

# RF EXPOSURE EVALUATION REPORT

**Product Name:** WIFI Module  
**Trade Mark:** GSD  
**Model No. / HVIN:** W7BM1100  
**Add. Model No. / HVIN:** N/A  
**Report Number:** 190716004RFC-2  
**Test Standards:** FCC 47 CFR Part 1 Subpart I  
 RSS-102 Issue 5  
**FCC ID:** 2AC23-W7BM1100  
**IC:** 12290A-W7BM1100  
**Test Result:** PASS  
**Date of Issue:** August 14, 2019

Prepared for:

**Hui Zhou Gaoshengda Technology Co., LTD**  
**NO.75 Zhongkai Development Area, Huizhou, Guangdong, China**

Prepared by:

**Shenzhen UnionTrust Quality and Technology Co., Ltd.**  
**16/F, Block A, Building 6, Baoneng Science and Technology Park,**  
**Qingxiang Road No.1, Longhua New District, Shenzhen, China**  
**TEL: +86-755-2823 0888**  
**FAX: +86-755-2823 0886**

Prepared by: \_\_\_\_\_

*Tony*  
 Tony Kang  
 Project Engineer

Reviewed by: \_\_\_\_\_

  
 Kevin Liang  
 Assistant Manager

Approved by: \_\_\_\_\_



Technical Director

Date: August 14, 2019

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# 1. GENERAL INFORMATION

## 1.1 CLIENT INFORMATION

<b>Applicant:</b>	Hui Zhou Gaoshengda Technology Co., LTD
<b>Address of Applicant:</b>	NO.75 Zhongkai Development Area, Huizhou, Guangdong, China
<b>Manufacturer:</b>	Hui Zhou Gaoshengda Technology Co., LTD
<b>Address of Manufacturer:</b>	NO.75 Zhongkai Development Area, Huizhou, Guangdong, China

## 1.2 EUT INFORMATION

<b>Product Name:</b>	WIFI Module	
<b>Model No. / HVIN:</b>	W7BM1100	
<b>Add. Model No. / HVIN:</b>	N/A	
<b>Trade Mark:</b>	GSD	
<b>DUT Stage:</b>	Identical Prototype	
<b>EUT Supports Function:</b>	2.4 GHz ISM Band:	IEEE 802.11b/g/n
<b>Sample Received Date:</b>	July 17, 2019	
<b>Sample Tested Date:</b>	July 17, 2019 to August 5, 2019	

## 1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

For 2.4 GHz ISM Band of Wi-Fi	
<b>Frequency Band:</b>	2400 MHz to 2483.5 MHz
<b>Frequency Range:</b>	2412 MHz to 2462 MHz
<b>Support Standards:</b>	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20, IEEE 802.11n-HT40
<b>Type of Modulation:</b>	IEEE 802.11b: DSSS(CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM(64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT20: OFDM(64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT40: OFDM(64-QAM, 16-QAM, QPSK, BPSK)
<b>Data Rate:</b>	IEEE 802.11b: Up to 11 Mbps IEEE 802.11g: Up to 54 Mbps IEEE 802.11n-HT20: Up to MCS7 IEEE 802.11n-HT40: Up to MCS7
<b>Number of Channels:</b>	IEEE 802.11b: 11 IEEE 802.11g: 11 IEEE 802.11n-HT20: 11 IEEE 802.11n-HT40: 7
<b>Channel Separation:</b>	5 MHz
<b>Antenna Type:</b>	PIFA Antenna
<b>Antenna Gain:</b>	3.52 dBi
<b>Maximum Peak Power:</b>	IEEE 802.11b: 20.60 dBm IEEE 802.11g: 25.05 dBm IEEE 802.11n-HT20: 23.07 dBm IEEE 802.11n-HT40: 23.57 dBm

### 1.4 OTHER INFORMATION

Test channels for 2.4 GHz ISM Band of Wi-Fi				
Mode	Tx/Rx Frequency	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
IEEE 802.11b	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11g	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11n-HT20	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11n-HT40	2422 MHz to 2452 MHz	Channel 3	Channel 6	Channel 9
		2422 MHz	2437 MHz	2452 MHz

### 1.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

**FCC 47 CFR Part 1 Subpart I**  
**RSS-102 Issue 5**

All test items have been performed and recorded as per the above standards

### 1.6 DEVIATION FROM STANDARDS

None.

