

# RF Exposure Evaluation

## FCC ID: 2ANZF-TQL-111

### 1. Client Information

|                     |   |   |
|---------------------|---|---|
| <b>Applicant</b>    | : | Shenzhen TQL Technology Co., Ltd  |
| <b>Address</b>      | : | Room 1202C, Block D, CFG Building, Baoyuan Road, Xixiang, Bao'an District, Shenzhen City, China |
| <b>Manufacturer</b> | : | Shenzhen TQL Technology Co., Ltd  |
| <b>Address</b>      | : | Room 1202C, Block D, CFG Building, Baoyuan Road, Xixiang, Bao'an District, Shenzhen City, China |

### 2. General Description of EUT

|                               |                      |   |
|-------------------------------|----------------------|---|
| <b>EUT Name</b>               | :                    | T-ONE Smartpen  |
| <b>Models No.</b>             | :                    | TQL-111 , TQL-111S , TQL-111W , TQL-111B , TQL-111G , TQL-111RG   |
| <b>Model Difference</b>       | :                    | All these models are identical in the same PCB layout and electrical circuit, the only difference is model name, appearance and color for commercial. |
| <b>Product Description</b>    | Operation Frequency: | Bluetooth V4.2: 2402~2480 MHz   |
|                               | RF Output Power:     | Bluetooth: 1.654dBm(Max)<br>BLE: -1.404 dBm(Max)  |
|                               | Antenna Gain:        | 2dBi Chip Antenna   |
| <b>Power Rating</b>           | :                    | DC 5.0V 500mAh by USB.<br>DC 3.7V by 260mAh Li-ion battery  |
| <b>Software Version</b>       | :                    | N/A   |
| <b>Hardware Version</b>       | :                    | N/A   |
| <b>Connecting I/O Port(S)</b> | :                    | Please refer to the User's Manual   |

**Note:** More test information about the EUT please refer the RF Test Report.

## SAR Test Exclusion Calculations

1. FCC: According to KDB 447498 D01 Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies v06.

(1) Clause 4.3: General SAR test reduction and exclusion guidance

Sub clause 4.31: Standalone SAR test exclusion considerations

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6GHz at test separation distance  $\leq 5$  mm are determined by:

$$\frac{[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation, mm})] * [\sqrt{f_{(\text{GHz})}}]}{\leq 3.0 \text{ for 1-g SAR}}$$

$$\frac{[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation, mm})] * [\sqrt{f_{(\text{GHz})}}]}{\leq 7.5.0 \text{ for 10-g SAR}}$$

## 2. Calculation:

| Test separation: 5mm       |                       |                              |                                      |                                     |                   |                 |
|----------------------------|-----------------------|------------------------------|--------------------------------------|-------------------------------------|-------------------|-----------------|
| Bluetooth Mode (GFSK)      |                       |                              |                                      |                                     |                   |                 |
| Frequency (GHz)            | Conducted Power (dBm) | Turn-up Power Tolerance (dB) | Max power of tune up tolerance (dbm) | Max power of tune up tolerance (mw) | Calculation Value | Threshold Value |
| 2.402                      | 1.654                 | 1±1                          | 2                                    | 1.585                               | 0.491             | 3.0             |
| 2.441                      | 1.181                 | 1±1                          | 2                                    | 1.585                               | 0.495             | 3.0             |
| 2.480                      | -0.021                | 0±1                          | 1                                    | 1.259                               | 0.397             | 3.0             |
| Bluetooth Mode (π/4-DQPSK) |                       |                              |                                      |                                     |                   |                 |
| Frequency (GHz)            | Conducted Power (dBm) | Turn-up Power Tolerance (dB) | Max power of tune up tolerance (dbm) | Max power of tune up tolerance (mw) | Calculation Value | Threshold Value |
| 2.402                      | 1.589                 | 1±1                          | 2                                    | 1.585                               | 0.491             | 3.0             |
| 2.441                      | 1.166                 | 1±1                          | 2                                    | 1.585                               | 0.495             | 3.0             |
| 2.480                      | -0.065                | 0±1                          | 1                                    | 1.259                               | 0.397             | 3.0             |
| Bluetooth Mode (8-DPSK)    |                       |                              |                                      |                                     |                   |                 |
| Frequency (GHz)            | Conducted Power (dBm) | Turn-up Power Tolerance (dB) | Max power of tune up tolerance (dbm) | Max power of tune up tolerance (mw) | Calculation Value | Threshold Value |
| 2.402                      | 1.654                 | 1±1                          | 2                                    | 1.585                               | 0.491             | 3.0             |
| 2.442                      | 1.181                 | 1±1                          | 2                                    | 1.585                               | 0.495             | 3.0             |
| 2.480                      | -0.021                | 0±1                          | 1                                    | 1.259                               | 0.397             | 3.0             |

| BLE Mode (GFSK) |                       |                              |                                      |                                     |                   |                 |
|-----------------|-----------------------|------------------------------|--------------------------------------|-------------------------------------|-------------------|-----------------|
| Frequency (GHz) | Conducted Power (dBm) | Turn-up Power Tolerance (dB) | Max power of tune up tolerance (dbm) | Max power of tune up tolerance (mw) | Calculation Value | Threshold Value |
| 2.402           | -3.070                | -2±1                         | -1                                   | 0.790                               | 0.245             | 3.0             |
| 2.442           | -1.653                | -2±1                         | -1                                   | 0.790                               | 0.247             | 3.0             |
| 2.480           | -1.404                | -2±1                         | -1                                   | 0.790                               | 0.249             | 3.0             |

| Test separation: 5mm             |                 |
|----------------------------------|-----------------|
| The worst RF Exposure Evaluation |                 |
| Worst Calculation Value          | Threshold Value |
| 0.495                            | 3.0             |

The worst RF Exposure Evaluation is  $0.495 / \text{cm}^2 < \text{limit } 3.0$ , So standalone SAR measurements are not required.

-----END OF REPORT-----