

## 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: [2AWONUT11223](#)

### EUT Specification

| EUT                        | Smart LED Downlight                                                                                                                                                                                                                              |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency band (Operating) | <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: BLE: 2402-2480MHz |
| Device category            | <input type="checkbox"/> Portable (<20cm separation)<br><input checked="" type="checkbox"/> Mobile (>20cm separation)<br><input type="checkbox"/> Others _____                                                                                   |
| Exposure classification    | <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> )                                                    |
| Antenna diversity          | <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                   |
| Max. output power          | -0.69 dBm (0.0009W)                                                                                                                                                                                                                              |
| Antenna gain (Max)         | 2.5 dBi                                                                                                                                                                                                                                          |
| Evaluation applied         | <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<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**

| <b>Operating Mode</b> | <b>Channel Frequency (MHz)</b> | <b>Maximum output power (dBm)</b> | <b>Tune up tolerance (dBm)</b> | <b>Max. Tune up Power (dBm)</b> | <b>Antenna Gain (dBi)</b> | <b>Power density at 20cm (mW/ cm2 )</b> | <b>Power density Limits (mW/cm2 )</b> |
|-----------------------|--------------------------------|-----------------------------------|--------------------------------|---------------------------------|---------------------------|-----------------------------------------|---------------------------------------|
| BLE                   | 2402                           | -0.69                             | -0.69 ± 1                      | 0.31                            | 2.5                       | 0.0004                                  | 1                                     |
|                       | 2440                           | -1.62                             | -1.62 ± 1                      | -0.62                           | 2.5                       | 0.0003                                  | 1                                     |
|                       | 2480                           | -1.46                             | -1.46 ± 1                      | -0.46                           | 2.5                       | 0.0003                                  | 1                                     |