RF Exposure Evaluation Report

1 RF EXPOSURE

Product Name: TP-Link AC1900 Wireless Gigabit Router

Model No.:   TL-WDR7650

FCC ID: 2BQ6NTL-WDR7650

2. RF Exposure Evaluation

FCC KDB447498 D01 General RF Exposure Guidance v06: Mobile and Portable Device, RF Exposure, Equipment Authorization Procedures.

FCC CFR 47 part1 1.1310: Radiofrequency radiation exposure limits.

FCC CFR 47 part2 2.1091: Radiofrequency radiation exposure evaluation: mobile devices.

2.1 LIMITS

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

Table 1 to § 1.1310(e)(1)—Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(i) Limits for Occupational/Controlled Exposure				
0.3–3.0	614	1.63	*(100)	≤6
3.0–30	1842/f	4.89/f	*(900/f^2)	<6
30–300	61.4	0.163	1.0	<6
300–1,500			f/300	<6
1,500–100,000			5	<6
(ii) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	<30
1.34–30	824/f	2.19/f	*(180/f^2)	<30
30–300	27.5	0.073	0.2	<30
300–1,500			f/1500	<30
1,500–100,000			1.0	<30

F= Frequency in MHz Friis Formula

Friis transmission formula: Pd = (Pout*G)/(4* Pi * R 2) Where

Pd = power density in mW/cm2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd id the limit of MPE . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2 EUT RF EXPOSURE EVALUATION

5GWIFI ANT1&ANT2: 1.81dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.0 in linear scale.

The Max Conducted Peak Output Power data refer to report DACE250702014RL001

Mode	Channel (MHz)	ANT1 Power (dBm)	ANT2 Power (dBm)	Max. ANT1 tune-up Power(dbm)	Max. ANT2 tune-up Power(dbm)	Max.MIMO tune-up Power (dbm)	Max.MIMO tune-up Power (mW)
802.11ac(VHT20)	5240.00	11±1.0	10±1.0	12	11	14.54	28.44
802.11ac(VHT40)	5795.00	10±1.0	9±1.0	11	10	13.54	22.59

Mode	Channel (MHz)	Max.MIMO tune-up Power (dbm)	Max.MIMO tune-up Power (mW)	Calculated value (mW/cm2)	Limit (mW/cm2)
802.11ac(VHT20)	5240.00	14.54	28.44	0.0086	1.0
802.11ac(VHT40)	5795.00	13.54	22.59	0.0068	1.0

Remark: 5.2G--Pd = (Pout*G)/(4* Pi * R^2)=(28.44*1.563)/(4*3.14159*20*20)=0.0086, G=$10^{gain/10}$ =1.5171

5.8G--Pd = (Pout*G)/(4* Pi * R^2)=(22.59*1.5171)/(4*3.14159*20*20)=0.0068, G=$10^{gain/10}$ =1.5171

Conclusion:

the sum of the ratios is less than the limit value of 1.0, so there is no sar requirement.