

FCC RF EXPOSURE REPORT

FCC ID: TE7AX10V1

Project No. : 1905C079A
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.
Address : Building 24(floors1,3,4,5) and 28(floors1-4) Central Science and Technology Park, Shennan Rd, Nanshan, Shenzhen, China
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 Receipt : Nov. 28, 2019
Date of Test : Nov. 29, 2019 ~ Jan. 16, 2020
Issued Date : Jan. 20, 2020
Report Version : R00
Test Sample : Engineering Sample No.: DG2020010657
Standard(s) : FCC Guidelines for Human Exposure IEEE C95.1 & FCC Part 2.1091
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.



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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Jan. 20, 2020

1. MPE CALCULATION METHOD

Calculation Method of RF Safety Distance:

$$S = \frac{PG}{4\pi^3} = \frac{EIRP}{4\pi^3}$$

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		3101502558	Dipole	Weld	3.82
2		3101502557	Dipole	Weld	3.82

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

For 5GHz:

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

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

1. For UNII-1 Non-Beamforming function,
For power spectral density measurements, $N_{ANT} = 2$, $N_{SS} = 1$.
So Directional gain = $G_{ANT} + \text{Array Gain} = 10 \log (N_{ANT} / N_{SS}) \text{ dB} = 4.37 + 10 \log (2/1) \text{ dBi} = 7.38$.
Then, the power spectral density limit is $17 - (7.38 - 6) = 15.62$.
For power measurements, Array Gain = 0 dB ($N_{ANT} \leq 4$), 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 = $G_{ANT} + \text{Array Gain} = 10 \log (N_{ANT} / N_{SS}) \text{ dB} = 5.80 + 10 \log (2/1) \text{ dBi} = 8.81$.
Then, the power spectral density limit is $30 - (8.81 - 6) = 27.19$.
For power measurements, Array Gain = 0 dB ($N_{ANT} \leq 4$), 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 $30 - (8.80 - 6) = 27.20$.

2. 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	23.16	207.0141	0.09930	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	26.42	438.5307	0.23875	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	26.38	434.5102	0.32881	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	26.25	421.6965	0.45809	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	26.34	430.5266	0.65006	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			
0.09930	0.65006	0.74936	1	Complies

Note: The calculated distance is 20 cm.
Output power including tune up tolerance.

End of Test Report