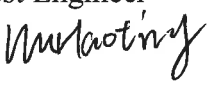


# TEST REPORT

**GRGTEST**

Verified code:960708

|                                                                                                                                                                                |                                                                                                                                 |                                                                                                                                                                                                                  |               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <b>Report No.:</b>                                                                                                                                                             | E201910118649-2                                                                                                                 | <b>Application No.:</b>                                                                                                                                                                                          | E201910118649 |
| <b>Client:</b>                                                                                                                                                                 | Dalian Golden Hualu Digital Technology Co.,Ltd.                                                                                 |                                                                                                                                                                                                                  |               |
| <b>Address:</b>                                                                                                                                                                | No.1, Hua Road, High-Tech Zone, Dalian,Liaoning,116023,China                                                                    |                                                                                                                                                                                                                  |               |
| <b>Sample Description:</b>                                                                                                                                                     | BT module                                                                                                                       |                                                                                                                                                                                                                  |               |
| <b>Model:</b>                                                                                                                                                                  | BM78SPP05MC2                                                                                                                    |                                                                                                                                                                                                                  |               |
| <b>Test Location:</b>                                                                                                                                                          | GRG METROLOGY & TEST (SHENZHEN) CO., LTD                                                                                        |                                                                                                                                                                                                                  |               |
| <b>Test Specification:</b>                                                                                                                                                     | KDB 447498 D01 General RF Exposure Guidance v06<br>FCC Part 2 §2.1091                                                           |                                                                                                                                                                                                                  |               |
| <b>Test Date:</b>                                                                                                                                                              | 2019/10/25 to 2020/01/07                                                                                                        |                                                                                                                                                                                                                  |               |
| <b>Issue Date:</b>                                                                                                                                                             | 2020/01/16                                                                                                                      |                                                                                                                                                                                                                  |               |
| <b>Test Result:</b>                                                                                                                                                            | Pass                                                                                                                            |                                                                                                                                                                                                                  |               |
| <b>Prepared By:</b><br>Test Engineer<br>                                                    | <b>Reviewed By:</b><br>Technical Manager<br> | <b>Approved By:</b><br>Manager<br><br> |               |
| <b>Other Aspects:</b>                                                                                                                                                          |                                                                                                                                 |                                                                                                                                                                                                                  |               |
| Note: /                                                                                                                                                                        |                                                                                                                                 |                                                                                                                                                                                                                  |               |
| Abbreviations: ok / P = passed; fail / F = failed; n.a. / N = not applicable;                                                                                                  |                                                                                                                                 |                                                                                                                                                                                                                  |               |
| The test result in this test report refers exclusively to the presented test sample. This report shall not be reproduced except in full, without the written approval of GRGT. |                                                                                                                                 |                                                                                                                                                                                                                  |               |

### **DIRECTIONS OF TEST**

1. This company carries out test task according to the national regulation of verifications which can be traced to National Primary Standards and BIPM.
2. The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.
3. If there is any objection concerning the test, the client should inform the laboratory within 15 days from the date of receiving the test report.

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## 1. GENERAL DESCRIPTION OF EUT

### 1.1. APPLICANT

Name: Dalian Golden Hualu Digital Technology Co.,Ltd.  
Address: No.1, Hua Road, High-Tech Zone, Dalian,Liaoning,116023,China

### 1.2. MANUFACTURER

Name: Dalian Golden Hualu Digital Technology Co.,Ltd.  
Address: No.1, Hua Road, High-Tech Zone, Dalian,Liaoning,116023,China

### 1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment: BT module  
Model No.: BM78SPP05MC2  
Adding Model: /  
FCC ID: 2ADKJ-BM78MC2  
Trade Name: /  
Power supply: DC 3.3V-4.2V supplied by battery or DC5V supplied by adapter  
Frequency Range: 2402MHz~2480MHz  
Transmit Power: GFSK: 2.06dBm  
 $\pi/4$ -DQPSK: 2.03dBm  
8DPSK: 2.48dBm  
Type of Modulation: FHSS (GFSK for 1Mbps,  $\pi/4$ -DQPSK for 2Mbps, 8DPSK for 3Mbps)  
Antenna Specification: Internal antenna with 2dBi gain (Max.)  
Temperature Range: -20 °C ~+70 °C  
Hardware Version: 1.0  
Software Version: 1.36  
I/O Port : /  
Note: /

## 2. LABORATORY AND ACCREDITATIONS

The tests and measurements refer to this report were performed by EMC Laboratory of GRG METROLOGY & TEST (SHENZHEN) CO., LTD

Add.: No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District Shenzhen, 518110, People's Republic of China

Telephone: +86-755-61180008

Fax: /

## 3. ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies.

|      |                            |
|------|----------------------------|
| A2LA | Certificate Number 2861.01 |
|------|----------------------------|

## 4. EVALUATION METHOD

Exposure category: General population/uncontrolled environment

EUT Type: Production Unit

Device Type: Mobile Device

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

In accordance with KDB447498D01 for Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is  $\leq 1.0$ . The MPE ratio of each antenna is determined at the minimum test separation distance required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to MPE limit, at the test frequency. Either the maximum peak or spatially averaged results from measurements or numerical simulations may be used to determine the MPE ratios. Spatial averaging does not apply when MPE is estimated using simple calculations based on far-field plane-wave equivalent conditions. The antenna installation and operating requirements for the host device must meet the minimum test separation distances required by all antennas, in both standalone and simultaneous transmission operations, to satisfy compliance.

