

11N40MIMO_Ant1_5795



11N40MIMO_Ant2_5795



11AC20MIMO_Ant1_5745



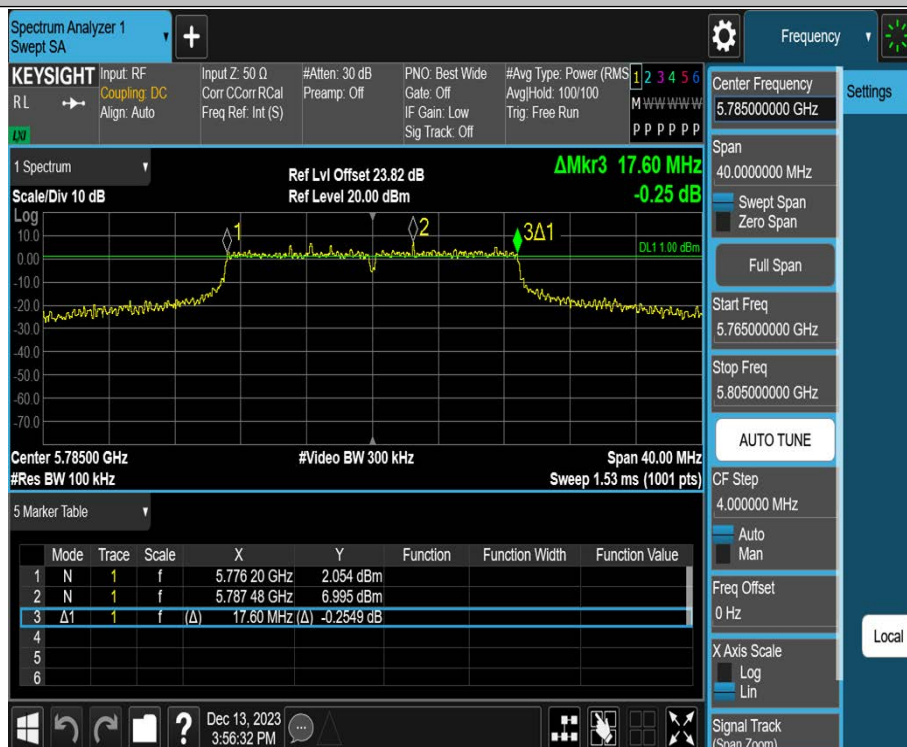
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11AC20MIMO_Ant1_5785



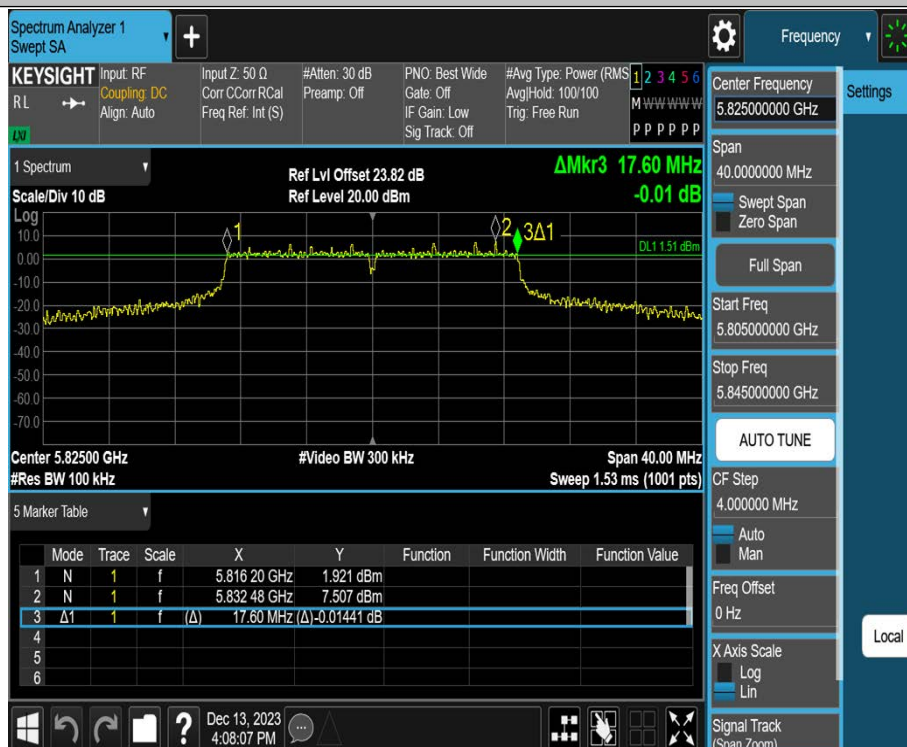
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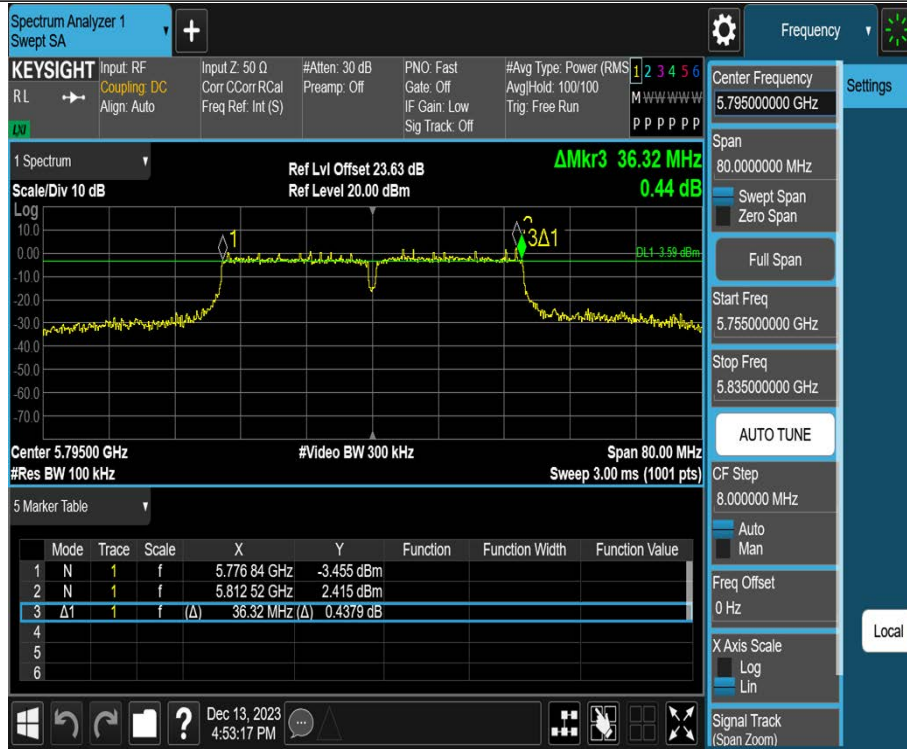
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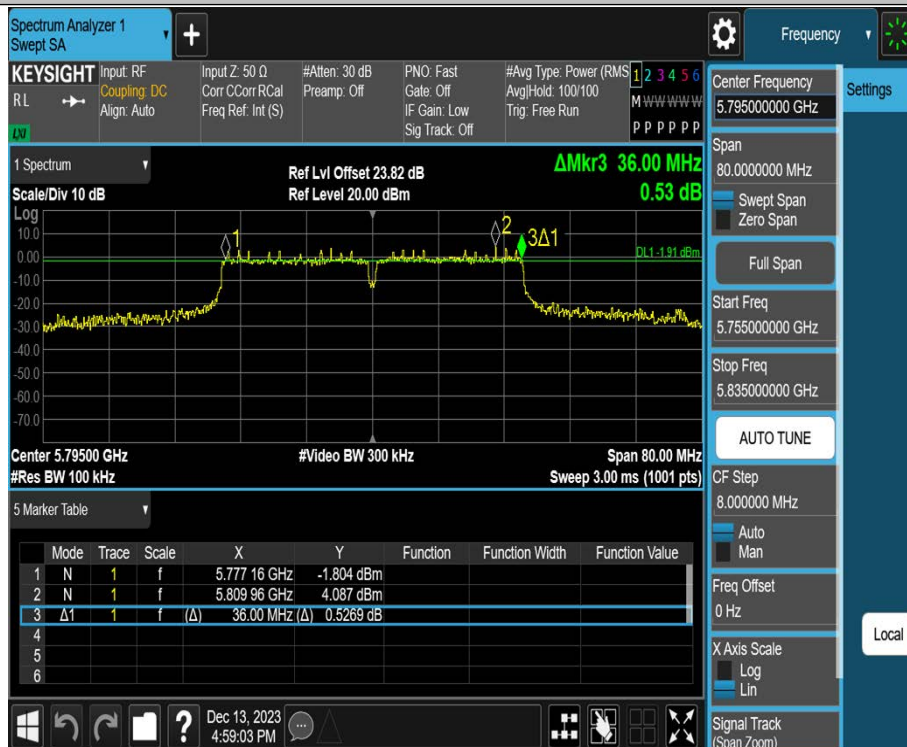
11AC40MIMO_Ant2_5755



11AC40MIMO_Ant1_5795



11AC40MIMO_Ant2_5795



11AC80MIMO_Ant1_5775



11AC80MIMO_Ant2_5775



3.4 Conducted Output Power

3.4.1 Limit

FCC Part15, Subpart E (15.407)			
Section	Test Item	Limit	Frequency Range (MHz)
15.407(a)	Conducted Output Power	Master device: 1 Watt (30 dBm) Client device: 250 mW (23.98 dBm)	5150-5250
		250 mW (23.98 dBm)	5250-5350
		250 mW (23.98 dBm)	5470-5725
		1 Watt (30dBm)	5725-5850

Note:

- 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.
- 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 dBm + 10log B, where B is the 26dB Bandwidth in megahertz.

