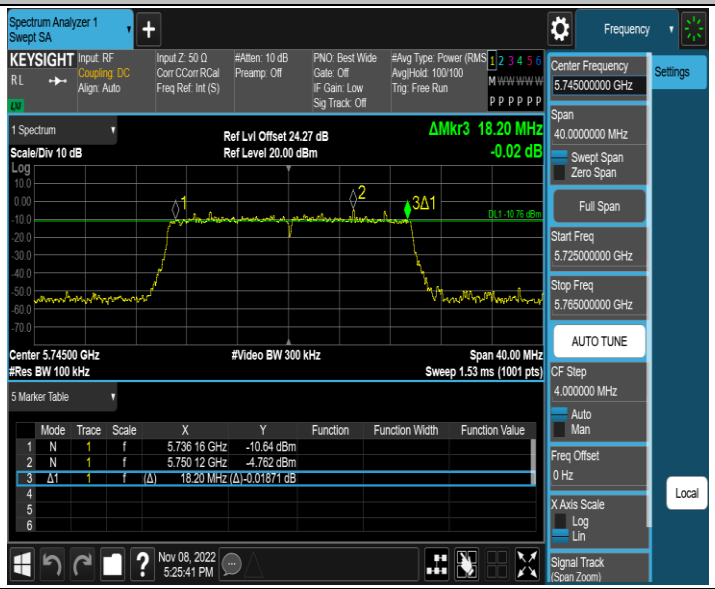
11AC40MIMO_Ant2_5795

11AC80MIMO_Ant1_5775

11AC80MIMO_Ant2_5775

11AX20MIMO_Ant1_5745

11AX20MIMO_Ant2_5745



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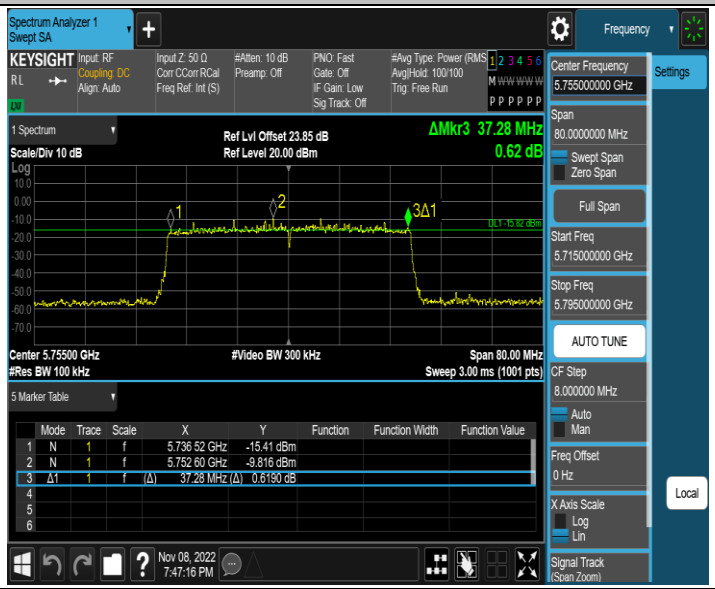
11AX20MIMO_Ant2_5785

11AX20MIMO_Ant1_5825

11AX20MIMO_Ant2_5825

11AX40MIMO_Ant1_5755



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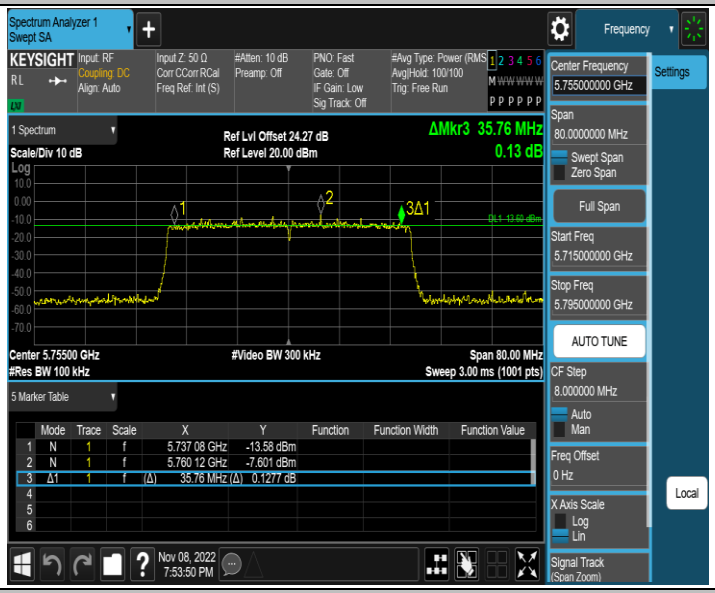
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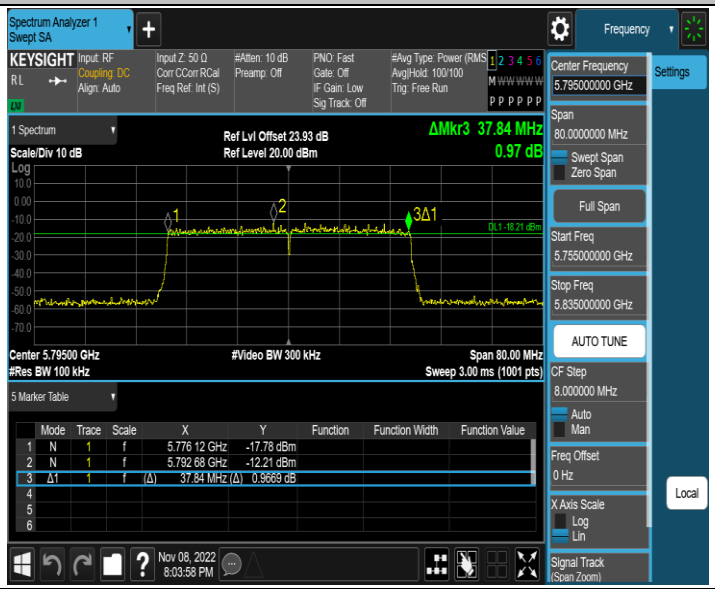
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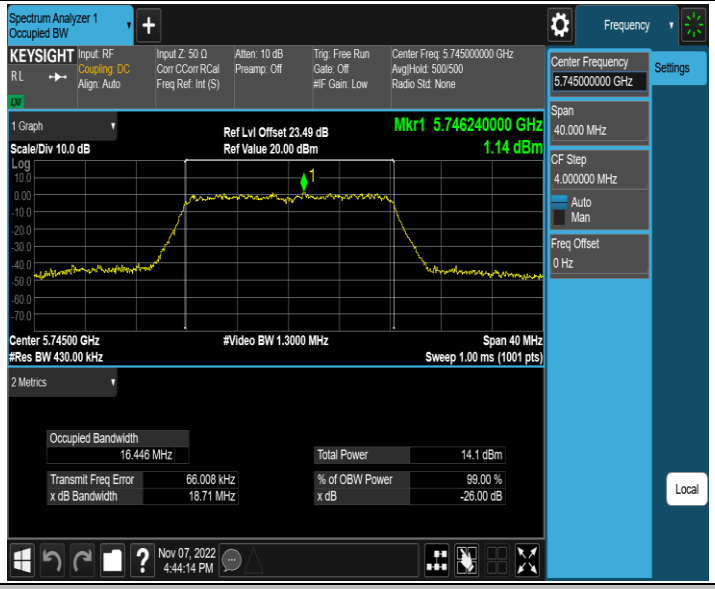
11AX80MIMO_Ant1_5775

11AX80MIMO_Ant2_5775

3.3.5.3 Occupied channel bandwidth

Test Mode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A-CDD	Ant1	5745	16.446	5736.8430	5753.2890	---	---
	Ant2	5745	16.483	5736.8509	5753.3339	---	---
	Ant1	5785	16.446	5776.9007	5793.3467	---	---
	Ant2	5785	16.498	5776.8828	5793.3808	---	---
	Ant1	5825	16.433	5816.9032	5833.3362	---	---
	Ant2	5825	16.501	5816.8666	5833.3676	---	---
11N20MIMO	Ant1	5745	17.615	5736.3143	5753.9293	---	---
	Ant2	5745	17.593	5736.3229	5753.9159	---	---
	Ant1	5785	17.625	5776.3174	5793.9424	---	---
	Ant2	5785	17.601	5776.3120	5793.9130	---	---
	Ant1	5825	17.598	5816.3123	5833.9103	---	---
	Ant2	5825	17.603	5816.3093	5833.9123	---	---
11N40MIMO	Ant1	5755	36.082	5737.1056	5773.1876	---	---
	Ant2	5755	36.050	5737.1258	5773.1758	---	---
	Ant1	5795	36.082	5777.1431	5813.2251	---	---
	Ant2	5795	36.085	5777.1147	5813.1997	---	---
11AC20MIMO	Ant1	5745	17.618	5736.3088	5753.9268	---	---
	Ant2	5745	17.609	5736.3088	5753.9178	---	---
	Ant1	5785	17.621	5776.3076	5793.9286	---	---
	Ant2	5785	17.629	5776.3071	5793.9361	---	---
	Ant1	5825	17.635	5816.2779	5833.9129	---	---
	Ant2	5825	17.610	5816.3203	5833.9303	---	---
11AC40MIMO	Ant1	5755	36.036	5737.1378	5773.1738	---	---
	Ant2	5755	36.063	5737.1190	5773.1820	---	---
	Ant1	5795	36.056	5777.1184	5813.1744	---	---
	Ant2	5795	36.131	5777.1304	5813.2614	---	---
11AC80MIMO	Ant1	5775	76.879	5736.8589	5813.7379	---	---
	Ant2	5775	76.604	5736.8921	5813.4961	---	---
11AX20MIMO	Ant1	5745	18.886	5735.6742	5754.5602	---	---
	Ant2	5745	18.909	5735.6664	5754.5754	---	---
	Ant1	5785	18.905	5775.6655	5794.5705	---	---
	Ant2	5785	18.940	5775.6794	5794.6194	---	---
	Ant1	5825	18.909	5815.6445	5834.5535	---	---
	Ant2	5825	18.931	5815.6659	5834.5969	---	---
11AX40MIMO	Ant1	5755	37.627	5736.3525	5773.9795	---	---
	Ant2	5755	37.721	5736.2747	5773.9957	---	---
	Ant1	5795	37.727	5776.2557	5813.9827	---	---
	Ant2	5795	37.678	5776.3984	5814.0764	---	---
11AX80MIMO	Ant1	5775	77.673	5736.5295	5814.2025	---	---
	Ant2	5775	77.702	5736.3572	5814.0592	---	---

