

FCC 47 CFR MPE REPORT

Zhongshan City Richsound Electronic Industrial Ltd.

Satelite Speaker

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-FS412

Applicant:	Zhongshan City Richsound Electronic Industrial Ltd.				
Address:	No.16, East Shagang Road, Gangkou, Zhongshan,				
	Guangdong 528447, China				
Prepared By:	EST Technology Co., Ltd.				
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China				
	Tel: 86-769-83081888-808				

Report Number:	ESTE-R2411102			
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)

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

(a) Limits for Occupational/Controlled Exposure

(b) Limits for General Population / Uncontrolled Exposure

Frequency	Electric Field	Magnetic	Power Density	Averaging Times
Range (MHz)	Strength (E)	Field Strength	(S) (mW/cm ²)	E ² , H ² or
	(V/m)	(H) (A/m)		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.o	30

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



 $\frac{E^2}{377}$

1.2. MPE Calculation Method

E (V/m) =
$$\frac{\sqrt{30 \times P \times G}}{d}$$
 Power Density: Pd (W/m²) =

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

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

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-1	5155	ant 1	2.31	1.702		
		ant 2	3.07	2.028		
	5195	ant 1	4.37	2.735		
		ant 2	4.68	2.938		
	5245	ant 1	4.48	2.805		
		ant 2	6.34	4.305		

3. Calculated Result and Limit

The Worst Mode	Antenna	Peak output power (dBm)	Target power (dBm)	MAX Target power (dBm)	Anter (dBi)	nna gain (Linear)	Power Density (S) (mW /cm2)	Limited of Power Density (S) (mW /cm2)	Test Result
5G Band									
U-NII-1	ant 1	4.48	4±1	5	1.23	1.327	0.0008	1	Complies
	ant 2	ant 2 6.34 6±1	6±1	7	1.96	1.570	0.0016	1	Complies

End of Test Report