3.4.2 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 power meter and antenna output port as show in the block diagram below.
- Test was performed in accordance with method of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

3.4.3 Test Setup



3.4.4 Table of Parameters of Text Software Setting

UNII-1			
Test Software Version	QRCT4		
Frequency (MHz)	5180	5200	5240
IEEE 802.11a	6	6	6
IEEE 802.11n(HT20)	6	6	6
IEEE 802.11ac(VHT20)	6	6	6
Frequency (MHz)	5190	5230	
IEEE 802.11n(HT40)	6	6	
IEEE 802.11ac(VHT40)	6	6	
Frequency (MHz)	5210		
IEEE 802.11ac(VHT80)	6		

UNII-3			
Test Software Version	QRCT4		
Frequency (MHz)	5745	5785	5825
IEEE 802.11a	6	6	6
IEEE 802.11n(HT20)	6	6	6
IEEE 802.11ac(VHT20)	6	6	6
Frequency (MHz)	5755	5795	
IEEE 802.11n(HT40)	6	6	
IEEE 802.11ac(VHT40)	6	6	
Frequency (MHz)	5775		
IEEE 802.11ac(VHT80)	6		

3.4.5 The Result

Test Mode	Antenna	Freq(MHz)	Result [dBm]	Limit [dBm]	Verdict
11A-CDD	Ant1	5180	11.89	≤23.98	PASS
	Ant2	5180	13.44	≤23.98	PASS
	total	5180	15.74	≤23.98	PASS
	Ant1	5200	12.12	≤23.98	PASS
	Ant2	5200	13.20	≤23.98	PASS
	total	5200	15.70	≤23.98	PASS
	Ant1	5240	11.61	≤23.98	PASS
	Ant2	5240	12.41	≤23.98	PASS
	total	5240	15.04	≤23.98	PASS
	Ant1	5745	12.94	≤30.00	PASS
	Ant2	5745	14.12	≤30.00	PASS
	total	5745	16.58	≤30.00	PASS
	Ant1	5785	12.98	≤30.00	PASS
	Ant2	5785	13.98	≤30.00	PASS
	total	5785	16.52	≤30.00	PASS
	Ant1	5825	12.73	≤30.00	PASS
	Ant2	5825	14.32	≤30.00	PASS
	total	5825	16.61	≤30.00	PASS
11N20MIMO	Ant1	5180	11.82	≤23.98	PASS
	Ant2	5180	13.41	≤23.98	PASS
	total	5180	15.70	≤23.98	PASS
	Ant1	5200	11.94	≤23.98	PASS
	Ant2	5200	13.20	≤23.98	PASS
	total	5200	15.63	≤23.98	PASS
	Ant1	5240	11.52	≤23.98	PASS
	Ant2	5240	12.43	≤23.98	PASS
	total	5240	15.01	≤23.98	PASS
	Ant1	5745	12.91	≤30.00	PASS
	Ant2	5745	14.10	≤30.00	PASS
	total	5745	16.56	≤30.00	PASS
	Ant1	5785	12.97	≤30.00	PASS
	Ant2	5785	14.01	≤30.00	PASS
	total	5785	16.53	≤30.00	PASS
	Ant1	5825	12.88	≤30.00	PASS
	Ant2	5825	14.27	≤30.00	PASS
	total	5825	16.64	≤30.00	PASS
11N40MIMO	Ant1	5190	11.22	≤23.98	PASS
	Ant2	5190	12.91	≤23.98	PASS
	total	5190	15.16	≤23.98	PASS
	Ant1	5230	11.10	≤23.98	PASS

	Ant2	5230	12.74	≤23.98	PASS
	total	5230	15.01	≤23.98	PASS
	Ant1	5755	12.13	≤30.00	PASS
	Ant2	5755	13.64	≤30.00	PASS
	total	5755	15.96	≤30.00	PASS
	Ant1	5795	12.32	≤30.00	PASS
	Ant2	5795	13.70	≤30.00	PASS
	total	5795	16.07	≤30.00	PASS
11AC20MIMO	Ant1	5180	12.02	≤23.98	PASS
	Ant2	5180	13.48	≤23.98	PASS
	total	5180	15.82	≤23.98	PASS
	Ant1	5200	12.22	≤23.98	PASS
	Ant2	5200	13.37	≤23.98	PASS
	total	5200	15.84	≤23.98	PASS
	Ant1	5240	11.84	≤23.98	PASS
	Ant2	5240	12.51	≤23.98	PASS
	total	5240	15.20	≤23.98	PASS
	Ant1	5745	12.87	≤30.00	PASS
	Ant2	5745	14.39	≤30.00	PASS
	total	5745	16.71	≤30.00	PASS
	Ant1	5785	13.29	≤30.00	PASS
	Ant2	5785	14.16	≤30.00	PASS
	total	5785	16.76	≤30.00	PASS
	Ant1	5825	12.98	≤30.00	PASS
	Ant2	5825	14.33	≤30.00	PASS
	total	5825	16.72	≤30.00	PASS
11AC40MIMO	Ant1	5190	11.46	≤23.98	PASS
	Ant2	5190	12.96	≤23.98	PASS
	total	5190	15.28	≤23.98	PASS
	Ant1	5230	11.45	≤23.98	PASS
	Ant2	5230	12.81	≤23.98	PASS
	total	5230	15.19	≤23.98	PASS
	Ant1	5755	12.23	≤30.00	PASS
	Ant2	5755	13.67	≤30.00	PASS
	total	5755	16.02	≤30.00	PASS
	Ant1	5795	12.10	≤30.00	PASS
	Ant2	5795	13.82	≤30.00	PASS
	total	5795	16.08	≤30.00	PASS
11AC80MIMO	Ant1	5210	11.73	≤23.98	PASS
	Ant2	5210	12.87	≤23.98	PASS
	total	5210	15.35	≤23.98	PASS
	Ant1	5775	12.70	≤30.00	PASS

	Ant2	5775	13.76	≤30.00	PASS
	total	5775	16.27	≤30.00	PASS

Note: The Duty Cycle Factor is compensated in the test system

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 = $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}]$ 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 = $10 \log[(10^{1.93/20} + 10^{2.14/20})^2 / N_{ANT}]$ dBi=5.05

3.5 Power Spectral Density

3.5.1 Limit

FCC Part15, Subpart E (15.407)			
Section	Test Item	Limit	Frequency Range (MHz)
15.407(a)	Power Spectral Density	Master device: 17 dBm/MHz Client device: 11 dBm/MHz	5150-5250
		11 dBm/MHz	5250-5350
		11 dBm/MHz	5470-5725
		30 dBm/500 kHz	5725-5850

Note:

- For UNII-3, according to KDB publication 789033 D02 General UNII Test Procedures New Rules v02r01, section II.F.5., it is acceptable to set RBW at 300kHz and VBW at 1500kHz if the spectrum analyzer does not have 500 kHz RBW. Then, add 10 log (500 kHz/300 kHz) to the measured result, i.e. 2.22 dB.
- During the test of U-NII 3 PSD, the measurement result with RBW=300kHz has been added 2.22 dB by compensating offset, offset=cable loss+duty factor+10log(500kHz/300kHz).

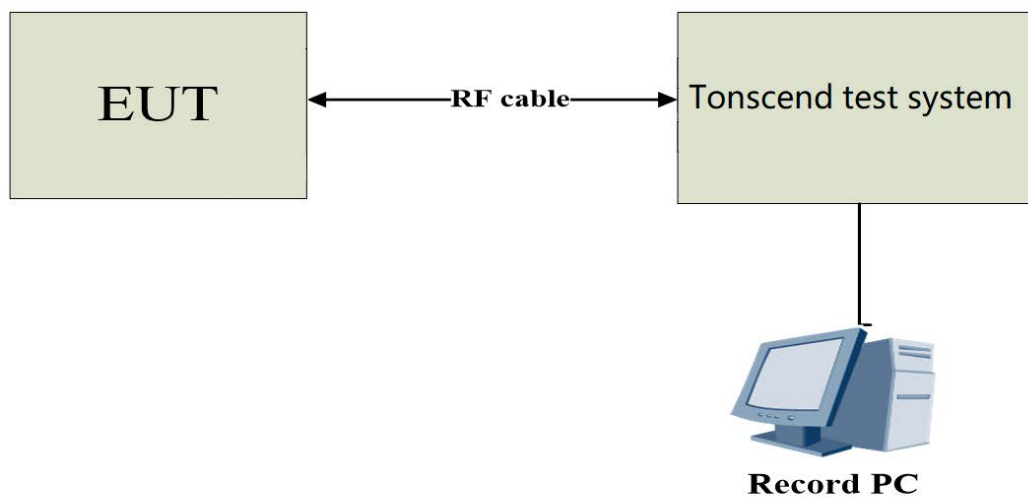
3.5.2 Test Procedure

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 tonscond test system and antenna output port as show in the block diagram below. Spectrum analyser settings as following:

Centre Frequency	The centre frequency of the channel under test
RBW	= 1 MHz (Band1/2/3); = 300kHz (Band4)
VBW	≥3 x RBW
Frequency span	2 x Nominal Channel Bandwidth
Detector Mode	RMS
Trace Mode	Max Hold
Sweep Time	Auto Couple

3.5.3 Test Setup



3.5.4 The Result

Test Mode	Antenna	Freq(MHz)	Result [dBm/MHz]	Limit[dBm/MHz]	Verdict
11A-CDD	Ant1	5180	5.27	≤11.00	PASS
	Ant2	5180	6.61	≤11.00	PASS
	total	5180	9.00	≤11.00	PASS
	Ant1	5200	5.51	≤11.00	PASS
	Ant2	5200	6.40	≤11.00	PASS
	total	5200	8.99	≤11.00	PASS
	Ant1	5240	4.93	≤11.00	PASS
	Ant2	5240	5.69	≤11.00	PASS
	total	5240	8.34	≤11.00	PASS
	Ant1	5745	3.79	≤30.00	PASS
	Ant2	5745	4.55	≤30.00	PASS
	total	5745	7.20	≤30.00	PASS
	Ant1	5785	3.77	≤30.00	PASS
	Ant2	5785	4.63	≤30.00	PASS
	total	5785	7.23	≤30.00	PASS
	Ant1	5825	3.49	≤30.00	PASS
	Ant2	5825	4.77	≤30.00	PASS
	total	5825	7.19	≤30.00	PASS
11N20MIMO	Ant1	5180	5.00	≤11.00	PASS
	Ant2	5180	6.30	≤11.00	PASS
	total	5180	8.71	≤11.00	PASS
	Ant1	5200	4.99	≤11.00	PASS
	Ant2	5200	6.12	≤11.00	PASS
	total	5200	8.60	≤11.00	PASS
	Ant1	5240	4.58	≤11.00	PASS
	Ant2	5240	5.56	≤11.00	PASS
	total	5240	8.11	≤11.00	PASS
	Ant1	5745	3.50	≤30.00	PASS
	Ant2	5745	4.16	≤30.00	PASS
	total	5745	6.85	≤30.00	PASS
	Ant1	5785	3.38	≤30.00	PASS
	Ant2	5785	4.20	≤30.00	PASS
	total	5785	6.82	≤30.00	PASS
	Ant1	5825	3.38	≤30.00	PASS
	Ant2	5825	4.37	≤30.00	PASS
	total	5825	6.91	≤30.00	PASS
11N40MIMO	Ant1	5190	1.12	≤11.00	PASS
	Ant2	5190	2.93	≤11.00	PASS
	total	5190	5.13	≤11.00	PASS
	Ant1	5230	1.38	≤11.00	PASS

