EMC TEST REPORT

Report No.: 17070107-FCC-E V1

Supersede Report No: N/A

Applicant	STAR MICRONICS CO., LTD.
Product Name	Portable Thermal Printer
Model No.	SM-L304
Serial No.	SM-L300
Test Standard	FCC Part 15 Subpart B Class B:2016, ANSI C63.4: 2014
Test Date	February 21 to 27, 2017
Issue Date	March 16, 2017
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Evans He	David Huang	
Test Engineer	Checked By	

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

Issued by:

SIEMIC (SHENZHEN-CHINA) LABORATORIES

Zone A, Floor 1, Building 2 Wan Ye Long Technology Park

South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108

Phone: +86 0755 2601 4629801 Email: China@siemic.com.cn

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
17070107-FCC-E	NONE	Original	February 28, 2017
17070107-FCC-E V1	V1	Added the serial model photos	March 16, 2017

2. Customer information

Applicant Name	STAR MICRONICS CO., LTD.
Applicant Add	20-10 Nakayoshida, Suruga-ku Shizuoka-shi 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 of Radiated Emission	Radiated Emission Program-To Shenzhen v2.0
Test Software of Conducted Emission	EZ-EMC(ver.Icp-03A1)

4. Equipment under Test (EUT) Information

Description of EUT:	Portable Thermal Printer
Main Model:	SM-L304
Serial Model:	SM-L300
Antenna Gain:	BT/BLE: 0dBi
Antenna Type:	PCB antenna
Input Power:	Battery: Model: X000-002 Spec: 2000mAh,7.4V,14.8Wh USB: DC 5V,1.0A
Equipment Category：	JBP
Type of Modulation:	Bluetooth: GFSK, π /4DQPSK, 8DPSK BLE: GFSK
RF Operating Frequency (ies):	BT/BLE: 2402-2480 MHz(TX/RX)
Number of Channels:	Bluetooth: 79CH BLE: 40CH
Port:	USB Port, Power Port
Trade Name :	star
FCC ID:	R49SM-L300
Date EUT received:	August 05, 2016
Test Date(s):	February 21 to 27, 2017

Note: The difference between the old case 16070599 and new case 17070107: battery cell change, and the two springs on top enclosure edge have change metal from plastic, cover a cotton on MCU, change the position of bottom wire, change the switch from metal material to plastic material, the other construction is the same.

So, we have retested the Radiated Emissions data in this report.

5. Test Summary

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§15.109; ANSI C63.4: 2014	Radiated Emissions	Compliance

Measurement Uncertainty

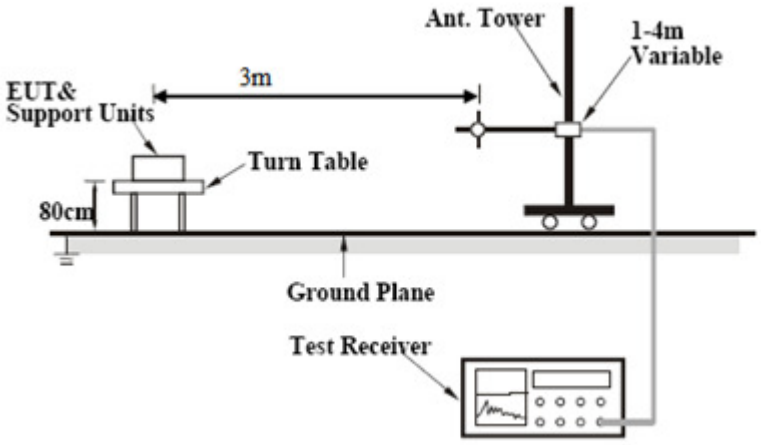
Emissions		
Test Item	**Description**	**Uncertainty**
Radiated Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
-	-	-

6. Measurements, Examination And Derived Results

6.1 Radiated Emissions

Temperature	25℃
Relative Humidity	55%
Atmospheric Pressure	1022mbar
Test date :	February 27, 2017
Tested By :	Evans He

