



## RF Exposure Evaluation Report

**Application No.:** ZR/2020/70017  
**Applicant:** Fibocom Wireless Inc.  
**Address of Applicant:** 5/F, Tower A, Technology Building II, 1057 Nanhai Avenue, Shenzhen, China  
**Manufacturer:** Fibocom Wireless Inc.  
**Address of Manufacturer:** 5/F, Tower A, Technology Building II, 1057 Nanhai Avenue, Shenzhen, China  
**EUT Description:** LTE Module  
**Model No.:** NL952-NA  
**Trade Mark:** Fibocom  
**FCC ID:** ZMONL952NA  
**Standards:** 47 CFR Part 2.1091  
 FCC KDB 447498 D01 v06  
**Date of Receipt:** 2020/7/10  
**Date of Test:** 2020/7/10 to 2020/8/30  
**Date of Issue:** 2020/9/1

|                     |              |
|---------------------|--------------|
| <b>Test Result:</b> | <b>PASS*</b> |
|---------------------|--------------|

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Derek Yang  
Wireless Laboratory Manager



SGS-CSTC Standards Technical Services Co., Ltd.  
Shenzhen Branch (FCC Laboratory)

Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.  
**Attention: To check the authenticity of testing/inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com**  
 No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn  
 中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

## 1 Version

| Revision Record |         |          |          |          |
|-----------------|---------|----------|----------|----------|
| Version         | Chapter | Date     | Modifier | Remark   |
| 01              |         | 2020/9/1 |          | Original |
|                 |         |          |          |          |
|                 |         |          |          |          |

|                          |  |                                                                                     |  |  |
|--------------------------|--|-------------------------------------------------------------------------------------|--|--|
| Authorized for issue by: |  |                                                                                     |  |  |
|                          |  |    |  |  |
|                          |  | Mike Hu /Project Engineer                                                           |  |  |
|                          |  |  |  |  |
|                          |  | David Chen /Reviewer                                                                |  |  |





## Contents

|                                               |          |
|-----------------------------------------------|----------|
| <b>1 VERSION .....</b>                        | <b>2</b> |
| <b>2 GENERAL INFORMATION.....</b>             | <b>4</b> |
| 2.1 CLIENT INFORMATION .....                  | 4        |
| 2.2 TEST LOCATION .....                       | 4        |
| 2.3 TEST FACILITY .....                       | 4        |
| 2.4 GENERAL DESCRIPTION OF EUT.....           | 5        |
| <b>3 RF EXPOSURE EVALUATION.....</b>          | <b>6</b> |
| 3.1 RF EXPOSURE COMPLIANCE REQUIREMENT .....  | 6        |
| 3.1.1 <i>Limits</i> .....                     | 6        |
| 3.1.2 <i>Test Procedure</i> .....             | 7        |
| 3.1.3 <i>EUT RF Exposure Evaluation</i> ..... | 7        |



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: [CN.Doccheck@sgs.com](mailto:CN.Doccheck@sgs.com)



## 2 General Information

### 2.1 Client Information

|                          |                                                                           |
|--------------------------|---------------------------------------------------------------------------|
| Applicant:               | Fibocom Wireless Inc.                                                     |
| Address of Applicant:    | 5/F, Tower A, Technology Building II, 1057 Nanhai Avenue, Shenzhen, China |
| Manufacturer:            | Fibocom Wireless Inc.                                                     |
| Address of Manufacturer: | 5/F, Tower A, Technology Building II, 1057 Nanhai Avenue, Shenzhen, China |

### 2.2 Test Location

|            |                                                                                             |
|------------|---------------------------------------------------------------------------------------------|
| Company:   | SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch                             |
| Address:   | No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China |
| Post code: | 518057                                                                                      |
| Telephone: | +86 (0) 755 2601 2053                                                                       |
| Fax:       | +86 (0) 755 2671 0594                                                                       |
| E-mail:    | ee.shenzhen@sgs.com                                                                         |

### 2.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 3816.01.

• **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: [CN.Doccheck@sgs.com](mailto:CN.Doccheck@sgs.com)

SGS-CSTC Standards Technical Services Co., Ltd.  
Shenzhen Branch EMC Laboratory

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgs.com.cn  
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

