



中国认可
国际互认
检测
TESTING
CNAS L5313



RF Exposure Evaluation Declaration

Product Name : 5GHz 300Mbps Outdoor
Wireless Base Station
Model No. : WBS510
FCC ID : TE7WBS510

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. 29, 2016
Issued Date : Jul. 27, 2016
Report No. : 1632114R -RF-US-P20V01
Report Version : V1.2

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 CNAS, TAF or any agency of the government.

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Test Report Certification

Issued Date : Jul. 27, 2016

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Science and Technology Park,Shennan Rd, Nanshan,
Shenzhen,China
Model No. : WBS510
FCC ID : TE7WBS510
Brand Name : TP-LINK
EUT Voltage : 100-240V, 50/60HZ
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

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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:

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

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

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

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
1632114R-RF-US-P20V01	V1.0	Initial Issued Report	Jun. 02, 2016
1632114R-RF-US-P20V01	V1.1	Add the evaluation of dipole antenna	Jul. 08, 2016
1632114R-RF-US-P20V01	V1.2	Add 10M bandwidth	Jul. 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 ²)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is the limit of MPE, 1 mW/cm². 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	:	5GHz 300Mbps Outdoor Wireless Base Station
Test Item	:	RF Exposure Evaluation
Test Site	:	AC-6

For Sectorized Antenna

Antenna Model	3101500451								
Antenna Manufacturer	N/A								
Antenna Delivery	<input type="checkbox"/>	1*TX+1*RX		<input checked="" type="checkbox"/>	2*TX+2*RX		<input 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 checked="" 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 type="checkbox"/>	Cyclic Delay Diversity (CDD)					
Antenna Type	External Antenna								

Antenna Information					
No.			Ant Type		Ant Gain/ Direction Gain
<input type="checkbox"/>	SISO	<input type="checkbox"/>	Antenna 1	Sector Antenna	19dBi
		<input type="checkbox"/>	Antenna 2	Sector Antenna	19dBi
		<input type="checkbox"/>	Antenna 3		
<input type="checkbox"/>	Basic				
<input checked="" type="checkbox"/>	CDD			Sector Antenna	19dBi
<input type="checkbox"/>	Beam-forming				

For Dipole Antenna

Antenna Model	T3030-KS000				
Antenna Manufacturer	N/A				
Antenna Delivery	<input type="checkbox"/>	1*TX+1*RX	<input checked="" type="checkbox"/>	2*TX+2*RX	<input 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		External Antenna		

Antenna Information					
No.			Ant Type	Ant Gain/ Direction Gain	
<input type="checkbox"/>	SISO	<input type="checkbox"/>	Antenna 1	Dipole Antenna	3dBi
		<input type="checkbox"/>	Antenna 2	Dipole Antenna	3dBi
		<input type="checkbox"/>	Antenna 3		
<input type="checkbox"/>	Basic				
<input checked="" type="checkbox"/>	CDD			External Antenna	5.97dBi
<input type="checkbox"/>	Beam-forming				

● Output Power into Antenna & RF Exposure Evaluation Distance:

Test Mode	Frequency Band (MHz)	Maximum Output Power to Antenna (dBm)	Direction Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)
802.11a/n(10MHz) for Sectorized Antenna	5150 - 5250 5725 - 5850	15.71	19.0	0.5885
802.11a/n(20MHz) for Sectorized Antenna	5150 - 5250 5725 - 5850	14.26	19.0	0.4214
802.11n(40MHz) for Sectorized Antenna	5150 - 5250 5725 - 5850	13.54	19.0	0.3571
802.11a/n(10MHz) for Dipole Antenna	5150 - 5250 5725 - 5850	25.45	3.0	0.1395
802.11a/n(20MHz) for Dipole Antenna	5150 - 5250 5725 - 5850	27.12	3.0	0.2045
802.11n(40MHz) for Dipole Antenna	5150 - 5250 5725 - 5850	26.69	3.0	0.1852

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 ²)	Safety Distance r(cm)
802.11a/n(10MHz) for Sectorized Antenna	5150 - 5250 5725 - 5850	34.71	1	15.34

Note: The safety distance is 15.34cm for 5GHz 300Mbps Outdoor Wireless Base Station without any other radio equipment.

_____ The End _____