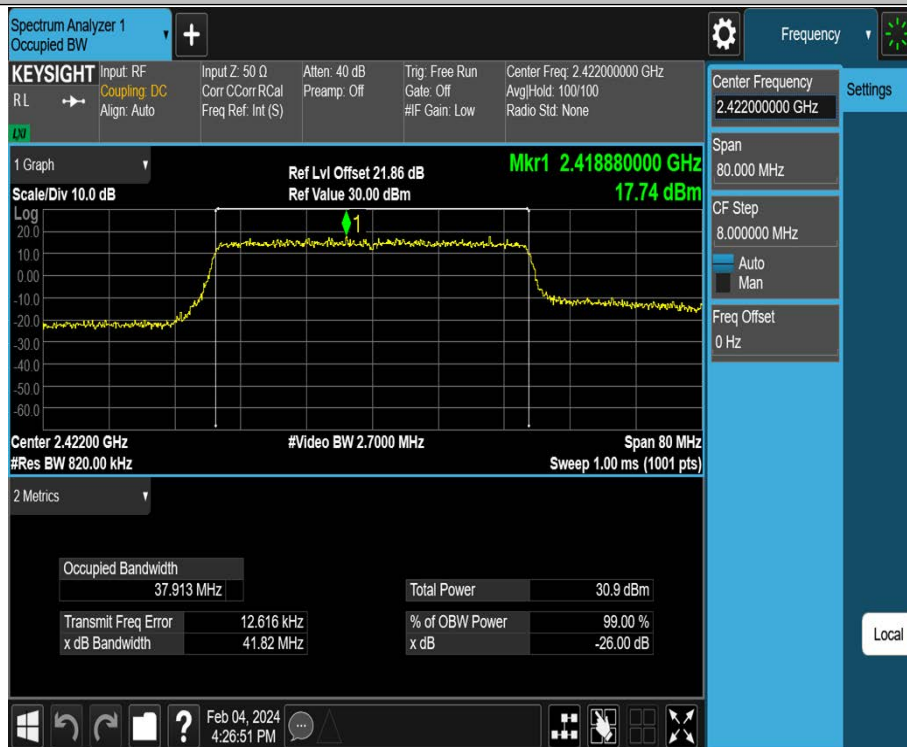


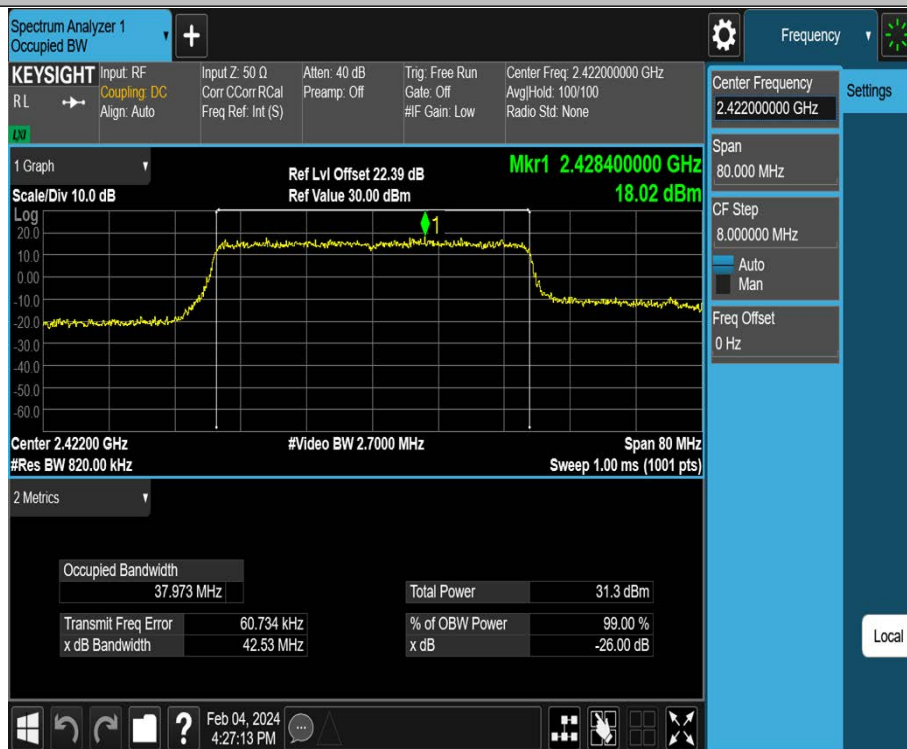
11AX40MIMO_Ant1_2422



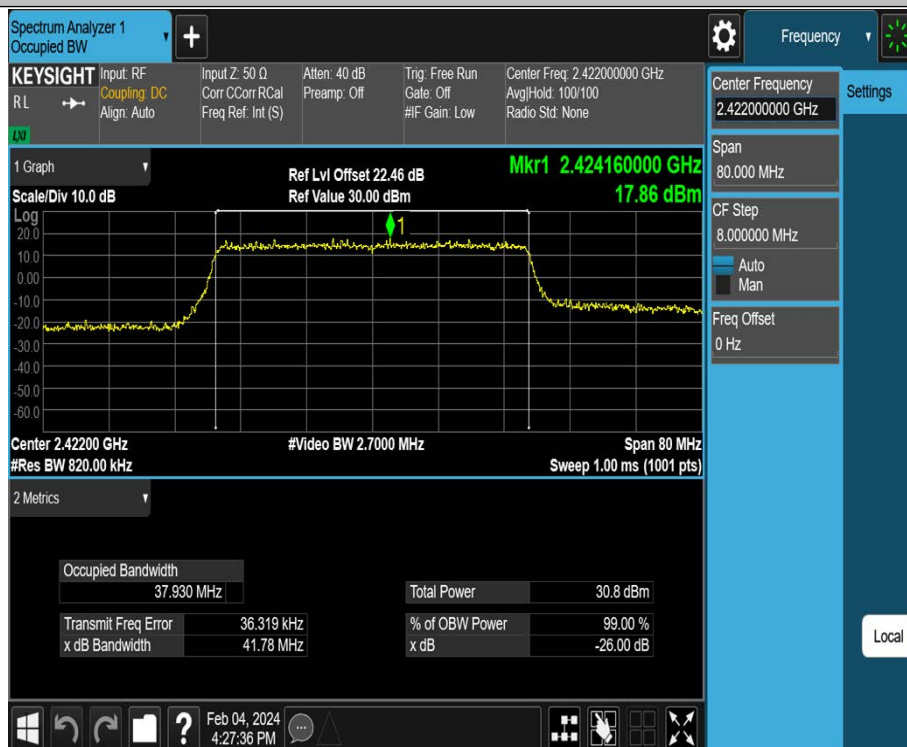
11AX40MIMO_Ant2_2422



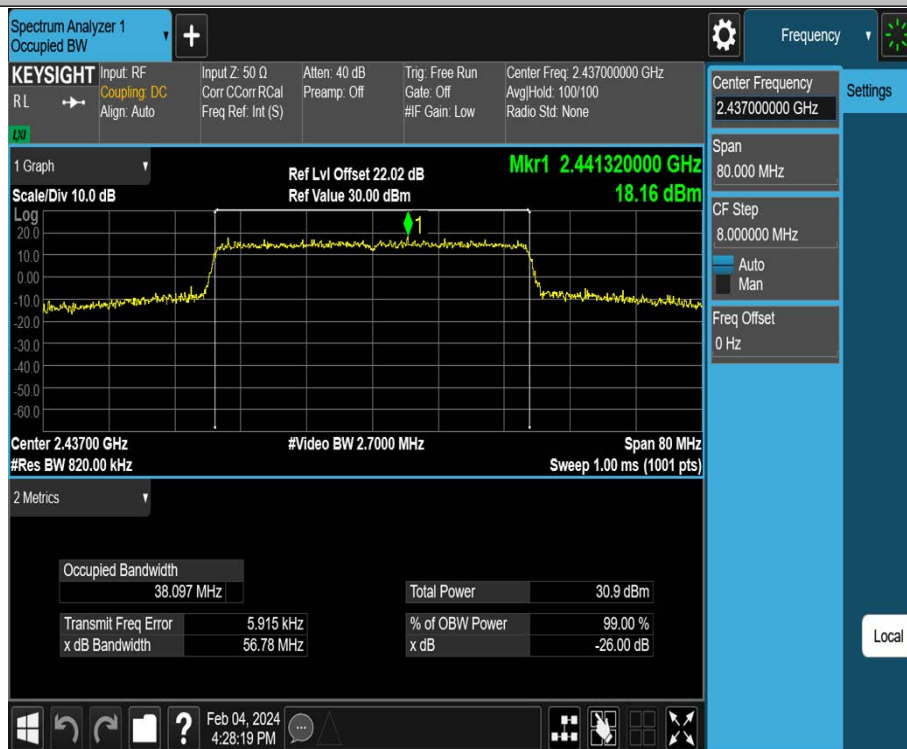
11AX40MIMO_Ant3_2422



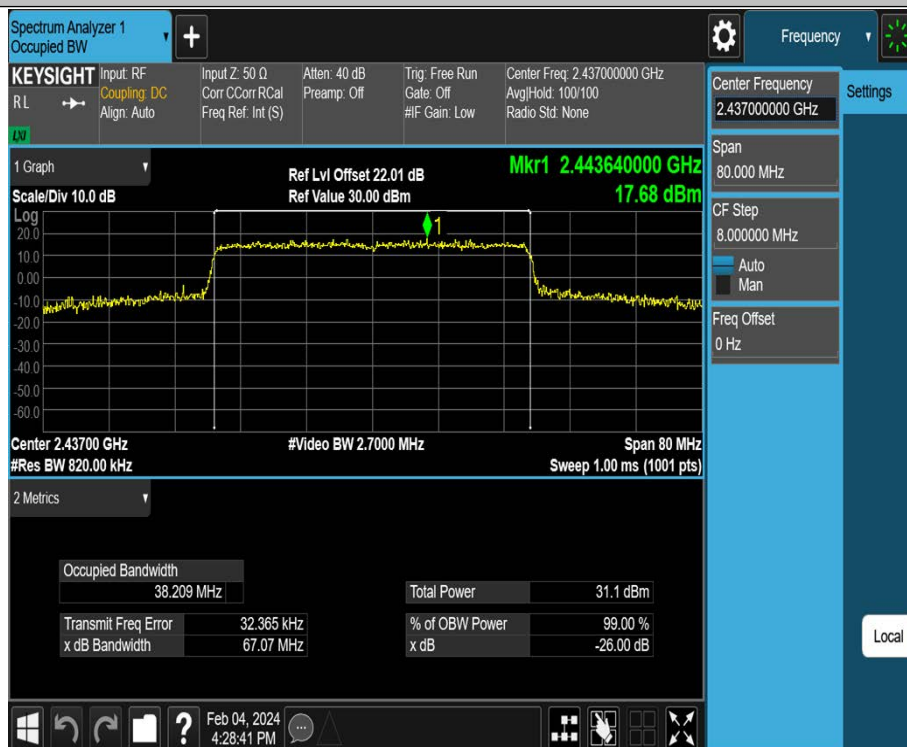
11AX40MIMO_Ant4_2422



11AX40MIMO_Ant1_2437



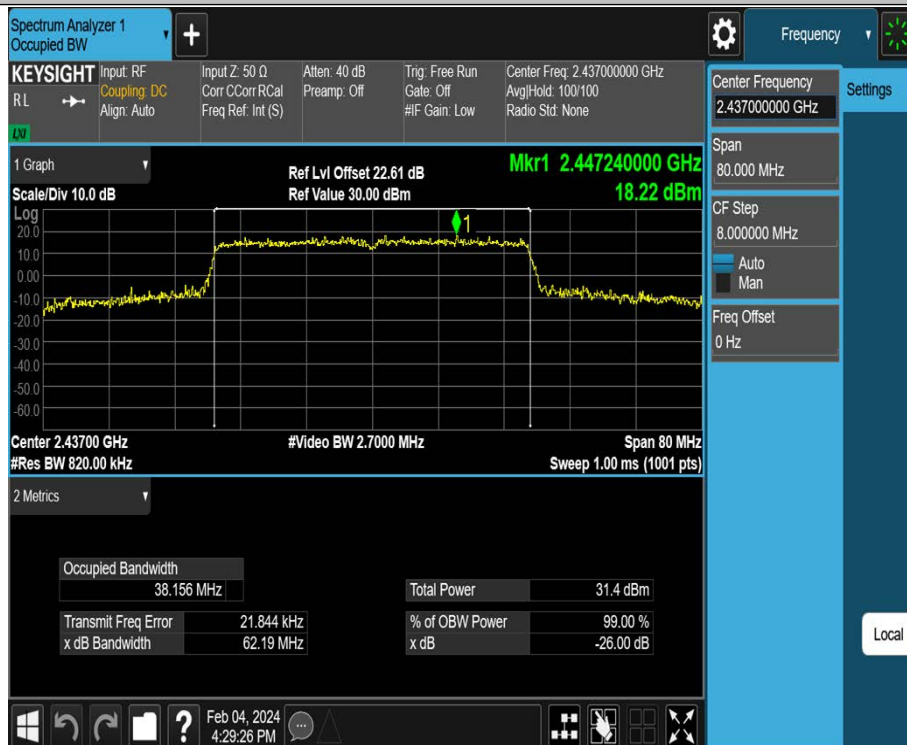
11AX40MIMO_Ant2_2437



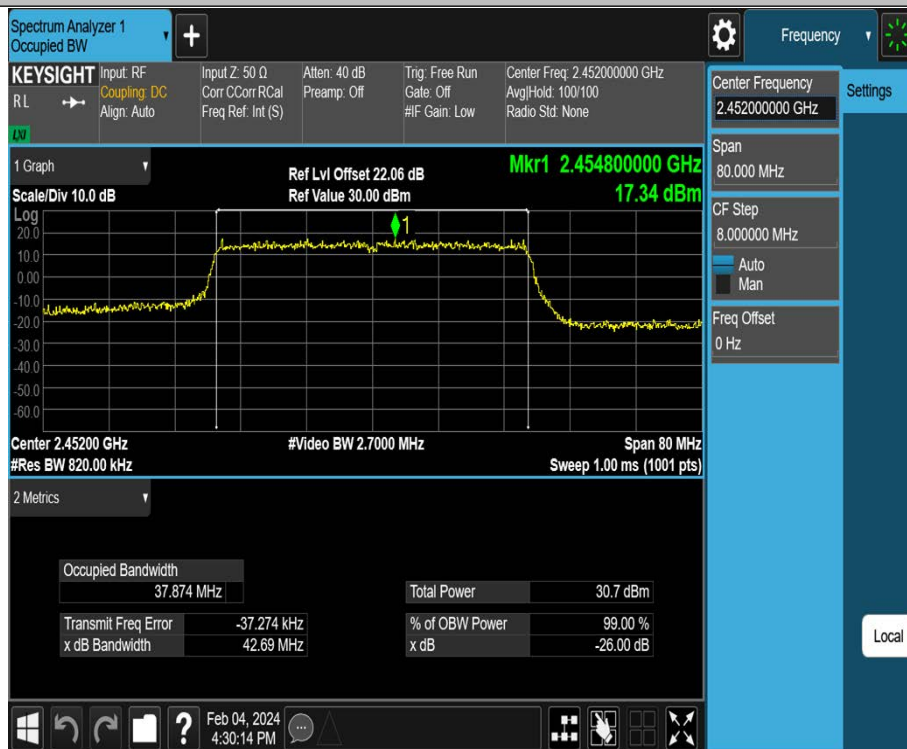
11AX40MIMO_Ant3_2437



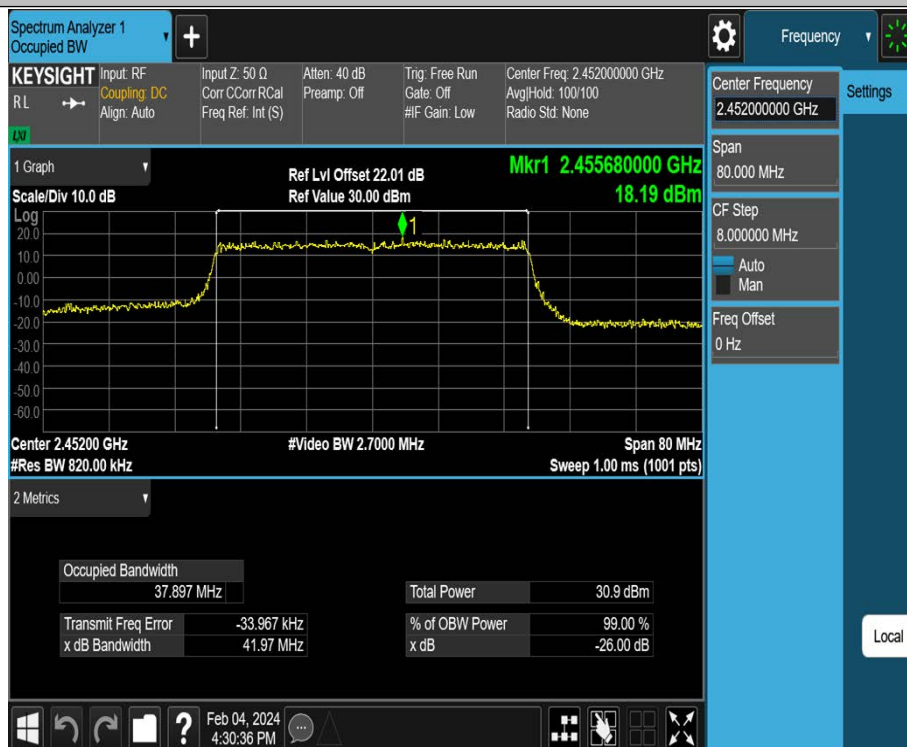
11AX40MIMO_Ant4_2437



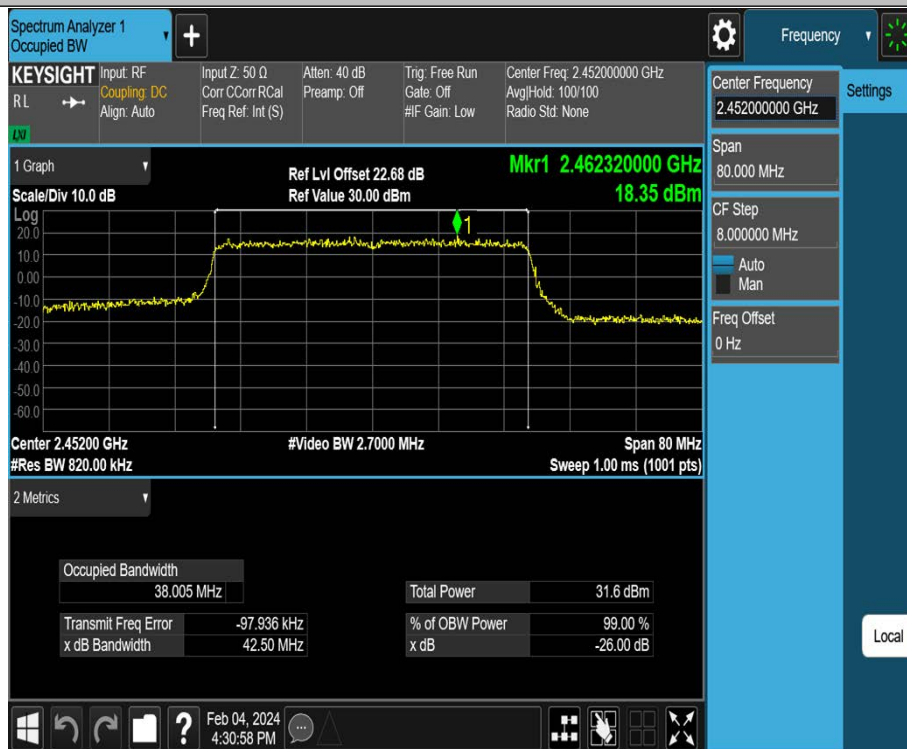
11AX40MIMO_Ant1_2452



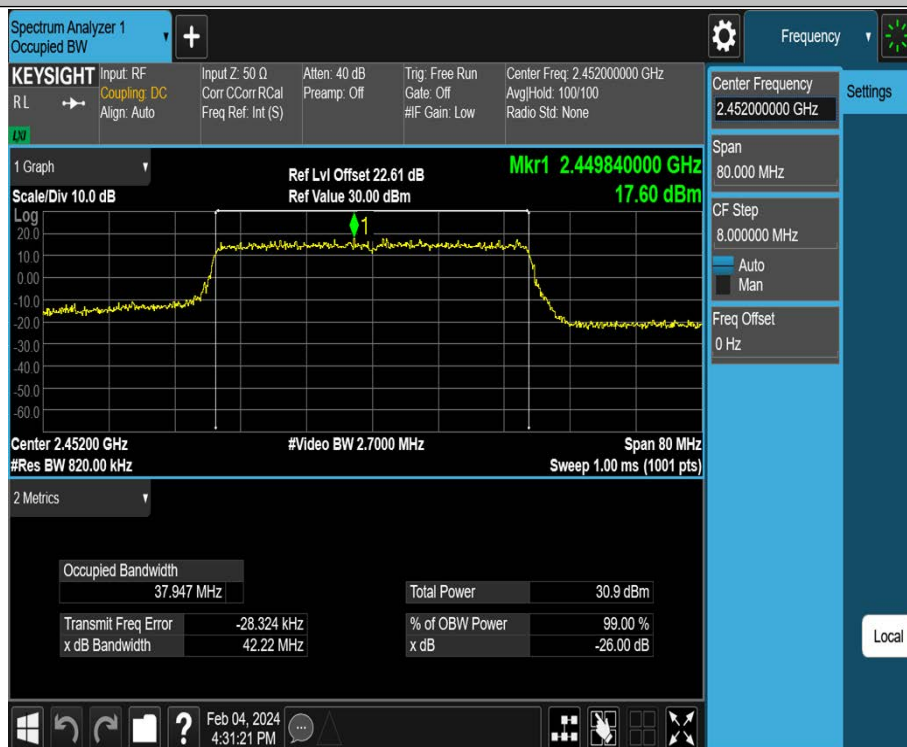
11AX40MIMO_Ant2_2452



11AX40MIMO_Ant3_2452



11AX40MIMO_Ant4_2452



3.5 Maximum conducted output power

3.5.1 Limit

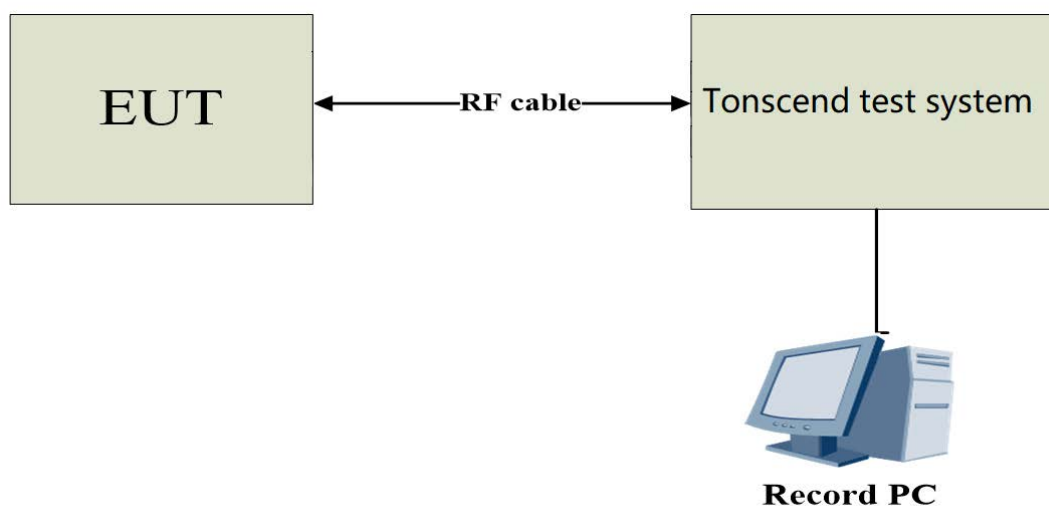
For systems using digital modulation in the 2400~2483.5MHz, The Maximum output Power shall not exceed 1W(30dBm)

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	

- The EUT was directly connected to the tonscend test system and antenna output port as show in the block diagram below.
- 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	86	94	84
IEEE 802.11g	70	94	68
IEEE 802.11n(20)	66	94	63
IEEE 802.11ax(20)	66	94	66
Frequency (MHz)	2422	2437	2452
IEEE 802.11n(40)	62	94	62
IEEE 802.11ax(40)	62	94	62

Beamforming

Test Software Version	accessMTool_REL_3_3_0_2		
Frequency (MHz)	2412	2437	2462
