

## TEST REPORT

**Applicant:** CTOUCH Europe B.V.  
**Address of Applicant:** Achtseweg Zuid 153R, 5651 GW Eindhoven, Nederlands  
**Manufacturer/Factory:** CTOUCH Europe B.V.  
**Address of Manufacturer/Factory:** Achtseweg Zuid 153R, 5651 GW Eindhoven, Nederlands  
**Equipment Under Test (EUT)**  
**Product Name:** WIFI6 MODULE  
**Model No.:** 6252M-PUB  
**Trade Mark:** CTOUCH  
**FCC ID:** 2APQQ-6252M-PUB  
**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.247  
ANSI C63.10:2013  
**Date of sample receipt:** December 6, 2022  
**Date of Test:** December 19, 2022~January 12, 2023  
**Date of report issued:** January 12, 2023  
**Test Result :** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Luo

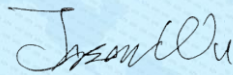
Laboratory Manager

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## 2 Version

Version No.	Date	Description
00	2023-1-12	Original

Prepared By:

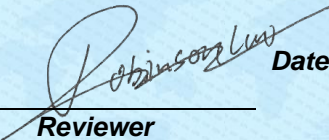


Date:

2023-1-12

Project Engineer

Check By:



Reviewer

Date:

2023-1-12

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## 4 Test Summary

Test Item	Section	Result
Antenna requirement	FCC part 15.203/15.247 (b)(4)	Pass
AC Power Line Conducted Emission	FCC part 15.207	Not Applicable
Conducted Peak Output Power	FCC part 15.247 (b)(3)	Pass
Channel Bandwidth & 99% OCB	FCC part 15.247 (a)(2)	Pass
Power Spectral Density	FCC part 15.247 (e)	Pass
Band Edge	FCC part 15.247(d)	Pass
Spurious Emission	FCC part 15.205/15.209	Pass

*Remark: Test according to ANSI C63.10:2013*

*Pass: The EUT complies with the essential requirements in the standard.*

### Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	1 x 10 <sup>-7</sup>
2	Duty cycle	0.37%
3	Occupied Bandwidth	3%
4	RF conducted power	0.75dB
5	RF power density	3dB
6	Conducted Spurious emissions	2.58dB
7	AC Power Line Conducted Emission	3.44dB (0.15MHz ~ 30MHz)
8	Radiated Spurious emission test	3.1dB (9kHz-30MHz)
		3.8039dB (30MHz-200MHz)
		3.9679dB (200MHz-1GHz)
		4.29dB (1GHz-18GHz)
		3.30dB (18GHz-40GHz)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

## 5 General Information

### 5.1 General Description of EUT

Product Name:	WIFI6 MODULE
Model No.:	6252M-PUB
Serial No.:	6252M-PUB-1
Hardware version:	V1.0
Software version:	V1.0
Test sample(s) ID:	GTSL202212000236-1
Sample(s) Status	Engineer sample
Operation Frequency:	802.11b/802.11g/802.11n(HT20)/ 802.11ax(HE20): 2412MHz~2462MHz 802.11n(HT40)/802.11ax(HE40): 2422MHz~2452MHz
Channel numbers:	802.11b/802.11g /802.11n(HT20)/802.11ax(HE20): 11 802.11n(HT40)/802.11ax(HE40):7
Channel separation:	5MHz
Modulation technology:	802.11b: DSSS 802.11g/802.11n(HT20)/802.11n(HT40): OFDM 802.11ax(HE20)/802.11ax(HE40): OFDMA CDD: 802.11b/g/n/ax (802.11ax mode only support Full RU)
Antenna Type:	External Antenna
Antenna gain:	ANTA:1.86dBi ANTB:1.86dBi MIMO technology: (PSD directional gain=4.87dBi, Power directional gain=4.87dBi)
Power Supply:	DC 3.3V

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz	X	

**Note:**

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	Frequency (MHz)	
	802.11b /802.11g /802.11n(HT20) / 802.11ax(HE20)	802.11n(HT40) / 802.11ax(HE40)
Lowest channel	2412MHz	2422MHz
Middle channel	2437MHz	2437MHz
Highest channel	2462MHz	2452MHz

Test Item	Software	Description
Conducted RF Testing and Radiated testing	MP_AX	Set the EUT to different modulation and channel

**Output power setting table:**

Test Mode	Set Tx Output Power	Data Rate
802.11b-CDD	17	1Mbps
802.11g-CDD	8	54Mbps
802.11n(HT20)-CDD	6	MCS7
802.11n(HT40)-CDD	5	MCS7
802.11ax(HE20)-CDD	5	MCS7
802.11ax(HE40)-CDD	4	MCS7

## 5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
<p><i>Remark: During the test, the duty cycle &gt;98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data. New battery is used during all test.</i></p>	

## 5.3 Description of Support Units

Computer Mode Number: TPC-F123-MT / Displayer Mode Number: KG223Q
Mouse Mode Number: KM10 / keyboard Mode Number: MK11

## 5.4 Deviation from Standards

None.
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## 5.5 Abnormalities from Standard Conditions

None.
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## 5.6 Test Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> <li>● <b>FCC—Registration No.: 381383</b> Designation Number: CN5029 Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files.</li> <li>● <b>IC —Registration No.: 9079A</b> CAB identifier: CN0091 The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing</li> <li>● <b>NVLAP (LAB CODE:600179-0)</b> Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).</li> </ul>
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## 5.7 Test Location

All tests were performed at:
<p>Global United Technology Services Co., Ltd. Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Tel: 0755-27798480 Fax: 0755-27798960</p>

## 6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July 02, 2020	July 01, 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	April 22, 2022	April 21, 2023
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	March 21, 2022	March 20, 2023
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June 12, 2022	June 11, 2023
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June 23, 2022	June 22, 2023
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	April 22, 2022	April 21, 2023
9	Coaxial Cable	GTS	N/A	GTS211	April 22, 2022	April 21, 2023
10	Coaxial cable	GTS	N/A	GTS210	April 22, 2022	April 21, 2023
11	Coaxial Cable	GTS	N/A	GTS212	April 22, 2022	April 21, 2023
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	April 22, 2022	April 21, 2023
13	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 23, 2022	June 22, 2023
14	Band filter	Amindeon	82346	GTS219	June 23, 2022	June 22, 2023
15	Power Meter	Anritsu	ML2495A	GTS540	June 23, 2022	June 22, 2023
16	Power Sensor	Anritsu	MA2411B	GTS541	June 23, 2022	June 22, 2023
17	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	April 22, 2022	April 21, 2023
18	Splitter	Agilent	11636B	GTS237	June 23, 2022	June 22, 2023
19	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov. 30, 2021	Nov. 29, 2022
20	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	April 22, 2022	April 21, 2023
21	Breitband hornantenna	SCHWARZBECK	BBHA 9170	GTS579	Oct. 16, 2022	Oct. 15, 2023
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 16, 2022	Oct. 15, 2023
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 16, 2022	Oct. 15, 2023
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June 23, 2022	June 22, 2023
25	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	April 22, 2022	April 21, 2023



RF Conducted Test:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	April 22, 2022	April 21, 2023
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 22, 2022	April 21, 2023
3	Spectrum Analyzer	Agilent	E4440A	GTS536	April 22, 2022	April 21, 2023
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	April 22, 2022	April 21, 2023
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	April 22, 2022	April 21, 2023
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	April 22, 2022	April 21, 2023
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	April 22, 2022	April 21, 2023
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	April 22, 2022	April 21, 2023

