

## 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: **2AOEI-XA-100**

### EUT Specification

|                                   |  |
|-----------------------------------|--|
| <b>EUT</b>                        | <b>Bluetooth Smart Switch</b>  |
| <b>Frequency band (Operating)</b> | <input type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz<br><input type="checkbox"/> WLAN: 5.18GHz ~ 5.24GHz<br><input checked="" type="checkbox"/> Others: 2.402GHz~2.480GHz (BT4.0)  |
| <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 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>          | -3.927dBm (0.0004W)  |
| <b>Antenna gain (Max)</b>         | 2.2 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  $\text{mW/cm}^2$

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

$G$ = gain of antenna in linear scale

$\pi=3.1416$

$R$ = distance between observation point and center of the radiator in  $\text{cm}$

$P_d$  the limit of MPE,  $1\text{mW/cm}^2$ . 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 | Measured Power | Tune up tolerance | Max. Tune up Power | Antenna Gain | Power density at 20cm | Power density Limits ( $\text{mW/cm}^2$ ) |
|----------------|-------------------|----------------|-------------------|--------------------|--------------|-----------------------|---|
|                | (MHz)             | (dBm)          | (dBm)             | (dBm)              | (dBi)        | (mW/cm <sup>2</sup> ) |   |
| BLE            | 2402              | -4.875         | $-4.875 \pm 1$    | -3.875             | 2.2          | 0.0001                | 1   |
|                | 2441              | -4.616         | $-4.616 \pm 1$    | -3.616             | 2.2          | 0.0001                | 1   |
|                | 2480              | -3.927         | $-3.927 \pm 1$    | -2.927             | 2.2          | 0.0002                | 1   |