

FCC AND ISCED CERTIFICATION TEST REPORT

Applicant:	Guangzhou Shikun Electronics Co., Ltd
Address:	NO.6 Liankun Road, Huangpu District, Guangzhou, China
Manufacturer:	Guangzhou Shikun Electronics Co., Ltd
Address:	NO.6 Liankun Road, Huangpu District, Guangzhou, China
Product Description:	IEEE 802.11a/b/g/n/ac 2T2R Wi-Fi Module Integrated BT 2.1/3.0/4.2/5.0
Brand Name:	N/A
Tested Model:	SKI.WB822CU.5
FCC ID:	2AR82-SKIWB822CU5
Report No.:	JCF231222208-003
Received Date:	Dec. 22, 2023
Tested Date:	Dec. 22, 2023 - Jan. 20, 2024
Issued Date:	Jan. 23, 2024
Test Standards:	FCC Rules and Regulations Part 15 Subpart C, RSS-247 Issue 3 August 2023
Test Procedure:	ANSI C63.10:2013, RSS-Gen Issue 5 A2, Feb. 2021
Test Result:	Pass

Prepared By:  <u>Kennys Zhang/Engineer</u>	Date: Jan. 23, 2024
Reviewed By:  <u>Roger Li/Engineer</u>	Date: Jan. 23, 2024
Approved By:  <u>Talent Zhang/Engineer</u>	Date: Jan. 23, 2024

Note: The test results in this report apply exclusively to the tested model / sample. Without written approval of Guangzhou Jingce Testing Technology Co., Ltd. the test report shall not be reproduced except in full.

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jan. 23, 2024	Original Report	/

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1. Test Report Declare

Applicant:	Guangzhou Shikun Electronics Co., Ltd
Address:	NO.6 Liankun Road, Huangpu District, Guangzhou, China
Manufacturer:	Guangzhou Shikun Electronics Co., Ltd
Address:	NO.6 Liankun Road, Huangpu District, Guangzhou, China
Product Name:	IEEE 802.11a/b/g/n/ac 2T2R Wi-Fi Module Integrated BT 2.1/3.0/4.2/5.0
Brand Name:	N/A
Model Name:	SKI.WB822CU.5

We Declare:

The equipment described above is tested by Guangzhou Jingce Testing Technology Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Guangzhou Jingce Testing Technology Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests except as provided information by clients.

2. Summary of Test Results

Summary of Test Results			
Clause	Test Items	FCC/ISED Rules	Test Results
1	6dB Bandwidth and 99 % Occupied Bandwidth	FCC Part 15.247 (a) (2) RSS-247 Clause 5.2 (a) ISED RSS-Gen Clause 6.7	Pass
2	Peak Conducted Output Power	FCC Part 15.247 (b) (3) RSS-247 Clause 5.4 (d)	Pass
3	Power Spectral Density	FCC Part 15.247 (e) RSS-247 Clause 5.2 (b)	Pass
4	Conducted Bandedge and Spurious Emission	FCC Part 15.247 (d) RSS-247 Clause 5.5	Pass
5	Radiated Bandedge and Spurious Emission	FCC Part 15.247 (d) FCC Part 15.209 FCC Part 15.205 RSS-247 Clause 5.5 RSS-GEN Clause 8.9	Pass
6	Conducted Emission Test For AC Power Port	FCC Part 15.207 RSS-GEN Clause 8.8	Pass
7	Antenna Requirement	FCC Part 15.203 RSS-GEN Clause 6.8	Pass

3. Test Laboratory

Guangzhou Jingce Testing Technology Co., Ltd.

Add.: No.192, Kezhu Road, Huangpu District, Guangzhou, Guangdong, China

Association for Laboratory Accreditation(A2LA). Certificate Number: 6594.01

FCC Designation Number: CN1331. Test Firm Registration Number: 360543

IC Test Firm Registration Number: 28796

Conformity Assessment Body identifier: CN0138

4. Equipment Under Test

4.1. Description of EUT

EUT Name:	IEEE 802.11a/b/g/n/ac 2T2R Wi-Fi Module Integrated BT 2.1/3.0/4.2/5.0
Model Number:	SKI.WB822CU.5
EUT Function Description:	Refer to user manual
Power Supply:	DC 3.3V±0.3
Hardware Version:	N/A
Software Version:	N/A
Radio Specification:	IEEE802.11b/g/n
Operation Frequency:	IEEE 802.11b: 2412MHz—2462MHz IEEE 802.11g: 2412MHz—2462MHz IEEE 802.11n HT20: 2412MHz—2462MHz IEEE 802.11n HT40: 2422MHz—2452MHz
Modulation:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n (HT20/40): OFDM (64QAM, 16QAM, QPSK, BPSK)
Data Rate:	IEEE 802.11b: 1, 2, 5.5, 11 Mbps IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps IEEE 802.11n HT20: 14.4, 28.9, 43.3, 57.8, 86.7, 115.6, 130.0, 144.4Mbps IEEE 802.11n HT40: 30.0, 60.0, 90.0, 120.0, 180.0, 240.0, 270.0, 300.0 Mbps
Antenna Type:	PCB Antenna0, MAX. Gain: 3.99 dBi PCB Antenna1, MAX. Gain: 3.42 dBi

Note 1: EUT is the ab. of equipment under test.

Note 2: The antenna gain is declared by the customer and the laboratory is not responsible for the accuracy of the antenna gain.

4.2. Channel List

Channel List for 802.11b/g/n (20 MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	4	2427	7	2442	10	2457
2	2417	5	2432	8	2447	11	2462
3	2422	6	2437	9	2452	/	/

Channel List for 802.11n (40 MHz)					
Channel	Frequency (MHz)	Channel	Frequency(MHz)	Channel	Frequency (MHz)
3	2422	6	2437	9	2452
4	2427	7	2442	/	/
5	2432	8	2447	/	/

4.3. Test Channel Configuration

Tested mode, channel and rand data rate information			
Mode	Data rate (Mbps) (see Note)	Channel	Frequency (MHz)
802.11b	1	Low: CH1	2412
	1	Middle: CH6	2437
	1	High: CH11	2462
802.11g	6	Low: CH1	2412
	6	Middle: CH6	2437
	6	High: CH11	2462
802.11n HT20	MCS 8	Low: CH1	2412
	MCS 8	Middle: CH6	2437
	MCS 8	High: CH11	2462
802.11n HT40	MCS 8	Low: CH3	2422
	MCS 8	Middle: CH6	2437
	MCS 8	High: CH9	2452

Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.

4.4. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-25 °C
Humidity range:	40-75%
Pressure range:	86-106 kPa

4.5. Description of Available Antennas

The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band				
Test Software		MPTool		
Modulation Mode	Transmit Antenna Number	Test Software Setting Value		
		Channel	ANT0	ANT1
802.11b	2	CH1	Default	Default
		CH6	Default	Default
		CH11	Default	Default
802.11g	2	CH1	Default	Default
		CH6	Default	Default
		CH11	Default	Default
802.11HT20	2	CH1	Default	Default
		CH6	Default	Default
		CH11	Default	Default
802.11n HT40	2	CH3	Default	Default
		CH6	Default	Default
		CH9	Default	Default

4.6. Description of Available Antennas

Test Mode	Transmit and Receive Mode	Description
802.11b	☒ 2TX, 2RX	ANT 0 and ANT1 can be used as transmitting/receiving antenna.
802.11g	☒ 2TX, 2RX	ANT 0 and ANT1 can be used as transmitting/receiving antenna.
802.11n HT20	☒ 2TX, 2RX	ANT 0 and ANT1 can be used as transmitting/receiving antenna.
802.11n HT40	☒ 2TX, 2RX	ANT 0 and ANT1 can be used as transmitting/receiving antenna.
Note: 1. Only 802.11n HT20/HT40 support MIMO mode 2. WLAN 2.4 GHz & WLAN 5G can't transmit simultaneously. (declared by client)		

5. Description of Test Setup

5.1. Accessory

Description of Accessories	Manufacturer	Model Number	Description	Remark
/	/	/	/	/

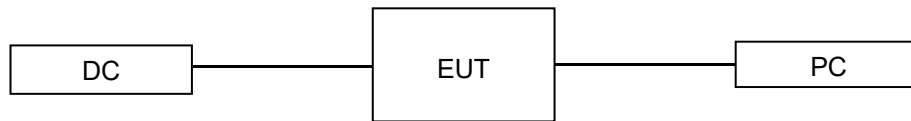
5.2. Support Equipment

Equipment	Brand Name	Model Name	P/N
PC	Lenovo	T480	/

5.3. Test Setup

The EUT can work in Fixed Frequency mode.

5.4. Setup Diagram for Tests



6. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
AC Power Conduction emission	1.37 dB
All Radiated emissions	5.4dB
Conducted emissions	3.09 dB
Occupied Channel Bandwidth	1.1%
Conducted Output power	0.82dB
Power Spectral Density	0.82dB

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of $k = 2$.

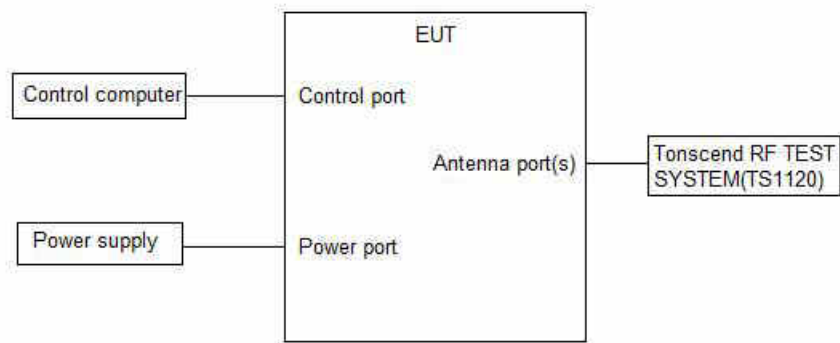
7. Measuring Instrument and Software Used

TS Test System						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
☒	Spectrum Analyzer	Keysight	N9030B	MY56320512	Sep. 12, 2023	Sep. 11, 2024
☒	Vector Signal Generator	Keysight	N5182B	MY57300334	Sep. 12, 2023	Sep. 11, 2024
☒	Signal Generator	Keysight	N5171B	MY57280639	Sep. 12, 2023	Sep. 11, 2024
☒	DC POWER	Keysight	E342A	MY59020356	Jul. 14, 2023	Jul. 13, 2024
☒	Incubator thermometer	GWS	EL-02JA	21107288	Sep. 12, 2023	Sep. 11, 2024
☒	Control unit(Power sensor)	Tonscend	JS0806-2	/	Sep. 12, 2023	Sep. 11, 2024
☒	Wideband radio communication tester	R&S	CMW500	163478	Jul. 11, 2023	Jul. 10, 2024
☒	Spectrum Analyzer	Keysight	N9020B	MY60112206	Sep. 12, 2023	Sep. 12, 2024
☒	Control unit(Power sensor)	Tonscend	JS0806-2	21H8060465	Sep. 12, 2023	Sep. 12, 2024
Software						
Used	Description	Manufacturer	Name		Version	
☒	Test software	Tonscend	JS1120-3		V3.3.10	
RSE Test System						

