

FCC RF EXPOSURE REPORT

FCC ID: 2AXJ4S7

Project No. : 2104C097
Equipment : AC1900 Whole Home Mesh Wi-Fi System
Brand Name : tp-link
Test Model : Deco S7
Series Model : N/A
Applicant : TP-Link Corporation Limited
Address : Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road,
Tsim Sha Tsui, Kowloon, Hong Kong
Manufacturer : TP-Link Corporation Limited
Address : Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road,
Tsim Sha Tsui, Kowloon, Hong Kong
Date of Receipt : Apr. 13, 2021
Date of Test : Jun. 02, 2021 ~ Jul. 07, 2021
Issued Date : Jul. 29, 2021
Report Version : R00
Test Sample : Engineering Sample No.: DG20210527190
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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TESTING CERT #5123.02

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue	Jul. 29, 2021

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

For 2.4GHz

Antenna Specification:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	tp-link	N/A	Dipole	I-PEX	1.96
2	tp-link	N/A	Dipole	I-PEX	1.99
3	tp-link	N/A	Dipole	I-PEX	2.00

Note:

- 1) This EUT supports CDD, and all antenna gains are not equal. Then, Directional gain= $10\log[(10^{G1/20}+10^{G2/20}+\dots+10^{GN/20})^2/N]$ dBi, that is Directional gain= $10\log[(10^{1.96/20}+10^{1.99/20}+10^{2.00/20})^2/3]$ dBi =6.75. So, the output power limit is $30-(6.75-6)=29.25$, the power spectral density limit is $8-(6.75-6)=7.25$.
- 2) Beamforming Gain: 4.70 dB. Then Directional gain= $4.70+2.00=6.70$. So, the output power limit is $30-(6.70-6)=29.30$.
- 3) The antenna gain and beamforming gain are provided by the manufacturer.

Table for Antenna Configuration:

For Non Beamforming:

Operating Mode	TX Mode	3TX
IEEE 802.11b		V (Ant. 1+Ant. 2+Ant. 3)
IEEE 802.11g		V (Ant. 1+Ant. 2+Ant. 3)
IEEE 802.11n(HT20)		V (Ant. 1+Ant. 2+Ant. 3)
IEEE 802.11n(HT40)		V (Ant. 1+Ant. 2+Ant. 3)
IEEE vht20		V (Ant. 1+Ant. 2+Ant. 3)
IEEE vht40		V (Ant. 1+Ant. 2+Ant. 3)

For Beamforming:

Operating Mode	TX Mode	3TX
IEEE 802.11n(HT20)		V (Ant. 1+Ant. 2+Ant. 3)
IEEE 802.11n(HT40)		V (Ant. 1+Ant. 2+Ant. 3)
IEEE vht20		V (Ant. 1+Ant. 2+Ant. 3)
IEEE vht40		V (Ant. 1+Ant. 2+Ant. 3)

For 5GHz:

Antenna Specification:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Note
1	tp-link	N/A	Dipole	I-PEX	0.94	UNII-1
2	tp-link	N/A	Dipole	I-PEX	0.96	
3	tp-link	N/A	Dipole	I-PEX	0.96	
1	tp-link	N/A	Dipole	I-PEX	0.97	UNII-3
2	tp-link	N/A	Dipole	I-PEX	0.99	
3	tp-link	N/A	Dipole	I-PEX	1.00	

Note:

- 1) This EUT supports CDD, and all antenna gains are not equal. Then, Directional gain= $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N]$ dBi.
 For UNII-1, Directional gain= $10\log[(10^{0.94/20} + 10^{0.96/20} + 10^{0.96/20})^2 / 3]$ dBi =5.72.
 For UNII-3, Directional gain= $10\log[(10^{0.97/20} + 10^{0.99/20} + 10^{1.00/20})^2 / 3]$ dBi =5.76.
- 2) Beamforming Gain: 4.70 dB. Then, UNII-1 Directional gain=4.70+0.96=5.66, UNII-3 Directional gain=4.70+1=5.70.
- 3) The antenna gain and beamforming gain are provided by the manufacturer.

Table for Antenna Configuration:

For Non Beamforming:

Operating Mode	TX Mode	3TX
IEEE 802.11a		V (Ant. 1+Ant. 2+Ant. 3)
IEEE 802.11n(HT20)		V (Ant. 1+Ant. 2+Ant. 3)
IEEE 802.11n(HT40)		V (Ant. 1+Ant. 2+Ant. 3)
IEEE 802.11ac(VHT20)		V (Ant. 1+Ant. 2+Ant. 3)
IEEE 802.11ac(VHT40)		V (Ant. 1+Ant. 2+Ant. 3)
IEEE 802.11ac(VHT80)		V (Ant. 1+Ant. 2+Ant. 3)

For Beamforming:

Operating Mode	TX Mode	3TX
IEEE 802.11n(HT20)		V (Ant. 1+Ant. 2+Ant. 3)
IEEE 802.11n(HT40)		V (Ant. 1+Ant. 2+Ant. 3)
IEEE 802.11ac(VHT20)		V (Ant. 1+Ant. 2+Ant. 3)
IEEE 802.11ac(VHT40)		V (Ant. 1+Ant. 2+Ant. 3)
IEEE 802.11ac(VHT80)		V (Ant. 1+Ant. 2+Ant. 3)

3. 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
6.75	4.7315	27.9	616.5950	0.37165	1	Complies

For 2.4GHz 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
6.70	4.6774	27.35	543.2503	0.32369	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
5.72	3.7325	25.83	382.8247	0.18202	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
5.66	3.6813	25.01	316.9567	0.14864	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
5.76	3.7670	29.32	855.0667	0.41033	1	Complies

For 5GHz UNII-3 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
5.70	3.7154	28.56	717.7943	0.33973	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			
0.37165	0.41033	0.78198	1	Complies

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

End of Test Report