	Ant2	5230	2.92	≤11.00	PASS
	total	5230	5.23	≤11.00	PASS
	Ant1	5755	-0.32	≤30.00	PASS
	Ant2	5755	0.79	≤30.00	PASS
	total	5755	3.28	≤30.00	PASS
	Ant1	5795	0.47	≤30.00	PASS
	Ant2	5795	1.37	≤30.00	PASS
	total	5795	3.95	≤30.00	PASS
11AC20MIMO	Ant1	5180	4.92	≤11.00	PASS
	Ant2	5180	6.27	≤11.00	PASS
	total	5180	8.66	≤11.00	PASS
	Ant1	5200	5.18	≤11.00	PASS
	Ant2	5200	6.22	≤11.00	PASS
	total	5200	8.74	≤11.00	PASS
	Ant1	5240	4.98	≤11.00	PASS
	Ant2	5240	5.47	≤11.00	PASS
	total	5240	8.24	≤11.00	PASS
	Ant1	5745	3.42	≤30.00	PASS
	Ant2	5745	5.01	≤30.00	PASS
	total	5745	7.30	≤30.00	PASS
	Ant1	5785	3.54	≤30.00	PASS
	Ant2	5785	4.38	≤30.00	PASS
	total	5785	6.99	≤30.00	PASS
	Ant1	5825	3.10	≤30.00	PASS
	Ant2	5825	4.37	≤30.00	PASS
	total	5825	6.79	≤30.00	PASS
11AC40MIMO	Ant1	5190	1.48	≤11.00	PASS
	Ant2	5190	2.84	≤11.00	PASS
	total	5190	5.22	≤11.00	PASS
	Ant1	5230	1.88	≤11.00	PASS
	Ant2	5230	2.98	≤11.00	PASS
	total	5230	5.48	≤11.00	PASS
	Ant1	5755	-0.54	≤30.00	PASS
	Ant2	5755	0.73	≤30.00	PASS
	total	5755	3.15	≤30.00	PASS
	Ant1	5795	-0.44	≤30.00	PASS
	Ant2	5795	1.17	≤30.00	PASS
	total	5795	3.46	≤30.00	PASS
11AC80MIMO	Ant1	5210	-0.63	≤11.00	PASS
	Ant2	5210	-0.03	≤11.00	PASS
	total	5210	2.69	≤11.00	PASS
	Ant1	5775	-2.94	≤30.00	PASS

	Ant2	5775	-2.05	≤30.00	PASS
	total	5775	0.54	≤30.00	PASS

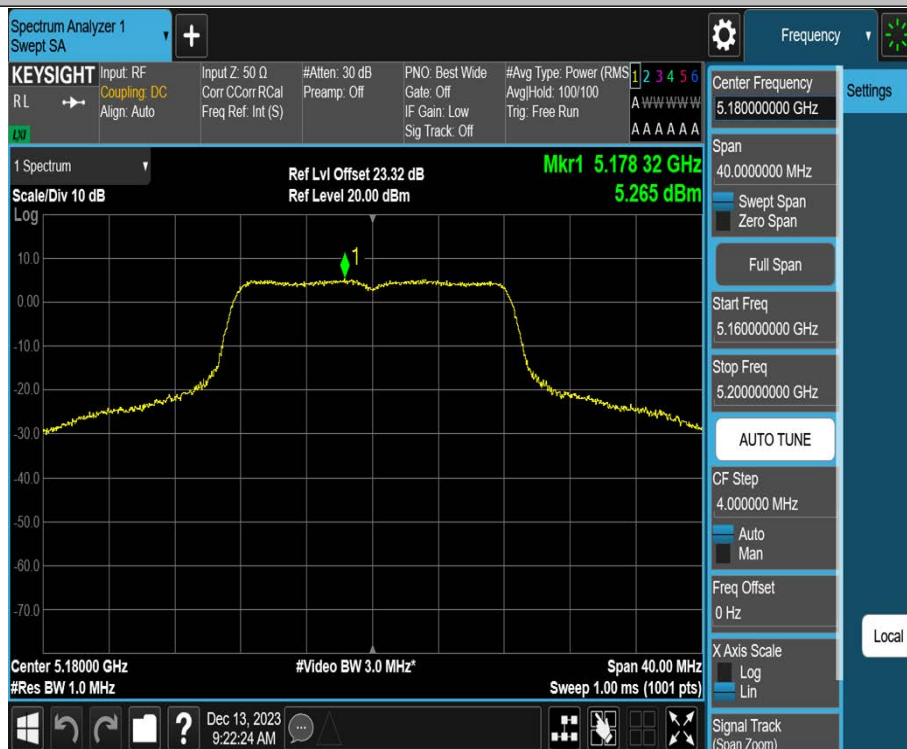
Note1: The Duty Cycle Factor is compensated in the test system

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 = $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}]$ 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 = $10 \log[(10^{1.93/20} + 10^{2.14/20})^2 / N_{ANT}]$ dBi=5.05

Note2:

1. For UNII-3, according to KDB publication 789033 D02 General UNII Test Procedures New Rules v02r01, section II.F.5., it is acceptable to set RBW at 300kHz and VBW at 1500kHz if the spectrum analyzer does not have 500 kHz RBW. Then, add $10 \log(500 \text{ kHz}/300 \text{ kHz})$ to the measured result, i.e. 2.22 dB.
2. During the test of U-NII 3 PSD, the measurement result with RBW=300kHz has been added 2.22 dB by compensating offset, offset=cable loss+duty factor+ $10 \log(500 \text{ kHz}/300 \text{ kHz})$.

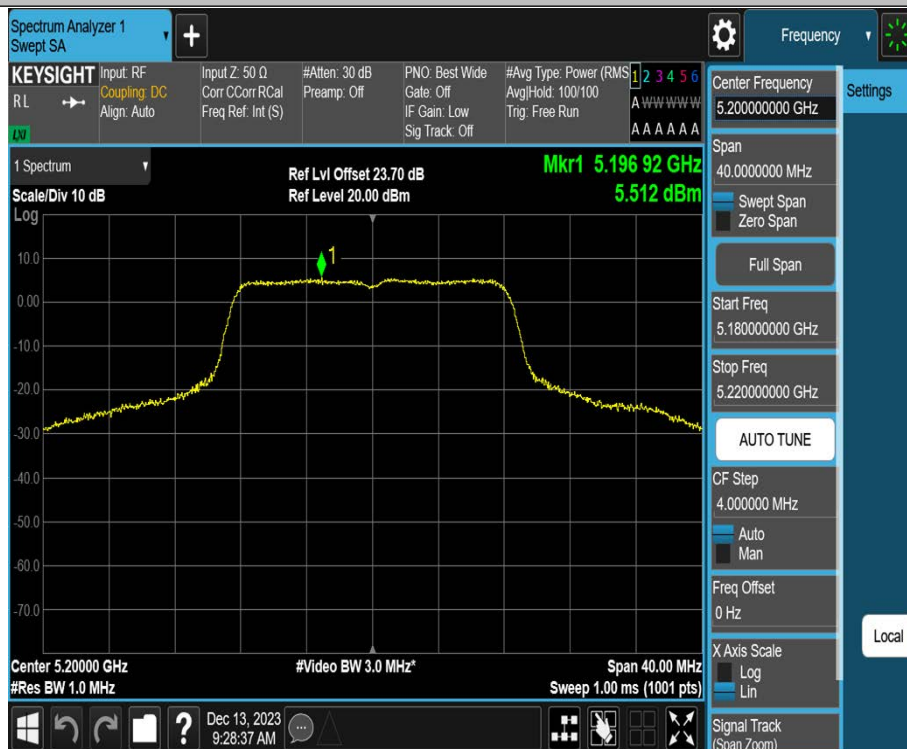
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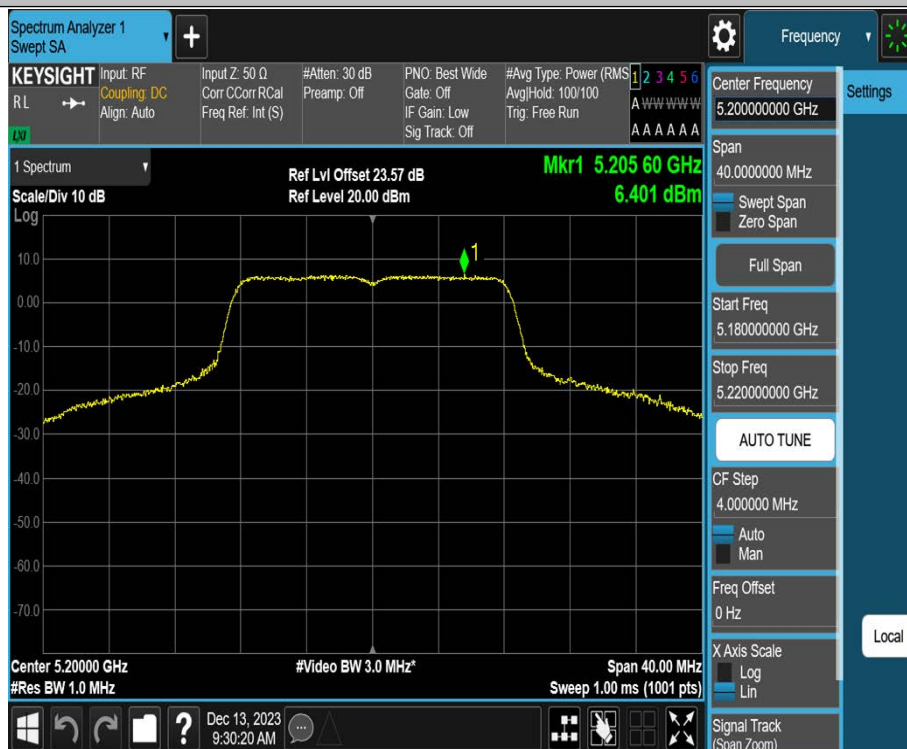
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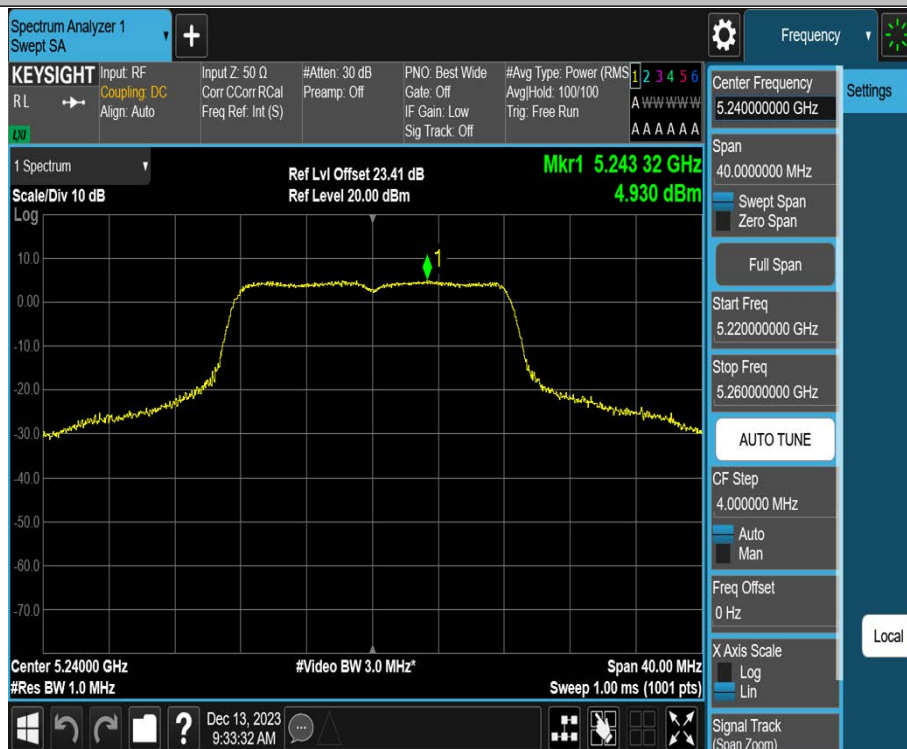
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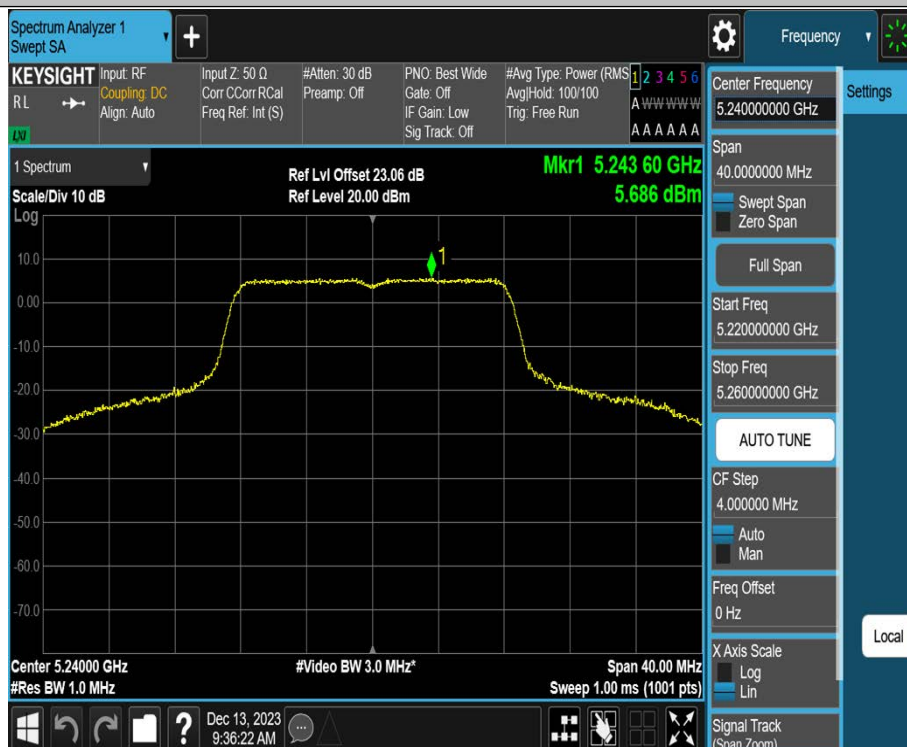
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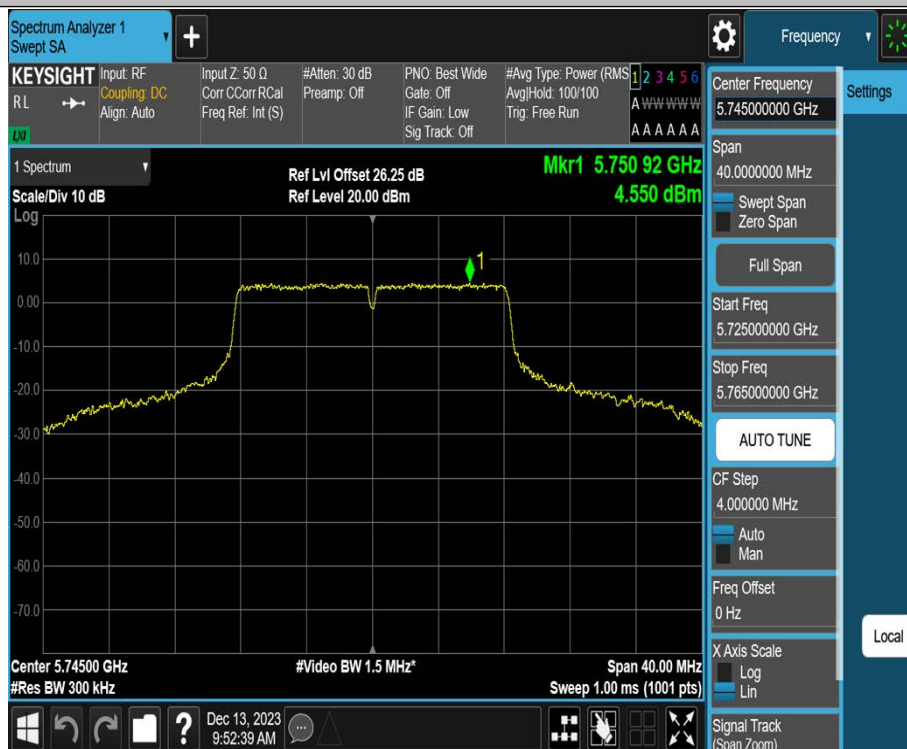
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11A-CDD_Ant1_5745



