

FCC TEST REPORT

Report No.....: AB25100066FW04

FCC ID.....: **2BSXS-Q880-AF**

Applicant.....: Shenzhen Zhijiwulian Technology Co., Ltd.

Address.....: Room 110, 1st Floor, Building A4, Zhongjia Creative Park,
Donghuan 2nd Road, Longhua Street, Longhua District, Shenzhen
City, Guangdong Province, China

Manufacturer.....: Shenzhen Zhijiwulian Technology Co., Ltd.

Address.....: Room 110, 1st Floor, Building A4, Zhongjia Creative Park,
Donghuan 2nd Road, Longhua Street, Longhua District, Shenzhen
City, Guangdong Province, China

Product Name.....: 4G Wireless Router Module

Trade Mark.....: HAO-LINK

Test Model.....: Q880-AF

Additional Model(s).....: Q881-AF, Q816-AF, Q817-AF, Q818-AF, M825-AF, M619-AF

Standard.....: FCC Part 2 (Section 2.1091);KDB 447498 D01;IEEE C95.1

Date of Receipt.....: 2025.10.24

Date of Issue.....: 2025.11.10

Test Result.....: Pass

Compiled by:
(Printed Name + Signature)

Huaijie Li

Huaijie Li

Supervised by:
(Printed Name + Signature)

David Huang

David Huang

Approved by:
(Printed Name + Signature)

Jay Liu

Jay Liu

Testing Laboratory Name.....: Aibo Standard Technology (Shenzhen) Co., Ltd.

Address.....: 101, Building B, Tuori New Energy Industrial Park, High-tech Park,
Tianliao Community, Yutang Street, Guangming District, Shenzhen
City, Guangdong Province, China

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FCC TEST REPORT

EUT.....	: 4G Wireless Router Module
Test Model.....	: Q880-AF
Applicant.....	: Shenzhen Zhijiwulian Technology Co., Ltd.
Address.....	: Room 110, 1st Floor, Building A4, Zhongjia Creative Park, Donghuan 2nd Road, Longhua Street, Longhua District, Shenzhen City, Guangdong Province, China
Manufacturer.....	: Shenzhen Zhijiwulian Technology Co., Ltd.
Address.....	: Room 110, 1st Floor, Building A4, Zhongjia Creative Park, Donghuan 2nd Road, Longhua Street, Longhua District, Shenzhen City, Guangdong Province, China

Test Result	Positive
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The test report merely corresponds to the test sample.

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REPORT VERSION

Version No.	Issue Date	Description
01	2025.11.10	Initial Issue

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1. GENERAL INFORMATION

1.1. GENERAL DESCRIPTION OF EUT

Product Name:		4G Wireless Router Module	
Trade Mark:		HAO-LINK	
Test Model:		Q880-AF	
Additional Model(s):		Q881-AF, Q816-AF, Q817-AF, Q818-AF, M825-AF, M619-AF	
Model Difference:		All models are the same circuit and RF module, except the model name	
Hardware Version:		/	
Software Version:		/	
Power Supply:		DC 5-36 V powered by adapter	
EUT Supports Function: (Provided by the customer)		E-UTRA Bands:	2.4G WIFI, WCDMA Band II/IV/V LTE Band 2/4/5/12/13/14/66/71
Test Sample(s) Number:		AB25090034-01 (Engineer Sample)	
Radio Specification Subject to this Report			
2.4G WIFI			
Radio Specification:		IEEE 802.11b/g/n	
Frequency Range:		2412MHz~2462MHz for IEEE 802.11b/g/n(HT20) 2422MHz~2452MHz for IEEE 802.11n(HT40)	
Modulation Type:		IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT20: OFDM (64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT40: OFDM (64-QAM, 16-QAM, QPSK, BPSK)	
Channel Spacing:		5MHz	
Channel Number(s):		11 Channels for IEEE 802.11b/g/n(HT20) 7 Channels for IEEE 802.11n(HT40)	
Antenna Type:		PC+ABS Antenna	
Antenna Gain:		4.5dBi	
WCDMA			
Support Networks:		WCDMA, HSDPA, HSUPA	
		WCDMA Band II:	1852.4MHz~1907.6MHz
		WCDMA Band IV:	1712.4MHz~1752.6MHz
		WCDMA Band V:	826.4MHz~846.6MHz
		WCDMA Band:	BPSK
		HSDPA:	QPSK
		HSUPA:	QPSK
UMTS Power Class:		Class 3	
Antenna Type:		PC+ABS Antenna	
		WCDMA Band II:	3.8dBi (Max.)
		WCDMA Band IV:	3.8dBi (Max.)
		WCDMA Band V:	1.9dBi (Max.)
LTE			
Support Networks:		Band 2 / 4 / 5 / 12 / 13 / 14 / 66/71	
Frequency Range:		Band 2	1850MHz–1910MHz
		Band 4	1710MHz–1755MHz

