

# FCC RF EXPOSURE REPORT

# FCC ID: TE7M4RV2

Project No.	:	1907C001
Equipment	:	AC1200 Whole Home Mesh Wi-Fi System
Brand Name	:	tp-link
Test Model	:	Deco M4R
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	:	Jul. 01, 2019
Date of Test	:	Jul. 01, 2019 ~ Aug. 02, 2019
Issued Date	:	Sep. 19, 2019
Report Version	:	R00
Test Sample	:	Engineering Sample No.: DG19070151
Standard(s)	:	FCC Guidelines for Human Exposure IEEE C95.1 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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### **REPORT ISSUED HISTORY**

Report Version	Description	Issued Date
R00	Original Issue	Sep. 19, 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

Antenna Specification:

For 2.4GHz:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	<b>TP-LINK</b> <sup>®</sup>	N/A	Monopole	N/A	1.48
2	<b>TP-LINK</b> <sup>®</sup>	N/A	Monopole	N/A	1.49

Note:

This EUT supports CDD, and antenna gains are not equal, so Directional gain=

 $10\log[(10^{G1/20}+10^{G2/20}+...10^{GN/20})^2/N]dBi$ , that is Directional gain= $10\log[(10^{1.48/20}+10^{1.49/20})^2/2]dBi$  =4.50.

#### For 5GHz:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Note
1	<b>TP-LINK</b>	N/A	Monopole	N/A	0.92	UNII-1
2	<b>TP-LINK</b>	N/A	Monopole	N/A	0.85	UNII-1
1	<b>TP-LINK</b>	N/A	Monopole	N/A	0.96	UNII-3
2	<b>TP-LINK</b> °	N/A	Monopole	N/A	0.96	UNII-3
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Note:

This EUT supports CDD, and antenna gains are not equal for UNII-1, all antennas have the same gain for UNII-3, so

(1) For Non Beamforming Function:

For UNII-1:

Directional gain =10log[ $(10^{G1/20}+10^{G2/20}+...10^{GN/20})^2/N$ ]dBi, that is Directional gain= 10log[ $(10^{0.92/20}+10^{0.85/20})^2/2$ ]dBi =3.90.

For UNII-3:

a) power spectral density measurements,  $N_{ANT}$  = 2,  $N_{SS}$  = 1.

So Directional gain =  $G_{ANT}$  + Array Gain =10 log ( $N_{ANT}$ / $N_{SS}$ ) dB =0.96+10log(2/1)dBi=3.97.

b) Power measurements, Array Gain = 0 dB ( $N_{ANT} \le 4$ ), so the Directional gain=0.96.

(2) For With Beamforming Function:

Beamforming Gain: 3 dB. So UNII-1Directional gain=0.92+3=3.92, UNII-3 Directional gain=0.96+3=3.96.



# 2. TEST RESULTS

#### For 2.4GHz:

Directional Gain (dBi)		Max. Average Output Power (dBm)	Max. Average Output Power (mW)	Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
4.50	2.8184	27.10	512.8614	0.28771	1	Complies

#### For 5GHz UNII-1 Non Beamforming:

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Directional	Directional	Max. Output	Max. Output	Power	Limit of Power	Test
Gain	Gain	Power	Power	Density (S)	Density (S)	Result
(dBi)	(numeric)	(dBm)	(mW)	(mW/cm <sup>2</sup> )	(mW/cm <sup>2</sup> )	Result
3.90	2.4547	28.01	632.4119	0.30899	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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
0.96	1.2474	28.72	744.7320	0.18491	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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
3.92	2.4660	28.01	632.4119	0.31042	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 <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
3.96	2.4889	28.60	724.4360	0.35888	1	Complies



#### For the max simultaneous transmission MPE:

Power Density (S) (mW/cm²)Power Density (S) (mW/cm²)2.4GHz5GHz		Total	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result	
0.28771	0.35888	0.64659	1	Complies	

Note: The calculated distance is 20 cm.

Output power including tune up tolerance.

End of Test Report