



# MEASUREMENT REPORT

## FCC PART 2 & 22 & 24 & 27

---

**FCC ID:** ZMOFM101GL12

**Applicant:** Fibocom Wireless Inc.

**Application Type:** Certification

**Product:** LTE Module

**Model No.:** FM101-GL

**Brand Name:** Fibocom

**FCC Rule Part(s):** Part 2, 22 (H), 24 (E), 27

**Test Procedure(s):** ANSI C63.26: 2015

**Test Date:** March 29, 2022

**Reviewed By:** \_\_\_\_\_

**Approved By:** \_\_\_\_\_



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.26-2015. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

## Revision History

| Report No.    | Version | Description                         | Issue Date | Note    |
|---------------|---------|-------------------------------------|------------|---------|
| 2202RSU033-U7 | Rev. 01 | Initial Report                      | 03-29-2022 | Invalid |
| 2202RSU033-U7 | Rev. 02 | Added worst data of original report | 03-30-2022 | Valid   |

Note: This application for certification is leveraging the data reuse procedures from KDB 484596 based on reference FCC ID: ZMOFM101GL to cover variant FCC ID: ZMOFM101GL12.

## CONTENTS

| Description  | Page      |
|--|-----------|
| <b>1. GENERAL INFORMATION.....</b>                             | <b>4</b>  |
| 1.1. Applicant.....  | 4         |
| 1.2. Manufacturer.....   | 4         |
| 1.3. Testing Facility .....                                    | 4         |
| <b>2. PRODUCT INFORMATION .....</b>                            | <b>5</b>  |
| 2.1. Product Information .....                                 | 5         |
| 2.2. Radio Specification under Test .....                      | 5         |
| 2.3. Description of Available Antennas.....                    | 6         |
| 2.4. Test Methodology.....                                     | 6         |
| 2.5. EMI Suppression Device(s)/Modifications .....             | 6         |
| 2.6. Configuration of Tested System .....                      | 7         |
| 2.7. Test Environment Condition.....                           | 7         |
| <b>3. TEST EQUIPMENT CALIBRATION DATE.....</b>                 | <b>8</b>  |
| <b>4. MEASUREMENT UNCERTAINTY.....</b>                         | <b>9</b>  |
| <b>5. TEST RESULT .....</b>                                    | <b>10</b> |
| 5.1. Summary .....   | 10        |
| 5.2. Equivalent Isotropically Radiated Power Measurement ..... | 11        |
| 5.2.1. Test Limit.....   | 11        |
| 5.2.2. Test Procedure.....                                     | 11        |
| 5.2.3. Test Setting .....                                      | 11        |
| 5.2.4. Test Setup .....  | 12        |
| 5.2.5. Test Result .....                                       | 13        |
| <b>6. CONCLUSION .....</b>                                     | <b>16</b> |
| <b>Appendix A - Test Setup Photograph .....</b>                | <b>17</b> |
| <b>Appendix B - EUT Photograph .....</b>                       | <b>18</b> |

## 1. GENERAL INFORMATION

### 1.1. Applicant

Fibocom Wireless Inc.

1101, Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1<sup>st</sup> Rd, Nanshan, Shenzhen, China

### 1.2. Manufacturer

Fibocom Wireless Inc.

1101, Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1<sup>st</sup> Rd, Nanshan, Shenzhen, China

### 1.3. Testing Facility

|                                     |  |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | <b>Test Site – MRT Suzhou Laboratory</b><br><b>Laboratory Location (Suzhou - Wuzhong)</b><br>D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China<br><b>Laboratory Location (Suzhou - SIP)</b><br>4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China<br><b>Laboratory Accreditations</b><br>A2LA: 3628.01 CNAS: L10551<br>FCC: CN1166 ISED: CN0001<br>VCCI: <input type="checkbox"/> R-20025 <input type="checkbox"/> G-20034 <input type="checkbox"/> C-20020 <input type="checkbox"/> T-20020<br><input type="checkbox"/> R-20141 <input type="checkbox"/> G-20134 <input type="checkbox"/> C-20103 <input type="checkbox"/> T-20104 |
| <input type="checkbox"/>            | <b>Test Site – MRT Shenzhen Laboratory</b><br><b>Laboratory Location (Shenzhen)</b><br>1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China<br><b>Laboratory Accreditations</b><br>A2LA: 3628.02 CNAS: L10551<br>FCC: CN1284 ISED: CN0105   |
| <input type="checkbox"/>            | <b>Test Site – MRT Taiwan Laboratory</b><br><b>Laboratory Location (Taiwan)</b><br>No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)<br><b>Laboratory Accreditations</b><br>TAF: L3261-190725<br>FCC: 291082, TW3261 ISED: TW3261   |

