



## 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  $mW/cm^2$

$P_{out}$  = 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,  $1 mW/cm^2$ . 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.



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## Results – Wi-Fi

### 1. 802.11b

Frequency (MHz)	Max tune-up power (dBm)	Antenna gain (dBi)	Power density at 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
2 412	16	3.77	0.018 87	1
2 437	16	3.77	0.018 87	1
2 462	16	3.77	0.018 87	1

### 2. 802.11g

Frequency (MHz)	Max tune-up power (dBm)	Antenna gain (dBi)	Power density at 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
2 412	14	3.77	0.011 91	1
2 437	14	3.77	0.011 91	1
2 462	12	3.77	0.007 51	1

### 3. 802.11n(HT20)

Frequency (MHz)	Max tune-up power (dBm)	Antenna gain (dBi)	Power density at 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
2 412	14	3.77	0.011 91	1
2 437	14	3.77	0.011 91	1
2 462	12	3.77	0.007 51	1