RF EXPOSURE REPORT

Report No.: 16020932-FCC-H1
Supersede Report No.: N/A

Applicant	Kohler Co.
Product Name	Kohler VAB Amplifier
Main Model No.	1263840
Serial Model No.	N/A
Test Standard	FCC 2.1091
Test Date	July 20 to July 25, 2016
Issue Date	July 27, 2016
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Louise Tu	Miro Bao	
Louise Tu Test Engineer	Miro Bao Checked By	

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Test result presented in this test report is applicable to the tested sample only

Issued by:
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Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.

In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

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1 Report Revision History

Report No.	Report Version	Description	Issue Date
16020932-FCC-H1	NONE	Original	July 27, 2016

2 Customer information

Applicant Name	Kohler Co.
Applicant Add	444 Highland Drive Kohler, Wisconsin USA 53044
Manufacturer 1	Dayton Audio
Manufacturer Add 1	705 Pleasant Valley Drive Springboro, Ohio 45066
Manufacturer 2	Sure Electronics Co., Ltd.
Manufacturer Add 2	3F, Building F6,No.9, Weidi Road, Xianlin, Qixia Dist.,Nanjing, China

3 Test site information

Lab performing tests	SIEMIC (Nanjing-China) Laboratories
Lab Address	2-1 Longcang Avenue Yuhua Economic and Technology Development Park, Nanjing, China
FCC Test Site No.	986914
IC Test Site No.	4842B-1
Test Software	Labview of SIEMIC version 1.0

4 Equipment under Test (EUT) Information

Description of EUT:	Kohler VAB Amplifier
Main Model:	1263840
Serial Model:	N/A
Date EUT received:	July 07, 2016
Test Date(s):	July 20 to July 25, 2016
Output power	-3.145 dBm
Antenna Gain:	4dBi
Type of Modulation:	Bluetooth: GFSK, π/4DQPSK, 8DPSK
RF Operating Frequency (ies):	Bluetooth: 2402-2480 MHz
Number of Channels:	Bluetooth: 79CH
Port:	Power Port, RS485 Port
Power:	Adapter: INPUT: 100-240VAC 1.1A 50/60Hz OUTPUT: +24VDC 3.75A
Trade Name :	Kohler
FCC ID:	N82KOHLER017

5 FCC §2.1091 - MaximuM Permissible exposure (MPE)

Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (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

Test Data

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

Where: S = power density (in appropriate units, e.g. mW/cm2)
P = power input to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Type	Test mode	CH	Freq (MHz)	Conducted Power (dBm)	Tune Up Power (dBm)
Output power	BT-GFSK	Low	2402	-3.350	-4.0±1
		Mid	2441	-3.635	
		High	2480	-3.145	

For the antenna manufacturer provide only used limited to ERP/EIRP or radiated spurious emission test. The MPE evaluation as below:

BT-GFSK

The maximum peak output power (turn-up power) in low channel of BT is -3.0 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 0.501(mW)
Prediction distance: >20 (cm)
Predication frequency: 2402(MHz) lowest frequency
Antenna Gain (typical): 4 (dBi)
Antenna Gain (typical): 2.51 (numeric)
The worst case is power density at predication frequency at 20 cm: 0.0003(mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0003 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in Middle channel of BT is -3.0 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 501 (mW)
Prediction distance: >20 (cm)
Predication frequency: 2441(MHz) lowest frequency
Antenna Gain (typical): 4 (dBi)
Antenna Gain (typical): 2.51numeric)
The worst case is power density at predication frequency at 20 cm: 0.0003(mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0003 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in High channel of BT is -3.0 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 0.501 (mW)
Prediction distance: >20 (cm)
Predication frequency: 2480(MHz) lowest frequency
Antenna Gain (typical): 4 (dBi)
Antenna Gain (typical): 2.51 (numeric)
The worst case is power density at predication frequency at 20 cm: 0.0003(mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0003 (mW/cm^2) < 1(mW/cm^2)

Result: Pass