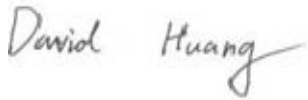


EMC TEST REPORT



Report No.: 16070599-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:2015, ANSI C63.4: 2014	
Test Date	August 06 to 29, 2016	
Issue Date	December 01, 2016	
Test Result	☒ Pass ☐ Fail	
Equipment complied with the specification ☒		
Equipment did not comply with the specification ☐		
		
Loren Luo Test Engineer	David Huang Checked By	
This test report may be reproduced in full only 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
16070599-FCC-E-V1	NONE	Original	December 01, 2016

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	Radiated Emission Program-To Shenzhen v2.0

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: Spec: 2000mAh,7.4V 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 :	
FCC ID:	R49SM-L300
Date EUT received:	August 05, 2016
Test Date(s):	August 06 to 29, 2016

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
§15.107; ANSI C63.4: 2014	AC Power Line Conducted Emissions	Compliance
§15.109; ANSI C63.4: 2014	Radiated Emissions	Compliance

Measurement Uncertainty

Emissions		
Test Item	Description	Uncertainty
Band Edge and Radiated Spurious 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
-	-	-

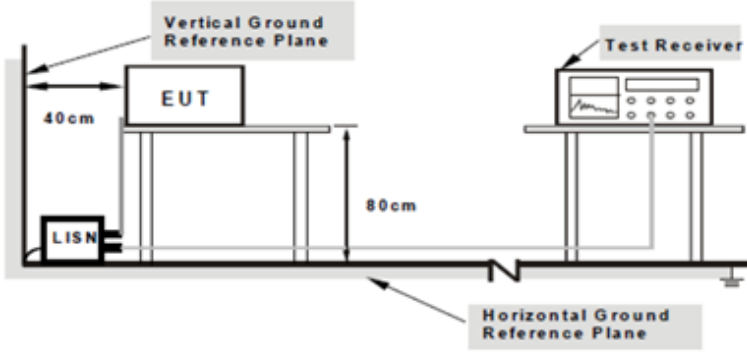
6. Measurements, Examination And Derived Results

6.1 AC Power Line Conducted Emissions

Temperature	23°C
Relative Humidity	59%
Atmospheric Pressure	1026mbar
Test date :	August 26, 2016
Tested By :	Loren Luo

Requirement(s):

Spec	Item	Requirement	Applicable		
47CFR§15.107	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 [mu] H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequencies ranges.			
		Frequency ranges (MHz)		Limit (dBµV)	
				QP	Average
		0.15 ~ 0.5		66 – 56	56 – 46
		0.5 ~ 5		56	46
		5 ~ 30	60	50	

Test Setup	 Note: 1.Support units were connected to second LISN. 2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.
------------	---

Procedure	- The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table. - The power supply for the EUT was fed through a 50Ω /50mH EUT LISN, connected to filtered mains.
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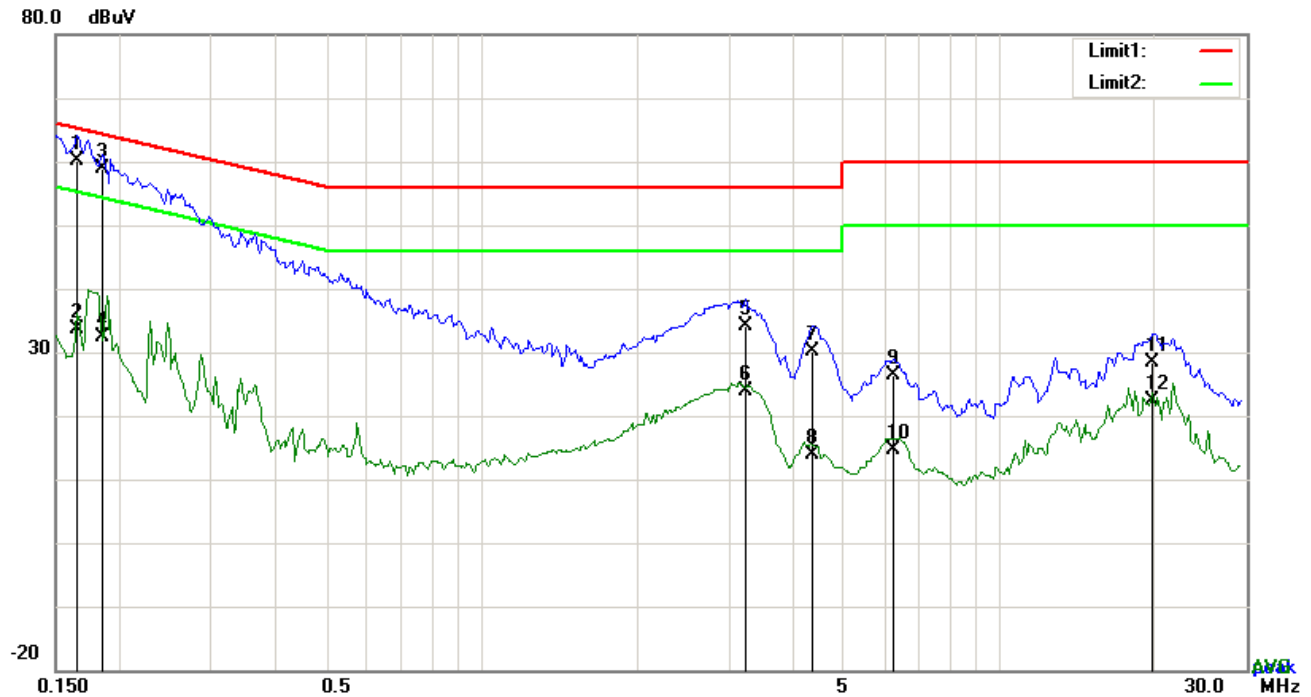
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	3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable. 4. All other supporting equipment were powered separately from another main supply. 5. The EUT was switched on and allowed to warm up to its normal operating condition. 6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver. 7. High peaks, relative to the limit line, The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz. 8. Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power).
Remark	
Result	☒ Pass ☐ Fail

