Certificate

Issue Date: May 18, 2012
Ref. Report No. ISL-12HE135CE

Product Name	:	Network Attached Storage
Models	:	**TS-269; TS-269 Pro; TS-269j; TS-269L; TS-269Lite; TS-269H; NAS-269G; NAS-269H; VS-2004 Pro+; VS-2008 Pro+; VS-2012 Pro+; VS-2016 Pro+; VS-2020 Pro+; VS-2024 Pro+; NVR-2004 Pro+; NVR-2008 Pro+; NVR-2012 Pro+; NVR-2016 Pro+; NVR-2020 Pro+; NVR-2024 Pro+; NVR-2004G+; NVR-2008G+; NVR-2012G+; NVR-2016G+; NVR-2020G+; NVR-2024G+; VS-2000 Pro+; NVR-2000 Pro+; NVR-2000G+**
Brand	:	**QNAP**
Responsible Party	:	**QNAP Systems, Inc.**
Address	:	2F, No.22, Zhongxing Rd., Xizhi Dist., New Taipei City 221, Taiwan

We, **International Standards Laboratory**, hereby certify that:

The device bearing the trade name and model specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in European Council Directive- EMC Directive 2004/108/EC. The device was passed the test performed according to :

CE

Standards:

EN 55022: 2010 and CISPR 22: 2008 (modified)
EN 61000-3-2: 2006+A1:2009 +A2:2009 and IEC 61000-3-2: 2005+A1:2008 +A2:2009
EN 61000-3-3: 2008 and IEC 61000-3-3: 2008
EN 55024: 2010 and CISPR 24: 2010
EN 61000-4-2: 2009 and IEC 61000-4-2: 2008
EN 61000-4-3: 2006+A1: 2008 +A2: 2010 and
IEC 61000-4-3:2006+A1: 2007+A2: 2010
EN 61000-4-4: 2004 +A1:2010 and IEC 61000-4-4: 2004 +A1:2010
EN 61000-4-5: 2006 and IEC 61000-4-5: 2005
EN 61000-4-6: 2009 and IEC 61000-4-6: 2008
EN 61000-4-8: 2010 and IEC 61000-4-8: 2009
EN 61000-4-11: 2004 and IEC 61000-4-11: 2004

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

International Standards Laboratory

Jim Chu / Director

☒ **Hsi-Chih LAB**:
No. 65, Gu Dai Keng St., Hsichih District,
New Taipei City 22117, Taiwan
Tel: 886-2-2646-2550; Fax: 886-2-2646-4641

Nemko
ELA113A

CE MARK TECHNICAL FILE

AS/NZS EMC CONSTRUCTION FILE

of

Product Name

Network Attached Storage

Models

TS-269; TS-269 Pro; TS-269j; TS-269L; TS-269Lite; TS-269H; NAS-269G; NAS-269H; VS-2004 Pro+; VS-2008 Pro+; VS-2012 Pro+; VS-2016 Pro+; VS-2020 Pro+; VS-2024 Pro+; NVR-2004 Pro+; NVR-2008 Pro+; NVR-2012 Pro+; NVR-2016 Pro+; NVR-2020 Pro+; NVR-2024 Pro+; NVR-2004G+; NVR-2008G+; NVR-2012G+; NVR-2016G+; NVR-2020G+; NVR-2024G+; VS-2000 Pro+; NVR-2000 Pro+; NVR-2000G+

Brand

QNAP

Contains:

1. Declaration of Conformity
2. EN55022/CISPR 22, AS/NZS CISPR 22 EMI test report
3. EN55024/CISPR 24, EN61000-3-2 / IEC 61000-3-2, and EN61000-3-3 / IEC 61000-3-3 test report
4. Certificate of EN60950-1
5. Block Diagram and Schematics
6. Users' manual

Declaration of Conformity

Name of Responsible Party:	QNAP Systems, Inc.
Address of Responsible Party:	2F, No.22, Zhongxing Rd., Xizhi Dist., New Taipei City 221, Taiwan
Declares that product:	Network Attached Storage
Models:	TS-269; TS-269 Pro; TS-269j; TS-269L; TS-269Lite; TS-269H; NAS-269G; NAS-269H; VS-2004 Pro+; VS-2008 Pro+; VS-2012 Pro+; VS-2016 Pro+; VS-2020 Pro+; VS-2024 Pro+; NVR-2004 Pro+; NVR-2008 Pro+; NVR-2012 Pro+; NVR-2016 Pro+; NVR-2020 Pro+; NVR-2024 Pro+; NVR-2004G+; NVR-2008G+; NVR-2012G+; NVR-2016G+; NVR-2020G+; NVR-2024G+; VS-2000 Pro+; NVR-2000 Pro+; NVR-2000G+
Brand:	QNAP
Assembled by:	Same as above
Address:	Same as above

Conforms to the EMC Directive 2004/108/EC as attested by conformity with the following harmonized standards:

EN 55022:2010, CISPR 22:2008 (modified) and AS/NZS CISPR 22: 2009: Limits and methods of measurement of Radio Interference characteristics of Information Technology Equipment.
EN 55024:2010 and CISPR 24:2010: Information technology equipment-Immunity characteristics - Limits and methods of measurement.

Standard	Description	Results	Criteria
EN 61000-4-2:2009 IEC 61000-4-2:2008	Electrostatic Discharge	Pass	B
EN 61000-4-3:2006+A1:2008 +A2:2010 IEC 61000-4-3:2006+A1:2007+A2:2010	Radio-Frequency, Electromagnetic Field	Pass	A
EN 61000-4-4: 2004 +A1:2010 IEC 61000-4-4: 2004 +A1:2010	Electrical Fast Transient/Burst	Pass	B
EN 61000-4-5: 2006 IEC 61000-4-5: 2005	Surge	Pass	B
EN 61000-4-6:2009 IEC 61000-4-6:2008	Conductive Disturbance	Pass	A
EN 61000-4-8:2010 IEC 61000-4-8:2009	Power Frequency Magnetic Field	Pass	A

<to be continued>

Standard	Description	Results	Criteria
EN 61000-4-11: 2004 IEC 61000-4-11: 2004	Voltage Dips / Short Interruption and Voltage Variation		
	>95% in 0.5 period	Pass	B
	30% in 25 period	Pass	C
	>95% in 250 period	Pass	C

Standard	Description	Results
EN 61000-3-2: 2006 +A1:2009 +A2:2009 IEC 61000-3-2: 2005 +A1:2008 +A2:2009	Limits for harmonics current emissions	Pass
EN 61000-3-3: 2008 IEC 61000-3-3: 2008	Limits for voltage fluctuations and flicker in low-voltage supply systems.	Pass

Conforms to the Low Voltage Directive 2006/95/EC, 93/68/EEC as attested by conformity with the following harmonized standard:

EN60950-1:2006+A11:2009: Safety of Information Technology Equipment Including electrical business equipment

We, QNAP Systems, Inc., hereby declare that the equipment bearing the trade name and model number specified above was tested conforming to the applicable Rules under the most accurate measurement standards possible, and that all the necessary steps have been taken and are in force to assure that production units of the same equipment will continue to comply with the requirements.

QNAP Systems, Inc.

Date: May 18, 2012

Declaration of Conformity

Name of Responsible Party:	QNAP Systems, Inc.
Address of Responsible Party:	2F, No.22, Zhongxing Rd., Xizhi Dist., New Taipei City 221, Taiwan
Declares that product:	Network Attached Storage
Models:	TS-269; TS-269 Pro; TS-269j; TS-269L; TS-269Lite; TS-269H; NAS-269G; NAS-269H; VS-2004 Pro+; VS-2008 Pro+; VS-2012 Pro+; VS-2016 Pro+; VS-2020 Pro+; VS-2024 Pro+; NVR-2004 Pro+; NVR-2008 Pro+; NVR-2012 Pro+; NVR-2016 Pro+; NVR-2020 Pro+; NVR-2024 Pro+; NVR-2004G+; NVR-2008G+; NVR-2012G+; NVR-2016G+; NVR-2020G+; NVR-2024G+; VS-2000 Pro+; NVR-2000 Pro+; NVR-2000G+
Brand:	QNAP
Assembled by:	Same as above
Address:	Same as above

Conforms to the C-Tick Mark requirement as attested by conformity with the following standards:

EN 55022:2010, CISPR 22:2008 (modified) and AS/NZS CISPR 22: 2009: Limits and methods of measurement of Radio Interference characteristics of Information Technology Equipment.
EN 55024:2010 and CISPR 24:2010: Information technology equipment-Immunity characteristics - Limits and methods of measurement.

Standard	Description	Results	Criteria
EN 61000-4-2:2009 IEC 61000-4-2:2008	Electrostatic Discharge	Pass	B
EN 61000-4-3:2006+A1:2008 +A2:2010 IEC 61000-4-3:2006+A1:2007+A2:2010	Radio-Frequency, Electromagnetic Field	Pass	A
EN 61000-4-4: 2004 +A1:2010 IEC 61000-4-4: 2004 +A1:2010	Electrical Fast Transient/Burst	Pass	B
EN 61000-4-5: 2006 IEC 61000-4-5: 2005	Surge	Pass	B
EN 61000-4-6:2009 IEC 61000-4-6:2008	Conductive Disturbance	Pass	A
EN 61000-4-8:2010 IEC 61000-4-8:2009	Power Frequency Magnetic Field	Pass	A

<to be continued>

Standard	Description	Results	Criteria
EN 61000-4-11: 2004 IEC 61000-4-11: 2004	Voltage Dips / Short Interruption and Voltage Variation		
	>95% in 0.5 period	Pass	B
	30% in 25 period	Pass	C
	>95% in 250 period	Pass	C

Standard	Description	Results
EN 61000-3-2: 2006 +A1:2009 +A2:2009 IEC 61000-3-2: 2005 +A1:2008 +A2:2009	Limits for harmonics current emissions	Pass
EN 61000-3-3: 2008 IEC 61000-3-3: 2008	Limits for voltage fluctuations and flicker in low-voltage supply systems.	Pass

We, QNAP Systems, Inc., hereby declare that the equipment bearing the trade name and model number specified above was tested conforming to the applicable Rules under the most accurate measurement standards possible, and that all the necessary steps have been taken and are in force to assure that production units of the same equipment will continue to comply with the requirements.

QNAP Systems, Inc.

Date: May 18, 2012

CE TEST REPORT

of

EN55022 / CISPR 22 / AS/NZS CISPR 22
Class B
EN55024 / CISPR 24 / IMMUNITY
EN61000-3-2 / EN61000-3-3

Product : **Network Attached Storage**

Models: **TS-269; TS-269 Pro; TS-269j; TS-269L; TS-269Lite; TS-269H; NAS-269G; NAS-269H; VS-2004 Pro+; VS-2008 Pro+; VS-2012 Pro+; VS-2016 Pro+; VS-2020 Pro+; VS-2024 Pro+; NVR-2004 Pro+; NVR-2008 Pro+; NVR-2012 Pro+; NVR-2016 Pro+; NVR-2020 Pro+; NVR-2024 Pro+; NVR-2004G+; NVR-2008G+; NVR-2012G+; NVR-2016G+; NVR-2020G+; NVR-2024G+; VS-2000 Pro+; NVR-2000 Pro+; NVR-2000G+**

Brand: **QNAP**

Applicant: **QNAP Systems, Inc.**

Address: **2F, No.22, Zhongxing Rd., Xizhi Dist., New Taipei City 221, Taiwan**

Test Performed by:

International Standards Laboratory
<Hsi-Chih LAB>
*Site Registration No.
BSMI:SL2-IN-E-0037; SL2-R1/R2-E-0037; TAF: 1178;
IC: IC4067A-1; VCCI: R-341,C-354, T-1749, G-443; NEMKO: ELA 113A
*Address:
No. 65, Gu Dai Keng St.
Hsichih District, New Taipei City 22117, Taiwan
*Tel: 886-2-2646-2550; Fax: 886-2-2646-4641

Report No.: **ISL-12HE135CE**
Issue Date : **May 18, 2012**

This report totally contains 53 pages including this cover page and contents page.

Contents of Report

1. General

1.1 Certification of Accuracy of Test Data

Standards:	Please refer to 1.2
Equipment Tested:	Network Attached Storage
Models:	TS-269; TS-269 Pro; TS-269j; TS-269L; TS-269Lite; TS-269H; NAS-269G; NAS-269H; VS-2004 Pro+; VS-2008 Pro+; VS-2012 Pro+; VS-2016 Pro+; VS-2020 Pro+; VS-2024 Pro+; NVR-2004 Pro+; NVR-2008 Pro+; NVR-2012 Pro+; NVR-2016 Pro+; NVR-2020 Pro+; NVR-2024 Pro+; NVR-2004G+; NVR-2008G+; NVR-2012G+; NVR-2016G+; NVR-2020G+; NVR-2024G+; VS-2000 Pro+; NVR-2000 Pro+; NVR-2000G+
Brand:	QNAP
Applicant:	QNAP Systems, Inc.
Sample received Date:	May 3, 2012
Final test Date:	EMI: refer to the date of test data EMS: May 17, 2012
Test Site:	International Standards Laboratory OATS 01; Chamber 01; Conduction 01; Immunity01
Test Distance:	10M; 3M (above1GHz) (EMI test)
Temperature:	refer to each site test data
Humidity:	refer to each site test data
Input power:	Conduction input power: AC 230 V / 50 Hz Radiation input power: AC 230 V / 50 Hz Immunity input power: AC 230 V / 50 Hz
Test Result:	**PASS**
Report Engineer:	Winnie Huang
Test Engineer:	Lee Chang Lee Chang
Approved By:	Eddy Hsiung Eddy Hsiung

1.2 Test Standards

The tests which this report describes were conducted by an independent electromagnetic compatibility consultant, International Standards Laboratory in accordance with the following

EN 55022:2010, CISPR 22:2008 (modified) and AS/NZS CISPR 22: 2009: Class B: Class B: Limits and methods of measurement of Radio Interference characteristics of Information Technology Equipment.
EN 55024:2010 and CISPR 24:2010: Information technology equipment-Immunity characteristics - Limits and methods of measurement.

Standard	Description	Results	Criteria
EN 61000-4-2:2009 IEC 61000-4-2:2008	Electrostatic Discharge	Pass	B
EN 61000-4-3:2006+A1:2008 +A2:2010 IEC 61000-4-3:2006+A1:2007+A2:2010	Radio-Frequency, Electromagnetic Field	Pass	A
EN 61000-4-4: 2004 +A1:2010 IEC 61000-4-4: 2004 +A1:2010	Electrical Fast Transient/Burst	Pass	B
EN 61000-4-5: 2006 IEC 61000-4-5: 2005	Surge	Pass	B
EN 61000-4-6:2009 IEC 61000-4-6:2008	Conductive Disturbance	Pass	A
EN 61000-4-8:2010 IEC 61000-4-8:2009	Power Frequency Magnetic Field	Pass	A
EN 61000-4-11: 2004 IEC 61000-4-11: 2004	Voltage Dips / Short Interruption and Voltage Variation		
	>95% in 0.5 period	Pass	B
	30% in 25 period	Pass	C
	>95% in 250 period	Pass	C

Standard	Description	Results
EN 61000-3-2: 2006 +A1:2009 +A2:2009 IEC 61000-3-2: 2005 +A1:2008 +A2:2009	Limits for harmonics current emissions	Pass
EN 61000-3-3: 2008 IEC 61000-3-3: 2008	Limits for voltage fluctuations and flicker in low-voltage supply systems.	Pass

1.3 Description of EUT

EUT

Product Name	Network Attached Storage
Condition	Pre-Production
Model Number(s)	TS-269; TS-269 Pro; TS-269j; TS-269L; TS-269Lite; TS-269H; NAS-269G; NAS-269H; VS-2004 Pro+; VS-2008 Pro+; VS-2012 Pro+; VS-2016 Pro+; VS-2020 Pro+; VS-2024 Pro+; NVR-2004 Pro+; NVR-2008 Pro+; NVR-2012 Pro+; NVR-2016 Pro+; NVR-2020 Pro+; NVR-2024 Pro+; NVR-2004G+; NVR-2008G+; NVR-2012G+; NVR-2016G+; NVR-2020G+; NVR-2024G+; VS-2000 Pro+; NVR-2000 Pro+; NVR-2000G+
Serial Number	N/A
Power Supply	DELTA (Model: DPS-90FBA)
	AC input: 100-240V, 2A-1A , 50-60Hz
	DC output: 12V, 7.5A
	Total output wattage: 90W MAX
CPU	Intel® Atom D2550 @1.86GHz or
	Intel® Atom D2700 @2.13GHz
Motherboard	Model: TS-269 Pro V20
SATA Board	Model: TS-269 Pro BP V3.2
SATA Hard Disk	Western Digital (Model: WD5000AADS-00S9B0) 500GB*2
Memory	ADATA DDR3 1333 1GB
USB Flash	one
USB 2.0 Port	three 4-pins
USB 3.0 Port	two 9-pins
E-SATA Port	one 7-pins
RJ45 Port	two 8-pins (10/100/1000Mbps)
HDMI Port	one 19-pins
DC-In	one
AC Power Cord	Non-shielded, Detachable (with ground pin)
Maximum Operating Frequency	2.13GHz.

