
MPE REPORT

Report No.: SRTC2022-9004(F)-22012608(I)

Product Name: BT/Wi-Fi Module

Product Model: MWH505S

Applicant: Hisense Communication Co., Ltd.

Manufacturer: Hisense Communication Co., Ltd.

Specification: FCC Part §2.1091, §2.1093, §1.1307(b), §1.1310 (2019)

FCC ID: SARMWH505S

The State Radio_monitoring_center Testing Center (SRTC)

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1 GENERAL INFORMATION

1.1 Notes of the test report

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1.2 Information about the testing laboratory

Company:	The State Radio_monitoring_center Testing Center (SRTC)
Address:	15th Building, No.30 Shixing Street, Shijingshan District, P.R.China
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Designation Number	CN1267

1.3 Applicant's details

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

1.4 Manufacturer's details

Company:	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:	2022-01-26
Testing Start Date:	2022-01-28
Testing End Date:	2022-02-25

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient	22	35

Normal Supply Voltage (V d.c.):	3.3
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2 DESCRIPTION OF THE DEVICE UNDER TEST

2.1 Final Equipment Build Status

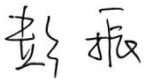
Frequency Bands	BT: 2402MHz – 2480MHz WIFI2.4GHz: 2400MHz – 2483.5MHz WIFI5GHz UNII-1: 5150MHz – 5250MHz WIFI5GHz UNII-2A: 5250MHz – 5350MHz WIFI5GHz UNII-2C: 5470MHz – 5725MHz WIFI5GHz UNII-3: 5725MHz – 5850MHz
Mode	BT: GFSK / π /4DQPSK / 8DPSK WIFI2.4GHz: 802.11b/g/n HT20/n HT40 WIFI5GHz: 802.11a/n HT20/n HT40/ac VHT20/ac VHT40 /ac VHT80
Antenna Gain	WLAN2.4GHz Ant0:2.72dBi / Ant1:1.2dBi WLAN5GHz Ant0:3.1dBi / Ant1:1.0dBi BT:1.2dBi
Power Supply	DC supply
Hardware Version	MWH505S V1.00
Software Version	NA
IMEI or Sample	#1

3 REFERENCE SPECIFICATION

Specification	Version	Title
2.1091	2022	Radio frequency radiation exposure evaluation: mobile devices.
2.1093	2022	Radio frequency radiation exposure evaluation: portable devices.
1.1307(b)	2022	Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.
1.1310	2022	Radio frequency radiation exposure limits.
KDB447498	October 23, 2015	RF exposure procedures and equipment authorization policies for mobile and portable devices

4 RESULT SUMMARY

No.	Test case	FCC reference
1	MPE Calculation	FCC Part §2.1091, FCC Part §2.1093, FCC Part §1.1307(b) FCC Part §1.1310 KDB 447498

This Test Report Is Approved by: Mr. Peng Zhen 	Review by: Mr. Li Bin 
Tested and issued by: Mr. Du Wei 	Approved date: 20220225

5 TEST RESULTS

5.1 Average Power Output Test Result

WIFI 2.4GHz

Mode	Freq (MHz)	Antenna	Average power output (dBm)	Tune-up (dBm)
802.11b	2412	Chain0	17.09	17.5
802.11b	2412	Chain1	16.71	17.0
802.11b	2437	Chain0	17.13	17.5
802.11b	2437	Chain1	16.91	17.0
802.11b	2462	Chain0	17.07	17.5
802.11b	2462	Chain1	16.75	17.0
802.11g	2412	Chain0	17.32	17.5
802.11g	2412	Chain1	17.11	17.5
802.11g	2437	Chain0	17.13	17.5
802.11g	2437	Chain1	16.84	17.0
802.11g	2462	Chain0	17.28	17.5
802.11g	2462	Chain1	16.99	17.0
802.11n HT20	2412	Chain0	16.23	16.5
802.11n HT20	2412	Chain1	15.96	16.0
802.11n HT20	2412	MIMO	19.11	19.5
802.11n HT20	2437	Chain0	15.96	16.0
802.11n HT20	2437	Chain1	15.63	16.0
802.11n HT20	2437	MIMO	18.81	19.0
802.11n HT20	2462	Chain0	16.12	16.5
802.11n HT20	2462	Chain1	15.77	16.0
802.11n HT20	2462	MIMO	18.96	19.0
802.11n HT40	2422	Chain0	16.01	16.5
802.11n HT40	2422	Chain1	15.73	16.0
802.11n HT40	2422	MIMO	18.88	19.0
802.11n HT40	2437	Chain0	15.90	16.0
802.11n HT40	2437	Chain1	15.79	16.0
802.11n HT40	2437	MIMO	18.86	19.0
802.11n HT40	2452	Chain0	16.06	16.5
802.11n HT40	2452	Chain1	15.70	16.0
802.11n HT40	2452	MIMO	18.89	19.0