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test Mode : USB Mode

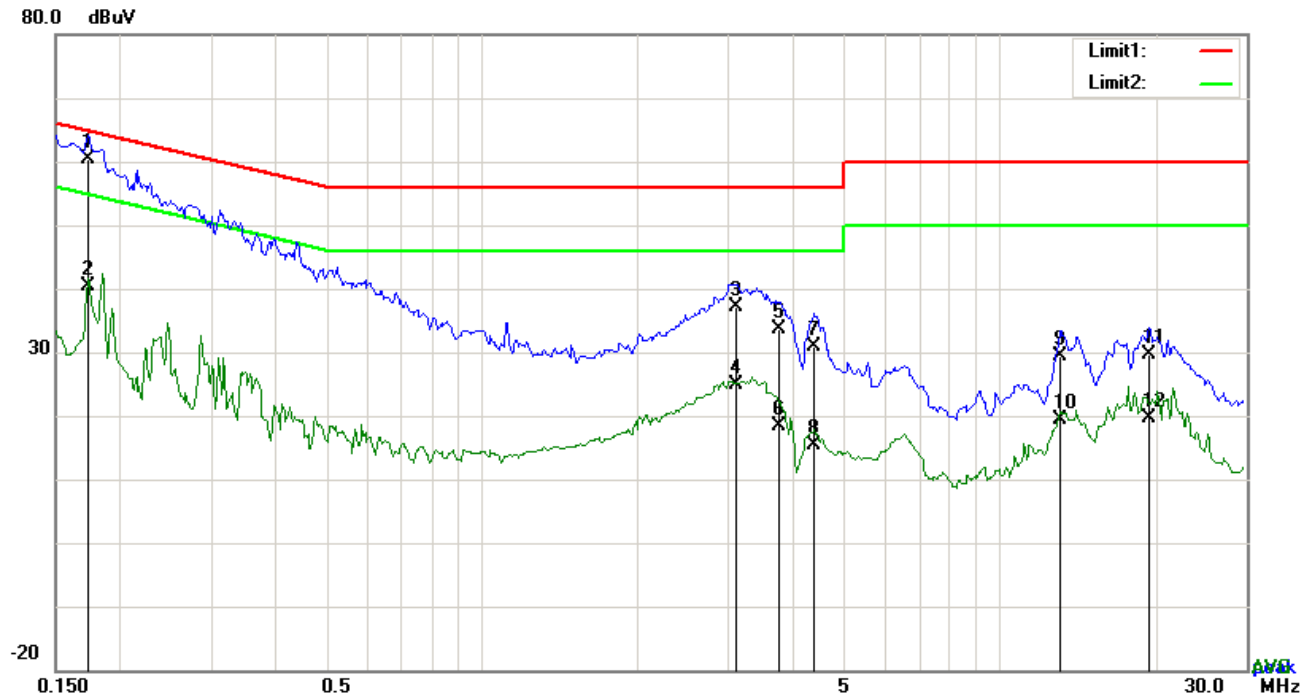


Test Data

Phase Line Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB)	(dBuV)	(dBuV)	(dB)
1	L1	0.1656	50.06	QP	10.03	60.09	65.18	-5.09
2	L1	0.1656	23.55	AVG	10.03	33.58	55.18	-21.60
3	L1	0.1851	48.78	QP	10.03	58.81	64.25	-5.44
4	L1	0.1851	22.29	AVG	10.03	32.32	54.25	-21.93
5	L1	3.2301	24.15	QP	10.06	34.21	56.00	-21.79
6	L1	3.2301	13.92	AVG	10.06	23.98	46.00	-22.02
7	L1	4.3572	20.16	QP	10.07	30.23	56.00	-25.77
8	L1	4.3572	3.71	AVG	10.07	13.78	46.00	-32.22
9	L1	6.2448	16.33	QP	10.10	26.43	60.00	-33.57
10	L1	6.2448	4.59	AVG	10.10	14.69	50.00	-35.31
11	L1	19.7115	17.97	QP	10.30	28.27	60.00	-31.73
12	L1	19.7115	12.10	AVG	10.30	22.40	50.00	-27.60

