

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)	Antenna Gain		Target Output Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
GPRS 850	824.2-848.8	0.0	1.00	26.50	446.68	20	0.0889	0.55
GPRS 1900	1850.2-1909.8	0.0	1.00	23.00	199.53	20	0.0397	1.00

Note:

Antenna Gain (numeric): 0.0dBi (1.0) for GPRS 850 mode.

Antenna Gain (numeric): 0.0 dBi (1.0) for GPRS 1900 mode.

3. GSM 850: Tune-up maximum output power : 1 slot 33.00dBm, 2 slots 32.00dBm, 3 slots 30.50dBm, 4 slots 29.50dBm, so the tune-up time based Ave. power compared to slotted Ave. power is 26.50dBm.

PCS 1900: Tune-up Maximum output power: 1 slot 29.00dBm, 2 slots 28.00dBm, 3 slots 27.00dBm, 4 slots 26.00dBm, so the tune-up time based Ave. power compared to slotted Ave. power is 23.00 dBm.

Number of Time slot	1	2	3	4
Duty Cycle	1:8	1:4	1:2.66	1:2
Time based Ave. power compared to slotted Ave. power	-9 dB	-6 dB	-4.25 dB	-3 dB

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