

# Qingdao Intelligent&Precise Electronics Co., Ltd

# **MPE ASSESSMENT REPORT**

## **Report Type:**

FCC MPE assessment report

#### Model:

ZDGF7668AU-C

#### **REPORT NUMBER:**

190400328SHA-006

### **ISSUE DATE:**

April 26, 2019

#### **DOCUMENT CONTROL NUMBER:**

TTRFFCCMPE-01 V1 © 2018 Intertek





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Report no.: 190400328SHA-006

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FCC: 2AJVQ-7668AUC

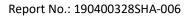
#### **SUMMARY:**

The equipment complies with the requirements according to the following standard(s) or Specification:

KDB447498 D01 General RF Exposure Guidance v06 FCC Part2.1091, FCC Part2.1093 FCC Part1.1307(b)

| PREPARED BY:     | REVIEWED BY: |  |
|------------------|--------------|--|
| remb             | Donnel       |  |
| Project Engineer | Reviewer     |  |
| Nemo Li          | Daniel Zhao  |  |

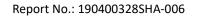
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# **Revision History**

| Report No.       | Version | Description             | Issued Date    |
|------------------|---------|-------------------------|----------------|
| 190400328SHA-006 | Rev. 01 | Initial issue of report | April 26, 2019 |
|                  |         |                         |                |
|                  |         |                         |                |





## **1 GENERAL INFORMATION**

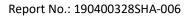
# 1.1 Description of Equipment Under Test (EUT)

| Product name:         | Wireless Module  |
|-----------------------|--|
| Type/Model:           | ZDGF7668AU-C   |
|                       | EUT is a Wireless Module with WiFi and Bluetooth function, and has |
| Description of EUT:   | only one model.  |
| Rating:               | DC 5V  |
| EUT type:             | ☐ Table top ☐ Floor standing                                       |
| Software Version:     | /  |
| Hardware Version:     | /  |
| Sample received date: | April 2, 2019  |
| Date of test:         | April 2, 2019 ~ April 25, 2019                                     |

# 1.2 Technical Specification

| Frequency Range:    | 2400MHz ~ 2483.5MHz                                |  |
|---------------------|--|--|
| Support Standards:  | 802.11b, 802.11g, 802.11n(HT20), 802.11n(HT40)     |  |
|                     | 802.11b: DSSS (CCK, DQPSK, DBPSK)                  |  |
|                     | 802.11g: OFDM (64-QAM, 16-QAM, QPSK, BPSK)         |  |
|                     | 802.11n(HT20): OFDM (64-QAM, 16-QAM, QPSK, BPSK)   |  |
| Type of Modulation: | 802.11n(HT40): OFDM (64-QAM, 16-QAM, QPSK, BPSK)   |  |
|                     | 11 Channels for 802.11b, 802.11g and 802.11n(HT20) |  |
| Channel Number:     | 7 Channels for 802.11n(HT40)                       |  |
| Channel Separation: | 5 MHz  |  |

|                     | 5150 ~ 5250MHz  |  |  |  |
|---------------------|---|--|--|--|
|                     | 5250 ~ 5350MHz  |  |  |  |
|                     | 5470 ~ 5725MHz  |  |  |  |
| Frequency Range:    | 5725 ~ 5850MHz  |  |  |  |
|                     | 802.11a, 802.11n(HT20), 802.11n(HT40), 802.11ac(VHT20), |  |  |  |
| Support Standards:  | 802.11ac(VHT40), 802.11ac(VHT80)                        |  |  |  |
| Type of Modulation: | OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)                 |  |  |  |
|                     | For 5150 ~ 5250MHz band: Channel 36 - 48                |  |  |  |
|                     | For 5250 ~ 5350MHz Band: Channel 52 - 64                |  |  |  |
|                     | For 5470 ~ 5725MHz Band: Channel 100 - 140              |  |  |  |
| Channel Number:     | For 5725 ~ 5850MHz band: Channel 149 - 165              |  |  |  |

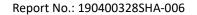




# 1.3 Description of Test Facility

| Name:      | Intertek Testing Services Shanghai                                     |
|------------|--|
| Address:   | Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China |
| Telephone: | 86 21 61278200   |
| Telefax:   | 86 21 54262353   |

| The test facility is                             | CNAS Accreditation Lab  |
|--|---|
| recognized,                                      | Registration No. CNAS L0139   |
| certified, or accredited by these organizations: | FCC Accredited Lab<br>Designation Number: CN1175                              |
| organizations.                                   | IC Registration Lab<br>CAB identifier.: CN0051                                |
|  | VCCI Registration Lab<br>Registration No.: R-14243, G-10845, C-14723, T-12252 |
|  | A2LA Accreditation Lab<br>Certificate Number: 3309.02                         |





