

FCC PART 15B, CLASS A
 MEASUREMENT AND TEST REPORT

For

Xi'an NovaStar Tech Co., Ltd

4F, Block D, Qinfeng Pavilion, Xi'an Software Park, No.68 Keji 2nd Rd., Xi'an, China

Model: MCTRL4K

Report Type: Amended Report	Product Type: LED Display Controller
Report Number: RSZ171122810-00A1	
Report Date: 2017-12-04	
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F I N A L

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Issue
0	RSZ161021811-00	Original Report	2016-11-14
1	RSZ171122810-00A1	Amended Report	2017-12-04

Note: This is an amended report based on Original Report RSZ161021811-00, the detailed difference between the original device and the current one described as following:

1) Change design on partial parts of PCB layout

Based on above difference, test item of “FCC§15.109 - RADIATED EMISSIONS” was performed, and partial EUT photos were changed. While the test item of “FCC §15.107 – AC LINE CONDUCTED EMISSIONS” and other photos were kept and copied from Original Report.

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The Xi'an NovaStar Tech Co., Ltd's product, model number: MCTRL4K in this report is a LED Display Controller, which was measured approximately: 48.2 cm (L) * 38.3 cm (W) * 8.9 cm (H), rated with input voltage: AC 120V/60 Hz. The highest operating frequency is 800 MHz.

* All measurement and test data in this report was gathered from production sample serial number: 1610212 & 171122810 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2016-10-21 & 2017-11-22.

Objective

This test report is prepared on behalf of Xi'an NovaStar Tech Co., Ltd in accordance with Part 2-Subpart J, Part 15B Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine the compliance of the EUT with FCC Part 15B.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expanded combined standard uncertainty of test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will be taken into consideration for the test data recorded in the report

Item		Expanded Measurement uncertainty	
AC Power Line Conducted Emissions		2.20 dB (k=2, 95% level of confidence)	
Radiated emission	30MHz~200MHz	Horizontal	4.58 dB (k=2, 95% level of confidence)
		Vertical	4.59 dB (k=2, 95% level of confidence)
	200MHz~1 GHz	Horizontal	4.83 dB (k=2, 95% level of confidence)
		Vertical	5.85 dB (k=2, 95% level of confidence)

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

Bay Area Compliance Laboratories Corp. (Shenzhen) has been accredited to ISO/IEC 17025 by CNAS (Lab code: L2408). And accredited to ISO/IEC 17025 by NVLAP (Lab code: 200707-0), the FCC Designation No. CN5001 under the KDB 974614 D01.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Bay Area Compliance Laboratories Corp. (Shenzhen) was registered with ISED Canada under ISED Canada Registration Number 3062B.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in normal condition.

EUT Exercise Software

No exercise software was used.

Equipment Modifications

No modification was made to the EUT tested.

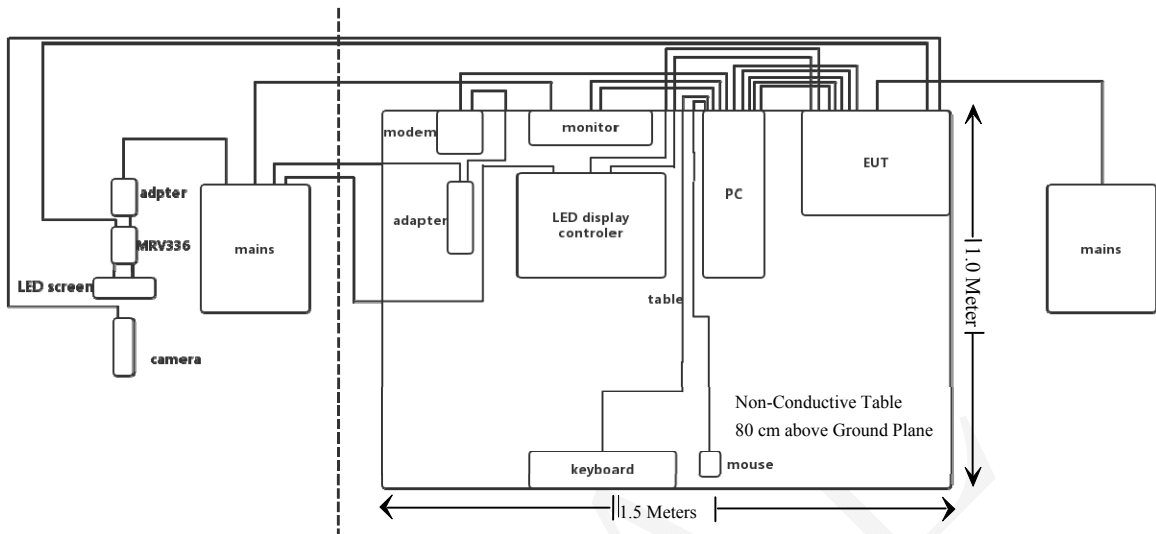
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	PC	OPTIPLEX380	N/A
DELL	Monitor	E178FPc	070072
ECOM	Modem	56000bps	21654684
LISTED	Adapter	TYP60-1207000Z	326703
Novastar	LED Display Controller	MCTRL4K	N/A
Microsoft	Keyboard	1406	0200706128743
BENQ	Mouse	MV219	M0A8F02807085
INFINOVA	Camera	VH111-B	N/A
KARUIDY	Power supply	KR-200	N/A
Novastar	MRV336	MRV336	N/A
Novastar	LED Screen	Q4E16V8	N/A

External I/O Cable

Cable Description	Length (m)	From/Port	To
Unshielded detachable AC cable	1.0	EUT	Mains
Unshielded detachable BNC cable	8.0	EUT	Camera
Unshielded detachable RJ45 cable	8.0	EUT	MRV336
Unshielded detachable DP cable	0.2	EUT	VGA Cable
Shielded detachable VGA cable	1.4	DP cable	PC
Shielded detachable HDMI cable	1.2	EUT	PC
Shielded detachable DVI cable	1.4	EUT	PC
Shielded detachable USB cable	1.8	EUT	PC
Unshielded detachable RJ45 cable	1.6	EUT	PC
Shielded detachable USB cable	1.8	EUT	LED Display Controller
Unshielded detachable BNC cable	1.8	EUT	LED Display Controller
Shielded detachable RS232 cable	1.6	Modem	PC
Unshielded detachable AC cable	1.2	PC	Mains
Shielded detachable VGA cable	1.4	PC	Monitor
Shielded Un-detachable USB cable	1.4	PC	Keyboard
Shielded Un-detachable USB cable	1.4	PC	Mouse
Unshielded detachable AC cable	1.2	PC	Monitor
Unshielded Un-detachable DC cable	1.2	Adapter	Modem
Unshielded detachable AC cable	1.5	LED Display Controller	Mains
Unshielded detachable AC cable	1.4	Adapter	mains
Unshielded detachable DC cable	0.2	MRV336	Power supply
Unshielded detachable DC cable	0.2	MRV336	LED screen
Unshielded detachable signal cable	0.2	MRV336	LED screen
Unshielded Un-detachable AC cable	1.2	Power supply	Mains

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	AC Line Conducted Emissions	Compliance*
§15.109	Radiated Emissions	Compliance

Note:

Compliance*: This test item was kept and copied from Original Report RSZ161021811-00 issued on 2016-11-14 by Bay Area Compliance Laboratories Corp. (Shenzhen)

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
AC Line Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2016-10-19	2017-10-18
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2015-12-15	2016-12-14
Rohde & Schwarz	LISN	ESH3-Z5	100113	2015-12-15	2016-12-14
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2016-05-14	2017-05-14
Rohde & Schwarz	CE Test software	EMC32	V8.53.0	NCR	NCR
Radiated Emission Test					
HP	Amplifier	HP8447E	1937A01046	2017-11-21	2018-05-19
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2016-12-07	2017-12-07
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-17	2017-12-16
TDK	Chamber	Chamber A	2#	2015-10-15	2018-10-15
Rohde & Schwarz	Signal Analyzer	FSIQ26	837405/023	2017-04-27	2018-04-26
Mini	Pre-Amplifier	ZVA-183-S+	5969001149	2017-02-14	2018-02-14
A.H.System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
TDK	Chamber	Chamber B	1#	2016-12-06	2019-12-06
R&S	Auto test Software	EMC32	V9.10	NCR	NCR