## 2.4 General Description of EUT

|                   |                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EUT Description:: | LTE Module                                                                                                                                                                                                                                                                                                                                                                            |
| Model No.:        | NL952-NA                                                                                                                                                                                                                                                                                                                                                                              |
| Trade Mark:       | Fibocom                                                                                                                                                                                                                                                                                                                                                                               |
| Hardware Version: | V1.02                                                                                                                                                                                                                                                                                                                                                                                 |
| Software Version: | 19602.7000.00.02.02.16                                                                                                                                                                                                                                                                                                                                                                |
| Sample Type:      | <input type="checkbox"/> Portable Device, <input checked="" type="checkbox"/> Module                                                                                                                                                                                                                                                                                                  |
| Antenna Type:     | <input checked="" type="checkbox"/> External, <input type="checkbox"/> Integrated                                                                                                                                                                                                                                                                                                     |
| Antenna Gain:     | WCDMA Band II:4dBi<br>WCDMA Band VI:4dBi<br>WCDMA Band V:3dBi<br>LTE Band 2:4dBi;<br>LTE Band 4:4dBi;<br>LTE Band 5:3dBi;<br>LTE Band 7: 4dBi;<br>LTE Band 12:3dBi;<br>LTE Band 13:2dBi;<br>LTE Band 14:2dBi;<br>LTE Band 17:3dBi;<br>LTE Band 25:4dBi;<br>LTE Band 26:3dBi;<br>LTE Band 30:1dBi;<br>LTE Band 41:3dBi;<br>LTE Band 48:1dBi;<br>LTE Band 66:4dBi;<br>LTE Band 71:4dBi; |





### 3 RF Exposure Evaluation

#### 3.1 RF Exposure Compliance Requirement

##### 3.1.1 Limits

| Frequency range (MHz)                                          | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|----------------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| <b>(A) Limits for Occupational/Controlled Exposures</b>        |                               |                               |                                     |                          |
| 0.3-3.0                                                        | 614                           | 1.63                          | *(100)                              | 6                        |
| 3.0-30                                                         | 1842/f                        | 4.89/f                        | *(900/f <sup>2</sup> )              | 6                        |
| 30-300                                                         | 61.4                          | 0.163                         | 1.0                                 | 6                        |
| 300-1500                                                       | /                             | /                             | f/300                               | 6                        |
| 1500-100,000                                                   | /                             | /                             | 5                                   | 6                        |
| <b>(B) Limits for General Population/Uncontrolled Exposure</b> |                               |                               |                                     |                          |
| 0.3-1.34                                                       | 614                           | 1.63                          | *(100)                              | 30                       |
| 1.34-30                                                        | 824/f                         | 2.19/f                        | *(180/f <sup>2</sup> )              | 30                       |
| 30-300                                                         | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300-1500                                                       | /                             | /                             | f/1500                              | 30                       |
| 1500-100,000                                                   | /                             | /                             | 1.0                                 | 30                       |

F=frequency in MHz  
 \*=Plane-wave equivalent power density  
 RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules. The emissions should be within the limits at 300kHz in Table 1 of 1.1310(use the 300kHz limits for 150kHz:614V/m,1.63A/m).

Friis Formula

Friis transmission formula:  $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

$G$  = gain of antenna in linear scale

$\pi$  = 3.1416

$R$  = distance between observation point and center of the radiator in cm

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance  $r$  where the MPE limit is reached.



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: [CN.Doccheck@sgs.com](mailto:CN.Doccheck@sgs.com)  
 No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgs.com.cn  
 中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com



### 3.1.2 Test Procedure

Software provided by client enabled the EUT to transmit data at lowest, middle and highest channel individually

### 3.1.3 EUT RF Exposure Evaluation

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.0 / 2.0 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