	Band 5	824MHz–849MHz
	Band 12	699MHz–716MHz
	Band 13	777MHz–787MHz
	Band 14	788MHz–798MHz
	Band 66	1710MHz–1780MHz
	Band 71	663MHz–698MHz
Modulation Type:	QPSK, 16QAM	
Channel Bandwidth:	Band 2	1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
	Band 4	1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
	Band 5	1.4MHz, 3MHz, 5MHz, 10MHz
	Band 12	1.4MHz, 3MHz, 5MHz, 10MHz
	Band 13	5MHz, 10MHz
	Band 14	5MHz, 10MHz
	Band 66	1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
	Band 71	5MHz, 10MHz, 15MHz, 20MHz
Antenna Type:	PC+ABS Antenna	
Antenna Gain:	Band 2	3.8 dBi
	Band 4	3.8 dBi
	Band 5	1.9 dBi
	Band 12	0.8 dBi
	Band 13	0.8 dBi
	Band 14	0.8 dBi
	Band 66	3.8 dBi
	Band 71	0.8 dBi

1.2. DESCRIPTION OF TEST FACILITY

Test Lab: Aibo Standard Technology (Shenzhen) Co., Ltd.

Address: 101, Building B, Tuori New Energy Industrial Park, High-tech Park, Tianliao Community, Yutang Street, Guangming District, Shenzhen City, Guangdong Province, China

Tel.: +(86) 0755 85250797

E-mail: aibo@aibonorm.com

Website: www.aibonorm.com

The test facility is recognized, certified, or accredited by the following organizations:

A2LA-Lab Certificate No.: 7514.01

Aibo Standard Technology (Shenzhen) Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC Accredited Lab.

Designation Number: CN1411

Test Firm Registration Number: 567066

ISED Wireless Device Testing Laboratories

CAB identifier: CN0185

2. RF EXPOSURE EVALUATION

2.1 Limit

The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

f = frequency in MHz

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

P_d = power density in mW/cm², P_{out} = output power to antenna in mW;

G = gain of antenna in linear scale, $\pi = 3.1416$;

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

2.2 Evaluation Result

2.4G b			
Channel	Low	Middle	High
Target (dBm)	6.0	6.0	6.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
2.4G g			
Channel	Low	Middle	High
Target (dBm)	6.0	6.0	6.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
2.4G n20			
Channel	Low	Middle	High
Target (dBm)	6.0	6.0	6.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
2.4G n40			
Channel	Low	Middle	High
Target (dBm)	6.0	6.0	6.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0

LTE B2			
Channel	Low	Middle	High
Target (dBm)	22.5	22.5	22.5
Tolerance $\pm$ (dB)	2.0	2.0	2.0
LTE B4			
Channel	Low	Middle	High
Target (dBm)	21	21	21
Tolerance $\pm$ (dB)	2.0	2.0	2.0
LTE B5			
Channel	Low	Middle	High
Target (dBm)	21.5	21.5	21.5
Tolerance $\pm$ (dB)	2.0	2.0	2.0
LTE B12			
Channel	Low	Middle	High
Target (dBm)	21.5	21.5	21.5
Tolerance $\pm$ (dB)	2.0	2.0	2.0
LTE B13			
Channel	Low	Middle	High

Target (dBm)	21.5	21.5	21.5
Tolerance $\pm$ (dB)	2.0	2.0	2.0
LTE B14			
Channel	Low	Middle	High
Target (dBm)	21.5	21.5	21.5
Tolerance $\pm$ (dB)	2.0	2.0	2.0
LTE B66			
Channel	Low	Middle	High
Target (dBm)	21	21	21
Tolerance $\pm$ (dB)	2.0	2.0	2.0
LTE B71			
Channel	Low	Middle	High
Target (dBm)	21	21	21
Tolerance $\pm$ (dB)	2.0	2.0	2.0

For Max allowed antenna calculate

Step 1 ERP/EIRP calculate:

2.4G WiFi	Max Turn-up Conducted power (dBm)	ERP/EIRP Limit (dBm)	Margin (dB)
802.11b	7	30	23
802.11g	7	30	23
802.11n 20	7	30	23
802.11n 40	7	30	23

Bands	Max Turn-up Conducted power (dBm)	ERP/EIRP Limit (dBm)	Margin (dB)
LTE Band 2	24.5	33.00	8.5
LTE Band 4	23.0	30.00	7
LTE Band 5	23.5	38.45	14.95
LTE Band 12	23.5	34.80	11.3
LTE Band 13	23.5	34.80	11.3
LTE Band 14	23.5	34.80	11.3
LTE Band 66	23.0	30.00	7
LTE Band 71	23.0	34.80	11.8

