

TEST REPORT

Applicant: Particle Industries, Inc.
EUT Description: M-SoM LTE-M/2G/Satellite + Wi-Fi for Global
Model: M635e
Brand: Particle
IC: 20127-M635
Standards: RSS-102 Issue 6
Date of Receipt: 2026/05/14
Date of Issue: 2026/06/17

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	2026/06/17	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. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014
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/HVIN:	M635e		
PMN:	M-Series LTE M1/2G/Satellite		
Brand:	Particle		
Hardware Version:	v0.2		
Software Version/FVIN:	v6.4.1		
Frequency Bands:	Band	TX Frequency	RX Frequency
	GSM 850	824 ~ 849 MHz	869 ~ 894 MHz
	PCS 1900	1850 ~ 1910 MHz	1930 ~ 1990 MHz
	Cat M1 Band 2	1850 ~ 1910 MHz	1930 ~ 1990 MHz
	Cat M1 Band 4	1710 ~ 1755 MHz	2110 ~ 2155 MHz
	Cat M1 Band 5	824 ~ 849 MHz	869 ~ 894 MHz
	Cat M1 Band 12	699 ~ 716 MHz	729 ~ 746 MHz
	Cat M1 Band 13	777 ~ 787 MHz	746 ~ 756 MHz
	Cat M1 Band 25	1850 ~ 1915 MHz	1930 ~ 1995 MHz
	Cat M1 Band 26	824 to 849 MHz	869 to 894 MHz
	Cat M1 Band 66	1710 ~ 1780 MHz	2110 ~ 2180 MHz
	Cat M1 Band 85	698 ~ 716 MHz	728 ~ 746 MHz
	NTN Band 23	2000 ~ 2020 MHz	2180 ~ 2200 MHz
	NTN Band 255	1626.5 ~ 1660.5 MHz	1525 ~ 1559 MHz
	BLE	2402~2480 MHz	2402~2480 MHz
	Wi-Fi 2.4G	2412~2462 MHz	2412~2462 MHz
	Wi-Fi 5G	5150~5850 MHz	5150~5850 MHz
Power Class:	Class 3: All		
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)
	GSM 850	1.78	2.01
	PCS 1900	5.3	1.26
	Cat M1 Band 2	5.3	1.26
	Cat M1 Band 4	3.74	1.15
	Cat M1 Band 5	1.78	2.01
	Cat M1 Band 12	2.17	1.77
	Cat M1 Band 13	2.74	1.51
	Cat M1 Band 25	5.3	1.26
	Cat M1 Band 26	1.18	2.01
	Cat M1 Band 66	3.74	1.15
	Cat M1 Band 85	2.17	1.75
	NTN Band 23	4.37	3
	NTN Band 255	3.91	1.2

	Band	Ant2 (dBi)
	BLE	3
	Wi-Fi 2.4G	3
	U-NII-1:	6.8
	U-NII-2A:	6.8
	U-NII-2C:	6.8
	U-NII-3:	6.8
Remark: The above EUT's information was declared by applicant, please refer to the specifications or user manual for more detailed description.		

2 Maximum Permissible RF Exposure

2.1 RF Exposure Limit Introduction

Field reference level (FRL) exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm (i.e. mobile devices), except when the device operates as follows:

- 1) below 20 MHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 1W (adjusted for tune-up tolerance)
- 2) at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than $4.49/f^{0.5}W$ (adjusted for tune-up tolerance), where f is in MHz
- 3) at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance)
- 4) at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}W$ (adjusted for tune-up tolerance), where f is in MHz
- 5) at or above 6 GHz and the source-based, time-averaged maximum EIRP of the device is equal to or less than 5 W (adjusted for tune-up tolerance)

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the EIRP was derived.

