



Test Report No.: SEBVCZ-W7L-P21060021



VARIANT RADIO TEST REPORT

(EN 62311)

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:	B SOM
Brand Name:	Particle
Model Name:	B524, B523
Date of tests:	Jan. 04, 2020 ~ Jun. 28, 2021

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

EN IEC 62311: 2020

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

Prepared by Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
Date: Jun. 29, 2021	Date: Jun. 29, 2021

This report is governed by, and incorporates by reference, CPS Conditions of Service as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.



Test Report No.: SEBVCZ-W7L-P21060021

TABLE OF CONTENTS

RADIO TEST REPORT	1
(EN 62311)	1
RELEASE CONTROL RECORD.....	3
1 GENERAL INFORMATION.....	4
2 RF EXPOSURE MEASUREMENT	6
2.1 INTRODUCTION	6
2.2 LIMIT	6
3.3 CLASSIFICATION OF THE ASSESSMENT METHODS	6
3.4 TEST RESULTS	7



Test Report No.: SEBVCZ-W7L-P21060021

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SE200103W001	Original release	Mar. 31, 2020
SEBVCZ-W7L-P21060021	Based on the original RE200103W001-1 Update the standard and change model	Jun. 29, 2021



1 GENERAL INFORMATION

PRODUCT	B SOM	
BRAND NAME	Particle	
MODEL NAME	B524, B523	
NOMINAL VOLTAGE	3V3 : DC +3.3V VCC: DC +3.8V	
MODULATION TYPE	GPRS/EDGE	GMSK, 8PSK
	BT_LE	GFSK
	WCDMA	BPSK/QPSK
	LTE	QPSK,16QAM
OPERATING FREQUENCY	BT_LE	2402MHz ~ 2480MHz
	GSM	880.2MHz ~ 914.8MHz (FOR GSM 900) 1710.2MHz ~ 1784.8MHz (FOR DCS 1800)
	WCDMA	1922.6MHz~ 1977.4MHz (FOR WCDMA Band 1) 882.4MHz ~ 912.6MHz (FOR WCDMA Band 8)
	LTE	1922.5MHz~ 1977.5MHz (FOR LTE Band1) 1710.7MHz ~ 1784.3MHz (FOR LTE Band3) 2502.5MHz~ 2567.5MHz (FOR LTE Band7) 880.7MHz ~ 914.3MHz (FOR LTE Band8) 834.5MHz~ 859.5MHz (FOR LTE Band20) 704.5MHz ~ 731.5MHz (FOR LTE Band28A)
ANTENNA TYPE	External Antenna	
Max. ANTENNA GAIN	GSM 900:	1.42dBi
	DCS 1800:	3.77dBi
	WCDMA Band I :	3.77dBi
	WCDMA Band VIII :	1.42dBi
	LTE Band 1	3.77dBi
	LTE Band 3	3.77dBi
	LTE Band 7	4.71dBi
	LTE Band 8	1.42dBi
	LTE Band 20	1.42dBi
	LTE Band 28A	1.42dBi
	BT_LE	2dBi
HW VERSION	V1.00	
SW VERSION	V1.5.0	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	N/A	
ACCESSORY DEVICES	Refer to note as below	



Test Report No.: SEBVCZ-W7L-P21060021

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. B524 & B523 differences just E_SIM, all other things are all the same.

Model name	E_SIM
B524	AT&T
B523	Vodafone

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 MEASUREMENT

2.1 INTRODUCTION

This International Standard applies to electronic and electrical equipment for which no dedicated product- or product family standard regarding human exposure to electromagnetic fields applies.

The frequency range covered is 0 Hz to 300 GHz.

The object of this generic standard is to provide assessment methods and criteria to evaluate such equipment against basic restrictions or reference levels on exposure of the general public related to electric, magnetic and electromagnetic fields and induced and contact current.

2.2 LIMIT

According to EN 62311: 2008, the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation.

FREQUENCY RANGE	E-FIELD STRENGTH (V/m)
400 ~ 2000MHz	1.375*F ^{1/2}
2 ~ 300GHz	61

Note: F= Operating frequency

3.3 CLASSIFICATION OF THE ASSESSMENT METHODS

The antenna of the product, under normal use condition is at least 20 cm away from the body of the user. Warning statement to the user for keeping at least 20cm separation distance and the prohibition of operating to a person has been printed on the WLAN easy install sheet. So, this product under normal use is located on electromagnetic far field between the human body.

Far Field Calculation Formula

$$E = \eta_0 H = \frac{\sqrt{30PG(\theta, \phi)}}{r}$$

G = antenna gain relative to an isotropic antenna
 θ, ϕ = elevation and azimuth angles to point of investigation
 r = distance from observation point to the antenna
 η_0 = Characteristic impedance of free space

3.4 TEST RESULTS

CALCULATION FOR MAXIMUM E.I.R.P.

GSM

OPERATING BAND(MHz)	Frequency (MHz)	Antenna Gain (dBi)	Tune-up Average Conducted Power (dBm)	Tune-up Conducted Power (W)	E-Field Strength (V/m)	E-Field Strength Limit (V/m)	PASS / FAIL
GSM 900	880.2~914.8	1.42	26.41	0.438	21.34	40.79	PASS
PCS 1800	1710.2~1784.8	3.77	25.81	0.381	26.09	56.86	PASS

WCDMA

OPERATING BAND(MHz)	Frequency (MHz)	Antenna Gain (dBi)	Tune-up Conducted Power (dBm)	Tune-up Conducted Power (W)	E-Field Strength (V/m)	E-Field Strength Limit (V/m)	PASS / FAIL
WCDMA I	1922.6~1977.4	3.77	22.49	0.177	17.78	60.29	PASS
WCDMA VIII	882.4~912.6	1.42	22.46	0.176	13.53	40.84	PASS

LTE

OPERATING BAND(MHz)	Frequency (MHz)	Antenna Gain (dBi)	Tune-up Conducted Power (dBm)	Tune-up Conducted Power (W)	E-Field Strength (V/m)	E-Field Strength Limit (V/m)	PASS / FAIL
BAND 1	1922.5~1977.5	3.77	22.20	0.166	17.22	60.29	PASS
BAND 3	1710.7~1784.3	3.77	23.00	0.200	18.9	56.87	PASS
BAND 7	2502.5~2567.5	4.71	22.80	0.191	20.58	61.00	PASS
BAND 8	880.7~ 914.3	1.42	23.00	0.200	14.42	40.81	PASS
BAND 20	834.5~859.5	1.42	22.90	0.195	14.24	39.72	PASS
BAND 28A	704.5~731.5	1.42	23.26	0.212	14.85	36.5	PASS



BUREAU
VERITAS

Test Report No.: SEBVCZ-W7L-P21060021

BT-LE

OPERATING BAND(MHz)	Frequency (MHz)	Antenna Gain (dBi)	Tune-up Average Conducted Power (dBm)	Tune-up Conducted Power (W)	E-Field Strength (V/m)	E-Field Strength Limit (V/m)	PASS / FAIL
BT-LE 1M	2402~ 2480	2	7.33	0.005	2.44	61.00	PASS
BT -LE 2M	2402~ 2480	2	5.46	0.004	2.18	61.00	PASS

CONCLUSION :

According to Council Recommendation 1999/519/EC and RED (Directive2014/53/EU), the RF exposure analysis concludes that the RF Exposure is CE compliant.