434	83.785
802.11n(HT20)	5260	21.379	22.129
	5280	22.148	21.443
	5320	22.232	22.119
802.11n(HT40)	5270	42.211	41.777
	5310	41.765	41.637

5470-5725MHz:

Test mode	Test Channel (MHz)	26dB Bandwidth (MHz)&ANT1	26dB Bandwidth (MHz)&ANT2
802.11a	5500	21.119	21.033
	5580	21.188	20.816
	5700	20.968	20.632
802.11ac20	5500	21.924	21.497
	5580	21.726	21.872
	5700	21.574	21.663
802.11ac40	5510	42.057	42.022
	5670	41.952	41.365
802.11ac80	5530	84.172	82.449
802.11n(HT20)	5500	22.003	21.922
	5580	21.791	22.123
	5700	21.248	21.579
802.11n(HT40)	5510	41.460	41.77
	5670	41.928	41.455

5725-5850MHz:

Test mode	Test Channel (MHz)	6dB Bandwidth (MHz)&ANT1	6dB Bandwidth (MHz)&ANT2
802.11a	5745	16.546	16.529
	5785	16.582	16.519
	5825	16.551	16.508
802.11ac20	5745	17.782	17.755
	5785	17.784	17.736
	5825	17.793	17.754
802.11ac40	5755	36.514	36.448
	5795	36.500	36.454
802.11ac80	5775	76.154	76.435
802.11n(HT20)	5745	17.662	17.777
	5785	17.751	17.786
	5825	17.805	17.775
802.11n(HT40)	5755	36.490	36.481
	5795	36.496	36.503