11A-CDD_Ant1_5745

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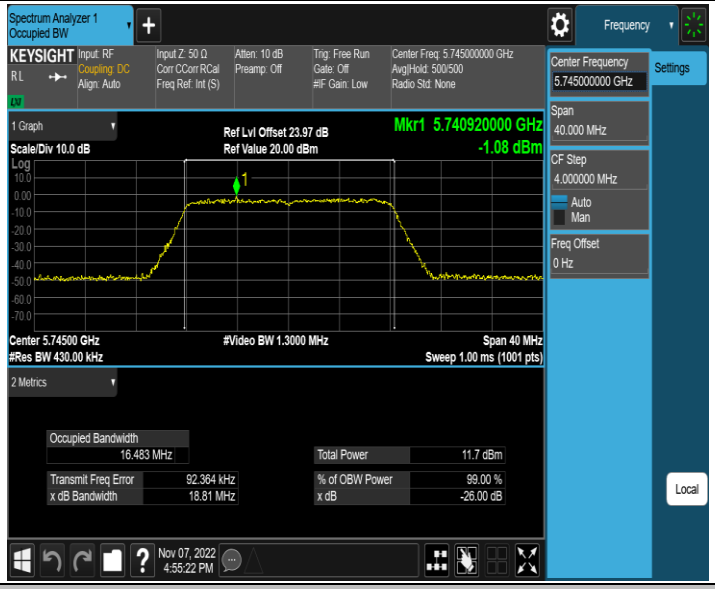
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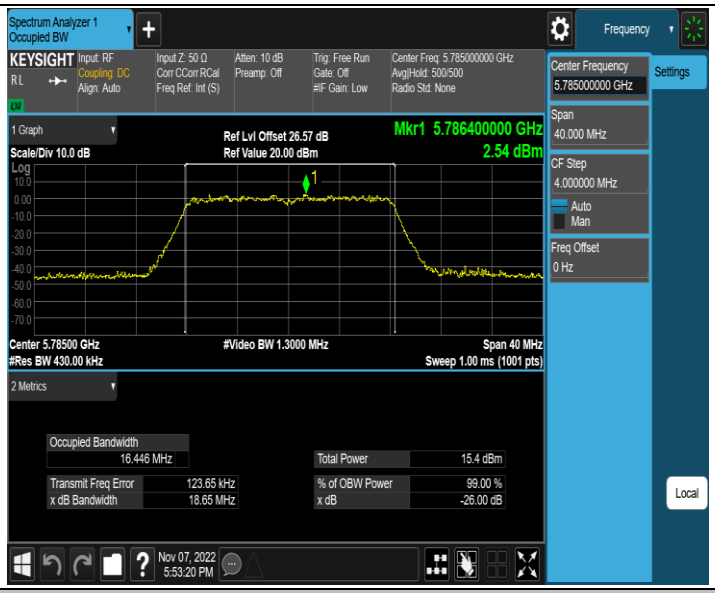

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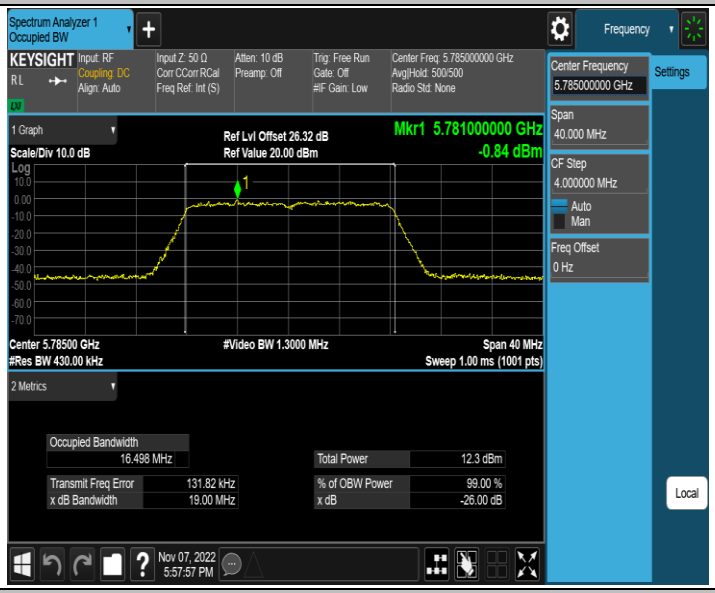

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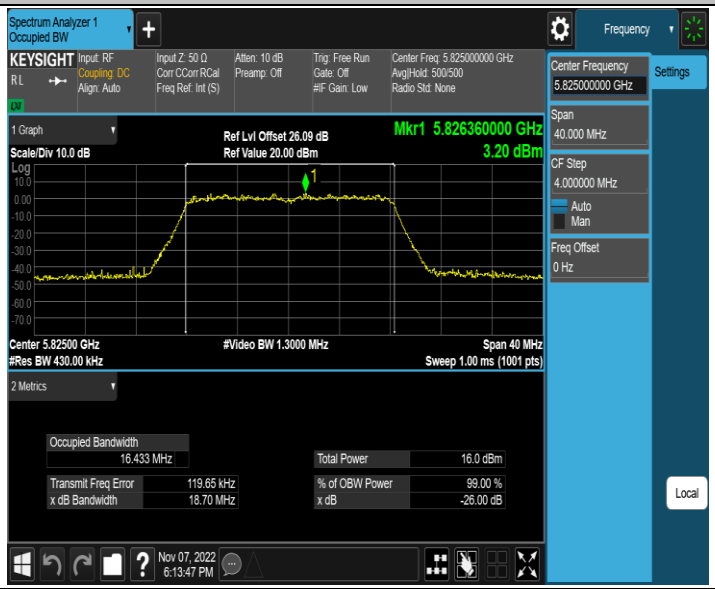

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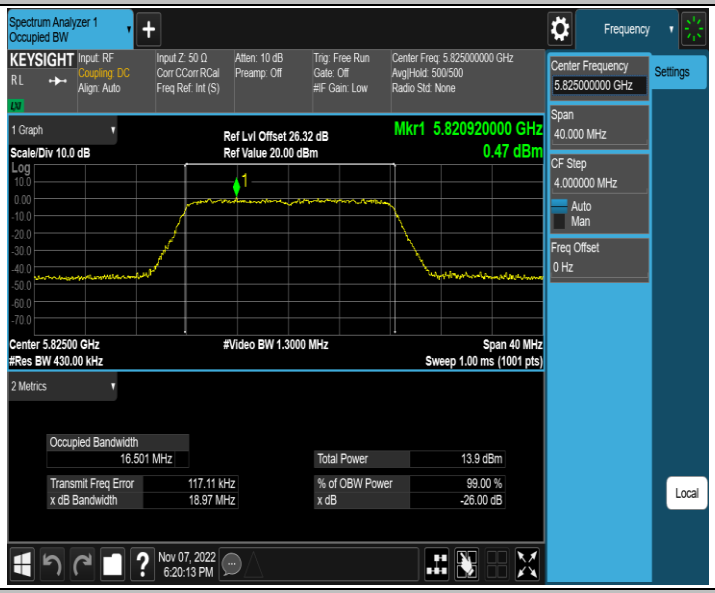
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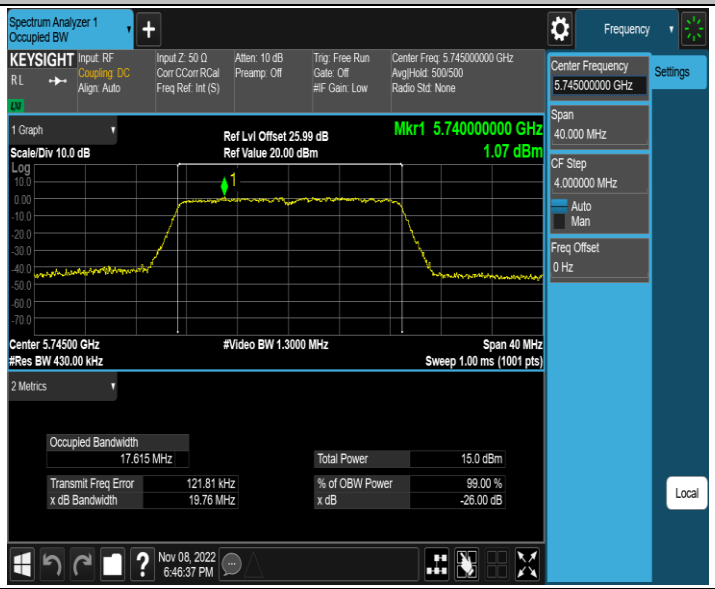
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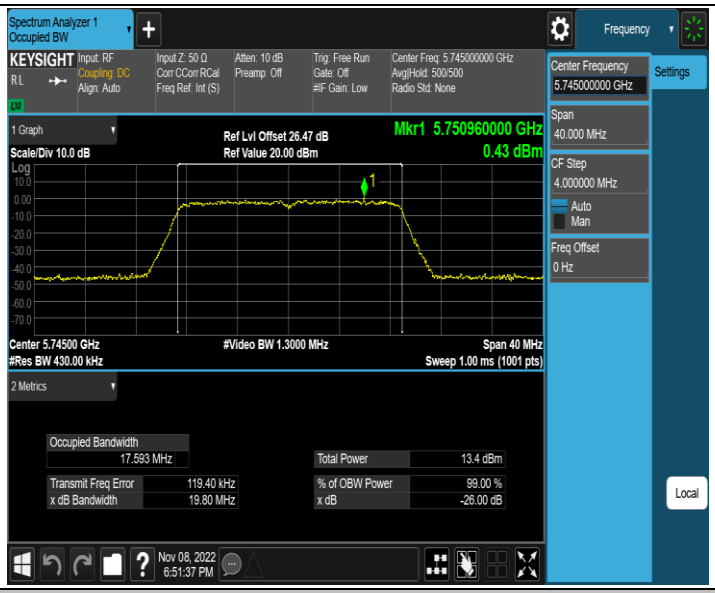

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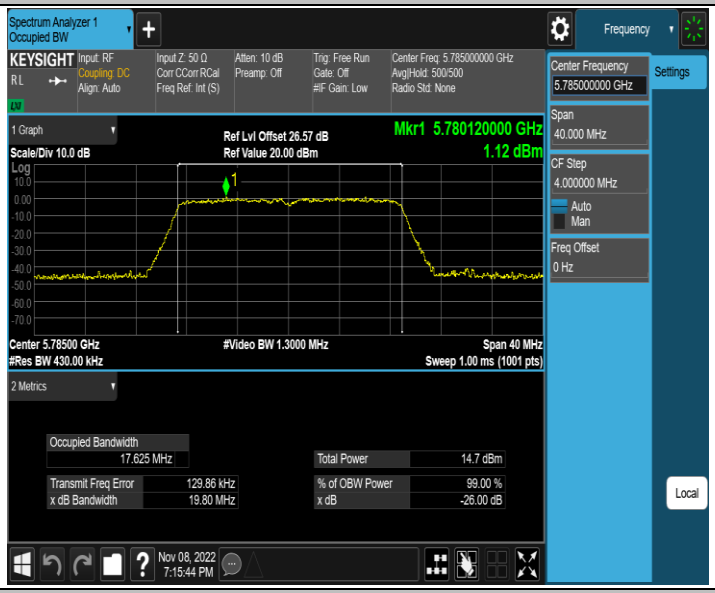

