





# 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	Boron LTE
Brand Name	Particle
Model	BRN402
Additional Model & Model Difference	BRN404
Date of tests	Sep. 03, 2018 ~ Nov. 08, 2018

- IC RSS-102 Issue 5
- IEEE C95.3

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

Tested by Breeze Jiang Senior Project Engineer / EMC Department	Approved by Glyn He Assistant Manager / EMC Department
	
	Date: Jan. 12, 2021

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VERITAS**

Test Report No.: IM2011WDG0364

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
IM180920N037	Original release	Nov. 16, 2018
IM2011WDG0364	Based on the original report IM180920N037 changed the brand name and added additional model.	Jan. 12, 2021

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## 1. CERTIFICATION

<b>IC:</b>	20127-BRN402
<b>PRODUCT:</b>	Boron LTE
<b>BRAND NAME:</b>	Particle Industries, Inc
<b>MODEL NO.:</b>	BRN402
<b>ADDITIONAL MODEL:</b>	BRN404
<b>TEST SAMPLE:</b>	Engineering Sample
<b>APPLICANT:</b>	Particle Industries, Inc
<b>STANDARDS:</b>	IC RSS-102 Issue 5
	IEEE C95.3

Note: Additional model BRN404 is identical with the test model BRN402 except the model name for trading 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 (W/m <sup>2</sup> )	AVERAGE TIME (minutes)
<b>LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE</b>				
48-300	22.06	0.05852	1.291	6
300-6000	3.142*F <sup>0.3417</sup>	0.008335*F <sup>0.3417</sup>	0.02619*F <sup>0.6834</sup>	6

F = Frequency in MHz

## 3. MPE CALCULATION FORMULA

$$Pd = (Pout * G) / (4 * pi * r^2)$$

where

Pd = power density in W/m<sup>2</sup>

Pout = output power to antenna in W

G = gain of antenna in linear scale

Pi = 3.1416

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

## 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. TARGET POWER AND TOLERANCE

Technology/Band	Mode	Target Power and Tolerance (dBm)
LTE BAND 2	QPSK/16QAM	23.8±1.0 dBm
LTE BAND 4	QPSK/16QAM	24±1.0 dBm
LTE BAND 5	QPSK/16QAM	24±1.0 dBm
LTE BAND 12	QPSK/16QAM	24±1.0 dBm
LTE BAND 13	QPSK/16QAM	24±1.0 dBm
DSSS(802.15.4)	OQPSK	-1±1.0 dBm

### 6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Power Density / Limit
LTE Band 12	1.0	25.0	26.000	0.398	398.107	0.792	2.303	0.344
LTE Band 13	1.0	25.0	26.000	0.398	398.107	0.792	2.480	0.320
LTE Band 5	1.0	25.0	26.000	0.398	398.107	0.792	2.577	0.307
LTE Band 4	3.5	25.0	28.500	0.708	707.946	1.409	4.243	0.332
LTE Band 2	3.5	24.8	28.300	0.676	676.083	1.346	4.477	0.301
DSSS(802.15.4)	0	0	0	0.001	-	0.00199	5.366	0.00037

### 7. CONCLUSION OF SIMULTANEOUS TRANSMITTER

Both of the WLAN 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 0.344+0.00037 =0.34437, which is less than “1”, This confirmed that the device comply with FCC 1.1310 MPE limit.

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