1-4

Table 2-Long Pulse Radar Test Waveform

Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Number of Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Table 3-Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	9	0.333	300	70%	30

In-Service Monitoring: Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period

Limit of In-Service Monitoring:

Reference to DFS Radar Signal Parameter Values.

Test Procedures:

a) One frequency will be chosen from the Operating Channels of the EUT within the 5250-5350 MHz or 5470-5725 MHz bands. For 802.11 devices, the test frequency must contain control signals. This can be verified by disabling channel loading and monitoring the spectrum analyzer. If no control signals are detected, another frequency must be selected within the emission bandwidth where control signals are detected.

b) In case the EUT is a Master Device, a U-NII device operating as a Client Device will be used and it is assumed that the Client will associate with the EUT (Master). For radiated tests, the emissions of the Radar Waveform generator will be directed towards the Master Device. If the Master Device has antenna gain, the main beam of the antenna will be directed toward the radar emitter. Vertical polarization is used for testing.

c) The TCP protocol unicast data stream was generated by the iperf software command line with at least 17% activity ratio over any 100ms period.

d) Timing plots are reported with calculations demonstrating a minimum channel loading of approximately 17% or greater. For example, channel loading can be estimated by setting the spectrum analyzer for zero span and approximate the Time On/ (Time On + Off Time).

e) At time T0 the Radar Waveform generator sends a Burst of pulses for one of the Short Pulse Radar Types 1-4 at DFS Detection Threshold levels on the Operating Channel. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.

f) Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the EUT during the observation time (Channel Move Time). Measure and record the Channel Move Time and Channel Closing Transmission Time if radar detection occurs.

g) When operating as a Master Device, monitor the EUT for more than 30 minutes following instant T2 to verify that the EUT does not resume any transmissions on this Channel. Perform this test once and record the measurement result.

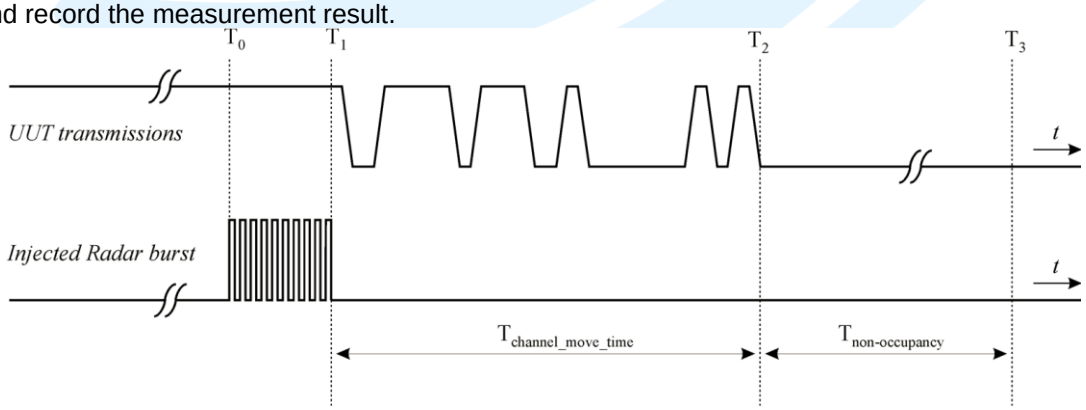
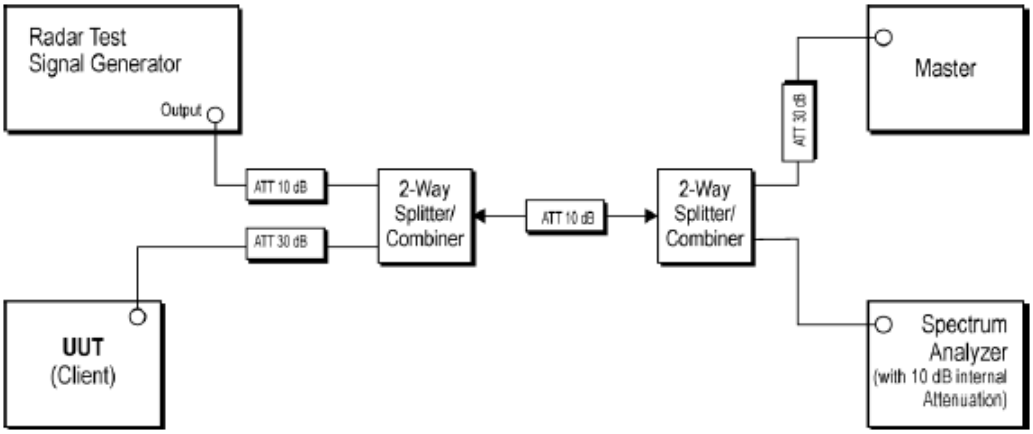


Figure 17: Channel Closing Transmission Time, Channel Move Time and Non-Occupancy Period

Conducted test setup



Setup for Client with injection at the Master

Equipment Used: Refer to section 3 for details.

Test Result: Result of Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period for Client Beacon Tes

Please refer to Appendix A

5.9 AC POWER LINE CONDUCTED EMISSION

Test Requirement: FCC 47 CFR Part 15 Subpart E Section 15.407 (b)(6)
FCC 47 CFR Part 15 Subpart C Section 15.207
RSS-Gen Issue 5, Section 8.8

Test Method: ANSI C63.10-2013, Section 6.2.

Limits:

Frequency range (MHz)	Limits (dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

Remark:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

Test Setup: Refer to section 4.5.2 for details.

Test Procedures:

Test frequency range :150KHz-30MHz

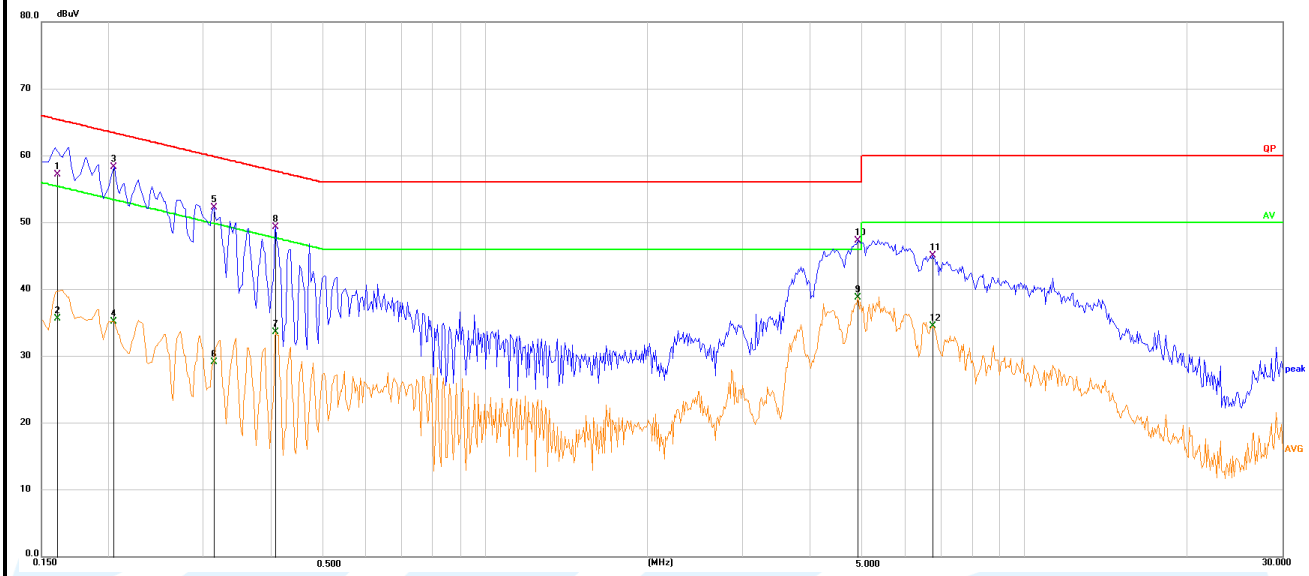
1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

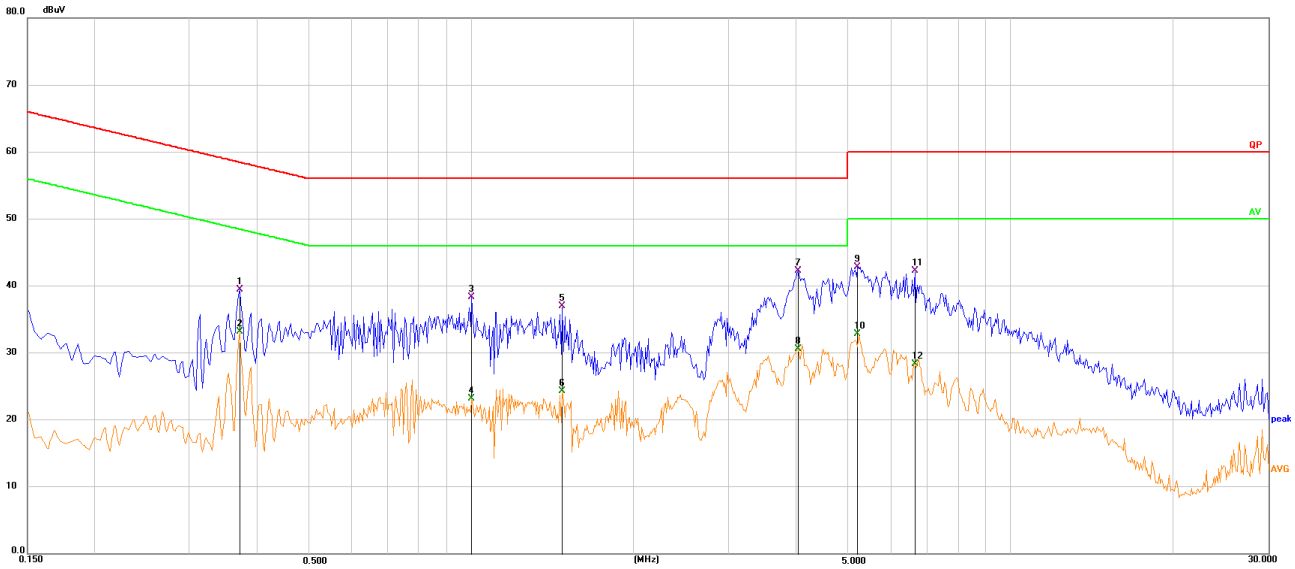
The measurement data as follows:
Quasi Peak and Average:
Mode: WIFI Link

Live Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.1609	46.98	10.20	57.18	65.42	-8.24	QP
2	0.1609	25.39	10.20	35.59	55.42	-19.83	AVG
3	0.2040	48.09	10.16	58.25	63.45	-5.20	QP
4	0.2040	25.04	10.16	35.20	53.45	-18.25	AVG
5	0.3120	42.07	10.20	52.27	59.92	-7.65	QP
6	0.3120	18.96	10.20	29.16	49.92	-20.76	AVG
7	0.4063	23.52	10.12	33.64	47.72	-14.08	AVG
8	0.4065	39.17	10.12	49.29	57.72	-8.43	QP
9	4.9153	28.57	10.23	38.80	46.00	-7.20	AVG
10	4.9155	37.09	10.23	47.32	56.00	-8.68	QP
11	6.7605	34.63	10.46	45.09	60.00	-14.91	QP
12	6.7605	24.02	10.46	34.48	50.00	-15.52	AVG

Neutral Line



No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.3704	29.31	10.16	39.47	58.49	-19.02	QP
2	0.3704	22.95	10.16	33.11	48.49	-15.38	AVG
3	1.0004	28.11	10.16	38.27	56.00	-17.73	QP
4	1.0004	13.03	10.16	23.19	46.00	-22.81	AVG
5	1.4775	26.73	10.24	36.97	56.00	-19.03	QP
6	1.4775	14.08	10.24	24.32	46.00	-21.68	AVG
7	4.0290	31.96	10.27	42.23	56.00	-13.77	QP
8	4.0290	20.27	10.27	30.54	46.00	-15.46	AVG
9	5.2035	32.57	10.29	42.86	60.00	-17.14	QP
10	5.2035	22.58	10.29	32.87	50.00	-17.13	AVG
11	6.6480	31.91	10.28	42.19	60.00	-17.81	QP
12	6.6480	18.06	10.28	28.34	50.00	-21.66	AVG

Remark:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result - Limit
4. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

APPENDIX A RF TEST DATA

A.1 EMISSION BANDWIDTH

For U-NII-1, U-NII-2A, U-NII-2C band

Test Mode	Antenna	Frequency[MHz]	26db EBW [MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	24.64	---	---
11A	Ant1	5220	23.84	---	---
11A	Ant1	5240	23.78	---	---
11A	Ant1	5260	23.68	---	---
11A	Ant1	5300	23.91	---	---
11A	Ant1	5320	23.54	---	---
11A	Ant1	5500	23.87	---	---
11A	Ant1	5580	24.54	---	---
11A	Ant1	5600	25.42	---	---
11A	Ant1	5700	25.65	---	---
11A	Ant1	5720	25.26	---	---
11N20SISO	Ant1	5180	24.76	---	---
11N20SISO	Ant1	5220	25.27	---	---
11N20SISO	Ant1	5240	25.92	---	---
11N20SISO	Ant1	5260	24.75	---	---
11N20SISO	Ant1	5300	24.68	---	---
11N20SISO	Ant1	5320	24.64	---	---
11N20SISO	Ant1	5500	25.07	---	---
11N20SISO	Ant1	5580	25.42	---	---
11N20SISO	Ant1	5600	25.39	---	---
11N20SISO	Ant1	5700	25.54	---	---
11N20SISO	Ant1	5720	26.42	---	---
11N40SISO	Ant1	5190	44.76	---	---
11N40SISO	Ant1	5230	44.75	---	---
11N40SISO	Ant1	5270	45.54	---	---
11N40SISO	Ant1	5310	44.32	---	---
11N40SISO	Ant1	5510	47.69	---	---
11N40SISO	Ant1	5550	46.92	---	---
11N40SISO	Ant1	5590	45.78	---	---
11N40SISO	Ant1	5670	45.75	---	---
11N40SISO	Ant1	5710	46.18	---	---
11AC20SISO	Ant1	5180	25.14	---	---
11AC20SISO	Ant1	5220	25.13	---	---
11AC20SISO	Ant1	5240	25.49	---	---
11AC20SISO	Ant1	5260	25.50	---	---
11AC20SISO	Ant1	5300	25.10	---	---
11AC20SISO	Ant1	5320	25.02	---	---
11AC20SISO	Ant1	5500	25.49	---	---
11AC20SISO	Ant1	5580	26.00	---	---
11AC20SISO	Ant1	5600	25.67	---	---
11AC20SISO	Ant1	5700	25.93	---	---
11AC20SISO	Ant1	5720	25.90	---	---
11AC40SISO	Ant1	5190	44.29	---	---
11AC40SISO	Ant1	5230	45.44	---	---
11AC40SISO	Ant1	5270	44.28	---	---
11AC40SISO	Ant1	5310	44.58	---	---
11AC40SISO	Ant1	5510	46.25	---	---
11AC40SISO	Ant1	5550	46.18	---	---
11AC40SISO	Ant1	5590	45.60	---	---
11AC40SISO	Ant1	5670	46.44	---	---
11AC40SISO	Ant1	5710	47.04	---	---
11AX20SISO	Ant1	5180	23.59	---	---
11AX20SISO	Ant1	5220	25.28	---	---
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11AX20SISO	Ant1	5260	23.20	---	---
11AX20SISO	Ant1	5300	24.77	---	---
11AX20SISO	Ant1	5320	24.26	---	---
11AX20SISO	Ant1	5500	24.01	---	---

11AX20SISO	Ant1	5580	25.65	---	---
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11AX20SISO	Ant1	5700	25.29	---	---
11AX20SISO	Ant1	5720	24.69	---	---
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11AX40SISO	Ant1	5230	43.73	---	---
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11AX40SISO	Ant1	5510	45.28	---	---
11AX40SISO	Ant1	5550	45.80	---	---
11AX40SISO	Ant1	5590	44.26	---	---
11AX40SISO	Ant1	5670	44.98	---	---
11AX40SISO	Ant1	5710	44.21	---	---

Test Graphs

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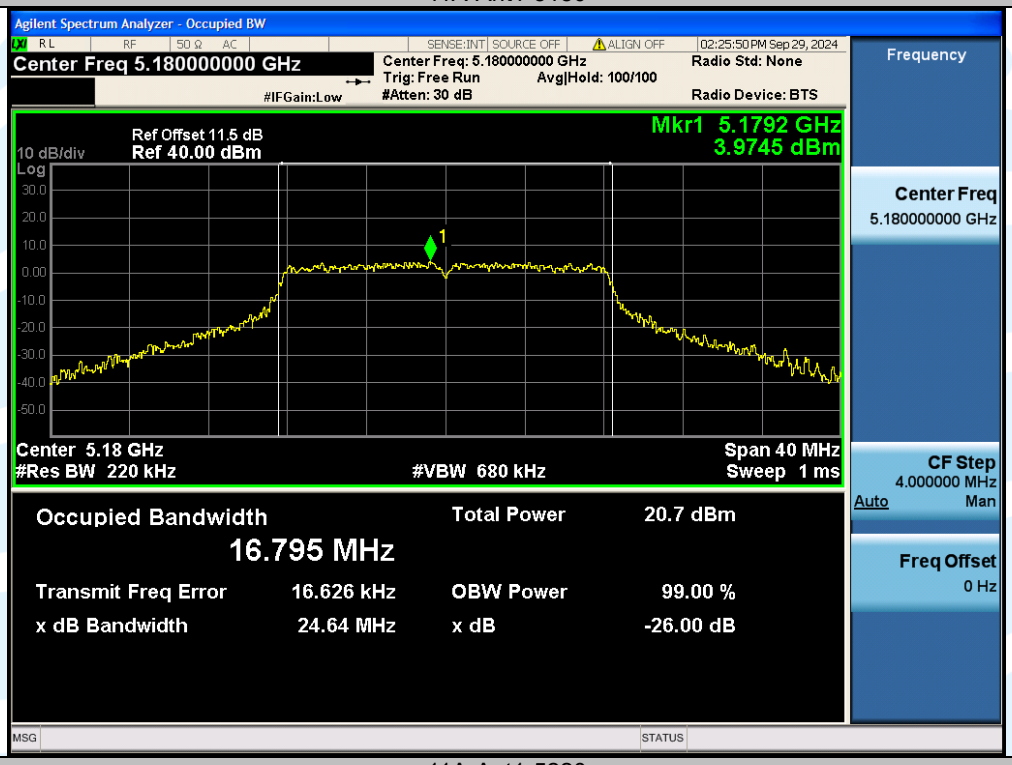

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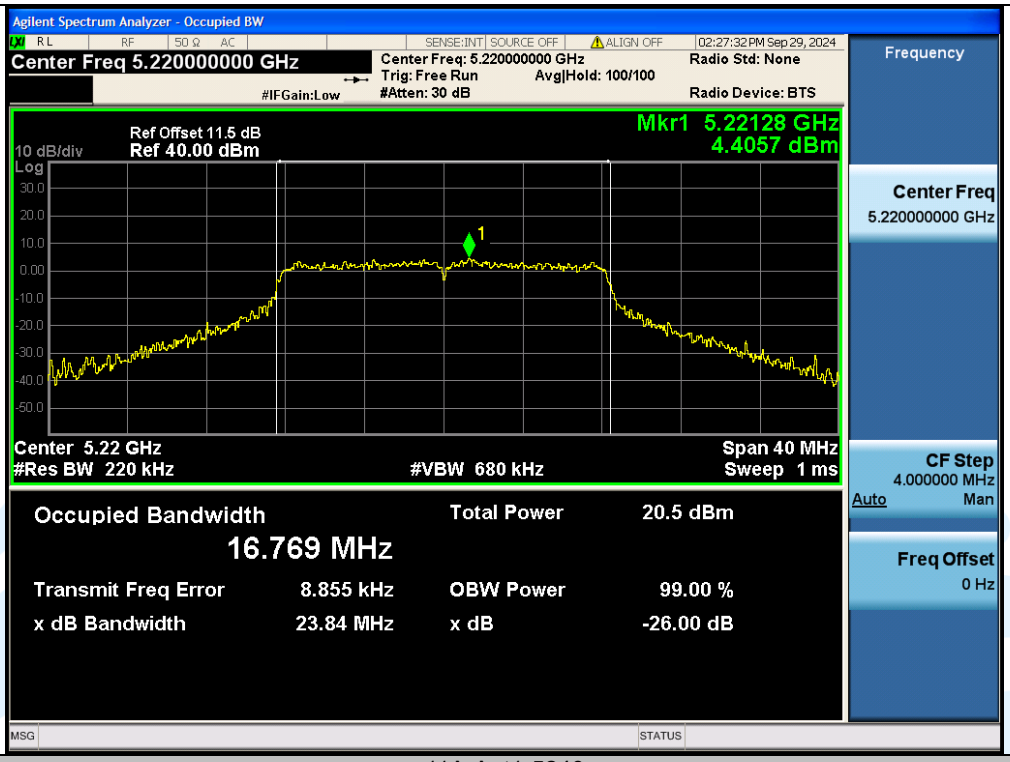

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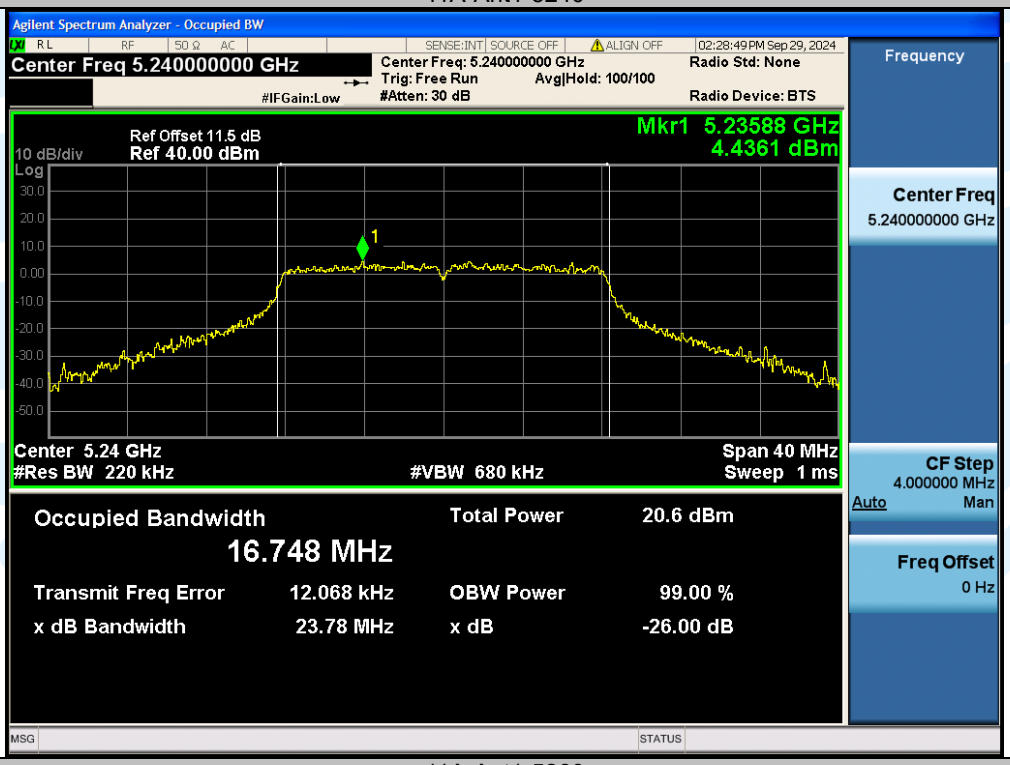

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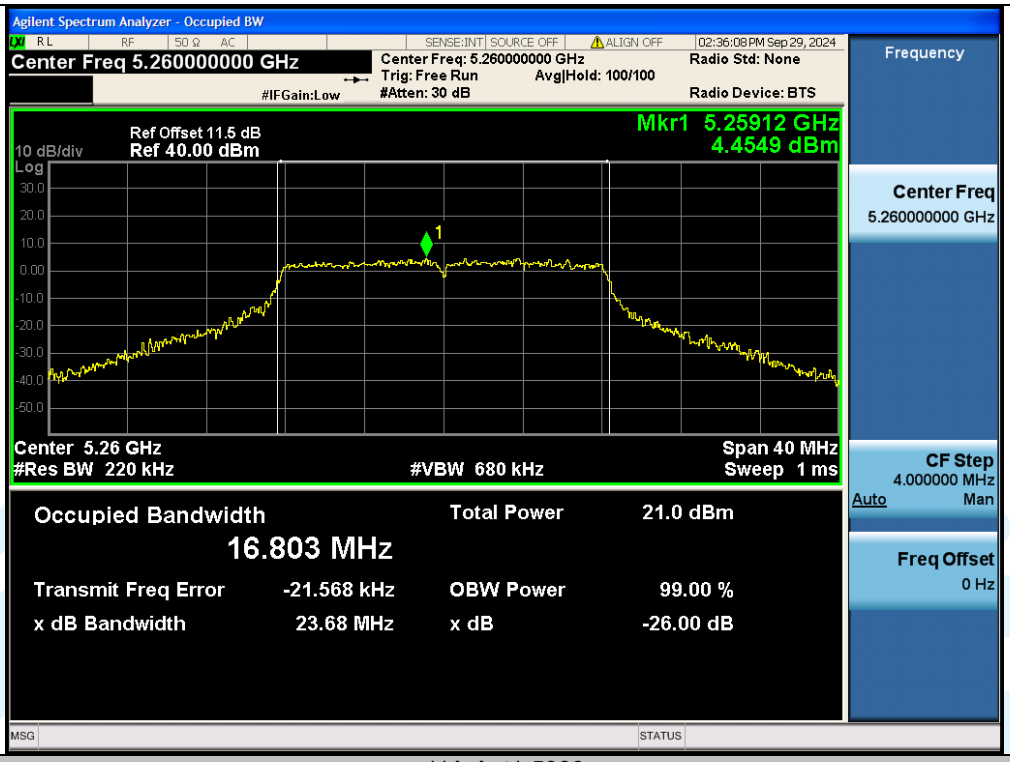

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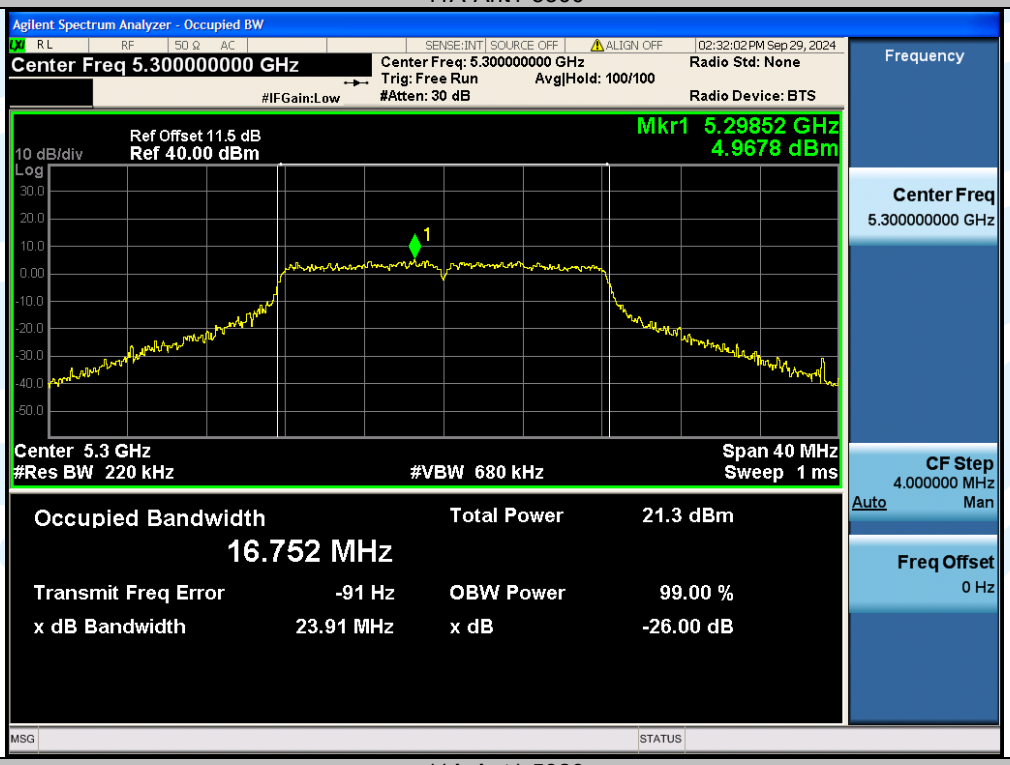

