

## 9. RF Exposure Information:

Calculation for compliance with MPE requirements (47CFR2.1091) is done using a worst-case transmitter power of 250 mW, assumption of a unity gain antenna, and an exposure limit of 0.6 mW/cm<sup>2</sup> (f/1500 mW/cm<sup>2</sup> at 20 cm per 47CFR1.1310) for general applications. This device is not carried or worn by the end user. It has an extremely low duty cycle and a low rate of transmission that dramatically reduces the average power level that could pose an exposure hazard.

Accumulating a digital count that exceeds a preset threshold typically activates the transmitter. This event rarely occurs more than once per hour. In addition to these change-of-state transmissions, the transmitter is configured to transmit a supervisory message once every hour. The averaging interval specified in Table 1(B) of 47CFR1.1310 is 30 minutes. For the purposes of this calculation, it is assumed that one supervisory and one change-of-state message will be sent in the 30-minute interval. Each supervisory message consists of 3 redundant packets, and each change-of-state message contains 21 packets, for a total of 24 packets in the 30-minute interval. A packet is typically 20 ms in length.

The worst-case average power density at a distance of 20 cm is then,

$$250mW \times \frac{24 \text{ packets}}{30 \text{ min}} \times \frac{20ms}{\text{packet}} \times \frac{1 \text{ min}}{60 \times 10^3 ms} \times \frac{1}{4\pi(20cm)^2} = 13.3 \frac{nW}{cm^2}$$

This is well below the 0.6 mW/cm<sup>2</sup> MPE limit.

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The time-averaged RF transmit power is then,

$$0.250\text{W} \times \frac{24 \text{ packets}}{3 \text{ min}} \times \frac{20 \text{ ms}}{\text{packet}} \times \frac{1 \text{ min}}{60 \times 10^3 \text{ ms}} = 0.667 \text{ mW}$$

#### 9. RF Exposure Information – SAR Calculations:

Calculation for compliance with SAR requirements (47CFR2.1093) is done using a worst-case transmitter power of 250 mW time-averaged by the duty cycle of the transmitter, and the assumption that all RF energy could be absorbed in 1 gram of tissue. The peak exposure limit is 1.6 mW/g (equivalent to 1.6 W/kg per 47CFR2.1093) in any 1 gram of tissue for General Population/Uncontrolled applications. This device has an extremely low duty cycle that dramatically reduces the average power level that could pose an exposure hazard.

If all of the transmitted power were absorbed in a 1-gram sample of tissue, the power density is 0.667 mW/gram and is well below the 1.6 mW/gram limit.

Since the device also meets the SAR requirements, the user manual does not require listing the minimum distance the device must be placed from an operator.