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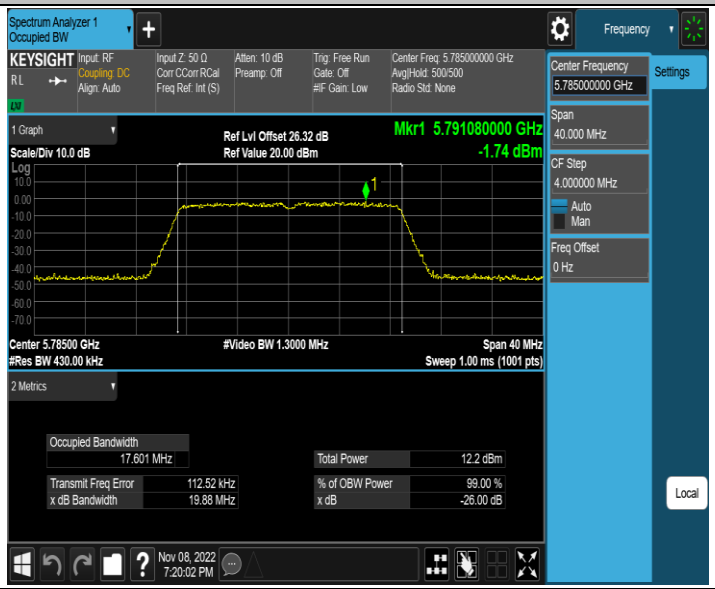

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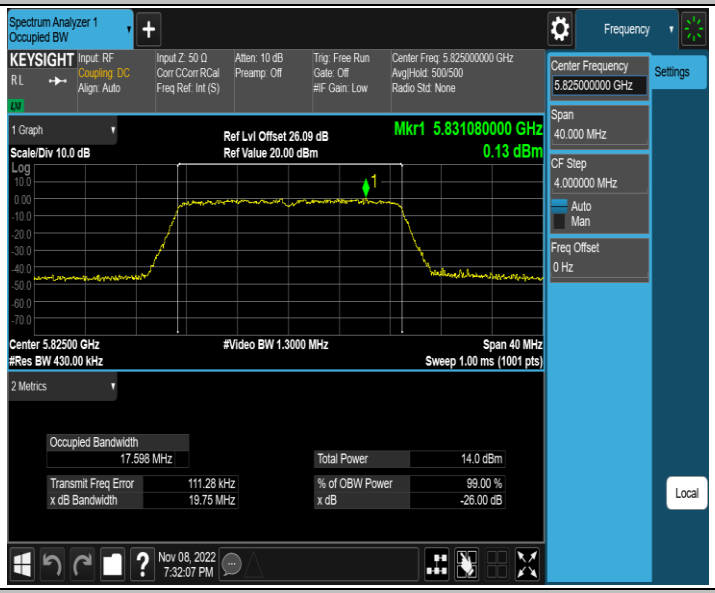
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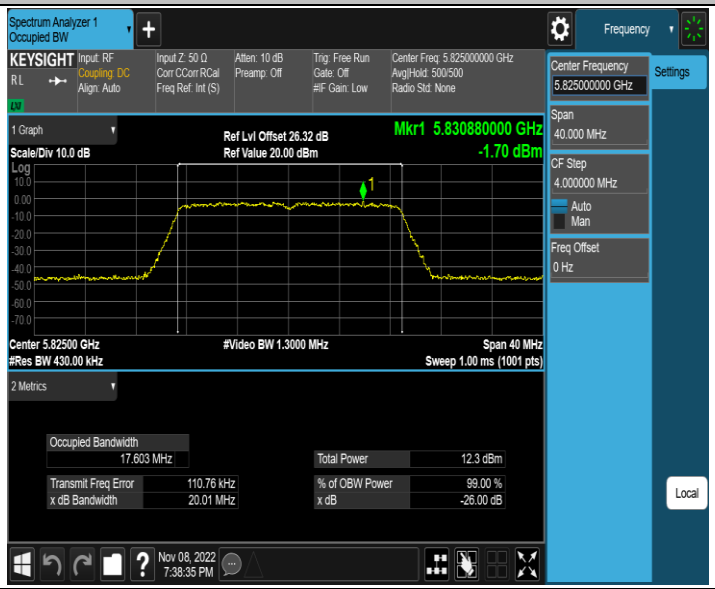
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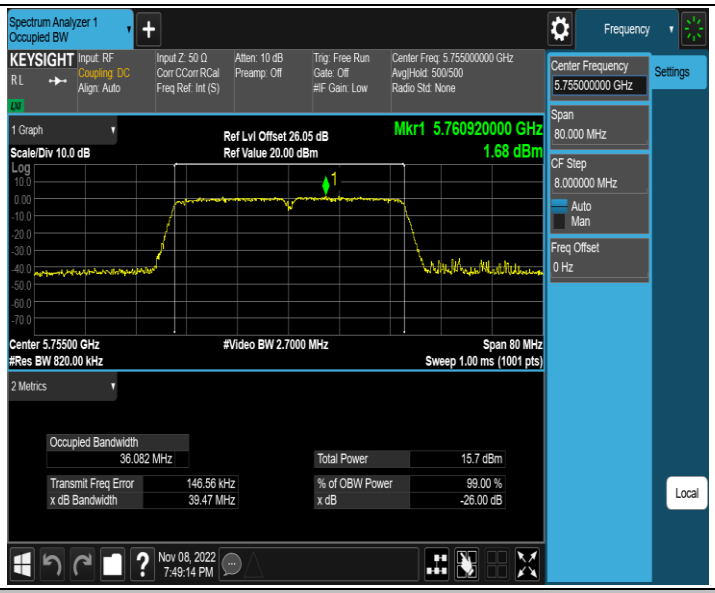

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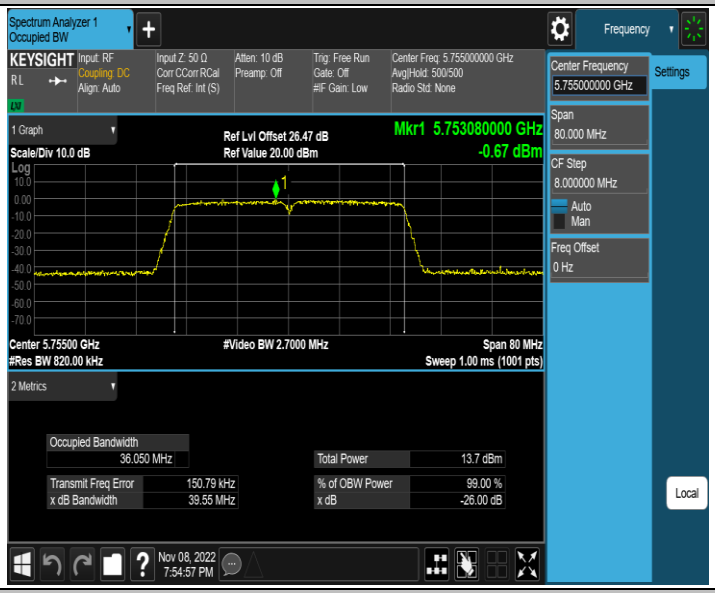

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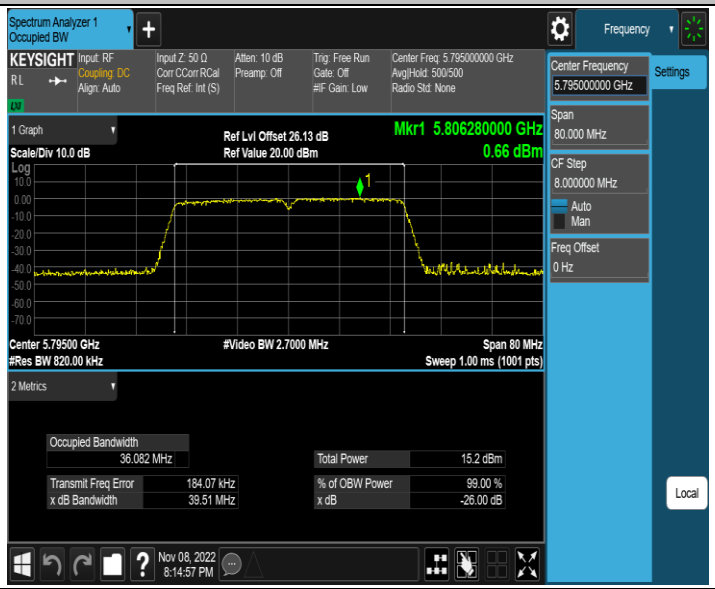

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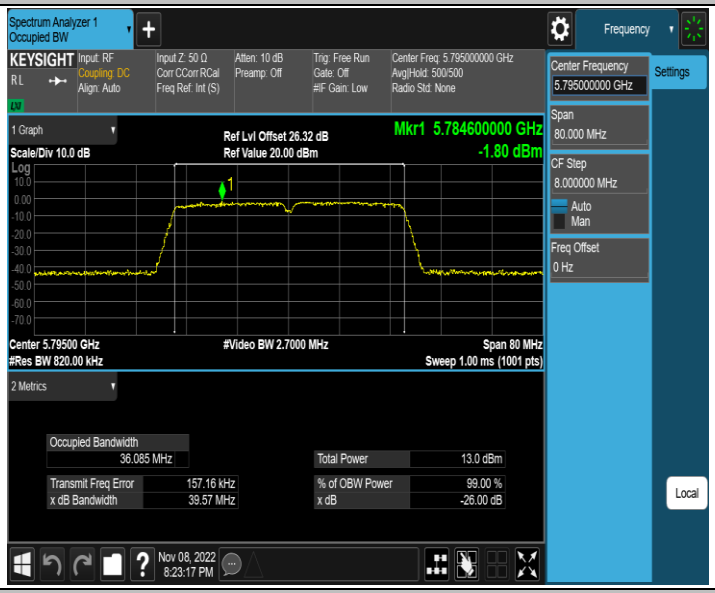

