



FCC 47 CFR MPE REPORT

HANSHOW TECHNOLOGY CO., LTD.

DIGITAL SIGNAGE

Model Number: Lumina Pro 1010-D2

FCC ID: 2AYMH-LUMINAD2

Applicant:	HANSHOW TECHNOLOGY CO., LTD.
Address:	Building 1 (1F podium building and 4F) and Building 5 (7F) in Jiaxing
	Photovoltaic High-tech Park, No.1288 Kanghe Rd., Xiuzhou
	District, Jiaxing Zhejiang, China
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
Tel: 86-769-83081888-808	

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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 & KDB 447498 D04 V01 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

Mode	Frequency (MHz)	Peak output power (dBm)	Peak output power (mW)
BLE 1M	2402	6.89	4.887
	2440	6.2	4.169
	2480	5.92	3.908
BLE 2M	2402	7.07	5.093
	2440	6.43	4.395
	2480	6.05	4.027
IEEE 802.11b	2412	15.02	31.769
	2437	15.08	32.211
	2462	16.3	42.658
IEEE 802.11g	2412	15.79	37.931
	2437	15.95	39.355
	2462	16.69	46.666
IEEE 802.11n HT20	2412	15.75	37.584
	2437	15.82	38.194
	2462	16.55	45.186
IEEE 802.11nHT40	2422	15.46	35.156
	2437	15.56	35.975
	2452	15.7	37.154
IEEE 802.11axHE20	2412	16.44	44.055
	2437	16.08	40.551
	2462	16.84	48.306
IEEE 802.11axHE40	2422	15.85	38.459
	2437	15.97	39.537
	2452	15.96	39.446

3. Calculated Result and Limit

Mode	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)			
2.4G Band								
BLE	7.07	7±1	8	3.63	2.307	0.00290	1	Complies
IEEE 802.11b	16.3	16±1	17	3.63	2.307	0.02300	1	Complies
IEEE 802.11g	16.69	16±1	17	3.63	2.307	0.02300	1	Complies
IEEE 802.11n HT20	16.55	16±1	17	3.63	2.307	0.02300	1	Complies
IEEE 802.11n HT40	15.7	15±1	16	3.63	2.307	0.01827	1	Complies
IEEE 802.11ax HE20	16.84	16±1	17	3.63	2.307	0.02300	1	Complies
IEEE 802.11ax HE40	15.97	15±1	16	3.63	2.307	0.01827	1	Complies

For 2.4G SRD

Field strength =51.51dBuV/m@3m

$$P=\{10^{[(51.51/20)]}/10^6 \cdot 3\}^2/30\} \cdot 1000\text{mW} = 0.000043\text{mW}$$

$$P_d=8.5 \times 10^{(-9)}\text{mW/cm}^2 < 1\text{mW/cm}^2$$

BLE+WIFI+2.4G SRD

MAX Power Density (S) (mW/cm ²) BLE	MAX Power Density (S) (mW/cm ²) WIFI	MAX Power Density (S) (mW/cm ²) 2.4G SRD	Total Ratio	Limit Ratio	Test Result
0.00290	0.02300	$8.5 \times 10^{(-9)}$	0.02590	1	Complies

End of Test Report