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
☒	EMI Receiver	R&S	ESW	101685	Jul. 12, 2023	Jul. 11, 2024
☒	Bilog Antenna	Schwarzbeck	VULB 9163	01416	Mar. 21, 2023	Mar. 20, 2024
☒	Horn Antenna 1	Schwarzbeck	BBHA 9120 D	02411	May. 25, 2023	May. 24, 2024
☒	Horn Antenna 2	ETS	BBHA 9170	1090	Sep. 04, 2023	Sep. 03, 2024
☒	loop-antenna	Schwarzbeck	FMZB 1513-60	00030	Jan. 14, 2024	Jan. 13, 2025
☒	Signal Pre-Amplifier	Tonscend	TAP01018050	AP21C806122	Jul. 10, 2023	Jul. 09, 2024
☒	Signal Pre-Amplifier	Tonscend	TAP9K3G32	AP20K806104	Jul. 10, 2023	Jul. 09, 2024
☒	Signal Pre-Amplifier	ETS	3116C-PA	00217677	Aug. 24, 2023	Aug. 23, 2024
☒	3m Fully-anechoic Chamber	ETS	RFD-100	/	Apr. 24, 2021	Apr. 23, 2024
Software						
Used	Description	Manufacturer	Name		Version	
☒	Test software	Tonscend	TS+		V3.0.0.4	
Conducted Emission Test For AC Power Port						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
☒	LISN	R&S	ENV216	102154	Jul. 10, 2023	Jul. 09, 2024
☒	EMI Receiver	R&S	ESR3	102509	Jul. 12, 2023	Jul. 11, 2024
Software						
Used	Description	Manufacturer	Name		Version	
☒	Test software	EZ	EZ-EMC		EMEC-3A1	
Other Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
☒	Temperature & Humidity	Temperature	HTC-1	/	Nov. 02, 2023	Nov. 01, 2024

8. On Time and Duty Cycle

8.1. Block diagram of test setup



8.2. Limits

None; for reporting purposes only

8.3. Procedure

KDB 558074 Zero-Span Spectrum Analyzer Method

8.4. Results

Test Mode	Ant.	Freq. (MHz)	Transmission Duration (ms)	Transmission Period (ms)	Duty Cycle (%)
11B	Ant1	2412	8.20	8.70	94.25
	Ant2	2412	8.20	8.70	94.25
	Ant1	2437	8.20	8.70	94.25
	Ant2	2437	8.19	8.69	94.25
	Ant1	2462	8.19	8.68	94.35
	Ant2	2462	8.19	8.70	94.14
11G	Ant1	2412	1.36	1.86	73.12
	Ant2	2412	1.36	1.86	73.12
	Ant1	2437	1.36	1.87	72.73
	Ant2	2437	1.36	1.87	72.73
	Ant1	2462	1.36	1.87	72.73
	Ant2	2462	1.36	1.87	72.73
11N20MIMO	Ant1	2412	1.27	1.77	71.75
	Ant2	2412	1.27	1.77	71.75
	Ant1	2437	1.27	1.77	71.75
	Ant2	2437	1.27	1.77	71.75
	Ant1	2462	1.27	1.77	71.75
	Ant2	2462	1.27	1.77	71.75
11N40MIMO	Ant1	2422	0.63	1.14	55.26
	Ant2	2422	0.63	1.14	55.26
	Ant1	2437	0.63	1.13	55.75
	Ant2	2437	0.63	1.14	55.26
	Ant1	2452	0.63	1.13	55.75
	Ant2	2452	0.63	1.13	55.75

Note: Duty Cycle Correction Factor = $10\log(1/x)$.

Where: x is Duty Cycle (Linear)

Where: T is On Time

If that calculated VBW is not available on the analyzer, then the next higher value should be used.

For mode 11b, the duty cycle is greater than 98 %, so it can set VBW to 10 Hz.

8.5. Original test data





11B_Ant1_2462



11B_Ant2_2462



11G_Ant1_2412



11G_Ant2_2412



11G_Ant1_2437



11G_Ant2_2437









9. 6 dB DTS Bandwidth and 99 % Occupied Bandwidth

9.1. Block diagram of test setup

Same as section 8.1

9.2. Limits

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 3			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(a)(2) ISED RSS-247 5.2 (a)	6 dB Bandwidth	≥ 500 kHz	2400-2483.5
ISED RSS-Gen Clause 6.7	99 % Occupied Bandwidth	For reporting purposes only.	2400-2483.5

9.3. Test Procedure

Connect the UUT to the spectrum analyzer and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	For 6 dB Bandwidth :100 kHz For 99 % Occupied Bandwidth :1 % to 5 % of the occupied bandwidth
VBW	For 6 dB Bandwidth: $\geq 3 \times$ RBW For 99 % Occupied Bandwidth : $\geq 3 \times$ RBW
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB and 99 % relative to the maximum level measured in the fundamental emission.

9.4. Results

6dB bandwidth:

Test Mode	Ant.	Freq. (MHz)	DTS BW (MHz)	FL (MHz)	FH (MHz)	Limit (MHz)	Verdict
11B	Ant1	2412	10.080	2406.920	2417.000	0.5	PASS
	Ant2	2412	9.880	2406.960	2416.840	0.5	PASS
	Ant1	2437	9.840	2431.960	2441.800	0.5	PASS
	Ant2	2437	8.920	2432.920	2441.840	0.5	PASS
	Ant1	2462	9.120	2457.720	2466.840	0.5	PASS
	Ant2	2462	9.880	2457.120	2467.000	0.5	PASS
11G	Ant1	2412	16.000	2403.800	2419.800	0.5	PASS
	Ant2	2412	15.320	2404.800	2420.120	0.5	PASS
	Ant1	2437	15.920	2428.840	2444.760	0.5	PASS
	Ant2	2437	16.360	2428.800	2445.160	0.5	PASS
	Ant1	2462	16.280	2453.880	2470.160	0.5	PASS
	Ant2	2462	16.360	2453.800	2470.160	0.5	PASS
11N20MIMO	Ant1	2412	17.600	2403.160	2420.760	0.5	PASS
	Ant2	2412	17.520	2403.240	2420.760	0.5	PASS
	Ant1	2437	16.920	2428.840	2445.760	0.5	PASS
	Ant2	2437	17.600	2428.160	2445.760	0.5	PASS
	Ant1	2462	17.560	2453.200	2470.760	0.5	PASS
	Ant2	2462	17.280	2453.480	2470.760	0.5	PASS
11N40MIMO	Ant1	2422	27.520	2409.440	2436.960	0.5	PASS
	Ant2	2422	27.520	2409.440	2436.960	0.5	PASS
	Ant1	2437	35.040	2419.480	2454.520	0.5	PASS
	Ant2	2437	34.400	2418.840	2453.240	0.5	PASS
	Ant1	2452	32.400	2436.080	2468.480	0.5	PASS
	Ant2	2452	21.600	2439.440	2461.040	0.5	PASS

99 % bandwidth:

Test Mode	Ant.	Channel Freq. (MHz)	OCB (MHz)	FL (MHz)	FH (MHz)	Limit (MHz)	Verdict
11B	Ant1	2412	14.834	2404.5567	2419.3907	---	---
	Ant2	2412	14.563	2404.6508	2419.2138	---	---
	Ant1	2437	14.826	2429.6100	2444.4360	---	---
	Ant2	2437	14.591	2429.7067	2444.2977	---	---
	Ant1	2462	14.790	2454.5270	2469.3170	---	---
	Ant2	2462	14.653	2454.6003	2469.2533	---	---
11G	Ant1	2412	16.523	2403.7511	2420.2741	---	---
	Ant2	2412	16.471	2403.7505	2420.2215	---	---
	Ant1	2437	16.460	2428.7521	2445.2121	---	---
	Ant2	2437	16.406	2428.7467	2445.1527	---	---
	Ant1	2462	16.473	2453.7283	2470.2013	---	---
	Ant2	2462	16.535	2453.7113	2470.2463	---	---
11N20MIMO	Ant1	2412	17.678	2403.0814	2420.7594	---	---
	Ant2	2412	17.639	2403.1307	2420.7697	---	---
	Ant1	2437	17.707	2428.1478	2445.8548	---	---
	Ant2	2437	17.569	2428.1558	2445.7248	---	---
	Ant1	2462	17.712	2453.0925	2470.8045	---	---
	Ant2	2462	17.643	2453.1298	2470.7728	---	---
11N40MIMO	Ant1	2422	35.990	2404.1443	2440.1343	---	---
	Ant2	2422	35.993	2403.9361	2439.9291	---	---
	Ant1	2437	36.051	2419.0404	2455.0914	---	---
	Ant2	2437	36.290	2418.6864	2454.9764	---	---
	Ant1	2452	36.089	2433.8840	2469.9730	---	---
	Ant2	2452	36.161	2433.7274	2469.8884	---	---

9.5. Original test data

6dB bandwidth:







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



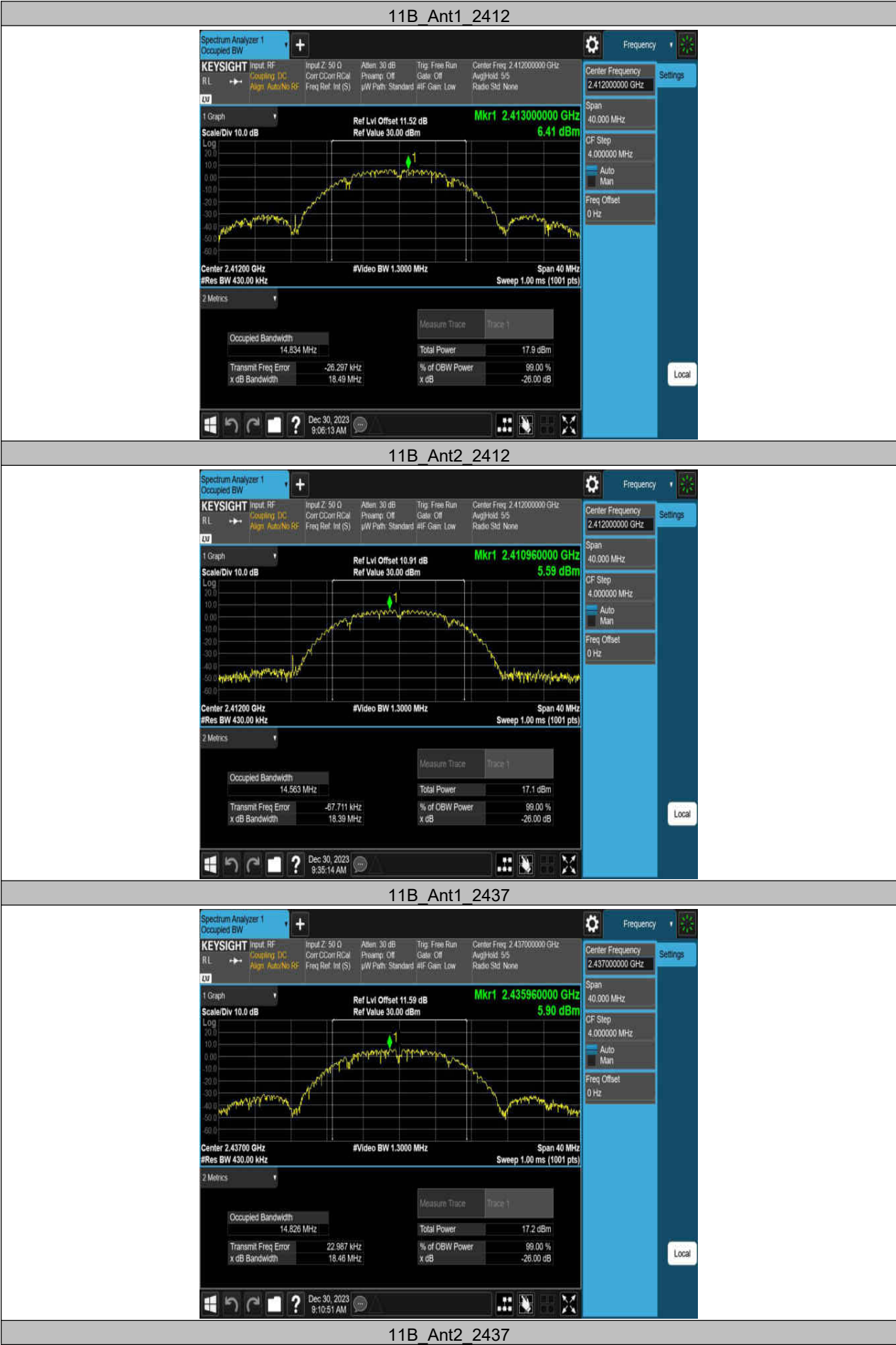
11N40MIMO_Ant1_2437



11N40MIMO_Ant2_2437



99 % bandwidth:





11B_Ant1_2462



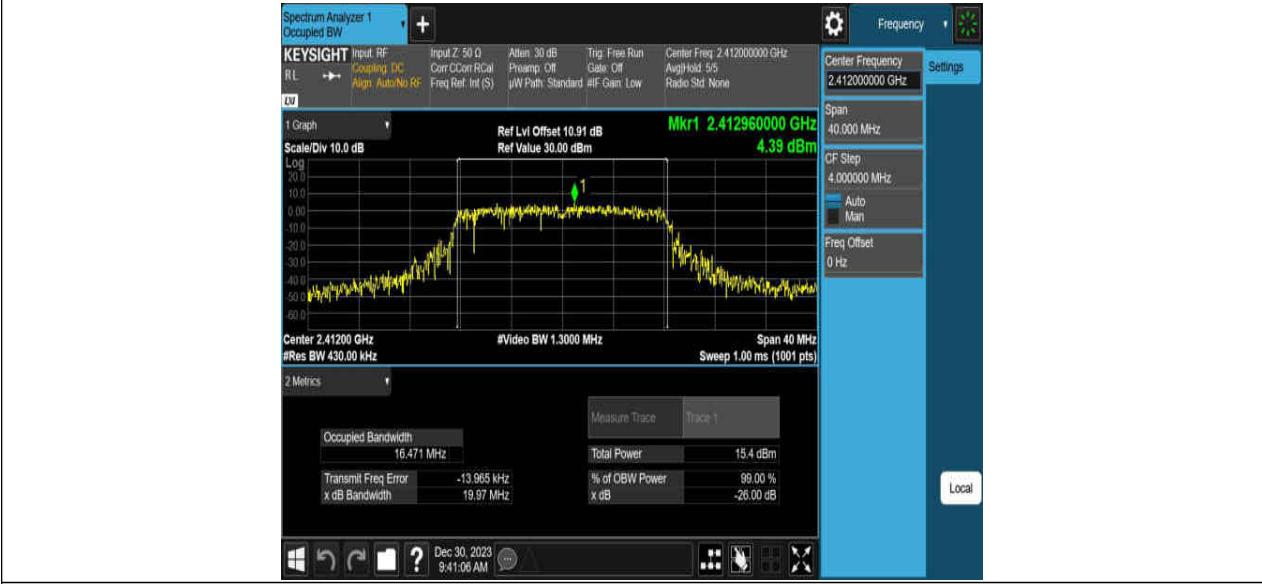
11B_Ant2_2462



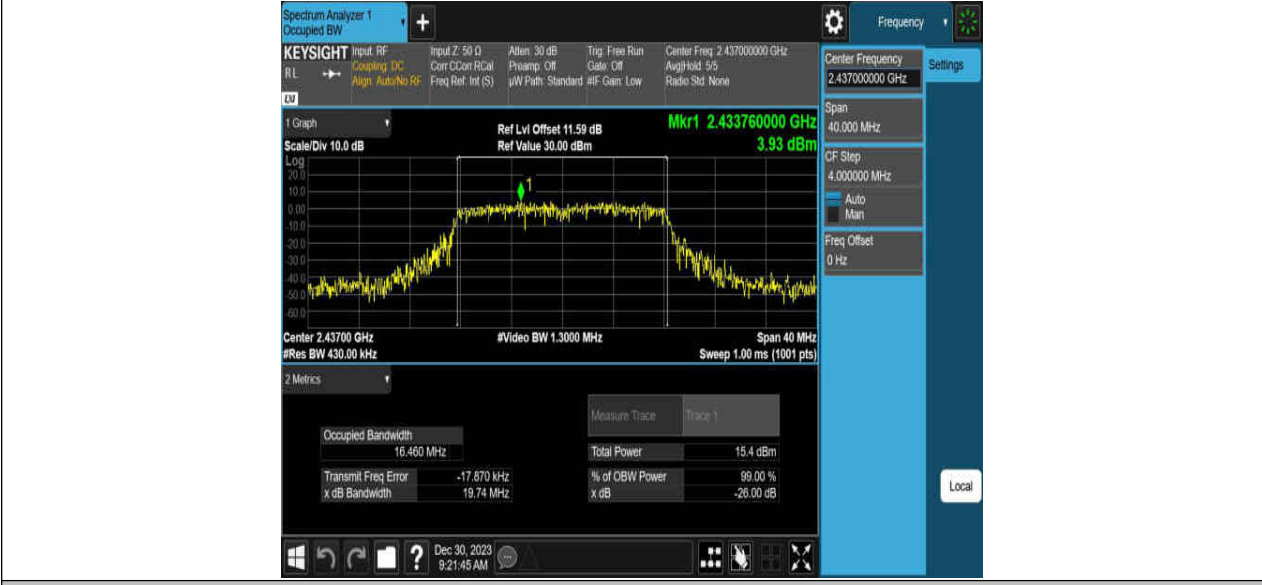
11G_Ant1_2412



11G_Ant2_2412



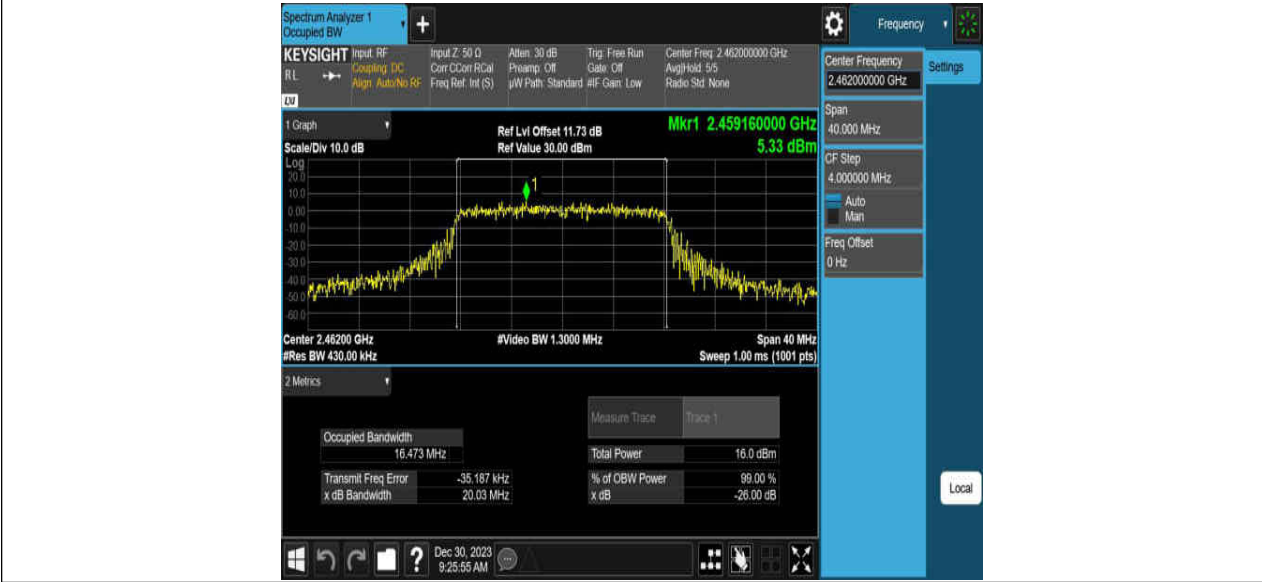
11G_Ant1_2437



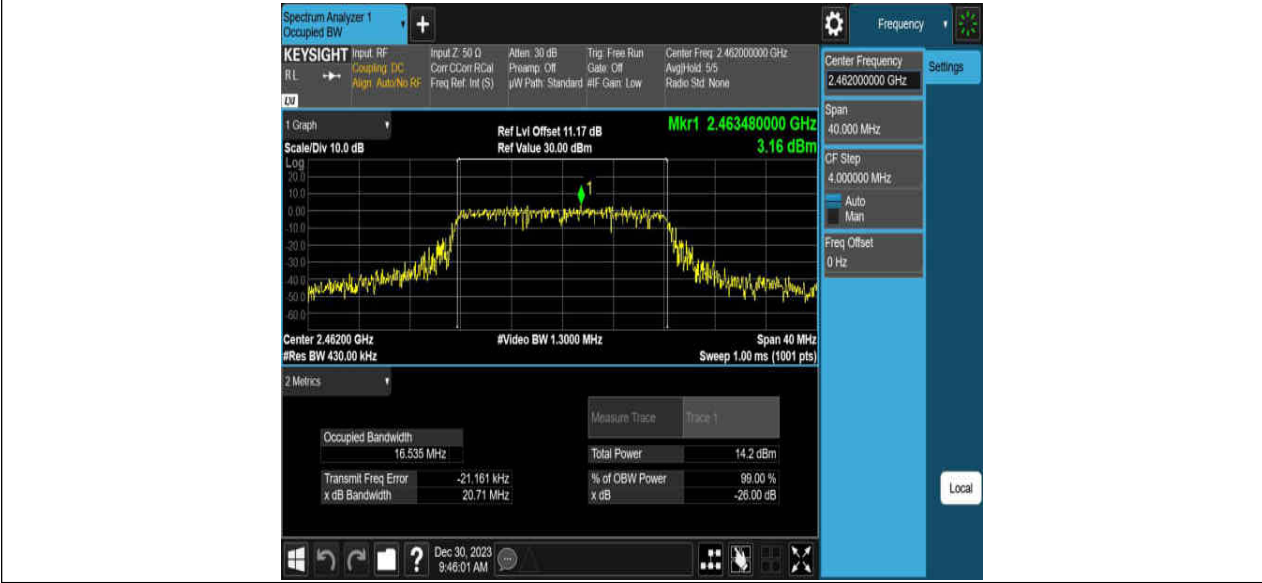
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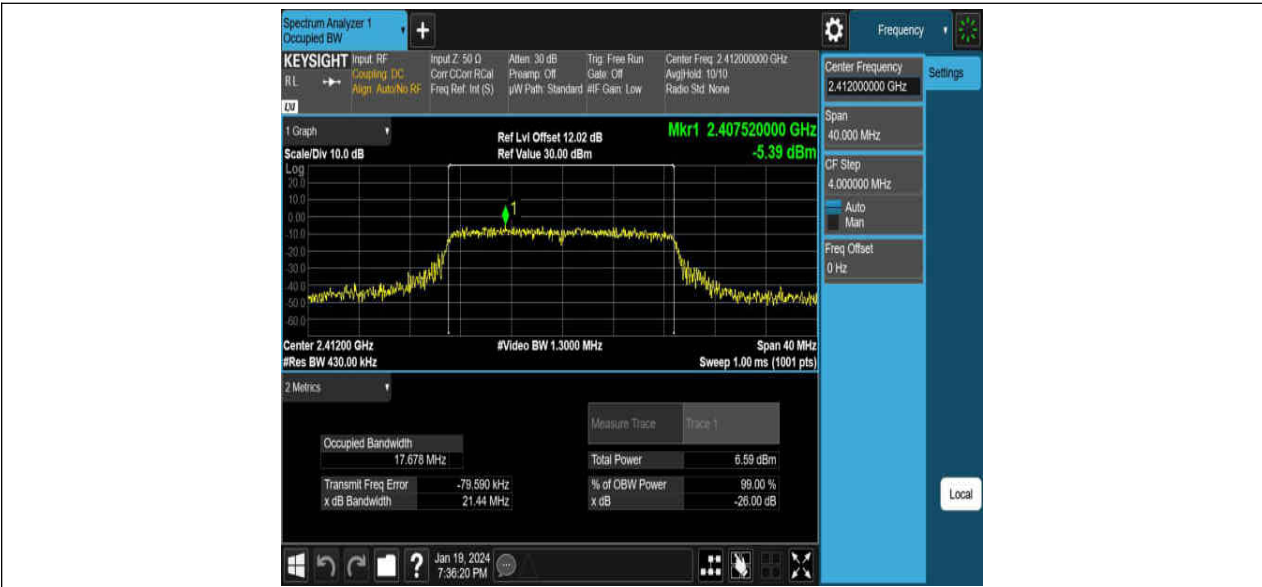
11G_Ant1_2462



