

EN 55022:2010

EN 55024:2010

TEST REPORT

For

Beijing Hysine Technology Co.,Ltd.

NO. 108, Beijing youth entrepreneur's demo park, Changping District, Beijing, china

Model: HMI Series

Report Type: Original Report	Product Name: Human Machine Interface
Test Engineer: Jone Lv	<i>Jone Lv</i>
Report Number: R2BJ131011015-01	
Report Date: 2013-10-15	
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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Beijing Hysine Technology Co.,Ltd.*'s product, model number: *HMI-X70* (the "EUT") in this report is a *Human Machine Interface*, Which was measured approximately: 22.7 cm (L) x16.3 cm (W) x 3.7 cm (H), rated input voltage: DC 24V. The highest operating frequency is 400MHz.

Note: the series product, has four models: HMI-X100, HMI-X70, HMI-X40 and HMI-T70 which are electrically identical with the same electromagnetic emissions and electromagnetic compatibility characteristics, we selected the model HMI-X70 for the testing, and the difference between them please refers to the attached declaration letter.

All measurement and test data in this report was gathered from production sample serial number: 131011051 (Assigned by BACL, Dongguan). The EUT was received on 2013-10-12.

Objective

This test report is prepared on behalf of *Beijing Hysine Technology Co.,Ltd.* in accordance with EN 55022: Information technology equipment-Radio disturbance characteristics-Limits and methods of measurement. EN 55024: Information technology equipment- Immunity characteristics – Limits and methods of measurement.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All measurements contained in this report were conducted with CISPR 16-1-1:2006+A1:2006+A2:2007, specification for radio disturbance and immunity measuring apparatus and methods P1-1: radio disturbance and immunity measuring apparatus measuring apparatus. CISPR 16-1-4:2007, Specification for radio disturbance and immunity measuring apparatus and methods-Part 1-4: Radio disturbance and immunity measuring apparatus -Ancillary equipment -Radiated disturbances. CISPR 16-2-1:2003, specification for radio disturbance and immunity measuring apparatus and methods P2-1: methods of measurement of disturbance and immunity conducted disturbance measurements. CISPR 16-2-3:2006, specification for radio disturbance and immunity measuring apparatus and methods P2-3 methods of measurement of disturbances and immunity radiated disturbance measurements. CISPR 16-4-2:2003, Specification for radio disturbance and immunity measuring apparatus and methods-Part 4-2: Uncertainties, statistics and limit modeling-Uncertainty in EMC measurements

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Dongguan). The radiated testing was performed at an antenna-to-EUT distance of 10 Meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

FEMVAL

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical mode.

EUT Exercise Software

No EUT exercise software was used.

Equipment Modifications

No modification was made to the EUT.

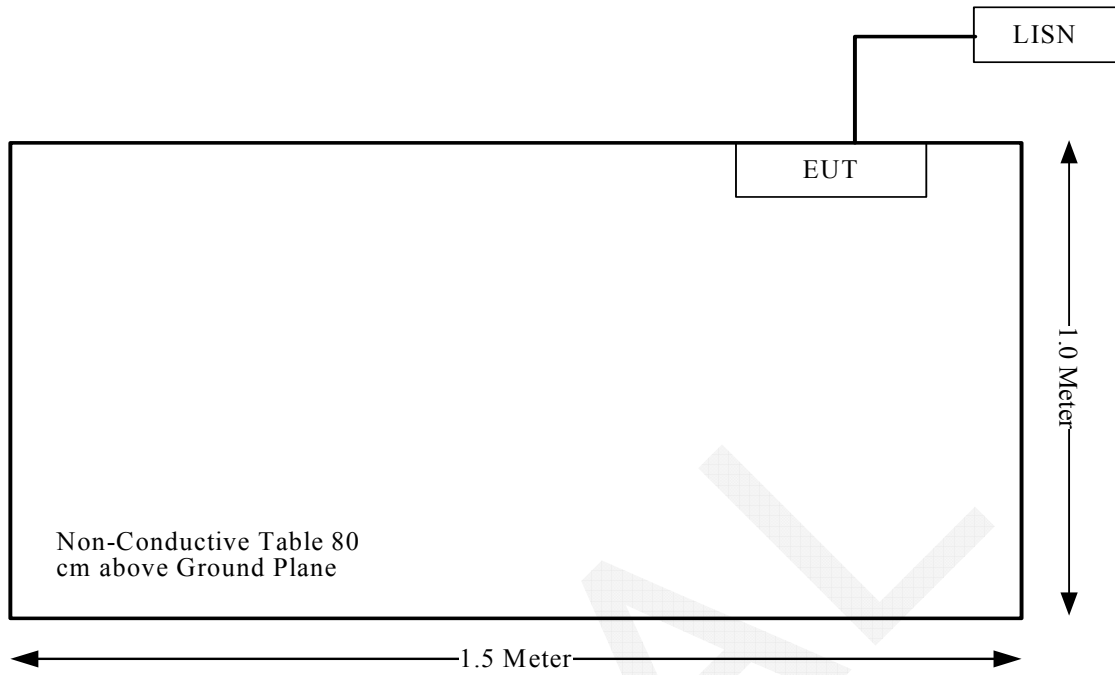
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
-	-	-	-

External I/O Cable

Cable Description	Length (m)	From	To
-	-	-	-

Block Diagram of Test Setup



SUMMARY OF TEST REPORT**EN 55022**

RULE	DESCRIPTION	RESULTS
§ 5.1	Conducted Disturbance at Mains Terminal	Compliance
§ 5.2	Conducted Disturbance at Telecommunication Ports	Not Applicable
§ 6	Radiated Disturbance	Compliance

EN 55024

RULE	DESCRIPTION	RESULTS
§4.2.1	Electrostatic Discharge IEC 61000-4-2	Compliance
§4.2.2	Electrical Fast Transient IEC 61000-4-4	Compliance
§4.2.3.2	Continuous Radiated Disturbances IEC 61000-4-3	Compliance
§4.2.3.3	Continuous Conducted Disturbances IEC 61000-4-6	Compliance
§4.2.4	Power Frequency Magnetic Field IEC 61000-4-8	Compliance
§4.2.5	Surge IEC 61000-4-5	Compliance
§4.2.6	Voltage Dips And Interruptions IEC 61000-4-11	Not Applicable

EN 55022 §5.1 CONDUCTED DISTURBANCE AT MAINS TERMINAL

Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 1, then:

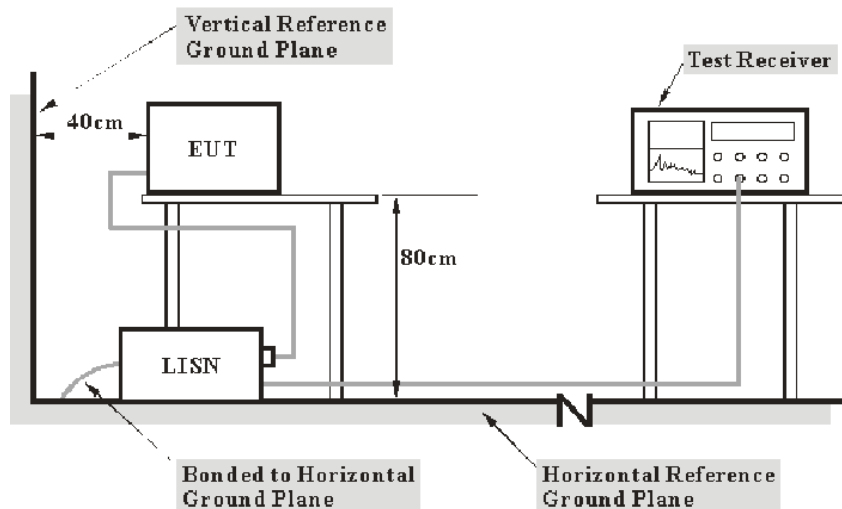
- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit.

Based on CISPR 16-4-2:2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz), and conducted disturbance at telecommunication port using AAN is 5.03 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cispr}

Measurement	U_{cispr}
Conducted disturbance at mains port using AMN (9 kHz to 150 kHz)	3.8 dB
(150 kHz to 30 MHz)	3.4 dB
Conducted disturbance at mains port using voltage probe (9 kHz to 30 MHz)	2.9 dB
Conducted disturbance at telecommunication port using AAN (150 kHz to 30 MHz)	5.0 dB
Conducted disturbance at telecommunication port using CVP (150 kHz to 30 MHz)	3.9 dB
Conducted disturbance at telecommunication port using CP (150 kHz to 30 MHz)	2.9 dB

Test System 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 setup of EUT is according with CISPR 16-1-1:2006+A1:2006+A2:2007, CISPR 16-2-1:2003 measurement procedure. The specification used was the EN 55022 Class B limits.