All types of EUT have been tested. We present the worst case test data (Configurations: 1) in the report. The test configurations are listed below:

Configurations

Configurations	CPU
1	Intel® Atom D2550 @1.86GHz
2	Intel® Atom D2700 @2.13GHz

EMI Noise Source

Motherboard Crystal	32.768KHz (X1)
	14.318MHz (X2)
	25MHz (X4)
	25MHz(Y1)
	25MHz (Y2)
	27MHz (Y3)
	25MHz (U26)
USB Flash Crystal	12MHz (Y1)
SATA Board Crystal	20MHz (Y1)

EMI Solution

1. Added one core on the Power Supply DC Cable.
2. Added one Gasket on the housing contact to HDMI Port & RJ45 Port.

Model Difference

Model	Package	Selling Markets
TS-269	Color box	Commercial storage related products supply chain management
TS-269 Pro	Color box	Commercial General Monitor storage related products
TS-269j	Color box	General Monitor storage related products
TS-269L	Color box	General Monitor related products supply chain management
TS-269Lite	Color box	General intelligent home related products supply chain management
TS-269H	Color box	General Media related products supply chain management
NAS-269G	Brown paper box (NO QNAP Logo)	Commercial Storage equipment Tender and Cooperation plan
NAS-269H	Brown paper box (NO QNAP Logo)	General Storage equipment Tender and Cooperation plan
VS-2004 Pro+	Carton box	General Monitor storage related products supply chain management
VS-2008 Pro+	Carton box	General Monitor storage related products supply chain management
VS-2012 Pro+	Carton box	Commercial Monitor storage related products supply chain management
VS-2016 Pro+	Carton box	Professional Monitor storage related products supply chain management
VS-2020 Pro+	Carton box	Industrial Monitor storage related products supply chain management
VS-2024 Pro+	Carton box	Large Monitor storage related products supply chain management
NVR-2004 Pro+	Carton box	General Monitor storage Tender product
NVR-2008 Pro+	Carton box	Commercial Monitor storage Tender product
NVR-2012 Pro+	Carton box	Commercial Monitor storage Tender product
NVR-2016 Pro+	Carton box	Professional Monitor storage Tender product
NVR-2020 Pro+	Carton box	Industrial Monitor storage Tender product
NVR-2024 Pro+	Carton box	Large Monitor storage Tender product
NVR-2004G+	Carton box (NO QNAP Logo)	General video Image storage Cooperation plan
NVR-2008G+	Carton box (NO QNAP Logo)	General video Image storage Cooperation plan
NVR-2012G+	Carton box (NO QNAP Logo)	Commercial video Image storage Cooperation plan
NVR-2016G+	Carton box (NO QNAP Logo)	Professional video Image storage Cooperation plan
NVR-2020G+	Carton box (NO QNAP Logo)	Industrial Image storage Cooperation plan
NVR-2024G+	Carton box (NO QNAP Logo)	Large video Image storage Cooperation plan
VS-2000 Pro+	Carton box	General Professional Monitor storage related products supply chain management
NVR-2000 Pro+	Brown box	General Professional Monitor storage Tender product
NVR-2000G+	Brown box	General Professional Image storage Cooperation plan

1.4 Description of Support Equipment

Unit	Model Serial No.	Brand	Power Cord	FCC ID
Notebook Personal Computer	Latitude D400 S/N: N/A	DELL	Non-shielded, Detachable	FCC DOC
Rack mountable Switch	DGS-1008D	D-Link	D-Link (Model:AF-1205-B)	FCC DOC
External HDD Enclosure USB2.0*3	RD1000 S/N: NA	DELL	Non-shielded, Detachable	FCC DOC
External HDD Enclosure USB3.0*2	WDBACY5000ABK-PESN S/N: XH1E31FSV80	WD	N/A	FCC DOC
E-SATA External Hard Disk	NST-200SU-BK	Vantec	Non-shielded, Detachable	FCC DOC
24” LCD Monitor	2408WFP S/N: N/A	DELL	Non-shielded, Detachable	FCC DOC

1.5 Software for Controlling Support Unit

Test programs exercising various part of EUT were used. The programs were executed as follows:

A. Send EUT Information to the video port device (LCD Monitor).
B. Read and write to the disk drives.
C. Send package to the Router LAN port (Router).
D. Receive and transmit package of EUT to the Rack mountable Switch HUB through LAN port.
E. Used Tfgen.exe to send signal to EUT RJ45 port through PC RJ45 port.
F. Read and write data in the USB2.0 Hard Disk through EUT USB2.0 port.
G. Read and write data in the USB3.0 Hard Disk through EUT USB3.0 port.
H. Read and write data in the E-SATA Hard Disk through EUT E-SATA port.
I. Search External HDD from PC RJ45 to EUT RJ45 with Finder.exe.
J. Repeat the above steps.

	Filename	Issued Date
External HDD Enclosure USB2.0	InterEMC.exe	9/04/2000
External HDD Enclosure USB3.0	InterEMC.exe	9/04/2000
E-SATA External Hard Disk	InterEMC.exe	9/04/2000
LAN	ping.exe	05/05/1999
LAN	Tfgen.exe	06/23/1999
EUT	Finder.exe	11/15/2008
EUT Hard Disk	InterEMC.exe	9/04/2000

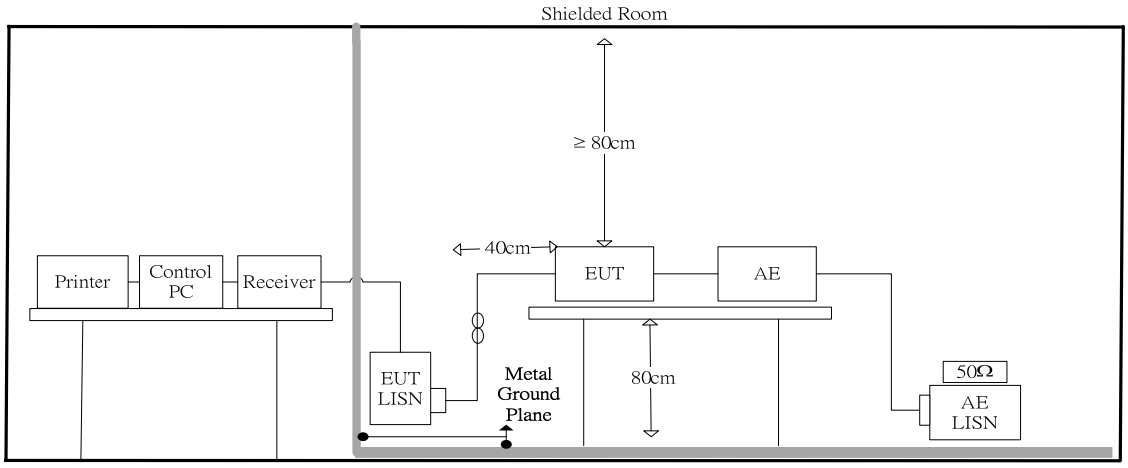
1.6 I/O Cable Condition of EUT and Support Units

Description	Path	Cable Length	Cable Type	Connector Type
AC Power Cord	110V (~240V) to EUT SPS	1.8M	Non-shielded, Detachable	Plastic Head
USB2.0 Data Cable*3	External HDD Enclosure USB2.0 Port to EUT USB2.0 Port	1.8M	Non-shielded, Detachable (with core)	Metal Head
USB3.0 Data Cable*2	External HDD Enclosure USB3.0 Port to EUT USB3.0 Port	1.0M	Shielded, Detachable	Metal Head
E-SATA Data Cable	External Hard Disk E-SATA Port to EUT E-SATA Port	1.0M	Shielded, Detachable	Metal Head
LAN Data Cable	Switch HUB LAN Port to NB LAN Port	1.0M	Non-shielded, Detachable	RJ-45, with Plastic Head
LAN Data Cable*2	Switch HUB LAN Port to EUT LAN Port	10M	Non-shielded, Detachable	RJ-45, with Plastic Head
Display Data Cable	LCD Monitor HDMI Port to EUT HDMI Port	1. 8M	Shielded, Detachable	Metal Head

2. Power Main Port Conducted Emissions

2.1 Test Setup and Procedure

2.1.1 Test Setup



2.1.2 Test Procedure

The measurements are performed in a 3.5m x 3.4m x 2.5m shielded room, which referred as Conduction 01 test site, or a 3m x 3m x 2.3m test site, which referred as Conduction 02 test site. The EUT was placed on non-conduction 1.0m x 1.5m table, which is 0.8 meters above an earth-grounded.

Power to the EUT was provided through the LISN which has the Impedance (50ohm/50uH) vs. Frequency Characteristic in accordance with the standard. Power to the LISNs were filtered to eliminate ambient signal interference and these filters were bonded to the ground plane. Peripheral equipment required to provide a functional system (support equipment) for EUT testing was powered from the second LISN through a ganged, metal power outlet box which is bonded to the ground plane at the LISN.

The interconnecting cables were arranged and moved to get the maximum measurement. Both the line of power cord, hot and neutral, were measured.

The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

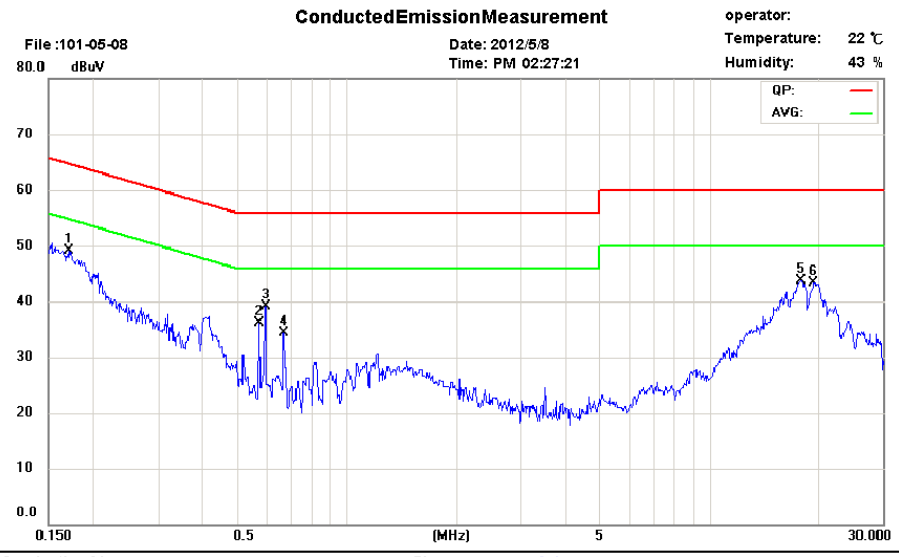
2.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

Frequency Range:	150KHz--30MHz
Detector Function:	Quasi-Peak / Average Mode
Resolution Bandwidth:	9KHz

2.2 Conduction Test Data: Configuration 1

Table 2.2.1 Power Line Conducted Emissions (Hot)

Test LAB:International Standards Laboratory (Hsichih Site)
Tel:886-2-26462550
Fax:886-2-26464641



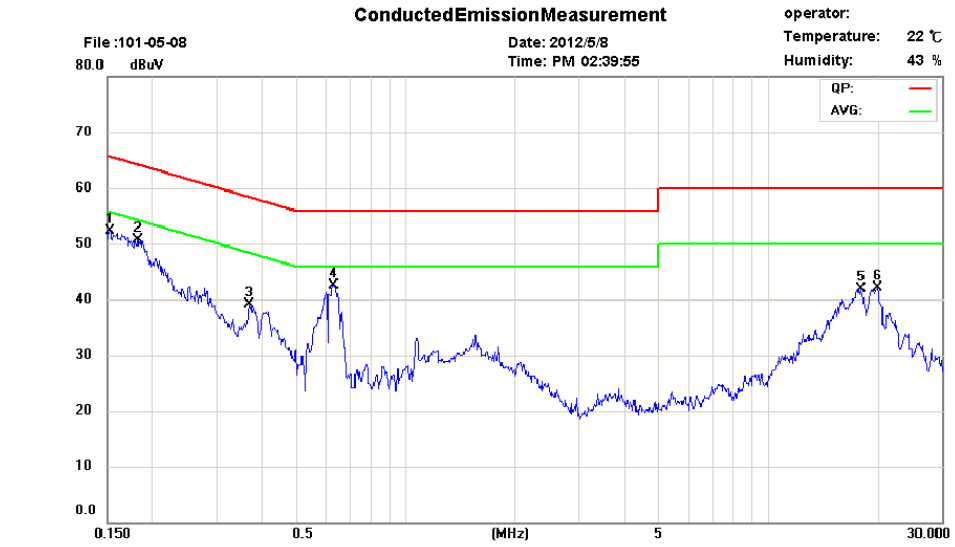
Site: Conduction 01
Phase: L1
Limit: CISPR22 Class B Conduction
Power:
Company:
Witness:
EUT Model:
Execute Program:
Note:

No.	Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct dBuV	QP Limit dBuV	QP Margin dB	AVG Correct dBuV	AVG Limit dBuV	AVG Margin dB	Note
1	0.1700	0.29	0.01	49.00	64.9	-15.9	49.00	54.9	-5.96	
2	0.5720	0.3	0.04	36.13	56.0	-19.8	36.13	46.0	-9.87	
3	0.5945	0.3	0.04	39.08	56.0	-16.9	39.08	46.0	-6.92	
4	0.6665	0.3	0.05	34.22	56.0	-21.7	34.22	46.0	-11.7	
5	17.8250	1.09	0.26	43.71	60.0	-16.2	43.71	50.0	-6.29	
6	19.3250	1.16	0.27	43.34	60.0	-16.6	43.34	50.0	-6.66	

Note:
Margin = Corrected Amplitude - Limit
Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss
A margin of -8dB means that the emission is 8dB below the limit
The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.
If peak data can pass, it will be shown in "QP/AVG Correct" column, if not, QP/AVG data will instead.

Table 2.2.2 Power Line Conducted Emissions (Neutral)

Test LAB:International Standards Laboratory (Hsichih Site)
Tel:886-2-26462550
Fax:886-2-26464641



Site: Conduction 01 Phase: N
Limit: CISPR22 Class B Conduction Power:
Company: Witness:
EUT Model:
Execute Program:
Note:

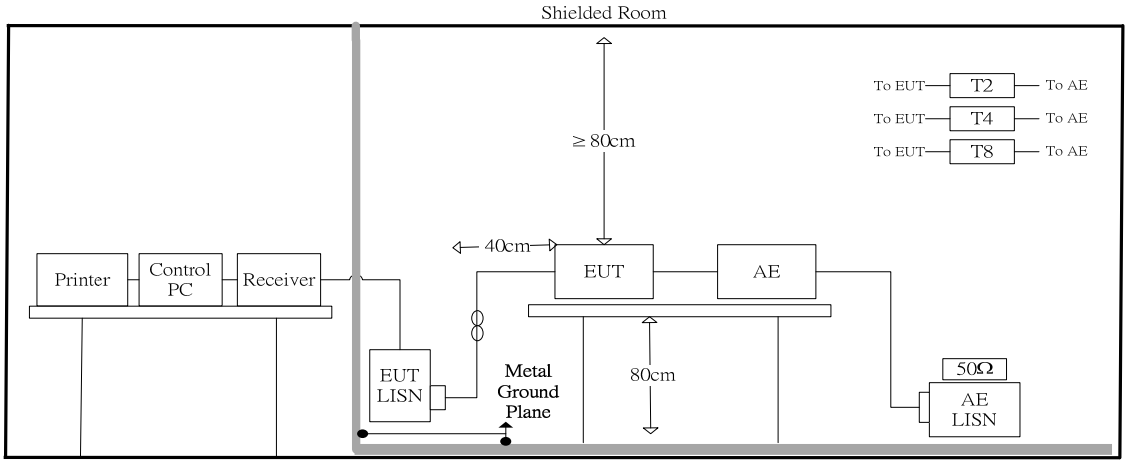
No.	Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct dBuV	QP Limit dBuV	QP Margin dB	AVG Correct dBuV	AVG Limit dBuV	AVG Margin dB	Note
1	0.1524	0.13	0.01	52.35	65.8	-13.5	52.35	55.8	-3.52	
2	0.1822	0.13	0.01	50.63	64.3	-13.7	50.63	54.3	-3.75	
3	0.3681	0.14	0.03	39.15	58.5	-19.3	39.15	48.5	-9.39	
4	0.6305	0.14	0.05	42.53	56.0	-13.4	42.53	46.0	-3.47	
5	17.8750	0.87	0.26	41.88	60.0	-18.1	41.88	50.0	-8.12	
6	19.8500	0.95	0.28	42.01	60.0	-17.9	42.01	50.0	-7.99	

Note:
Margin = Corrected Amplitude - Limit
Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss
A margin of -8dB means that the emission is 8dB below the limit
The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result. If peak data can pass, it will be shown in "QP/AVG Correct" column, if not, QP/AVG data will instead.