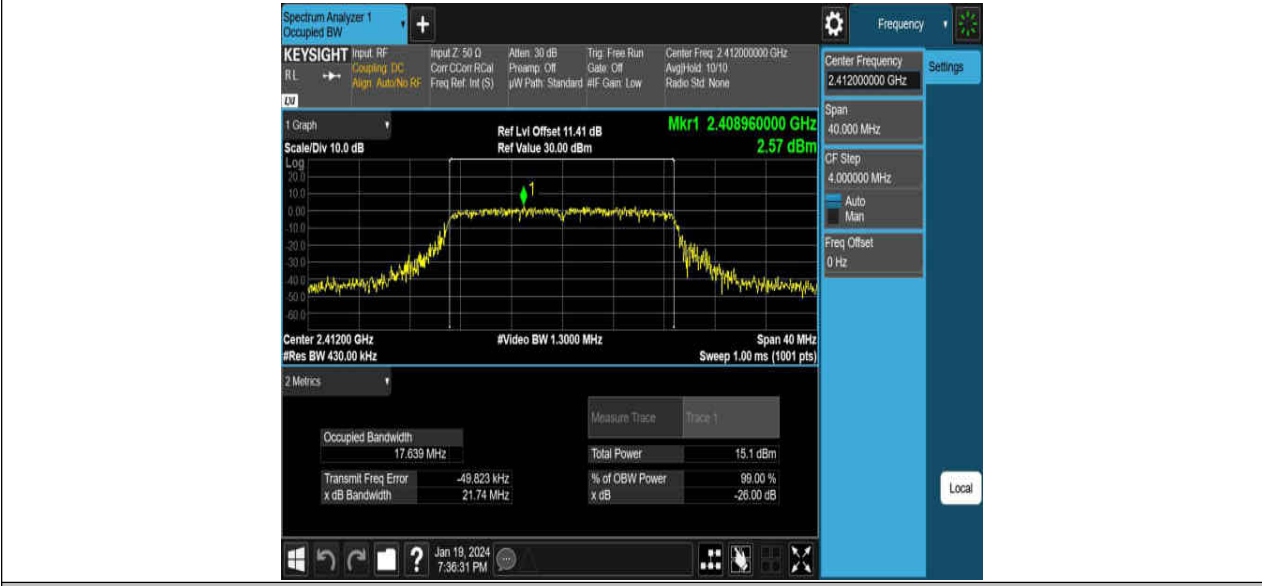
11G_Ant2_2462



11N20MIMO_Ant1_2412



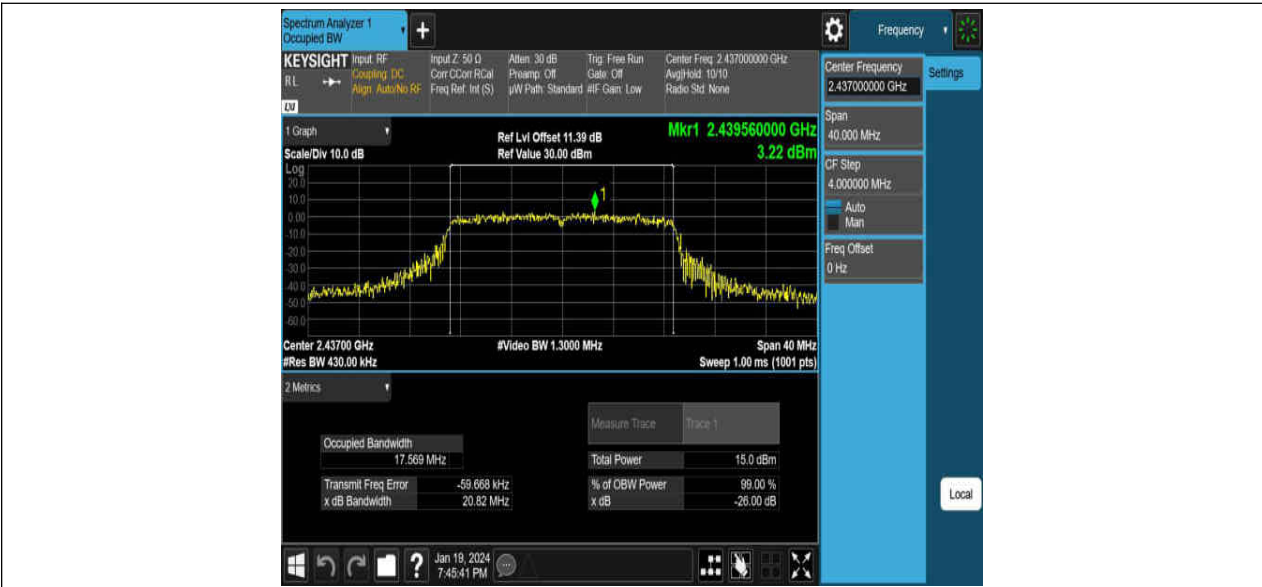
11N20MIMO_Ant2_2412



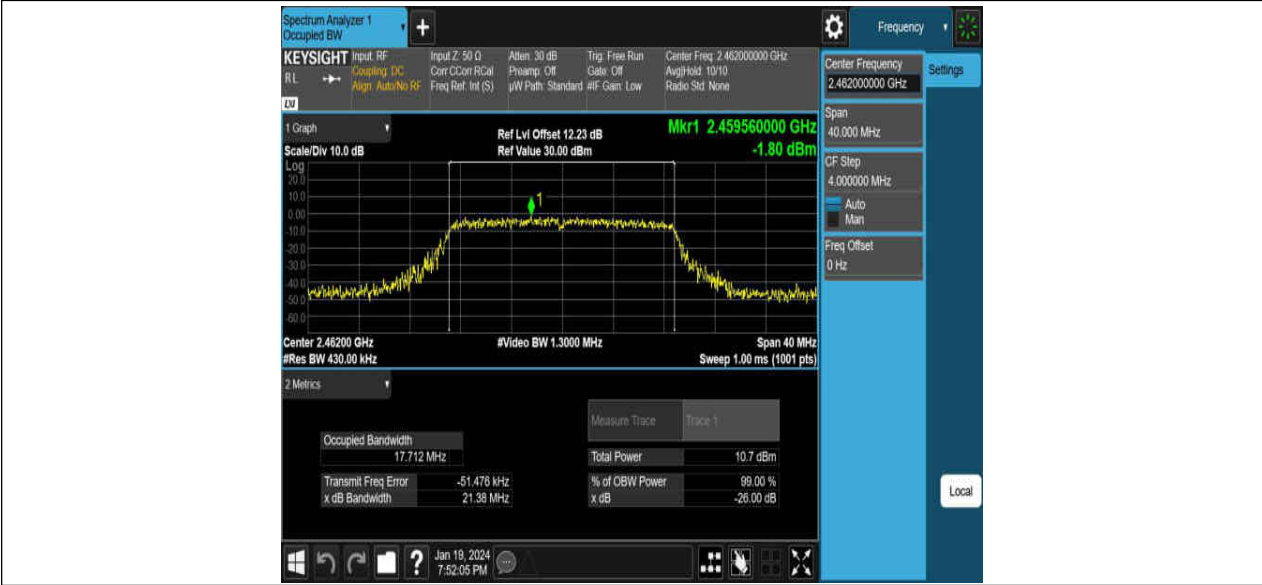
11N20MIMO_Ant1_2437



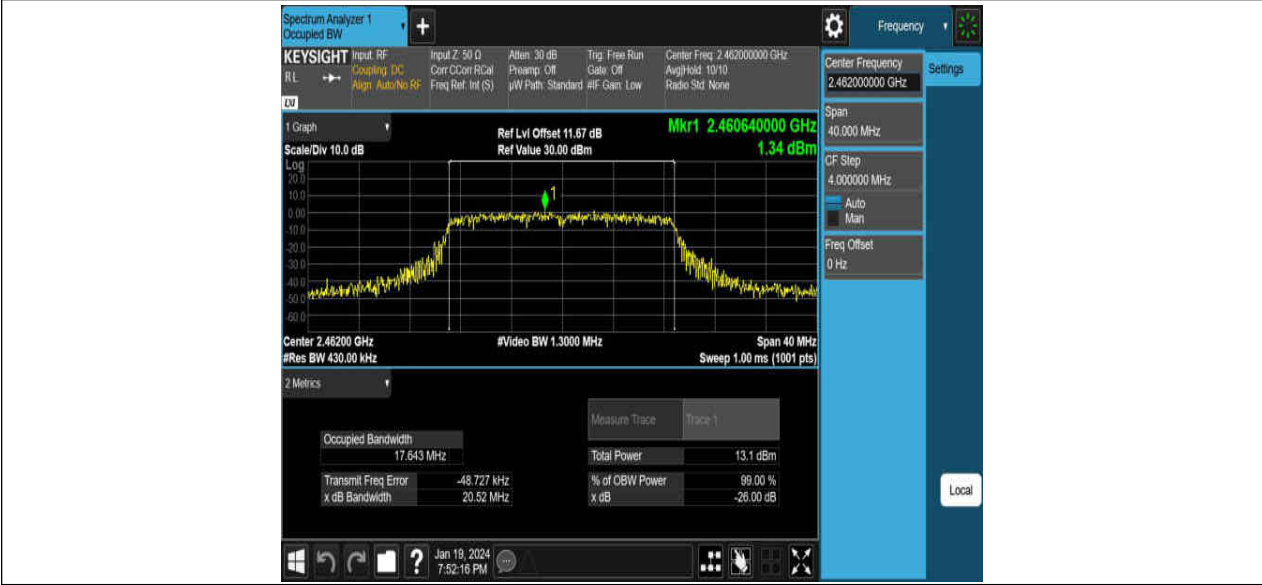
11N20MIMO_Ant2_2437



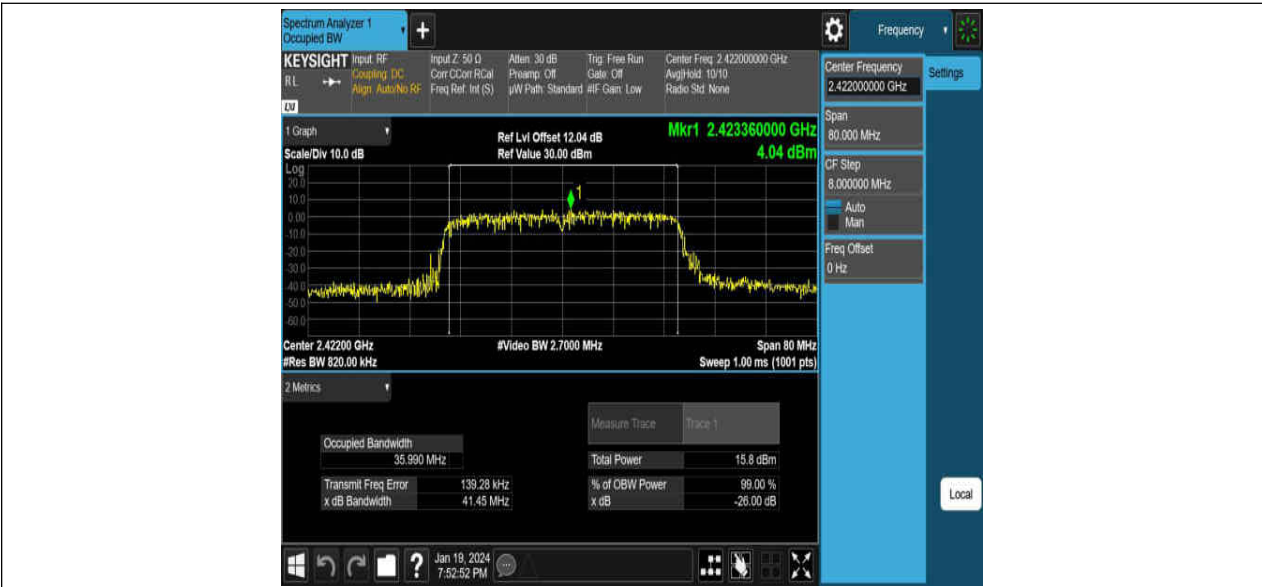
11N20MIMO_Ant1_2462



11N20MIMO_Ant2_2462



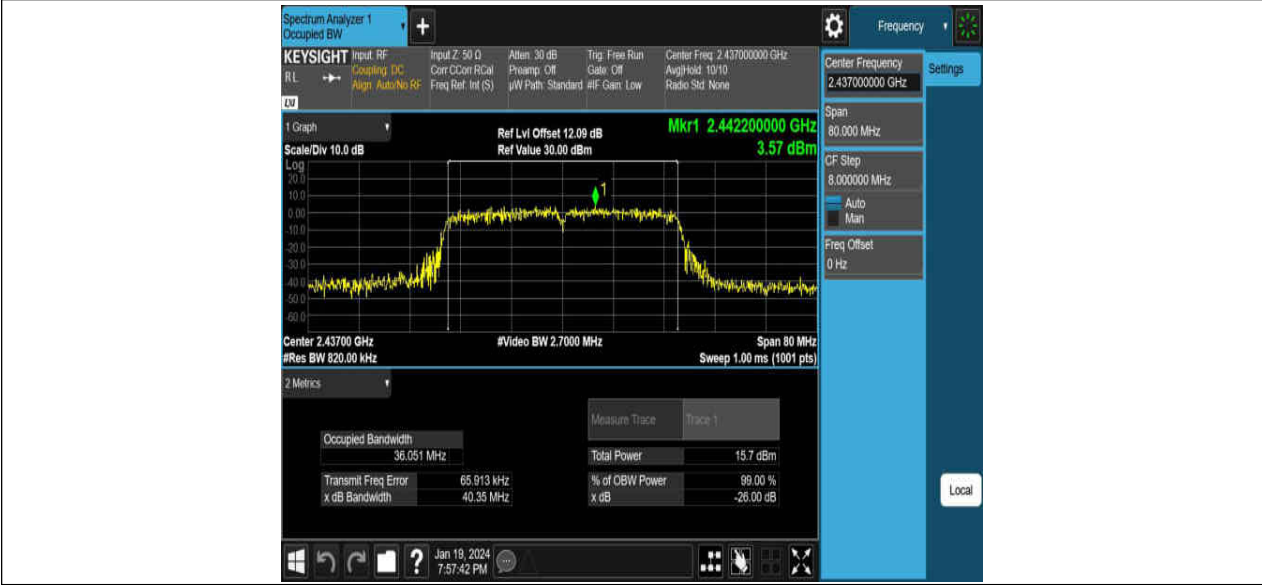
11N40MIMO_Ant1_2422



11N40MIMO_Ant2_2422



11N40MIMO_Ant1_2437



11N40MIMO_Ant2_2437



11N40MIMO_Ant1_2452



11N40MIMO_Ant2_2452



10. Conducted Output Power

10.1. Block diagram of test setup

Same as section 8.1

10.2. Limits

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 3			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(b)(3) ISED RSS-247 5.4 (d)	Peak Output Power	1 watt or 30 dBm	2400-2483.5

10.3. Test Procedure

Place the EUT on the table and set it in the transmitting mode.

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.

Measure peak power each channel.

Peak Detector use for Peak result.

AVG Detector use for AVG result.

10.4. Results

Test Mode	Ant.	Freq. (MHz)	Peak Power (dBm)	Conducted Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)	Verdict
11B	Ant1	2412	18.05	≤30.00	22.04	≤36.00	PASS
	Ant2	2412	18.14	≤30.00	21.56	≤36.00	PASS
	Ant1	2437	17.55	≤30.00	21.54	≤36.00	PASS
	Ant2	2437	16.52	≤30.00	19.94	≤36.00	PASS
	Ant1	2462	17.80	≤30.00	21.79	≤36.00	PASS
	Ant2	2462	16.30	≤30.00	19.72	≤36.00	PASS
11G	Ant1	2412	18.94	≤30.00	22.93	≤36.00	PASS
	Ant2	2412	17.06	≤30.00	20.48	≤36.00	PASS
	Ant1	2437	17.30	≤30.00	21.29	≤36.00	PASS
	Ant2	2437	16.97	≤30.00	20.39	≤36.00	PASS
	Ant1	2462	16.24	≤30.00	20.23	≤36.00	PASS
	Ant2	2462	17.02	≤30.00	20.44	≤36.00	PASS
11N20MIMO	Ant1	2412	17.29	≤30.00	21.28	≤36.00	PASS
	Ant2	2412	15.68	≤30.00	19.10	≤36.00	PASS
	total	2412	19.57	≤30.00	23.56	≤36.00	PASS
	Ant1	2437	13.81	≤30.00	17.80	≤36.00	PASS
	Ant2	2437	14.29	≤30.00	17.71	≤36.00	PASS
	total	2437	17.07	≤30.00	21.06	≤36.00	PASS
	Ant1	2462	15.67	≤30.00	19.66	≤36.00	PASS