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.

The EUT was connected to a DC24V Hz power source.

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI TEST RECEIVER	ESCS 30	830245/006	2012-11-29	2013-11-28
R&S	Two-line V-network	ENV216	3560.6550.12	2013-2-18	2014-2-17
R&S	L.I.S.N	ESH3-Z5	100113	2012-11-29	2013-11-28

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

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

Herein,

V_C : corrected voltage amplitude

V_R : reading voltage amplitude

A_C : attenuation caused by cable loss

VDF: voltage division factor of AMN or ISN

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

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

Test Procedure

During the conducted emission test, the EUT was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.

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

Test Results Summary

According to the recorded data in following table, the EUT complied with the EN 55022 Class B, with the worst margin reading of:

8.50 dB at 0.710 MHz in the **Positive** conducted mode

Test Data

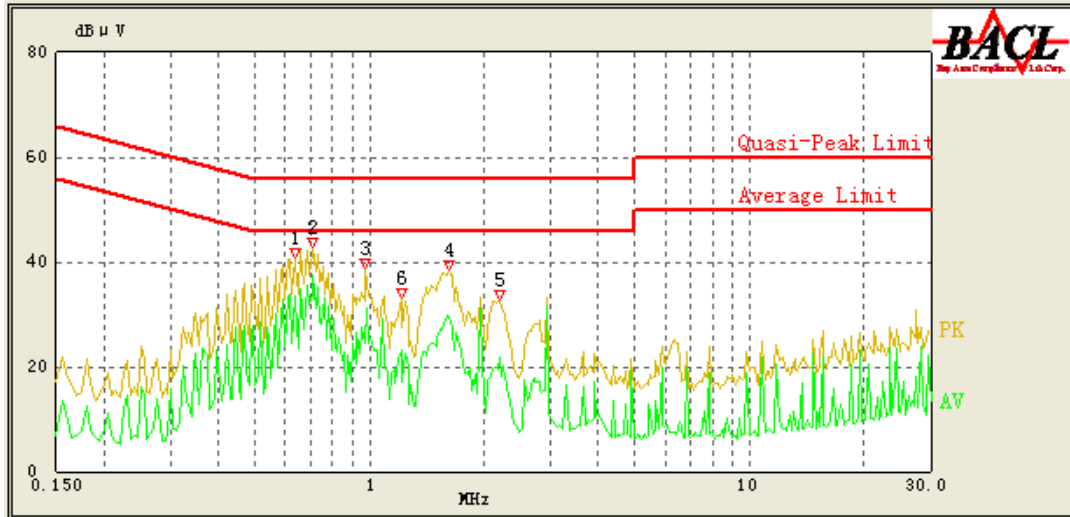
Environmental Conditions

Temperature:	28.1 °C
Relative Humidity:	50 %
ATM Pressure:	100.4 kPa

The testing was performed by Jone Lv on 2013-10-14.

Test Mode: Running

Positive:



No.	Frequency (MHz)	Cord. Reading (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/AV/QP)
1	0.635	38.62	9.67	56.00	17.38	QP
2	0.635	33.38	9.67	46.00	12.62	AV
3	0.710	40.64	9.67	56.00	15.36	QP
4	0.710	37.50	9.67	46.00	8.50	AV
5	0.975	33.84	9.68	56.00	22.16	QP
6	0.980	31.03	9.68	46.00	14.97	AV
7	1.625	36.32	9.68	56.00	19.68	QP
8	1.625	29.54	9.68	46.00	16.46	AV
9	2.200	29.20	9.68	56.00	26.80	QP
10	2.200	21.70	9.68	46.00	24.30	AV
11	1.215	28.94	9.68	56.00	27.06	QP
12	1.215	23.07	9.68	46.00	22.93	AV

Negative:



No.	Frequency (MHz)	Cord. Reading (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
1	0.710	40.12	9.67	56.00	15.88	QP
2	0.710	37.14	9.67	46.00	8.86	AV
3	0.975	33.43	9.69	56.00	22.57	QP
4	0.980	30.47	9.69	46.00	15.53	AV
5	1.625	36.19	9.68	56.00	19.81	QP
6	1.625	30.01	9.68	46.00	15.99	AV
7	1.960	30.09	9.68	56.00	25.91	QP
8	1.960	29.21	9.68	46.00	16.79	AV
9	2.175	27.78	9.68	56.00	28.22	QP
10	2.175	20.66	9.68	46.00	25.34	AV
11	2.635	20.86	9.69	56.00	35.14	QP
12	2.655	14.65	9.70	46.00	31.35	AV

EN 55022 §6 RADIATED DISTURBANCE

Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit.

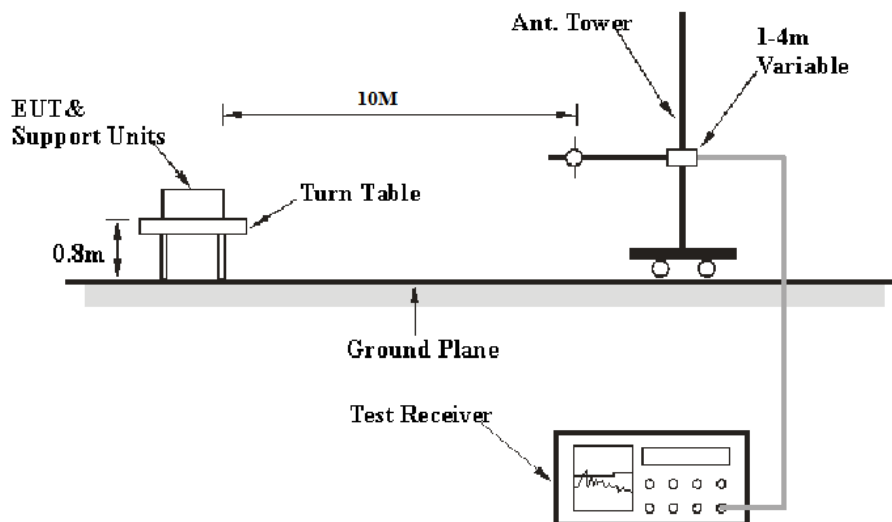
Based on CISPR 16-4-2:2011, measurement uncertainty of radiated emission at a distance of 10m at Bay Area Compliance Laboratories Corp. (Dongguan) is: 30M~200MHz: 4.9 dB; 200M~1GHz: 5.0 dB; measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is: 1G~6GHz: 4.45 dB; 6G~18GHz: 5.23 dB.

Table 1 – Values of U_{cispr}

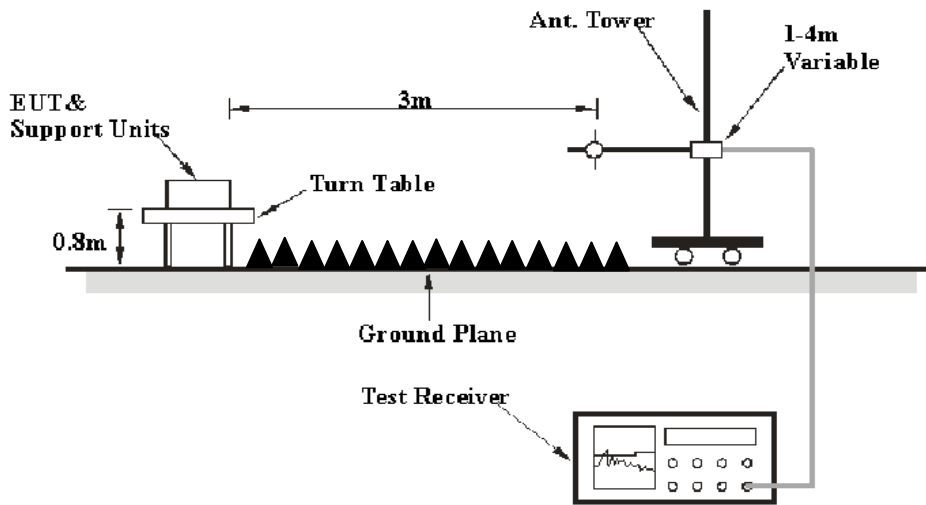
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

Test System Setup

Below 1 G:



Above 1 G:



The radiated emission tests were performed in the 10 meters chamber test site for below 1G; The radiated emission tests were performed in the 3 meters chamber test site for above 1G, using the setup accordance with the CISPR 16-1-1:2006+A1:2006+A2:2007, CISPR16-1-4:2007, CISPR 16-2-3:2006. The specification used was EN 55022 Class B limits.

