

RF Exposure Evaluation Report

Product : WiFi module
Trade mark : N/A
Model/Type reference : ESP-01E
Serial Number : N/A
Report Number : EED32K00216302
FCC ID : 2AHMR-ESP01E
Date of Issue : Nov. 07, 2018
47 CFR Part 1.1307
Test Standards : 47 CFR Part 1.1310
KDB 447498 D01v06
Test result : PASS

Prepared for:

Shenzhen Ai-Thinker Technology Co., Ltd.
6/F, Block C2, Huafeng Industrial Park, Hangcheng Road,
Baoan district, Shenzhen, China

Prepared by:

Centre Testing International Group Co., Ltd.
Hongwei Industrial Zone, Bao'an 70 District,
Shenzhen, Guangdong, China

TEL: +86-755-3368 3668

FAX: +86-755-3368 3385

Tested By:

Tom chen

Tom chen (Test Project)

Compiled by:

Kevin lan

Kevin lan (Project Engineer)

Reviewed by:

Kevin Yang

Kevin yang (Reviewer)

Approved by:

Sheek Luo

Sheek Luo (Lab supervisor)

Date:

Nov. 07, 2018

Check No.: 3320276355



2 Version

Version No.	Date	Description
00	Nov. 07, 2018	Original

3 Contents

	Page
1 COVER PAGE.....	1
2 VERSION.....	2
3 CONTENTS.....	3
4 GENERAL INFORMATION.....	4
4.1 CLIENT INFORMATION.....	4
4.2 GENERAL DESCRIPTION OF EUT.....	4
4.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD.....	4
4.4 TEST LOCATION.....	4
4.5 DEVIATION FROM STANDARDS.....	5
4.6 ABNORMALITIES FROM STANDARD CONDITIONS.....	5
4.7 OTHER INFORMATION REQUESTED BY THE CUSTOMER.....	5
5 RF EXPOSURE EVALUATION.....	6
5.1 RF EXPOSURE COMPLIANCE REQUIREMENT.....	6
5.1.1 Limits.....	6
5.1.2 Test Procedure.....	6
5.1.3 EUT RF Exposure Evaluation.....	7
PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS.....	8

4 General Information

4.1 Client Information

Applicant:	Shenzhen Ai-Thinker Technology Co., Ltd.
Address of Applicant:	6/F, Block C2, Huafeng Industrial Park, Hangcheng Road, Baoan district, Shenzhen, China
Manufacturer:	Shenzhen Ai-Thinker Technology Co., Ltd.
Address of Manufacturer:	6/F, Block C2, Huafeng Industrial Park, Hangcheng Road, Baoan district, Shenzhen, China
Factory:	Shenzhen Ai-Thinker Technology Co., Ltd.
Address of Factory:	6/F, Block C2, Huafeng Industrial Park, Hangcheng Road, Baoan district, Shenzhen, China

4.2 General Description of EUT

Product Name:	WiFi module
Model No.(EUT):	ESP-01E
Trade Mark:	N/A
EUT Supports Radios application:	WiFi 802.11b/g/n(HT20): 2412MHz to 2462MHz
Power Supply:	DC 3.3V

4.3 Product Specification subjective to this standard

Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 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): OFDM (64QAM, 16QAM, QPSK,BPSK)
Test Power Grade:	N/A
Test Software of EUT:	ESP Series Modules FCC & CE Test Tool V2.2.3.exe (manufacturer declare)
Antenna Type:	Spring antenna
Antenna Gain:	2.78dBi
Max Conducted Peak Output Power:	16.23dBm The power data refer to the report EED32K00216301
Sample Received Date:	Aug. 09, 2018
Sample tested Date:	Aug. 09, 2018 to Nov. 07, 2018
The tested sample(s) and the sample information are provided by the client.	

4.4 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd

Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China

Telephone: +86 (0) 755 33683668 Fax:+86 (0) 755 33683385

No tests were sub-contracted.

FCC Designation No.: CN1164

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 ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
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				
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

A rough estimation of the expected exposure in power flux density on a given point can be made with the following equation:

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

Where:

S = power density

P = power input to the antenna

G = numeric gain of the antenna in the direction of interest relative to an isotropic radiator

R= distance to the centre of radiation of the antenna

EIRP = P*G

The antenna of the product, under normal use condition is at least 20 cm away from the body of the user.

Warning statement to the user for keeping at least 20cm separation distance and the prohibition of operating to a person has been printed on the user's manual. Therefore, the S of the device is calculated with R=20cm, and if it is below the limit S, then we can conclude the device complies with the rules.

5.1.2 Test Procedure

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

Report No. : EED32K00216302

Page 7 of 8

5.1.3 EUT RF Exposure Evaluation

Antenna Gain: 2.78dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power(dBm)	Gain (dBi)	EIRP* (dBm)	EIRP (mW)	R (cm)	S (mW/cm ²)	Limit (mW/cm ²)	Result
Highest	2462	16.23	2.78	19.01	79.62	20	0.016	1.0	Pass

Note: Refer to report No. EED32K00216301 for EUT test Max Conducted Peak Output Power value.

PHOTOGRAPHS OF EUT Constructional Details

Refer to Report No. EED32K00216301 for EUT external and internal photos.

***** End of Report *****

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CTI, this report can't be reproduced except in full.