	Ant2	2462	13.93	≤30.00	17.35	≤36.00	PASS
11N40MIMO	total	2462	17.90	≤30.00	21.89	≤36.00	PASS
	Ant1	2422	15.69	≤30.00	19.68	≤36.00	PASS
	Ant2	2422	15.11	≤30.00	18.53	≤36.00	PASS
	total	2422	18.42	≤30.00	22.41	≤36.00	PASS
	Ant1	2437	15.87	≤30.00	19.86	≤36.00	PASS
	Ant2	2437	14.60	≤30.00	18.02	≤36.00	PASS
	total	2437	18.29	≤30.00	22.28	≤36.00	PASS
	Ant1	2452	15.44	≤30.00	19.43	≤36.00	PASS

	Ant2	2452	14.07	≤30.00	17.49	≤36.00	PASS
	total	2452	17.82	≤30.00	21.81	≤36.00	PASS

11. Power Spectral Density

11.1. Block diagram of test setup

Same as section 8.1

11.2. Limits

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 3			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC §15.247 (e) ISED RSS-247 5.2 (b)	Power Spectral Density	8 dBm/3 kHz	2400-2483.5

11.3. Test Procedure

Connect the UUT to the spectrum analyzer and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW	$\geq 3 \times \text{RBW}$
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

11.4. Results

Test Mode	Ant.	Freq. (MHz)	Result (dBm/3-100kHz)	Limit (dBm/3kHz)	Verdict
11B	Ant1	2412	-9.96	≤ 8.00	PASS
	Ant2	2412	-9.49	≤ 8.00	PASS
	Ant1	2437	-8.87	≤ 8.00	PASS
	Ant2	2437	-9.79	≤ 8.00	PASS
	Ant1	2462	-8.93	≤ 8.00	PASS
	Ant2	2462	-10.09	≤ 8.00	PASS
11G	Ant1	2412	-11.70	≤ 8.00	PASS
	Ant2	2412	-13.29	≤ 8.00	PASS
	Ant1	2437	-13.19	≤ 8.00	PASS
	Ant2	2437	-13.47	≤ 8.00	PASS
	Ant1	2462	-13.10	≤ 8.00	PASS
	Ant2	2462	-14.06	≤ 8.00	PASS
11N20MIMO	Ant1	2412	-13.15	≤ 8.00	PASS
	Ant2	2412	-17.92	≤ 8.00	PASS
	total	2412	-11.90	≤ 8.00	PASS
	Ant1	2437	-16.63	≤ 8.00	PASS
	Ant2	2437	-16.36	≤ 8.00	PASS
	total	2437	-13.48	≤ 8.00	PASS
	Ant1	2462	-15.32	≤ 8.00	PASS
	Ant2	2462	-15.91	≤ 8.00	PASS
	total	2462	-12.59	≤ 8.00	PASS
11N40MIMO	Ant1	2422	-17.45	≤ 8.00	PASS

	Ant2	2422	-17.19	≤8.00	PASS
	total	2422	-14.31	≤8.00	PASS
	Ant1	2437	-17.56	≤8.00	PASS
	Ant2	2437	-17.29	≤8.00	PASS
	total	2437	-14.41	≤8.00	PASS
	Ant1	2452	-17.20	≤8.00	PASS
	Ant2	2452	-17.49	≤8.00	PASS
	total	2452	-14.33	≤8.00	PASS

