



FCC Test Report

Test Report
On Behalf of
MICRO COMPUTER (HK) TECH LIMITED
For
Mini PC

Model No.: X1 Pro-370, X1 Pro-365, X1 Pro-*****: where* =
“0-9”, “A-Z”, “-”, “space”

FCC ID: 2A49R-X1PRO

Prepared For: **MICRO COMPUTER (HK) TECH LIMITED**
RM 18, 28/F, Shui On Centre, 6-8 Harbour Road, Waterfront, Wan Chai, HK,
HONG KONG, China

Prepared By: **Shenzhen HUAKE Testing Technology Co., Ltd.**
1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping,
Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Date of Test: **Jan. 10, 2025 ~ Feb. 07, 2025**

Date of Report: **Feb. 21, 2025**

Report Number: **HK2501100235-3E**



Test Result Certification

Applicant's Name.....: MICRO COMPUTER (HK) TECH LIMITED
Address: RM 18, 28/F, Shui On Centre, 6-8 Harbour Road, Waterfront, Wan Chai, HK, HONG KONG, China
Manufacturer's Name: MICRO COMPUTER (HK) TECH LIMITED
Address: RM 18, 28/F, Shui On Centre, 6-8 Harbour Road, Waterfront, Wan Chai, HK, HONG KONG, China
Product Description
Trade Mark.....: N/A
Product Name.....: Mini PC
Model and/or Type Reference : X1 Pro-370, X1 Pro-365, X1 Pro-*****: where* = "0-9", "A-Z", "-", "space"
Standards: FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.10: 2013

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen HUAKE Testing Technology Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen HUAKE Testing Technology Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Date of Test:
Date (s) of Performance of Tests: Jan. 10, 2025 ~ Feb. 07, 2025
Date of Issue.....: Feb. 21, 2025
Test Result.....: Pass

Testing Engineer :

(Len Liao)

Technical Manager :

(Sliver Wan)

Authorized Signatory :

(Jason Zhou)



Table of Contents

1. Test Result Summary	5
1.1 Test Procedures and Results.....	5
1.2 Information of the Test Laboratory	5
1.3 Measurement Uncertainty	6
2. EUT Description	7
2.1 General Description of EUT	7
2.2 Carrier Frequency of Channels.....	8
2.3 Operation of EUT during Testing.....	8
2.4 Description of Test Setup.....	9
2.5 Description of Support Units	10
3. General Information.....	11
3.1 Test Environment and Mode	11
4. Test Results and Measurement Data	17
4.1 Conducted Emission.....	17
4.2 Maximum Conducted Output Power	21
4.3 Emission Bandwidth	24
4.4 Power Spectral Density	41
4.5 Conducted Band Edge and Spurious Emission Measurement	75
4.6 Radiated Spurious Emission Measurement	117
4.7 Antenna Requirement.....	173
5. Photographs of Test.....	174
6. Photos of the EUT.....	176



**** Modified History ****

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	Feb. 21, 2025	Jason Zhou



1. Test Result Summary

1.1 Test Procedures and Results

Requirement	CFR 47 Section	Result
Antenna Requirement	§15.203/§15.247(b)(4)	PASS
AC Power Line Conducted Emission	§15.207	PASS
Conducted Peak Output Power	§15.247(b)(3)	PASS
6dB Emission Bandwidth	§15.247(a)(2)	PASS
Power Spectral Density	§15.247(e)	PASS
Band Edge	§15.247(d)	PASS
Spurious Emission	§15.205/§15.209	PASS

Note:

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

1.2 Information of the Test Laboratory

Shenzhen HUAKE Testing Technology Co., Ltd.

Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization:

A2LA Accreditation Code is 4781.01.

FCC Designation Number is CN1229.

Canada IC CAB identifier is CN0045.

CNAS Registration Number is L9589.



1.3 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	$\pm 0.37\text{dB}$
2	RF Power, Conducted	$\pm 3.35\text{dB}$
3	Spurious Emissions, Conducted	$\pm 2.20\text{dB}$
4	All Emissions, Radiated(<1G)	$\pm 3.90\text{dB}$
5	All Emissions, Radiated(>1G)	$\pm 4.28\text{dB}$
6	Temperature	$\pm 0.1^{\circ}\text{C}$
7	Humidity	$\pm 1.0\%$



2. EUT Description

2.1 General Description of EUT

Equipment:	Mini PC
Model Name:	X1 Pro-370
Series Model:	X1 Pro-365, X1 Pro-*****: where* = "0-9", "A-Z", "-", "space"
Model Difference:	The difference between each model is only due to the different sales area and the model name is different, the other circuit principle, safety structure and key components are the same, the difference does not affect the safety and electromagnetic compatibility performance of the product. Test sample model: X1 Pro-370.
Trade Mark:	N/A
FCC ID:	2A49R-X1PRO
Antenna Type:	FPC antenna
Antenna Gain:	Antenna 1: -0.50dBi Antenna 2: 0.96dBi MIMO: 3.30dBi
Operation Frequency:	802.11b/g/n/ac(HT20)/ax(HE20)/be(EHT20): 2412~2462MHz 802.11n/ac(HT40)/ax(HE40)/be(EHT40): 2422~2452MHz
Number of Channels:	802.11b/g/n/ac(HT20)/ax(HE20)/be(EHT20): 11CH 802.11n/ac(HT40)/ax(HE40)/be(EHT40): 7CH
Modulation Type:	DSSS, OFDM, OFDMA
Power Source:	AC100-240V, 50/60Hz, 1.8A
Power Rating:	AC100-240V, 50/60Hz, 1.8A
Hardware Version	V1.0
Software Version:	V1.0
Note: 1. The EUT incorporates a MIMO function. Physically, it provides two completed transmitters and receivers(2T2R), two transmit signals are completely correlated, then, Direction gain=GANT + Array Gain(Array Gain=10 log(2) dB for power spectral density; Array Gain=0 for power measurement) 2. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 3. Antenna gain Refer to the antenna specifications. 4. The cable loss data is obtained from the supplier. 5. The test results in the report only apply to the tested sample.	



2.2 Carrier Frequency of Channels

Channel List for 802.11b/g/n/ac(HT20)/ax(HE20)/be(EHT20)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

Channel List for 802.11n/ac(HT40)/ax(HE40)/be(EHT40)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
--	--	04	2427	07	2442	--	--
--	--	05	2432	08	2447	--	--
03	2422	06	2437	09	2452		

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:

2.3 Operation of EUT during Testing

Operating Mode

The mode is used: Transmitting mode for 802.11b/g/n/ac(HT20)/ax(HE20)/be(EHT20)

Low Channel: 2412MHz

Middle Channel: 2437MHz

High Channel: 2462MHz

The mode is used: Transmitting mode for 802.11n/ac(HT40)/ax(HE40)/be(EHT40)

Low Channel: 2422MHz

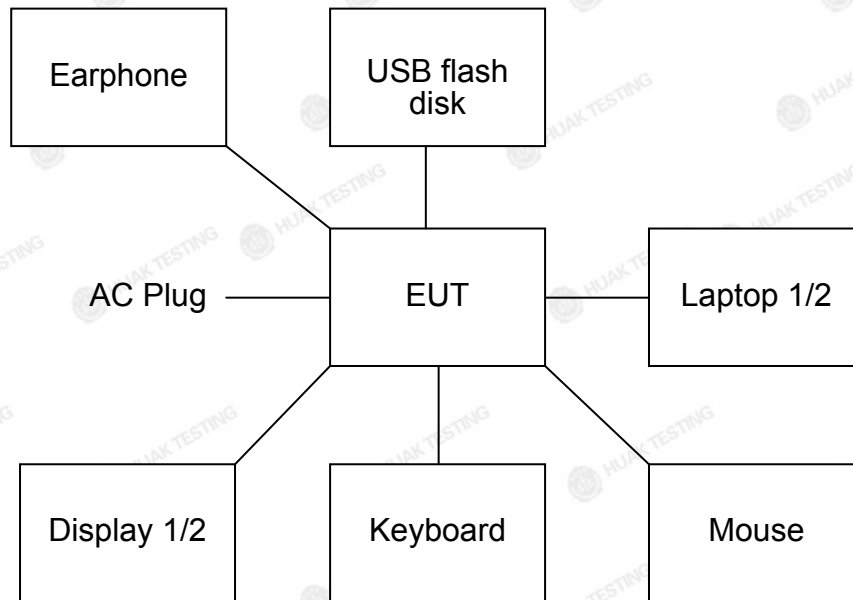
Middle Channel: 2437MHz

High Channel: 2452MHz

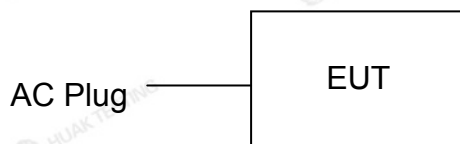


2.4 Description of Test Setup

Operation of EUT during Conducted and Radiation below 1GHz testing:



Operation of EUT during Radiation Above 1GHz testing:



The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. The worst case is X position.



2.5 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Trade Mark	Model/Type No.	Specification	Remark
1	Mini PC	N/A	X1 Pro-370	N/A	EUT
2	Laptop 1	Lenovo	TP00096A	Input: DC 20V, 2.25~3.25A Output: 5VDC, 0.5A	Peripheral
3	Laptop 2	Lenovo	TP00096A	Input: DC 20V, 2.25~3.25A Output: 5VDC, 0.5A	Peripheral
4	Display 1	AOC	280LM00004	N/A	Peripheral
5	Display 2	PHILIPS	279E1	N/A	Peripheral
6	Keyboard	N/A	N/A	N/A	Peripheral
7	Mouse	N/A	N/A	N/A	Peripheral
8	Earphone	N/A	N/A	N/A	Peripheral
9	USB flash disk	N/A	N/A	N/A	Peripheral

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. For conducted measurements (Output Power, 6dB Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.



3. General Information

3.1 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Engineering Mode:	Keep the EUT in continuous transmitting by select channel and modulations
We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:	

Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.	
Mode	Data rate
802.11b	1Mbps
802.11g	6Mbps
802.11n/ac(HT20)/ax(HE20)/be(EHT20)	6.5Mbps
802.11n/ac(HT40)/ax(HE40)/be(EHT40)	13.5Mbps
Final Test Mode:	
Operation Mode:	Keep the EUT in continuous transmitting with modulation
1. For WIFI function, the engineering test program was provided and enabled to make EUT continuous transmit/receive. 2. According to ANSI C63.10 standards, the test results are both the “worst case” and “worst setup” 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n/ac(HT20)/ax(HE20)/be(EHT20), 13.5Mbps for 802.11n/ac(HT40)/ax(HE40)/be(EHT40).	