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.

The EUT was connected to a DC24V power source.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 6 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	120 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI TEST RECEIVER	ESCI	100035	2013-5-6	2014-5-5
Sunol Sciences	Antenna	JB3	A060611-2	2011-9-6	2014-9-5
HP	AMPLIFIER	8447D	2727A05902	N/A	N/A
R&S	Spectrum analyzer	FSEM	DE31388	2013-5-7	2014-5-6
ETS-Lindgren	horn antenna	3115	000 527 35	2012-9-6	2015-9-5
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	N/A	N/A

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

Test Procedure

For the radiated emissions test, the EUT was connected to the AC floor outlet

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

The data was recorded in the Quasi-peak detection mode for below 1 GHz.

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 for Class B. 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 EN 55022 Class B, with the worst margin reading of:

3.90 dB at 116.3300 MHz in the Vertical polarization for below 1 G

Test Data

Environmental Conditions

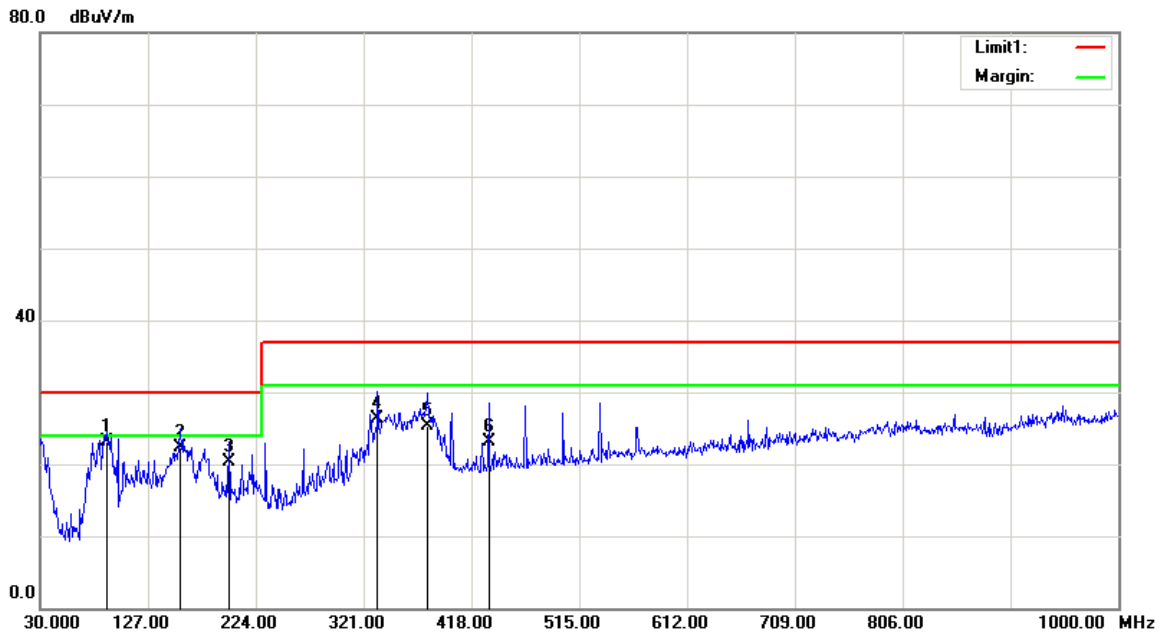
Temperature:	25.3~25.5 °C
Relative Humidity:	55~57 %
ATM Pressure:	100.4~100.8 kPa

The testing was performed by Jone Lv from 2013-10-12 to 2013-10-15.

1) Below 1 GHz:

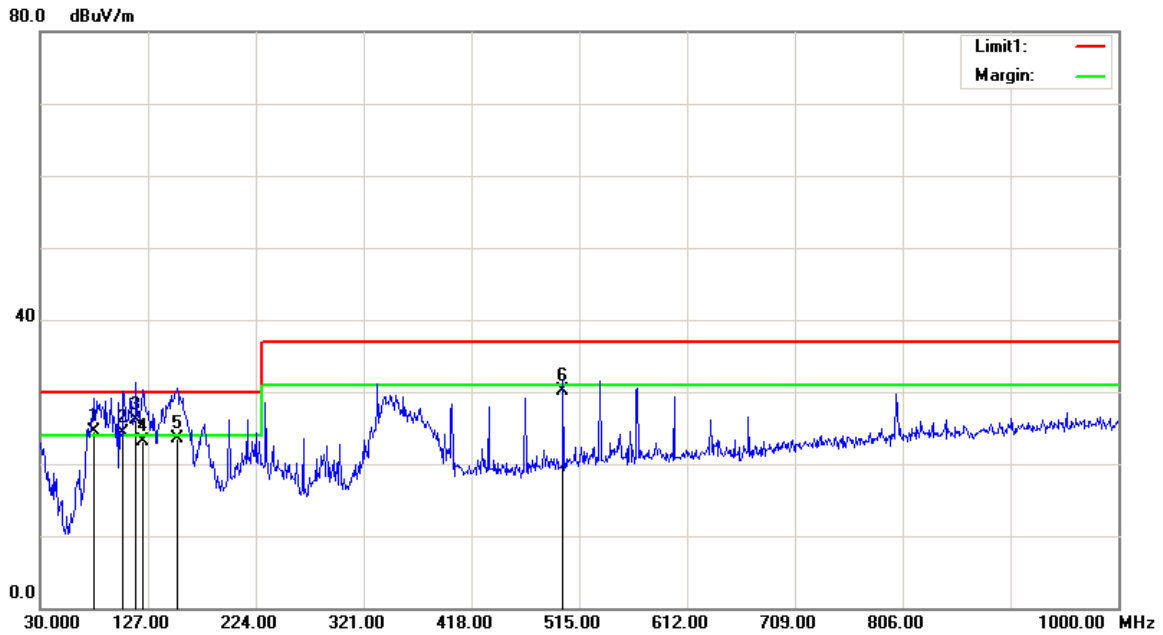
Test Mode: Running

Horizontal:



Frequency (MHz)	Receiver Reading (dBµV/m)	Detector (PK/QP/AV)	Correction Factor (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
90.1400	34.56	QP	-11.46	23.10	30.00	6.90
156.1000	28.71	QP	-6.41	22.30	30.00	7.70
199.7500	26.87	QP	-6.47	20.40	30.00	9.60
333.6100	30.45	QP	-4.15	26.30	37.00	10.70
378.2300	28.35	QP	-2.95	25.40	37.00	11.60
433.5200	25.10	QP	-2.00	23.10	37.00	13.90

Vertical:



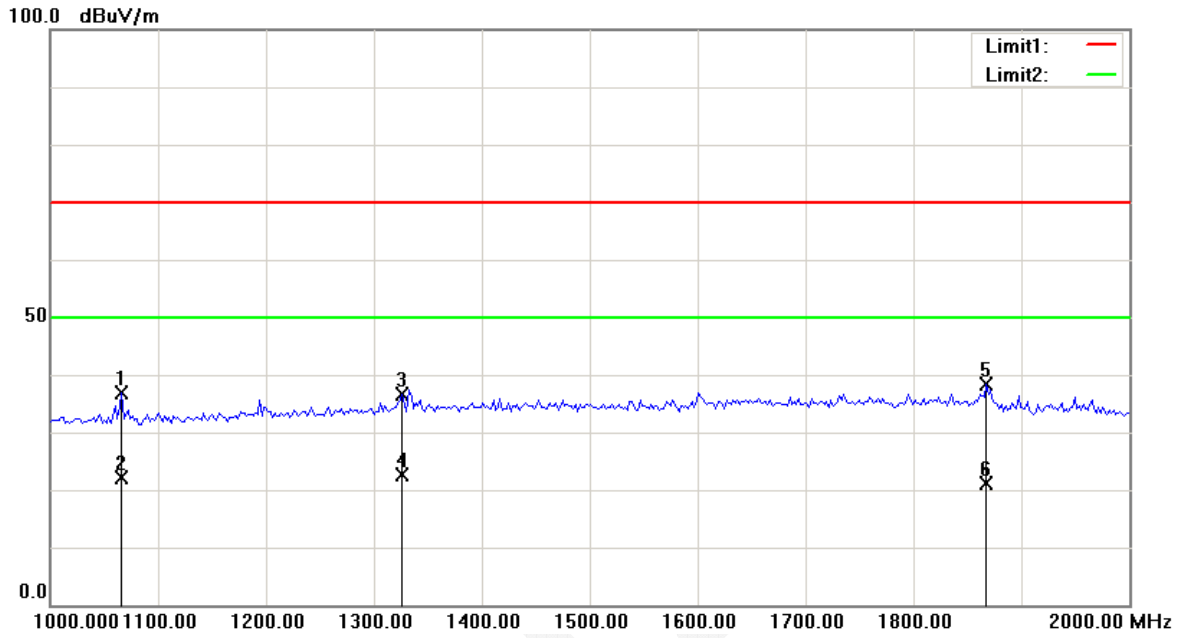
Frequency (MHz)	Receiver Reading (dBµV/m)	Detector (PK/QP/AV)	Correction Factor (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
78.5000	41.88	QP	-17.38	24.50	30.00	5.50
104.6900	37.96	QP	-13.56	24.40	30.00	5.60
116.3300	37.53	QP	-11.43	26.10	30.00	3.90*
122.1500	34.08	QP	-10.98	23.10	30.00	6.90
153.1900	35.74	QP	-12.14	23.60	30.00	6.40
500.4500	37.05	QP	-6.95	30.10	37.00	6.90

