Certificate

Issue Date: 2008/08/08
Ref. Report No. ISL-08HE175CE

Product Name:	:	Network Attached Storage
Model Number(s)	:	Please reference the attachment
Responsible Party	:	**QNAP System, Inc.**
Address	:	21F,No.77,Sec. 1,Xintai 5th Rd., Xizhi City,Taipei Country,221, Taiwan,R.O.C
Contact Person	:	

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 :

Standards:

EN55022: 2006 / CISPR 22:2005; AS/NZS CISPR 22: 2006: Limits and methods of measurement of Radio Interference characteristics of Information Technology Equipment. (* Remarks: Testing radiated emissions above 1 GHz is not yet required in Australia.)
EN55024: 1998/A1:2001/A2: 2003; AS/NZS CISPR 24: 2002: Information technology equipment-Immunity characteristics-Limits and methods of measurement.
EN61000-3-2: 2006; AS/NZS 61000.3.2: 2007: Limits for harmonics current emissions
EN61000-3-3: 1995/A1: 2001/A2:2005; AS/NZS 61000.3.3: 2006: Limits for voltage fluctuations and flicker in low-voltage supply systems.

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.

Jim Chu/ Director

International Standards laboratory
Lung-Tan LAB:
No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd.
Lung-Tan Hsiang, Tao Yuan County 325, Taiwan
Tel: 886-3-407-1718; Fax: 886-3407-1738
His-Chih LAB:
No. 65, Gu Dai Keng St.. Hsichih, Taipei Hsien 22117, Taiwan.
Tel: 886-2-2646-2550; Fax: 886-2-2646-4641

ISL International Standards Laboratory http://www.isl.com.tw

ISL International Standards Laboratory http://www.isl.com.tw

Attachment:

Model Number(s):

TS-509 Pro; TS-509; TS-509 Pro II; TS-509 II; TS-508 Pro; TS-508; TS-508 Pro II; TS-508 II; TS-519; TS-519 Pro; TS-519 II; TS-519 Pro II;TS-2509 Pro; TS-2509; TS-2509 Pro II; TS-2509 II; NAS-501; NAS-502; NS-501; NS-502; MTS-509 Pro; MTS-509; MTS 508 Pro; MTS-508; MTS-509 Pro II; MTS-509 II; MTS-508 Pro II; MTS-508 II; NVR-509; NVR-509P; NVR-509V; NVR-509A; NVR-509C; NVR-509D; NVR-509S; NVR-509G; NVR-509U; NVR-509M; NVR-509Pro; NVR-509P-Pro; NVR-509V-Pro; NVR-509A-Pro; NVR-509C-Pro; NVR-509D-Pro; NVR-509S-Pro; NVR-509G-Pro; NVR-509M-Pro; NVR-509U-Pro; VioStor-509; VioStor-509P; VioStor-509V; VioStor-509A; VioStor-509C; VioStor-509D; VioStor-509S; VioStor-509G; VioStor-509U; VioStor-509M; VioStor-509Pro; VioStor-509P-Pro; VioStor-509V-Pro; VioStor-509A-Pro; VioStor-509C-Pro; VioStor-509D-Pro; VioStor-509S-Pro; VioStor-509G-Pro; VioStor-509M-Pro; VioStor-509U-Pro;NVR-501; NVR-501P; NVR-501V; NVR-501A; NVR-501C; NVR-501D; NVR-501S; NVR-501G; NVR-501U; NVR-501M; NVR-501Pro; NVR-501P-Pro; NVR-501V-Pro; NVR-501A-Pro; NVR-501C-Pro; NVR-501D-Pro; NVR-501S-Pro; NVR-501G-Pro; NVR-501M-Pro; NVR-501U-Pro;VioStor-501; VioStor-501P; VioStor-501V; VioStor-501A; VioStor-501C; VioStor-501D; VioStor-501S; VioStor-501G; VioStor-501U; VioStor-501M; VioStor-501ro; VioStor-501-Pro; VioStor-501V-Pro; VioStor-501A-Pro; VioStor-501C-Pro; VioStor-501D-Pro; VioStor-501S-Pro; VioStor-501G-Pro; VioStor-501M-Pro; VioStor-501U-Pro;NVR-5012; NVR-5012-Pro; NVR-5016; NVR-5016-Pro; NVR-5020; NVR-5020-Pro; NVR-5012P; NVR-5012P-Pro; NVR-5016P; NVR-5016P-Pro; NVR-5020P; NVR-5020P-Pro; NVR-5012A; NVR-5012A-Pro; NVR-5016A; NVR-5016A-Pro; NVR-5020A; NVR-5020A-Pro; NVR-5012V; NVR-5012V-Pro; NVR-5016V; NVR-5016V-Pro; NVR-5020V; NVR-5020V-Pro; NVR-5012U; NVR-5012U-Pro; NVR-5016U; NVR-5016U-Pro; NVR-5020U; NVR-5020U-Pro; NV-5012; NV-5012-Pro; NV-5016; NV-5016-Pro; NV-5020; NV-5020-Pro; NV-5012P; NV-5012P-Pro; NV-5016P; NV-5016P-Pro; NV-5020P; NV-5020P-Pro ; NV-5012A-Pro; NV-5012A-Pro; NV-5016A-Pro; NV-5016A-Pro; NV-5020A-Pro; NV-5020A-Pro; NV-5012V-Pro; NV-5012V-Pro; NV-5016V-Pro; NV-5016V-Pro; NV-5020V-Pro; NV-5020V-Pro; NV-5012U; NV-5012U-Pro; NV-5016U; NV-5016U-Pro; NV-5020U; NV-5020U-Pro

CE MARK TECHNICAL FILE

AS/NZS EMC CONSTRUCTION FILE

of

Product Name

Network Attached Storage

Model

Please reference the attachment

Contains:

1. Declaration of Conformity
2. EN55022/CISPR 22, AS/NZS CISPR 22 EMI test report
3. EN55024, AS/NZS CISPR 24, EN61000-3-2 / AS/NZS 61000.3.2, and EN61000-3-3 / AS/NZS 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 System, Inc.
Address of Responsible Party:	21F,No.77,Sec. 1,Xintai 5th Rd. Xizhi City,Taipei Country,221 Taiwan,R.O.C
Declares that product:	Network Attached Storage
Model:	**Please reference the attachment**
Assembled by: Address:	Same as above Same as above

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

EN55022: 2006 / CISPR 22:2005; AS/NZS CISPR 22: 2006: Limits and methods of measurement of Radio Interference characteristics of Information Technology Equipment. (* Remarks: Testing radiated emissions above 1 GHz is not yet required in Australia.)
EN55024: 1998/A1: 2001/A2: 2003; AS/NZS CISPR 24: 2002: Information technology equipment-Immunity characteristics-Limits and methods of measurement.

Standard	Description	Results	Criteria
EN61000-4-2: 1995/A1: 1998/A2: 2001 AS/NZS 61000.4.2: 2002	Electrostatic Discharge	Pass	B
EN61000-4-3: 2006 AS/NZS 61000.4.3: 2006	Radio-Frequency, Electromagnetic Field	Pass	A
EN61000-4-4: 2004 AS/NZS 61000.4.4: 2006	Electrical Fast Transient/Burst	Pass	B
EN61000-4-5: 2006 AS/NZS 61000.4.5: 2006	Surge	Pass	B
EN61000-4-6: 1996/A1: 2001 AS/NZS 61000.4.6: 2006	Conductive Disturbance	Pass	A
EN61000-4-8: 1993/A1: 2001 AS/NZS 61000.4.8: 2002	Power Frequency Magnetic Field	Pass	A
EN61000-4-11: 2004 AS/NZS 61000.4.11: 2005	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

<to be continued>

Standard	Description	Results
EN61000-3-2: 2006 AS/NZS 61000.3.2: 2007	Limits for harmonics current emissions	Pass
EN61000-3-3: 1995/A1: 2001/A2:2005 AS/NZS 61000.3.3: 2006	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: 2001+A11: Safety of Information Technology Equipment Including electrical business equipment

We, QNAP System, 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 System, Inc.

Date: 2008/08/08

Declaration of Conformity

Name of Responsible Party:	QNAP System, Inc.
Address of Responsible Party:	21F,No.77,Sec. 1,Xintai 5th Rd. Xizhi City,Taipei Country,221 Taiwan,R.O.C
Declares that product:	Network Attached Storage
Model:	**Please reference the attachment**
Assembled by: Address:	Same as above Same as above

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

EN55022: 2006 / CISPR 22:2005; AS/NZS CISPR 22: 2006: Limits and methods of measurement of Radio Interference characteristics of Information Technology Equipment. (* Remarks: Testing radiated emissions above 1 GHz is not yet required in Australia.)
EN55024: 1998/A1: 2001/A2: 2003; AS/NZS CISPR 24: 2002: Information technology equipment-Immunity characteristics-Limits and methods of measurement.

Standard	Description	Results	Criteria
EN61000-4-2: 1995/A1: 1998/A2: 2001 AS/NZS 61000.4.2: 2002	Electrostatic Discharge	Pass	B
EN61000-4-3: 2006 AS/NZS 61000.4.3: 2006	Radio-Frequency, Electromagnetic Field	Pass	A
EN61000-4-4: 2004 AS/NZS 61000.4.4: 2006	Electrical Fast Transient/Burst	Pass	B
EN61000-4-5: 2006 AS/NZS 61000.4.5: 2006	Surge	Pass	B
EN61000-4-6: 1996/A1: 2001 AS/NZS 61000.4.6: 2006	Conductive Disturbance	Pass	A
EN61000-4-8: 1993/A1: 2001 AS/NZS 61000.4.8: 2002	Power Frequency Magnetic Field	Pass	A
EN61000-4-11: 2004 AS/NZS 61000.4.11: 2005	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

<to be continued>

Standard	Description	Results
EN61000-3-2: 2006 AS/NZS 61000.3.2: 2007	Limits for harmonics current emissions	Pass
EN61000-3-3: 1995/A1: 2001/A2:2005 AS/NZS 61000.3.3: 2006	Limits for voltage fluctuations and flicker in low-voltage supply systems.	Pass

We, QNAP System, 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 System, Inc.

Date: 2008/08/08

CE TEST REPORT

of

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

Product : **Network Attached Storage**

Model(s): **Please reference the attachment**

Applicant: **QNAP System, Inc.**

Address: **21F,No.77,Sec. 1,Xintai 5th Rd.**
Xizhi City,Taipei Country,221
Taiwan,R.O.C

Test Performed by:

International Standards Laboratory
<HC LAB>
*Site Registration No.
BSMI:SL2-IN-E-0037; SL2-R1/R2-E-0037; TAF: 1178;
IC: IC4067; VCCI: R-341,C-354; NEMKO: ELA 113A
*Address:
No. 65, Gu Dai Keng St.
Hsichih, Taipei Hsien 22117, Taiwan
*Tel: 886-2-2646-2550; Fax: 886-2-2646-4641

Report No.: **ISL-08HE175CE**
Issue Date : **2008/08/08**

Contents of Report

1. General

1.1 Certification of Accuracy of Test Data

Standards:	Please refer to 2.2
Equipment Tested:	Network Attached Storage
Model:	Please reference the attachment
Applied by	QNAP System, Inc.
Sample received Date:	2008/08/01
Final test Date :	2008/08/06
Test Site:	OATS 01; Conduction 01; HC Test Site
Test Result:	**PASS**
Report Engineer:	Lily L.C. Tseng
Test Engineer:	David Y.Y. Wu

Approve & Signature

Jim Chu / Director

Test results given in this report apply only to the specific sample(s) tested under stated test conditions.
This report shall not be reproduced other than in full without the explicit written consent of ISL. This report totally contains 54 pages, including 1 cover page , 2 contents page, and 51 pages for the test description.

