**Radio Frequency Hazard Information**

The power level of this transmitter can be set between +15 and +37 dBm.

A maximum power level of +37 dBm (5 watts) has been used in these calculations.

Although the duty cycle is generally low, a duty cycle of 100% is assumed for these calculations.

The power density formula is: $S = P / (4 \pi r^2)$ where:

S= Power Density ($W/m^2$)
P= Transmitter Power (W) x Antenna Gain (In linear units relative to isotropic).
r = Distance from the observation point to the antenna.

The user manual states a safe distance that should be maintained from the antenna of any system that uses this transmitter based upon the gain of the antenna being used.

The limits contained within CFR 47 Part 1.1311 TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE), (B) Limits for General Population / Uncontrolled Exposure have been applied.

The relevant limit for the range 300 – 1500 MHz is $f/1500$ $mW/cm^2$

The radio operates over the frequency range of 421 to 512 MHz so the limit has a minimum value at f= 421 MHz.

The limit at this frequency is: $421/1500 = 0.281$ $mW/cm^2 = 2.81$ $W/m^2$.

A nominal power density of 2.0 $W/m^2$ has been applied as a safe level.

The following table details the minimum safe distance for various antenna combinations and with the transmitter operating at maximum power (5 watts).

| Range of Antenna Gains (dBd) | Maximum Antenna Gain (dBi) | Worst Case EIRP (W) | Power Density ($W/m^2$) | Safe distance in user manual (metres) |
|---|---|---|---|---|
| 0 to 4 | 6.15 | 20.60 | 1.980 | 0.91 |
| 4 to 8 | 10.15 | 51.76 | 1.986 | 1.44 |
| 8 to 12 | 14.15 | 130.0 | 1.990 | 2.28 |
| 12 to 16 | 18.15 | 326.57 | 1.994 | 3.61 |

For example:

An antenna with a maximum antenna gain of 4 dBd (gain over a dipole) is to be used.

This antenna gain converts to 6.15 dBi (gain over an isotropic antenna).

Converting this gain to a linear gain using 10^(6.15/10) gives a gain of 4.121.

The radiated power will therefore be 5 W x 4.121 which gives an EIRP power of 20.60 Watts.

Cable losses have been ignored to give a worst case result.

The safe distance for this antenna would therefore be calculated from: $S = P / (4 \pi r^2)$

Therefore

$2.00\ W/m^2 = 20.60\ W / (4 \pi r^2)$

Re-arranging the formula gives

r = square root (20.60 W / (2.00 W/m² 4 π ))
r = 0.91 metres

**Result:** Complies if the safe distances detailed in the above table, which is derived from the user manual for this transmitter, are applied.