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§15.109(d)</td><td>a)</td><td>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges
<table>
<tr><th>Frequency range (MHz)</th><th>Field Strength (μV/m)</th></tr>
<tr><td>30 – 88</td><td>100</td></tr>
<tr><td>88 – 216</td><td>150</td></tr>
<tr><td>216 960</td><td>200</td></tr>
<tr><td>Above 960</td><td>500</td></tr>
</table></td><td>☑</td></tr>
<tr><td>Test Setup</td><td colspan="3"> 
</td></tr>
<tr><td>Procedure</td><td colspan="3">1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following</td></tr>
</table>

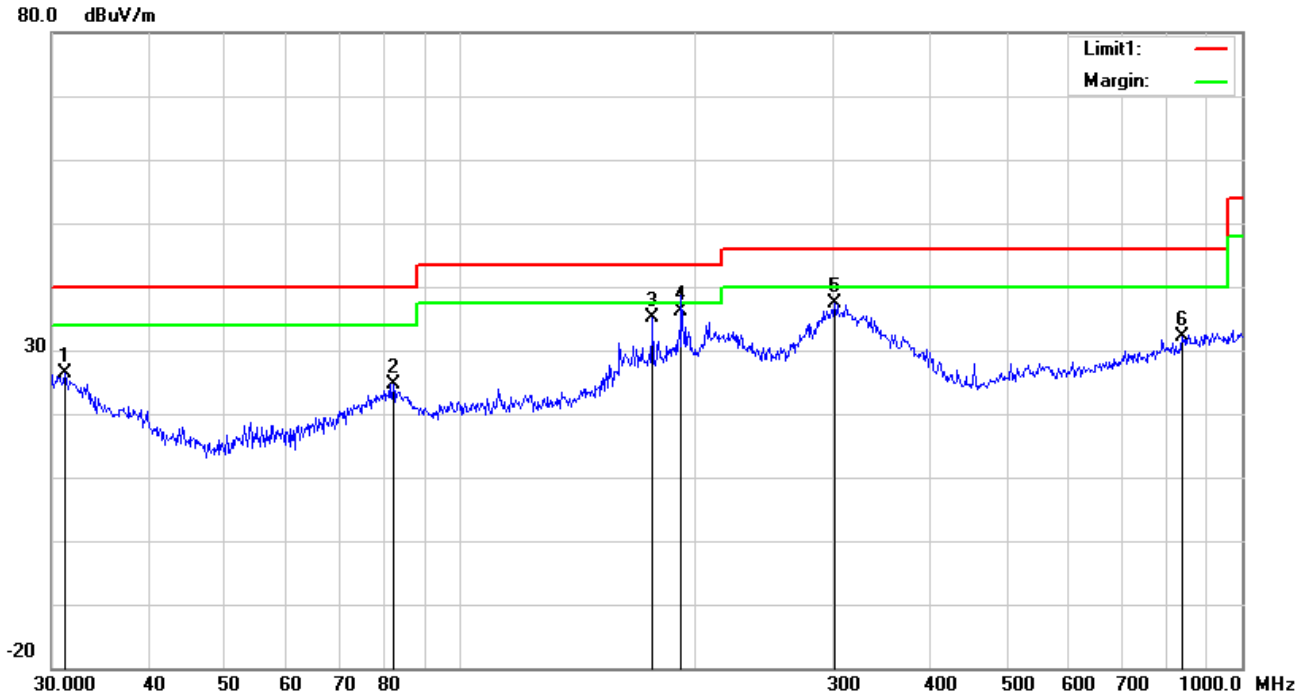
	manner: a. Vertical or horizontal polarization (whichever gave the higher emission level over a full rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maximum emission. 3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz. 4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth with Peak detection for Average Measurement as below at frequency above 1GHz. ■ 1 kHz (Duty cycle < 98%) □ 10 Hz (Duty cycle > 98%) 5. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.
Remark	
Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Test Mode :	USB Mode

