MPE REPORT

Report No.:	SRTC2023-9004 (F)- 23022105 (I)
Product Name:	BT/Wi-Fi Module
Model Name:	MWH411B
Applicant:	Qingdao Hisense Communication Co., Ltd
Manufacturer:	Qingdao Hisense Communication Co., Ltd
FCC ID:	SARMWH411B

Reference Specification
FCC Part §1.1310

The State Radio_monitoring_center Testing Center (SRTC)

15th Building, No.30 Shixing Street, ShijingshanDistrict, Beijing,P.R.China

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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:	The State Radio_monitoring_center Testing Center (SRTC)
Designation number:	CN1267
Registration number:	239125
Certificate Number:	5055.02
Address:	15th Building, No.30 Shixing Street, Shijingshan District, Beijing P.R.China
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1.3 Applicant's details

Company:	Qingdao Hisense Communication Co., Ltd
Address:	No.218, Qianwangang Road, Economic and Technological Development Zone, Qingdao, Shandong Province,China

1.4 Manufacturer's details

Company:	Qingdao Hisense Communication Co., Ltd
Address:	No.218, Qianwangang Road, Economic and Technological Development Zone, Qingdao, Shandong Province,China

1.5 Test environment

Date of Receipt of test sample at SRTC:	2023/2/21
Testing Start Date:	2023/2/22
Testing End Date:	2023/3/10

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient	25	40
Maximum Extreme	70	---
Minimum Extreme	-10	---

Normal Supply Voltage (V d.c.):	3.0
Maximum Extreme Supply Voltage (V d.c.):	3.6
Minimum Extreme Supply Voltage (V d.c.):	3.3

2 DESCRIPTION OF THE EQUIPMENT UNDER TEST

2.1 Final equipment build status

WIFI 2.4G

Frequency Range:	2.412GHz~2.472GHz
Number of Channel For 20MHz:	11
Number of Channel For 40MHz:	7
Channel Spacing:	5MHz
Mode:	802.11b / 802.11g / 802.11n HT20&HT40
Antenna Type:	PIFA
Antenna Gain:	ANT0 gain：3.72dBi ANT1 gain：2.00dBi
Beamforming Directional Gain:	N/A
Power Supply:	DC supply
Software Revision:	NA
Hardware Revision:	V1.00
IMEI:	NA

WIFI 5G

Operating Band(s):	5.15GHz~5.35GHz;5.47GHz~5.725GHz
Channel/For 20MHz:	36/40/44/48/52/56/60/64 /100/104/108/112/116/120/124/128/132/136/140
Channel/For 40MHz:	38/46/54/62/102/110/118/126/134
The DFS related operating mode(s) of the equipment:	Slave without radar detection
Modulation Type:	802.11a / 802.11n HT20&HT40
Antenna Type:	PIFA
Antenna Gain:	ANT0 gain：4.07dBi ANT1 gain：2.50dBi
Beamforming Directional Gain:	N/A
Power Supply:	DC supply
Software Revision:	NA

Hardware Revision:	V1.00
IMEI:	NA

WIFI 5.8G

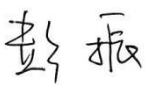
Operating Band	5725 MHz ~ 5850 MHz
Channel/For 20MHz	149/153/157/161/165
Channel/For 40MHz	151/159
Channel/For 80MHz	0
Modulation Type	802.11a / 802.11n (HT20/HT40)
Duplex Mode	0
Antenna Type	PIFA
Antenna Gain	ANT0 gain：4.07dBi ANT1 gain：2.50dBi
Power Supply	DC supply
Software Revision:	NA
Hardware Revision:	V1.00
IMEI or Sample:	NA

3 SPECIFICATION

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

4 RESULT SUMMARY

Case	Verdict
MPE	Pass

This Test Report Is Issued by: Mr. Peng Zhen 	Checked by: Mr. Li Bin 
Tested by:	Issued date: 2023/3/13

