11G_Ant2_2412


11G_Ant3_2412


11G_Ant1_2437


11G_Ant2_2437


11G_Ant3_2437


11G_Ant1_2462


11G_Ant2_2462


11G_Ant3_2462


11N20MIMO_Ant1_2412


11N20MIMO_Ant2_2412


11N20MIMO_Ant3_2412


11N20MIMO_Ant1_2437


11N20MIMO_Ant2_2437


11N20MIMO_Ant3_2437


11N20MIMO_Ant1_2462

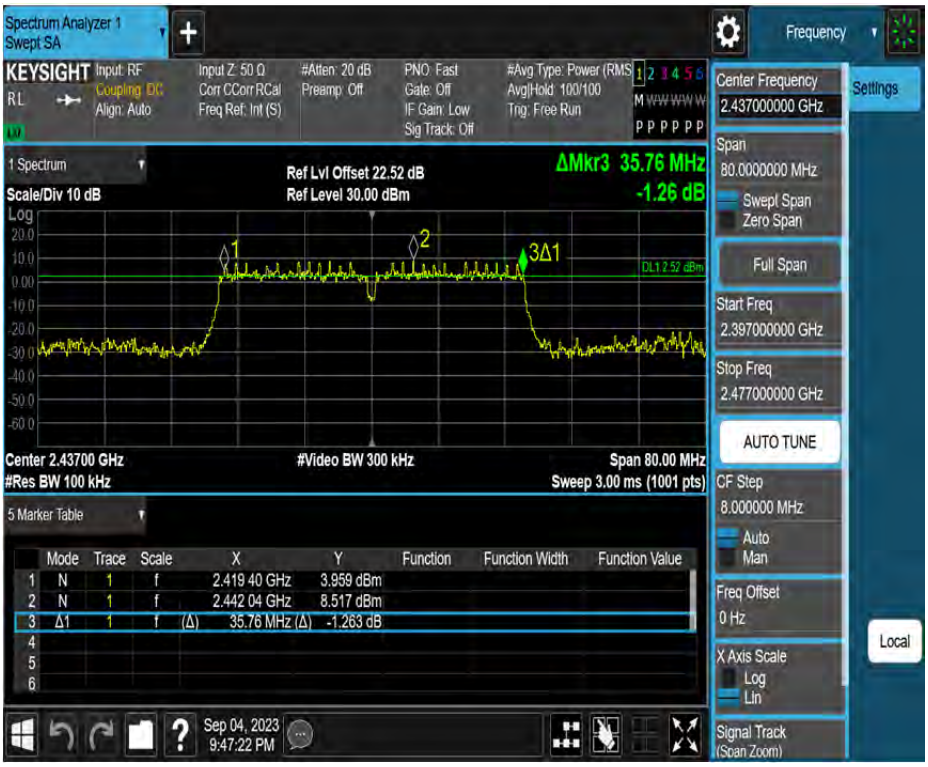

11N20MIMO_Ant2_2462


11N20MIMO_Ant3_2462


11N40MIMO_Ant1_2422


11N40MIMO_Ant2_2422


11N40MIMO_Ant3_2422


11N40MIMO_Ant1_2437

11N40MIMO_Ant2_2437


11N40MIMO_Ant3_2437


11N40MIMO_Ant1_2452


11N40MIMO_Ant2_2452


11N40MIMO_Ant3_2452


11AX20MIMO_Ant1_2412


11AX20MIMO_Ant2_2412


11AX20MIMO_Ant3_2412


11AX20MIMO_Ant1_2437


11AX20MIMO_Ant2_2437


11AX20MIMO_Ant3_2437


11AX20MIMO_Ant1_2462


11AX20MIMO_Ant2_2462


11AX20MIMO_Ant3_2462


11AX40MIMO_Ant1_2422


11AX40MIMO_Ant2_2422


11AX40MIMO_Ant3_2422


11AX40MIMO_Ant1_2437


11AX40MIMO_Ant2_2437


11AX40MIMO_Ant3_2437

11AX40MIMO_Ant1_2452


11AX40MIMO_Ant2_2452


11AX40MIMO_Ant3_2452


Occupied Channel Bandwidth

Test Mode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B-CDD	Ant1	2412	10.577	2406.7324	2417.3094	---	---
	Ant2	2412	10.619	2406.7128	2417.3318	---	---
	Ant3	2412	10.593	2406.7057	2417.2987	---	---
	Ant1	2437	10.606	2431.7053	2442.3113	---	---
	Ant2	2437	10.799	2431.6237	2442.4227	---	---
	Ant3	2437	10.584	2431.7078	2442.2918	---	---
	Ant1	2462	10.642	2456.6761	2467.3181	---	---
	Ant2	2462	10.694	2456.6614	2467.3554	---	---
	Ant3	2462	10.646	2456.6746	2467.3206	---	---
11G-CDD	Ant1	2412	17.294	2403.4188	2420.7128	---	---
	Ant2	2412	17.354	2403.3272	2420.6812	---	---
	Ant3	2412	17.036	2403.4852	2420.5212	---	---
	Ant1	2437	17.471	2428.3903	2445.8613	---	---
	Ant2	2437	17.174	2428.4372	2445.6112	---	---
	Ant3	2437	17.041	2428.4838	2445.5248	---	---
	Ant1	2462	17.273	2453.5096	2470.7826	---	---
	Ant2	2462	17.383	2453.3096	2470.6926	---	---
	Ant3	2462	17.000	2453.4844	2470.4844	---	---
11N20MIMO	Ant1	2412	18.246	2402.9593	2421.2053	---	---
	Ant2	2412	18.155	2402.9701	2421.1251	---	---
	Ant3	2412	18.001	2403.0133	2421.0143	---	---
	Ant1	2437	18.588	2427.7616	2446.3496	---	---
	Ant2	2437	18.274	2427.9327	2446.2067	---	---
	Ant3	2437	18.379	2427.8248	2446.2038	---	---
	Ant1	2462	18.204	2452.9363	2471.1403	---	---
	Ant2	2462	18.035	2453.0356	2471.0706	---	---
	Ant3	2462	17.962	2453.0271	2470.9891	---	---
11N40MIMO	Ant1	2422	36.333	2403.8002	2440.1332	---	---
	Ant2	2422	36.391	2403.8019	2440.1929	---	---
	Ant3	2422	36.350	2403.8019	2440.1519	---	---
	Ant1	2437	36.584	2418.7522	2455.3362	---	---
	Ant2	2437	36.518	2418.7393	2455.2573	---	---
	Ant3	2437	36.433	2418.7626	2455.1956	---	---
	Ant1	2452	36.367	2433.8034	2470.1704	---	---
	Ant2	2452	36.532	2433.6906	2470.2226	---	---
	Ant3	2452	36.398	2433.8141	2470.2121	---	---
11AX20MIMO	Ant1	2412	19.129	2402.4618	2421.5908	---	---
	Ant2	2412	19.213	2402.4090	2421.6220	---	---
	Ant3	2412	19.120	2402.4602	2421.5802	---	---

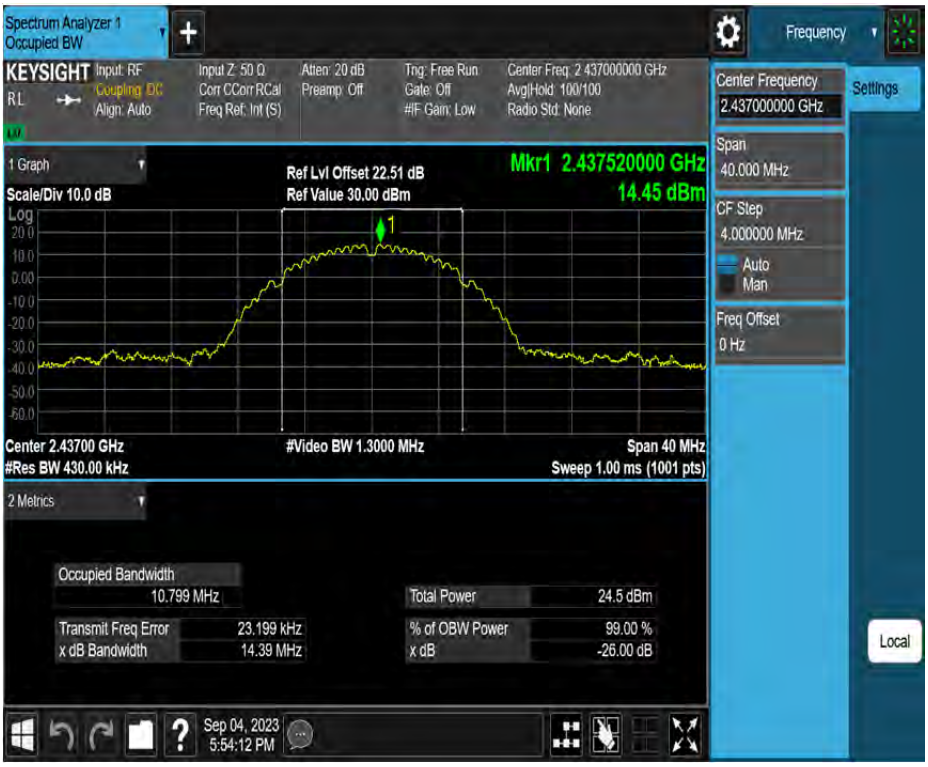
	Ant1	2437	19.173	2427.4174	2446.5904	---	---
	Ant2	2437	19.192	2427.4308	2446.6228	---	---
	Ant3	2437	19.160	2427.4142	2446.5742	---	---
	Ant1	2462	19.128	2452.4404	2471.5684	---	---
	Ant2	2462	19.174	2452.4071	2471.5811	---	---
	Ant3	2462	19.081	2452.4795	2471.5605	---	---
11AX40MIMO	Ant1	2422	37.569	2403.2257	2440.7947	---	---
	Ant2	2422	37.560	2403.2397	2440.7997	---	---
	Ant3	2422	37.632	2403.1514	2440.7834	---	---
	Ant1	2437	37.699	2418.1232	2455.8222	---	---
	Ant2	2437	37.562	2418.2347	2455.7967	---	---
	Ant3	2437	37.588	2418.1545	2455.7425	---	---
	Ant1	2452	37.572	2433.2217	2470.7937	---	---
	Ant2	2452	37.609	2433.1910	2470.8000	---	---
	Ant3	2452	37.601	2433.1918	2470.7928	---	---