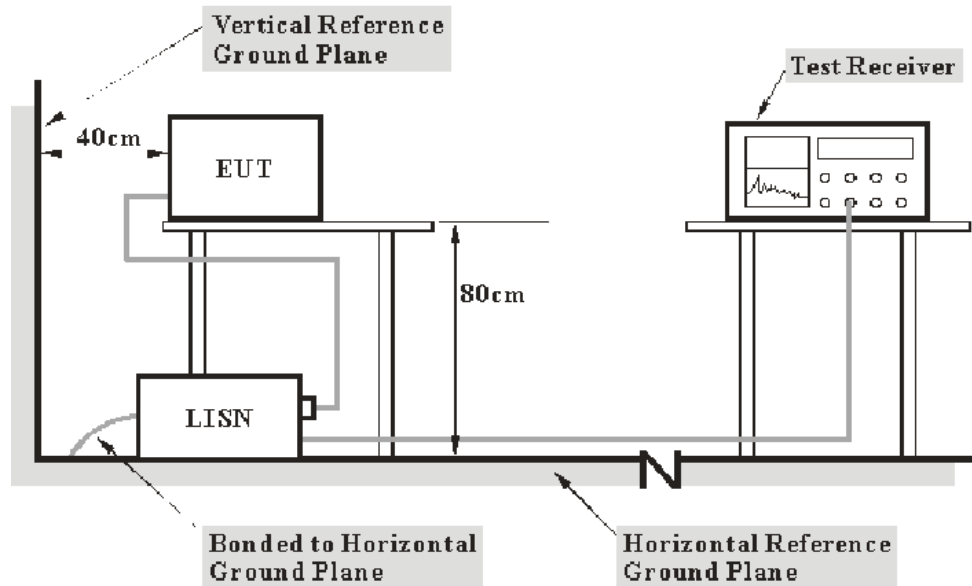
* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §15.107 – AC LINE CONDUCTED EMISSIONS

Applicable Standard

According to FCC§15.107

EUT Setup



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

The measurement procedure of EUT setup is according with ANSI C63.4-2014. The related limit was specified in FCC Part 15.107 Class A.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Correction Factor} = \text{LISN/ISN VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.107

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

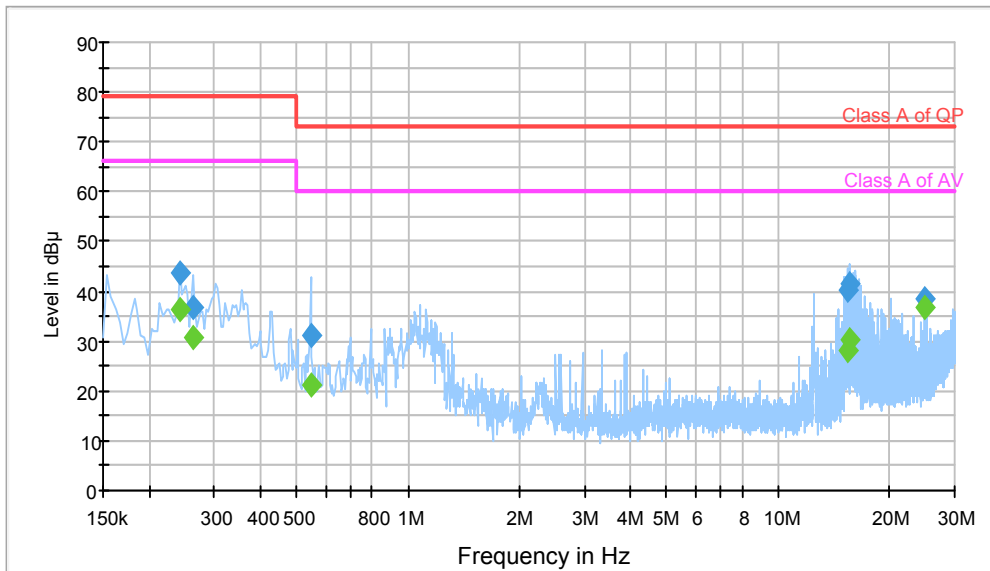
Temperature:	22.6 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Ray Hu on 2016-11-11.

EUT Operation Mode: Controlling the image signal transmission and display

AC 120V/60 Hz, Line

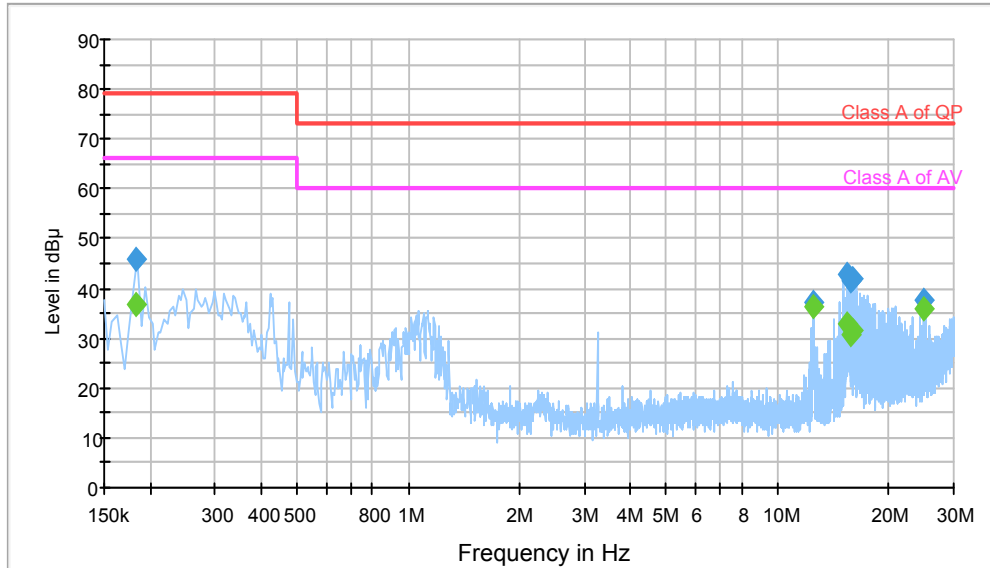
Class A of EMI Auto Test L



Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/QP/Ave.)
0.242000	43.7	20.1	79.0	35.3	QP
0.262000	36.7	20.1	79.0	42.3	QP
0.546000	31.0	20.1	73.0	42.0	QP
15.506000	40.1	20.0	73.0	32.9	QP
15.586000	41.7	20.0	73.0	31.3	QP
25.022000	38.5	19.9	73.0	34.5	QP
0.242000	36.3	20.1	66.0	29.7	Ave
0.262000	30.9	20.1	66.0	35.1	Ave
0.546000	21.3	20.1	60.0	38.7	Ave
15.506000	28.0	20.0	60.0	32.0	Ave
15.586000	30.5	20.0	60.0	29.5	Ave
25.022000	36.9	19.9	60.0	23.1	Ave

AC 120V/60 Hz, Neutral

Class A of EMI Auto Test N



Frequency (MHz)	Corrected Amplitude (dBµV)	Corrected Factor (dB)	Limit (dBµV)	Margin (dB)	Remark (PK/QP/Ave.)
0.182000	45.7	20.1	79.0	33.3	QP
12.462000	37.2	19.9	73.0	35.8	QP
15.498000	42.7	20.0	73.0	30.3	QP
15.742000	41.7	20.0	73.0	31.3	QP
15.910000	42.0	20.0	73.0	31.0	QP
25.018000	37.7	19.9	73.0	35.3	QP
0.182000	36.7	20.1	66.0	29.3	Ave
12.462000	36.3	19.9	60.0	23.7	Ave
15.498000	32.8	20.0	60.0	27.2	Ave
15.742000	30.6	20.0	60.0	29.4	Ave
15.910000	31.7	20.0	60.0	28.3	Ave
25.018000	35.8	19.9	60.0	24.2	Ave

