

RF Exposure Evaluation Declaration

FCC ID: 2AXJ4RE500X

APPLICANT: TP-Link Corporation Limited

Application Type: Certification

Product: AX1500 Wi-Fi 6 Range Extender

Model No.: RE500X

Trademark: tp-link

FCC Classification: Digital Transmission System (DTS)
Unlicensed National Information Infrastructure (NII)

Test Date: April 20, 2021

Reviewed By:

Paddy Chen

(Paddy Chen)

Approved By:

Chenz Ker

(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.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Taiwan) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2012TW0007-U4	V1.0	Initial report	2021-07-05	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.

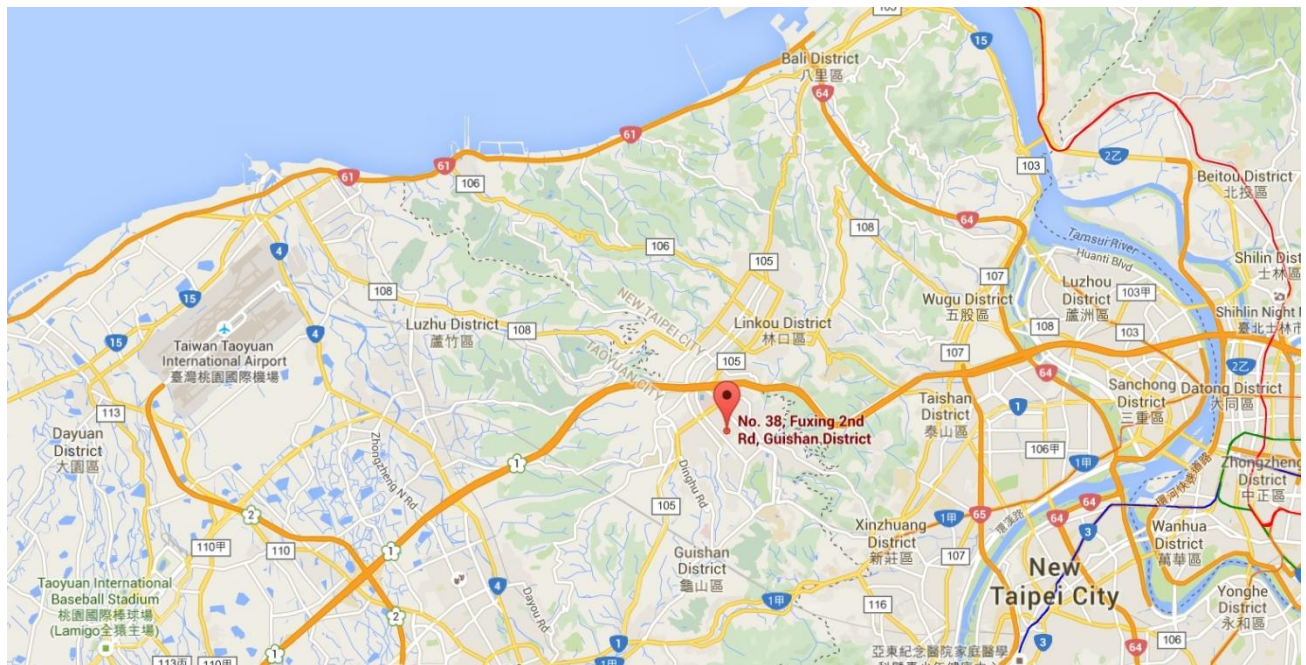
1. INTRODUCTION

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	AX1500 Wi-Fi 6 Range Extender
Model No.	RE500X
Brand Name:	tp-link
Wi-Fi Specification:	802.11a/b/g/n/ac
Working Voltage:	AC100~240V/50~60Hz

