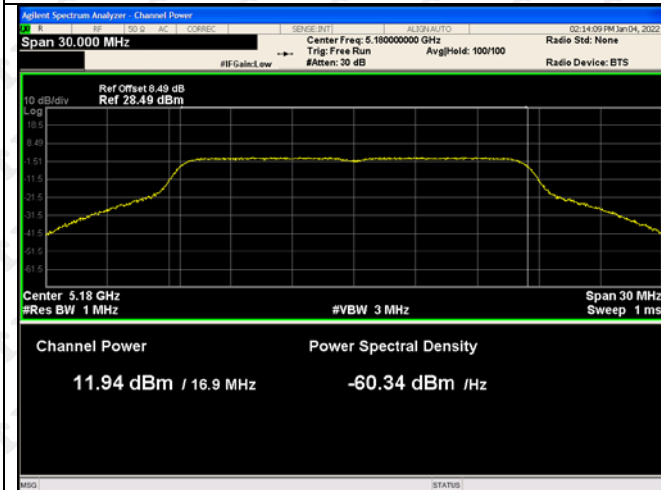
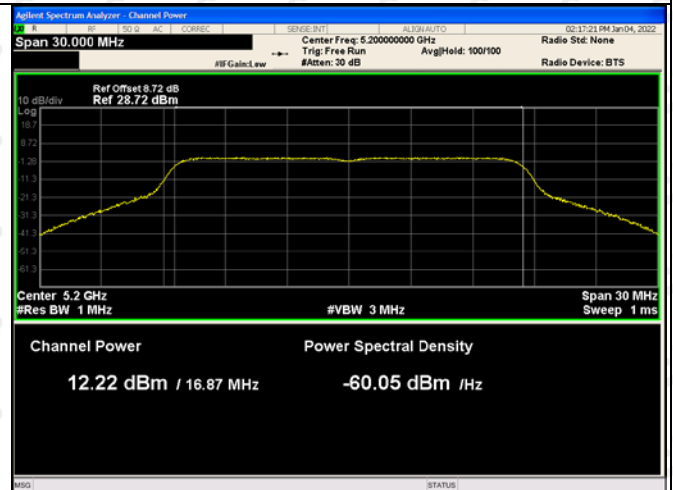


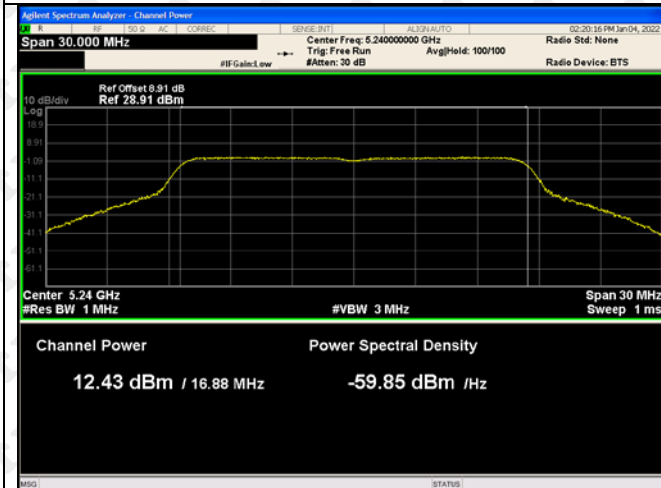
802.11a-5180



802.11a-5200



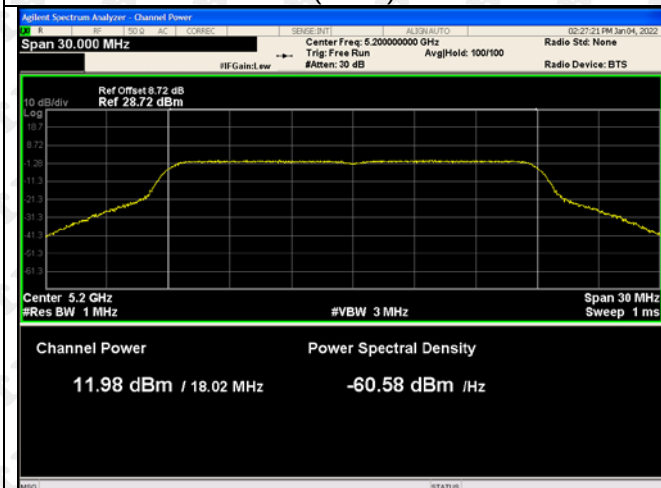
802.11a-5240



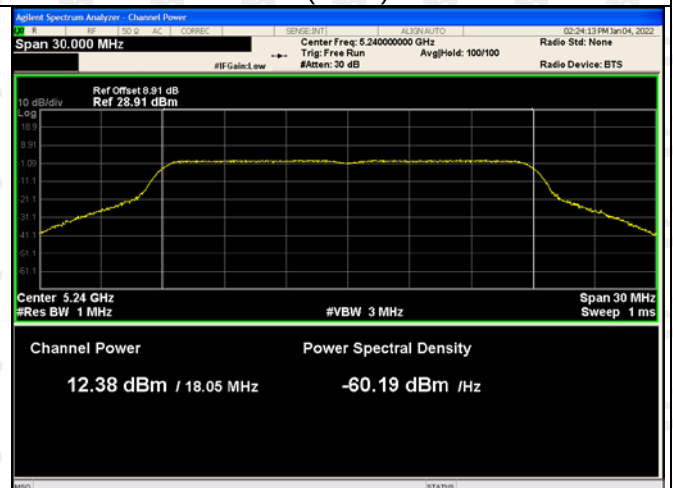
802.11n(HT20)-5180



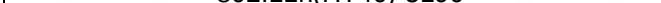
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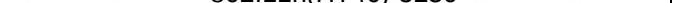
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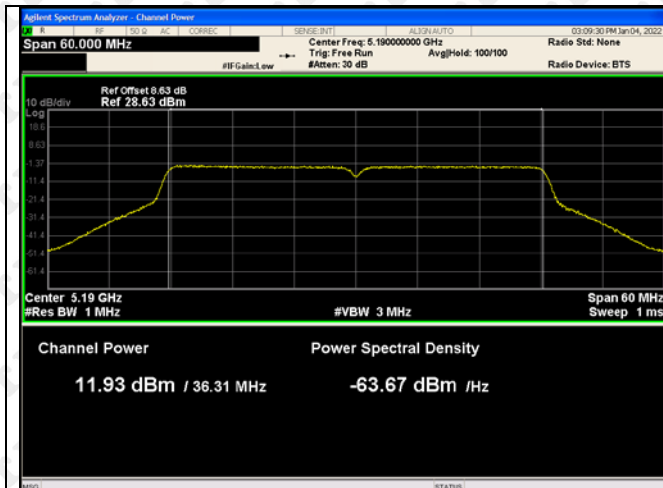


802.11n(HT40)-5190

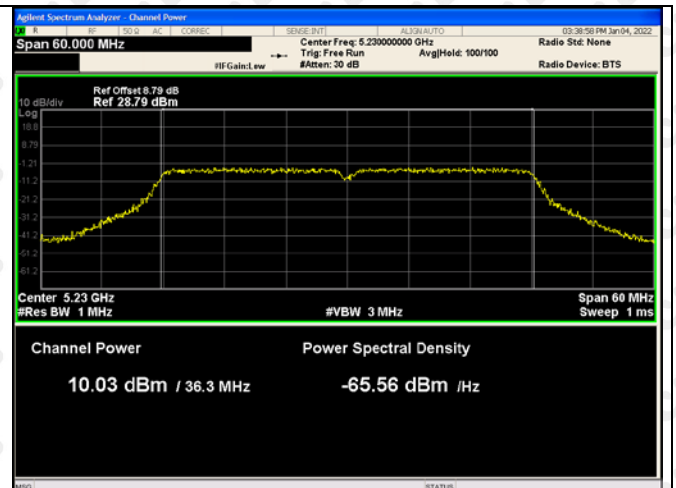


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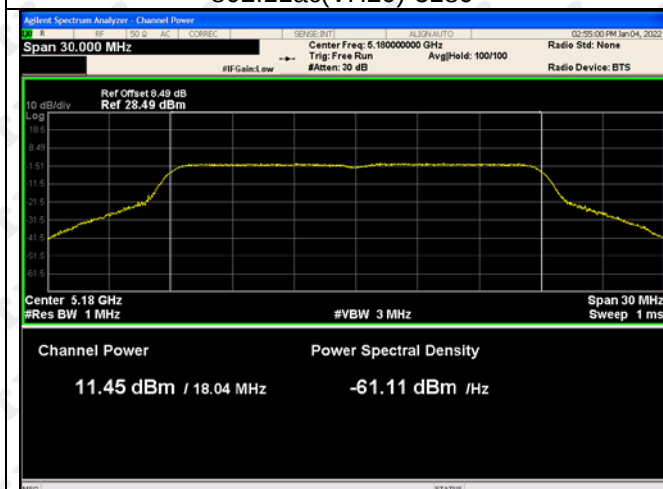