## 2 MPE Assessment

Test result: Pass

### 2.1 MPE Assessment Limit

Mobile device exposure for standalone operations:

| Frequency range | E-field strength       | H-field strength        | B-field                 | Equivalent plane wave               |  |
|-----------------|------------------------|-------------------------|-------------------------|-------------------------------------|--|
|                 | (V/m)                  | (A/m)                   | (uT)                    | power density                       |  |
|                 |                        |                         |                         | S <sub>eq</sub> (W/m <sup>2</sup> ) |  |
| 0-1 Hz          | -                      | $3,2 \times 10^4$       | $4 \times 10^{4}$       | -                                   |  |
| 1-8 Hz          | 10 000                 | $3.2 \times 10^4/f^2$   | $4 \times 10^4/f^2$     | -                                   |  |
| 8-25 Hz         | 10 000                 | 4 000/f                 | 5 000/f                 | -                                   |  |
| 0,025-0,8 kHz   | 250/f                  | 4/f                     | 5/f                     | -                                   |  |
| 0,8-3 kHz       | 250/f                  | 5                       | 6,25                    | -                                   |  |
| 3-150 kHz       | 87                     | 5                       | 6,25                    | -                                   |  |
| 0,15-1 MHz      | 87                     | 0,73/f                  | 0,92/f                  | -                                   |  |
| 1-10 MHz        | 87/f <sup>1/2</sup>    | 0,73/f                  | 0,92/f                  | -                                   |  |
| 10-400 MHz      | 28                     | 0,073                   | 0,092                   | 2                                   |  |
| 400-2 000 MHz   | 1,375 f <sup>1/2</sup> | 0,0037 f <sup>1/2</sup> | 0,0046 f <sup>1/2</sup> | f/200                               |  |
| 2-300 GHz       | 61                     | 0,16                    | 0,20                    | 10                                  |  |

Mobile device exposure for simultaneous transmission operations: the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is  $\leq$  1.0

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# 2.2 Assessment Results

Power density (S) is calculated according to the formula:

 $S = P / (4\pi R^2)$ 

**TEST REPORT** 

Where  $S = power density in mW/cm^2$ 

P = Radiated transmit power in mW

G = numeric gain of transmit antenna

R = distance (cm)

As we can see from the test report 190400328SHA-001, 190400328SHA-002, 190400328SHA-004 and 190400328SHA-005:

The calculations in the table below use the highest antenna gain or directional gain for EUT. These calculations represent worst case in terms of the exposure levels.

The 2.4G Band WiFi and 5G Band WiFi cannot can support simultaneous transmission, the Bluetooth and WiFi can support simultaneous transmission.

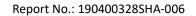
| Mode      | Frequency<br>band | Power | Directional Gain | R    | S        | Limits   |
|-----------|-------------------|-------|------------------|------|----------|----------|
|           | (MHz)             | (dBm) | dBi              | (cm) | (mW/cm2) | (mW/cm2) |
| Bluetooth | 2400 -2483.5      | 6.38  | 0.13             | 20   | 0.0009   | 1        |
|           | 2400 -2483.5      | 17.67 | 1.62             | 20   | 0.0169   | 1        |
|           | 5150-5250         | 16.27 | 3.48             | 20   | 0.0188   | 1        |
| WiFi      | 5250-5350         | 15.96 | 3.48             | 20   | 0.0175   | 1        |
|           | 5470-5725         | 16.71 | 3.48             | 20   | 0.0208   | 1        |
|           | 5725-5850         | 16.57 | 3.48             | 20   | 0.0201   | 1        |

Note: 1 mW/cm2 from 1.310 Table 1

For the device can support simultaneous transmission, according to 447498 D01 General RF Exposure Guidance v06,

For the device consider simultaneous transmission of WiFi and Bluetooth:

The worst MPE = 0.0009/1 + 0.0208/1 = 0.0217 mW/cm2 < 1 mW/cm2.





# Appendix I

Definition below must be outlined in the User Manual:

| To satisfy FCC RF exposure requirements, a separation distance of 20 cm or more should be maintained |
|--|
| between the antenna of this device and persons during device operation.                              |
| To ensure compliance, operations at closer than this distance is not recommended.                    |