

FCC Test Report

Test Report
On Behalf of
Shenzhen Ningyuanda Technology Co., Ltd
For
WIFI CAMERA

Model No.: TC107, PC180, PC181, PC182, PC183, PC185, PC186, PC187, PC188, PC189, PC190, PC203, PC207, PC205, PC206, PC208, PC209, PC210, PC109, PC110, AD118, AD119, AD120, AD121, AD122

FCC ID: 2BEXJ-TC107

Prepared For: Shenzhen Ningyuanda Technology Co., Ltd

402 Kaiteng Building, Bantian Street, Longgang District, Shenzhen, China

Prepared By: Shenzhen HUAK 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. 25, 2024 ~ Feb. 01, 2024

Date of Report: Feb. 01, 2024

Report Number: HK2401250555-E

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 cannont 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



Test Result Certification

Applicant's Name.....: Shenzhen Ningyuanda Technology Co., Ltd

402 Kaiteng Building, Bantian Street, Longgang District, Address

Shenzhen, China

Manufacturer's Name Shenzhen Ningyuanda Technology Co., Ltd

402 Kaiteng Building, Bantian Street, Longgang District, Address

Shenzhen, China

Product Description

Trade Mark: N/A

Product Name...... WIFI CAMERA

TC107, PC180, PC181, PC182, PC183, PC185, PC186, PC187,

Report No.: HK2401250555-E

PC188, PC189, PC190, PC203, PC207, PC205, PC206, PC208, Model and/or Type Reference:

PC209, PC210, PC109, PC110, AD118, AD119, AD120, AD121,

AD122

FCC Rules and Regulations Part 15 Subpart C Section 15.247 Standards

ANSI C63.10: 2013

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen HUAK Testing Technology Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen HUAK 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. 25, 2024 ~ Feb. 01, 2024

Feb. 01, 2024 Date of Issue....:

Test Result.....

Testing Engineer

Len Liao

Technical Manager

Sliver Wan

Authorized Signatory

Jason Zhou

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 cannont 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



Table of Contents

1.	Test Result Summary						
	1.1. Test Procedures and Results						
	1.2. Information of the Test Laboratory	5					
	1.3. Measurement Uncertainty						
2.		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					
3.	General Information	10					
	3.1. Test Environment and Mode						
	3.2. Description of Support Units	13					
4.	Test Results and Measurement Data	14					
	4.1. Conducted Emission	14					
	4.2. Test Result						
	4.3. Maximum Conducted Output Power	18					
	4.4. Emission Bandwidth						
	4.5. Power Spectral Density	26					
	4.6. Conducted Band Edge and Spurious Emission Measurement	33					
	4.7. Radiated Spurious Emission Measurement	43					
	4.8. Antenna Requirement	69					
5.	Photographs of Test	70					
6	Photos of the FUT	72					

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 cannont 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.





** Modified History **

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	Feb. 01, 2024	Jason Zhou
JAN HUAN		HUAN	
			9

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



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 HUAK 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.

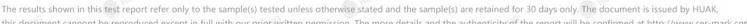
The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAK, this document cannon be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at http://www.cer-mark.com



1.3. Measurement Uncertainty

The reported uncertainty of measurement y ± U, where expended 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.	ltem	MU
1	Conducted Emission	±2.71dB
2 HUM	RF power, conducted	±0.37dB
3	Spurious emissions, conducted	±0.11dB
4	All emissions, radiated(<1G)	±3.90dB
5	All emissions, radiated(>1G)	±4.28dB
6	Temperature	±0.1°C
7	Humidity	±1.0%





