

RF EXPOSURE REPORT

Product: B Series B402

Model Name: B402,B402S

FCC ID: 2AEMI-B402

Applicant: Particle Industries,Inc

Address: 126 Post St,4th floor, San Francisco,CA 94108 USA

Manufacturer: Particle Industries,Inc

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Report No.: SA190606W003

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Issued Date: Jul. 24, 2019

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA190606W003	Original release	Jul. 24, 2019



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1 CERTIFICATION

PRODUCT: B Series B402
BRAND NAME: Particle
MODEL NAME: B402,B402S
APPLICANT: Particle Industries,Inc
TESTED: Jul. 20, 2019 ~ Jul. 21, 2019
TEST SAMPLE: Identical Prototype
STANDARDS: **FCC Part 2 (Section 2.1091)**
FCC OET Bulletin 65, Supplement C (01-01)
KDB 447498 D01 General RF Exposure Guidance v06
IEEE C95.1

The above equipment has been tested by **BV 7Layers Communications Technology (Shenzhen) Co. Ltd** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Alex, **DATE:** Jul. 24, 2019
(Alex Chen/ Engineer)

APPROVED BY : Luke Lu, **DATE:** Jul. 24, 2019
(Luke Lu / Manager)



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	B Series B402	
MODEL NAME	B402,B402S	
NOMINAL VOLTAGE	Li+ PIN /Battery connector: DC 3.7V from Li-ion Battery or VUSB PIN /USB connector :DC 5V from USB Host Unit	
OPERATING TEMPERATURE RANGE	-20 ~ 75°C	
MODULATION TYPE	LTE/BLE	QPSK&16QAM, GFSK(1MHz, 2MHz)
OPERATING FREQUENCY	LTE/BLE	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) 2402MHz ~ 2480MHz (FOR BLE)
ANTENNA GAIN	LTE Band 2	Fixed External Antenna with 3.5dBi gain
	LTE Band 4	Fixed External Antenna with 3.5dBi gain
	LTE Band 5	Fixed External Antenna with 1.0dBi gain
	LTE Band 12	Fixed External Antenna with 1.0dBi gain
	LTE Band 13	Fixed External Antenna with 1.0dBi gain
	BLE	FPCB Antenna with 2.0dBi gain
HW VERSION	V1.00	
SW VERSION	V1.2.1	
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. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

3 RF EXPOSURE

3.1 LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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

F = Frequency in MHz

3.2 MPE CALCULATION FORMULA

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

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

3.3 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**.



3.4 CONDUCTED POWER

TUNE-UP POWER TABLE

Band	Frequency (MHz)	Operating Mode	Tune-Up Power And Tolerance (dBm)
BLE	2402	GFSK(1MHz)	-4.0
BLE	2480	GFSK(2MHz)	-9.0
LTE 2	1880	QPSK	24.8
LTE 4	1732.5	QPSK	25.0
LTE 5	836.5	QPSK	25.0
LTE 12	707.5	QPSK	25.0
LTE 13	782	QPSK	25.0



3.5 CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

BT

Band	Frequency (MHz)	Operating Mode	Antenna Gain (dBi)	Tune-up Power (dBm)	E.I.R.P Power (mW)	Power Density (mW/cm ²)	limit (mW/cm ²)	PASS / FAIL
BLE	2402	GFSK(1MHz)	2	-4	0.631	0.000126	1.00	PASS
BLE	2480	GFSK(2MHz)	2	-9	0.199	0.000040	1.00	PASS

LTE

Band	Frequency (MHz)	Operating Mode	Antenna Gain (dBi)	Tune-up Power (dBm)	E.I.R.P Power (mW)	Power Density (mW/cm ²)	limit (mW/cm ²)	PASS / FAIL
Band 2	1880	QPSK	3.50	24.80	676.083	0.135	1.00	PASS
Band 4	1720	QPSK	3.50	25.00	707.946	0.141	1.00	PASS
Band 5	829	QPSK	1.00	25.00	398.107	0.079	0.56	PASS
Band 12	707.5	QPSK	1.00	25.00	398.107	0.079	0.47	PASS
Band 13	782.0	QPSK	1.00	25.00	398.107	0.079	0.52	PASS

3.6 CONCLUSION OF SIMULTANEOUS TRANSMITTER

Both of the BT and plug-in device can transmit simultaneously, the formula of calculated the MPE is:

$$CPD1/LPD1+CPD2/LPD2+.....etc. < 1$$

CPD = Calculation power density

LPD = Limit of power density

Therefore the worst-case situation is, which is less than “1”, This confirmed that the device comply with FCC 1.1310 MPE limit.

Band	Frequency (MHz)	Power Density (mW/cm^2)	limit (mW/cm^2)	Power Density / Limit	MPE Limit	PASS / FAIL
BLE(1MHz)	2402	0.000126	1	0.000126	1.000	PASS
LTE BAND 4	1720	0.141	1	0.141		

--END--