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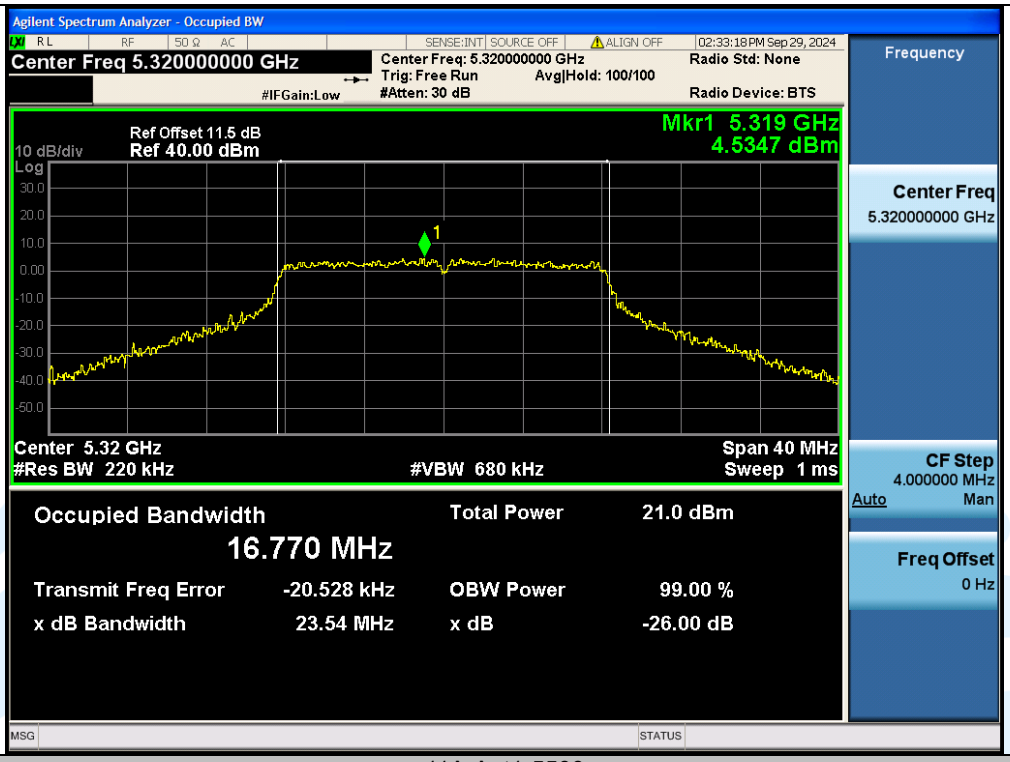

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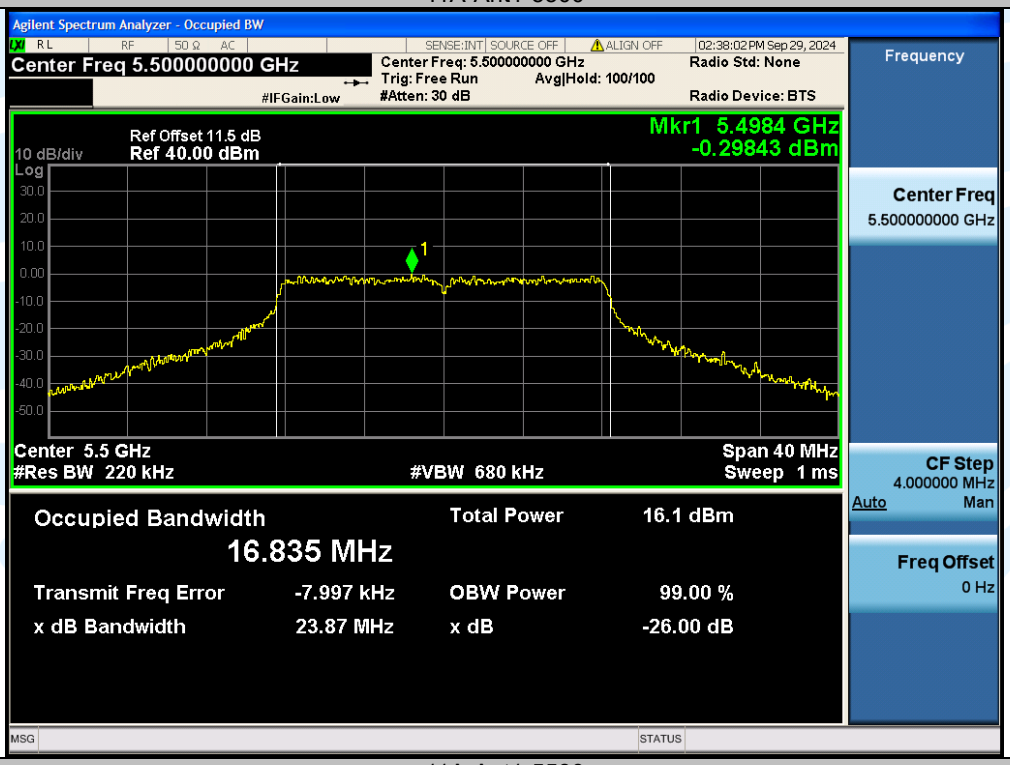

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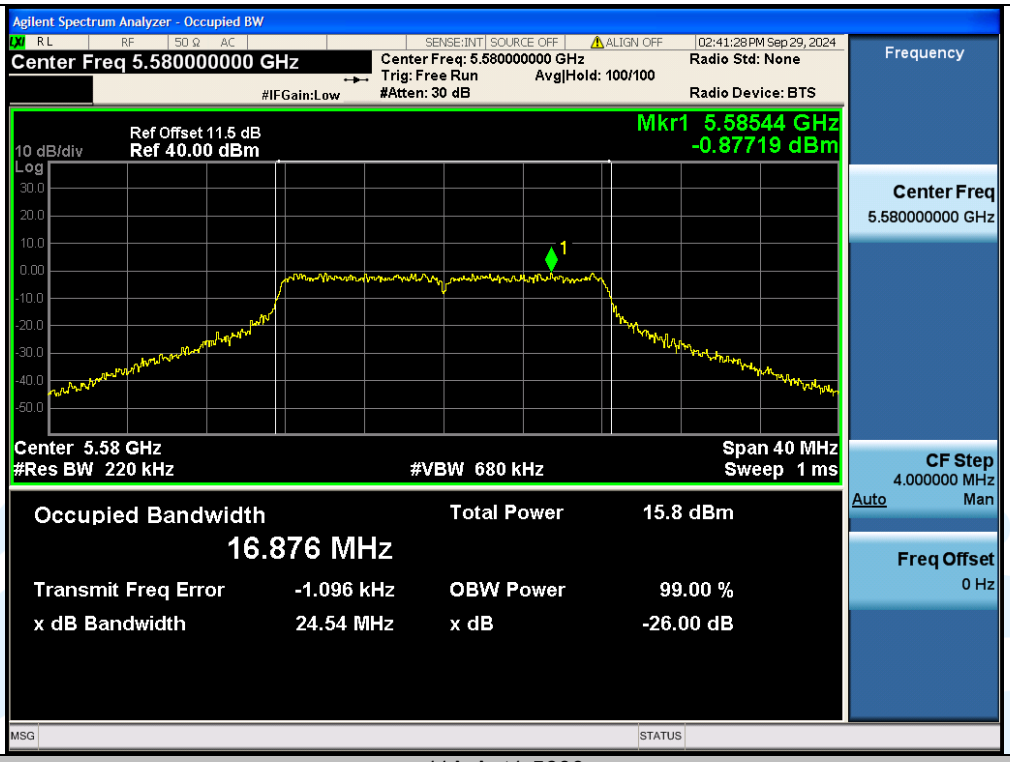

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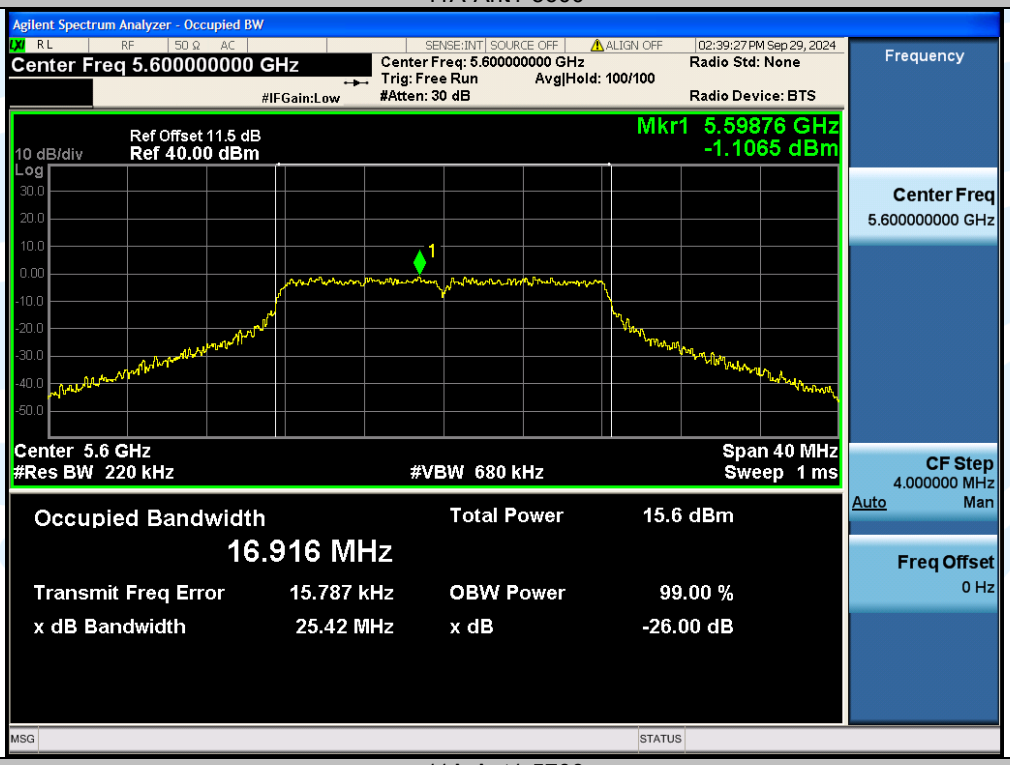

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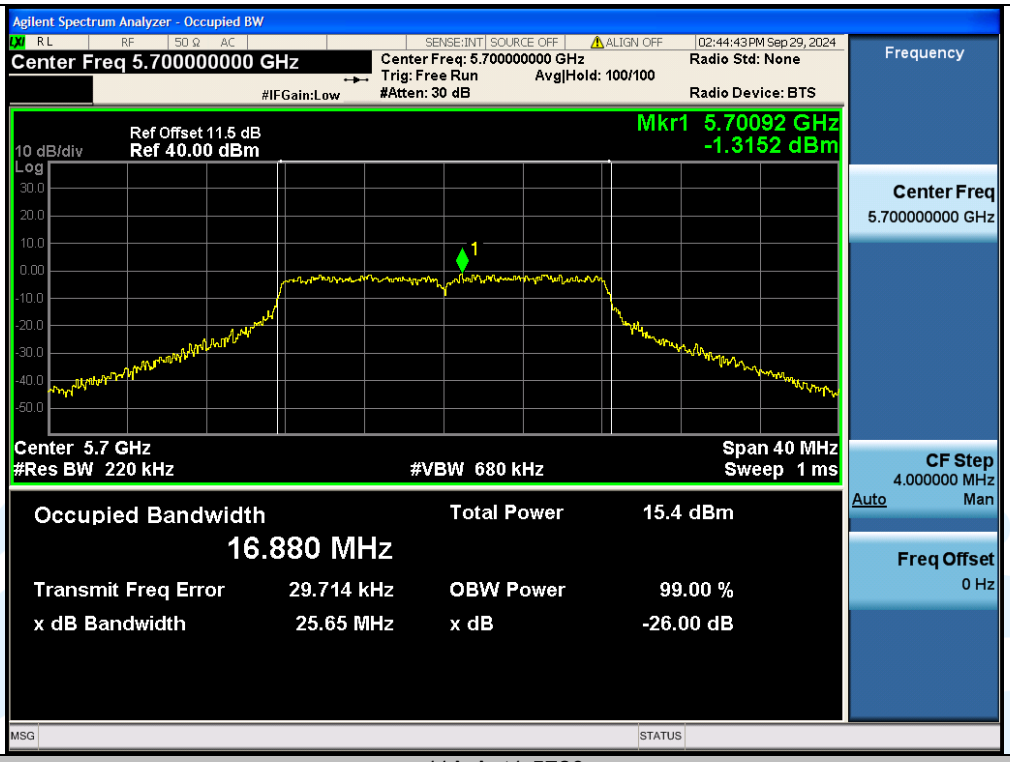

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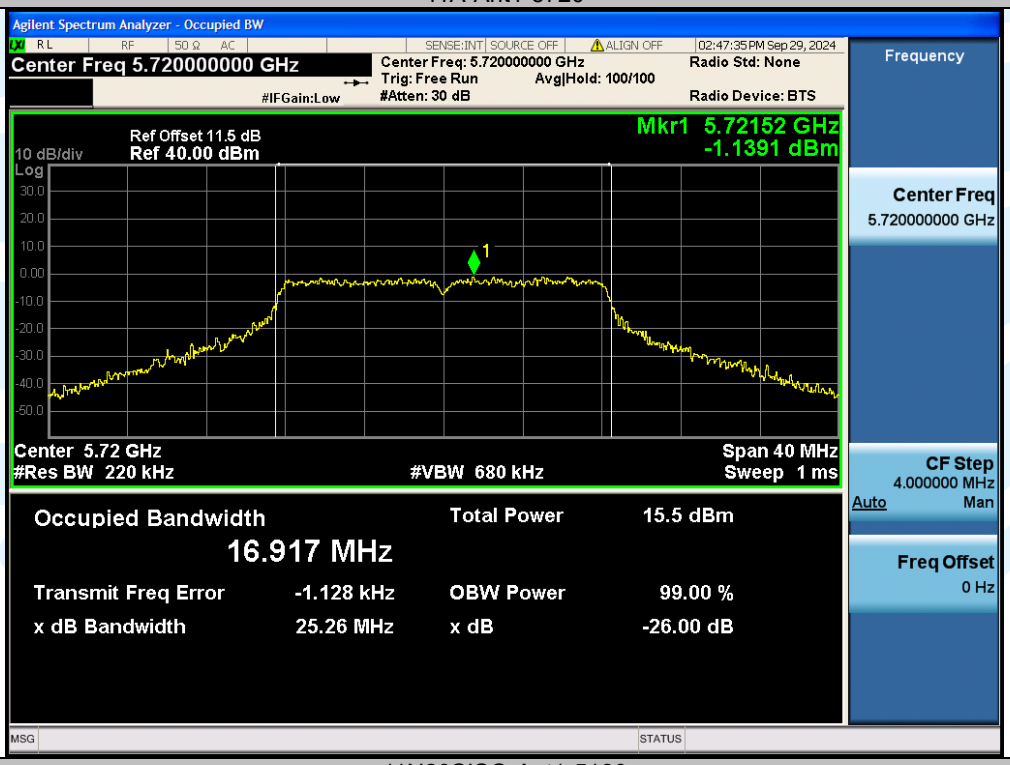

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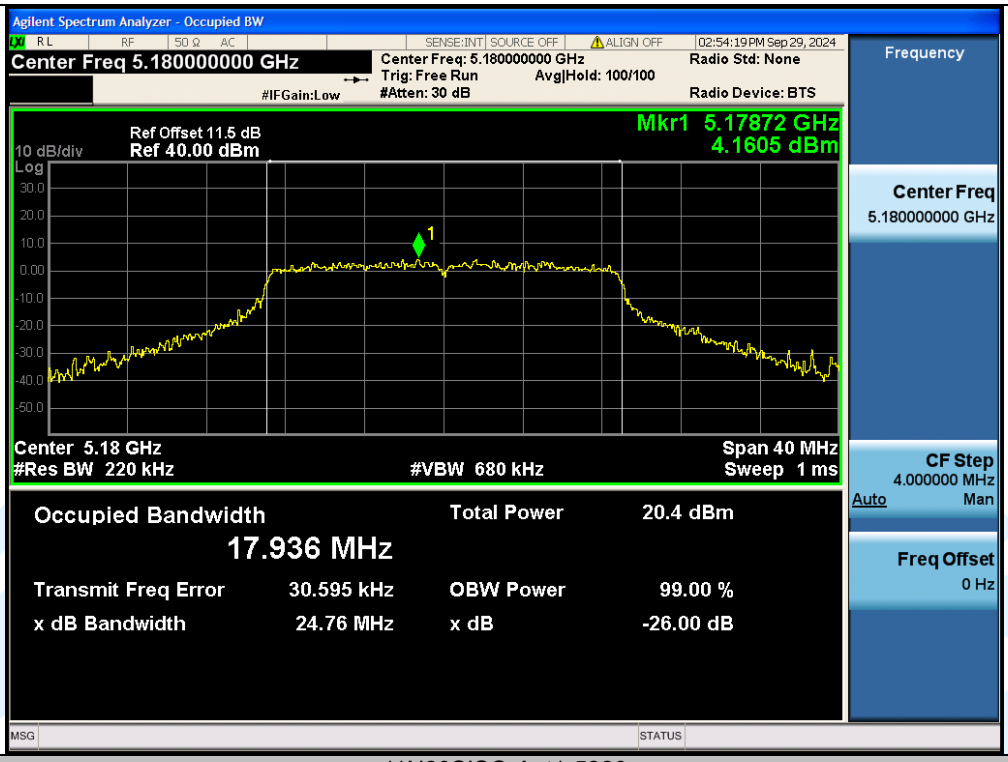

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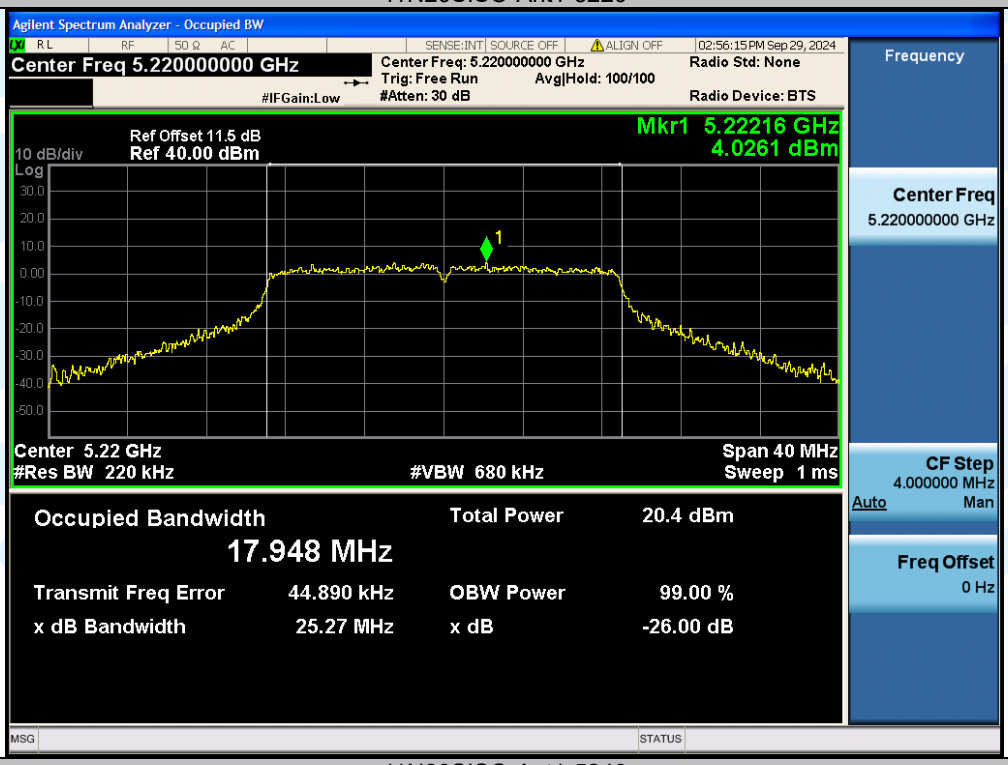

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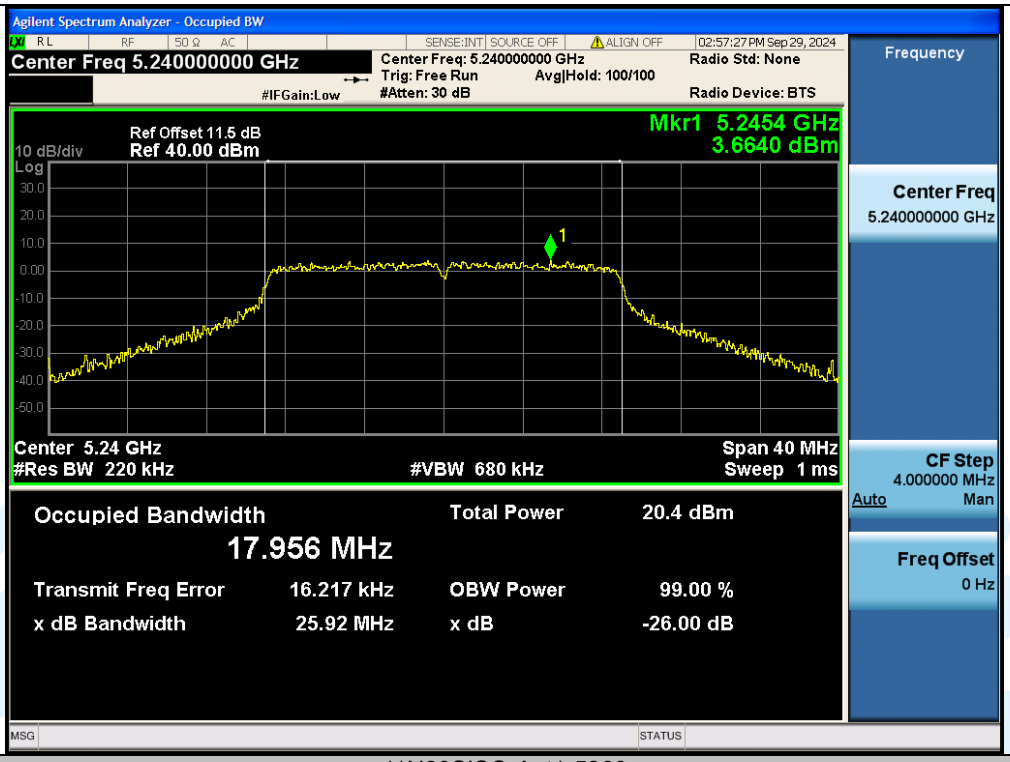

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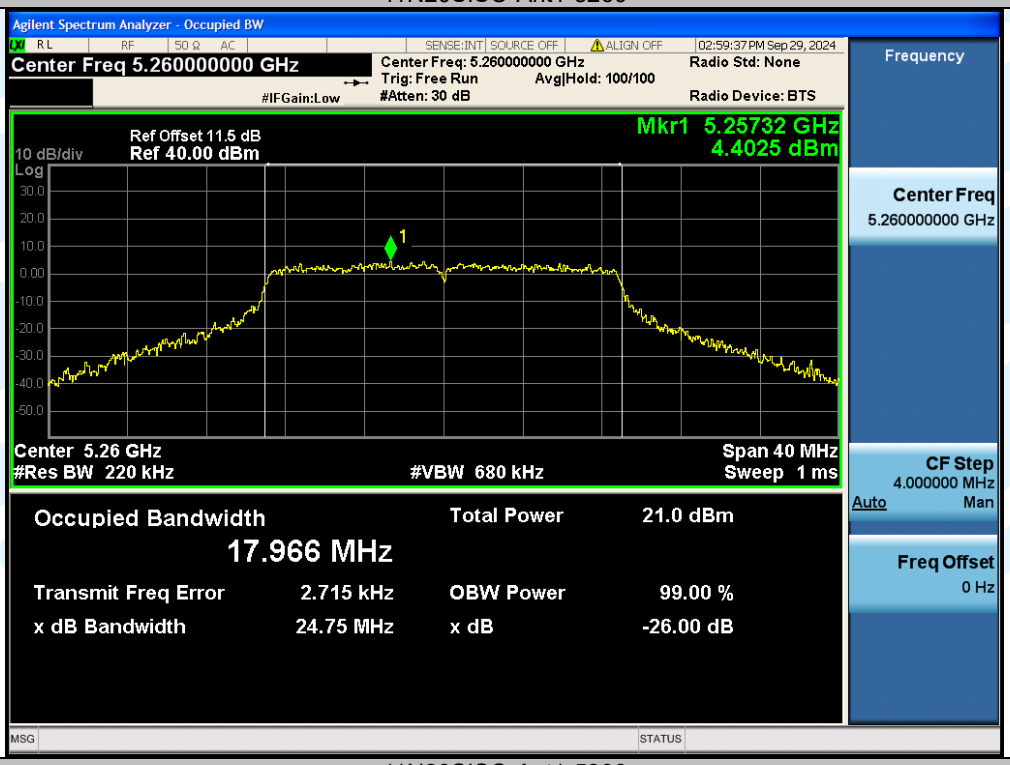

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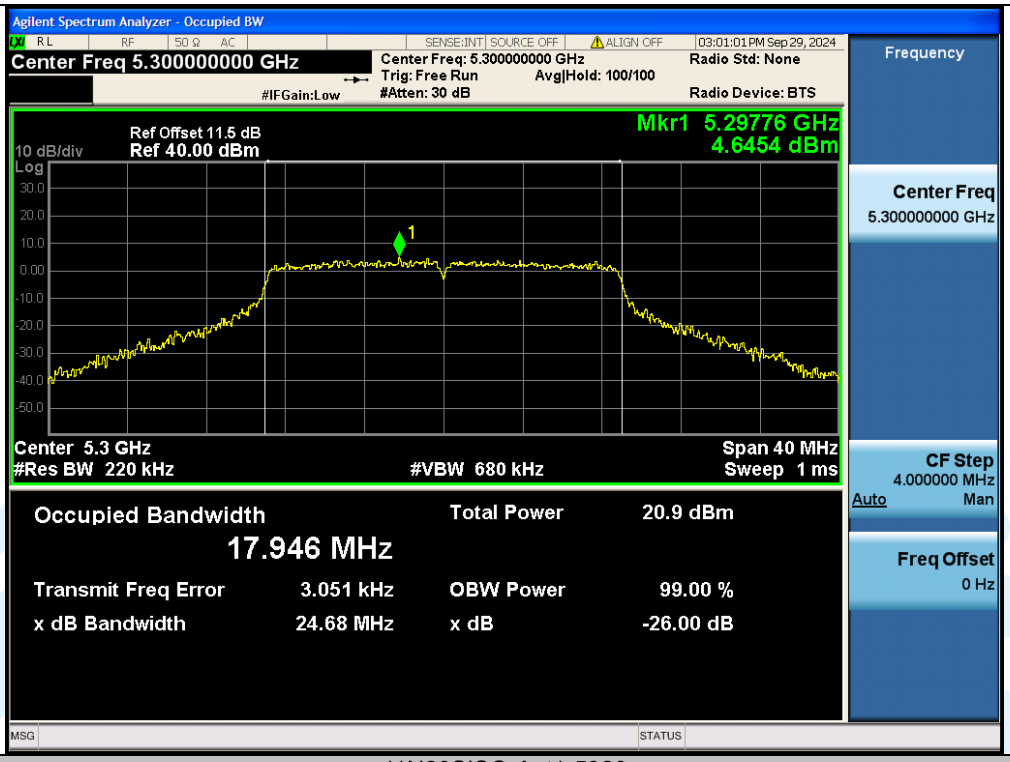

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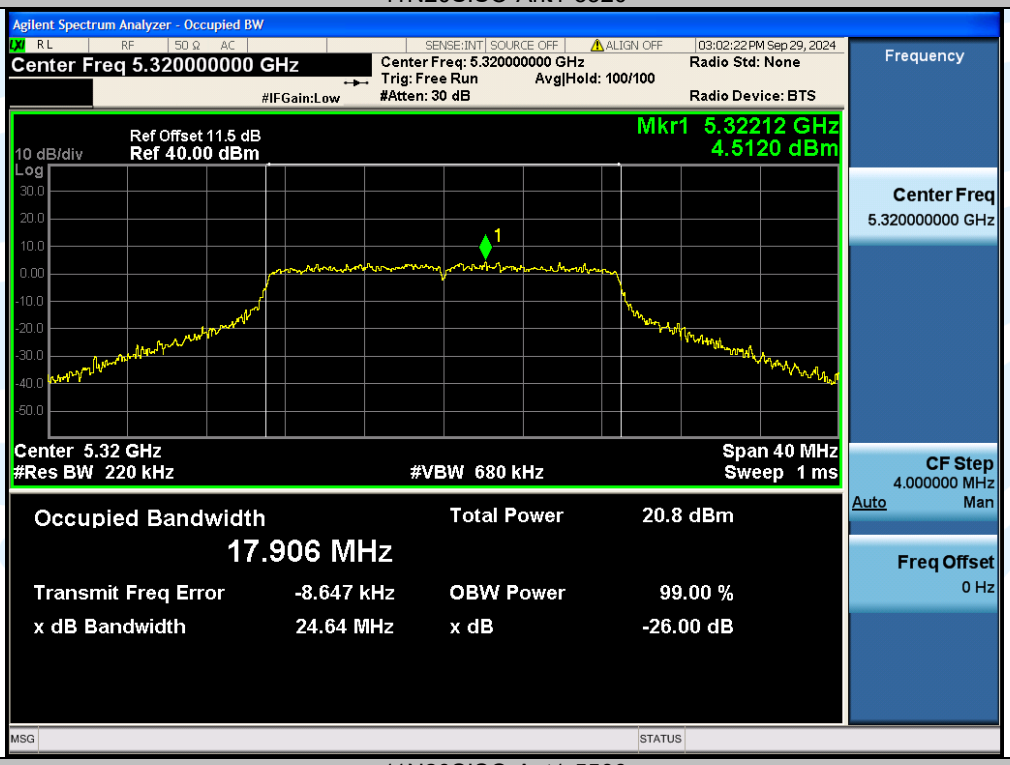

