11B_Ant1_2462_0~Reference

11B_Ant1_2462_30~1000

11B_Ant1_2462_1000~26500

11B_Ant2_2462_0~Reference

11B_Ant2_2462_30~1000

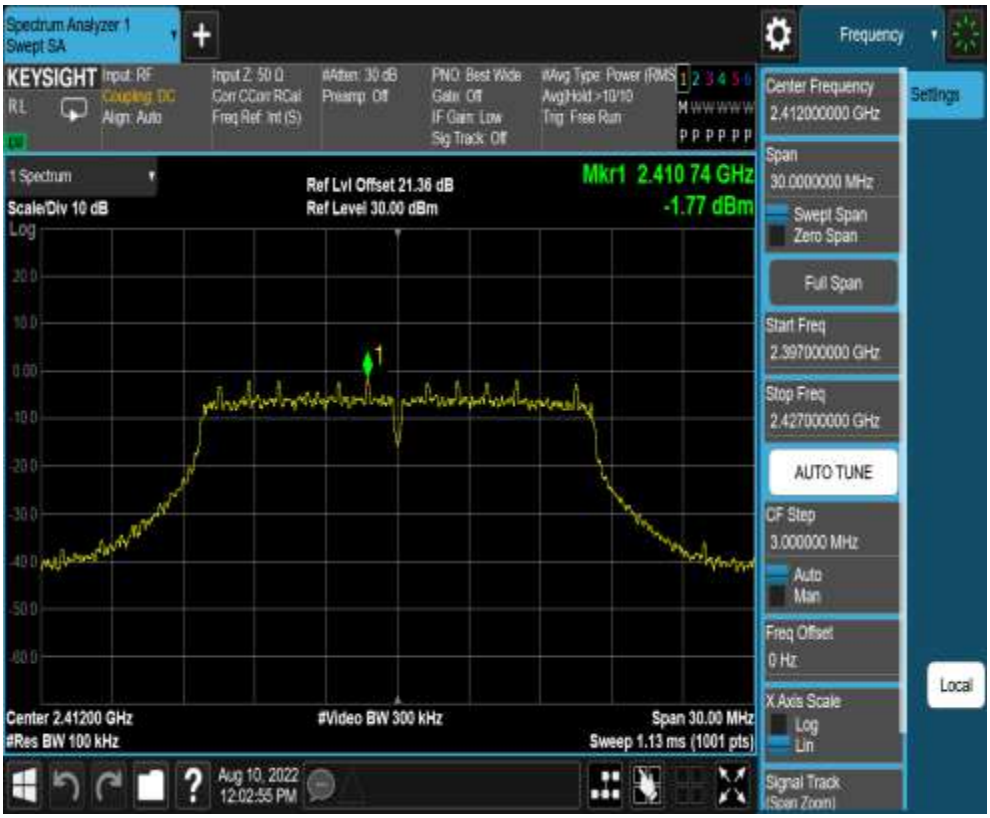
11B_Ant2_2462_1000~26500

11G_Ant1_2412_0~Reference

11G_Ant1_2412_30~1000

11G_Ant1_2412_1000~26500

11G_Ant2_2412_0~Reference



11G_Ant2_2412_30~1000

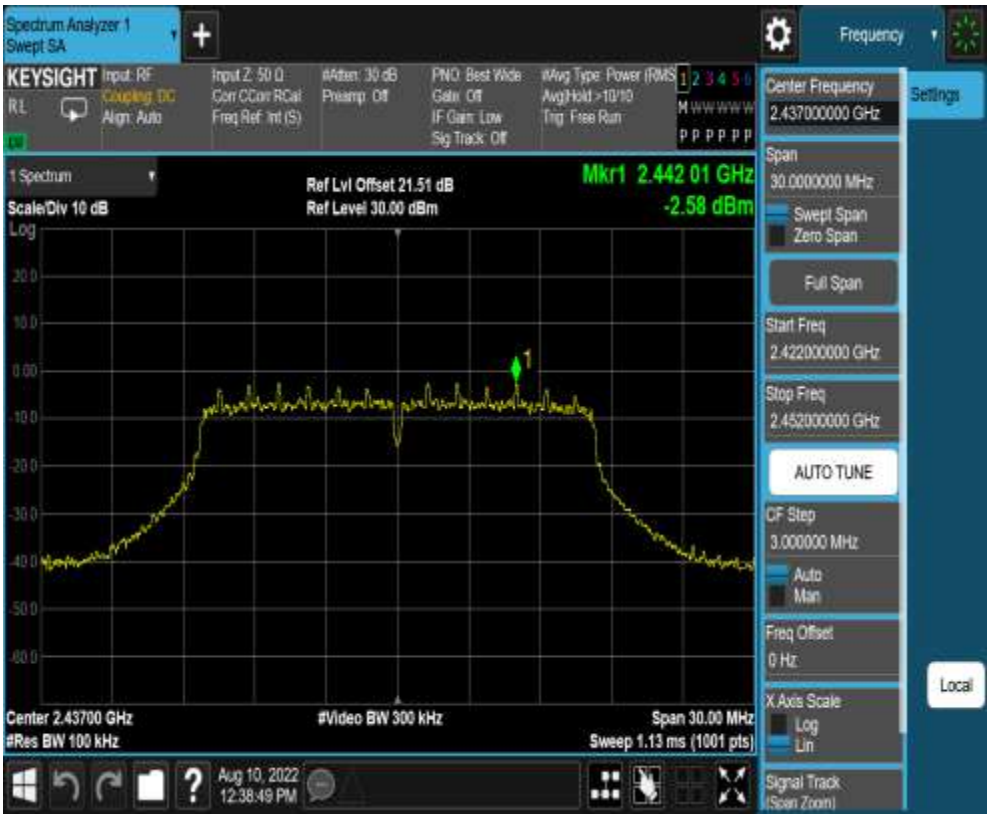
11G_Ant2_2412_1000~26500

11G_Ant1_2437_0~Reference

11G_Ant1_2437_30~1000

11G_Ant1_2437_1000~26500

11G_Ant2_2437_0~Reference



11G_Ant2_2437_30~1000

11G_Ant2_2437_1000~26500

11G_Ant1_2462_0~Reference

11G_Ant1_2462_30~1000

11G_Ant1_2462_1000~26500

11G_Ant2_2462_0~Reference

11G_Ant2_2462_30~1000

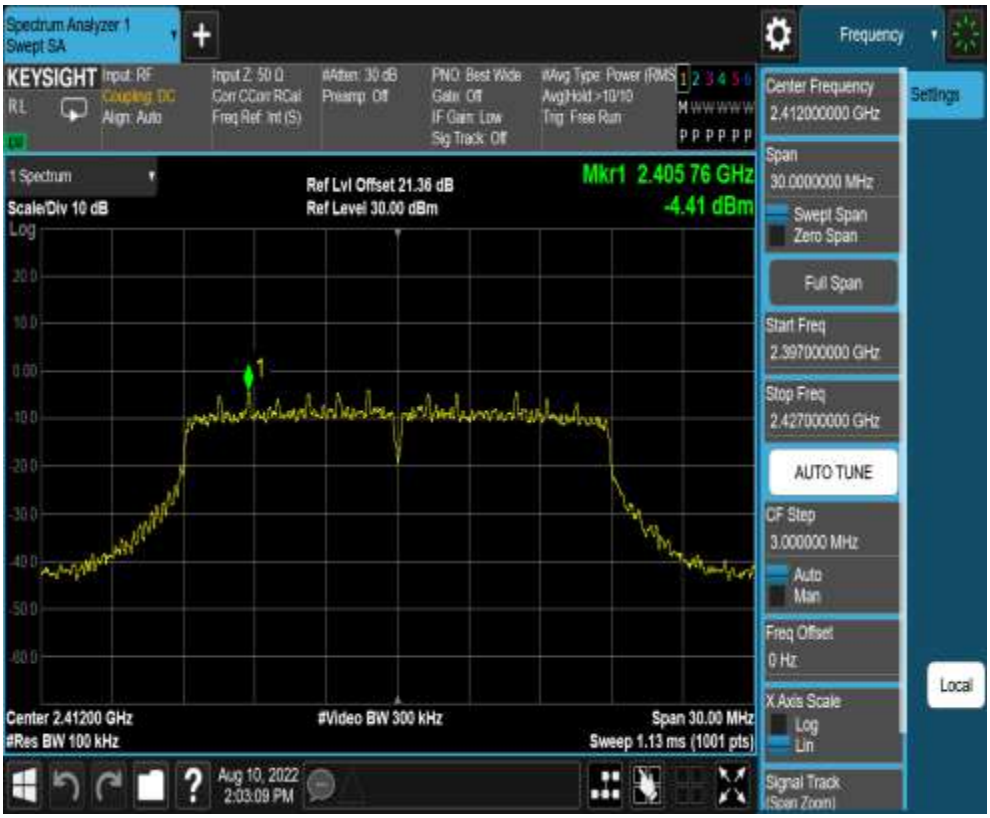
11G_Ant2_2462_1000~26500

11N20MIMO_Ant1_2412_0~Reference

11N20MIMO_Ant1_2412_30~1000

11N20MIMO_Ant1_2412_1000~26500

11N20MIMO_Ant2_2412_0~Reference



11N20MIMO_Ant2_2412_30~1000

11N20MIMO_Ant2_2412_1000~26500