## 5. LIMITS FOR GENERAL POPULATION/UNCONTROLLED

### EXPOSURE

(B) Limits for General Population / Uncontrolled Exposure

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/cm <sup>2</sup> ) | Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|-----------------------------------------|-------------------------------------------------------------------|
| 0.3-1.34              | 614                               | 1.63                              | (100)*                                  | 30                                                                |
| 1.34-30               | 824/f                             | 2.19/f                            | (180/f)*                                | 30                                                                |
| 30-300                | 27.5                              | 0.073                             | 0.2                                     | 30                                                                |
| 300-1500              |                                   |                                   | F/1500                                  | 30                                                                |
| 1500-100,000          |                                   |                                   | 1.0                                     | 30                                                                |

Note: f = frequency in MHz ; \*Plane-wave equivalent power density

## 6. CALCULATION METHOD

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG / 4\pi R^2$$

Where: S=power density

P=power input to antenna

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

R=distance to the center of radiation of the antenna

From the EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the maximum gain of the used 2dBi for BT, the RF power density can be obtained.

| Frequency Band | Antenna type and antenna number | Maximum antenna gain |
|----------------|---------------------------------|----------------------|
| 2.4GHz         | Internal Antenna                | 2 dBi                |

## 7. ESTIMATION RESULT

### 7.1. CONDUCTED POWER RESULTS

| <i>Bluetooth</i> |         |                 |                                   |
|------------------|---------|-----------------|-----------------------------------|
| Mode             | Channel | Frequency(MHz ) | Peak Conducted Output Power (dBm) |
| GFSK             | 00      | 2402            | 1.86                              |
|                  | 39      | 2441            | 2.06                              |
|                  | 78      | 2480            | 1.98                              |
| $\pi/4$ DQPSK    | 00      | 2402            | 1.83                              |
|                  | 39      | 2441            | 2.03                              |
|                  | 78      | 2480            | 1.93                              |
| 8DPSK            | 00      | 2402            | 2.31                              |
|                  | 39      | 2441            | 2.48                              |
|                  | 78      | 2480            | 2.36                              |

## 7.2. MANUFACTURING TOLERANCE

### *Bluetooth*

| GFSK                      |      |      |      |
|---------------------------|------|------|------|
| Frequency (MHz)           | 2402 | 2441 | 2480 |
| Maximum Output Power(dBm) | 1.0  | 2.0  | 1.0  |
| Tolerance $\pm$ (dB)      | 1.0  | 1.0  | 1.0  |

| $\pi/4$ DQPSK             |      |      |      |
|---------------------------|------|------|------|
| Frequency (MHz)           | 2402 | 2441 | 2480 |
| Maximum Output Power(dBm) | 1.0  | 2.0  | 1.0  |
| Tolerance $\pm$ (dB)      | 1.0  | 1.0  | 1.0  |

| 8DPSK                     |      |      |      |
|---------------------------|------|------|------|
| Frequency (MHz)           | 2402 | 2441 | 2480 |
| Maximum Output Power(dBm) | 2.0  | 2.0  | 2.0  |
| Tolerance $\pm$ (dB)      | 1.0  | 1.0  | 1.0  |

## 7.3. MEASUREMENT RESULTS

### 7.3.1. STANDALONE MPE

### *Bluetooth*

| Mode          | Output power |        | Antenna Gain (dBi) | Antenna Gain (linear) | Duty Cycle | MPE (mW/cm <sup>2</sup> ) | MPE Limits (mW/cm <sup>2</sup> ) |
|---------------|--------------|--------|--------------------|-----------------------|------------|---------------------------|----------------------------------|
|               | (dBm)        | (mW)   |                    |                       |            |                           |                                  |
| GFSK          | 3.0          | 1.9953 | 2                  | 1.5849                | 100%       | 0.0006                    | 1.0000                           |
| $\pi/4$ DQPSK | 3.0          | 1.9953 | 2                  | 1.5849                | 100%       | 0.0006                    | 1.0000                           |
| 8DPSK         | 3.0          | 1.9953 | 2                  | 1.5849                | 100%       | 0.0006                    | 1.0000                           |

Remark:

1. Maximum power including tune-up tolerance;
2. MPE use distance is 20cm from manufacturer declaration of user manual.

According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;

The device support one BT modular and one antenna, no need consider simultaneous transmission.

## 8. CONCLUSION

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

----- END OF REPORT-----