

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, 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.

Results

<Wireless Lan>

Operation mode / Data Rate	Frequency (MHz)	Peak output power (dBm)	Antenna gain (dBi)	Power density at 20 cm(mW/cm ²)	Limit (mW/cm ²)
802.11b / 11Mbps	2442	14.75	1.3	0.008 00	1
802.11g / 24Mbps	2442	17.15	1.3	0.013 91	1
802.11n(HT20) / MCS7	2442	16.71	1.3	0.012 57	1
802.11n(HT40) / MCS6	2442	16.63	1.3	0.012 34	1

<Bluetooth BDR & EDR>

Operation mode / Data Rate	Frequency (MHz)	Peak output power (dBm)	Antenna gain (dBi)	Power density at 20 cm(mW/cm ²)	Limit (mW/cm ²)
GFSK/ 1Mbps	2441	4.83	1.3	0.000 88	1
8-DPSK / 3Mbps	2441	3.30	1.3	0.000 57	1