*Within measurement uncertainty!

2) Above 1 GHz:

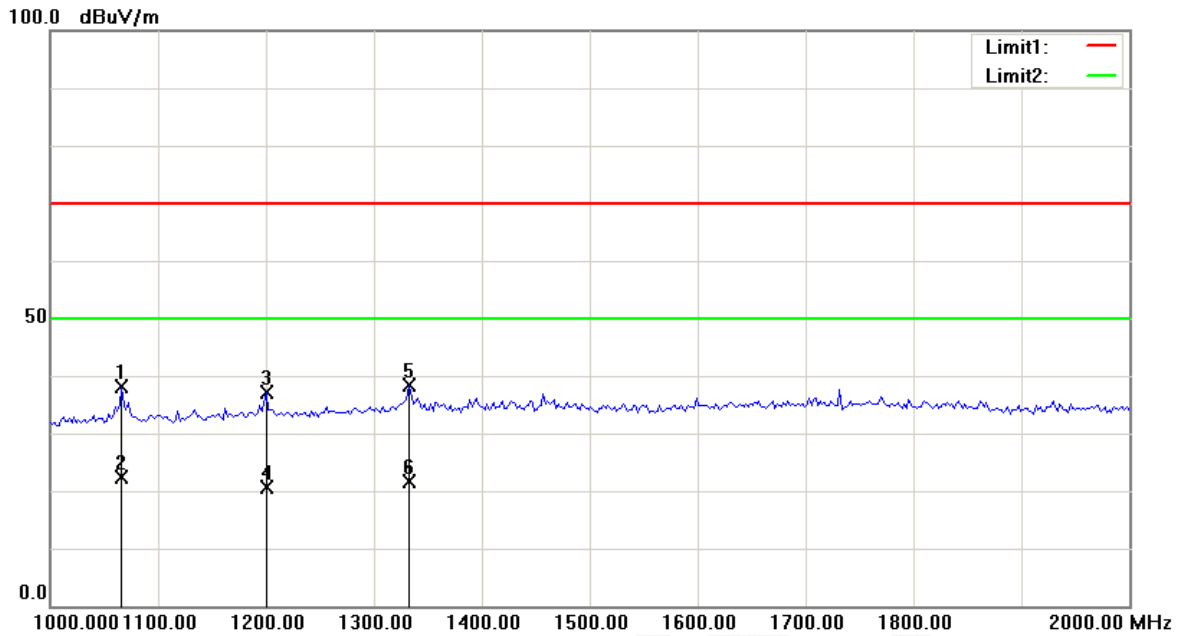
Test Mode: Running

Horizontal:



Frequency (MHz)	Receiver Reading (dBµV/m)	Detector (PK/QP/AV)	Correction Factor (dB)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1066.132	38.97	peak	-2.08	36.89	70.00	33.11
1066.132	24.26	AVG	-2.08	22.18	50.00	27.82
1326.653	37.61	peak	-1.06	36.55	70.00	33.45
1326.653	23.69	AVG	-1.06	22.63	50.00	27.37
1867.736	37.51	peak	0.99	38.50	70.00	31.50
1867.736	20.23	AVG	0.99	21.22	50.00	28.78

Vertical:



Frequency (MHz)	Receiver Reading (dB μ V/m)	Detector (PK/QP/AV)	Correction Factor (dB)	Cord. Amp. (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1066.132	40.18	peak	-2.08	38.10	70.00	31.90
1066.132	24.38	AVG	-2.08	22.30	50.00	27.70
1200.401	38.66	peak	-1.65	37.01	70.00	32.99
1200.401	22.22	AVG	-1.65	20.57	50.00	29.43
1332.665	39.35	peak	-1.03	38.32	70.00	31.68
1332.665	22.59	AVG	-1.03	21.56	50.00	28.44

EN 55024 §4.2.1 ELECTROSTATIC DISCHARGE (IEC 61000-4-2)

Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-2) please refer to the following:

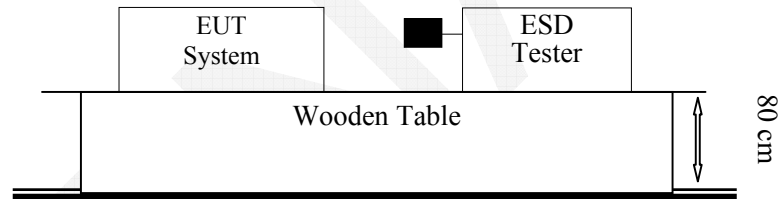
Parameter	U_{EN}	U_{lab}
Rise time t_r	$\leq 15\%$	15%
Peak current I_p	$\leq 7\%$	6.30%
Current at 30 ns	$\leq 7\%$	6.30%
Current at 60 ns	$\leq 7\%$	6.30%

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
SCHAFFNER	ESD TESTER	NSG435	005101	2013-5-9	2014-5-9

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

Test System Setup



Remark: ■ is the tip of the electrode

IEC 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.6 by 0.8-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5-millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

Test Standard

- EN 55024:2010 (IEC 61000-4-2:2008)
- Test level 2 for Contact Discharge at ± 4 kV
- Test level 3 for Air Discharge at ± 8 kV

Test Level

Level	Test Voltage Contact Discharge (\pm kV)	Test Voltage Air Discharge (\pm kV)
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X.	Special	Special

Performance criteria: B**Test Procedure****Air Discharge:**

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Contact Discharge:

All the procedure shall be same as Section 8.3.1 of IEC 61000-4-2, except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

Indirect discharge for horizontal coupling plane:

At least 50 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1 m from the EUT and with the discharge electrode touching the coupling plane.

Indirect discharge for vertical coupling plane:

At least 50 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m \times 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

Test Data and Setup Photo**Environmental Conditions**

Temperature:	21.8°C
Relative Humidity:	54%
ATM Pressure:	100.4 kPa

The testing was performed by Jone Lv on 2013-10-14.

Test Mode: Running

Table 1: Electrostatic Discharge Immunity (Air Discharge)

EN 61000-4-2 Test Points Location	Test Levels								
	-2 kV	+2 kV	-4 kV	+4 kV	-8 kV	+8 kV	-15 kV	+15 kV	X
Aperture (8 points)	A	A	A	A	A	A	/	/	/
Surface (5 points)	A	A	A	A	A	A	/	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

EN 61000-4-2 Test Points Location	Test Levels								
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	X
Port(2 Points)	A	A	A	A	/	/	/	/	/

Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

EN 61000-4-2 Test Points Location	Test Levels								
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	X
Front Side	A	A	A	A	/	/	/	/	/
Back Side	A	A	A	A	/	/	/	/	/
Left Side	A	A	A	A	/	/	/	/	/
Right Side	A	A	A	A	/	/	/	/	/

