

6. Prediction of MPE Limit

6.1. Friis Formula

Friis transmission formula : $S = (P_{out} \times G) / (4 \times \pi \times R^2)$

$$R = \sqrt{\frac{P_{out} \times G}{4\pi \times S}}$$

S = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

Power density(S) is limit of MPE, **f/1500 mW/cm²**. If we know the maximum Gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

6.2. Test Results

6.2.1 Antenna Gain

The maximum Gain measured in Fully Anechoic Chamber is 2.5dBi or 1.778(numeric).

6.2.2 Output Power into Antenna & Distance at RF Exposure value(f/1500 mW/cm²)

Channel	Frequency (MHz)	Maximum Output Power at Antenna Terminal(mW)	Distance (cm)
363	835.89	251.1886	7.986

Note: Power Density(S)= f/1500 = 835.89/1500 = 0.5573 mW/cm²

Calculation distance value

$$R = \sqrt{\frac{P_{out} \times G}{4\pi \times S}} = \sqrt{\frac{251.1886 \times 1.778}{4 \times 3.1416 \times 0.5573}} = \underline{\underline{7.986 \text{ (cm)}}}$$