WIFI5GHz UNII-1

Mode	Freq (MHz)	Antenna	Average power output (dBm)	Tune-up (dBm)
802.11a	5180	Chain0	14.96	15.0
802.11a	5180	Chain1	16.65	17.0
802.11a	5220	Chain0	15.28	15.5
802.11a	5220	Chain1	16.24	16.5
802.11a	5240	Chain0	15.43	15.5
802.11a	5240	Chain1	16.08	16.5
802.11n HT20	5180	Chain0	14.91	15.0
802.11n HT20	5180	Chain1	16.54	17.0
802.11n HT20	5180	MIMO	18.81	19.0
802.11n HT20	5220	Chain0	15.14	15.5
802.11n HT20	5220	Chain1	16.20	16.5
802.11n HT20	5220	MIMO	18.71	19.0
802.11n HT20	5240	Chain0	15.27	15.5
802.11n HT20	5240	Chain1	16.04	16.5
802.11n HT20	5240	MIMO	18.68	19.0
802.11ac VHT20	5180	Chain0	14.84	15.0
802.11ac VHT20	5180	Chain1	16.23	16.5
802.11ac VHT20	5180	MIMO	18.60	19.0
802.11ac VHT20	5220	Chain0	15.12	15.5
802.11ac VHT20	5220	Chain1	16.08	16.5
802.11ac VHT20	5220	MIMO	18.64	19.0
802.11ac VHT20	5240	Chain0	15.26	15.5
802.11ac VHT20	5240	Chain1	16.06	16.5
802.11ac VHT20	5240	MIMO	18.69	19.0
802.11n HT40	5190	Chain0	14.88	15.0
802.11n HT40	5190	Chain1	16.35	16.5
802.11n HT40	5190	MIMO	18.69	19.0
802.11n HT40	5230	Chain0	15.19	15.5
802.11n HT40	5230	Chain1	16.16	16.5
802.11n HT40	5230	MIMO	18.71	19.0
802.11ac VHT40	5190	Chain0	14.82	15.0
802.11ac VHT40	5190	Chain1	16.33	16.5
802.11ac VHT40	5190	MIMO	18.65	19.0
802.11ac VHT40	5230	Chain0	15.25	15.5
802.11ac VHT40	5230	Chain1	16.15	16.5

802.11ac VHT40	5230	MIMO	18.73	19.0
802.11ac VHT80	5210	Chain0	14.71	15.0
802.11ac VHT80	5210	Chain1	15.88	16.0
802.11ac VHT80	5210	MIMO	18.34	18.5

WIFI5GHz UNII-2A

Mode	Freq (MHz)	Antenna	Average power output (dBm)	Tune-up (dBm)
802.11a	5260	Chain0	15.37	15.5
802.11a	5260	Chain1	16.00	16.0
802.11a	5280	Chain0	15.66	16.0
802.11a	5280	Chain1	16.15	16.5
802.11a	5320	Chain0	15.90	16.0
802.11a	5320	Chain1	16.27	16.5
802.11n HT20	5260	Chain0	15.29	15.5
802.11n HT20	5260	Chain1	15.94	16.0
802.11n HT20	5260	MIMO	18.64	19.0
802.11n HT20	5280	Chain0	15.53	16.0
802.11n HT20	5280	Chain1	16.00	16.0
802.11n HT20	5280	MIMO	18.78	19.0
802.11n HT20	5320	Chain0	15.69	16.0
802.11n HT20	5320	Chain1	16.14	16.5
802.11n HT20	5320	MIMO	18.93	19.0
802.11ac VHT20	5260	Chain0	15.39	15.5
802.11ac VHT20	5260	Chain1	15.95	16.0
802.11ac VHT20	5260	MIMO	18.69	19.0
802.11ac VHT20	5280	Chain0	15.63	16.0
802.11ac VHT20	5280	Chain1	16.01	16.5
802.11ac VHT20	5280	MIMO	18.83	19.0
802.11ac VHT20	5320	Chain0	15.72	16.0
802.11ac VHT20	5320	Chain1	16.15	16.5
802.11ac VHT20	5320	MIMO	18.95	19.0
802.11n HT40	5270	Chain0	15.43	15.5
802.11n HT40	5270	Chain1	16.01	16.5
802.11n HT40	5270	MIMO	18.74	19.0
802.11n HT40	5310	Chain0	15.67	16.0
802.11n HT40	5310	Chain1	16.08	16.5
802.11n HT40	5310	MIMO	18.89	19.0
802.11ac VHT40	5270	Chain0	15.47	15.5

