

FCC RF EXPOSURE REPORT

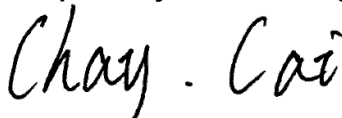
FCC ID: TE7EAP225OD

Project No. : 2204C180
Equipment : AC1200 Wireless MU-MIMO Gigabit Indoor/Outdoor Access Point
Brand Name : tp-link
Test Model : EAP225-Outdoor
Series Model : N/A
Applicant : TP-Link Technologies Co., Ltd.
Address : Building 24 (floors 1,3,4,5) and 28 (floors1-4), Central Science and Technology Park,Nanshan Shenzhen, 518057 China
Manufacturer : TP-Link Technologies Co., Ltd.
Address : Building 24 (floors 1,3,4,5) and 28 (floors1-4), Central Science and Technology Park,Nanshan Shenzhen, 518057 China
Date of Receipt : Apr. 29, 2022
Date of Test : Apr. 29, 2022 ~ May 07, 2022
Issued Date : May 09, 2022
Report Version : R01
Test Sample : Engineering Sample
Standard(s) : FCC Guidelines for Human Exposure IEEE C95.1 & FCC Part 2.1091
FCC Title 47 Part 2.1091

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.



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TESTING CERT #5123.02

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REPORT ISSUED HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-FCCP-3-2204C180	R00	Compared with original report (FA790815), the product has below changes: a. Changed the PHY chip. b. Changed the power supply, the isolated POE circuit is changed to non-isolated POE, adjusted DC-DC. The above changes do not affect the test results. The rest are kept the same.	May 07, 2022	Invalid
BTL-FCCP-3-2204C180	R01	Updated the date of test.	May 09, 2022	Valid

1. TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No. 3 Jinshagang 1st Rd. Shixia, Dalang Town Dongguan City, Guangdong 523792 People's Republic of China.

BTL's Registration Number for FCC: 357015

BTL's Designation Number for FCC: CN1240

2. MPE CALCULATION METHOD

Calculation Method of RF Safety Distance:

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

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

Antenna Specification:

For 2.4GHz:

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	tp-link	3101501275	Dipole	RP-SMA-F	3.36
2	tp-link	3101501275	Dipole	RP-SMA-F	3.36

Note:

- This EUT supports CDD, and all antennas have the same gain, Directional gain = $G_{ANT} + \text{Array Gain}$.
For power measurements, Array Gain=0dB ($N_{ANT} \leq 4$), so the Directional gain=3.36 dBi.
For power spectral density measurements, $N_{ANT}=2$, $N_{SS} = 1$.
So the Directional gain= $G_{ANT} + \text{Array Gain} = G_{ANT} + 10\log(N_{ANT}/N_{SS})\text{dBi} = 3.36 + 10\log(2/1)\text{dBi} = 6.37\text{ dBi}$.
Then, the power spectral density limit is $8 - (6.37 - 6) = 7.63$.
- The antenna gain is provided by the manufacturer.

Table for Antenna Configuration:

Operating Mode	TX Mode	2TX
IEEE 802.11b		V (Ant. 1 + Ant. 2)
IEEE 802.11g		V (Ant. 1 + Ant. 2)
IEEE 802.11n(HT20)		V (Ant. 1 + Ant. 2)
IEEE 802.11n(HT40)		V (Ant. 1 + Ant. 2)

For 5GHz:

Antenna Specification:

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)	Note
1	tp-link	3101501275	Dipole	RP-SMA-F	5.19	UNII-1
2	tp-link	3101501275	Dipole	RP-SMA-F	5.19	
1	tp-link	3101501275	Dipole	RP-SMA-F	4.56	UNII-3
2	tp-link	3101501275	Dipole	RP-SMA-F	4.56	

Note:

- 1) This EUT supports CDD, and all antennas have the same gain, Directional gain = $G_{ANT} + \text{Array Gain}$.
For power measurements, Array Gain=0dB ($N_{ANT} \leq 4$), so the UNII-1 Directional gain=5.19 dBi, the UNII-3 Directional gain=4.56 dBi.
For power spectral density measurements, $N_{ANT}=2$, $N_{SS} = 1$.
So the UNII-1 Directional gain= $G_{ANT} + \text{Array Gain} = G_{ANT} + 10\log(N_{ANT}/N_{SS})$ dBi=5.19+10log(2/1)dBi=8.20 dBi, the UNII-3 Directional gain= $G_{ANT} + \text{Array Gain} = G_{ANT} + 10\log(N_{ANT}/N_{SS})$ dBi=4.56+10log(2/1)dBi=7.57 dBi
Then, the UNII-1 power spectral density limit is 17-(8.20-6)=14.80, the UNII-3 power spectral density limit is 30-(7.57-6)=28.43.
- 2) Beamforming Gain: 3dB. Then the UNII-1 Directional gain=3+5.19=8.19 dBi, the UNII-3 Directional gain=3+4.56=7.56 dBi. So the UNII-1 output power limit is 30-(8.19-6)=27.81 dBm, the UNII-3 output power limit is 30-(7.56-6)=28.44 dBm.
- 3) Elevation angle above 30 degree Max Gain: -2.22dBi
- 4) Elevation angle above 30 degree Max Gain is provided by original report.
- 5) The antenna gain and beamforming gain are provided by the manufacturer.

Table for Antenna Configuration:

For Non Beamforming:

Operating Mode	TX Mode	2TX
IEEE 802.11a		V (Ant. 1 + Ant. 2)
IEEE 802.11n(HT20)		V (Ant. 1 + Ant. 2)
IEEE 802.11n(HT40)		V (Ant. 1 + Ant. 2)
IEEE 802.11ac(VHT20)		V (Ant. 1 + Ant. 2)
IEEE 802.11ac(VHT40)		V (Ant. 1 + Ant. 2)
IEEE 802.11ac(VHT80)		V (Ant. 1 + Ant. 2)

For Beamforming:

Operating Mode	TX Mode	2TX
IEEE 802.11n(HT20)		V (Ant. 1 + Ant. 2)
IEEE 802.11n(HT40)		V (Ant. 1 + Ant. 2)
IEEE 802.11ac(VHT20)		V (Ant. 1 + Ant. 2)
IEEE 802.11ac(VHT40)		V (Ant. 1 + Ant. 2)
IEEE 802.11ac(VHT80)		V (Ant. 1 + Ant. 2)

3. TEST RESULTS

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
3.36	2.1677	29.56	903.6495	0.38990	1	Complies

For 5GHz UNII-1 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
8.19	6.5917	23.45	221.3095	0.29037	1	Complies

For the max simultaneous transmission MPE:

Ratio		Total	Limit of Ratio	Test Result
2.4GHz	5GHz			
0.38990	0.29037	0.68027	1	Complies

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

End of Test Report