Test Mode : USB Mode

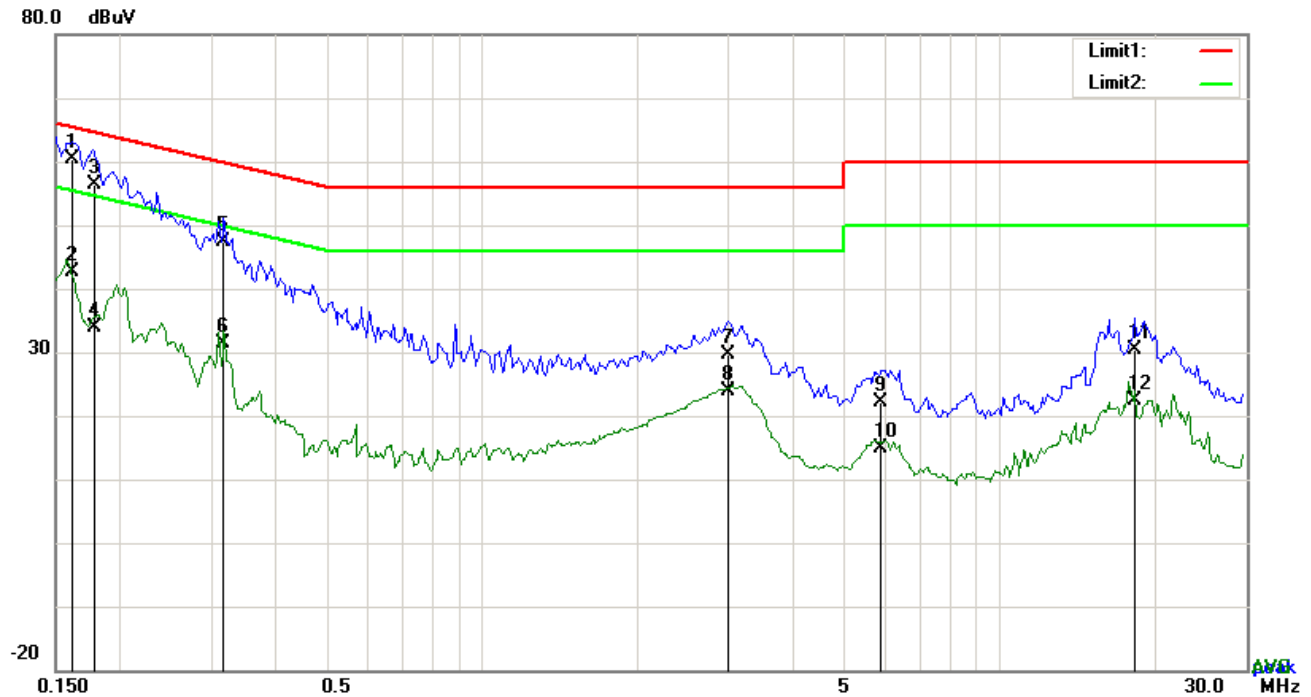


Test Data

Phase Neutral Plot at 120Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	N	0.1734	50.48	QP	10.02	60.50	64.80	-4.30
2	N	0.1734	30.31	AVG	10.02	40.33	54.80	-14.47
3	N	3.0975	27.10	QP	10.05	37.15	56.00	-18.85
4	N	3.0975	14.73	AVG	10.05	24.78	46.00	-21.22
5	N	3.7566	23.59	QP	10.06	33.65	56.00	-22.35
6	N	3.7566	8.32	AVG	10.06	18.38	46.00	-27.62
7	N	4.3884	20.74	QP	10.06	30.80	56.00	-25.20
8	N	4.3884	5.34	AVG	10.06	15.40	46.00	-30.60
9	N	13.0893	19.16	QP	10.18	29.34	60.00	-30.66
10	N	13.0893	9.09	AVG	10.18	19.27	50.00	-30.73
11	N	19.5204	19.49	QP	10.25	29.74	60.00	-30.26
12	N	19.5204	9.43	AVG	10.25	19.68	50.00	-30.32

Test Mode : USB Mode

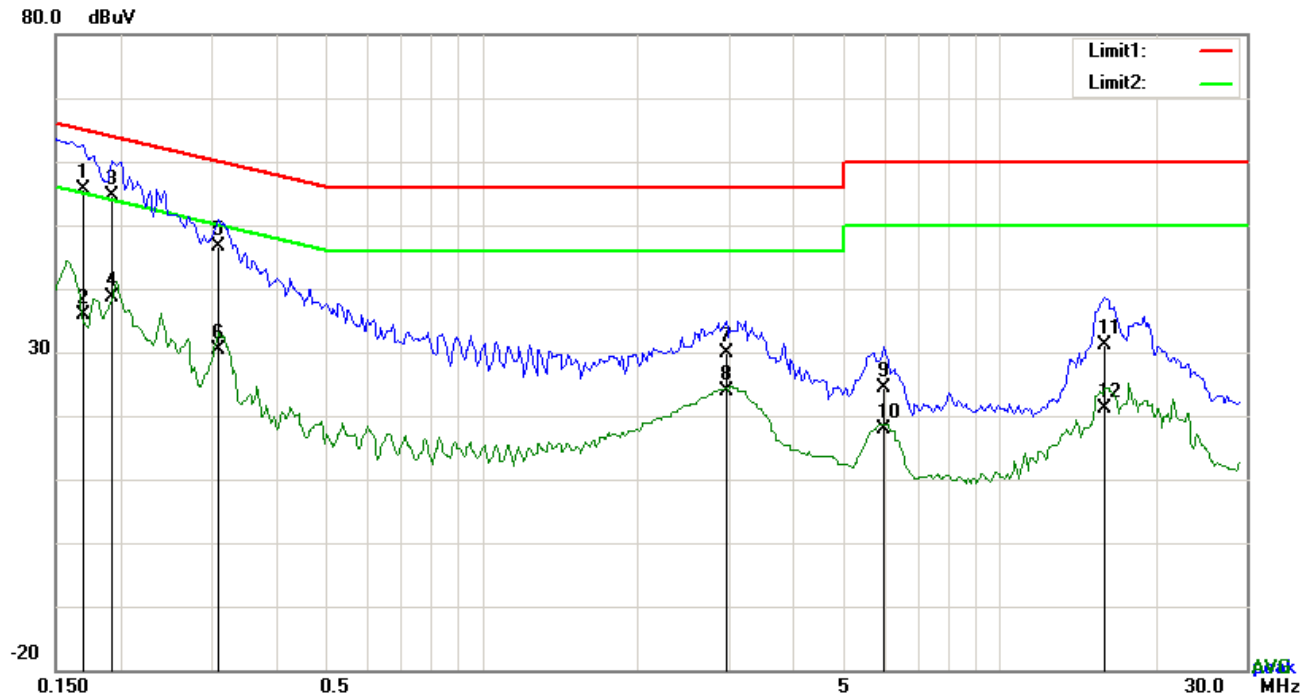


Test Data

Phase Line Plot at 240Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	L1	0.1617	50.45	QP	10.03	60.48	65.38	-4.90
2	L1	0.1617	32.60	AVG	10.03	42.63	55.38	-12.75
3	L1	0.1787	46.28	QP	10.03	56.31	64.55	-8.24
4	L1	0.1787	23.75	AVG	10.03	33.78	54.55	-20.77
5	L1	0.3177	37.44	QP	10.03	47.47	59.77	-12.30
6	L1	0.3177	21.39	AVG	10.03	31.42	49.77	-18.35
7	L1	2.9970	19.64	QP	10.05	29.69	56.00	-26.31
8	L1	2.9970	13.78	AVG	10.05	23.83	46.00	-22.17
9	L1	5.9094	11.94	QP	10.09	22.03	60.00	-37.97
10	L1	5.9094	4.88	AVG	10.09	14.97	50.00	-35.03
11	L1	18.3075	20.17	QP	10.27	30.44	60.00	-29.56
12	L1	18.3075	12.20	AVG	10.27	22.47	50.00	-27.53

Test Mode : USB Mode



Test Data

Phase Neutral Plot at 240Vac, 60Hz

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
		(MHz)	(dBuV)		(dB}	(dBuV)	(dBuV)	(dB)
1	N	0.1695	45.69	QP	10.02	55.71	64.98	-9.27
2	N	0.1695	25.98	AVG	10.02	36.00	54.98	-18.98
3	N	0.1929	44.59	QP	10.02	54.61	63.91	-9.30
4	N	0.1929	28.63	AVG	10.02	38.65	53.91	-15.26
5	N	0.3099	36.59	QP	10.02	46.61	59.97	-13.36
6	N	0.3099	20.36	AVG	10.02	30.38	49.97	-19.59
7	N	2.9619	19.93	QP	10.05	29.98	56.00	-26.02
8	N	2.9619	13.89	AVG	10.05	23.94	46.00	-22.06
9	N	5.9718	14.33	QP	10.08	24.41	60.00	-35.59
10	N	5.9718	7.86	AVG	10.08	17.94	50.00	-32.06
11	N	15.9558	20.88	QP	10.21	31.09	60.00	-28.91
12	N	15.9558	11.03	AVG	10.21	21.24	50.00	-28.76

