

# **TEST REPORT**

**Applicant:** Particle Industries, Inc.  
**EUT Description:** M-SoM LTE-M/2G/Satellite + Wi-Fi for Global  
**Model:** M635e  
**Brand:** Particle  
**Standards:** ETSI EN 300 440 V2.2.1  
**Date of Receipt:** 2026/05/14  
**Date of Test:** 2026/05/14 to 2026/06/11  
**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 |

## Summary of Test Results

| Test Item                                          | Test Requirement | Test Method    | Result                              |
|----------------------------------------------------|------------------|----------------|-------------------------------------|
| Equivalent isotropically radiated power (e.i.r.p.) | Clause 4.2.2     | Clause 4.2.2.3 | Reference report<br>RE2312WDG0148-5 |
| Permitted range of operating frequencies           | Clause 4.2.3     | Clause 4.2.3.3 |                                     |
| Duty cycle                                         | Clause 4.2.5     | Clause 4.2.5.3 |                                     |
| Blocking or desensitization                        | Clause 4.3.4     | Clause 4.3.4.3 |                                     |
| Receiver spurious radiations                       | Clause 4.3.5     | Clause 4.3.5.3 |                                     |
| Unwanted emissions in the spurious domain          | Clause 4.2.4     | Clause 4.2.4.3 | Pass                                |

**Remark:**

In this report the worst data of Unwanted emissions in the spurious domain were spot checked, and other items data please refer to the previous report with report number RE2312WDG0148-5 issued by Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch.

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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                                       |                                              |                                                         |
| IMEI:                                                                                                                                             | 862063070036368                              |                                              |                                                         |
| Modulation Type:                                                                                                                                  | 802.11a/n:                                   | OFDM-BPSK, QPSK, 16QAM, 64QAM                |                                                         |
|                                                                                                                                                   | 802.11ac:                                    | OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM        |                                                         |
| Smart System:                                                                                                                                     | <input checked="" type="checkbox"/> SISO     | 802.11a/n/ac                                 |                                                         |
| TPC Function:                                                                                                                                     | <input type="checkbox"/> With TPC            |                                              | <input checked="" type="checkbox"/> Without TPC         |
| Frequency Range:                                                                                                                                  | 5725MHz ~ 5850MHz                            |                                              |                                                         |
| Channel Frequency:                                                                                                                                | 20M Bandwidth Channel:                       | 5745 ~ 5825MHz                               | 5 Channels                                              |
|                                                                                                                                                   | 40M Bandwidth Channel:                       | 5755 ~ 5795MHz                               | 2 Channels                                              |
| Receiver Category:                                                                                                                                | <input type="checkbox"/> Receiver Category 1 | <input type="checkbox"/> Receiver Category 2 | <input checked="" type="checkbox"/> Receiver Category 3 |
| Antenna Type:                                                                                                                                     | PCB Antenna                                  |                                              |                                                         |
| Antenna Gain:                                                                                                                                     | Ant2 (dBi)                                   |                                              |                                                         |
|                                                                                                                                                   | 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 Test Configuration

### 2.1 Standards Specification

| Reference Standards    | Standards Title                                                                                                                                |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| ETSI EN 300 440 V2.2.1 | Short Range Devices (SRD); Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Harmonised Standard for access to radio spectrum |

### 2.2 Test Channel

| Modulation Type  | Test Channel                | Test Frequency |
|------------------|-----------------------------|----------------|
| 802.11a/n20/ac20 | The Lowest channel (CH149)  | 5745MHz        |
|                  | The Middle channel (CH157)  | 5785MHz        |
|                  | The Highest channel (CH165) | 5825MHz        |
| Modulation Type  | Test Channel                | Test Frequency |
| 802.11n40/ac40   | The Lowest channel (CH151)  | 5755MHz        |
|                  | The Highest channel (CH159) | 5795MHz        |