2. EUT Description

2.1. General Description of EUT

Equipment:	WIFI CAMERA	O HU	(a) HO
Model Name:	TC107	V TESTING	
Series Model:	PC180, PC181, PC182, P PC188, PC189, PC190, P PC208, PC209, PC210, P AD120, AD121, AD122	C203, PC207, PC2	205, PC206,
Model Difference:	All model's the function, so same, only with product m model: TC107.		
FCC ID:	2BEXJ-TC107	TING	TING
Antenna Type:	FPC Antenna	MHUANTED TO	MINAX TEX
Antenna Gain:	2dBi	y TESTING	
Operation Frequency:	802.11b/g/n 20:2412~246; 802.11n 40: 2422~2452M		HUANTESTIN
Number of Channels:	802.11b/g/n20: 11CH 802.11n 40: 7CH	HUAKTESTING	
Modulation Type:	CCK/OFDM/DBPSK/DAPS	SK	HUAKTES
Power Source:	DC12V, 2A from Adapter v	with AC110-240V,	50/60Hz
Power Rating:	DC12V, 2A from Adapter	with AC110-240V,	50/60Hz

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 cannont 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.



2.2. Carrier Frequency of Channels

Channel List For 802.11b/802.11g/802.11n (HT20)							
Channel Frequency (MHz) Channel Frequency (MHz) Channel Frequency (MHz) Channel Frequency (MHz)							
01	2412	04	2427	07	2442	^{AUP 10}	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452	-STING	

Channel List For 802.11n (HT40)								
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	
STING	OKTESTI .	04	2427	07	2442	TESTIN	NETE	
(D) ///		05	2432	08	2447	HODE.	(C) HO	
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/802.11g/802.11n (HT20)

Low Channel: 2412MHz Middle Channel: 2437MHz High Channel: 2462MHz

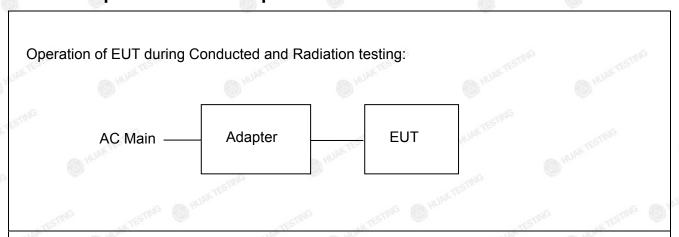
The mode is used: Transmitting mode for 802.11n (HT40)

Low Channel: 2422MHz Middle Channel: 2437MHz High Channel: 2452MHz

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 cannont 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.

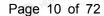


2.4. Description of Test Setup



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.

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 cannont 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.





3. General Information

3.1. Test Environment and Mode

perating Environment:			
Temperature:	25.0 °C	HUAKTESII	HUAKT
Humidity:	56 % RH	(a)	0
Atmospheric Pressure:	1010 mbar	AX TESTING	
est Mode:		. 550	
Engineering Mode:	Keep the EUT by select chann		

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. For the full battery state and The output power to the maximum state.

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 cannont 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

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(H20)	6.5Mbps
802.11n(H40)	13.5Mbps

Final Test Mode:

Operation mode:

Keep the EUT in continuous transmitting with modulation

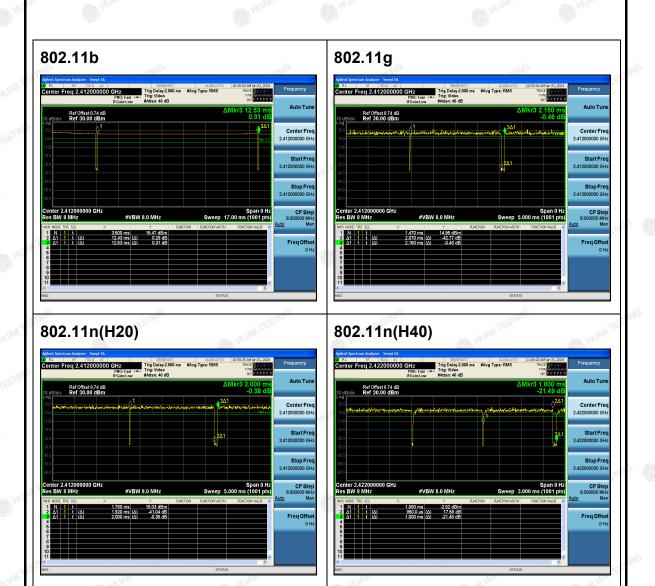
- 1. For WIFI function, the engineering test program was provided and enabled to make EUT continuous transmit/receive.
- 2.According to ANSI C63.10 standards, the test results are both the "worst case" and "worst setup" 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n(H20), 13.5Mbps for 802.11n(H40).

