

## 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: 2ATC3-H101SKLI40

### EUT Specification

|                                   |   |
|-----------------------------------|---|
| <b>EUT</b>                        | <b>4ch Smart Light Switch</b>   |
| <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: 2405-2480MHz |
| <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>          | 9.147 dBm (0.0082W)   |
| <b>Antenna gain (Max)</b>         | 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   | --                           | --                           | <b>F/300</b>                       | <b>6</b>     |
| 1500-100000  | --                           | --                           | <b>5</b>                           | <b>6</b>     |
| <b>(B) Limits for General Population/Uncontrol Exposures</b> |                              |                              |                                    |              |
| 300-1500   | --                           | --                           | <b>F/1500</b>                      | <b>6</b>     |
| 1500-100000  | --                           | --                           | <b>1</b>                           | <b>30</b>    |

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

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

Module 1:

| Operating Mode | Channel Frequency (MHz) | Measured Power (dBm) | Tune up tolerance (dBm) | Max. Tune up Power (dBm) | Antenna Gain (dBi) | Power density at 20cm ( $mW/cm^2$ ) | Power density Limits ( $mW/cm^2$ ) |
|----------------|-------------------------|----------------------|-------------------------|--------------------------|--------------------|-------------------------------------|------------------------------------|
| 2405-2480MHz   | 2405                    | 9.147                | 9.147±1                 | 10.147                   | 5                  | 0.0065                              | 1                                  |
|                | 2440                    | 7.800                | 7.800±1                 | 8.800                    | 5                  | 0.0048                              | 1                                  |
|                | 2480                    | 6.843                | 6.843±1                 | 7.843                    | 5                  | 0.0038                              | 1                                  |

Module 2:

| Operating Mode | Channel Frequency (MHz) | Measured Power (dBm) | Tune up tolerance (dBm) | Max. Tune up Power (dBm) | Antenna Gain (dBi) | Power density at 20cm ( $mW/cm^2$ ) | Power density Limits ( $mW/cm^2$ ) |
|----------------|-------------------------|----------------------|-------------------------|--------------------------|--------------------|-------------------------------------|------------------------------------|
| 2405-2480MHz   | 2405                    | 9.147                | 9.147±1                 | 10.147                   | 5                  | 0.0065                              | 1                                  |
|                | 2440                    | 7.810                | 7.810±1                 | 8.810                    | 5                  | 0.0048                              | 1                                  |
|                | 2480                    | 6.347                | 6.347±1                 | 7.347                    | 5                  | 0.0034                              | 1                                  |

Worst case:

$$0.0065 + 0.0065 = 0.013 < 1$$

Calculation: Pass. SAR test no need.