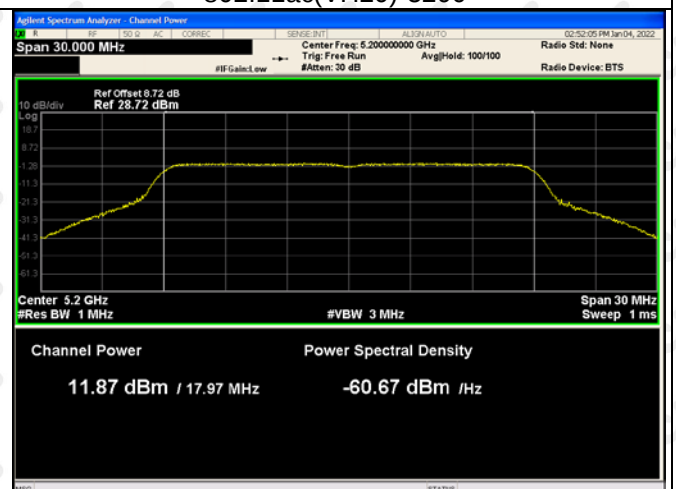
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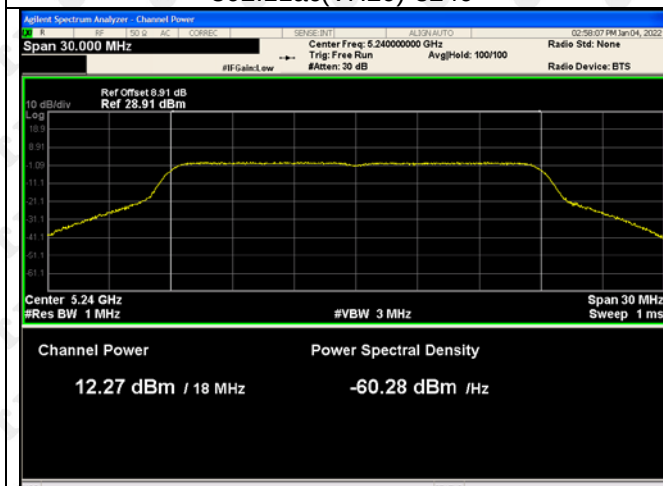
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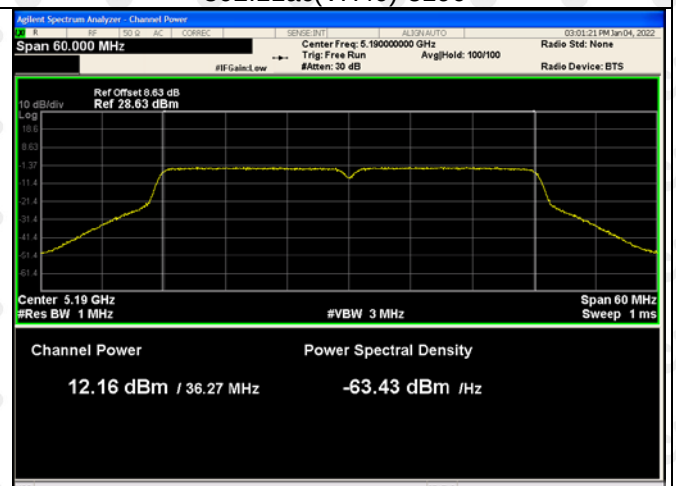
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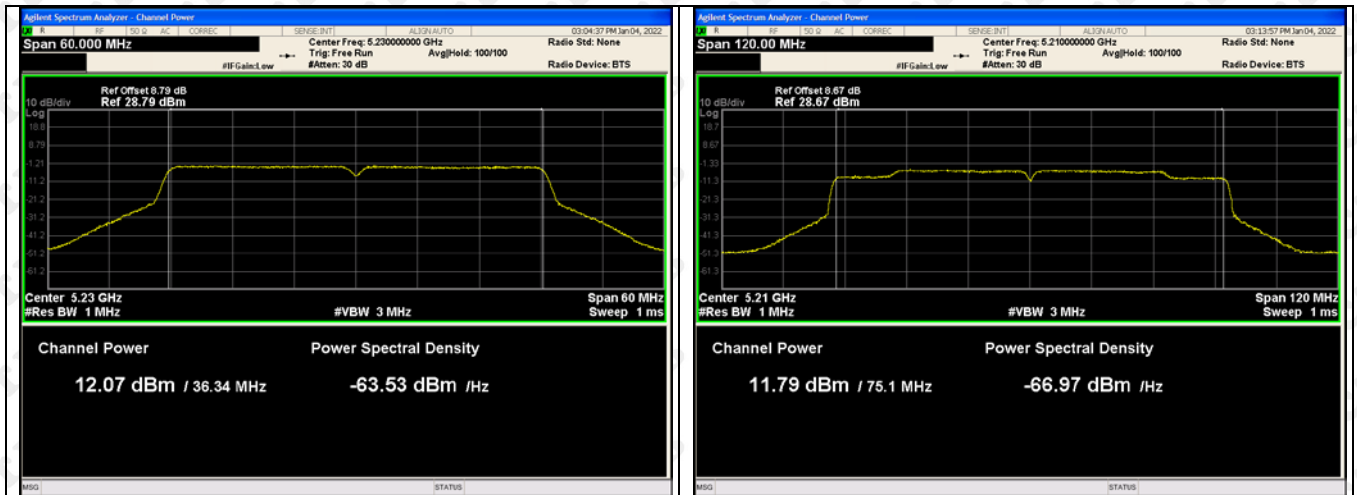
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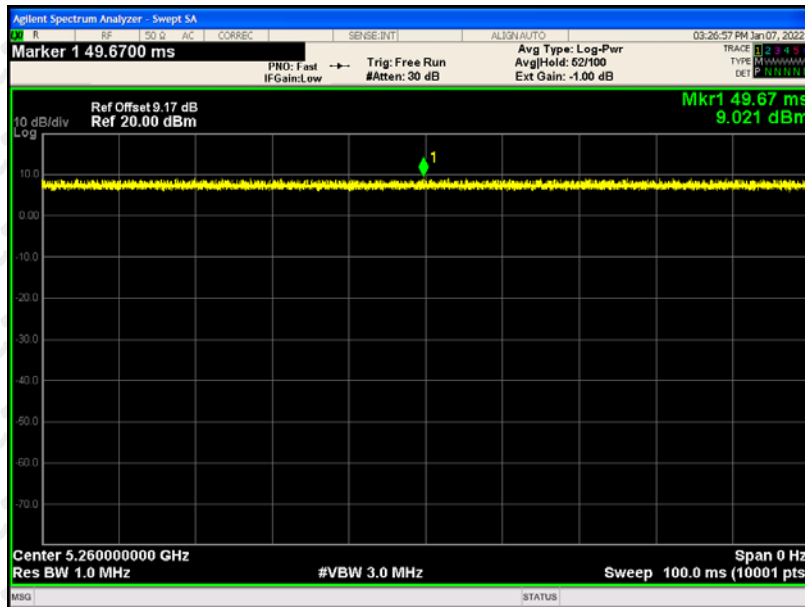
802.11ac(VH40)-5230



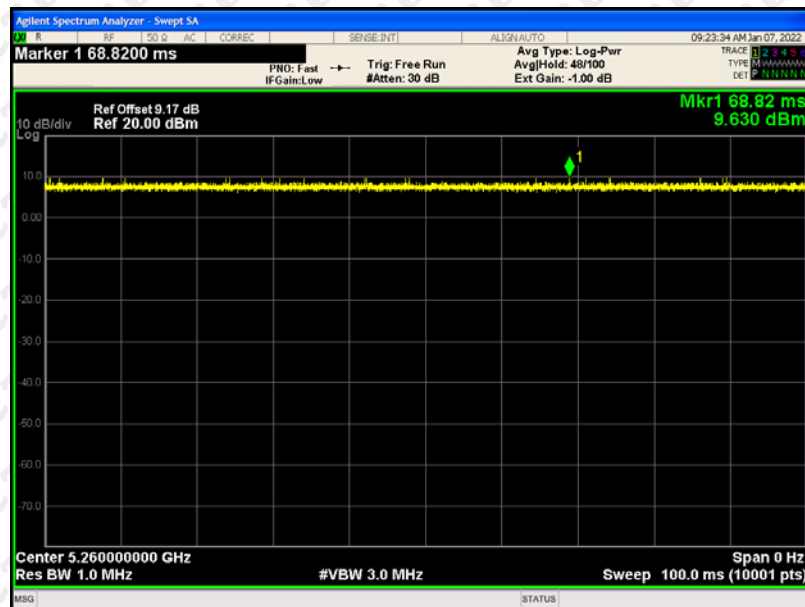
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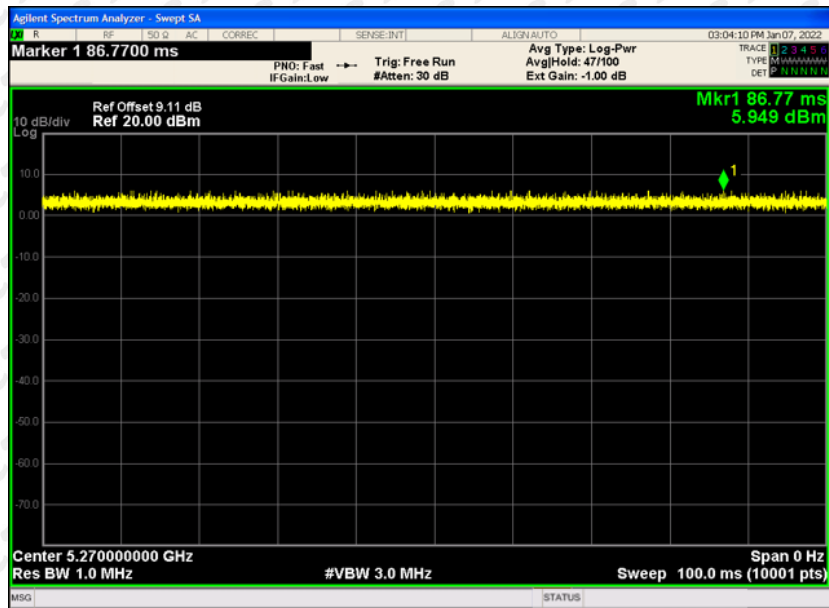
5250-5350MHz:
a20:



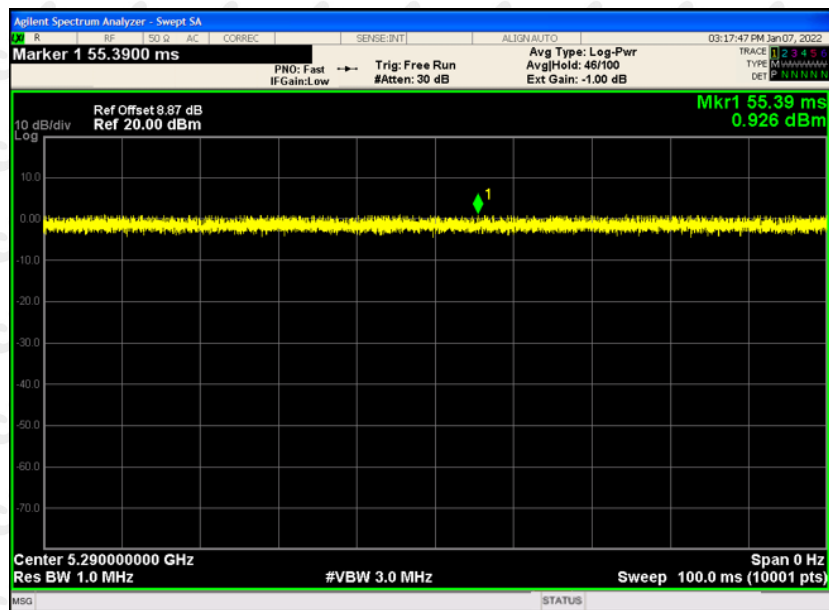
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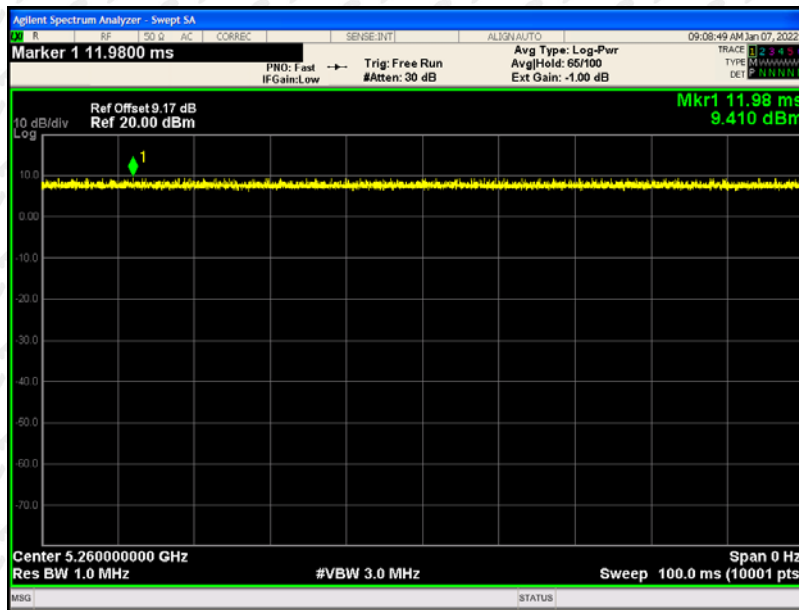
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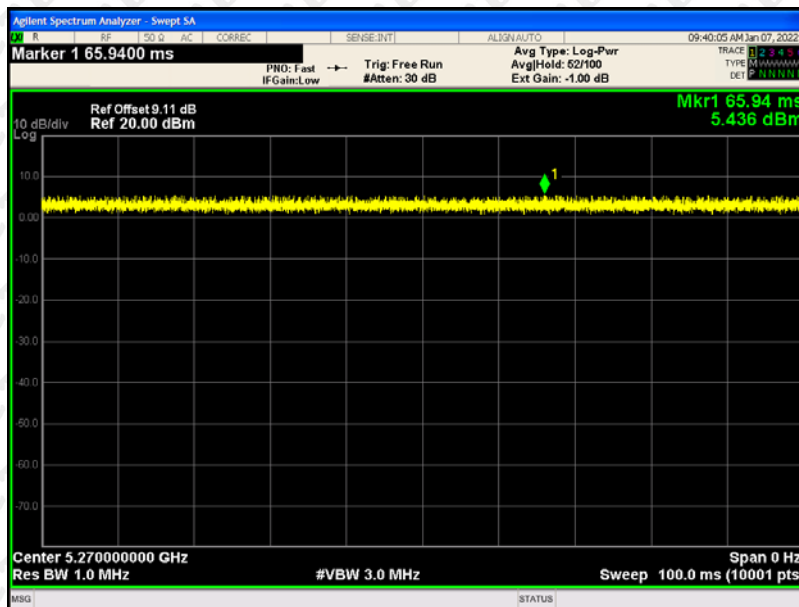
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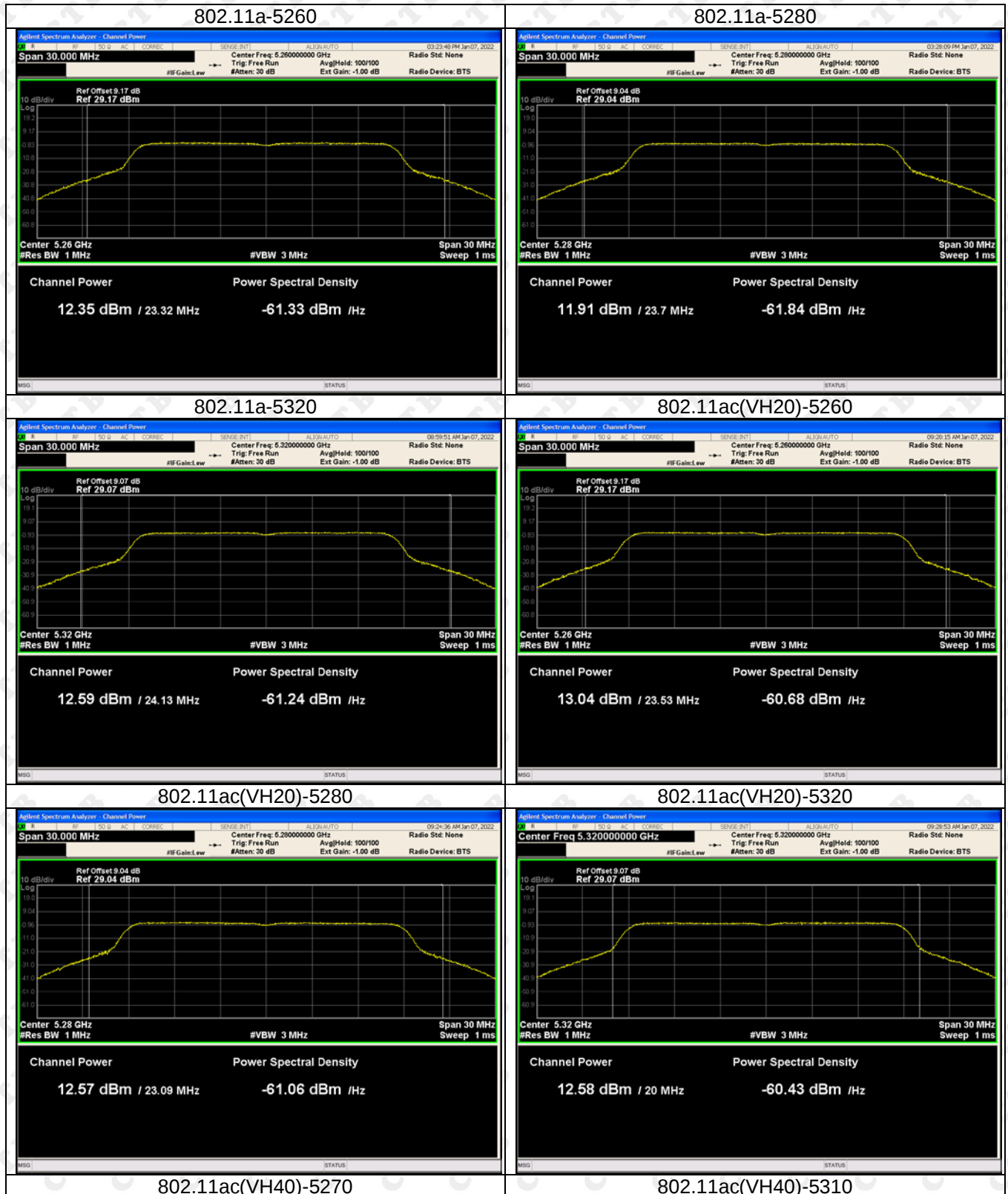


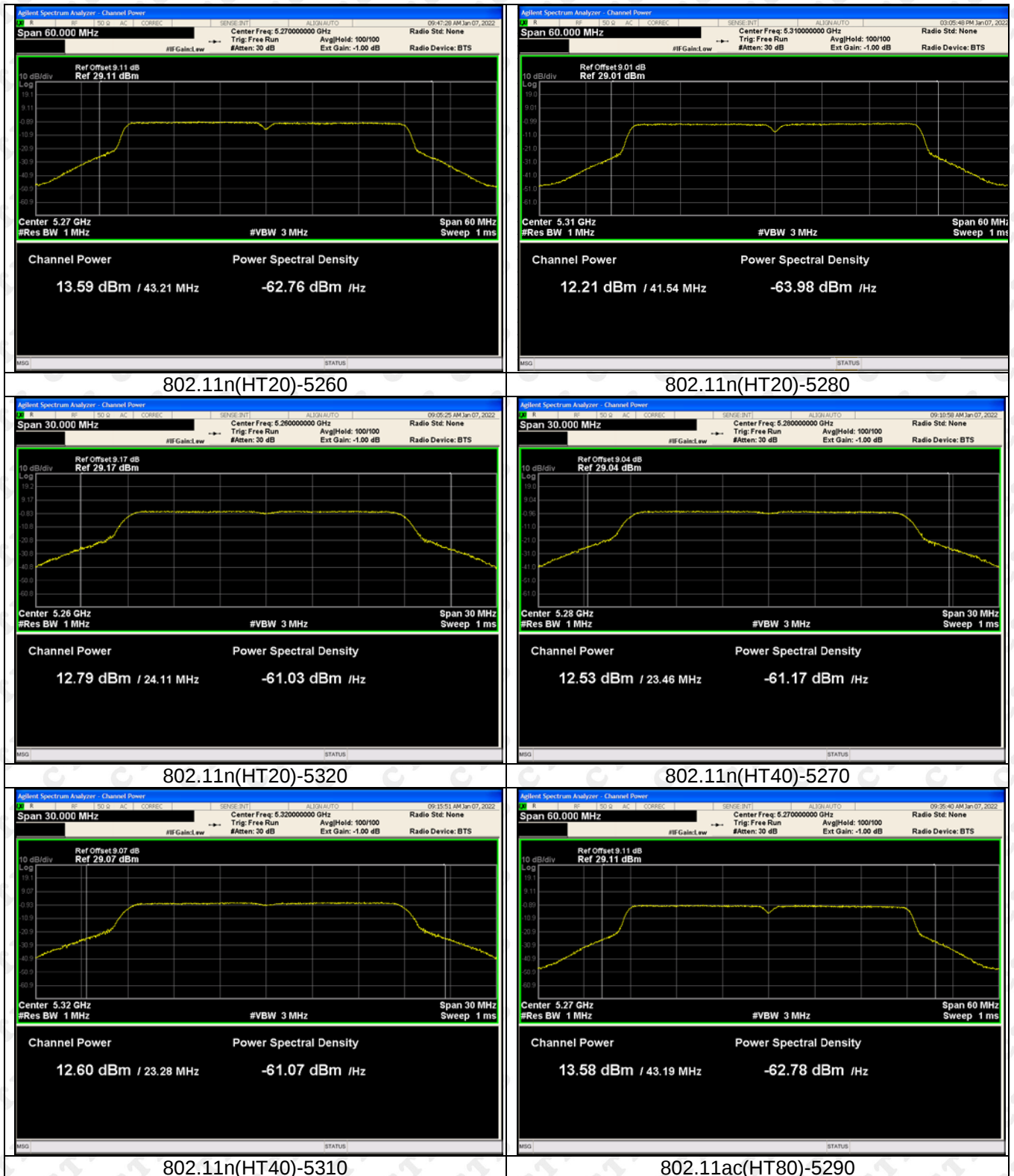
N20:



N40:







802.11n(HT20)-5260

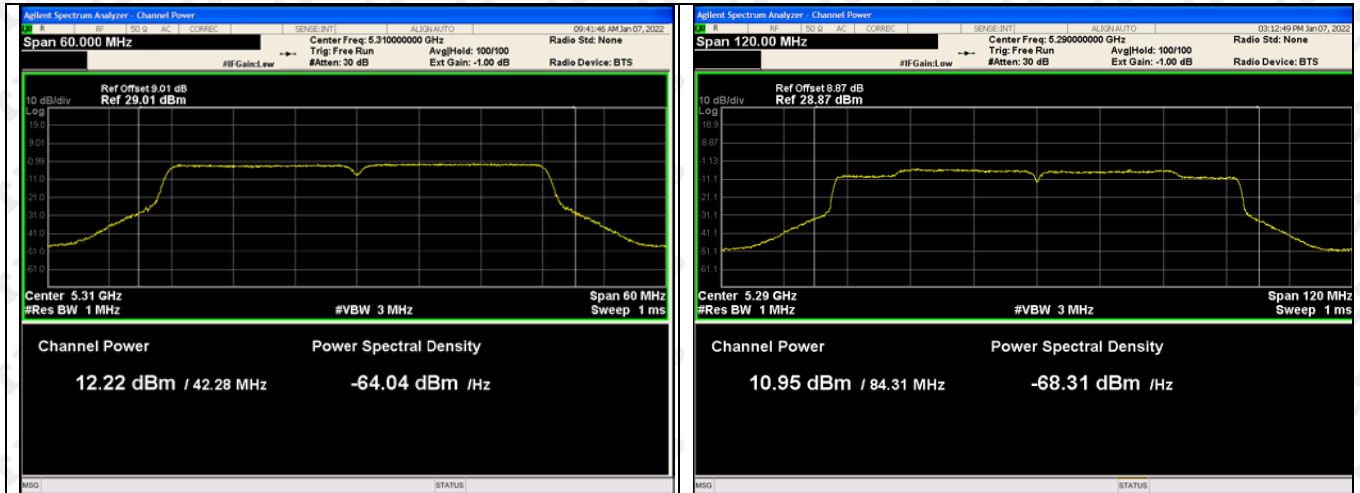
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802.11n(HT20)-5320

