

TEST REPORT

Reference No...... : WTD22D02019007W004
FCC ID : 2A4RQ-ESP32
Applicant..... : Shen Zhen Shi Ya Ying Technology Co., Ltd.
Address..... : Room 704, No.18, Huayuan New Village, Longyuan Community,
Longhua District Shenzhen 518109 China
Manufacturer : Shen Zhen Shi Ya Ying Technology Co., Ltd.
Address..... : Room 704, No.18, Huayuan New Village, Longyuan Community,
Longhua District Shenzhen 518109 China
Product..... : ESP32 WiFi & Bluetooth Development Board
Model(s) : ESP32
Standards..... : FCC 47CFR Part 2 Subpart J Section 2.1091
Date of Receipt sample : 2022-02-17
Date of Test : 2022-02-17 to 2022-02-24
Date of Issue..... : 2022-02-25
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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3. Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTD22D02019007 W004	2022-02-17	2022-02-17 to 2022-02-24	2022-02-25	Original	-	Valid

4. General Information

4.1. General Description of E.U.T.

Product:	ESP32 WiFi & Bluetooth Development Board
Model(s):	ESP32
Model difference:	N/A
BT Version:	4.2
Wi-Fi Specification:	2.4G-802.11b/g/n HT20/n HT40
Hardware Version:	V2.0
Software Version:	V2.0

4.2. Details of E.U.T.

Operation Frequency:	Bluetooth: 2402-2480MHz, 79 Channels in total BLE: 2402-2480MHz, 40 Channels in total Wi-Fi: 802.11b/g/n HT20: 2412~2462MHz, 11CH 802.11n HT40: 2422~2452MHz, 7CH
Max. RF output power:	Bluetooth: 3.81dBm BLE: 0.98dBm Wi-Fi: 17.29dBm
Modulation Technology:	Bluetooth: 3.81dBm BLE: GFSK, $\pi/4$ DQPSK, 8DPSK Wi-Fi: CCK, OFDM
Antenna installation:	PCB printed antenna
Antenna Gain:	2.0dBi
Ratings:	DC 5V

4.3. Test Facility

The test facility has a test site registered with the following organizations:

ISED CAB identifier: CN0013. Test Firm Registration No.: 7760A.

Waltek Testing Group Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files.

Registration number 7760A, October 15, 2016.

FCC Designation No.: CN1201. Test Firm Registration No.: 523476.

Waltek Testing Group Co., Ltd. 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 number 523476, September 10, 2019.

4.4. Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test Lab: N/A

Lab address: N/A

Test items: N/A

4.5. Abnormalities from Standard Conditions

None.

5. Test Summary

Test Items	Test Requirement	Result
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	FCC Part 2.1091	PASS

6. RF Exposure

Test Requirement: FCC 47CFR Part 2 Subpart J Section 2.1091

Evaluation Method: FCC 47CFR Part 1 Subpart I Section 1.1310,
KDB 447498 D01 General RF Exposure Guidance v06

6.1. Requirements

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

6.2. The procedures / limit

Table 1 to § 1.1310(e)(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)
(i) Limits for Occupational/Controlled Exposure				
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	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
(ii) 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
300-1,500			f/1500	<30
1,500-100,000			1	<30

f = frequency in MHz. * = Plane-wave equivalent power density.

6.3. MPE Calculation Method

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

S = power density (in appropriate units, e.g. mW/cm²)

P = output power to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

From the peak EUT RF output power, the minimum mobile separation distance, R=20cm, as well as the gain of the used antenna, the RF power density can be obtained

6.4. Radio Frequency Radiation Exposure Evaluation

Band	Antenna Gain (dBi)	Antenna Gain (numeric)	Max. Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (mW/cm ²)	Limit (mW/cm ²)
Bluetooth	2.00	1.585	3.81	2.40	0.000758	1.0
BLE	2.00	1.585	0.98	1.25	0.000395	1.0
2.4G WIFI	2.00	1.585	17.29	53.58	0.016894	1.0

Note:

1. For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.
2. Chose the maximum power to do MPE analysis.
3. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.

Conclusion:

RF Exposure is FCC compliant.

=====End of Report=====