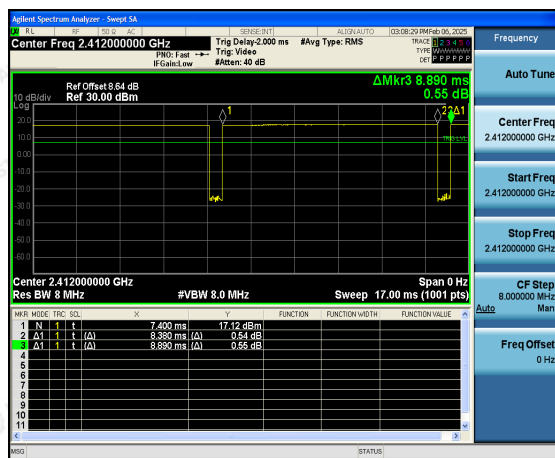
**3. Mode Test Duty Cycle**

ANT.1:

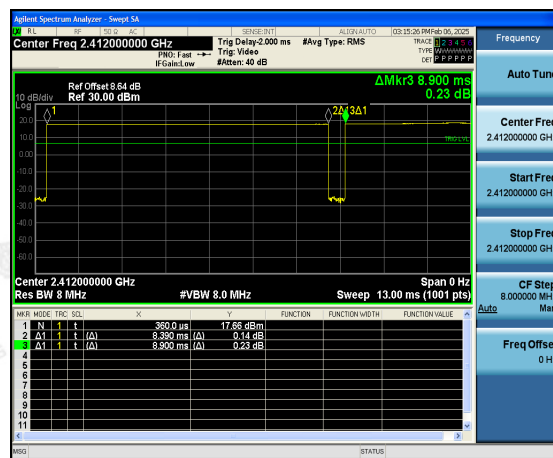
Mode	Duty Cycle
802.11b	0.943
802.11g	0.943
802.11n(HT20)	0.943
802.11n(HT40)	0.942
802.11ac(HT20)	0.942
802.11ac(HT40)	0.943
802.11ax(HE20)	0.943
802.11ax(HE40)	0.942
802.11be(EHT20)	0.979
802.11be(EHT40)	0.972



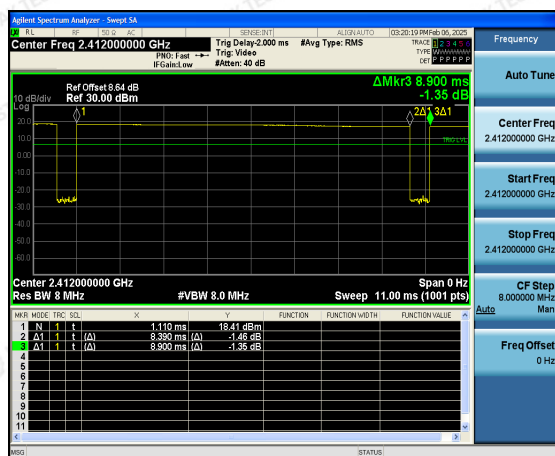
802.11b



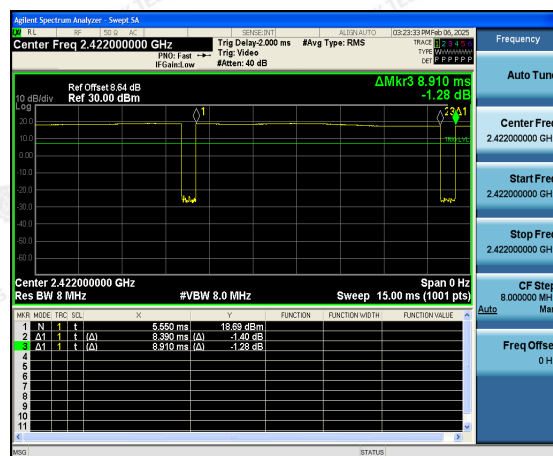
802.11g



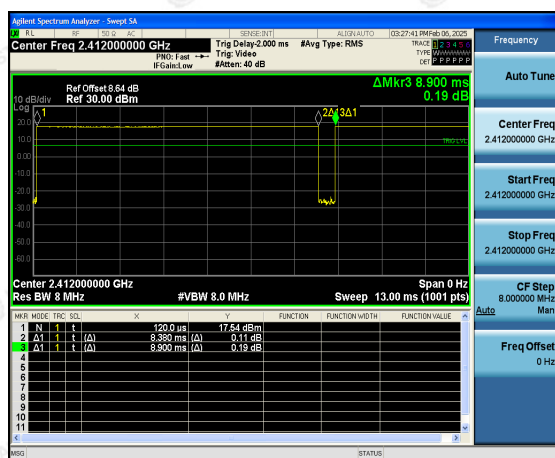
802.11n(HT20)



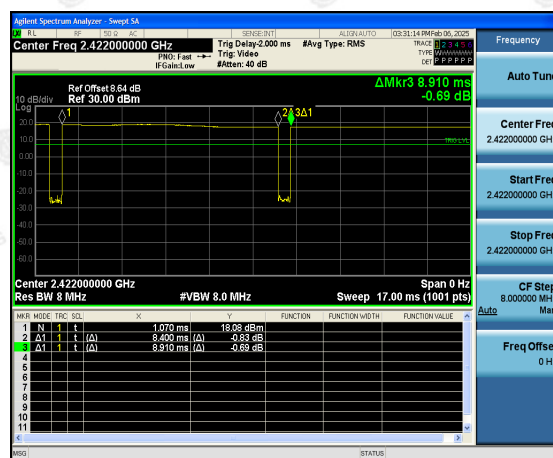
802.11n(HT40)



802.11ac(HT20)



802.11ac(HT40)

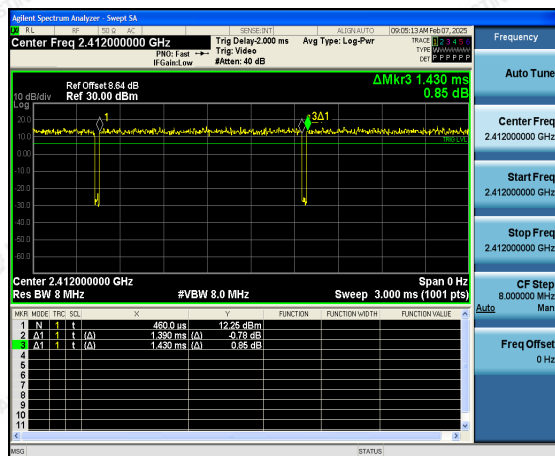




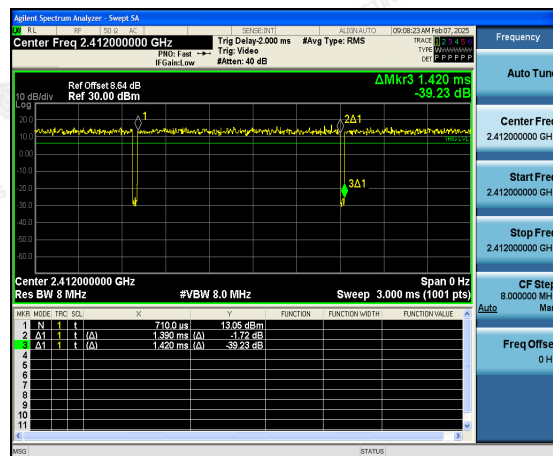
ANT.2:

Mode	Duty Cycle
802.11b	0.972
802.11g	0.979
802.11n(HT20)	0.979
802.11n(HT40)	0.979
802.11ac(HT20)	0.979
802.11ac(HT40)	0.979
802.11ax(HE20)	0.979
802.11ax(HE40)	0.972
802.11be(EHT20)	0.972
802.11be(EHT40)	0.979

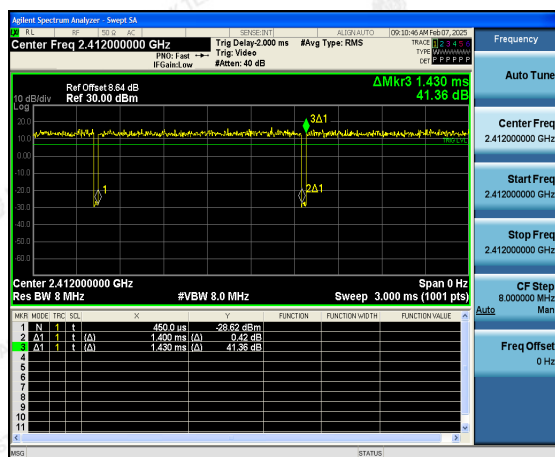
802.11b



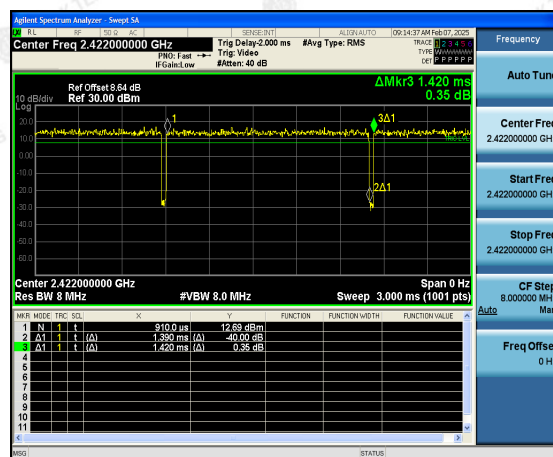
802.11g



802.11n(HT20)

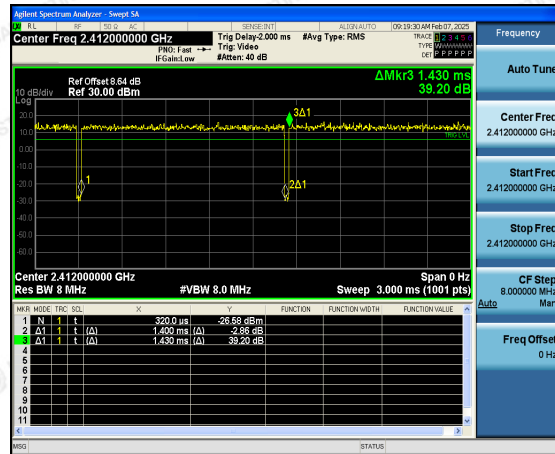


802.11n(HT40)

