

## RF Exposure Report

**Report No.:** SA200320E01A

**FCC ID:** I88C4000LZ

**Test Model:** C4000LZ

**Received Date:** Mar. 24, 2020

**Test Date:** May 06, 2020

**Issued Date:** Sep. 11, 2020

**Applicant:** Zyxel Communications Corporation

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**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Hsin Chu Laboratory

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Taiwan

**Test Location:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
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**FCC Registration /  
Designation Number:** 723255 / TW2022

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### Release Control Record

Issue No.	Description	Date Issued
SA200320E01A	Original release.	Sep. 11, 2020

## 1 Certificate of Conformity

**Product:** Dual-Band Wireless AX VDSL2 Gigabit Gateway

**Brand:** CenturyLink, ZYXEL

**Test Model:** C4000LZ

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** Zyxel Communications Corporation

**Test Date:** May 06, 2020

**Standards:** FCC Part 2 (Section 2.1091)

IEEE C95.3 -2002

**References Test Guidance:** KDB 447498 D01 General RF Exposure Guidance v06

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**Prepared by :**



Joyce Kuo / Specialist

**Date:**

Sep. 11, 2020

**Approved by :**



Clark Lin / Technical Manager

**Date:**

Sep. 11, 2020

## 2 RF Exposure

### 2.1 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> )	Average Time (minutes)
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
300-1500	...	...	f/1500	30
1500-100,000	...	...	1.0	30

f = Frequency in MHz ; \*Plane-wave equivalent power density

### 2.2 MPE Calculation Formula

$$Pd = (Pout * G) / (4 * \pi * r^2)$$

where

Pd = power density in mW/cm<sup>2</sup>

Pout = 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

### 2.3 Classification

The antenna of this product, under normal use condition, is at least 25cm away from the body of the user. So, this device is classified as **Mobile Device**.

## 2.4 Antenna Gain

Antenna NO.	Chain NO.	Brand	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length(mm)
2G_ANT1	Chain 0	M.gear	2.48	2.4~2.4835GHz	Dipole	i-pex(MHF)	108.5
5G_ANT1	Chain 0	M.gear	3.36	5.15~5.25GHz	Dipole	i-pex(MHF)	113.5
			3.45	5.25~5.35GHz			
			3.44	5.47~5.725GHz			
			3.36	5.725~5.85GHz			
2G_ANT2	Chain 1	M.gear	2.77	2.4~2.4835GHz	Dipole	i-pex(MHF)	148.5
5G_ANT2	Chain 1	M.gear	3.41	5.15~5.25GHz	Dipole	i-pex(MHF)	78.5
			3.18	5.25~5.35GHz			
			3.47	5.47~5.725GHz			
			3.47	5.725~5.85GHz			

\* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

## 2.5 Calculation Result

For 2.4GHz, 5GHz (U-NII-1 & U-NII-3 band) data was copied from the original test report (Report No.: SA200320E01)

Operation Mode	Evaluation Frequency (MHz)	Max AV. Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
WLAN (2.4GHz)	2437	832.061	5.64	25	0.38821	1
WLAN 5GHz U-NII-1	5200	827.149	6.4	25	0.45972	1
WLAN 5GHz U-NII-2A	5270	221.25	6.33	25	0.121	1
WLAN 5GHz U-NII-2C	5510	221.692	6.47	25	0.07621	1
WLAN 5GHz U-NII-3	5755	945.395	6.43	25	0.52908	1

### NOTE:

- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- 2.4GHz: The directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 5.64 \text{ dBi}$
- 5GHz:
  - U-NII-1: The directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 6.4 \text{ dBi}$
  - U-NII-2A: The directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 6.33 \text{ dBi}$
  - U-NII-2C: The directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 6.47 \text{ dBi}$
  - U-NII-3: The directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 6.43 \text{ dBi}$

### Conclusion:

The formula of calculated the MPE is:

$$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

$$\text{WLAN 2.4GHz} + \text{WLAN 5GHz} = 0.38821 / 1 + 0.52908 / 1 = 0.91729$$

**Therefore the maximum calculations of above situations are less than the "1" limit.**

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