This test report accurately contains the test results of the above standards at the time of the test.
The results in this report apply only to the sample(s) tested.
This test report shall not be reproduced except in full, without the written approval of International Standards Laboratory.

2. Summary

2.1 Operation Environment

Test Distance	10M (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

2.2 Test Standards

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

EN55022: 2006 / CISPR 22:2005; AS/NZS CISPR 22: 2006: Class A: Limits and methods of measurement of Radio Interference characteristics of Information Technology Equipment. (* Remarks: Testing radiated emissions above 1 GHz is not yet required in Australia.)
EN55024: 1998/A1: 2001/A2: 2003; AS/NZS CISPR 24: 2002: Information technology equipment-Immunity characteristics-Limits and methods of measurement.

Standard	Description	Results	Criteria
EN61000-4-2: 1995/A1: 1998/A2: 2001 AS/NZS 61000.4.2: 2002	Electrostatic Discharge	Pass	B
EN61000-4-3: 2006 AS/NZS 61000.4.3: 2006	Radio-Frequency, Electromagnetic Field	Pass	A
EN61000-4-4: 2004 AS/NZS 61000.4.4: 2006	Electrical Fast Transient/Burst	Pass	B
EN61000-4-5: 2006 AS/NZS 61000.4.5: 2006	Surge	Pass	B
EN61000-4-6: 1996/A1: 2001 AS/NZS 61000.4.6: 2006	Conductive Disturbance	Pass	A
EN61000-4-8: 1993/A1: 2001 AS/NZS 61000.4.8: 2002	Power Frequency Magnetic Field	Pass	A
EN61000-4-11: 2004 AS/NZS 61000.4.11: 2005	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
EN61000-3-2: 2006 AS/NZS 61000.3.2: 2007	Limits for harmonics current emissions	Pass
EN61000-3-3: 1995/A1: 2001/A2:2005 AS/NZS 61000.3.3: 2006	Limits for voltage fluctuations and flicker in low-voltage supply systems.	Pass

3. Description of EUT

EUT

Product Name:	Network Attached Storage
Condition:	Pre-Production
Model Number(s)**:**	Please reference the attachment
Serial Number:	N/A
Power Supply Type:	Seasanic (Model: SS-250SU) 250W AC Input: 100~240V~5A, 50-60Hz
Power Switch Button:	one
Back Up Button:	one
USB 2.0 Connector:	Five (4-pins)
E-Serial ATA Port:	one-7pin
RJ45 Connector:	one (8-pins) (10/100Mbps/1Gbps)
VGA Port:	one-15pin
COM Port:	one-9pin
Hard Disk1:	Seagate (Model: ST3750640AS) 750GB (Option)
Hard Disk2:	Seagate (Model: ST3250620AS) 250GB (Option))
Hard Disk3:	Western Digital (Model: WD4000KS) 400GB (Option)
Hard Disk4:	Western Digital (Model: WD4000KS) 400GB (Option)
Hard Disk5:	Western Digital (Model: WD3200AAKS) 320GB (Option)

All types of EUT Connect have been tested. The worst data listed in this test report.

Test Configuration:

Seagate (Model: ST3750640AS) 750GB + Seagate (Model: ST3250620AS) 250GB + Western Digital (Model: WD4000KS) 400GB + Western Digital (Model: WD4000KS) 400GB + Western Digital (Model: WD3200AAKS) 320GB + USB2.0 connect + LAN (1Gbps) + Seasanic (Model: SS-250SU) 250W Switching Power Supply.

EMI Noise Source:

Crystal: 4MHz (Y1), 25MHz (X1), 25MHz (X2), 25MHz (X3), 25MHz (X4), 25MHz (X5), 25MHz (X6).
Clock Generator: ICS 95412BAFLF (U11)

EMI Solution:
None.

4. Description of Support Equipment

4.1 Description of Support Equipment

Unit	Model Serial No.	Brand	Power Cord	FCC ID
External HDD Enclosure*5	OT-201 S/N: NA	A-TEC	N/A	FCC DOC
E-SATA External Hard Disk	QBack-35S	QNAP	Non-shielded, Detachable	FCC DOC
Rack mountable Switch	DGS-1008D	D-Link	D-Link (Model:AF-1205-B)	FCC DOC

4.2 Software for Controlling Support Unit

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

A. Read and write to the disk drives.
B. Send package to the Router LAN port (Router).
C. Receive and transmit package of EUT to the Rack mountable Switch HUB through LAN port.
D. Read and write data in the E-SATA Hard Disk through EUT E-SATA port.
E. R/W External HDD Enclosure from USB Port.
F. Used Tfgen.exe to Send signal to EUT RJ45 port through PC RJ45 Port.
G. Search External HDD from PC RJ45 to EUT RJ45 with InterEMC.exe.
H. Repeat the above steps.

	Filename	Issued Date
External Hard Disk	InterEMC.exe	5/21/1996
E-SATA	Intel EMCTEST.exe	9/04/2000
Rack mountable Switch	ping.exe	05/05/1999
Router LAN Port	Ping.exe	5/5/1999
EUT Hard Disk	InterEMC.exe	04/16/2003
RJ45	Tfgen.exe	05/22/2001

4.3 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	Nonshielded, Detachable	Plastic Head
USB Data Cable*5	External HDD Enclosure USB Port to PC USB Port	0.98M	Non-shielded, Detachable (With Core)	Metal Head
E-SATA Data Cable	External Hard disk E-S ATA Port to EUT E-SATA Port	1.0M	Shielded, Detachable	Metal Head
LAN Data Cable	PC LAN Port to Router LAN Port.	1.0M	Nonshielded, Detachable	RJ-45, with Plastic Head
VGA Data Cable	VGA Port dummy load	1.98M	Shielded, Detachable (with cord)	Metal Head
COM port Data Cable	COM port with dummy load	1.5M	Shielded, Detachable	Metal Head

5. Power Main Port Conducted Emissions

5.1 Configuration and Procedure

5.1.1 EUT Configuration

The EUT was set up on the non-conductive table that is 1.0 by 1.5 meter, 80cm above ground. The wall was 40cm to the rear of the EUT.

