

MPE Calculations -- UNII

Systems operating under the provision of 47 CFR 1.1307(b)(1) shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the FCC guidelines.

The EUT will only be used with a separation of 1 meter or greater between the antenna and the body of the user or nearby persons and can therefore be considered a mobile transmitter per 47 CFR 2.1091(b). The MPE calculation for this exposure is shown below.

Power density at the specific separation:

$$S = PG/(4R^2\pi)$$

$$S = (41.305 \times 2.884) / (4 \times 20^2 \times \pi)$$

$$S = \mathbf{0.0237 \text{ mW/cm}^2}$$

Where

S = Maximum power density (mW/cm²)

P = Power input to the antenna (mW).

G = Numeric power gain of the antenna – worst case

R = Distance to the center of the radiation of the antenna (20cm = limit for MPE)

The maximum permissible exposure (MPE) for the general population is 1mW/cm².

The power density at 1 meter does not exceed the 1mW/cm² limit. Therefore, the exposure condition is compliant with FCC rules.

The numeric gain (G) of the antenna with a gain specified in dB is determined by:

$$G = \text{Log}^{-1} (\text{antenna gain in dBi}/10)$$

$$G = \text{Log}^{-1} (4.6/10)$$

$$G = 2.884$$