

# **Calculation of Antenna safety distance**

**FCC ID: ROJ6300B Model: TT-6366B**

Calculations of the safety distance due to emitted RF power from an Antenna connected to the TT-6366B transmitter.

The calculations in this document are made in accordance with the FCC rules described in OET bulletin 65 Edition 97-01 concerning Human exposure to RF Electromagnetic Fields. The limit Occupational / Controlled MPE is stated in accordance with Appendix A page 67.

## Calculus assumptions:

Antenna: Whip antenna with ground plane.  
The Antenna is assumed to be a half wave monopole and the ground plane assumed to be ideal.  
These assumptions result in radiation pattern and gain similar to a half wave dipole antenna.

Antenna pattern: Omni directional

Transmitter Power:  $P = 150 \text{ W}$

Frequency modulation: CW

Gain relative to isotropic:  $Gi = 2$  equals 3dB

Frequency range: 1.6MHz to 30MHz

Equation used for calculus: 
$$MPE = \frac{EIRP}{4 \cdot \pi \cdot R^2} \quad 1)$$

The equation regarding MPE is generally accurate in the antenna far field, but it will over-predict the Power density in the near field. This means that the calculus can be regarded as a “worst case” or conservative prediction.

$$EIRP = Gi \cdot P \quad 2)$$

$$MPE = \frac{900}{f^2} \quad [mW/cm^2] \quad 3)$$

"f" is the frequency inserted in MHz.

The expression for MPE is in accordance with OET bulletin 65 Edition 97-01 Appendix A page 67

## Calculation of safety distance:

Using equation 1):

$$MPE = \frac{EIRP}{4 \cdot \pi \cdot R^2} \Rightarrow R = \sqrt{\frac{EIRP}{4 \cdot \pi \cdot MPE}} \quad 4)$$

Equation 2) inserted into 4):

$$R = \sqrt{\frac{Gi \cdot P}{4 \cdot \pi \cdot MPE}} \quad 5)$$

Equation 3) inserted into 5):

$$R = \sqrt{\frac{Gi \cdot P}{4 \cdot \pi \cdot \frac{900}{f^2}}} \Rightarrow R = f \cdot \sqrt{\frac{Gi \cdot P}{4 \cdot \pi \cdot 900}} \quad 6)$$

Values for Gi and P are inserted into equation 6). P is inserted in mW and the distance R is in cm, due to the unit of MPE, which is [mW/cm<sup>2</sup>]:

$$R = 5.2 \cdot f \quad 7)$$

Value for safety distance R is calculated:

$$f = 30 \text{ MHz} \Rightarrow R = 156 \text{ cm} \quad 8)$$

$$f = 1,6 \text{ MHz} \Rightarrow R = 8.3 \text{ cm} \quad 9)$$

**The safety distance is stated to 6 feet which are equal to 184cm > 156cm**

## Note:

The safety distance is issued in the user manual:

SAILOR 6300 MF/HF DSC 150W FCC