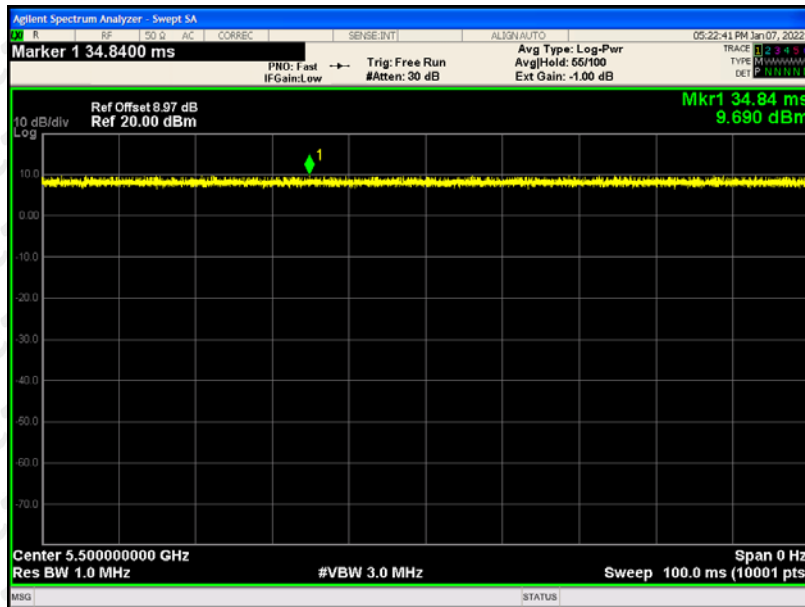
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802.11n(HT40)-5310

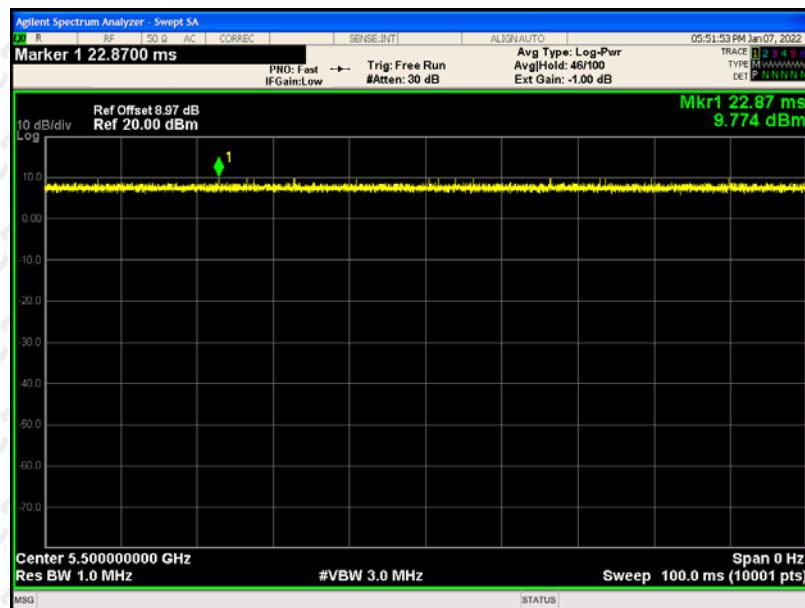
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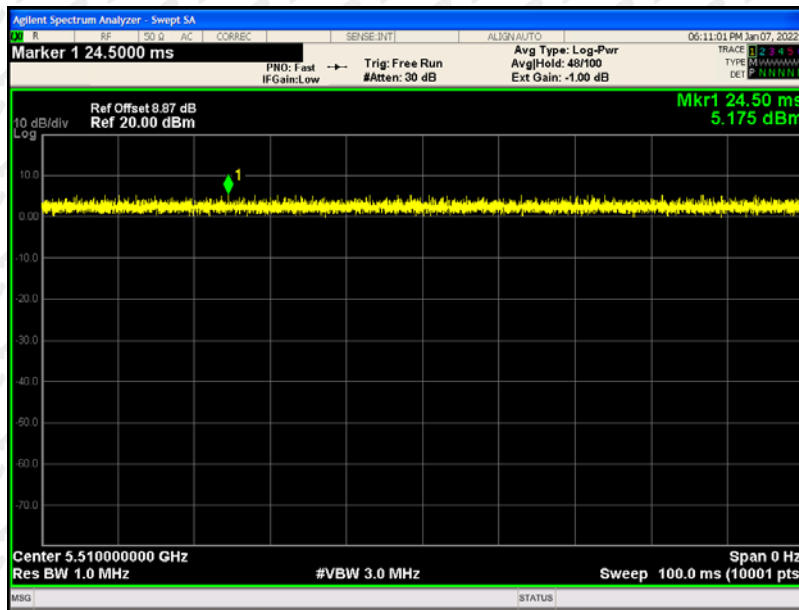
5500-5700MHz
802.11 a20