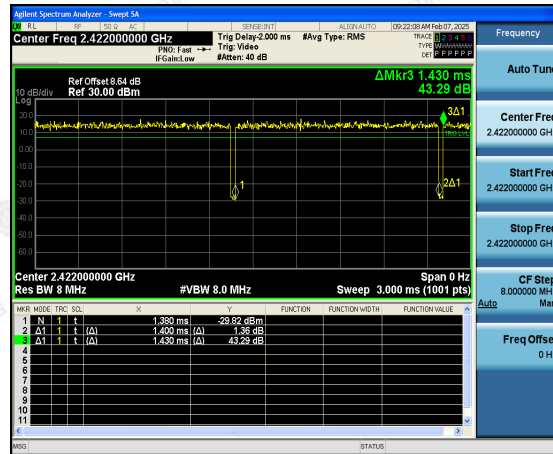




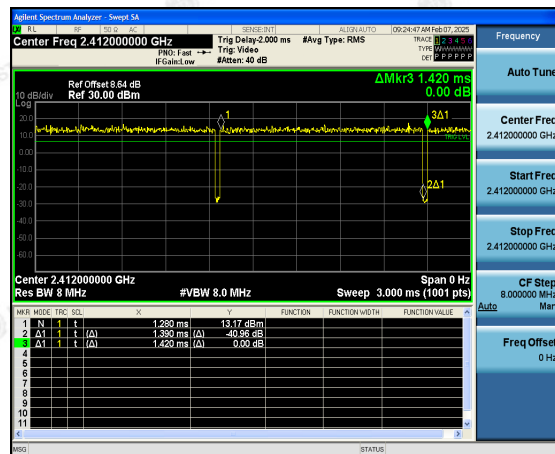
802.11ac(HT20)



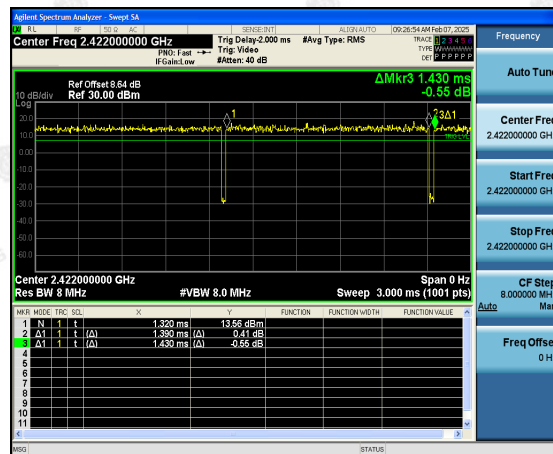
802.11ac(HT40)



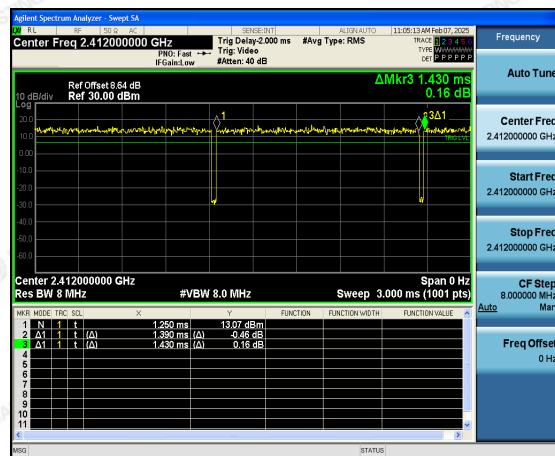
802.11ax(HE20)



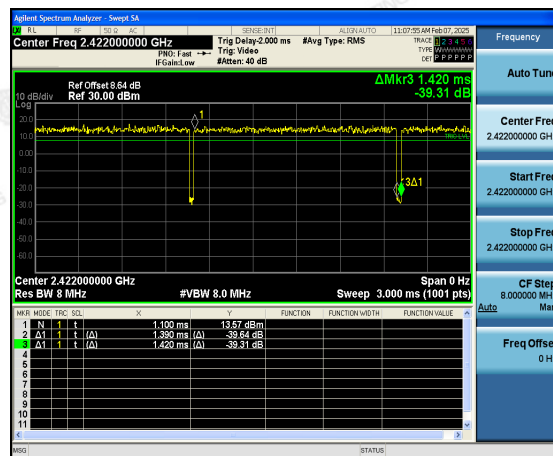
802.11ax(HE40)



802.11be(EHT20)



802.11be(EHT40)





4. Test Results and Measurement Data

4.1 Conducted Emission

4.1.1 Test Specification

Test Requirement:	FCC Part15 C Section 15.207														
Test Method:	ANSI C63.10:2013														
Frequency Range:	150 kHz to 30 MHz														
Receiver Setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto														
Limits:	<table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table>	Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													
Test Setup:	Reference Plane 40cm E.U.T AC power 80cm LISN Filter AC power EMI Receiver Test table/Insulation plane Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m														
Test Mode:	Charging + transmitting with modulation														
Test Procedure:	1. The E.U.T is connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.														
Test Result:	PASS														



4.1.2 Test Instruments

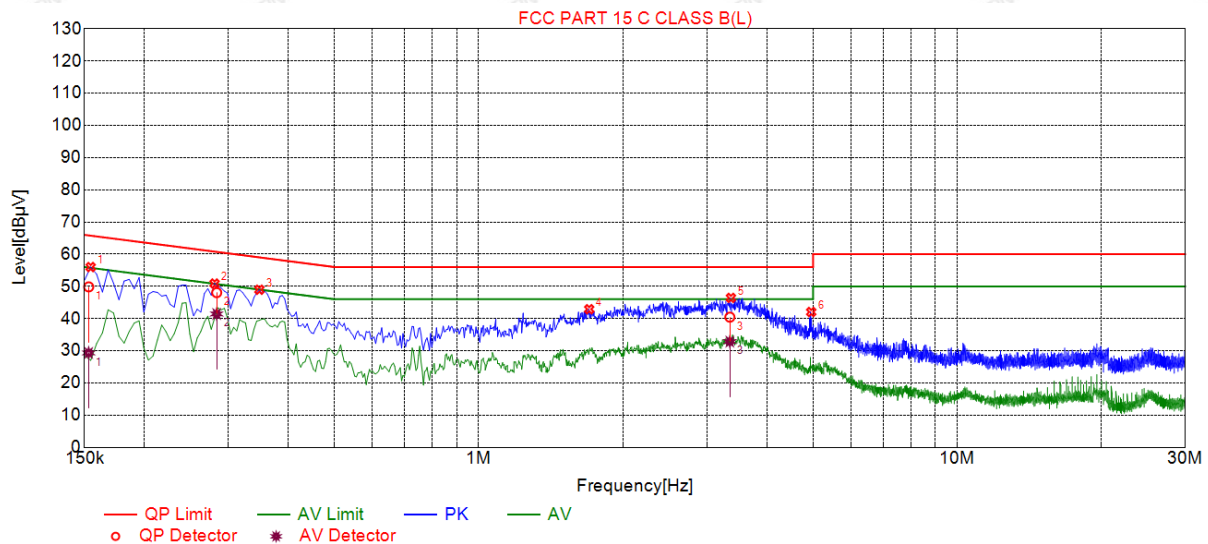
Conducted Emission Shielding Room Test Site (843)					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Receiver	R&S	ESR	HKE-005	Feb. 20, 2024	Feb. 19, 2025
LISN	R&S	ENV216	HKE-002	Feb. 20, 2024	Feb. 19, 2025
LISN	R&S	ENV216	HKE-059	Feb. 20, 2024	Feb. 19, 2025
Coax cable (9KHz-30MHz)	Times	381806-0 02	N/A	Feb. 20, 2024	Feb. 19, 2025
EMI Test Software	Tonscend	JS32-CE 2.5.0.6	HKE-081	N/A	N/A
10dB Attenuator	Schwarzbeck	VTSD956 1F	HKE-153	Feb. 20, 2024	Feb. 19, 2025

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



4.1.3 Test data

Test Specification: Line



Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1545	56.01	19.83	65.75	9.74	36.18	PK	L
2	0.2805	50.89	19.84	60.80	9.91	31.05	PK	L
3	0.3480	48.96	19.83	59.01	10.05	29.13	PK	L
4	1.7025	42.91	19.95	56.00	13.09	22.96	PK	L
5	3.3675	46.43	20.07	56.00	9.57	26.36	PK	L
6	4.9560	42.05	20.11	56.00	13.95	21.94	PK	L

Final Data List

NO.	Freq. [MHz]	Correction factor[dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	QP Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	AV Reading [dBμV]	Type
1	0.1530	19.83	49.86	65.84	15.98	30.03	29.33	55.84	26.51	9.50	L
2	0.2833	19.84	48.07	60.72	12.65	28.23	41.44	50.72	9.28	21.60	L
3	3.3496	20.07	40.45	56.00	15.55	20.38	32.85	46.00	13.15	12.78	L

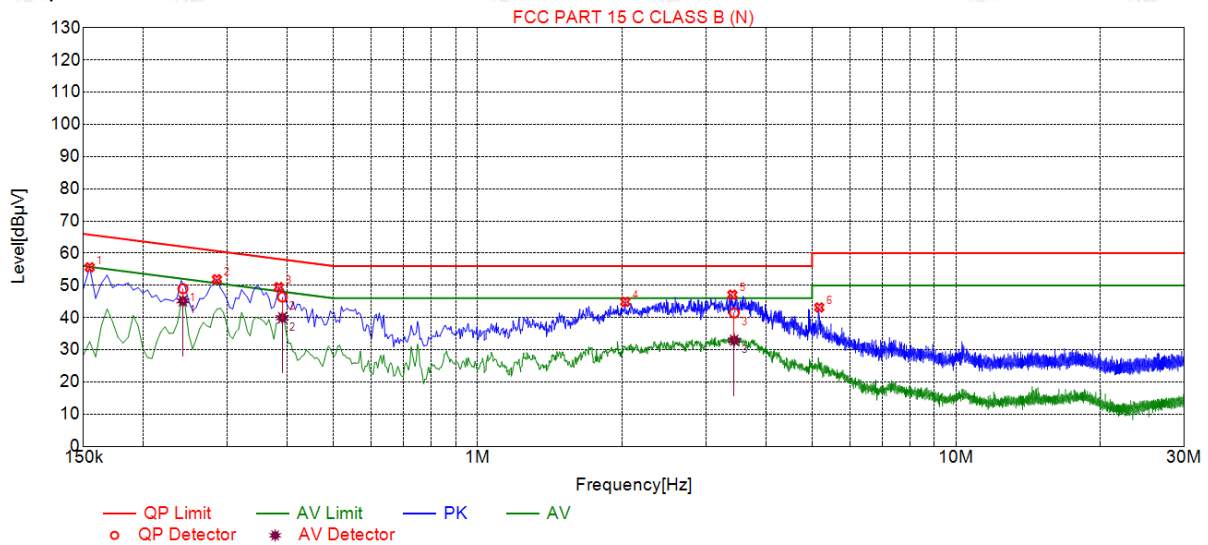
Remark: Margin = Limit – Level

Correction factor = Cable lose + ISN insertion loss

Level=Test receiver reading + correction factor



Test Specification: Neutral



Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1545	55.60	19.73	65.75	10.15	35.87	PK	N
2	0.2850	51.92	19.73	60.67	8.75	32.19	PK	N
3	0.3840	49.45	19.74	58.19	8.74	29.71	PK	N
4	2.0355	44.89	19.84	56.00	11.11	25.05	PK	N
5	3.4080	47.10	19.96	56.00	8.90	27.14	PK	N
6	5.1765	43.14	20.00	60.00	16.86	23.14	PK	N

