



# TEST REPORT

|                                                                                                                                                                                                                                                                      |                                            |                                                  |                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------------|-------------------------------------------------------|
| <b>KCTL Inc.</b><br>65, Sinwon-ro, Yeongtong-gu,<br>Suwon-si, Gyeonggi-do, 16677, Korea<br>TEL: 82-31-285-0894 FAX: 82-505-299-8311<br><a href="http://www.kctl.co.kr">www.kctl.co.kr</a>                                                                            |                                            | Report No.:<br>KR22-SRF0013-A<br>Page (1) of (8) | <br>                                                  |
| <b>1. Client</b> <ul style="list-style-type: none"> <li>Name : Fibocom Wireless Inc.</li> <li>Address : 1101, Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan, Shenzhen, China</li> <li>Date of Receipt : 2022-01-11</li> </ul> |                                            |                                                  |                                                       |
| <b>2. Use of Report</b> : Class II Permissive change                                                                                                                                                                                                                 |                                            |                                                  |                                                       |
| <b>3. Name of Product / Model</b> : LTE module / L850-GL                                                                                                                                                                                                             |                                            |                                                  |                                                       |
| <b>4. Manufacturer / Country of Origin</b> : Fibocom Wireless Inc. / China                                                                                                                                                                                           |                                            |                                                  |                                                       |
| <b>5. Host Name of Product / Model</b> : Notebook PC / XE345XDA                                                                                                                                                                                                      |                                            |                                                  |                                                       |
| <b>6. FCC ID</b> : ZMOL850GLD                                                                                                                                                                                                                                        |                                            |                                                  |                                                       |
| <b>7. Date of Test</b> : 2022-02-03 to 2022-02-06                                                                                                                                                                                                                    |                                            |                                                  |                                                       |
| <b>8. Location of Test</b> : <input checked="" type="checkbox"/> Permanent Testing Lab <input type="checkbox"/> On Site Testing<br>(Address: 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)                                                       |                                            |                                                  |                                                       |
| <b>9. Test method used</b> : FCC Part 1.1310                                                                                                                                                                                                                         |                                            |                                                  |                                                       |
| <b>10. Test Result</b> : Refer to the test result in the test report                                                                                                                                                                                                 |                                            |                                                  |                                                       |
| Affirmation                                                                                                                                                                                                                                                          | Tested by<br>Name : Kwonse Kim (Signature) |                                                  | Technical Manager<br>Name : Seungyong Kim (Signature) |
|                                                                                                                                                                                                                                                                      |                                            |                                                  |                                                       |
| 2022-02-11                                                                                                                                                                                                                                                           |                                            |                                                  |                                                       |
| <b>KCTL Inc.</b><br>As a test result of the sample which was submitted from the client, this report does not guarantee the whole product quality. This test report should not be used and copied without a written agreement by KCTL Inc.                            |                                            |                                                  |                                                       |

|                                                                                                                                                                                           |                                                  |                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>KCTL Inc.</b><br>65, Sinwon-ro, Yeongtong-gu,<br>Suwon-si, Gyeonggi-do, 16677, Korea<br>TEL: 82-31-285-0894 FAX: 82-505-299-8311<br><a href="http://www.kctl.co.kr">www.kctl.co.kr</a> | Report No.:<br>KR22-SRF0013-A<br>Page (2) of (8) |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-------------------------------------------------------------------------------------|

## REPORT REVISION HISTORY

| Date       | Revision                   | Page No |
|------------|----------------------------|---------|
| 2022-02-10 | Originally issued          | -       |
| 2022-02-11 | Revised calculation result | 8       |
|            |                            |         |
|            |                            |         |
|            |                            |         |

*This report shall not be reproduced except in full, without the written approval of KCTL Inc. This document may be altered or revised by KCTL Inc. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by KCTL Inc. will constitute fraud and shall nullify the document. This test report is a general report that does not use the KOLAS accreditation mark and is not related to KS Q ISO/IEC 17025 and KOLAS accreditation.*

Note. The report No. KR22-SRF0013 is superseded by the report No. KR22-SRF0013-A.