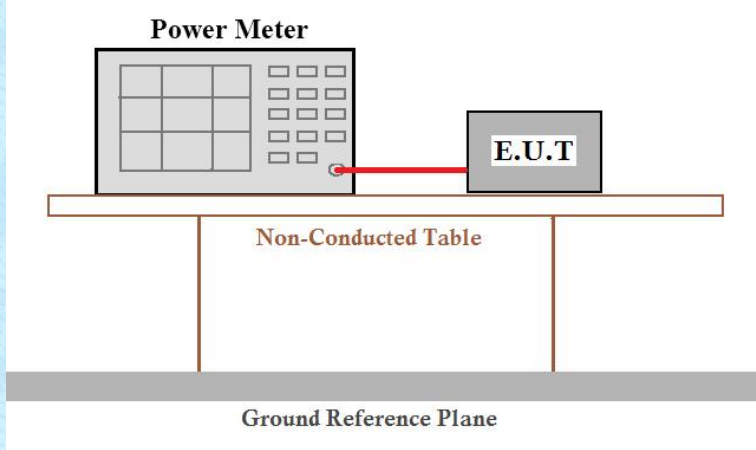
General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	April 25, 2022	April 24, 2023
2	Barometer	KUMAO	SF132	GTS647	July 26, 2022	July 25, 2023

## 7 Test results and Measurement Data

### 7.1 Antenna requirement

Standard requirement:	<b>FCC Part15 C Section 15.203 /247(b) (4)</b>
<p><b>15.203 requirement:</b></p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p><b>15.247(b)(4) requirement:</b></p> <p>(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p>	
<b>EUT Antenna:</b>	
<p><i>The antenna is External Antenna, the best case gain of the antenna is 1.86dBi, reference to the appendix II for details</i></p>	

## 7.2 Conducted Peak Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	30dBm
Test setup:	 <p>The diagram illustrates the test setup. A Power Meter is connected to an E.U.T. (Equipment Under Test) via a red cable. Both are placed on a Non-Conducted Table, which sits on a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

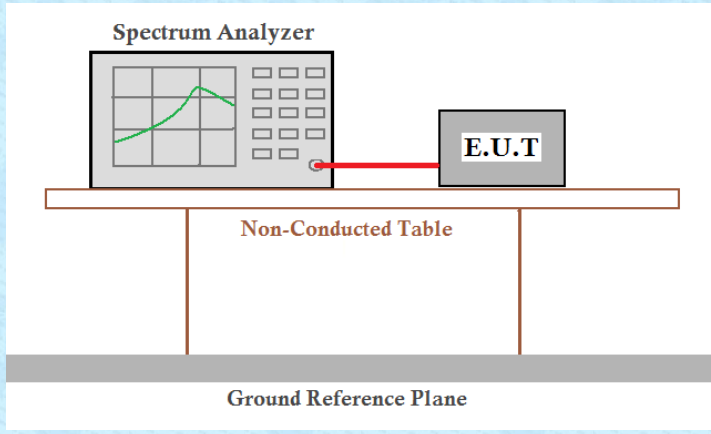
**Measurement Data**

**Output Power:**

802.11b mode						
CH No.	Frequency (MHz)	Output Power (dBm)			Limit (dBm)	Result
		ANT A	ANT B	ANT A+B		
01	2412	14.074	13.315	16.721	30	Pass
06	2437	14.143	13.012	16.625		
11	2462	14.135	13.06	16.641		
802.11g mode						
CH No.	Frequency (MHz)	Output Power (dBm)			Limit (dBm)	Result
		ANT A	ANT B	ANT A+B		
03	2412	15.6	14.687	18.178	30	Pass
06	2437	15.589	14.214	17.966		
09	2462	15.635	14.532	18.129		
802.11 n(HT20) mode						
CH No.	Frequency (MHz)	Output Power (dBm)			Limit (dBm)	Result
		ANT A	ANT B	ANT A+B		
01	2412	15.582	14.696	18.172	30	Pass
06	2437	15.259	14.219	17.78		
11	2462	16.135	14.914	18.578		
802.11 n(HT40) mode						
CH No.	Frequency (MHz)	Output Power (dBm)			Limit (dBm)	Result
		ANT A	ANT B	ANT A+B		
03	2422	15.791	14.482	18.196	30	Pass
06	2437	15.419	14.602	18.04		
09	2452	16.569	14.529	18.678		

802.11 ax(HE20) mode						
CH No.	Frequency (MHz)	Output Power (dBm)			Limit (dBm)	Result
		ANT A	ANT B	ANT A+B		
01	2412	15.053	14.037	17.585	30	Pass
06	2437	15.118	14.311	17.744		
11	2462	15.505	14.613	18.092		
802.11 ax(HE40) mode						
CH No.	Frequency (MHz)	Output Power (dBm)			Limit (dBm)	Result
		ANT A	ANT B	ANT A+B		
03	2422	15.326	14.391	17.894	30	Pass
06	2437	14.854	14.328	17.609		
09	2452	15.589	14.22	17.969		

## 7.3 Channel Bandwidth & 99% Occupancy Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.10:2013 and KDB558074 D01 15.247 Meas Guidance v05r02
Limit:	>500kHz
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table, which is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

### Measurement Data

Test Channel	Channel Bandwidth (MHz)								Limit(kHz)	Result
	802.11b		802.11g		802.11n(HT20)		802.11n(HT40)			
	ANT A	ANT B	ANT A	ANT B	ANT A	ANT B	ANT A	ANT B		
Lowest	10.1	11.01	16.33	16.31	17.35	16.9	35.75	36.18	>500	Pass
Middle	11.07	10.09	16.35	16.33	16.74	17.55	35.77	35.36		
Highest	10.13	10.11	16.33	16.32	17.15	17.54	35.64	35.86		

Test Channel	Channel Bandwidth (MHz)				Limit(kHz)	Result
	802.11ax(HE20)		802.11ax(HE40)			
	ANT A	ANT B	ANT A	ANT B		
Lowest	18.39	18.19	25.83	29.09	>500	Pass
Middle	18.79	18.64	37.53	36.4		
Highest	18.09	18.16	36.45	37.2		

