

FCC 47 CFR MPE REPORT

WOW Technologies (Singapore) Pte Ltd

Shockwafe Sound Bar with Wireless Subwoofer

Model Number: ULTRA 9.2 eARC

FCC ID: 2AGB6-SWEARC

Prepared for:	WOW Technologies (Singapore) Pte Ltd
	19 Ubi Crescent Singapore 408577
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
Tel: 86-769-83081888-808	

Report Number:	ESTE-R2107187
Date of Test:	Jun. 24~Jul. 29, 2021
Date of Report:	Jul. 30, 2021

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

Bluetooth

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
GFSK	2402	8.05	6.383	8 ± 1	4	2.512
	2441	7.82	6.053	7 ± 1	4	2.512
	2480	7.81	6.039	7 ± 1	4	2.512
8-DPSK	2402	11.09	12.853	11 ± 1	4	2.512
	2441	10.67	11.668	10 ± 1	4	2.512
	2480	10.50	11.220	10 ± 1	4	2.512
BLE	2402	7.45	5.559	7 ± 1	4	2.512
	2440	7.48	5.598	7 ± 1	4	2.512
	2480	7.25	5.309	7 ± 1	4	2.512

UNII Antenna A

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
5G BAND1	5180	8.03	6.353	8 ± 1	0	1
	5210	9.19	8.299	9 ± 1	0	1
	5240	9.34	8.590	9 ± 1	0	1
5G BAND4	5736	10.88	12.246	10 ± 1	0	1
	5762	10.87	12.218	10 ± 1	0	1
	5814	9.50	8.913	9 ± 1	0	1

UNII Antenna B

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
5G BAND1	5180	7.10	5.129	7 ± 1	0	1
	5210	8.33	6.808	8 ± 1	0	1
	5240	9.27	8.453	9 ± 1	0	1
5G BAND4	5736	7.56	5.702	7 ± 1	0	1
	5762	10.64	11.588	10 ± 1	0	1
	5814	9.38	8.670	9 ± 1	0	1

3. Calculated Result and Limit

Bluetooth

Mode	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	8.05	4	2.512	0.00319	1	Complies
8-DPSK	11.09	4	2.512	0.00642	1	Complies
BLE	7.48	4	2.512	0.00280	1	Complies

UNII Antenna A

Mode	Target power (dBm)	Antenna gain		Power Density (S) (mW/cm ²)	Limited of Power Density (S) (mW/cm ²)	Test Result
		(dBi)	(Linear)			
5G Band						
TX	10.88	0	1	0.00244	1	Complies

UNII Antenna B

Mode	Target power (dBm)	Antenna gain		Power Density (S) (mW/cm ²)	Limited of Power Density (S) (mW/cm ²)	Test Result
		(dBi)	(Linear)			
5G Band						
TX	10.64	0	1	0.00231	1	Complies

UNII Antenna A +B

Mode	Power Density (S) (mW/cm ²) Antenna A	Power Density (S) (mW/cm ²) Antenna B	Power Density (S) (mW/cm ²) Total	Limited of Power Density (S) (mW/cm ²)	Test Result
5G Band					
TX	0.00244	0.00231	0.00475	1	Complies

Bluetooth+UNII Antenna A+B

Mode	Power Density (S) (mW/cm ²) Bluetooth	Power Density (S) (mW/cm ²) Antenna A	Power Density (S) (mW/cm ²) Antenna B	Power Density (S) (mW/cm ²) Total	Limited of Power Density (S) (mW/cm ²)	Test Result
TX	0.00642	0.00244	0.00231	0.01117	1	Complies

End of Test Report