802.11ac VHT40	5270	Chain1	15.93	16.0
802.11ac VHT40	5270	MIMO	18.72	19.0
802.11ac VHT40	5310	Chain0	15.70	16.0
802.11ac VHT40	5310	Chain1	16.18	16.5
802.11ac VHT40	5310	MIMO	18.96	19.0
802.11ac VHT80	5290	Chain0	15.26	15.5
802.11ac VHT80	5290	Chain1	15.75	16.0
802.11ac VHT80	5290	MIMO	18.52	19.0

WIFI5GHZ UNII-2C

Mode	Freq (MHz)	Antenna	Average power output (dBm)	Tune-up (dBm)
802.11a	5500	Chain0	15.52	16.0
802.11a	5500	Chain1	16.19	16.5
802.11a	5580	Chain0	15.34	15.5
802.11a	5580	Chain1	15.86	16.0
802.11a	5700	Chain0	14.83	15.0
802.11a	5700	Chain1	15.10	15.5
802.11n HT20	5500	Chain0	15.50	15.5
802.11n HT20	5500	Chain1	16.03	16.5
802.11n HT20	5500	MIMO	18.78	19.0
802.11n HT20	5580	Chain0	15.31	15.5
802.11n HT20	5580	Chain1	15.75	16.0
802.11n HT20	5580	MIMO	18.55	19.0
802.11n HT20	5700	Chain0	14.72	15.0
802.11n HT20	5700	Chain1	14.97	15.0
802.11n HT20	5700	MIMO	17.86	18.0
802.11ac VHT20	5500	Chain0	15.53	16.0
802.11ac VHT20	5500	Chain1	16.00	16.0
802.11ac VHT20	5500	MIMO	18.78	19.0
802.11ac VHT20	5580	Chain0	15.32	15.5
802.11ac VHT20	5580	Chain1	15.78	16.0
802.11ac VHT20	5580	MIMO	18.57	19.0
802.11ac VHT20	5700	Chain0	14.65	15.0
802.11ac VHT20	5700	Chain1	14.97	15.0
802.11ac VHT20	5700	MIMO	17.82	18.0
802.11n HT40	5510	Chain0	15.38	15.5
802.11n HT40	5510	Chain1	16.14	16.5
802.11n HT40	5510	MIMO	18.79	19.0

802.11n HT40	5590	Chain0	15.22	15.5
802.11n HT40	5590	Chain1	15.58	16.0
802.11n HT40	5590	MIMO	18.41	18.5
802.11n HT40	5670	Chain0	14.74	15.0
802.11n HT40	5670	Chain1	15.09	15.5
802.11n HT40	5670	MIMO	17.93	18.0
802.11ac VHT40	5510	Chain0	15.58	16.0
802.11ac VHT40	5510	Chain1	16.11	16.5
802.11ac VHT40	5510	MIMO	18.86	19.0
802.11ac VHT40	5590	Chain0	15.21	15.5
802.11ac VHT40	5590	Chain1	15.59	16.0
802.11ac VHT40	5590	MIMO	18.41	18.5
802.11ac VHT40	5670	Chain0	14.73	15.0
802.11ac VHT40	5670	Chain1	15.22	15.5
802.11ac VHT40	5670	MIMO	17.99	18.0
802.11ac VHT80	5530	Chain0	15.25	15.5
802.11ac VHT80	5530	Chain1	15.71	16.0
802.11ac VHT80	5530	MIMO	18.50	18.5
802.11ac VHT80	5610	Chain0	14.69	15.0
802.11ac VHT80	5610	Chain1	15.03	15.5
802.11ac VHT80	5610	MIMO	17.87	18.0

