# FCC RF EXPOSURE REPORT

## FCC ID: 2BCGWEAP610GPDT

| | | |
|---|---|---|
| **Project No.** | : | 2401G094A |
| **Equipment** | : | AX1800 Desktop Wi-Fi 6 GPON Access Point |
| **Brand Name** | : | tp-link |
| **Test Model** | : | EAP610GP-Desktop |
| **Series Model** | : | NA |
| **Applicant** | : | TP-LINK CORPORATION PTE. LTD. |
| **Address** | : | 7 Temasek Boulevard #29-03 Suntec Tower One, Singapore 038987 |
| **Manufacturer** | : | TP-LINK CORPORATION PTE. LTD. |
| **Address** | : | 7 Temasek Boulevard #29-03 Suntec Tower One, Singapore 038987 |
| **Date of Receipt** | : | Jan. 18, 2024 |
| **Date of Test** | : | Jan. 18, 2024 ~ Mar. 14, 2024 |
| **Issued Date** | : | May 31, 2024 |
| **Report Version** | : | R00 |
| **Test Sample** | : | Engineering Sample No.: SSL202401187 |
| **Standard(s)** | : | FCC Guidelines for Human Exposure IEEE C95.1 & KDB 447498 D04 |

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

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# REPORT ISSUED HISTORY

| Report No. | Version | Description | Issued Date | Note |
|---|---|---|---|---|
| BTL-FCCP-3-2401G094A | R00 | This is a copy report which referencing test data are provided from the original test report (BTL-FCCP-3-2401G094). Change the signal transformer of the network port which does not affect the test results. Other are kept the same. | May 31, 2024 | Valid |

## 1. GENERAL CONCULUSION

According to FCC §§1.1307 and KDB 447498 D04 v01, the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold $P_{th}$ (mW).

1) Option A. 1-mW Test Exemption
   Per § 1.1307(b)(3)(i)(A), a single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance.
   This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

2) Option B. SAR-Based Exemption
   A more comprehensive exemption, considering a variable power threshold that depends on both the separation distance and power, is provided in § 1.1307(b)(3)(i)(B). This exemption is applicable to the frequency range between 300 MHz and 6 GHz, with test separation distances between 0.5 cm and 40 cm, and for all RF sources in fixed, mobile, and portable device exposure conditions.
   Accordingly, a RF source is considered an RF exempt device if its available maximum time-averaged (matched conducted) power or its effective radiated power (ERP), whichever is greater, are below a specified threshold.
   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). Pth is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20\,cm}(d/20\,\text{cm})^x & d \leq 20\,\text{cm} \\ ERP_{20\,cm} & 20\,\text{cm} < d \leq 40\,\text{cm} \end{cases}$$

Where

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

and

$$ERP_{20\,cm} \text{ (mW)} = \begin{cases} 2040f & 0.3\,\text{GHz} \leq f < 1.5\,\text{GHz} \\ 3060 & 1.5\,\text{GHz} \leq f \leq 6\,\text{GHz} \end{cases}$$

$d$ = the separation distance (cm);

**Table B2-Example Power Thresholds (mW)**

| | | Distance(mm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | mW | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| | 300 | 39 | 65 | 88 | 110 | 129 | 148 | 166 | 184 | 201 | 217 |
| | 450 | 22 | 44 | 67 | 89 | 112 | 135 | 158 | 180 | 203 | 226 |
| | 835 | 9 | 25 | 44 | 66 | 90 | 116 | 145 | 175 | 207 | 240 |
| | 1900 | 3 | 12 | 26 | 44 | 66 | 92 | 122 | 157 | 195 | 236 |
| | 2450 | 3 | 10 | 22 | 38 | 59 | 83 | 111 | 143 | 179 | 219 |
| | 3600 | 2 | 8 | 18 | 32 | 49 | 71 | 96 | 125 | 158 | 195 |
| | 5800 | 1 | 6 | 14 | 25 | 40 | 58 | 80 | 106 | 136 | 169 |

3) Option C MPE-Based Exemption

An alternative to the SAR-based exemption is provided in § 1.1307(b)(3)(i)(C), for a much wider frequency range, from 300 kHz to 100 GHz, applicable for separation distances greater or equal to $\lambda/2\pi$, where $\lambda$ is the free-space operating wavelength in meters. The MPE-based test exemption condition is in terms of ERP, defined as the product of the maximum antenna gain and the delivered maximum time-averaged power. For this case, a RF source is an RF exempt device if its ERP (watts) is no more than a frequency-dependent value, as detailed tabular form in Appendix B. These limits have been derived based on the basic specifications on Maximum Permissible Exposure (MPE) considered for the FCC rules in § 1.1310(e)(1).

**TABLE B.1—THRESHOLDS FOR SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION**

| RF Source Frequency | | | Minimum Distance | | | Threshold ERP |
|---|---|---|---|---|---|---|
| $f_L$ MHz | | $f_H$ MHz | $\lambda_L/2\pi$ | | $\lambda_H/2\pi$ | W |
| 0.3 | – | 1.34 | 159 m | – | 35.6 m | $1{,}920\ R^2$ |
| 1.34 | – | 30 | 35.6 m | – | 1.6 m | $3{,}450\ R^2/f^2$ |
| 30 | – | 300 | 1.6 m | – | 159 mm | $3.83\ R^2$ |
| 300 | – | 1,500 | 159 mm | – | 31.8 mm | $0.0128\ R^2 f$ |
| 1,500 | – | 100,000 | 31.8 mm | – | 0.5 mm | $19.2 R^2$ |

Subscripts L and H are low and high; $\lambda$ is wavelength.
From § 1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.

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 (b)(3)(i)(B) of this section for Pth, including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (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.

$P_i$ = 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).

$P_{th,i}$ = the exemption threshold power ($P_{th}$) according to paragraph (b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i.

$ERP_j$ = 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 (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. PRDUCT INFO

| Band | Freq. (MHz) | AVGP (dBm) | Ant. Gain (dBi) | ERP (dBm) | Distances (mm) | Duty (%) | AVGP (mW) | ERP (mW) |
|---|---|---|---|---|---|---|---|---|
| WLAN 2.4G | 2437 | 25.10 | 2 | 24.95 | 200 | 99.19% | 323.59 | 312.61 |
| WLAN 5G | 5775 | 25.52 | 2 | 25.37 | 200 | 95.51% | 356.45 | 344.35 |

## 3. TEST RESULTS

| Band | Freq (MHz) | λ/2π (mm) | Distances applies | ERP Limit (mW) | Ratio | Result Option C |
|---|---|---|---|---|---|---|
| WLAN 2.4G | 2437 | 19.59 | apply | 768.00 | 0.42 | exempt |
| WLAN 5G | 5775 | 8.27 | apply | 768.00 | 0.46 | exempt |

**For the max simultaneous transmission MPE:**

| Ratio | | Total | Limit of Ratio | Test Result |
|---|---|---|---|---|
| 2.4GHz | 5GHz | | | |
| 0.42 | 0.46 | 0.88 | 1 | Complies |

Note:
(1) Output power including tune up tolerance.
(2) SAR and MPE evaluation is not required(For C).

**End of Test Report**