MPE Calculations

FCC § 1.1307, Radio Frequency Exposure

The EUT described in this report has been evaluated to the MPE limits for **General Population/Uncontrolled Environment**. As the manufacturer does not specify or sale any antenna with the radio the MPE calculations are based on commercially available CB antennas.

According to Section 1.1310 of the FCC rules, the uncontrolled RF exposure limit for this frequency range is $180/f^2$ (mW/cm^2). To comply with the exposure limits for this section, humans must not be too close to the transmit antenna. The following formula was used to calculate the minimum safe distance from the antenna that must be maintained during use (no time averaging was used):

$$S = (PG)/(4\pi R^2)$$

Where,

S = Power Density
P = Output Power at the Antenna Terminals in mW
G = Gain of Transmit Antenna (linear gain)
R = Distance from Transmitting Antenna in cm

For this device, the calculation is as follows: (Based on worst case power and frequency)

S = FCC Limit = $180/(26.9848)^2$ mW/ cm^2 = 0.25 mW/ cm^2
P = Output Power = 3960 mW
G* = Antenna Gain = 2.15 dBi = INVLOG(2.15/10) = 1.64

*Antenna Gain based on an ideal ½-wave dipole.

Therefore:

$$R = \sqrt{(3960mW \times 1.64\ ) \div (4 \times \pi \times 0.25)}$$

R = 45cm (Continuous operation)

From this calculation, the minimum safe distance is 45 cm for continuous operation. Based on the worst-case usage of the device the source-based time averaging would be a 40% duty cycle. This would reduce the minimum safe distance to be 18 cm.

R = 18 cm (Source-based time-averaging)

The antenna for this radio is either located on top of a construction trailer roof or on top of a road construction vehicle and will be located greater than 18cm from personnel. For this reason the minimum safe distance is met by the typical mounting of the antenna.