

RF exposure

According to FCC part 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 – 1 500 | -- | -- | f/300 | 6 |
| 1 500 - 100000 | -- | -- | 5 | 6 |
| (B) Limits for General Population / Uncontrol Exposures | | | | |
| 300 – 1 500 | -- | -- | f/1500 | 6 |
| 1 500 – 100 000 | -- | -- | 1 | 30 |

f= frequency in MHz

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

Where,

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d the 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 where the MPE limit is reached.

Results

| Channel | Frequency (MHz) | Peak output power (dBm) | Antenna gain (dBi) | Power density at 20 cm(mW/cm ²) | Limit (mW/cm ²) |
|---------|-----------------|-------------------------|--------------------|---|-----------------------------|
| Low | 910.920 | 16.11 | -9.153 | 0.000 44 | 0.61 |
| Middle | 915.000 | 15.95 | -9.153 | 0.000 42 | 0.61 |
| High | 919.080 | 15.93 | -9.153 | 0.000 42 | 0.61 |