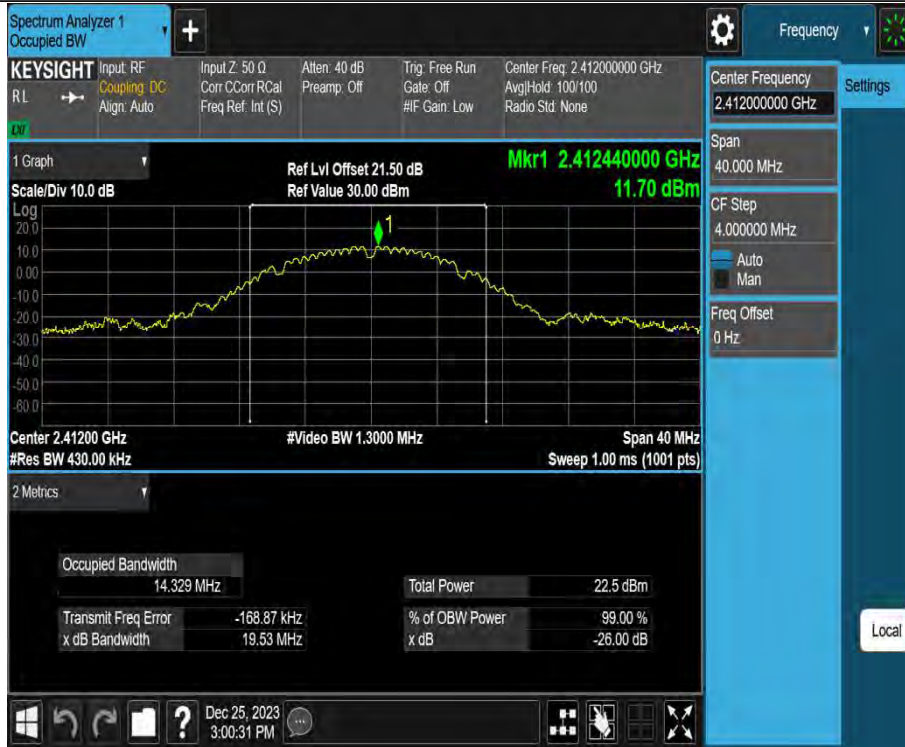


Occupied Channel Bandwidth

Test Mode	Antenna	Channel Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B-CDD	Ant1	2412	14.329	2404.6666	2418.9956	---	---
	Ant2	2412	13.647	2405.0965	2418.7435	---	---
	Ant1	2437	13.963	2430.0058	2443.9688	---	---
	Ant2	2437	13.734	2430.0493	2443.7833	---	---
	Ant1	2462	13.887	2455.0024	2468.8894	---	---
	Ant2	2462	13.612	2455.0767	2468.6887	---	---
11G-CDD	Ant1	2412	16.438	2403.7192	2420.1572	---	---
	Ant2	2412	16.400	2403.7452	2420.1452	---	---
	Ant1	2437	16.447	2428.7500	2445.1970	---	---
	Ant2	2437	16.410	2428.7517	2445.1617	---	---
	Ant1	2462	16.423	2453.7365	2470.1595	---	---
	Ant2	2462	16.425	2453.7357	2470.1607	---	---
11N20MIMO	Ant1	2412	17.567	2403.1667	2420.7337	---	---
	Ant2	2412	17.572	2403.1692	2420.7412	---	---
	Ant1	2437	17.636	2428.1326	2445.7686	---	---
	Ant2	2437	17.564	2428.1742	2445.7382	---	---
	Ant1	2462	17.618	2453.1583	2470.7763	---	---
	Ant2	2462	17.576	2453.1507	2470.7267	---	---
11N40MIMO	Ant1	2422	36.069	2403.9471	2440.0161	---	---
	Ant2	2422	35.975	2403.9102	2439.8852	---	---
	Ant1	2437	36.009	2418.9531	2454.9621	---	---
	Ant2	2437	36.014	2418.8905	2454.9045	---	---
	Ant1	2452	36.047	2433.9435	2469.9905	---	---
	Ant2	2452	35.999	2433.8950	2469.8940	---	---
11AX20MIMO	Ant1	2412	18.848	2402.5300	2421.3780	---	---
	Ant2	2412	18.875	2402.4969	2421.3719	---	---
	Ant1	2437	18.868	2427.5217	2446.3897	---	---
	Ant2	2437	18.893	2427.4787	2446.3717	---	---
	Ant1	2462	18.858	2452.5206	2471.3786	---	---
	Ant2	2462	18.862	2452.5182	2471.3802	---	---
11AX40MIMO	Ant1	2422	37.660	2403.0719	2440.7319	---	---
	Ant2	2422	37.633	2403.0703	2440.7033	---	---
	Ant1	2437	37.686	2418.1599	2455.8459	---	---
	Ant2	2437	37.665	2418.0908	2455.7558	---	---
	Ant1	2452	37.692	2433.1316	2470.8236	---	---
	Ant2	2452	37.689	2433.0587	2470.7477	---	---