Test Graph:
5150-5250MHz-Power
ANT1





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

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



802.11ac(VH80)-5230



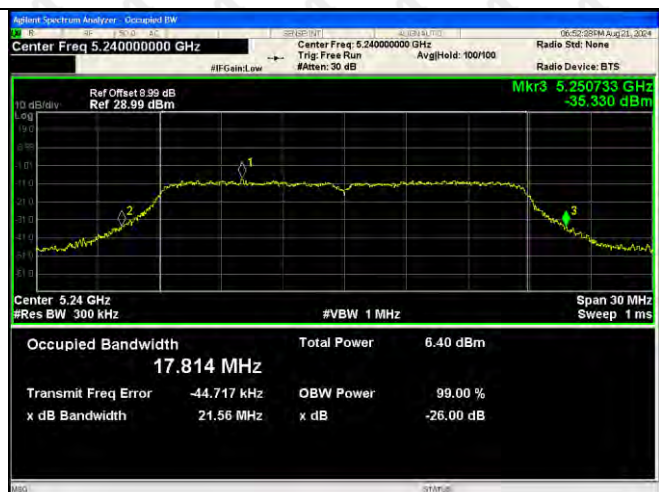
802.11n(HT20)-5200



802.11n(HT20)-5240



802.11n(HT40)-5190



802.11n(HT40)-5230



5250-5350MHz-Power ANT1





802.11ac(VH80)-5290



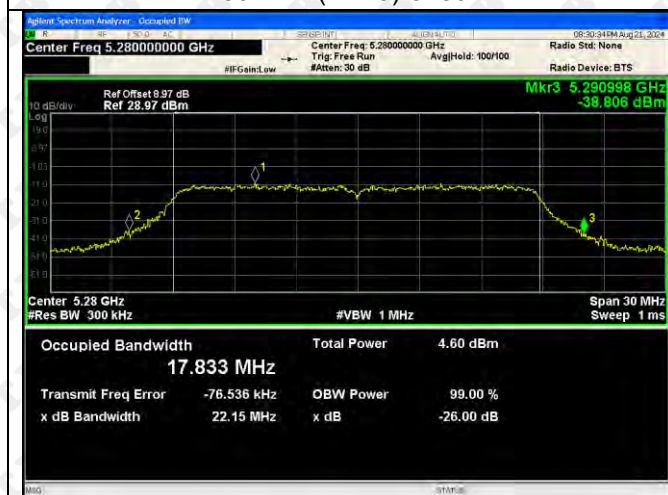
802.11n(HT20)-5260



802.11n(HT20)-5280



802.11n(HT20)-5320



802.11n(HT40)-5270



802.11n(HT40)-5310



ANT2

802.11a-5260



802.11a-5280



802.11a-5320



802.11ac(VH20)-5260



802.11ac(VH20)-5280

802.11ac(VH20)-5320



802.11ac(VH40)-5270



802.11ac(VH40)-5310



802.11ac(VH80)-5290



802.11ac(VH80)-5310



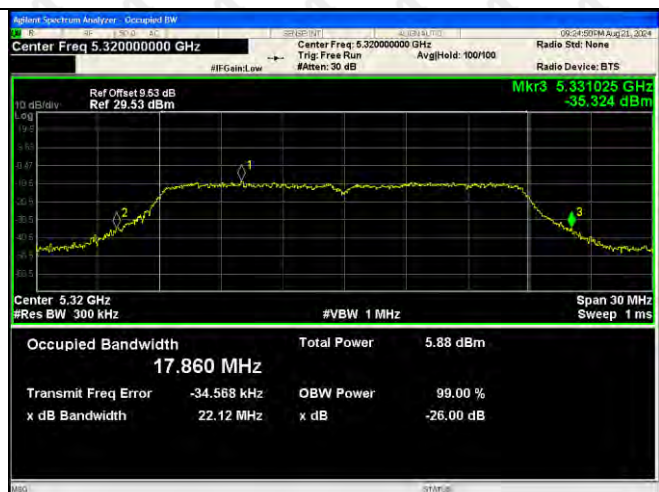
802.11n(HT20)-5280



802.11n(HT20)-5320



802.11n(HT40)-5270



802.11n(HT40)-5310



5470-5725MHz-Power ANT1





802.11ac(VH80)-5530



802.11n(HT20)-5500



802.11n(HT20)-5580



802.11n(HT20)-5700



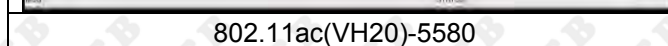
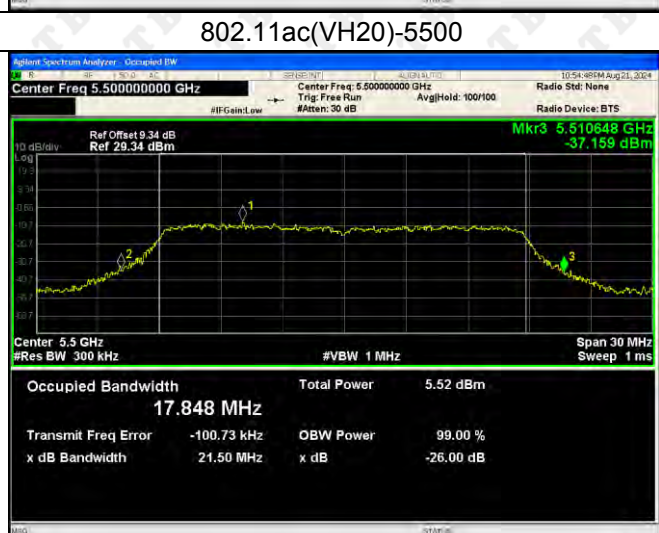
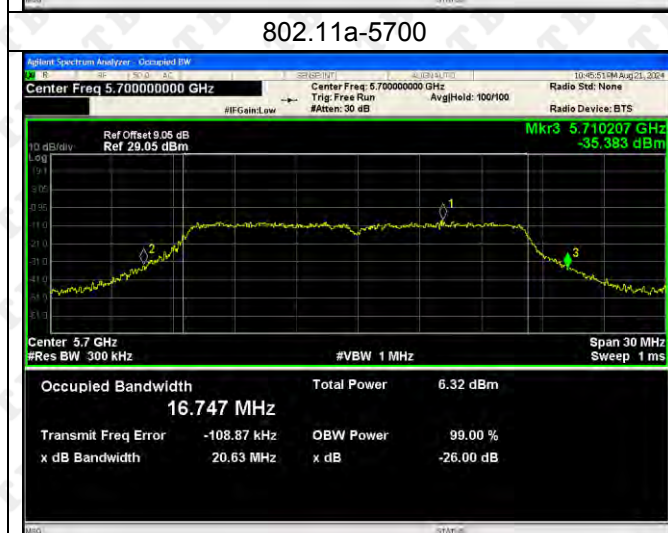
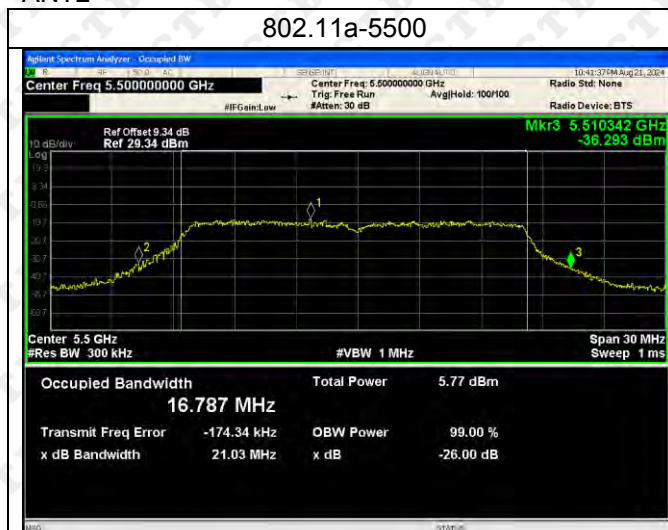
802.11n(HT40)-5510