Note:

- 1) Corrected Amplitude = Reading + Correction Factor
- 2) Correction Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation
- 3) Margin = Limit – Corrected Amplitude

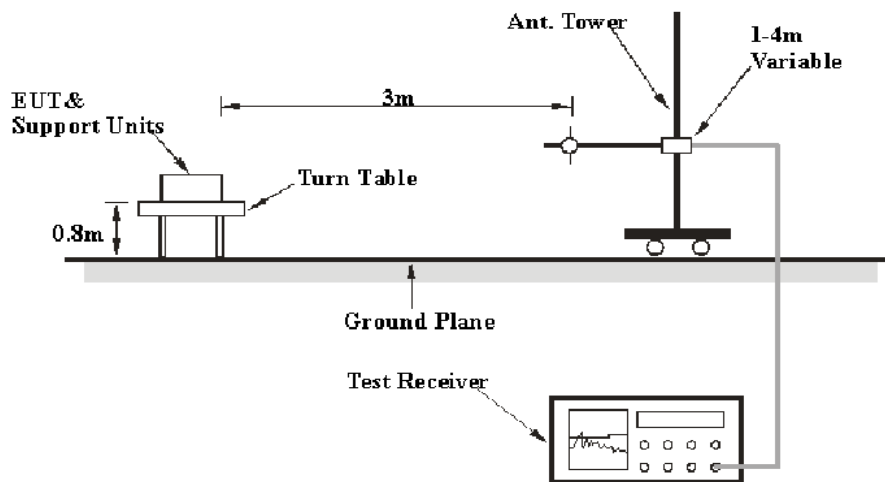
FCC§15.109 - RADIATED EMISSIONS

Applicable Standard

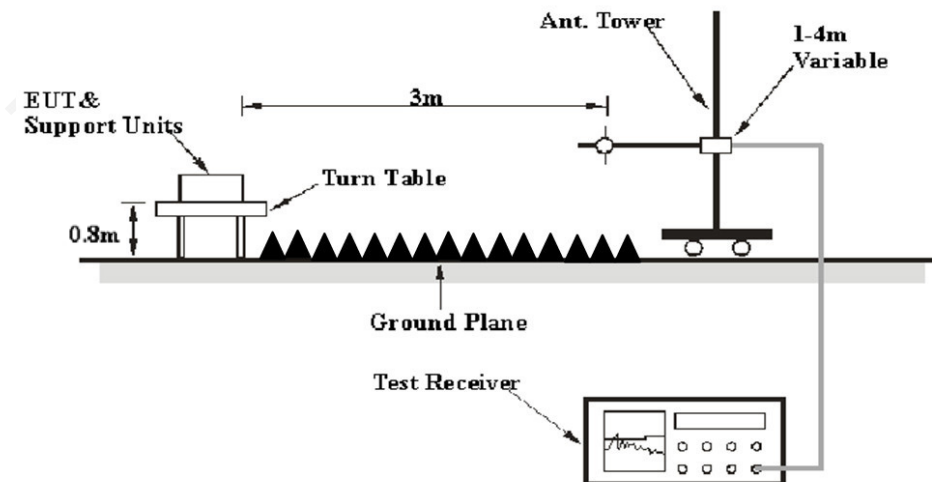
FCC §15.109

EUT Setup

Below 1 GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. The related limit was specified in FCC Part 15B.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

According to FCC 15.33 requirements, the EUT system was measured from 30 MHz to 5 GHz.

During the radiated emission test, the EMI test receiver Setup was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
Above 1 GHz	1 MHz	10 Hz	/	Average

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC §15.109 Class A,

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(L_m)} \leq L_{\text{lim}} + U_{\text{cispr}}$$

In BACL, $U_{(L_m)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

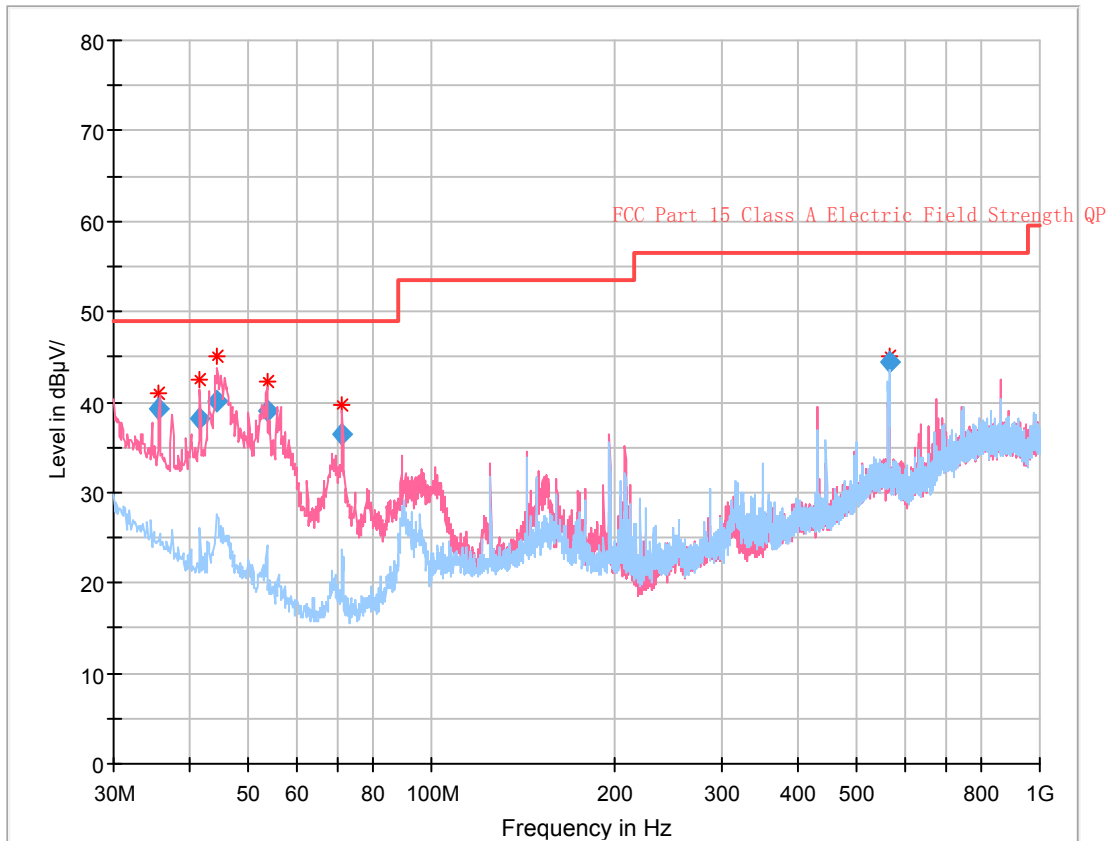
Environmental Conditions

Temperature:	25°C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Joson Xiao on 2017-11-27.

