

## RF Exposure Evaluation

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b)

### LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength(V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time
(A) Limits for Occupational /Control Exposures				
300 – 1500	--	--	F/300	6
1500 - 100000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300 – 1500	--	--	F/1500	6
<u>1500 - 100000</u>	--	--	<u>1</u>	<u>30</u>

### 1. Friis transmission formula : $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where  $P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

$G$  = gain of antenna in linear scale

$\pi$  = 3.1416

$R$  = distance between observation point and center of the radiator in cm

$P_d$  the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

## 2. Test Result of RF Exposure Evaluation

### 2.1. Output Power into Antenna & RF Exposure Evaluation Distance : GPRS 850

Channel	Channel Frequency (MHz)	Output Peak Power to Antenna (dBm)	Antenna Gain (dBi)	Power Density at 20cm (mW/cm <sup>2</sup> )	LIMITS (mW/cm <sup>2</sup> )
Low	824.2	26.91	-1.38	0.07	0.55
Middle	836.6	25.41	-1.38	0.05	0.56
High	848.8	26.05	-1.38	0.05	0.57

#### NOTE :

The power density Pd (4th column) at a distance of 20cm calculated from the friis transmission formula is far below the limit of 1 mW/ cm<sup>2</sup>.

### 2.2. Output Power into Antenna & RF Exposure Evaluation Distance : GPRS 1900

Channel	Channel Frequency (MHz)	Output Peak Power to Antenna (dBm)	Antenna Gain (dBi)	Power Density at 20cm (mW/cm <sup>2</sup> )	LIMITS (mW/cm <sup>2</sup> )
Low	1850.2	31.15	-1.50	0.18	1
Middle	1880.0	30.37	-1.50	0.15	
High	1909.8	30.36	-1.50	0.15	

#### NOTE :

The power density Pd (4th column) at a distance of 20cm calculated from the friis transmission formula is far below the limit of 1 mW/ cm<sup>2</sup>.