Below 1GHz

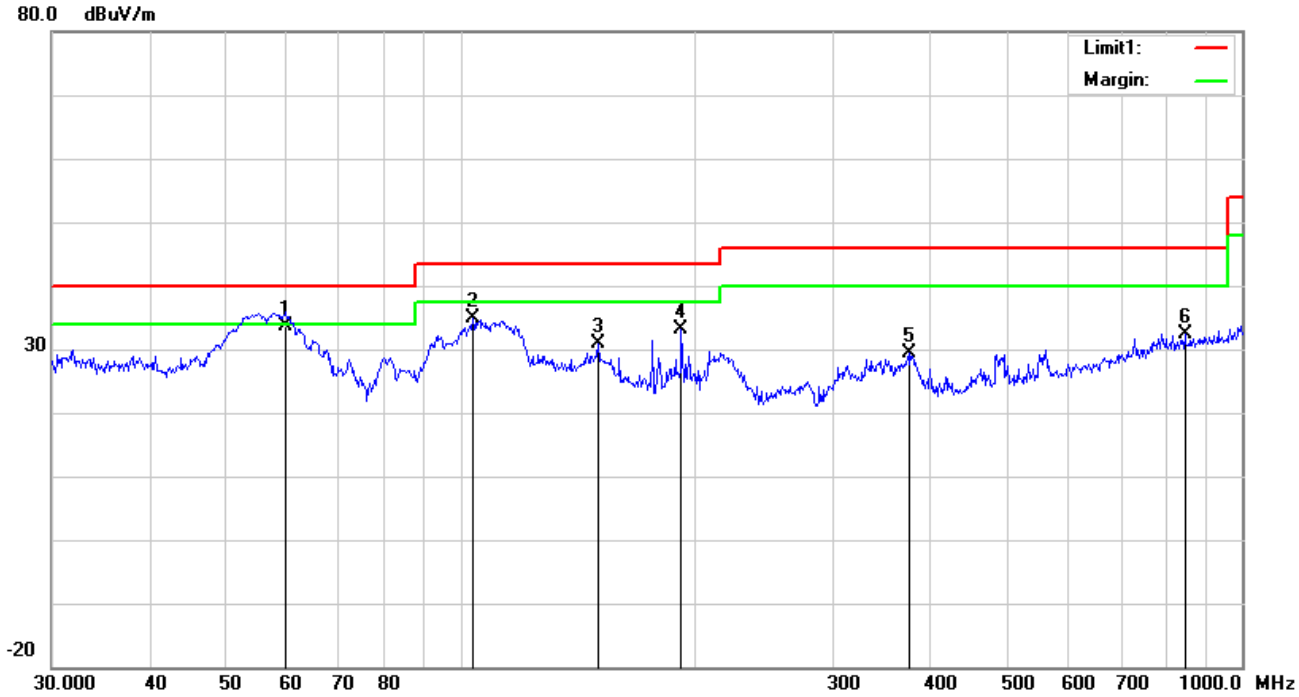


Test Data

Horizontal Polarity Plot @3m

No.	P/L	Frequency	Reading	Detector	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)		(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	H	31.1798	27.53	peak	20.49	22.27	0.65	26.40	40.00	-13.60	300	112
2	H	82.0706	38.32	peak	7.68	22.40	1.06	24.66	40.00	-15.34	200	49
3	H	176.2686	44.75	peak	11.30	22.25	1.36	35.16	43.50	-8.34	100	324
4	H	191.7450	45.34	QP	11.65	22.33	1.54	36.20	43.50	-7.30	200	112
5	H	301.4224	44.28	peak	13.63	22.29	1.80	37.42	46.00	-8.58	300	282
6	H	839.1818	28.47	peak	21.83	21.04	2.89	32.15	46.00	-13.85	100	161

Below 1GHz



Test Data

Vertical Polarity Plot @3m

No.	P/L	Frequency	Reading	Detector	Ant_F	PA_G	Cab_L	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)		(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	V	59.8588	47.94	QP	7.32	22.41	0.75	33.60	40.00	-6.40	100	67
2	V	103.8055	44.96	peak	11.07	22.33	1.14	34.84	43.50	-8.66	100	145
3	V	150.0108	39.16	peak	12.60	22.34	1.34	30.76	43.50	-12.74	200	294
4	V	191.7450	42.19	peak	11.65	22.33	1.54	33.05	43.50	-10.45	100	96
5	V	374.6226	34.27	peak	15.17	22.08	2.03	29.39	46.00	-16.61	200	104
6	V	845.0878	28.61	peak	21.90	21.03	2.88	32.36	46.00	-13.64	200	192

Above 1GHz

Frequency (MHz)	Amplitude (dBμV/m)	Azimuth	Height (cm)	Polarity (H/V)	Factors (dB)	Limit (dBμV/m)	Margin (dB)	Detector (PK/AV)
1176.5	50.96	53	140	V	-20.35	74	-23.04	PK
1796.2	54.38	134	100	V	-21.26	74	-19.62	PK
2043.8	52.46	92	200	V	-19.98	74	-21.54	PK
1629.7	51.87	71	200	H	-19.79	74	-22.13	PK
2285.4	54.28	111	100	H	-20.87	74	-19.72	PK
1956.7	52.33	144	200	H	-19.94	74	-21.67	PK

*Note1: The highest frequency of the EUT is 2480 MHz, so the testing has been conformed to 5*2480MHz=12,400MHz.*

Note2: The frequency that above 3GHz is mainly from the environment noise.

