

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

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Report No.: SHEMO10040044203  
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# TEST REPORT

**Application No. :** SHEMO10040044203  
**Applicant:** Kohler Co.  
**FCC ID:** N82-KOHLER006  
**IC ID:** 4554A-KOHLER006  
**Fundamental Frequency :** 10.5G-10.55GHz  
**Equipment Under Test (EUT):**  
Name: NUMI Integrated Toilet  
Model No.: K-3900  
**Standards:** FCC PART 15 SUBPART C, Section 15.245 & 15.215,  
ANSI 63.10 : 2009  
RSS 210 issue7, RSS GEN issue2  
**Date of Receipt:** Jun 1,2010  
**Date of Test:** Aug 24- Aug26,2010  
**Date of Issue:** Aug 27,2010  
**Test Result :** **PASS \***

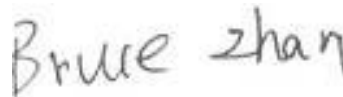
\* In the configuration tested, the EUT complied with the standards specified above.

**Approved by:**



Tino Pan  
E&E Section Manager

**Tested By:**



Bruce Zhan  
EMC TEST Engineer

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## 2 Test Summary

The customer requested FCC tests for 10.5GHz transmitter part.			
Test	Test Requirement	Test methods	Result
Field strength of emissions from intentional radiators	FCC PART 15.245(b) RSS 210 issue 7 Annex 7	ANSI 63.10: 2009 RSS GEN issue 2	PASS
Field strength of emissions from harmonic & non harmonic emissions	FCC PART 15.245(b)&15.209 RSS 210 Annex 7 RSS GEN table 2	ANSI 63.10: 2009 RSS GEN issue 2	PASS
Intentional Emission Band Occupancy	FCC Part 15.215(C) RSS 210 issue 7	ANSI 63.10: 2009 RSS GEN issue 2	PASS

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## **4 General Information**

### **4.1 Client Information**

Applicant : Kohler Co.  
Applicant Address: 444 Highland Drive Kohler, WI 53044  
Manufacturer: Shanghai KOHLER Electronics, Ltd.  
Manufacturer Address: Building E, 18 Jindian Road, Pudong New area, Shanghai, the PRC

### **4.2 Details of E.U.T.**

Name: NUMI Integrated Toilet  
Model No.: K-3900  
Power Supply: 120VAC 60Hz  
Power Cord: About 1.5m  
EUT function: field disturbance sensors  
Frequency Range& Channel number: 10.5-10.55GHz  
Antenna of Wireless Detector: Integral  
Model: MC420s  
Operating Frequency Band: 10.5-10.55GHz  
Gain:8.0dBi

### **4.3 Description of Support Units**

None.

### **4.4 Test Location**

Tests were performed at:

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 5655

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

None.

#### **4.6 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. Date of expiry: 2011-07-29.

- **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: 2012-03-17.

- **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: 2011-09-29.

- **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-3172 and C-3514 respectively. Date of Registration: 2009-11-30. Date of Expiry: 2012-03-17.

## 5 Test Results

### 5.1 Test Instruments

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	EMI test receiver	Rohde & Schwarz	ESU40	100109	2010-6-4	2011-6-3
2	Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-679	2010-6-4	2011-6-3
3	Horn Antenna	Rohde & Schwarz	HF906	100284	2010-4-9	2011-4-8
4	ANTENNA	SCHWARZBECK	VULB9168	9168-313	2010-6-4	2011-6-3
5	Ultra broadband antenna	Rohde & Schwarz	HL562	100227	2009-10-9	2010-10-8
6	Atmosphere pressure meter	Shanghai ZhongXuan Electronic Co;Ltd	BY—2003P	--	2009-10-15	2010-10-14
7	CLAMP METER	FLUKE	316	86080010	2010-04-28	2011-04-27
8	Thermo-Hygrometer	ZHICHEN	ZC1-2	01050033	2009-10-15	2010-10-14
9	High-low temperature cabinet	Shanghai YuanZhen	GW2050	--	2010-6-18	2011-6-17
10	DC power	KIKUSUI	PMC35—3	NF100260	2010-1-16	2011-1-15
11	Power meter	Rohde & Schwarz	NRP	101641	2010-5-4	2011-5-3
12	High pass Filter	FSCW	HP 12/2800-5AA2	19A45-02	2010-4-11	2011-4-10
13	Low noise amplifier	TESEQ	LNA6900	70133	2010-7-7	2011-7-6

## 5.2 E.U.T. Operation

Input voltage:	AC 120V , 60Hz
Operating Environment:	
Temperature:	20.0-25.0 °C
Humidity:	45-56 % RH
Atmospheric Pressure:	990-1018mbar
EUT Operation:	The EUT has been tested under operating condition.