11.5. Original test data





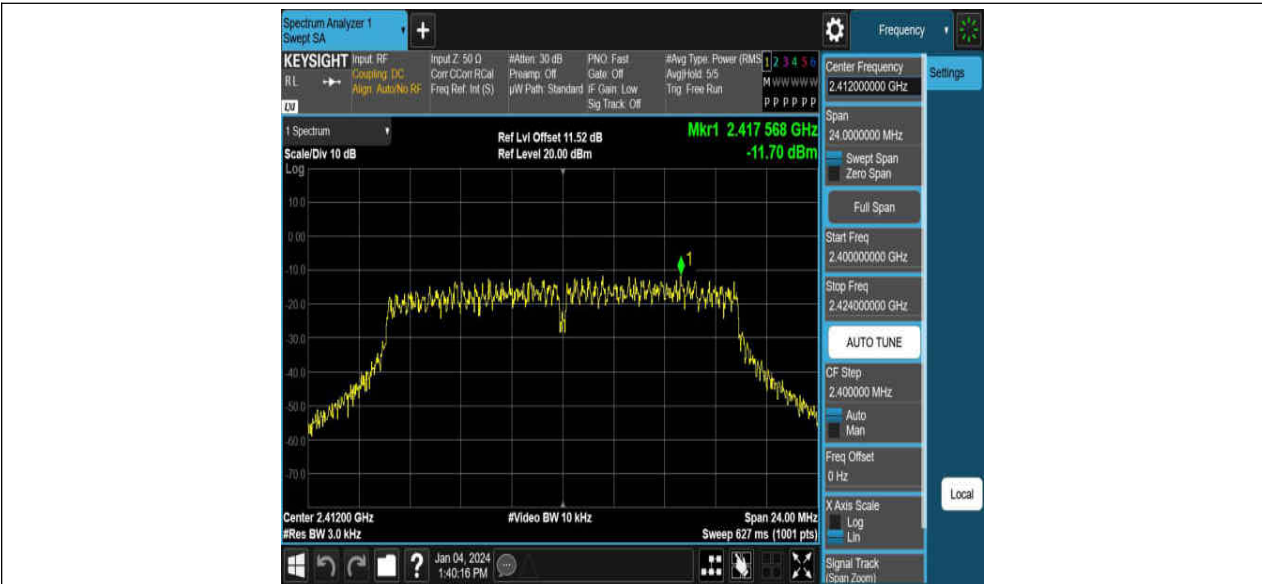
11B_Ant1_2462



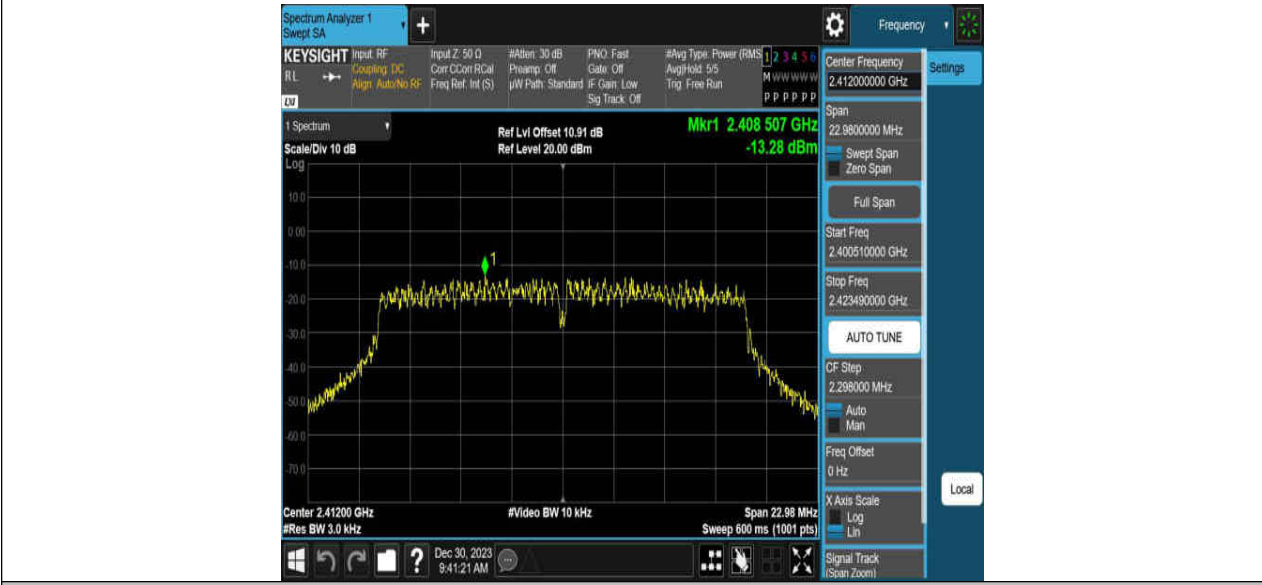
11B_Ant2_2462



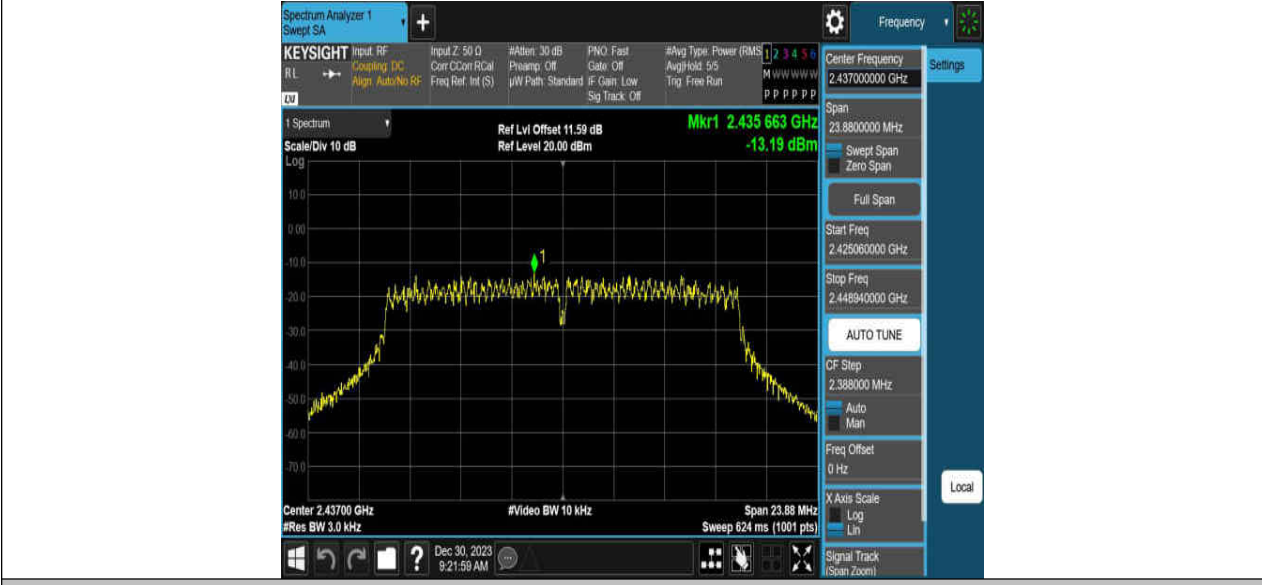
11G_Ant1_2412



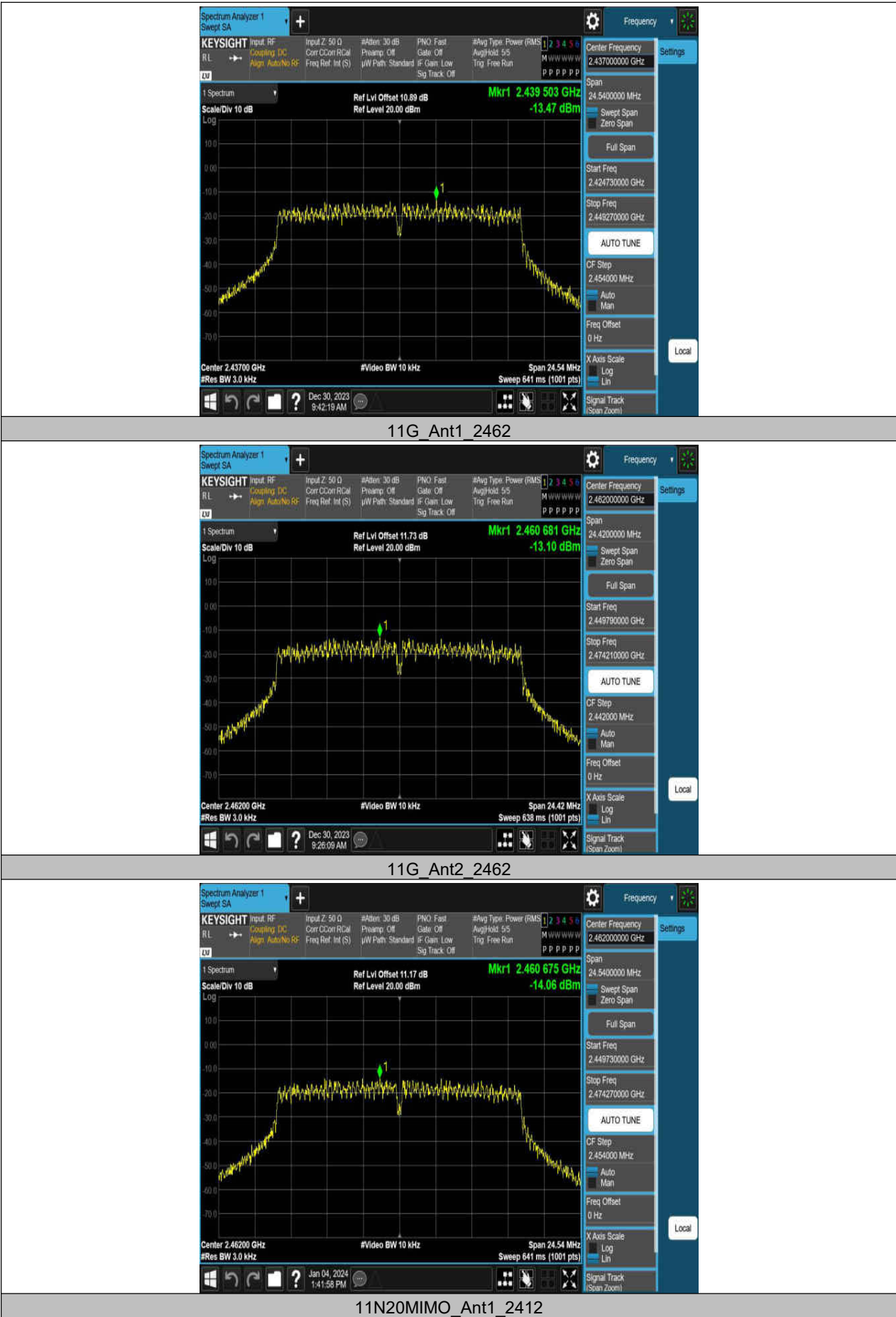
11G_Ant2_2412

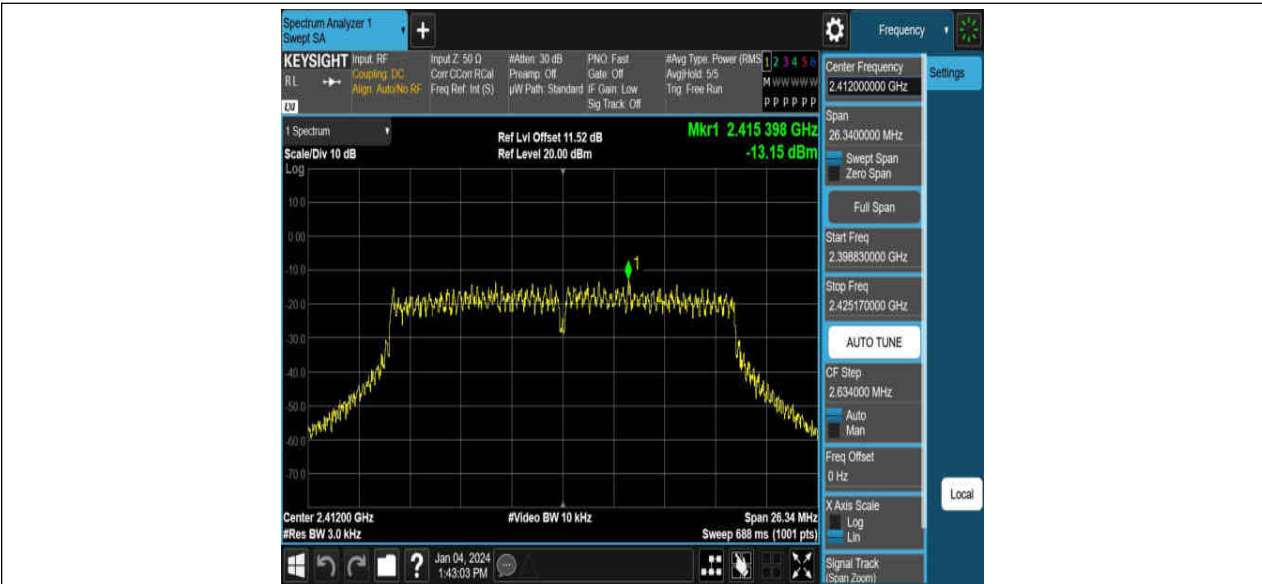


11G_Ant1_2437

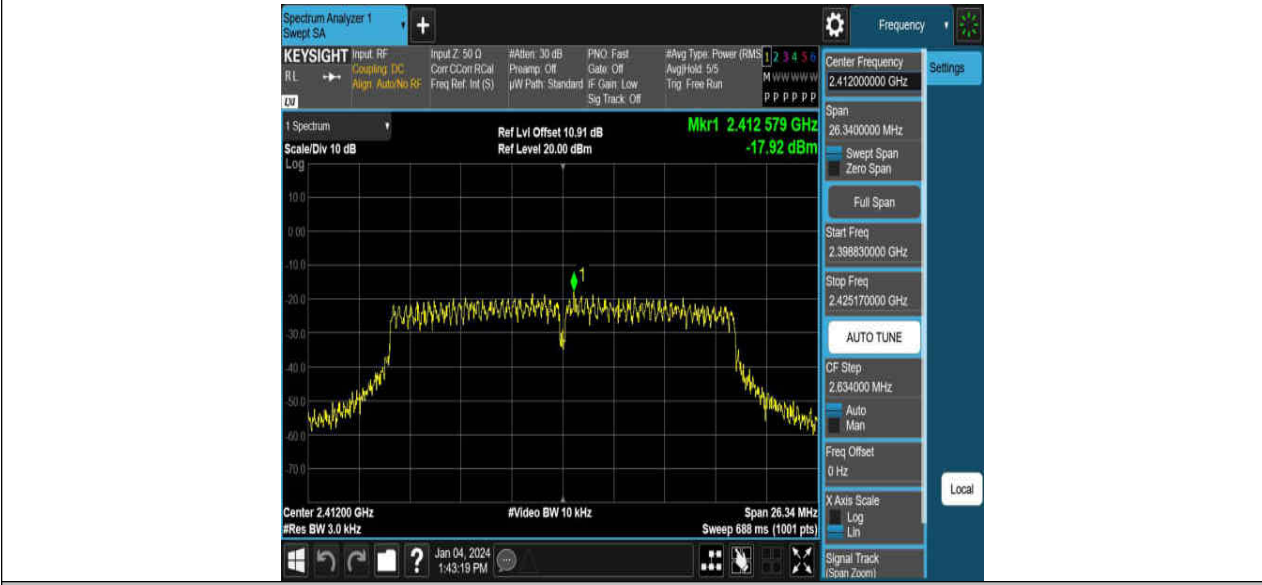


11G_Ant2_2437

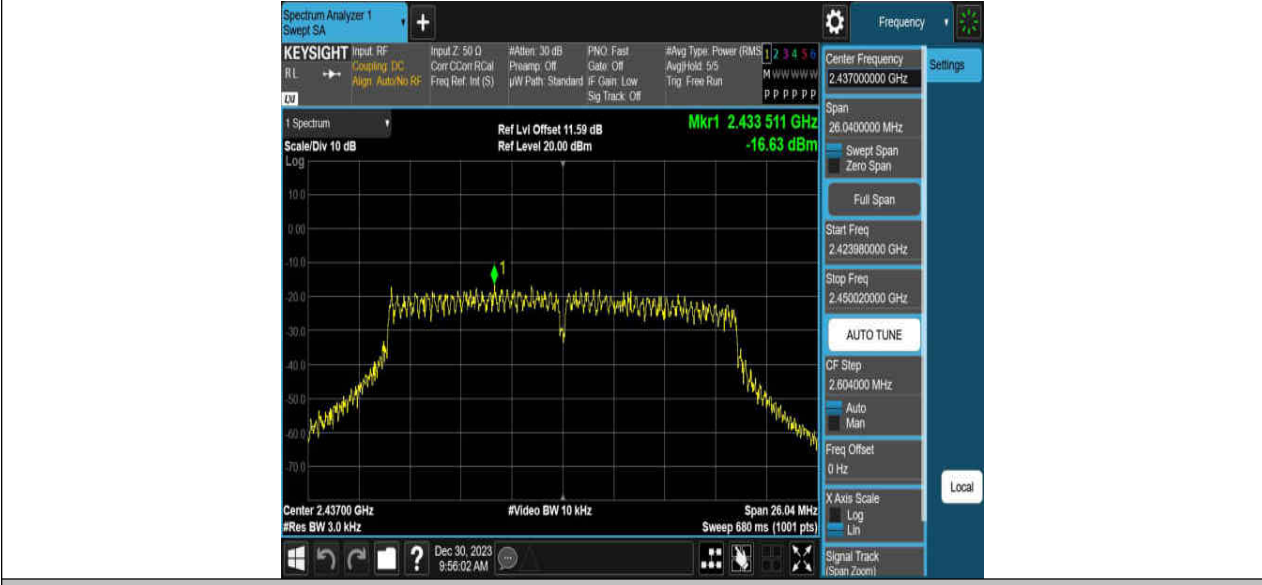




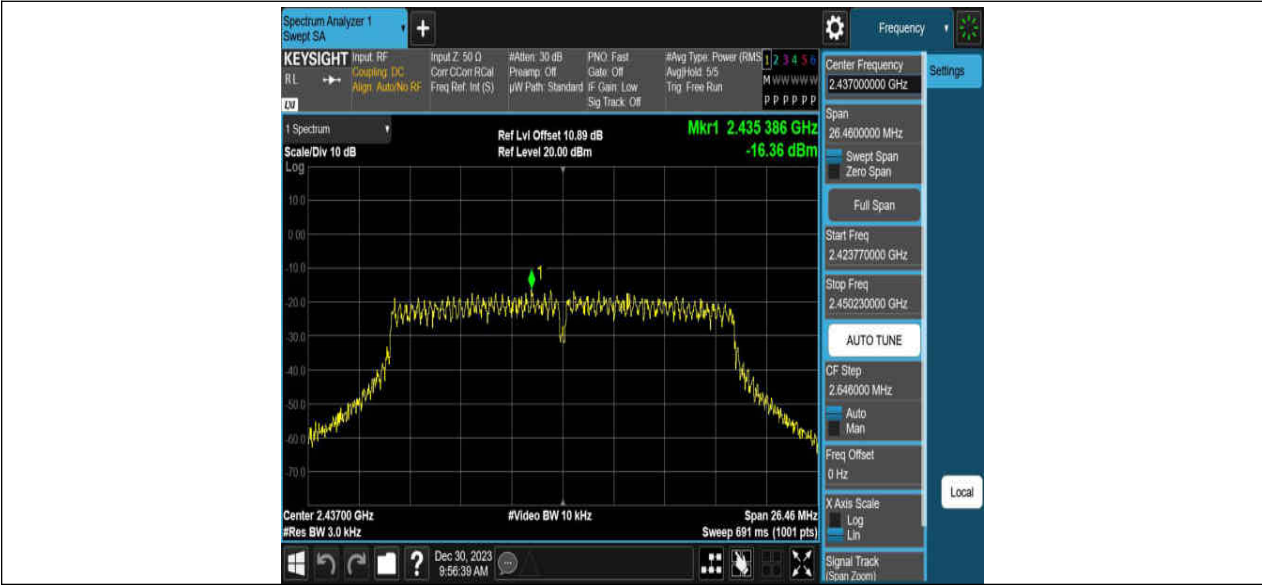
11N20MIMO_Ant2_2412



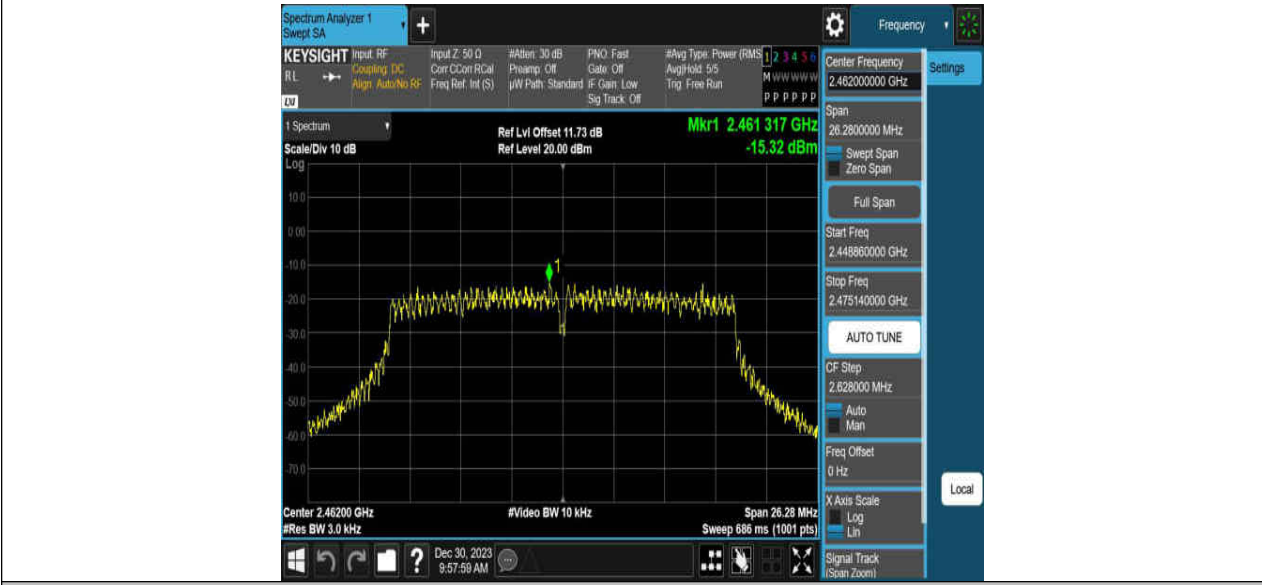
11N20MIMO_Ant1_2437



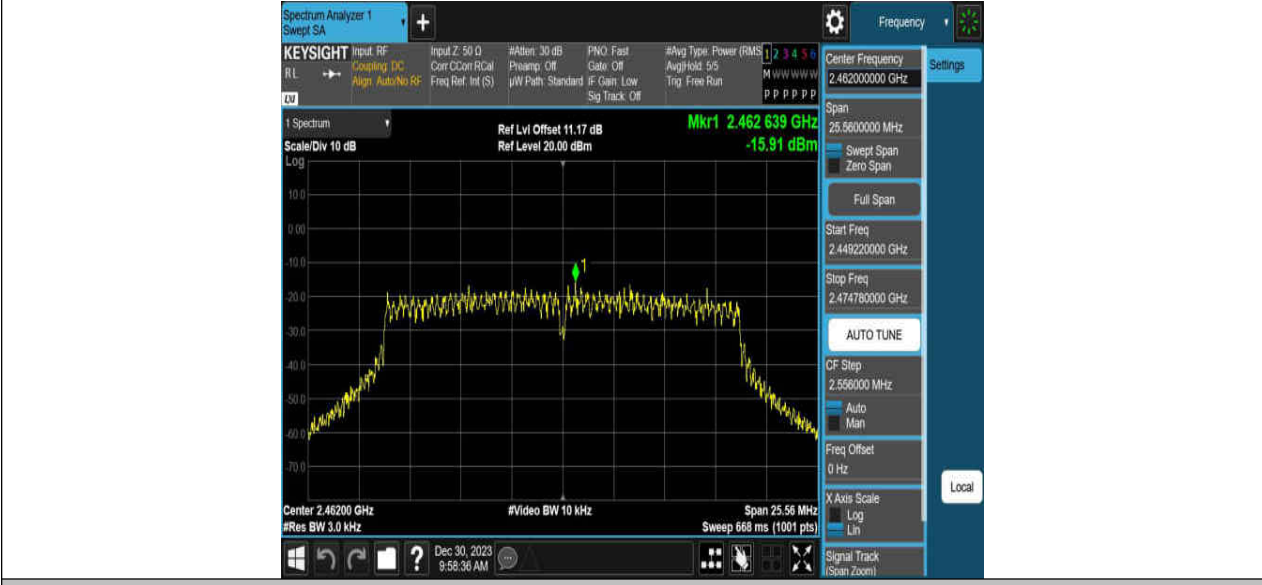
11N20MIMO_Ant2_2437



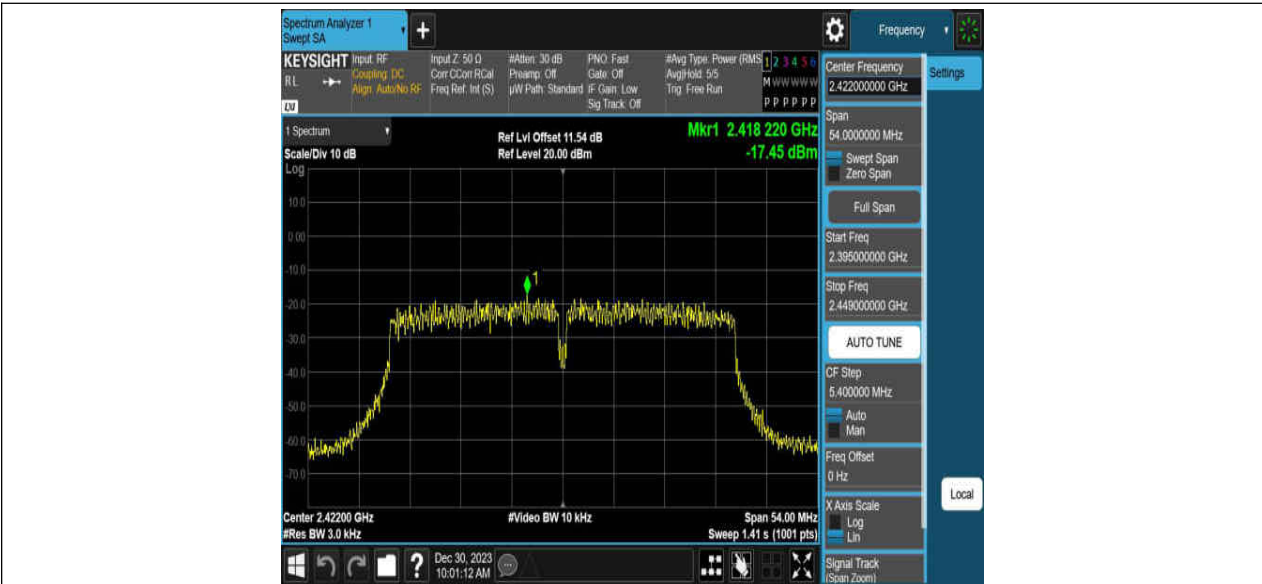
11N20MIMO_Ant1_2462



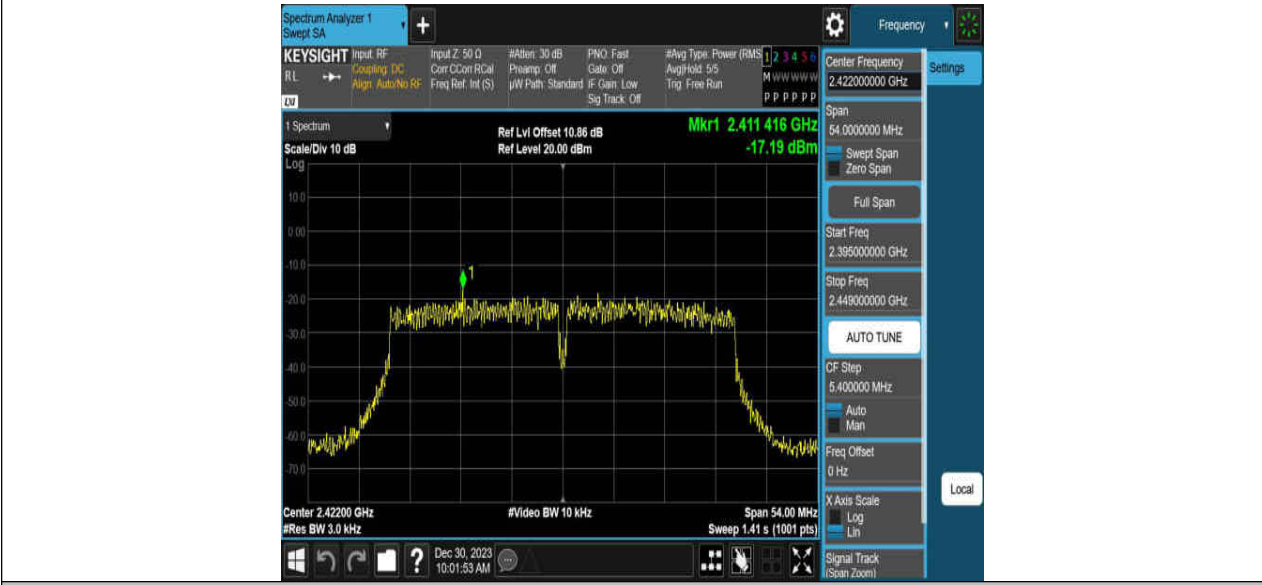
11N20MIMO_Ant2_2462



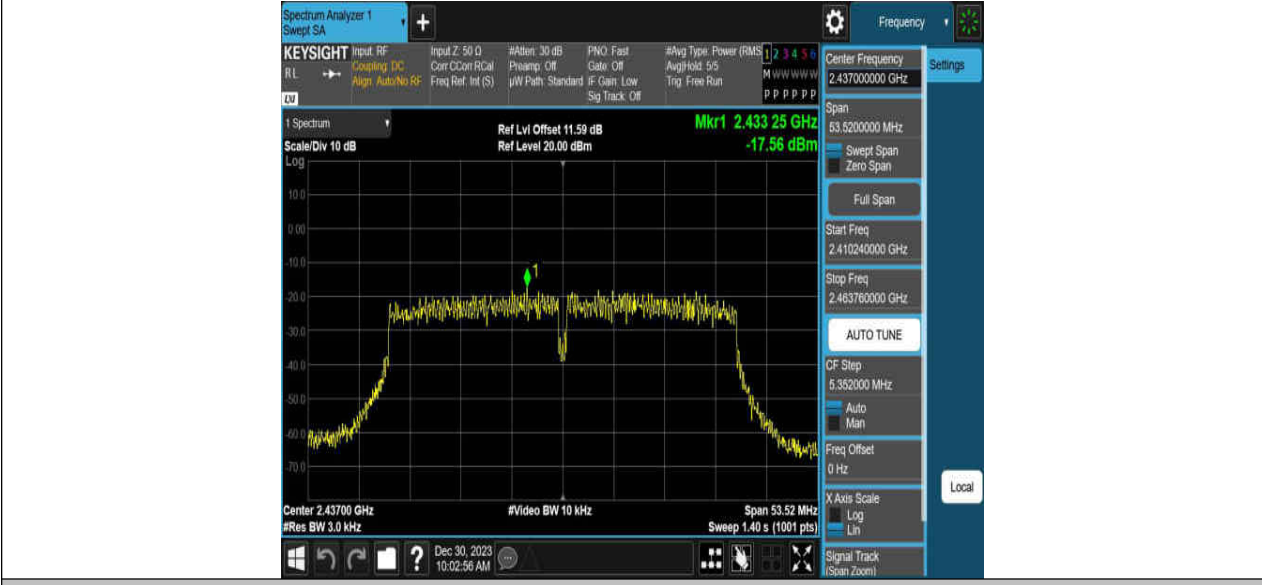
11N40MIMO_Ant1_2422



11N40MIMO_Ant2_2422



11N40MIMO_Ant1_2437



11N40MIMO_Ant2_2437



12. Conducted Band edge and Spurious Emissions

12.1. Block diagram of test setup

Same as section 8.1

12.2. Limits

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 3		
Section	Test Item	Limit
CFR 47 FCC §15.247 (d) ISED RSS-247 5.5	Conducted Bandedge and Spurious Emissions	at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

12.3. Test Procedure

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	100 kHz
VBW	$\geq 3 \times \text{RBW}$
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Connect the UUT to the spectrum analyzer and use the following settings:

Use the peak marker function to determine the maximum PSD level.

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100 kHz
