

TEST REPORT

Applicant: Particle Industries, Inc.

EUT Description: M-SoM LTE-M/2G/Satellite + Wi-Fi for Global

Model: M635e

Brand: Particle

Standards: EN IEC 62311: 2020

Date of Receipt: 2026/05/14

Date of Issue: 2026/06/11

TOWE. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

the results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of the model are manufactured with identical electrical and mechanical components. All sample tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise. without written approval of TOWE, the test report shall not be reproduced except in full.



Jim Huang
Approved By:



Carey Chen
Reviewed By:

Revision History

Rev.	Issue Date	Description	Revised by
01	2026/06/11	Original	Carey Chen

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1 General Description

1.1 Lab Information

1.1.1 Testing Location

These measurements tests were conducted at the Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. facility located at F401 and F101, Building E, Hongwei Industrial Zone, Liuxian 3rd Road, Bao'an District, Shenzhen, China.

Tel.: +86-755-27212361

Contact Email: info@towewireless.com

1.1.2 Test Facility / Accreditations

A2LA (Certificate Number: 7088.01)

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

FCC Designation No.: CN1353

Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. has been recognized as an accredited testing laboratory.

Test Firm Registration Number: 684095

Designation Number: CN1353.

ISED CAB identifier: CN0152

Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0152

Company Number: 31000

1.2 Client Information

1.2.1 Applicant

Applicant:	Particle Industries, Inc.
Address:	548 Market St, PMB 34833, San Francisco, CA 94104, USA

1.2.2 Manufacturer

Manufacturer:	Particle Industries, Inc.
Address:	548 Market St, PMB 34833, San Francisco, CA 94104, USA

1.3 Product Information

EUT Description:	M-SoM LTE-M/2G/Satellite + Wi-Fi for Global		
Model:	M635e		
Brand:	Particle		
Hardware Version:	v0.2		
Software Version:	v6.4.1		
Frequency Bands:	Band	TX Frequency	RX Frequency
	E-GSM900	880MHz ~ 915MHz	925MHz ~ 960MHz
	DCS1800	1710MHz ~ 1785MHz	1805MHz ~ 1880MHz
	LTE Cat M1 Band 1	1920MHz ~ 1980MHz	2110MHz ~ 2170MHz
	LTE Cat M1 Band 3	1710MHz ~ 1785MHz	1805MHz ~ 1880MHz
	LTE Cat M1 Band 5	824MHz ~ 849MHz	869MHz ~ 894MHz
	LTE Cat M1 Band 8	880MHz ~ 915MHz	925MHz ~ 960MHz
	LTE Cat M1 Band 20	832MHz ~ 862MHz	791MHz ~ 821MHz
	LTE Cat M1 Band 28	703MHz ~ 748MHz	758MHz ~ 803MHz
	NB-IoT NTN Band 255	1626.6MHz ~ 1660.4MHz	1525.1MHz ~ 1558.9MHz
	NB-IoT NTN Band 256	1980MHz ~ 2010MHz	2170MHz ~ 2200MHz
	BLE	2402MHz ~ 2480 MHz	2402MHz ~ 2480 MHz
	Wi-Fi 2.4G	2412MHz ~ 2472 MHz	2412MHz ~ 2472 MHz
	5G WIFI(U-NII-1)	5150MHz ~ 5250MHz	5150MHz ~ 5250MHz
	5G WIFI(U-NII-2A)	5250MHz ~ 5350MHz	5250MHz ~ 5350MHz
	5G WIFI(U-NII-2C)	5470MHz ~ 5725MHz	5470MHz ~ 5725MHz
	5G WIFI(U-NII-3)	5725MHz ~ 5850MHz	5725MHz ~ 5850MHz
Power Class:	Class 3: All Frequency Bands		
Antenna Type:	Internal: Dipole Antenna (For WWAN) External: Omnidirectional Antenna (For WWAN) PCB Antenna (For BLEWIFI)		
Antenna Gain:	Band	Ant1 Internal (dBi)	Ant4 External (dBi)
	E-GSM900	1.86	2.25
	DCS1800	4.12	1.15
	LTE Cat M1 Band 1	5.23	1.8
	LTE Cat M1 Band 3	4.12	1.14
	LTE Cat M1 Band 5	1.78	2.01
	LTE Cat M1 Band 8	1.91	2.25
	LTE Cat M1 Band 20	1.64	2.01
	LTE Cat M1 Band 28	2.5	1.83
	NB-IoT NTN Band 255	3.91	1.2
	NB-IoT NTN Band 256	4.61	3
	Band	Ant2 (dBi)	
	BLE	3	
	Wi-Fi 2.4G	3	
	5G WIFI(U-NII-1)	6.8	