11B_Ant1_2412


11B_Ant2_2412


11B_Ant3_2412


11B_Ant1_2437


11B_Ant2_2437

11B_Ant3_2437


11B_Ant1_2462


11B_Ant2_2462


11B_Ant3_2462


11G_Ant1_2412


11G_Ant2_2412


11G_Ant3_2412


11G_Ant1_2437


11G_Ant2_2437


11G_Ant3_2437


11G_Ant1_2462


11G_Ant2_2462


11G_Ant3_2462


11N20MIMO_Ant1_2412


11N20MIMO_Ant2_2412


11N20MIMO_Ant3_2412

11N20MIMO_Ant1_2437


11N20MIMO_Ant2_2437


11N20MIMO_Ant3_2437


11N20MIMO_Ant1_2462

11N20MIMO_Ant2_2462


11N20MIMO_Ant3_2462


11N40MIMO_Ant1_2422


11N40MIMO_Ant2_2422


11N40MIMO_Ant3_2422


11N40MIMO_Ant1_2437

11N40MIMO_Ant2_2437


11N40MIMO_Ant3_2437


11N40MIMO_Ant1_2452


11N40MIMO_Ant2_2452

11N40MIMO_Ant3_2452


11AX20MIMO_Ant1_2412


11AX20MIMO_Ant2_2412


11AX20MIMO_Ant3_2412


11AX20MIMO_Ant1_2437


11AX20MIMO_Ant2_2437


11AX20MIMO_Ant3_2437


11AX20MIMO_Ant1_2462

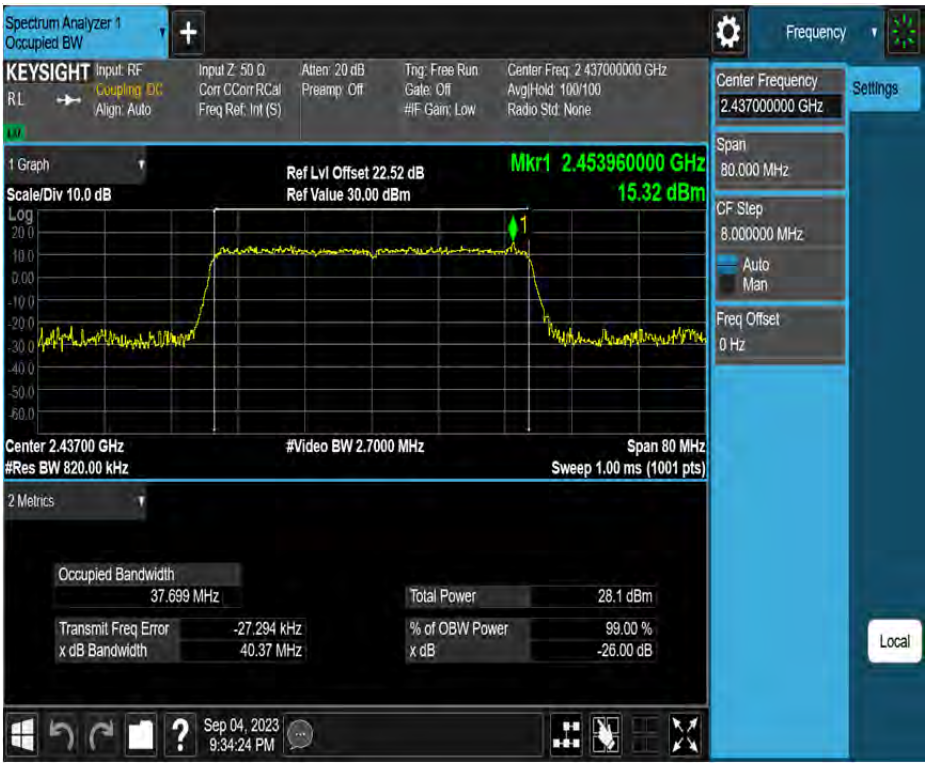

11AX20MIMO_Ant2_2462

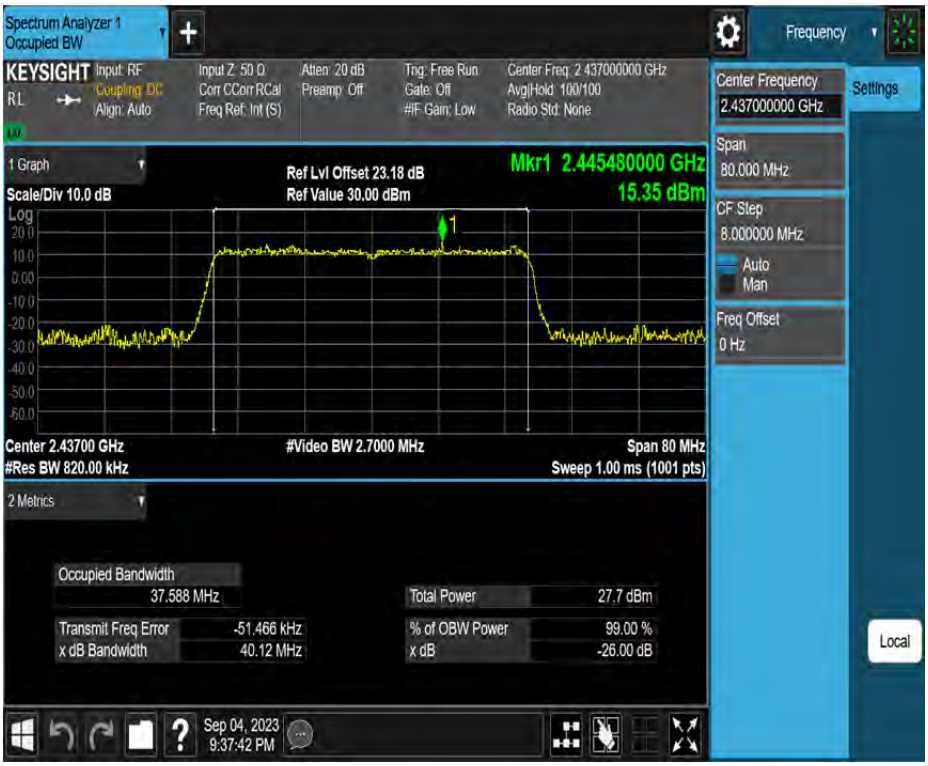

11AX20MIMO_Ant3_2462


11AX40MIMO_Ant1_2422


11AX40MIMO_Ant2_2422

11AX40MIMO_Ant3_2422


11AX40MIMO_Ant1_2437

11AX40MIMO_Ant2_2437


11AX40MIMO_Ant3_2437


11AX40MIMO_Ant1_2452


11AX40MIMO_Ant2_2452


11AX40MIMO_Ant3_2452


3.5 Maximum conducted output power

3.5.1 Limit

For systems using digital modulation in the 2400~2483.5MHz, The Maximum output Power shall not exceed 1W(30dBm)

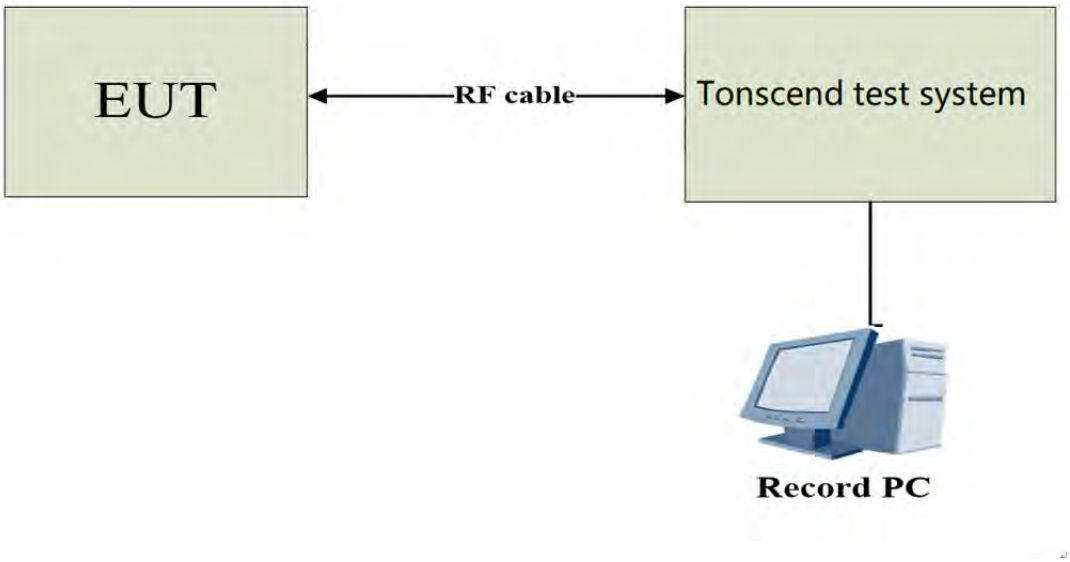
3.5.2 Test Procedure

Test Method	
●Conducted Measurement	○Radiated Measurement
Test Channels	
●Lowest, Middle and Highest Channel	○ Lowest and Highest Channel
Environmental conditions	
●Normal	○Normal and Extreme
Note:●:Test ○:No Test	

a) The EUT was directly connected to the tonscend test system and antenna output port as show in the block diagram below.

b) The maximum conducted output power was performed in accordance with method 11.9.2.3 (for average power) of ANSI C63.10-2013 and FCC KDB 662911 D01 v02r01 Multiple Transmitter Output.

3.5.3 Test Setup



3.5.4 Table of Parameters of Text Software Setting

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

No beamforming

Test Software Version	accessMTool_REL_3_3_0_2		
Frequency (MHz)	2412	2437	2462
IEEE 802.11b	76	88	76
IEEE 802.11g	65	88	67
IEEE 802.11n(20)	62	88	62
IEEE 802.11ax(20)	60	88	60
Frequency (MHz)	2422	2437	2452
IEEE 802.11n(40)	60	88	60
IEEE 802.11ax(40)	60	88	60

Beamforming

Test Software Version	accessMTool_REL_3_3_0_2		
Frequency (MHz)	2412	2437	2462
IEEE 802.11ax(20)	50	78	50
Frequency (MHz)	2422	2437	2452
IEEE 802.11ax(40)	50	78	50

3.5.5 The Result

No beamforming

Test Mode	Antenna	Frequency[MHz]	Average conducted output Power [dBm]	Limit [dBm]	Verdict
11B-CDD	Ant1	2412	20.08	≤29.56	PASS
	Ant2	2412	20.24	≤29.56	PASS
	Ant3	2412	20.65	≤29.56	PASS
	total	2412	25.10	≤29.56	PASS
	Ant1	2437	24.11	≤29.56	PASS
	Ant2	2437	24.05	≤29.56	PASS
	Ant3	2437	24.49	≤29.56	PASS
	total	2437	28.99	≤29.56	PASS
	Ant1	2462	20.00	≤29.56	PASS
	Ant2	2462	20.23	≤29.56	PASS
	Ant3	2462	20.83	≤29.56	PASS
	total	2462	25.14	≤29.56	PASS
11G-CDD	Ant1	2412	16.56	≤29.56	PASS
	Ant2	2412	16.11	≤29.56	PASS
	Ant3	2412	16.04	≤29.56	PASS
	total	2412	21.01	≤29.56	PASS
	Ant1	2437	24.56	≤29.56	PASS
	Ant2	2437	23.76	≤29.56	PASS
	Ant3	2437	24.21	≤29.56	PASS
	total	2437	28.96	≤29.56	PASS
	Ant1	2462	16.78	≤29.56	PASS
	Ant2	2462	16.89	≤29.56	PASS
	Ant3	2462	16.92	≤29.56	PASS
	total	2462	21.63	≤29.56	PASS
11N20MIMO	Ant1	2412	16.09	≤29.56	PASS
	Ant2	2412	16.19	≤29.56	PASS
	Ant3	2412	15.95	≤29.56	PASS
	total	2412	20.85	≤29.56	PASS
	Ant1	2437	24.22	≤29.56	PASS
	Ant2	2437	23.88	≤29.56	PASS
	Ant3	2437	24.15	≤29.56	PASS
	total	2437	28.86	≤29.56	PASS
	Ant1	2462	15.92	≤29.56	PASS
	Ant2	2462	16.07	≤29.56	PASS
	Ant3	2462	16.02	≤29.56	PASS
	total	2462	20.77	≤29.56	PASS

