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.

Welly Zhou

Prepared by : Welly Zhou

Ethan Ma

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:

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

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	3101502557	Dipole	Weld	3.82
2	TP-LINK	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+10log(2/1)dBi=6.83. So the power spectral density limit is 8-(6.83-6)=7.17.
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	TP-LINK	3101502648	Dipole	I-PEX	4.37	UNII-1
2	TP-LINK	3101502649	Dipole	I-PEX	4.37	UNII-1
1	TP-LINK	3101502648	Dipole	I-PEX	5.80	UNII-3
2	TP-LINK	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+10log(2/1)dBi =7.38, the UNII-3 Directional gain = G_{ANT} + Array Gain =10 log (N_{ANT}/ N_{SS}) dB =5.80+10log(2/1)dBi=8.81. So the UNII-1 power spectral density limit is 17-(7.38-6)=15.62, the UNII-3 power spectral density limit is 30-(8.81-6)=27.19.
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)=28.62, the UNII-3 output power limit is 30-(8.81-6)=27.19.

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) 2.4GHz	Power Density (S) (mW/cm^2) 5GHz	Total	Limit of Power Density (S) (mW/cm^2)	Test Result
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