2.2. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	Mode	TX Paths	Max Antenna Gain (dBi)	Beamforming Directional Gain (dBi)	CDD Directional Gain (dBi)	
						For Power	For PSD
PCB Antenna	2412 ~ 2462	11b	1	1	--	--	--
	2412 ~ 2462	11g/n	2	1	--	1	4.01
	5150 ~ 5850	11a/n/ac/ax	2	2	5.01	2	5.01

Note 1: The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated

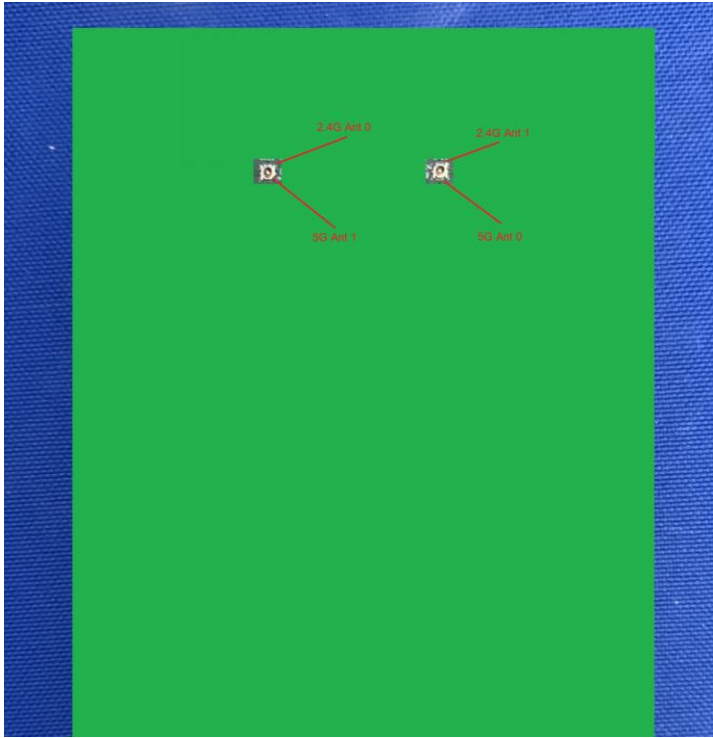
If all antennas have the same gain, G_{ANT} , Directional gain = $G_{ANT} + \text{Array Gain}$, where Array Gain is as follows.

- For power spectral density (PSD) measurements on all devices,
 $\text{Array Gain} = 10 \log (N_{ANT} / N_{SS}) \text{ dB};$
- For power measurements on IEEE 802.11 devices,
 $\text{Array Gain} = 0 \text{ dB for } N_{ANT} \leq 4;$

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

Note 3: All antenna information is provided by the manufacturer, test laboratory will not be responsible if any error.

2.3. escription of Antenna RF Port

Antenna RF Port		
Software Control Port	2.4GHz & 5GHz RF Port	
	Ant 0	Ant 1
		

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: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d 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.

3.2. Test Result of RF Exposure Evaluation

Product	AX1500 Wi-Fi 6 Range Extender
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	2412 ~ 2462	23.12	1	24.12
802.11a/n/ac	5180 ~ 5240 5260 ~ 5320 5500 ~ 5700 5745 ~ 5825	25.09	5.01	30.10

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Safety Distance (cm)	Power Density (mW/cm ²)	Limit of Power Density (mW/cm ²)
802.11b/g/n	2412 ~ 2462	24.12	20	0.0514	1
802.11a/n/ac	5180 ~ 5240 5260 ~ 5320 5500 ~ 5700 5745 ~ 5825	30.10	20	0.2036	1

CONCLUSION:

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

The max Power Density at R (20 cm) = $0.0514\text{mW/cm}^2 + 0.2036\text{mW/cm}^2 = 0.2549\text{mW/cm}^2 < 1\text{mW/cm}^2$.

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

_____ The End _____

Appendix A - External Photograph

Refer to “2012TW0007-External Photo” file.

Appendix B - Internal Photograph

Refer to “2012TW0007-Internal Photo” file.