

## INTERTEK TESTING SERVICES

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### RF Exposure report

The Equipment Under Test (EUT) is a 802.15.4 Module with ZigBee function operating at 2405-2475MHz for 15 channels with 5MHz channel spacing. For more detailed features description, please refer to the user's manual.

Modulation Type: GFSK.

Antenna Type:

1. Integral Antenna(for PCB PIFA) / Gain: 0dBi
2. Dedicated Antenna with reversed SMA connector / Gain: 2dBi
3. Dedicated antenna with u.fl connector / Gain: 2dBi

The nominal conducted output power specified: 20 dBm (Tolerance: +/-3dB)

The maximum conducted output power for the EUT is 20.78dBm in the frequency 2.475GHz which is within the production variation.

The minimum conducted output power for the EUT is 19.67dBm in the frequency 2.440GHz which is within the production variation.

According to FCC Part 2.1091, this unlicensed transmitting devices is categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use,

According to the KDB 447498 and OET 65, the simple calculation as below:

For Maximum Permissible Exposure (MPE) evaluation of the product, the maximum power density at 20 cm from this transmitter shall be less than the General Population / Uncontrolled MPE limit in FCC Part 1.1310.

The maximum E.I.R.P= 20.0+3.0+2.0=25.0 dBm=316.2 mW

The source-based time averaged maximum radiated power = 316.2 x Duty Cycle = 316.2mW

From above data, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna can be calculated as follow:

$$\begin{aligned} &= 316.2 / 4\pi R^2 \\ &= 0.063 \text{ mW/cm}^2 \end{aligned}$$

The MPE limit is 1.0 mW/cm<sup>2</sup> for general population and uncontrolled exposure in the 802.15.4 frequency range according to FCC Part 1.1310. As the measured power density at 20cm from the transmitter is lower than the MPE limit, the compliance to the MPE limit can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structure and body of the user or nearby persons.

Transmitter Duty Cycle Calculation

The EUT transmit continuously during the test, the duty cycle is 100%.

The following RF exposure statement or similar sentence is proposed to be included in the user manual:

**“FCC RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons.”**