6.2 Radiated Emissions

Temperature	23°C
Relative Humidity	59%
Atmospheric Pressure	1026mbar
Test date :	August 26, 2016
Tested By :	Loren Luo

Requirement(s):

Spec	Item	Requirement	Applicable	
47CFR§15.109(d)	a)	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		
		Frequency range (MHz)		Field Strength (µV/m)
		30 – 88		100
		88 – 216		150
		216 960		200
		Above 960		500

Test Setup	
------------	--

Procedure	- The EUT was switched on and allowed to warm up to its normal operating condition. - 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 manner: - Vertical or horizontal polarization (whichever gave the higher emission level
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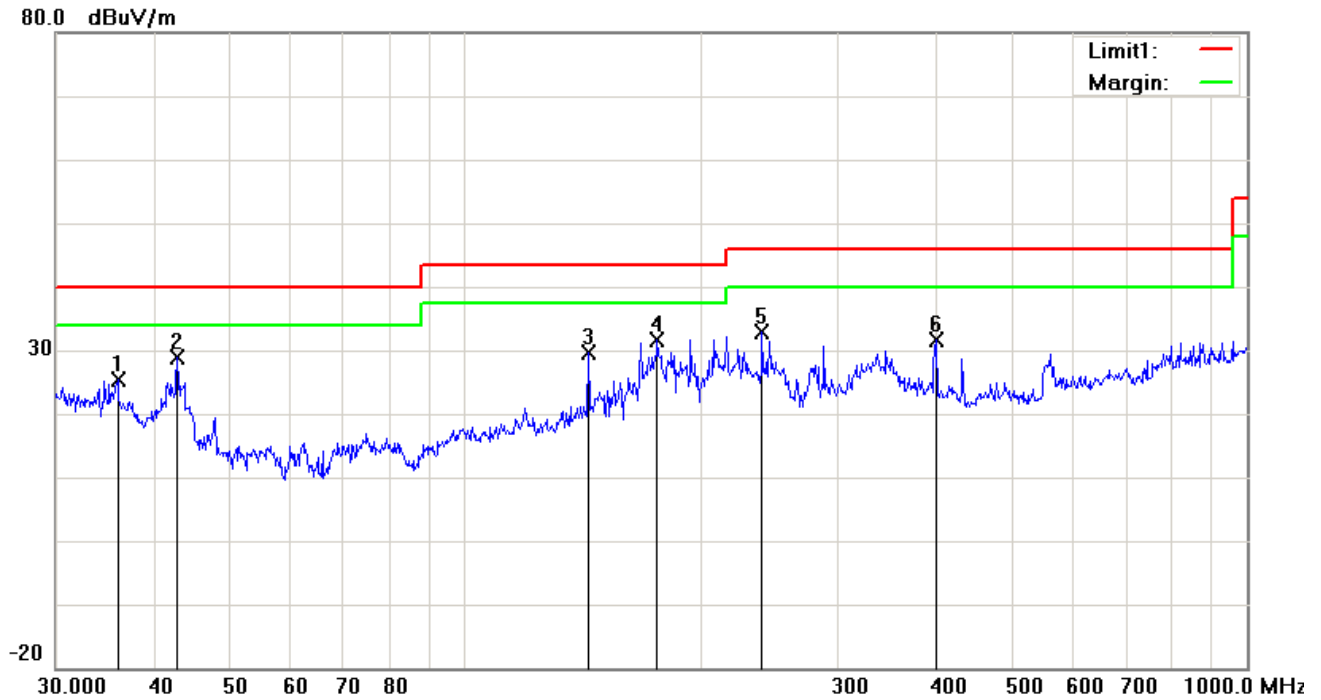
	over a full rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maximum emission. 3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi 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

