

## FCC§1.1307(b)(1) & §2.1091-RF EXPOSURE

### 1. Applicable Standard

According to FCC§part 1.1310 and §Part 2.1091 (Mobile Devices)RF exposure is calculated.

| Frequency Range(MHz)                                | Electric Field Stength(V/m) | Magnetic Field Stength(A/m) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (minute) |
|-----------------------------------------------------|-----------------------------|-----------------------------|-------------------------------------|-------------------------|
| Limits for General Population/Uncontrolled Exposure |                             |                             |                                     |                         |
| 0.3-1.34                                            | 614                         | 1.63                        | *(100)                              | 30                      |
| 1.34-30                                             | 824/f                       | 2.19/f                      | *(180/f <sup>2</sup> )              | 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

### 2.Prediction of MPE limit at given distance, equations from OET Bulletin 65, Edition 97-01:

$$S = (1.64 * P * G) / (4 * \pi * R^2) \quad (\text{where } PG = \text{ERP})$$

$$S = (P * G) / (4 * \pi * R^2) \quad (\text{where } PG = \text{EIRP})$$

Where:

S = power density

P= power input to antenna

G= numeric gain of the antenna

R= distance to the center of radiation of the antenna

#### a 700MHz Lower ABC Band:

Maximum peak output power at antenna input terminal (dBm): -18.54

Maximum peak output power at antenna input terminal (mW): 0.014

Prediction frequency (MHz): 711.5

Maximum antenna gain (dBi): 12.5

Maximum antenna gain (dBd): 10.35

Maximum antenna gain (numeric): 10.84

Maximum RF output power (ERP, mW): 0.152

MPE limit for uncontrolled exposure at predication frequency (mW/ cm<sup>2</sup>): 0.474

$$\text{Prediction distance (cm) } R = \sqrt{\frac{1.64 * P * G}{S * 4 * 3.14}} : 0.20$$

**b 700MHz UpperC Band:**

|                                                                                      |        |
|--------------------------------------------------------------------------------------|--------|
| Maximum peak output power at antenna input terminal (dBm):                           | -18.30 |
| Maximum peak output power at antenna input terminal (mW):                            | 0.015  |
| Prediction frequency (MHz):                                                          | 781.5  |
| Maximum antenna gain (dBi):                                                          | 12.5   |
| Maximum antenna gain (dBd):                                                          | 10.35  |
| Maximum antenna gain (numeric):                                                      | 10.84  |
| Maximum RF output power (ERP, mW):                                                   | 0.16   |
| MPE limit for uncontrolled exposure at predication frequency (mW/ cm <sup>2</sup> ): | 0.52   |
| Prediction distance (cm) $R = \sqrt{\frac{1.64 * P * G}{S * 4 * 3.14}}$ :            | 0.20   |

**c 800MHz Band:**

|                                                                                      |        |
|--------------------------------------------------------------------------------------|--------|
| Maximum peak output power at antenna input terminal (dBm):                           | -18.94 |
| Maximum peak output power at antenna input terminal (mW):                            | 0.013  |
| Prediction frequency (MHz):                                                          | 817.7  |
| Maximum antenna gain (dBi):                                                          | 12.5   |
| Maximum antenna gain (dBd):                                                          | 10.35  |
| Maximum antenna gain (numeric):                                                      | 10.84  |
| Maximum RF output power (ERP, mW):                                                   | 0.141  |
| MPE limit for uncontrolled exposure at predication frequency (mW/ cm <sup>2</sup> ): | 0.545  |
| Prediction distance (cm) $R = \sqrt{\frac{1.64 * P * G}{S * 4 * 3.14}}$ :            | 0.184  |

**d 850MHz Band:**

|                                                                                      |        |
|--------------------------------------------------------------------------------------|--------|
| Maximum peak output power at antenna input terminal (dBm):                           | -19.33 |
| Maximum peak output power at antenna input terminal (mW):                            | 0.012  |
| Prediction frequency (MHz):                                                          | 836.5  |
| Maximum antenna gain (dBi):                                                          | 12.5   |
| Maximum antenna gain (dBd):                                                          | 10.35  |
| Maximum antenna gain (numeric):                                                      | 10.84  |
| Maximum RF output power (ERP, mW):                                                   | 0.131  |
| MPE limit for uncontrolled exposure at predication frequency (mW/ cm <sup>2</sup> ): | 0.558  |

$$\text{Prediction distance (cm)} R = \sqrt{\frac{1.64 * P * G}{S * 4 * 3.14}} : \quad 0.174$$

**e 1900MHz Broadband PCS:**

Maximum peak output power at antenna input terminal (dBm): -18.53

Maximum peak output power at antenna input terminal (mW): 0.014

Prediction frequency (MHz): 1882.5

Maximum antenna gain (dBi): 12.5

Maximum antenna gain (dBd): 10.35

Maximum antenna gain (numeric): 10.84

Maximum RF output power (ERP, mW): 0.152

MPE limit for uncontrolled exposure at predication frequency (mW/ cm<sup>2</sup>): 1

$$\text{Prediction distance (cm)} R = \sqrt{\frac{1.64 * P * G}{S * 4 * 3.14}} : \quad 0.141$$

**f AWS-1 Band**

Maximum peak output power at antenna input terminal (dBm): -18.69

Maximum peak output power at antenna input terminal (mW): 0.014

Prediction frequency (MHz): 1732.5

Maximum antenna gain (dBi): 12.5

Maximum antenna gain (dBd): 10.35

Maximum antenna gain (numeric): 10.84

Maximum RF output power (ERP, mW): 0.152

MPE limit for uncontrolled exposure at predication frequency (mW/ cm<sup>2</sup>): 1

$$\text{Prediction distance (cm)} R = \sqrt{\frac{1.64 * P * G}{S * 4 * 3.14}} : \quad 0.141$$

### 3. Test Results

The above all ,when the Maximum antenna gain is 12.5dBi and the shortest distance from the human specific is 0.20 cm, the device is compliant with the requirement MPE limit for uncontrolled exposure.