## 2. PRODUCT INFORMATION

### 2.1. Product Information

|                       |   |
|-----------------------|---|
| Product Name          | LTE Module  |
| Model No.             | FM101-GL  |
| Brand Name            | Fibocom   |
| IMEI                  | Conducted Measurement: 861023050031798<br>Radiated Measurement: 861023050029685 |
| Operating Temperature | -10 ~ 55 °C   |
| Power Type            | 3.135 ~ 4.4Vdc, typical 3.3Vdc  |
| Antenna Information   | Refer to Section 2.3  |
| UMTS Specification    |   |
| Single Band           | Band 2, 4, 5  |
| Modulation            | Uplink up to 16QAM, Downlink up to 64QAM  |
| E-UTRA Specification  |   |
| Single Band           | Band 2, 4, 5, 7, 12, 13, 14, 17, 25, 26, 30, 38, 41, 48, 66, 71                 |
| HPUE Band             | Band 41   |
| Intra-Band            | CA_5B, CA_7C, CA_38C, CA_41C  |
| Modulation            | Uplink up to 16QAM, Downlink up to 64QAM  |

Note: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.

### 2.2. Radio Specification under Test

|                                 |  |
|---------------------------------|--|
| T <sub>x</sub> Frequency Range: | Band II: 1850 ~ 1910MHz, Band IV: 1710 ~ 1755MHz<br>Band V: 824 ~ 849MHz |
| R <sub>x</sub> Frequency Range: | Band II: 1930 ~ 1990MHz, Band IV: 2110 ~ 2155MHz<br>Band V: 869 ~ 894MHz |

Note: For other features of this EUT, test reports will be issued separately.

### 2.3. Description of Available Antennas

| Technology    | Frequency Range (MHz) | Antenna Type | Max Peak Gain (dBi) |
|---------------|-----------------------|--------------|---------------------|
| WCDMA Band II | 1850 ~ 1910           | PIFA         | 4.00                |
| WCDMA Band IV | 1710 ~ 1755           |              | 3.00                |
| WCDMA Band V  | 824 ~ 849             |              | 3.00                |

### 2.4. Test Methodology

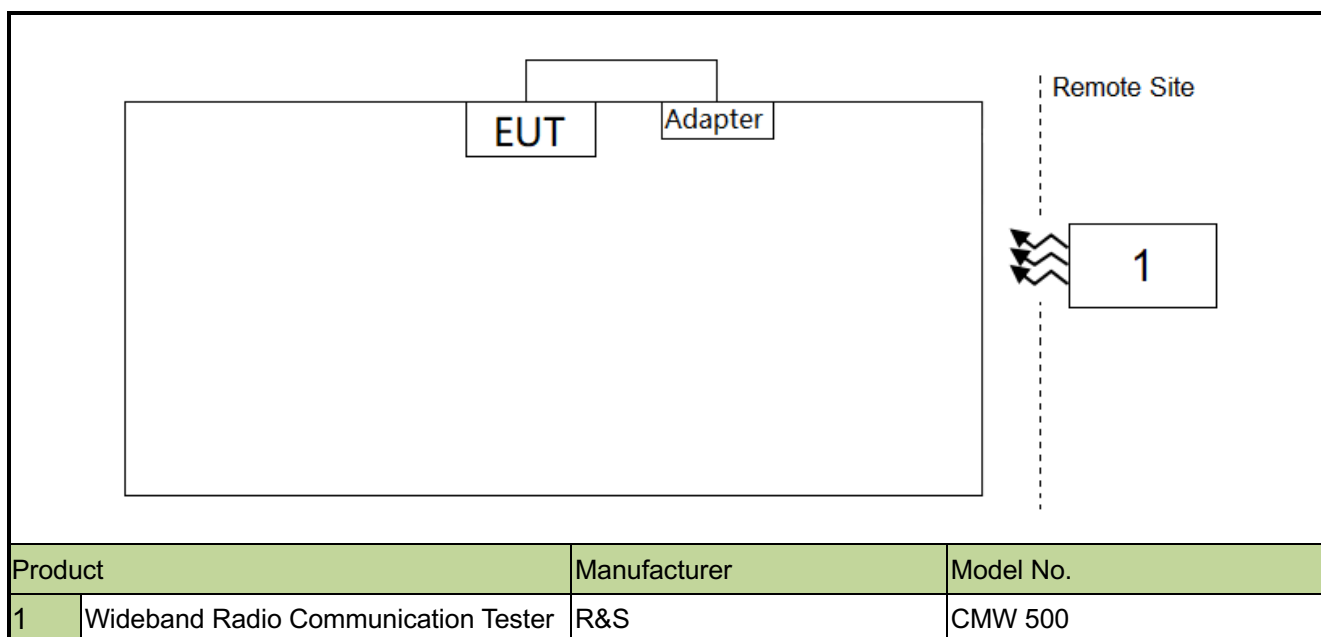
According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ANSI C63.26:2015
- FCC CFR 47 Part 22, Part 24, Part 27
- FCC KDB 971168 D01 v03r01: Power Meas License Digital Systems
- FCC KDB 971168 D02 v02r01: Misc Rev Approv License Devices
- FCC KDB 412172 D01 v01r01: Determining ERP and EIRP