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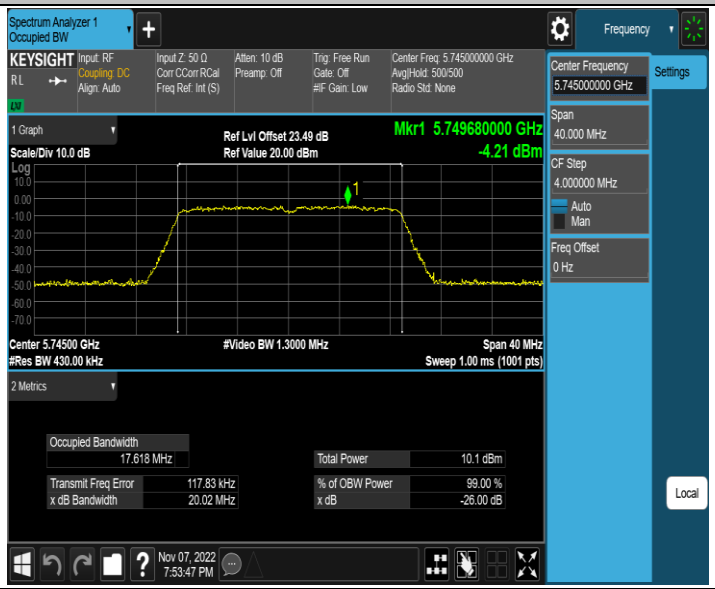

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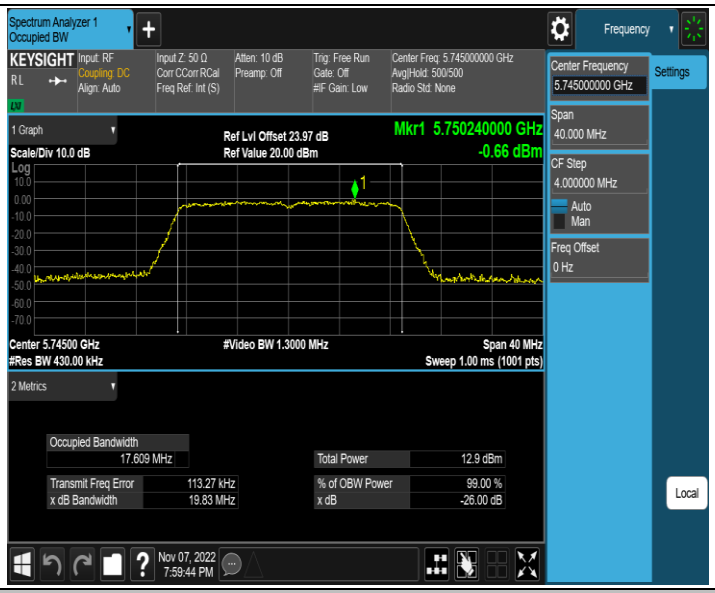

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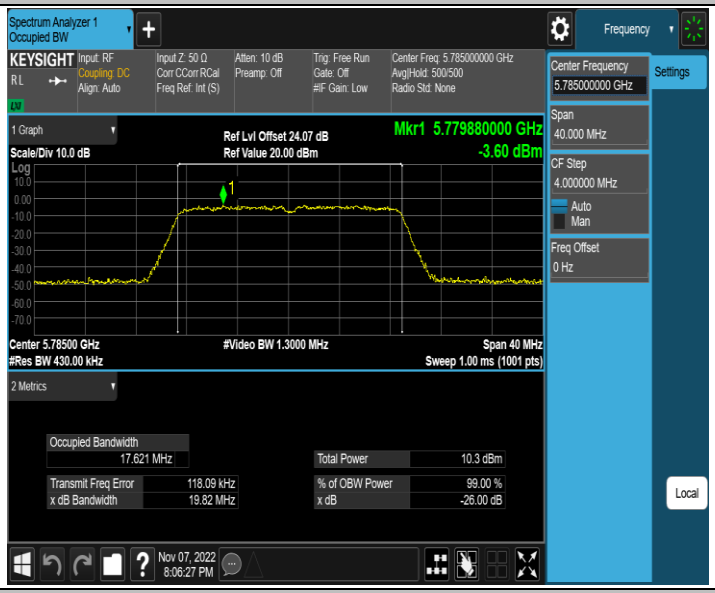

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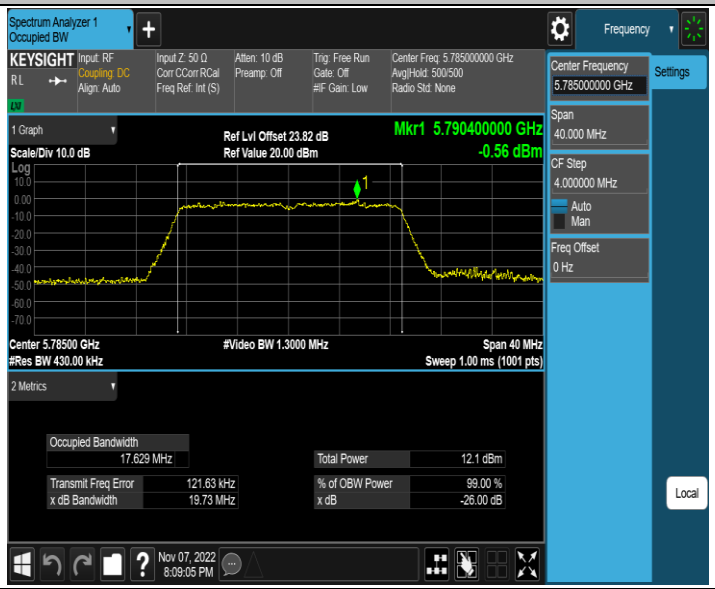

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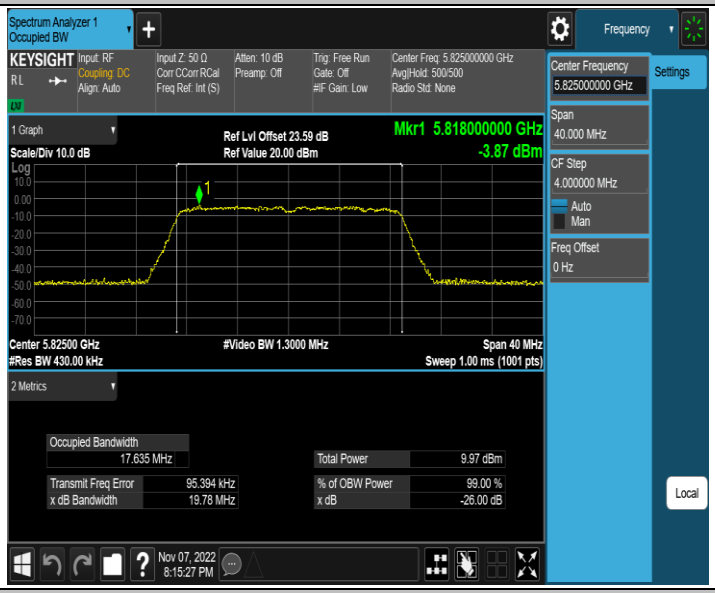
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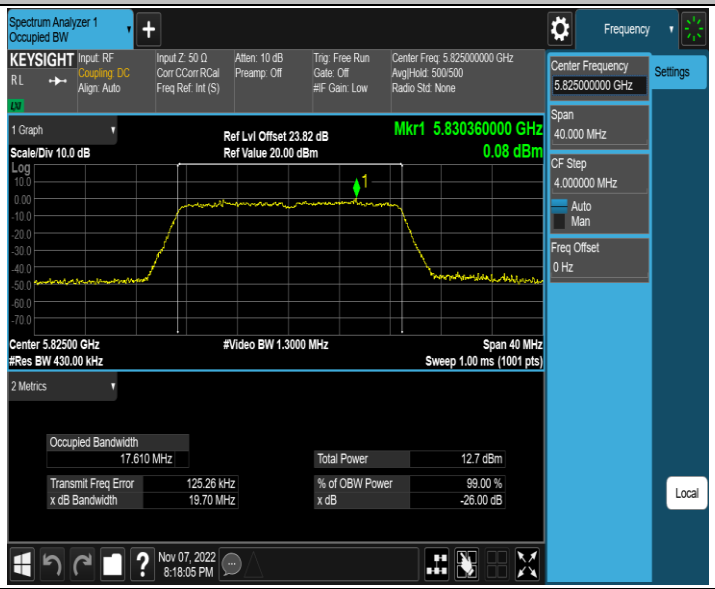
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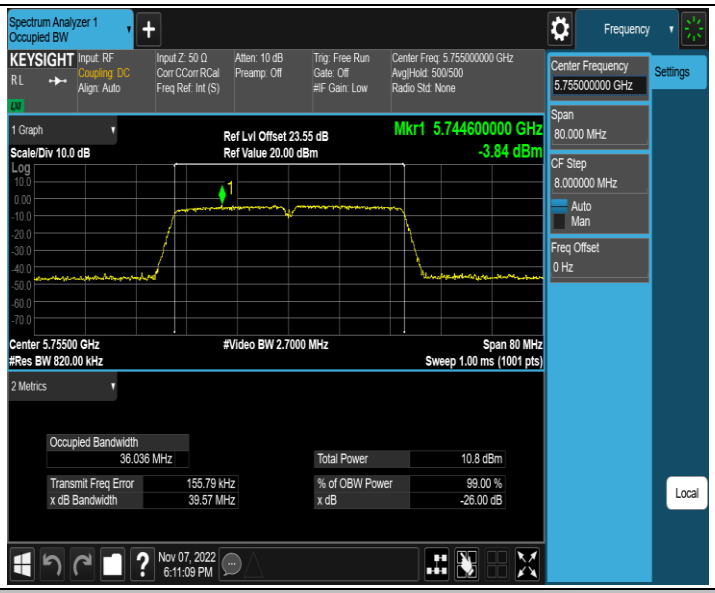

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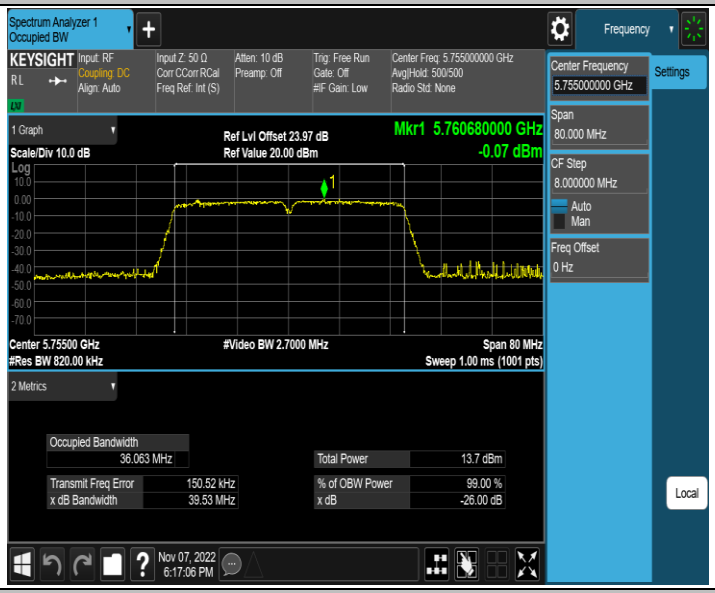

