FCC 47 CFR MPE REPORT

TCL Entertainment Solutions Limited

Wireless subwoofer

Model Number: S643W-SW

Additional Model: S310W-SW, S4310-SW, S643W*-SW
(*can be any numerica number"0~9" or alphebtical number "A~Z")

FCC ID: 2ARUDS310WSW

Applicant:	TCL Entertainment Solutions Limited
Address:	7/F, building 22E, 22 science park east avenue Hong Kong science park,
	SHATIN, N.T. ,Hong Kong, China
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
Tel: 86-769-83081888-808	

Report Number:	ESTE-R2303034
Date of Test:	Feb. 20~Mar. 04, 2023
Date of Report:	Mar. 06, 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 $\mid E \mid ^2$, $\mid H \mid ^2$ 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 $\mid E \mid ^2$, $\mid H \mid ^2$ 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.o	30

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

1.2. MPE Calculation Method

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

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	3.47	2.223
	2441	3.33	2.153
	2480	3.27	2.123
π/4 DQPSK	2402	3.93	2.472
	2441	3.99	2.506
	2480	3.98	2.500
8-DPSK	2402	3.94	2.477
	2441	4.06	2.547
	2480	4.08	2.559
BLE 1M	2402	3.15	2.065
	2440	3.14	2.061
	2480	3.12	2.051
BLE 2M	2402	3.35	2.163
	2440	3.48	2.228
	2480	3.49	2.234

3. Calculated Result and Limit

Mode	Peak output power (dBm)	Target power (dBm)	MAX Target power (dBm)	Antenna gain (dBi)	Antenna gain (Linear)	Power Density (S) (mW/cm^2)	Limited of Power Density (S) (mW/cm^2)	Test Result
GFSK	3.47	3±1	4	2.37	1.726	0.0009	1	Complies
π/4 DQPSK	3.99	3±1	4	2.37	1.726	0.0009	1	Complies
8-DPSK	4.08	4±1	5	2.37	1.726	0.0011	1	Complies
BLE 1M	3.15	3±1	4	2.37	1.726	0.0009	1	Complies
BLE 2M	3.49	3±1	4	2.37	1.726	0.0009	1	Complies

End of Test Report