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Report No.: SZEM170700739202

Page: 1 of 8

# RF Exposure Evaluation Report

<b>Application No.:</b>	SZEM1707007392CR(SHEM1707004565HS)
<b>Applicant:</b>	Qingdao Haier Technology Co.,Ltd
<b>Address of Applicant:</b>	Building A01, Haier Information Garden NO.1 Haier Road, Qingdao, P.R.China
<b>Manufacturer:</b>	Qingdao Haier Technology Co.,Ltd
<b>Address of Manufacturer:</b>	Building A01, Haier Inforamtion Garden NO.1 Haier Road, Qingdao, P.R.China
<b>Factory:</b>	1. Rayson Technology (Shenzhen) Co., Ltd. 2. Sichuan Changhong Component Technology., Ltd.
<b>Address of Factory:</b>	1. No.1, Tongfu 1st Road, The 2nd Industrial Zone, Loucun, Gongming, Guangming New District, Shenzhen, China. 2. 35 East Mianxing Road High-Tech Park Mianyang City Sichuan Province Province.
<b>Equipment Under Test (EUT):</b>	
<b>EUT Name:</b>	WiFi module
<b>Model No.:</b>	MK-QTWIFI-08(A)
<b>FCC ID:</b>	2ALD3-MKQTWIFI08A
<b>Trade mark:</b>	Haier
<b>Standards:</b>	47 CFR Part 1.1307, 47 CFR Part 1.1310
<b>Date of Receipt:</b>	2017-07-13
<b>Date of Test:</b>	2017-07-21 to 2017-08-03
<b>Date of Issue:</b>	2017-08-08
<b>Test Result :</b>	<b>Pass*</b>

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Jack Zhang  
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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<b>Revision Record</b>				
<b>Version</b>	<b>Chapter</b>	<b>Date</b>	<b>Modifier</b>	<b>Remark</b>
01		2017-08-08		Original

<b>Authorized for issue by:</b>			
			
		<b>Bill Chen /Project Engineer</b>	
			
		<b>Eric Fu /Reviewer</b>	

## 2 Contents

	Page
<b>1 COVER PAGE .....</b>	<b>1</b>
<b>2 CONTENTS .....</b>	<b>3</b>
<b>3 GENERAL INFORMATION.....</b>	<b>4</b>
3.1 GENERAL DESCRIPTION OF EUT .....	4
3.2 TEST LOCATION.....	5
3.3 TEST FACILITY.....	5
3.4 DEVIATION FROM STANDARDS.....	6
3.5 ABNORMALITIES FROM STANDARD CONDITIONS.....	6
3.6 OTHER INFORMATION REQUESTED BY THE CUSTOMER.....	6
<b>4 RF EXPOSURE EVALUATION .....</b>	<b>7</b>
4.1 RF EXPOSURE COMPLIANCE REQUIREMENT.....	7
4.1.1 <i>Limits</i> .....	7
4.1.2 <i>Test Procedure</i> .....	7
4.1.3 EUT RF EXPOSURE EVALUATION .....	8

### **3 General Information**

#### **3.1 General Description of EUT**

Product Name:	WIFI Module
Model No.:	MK-QTWIFI-08(A)
Trade Mark:	Haier
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 and HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)
Operating Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz
Channel Number:	IEEE 802.11b/g, IEEE 802.11n(HT20): 11 Channels IEEE 802.11n(HT40): 7 Channels
Channels Step:	5MHz step
Sample Type:	Fixed production
Antenna Type:	PCB antenna
Antenna Gain:	3dBi
Power supply:	DC input 5.0V
Test voltage:	AC 120V 60Hz

### **3.2 Test Location**

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch  
No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China  
518057  
Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594  
No tests were sub-contracted.

### **3.3 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

- CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- VCCI**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

- FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

### **3.4 Deviation from Standards**

None.

### **3.5 Abnormalities from Standard Conditions**

None.

### **3.6 Other Information Requested by the Customer**

None.

## 4 RF Exposure Evaluation

### 4.1 RF Exposure Compliance Requirement

#### 4.1.1 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 <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300 .....	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula:  $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

$G$  = gain of antenna in linear scale

$\pi = 3.1416$

$R$  = distance between observation point and center of the radiator in cm

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance  $r$  where the MPE limit is reached.

#### 4.1.2 Test Procedure

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

#### **4.1.3 EUT RF Exposure Evaluation**

Antenna Gain: 3dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.995 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Max Conducted Peak Output Power (dBm)</b>	<b>Output Power to Antenna (mW)</b>	<b>Power Density at R = 20 cm (mW/cm<sup>2</sup>)</b>	<b>Limit</b>	<b>Result</b>
High	2437	18.79	75.68	0.03	1.0	PASS

Note: Refer to report No. SZEM170700739201 for EUT test Max Conducted Peak Output Power value.

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.