

4 - FCC §15.247 (i) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

4.1 Applicable Standard

According to subpart 15.247(i) and subpart §1.1307(b)(1), 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 of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

4.2 MPE Calculation

The MPE is predicated at a given distance using the following formulary

$$S = PG/4\pi R^2$$

Where:

S = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = Antenna Gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Mode	Frequency (MHz)	Antenna Gain		Conducted Output Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11b	2437	2.0	1.58	14.86	30.61	20	0.096545	1.0
802.11g	2462	2.0	1.58	13.94	24.77	20	0.078114	1.0
802.11n20	2437	2.0	1.58	12.93	19.64	20	0.061906	1.0
802.11n40	2437	2.0	1.58	12.62	18.28	20	0.057641	1.0

Result: The device meets FCC MPE at 20 cm distance.