	5G WIFI(U-NII-2A)	6.8
	5G WIFI(U-NII-2C)	6.8
	5G WIFI(U-NII-3)	6.8
Remark: The above EUT's information was declared by applicant, please refer to the specifications or user's manual for more detailed description.		

2 Maximum Permissible RF Exposure

2.1 Reference Levels

Reference levels for electric, magnetic and electromagnetic fields
(0 Hz to 300 GHz, unperturbed rms values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density S_{eq} (W/m ²)
0-1 Hz	—	$3,2 \times 10^4$	4×10^4	—
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	—
8-25 Hz	10 000	$4\,000/f$	$5\,000/f$	—
0,025-0,8 kHz	$250/f$	$4/f$	$5/f$	—
0,8-3 kHz	$250/f$	5	6,25	—
3-150 kHz	87	5	6,25	—
0,15-1 MHz	87	$0,73/f$	$0,92/f$	—
1-10 MHz	$87/f^{1/2}$	$0,73/f$	$0,92/f$	—
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046\ f^{1/2}$	$f/200$
2-300 GHz	61	0,16	0,20	10

Notes:

1. f as indicated in the frequency range column.
2. For frequencies between 100 kHz and 10 GHz, S_{eq} , E^2 , H^2 , and B^2 are to be averaged over any six-minute period.
3. For frequencies exceeding 10 GHz, S_{eq} , E^2 , H^2 , and B^2 are to be averaged over any $68/f^{1.05}$ -minute period (f in GHz).
4. No E-field value is provided for frequencies < 1 Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 25 kV/m. Spark discharges causing stress or annoyance should be avoided.

The field calculation does not take into account the antenna size, which is assumed to be a point source. An ideal isotropic antenna is used as a reference to compare the performance of practical antennas: P watts is radiated, from a point, uniformly over the surface of sphere of radius r .

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

where

- G is the antenna gain relative to an isotropic antenna;
 θ, ϕ are elevation and azimuth angles to point of investigation;
 r is the distance from observation point to the antenna;
 η_0 is the characteristic impedance of free space.

2.2 Simultaneous Transmission

Exposure field strengths can be compared to the reference levels on a sum square basis:

$$\sum_{i=100\text{kHz}}^{1\text{MHz}} \left(\frac{E_i}{c} \right)^2 + \sum_{i>1\text{MHz}}^{300\text{GHz}} \left(\frac{E_i}{E_{L,i}} \right)^2 \leq 1$$

- E_i is the electric field strength at frequency i ;
 $E_{L,i}$ is the electric field reference level;
 H_i is the magnetic field strength at frequency i ;
 $H_{L,i}$ is the magnetic field reference level;
 c is $610/f$ V/m (f in MHz) for occupational exposure and $87/f^{1/2}$ V/m (f in MHz) for general public exposure;
 d is $1,61/f$ A/m (f in MHz) for occupational exposure and $0,73/f$ A/m (f in MHz) for general public exposure. NOTE The values c and d are only examples.

NOTE The values c and d are only examples

3 RF Exposure Results

The antenna of the product, under normal use condition is at least 20cm away from the body of the user.

Warning statement to the user for keeping 20cm separation distance and the prohibition of operating to a person has been printed on the user manual. So, this product under normal use is located on electromagnetic far field between the human body.

