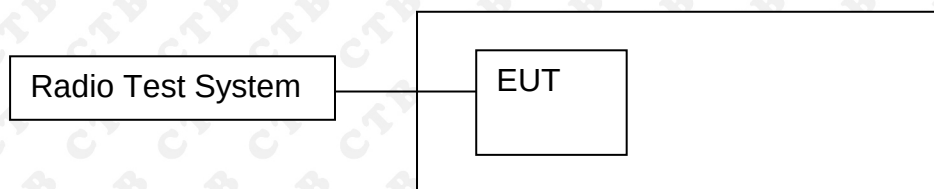


9. CONDUCTED OUTPUT POWER

9.1 Block Diagram Of Test Setup



9.2 Limit

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p.

at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 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 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. 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.

(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.

(4) The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

(5) The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less.

Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution

bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

(h) Transmit Power Control (TPC) and Dynamic Frequency Selection (DFS).

(1) Transmit power control (TPC). U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

9.3 Test procedure

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

(i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW $\geq$ 3 MHz.

(iv) 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.)

(v) Sweep time = auto.

(vi) Detector = power averaging (rms), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle $< 98\%$, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle $\geq 98\%$, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run."

(viii) Trace average at least 100 traces in power averaging (rms) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

9.4 Test Result

5150-5250MHz:

Test mode1	Test Channel (MHz)	Output Power dBm ANT1	Output Power dBm ANT2	Output Power dBm Total	Limit dBm
802.11a	5180	13.136	12.859	/	30
	5200	13.47	13.676	/	30
	5240	13.465	12.853	/	30
802.11ac20	5180	12.457	13.688	16.126	30
	5200	12.823	13.507	16.189	30
	5240	12.298	12.384	15.352	30
802.11ac40	5190	12.136	11.953	15.056	30
	5230	12.69	13.599	16.179	30
802.11ac80	5210	11.758	12.277	15.036	30
802.11ax20	5180	11.904	12.998	15.496	30
	5200	12.051	12.697	15.396	30
	5240	11.755	11.732	14.754	30
802.11ax40	5190	11.811	12.492	15.175	30
	5230	12.356	14.187	16.378	30
802.11ax80	5210	11.898	13.65	15.872	30
802.11n(HT20)	5180	12.255	13.662	16.026	30
	5200	12.491	13.427	15.994	30
	5240	12.215	12.534	15.388	30
802.11n(HT40)	5190	12.017	11.83	14.935	30
	5230	12.693	13.628	16.196	30

5250-5350MHz:

Test mode1	Test Channel (MHz)	Output Power dBm ANT1	Output Power dBm ANT2	Output Power dBm Total	Limit dBm
802.11a	5260	13.817	12.51	/	23.98
	5280	13.448	12.195	/	23.98
	5320	12.962	13.014	/	23.98
802.11ac20	5260	13.403	11.578	15.596	23.98
	5280	12.975	10.871	15.059	23.98
	5320	12.745	11.606	15.223	23.98
802.11ac40	5270	12.566	12.446	15.517	23.98
	5310	12.889	12.755	15.833	23.98
802.11ac80	5290	13.25	12.171	15.754	23.98
802.11ax20	5260	12.761	12.707	15.744	23.98
	5280	12.323	12.391	15.367	23.98
	5320	12.204	13.107	15.689	23.98
802.11ax40	5270	12.609	12.969	15.803	23.98
	5310	12.709	13.504	16.135	23.98
802.11ax80	5290	13.391	13.701	16.559	23.98
802.11n(HT20)	5260	13.253	11.638	15.530	23.98
	5280	12.934	10.864	15.031	23.98
	5320	12.592	11.745	15.199	23.98
802.11n(HT40)	5270	12.808	13.435	16.143	23.98
	5310	12.98	14.079	16.574	23.98

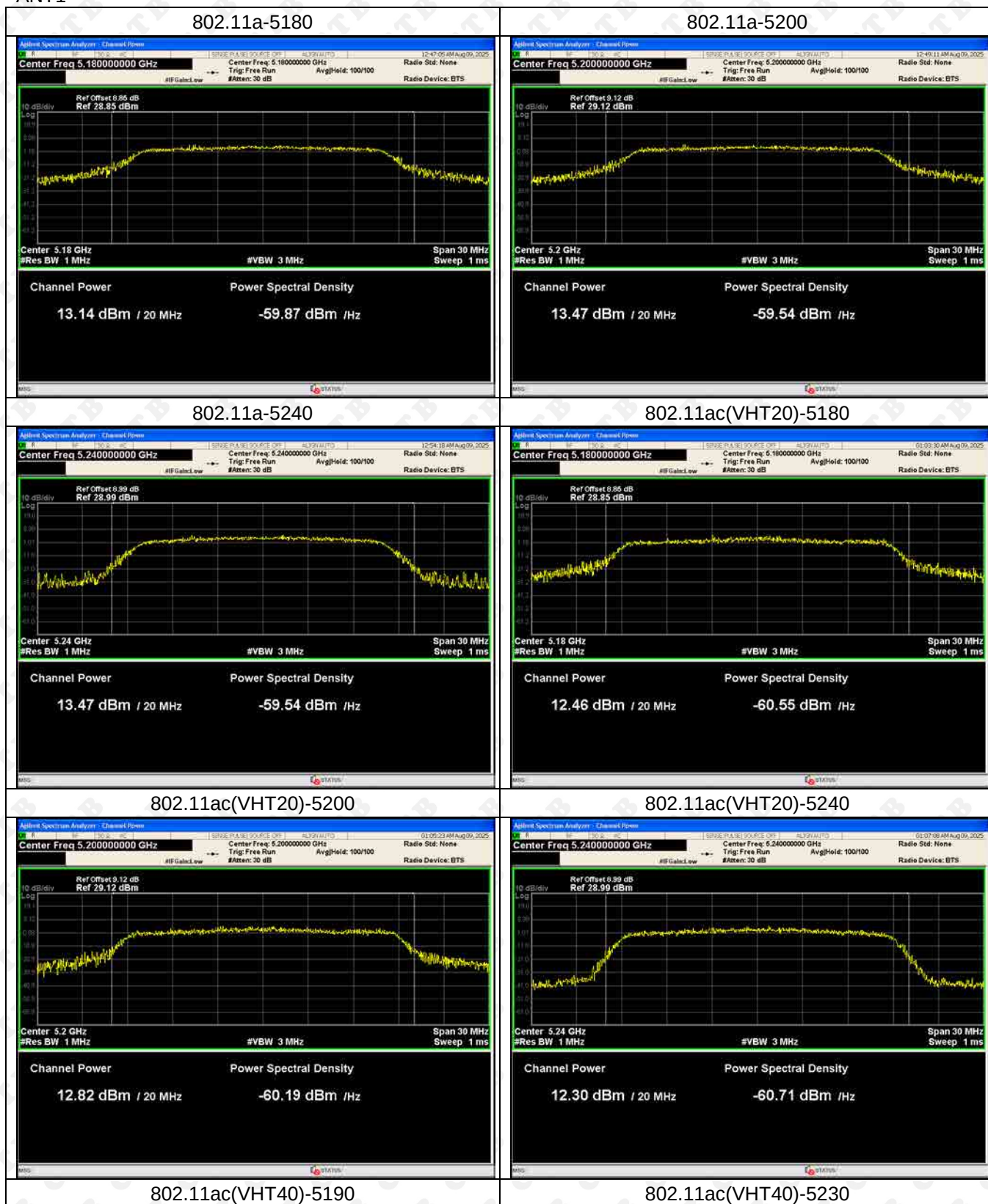
5470-5725MHz:

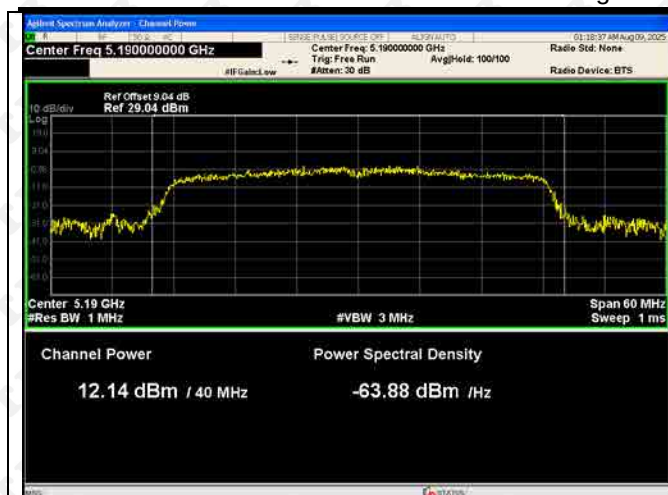
Test mode1	Test Channel (MHz)	Output Power dBm ANT1	Output Power dBm ANT2	Output Power dBm Total	Limit dBm
802.11a	5500	12.168	12.816	/	23.98
	5580	11.817	10.636	/	23.98
	5700	13.141	13.32	/	23.98
802.11ac20	5500	12.868	12.809	15.849	23.98
	5580	12.8	10.392	14.771	23.98
	5700	13.785	13.169	16.498	23.98
802.11ac40	5510	13.358	11.974	15.731	23.98
	5670	11.977	13.217	15.651	23.98
802.11ac80	5530	12.365	11.459	14.946	23.98
802.11ax20	5500	13.357	11.537	15.552	23.98
	5580	12.012	10.152	14.191	23.98
	5700	13.347	13.643	16.508	23.98
802.11ax40	5510	11.852	11.619	14.747	23.98
	5670	11.641	12.944	15.351	23.98
802.11ax80	5530	13.792	12.658	16.272	23.98
802.11n(HT20)	5500	12.914	11.962	15.474	23.98
	5580	12.82	10.592	14.858	23.98
	5700	13.881	13.265	16.594	23.98
802.11n(HT40)	5510	13.228	11.887	15.619	23.98
	5670	11.103	12.42	14.822	23.98

5725-5850MHz:

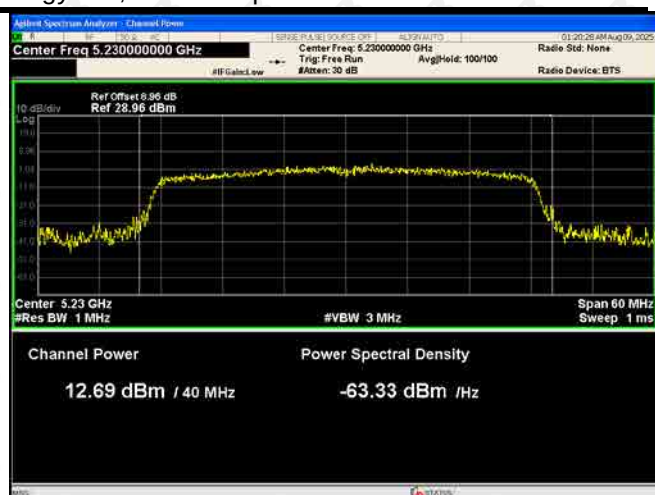
Test mode1	Test Channel (MHz)	Output Power dBm ANT1	Output Power dBm ANT2	Output Power dBm Total	Limit dBm
802.11a	5745	13.574	12.416	/	23.98
	5785	13.471	13.253	/	23.98
	5825	12.489	13.848	/	23.98
802.11ac20	5745	12.412	13.442	15.968	23.98
	5785	12.366	14.418	16.522	23.98
	5825	12.405	12.913	15.677	23.98
802.11ac40	5755	11.958	13.604	15.869	23.98
	5795	11.559	14.048	15.990	23.98
802.11ac80	5775	12.948	12.766	15.868	23.98
802.11ax20	5745	11.844	12.85	15.386	23.98
	5785	11.616	13.784	15.844	23.98
	5825	11.819	13.309	15.638	23.98
802.11ax40	5755	12.46	12.186	15.335	23.98
	5795	11.127	12.531	14.896	23.98
802.11ax80	5775	13.06	13.476	16.283	23.98
802.11n(HT20)	5745	13.489	12.518	16.041	23.98
	5785	13.117	14.346	16.785	23.98
	5825	13.227	13.91	16.592	23.98
802.11n(HT40)	5755	12.013	13.553	15.861	23.98
	5795	12.704	13.909	16.358	23.98

