

FCC TEST REPORT

Test report
On Behalf of
TPV Electronics (Fujian) Co., Ltd.
For

USB Wireless Dongle Model No.: AOC GH401, GH401A, GH401B, GH401X, G03

FCC ID: 2A2RT-AOCGH401TX

Prepared For: TPV Electronics (Fujian) Co., Ltd.

Shangzheng, Yuanhong Road, Fuqing City, Fujian Province, 350301 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: July. 07, 2021 ~Aug. 02, 2021

Date of Report: Aug. 02, 2021

Report Number: HK2107072240-E



TEST RESULT CERTIFICATION

Applicant's name TPV Electronics (Fujian) Co., Ltd.

Address Shangzheng, Yuanhong Road, Fuqing City, Fujian Province,

350301 China

Manufacture's Name.....: Dongguan Desheng Industrial Co., Ltd.

Area A5, Shichong Industrial Park, Shipai Town, Dongguan City,

523000 China

Product description

Trade Mark: AOC

Product name: USB Wireless Dongle

Model and/or type reference : AOC GH401, GH401A, GH401B, GH401R, GH401X, G03

FCC Rules and Regulations Part 15 Subpart C Section 15.249

Report No.: HK2107072240-E

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 of Issue Aug. 02, 2021

Test Result Pass

Testing Engineer : / xov

(Gary Qian)

Technical Manager :

HUM FM

(Eden Hu)

Authorized Signatory:

Jasin Hou

(Jason Zhou)

23 23

23

25

26

28



1. TEST SUMMARY

3.2 Test Setup

3.4 Test Result

4.2 Test Setup

4.4 Test Result

5. BAND EDGE

5.1 Limits

3.3 Test Procedure

4.1 Radiation Limit

4.3 Test Procedure

5.2 Test Procedure

6.1 Test Setup

6.4 Test Result

6.2 Test Procedure

7. ANTENNA REQUIREMENT

8. PHOTOGRAPH OF TEST

9. PHOTOS OF THE EUT

6.3 Measurement Equipment Used

Table of Contents Page 5 2. GENERAL INFORMATION 6 2.1 General Description of EUT 6 2.2 Operation of EUT During Testing 7 2.3 Description of Test Setup 2.4 Measurement Instruments List 3. CONDUCTED EMISSIONS TEST 10 3.1 Conducted Power Line Emission Limit 10 10 10 11 4. RADIATED EMISSION TEST 13 13 13 14 14 20 20 20 6. OCCUPIED BANDWIDTH MEASUREMENT 23 23



Page 4 of 28

Report No.: HK2107072240-E

** Modified History **

-TIME	" The	C.I.	-410	
Revision	Description	Issued Data	Remark	
Revision 1.0	Initial Test Report Release	Aug. 02, 2021	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.

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



1. TEST SUMMARY

1.1 Test Procedures And Results

DESCRIPTION OF TEST	SECTION NUMBER	RESULT
CONDUCTED EMISSIONS TEST	15.207	COMPLIANT
RADIATED EMISSION TEST	15.249(a)/15.209	COMPLIANT
BAND EDGE	15.249(d)/15.205	COMPLIANT
OCCUPIED BANDWIDTH MEASUREMENT	15.215 (c)	COMPLIANT
ANTENNA REQUIREMENT	15.203	COMPLIANT

1.2 Test Facility

Test Firm : Shenzhen HUAK Testing Technology Co., Ltd.

