

## MPE Calculation

|                       |  |
|-----------------------|--|
| Applicant:            | Quilo Technology (Jiaxing) Co., Ltd.   |
| Address:              | Room 199, No. 2176 Fanggong Road, Dongzha Street, Nanhу District, Jiaxing City, Zhejiang Province, P.R.China |
| Product:              | Robotic Pool Skimmer   |
| FCC ID:               | 2BOBWPNUJ4110  |
| Model No.:            | PNUJ4110   |
| Reference RF report # | 4840125229300A, 4840125229300B   |
| RF parameters         | 2402-2480MHz for BLE, 2412-2462MHz for Wi-Fi   |

According to subpart 15.247(i) and subpart §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (KDB 447498 D01, §1.1310, §2.1091)

| (B) Limits for General Population/Uncontrolled Exposure |                               |                               |                                     |                          |
|---|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| Frequency Range (MHz)                                   | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (minutes) |
| 0.3–1.34  | 614                           | 1.63                          | *(100)                              | 30                       |
| 1.34–30   | 824/f                         | 2.19/f                        | *(180/f <sup>2</sup> )              | 30                       |
| 30–300  | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300–1,500   | /                             | /                             | f/1500                              | 30                       |
| 1,500–100,000   | /                             | /                             | 1.0                                 | 30                       |

f = frequency in MHz; \* = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

### Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$  = 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, the power gain factor, is normally numeric gain;

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



## Calculated Data: Wi-Fi

|  |        |
|--|--------|
| Maximum peak output power at antenna input terminal (dBm):                               | 22.9   |
| Maximum peak output power at antenna input terminal (mW):                                | 194.98 |
| tune-up conducted power(dBm):  | N/A    |
| tune-up conducted power(dBm):  | N/A    |
| Prediction distance (cm):  | 20     |
| Antenna Gain, typical (dBi):   | 1.65   |
| Maximum Antenna Gain (numeric):  | 1.46   |
| The worst case is power density at predication frequency at 20 cm (mW/cm <sup>2</sup> ): | 0.06   |
| MPE limit for general population exposure at prediction frequency (mW/cm <sup>2</sup> ): | 1.00   |

**Note:** The tune-up conducted power was declared by the manufacturer.

The max power density 0.06 (mW/cm<sup>2</sup>) < 1 (mW/cm<sup>2</sup>)

Result: Compliant

## Calculated Data for BLE

|  |       |
|--|-------|
| Maximum peak output power at antenna input terminal (dBm):                               | 7.7   |
| Maximum peak output power at antenna input terminal (mW):                                | 5.89  |
| tune-up conducted power(dBm):  | N/A   |
| tune-up conducted power(dBm):  | N/A   |
| Prediction distance (cm):  | 20    |
| Antenna Gain, typical (dBi):   | 1.65  |
| Maximum Antenna Gain (numeric):  | 1.46  |
| The worst case is power density at predication frequency at 20 cm (mW/cm <sup>2</sup> ): | 0.002 |
| MPE limit for general population exposure at prediction frequency (mW/cm <sup>2</sup> ): | 1.0   |

**Note:** The tune-up conducted power was declared by the manufacturer.

The max power density 0.002 (mW/cm<sup>2</sup>) < 1 (mW/cm<sup>2</sup>)

Result: Compliant

## Remark:

The device does not support simultaneous Wi-Fi 2.4GHz and 2.4GHz BLE, because the Wi-Fi 2.4GHz and 2.4GHz BLE share the same antenna and can't transmit simultaneously. There is not simultaneous transmission possibility.

-TÜV SÜD Certification and Testing (China) Co., Ltd.

Reviewed by:

Zhilan Xue  
Review Engineer

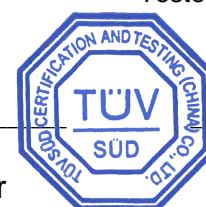
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-----End of Test Report-----