Exposure Limits:

Frequency range (MHz)	Reference level basis	Reference level (ERL) for uncontrolled environment (VRMS/m)	Reference level (ERL) for controlled environment (VRMS/m)	Reference period
0.003 -10	NS	83	170	Instantaneous
1.10-10	SAR	$193/f^{0.5}$	N/A	6 minutes
1.29-10	SAR	N/A	$193/f^{0.5}$	6 minutes

Frequency range (MHz)	Reference level basis	Reference level (HRL) for uncontrolled environment (ARMS/m)	Reference level (HRL) for controlled environment (ARMS/m)	Reference period
0.003-10	NS	90	180	Instantaneous
0.1-10	SAR	$0.73/f$	$1.6/f$	6 minutes

Frequency range (MHz)	Electric field (VRMS/m)	Magnetic field (ARMS/m)	Power density (W/m ²)	Reference period (minutes)
10-20	27.46	0.0728	2	6
20-48	$58.07 / f^{0.25}$	$0.1540 / f^{0.25}$	$8.944 / f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142 f^{0.3417}$	$0.008335 f^{0.3417}$	$0.02619 f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-50000	61.4	0.163	10	$616000/f^{1.2}$
150000-300000	$0.158 f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	$616000/f^{1.2}$

Note: f is frequency in MHz.

The MPE was calculated at **20cm** to show compliance with the power density limit.

2.2 Equations

Power Density is given by:

$$S = \frac{\text{EIRP}}{4\pi R^2}$$

Where:

S = Power density in mW/cm²

EIRP= Equivalent isotropic Radiated power in mW

R = Distance from transmitting antenna in cm

Power density in units of mW/cm² is converted to units of W/m² by multiplying by 10.

Distance:

$$R = \sqrt{\frac{\text{EIRP}}{4\pi S}}$$

Where:

S = Power density in mW/cm²

EIRP= Equivalent isotropic Radiated power in mW

R = Distance from transmitting antenna in cm

EIRP:

$$\text{EIRP} = P + G$$

Where:

EIRP = Equivalent isotropic Radiated power in Mw

P = Output power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

Source-Based Duty Cycle:

Where applicable (for example, multi-slot cell phone applications) a duty cycle factor may be applied.

Source-based time-averaged EIRP = (DC / 100) * EIRP

Where:

DC = Duty Cycle in %, as applicable

EIRP= Equivalent isotropic Radiated power in mW

MIMO and collocated transmitters (identical limit for all transmitters):

For multiple chain devices, and collocated transmitters operating simultaneously in frequency bands where the limit is identical, the total power density is calculated using the total EIRP obtained by summing the PG (in linear units) of each transmitter.

Total EIRP = (EIRP 1) + (EIRP 2) + ... + (EIRP n)

MIMO and collocated transmitters:

For multiple collocated transmitters operating simultaneously in frequency bands where different limit apply:

The power density at the specified separation distance is calculated for each transmitter chain or transmitter.

The fraction of the exposure limit is calculated for each chain or transmitter as

Power density of chain or transmitter / limit applicable to the chain or transmitter.

The fractions are summed.

Compliance is established if the sum of the fractions is less than or equal to one.

3 RF Exposure Results

3.1 Standalone Exposure Calculations

For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.

The manufacturing configures output power so that the maximum power, after accounting for manufacturing tolerances, will never exceed the maximum power level measured.

The antenna gain in the tables below is the maximum antenna gain among various channels within the specified band.