## General remarks for test reports

### Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:

### Procedure number, issue date and title:

Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

☒ Statement not required by the standard or client used for type testing

CONTENTS

1. General information .....4

2. Device information .....4

2.1. Additional WLAN/Bluetooth Module information .....5

2.2. Simultaneous Transmission Configurations .....5

3. RF Exposure.....6

4. Test Result.....8

4.1 Calculation result of RF exposure .....8

4.2 Simultaneous Transmission Analysis .....8



|                                                                                                                                                                                           |                                                         |                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>KCTL Inc.</b><br>65, Sinwon-ro, Yeongtong-gu,<br>Suwon-si, Gyeonggi-do, 16677, Korea<br>TEL: 82-31-285-0894 FAX: 82-505-299-8311<br><a href="http://www.kctl.co.kr">www.kctl.co.kr</a> | Report No.:<br><b>KR22-SRF0013-A</b><br>Page (4) of (8) |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 1. General information

Client : Fibocom Wireless Inc.  
 Address : 1101, Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan, Shenzhen, China  
 Manufacturer : Fibocom Wireless Inc.  
 Address : 1101, Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan, Shenzhen, China  
 Laboratory : KCTL Inc.  
 Address : 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea  
 Accreditations : FCC Site Designation No: KR0040, FCC Site Registration No: 687132  
 VCCI Registration No. : R-20080, G-20078, C-20059, T-20056  
 CAB Identifier: KR0040  
 ISED Number: 8035A  
 KOLAS No.: KT231

## 2. Device information

Equipment under test : LTE module  
 Model : L850-GL  
 Host name of Product : Notebook PC  
 Host Model : XE345XDA  
 Modulation technique : LTE\_QPSK, 16QAM  
 WCDMA\_QPSK  
 Power source : DC 7.72 V  
 Antenna specification : LTE/WCDMA\_FPCB Antenna  
 Frequency range :
 

|             |                         |
|-------------|-------------------------|
| LTE Band 2  | : 1 850 MHz ~ 1 910 MHz |
| LTE Band 4  | : 1 710 MHz ~ 1 755 MHz |
| LTE Band 5  | : 824 MHz ~ 849 MHz     |
| LTE Band 7  | : 2 500 MHz ~ 2 570 MHz |
| LTE Band 12 | : 699 MHz ~ 716 MHz     |
| LTE Band 13 | : 777 MHz ~ 787 MHz     |
| LTE Band 38 | : 2 570 MHz ~ 2 620 MHz |
| LTE Band 66 | : 1 710 MHz ~ 1 780 MHz |
| WCDMA 850   | : 824 MHz ~ 849 MHz     |
| WCDMA 1900  | : 1 850 MHz ~ 1 910 MHz |

Software version : Chrome OS  
 Hardware version : REV5  
 Test device serial No. : 1JKN91ZR600022M, 1JKP91ZR600093W, 1JKN91ZR600017E

### Note.

1. In this report is based on original report FCC ID: ZMOL850GLD, additional simultaneous transmission measurement with intel module AX201D2W which is also integrated into this host was investigated in test report.  
 - SAR Report No.: KR21-SPF0049 (Intel Mobile Communications / AX201D2W / FCC ID: PD9AX201D2)

## 2.1. Additional WLAN/Bluetooth Module information

|                      |   |                                                   |                                        |  |
|----------------------|---|---------------------------------------------------|----------------------------------------|--|
| Manufacturer         | : | Intel Mobile Communications                       |                                        |  |
| Model                | : | AX201D2W                                          |                                        |  |
| FCC ID               | : | PD9AX201D2                                        |                                        |  |
| Modulation technique | : | DSSS, OFDM, OFDMA                                 |                                        |  |
| Frequency range      | : | 802.11b/g/n/ax                                    | 2.4 GHz Band (2 400.0 – 2 483.5 MHz)   |  |
|                      |   | 802.11a/n/ac/ax                                   | 5.15 GHz Band (5 150.0 – 5 250.0 MHz)  |  |
|                      |   |                                                   | 5.25 GHz Band (5 250.0 – 5 350.0 MHz)  |  |
|                      |   |                                                   | 5.47 GHz Band (5 470.0 – 5 725.0 MHz)  |  |
|                      |   |                                                   | 5.725 GHz Band (5 725.0 – 5 850.0 MHz) |  |
|                      |   | Bluetooth/Low Energy                              | 2.4 GHz Band (2 400.0 – 2 483.5 MHz)   |  |
| Antenna Information  | : | Chain A (Aux): WLAN 2.4 GHz & 5 GHz and Bluetooth |                                        |  |
|                      |   | Chain B (Main): WLAN 2.4 GHz & 5 GHz              |                                        |  |

## 2.2. Simultaneous Transmission Configurations

| No | Scenario               |
|----|------------------------|
| 1  | Bluetooth (Aux) + WWAN |

Note.

