

## RF Exposure Evaluation Declaration

**FCC ID:** 2BH7FWR1512X  
**Applicant:** TP-Link Systems Inc.  
**Product:** AX1500 Wi-Fi 6 Portable Router  
**Model No.:** TL-WR1512X  
**Brand Name:** tp-link  
**FCC Rule Part(s):** FCC Part 2.1093  
**Result:** Complies  
**Evaluation Date:** 2025-08-02

**Reviewed By:**

Kevin Guo

**Approved By:**

Robin Wu



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
R25S1052031-U401	V01	Initial Report	2025-07-15	Invalid
R25S1052031-U401	V02	Re-evaluate the MPE result	2025-08-02	Valid

## CONTENTS

Description	Page
<b>1. General Information</b>	<b>4</b>
1.1. Applicant	4
1.2. Manufacturer	4
1.3. Testing Facility	4
1.4. Product Information	5
1.5. Antenna Details	5
1.6. Device Classification	6
1.7. Applied Standards	6
<b>2. RF Exposure Evaluation</b>	<b>7</b>
2.1. Limits	7
2.2. SAR Exemptions	8
2.3. Calculated Result	11

## 1. General Information

## 1.1. Applicant

TP-Link Systems Inc.

10 Mauchly, Irvine, CA 92618

## 1.2. Manufacturer

TP-Link Systems Inc.

10 Mauchly, Irvine, CA 92618

### 1.3. Testing Facility

#### 1.4. Product Information

Product Name	AX1500 Wi-Fi 6 Portable Router	
Model No.	TL-WR1512X	
Wi-Fi Specification	802.11a/b/g/n/ac/ax	
Antenna Information	Refer to section 1.7	
Operating Temperature	0 ~ 40°C	
Power Type	By AC/DC Adapter	
Accessory		
AC Adapter	Model: DSA-18QFB FUS A Input: 100-240V~50/60Hz,0.8A Output: 5.0VDC 3.0A 15.0W,9.0VDC 2.0A 18.0W,12.0VDC 1.5A 18.0W	
Note: The information of the EUT (Equipment Under Test) was provided by the manufacturer. The accuracy, completeness, and validity of the information are solely the responsibility of the manufacturer.		

#### 1.5. Antenna Details

Antenna Type	Frequency Band (MHz)	Antenna Gain (dBi)		CDD Directional Gain (dBi)		Beamforming Gain (dBi)
		Ant 0	Ant 1	For Power	For PSD	
Wi-Fi Antennas						
Dipole	2400 ~ 2500	2.52	2.88	2.88	5.89	5.89
	5150 ~ 5250	3.02	3.07	3.07	6.08	6.08
	5250 ~ 5350	2.92	3.00	3.00	6.01	6.01
	5470 ~ 5725	2.94	2.80	2.94	5.95	5.95
	5725 ~ 5895	3.38	3.92	3.92	6.93	6.93
Notes:						
1. The EUT supports Cyclic Delay Diversity (CDD) mode., details refer to the table as below. 2. For CDD Mode, directional gain is calculated as follows. 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, $Array\ Gain = 0\ dB\ for\ N_{ANT} \leq 4;$ 3. The information as above is from the antenna report. 4. The EUT also supports Beam Forming mode, and the Beam Forming support 802.11n/ac/ax, not include 802.11a/b/g. Directional gain = $G_{ANT}$ + BF Gain, BF Gain was declared by the applicant.						

## 1.6. Device Classification

According to the user manual, this device is classified as a Portable Device. So, the RF exposure evaluation requirements of § 2.1093 for portable device exposure conditions subject to SAR limits.

## 1.7. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 2.1093
- KDB 447498 D04 Interim General RF Exposure Guidance v01

## 2. RF Exposure Evaluation

### 2.1. Limits

According to FCC §1.1310:

- (a) Specific absorption rate (SAR) shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in § 1.1307(b) of this part within the frequency range of 100 kHz to 6 GHz (inclusive).
- (b) The SAR limits for occupational/controlled exposure are 0.4 W/kg, as averaged over the whole body, and a peak spatial-average SAR of 8 W/kg, averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the parts of the human body treated as extremities, such as hands, wrists, feet, ankles, and pinnae, where the peak spatial-average SAR limit for occupational/controlled exposure is 20 W/kg, averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). Exposure may be averaged over a time period not to exceed 6 minutes to determine compliance with occupational/controlled SAR limits.
- (c) The SAR limits for general population/uncontrolled exposure are 0.08 W/kg, as averaged over the whole body, and a peak spatial-average SAR of 1.6 W/kg, averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the parts of the human body treated as extremities, such as hands, wrists, feet, ankles, and pinnae, where the peak spatial-average SAR limit is 4 W/kg, averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). Exposure may be averaged over a time period not to exceed 30 minutes to determine compliance with general population/uncontrolled SAR limits.