3. Mode Test Duty Cycle

Mode	Duty Cycle	Duty Cycle Factor (dB)
802.11b	0.992	-0.035
802.11g	0.963	-0.165
802.11n(H20)	0.960	-0.177
802.11n(H40)	0.950	-0.223

Test plots as follows:

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 cannont 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



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 cannont 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.

3.2. 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
11G	WIFI CAMERA	N/A	,⊚ TC107	N/A	EUT
2	Adapter	N/A	YN-K013	Input: AC110-240V, 50/60Hz Output: DC12V, 2A	Peripheral
G		LAKTESTING		LAK TESTING	
.18	THE ON TESTING	0,00	TESTING	3 O'M'S	AKTESTING WITH
HUAN	(a)	0)	Olyan Wash	Muya.	HO

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
- 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.

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 cannont 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



4. Test Results and Measurement Data

4.1. Conducted Emission

Test Specification

TING	- TOPO	TIME	TING	Mr		
Test Requirement:	FCC Part15 C Secti	on 15.207	AKTES	HUAKTES		
Test Method:	ANSI C63.10:2013	ANSI C63.10:2013				
Frequency Range:	150 kHz to 30 MHz	HUAKIE	· ox	TESTING		
Receiver Setup:	RBW=9 kHz, VBW=	30 kHz, Sweep	time=auto			
Limits:	Frequency range (MHz) 0.15-0.5 0.5-5 5-30	Limit (d Quasi-peak 66 to 56* 56 60	Average 56 to 46* 46 50	AFTESTING		
Test Setup:	Test table/Insulation p	Test table/Insulation plane Remark E.U.T. Equipment Under Test LISN: Line Impedence Stabilization Network				
Test Mode:	Transmitting with mo	odulation	AK TESTING	MAKTESTIN		
Test Procedure:	line impedance st provides a 50ohm measuring equipm 2. The peripheral de power through a l coupling impedant refer to the block photographs). 3. Both sides of A.C conducted interfe emission, the relation	 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. 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). 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	JAKTE	TING	-n/G		
25"	50 Y-	Mary Arguer		25		

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.



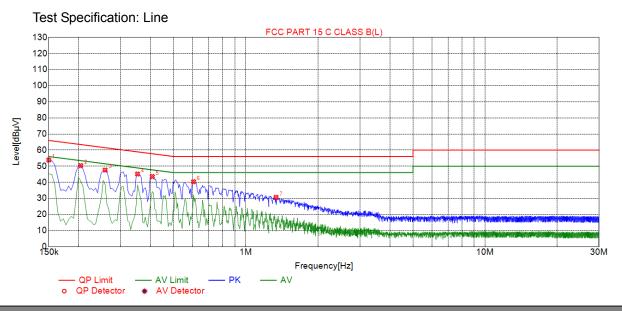
Test Instruments

Conducted Emission Shielding Room Test Site (843)							
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due		
Receiver	R&S	ESR-7	HKE-005	Feb. 17, 2023	Feb. 16, 2024		
LISN	R&S	ENV216	HKE-002	Feb. 17, 2023	Feb. 16, 2024		
Coax cable (9KHz-30MHz)	Times	381806-002	N/A	Feb. 17, 2023	Feb. 16, 2024		
10dB Attenuator	Schwarzbeck	VTSD9561F	HKE-153	Feb. 17, 2023	Feb. 16, 2024		
Conducted test software	Tonscend	TS+ Rev 2.5.0.0	HKE-081	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).

