

## 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)

FCC ID: 2AJDA-USRGM3

### EUT Specification

|                                   |                                                                                                                                                                                                                                |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EUT</b>                        | <b>Serial to GPRS Module</b>                                                                                                                                                                                                   |
| <b>Frequency band (Operating)</b> | <input checked="" type="checkbox"/> GSM: 850/1900<br><input type="checkbox"/> Others                                                                                                                                           |
| <b>Device category</b>            | <input type="checkbox"/> Portable (<20cm separation)<br><input checked="" type="checkbox"/> Mobile (>20cm separation)<br><input type="checkbox"/> Others ____                                                                  |
| <b>Exposure classification</b>    | <input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm <sup>2</sup> )<br><input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm <sup>2</sup> )                                  |
| <b>Antenna diversity</b>          | <input checked="" type="checkbox"/> Single antenna<br><input type="checkbox"/> Multiple antennas<br><input type="checkbox"/> Tx diversity<br><input type="checkbox"/> Rx diversity<br><input type="checkbox"/> Tx/Rx diversity |
| <b>Max. output power</b>          | 31.67dBm (1.469W)                                                                                                                                                                                                              |
| <b>Antenna gain (Max)</b>         | 2.5 dBi                                                                                                                                                                                                                        |
| <b>Evaluation applied</b>         | <input checked="" type="checkbox"/> MPE Evaluation<br><input type="checkbox"/> SAR Evaluation                                                                                                                                  |

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 |
|--------------------------------------------------------------|------------------------------|------------------------------|------------------------------------|--------------|
| <b>(A) Limits for Occupational/Control Exposures</b>         |                              |                              |                                    |              |
| 300-1500                                                     | --                           | --                           | F/300                              | 6            |
| 1500-100000                                                  | --                           | --                           | 5                                  | 6            |
| <b>(B) Limits for General Population/Uncontrol Exposures</b> |                              |                              |                                    |              |
| 300-1500                                                     | --                           | --                           | F/1500                             | 6            |
| 1500-100000                                                  | --                           | --                           | 1                                  | 30           |

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

Where

$P_d$  = Power density in  $mW/cm^2$

$P_{out}$  = 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,  $1mW/cm^2$ . If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

## **Measurement Result**

| Operating Mode | Channel Frequency (MHz) | Measured Power (dBm) | Tune up tolerance (dBm) | Max. Tune up Power (dBm) | Antenna Gain | Power density at 20cm ( $mW/cm^2$ ) | Power density Limits ( $mW/cm^2$ ) |
|----------------|-------------------------|----------------------|-------------------------|--------------------------|--------------|-------------------------------------|------------------------------------|
| GSM850         | 824.2                   | 31.56                | 30.7±1                  | 31.7                     | 2.5          | 0.5238                              | 0.55                               |
|                | 836.6                   | 31.67                | 30.7±1                  | 31.7                     | 2.5          | 0.5238                              | 0.56                               |
|                | 848.8                   | 31.52                | 30.7±1                  | 31.7                     | 2.5          | 0.5238                              | 0.57                               |
| PCS1900        | 1850.2                  | 28.75                | 29±1                    | 29                       | 2.5          | 0.2813                              | 1                                  |
|                | 1880.0                  | 28.84                | 29±1                    | 29                       | 2.5          | 0.2813                              | 1                                  |
|                | 1909.8                  | 28.29                | 29±1                    | 29                       | 2.5          | 0.2813                              | 1                                  |

Conclusion: No SAR is required.