

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

Applicable Standard

According to 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		Tune-up Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
GPRS/EGPRS 850	824.2-848.8	2.50	1.78	27.00	501.19	20	0.1773	0.55
WCDMA Band V	826.4-846.6	2.50	1.78	24.00	251.19	20	0.0889	0.55
LTE B5	824.7-848.3	2.50	1.78	24.50	281.84	20	0.0997	0.55
LTE B41	2557.5-2652.5	2.50	1.78	24.00	251.19	20	0.0889	1.00

Note 1:

GPRS 850: Tune-up maximum output power with 1 slots is 33.50 dBm, 2 slots is 33.00 dBm, 3 slots is 30.50 dBm, 4 slots is 30.00 dBm, so the tune-up time based Ave. power compared to slotted Ave. power is 27.00dBm.

EGPRS 850: Tune-up maximum output power with 1 slots is 27.00 dBm, 2 slots is 26.00 dBm, 3 slots is 24.00 dBm, 4 slots is 22.00 dBm, so the tune-up time based Ave. power compared to slotted Ave. power is 20.00dBm.

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	-4.26 dB	-3 dB

Result: The device meet FCC MPE at 20 cm distance