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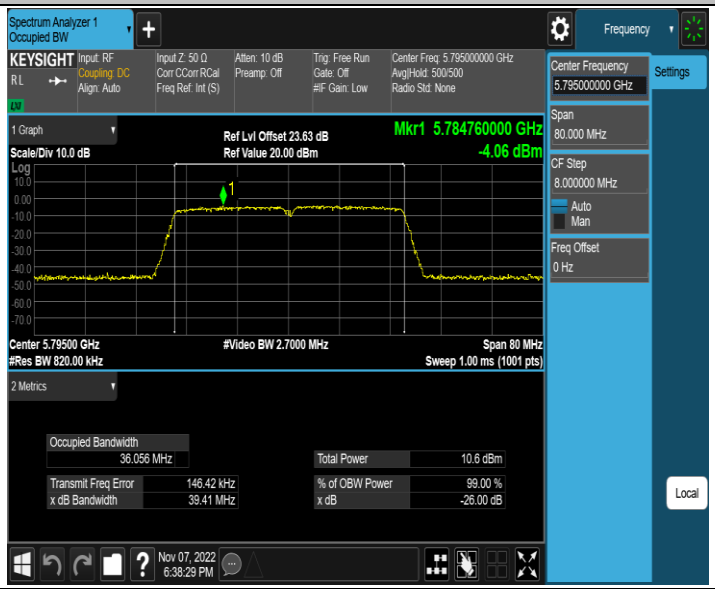

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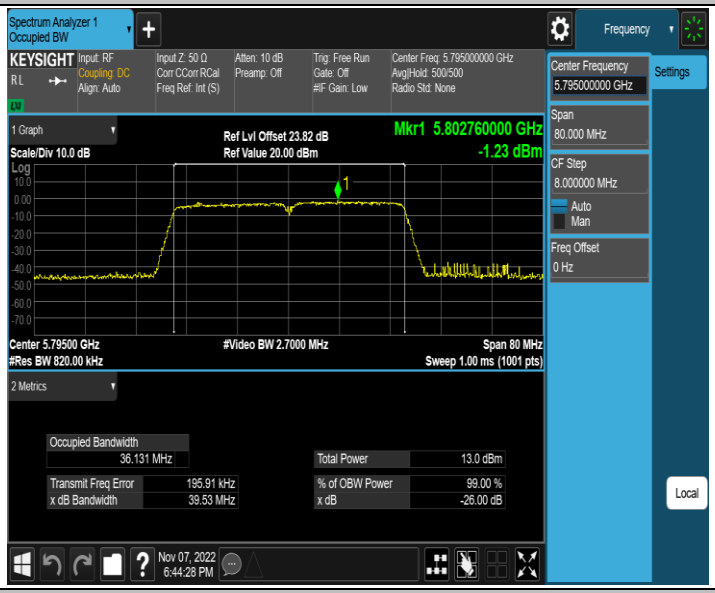

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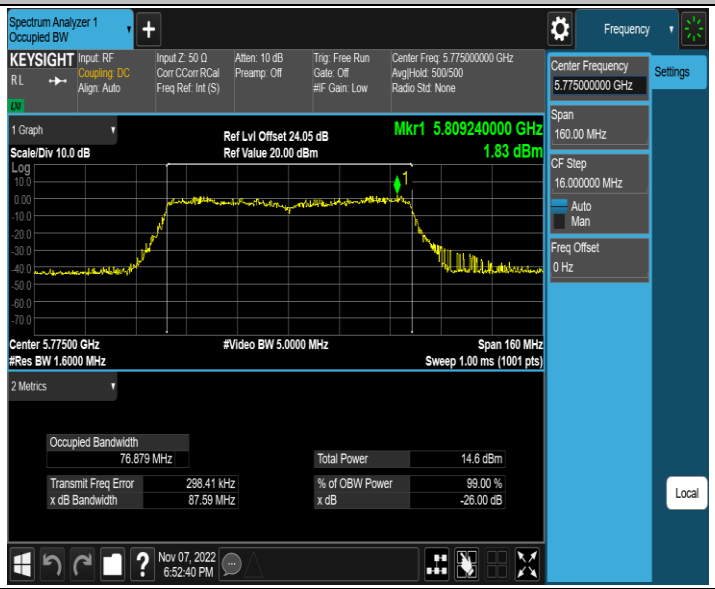

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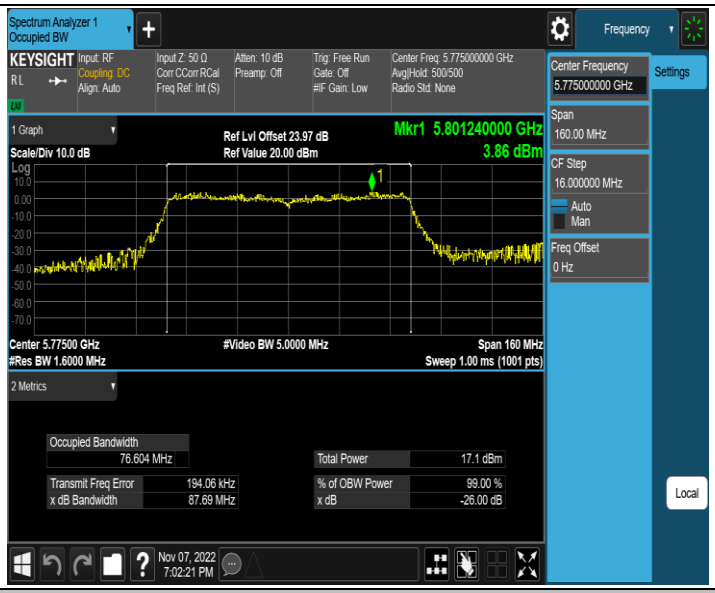

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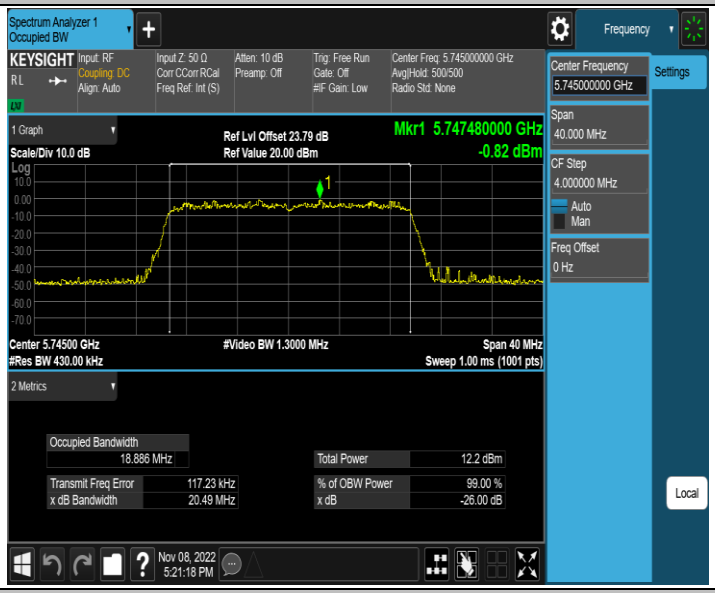

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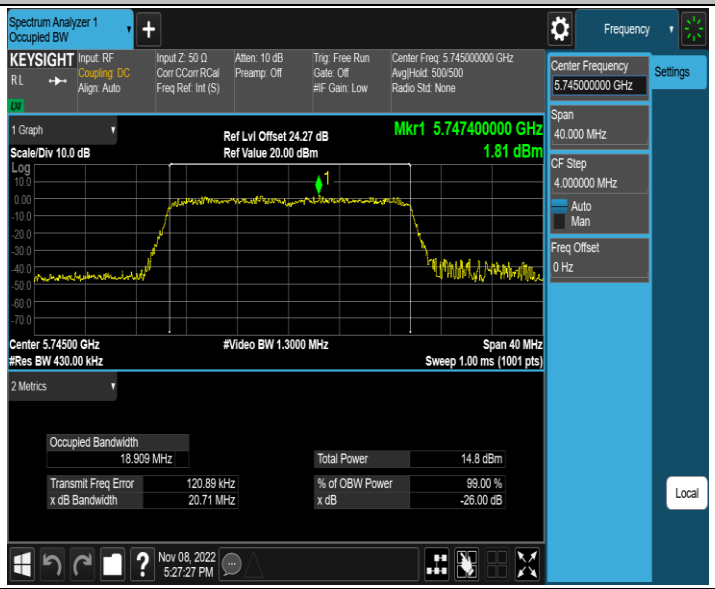