EUT Operation Mode: Controlling the image signal transmission and display

30 MHz~1 GHz



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
35.680375	39.19	100.0	V	101.0	-3.4	49.00	9.81
41.641500	38.21	105.0	V	99.0	-7.3	49.00	10.79
44.447125	40.21	107.0	V	144.0	-9.5	49.00	8.79
53.617500	39.06	100.0	V	106.0	-11.3	49.00	9.94
71.355000	36.51	160.0	V	127.0	-11.9	49.00	12.49
566.372125	44.45	173.0	H	159.0	4.4	56.50	12.05

Above 1 GHz

Frequency (MHz)	Measurement		Turntable Degree	Rx Antenna		Corrected Factor (dB)	Corrected Amplitude (dBµV/m)	FCC Part 15B	
	Reading (dBµV)	(PK/QP/Ave.)		Height (m)	Polar (H / V)			Limit (dBµV/m)	Margin (dB)
1293.66	62.53	PK	301	2.3	H	-8.04	54.49	80	25.51
1293.66	51.71	Ave.	301	2.3	H	-8.04	43.67	60	16.33
1293.66	62.91	PK	302	2.1	V	-8.04	54.87	80	25.13
1293.66	51.45	Ave.	302	2.1	V	-8.04	43.41	60	16.59
1437.53	61.31	PK	171	1.9	H	-7.89	53.42	80	26.58
1437.53	46.89	Ave.	171	1.9	H	-7.89	39.00	60	21.00
1437.47	63.10	PK	70	1.5	V	-7.89	55.21	80	24.79
1437.47	48.55	Ave.	70	1.5	V	-7.89	40.66	60	19.34

Note:

- 1) Corrected Amplitude = Meter Reading + Correction Factor
- 2) Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain
- 3) Margin = Limit – Corrected Amplitude

FCC§15.19, §15.21, §15.27, §15.105 - PRODUCT LABELING

FCC Warning Statement

Products subject to authorization under a Declaration of Conformity shall be labelled as follows:

The label shall be located in a conspicuous location on the device and shall contain the unique identification described in §2.1074 of this chapter and the following logo:

If the product is authorized based on testing of the product or system; label as bellow:



NOVA STAR
Manufacturer 制造商: Xi'an NovaStar Tech Co.,Ltd. 西安诺瓦电子科技有限公司

Model / 型号: MCTRL4K
Product / 产品: LED Display Controller / LED显示控制器
P/N / 编号:
S/N / 序号:



FC

Input / 输入: 100-240V~,50/60Hz,1.5 A max.
MADE IN CHINA / 中国制造
Manufacturer Address / 制造商地址: 4F, Block D, Qinfeng Pavilion,
Xi'an Software Park, No.68 Keji 2nd Rd., Xi'an, China
西安市高新区科技二路68号西安软件园秦风阁D区401

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION.
THIS IS CLASS A PRODUCT. IN A DOMESTIC ENVIRONMENT THIS PRODUCT MAY CAUSE RADIO INTERFERENCE IN WHICH CASE THE USER MAY BE REQUIRED TO TAKE ADEQUATE MEASURES.
声明: 此为A级产品, 在生活环境中, 该产品可能会造成无线电干扰。在这种情况下, 可能需要用户对其干扰采取切实可行的措施。
CAN ICES-3 (A) / NBM-3 (A)



