



## FCC AND ISED CERTIFICATION TEST REPORT

<b>Applicant:</b>	Guangzhou Shikun Electronics Co., Ltd
<b>Address:</b>	NO.6 Liankun Road, Huangpu District, Guangzhou, China
<b>Manufacturer:</b>	Guangzhou Shikun Electronics Co., Ltd
<b>Address:</b>	NO.6 Liankun Road, Huangpu District, Guangzhou, China
<b>Product Description:</b>	IEEE 802.11b/g/n/a/ac 2T2R USB WiFi Module Integrated BT 2.1+EDR/4.2/5.1
<b>Brand Name:</b>	NA
<b>Tested Model:</b>	SKI.WB663U.17
<b>FCC ID:</b>	2AR82-SKIWB663U17
<b>IC:</b>	24628-SKIWB663U17
<b>Report No.:</b>	JCF231027201-003
<b>Received Date:</b>	Oct. 27, 2023
<b>Tested Date:</b>	Oct. 27, 2023 ~ Nov. 30, 2023
<b>Issued Date:</b>	Nov. 30, 2023
<b>Test Standards:</b>	FCC Rules and Regulations Part 15 Subpart C, RSS-247 Issue 3 August 2023
<b>Test Procedure:</b>	ANSI C63.10:2013, RSS-Gen Issue 5 A2, Feb. 2021
<b>Test Result:</b>	Pass
<b>Prepared By:</b>  <u>Roger Li/Engineer</u>	
<b>Date:</b> Nov. 30, 2023 	
<b>Reviewed By:</b>  <u>Kennys Zhang/Engineer</u>	
<b>Date:</b> Nov. 30, 2023 	
<b>Approved By:</b>  <u>Talent Zhang/Engineer</u>	
<b>Date:</b> Nov. 30, 2023 	

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	/	Nov. 30, 2023	Original Report	/

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## 1. Test Report Declare

<b>Applicant:</b>	Guangzhou Shikun Electronics Co., Ltd
<b>Address:</b>	NO.6 Liankun Road, Huangpu District, Guangzhou, China
<b>Manufacturer:</b>	Guangzhou Shikun Electronics Co., Ltd
<b>Address:</b>	NO.6 Liankun Road, Huangpu District, Guangzhou, China
<b>Product Name:</b>	IEEE 802.11b/g/n/a/ac 2T2R USB WiFi Module Integrated BT 2.1+EDR/4.2/5.1
<b>Brand Name:</b>	NA
<b>Model Name:</b>	SKI.WB663U.17
<b>Difference Description:</b>	NA

### 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.

## 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	NA
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

<b>EUT Name:</b>	IEEE 802.11b/g/n/a/ac 2T2R USB WiFi Module Integrated BT 2.1+EDR/4.2/5.1
<b>Model Number:</b>	SKI.WB663U.17
<b>EUT Function Description:</b>	Please refer to user manual of this device
<b>Power Supply:</b>	DC 3.3V+/-0.3
<b>Hardware Version:</b>	NA
<b>Software Version:</b>	NA
<b>Radio Specification:</b>	IEEE802.11b/g/n
<b>Operation Frequency:</b>	IEEE 802.11b: 2412MHz—2462MHz IEEE 802.11g: 2412MHz—2462MHz IEEE 802.11n HT20: 2412MHz—2462MHz IEEE 802.11n HT40: 2422MHz—2452MHz
<b>Modulation:</b>	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)
<b>Data Rate:</b>	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
<b>Antenna Type:</b>	Shrapnel Antenna, MAX. Gain: 4.13 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	1MHz	Low: CH1	2412
	1MHz	Middle: CH6	2437
	1MHz	High: CH11	2462
802.11g	6 MHz	Low: CH1	2412
	6 MHz	Middle: CH6	2437
	6 MHz	High: CH11	2462
802.11n HT20	MCS0	Low: CH1	2412
	MCS0	Middle: CH6	2437
	MCS0	High: CH11	2462
802.11n HT40	MCS0	Low: CH3	2422
	MCS0	Middle: CH6	2437
	MCS0	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		QATool_Dbg		
Modulation Mode	Transmit Antenna Number	Test Software Setting Value		
		ANT1	ANT2	Channel
802.11b	2	9	9	CH1
		9	9	CH6
		9	9	CH11
802.11g	2	6	6	CH1
		6	5	CH6
		6	5	CH11
802.11HT20	2	2	2	CH1
		2	2	CH6
		2	2	CH11
802.11n HT40	2	2	2	CH3
		2	2	CH6
		2	2	CH9

#### 4.6. Description of Available Antennas

Test Mode	Transmit and Receive Mode	Description
802.11b	<input checked="" type="checkbox"/> 2TX, 2RX	ANT 1 and ANT2 can be used as transmitting/receiving antenna.



802.11g	<input checked="" type="checkbox"/> 2TX, 2RX	ANT 1 and ANT2 can be used as transmitting/receiving antenna.
802.11n HT20	<input checked="" type="checkbox"/> 2TX, 2RX	ANT 1 and ANT2 can be used as transmitting/receiving antenna.
802.11n HT40	<input checked="" type="checkbox"/> 2TX, 2RX	ANT 1 and ANT2 can be used as transmitting/receiving antenna.
<b>Note:</b> 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.

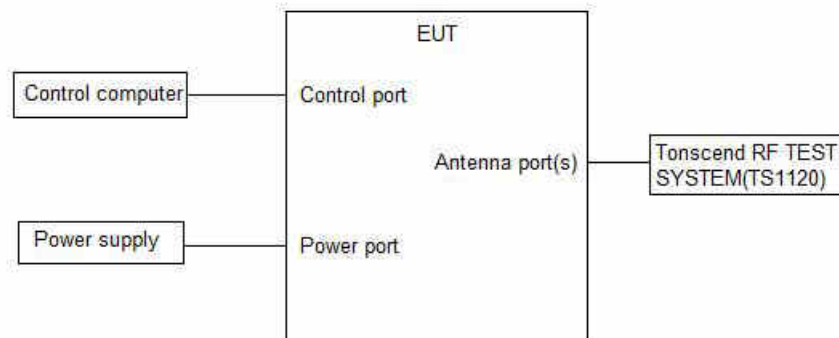
## 7. Measuring Instrument and Software Used

TS Test System						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
<input checked="" type="checkbox"/>	Spectrum Analyzer	Keysight	N9030B	MY56320512	Sep. 12, 2023	Sep. 11, 2024
<input checked="" type="checkbox"/>	Vector Signal Generator	Keysight	N5182B	MY57300334	Sep. 12, 2023	Sep. 11, 2024
<input checked="" type="checkbox"/>	Signal Generator	Keysight	N5171B	MY57280639	Sep. 12, 2023	Sep. 11, 2024
<input checked="" type="checkbox"/>	DC POWER	Keysight	E342A	MY59020356	Jul. 14, 2023	Jul. 13, 2024
<input checked="" type="checkbox"/>	Incubator thermometer	GWS	EL-02JA	21107288	Sep. 12, 2023	Sep. 11, 2024
<input checked="" type="checkbox"/>	Control unit(Power sensor)	Tonscend	JS0806-2	/	Sep. 12, 2023	Sep. 11, 2024
<input checked="" type="checkbox"/>	Wideband radio communication tester	R&S	CMW500	163478	Jul. 11, 2023	Jul. 10, 2024
Software						
Used	Description	Manufacturer	Name		Version	
<input checked="" type="checkbox"/>	Test software	TS+	JS1120-3		V3.3.10	
RSE Test System						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
<input checked="" type="checkbox"/>	EMI Receiver	R&S	ESW	101685	Jul. 12, 2023	Jul. 11, 2024

<input checked="" type="checkbox"/>	Bilog Antenna	Schwarzbeck	VULB 9163	01416	Mar. 21, 2023	Mar. 20, 2024
<input checked="" type="checkbox"/>	Horn Antenna 1	Schwarzbeck	BBHA 9120 D	02411	May. 25, 2023	May. 24, 2024
<input checked="" type="checkbox"/>	Horn Antenna 2	ETS	BBHA 9170	1090	Sep. 04, 2023	Sep. 03, 2024
<input checked="" type="checkbox"/>	loop-antenna	Schwarzbeck	FMZB 1513-60	00030	Jan.14,2023	Jan.13,2024
<input checked="" type="checkbox"/>	Signal Pre-Amplifier	Tonscend	TAP01018050	AP21C806122	Jul. 10, 2023	Jul. 09, 2024
<input checked="" type="checkbox"/>	Signal Pre-Amplifier	Tonscend	TAP9K3G32	AP20K806104	Jul. 10, 2023	Jul. 09, 2024
<input checked="" type="checkbox"/>	Signal Pre-Amplifier	ETS	3116C-PA	00217677	Aug. 24, 2023	Aug. 23, 2024
<input checked="" type="checkbox"/>	3m Fully-anechoic Chamber	ETS	RFD-100	/	Apr. 24, 2021	Apr. 23, 2024
<input checked="" type="checkbox"/>	Temperature & Humidity	Temperature	HTC-1	/	Nov. 02, 2023	Nov. 01, 2024
Software						
Used	Description	Manufacturer	Name		Version	
<input checked="" type="checkbox"/>	Test software	TS+	TS+		V3.0.0.4	

## 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	8.39	8.42	99.64
	Ant2	2412	8.37	8.41	99.52
	Ant1	2437	8.38	8.42	99.52
	Ant2	2437	8.38	8.43	99.41
	Ant1	2462	8.38	8.42	99.52
	Ant2	2462	8.39	8.43	99.53

11G	Ant1	2412	1.39	1.44	96.53
	Ant2	2412	1.39	1.44	96.53
	Ant1	2437	1.39	1.43	97.20
	Ant2	2437	1.39	1.43	97.20
	Ant1	2462	1.39	1.44	96.53
	Ant2	2462	1.39	1.43	97.20
11N20MIMO	Ant1	2412	1.28	1.33	96.24
	Ant2	2412	1.29	1.33	96.99
	Ant1	2437	1.28	1.33	96.24
	Ant2	2437	1.29	1.33	96.99
	Ant1	2462	1.29	1.33	96.99
	Ant2	2462	1.28	1.33	96.24
11N40MIMO	Ant1	2422	0.63	0.68	92.65
	Ant2	2422	0.63	0.68	92.65
	Ant1	2437	0.63	0.68	92.65
	Ant2	2437	0.64	0.68	94.12
	Ant1	2452	0.64	0.68	94.12
	Ant2	2452	0.64	0.68	94.12

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

Where: x is Duty Cycle (Linear)