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 cannont 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.

4.2. Test Result



Sus	Suspected List									
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Туре		
1	0.1500	53.81	20.03	66.00	12.19	81.78	PK	L		
2	0.2040	50.35	20.04	63.45	13.10	78.31	PK	L		
3	0.2580	47.60	20.04	61.50	13.90	75.56	PK	L		
4	0.3525	45.12	20.03	58.90	13.78	73.09	PK	L		
5	0.4065	43.57	20.03	57.72	14.15	71.54	PK	L		
6	0.6045	40.37	20.05	56.00	15.63	68.32	PK	L		
7	1.3380	30.65	20.10	56.00	25.35	58.55	PK	L		

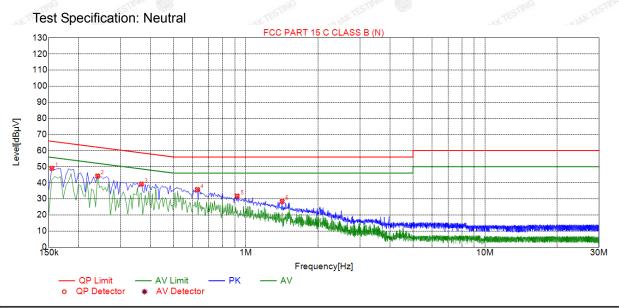
Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

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 cannont 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.





Sus	Suspected List								
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Туре	
1	0.1545	48.95	20.03	65.75	16.80	70.92	PK	N	
2	0.2400	44.20	20.03	62.10	17.90	66.17	PK	N	
3	0.3660	39.20	20.04	58.59	19.39	61.16	PK	N	
4	0.6270	35.81	20.05	56.00	20.19	57.76	PK	N	
5	0.9195	31.77	20.06	56.00	24.23	53.71	PK	N	
6	1.4190	28.47	20.11	56.00	27.53	50.36	PK	N	

Remark: Margin = Limit - Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

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 cannont 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.

4.3. Maximum Conducted Output Power

Test Specification

Test Requirement:	FCC Part15 C Section 15	FCC Part15 C Section 15.247 (b)(3)				
Test Method:	KDB 558074 D01 15.247	KDB 558074 D01 15.247 Meas Guidance v05r02				
Limit:	30dBm	AKTESTING				
Test Setup:	RF automatic control unit	EUT HUAYTESTING HUAYTESTING				
Test Mode:	Transmitting mode with m	Transmitting mode with modulation				
Test Procedure:	FCC KDB 558074 D0 v05r02. 2. The RF output of EUT automatic control unit The path loss was coreach measurement. 3. Set to the maximum por EUT transmit continuous.	 The testing follows the Measurement Procedure of FCC KDB 558074 D01 15.247 Meas Guidance v05r02. The RF output of EUT was connected to the RF automatic control unit by RF cable and attenuator. The path loss was compensated to the results for each measurement. Set to the maximum power setting and enable the EUT transmit continuously. Measure the Peak output power and record the results 				
Test Result:	PASS					

Test Instruments

RF Test Room						
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due	
Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 17, 2023	Feb. 16, 2024	
Power meter	Agilent	E4419B	HKE-085	Feb. 17, 2023	Feb. 16, 2024	
Power Sensor	Agilent	E9300A	HKE-086	Feb. 17, 2023	Feb. 16, 2024	
RF cable	Times	1-40G	HKE-034	Feb. 17, 2023	Feb. 16, 2024	
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 17, 2023	Feb. 16, 2024	

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

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 cannont 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.