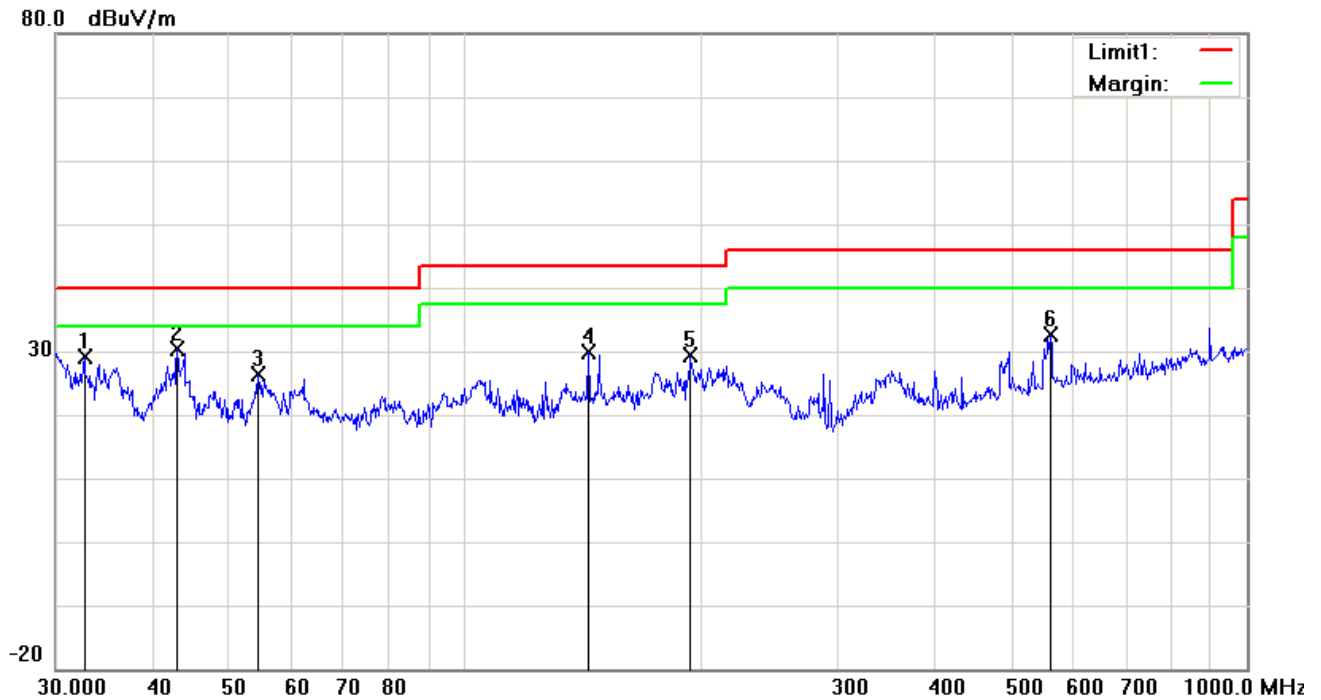


Test Data

Horizontal Polarity Plot @3m

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	H	36.0007	29.96	peak	-4.67	25.29	40.00	-14.71	100	318
2	H	42.8998	38.33	peak	-9.53	28.80	40.00	-11.20	100	168
3	H	143.8295	38.04	peak	-8.48	29.56	43.50	-13.94	100	221
4	H	176.2686	41.26	peak	-9.59	31.67	43.50	-11.83	100	194
5	H	239.9873	42.04	peak	-9.10	32.94	46.00	-13.06	100	109
6	H	400.4319	35.81	peak	-4.29	31.52	46.00	-14.48	100	39

Below 1GHz



Test Data

Vertical Polarity Plot @3m

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	V	32.6340	31.43	peak	-2.20	29.23	40.00	-10.77	100	146
2	V	42.8998	39.87	peak	-9.53	30.34	40.00	-9.66	100	325
3	V	54.4516	40.10	peak	-13.70	26.40	40.00	-13.60	100	34
4	V	143.8295	38.41	peak	-8.48	29.93	43.50	-13.57	100	29
5	V	194.4534	38.30	peak	-9.01	29.29	43.50	-14.21	100	187
6	V	560.6928	33.27	peak	-0.64	32.63	46.00	-13.37	100	36

Above 1GHz

Frequency (MHz)	Amplitude (dBμV/m)	Azimuth	Height (cm)	Polarity (H/V)	Factors (dB)	Limit (dBμV/m)	Margin (dB)	Detector (PK/AV)
1547.68	49.22	80	168	V	-22.75	74	-24.78	PK
2072.55	50.33	47	133	V	-21.86	74	-23.67	PK
1666.24	50.47	67	124	V	-22.47	74	-23.53	PK
2168.57	49.63	54	180	H	-21.55	74	-24.37	PK
2844.32	48.18	66	164	H	-21.68	74	-25.82	PK
1855.18	50.24	47	120	H	-22.58	74	-23.76	PK

Note1: The highest frequency of the EUT is 2480 MHz, so the testing has been conformed to $5 \times 2472 \text{ MHz} = 12,360 \text{ MHz}$.

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

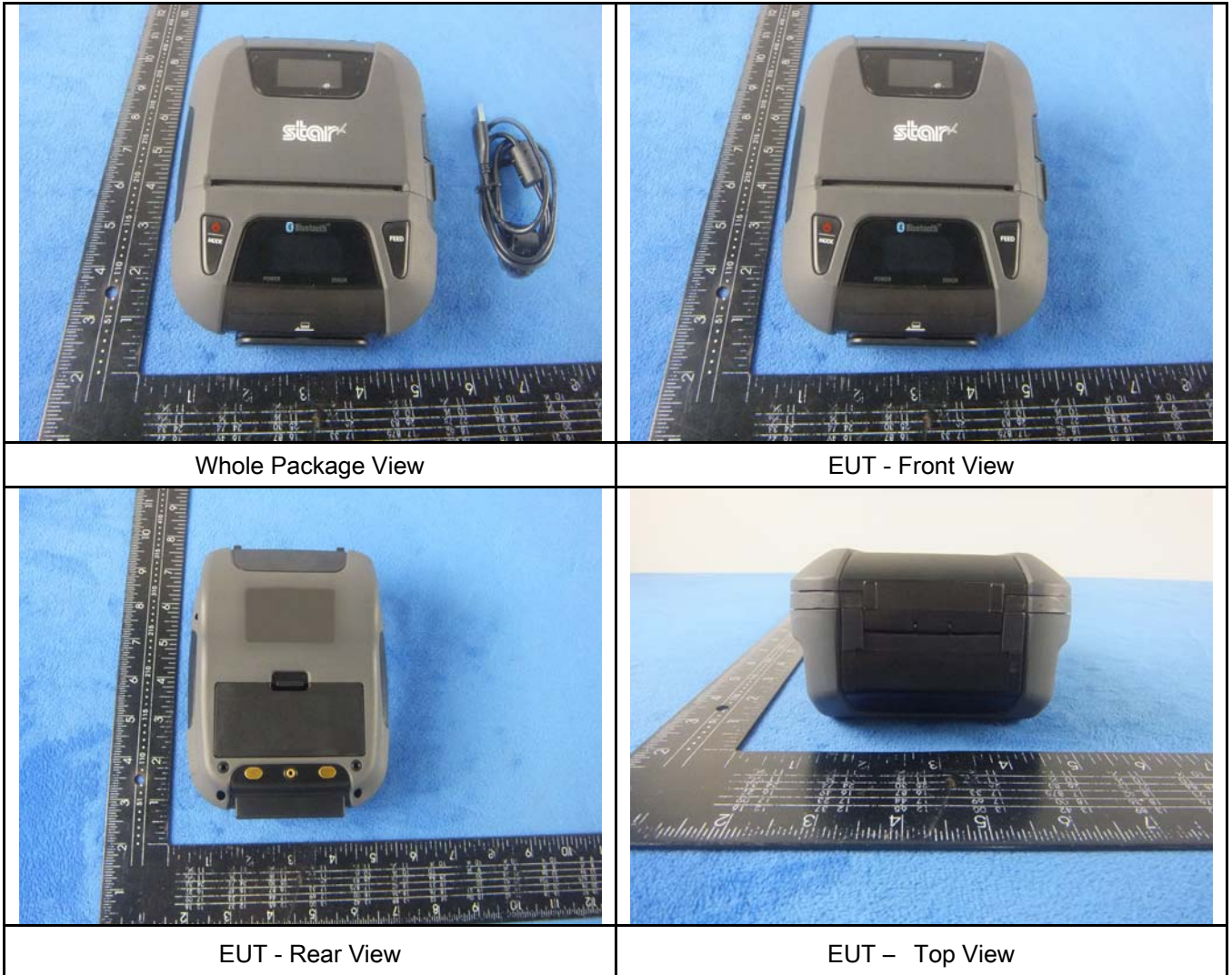
Note3: The AV measurement performed, more than 20dB below limit so AV test data was not presented.