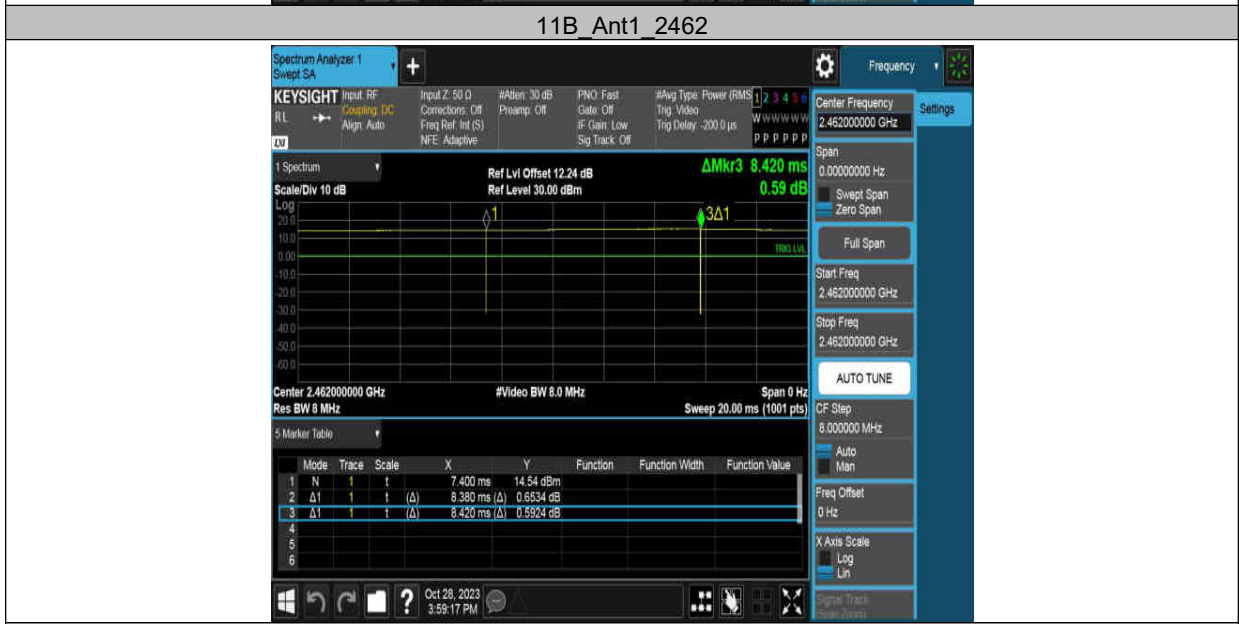
Where: T is On Time

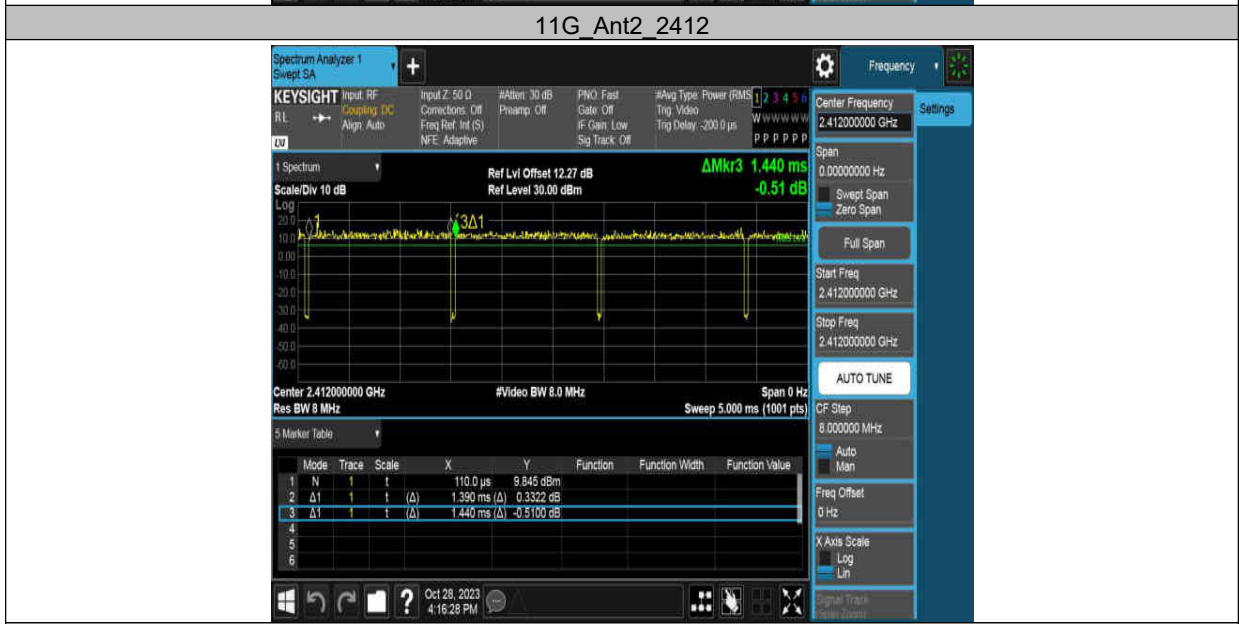
If that calculated VBW is not available on the analyzer, then the next higher value should be used.

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

### 8.5. Original test data









11G\_Ant1\_2462

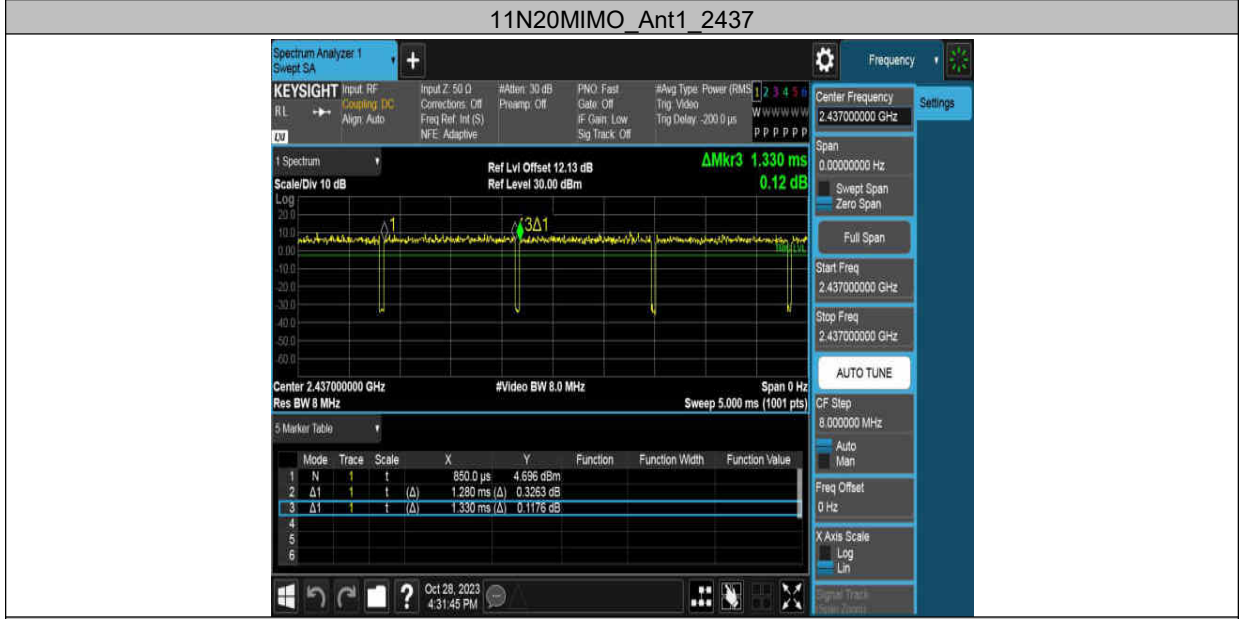
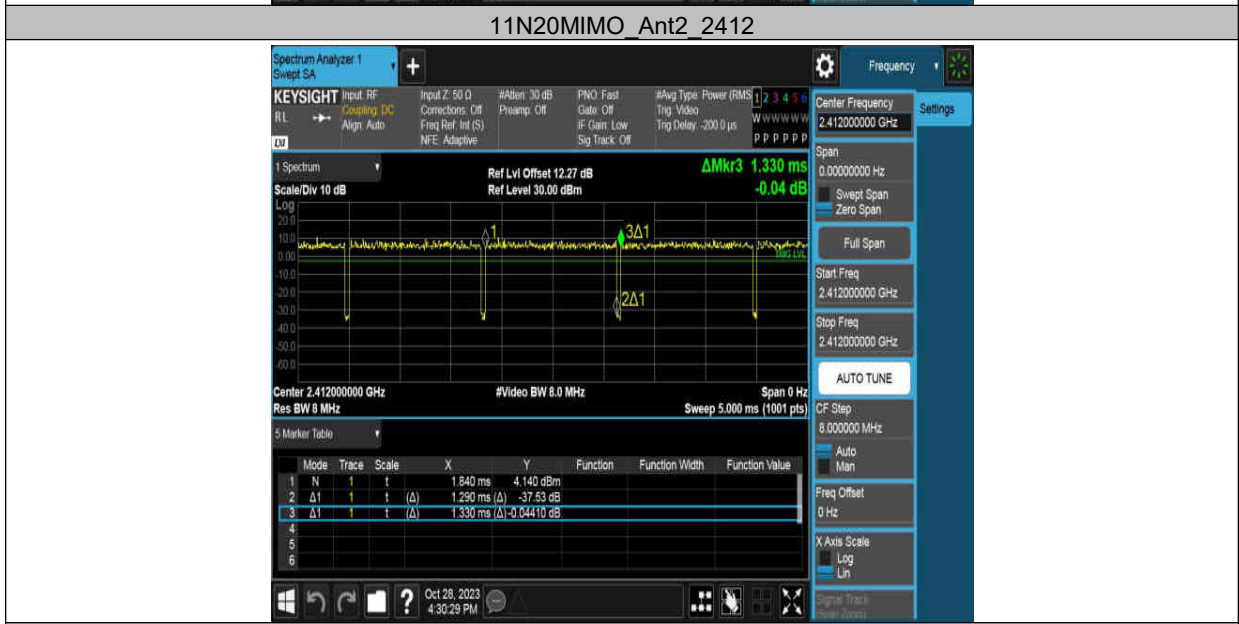


