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.

Power density, $mW/m^2 = E^2/3770$

- Occupational / Controlled Exposure limit will be 1.47 mW/m^2
($f/300 = 440$ MHz/300)

- General Population / Uncontrolled exposure limit will be 0.293 mW/m^2
($f/1500 = 440$ 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:

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

Controlled   **Uncontrolled**
$E = 1.47\ W/m^2 = E^2/3770$ $E = 0.293\ W/m^2 = E^2/3770$

$E = \sqrt{1.47*3770}$ $E = \sqrt{0.293*3770}$

$E = 74.4\ V/m$ $E = 33.2\ V/m$

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   **Uncontrolled**

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

$d = \sqrt{(30 * 25 * 1.64 * 0.5)} / 74.4$ $d = \sqrt{(30 * 25 * 1.64 * 0.5)} / 33.2$

$d = 0.333$ metres or 33.3 cm $d = 0.747$ metres or 74.7 cm

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