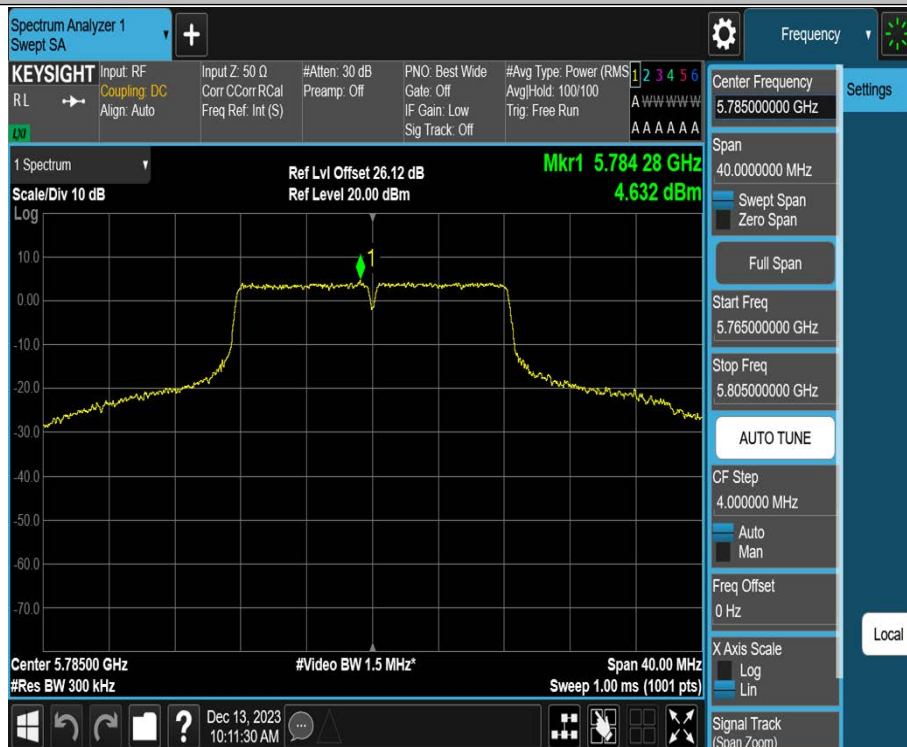
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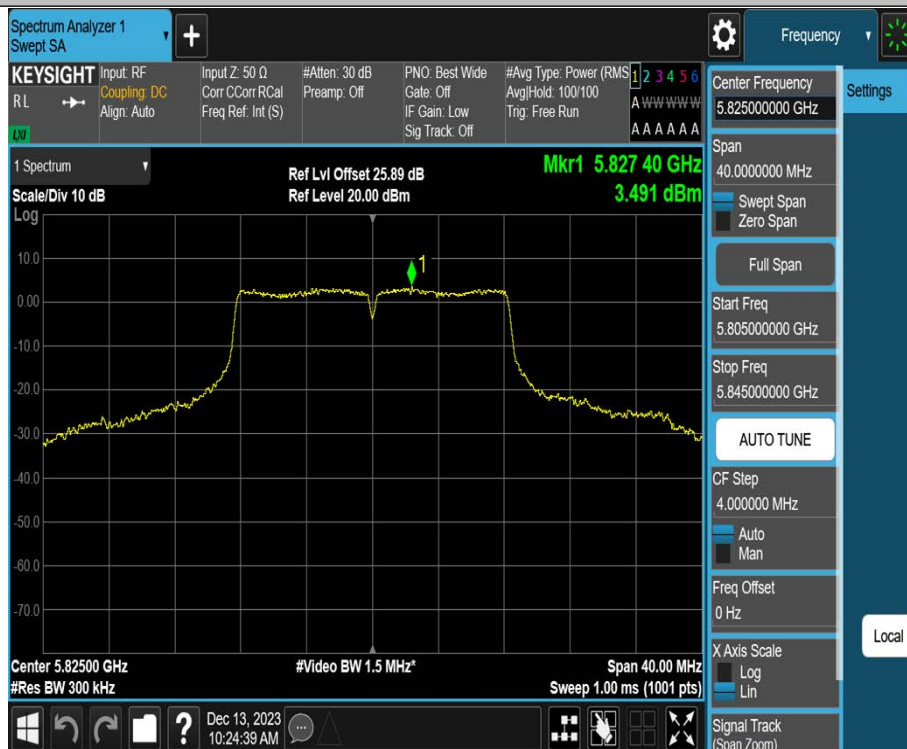
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11A-CDD_Ant2_5785