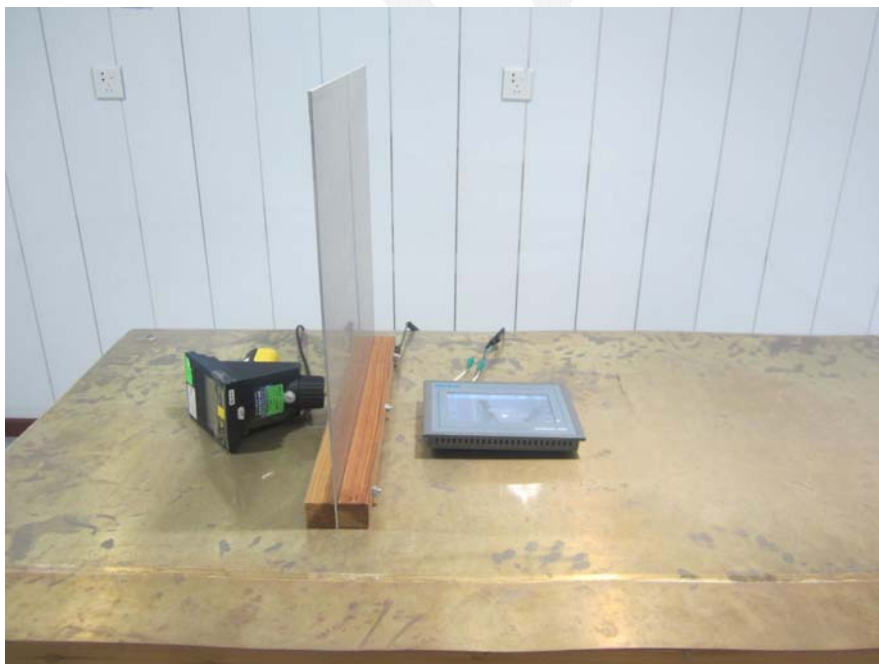
Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

EN 61000-4-2 Test Points Location	Test Levels								
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	X
Front Side	A	A	A	A	/	/	/	/	/
Back Side	A	A	A	A	/	/	/	/	/
Left Side	A	A	A	A	/	/	/	/	/
Right Side	A	A	A	A	/	/	/	/	/

Air Discharge



Indirect Contact



Test Setup Photos

EN 55024 §4.2.2 ELECTRICAL FAST TRANSIENT (IEC 61000-4-4)

Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-4) please refer to the following:

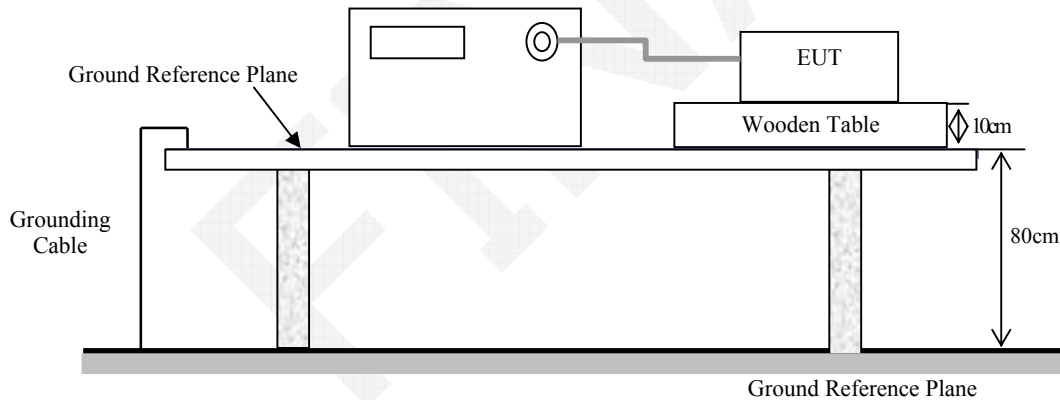
Parameter	U_{EN}	U_{lab}
Rise time t_r	6.20%	6.20%
Peak voltage value V_p	8.60%	8.60%
Voltage pulse width t_w	5.90%	5.90%

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM TEST	Auto transformer	MV2616	0403-16	N/A	N/A
EM TEST	Ultra Compact Generator	UCS500-M	303279	2012-12-27	2013-12-26
EM TEST	EFT Clamp	N/A	300886	2013-1-9	2014-1-8

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

Test System Setup



Test Standard

EN 55024:2010 (IEC 61000-4-4:2004)
 DC mains: Test level 1 at 0.5 kV

Test Level

Open Circuit Output Test Voltage ±10%		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special

Performance criteria: B

Test Procedure

The EUT was arranged for Power Line Coupling and for I/O Line Coupling through a capacitive clamp, where applicable. (Note: The I/O coupling test using a capacitive clamp is performed on the I/O interface cables that are longer in length than 3 meters.) A metal ground plane 2.4 meter by 2.0 meter was placed between the floor and the table and is connected to the earth by a 2.0 meter ground rod. The ground rod is connected to the test facility’s electrical earth.

Test Data and Setup Photo

Environmental Conditions

Temperature:	21.8°C
Relative Humidity:	54 %
ATM Pressure:	100.4kPa

The testing was performed by Jone Lv on 2013-10-14.

Test Mode: Running

EN61000-4-4 Test Points		Test Levels (kV)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
DC mains power input ports	Positive	A	A	/	/	/	/	/	/
	Negative	A	A	/	/	/	/	/	/
	Earth	/	/	/	/	/	/	/	/
	Positive+Negative	A	A	/	/	/	/	/	/
	L + Earth	/	/	/	/	/	/	/	/
	N+ Earth	/	/	/	/	/	/	/	/
	L+N+Earth	/	/	/	/	/	/	/	/
Signal ports	/	/	/	/	/	/	/	/	



Test Setup Photo

EN 55024 §4.2.3.2 CONTINUOUS RADIATED DISTURBANCES (IEC 61000-4-3)

Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-3) please refer to the following:

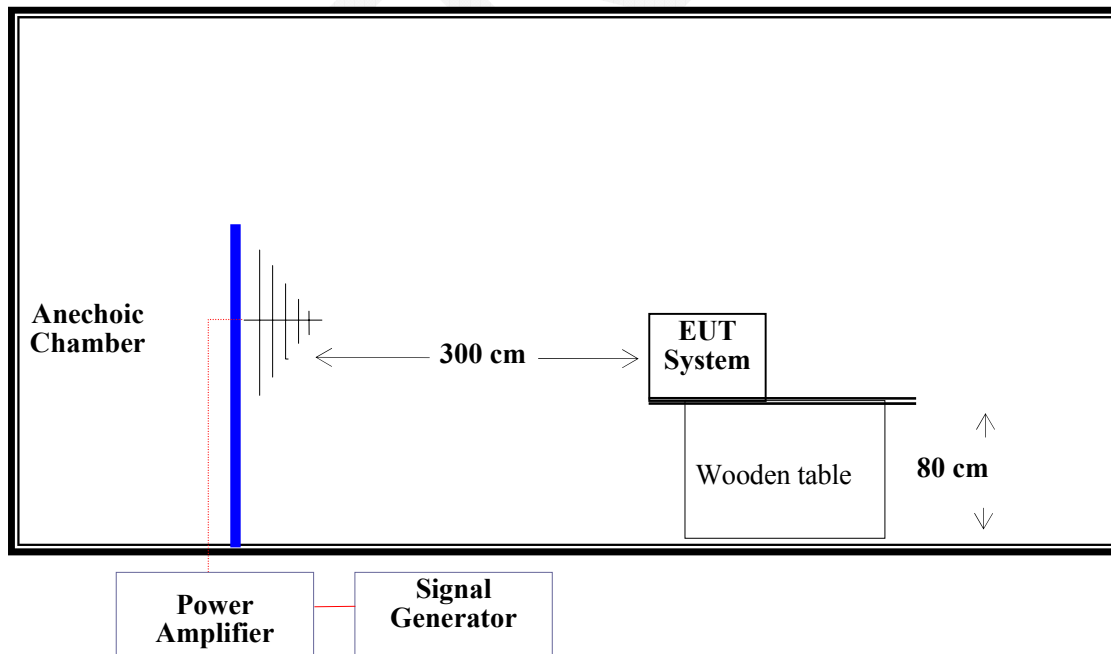
Parameter	U_{EN}	U_{lab}
Calibration process	1.88 dB	1.88 dB
Level setting	2.19 dB	2.19 dB

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Signal Generator	8648A	3426A00831	2012-11-29	2013-11-28
AR	Power Amplifier	100W1000M1	13410	2012-11-29	2013-11-28
Sunol Sciences	Antenna	JB3	A060611-3	N/A	N/A
Amplifier Research	Sensor	FP5000	301825	2012-12-22	2015-12-21

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

Test System Setup



Test Standard

EN 55024:2010 (IEC 61000-4-3:2006 + A1:2007 + A2:2010)
 Test level 2 at 3V / m

Test Level

Level	Field Strength V/m
1.	1
2.	3
3.	10
X.	Special

Performance criteria: A

Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above the ground. The EUT is set 3 meters away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarizations of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera was used to monitor the EUT. All the scanning conditions are as follows:

Condition of Test	Remarks
Field Strength	3 V/m (Test level 2)
Radiated Signal	AM 80%, 1 kHz Modulation
Scanning Frequency	80 – 1000 MHz
Sweeping Frequency Step	1%
Dwell Time	1Sec.