IEEE 802.11n(20)	59	87	56
IEEE 802.11ax(20)	59	87	59
Frequency (MHz)	2422	2437	2452
IEEE 802.11n(40)	55	87	55
IEEE 802.11ax(40)	55	87	55

3.5.5 The Result

No beamforming

Test Mode	Antenna	Frequency[MHz]	Result [dBm]	Limit [dBm]	Verdict
11B-CDD	Ant1	2412	21.12	≤30.00	PASS
	Ant2	2412	21.31	≤30.00	PASS
	Ant3	2412	20.94	≤30.00	PASS
	Ant4	2412	21.11	≤30.00	PASS
	total	2412	27.14	≤30.00	PASS
	Ant1	2437	22.86	≤30.00	PASS
	Ant2	2437	23.08	≤30.00	PASS
	Ant3	2437	22.97	≤30.00	PASS
	Ant4	2437	23.15	≤30.00	PASS
	total	2437	29.04	≤30.00	PASS
	Ant1	2462	20.03	≤30.00	PASS
	Ant2	2462	20.60	≤30.00	PASS
	Ant3	2462	20.26	≤30.00	PASS
	Ant4	2462	20.13	≤30.00	PASS
	total	2462	26.28	≤30.00	PASS
11G-CDD	Ant1	2412	16.18	≤30.00	PASS
	Ant2	2412	16.37	≤30.00	PASS
	Ant3	2412	16.31	≤30.00	PASS
	Ant4	2412	16.69	≤30.00	PASS
	total	2412	22.41	≤30.00	PASS
	Ant1	2437	22.34	≤30.00	PASS
	Ant2	2437	23.01	≤30.00	PASS
	Ant3	2437	22.69	≤30.00	PASS
	Ant4	2437	22.91	≤30.00	PASS
	total	2437	28.77	≤30.00	PASS
	Ant1	2462	15.39	≤30.00	PASS
	Ant2	2462	15.92	≤30.00	PASS
	Ant3	2462	16.11	≤30.00	PASS
	Ant4	2462	15.95	≤30.00	PASS
	total	2462	21.87	≤30.00	PASS
11N20MIMO	Ant1	2412	15.38	≤30.00	PASS
	Ant2	2412	15.42	≤30.00	PASS
	Ant3	2412	15.78	≤30.00	PASS
	Ant4	2412	15.56	≤30.00	PASS
	total	2412	21.56	≤30.00	PASS
	Ant1	2437	22.83	≤30.00	PASS
	Ant2	2437	23.06	≤30.00	PASS
	Ant3	2437	22.71	≤30.00	PASS

