

FCC RF EXPOSURE REPORT

FCC ID: TE7AX20

Project No. : 1907C233
Equipment : AX1800 Wi-Fi 6 Router
Brand Name : tp-link
Test Model : Archer AX20
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 : Aug. 01, 2019
Date of Test : Aug. 02, 2019 ~ Sep. 19, 2019
Issued Date : Oct. 15, 2019
Report Version : R00
Test Sample : Engineering Sample No.: DG19073064
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.



Prepared by : Welly Zhou



Approved by : Ethan Ma



Certificate #5123.02

Add: No.3, Jinshagang 1st Road, Shixia, Dalang Town,Dongguan, Guangdong, China.

Tel: +86-769-8318-3000

Web: www.newbtl.com

REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue	Oct. 15, 2019

1. MPE CALCULATION METHOD

Calculation Method of RF Safety Distance:

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

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		3101502557	Dipole	Weld	3.82
2		3101502647	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:

(1) For Non Beamforming Function,

For power spectral density measurements, $N_{ANT} = 2$, $N_{SS} = 1$. Then Directional gain = G_{ANT} + Array Gain = $10 \log (N_{ANT} / N_{SS})$ dB = $3.82 + 10 \log (2/1)$ dB = 6.83. So the power spectral density limit is $30 - (6.83 - 6) = 29.17$.

For the power measurements, Array Gain = 0 dB ($N_{ANT} \leq 4$), so the Directional gain = 3.82.

(2) For With Beamforming Function, Beamforming Gain: 3.01 dB. Then Directional gain = $3.01 + 3.82 = 6.83$. So the average output power limit is $30 - (6.83 - 6) = 29.17$.

For 5GHz:

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)	Note
1		3101502648	Dipole	I-PEX	4.37	UNII-1
2		3101502649	Dipole	I-PEX	4.37	UNII-1
1		3101502648	Dipole	I-PEX	5.80	UNII-3
2		3101502649	Dipole	I-PEX	5.80	UNII-3

Note:

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

(1) For Non-Beamforming Function,

For power spectral density measurements, $N_{ANT} = 2$, $N_{SS} = 1$. Then the UNII-1

Directional gain = G_{ANT} + Array Gain = $10 \log (N_{ANT} / N_{SS})$ dB = $4.37 + 10 \log (2/1)$ dB

= 7.38, the UNII-3 Directional gain = G_{ANT} + Array Gain = $10 \log (N_{ANT} / N_{SS})$ dB

= $5.80 + 10 \log (2/1)$ dB = 8.81. So the UNII-1 power spectral density limit is $30 - (7.38 - 6) = 22.62$, the UNII-3 power spectral density limit is $30 - (8.81 - 6) = 21.19$.

For power measurements, Array Gain = 0 dB ($N_{ANT} \leq 4$), so the UNII-1 Directional gain = 4.37, the UNII-3 Directional gain = 5.80.

(2) For With Beamforming Function, Beamforming Gain: 3.01 dB.

Then the UNII-1 Directional gain = $4.37 + 3.01 = 7.38$, the UNII-3 Directional gain = $5.80 + 3.01 = 8.81$.

So the UNII-1 output power limit is $30 - (7.38 - 6) = 22.62$, the UNII-3 output power limit is

$30 - (8.81 - 6) = 21.19$.

2. TEST RESULTS

For 2.4GHz Non Beamforming:

Directional Gain (dBi)	Directional Gain (numeric)	Max. Average Output Power (dBm)	Max. Average Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
3.82	2.4099	27.47	558.4702	0.17145	1	Complies

For 2.4GHz With Beamforming:

Directional Gain (dBi)	Directional Gain (numeric)	Max. Average Output Power (dBm)	Max. Average Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
6.83	4.8195	27.61	576.7665	0.35410	1	Complies

For 5GHz UNII-1 Non Beamforming:

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	27.54	567.5446	0.19776	1	Complies

For 5GHz UNII-3 Non Beamforming:

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	27.68	586.1382	0.28388	1	Complies

For 5GHz UNII-1 With Beamforming:

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
7.38	5.4702	27.59	574.1165	0.40006	1	Complies

For 5GHz UNII-3 With Beamforming:

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
8.81	7.6033	27.68	586.1382	0.56771	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			
0.35410	0.56771	0.92181	1	Complies

Note: The calculated distance is 25 cm.
Output power including tune up tolerance.

End of Test Report