Test Data and Setup Photo

Environmental Conditions

Temperature:	21.8 °C
Relative Humidity:	54 %
ATM Pressure:	100.4 kPa

The testing was performed by Jone Lv on 2013-10-14.

Test Mode: Running

Severity Level: 3 V/m Unmodulated, r.m.s

Frequency Range (MHz)	Front Side		Rear Side		Left Side		Right Side	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A



Test Setup Photo

EN 55024 §4.2.3.3 CONTINUOUS CONDUCTED DISTURBANCES (IEC 61000-4-6)

Measurement Uncertainty

U_{lab} (measurement uncertainty of lab) and U_{EN} (measurement uncertainty of EN 61000-4-6) please refer to the following:

Parameter	U_{EN}	U_{lab}
CDN calibration process	1.27 dB	1.27 dB
CDN test process	1.36 dB	1.36 dB

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Signal Generator	HP8657A	2849U00982	2012-11-29	2013-11-28
R&S	Power Amplifier	15A250	12934	N/A	N/A
NARDA	Attenuator	769-6	2754	N/A	N/A
COM-POWER	CDN	M325E	521064	2012-11-29	2013-11-28

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

Test Setup



Test Standard

EN 55024:2010 (IEC 61000-4-6:2008)
 Test level 2 at 3 V (r.m.s.), 0.15 MHz ~ 80 MHz,

Test Level

Level	Voltage Level (r.m.s.) (V)
1	1
2	3
3	10
X	Special

Performance criteria: A

Test Procedure

- 1) Let the EUT work in test mode and test it.
- 2) The EUT are placed on an insulating support 0.1 m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3 m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
- 3) The disturbance signal described below is injected to EUT through CDN.
- 4) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- 5) The frequency range is swept from 150 kHz to 80 MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave.
- 6) The step of sweep shall not exceed 1%. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

Test Data and Setup Photo

Environmental Conditions

Temperature:	23.8 °C
Relative Humidity:	52%
ATM Pressure:	100.8kPa

The testing was performed by Jone Lv on 2013-10-15.

Test Mode: Running

Table 1: AC mains power input port

Frequency range: 150 kHz to 80 MHz
 Modulated: Amplitude 80%, 1kHz sine wave Unmodulated Other:
 Severity Level: 3 V Unmodulated, r.m.s

Level	Voltage Level (e.m.f.) U ₀	Pass	Fail
1	1	/	/
2	3	A	/
3	10	/	/
X	Special	/	/



Test Setup Photo

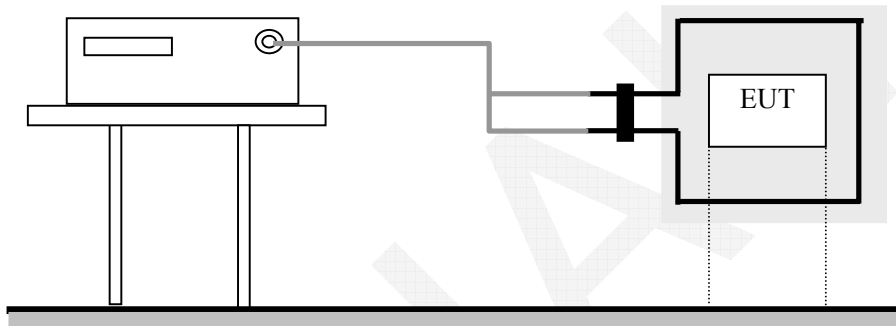
EN 55024 §4.2.4 POWER FREQUENCY MAGNETIC FIELD (IEC 61000-4-8)

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM TEST	Loop Antenna	MS100	303298	N/A	N/A
EM TEST	Current Transformer	MC2630	301873	N/A	N/A

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

Test Setup



Test Standard

EN 55024:2010 (IEC 61000-4-8:2009)
 Test level 1 at 1A/m

Test Level

Level	Magnetic Field Strength A/m
1	1
2	3
3	10
4	30
5	100
X.	Special

Performance criteria: A

Test Procedure

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1 m*1 m). The induction coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations.

Test Data and Setup Photo

Environmental Conditions

Temperature:	21.8 °C
Relative Humidity:	54 %
ATM Pressure:	100.4 kPa

The testing was performed by Jone Lv on 2013-10-14.

Test Mode: Running

Level	Magnetic Field Strength A/M	X (Horizontal)	Y (Vertical)	Z (Special)
1	1	A	A	A
2	3	/	/	/
3	10	/	/	/
4	30	/	/	/
5	100	/	/	/
X	Special	/	/	/



Test Setup Photo

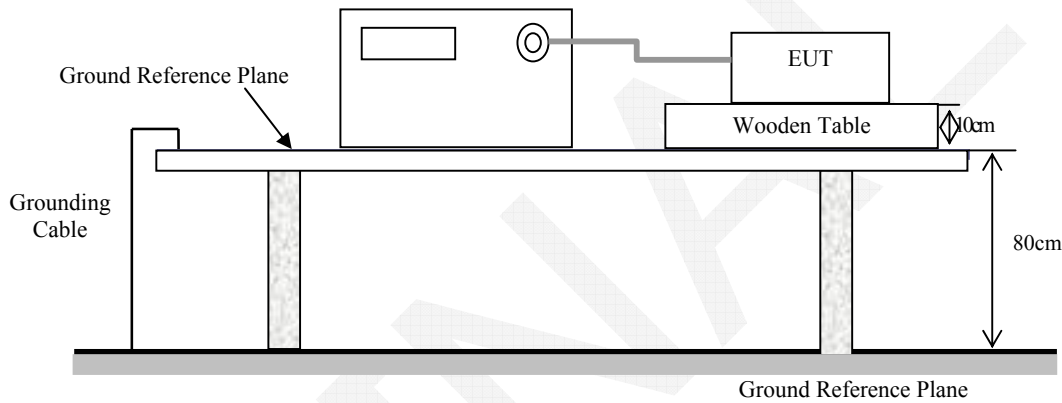
EN 55024 §4.2.5 SURGE (IEC 61000-4-5)

Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM TEST	Auto transformer	MV2616	0403-16	N/A	N/A
EM TEST	Ultra Compact Generator	UCS500-M	303279	2012-12-27	2013-12-26
EM TEST	EM Test Coupling/Decoupling Network	CNV508 S1	311137	2013-10-8	2014-10-7

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

Test System Setup



Test Standard

EN 55024:2010 (IEC 61000-4-5:2005)
 DC Mains: P-N: Test level 1 at 0.5 kV

Test Level

Level	Open Circuit Output Test Voltage ±10%
1	0.5 kV
2	1 kV
3	2 kV
4	4 kV
X	Special

Performance criteria: B

Test Procedure

- 1) Provide disturbance signal described below is injected to EUT.
- 2) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 3) Different phase angles are done individually.
- 4) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

Test Data and Setup Photo

Environmental Conditions

Temperature:	21.8 °C
Relative Humidity:	54%
ATM Pressure:	100.4 kPa

The testing was performed by Jone Lv on 2013-10-15.

