

Microwave Radiation Safety Evaluation of the Safe Zone CTD

The concealed threat detector (CTD) is a spread spectrum, interrupted CW radar operating in the range of 10 GHz. The term “interrupted CW” is used since the time that the signal is ON is long compared to the over-the-air transit time for the signal to propagate to the target and return. The ON time is also long compared to the detection and digitizing time. The signal is ON for about 37% of the time.

The power density at a given target range is

$$P_d = \frac{P_t G}{4\pi R^2}$$

The minimum range to target is 3 meters (300 cm).

The peak transmitted power is 0.1 watts and the antenna gain is 19 dB max (numeric = 79).

Using these values, the power density at the target (or subject) is 7×10^{-6} watts per square centimeter, or 7×10^{-3} milliwatts/cm².

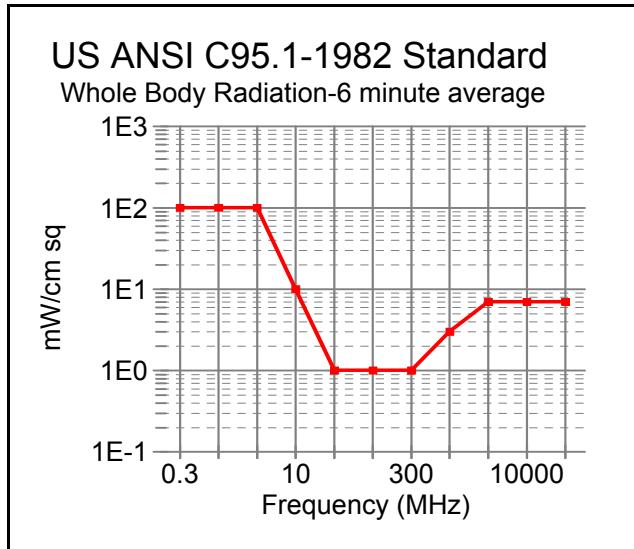


Figure 1 ANSI Safety Standard

The latest ANSI C95.1-1982 Standard for full body illumination is shown in Figure 1. Note that this is for a 6 minute average exposure. The maximum allowable value at 10 GHz is about 7 mW/cm^2 . The SafeZone CTD peak power is three orders of magnitude below this figure and when multiplied by the 37% duty cycle to arrive at average power, the exposure is $2.6 \times 10^{-3} \text{ mW/cm}^2$. This is a safety margin of 34dB. Furthermore, the subject being screened is in the beam for typically 5 or 6 seconds; far below the 6 minute exposure time on which the ANSI values are based.