MPE Calculations

Alien Technology has evaluated the Maximum Permissible Exposure (MPE) calculations and recommends the minimum separation distance from the NanoScanner reader's antenna to be 17.8 cm in an uncontrolled exposure.

Uncontrolled exposure

From the guidelines in OTE bulletin 65, for the general population, in a *uncontrolled exposure*, we have determined an upper MPE limit

The power density guideline for frequencies above 1500 MHz is:

$1.0\,{}^{mW}\!/_{cm^2}$ or **10.0** ${}^{W}\!/_{m^2}$

The field strength for this power density is

$$E = {}^{V}\!/_{m} = \left[\left(\frac{W}{m^2}\right)\bullet 377\right]^{1/2}$$

$$E = \left[(10.0)\bullet(377)\right]^{1/2} = \mathbf{61.40}\,{}^{V}\!/_{m}$$

If one takes this field strength along with the maximum radiated power of 4 watts EIRP into the equation (Antenna Gain (dBi) + power output (dBW))

$$P_{Trans} = \frac{4\bullet\pi\bullet d^2}{377}\bullet\left(E\right)^2$$ d = minimum distance from antenna

The minimum distance at which persons must keep away in a uncontrolled exposure is,

$$d = \left[\frac{\left(P_{Trans}\bullet 377\right)}{4\bullet\pi\bullet E^2}\right]^{1/2} = \left[\frac{\left(4\bullet 377\right)}{4\bullet\pi\bullet\left(61.4\right)^2}\right]^{1/2} = \mathbf{0.178}m = \mathbf{17.8}cm$$

Definitions

Power Density

$$\frac{W}{cm^2} = \frac{\left(\frac{V}{cm}\right)^2}{377}$$ 1 $cm^2 = 10^{-4}\,m^2$