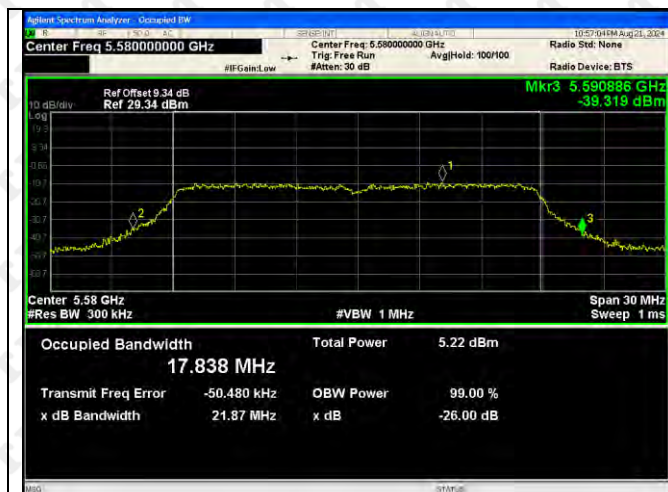


802.11n(HT40)-5670

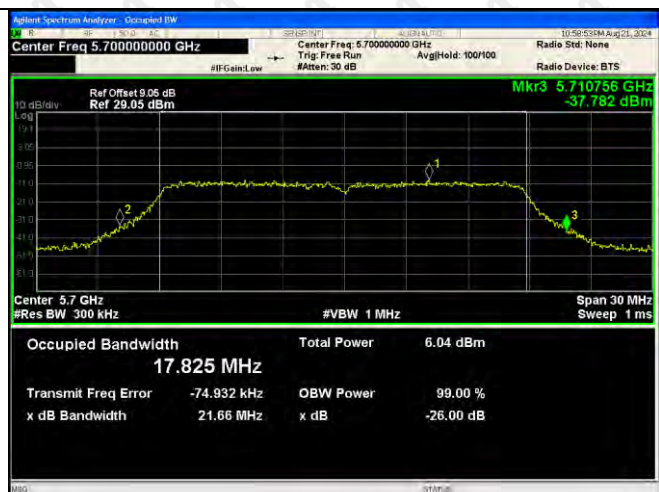


ANT2





802.11ac(VH40)-5510



802.11ac(VH40)-5670



802.11ac(VH80)-5530



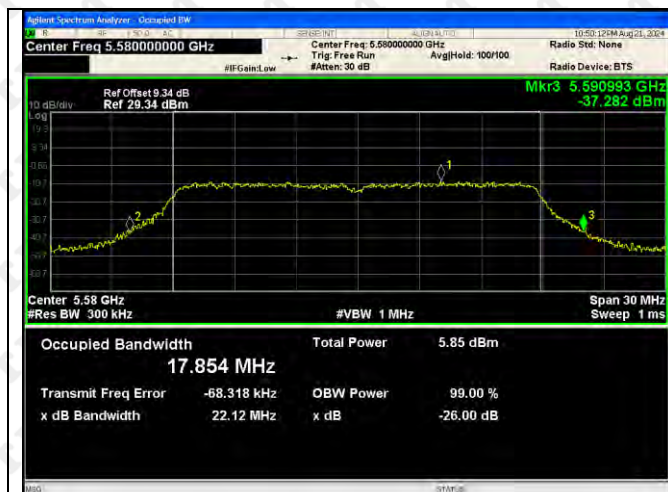
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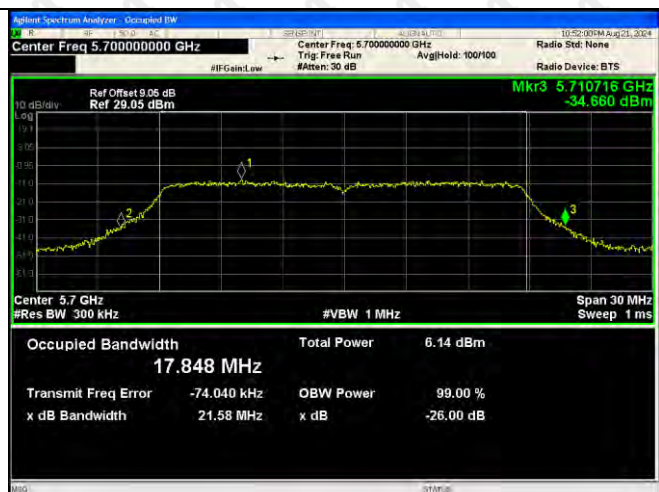
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802.11n(HT20)-5700



