

# MPE EVALUATION REPORT

**Product Name:** Bluetooth Thermometer

**Trade Mark:** 

**Model No.:** WNR004

**Add. Model No.:** N/A

**Report Number:** 25010715640RFC-2

**Test Standards:** FCC 47 CFR Part 1 Subpart I  
RSS-102 Issue 6

**FCC ID:** 2AHSR-NBEX001

**IC:** 21267-NBEX001

**Test Result:** PASS

**Date of Issue:** February 28, 2025

Prepared for:

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UTTR-RF-FCC-MPE-V1.0

**Version**

| Version No. | Date              | Description |
|-------------|-------------------|-------------|
| V1.0        | February 28, 2025 | Original    |

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## CONTENTS

|                                                             |          |
|-------------------------------------------------------------|----------|
| <b>1. GENERAL INFORMATION .....</b>                         | <b>4</b> |
| 1.1 CLIENT INFORMATION .....                                | 4        |
| 1.2 EUT INFORMATION .....                                   | 4        |
| 1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD ..... | 4        |
| 1.4 OTHER INFORMATION.....                                  | 5        |
| 1.5 GENERAL DESCRIPTION OF APPLIED STANDARDS .....          | 5        |
| 1.6 DEVIATION FROM STANDARDS .....                          | 5        |
| 1.7 ABNORMALITIES FROM STANDARD CONDITIONS.....             | 5        |
| 1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER .....       | 5        |
| <b>2. EQUIPMENT LIST .....</b>                              | <b>5</b> |
| <b>3. MPE EVALUATION .....</b>                              | <b>6</b> |
| 3.1 REFERENCE DOCUMENTS FOR EVALUATION .....                | 6        |
| 3.2 MPE COMPLIANCE REQUIREMENT .....                        | 6        |
| 3.2.1 LIMITS .....                                          | 6        |
| 3.2.2 TEST PROCEDURE .....                                  | 7        |
| 3.3 MPE CALCULATION METHOD.....                             | 7        |
| 3.4 MPE CALCULATION RESULTS .....                           | 8        |
| 3.4.1 FOR BT .....                                          | 8        |
| <b>APPENDIX 1 PHOTOS OF TEST SETUP.....</b>                 | <b>9</b> |
| <b>APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS.....</b> | <b>9</b> |

## 1. GENERAL INFORMATION

### 1.1 CLIENT INFORMATION

|                                 |                                                                                                     |
|---------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>Applicant:</b>               | Weber-Stephen Products LLC                                                                          |
| <b>Address of Applicant:</b>    | 1415 S.Roselle Road, Palatine, IL 60067, USA                                                        |
| <b>Manufacturer:</b>            | TKC Progress CO.,LTD                                                                                |
| <b>Address of Manufacturer:</b> | Rangsit Fortune Estate (RPE II) 64/16-19 Moo 3, Klongnueng,Klonglauang, Pathumthani 12120, Thailand |

### 1.2 EUT INFORMATION

|                                                             |                                                                                   |
|-------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>Product Name:</b>                                        | Bluetooth Thermometer                                                             |
| <b>Model No.:</b>                                           | WNR004                                                                            |
| <b>HVIN:</b>                                                | WNR004                                                                            |
| <b>Trade Mark:</b>                                          |  |
| <b>DUT Stage:</b>                                           | Identical Prototype                                                               |
| <b>EUT Supports Function:</b><br>(Provided by the customer) | Bluetooth 5.0                                                                     |
| <b>Power Supply:</b>                                        | 3.2Vdc Button Battery                                                             |
| <b>Software Version:</b>                                    | Revision 3 (Provided by the customer)                                             |
| <b>Hardware Version:</b>                                    | 2.0.4 (Provided by the customer)                                                  |
| <b>Sample Received Date:</b>                                | January 7, 2025                                                                   |
| <b>Sample Tested Date:</b>                                  | January 8, 2025 to February 10, 2025                                              |

### 1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

| For 2.4 GHz ISM Band of Bluetooth                  |                        |
|----------------------------------------------------|------------------------|
| <b>Frequency Band:</b>                             | 2400 MHz to 2483.5 MHz |
| <b>Frequency Range:</b>                            | 2402 MHz to 2480 MHz   |
| <b>Bluetooth Version:</b>                          | Bluetooth LE           |
| <b>Type of Modulation:</b>                         | GFSK                   |
| <b>Number of Channels:</b>                         | 40                     |
| <b>Channel Separation:</b>                         | 2 MHz                  |
| <b>Antenna Type:</b><br>(Provided by the customer) | Integral Antenna       |
| <b>Antenna Gain:</b><br>(Provided by the customer) | 2.14 dBi               |
| <b>Maximum Peak Power:</b>                         | 5.31 dBm               |

## 1.4 OTHER INFORMATION

| Operation Frequency Each of Channel            |                                   |
|------------------------------------------------|-----------------------------------|
| $f = 2402 + 2k \text{ MHz, } k = 0, \dots, 39$ |                                   |
| Note:                                          |                                   |
| f                                              | is the operating frequency (MHz); |
| k                                              | is the operating channel.         |

## 1.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

**FCC 47 CFR Part 1 Subpart I**

**RSS-102 Issue 6**

All test items have been performed and recorded as per the above standards

## 1.6 DEVIATION FROM STANDARDS

None.