### 2.5. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

## 2.6. Configuration of Tested System



## 2.7. Test Environment Condition

|                     |             |
|---------------------|-------------|
| Ambient Temperature | 15 ~ 35°C   |
| Relative Humidity   | 20% ~ 75%RH |

### 3. TEST EQUIPMENT CALIBRATION DATE

| Instrument Name      | Manufacturer | Model No. | Asset No.   | Cali. Interval | Cal. Due Date | Test Site |
|----------------------|--------------|-----------|-------------|----------------|---------------|-----------|
| Communication Tester | R&S          | CMW500    | MRTSUE06243 | 1 year         | 2022/10/10    | SIP-SR1   |
| Thermohygrometer     | testo        | 622       | MRTSUE06629 | 1 year         | 2022/11/2     | SIP-SR1   |
| Shielding Room       | MIX-BEP      | SIP-SR1   | MRTSUE06948 | /              | /             | SIP-SR1   |

| Software     | Version | Function          |
|--------------|---------|-------------------|
| EMI Software | V3      | EMI Test Software |

#### 4. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k = 2$ .

| Output Power  |
|---|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U=2U_c(y)$ ):<br>1.13dB |

## 5. TEST RESULT

### 5.1. Summary

| FCC Part<br>Section(s) | Test<br>Description                         | Test<br>Limit      | Test<br>Condition | Test<br>Result | Reference   |
|------------------------|---|--------------------|-------------------|----------------|-------------|
| 22.913(a)(5)           | Equivalent Radiated<br>Power (B5)           | < 7 Watts Max ERP  | Conducted         | Pass           | Section 5.2 |
| 27.50(d)(4)            | Equivalent Isotropic<br>Radiated Power (B4) | < 1 Watts Max EIRP |                   | Pass           | Section 5.2 |
| 24.232(c)              | Equivalent Isotropic<br>Radiated Power (B2) | < 2 Watts Max EIRP |                   | Pass           | Section 5.2 |

#### Notes:

- 1) The analyzer plots shown in this report were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 2) Based on the original report, this change is only enable the UL CA configurations (5B/7C/38C/41C) via software.

## 5.2. Equivalent Isotropically Radiated Power Measurement

### 5.2.1. Test Limit

#### Band 2:

Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

#### Band 4:

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

#### Band 5:

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

### 5.2.2. Test Procedure

ANSI C63.26-2015 - Section 5.2

### 5.2.3. Test Setting

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation (1) as follows:

$$\text{ERP or EIRP} = P_{\text{Meas}} + G_T$$

where

ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as  $P_{\text{Meas}}$ , e.g., dBm or dBW)

$P_{\text{Meas}}$  measured transmitter output power or PSD, in dBm or dBW

$G_T$  gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

$$\text{ERP} = \text{EIRP} - 2.15$$

## 5.2.4. Test Setup



### 5.2.5. Test Result

|               |               |           |            |
|---------------|---------------|-----------|------------|
| Product       | LTE Module    | Test Site | SIP-SR1    |
| Test Engineer | Candy Luo     | Test Date | 2022/03/29 |
| Test Band     | WCDMA Band II |           |            |

| Mode      | 3GPP Subtest | Conducted Power (dBm) |       |       | Antenna Gain (dBi) | EIRP (dBm)      |       |       |
|-----------|--------------|-----------------------|-------|-------|--------------------|-----------------|-------|-------|
|           |              | Band II Channel       |       |       |                    | Band II Channel |       |       |
|           |              | 9262                  | 9400  | 9538  |                    | 9262            | 9400  | 9538  |
| WCDMA R99 | 1            | 23.23                 | 23.14 | 23.22 | 4.00               | 27.23           | 27.14 | 27.22 |
| Limit     | 33.01dBm     |                       |       |       |                    |                 |       |       |

Note: The EIRP (dBm) = Conducted Power (dBm) + Antenna Gain (dBi)

The worst-case results reported in the original FCC ID: ZMOFM101GL.

| Mode      | 3GPP Subtest | Conducted Power (dBm) |       |       | Antenna Gain (dBi) | EIRP (dBm)      |       |       |
|-----------|--------------|-----------------------|-------|-------|--------------------|-----------------|-------|-------|
|           |              | Band II Channel       |       |       |                    | Band II Channel |       |       |
|           |              | 9262                  | 9400  | 9538  |                    | 9262            | 9400  | 9538  |
| WCDMA R99 | 1            | 23.87                 | 23.77 | 23.85 | 4.00               | 27.87           | 27.77 | 27.85 |
| Limit     | 33.01dBm     |                       |       |       |                    |                 |       |       |