	Ant4	2437	23.48	≤30.00	PASS
	total	2437	29.05	≤30.00	PASS
	Ant1	2462	14.18	≤30.00	PASS
	Ant2	2462	14.62	≤30.00	PASS
	Ant3	2462	15.09	≤30.00	PASS
	Ant4	2462	14.47	≤30.00	PASS
	total	2462	20.62	≤30.00	PASS
11N40MIMO	Ant1	2422	14.33	≤30.00	PASS
	Ant2	2422	14.08	≤30.00	PASS
	Ant3	2422	14.58	≤30.00	PASS
	Ant4	2422	14.51	≤30.00	PASS
	total	2422	20.40	≤30.00	PASS
	Ant1	2437	22.72	≤30.00	PASS
	Ant2	2437	22.83	≤30.00	PASS
	Ant3	2437	23.31	≤30.00	PASS
	Ant4	2437	22.88	≤30.00	PASS
	total	2437	28.96	≤30.00	PASS
	Ant1	2452	14.45	≤30.00	PASS
	Ant2	2452	14.03	≤30.00	PASS
	Ant3	2452	14.76	≤30.00	PASS
	Ant4	2452	14.88	≤30.00	PASS
	total	2452	20.56	≤30.00	PASS
11AX20MIMO	Ant1	2412	15.12	≤30.00	PASS
	Ant2	2412	15.17	≤30.00	PASS
	Ant3	2412	15.51	≤30.00	PASS
	Ant4	2412	15.54	≤30.00	PASS
	total	2412	21.36	≤30.00	PASS
	Ant1	2437	22.46	≤30.00	PASS
	Ant2	2437	22.77	≤30.00	PASS
	Ant3	2437	22.57	≤30.00	PASS
	Ant4	2437	22.96	≤30.00	PASS
	total	2437	28.71	≤30.00	PASS
	Ant1	2462	15.18	≤30.00	PASS
	Ant2	2462	15.25	≤30.00	PASS
	Ant3	2462	15.88	≤30.00	PASS
	Ant4	2462	15.41	≤30.00	PASS
	total	2462	21.46	≤30.00	PASS
11AX40MIMO	Ant1	2422	14.59	≤30.00	PASS
	Ant2	2422	14.44	≤30.00	PASS
	Ant3	2422	14.99	≤30.00	PASS
	Ant4	2422	15.01	≤30.00	PASS
	total	2422	20.79	≤30.00	PASS

	Ant1	2437	22.19	≤30.00	PASS
	Ant2	2437	22.35	≤30.00	PASS
	Ant3	2437	23.04	≤30.00	PASS
	Ant4	2437	22.47	≤30.00	PASS
	total	2437	28.55	≤30.00	PASS
	Ant1	2452	14.55	≤30.00	PASS
	Ant2	2452	14.61	≤30.00	PASS
	Ant3	2452	15.01	≤30.00	PASS
	Ant4	2452	15.11	≤30.00	PASS
	total	2452	20.85	≤30.00	PASS

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

Unequal antenna gains, with equal transmit powers. For antenna gains given by $G_1, G_2, \dots, G_N$ dBi If transmit signals are correlated, then Directional gain = $10 \log[(10^{G_1 \phi / 20} + 10^{G_2 \phi / 20} + \dots + 10^{G_N \phi / 20}) / N_{ANT} + (10^{G_1 \theta / 20} + 10^{G_2 \theta / 20} + \dots + 10^{G_N \theta / 20})^2 / N_{ANT}]$ dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.] Directional gain = 1.85dBi

Beamforming

Test Mode	Antenna	Frequency[MHz]	Result [dBm]	Limit [dBm]	Verdict
11N20MIMO	Ant1	2412	13.85	≤30.00	PASS
	Ant2	2412	13.89	≤30.00	PASS
	Ant3	2412	14.25	≤30.00	PASS
	Ant4	2412	14.03	≤30.00	PASS
	total	2412	20.03	≤30.00	PASS
	Ant1	2437	21.28	≤30.00	PASS
	Ant2	2437	21.51	≤30.00	PASS
	Ant3	2437	21.16	≤30.00	PASS
	Ant4	2437	21.93	≤30.00	PASS
	total	2437	27.50	≤30.00	PASS
	Ant1	2462	12.61	≤30.00	PASS
	Ant2	2462	13.05	≤30.00	PASS
	Ant3	2462	13.52	≤30.00	PASS
	Ant4	2462	12.90	≤30.00	PASS
	total	2462	19.05	≤30.00	PASS
11N40MIMO	Ant1	2422	12.78	≤30.00	PASS
	Ant2	2422	12.53	≤30.00	PASS
	Ant3	2422	13.03	≤30.00	PASS
	Ant4	2422	12.96	≤30.00	PASS
	total	2422	18.85	≤30.00	PASS
	Ant1	2437	21.15	≤30.00	PASS
	Ant2	2437	21.26	≤30.00	PASS
	Ant3	2437	21.74	≤30.00	PASS

	Ant4	2437	21.31	≤30.00	PASS
	total	2437	27.39	≤30.00	PASS
	Ant1	2452	12.93	≤30.00	PASS
	Ant2	2452	12.51	≤30.00	PASS
	Ant3	2452	13.24	≤30.00	PASS
	Ant4	2452	13.36	≤30.00	PASS
	total	2452	19.04	≤30.00	PASS
11AX20MIMO	Ant1	2412	13.50	≤30.00	PASS
	Ant2	2412	13.55	≤30.00	PASS
	Ant3	2412	13.89	≤30.00	PASS
	Ant4	2412	13.92	≤30.00	PASS
	total	2412	19.74	≤30.00	PASS
	Ant1	2437	20.88	≤30.00	PASS
	Ant2	2437	21.19	≤30.00	PASS
	Ant3	2437	20.99	≤30.00	PASS
	Ant4	2437	21.38	≤30.00	PASS
	total	2437	27.13	≤30.00	PASS
	Ant1	2462	13.62	≤30.00	PASS
	Ant2	2462	13.69	≤30.00	PASS
	Ant3	2462	14.32	≤30.00	PASS
	Ant4	2462	13.85	≤30.00	PASS
	total	2462	19.90	≤30.00	PASS
11AX40MIMO	Ant1	2422	13.03	≤30.00	PASS
	Ant2	2422	12.88	≤30.00	PASS
	Ant3	2422	13.43	≤30.00	PASS
	Ant4	2422	13.45	≤30.00	PASS
	total	2422	19.23	≤30.00	PASS
	Ant1	2437	20.60	≤30.00	PASS
	Ant2	2437	20.76	≤30.00	PASS
	Ant3	2437	21.45	≤30.00	PASS
	Ant4	2437	20.88	≤30.00	PASS
	total	2437	26.96	≤30.00	PASS
	Ant1	2452	13.00	≤30.00	PASS
	Ant2	2452	13.06	≤30.00	PASS
	Ant3	2452	13.46	≤30.00	PASS
	Ant4	2452	13.56	≤30.00	PASS
	total	2452	19.30	≤30.00	PASS

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

Correlated chains directional gain=1.85+1.5=3.35dBi

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

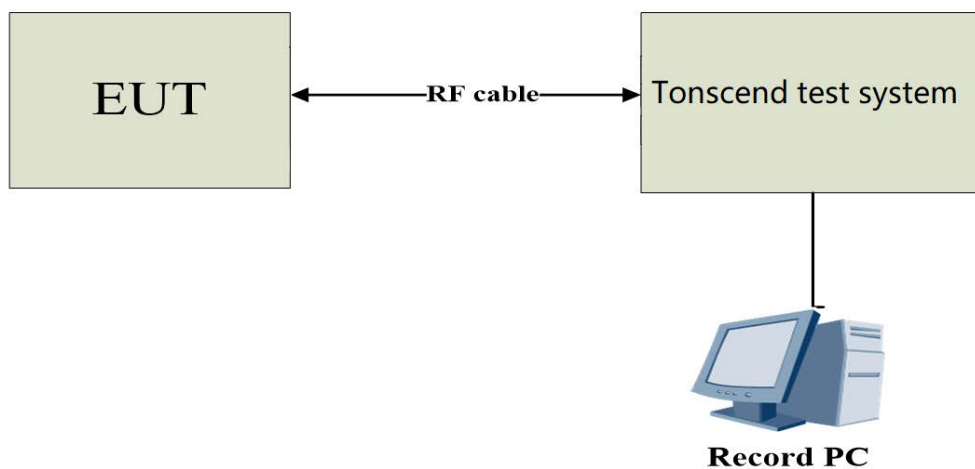
Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☒ Lowest, Middle and Highest Channel	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ● : Test ○ : No Test	

a) The EUT was directly connected to the tonscond 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	-7.25	≤8.00	PASS
	Ant2	2412	-6.97	≤8.00	PASS
	Ant3	2412	-7.20	≤8.00	PASS
	Ant4	2412	-7.37	≤8.00	PASS
	total	2412	-1.17	≤8.00	PASS
	Ant1	2437	-7.09	≤8.00	PASS
	Ant2	2437	-7.05	≤8.00	PASS
	Ant3	2437	-7.51	≤8.00	PASS
	Ant4	2437	-6.97	≤8.00	PASS
	total	2437	-1.13	≤8.00	PASS
	Ant1	2462	-6.80	≤8.00	PASS
	Ant2	2462	-6.72	≤8.00	PASS
	Ant3	2462	-7.01	≤8.00	PASS
	Ant4	2462	-6.77	≤8.00	PASS
	total	2462	-0.80	≤8.00	PASS
11G-CDD	Ant1	2412	-13.42	≤8.00	PASS
	Ant2	2412	-13.15	≤8.00	PASS
	Ant3	2412	-13.29	≤8.00	PASS
	Ant4	2412	-13.02	≤8.00	PASS
	total	2412	-7.20	≤8.00	PASS
	Ant1	2437	-6.43	≤8.00	PASS
	Ant2	2437	-5.81	≤8.00	PASS
	Ant3	2437	-5.83	≤8.00	PASS
	Ant4	2437	-5.89	≤8.00	PASS
	total	2437	0.04	≤8.00	PASS
	Ant1	2462	-13.44	≤8.00	PASS
	Ant2	2462	-13.21	≤8.00	PASS
	Ant3	2462	-13.15	≤8.00	PASS
	Ant4	2462	-13.20	≤8.00	PASS
	total	2462	-7.23	≤8.00	PASS
11N20MIMO	Ant1	2412	-14.22	≤8.00	PASS
	Ant2	2412	-13.76	≤8.00	PASS
	Ant3	2412	-13.24	≤8.00	PASS
	Ant4	2412	-14.17	≤8.00	PASS
	total	2412	-7.81	≤8.00	PASS
	Ant1	2437	-6.64	≤8.00	PASS
	Ant2	2437	-6.10	≤8.00	PASS
	Ant3	2437	-5.59	≤8.00	PASS
	Ant4	2437	-5.63	≤8.00	PASS
	total	2437	0.05	≤8.00	PASS

	Ant1	2462	-15.37	≤8.00	PASS
	Ant2	2462	-14.72	≤8.00	PASS
	Ant3	2462	-13.76	≤8.00	PASS
	Ant4	2462	-15.37	≤8.00	PASS
	total	2462	-8.73	≤8.00	PASS
11N40MIMO	Ant1	2422	-17.87	≤8.00	PASS
	Ant2	2422	-17.90	≤8.00	PASS
	Ant3	2422	-17.56	≤8.00	PASS
	Ant4	2422	-17.31	≤8.00	PASS
	total	2422	-11.63	≤8.00	PASS
	Ant1	2437	-8.85	≤8.00	PASS
	Ant2	2437	-8.25	≤8.00	PASS
	Ant3	2437	-7.37	≤8.00	PASS
	Ant4	2437	-8.30	≤8.00	PASS
	total	2437	-2.14	≤8.00	PASS
	Ant1	2452	-18.68	≤8.00	PASS
	Ant2	2452	-18.93	≤8.00	PASS
	Ant3	2452	-17.85	≤8.00	PASS
	Ant4	2452	-17.68	≤8.00	PASS
	total	2452	-12.23	≤8.00	PASS
11AX20MIMO	Ant1	2412	-17.22	≤8.00	PASS
	Ant2	2412	-15.59	≤8.00	PASS
	Ant3	2412	-15.39	≤8.00	PASS
	Ant4	2412	-16.35	≤8.00	PASS
	total	2412	-10.06	≤8.00	PASS
	Ant1	2437	-8.62	≤8.00	PASS
	Ant2	2437	-6.53	≤8.00	PASS
	Ant3	2437	-6.32	≤8.00	PASS
	Ant4	2437	-7.13	≤8.00	PASS
	total	2437	-1.04	≤8.00	PASS
	Ant1	2462	-17.76	≤8.00	PASS
	Ant2	2462	-16.17	≤8.00	PASS
	Ant3	2462	-15.46	≤8.00	PASS
	Ant4	2462	-17.65	≤8.00	PASS
	total	2462	-10.63	≤8.00	PASS
11AX40MIMO	Ant1	2422	-21.01	≤8.00	PASS
	Ant2	2422	-20.70	≤8.00	PASS
	Ant3	2422	-19.81	≤8.00	PASS
	Ant4	2422	-20.30	≤8.00	PASS
	total	2422	-14.41	≤8.00	PASS
	Ant1	2437	-11.32	≤8.00	PASS
	Ant2	2437	-11.20	≤8.00	PASS