Output Power into Antenna & RF Exposure Evaluation Distance:

Operating Band	Frequency (MHz)	Max Conducted Average Output Power (dBm)	Antenna Gain (dBi)	EIRP (W)	E Field Strength at R=20cm (V/m)	E Field Strength Limit (V/m)	Max Gain	Conclusion
E-GSM900	880.2	35.00	2.25	0.64	21.90	40.79	7.64	Pass
DCS1800	1710.2	32.00	4.12	0.49	19.23	56.86	13.53	Pass
LTE Cat M1 Band 1	1922.5	25.00	5.23	1.05	28.12	60.29	11.85	Pass
LTE Cat M1 Band 3	1710.7	25.00	4.12	0.82	24.75	56.87	11.34	Pass
LTE Cat M1 Band 5	824.7	25.00	2.01	0.50	19.41	39.49	8.17	Pass
LTE Cat M1 Band 8	880.7	25.00	2.25	0.53	19.95	40.81	8.46	Pass
LTE Cat M1 Band 20	834.5	25.00	2.01	0.50	19.41	39.72	8.22	Pass
LTE Cat M1 Band 28	704.5	25.00	2.50	0.56	20.54	36.50	7.49	Pass
NTN Band 255	1626.6	25.00	3.91	0.78	24.16	55.46	11.12	Pass
NTN Band 256	1980	25.00	4.61	0.91	26.18	61.18	11.98	Pass
BLE	2402	6.50	3.00	0.01	2.59	61.00	--	Pass
Wi-Fi 2.4G	2412	17.00	3.00	0.10	8.66	61.00	--	Pass
5G WIFI(U-NII-1)	5180	12.00	6.80	0.08	7.54	61.00	--	Pass
5G WIFI(U-NII-2A)	5260	12.00	6.80	0.08	7.54	61.00	--	Pass
5G WIFI(U-NII-2C)	5500	12.50	6.80	0.09	7.99	61.00	--	Pass
5G WIFI(U-NII-3)	5745	7.00	6.80	0.02	4.24	61.00	--	Pass

Remark:

1. GSM Operating Band: Frame-average power=Burst power+ Division Factors (-9.19).
2. "Max Conducted Average Output Power" comes from the largest "Tune-up" provided by the customer.
3. "Max Gain" The maximum ANT gain supported by EUT.

Simultaneous Transmission:

Due to the EUT support Simultaneous Transmission.

The corresponding MEs must be expressed in terms of power density in the 2.2-chapter summation Therefore.

Simultaneous Tx Combination	Configuration
1	WWAN + 2.4G WIFI
2	WWAN + WIFI 5G
3	2.4G WIFI + BLE
4	WIFI 5G + BLE
5	WWAN + 2.4G WIFI + BLE
6	WWAN + WIFI 5G + BLE

Operating Band	Frequency (MHz)	E Field Strength at R=20cm (V/m)	E Field Strength Limit (V/m)	MEs
E-GSM900	880.2	21.90	40.79	0.5370
DCS1800	1710.2	19.23	56.86	0.3382
LTE Cat M1 Band 1	1922.5	28.12	60.29	0.4664
LTE Cat M1 Band 3	1710.7	24.75	56.87	0.4352
LTE Cat M1 Band 5	824.7	19.41	39.49	0.4916
LTE Cat M1 Band 8	880.7	19.95	40.81	0.4890
LTE Cat M1 Band 20	834.5	19.41	39.72	0.4887
LTE Cat M1 Band 28	704.5	20.54	36.50	0.5627
NTN Band 255	1626.6	24.16	55.46	0.4356
NTN Band 256	1980	26.18	61.18	0.4280
BLE	2402	2.59	61.00	0.0424
Wi-Fi 2.4G	2412	8.66	61.00	0.1420
5G WIFI(U-NII-1)	5180	7.54	61.00	0.1237
5G WIFI(U-NII-2A)	5260	7.54	61.00	0.1237
5G WIFI(U-NII-2C)	5500	7.99	61.00	0.1310
5G WIFI(U-NII-3)	5745	4.24	61.00	0.0695

The worst-case combination: **Mode 5: WWAN + 2.4G WIFI + BLE**

Combination	MEs	Total MEs	Limit	Conclusion
LTE Cat M1 Band 28	$(0.5627)^{^2}$	0.3386	<1	PASS
2.4G WIFI	$(0.1420)^{^2}$			
BLE	$(0.0424)^{^2}$			

~The End~