



Test Report No.: SAP20120028



# 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:	E Series LTE
Brand Name:	Particle
Model Name:	E402, E404
FCC ID:	XPY2AGQN4NNN
Date of tests:	Oct. 17, 2019 ~ Dec. 05, 2019

The submitted sample of the above equipment has been tested for according to the requirements of the following standards:

- IEEE C95.1
- FCC Part 2.1091**
- KDB 447498 D01 General RF Exposure Guidance v06**

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

**Remark : This test report is for internal customer use only, not as a final certification test report.**

Prepared by Alex Chen Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
Date: Dec. 23, 2020	Date: Dec. 23, 2020

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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA191017W005	Original release, This test report is for internal customer use only, not as a final certification test report.	Dec. 09, 2019
SAP20120028	Based on the original product add one model name. In this report, All test data is copied from the original test report SA191017W005.	Dec. 23, 2020



# 1 GENERAL INFORMATION

## 1.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	E Series LTE	
<b>BRAND NAME</b>	Particle	
<b>MODEL NAME</b>	E402, E404	
<b>POWER SUPPLY</b>	DC 5V from Host Uint or DC 3.7V from Li-ion battery	
<b>OPERATING TEMPERATURE RANGE</b>	-20 ~ 60°C	
<b>MODULATION TYPE</b>	LTE	QPSK
<b>OPERATING FREQUENCY</b>	LTE	1850.7MHz ~ 1909.3MHz (FOR LTE Band2) 1710.7MHz ~ 1754.3MHz (FOR LTE Band4) 824.7MHz ~ 848.3MHz (FOR LTE Band5) 699.7MHz ~ 715.3MHz (FOR LTE Band12)
<b>ANTENNA GAIN</b>	LTE Band 2	Fixed External Antenna with 3.77dBi gain
	LTE Band 4	Fixed External Antenna with 3.77dBi gain
	LTE Band 5	Fixed External Antenna with 1.42dBi gain
	LTE Band 12	Fixed External Antenna with 1.4dBi gain
<b>HW VERSION</b>	V1.00	
<b>SW VERSION</b>	V1.4.0	
<b>I/O PORTS</b>	Refer to user's manual	
<b>CABLE SUPPLIED</b>	N/A	

**NOTE:**

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The schematic and PCB of the E404 is completely the same with E402, and these two models of HW&SW is the same. Because changing the MVNO's E-SIM card (embedded SIM card) provider from Kore to Twilio, so we plan to use different model name to sell it in market. The differences are as follows:E402 uses eSIM of Kore.E404 uses eSIM of Twilio.
3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.



## 2 RF EXPOSURE

### 2.1 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> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposure</b>				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
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

### 2.2 MPE CALCULATION FORMULA

$$Pd = (Pout * G) / (4 * Pi * R^2)$$

where

Pd = power density in mW/cm<sup>2</sup>

Pout = 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



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## 2.3 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**.



## 2.4 CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

### LTE

Mode	Frequency (MHz)	Operating Mode	Antenna Gain (dBi)	Tune-up Power (dBm)	Tune-up Power (mW)	Power Density (mW/cm <sup>2</sup> )	limit (mW/cm <sup>2</sup> )	PASS / FAIL
<b>Band2</b>	1850-1910	QPSK	3.77	23.00	199.53	0.0946	1.00	PASS
<b>Band4</b>	1710-1755	QPSK	3.77	23.00	199.53	0.0946	1.00	PASS
<b>Band5</b>	824-849	QPSK	1.42	23.50	223.87	0.0618	0.55	PASS
<b>Band12</b>	699-716	QPSK	1.4	24.00	251.19	0.069	0.47	PASS

--END--