Address 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park,

Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

1.3 Measurement Uncertainty

Measurement Uncertainty

Conducted Emission Expanded Uncertainty = 2.71dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz) = 3.90dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz) = 3.90dB, k=2
Radiated emission expanded uncertainty(Above 1GHz) = 4.28dB, k=2

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

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



2. GENERAL INFORMATION

2.1 General Description of EUT

Equipment	USB Wireless Dongle
Model Name	AOC GH401
Serial Model	GH401A, GH401B, GH401R, GH401X, G03
Model Difference	All model's the function, software and electric circuit are the same, only with a product color, appearance and model named different. Test sample model: AOC GH401.
FCC ID	2A2RT-AOCGH401TX
Antenna Type	PCB Antenna
Antenna Gain	0 dBi
Operation frequency	2403-2478MHz
Number of Channels	26CH STING STING
Modulation Type	GFSK OFFICE OFFI
Power Source	DC 5V from USB
Power Rating	DC 5V from USB

FICATION





2.1.1 Carrier Frequency of Channels

MA	" Ibu	As.	- u IPir	As.	1 122
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
-STING 1	2403	10	2430	19	2457
2	2406	11	2433	20	2460
3	2409	12	2436	21	2463
4	2412	13	2439	22	2466
5 HUA	2415	14	2442	23	2469
6	2418	15	2445	24	2472
7	2421	16	2448	25	2475
8	2424	17	2451	26	2478
9	2427	18	2454		

2.2 Operation of EUT During Testing

Operating Mode

The mode is used: Transmitting mode

Low Channel: 2403MHz Middle Channel: 2439MHz High Channel: 2478MHz

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.

HUAK Testing Lab TEL: +86-755 2302 9901 FAX: +86-755 2302 9901 E-mail: service@cer-mark.com
1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

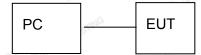


2.3 Description of Test Setup

Operation of EUT during conducted and radiation below 1GHz testing:



Operation of EUT during radiation above 1GHz testing



PC information

Model: ThinkPad X220i Input: 20V, 3.25A/4.5A

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.

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



2.4 Measurement Instruments List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.
AK TEST	L.I.S.N.	HUAKTESIA	HUAKTESI	HUAKT	HUP	KTESI
1.	Artificial Mains Network	R&S	ENV216	HKE-002	Dec. 10, 2020	1 Year
2.	Receiver	R&S	ESCI 7	HKE-010	Dec. 10, 2020	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 10, 2020	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Dec. 10, 2020	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 10, 2020	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 10, 2020	1 Year
7.77	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Dec. 10, 2020	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 10, 2020	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 10, 2020	⁰ 1 Year
10.	Horn Antenna	Schewarzbeck	9120D	HKE-013	Dec. 10, 2020	1 Year
11.	Pre-amplifier	EMCI	EMC051845S E	HKE-015	Dec. 10, 2020	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Dec. 10, 2020	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JY3120-B Version	HKE-083	N/A	N/A
14.	Power Sensor	Agilent	E9300A	HKE-086	Dec. 10, 2020	1 Year
15.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 10, 2020	1 Year
16.	Signal generator	Agilent	N5182A	HKE-029	Dec. 10, 2020	1 Year
17.	Signal Generator	Agilent	83630A	HKE-028	Dec. 10, 2020	1 Year
18.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 17, 2020	3 Year
19.	Hight gain antenna	Schwarzbeck	LB-180400KF	HKE-054	Dec. 10, 2020	1 Year

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.

HUAK Testing Lab TEL: +86-755 2302 9901 FAX: +86-755 2302 9901 E-mail: service@cer-mark.com 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



3. CONDUCTED EMISSIONS TEST

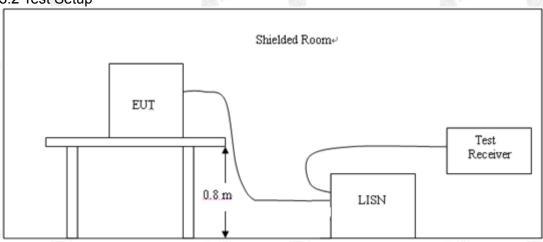
3.1 Conducted Power Line Emission Limit

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following.