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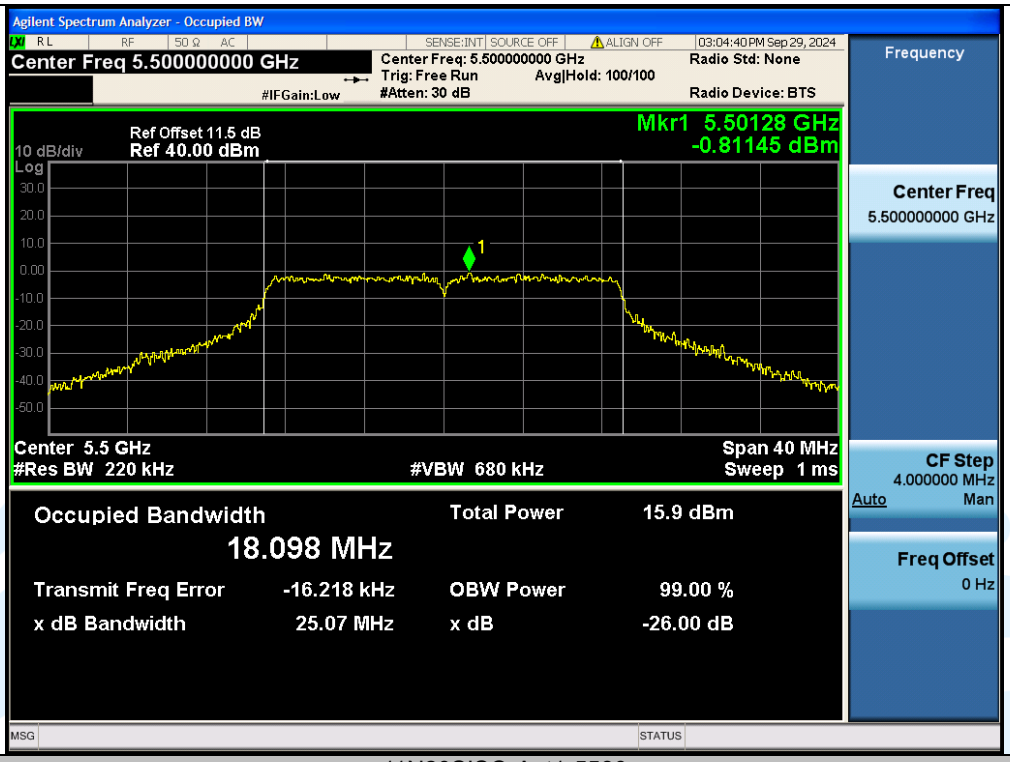

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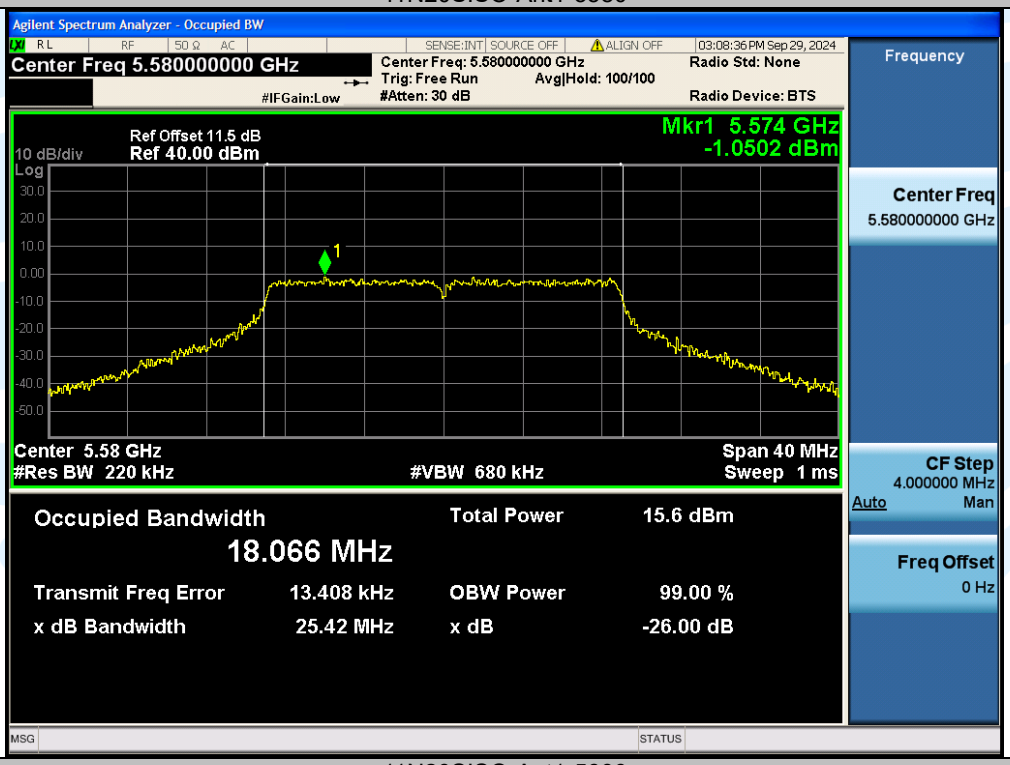

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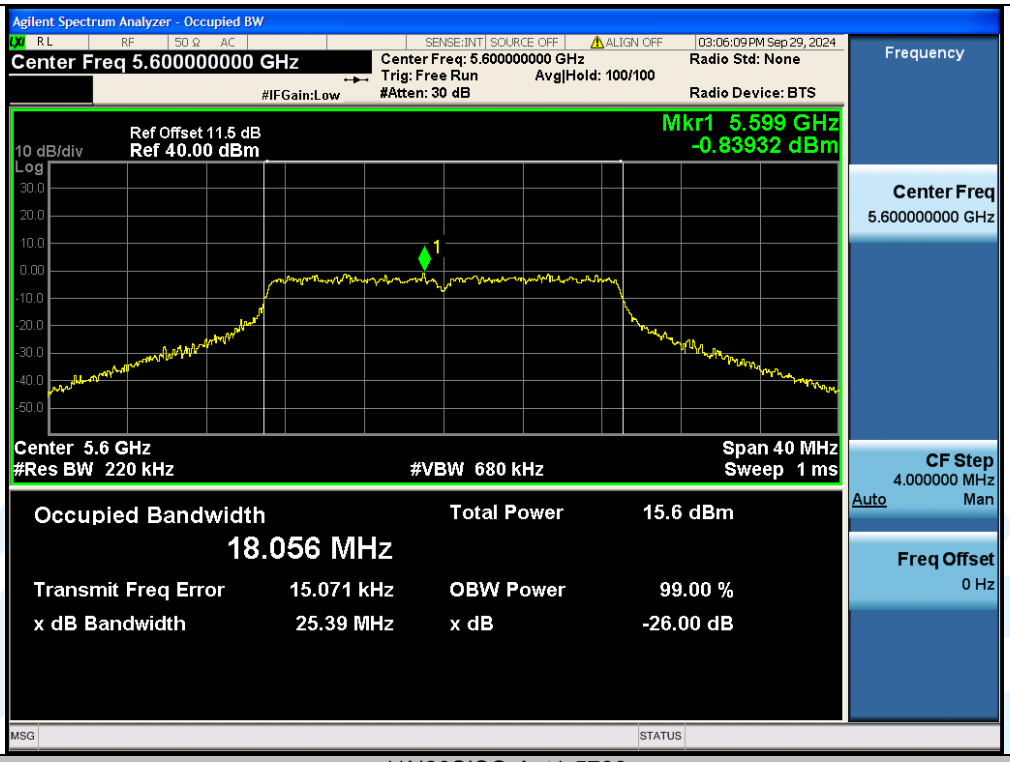

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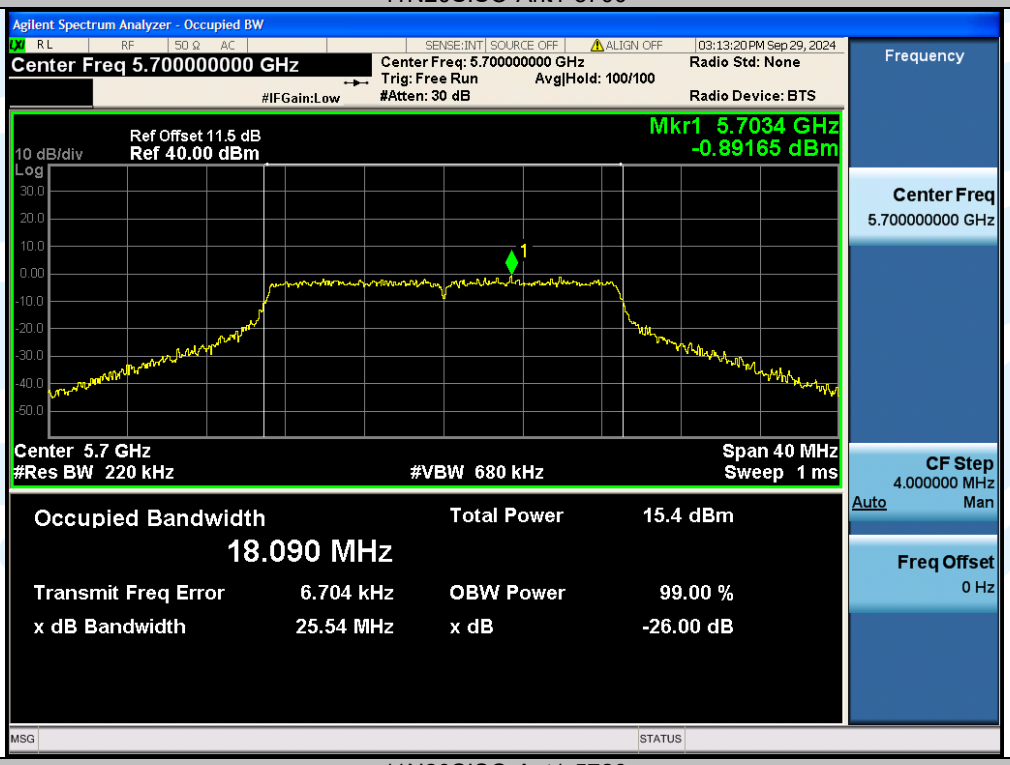

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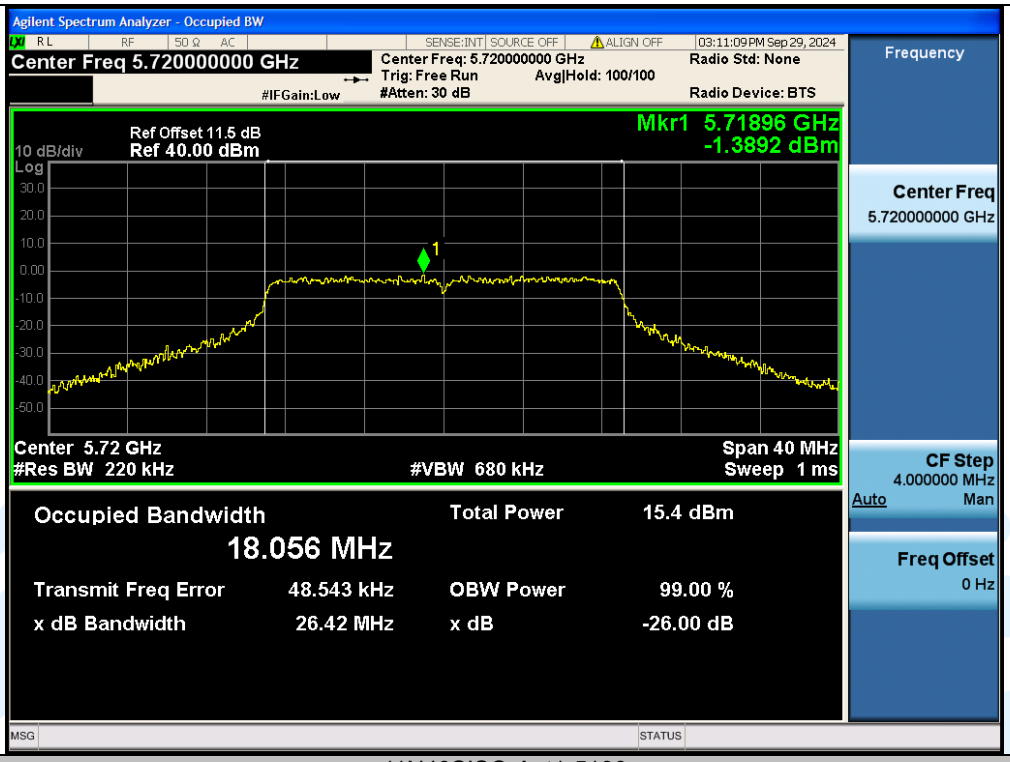

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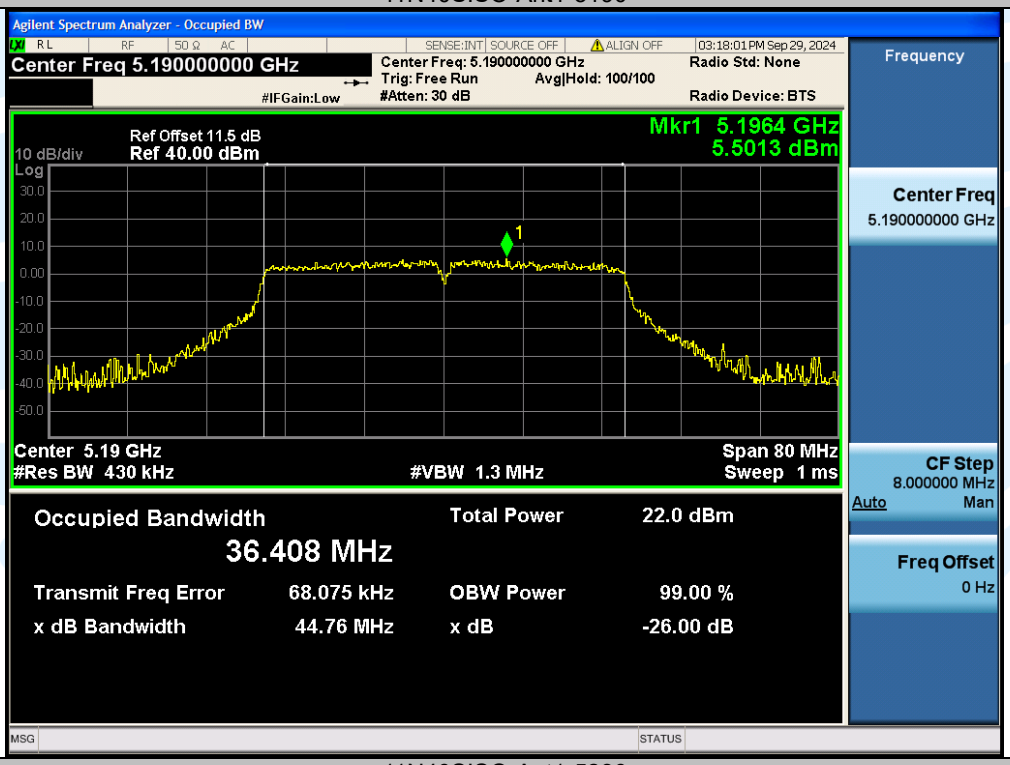

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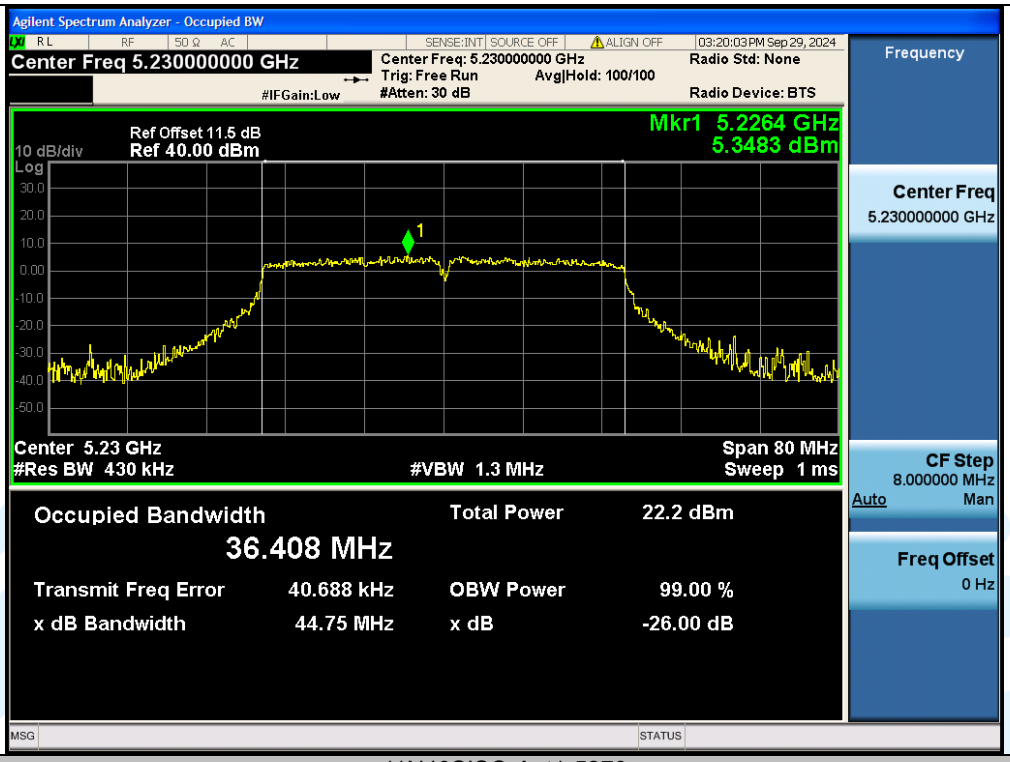

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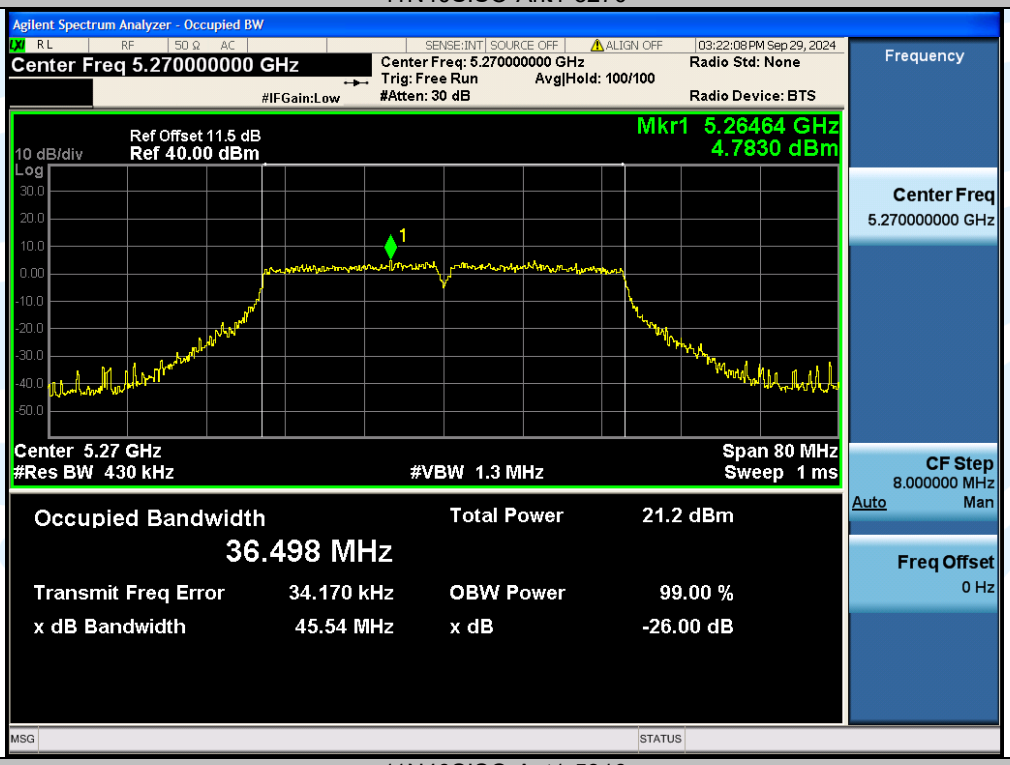

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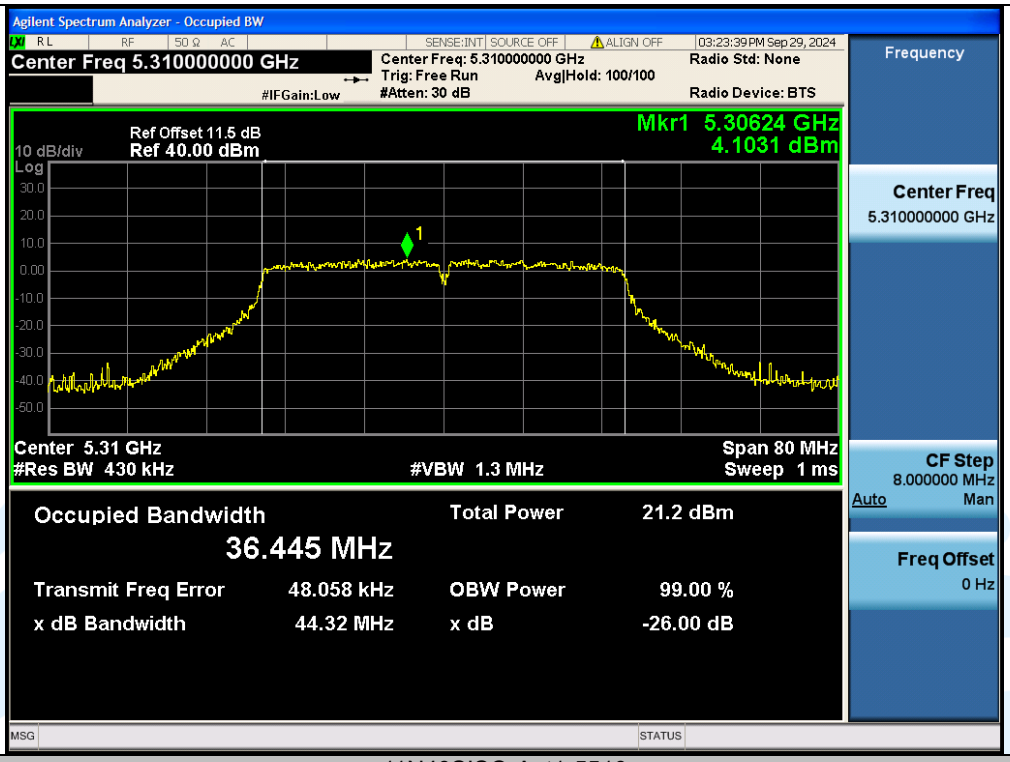

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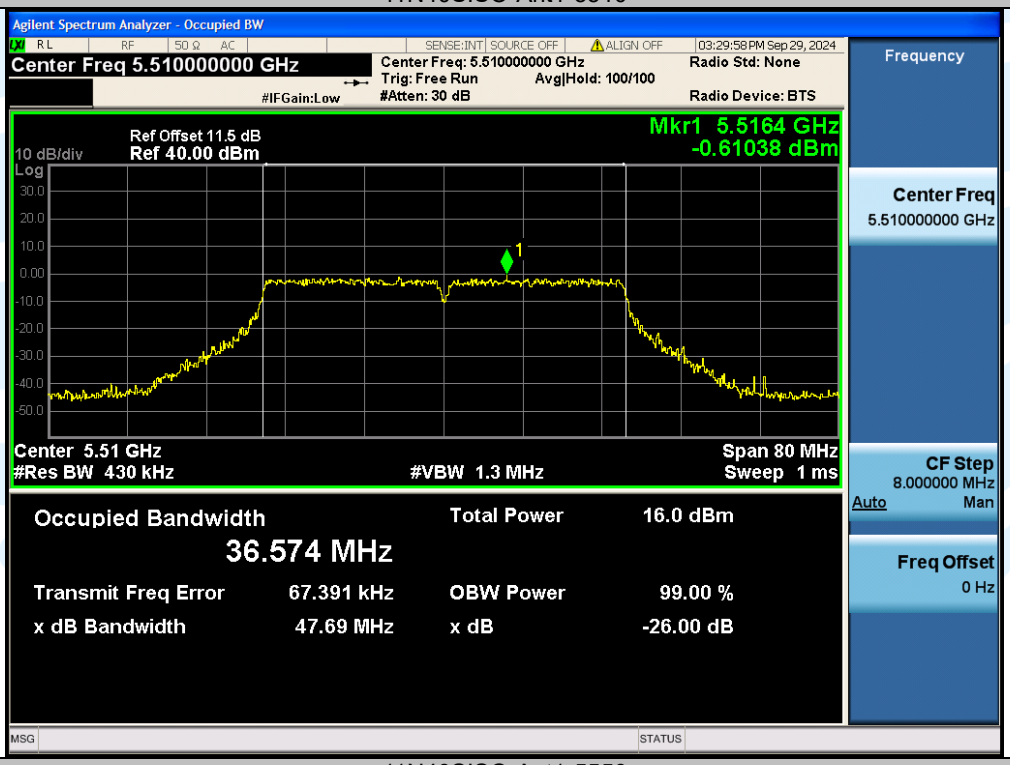

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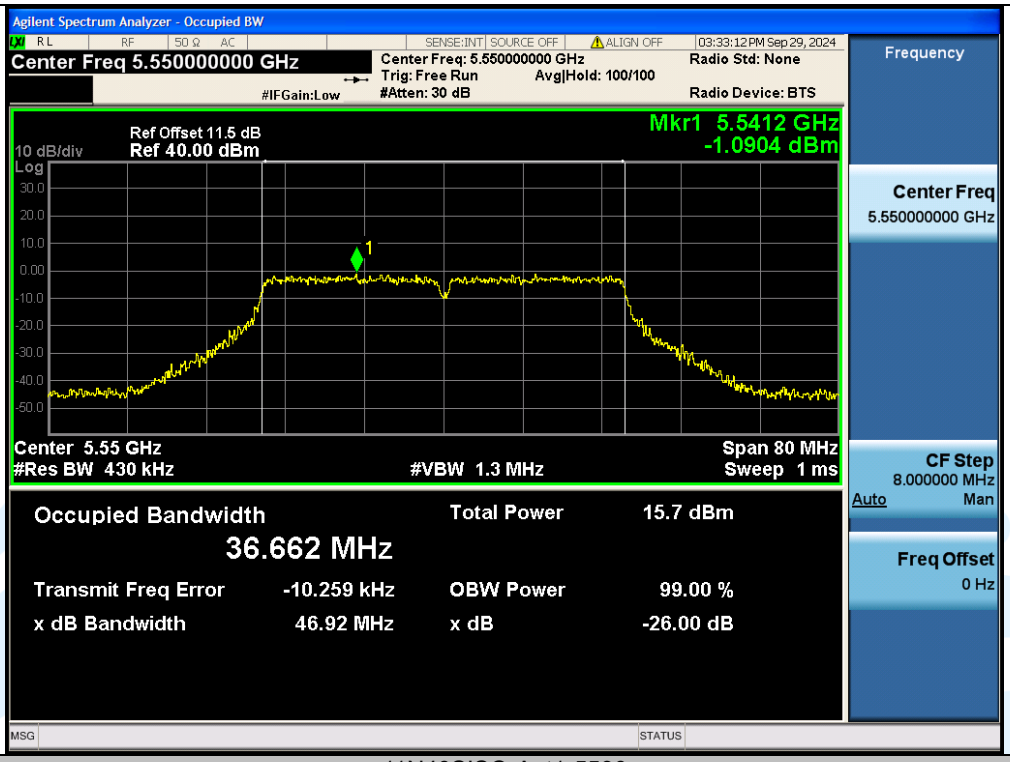

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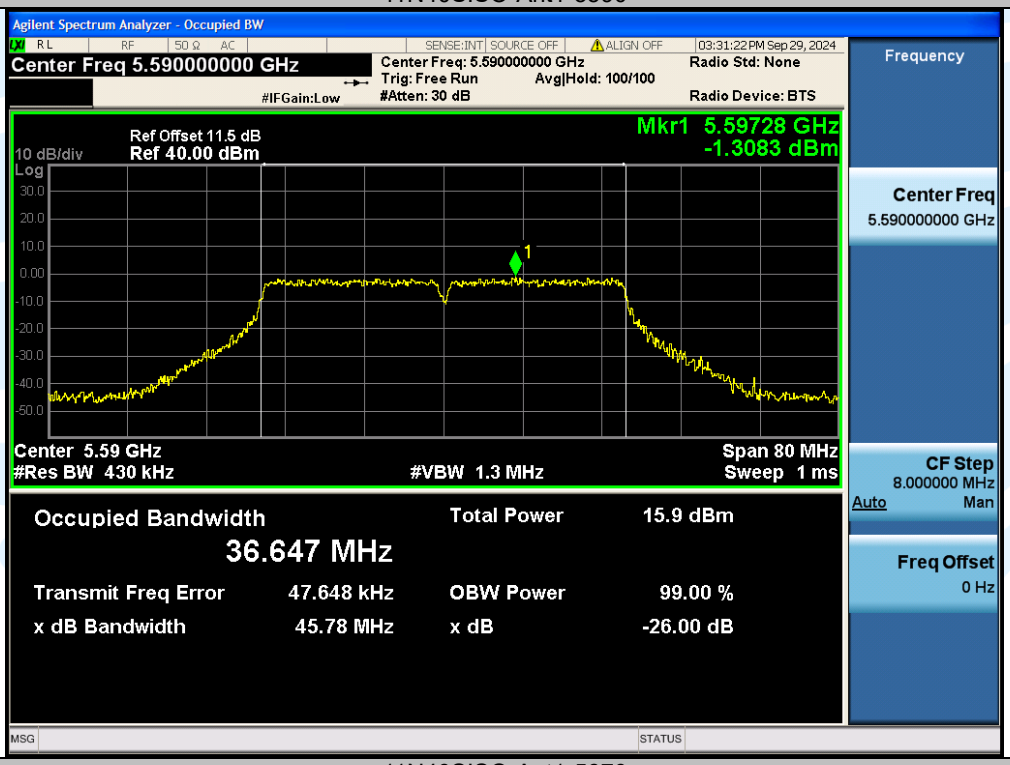