Test Graph:
5150-5250MHz
ANT1

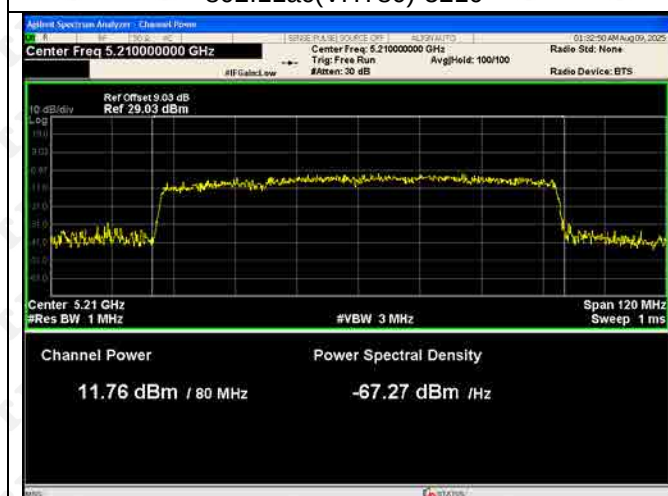




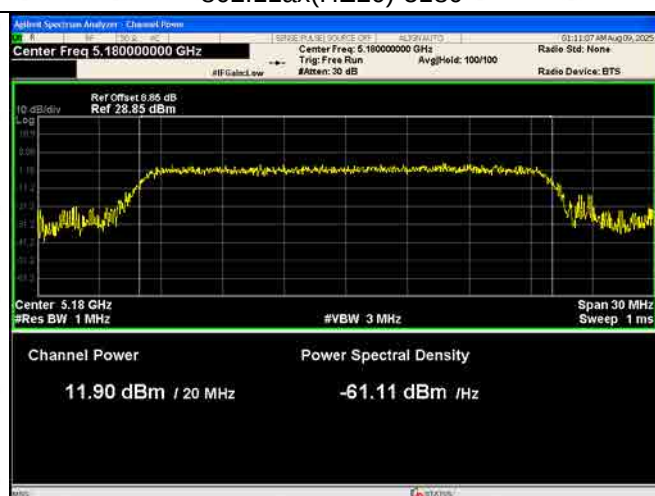
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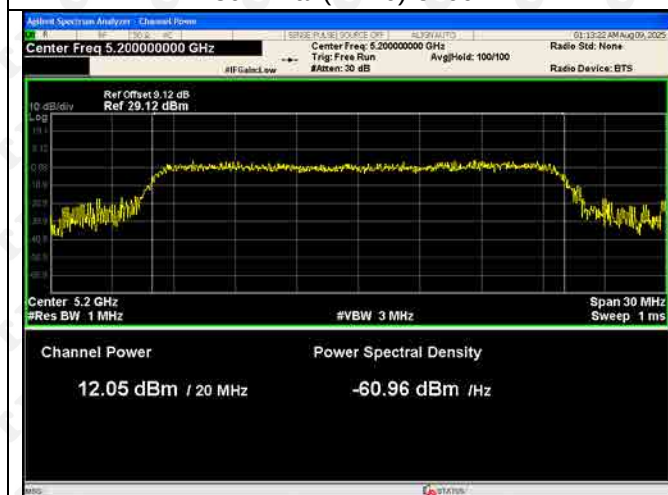
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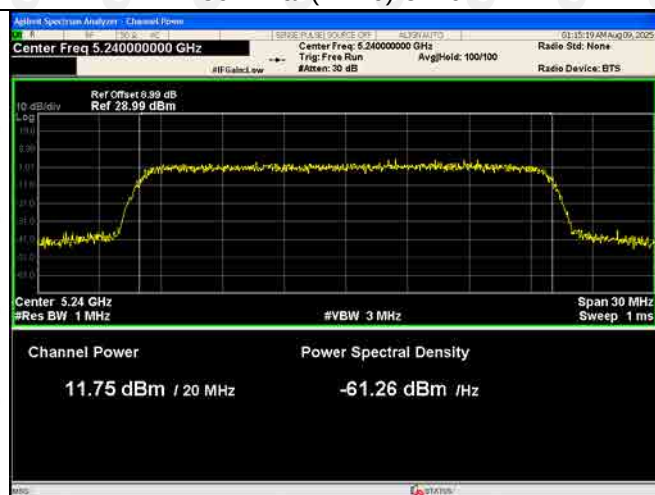
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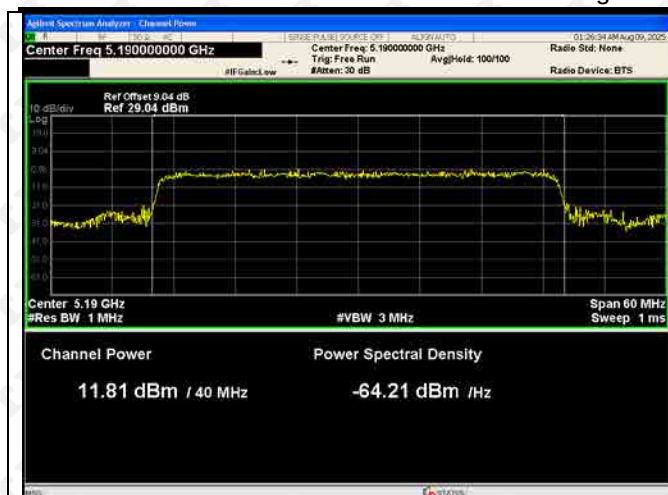
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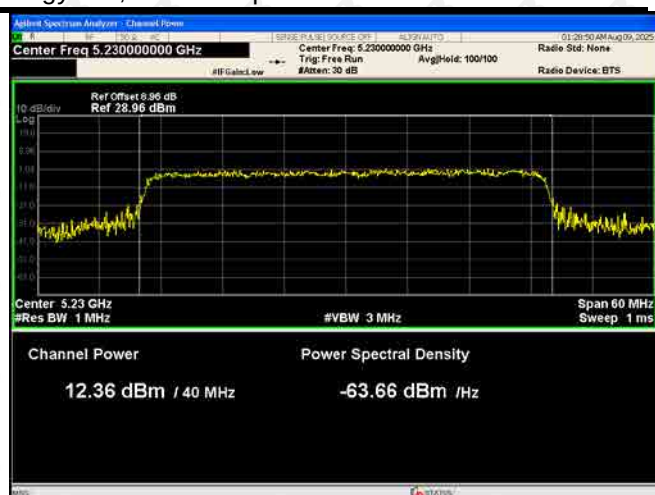
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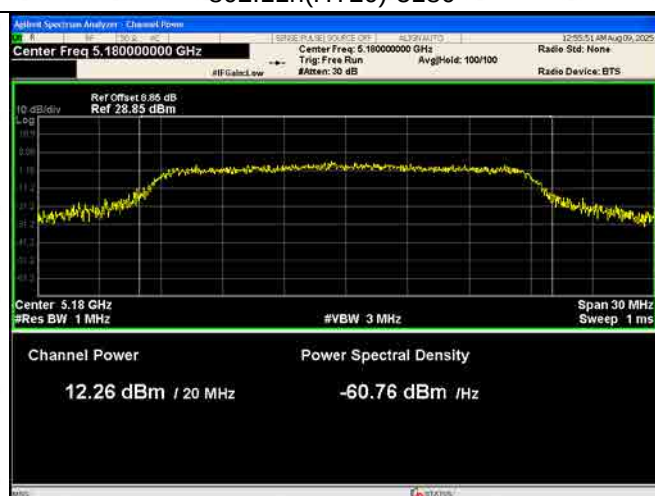
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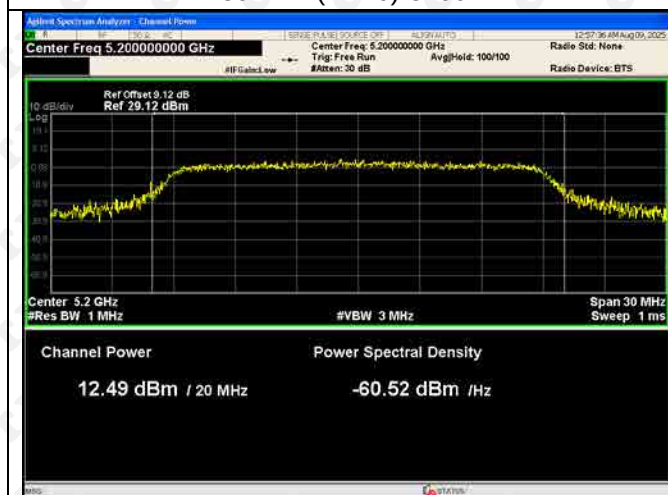
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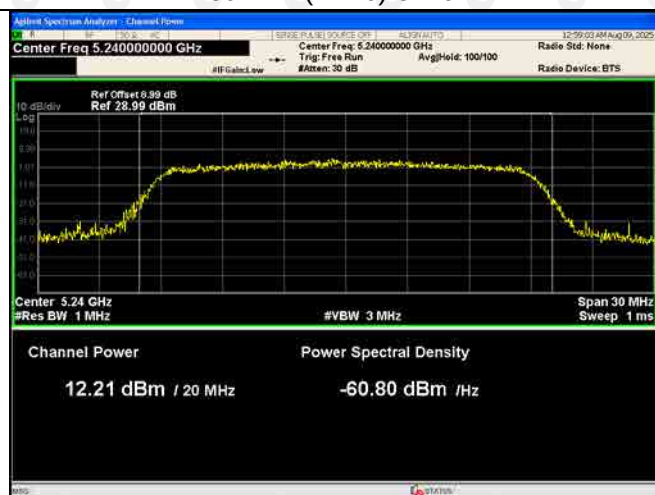
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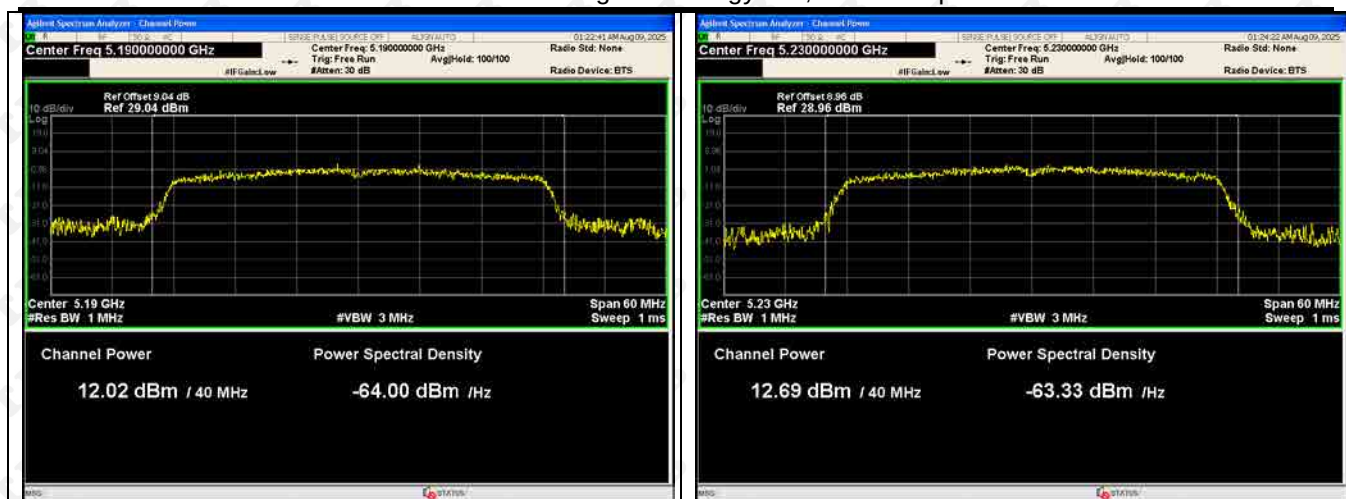
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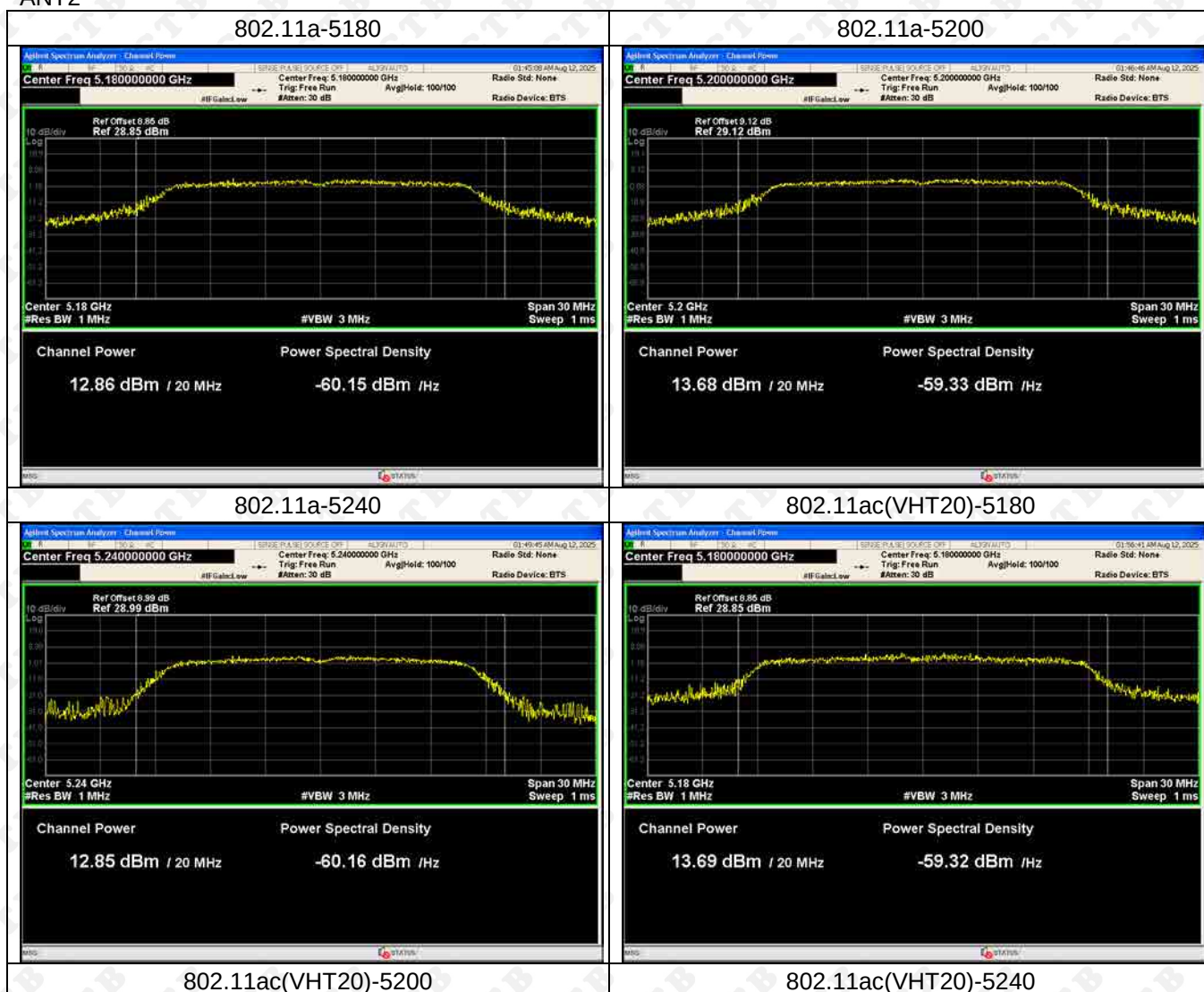
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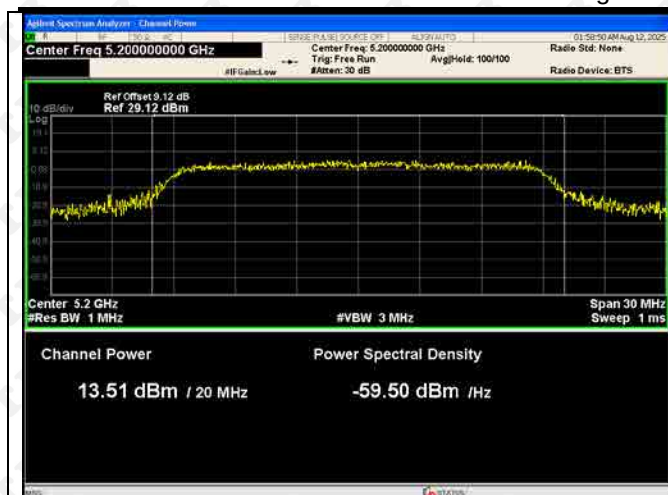


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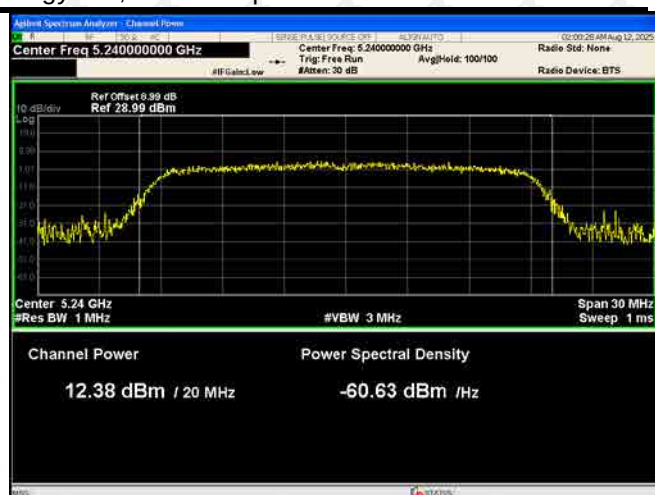