Francis	Maximum RF Line Voltage (dBμV)								
Frequency (MHz)	CLAS	SS A	CLASS B						
(11112)	Q.P.	Ave.	Q.P.	Ave.					
0.15 - 0.50	79	66	66-56*	56-46*					
0.50 - 5.00	73	60	56	46					
5.00 - 30.0	73	60	60	50					

^{*} Decreasing linearly with the logarithm of the frequency
For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

3.2 Test Setup



3.3 Test Procedure

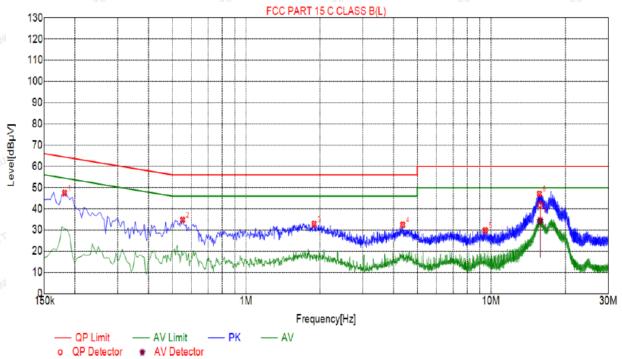
- 1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
- 2. Support equipment, if needed, was placed as per ANSI C63.10.
- 3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4. If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5. All support equipments received AC power from a second LISN, if any.
- 6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

3.4 Test Result

PASS

All the test modes completed for test. only the worst result of High Channel was reported as below:

Test Specification: Line



Sus	Suspected List									
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Туре		
1	0.1815	47.50	20.06	64.42	16.92	27.44	PK	L		
2	0.5505	34.78	20.06	56.00	21.22	14.72	PK	L		
3	1.8960	32.89	20.14	56.00	23.11	12.75	PK	L		
4	4.3620	32.46	20.25	56.00	23.54	12.21	PK	L		
5	9.4785	29.87	20.09	60.00	30.13	9.78	PK	L		
6	15.6750	47.08	19.97	60.00	12.92	27.11	PK	L		

į	Final Data List											
	NO.	Freq. [MHz]	Correction factor[dB]	QP Value [dBµV]	QP Limit [dΒμV]	QP Margin [dB]	QP Reading [dBμV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	ΑV Reading [dBμV]	Туре
	1	15.7902	19.97	41.99	60.00	18.01	22.02	34.34	50.00	15.66	14.37	L

Remark: Margin = Limit - Level

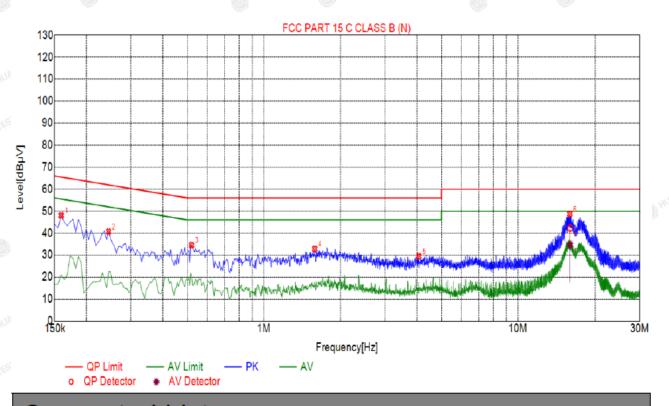
Correction factor = Cable lose + LISN insertion loss

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.

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

Test Specification: Neutral



Sus	spect	ted	List	

NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Туре			
1	0.1590	48.00	20.01	65.52	17.52	27.99	PK	N			
2	0.2445	40.65	20.03	61.94	21.29	20.62	PK	N			
3	0.5190	34.50	20.04	56.00	21.50	14.46	PK	N			
4	1.5855	32.78	20.11	56.00	23.22	12.67	PK	N			
5	4.0740	29.39	20.25	56.00	26.61	9.14	PK	N			
6	15.9000	48.69	19.98	60.00	11.31	28.71	PK	N			

Final	Final Data List										
NO.	Freq. [MHz]	Correction factor[dB]	QP Value [dBµV]	QP Limit [dΒμV]	QP Margin [dB]	QP Reading [dBμV]	AV Value [dBµV]	ΑV Limit [dBμV]	AV Margin [dB]	AV Reading [dBµV]	Туре
1	15.9368	19.98	42.25	60.00	17.75	22.27	34.73	50.00	15.27	14.75	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.