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted Emissions					
EMI test receiver	ESCS30	8471241027	09/17/2015	09/16/2016	☒
Line Impedance Stabilization Network	LI-125A	191106	09/25/2015	09/24/2016	☒
Line Impedance Stabilization Network	LI-125A	191107	09/25/2015	09/24/2016	☒
LISN	ISN T800	34373	09/25/2015	09/24/2016	☒
Transient Limiter	LIT-153	531118	09/01/2015	08/31/2016	☒
Radiated Emissions					
EMI test receiver	ESL6	100262	09/17/2015	09/16/2016	☒
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/01/2015	08/31/2016	☒
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/24/2016	03/23/2017	☒
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/21/2015	09/20/2016	☒
Double Ridge Horn Antenna	AH-118	71259	09/24/2015	09/23/2016	☒

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo





EUT - Bottom View



EUT - Left View



EUT - Right View

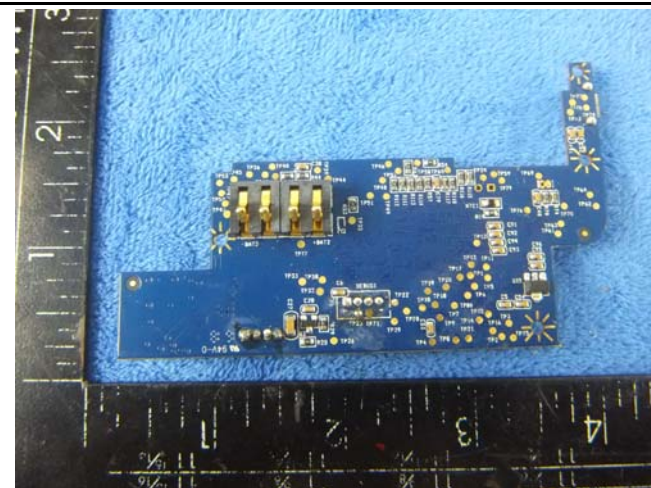
Annex B.ii. Photograph: EUT Internal Photo



