



Test Report No.: SE200520W002



# 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:	Tracker SoM LTE CAT1/3G/2G
Brand Name:	Particle
Model Name:	T523M/T524M
Date of tests:	May. 21, 2020 ~ Jul. 01, 2020

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

EN 62311: 2008

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

Prepared by Alex Chen Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
Date: Jul. 01, 2020	Date: Jul. 01, 2020

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### RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SE200520W002	Original release	Jul. 01, 2020



# 1 GENERAL INFORMATION

<b>PRODUCT</b>	Tracker SoM LTE CAT1/3G/2G	
<b>BRAND NAME</b>	Particle	
<b>MODEL NAME</b>	T523M/T524M	
<b>NOMINAL VOLTAGE</b>	Li+ PIN: DC +3.3V--4.3V or Vusb PIN: DC +4.35V--5.5V or Vin PIN: DC +3.9V--17V	
<b>MODULATION TYPE</b>	<b>GSM/GPRS/EDGE</b>	GMSK, 8PSK
	<b>WCDMA</b>	BPSK/QPSK/16QAM
	<b>LTE CAT.1</b>	QPSK/16QAM
<b>PERATING FREQUENCY</b>	<b>GSM</b>	880.2MHz ~ 914.8MHz ( FOR GSM 900 ) 1710.2MHz ~ 1784.8MHz ( FOR DCS 1800)
	<b>WCDMA</b>	1922.6MHz~ 1977.4MHz (FOR WCDMA Band 1) 882.4MHz ~ 912.6MHz (FOR WCDMA Band 8)
	<b>LTE</b>	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 ~ 746.5MHz (FOR LTE Band28)
<b>ANTENNA TYPE</b>	External Antenna	
<b>Max. ANTENNA GAIN</b>	<b>GSM</b>	1.42dBi for GSM 900
		3.77dBi for DCS 1800
	<b>WCDMA</b>	3.77dBi for WCDMA Band 1
		1.42dBi for WCDMA Band 8
<b>LTE</b>	3.77dBi for LTE Band1 3.77dBi for LTE Band3 4.66dBi for LTE Band7 1.42dBi for LTE Band8 1.42dBi for LTE Band20 1.42dBi for LTE Band28	
<b>HW VERSION</b>	V1.0	
<b>SW VERSION</b>	V1.5.4	
<b>I/O PORTS</b>	Refer to user's manual	
<b>CABLE SUPPLIED</b>	N/A	



**BUREAU  
VERITAS**

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**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 two models T523M and T524M used by our company for the Certification is completely the same ,and the HW&SW used is the same. Because the product is sold in different market using different models eSIM, different models are named. the differences are as follows:T523M uses eSIM of Kore.T524M 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 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 <sup>1/2</sup>
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  
 $\theta, \phi$  = elevation and azimuth angles to point of investigation  
 r = distance from observation point to the antenna  
 $\eta_0$  = 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 Conducted Time Average Power(dBm)	Tune-up Conducted Power (W)	E-Field Strength (V/m)	E-Field Strength Limit (V/m)	PASS / FAIL
<b>GSM 900</b>	880.2 ~ 914.8	1.42	23.5	0.224	15.26	40.79	PASS
<b>DCS 1800</b>	710.2 ~ 1784.8	3.77	20.5	0.112	14.15	36.64	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
<b>Band 1</b>	1922.6~ 1977.4	3.77	23.5	0.224	20.01	60.29	PASS
<b>Band 8</b>	882.4 ~ 912.6	1.42	23.5	0.224	15.26	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
<b>Band 1</b>	1922.5~ 1977.5	3.77	24.0	0.251	21.18	60.29	PASS
<b>Band 3</b>	1710.7 ~ 1784.3	3.77	23.5	0.224	20.01	56.87	PASS
<b>Band 7</b>	2502.5~ 2567.5	4.66	23.5	0.224	22.16	61.0	PASS
<b>Band 8</b>	880.7 ~ 914.3	1.42	24.0	0.251	16.16	40.81	PASS
<b>Band 20</b>	834.5~ 859.5	1.42	23.5	0.224	15.26	39.72	PASS
<b>Band 28</b>	704.5 ~ 746.5	1.42	23.5	0.224	15.26	36.5	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.