## 5.3 Test Procedure & Measurement Data

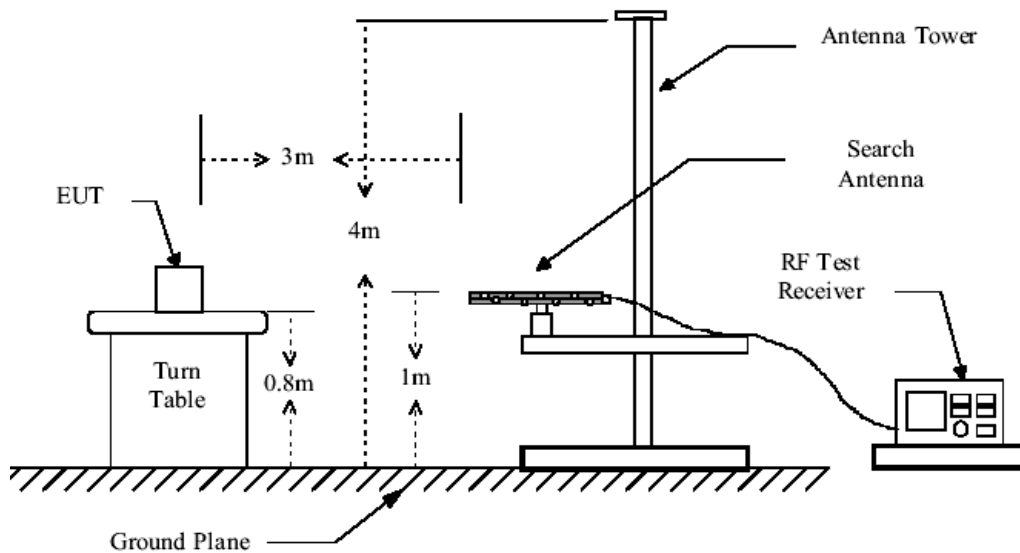
### 5.3.1 Field strength of emissions from intentional radiators and harmonic emissions Test

<b>Test Requirement:</b>	FCC Part15.245
<b>Test methods:</b>	ANSI 63.10: 2009 RSS GEN issue 2
<b>Test date:</b>	Aug 24-Aug 26, 2010
<b>Standard Applicable:</b>	Harmonic emissions in the restricted bands below 17.7 GHz, as specified in § 15.205, shall not exceed the field strength limits shown in § 15.209. Harmonic emissions in the restricted bands at and above 17.7 GHz shall not exceed 7.5 mV/m. Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

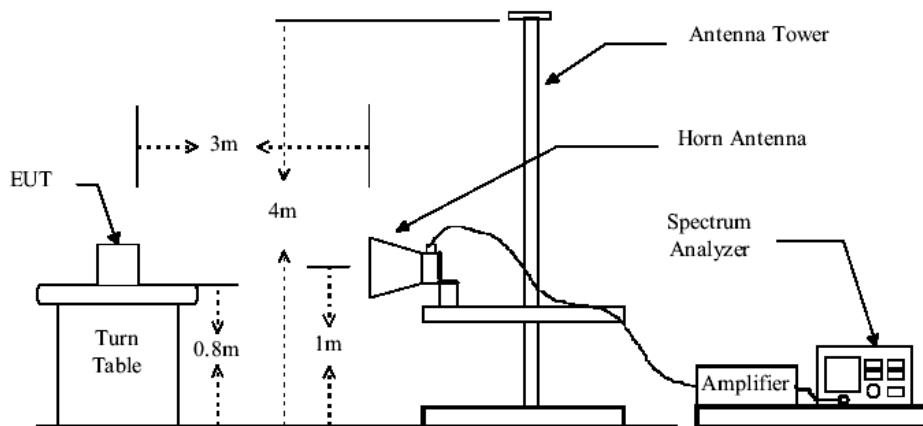
And according to section 15.33(a)(1),for an intentional radiator operates below 10GHz,the frequency range of measurements:to the tenth harmonic of the highest fundamental frequency or to 40GHz,which is lower. If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

