



Test Report No.: FM2108WDG0172R1





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 Industries, Inc
Model	BRN402
Additional Model & Model Difference	BRN404. See section 1
Date of tests	Aug. 13, 2021 ~ Nov. 11, 2021

- 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 Andy Zhu Supervisor / EMC Department	Approved by Glyn He Assistant Manager / EMC Department
	
	Date: Nov. 18, 2021

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FM2108WDG0172	Original release	Oct. 14, 2021
FM2108WDG0172R1	Reduce transmission power and revise the calculation results	Nov. 18, 2021

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1. CERTIFICATION

FCC ID:	2AEMI-BRN402
PRODUCT:	Boron LTE
BRAND NAME:	Particle
MODEL NO.:	BRN402
ADDITIONAL NO.:	BRN404
APPLICANT:	Particle Industries, Inc
STANDARDS:	FCC Part 2 (Section 2.1091)
	KDB 447498 D01
	IEEE C95.1

NOTE: Additional model (See above table) is identical with the test model BRN402 except the model no. for trading purposes.



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 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. MPE CALCULATION FORMULA

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

where

Pd = power density in mW/cm²

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

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
BLE	GFSK	-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 ²)	Limit (mW/cm ²)	Power Density / Limit
LTE Band 12	1.0	25.0	26.000	0.398	398.107	0.079	0.466	0.170
LTE Band 13	1.0	25.0	26.000	0.398	398.107	0.079	0.520	0.152
LTE Band 5	1.0	25.0	26.000	0.398	398.107	0.079	0.550	0.144
LTE Band 4	3.5	25.0	28.500	0.708	707.946	0.141	1.000	0.141
LTE Band 2	3.5	24.8	28.300	0.676	676.083	0.135	1.000	0.135
BLE	2.0	0	2.0	0.001585	1.585	0.000315	1.000	0.000315

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 0.170+0.000315 =0.170315, which is less than “1”, This confirmed that the device comply with FCC 1.1310 MPE limit.

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