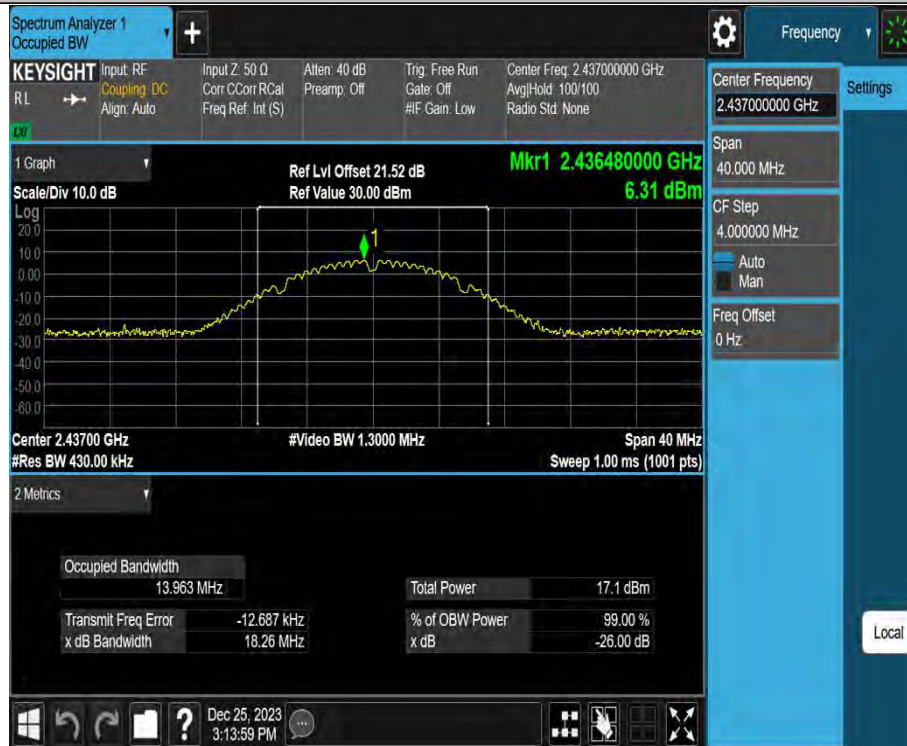
11B-CDD_Ant1_2412



11B-CDD_Ant2_2412



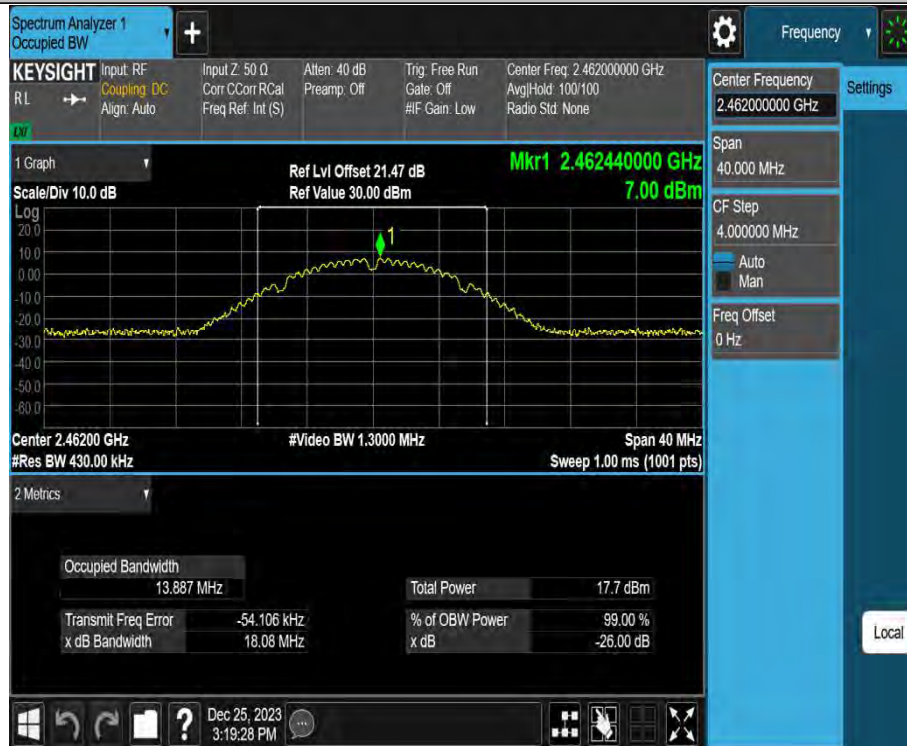
11B-CDD_Ant1_2437



11B-CDD_Ant2_2437



11B-CDD_Ant1_2462



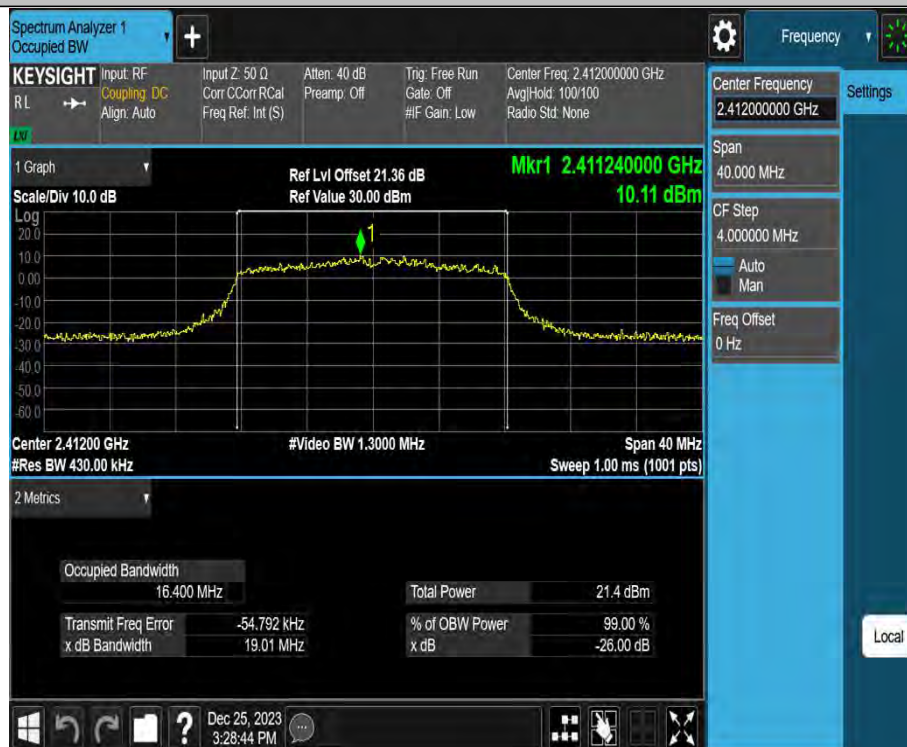
11B-CDD_Ant2_2462



11G-CDD_Ant1_2412



11G-CDD_Ant2_2412



11G-CDD_Ant1_2437



11G-CDD_Ant2_2437



11G-CDD_Ant1_2462



11G-CDD_Ant2_2462



11N20MIMO_Ant1_2412



11N20MIMO_Ant2_2412



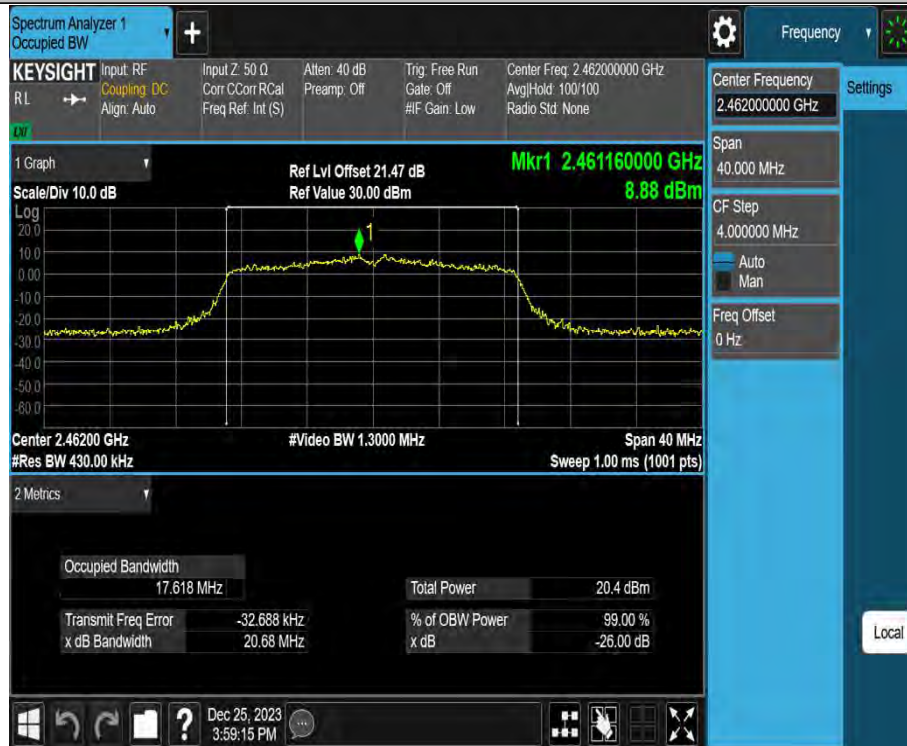
11N20MIMO_Ant1_2437



11N20MIMO_Ant2_2437



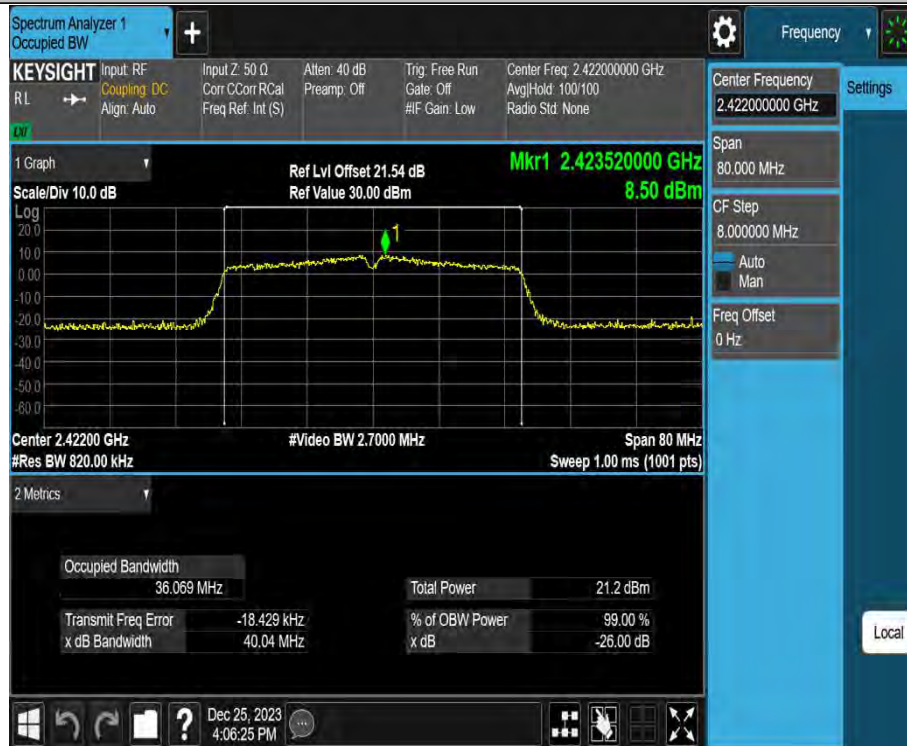
11N20MIMO_Ant1_2462



11N20MIMO_Ant2_2462



11N40MIMO_Ant1_2422



11N40MIMO_Ant2_2422



11N40MIMO_Ant1_2437



11N40MIMO_Ant2_2437



11N40MIMO_Ant1_2452



11N40MIMO_Ant2_2452



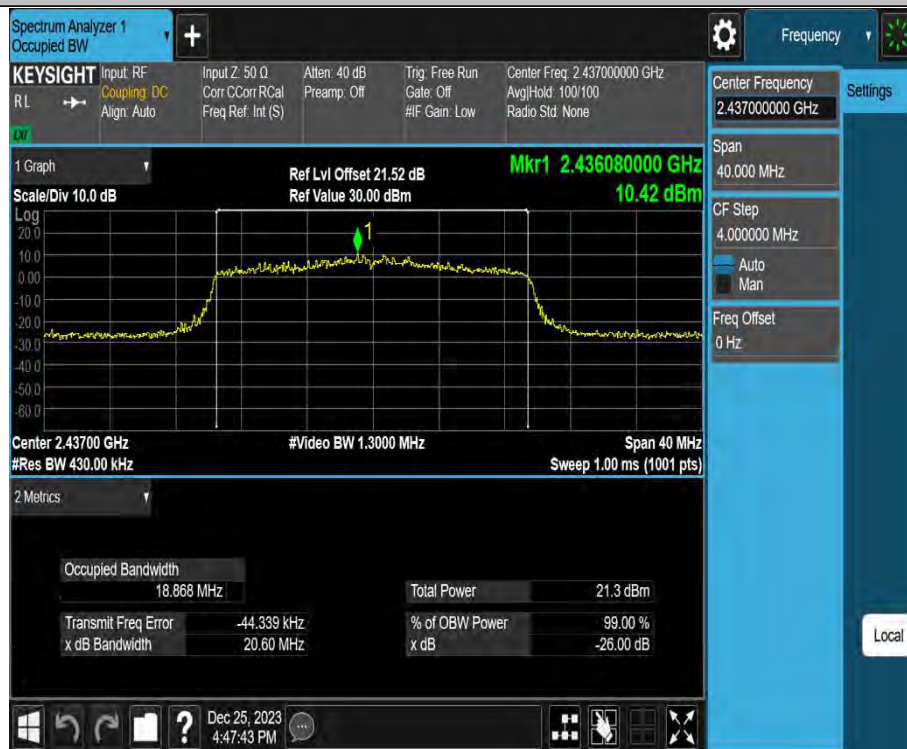
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11AX20MIMO_Ant2_2412



11AX20MIMO_Ant1_2437



11AX20MIMO_Ant2_2437



11AX20MIMO_Ant1_2462



11AX20MIMO_Ant2_2462



11AX40MIMO_Ant1_2422



11AX40MIMO_Ant2_2422



11AX40MIMO_Ant1_2437



11AX40MIMO_Ant2_2437



11AX40MIMO_Ant1_2452



11AX40MIMO_Ant2_2452



3.5 Maximum conducted output power

3.5.1 Limit

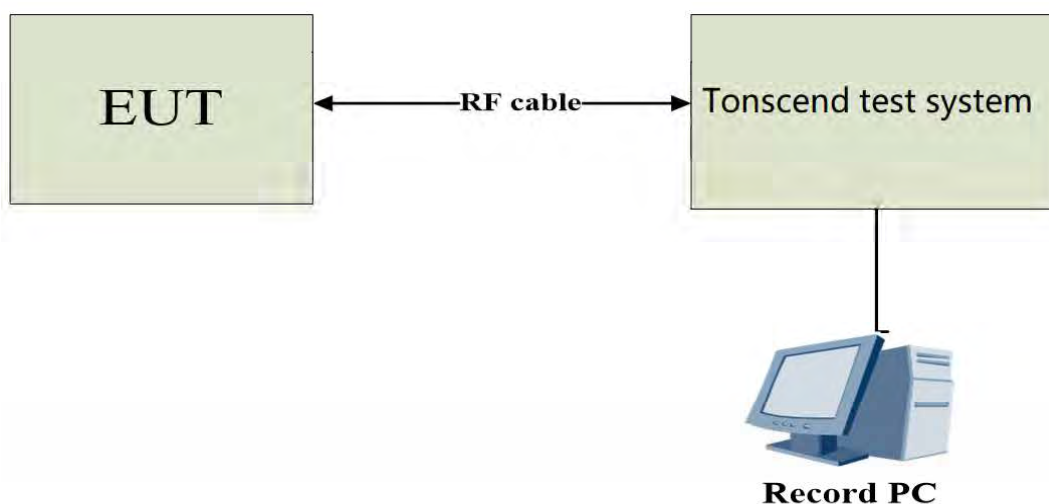
For systems using digital modulation in the 2400~2483.5MHz, The Maximum output Power shall not exceed 1W(30dBm)

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.

Test Software Version	QSPR		
Frequency (MHz)	2412	2437	2462
IEEE 802.11b	15	15	15
IEEE 802.11g	10	10	10
IEEE 802.11n(20)	10	10	10
IEEE 802.11ax(20)	10	10	10
Frequency (MHz)	2422	2437	2452
IEEE 802.11n(40)	6	6	6
IEEE 802.11ax(40)	6	6	6

3.5.5 The Result

Test Mode	Antenna	Frequency[MHz]	Maximum conducted output Power [dBm]	Limit [dBm]	Verdict
11B-CDD	Ant1	2412	12.22	≤30.00	PASS
	Ant2	2412	12.88	≤30.00	PASS
	total	2412	15.57	≤30.00	PASS
	Ant1	2437	12.62	≤30.00	PASS
	Ant2	2437	12.61	≤30.00	PASS
