

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.

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

- Occupational / Controlled Exposure limit will be 1.35 mW/m²
(f/300 = 406 MHz/300)

- General Population / Uncontrolled exposure limit will be 0.270 mW/m²
(f/1500 = 406 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

$$E = 1.35 \text{ W/m}^2 = E^2/3770$$

$$E = \sqrt{1.35 * 3770}$$

$$E = 71.3 \text{ V/m}$$

Uncontrolled

$$E = 0.270 \text{ W/m}^2 = E^2/3770$$

$$E = \sqrt{0.270 * 3770}$$

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

The rated maximum transmitter power = 25 watts.

Transmitter is operated using a quarter wave whip antenna with a gain of 2.14 dBi (1.64).

The client has declared a duty cycle of 50% as the device operates on a push to talk basis

Controlled

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

$$d = \sqrt{30 * 25 * 1.64 * 0.5} / 71.3$$

$$d = 0.348 \text{ metres or } 34.8 \text{ cm}$$

Uncontrolled

$$d = \sqrt{30 * 25 * 1.64 * 0.5} / 31.9$$

$$d = 0.777 \text{ metres or } 77.7 \text{ cm}$$

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