Note3: The AV measurement performed, more than 20dB below limit so AV test data was not presented.

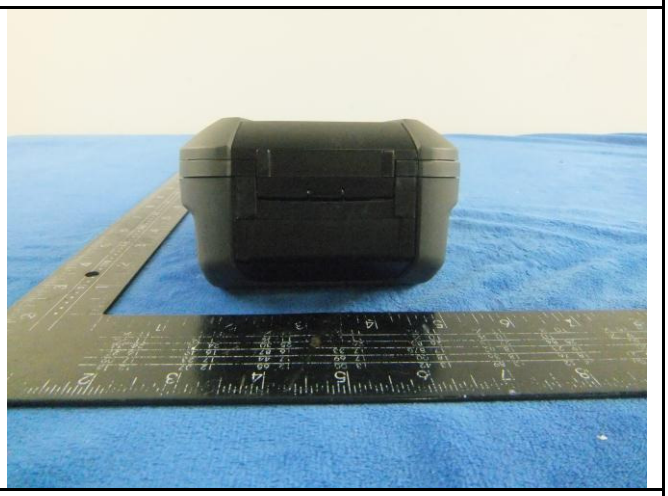
Annex A. TEST INSTRUMENT

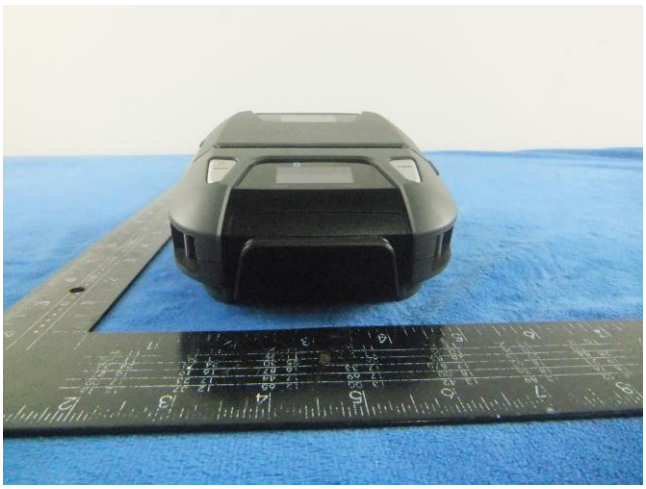
Instrument	Model	Serial #	Cal Date	Cal Due	In use
Radiated Emissions					
EMI test receiver	ESL6	100262	09/16/2016	09/15/2017	☑
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	08/31/2016	08/30/2017	☑
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/24/2016	03/23/2017	☑
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/20/2016	09/19/2017	☑
Double Ridge Horn Antenna	AH-118	71259	09/23/2016	09/22/2017	☑

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

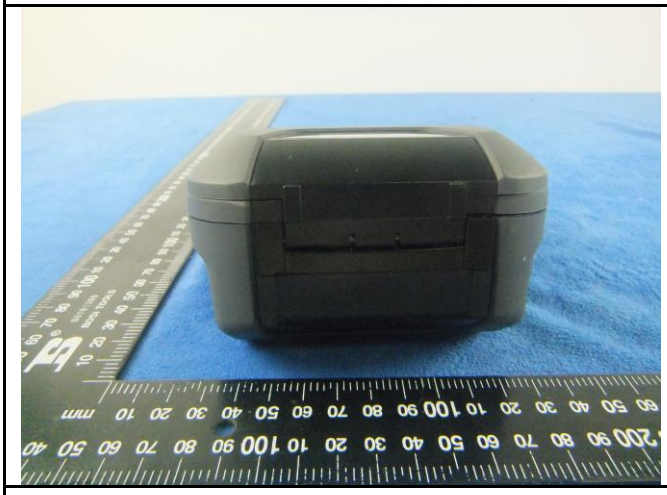
Note: **SM-L304 has magnetic reader head ; There' s no magnetic reader head in SM-L300. The internal circuit structure is the same.**