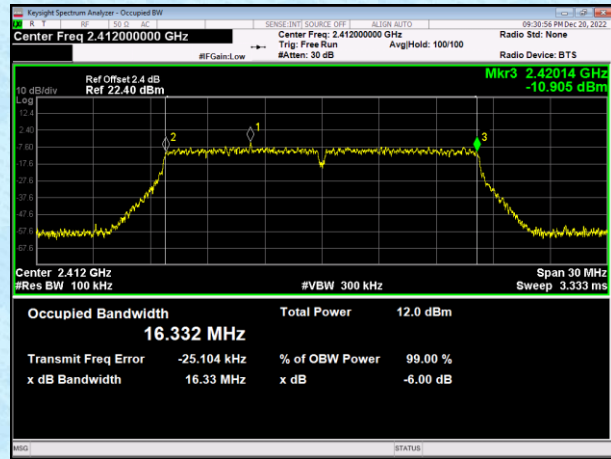
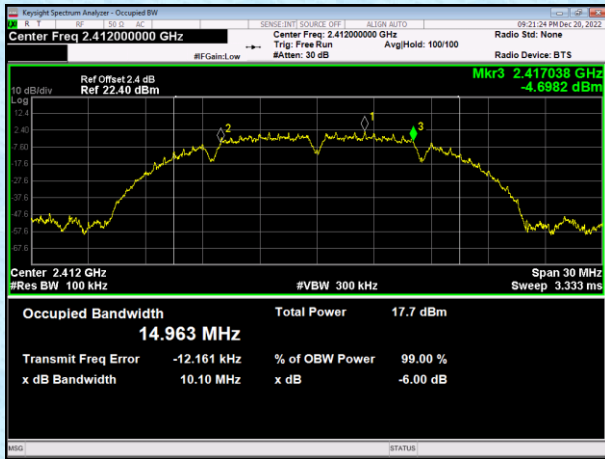
Test Channel	99% Occupy Bandwidth (MHz)								Result
	802.11b		802.11g		802.11n(HT20)		802.11n(HT40)		
	ANT A	ANT B	ANT A	ANT B	ANT A	ANT B	ANT A	ANT B	
Lowest	14.925	14.874	16.355	16.346	17.537	17.527	36.1	36.028	Pass
Middle	14.954	14.862	16.366	16.329	17.532	17.533	36.143	36.076	
Highest	14.92	14.858	16.348	16.358	17.533	17.529	36.052	36.054	

Test Channel	99% Occupy Bandwidth (MHz)				Result
	802.11ax(HE20)		802.11ax(HE40)		
	ANT A	ANT B	ANT A	ANT B	
Lowest	18.863	18.923	37.228	37.1	Pass
Middle	18.896	18.908	37.693	37.722	
Highest	18.87	18.823	37.666	37.64	

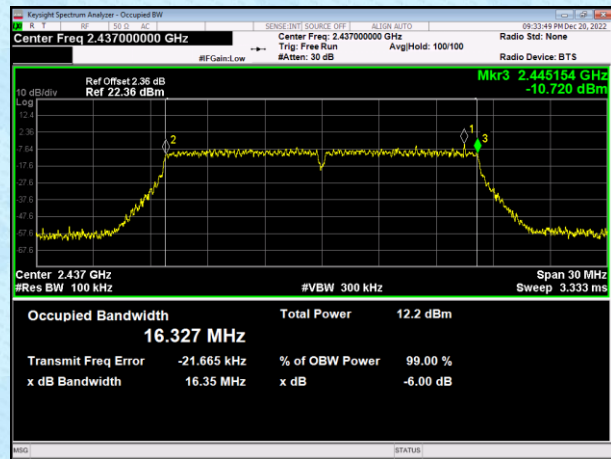
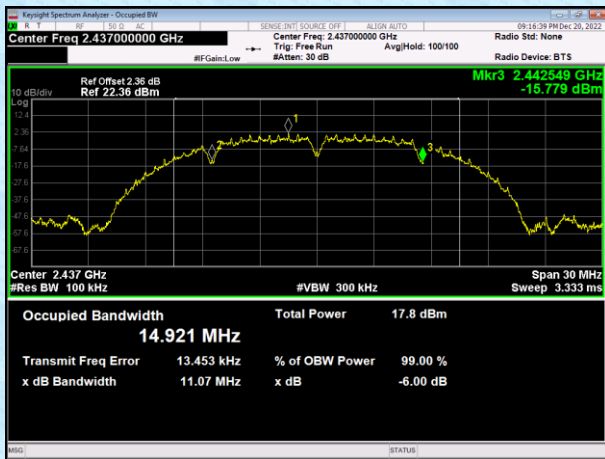
Test plot as follows:

-6dB BW(ANT A):

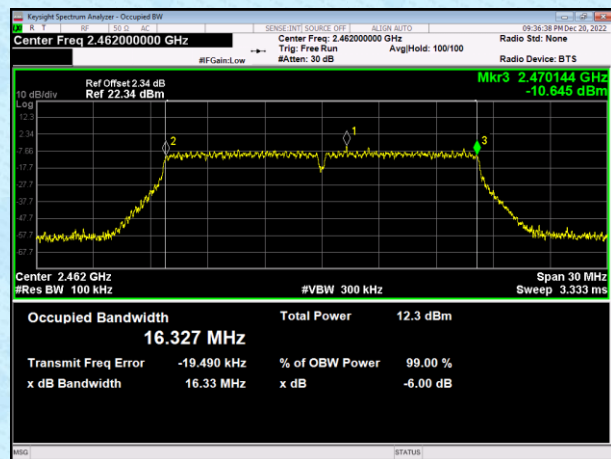
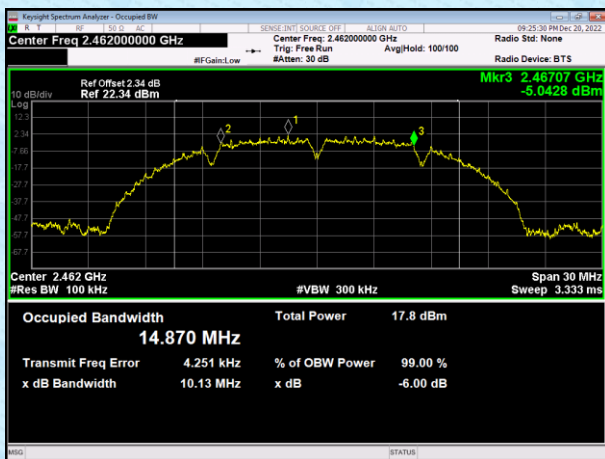
Test mode:	802.11b	Test mode:	802.11g
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Lowest channel



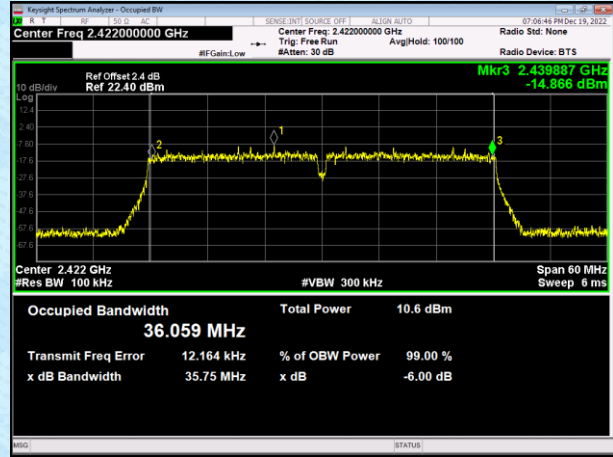
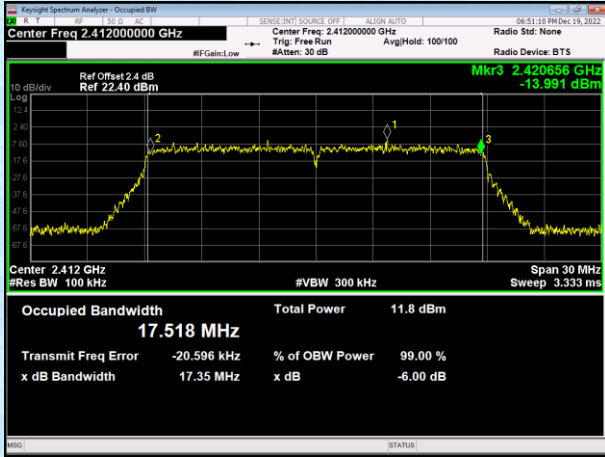
Middle channel



