



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	1,842 / f	4.89 / f	(900 / f ²)*	6
30-300	61.4	0.163	1.0	6
300-1,500	-	-	F/300	6
1,500-100,000	-	-	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
300-1,500	-	-	F/1500	30
1,500-100,000	-	-	1.0	30
Note 1: f = frequency in MHz ; *Plane-wave equivalent power density				
Note 2: For the applicable limit, see FCC 1.1310				

1.1.2 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)



1.1.3 Result of Maximum Permissible Exposure

RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	RF Output Power (dBm)
5150-5250	a	5180-5240	36-48 [4]	2	22.13
5250-5350		5260-5320	52-64 [4]	2	21.52
5470-5725		5500-5700	100-140 [8]	2	21.19
5725-5850		5745-5825	149-165 [5]	2	24.23
5150-5250	n (HT20)	5180-5240	36-48 [4]	2	22.11
5250-5350		5260-5320	52-64 [4]	2	21.76
5470-5725		5500-5700	100-140 [8]	2	21.38
5725-5850		5745-5825	149-165 [5]	2	24.15
5150-5250	n (HT40)	5190-5230	38-46 [2]	2	23.75
5250-5350		5270-5310	54-62 [2]	2	22.57
5470-5725		5510-5670	102-134 [3]	2	22.49
5725-5850		5755-5795	151-159 [2]	2	23.75

Note 1: RF output power specifies that Maximum Conducted Output Power.
 Note 2: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (i.e., EUT has simultaneously co-transmitting that operating 2.4GHz and 5GHz.)

Worst Maximum RF Output Power Result								
Exposure Environment			General Population / Uncontrolled Exposure					
Separation Distance (cm)			20					
Power Level		1	RF Output Power (dBm)					
Frequency Range (MHz)	Modulation Mode	N _{TX}	Chain-Port 1	Chain-Port 2	Sum Chain	Gain (dBi)	EIRP Power	PD (S) (mW/cm ²)
5150-5250	802.11n (HT40)	2	20.54	20.93	23.75	1.64	25.39	0.06882
5250-5350	802.11n (HT40)	2	19.54	19.57	22.57	1.64	24.21	0.05247
5470-5725	802.11n (HT40)	2	19.66	19.30	22.49	1.64	24.13	0.05152
5725-5850	802.11a	2	20.88	21.54	24.23	1.64	25.87	0.07692
Maximum Permissible Exposure Limit (mW/cm²)								1

Note 1: N_{TX} = Number of Transmit Chains