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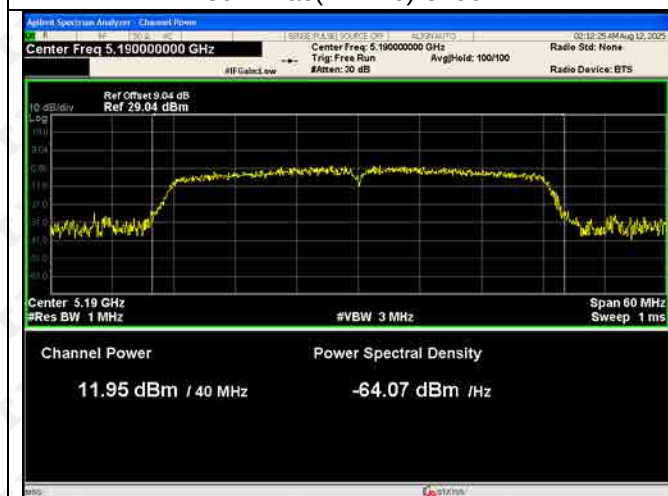




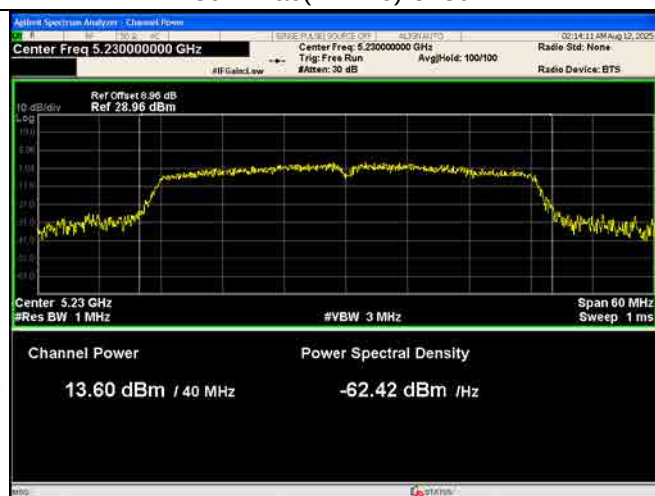
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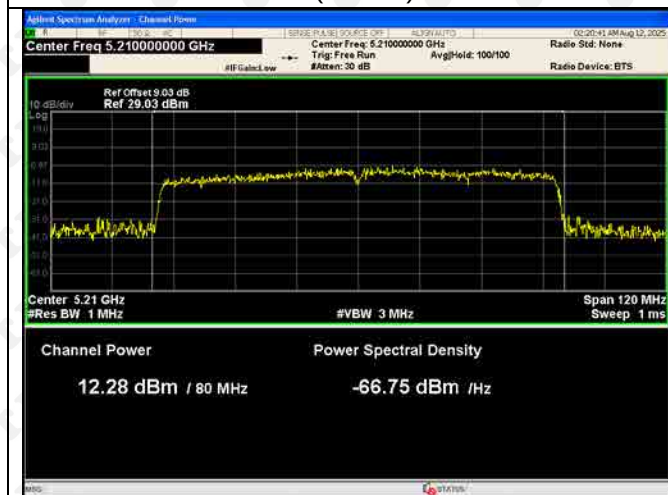
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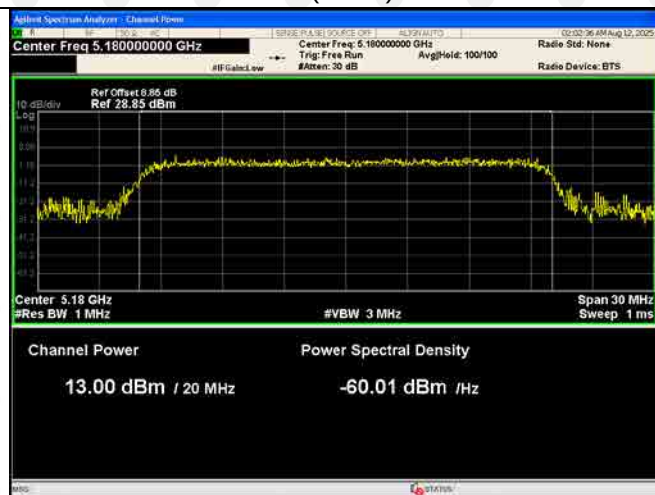
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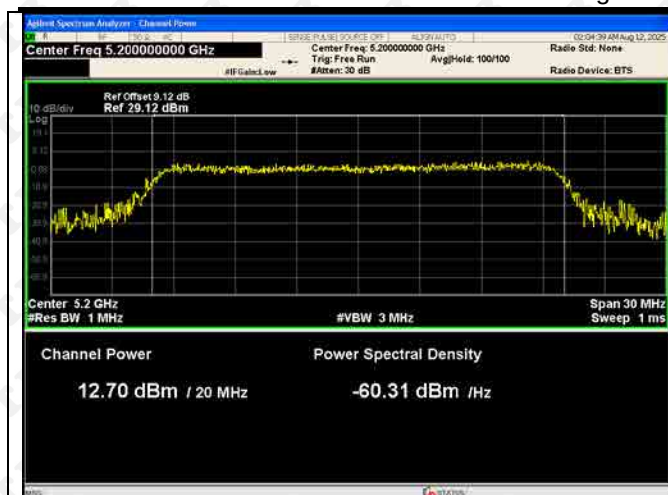
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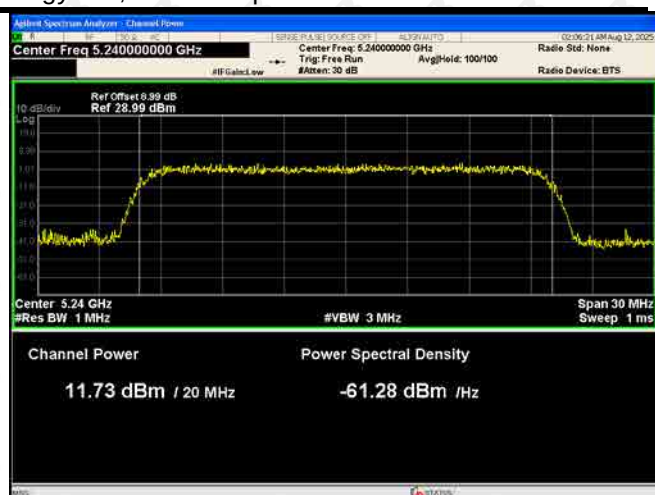
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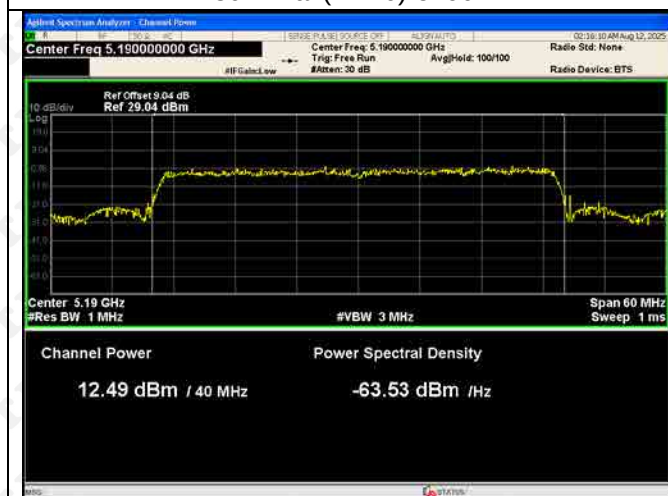
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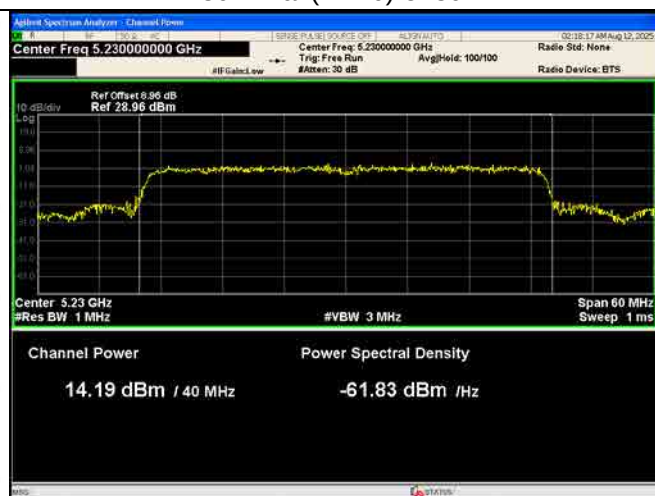
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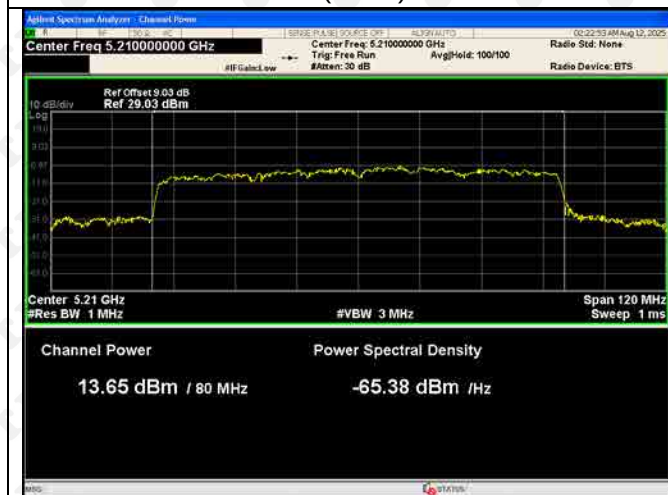
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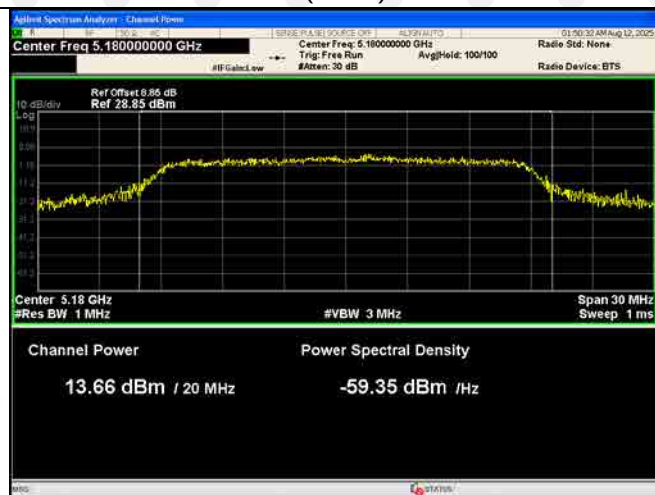
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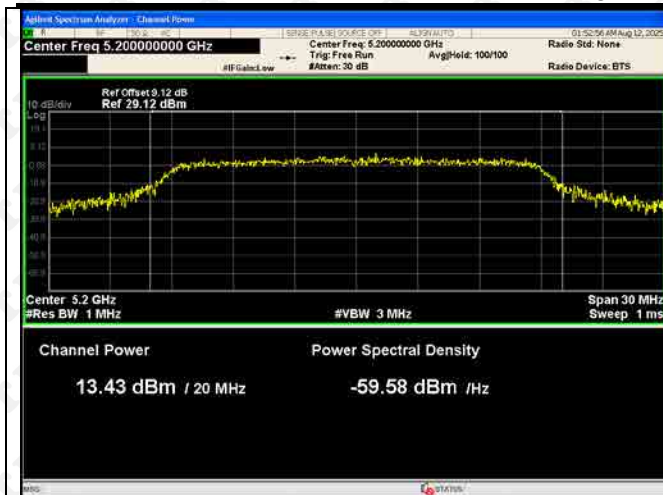
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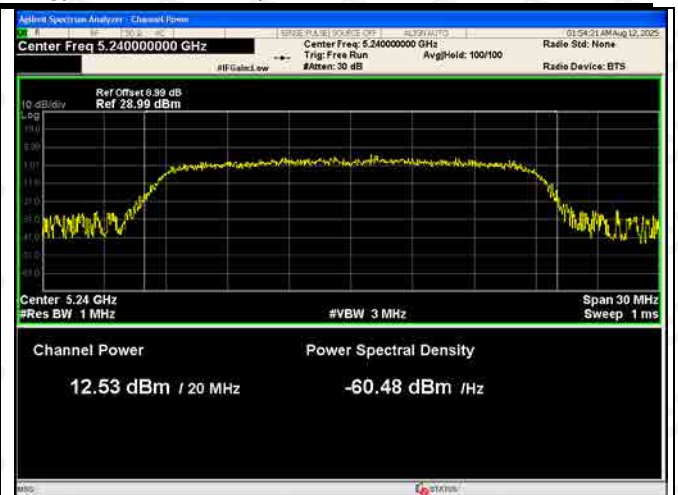
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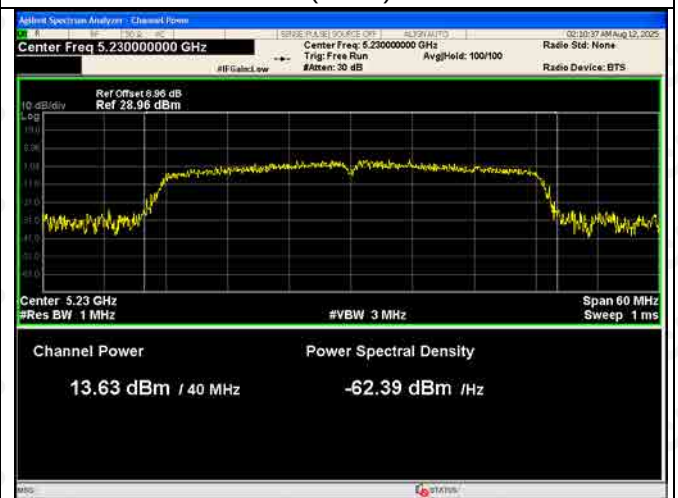
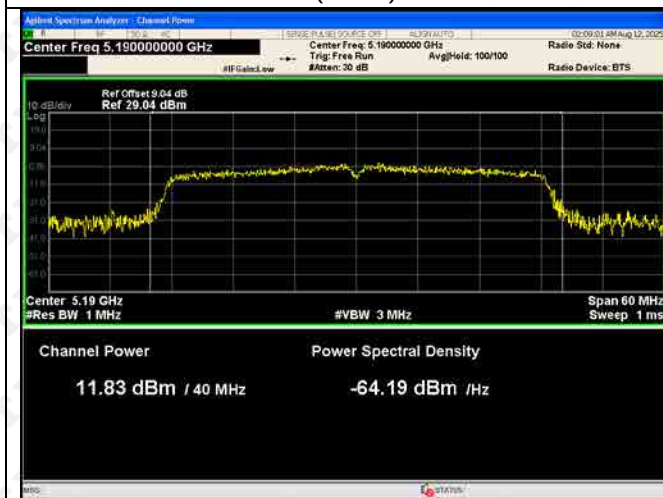
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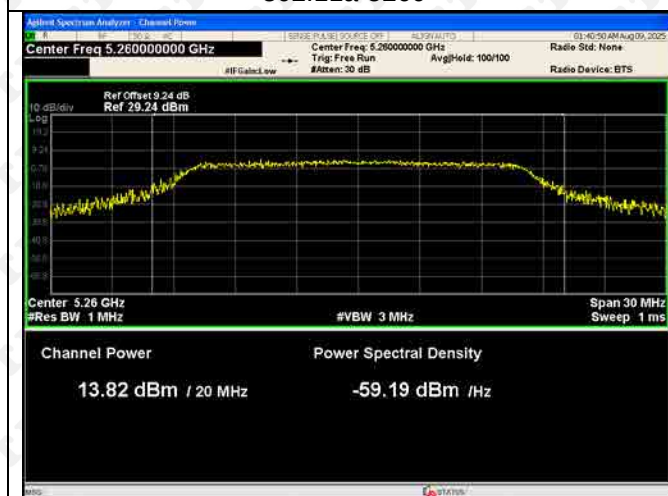


