

Exposure of humans to RF fields

Transmit Frequency 901.525 MHz

Minimum safe distances have been calculated below.

Power density, $\text{mW/cm}^2 = E^2/3770$

- Occupational / Controlled Exposure limit will be 3.00 mW/cm^2
($f/300 = 901.525 \text{ MHz}/300$)

- General Population / Uncontrolled exposure limit will be 0.60 mW/cm^2
($f/1500 = 901.525 \text{ MHz}/1500$)

The minimum distance from the antenna at which the MPE is met is calculated from the equation relating field strength in V/m, transmit power in watts, transmit antenna gain, transmitter duty cycle and separation distance in metres:

$$E, \text{ V/m} = (\sqrt{30 * P * G}) / d$$

Controlled

$$E = 3.10 \text{ mW/cm}^2 = E^2/3770$$

$$E = \sqrt{3.0 * 3770}$$

$$E = 106.3 \text{ V/m}$$

Uncontrolled

$$E = 0.62 \text{ mW/cm}^2 = E^2/3770$$

$$E = \sqrt{0.6 * 3770}$$

$$E = 47.6 \text{ V/m}$$

The rated maximum transmitter power (P) = 5 watts.

Transmitter is operated using an antenna with a gain (G) of up to 631 (+28 dBi).

The client has declared a duty cycle (DC) of 100% (1)

Controlled

$$d = \sqrt{(30 * P * G * DC)} / E$$

$$d = \sqrt{(30 * 5 * 631 * 1)} / 106.3$$

$$d = 2.89 \text{ metres or } 289 \text{ cm}$$

Uncontrolled

$$d = \sqrt{(30 * 5 * 631 * 1)} / 47.6$$

$$d = 6.46 \text{ metres or } 646 \text{ cm}$$

Result: Complies if the safe distances defined for each environment are applied.