802.11n(HT40)-5510



802.11n(HT40)-5670

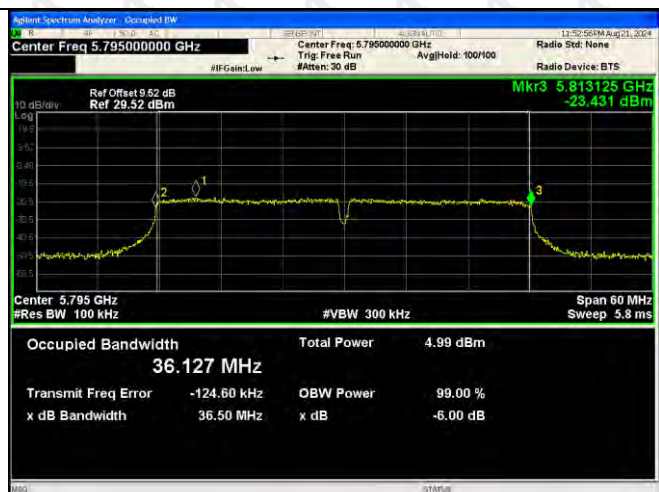


5725-5850MHz:-Power
ANT1

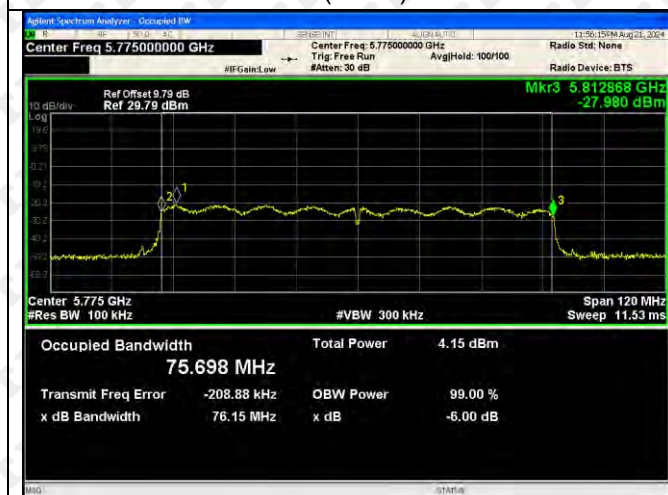




802.11ac(VH80)-5775



802.11n(HT20)-5745



802.11n(HT20)-5785



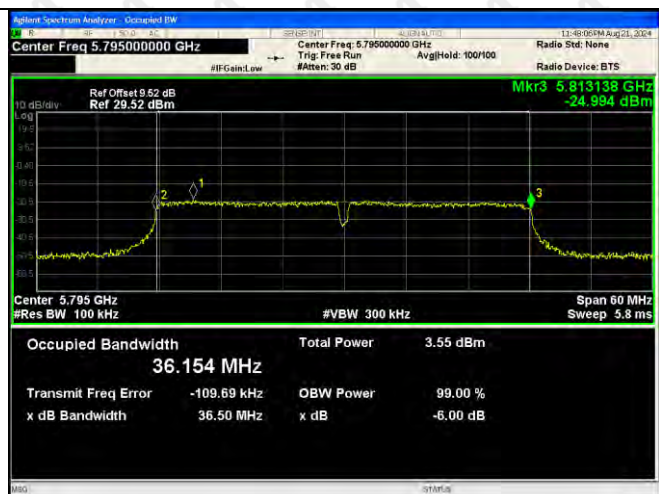