Power to the EUT was provided through the LISN. The impedance vs. frequency characteristic of the LISN is complied with the limit of standards used.

Both lines (neutral and hot) were connected to the LISN in series at testing. A coaxial-type connector which provides one 50 ohms impedance termination was connected to the test instrument. The excess length of the power cord was folded back and forth at the center of the lead to form a bundle 30cm to 40cm in length.

Any changes made to the configuration or modifications made to EUT during testing, are noted in the following test record.

If EUT has an extra auxiliary AC outlet which can provide power to an external monitor, all measurements will be made with the monitor power from EUT-mounted AC outlet and then from floor-mounted AC outlet.

5.1.2 Test Procedure

The system was set up as described above, with the EMI diagnostic software running. The main power line conducted EMI tests were run on both hot and neutral conductors of the power cord and the results were recorded. The effect of varying the position of the interface cables has been investigated to find the configuration that produces maximum emission.

At the frequencies where the peak values of the emissions were higher than 6dß below the applicable limits, the emissions were also measured with the quasi-peak detectors. At the frequencies where the quasi-peak values of the emissions were higher than 6dß below the applicable average limits, the emissions were also measured with the average detectors.

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.

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

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

5.2 Conduction Test Data: Configuration 1

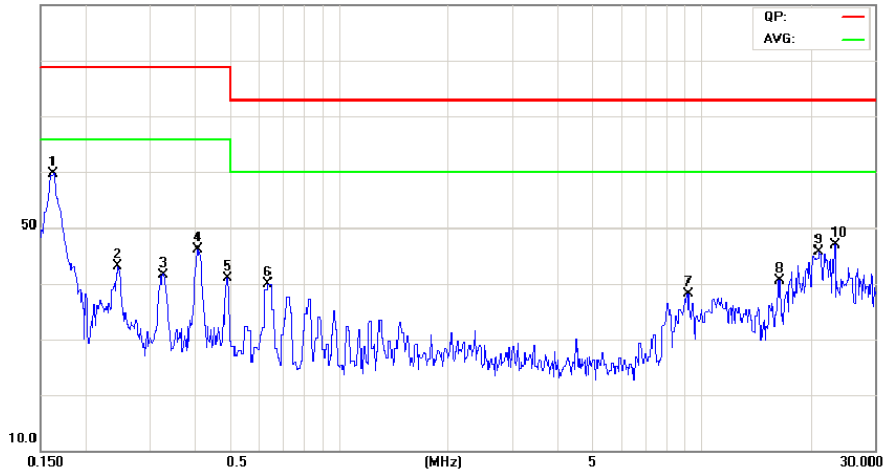
Table 5.2.1 Power Line Conducted Emissions (Hot)

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

ConductedEmissionMeasurement

operator:
Temperature: 26 ℃
Humidity: 46 %

File :97-08-01
90.0 dBuV
Data :#8
Date: 2008/08/01
Time: PM 03:33:29



Site: Conduction 01
Limit: EN55022 Class A
Company:
EUT Model:
Execute Program:
Note:

Phase: L1
Power:
Witness:

	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
*	0.1614	0.18	0.07	58.50	79.0	-20.5	55.10	66.0	-10.9	
	0.2454	0.18	0.08	40.20	79.0	-38.8	35.50	66.0	-30.5	
	0.3259	0.19	0.09	39.40	79.0	-39.6	37.80	66.0	-28.2	
	0.4073	0.19	0.1	44.10	79.0	-34.9	43.60	66.0	-22.4	
	0.4921	0.19	0.11	38.20	79.0	-40.8	37.00	66.0	-29.0	
	0.6350	0.2	0.12	38.20	73.0	-34.8	37.20	60.0	-22.8	
	9.1250	0.39	0.56	37.10	73.0	-35.9	28.20	60.0	-31.8	
	16.3125	0.6	0.76	41.00	73.0	-32.0	37.50	60.0	-22.5	
	20.8750	0.63	0.87	45.20	73.0	-27.8	40.20	60.0	-19.8	
	23.1875	0.66	0.92	48.10	73.0	-24.9	45.10	60.0	-14.9	

*:Maximum data x:Over limit

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.

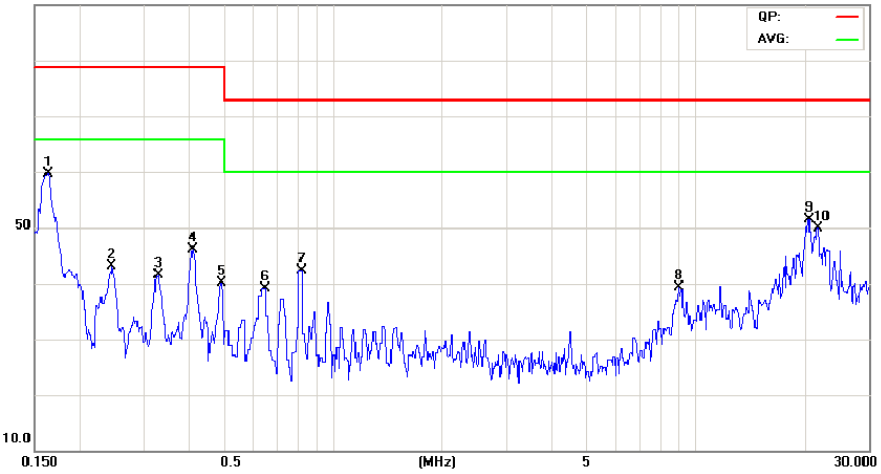
Table 5.2.2 Power Line Conducted Emissions (Neutral)

