

From: "Michael Lockerbie" <mlockerbie@criticaltelecom.com>  
To: "David Raynes (E-mail)" <draynes@etc-mpbtech.com>  
Subject: MPE related minimum distance from antenna  
Date: Friday, 03 November, 2000 12:05 PM

Dear David,

Please see our calculation of minimum distance from our largest antenna so as not to exceed the Maximum Permissible Exposure (MPE) regulation of 1.1310.

Table 1(B) - General Population/Uncontrolled Exposure gives the MPE limit in the 900 MHz ISM band as follows:

MPE =  $f/1500$  where MPE is in units of  $[mW/cm^2]$  and  $f$  is in units of  $[MHz]$  (1)

At the highest frequency in the band (928 MHz), MPE is then  $0.619 mW/cm^2$ . (2)

The power output of our radio device was measured and found to be always less than 100 mW. (3)

Of the three antennas tested with our system, the greatest antenna gain is 13 dBi (4)

The antenna gain (4) can be applied to the maximum output power (3) to yield an effective isotropic radiated output power as follows:

$$P_{iso} = 100 mW * 10^{(13/10)} \quad (5)$$

$$P_{iso} = 2000 mW \quad (6)$$

The minimum distance permissible can be computed based on the surface area of the isotropic sphere:

$A_{iso} = 4 * \pi * r^2$  where  $A_{iso}$  is the area  $[cm^2]$  and  $r$  is the radius of the sphere  $[cm]$  (7)

$$MPE * A_{iso} = P_{iso} \quad (8)$$

$$r = (P_{iso} / (MPE * 4 * \pi))^{(1/2)} \quad (9)$$

$$r = (2000 [mW] / (0.619 [mW/cm^2] * 4 * \pi))^{(1/2)} \quad (10)$$

$$\mathbf{r = 16.0 cm or 6 5/16"} \quad (11)$$

To protect the general public from undue radio exposure, antennas should be installed such that persons would not be closer than 16 cm (6 5/16") from any part of the antenna.

Please submit this calculation and statement on our behalf.

Regards,  
Mike.