### 2.3 Test Mode

| Modulation Type    | SISO - Data Rate                                                     |
|--------------------|----------------------------------------------------------------------|
| 802.11a            | 6 Mbps                                                               |
| 802.11n20          | MCS0 (6.5 Mbps)                                                      |
| 802.11n40          | MCS0 (13.5 Mbps)                                                     |
| 802.11ac20         | MCS0 (6.5 Mbps)                                                      |
| 802.11ac40         | MCS0 (13.5 Mbps)                                                     |
| Transmitting mode: | Keep the EUT was programmed to be in continuously transmitting mode. |
| Normal Link:       | Keep the EUT operation to normal function.                           |

## 2.4 Test Environment

| Relative Humidity                      | 45-56 % RH Ambient |            |
|----------------------------------------|--------------------|------------|
| Condition                              | Temperature(°C)    | Voltage(V) |
| NTNV                                   | 25                 | 3.8        |
| LTNV                                   | -35                | 3.8        |
| HTNV                                   | 75                 | 3.8        |
| Remark:                                |                    |            |
| NTNV Normal Temperature Normal Voltage |                    |            |
| LTNV Low Temperature Normal Voltage    |                    |            |
| HTNV High Temperature Normal Voltage   |                    |            |

## 2.5 Support Unit used in test

| Description | Manufacturer | Model               | Serial Number |
|-------------|--------------|---------------------|---------------|
| Laptop      | Lenovo       | Thinkbook 14 G4+IAP | YX05AZ13      |

## 2.6 Test RF Cable

**For all conducted test items:** The offset level is set spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

## 2.7 Modifications

No modifications were made during testing.

### 3 Equipment and Measurement Uncertainty

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, whichever is less, and where applicable is traceable to recognized national standards.

#### 3.1 Test Equipment List

| Radiated Emission                     |              |             |                |            |            |
|---------------------------------------|--------------|-------------|----------------|------------|------------|
| Description                           | Manufacturer | Model       | S.N.           | Last Due   | Cal Due    |
| Biconic Logarithmic Periodic Antennas | Schwarzbeck  | VULB9163    | 1461           | 2023/06/25 | 2026/06/24 |
| Double-Ridged Horn Antennas           | Schwarzbeck  | BBHA 9120D  | 2814           | 2023/06/25 | 2026/06/24 |
| Broad-Band Horn Antenna               | Schwarzbeck  | BBHA 9170   | 1291           | 2023/06/25 | 2026/06/24 |
| Signal Analyzer                       | Keysight     | N9020A      | US46470366     | 2026/03/06 | 2027/03/05 |
| Low Noise Amplifier                   | Tonscend     | TAP9K3G40   | AP23A8060274   | 2025/03/11 | 2027/03/10 |
| Low Noise Amplifier                   | Tonscend     | TAP01018050 | AP23A8060268   | 2025/03/11 | 2027/03/10 |
| Low Noise Amplifier                   | Tonscend     | TAP18040048 | AP22G806249    | 2025/03/11 | 2027/03/10 |
| Hygrometer                            | BINGYU       | HTC-1       | N/A            | 2025/07/25 | 2026/07/24 |
| Band Reject Filter Group              | Tonscend     | JS0806-F    | 23A806F0654    | N/A        | N/A        |
| Test Software                         | Tonscend     | TS+         | Version: 5.0.0 | N/A        | N/A        |

