

---

# INTERTEK TESTING SERVICES

---

## RF Exposure Report

The equipment under test (EUT) is a Robotic Vacuum with 2.4GHz Transmitter function operating in 2402-2480MHz. The EUT can be powered DC 20V with adapter. For more detail information pls. refer to the user manual.

### 2.4G RF Transmitter:

Modulation Type: GFSK

Antenna Type: PCB antenna

Antenna Gain: 2dBi.

The normal radiated output power (e.i.r.p) is: -16 dBm (tolerance:  $\pm 1$ dB).

The normal conducted output power is: -18 dBm (tolerance:  $\pm 1$ dB).

According to the KDB 447498:

The Maximum peak radiated emission for the EUT is 79.7 dB $\mu$ V/m at 3m in the frequency 2480MHz

The EIRP =  $[(FS*D)^2 / 30]$  mW = -15.53 dBm

which is within the production variation.

The Minimum peak radiated emission for the EUT is 78.3 dB $\mu$ V/m at 3m in the frequency 2402MHz

The EIRP =  $[(FS*D)^2 / 30]$  mW = -16.93 dBm

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 maximum E.I.R.P = -15dBm=0.032mW

From above data, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna can be calculated according to OET Bulletin 65 as follow:

$$= 0.032\text{mW} / 4\pi R^2$$

$$= 0.000006 \text{ mW/cm}^2$$

The MPE limit is 1.0 mW/cm<sup>2</sup> for general population and uncontrolled exposure in the 2.4G frequency band 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.

## INTERTEK TESTING SERVICES

---

### Simultaneous Transmission Evaluation

The EUT can work with the Robot which has 2.4GHz transmitting and WIFI functions, therefore, transmit simultaneously with all antennas incorporated in the EUT and the Robot need to be evaluated. According to 865664D02 2.2 d) 1):

For 2.4GHz transmitter function of the Robot, based on the FCC ID:2ATRE-QQ6 test report, the MPE estimated value is 0.0001 mW/cm<sup>2</sup>.

For WIFI function of the Robot, based on the FCC ID:2AHMRESP12S test report, The MPE estimated value is 0.01mW/cm<sup>2</sup>.

For 2.4GHz transmitter function of the EUT, based on above calculated, the MPE estimated value is 0.000006 mW/cm<sup>2</sup>.

The sum of the ratios of the spatially averaged results to the applicable frequency dependent MPE limits =  $0.0001/1 + 0.01/1 + 0.000006/1 = 0.010106 < 1$

Since the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in the device is  $\leq 1.0$ , the EUT is considered to satisfy MPE compliance for simultaneous transmission operations.

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.”**