



FCC 47 CFR MPE REPORT

HANSHOW TECHNOLOGY CO., LTD.

DIGITAL SIGNAGE

Model Number: Lumina Pro 1010-D1

FCC ID: 2AYMH-LUMINAD1

Applicant:	HANSHOW TECHNOLOGY CO., LTD.
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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	7.26	5.321
	2440	6.46	4.426
	2480	6.17	4.140
BLE 2M	2402	7.48	5.598
	2440	6.83	4.819
	2480	6.39	4.355
IEEE 802.11b	2412	15.2	33.113
	2437	15.51	35.563
	2462	16.75	47.315
IEEE 802.11g	2412	16.41	43.752
	2437	16.35	43.152
	2462	16.77	47.534
IEEE 802.11n HT20	2412	16.52	44.875
	2437	16.26	42.267
	2462	16.47	44.361
IEEE 802.11nHT40	2422	15.74	37.497
	2437	15.78	37.844
	2452	15.84	38.371
IEEE 802.11axHE20	2412	16.7	46.774
	2437	16.41	43.752
	2462	16.84	48.306
IEEE 802.11axHE40	2422	15.92	39.084
	2437	16.37	43.351
	2452	16.45	44.157

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	7.48	7±1	8	3.45	2.213	0.00278	1	Complies
IEEE 802.11b	16.75	16±1	17	3.45	2.213	0.02207	1	Complies
IEEE 802.11g	16.77	16±1	17	3.45	2.213	0.02207	1	Complies
IEEE 802.11n HT20	16.52	16±1	17	3.45	2.213	0.02207	1	Complies
IEEE 802.11n HT40	15.84	15±1	16	3.45	2.213	0.01753	1	Complies
IEEE 802.11ax HE20	16.84	16±1	17	3.45	2.213	0.02207	1	Complies
IEEE 802.11ax HE40	16.45	16±1	17	3.45	2.213	0.02207	1	Complies

For 2.4G SRD

Field strength =51.9dBuV/m@3m

$$P=\{10^{(51.9/20)}/10^6 \cdot 3\}^2/30 \cdot 1000\text{mW} = 0.000047\text{mW}$$

$$P_d=9.3 \times 10^{-9} \text{mW/cm}^2 < 1 \text{mW/cm}^2$$

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
0.00278	0.02207	9.3×10^{-9}	0.02485	1	Complies

End of Test Report