



MEASUREMENT REPORT

FCC PART 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 27 Subpart D
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-U6	Rev. 01	Initial Report	03-29-2022	Invalid
2202RSU033-U6	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.

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1. GENERAL INFORMATION

1.1. Applicant

Fibocom Wireless Inc.

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

1.2. Manufacturer

Fibocom Wireless Inc.

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

1.3. Testing Facility

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

FDD T _x Frequency Range	Band 30: 2305 ~ 2315 MHz
FDD R _x Frequency Range	Band 30: 2350 ~ 2360 MHz

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)
LTE Band 2	1850 ~ 1910	PIFA	4.00
LTE Band 4	1710 ~ 1755		3.00
LTE Band 5	824 ~ 849		3.00
LTE Band 7	2500 ~ 2570		4.00
LTE Band 12	699 ~ 716		3.00
LTE Band 13	777 ~ 787		3.00
LTE Band 14	788 ~ 798		3.00
LTE Band 17	704 ~ 716		3.00
LTE Band 25	1850 ~ 1915		4.00
LTE Band 26	814 ~ 849		3.00
LTE Band 30	2305 ~ 2315		1.00
LTE Band 38	2570 ~ 2620		4.00
LTE Band 41	2500 ~ 2690		4.00
LTE Band 48	3550 ~ 3700		1.00
LTE Band 66	1710 ~ 1780		3.00
LTE Band 71	663 ~ 698		3.00

2.4. Test Methodology

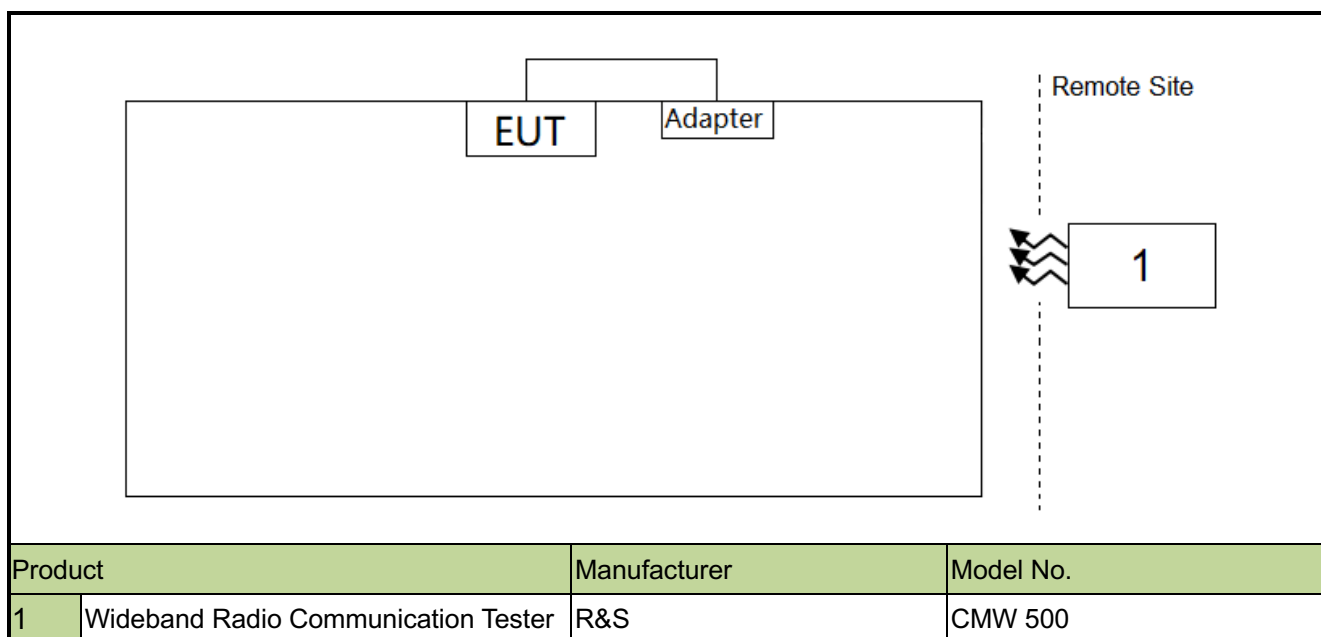
According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ANSI C63.26:2015
- FCC CFR 47 Part 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
Signal Analyzer	Keysight	N9021B	MRTSUE06915	1 year	2022/12/15	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% ($U=2Uc(y)$): 1.13dB

5. TEST RESULT

5.1. Summary

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
27.50(a)(3)	Equivalent Radiated Power	< 250mW/5MHz	Conducted	Pass	Section 5.4

Notes:

- 1) The analyzer plots shown in this section 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