11N20MIMO_Ant1_2437_0~Reference

11N20MIMO_Ant1_2437_30~1000

11N20MIMO_Ant1_2437_1000~26500

11N20MIMO_Ant2_2437_0~Reference

11N20MIMO_Ant2_2437_30~1000

11N20MIMO_Ant2_2437_1000~26500

11N20MIMO_Ant1_2462_0~Reference

11N20MIMO_Ant1_2462_30~1000

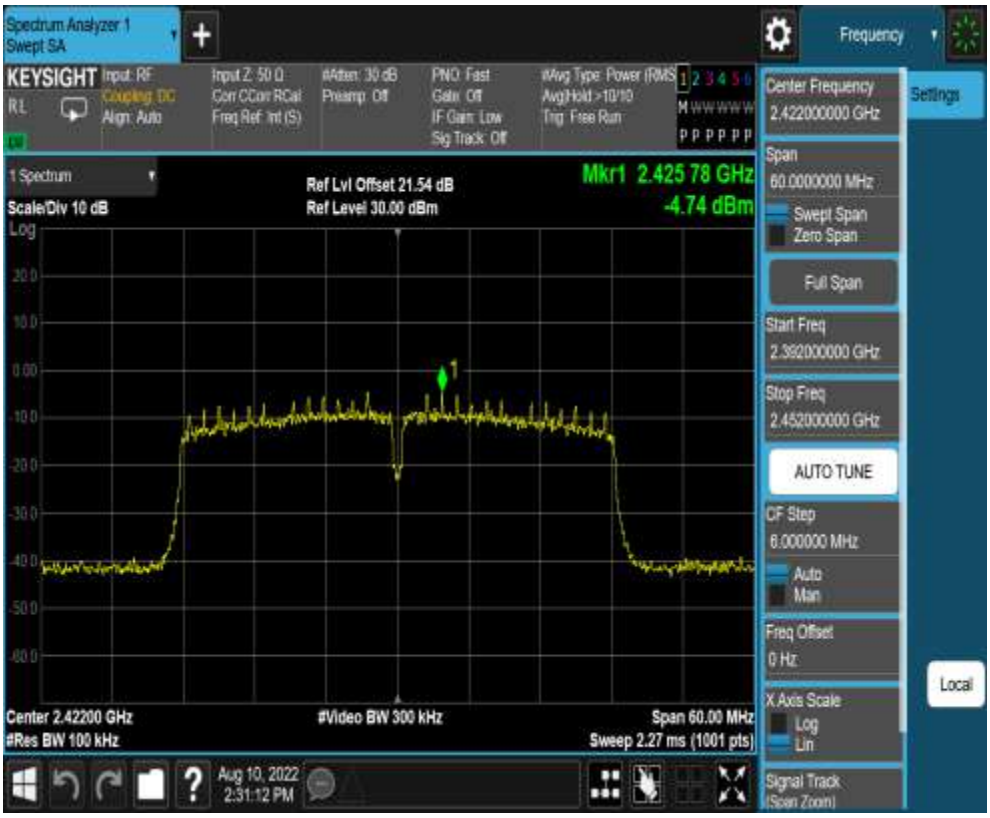
11N20MIMO_Ant1_2462_1000~26500

11N20MIMO_Ant2_2462_0~Reference

11N20MIMO_Ant2_2462_30~1000

11N20MIMO_Ant2_2462_1000~26500

11N40MIMO_Ant1_2422_0~Reference



11N40MIMO_Ant1_2422_30~1000

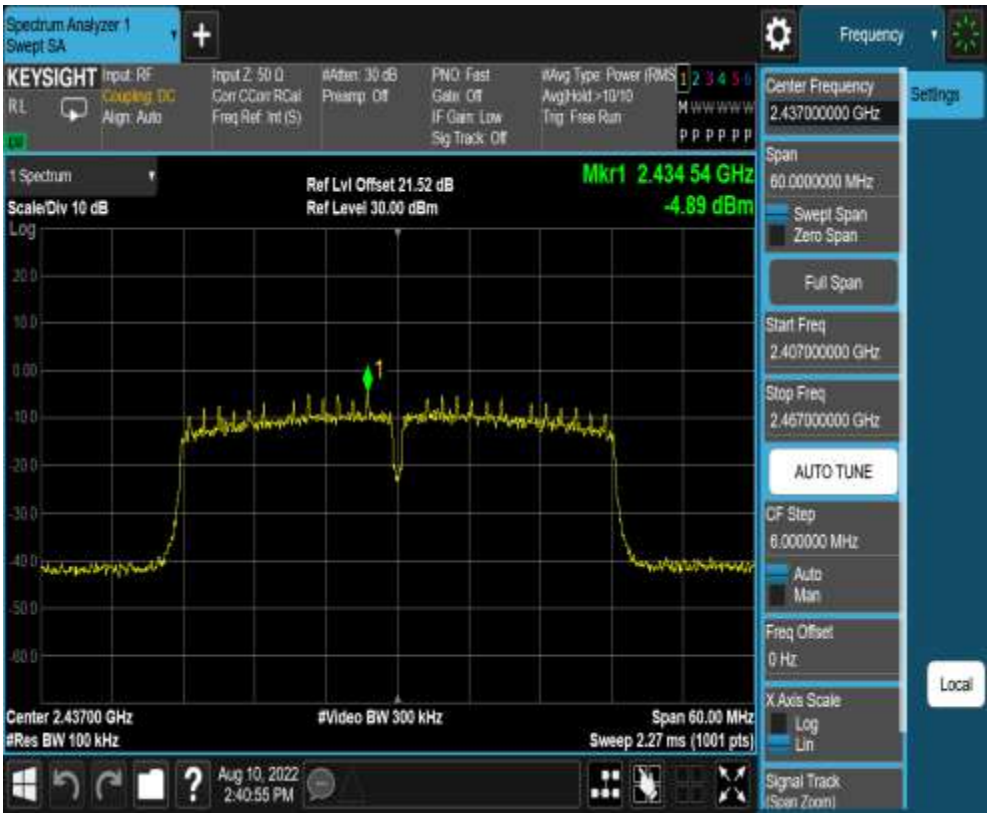
11N40MIMO_Ant1_2422_1000~26500

11N40MIMO_Ant2_2422_0~Reference

11N40MIMO_Ant2_2422_30~1000

11N40MIMO_Ant2_2422_1000~26500

11N40MIMO_Ant1_2437_0~Reference



11N40MIMO_Ant1_2437_30~1000

11N40MIMO_Ant1_2437_1000~26500

11N40MIMO_Ant2_2437_0~Reference

11N40MIMO_Ant2_2437_30~1000

11N40MIMO_Ant2_2437_1000~26500

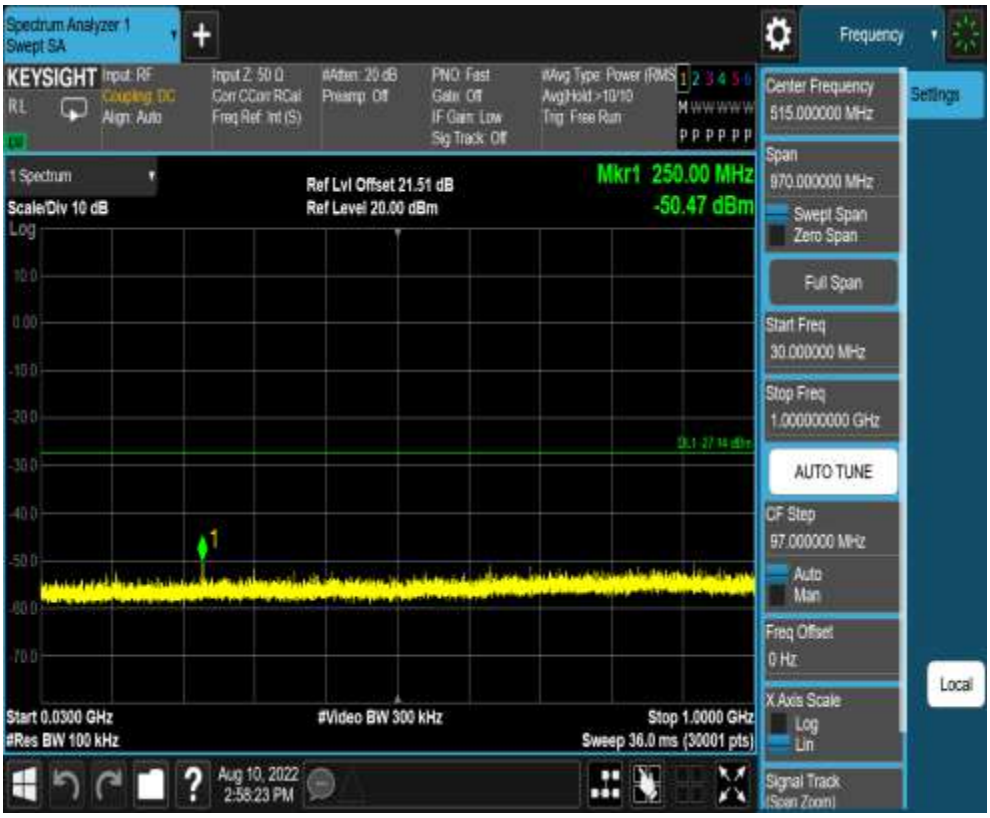
11N40MIMO_Ant1_2452_0~Reference