WIFI5GHz UNII-3

Mode	Freq (MHz)	Antenna	Average power output (dBm)	Tune-up (dBm)
802.11a	5745	Chain0	15.18	15.5
802.11a	5745	Chain1	15.06	15.5
802.11a	5785	Chain0	15.64	16.0
802.11a	5785	Chain1	15.40	15.5
802.11a	5825	Chain0	15.60	16.0
802.11a	5825	Chain1	15.39	15.5
802.11n HT20	5745	Chain0	14.92	15.0
802.11n HT20	5745	Chain1	15.01	15.5
802.11n HT20	5745	MIMO	17.98	18.0
802.11n HT20	5785	Chain0	15.54	16.0
802.11n HT20	5785	Chain1	15.28	15.5
802.11n HT20	5785	MIMO	18.42	18.5
802.11n HT20	5825	Chain0	15.43	15.5
802.11n HT20	5825	Chain1	15.26	15.5
802.11n HT20	5825	MIMO	18.36	18.5
802.11ac VHT20	5745	Chain0	14.92	15.0
802.11ac VHT20	5745	Chain1	15.01	15.5
802.11ac VHT20	5745	MIMO	17.98	18.0
802.11ac VHT20	5785	Chain0	15.57	16.0
802.11ac VHT20	5785	Chain1	15.30	15.5
802.11ac VHT20	5785	MIMO	18.45	18.5
802.11ac VHT20	5825	Chain0	15.50	15.5
802.11ac VHT20	5825	Chain1	15.27	15.5
802.11ac VHT20	5825	MIMO	18.40	18.5
802.11n HT40	5755	Chain0	15.21	15.5
802.11n HT40	5755	Chain1	14.98	15.0
802.11n HT40	5755	MIMO	18.11	18.5
802.11n HT40	5795	Chain0	15.52	16.0
802.11n HT40	5795	Chain1	14.96	15.0
802.11n HT40	5795	MIMO	18.26	18.5
802.11ac VHT40	5755	Chain0	15.15	15.5
802.11ac VHT40	5755	Chain1	14.98	15.0
802.11ac VHT40	5755	MIMO	18.08	18.5
802.11ac VHT40	5795	Chain0	15.62	16.0
802.11ac VHT40	5795	Chain1	14.85	15.0
802.11ac VHT40	5795	MIMO	18.26	18.5

802.11ac VHT80	5775	Chain0	15.04	15.5
802.11ac VHT80	5775	Chain1	14.44	14.5
802.11ac VHT80	5775	MIMO	17.76	18.0

Bluetooth

Modulation type	Conducted Average Power(dBm)			Tune-up (dBm)
	2402MHz	2440MHz	2480MHz	
GFSK(DH5)	9.28	8.79	8.74	9.5
$\pi/4$ DQPSK(2DH5)	6.71	6.16	6.20	7.0
8DPSK(3DH5)	6.75	6.09	6.06	7.0

BLE

Modulation type	Conducted Average Power(dBm)			Tune-up (dBm)
	2402MHz	2440MHz	2480MHz	
GFSK (LE 1Mbps)	9.79	9.13	9.24	10.0
GFSK (LE 2Mbps)	8.06	7.56	7.61	8.5

5.2 Calculation result

FCC LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

(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

Calculation procedure:

According to §2.1091, §2.1093, §1.1307(b) and §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 level 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)

The calculations in the table below use the highest gain of antenna for client EUT. These calculations represent worst case in terms of the exposure levels.

Band	Freq. (MHz)	Maximum Power (dBm)	Ant Gain (dBi)	Maximum EIRP (dBm)	Average EIRP (mW)	Power Density at 20cm	Limit (mW/cm ²)	Power Density / Limit
BT	2402	9.5	1.20	10.70	11.75	0.002	1.0	0.002
BLE	2402	10.0	1.20	11.20	13.18	0.003	1.0	0.003
WLAN2.4GHz	2412	19.5	2.72	22.22	166.72	0.033	1.0	0.033
WLAN5.2GHz	5180	19.0	3.10	22.10	162.18	0.032	1.0	0.032
WLAN5.3GHz	5310	19.0	3.10	22.10	162.18	0.032	1.0	0.032
WLAN5.6GHz	5510	19.0	3.10	22.10	162.18	0.032	1.0	0.032
WLAN5.8GHz	5785	18.5	3.10	21.60	144.54	0.029	1.0	0.029

Note1:

SAR considers the worst case, use Tune up with maximum power plus antenna gain as EIRP.

Note2:

For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.

Worst Simultaneous Transmission Result

BT Power Density / Limit	WLAN Power Density / Limit	Σ(Power Density / Limit) of BT+ WLAN
0.003	0.032	0.035

Note: Simultaneous Transmission Limit=Power Density_1/ limit_1 + Power Density_2/ limit_2<1

According to the KDB447498 D01 section 7.1 determine the device is exclusion from SAR test.

---End of Test Report---