

FCC 47 CFR MPE REPORT

Hisense Home Appliances Group Co., Ltd. Qingdao Branch

7s washing machine screen display module,
7s Clothes dryer screen display module

Model Number: HLP5602-GWM
Additional Model: HLP5602-GWM.01

FCC ID: 2A9F9HLP5602WM

Applicant:	Hisense Home Appliances Group Co., Ltd. Qingdao Branch
Address:	Hisense R/D center, #399 SongLing Road, Qingdao,
	Shandong 266104, China
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
Tel: 86-769-83081888-808	

Report Number:	ESTE-R2308253
Date of Test:	Jul. 24~Aug. 21, 2023
Date of Report:	Aug. 22, 2023

Maximum Permissible Exposure

1. Applicable Standards

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 limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

1.1. 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 Times 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)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-10000			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 Times 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)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-10000			1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

1.2. MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric Field (V/m)

P = Peak RF output Power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained

2. Conducted Power Result

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)
GFSK	2402	4.10	2.570
	2441	3.41	2.193
	2480	2.24	1.675
$\pi/4$ -DQPSK	2402	6.66	4.634
	2441	5.95	3.936
	2480	4.80	3.020
8-DPSK	2402	7.06	5.082
	2441	6.33	4.295
	2480	5.26	3.357
BLE 1M	2402	3.64	2.312
	2440	3.19	2.084
	2480	1.80	1.514
IEEE 802.11b	2412	16.48	44.463
	2437	16.31	42.756
	2462	15.49	35.400
IEEE 802.11g	2412	21.48	140.605
	2437	21.46	139.959
	2462	20.55	113.501
IEEE 802.11n HT20	2412	23.39	218.273
	2437	23.32	214.783
	2462	22.62	182.810
IEEE 802.11a	5180	14.82	30.339
	5200	14.76	29.923
	5240	14.96	31.333
	5260	14.71	29.580
	5300	14.62	28.973
	5320	14.17	26.122
	5500	14.25	26.607
	5580	14.55	28.510
	5700	14.62	28.973
	5745	14.48	28.054
	5785	13.90	24.547
	5825	13.62	23.014

IEEE 802.11n HT20	5180	15.63	36.559
	5200	15.76	37.670
	5240	15.88	38.726
	5260	15.60	36.308
	5300	15.30	33.884
	5320	14.85	30.549
	5500	14.85	30.549
	5580	15.19	33.037
	5700	15.45	35.075
	5745	15.07	32.137
	5785	14.62	28.973
	5825	14.47	27.990
IEEE 802.11ac VHT20	5180	14.49	28.119
	5200	14.39	27.479
	5240	14.50	28.184
	5260	14.48	28.054
	5300	14.49	28.119
	5320	14.12	25.823
	5500	14.39	27.479
	5580	14.25	26.607
	5700	14.58	28.708
	5745	14.08	25.586
	5785	13.53	22.542
	5825	13.43	22.029
IEEE 802.11n HT40	5190	16.15	41.210
	5230	14.98	31.477
	5270	14.76	29.923
	5310	14.53	28.379
	5510	14.60	28.840
	5550	14.58	28.708
	5670	15.02	31.769
	5755	14.70	29.512
	5795	14.20	26.303
IEEE 802.11ac VHT40	5190	14.99	31.550
	5230	14.81	30.269
	5270	14.74	29.785
	5310	14.32	27.040

	5510	14.67	29.309
	5550	14.45	27.861
	5670	15.00	31.623
	5755	14.64	29.107
	5795	14.29	26.853
IEEE 802.11ac VHT80	5210	14.66	29.242
	5290	14.52	28.314
	5530	14.83	30.409
	5610	14.33	27.102
	5775	14.09	25.645

3. Calculated Result and Limit

Mode	Peak output power (dBm)	Target power (dBm)	MAX Target power (dBm)	Antenna gain		Power Density (S) (mW /cm ²)	Limited of Power Density (S) (mW /cm ²)	Test Result
				(dBi)	(Linear)			
2.4G Band								
GFSK	4.10	4±1	5	1.5	1.413	0.00089	1	Complies
$\pi/4$ -DQPSK	6.66	6±1	7	1.5	1.413	0.00141	1	Complies
8-DPSK	7.06	7±1	8	1.5	1.413	0.00177	1	Complies
BLE 1M	3.64	3±1	4	1.5	1.413	0.00071	1	Complies
IEEE 802.11b	16.48	16±1	17	1.5	1.413	0.01408	1	Complies
IEEE 802.11g	21.48	21±1	22	1.5	1.413	0.04454	1	Complies
IEEE 802.11n HT20	23.39	23±1	24	1.5	1.413	0.07059	1	Complies
5G Band								
IEEE 802.11a	14.96	14±1	15	3	1.995	0.01255	1	Complies
IEEE 802.11n HT20	15.88	15±1	16	3	1.995	0.01580	1	Complies
IEEE802.11acVHT20	14.58	14±1	15	3	1.995	0.01255	1	Complies
IEEE 802.11n HT40	16.15	16±1	17	3	1.995	0.01989	1	Complies
IEEE802.11acVHT40	15.00	15±1	16	3	1.995	0.01580	1	Complies
IEEE802.11acVHT80	14.83	14±1	15	3	1.995	0.01255	1	Complies

Note: 2.4 and 5GHz bands are share an antenna, Can't both the 2.4 and 5 GHz bands operate simultaneously.

End of Test Report