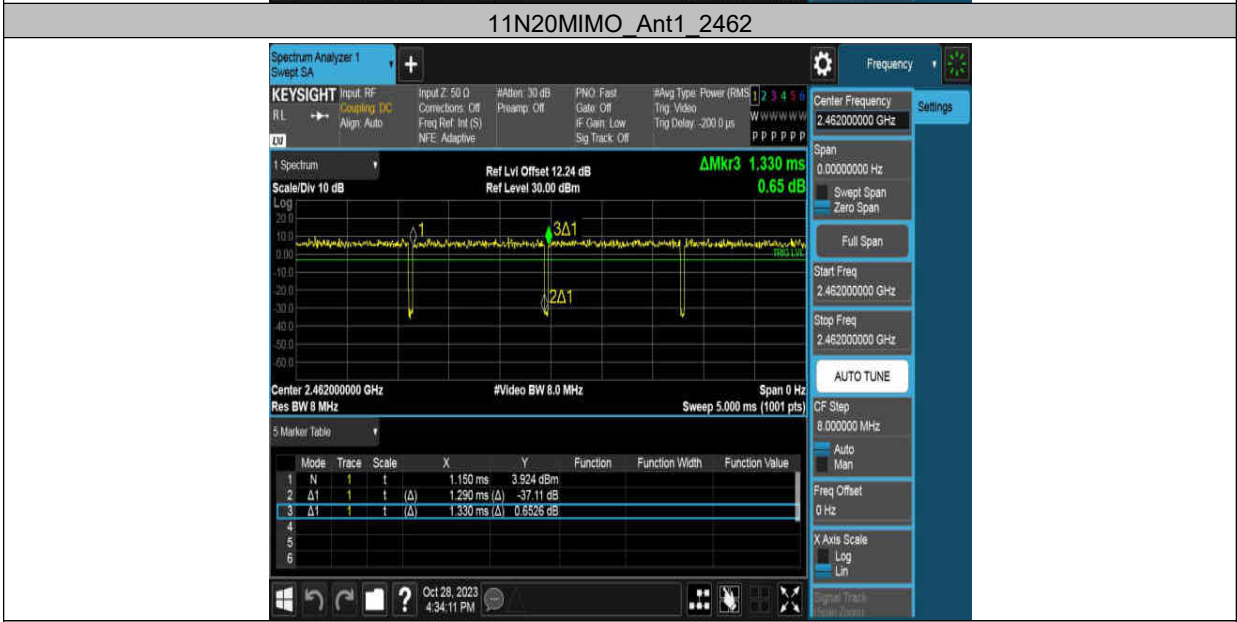
11G\_Ant2\_2462

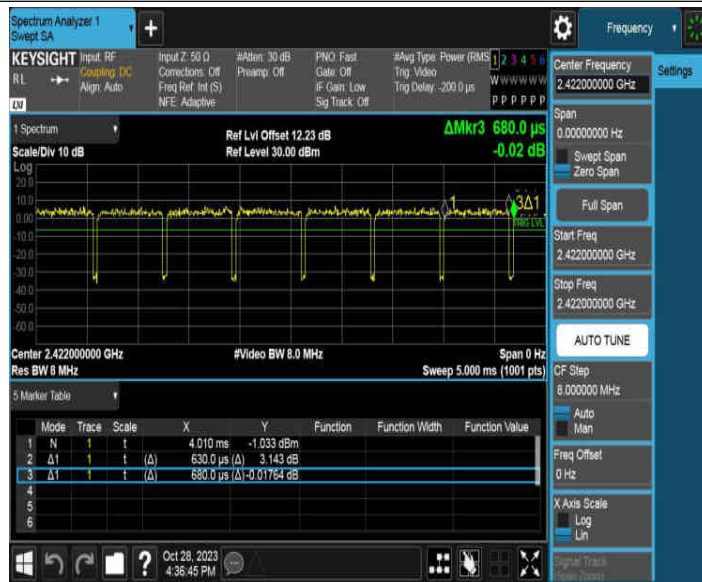


11N20MIMO\_Ant1\_2412

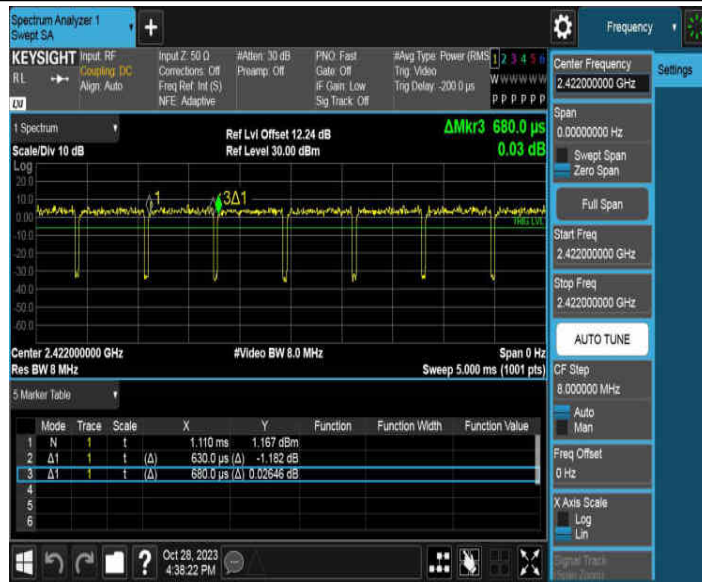








11N40MIMO\_Ant2\_2422



11N40MIMO\_Ant1\_2437



11N40MIMO\_Ant2\_2437



11N40MIMO Ant1 2452



11N40MIMO Ant2 2452



## 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	$\geq 500$ 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	8.080	2408.480	2416.560	0.5	PASS
	Ant2	2412	8.080	2408.000	2416.080	0.5	PASS
	Ant1	2437	8.040	2433.000	2441.040	0.5	PASS
	Ant2	2437	9.040	2432.520	2441.560	0.5	PASS
	Ant1	2462	8.560	2457.520	2466.080	0.5	PASS
	Ant2	2462	8.000	2458.080	2466.080	0.5	PASS
11G	Ant1	2412	14.160	2405.400	2419.560	0.5	PASS
	Ant2	2412	14.440	2404.480	2418.920	0.5	PASS
	Ant1	2437	15.400	2429.520	2444.920	0.5	PASS
	Ant2	2437	15.640	2429.280	2444.920	0.5	PASS
	Ant1	2462	14.440	2454.480	2468.920	0.5	PASS
	Ant2	2462	14.440	2454.480	2468.920	0.5	PASS
11N20MIMO	Ant1	2412	16.920	2403.640	2420.560	0.5	PASS
	Ant2	2412	13.840	2404.520	2418.360	0.5	PASS
	Ant1	2437	14.800	2429.480	2444.280	0.5	PASS
	Ant2	2437	17.560	2428.240	2445.800	0.5	PASS
	Ant1	2462	13.880	2454.480	2468.360	0.5	PASS
	Ant2	2462	17.280	2453.280	2470.560	0.5	PASS
11N40MIMO	Ant1	2422	32.640	2404.480	2437.120	0.5	PASS
	Ant2	2422	31.280	2404.480	2435.760	0.5	PASS
	Ant1	2437	33.760	2419.480	2453.240	0.5	PASS
	Ant2	2437	35.920	2419.240	2455.160	0.5	PASS
	Ant1	2452	35.120	2434.480	2469.600	0.5	PASS
	Ant2	2452	32.480	2437.040	2469.520	0.5	PASS

99 % bandwidth:

Test Mode	Ant.	Channel Freq. (MHz)	OCB (MHz)	FL (MHz)	FH (MHz)	Limit (MHz)	Verdict
11B	Ant1	2412	13.465	2405.3345	2418.7995	---	---
	Ant2	2412	13.266	2405.4027	2418.6687	---	---
	Ant1	2437	13.190	2430.4510	2443.6410	---	---
	Ant2	2437	13.214	2430.4552	2443.6692	---	---
	Ant1	2462	13.210	2455.4328	2468.6428	---	---
	Ant2	2462	13.226	2455.4142	2468.6402	---	---
11G	Ant1	2412	16.753	2403.6734	2420.4264	---	---
	Ant2	2412	16.709	2403.6837	2420.3927	---	---
	Ant1	2437	16.665	2428.7421	2445.4071	---	---
	Ant2	2437	16.723	2428.7004	2445.4234	---	---
	Ant1	2462	16.766	2453.6961	2470.4621	---	---
	Ant2	2462	16.766	2453.6461	2470.4121	---	---
11N20MIMO	Ant1	2412	17.742	2403.1674	2420.9094	---	---
	Ant2	2412	17.655	2403.1534	2420.8084	---	---
	Ant1	2437	17.711	2428.2009	2445.9119	---	---
	Ant2	2437	17.764	2428.1224	2445.8864	---	---
	Ant1	2462	17.735	2453.1856	2470.9206	---	---
	Ant2	2462	17.692	2453.2295	2470.9215	---	---
11N40MIMO	Ant1	2422	36.179	2404.0059	2440.1849	---	---
	Ant2	2422	36.005	2403.8326	2439.8376	---	---
	Ant1	2437	35.944	2419.0910	2455.0350	---	---
	Ant2	2437	36.301	2418.9688	2455.2698	---	---
	Ant1	2452	36.134	2434.0647	2470.1987	---	---
	Ant2	2452	35.989	2434.2835	2470.2725	---	---

### 9.5. Original test data

6dB bandwidth:





11B Ant2 2437



11B Ant1 2462



11B Ant2 2462



11G Ant1 2412







11N20MIMO\_Ant2\_2412

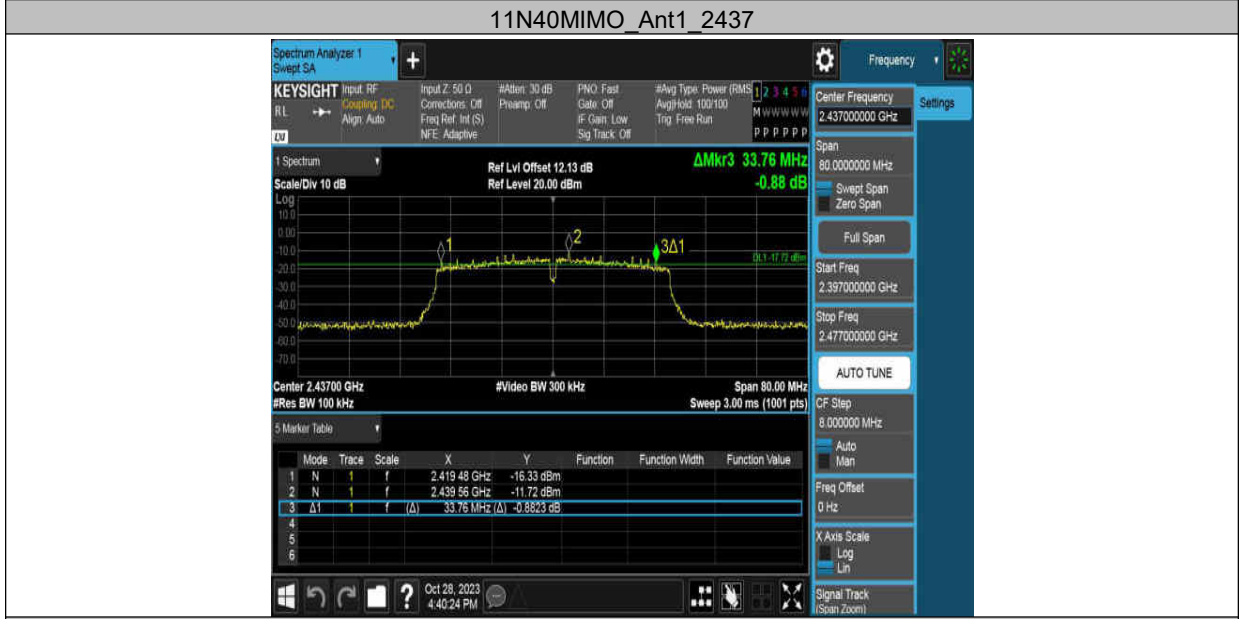
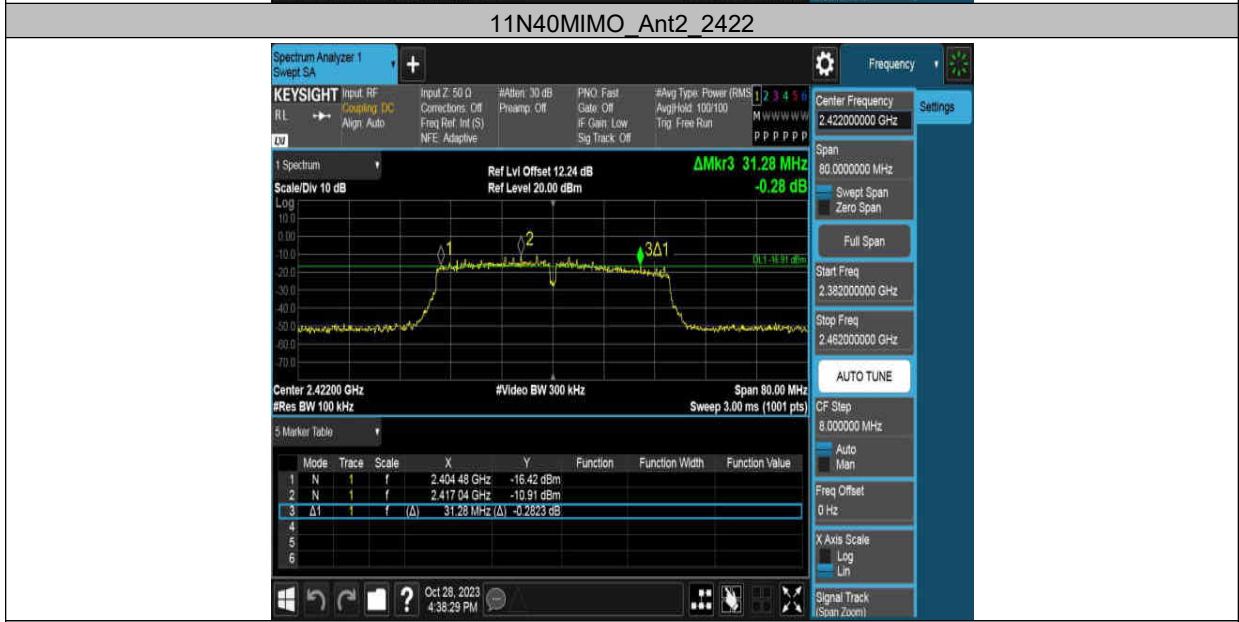


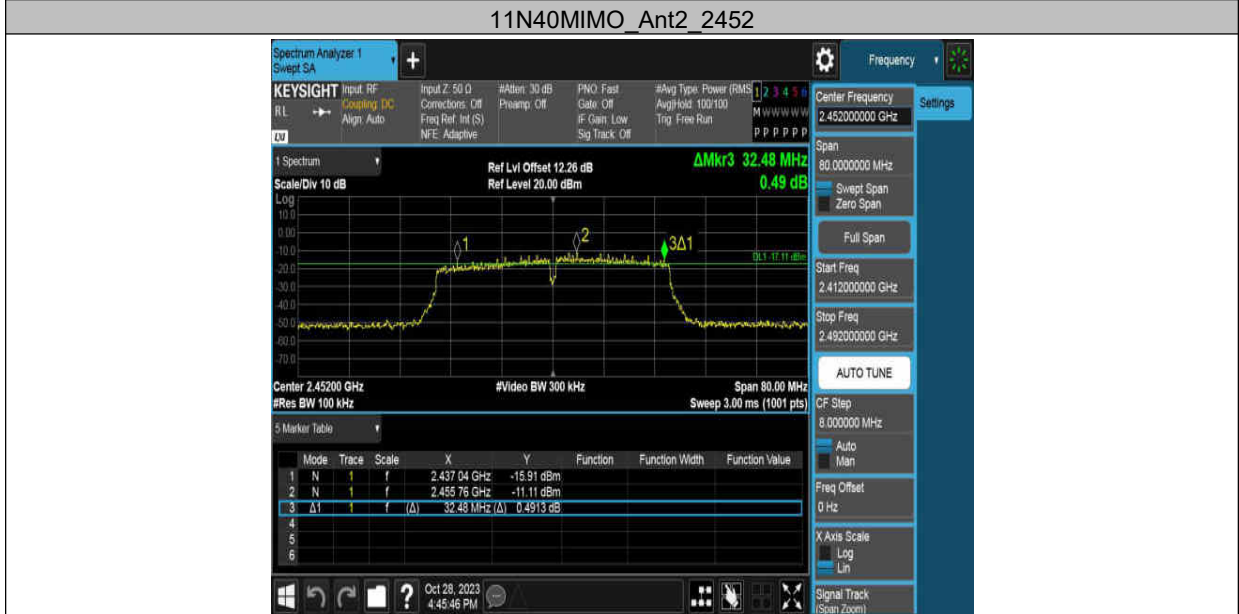
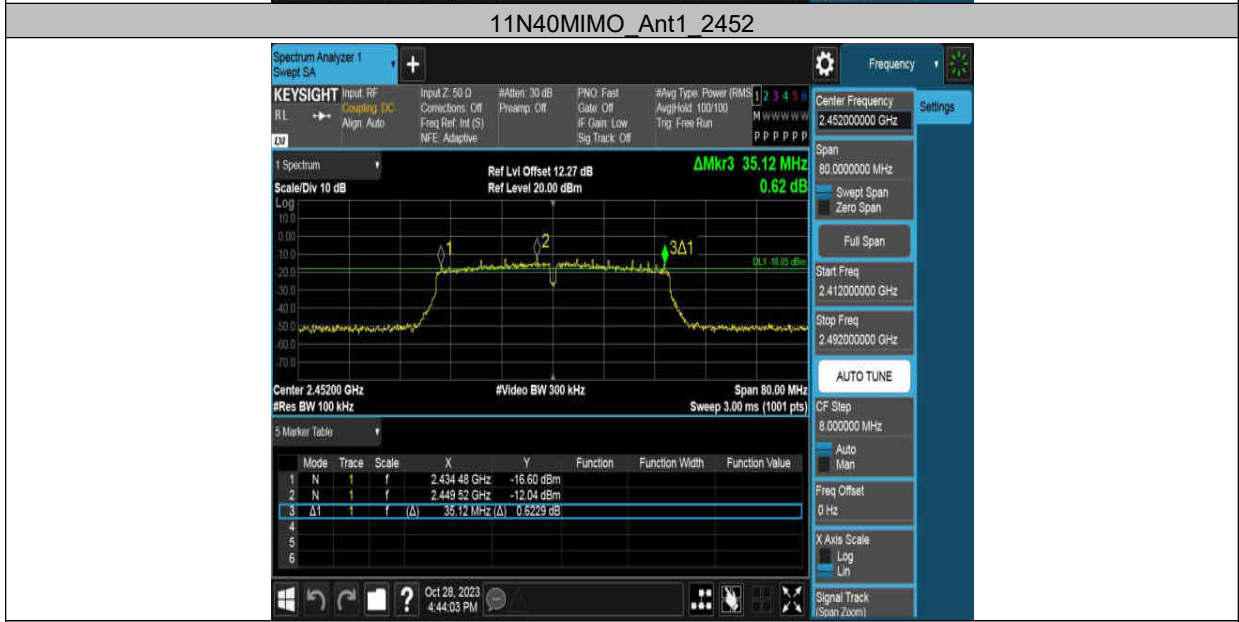
11N20MIMO\_Ant1\_2437