	
Whole Package View (**Left is Main Model No., Right is serial Model No.**)	EUT - Front View(**Main Model No.**)
	
EUT - Rear View(**Main Model No.**)	EUT – Top View(**Main Model No.**)

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>EUT - Bottom View(Main Model No.)</td><td>EUT - Left View(Main Model No.)</td></tr>
<tr><td>  </td><td></td></tr>
<tr><td>EUT - Right View(Main Model No.)</td><td></td></tr>
</table>

EUT - Front View(**serial Model No.**)

EUT - Rear View(**serial Model No.**)



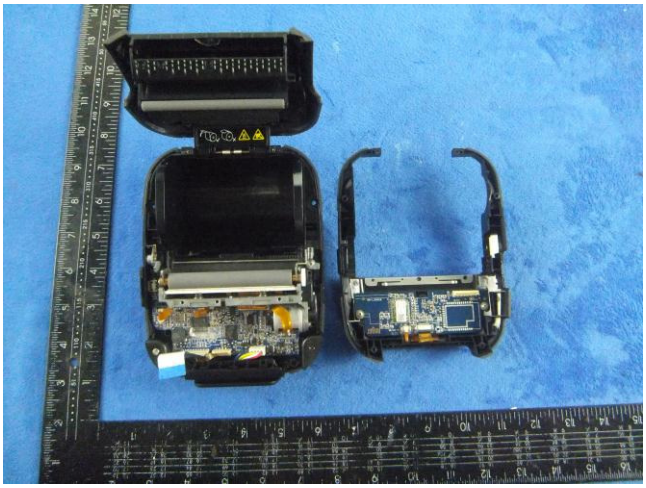
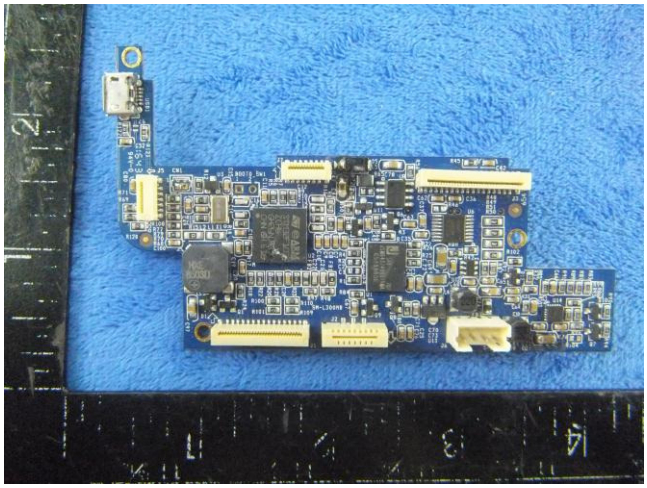
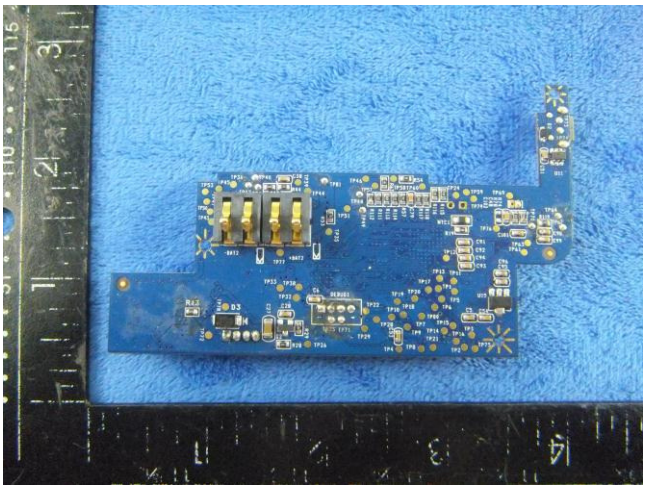
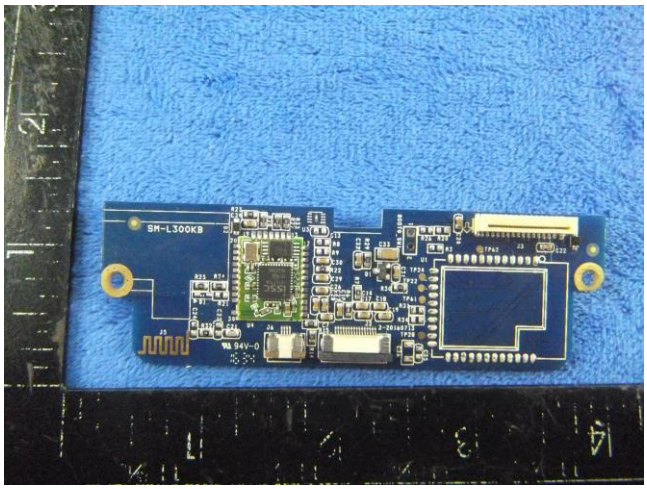
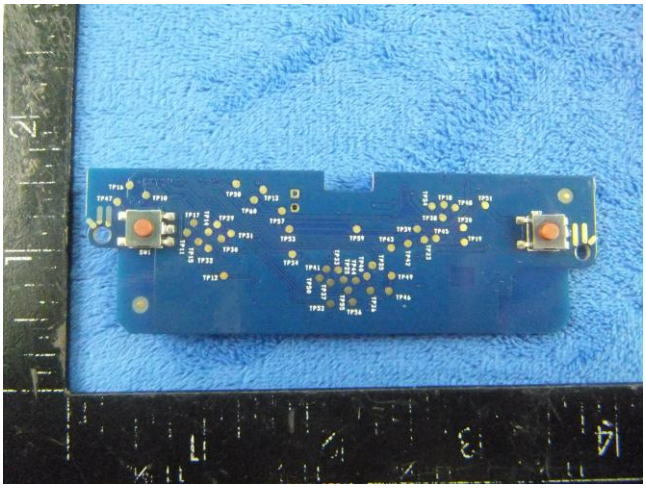
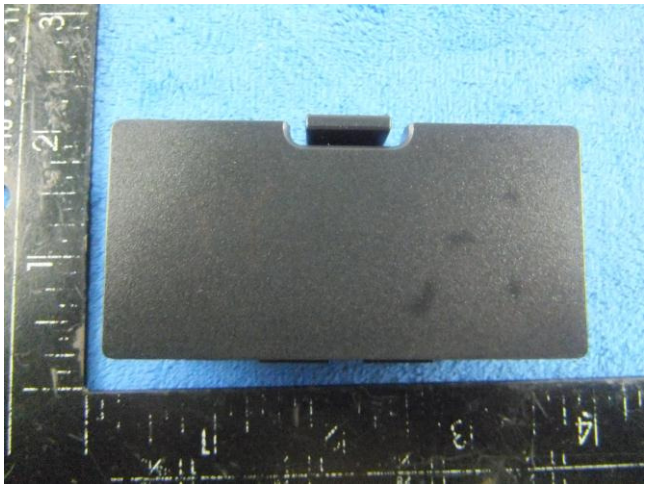
EUT – Top View(**serial Model No.**)