3. Telecommunication Port Conducted Emissions

3.1 Test Setup and Procedure

3.1.1 Test Setup



3.1.2 Test Procedure

The measurements are performed in a 3.5m x 3.4m x 2.5m shielded room, which referred as Conduction 01 test site, or a 3m x 3m x 2.3m test site, which referred as Conduction 02 test site. The EUT was placed on non-conduction 1.0m x 1.5m table, which is 0.8 meters above an earth-grounded.

The EUT, any support equipment, and any interconnecting cables were arranged and moved to get the maximum measurement.

Power to the EUT was provided through the LISN which has the Impedance (50 Ohm/50uH) vs. Frequency Characteristic in accordance with the standard. Power to the LISN was filtered to eliminate ambient signal interference and this filter was bonded to ground. Peripheral equipment to provide a functional system (support equipment) for EUT testing was powered through a ganged, metal power outlet box bonded to the ground. AC input power for the auxiliary power outlets was obtained from the same filtered source that provides input power to the LISN.

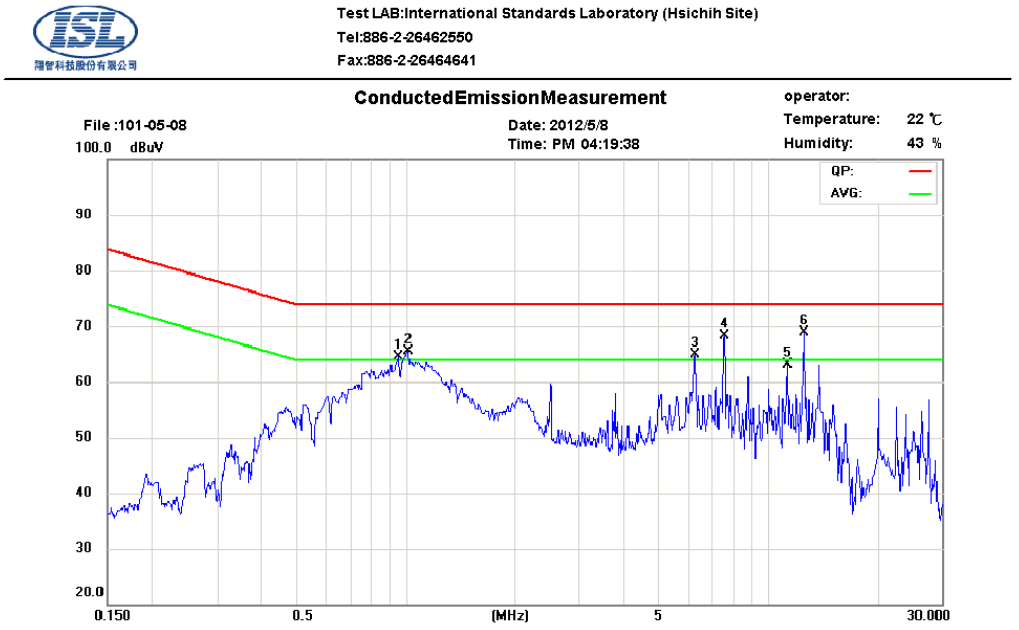
The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information could be useful in reducing their amplitude.

3.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

Frequency Range:	150KHz--30MHz
Detector Function:	Quasi-Peak / Average Mode
Resolution Bandwidth:	9KHz

3.2 Test Data: LAN--10M: Configuration 1

Table 3.2.1 Telecommunication Port Conducted Emission



Site: Conduction 01
Limit: ISN RJ-45 Class B Conduction
Company:
EUT Model:
Execute Program:
Note:

Phase: L2
Power:
Witness:

No.	Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct dBuV	QP Limit dBuV	QP Margin dB	AVG Correct dBuV	AVG Limit dBuV	AVG Margin dB	Note
1	0.9500	9.98	0.07	56.95	74.0	-17.0	42.67	64.0	-21.3	
2	1.0085	9.98	0.07	57.86	74.0	-16.1	43.85	64.0	-20.1	
3	6.2500	9.97	0.18	56.61	74.0	-17.3	45.98	64.0	-18.0	
4	7.5000	9.98	0.2	60.87	74.0	-13.1	49.19	64.0	-14.8	
5	11.2500	9.98	0.23	54.62	74.0	-19.3	41.87	64.0	-22.1	
6	12.5000	9.98	0.23	60.07	74.0	-13.9	49.00	64.0	-15.0	

Note :

Margin = Corrected Amplitude - Limit

Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

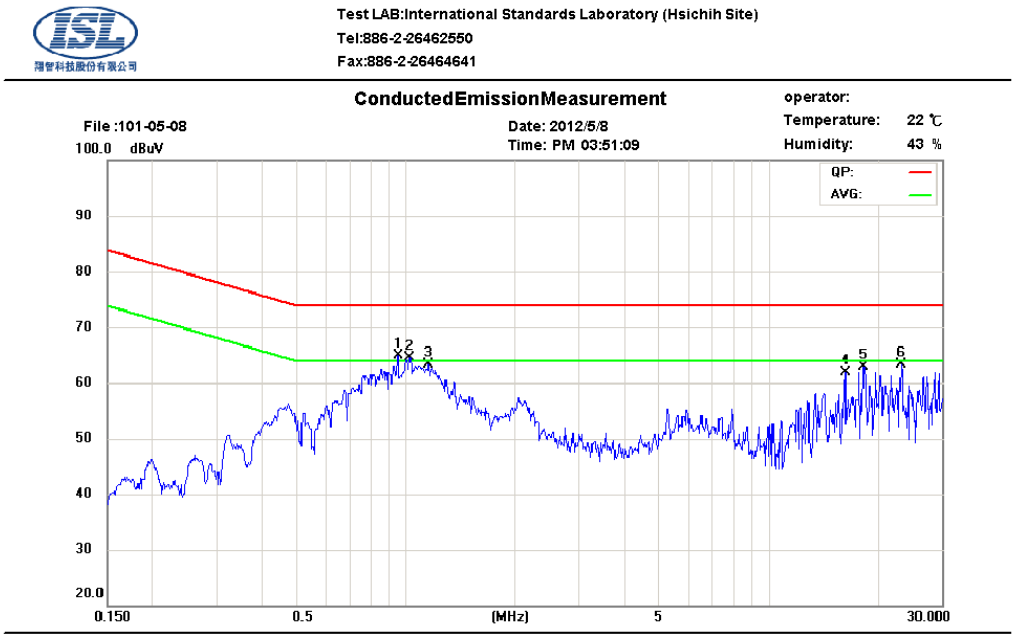
A margin of -8dB means that the emission is 8dB below the limit

The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.

If peak data can pass, it will be shown in "QP/AVG Correct" column, if not, QP/AVG data will instead.

3.3 Test Data: LAN--100M: Configuration 1

Table 3.3.1 Telecommunication Port Conducted Emission



Site: Conduction 01 Phase: L2

Limit: ISN RJ-45 Class B Conduction Power:

Company: Witness:

EUT Model:

Execute Program:

Note:

No.	Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct dBuV	QP Limit dBuV	QP Margin dB	AVG Correct dBuV	AVG Limit dBuV	AVG Margin dB	Note
1	0.9455	9.98	0.07	55.33	74.0	-18.6	41.70	64.0	-22.3	
2	1.0220	9.98	0.07	56.97	74.0	-17.0	47.26	64.0	-16.7	
3	1.1525	9.98	0.08	59.26	74.0	-14.7	45.59	64.0	-18.4	
4	16.2250	9.98	0.25	58.71	74.0	-15.2	56.37	64.0	-7.63	
5	18.2500	9.98	0.27	47.90	74.0	-26.1	45.73	64.0	-18.2	
6	23.1250	9.99	0.3	59.51	74.0	-14.4	56.75	64.0	-7.25	

Note :

Margin = Corrected Amplitude - Limit

Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

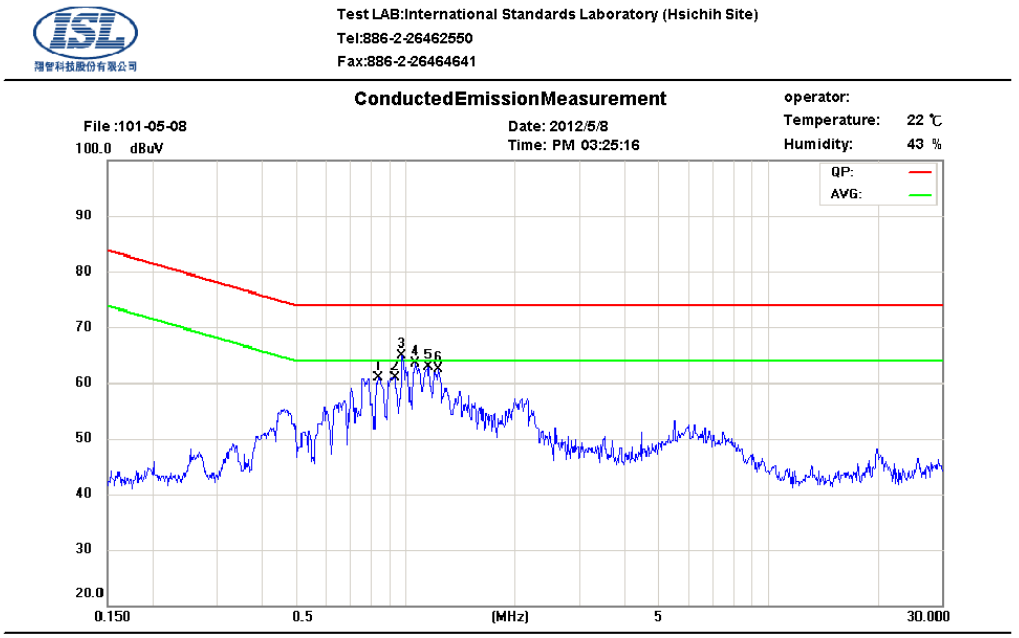
A margin of -8dB means that the emission is 8dB below the limit

The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.

If peak data can pass, it will be shown in "QP/AVG Correct" column, if not, QP/AVG data will instead.

3.4 Test Data: LAN--GIGA: Configuration 1

Table 3.4.1 Telecommunication Port Conducted Emission



Site: Conduction 01 Phase: L2

Limit: ISN RJ-45 Giga Class B Conduction Power:

Company: Witness:

EUT Model:

Execute Program:

Note:

No.	Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct dBuV	QP Limit dBuV	QP Margin dB	AVG Correct dBuV	AVG Limit dBuV	AVG Margin dB	Note
1	0.8420	10.02	0.06	56.26	74.0	-17.7	42.16	64.0	-21.8	
2	0.9275	10.02	0.07	55.30	74.0	-18.7	42.50	64.0	-21.5	
3	0.9770	10.01	0.07	54.50	74.0	-19.5	41.65	64.0	-22.3	
4	1.0535	10.01	0.07	58.05	74.0	-15.9	44.84	64.0	-19.1	
5	1.1525	10.01	0.08	59.97	74.0	-14.0	46.29	64.0	-17.7	
6	1.2245	10.01	0.08	54.68	74.0	-19.3	43.21	64.0	-20.7	

Note :

Margin = Corrected Amplitude - Limit

Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

A margin of -8dB means that the emission is 8dB below the limit

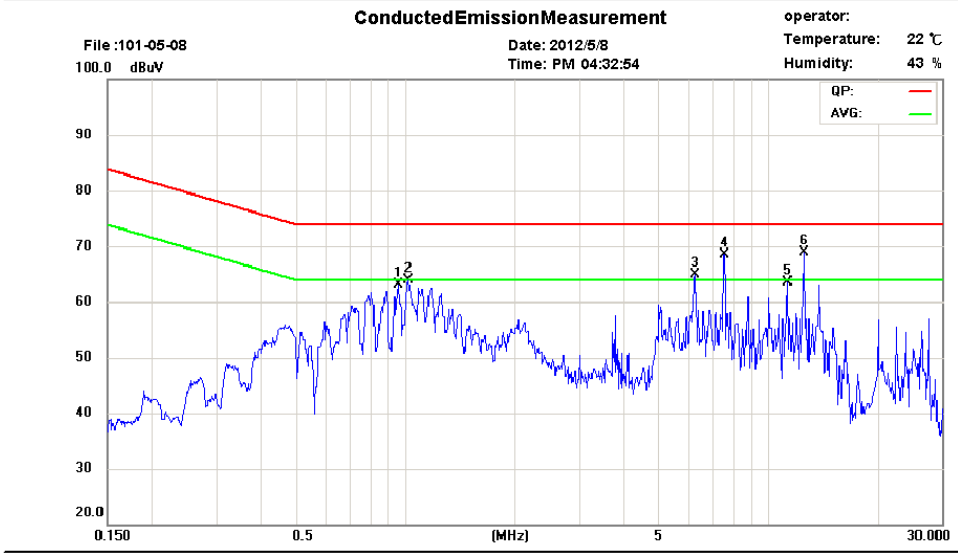
The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.

If peak data can pass, it will be shown in "QP/AVG Correct" column, if not, QP/AVG data will instead.

3.5 Test Data: LAN--10M: Configuration 2

Table 3.5.1 Telecommunication Port Conducted Emission

Test LAB:International Standards Laboratory (Hsichih Site)
Tel:886-2-26462550
Fax:886-2-26464641



Site: Conduction 01 Phase: L2
Limit: ISN RJ-45 Class B Conduction Power:
Company: Witness:
EUT Model:
Execute Program:
Note:

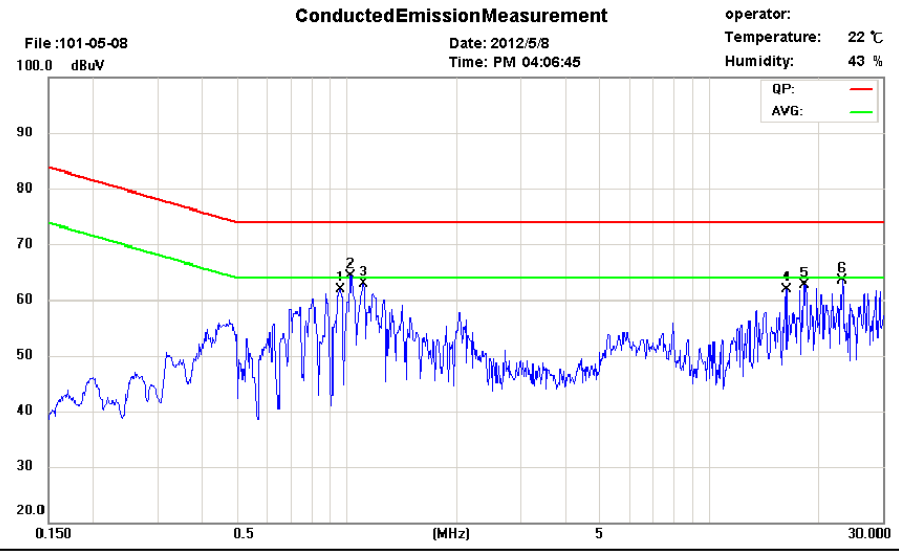
No.	Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct dBuV	QP Limit dBuV	QP Margin dB	AVG Correct dBuV	AVG Limit dBuV	AVG Margin dB	Note
1	0.9500	9.98	0.07	56.61	74.0	-17.3	42.87	64.0	-21.1	
2	1.0130	9.98	0.07	58.88	74.0	-15.1	45.66	64.0	-18.3	
3	6.2500	9.97	0.18	56.55	74.0	-17.4	46.03	64.0	-17.9	
4	7.5000	9.98	0.2	60.89	74.0	-13.1	49.20	64.0	-14.8	
5	11.2500	9.98	0.23	54.62	74.0	-19.3	41.86	64.0	-22.1	
6	12.5000	9.98	0.23	60.03	74.0	-13.9	46.61	64.0	-17.3	

Note :
Margin = Corrected Amplitude - Limit
Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss
A margin of -8dB means that the emission is 8dB below the limit
The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.
If peak data can pass, it will be shown in "QP/AVG Correct" column, if not, QP/AVG data will instead.

