

2.1.6 RF exposure evaluation

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b)

Limits for maximum permissible exposure (MPE)

Frequency range (MHz)	Electric field strength(V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Average time
(A) Limits for Occupational / Control exposures				
300 – 1500	--	--	F/300	6
1500 – 100000	--	--	5	6
(B) Limits for General Population / Uncontrol Exposures				
300 – 1500	--	--	F/1500	6
1500 – 100000	--	--	1	30

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

Where;

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

$P_i = 3.1416$

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

P_d the limit of MPE, 1 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 where the MPE limit is reached.

Output power into antenna & RF exposure evaluation distance

Frequency (MHz)	Average power (dBm)	Max. antenna gain (dBi)	Power density at 20 cm (mW/cm ²)	Limit (mW/cm ²)
2402	9.50	3.70	0.00416	1
2440	9.80	3.70	0.00445	
2480	10.99	3.70	0.00586	

※ Remark

The power density P_d at a distance of 20 cm calculated from the friis transmission formula is far below the limit of 1 mW/cm².