11N40MIMO_Ant1_2452_30~1000

11N40MIMO_Ant1_2452_1000~26500

11N40MIMO_Ant2_2452_0~Reference

11N40MIMO_Ant2_2452_30~1000



11N40MIMO_Ant2_2452_1000~26500

3.3.5.2. Band edge measurements

Test Mode	Antenna	Channel	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	6.97	-38.25	≤-13.03	PASS
	Ant2	Low	2412	3.65	-37.65	≤-16.35	PASS
	Ant1	High	2462	5.46	-38.33	≤-14.54	PASS
	Ant2	High	2462	2.46	-38.56	≤-17.54	PASS
11G	Ant1	Low	2412	0.38	-35.5	≤-19.62	PASS
	Ant2	Low	2412	-1.66	-36	≤-21.66	PASS
	Ant1	High	2462	0.30	-38.55	≤-19.7	PASS
	Ant2	High	2462	-2.78	-38.79	≤-22.78	PASS
11N20MIMO	Ant1	Low	2412	-2.06	-36.84	≤-22.06	PASS
	Ant2	Low	2412	-3.86	-36.79	≤-23.86	PASS
	Ant1	High	2462	-1.26	-39.37	≤-21.26	PASS
	Ant2	High	2462	-5.46	-38.9	≤-25.46	PASS
11N40MIMO	Ant1	Low	2422	-4.92	-39.04	≤-24.92	PASS
	Ant2	Low	2422	-6.76	-39.01	≤-26.76	PASS
	Ant1	High	2452	-4.85	-39.02	≤-24.85	PASS
	Ant2	High	2452	-7.83	-39.24	≤-27.83	PASS