- WWAN does not work simultaneously with WIFI.
- For the simultaneous analysis the highest ratio among the channels and modes of cellular module L850-GL and SAR values of the unlicensed module AX201D2W was selected for the RF exposure.

### 3. RF Exposure

#### 3.1 Regulation

This document is prepared to show compliance with the RF Exposure requirements as required in §1.1310 of the FCC rules and Regulations.

The limit for Maximum Permissible Exposure (MPE), specified in FCC §1.1310, is listed in Table 1-1. According to FCC §1.1310: the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b).

Table 1 – Limits for Maximum Permissible Exposure (MPE)

| Frequency Range<br>(MHz)                                  | Electric Field<br>Strength<br>[V/m] | Magnetic Field<br>Strength<br>[A/m] | Power Density<br>[mW/cm <sup>2</sup> ] | Averaging<br>Time<br>[minute] |
|-----------------------------------------------------------|-------------------------------------|-------------------------------------|----------------------------------------|-------------------------------|
| (A) Limits for Occupational / Controlled Exposure         |                                     |                                     |                                        |                               |
| 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 ~ 1 500                                               | /                                   | /                                   | f/300                                  | 6                             |
| 1 500 ~ 15 000                                            | /                                   | /                                   | 5                                      | 6                             |
| (B) Limits for General Population / Uncontrolled Exposure |                                     |                                     |                                        |                               |
| 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 ~ 1 500                                               | /                                   | /                                   | f/1 500                                | 30                            |
| 1 500 ~ 15 000                                            | /                                   | /                                   | 1.0                                    | 30                            |

f=frequency in MHz, \*= plane-wave equivalent power density

#### 3.2 MPE (Maximum Permissible Exposure) Prediction

Predication of MPE limit at a given distance: Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4\pi R^2} \quad (\Rightarrow R = \sqrt{\frac{PG}{4\pi S}})$$

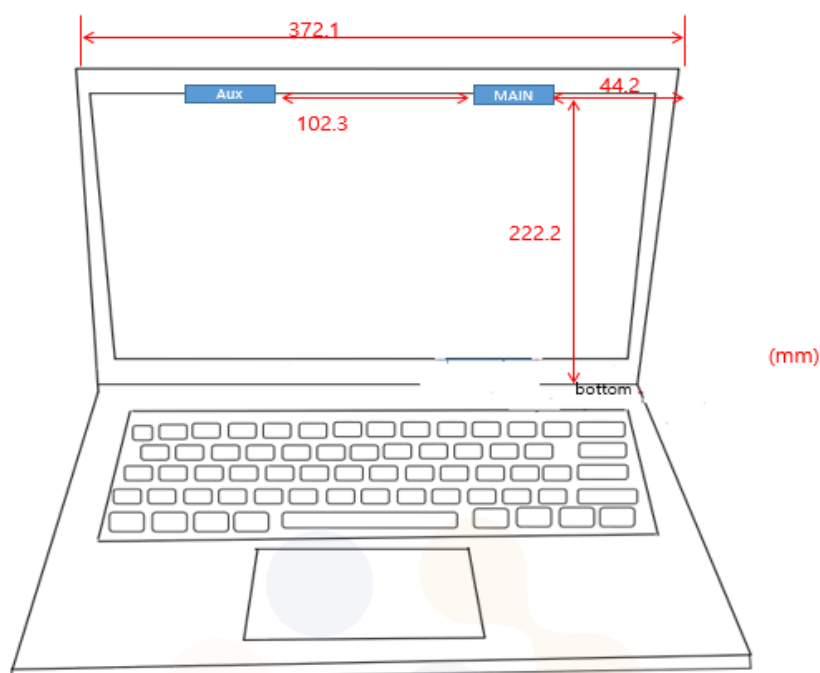
S = power density [mW/cm<sup>2</sup>]

P = Power input to antenna [mW]

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna [cm]

### 3.3 Antenna Position



The antenna of this product, under normal use condition, is at least 20 cm away from bottom. So, this device is classified as Mobile device.