MAKTES!

CATION



4. RADIATED EMISSION TEST

4.1 Radiation Limit

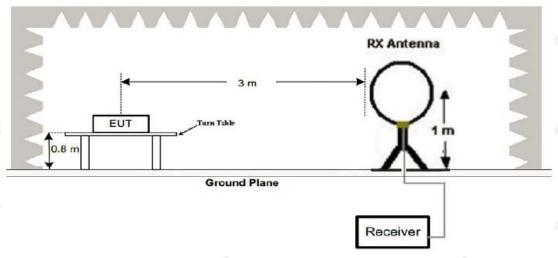
For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency	Distance	Radiated	Radiated
(MHz)	(Meters)	(dBµV/m)	(µV/m)
0.009-0.490	300	20log 2400/F (kHz)	2400/F (kHz)
0.490-1.705	30	20log 24000/F (kHz)	24000/F (kHz)
1.705-30	30	20log 30	30
30-88	3	40	100
88-216	3	43.5	150
216-960	3 TESTINE	46	200
Above 960	3	54	500

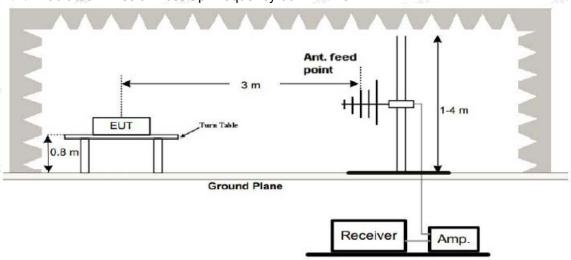
For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

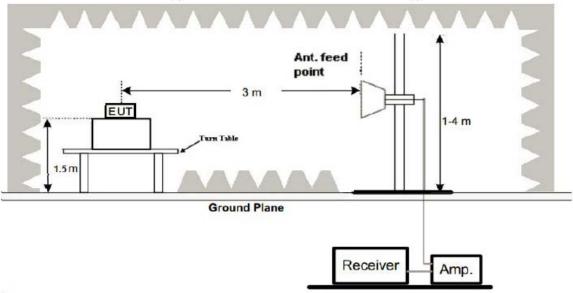
4.2 Test Setup

(1) Radiated Emission Test-Up Frequency Below 30MHz



(2) Radiated Emission Test-Up Frequency 30MHz~1GHz





4.3 Test Procedure

- 1. Below 1GHz measurement the EUT is placed on turntable which is 0.8m above ground plane.

 And above 1GHz measurement EUT was placed on low permittivity and low tangent turn table which is 1.5m above ground plane.
- 2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- 4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 6. Repeat above procedures until the measurements for all frequencies are complete.
- 7. The test frequency range from 9KHz to 25GHz per FCC PART 15.33(a).

Note:

For battery operated equipment, the equipment tests shall be performed using a new battery.

4.4 Test Result

PASS

All the test modes completed for test. The worst case of Radiated Emission is CH 01; the test data of this mode was reported.



Below 1GHz Test Results:

Antenna polarity: H



			20 5 50						20.00				
3	Suspe	Suspected List											
	NO	Freq.	Factor	Reading	Level	Limit	Margin	Height	Angle	Dalasitas			
	NO.	[MHz]	[dB]	[dBµV/m]	[dBµV/m]	[dBµV/m]	[dB]	[cm]	[°]	Polarity			
1	1	57.1872	-14.74	23.84	9.10	40.00	30.90	100	224	Horizontal			
	2	153.3133	-18.70	36.02	17.32	43.50	26.18	100	64	Horizontal			
	3	179.5295	-16.88	37.07	20.19	43.50	23.31	100	248	Horizontal			
à	4	229.0490	-14.34	40.46	26.12	46.00	19.88	100	312	Horizontal			
	5	282.4525	-13.15	42.06	28.91	46.00	17.09	100	359	Horizontal			
	6	726.1862	-4.60	33.26	28.66	46.00	17.34	100	116	Horizontal			