Operating Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	EIRP/ERP (dBm)	EIRP/ERP Limit (dBm)	EIRP (W)	Exemption Limits (W)	Result
GSM850	824.2	2.01	35.00	34.86	34.77	0.3690	1.2885	Pass
PCS 1900	1850.2	5.3	27.07	32.37	33.00	0.2080	2.2392	Pass
Cat M1 Band 2	1850.7	5.3	25.00	30.30	33.00	1.0715	2.2396	Pass
Cat M1 Band 4	1710.7	3.74	25.00	28.74	30.00	0.7482	2.1224	Pass
Cat M1 Band 5	824.7	2.01	25.00	24.86	34.77	0.3062	1.2890	Pass
Cat M1 Band 12	699.7	2.17	25.00	25.02	34.77	0.3177	1.1521	Pass
Cat M1 Band 13	779.5	2.74	25.00	25.59	34.77	0.3622	1.2403	Pass
Cat M1 Band 25	1850.7	5.3	25.00	30.30	33.00	1.0715	2.2396	Pass
Cat M1 Band 26	824.7	2.01	25.00	24.86	34.77	0.3062	1.2890	Pass
Cat M1 Band 66	1710.7	3.74	25.00	28.74	30.00	0.7482	2.1224	Pass
Cat M1 Band 85	700.5	2.17	25.00	25.02	34.77	0.3177	1.1530	Pass
NTN Band 23	2000.1	4.37	25.00	29.37	31.37	0.8650	2.3616	Pass
NTN Band 255	1626.6	3.91	25.00	28.91	30.91	0.7780	2.0505	Pass
BLE	2402	3	8.50	11.50	--	0.0141	2.6764	Pass
2.4GWIFI	2412	3	17.00	20.00	--	0.1000	2.6840	Pass
WIFI 5G B1	5180.0	6.8	15.00	21.80	--	0.1514	4.5253	Pass
WIFI 5G B2	5260.0	6.8	18.50	25.30	--	0.3388	4.5729	Pass
WIFI 5G B3	5500.0	6.8	17.00	23.80	--	0.2399	4.7145	Pass
WIFI 5G B4	5745.0	6.8	18.50	25.30	--	0.3388	4.8570	Pass

Remark:

1. GSM Operating Band: Frame-average power=Burst power+ Division Factors (-9.19).
2. "Maximum Power" comes from the largest "Tune-up" provided by the customer.

3.2 Multiple Sources Exposure Calculations

The product also has multiple transmitters The Simultaneous Transmission Possibilities are as below:

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

TER (Total exposure ratio) = EIRP(W) / Limit(W)

Operating Band	Frequency (MHz)	EIRP (W)	Exemption Limits (W)	TER
GSM 850	824.2	0.3690	1.2885	0.2864
PCS 1900	1850.2	0.2080	2.2392	0.0929
Cat M1 Band 2	1850.7	1.0715	2.2396	0.4784
Cat M1 Band 4	1710.7	0.7482	2.1224	0.3525
Cat M1 Band 5	824.7	0.3062	1.2890	0.2375
Cat M1 Band 12	699.7	0.3177	1.1521	0.2758
Cat M1 Band 13	779.5	0.3622	1.2403	0.2921
Cat M1 Band 25	1850.7	1.0715	2.2396	0.4784
Cat M1 Band 26	824.7	0.3062	1.2890	0.2375
Cat M1 Band 66	1710.7	0.7482	2.1224	0.3525
Cat M1 Band 85	700.5	0.3177	1.1530	0.2755
NTN Band 23	2000.1	0.8650	2.3616	0.3663
NTN Band 255	1626.6	0.7780	2.0505	0.3794
BLE	2402	0.0141	2.6764	0.0053
2.4GWIFI	2412	0.1000	2.6840	0.0373
WIFI 5G B1	5180.0	0.1514	4.5253	0.0334
WIFI 5G B2	5260.0	0.3388	4.5729	0.0741
WIFI 5G B3	5500.0	0.2399	4.7145	0.0509
WIFI 5G B4	5745.0	0.3388	4.8570	0.0698

The product also has multiple transmitters. The Simultaneous Transmission Possibilities are as below:

The worst-case combination: **Mode 6: WWAN + WIFI 5G + BLE**

Combination	TER	Total TER	Limit	Conclusion
Cat M1 Band 25	0.4784	0.5578	≤1	PASS
WIFI 5G	0.0741			
BLE	0.0053			

~The End~