5 CALCULATION RESULT

5.1 Average output power

2.4G Wifi

Test Mode	Frequency (MHz)	Antenna	Average power output (dBm)	Tune up (dBm)
802.11b	2412	Chain0	12.96	13.0
802.11b	2412	Chain1	14.12	14.5
802.11b	2437	Chain0	13.15	13.5
802.11b	2437	Chain1	14.65	15.0
802.11b	2462	Chain0	13.27	13.5
802.11b	2462	Chain1	14.83	15.0
802.11g	2412	Chain0	6.81	7.0
802.11g	2412	Chain1	9.16	9.5
802.11g	2437	Chain0	6.85	7.0
802.11g	2437	Chain1	9.37	9.5
802.11g	2462	Chain0	7.20	7.5
802.11g	2462	Chain1	9.41	9.5
802.11n HT20	2412	Chain0	5.37	5.5
802.11n HT20	2412	Chain1	7.99	8.0
802.11n HT20	2412	MIMO	9.88	10.0
802.11n HT20	2437	Chain0	6.45	6.5
802.11n HT20	2437	Chain1	8.22	8.5
802.11n HT20	2437	MIMO	10.43	10.5
802.11n HT20	2462	Chain0	6.63	7.0
802.11n HT20	2462	Chain1	8.28	8.5
802.11n HT20	2462	MIMO	10.54	11.0
802.11n HT40	2422	Chain0	6.50	6.5
802.11n HT40	2422	Chain1	8.04	8.5
802.11n HT40	2422	MIMO	10.35	10.5
802.11n HT40	2437	Chain0	6.25	6.5
802.11n HT40	2437	Chain1	7.03	7.5

802.11n HT40	2437	MIMO	9.67	10.0
802.11n HT40	2452	Chain0	6.54	7.0
802.11n HT40	2452	Chain1	7.12	7.5
802.11n HT40	2452	MIMO	9.85	10.0

5G WIFI

Mode	Frequency (MHz)	Antenna	Conducted average power output(dBm)	Tune up (dBm)
802.11a	5180	Chain0	15.40	15.5
802.11a	5180	Chain1	15.95	16.0
802.11a	5220	Chain0	15.32	15.5
802.11a	5220	Chain1	15.78	16.0
802.11a	5240	Chain0	15.49	15.5
802.11a	5240	Chain1	16.05	16.5
802.11n HT20	5180	Chain0	12.53	13.0
802.11n HT20	5180	Chain1	14.10	14.5
802.11n HT20	5180	MIMO	16.40	16.5
802.11n HT20	5220	Chain0	11.89	12.0
802.11n HT20	5220	Chain1	14.17	14.5
802.11n HT20	5220	MIMO	16.19	16.5
802.11n HT20	5240	Chain0	12.50	12.5
802.11n HT20	5240	Chain1	14.26	14.5
802.11n HT20	5240	MIMO	16.48	16.5
802.11n HT40	5190	Chain0	12.61	13.0
802.11n HT40	5190	Chain1	14.13	14.5
802.11n HT40	5190	MIMO	16.45	16.5
802.11n HT40	5230	Chain0	12.38	12.5
802.11n HT40	5230	Chain1	14.57	15.0
802.11n HT40	5230	MIMO	16.62	17.0

Mode	Frequency (MHz)	Antenna	Conducted average power	Tune up (dBm)