Remark: Factor = Cable loss + Antenna factor - Preamplifier; Level = Reading + Factor; Margin = Limit - Level

Antenna polarity: V



Su	Suspected List												
NI.	Ο.	Freq.	Factor	Reading	Level	Limit	Margin	Height	Angle	Polarity			
IN	0.	[MHz]	[dB]	[dBµV/m]	[dBµV/m]	[dBµV/m]	[dB]	[cm]	[°]	Polarity			
	1	66.8969	-16.89	34.07	17.18	40.00	22.82	100	5	Vertical			
2	2	78.5485	-19.21	34.60	15.39	40.00	24.61	100	303	Vertical			
۲ :	3	174.6747	-17.09	30.79	13.70	43.50	29.80	100	343	Vertical			
4	4	228.0781	-14.37	32.72	18.35	46.00	27.65	100	216	Vertical			
Ę	5	399.9399	-10.41	33.93	23.52	46.00	22.48	100	64	Vertical			
. (6	598.0180	-6.24	32.39	26.15	46.00	19.85	100	77	Vertical			

Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

Harmonics and Spurious Emissions

Frequency Range (9kHz-30MHz)

	Frequency (MHz)	Level@3m (dBµV/m)	Limit@3m (dBµV/m)
III	41. 	TESTING TING	"IAKTESTIVE"
	HUMKTES	HUAN TES	HUAKTES
		ß	-STING
	THE MUANTE	- me mu	

Note: 1. Emission Level=Reading+ Cable loss+ Antenna factor-Amp factor.

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement.

Above 1 GHz Test Results:

CH Low (2403MHz)

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
2403	106.72	-5.84	100.88	114	-13.12	peak
2403	87.66	-5.84	81.82	94	-12.18	AVG
4806	57.17	-3.64	53.53	74	-20.47	peak
4806	47.33	-3.64	43.69	54	-10.31	AVG
7209	53.79	-0.95	52.84	74	-21.16	peak
7209	42.43	-0.95	41.48	₆ 54	-12.52	AVG
Remark: Facto	r = Antenna Fa	ctor + Cable Lo	oss – Pre-amplifier.		HUAKTE	HUAKTE

Vertical:

Meter					
Reading	Factor	Emission Level	Limits	Margin	Detector
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
109.22	-5.84	103.38	114	-10.62	peak
83.16	-5.84	77.32	94	-16.68	AVG
55.73	-3.64	52.09	74	-21.91	peak
45.92	-3.64	42.28	54	-11.72	AVG
53.61	-0.95	52.66	74	-21.34	peak
41.28	-0.95	40.33	54	-13.67	AVG
	(dBµV) 109.22 83.16 55.73 45.92 53.61	(dBµV) (dB) 109.22 -5.84 83.16 -5.84 55.73 -3.64 45.92 -3.64 53.61 -0.95	(dBμV) (dB) (dBμV/m) 109.22 -5.84 103.38 83.16 -5.84 77.32 55.73 -3.64 52.09 45.92 -3.64 42.28 53.61 -0.95 52.66	(dBμV) (dB) (dBμV/m) (dBμV/m) 109.22 -5.84 103.38 114 83.16 -5.84 77.32 94 55.73 -3.64 52.09 74 45.92 -3.64 42.28 54 53.61 -0.95 52.66 74	(dBμV) (dB) (dBμV/m) (dBμV/m) (dBμV/m) 109.22 -5.84 103.38 114 -10.62 83.16 -5.84 77.32 94 -16.68 55.73 -3.64 52.09 74 -21.91 45.92 -3.64 42.28 54 -11.72 53.61 -0.95 52.66 74 -21.34

CH Middle (2439MHz)