11A-CDD_Ant1_5825



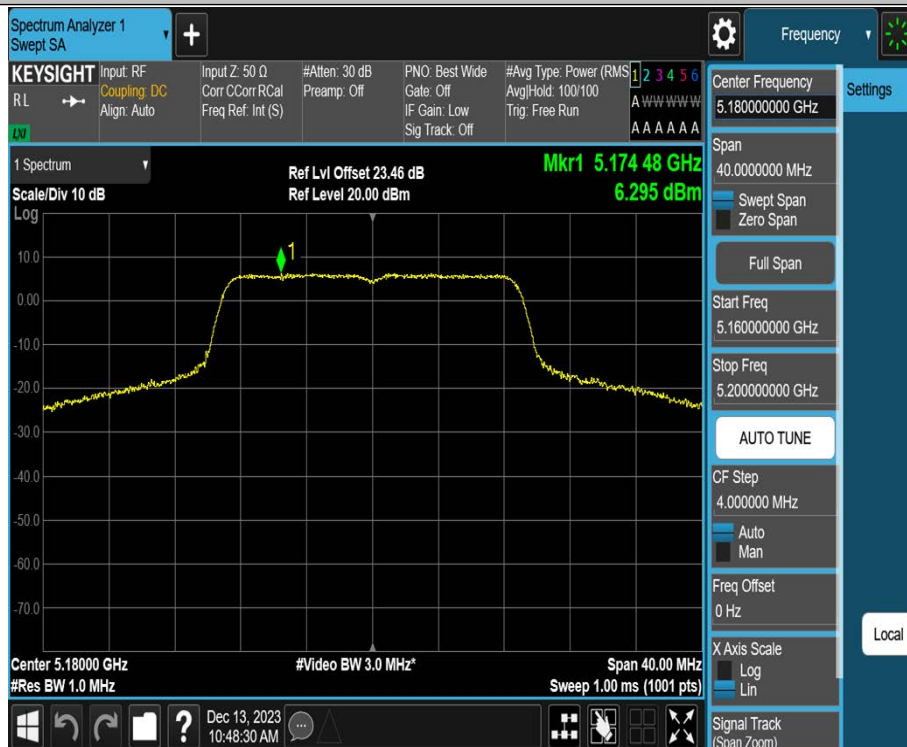
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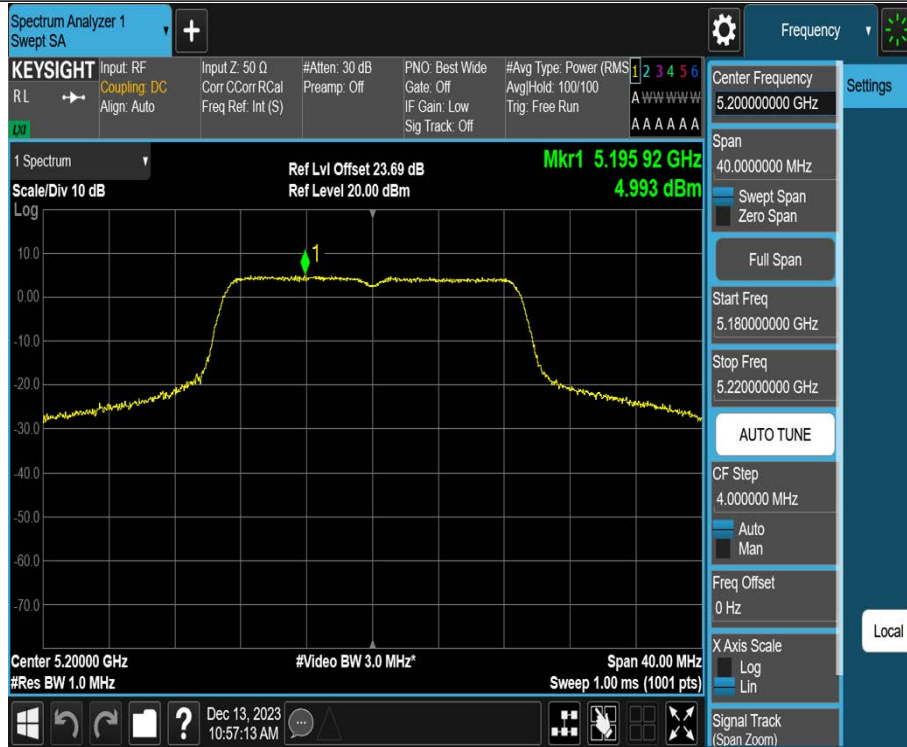
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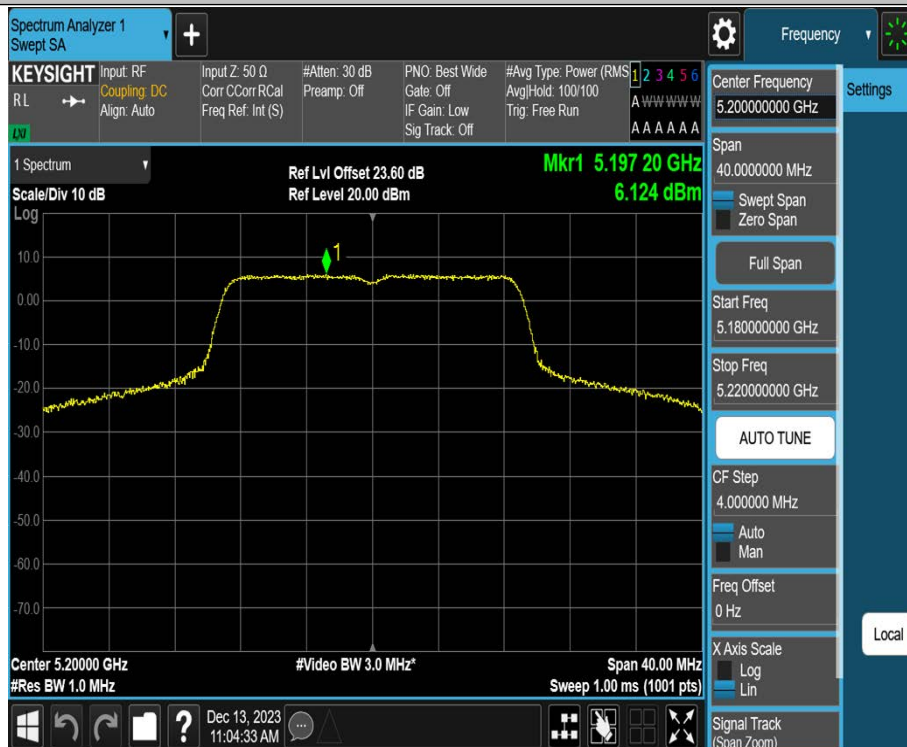
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11N20MIMO_Ant1_5200



