



## 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 <sup>2</sup> )	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	--	--	<b>1</b>	<b>30</b>

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/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

$G$  = gain of antenna in linear scale

$\pi$  = 3.1416

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

$P_d$  the limit of MPE, 1 mW/cm<sup>2</sup>. 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 – Wi-Fi (Worst case)

Mode	Max tune-up power (dBm)	Antenna gain (dBi)	Power density at 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
802.11b	20.5	2.00	0.035 38	1
802.11g	23.5	2.00	0.070 59	1
802.11n(HT20)	24.0	2.00	0.079 20	1
802.11n(HT40)	24.0	2.00	0.079 20	1

### Results – FHSS (Worst case)

Mode	Max tune-up power (dBm)	Antenna gain (dBi)	Power density at 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
GFSK	17.0	2.00	0.015 80	1

### Results – SUM (Worst case)

Wi-Fi Maximum Power density at 20 cm (mW/cm <sup>2</sup> )	FHSS Maximum Power density at 20 cm (mW/cm <sup>2</sup> )	Sum(mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
0.079 20	0.015 80	0.095	1

Note : This device includes two transmitters of FHSS and Wi-Fi. The two transmitters can operate simultaneously.