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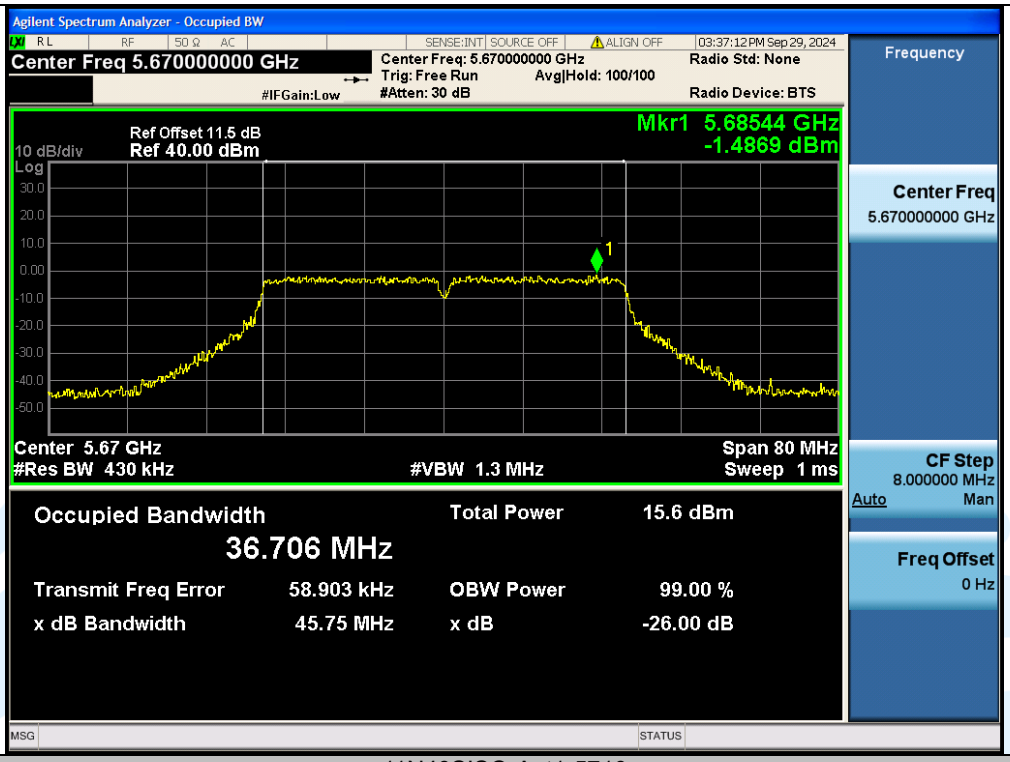
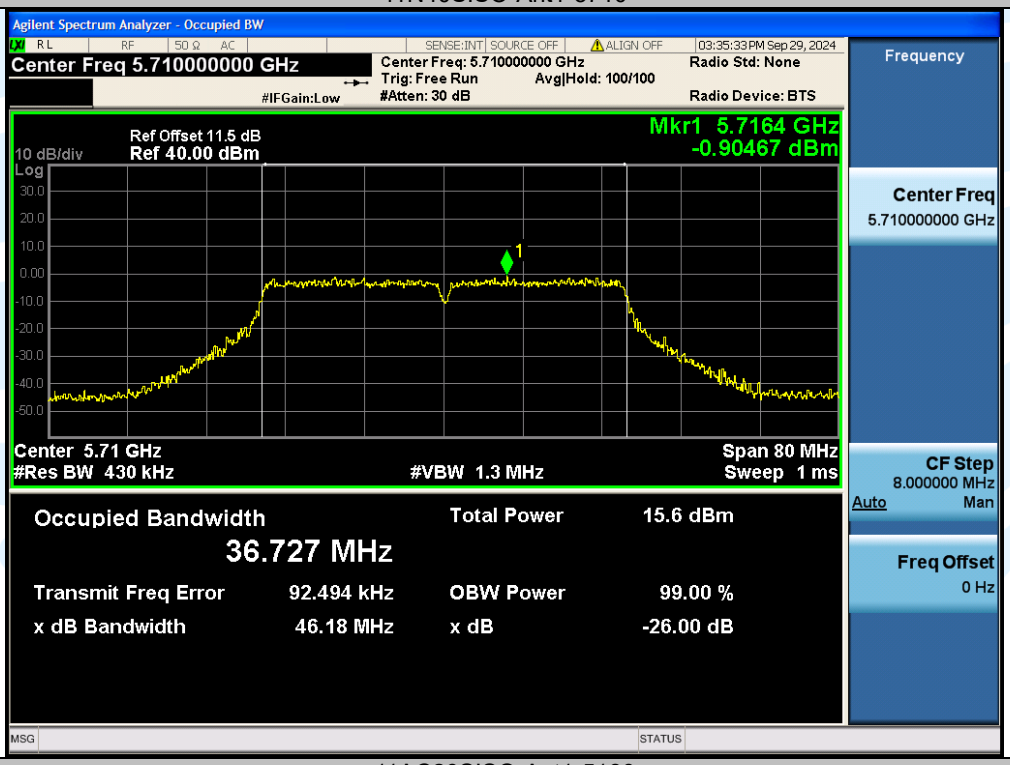


11N40SISO-Ant1-5710



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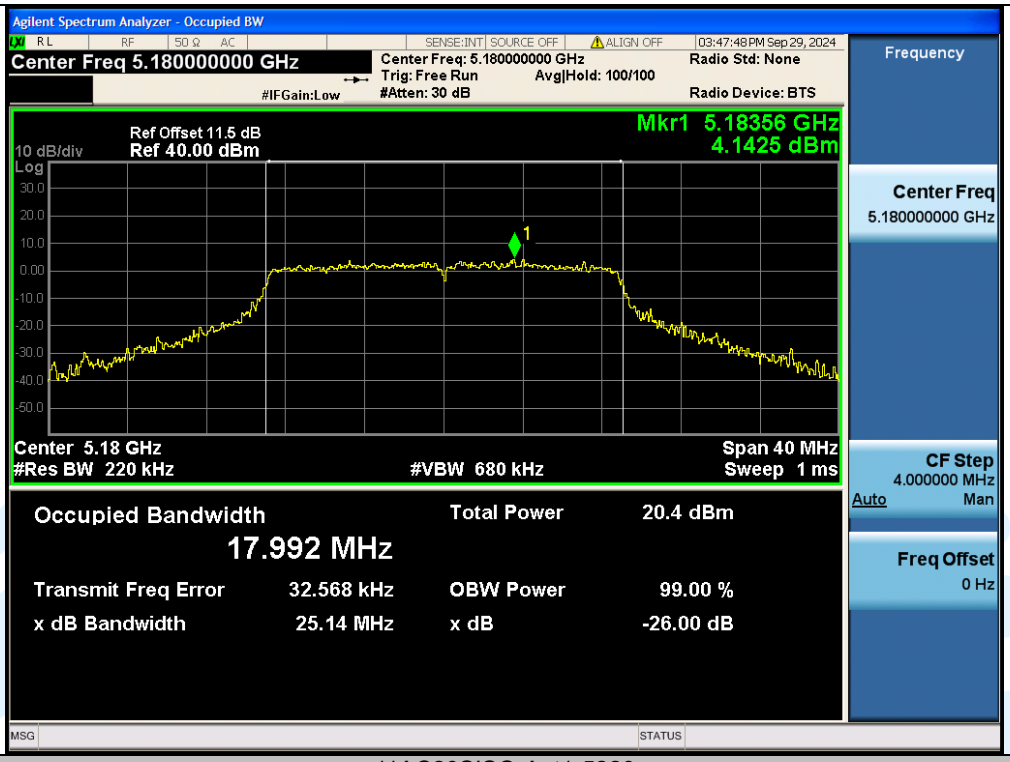

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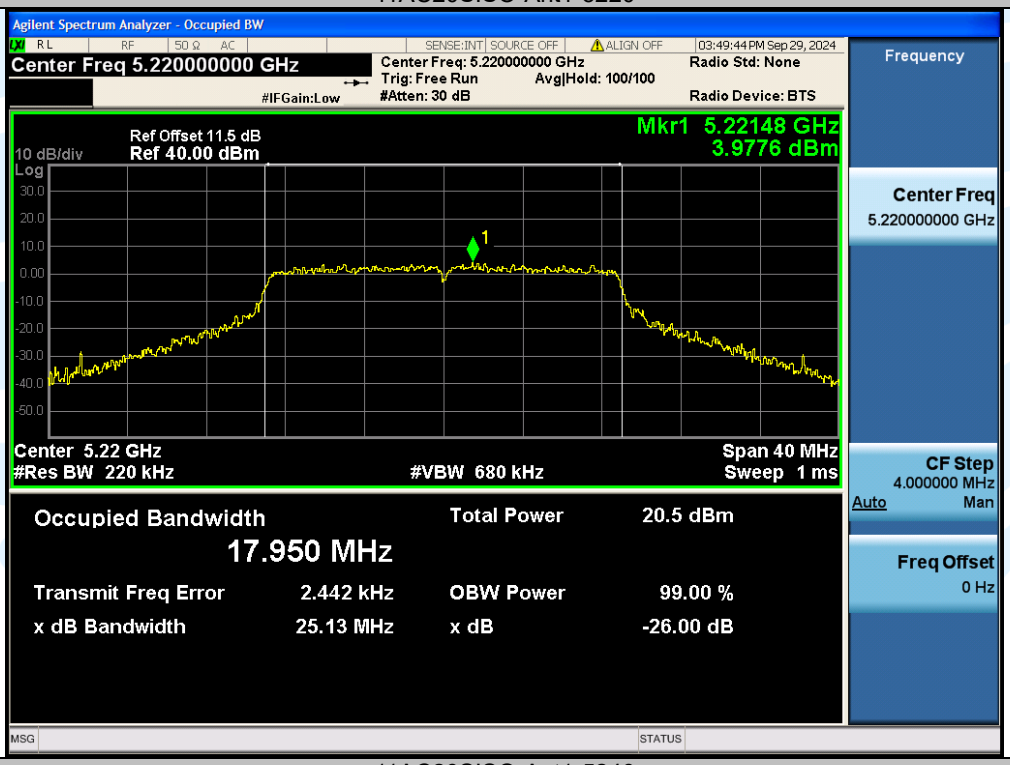

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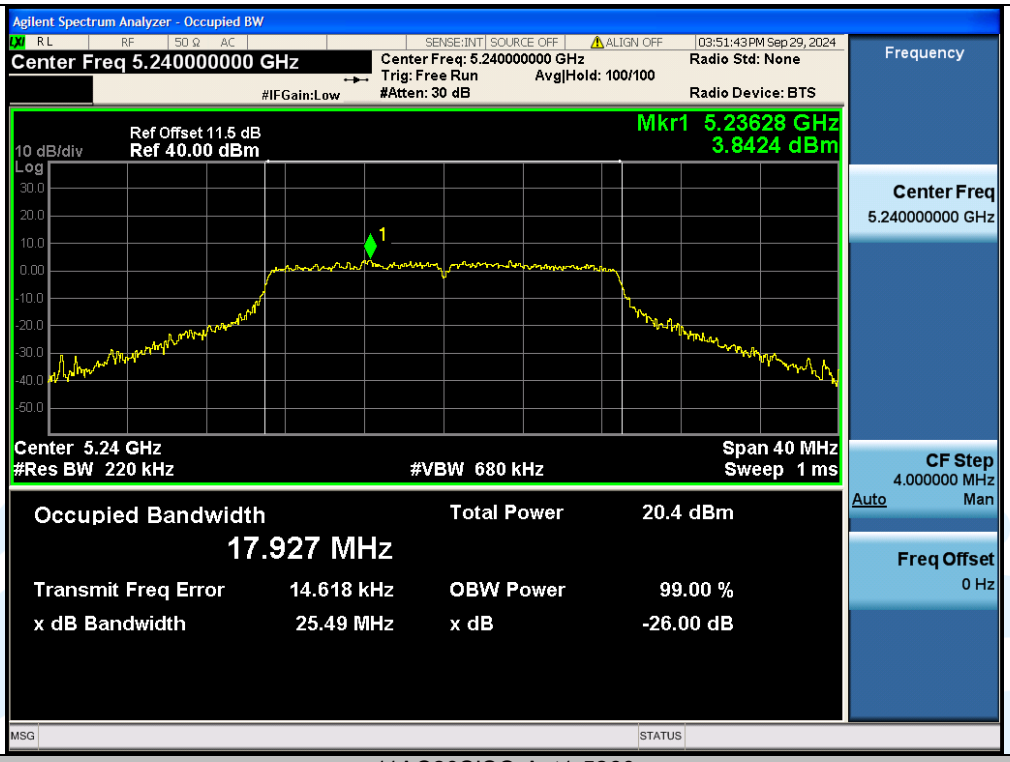

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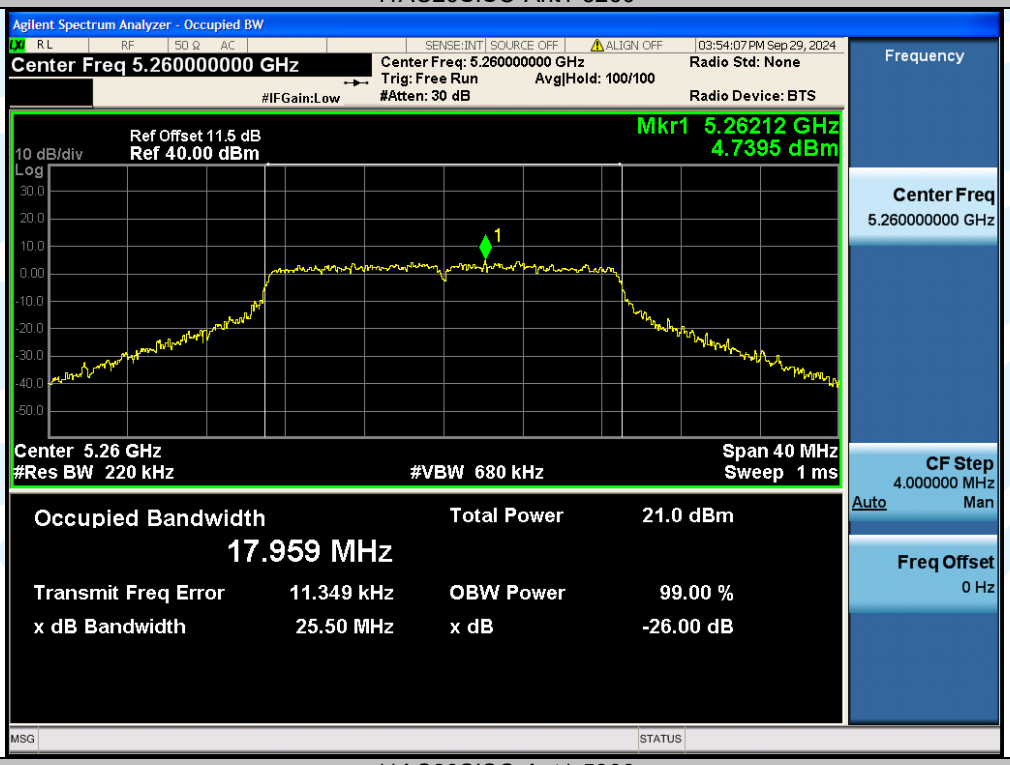

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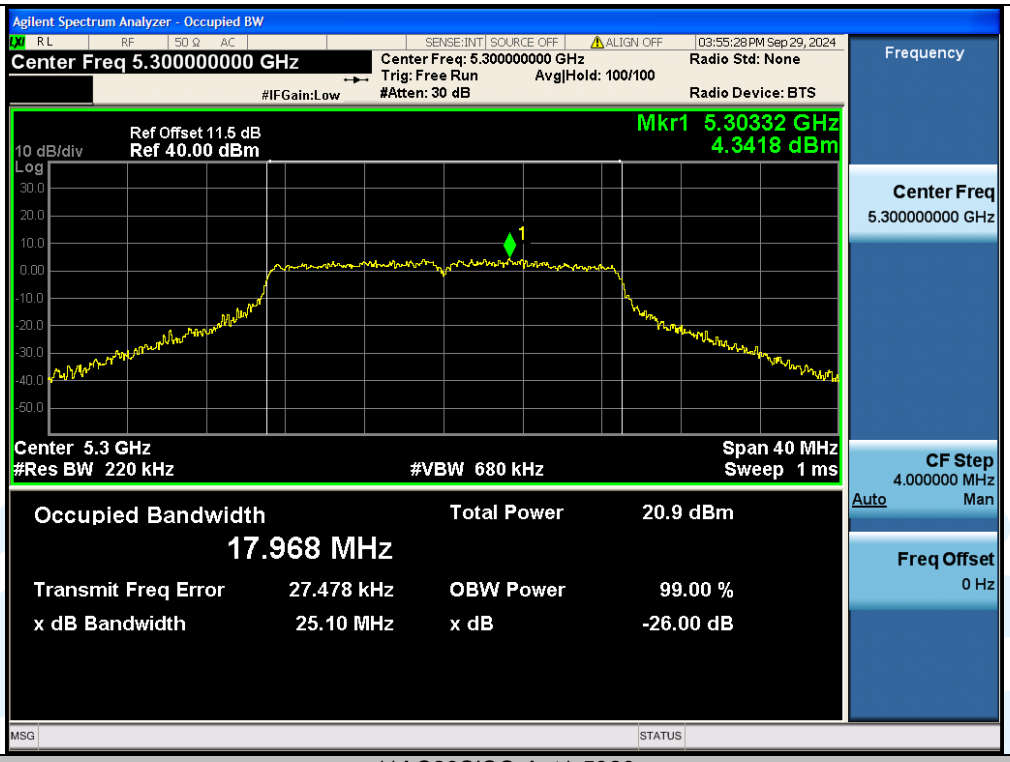

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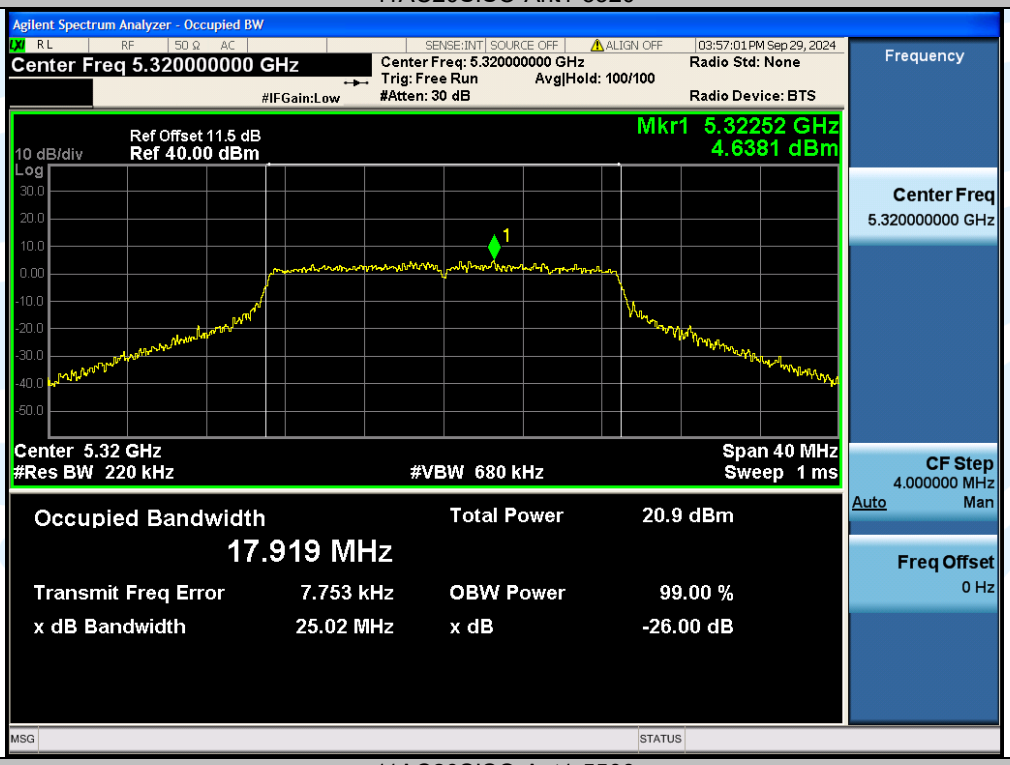

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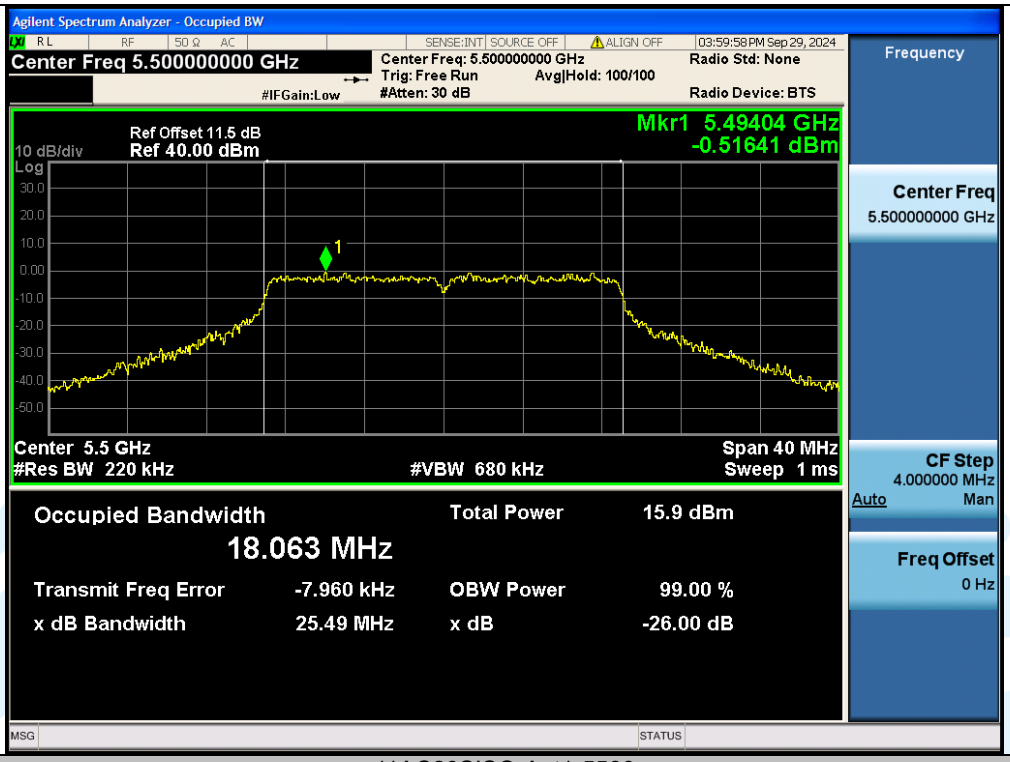

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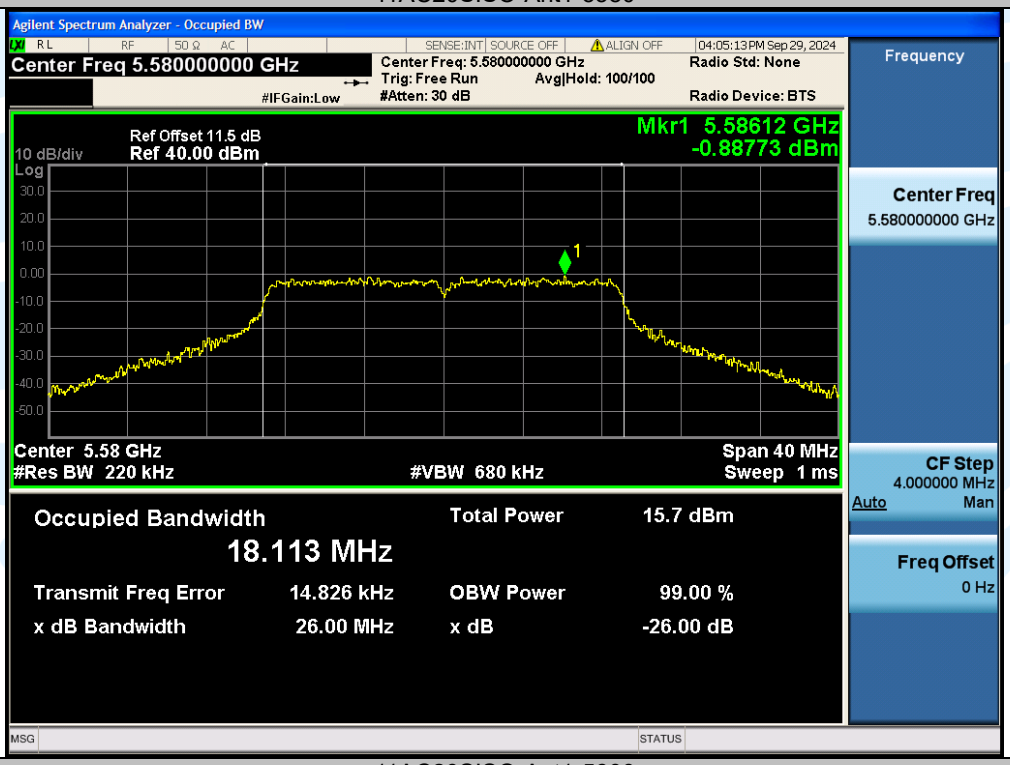

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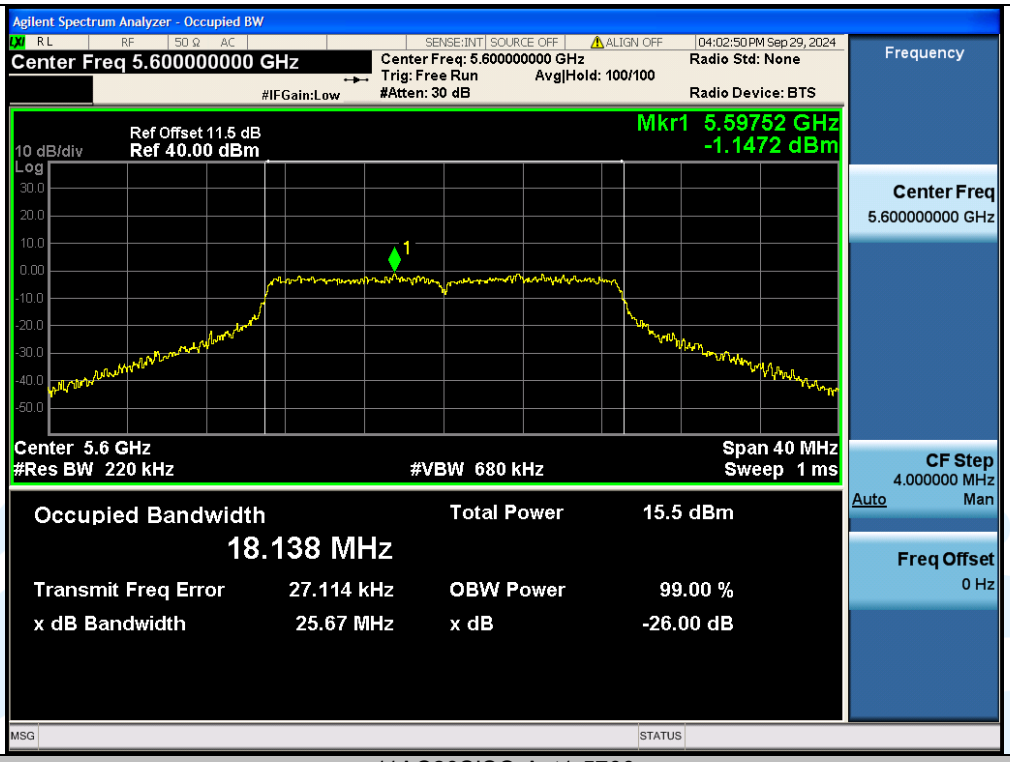

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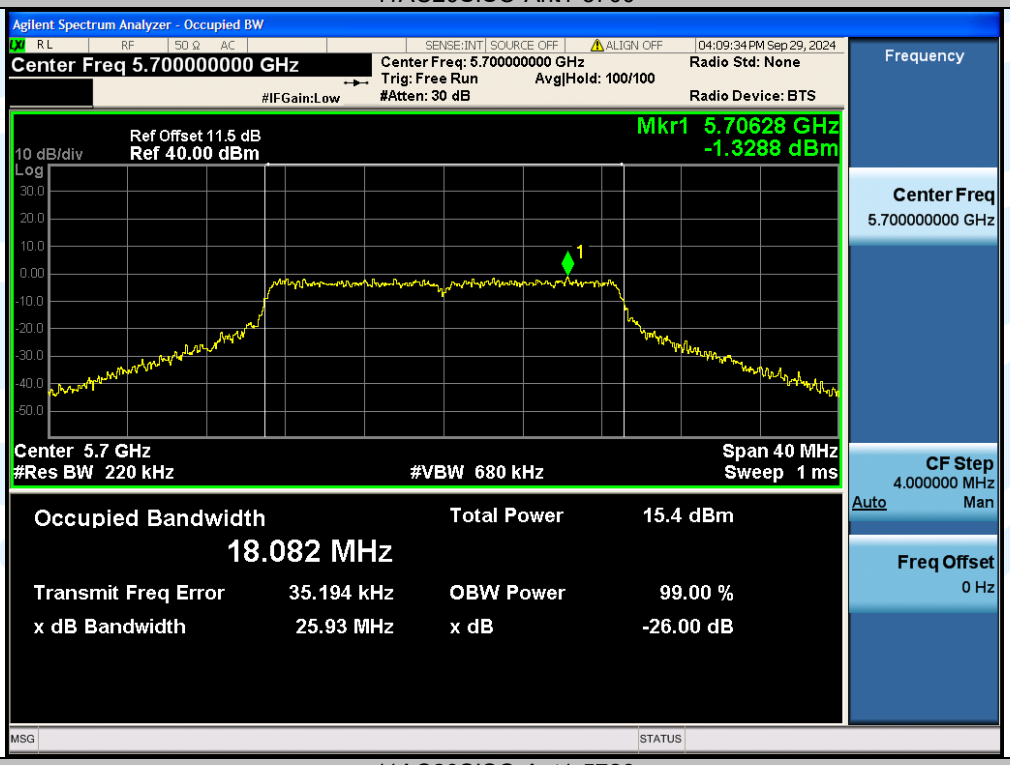

