

## 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: WSG-I3

### EUT Specification

| EUT                               | Bluetooth Adapter                                                                                                                                                                                                                                        |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Frequency band (Operating)</b> | <input type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz<br><input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz<br><input type="checkbox"/> WLAN: 5.745GHz ~ 5825GHz<br><input checked="" type="checkbox"/> Others: 2.402GHz~2.480GHz (BT5.0) |
| <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 type="checkbox"/> Single antenna<br><input checked="" 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>          | ANT A: 13.152 dBm (0.0207W)<br>ANT B: 13.052 dBm (0.0202W)                                                                                                                                                                                               |
| <b>Antenna gain (Max)</b>         | 2 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>         |                              |                              |                                    |              |
| <b>300-1500</b>                                              | --                           | --                           | <b>F/300</b>                       | <b>6</b>     |
| <b>1500-100000</b>                                           | --                           | --                           | <b>5</b>                           | <b>6</b>     |
| <b>(B) Limits for General Population/Uncontrol Exposures</b> |                              |                              |                                    |              |
| <b>300-1500</b>                                              | --                           | --                           | <b>F/1500</b>                      | <b>6</b>     |
| <b>1500-100000</b>                                           | --                           | --                           | <b>1</b>                           | <b>30</b>    |

## 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, 1mW/cm<sup>2</sup>. 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

### ANT A:

| Operating Mode | Channel Frequency (MHz) | Measured Power (dBm) | Tune up tolerance (dBm) | Max. Tune up Power (dBm) | Antenna Gain (dBi) | Power density at 20cm (mW/ cm <sup>2</sup> ) | Power density Limits (mW/cm <sup>2</sup> ) |
|----------------|-------------------------|----------------------|-------------------------|--------------------------|--------------------|----------------------------------------------|--------------------------------------------|
| BT 5.0 EDR     | 2402                    | 12.047               | 12.047±1                | 13.047                   | 2                  | 0.0064                                       | 1                                          |
|                | 2441                    | 13.152               | 13.152±1                | 14.152                   | 2                  | 0.0082                                       | 1                                          |
|                | 2480                    | 12.498               | 12.498±1                | 13.498                   | 2                  | 0.0071                                       | 1                                          |
|                | 2402                    | 11.564               | 11.564±1                | 12.564                   | 2                  | 0.0057                                       | 1                                          |
|                | 2441                    | 12.756               | 12.756±1                | 13.756                   | 2                  | 0.0075                                       | 1                                          |
|                | 2480                    | 12.913               | 12.913±1                | 13.913                   | 2                  | 0.0078                                       | 1                                          |

### ANT B:

| Operating Mode | Channel Frequency (MHz) | Measured Power (dBm) | Tune up tolerance (dBm) | Max. Tune up Power (dBm) | Antenna Gain (dBi) | Power density at 20cm (mW/ cm <sup>2</sup> ) | Power density Limits (mW/cm <sup>2</sup> ) |
|----------------|-------------------------|----------------------|-------------------------|--------------------------|--------------------|----------------------------------------------|--------------------------------------------|
| BT 5.0 EDR     | 2402                    | 12.061               | 12.061±1                | 13.061                   | 2                  | 0.0064                                       | 1                                          |
|                | 2441                    | 13.052               | 13.052±1                | 14.052                   | 2                  | 0.0080                                       | 1                                          |
|                | 2480                    | 12.460               | 12.460±1                | 13.460                   | 2                  | 0.0070                                       | 1                                          |
|                | 2402                    | 11.589               | 11.589±1                | 12.589                   | 2                  | 0.0057                                       | 1                                          |
|                | 2441                    | 12.693               | 12.693±1                | 13.693                   | 2                  | 0.0074                                       | 1                                          |
|                | 2480                    | 12.839               | 12.839±1                | 13.839                   | 2                  | 0.0076                                       | 1                                          |