




# TEST REPORT

<b>KCTL Inc.</b> 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea TEL: 82-31-285-0894 FAX: 82-505-299-8311 <a href="http://www.kctl.co.kr">www.kctl.co.kr</a>		Report No.: <b>KR21-SRF0167-A</b> Page (1) of (8)	
<b>1. Client</b> ◦ Name : Fibocom Wireless Inc. ◦ Address : 1101, Tower A, Building 6, Shenzhen International Innovation Valley Dashi 1st Rd, Nanshan, Shenzhen, China ◦ Date of Receipt : 2021-06-03			
<b>2. Use of Report</b> : Class II Permissive change			
<b>3. Name of Product / Model</b> : LTE module / NL668-AM-00			
<b>4. Manufacturer / Country of Origin</b> : Fibocom Wireless Inc. / China			
<b>5. Host Name of Product / Model</b> : Notebook PC / XE345XDA			
<b>6. Host Series Model</b> : XE345XDA-MA1TM			
<b>7. FCC ID</b> : ZMONL668AM00			
<b>8. Date of Test</b> : 2021-07-30 to 2021-08-03			
<b>9. Location of Test</b> : <input checked="" type="checkbox"/> Permanent Testing Lab <input type="checkbox"/> On Site Testing (Address: 65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea)			
<b>10. Test method used</b> : FCC Part 1.1310			
<b>11. Test Result</b> : Refer to the test result in the test report			
Affirmation	Tested by Name : Kwonse Kim (Signature)		Technical Manager Name : Seungyong Kim (Signature)
			2021-08-12
<h2>KCTL Inc.</h2> <p>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.</p>			

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## REPORT REVISION HISTORY

Date	Revision	Page No
2021-08-09	Originally issued	-
2021-08-12	Updated	1, 4

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Note. The report No. KR21-SRF0167 is superseded by the report No. KR21-SRF0167-A.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.....7

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

    4.2 Simultaneous Transmission Analysis .....8

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## 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 : NL668-AM-00  
 Host name of Product : Notebook PC  
 Host Model : XE345XDA  
 Host Series Model : XE345XDA-MA1TM  
 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 12\_699 MHz ~ 716 MHz  
 LTE Band 66\_1 710 MHz ~ 1 780 MHz  
 LTE Band 71\_663 MHz ~ 698 MHz  
 WCDMA B2\_1 850 MHz ~ 1 910 MHz  
 WCDMA B4\_1 710 MHz ~ 1 755 MHz  
 Software version : Chrome OS  
 Hardware version : REV5  
 Test device serial No. : 1JKP91ZR600080W  
 Operation temperature : 10 °C ~ 35 °C

### Note.

1. In this report is based on original report FCC ID: ZMONL668AM00, additional simultaneous transmission analysis with intel module AX201D2W which is also integrated into this host was reported in test report.

- SAR Report No.: KR21-SPF0051 (Intel Mobile Communications / AX201D2W / FCC ID: PD9AX201D2)

2. Host series model: the SKU model name is a 5-digit identification number that is added after the basic model name (8 digits), and serves as a memo to indicate detailed specifications/businesses.

## 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: WLAN 2.4 GHz & 5 GHz and Bluetooth		
		Chain B: 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 NL668-AM-00 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 (MHz)	Electric Field Strength [V/m]	Magnetic Field Strength [A/m]	Power Density [mW/cm <sup>2</sup> ]	Averaging Time [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

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

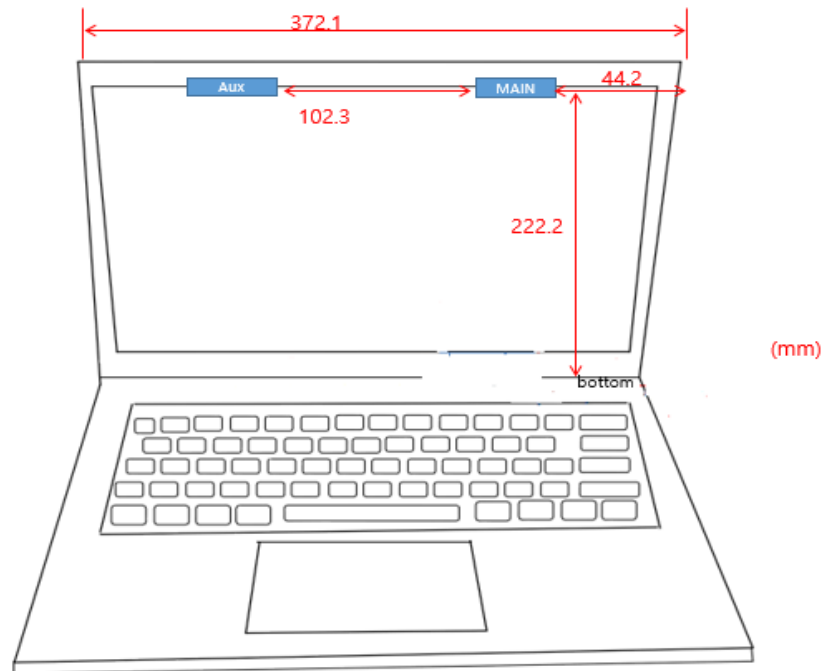
S = power density [mW/cm<sup>2</sup>]

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	2.38	20	0.086 443	1.00
WCDMA Band 4	1 710 – 1 755	24	1.47	20	0.070 102	1.00
LTE Band 2	1 850 – 1 910	23.5	2.38	20	0.077 042	1.00
LTE Band 4	1 710 – 1 755	23.5	1.47	20	0.062 478	1.00
LTE Band 5	824 – 849	23.5	-3.41	20	0.020 311	0.55
LTE Band 12	699 – 716	23.5	-1.30	20	0.033 016	0.47
LTE Band 66	1 710 – 1 780	23.5	2.18	20	0.073 575	1.00
LTE Band 71	663 - 698	23.5	-0.81	20	0.036 960	0.44

**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	Body SAR / Rear	0.146	N/A	0.091
Cellular Band (WCDMA B2)	MPE		0.086	0.086
Summation (Bluetooth SAR Ratio + WCDMA B2 MPE Ratio)				0.177

**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:  $0.146 / 1.6 = 0.091$
  - WCDMA Band 2:  $0.086 / 1.00 = 0.086$
3. Simultaneous transmission of RF exposure.
  - $0.091 + 0.086 = 0.177$

**End of test report**