RF Exposure Report

Report No.: SA170315E03A

FCC ID: I88C3000Z

Test Model: C3000Z

Received Date: Mar. 15, 2017

Test Date: Apr. 19, 2017

Issued Date: July 12, 2017

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

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Release Control Record

Issue No.	Description	Date Issued
SA170315E03A	Original release.	July 12, 2017

1   Certificate of Conformity

Product: WiFi-N VDSL2 4-port Combo WAN CPE

Brand: ZYXEL

Test Model: C3000Z

Sample Status: ENGINEERING SAMPLE

Applicant: Zyxel Communications Corporation

Test Date: Apr. 19, 2017

Standards: FCC Part 2 (Section 2.1091)

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 : _Cindy Hsin_   , **Date:** July 12, 2017

Cindy Hsin / Specialist

Approved by : _____   , **Date:** July 12, 2017

May Chen / 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 40cm away from the body of the user.
So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

2.4GHz antenna								
Antenna NO.	PCB NO.	Brand	Model	Antenna Gain(dBi) Including cable loss	Frequency range (GHz)	Antenna Type	Antenna Connector	Cable Length (mm)
1	WJ1	Airgain	65-031-049008B	4.5	2.4~2.4835	Dipole	NA	295
2	WJ0	Airgain	65-031-049007B	4.1	2.4~2.4835	Dipole	NA	320
3	WJ2	Airgain	65-031-049009B	3.1	2.4~2.4835	Dipole	NA	270
5GHz antenna								
Antenna NO.	PCB NO.	Brand	Model	Antenna Gain(dBi) Including cable loss	Frequency range (GHz)	Antenna Type	Antenna Connector	Cable Length (mm)
1	JC2	Airgain	65-031-049003B	4.4	5.15~5.85	Dipole	i-pex(MHF)	50
2	JC3	Airgain	65-031-049004B	4.8	5.15~5.85	Dipole	i-pex(MHF)	85
3	JC1	Airgain	65-031-049005B	4.4	5.15~5.85	Dipole	i-pex(MHF)	50
4	JC0	Airgain	65-031-049006B	4.4	5.15~5.85	Dipole	i-pex(MHF)	65

2.5　Calculation Result of Maximum Conducted Power

For 2.4GHz, 5GHz (U-NII-1 & UNII-3 band) data was copied from the original test report (Report No.: SA170315E03)

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm²)	Limit (mW/cm²)
2412~2462	989.071	8.69	40	0.36383	1
5180-5240	703.104	10.52	40	0.39417	1
5260-5320	221.701	10.52	40	0.12429	1
5500-5720	241.613	10.52	40	0.13545	1
5745-5825	926.785	10.52	40	0.51957	1

NOTE:

2.4GHz : Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.69$dBi

5 GHz : Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / 4] = 10.52$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 = 0.36383 / 1 + 0.51957 / 1 = 0.88340

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

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