3.6 Test Data: LAN--100M: Configuration 2

Table 3.6.1 Telecommunication Port Conducted Emission

Test LAB:International Standards Laboratory (Hsichih Site)
Tel:886-2-26462550
Fax:886-2-26464641



Site: Conduction 01 Phase: L2
Limit: ISN RJ-45 Class B Conduction Power:
Company: Witness:
EUT Model:
Execute Program:
Note:

No.	Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct dBuV	QP Limit dBuV	QP Margin dB	AVG Correct dBuV	AVG Limit dBuV	AVG Margin dB	Note
1	0.9545	9.98	0.07	55.12	74.0	-18.8	41.84	64.0	-22.1	
2	1.0220	9.98	0.07	57.22	74.0	-16.7	47.32	64.0	-16.6	
3	1.1075	9.98	0.07	57.79	74.0	-16.2	44.57	64.0	-19.4	
4	16.2250	9.98	0.25	58.73	74.0	-15.2	56.36	64.0	-7.64	
5	18.2500	9.98	0.27	47.92	74.0	-26.0	45.75	64.0	-18.2	
6	23.1250	9.99	0.3	59.51	74.0	-14.4	56.79	64.0	-7.21	

Note :
Margin = Corrected Amplitude - Limit
Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss
A margin of -8dB means that the emission is 8dB below the limit
The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.
If peak data can pass, it will be shown in "QP/AVG Correct" column, if not, QP/AVG data will instead.

3.7 Test Data: LAN--GIGA: Configuration 2

Table 3.7.1 Telecommunication Port Conducted Emission

Test LAB:International Standards Laboratory (Hsichih Site)
Tel:886-2-26462550
Fax:886-2-26464641

ConductedEmissionMeasurement

operator:
Temperature: 22 ℃
Humidity: 43 %

File :101-05-08
Date: 2012/5/8
Time: PM 03:32:05

Site: Conduction 01
Phase: L2
Limit: ISN RJ-45 Giga Class B Conduction
Power:
Company:
Witness:
EUT Model:
Execute Program:
Note:

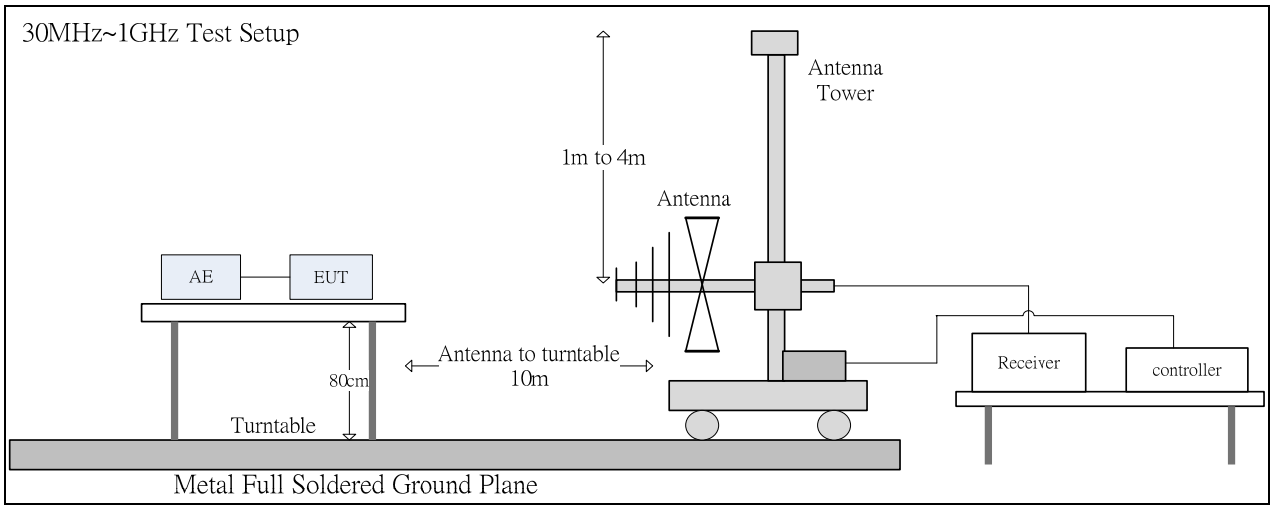
No.	Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct dBuV	QP Limit dBuV	QP Margin dB	AVG Correct dBuV	AVG Limit dBuV	AVG Margin dB	Note
1	0.8105	10.03	0.06	56.15	74.0	-17.8	41.46	64.0	-22.5	
2	0.9815	10.01	0.07	56.55	74.0	-17.4	43.29	64.0	-20.7	
3	1.0175	10.01	0.07	60.29	74.0	-13.7	46.44	64.0	-17.5	
4	1.1165	10.01	0.07	56.89	74.0	-17.1	44.87	64.0	-19.1	
5	1.1615	10.01	0.08	56.84	74.0	-17.1	43.43	64.0	-20.5	
6	1.2470	10.01	0.08	52.52	74.0	-21.4	41.99	64.0	-22.0	

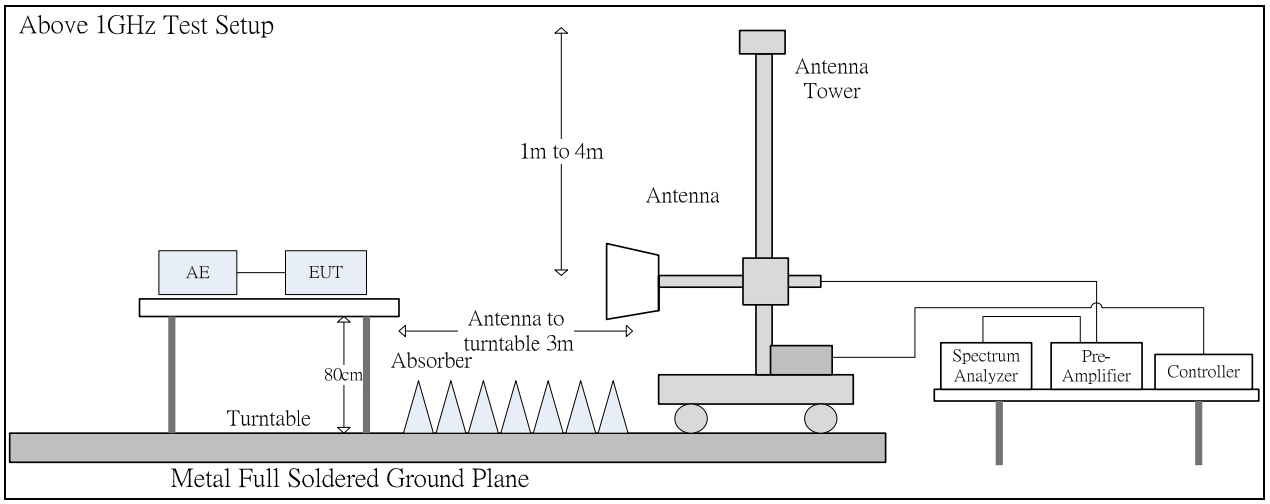
Note :
Margin = Corrected Amplitude - Limit
Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss
A margin of -8dB means that the emission is 8dB below the limit
The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.
If peak data can pass, it will be shown in "QP/AVG Correct" column, if not, QP/AVG data will instead.

4. Radiated Disturbance Emissions

4.1 Test Setup and Procedure

4.1.1 Test Setup





4.1.2 Test Procedure

The radiated emissions test will then be repeated on the open site or chamber to measure the amplitudes accurately and without the multiple reflections existing in the shielded room. The EUT and support equipment are set up on the turntable of one of 10 meter open field sites or 10 meter chamber. Desktop EUT are set up on a wooden stand 0.8 meter above the ground or floor-standing arrangement shall be placed on the horizontal ground reference plane. The test volume for a height of up to 30 cm may be obstructed by absorber placed on the ground plane.

For the initial measurements, the receiving antenna is varied from 1-4 meter height and is changed in the vertical plane from vertical to horizontal polarization at each frequency. The highest emissions between 30 MHz to 1000 MHz were analyzed in details by operating the spectrum analyzer and/or EMI receiver in quasi-peak mode to determine the precise amplitude of the emissions. The highest emissions between 1 GHz to 6 GHz were analyzed in details by operating

the spectrum analyzer in peak and average mode to determine the precise amplitude of the emissions.

At the highest amplitudes observed, the EUT is rotated in the horizontal plane while changing the antenna polarization in the vertical plane to maximize the reading. The interconnecting cables were arranged and moved to get the maximum measurement. Once the maximum reading is obtained, the antenna elevation and polarization will be varied between specified limits to maximize the readings.

The highest internal source of an EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes. If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.

4.1.3 Spectrum Analyzer Configuration (for the frequencies tested)

Frequency Range:	30MHz--1000MHz
Detector Function:	Quasi-Peak Mode
Resolution Bandwidth:	120KHz

Frequency Range:	Above 1 GHz to 6 GHz
Detector Function:	Peak/Average Mode
Resolution Bandwidth:	1MHz

4.2 Radiation Test Data: Configuration 1

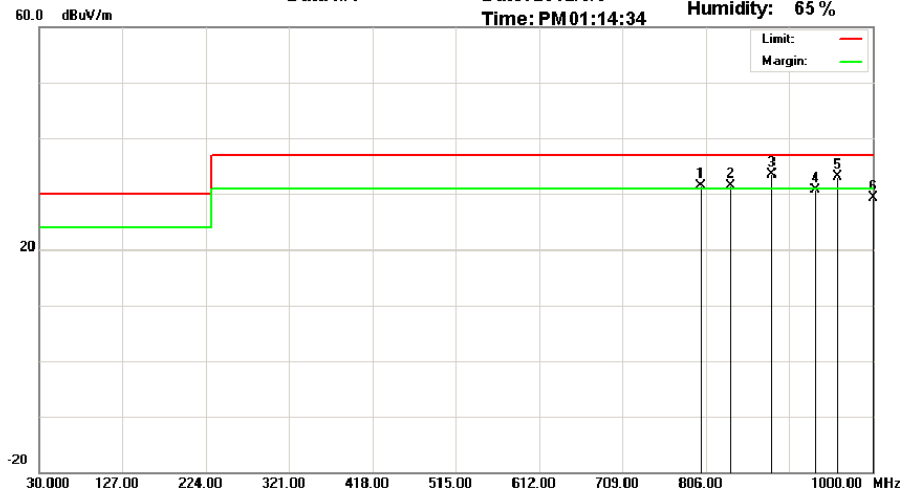
Table 4.2.1 Radiated Emissions (Horizontal)

Test LAB:International Standards Laboratory (Hsichih Site)
Tel:886-2-26462550
Fax:886-2-26464641

Radiated Emission Measurement

Operator:
Temperature: 27 ℃
Humidity: 65 %

File :101-05-09
Data :#1
Date: 2012/5/9
Time: PM 01:14:34



Site : OATS 01
Condition : CISPR22 ClassB 10M Radiation
Company:
EUT Model:
Execute Program:
Note :

Polarization: *Horizontal*
Power:
Witness:

No.	Frequency (MHz)	RX_R (dBuV/m)	Ant_F (dB)	Cab_L (dB)	PreAmp (dB)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
1	799.6200	7.27	21.29	2.98	0	31.54	37.00	-5.46	143	269	QP
2	834.1400	6.75	21.71	3.04	0	31.50	37.00	-5.50	246	263	QP
3	881.6700	8.27	22.15	3.12	0	33.54	37.00	-3.46	229	261	QP
4	932.5610	4.84	22.63	3.21	0	30.68	37.00	-6.32	380	85	QP
5	959.2540	6.95	22.89	3.26	0	33.10	37.00	-3.90	170	357	QP
6	1000.0000	2.66	23.3	3.36	0	29.32	37.00	-7.68	245	39	QP

* Note:
Margin = Corrected Amplitude – Limit
Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
BILOG Antenna Distance: 10 meters

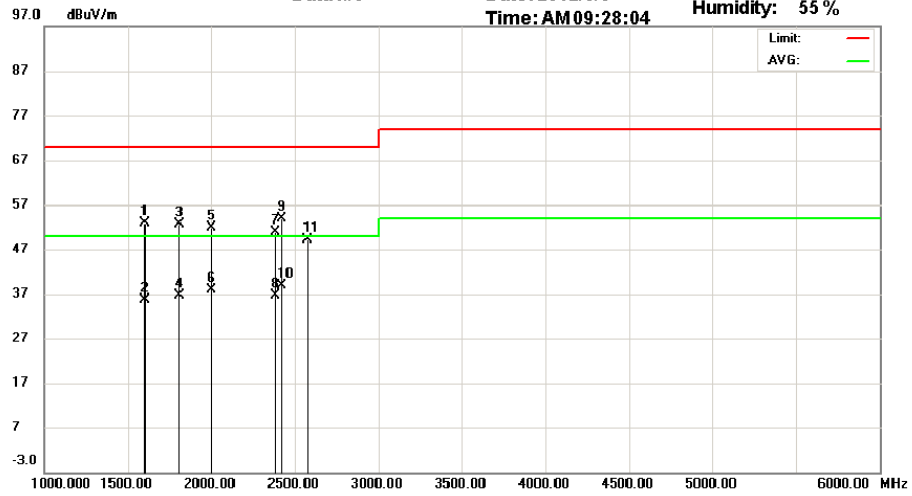
Below 1GHz test, if the peak measured value meets the QP limit, it is unnecessary to perform the QP measurement. measurement.

Test LAB:International Standards Laboratory (Hsichih Site)
Tel:886-2-26462550
Fax:886-2-26464641

Radiated Emission Measurement

Operator:
Temperature: 25 ℃
Humidity: 55 %

File :101-05-08 Data :#5 Date: 2012/5/8 Time: AM 09:28:04



Site : Chamber 01
Condition : CISPR22 ClassB Radiation
Company:
EUT Model:
Execute Program:
Note :

Polarization: *Horizontal*
Power:
Witness:

Mk.	Frequency (MHz)	RX_R (dBuV/m)	Ant_F (dB)	Cab_L (dB)	PreAmp (dB)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
1	1600.160	75.50	25.72	3.74	52.07	52.89	70.00	-17.11	100	76	peak
2	1600.160	58.22	25.72	3.74	52.07	35.61	50.00	-14.39	100	76	AVG
3	1802.340	74.10	26.57	3.98	52.1	52.55	70.00	-17.45	100	286	peak
4	1802.340	58.11	26.57	3.98	52.1	36.56	50.00	-13.44	100	286	AVG
5	2000.353	72.31	27.4	4.22	52.13	51.80	70.00	-18.20	100	160	peak
6	2000.353	58.32	27.4	4.22	52.13	37.81	50.00	-12.19	100	160	AVG
7	2378.686	70.20	28.23	4.61	52.09	50.95	70.00	-19.05	100	146	peak
8	2378.686	55.98	28.23	4.61	52.09	36.73	50.00	-13.27	100	146	AVG
9	2425.064	73.03	28.34	4.66	52.09	53.94	70.00	-16.06	100	146	peak
10	2425.064	57.92	28.34	4.66	52.09	38.83	50.00	-11.17	100	146	AVG
11	2570.513	67.61	28.74	4.81	52.09	49.07	70.00	-20.93	100	164	peak

*:Maximum data x:Over limit !:over margin

* Note:
Margin = Corrected Amplitude – Limit
Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
Horn Antenna Distance: 3 meters

Above 1GHz test, if the peak measured value meets the average limit, it is unnecessary to perform the average measurement.