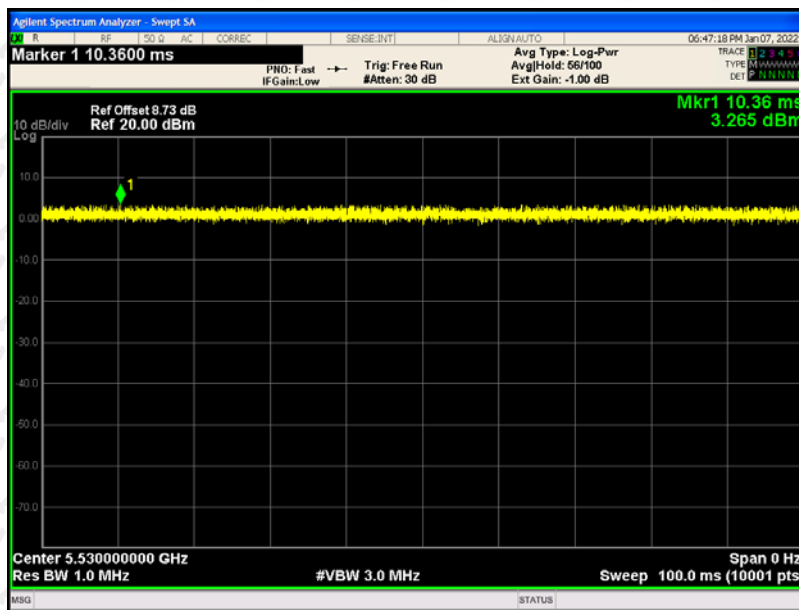
802.11 ac20



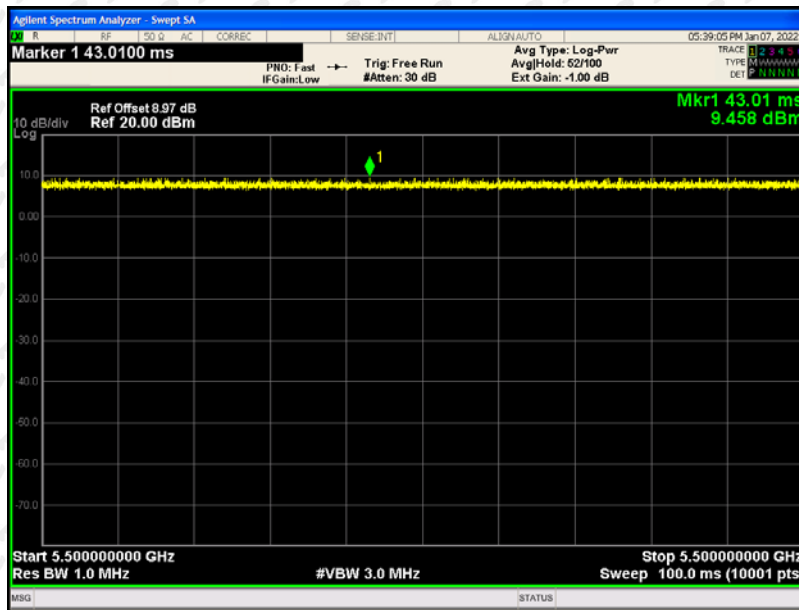
802.11 ac40



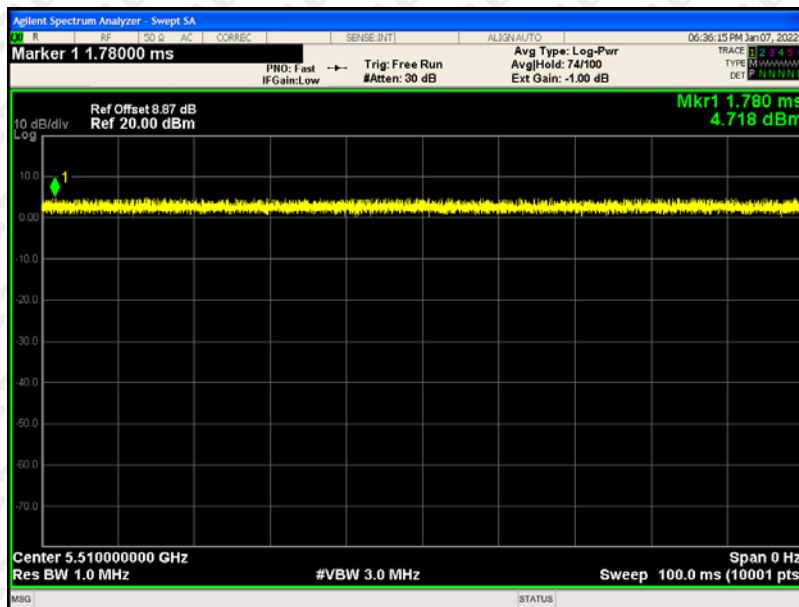
802.11 ac80

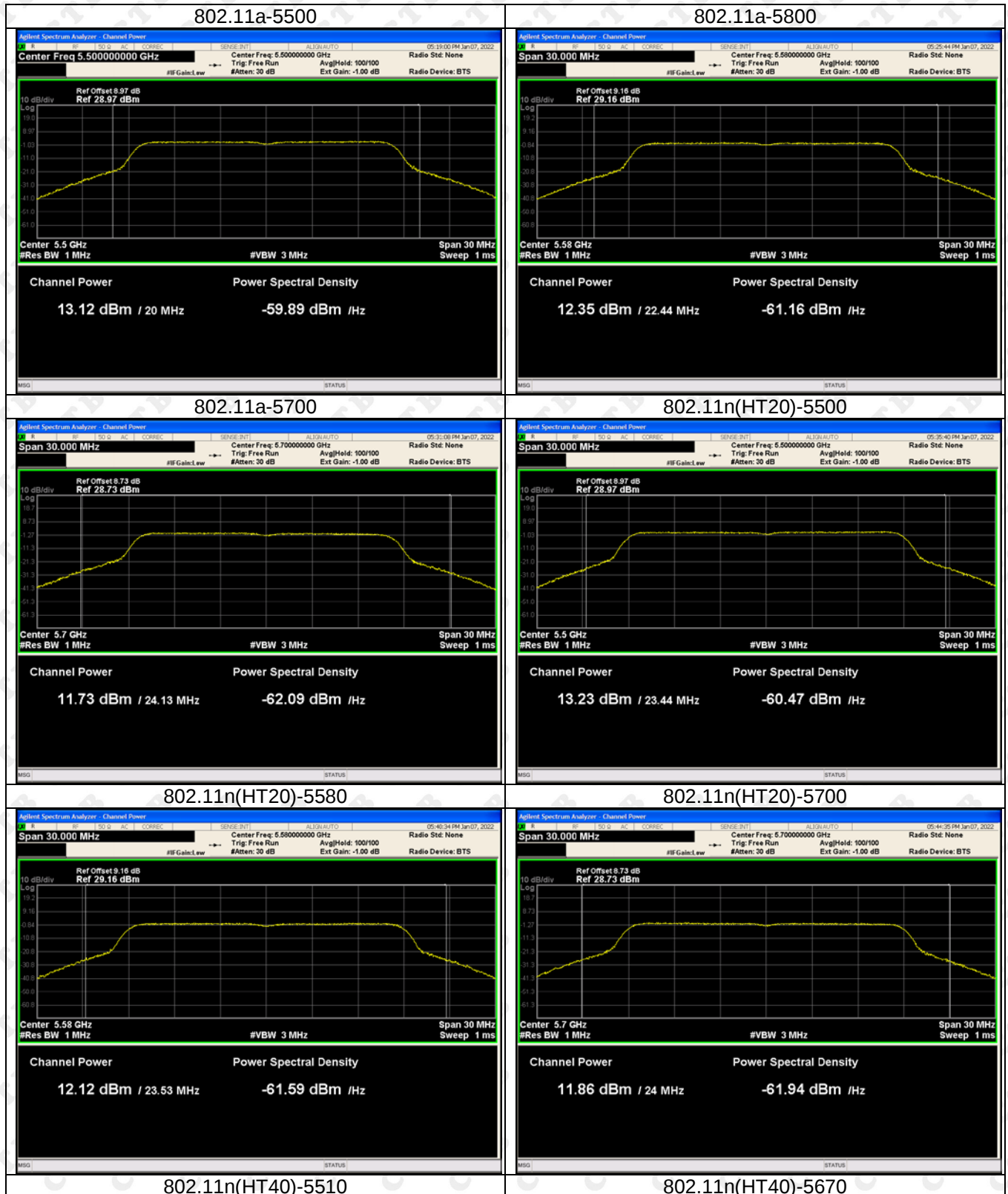


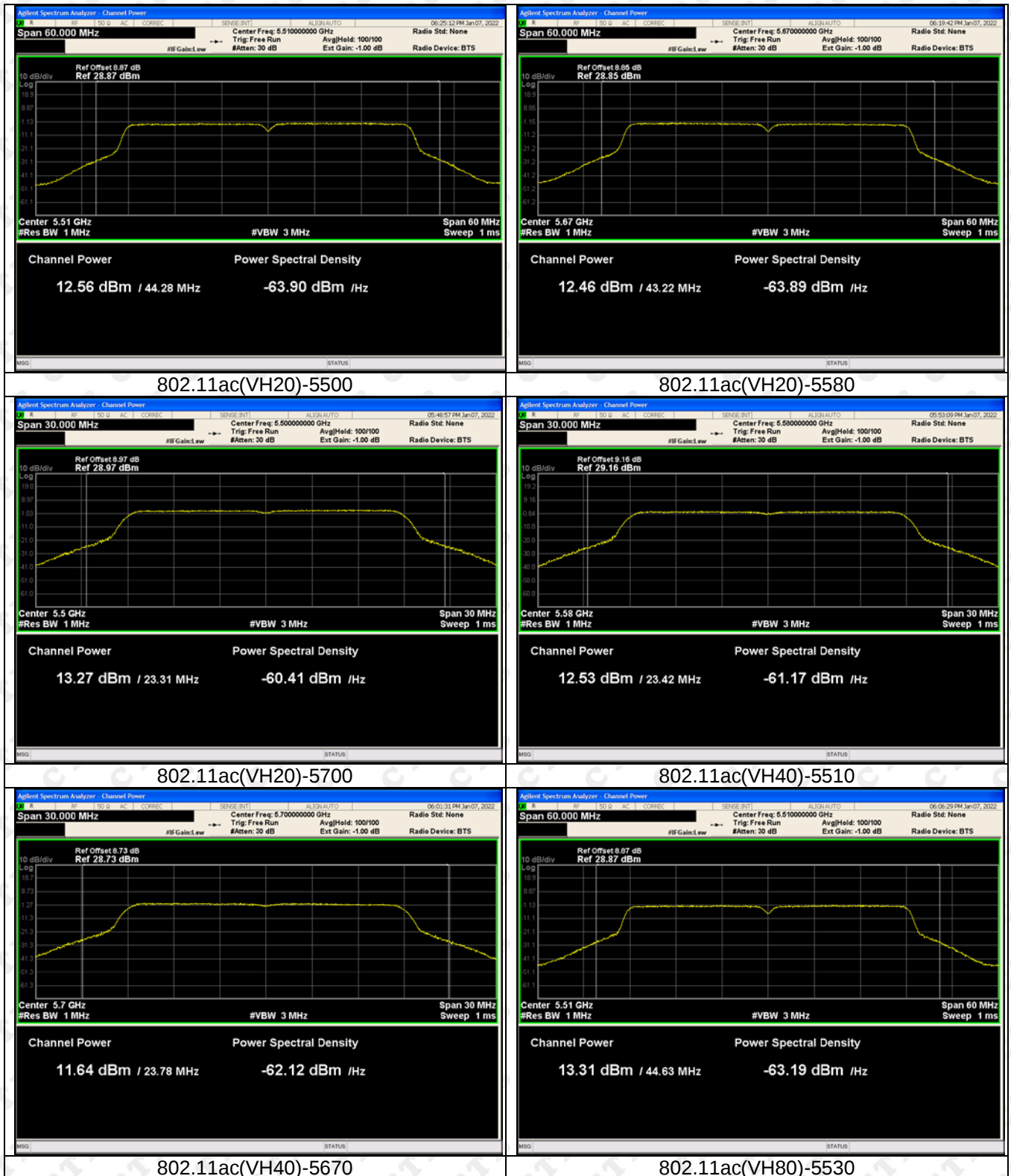
802.11 n20



802.11 n40



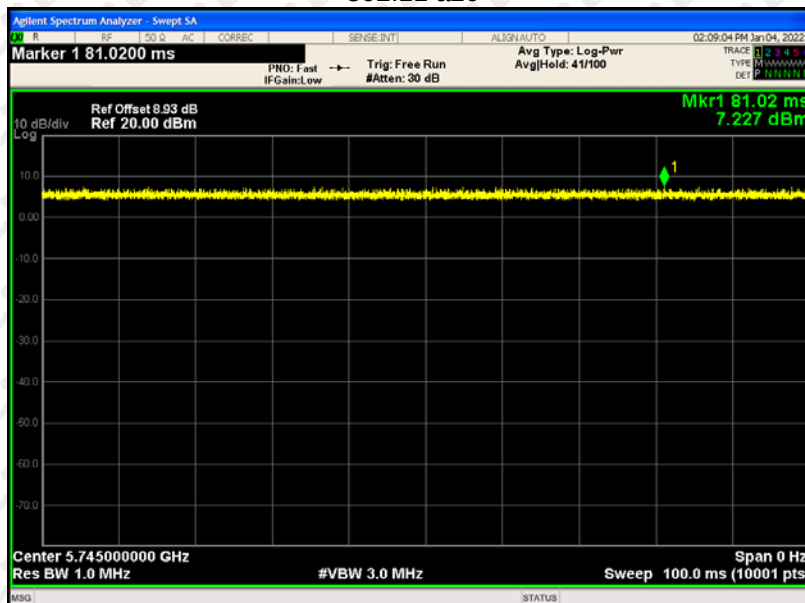




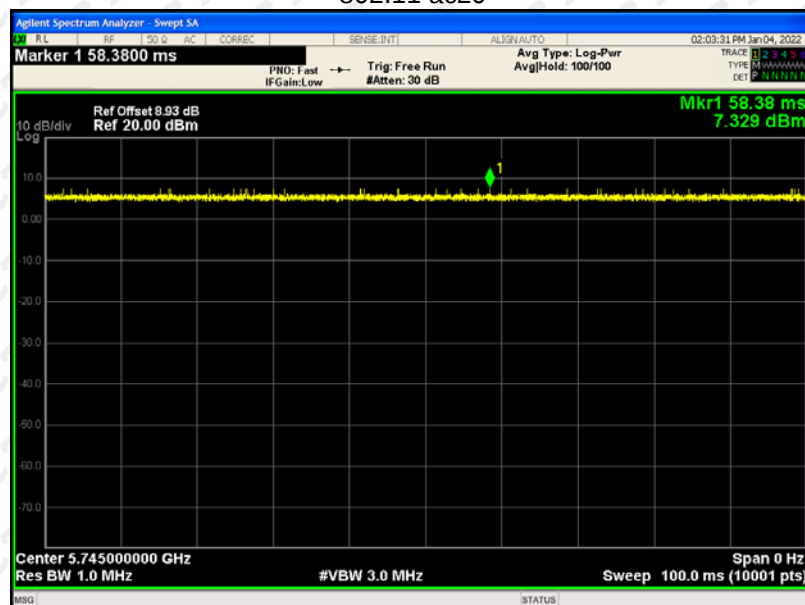


5725-5850MHz

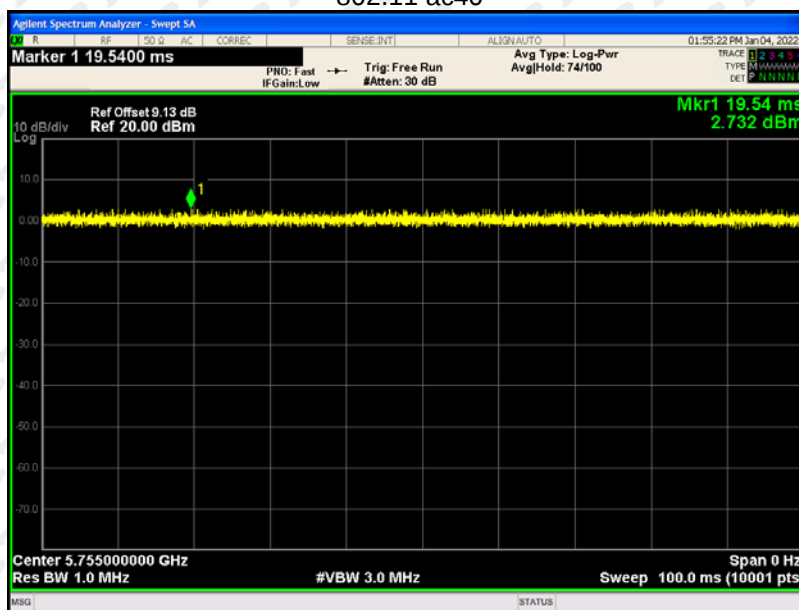
802.11 a20



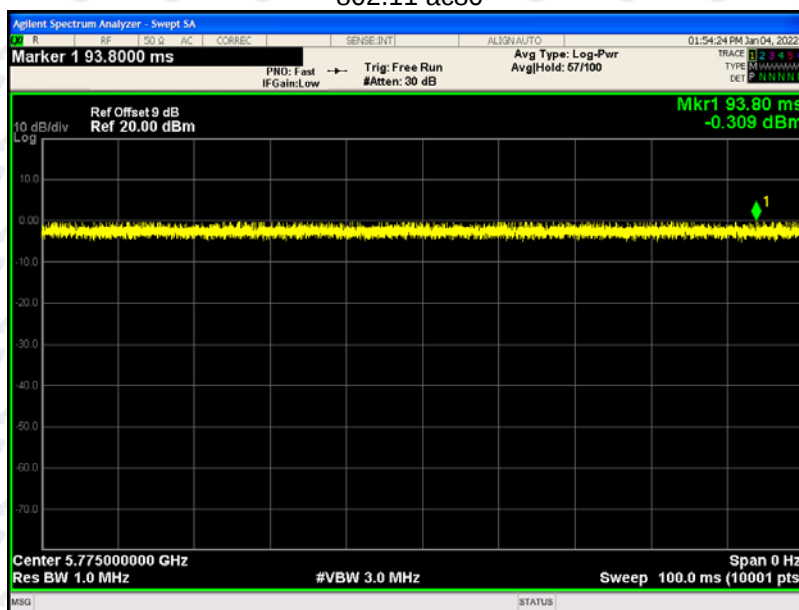
802.11 ac20



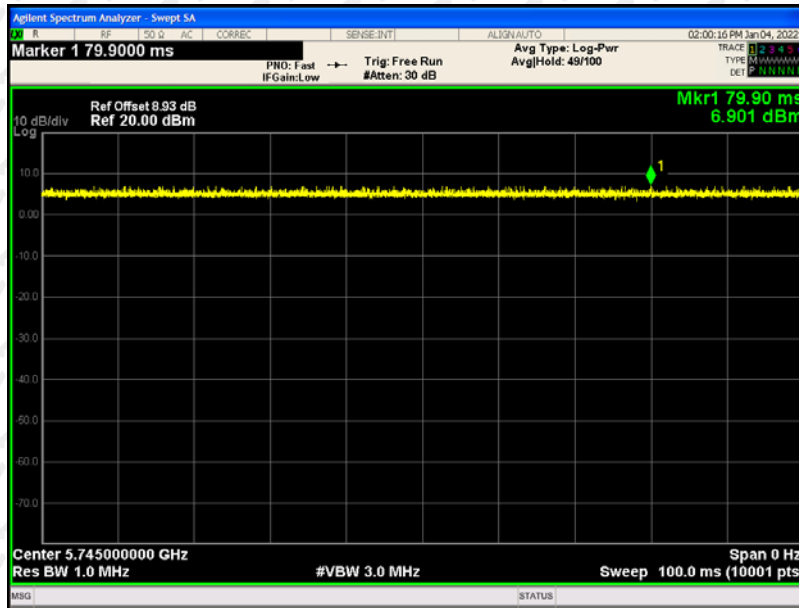
802.11 ac40



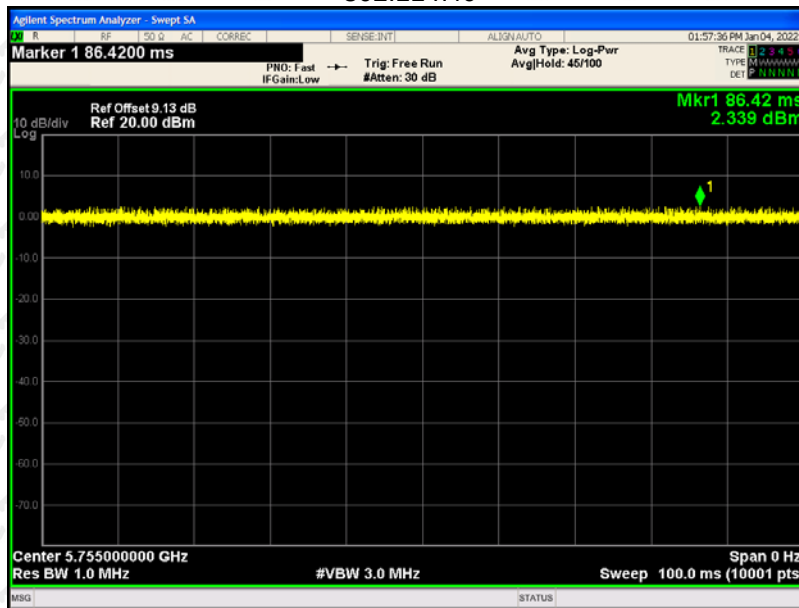
802.11 ac80



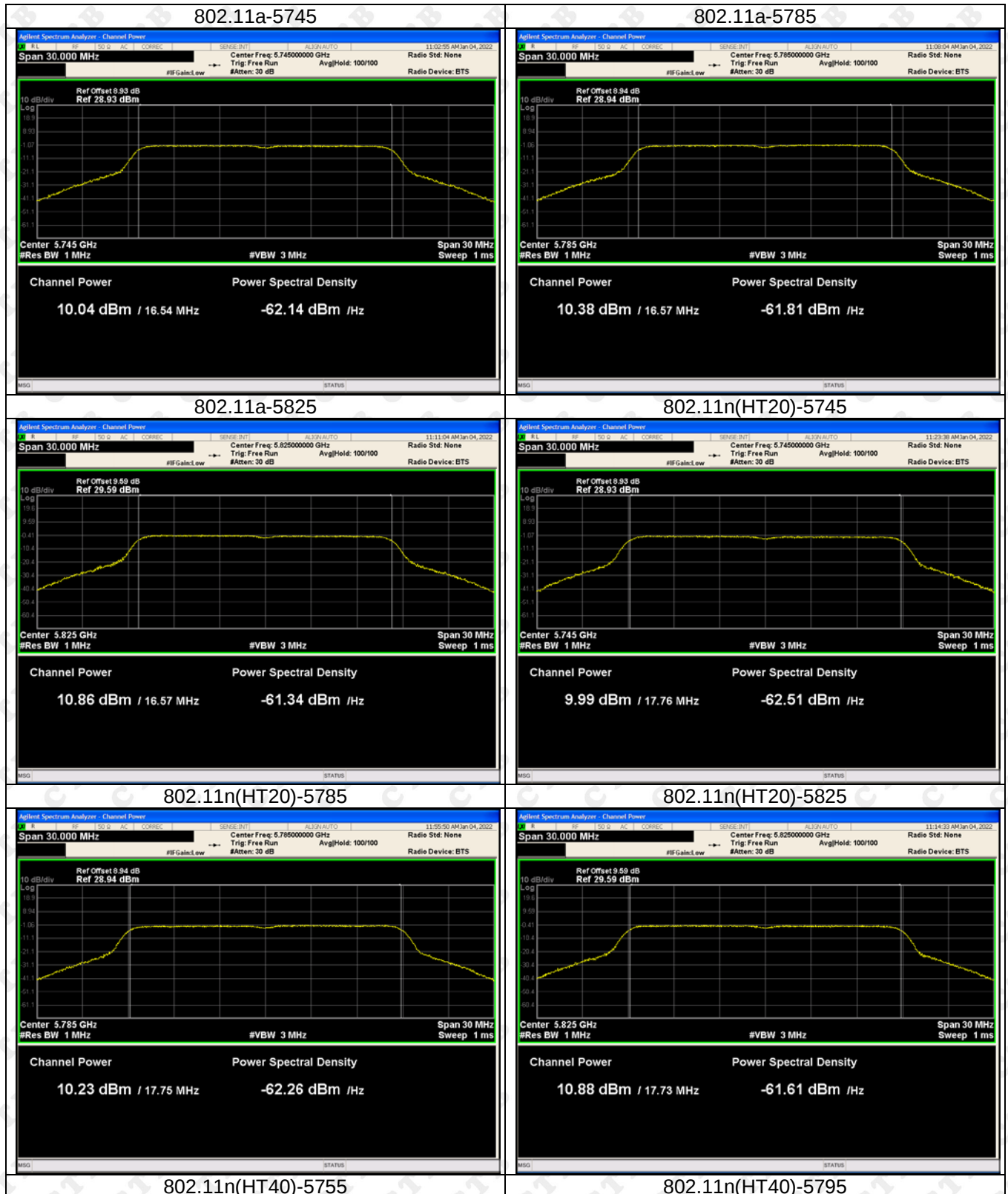
802.11 n20

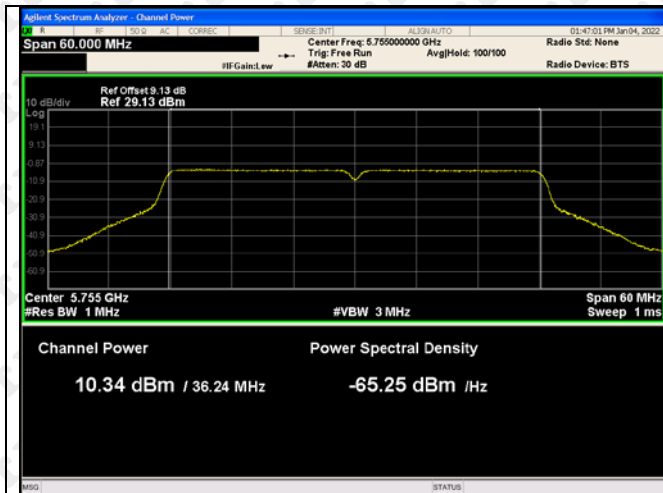


802.11 n40

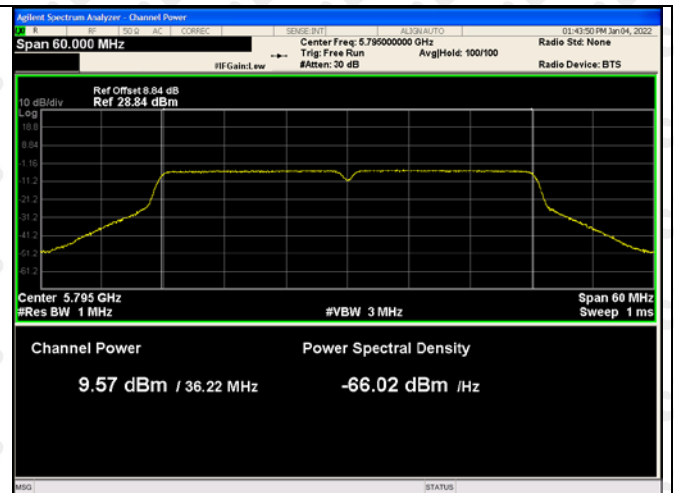


5745-5825MHz-Power

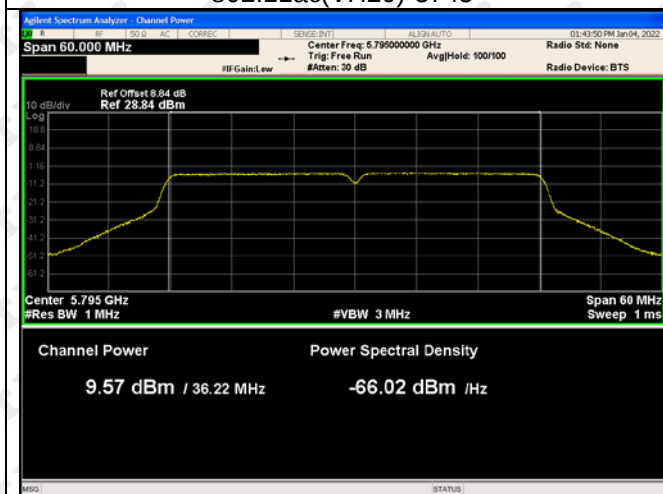




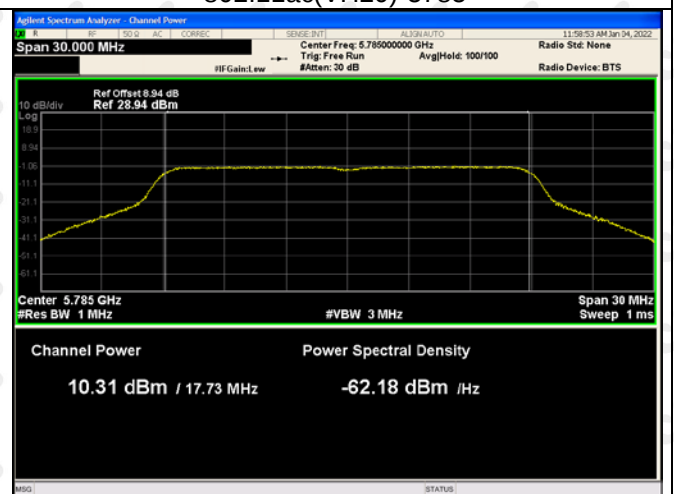
802.11ac(VH20)-5745



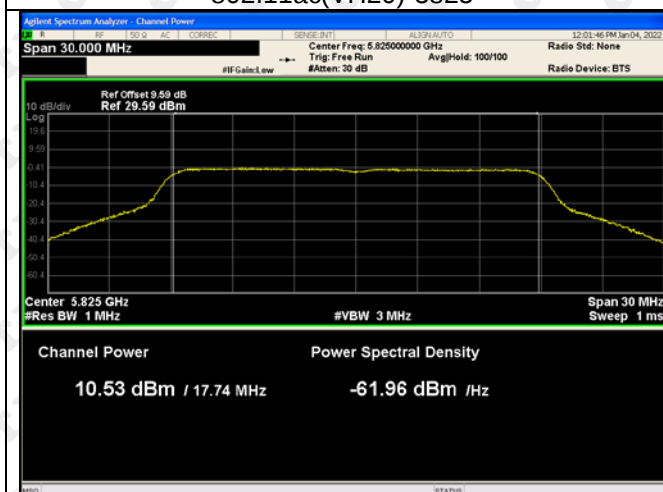
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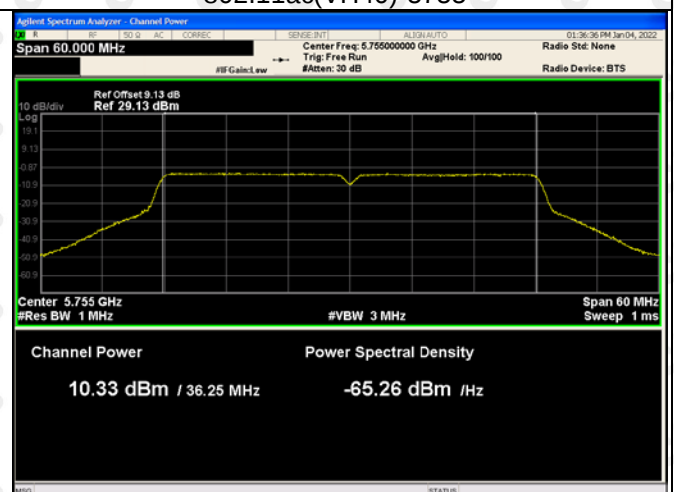