11N40MIMO	Ant1	2422	16.02	≤29.56	PASS
	Ant2	2422	16.11	≤29.56	PASS
	Ant3	2422	15.84	≤29.56	PASS
	total	2422	20.76	≤29.56	PASS
	Ant1	2437	24.55	≤29.56	PASS
	Ant2	2437	24.21	≤29.56	PASS
	Ant3	2437	23.89	≤29.56	PASS
	total	2437	29.00	≤29.56	PASS
	Ant1	2452	15.98	≤29.56	PASS
	Ant2	2452	16.11	≤29.56	PASS
	Ant3	2452	15.86	≤29.56	PASS
	total	2452	20.76	≤29.56	PASS
11AX20MIMO	Ant1	2412	16.23	≤29.56	PASS
	Ant2	2412	16.10	≤29.56	PASS
	Ant3	2412	16.03	≤29.56	PASS
	total	2412	20.89	≤29.56	PASS
	Ant1	2437	24.26	≤29.56	PASS
	Ant2	2437	23.94	≤29.56	PASS
	Ant3	2437	24.52	≤29.56	PASS
	total	2437	**29.02**	≤29.56	PASS
	Ant1	2462	16.08	≤29.56	PASS
	Ant2	2462	15.86	≤29.56	PASS
	Ant3	2462	15.91	≤29.56	PASS
	total	2462	20.72	≤29.56	PASS
11AX40MIMO	Ant1	2422	16.22	≤29.56	PASS
	Ant2	2422	16.35	≤29.56	PASS
	Ant3	2422	16.04	≤29.56	PASS
	total	2422	20.98	≤29.56	PASS
	Ant1	2437	24.05	≤29.56	PASS
	Ant2	2437	24.22	≤29.56	PASS
	Ant3	2437	24.27	≤29.56	PASS
	total	2437	28.95	≤29.56	PASS
	Ant1	2452	16.13	≤29.56	PASS
	Ant2	2452	16.34	≤29.56	PASS
	Ant3	2452	16.11	≤29.56	PASS
	total	2452	20.97	≤29.56	PASS

Note: The duty cycle factor is compensated in the average conducted output power.
Max Directional gain=6.44dBi

Beamforming

Test Mode	Antenna	Frequency[MHz]	Average conducted output Power [dBm]	Limit [dBm]	Verdict
11AX20MIMO	Ant1	2412	13.65	≤27.06	PASS
	Ant2	2412	13.42	≤27.06	PASS
	Ant3	2412	13.51	≤27.06	PASS
	total	2412	18.30	≤27.06	PASS
	Ant1	2437	21.58	≤27.06	PASS
	Ant2	2437	21.34	≤27.06	PASS
	Ant3	2437	21.96	≤27.06	PASS
	total	2437	**26.41**	≤27.06	PASS
	Ant1	2462	13.49	≤27.06	PASS
	Ant2	2462	13.25	≤27.06	PASS
	Ant3	2462	13.32	≤27.06	PASS
	total	2462	18.13	≤27.06	PASS
11AX40MIMO	Ant1	2422	13.62	≤27.06	PASS
	Ant2	2422	13.74	≤27.06	PASS
	Ant3	2422	13.51	≤27.06	PASS
	total	2422	18.39	≤27.06	PASS
	Ant1	2437	21.44	≤27.06	PASS
	Ant2	2437	21.59	≤27.06	PASS
	Ant3	2437	21.65	≤27.06	PASS
	total	2437	26.33	≤27.06	PASS
	Ant1	2452	13.53	≤27.06	PASS
	Ant2	2452	13.78	≤27.06	PASS
	Ant3	2452	13.52	≤27.06	PASS
	total	2452	18.38	≤27.06	PASS

Note: The duty cycle factor is compensated in the average conducted output power.

Correlated chains directional gain=6.44+2.5=8.94dBi

3.6 Power Spectral Density

3.6.1 Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmitting.

3.6.2 Test Procedure

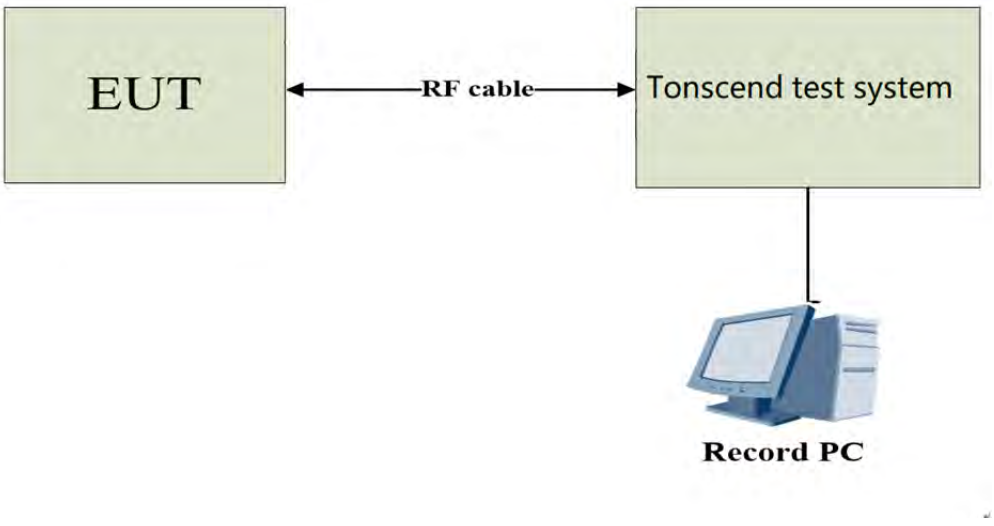
Test Method	
●Conducted Measurement	○Radiated Measurement
Test Channels	
●Lowest, Middle and Highest Channel	○ Lowest and Highest Channel
Environmental conditions	
●Normal	○Normal and Extreme
Note: ●: Test ○: No Test	

a) The EUT was directly connected to the tonscend test system and antenna output port as show in the block diagram below.

b) Spectrum analyser settings as following:

Spectrum Parameters	Setting
Span Frequency	1.5 times the DTS bandwidth
RBW	3 kHz
VBW	10 kHz
Detector	Average
Trace	Max Hold
Sweep Time	Auto

3.6.3 Test Setup



3.6.4 The Result

Test Mode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B-CDD	Ant1	2412	-8.94	≤7.56	PASS
	Ant2	2412	-8.15	≤7.56	PASS
	Ant3	2412	-8.74	≤7.56	PASS
	total	2412	-3.83	≤7.56	PASS
	Ant1	2437	-5.84	≤7.56	PASS
	Ant2	2437	-5.82	≤7.56	PASS
	Ant3	2437	-5.54	≤7.56	PASS
	total	2437	-0.96	≤7.56	PASS
	Ant1	2462	-9.3	≤7.56	PASS
	Ant2	2462	-8.56	≤7.56	PASS
	Ant3	2462	-8.2	≤7.56	PASS
	total	2462	-3.89	≤7.56	PASS
11G-CDD	Ant1	2412	-12.74	≤7.56	PASS
	Ant2	2412	-12.96	≤7.56	PASS
	Ant3	2412	-13.14	≤7.56	PASS
	total	2412	-8.17	≤7.56	PASS
	Ant1	2437	-2.8	≤7.56	PASS
	Ant2	2437	-3.46	≤7.56	PASS
	Ant3	2437	-2.44	≤7.56	PASS
	total	2437	1.89	≤7.56	PASS
	Ant1	2462	-11.88	≤7.56	PASS
	Ant2	2462	-12.09	≤7.56	PASS
	Ant3	2462	-11.54	≤7.56	PASS
	total	2462	-7.06	≤7.56	PASS
11N20MIMO	Ant1	2412	-14.73	≤7.56	PASS
	Ant2	2412	-14.7	≤7.56	PASS
	Ant3	2412	-14.76	≤7.56	PASS
	total	2412	-9.96	≤7.56	PASS
	Ant1	2437	-3.83	≤7.56	PASS
	Ant2	2437	-4.69	≤7.56	PASS
	Ant3	2437	-4.4	≤7.56	PASS
	total	2437	0.48	≤7.56	PASS
	Ant1	2462	-15.17	≤7.56	PASS
	Ant2	2462	-14.69	≤7.56	PASS
	Ant3	2462	-14.09	≤7.56	PASS
	total	2462	-9.86	≤7.56	PASS
11N40MIMO	Ant1	2422	-15.94	≤7.56	PASS
	Ant2	2422	-16.4	≤7.56	PASS
	Ant3	2422	-16.17	≤7.56	PASS

	total	2422	-11.39	≤7.56	PASS
	Ant1	2437	-8.11	≤7.56	PASS
	Ant2	2437	-8.97	≤7.56	PASS
	Ant3	2437	-8.84	≤7.56	PASS
	total	2437	-3.85	≤7.56	PASS
	Ant1	2452	-15.98	≤7.56	PASS
	Ant2	2452	-15.8	≤7.56	PASS
	Ant3	2452	-16.13	≤7.56	PASS
	total	2452	-11.20	≤7.56	PASS
11AX20MIMO	Ant1	2412	-16.68	≤7.56	PASS
	Ant2	2412	-15.92	≤7.56	PASS
	Ant3	2412	-16.28	≤7.56	PASS
	total	2412	-11.51	≤7.56	PASS
	Ant1	2437	-6.82	≤7.56	PASS
	Ant2	2437	-6.75	≤7.56	PASS
	Ant3	2437	-6.35	≤7.56	PASS
	total	2437	-1.86	≤7.56	PASS
	Ant1	2462	-16.55	≤7.56	PASS
	Ant2	2462	-16.48	≤7.56	PASS
	Ant3	2462	-16.63	≤7.56	PASS
	total	2462	-11.78	≤7.56	PASS
11AX40MIMO	Ant1	2422	-18.69	≤7.56	PASS
	Ant2	2422	-18.1	≤7.56	PASS
	Ant3	2422	-18.69	≤7.56	PASS
	total	2422	-13.71	≤7.56	PASS
	Ant1	2437	-10.01	≤7.56	PASS
	Ant2	2437	-10.08	≤7.56	PASS
	Ant3	2437	-10.33	≤7.56	PASS
	total	2437	-5.37	≤7.56	PASS
	Ant1	2452	-18.28	≤7.56	PASS
	Ant2	2452	-18	≤7.56	PASS
	Ant3	2452	-18.13	≤7.56	PASS
	total	2452	-13.36	≤7.56	PASS

Note: The duty cycle factor is compensated in the graph.

Max Directional gain=6.44dBi

Beamforming conducted power less than no beamforming conducted power, so only no beamforming conducted power spectral density was recored.