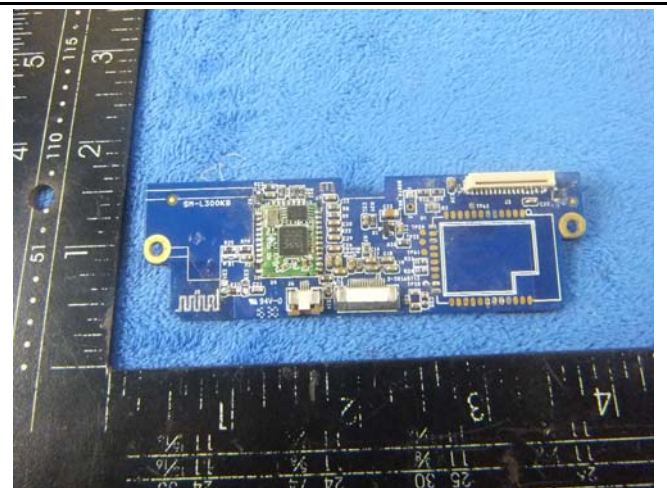
Cover Off - Top View



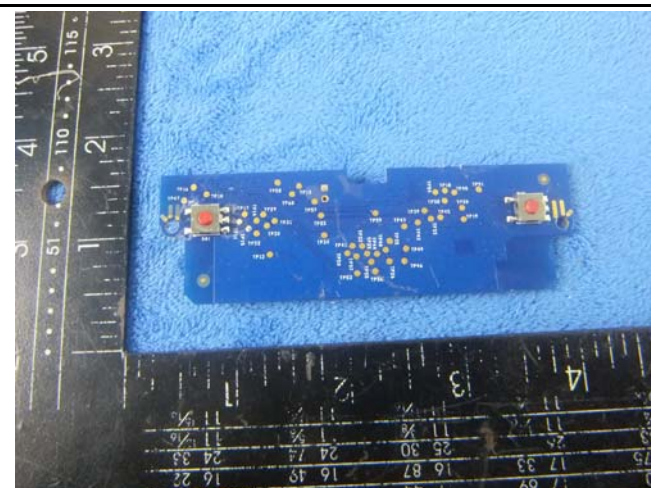
Main Board - Front View



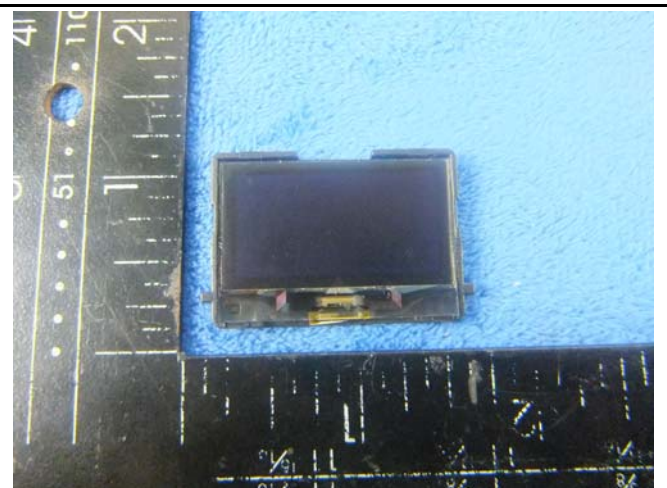
Main Board - Rear View



Small Board - Front View



Small Board - Rear View

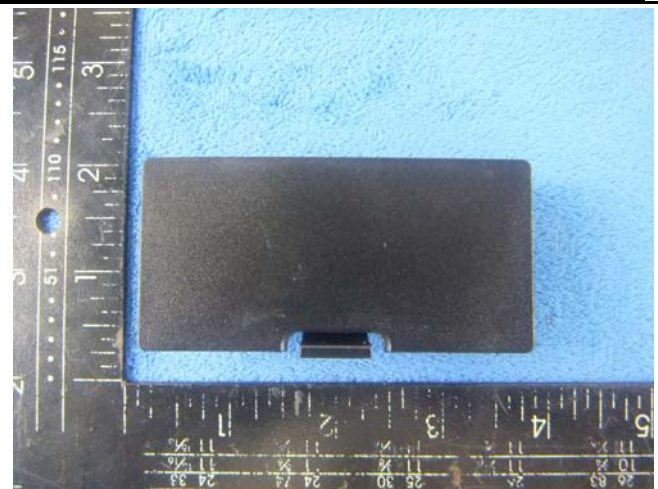


LCD - Front View

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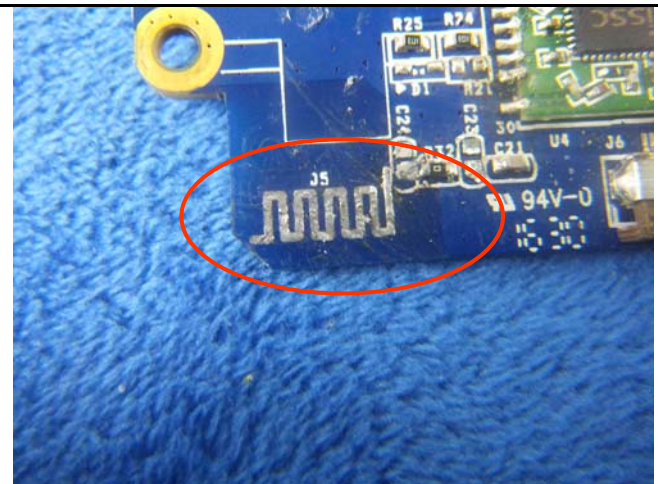
LCD - Rear View



Battery - Front View



Battery - Rear View

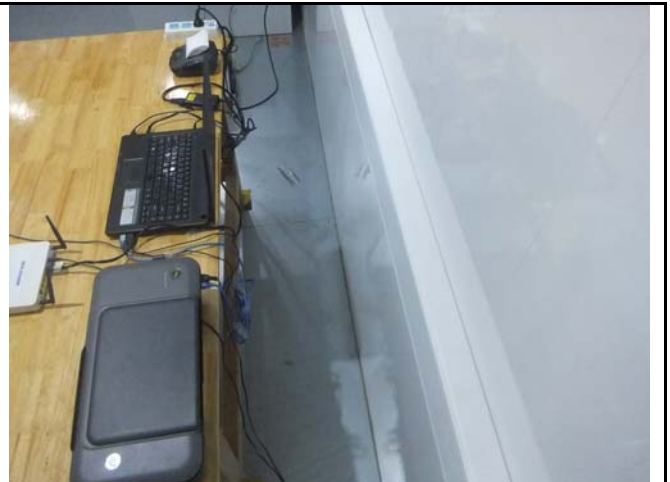


BT/BLE - Antenna View

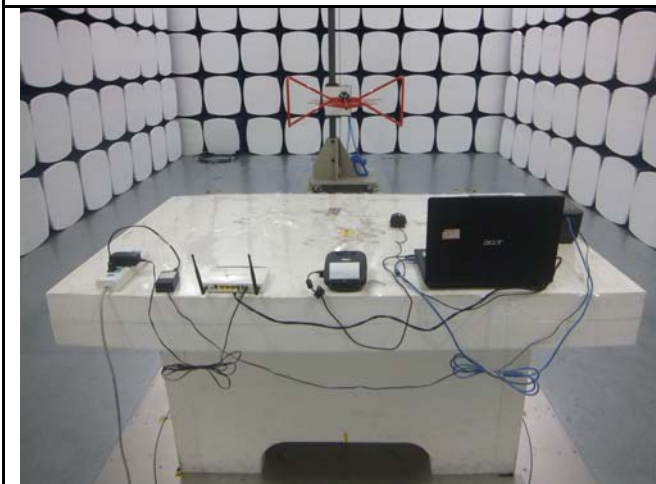
Annex B.iii. Photograph: Test Setup Photo



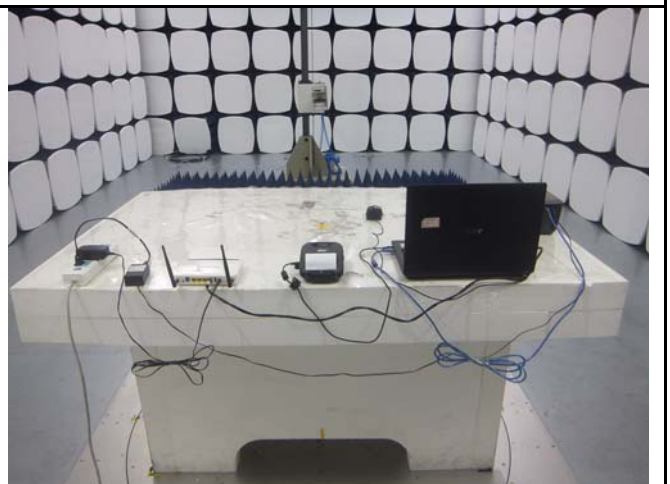
Conducted Emissions Test Setup – Front View



