

## RF Exposure Report

**Report No.:** SA190806E11A

**FCC ID:** I88EX5510-B0

**Test Model:** EX5510-B0, PX7511-B0, DX5510-B0

**Received Date:** Aug. 06, 2019

**Test Date:** Aug. 26 to 28, 2019

**Issued Date:** Dec. 19, 2019

**Applicant:** Zyxel Communications Corporation

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**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
SA190806E11A	Original release.	Dec. 19, 2019

## 1 Certificate of Conformity

**Product:** Dual-Band Wireless AX Gigabit Ethernet Gateway,  
Wireless AX 10G PON Gateway with VoIP,  
Wireless AX VDSL Bonding Gateway

**Brand:** ZYXEL

**Test Model:** EX5510-B0, PX7511-B0, DX5510-B0

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** Zyxel Communications Corporation

**Test Date:** Aug. 26 to 28, 2019

**Standards:** FCC Part 2 (Section 2.1091)  
KDB 447498 D01 General RF Exposure Guidance v06  
IEEE C95.1-1992

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 :**  , **Date:** Dec. 19, 2019  
Claire Kuan / Specialist

**Approved by :**  , **Date:** Dec. 19, 2019  
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 <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

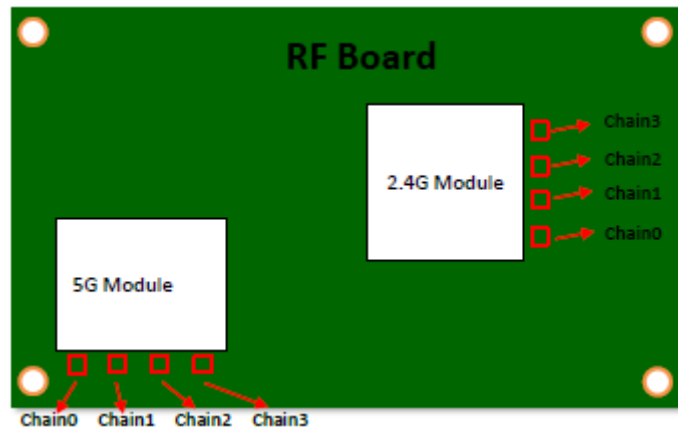
### 2.3 Classification

The antenna of this product, under normal use condition, is at least 27cm away from the body of the user.

So, this device is classified as **Mobile Device**.

## 2.4 Antenna Gain

Ant. No.	Chain No.	Brand	Model	Antenna Gain (dBi)	Frequency range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
1	2G Chain 2	Airgain	65-034-000014B	0.12	2.4~2.4835	Dipole	i-pex (MHF)	150
2	2G Chain 3		65-034-000015B	0.12	2.4~2.4835 5.15~5.85 (5G for RX zero wait DFS)	Dipole	i-pex (MHF)	100
3	2G Chain 0		65-034-000016B	0.12	2.4~2.4835	Dipole	i-pex (MHF)	65
4	2G Chain 1		65-034-000017B	0.12	2.4~2.4835	Dipole	i-pex (MHF)	130
5	5G Chain 2	Airgain	65-034-000018B	0	5.15~5.85	Dipole	i-pex (MHF)	195
6	5G Chain 0		65-034-000019B	0	5.15~5.85	Dipole	i-pex (MHF)	150
7	5G Chain 3		65-034-000020B	0	5.15~5.85	Dipole	i-pex (MHF)	250
8	5G Chain 1		65-034-000021B	0	5.15~5.85	Dipole	i-pex (MHF)	230



\* Antenna port location

## 2.5 Calculation Result of Maximum Conducted Power

For 2.4GHz, 5GHz (U-NII-1, U-NII-3) data was copied from the original test report (Report No.: SA190806E11)

Operation Mode	Evaluation Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
WLAN 2.4GHz	2437	995.204	6.14	27	0.44666	1
WLAN U-NII-1	5200	975.47	6.02	27	0.42587	1
WLAN U-NII-2A	5290	249.522	6.02	27	0.10894	1
WLAN U-NII-2C	5500	248.699	6.02	27	0.10858	1
WLAN U-NII-3	5785	988.981	6.02	27	0.43177	1

### NOTE:

- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- 2.4GHz: Directional gain =  $0.12\text{dBi} + 10\log(4) = 6.14\text{dBi}$   
5GHz: Directional gain =  $0\text{dBi} + 10\log(4) = 6.02\text{dBi}$

### 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

$$\text{WLAN 2.4GHz} + \text{WLAN 5GHz} = 0.44666 / 1 + 0.43177 / 1 = 0.87843$$

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

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