



RADIO EXPOSURE TEST REPORT

FCC ID : 2BCGWBE900V2

Equipment : BE24000 Quad-Band Wi-Fi 7 Router

Brand Name : tp-link

Model Name : Archer BE900

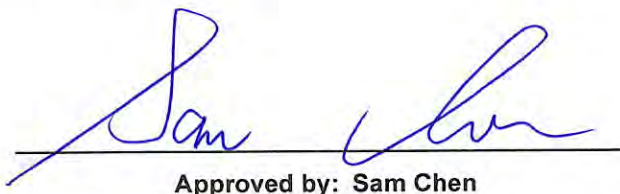
Applicant : TP-LINK CORPORATION PTE.LTD.
7 Temasek Boulevard #29-03 Suntec Tower One,
Singapore 038987

Manufacturer : TP-LINK CORPORATION PTE.LTD.
7 Temasek Boulevard #29-03 Suntec Tower One,
Singapore 038987

Standard : 47 CFR Part 2.1091

The product was received on Jul. 11, 2024, and testing was started from Jul. 16, 2024 and completed on Aug. 09, 2024. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.



Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory
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History of this test report

TEL : 886-3-656-9065
FAX : 886-3-656-9085
Report Template No.: CB-A1_1 Ver1.1

Page Number : 3 of 11
Issued Date : Feb. 20, 2025
Report Version : 01



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the chapter "Measurement Uncertainty".

Disclaimer:

1. The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.
2. The presented declaration output power of WLAN 2.4 GHz, 5GHz for EUT in the report are provided by the manufacturer, and We, Sporton International Inc. Hsinchu Laboratory does not guarantee its accuracy.

Reviewed by: Sam Chen**Report Producer: Sandy Chuang**



1 General Description

1.1 EUT General Information

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) VHT: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11be: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5250 5250-5320 5500-5720 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11be: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM)
6GHz WLAN	5925-6425 6525-6875	5955-6415 6595-6855	802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11be: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM)



1.2 Antenna Information

Ant.	Port			Brand	Model Name	Ant. Type	Connector	Gain (dBi)
	2.4GHz	5GHz	6GHz					
1	-	-	-	TP-Link	Archer BE900	Dipole	I-PEX	Note 1
2	-	-	-	TP-Link	Archer BE900	Dipole	I-PEX	
3	-	-	-	TP-Link	Archer BE900	Dipole	I-PEX	
4	-	-	-	TP-Link	Archer BE900	Dipole	I-PEX	
5	-	-	-	TP-Link	Archer BE900	Dipole	I-PEX	
6	-	-	-	TP-Link	Archer BE900	Dipole	I-PEX	
7	-	-	-	TP-Link	Archer BE900	Dipole	I-PEX	
8	-	-	-	TP-Link	Archer BE900	Dipole	I-PEX	
9	-	-	1	TP-Link	Archer BE900	Dipole	I-PEX	
10	-	-	2	TP-Link	Archer BE900	Dipole	I-PEX	
11	-	-	3	TP-Link	Archer BE900	Dipole	I-PEX	
12	-	-	4	TP-Link	Archer BE900	Dipole	I-PEX	
13	-	-	-	TP-Link	Archer BE900	Dipole	I-PEX	

Note 1

Ant.	Gain (dBi)								
	2.4GHz	5GHz				6GHz			
		UNII 1	UNII 2A	UNII 2C	UNII 3	UNII 5	UNII 6	UNII 7	UNII 8
1	2.91	3.08	-	-	-	-	-	-	-
2	2.91	3.08	-	-	-	-	-	-	-
3	2.91	3.08	-	-	-	-	-	-	-
4	2.91	3.08	-	-	-	-	-	-	-
5	-	-		3.13	2.97	-	-	-	-
6	-	-	-	3.13	2.97	-	-	-	-
7	-	-	-	3.13	2.97	-	-	-	-
8	-	-	-	3.13	2.97	-	-	-	-
9	-	-	-	-	-	3.10	3.04	3.29	3.44
10	-	-	-	-	-	3.10	3.04	3.29	3.44
11	-	-	-	-	-	3.10	3.04	3.29	3.44
12	-	-	-	-	-	3.10	3.04	3.29	3.44
13	-	-	3	3	-	-	-	-	-

Note 2: The above information was declared by manufacturer.

Note 3: Ant 13 actual function is not activated, reserved for DFS, don't support TX/RX function.

Note 4: Directional gain information

Type	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4	$Directional\ IGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left(\sum_{k=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right]$
BF	$Directional\ IGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left(\sum_{k=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right]$	$Directional\ IGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left(\sum_{k=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right]$

Ex.