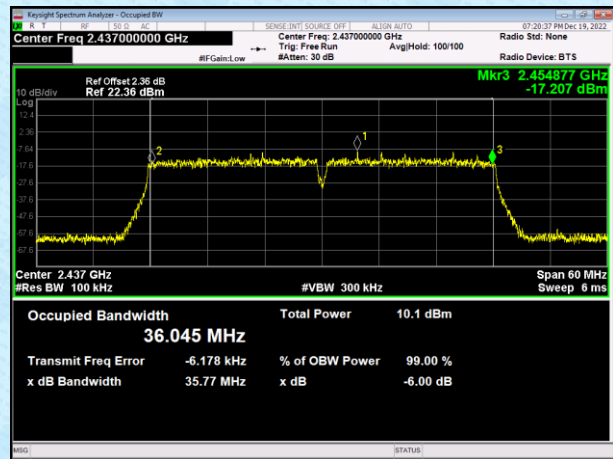
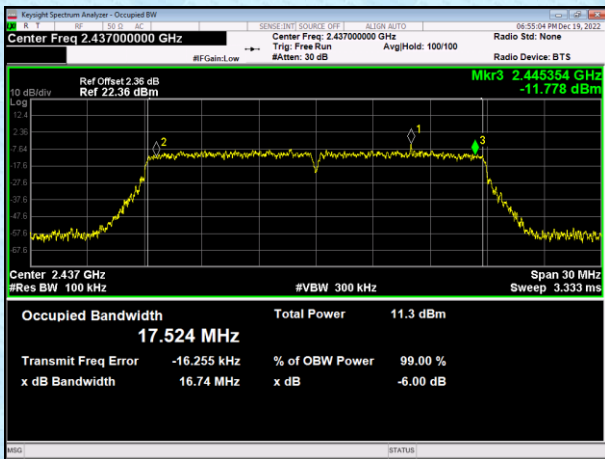
Highest channel



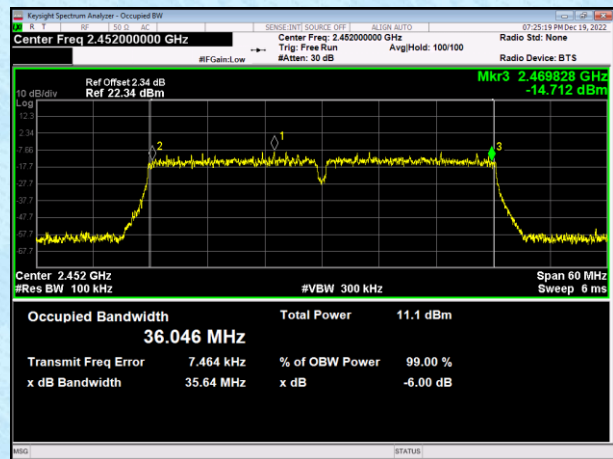
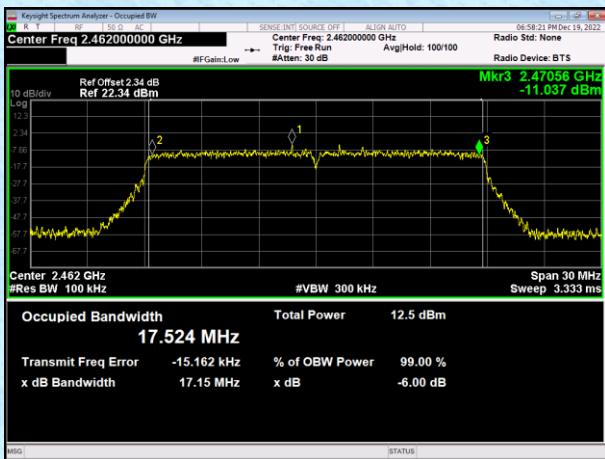
Test mode:	802.11n(HT20)	Test mode:	802.11n(HT40)
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Lowest channel

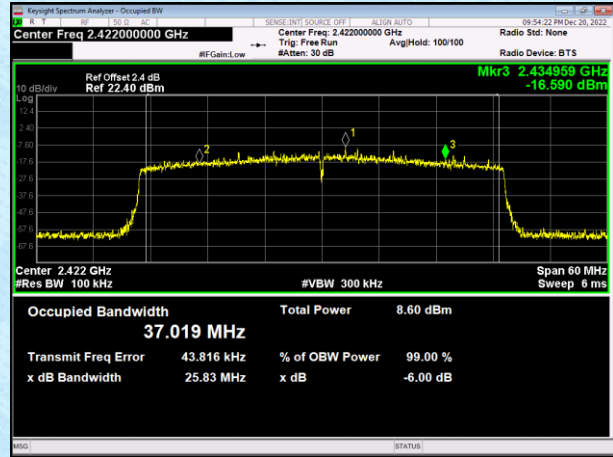
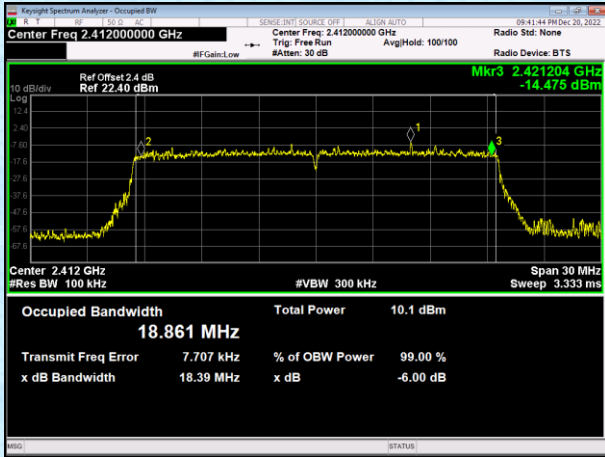


Middle channel

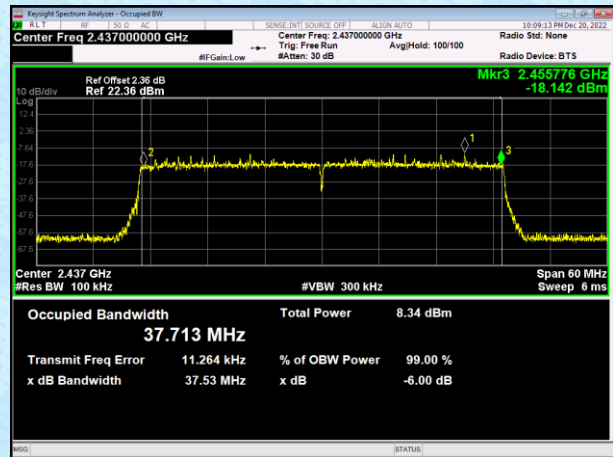
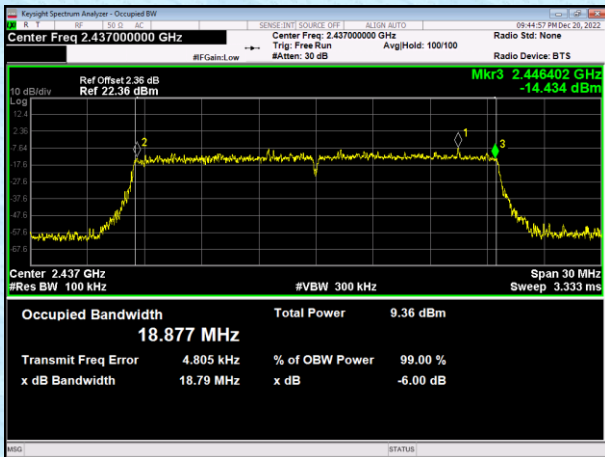