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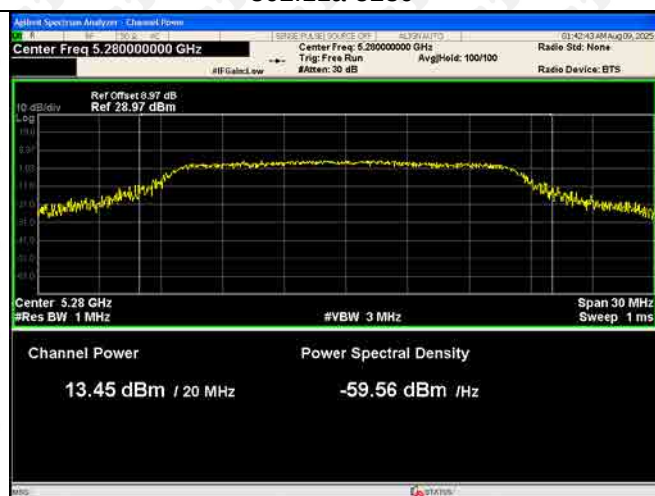


5250-5350MHz
ANT1

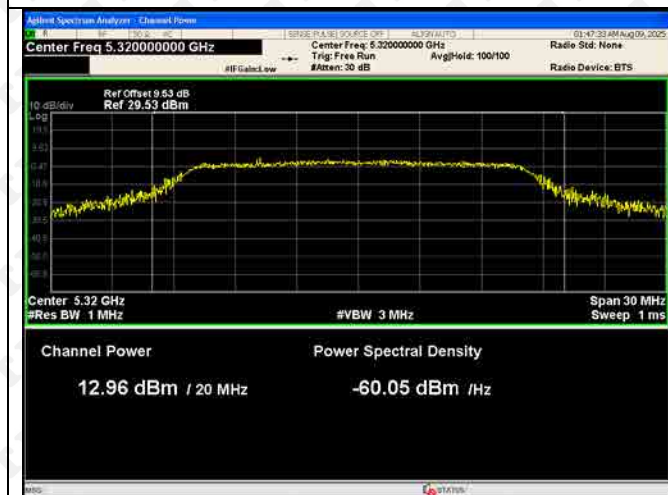
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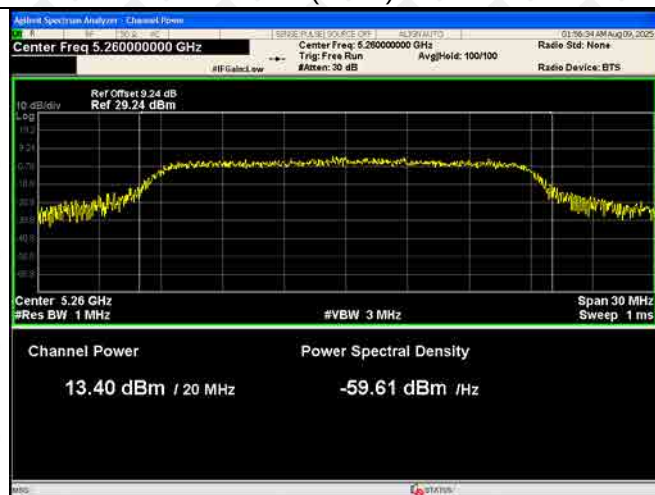
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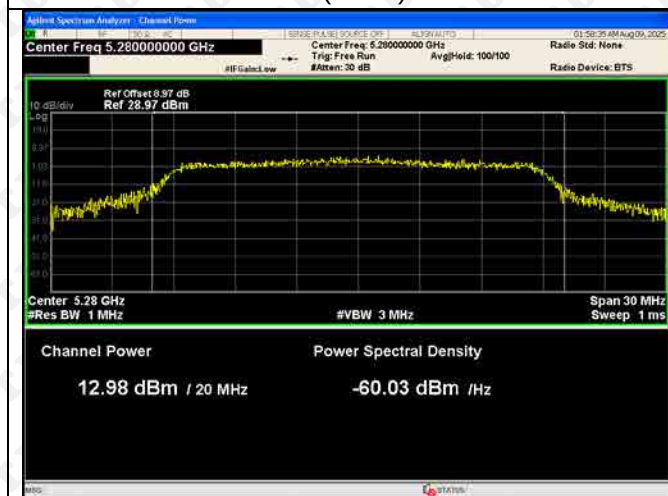
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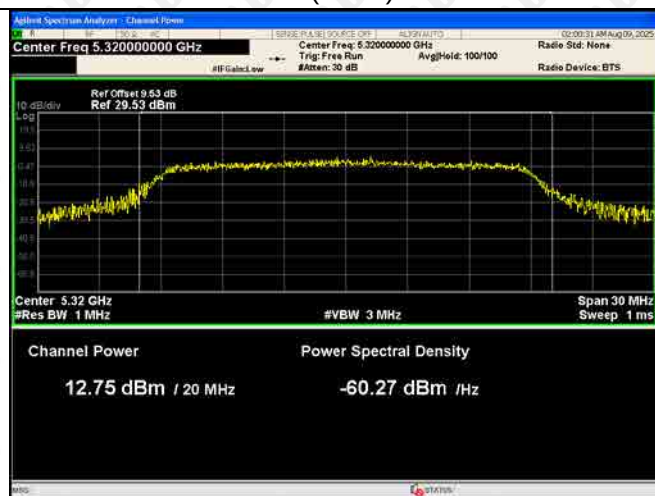
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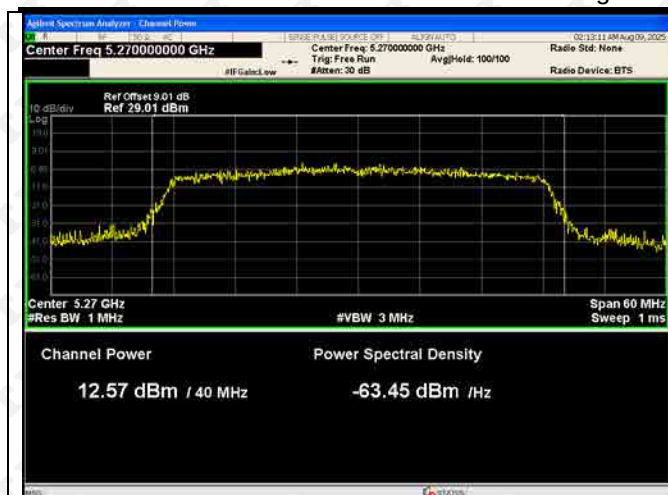


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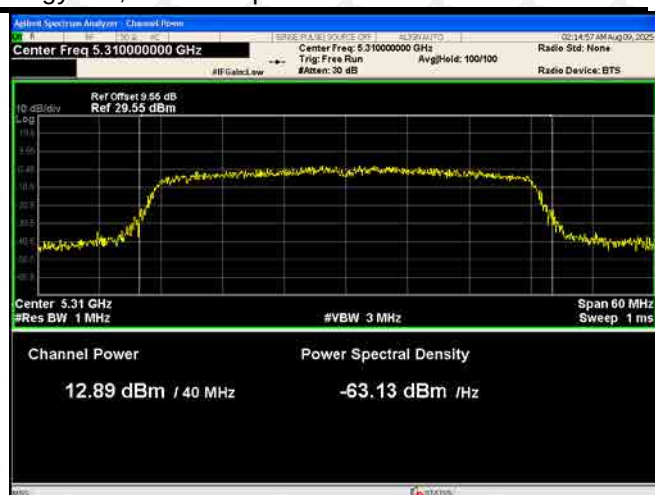


