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:	Electron
Brand Name:	Particle
Model Name:	ELC402, ELC404
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
Alex Date: Dec. 23, 2020	Luke Lu Date: Dec. 23, 2020

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA191017W004	Original release, This test report is for internal customer use only, not as a final certification test report.	Dec. 09, 2019
SAP20120029	Based on the original product add one model name, changed product name. In this report, All test data is copied from the original test report SA191017W004.	Dec. 23, 2020

1 GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

EUT	Electron	
BRAND NAME	Particle	
MODEL NAME	ELC402, ELC404	
POWER SUPPLY	DC 5V from Host Uint or DC 3.7V from Li-ion battery	
OPERATING TEMPERATURE RANGE	-20 ~ 60℃	
MODULATION TYPE	**LTE**	QPSK
OPERATING FREQUENCY	**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) 779.5MHz ~ 784.5MHz (FOR LTE Band13)
ANTENNA GAIN	**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
	LTE Band 13	Fixed External Antenna with 1.4dBi gain
HW VERSION	V007	
SW VERSION	V1.4.0	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	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 ELC404 is completely the same with ELC402, 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:ELC402 uses eSIM of Kore.ELC404 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^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	$*900/f^2$	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	$*180/f^2$	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^2

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

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^2)	limit (mW/cm^2)	PASS / FAIL
Band2	1850-1910	QPSK	3.77	23.00	199.53	0.0946	1.00	PASS
Band4	1710-1755	QPSK	3.77	23.00	199.53	0.0946	1.00	PASS
Band5	824-849	QPSK	1.42	23.50	223.87	0.0618	0.55	PASS
Band12	699-716	QPSK	1.4	24.00	251.19	0.0690	0.47	PASS
Band13	780-785	QPSK	1.4	24.00	251.19	0.0690	0.52	PASS

--END--