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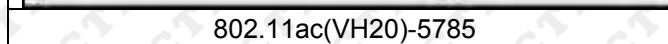
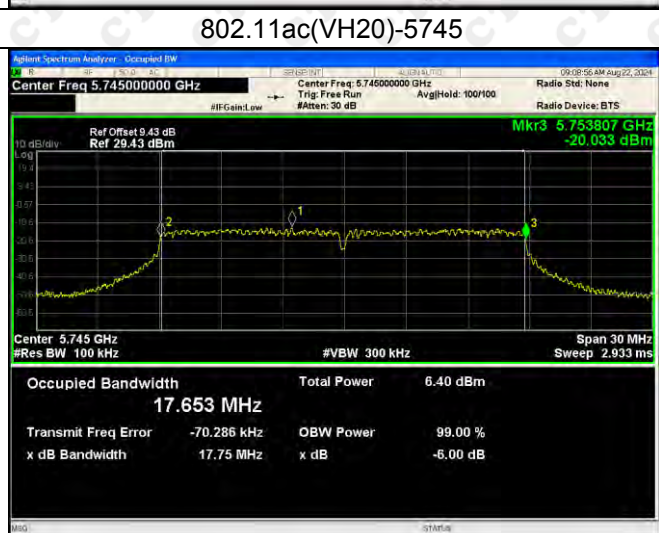
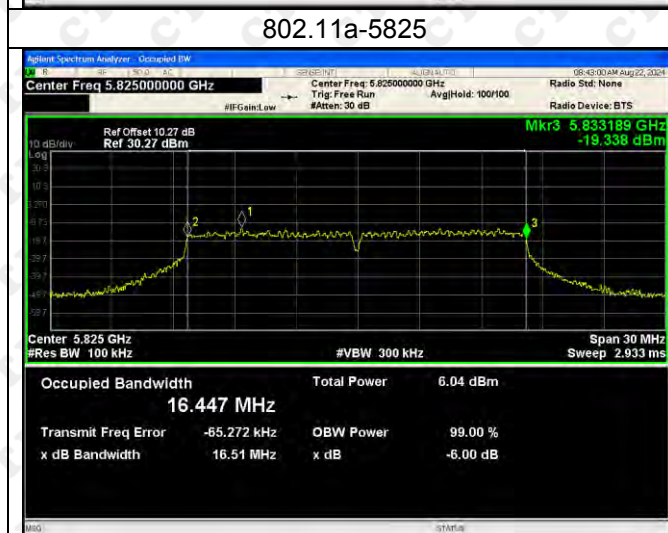
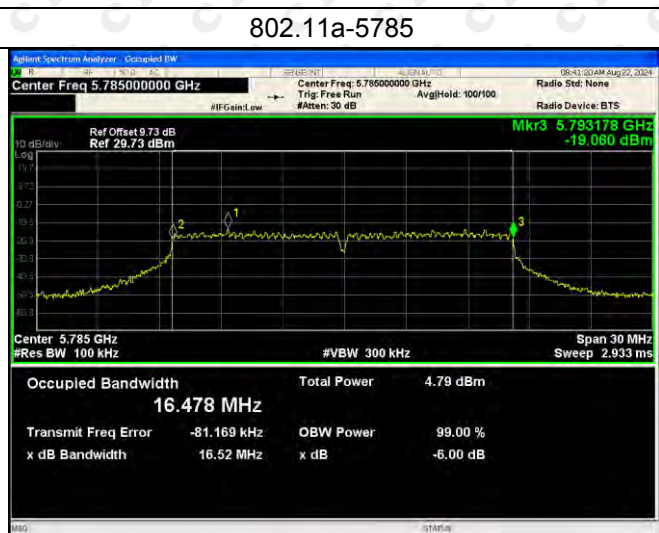
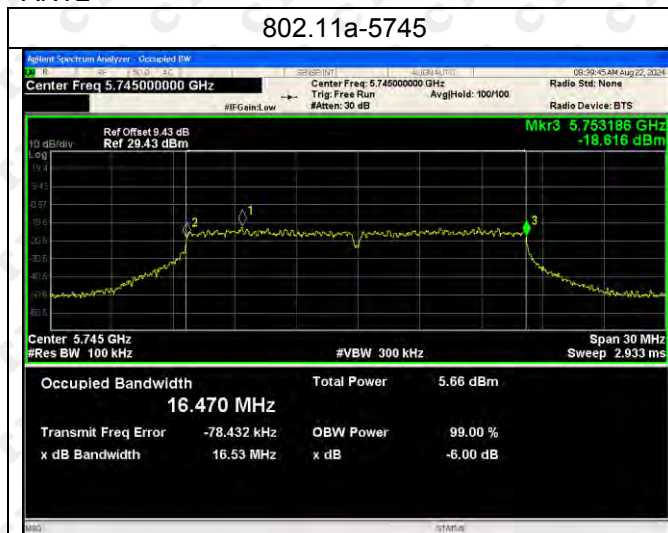
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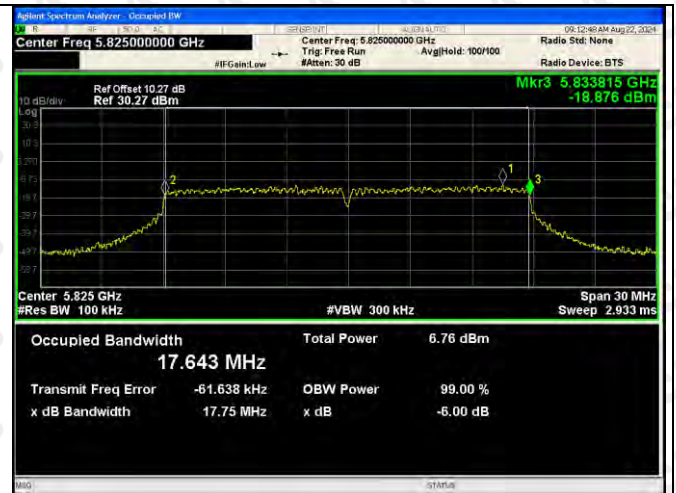