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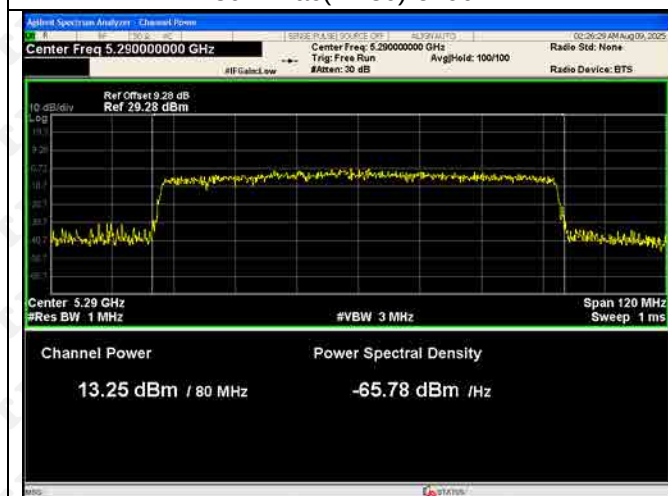
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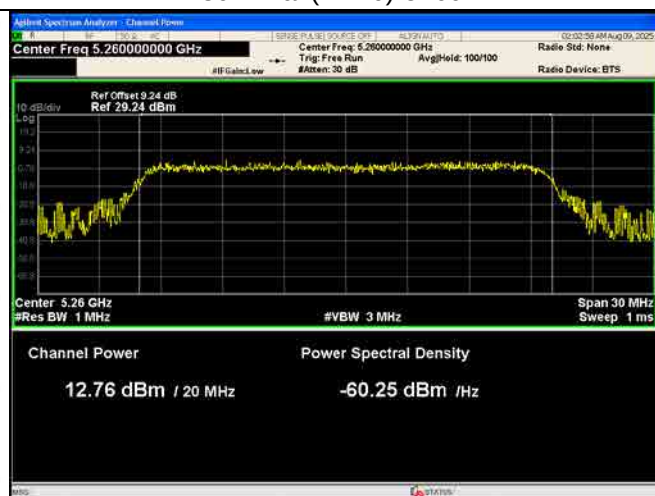
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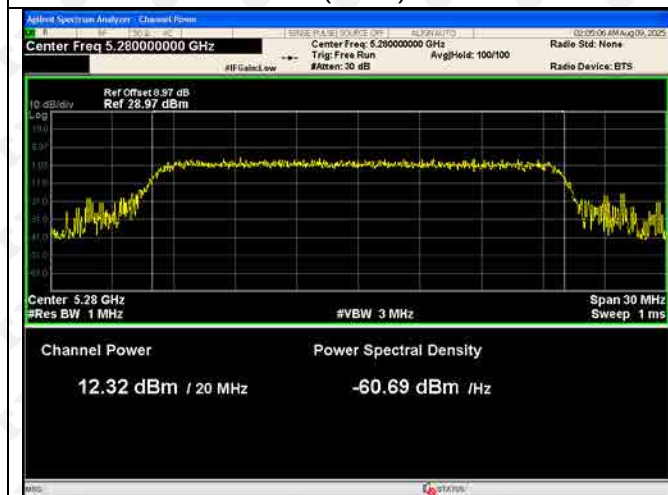
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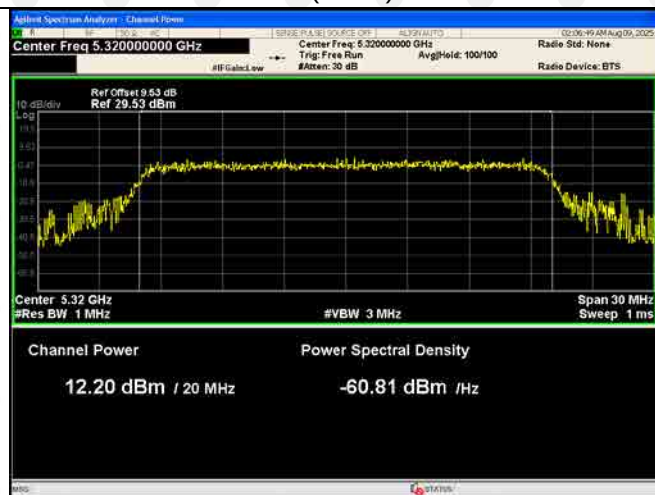
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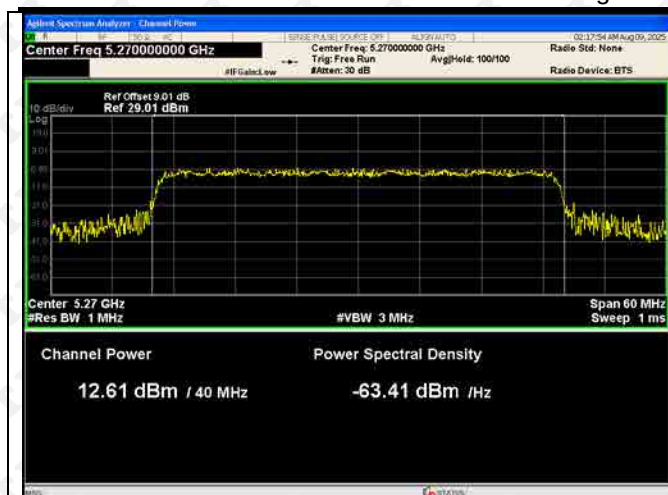
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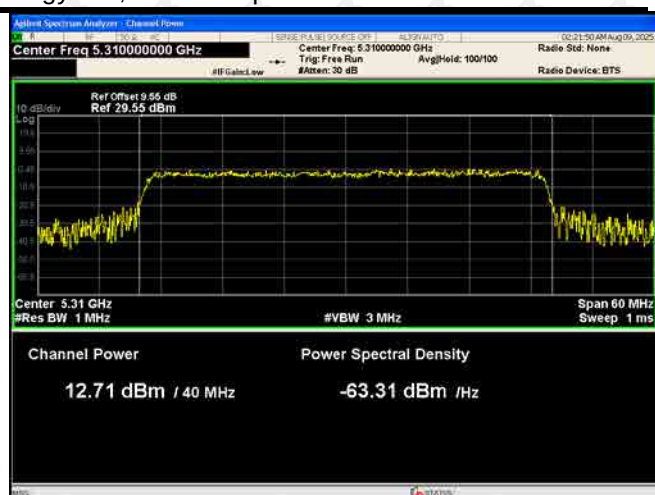
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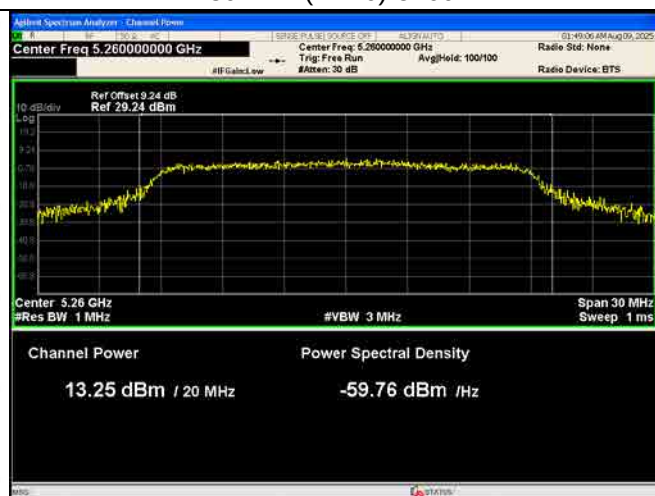
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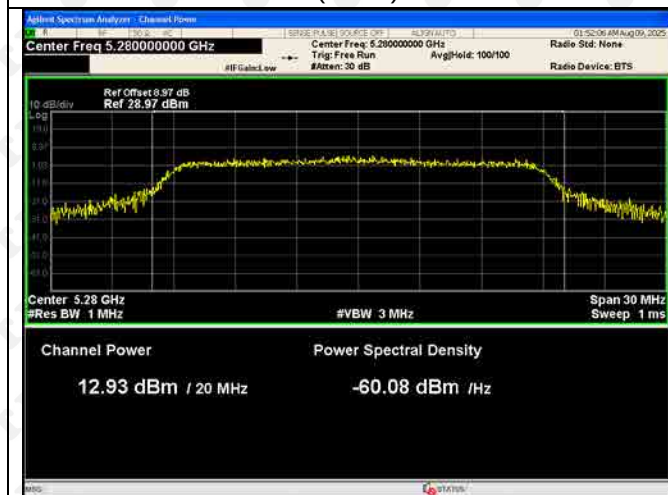
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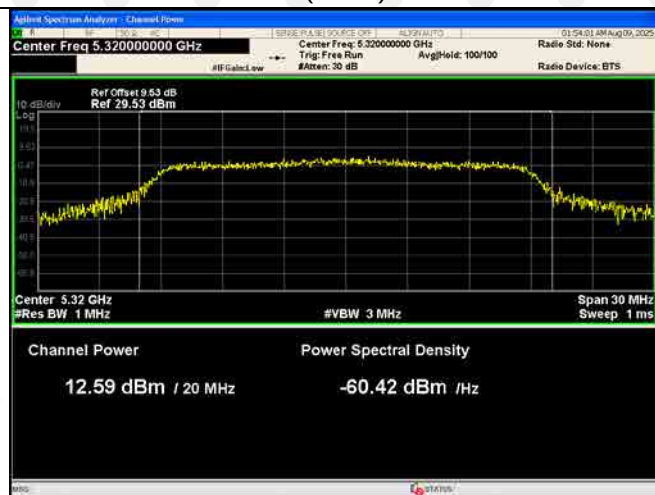
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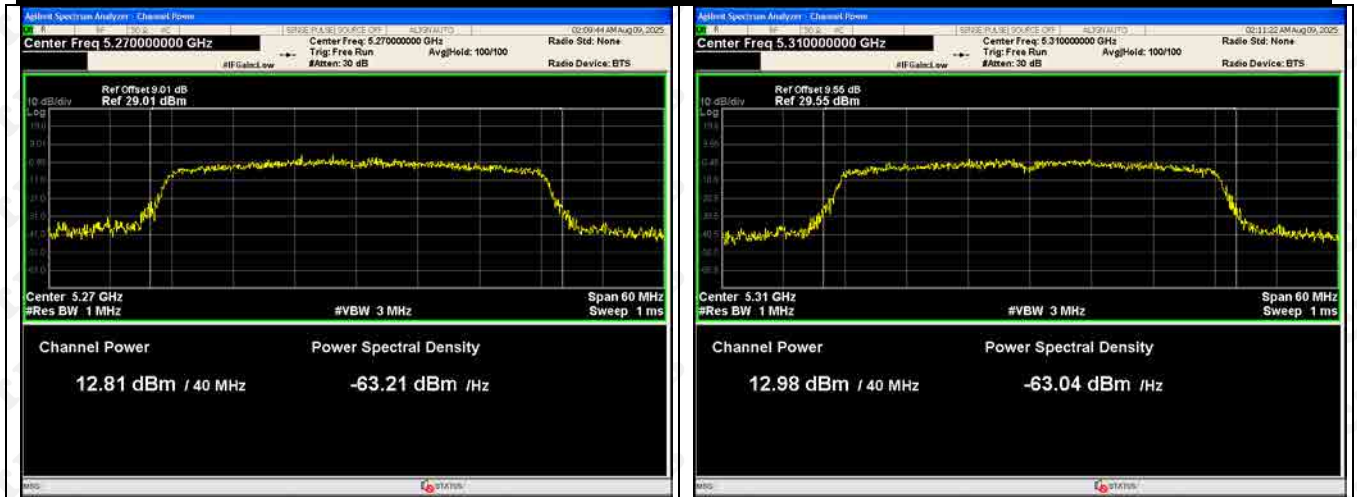
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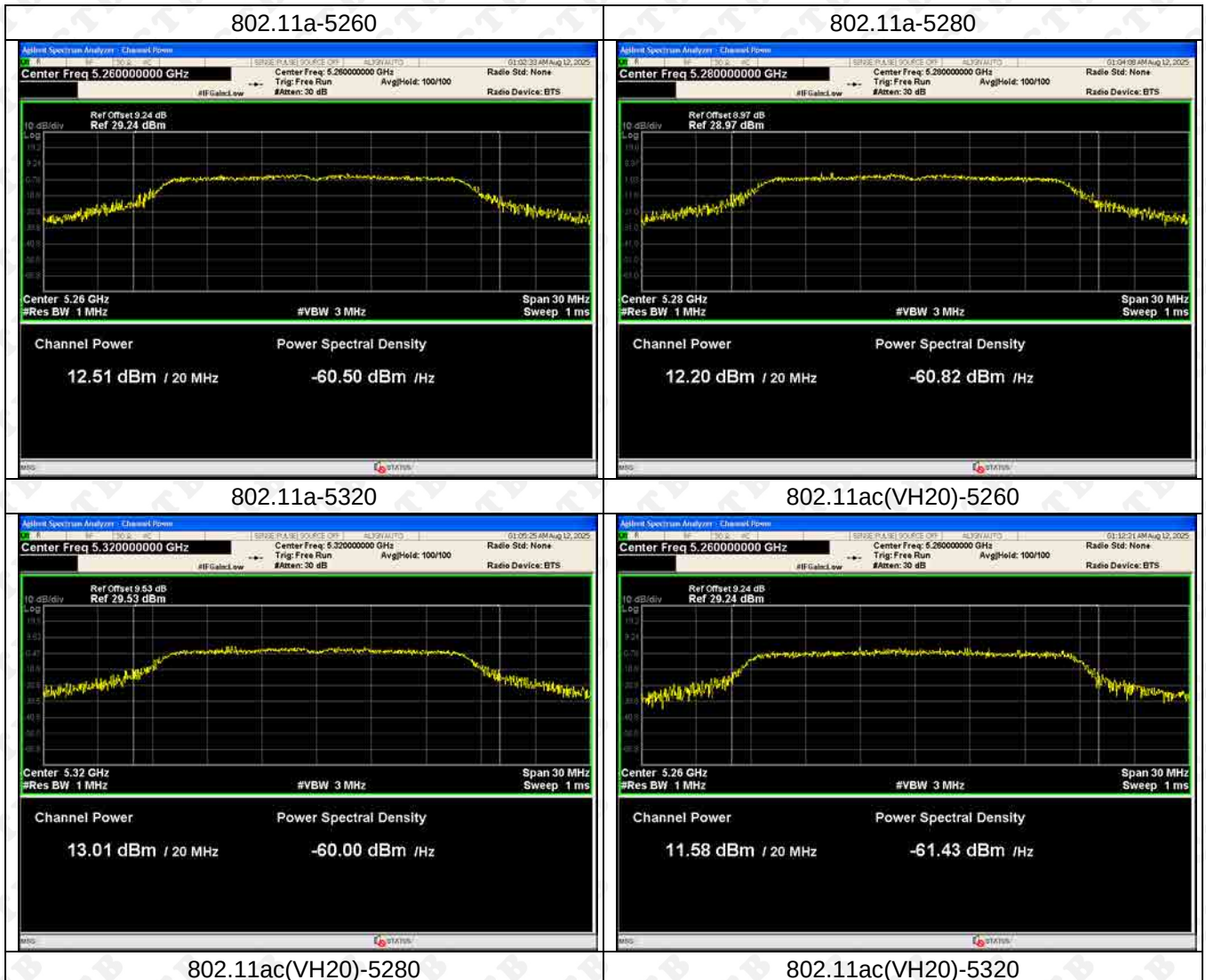
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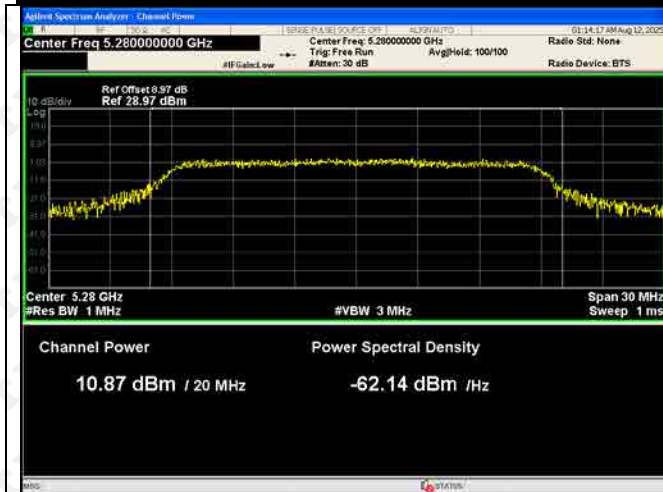


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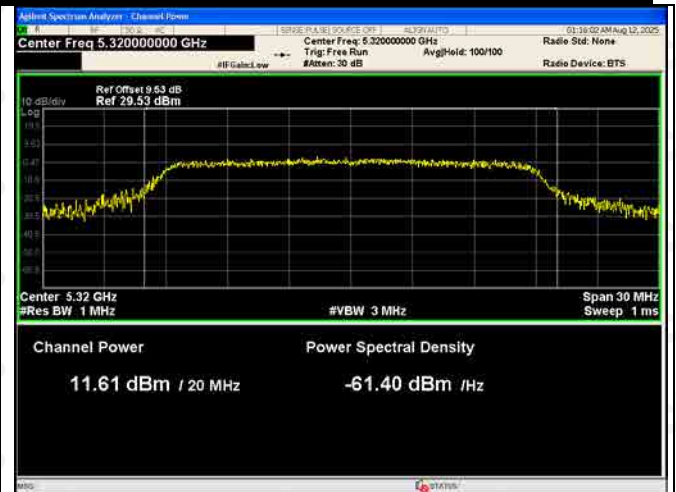


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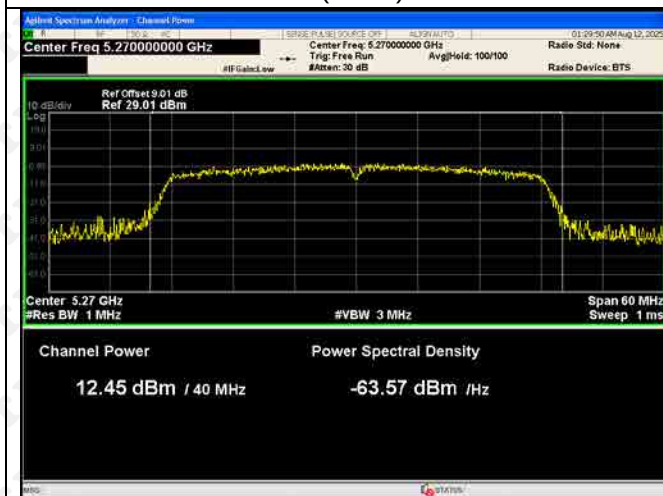