Highest channel

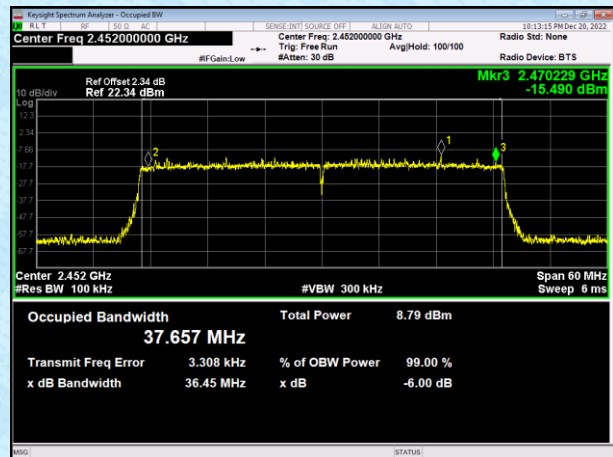
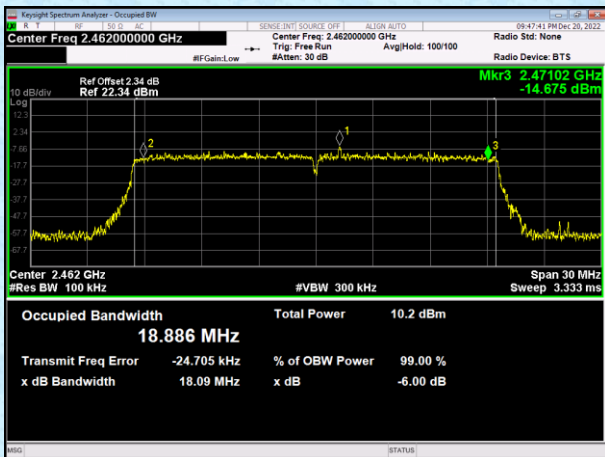
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Lowest channel



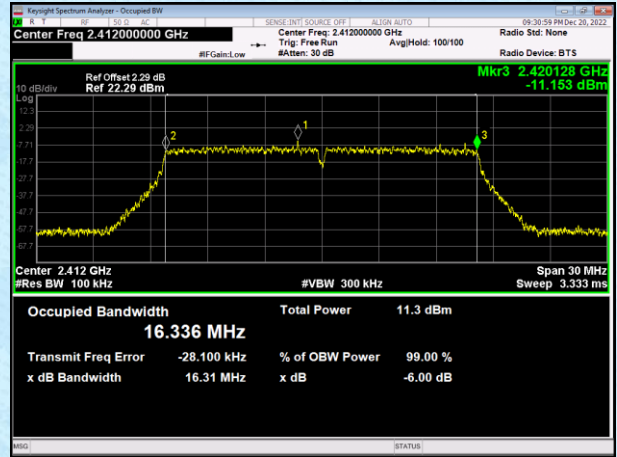
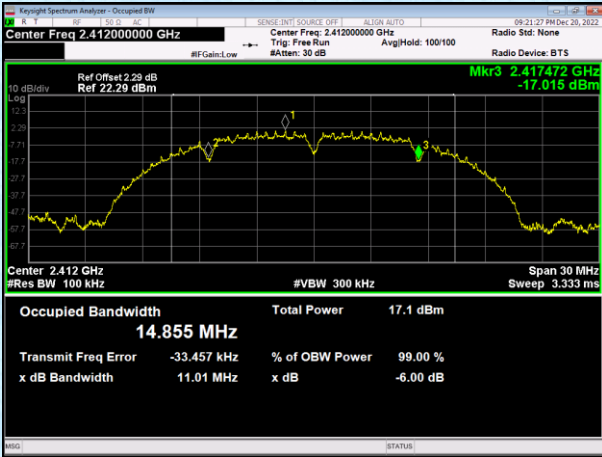
Middle channel



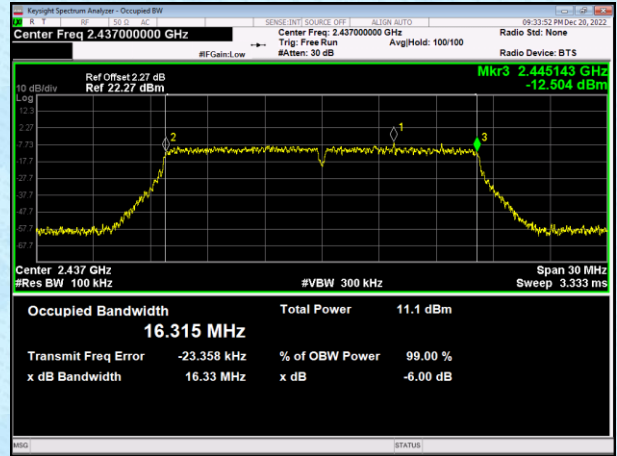
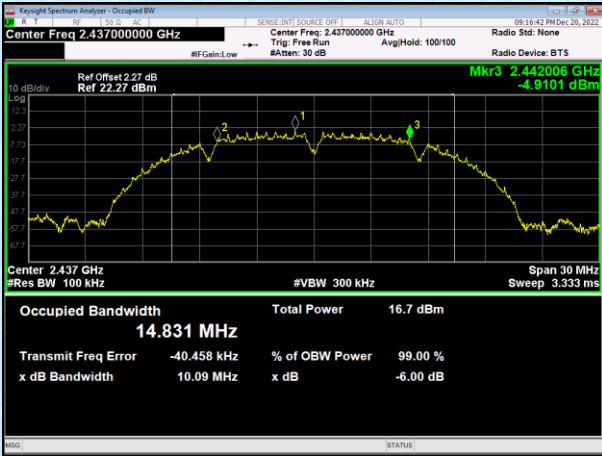
Highest channel

-6dB BW (ANT B):

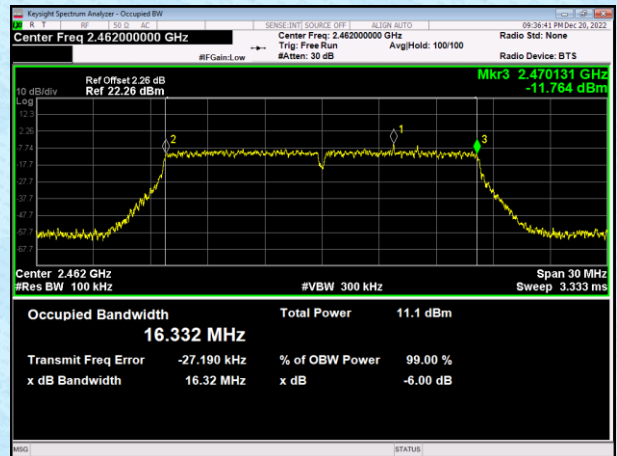
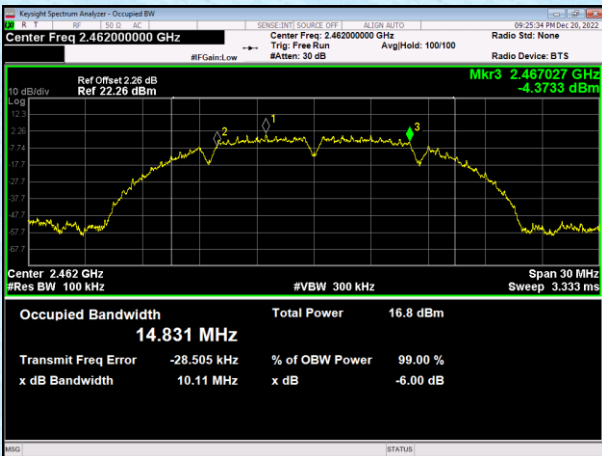
Test mode:	802.11b	Test mode:	802.11g
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Lowest channel