11N20MIMO_Ant2_5200



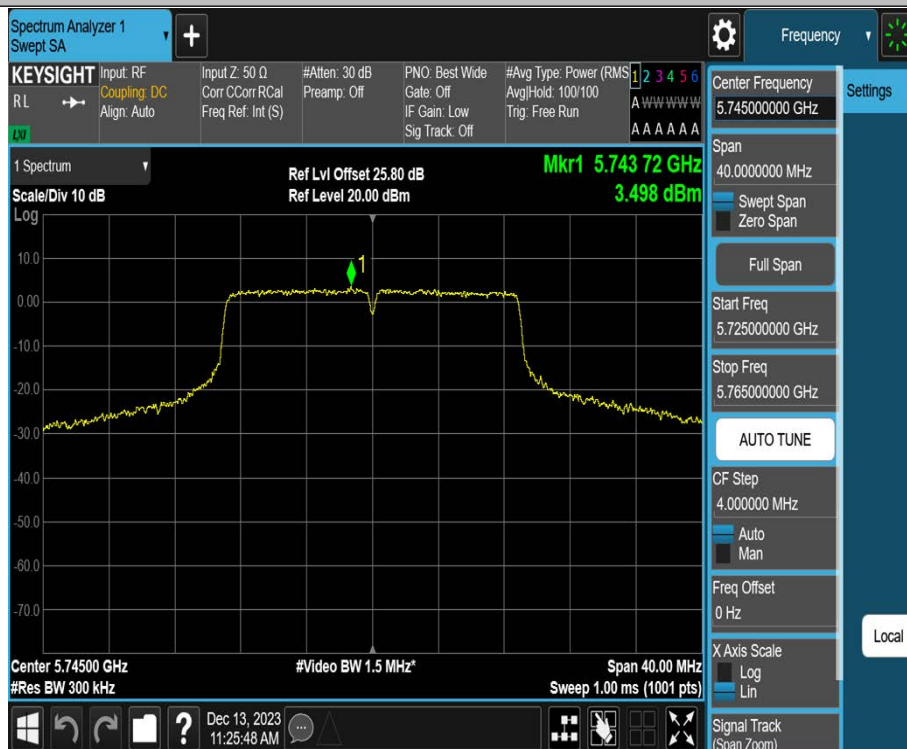
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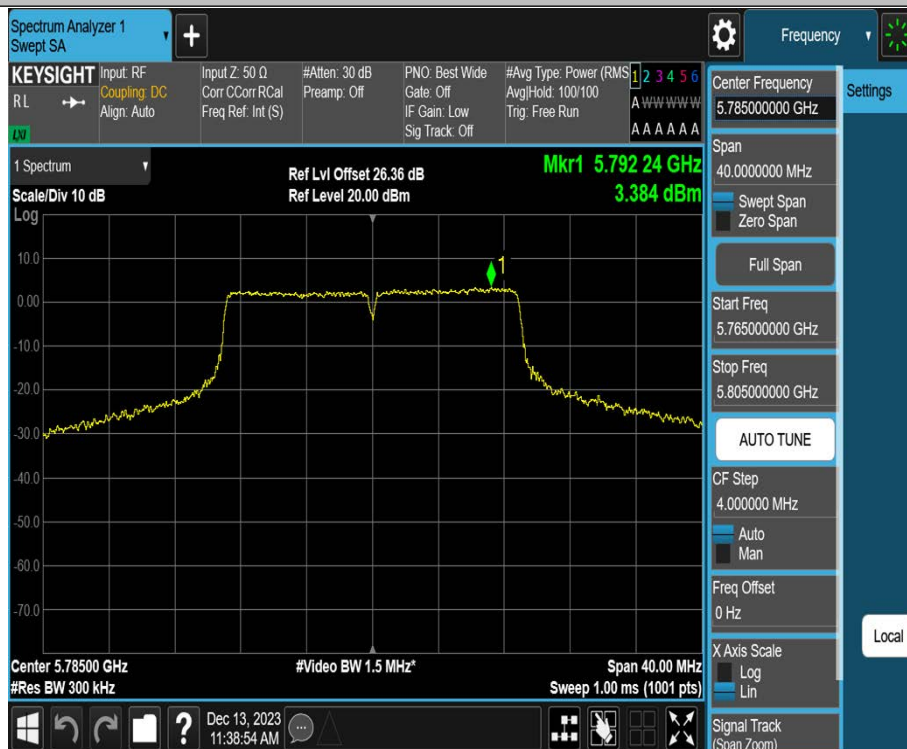
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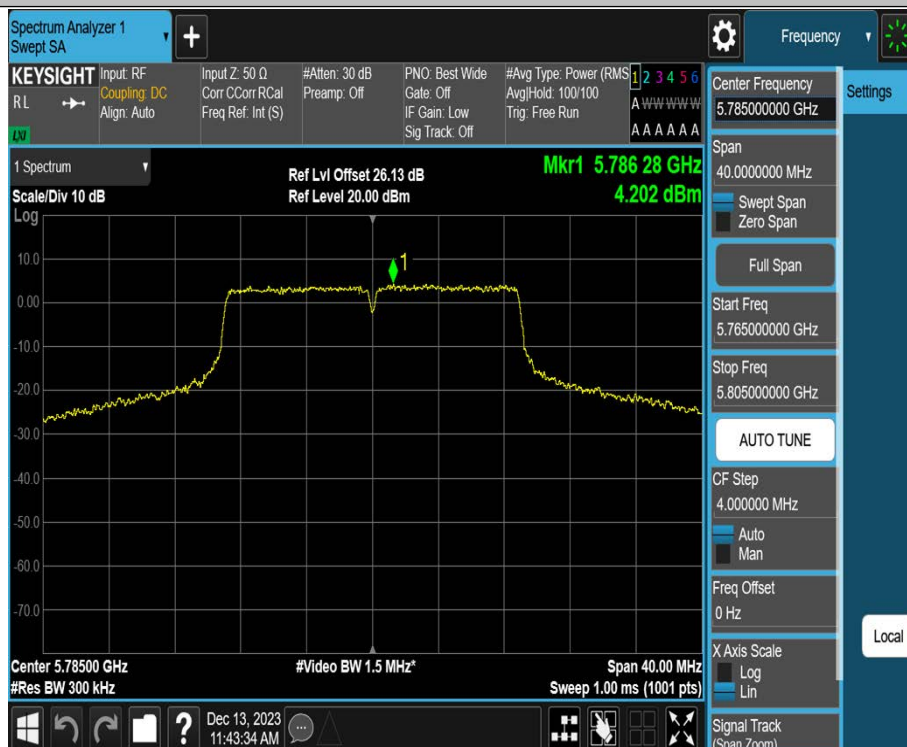
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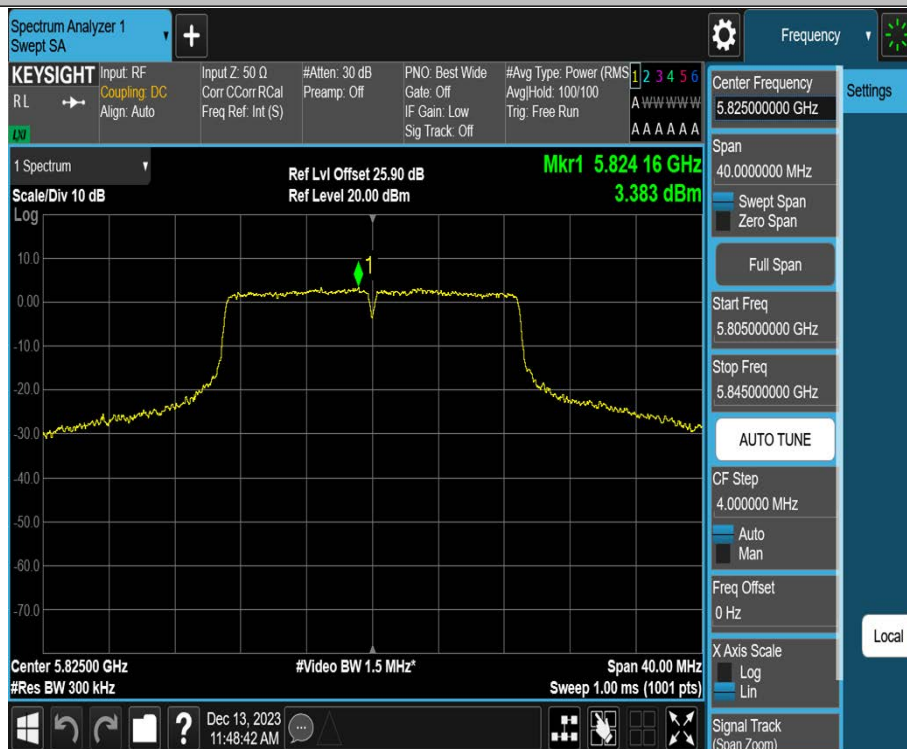
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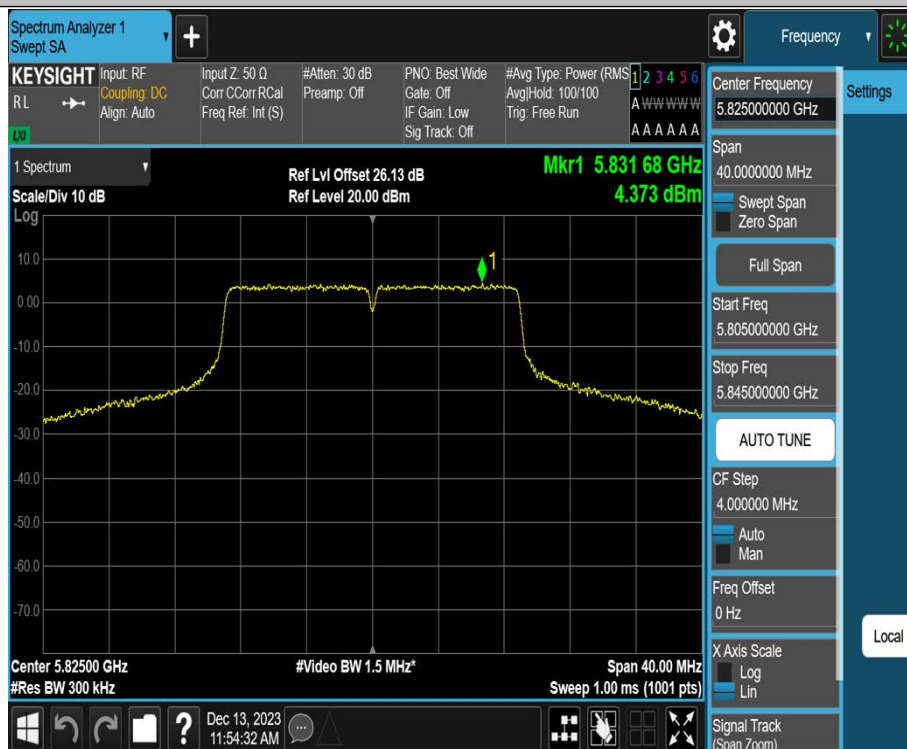
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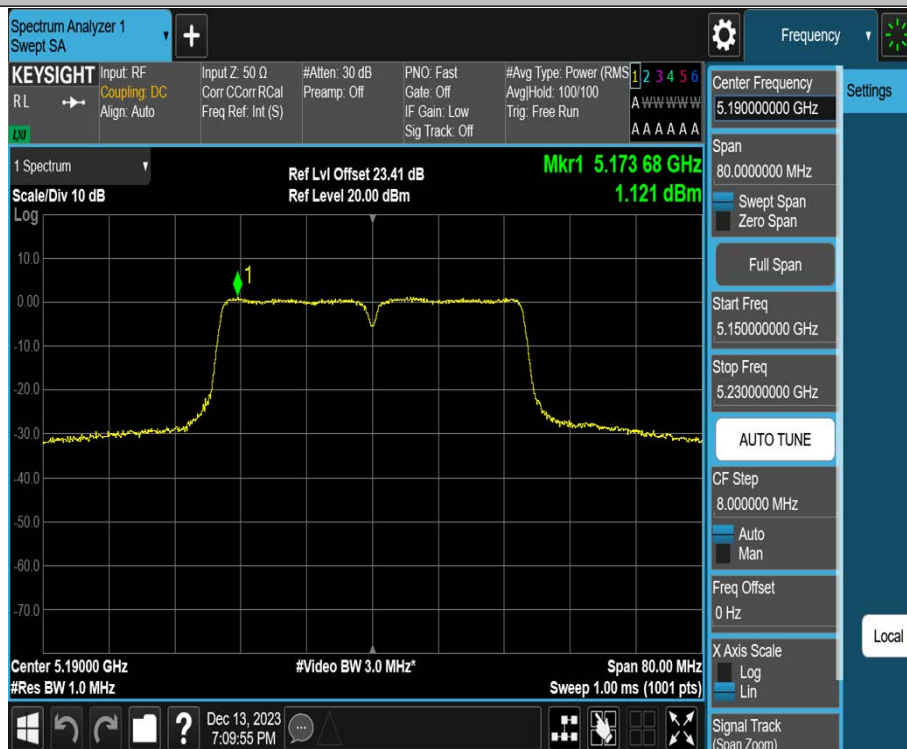
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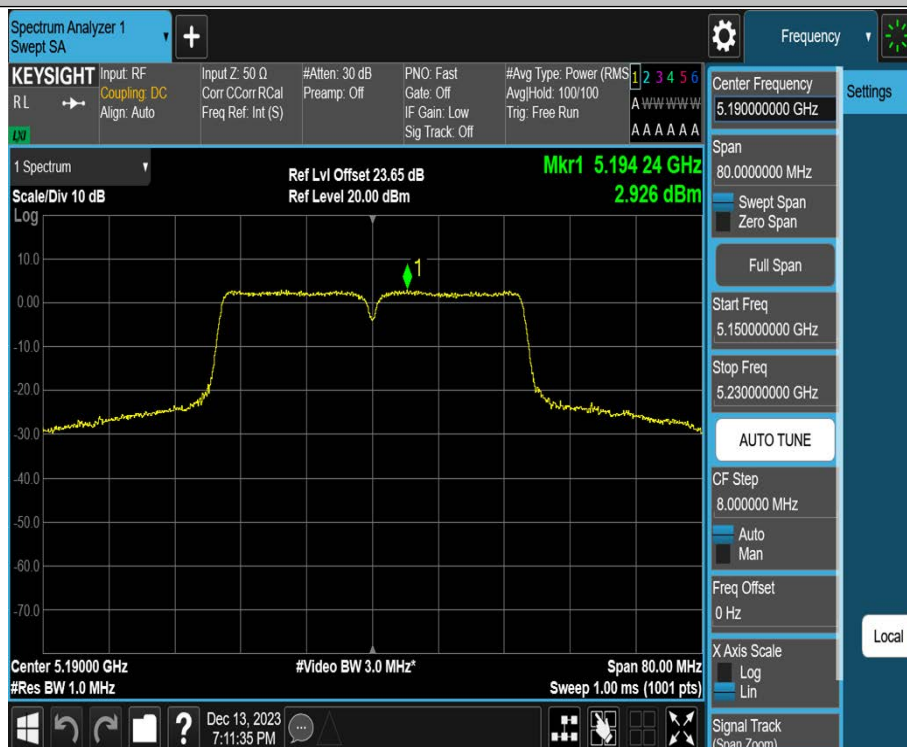
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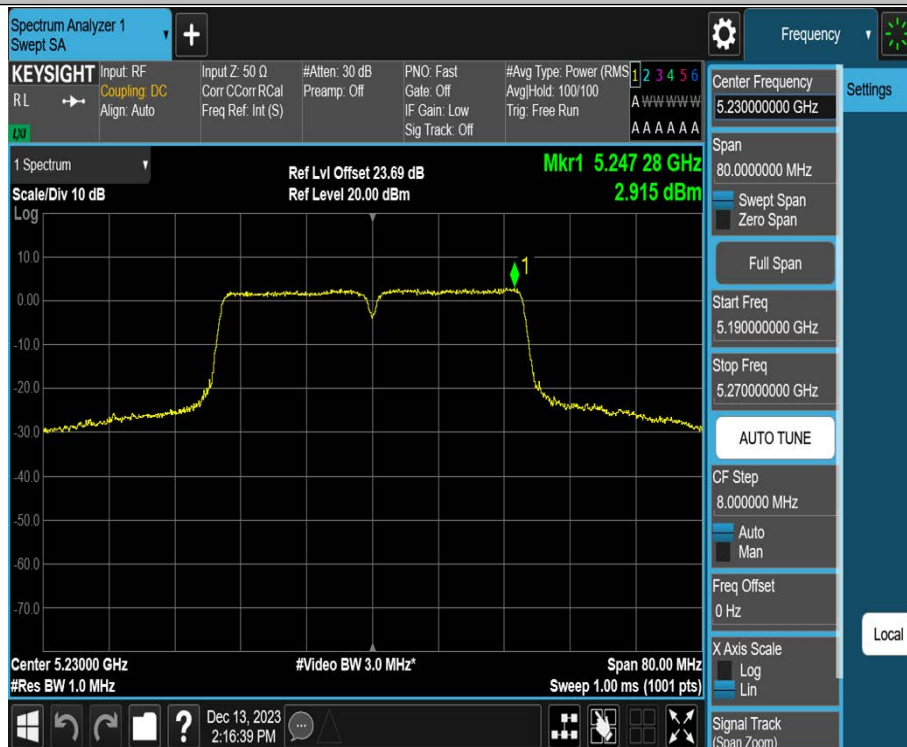
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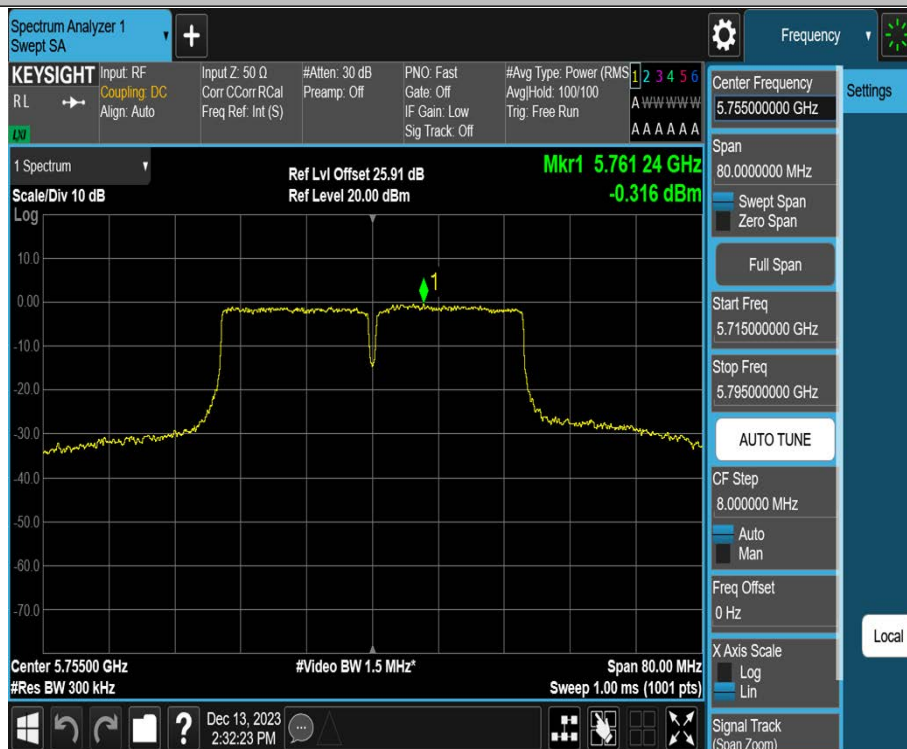
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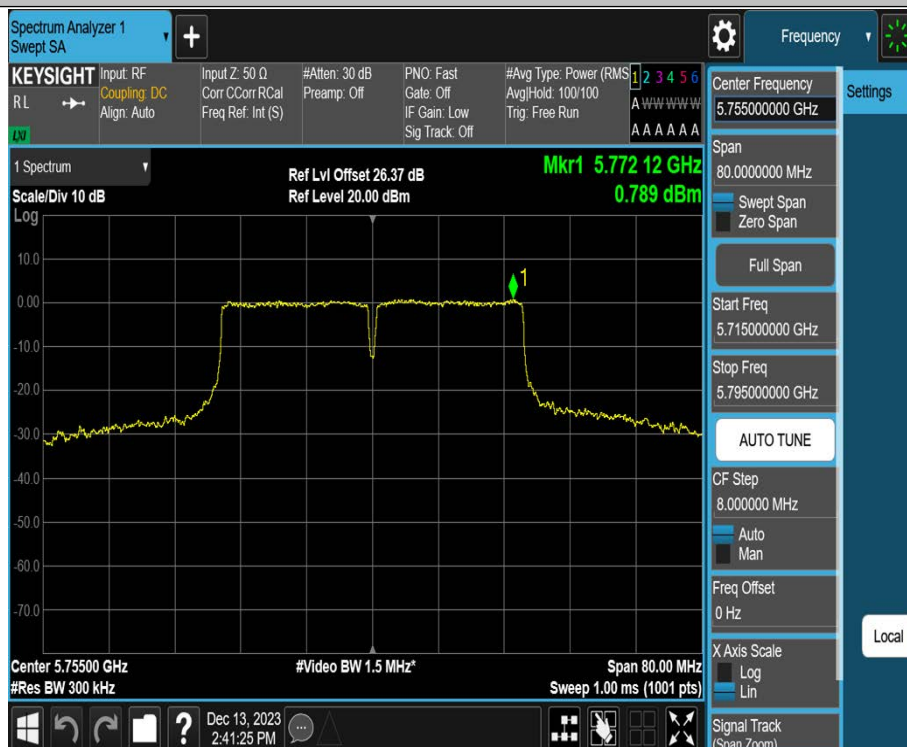
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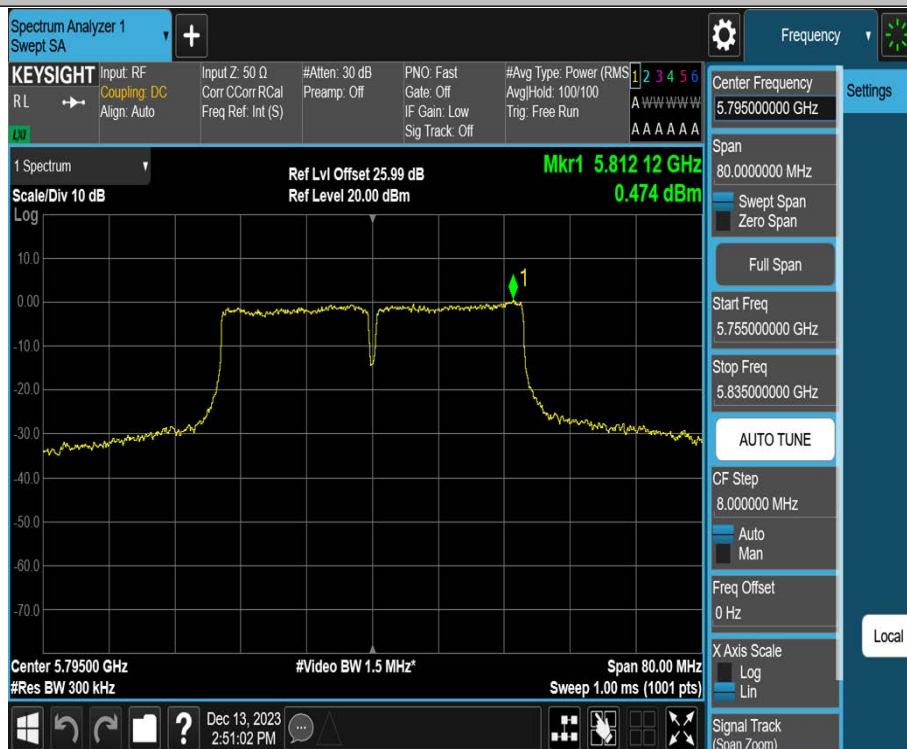
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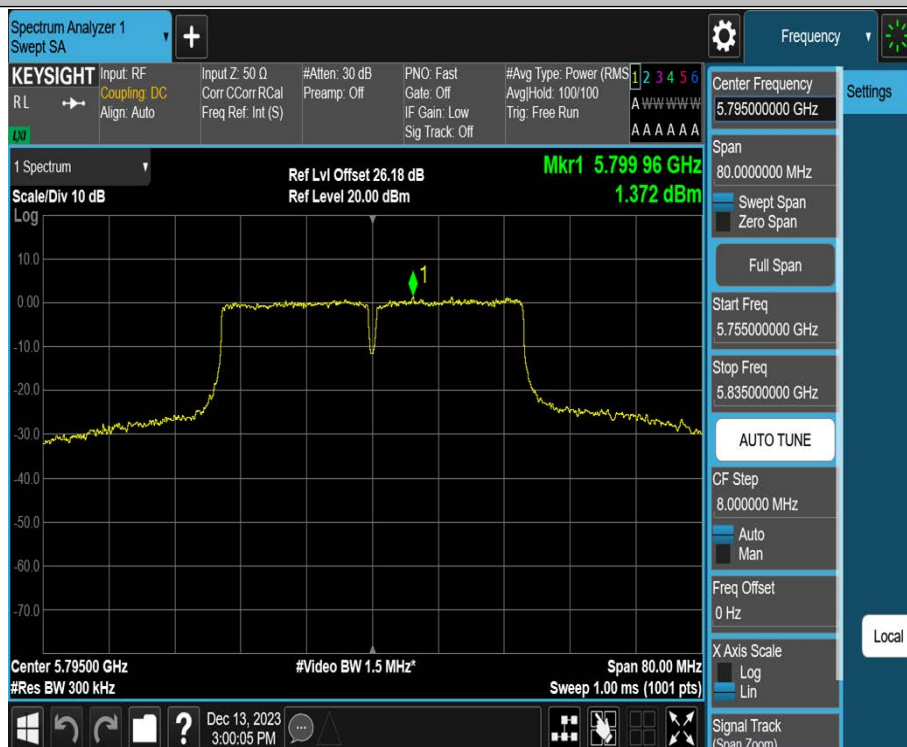
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11N40MIMO_Ant1_5795