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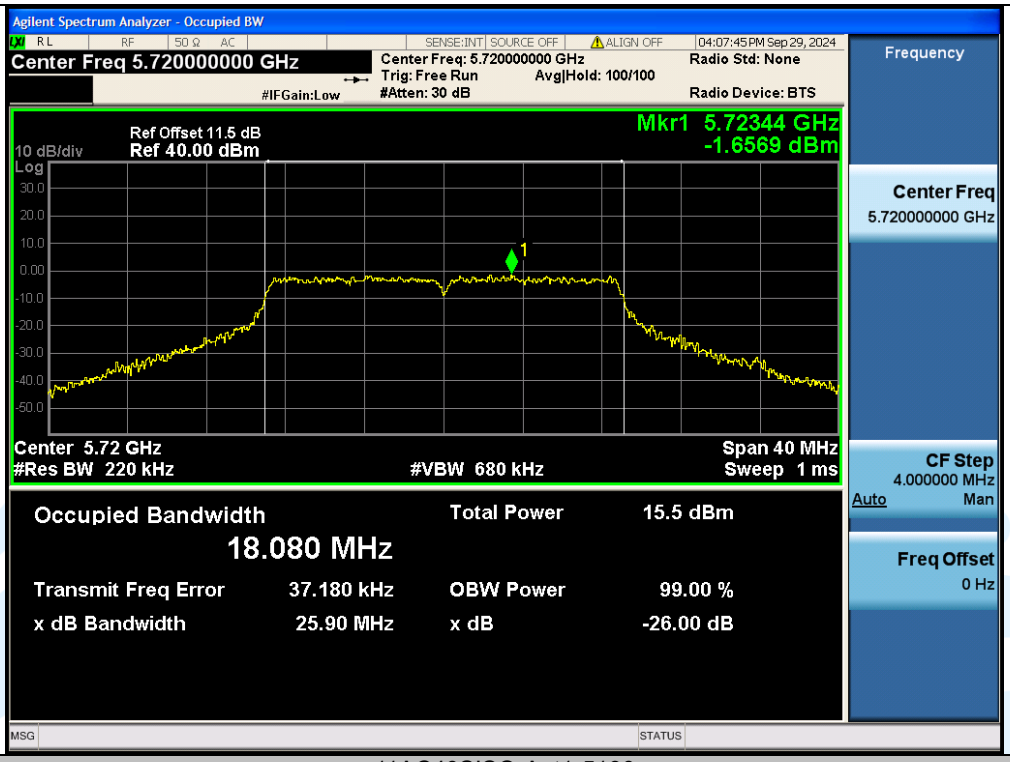

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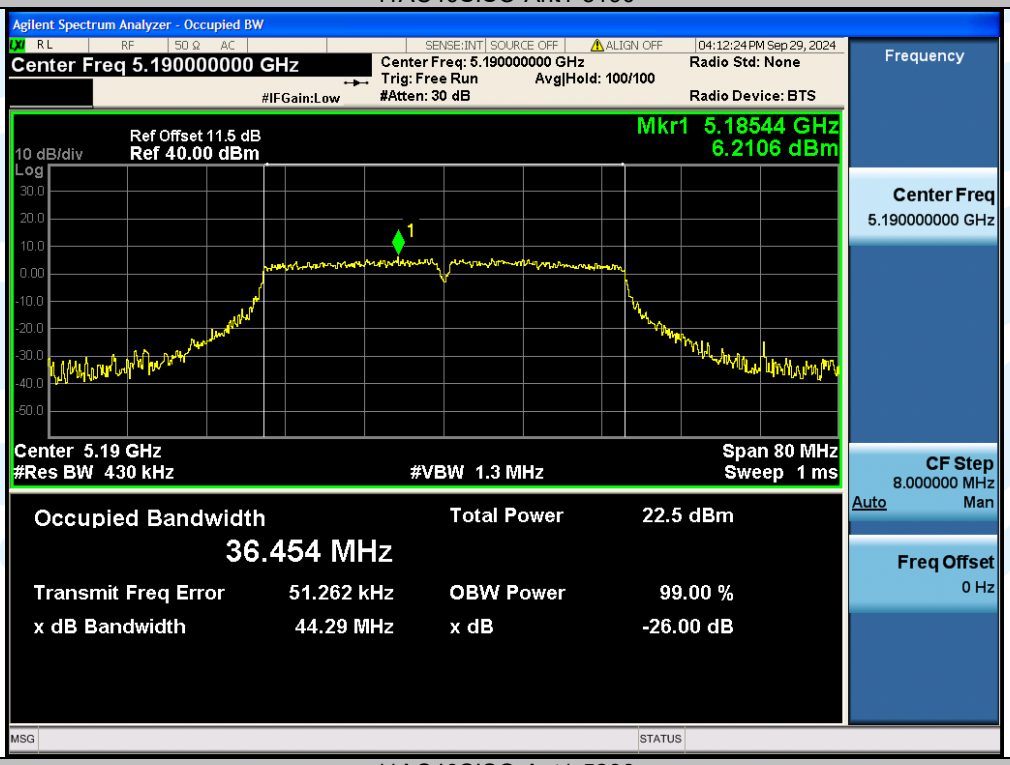
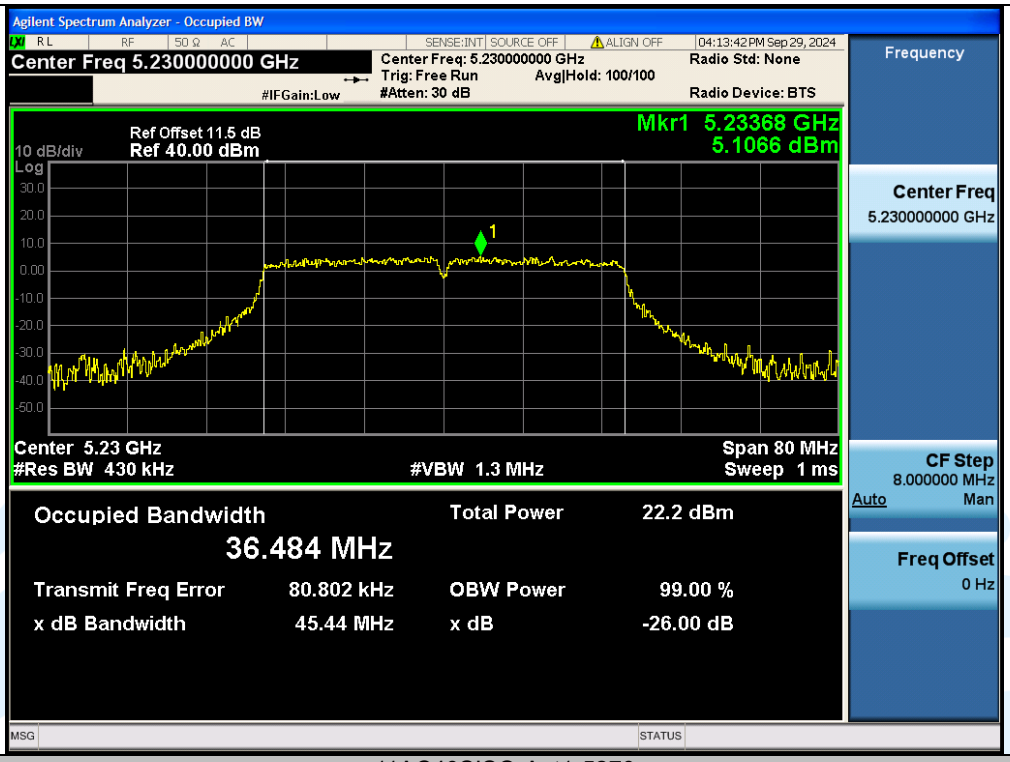
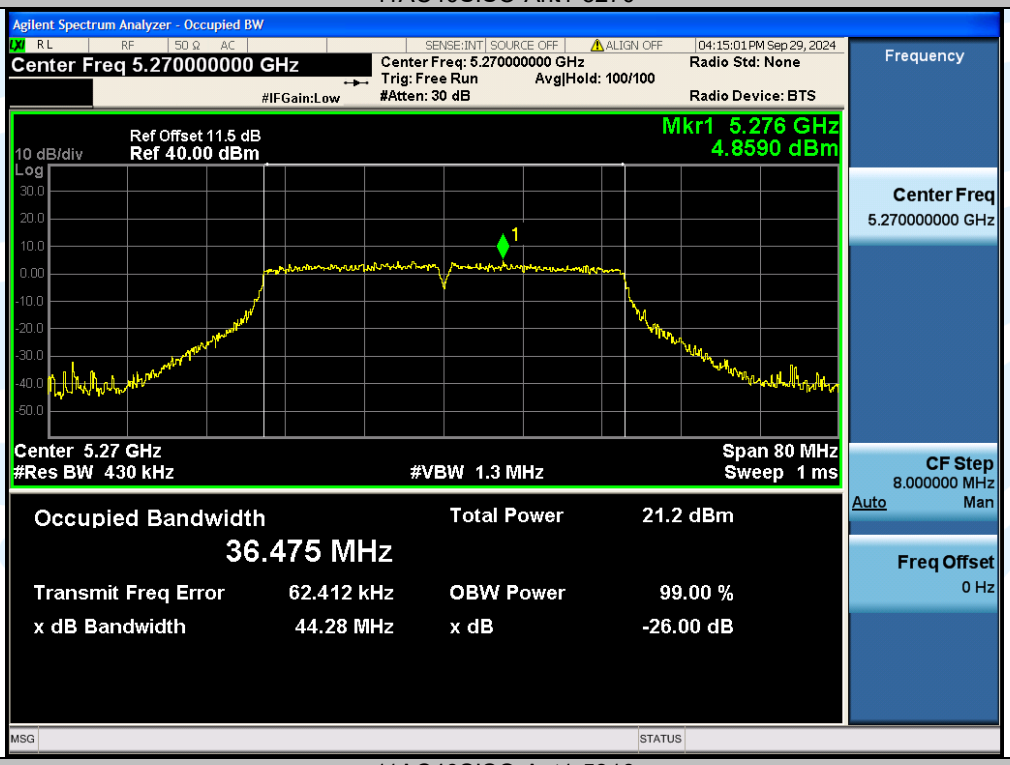


11AC40SISO-Ant1-5230



11AC40SISO-Ant1-5270



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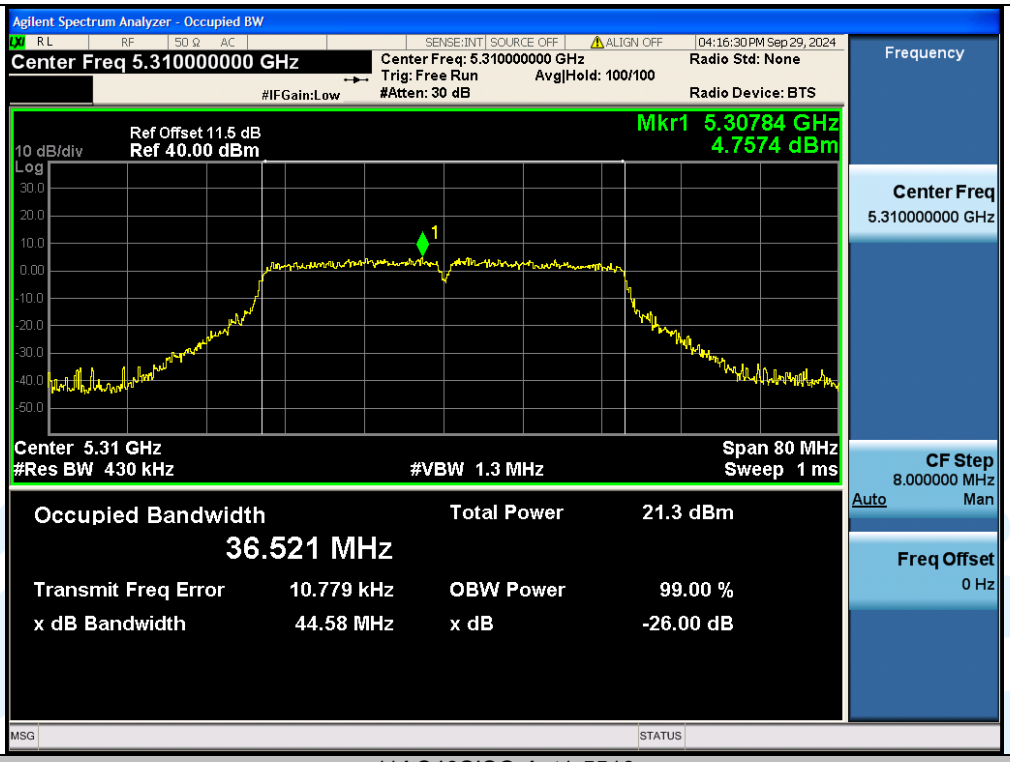

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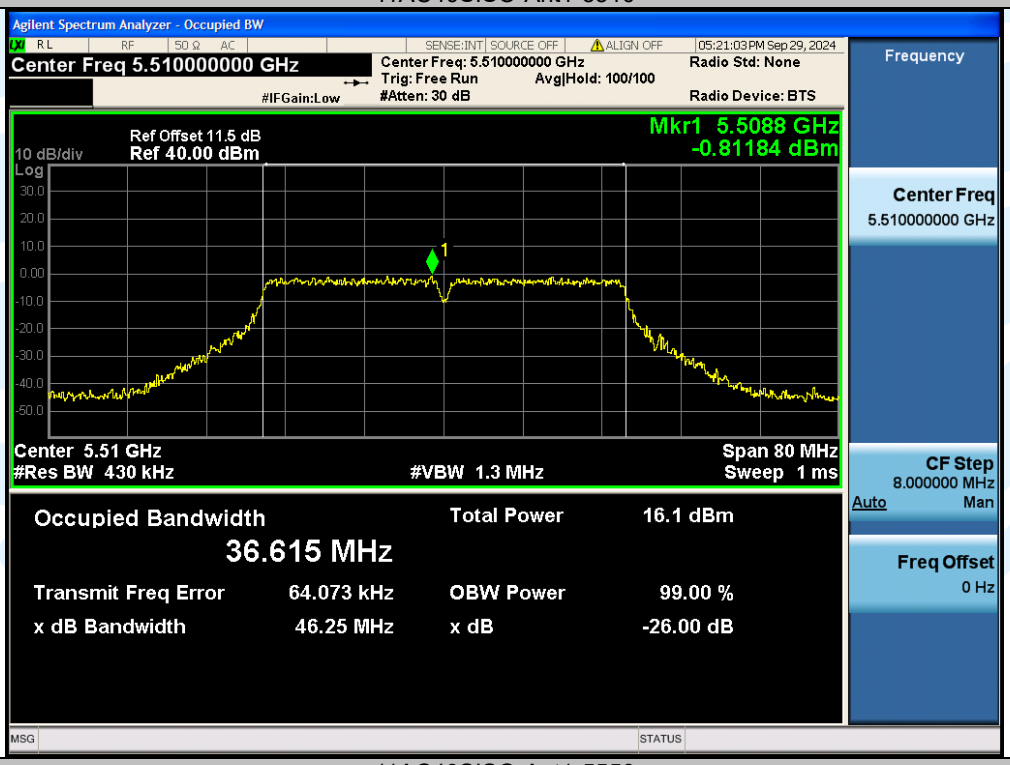

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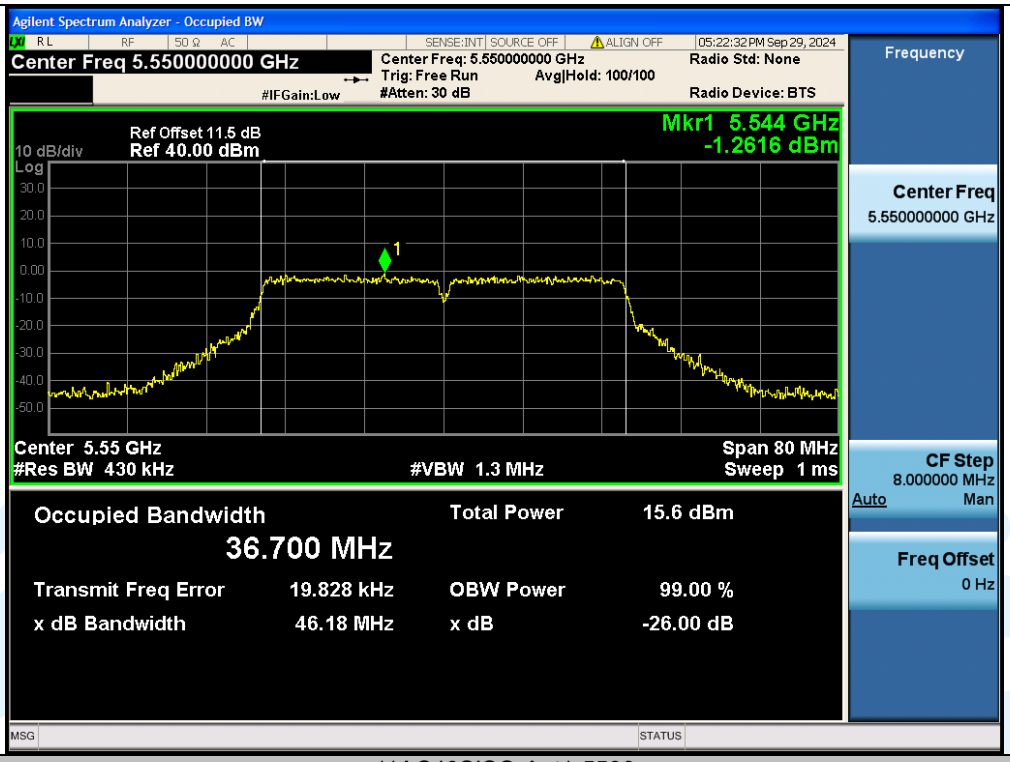
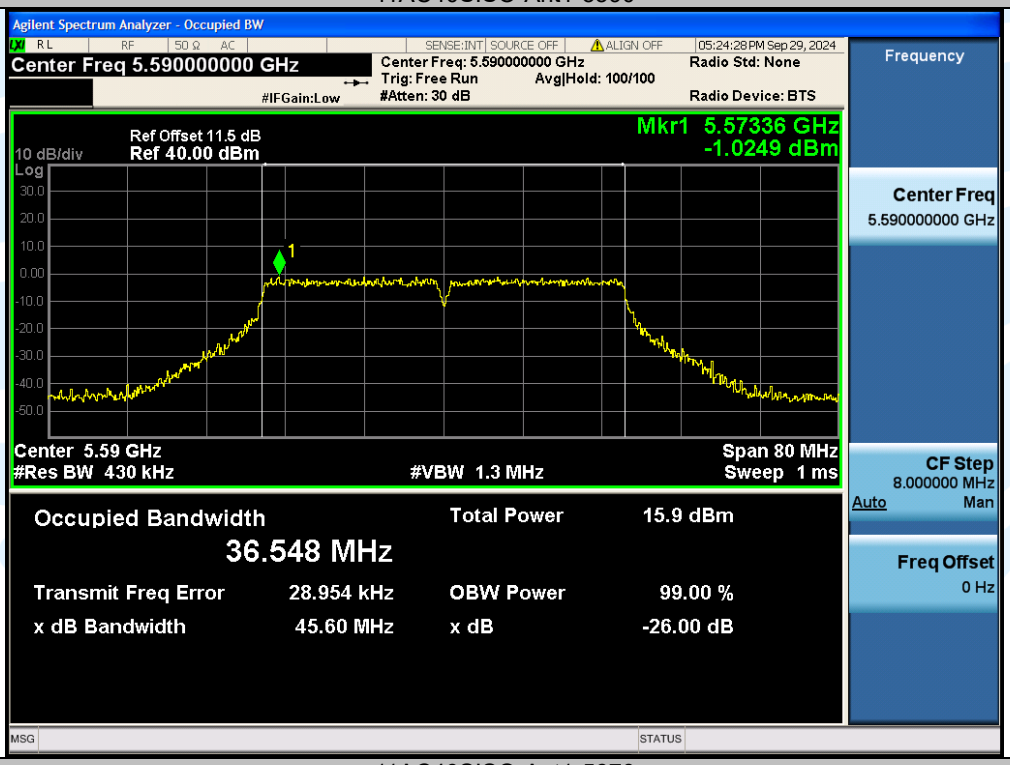


11AC40SISO-Ant1-5590



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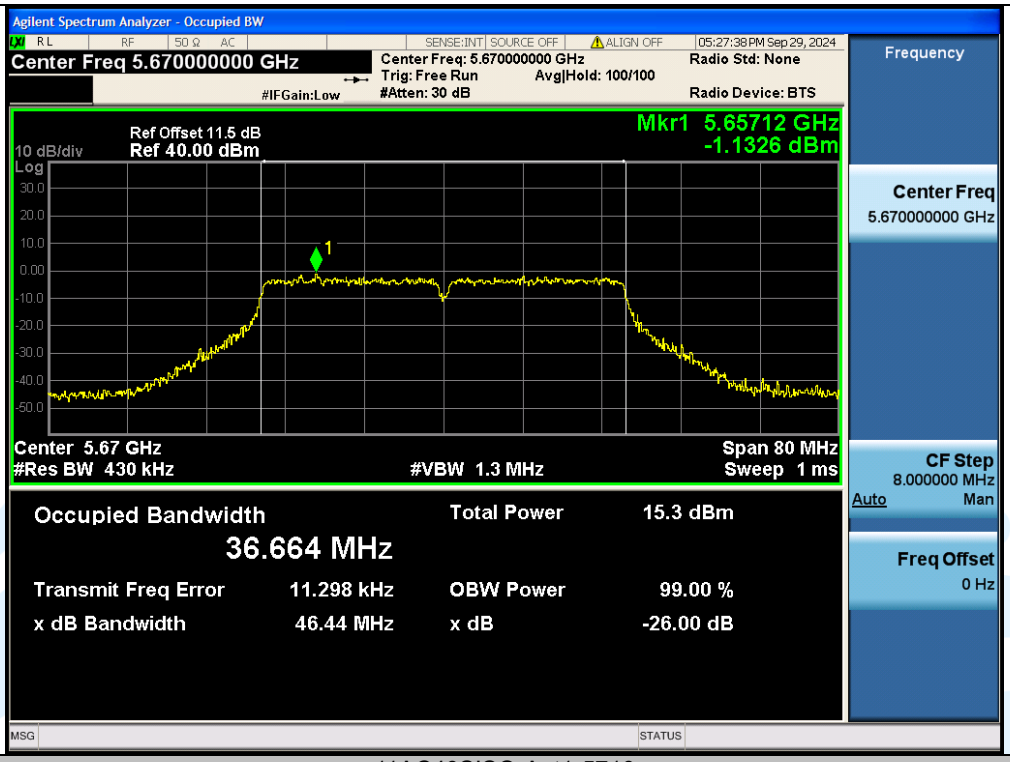
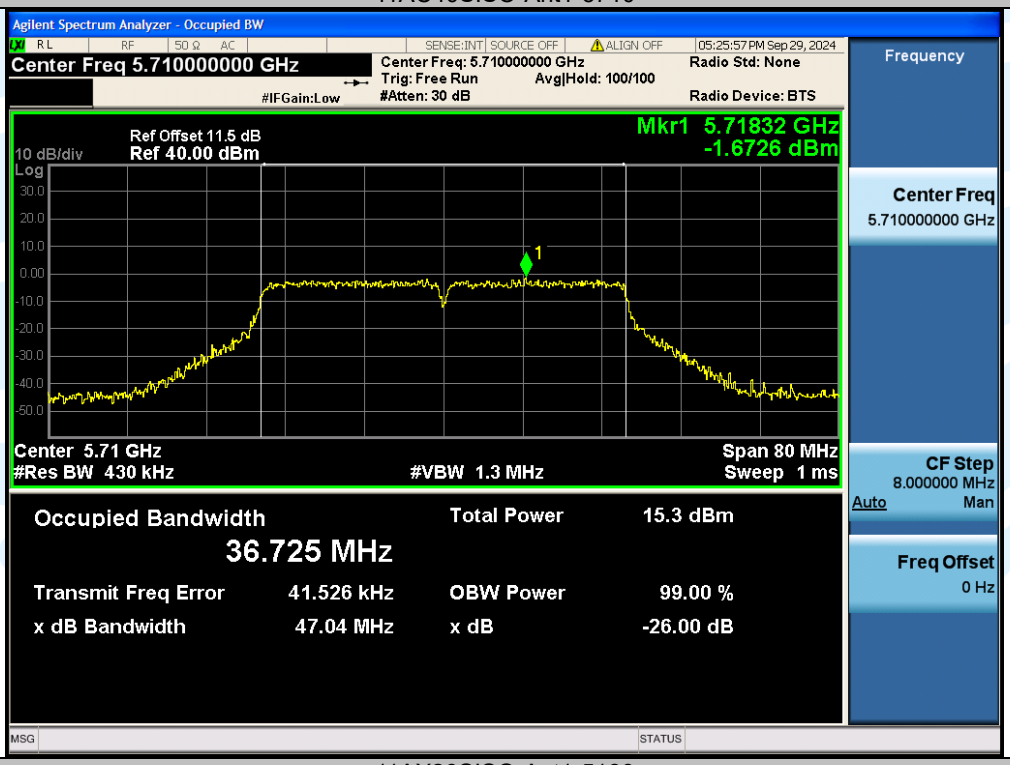
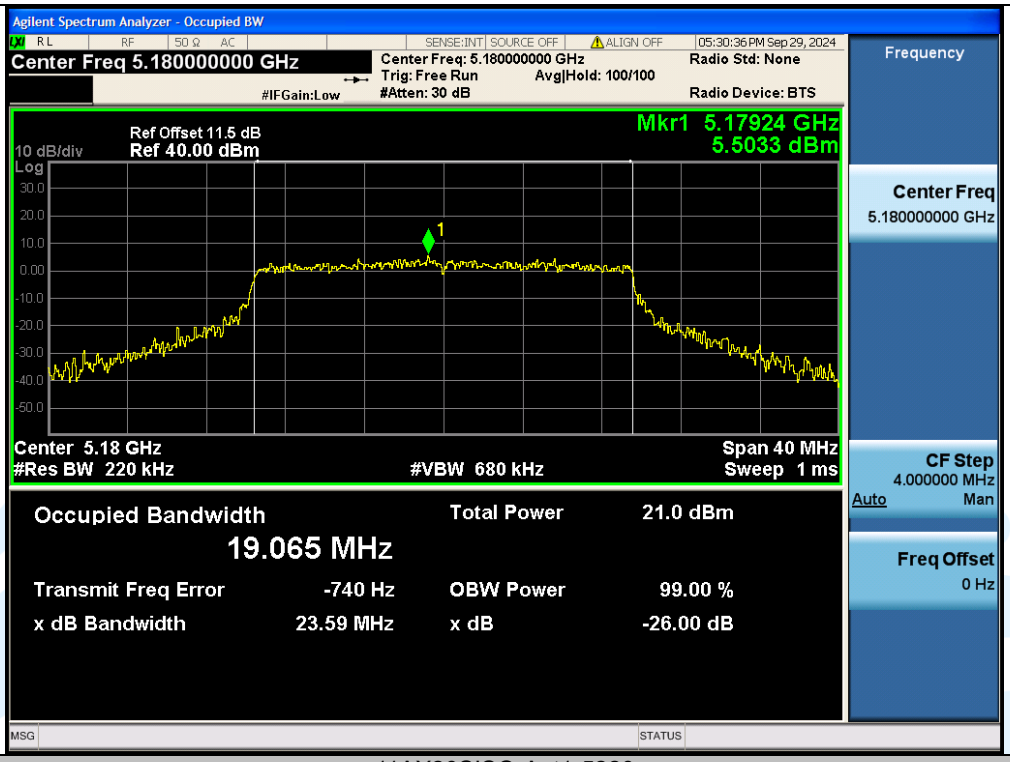


11AC40SISO-Ant1-5710



11AX20SISO-Ant1-5180



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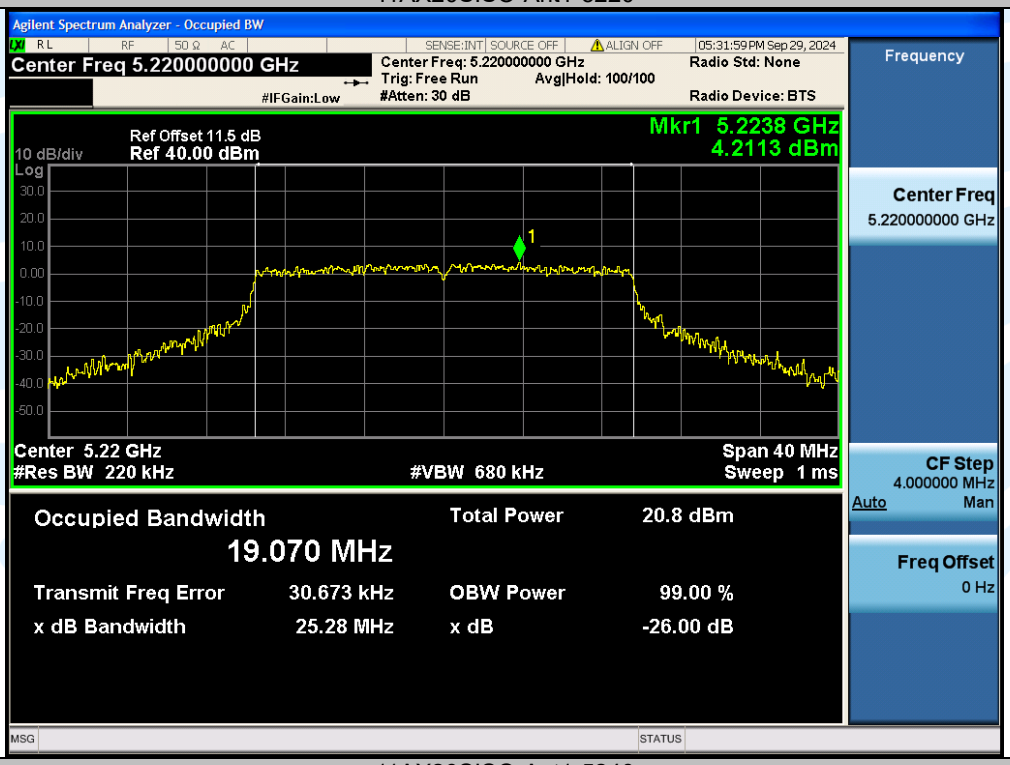