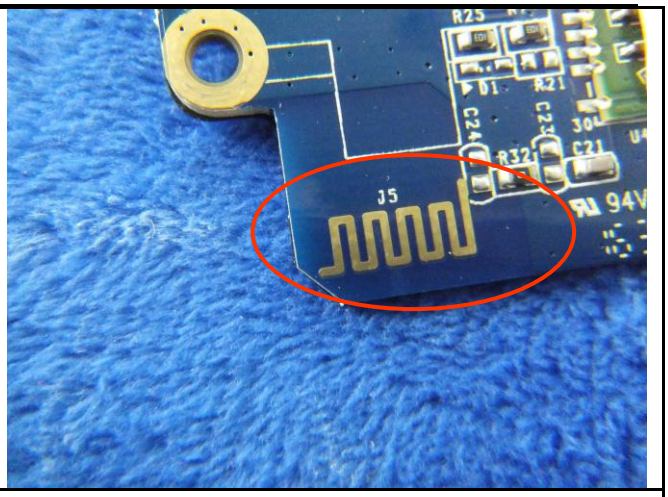
EUT - Bottom View(**serial Model No.**)

EUT - Left View(**serial Model No.**)

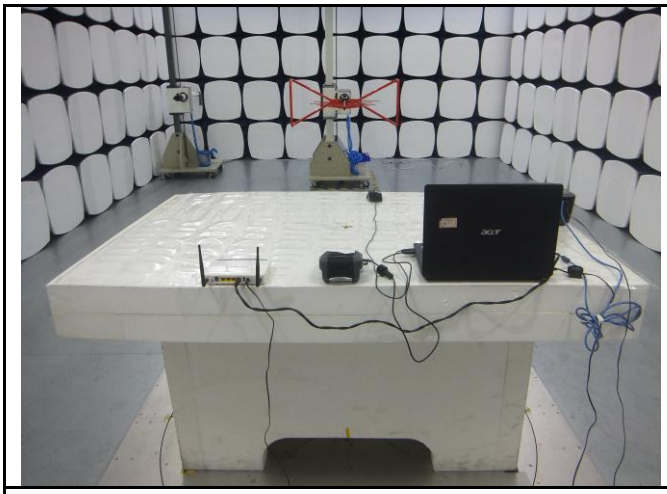
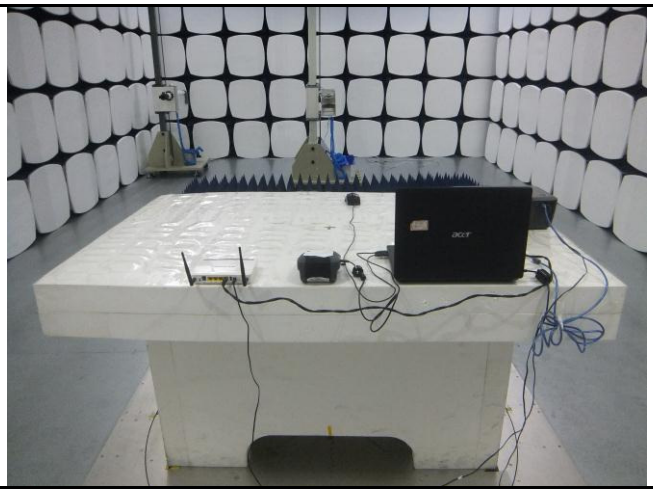
EUT - Right View(**serial Model No.**)

Annex B.ii. Photograph: EUT Internal Photo

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Cover Off - Top View</td><td>Main Board - Front View</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Main Board - Rear View</td><td>Small Board - Front View</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Small Board - Rear View</td><td>Battery - Front View</td></tr>
</table>

