# FCC §1.1307 (b)(1) & §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

## Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure:

| Limits for General Population/Uncontrolled Exposure | | | | |
|---|---|---|---|---|
| **Frequency Range (MHz)** | **Electric Field Strength (V/m)** | **Magnetic Field Strength (A/m)** | **Power Density ($mW/cm^2$)** | **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

## Test Data

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

Where: 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 (appropriate units, e.g., cm)

Prediction distance: >20 (cm)

Antenna Gain (GSM850): 0.5 (dBi)
(PCS1900): 2 (dBi)
Antenna Gain (GSM850): 1.122 (numeric)
(PCS1900): 1.585 (numeric)

| Frequency (MHz) | Output power(dBm) | Output power(mW) | Power Density (mW/cm2) | limit (mW/cm2) | Result |
|---|---|---|---|---|---|
| 824.2 | 31.79 | 1510.0802 | 0.3372 | 0.5495 | PASS |
| 836.6 | 31.84 | 1527.5661 | 0.3412 | 0.5577 | PASS |
| 848.8 | 31.82 | 1520.5475 | 0.3396 | 0.5659 | PASS |
| 1850.2 | 29.17 | 826.0379 | 0.2606 | 1.0 | PASS |
| 1880.0 | 29.27 | 845.2788 | 0.2667 | 1.0 | PASS |
| 1909.8 | 29.24 | 839.4600 | 0.2648 | 1.0 | PASS |

**Result: Pass**