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Report No.: SZEM150500284202

Page: 1 of 7

# RF Exposure Evaluation Report

<b>Application No.:</b>	SZEM1505002842HR
<b>Applicant:</b>	TP-LINK TECHNOLOGIES CO., LTD.
<b>Manufacturer:</b>	TP-LINK TECHNOLOGIES CO., LTD.
<b>Product Name:</b>	300Mbps Wireless N Access Point
<b>Model No.(EUT):</b>	TL-WA801ND
<b>Trade Mark.:</b>	TP-LINK
<b>Standards:</b>	47 CFR Part 1.1307 (2014) 47 CFR Part 1.1310 (2014) KDB447498D01 General RF Exposure Guidance v05r02
<b>Date of Receipt:</b>	2015-05-28
<b>Date of Test:</b>	2015-06-02 to 2015-06-03
<b>Date of Issue:</b>	2015-08-06

<b>Test Result :</b>	<b>PASS*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Jack Zhang  
EMC Laboratory Manager

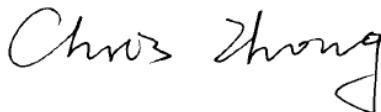
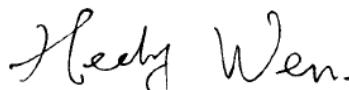
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## 2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2015-08-06		Original

Authorized for issue by:			
			2015-06-03
Tested By	(Chris Zhong) /Project Engineer		Date
			2015-08-06
Prepared By	(Hedy Wen) /Clerk		Date
			2015-08-06
Checked By	(Owen Zhou) /Reviewer		Date

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## 4 General Information

### 4.1 Client Information

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

### 4.2 General Description of EUT

Product Name:	300Mbps Wireless N Access Point
Model No.:	TL-WA801ND
Trade Mark:	TP-LINK
Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels IEEE 802.11n HT40: 7 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g : OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20 and HT40) : OFDM (64QAM, 16QAM, QPSK,BPSK)
Test Power Grade:	802.11b:19dBm; 802.11g:19dBm; 802.11n(20MHz):19dBm; 802.11n(40MHz):5.5dBm
Test Software of EUT:	Artgui (manufacturer declare )
Antenna Gain:	wifi:5dBi
Antenna Type:	I-PEX external
EUT Power Supply:	MODEL: T090060-2B1 INPUT:AC 100-240V~ 50/60Hz 0.3A OUTPUT:9V 0.6A

### 4.3 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch E&E Lab

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China  
518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

#### **4.4 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **VCCI**

The 10m Semi-anechoic chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers of SGS-CSTC Standards Technical Services Co., Ltd. have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-2.

#### **4.5 Deviation from Standards**

None.

#### **4.6 Abnormalities from Standard Conditions**

None.

#### **4.7 Other Information Requested by the Customer**

None.

## 5 RF Exposure Evaluation

### 5.1 RF Exposure Compliance Requirement

#### 5.1.1 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—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> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300 .....	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	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/cm<sup>2</sup>

$P_{out}$  = 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

$P_d$  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.

#### 5.1.2 Test Procedure

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

### 5.1.3 EUT RF Exposure Evaluation

#### 1) . exposure conditions for standalone operations

Antenna Gain: 5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.16 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max. Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit	MPE Ratios	Result
Highest	2437	22.55	179.89	0.179	1.0	0.001	PASS

Note: Refer to report No. SZEM150500284201 for EUT test Max Conducted Peak Output Power value.

The distance (4th column) calculated from the Friis transmission formula is far greater than 20 cm separation requirement.

#### exposure conditions for simultaneous transmission operations

Simultaneous transmission MPE test is not required, because the Max. sum of the MPE ratios for WiFi is  $0.95+0.001=0.0951 < 1$