#### 3.2 Measurement Uncertainty

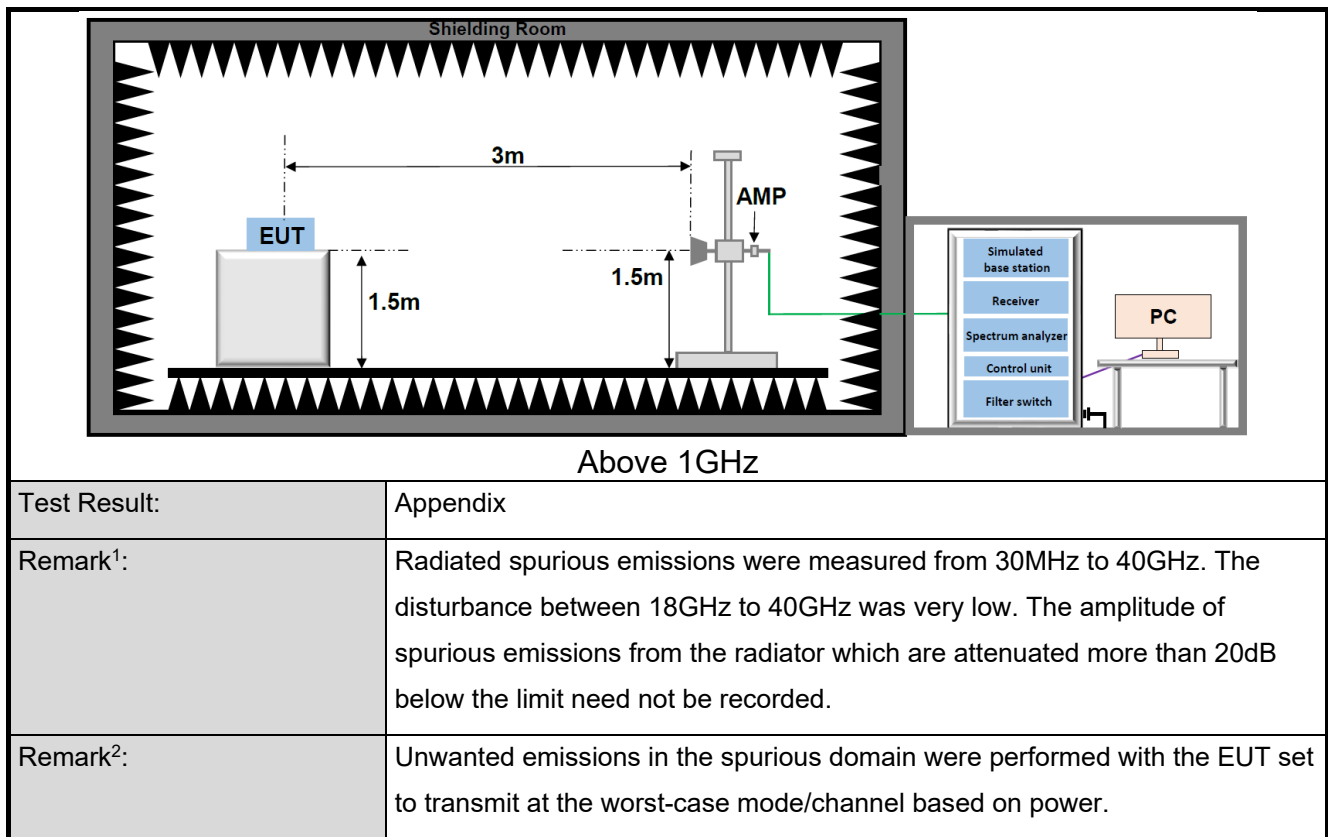
| Parameter                  | Ulab   |
|----------------------------|--------|
| Radiation 30MHz~1GHz(FAR)  | 4.48dB |
| Radiation 1GHz~18GHz(FAR)  | 5.30dB |
| Radiation 18GHz~40GHz(FAR) | 5.26dB |