Directional Gain (NSS1) formula :

$$Directional\ IGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left(\sum_{k=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right]$$

$$NSS1(g1,1) = 10^{G1/20} ; NSS1(g1,2) = 10^{G2/20} ; NSS1(g1,3) = 10^{G3/20} ; NSS1(g1,4) = 10^{G4/20}$$

$$g_{j,k} = (NSS1(g1,1) + NSS1(g1,2) + NSS1(g1,3) + NSS1(g1,4))^2$$

$$DG = 10 \log[(NSS1(g1,1) + NSS1(g1,2) + NSS1(g1,3) + NSS1(g1,4))^2 / N_{ANT}] \Rightarrow 10$$

$$\log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / N_{ANT}]$$

Where ;

$$6E\ UNII-5\ G1 = 3.10\ dB; G2 = 3.10\ dB; G3 = 3.10\ dB; G4 = 3.10\ dB$$

$$6E\ UNII-7\ G1 = 3.29\ dB; G2 = 3.29\ dB; G3 = 3.29\ dB; G4 = 3.29\ dB$$

$$6E\ UNII-5\ DG = 9.12\ dB$$

$$6E\ UNII-7\ DG = 9.31\ dB$$

Note 5:

For 2.4GHz function:

For IEEE 802.11 b/g/n/VHT/be (4TX/4RX):

Ant. 1~4 can be used as transmitting/receiving antenna.

Ant. 1~4 could transmit/receive simultaneously.

For 5GHz function:

For IEEE 802.11a/n/ac/ax/be (4TX/4RX):

Ant. 1~4 can be used as transmitting/receiving antenna.

Ant. 1~4 could transmit/receive simultaneously.

For 6GHz function:

For IEEE 802.11ax/be mode (4TX/4RX):

Port 1, Port 2, Port 3 and Port 4 can be used as transmitting/receiving antenna.

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.



1.3 Table for EUT supports function

Function
AP Router
Mesh

Note: The above information was declared by manufacturer.

1.4 Accessories

Accessories				
Power	Brand Name	Model Name	Rating	DC Power Line
Adapter	tp-link	T150500-2-DT	Input: 100-240V~50/60Hz, 2.0A Output: 15.0V, 5.0A, 75.0W	Non-Shielded, 1.5m
Others				
Power cord*1: Non-shielded, 1.5m				
RJ-45 Ethernet cable*1: Shielded, 1.5m				

1.5 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 2.1091
 - ♦ KDB 447498 D04 Interim General RF Exposure Guidance v01
- The following reference test guidance is not within the scope of accreditation of TAF.
- ♦ 47 CFR Part 1.1307
 - ♦ 47 CFR Part 1.1310

1.6 Testing Location

Testing Location Information	
Test Lab. : Sporton International Inc. Hsinchu Laboratory	
Hsinchu	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)
(TAF: 3787)	TEL: 886-3-656-9065 FAX: 886-3-656-9085
	Test site Designation No. TW3787 with FCC.
	Conformity Assessment Body Identifier (CABID) TW3787 with ISED.



2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
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
300-1500	-	-	f/300	<6
1500-100,000	-	-	5	<6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
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
300-1500	-	-	f/1500	<30
1500-100,000	-	-	1.0	<30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Method

The MPE was calculated at 72 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



2.3 MPE Exemption

Option (A): 1.1307(b)(3)(i)(A): Available maximum time-averaged power is < 1 mW

Option (B): 1.1307(b)(3)(i)(B): Device operates between 300 MHz and 6 GHz and the maximum time-averaged power or effective radiated power (ERP), whichever is greater, <= P_{th}.

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

Option (C): 1.1307(b)(3)(i)(C): ERP is below a threshold calculated based on the distance

R between the person and the antenna / radiating structure, where $R > \lambda / 2 \pi$.

Single RF Sources Subject to Routine Environmental Evaluation	
RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$.
1.34-30	$3,450 R^2/f^2$.
30-300	$3.83 R^2$.
300-1,500	$0.0128 R^2 f$.
1,500-100,000	$19.2 R^2$.
Note: R is in meters, f is in MHz.	



2.4 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	8.93	26.89	33.67	0.17	2421.029	72	C	9953.4	0.2433
5.2G;D1D	9.10	26.84	33.79	0.05	2421.029	72	C	9953.4	0.2433
5.8G;D1D	8.99	26.88	33.72	0.12	2421.029	72	C	9953.4	0.2433
6.2G;D1D	9.12	26.52	33.49	0.35	2421.029	72	C	9953.4	0.2433
6.7G;D1D	3.29	32.54	33.68	0.16	2421.029	72	C	9953.4	0.2433

Simultaneous Transmission Analysis Mode:

WLAN 2.4GHz + WLAN 5GHz UNII 1/2A + WLAN 5GHz UNII 2C/3 + WLAN 6GHz UNII 5/7

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	8.93	26.89	33.67	0.17	2421.029	72	C	9953.4	0.2433
5.2G;D1D	9.10	26.84	33.79	0.05	2421.029	72	C	9953.4	0.2433
5.8G;D1D	8.99	26.88	33.72	0.12	2421.029	72	C	9953.4	0.2433
6.7G;D1D	3.29	32.54	33.68	0.16	2421.029	72	C	9953.4	0.2433
Sum TL Ratio_C	0.9732								
Ratio Limit	1								

Note: The above antenna gain was declared by manufacturer.

————THE END————