Conducted Emissions Test Setup – Side View



Radiated Emissions Test Setup Below 1GHz

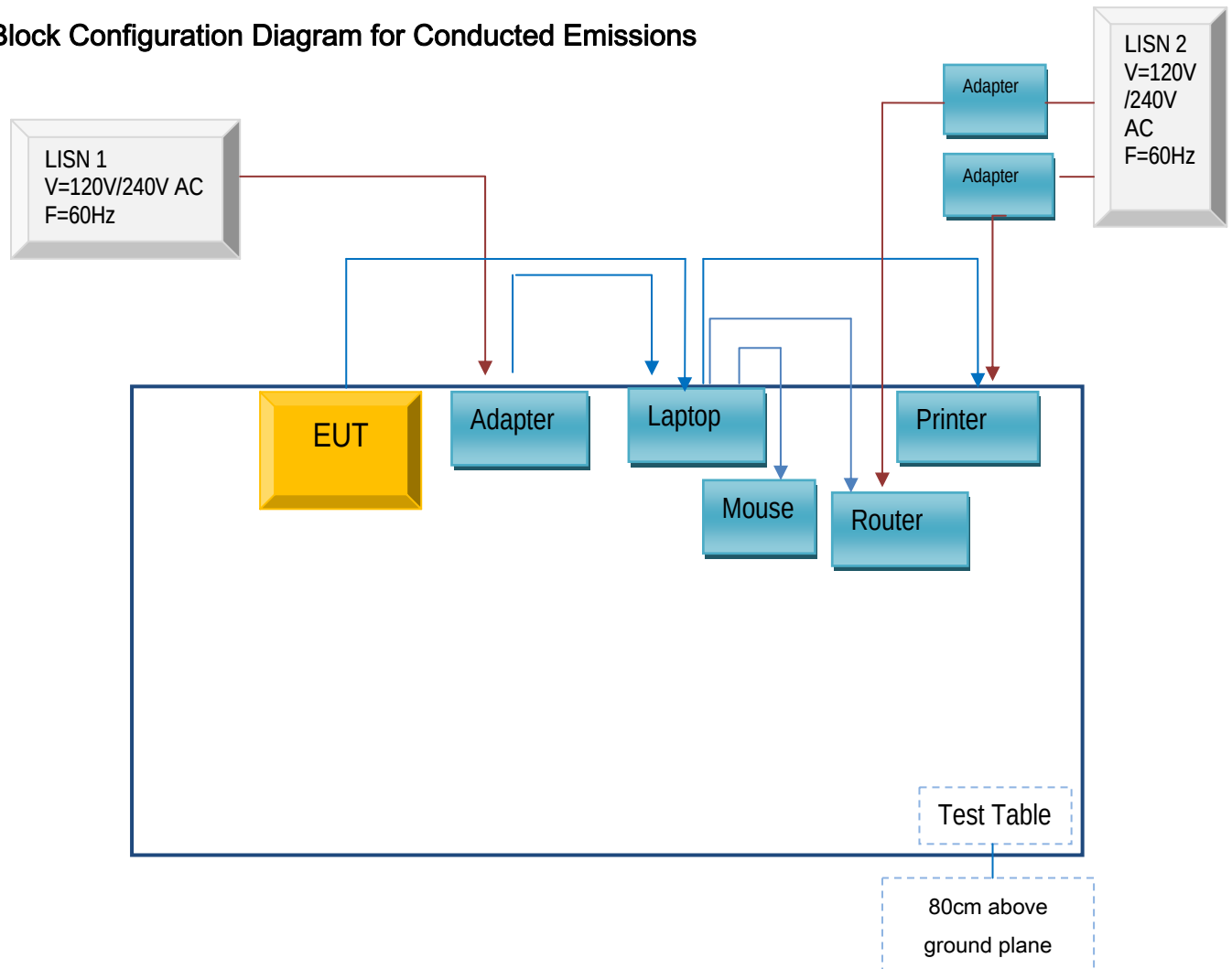


Radiated Emissions Test Setup Above 1GHz

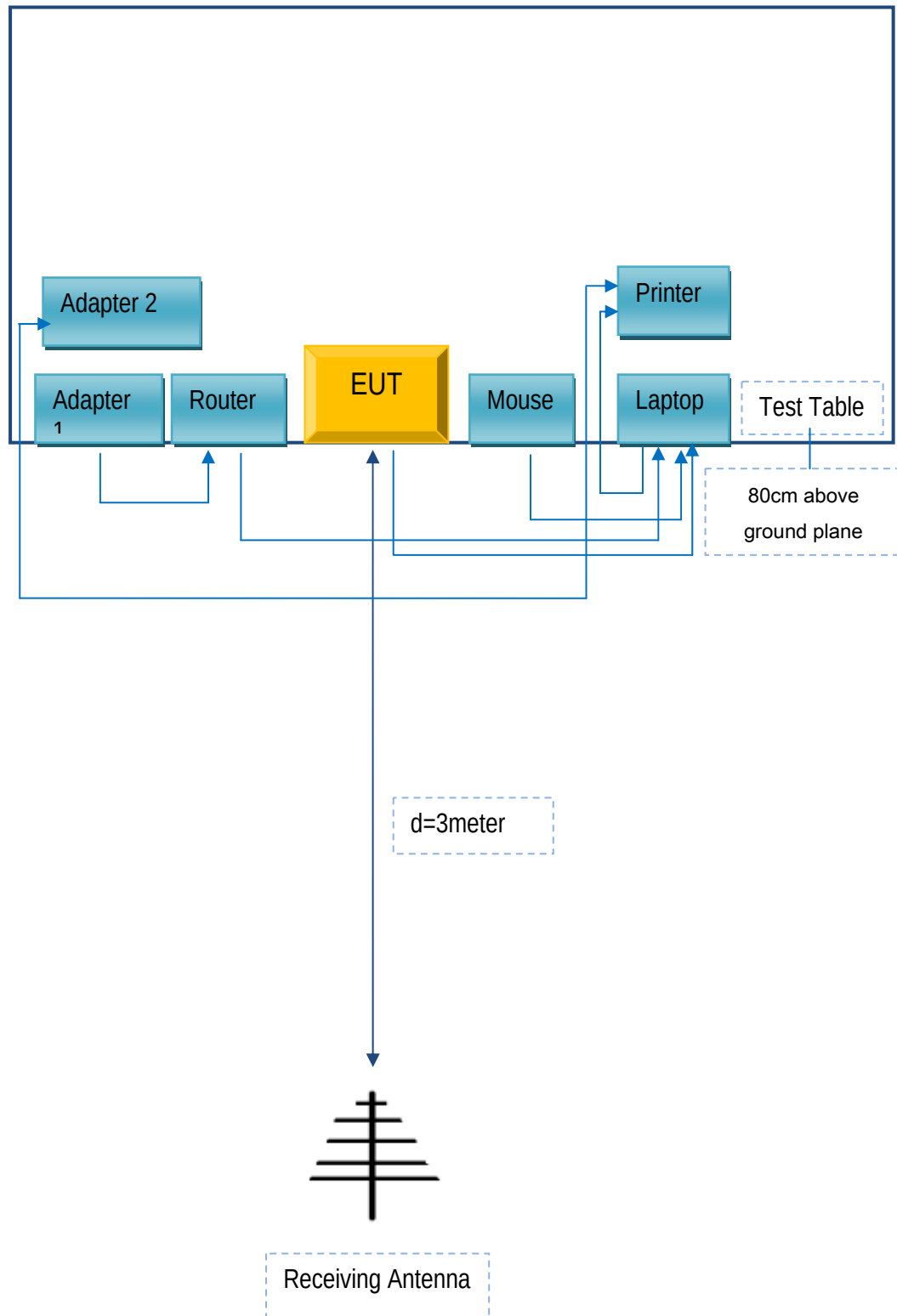
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

Block Configuration Diagram for Conducted Emissions



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

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

See attachment

Annex E. DECLARATION OF SIMILARITY

STAR MICRONICS CO., LTD.

To: SIEMIC ,775 Montague Expressway, Milpitas, CA 95035,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:

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