

MPE Calculations for Skylinks Unit

For calculations shown below, the case of **General population/uncontrolled** exposure limits for Mobile equipment is assumed.

Effective Isotropically Radiated Power (EIRP) = Pout (mWatts) * antenna's numeric gain, which yields

$$\text{EIRP} = 6.531 \text{ W} = 38.15 \text{ dB.}$$

This is above the 1.5 -watt limit stated in paragraph 3 of page 41, and requires that this case be examined for compliance with the MPE limits, and for determination of the minimum safe distance from the antenna.

In above calculation the numeric gain of the antenna was inserted. The antenna's gain has been listed, by the manufacturer, to be 3 dB; and converts to a **numerical gain** of **2.15** using the equation $G = 10^{(\text{dB}/10)}$ in page 20 of the OET 65.

From Table 1 in Appendix A of the OET bulletin 65;

$$\text{MPE} = f/1500 = 450/1500 = 0.3 \text{ (mW/cm}^2\text{)}.$$

For the worst-case calculation, the lower frequency in the operating band 450 – 470 MHz has been used.

From Equation 3 in page 19 we have:

$$S \text{ (mW/ cm}^2\text{)} = P \text{ (mW)} * G \text{ (numeric gain)} / 4\pi R^2.$$

Where R is the separation distance from the center of the radiating structure, and is measured in centimeters.

Plugging in for the variables results in:

$$0.3 = 4000 * 2.15 / 4\pi R^2$$

Which then yields a separation distance of:

$$R = 47.76 \text{ cm.}$$

Time-averaging Method:

It should be noted that the unit transmits for controlled duration of 30 ms once every 6 seconds. If the averaging method is used, as permitted under §15.2091 (d) (2), the following should apply.

Please consider the Equation (2) in page 11 of OET 65, which is as follows:

$$S_{exp} t_{exp} = S_{lim} t_{avg}$$

Where S_{lim} was calculated in above to be $0.3 \text{ (mW/cm}^2\text{)}$, and t_{avg} is specified in Table 1 of appendix A as 30 (min). Where S_{exp} and t_{exp} are the exposure power density and the total time of exposure during the specified given averaging time, respectively, and are calculated as follow.

$$S_{exp} = P / 4\pi R^2 = 4000 * 2.15 / 4\pi R^2 = 2150 \text{ (mW)} / 4\pi R^2 \text{ (cm}^2\text{)}$$

$$t_{exp} = (30 \text{ ms}) (1/6 \text{ sec}) (30 \text{ min}) (60 \text{ sec}/1 \text{ min}) = 9 \text{ sec}$$

Plugging in the numbers and solving for R yields:

$$\boxed{R = 11.406 \text{ cm.}}$$

This distance is less than the recommended minimum distance for MPE calculations for mobile devices (i.e., the 20-cm minimum separation distance).