Note: The EIRP (dBm) = Conducted Power (dBm) + Antenna Gain (dBi)

|               |               |           |            |
|---------------|---------------|-----------|------------|
| Product       | LTE Module    | Test Site | SIP-SR1    |
| Test Engineer | Candy Luo     | Test Date | 2022/03/29 |
| Test Band     | WCDMA Band IV |           |            |

| Mode      | 3GPP Subtest | Conducted Power (dBm) |       |       | Antenna Gain (dBi) | EIRP (dBm)      |       |       |
|-----------|--------------|-----------------------|-------|-------|--------------------|-----------------|-------|-------|
|           |              | Band IV Channel       |       |       |                    | Band IV Channel |       |       |
|           |              | 1312                  | 1412  | 1513  |                    | 1312            | 1412  | 1513  |
| WCDMA R99 | 1            | 23.17                 | 23.28 | 23.30 | 3.00               | 26.17           | 26.28 | 26.30 |
| Limit     | 30.00dBm     |                       |       |       |                    |                 |       |       |

Note: The EIRP (dBm) = Conducted Power (dBm) + Antenna Gain (dBi)

The worst-case results reported in the original FCC ID: ZMOFM101GL.

| Mode      | 3GPP Subtest | Conducted Power (dBm) |       |       | Antenna Gain (dBi) | EIRP (dBm)      |       |       |
|-----------|--------------|-----------------------|-------|-------|--------------------|-----------------|-------|-------|
|           |              | Band IV Channel       |       |       |                    | Band IV Channel |       |       |
|           |              | 1312                  | 1412  | 1513  |                    | 1312            | 1412  | 1513  |
| WCDMA R99 | 1            | 23.85                 | 23.98 | 23.98 | 3.00               | 26.85           | 26.98 | 26.98 |
| Limit     | 30.00dBm     |                       |       |       |                    |                 |       |       |

Note: The EIRP (dBm) = Conducted Power (dBm) + Antenna Gain (dBi)

|               |              |           |            |
|---------------|--------------|-----------|------------|
| Product       | LTE Module   | Test Site | SIP-SR1    |
| Test Engineer | Candy Luo    | Test Date | 2022/03/29 |
| Test Band     | WCDMA Band V |           |            |

| Mode      | 3GPP Subtest | Conducted Power (dBm) |       |       | Antenna Gain (dBi) | ERP (dBm)      |       |       |
|-----------|--------------|-----------------------|-------|-------|--------------------|----------------|-------|-------|
|           |              | Band V Channel        |       |       |                    | Band V Channel |       |       |
|           |              | 4132                  | 4182  | 4233  |                    | 4132           | 4182  | 4233  |
| WCDMA R99 | 1            | 23.32                 | 23.31 | 23.30 | 3.00               | 24.17          | 24.16 | 24.15 |
| Limit     | 38.45dBm     |                       |       |       |                    |                |       |       |

Note: The ERP (dBm) = Conducted Power (dBm) + Antenna Gain (dBi) – 2.15

The worst-case results reported in the original FCC ID: ZMOFM101GL.

| Mode      | 3GPP Subtest | Conducted Power (dBm) |       |       | Antenna Gain (dBi) | ERP (dBm)      |       |       |
|-----------|--------------|-----------------------|-------|-------|--------------------|----------------|-------|-------|
|           |              | Band V Channel        |       |       |                    | Band V Channel |       |       |
|           |              | 4132                  | 4182  | 4233  |                    | 4132           | 4182  | 4233  |
| WCDMA R99 | 1            | 23.88                 | 23.93 | 23.96 | 3.00               | 24.73          | 24.78 | 24.81 |
| Limit     | 38.45dBm     |                       |       |       |                    |                |       |       |

Note: The ERP (dBm) = Conducted Power (dBm) + Antenna Gain (dBi) – 2.15

## 6. CONCLUSION

Based on the spot check test result, the test data from the original model is representative for the variant model. The power level spot check are shown within expected level compliant to limit line. We are using power and ERP/EIRP measurements from the the original parent model reports to list on the grant.

We confirm that the test data reuse policy of FCC KDB 484596 D01 Referencing Test Data v01 has been followed and the test data as referenced from the parent model report represents compliance with new FCC ID.

---

The End

---

## **Appendix A - Test Setup Photograph**

Refer to “2202RSU033-UT” file.

## **Appendix B - EUT Photograph**

Refer to “2202RSU033-UE” file.