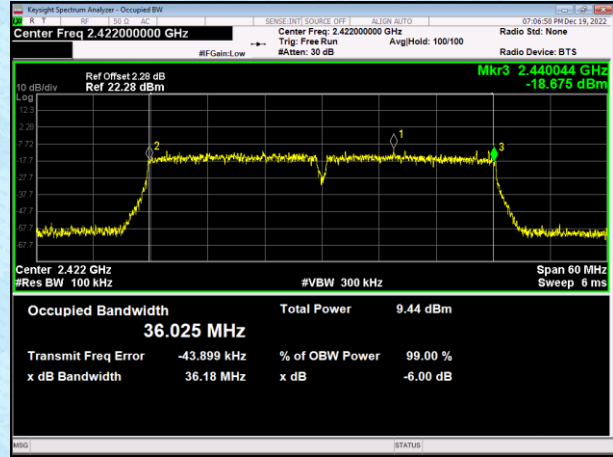
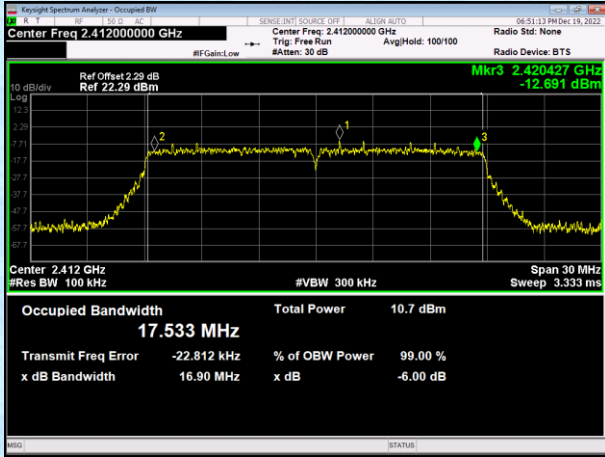


Middle channel

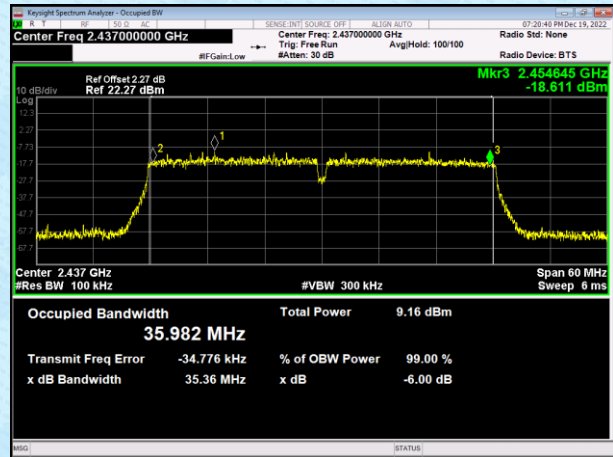
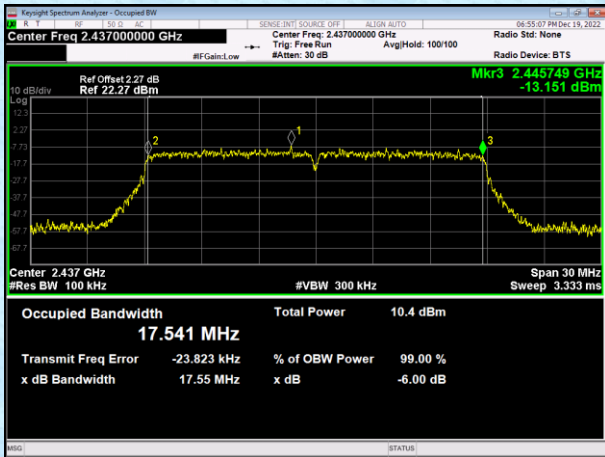


Highest channel

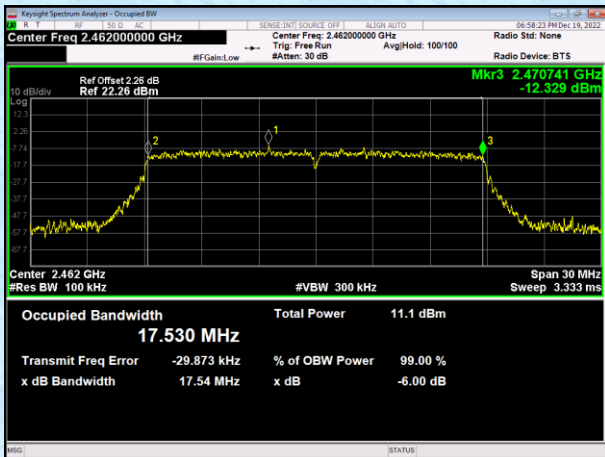
Test mode:	802.11n(HT20)	Test mode:	802.11n(HT40)
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Lowest channel

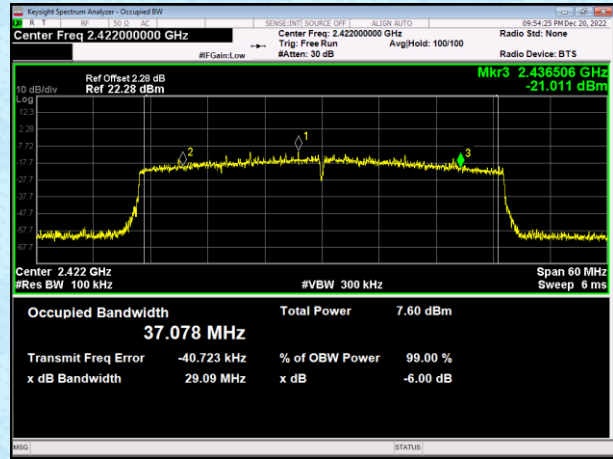
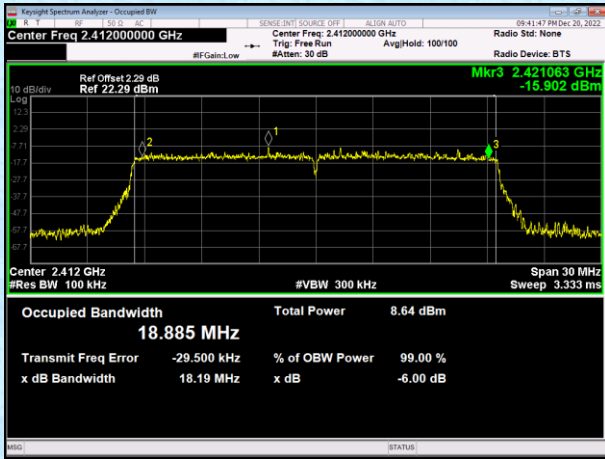


