RF Exposure Evaluation Declaration

FCC ID:	2AXJ4RE650V2
Applicant:	TP-Link Corporation Limited
Application Type:	Certification
Product:	AC2600 MU-MIMO Wi-Fi Range Extender
Model No.:	RE650
Brand Name:	tp-link
FCC Classification:	Digital Transmission System (DTS) Unlicensed National Information Infrastructure (NII)
Test Procedure(s):	KDB 447498 D01v06
Test Date:	October 29, 2021

Reviewed By: Kevin Guo

Approved By: Robin Wu

Revision History

Report No.	Version	Description	Issue Date	Note
2109RSU016-U4	Rev. 01	Initial Report	11-09-2021	Valid

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1. General Information

1.1. Applicant

TP-Link Corporation Limited

Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hongkong

1.2. Manufacturer

TP-Link Corporation Limited

Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hongkong

1.3. Testing Facility

☒	**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 Accreditations				
	A2LA: 3628.01		CNAS: L10551		
	FCC: CN1166		ISED: CN0001		
	VCCI:	☐R-20025	☐G-20034	☐C-20020	☐T-20020
		☐R-20141	☐G-20134	☐C-20103	☐T-20104
☒	**Test Site – MRT Shenzhen Laboratory**				
	Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China				
	Laboratory Accreditations				
	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 Accreditations				
	TAF: L3261-190725				
	FCC: 291082, TW3261		ISED: TW3261		

1.4. Product Information

Product Name	AC2600 MU-MIMO Wi-Fi Range Extender
Model No.	RE650
Brand Name	tp-link
Wi-Fi Specification	802.11a/b/g/n/ac & VHT
Antenna Specification	Refer to section 1.5
Power Supply	AC100~240V/50~60Hz
Remark: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Antenna Details

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	1.0	7.02	1.0	7.02
	5150 ~ 5850	4	2.0	8.02	2.0	8.02

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 $N_{ANT} \leqslant 4$;
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}).

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 (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.

2.2. Test Result

Product	AC2600 MU-MIMO Wi-Fi Range Extender
Test Item	RF Exposure Evaluation

Antenna Gain: Refer to clause 1.5.

Test Mode	Frequency Band (MHz)	Conducted Power (dBm)	Beamforming Gain (dBi)	Maximum EIRP (dBm)
802.11b/g/n & VHT	2412 ~ 2462	25.64	7.02	32.66
802.11a/n/ac	5180 ~ 5240 5260 ~ 5320 5500 ~ 5700 5745 ~ 5825	25.92	8.02	33.94

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	2412 ~ 2462	32.66	20.00	0.3671	1
802.11a/n/ac	5180 ~ 5240 5260 ~ 5320 5500 ~ 5700 5745 ~ 5825	33.94	20.00	0.4929	1

CONCLUSION:

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

The max Power Density at R (20 cm) = $0.3671mW/cm^2 + 0.4929mW/cm^2 = 0.8600mW/cm^2 < 1mW/cm^2$.

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

Appendix A - EUT Photograph

Refer to “2109RSU016-UE” file.

The End