Proposed Label Location on EUT

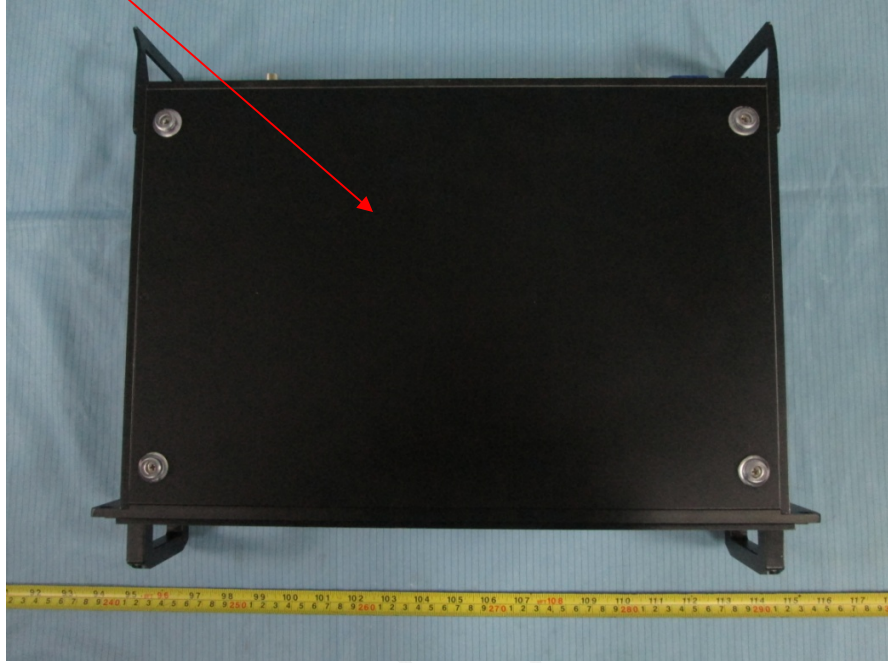


EXHIBIT A - EUT PHOTOGRAPHS

EUT – Front View



EUT – Rear View



EUT – Top View



EUT – Bottom View



EUT – Left View



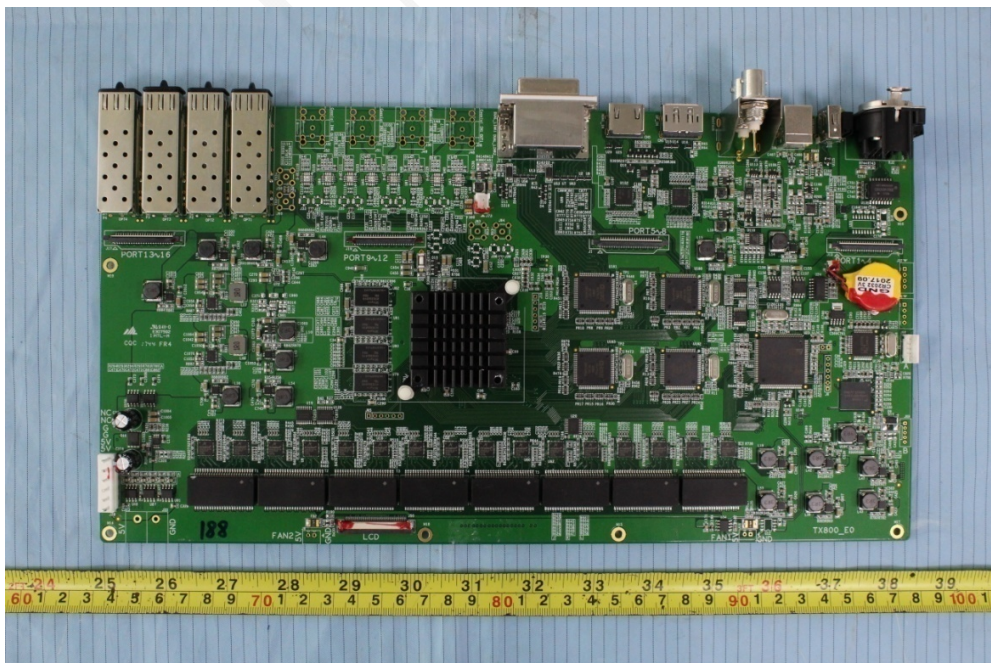
EUT – Right View



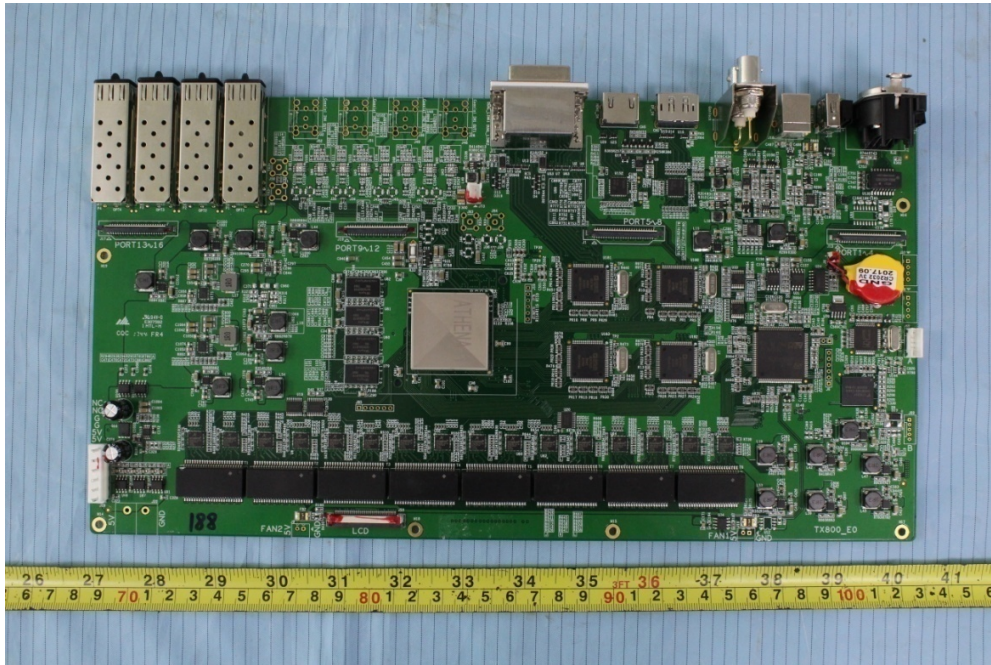
EUT – Cover off View



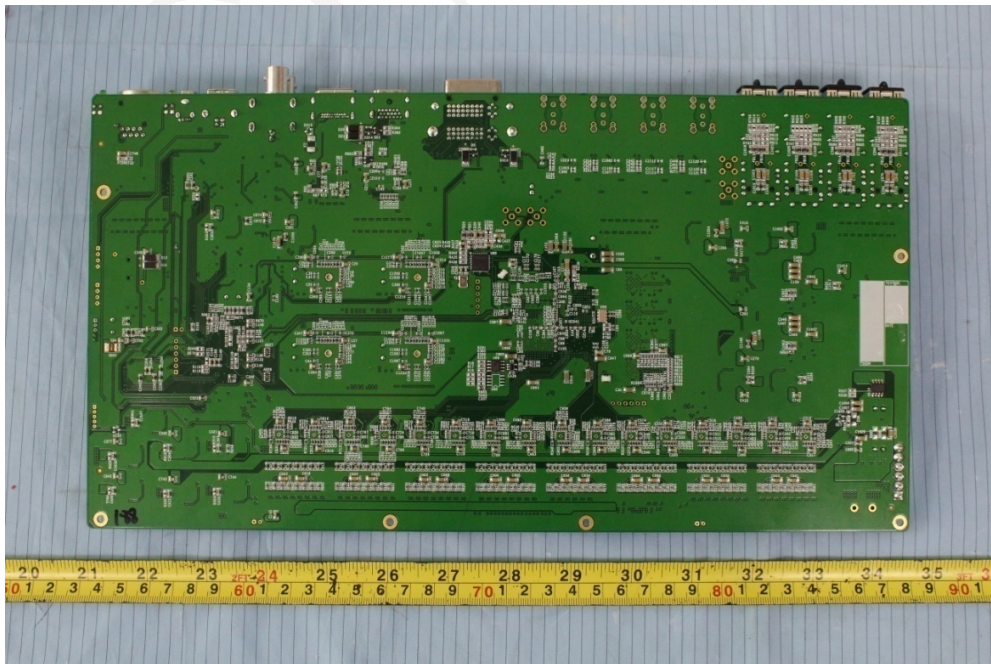
EUT – Main Board Top View 1