11B_Ant1_2412


11B_Ant2_2412


11B_Ant3_2412


11B_Ant1_2437

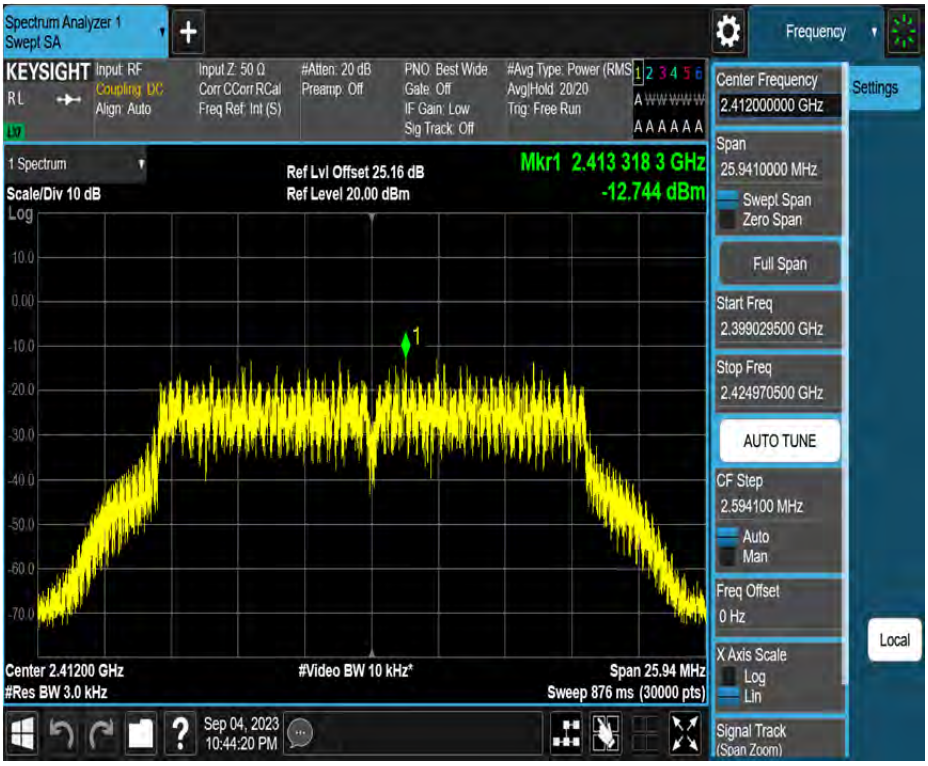

11B_Ant2_2437

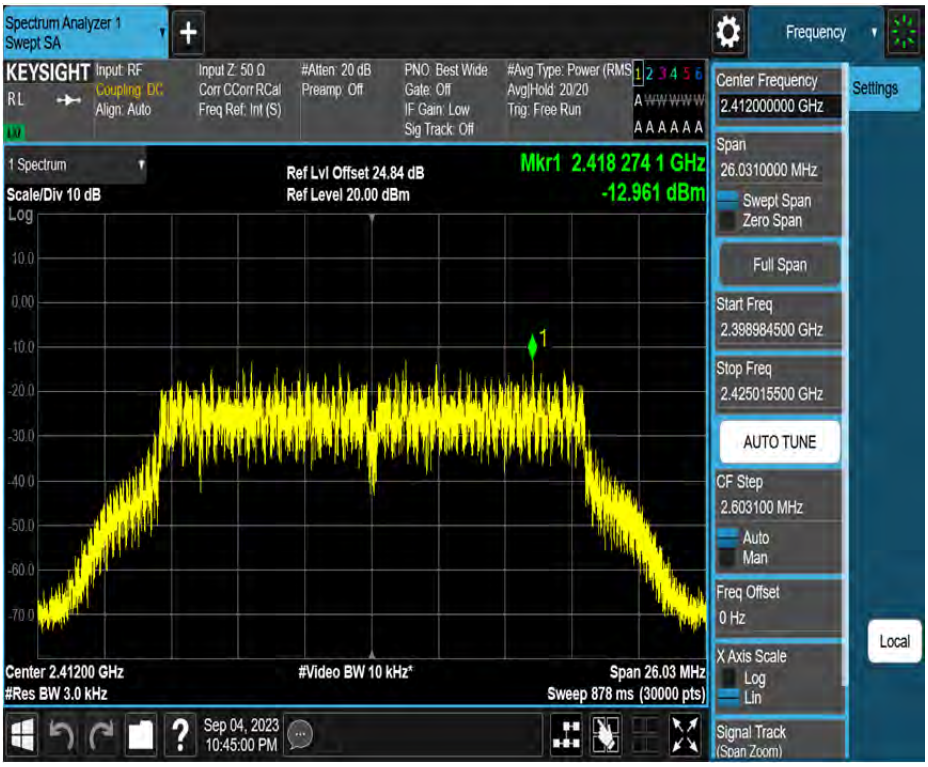
11B_Ant3_2437


11B_Ant1_2462

11B_Ant2_2462


11B_Ant3_2462


11G_Ant1_2412


11G_Ant2_2412


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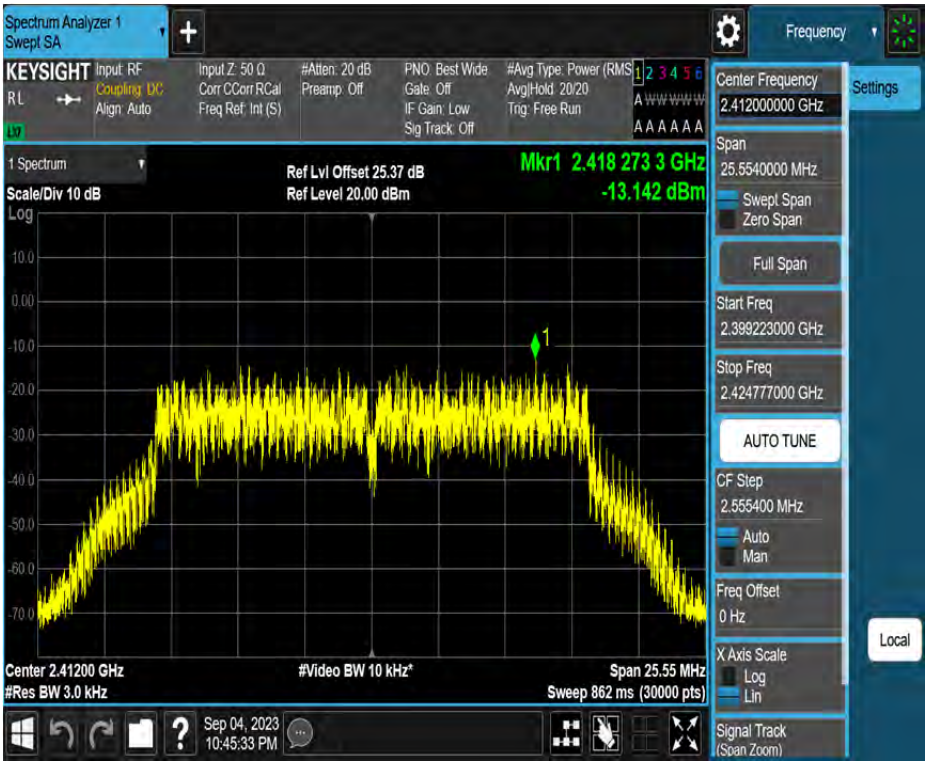

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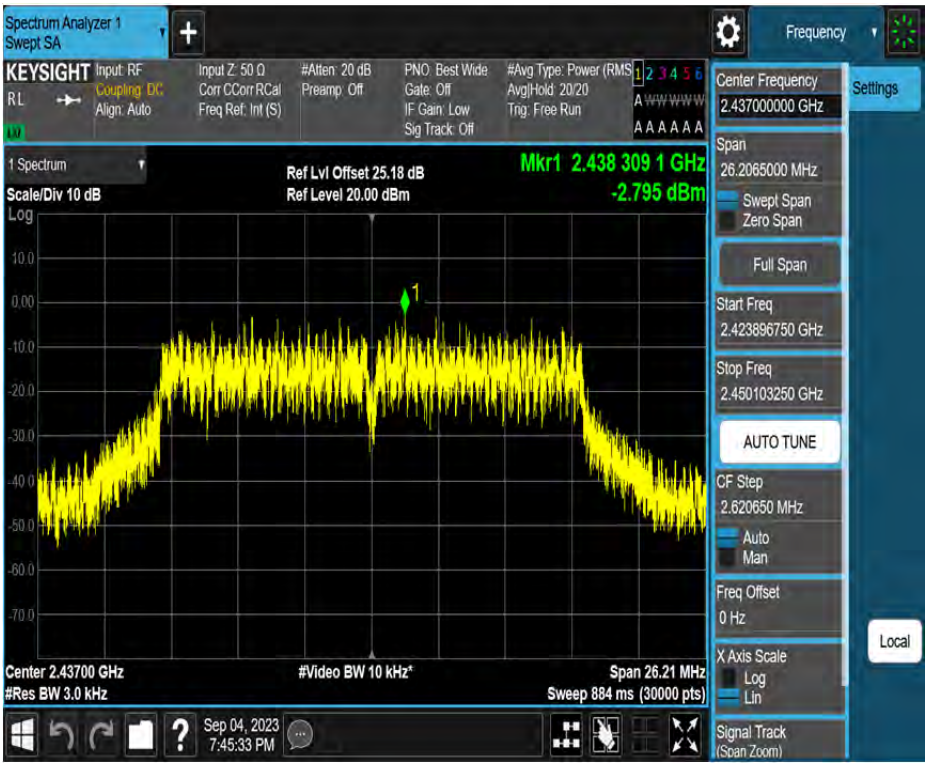

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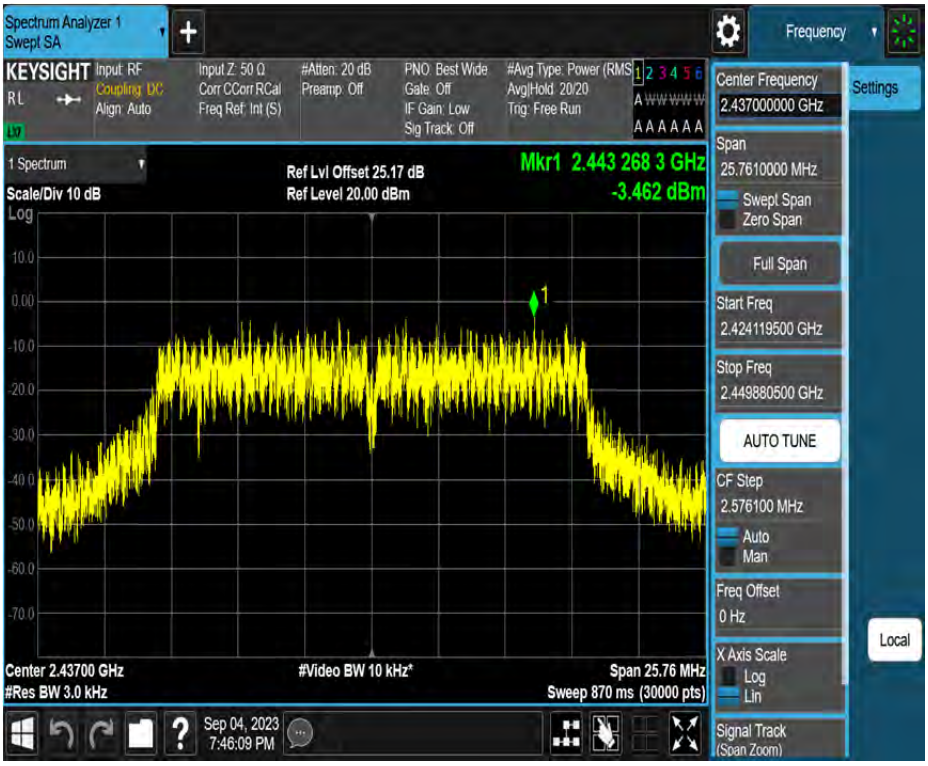

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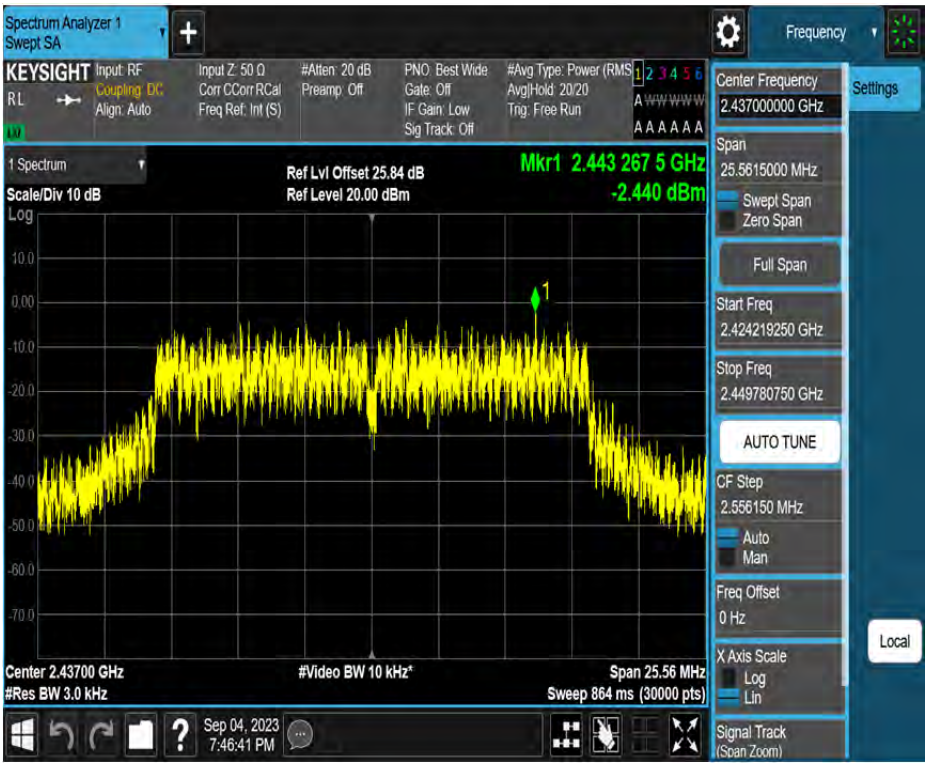

