RF Exposure Evaluation Declaration

FCC ID	:	2AXJ4AX80
Applicant	:	TP-Link Corporation Limited
Application Type	:	Certification
Product	:	AX6000 8-Stream Wi-Fi 6 Router
Model No.	:	Archer AX80
Brand Name	:	tp-link
FCC Classification	:	Digital Transmission System (DTS) Unlicensed National Information Infrastructure (NII)
Received Date	:	June 28 ,2022
Test Date	:	July 28 ,2022

Test By : Owen Tsai
(Owen Tsai)

Reviewed By : Paddy Chen
(Paddy Chen)

Approved By : Chenz Ker
(Chenz Ker)

Testing Laboratory
3261

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
2206TW0119-U4	V1.0	Original Report	2022-08-31	Valid

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General Information

Applicant	TP-Link Corporation Limited
Applicant Address	Room 901, 9/F., New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hongkong
Manufacturer	TP-Link Corporation Limited
Manufacturer Address	Room 901, 9/F., New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hongkong
Test Site	MRT Technology (Taiwan) Co., Ltd
Test Site Address	No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)
MRT FCC Registration No.	291082
Test Device Serial No.	N/A ☐ Production ☒ Pre-Production ☐ Engineering

Test Facility / Accreditations

1. MRT facility is a FCC registered (Reg. No. 291082) test facility with the site description report on file and is designated by the FCC as an Accredited Test Firm.
2. MRT facility is an IC registered (MRT Reg. No. 21723) test laboratory with the site description on file at Industry Canada.
3. MRT Lab is accredited to ISO 17025 by the Taiwan Accreditation Foundation (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC (Designation Number: TW3261), Industry Taiwan, EU and TELEC Rules.

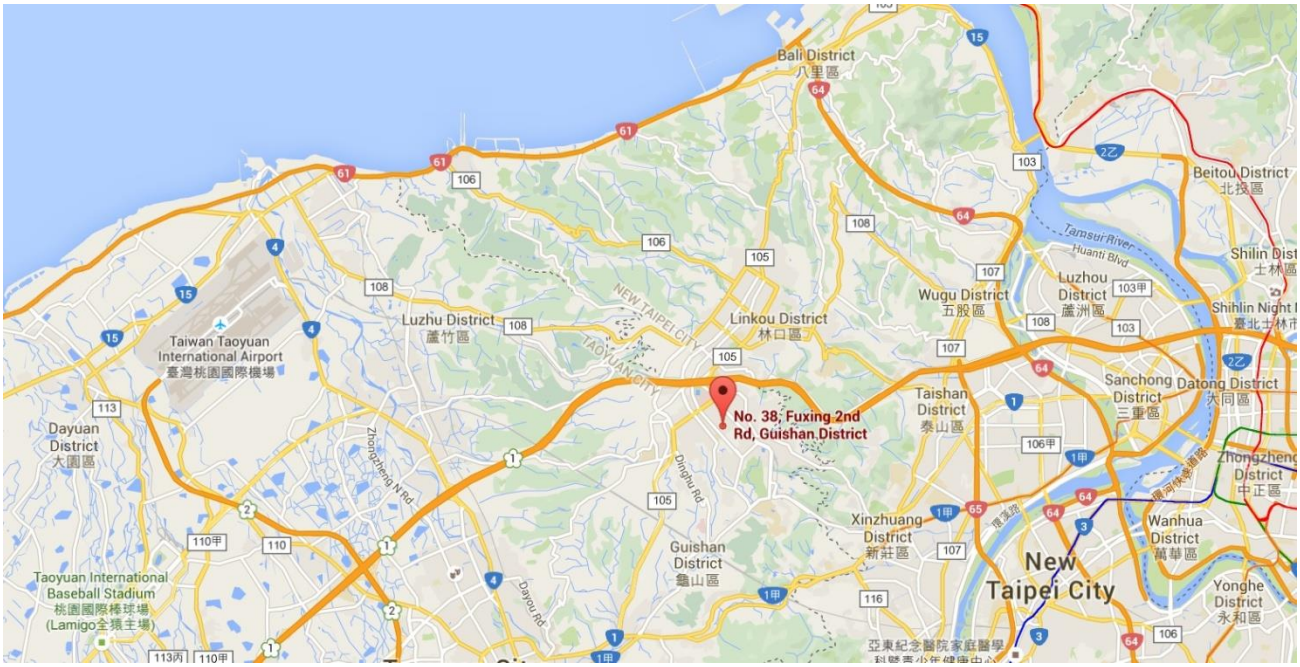
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada and Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taoyuan City. These measurement tests were conducted at the MRT Technology (Taiwan) Co., Ltd. Facility located at No.38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).



2. PRODUCT INFORMATION

2.1. Feature of Equipment under Test

Product Name:	AX6000 8-Stream Wi-Fi 6 Router
Model No.:	Archer AX80
Brand Name:	tp-link
Wi-Fi Specification:	802.11a/b/g/n/ac/ax
Adapter	BRAND: MASS POWER MODEL: S042-1A120330VU INPUT: 100 - 240V ~ 50/60Hz 1.0A OUTPUT: DC 12.0V 3.3A

2.2. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	T_X Paths	Max Antenna Gain (dBi)	Beamforming Directional Gain (dBi)	CDD Directional Gain (dBi)	
					For Power	For PSD
Dipole Antenna	2412 ~ 2462	4	1.97	7.99	1.97	7.99
	5150 ~ 5250	4	3.00	9.02	3.00	9.02
	5250 ~ 5350	4	2.43	8.45	2.43	8.45
	5470 ~ 5725	4	2.89	8.91	2.89	8.91
	5725 ~ 5850	4	2.96	8.98	2.96	8.98

Remark:

1. 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(N_{ANT}/ N_{SS}) dB;

- For power measurements on IEEE 802.11 devices,

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

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}).
3. All messages of antenna were declared by manufacturer.

Test Mode	T_X Paths	CDD Mode	Beamforming Mode
802.11b/g/n (DTS)	4	√	X
802.11ax (DTS)	4	√	√
802.11a/n (NII)	4	√	X
802.11ac/ax (NII)	4	√	√

3. RF Exposure Evaluation

3.1. 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 (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (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/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

Pd is the limit of MPE, $1mW/cm^2$. 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.

3.2. Test Result of RF Exposure Evaluation

Product	AX6000 8-Stream Wi-Fi 6 Router
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 2.2.

Test Mode	Frequency Band (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	Maximum EIRP (dBm)
802.11b/g/n/ax	2412 ~ 2462	27.54	7.99	35.53
802.11a/n/ac/ax	5180 ~ 5240 5260 ~ 5320 5500 ~ 5720 5745 ~ 5825	29.92	9.02	38.94

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Compliance Distance (cm)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
802.11b/g/n/ax	2412 ~ 2462	35.53	31.00	0.2958	1
802.11a/n/ac/ax	5180 ~ 5240 5260 ~ 5320 5500 ~ 5720 5745 ~ 5825	38.94	31.00	0.6487	1

CONCLUSION:

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

The max Power Density at R (31 cm) = 0.2958mW/cm2 + 0.6487mW/cm2 = 0.9450mW/cm^2 < 1mW/cm^2.

So the compliance distance is 31cm for device installed without any other radio equipment.

The End

Appendix A : External Photograph

Refer to “2206TW0119-External Photo” file.

Appendix B : Internal Photograph

Refer to “2206TW0119-Internal Photo” file.