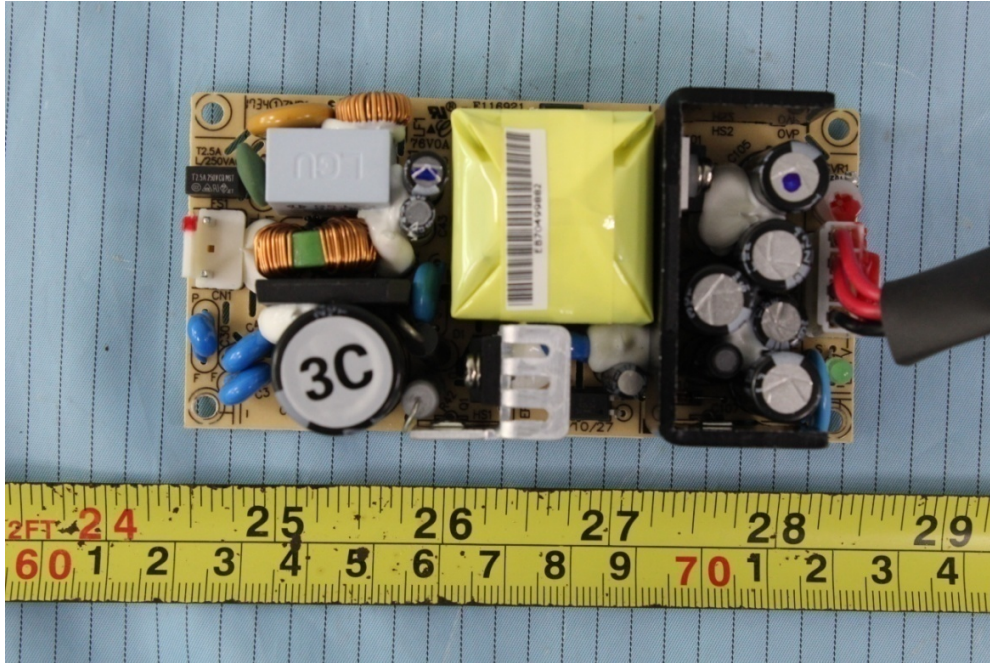
EUT – Main Board Top View 2



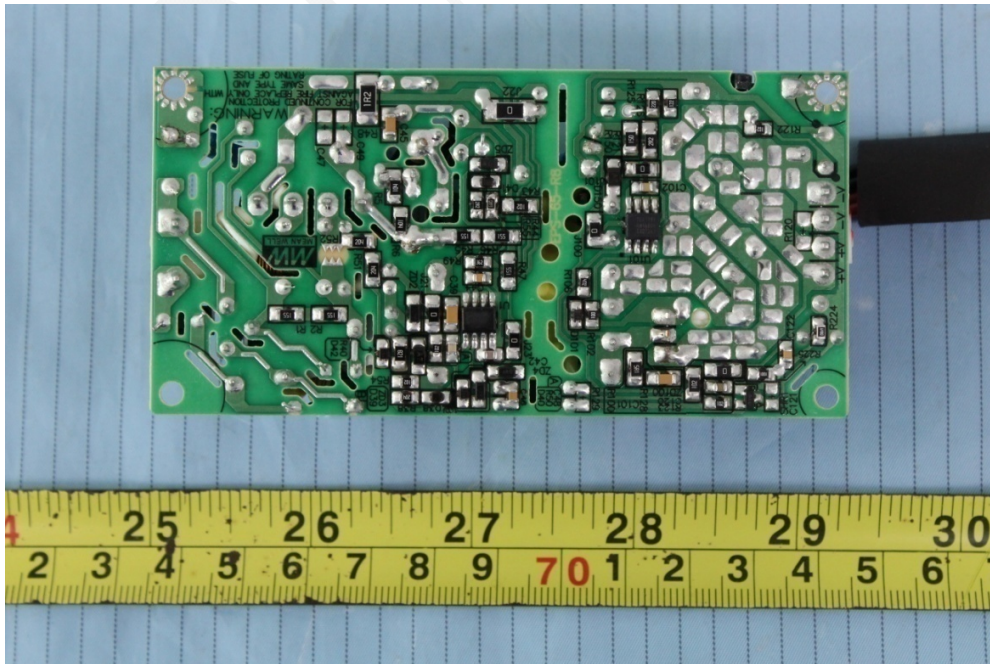
EUT – Main Board Bottom View



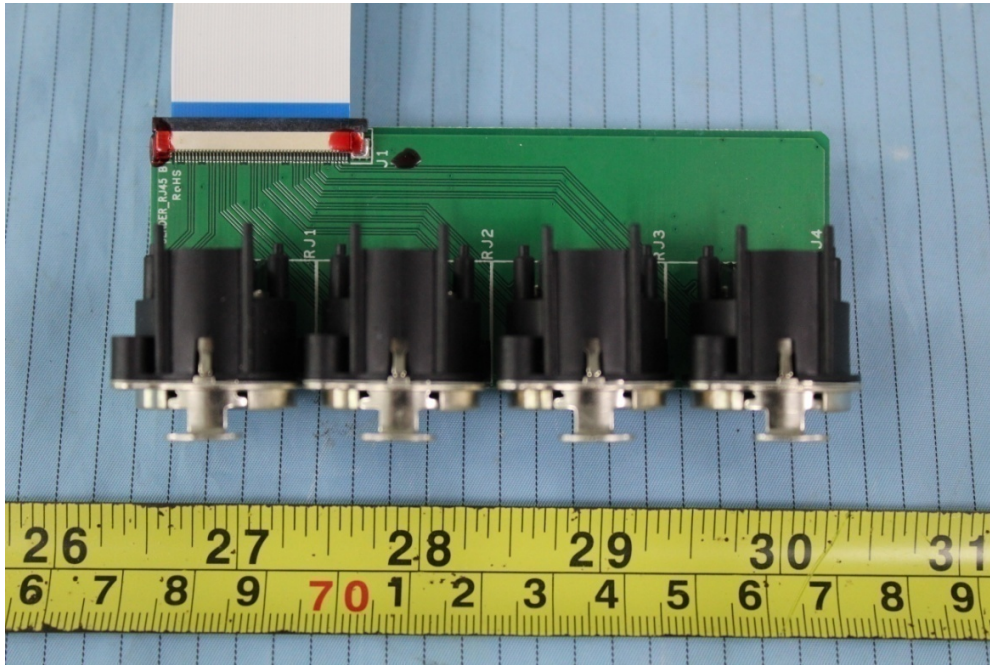
EUT – Power Supply Board Top View



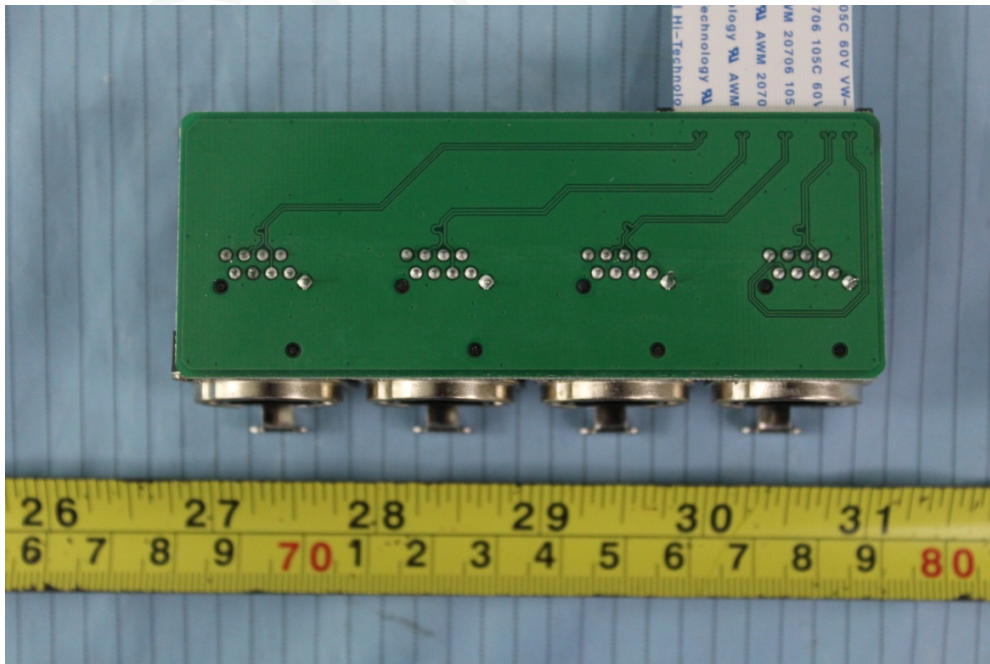
EUT – Power Supply Board Bottom View



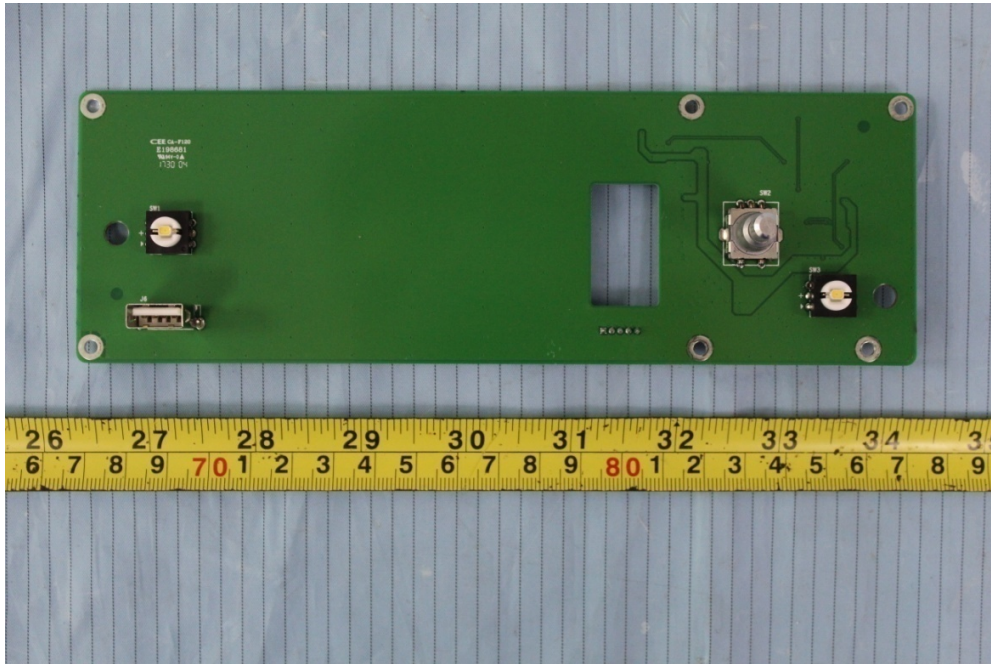
EUT – RJ45 Port Board Top View



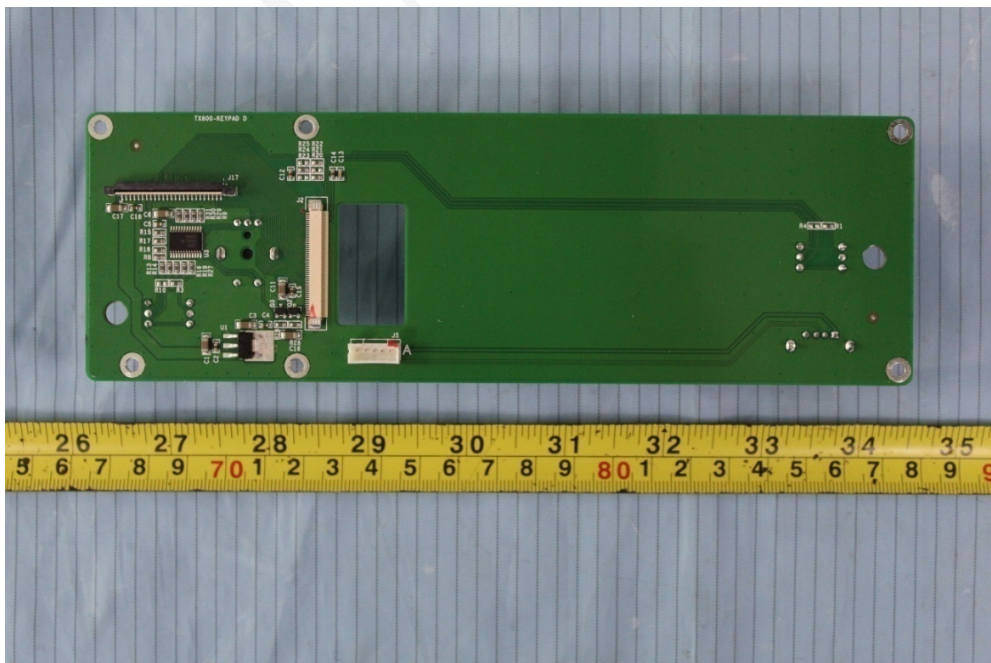