Test Data

NG TEST	NG	TX 802.11b Mode	3
Test Channel	Frequency	Maximum Peak Conducted Output Power	LIMIT
rest Oriannei	(MHz)	(dBm)	dBm
CH01	2412	12.67	30
CH06	2437	12.95	30
STING CH11	2462	12.59	30 m
0	0	TX 802.11g Mode	9
CH01	2412	13.44	30
CH06	2437	13.53	30
CH11	2462	13.20	30
ESTING	HUAKT	TX 802.11n20 Mode	-STING
CH01	2412	13.33	30
CH06	2437	13.55	30
CH11	2462	13.16	30
		TX 802.11n40 Mode	
CH03	2422	13.24	30
CH06	2437	12.94	30
CH09	2452	12.41	30

Note: The test results including the cable loss.

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 cannont 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.

4.4. Emission Bandwidth

Test Specification

Test Requirement:	FCC Part15 C Section 15.	FCC Part15 C Section 15.247 (a)(2)					
Test Method:	KDB 558074 D01 15.247	KDB 558074 D01 15.247 Meas Guidance v05r02					
Limit:	>500kHz	W. TESTING					
Test Setup:	Spectrum Analyzer	EUT MUS MILANTESTIN					
Test Mode:	Transmitting mode with me	Transmitting mode with modulation					
Test Procedure:	15.247 Meas Guidance 2. Set to the maximum por EUT transmit continuor 3. Make the measurement resolution bandwidth (Foundation of the Video bandwidth (VBW) an accurate measurement be greater than 500 kH	 The testing follows FCC KDB Publication 558074 D01 15.247 Meas Guidance v05r02. Set to the maximum power setting and enable the EUT transmit continuously. 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. Measure and record the results in the test report. 					
Test Result:	PASS	O HUM O HO					

Test Instruments

RF Test Room						
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due	
Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 17, 2023	Feb. 16, 2024	
RF cable	Times	1-40G	HKE-034	Feb. 17, 2023	Feb. 16, 2024	
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 17, 2023	Feb. 16, 2024	

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

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 cannont 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.



Test data

Test channel	6dB Emission Bandwidth (MHz)					
rest channel	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	10.040	16.360	17.320	34.080		
Middle	9.080	16.280	16.960	35.040		
Highest	9.080	16.280	17.320	35.280		
Limit:	3 HUAKTES.	>50	00kHz	- G (M)		
Test Result:	100	TESTING P	ASS	THE HUAY TESTING		

Test plots as follows:

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.

802.11b 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 cannon 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.

802.11g 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.

802.11n (HT20) 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 cannont 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.

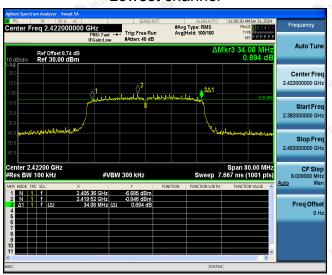
TEL: +86-755 2302 9901 FAX: +86-755 2302 9901 E-mail: service@cer-mark.com

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

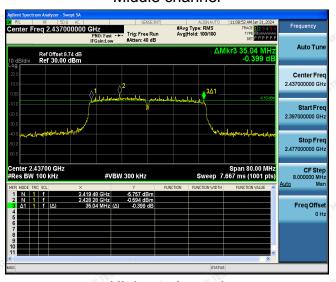


802.11n (HT40) Modulation

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 cannon 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.





4.5. Power Spectral Density

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:	Spectrum Analyzer EUT
Test Mode:	Transmitting mode with modulation
Test Procedure:	 The testing follows Measurement procedure 10.2 method PKPSD of FCC KDB Publication 558074 D01 15.247 Meas Guidance v05r02. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. Set to the maximum power setting and enable the EUT transmit continuously. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW): 3 kHz ≤ RBW ≤ 100 kHz. Video bandwidth VBW ≥ 3 x RBW. Set the span to at least 1.5 times the OBW. Detector = Peak, Sweep time = auto couple. Employ trace averaging (Peak) mode over a minimum of 100 traces. Use the peak marker function to determine the maximum power level. Measure and record the results in the test report.
Test Result:	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 HUAK, this document cannont 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.



