Maximum Permissible Exposure (MPE)

According to subpart FCC §1.1307 (b)(1) and §2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure (§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/cm²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

NOTE:

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

The RF Exposure level is calculated using the general equation:

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

Where:

S = power density (W/m^2)

P = power input to the antenna (W)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator (Numeric)

R = distance to the center of radiation of the antenna (m)

PG = EIRP (effective isotropic radiated power) [W]

Result:

Max P is 15 dBm $\approx$ 31.62 mW

R = 20 cm

π $\approx$ 3.1416

g = 5 dBi   G = 3.16

The power density limit is:

For 1500 – 100000MHz: S = 1.0 mW/cm^2

Calculation Result:

$$S = 31.62*3.16 / 4\pi(20)^2$$
$$G \approx 0.02 < 1.0 \text{ mW/cm}^2$$

So, the power density is kept.