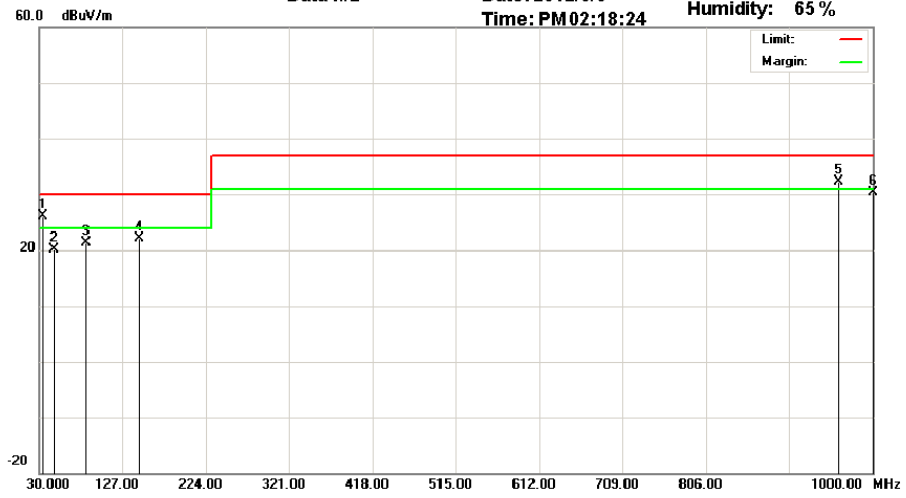
Table 4.2.2 Radiated Emissions (Vertical)

Test LAB:International Standards Laboratory (Hsichih Site)
Tel:886-2-26462550
Fax:886-2-26464641

Radiated Emission Measurement

Operator:
Temperature: 27 ℃
Humidity: 65 %

File :101-05-09
Data :#2
Date: 2012/5/9
Time: PM 02:18:24



Site : OATS 01
Condition : CISPR22 ClassB 10M Radiation
Company:
EUT Model:
Execute Program:
Note :

Polarization: Vertical
Power:
Witness:

No.	Frequency (MHz)	RX_R (dBuV/m)	Ant_F (dB)	Cab_L (dB)	PreAmp (dB)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
1	33.6500	7.08	18.47	0.61	0	26.16	30.00	-3.84	141	278	QP
2	46.8500	10.02	9.31	0.71	0	20.04	30.00	-9.96	125	294	QP
3	84.3590	12.65	7.73	0.92	0	21.30	30.00	-8.70	149	292	QP
4	145.8400	8.09	12.89	1.2	0	22.18	30.00	-7.82	100	175	QP
5	959.3700	6.15	22.89	3.26	0	32.30	37.00	-4.70	333	261	QP
6	1000.0000	3.66	23.3	3.36	0	30.32	37.00	-6.68	122	248	QP

* Note:
Margin = Corrected Amplitude – Limit
Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
BILOG Antenna Distance: 10 meters

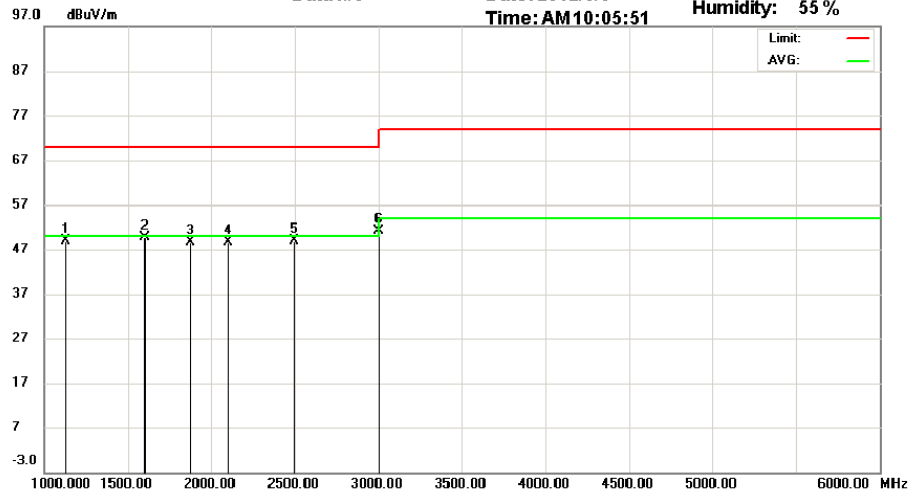
Below 1GHz test, if the peak measured value meets the QP limit, it is unnecessary to perform the QP measurement. measurement.

Test LAB:International Standards Laboratory (Hsichih Site)
Tel:886-2-26462550
Fax:886-2-26464641

Radiated Emission Measurement

Operator:
Temperature: 25 ℃
Humidity: 55 %

File :101-05-08 Data :#6 Date: 2012/5/8 Time: AM10:05:51



Site : Chamber 01
Condition : CISPR22 ClassB Radiation
Company:
EUT Model:
Execute Program:
Note :

Polarization: Vertical
Power:
Witness:

Mk.	Frequency (MHz)	RX_R (dBuV/m)	Ant_F (dB)	Cab_L (dB)	PreAmp (dB)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
1	1128.205	73.12	24.63	3.11	51.97	48.89	70.00	-21.11	191	58	peak
2	1600.961	72.26	25.72	3.74	52.07	49.65	70.00	-20.35	160	53	peak
3	1865.385	69.95	26.83	4.06	52.11	48.73	70.00	-21.27	198	340	peak
4	2105.769	68.91	27.63	4.33	52.12	48.75	70.00	-21.25	157	120	peak
5	2498.397	67.64	28.5	4.74	52.08	48.80	70.00	-21.20	171	320	peak
6	3003.205	67.73	30.21	5.23	52.16	51.01	74.00	-22.99	120	89	peak

*:Maximum data x:Over limit !:over margin

* Note:
Margin = Corrected Amplitude – Limit
Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
Horn Antenna Distance: 3 meters

Above 1GHz test, if the peak measured value meets the average limit, it is unnecessary to perform the average measurement.

5. Electrostatic discharge (ESD) immunity

5.1 Test Specification

Port:	Enclosure
Basic Standard:	EN 61000-4-2/ IEC EN61000-4-2 (details referred to Sec 1.2)
Test Level:	Air +/- 2 kV, +/- 4 kV, +/- 8 kV Contact +/- 4 kV
Criteria:	B
Test Procedure	refer to ISL QA -T4-E-S7
Temperature:	16 °C
Humidity:	56%

Selected Test Point

Air: discharges were applied to slots, aperture or insulating surfaces. 10 single air discharges were applied to each selected points.

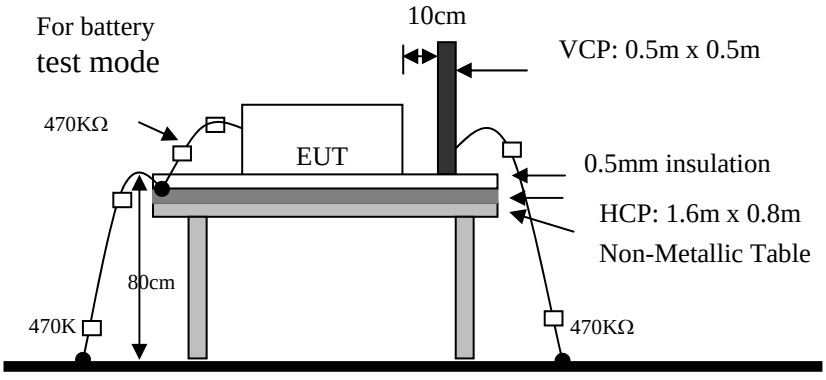
Contact: Total 200 discharges minimum were to the selected contact points.

Indirect Contact Points: 25 discharges were applied to center of one edge of VCP and each EUT side of HCP with 10 cm away from EUT.

Red arrow lines indicate the contact points, and blue arrow lines indicate the air points.

5.2 Test Setup

EUT is 1m from the wall and other metallic structure. When Battery test mode is needed, a cable with one 470KΩ resister at two rare ends is connected from metallic part of EUT and screwed to HCP.



5.3 Test Result

Performance of EUT complies with the given specification.

TestPoint:

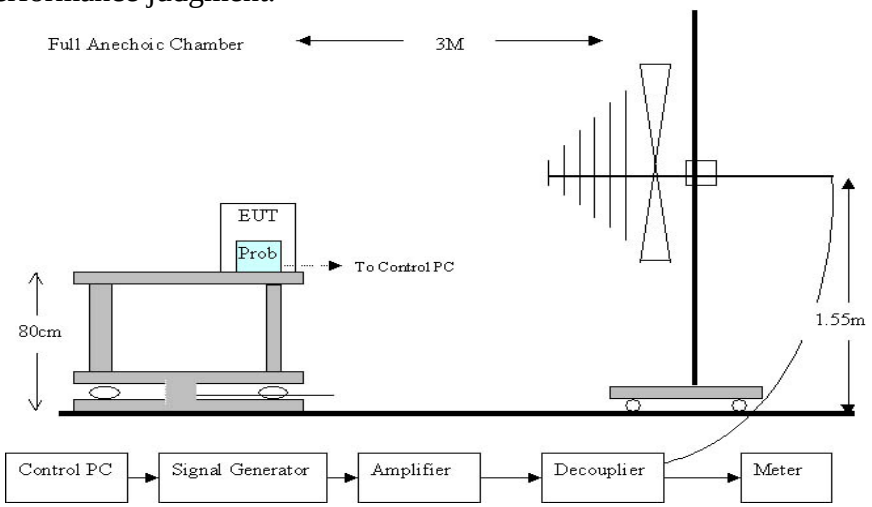
6. Radio-Frequency, Electromagnetic Field immunity

6.1 Test Specification

Port:	Enclosure
Basic Standard:	EN 61000-4-3/ IEC EN61000-4-3 (details referred to Sec 1.2)
Test Level:	3 V/m
Modulation:	AM 1KHz 80%
Frequency range:	80 MHz~1 GHz
Frequency Step:	1% of last step frequency
Dwell time:	3s
Polarization:	Vertical and Horizontal
EUT Azimuth Angle	☒0° ☒90° ☒180° ☒270°
Criteria:	A
Test Procedure	refer to ISL QA -T4-E-S8
Temperature:	22°C
Humidity:	57%

6.2 Test Setup

The field sensor is placed at one calibration grid point to check the intensity of the established fields on both polarizations. EUT is adjusted to have each side of EUT face coincident with the calibration plane. A CCD camera and speakers are used to monitor the condition of EUT for the performance judgment.



6.3 Test Result

Performance of EUT complies with the given specification.

7. Electrical Fast transients/burst immunity

7.1 Test Specification

Port:	AC mains
Basic Standard:	EN 61000-4-4/ IEC EN61000-4-4 (details referred to Sec 1.2)
Test Level:	AC Power Port: +/- 1 kV (I/O Cables): +/- 0.5 kV
Rise Time:	5ns
Hold Time:	50ns
Repetition Frequency:	5KHz
Criteria:	B
Test Procedure	refer to ISL QA -T4-E-S9
Temperature:	22 °C
Humidity:	55%

Test Procedure

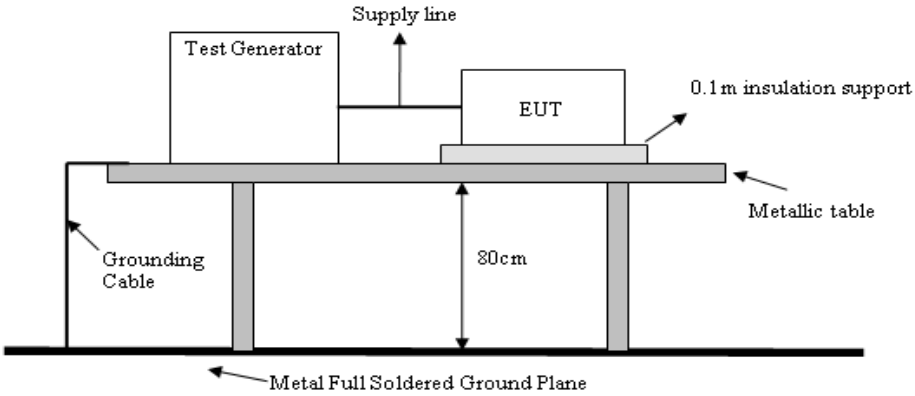
The EUT was setup on a nonconductive table 0.1 m above a reference ground plane.

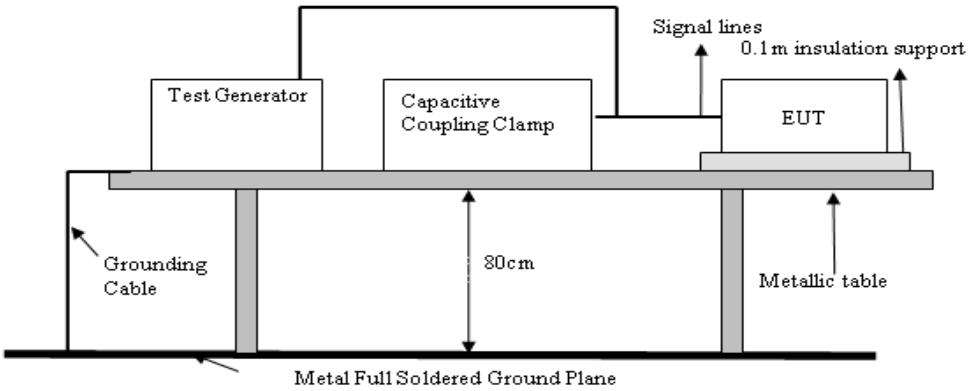
Test Points	Polarity	Result	Comment
Line	+	N	60 sec
	-	N	60 sec
Neutral	+	N	60 sec
	-	N	60 sec
Ground	+	N	60 sec
	-	N	60 sec
Line to Neutral	+	N	60 sec
	-	N	60 sec
Line to Ground	+	N	60 sec
	-	N	60 sec
Neutral to Ground	+	N	60 sec
	-	N	60 sec
Line to Neutral to Ground	+	N	60 sec
	-	N	60 sec
Capacitive coupling clamp	+	N	60 sec
	-	N	60 sec

Note: 'N' means normal, the EUT function is correct during the test.

7.2 Test Setup

EUT is at least 50cm from the conductive structure.





7.3 Test Result

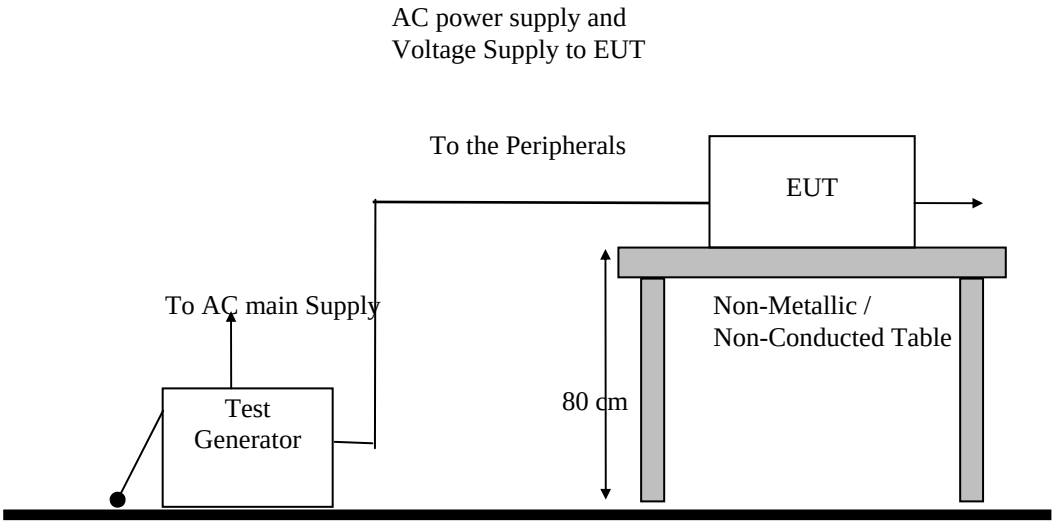
Performance of EUT complies with the given specification.

8. Surge Immunity

8.1 Test Specification

Port:	AC mains	Signal and telecommunication port-NA
Basic Standard:	EN 61000-4-5/ IEC EN61000-4-5 (details referred to Sec 1.2)	
Test Level:	Line to Line: +/- 0.5 kV, +/- 1 kV Line to Earth: +/- 0.5 kV, +/- 1 kV, +/- 2kV	Line to Earth: +/- 0.5 kV, +/- 1 kV, +/- 4 kV
Rise Time:	1.2us	10us
Hold Time:	50us	700us
Repetition Rate:	30 second	60 second
Angle:	☒0° ☒90° ☒180° ☒270°	NA
Criteria:	B	C
Remarks:		Where the coupling network for the 10/700 us waveform affects the functioning of high speed data ports, the test shall be carried out using a 1,2/50 (8/20) us waveform and appropriate coupling network.
Test Procedure:	refer to ISL QA -T4-E-S10	
Temperature:	22°C	
Humidity:	55%	

8.2 Test Setup



8.3 Test Result

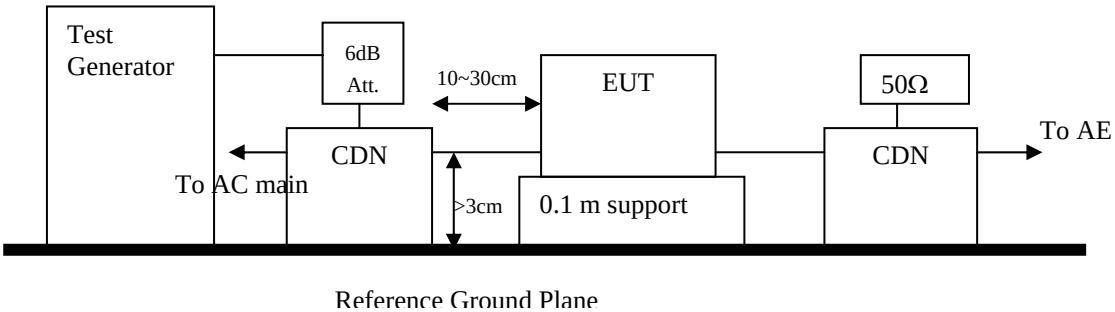
Performance of EUT complies with the given specification.

