RF Exposure Report

Report No.:	SA200320E01
FCC ID:	I88C4000LZ
Test Model:	C4000LZ
Received Date:	Mar. 20, 2020
Test Date:	Apr. 30, 2020
Issued Date:	May 28, 2020
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
SA200320E01	Original release.	May 28, 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:	Apr. 30, 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 , **Date:** May 28, 2020

Joyce Kuo / Specialist

Approved by : , **Date:** May 28, 2020

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

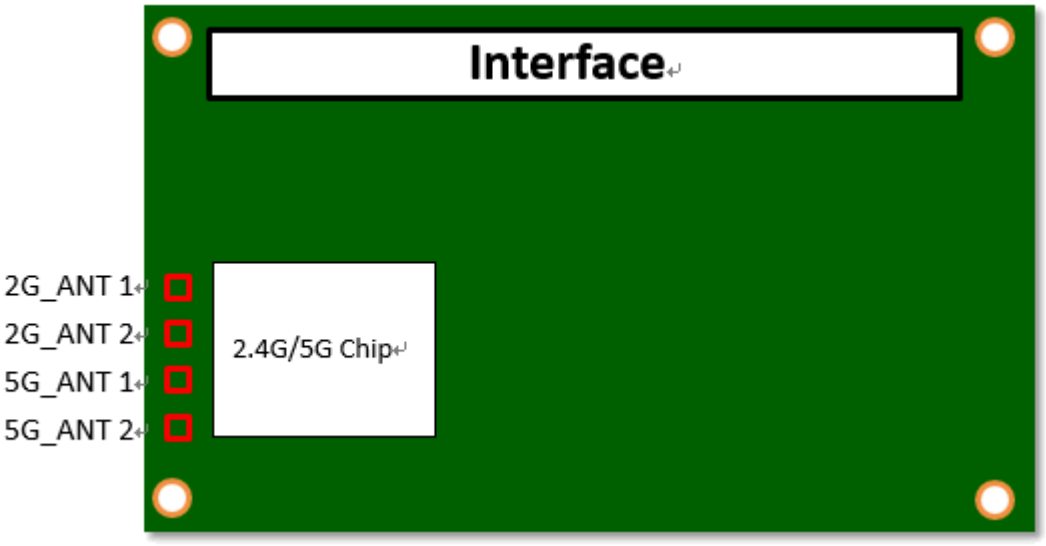
R = distance between observation point and center of the radiator in cm

2.3 Classification

The antenna of this product, under normal use condition, is at least 25 cm 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)	150
2G_ANT2	Chain 1	M.gear	2.77	2.4~2.4835GHz	Dipole	i-pex(MHF)	150
5G_ANT1	Chain 0	M.gear	3.36	5.15~5.25GHz	Dipole	i-pex(MHF)	150
			3.45	5.25~5.35GHz			
			3.44	5.47~5.725GHz			
			3.36	5.725~5.85GHz			
5G_ANT2	Chain 0	M.gear	3.41	5.15~5.25GHz	Dipole	i-pex(MHF)	150
			3.18	5.25~5.35GHz			
			3.47	5.47~5.725GHz			
			3.47	5.725~5.85GHz			



* Antenna port location

2.5 Calculation Result

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 (U-NII-1)	5200	827.149	6.4	25	0.45972	1
WLAN (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-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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