FCC RF EXPOSURE REPORT

FCC ID: TE7EX220G2V1

Project No.	:	1905C079C
Equipment	:	AX1500 Wi-Fi 6 Router
Brand Name	:	tp-link
Test Model	:	EX220-G2
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 Aug. 17, 2020
Date of Test	:	Nov. 29, 2019 ~ Jan. 16, 2020
Issued Date	:	Sep. 25, 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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Certificate #5123.02

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Compared with previous report (BTL-FCCP-3-1905C079A), changed the adapter. which does not affect the test results, the rest are kept the same.	Sep. 25, 2020

1. TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3,Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.
BTL's Test Firm Registration Number for FCC: 357015
BTL's Designation Number for FCC: CN1240

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:

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)	Note
1	TP-LINK	3101502560	Dipole	I-PEX	4.37	UNII-1
2	TP-LINK	3101502559	Dipole	I-PEX	4.37	UNII-1
1	TP-LINK	3101502560	Dipole	I-PEX	5.80	UNII-3
2	TP-LINK	3101502559	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 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	23.16	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