9. Immunity to Conductive Disturbance

9.1 Test Specification

Port:	AC mains
Basic Standard:	EN 61000-4-6/ IEC EN61000-4-6 (details referred to Sec 1.2)
Test Level:	3 V
Modulation:	AM 1KHz 80%
Frequency range:	0.15 MHz - 80MHz
Frequency Step:	1% of last Frequency
Dwell time:	3s
Criteria:	A
CDN Type:	CDN M2+M3, CDN T2, CDN T4, CDN T8, EM Clamp
Test Procedure	refer to ISL QA -T4-E-S11
Temperature:	16°C
Humidity:	56%

9.2 Test Setup



9.3 Test Result

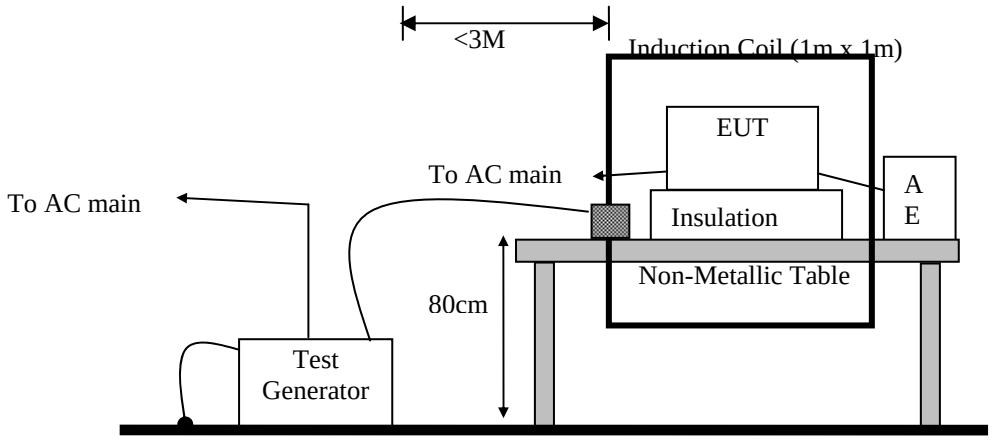
Performance of EUT complies with the given specification.

10. Power Frequency Magnetic Field immunity

10.1 Test Specification

Port:	Enclosure
Basic Standard:	EN 61000-4-8/ IEC EN61000-4-8 (details referred to Sec 1.2)
Test Level:	1A/m
Polarization:	X, Y, Z
Criteria:	A
Test Procedure	refer to ISL QA -T4-E-S12
Temperature:	22°C
Humidity:	55%

10.2 Test Setup



10.3 Test Result

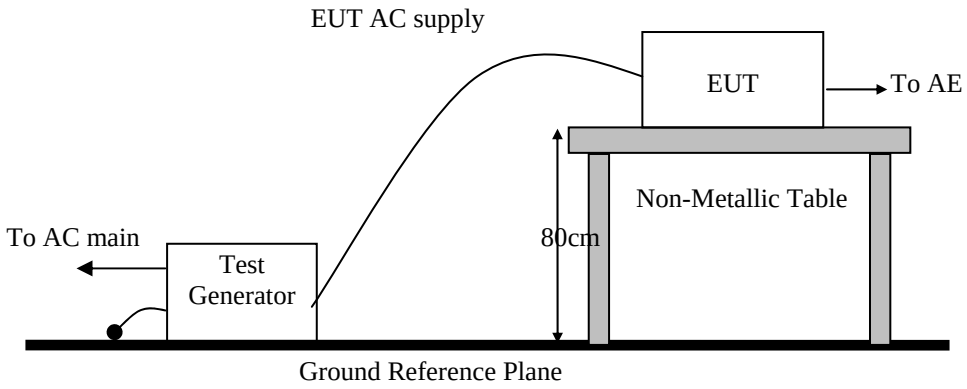
Performance of EUT complies with the given specification.

11. Voltage Dips, Short Interruption and Voltage Variation immunity

11.1 Test Specification

Port:	AC mains
Basic Standard:	EN 61000-4-11/ IEC EN61000-4-11 (details referred to Sec 1.2)
Test Level: Criteria:	>95% in 0.5 period B
Test Level: Criteria:	30% in 25 period C
Test Level: Criteria:	>95% in 250 period C
Phase:	0°; 180°
Test intervals:	3 times with 10s each
Test Procedure	refer to ISL QA -T4-E-S13
Temperature:	22°C
Humidity:	55%

11.2 Test Setup



11.3 Test Result

Performance of EUT complies with the given specification.

12. Harmonics

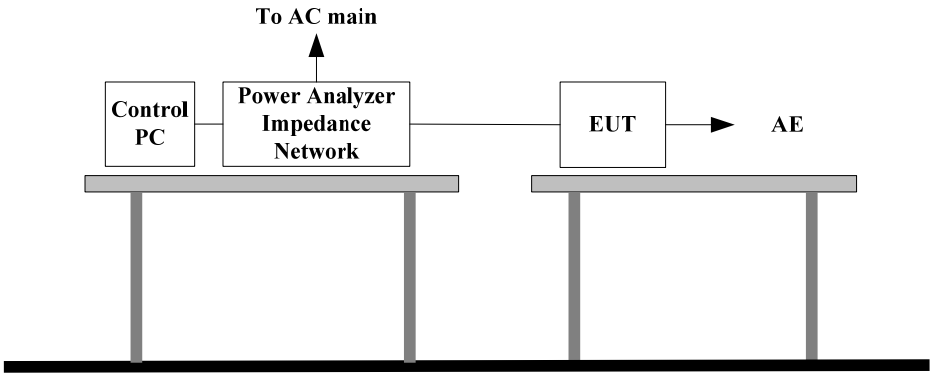
12.1 Test Specification

Port:	AC mains
Active Input Power:	>75W
Basic Standard:	EN61000-3-2/IEC 61000-3-2 (details referred to Sec 1.2)
Test Duration:	2.5min
Class:	D
Test Procedure	refer to ISL QA -T4-E-S14
Temperature:	23°C
Humidity:	60%

Test Procedure

The EUT is supplied in series with shunts or current transformers from a source having the same nominal voltage and frequency as the rated supply voltage and frequency of the EUT. The EUT is configured to its rated current with additional resistive load when the testing is performed.
Equipment having more than one rated voltage shall be tested at the rated voltage producing the highest harmonics as compared with the limits.

12.2 Test Setup



12.3 Test Result

Performance of EUT complies with the given specification.

13. Voltage Fluctuations

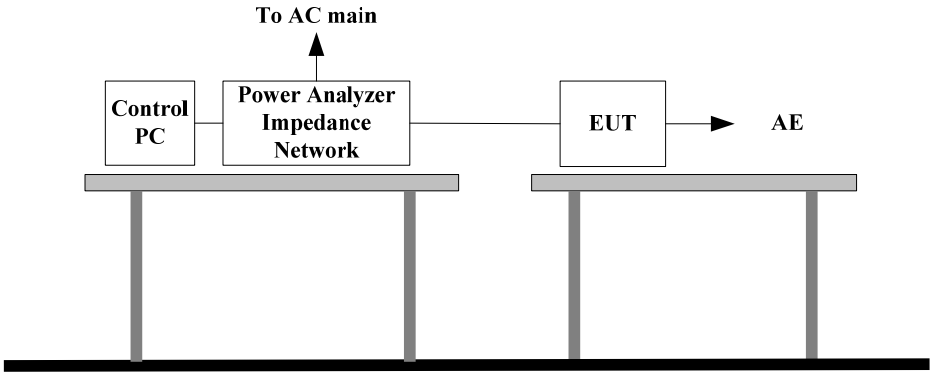
13.1 Test Specification

Port:	AC mains
Basic Standard:	EN61000-3-3/IEC61000-3-3 (details referred to Sec 1.2)
Test Procedure	refer to ISL QA -T4-E-S14
Observation period:	For Pst 10min
	For Plt 2 hours
Temperature:	23°C
Humidity:	60%

Test Procedure

The EUT is supplied in series with reference impedance from a power source with the voltage and frequency as the nominal supply voltage and frequency of the EUT.

13.2 Test Setup



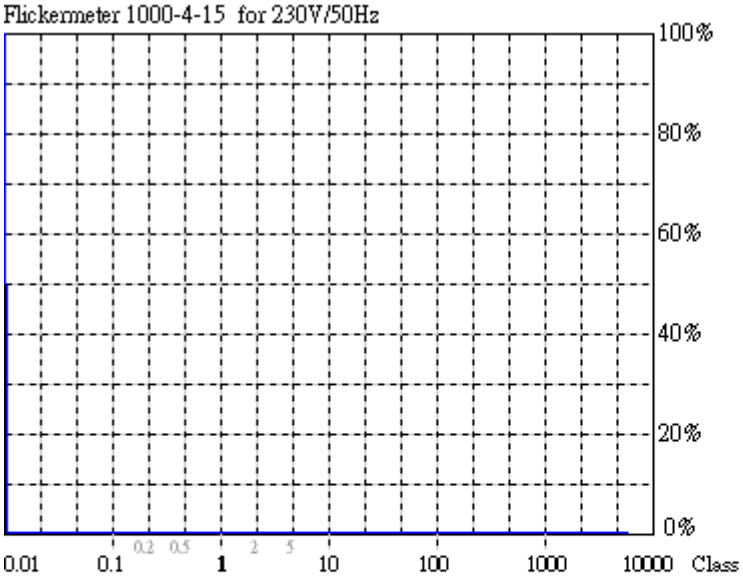
13.3 Test Result

Performance of EUT complies with the given specification.

TestData:

10Min

Flickermeter 1000-4-15 for 230V/50Hz



Actual Flicker (Fli):	**0.00**
Short-term Flicker (Pst):	**0.07**
Limit (Pst):	1.00
Long-term Flicker (Plt):	**0.07**
Limit (Plt):	0.65
Maximum Relative Volt. Change (dmax):	**0.00%**
Limit (dmax):	4.00%
Relative Steady-state Voltage Change (dc):	**0.03%**
Limit (dc):	3.30%
Maximum Interval exceeding 3.30% (dt):	**0.00ms**
Limit (dt>Lim):	500ms

Flicker Emission - IEC 61000-3-3 , EN 61000-3-3 , (EN60555-3)

2012/5/11 AM 09:32:5

Urms =	229.7	V	P =	30.53	W
Irms =	0.313	A	pf =	0.424	

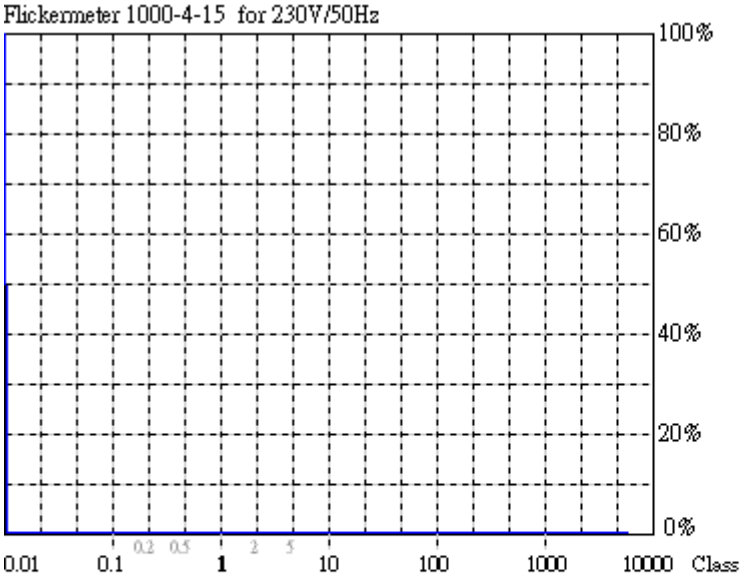
Range:	2 A
V-nom:	230 V
TestTime:	10 min (100%)

Test completed, Result: PASSED

HAR-1000 EMC-Retur

120Min

Flickermeter 1000-4-15 for 230V/50Hz



Actual Flicker (Fli):	**0.00**
Short-term Flicker (Pst):	**0.07**
Limit (Pst):	1.00
Long-term Flicker (Plt):	**0.07**
Limit (Plt):	0.65
Maximum Relative Volt. Change (dmax):	**0.00%**
Limit (dmax):	4.00%
Relative Steady-state Voltage Change (dc):	**0.07%**
Limit (dc):	3.30%
Maximum Interval exceeding 3.30% (dt):	**0.00ms**
Limit (dt>Lim):	500ms

Flicker Emission - IEC 61000-3-3 , EN 61000-3-3 , (EN60555-3)

2012/5/11 AM 11:34:0

Urms =	229.7	V	P =	30.29	W
Irms =	0.313	A	pf =	0.422	

Range:	2 A
V-nom:	230 V
TestTime:	120 min (10000%)

Test completed, Result: PASSED

HAR-1000 EMC-Retur

14. Appendix

14.1 Appendix A: Test Equipment

14.1.1 Test Equipment List

Location CON01	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conduction	Coaxial Cable 1F-C1	EMEC	5D Cable	1F-C1	10/25/2011	10/25/2012
Conduction	LISN 02	EMCO	3825/2	1407	07/28/2011	07/28/2012
Conduction	LISN 03	R&S	ESH3-Z5 831.5518.52	828874/010	07/28/2011	07/28/2012
Conduction	ISN T2 03	FCC	FCC-TLISN-T2-02	20618	07/28/2011	07/28/2012
Conduction	ISN T4 05	FCC	FCC-TLISN-T4-02	20619	07/28/2011	07/28/2012
Conduction	ISN T8 03	FCC	FCC-TLINS-T8-02	20620	07/28/2011	07/28/2012
Conduction	EMI Receiver 15	ROHDE & SCHWARZ	ESCI	101166	04/24/2012	04/24/2013

Location OATS01	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Radiation	BILOG Antenna 10	Sumol Sciences	JB1	A013004-1	07/18/2011	07/18/2012
Radiation	Coaxial Cable 3F-10M	EMCI	CFD400-NL	ISL-R001	03/16/2012	03/16/2013
Radiation	EMI Receiver 13	ROHDE & SCHWARZ	ESCI	101015	02/22/2012	02/22/2013

Location Chamber 01	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Rad. above 1Ghz	Horn Antenna 01	EMCO	3115	9504-4462	11/23/2011	11/23/2012
Rad. above 1Ghz	Horn Antenna 03	COM-Power	AH-826	100A	03/15/2011	03/15/2013
Rad. above 1Ghz	Microwave Cable-06	HUBER SUHNER	SUCFLEX 106	60404/6	07/13/2011	07/13/2012
Rad. above 1Ghz	Preamplifier 17	EMCI	EMC 01630	980009	08/03/2011	08/03/2012
Rad. above 1Ghz	Preamplifier 20	EMCI	EMC051845	980084	10/26/2011	10/26/2012
Rad. above 1Ghz	Spectrum Analyzer 23	ROHDE & SCHWARZ	FSU43	101255	10/06/2011	10/06/2012

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
EN61K-3-2/3	DC Burn-In Load 02	D-RAM	DBS-2100	2100-910027	N/A	N/A
EN61K-3-2/3	Harmonic/Flicker Test System 03	EMC Partner	HARMONICS-1000	178	03/23/2012	03/23/2013
EN61K-4-,4,5,8,11	TRANSIENT 2000 01	EMC Partner	TRANSIENT-2000	950	12/01/2011	12/01/2012
EN61K-4-2	ESD GUN 04	Schaffner	NSG 438	489	03/28/2012	03/28/2013
EN61K-4-3	BILOG Antenna 06	Schaffner	CBL6112B	2754	N/A	N/A
EN61K-4-3	Amplifier 80Mz~1GHz 250W	AR	250W1000A	312494	N/A	N/A
EN61K-4-3	Amplifier 800MHz~3.0GHz 60W	AR	60S1G3	312762	N/A	N/A
EN61K-4-3	Broadband coupler 10K~220Mhz	Amplifier Research	DC2500	19810	N/A	N/A
EN61K-4-3	Broadband Coupler 80M~1GHz	Amplifier Research	DC6180	20364	N/A	N/A
EN61K-4-3	Broadband Coupler 1~4GHz	Werlatone	C5291	6516	N/A	N/A
EN61K-4-3	Coaxial Cable Chmb 04-3M-2	Belden	RG-8/U	Chmb 04-3M-2	N/A	N/A
EN61K-4-3	Signal Generator 03	Anritsu	MG3642A	6200162550	06/10/2011	06/10/2012
EN61K-4-4	Digital Oscilloscope	Tektronix	TDS 684A	B010761	N/A	N/A
EN61K-4-4	EFT Clamp	Precision	1604242	CNEFT1000-103	N/A	N/A
EN61K-4-5	CDN-UTP8 01	EMC Partner	CDN-UTP8	032	12/01/2011	12/01/2012
EN61K-4-5	SURGE-TESTER 01	EMC Partner	MIG0603IN3	778	12/01/2011	12/01/2012
EN61K-4-6	6dB Attenuator	Weinschel Corp	33-6-34	BC5975	N/A	N/A
EN61K-4-6	Amplifier 4-6	Amplifier Research	150A100	1-1-R-02157	N/A	N/A
EN61K-4-6	Attenuator 6dB 4-6	BIRO	100-A-FFN-06	0123	N/A	N/A
EN61K-4-6	CDN M2+M3	Frankonia	M2+M3	A3011016	07/30/2011	07/30/2012
EN61K-4-6	CDN T2 01	Frankonia	T2	A3010003	07/30/2011	07/30/2012
EN61K-4-6	CDN T4 05	FCC Inc.	FCC-801-T4-RJ45	08020	08/26/2011	08/26/2012
EN61K-4-6	CDN T8 01	FCC Inc.	FCC-801-T8-RJ45	08021	08/26/2011	08/26/2012
EN61K-4-6	EM-Clamp 01	FCC	F-203I-23MM	539	N/A	N/A
EN61K-4-6	Coaxial Cable 4-6 01-1	Harbour Industries	M17/128-RG400	4-6 01-1	N/A	N/A
EN61K-4-6	Coaxial Cable 4-6 01-2	Harbour Industries	M17/128-RG400	4-6 01-2	N/A	N/A
EN61K-4-6	Coaxial Cable 4-6 01-3	Harbour Industries	M17/128-RG400	4-6 01-3	N/A	N/A
EN61K-4-6	KAL-AD RJ45S	BIRO			N/A	N/A
EN61K-4-6	KAL-AD T2	BIRO			N/A	N/A
EN61K-4-6	Passive Impedance Adaptor 4-6	FCC	FCC-801-150-50-CDN	9758;9759	N/A	N/A
EN61K-4-6, CISPR 13, Antenna	Signal Generator 02	HP	8648B	3642U01040	08/18/2011	08/18/2012
EN61K-4-8	Magnetic Field Antenna	Precision	TRAIZ44B	MF1000-23	N/A	N/A

PS: N/A => The equipment does not need calibration.