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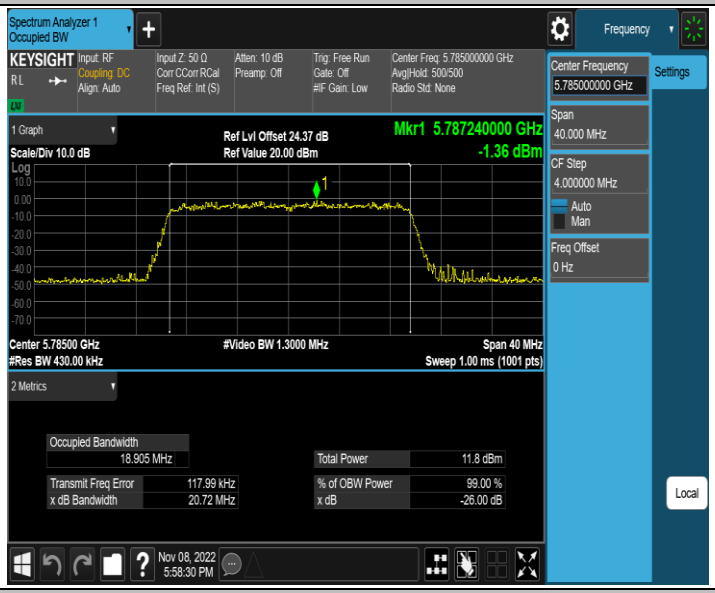
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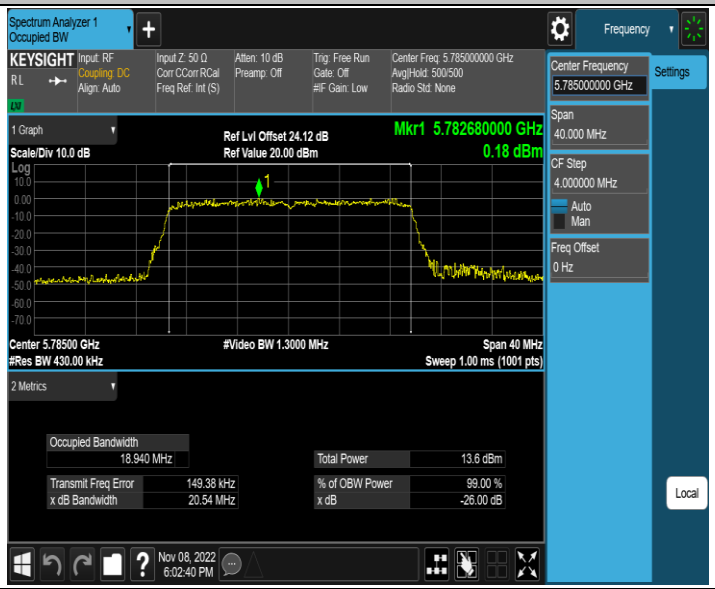
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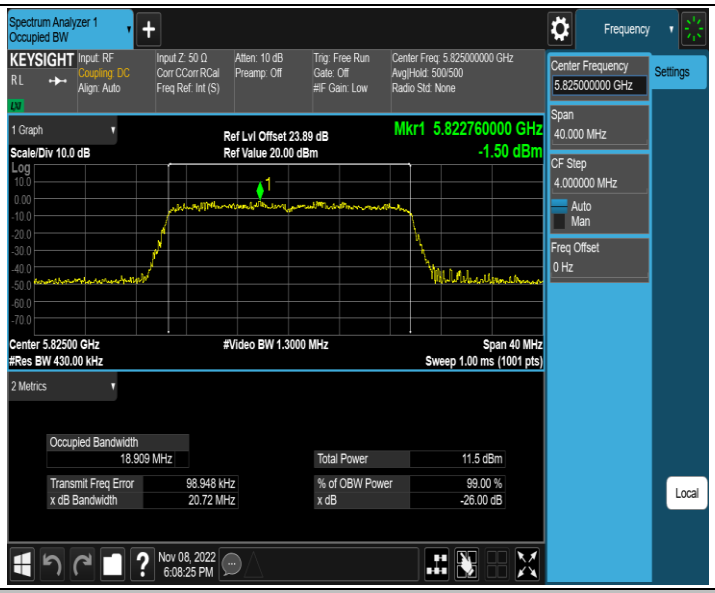

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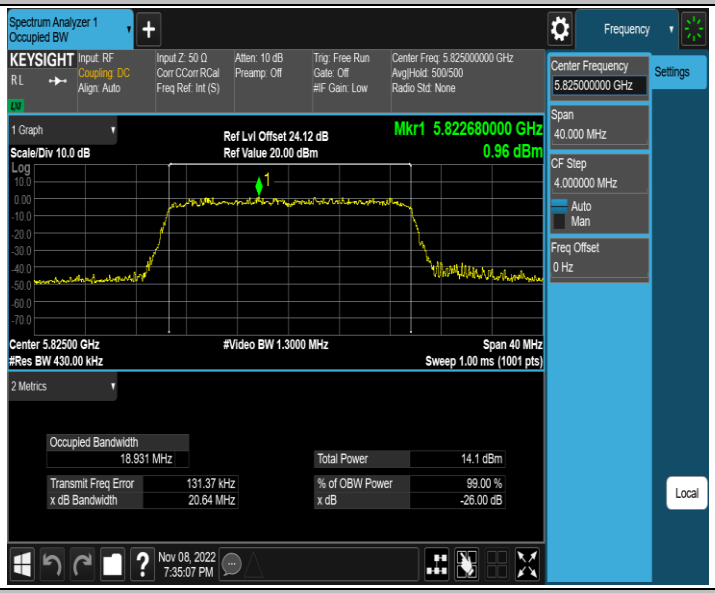

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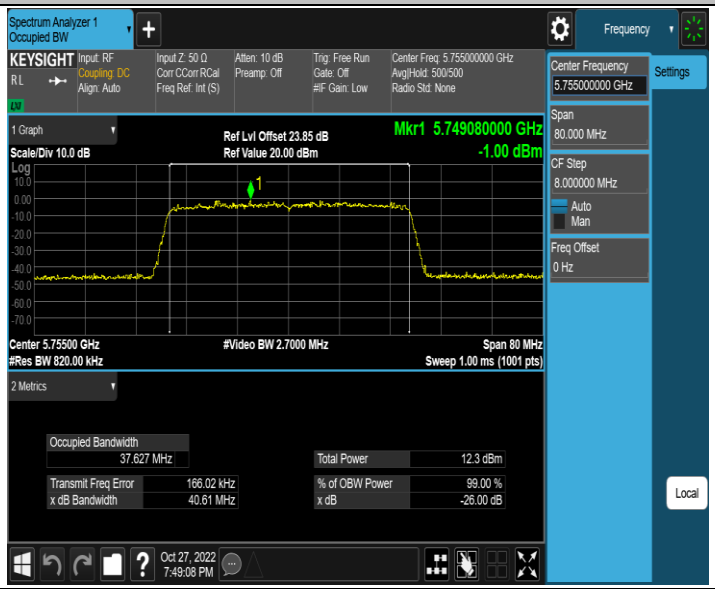

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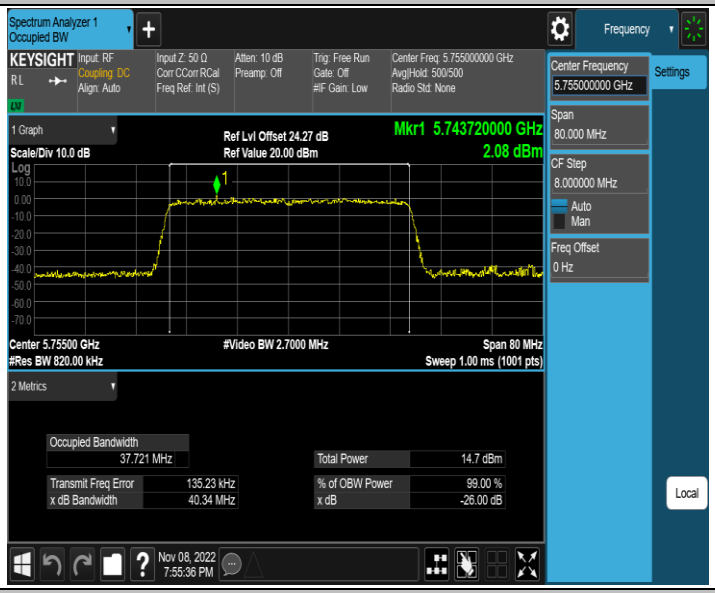
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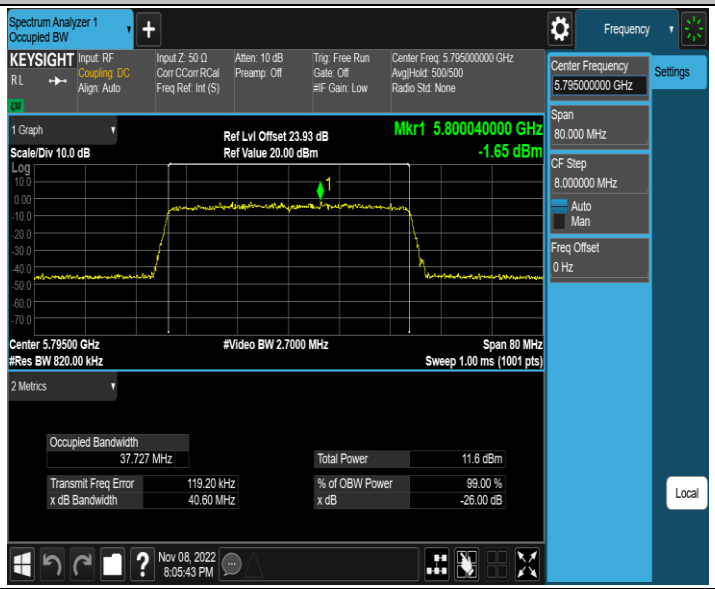
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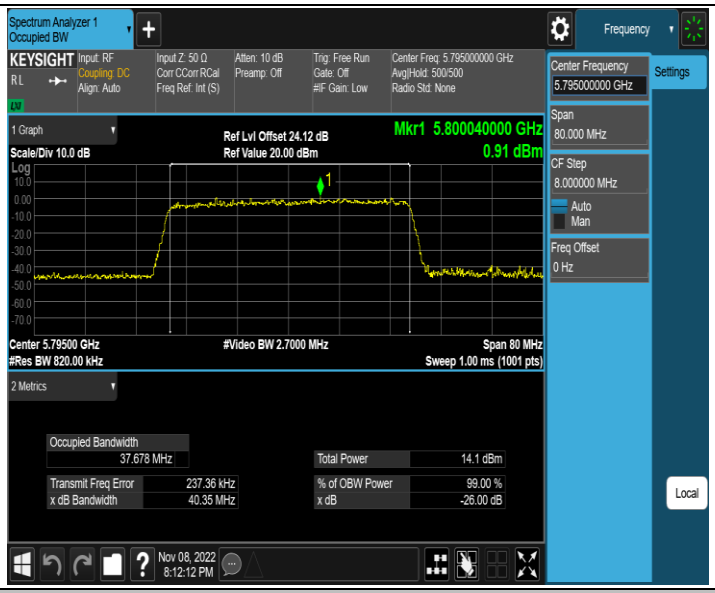

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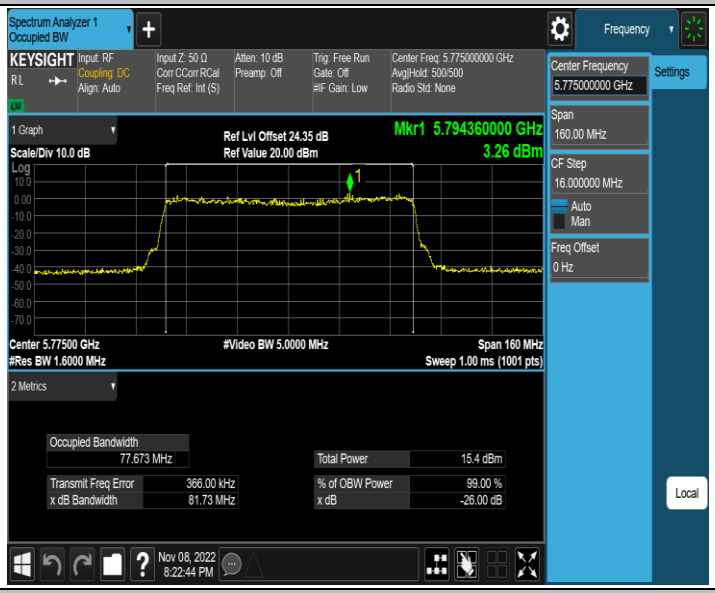