11B_Ant1_Low_2412

11B_Ant2_Low_2412

11B_Ant1_High_2462

11B_Ant2_High_2462

11G_Ant1_Low_2412

11G_Ant2_Low_2412

11G_Ant1_High_2462

11G_Ant2_High_2462

11N20MIMO_Ant1_Low_2412

11N20MIMO_Ant2_Low_2412

11N20MIMO_Ant1_High_2462

11N20MIMO_Ant2_High_2462

11N40MIMO_Ant1_Low_2422

11N40MIMO_Ant2_Low_2422

11N40MIMO_Ant1_High_2452

11N40MIMO_Ant2_High_2452

3.4 6dB Bandwidth

3.4.1 Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

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 shall be connected to the spectrum analyser, and the spectrum analyser is set as follow:

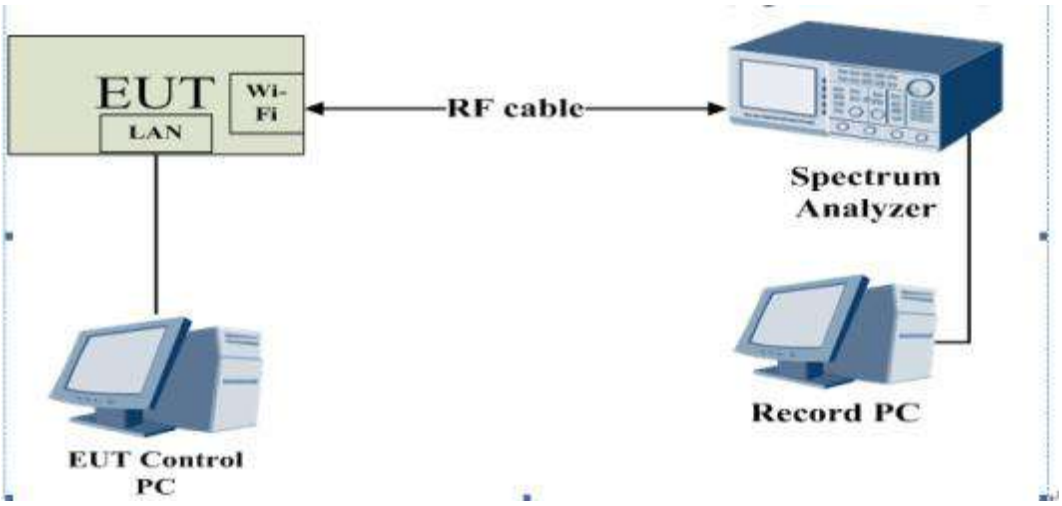
Centre Frequency	The centre frequency of the channel under test
RBW	100kHz
VBW	300kHz
Frequency span	2x Nominal Channel Bandwidth
Detector Mode	Peak
Trace Mode	Max Hold
Sweep Time	Auto Couple

b) Wait for the trace to stabilize then find the peak value of the trace and place the analyser marker on this peak.

c) Use the -6dB bandwidth function of the spectrum analyser to measure the 6dB Bandwidth of the EUT. This value shall be recorded.

d) Make sure that the power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals left and right from the power envelope being taken into account by this measurement.

3.4.4 Test Setup



3.4.5 Test Result

6dB Bandwidth

Test Mode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	10.080	2406.960	2417.040	0.5	PASS
	Ant2	2412	10.080	2406.960	2417.040	0.5	PASS
	Ant1	2437	10.080	2431.960	2442.040	0.5	PASS
	Ant2	2437	10.080	2431.960	2442.040	0.5	PASS
	Ant1	2462	10.080	2456.960	2467.040	0.5	PASS
	Ant2	2462	10.080	2456.960	2467.040	0.5	PASS
11G	Ant1	2412	16.360	2403.840	2420.200	0.5	PASS
	Ant2	2412	16.280	2403.880	2420.160	0.5	PASS
	Ant1	2437	16.320	2428.840	2445.160	0.5	PASS
	Ant2	2437	16.280	2428.880	2445.160	0.5	PASS
	Ant1	2462	16.280	2453.880	2470.160	0.5	PASS
	Ant2	2462	16.280	2453.880	2470.160	0.5	PASS
11N20MIMO	Ant1	2412	17.560	2403.240	2420.800	0.5	PASS
	Ant2	2412	17.280	2403.240	2420.520	0.5	PASS
	Ant1	2437	17.560	2428.240	2445.800	0.5	PASS
	Ant2	2437	16.920	2428.240	2445.160	0.5	PASS
	Ant1	2462	15.920	2453.880	2469.800	0.5	PASS
	Ant2	2462	16.680	2453.480	2470.160	0.5	PASS
11N40MIMO	Ant1	2422	35.040	2404.480	2439.520	0.5	PASS
	Ant2	2422	33.840	2404.480	2438.320	0.5	PASS
	Ant1	2437	35.120	2419.480	2454.600	0.5	PASS
	Ant2	2437	33.840	2419.480	2453.320	0.5	PASS
	Ant1	2452	35.040	2434.480	2469.520	0.5	PASS
	Ant2	2452	35.040	2434.480	2469.520	0.5	PASS

11B_Ant1_2412

11B_Ant2_2412

11B_Ant1_2437

11B_Ant2_2437

11B_Ant1_2462

11B_Ant2_2462

11G_Ant1_2412

11G_Ant2_2412

11G_Ant1_2437

11G_Ant2_2437

11G_Ant1_2462

11G_Ant2_2462

11N20MIMO_Ant1_2412

11N20MIMO_Ant2_2412

11N20MIMO_Ant1_2437

11N20MIMO_Ant2_2437

11N20MIMO_Ant1_2462

11N20MIMO_Ant2_2462

11N40MIMO_Ant1_2422

11N40MIMO_Ant2_2422

11N40MIMO_Ant1_2437

11N40MIMO_Ant2_2437

11N40MIMO_Ant1_2452

11N40MIMO_Ant2_2452

Occupied Channel Bandwidth

Test Mode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	14.224	2404.911	2419.135	---	---
	Ant2	2412	14.621	2404.680	2419.301	---	---
	Ant1	2437	14.273	2429.908	2444.181	---	---
	Ant2	2437	14.792	2429.618	2444.410	---	---
	Ant1	2462	14.246	2454.923	2469.169	---	---
	Ant2	2462	14.935	2454.544	2469.479	---	---
11G	Ant1	2412	17.380	2403.269	2420.649	---	---
	Ant2	2412	17.556	2403.170	2420.726	---	---
	Ant1	2437	17.391	2428.282	2445.673	---	---
	Ant2	2437	17.687	2428.122	2445.809	---	---
	Ant1	2462	17.392	2453.257	2470.649	---	---
	Ant2	2462	17.886	2453.005	2470.891	---	---
11N20MIMO	Ant1	2412	18.467	2402.778	2421.245	---	---
	Ant2	2412	18.749	2402.601	2421.350	---	---
	Ant1	2437	18.533	2427.764	2446.297	---	---
	Ant2	2437	19.126	2427.464	2446.590	---	---
	Ant1	2462	18.501	2452.780	2471.281	---	---
	Ant2	2462	19.304	2452.398	2471.702	---	---
11N40MIMO	Ant1	2422	36.803	2403.679	2440.482	---	---
	Ant2	2422	36.803	2403.679	2440.482	---	---
	Ant1	2437	36.821	2418.662	2455.483	---	---
	Ant2	2437	36.721	2418.662	2455.483	---	---
	Ant1	2452	36.881	2433.676	2470.557	---	---
	Ant2	2452	36.881	2433.676	2470.557	---	---

