FCC 47 CFR MPE REPORT

TCL Entertainment Solutions Limited

3.1.2 Channel Dolby Atmos Sound Bar with Wireless Subwoofer

Model Number: TS8132

Additional Model: TDS8132, FS8132, OS8132, Alto8e, TS8132K,

TDS8132K, ***8132

FCC ID: 2ARUDTS8132

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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.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

BT Antenna

Mode	Peak output power (dBm)	Peak output power (mW)	Target power (dBm)	Antenna gain	
				(dBi)	(Linear)
GFSK	6.83	4.819	6±1	3.29	2.133
8-DPSK	6.66	4.634	6±1	3.29	2.133
BLE	2.02	1.592	2±1	3.29	2.133

WiFi Antenna 1

Mode	AVG output power (dBm)	AVG output power (mW)	Target power (dBm)	Antenna gain	
				(dBi)	(Linear)
IEEE 802.11b	15.10	32.359	15±1	2.89	1.945
IEEE 802.11g	15.51	35.563	15±1	2.89	1.945
IEEE 802.11n HT20 (2.4G)	13.46	22.182	13±1	2.89	1.945
IEEE 802.11n HT40 (2.4G)	12.31	17.022	12±1	2.89	1.945
IEEE 802.11a（5G）	11.86	15.346	11±1	3.95	2.483
IEEE 802.11n HT20 (5G)	9.89	9.750	9±1	3.95	2.483
IEEE 802.11ac VHT20 (5G)	10.89	12.274	10±1	3.95	2.483
IEEE 802.11n HT40 (5G)	9.83	9.616	9±1	3.95	2.483
IEEE 802.11a VHT40	9.83	9.616	9±1	3.95	2.483
IEEE 802.11ac VHT80	9.49	8.892	9±1	3.95	2.483

WiFi Antenna 2

Mode	AVG output power (dBm)	AVG output power (mW)	Target power (dBm)	Antenna gain	
				(dBi)	(Linear)
IEEE802.11b	15.32	58.749	17±1	3.34	2.158
IEEE 802.11g	15.50	199.986	23±1	3.34	2.158
IEEE 802.11nHT20 (2.4G)	13.44	134.896	21±1	3.34	2.158
IEEE 802.11n HT40 (2.4G)	12.37	84.918	19±1	3.34	2.158
IEEE 802.11a	11.82	15.205	11±1	3.76	2.377
IEEE 802.11n HT20 (5G)	9.63	9.183	9±1	3.76	2.377
IEEE 802.11ac VHT20	9.69	9.311	9±1	3.76	2.377
IEEE 802.11n HT40 (5G)	9.84	9.638	9±1	3.76	2.377
IEEE 802.11ac VHT40	9.84	9.638	9±1	3.76	2.377
IEEE 802.11ac VHT80	9.58	9.078	9±1	3.76	2.377

5.8G SRD Antenna

Mode	AVG output power (dBm)	AVG output power (mW)	Target power (dBm)	Antenna gain	
				(dBi)	(Linear)
TX 5.8G SRD	6.50	2.014	6±1	0.48	1.12

3. Calculated Result and Limit

BT Antenna

Mode	Target power (dBm)	Antenna gain		Power Density (S) (mW/cm^2)	Limited of Power Density (S) (mW/cm^2)	Test Result
		(dBi)	(Linear)			
GFSK	7	3.29	2.133	0.0021	1	Compiles
8-DPSK	7	3.29	2.133	0.0021	1	Compiles
BLE GFSK	3	3.29	2.133	0.0008	1	Compiles

WiFi Antenna1

Mode	Target power (dBm)	Antenna gain		Power Density (S) (mW/cm^2)	Limited of Power Density (S) (mW/cm^2)	Test Result
		(dBi)	(Linear)			
IEEE 802.11b	16	2.89	1.945	0.0154	1	Compiles
IEEE 802.11g	16	2.89	1.945	0.0154	1	Compiles
IEEE 802.11n HT20	14	2.89	1.945	0.0097	1	Compiles
IEEE 802.11n HT40	13	2.89	1.945	0.0077	1	Compiles
5G Band						
IEEE 802.11a	12	3.95	2.483	0.0078	1	Compiles
IEEE 802.11n HT20	10	3.95	2.483	0.0049	1	Compiles
IEEE 802.11ac VHT20	11	3.95	2.483	0.0062	1	Compiles
IEEE 802.11n HT40	10	3.95	2.483	0.0049	1	Compiles
IEEE 802.11ac VHT40	10	3.95	2.483	0.0049	1	Compiles
IEEE 802.11ac VHT80	10	3.95	2.483	0.0049	1	Compiles

WiFi Antenna 2

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						
IEEE 802.11b	16	3.34	2.158	0.0171	1	Compiles
IEEE 802.11g	16	3.34	2.158	0.0171	1	Compiles
IEEE 802.11n HT20	14	3.34	2.158	0.0108	1	Compiles
IEEE 802.11n HT40	13	3.34	2.158	0.0086	1	Compiles
5G Band						
IEEE 802.11a	12	3.76	2.377	0.0075	1	Compiles
IEEE 802.11n HT20	10	3.76	2.377	0.0047	1	Compiles
IEEE 802.11ac VHT20	10	3.76	2.377	0.0047	1	Compiles
IEEE 802.11n HT40	10	3.76	2.377	0.0047	1	Compiles
IEEE 802.11ac VHT40	10	3.76	2.377	0.0047	1	Compiles
IEEE 802.11ac VHT80	10	3.76	2.377	0.0047	1	Compiles

5.8G SRD Antenna

Mode	Target power (dBm)	Antenna gain		Power Density (S) (mW/cm^2)	Limited of Power Density (S) (mW/cm^2)	Test Result
		(dBi)	(Linear)			
TX 5.8G SRD	7	0.48	1.12	0.0011	1	Compiles

WiFi Antenna 1+2

Mode	Power Density (S) (mW/cm^2) ANT1	Power Density (S) (mW/cm^2) ANT2	Power Density (S) (mW/cm^2) Total	Limited of Power Density (S) (mW/cm^2)	Test Result
2.4G Band					
IEEE 802.11n HT20	0.0097	0.0108	0.0205	1	Compiles
IEEE 802.11n HT40	0.0077	0.0086	0.0163	1	Compiles
5G Band					
IEEE 802.11n HT20	0.0049	0.0047	0.0096	1	Compiles
IEEE 802.11ac VHT20	0.0062	0.0047	0.0109	1	Compiles
IEEE 802.11n HT40	0.0049	0.0047	0.0096	1	Compiles
IEEE 802.11ac VHT40	0.0049	0.0047	0.0096	1	Compiles
IEEE 802.11ac VHT80	0.0049	0.0047	0.0096	1	Compiles

BT+2.4GWiFi+5GWiFi+5.8G SRD

Power Density (S) (mW/cm^2) BT	Power Density (S) (mW/cm^2) 2.4G WiFi	Power Density (S) (mW/cm^2) 5GWiFi	Power Density (S) (mW/cm^2) 5.8G SRD	Power Density (S) (mW/cm^2) Total	Limited of Power Density (S) (mW/cm^2)	Test Result
0.0021	0.0205	0.0109	0.0011	0.0346	1	Compiles

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

End of Test Report