802.11ac(VH20)-5825



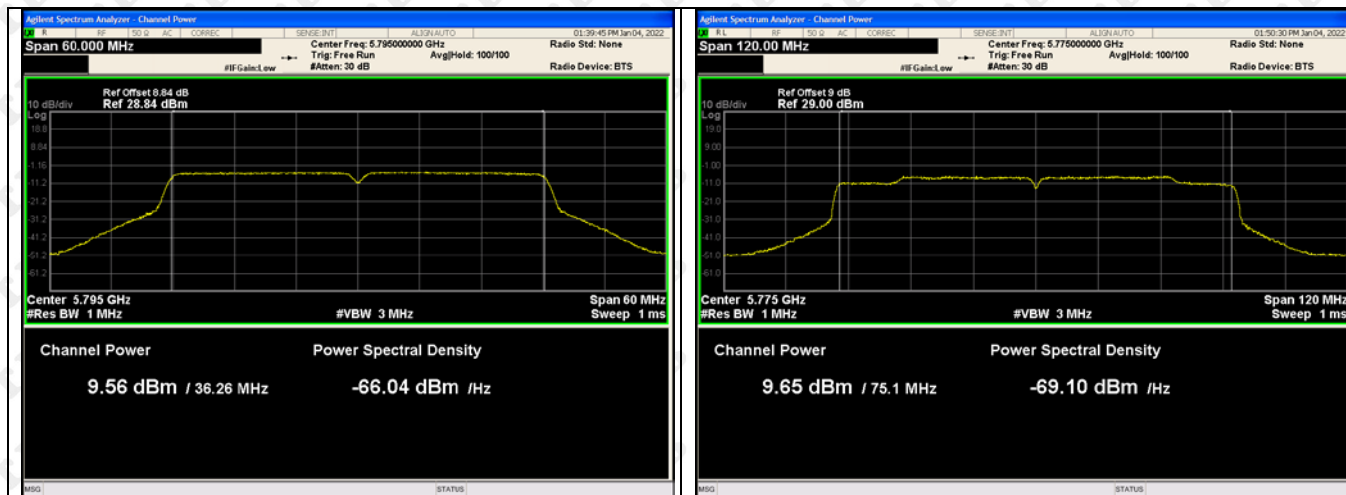
802.11ac(VH40)-5755



802.11ac(VH40)-5795

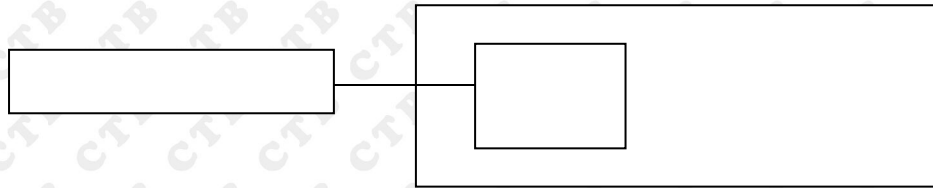


802.11ac(VH80)-5775



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)

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- 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:

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 * \text{RBW}$.
- 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

Test mode	Test Channel (MHz)	26dB Bandwidth (MHz)
802.11a	5180	23.8
	5200	23.209
	5240	23.329
802.11ac20	5180	24.144
	5200	24.106
	5240	24.247
802.11ac40	5190	43.779
	5230	43.49
802.11ac80	5210	81.867
802.11n(HT20)	5180	22.698
	5200	23.709
	5240	23.55
802.11n(HT40)	5190	43.955
	5230	44.383

5250-5350 MHz

Test mode	Test Channel (MHz)	26dB Bandwidth (MHz)	Result
802.11a	5260	23.317	Pass
	5280	23.697	Pass
	5320	24.128	Pass
802.11n(HT20)	5260	24.109	Pass
	5280	23.46	Pass