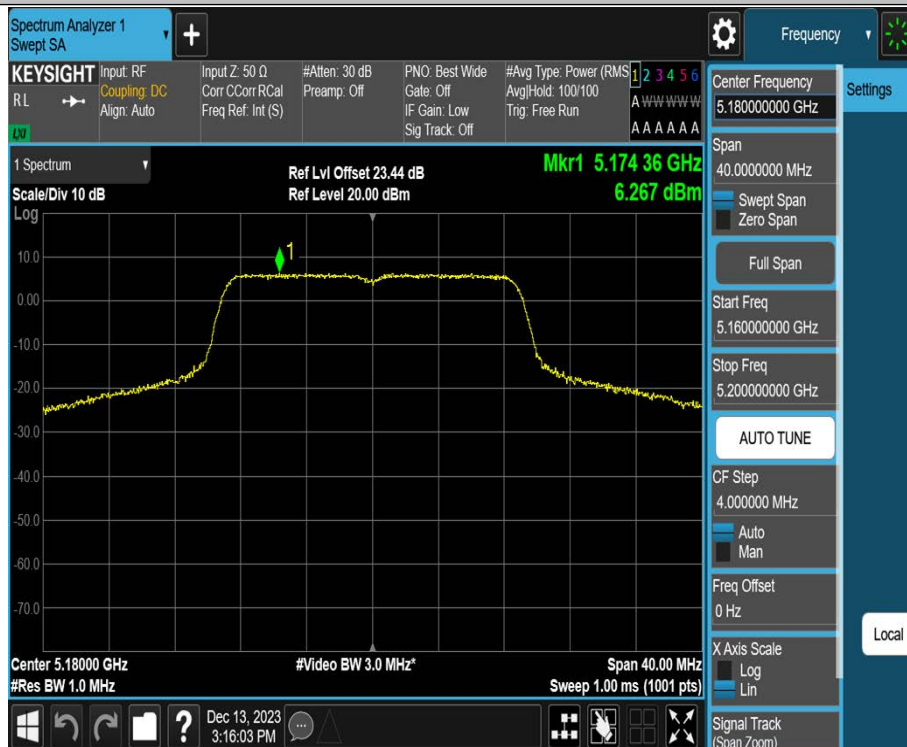
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11AC20MIMO_Ant1_5180