14.1.2 Software for Controlling Spectrum/Receiver and Calculating Test Data

Test Item	Filename	Version
EN61000-3-2	HARCS.EXE	4.16
EN61000-3-3	HARCS.EXE	4.16
EN61000-4-3	Tile.Exe	2.0.P
EN61000-4-6	EN61000-4-6 Application Software	1.13.e
EN61000-4-2	N/A	2.0
EN61000-4-4	Tema.EXE	1.69
EN61000-4-5	Tema.EXE	1.69
EN61000-4-8	N/A	
EN61000-4-11	VDS-2002Rs.EXE	2.00

Radiation/Conduction	Filename	Version	Issued Date
Hsichih Conduction	EZ EMC	1.1.4.2	2/10/2007
Hsichih Radiation	EZ EMC	1.1.4.2	1/24/2007

14.2 Appendix B: Uncertainty of Measurement

The measurement uncertainty refers to CISPR 16-4-2:2003. The coverage factor k = 2 yields approximately a 95 % level of confidence.

<Conduction 01> ± 3.262dB

<OATS 01 (10M)>
Horizontal
30MHz~200MHz: ±4.216 dB
200MHz~1GHz: ±4.438 dB
Vertical
30MHz~200MHz: ±4.342 dB
200MHz~1GHz: ±4.426 dB

<Chamber 01 (3M)>
1GHz~18GHz: ± 3.515dB
18GHz~26.5GHz: ± 3.424dB

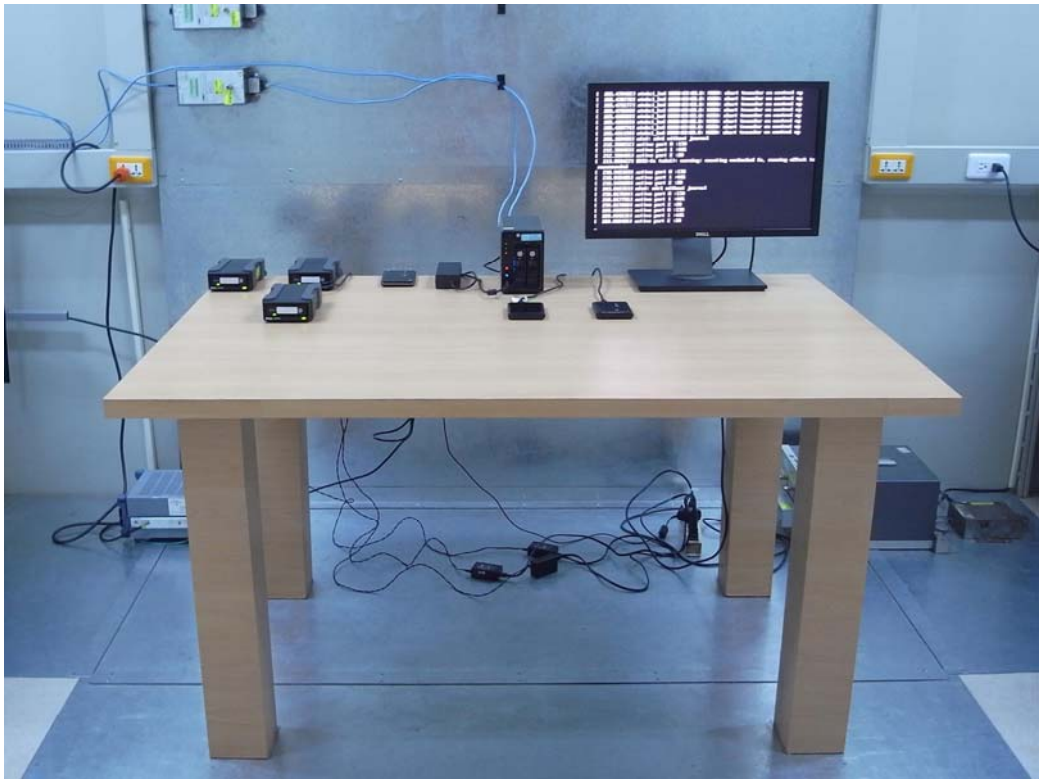
<Immunity 01>

Test item	Uncertainty
EN61000-4-2 (ESD)	
Rise time tr	≦ 15%
Peak current Ip	≦ 6.3%
current at 30 ns	≦ 6.3%
current at 60 ns	≦ 6.3%
EN61000-4-3 (RS)	± 1.776dB
EN61000-4-4 (EFT)	
Time	± 1.427%
Voltage	± 1.110 %
Current	
EN61000-4-5 (Surge)	
Time	± 0.588 %
Voltage	± 1.282 %
Current	± 1.282 %
EN61000-4-6 (CS)	± 1.892dB
CDN	± 1.36dB
EM Clamp	± 3.19dB
EN61000-4-8 (Magnetic)	± 1.728%
EN61000-4-11 (Dips)	
Time	±1.159%
Voltage	±0.100%
Current	±1.177%
EN61000-3-2 (Harmonics)	±1.879 %
EN61000-3-3 (Fluctuations and Flicker)	±1.879 %

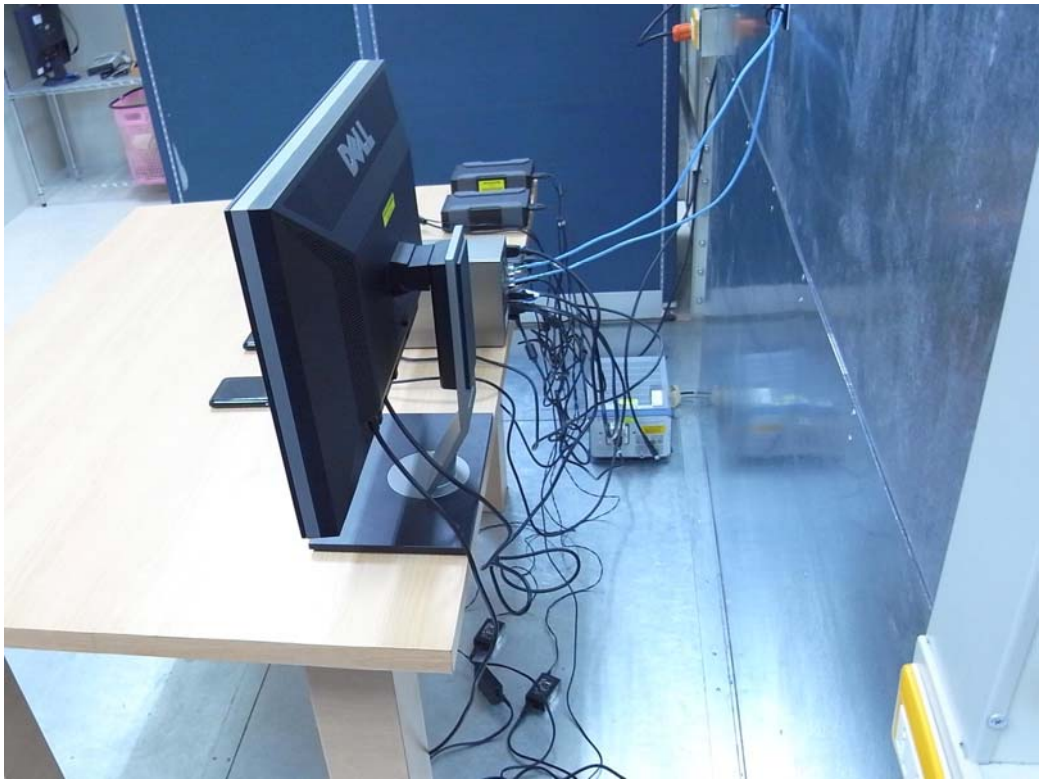
14.3 Appendix C: Photographs of EUT Configuration Test Set Up

14.3.1 Photo of Main Power Port Conducted Emission and Telecommunication Port Conducted Emission Measurement

Front View

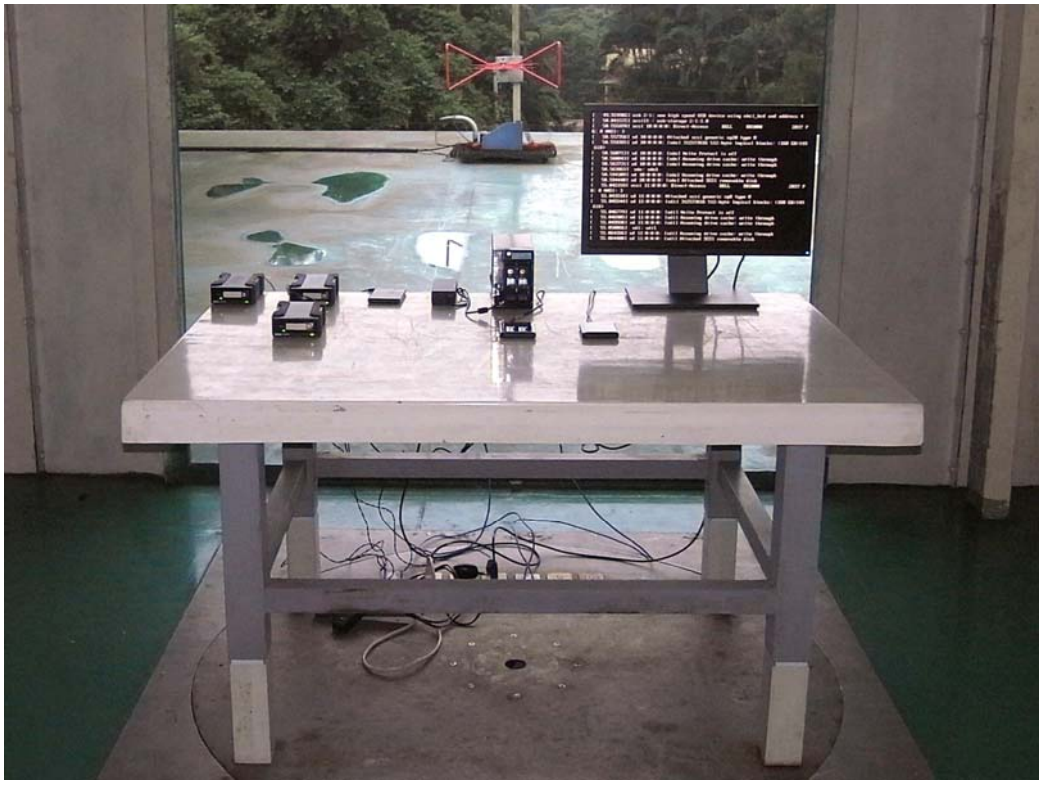


Back View



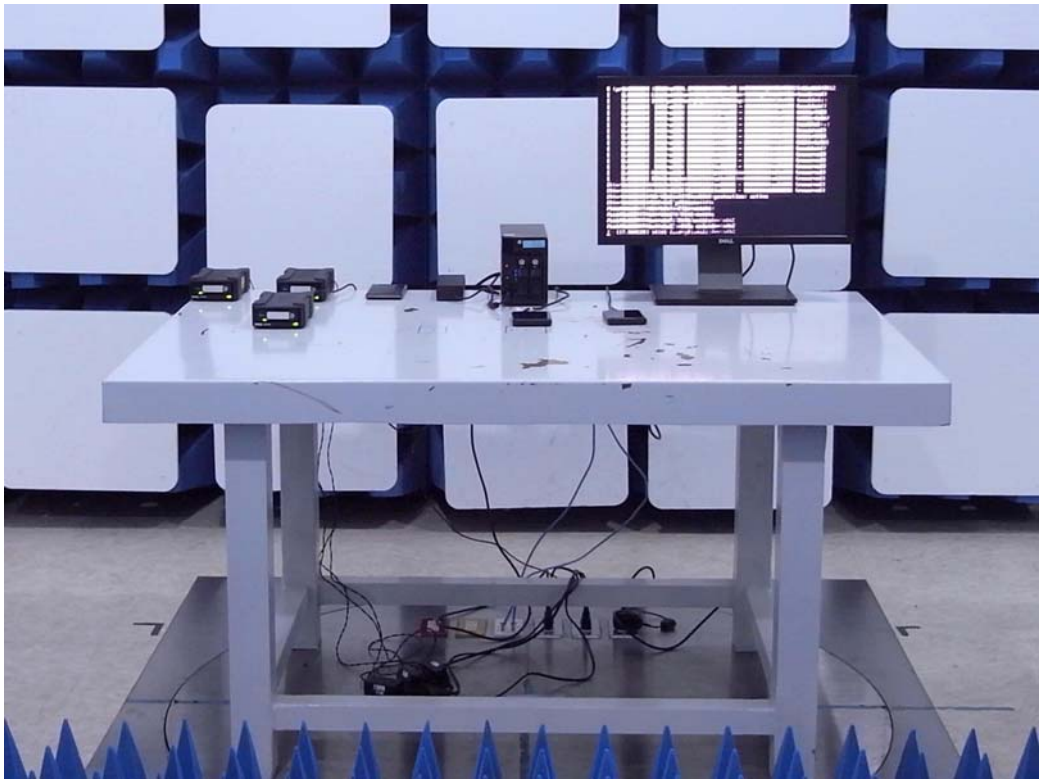
14.3.2 Photo of Radiated Emission Measurement

Front View (30MHz~1GHz)



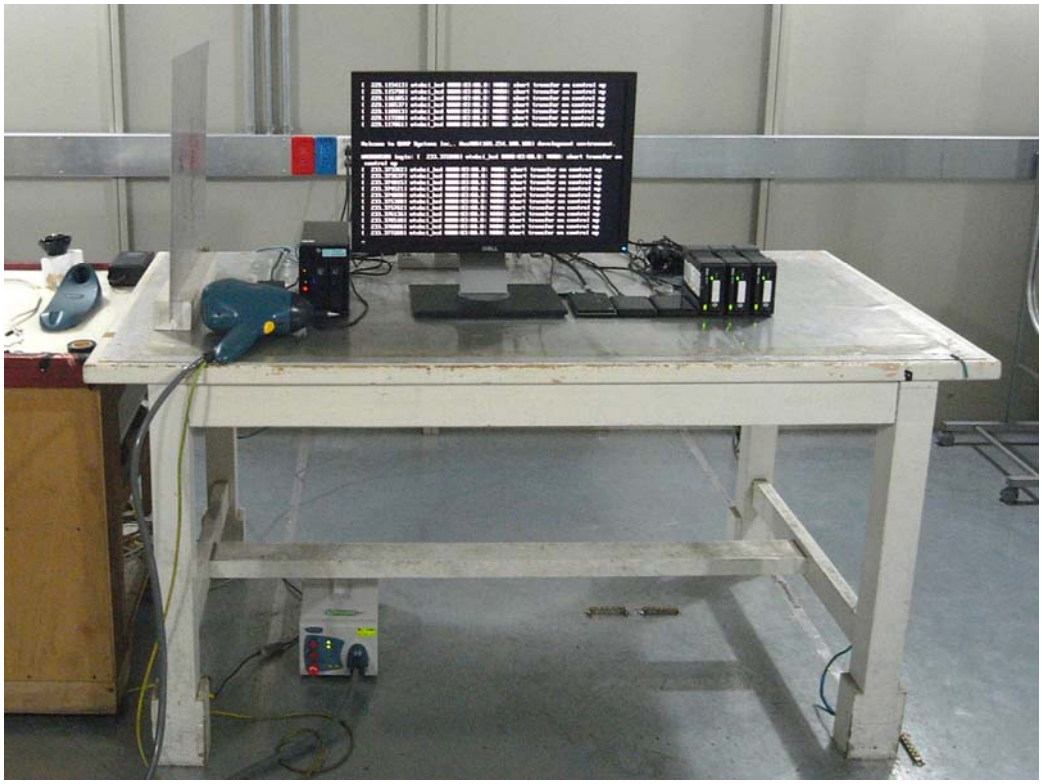
Back View (30MHz~1GHz)

