

# INTERTEK TESTING SERVICES

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## RF Exposure

The equipment under test (EUT) is a Robosen AI Base Lite with Bluetooth 4.2 BLE (Single-mode) function operating in 2402-2480MHz, 2.4G WIFI function operating in 2412-2462MHz. The EUT is powered by DC 12V. The micro-USB port of the device is only used for upgrading firmware. For more detail information pls. refer to the user manual.

### 2.4GHz WiFi:

Antenna Type: Integral Antenna

Antenna Gain: 0.18dBi

Modulation Type: CCK, BPSK, QPSK, 16QAM, 64QAM

The normal radiated output power (e.i.r.p) is: 19.18dBm (tolerance: +/-3dB).

The normal conducted output power is 19.0dBm (tolerance: +/-3dB).

The maximum conducted output power for the EUT is 21.0dBm in the frequency 2.412GHz 802.11n-HT20 mode which is within the production variation.

The minimum conducted output power for the EUT is 18.0dBm in the frequency 2.462GHz 802.11b mode 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:

The source-based time averaged maximum radiated power = 19.18dBm+3dB= 22.18dBm = 165.2mW

At the distance (R) of 20cm to 40cm and in 0.3 GHz to 6 GHz, MPE Exclusion Threshold Level:

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

The MPE limit is 3060mW for general population and uncontrolled exposure in the 2.4GHz frequency range according to FCC Part 1.1307. 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.

Note: EIRP is higher than ERP, thus EIRP is compared with the Exclusion Threshold.

**Bluetooth:**

Antenna Type: Integral Antenna

Antenna Gain: 0.18dBi

Modulation Type: GFSK

The normal radiated output power (e.i.r.p) is: 5.18dBm (tolerance: +/-2dB).

The normal conducted output power is 5dBm (tolerance: +/-2dB).

The maximum conducted output power for the EUT is 6.54dBm in the frequency 2.480GHz which is within the production variation.

The minimum conducted output power for the EUT is 5.93dBm in the frequency 2.402GHz 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:

The source-based time averaged maximum radiated power = 5.18dBm+2dB= 7.18dBm = 5.22mW

At the distance (R) of 20cm to 40cm and in 0.3 GHz to 6 GHz, MPE Exclusion Threshold Level:

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

The MPE limit is 3060mW for general population and uncontrolled exposure in the 2.4GHz frequency range according to FCC Part 1.1307. 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.

Note: EIRP is higher than ERP, thus EIRP is compared with the Exclusion Threshold.

**For Simultaneous Transmission:**

Total exposure ratio =  $165.2/3060+5.22/3060=0.056<1$

According to KDB 447498 D04, the device with multiple RF sources can be exempted from the requirements of RF exposure testing.