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

ConductedEmissionMeasurement

operator:
Temperature: 26 ℃
Humidity: 46 %

File :97-08-01
Data :#9
Date: 2008/08/01
Time: PM 03:37:35



Site: Conduction 01
Phase: N
Limit: EN55022 Class A
Power:
Company:
Witness:
EUT Model:
Execute Program:
Note:

	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
*	0.1631	0.2	0.07	58.40	79.0	-20.6	54.60	66.0	-11.4	
	0.2454	0.2	0.08	40.10	79.0	-38.9	36.40	66.0	-29.6	
	0.3259	0.2	0.09	38.50	79.0	-40.5	37.80	66.0	-28.2	
	0.4099	0.2	0.1	44.10	79.0	-34.9	43.40	66.0	-22.6	
	0.4895	0.2	0.11	37.80	79.0	-41.2	37.00	66.0	-29.0	
	0.6462	0.21	0.12	37.00	73.0	-36.0	35.60	60.0	-24.4	
	0.8150	0.22	0.14	30.40	73.0	-42.6	15.40	60.0	-44.6	
	9.0625	0.52	0.56	34.80	73.0	-38.2	27.60	60.0	-32.4	
	20.4375	0.91	0.86	48.60	73.0	-24.4	38.00	60.0	-22.0	
	21.6250	0.96	0.89	44.70	73.0	-28.3	34.80	60.0	-25.2	

*:Maximum data x:Over limit

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.

6. Telecommunication Port Conducted Emissions

6.1 Configuration and Procedure

6.1.1 EUT Configuration

The EUT was set up on the non-conductive table that is 1.0 by 1.5 meter, 80cm above ground. The wall was 40cm to the rear of the EUT. The excess length of the power cord was folded back and forth at the center of the lead to form a bundle 30cm to 40cm in length. The distance between EUT and CDN is 80cm. CDN is connected to the reference ground plane. Any changes made to the configuration, or modifications made to the EUT, during testing are noted in the following test record.

6.1.2 Test Procedure

The system was set up as described above, with the EMI diagnostic software running. The content of the software consist of both periodic and pseudo-random messages. The effect of varying the position of the interface cables has been investigated to find the configuration that produces maximum emission. 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.

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

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

6.2 Test Data: LAN 1--GIGA (Voltage)

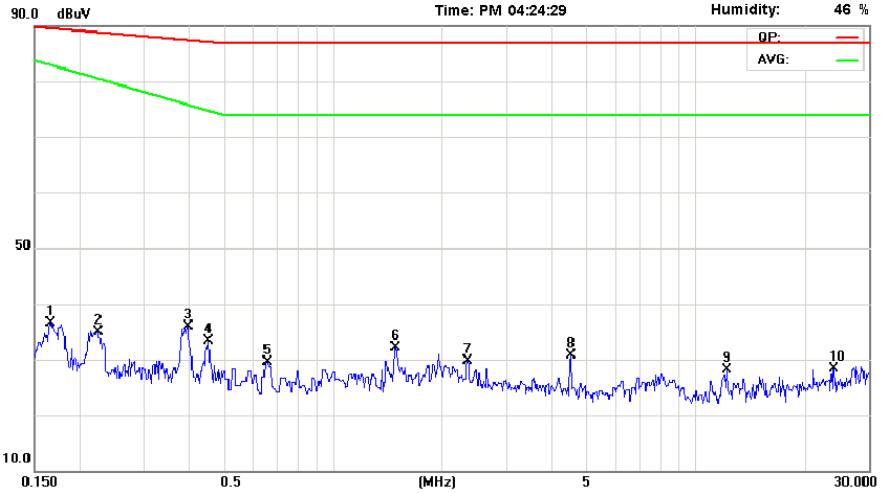
Table 6.2.1 Telecommunication Port Conducted Emission

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

ConductedEmissionMeasurement

operator:
Temperature: 26 ℃
Humidity: 46 %

File :97-08-01
Data :#13
Date: 2008/08/01
Time: PM 04:24:29



Site: Conduction 01
Phase: L2
Limit: FCVP Class A Conduction
Power:
Company:
Witness:
EUT Model:
Execute Program:
Note:

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
0.1657	0	0.07	28.20	96.1	-67.9	27.60	83.1	-55.5	
0.2235	0	0.08	29.70	93.6	-63.9	29.40	80.6	-51.2	
* 0.3959	0	0.1	32.20	88.9	-56.7	30.10	75.9	-45.8	
0.4519	0	0.11	25.70	87.8	-62.1	22.70	74.8	-52.1	
0.6575	0	0.13	18.50	87.0	-68.5	15.20	74.0	-58.8	
1.4900	0	0.2	28.40	87.0	-58.6	17.00	74.0	-57.0	
2.3337	0	0.26	25.70	87.0	-61.3	17.60	74.0	-56.4	
4.5162	0	0.38	16.40	87.0	-70.6	10.40	74.0	-63.6	
12.1875	0	0.65	16.90	87.0	-70.1	14.20	74.0	-59.8	
23.9375	0	0.94	15.30	87.0	-71.7	12.80	74.0	-61.2	

*:Maximum data x:Over limit

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.

