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 1.53 mW/m^2
(f/300 = 459 MHz/300)

- General Population / Uncontrolled exposure limit will be 0.306 mW/m^2
(f/1500 = 459 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**
$E = 1.53 \ W/m^2 = E^2/3770$ $E = 0.306 \ W/m^2 = E^2/3770$

$E = \sqrt{1.53*3770}$ $E = \sqrt{0.306*3770}$

$E = 75.9 \ V/m$ $E = 34.0 \ V/m$

The rated maximum transmitter power = 0.063 watts (+18 dBm).

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 100% however in practice the duty cycle would be less.

Controlled   **Uncontrolled**

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

$d = \sqrt{(30 * 0.063 * 1.64 * 1.0)} / 75.9$ $d = \sqrt{(30 * 0.063 * 1.64 * 1.0)} / 34.0$

$d = 0.023$ metres or 2.3 cm $d = 0.052$ metres or 5.2 cm

Result: Complies if a safe distance of a least 20 cm is defined for each environment.