# FCC RF EXPOSURE REPORT

## FCC ID: TE7AX10

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|---|---|
| **Project No.** | **: 1905C079** |
| **Equipment** | **: AX1500 Wi-Fi 6 Router** |
| **Model Name** | **: Archer AX10, Archer AX1500** |
| **Series Model** | **: N/A** |
| **Applicant** | **: TP-Link Technologies Co., Ltd.** |
| **Address** | **: Building 24(floors1,3,4,5) and 28(floors1-4) Central Science and Technology Park, Shennan Rd, Nanshan, Shenzhen, China** |
| **According** | **: FCC Guidelines for Human Exposure IEEE C95.1 & FCC Part 2.1091** |


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Certificate #5123.02

## 1. GENERAL SUMMARY

| | | |
|---|---|---|
| Equipment | : | AX1500 Wi-Fi 6 Router |
| Brand Name | : | tp-link |
| Test Model | : | Archer AX10, Archer AX1500 |
| Series Model | : | N/A |
| Applicant | : | TP-Link Technologies Co., Ltd. |
| Manufacturer | : | TP-Link Technologies Co., Ltd. |
| Address | : | Building 24(floors1,3,4,5) and 28(floors1-4) Central Science and Technology Park, Shennan Rd, Nanshan, Shenzhen, China |
| Date of Test | : | May 23, 2019 ~ Jul. 10, 2019 |
| Test Sample | : | Engineering Sample No.: DG19061085 |
| Standards | : | FCC Title 47 Part 2.1091, OET Bulletin 65 Supplement C |

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-3-1905C079) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of A2LA according to the ISO/IEC 17025 quality assessment standard and technical standard(s).

## 2. MPE CALCULATION METHOD

Calculation Method of RF Safety Distance:

$$S = \frac{PG}{4\pi r^2} = \frac{EIRP}{4\pi r^2}$$

where:
S = power density
P = power input to the antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Table for Filed Antenna:

For 2.4GHz:

| Ant. | Brand | P/N | Antenna Type | Connector | Gain (dBi) |
|---|---|---|---|---|---|
| 1 | TP-LINK | 3101502558 | Dipole | Weld | 3.82 |
| 2 | TP-LINK | 3101502557 | Dipole | Weld | 3.82 |

Note: This EUT supports CDD, and all antennas have the same gain,
Directional gain = $G_{ANT}$+Array Gain, where Array Gain is as follows:
For power spectral density measurements, $N_{ANT}$ = 2, $N_{SS}$ = 1.
So Directional gain = $G_{ANT}$ + Array Gain =10 log ($N_{ANT}$/ $N_{SS}$) dB =3.82+10log(2/1)dBi=6.83.
Then, the power density limit is 8-(6.83-6) = 7.17.
For power measurements, Array Gain = 0 dB ($N_{ANT}$ ≤ 4), so the Directional gain=3.82.

For 5GHz:
Antenna Specification:

| Ant. | Brand | P/N | Antenna Type | Connector | Gain (dBi) | Note |
|---|---|---|---|---|---|---|
| 1 | TP-LINK | 3101502560 | I-PEX | N/A | 4.37 | UNII-1 |
| 2 | TP-LINK | 3101502559 | I-PEX | N/A | 4.37 | UNII-1 |
| 1 | TP-LINK | 3101502560 | I-PEX | N/A | 5.80 | UNII-3 |
| 2 | TP-LINK | 3101502559 | I-PEX | N/A | 5.80 | UNII-3 |

Note: 1. This EUT supports CDD, and all antennas have the same gain, Directional gain = $G_{ANT}$+Array Gain, where Array Gain is as follows:

For UNII-1 Non-Beamforming function,
For power spectral density measurements, $N_{ANT}$ = 2, $N_{SS}$ = 1.
So Directional gain = $G_{ANT}$ + Array Gain =10 log ($N_{ANT}$/ $N_{SS}$) dB =4.37+10log(2/1)dBi
=7.38. Then, the power spectral density limit is 17-7.38+6=15.62.
For power measurements, Array Gain = 0 dB ($N_{ANT}$ ≤ 4), so the Directional gain=4.37.