## 1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

## 1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

## 2. EQUIPMENT LIST

Please refer to the RF test report no.: 24010715640RFC-1.

### 3. MPE EVALUATION

#### 3.1 REFERENCE DOCUMENTS FOR EVALUATION

| No. | Identity                                        | Document Title                                                                                 |
|-----|-------------------------------------------------|------------------------------------------------------------------------------------------------|
| 1   | FCC 47 CFR Part 1 Subpart I                     | PROCEDURES IMPLEMENTING THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969                          |
| 2   | KDB 447498 D01 General RF Exposure Guidance v06 | RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES    |
| 3   | FCC 47 CFR Part 1 Subpart I                     | Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) |

#### 3.2 MPE COMPLIANCE REQUIREMENT

##### 3.2.1 Limits

##### 3.2.1.1 FCC 47 CFR Part 1 Subpart I

According to §1.1307(b)(1), system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

##### Limits for Occupational / Controlled Exposure

| Frequency range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/cm <sup>2</sup> ) | Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|-----------------------------------------|------------------------------------------------------------------------|
| 0.3-3.0               | 614                               | 1.63                              | (100)*                                  | 6                                                                      |
| 3.0-30                | 1842/f                            | 4.89/f                            | (900/f)*                                | 6                                                                      |
| 30-300                | 61.4                              | 0.163                             | 1.0                                     | 6                                                                      |
| 300-1500              | /                                 | /                                 | F/300                                   | 6                                                                      |
| 1500-100000           | /                                 | /                                 | 5                                       | 6                                                                      |

##### Limits for General Population / Uncontrolled Exposure

| Frequency range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/cm <sup>2</sup> ) | Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|-----------------------------------------|------------------------------------------------------------------------|
| 0.3-1.34              | 614                               | 1.63                              | (100)*                                  | 30                                                                     |
| 1.34-30               | 824/f                             | 2.19/f                            | (180/f)*                                | 30                                                                     |
| 30-300                | 27.5                              | 0.073                             | 0.2                                     | 30                                                                     |
| 300-1500              | /                                 | /                                 | F/1500                                  | 30                                                                     |
| 1500-100000           | /                                 | /                                 | 1                                       | 30                                                                     |

**Note:** f = frequency in MHz: \* = Plane-wave equivalents power density.

##### 3.2.1.2 FCC 47 CFR Part 1 Subpart I

According to FCC 47 CFR Part 1 Subpart I, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

According to FCC 47 CFR Part 1 Subpart I, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz<sup>6</sup> and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the

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- device is equal to or less than  $4.49/f^{0.5}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
  - at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
  - at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

### 3.2.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

## 3.3 MPE CALCULATION METHOD

### FCC 47 CFR Part 1 Subpart I

$$S = PG/4\pi R^2 = EIRP/4\pi R^2$$

S = 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 = 20cm distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

### 3.4 MPE CALCULATION RESULTS

**Note:** For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

#### 3.4.1 For BT

For BT\_BLE function, operating at 2402MHz to 2480 MHz for GFSK

##### 3.4.1.1 Antenna Type:

Integral Antenna

##### 3.4.1.2 Antenna Gain:

2402MHz to 2480 MHz: 2.14 dBi

##### 3.4.1.3 Results for FCC 47 CFR Part 1 Subpart I

| Operating Mode | Freq.     | Declared maximum conducted Average output power | Max. positive tolerance according manufacturer | Max. Antenna Gain | Calculated maximum EIRP | Declared maximum EIRP | MPE Limit | MPE Value             |
|----------------|-----------|-------------------------------------------------|------------------------------------------------|-------------------|-------------------------|-----------------------|-----------|-----------------------|
|                | (MHz)     | (dBm)                                           |                                                | (dBi)             | (dBm)                   | (mW)                  |           | (mW/cm <sup>2</sup> ) |
| Bluetooth      | 2402-2480 | 4.0                                             | 1                                              | 2.14              | 7.14                    | 5.1761                | 1         | 0.0010                |

##### 3.4.1.4 Results for RSS-102 Issue 6

| Operating Mode | Freq.     | Declared maximum conducted avg output power | Max. positive tolerance according manufacturer | Antenna Gain | Calculated maximum EIRP | Declared maximum EIRP | Limit  |
|----------------|-----------|---------------------------------------------|------------------------------------------------|--------------|-------------------------|-----------------------|--------|
|                | (MHz)     | (dBm)                                       |                                                | (dBi)        | (dBm)                   | (W)                   | (W)    |
| Bluetooth      | 2402-2480 | 4.0                                         | 1                                              | 2.14         | 7.14                    | 0.0052                | 2.6764 |



## APPENDIX 1 PHOTOS OF TEST SETUP

N/A

## APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal Photos.

\*\*\* End of Report \*\*\*

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