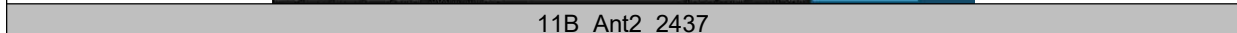
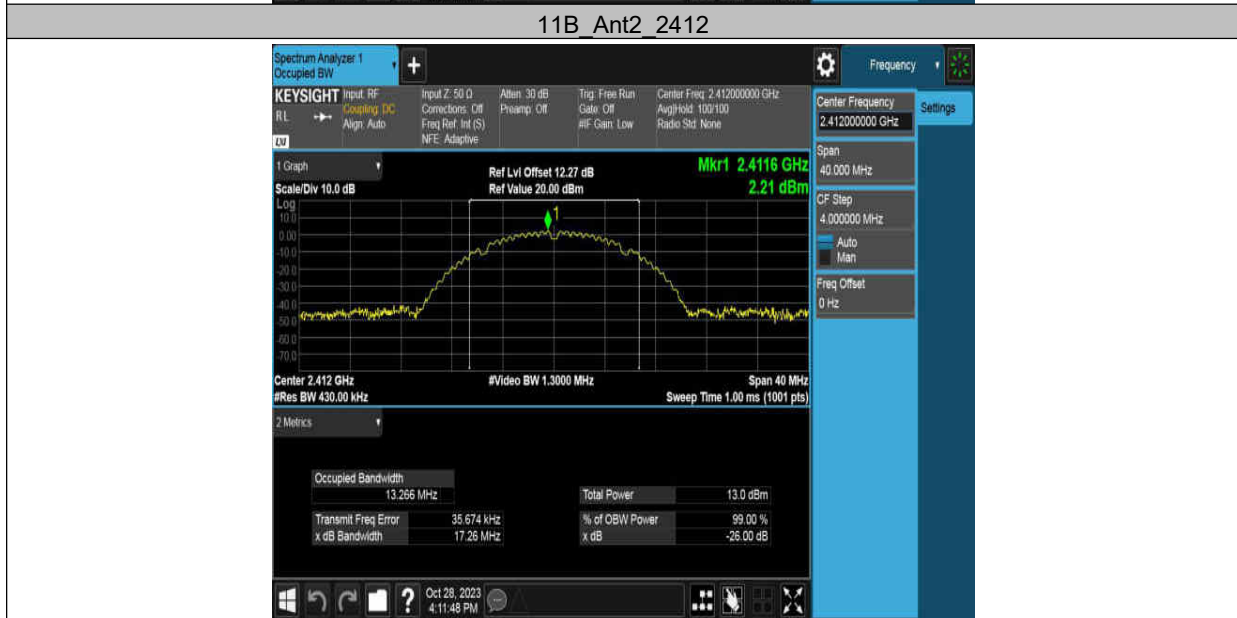
11N20MIMO\_Ant2\_2437







99 % bandwidth:







11B Ant1 2462



11B Ant2 2462



11G Ant1 2412



11G\_Ant2\_2412



11G\_Ant1\_2437



11G\_Ant2\_2437

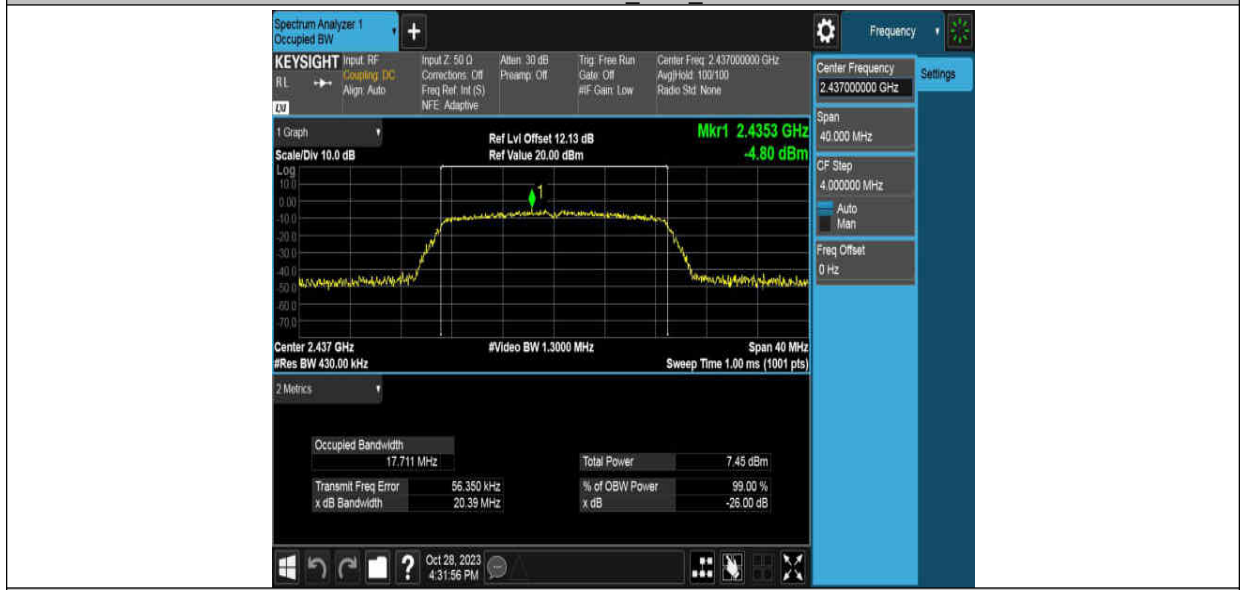




11N20MIMO\_Ant2\_2412



11N20MIMO\_Ant1\_2437



11N20MIMO\_Ant2\_2437



11N20MIMO\_Ant1\_2462



11N20MIMO\_Ant2\_2462



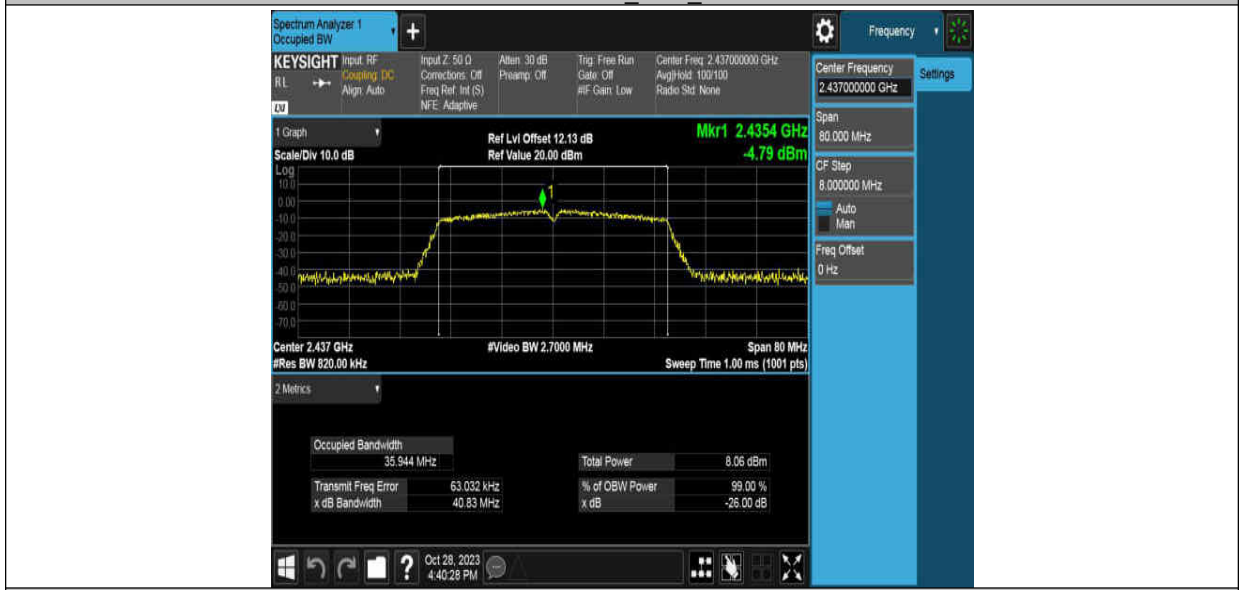
11N40MIMO\_Ant1\_2422



11N40MIMO\_Ant2\_2422



11N40MIMO\_Ant1\_2437



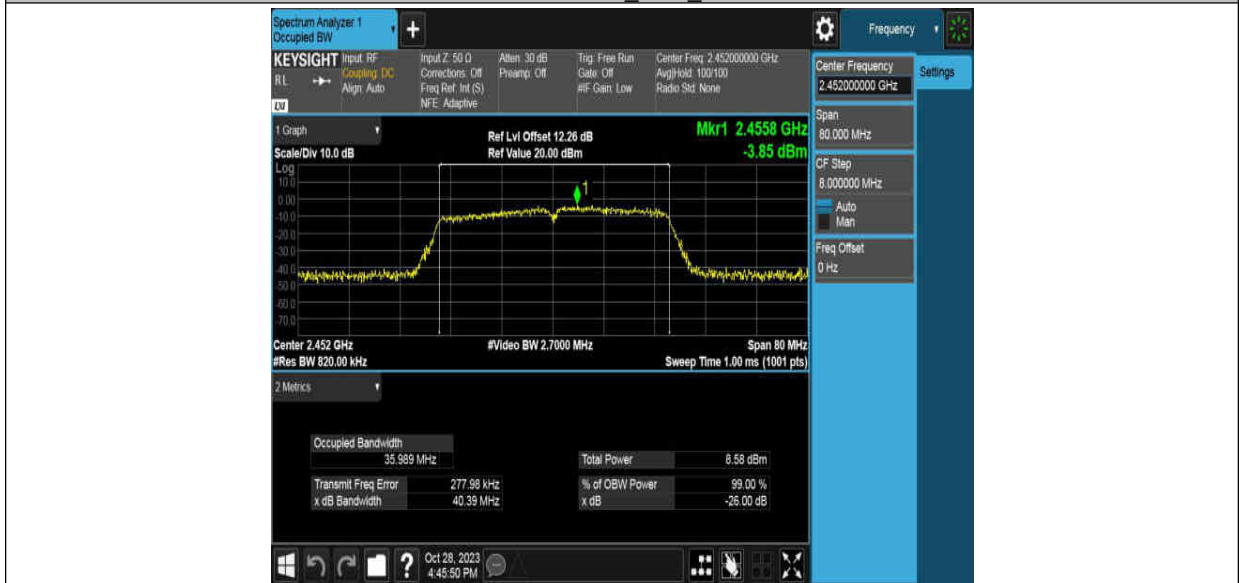
11N40MIMO\_Ant2\_2437



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	12.49	≤30.00	16.31	≤36.00	PASS
	Ant2	2412	12.55	≤30.00	16.68	≤36.00	PASS
	Ant1	2437	12.94	≤30.00	16.76	≤36.00	PASS
	Ant2	2437	13.14	≤30.00	17.27	≤36.00	PASS
	Ant1	2462	12.65	≤30.00	16.47	≤36.00	PASS
	Ant2	2462	12.62	≤30.00	16.75	≤36.00	PASS
11G	Ant1	2412	12.79	≤30.00	16.61	≤36.00	PASS
	Ant2	2412	13.23	≤30.00	17.36	≤36.00	PASS
	Ant1	2437	13.18	≤30.00	17.00	≤36.00	PASS
	Ant2	2437	12.35	≤30.00	16.48	≤36.00	PASS
	Ant1	2462	12.90	≤30.00	16.72	≤36.00	PASS
	Ant2	2462	12.21	≤30.00	16.34	≤36.00	PASS
11N20MIMO	Ant1	2412	8.05	≤30.00	11.87	≤36.00	PASS
	Ant2	2412	8.02	≤30.00	12.15	≤36.00	PASS
	total	2412	11.05	≤30.00	15.18	≤36.00	PASS
	Ant1	2437	7.86	≤30.00	11.68	≤36.00	PASS
	Ant2	2437	8.59	≤30.00	12.72	≤36.00	PASS
	total	2437	11.25	≤30.00	15.38	≤36.00	PASS
	Ant1	2462	7.52	≤30.00	11.34	≤36.00	PASS
	Ant2	2462	8.33	≤30.00	12.46	≤36.00	PASS
	total	2462	10.95	≤30.00	15.08	≤36.00	PASS
11N40MIMO	Ant1	2422	8.09	≤30.00	11.91	≤36.00	PASS
	Ant2	2422	8.36	≤30.00	12.49	≤36.00	PASS
	total	2422	11.24	≤30.00	15.37	≤36.00	PASS
	Ant1	2437	8.31	≤30.00	12.13	≤36.00	PASS
	Ant2	2437	8.45	≤30.00	12.58	≤36.00	PASS
	total	2437	11.39	≤30.00	15.52	≤36.00	PASS
	Ant1	2452	8.17	≤30.00	11.99	≤36.00	PASS



