

1 Human Exposure Assessment

1.1 Maximum Permissible Exposure

1.1.1 Limit of Maximum Permissible Exposure

Limits for Occupational / Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	F/300	6
1500-100,000	-	-	5	6
Limits for General Population / Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	F/1500	30
1500-100,000	-	-	1.0	30
Note 1: f = frequency in MHz ; *Plane-wave equivalent power density				
Note 2: For the applicable limit, see FCC 1.1310				

MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d}$$

E = Electric field (V/m)

G = EUT Antenna numeric gain (numeric)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

P = RF output power (W)

d = Separation distance between radiator and human body (m)



1.1.2 Result of Maximum Permissible Exposure (5.3G)

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11 Protocol	Ch. Frequency (MHz)	Channel Number	Number of Transmit Chains (N _{TX})	RF Output Power (dBm)
5250-5350	a	5260-5320	52-64 [4]	1	21.76
5250-5350	n (HT20)	5260-5320	52-64 [4]	2	21.06
5250-5350	n (HT40)	5270-5310	54-62 [2]	2	22.17
5250-5350	ac (VHT20)	5260-5320	52-64 [4]	2	21.25
5250-5350	ac (VHT40)	5270-5310	54-62 [2]	2	22.12
5250-5350	ac (VHT80)	5290	58 [1]	2	16.27
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power..					

Worst Maximum RF Output Power Result							
Exposure Environment		General Population / Uncontrolled Exposure					
Separation Distance (cm)		20					
Power Level	1	RF Output Power (dBm)					
Modulation Mode	N _{TX}	Chain-Port 1	Chain-Port 2	Sum Chain	Gain (dBi)	EIRP Power	PD (S) (mW/cm ²)
a	1	21.76	-	21.76	4.00	25.76	0.07495
n(HT20)	2	17.16	18.79	21.06	3.73	24.80	0.06107
n(HT40)	2	18.39	19.81	22.17	3.73	25.90	0.10831
ac(VHT20)	2	17.37	18.96	21.25	3.73	24.98	0.06264
ac(VHT40)	2	18.35	19.75	22.12	3.73	25.85	0.10958
ac(VHT80)	2	12.60	13.83	16.27	3.73	20.00	0.07130
Maximum Permissible Exposure Limit (mW/cm ²)							1
Note 1: N _{TX} = Number of Transmit Chains							



1.1.3 Result of Maximum Permissible Exposure (5.6G)

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11 Protocol	Ch. Frequency (MHz)	Channel Number	Number of Transmit Chains (N _{TX})	RF Output Power (dBm)
5470-5725	a	5500-5700	100-140 [11]	1	21.68
5470-5725	n (HT20)	5500-5700	100-140 [11]	2	21.14
5470-5725	n (HT40)	5510-5670	102-134 [3]	2	23.63
5470-5725	ac (VHT20)	5500-5700	100-140 [11]	2	21.05
5470-5725	ac (VHT40)	5510-5670	102-134 [3]	2	23.68
5470-5725	ac (VHT80)	5530	106 [2]	2	21.81
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power..					

Worst Maximum RF Output Power Result							
Exposure Environment		General Population / Uncontrolled Exposure					
Separation Distance (cm)		20					
Power Level	1	RF Output Power (dBm)					
Modulation Mode	N _{TX}	Chain-Port 1	Chain-Port 2	Sum Chain	Gain (dBi)	EIRP Power	PD (S) (mW/cm ²)
a	1	21.68	-	21.68	4.00	25.68	0.07495
n(HT20)	2	17.62	18.58	21.14	3.73	24.87	0.06107
n(HT40)	2	20.34	20.87	23.63	3.73	27.36	0.10831
ac(VHT20)	2	17.56	18.48	21.05	3.73	24.79	0.06264
ac(VHT40)	2	20.38	20.93	23.68	3.73	27.41	0.10958
ac(VHT80)	2	18.64	18.95	21.81	3.73	25.54	0.07130
Maximum Permissible Exposure Limit (mW/cm ²)							1
Note 1: N _{TX} = Number of Transmit Chains							