| Operating Band   | Frequency (MHz) | Antenna Gain (dBi) | Max Conducted Average Output Power (dBm) | Output Power to Antenna (dBm) | EIRP(ERP) Limit (dBm) | Output Power to Antenna (mW) | Power Density at R = 20 cm (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) | Gain according to EIRP (dBi) | Gain according to Pd (dBi) | Max Gain Allowed (dBi) | conclusion |
|------------------|-----------------|--------------------|------------------------------------------|-------------------------------|-----------------------|------------------------------|--------------------------------------------------|-----------------------------|------------------------------|----------------------------|------------------------|------------|
| WCDMA B2         | 1852.4          | 4.00               | 24.50                                    | 28.50                         | 33.00                 | 281.8383                     | 0.1408                                           | 1.0000                      | 8.50                         | 12.51                      | 8.50                   | Pass       |
| WCDMA B4         | 1712.4          | 4.00               | 24.50                                    | 28.50                         | 30.00                 | 281.8383                     | 0.1408                                           | 1.0000                      | 5.50                         | 12.51                      | 5.50                   | Pass       |
| WCDMA B5         | 826.4           | 3.00               | 24.50                                    | 25.35                         | 38.45                 | 281.8383                     | 0.1119                                           | 0.5509                      | 16.10                        | 9.92                       | 9.92                   | Pass       |
| LTE B2           | 1880            | 4.00               | 24.00                                    | 28.00                         | 33.00                 | 251.1886                     | 0.1255                                           | 1.0000                      | 9.00                         | 13.01                      | 9.00                   | Pass       |
| LTE B4           | 1710.7          | 4.00               | 24.00                                    | 28.00                         | 30.00                 | 251.1886                     | 0.1255                                           | 1.0000                      | 6.00                         | 13.01                      | 6.00                   | Pass       |
| LTE B5           | 824.70          | 3.00               | 24.00                                    | 24.85                         | 38.45                 | 251.1886                     | 0.0997                                           | 0.5498                      | 16.60                        | 10.41                      | 10.41                  | Pass       |
| LTE B7           | 2502.50         | 4.00               | 24.00                                    | 28.00                         | 33.00                 | 251.1886                     | 0.1255                                           | 1.0000                      | 9.00                         | 13.01                      | 9.00                   | Pass       |
| LTE B12          | 699.70          | 3.00               | 24.00                                    | 24.85                         | 34.77                 | 251.1886                     | 0.0997                                           | 0.4665                      | 12.92                        | 9.70                       | 9.70                   | Pass       |
| LTE B13          | 779.50          | 2.00               | 24.00                                    | 23.85                         | 34.77                 | 251.1886                     | 0.0792                                           | 0.5197                      | 12.92                        | 10.16                      | 10.16                  | Pass       |
| LTE B14          | 790.5           | 2.00               | 24.00                                    | 23.85                         | 34.77                 | 251.1886                     | 0.0792                                           | 0.5270                      | 12.92                        | 10.23                      | 10.23                  | Pass       |
| LTE B17          | 706.5           | 3.00               | 24.00                                    | 24.85                         | 34.77                 | 251.1886                     | 0.0997                                           | 0.4710                      | 12.92                        | 9.74                       | 9.74                   | Pass       |
| LTE B25          | 1850.7          | 4.00               | 24.00                                    | 28.00                         | 33.00                 | 251.1886                     | 0.1255                                           | 1.0000                      | 9.00                         | 13.01                      | 9.00                   | Pass       |
| LTE B26(824-849) | 824.7           | 3.00               | 24.00                                    | 24.85                         | 38.45                 | 251.1886                     | 0.0997                                           | 0.5498                      | 16.60                        | 10.41                      | 10.41                  | Pass       |
| LTE B30          | 2307.5          | 1.00               | 23.00                                    | 24.00                         | 24.00                 | 199.5262                     | 0.0500                                           | 1.0000                      | 1.00                         | 14.01                      | 1.00                   | Pass       |
| LTE B41          | 2498.5          | 3.00               | 24.00                                    | 27.00                         | 33.00                 | 251.1886                     | 0.0997                                           | 1.0000                      | 9.00                         | 13.01                      | 9.00                   | Pass       |
| LTE B48          | 3552.5          | 1.00               | 22.00                                    | 23.00                         | 23.00                 | 158.4893                     | 0.0397                                           | 1.0000                      | 1.00                         | 15.01                      | 1.00                   | Pass       |
| LTE B66          | 1710.7          | 4.00               | 24.00                                    | 28.00                         | 30.00                 | 251.1886                     | 0.1255                                           | 1.0000                      | 6.00                         | 13.01                      | 6.00                   | Pass       |
| LTE B71          | 665.5           | 4.00               | 24.00                                    | 25.85                         | 34.77                 | 251.1886                     | 0.1255                                           | 0.4437                      | 12.92                        | 9.48                       | 9.48                   | Pass       |

This confirmed that the device comply with MPE limit.

The End