	total	2437	15.63	≤30.00	PASS
	Ant1	2462	12.58	≤30.00	PASS
	Ant2	2462	12.03	≤30.00	PASS
	total	2462	15.32	≤30.00	PASS
11G-CDD	Ant1	2412	10.36	≤30.00	PASS
	Ant2	2412	10.80	≤30.00	PASS
	total	2412	13.60	≤30.00	PASS
	Ant1	2437	10.29	≤30.00	PASS
	Ant2	2437	11.01	≤30.00	PASS
	total	2437	13.68	≤30.00	PASS
	Ant1	2462	10.97	≤30.00	PASS
	Ant2	2462	11.08	≤30.00	PASS
	total	2462	14.04	≤30.00	PASS
11N20MIMO	Ant1	2412	9.79	≤30.00	PASS
	Ant2	2412	10.50	≤30.00	PASS
	total	2412	13.17	≤30.00	PASS
	Ant1	2437	9.86	≤30.00	PASS
	Ant2	2437	10.94	≤30.00	PASS
	total	2437	13.44	≤30.00	PASS
	Ant1	2462	10.28	≤30.00	PASS
	Ant2	2462	10.85	≤30.00	PASS
	total	2462	13.58	≤30.00	PASS
11N40MIMO	Ant1	2422	10.10	≤30.00	PASS
	Ant2	2422	10.73	≤30.00	PASS
	total	2422	13.44	≤30.00	PASS
	Ant1	2437	10.10	≤30.00	PASS
	Ant2	2437	10.89	≤30.00	PASS
	total	2437	13.52	≤30.00	PASS
	Ant1	2452	10.46	≤30.00	PASS
	Ant2	2452	11.38	≤30.00	PASS
	total	2452	13.95	≤30.00	PASS

11AX20MIMO	Ant1	2412	10.01	≤30.00	PASS
	Ant2	2412	10.72	≤30.00	PASS
	total	2412	13.39	≤30.00	PASS
	Ant1	2437	9.76	≤30.00	PASS
	Ant2	2437	10.83	≤30.00	PASS
	total	2437	13.34	≤30.00	PASS
	Ant1	2462	10.34	≤30.00	PASS
	Ant2	2462	10.88	≤30.00	PASS
	total	2462	13.63	≤30.00	PASS
11AX40MIMO	Ant1	2422	9.95	≤30.00	PASS
	Ant2	2422	10.49	≤30.00	PASS
	total	2422	13.24	≤30.00	PASS
	Ant1	2437	9.93	≤30.00	PASS
	Ant2	2437	10.50	≤30.00	PASS
	total	2437	13.23	≤30.00	PASS
	Ant1	2452	10.12	≤30.00	PASS
	Ant2	2452	10.59	≤30.00	PASS
	total	2452	13.37	≤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 = $10 \log[(10^{3.10/20} + 10^{2.43/20})^2 / N_{ANT}]$ dBi=5.78

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

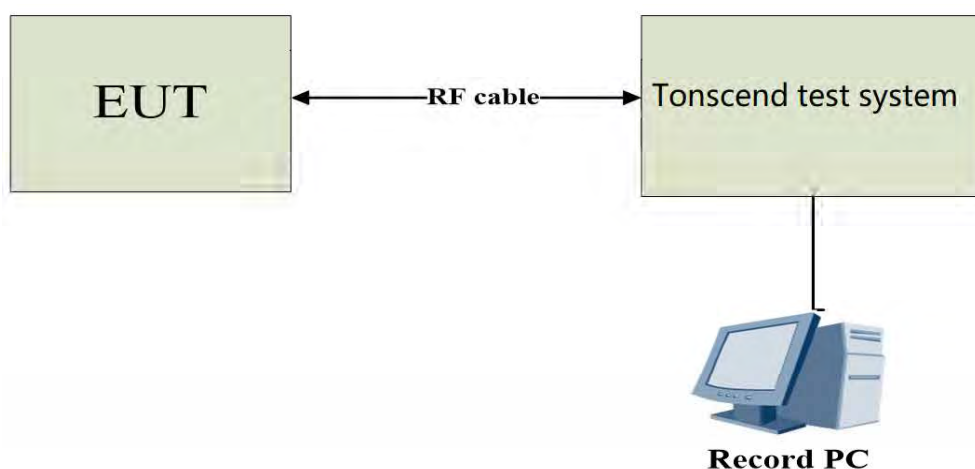
Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☒ Lowest, Middle and Highest Channel	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ☒ : Test ☐ : No Test	

