



Test Report No.: FM200518N028



# RF EXPOSURE REPORT

|           |  |
|-----------|--|
| Applicant | Particle Industries, Inc                           |
| Address   | 126 Post St,4th floor, San Francisco, CA 94108 USA |

|                                     |  |
|-------------------------------------|--|
| Manufacturer or Supplier            | Particle Industries, Inc                           |
| Address                             | 126 Post St,4th floor, San Francisco, CA 94108 USA |
| Product                             | Tracker SoM LTE M1                                 |
| Brand Name                          | Particle   |
| Model                               | T402M  |
| Additional Model & Model Difference | T404M  |
| Date of tests                       | May 18, 2020 ~ Jul. 18, 2020                       |

- FCC Part 2 (Section 2.1091)
- KDB 447498 D01
- IEEE C95.1

**CONCLUSION: The submitted sample was found to COMPLY with the test requirement**

|   |  |
|---|--|
| Tested by Breeze Jiang<br>Senior Project Engineer / EMC Department                  | Approved by Glyn He<br>Assistant Manager / EMC Department  |
|  | <br><br>Date: Aug. 14, 2020 |

This report is governed by, and incorporates by reference, CPS Conditions of Service as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

Bureau Veritas Shenzhen Co., Ltd.  
Dongguan Branch

No. 96, Guantai Road (Houjie Section), Houjie  
Town, Dongguan City, Guangdong Province.  
523942. People's Republic of China.

Tel: +86 769 8998 2098  
Fax: +86 769 8593 1080  
Email: [customerservice.dg@cn.bureauveritas.com](mailto:customerservice.dg@cn.bureauveritas.com)



Test Report No.: FM200518N028

## TABLE OF CONTENTS

|   |   |
|---|---|
| RELEASE CONTROL RECORD .....                          | 3 |
| 1. CERTIFICATION.....                                 | 4 |
| 2. RF EXPOSURE LIMIT .....                            | 5 |
| 3. MPE CALCULATION FORMULA.....                       | 5 |
| 4. CLASSIFICATION .....                               | 5 |
| 5. ANTENNA GAIN .....                                 | 6 |
| 6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER..... | 6 |



**BUREAU  
VERITAS**

Test Report No.: FM200518N028

## RELEASE CONTROL RECORD

| ISSUE NO.    | REASON FOR CHANGE | DATE ISSUED   |
|--------------|-------------------|---------------|
| FM200518N028 | Original release  | Aug. 14, 2020 |

**Bureau Veritas Shenzhen Co., Ltd.  
Dongguan Branch**

No. 96, Guantai Road (Houjie Section), Houjie  
Town, Dongguan City, Guangdong Province.  
523942. People's Republic of China.

Tel: +86 769 8998 2098  
Fax: +86 769 8593 1080  
Email: [customerservice.dg@cn.bureauveritas.com](mailto:customerservice.dg@cn.bureauveritas.com)



Test Report No.: FM200518N028

## 1. CERTIFICATION

|                        |                             |
|------------------------|-----------------------------|
| <b>FCC ID:</b>         | 2AEMI-T40X                  |
| <b>PRODUCT:</b>        | Tracker SoM LTE M1          |
| <b>BRAND NAME:</b>     | Particle                    |
| <b>MODEL NO.:</b>      | T402M                       |
| <b>ADDITIONAL NO.:</b> | T404M                       |
| <b>TEST SAMPLE:</b>    | Engineering Sample          |
| <b>APPLICANT:</b>      | Particle Industries, Inc    |
| <b>STANDARDS:</b>      | FCC Part 2 (Section 2.1091) |
|                        | KDB 447498 D01              |
|                        | IEEE C95.1                  |

Note: Additional model T404M is identical with the test model T402M except the model number for marketing purpose.

## 2. RF EXPOSURE LIMIT

### LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| FREQUENCY RANGE (MHz)  | ELECTRIC FIELD STRENGTH (V/m) | MAGNETIC FIELD STRENGTH (A/m) | POWER DENSITY (mW/cm <sup>2</sup> ) | AVERAGE TIME (minutes) |
|--|-------------------------------|-------------------------------|-------------------------------------|------------------------|
| <b>LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE</b> |                               |                               |                                     |                        |
| 300-1500   | ...                           | ...                           | F/1500                              | 30                     |
| 1500-100,000   | ...                           | ...                           | 1.0                                 | 30                     |

F = Frequency in MHz

## 3. MPE CALCULATION FORMULA

$$P_d = (P_{out} * G) / (4 * \pi * r^2)$$

where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

$\pi$  = 3.1416

R = distance between observation point and center of the radiator in cm

## 4. CLASSIFICATION

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.



### 5. ANTENNA GAIN

The antennas provided to the EUT, please refer to the following table:

| Transmitter Circuit | Peak Gain (dBi) | Antenna Type     |
|---------------------|-----------------|------------------|
| Wi-Fi 2.4GHz        | 2               | FPCB Antenna     |
| BT 2.4GHz           | 2               | FPCB Antenna     |
|                     | 0               | Ceramic Antenna  |
| LTE                 | 3.77            | External Antenna |

### 6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

The tuned conducted Average Power (declared by client)

| Mode          | Frequency (MHz)     | Target Power (dBm) | Tolerance (dBm) | Lower Tolerance (dBm) | Upper Tolerance (dBm) |
|---------------|---------------------|--------------------|-----------------|-----------------------|-----------------------|
| 802.11b       | 2412-2462           | 16                 | +1              | 15                    | 17                    |
| 802.11g       | 2412-2462           | 15                 | +1              | 14                    | 16                    |
| 802.11n(HT20) | 2412-2462           | 15                 | +1              | 14                    | 16                    |
| 802.11n HT40  | 2422-2452           | 15                 | +1              | 14                    | 16                    |
| BT-LE (GFSK)  | 2402-2480           | 8                  | +1              | 7                     | 9                     |
| LTE           | Band 2/4/5/12/13/25 | 24                 | +1              | 23                    | 25                    |

The measured conducted Average Power

| Mode          | Frequency (MHz) | Averaged Power (dBm) |
|---------------|-----------------|----------------------|
| 802.11b       | 2437            | 16.83                |
| 802.11g       | 2412            | 15.71                |
| 802.11n(HT20) | 2412            | 15.54                |
| 802.11n HT40  | 2412            | 15.61                |
| BT-LE (GFSK)  | 2402            | 7.81                 |
| LTE           | Band 25         | 24.5                 |

| FREQUENCY BAND (MHz) | MAX AVERAGE POWER (dBm) | ANTENNA GAIN (dBi) | DISTANCE (cm) | POWER DENSITY (mW/cm <sup>2</sup> ) | LIMIT (mW/cm <sup>2</sup> ) |
|----------------------|-------------------------|--------------------|---------------|-------------------------------------|-----------------------------|
| BT 2.4GHz            | 9                       | 2                  | 20            | 0.002505                            | 1.0                         |
| Wi-Fi 2.4GHz         | 17                      | 2                  | 20            | 0.015803                            | 1.0                         |
| LTE                  | 25                      | 3.77               | 20            | 0.149875                            | 1.0                         |



Test Report No.: FM200518N028

## CONCLUSION:

The BT and WLAN can transmit simultaneously, the formula of calculated the MPE is:

$$\text{CPD1} / \text{LPD1} + \text{CPD2} / \text{LPD2} + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

$(0.002505/1) + (0.015803/1) + (0.149875/1) = 0.168183 < 1$ , which is less than the "1" limit.

--- END ---