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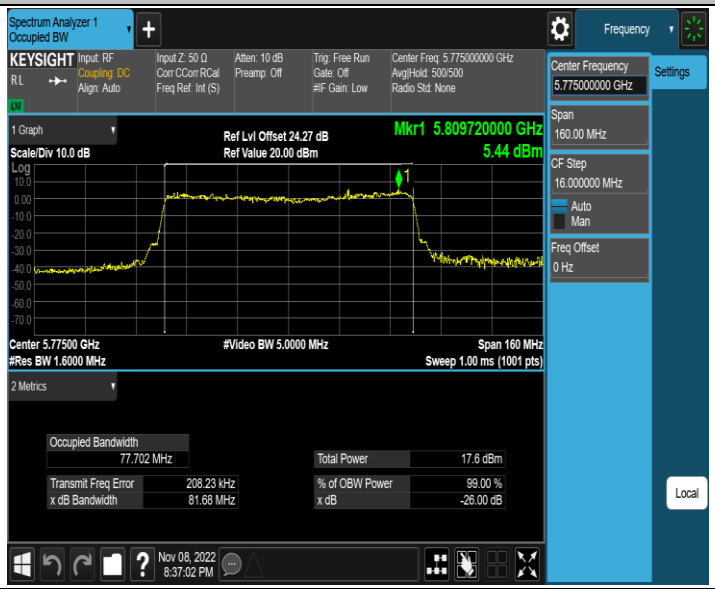


3.4 Conducted Output Power

3.4.1 Limit

FCC Part15, Subpart E (15.407)			
Section	Test Item	Limit	Frequency Range (MHz)
15.407(a)	Conducted Output Power	AP device: 1 Watt (30 dBm) Client device: 250 mW (24 dBm)	5150-5250
		250 mW (24 dBm)	5250-5350
		250 mW (24 dBm)	5470-5725
		1 Watt (30dBm)	5725-5850

Note:

a. 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.

b. 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.

c. For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz 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. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

3.4.2 Test Peripherals

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Record PC	Lenovo	M4500T	NA
2	Control PC	Lenovo	M4500T	NA

3.4.3 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 power meter and antenna output port as show in the block diagram below.

b) Test test was performed in accordance with method of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

3.4.4 Test Setup

3.4.5 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.

For Power Setting value

Test Mode	Power Level Setting defined by Manufacturer					
	ALL ANT					
	Channel	Value	Channel	Value	Channel	Value
11A-CDD	5745	10	5785	10	5825	10
11N20MIMO	5745	9	5785	9	5825	9
11N40MIMO	5755	9	5795	9	/	/
11AC20MIMO	5745	9	5785	9	5825	9
11AC40MIMO	5755	9	5795	9	/	/
11AC80MIMO	5775	12	/	/	/	/
11AX20MIMO	5745	9	5785	9	5825	9
11AX40MIMO	5755	9	5795	9	/	/
11AX80MIMO	5775	12	/	/	/	/

3.4.6 The Result

Test Mode	Antenna	Frequency[MHz]	Channel Powert [dBm]	Duty Cycle [%]	DC Factor [dBm]	Result [dBm]	Limit [dBm]	Verdict
11A-CDD	Ant1	5745	5.14	35.23	4.53	9.67	≤30.00	PASS
	Ant2	5745	5.84	35.23	4.53	10.37	≤30.00	PASS
	total	5745	---	---	---	13.04	≤30.00	PASS
	Ant1	5785	6.62	35.23	4.53	11.15	≤30.00	PASS
	Ant2	5785	5.94	35.23	4.53	10.47	≤30.00	PASS
	total	5785	---	---	---	13.83	≤30.00	PASS
	Ant1	5825	4.38	35.23	4.53	8.91	≤30.00	PASS
	Ant2	5825	4.80	35.23	4.53	9.33	≤30.00	PASS
	total	5825	---	---	---	12.14	≤30.00	PASS
11N20MIMO	Ant1	5745	4.22	33.69	4.73	8.95	≤30.00	PASS
	Ant2	5745	4.81	33.60	4.74	9.55	≤30.00	PASS
	total	5745	---	---	---	12.27	≤30.00	PASS
	Ant1	5785	5.00	33.86	4.73	9.73	≤30.00	PASS
	Ant2	5785	4.43	33.69	4.74	9.17	≤30.00	PASS
	total	5785	---	---	---	12.47	≤30.00	PASS
	Ant1	5825	3.31	33.69	4.73	8.04	≤30.00	PASS
	Ant2	5825	3.43	33.69	4.74	8.17	≤30.00	PASS
	total	5825	---	---	---	11.12	≤30.00	PASS
11N40MIMO	Ant1	5755	2.25	20.06	6.98	9.23	≤30.00	PASS
	Ant2	5755	2.43	20.13	6.96	9.39	≤30.00	PASS
	total	5755	---	---	---	12.32	≤30.00	PASS
	Ant1	5795	1.81	20.13	6.98	8.79	≤30.00	PASS
	Ant2	5795	2.16	20.06	6.96	9.12	≤30.00	PASS
	total	5795	---	---	---	11.97	≤30.00	PASS
11AC20MIMO	Ant1	5745	4.53	33.86	4.70	9.23	≤30.00	PASS
	Ant2	5745	5.05	33.86	4.70	9.75	≤30.00	PASS
	total	5745	---	---	---	12.51	≤30.00	PASS
	Ant1	5785	4.69	33.86	4.70	9.39	≤30.00	PASS
	Ant2	5785	4.72	33.86	4.70	9.42	≤30.00	PASS
	total	5785	---	---	---	12.42	≤30.00	PASS
	Ant1	5825	3.08	33.69	4.70	7.78	≤30.00	PASS
	Ant2	5825	3.50	33.86	4.70	8.20	≤30.00	PASS
	total	5825	---	---	---	11.01	≤30.00	PASS
11AC40MIMO	Ant1	5755	1.95	20.13	6.96	8.91	≤30.00	PASS
	Ant2	5755	1.71	20.38	6.91	8.62	≤30.00	PASS
	total	5755	---	---	---	11.78	≤30.00	PASS
	Ant1	5795	3.34	20.13	6.96	10.30	≤30.00	PASS
	Ant2	5795	4.05	20.38	6.91	10.96	≤30.00	PASS

	total	5795	---	---	---	13.65	≤30.00	PASS
11AC80MIMO	Ant1	5775	3.12	10.99	9.59	12.71	≤30.00	PASS
	Ant2	5775	2.22	11.35	9.45	11.67	≤30.00	PASS
	total	5775	---	---	---	15.23	≤30.00	PASS
11AX20MIMO	Ant1	5745	3.59	31.88	4.96	8.55	≤30.00	PASS
	Ant2	5745	4.05	31.61	5.00	9.05	≤30.00	PASS
	total	5745	---	---	---	11.82	≤30.00	PASS
	Ant1	5785	4.28	31.88	4.96	9.24	≤30.00	PASS
	Ant2	5785	4.07	31.61	5.00	9.07	≤30.00	PASS
	total	5785	---	---	---	12.17	≤30.00	PASS
	Ant1	5825	3.47	31.88	4.96	8.43	≤30.00	PASS
	Ant2	5825	3.94	31.61	5.00	8.94	≤30.00	PASS
	total	5825	---	---	---	11.68	≤30.00	PASS
11AX40MIMO	Ant1	5755	1.82	19.87	7.02	8.84	≤30.00	PASS
	Ant2	5755	2.59	19.55	7.09	9.68	≤30.00	PASS
	total	5755	---	---	---	12.29	≤30.00	PASS
	Ant1	5795	1.26	19.55	7.02	8.28	≤30.00	PASS
	Ant2	5795	1.38	19.87	7.09	8.47	≤30.00	PASS
	total	5795	---	---	---	11.39	≤30.00	PASS
11AX80MIMO	Ant1	5775	2.93	11.97	9.22	12.15	≤30.00	PASS
	Ant2	5775	3.06	11.97	9.22	12.28	≤30.00	PASS
	total	5775	---	---	---	15.23	≤30.00	PASS

Frequency Band	ANT 1 Antenna Gain (dBi)	ANT 2 Antenna Gain (dBi)	Correlated chains directional gain (dBi)	Peak Power Limit (dBm)
U-NII-3	2.91	2.89	5.91	30.00

Unequal antenna gains, with equal transmit powers. Directional gain is to be computed as follows:

If transmit signals are correlated, then

Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}$] 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.]

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	AP 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

3.5.2 Test Peripherals

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Record PC	Lenovo	M4500T	NA
2	Control PC	Lenovo	M4500T	NA

3.5.3 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	

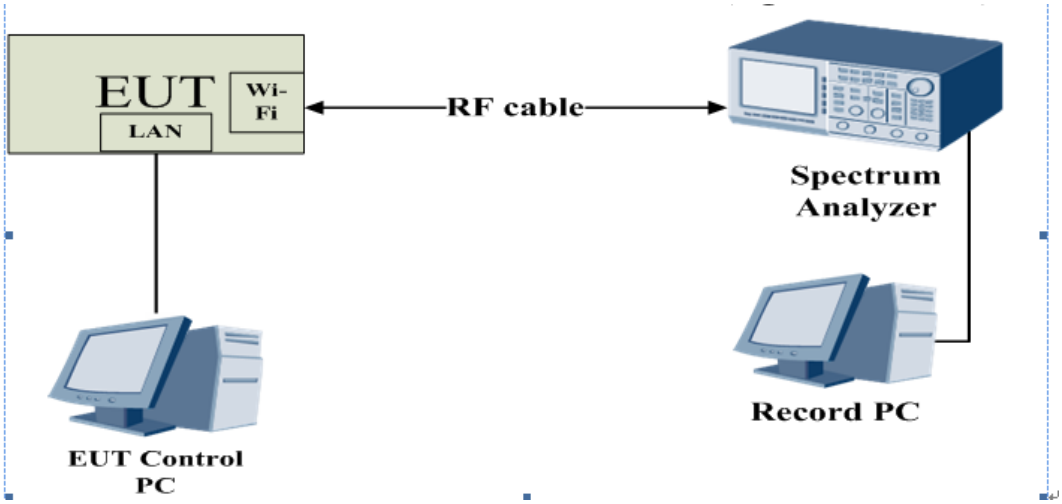
a) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below. Spectrum analyser settings as following:

Centre Frequency	The centre frequency of the channel under test
RBW	= 1 MHz (Band1/2/3) = 500 KHz (Band4)
VBW	≥3 x RBW
Frequency span	2 x Nominal Channel Bandwidth
Detector Mode	RMS
Trace Mode	Max Hold
Sweep Time	Auto Couple

b) Wait for the trace to stabilize. Use the peak marker function to determine the maximum amplitude level within the RBW.

c) The value defined in step b shall be compared to the limits and be recorded .