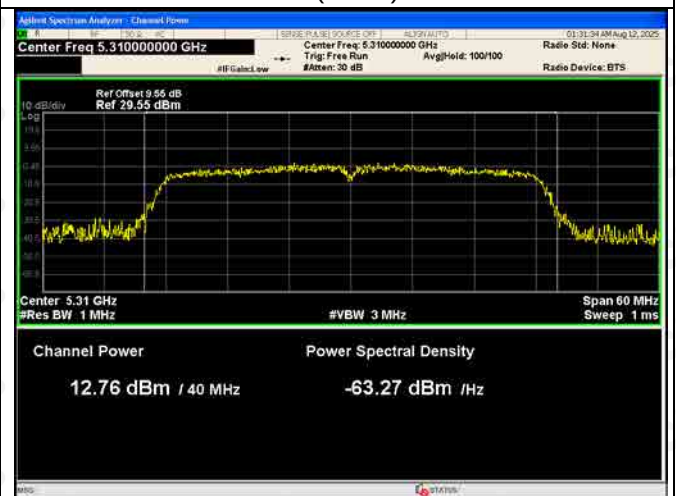
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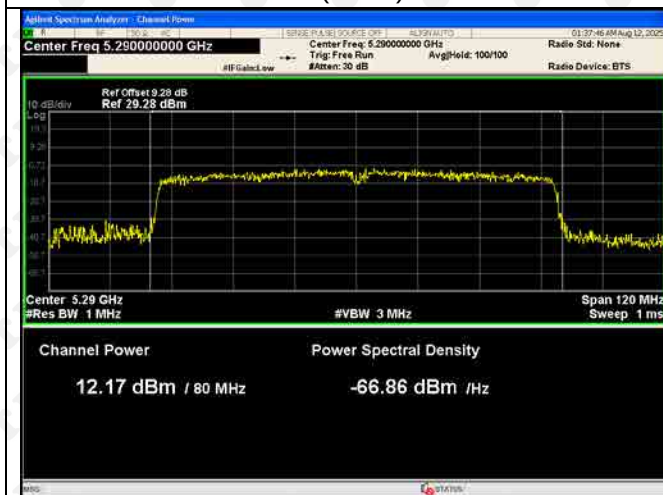
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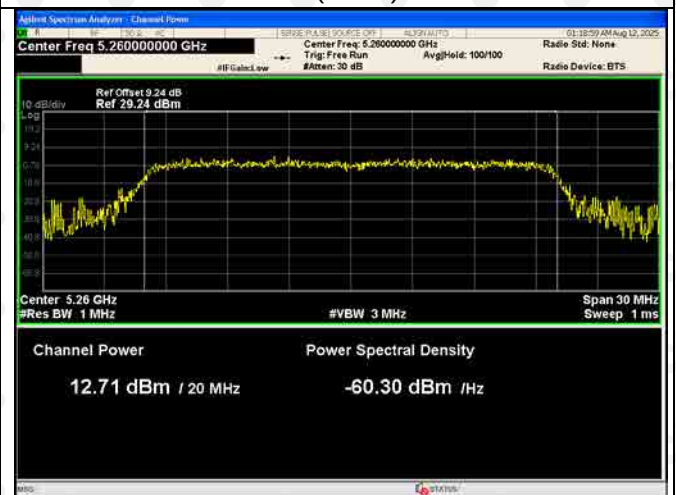
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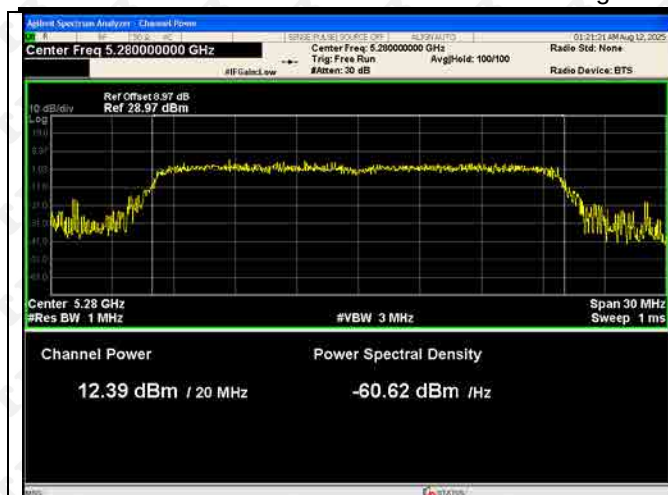
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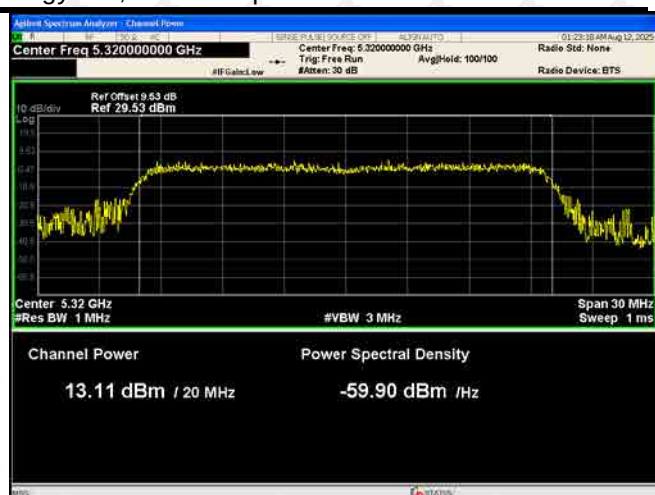
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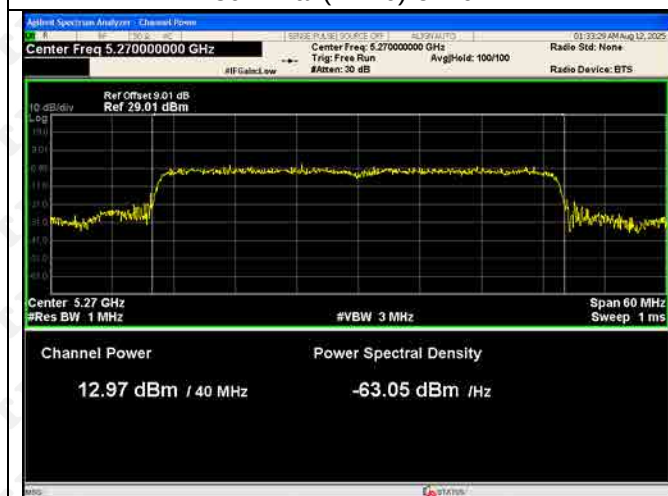
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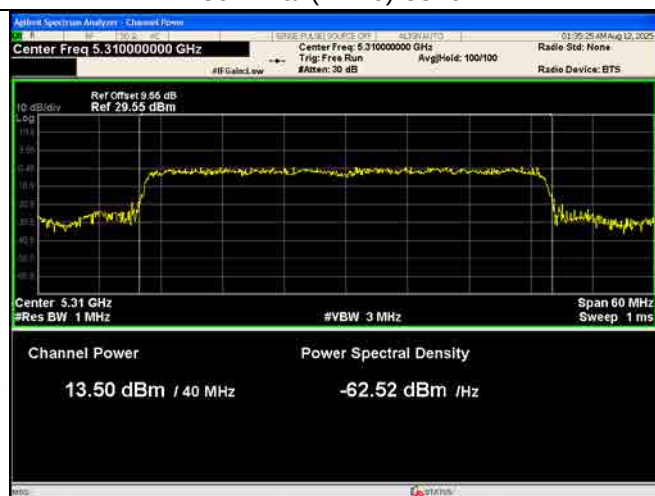
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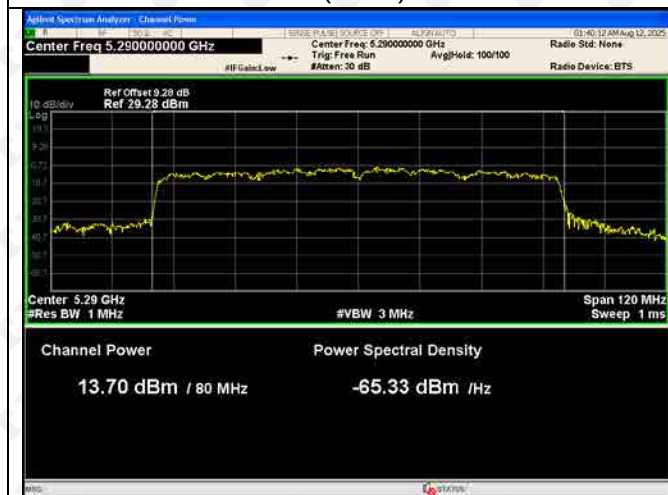
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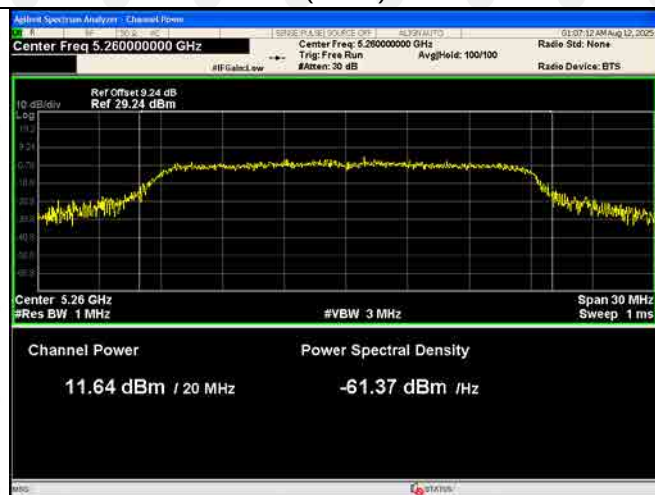
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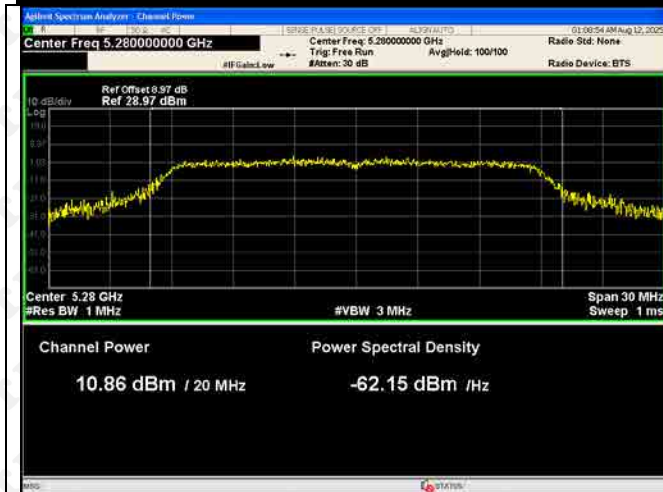
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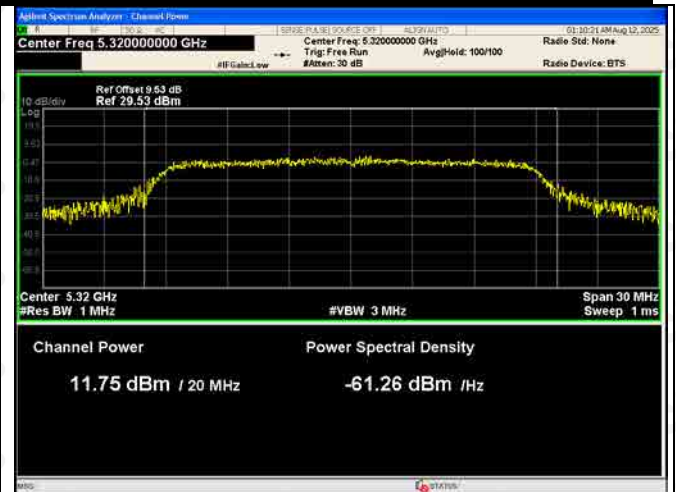
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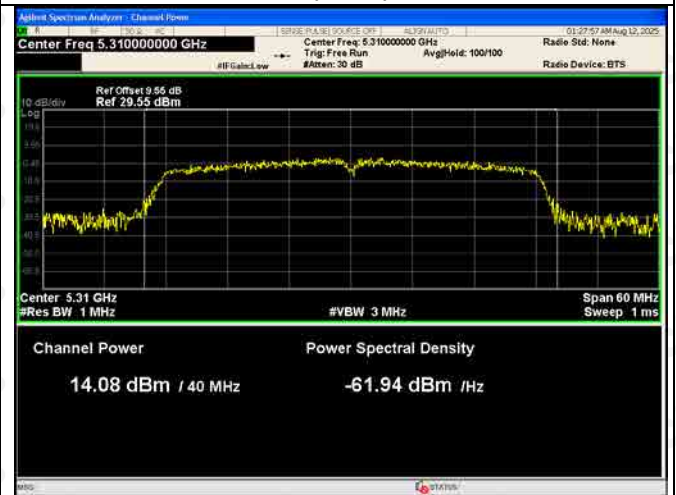
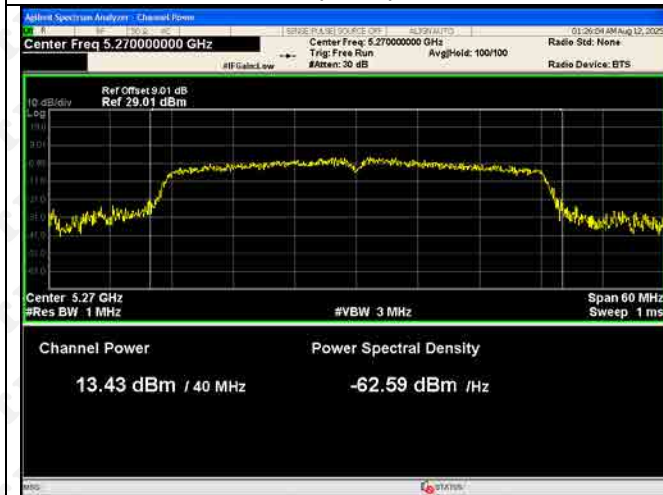
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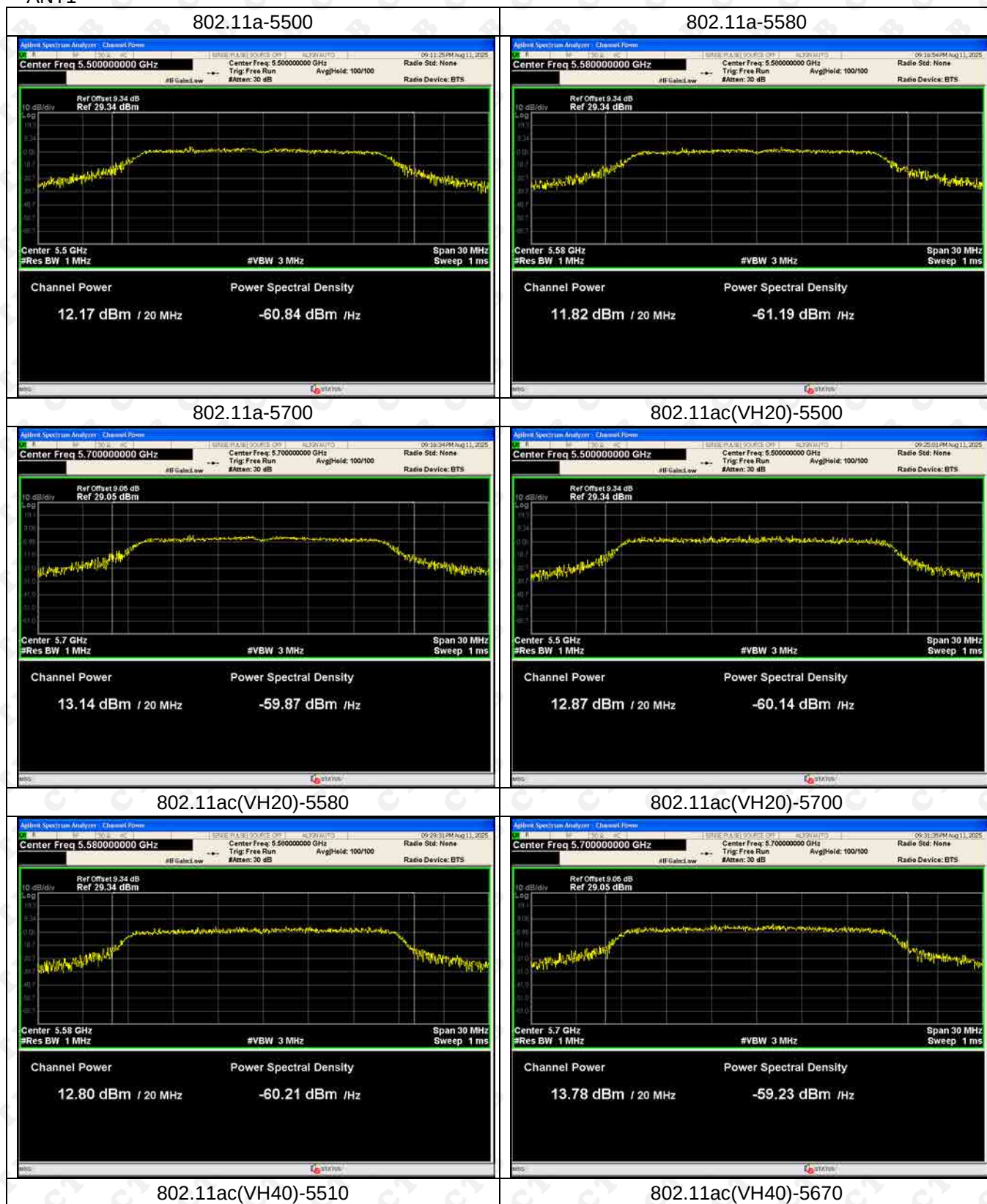
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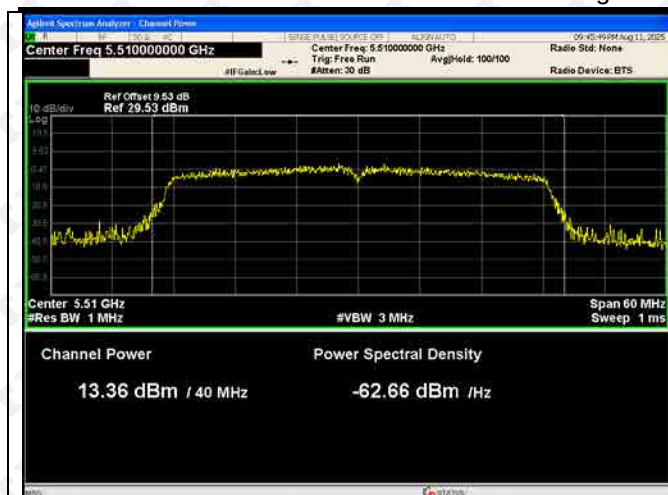