Middle channel

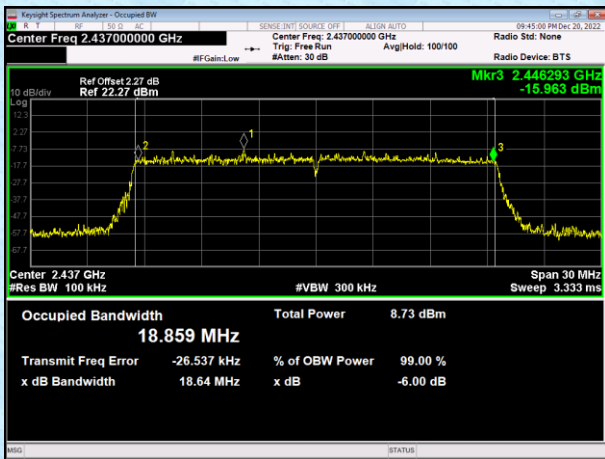


Highest channel

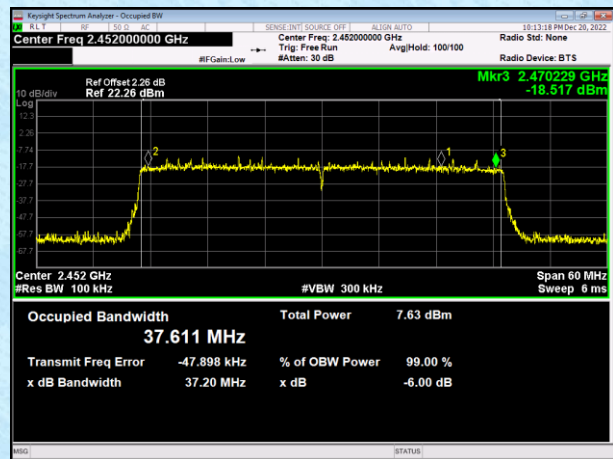
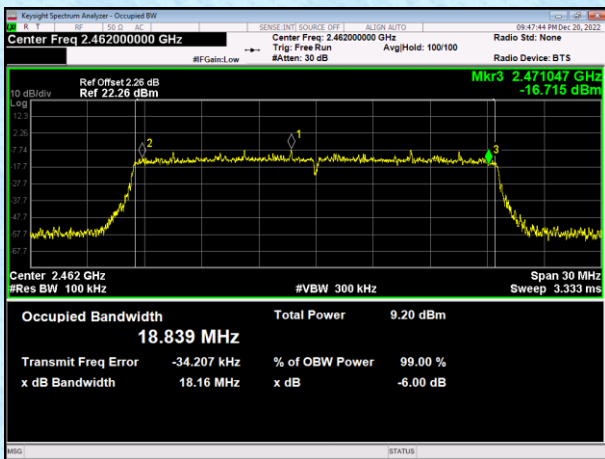
Test mode:	802.11ax(HE20)	Test mode:	802.11ax(HE40)
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Lowest channel



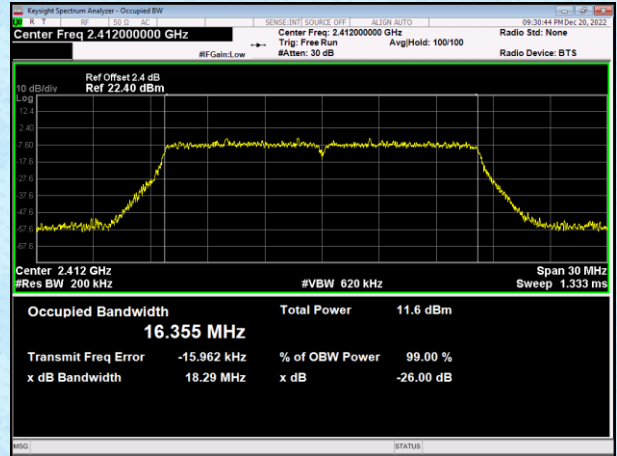
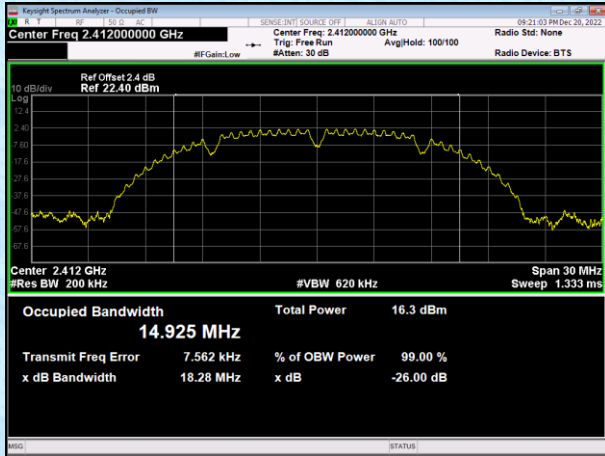
Middle channel



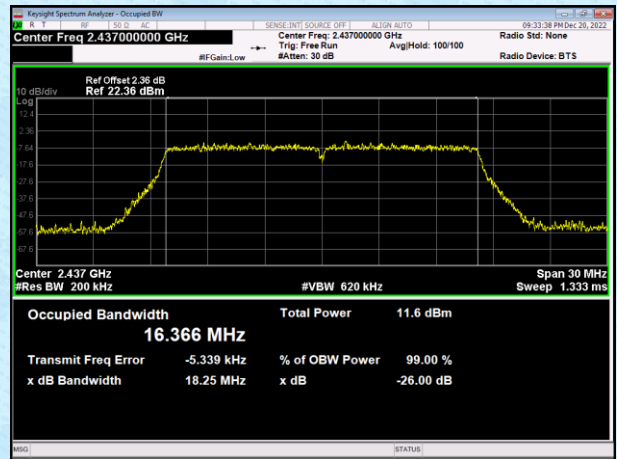
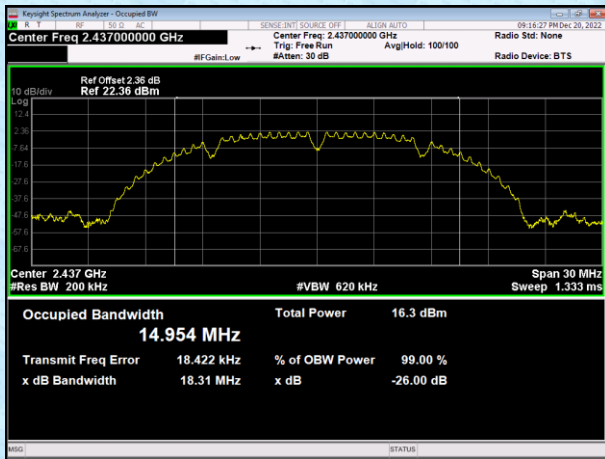
Highest channel