11B_Ant1_2412

11B_Ant2_2412

11B_Ant1_2437

11B_Ant2_2437

11B_Ant1_2462

11B_Ant2_2462

11G_Ant1_2412

11G_Ant2_2412

11G_Ant1_2437

11G_Ant2_2437

11G_Ant1_2462

11G_Ant2_2462

11N20MIMO_Ant1_2412

11N20MIMO_Ant2_2412

11N20MIMO_Ant1_2437

11N20MIMO_Ant2_2437

11N20MIMO_Ant1_2462

11N20MIMO_Ant2_2462

11N40MIMO_Ant1_2422

11N40MIMO_Ant2_2422

11N40MIMO_Ant1_2437

11N40MIMO_Ant2_2437

11N40MIMO_Ant1_2452

11N40MIMO_Ant2_2452

3.5 Maximum conducted (peak) 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 Peripherals

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

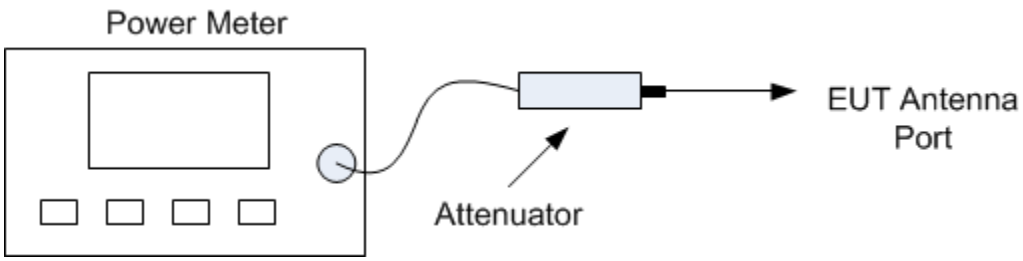
3.5.3 Test Procedure

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

b) The maximum output power was performed in accordance with method 11.9.2.3 of ANSI C63.10.

3.5.4 Test Setup



3.5.5 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 Software Version	Command					
Frequency (MHz)	2412		2437		2462	
Antenna	Ant1	Ant2	Ant1	Ant2	Ant1	Ant2
IEEE 802.11b	70	70	70	70	70	70
IEEE 802.11g	64	64	64	64	64	64
Frequency (MHz)	2412		2437		2462	
IEEE 802.11n (20MHz)	52		52		52	
Frequency (MHz)	2422		2437		2452	
IEEE 802.11n (40MHz)	52		52		52	

3.5.6 The Result

Test Mode	Antenna	Channel	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	15.28	≤27.71	PASS
	Ant2	2412	14.26	≤27.71	PASS
	Ant1	2437	15.23	≤27.71	PASS
	Ant2	2437	14.07	≤27.71	PASS
	Ant1	2462	15.16	≤27.71	PASS
	Ant2	2462	13.97	≤27.71	PASS
11G	Ant1	2412	14.68	≤27.71	PASS
	Ant2	2412	13.13	≤27.71	PASS
	Ant1	2437	14.04	≤27.71	PASS
	Ant2	2437	13.37	≤27.71	PASS
	Ant1	2462	14.23	≤27.71	PASS
	Ant2	2462	13.73	≤27.71	PASS
11N20MIMO	Ant1	2412	11.82	≤27.71	PASS
	Ant2	2412	10.63	≤27.71	PASS
	total	2412	14.28	≤27.71	PASS
	Ant1	2437	11.59	≤27.71	PASS
	Ant2	2437	10.26	≤27.71	PASS
	total	2437	13.99	≤27.71	PASS
	Ant1	2462	11.37	≤27.71	PASS
	Ant2	2462	10.16	≤27.71	PASS
	total	2462	13.82	≤27.71	PASS
11N40MIMO	Ant1	2422	10.28	≤27.71	PASS
	Ant2	2422	9.00	≤27.71	PASS
	total	2422	12.70	≤27.71	PASS
	Ant1	2437	10.56	≤27.71	PASS
	Ant2	2437	9.72	≤27.71	PASS
	total	2437	13.17	≤27.71	PASS
	Ant1	2452	10.28	≤27.71	PASS
	Ant2	2452	9.31	≤27.71	PASS
	total	2452	12.83	≤27.71	PASS

EUT	ANT 1 Antenna Gain (dBi)	ANT 2 Antenna Gain (dBi)	Correlated chains directional gain (dBi)	Peak Power Limit (dBm)
EUT1, EUT4 and EUT5	5.25	5.32	8.29	27.71
EUT2 and EUT3	4.32	4.32	7.33	28.67

Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1, G_2, …, G_N dBi

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.]

EUT1/EUT4/EUT5: Directional gain = $10\log[(10^{5.25/20} + 10^{5.32/20})^2/N_{ANT}]$ dBi=8.29

EUT2/EUT3: Directional gain = $10\log[(10^{4.32/20} + 10^{4.32/20})^2/N_{ANT}]$ dBi=7.33

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 Peripherals

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

3.6.3 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	

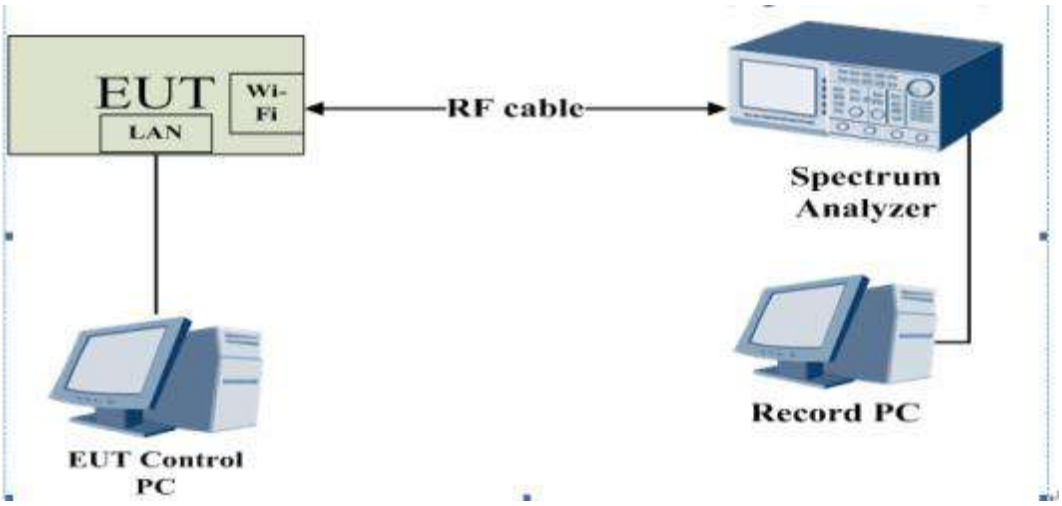
a) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below. Spectrum analyser settings as following:

RBW	3 kHz
VBW	10 kHz
Detector Mode	Peak
Trace Mode	Max Hold
Sweep Time	Auto

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 .

