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Report No.: 2203RSU090-U4 Report Version: V01 Issue Date: 2022-06-06

RF Exposure Evaluation Declaration

FCC ID: 188EX2210-T0

Applicant: Zyxel Communications Corporation

Product: Dual-Band Wireless AX1800 Gigabit Ethernet Gateway

Model No.: EX2210-T0

Brand Name: ZYXEL

FCC Classification: Digital Transmission System (DTS)

Unlicensed National Information Infrastructure (NII)

FCC Rule Part(s): Part 2.1091

Result: Complies

Test Date: 2022-05-07

Reviewed By:

Kevin Guo

Approved By:

Robin Wu

Robin Wu

Kevin Guo

ACCREDITED

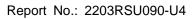
TESTING LABORATORY
CERTIFICATE #3628.01

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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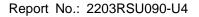
Revision History

Report No.	Version	Description	Issue Date	Note
2203RSU090-U4	Rev. 01	Initial Report	2022-06-06	Valid



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1. General Information

1.1. Applicant

Zyxel Communications Corporation

No.2, Industry East Road IX, Science Park Hsinchu, Taiwan

1.2. Manufacturer

Zyxel Communications Corporation

No.2, Industry East Road IX, Science Park Hsinchu, Taiwan

1.3. Testing Facility

\boxtimes	Test Site - MRT	Test Site – MRT Suzhou Laboratory						
	Laboratory Location (Suzhou - Wuzhong)							
	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China Laboratory Location (Suzhou - SIP) 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China							
	Laboratory Accre	editations						
	A2LA: 3628.01		CNAS	S: L10551				
	FCC: CN1166		ISED:	: CN0001				
	VCCI:	□R-20025	□G-20034	□C-20020	□T-20020			
	VCCI:	□R-20141	□G-20134	□C-20103	□T-20104			
	Test Site - MRT	Shenzhen Laborat	ory					
	Laboratory Loca	tion (Shenzhen)						
	1G, Building A, Ju	ınxiangda Building,	Zhongshanyuan Roa	ıd West, Nanshan Di	strict, Shenzhen, China			
	Laboratory Accre	editations						
	A2LA: 3628.02 CNAS: L10551							
	FCC: CN1284		ISED:	CN0105	_			
	Test Site - MRT	Taiwan Laboratory	,					
	Laboratory Location (Taiwan)							
	No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)							
	Laboratory Accre	editations						
	TAF: L3261-19072	25						
	FCC: 291082, TW	/3261	ISED:	TW3261				



1.4. Product Information

Product Name Dual-Band Wireless AX1800 Gigabit Ethernet Gateway				
Model No.	EX2210-T0			
Wi-Fi Specification	802.11a/b/g/n/ac/ax			
Antenna Information	Refer to clause 1.5			
Operating Temperature	0°C to 40°C			
Accessories				
Adapter	Model No.: MAUS-1201501801			
	Input Power: 100 - 240V ~ 50/60Hz, 0.5A			
Output Power: 12V dc 1.5A				
Remark: The information of EUT was provided by the manufacturer, and the accuracy of the information shall				

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1.5. Antenna Details

Antenna Type	Frequency Band	T _X Paths	Antenna Gain (dBi) Ant 0 Ant 1		Beamforming Directional Gain	CDD Directional Gain (dBi)	
	(MHz)				(dBi)	For Power	For PSD
	2412 ~ 2462	2	3.5	2.9	6.51	3.5	6.51
РСВ	5180 ~ 5320	2	4.2	3.2	7.21	4.2	7.21
Antenna	5500 ~ 5720	2	4.0	3.9	7.01	4.0	7.01
	5745 ~ 5825	2	4.6	3.3	7.61	4.6	7.61

Remark:

- The EUT supports Cyclic Delay Diversity (CDD) mode and CDD signals are correlated.
 If all antennas have the same gain, G_{ANT}, Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.
 - For power spectral density (PSD) measurements on all devices,
 Array Gain = 10 log (Nant/ Nss) dB;
 - For power measurements on IEEE 802.11 devices,
 Array Gain = 0 dB for N_{ANT} ≤ 4;
- 2. The EUT also supports Beam Forming mode, and the Beam Forming support 802.11ac/ax. BF Directional gain = G_{ANT} + 10 log (N_{ANT}). For beamforming operation, manufacturer automatically backs power down based on a $10\log(N)$ factor based on CDD power.



2. RF Exposure Evaluation

2.1. Test Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range	Electric Field	Magnetic Field	Power Density	Average Time		
(MHz)	Strength (V/m)	Strength (A/m)	(mW/cm ²)	(Minutes)		
	(A) Limits for Occupational/ Control Exposures					
300-1500			f/300 6			
1500-100,000			5 6			
	(B) Limits for General Population/ Uncontrolled Exposures					
300-1500			f/1500	6		
1500-100,000			1 30			

f= Frequency in MHz

Calculation Formula: $Pd = (Pout*G)/(4*pi*r^2)$

Where

Pd = power density in mW/cm²

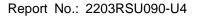
Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

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

Pd is the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.





2.2. Test Result

Product	Dual-Band Wireless AX1800 Gigabit Ethernet Gateway
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 1.5.

Test Mode	Frequency Band	Conducted Power	Tune-up Power	Antenna Gain	Maximum EIRP
	(MHz)	(dBm)	(dBm)	(dBi)	(dBm)
802.11b/g/n/ax	2412 ~ 2462	23.88	24.0	3.5	27.5
802.11a/n/ac/ax	5180 ~ 5240	28.58	29.0	4.6	33.6
	5260 ~ 5320				
	5500 ~ 5720				
	5745 ~ 5825				

Test Mode	Frequency Band	Maximum EIRP	Compliance	Power Density	Limit of Power
	(MHz)	(dBm)	Distance	(mW/cm ²)	Density
			(cm)		(mW/cm ²)
802.11b/g/n/ax	2412 ~ 2462	27.5	20.00	0.1119	1
	5180 ~ 5240				
802.11a/n/ac/ax	5260 ~ 5320	22.0	20.00	0.4558	1
	5500 ~ 5720	33.6			
	5745 ~ 5825				

CONCLUSION:

WLAN 2.4GHz Band, WLAN 5GHz can transmit simultaneously.

The max Power Density at R (20 cm) = $0.1119 \text{mW/cm}^2 + 0.4558 \text{mW/cm}^2 = 0.5677 \text{mW/cm}^2 < 1 \text{mW/cm}^2$.

So the compliance distance is 20 cm for device installed without any other radio equipment.



Appendix A - EUT Photograph

Refer to "2203RSU090-UE" file.

_____ The End