<b>Measurement Procedure:</b>	<ol style="list-style-type: none"><li>1. The EUT was placed on a turn table</li><li>2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.</li><li>3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.</li><li>4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.</li><li>5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.</li><li>6. Repeat above procedures until all frequency measured were complete.</li></ol>
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**Radiated Test Set-up:  
Radiated Emission Test Set-up, Frequency Below 1000MHz**



**Radiated Emission Test Set-up Frequency Over 1GHz**



The field strength is calculated by adding the Antenna Factor, Cable Factor & preamplifier.  
The basic equation with a sample calculation is as follows:  
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – preamplifier Factor



## Measurement Result:

### Radiated Spurious Emission Measurement Result

Vertical polarization

Non-harmonic Emissions below 1 GHz ,Quasi-Peak Measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)
30.0	14.2	0.6	24.6	26.70	16.90	40.0
200.0	10.9	1.6	24.5	26.00	14.00	43.5
830.0	22.8	3.5	24.0	22.95	25.25	46.0

Non-harmonic emissions above 1GHz, Average measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)
2589.5	27.6	4.8	42.4	35.025	25.025	55
5459.1	32.0	7.2	42.3	33.303	30.203	55
10113.7	38.1	9.9	42.8	30.664	35.864	55
14195.4	41.5	11.9	44.5	30.523	39.423	55
28935.60	39.8	6.9	39.8	36.852	43.752	55
40000.00	43.2	8.6	36.7	37.400	52.500	55

Harmonics & Spurious Emissions, Average Measurement

Average Measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)
20974.400	38.0	6.0	40.5	52.38	55.88	77.5
31481.600	41.2	7.3	40.0	55.05	63.55	77.5

Remark: No other radiation has been found. Emissions radiated outside of the specified frequency bands, except for harmonics are subjected to the general radiated emission limits in § 15.209.

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Horizontal polarization

Non- harmonic Spurious Emissions below 1GHz, Quasi-Peak Measurement:

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)
30.00	14.2	0.6	24.6	26.50	16.7	40.0
200.00	10.9	1.6	24.5	27.30	15.3	43.5
830.00	22.8	3.5	24.0	22.51	24.81	46.0

Non-harmonic Spurious emissions above 1GHz, Average measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)
2934.60	28.3	5.2	42.5	34.068	25.068	55
5556.00	32.0	7.2	42.3	32.656	29.556	55
10149.40	38.1	9.9	42.8	31.494	36.694	55
14329.70	41.5	11.9	44.4	30.108	39.108	55
28935.60	39.8	6.9	39.8	37.25	44.150	55
40000.00	43.2	8.6	36.7	34.90	50.000	55

Harmonics & Spurious Emissions, Average Measurement

Average Measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp (dB)	Reading Level (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)
20974.400	38.0	6.0	40.5	54.41	57.91	77.5
31481.600	41.2	7.3	40.0	46.86	55.36	77.5

Remark: No other radiation has been found. Emissions radiated outside of the specified frequency bands, except for harmonics are subjected to the general radiated emission limits in § 15.209.

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Field strength of emissions from intentional radiators:

Frequency (GHz)	Antenna factors (dB/m)	Cable loss(dB)	Preamp (dB)	Reading Level(AV) (dBμV)	Emission Level(AV) (dBμV/m)	Limit (Average) (dBμV/m)	Polarization
10.5438	38.1	10.1	44.3	67.5	71.4	128	H
10.5438	38.1	10.1	44.3	74.9	78.8	128	V

**Note:**

1. Data of measurement within this frequency range show "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
2. Spectrum Peak/AV Setting : below 1 GHz, RBW= 100kHz, VBW= 300kHz;above 1GHz,RBW= 1MHz, VBW= 3MHz
3. Final Test Level = Reading Level+Factor  
Factor= Antenna Factor + Cable Factor – preamplifier Factor