			output(dBm)	
802.11a	5260	Chain0	15.23	15.5
802.11a	5260	Chain1	15.18	15.5
802.11a	5280	Chain0	14.59	15.0
802.11a	5280	Chain1	14.88	15.0
802.11a	5320	Chain0	15.58	16.0
802.11a	5320	Chain1	15.53	16.0
802.11n HT20	5260	Chain0	12.74	13.0
802.11n HT20	5260	Chain1	14.16	14.5
802.11n HT20	5260	MIMO	16.52	17.0
802.11n HT20	5280	Chain0	10.99	11.0
802.11n HT20	5280	Chain1	13.96	14.0
802.11n HT20	5280	MIMO	15.73	16.0
802.11n HT20	5320	Chain0	10.97	11.0
802.11n HT20	5320	Chain1	14.47	14.5
802.11n HT20	5320	MIMO	16.07	16.5
802.11n HT40	5270	Chain0	9.43	9.5
802.11n HT40	5270	Chain1	12.59	13.0
802.11n HT40	5270	MIMO	14.30	14.5
802.11n HT40	5310	Chain0	10.04	10.5
802.11n HT40	5310	Chain1	14.30	14.5
802.11n HT40	5310	MIMO	15.68	16.0

Mode	Frequency (MHz)	Antenna	Conducted average power output(dBm)	Tune up (dBm)
802.11a	5500	Chain0	14.81	15.0
802.11a	5500	Chain1	14.61	15.0
802.11a	5580	Chain0	14.38	14.5
802.11a	5580	Chain1	15.61	16.0
802.11a	5700	Chain0	14.70	15.0
802.11a	5700	Chain1	15.93	16.0

802.11n HT20	5500	Chain0	10.13	10.5
802.11n HT20	5500	Chain1	12.75	13.0
802.11n HT20	5500	MIMO	14.64	15.0
802.11n HT20	5580	Chain0	11.18	11.5
802.11n HT20	5580	Chain1	12.52	13.0
802.11n HT20	5580	MIMO	14.91	15.0
802.11n HT20	5700	Chain0	11.28	11.5
802.11n HT20	5700	Chain1	13.72	14.0
802.11n HT20	5700	MIMO	15.68	16.0
802.11n HT40	5510	Chain0	9.87	10.0
802.11n HT40	5510	Chain1	12.78	13.0
802.11n HT40	5510	MIMO	14.57	15.0
802.11n HT40	5590	Chain0	9.64	10.0
802.11n HT40	5590	Chain1	11.78	12.0
802.11n HT40	5590	MIMO	13.85	14.0

Mode	Frequency (MHz)	Antenna	Conducted average power output(dBm)	Tune up (dBm)
802.11a	5745	Chain0	14.62	15.0
802.11a	5745	Chain1	14.69	15.0
802.11a	5785	Chain0	14.68	15.0
802.11a	5785	Chain1	14.24	14.5
802.11a	5825	Chain0	14.54	15.0
802.11a	5825	Chain1	14.01	14.5
802.11n HT20	5745	Chain0	10.86	11.0
802.11n HT20	5745	Chain1	13.79	14.0
802.11n HT20	5745	MIMO	15.58	16.0
802.11n HT20	5785	Chain0	10.85	11.0
802.11n HT20	5785	Chain1	13.24	13.5
802.11n HT20	5785	MIMO	15.22	15.5
802.11n HT20	5825	Chain0	10.71	11.0

802.11n HT20	5825	Chain1	13.01	13.5
802.11n HT20	5825	MIMO	15.02	15.5
802.11n HT40	5755	Chain0	10.13	10.5
802.11n HT40	5755	Chain1	13.43	13.5
802.11n HT40	5755	MIMO	15.10	15.5
802.11n HT40	5795	Chain0	10.28	10.5
802.11n HT40	5795	Chain1	13.41	13.5
802.11n HT40	5795	MIMO	15.13	15.5

5.2 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/cm2)	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/cm2)	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/cm^2
P = transmit power in mW
G = numeric gain of transmit antenna
R = distance (cm)

Standalone Transmission Result

Band	Freq. (MHz)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (mW)	Power Density at 20cm (mW/cm^2)	Limit (mW/cm^2)	Power Density/ Limit
WIFI 2.4G	2437	15.0	18.72	74.473	0.015	1	0.015
WIFI 5G	5230	17.0	21.07	127.938	0.025	1	0.025

Simultaneous Transmission Result

Power Density1 / Limit	Power Density2 / Limit	Σ(Power Density / Limit)
0.015	0.025	0.040

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