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Type
2439	106.74	-5.71	101.03	114	-12.97	peak
2439	80.69	-5.71	74.98	94	-19.02	AVG
4878	55.36	-3.51	51.85	74	-22.15	peak
4878	45.14	-3.51	41.63	54	-12.37	AVG
7317	54.86	-0.82	54.04	74	-19.96	peak
7317	41.57	-0.82	40.75	54	-13.25	AVG

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detaile
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detecto Type
2439	104.52	-5.71	98.81	114 (5 ^{TMG}	-15.19	peak
2439	83.13	-5.71	77.42	94	-16.58	AVG
4878	54.16	-3.51	50.65	74	-23.35	peak
4878	47.44	-3.51	43.93	54	-10.07	AVG
7317	54.63	-0.82	53.81	74	-20.19	peak
7317	42.04	-0.82	41.22	54	-12.78	AVG

FICATION



CH High (2478MHz)

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	.
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
2478	104.82	-5.65	99.17	114	-14.83	peak
2478	82.61	-5.65	76.96	94	-17.04	AVG
4956	53.77	-3.43	50.34	74	-23.66	peak
4956	44.26	-3.43	40.83	54	-13.17	AVG
7434	54.12	-0.75	53.37	74	-20.63	peak
7434	41.39	-0.75	40.64	54	-13.36	AVG

Vertical:

		W05535	10000	100000		FILESCO.
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
2478	104.69	-5.65	99.04	114	-14.96	peak
2478	81.21	-5.65	75.56	94 TESTING	-18.44	AVG
4956	54.66	-3.43	51.23	74	-22.77	peak
4956	45.37	-3.43	41.94	54	-12.06	AVG
7434	54.58	-0.75	53.83	74	-20.17	peak
7434	38.96	-0.75	38.21	54	-15.79	AVG

Remark: Factor = Antenna Factor + Cable Loss - Pre-amplifier.

Remark:

- (1) Measuring frequencies from 1 GHz to the 25 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency; "E" denotes band edge frequency.
- (3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) The emissions are attenuated more than 20dB below the permissible limits are not record in the report.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.
- (7) All modes of operation were investigated and the worst-case emissions are reported.



5. BAND EDGE

5.1 Limits

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

5.2 Test Procedure

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW to 100KHz and VBM to 300KHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength. The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW to 100 KHz and VBW to 300 KHz, to measure the conducted peak band edge.

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

HUAK Testing Lab TEL: +86-755 2302 9901 FAX: +86-755 2302 9901 E-mail: service@cer-mark.com
1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



5.3 Test Result

PASS

Radiated Band Edge Test:

Operation Mode: TX CH Low (2403MHz)

Horizontal (Worst case)

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2310	57.42	-5.81	51.61	74	-22.39	peak
2310	NY TESTING OF PRO	-5.81	ETING / NYTESTING	54	TESTAG	AVG
2390	55.87	-5.84	50.03	74	-23.97	peak
2390	1	-5.84	/	54	1	AVG
2400	54.26	-5.84	48.42	74	-25.58	peak
2400	Ho	-5.84	D HO.	54	1	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2310	57.12	-5.81	51.31	74	-22.69	peak
2310	MAKTESTING	-5.81	I MAKTESTA	54	TESTING!	AVG
2390	56.55	-5.84	50.71	74	-23.29	peak
2390	TING 1	-5.84	1	54	1	AVG
2400	55.74	-5.84	49.9	74	-24.1	peak
2400	1	-5.84	/	54 STING	1	AVG

Remark: Factor = Antenna Factor + Cable Loss - Pre-amplifier.

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.

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



Operation Mode: TX CH High (2478MHz)

Horizontal (Worst case)

Frequency	Reading Result	Factor	Emission Level	[©] Limits	Margin	Data atas Tuna
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
[©] 2483.50	56.28	-5.65	50.63	74	-23.37	peak
2483.50	Estine 1	-5.65	WAX ISTING	54	1	AVG
2500.00	54.96	-5.65	49.31	74	-24.69	peak
2500.00	MG HUAK	-5.65	1	54	1	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

ſ	Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
110	(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
	2483.50	57.14	-5.65	51.49	74	-22.51	peak
	2483.50	1	-5.65	1	54	1	AVG
Ī	2500.00	56.45	-5.65	50.8	74	-23.2	peak
PA	2500.00	1	-5.65	1	54	HUM /	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.



