



中国认可  
国际互认  
检测  
TESTING  
CNAS L5313



# RF Exposure Evaluation Declaration

Product Name : AC1750 Wireless Dual Band  
Gigabit Router  
Model No. : Archer C7  
FCC ID : TE7C7V2

Applicant : TP-LINK TECHNOLOGIES CO., LTD.  
Address : Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central  
Science and Technology Park,Shennan Rd,  
Nanshan,  
Shenzhen,China

Date of Receipt : Mar. 16, 2016  
Issued Date : May. 27, 2016  
Report No. : 1612064R-RF-US-P20V01  
Report Version : V1.0

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

The test report shall not be reproduced without the written approval of Quietek Corporation.

# Test Report Certification

Issued Date : May. 27, 2016

Report No. : 1612064R-RF-US-P20V01



Product Name : AC1750 Wireless Dual Band Gigabit Router  
Applicant : TP-LINK TECHNOLOGIES CO., LTD.  
Address : Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park,Shennan Rd, Nanshan, Shenzhen,China  
Manufacturer : TP-LINK TECHNOLOGIES CO., LTD  
Address : Building 24 (floors 1,3,4,5) and 28 (floors1-4) Central Science and Technology Park,Shennan Rd, Nanshan, Shenzhen,China  
Model No. : Archer C7  
FCC ID : TE7C7V2  
Brand Name : AC 100-240V, 50/60Hz  
EUT Voltage : TP-LINK  
Applicable Standard : KDB 447498D01V06  
FCC Part1.1310(b)  
Test Result : Complied  
Performed Location : Quietek Corporation - Suzhou EMC Laboratory  
No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006, Jiangsu, China  
TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098  
FCC Registration Number: 800392

Documented By : Alice Ni  
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Reviewed By : Frank He  
(Senior Engineer: Frank He )

Approved By : Harry Zhao  
(Engineering Manager : Harry Zhao )

## Laboratory Information

We, **Quietek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scope:

<b>Taiwan R.O.C.</b>	<b>:</b>	<b>BSMI, NCC, TAF</b>
<b>USA</b>	<b>:</b>	<b>FCC</b>
<b>Japan</b>	<b>:</b>	<b>VCCI</b>
<b>China</b>	<b>:</b>	<b>CNAS</b>

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site : <http://www.quietek.com/english/about/certificates.aspx?bval=5>  
The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : [http://www.quietek.com/index\\_en.aspx](http://www.quietek.com/index_en.aspx)

If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

### **HsinChu Testing Laboratory :**

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### **LinKou Testing Laboratory :**

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TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789 E-Mail : [service@quietek.com](mailto:service@quietek.com)

### **Suzhou Testing Laboratory :**

No.99 Hongye Rd., Suzhou Industrial Park, Suzhou, 215006, Jiangsu, China  
TEL : +86-512-6251-5088 / FAX : 86-512-6251-5098 E-Mail : [service@quietek.com](mailto:service@quietek.com)

### History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
1612064R-RF-US-P20V01	V1.0	Initial Issued Report	May. 27, 2016

## 1. RF Exposure Evaluation

### 1.1. Limits

According to FCC 1.1310: 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 1.1307(b)

#### LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time (Minutes)
<b>(A) Limits for Occupational/ Control Exposures</b>				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
<b>(B) Limits for General Population/ Uncontrolled Exposures</b>				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

Friis Formula

Friis transmission formula:  $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

Pd = power density in mW/cm<sup>2</sup>

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 is the limit of MPE, 1 mW/cm<sup>2</sup>. 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.

### 1.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 18°C and 78% RH.

### 1.3. Test Result of RF Exposure Evaluation

Product	:	AC1750 Wireless Dual Band Gigabit Router
Test Item	:	RF Exposure Evaluation
Test Site	:	AC-6

