Appendix C. Maximum Permissible Exposure

1. Maximum Permissible Exposure

1.1. Applicable Standard

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 1 m normally can be maintained between the user and the device.

(A) 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

(B) 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: f = frequency in MHz ; *Plane-wave equivalent power density

1.2. MPE Calculation Method

E (V/m) = $\frac{\sqrt{30 \times P \times G}}{d}$ Power Density: *Pd* (W/m²) = $\frac{E^2}{377}$

E = Electric field (V/m)

P = Peak 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

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

From the peak EUT RF output power, the minimum mobile separation distance, d=1m, as well as the gain of the used antenna, the RF power density can be obtained.

1.3. Calculated Result and Limit

<For Ant. 1>:

Antenna Type : Sector Antenna

Max Conducted Power for IEEE 802.11n MCS8 20MHz J2+J4: 14.92 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
15.00	31.6228	14.9155	31.0137	0.195211	1	Complies

Max Conducted Power for IEEE 802.11n MCS8 40MHz J2+J4: 14.18 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
15.00	31.6228	14.1800	26.1818	0.164797	1	Complies

Max Conducted Power for IEEE 802.11a J2+J4: 11.80 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
18.01	63.2456	11.7967	15.1242	0.190393	1	Complies

<For Ant. 4>:

Antenna Type : Sector Antenna

Max Conducted Power for IEEE 802.11n MCS8 20MHz J2+J3+J4: 23.66 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
6.00	3.9811	23.6598	232.2608	0.184046	1	Complies

Max Conducted Power for IEEE 802.11n MCS8 40MHz J2+J3+J4: 23.57 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
6.00	3.9811	23.5700	227.5097	0.180281	1	Complies

Max Conducted Power for IEEE 802.11a J2+J3+J4: 19.11 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
10.77	11.9432	19.1100	81.4704	0.193674	1	Complies

<For Ant. 7>:

Antenna Type : Omni Antenna

Max Conducted Power for IEEE 802.11n MCS8 20MHz J2+J3+J4: 23.97 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
4.00	2.5119	23.9735	249.6606	0.124825	1	Complies

Max Conducted Power for IEEE 802.11n MCS8 40MHz J2+J3+J4: 23.57 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
4.00	2.5119	23.5900	228.5599	0.114275	1	Complies

Max Conducted Power for IEEE 802.11a J2+J3+J4: 21.18 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
8.77	7.5357	21.1800	131.2200	0.196821	1	Complies

<For Ant. 8>:

Antenna Type : Omni Antenna

Max Conducted Power for IEEE 802.11n MCS8 20MHz J2+J3+J4: 23.66 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
4.00	2.5119	23.6598	232.2608	0.116125	1	Complies

Max Conducted Power for IEEE 802.11n MCS8 40MHz J2+J3+J4: 23.57 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
4.00	2.5119	23.5700	227.5097	0.113750	1	Complies

Max Conducted Power for IEEE 802.11a J2+J3+J4: 21.18 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm²)	Limit of Power Density (S) (mW/cm²)	Test Result
8.77	7.5357	21.1800	131.2200	0.196821	1	Complies