



SGS-CSTC Standards Technical Services Co., Ltd.
Shanghai Branch

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Telephone: +86 (0) 21 6191 5666

Fax: +86 (0) 21 6191 5678

ee.shanghai@sgs.com

Report No.: SHEM181200000202

Page: 1 of 9

1 Cover Page

RF MPE REPORT

Application No.:	SHEM1812000002CR
Applicant:	Kohler Co.
FCC:	N82-KOHLER035
IC ID:	4554A-KOHLER035
Equipment Under Test (EUT): NOTE: The following sample(s) was/were submitted and identified by the client as	
Product Name:	EIR Intelligent Toilet
Model No.(EUT):	K-77795, K-77795-RGD, K-77795-SG
Trade mark:	KOHLER
Standards:	FCC Rules 47 CFR §2.1091 KDB447498 D01 General RF Exposure Guidance v06 RSS-102 Issue 5 (March 2015)
Date of Receipt:	2018-12-18
Date of Test:	2018-12-18 to 2018-12-25
Date of Issue:	2019-04-08
Test Result:	Pass*

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



Parlam Zhan

E&E Section 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.

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.



Revision Record			
Version	Description	Date	Remark
00	Original	2019-04-10	/

Authorized for issue by:				
				
		Vincent Zhu / Project Engineer		
				
		Parlam Zhan / Reviewer		



2 Contents

	Page
1 COVER PAGE.....	1
2 CONTENTS	3
3 GENERAL INFORMATION.....	4
3.1 CLIENT INFORMATION	4
3.1 GENERAL DESCRIPTION OF E.U.T.....	4
3.2 TECHNICAL SPECIFICATIONS	4
3.3 TEST LOCATION.....	6
3.4 TEST FACILITY.....	6
4 TEST STANDARDS AND LIMITS	7
4.1 FCC RADIOFREQUENCY RADIATION EXPOSURE LIMITS:	7
5 MEASUREMENT AND CALCULATION.....	8
5.1 MAXIMUM TRANSMIT POWER	8
5.2 MPE CALCULATION	9



3 General Information

3.1 Client Information

Applicant:	Kohler Co.
Address of Applicant:	444 Highland Drive KOHLER, WI 53044
Manufacturer:	Shanghai Kohler Electronics., Ltd.
Address of Manufacturer:	No. 1955, Fengxiang Road, Baoshan Area, Shanghai, PRC Post code: 200444
Factory:	Shanghai Kohler Electronics., Ltd.
Address of Factory:	No. 1955, Fengxiang Road, Baoshan Area, Shanghai, PRC Post code: 200444

3.1 General Description of E.U.T.

Power supply:	AC 120V 60Hz
---------------	--------------

3.2 Technical Specifications

2.4GHz:

Modulation Type	MSK
Number of Channels	8
Operation Frequency	2414.5MHz~2449.5MHz
Channel Spacing	5MHz
Antenna Type:	PCB Antenna
Antenna Gain:	2.88 dBi
Modulation Type	MSK

BLE

Antenna Gain	0dBi
Antenna Type	PIFA Antenna
Channel Spacing	2MHz
Modulation Type	GFSK
Number of Channels	40
Operation Frequency	2402MHz to 2480MHz

2.4G WiFi

Antenna Gain	2dBi
Antenna Type	PCB Antenna
Channel Spacing	5MHz
Modulation Type	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels	802.11b/g/n(HT20):11
Operation Frequency	802.11b/g/n(HT20): 2412MHz to 2462MHz



24GHz:

Operation Frequency	24.125GHz(24GHz-24.25GHz)
Antenna Type	PCB Antenna
Modulation Type	FMCW
Number of Channels	1



3.3 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

No tests were sub-contracted.

3.4 Test Facility

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

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. 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.

- **NVLAP (Certificate No. 201034-0)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program(NVLAP). Certificate No. 201034-0.

- **FCC –Designation Number: CN5033**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

Designation Number: CN5033. Test Firm Registration Number: 479755.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A-1. CAB identifier: CN0020.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.



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 device using a wireless module (UART CLOUD MODULE) has been certified.

The wireless module FCC ID: N82-KOHLER032, IC:4554A-KOHLER032

The max output power: BLE:0.8 mW, WiFi: 48 mW

2.4GHz max output power Base on: SHEM181200000201:

Test Frequency (MHz)	Output Power (dBuV/m)	Output Power (dBm)	Reading Power (mW)	Polarization
2414.5	83.27	-12.03	0.06	Horizontal
	77.8	-17.5	0.02	Vertical
2434.5	81.88	-13.42	0.05	Horizontal
	78.05	-17.25	0.02	Vertical
2449.5	81.17	-14.13	0.04	Horizontal
	78.2	-17.1	0.02	Vertical



5.2 MPE Calculation

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

For 2.4GHz :

The max E.I.R.P. is 0.06mW, so $S = 0.00001 < 1\ mW/cm^2$

For BLE

The max. antenna gain is 0 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
0.8	1.000	20	0.00016	1	Pass

For 2.4G WiFi

The max. antenna gain is 2 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
48	1.585	20	0.01513	1	Pass

The 2.4GHz, BT and the DTS modules can simultaneous transmitting at frequency 2.4GHz band. But the maximum rate of MPE is $0.00001/1 + 0.00016/1 + 0.01513/1 = 0.015 < 1.0$. according to the KDB447498 section 7.2 determine the device is exclusion from SAR test.

For IC:

2.4GHz: E.I.R.P. = 0.00006W < 2.68W

BLE: E.I.R.P. = P * G = 0.0008W < 2.68W

WiFi: E.I.R.P. = P * G = 0.076W < 2.68W

The 2.4GHz, BT and the DTS modules can simultaneous transmitting at frequency 2.4GHz, But the maximum MPE is $0.00006W + 0.076W + 0.0008W = 0.0768W < 2.68W$. So the device is exclusion from SAR test.

--End of the Report--