3.6.4 Test Setup



3.6.5 The Result

Test Mode	Antenna	Channel	Result [dBm/3kHz]	Limit [dBm/3kHz]	Verdict
11B	Ant1	2412	-0.86	≤5.71	PASS
	Ant2	2412	-2.38	≤5.71	PASS
	Ant1	2437	-0.57	≤5.71	PASS
	Ant2	2437	-2.63	≤5.71	PASS
	Ant1	2462	0.77	≤5.71	PASS
	Ant2	2462	-3.22	≤5.71	PASS
11G	Ant1	2412	-15.84	≤5.71	PASS
	Ant2	2412	-17.87	≤5.71	PASS
	Ant1	2437	-15.94	≤5.71	PASS
	Ant2	2437	-17.98	≤5.71	PASS
	Ant1	2462	-15.6	≤5.71	PASS
	Ant2	2462	-19.13	≤5.71	PASS
11N20MIMO	Ant1	2412	-17.41	≤5.71	PASS
	Ant2	2412	-19.04	≤5.71	PASS
	total	2412	-15.14	≤5.71	PASS
	Ant1	2437	-17.68	≤5.71	PASS
	Ant2	2437	-20.54	≤5.71	PASS
	total	2437	-15.87	≤5.71	PASS
	Ant1	2462	-17.67	≤5.71	PASS
	Ant2	2462	-20.62	≤5.71	PASS
	total	2462	-15.89	≤5.71	PASS
11N40MIMO	Ant1	2422	-20.12	≤5.71	PASS
	Ant2	2422	-21.78	≤5.71	PASS
	total	2422	-17.86	≤5.71	PASS
	Ant1	2437	-19.98	≤5.71	PASS
	Ant2	2437	-22.02	≤5.71	PASS
	total	2437	-17.87	≤5.71	PASS
	Ant1	2452	-19.76	≤5.71	PASS
	Ant2	2452	-22.54	≤5.71	PASS
	total	2452	-17.92	≤5.71	PASS

EUT	ANT 1 Antenna Gain (dBi)	ANT 2 Antenna Gain (dBi)	Correlated chains directional gain (dBi)	Power Spectral Density Limit (dBm)
EUT1, EUT4 and EUT5	5.25	5.32	8.29	5.71
EUT2 and EUT3	4.32	4.32	7.33	6.67

Unequal antenna gains, with equal transmit powers. For antenna gains given by G_1, G_2, …, G_N dBi

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.]

EUT1/EUT4/EUT5: Directional gain = $10\log[(10^{5.25/20} + 10^{5.32/20})^2/N_{ANT}]$ dBi=8.29

EUT2/EUT3: Directional gain = $10\log[(10^{4.32/20} + 10^{4.32/20})^2/N_{ANT}]$ dBi=7.33

