RF Exposure Report

Report No.: SABFBE-WTW-P21080189

FCC ID: I88C4000LZ

Test Model: C4000LZ

Series Model: C4000BZ

Received Date: Mar. 24, 2020

Test Date: May 06, 2020

Issued Date: Oct. 07, 2021

Applicant: Zyxel Communications Corporation

Address: No.2 Industry East RD. IX, Hsinchu Science Park, Hsinchu 30075, Taiwan

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

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

FCC Registration / Designation Number: 723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
SABFBE-WTW-P21080189	Original release.	Oct. 07, 2021

1　Certificate of Conformity

Product:	Dual-Band Wireless AX VDSL2 Gigabit Gateway, Dual-Band Wireless AX VDSL2 Gigabit Bonding Gateway
Brand:	CenturyLink, ZYXEL
Test Model:	C4000LZ
Series Model:	C4000BZ
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 : _Cherry Chuo_ , **Date:** Oct. 07, 2021

Cherry Chuo / Specialist

Approved by : _____ , **Date:** Oct. 07, 2021

Clark Lin / Technical Manager

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^2)	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^2)*	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^2

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

All data was copied from the original test report (Report No.: SA200320E01A).

Operation Mode	Evaluation Frequency (MHz)	Max AV. Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
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:
1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. 2.4GHz: The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2]$ = 5.64 dBi
3. 5GHz:
   U-NII-1: The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2]$ = 6.4 dBi
   U-NII-2A: The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2]$ = 6.33 dBi
   U-NII-2C: The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2]$ = 6.47 dBi
   U-NII-3: The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2]$ = 6.43 dBi

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + 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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