3.5.4 Test Setup



3.5.5 The Result

Test Mode	Antenna	Frequency[MHz]	Result [dBm/MHz]	Limit [dBm/MHz]	Verdict
11A-CDD	Ant1	5745	-3.76	≤30.00	PASS
	Ant2	5745	-2.65	≤30.00	PASS
	total	5745	-0.16	≤30.00	PASS
	Ant1	5785	-2.57	≤30.00	PASS
	Ant2	5785	-3.47	≤30.00	PASS
	total	5785	0.01	≤30.00	PASS
	Ant1	5825	-4.69	≤30.00	PASS
	Ant2	5825	-3.77	≤30.00	PASS
	total	5825	-1.20	≤30.00	PASS
11N20MIMO	Ant1	5745	-4.26	≤30.00	PASS
	Ant2	5745	-4.17	≤30.00	PASS
	total	5745	-1.20	≤30.00	PASS
	Ant1	5785	-3.84	≤30.00	PASS
	Ant2	5785	-3.98	≤30.00	PASS
	total	5785	-0.90	≤30.00	PASS
	Ant1	5825	-5.66	≤30.00	PASS
	Ant2	5825	-5.63	≤30.00	PASS
	total	5825	-2.63	≤30.00	PASS
11N40MIMO	Ant1	5755	-7.32	≤30.00	PASS
	Ant2	5755	-5.62	≤30.00	PASS
	total	5755	-3.38	≤30.00	PASS
	Ant1	5795	-8.1	≤30.00	PASS
	Ant2	5795	-6.66	≤30.00	PASS
	total	5795	-4.31	≤30.00	PASS
11AC20MIMO	Ant1	5745	-4.44	≤30.00	PASS
	Ant2	5745	-3.25	≤30.00	PASS
	total	5745	-0.79	≤30.00	PASS
	Ant1	5785	-3.98	≤30.00	PASS
	Ant2	5785	-4.21	≤30.00	PASS
	total	5785	-1.08	≤30.00	PASS
	Ant1	5825	-6.16	≤30.00	PASS
	Ant2	5825	-5.48	≤30.00	PASS
	total	5825	-2.80	≤30.00	PASS
11AC40MIMO	Ant1	5755	-6.9	≤30.00	PASS
	Ant2	5755	-6.36	≤30.00	PASS
	total	5755	-3.61	≤30.00	PASS
	Ant1	5795	-7.38	≤30.00	PASS
	Ant2	5795	-7.55	≤30.00	PASS
	total	5795	-4.45	≤30.00	PASS
11AC80MIMO	Ant1	5775	-6.12	≤30.00	PASS

	Ant2	5775	-6.74	≤30.00	PASS
	total	5775	-3.41	≤30.00	PASS
11AX20MIMO	Ant1	5745	-4.68	≤30.00	PASS
	Ant2	5745	-3.87	≤30.00	PASS
	total	5745	-1.25	≤30.00	PASS
	Ant1	5785	-2.64	≤30.00	PASS
	Ant2	5785	-3.14	≤30.00	PASS
	total	5785	0.13	≤30.00	PASS
	Ant1	5825	-5.11	≤30.00	PASS
	Ant2	5825	-4.71	≤30.00	PASS
	total	5825	-1.90	≤30.00	PASS
11AX40MIMO	Ant1	5755	-6.83	≤30.00	PASS
	Ant2	5755	-5.78	≤30.00	PASS
	total	5755	-3.26	≤30.00	PASS
	Ant1	5795	-6.62	≤30.00	PASS
	Ant2	5795	-7.94	≤30.00	PASS
	total	5795	-4.22	≤30.00	PASS
11AX80MIMO	Ant1	5775	-6.21	≤30.00	PASS
	Ant2	5775	-12.36	≤30.00	PASS
	total	5775	-5.27	≤30.00	PASS

Note：

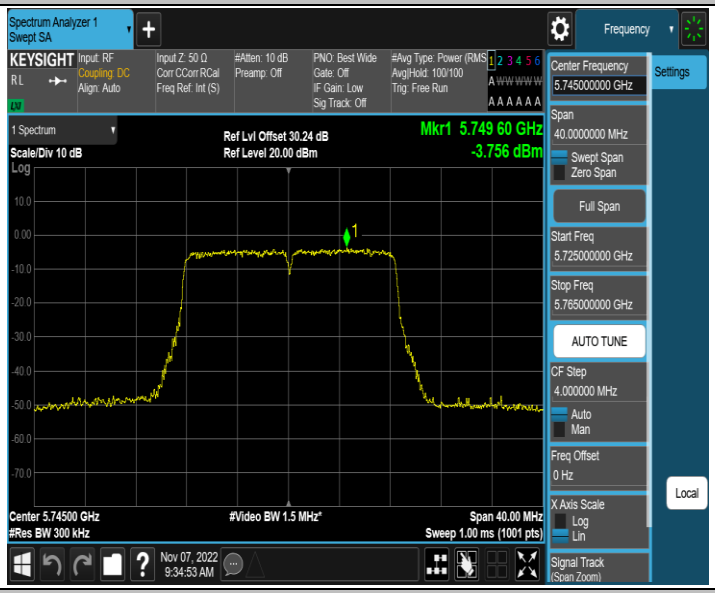
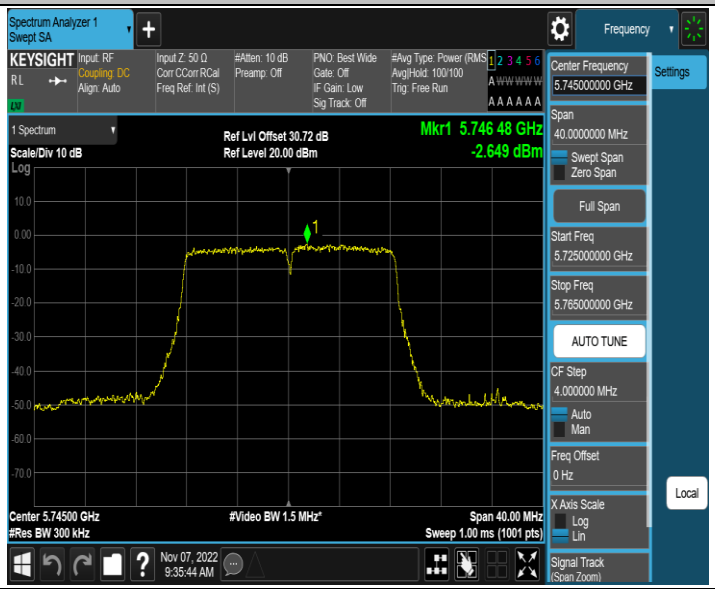
1. The Result and Limit Unit is dBm/500 kHz in the band 5.725–5.85 GHz.
2. The Duty Cycle Factor and RBW Factor is compensated in the graph.

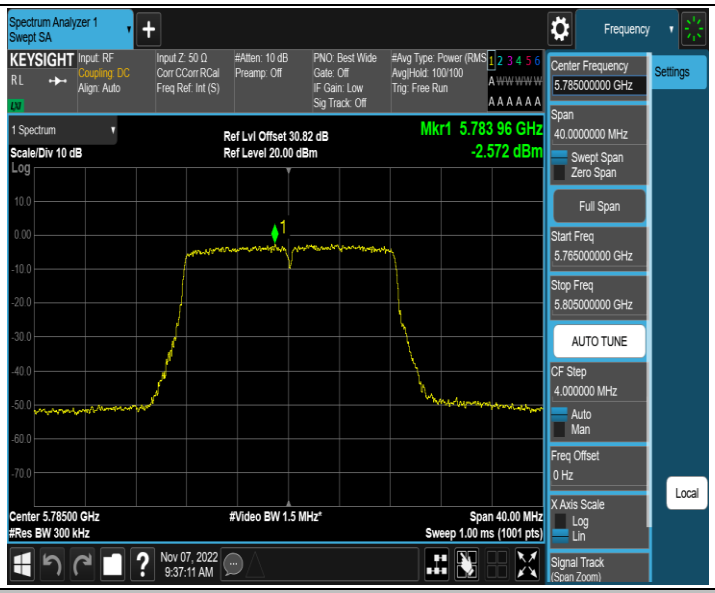
Frequency Band	ANT 1 Antenna Gain (dBi)	ANT 2 Antenna Gain (dBi)	Correlated chains directional gain (dBi)	Peak Power Limit (dBm)
U-NII-3	2.91	2.89	5.91	30.00

Unequal antenna gains, with equal transmit powers. Directional gain is to be computed as follows:

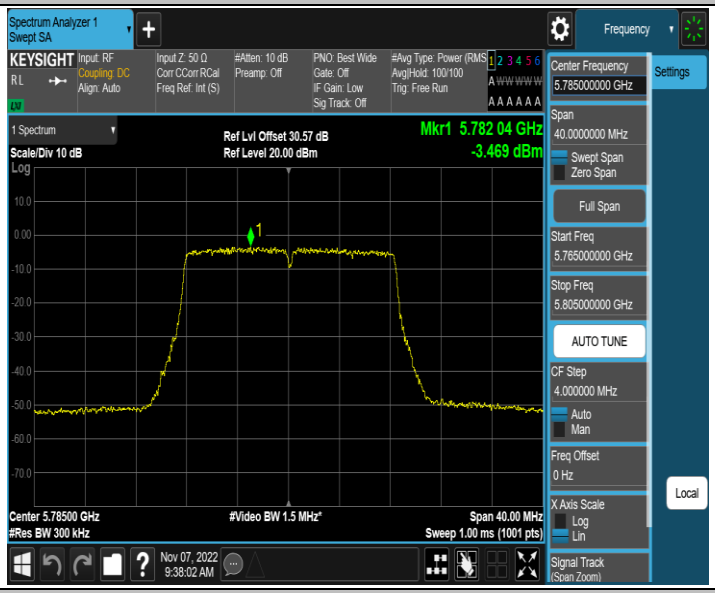
If transmit signals are correlated, then

Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}$] dBi [Note the “20”s in the denominator of each exponentand the square of the sum of terms; the object is to combine the signal levels coherently.]

11A-CDD_Ant1_5745

11A-CDD_Ant2_5745

11A-CDD_Ant1_5785



11A-CDD_Ant2_5785



11A-CDD_Ant1_5825