For mobile and portable stations transmitting in the 2305-2315 MHz band or the 2350-2360 MHz band, the average EIRP must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth, except that for mobile and portable stations compliant with 3GPP LTE standards or another advanced mobile broadband protocol that avoids concentrating energy at the edge of the operating band the average EIRP must not exceed 250 milliwatts within any 5 megahertz of authorized bandwidth but may exceed 50 milliwatts within any 1 megahertz of authorized bandwidth

5.2.2. Test Procedure

ANSI C63.26-2015 - Section 5.2.4.4.2 & 5.2.5.5

5.2.3. Test Setting

When the fundamental condition for average power measurements cannot be realized (i.e., the EUT can not be configured to transmit at full-power on a continuous basis (i.e., duty cycle < 98%) and the instrumentation cannot be configured to measure only during active full-power transmissions), then the following procedure can be used if the EUT duty cycle is constant (i.e., duty cycle variations are less than or equal to $\pm 2\%$).

- a) Set span to $2 \times$ to $3 \times$ the OBW.
- b) Set RBW = 1% to 5% of the OBW.
- c) Set VBW $\geq 3 \times$ RBW.
- d) Set number of measurement points in sweep $\geq 2 \times$ span / RBW.
- e) Sweep time:
 - 1) Set = auto-couple, or
 - 2) Set $\geq [10 \times (\text{number of points in sweep}) \times (\text{transmission symbol period})]$ for single sweep (automation-compatible) measurement.
- f) Detector = power averaging (rms).
- g) Set sweep trigger to "free run."
- h) Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple.

To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time.

i) Using the marker function to identify the maximum PSD.

j) Add $10 \log (1/\text{duty cycle})$ to the measured power level to compute the average power during continuous transmission. For example, add $[10 \log (1/0.25)] = 6 \text{ dB}$ if the duty cycle is a constant 25%.

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

$$\text{ERP or EIRP} = P_{\text{Meas}} + G_T \quad (1)$$

where

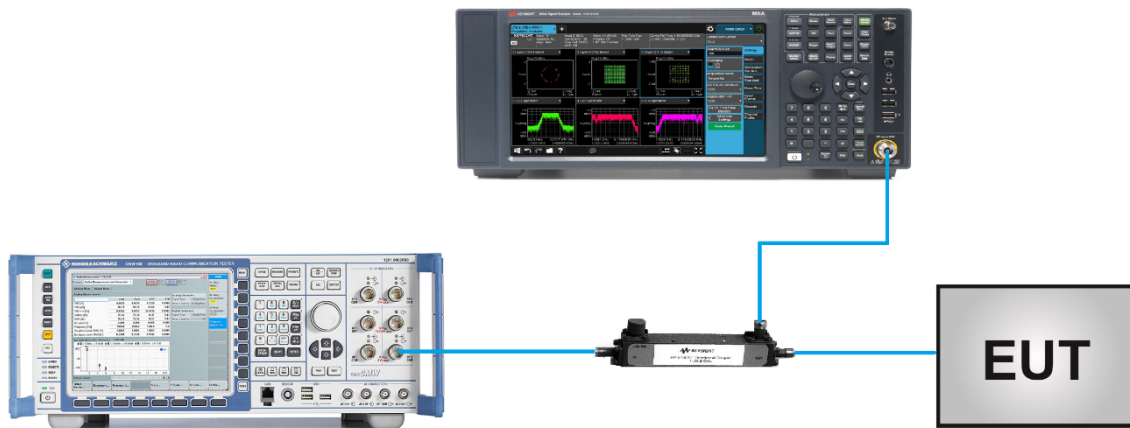
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas} , e.g., dBm or dBW)

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

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

For devices utilizing multiple antennas, see 6.4 for guidance with respect to determining the effective array transmit antenna gain term to be used in the above equation.

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

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Power Density (dBm/5MHz)	EIRP Density (dBm/5MHz)	Limit (dBm /5MHz)
QPSK							
27685	2307.5	5	25	0	18.51	19.51	< 23.98
27710	2310.0				18.62	19.62	< 23.98
27735	2312.5				18.64	19.64	< 23.98
Note: The EIRP Density (dBm/5MHz) = Power Density (dBm/5MHz) + Antenna Gain (dBi)							

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

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Power Density (dBm/5MHz)	EIRP Density (dBm/5MHz)	Limit (dBm /5MHz)
QPSK							
27685	2307.5	5	25	0	19.59	20.59	< 23.98
27710	2310.0				19.57	20.57	< 23.98
27735	2312.5				19.73	20.73	< 23.98
Note: The EIRP Density (dBm/5MHz) = Power Density (dBm/5MHz) + Antenna Gain (dBi)							

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.

Appendix A - Test Setup Photograph

Refer to “2202RSU033-UT” file.

Appendix B - EUT Photograph

Refer to “2202RSU033-UE” file.