	Ant2	2452	8.49	≤30.00	12.62	≤36.00	PASS
	total	2452	11.34	≤30.00	15.47	≤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	-11.38	$\leq 8.00$	PASS
	Ant2	2412	-12.54	$\leq 8.00$	PASS
	Ant1	2437	-11.30	$\leq 8.00$	PASS
	Ant2	2437	-11.20	$\leq 8.00$	PASS
	Ant1	2462	-11.94	$\leq 8.00$	PASS
	Ant2	2462	-11.69	$\leq 8.00$	PASS
11G	Ant1	2412	-17.42	$\leq 8.00$	PASS
	Ant2	2412	-17.37	$\leq 8.00$	PASS
	Ant1	2437	-17.33	$\leq 8.00$	PASS
	Ant2	2437	-18.07	$\leq 8.00$	PASS
	Ant1	2462	-16.94	$\leq 8.00$	PASS
	Ant2	2462	-17.80	$\leq 8.00$	PASS
11N20MIMO	Ant1	2412	-22.35	$\leq 8.00$	PASS
	Ant2	2412	-22.75	$\leq 8.00$	PASS
	total	2412	-19.54	$\leq 8.00$	PASS
	Ant1	2437	-23.15	$\leq 8.00$	PASS
	Ant2	2437	-22.64	$\leq 8.00$	PASS
	total	2437	-19.88	$\leq 8.00$	PASS
	Ant1	2462	-22.61	$\leq 8.00$	PASS
	Ant2	2462	-21.75	$\leq 8.00$	PASS
total	2462	-19.15	$\leq 8.00$	PASS	
11N40MIMO	Ant1	2422	-25.04	$\leq 8.00$	PASS

	Ant2	2422	-24.78	$\leq 8.00$	PASS
	total	2422	-21.90	$\leq 8.00$	PASS
	Ant1	2437	-24.89	$\leq 8.00$	PASS
	Ant2	2437	-26.05	$\leq 8.00$	PASS
	total	2437	-22.42	$\leq 8.00$	PASS
	Ant1	2452	-24.85	$\leq 8.00$	PASS
	Ant2	2452	-24.51	$\leq 8.00$	PASS
	total	2452	-21.67	$\leq 8.00$	PASS

