



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
Email: ee.shenzhen@sgs.com

Report No.: SZEM171101195404
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1 Cover Page

RF MPE REPORT

Application No.:	SZEM1711011954CR (SHEM1711007452CR)
Applicant:	Qingdao Haier Technology Co., Ltd
FCC ID:	2ALD3-MKQTWIFI11
IC:	22987-MKQTWIFI11
Equipment Under Test (EUT): NOTE: The following sample(s) was/were submitted and identified by the client as	
Product Name:	WiFi module
Model No.(EUT):	MK-QTWIFI-11(A)
Add Model No.:	MK-QTWIFI-11(B)
Brand Name:	Haier
Standards:	FCC Rules 47 CFR §2.1091, KDB447498 D01 General RF Exposure Guidance v06, RSS-102 Issue 5 (March 2015)
Date of Receipt:	2017-11-02
Date of Test:	2017-11-07 to 2017-11-28
Date of Issue:	2017-12-04
Test Result:	Pass*

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




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.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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Revision Record				
Version	Chapter	Date	Modifier	Remark
00	/	2017-12-04	/	Original

Authorized for issue by:				
				
		Foray Chen /Project Engineer		2017-12-04
				Date
				
		Eric Fu /Reviewer		2017-12-04
				Date



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3 General Information

3.1 Client Information

Applicant:	Qingdao Haier Technology Co., Ltd
Address of Applicant:	Building A01, Haier Information Garden No.1 Haier Road Qingdao, P.R.China
Manufacturer:	Qingdao Haier Technology Co., Ltd
Address of Manufacturer:	Building A01, Haier Information Garden No.1 Haier Road Qingdao, P.R.China
Factory:	LITEO-ON Technology (Changzhou) Co., Ltd
Address of Factory:	A9 Building, No.88, Yanghu Road, Wujun Hi-Tech Industrial Development Zone, Changzhou City

3.1 General Description of E.U.T.

Product Description:	Module with WiFi function
Rated Input:	DC 5V by USB Port
Test Voltage:	DC 5V

3.2 Technical Specifications

Operation Frequency:	802.11 b/g/n(HT20): 2412MHz-2462MHz 802.11 (HT40): 2422MHz-2452MHz
Modulation Type:	802.11 b DSSS(CCK, DQPSK, DBPSK) 802.11 g/n(OFDM(64QAM, 16QAM, QPSK, BPSK)
Number of Channel:	802.11 b/g/n(HT20): 11, 802.11 (HT40):7
Data Rate:	802.11b: 1/2/5.5/11Mbps, 802.11g: 6/9/12/18/24/36/48/54Mbps 802.11n: 13/26/39/52/78/104/117/135Mbps
Antenna Type	PCB Antenna
Antenna Gain	3dBi



3.3 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.

Tel: +86 755 2601 2053

Fax: +86 755 2671 0594

No tests were sub-contracted.

3.4 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.



4 Test Standards and Limits

4.1 FCC Radiofrequency radiation exposure limits:

According to §1.1310, the limit for general population/uncontrolled exposures

Frequency	Power density(mW/cm ²)	Averaging time(minutes)
300MHz~1.5GHz	$f/1500$	30
1.5GHz~100GHz	1.0	30

4.2 IC Radiofrequency radiation exposure limits:

According to RSS-102 section 2.5.2, 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 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).

For 2.4G device, the limit of worse case is 2.68 W



5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SZEM171101195403.

Test mode	Test Frequency (MHz)	Output Power (dBm)	Output Power (mW)
802.11b	2412	16.68	46.56
	2437	17.35	54.33
	2462	16.58	45.50
802.11g	2412	12.32	17.06
	2437	15.31	33.96
	2462	13.46	22.18
802.11 n(HT20)	2412	10.98	12.53
	2437	14.33	27.10
	2462	12.44	17.54
802.11 n(HT40)	2422	9.92	9.82
	2437	14.07	25.53
	2452	10.53	11.30



5.2 MPE Calculation

The Max Conducted Peak Output Power is 54.33mW(0.05433W) in middle channel;

The best case gain of the antenna is 3dBi. 3dB logarithmic terms convert to numeric result is nearly 2

For FCC:

According to the formula $S = \frac{PG}{4R^2\pi}$, we can calculate S which is MPE.

Note:

1) P (Watts) = Power Input to antenna = $10^{\frac{dBm}{10}} / 1000$

2) G (Antenna gain in numeric) = $10^{(Antenna\ gain\ in\ dBi / 10)}$

3) R = distance to the center of radiation of antenna (in meter) = 20cm

4) MPE limit = 1mW/cm²

$$S = \frac{PG}{4R^2\pi} = \frac{54.332 \times 2}{4 \times 0.2^2 \times 3.14} = 0.0216\ mW/cm^2$$

For IC:

$$E.I.R.P. = P \times G = 0.05433 \times 2 = 0.109 < 2.68W$$

So the device is exclusion from SAR test.

--End of the Report--