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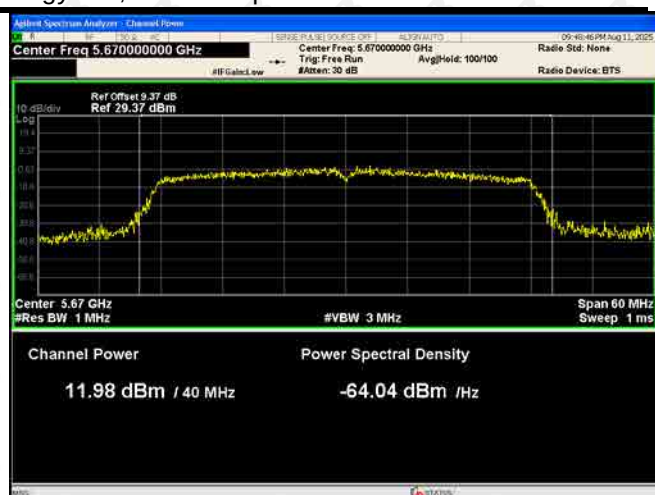


5470-5725MHz
ANT1

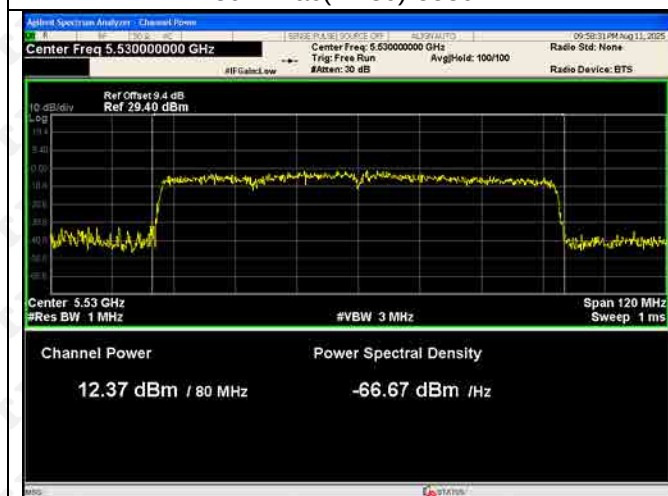




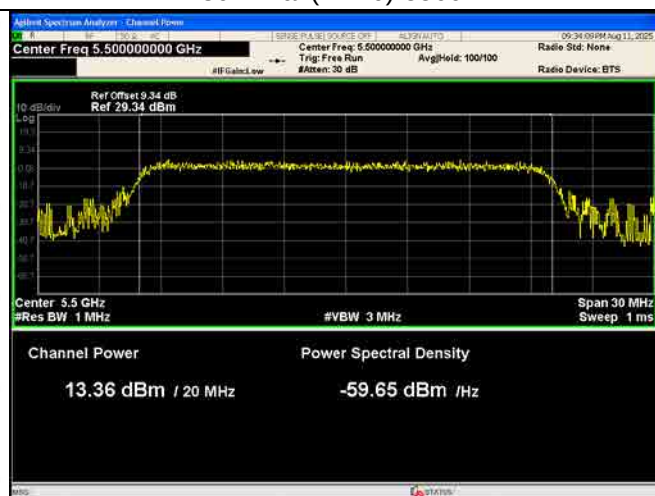
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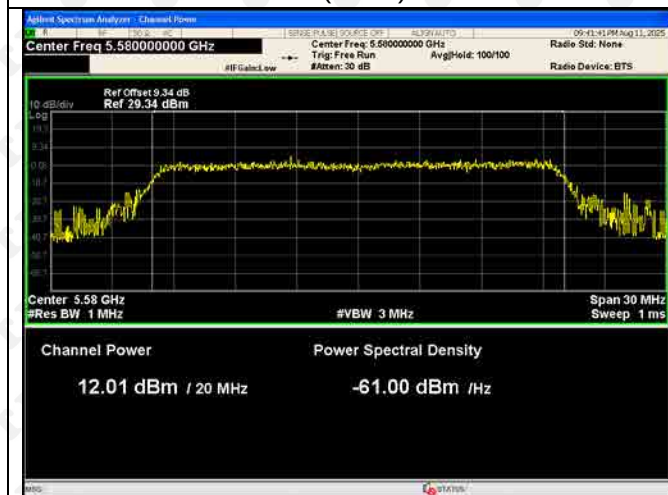
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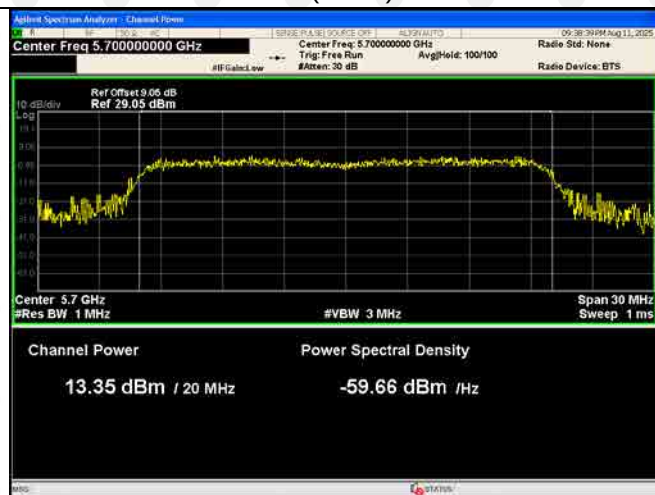
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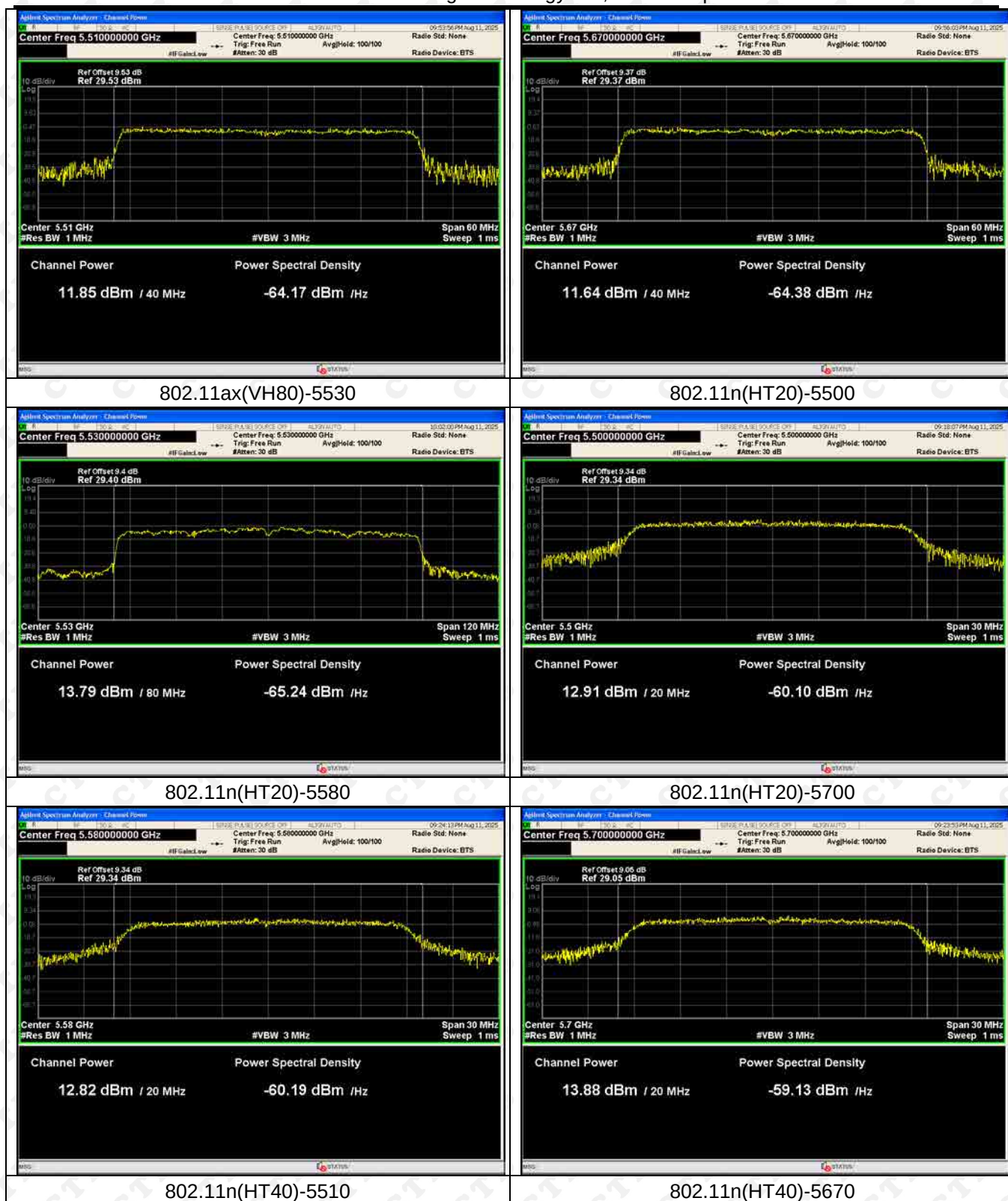
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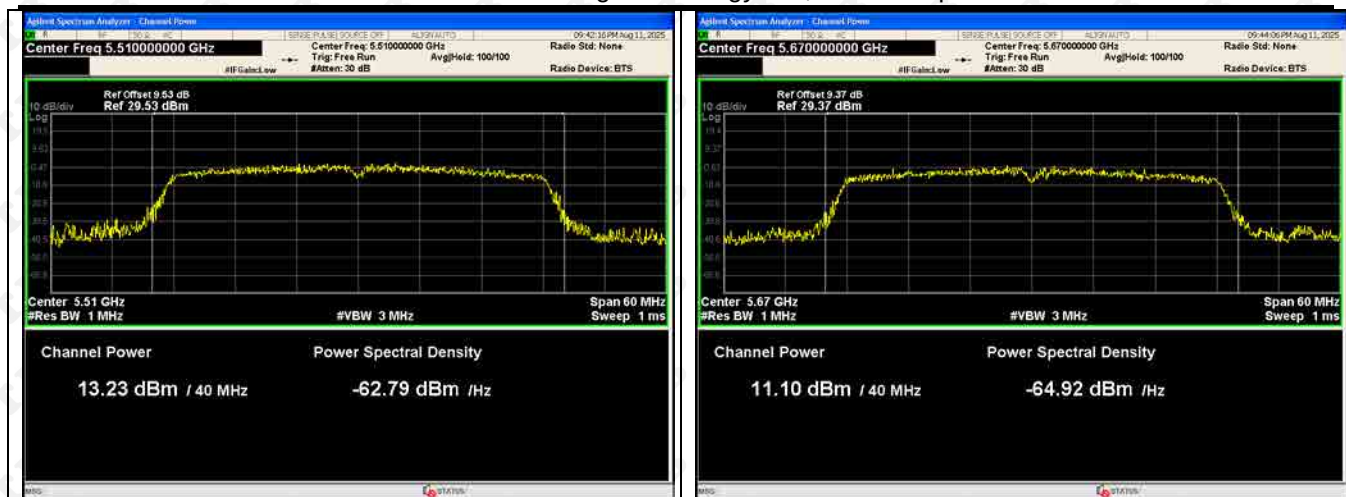