EUT – RJ45 Port Board Bottom View



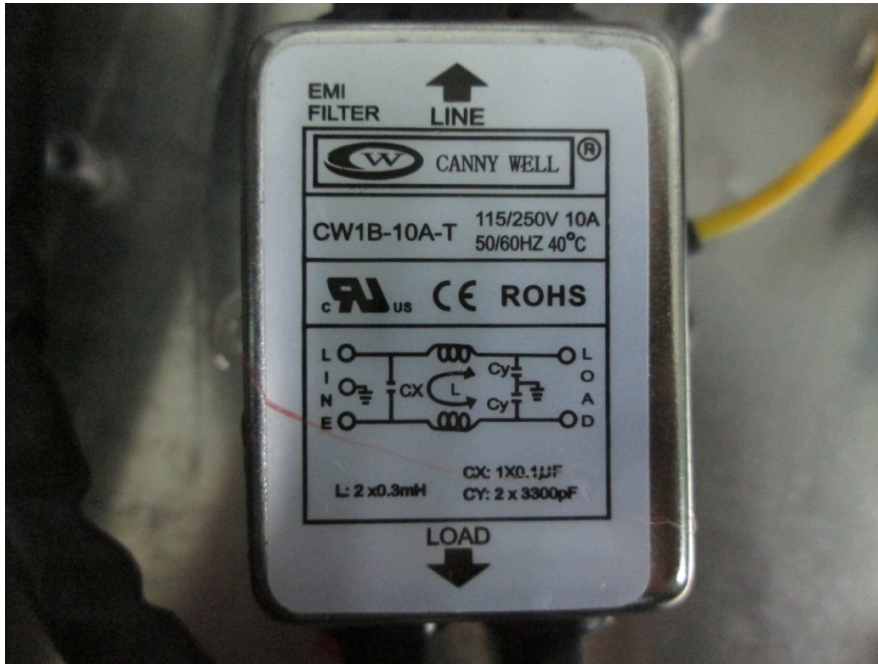
EUT – Switch Control Board Top Ciew



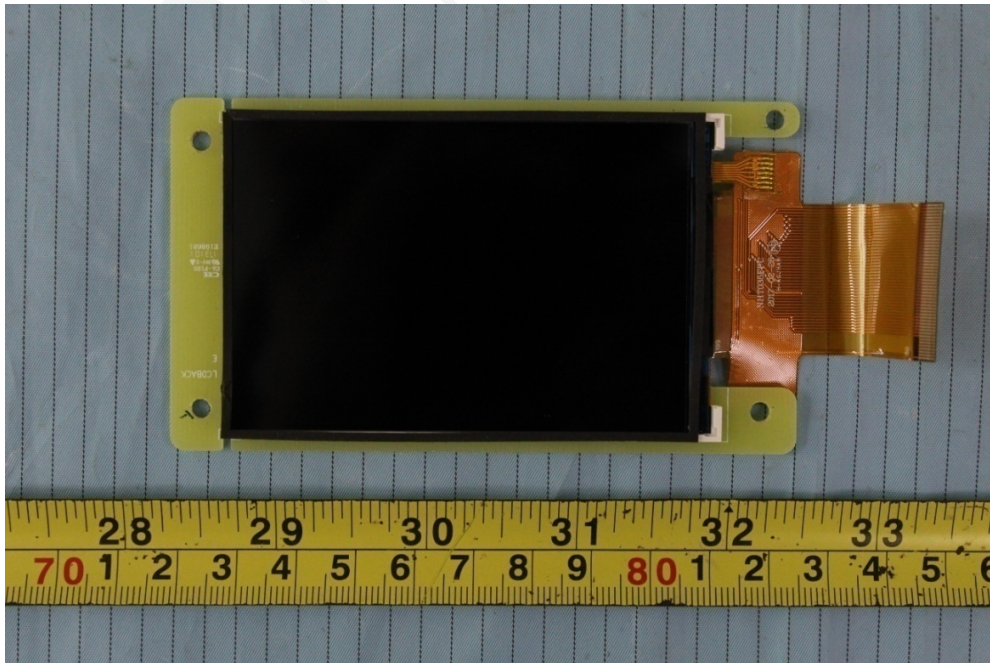
EUT –Switch Control Board Bottom Ciew



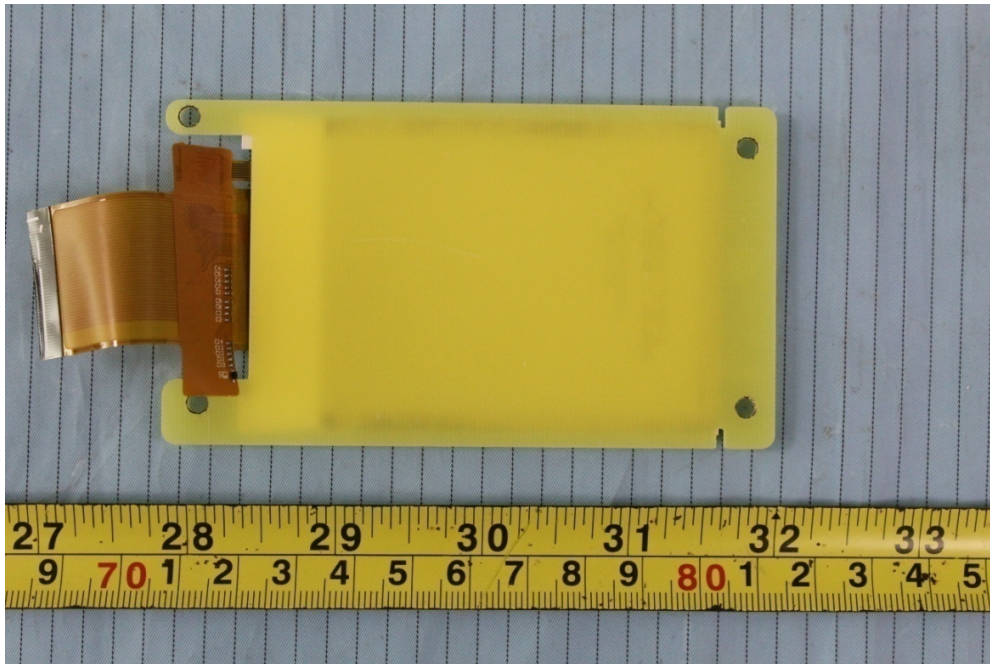
EUT – Filter View



EUT – LCD Board Top View



EUT – LCD Board Bottom View



EUT – Fan View

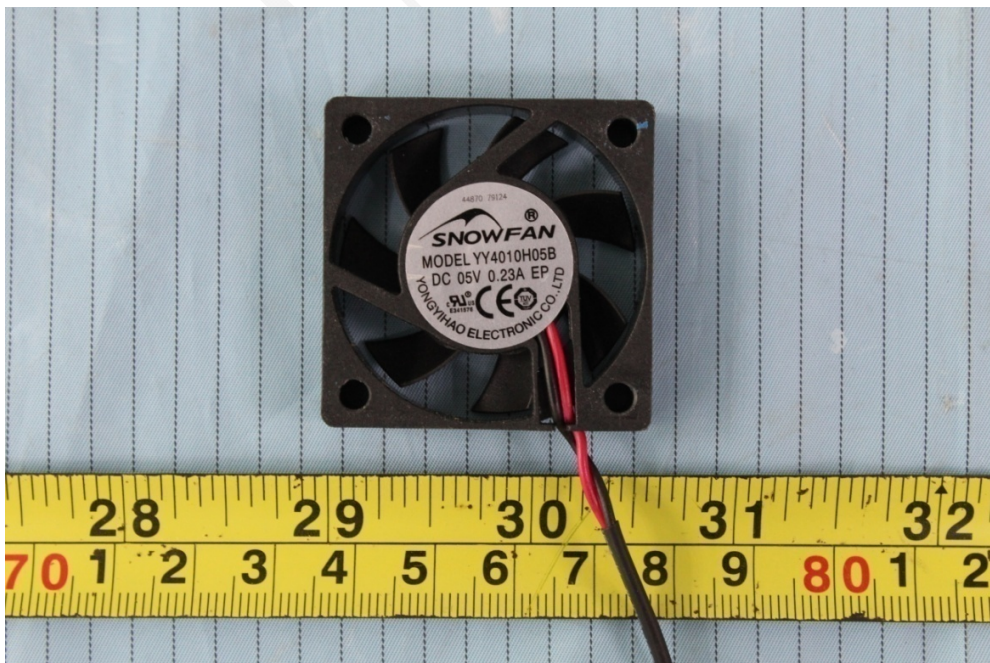


EXHIBIT B - TEST SETUP PHOTOGRAPHS

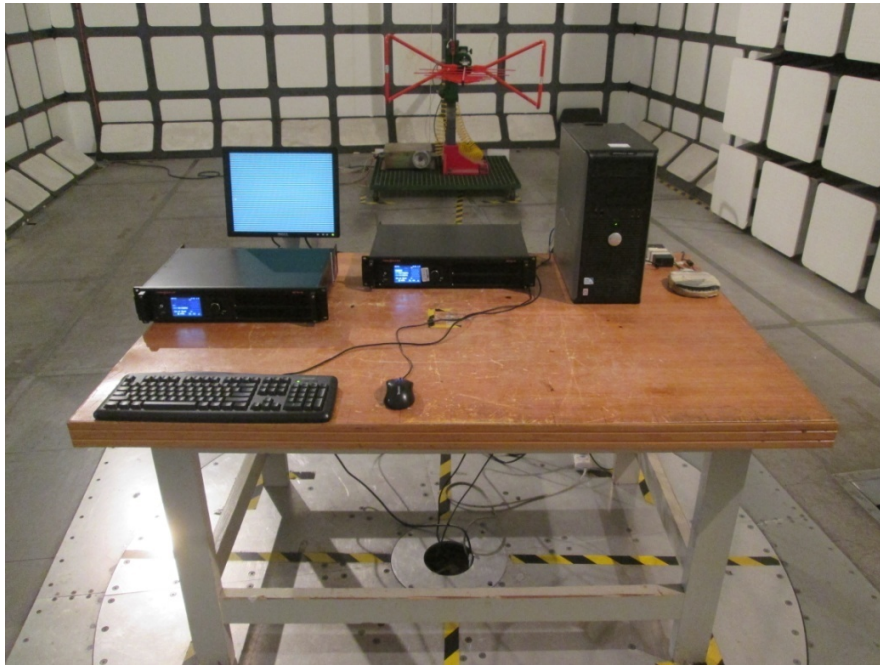