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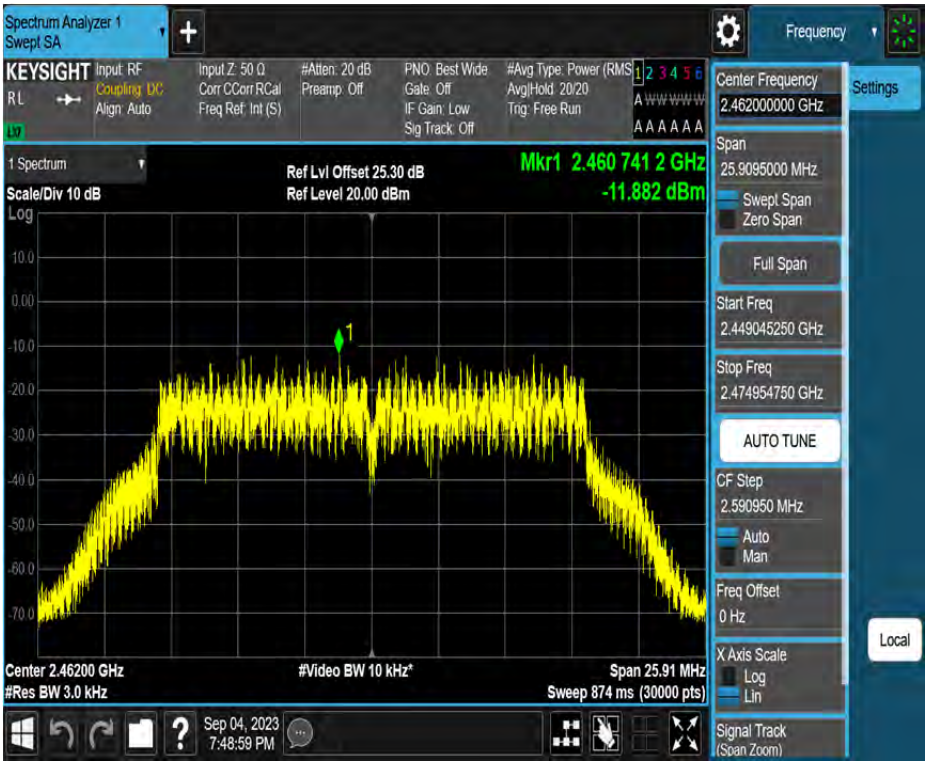

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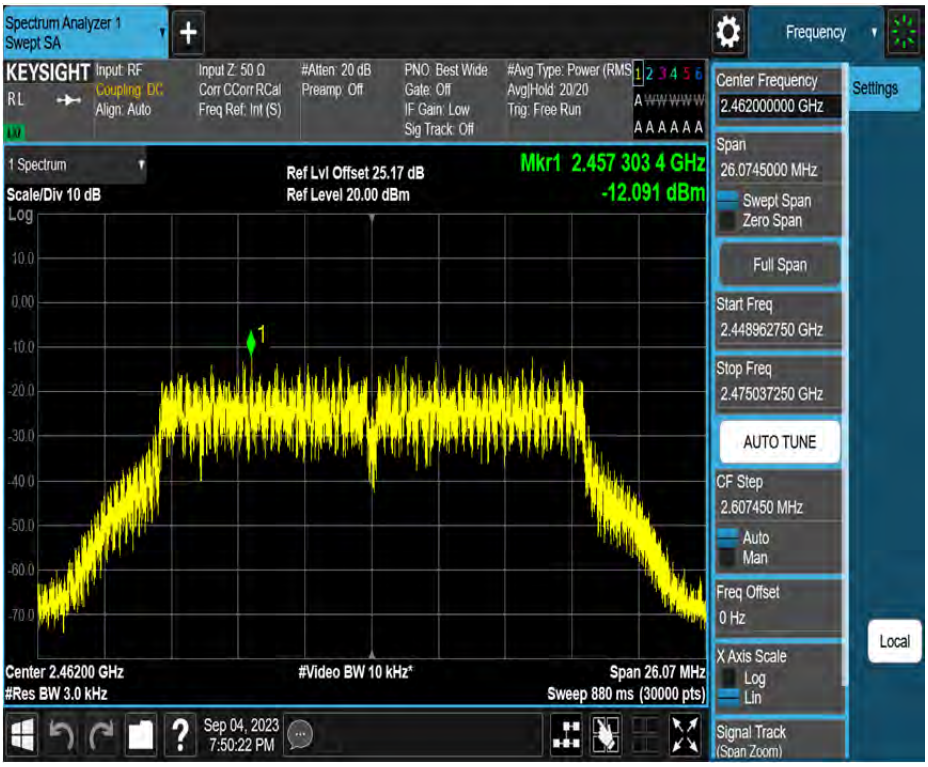

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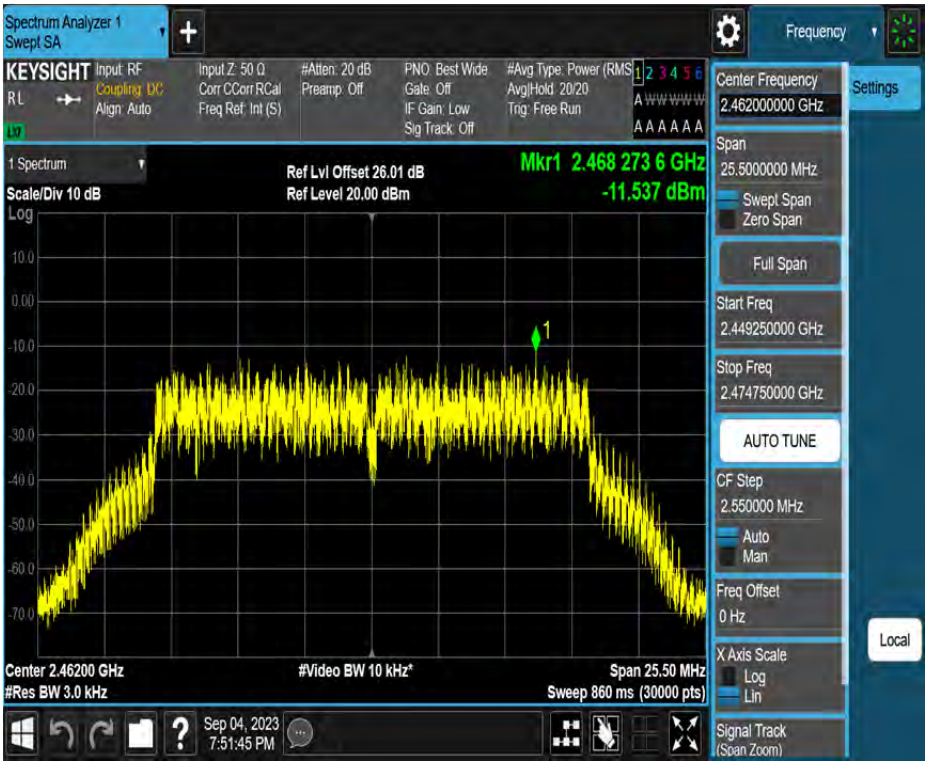

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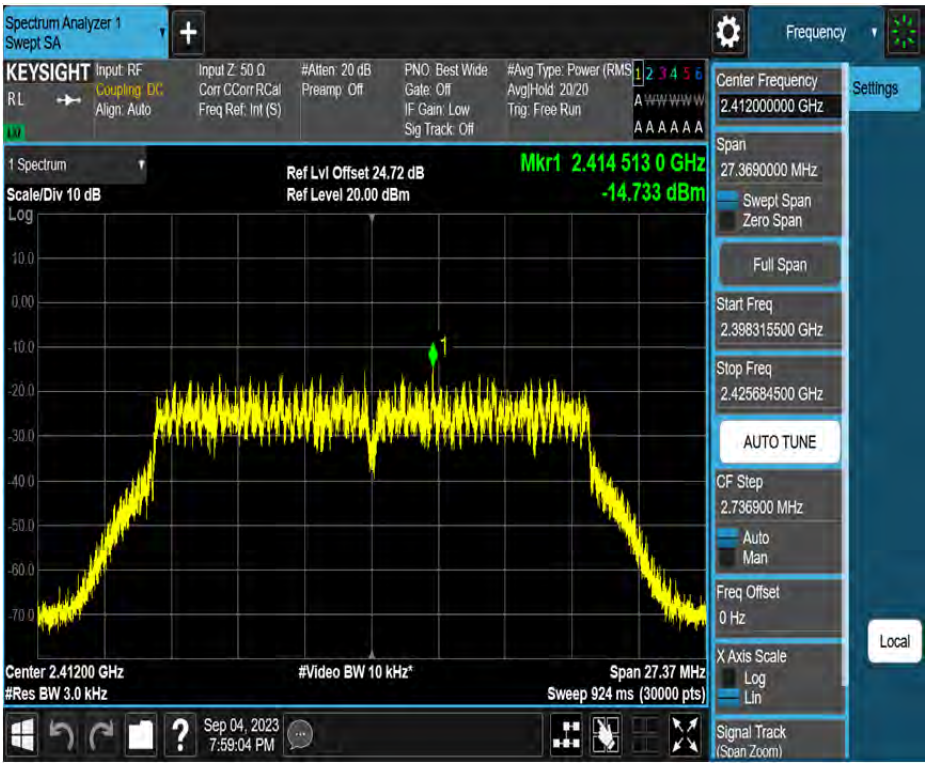
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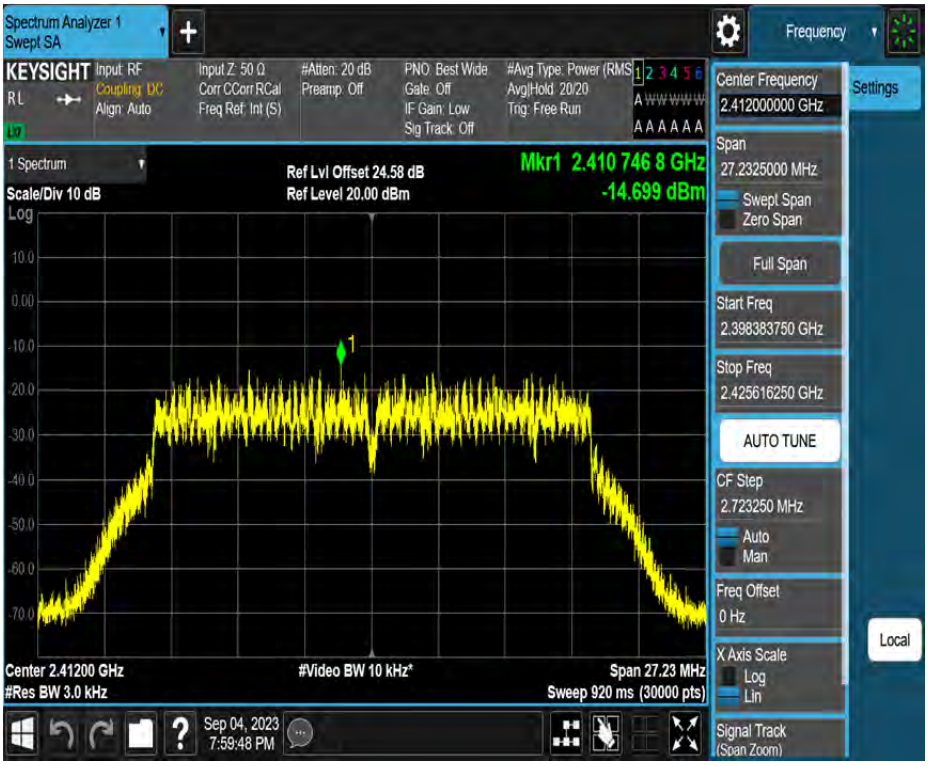