11B_Ant1_2412

11B_Ant2_2412

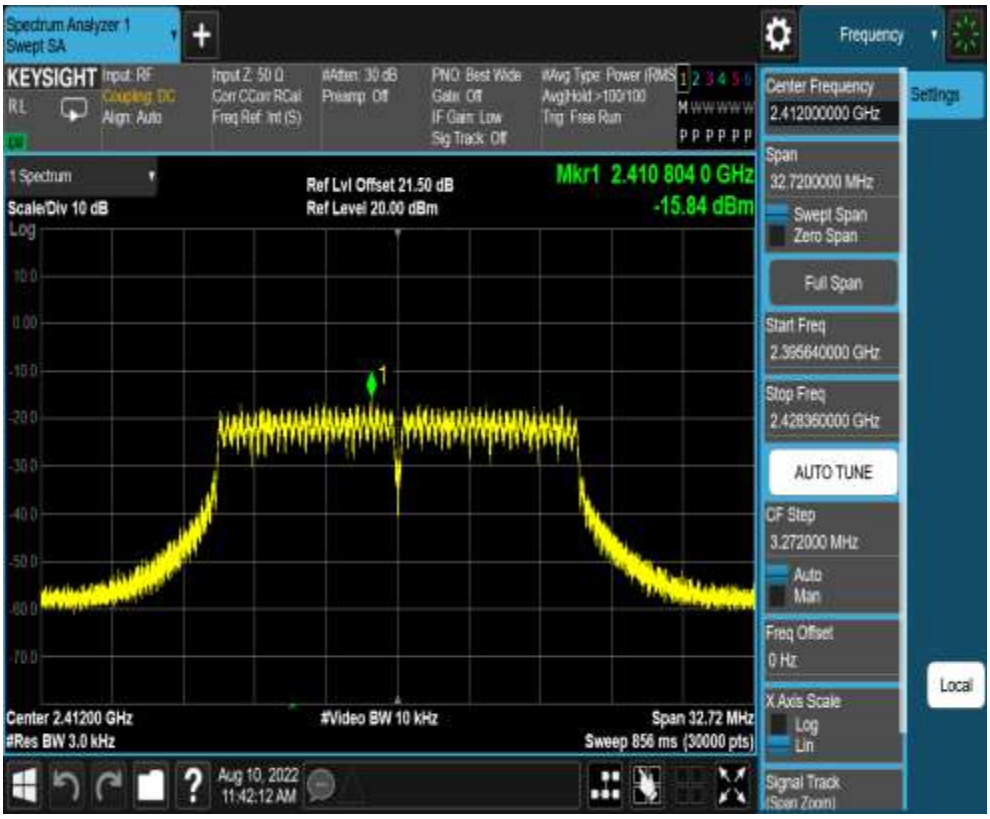
11B_Ant1_2437

11B_Ant2_2437

11B_Ant1_2462

11B_Ant2_2462

11G_Ant1_2412



11G_Ant2_2412

11G_Ant1_2437

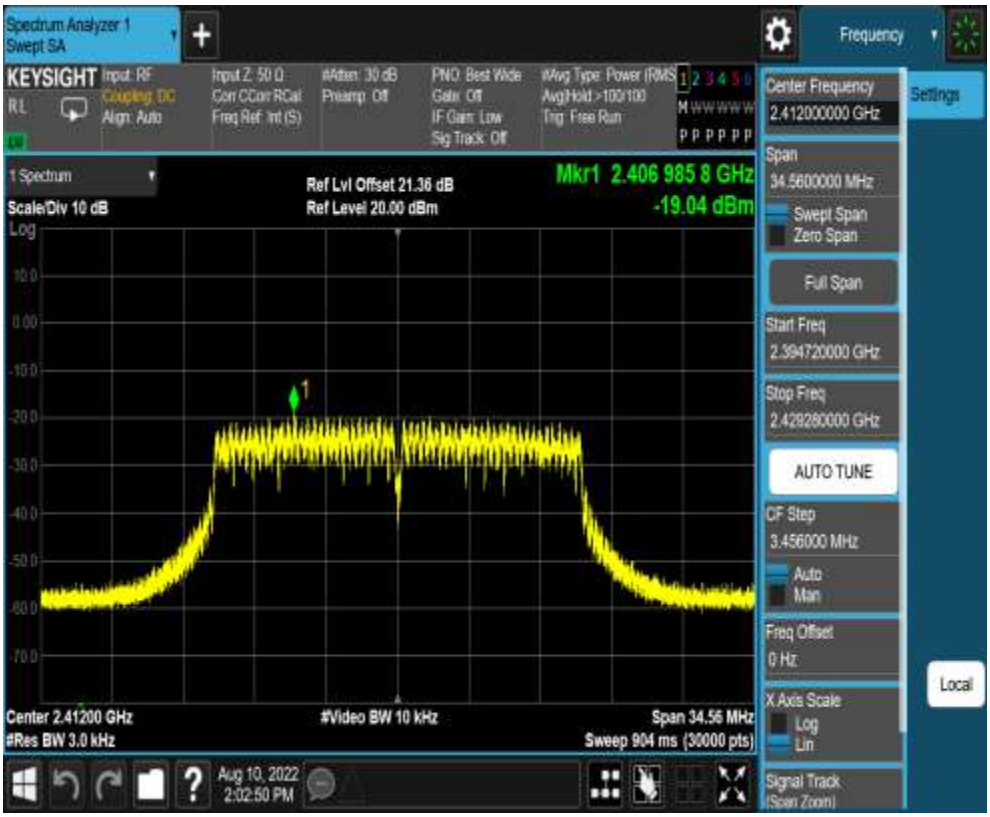
11G_Ant2_2437

11G_Ant1_2462

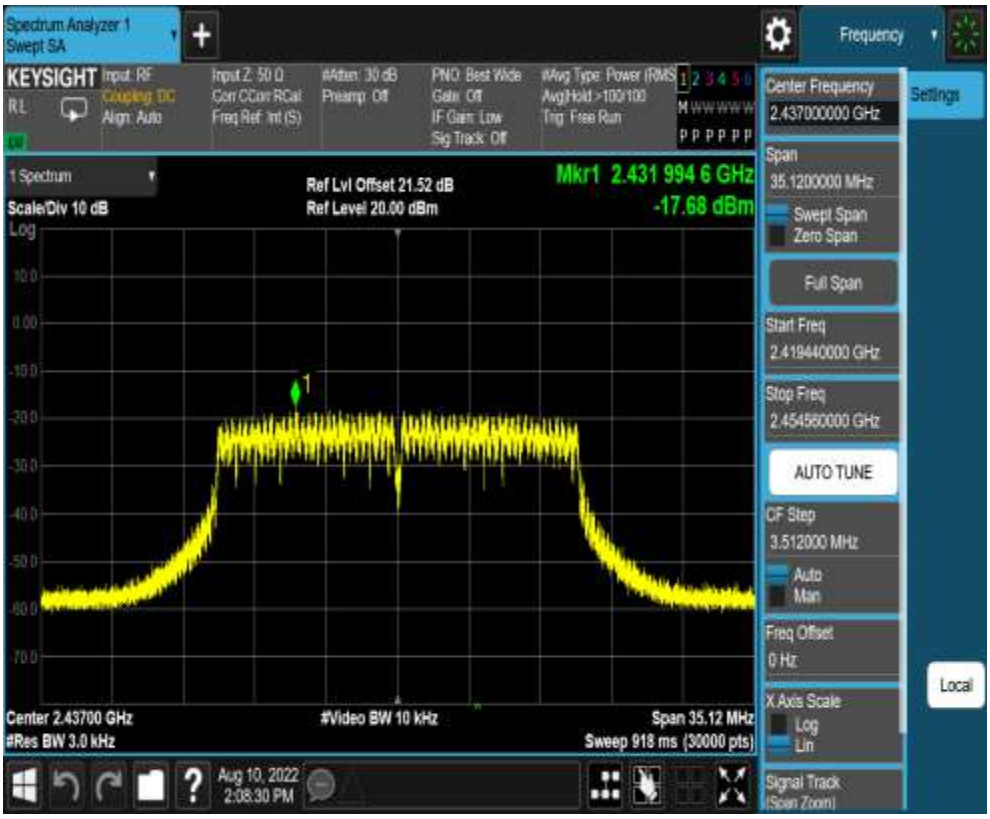
11G_Ant2_2462

11N20MIMO_Ant1_2412

11N20MIMO_Ant2_2412



11N20MIMO_Ant1_2437



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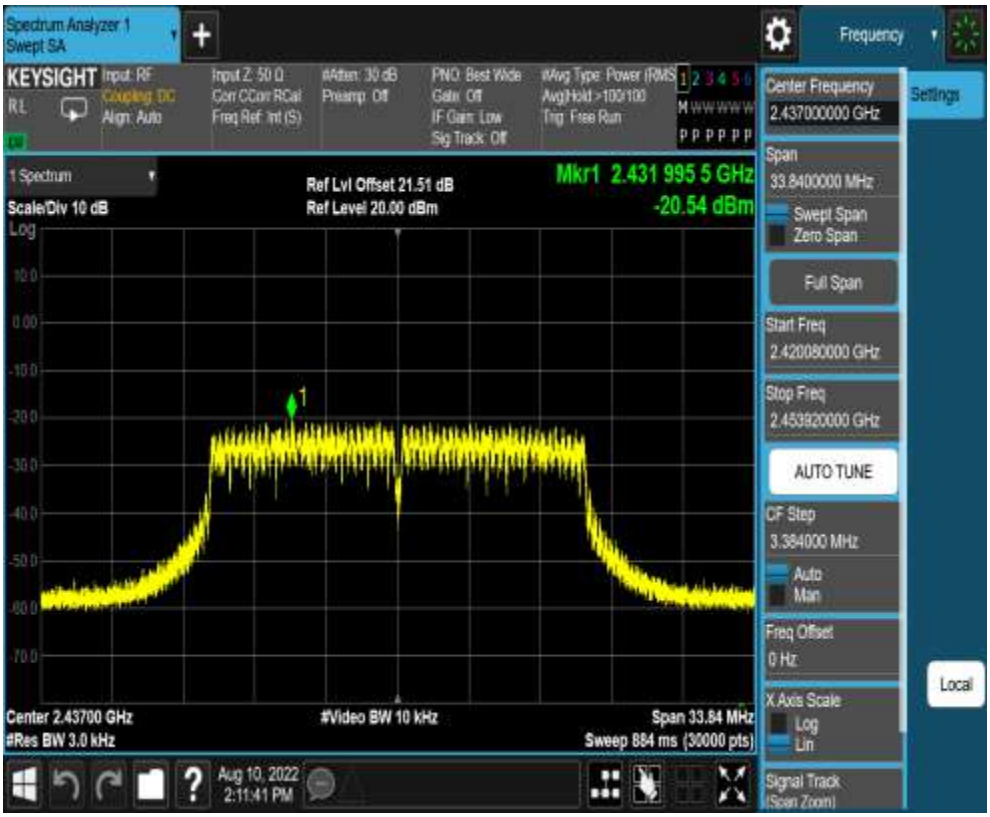