### 3.4 Simultaneous transmission

According to KDB 447498 D01v06, When one of the following test exclusion conditions is satisfied for all combinations of simultaneous transmission configurations, further equipment approval is not required to incorporate transmitter modules in host devices that operate in the mixed mobile and portable host platform exposure conditions.

- The  $\sum$  of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg] + [ $\sum$  of MPE ratios] is  $\leq 1.0$
- The SAR to peak location separation ratios of all simultaneously transmitting antenna pairs operating in portable device exposure conditions are all  $\leq 0.04$ , and the [ $\sum$  of MPE ratios] is  $\leq 1.0$ .

Test exclusion condition a):

$$\frac{\sum \text{ of Highest Reported SAR(Bluetooth)}}{\text{Limit}} + \frac{\text{Highest Max.tune up of cellular band}}{\text{Limit}} = < 1.0$$

## 4. Test Result

### 4.1 Calculation result of RF exposure

| Band         | Frequency range [MHz] | Max. Tune-up Power [dBm] | Ant. Gain [dBi] | Distance [cm] | Power density [mW/cm <sup>2</sup> ] | Limit [mW/cm <sup>2</sup> ] |
|--------------|-----------------------|--------------------------|-----------------|---------------|-------------------------------------|-----------------------------|
| WCDMA Band 2 | 1 850 – 1 910         | 24.5                     | 2.55            | 20            | 0.100 863                           | 1.00                        |
| WCDMA Band 5 | 824 – 849             | 24.5                     | 1.63            | 20            | 0.081 608                           | 0.55                        |
| LTE Band 2   | 1 850 – 1 910         | 24                       | 2.55            | 20            | 0.089 894                           | 1.00                        |
| LTE Band 4   | 1 710 – 1 755         | 24                       | 3.14            | 20            | 0.102 975                           | 1.00                        |
| LTE Band 5   | 824 – 849             | 24                       | 1.63            | 20            | 0.072 733                           | 0.55                        |
| LTE Band 7   | 2 500 – 2 570         | 24                       | 3.69            | 20            | 0.116 877                           | 1.00                        |
| LTE Band 12  | 699 – 716             | 24                       | -0.96           | 20            | 0.040 062                           | 0.47                        |
| LTE Band 13  | 777 – 787             | 24                       | 1.75            | 20            | 0.074 770                           | 0.52                        |
| LTE Band 38  | 2 570 – 2 620         | 24                       | 1.83            | 20            | 0.076 161                           | 1.00                        |
| LTE Band 66  | 1 710 – 1 780         | 24                       | 3.14            | 20            | 0.102 975                           | 1.00                        |

#### Note.

1. The power density  $P_d$  at a distance of 20 cm calculated from the friis transmission.

### 4.2 Simultaneous Transmission Analysis

| Mode                                                 | Exposure Condition / Position | Scaled 1g SAR (W/kg) | Power density (mW/cm <sup>2</sup> ) | Ratio |
|------------------------------------------------------|-------------------------------|----------------------|-------------------------------------|-------|
| Bluetooth (DH5)                                      | Body SAR / Rear               | 0.210                | N/A                                 | 0.131 |
| Cellular Band (WCDMA B5)                             | MPE                           |                      | 0.082                               | 0.149 |
| Summation (Bluetooth SAR Ratio + WCDMA B5 MPE Ratio) |                               |                      |                                     | 0.280 |

#### Note.

1. When the sum of ratios of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the 1.0 the additional equipment approval is not required.
2. Ratio calculation
  - Bluetooth:  $0.210 / 1.6 = 0.131$
  - WCDMA Band 5 :  $0.082 / 0.55 = 0.149$
3. Simultaneous transmission of RF exposure.
  - $0.131 + 0.149 = 0.280$

**End of test report**