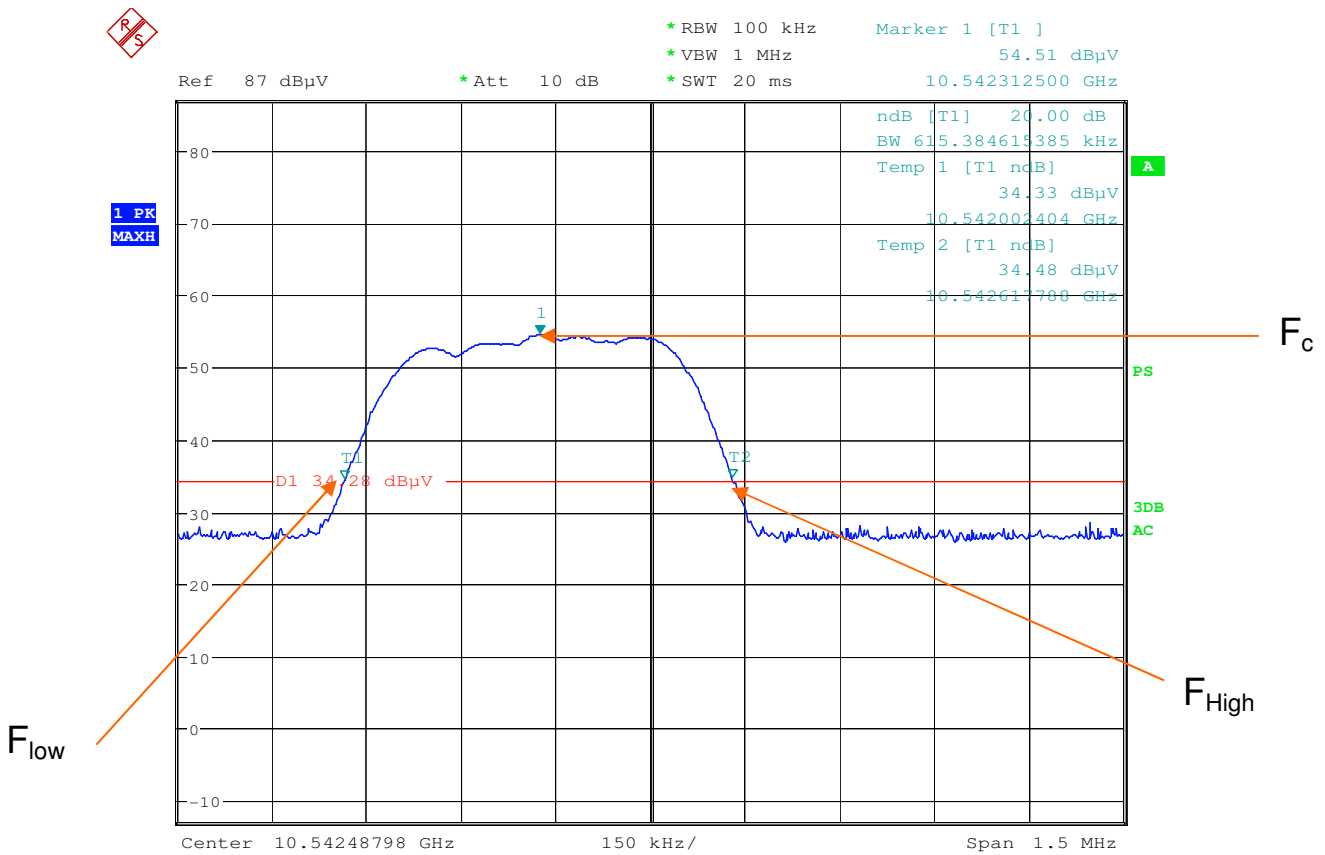
**5.3.2 Intentional emission band occupancy**

**Test Requirement:** FCC Part 15.215(C)  
RSS 210 issue 7

**Test methods:** ANSI 63.10: 2009  
RSS GEN issue 2

**Test date:** Aug 26, 2010

20 dB Bandwidth :



Date: 26.AUG.2010 18:32:42

$F_{low} = 10.542002404 \text{ GHz}$ ,  $F_{high} = 10.542617788615 \text{ GHz}$   
20 dB bandwidth =  $F_{high} - F_{low} = 615.384615 \text{ kHz}$

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