

FCC §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247 (i) and subpart 1.1310, 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				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm²)	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

Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4 \pi R^2$ = 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 (appropriate units, e.g., cm);

Calculated Data:

Mode	Frequency Range (MHz)	Max Antenna Gain		Tune-up time based average power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
GPRS 850	824.2-848.8	2.70	1.86	25.50	354.81	20	0.1314	0.55
GPRS 1900	1850.2-1909.8	1.00	1.26	24.00	251.19	20	0.0629	1.00

Note:

1. The tune-up output power was declared by the Manufacturer.
2. GSM 850: Maximum target power: 1 slot 33.0 dBm, 2 slots 31.5 dBm, max time based average power 25.50dBm;
PCS 1900: Maximum target power: 1 slot 31.0 dBm, 2 slots 30.0 dBm, max time based average power 24.00dBm.
- 3: Antenna Gain (numeric): 2.70 dBi (1.86) for GPRS 850, 1.00 dBi(1.26) for GPRS 1900.
4. For GPRS Mode, the time based average power is relevant, the difference in between depends on the duty cycle of the TDMA signal.

Number of Time slot	1	2
Duty Cycle	1:8	1:4
Time based Ave. power compared to slotted Ave. power	-9 dB	-6 dB

Result: The device meet FCC MPE at 20 cm distance.