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/ cm²)**	**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/ cm²)**	**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

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

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

E = Electric field (V/m)
P = RF output power (W)
G = EUT Antenna numeric gain (numeric)
d = Separation distance between radiator and human body (m)

The formula can be changed to

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

1.1.2 Result of Maximum Permissible Exposure

RF General Information 2400 MHz – 2483.5 MHz						
Frequency Range (MHz)	**IEEE Std. 802.11 Protocol**	**Ch. Frequency (MHz)**	**Channel Number**	**Number of Transmit Chains (N_{TX})**	**RF Output Power (dBm)**	**Co-location**
2400-2483.5	b	2412-2462	1-11 [11]	2	22.82	Yes
2400-2483.5	g	2412-2462	1-11 [11]	2	21.87	Yes
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	2	21.38	Yes
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	2	17.83	Yes
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.						

RF General Information 5250 MHz – 5350 MHz						
Frequency Range (MHz)	**IEEE Std. 802.11 Protocol**	**Ch. Frequency (MHz)**	**Channel Number**	**Transmit Chains (N_{TX})**	**RF Output Power (dBm)**	**Co-location**
5250-5350	a	5260-5320	52-64 [4]	2	17.96	Yes
5250-5350	n (HT20)	5260-5320	52-64 [4]	2	17.92	Yes
5250-5350	n (HT40)	5270-5310	54-62 [2]	2	17.74	Yes
5250-5350	ac (VHT20)	5260-5320	52-64 [4]	2	17.76	Yes
5250-5350	ac (VHT40)	5270-5310	54-62 [2]	2	17.47	Yes
5250-5350	ac (VHT80)	5290	58 [1]	2	16.50	Yes
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power..						

RF General Information 5470 MHz – 5725 MHz						
Frequency Range (MHz)	**IEEE Std. 802.11 Protocol**	**Ch. Frequency (MHz)**	**Channel Number**	**Transmit Chains (N_{TX})**	**RF Output Power (dBm)**	**Co-location**
5470-5725	a	5500-5700	100-140 [8]	2	16.41	Yes
5470-5725	n (HT20)	5500-5700	100-140 [8]	2	16.33	Yes
5470-5725	n (HT40)	5510-5670	102-134 [3]	2	16.32	Yes
5470-5725	ac (VHT20)	5500-5700	100-140 [8]	2	16.34	Yes
5470-5725	ac (VHT40)	5510-5670	102-134 [3]	2	16.69	Yes
5470-5725	ac (VHT80)	5530	106 [1]	2	16.14	Yes
Note 1: RF output power specifies that Maximum Conducted (Average) Output Power..						

RF General Information (for band 3 straddle)						
Frequency Range (MHz)	**IEEE Std. 802.11**	**Ch. Freq. (MHz)**	**Channel Number**	**Transmit Chains (N_{TX})**	**RF Output Power (dBm)**	**Co-location**
straddle 5725	a	5720	144 [1]	2	15.93	Yes
straddle 5725	n (HT20)	5720	144 [1]	2	15.58	Yes
straddle 5725	n (HT40)	5710	142 [1]	2	15.92	Yes
straddle 5725	ac (VHT20)	5720	144 [1]	2	15.57	Yes
straddle 5725	ac (VHT40)	5710	142 [1]	2	15.99	Yes
straddle 5725	ac (VHT80)	5690	138 [1]	2	15.96	Yes
Note 1: RF output power specifies that Maximum Conducted Output Power.						

RF General Information (for band 4 straddle)						
Frequency Range (MHz)	**IEEE Std. 802.11**	**Ch. Freq. (MHz)**	**Channel Number**	**Transmit Chains (N_{TX})**	**RF Output Power (dBm)**	**Co-location**
straddle 5725	a	5720	144 [1]	2	12.57	Yes
straddle 5725	n (HT20)	5720	144 [1]	2	13.09	Yes
straddle 5725	n (HT40)	5710	142 [1]	2	8.62	Yes
straddle 5725	ac (VHT20)	5720	144 [1]	2	14.10	Yes
straddle 5725	ac (VHT40)	5710	142 [1]	2	9.51	Yes
straddle 5725	ac (VHT80)	5690	138 [1]	2	4.21	Yes
Note 1: RF output power specifies that Maximum Conducted Output Power.						

Worst Maximum RF Output Power Result							
Exposure Environment	General Population / Uncontrolled Exposure						
Separation Distance (cm)	26						
Condition	**RF Output Power (dBm)**						
Modulation Mode	**N_{TX}**	**Chain port 1**	**Chain port 2**	**Sum Chain**	**DG (dBi)**	**EIRP Power**	**PD (S) (mW/cm²)**
2.4GHz WLAN (11b)	2	19.84	19.78	22.82	2.3	25.12	0.03828
5250MHz – 5350MHz (11a)	2	14.88	15.02	17.96	5.00	22.96	0.02328
Co-location Total							0.06156
Maximum Permissible Exposure Limit (mW/cm²)							1
Note 1: N_{TX} = Number of Transmit Chains							