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)*	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)*	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				

RF Field Strength Limits for Controlled Use Devices (Controlled Environment)				
Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m2)	Averaging Time (minutes)
0.003-1	600	4.9	-	6
1-10	600/f	4.9/f	-	6
10-30	60	4.9/f	-	6
30-300	60	0.163	10*	6
300-1500	3.54 f 0.5	0.0094 f 0.5	f/30	6
1500-15000	137	0.364	50	6
15000-150000	137	0.364	50	616000/f 1.2
150000-300000	0.354 f 0.5	9.4 x 10-4 f 0.5	3.33 x 10-4 f	616000/f 1.2
RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)				
Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m2)	Averaging Time (minutes)
0.003-1	280	2.19	-	6
1-10	280/f	2.19/f	-	6
10-30	28	2.19/f	-	6
30-300	28	0.073	2*	6
300-1500	1.585 $f^{0.5}$	0.0042 $f^{0.5}$	f/150	6
1500-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/$f^{1.2}$
150000-300000	0.158 $f^{0.5}$	4.21 x 10^{-4} $f^{0.5}$	6.67 x 10^{-5} f	616000/$f^{1.2}$
Note 1: f is frequency in MHz. Note 2: For the applicable limit, see IC RSS-102				

1.1.2 MPE Calculation Method

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

E = Electric field (V/m)
G = EUT Antenna numeric gain (numeric)
The formula can be changed to

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

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

P = RF output power (W)
d = Separation distance between radiator and human body (m)

1.1.3   Result of Maximum Permissible Exposure

Transmitter Chains & Receiver Chains Information				
IEEE Std. 802.11 Protocol	Number of Transmit Chains (N_{TX})	Number of Receive Chains (N_{RX})	Correlation Signals with Multiple N_{TX}	RF Output Power (dBm)
b	1	1	Uncorrelated	15.55
g	1	1	Uncorrelated	16.13
n (HT20)	1	1	Uncorrelated	15.64
n (HT40)	1	1	Uncorrelated	14.58
n (HT20)	2	2	Correlated	16.39
n (HT40)	2	2	Correlated	16.63
Note 1: 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.) Note 2: 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/cm²)
11B-20M	1	15.55	-	15.55	2.00	17.55	0.01132
11G-20M	1	16.13	-	16.13	2.00	18.13	0.01293
11N2.4G-20M	1	15.64	-	15.64	2.00	17.64	0.01155
11N2.4G-40M	1	14.58	-	14.58	2.00	16.58	0.00905
11N2.4G-20M	2	13.69	13.04	16.39	2.00	18.39	0.01372
11N2.4G-40M	2	13.98	13.22	16.63	2.00	18.63	0.01450
Maximum Permissible Exposure Limit (mW/cm²)							1
Note 1: N_{TX} = Number of Transmit Chains							