

Exposure of humans to RF fields

As per Section 1.1310 mobile transmitters are required to be operated in a manner that ensures the public is not exposed to RF energy levels in accordance with OST/OET Bulletin Number 65.

Calculations have been made using the General Public/Uncontrolled Exposure limits.

Minimum safe distances have been calculated below.

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

- General Population / Uncontrolled exposure limit will be 0.27 mW/m^2
($f/1500 = 406.1 \text{ MHz}/1500$)

As 406.1 MHz is the lowest frequency of operation in USA, this frequency has been used to give a worst case result.

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

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

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

$$E = 31.6 \text{ V/m}$$

The rated maximum transmitter power = 5 watts.

This transmitter can be used with a variety of antennas with gains of up to 15 dBi (31.6).

A duty cycle of 100% as the transmitter is a base station could possibly be operated for long periods of time.

Uncontrolled

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

$$d = \sqrt{30 * 5 * 31.6 * 1.0} / 31.6$$

$$d = 2.18 \text{ metres or } 218 \text{ cm}$$

Result: Complies if the safe distance defined for this environment is applied.