	Ant3	2437	-11.11	≤8.00	PASS
	Ant4	2437	-11.50	≤8.00	PASS
	total	2437	-5.26	≤8.00	PASS
	Ant1	2452	-21.11	≤8.00	PASS
	Ant2	2452	-21.43	≤8.00	PASS
	Ant3	2452	-20.88	≤8.00	PASS
	Ant4	2452	-20.69	≤8.00	PASS
	total	2452	-15.00	≤8.00	PASS

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

Unequal antenna gains, with equal transmit powers. For antenna gains given by $G_1, G_2, \dots, G_N$ dBi
 If transmit signals are correlated, then Directional gain = $10 \log[(10^{G_1 \phi / 20} + 10^{G_2 \phi / 20} + \dots + 10^{G_N \phi / 20}) / N_{ANT} + (10^{G_1 \theta / 20} + 10^{G_2 \theta / 20} + \dots + 10^{G_N \theta / 20})^2 / N_{ANT}]$ dBi [Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

Directional gain = 1.85dBi

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

11B-CDD_Ant1_2412



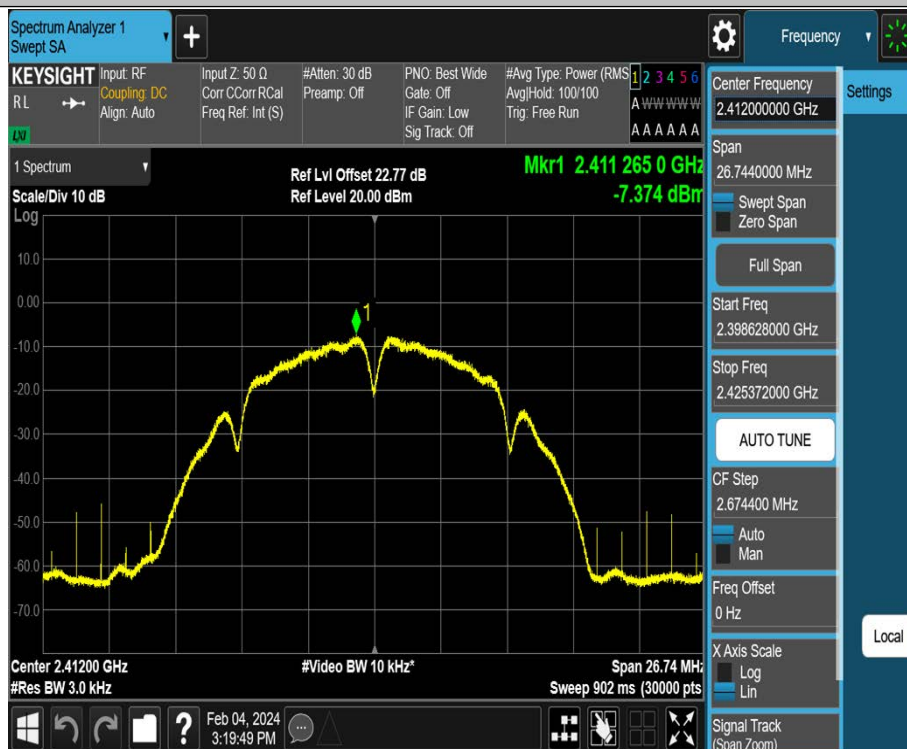
11B-CDD_Ant2_2412



11B-CDD_Ant3_2412



11B-CDD_Ant4_2412



11B-CDD_Ant1_2437



11B-CDD_Ant2_2437



11B-CDD_Ant3_2437



11B-CDD_Ant4_2437



11B-CDD_Ant1_2462



11B-CDD_Ant2_2462



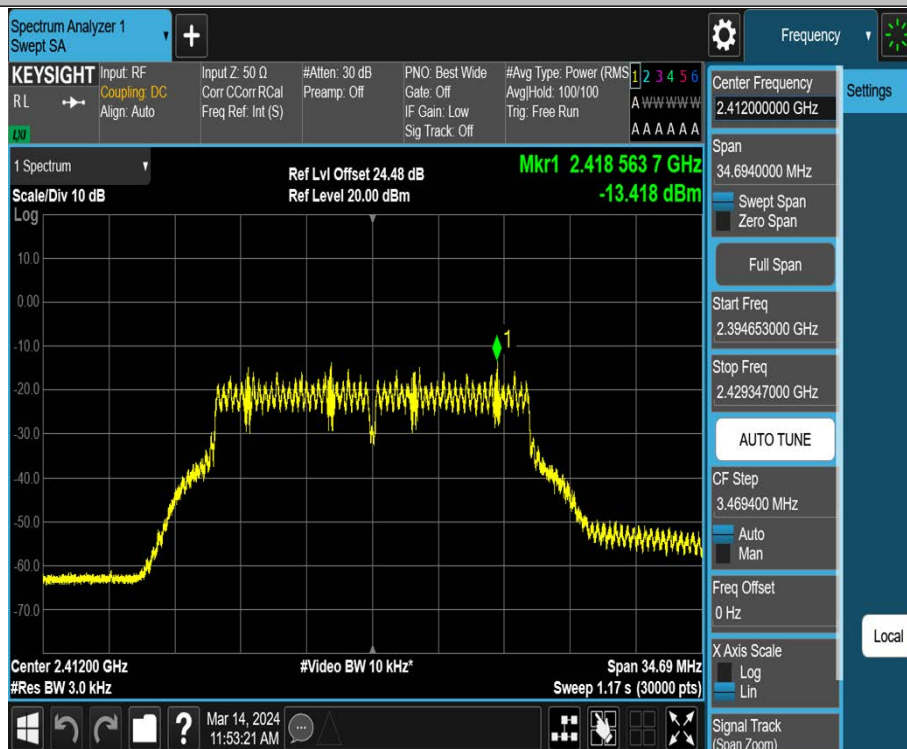
11B-CDD_Ant3_2462



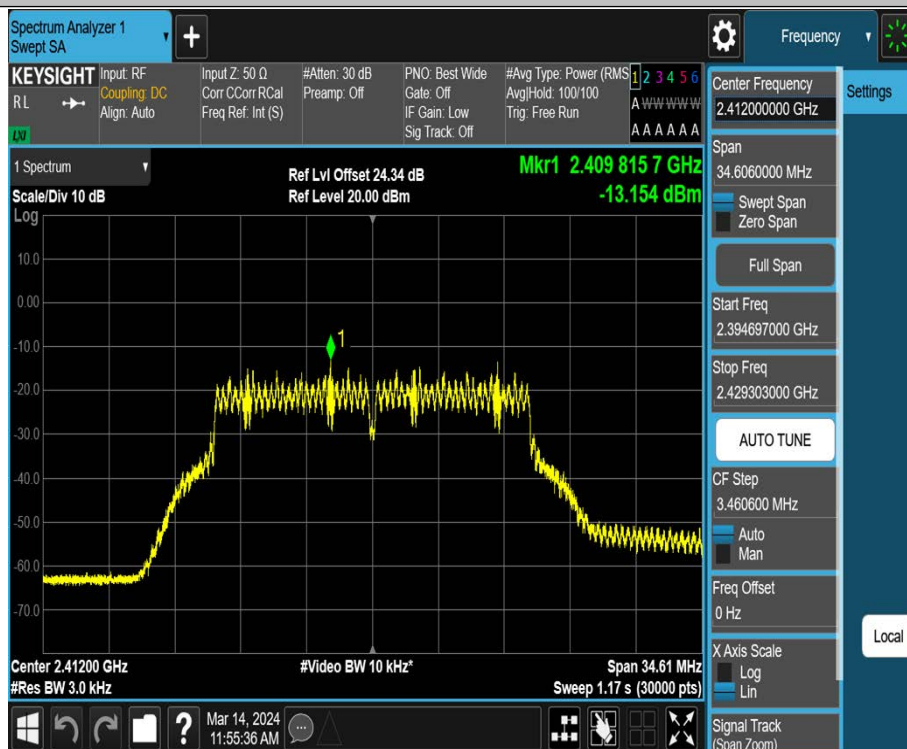
11B-CDD_Ant4_2462



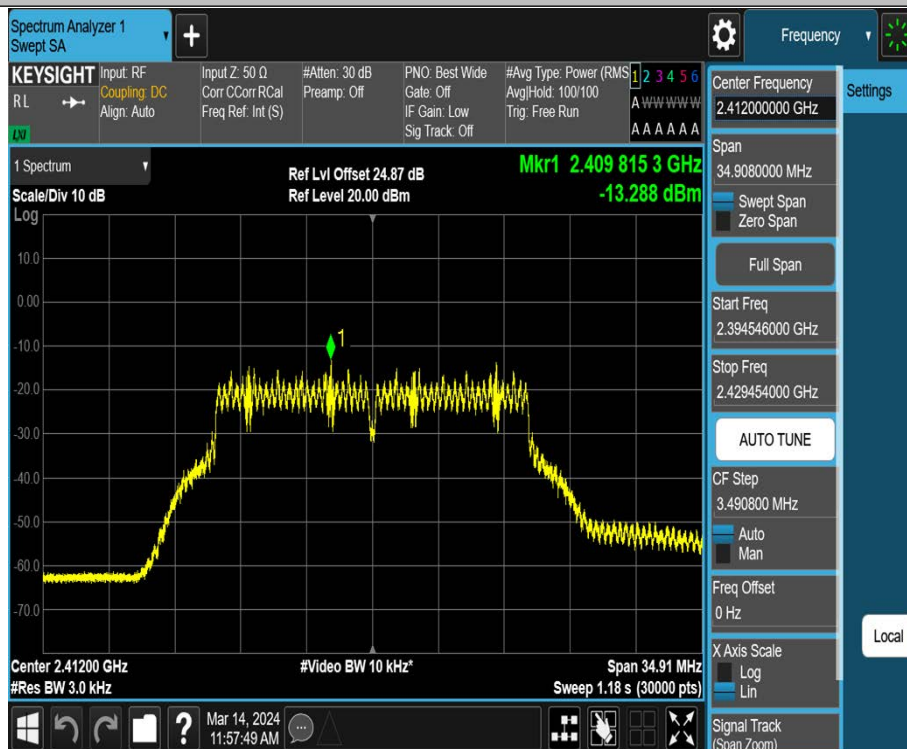
11G-CDD_Ant1_2412



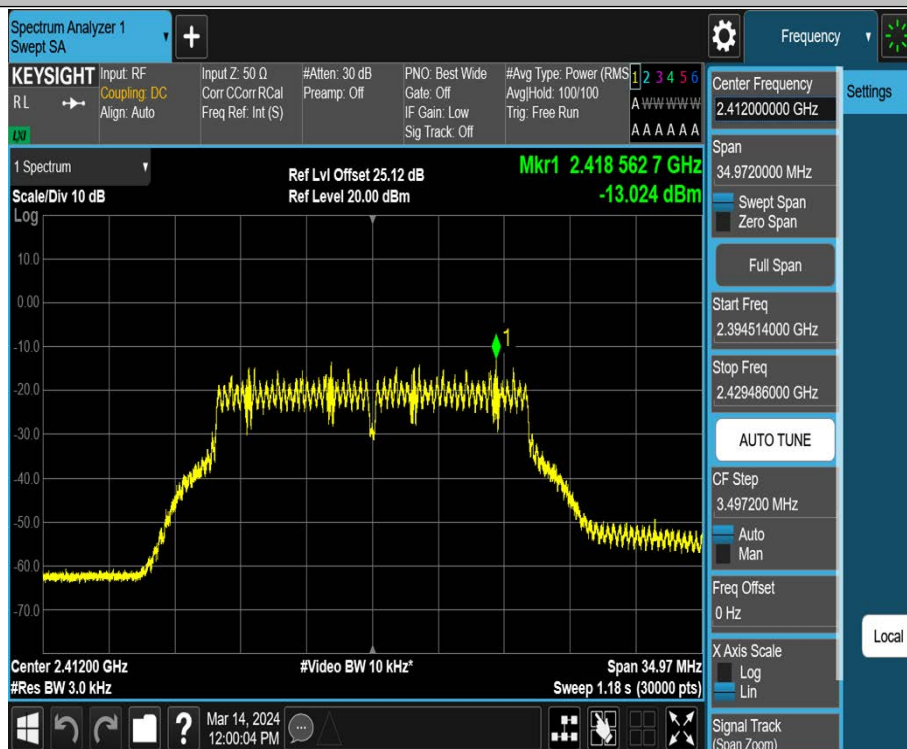
11G-CDD_Ant2_2412



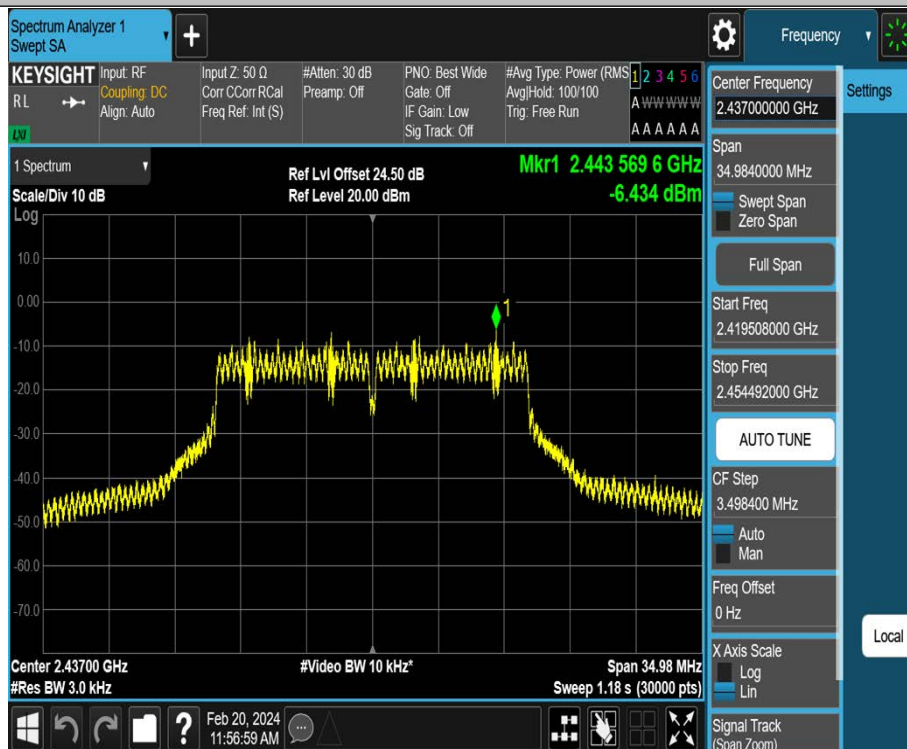
11G-CDD_Ant3_2412



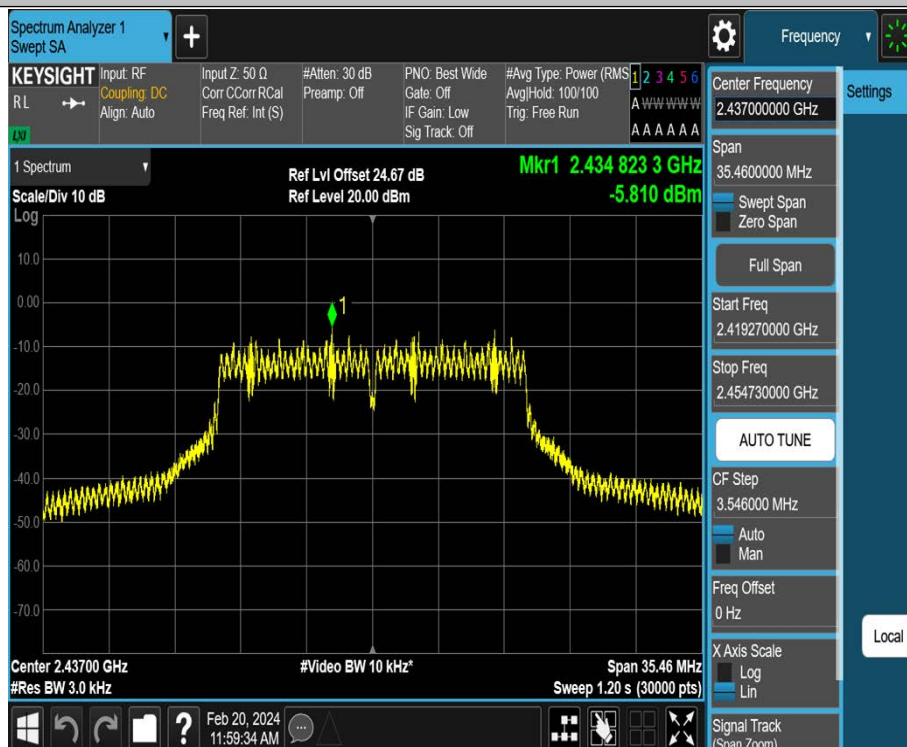
11G-CDD_Ant4_2412



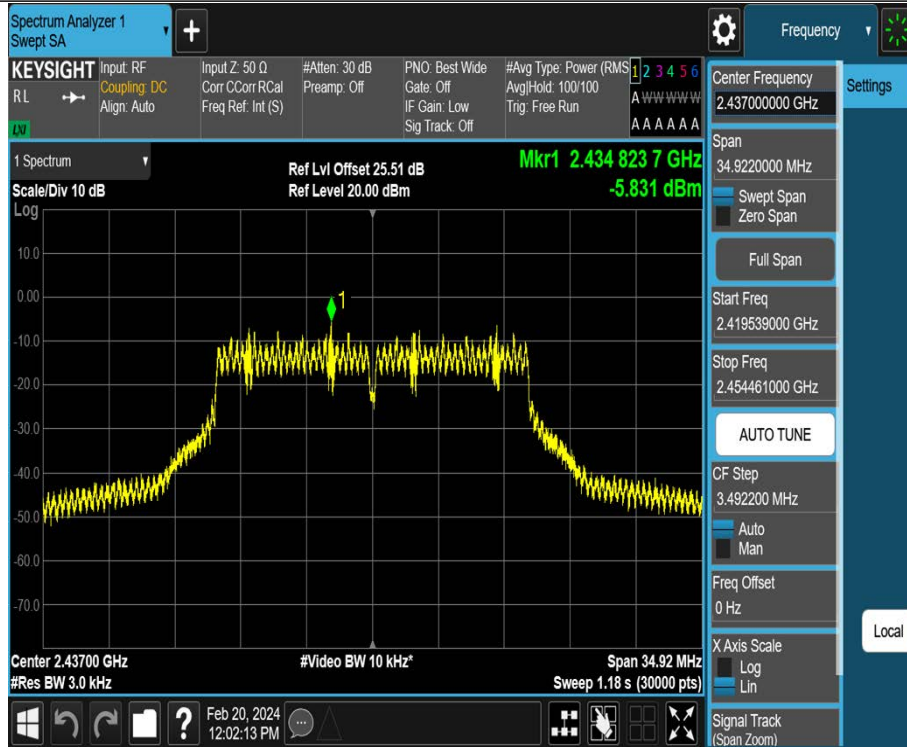