Uncertainty figures are valid to a confidence level of 95%

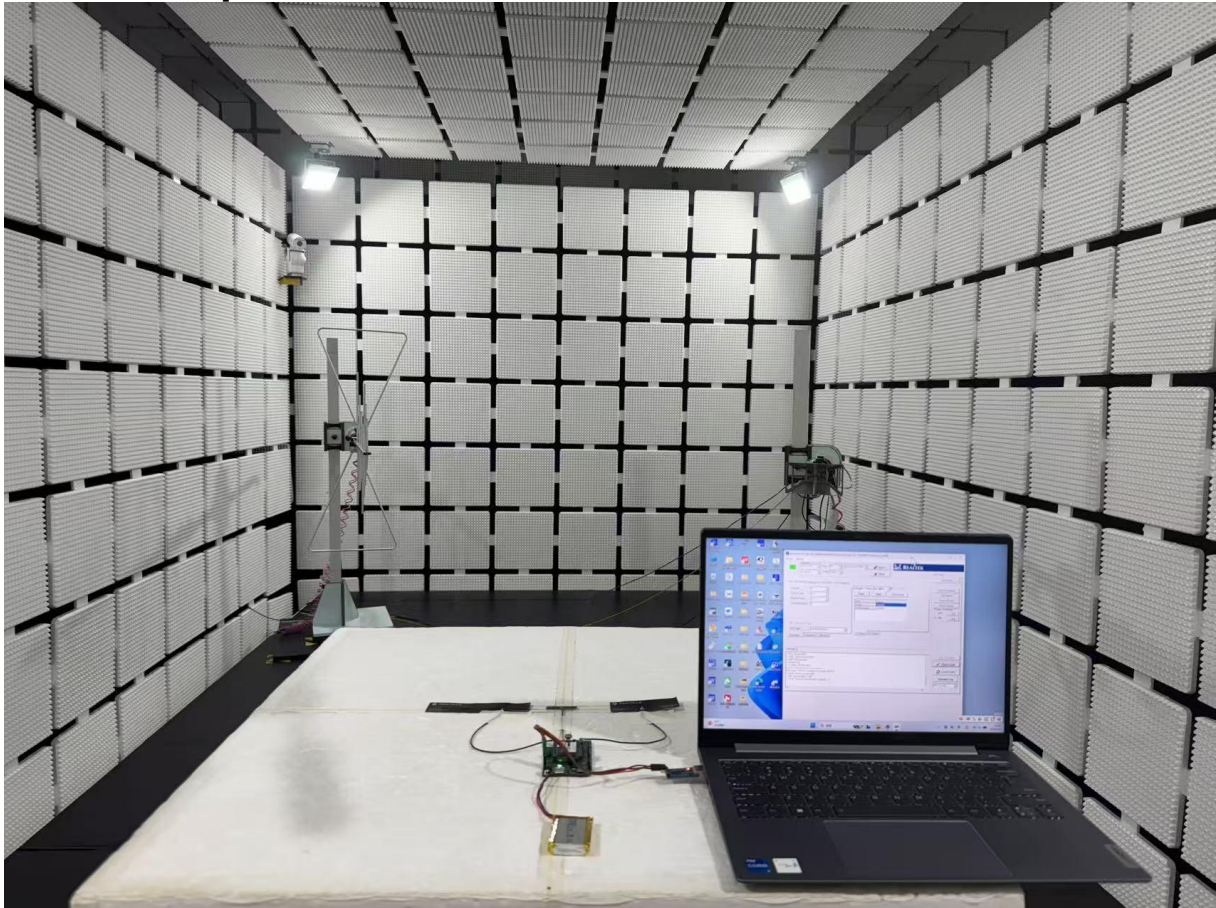
## 4 Test Results

### 4.1 Unwanted emissions in the spurious domain

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                        |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------|
| Test Requirement:           | ETSI EN 300 440 Clause 4.2.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |                        |
| Test Method:                | ETSI EN 300 440 Clause 4.2.4.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                              |                        |
| Limit:                      | The maximum power limits of any unwanted emissions in the spurious domain are given in table 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                        |
| Table 3: Spurious emissions |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                        |
| Frequency ranges            | 47 MHz to 74 MHz 87,5 MHz to 108 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Other frequencies ≤1 000 MHz | Frequencies >1 000 MHz |
| Operating                   | 4nW (-54dBm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 250nW (-36dBm)               | 1uW (-30dBm)           |
| Standby                     | 2nW (-57dBm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2nW (-57dBm)                 | 20nW (-47dBm)          |
| Test Environment:           | Refer to section 2.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                              |                        |
| Measuring Instruments:      | Refer to section 3.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                              |                        |