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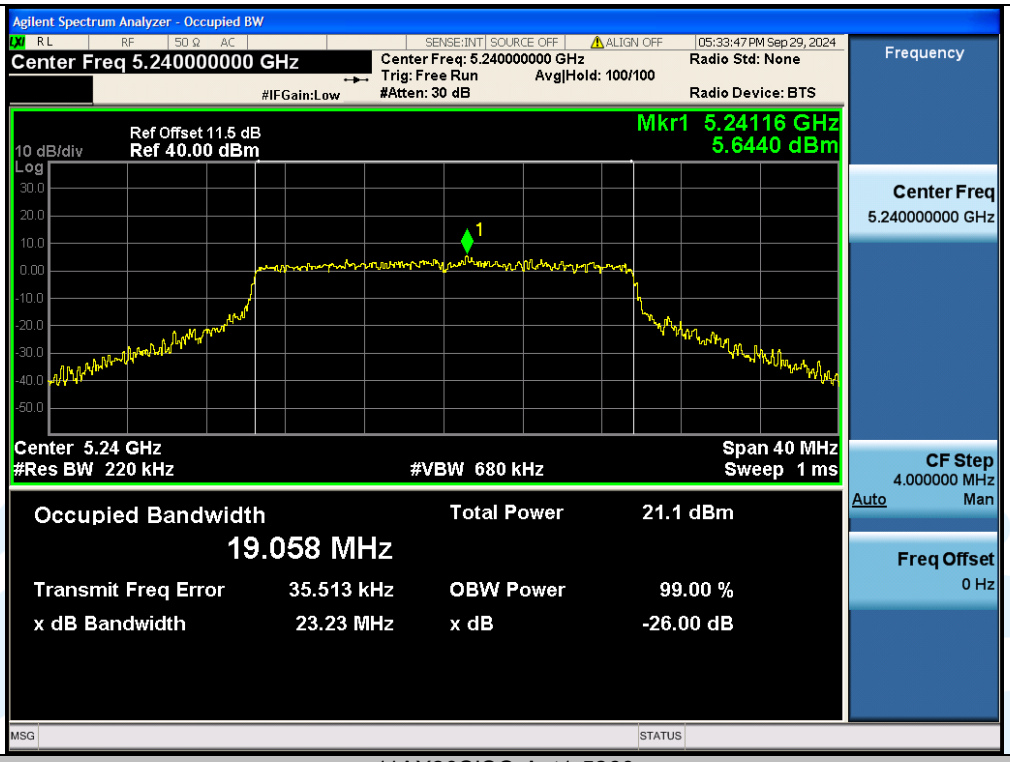

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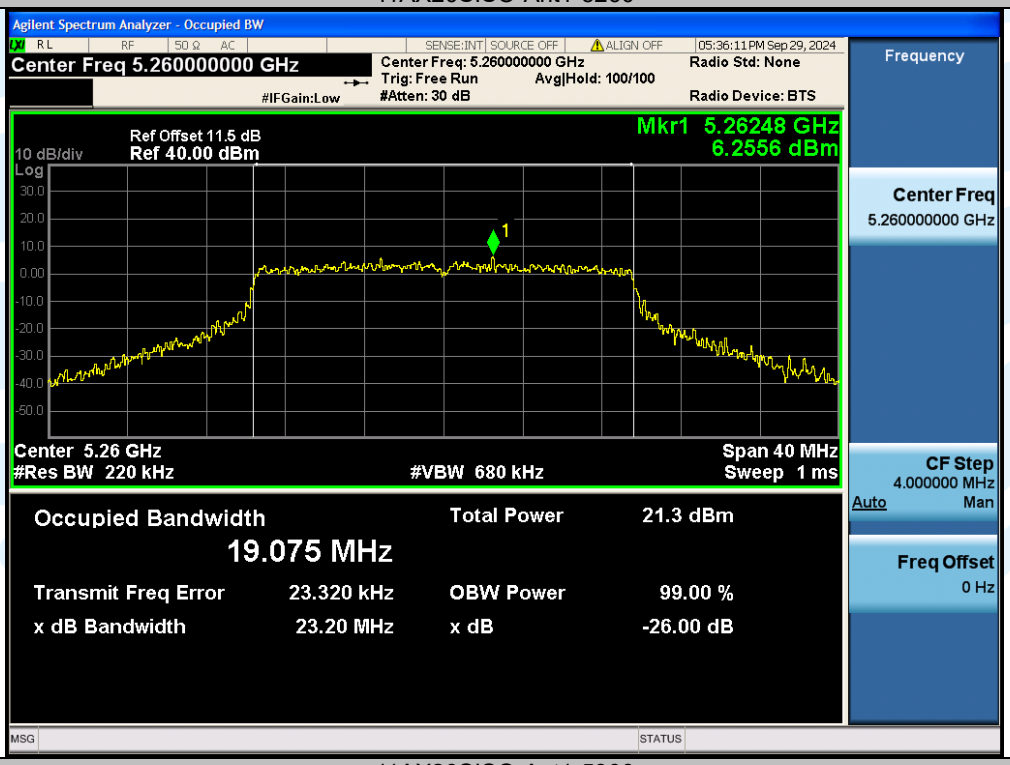

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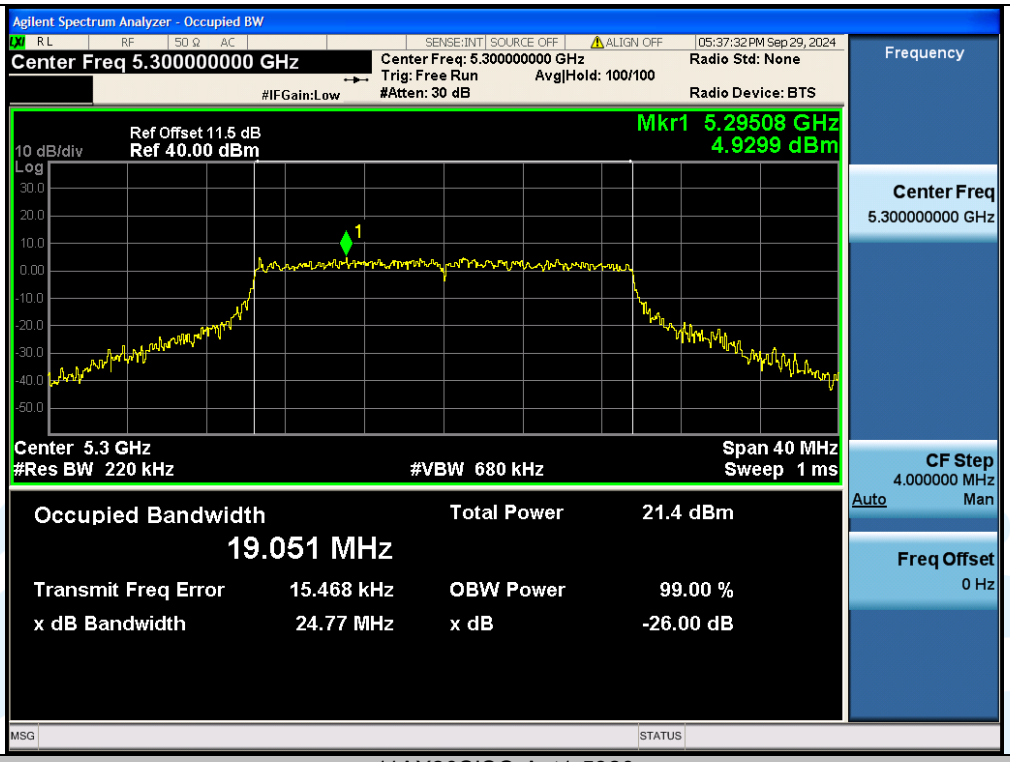

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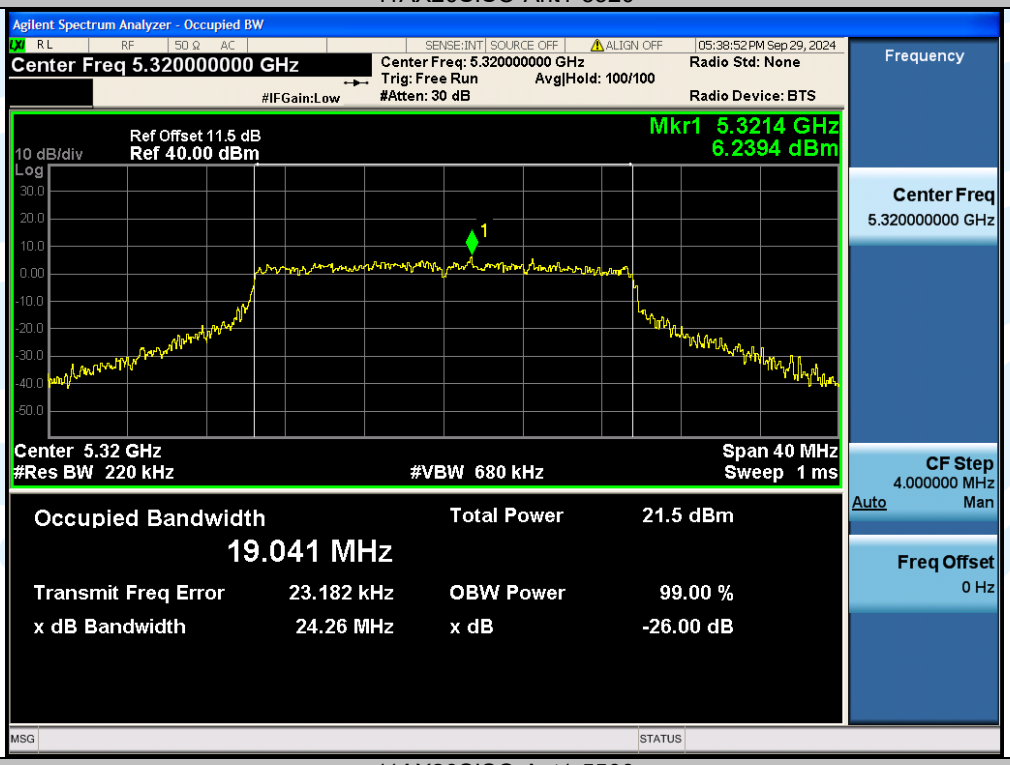
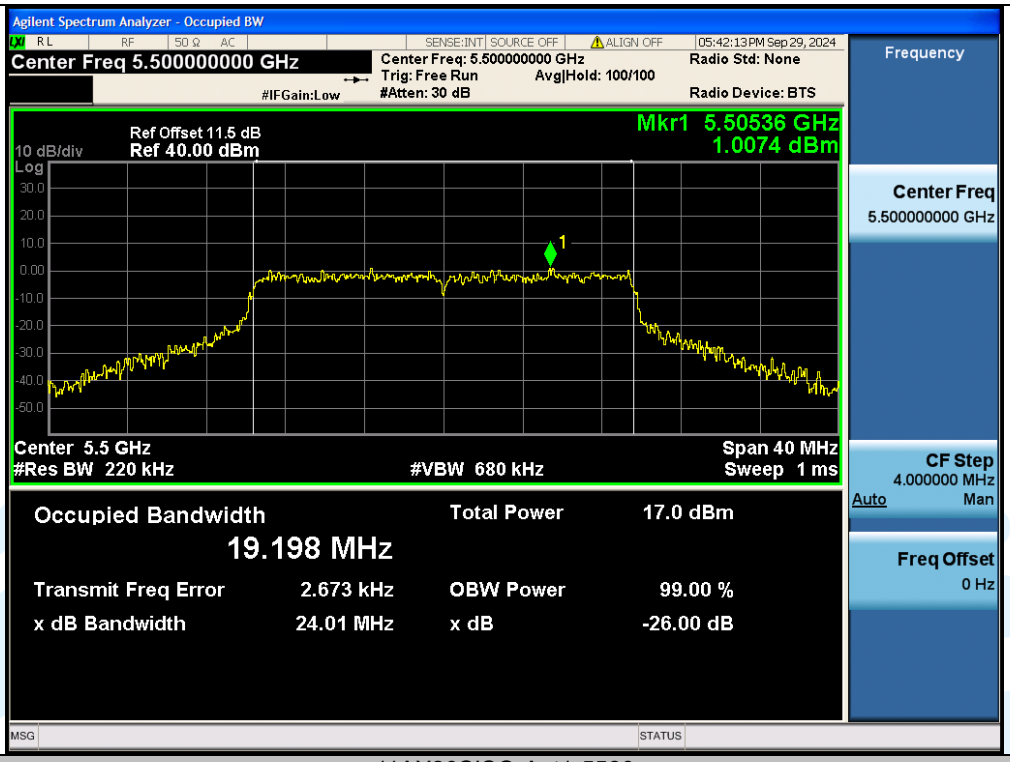
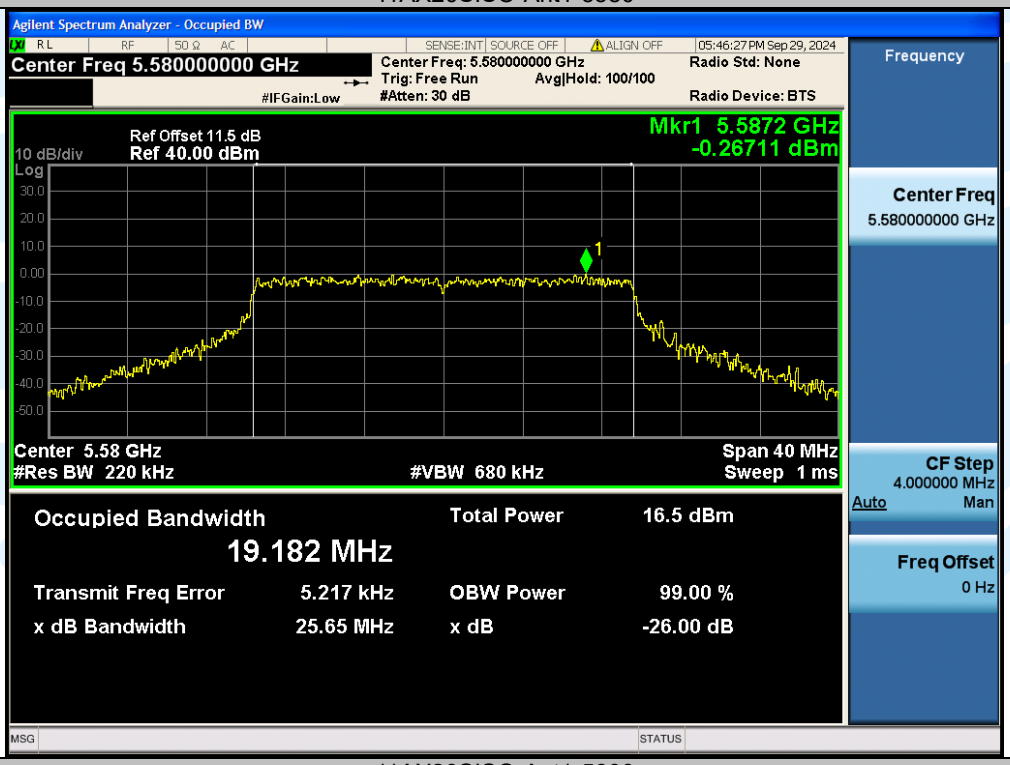


11AX20SISO-Ant1-5500



11AX20SISO-Ant1-5580



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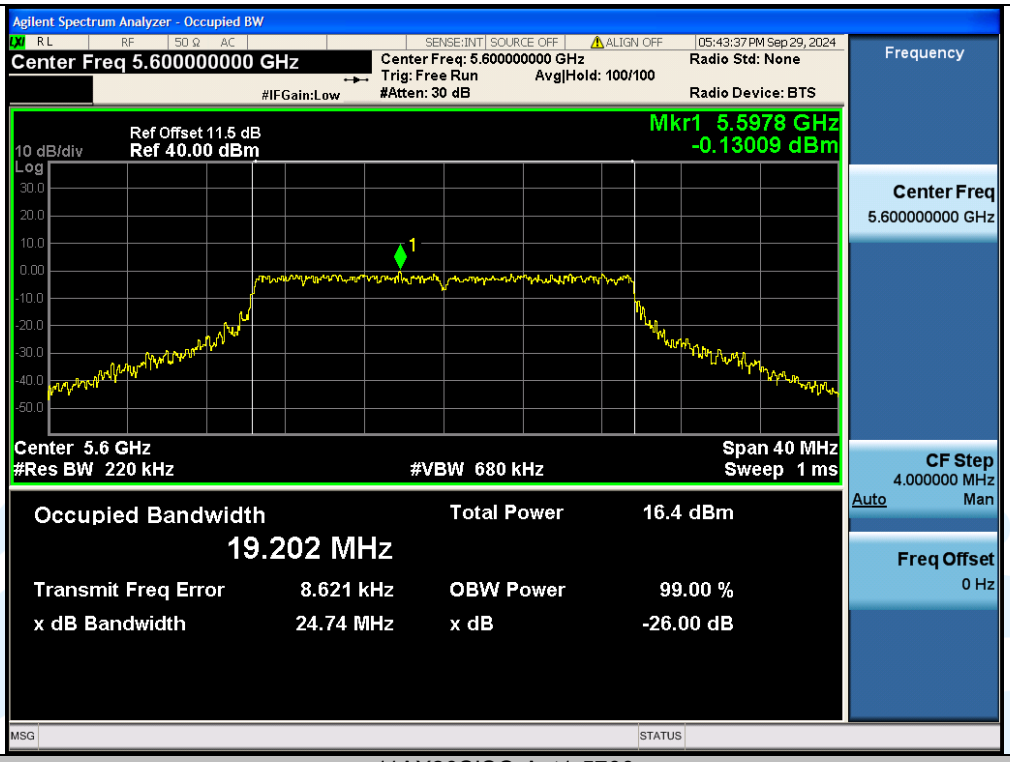

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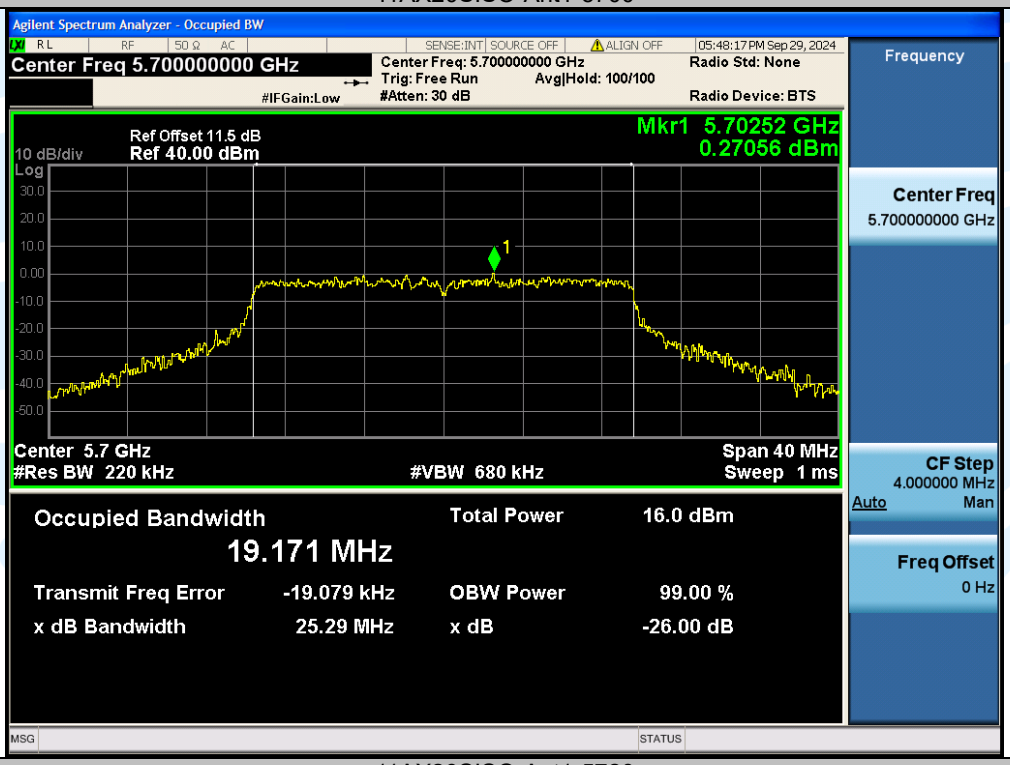

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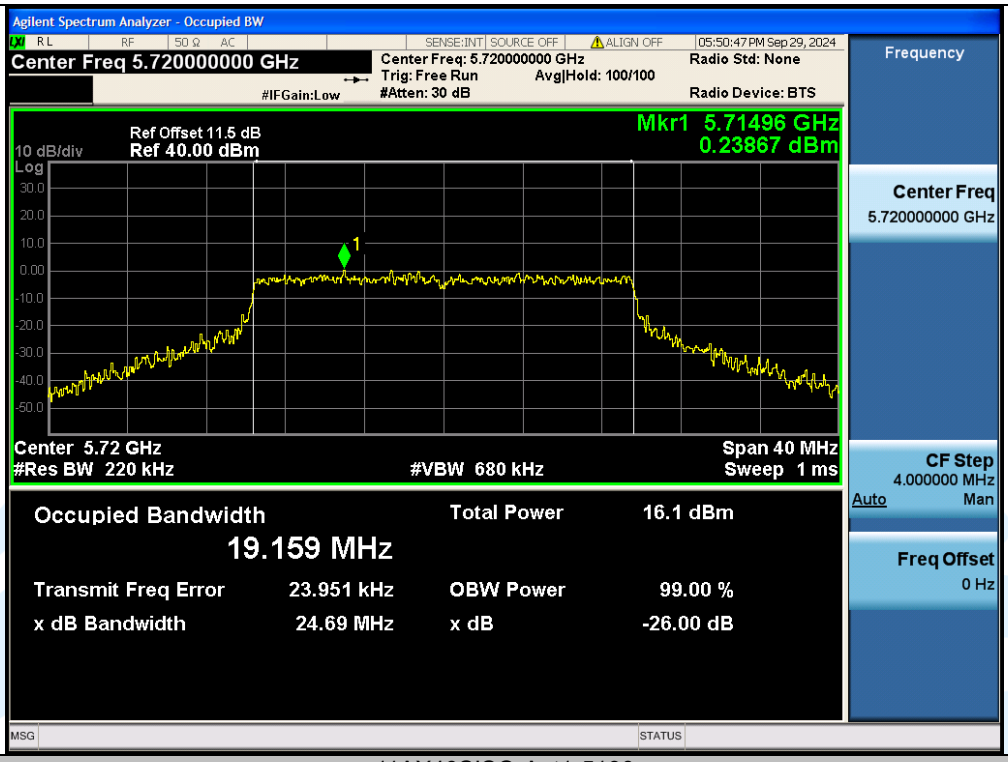

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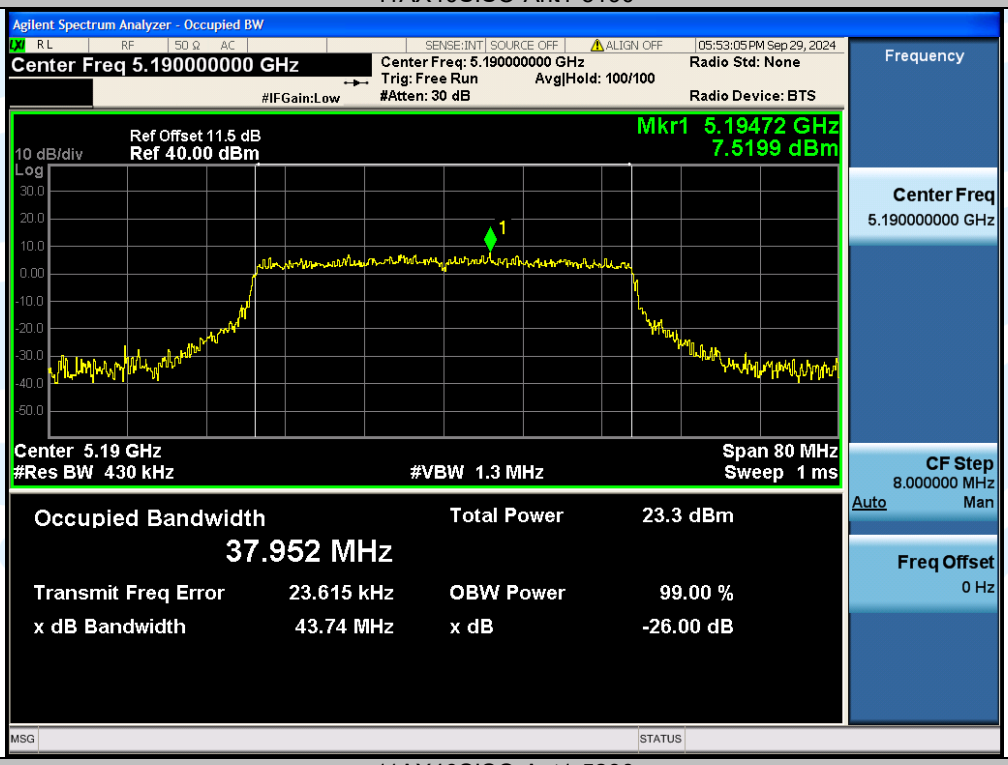

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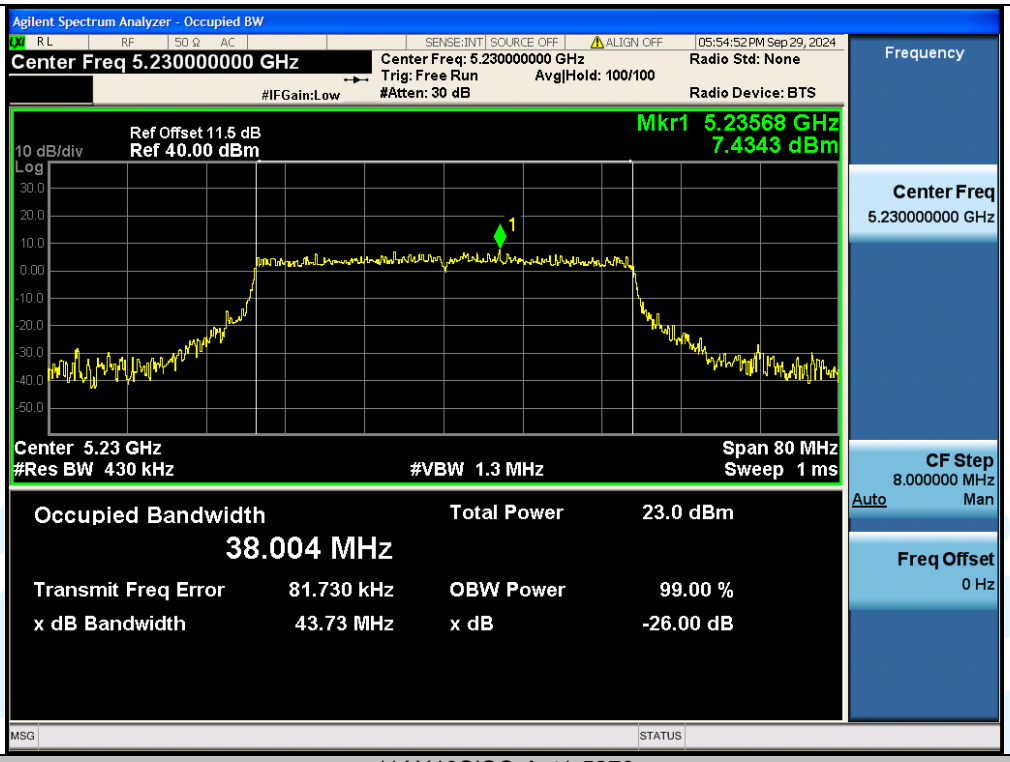