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	Peak
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	-12.92	≤8.00	PASS
	Ant2	2412	-13.04	≤8.00	PASS
	total	2412	-9.97	≤8.00	PASS
	Ant1	2437	-13.15	≤8.00	PASS
	Ant2	2437	-13.16	≤8.00	PASS
	total	2437	-10.14	≤8.00	PASS
	Ant1	2462	-12.51	≤8.00	PASS
	Ant2	2462	-12.74	≤8.00	PASS
	total	2462	-9.61	≤8.00	PASS
11G-CDD	Ant1	2412	-17.03	≤8.00	PASS
	Ant2	2412	-16.39	≤8.00	PASS
	total	2412	-13.69	≤8.00	PASS
	Ant1	2437	-17.10	≤8.00	PASS
	Ant2	2437	-15.92	≤8.00	PASS
	total	2437	-13.46	≤8.00	PASS
	Ant1	2462	-16.54	≤8.00	PASS
	Ant2	2462	-16.19	≤8.00	PASS
	total	2462	-13.35	≤8.00	PASS
11N20MIMO	Ant1	2412	-17.67	≤8.00	PASS
	Ant2	2412	-17.10	≤8.00	PASS
	total	2412	-14.37	≤8.00	PASS
	Ant1	2437	-17.34	≤8.00	PASS
	Ant2	2437	-16.12	≤8.00	PASS
	total	2437	-13.68	≤8.00	PASS
	Ant1	2462	-16.87	≤8.00	PASS
	Ant2	2462	-16.44	≤8.00	PASS
	total	2462	-13.64	≤8.00	PASS
11N40MIMO	Ant1	2422	-19.91	≤8.00	PASS
	Ant2	2422	-19.47	≤8.00	PASS
	total	2422	-16.67	≤8.00	PASS
	Ant1	2437	-19.90	≤8.00	PASS
	Ant2	2437	-18.72	≤8.00	PASS
	total	2437	-16.26	≤8.00	PASS
	Ant1	2452	-19.37	≤8.00	PASS
	Ant2	2452	-18.41	≤8.00	PASS
	total	2452	-15.85	≤8.00	PASS

11AX20MIMO	Ant1	2412	-19.26	≤8.00	PASS
	Ant2	2412	-18.11	≤8.00	PASS
	total	2412	-15.64	≤8.00	PASS
	Ant1	2437	-19.40	≤8.00	PASS
	Ant2	2437	-18.47	≤8.00	PASS
	total	2437	-15.90	≤8.00	PASS
	Ant1	2462	-18.81	≤8.00	PASS
	Ant2	2462	-18.39	≤8.00	PASS
	total	2462	-15.58	≤8.00	PASS
11AX40MIMO	Ant1	2422	-22.01	≤8.00	PASS
	Ant2	2422	-21.60	≤8.00	PASS
	total	2422	-18.79	≤8.00	PASS
	Ant1	2437	-22.45	≤8.00	PASS
	Ant2	2437	-21.33	≤8.00	PASS
	total	2437	-18.84	≤8.00	PASS
	Ant1	2452	-21.61	≤8.00	PASS
	Ant2	2452	-21.22	≤8.00	PASS
	total	2452	-18.40	≤8.00	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 = $10 \log[(10^{3.10/20} + 10^{2.43/20})^2 / N_{ANT}]$ dBi=5.78