6. OCCUPIED BANDWIDTH MEASUREMENT

6.1 Test Setup

Same as Radiated Emission Measurement

6.2 Test Procedure

- 1. The EUT was placed on a turn table which is 0.8m above ground plane.
- 2. Set EUT as normal operation.
- 3. Based on ANSI C63.10 section 6.9.2: RBW= 39KHz. VBW= 120 KHz, Span=8MHz.
- 4. The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector.

6.3 Measurement Equipment Used

Same as Radiated Emission Measurement

6.4 Test Result

PASS

Frequency	20dB Bandwidth (MHz)	Result
2403 MHz	3.299	PASS
2439 MHz	3.511	PASS
2478 MHz	3.363	PASS

CH: 2403MHz



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.

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

CH: 2439MHz



CH: 2478MHz



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,

ACATION.



7. ANTENNA REQUIREMENT

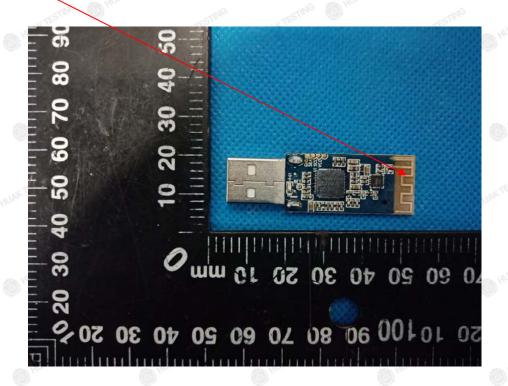
Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, 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

Antenna Connected Construction

The antenna used in this product is a PCB Antenna, which permanently attached. It conforms to the standard requirements. The directional gains of antenna used for transmitting is 0dBi.

ANTENNA



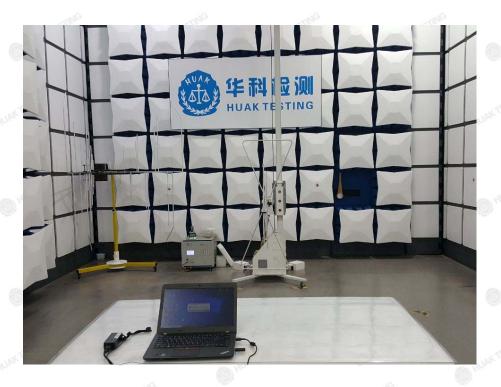
The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAK, this document cannon be reproduced except in full with our prior written permission. The more details and the authenticity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

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



8. PHOTOGRAPH OF TEST

Radiated Emission

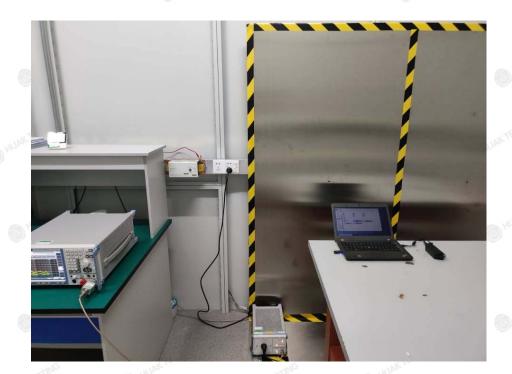




HK SPPR



Conducted Emission



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.

HUAK Testing Lab TEL: +86-755 2302 9901 FAX: +86-755 2302 9901 E-mail: service@cer-mark.com
1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China





9. PHOTOS OF THE EUT

Reference to the report: ANNEX A of external photos and ANNEX B of internal photos.

End of test report--