Test Instruments

	RF Test Room						
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due		
Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 17, 2023	Feb. 16, 2024		
RF Cable (9KHz-26.5GHz)	Tonscend	170660	N/A	Feb. 17, 2023	Feb. 16, 2024		
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 17, 2023	Feb. 16, 2024		
RF test software	Tonscend	JS1120-B Version 2.6	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).

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 cannont 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.



Test data

EUT Set Mode	Channel	Result (dBm/30KHz)	Result (dBm/3kHz)
	Lowest	-0.37	-10.37
802.11b	Middle	1.34	-8.66
	Highest	-0.43	-10.43
	Lowest	-1.64	-11.64 _{(7.65} m ²
802.11g	Middle	-2.07	-12.07
	Highest	-2.37	-12.37
	Lowest	-2.65	-12.65
802.11n(H20)	Middle	-2.08	-12.08
	Highest	-2.21	-12.21
	Lowest	-3.72	-13.72
802.11n(H40)	Middle	-4.09	-14.09
	Highest	-4.56	-14.56
PSD Test Resul	t (dBm/3kHz)= PS	SD Test Result (dBm/30kl	Hz)-10
Limit: 8dBm/3kl	Hz		
Test Result:	IG HUAKTES	PASS	TES .
455	CIC DEED .	Was also also also also also also also al	

Test plots as follows:

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.



802.11b Modulation

Lowest channel



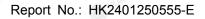
Middle channel



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.



802.11g Modulation

HUAK TESTING

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 cannon 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.



802.11n (HT20) Modulation

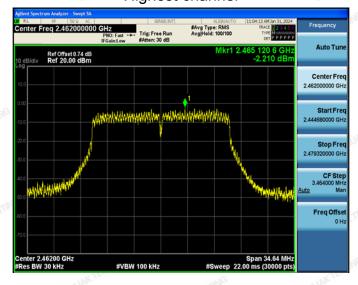
Lowest channel



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.

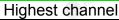
802.11n (HT40) Modulation

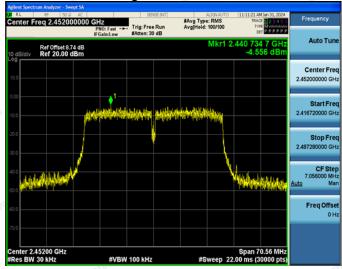
Lowest channel



Middle 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 cannont 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.



4.6. Conducted Band Edge and Spurious Emission Measurement

Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (d)				
Test Method:	KDB 558074 D01 15.247 Meas Guidance v05r02				
Limit:	In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).				
Test Setup:	Spectrum Analyzer EUT				
Test Mode:	Transmitting mode with modulation				
Test Procedure:	 Transmitting mode with modulation The testing follows FCC KDB Publication 558074 D01 15.247 Meas Guidance v05r02. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. Set to the maximum power setting and enable the EUT transmit continuously. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d). Measure and record the results in the test report. The RF fundamental frequency should be excluded against the limit line in the operating frequency band. 				
Test Result:	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 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.



Test Instruments

RF Test Room						
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due	
Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 17, 2023	Feb. 16, 2024	
High pass filter unit	Tonscend	JS0806-F	HKE-055	Feb. 17, 2023	Feb. 16, 2024	
RF Cable (9KHz-26.5GHz)	Tonscend	170660	N/A	Feb. 17, 2023	Feb. 16, 2024	
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 17, 2023	Feb. 16, 2024	
RF test software	Tonscend	JS1120-B Version 2.6	HKE-083	N/A	N/A	

