FCC RF EXPOSURE REPORT

FCC ID: TE7C4000V3

Project No.	**: 1902C049**
Equipment	**: AC4000 MU-MIMO Tri-Band Wi-Fi Router**
Model Name	**: Archer C4000**
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	:	AC4000 MU-MIMO Tri-Band Wi-Fi Router
Brand Name	:	tp-link
Test Model	:	Archer C4000
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	:	Feb. 20, 2019 ~ Apr. 12, 2019
Test Sample	:	Engineering Sample No.: D190201479
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-3-1902C049) 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	Model Name	Antenna Type	Connector	Gain (dBi)
1	TP-LINK	N/A	Dipole	N/A	1.8
2	TP-LINK	N/A	Dipole	N/A	1.8
3	TP-LINK	N/A	Dipole	N/A	1.8

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) Non-Beamforming function,
For power spectral density measurements, N_{ANT} = 3, N_{SS} = 1.
So Directional gain = G_{ANT} + Array Gain =10 log (N_{ANT}/ N_{SS}) dB =1.8+10log(3/1)dBi=6.57.
Then, the power density limit is 8-(6.57-6)=7.43.
For power measurements, Array Gain = 0 dB ($N_{ANT} \leq 4$), so the Directional gain=1.8.
(2) Beamforming function, Beamforming Gain: 4.77 dB.
So Directional gain = 4.77+1.8=6.57. Then, the average output power limit is 30-(6.57-6)=29.43. The power density limit is 8-(6.57-6)=7.43.

For 5GHz:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Note
1	TP-LINK	N/A	Dipole	N/A	1.8	UNII-1
2	TP-LINK	N/A	Dipole	N/A	1.8	UNII-1
3	TP-LINK	N/A	Dipole	N/A	1.8	UNII-1
4	TP-LINK	N/A	Dipole	N/A	1.8	UNII-3
5	TP-LINK	N/A	Dipole	N/A	1.8	UNII-3
6	TP-LINK	N/A	Dipole	N/A	1.8	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) Non-Beamforming function,
For power spectral density measurements, N_{ANT} = 3, N_{SS} = 1.
So Directional gain = G_{ANT} + Array Gain =10 log (N_{ANT}/ N_{SS}) dB =1.8+10log(3/1)dBi=6.57.
Then, the UNII-1 power spectral density limit is 17-6.57+6=16.43, the UNII-3 power density limit is 30-6.57+6=29.43.
For power measurements, Array Gain = 0 dB ($N_{ANT} \leq 4$), so the Directional gain=1.8.
(2) For Beamforming function, Beamforming Gain: 4.77 dB.
So Directional gain = 4.77+1.8=6.57. Then, the UNII-1 and UNII-3 output power limit is 30-6.57+6=29.43; the UNII-1 power density limit is 17-6.57+6=16.43, the UNII-3 power density limit is 30-6.57+6=29.43.

3. TEST RESULTS

For 2.4GHz 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
1.8	1.5136	28.84	765.5966	0.23065	1	Complies

For 2.4GHz 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
6.57	4.5394	28.81	760.3263	0.43967	1	Complies

For 5GHz 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
1.8	1.5136	29.2	831.7638	0.25058	1	Complies

For 5GHz 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
6.57	4.5394	29.17	826.0379	0.47767	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			
0.43967	0.47767	0.91734	1	Complies

Note: The calculated distance is 25 cm.

End of Test Report