### 11.5. Original test data





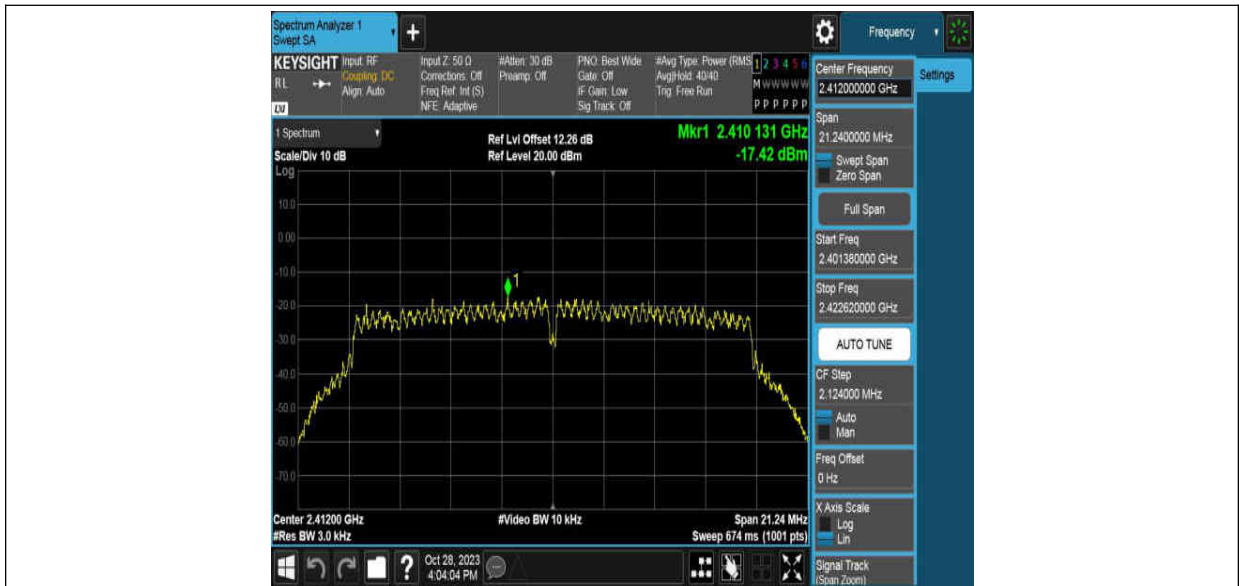
11B Ant1 2462



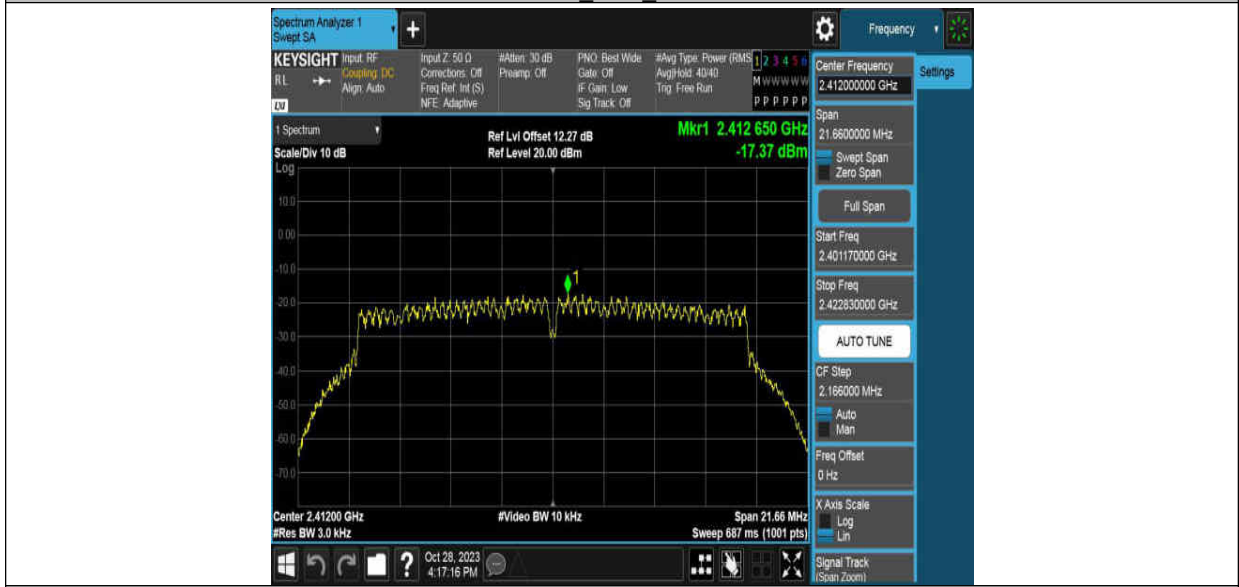
11B Ant2 2462



11G Ant1 2412



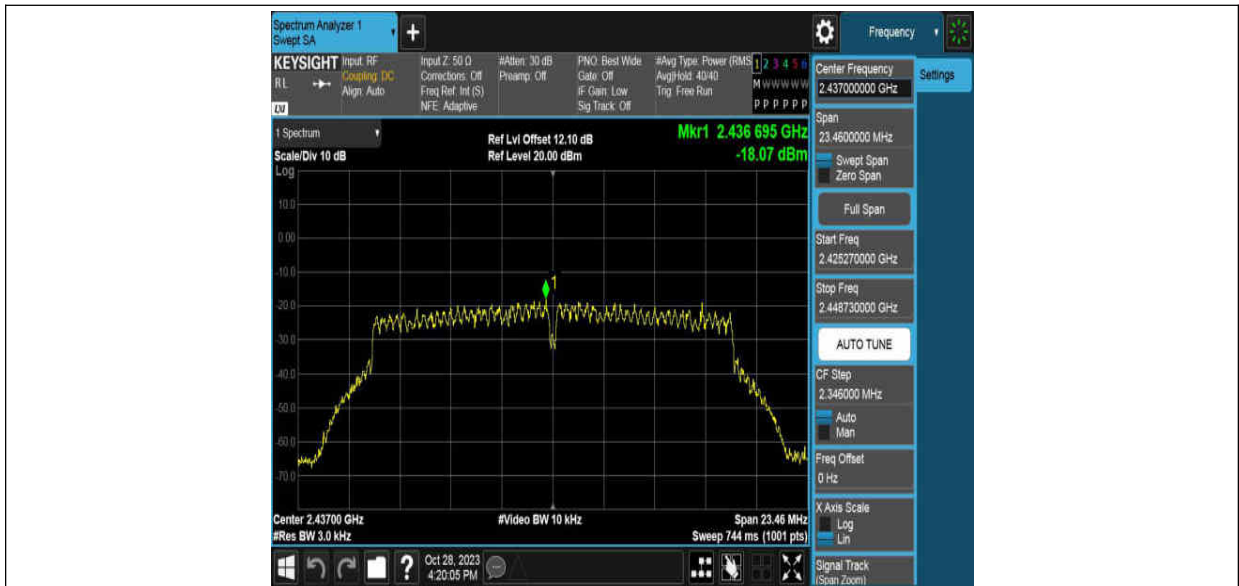
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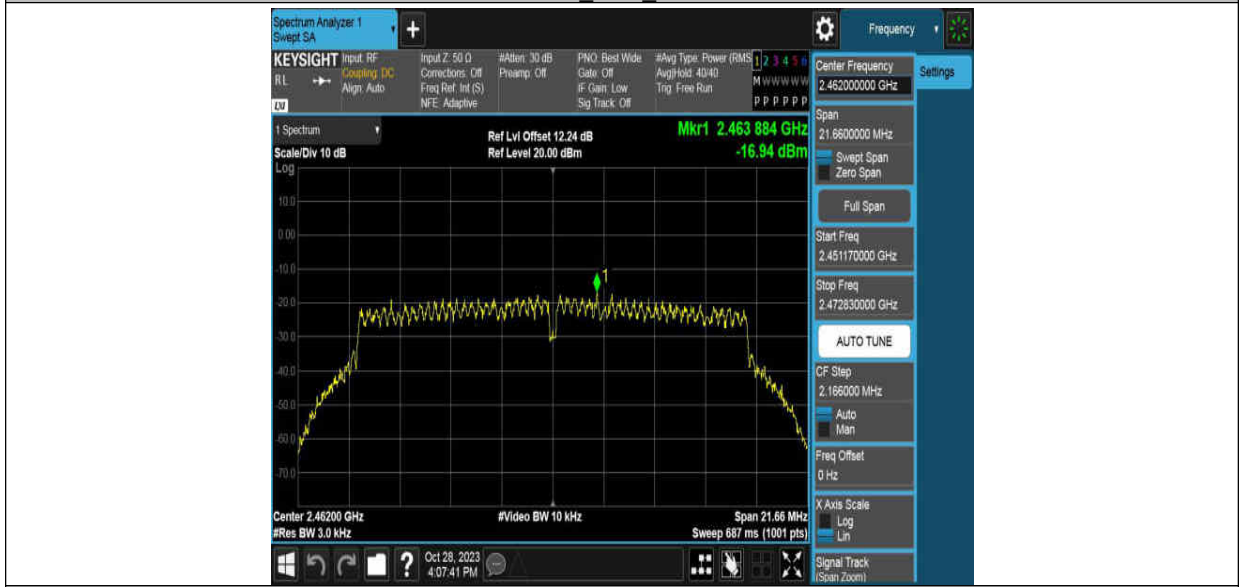
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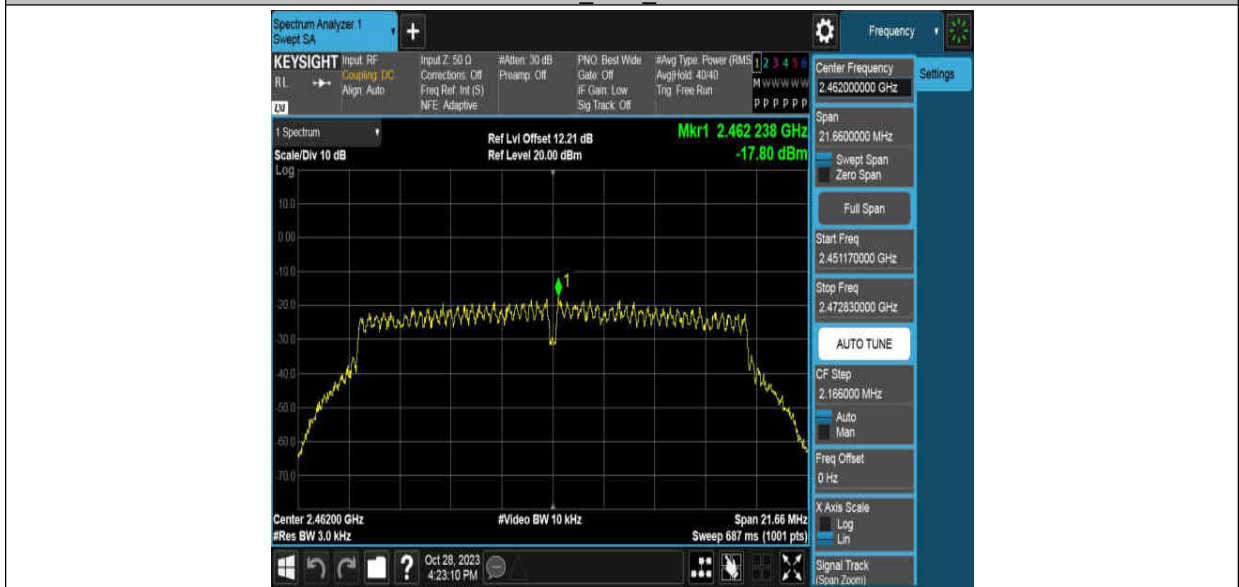
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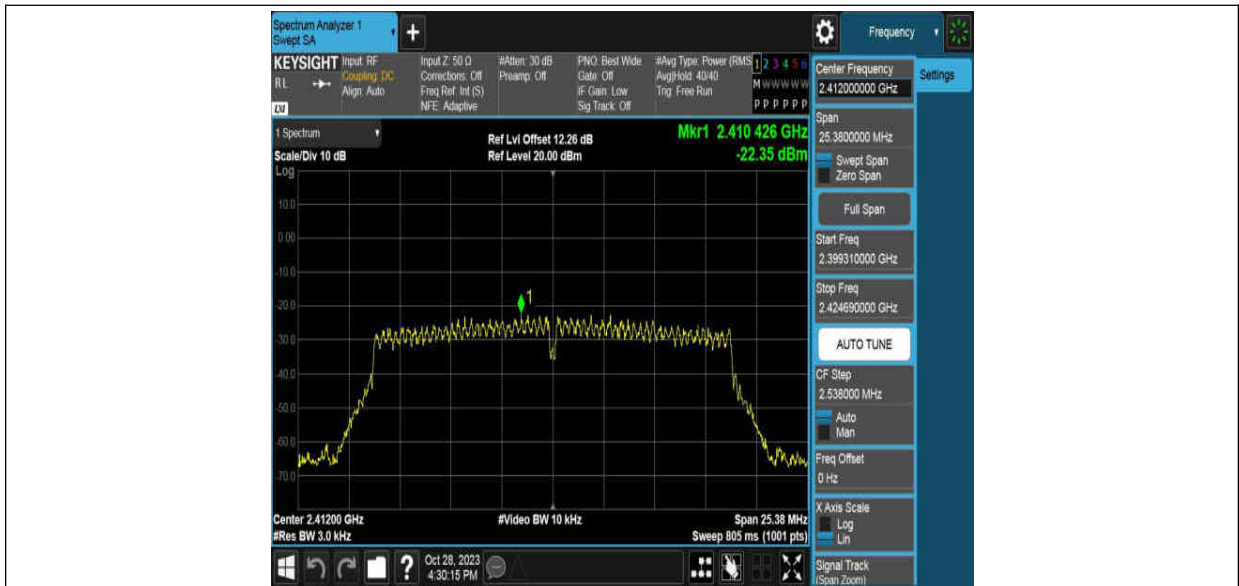
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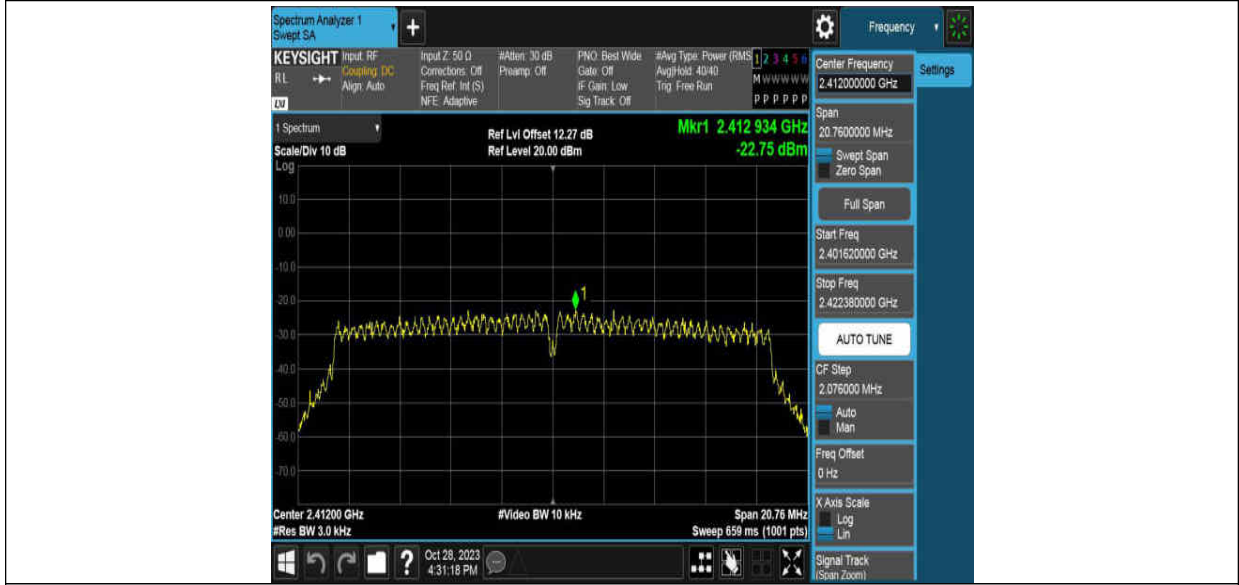
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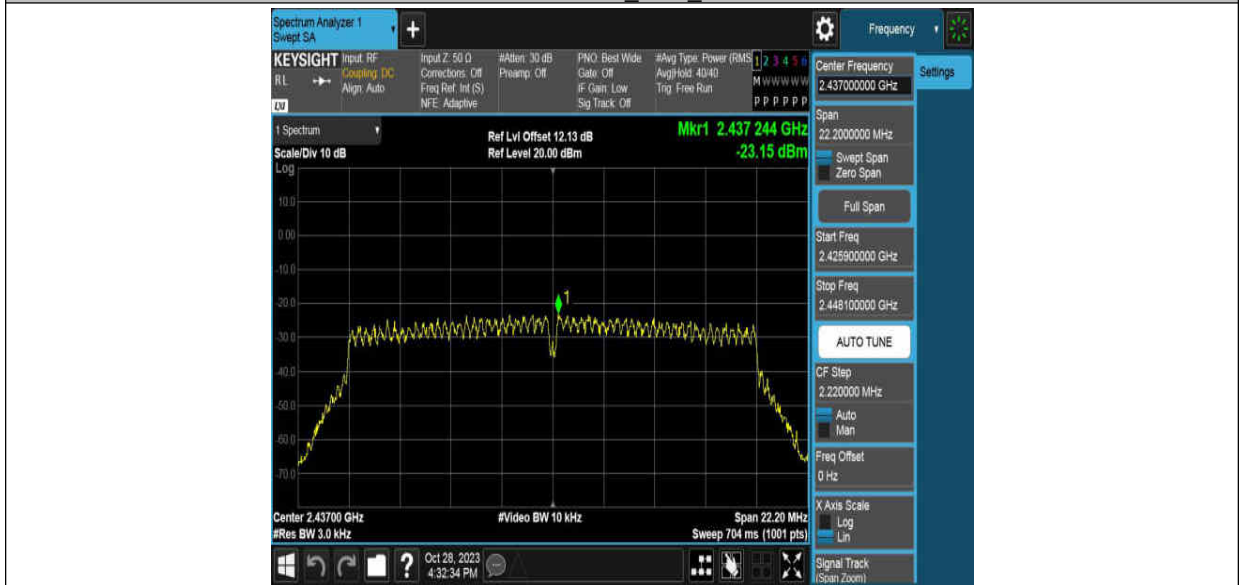
11N20MIMO\_Ant1\_2412