	
Battery - Rear View	BT/BLE – Antenna View

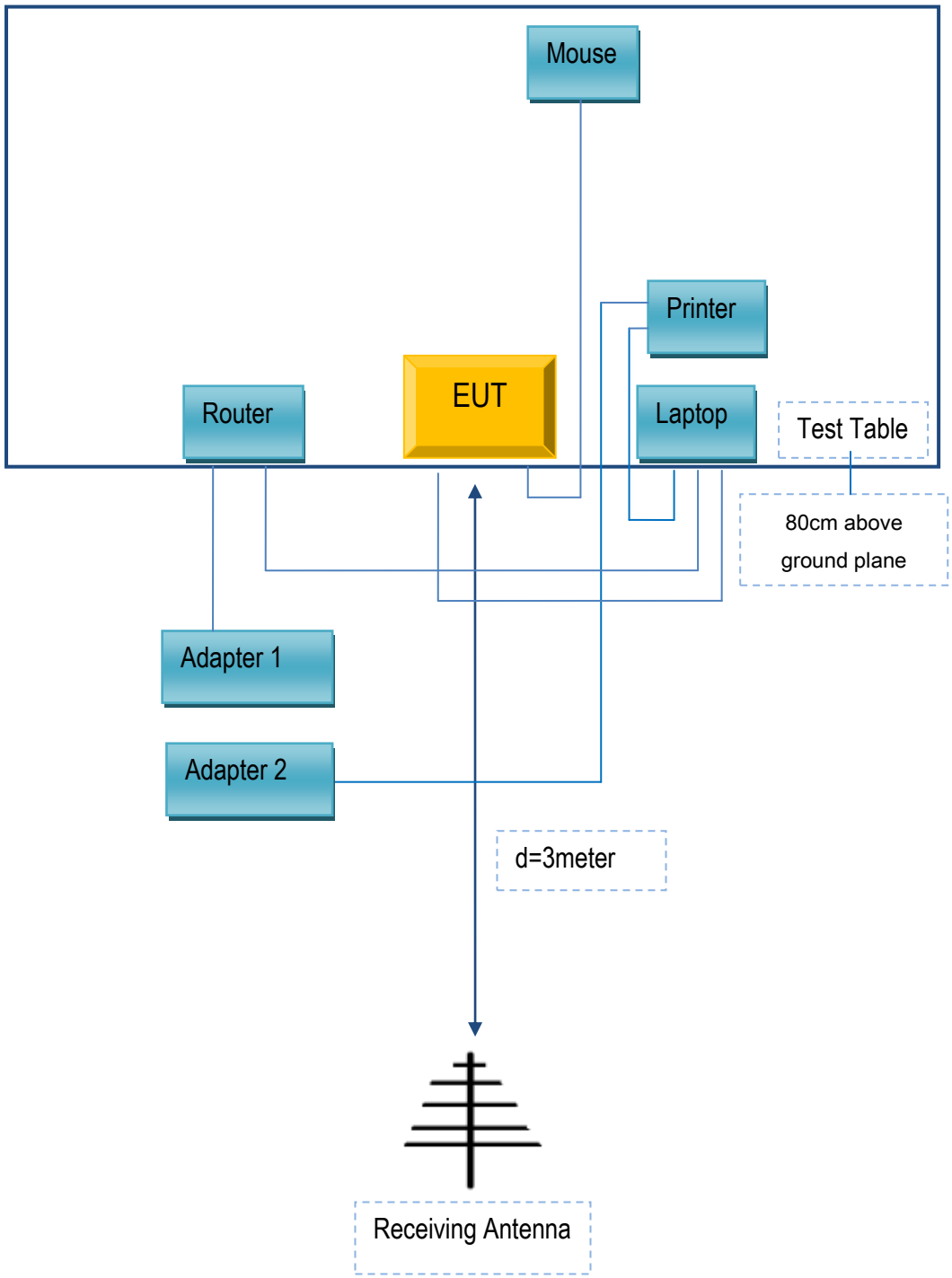
Annex B.iii. Photograph: Test Setup Photo

	
Radiated Emissions Test Setup Below 1GHz	Radiated Emissions Test Setup Above 1GHz

Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

Block Configuration Diagram for Radiated Emissions



Annex C. iI. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Supporting Equipment:

Manufacturer	Equipment Description	Model	Serial No
Lenovo	Laptop	E40	LR-1EHRX
GOLDWEB	Router	R102	1202032094
DCA	Adapter	E2164A	S201153
Lenovo	AC Adapter	42T4416	21D9JU
HP	Printer	VCVRA-1003	CN36M19JWX
DELL	Mouse	E100	912NMTUT41481
BULL	Socket	GN-403	GN201203

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	2m	JX120051274
USB Cable	Un-shielding	No	2m	JX110725002
RJ45 Cable	Un-shielding	No	2m	KX156327541
Router Power cable	Un-shielding	No	2m	13274630Z
Printer Power cable	Un-shielding	No	2m	127581031
Power Cable	Un-shielding	No	0.8m	GT211032

Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see attachment

Annex E. DECLARATION OF SIMILARITY

STAR MICRONICS CO., LTD.

To：SIEMIC,775MontagueExpressway,Milpitas,CA95035,USA

Declaration Letter

Dear Sir，

For our business issue and marketing requirement, we would like to list 2 model numbers on the **CE/IC/FCC/ TELEC** certificates and reports, as following:

Model No.:**SM-L304**

We declare that the difference of these is listed as below:

Main Model No	Serial Model No	Difference
SM-L304	SM-L300	SM-L304 has magnetic reader head ; There's no magnetic reader head in SM-L300.The internal circuit structure is the same。

Thank you!

Signature: Tsuyoshi Tanamori

Printed name/title: Tsuyoshi Tanamori
Tel: +81-54-347-2163
Fax: 81-54-347-0409
Address: 20-10 NAKAYOSHIDA，SURUGA-ku，SHIZUOKA-shi，SHIZUOKA 422-8654，JAPAN