RF exposure

FCC ID : TDU-WBT-MSB

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 (㎒)	Electric field strength(V/m)	Magnetic field strength (A/m)	Power density (㎽/㎠)	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 ㎒

Friis transmission formula: Pd = (Pout×G)/(4×pi×R^2)

Where,

Pd = power density in ㎽/㎠

Pout = output power to antenna in ㎽

G = gain of antenna in linear scale

Pi = 3.1416

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

Pd the limit of MPE, 1 ㎽/㎠. 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

2.4 ㎓

Operation mode	Frequency (㎒)	Maximum Average output power (dBm)	Antenna gain (dBi)	Power density at 20 ㎝(㎽/㎠)	Limit (㎽/㎠)
BDR (1 Mbps)	2 402 ㎒ ~ 2 480 ㎒	9.0	0.01	0.001 58	1
EDR (2 Mbps)		6.0		0.000 79	
EDR (3 Mbps)		6.0		0.000 79	
LE 1 Mbps		9.0		0.001 58	
LE 2 Mbps		9.0		0.001 58	
802.11b	2 412 ㎒ ~ 2 462 ㎒	16.0		0.007 94	
802.11g		10.0		0.001 99	
802.11n_HT20		11.5		0.002 82	
802.11ax_HE20		11.5		0.002 82	
802.11n_HT40	2 422 ㎒ ~ 2 452 ㎒	11.5		0.002 82	
802.11ax_HE40		10.0		0.001 99	

UNII-1

Operation mode	Frequency (㎒)	Maximum Average output power (dBm)	Antenna gain (dBi)	Power density at 20 ㎝(㎽/㎠)	Limit (㎽/㎠)
802.11a	5 180 ㎒ ~ 5 240 ㎒	15.0	-2.18	0.003 81	1
802.11n_HT20		13.0		0.002 40	
802.11ac_VHT20		13.0		0.002 40	
802.11ax_HE20		12.0		0.001 91	
802.11n_HT40	5 190 ㎒ ~ 5 230 ㎒	12.0		0.001 91	
802.11ac_VHT40		11.0		0.001 52	
802.11ax_HE40		11.0		0.001 52	
802.11ac_VHT80	5 210 ㎒	6.0		0.000 48	
802.11ax_HE80		6.0		0.000 48	

UNII-2A

Operation mode	Frequency (㎒)	Maximum Average output power (dBm)	Antenna gain (dBi)	Power density at 20 ㎝(㎽/㎠)	Limit (㎽/㎠)
802.11a	5 260 ㎒ ~ 5 320 ㎒	15.0	-2.18	0.003 81	1
802.11n_HT20		13.0		0.002 40	
802.11ac_VHT20		13.0		0.002 40	
802.11ax_HE20		12.0		0.001 91	
802.11n_HT40	5 270 ㎒ ~ 5 310 ㎒	12.0		0.001 91	
802.11ac_VHT40		10.0		0.001 20	
802.11ax_HE40		11.0		0.001 52	
802.11ac_VHT80	5 290 ㎒	6.0		0.000 48	
802.11ax_HE80		6.0		0.000 48	

UNII-2C

Operation mode	Frequency (㎒)	Maximum Average output power (dBm)	Antenna gain (dBi)	Power density at 20 ㎝(㎽/㎠)	Limit (㎽/㎠)
802.11a	5 500 ㎒ ~ 5 720 ㎒	15.0	-2.18	0.003 81	1
802.11n_HT20		13.0		0.002 40	
802.11ac_VHT20		13.0		0.002 40	
802.11ax_HE20		12.0		0.001 91	
802.11n_HT40	5 510 ㎒ ~ 5 710 ㎒	12.0		0.001 91	
802.11ac_VHT40		10.0		0.001 20	
802.11ax_HE40		11.0		0.001 52	
802.11ac_VHT80	5 530 ㎒ ~ 5 690 ㎒	6.0		0.000 48	
802.11ax_HE80		6.0		0.000 48	

UNII-3

Operation mode	Frequency (㎒)	Maximum Average output power (dBm)	Antenna gain (dBi)	Power density at 20 ㎝(㎽/㎠)	Limit (㎽/㎠)
802.11a	5 745 ㎒ ~ 5 825 ㎒	12.5	-2.18	0.002 14	1
802.11n_HT20		11.0		0.001 52	
802.11ac_VHT20		11.0		0.001 52	
802.11ax_HE20		11.0		0.001 52	
802.11n_HT40	5 755 ㎒ ~ 5 795 ㎒	12.0		0.001 91	
802.11ac_VHT40		9.0		0.000 96	
802.11ax_HE40		10.0		0.001 20	
802.11ac_VHT80	5 775 ㎒	5.5		0.000 43	
802.11ax_HE80		6.0		0.000 48	