11B-CDD_Ant1_2412



11B-CDD_Ant2_2412



11B-CDD_Ant1_2437



11B-CDD_Ant2_2437



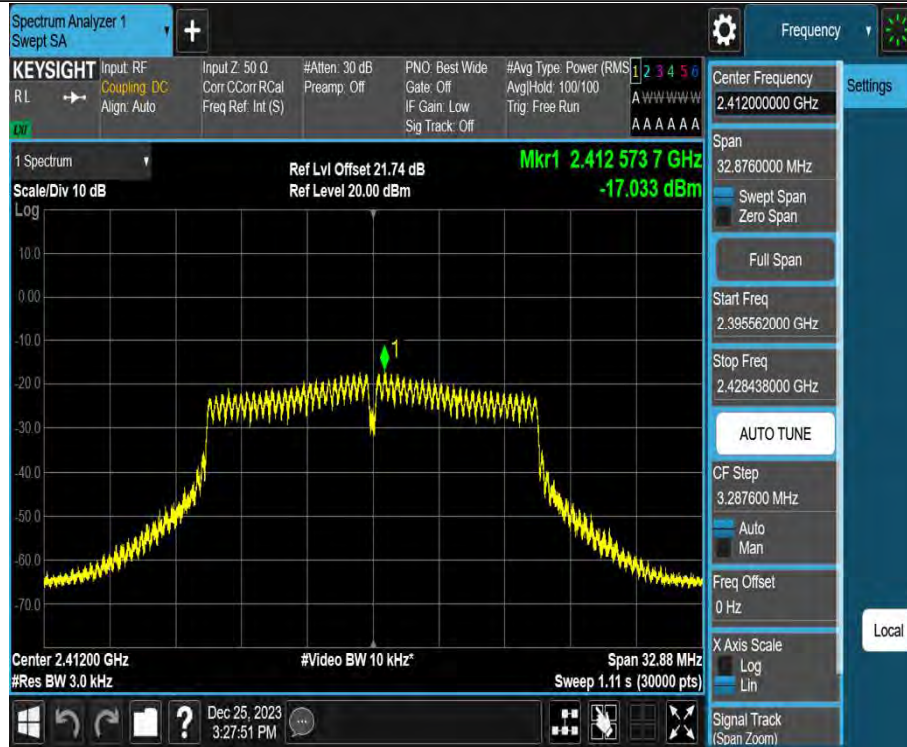
11B-CDD_Ant1_2462



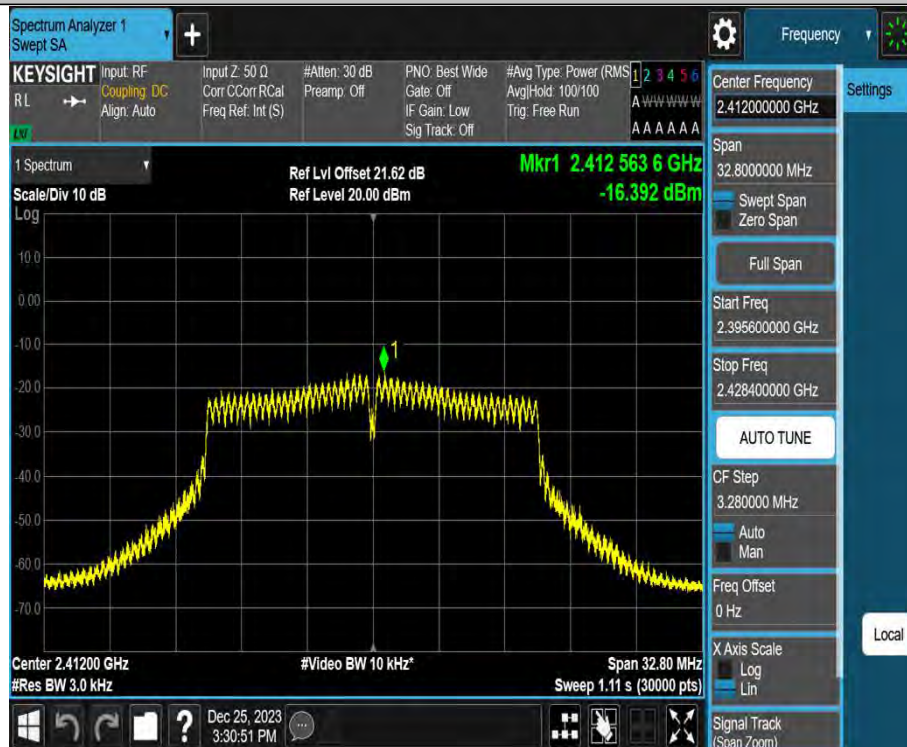
11B-CDD_Ant2_2462



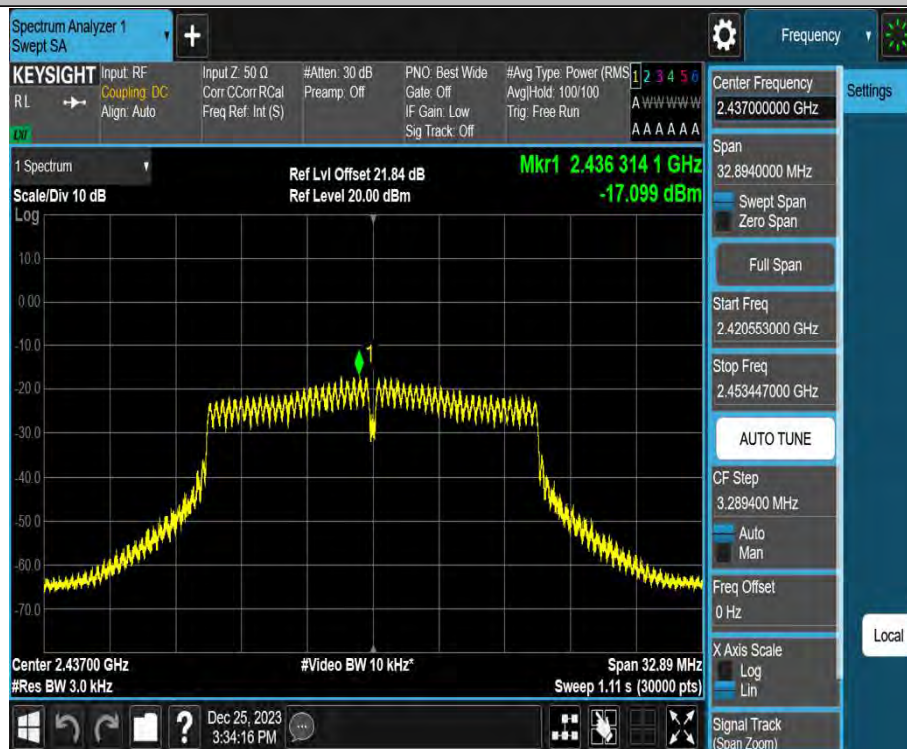
11G-CDD_Ant1_2412



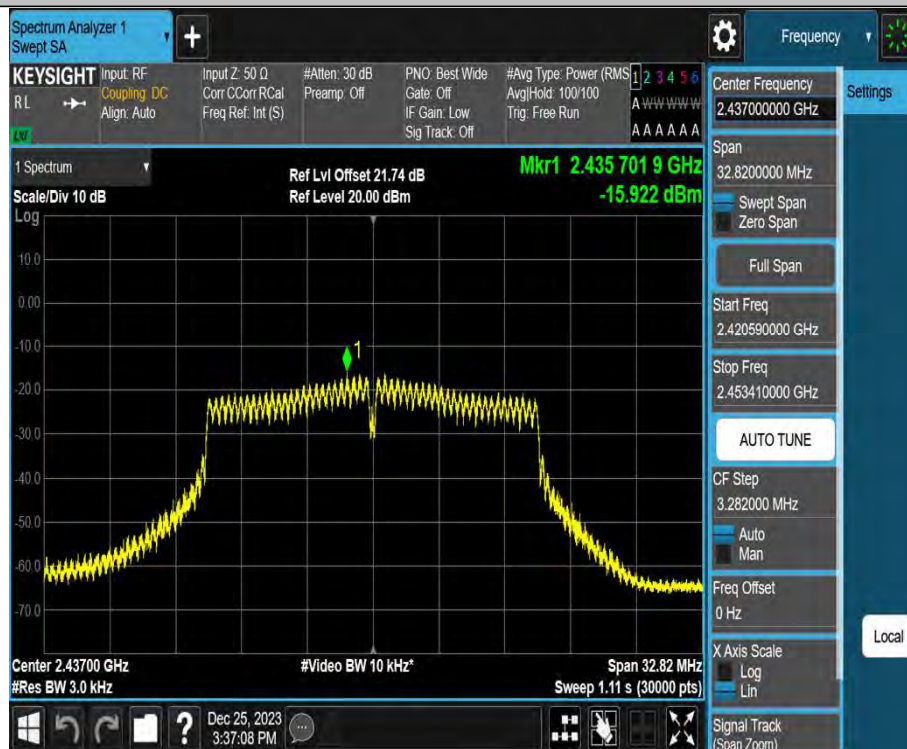
11G-CDD_Ant2_2412



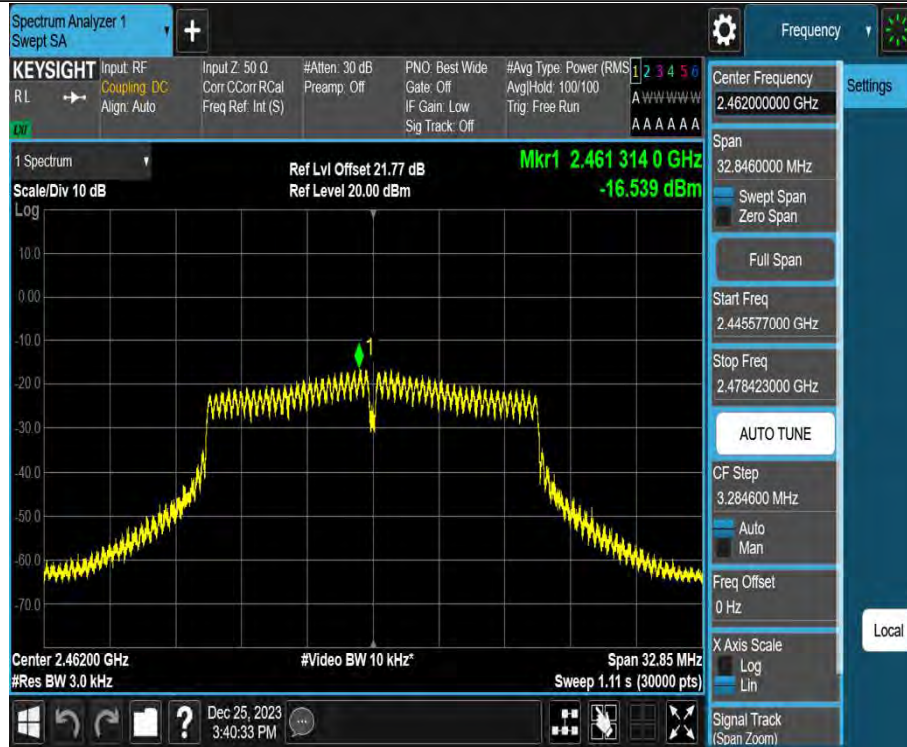
11G-CDD_Ant1_2437



11G-CDD_Ant2_2437



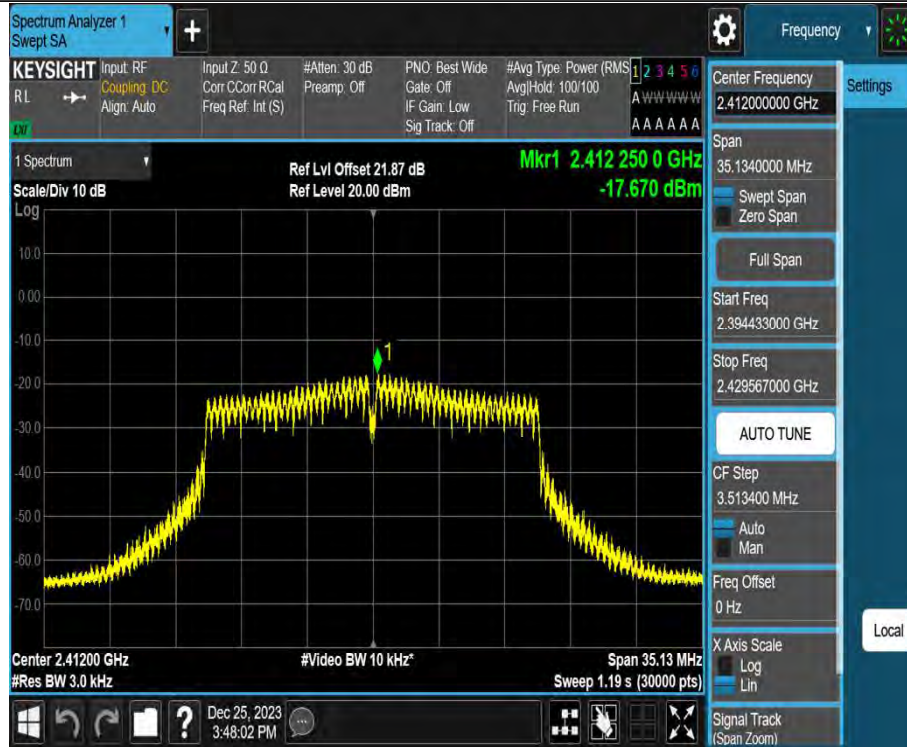
11G-CDD_Ant1_2462



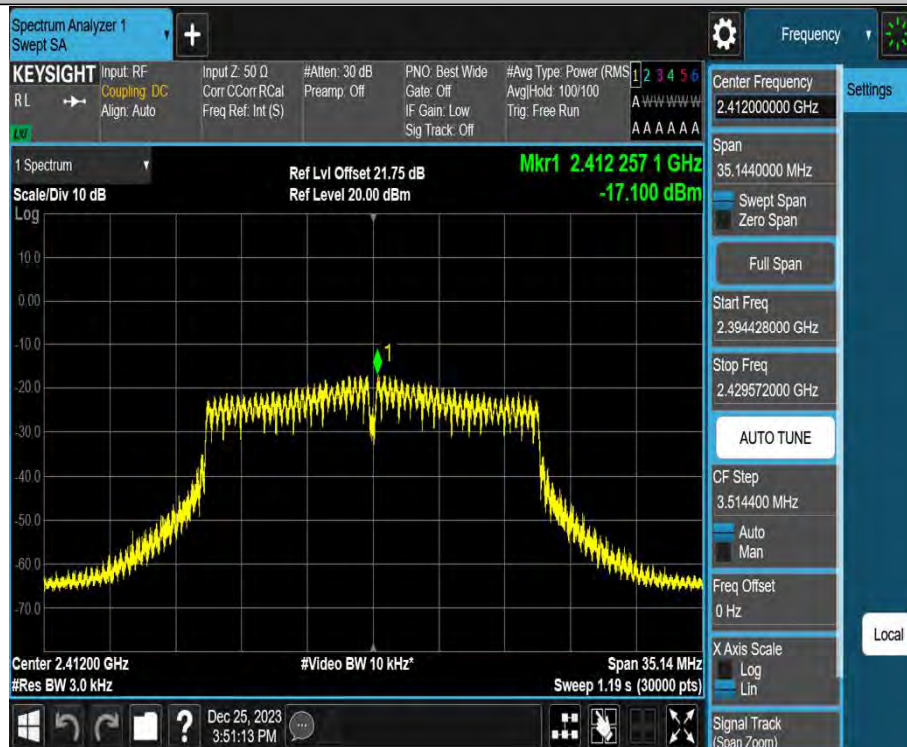
11G-CDD_Ant2_2462



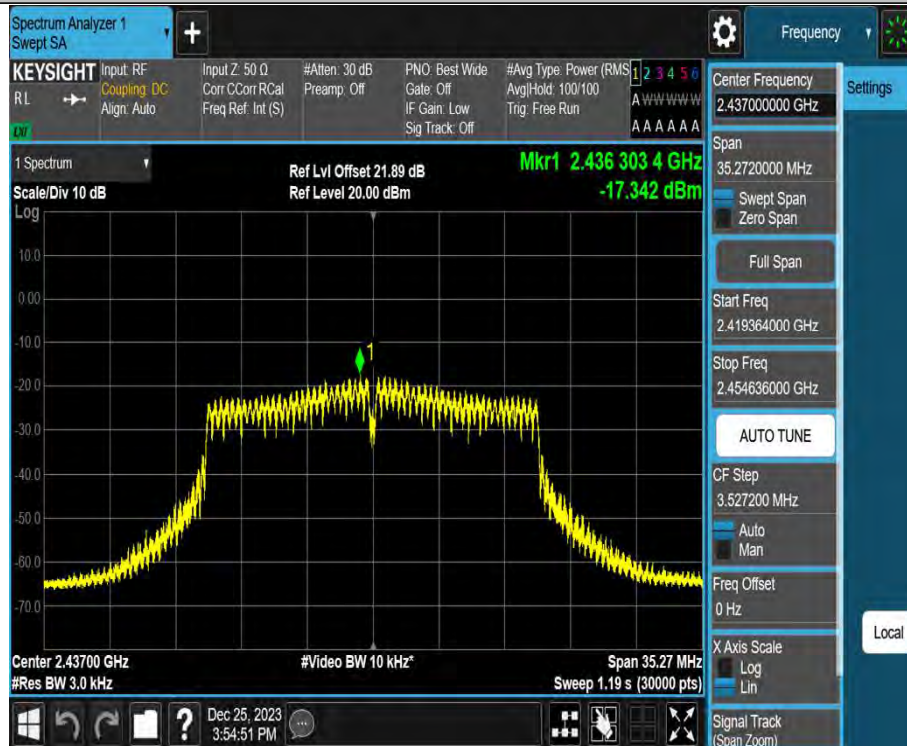