| Test Procedure:             | <div>1. The test distance between the receiving antenna and the EUT is 4.6m below 1GHz frequency range, and 3m which is in far field test condition for measured frequency above 1GHz, while the receiving (test) antenna scanning 1.5m height.</div> <div>2. The EUT was placed on a turntable with 1.5m height (FAR).</div> <div>3. Set EUT in continuous transmitting with maximum output power.</div> <div>4. The table was rotated from 0 to 360 degree to search the highest radiated emission.</div> <div>5. Repeat above step for each polarization and channel to find the worst emission level.</div> <div>6. The results obtained are compared to the limits in order to prove compliance with the requirement.</div> |                              |                        |
| Test Setup:                 | <div><div><div>Shielding Room</div><div><div><div>EUT</div><div>1.5m</div></div><div><div>4.6m</div><div>1.5m</div><div>AMP</div></div></div></div><div><div><div>Simulated base station</div><div>Receiver</div><div>Spectrum analyzer</div><div>Control unit</div><div>Filter switch</div></div><div><div>PC</div></div></div></div> <div>Below 1GHz</div>                                                                                                                                                                                                                                                                                                                                                                     |                              |                        |



## 5 Test Setup Photos



# Appendix

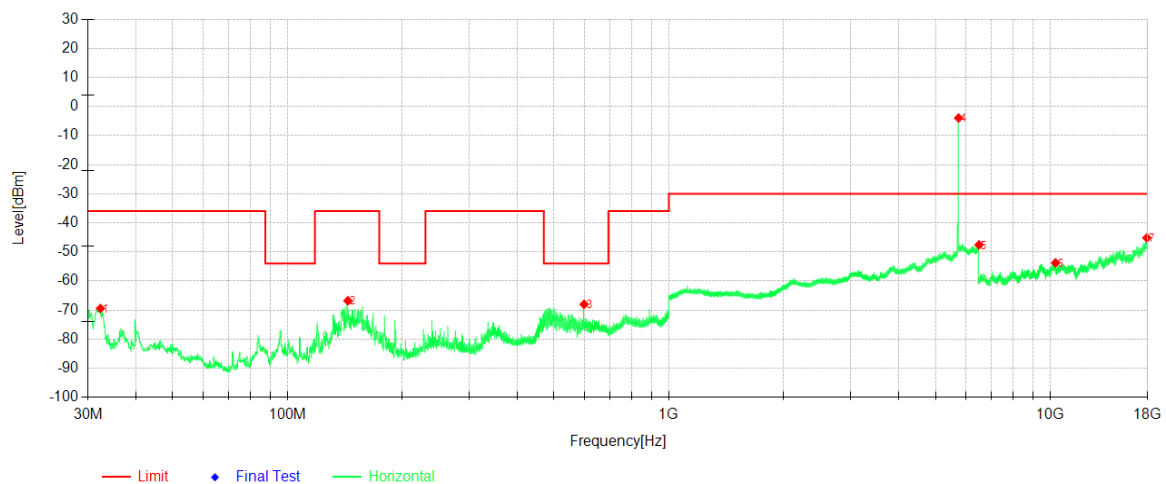
## Unwanted emissions in the spurious domain

### Test for spot check:

### Test Result

| Project Information |                 |           |              |
|---------------------|-----------------|-----------|--------------|
| Mode:               | 802.11a         | Band:     | 5725-5850MHz |
| Bandwidth:          | -               | Channel:  | Low          |
| IMEI:               | 862063070036368 | Engineer: | Zhangweizhi  |
| Remark:             |                 |           |              |