11N20MIMO\_Ant2\_2412

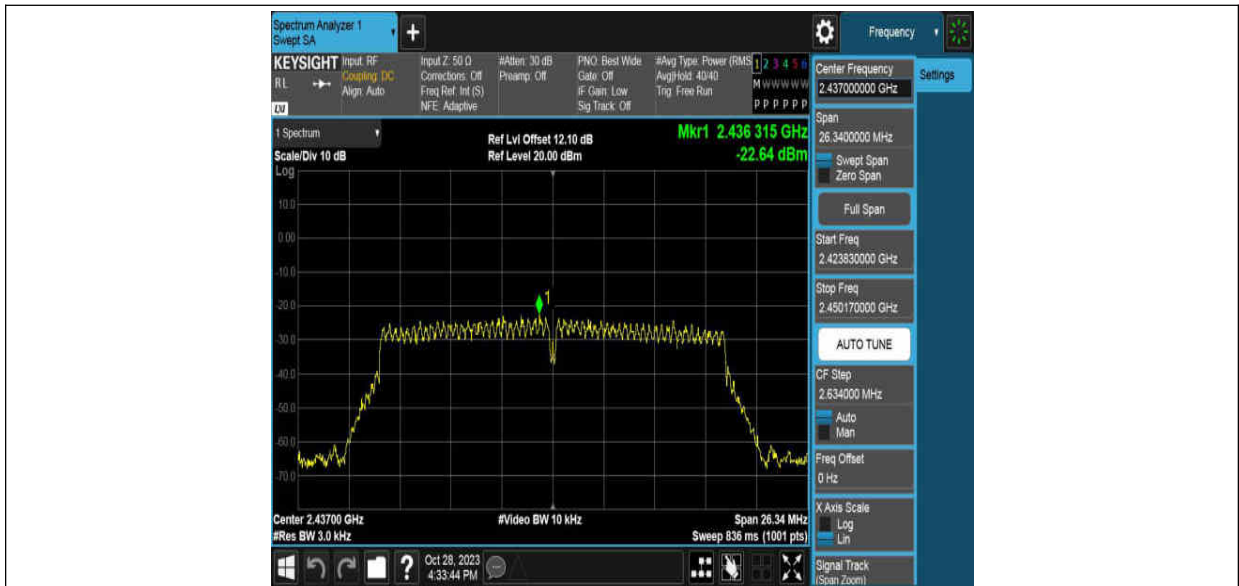


11N20MIMO\_Ant1\_2437

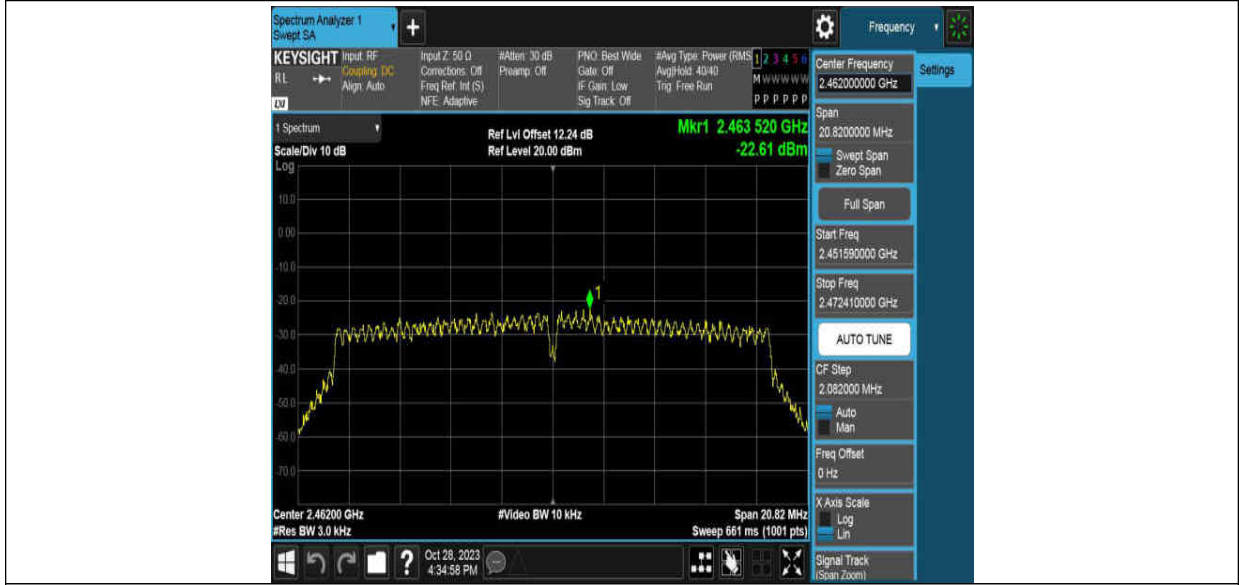


11N20MIMO\_Ant2\_2437

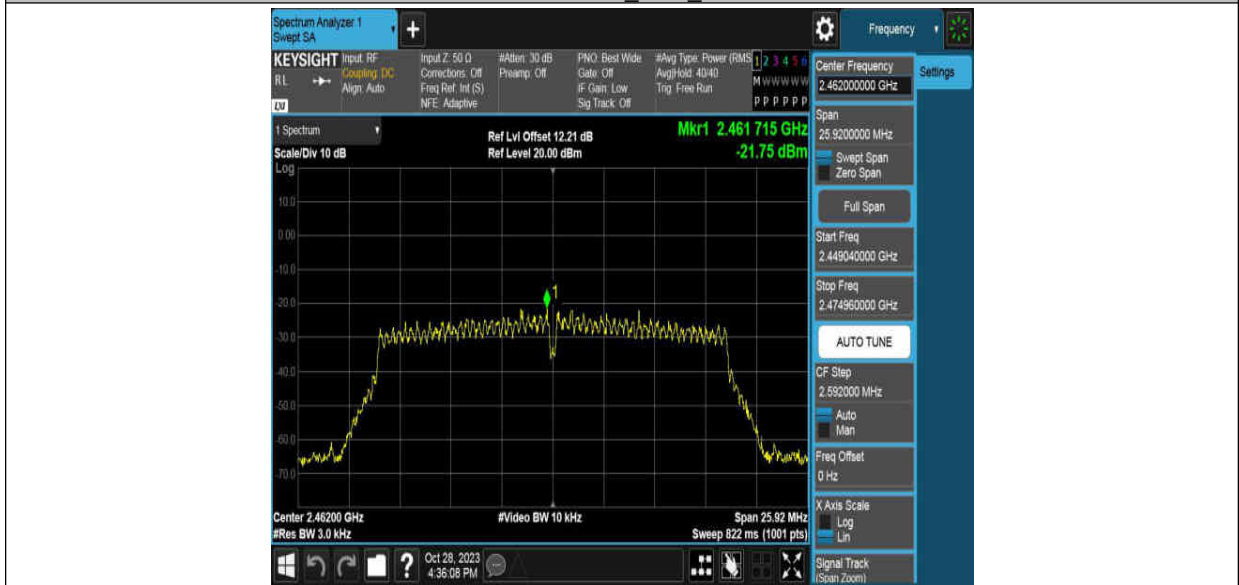




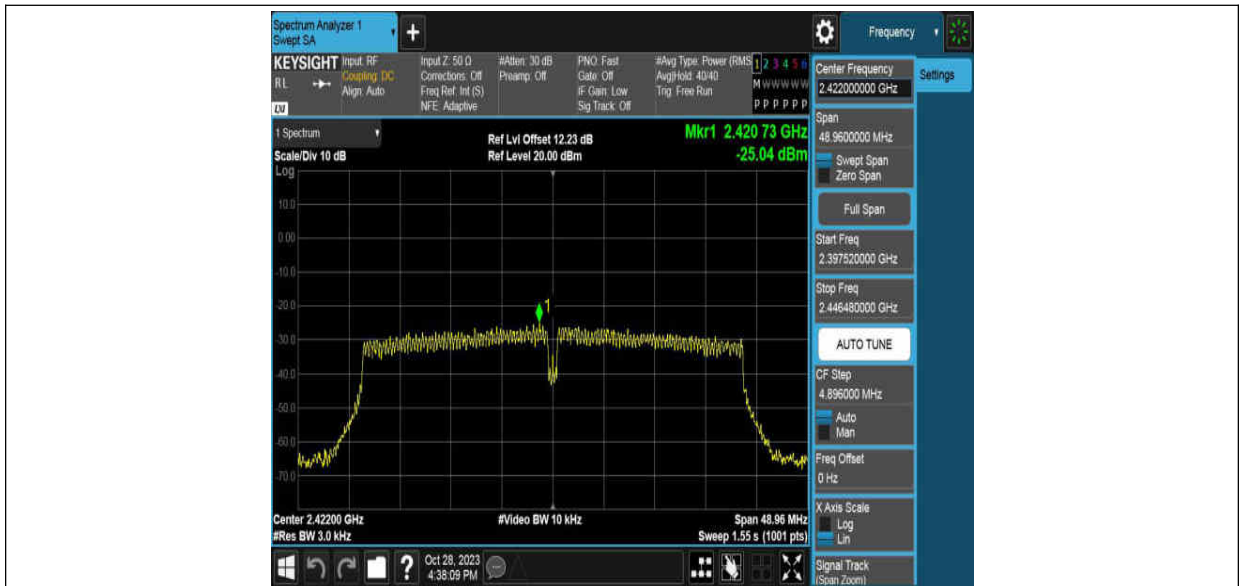
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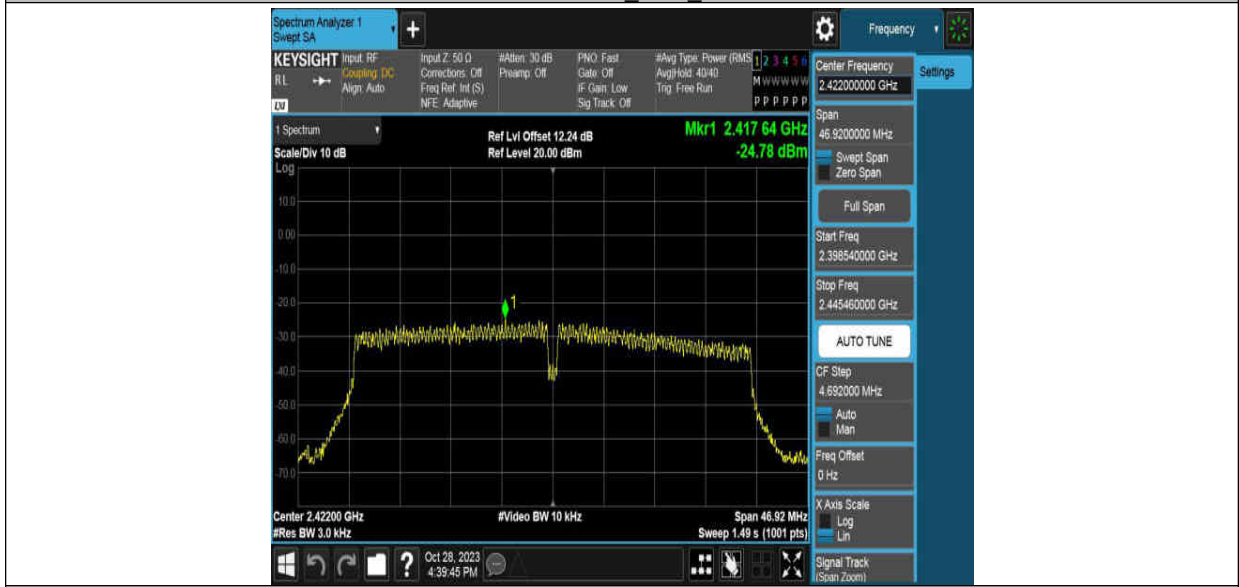
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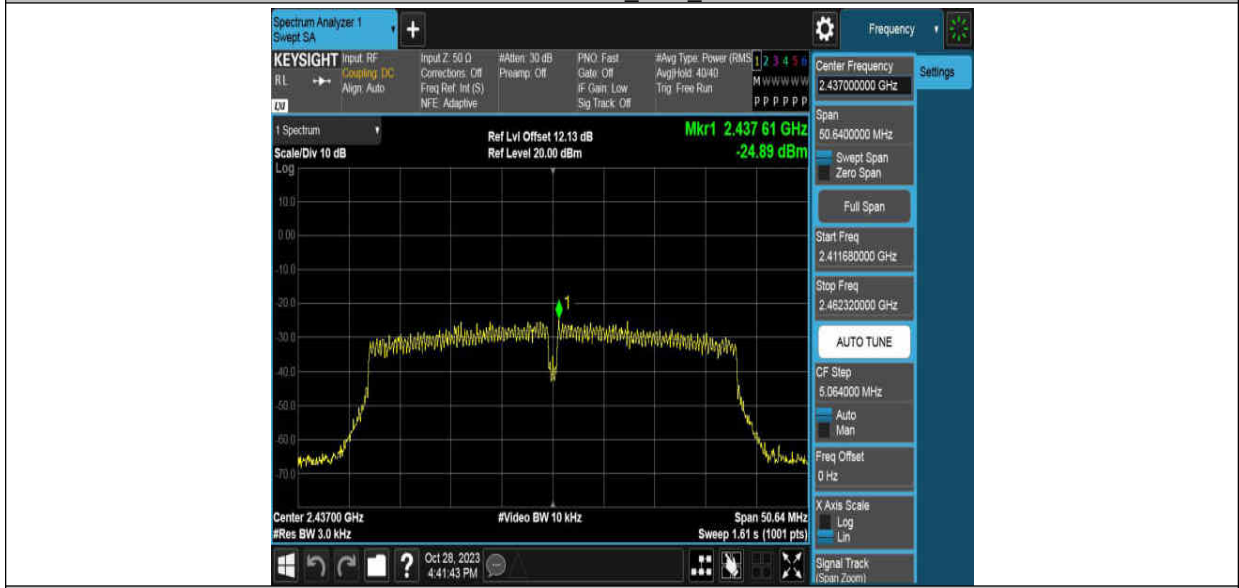
11N40MIMO\_Ant1\_2422