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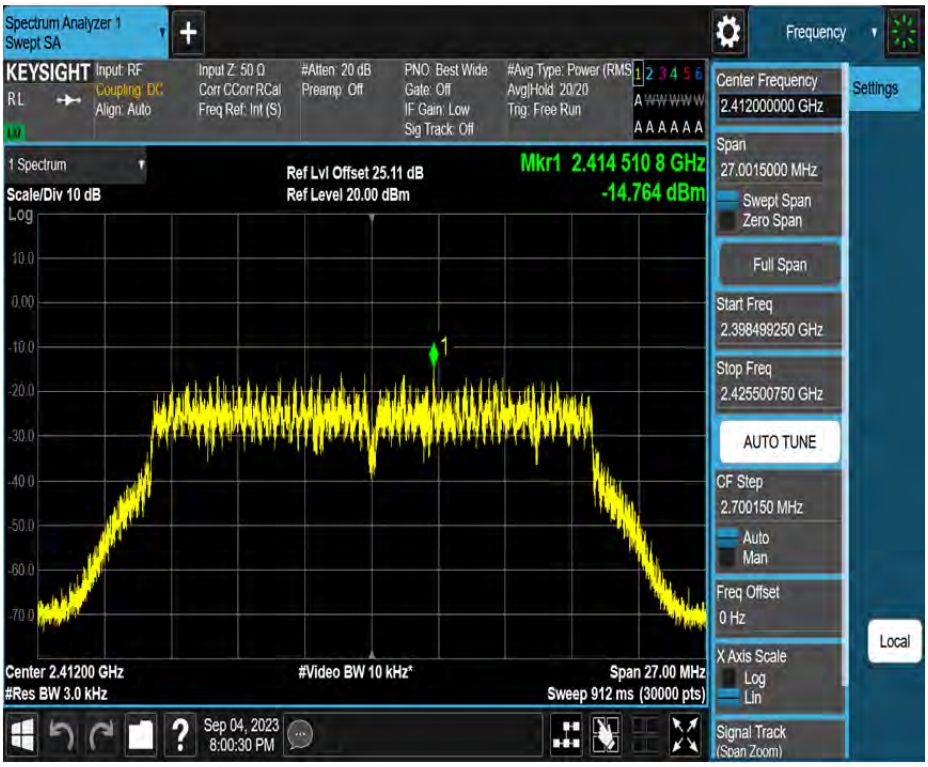
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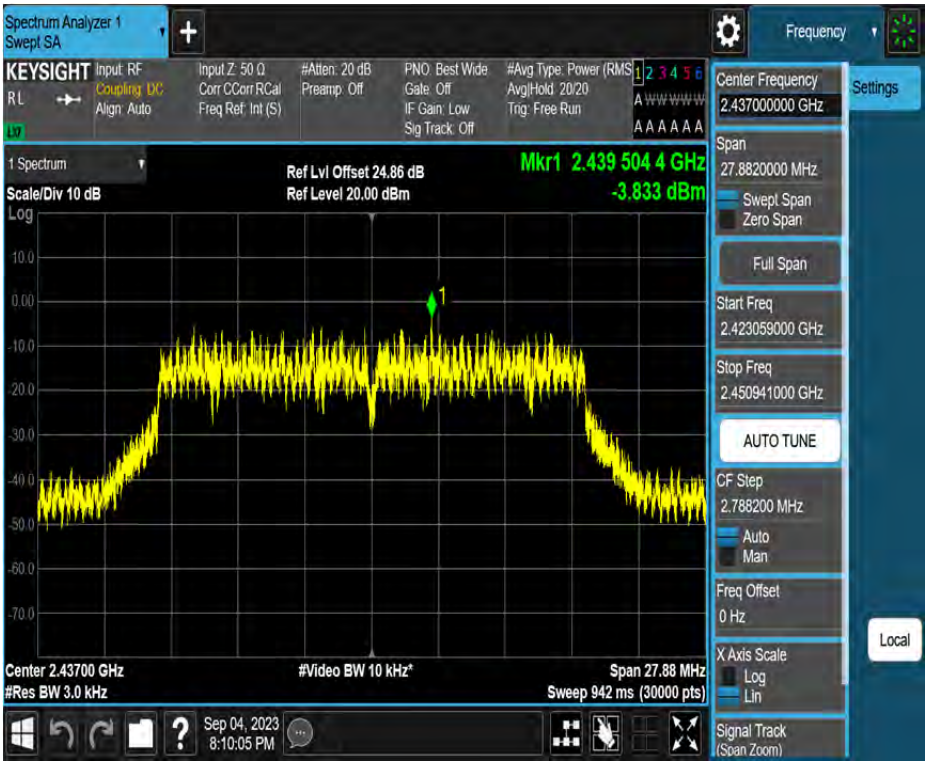

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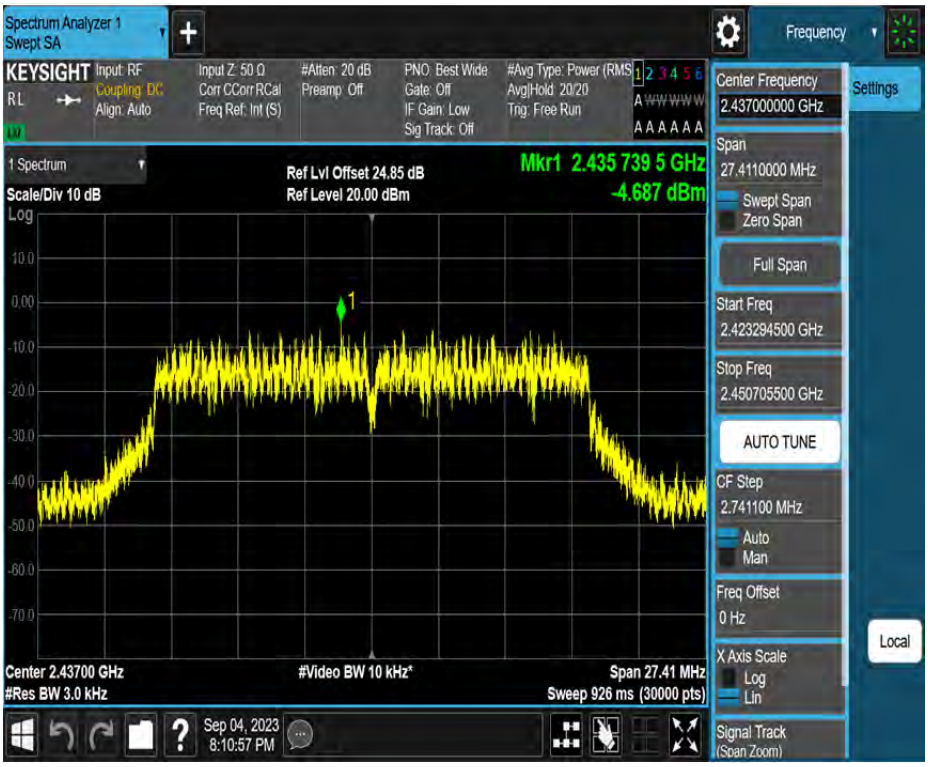
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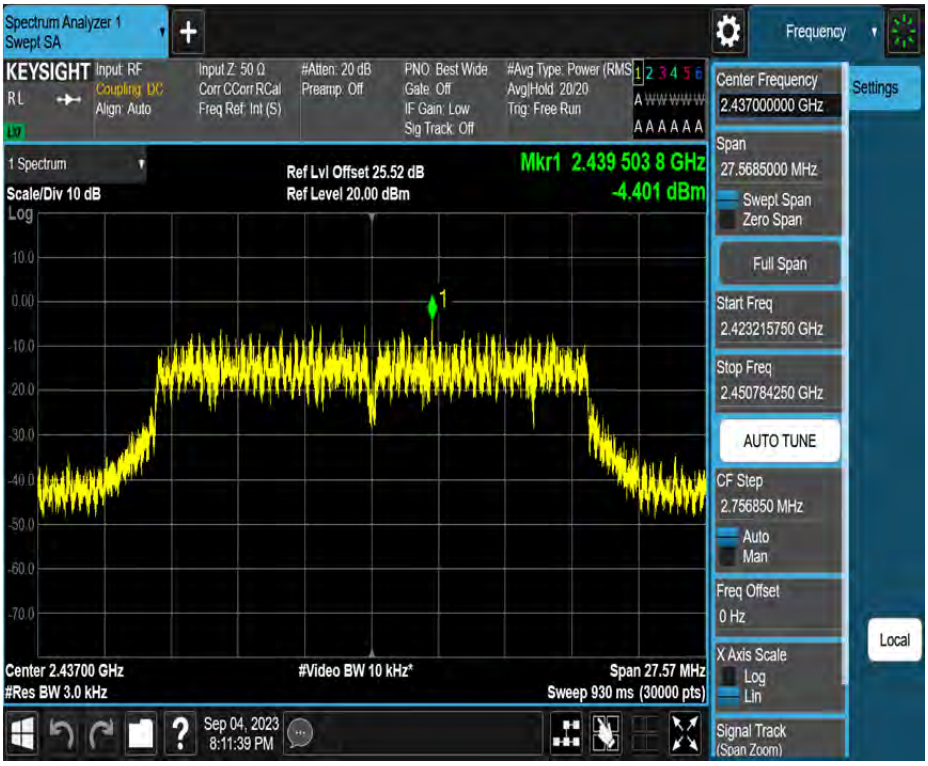