11N20MIMO_Ant1_2412



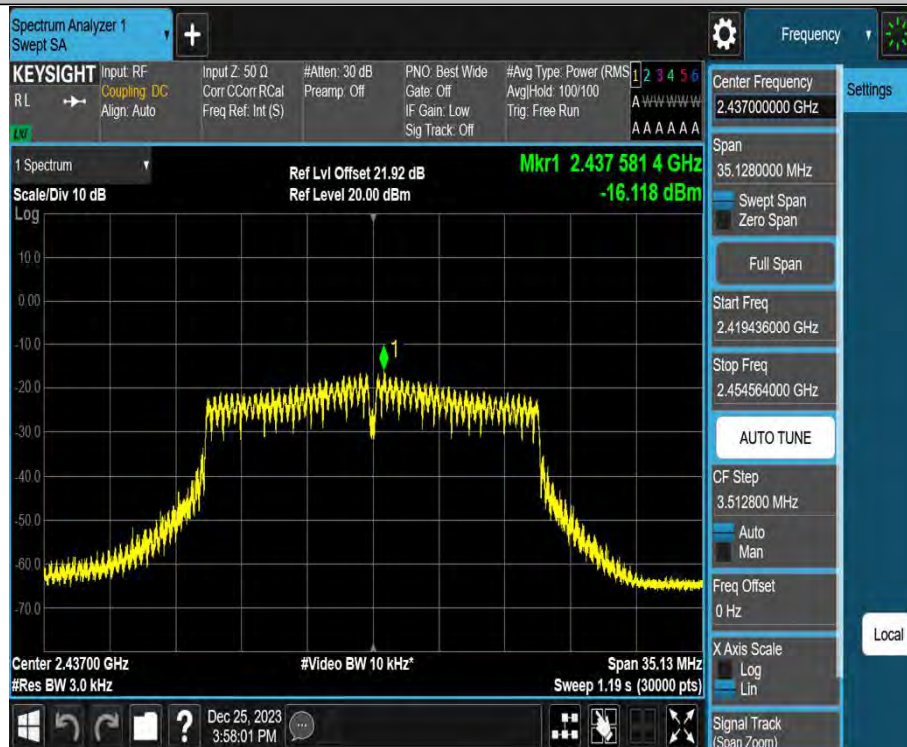
11N20MIMO_Ant2_2412



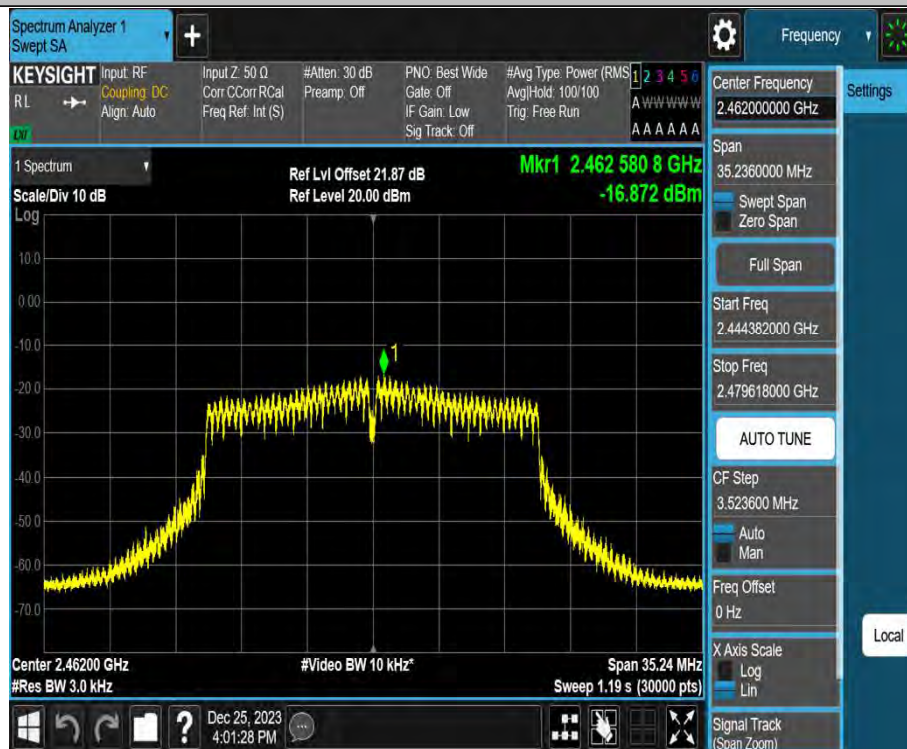
11N20MIMO_Ant1_2437



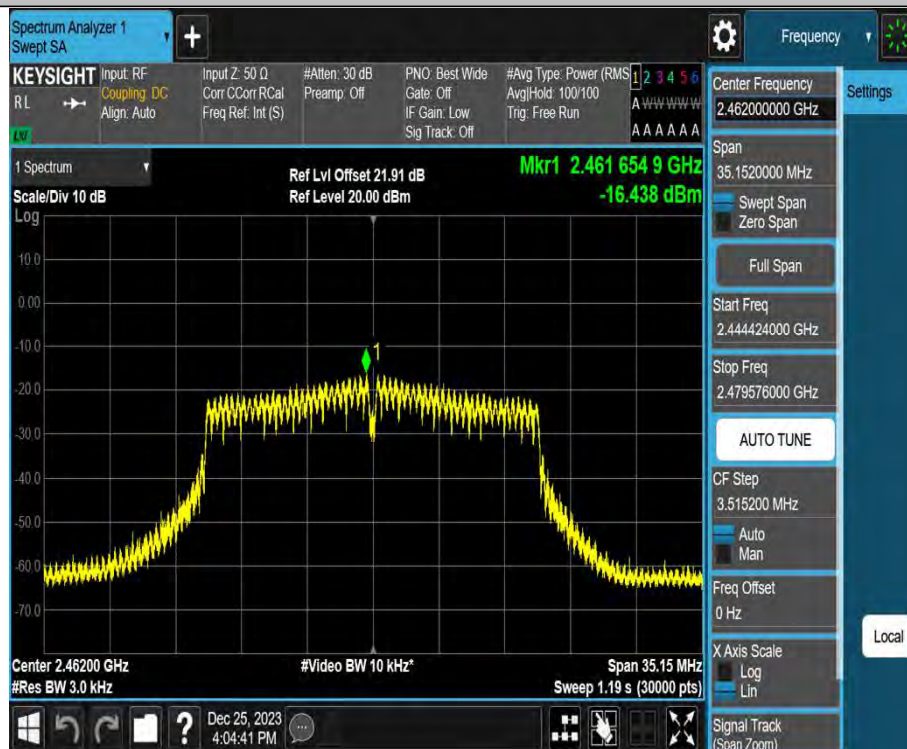
11N20MIMO_Ant2_2437



11N20MIMO_Ant1_2462



11N20MIMO_Ant2_2462



11N40MIMO_Ant1_2422



11N40MIMO_Ant2_2422



11N40MIMO_Ant1_2437



11N40MIMO_Ant2_2437



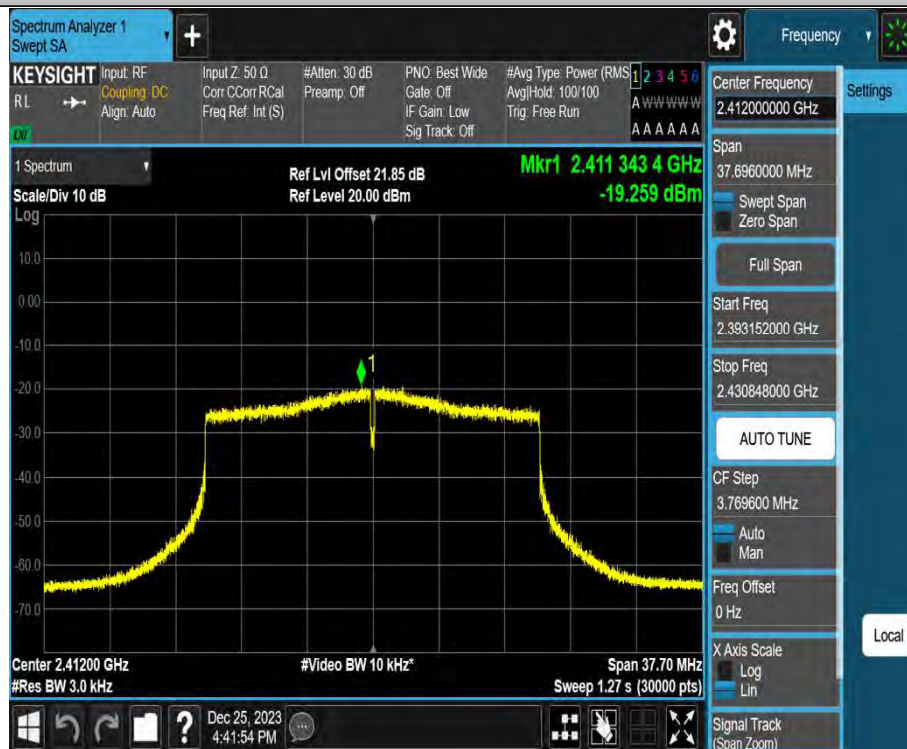
11N40MIMO_Ant1_2452



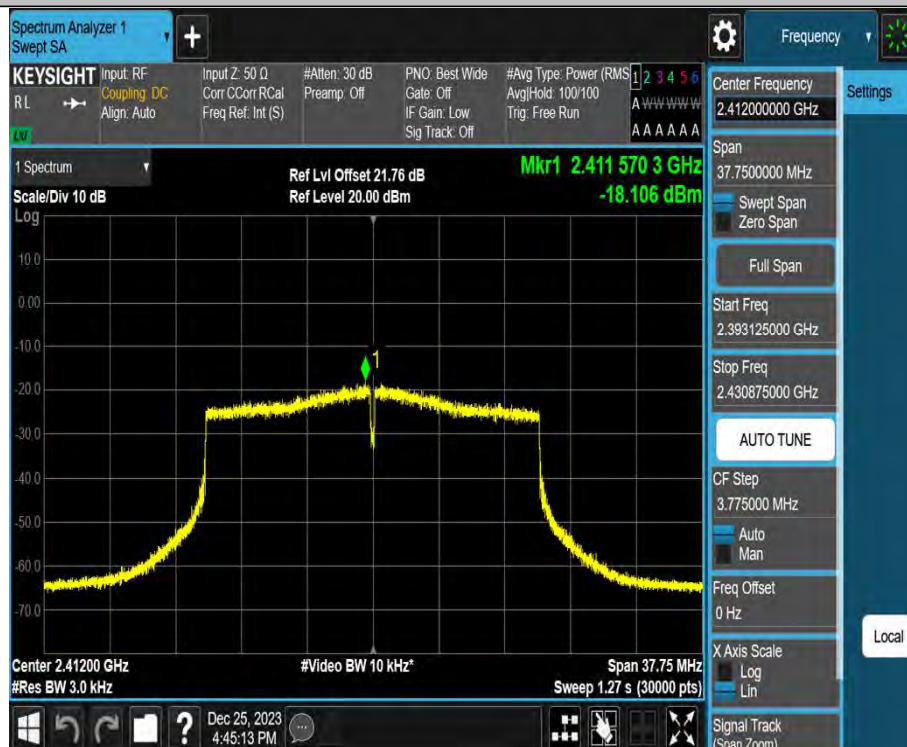
11N40MIMO_Ant2_2452



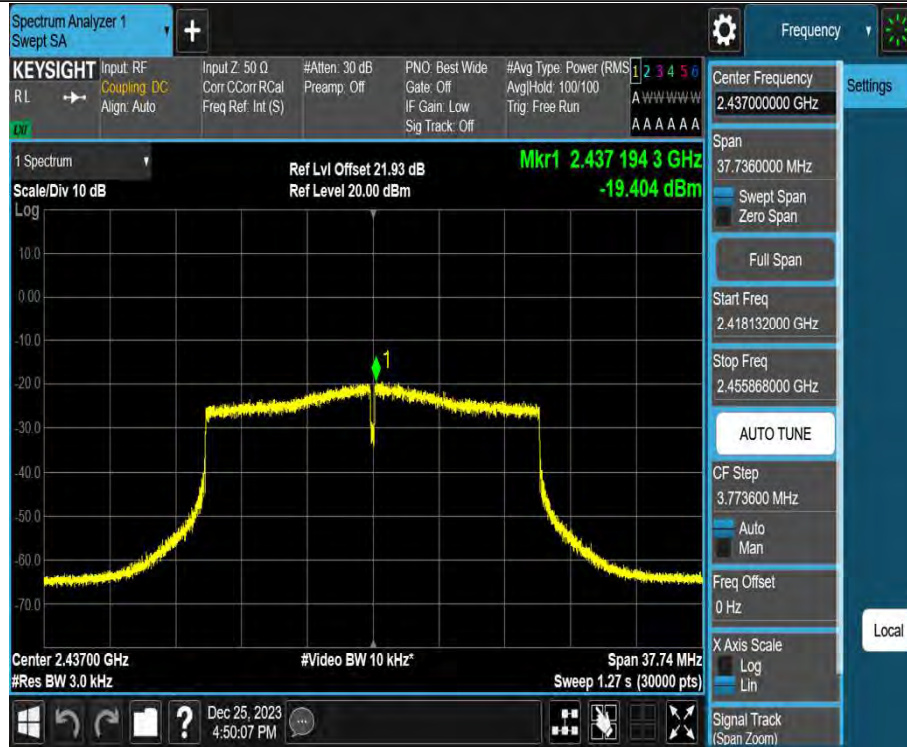
11AX20MIMO_Ant1_2412



