

## RF Exposure Report

**Report No.:** SA170315E03

**FCC ID:** I88C3000Z

**Test Model:** C3000Z

**Received Date:** Mar. 15, 2017

**Test Date:** Apr. 19 to 26, 2017

**Issued Date:** May 29, 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
SA170315E03	Original release.	May 29, 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 to 26, 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:**

May 29, 2017

Cindy Hsin / Specialist

**Approved by :**

*May Chen*

**Date:**

May 29, 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 <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

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

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 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

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
2412~2462	989.071	8.69	40	0.36383	1
5180-5240	703.104	10.52	40	0.39417	1
5745-5825	926.785	10.52	40	0.51957	1

NOTE:

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

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

### Conclusion:

The formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

$\text{WLAN 2.4GHz} + \text{WLAN 5GHz} = 0.36383 / 1 + 0.51957 / 1 = 0.88340$

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

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