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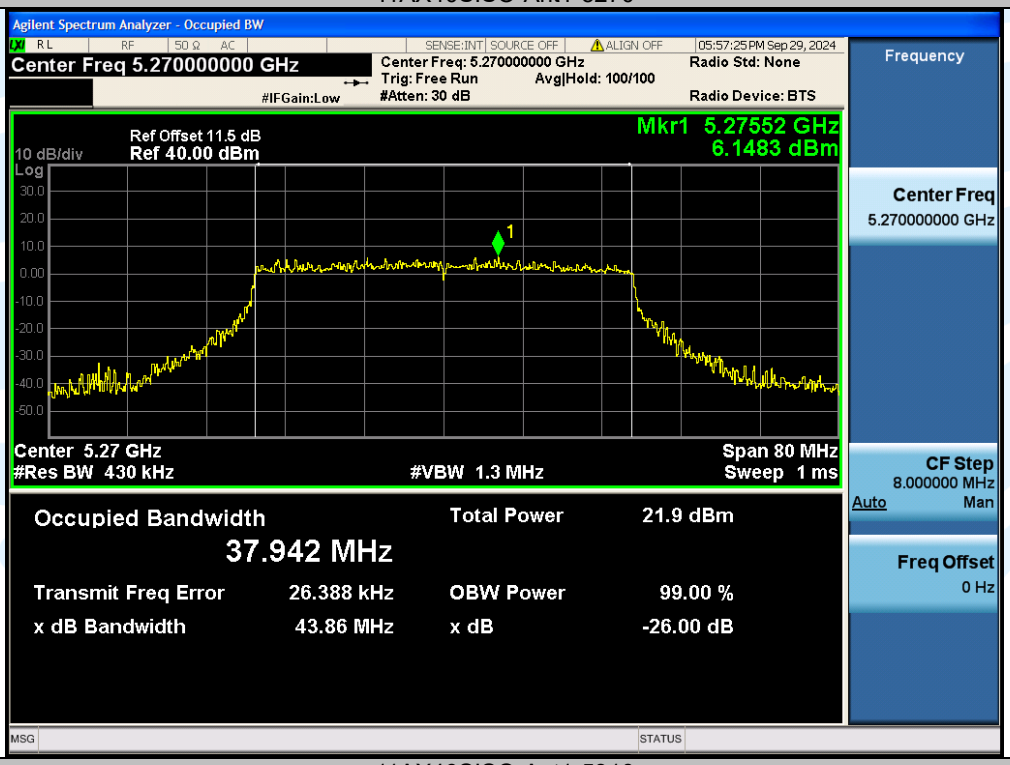

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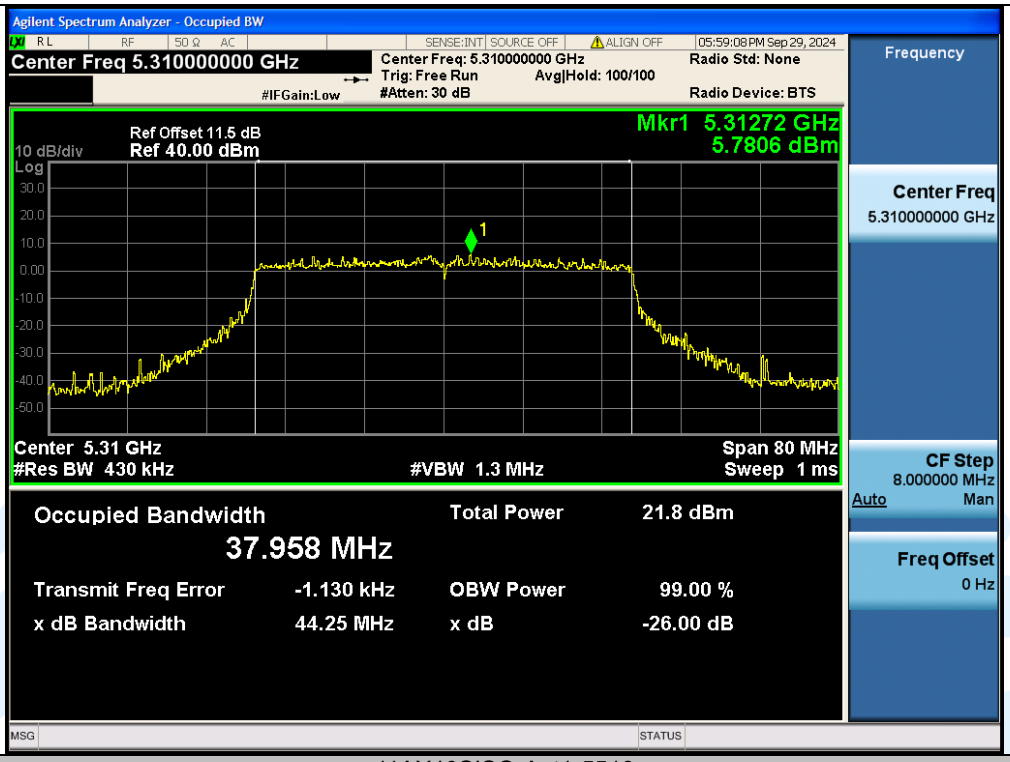

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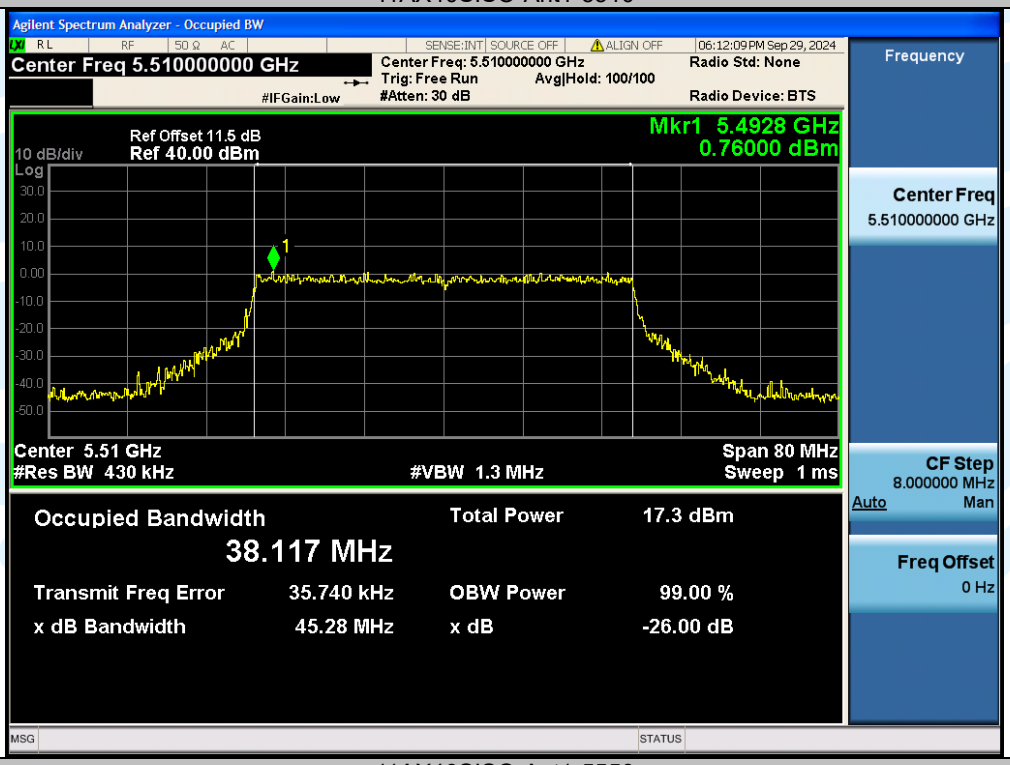

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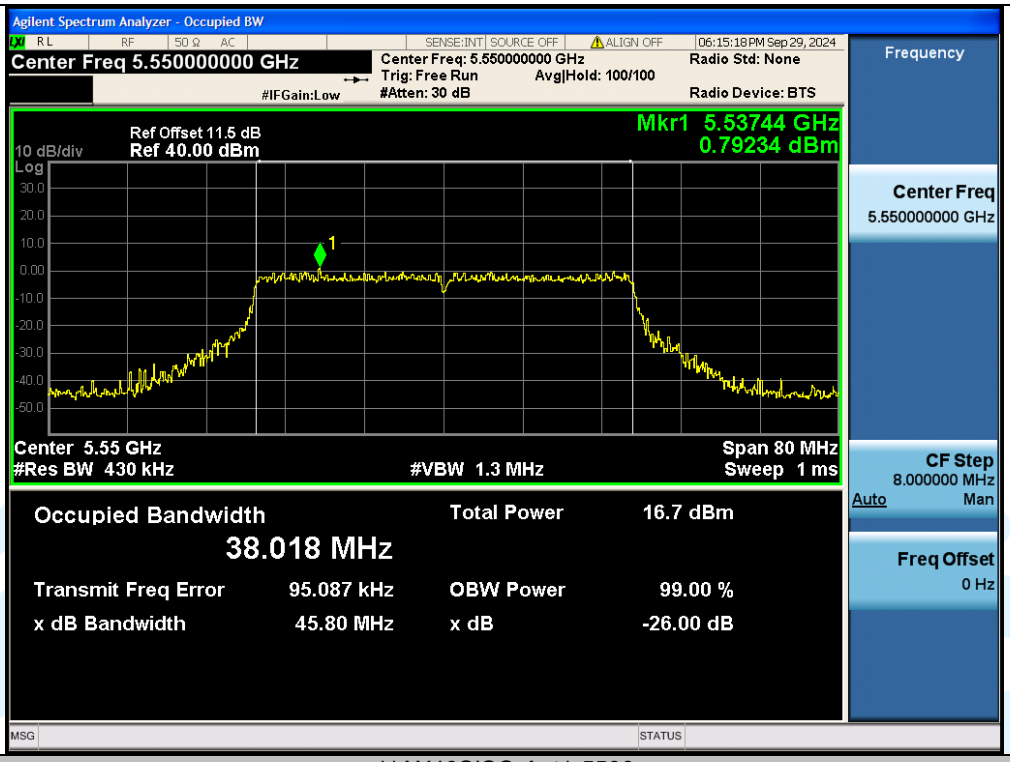

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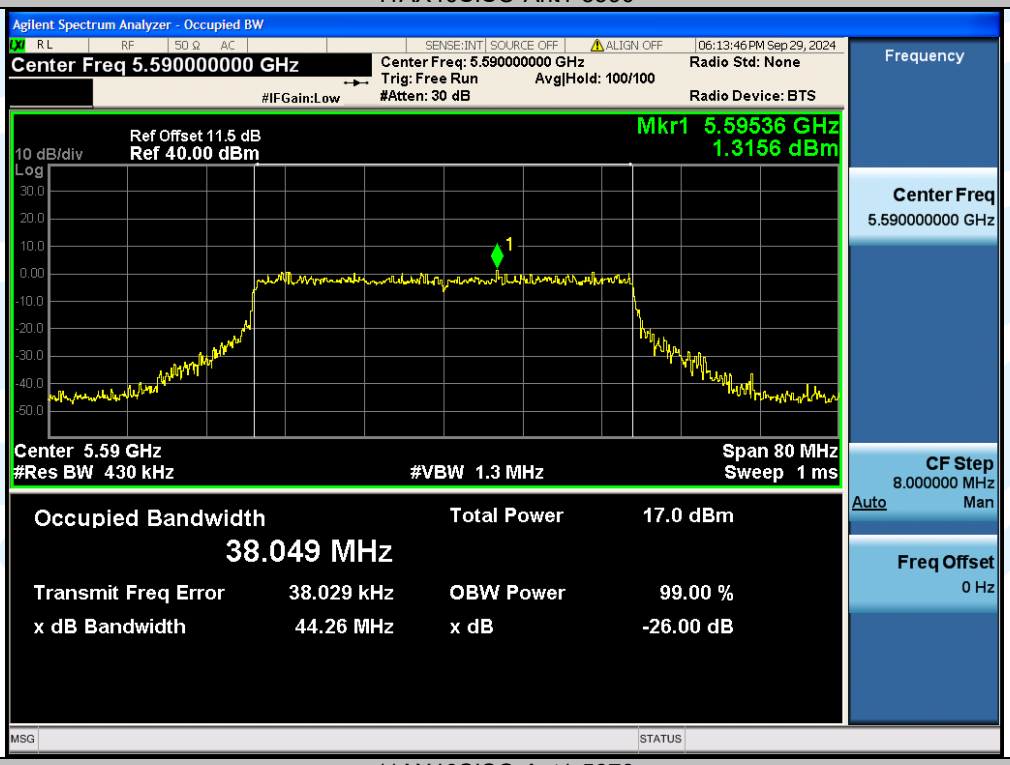

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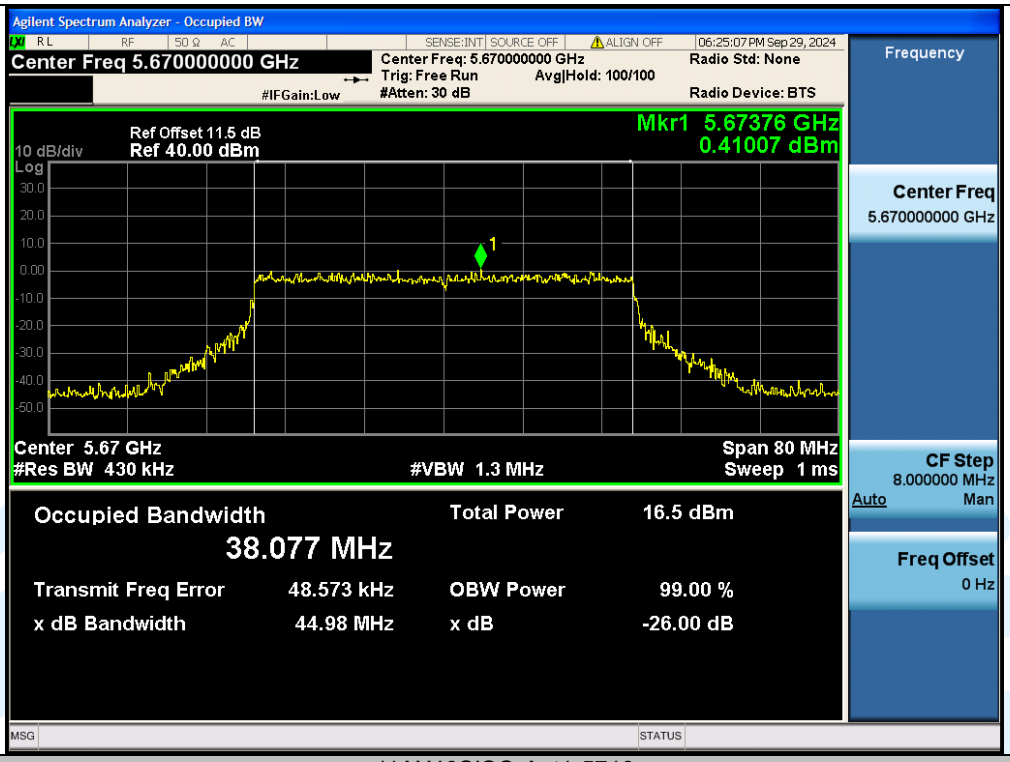

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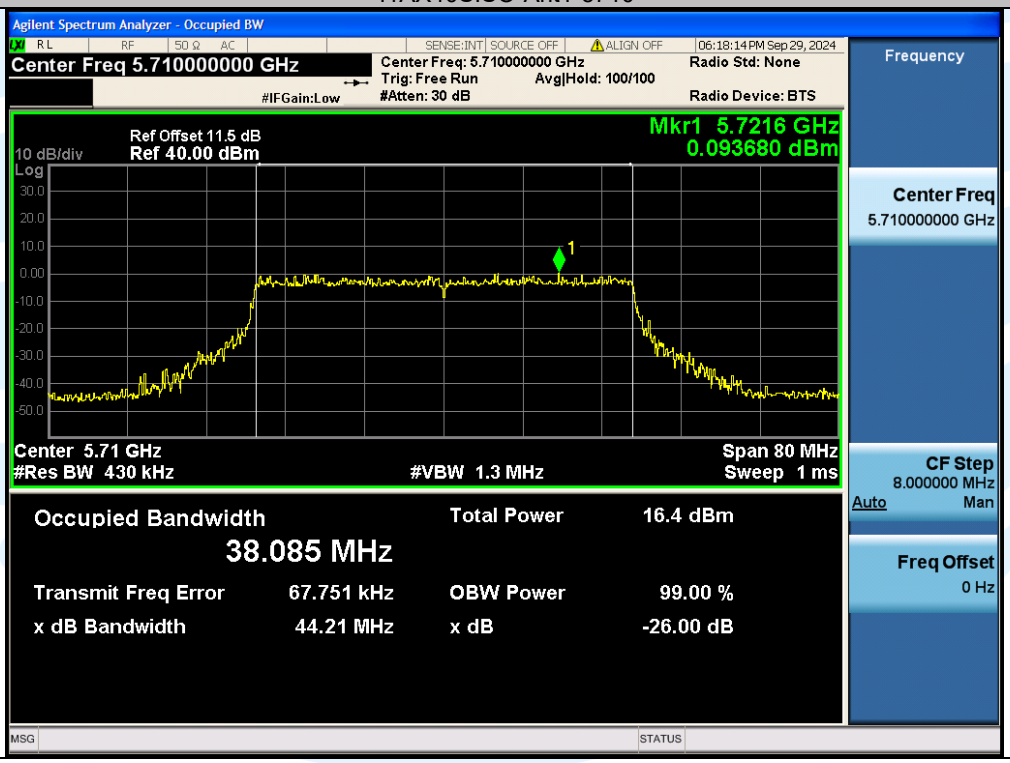

A.2 OCCUPIED CHANNEL BANDWIDTH

For U-NII-1, U-NII-2A, U-NII-2C and U-NII-3 band

Test Mode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	17.700	5171.1207	5188.8207	---	---
11A	Ant1	5220	17.655	5211.1202	5228.7752	---	---
11A	Ant1	5240	17.642	5231.1372	5248.7792	---	---
11A	Ant1	5260	17.749	5251.0748	5268.8238	---	---
11A	Ant1	5300	17.711	5291.0767	5308.7877	---	---
11A	Ant1	5320	17.642	5311.1400	5328.7820	---	---
11A	Ant1	5500	17.887	5491.0056	5508.8926	---	---
11A	Ant1	5580	17.871	5571.0203	5588.8913	---	---
11A	Ant1	5600	17.870	5591.0288	5608.8988	---	---
11A	Ant1	5700	17.895	5691.0342	5708.9292	---	---
11A	Ant1	5720	17.902	5710.9866	5728.8886	---	---
11A	Ant1	5745	17.961	5735.9639	5753.9249	---	---
11A	Ant1	5785	17.959	5775.9968	5793.9558	---	---
11A	Ant1	5825	17.929	5816.0100	5833.9390	---	---
11N20SISO	Ant1	5180	18.757	5170.6116	5189.3686	---	---
11N20SISO	Ant1	5220	18.789	5210.6478	5229.4368	---	---
11N20SISO	Ant1	5240	18.787	5230.6175	5249.4045	---	---
11N20SISO	Ant1	5260	18.750	5250.6251	5269.3751	---	---
11N20SISO	Ant1	5300	18.695	5290.6406	5309.3356	---	---
11N20SISO	Ant1	5320	18.800	5310.6018	5329.4018	---	---
11N20SISO	Ant1	5500	18.933	5490.4799	5509.4129	---	---
11N20SISO	Ant1	5580	19.062	5570.4845	5589.5465	---	---
11N20SISO	Ant1	5600	19.029	5590.4735	5609.5025	---	---
11N20SISO	Ant1	5700	19.052	5690.4913	5709.5433	---	---
11N20SISO	Ant1	5720	19.032	5710.5284	5729.5604	---	---
11N20SISO	Ant1	5745	19.053	5735.4826	5754.5356	---	---
11N20SISO	Ant1	5785	19.032	5775.5234	5794.5554	---	---
11N20SISO	Ant1	5825	18.986	5815.4955	5834.4815	---	---
11N40SISO	Ant1	5190	37.266	5171.4118	5208.6778	---	---
11N40SISO	Ant1	5230	37.247	5211.4469	5248.6939	---	---
11N40SISO	Ant1	5270	37.266	5251.3923	5288.6583	---	---
11N40SISO	Ant1	5310	37.278	5291.3689	5328.6469	---	---
11N40SISO	Ant1	5510	37.641	5491.1922	5528.8332	---	---
11N40SISO	Ant1	5550	37.558	5531.2768	5568.8348	---	---
11N40SISO	Ant1	5590	37.627	5571.2332	5608.8602	---	---
11N40SISO	Ant1	5670	37.645	5651.2373	5688.8823	---	---
11N40SISO	Ant1	5710	37.632	5691.2837	5728.9157	---	---
11N40SISO	Ant1	5755	37.507	5736.3223	5773.8293	---	---
11N40SISO	Ant1	5795	37.711	5776.2328	5813.9438	---	---
11AC20SISO	Ant1	5180	18.822	5170.6279	5189.4499	---	---
11AC20SISO	Ant1	5220	18.774	5210.6227	5229.3967	---	---
11AC20SISO	Ant1	5240	18.737	5230.6517	5249.3887	---	---
11AC20SISO	Ant1	5260	18.704	5250.6699	5269.3739	---	---
11AC20SISO	Ant1	5300	18.730	5290.6404	5309.3704	---	---
11AC20SISO	Ant1	5320	18.703	5310.6354	5329.3384	---	---
11AC20SISO	Ant1	5500	18.977	5490.4804	5509.4574	---	---
11AC20SISO	Ant1	5580	18.964	5570.5311	5589.4951	---	---
11AC20SISO	Ant1	5600	19.006	5590.5064	5609.5124	---	---
11AC20SISO	Ant1	5700	19.031	5690.4852	5709.5162	---	---
11AC20SISO	Ant1	5720	18.949	5710.5360	5729.4850	---	---
11AC20SISO	Ant1	5745	18.984	5735.5013	5754.4853	---	---
11AC20SISO	Ant1	5785	19.024	5775.5197	5794.5437	---	---
11AC20SISO	Ant1	5825	19.025	5815.5152	5834.5402	---	---
11AC40SISO	Ant1	5190	37.270	5171.3863	5208.6563	---	---
11AC40SISO	Ant1	5230	37.231	5211.4803	5248.7113	---	---
11AC40SISO	Ant1	5270	37.190	5251.4464	5288.6364	---	---
11AC40SISO	Ant1	5310	37.104	5291.4948	5328.5988	---	---
11AC40SISO	Ant1	5510	37.515	5491.2157	5528.7307	---	---

11AC40SISO	Ant1	5550	37.663	5531.1849	5568.8479	---	---
11AC40SISO	Ant1	5590	37.622	5571.2087	5608.8307	---	---
11AC40SISO	Ant1	5670	37.671	5651.2057	5688.8767	---	---
11AC40SISO	Ant1	5710	37.598	5691.2788	5728.8768	---	---
11AC40SISO	Ant1	5755	37.651	5736.2354	5773.8864	---	---
11AC40SISO	Ant1	5795	37.570	5776.2749	5813.8449	---	---
11AX20SISO	Ant1	5180	19.442	5170.3139	5189.7559	---	---
11AX20SISO	Ant1	5220	19.401	5210.3233	5229.7243	---	---
11AX20SISO	Ant1	5240	19.425	5230.3311	5249.7561	---	---
11AX20SISO	Ant1	5260	19.473	5250.3058	5269.7788	---	---
11AX20SISO	Ant1	5300	19.466	5290.2926	5309.7586	---	---
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11AX20SISO	Ant1	5500	19.625	5490.1535	5509.7785	---	---
11AX20SISO	Ant1	5580	19.594	5570.2409	5589.8349	---	---
11AX20SISO	Ant1	5600	19.622	5590.1786	5609.8006	---	---
11AX20SISO	Ant1	5700	19.623	5690.2132	5709.8362	---	---
11AX20SISO	Ant1	5720	19.654	5710.2199	5729.8739	---	---
11AX20SISO	Ant1	5745	19.632	5735.2354	5754.8674	---	---
11AX20SISO	Ant1	5785	19.588	5775.2491	5794.8371	---	---
11AX20SISO	Ant1	5825	19.678	5815.1346	5834.8126	---	---
11AX40SISO	Ant1	5190	38.149	5170.9675	5209.1165	---	---
11AX40SISO	Ant1	5230	38.325	5210.9078	5249.2328	---	---
11AX40SISO	Ant1	5270	38.262	5250.8849	5289.1469	---	---
11AX40SISO	Ant1	5310	38.358	5290.8645	5329.2225	---	---
11AX40SISO	Ant1	5510	38.515	5490.7650	5529.2800	---	---
11AX40SISO	Ant1	5550	38.563	5530.7485	5569.3115	---	---
11AX40SISO	Ant1	5590	38.436	5570.8590	5609.2950	---	---
11AX40SISO	Ant1	5670	38.455	5650.8552	5689.3102	---	---
11AX40SISO	Ant1	5710	38.614	5690.8124	5729.4264	---	---
11AX40SISO	Ant1	5755	38.508	5735.8242	5774.3322	---	---
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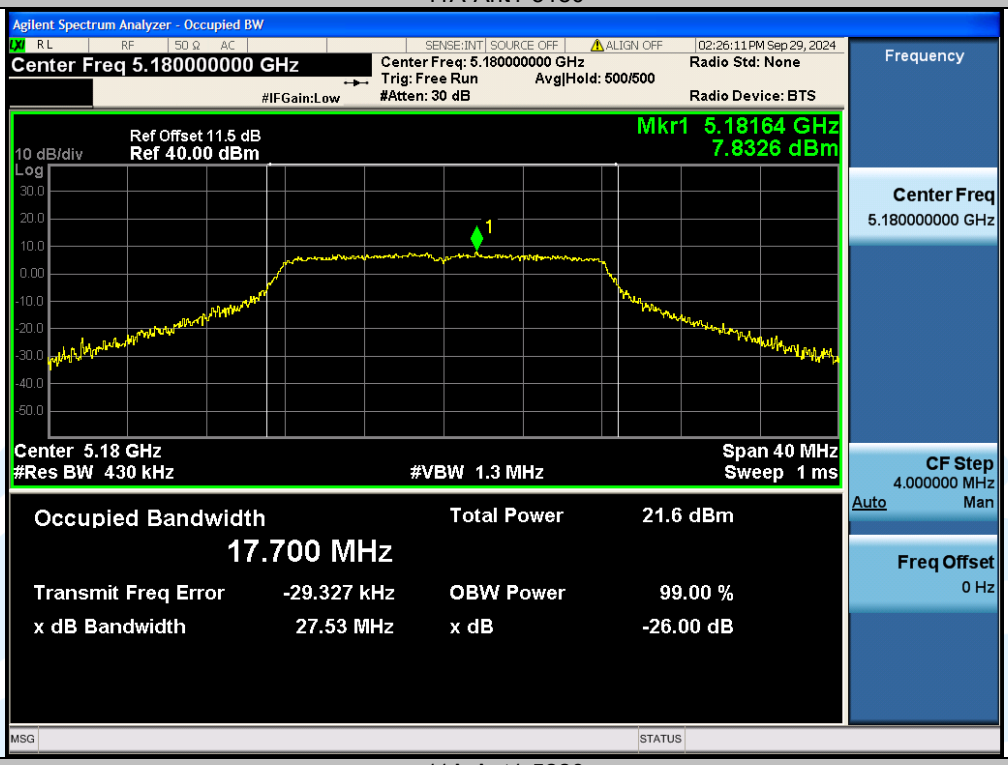
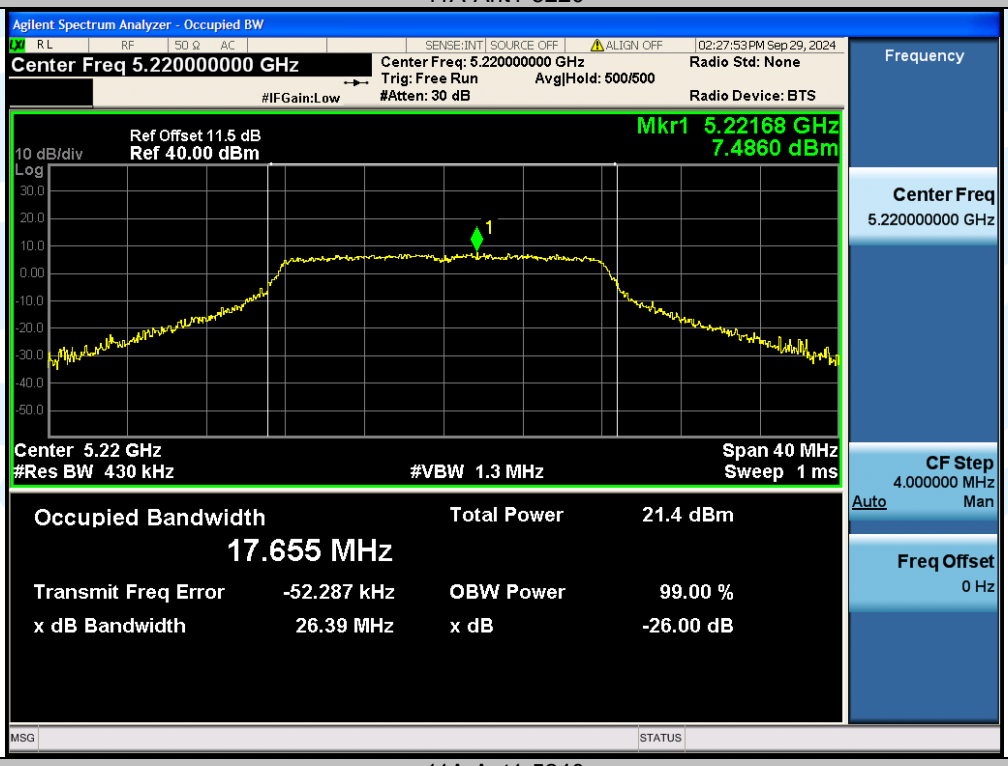
Test Graphs