Test Mode: Running

DC mains power input port

Level	Voltage	Poll	Path	Pass	Fail
1	0.5kV	±	Positive-Negative	A	/
2	1kV	±	L-N,L-PE,N-PE	/	/
3	2kV	±	L-PE, N-PE	/	/
4	4kV	±	L-N, L-PE, N-PE	/	/

RJ45 I/O Circuit and Lines

Level	Voltage	Poll	Path	Pass	Fail
1	0.5kV	±	Line-Ground	/	/
2	1kV	±	Line-Ground	/	/
3	2kV	±	Line-Ground	/	/
4	4kV	±	Line-Ground	/	/



Test Setup Photo

EXHIBIT A - PRODUCT LABELING

Label Specification



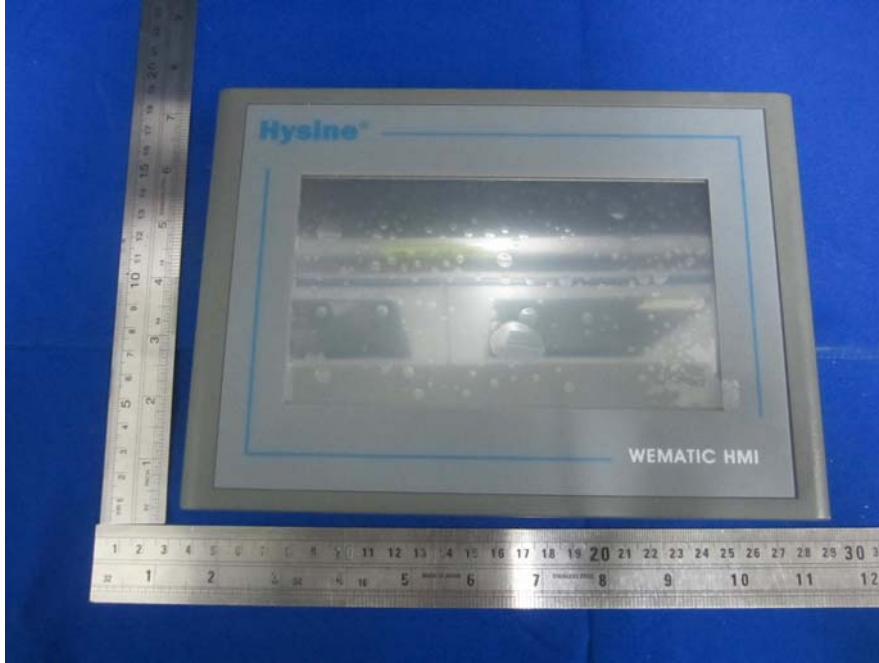
Specifications: The marking set out above must be affixed to the apparatus or to its data plate and have a minimum height of 5 mm. The elements should be easily readable and indelible. They may be placed anywhere on the apparatus case or in its battery compartment. No tool should be needed to view the marking.