11G-CDD_Ant1_2437



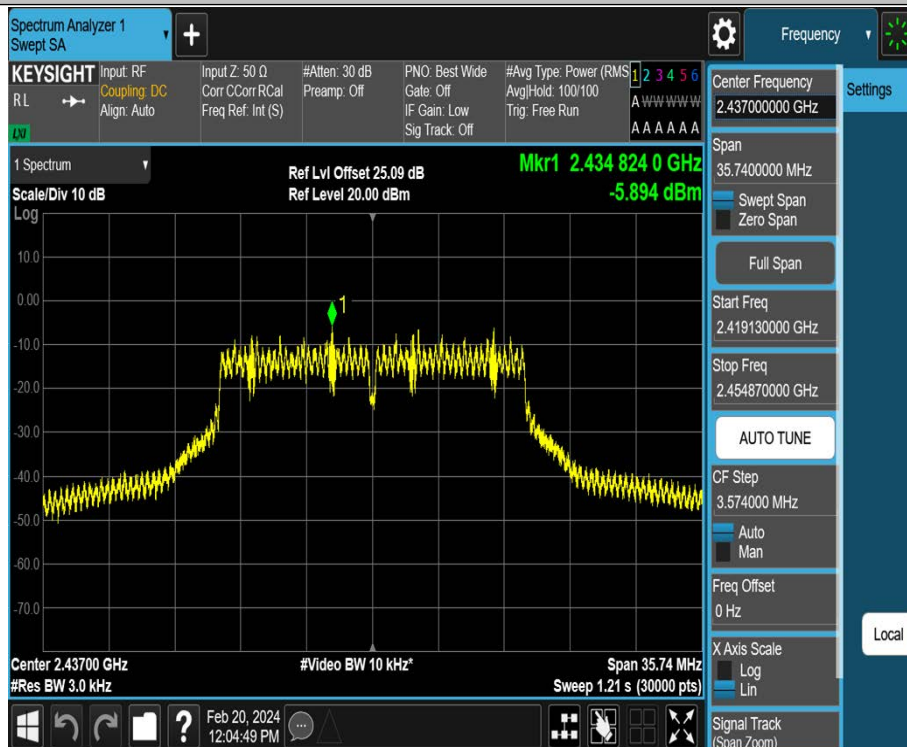
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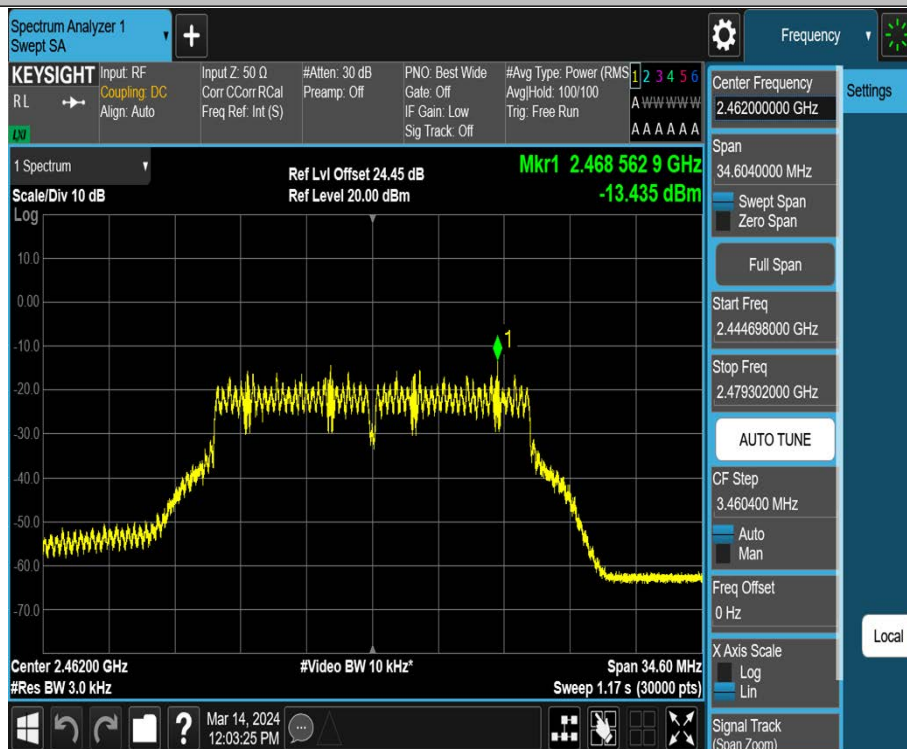
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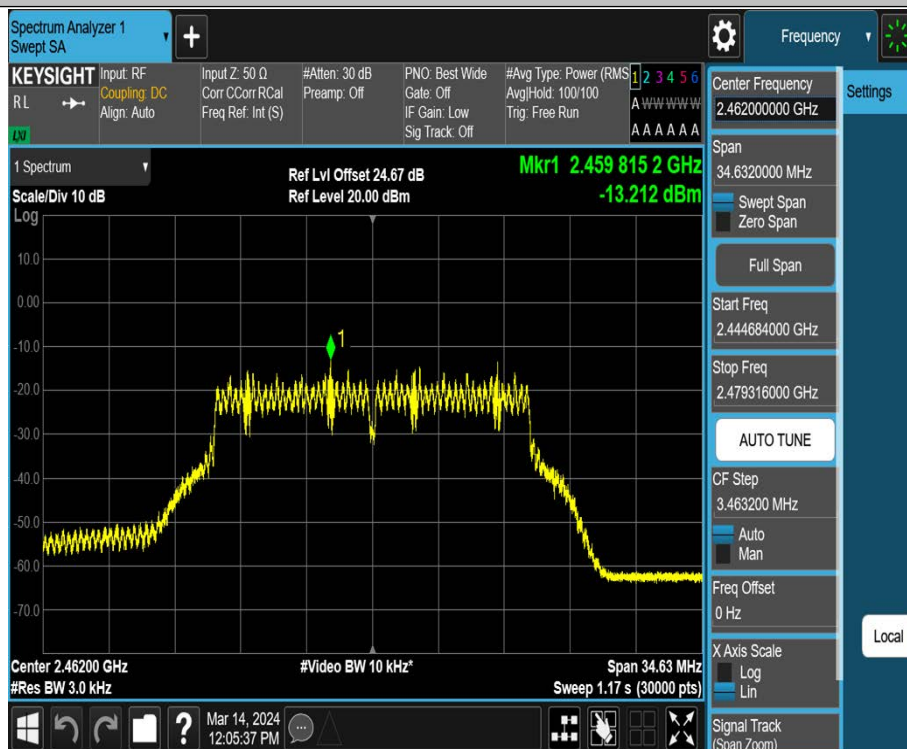
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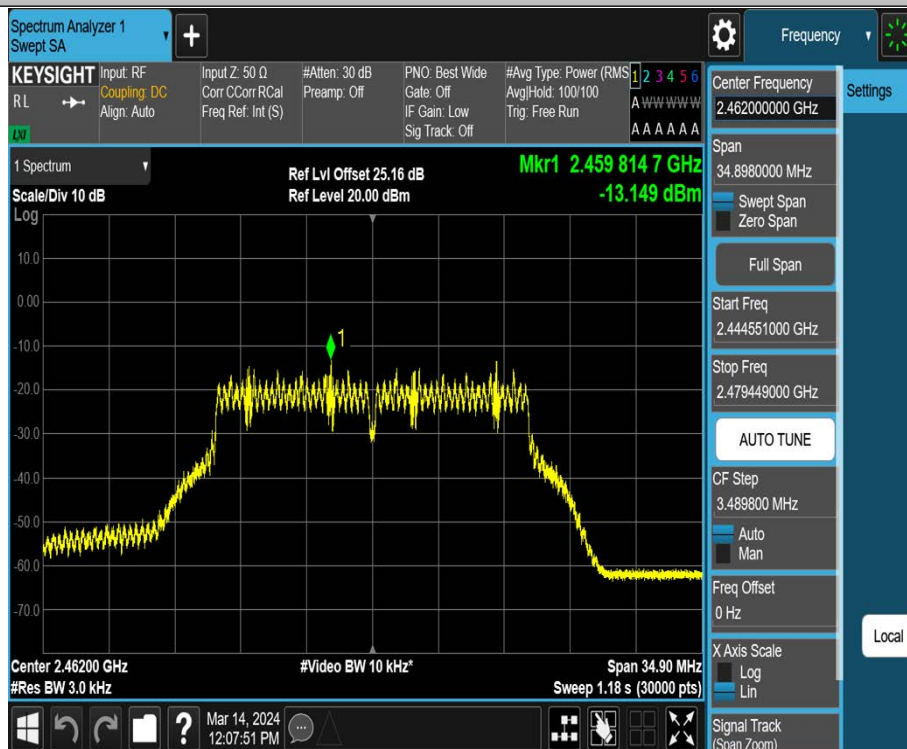
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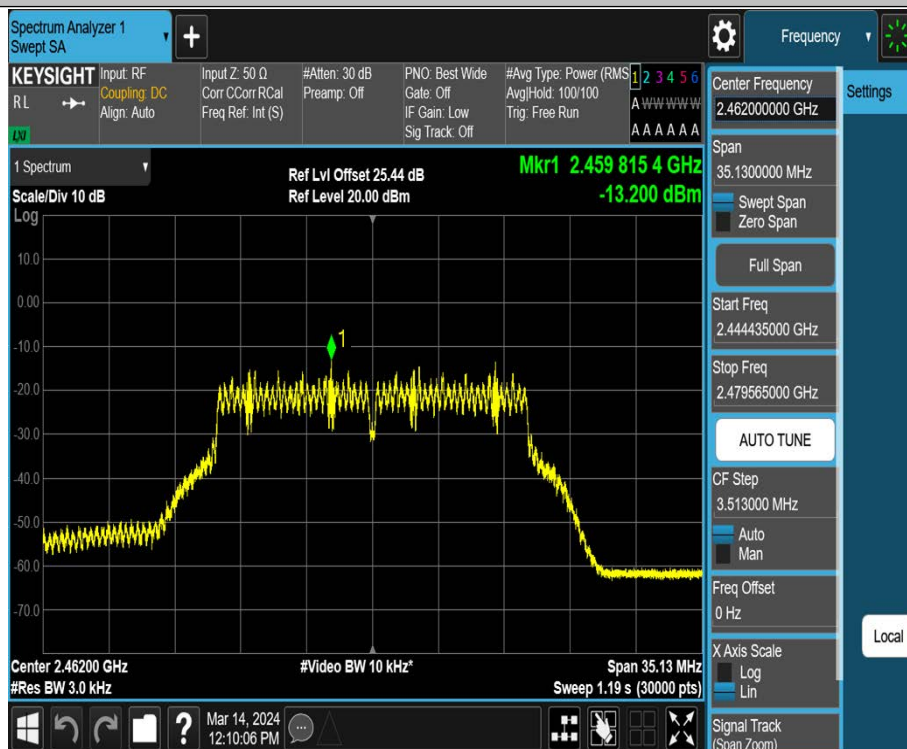
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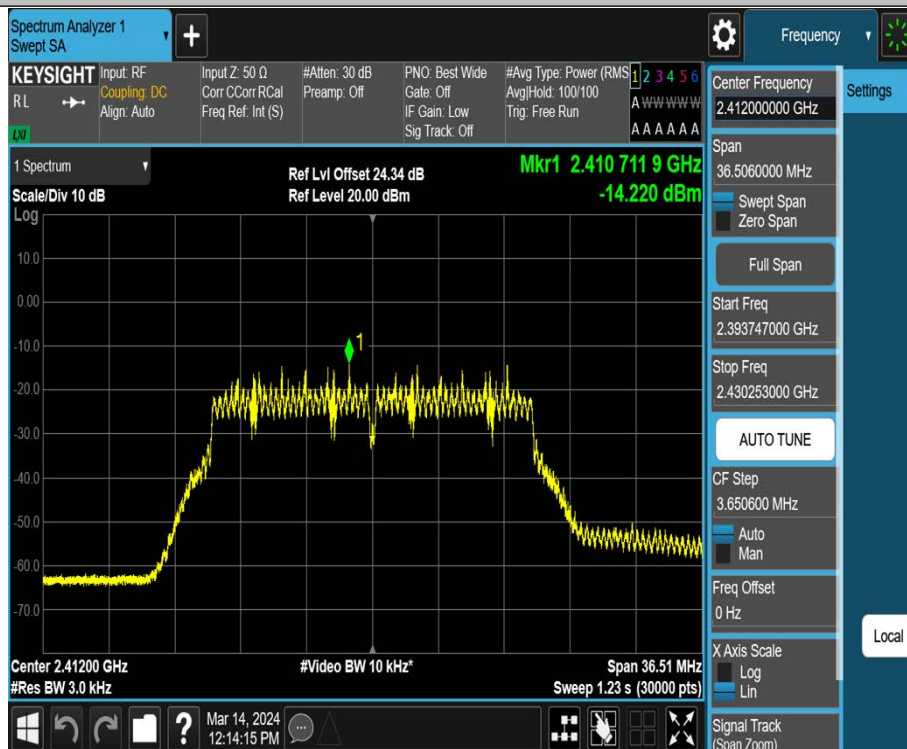
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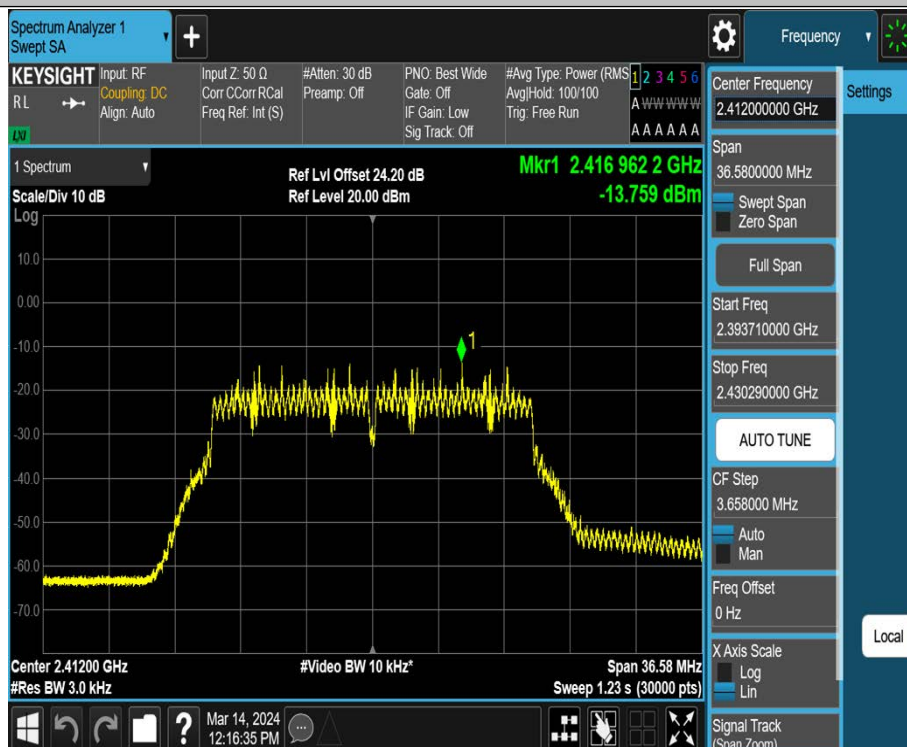
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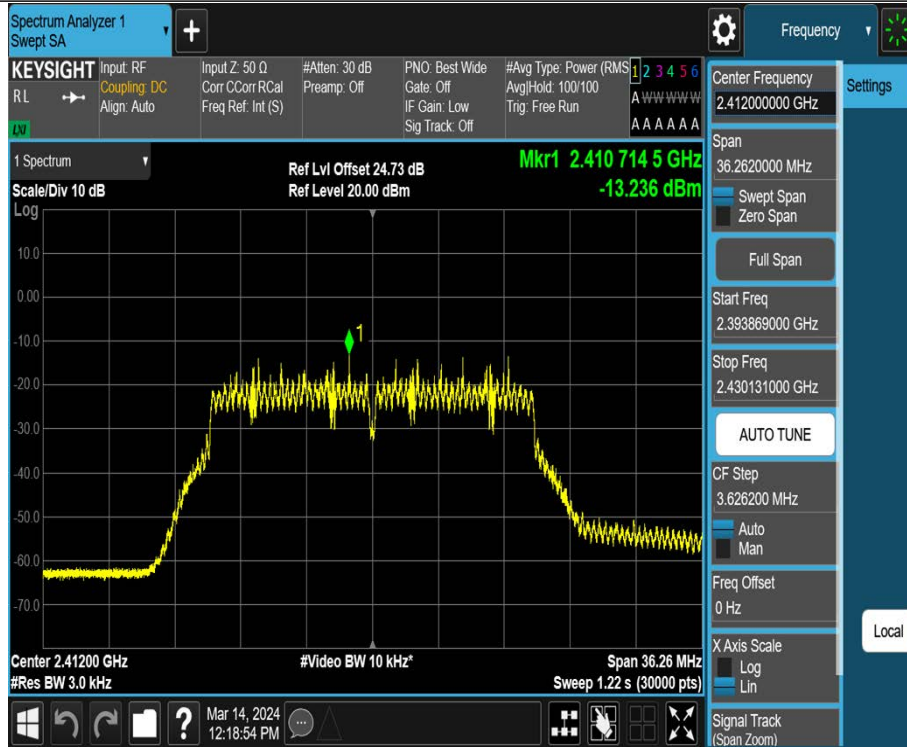