VBW	$\geq 3 \times \text{RBW}$
measurement points	$\geq \text{span}/\text{RBW}$
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum amplitude level.

12.4. Test result

Test Mode	Ant.	Ch Name	Freq. (MHz)	Ref Level (dBm)	Result (dBm)	Limit (dBm)	Verdict
11B	Ant1	Low	2412	5.82	-31.43	≤-14.18	PASS
	Ant2	Low	2412	5.97	-41.43	≤-14.03	PASS
	Ant1	High	2462	1.63	-48.36	≤-18.37	PASS
	Ant2	High	2462	5.68	-48.49	≤-14.32	PASS
11G	Ant1	Low	2412	1.64	-40.56	≤-18.36	PASS
	Ant2	Low	2412	1.63	-35.89	≤-18.37	PASS
	Ant1	High	2462	-3.26	-47.55	≤-23.26	PASS
	Ant2	High	2462	1.65	-47.35	≤-18.35	PASS
11N20MIMO	Ant1	Low	2412	1.73	-34.73	≤-18.27	PASS
	Ant2	Low	2412	-3.37	-34.57	≤-23.37	PASS
	Ant1	High	2462	-4.90	-47.91	≤-24.9	PASS
	Ant2	High	2462	-8.42	-48.53	≤-28.42	PASS
11N40MIMO	Ant1	Low	2422	-1.52	-41.95	≤-21.52	PASS
	Ant2	Low	2422	-6.21	-38.52	≤-26.21	PASS
	Ant1	High	2452	-4.08	-42.99	≤-24.08	PASS
	Ant2	High	2452	-6.36	-42.51	≤-26.36	PASS

Test Mode	Ant.	Freq. (MHz)	Freq Range (Mhz)	Ref Level (dBm)	Result (dBm)	Limit (dBm)	Verdict
11B	Ant1	2412	30~1000	5.82	-61.72	≤-14.18	PASS
			1000~26500	5.82	-50.01	≤-14.18	PASS
	Ant2	2412	30~1000	5.97	-62.32	≤-14.03	PASS
			1000~26500	5.97	-51.21	≤-14.03	PASS
	Ant1	2437	30~1000	5.76	-61.65	≤-14.24	PASS
			1000~26500	5.76	-50.49	≤-14.24	PASS
	Ant2	2437	30~1000	5.99	-62.37	≤-14.01	PASS
			1000~26500	5.99	-51.49	≤-14.01	PASS
	Ant1	2462	30~1000	1.63	-61.92	≤-18.37	PASS
			1000~26500	1.63	-50.22	≤-18.37	PASS
	Ant2	2462	30~1000	5.68	-62.49	≤-14.32	PASS
			1000~26500	5.68	-50.47	≤-14.32	PASS
11G	Ant1	2412	30~1000	1.64	-61.09	≤-18.36	PASS