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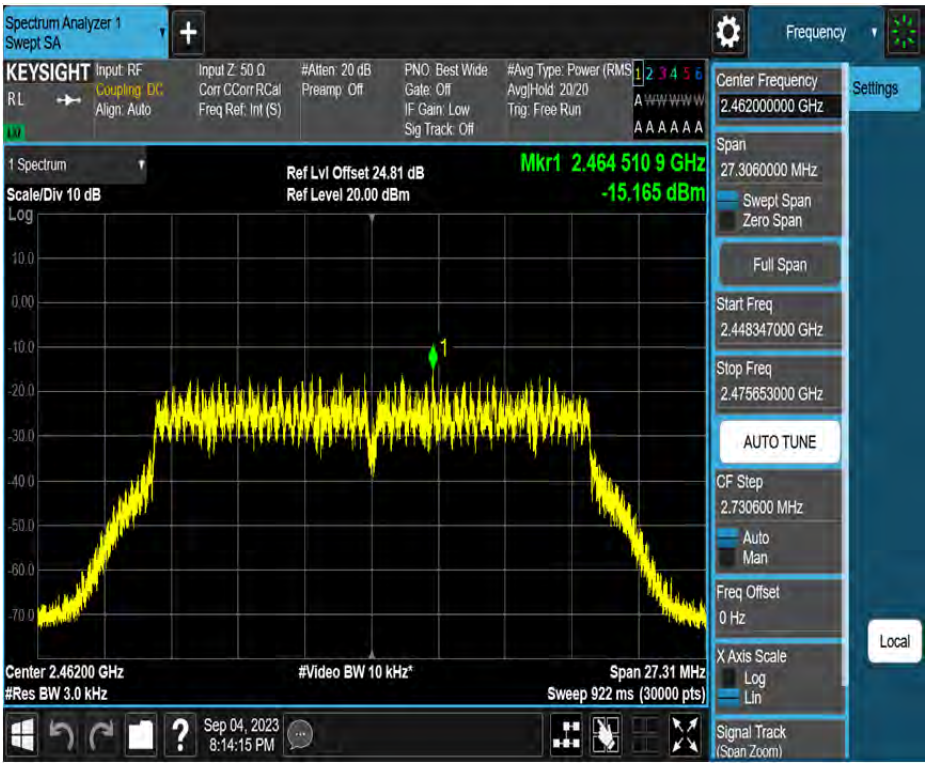
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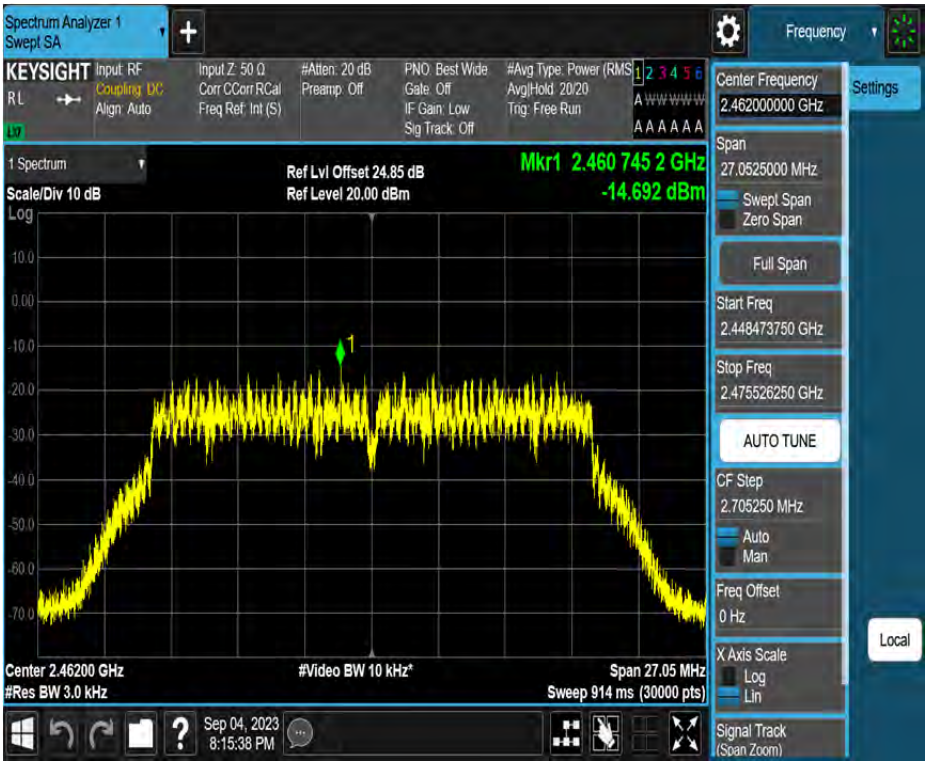

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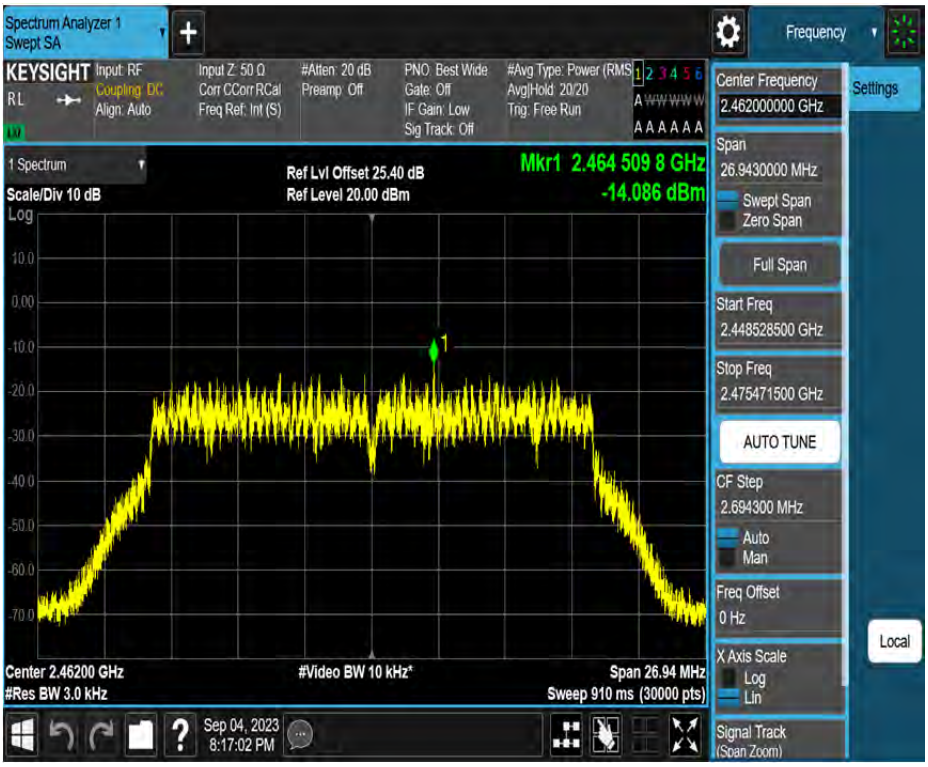

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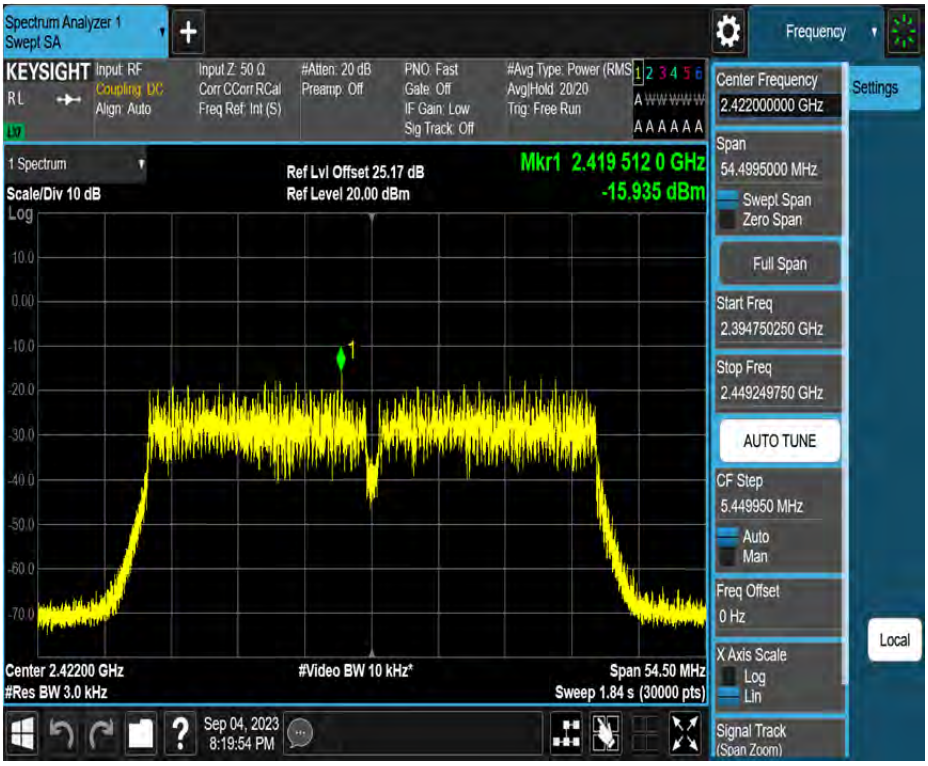

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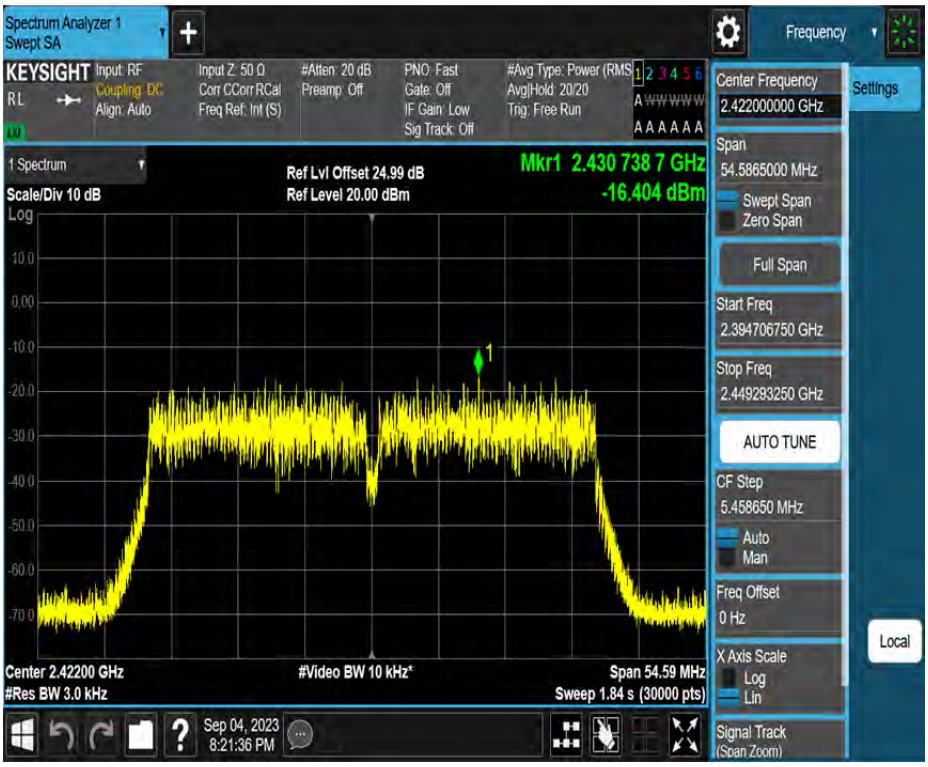
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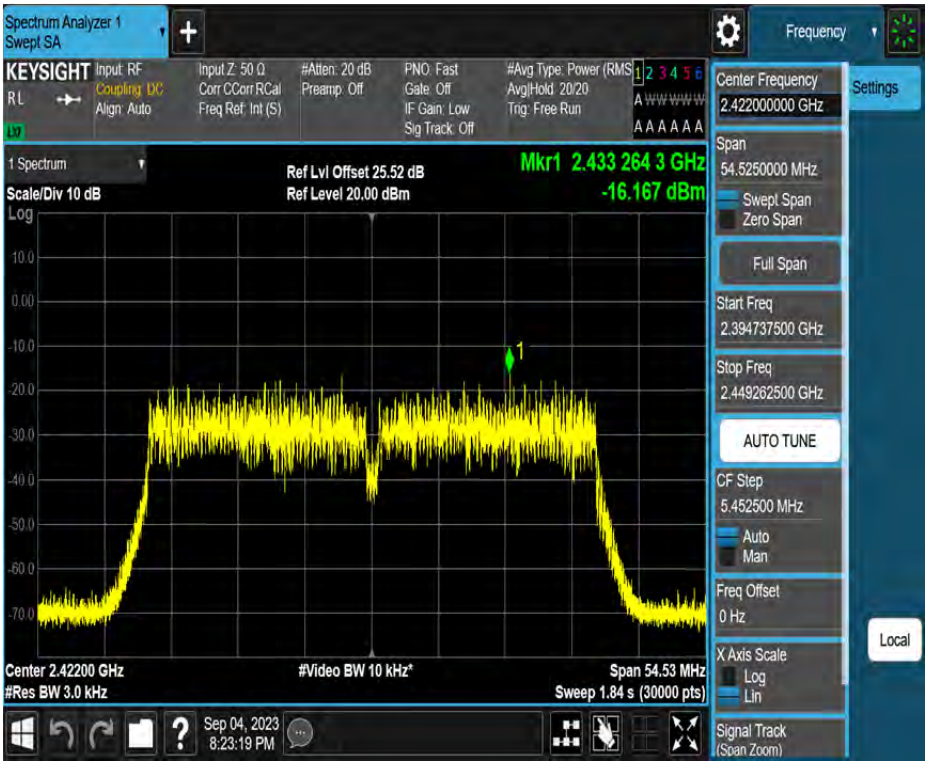