For UNII-3 Non-Beamforming function,
For power spectral density measurements, $N_{ANT}$ = 2, $N_{SS}$ = 1.
So Directional gain = $G_{ANT}$ + Array Gain =10 log ($N_{ANT}$/ $N_{SS}$) dB =5.80+10log(2/1)dBi
=8.81. Then, the power spectral density limit is 30-8.81+6=27.19.
For power measurements, Array Gain = 0 dB ($N_{ANT}$ ≤ 4), so the Directional gain=5.80.

2. For UNII-1 Beamforming function, Beamforming Gain: 3.00 dB.
So Directional gain = 4.37+3.00=7.37. Then, output power limit is 30-7.37+6=28.63, the power density limit is 17-7.37+6=15.63.

For UNII-3 Beamforming function, Beamforming Gain: 3.00 dB.
So Directional gain = 5.80+3.00=8.80. Then, output power limit is 30-8.80+6=27.20, the power density limit is 30-8.80+6=27.20

## 3. TEST RESULTS

| Tune up tolerance(dBm) | |
|---|---|
| 2.4GHz | 5GHz |
| ±0.5 | ±0.5 |

For 2.4GHz:

| Directional Gain (dBi) | Directional Gain (numeric) | Max. Output Power (dBm) | Max. Output Power (mW) | Power Density (S) ($mW/cm^2$) | Limit of Power Density (S) ($mW/cm^2$) | Test Result |
|---|---|---|---|---|---|---|
| 3.82 | 2.4099 | 23.4 | 218.7762 | 0.10494 | 1 | Complies |

For 5GHz Non-Beamforming (UNII-1):

| Directional Gain (dBi) | Directional Gain (numeric) | Max. Output Power (dBm) | Max. Output Power (mW) | Power Density (S) ($mW/cm^2$) | Limit of Power Density (S) ($mW/cm^2$) | Test Result |
|---|---|---|---|---|---|---|
| 4.37 | 2.7353 | 26.52 | 448.7454 | 0.24432 | 1 | Complies |

For 5GHz Non-Beamforming (UNII-3):

| Directional Gain (dBi) | Directional Gain (numeric) | Max. Output Power (dBm) | Max. Output Power (mW) | Power Density (S) ($mW/cm^2$) | Limit of Power Density (S) ($mW/cm^2$) | Test Result |
|---|---|---|---|---|---|---|
| 5.80 | 3.8019 | 26.78 | 476.4310 | 0.36054 | 1 | Complies |

For 5GHz With Beamforming (UNII-1):

| Directional Gain (dBi) | Directional Gain (numeric) | Max. Output Power (dBm) | Max. Output Power (mW) | Power Density (S) ($mW/cm^2$) | Limit of Power Density (S) ($mW/cm^2$) | Test Result |
|---|---|---|---|---|---|---|
| 7.37 | 5.4576 | 26.56 | 452.8976 | 0.49198 | 1 | Complies |

For 5GHz With Beamforming (UNII-3):

| Directional Gain (dBi) | Directional Gain (numeric) | Max. Output Power (dBm) | Max. Output Power (mW) | Power Density (S) ($mW/cm^2$) | Limit of Power Density (S) ($mW/cm^2$) | Test Result |
|---|---|---|---|---|---|---|
| 8.80 | 7.5858 | 26.46 | 442.5884 | 0.66827 | 1 | Complies |

**For the max simultaneous transmission MPE:**

| Power Density (S) ($mW/cm^2$) | Power Density (S) ($mW/cm^2$) | Total | Limit of Power Density (S) ($mW/cm^2$) | Test Result |
|---|---|---|---|---|
| 2.4GHz | 5GHz | | | |
| 0.10494 | 0.66827 | 0.77321 | 1 | Complies |

Note: The calculated distance is 20 cm.

**End of Test Report**