AC Line Conducted Emissions - Front View



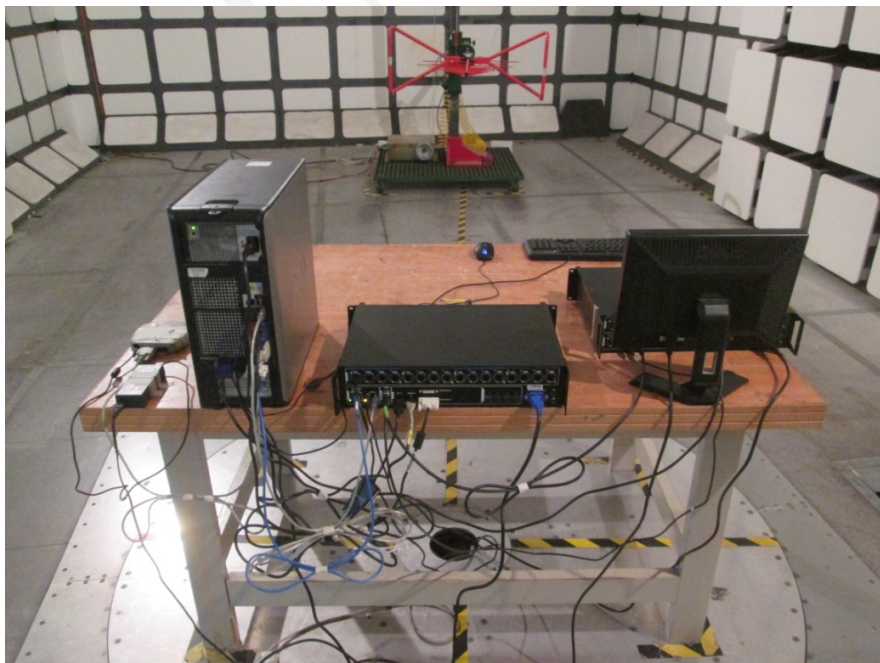
AC Line Conducted Emissions - Side View



Radiated Emissions – Front View (30 MHz~1000 MHz)



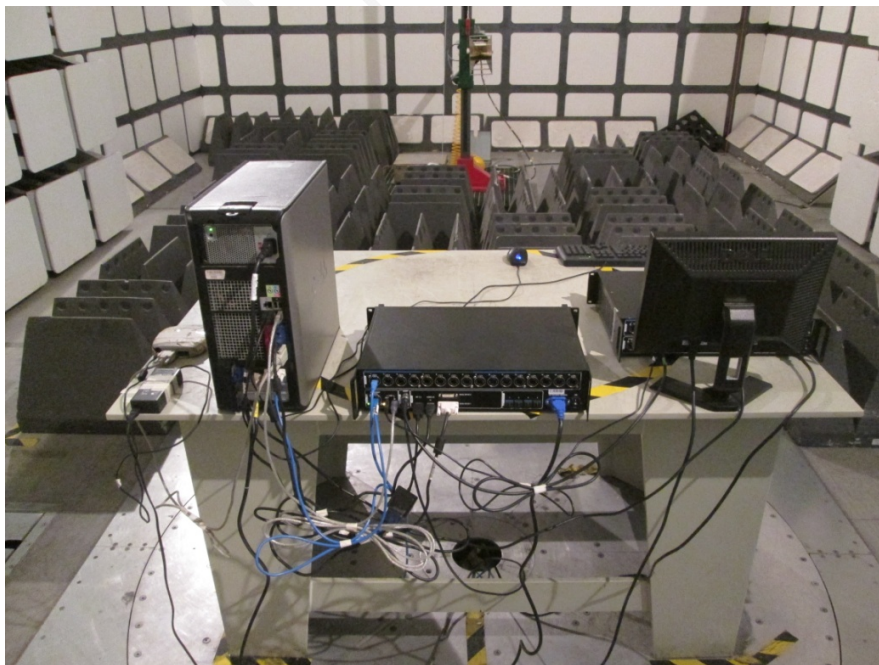
Radiated Emissions – Rear View (30 MHz~1000 MHz)



Radiated Emissions – Front View (Above 1 GHz)



Radiated Emissions – Rear View (Above 1 GHz)



******* END OF REPORT *******