Final Data List

NO.	Freq. [MHz]	Correction factor[dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	QP Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	AV Reading [dBμV]	Type
1	0.2420	19.73	48.98	62.03	13.05	29.25	45.19	52.03	6.84	25.46	N
2	0.3905	19.73	46.38	58.05	11.67	26.65	39.96	48.05	8.09	20.23	N
3	3.4384	19.96	41.46	56.00	14.54	21.50	32.96	46.00	13.04	13.00	N

Remark: Margin = Limit – Level

Correction factor = Cable lose + ISN insertion loss

Level=Test receiver reading + correction factor



4.2 Maximum Conducted Output Power

4.2.1 Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	KDB 558074 D01 15.247 Meas Guidance v05r02
Limit:	30dBm
Test Setup:	 RF automatic control unit EUT
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 15.247 Meas Guidance v05r02. 2. The RF output of EUT was connected to the RF automatic control unit by RF cable. The path loss was compensated to the results for each measurement. 3. Set to the maximum power setting and enable the EUT transmit continuously. 4. Measure the Peak output power and record the results in the test report.
Test Result:	PASS

4.2.2 Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	Feb. 19, 2025
Power meter	Agilent	E4419B	HKE-085	Feb. 20, 2024	Feb. 19, 2025
Power Sensor	Agilent	E9300A	HKE-086	Feb. 20, 2024	Feb. 19, 2025
RF cable	Times	1-40G	HKE-034	Feb. 20, 2024	Feb. 19, 2025
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 20, 2024	Feb. 19, 2025
RF Test Software	Tonscend	JS1120-3 Version 3.5.39	HKE-083	N/A	N/A

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



4.2.3 Test Data

Mode	Test channel	Frequency (MHz)	Reading Conducted Output Power (dBm)			Limit (dBm)	Result
			Antenna port 1	Antenna port 2	MIMO		
802.11b	CH01	2412	12.71	12.86	/	30	PASS
802.11b	CH06	2437	13.00	13.13	/	30	PASS
802.11b	CH11	2462	13.15	13.30	/	30	PASS
802.11g	CH01	2412	13.03	13.28	/	30	PASS
802.11g	CH06	2437	13.08	13.28	/	30	PASS
802.11g	CH11	2462	13.01	13.57	/	30	PASS
802.11n(HT20)	CH01	2412	12.64	12.51	15.59	30	PASS
802.11n(HT20)	CH06	2437	12.49	12.52	15.52	30	PASS
802.11n(HT20)	CH11	2462	12.55	12.93	15.75	30	PASS
802.11n(HT40)	CH03	2422	11.77	11.09	14.45	30	PASS
802.11n(HT40)	CH06	2437	11.82	11.69	14.77	30	PASS
802.11n(HT40)	CH09	2452	11.79	11.56	14.69	30	PASS
802.11ac(HT20)	CH01	2412	12.77	12.54	15.67	30	PASS
802.11ac(HT20)	CH06	2437	13.12	12.86	16.00	30	PASS
802.11ac(HT20)	CH11	2462	12.95	12.82	15.90	30	PASS
802.11ac(HT40)	CH03	2422	11.58	11.79	14.70	30	PASS
802.11ac(HT40)	CH06	2437	11.20	11.99	14.62	30	PASS
802.11ac(HT40)	CH09	2452	11.46	11.43	14.46	30	PASS
802.11ax(HE20)	CH01	2412	13.24	11.73	15.56	30	PASS
802.11ax(HE20)	CH06	2437	13.64	13.19	16.43	30	PASS
802.11ax(HE20)	CH11	2462	13.79	13.46	16.64	30	PASS
802.11ax(HE40)	CH03	2422	12.21	11.64	14.94	30	PASS
802.11ax(HE40)	CH06	2437	12.39	11.25	14.87	30	PASS
802.11ax(HE40)	CH09	2452	12.24	11.89	15.08	30	PASS

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAKE, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.

TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



802.11be(EHT20)	CH01	2412	13.03	13.73	16.40	30	PASS
802.11be(EHT20)	CH06	2437	13.07	13.66	16.39	30	PASS
802.11be(EHT20)	CH11	2462	13.52	14.07	16.81	30	PASS
802.11be(EHT40)	CH03	2422	11.91	12.46	15.20	30	PASS
802.11be(EHT40)	CH06	2437	11.81	12.32	15.08	30	PASS
802.11be(EHT40)	CH09	2452	12.22	11.90	15.07	30	PASS

Note: 1.The test results including the cable lose.

2. This product supports antenna 1 and antenna 2 launch, but only support 802.11n/ac/ax/be for MIMO mode, not support 802.11b and 802.11g for MIMO mode.



4.3 Emission Bandwidth

4.3.1 Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	KDB 558074 D01 15.247 Meas Guidance v05r02
Limit:	>500kHz
Test Setup:	 Spectrum Analyzer EUT
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The testing follows FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02. 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz. 4. Measure and record the results in the test report.
Test Result:	PASS

4.3.2 Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	Feb. 19, 2025
RF cable	Times	1-40G	HKE-034	Feb. 20, 2024	Feb. 19, 2025
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 20, 2024	Feb. 19, 2025
RF Test Software	Tonscend	JS1120-3 Version 3.5.39	HKE-083	N/A	N/A

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



4.3.3 Test Data

For antenna port 1

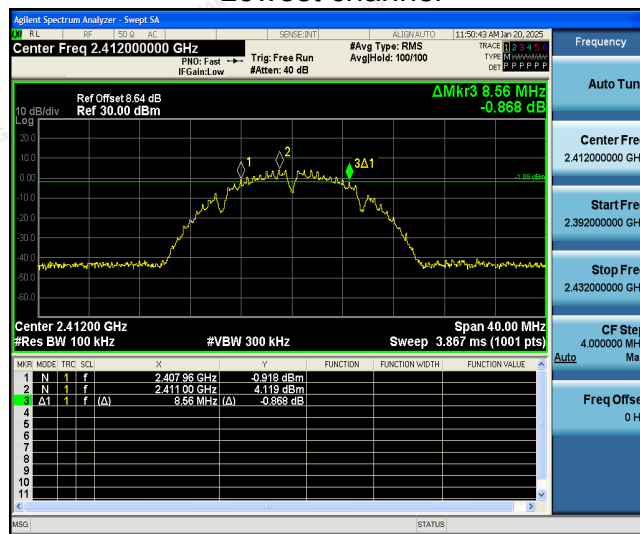
Mode	Test channel	6dB Emission Bandwidth (MHz)	Limit	Test Result
802.11b	Lowest	8.560	>500KHz	PASS
802.11b	Middle	7.560	>500KHz	PASS
802.11b	Highest	7.560	>500KHz	PASS
802.11g	Lowest	15.280	>500KHz	PASS
802.11g	Middle	15.680	>500KHz	PASS
802.11g	Highest	15.920	>500KHz	PASS
802.11n(HT20)	Lowest	16.920	>500KHz	PASS
802.11n(HT20)	Middle	16.000	>500KHz	PASS
802.11n(HT20)	Highest	14.840	>500KHz	PASS
802.11n(HT40)	Lowest	35.520	>500KHz	PASS
802.11n(HT40)	Middle	31.920	>500KHz	PASS
802.11n(HT40)	Highest	35.360	>500KHz	PASS
802.11ac(HT20)	Lowest	15.920	>500KHz	PASS
802.11ac(HT20)	Middle	15.040	>500KHz	PASS
802.11ac(HT20)	Highest	16.480	>500KHz	PASS
802.11ac(HT40)	Lowest	33.360	>500KHz	PASS
802.11ac(HT40)	Middle	35.040	>500KHz	PASS
802.11ac(HT40)	Highest	35.040	>500KHz	PASS
802.11ax(HE20)	Lowest	17.080	>500KHz	PASS
802.11ax(HE20)	Middle	17.600	>500KHz	PASS
802.11ax(HE20)	Highest	17.760	>500KHz	PASS
802.11ax(HE40)	Lowest	37.520	>500KHz	PASS
802.11ax(HE40)	Middle	37.520	>500KHz	PASS
802.11ax(HE40)	Highest	37.600	>500KHz	PASS
802.11be(EHT20)	Lowest	18.560	>500KHz	PASS
802.11be(EHT20)	Middle	16.920	>500KHz	PASS
802.11be(EHT20)	Highest	18.160	>500KHz	PASS
802.11be(EHT40)	Lowest	37.280	>500KHz	PASS
802.11be(EHT40)	Middle	37.440	>500KHz	PASS
802.11be(EHT40)	Highest	36.880	>500KHz	PASS

Test plots as follows:



802.11b Modulation

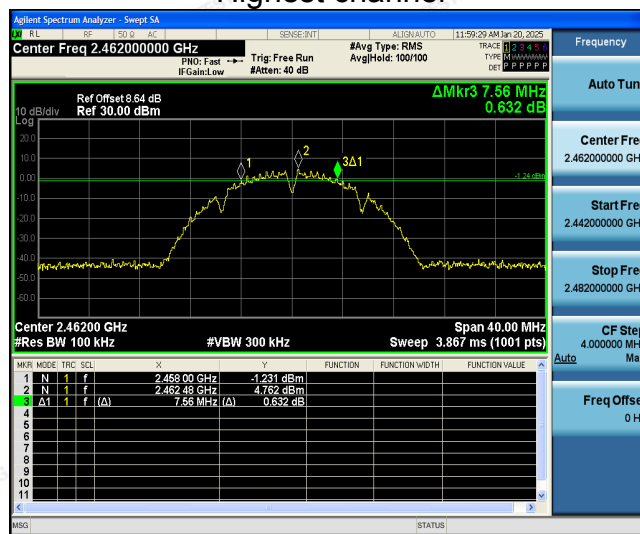
Lowest channel



Middle channel



Highest channel



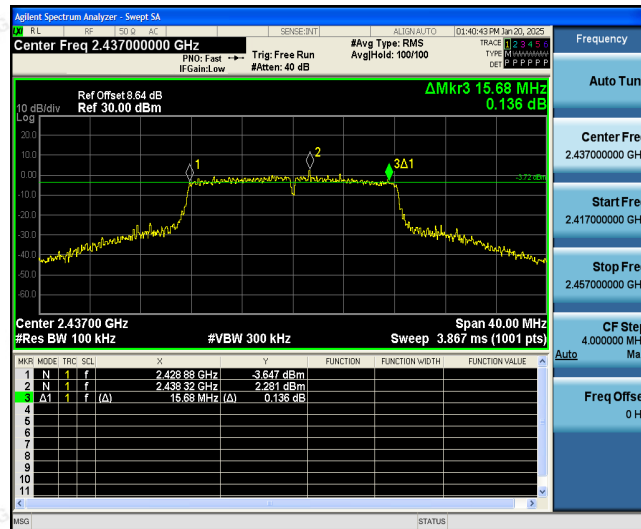


802.11g Modulation

Lowest channel



Middle channel



Highest channel



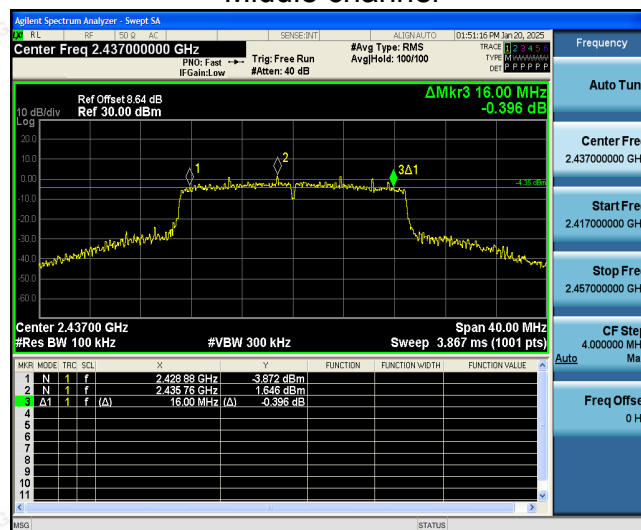


802.11n(HT20) Modulation

Lowest channel



Middle channel



Highest channel





802.11n(HT40) Modulation

Lowest channel



Middle channel



Highest channel



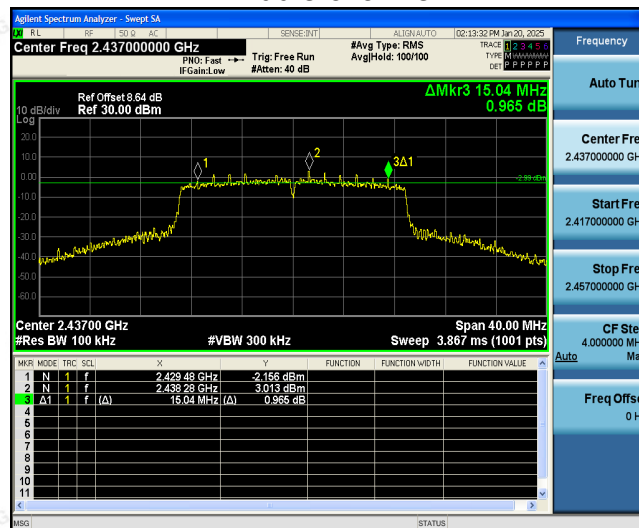


802.11ac(HT20) Modulation

Lowest channel



Middle channel



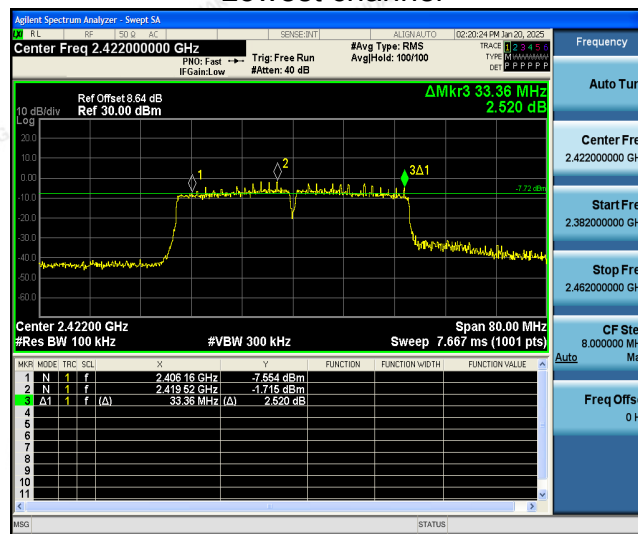
Highest channel





802.11ac(HT40) Modulation

Lowest channel



Middle channel



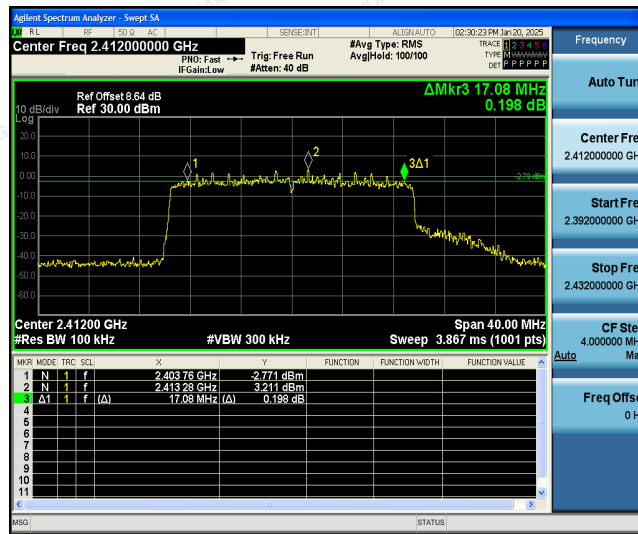
Highest channel



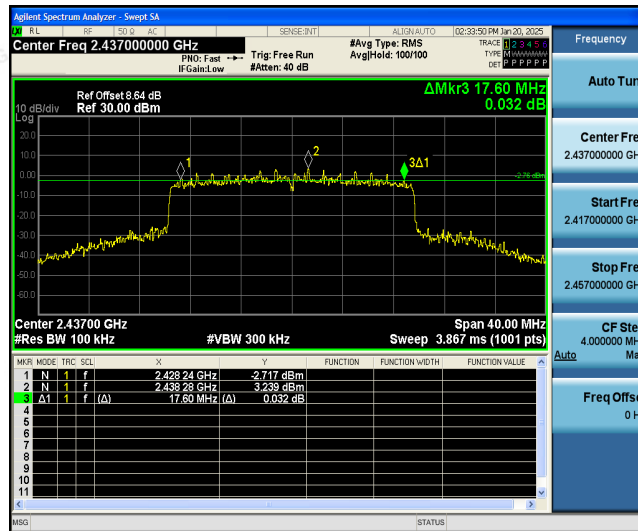


802.11ax(HE20) Modulation

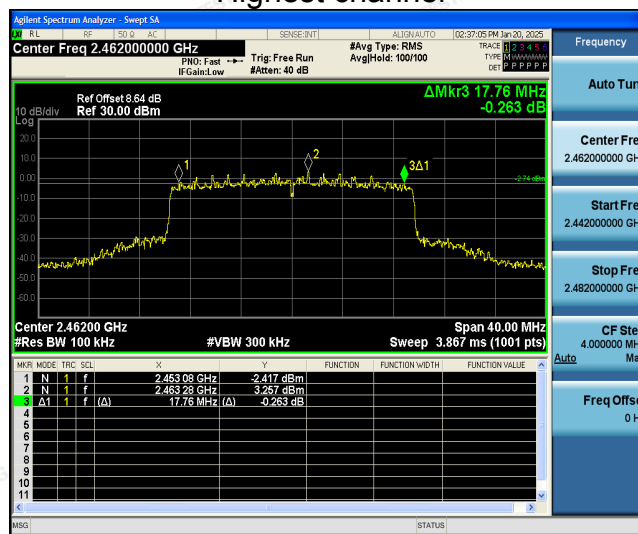
Lowest channel



Middle channel



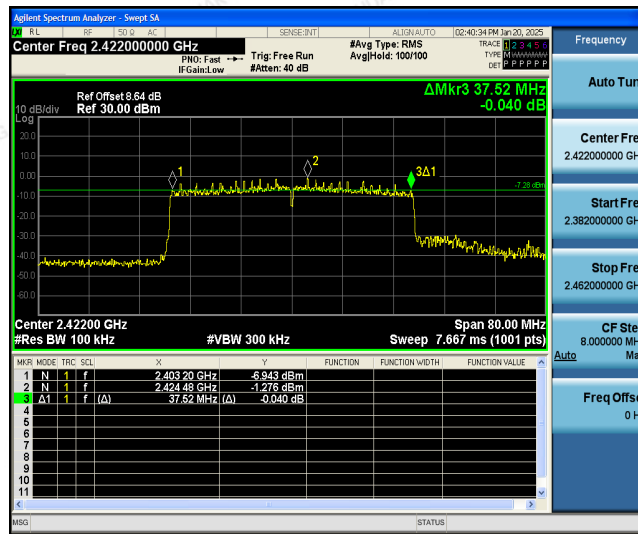
Highest channel



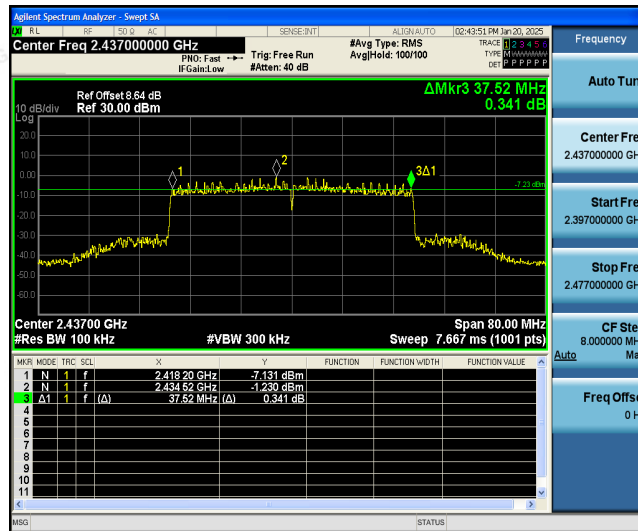


802.11ax(HE40) Modulation

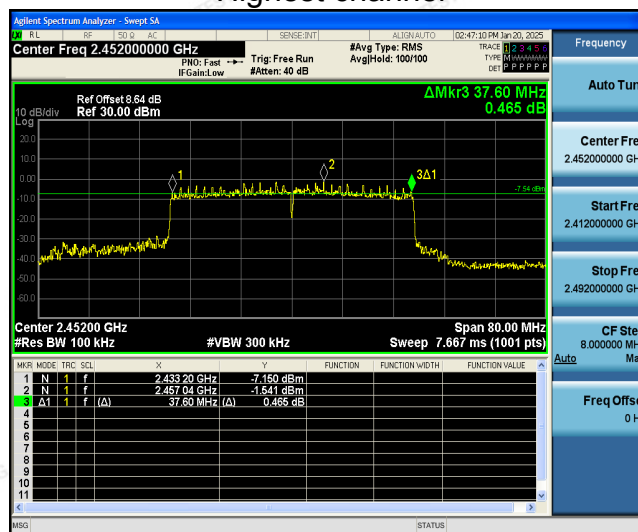
Lowest channel



Middle channel



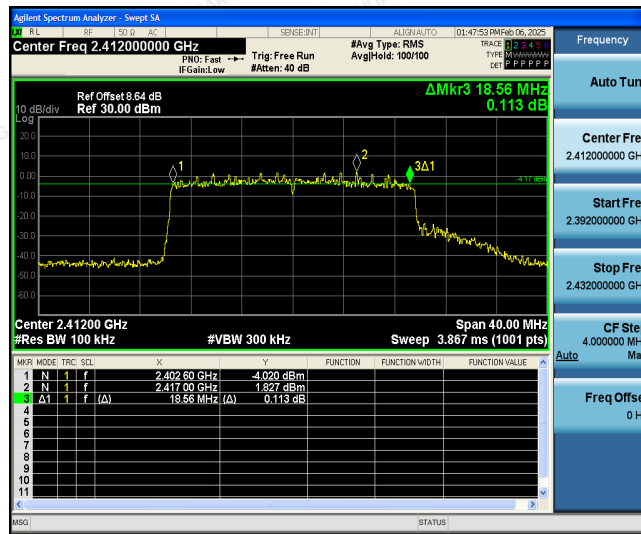
Highest channel





802.11be(EHT20) Modulation

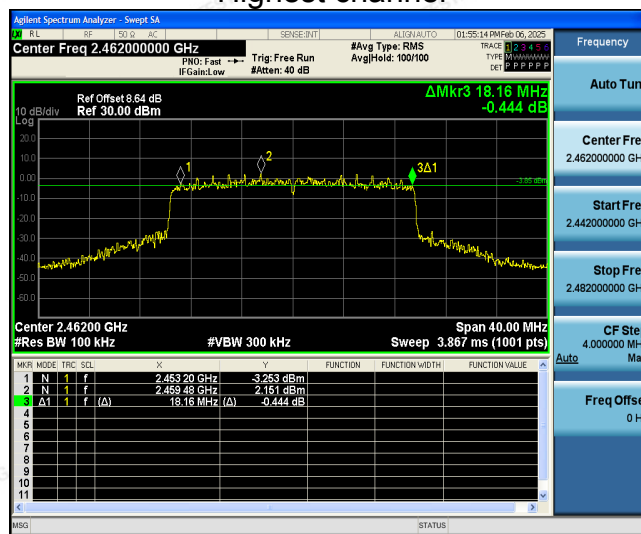
Lowest channel



Middle channel



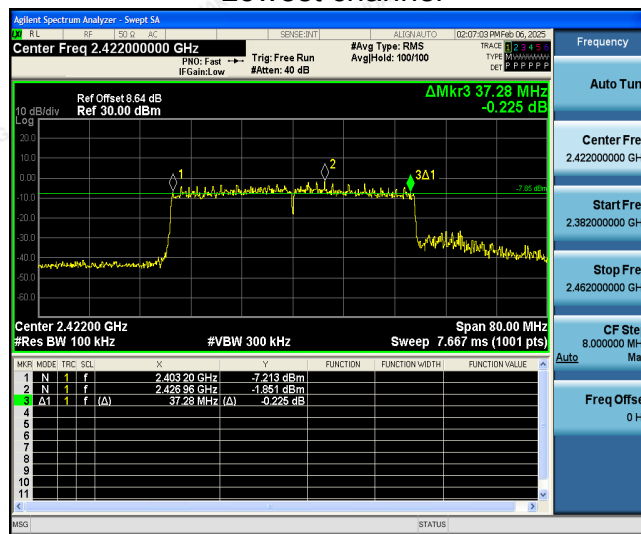
Highest channel



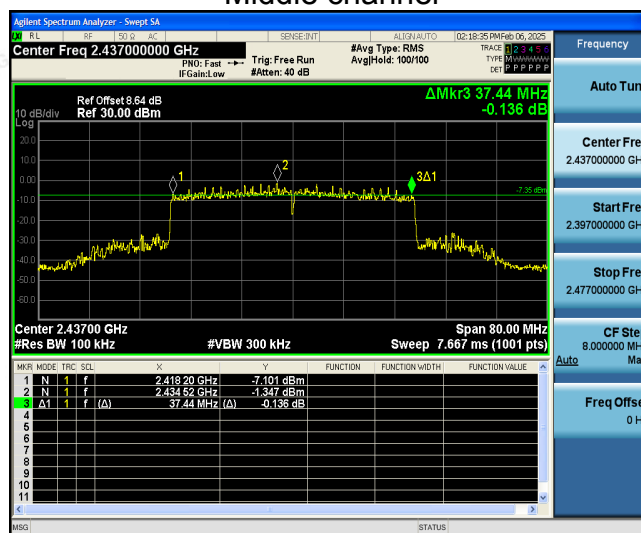


802.11be(EHT40) Modulation

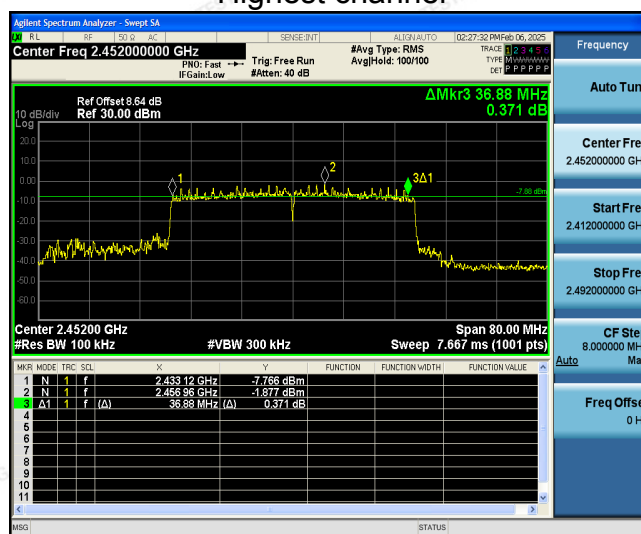