## 2.2. SAR Exemptions

**For single RF sources** (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph §1.1307(b)(2) of this section): A single RF source is exempt if:

**(Option A)** The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307(b)(3)(ii)(A) of this section.

Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(ii)(A);

**(Option B)** Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P is given by:

$$P_{th}(mW) = \{ERP_{20cm}(d / 20cm)^x \quad d \leq 20cm$$

$$P_{th}(mW) = \{ERP_{20cm} \quad 20cm < d \leq 40cm$$

Where

$$x = -\log_{10} \left( \frac{60}{ERP_{20cm}\sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20cm}(mW) = \{2040f \quad 0.3GHz \leq f < 1.5GHz$$

$$ERP_{20cm}(mW) = \{3060 \quad 1.5GHz \leq f \leq 6GHz$$

**(Option C)** Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least  $\lambda/2\pi$ , where  $\lambda$  is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of  $\lambda/4$  or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1 to §1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source Frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1920R <sup>2</sup>
1.34-30	3450R <sup>2</sup> /f <sup>2</sup>
30-300	3.83R <sup>2</sup>
300-1,500	0.0128R <sup>2</sup> f
1,500-100,000	19.2R <sup>2</sup>

**For multiple RF sources:** Multiple RF sources are exempt if:

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307(b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(i)(A).

(B) in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

Where:

**a** = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(B) of this section for  $P_{th}$ , including existing exempt transmitters and those being added.

**b** = number of fixed, mobile, or portable RF sources claiming exemption using paragraph §1.1307(b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.

**c** = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

**P<sub>i</sub>** = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source *i* at a distance between 0.5 cm and 40 cm (inclusive).

**P<sub>th,i</sub>** = the exemption threshold power ( $P_{th}$ ) according to paragraph §1.1307(b)(3)(i)(B) of this section for fixed, mobile, or portable RF source *i*.

**ERP<sub>j</sub>** = the ERP of fixed, mobile, or portable RF source *j*.

**$ERP_{th,j}$**  = exemption threshold ERP for fixed, mobile, or portable RF source  $j$ , at a distance of at least  $\lambda/2\pi$  according to the applicable formula of paragraph §1.1307(b)(3)(i)(C) of this section.

**$Evaluated_k$**  = the maximum reported SAR or MPE of fixed, mobile, or portable RF source  $k$  either in the device or at the transmitter site from an existing evaluation at the location of exposure.

**$Exposure\ Limit_k$**  = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source  $k$ , as applicable from §1.1310 of this chapter.

### 2.3. Calculated Result

Product	AX1500 Wi-Fi 6 Portable Router				
Test Item	RF Exposure Evaluation				

Test Mode	Frequency Band (MHz)	Max. Conducted Power (dBm)	Tune-up Conducted Power (dBm)	Antenna Gain (dBi)	Tune-up ERP (dBm)
2.4GHz Wi-Fi	2412 ~ 2462	25.80	26.30	2.88	27.03
5GHz Wi-Fi	5180 ~ 5825	25.64	26.14	3.92	27.91

Note 1: The Max. Power of 2.4GHz Wi-Fi (dBm) is referenced from MRT report No.: R25S1052031-U201.

Note 2: The Max. Power of 5GHz Wi-Fi (dBm) is referenced from MRT report No.: R25S1052031-U202.

Note 3: Tune-up Conducted Power was declared by manufacturer.

Note 4: Tune-up ERP (dBm) = Tune-up Conducted Power (dBm) + Antenna Gain (dBi) - 2.15.

### For single RF source, Option B

Test Mode	Frequency Band (MHz)	R (m)	Tune-up ERP (dBm)	Tune-up ERP (mW)	Thresholds ERP (mW)
2.4GHz Wi-Fi	2412 ~ 2462	0.2	27.03	504.66	3060
5GHz Wi-Fi	5180 ~ 5825	0.2	27.91	618.02	3060

Note 1: The distance R used in the MPE calculation is specified in the user manual.

Note 2: The EUT supports simultaneous transmissions of 2.4GHz Wi-Fi and 5GHz Wi-Fi, therefore, the worst-case total exposure ratios = 504.66 / 3060 + 618.02 / 3060 = 0.3669 < 1.

### Conclusion:

The device qualifies for RF exposure test exemption at 20cm distance.

The End