

# 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,  $f/1500 mW/cm^2$ . 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 (Worst case)

Operation mode / Data Rate	Frequency (MHz)	Peak output power (dBm)	Antenna gain (dBi)	Power density at 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
802.11n_HT20 // 8Mbps	2 412	15.89	0.56	0.008 78	1
802.11n_HT20 // 8Mbps	2 437	15.52	0.56	0.008 07	1
802.11n_HT20 // 8Mbps	2 462	15.30	0.56	0.007 67	1
802.11n_HT40 // MCS8	5 755	19.95	3.22	0.041 28	1
802.11n_HT40 // MCS8	5 795	19.83	3.22	0.040 15	1
802.11n_HT20 // MCS8	5 180	22.38	4.82	0.104 41	1
802.11n_HT20 // MCS8	5 220	22.18	4.82	0.099 71	1
802.11n_HT20 // MCS8	5 240	22.23	4.82	0.100 86	1
802.11n_HT20 // MCS8	5 260	22.13	3.38	0.070 75	1
802.11n_HT20 // MCS8	5 300	21.76	3.38	0.064 97	1
802.11n_HT20 // MCS8	5 320	21.57	3.38	0.062 19	1
802.11n_HT20 // MCS8	5 500	20.38	3.81	0.052 21	1
802.11n_HT20 // MCS8	5 580	21.27	3.81	0.064 08	1
802.11n_HT20 // MCS8	5 700	22.25	3.81	0.080 30	1