Note:

$$G_T(\text{dBd}) = G_T(\text{dBi}) - 2.15 \text{ dB.}$$

Alternatively, the EIRP can be determined from Equation (3) and then converted to ERP based on the maximum antenna gain relationship by applying the following equation:

$$\text{ERP} = \text{EIRP} - 2.15 \text{ dB.}$$

Similarly, the EIRP can be determined from the ERP as follows:

$$\text{EIRP} = \text{ERP} + 2.15 \text{ dB.}$$

Step 2 MPE calculate:

Mode	Output power to antenna (dBm)	Output power to antenna (mW)	Power Density at R=20cm (mW/cm ²)	Limit (mW/cm ²)	Result
2.4G WIFI	11.540	14.256	0.002836	1.0	PASS

Results for transmit simultaneously

No.	Mode	Power Density at R=20cm (mW/cm ²)	Configurations	Limit (mW/cm ²)	Margin
1	2.4G WIFI	0.002836	2.4G WIFI+ LTE Band 2	1	0.9972
2	2.4G WIFI	0.002836	2.4G WIFI+ LTE Band 4	1	0.9972
3	2.4G WIFI	0.002836	2.4G WIFI+ LTE Band 5	0.5577	0.5549
4	2.4G WIFI	0.002836	2.4G WIFI+ LTE Band 12	0.4717	0.4689
5	2.4G WIFI	0.002836	2.4G WIFI+ LTE Band 13	0.5213	0.5185
6	2.4G WIFI	0.002836	2.4G WIFI+ LTE Band 14	0.5287	0.5259
7	2.4G WIFI	0.002836	2.4G WIFI+ LTE Band 66	1	0.9972
8	2.4G WIFI	0.002836	2.4G WIFI+ LTE Band 71	0.4537	0.4509

At the transmit simultaneously calculation method is as follows:

Transmit simultaneously MPE = Mode1 Power Density + Mode2 Power Density

Margin = Limit - Power Density

Bands	Max Turn-up Conducted Source Based time Average Power (dBm)	Max Turn-up Conducted Source Based time Average Power (mw)	Distance (cm)	Power Density Limit (mW/cm2)	Max allow antenna gain (dBi)
LTE Band 2	24.5	281.838	20	0.9972	12.51
LTE Band 4	23.0	199.526	20	0.9972	14.01
LTE Band 5	23.5	223.872	20	0.5549	13.12
LTE Band 12	23.5	223.872	20	0.4689	12.39
LTE Band 13	23.5	223.872	20	0.5185	12.83
LTE Band 14	23.5	223.872	20	0.5259	12.89
LTE Band 66	23.0	199.526	20	0.9972	14.01
LTE Band 71	23.0	199.526	20	0.4509	12.73

Step 3:

If meet above step 1 and 2, the Max allows antenna gain of different bands and different modes show is below:

Bands	Max allow antenna gain (dBi)
LTE Band 2	8.5
LTE Band 4	7
LTE Band 5	13.12
LTE Band 12	11.3
LTE Band 13	11.3
LTE Band 14	11.3
LTE Band 66	7
LTE Band 71	11.8

Step 4:

If meet above step 1, 2 and 3, the Max allows antenna gain show is below:

Uplink Frequency (MHz)	Band	Max allow antenna gain of each band (dBi)
1850 – 1910	LTE Band 2	8.5
1710 – 1755	LTE Band 4	7
824 – 849	LTE Band 5	13.12
699 – 716	LTE Band 12	11.3
777 – 787	LTE Band 13	11.3
788 – 798	LTE Band 14	11.3
1710 – 1780	LTE Band 66	7
663 – 698	LTE Band 71	11.8

Note:

Single Modular Approval.

Output power is conducted. This device is to be used in mobile or fixed applications only. Antenna gain including cable loss must not exceed 23 dBi of frequency band 2412-2462MHz, 8.5 dBi of frequency band 1850-1910MHz, 7 dBi of frequency band 1710-1780MHz, 13.12dBi of frequency band 824-849MHz, 11.3 dBi of frequency band 699-716MHz, 11.3 dBi of frequency band 777-787MHz, 11.3 dBi of frequency band 788-798MHz, 11.8 dBi of frequency band 663-698MHz, for the purpose of satisfying the requirements of 2.1043 and 2.1091. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least



20cm from all persons and must not be co-located or operated in conjunction with any antenna or transmitter not described under this FCC ID. The final product operating with this transmitter must include operating instructions and antenna installation instructions, for end-users and installers to satisfy RF exposure compliance requirements. Compliance of this device in all final product configurations is the responsibility of the Grantee. Installation of this device into specific final products may require the submission of a Class II permissive change application containing data pertinent to RF Exposure, spurious emissions, ERP/EIRP, and host/module authentication, or new application if appropriate. Installation of this device into specific final products may require the submission of a Class II permissive change application containing data pertinent to RF Exposure, spurious emissions, ERP/EIRP, and host/module authentication, or new application if appropriate.

*******THE END*******