

4 - FCC §1.1307 & §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

4.1 Applicable Standard

According to subpart FCC §1.1307 (b)(1) and §2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (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

f = frequency in MHz;

* = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

4.2 MPE Calculation

The MPE is predicated at a given distance using the following formulary

$$S = PG/4\pi R^2$$

Where:

S = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = Antenna Gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

CDMA:

Frequency Band	Frequency (MHz)	Antenna Gain		Conducted Output Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
Cellular Band								
Uplink	836.52	6	3.98	23.1	204.17	76.2	0.01115	0.558
Downlink	881.52	5	3.16	23.39	218.27	38.1	0.03786	0.588
PCS Band								
Uplink	1880	6	3.98	23.31	214.29	76.2	0.01170	1.0
Downlink	1960	5	3.16	24.67	293.09	38.1	0.05083	1.0

GSM:

Frequency Band	Frequency (MHz)	Antenna Gain		Conducted Output Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
Cellular Band								
Uplink	836.6	6	3.98	24.71	295.80	76.2	0.01615	0.558
Downlink	881.6	5	3.16	26.73	470.98	38.1	0.08169	0.588
PCS Band								
Uplink	1880	6	3.98	24.81	302.69	76.2	0.01652	1.0
Downlink	1960	5	3.16	24.47	279.90	38.1	0.04855	1.0

EDGE:

Frequency Band	Frequency (MHz)	Antenna Gain		Conducted Output Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
Cellular Band								
Uplink	836.6	6	3.98	25.44	349.95	76.2	0.01910	0.558
Downlink	881.6	5	3.16	25.99	397.19	38.1	0.06889	0.588
PCS Band								
Uplink	1880	6	3.98	24.99	315.50	76.2	0.01722	1.0
Downlink	1960	5	3.16	24.36	272.90	38.1	0.04733	1.0

WCDMA:

Frequency Band	Frequency (MHz)	Antenna Gain		Conducted Output Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
Cellular Band								
Uplink	836.6	6	3.98	25.08	322.11	76.2	0.01758	0.558
Downlink	881.6	5	3.16	25.75	375.84	38.1	0.06519	0.588
PCS Band								
Uplink	1880	6	3.98	26.18	414.95	76.2	0.02265	1.0
Downlink	1960	5	3.16	23.82	240.99	38.1	0.04180	1.0

Note: Manufacturer declares that the maximum antenna gains are: 6 dBi for uplink (outdoor), 5 dBi for downlink (indoor).

Manufacturer declares that the nearest distance between human and the EUT are 15 inches for indoor and 30 inches for outdoor.

Result: Compliance