

Exposure of humans to RF fields

As per FCC KDB 447498 D01 and Section 2.1091 radio frequency transmitters are required to be operated in a manner that ensures the public is not exposed to RF energy levels.

Calculations have been made using the General Public/Uncontrolled Exposure limits that are defined in Section 1.1310.

Minimum safe distances have been calculated using 406.100 MHz which gives a worst case calculation.

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

- General Population / Uncontrolled exposure limit will be 0.27 mW/cm²
(f/1500 = 406.1 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:

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

Uncontrolled

$$\text{Power Density} = 0.27 \text{ mW/m}^2 = E^2/3770$$

$$E = \sqrt{0.27 * 3770}$$

$$E = 31.9 \text{ V/m}$$

The rated maximum transmitter power = 0.25 watts.

Transmitter is operated using various antennas with the highest gain declared to be 17 dBi (G=50).

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

Uncontrolled

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

$$d = \sqrt{30 * 0.25 * 50 * 1} / 31.9$$

$$d = 0.61 \text{ metres or } 61.0 \text{ cm}$$

Result: Complies if the safe distance calculated is applied.