			1000~26500	1.64	-51.05	≤-18.36	PASS
	Ant2	2412	30~1000	1.63	-61.84	≤-18.37	PASS
			1000~26500	1.63	-51.48	≤-18.37	PASS
	Ant1	2437	30~1000	1.67	-62.19	≤-18.33	PASS
			1000~26500	1.67	-50.91	≤-18.33	PASS
	Ant2	2437	30~1000	1.35	-63.24	≤-18.65	PASS
			1000~26500	1.35	-51.95	≤-18.65	PASS
	Ant1	2462	30~1000	-3.26	-60.92	≤-23.26	PASS
			1000~26500	-3.26	-50.38	≤-23.26	PASS
	Ant2	2462	30~1000	1.65	-62.39	≤-18.35	PASS
			1000~26500	1.65	-51.35	≤-18.35	PASS
11N20MIMO	Ant1	2412	30~1000	1.73	-60.96	≤-18.27	PASS
			1000~26500	1.73	-50.9	≤-18.27	PASS
	Ant2	2412	30~1000	-3.37	-62.38	≤-23.37	PASS
			1000~26500	-3.37	-51.63	≤-23.37	PASS

	Ant1	2437	30~1000	0.33	-62.28	≤ -19.67	PASS
			1000~26500	0.33	-50.82	≤ -19.67	PASS
	Ant2	2437	30~1000	-7.75	-62.47	≤ -27.75	PASS
			1000~26500	-7.75	-51.13	≤ -27.75	PASS
	Ant1	2462	30~1000	-4.90	-61.32	≤ -24.9	PASS
			1000~26500	-4.90	-50.04	≤ -24.9	PASS
	Ant2	2462	30~1000	-8.42	-62.1	≤ -28.42	PASS
			1000~26500	-8.42	-51.17	≤ -28.42	PASS
11N40MIMO	Ant1	2422	30~1000	-1.52	-61.86	≤ -21.52	PASS
			1000~26500	-1.52	-50.27	≤ -21.52	PASS
	Ant2	2422	30~1000	-6.21	-62.76	≤ -26.21	PASS
			1000~26500	-6.21	-51.35	≤ -26.21	PASS
	Ant1	2437	30~1000	-3.27	-60.69	≤ -23.27	PASS
			1000~26500	-3.27	-50.72	≤ -23.27	PASS
	Ant2	2437	30~1000	-4.72	-63.12	≤ -24.72	PASS
			1000~26500	-4.72	-51.48	≤ -24.72	PASS
	Ant1	2452	30~1000	-4.08	-62.16	≤ -24.08	PASS
			1000~26500	-4.08	-50.57	≤ -24.08	PASS
	Ant2	2452	30~1000	-6.36	-62.12	≤ -26.36	PASS
			1000~26500	-6.36	-51.04	≤ -26.36	PASS

12.5. Original test data
Reference level