	5320	23.278	Pass
802.11n(HT40)	5270	43.185	Pass
	5310	42.276	Pass
802.11ac(VH20)	5260	23.53	Pass
	5280	23.092	Pass
	5320	24.344	Pass
802.11ac(VH40)	5270	43.21	Pass
	5310	41.543	Pass
802.11ac(VH80)	5290	84.305	Pass

5470-5725 MHz

Test mode	Test Channel (MHz)	26dB Bandwidth (MHz)	Result
802.11a	5500	23.766	Pass
	5580	22.437	Pass
	5700	24.126	Pass
802.11n(HT20)	5500	23.437	Pass
	5580	23.53	Pass
	5700	23.996	Pass
802.11n(HT40)	5510	44.285	Pass
	5670	43.223	Pass
802.11ac(VH20)	5500	23.309	Pass
	5580	23.421	Pass
	5700	23.783	Pass
802.11ac(VH40)	5510	44.628	Pass
	5670	43.055	Pass
802.11ac(VH80)	5530	82.91	Pass

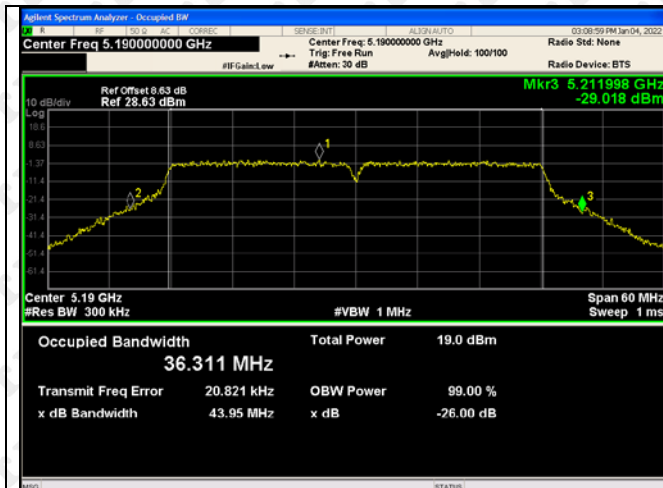
5745-5825MHz

Test mode	Test Channel (MHz)	6dB Bandwidth (MHz) ANT1
802.11a	5745	16.366
	5785	16.357
	5825	16.368
802.11a20	5745	17.544
	5785	17.586
	5825	17.603
802.11ac40	5755	36.331
	5795	36.346
802.11ac80	5775	75.227
802.11n(HT20)	5745	17.619
	5785	17.605
	5825	17.276
802.11n(HT40)	5755	36.346
	5795	36.346

