



## FCC 47 CFR MPE REPORT

Zhongshan City Richsound Electronic Industrial Ltd.

Wireless Subwoofer

Model Number: HT Saturn

Addition Model:

U412, U4120K, HT4120K, U412N, HT412N, HT Glory, HT Starlight, HT Planet,  
HT satellite, HT Jupiter, HT Uranus, HT Neptune

FCC ID: Z8M-SW412

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Report Number:	ESTE-R2411106
Date of Test:	Sep. 06, 2024 ~ Nov. 27, 2024
Date of Report:	Nov. 28, 2024

## 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 <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> 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 <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> 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)	Antenna	Peak output power (dBm)	Peak output power (mW)
U-NII-3	5730	ant 1	4.45	2.786
		ant 2	5.35	3.428
	5790	ant 1	4.52	2.831
		ant 2	3.15	2.065
	5848	ant 1	-5.95	0.254
		ant 2	-7.93	0.161

## 3. Calculated Result and Limit

The Worst Mode	Antenna	Peak output power (dBm)	Target power ( dBm )	MAX Target power ( dBm )	Antenna gain		Power Density (S) (mW /cm2)	Limited of Power Density (S) (mW /cm2)	Test Result
					(dBi)	(Linear)			
5G Band									
U-NII-3	ant 1	4.52	4±1	5	1.93	1.560	0.0010	1	Complies
	ant 2	5.35	5±1	6	1.92	1.556	0.0012	1	Complies

**End of Test Report**