

# 1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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## 1.1 General Information

### Client Information

Applicant: Meshify Inc.  
Address of applicant: 3500 Jefferson St. Suite 206, Austin, TX 78731

Manufacturer: Meshify Inc.  
Address of manufacturer: 3500 Jefferson St. Suite 206, Austin, TX 78731

### General Description of EUT:

Product Name: Smart Temp Sensor  
Trade Name: /  
Model No.: TDLT002  
Adding Model(s): /  
Rated Voltage: Battery: 2xAA, 3V  
Power Adapter: /  
FCC ID: 2AQ34-TDLT002  
Equipment Type: Fixed device

### Technical Characteristics of EUT:

#### LoRa

Frequency Range: 903MHz-914.2MHz  
RF Output Power: 19.11dBm (Conducted)  
Modulation: GFSK  
Quantity of Channels: 8  
Channel Separation: 1600kHz  
Type of Antenna: Chip Antenna  
Antenna Gain: -1dBi

#### LoRa Hopping

Frequency Range: 902.3MHz-914.9MHz  
RF Output Power: 17.86dBm (Conducted)  
Modulation: GFSK  
Quantity of Channels: 64  
Channel Separation: 200kHz  
Type of Antenna: Chip Antenna  
Antenna Gain: -1dBi

## 1.2 Standard Applicable

According to § 1.1307(b)(1) and KDB 447498 D01 General RF Exposure Guidance v06, 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.

### (a) 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  |

### (b) 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 equivalent power density

### 1.3 MPE Calculation Method

$$S = (30 * P * G) / (377 * R^2)$$

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

### 1.4 MPE Calculation Result

For LoRa(902.3MHz-914.9MHz)

Maximum Tune-Up output power: 18.0(dBm)

Maximum peak output power at antenna input terminal: 63.10(mW)

Prediction distance: >20(cm)

Prediction frequency: 902.3 (MHz)

Antenna gain: -1 (dBi)

Directional gain (numeric gain): 0.79

The worst case is power density at prediction frequency at 20cm: 0.0100(mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 0.6015 (mw/cm<sup>2</sup>)

For LoRa(903MHz-914.2MHz)

Maximum Tune-Up output power: 19.5(dBm)

Maximum peak output power at antenna input terminal: 89.13(mW)

Prediction distance: >20(cm)

Prediction frequency: 914.2(MHz)

Antenna gain: -1 (dBi)

Directional gain (numeric gain): 0.79

The worst case is power density at prediction frequency at 20cm: 0.0141(mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 0.6095 (mw/cm<sup>2</sup>)

Result: Pass