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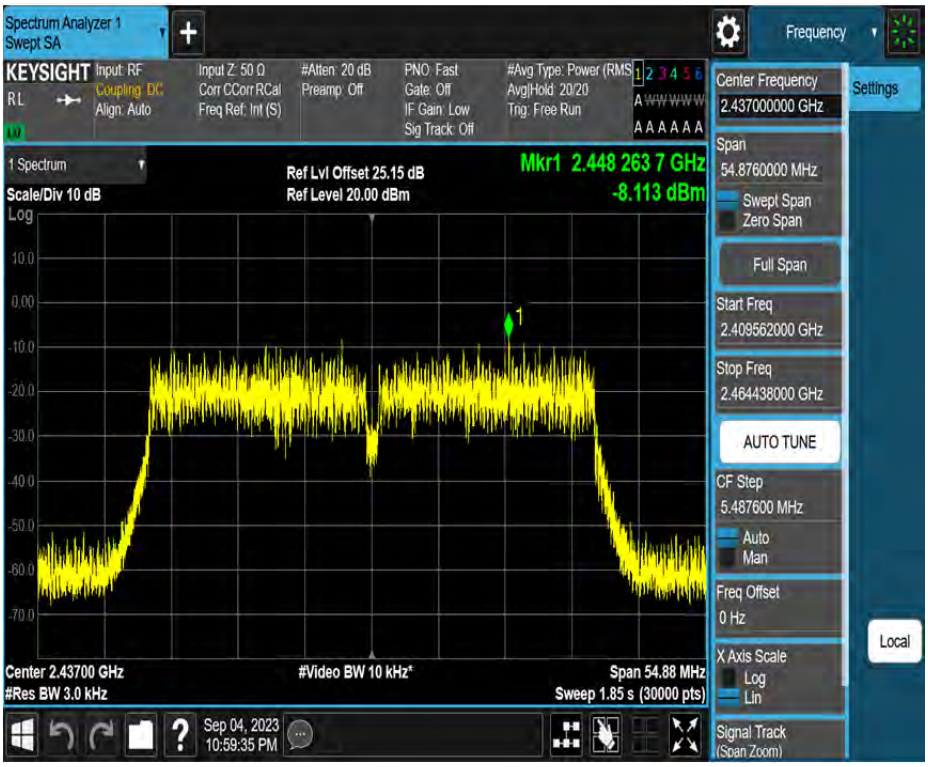
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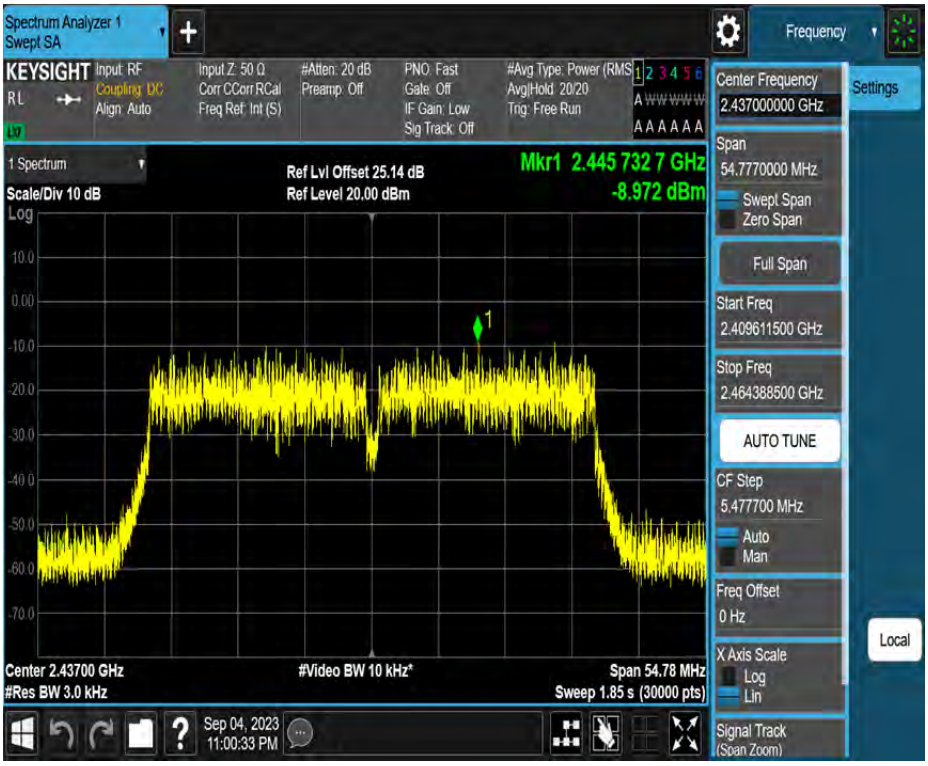

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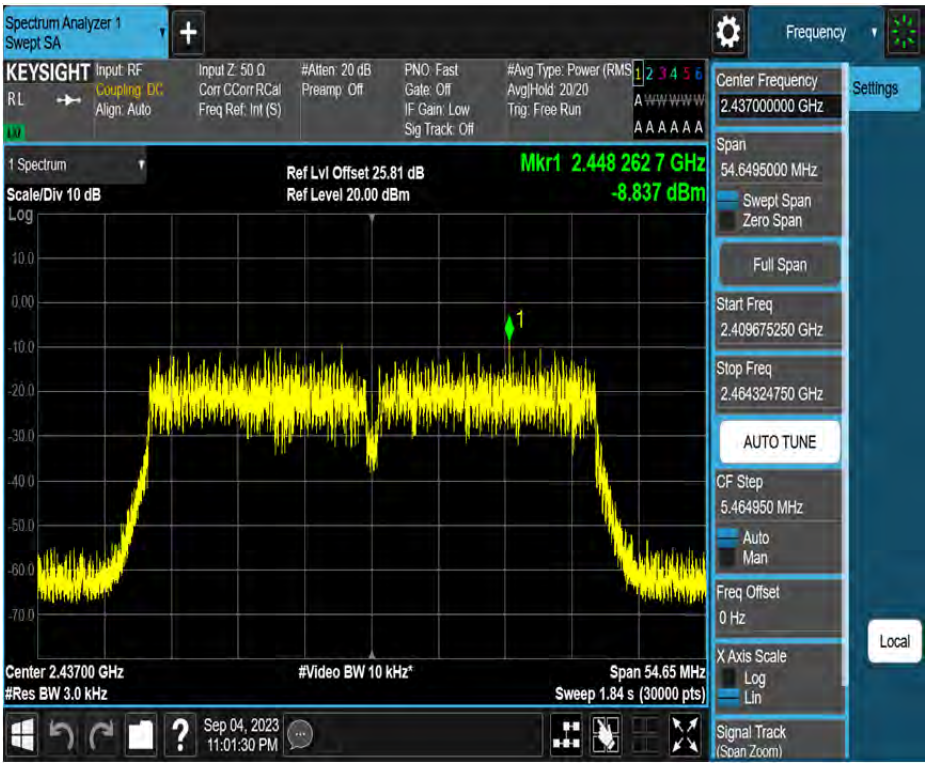
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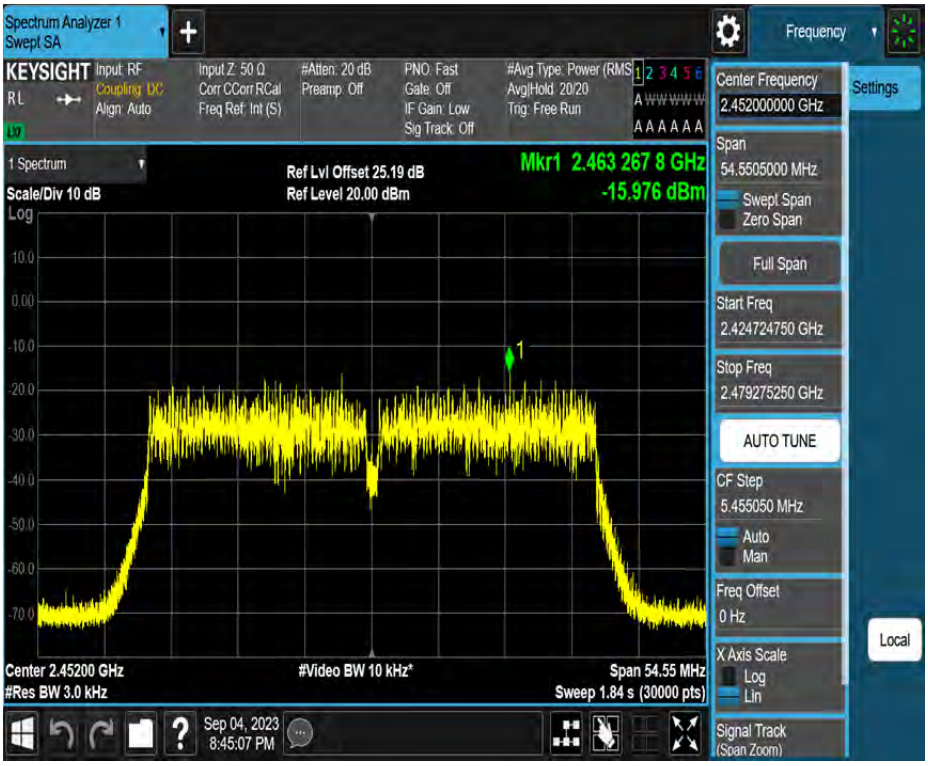

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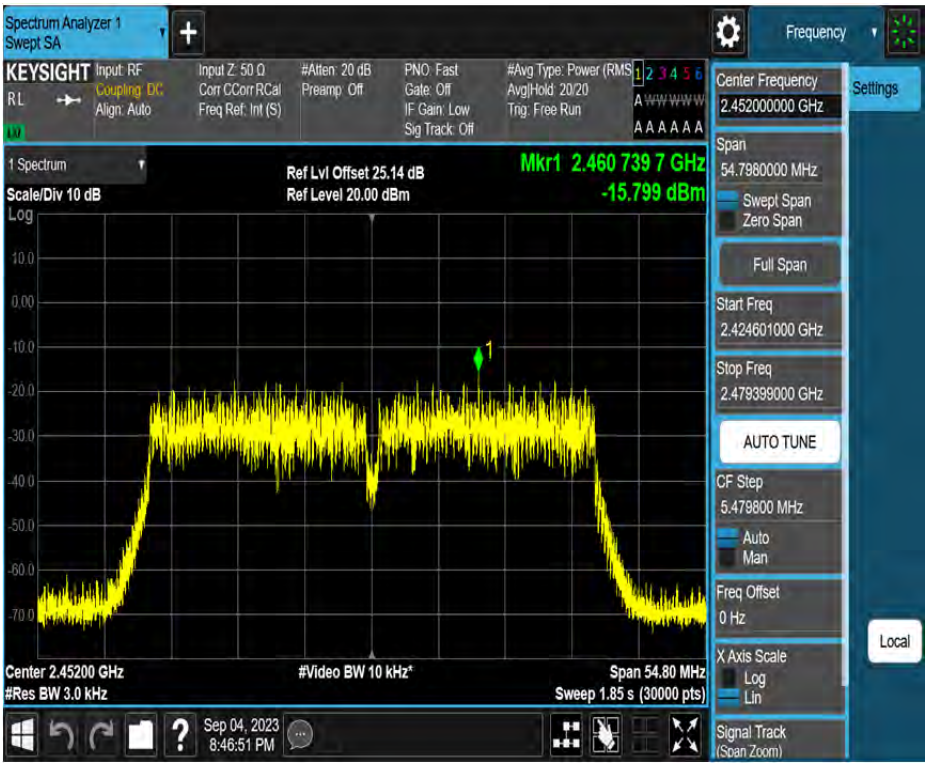
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