6.3 Test Data: LAN 2--GIGA (Voltage)

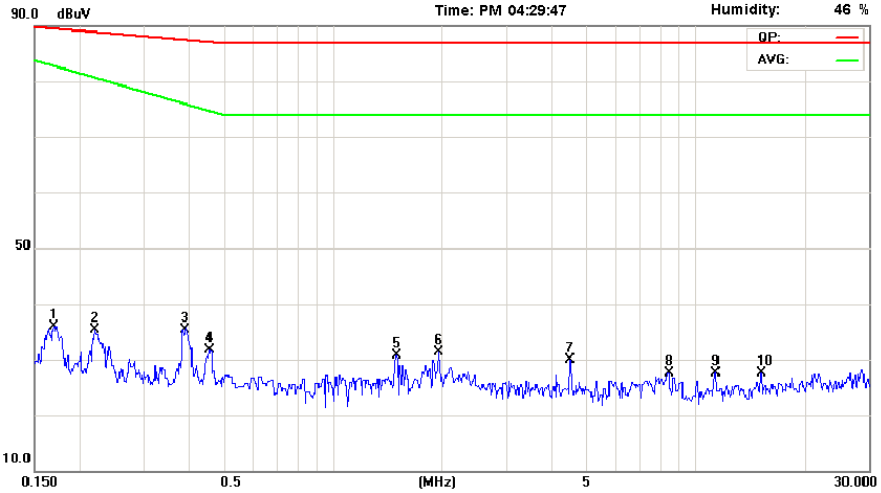
Table 6.3.1 Telecommunication Port Conducted Emission

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

ConductedEmissionMeasurement

operator:
Temperature: 26 ℃
Humidity: 46 %

File :97-08-01
Data :#14
Date: 2008/08/01
Time: PM 04:29:47



Site: Conduction 01
Limit: FCVP Class A Conduction
Company:
EUT Model:
Execute Program:
Note:

Phase: L2
Power:
Witness:

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
0.1684	0	0.07	30.00	96.0	-66.0	28.40	83.0	-54.6	
0.2226	0	0.08	29.50	93.7	-64.2	29.20	80.7	-51.5	
* 0.3854	0	0.1	30.10	89.1	-59.0	28.40	76.1	-47.7	
0.4589	0	0.11	25.70	87.7	-62.0	22.40	74.7	-52.3	
1.4900	0	0.2	28.80	87.0	-58.2	17.00	74.0	-57.0	
1.9512	0	0.24	26.20	87.0	-60.8	19.40	74.0	-54.6	
4.4600	0	0.38	16.40	87.0	-70.6	10.40	74.0	-63.6	
8.3750	0	0.54	15.60	87.0	-71.4	12.40	74.0	-61.6	
11.3125	0	0.63	12.50	87.0	-74.5	10.60	74.0	-63.4	
15.1250	0	0.73	12.60	87.0	-74.4	10.70	74.0	-63.3	

*:Maximum data x:Over limit

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.

6.4 Test Data: LAN 1--100M

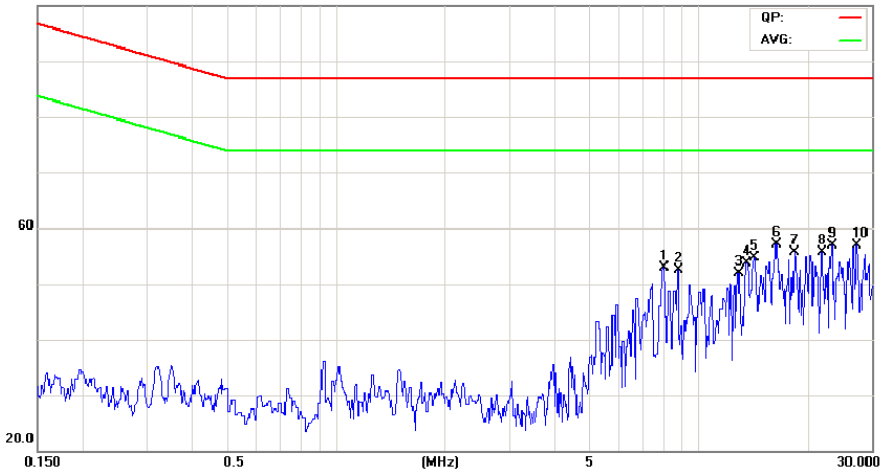
Table 6.4.1 Telecommunication Port Conducted Emission

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

ConductedEmissionMeasurement

operator:
Temperature: 26 ℃
Humidity: 46 %

File :97-08-01 Data :#10 Date: 2008/08/01 Time: PM 03:53:48



Site: Conduction 01 Phase: L2
Limit: ISN Class A Conduction Power:
Company: Witness:
EUT Model:
Execute Program:
Note:

	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
	8.0000	0	0.53	54.10	87.0	-32.9	51.60	74.0	-22.4	
	8.7500	0	0.55	52.80	87.0	-34.2	50.50	74.0	-23.5	
	12.8125	0	0.67	52.70	87.0	-34.3	50.00	74.0	-24.0	
	13.5000	0	0.69	55.20	87.0	-31.8	52.10	74.0	-21.9	
	14.3125	0	0.71	55.40	87.0	-31.6	52.10	74.0	-21.9	
	16.3125	0	0.76	58.40	87.0	-28.6	54.50	74.0	-19.5	
	18.3125	0	0.81	57.40	87.0	-29.6	53.50	74.0	-20.5	
	21.7500	0	0.89	56.60	87.0	-30.4	53.20	74.0	-20.8	
*	23.1875	0	0.92	59.20	87.0	-27.8	55.40	74.0	-18.6	
	27.1875	0	1	58.00	87.0	-29.0	55.00	74.0	-19.0	

*:Maximum data x:Over limit

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.

