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

588 West Jindu Road,Songjiang District,Shanghai,China
Telephone: +86 (0) 21 6191 5666
Fax: +86 (0) 21 6191 5655
ee.shanghai@sgs.com

1 Cover page

RF Exposure Evaluation Report

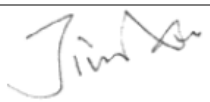
Application No.:	SHEM1209001305RF
Applicant:	Kohler Co.
Manufacturer:	Shanghai KOHLER Electronics., Ltd.
FCC ID:	N82-KOHLER009
IC ID:	4554A-KOHLER009
Equipment Under Test (EUT):	
Product Name:	Numi upgrade Integrated toilet with bidet functionality
Model No.(EUT):	K-3901
Standards:	FCC Rules 47 CFR §2.1091 & FCC OET Bulletin 65 supplement C
Date of Receipt:	October 23, 2012
Date of Test:	October 29, 2012 to February 25, 2013
Date of Issue:	March 06, 2013
Test Result :	**PASS ***

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Tony Wu
E&E Section Manager
SGS-CSTC (Shanghai) Co., Ltd.

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00	/	March 06, 2013	/	Original

Authorized for issue by:				
Engineer		Zenger Zhang **Print Name**		 **Date** (February 25, 2013)
Clerk		Amy Wang **Print Name**		 **Date**(March 06, 2013)
Reviewer		Jim Xu **Print Name**		 **Date**(March 06, 2013)

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4 General Information

4.1 Client Information

Applicant:	Kohler Co.
Address of Applicant:	444 Highland Drive Kohler, WI 53044
Manufacturer:	Shanghai KOHLER Electronics., Ltd.
Address of Manufacturer:	Building E, 18 Jindian Road, Pudong New Area, 201206 Shanghai, China
Factory:	Shanghai KOHLER Electronics., Ltd.
Address of Factory:	Building E, 18 Jindian Road, Pudong New Area, 201206 Shanghai, China

4.2 General Description of EUT

Product Name:	Numi upgrade Integrated toilet with bidet functionality
Model No.(EUT):	K-3901
Trade Mark:	Kohler

4.3 Details of EUT

Technical Specifications:

Support Frequency Band:	BT: 2402-2480MHz / 79 Channels Zigbee: 2405-2480 MHz / 16 Channels
BT Version:	☐2.0 ☒2.1 ☐3.0 ☐Other:
BT Modulation Type:	☒GFSK ☒π/4DQPSK ☒8DPSK ☐Other:
Zigbee Modulation Type:	DSSS
Equipment classification:	☒ equipment for fixed use (mobile device) As the client's declare, the antenna operational separation distance is more than 300mm.
Antenna Type:	The BT & Zigbee part use the same antenna as below described. PIFA antenna (as below figure) 
Antenna Gain:	3.0 dBi / 1.995 numeric

Power Supply:

Rated Input:	120VAC 60Hz
Power Cable:	2 wires
	1.5m

4.4 Test Equipment Information

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	Spectrum Analyzer	Rohde & Schwarz	FSP-30	100324	2012-04-12	2013-04-11

4.5 Test Location

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

No.588 West Jindu Road, Songjiang District, Shanghai, China. 201612.

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

4.6 Test Facility

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

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

- **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. Date of expiry: 2014-07-26.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2015-02-22.

- **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. Expiry Date: 2014-09-20.

5 Test Standards and Limits

The Equipment under Test (EUT) has been tested at SGS's laboratories.

The following table summarizes the specific reference documents such as harmonized standards or test specifications which were used for testing as SGS's (own or subcontracted) laboratories.

Identity	Document Title	Version
FCC OET Bulletin 65 supplement C	Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields	2001

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

FCC LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE):

(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^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	$(180/f^2)$*	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 *Plane-wave equivalent power density

6 Calculation Formula and Test Result

6.1 Calculation Formula

Pd = (Pout*G) / 4πR²

Where:

Pd = Power density in mW/cm^2

Pout = Output power to antenna in mW

G = Antenna Gain in linear scale

π = 3.14

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

NOTE: Pd limit = 1.0mW/cm².

6.2 Test Results

Remark: The Max. peak conducted output power is based on the 15.247 Test Reports SHEM120900130501(for BT) and SHEM120900130503 (for Zigbee).

Operated in 2402 ~ 2480MHz band (for BT):

GFSK

Freq. (MHz)	Max. Peak Conducted Power		Antenna Gain in linear scale	Power Density (mW/cm^2)	Power Density Limit (mW/cm^2)	Result
	(dBm)	(mW)				
2402	6.74	4.72	1.995	0.00187	1	Pass
2441	5.98	3.96	1.995	0.00157	1	Pass
2480	5.59	3.62	1.995	0.00144	1	Pass

π/4DQPSK

Freq. (MHz)	Max. Peak Conducted Power		Antenna Gain in linear scale	Power Density (mW/cm^2)	Power Density Limit (mW/cm^2)	Result
	(dBm)	(mW)				
2402	6.16	4.13	1.995	0.00164	1	Pass
2441	5.18	3.30	1.995	0.00131	1	Pass
2480	5.26	3.36	1.995	0.00133	1	Pass

8DPSK

Freq. (MHz)	Max. Peak Conducted Power		Antenna Gain in linear scale	Power Density (mW/cm^2)	Power Density Limit (mW/cm^2)	Result
	(dBm)	(mW)				
2402	5.79	3.79	1.995	0.00150	1	Pass
2441	5.33	3.41	1.995	0.00135	1	Pass
2480	4.18	2.62	1.995	0.00104	1	Pass

Operated in 2405 ~ 2480MHz band (for Zigbee):

DSSS

Freq. (MHz)	Max. Peak Conducted Power		Antenna Gain in linear scale	Power Density (mW/cm^2)	Power Density Limit (mW/cm^2)	Result
	(dBm)	(mW)				
2402	4.05	2.54	1.995	0.00099	1	Pass
2441	3.18	2.08	1.995	0.00083	1	Pass
2480	3.34	2.16	1.995	0.00087	1	Pass

7 EUT Constructional Details

Refer to the Appendixs <External photo.pdf> & <Internal photo.pdf>.

The End of Report