Proposed Label Location on EUT



EXHIBIT B - EUT PHOTOGRAPHS

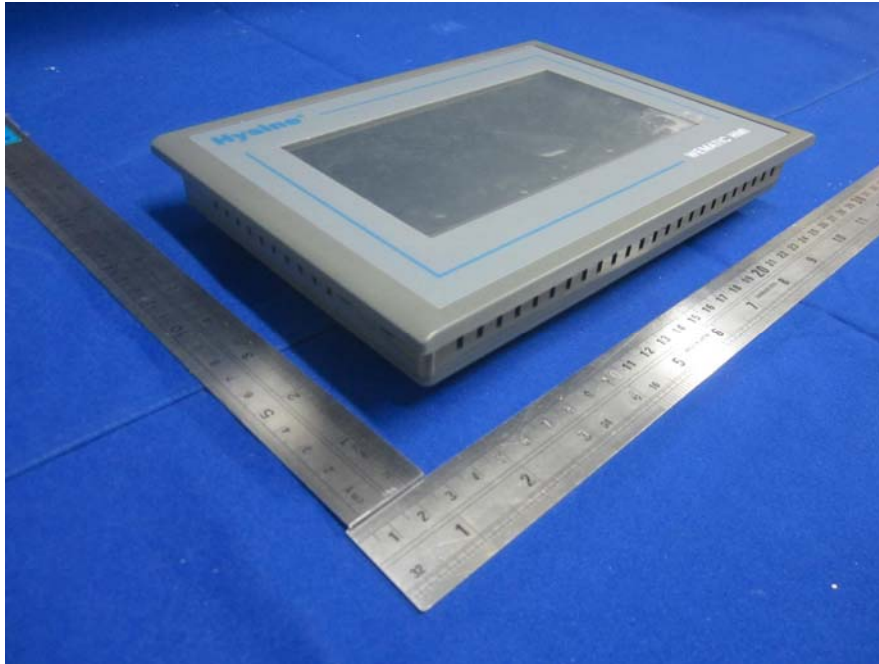
EUT— Top View



EUT- Bottom View



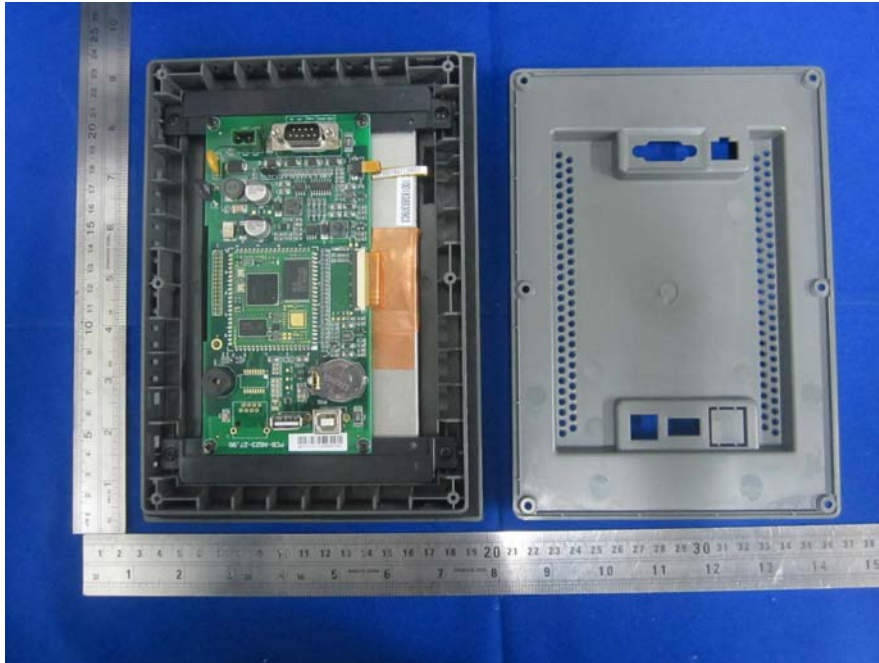
EUT- Side View



EUT- Side View



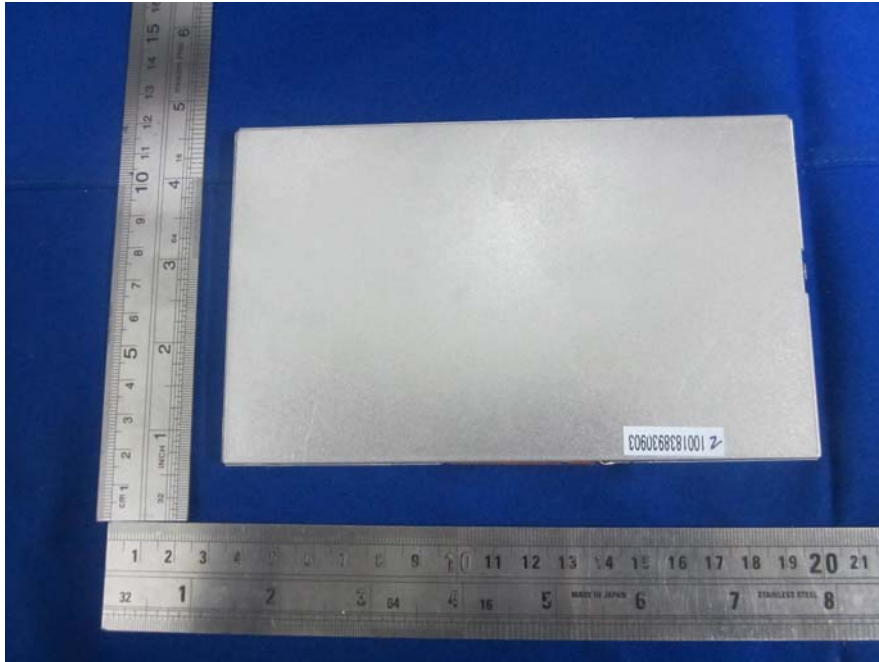
EUT- Uncover View



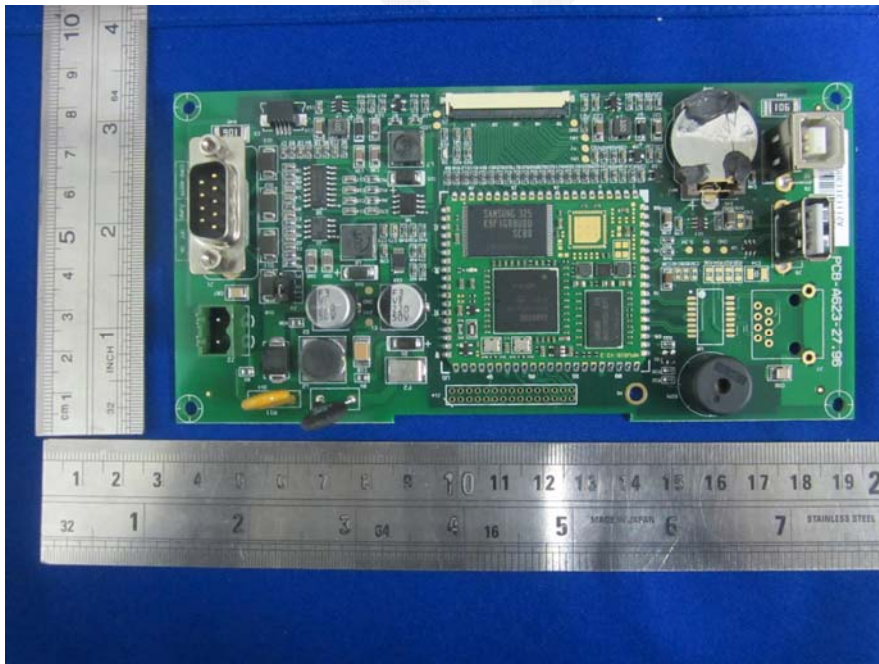
EUT- Screen Top View



EUT- Screen Bottom View



EUT- Main Board Top View



EUT- Main Board Bottom View

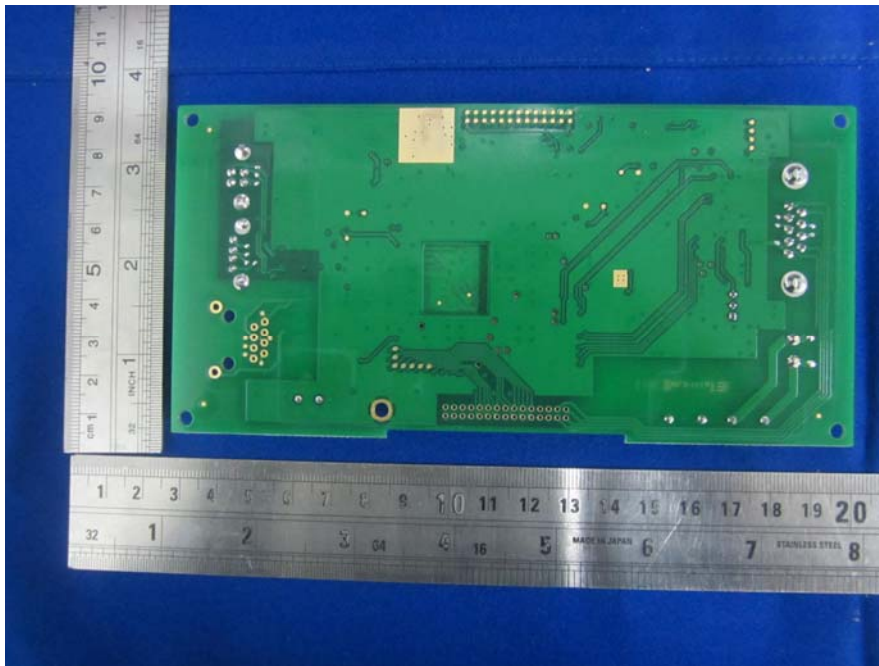


EXHIBIT C - TEST SETUP PHOTOGRAPHS

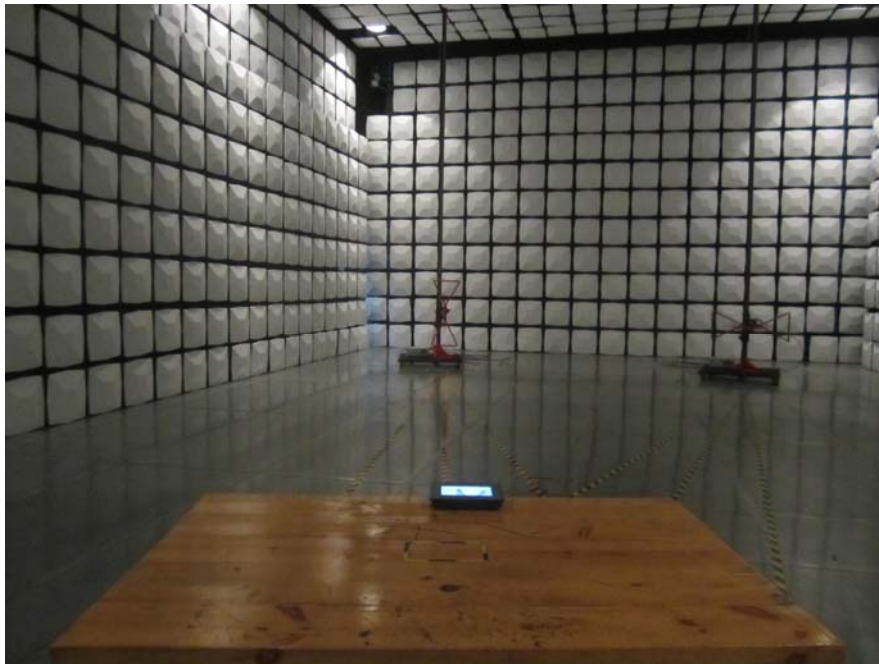
Conducted Disturbance – Front View



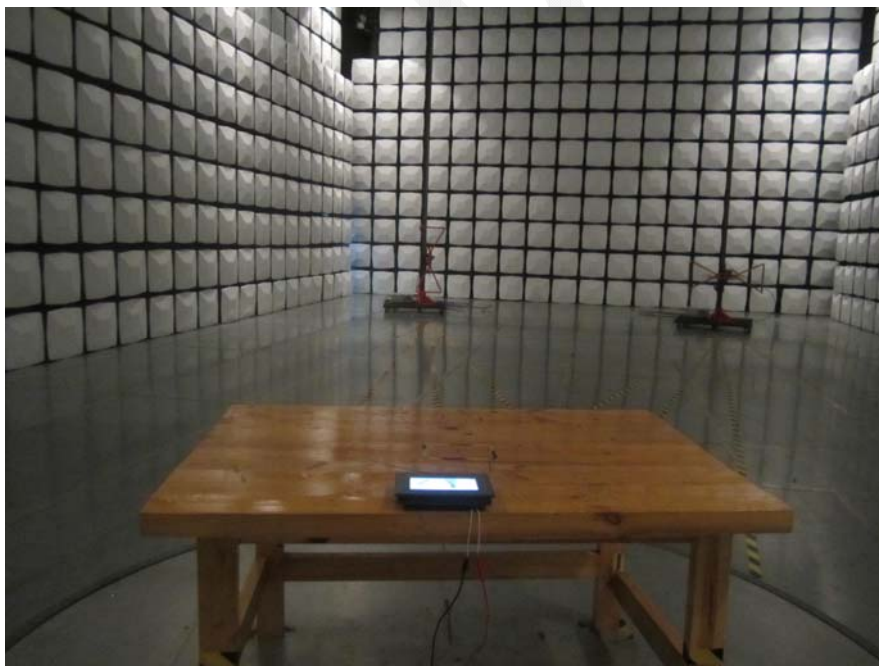
Conducted Disturbance – Side View



Radiated Emissions - Front View



Radiated Emissions –Rear View



DECLARATION LETTER

Hysine®

Company name: Beijing Hysine Technology Co., Ltd.
Address: No.108, Beijing youth entrepreneur's demo park, Changping District, Beijing, China
Postal Code: 100080
Tel: 010-62719309-116 Fax: 010-62718559

DECLARATION OF SIMILARITY

2013-10-09

To:
Bay Area Compliance Laboratories Corp. (Dongguan)
No.69 Pulong Village, Puxinhu Industry Zone, Tangxia, Dongguan, China
Tel: +86 769 86858888 Fax: +86 769 86858892
<http://www.baclcorp.com>

Dear Sir or Madam:

We Beijing Hysine Technology Co., Ltd. hereby declare that our product Human Machine Interface, model(s): HMI Series (include model number: HMI-X100, HMI-X70, HMI-X40, HMI-T70) is electrically identical with the same electromagnetic emissions and electromagnetic compatibility characteristics. And HMI-X70 is tested by BA CL, the results of which are featured in BA CL project:
R2BJ131011051.

A description of the differences between the tested model and the other number is as following:

Models: HMI-X100, HMI-X70, HMI-X40, HMI-T70 just have different the model name.

Please contact me should there be need for any additional clarification or information.

Best Regards,

Signature: 
Xi Lin
Manager

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