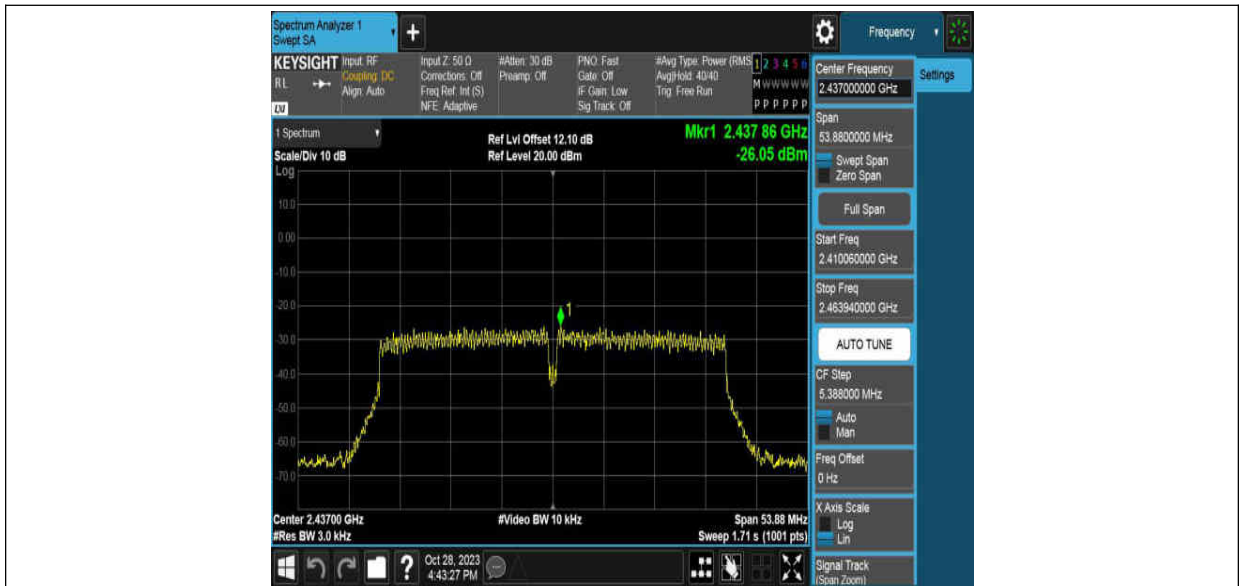
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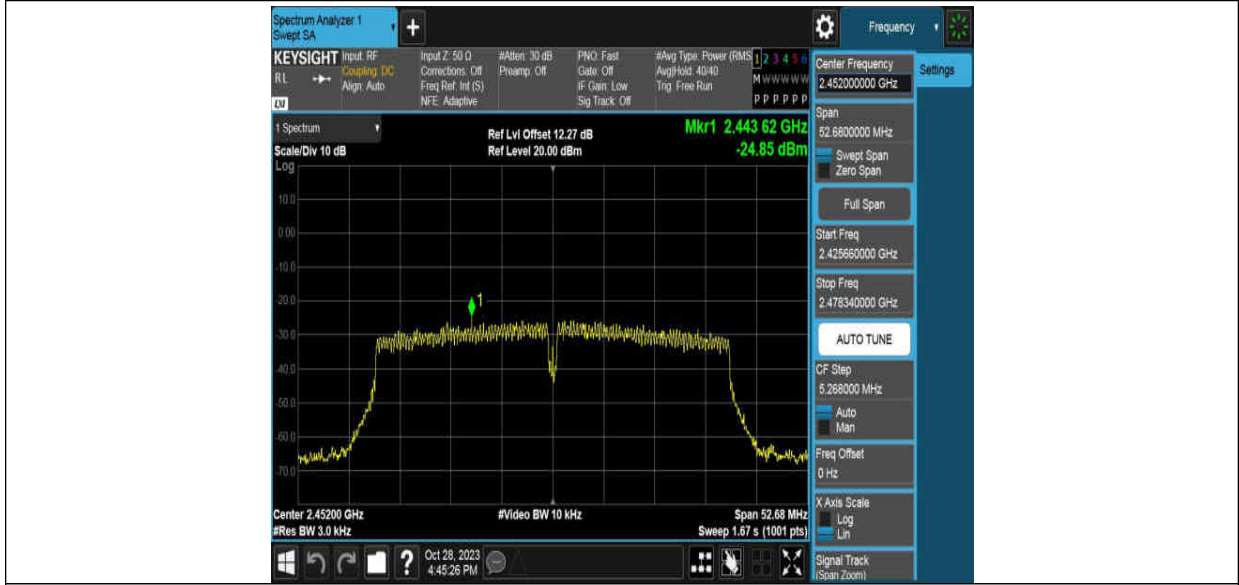
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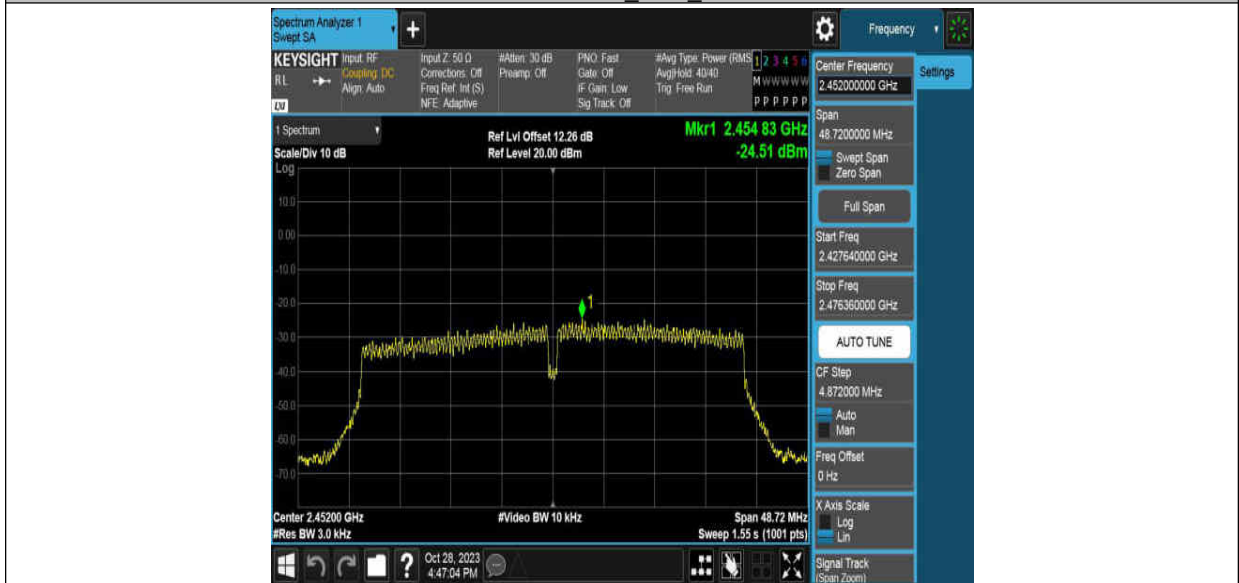
11N40MIMO\_Ant2\_2437



11N40MIMO Ant1 2452



11N40MIMO Ant2 2452



## 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	7.59	-37.98	≤-12.41	PASS
	Ant2	Low	2412	2.14	-45.38	≤-17.86	PASS
	Ant1	High	2462	1.94	-48.18	≤-18.06	PASS
	Ant2	High	2462	1.60	-48.24	≤-18.4	PASS
11G	Ant1	Low	2412	-1.31	-43.88	≤-21.31	PASS
	Ant2	Low	2412	-0.51	-44.04	≤-20.51	PASS
	Ant1	High	2462	-0.60	-47.97	≤-20.6	PASS
	Ant2	High	2462	-1.31	-47.28	≤-21.31	PASS
11N20MIMO	Ant1	Low	2412	-5.72	-46.56	≤-25.72	PASS
	Ant2	Low	2412	-6.41	-47.93	≤-26.41	PASS
	Ant1	High	2462	-5.67	-48.35	≤-25.67	PASS
	Ant2	High	2462	-4.72	-47.57	≤-24.72	PASS
11N40MIMO	Ant1	Low	2422	-7.57	-46.96	≤-27.57	PASS
	Ant2	Low	2422	-6.05	-44.94	≤-26.05	PASS
	Ant1	High	2452	-7.63	-46.54	≤-27.63	PASS
	Ant2	High	2452	-7.92	-47.98	≤-27.92	PASS

Test Mode	Ant.	Freq. (MHz)	Freq Range (Mhz)	Ref Level (dBm)	Result (dBm)	Limit (dBm)	Verdict
11B	Ant1	2412	30~1000	7.59	-60.36	≤-12.41	PASS
			1000~26500	7.59	-43.35	≤-12.41	PASS
	Ant2	2412	30~1000	2.14	-59.9	≤-17.86	PASS
			1000~26500	2.14	-51.5	≤-17.86	PASS
	Ant1	2437	30~1000	0.94	-60.62	≤-19.06	PASS
			1000~26500	0.94	-51.84	≤-19.06	PASS
	Ant2	2437	30~1000	2.21	-60.91	≤-17.79	PASS
			1000~26500	2.21	-51.88	≤-17.79	PASS
	Ant1	2462	30~1000	1.94	-60.16	≤-18.06	PASS
			1000~26500	1.94	-51.78	≤-18.06	PASS
	Ant2	2462	30~1000	1.60	-60.08	≤-18.4	PASS
			1000~26500	1.60	-51.82	≤-18.4	PASS
11G	Ant1	2412	30~1000	-1.31	-60.29	≤-21.31	PASS
			1000~26500	-1.31	-51.93	≤-21.31	PASS
	Ant2	2412	30~1000	-0.51	-60.93	≤-20.51	PASS
			1000~26500	-0.51	-51.42	≤-20.51	PASS
	Ant1	2437	30~1000	-1.43	-59.96	≤-21.43	PASS
			1000~26500	-1.43	-51.76	≤-21.43	PASS
	Ant2	2437	30~1000	-1.43	-60.58	≤-21.43	PASS
			1000~26500	-1.43	-52.16	≤-21.43	PASS
	Ant1	2462	30~1000	-0.60	-59.42	≤-20.6	PASS
			1000~26500	-0.60	-52.04	≤-20.6	PASS
	Ant2	2462	30~1000	-1.31	-60.15	≤-21.31	PASS
			1000~26500	-1.31	-50.3	≤-21.31	PASS
11N20MIMO	Ant1	2412	30~1000	-5.72	-60.35	≤-25.72	PASS
			1000~26500	-5.72	-51.41	≤-25.72	PASS
	Ant2	2412	30~1000	-6.41	-60.65	≤-26.41	PASS
			1000~26500	-6.41	-51.65	≤-26.41	PASS

	Ant1	2437	30~1000	-4.99	-60.99	$\leq -24.99$	PASS
			1000~26500	-4.99	-52.22	$\leq -24.99$	PASS
	Ant2	2437	30~1000	-5.76	-60.52	$\leq -25.76$	PASS
			1000~26500	-5.76	-51.7	$\leq -25.76$	PASS
	Ant1	2462	30~1000	-5.67	-59.83	$\leq -25.67$	PASS
			1000~26500	-5.67	-51.38	$\leq -25.67$	PASS
Ant2	2462	30~1000	-4.72	-61.02	$\leq -24.72$	PASS	
		1000~26500	-4.72	-51.28	$\leq -24.72$	PASS	
11N40MIMO	Ant1	2422	30~1000	-7.57	-57.36	$\leq -27.57$	PASS
			1000~26500	-7.57	-51.33	$\leq -27.57$	PASS
	Ant2	2422	30~1000	-6.05	-60.14	$\leq -26.05$	PASS
			1000~26500	-6.05	-51.33	$\leq -26.05$	PASS
	Ant1	2437	30~1000	-7.78	-57.72	$\leq -27.78$	PASS
			1000~26500	-7.78	-51.14	$\leq -27.78$	PASS
	Ant2	2437	30~1000	-7.01	-57.14	$\leq -27.01$	PASS
			1000~26500	-7.01	-51.38	$\leq -27.01$	PASS
	Ant1	2452	30~1000	-7.63	-53.54	$\leq -27.63$	PASS
			1000~26500	-7.63	-51.07	$\leq -27.63$	PASS
	Ant2	2452	30~1000	-7.92	-58.98	$\leq -27.92$	PASS
			1000~26500	-7.92	-51.51	$\leq -27.92$	PASS

## 12.5. Original test data

Reference level



11B Ant2 2437



11B Ant1 2462



11B Ant2 2462



11G Ant1 2412





11G\_Ant2\_2412



11G\_Ant1\_2437



11G\_Ant2\_2437



11G\_Ant1\_2462



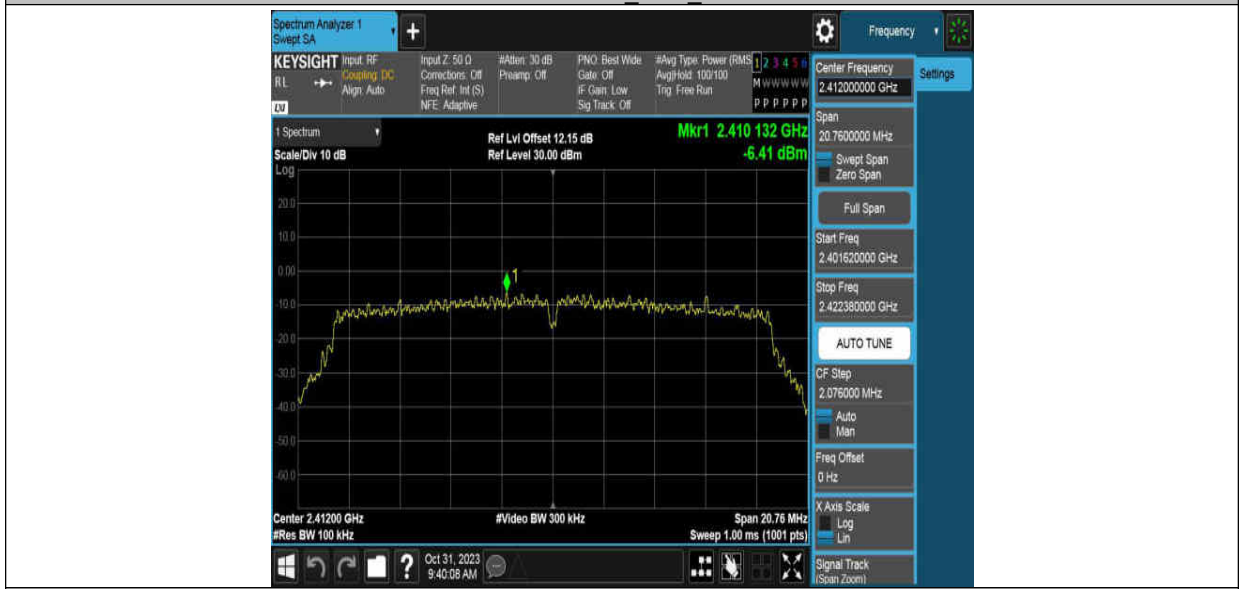
11G\_Ant2\_2462



11N20MIMO\_Ant1\_2412



11N20MIMO\_Ant2\_2412



11N20MIMO\_Ant1\_2437



11N20MIMO\_Ant2\_2437



11N20MIMO\_Ant1\_2462



11N20MIMO\_Ant2\_2462



11N40MIMO\_Ant1\_2422