




# RF EXPOSURE REPORT



Report No.: 14070689-FCC-H2

Supersede Report No.: N/A

Applicant	STAR MICRONICS CO., LTD.	
Product Name	Thermal Printer	
Model No.	SM-L204	
Test Standard	FCC 2.1091	
Test Date	January 15, 2015	
Issue Date	March 24, 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"/>	
		
Dustin Wang Test Engineer	Alex Liu 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:

**SIEMIC (SHENZHEN-CHINA) LABORATORIES**

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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
14070689-FCC-H2	NONE	Original	March 24, 2015

## 2. Customer information

Applicant Name	STAR MICRONICS CO., LTD.
Applicant Add	20-10 NAKAYOSHIDA, SURUGA-ku, SHIZUOKA-shi, SHIZUOKA 422-8654, JAPAN
Manufacturer	Xiamen PRT Technology Co.,Ltd
Manufacturer Add	4, 5/f, #8, gaoqi Nan Shi'er Road(Aide Airport Industrial Park), Xiamen, Fujian

## 3. Test site information

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao'an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	718246
IC Test Site No.	4842E-1
Test Software	Radiated Emission Program-To Shenzhen v2.0

## 4. Equipment under Test (EUT) Information

Description of EUT:	Thermal Printer
Main Model:	SM-L204
Serial Model:	SM-L200
Date EUT received:	December 15, 2014
Antenna Gain:	Bluetooth/BLE: 2 dBi
Type of Modulation:	Bluetooth: GFSK, $\pi$ /4DQPSK, 8DPSK BLE: GFSK
RF Operating Frequency (ies):	Bluetooth: 2402-2480 MHz BLE: 2402-2480 MHz
Number of Channels:	Bluetooth: 79CH BLE: 40CH
Port:	USB Port, Power Port
Input Power:	Battery: Model: X000-001 Spec: 3.7V 1700mAh Adapter ( <i>Optinal on sale</i> ): Model: ETPCA-050050U3W Input: AC 100-240V; 50/60Hz 0.2A Output: DC 5.0V; 0.5A
Trade Name :	STAR MICRONICS CO., LTD. / STAR
FCC ID:	R49SM-L200

## 5. FCC §2.1091 - Maximum Permissible exposure (MPE)

### 5.1 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 <sup>2</sup> )	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	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

## 5.2 Test Result

Type	Test mode	CH	Freq (MHz)	Conducted Power (dBm)	Tune Up Power (dBm)
Bluetooth Output power	GFSK	Low	2402	0.136	0±1
		Mid	2441	0.008	0±1
		High	2480	-0.496	0±1
	π /4 DQPSK	Low	2402	0.166	0±1
		Mid	2441	-0.227	0±1
		High	2480	-0.440	0±1
	8-DPSK	Low	2402	0.280	0±1
		Mid	2441	-0.048	0±1
		High	2480	-0.248	0±1
BLE Output power	GFSK	Low	2402	-0.175	0±1
		Mid	2441	-0.498	0±1
		High	2480	-0.908	0±1

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/cm<sup>2</sup>)

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)

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

Maximum output power at antenna input terminal: 1.0 dBm)



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Maximum output power at antenna input terminal: 1.259 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2480 (MHz) High frequency

Antenna Gain (typical): 2 (dBi)

Antenna Gain (typical): 1.585 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.0004(mW/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1.0 (mW/cm<sup>2</sup>)

$0.0004(\text{mW}/\text{cm}^2) < 1.0 (\text{mW}/\text{cm}^2)$

**Result:** Pass