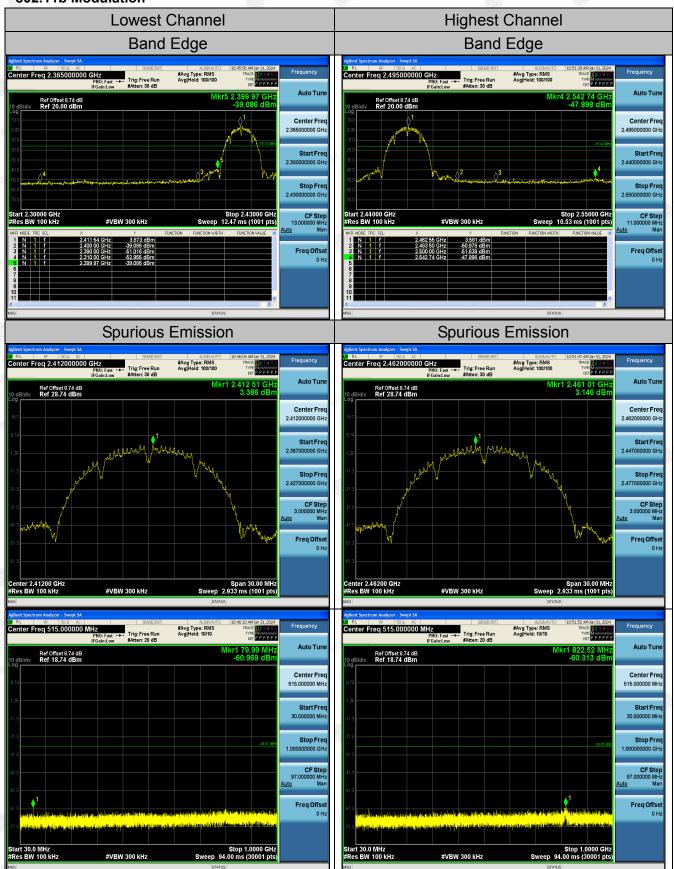
Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

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 cannont 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.

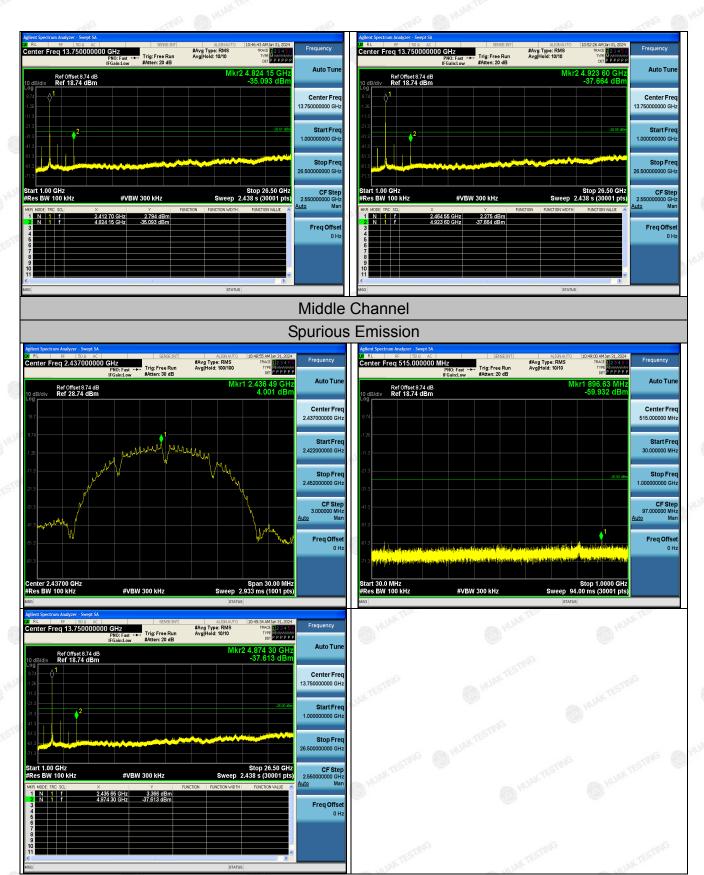


Test Data

802.11b Modulation



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 cannon 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.



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 cannon 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.