11A-Ant1-5180



11A-Ant1-5220



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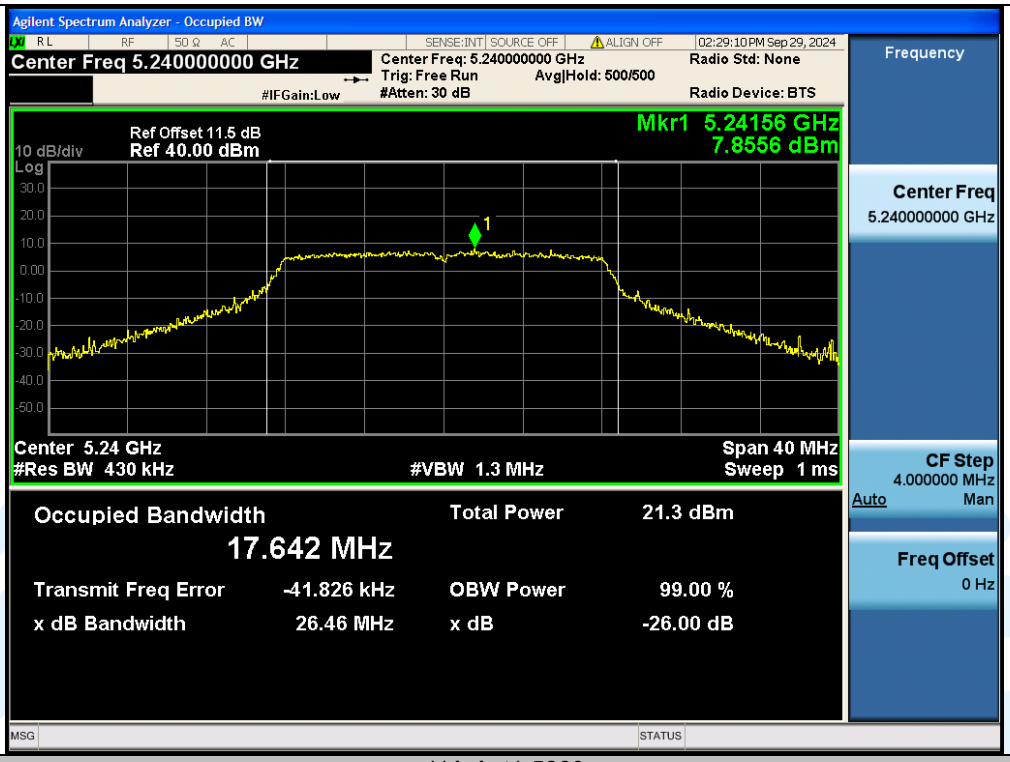

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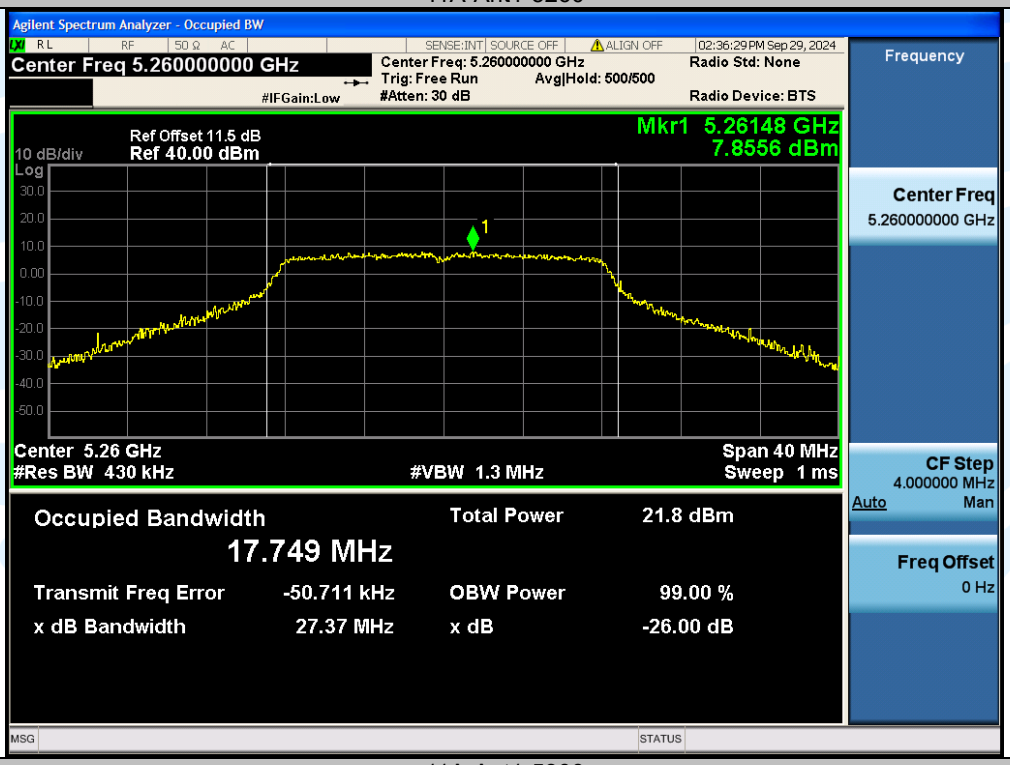

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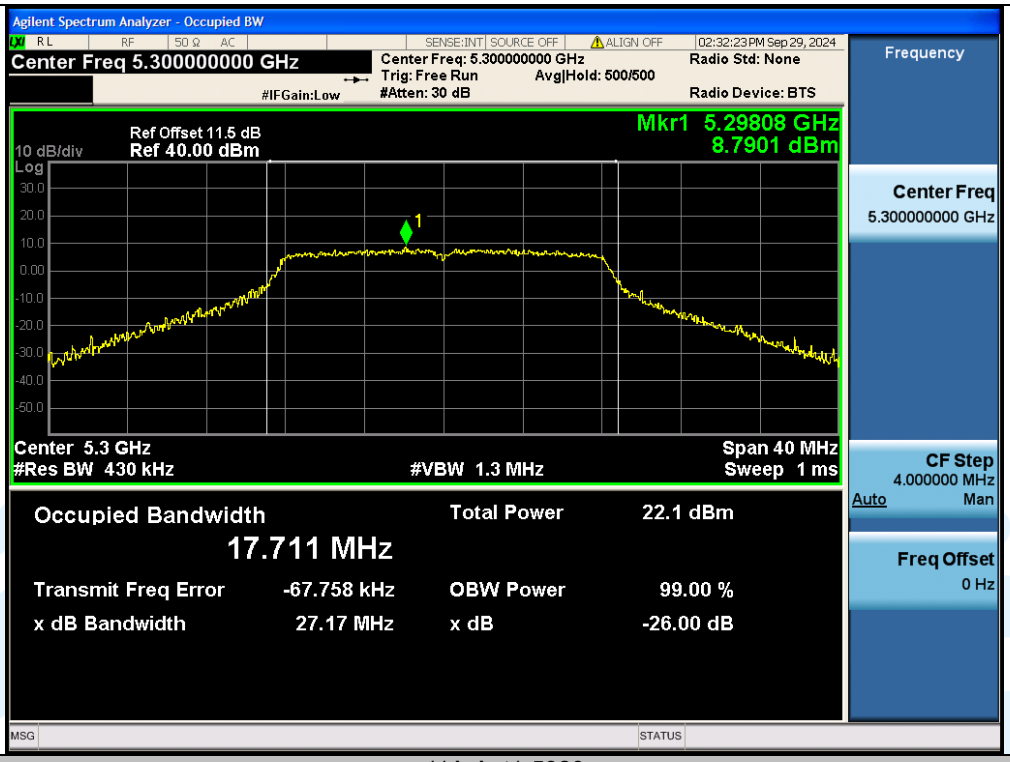

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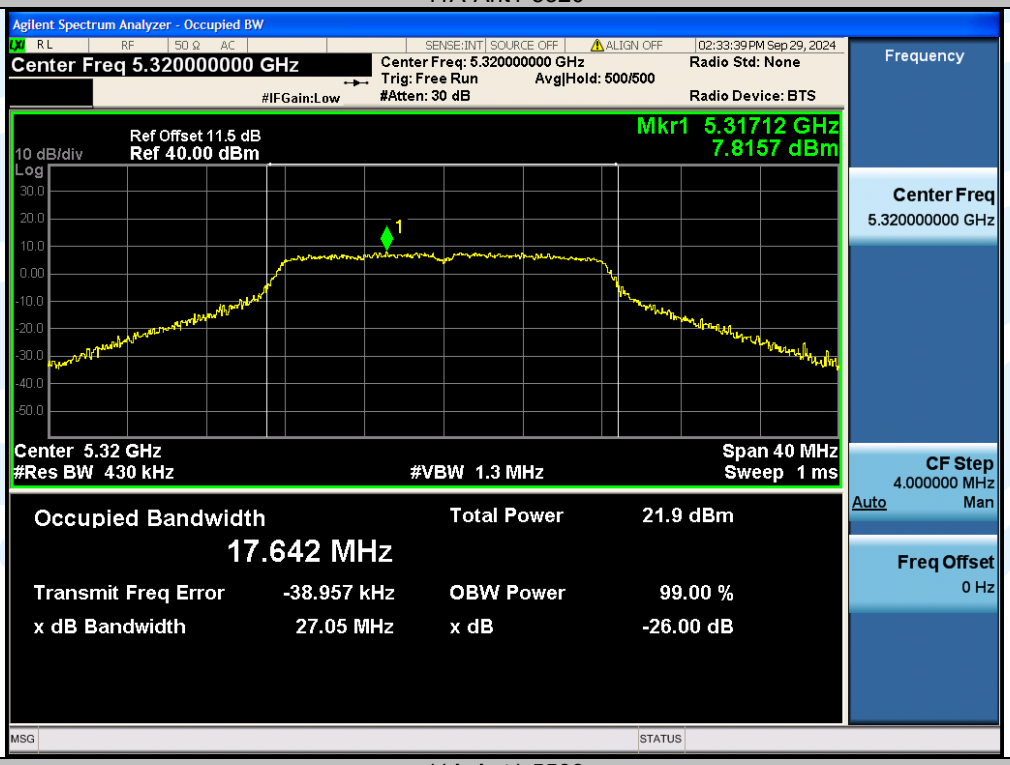

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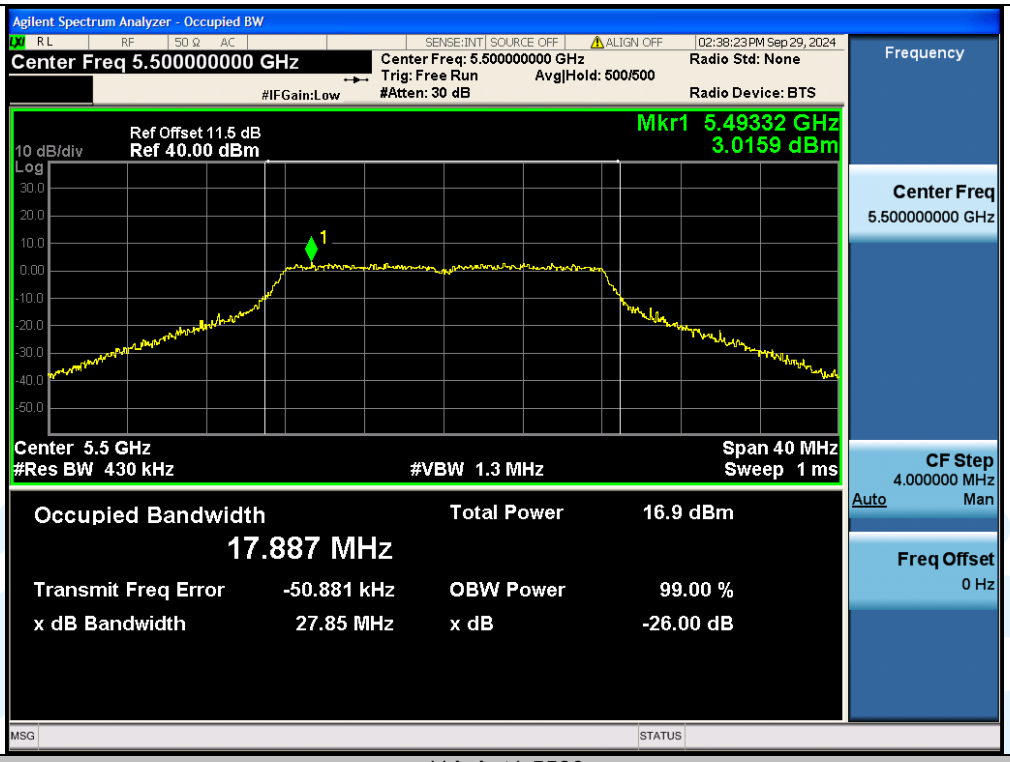

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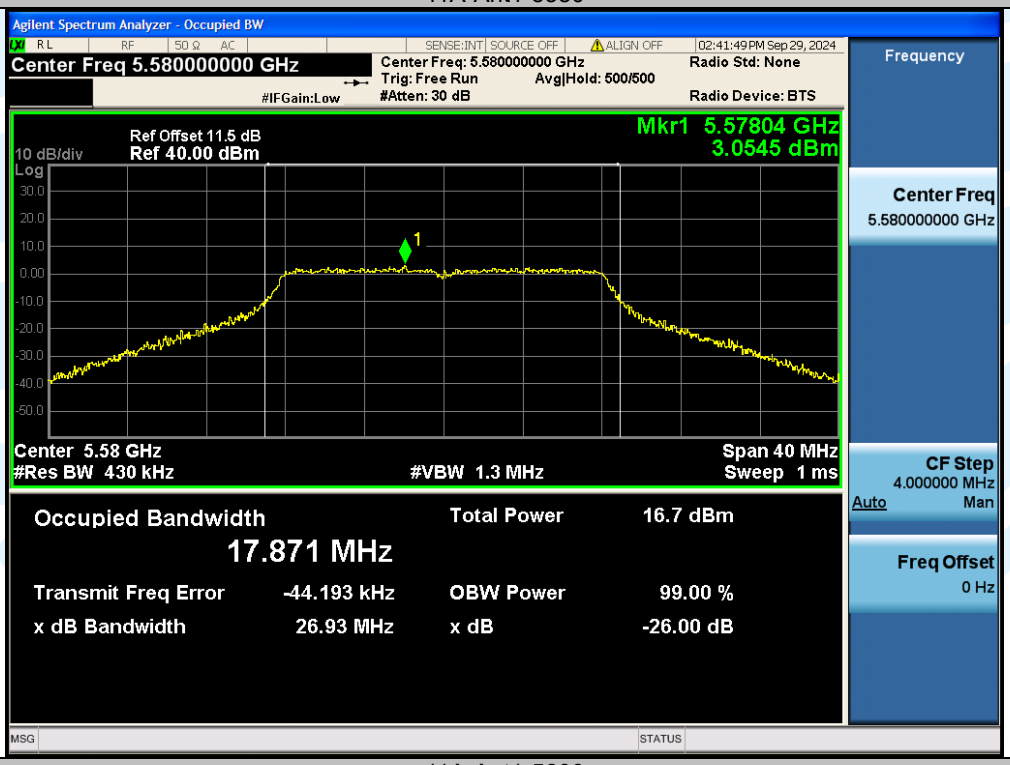

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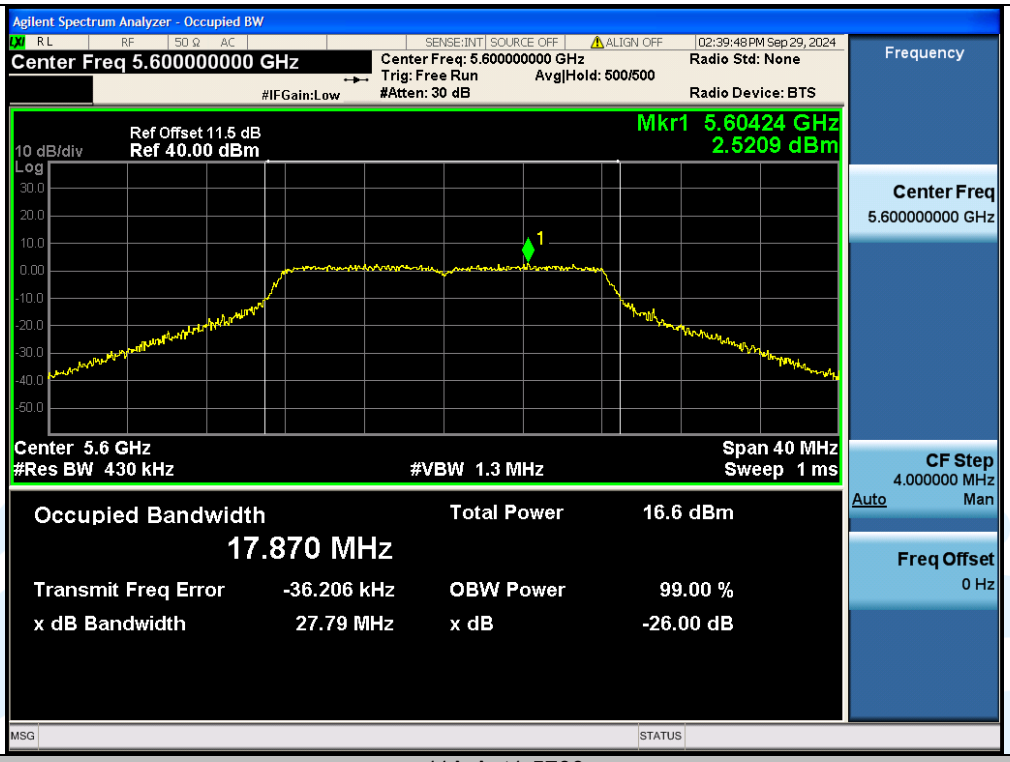

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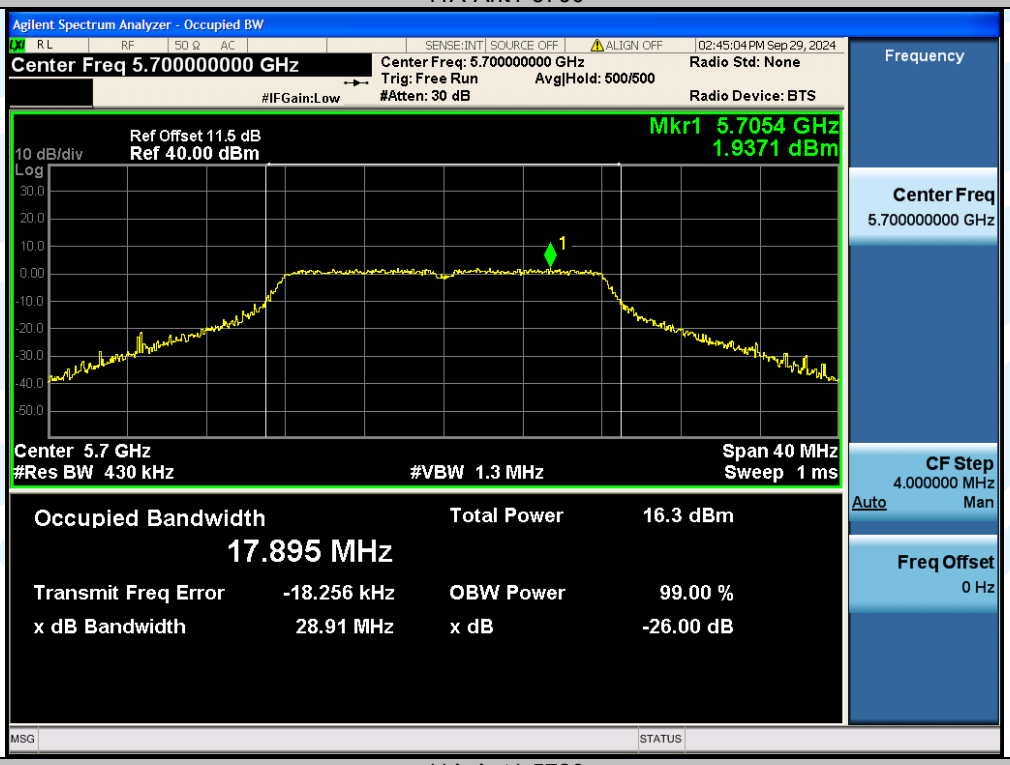

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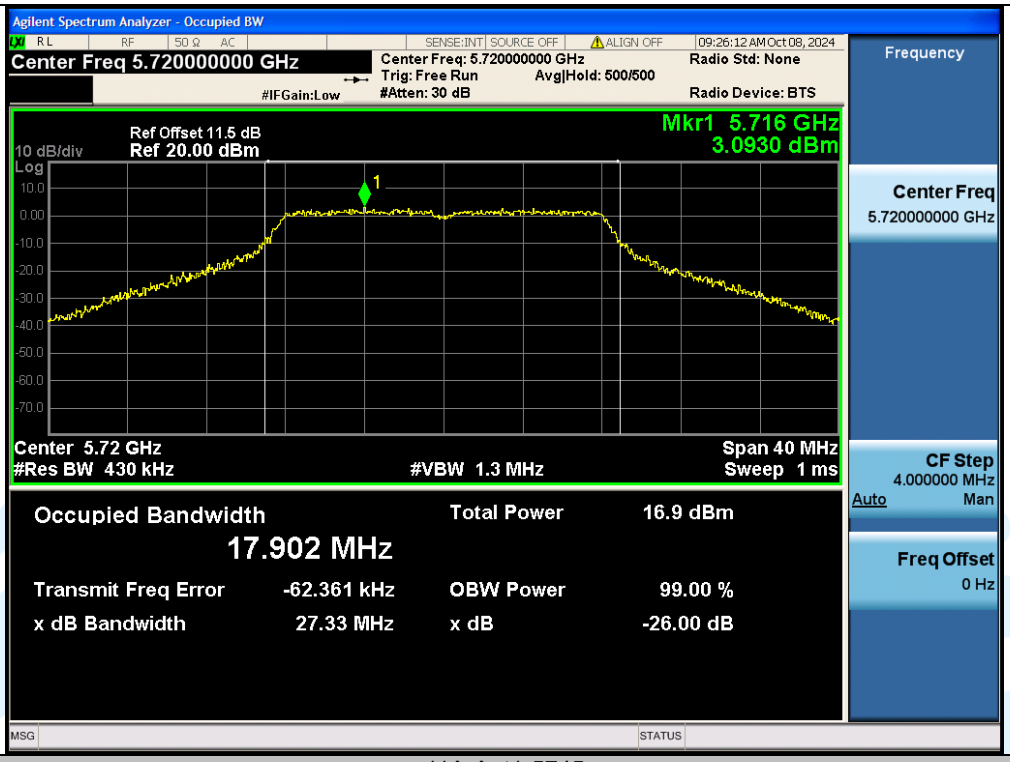

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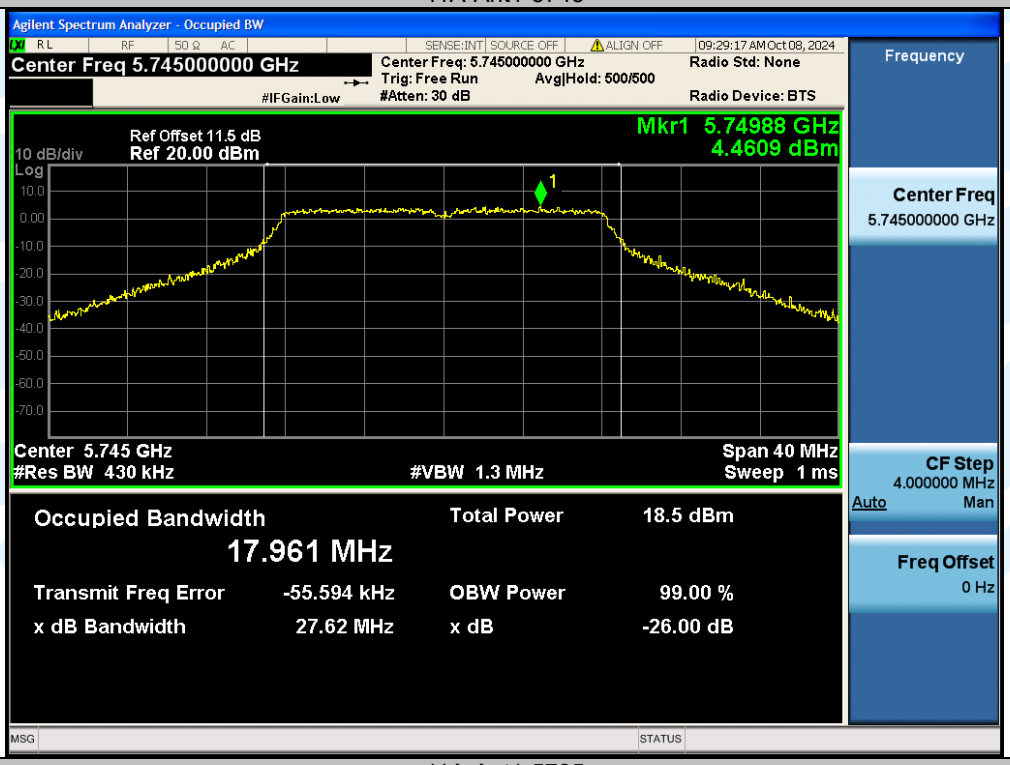

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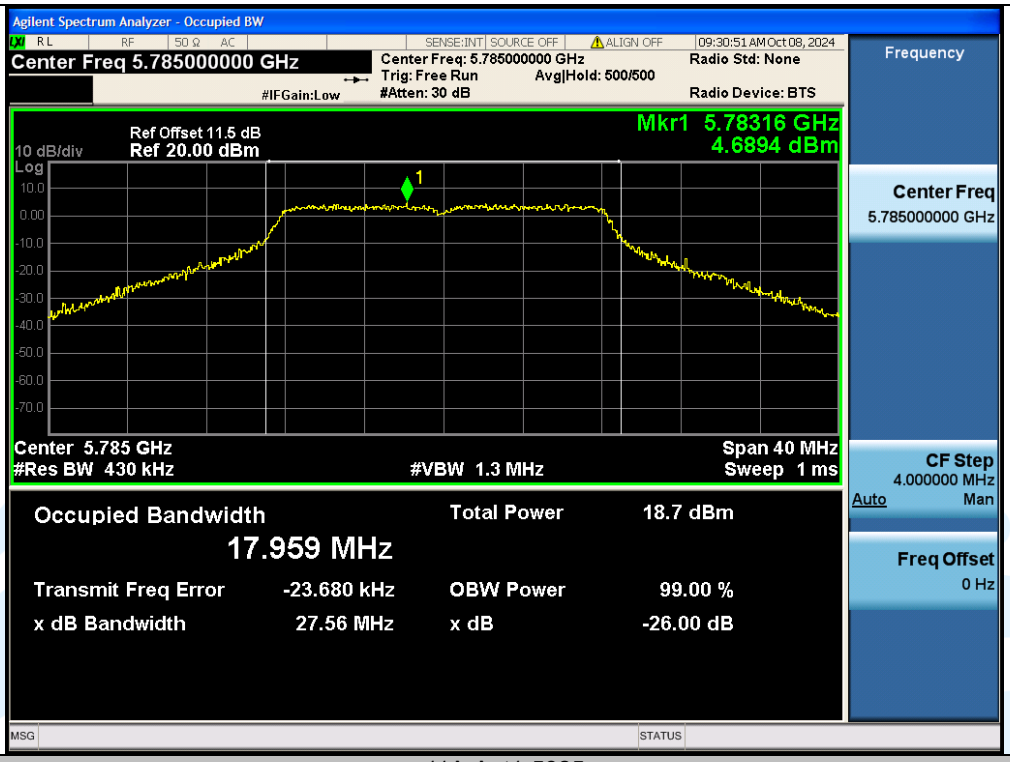

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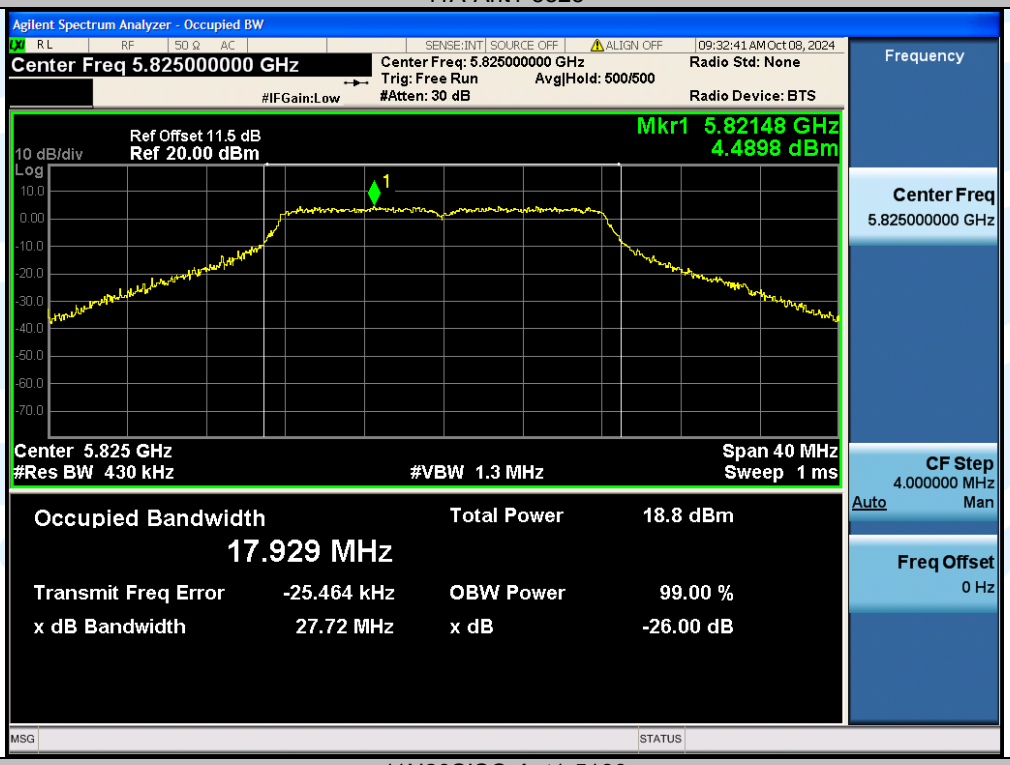

11N20SISO-Ant1-5180