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Report No.: 1912TW0111-U3 Report Version: V01 Issue Date: 12-20-2019

RF Exposure Evaluation Declaration

FCC ID: TE7AX50

APPLICANT: TP-Link Technologies Co., Ltd.

Application Type: Certification

Product: AX3000 Gigabit Wi-Fi Router

Model No.: Archer AX50, Archer AX3000

Trademark: tp-link

FCC Classification: Digital Transmission System (DTS)

Unlicensed National Information Infrastructure (NII)

Test Procedure(s): KDB 447498 D01v06

Test Date: December 20, 2019

Reviewed By: Paddy Chen

(Paddy Chen)

Approved By: Am her

(Chenz Ker)





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
1912TW0111-U2	Rev. 01	Initial report	12-20-2019	Valid

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1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name	AX3000 Gigabit Wi-Fi 6 Router
Model No.	Archer AX50, Archer AX3000
Brand Name:	tp-link
Wi-Fi Specification:	802.11a/b/g/n/ac/ax

Note: These models are different in the USB interface, Archer AX50 supports USB 3.0, Archer AX3000 supports USB2.0. Others are the same. So Archer AX50 is chosen for the tests.

1.2. Description of Available Antennas

Antenna Type	Frequency	TX	Max Antenna	BF Directional	CDD Direction	nal Gain (dBi)
	Band (MHz)	Paths	Gain (dBi)	Gain (dBi)	For Power	For PSD
Dinala Antonna	2400 ~ 2500	2	2.0	5.01	2.0	5.01
Dipole Antenna	5150 ~ 5850	2	3.0	6.01	3.0	6.01

Note:

1. The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated. For CDD transmissions, directional gain is calculated as follows, $N_{ANT} = 2$, $N_{SS} = 1$. 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 (N_{ANT}/N_{SS}) dB = 3.01;

For power measurements on IEEE 802.11 devices,

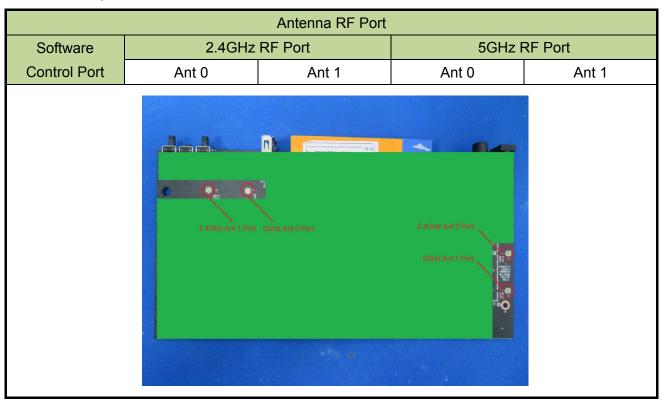
Array Gain = 0 dB for $N_{ANT} \le 4$;

2. The EUT also supports Beam Forming mode, and the Beam Forming support 802.11ac/ax, not include 802.11a/b/g/n. BF Directional gain = G_{ANT} + 10 log (N_{ANT}).

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1.3. Description of Antenna RF Port



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2. RF Exposure Evaluation

2.1. 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.

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2.2. Test Result of RF Exposure Evaluation

Product	AX3000 Gigabit Wi-Fi 6 Router
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 1.2.

Test Mode	Frequency Band	Max Conducted	Antenna Gain	Maximum EIRP
	(MHz)	Power	(dBi)	(dBm)
		(dBm)		
802.11b/g/n/ax	2412 ~ 2462	29.79	2.00	31.79
	5180 ~ 5320,			
802.11 a/n/ac/ax	5500 ~ 5720,	29.71	3.00	32.71
	5745 ~ 5825			

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Power Density at $R = 20 \text{ cm}$ (mW/cm^2)	Limit (mW/cm²)
802.11b/g/n/ax	2412 ~ 2462	31.79	0.3004	1
802.11 a/n/ac/ax	5180 ~ 5320, 5500 ~ 5720, 5745 ~ 5825	32.71	0.3713	1

CONCLUSION:

Both of the WLAN 2.4GHz Band and WLAN 5GHz Band can transmit simultaneously.

The max Power Density at R (20 cm) = $0.3004 \text{mW/cm}^2 + 0.3713 \text{mW/cm}^2 = 0.6717 \text{mW/cm}^2 < 1 \text{mW/cm}^2$.

So the safety distance is 20cm for **AX3000 Gigabit Wi-Fi 6 Router** installed without any other radio equipment.

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Appendix A - EUT Photograph

Refer to "1912TW0111-UE" file.

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