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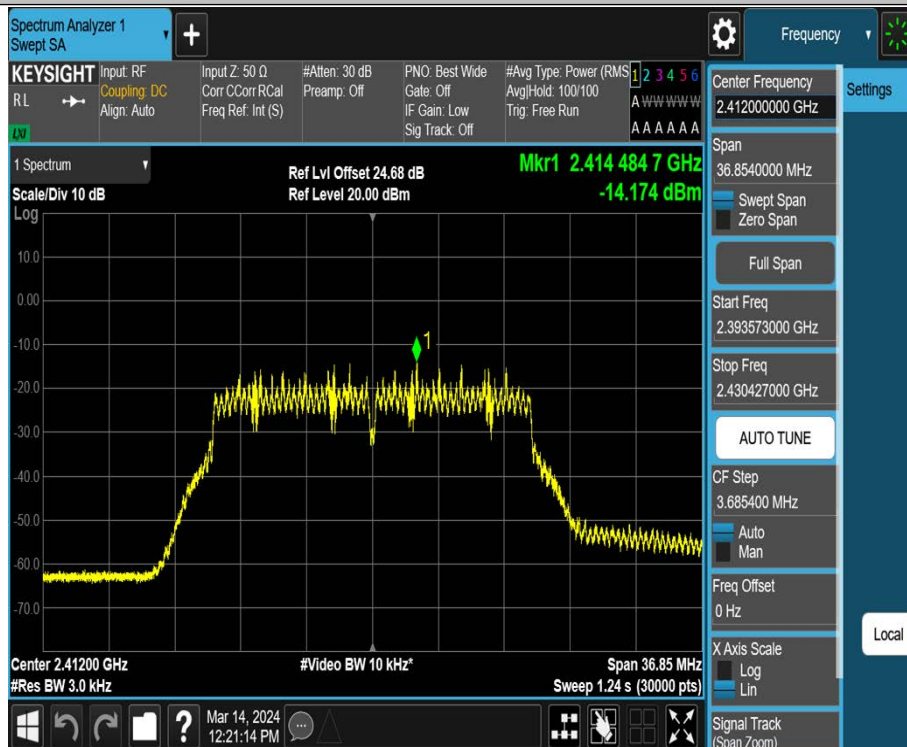
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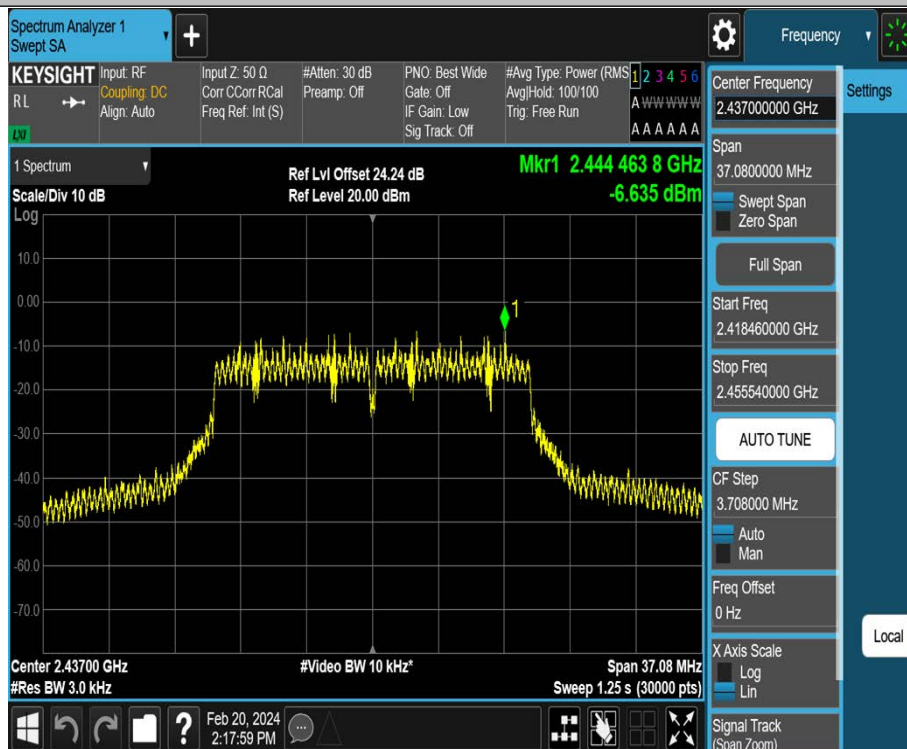
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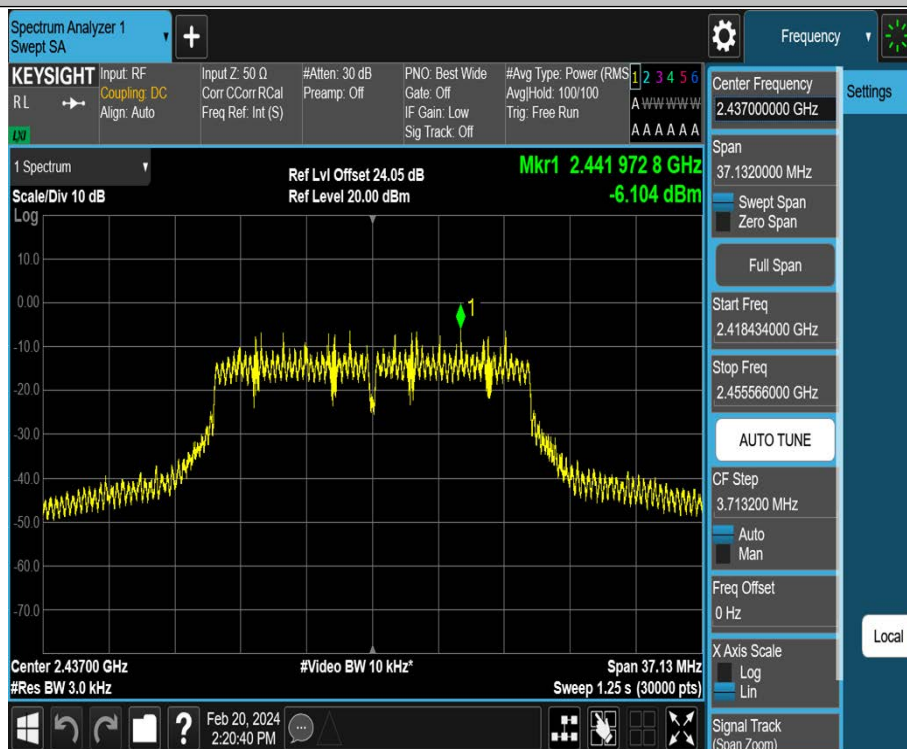
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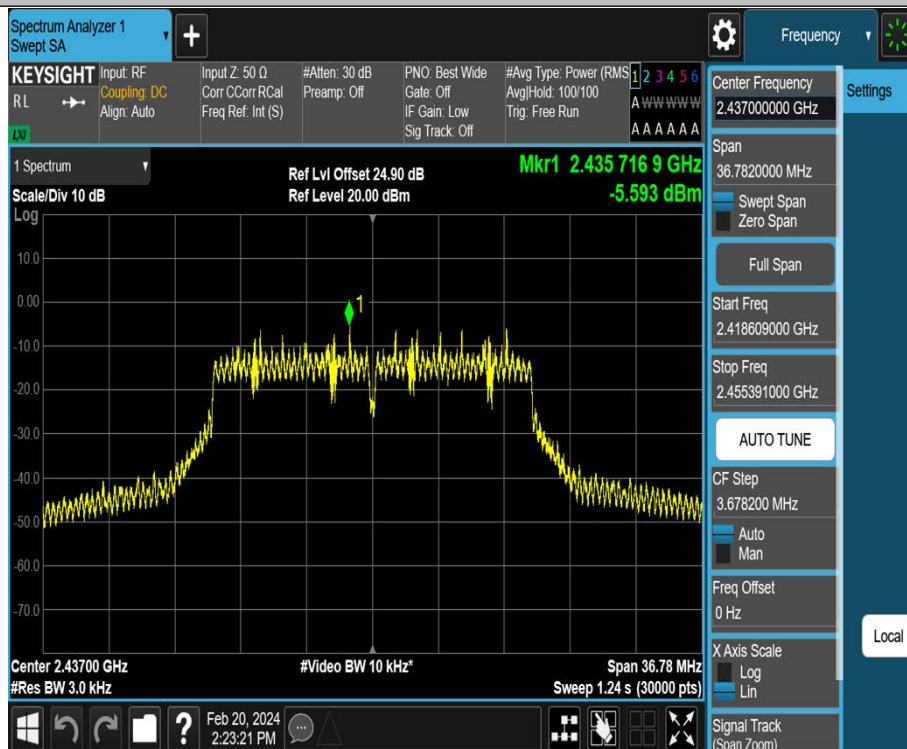
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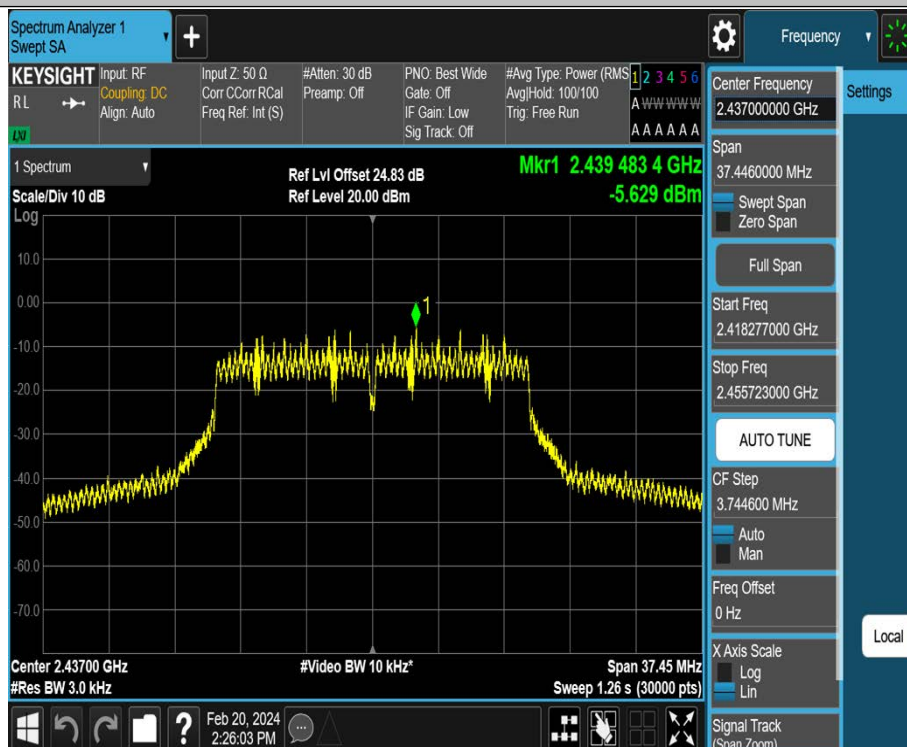
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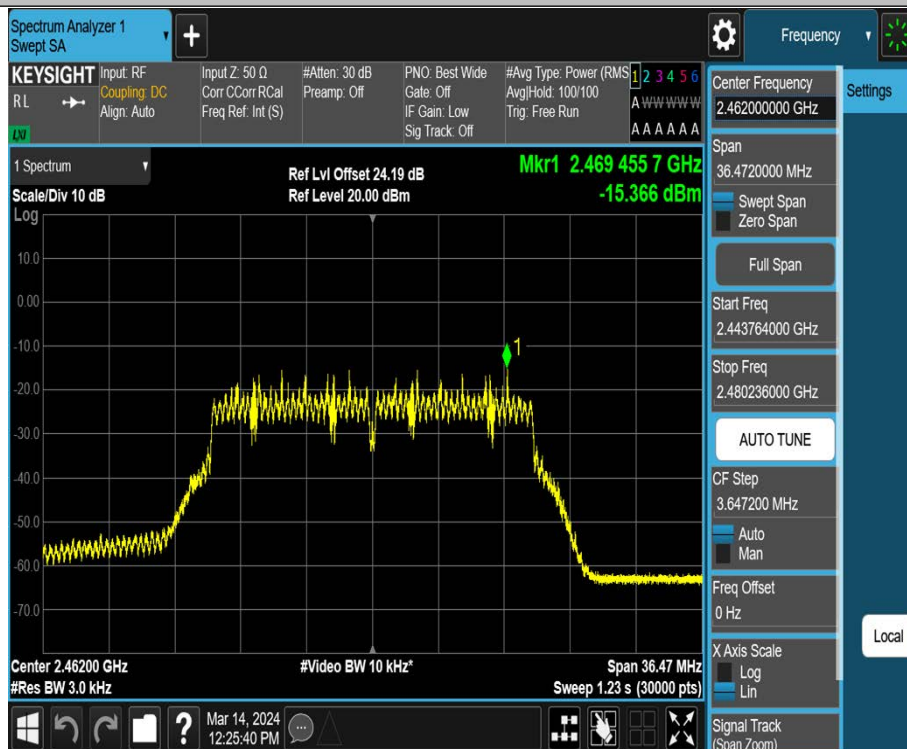
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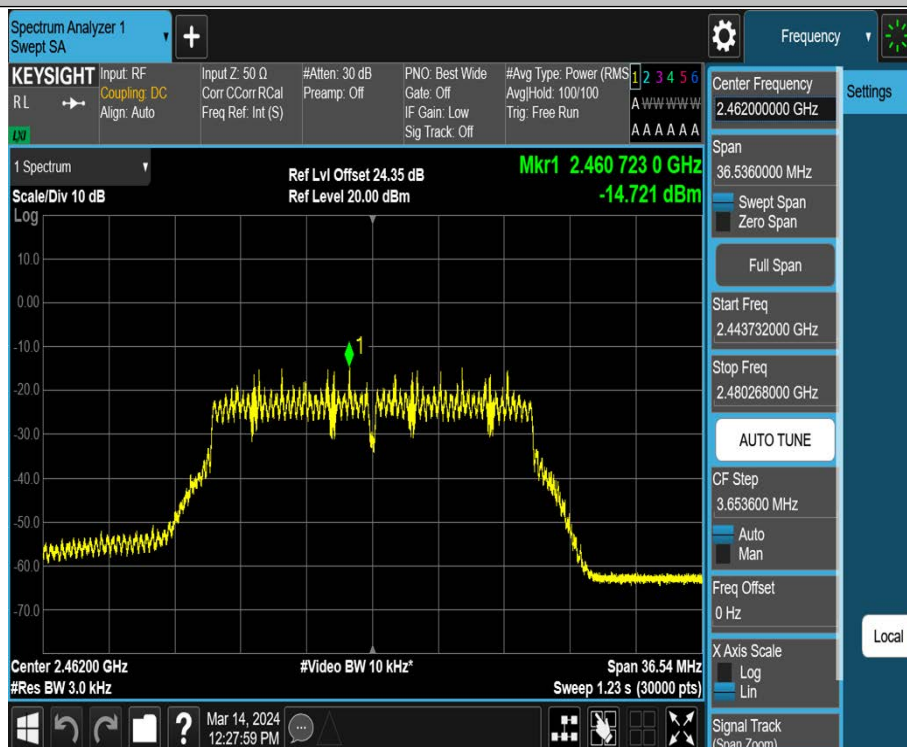