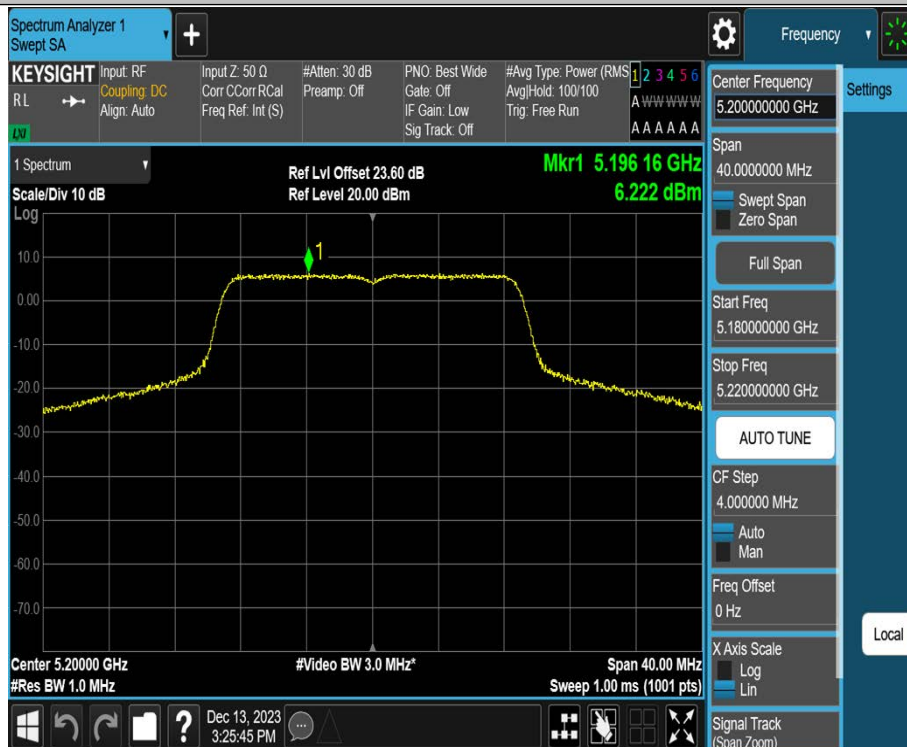
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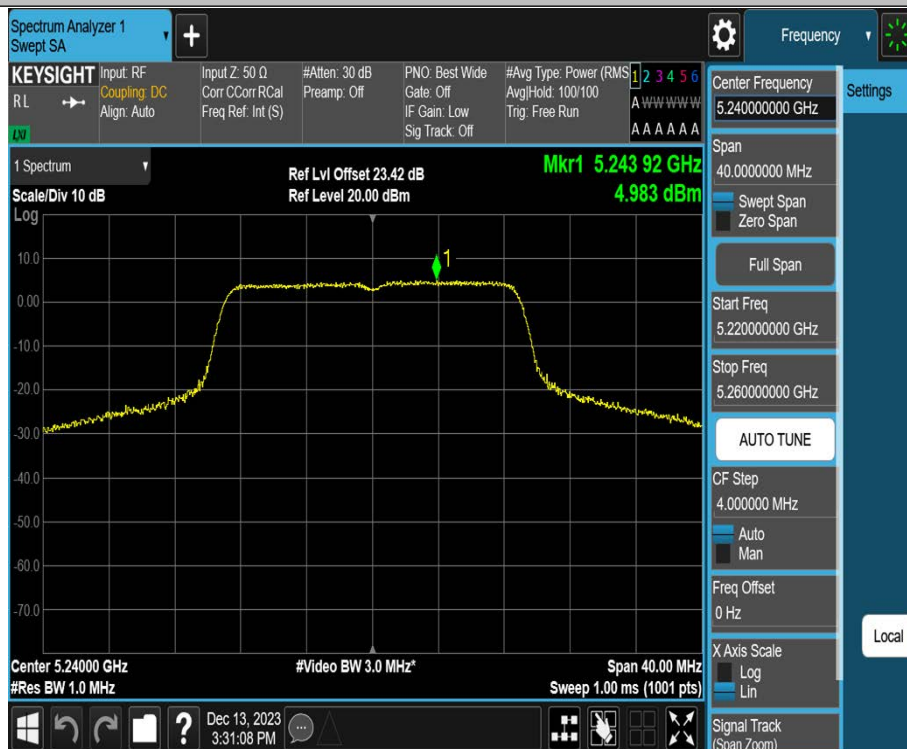
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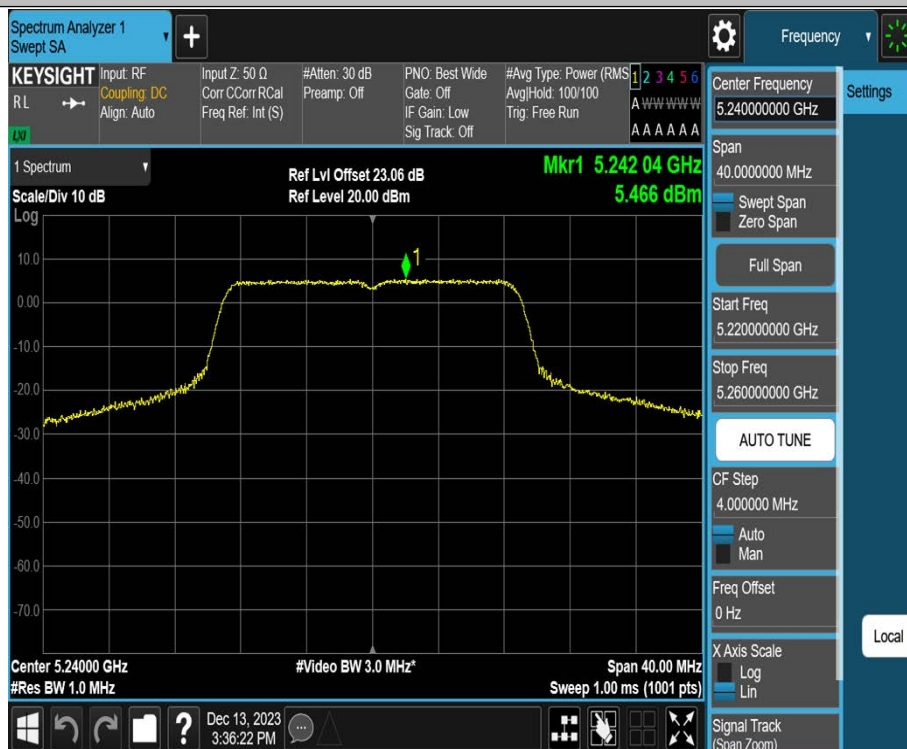
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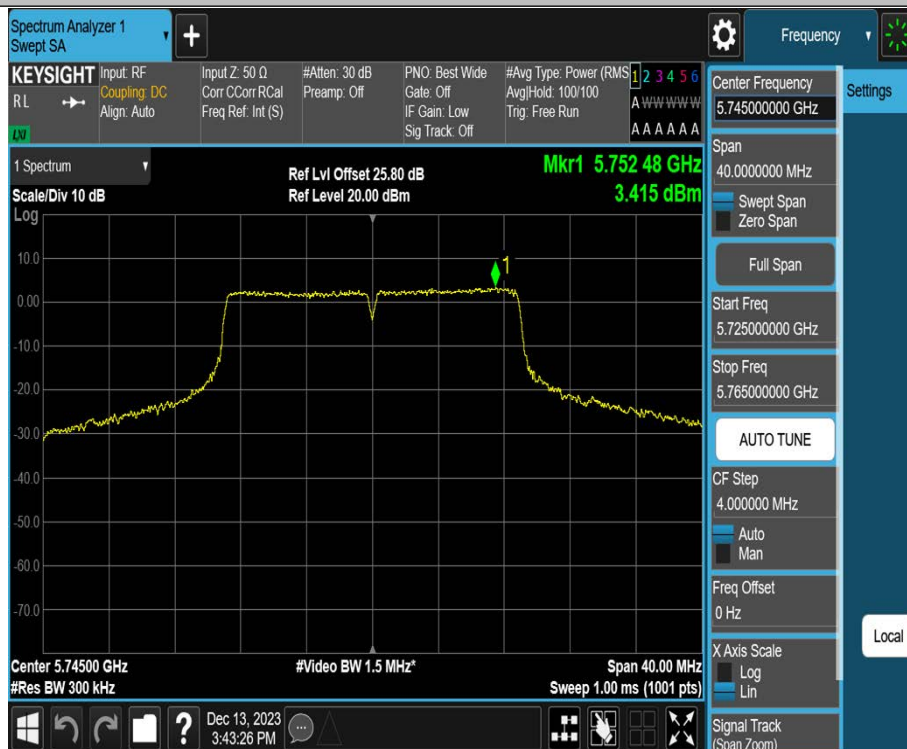
11AC20MIMO_Ant1_5240



11AC20MIMO_Ant2_5240



11AC20MIMO_Ant1_5745



11AC20MIMO_Ant2_5745