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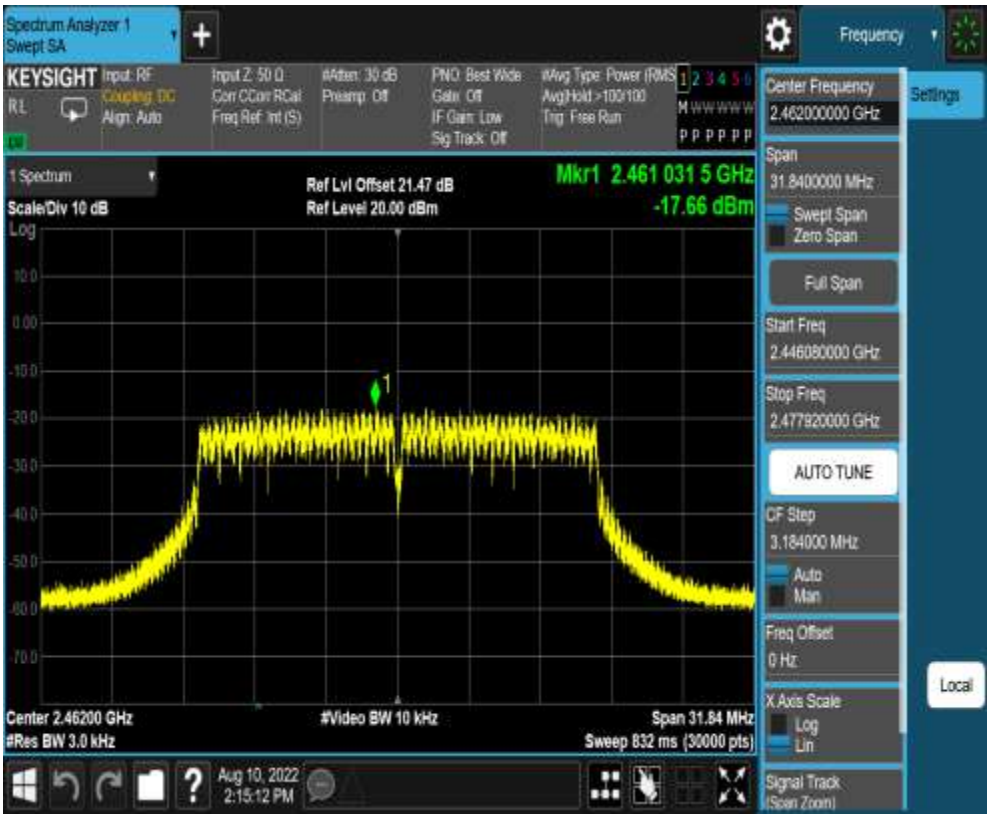

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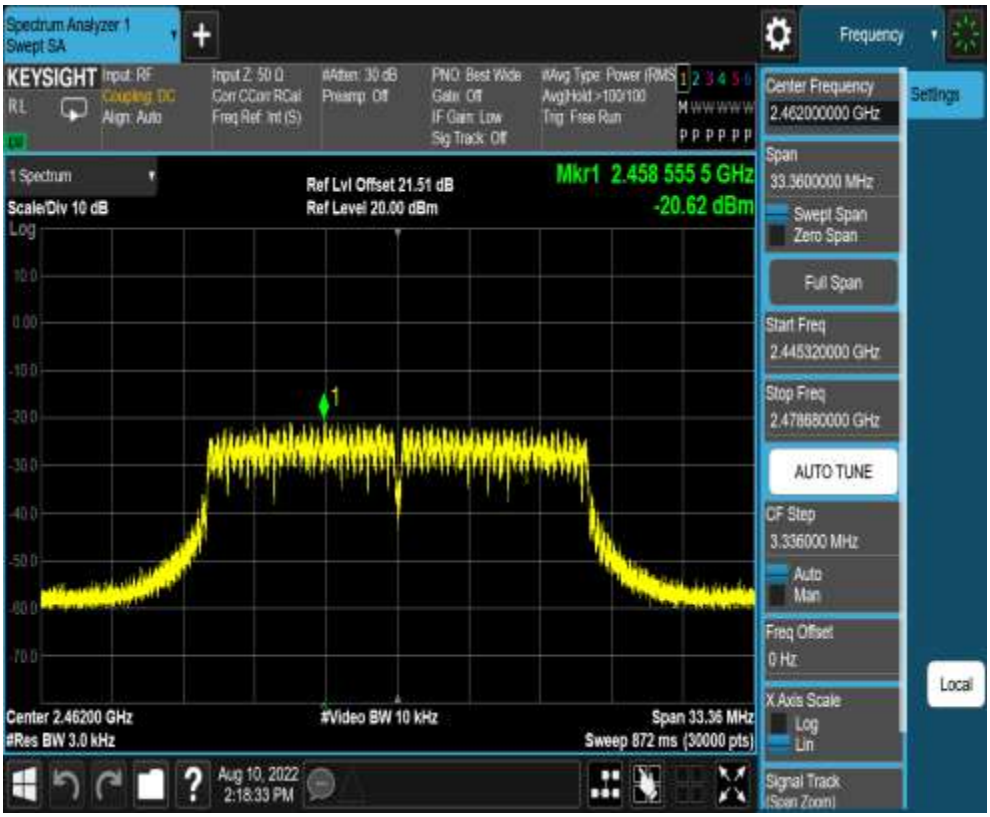

11N40MIMO_Ant1_2422

11N40MIMO_Ant2_2422

11N40MIMO_Ant1_2437

11N40MIMO_Ant2_2437

11N40MIMO_Ant1_2452

11N40MIMO_Ant2_2452

（END OF REPORT）