

MAXIMUM PERMISSIBLE EXPOSURE

RF Exposure Calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment is 1mW/cm².

The electric field generated for a 1mW/cm² exposure is calculated as follows:

$$E = \sqrt{(30 * P * G)} / d, \text{ and } S = E^2 / Z = E^2 / 3770, \text{ because } 1\text{mW/cm}^2 = 10\text{W/m}^2$$

Where

S = Power density in mW/cm², Z = Impedance of free space, 377Ω

E = Electric field strength in Volts/m, G = Numeric antenna gain, and d = distance in meter

Combining equations and rearranging the terms to express the distance as a function of the remaining variable

$$d = \sqrt{(30 * P * G) / (3770 * S)}$$

Changing to units of mW and cm, using P (mW) = P (W) / 1000, d (cm) = 100 * d (m)

$$d = 0.282 * \sqrt{(P * G) / S}$$

Where

d = distance in cm, P = Power in mW, G = Numeric antenna gain, and S = Power density in mW/cm²

Calculated MPE Safe Distance

According to above equation, the following result was obtained.

Operating Mode	Peak Output Power		Antenna Gain	Calculated RF Exposure Separation Distance (cm)
	(dBm)	(mW)	dBi	
802.11b	16.2	41.687	12.0	7.25
802.11g	14.2	26.303	12.0	5.76
802.11a	12.0	16.069	12.0	4.50

Remark The numeric antenna gain for the EUT is 15.85.