

MPE REPORT

Report No.: W7L-P20241205-1SA01
Product Name: WiFi/BT Module
Model Name: MWH647B
Applicant: Qingdao Intelligent & Precise Electronics Co., Ltd.
FCC ID: 2AJVQ-MWH647B

Reference Specification
FCC Part §1.1310

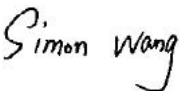
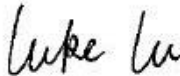
Prepared by Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
 Date: Dec. 02, 2024	 Date: Dec. 02, 2024
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1 GENERAL INFORMATION

1.1 Notes of the test report

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The certification and accreditation identifiers used in this report shall not be applicable to the tested or calibrated samples thereof. The manufacturer shall not mark the tested samples or items (or a separate part of the item) with the identifiers of certification and accreditation to mislead relevant parties about the tested samples or items.

1.2 Information about the testing laboratory

Company:	BV 7Layers Communications Technology (Shenzhen) Co., Ltd
Address:	Room B37, Warehouse A5, No.3 Chiwan 4th Road, Zhaoshang Street, Nanshan District Shenzhen, Guangdong, People's Republic of China
City:	Shenzhen
Country or Region:	P.R.China
Tel:	+86 755 8869 6566
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Designation Number:	CN1171
Registration number:	525120

1.3 Applicant's details

Company:	Qingdao Intelligent & Precise Electronics Co., Ltd.
Address:	No.218 Qianwangang Road, Qingdao Economic & Technological Development Zone, Qingdao City, Shandong Province, P. R. China
City:	Qingdao
Country or Region:	CHINA
Contacted person:	wanghaining
Tel:	13381232625
Email:	wanghaining@hisense.com

1.4 Manufacturer's details

Company:	Qingdao Intelligent & Precise Electronics Co., Ltd.
Address:	No.218 Qianwangang Road, Qingdao Economic & Technological Development Zone, Qingdao City, Shandong Province, P. R. China
City:	Qingdao
Country or Region:	CHINA
Contacted person:	wanghaining
Tel:	13381232625
Email:	wanghaining@hisense.com

1.5 Test environment

Date of Receipt of test sample:	2024/11/6
Testing Start Date:	2024/11/7
Testing End Date:	2024/12/2

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient	25	40
Maximum Extreme	70	---
Minimum Extreme	25	---

Normal Supply Voltage (V d.c.):	5.0
Maximum Extreme Supply Voltage (V d.c.):	5.5
Minimum Extreme Supply Voltage (V d.c.):	4.5

2 DESCRIPTION OF THE EQUIPMENT UNDER TEST

Final equipment build status

BT

Frequency Range:	2.402GHz~2.480GHz
Number of Channel:	79
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK
Duplex Mode:	TDD
Channel Spacing:	1MHz
Data Rate:	1Mbps, 2 Mbps, 3 Mbps
Power Supply:	DC supply
Software Revision:	/
Hardware Revision:	V1.0
SN:	
Antenna gain	-6.13dBi
Antenna type:	Loop Antenna
Antenna connector:	N/A

BLE

Frequency Range:	2.402GHz~2.480GHz
Number of Channel:	40
Modulation Type:	GFSK
Equipment Class:	DTS
Channel Spacing:	2MHz
Data Rate:	LE 1Mbps/2Mbps LE Coded 125kbps/500kbps
Power Supply:	DC supply
Software Revision:	/
Hardware Revision:	V1.0
SN:	
Antenna gain	-6.13dBi
Antenna type:	Loop Antenna

Antenna connector:	N/A
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WiFi 2.4G

Frequency Band:	2.412GHz~2.462GHz
Number of Channel For 20MHz:	11
Number of Channel For 40MHz:	7
Modulation Type:	802.11b/802.11g 802.11n (HT20/HT40) 802.11ax (HE20/HE40)
Power Supply:	DC supply
Antenna gain:	For Power/PSD:ANT0: 4.03dBi ANT1: 3.03dBi
Directional Gain:	3.56dBi(Uncorrelated)
Software Revision:	/
Hardware Revision:	V1.0
SN:	
Antenna type:	Inverted F Antenna
Antenna connector:	N/A

WiFi 5G

Frequency Band(s):	U-NII-1:5150MHz-5250MHz U-NII-2A:5250MHz-5350MHz U-NII-2C:5470MHz-5725MHz U-NII-3:5725MHz-5850MHz	
The DFS related operating mode(s) of the equipment:	☐	Master
	☐	Slave with radar detection
	☒	Slave without radar detection
Modulation Type:	802.11a 802.11n (HT20/HT40) 802.11ac (VHT20/VHT40/VHT80) 802.11ax (HE20/HE40/HE80)	
RU Type	Full RU	

	Partial RU
Antenna Type:	Inverted F Antenna
Antenna gain	For Power/PSD:ANT0: 4.40dBi ANT1: 3.53dBi
Directional Gain:	3.99dBi(Uncorrelated)
Beamforming Directional Gain:	N/A
Power Supply:	DC supply
Software Revision:	/
Hardware Revision:	V1.0
SN:	

NOTE1: Directional gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / N_{ANT}]$ dBi(Uncorrelated)

3 SPECIFICATION

Specification	Version	Title
Part 1.1310	Latest	Radio frequency radiation exposure limits.

4 RESULT SUMMARY

Case	Verdict
MPE	Pass

5 CALCULATION RESULT

5.1 Maximum permissible exposure (MPE)

Limit:

(A) Limits for Occupational/Controlled Exposure ☐

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
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 ☒

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
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 *Plane-wave equivalent power density

Result:

According to §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

The $S = PG / (4\pi R^2)$

Where S = power density in mW/cm²

P = transmit power in mW

G = numeric gain of transmit antenna

R = distance (cm)

Standalone Transmission Result

Band	Freq. (MHz)	Maximum Power (dBm)	ANT Gain (dBi)	Maximum EIRP (dBm)	Maximum EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
BT	2402	8.46	-6.13	2.33	1.710	0.000	1
BLE	2402	9.14	-6.13	3.01	2.000	0.000	1
WiFi 2.4G	2462	17.43	3.56	20.99	125.603	0.025	1
WiFi 5G	5180	17.96	3.99	21.95	156.675	0.031	1

Simultaneous Transmission Result

Power Density1 / Limit	Power Density2 / Limit	$\Sigma(\text{Power Density} / \text{Limit})$
0.000 (BT)	0.056 (WiFi 2.4G+WiFi 5G)	0.056

Note: Simultaneous Transmission Limit = Power Density_1 / Limit_1 + Power Density_2 / Limit_2 < 1.

---End of Test Report---