#### 2.4G Antenna :

Model No.	N/A					
Antenna manufacturer	TP-LINK					
Antenna Delivery	<input type="checkbox"/>	1*TX+1*RX	<input type="checkbox"/>	2*TX+2*RX	<input checked="" type="checkbox"/>	3*TX+3*RX
Antenna technology	<input type="checkbox"/>	SISO				
	<input checked="" type="checkbox"/>	MIMO	<input type="checkbox"/>	Basic		
			<input checked="" type="checkbox"/>	CDD		
			<input type="checkbox"/>	Beam-forming		
Antenna Type	<input type="checkbox"/>	External	<input type="checkbox"/>	Dipole		
	<input checked="" type="checkbox"/>	Internal	<input checked="" type="checkbox"/>	PIFA		
			<input type="checkbox"/>	PCB		
			<input type="checkbox"/>	Ceramic Chip Antenna		
			<input type="checkbox"/>	Metal plate type F antenna		
Antenna Technology	Ant Gain (dBi)			Directional Gain (dBi)		
				For Power	For PSD	
<input checked="" type="checkbox"/>	CDD	Ant 0: 3.81 Ant 1: 2.44 Ant 2: 3.67		3.3	8.1	
<input type="checkbox"/>	Beam-forming	N/A		N/A	N/A	

5G Antenna :

Antenna Model		Dipole Antenna			
Antenna Manufacturer		TPlink			
Antenna Delivery		<input type="checkbox"/> 1*TX+1*RX	<input type="checkbox"/> 2*TX+2*RX	<input checked="" type="checkbox"/> 3*TX+3*RX	
Antenna Technology		<input type="checkbox"/> SISO			
		<input checked="" type="checkbox"/> MIMO	<input type="checkbox"/> Basic methodology with NANT transmit antennas		
			<input type="checkbox"/> Sectorized antenna systems		
			<input type="checkbox"/> Cross-polarized antennas		
			<input type="checkbox"/> Unequal antenna gains, with equal transmit powers		
			<input type="checkbox"/> Spatial Multiplexing		
<input checked="" type="checkbox"/> Cyclic Delay Diversity (CDD)					
Antenna Type		Dipole Antenna			
Antenna Gain					
Antenna Technology		Ant Gain		Directional Gain	
				For Power	For PSD
<input checked="" type="checkbox"/>	CDD	Ant0: 4.1 Ant1: 4.1 Ant2: 4.1		4.1	8.87

- Output Power into Antenna & RF Exposure Evaluation Distance:

**Standalone modes**

**2.4GHz:**

Test Mode	Frequency Band (MHz)	Maximum Output Power to Antenna (dBm)	Directional Gain (dBi)	Power Density at R = 23 cm (mW/cm <sup>2</sup> )
802.11b/g/n(20MHz) with CDD	2412 - 2462	25.51	8.1	0.3454
802.11n(40MHz) with CDD	2422 - 2452	17.17	8.1	0.0506

**5GHz:**

Test Mode	Frequency Band (MHz)	Maximum Output Power to Antenna (dBm)	Antenna Gain (dBi)	Power Density at R = 23 cm (mW/cm <sup>2</sup> )
802.11a/n(20MHz)/ac(20MHz)	5180 - 5240 5745 - 5825	25.60	8.87	0.4211
802.11n(40MHz)/ac(40MHz)	5190 - 5230 5755 - 5795	25.26	8.87	0.3893
802.11ac(80MHz)	5210 5775	26.95	8.87	0.5746



**Simultaneous transmission:**

Test Mode	Frequency Band (MHz)	Maximum Output Power to Antenna (dBm)	Directional Gain (dBi)	Power Density at R = 23 cm (mW/cm <sup>2</sup> )
802.11b/g/n(20MHz) with CDD	2412 - 2462	25.51	8.1	0.3454
802.11ac(80MHz)	5210 5775	26.95	8.87	0.5746
Simultaneous transmission power density				0.92

So according to transmission formula:  $P_d = (P_{out} * G) / (4 * \pi * r^2)$  and the power density limit according to KDB 447498D01V06 and FCC Part1.1310(b), the limit is 1mW/cm<sup>2</sup>

**Safety Distance Calculation Formula:**

The power flux:

$$S = \frac{P * G_{(\theta, \phi)}}{4 * \pi * r^2}$$

So safety distance as following:

$$r = \sqrt{\frac{P * G}{4 * \pi * S}}$$

P = input power of the antenna

G = antenna gain relative to an isotropic antenna

θ, φ = elevation and azimuth angles.

r = distance from the antenna to the point of investigation

Test Mode	Frequency Range (MHz)	Maximum EIRP (dBm)	Limit of Power Density S(mW/cm <sup>2</sup> )	Safety Distance r(cm)
802.11b/g/n(20MHz) with CDD	2412 - 2462	33.61	1	17.43
802.11ac(80MHz)	5210 5775	35.82	1	

Note: The safety distance is 23cm for AC1750 Wireless Dual Band Gigabit Router without any other radio equipment.

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