ANT2





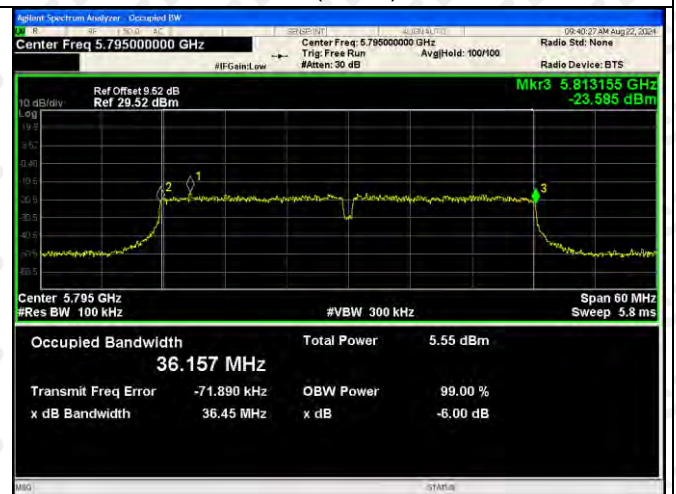
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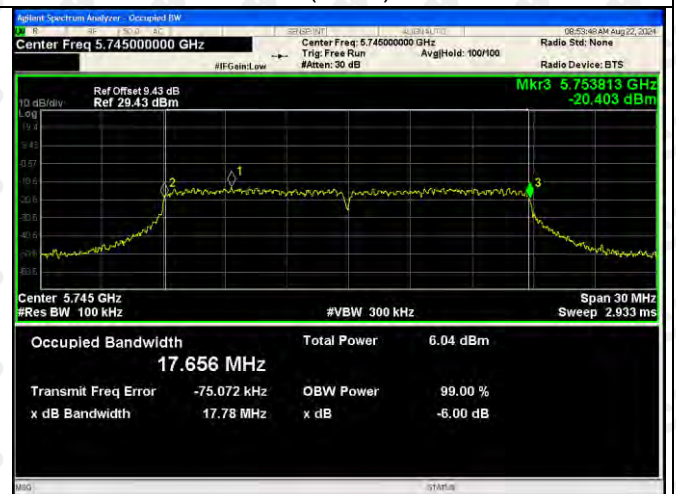
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802.11n(HT20)-5745



802.11n(HT20)-5785



802.11n(HT20)-5825