Lowest channel



Middle channel



Highest channel





For antenna port 2

Mode	Test channel	6dB Emission Bandwidth (MHz)	Limit	Test Result
802.11b	Lowest	7.560	>500KHz	PASS
802.11b	Middle	8.040	>500KHz	PASS
802.11b	Highest	7.560	>500KHz	PASS
802.11g	Lowest	15.720	>500KHz	PASS
802.11g	Middle	16.320	>500KHz	PASS
802.11g	Highest	16.000	>500KHz	PASS
802.11n(HT20)	Lowest	16.120	>500KHz	PASS
802.11n(HT20)	Middle	15.920	>500KHz	PASS
802.11n(HT20)	Highest	14.920	>500KHz	PASS
802.11n(HT40)	Lowest	33.920	>500KHz	PASS
802.11n(HT40)	Middle	35.120	>500KHz	PASS
802.11n(HT40)	Highest	34.960	>500KHz	PASS
802.11ac(HT20)	Lowest	16.920	>500KHz	PASS
802.11ac(HT20)	Middle	16.040	>500KHz	PASS
802.11ac(HT20)	Highest	16.560	>500KHz	PASS
802.11ac(HT40)	Lowest	35.120	>500KHz	PASS
802.11ac(HT40)	Middle	33.760	>500KHz	PASS
802.11ac(HT40)	Highest	35.120	>500KHz	PASS
802.11ax(HE20)	Lowest	18.000	>500KHz	PASS
802.11ax(HE20)	Middle	17.760	>500KHz	PASS
802.11ax(HE20)	Highest	17.400	>500KHz	PASS
802.11ax(HE40)	Lowest	35.040	>500KHz	PASS
802.11ax(HE40)	Middle	35.040	>500KHz	PASS
802.11ax(HE40)	Highest	36.320	>500KHz	PASS
802.11be(EHT20)	Lowest	17.120	>500KHz	PASS
802.11be(EHT20)	Middle	16.320	>500KHz	PASS
802.11be(EHT20)	Highest	18.000	>500KHz	PASS
802.11be(EHT40)	Lowest	36.320	>500KHz	PASS
802.11be(EHT40)	Middle	36.560	>500KHz	PASS
802.11be(EHT40)	Highest	36.400	>500KHz	PASS

Test plots as follows:



802.11b Modulation

Lowest channel



Middle channel



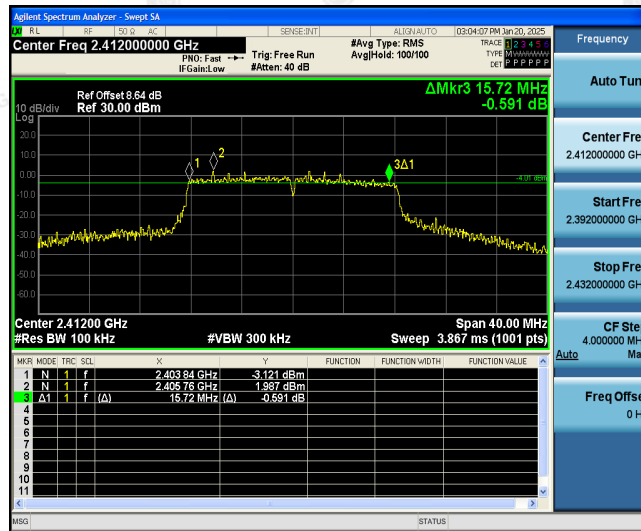
Highest channel





802.11g Modulation

Lowest channel



Middle channel



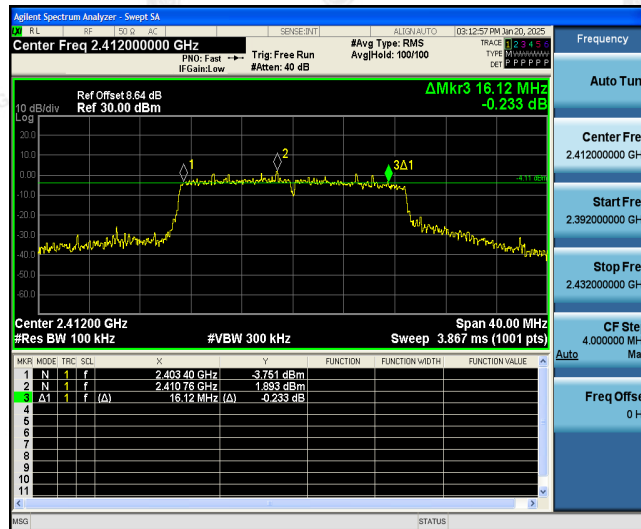
Highest channel



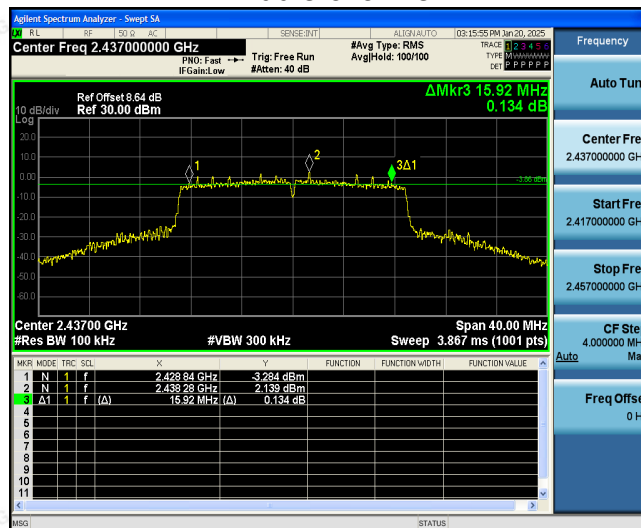


802.11n(HT20) Modulation

Lowest channel



Middle channel



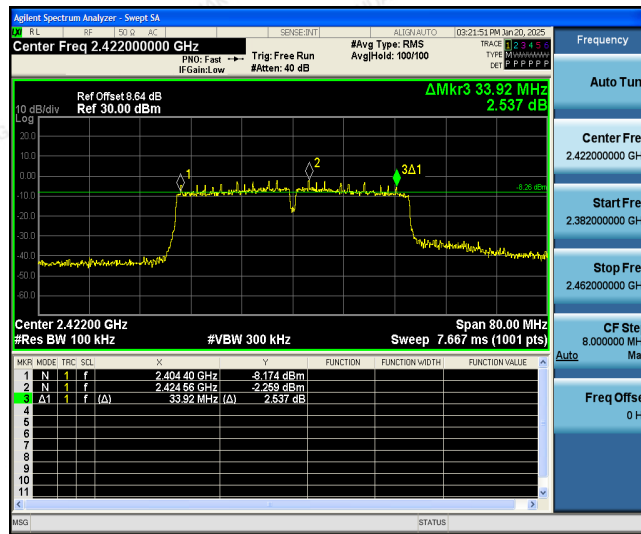
Highest channel





802.11n(HT40) Modulation

Lowest channel



Middle channel



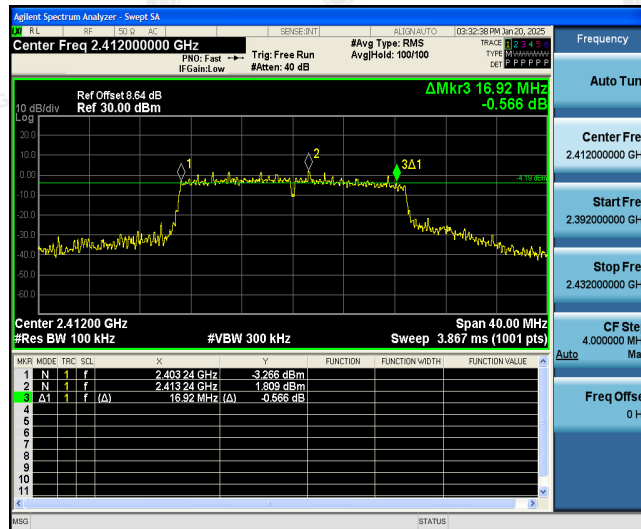
Highest channel



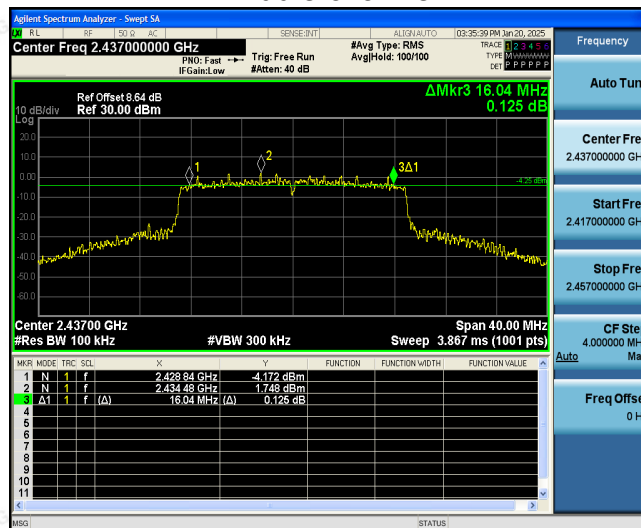


802.11ac(HT20) Modulation

Lowest channel



Middle channel

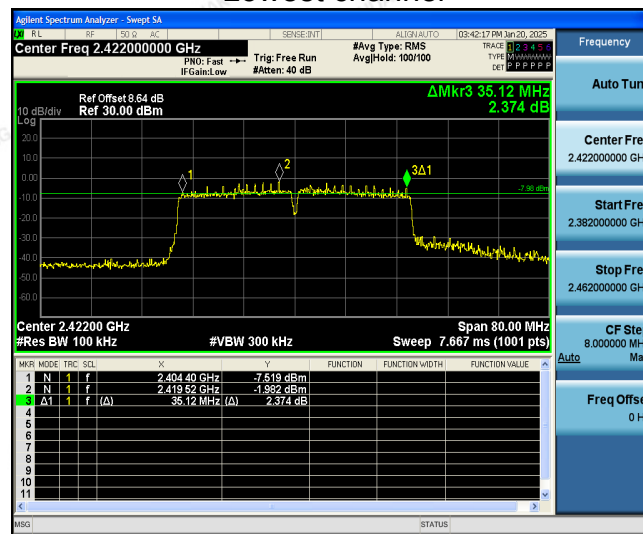


Highest channel

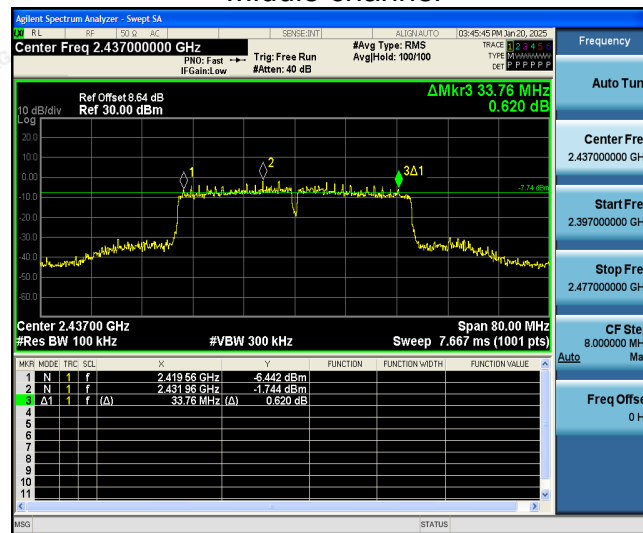


802.11ac(HT40) Modulation

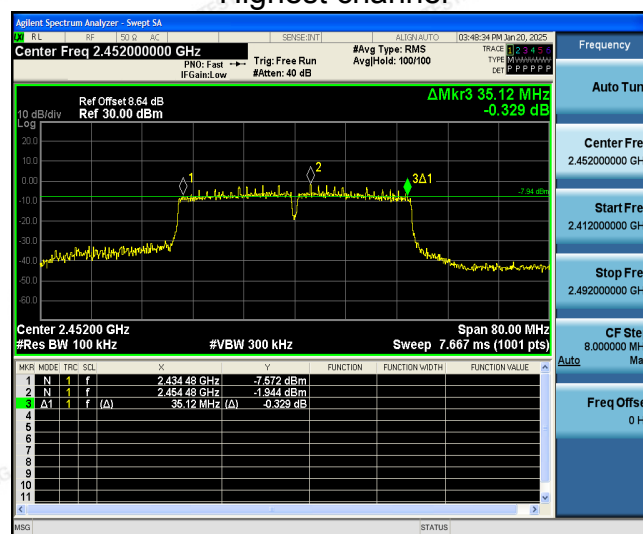
Lowest channel



Middle channel



Highest channel



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAK, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.

TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

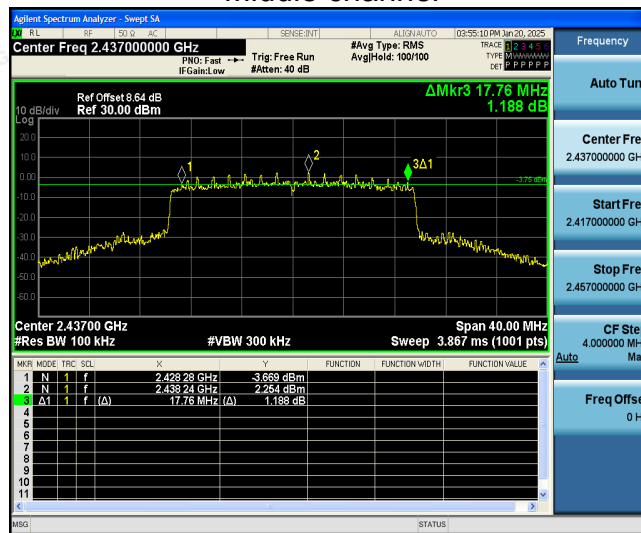


802.11ax(HE20) Modulation

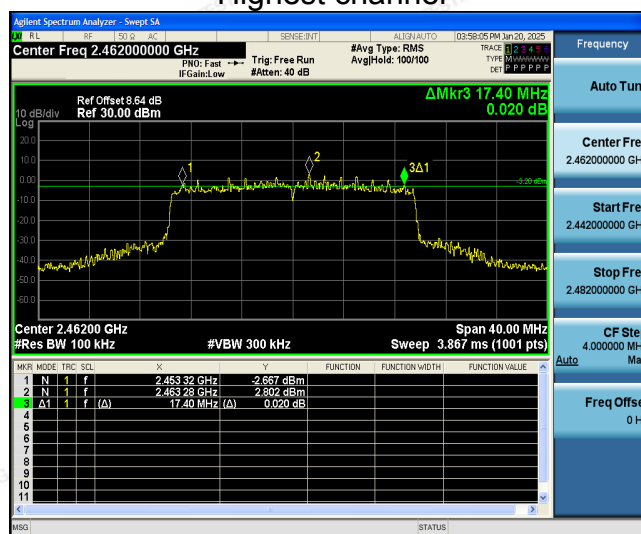
Lowest channel



Middle channel



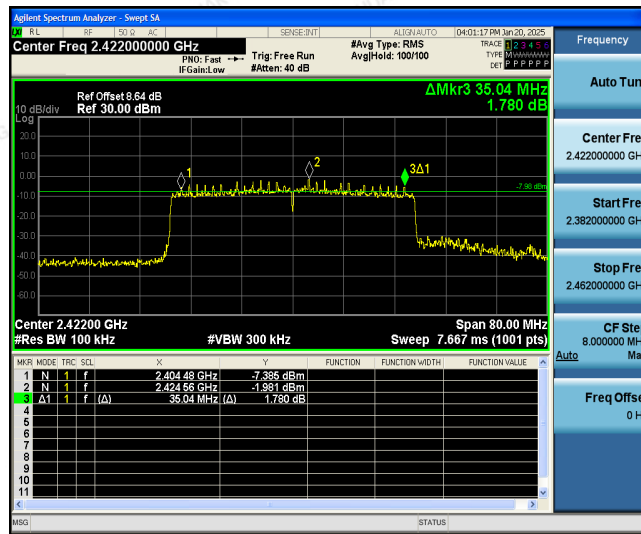
Highest channel





802.11ax(HE40) Modulation

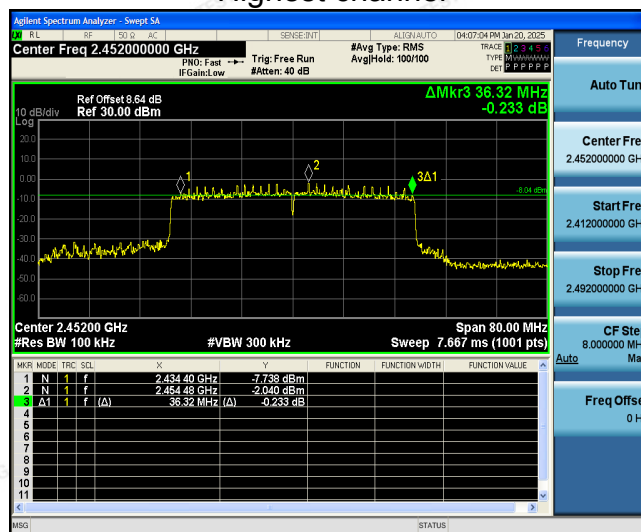
Lowest channel



Middle channel



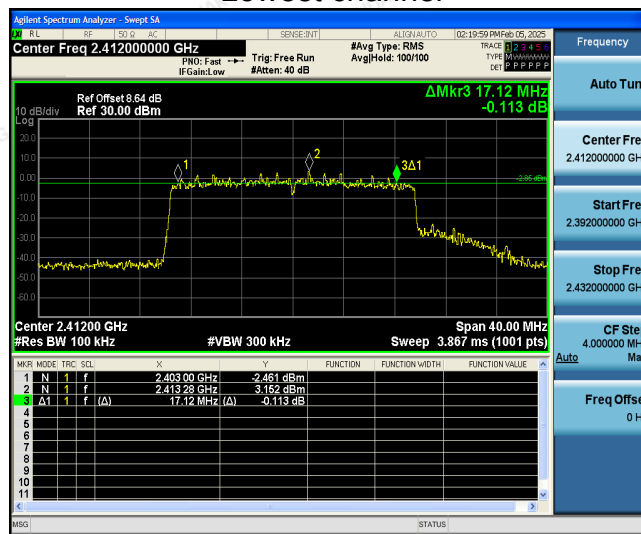
Highest channel



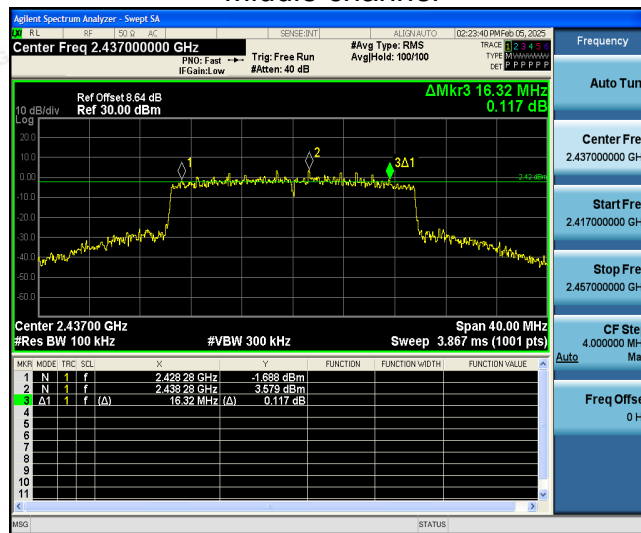


802.11be(EHT20) Modulation

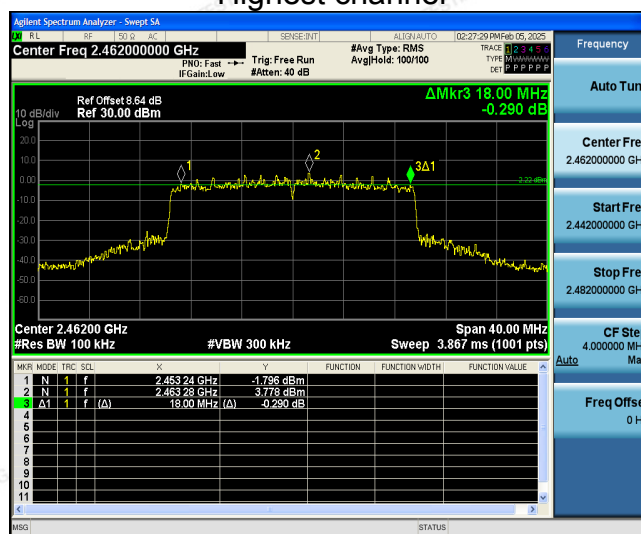
Lowest channel



Middle channel



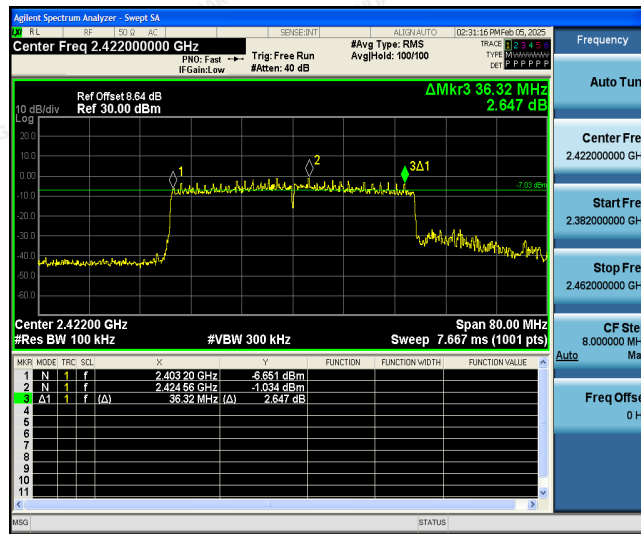
Highest channel



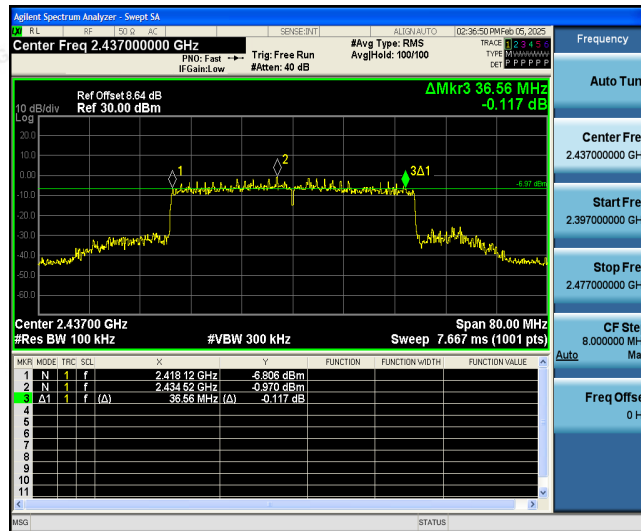


802.11be(EHT40) Modulation

Lowest channel



Middle channel



Highest channel





4.4 Power Spectral Density

4.4.1 Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB 558074 D01 15.247 Meas Guidance v05r02
Limit:	The average power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.
Test Setup:	 The diagram illustrates the test setup. On the left is a green box labeled 'Spectrum Analyzer'. A black line representing an RF cable connects it to a yellow box on the right labeled 'EUT'.
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The testing follows Measurement procedure 10.2 method PKPSD of FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02. 2. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement. 3. Set to the maximum power setting and enable the EUT transmit continuously. 4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW): $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$. Video bandwidth $\text{VBW} \geq 3 \times \text{RBW}$. Set the span to at least 1.5 times the OBW. 5. Detector = Peak, Sweep time = auto couple. 6. Employ trace averaging (Peak) mode over a minimum of 100 traces. Use the peak marker function to determine the maximum power level. 7. Measure and record the results in the test report.
Test Result:	PASS



4.4.2 Test Instruments

RF Test Room					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-025	Feb. 20, 2024	Feb. 19, 2025
RF cable	Times	1-40G	HKE-034	Feb. 20, 2024	Feb. 19, 2025
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 20, 2024	Feb. 19, 2025
RF Test Software	Tonscend	JS1120-3 Version 3.5.39	HKE-083	N/A	N/A

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



4.4.3 Test Data

For antenna port 1

EUT Set Mode	Channel	Test Result (dBm/30kHz)	Result (dBm/30kHz)
802.11b	Lowest	0.60	-9.40
	Middle	0.22	-9.78
	Highest	-0.21	-10.21
802.11g	Lowest	-2.70	-12.70
	Middle	-2.52	-12.52
	Highest	-2.02	-12.02
802.11n(HT20)	Lowest	-2.21	-12.21
	Middle	-2.48	-12.48
	Highest	-2.31	-12.31
802.11n(HT40)	Lowest	-6.33	-16.33
	Middle	-5.55	-15.55
	Highest	-5.26	-15.26
802.11ac(HT20)	Lowest	-1.95	-11.95
	Middle	-2.16	-12.16
	Highest	-1.56	-11.56
802.11ac(HT40)	Lowest	-5.14	-15.14
	Middle	-3.95	-13.95
	Highest	-4.32	-14.32



802.11ax(HE20)	Lowest	-0.99	-10.99
	Middle	-0.58	-10.58
	Highest	-0.17	-10.17
802.11ax(HE40)	Lowest	-3.90	-13.90
	Middle	-3.90	-13.90
	Highest	-5.36	-15.36
802.11be(EHT20)	Lowest	-1.21	-11.21
	Middle	-0.89	-10.89
	Highest	-0.73	-10.73
802.11be(EHT40)	Lowest	-5.28	-15.28
	Middle	-5.08	-15.08
	Highest	-4.96	-14.96
PSD test result (dBm/3kHz)= PSD test result (dBm/30kHz)-10			
Limit: 8dBm/3kHz			
Test Result:		PASS	

Test plots as follows:



802.11b Modulation

Lowest channel



Middle channel



Highest channel