### Test Graph

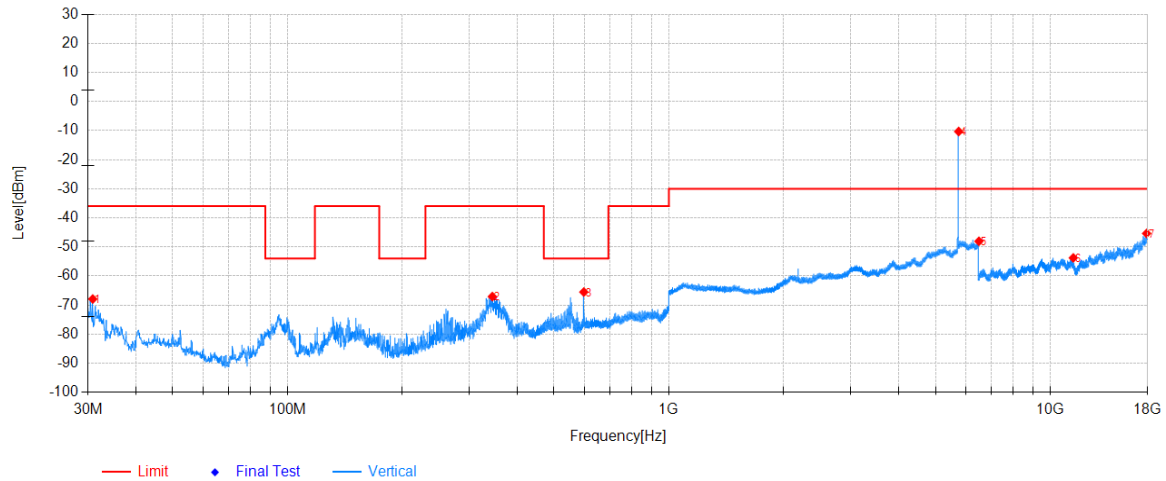


| Data List |             |               |             |             |             |             |            |
|-----------|-------------|---------------|-------------|-------------|-------------|-------------|------------|
| NO.       | Freq. [MHz] | Reading [dBm] | Level [dBm] | Limit [dBm] | Margin [dB] | Factor [dB] | Polarity   |
| 1         | 32.33       | -58.42        | -69.46      | -36.00      | 33.46       | -11.04      | Horizontal |
| 2         | 143.99      | -48.71        | -66.81      | -36.00      | 30.81       | -18.10      | Horizontal |
| 3         | 599.16      | -64.88        | -68.04      | -54.00      | 14.04       | -3.16       | Horizontal |
| 4         | 5746.46     | -31.11        | -3.95       | -           | -           | 27.16       | Horizontal |
| 5         | 6498.62     | -77.27        | -47.60      | -30.00      | 17.60       | 29.67       | Horizontal |
| 6         | 10316.21    | -68.23        | -53.77      | -30.00      | 23.77       | 14.46       | Horizontal |
| 7         | 17903.01    | -73.84        | -45.18      | -30.00      | 15.18       | 28.66       | Horizontal |

## Project Information

|            |                 |           |              |
|------------|-----------------|-----------|--------------|
| Mode:      | 802.11a         | Band:     | 5725-5850MHz |
| Bandwidth: | -               | Channel:  | Low          |
| IMEI:      | 862063070036368 | Engineer: | Zhangweizhi  |
| Remark:    |                 |           |              |

## Test Graph



## Data List

| NO. | Freq. [MHz] | Reading [dBm] | Level [dBm] | Limit [dBm] | Margin [dB] | Factor [dB] | Polarity |
|-----|-------------|---------------|-------------|-------------|-------------|-------------|----------|
| 1   | 30.87       | -55.10        | -67.94      | -36.00      | 31.94       | -12.84      | Vertical |
| 2   | 344.41      | -57.94        | -67.10      | -36.00      | 31.10       | -9.16       | Vertical |
| 3   | 598.28      | -61.98        | -65.55      | -54.00      | 11.55       | -3.57       | Vertical |
| 4   | 5749.21     | -37.24        | -10.30      | -           | -           | 26.94       | Vertical |
| 5   | 6496.70     | -77.22        | -48.08      | -30.00      | 18.08       | 29.14       | Vertical |
| 6   | 11483.50    | -68.56        | -53.78      | -30.00      | 23.78       | 14.78       | Vertical |
| 7   | 17875.41    | -73.59        | -45.37      | -30.00      | 15.37       | 28.22       | Vertical |

~The End~