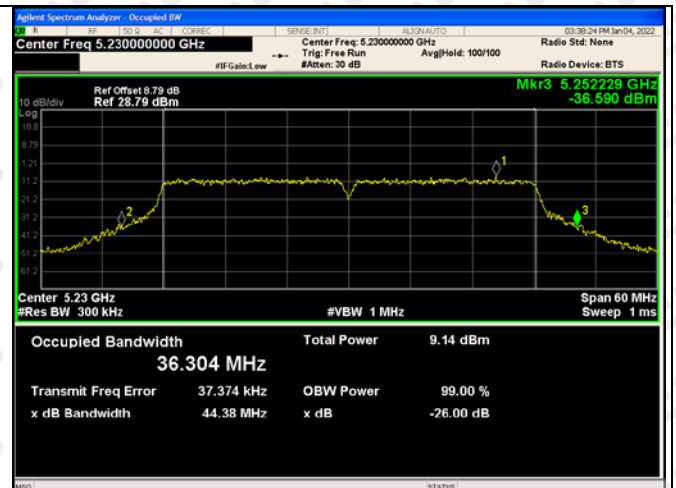
Test Graph

5180-5240MHz

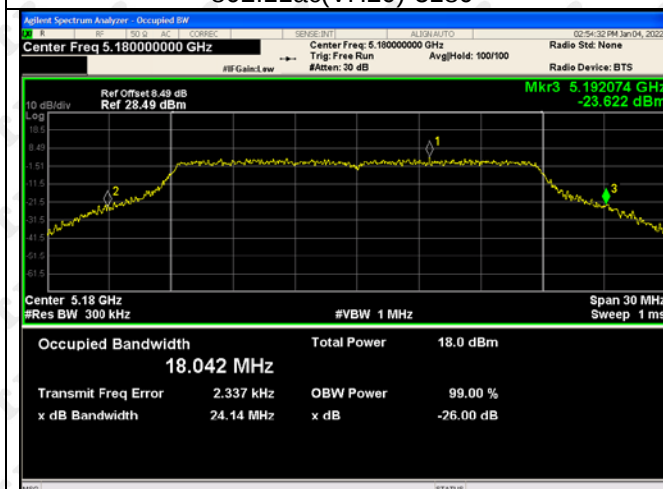




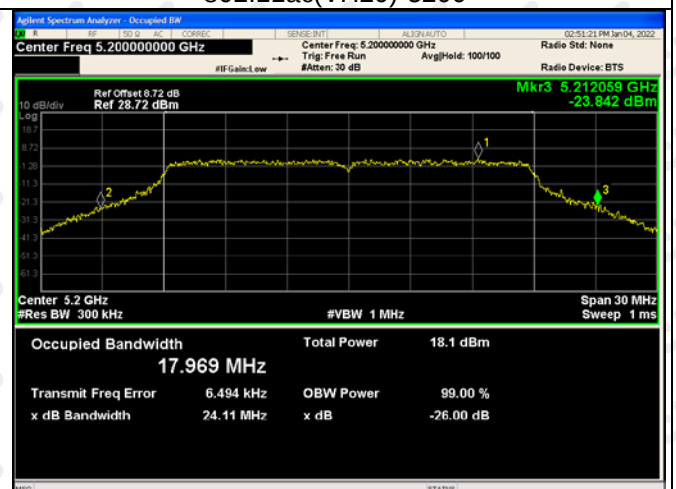
802.11ac(VH20)-5180



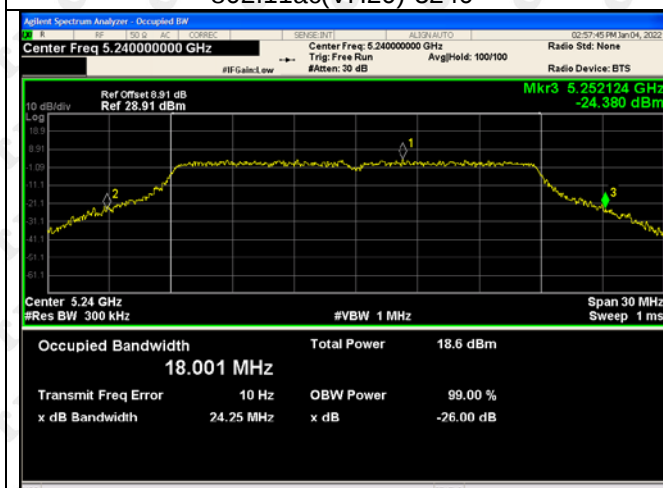
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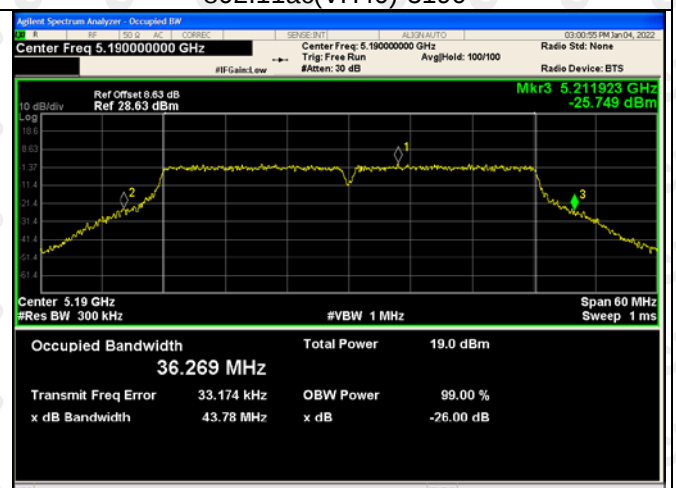
802.11ac(VH20)-5240



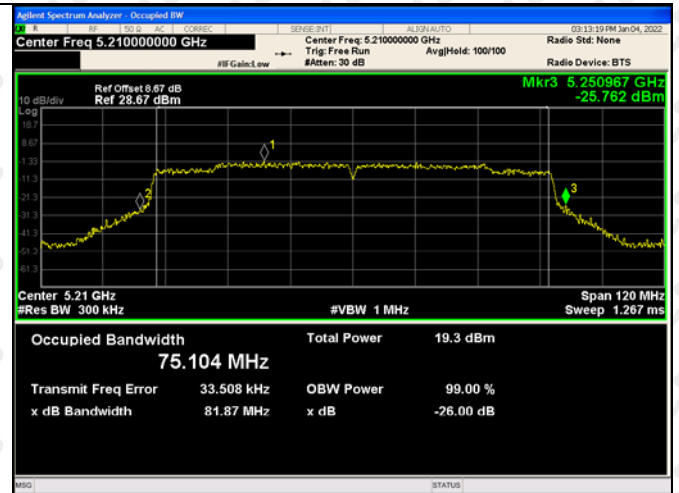
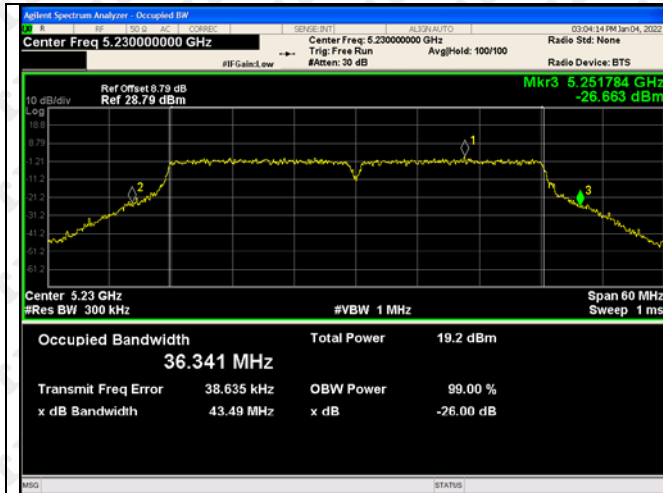
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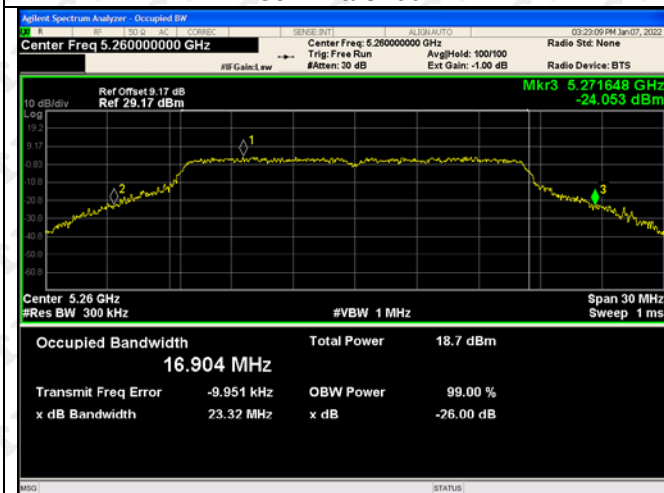
802.11ac(VH40)-5230



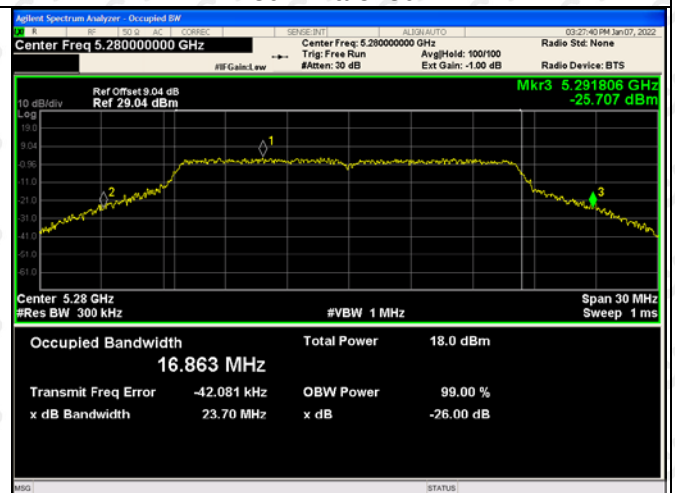
802.11ac(VH80)-5230



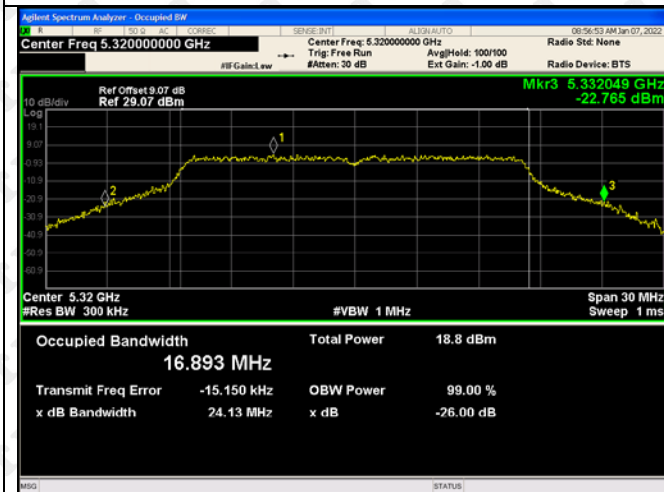
802.11a-5260



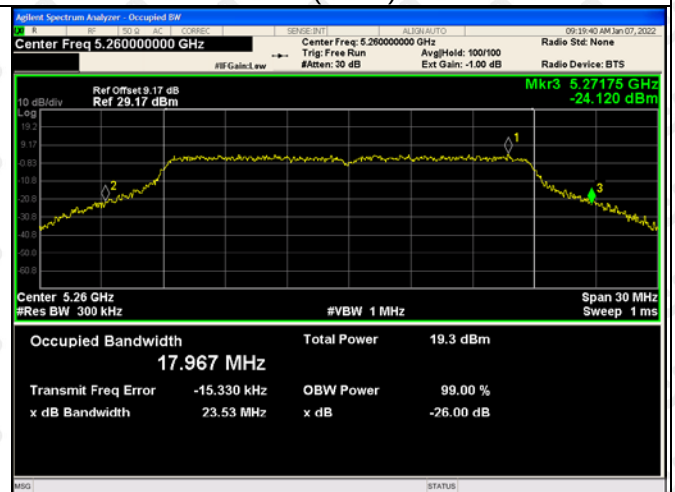
802.11a-5280



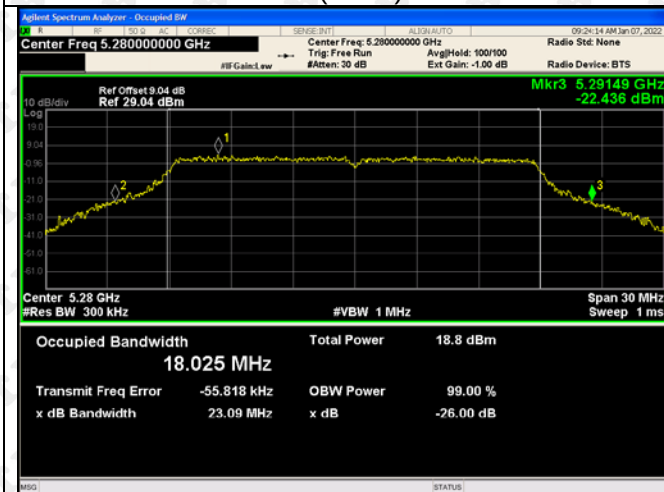
802.11a-5320



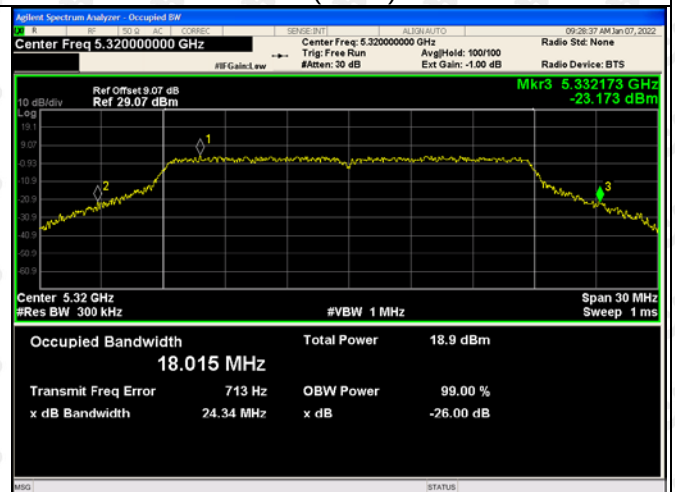
802.11ac(VH20)-5260



802.11ac(VH20)-5280



802.11ac(VH20)-5320



802.11ac(VH40)-5270

802.11ac(VH40)-5310

