

# Safety Human Exposure

## 1.1 Radio Frequency Exposure Compliance

### 1.1.1 Electromagnetic Fields

#### RESULT:

Pass

|                           |   |
|---------------------------|---|
| Test item                 | : Self-ballasted LED lamps  |
| Identification / Type No. | : LED2410R5NA   |
| FCC ID                    | : FHO-LED2410R5NA   |
| IC                        | : 10912A-LED2410R5NA  |
| Test standard             | : CFR47 FCC Part 2: Section 2.1091<br>CFR47 FCC Part 1: Section 1.1310<br>FCC KDB Publication 447498 D01 V06<br>RSS-102 Issue 6 December 2023 |

#### ➤ Product Classification

This device defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the RF source's radiating structure(s) and the body of the user or nearby persons.

Max -1.31 dBi

#### ➤ FCC Radio Frequency Exposure Limit

| Frequency range<br>(MHz) | Electric field strength<br>(V/m) | Magnetic field strength<br>(A/m) | Power density<br>(mW/cm <sup>2</sup> ) |
|--------------------------|----------------------------------|----------------------------------|--|
| 300-1,500                | --                               | --                               | f/1500                                 |
| 1,500-100,000            | --                               | --                               | 1.0                                    |

#### ➤ Radio Frequency Exposure Calculation Formula

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

or:

$$S = \frac{EIRP}{4\pi R^2}$$

where: EIRP = equivalent (or effective) isotropically radiated power

➤ **IC Field reference level exposure exemption limits**

Field reference level (FRL) exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm (i.e. mobile devices), except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 1 W (adjusted for tune-up tolerance)
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than  $4.49/f^{0.5}W$  (adjusted for tune-up tolerance), where  $f$  is in MHz
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance)
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834} W$  (adjusted for tune-up tolerance), where  $f$  is in MHz
- at or above 6 GHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 5 W (adjusted for tune-up tolerance)

**a) EUT RF Exposure Evaluation standalone operations**

FCC

| Mode   | *Measured RF Output Power (dBm) | EIRP (dBm) | Distance (cm) | Power Density (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) |
|--------|---------------------------------|------------|---------------|-------------------------------------|-----------------------------|
| BLE    | 9.7                             | 8.39       | 20            | 0.0014                              | 1                           |
| Zigbee | 9.2                             | 7.89       | 20            | 0.0012                              | 1                           |
| Thread | 9.3                             | 7.99       | 20            | 0.0013                              | 1                           |

IC

| Mode   | Frequency (MHz) | *Measured RF Output Power (dBm) | EIRP (dBm) | EIRP (W) | Limit (W) |
|--------|-----------------|---------------------------------|------------|----------|-----------|
| BLE    | 2442            | 9.7                             | 8.39       | 0.0069   | 2.7068    |
| Zigbee | 2405            | 9.2                             | 7.89       | 0.0062   | 2.6787    |
| Thread | 2445            | 9.3                             | 7.99       | 0.0063   | 2.7091    |

Note:

BLE RF Output Power: Refer CN25S86U 001

Zigbee Output Power: Refer CN25OZJN 001

Thread Output Power: Refer CN25JZYT 001

BLE, Zigbee and Thread share one RF chip and antenna, so no need to evaluation simultaneous transmission.

➤ **Conclusion**

The distance between antenna and human is larger than 20 cm in the normal use.

Therefore, the maximum calculations result of above are meet the requirement of Radio Frequency Exposure limit.