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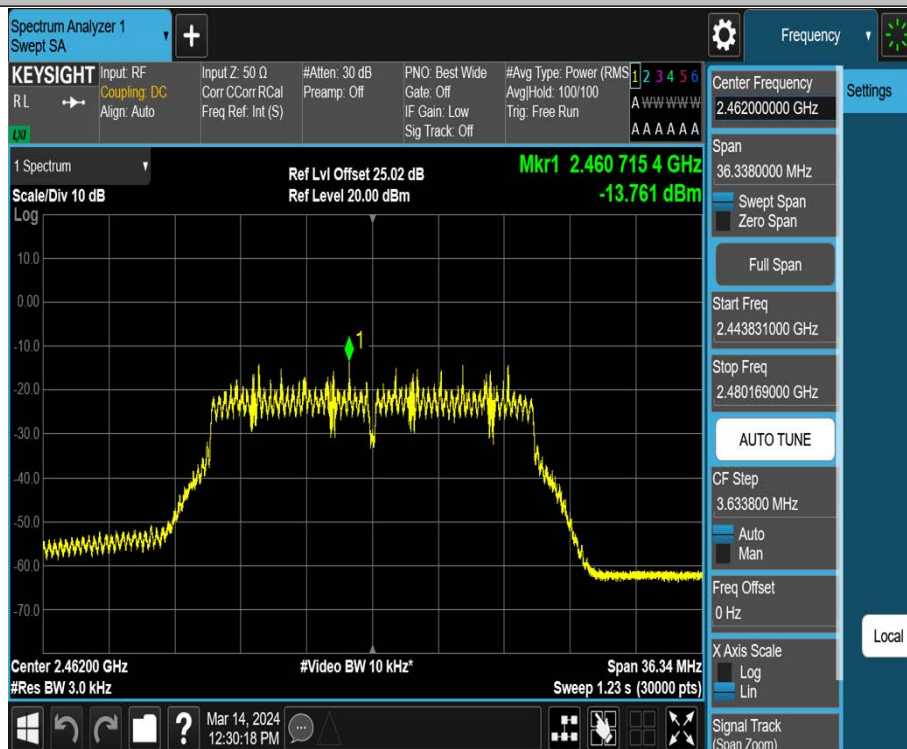
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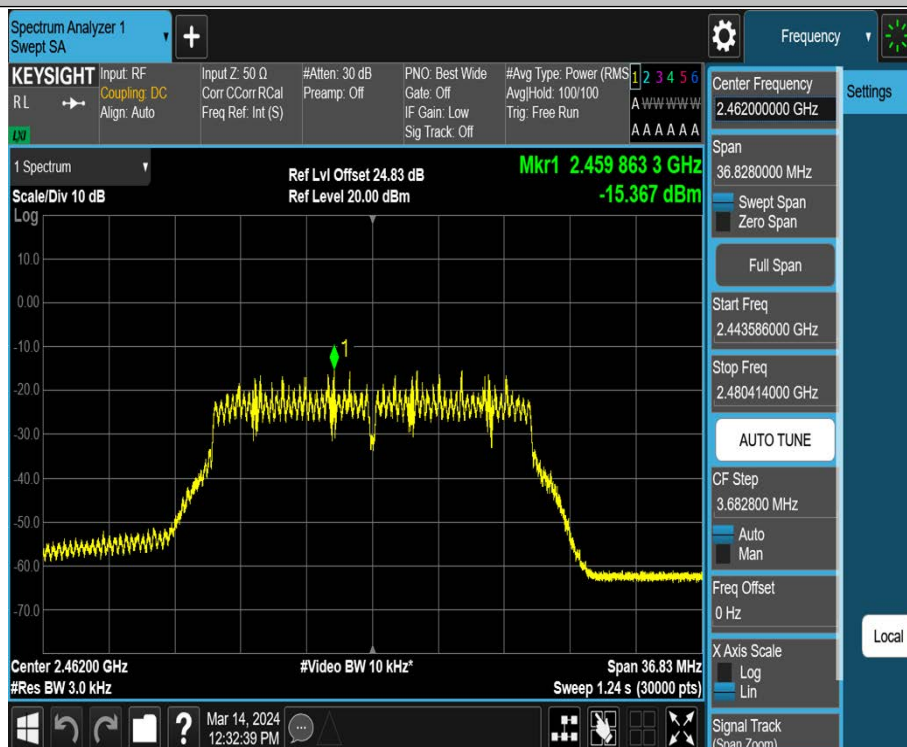
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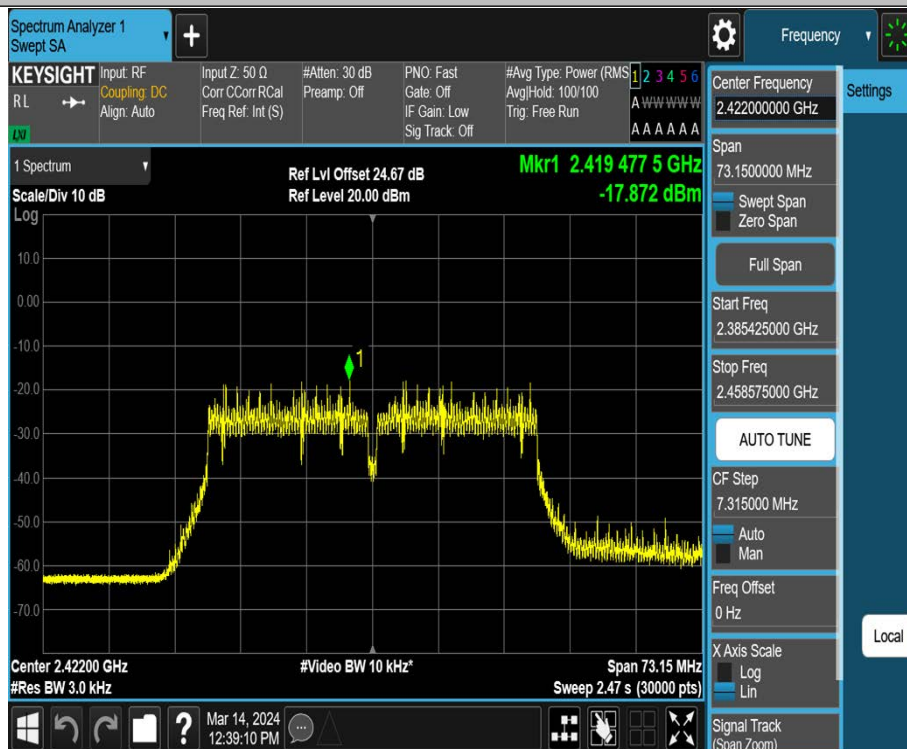
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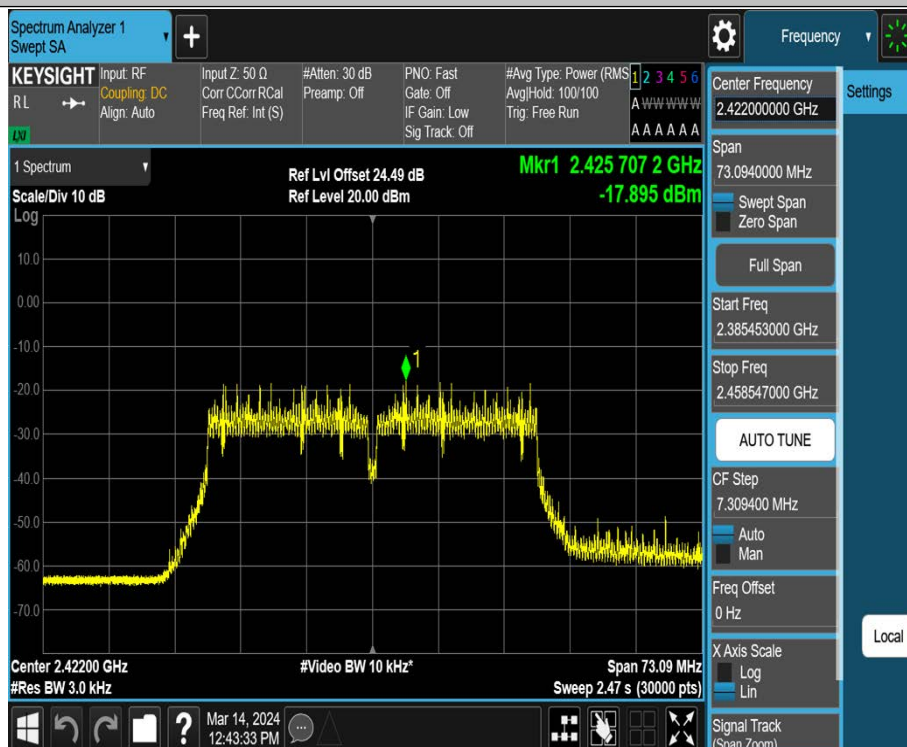
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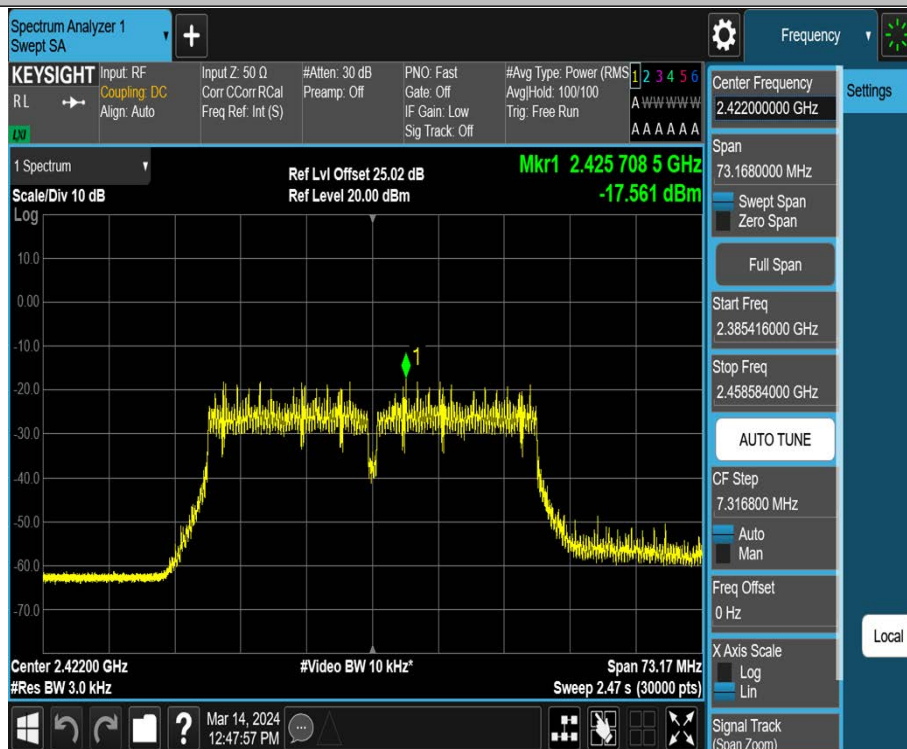
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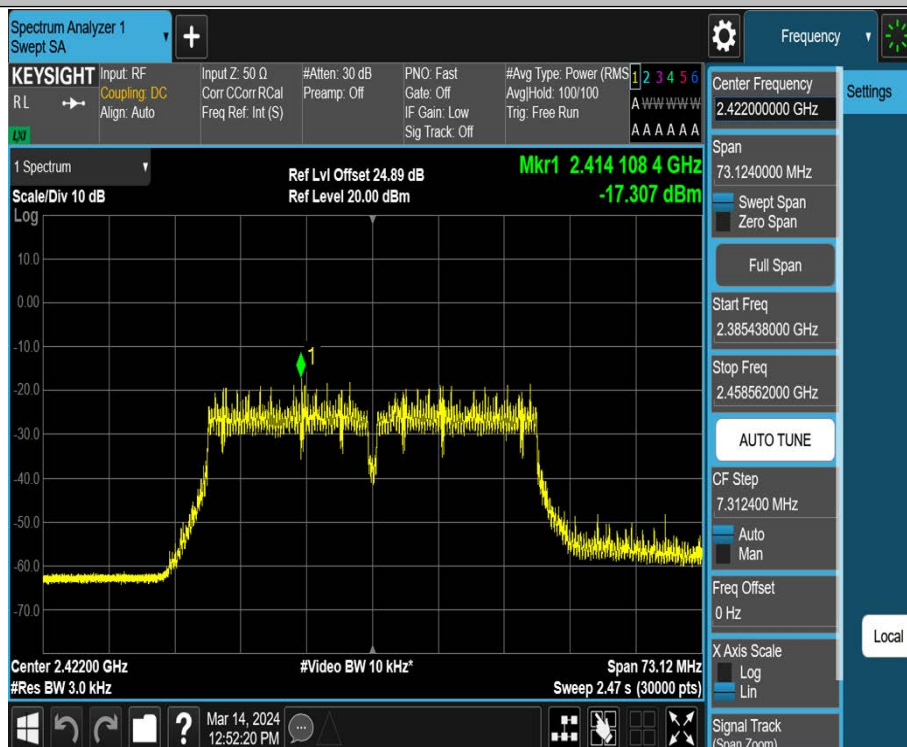
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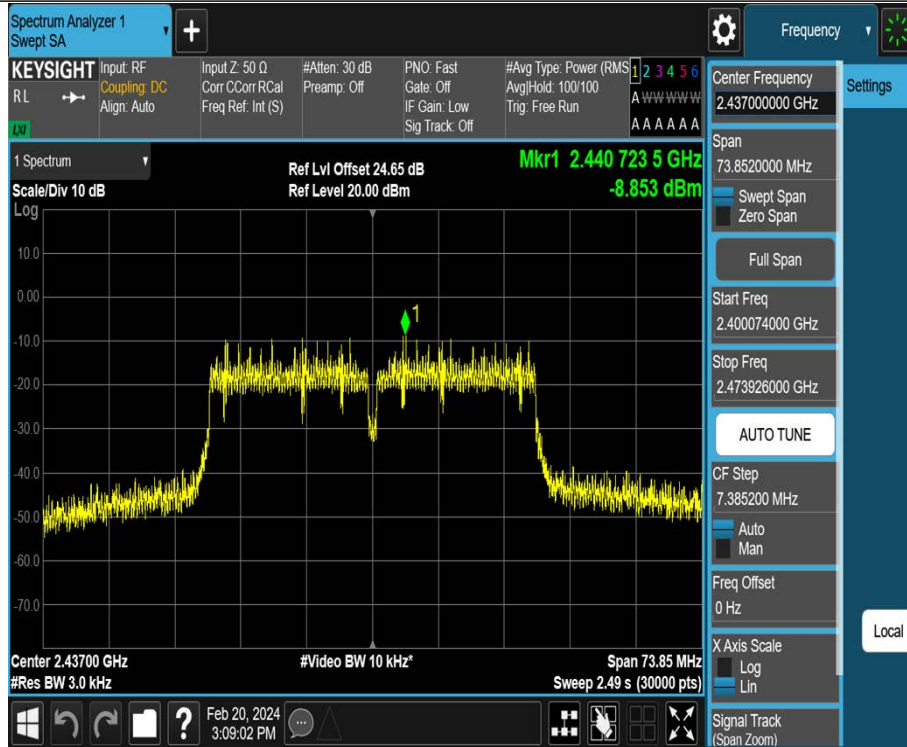
11N40MIMO_Ant3_2422



11N40MIMO_Ant4_2422



11N40MIMO_Ant1_2437



11N40MIMO_Ant2_2437

