

FCC 47 CFR MPE REPORT

Shenzhen Interthings Technology Co., Ltd.

Smart Doorbell

Model Number: IPB190

FCC ID: 2AQ7B-IPB190

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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			1.0	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)	Target power (dBm)	Antenna gain	
					(dBi)	(Linear)
IEEE 802.11b	2412	26.01	399.0249024	26 ± 1	2	1.58489
	2437	26.33	429.5364268	26 ± 1	2	1.58489
	2462	26.77	475.3352259	26 ± 1	2	1.58489
IEEE 802.11g	2412	25.97	395.3666201	25 ± 1	2	1.58489
	2437	25.51	355.6313186	25 ± 1	2	1.58489
	2462	23.78	238.7811283	23 ± 1	2	1.58489
IEEE 802.11n HT20	2412	25.14	326.5878322	25 ± 1	2	1.58489
	2437	24.96	313.3285724	24 ± 1	2	1.58489
	2462	23.16	207.0141349	23 ± 1	2	1.58489
IEEE 802.11n HT40	2422	24.81	302.6913428	24 ± 1	2	1.58489
	2437	24.66	292.4152378	24 ± 1	2	1.58489
	2452	24.31	269.7739432	24 ± 1	2	1.58489

3. Calculated Result and Limit

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	27	2	1.58489	0.15803	1	Compiles
IEEE 802.11g	26	2	1.58489	0.12552	1	Compiles
IEEE 802.11n HT20	26	2	1.58489	0.12552	1	Compiles
IEEE 802.11n HT40	25	2	1.58489	0.09971	1	Compiles

End of Test Report