6.5 Test Data: LAN 2--100M

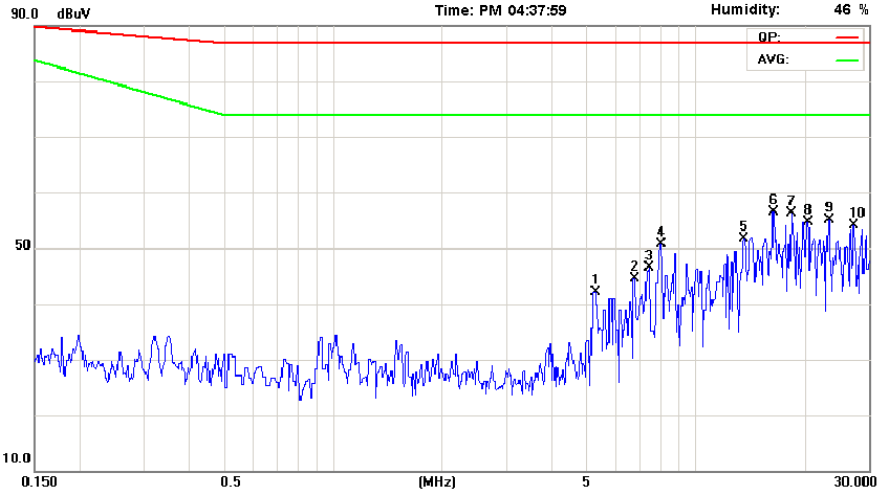
Table 6.5.1 Telecommunication Port Conducted Emission

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

ConductedEmissionMeasurement

operator:
Temperature: 26 ℃
Humidity: 46 %

File :97-08-01 Data :#16 Date: 2008/08/01 Time: PM 04:37:59



Site: Conduction 01
Limit: ISN Class A Conduction
Company:
EUT Model:
Execute Program:
Note:

Phase: L2
Power:
Witness:

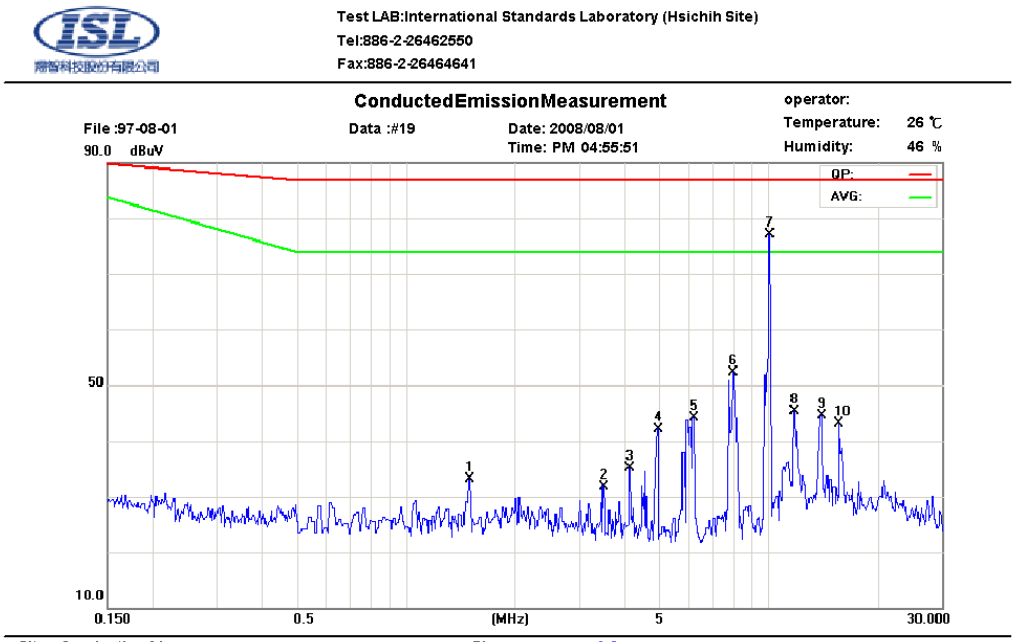
	Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct dBuV	QP Limit dBuV	QP Margin dB	AVG Correct dBuV	AVG Limit dBuV	AVG Margin dB	Note
	5.2500	0	0.41	41.90	87.0	-45.1	38.70	74.0	-35.3	
	6.7500	0	0.48	44.50	87.0	-42.5	41.10	74.0	-32.9	
	7.4375	0	0.51	45.50	87.0	-41.5	42.20	74.0	-31.8	
	8.0000	0	0.53	50.80	87.0	-36.2	47.10	74.0	-26.9	
	13.5000	0	0.69	53.00	87.0	-34.0	49.30	74.0	-24.7	
*	16.3125	0	0.76	57.30	87.0	-29.7	53.10	74.0	-20.9	
	18.3125	0	0.81	56.30	87.0	-30.7	52.10	74.0	-21.9	
	20.3125	0	0.86	56.10	87.0	-30.9	52.00	74.0	-22.0	
	23.1875	0	0.92	57.50	87.0	-29.5	53.00	74.0	-21.0	
	27.1875	0	1	54.90	87.0	-32.1	50.90	74.0	-23.1	

*:Maximum data x:Over limit

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.

6.6 Test Data: LAN 1--10M

Table 6.6.1 Telecommunication Port Conducted Emission



Site: Conduction 01 Phase: L2

Limit: ISN Class A Conduction Power:

Company: Witness:

EUT Model:

Execute Program:

Note:

	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
	1.4900	0	0.2	28.20	87.0	-58.8	22.20	74.0	-51.8	
	3.4925	0	0.33	13.10	87.0	-73.9	10.30	74.0	-63.7	
	4.1225	0	0.37	14.70	87.0	-72.3	10.40	74.0	-63.6	
	4.9325	0	0.4	36.70	87.0	-50.3	11.20	74.0	-62.8	
	6.1875	0	0.45	34.40	87.0	-52.6	19.60	74.0	-54.4	
	7.9375	0	0.53	41.10	87.0	-45.9	17.90	74.0	-56.1	
*	10.0625	0	0.59	77.20	87.0	-9.80	56.40	74.0	-17.6	
	11.6875	0	0.64	34.90	87.0	-52.1	11.50	74.0	-62.5	
	13.9375	0	0.7	35.60	87.0	-51.4	27.60	74.0	-46.4	
	15.6250	0	0.74	33.70	87.0	-53.3	10.70	74.0	-63.3	