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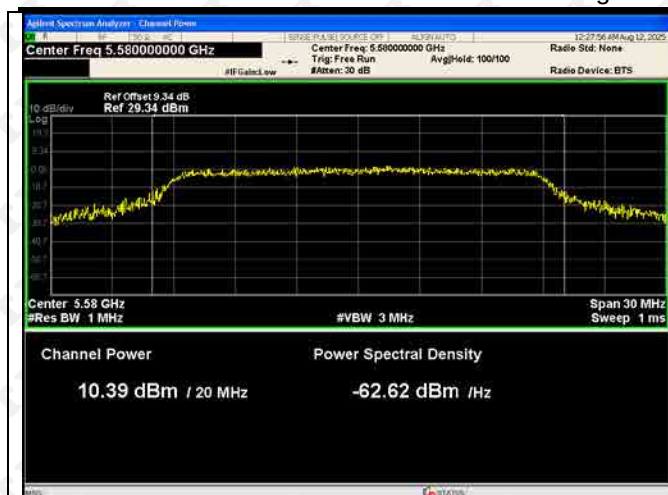
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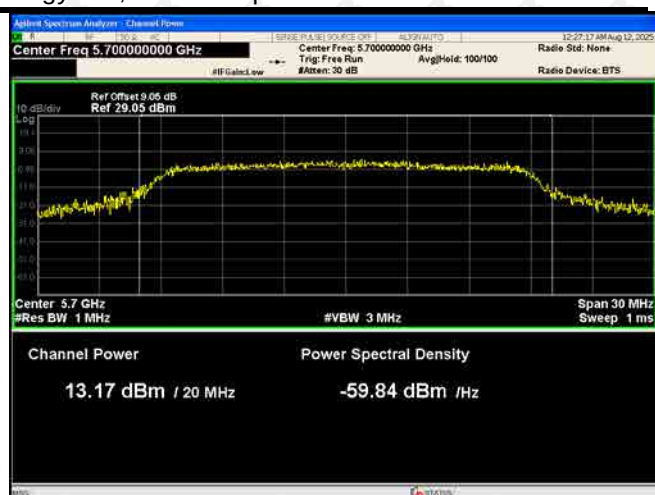


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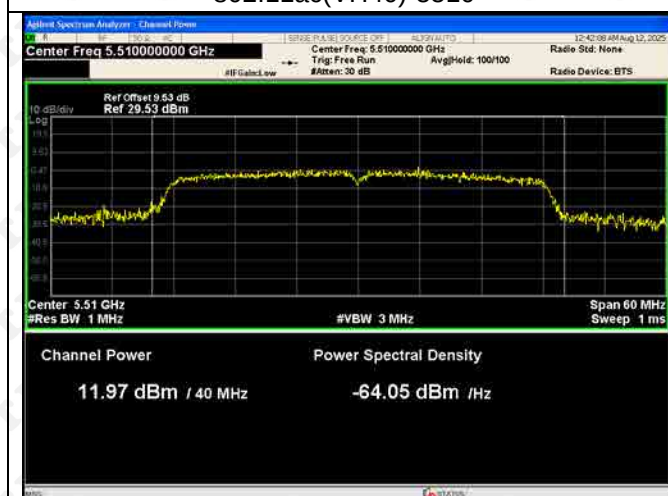




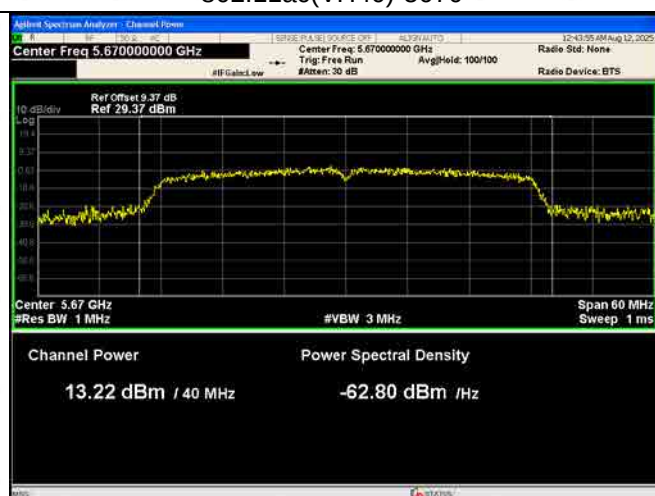
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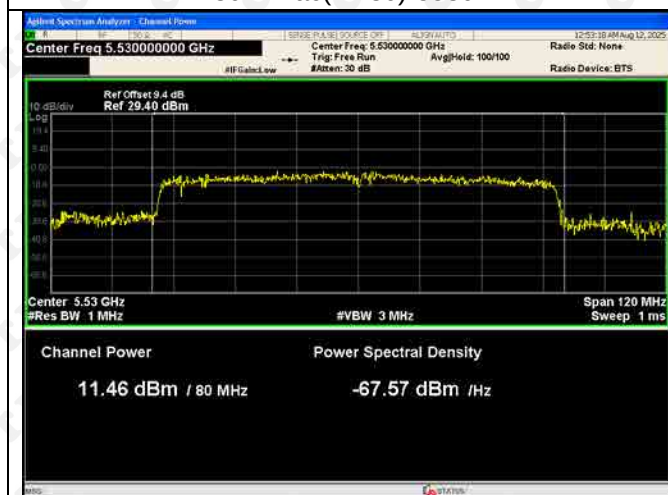
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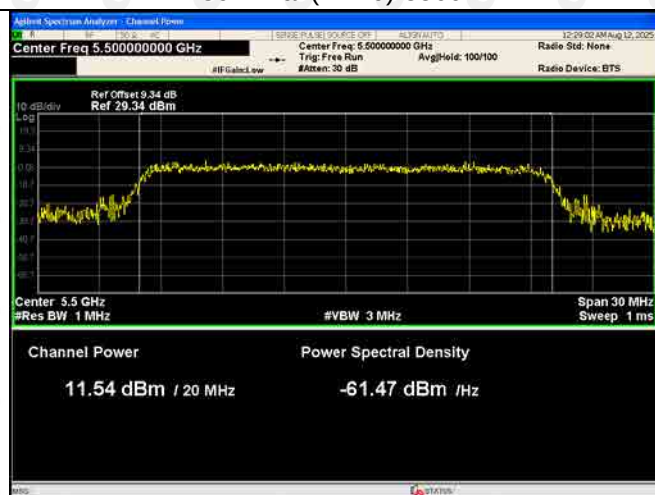
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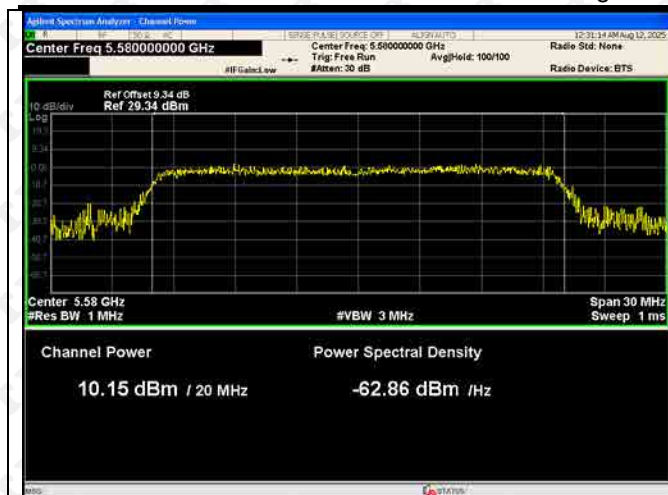
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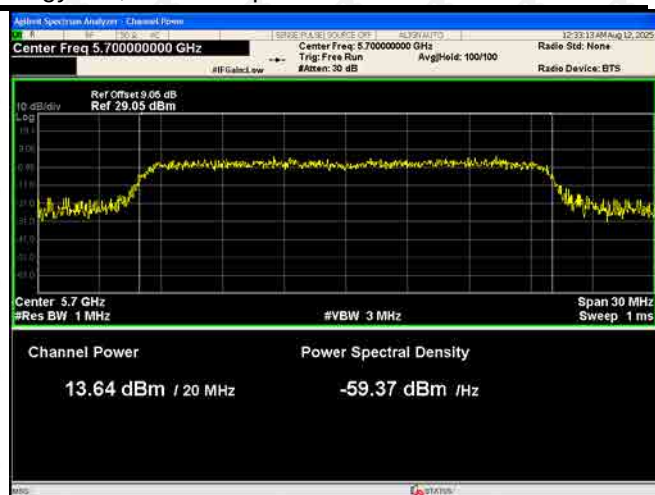
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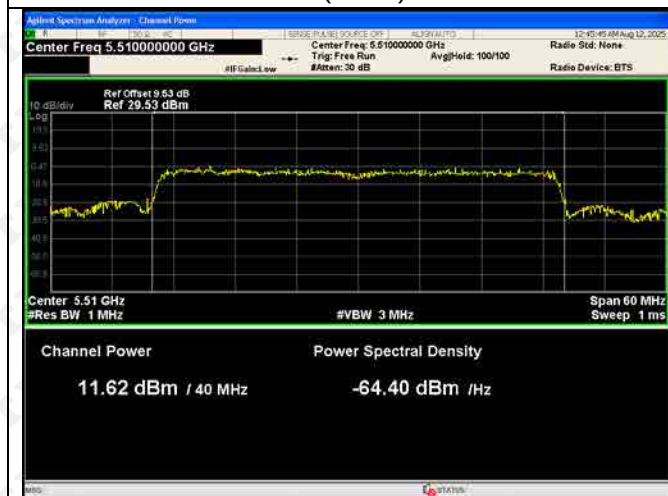
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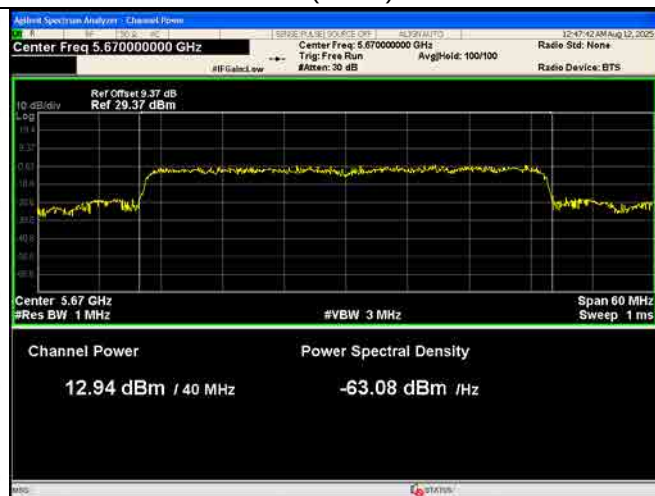
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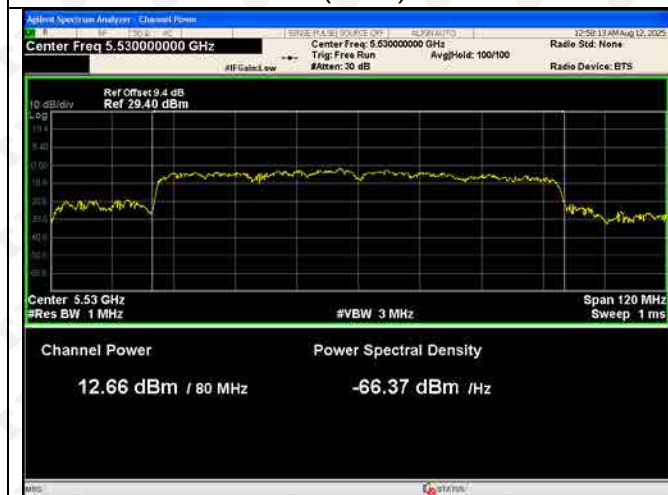
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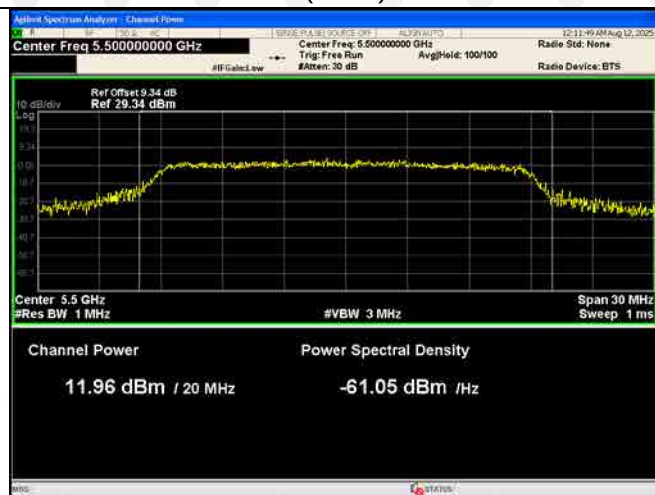
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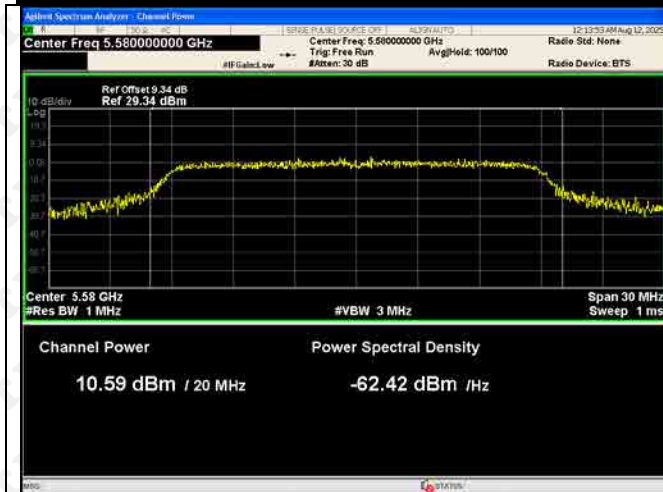
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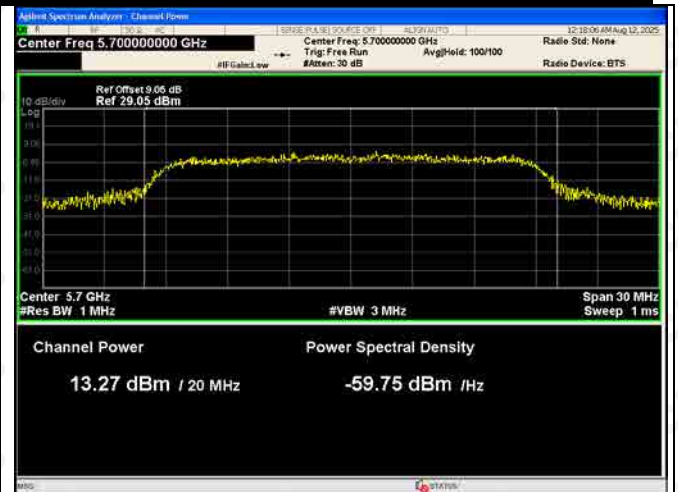
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802.11n(HT40)-5670