Front View (Above 1GHz)



Back View (Above 1GHz)

14.3.3 Photo of ESD Measurement



14.3.4 Photo of RF Field Strength Susceptibility Measurement

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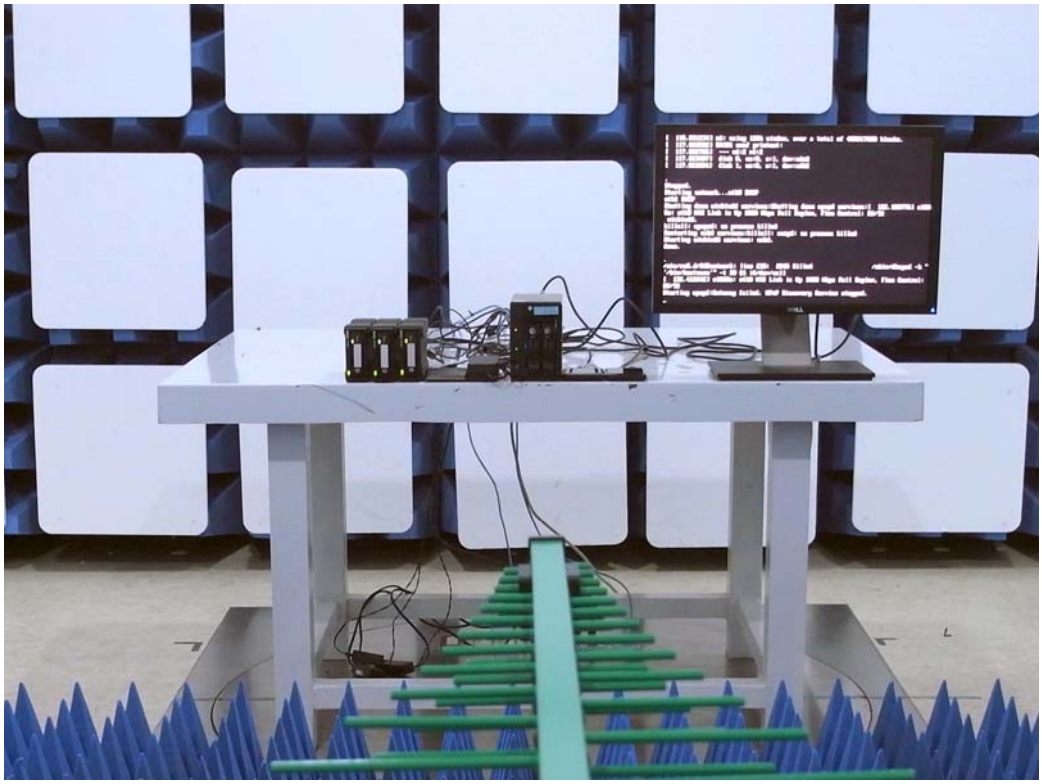
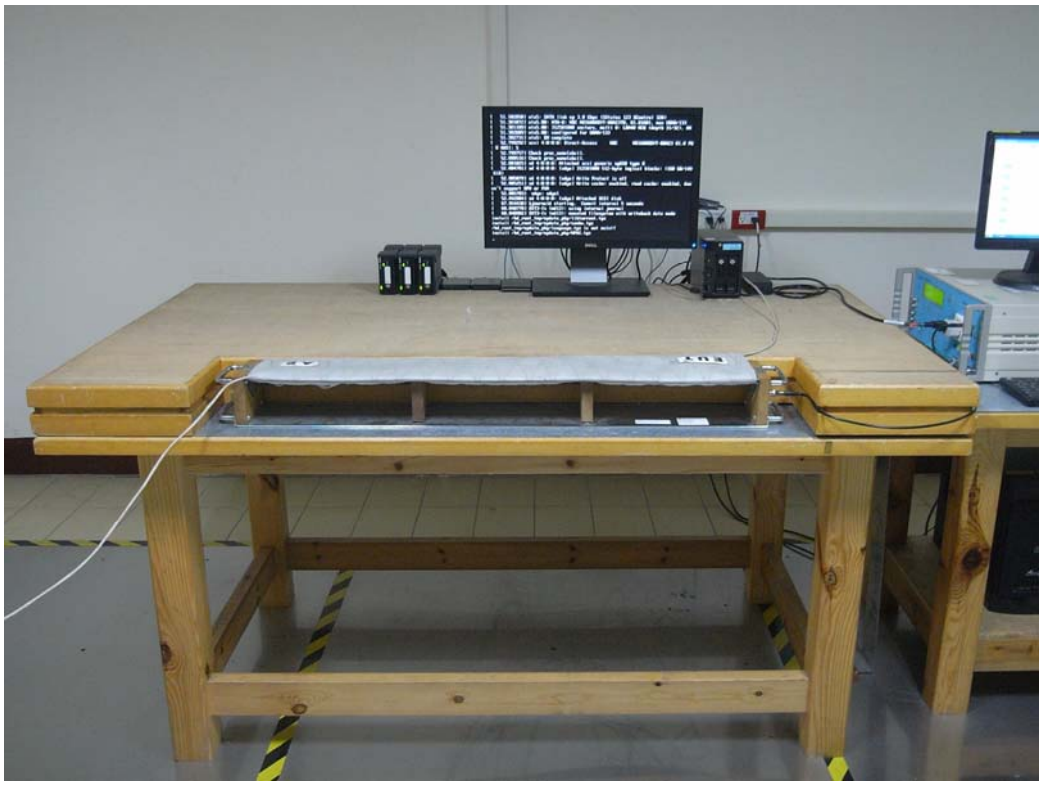
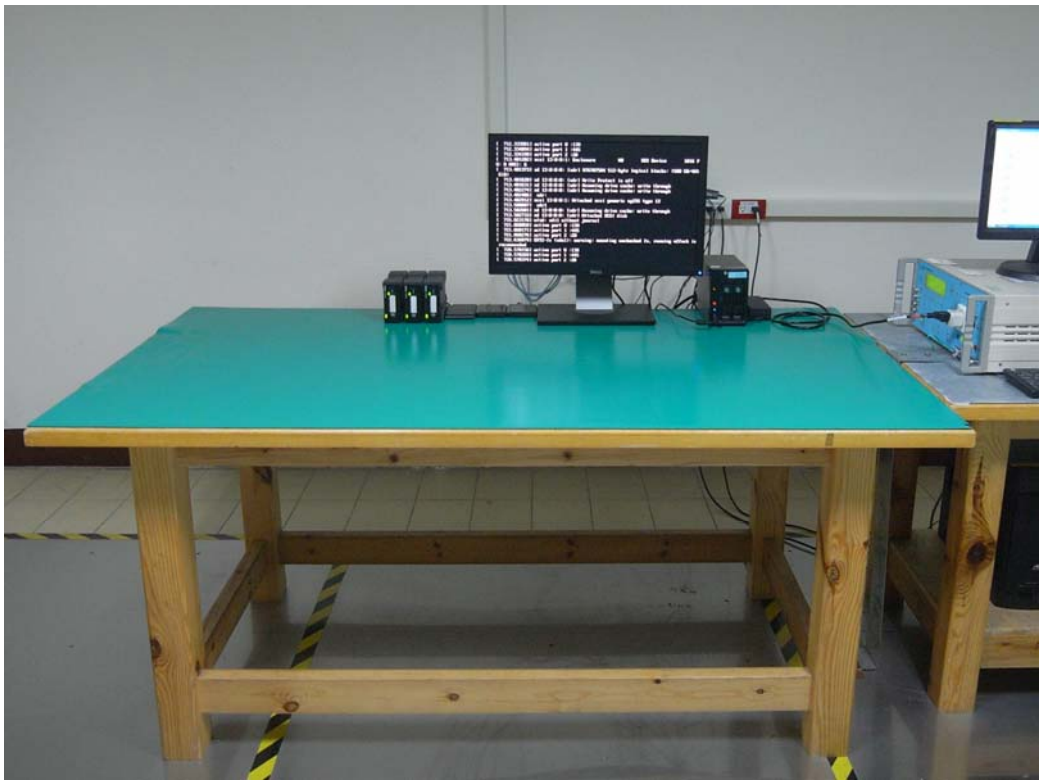


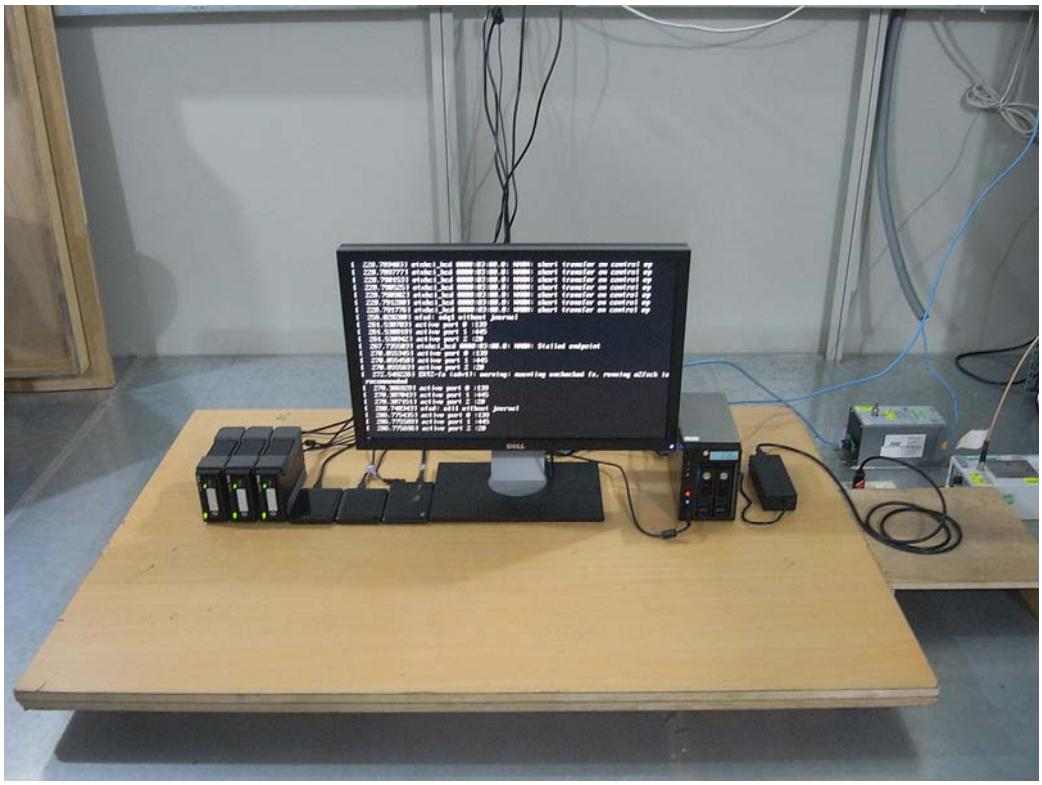
14.3.5 Photo of Electrical Fast Transient/Burst Measurement



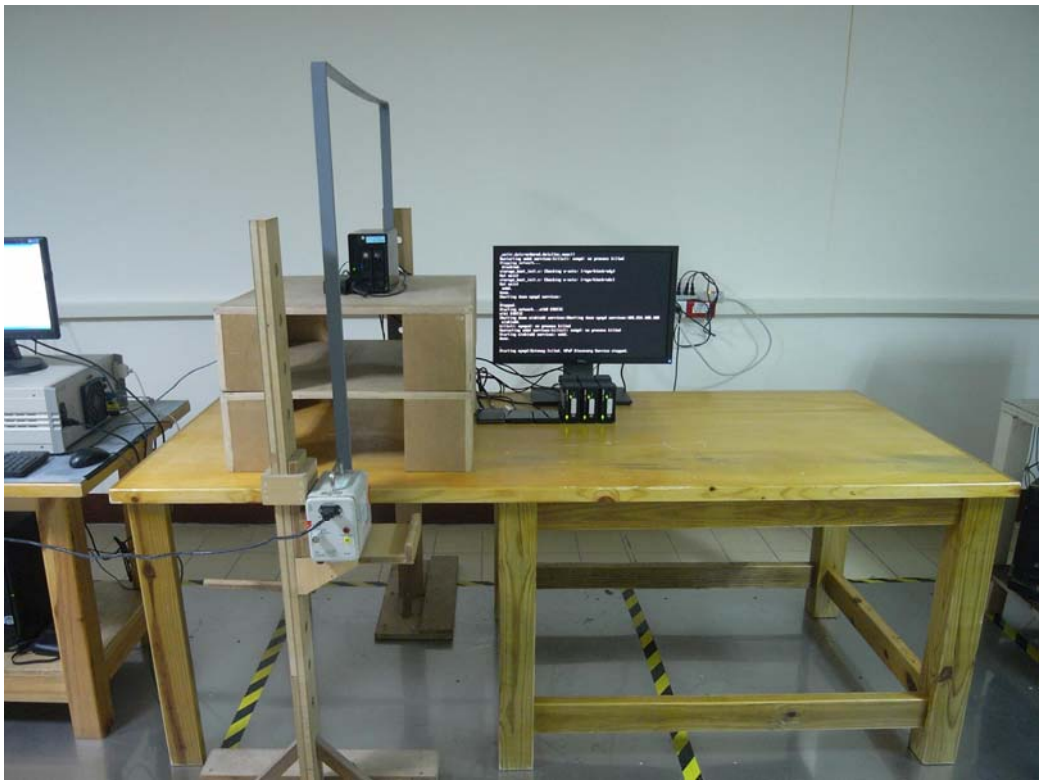
14.3.6 Photo of Surge Measurement



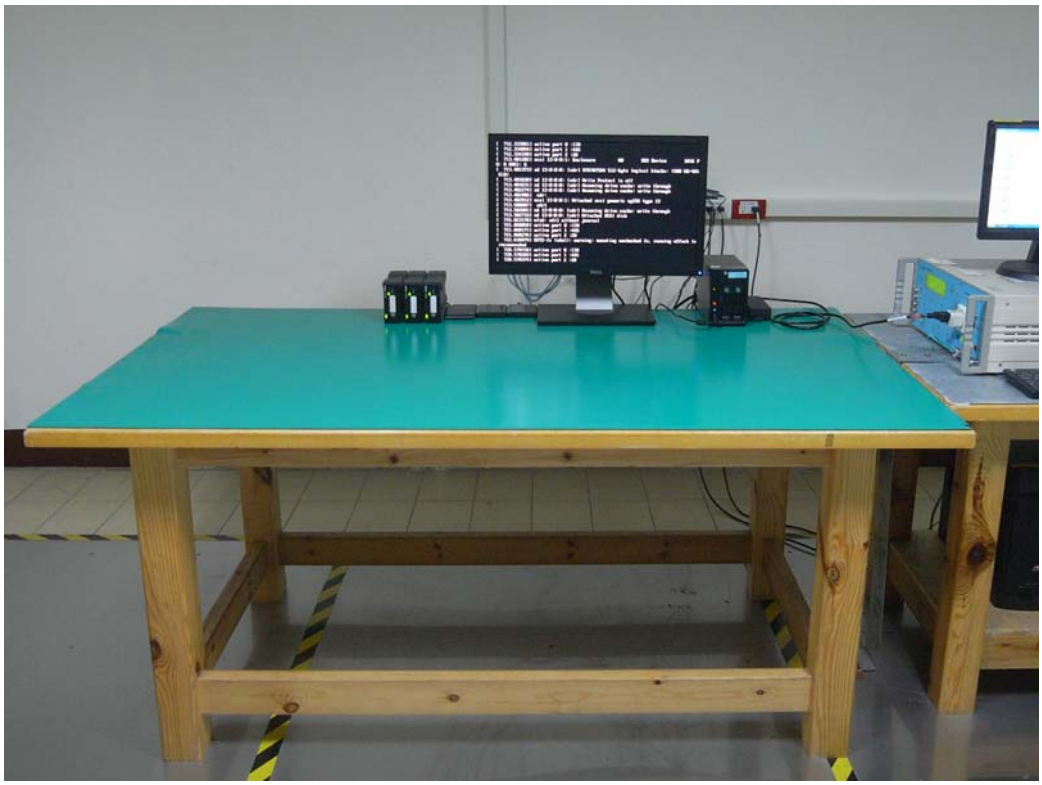
14.3.7 Photo of Conductive Measurement



14.3.8 Photo of Magnetic field Measurement



14.3.9 Photo of Voltage Dips Measurement



14.3.10 Photo of Harmonics and Voltage Fluctuations

14.4 Appendix D: Photographs of EUT

Please refer to the File of ISL-12HE135P