

INTERTEK TESTING SERVICES

RF Exposure

The tested equipment (WTW2P) is an Smart Pool Monitor & Communication Device, Smart Pool Monitor, Underwater Communication Device with Wifi and BT function. ISB-03 uses for Adaptor of the DC 16.8V1.0 A power as the power supply. The Bluetooth and Wi-Fi can be transmitted at the same time, operation for the 2402-2480MHz for BT and 2412-2462MHz for 2.4G WiFi, For more detail information pls. refer to the user manual.

2.4G BT(BLE):

Antenna Type: Integral antenna

Modulation Type: GFSK

Antenna Gain: 0.49dBi

Bluetooth Version: 5.0 (Single Mode BLE)

The nominal conducted output power specified: -5.99 dBm (± 1.0 dB)

The nominal radiated output power (e.i.r.p) specified: -5.5 dBm (± 1.0 dB)

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 peak radiated emission tested is 90.3dBuV/m(-4.93dBm) at 3m in the frequency 2402MHz which is within the specified power above.

The minimum peak radiated emission tested is 88.9dBuV/m(-6.33dBm) at 3m in the frequency 2480MHz which is within the specified power above.

The source-based time averaged maximum radiated power = -4.99dBm +0.49dBi = -4.5dBm = 0.355mW

From above data, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna for 2.4GHz band can be calculated according to OET 65 as follow:

= $0.355\text{mW} / 4\pi R^2$

= 0.00007 mW/cm^2

< 1mW/cm^2

The MPE limit is 1.0 mW/cm^2 for general population and uncontrolled exposure in the WIFI 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.

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2.4GHz WiFi:

Antenna Type: Integral antenna.

Antenna Gain: 0.49dBi

Modulation Type: BPSK, QPSK, 16QAM, 64QAM, CCK, DQPSK, DBPSK and DSSS.

The nominal conducted output power specified: 18.5dBm (Tolerance: +/-6.0dB).

The nominal radiated output power (e.i.r.p) specified: 18.99dBm (Tolerance: +/-6.0dB).

The maximum conducted output power for the EUT is 24.3dBm in the frequency 2412MHz(IEEE 802.11G) which is within the production variation.

The minimum conducted output power for the EUT is 13.5dBm in the frequency 2462MHz(IEEE 802.11B) which is within the production variation.

According to FCC Part 2.1091, this unlicensed transmitting device 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 is as follows:

The source-based time averaged maximum radiated power = 24.5dBm + 0.49dBi = 24.99dBm = 315.50mW

From above data, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna for 2.4GHz band can be calculated according to OET 65 as follows:

$$= 315.50\text{mW} / 4\pi R^2$$

$$= 0.0628 \text{ mW/cm}^2$$

$$< 1\text{mW/cm}^2$$

The MPE limit is 1.0 mW/cm² for general population and uncontrolled exposure in the WIFI 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.

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Simultaneous Transmission

For Simultaneous transmitting of Bluetooth and WIFI transmitter. According to KDB 447498 D04 v01:

The sum of the ratios of the spatially averaged results to the applicable frequency dependent MPE limits = $0.355\text{mW}/3060\text{ mW} + 315.50\text{mW}/3060\text{mW} = 0.103 < 1$

Since the sum of the ratios for all simultaneously transmitting antennas incorporated in the device is ≤ 1.0 , the EUT is considered to satisfy RF exposure 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.”

FCC ID: 2BD5N-WTW2P