

1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 Standard Applicable

According to § 1.1307(b)(1), system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

(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/cm ²)	Averaging Times 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
1500-100000	/	/	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/cm ²)	Averaging Times 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
1500-100000	/	/	1	30

Note: f = frequency in MHz: * = Plane-wave equivalents power density

1.2 MPE Calculation Method

$$S = (30 * P * G) / (377 * R^2), \text{ or } R = \sqrt{30 * P * G / (377 * S)}$$

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

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

G = power gain of the antenna in the direction of interest relative to an isotropic radiator,
the power gain factor is normally numeric gain.

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

1.3 MPE Calculation Result

According to the above Limit and Calculation method, the result are as follows:

For Cellular Band (824~849MHz):

Test Mode	Frequency MHz	Power dBm	Power mW	Gain dBi	Gain numeric	Power Density	R cm
GSM	824.2	32.30	1698.244	3.5	2.239	0.54947	23.47
	836.6	32.22	1667.247	3.5	2.239	0.55773	23.08
	848.8	32.02	1592.209	3.5	2.239	0.56587	22.39
GPRS	824.2	32.29	1694.338	3.5	2.239	0.54947	23.44
	836.6	32.24	1674.943	3.5	2.239	0.55773	23.13
	848.8	32.07	1610.646	3.5	2.239	0.56587	22.52
EDGE	824.2	26.93	493.174	3.5	2.239	0.54947	12.65
	836.6	26.92	492.040	3.5	2.239	0.55773	12.54
	848.8	26.76	474.242	3.5	2.239	0.56587	12.22

For PCS Band (1850~1910MHz):

Test Mode	Frequency MHz	Power dBm	Power mW	Gain dBi	Gain numeric	Power Density	R cm
GSM	1850.2	29.41	872.971	3.5	2.239	1	12.47
	1880.0	28.92	779.830	3.5	2.239	1	11.79
	1909.8	29.01	796.159	3.5	2.239	1	11.91
GPRS	1850.2	28.76	751.623	3.5	2.239	1	11.57
	1880.0	28.30	676.083	3.5	2.239	1	10.97
	1909.8	28.36	685.488	3.5	2.239	1	11.05
EDGE	1850.2	25.53	357.273	3.5	2.239	1	7.98
	1880.0	25.14	326.588	3.5	2.239	1	7.63
	1909.8	25.15	327.341	3.5	2.239	1	7.64

For WCDMA Band V (824~849MHz):

Test Mode	Frequency MHz	Power dBm	Power mW	Gain dBi	Gain numeric	Power Density	R cm
WCDMA	826.4	22.10	162.181	3.5	2.239	0.55093	7.24
	836.4	22.11	162.555	3.5	2.239	0.55760	7.21
	846.6	22.39	173.380	3.5	2.239	0.56440	7.40
HSUPA	826.4	21.94	156.315	3.5	2.239	0.55093	7.11
	836.4	21.90	154.882	3.5	2.239	0.55760	7.03
	846.6	21.83	152.405	3.5	2.239	0.56440	6.94
HSDPA	826.4	21.30	134.896	3.5	2.239	0.55093	6.60
	836.4	21.33	135.831	3.5	2.239	0.55760	6.59
	846.6	21.47	140.281	3.5	2.239	0.56440	6.65

For WCDMA Band II (1850~1910MHz):

Test Mode	Frequency MHz	Power dBm	Power mW	Gain dBi	Gain numeric	Power Density	R cm
WCDMA	1852.4	22.44	175.388	3.5	2.239	1	5.59
	1880.0	22.71	186.638	3.5	2.239	1	5.77
	1907.6	22.58	181.134	3.5	2.239	1	5.68
HSUPA	1852.4	21.87	153.815	3.5	2.239	1	5.23
	1880.0	21.92	155.597	3.5	2.239	1	5.26
	1907.6	22.04	159.956	3.5	2.239	1	5.34
HSDPA	1852.4	21.58	143.880	3.5	2.239	1	5.06
	1880.0	21.52	141.906	3.5	2.239	1	5.03
	1907.6	21.65	146.218	3.5	2.239	1	5.10

So the antenna of this device must be installed to provide a separation distance of at least 24 cm from all persons, to ensure satisfy the requirement of the RF Exposure.