

RF EXPOSURE REPORT



Report No.: 15021175-FCC-H1

Supersede Report No.: N/A

Applicant	Ringway Tech(Jiangsu) Co.,Ltd.	
Product Name	Symphony Grand	
Model No.	CSR8670	
Test Standard	FCC 2.1091	
Test Date	November 20 to November 24, 2015	
Issue Date	December 01, 2015	
Test Result	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail
Equipment complied with the specification		<input checked="" type="checkbox"/>
Equipment did not comply with the specification		<input type="checkbox"/>
Amos Xia	Herve Idoko	
Amos Xia Test Engineer	Herve Idoko Checked By	
<p>This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only</p>		

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
15021175-FCC-H1	NONE	Original	December 01, 2015

2 Customer information

Applicant Name	Ringway Tech(Jiangsu) Co.,Ltd.
Applicant Add	No. 101 West Hanjiang Road, Changzhou,Jiangsu, China
Manufacturer	Ringway Tech(Jiangsu) Co.,Ltd.
Manufacturer Add	No. 101 West Hanjiang Road, Changzhou,Jiangsu, 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:	Symphony Grand
Main Model:	CSR8670
Serial Model:	N/A
Date EUT received:	November 12, 2015
Test Date(s):	November 20 to November 24, 2015
Output power	BT:1.851 dBm (1.531mW) BLE:3.001dBm (1.996mW)
Antenna Gain:	Bluetooth/BLE: 1.54 dBi
Type of Modulation:	Bluetooth: GFSK& $\pi/4$ -DQPSK&8DPSK BLE:GFSK
RF Operating Frequency (ies):	Bluetooth&BLE: 2402-2480 MHz
Number of Channels:	Bluetooth: 79CH BLE: 40CH
Port:	N/A
Input Power:	DC 5V
Trade Name :	N/A
FCC ID:	OCDSYMPHONY

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	GFSK	Low	2402	1.851	1±1
		Mid	2441	1.631	
		High	2480	1.775	
	$\pi/4$ DQPSK	Low	2402	0.784	0.7±1
		Mid	2441	1.280	
		High	2480	1.638	
	8-DPSK	Low	2402	0.795	1±1
		Mid	2441	1.062	
		High	2480	1.518	
	BLE	Low	2402	2.639	2.5±1
		Mid	2440	2.718	
		High	2480	3.001	

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

GFSK

The maximum peak output power (turn-up power) in low channel of BT is 2dBm

Maximum peak output power (turn-up power) at antenna input terminal: 1.58 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2402(MHz) lowest frequency

Antenna Gain (typical): 1.54 (dBi)

Antenna Gain (typical): 1.43 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.0004(mW/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

0.0004 (mW/cm²) < 1(mW/cm²)

The maximum peak output power (turn-up power) in low channel of BT is 2dBm

Maximum peak output power (turn-up power) at antenna input terminal: 1.58 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2441(MHz) lowest frequency

Antenna Gain (typical): 1.54 (dBi)

Antenna Gain (typical): 1.43 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.0004(mW/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

0.0004 (mW/cm²) < 1(mW/cm²)

The maximum peak output power (turn-up power) in low channel of BT is 2dBm

Maximum peak output power (turn-up power) at antenna input terminal: 1.58 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2480(MHz) lowest frequency

Antenna Gain (typical): 1.54 (dBi)

Antenna Gain (typical): 1.43 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.0004(mW/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

0.0004 (mW/cm²) < 1(mW/cm²)

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$\pi/4$ DQPSK

The maximum peak output power (turn-up power) in low channel of BT is 1.7dBm

Maximum peak output power (turn-up power) at antenna input terminal: 1.48 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2402(MHz) lowest frequency

Antenna Gain (typical): 1.54 (dBi)

Antenna Gain (typical): 1.43 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.0004(mW/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

$0.0004 \text{ (mW/cm}^2\text{)} < 1(\text{mW/cm}^2)$

The maximum peak output power (turn-up power) in low channel of BT is 1.7dBm

Maximum peak output power (turn-up power) at antenna input terminal: 1.48 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2440(MHz) lowest frequency

Antenna Gain (typical): 1.54 (dBi)

Antenna Gain (typical): 1.43 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.0004(mW/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

$0.0004 \text{ (mW/cm}^2\text{)} < 1(\text{mW/cm}^2)$

The maximum peak output power (turn-up power) in low channel of BT is 1.7dBm

Maximum peak output power (turn-up power) at antenna input terminal: 1.48 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2480(MHz) lowest frequency

Antenna Gain (typical): 1.54 (dBi)

Antenna Gain (typical): 1.43 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.0004(mW/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

$0.0004 \text{ (mW/cm}^2\text{)} < 1(\text{mW/cm}^2)$

8-DPSK

The maximum peak output power (turn-up power) in low channel of BT is 2dBm

Maximum peak output power (turn-up power) at antenna input terminal: 1.58 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2402(MHz) lowest frequency

Antenna Gain (typical): 1.54 (dBi)

Antenna Gain (typical): 1.43 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.0004(mW/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

$0.0004 \text{ (mW/cm}^2\text{)} < 1(\text{mW/cm}^2)$

The maximum peak output power (turn-up power) in low channel of BT is 2dBm

Maximum peak output power (turn-up power) at antenna input terminal: 1.58 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2440(MHz) lowest frequency

Antenna Gain (typical): 1.54 (dBi)

Antenna Gain (typical): 1.43 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.0004(mW/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

$0.0004 \text{ (mW/cm}^2\text{)} < 1(\text{mW/cm}^2)$

The maximum peak output power (turn-up power) in low channel of BT is 2dBm

Maximum peak output power (turn-up power) at antenna input terminal: 1.58 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2480(MHz) lowest frequency

Antenna Gain (typical): 1.54 (dBi)

Antenna Gain (typical): 1.43 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.0004(mW/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

$0.0004 \text{ (mW/cm}^2\text{)} < 1(\text{mW/cm}^2)$

BLE

The maximum peak output power (turn-up power) in low channel of BLE is 3.5dBm

Maximum peak output power (turn-up power) at antenna input terminal: 2.24 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2402(MHz) lowest frequency

Antenna Gain (typical): 1.54 (dBi)

Antenna Gain (typical): 1.43 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.0006(mW/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

$0.0006 \text{ (mW/cm}^2\text{)} < 1 \text{ (mW/cm}^2\text{)}$

The maximum peak output power (turn-up power) in low channel of BLE is 3.5dBm

Maximum peak output power (turn-up power) at antenna input terminal: 2.24 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2440(MHz) lowest frequency

Antenna Gain (typical): 1.54 (dBi)

Antenna Gain (typical): 1.43 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.0006(mW/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

$0.0006 \text{ (mW/cm}^2\text{)} < 1 \text{ (mW/cm}^2\text{)}$

The maximum peak output power (turn-up power) in low channel of BLE is 3.5dBm

Maximum peak output power (turn-up power) at antenna input terminal: 2.24 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2480(MHz) lowest frequency

Antenna Gain (typical): 1.54 (dBi)

Antenna Gain (typical): 1.43 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.0006(mW/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm²)

$0.0006 \text{ (mW/cm}^2\text{)} < 1 \text{ (mW/cm}^2\text{)}$

Result: Pass