### 1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

### 1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

## 2. EQUIPMENT LIST

Please refer to the RF test report.

### 3. MPE EVALUATION

#### 3.1 REFERENCE DOCUMENTS FOR EVALUATION

No.	Identity	Document Title
1	FCC 47 CFR Part 1 Subpart I	PROCEDURES IMPLEMENTING THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969
2	RSS-102 Issue 5	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
3	KDB 447498 D01 General RF Exposure Guidance v06	RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES

#### 3.2 MPE COMPLIANCE REQUIREMENT

##### 3.2.1 Limits

##### 3.2.1.1 FCC 47 CFR Part 1 Subpart I

According to §1.1307(b)(1), system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

##### Limits for Occupational / Controlled 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 Times   E   <sup>2</sup> ,   H   <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

##### 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 Times   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
1500-100000	/	/	1	30

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



**3.2.1.2 RSS-102 Issue 5**

According to RSS-102 Issue 5, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

According to RSS-102 Issue 5, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device’s radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz<sup>6</sup> and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $4.49/f^{0.5}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

**3.2.2 Test Procedure**

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

**3.3 MPE CALCULATION METHOD**

**FCC 47 CFR Part 1 Subpart I**

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

S = power density (in appropriate units, e.g., mw/cm<sup>2</sup>)

P = power input 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 (in appropriate units, e.g., cm)

**3.4 MPE CALCULATION RESULTS**

**Note:** For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

**3.4.1 For WLAN**

For Wi-Fi function, operating at 2412MHz to 2462 MHz for IEEE802.11b/g/n

**3.4.1.1 Antenna Type:**

**Chain 0:** PIFA Antenna

**3.4.1.2 Antenna Gain:**

**Chain 0:** 2412MHz to 2462 MHz: 3.52 dBi

**3.4.1.3 Results for FCC 47 CFR Part 1 Subpart I**

**For SISO (1TX/1RX) Mode**

Operating Mode	Freq.	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value	
	(MHz)	(dBm)		(dBi)	(dBm)	(mW)	(mW/cm <sup>2</sup> )		
SISO	IEEE 802.11b	2412-2462	17	2	3.52	22.52	178.6488	1	0.0355
	IEEE 802.11g	2412-2462	15	2	3.52	20.52	112.7197	1	0.0224
	IEEE 802.11n-HT20	2412-2462	13	2	3.52	18.52	71.1214	1	0.0141
	IEEE 802.11n-HT40	2422-2452	13	2	3.52	18.52	71.1214	1	0.0141

**3.4.1.4 Results for RSS-102 Issue 5**

**For SISO (1TX/1RX) Mode**

Operating Mode	Freq.	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	Limit	
	(MHz)	(dBm)		(dBi)	(dBm)	(W)	(W)	
SISO	IEEE 802.11g	2412-2462	17	2	3.52	22.52	0.178649	2.6840
	IEEE 802.11b	2412-2462	15	2	3.52	20.52	0.112720	2.6840
	IEEE 802.11n-HT20	2412-2462	13	2	3.52	18.52	0.071121	2.6840
	IEEE 802.11n-HT40	2422-2452	13	2	3.52	18.52	0.071121	2.6916

**3.4.2 Simultaneous Multi-band Transmission MPE Analysis**

Not support for Simultaneous Muti-band Transmission



## APPENDIX 1 PHOTOS OF TEST SETUP

N/A

## APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal Photos.

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

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