**99% BW (ANT A):**

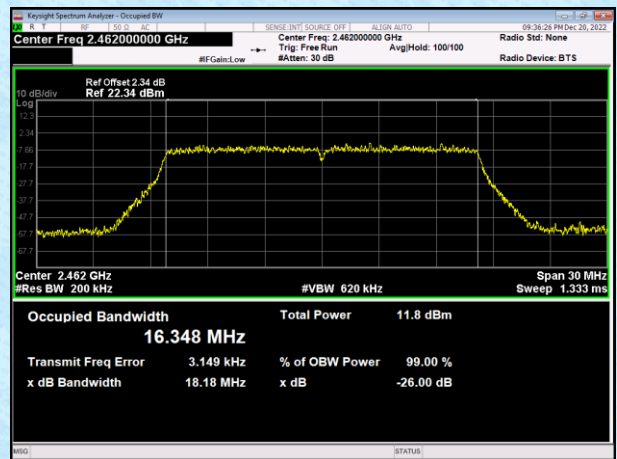
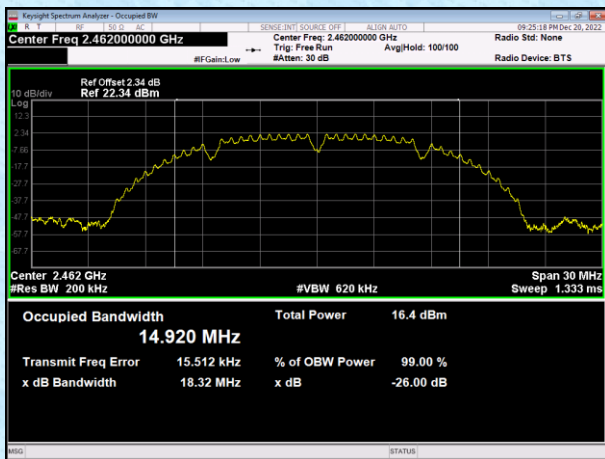
Test mode:	802.11b	Test mode:	802.11g
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Lowest channel

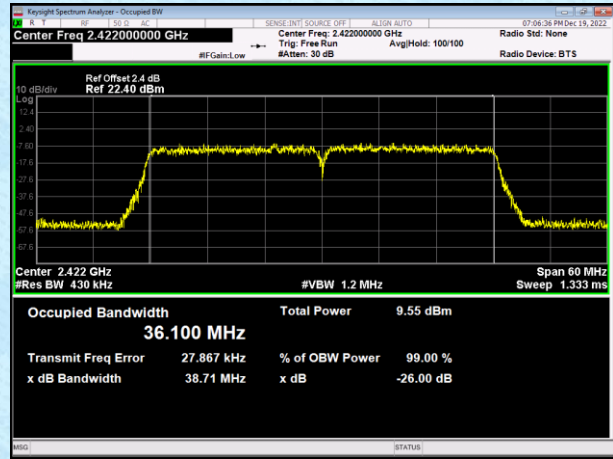
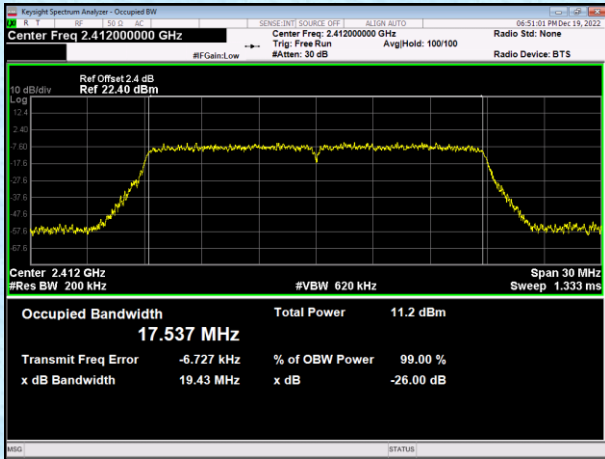


Middle channel

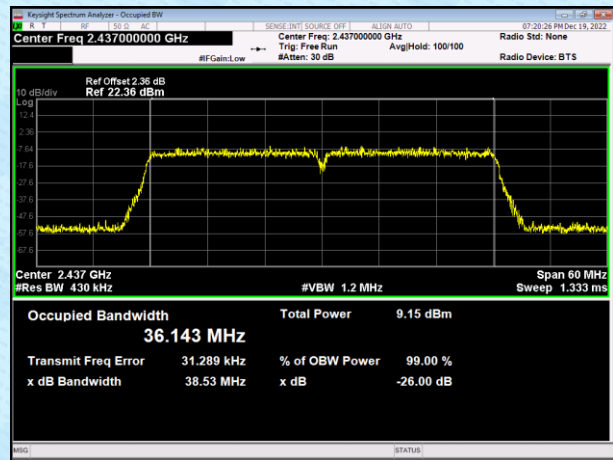
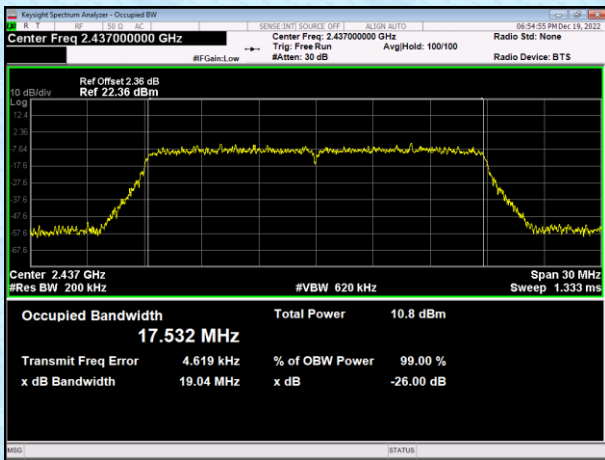


Highest channel

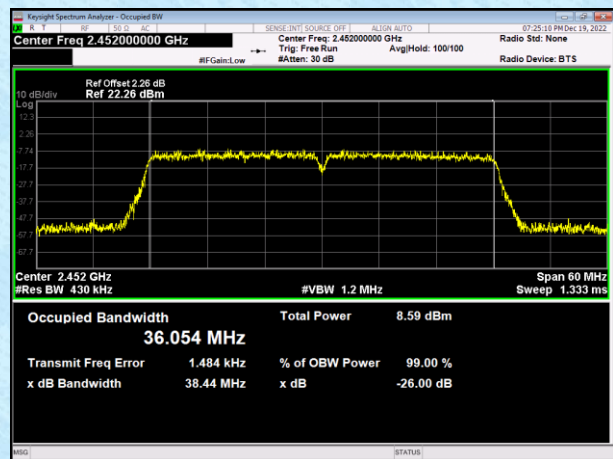
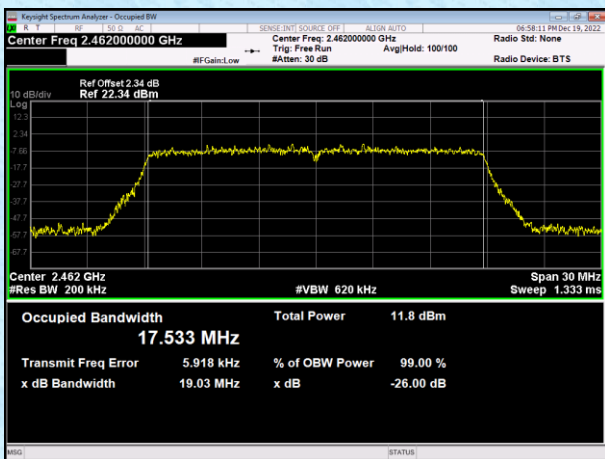
Test mode:	802.11n(HT20)	Test mode:	802.11n(HT40)
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Lowest channel



Middle channel



Highest channel