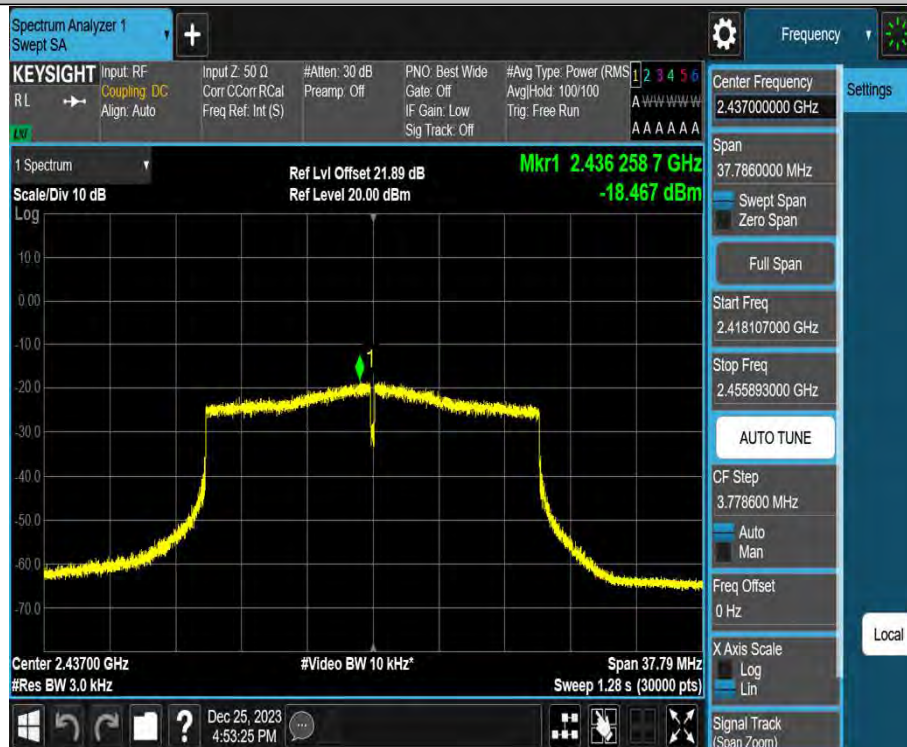
11AX20MIMO_Ant2_2412



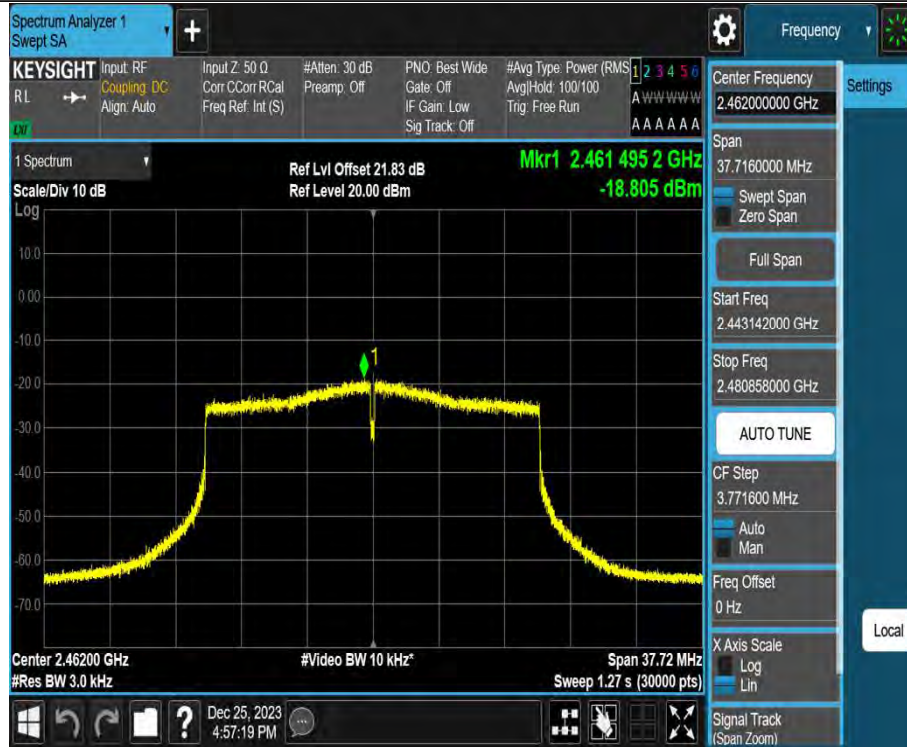
11AX20MIMO_Ant1_2437



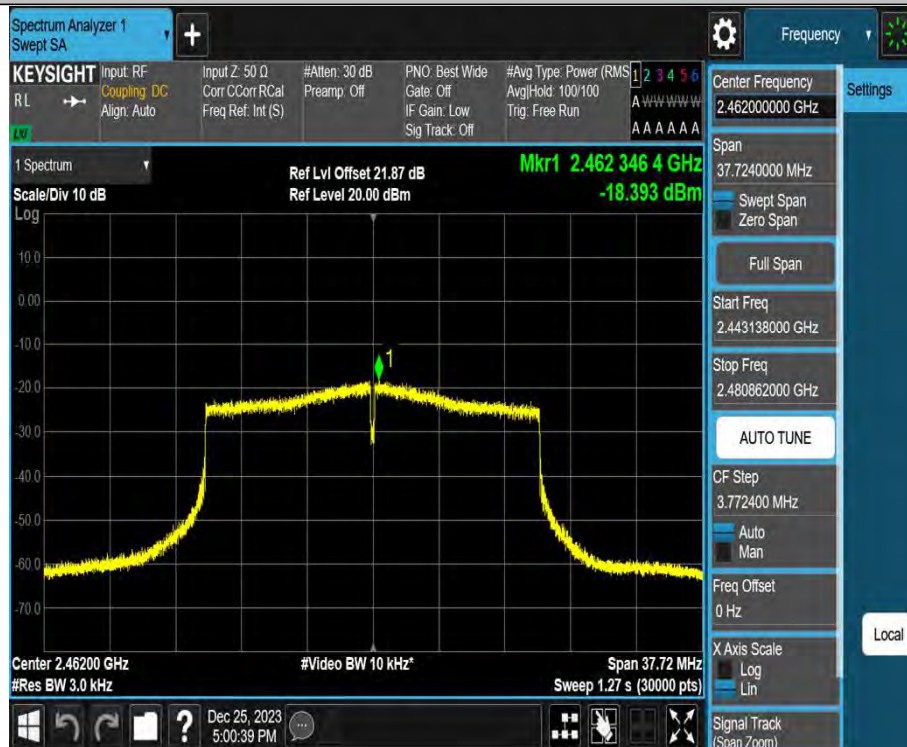
11AX20MIMO_Ant2_2437



11AX20MIMO_Ant1_2462



11AX20MIMO_Ant2_2462



11AX40MIMO_Ant1_2422



11AX40MIMO Ant2 2422



11AX40MIMO_Ant1_2437



11AX40MIMO_Ant2_2437



11AX40MIMO_Ant1_2452



11AX40MIMO_Ant2_2452



Statement

1. The report is invalid without the official seal or special seal of Shenzhen Haiyun Standard Technology Co., Ltd. (hereinafter referred to as the unit).
2. The report is invalid without the signature of the approver.
3. The report is invalid if altered arbitrarily.
4. The report shall not be partially copied without the written approval of the unit.
5. The reported test results are only valid for the tested samples.
6. If there is any objection to the test report, it shall be submitted to the test unit within 15 days from the date of receiving the report, and the overdue shall not be accepted.

Shenzhen Haiyun Standard Technology Co., Ltd.

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Tel: 0755-26024411

Email: service@hy-lab.cn

End of Test Report