*:Maximum data x:Over limit

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

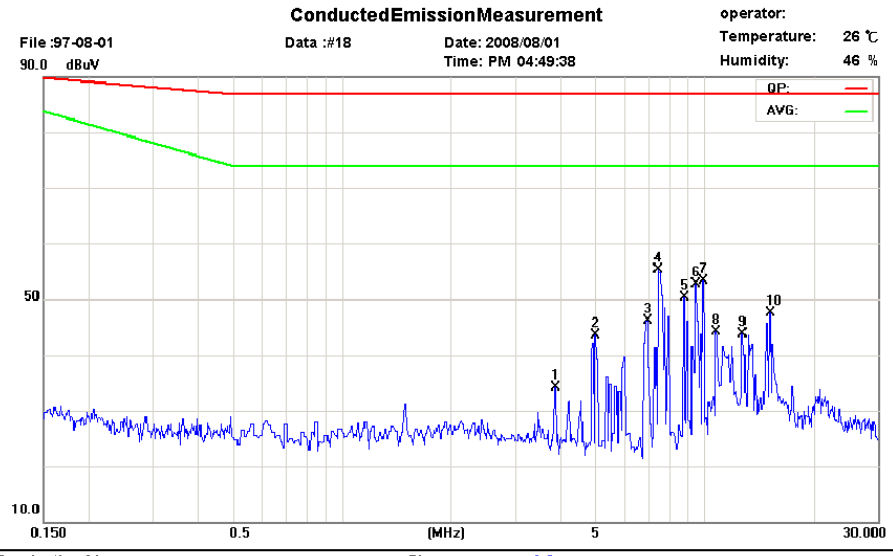
The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.

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

6.7 Test Data: LAN 2--10M

Table 6.7.1 Telecommunication Port Conducted Emission

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



Site: Conduction 01
Limit: ISN Class A Conduction
Company:
EUT Model:
Execute Program:
Note:

Phase: L2
Power:
Witness:

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
3.8637	0	0.35	13.90	87.0	-73.1	10.30	74.0	-63.7	
5.0000	0	0.4	37.90	87.0	-49.1	13.20	74.0	-60.8	
6.9375	0	0.48	33.90	87.0	-53.1	22.80	74.0	-51.2	
7.4375	0	0.51	43.70	87.0	-43.3	17.30	74.0	-56.7	
8.7500	0	0.55	43.00	87.0	-44.0	22.60	74.0	-51.4	
9.4375	0	0.57	42.00	87.0	-45.0	15.60	74.0	-58.4	
* 9.8750	0	0.59	76.90	87.0	-10.1	60.70	74.0	-13.3	
10.6875	0	0.61	38.30	87.0	-48.7	23.20	74.0	-50.8	
12.6875	0	0.67	37.40	87.0	-49.6	29.10	74.0	-44.9	
15.1250	0	0.73	42.50	87.0	-44.5	29.00	74.0	-45.0	

*:Maximum data x:Over limit

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.

7. Radiated Disturbance Emissions

7.1 Configuration and Procedure

7.1.1 EUT Configuration

The equipment under test was set up on a non-conductive table 80cm above ground, on open field or chamber. The excess length of the power cord was folded back and forth at the center of the lead to form a bundle 30cm to 40cm in length. Any changes made to the configuration, or modifications made to the EUT, during testing are noted in the following test record.

If EUT has an extra auxiliary AC outlet which can provide power to an external monitor, all measurements will be made with the monitor power from EUT-mounted AC outlet and then from floor-mounted AC outlet.

7.1.2 Test Procedure

The system was set up as described above, with the EMI diagnostic software running. The maximum emission was measured by varying the height of antenna and then by rotating the turntable. Both polarization of antenna, horizontal and vertical, were measured.

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. While doing so, the interconnecting cables and major parts of the system were moved around, the antenna height was varied between one and four meters, its polarization was varied between vertical and horizontal, and the turntable was slowly rotated, to maximize the emission.

7.1.3 Spectrum Analyzer Configuration (for the frequencies tested)

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

7.2 Radiation Test Data: Configuration 1

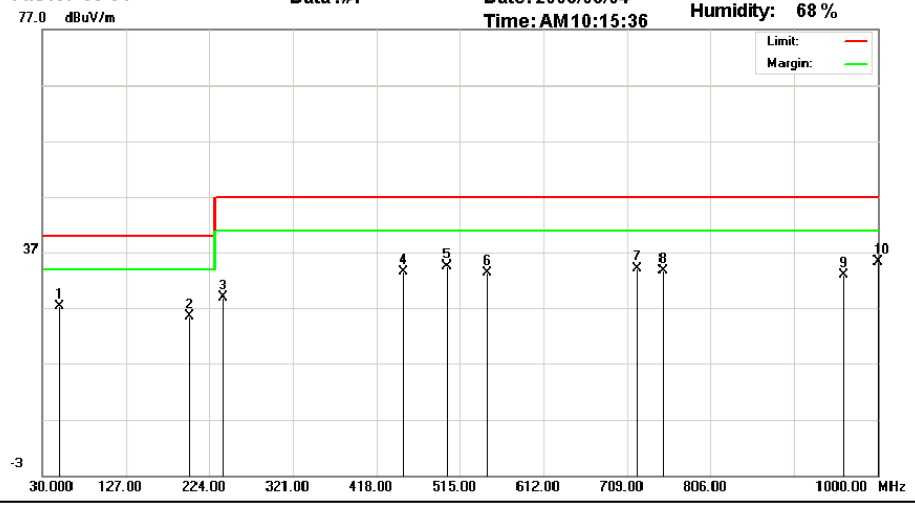
Table 7.2.1 Radiated Emissions (Horizontal)

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

RadiatedEmissionMeasurement

Operator:
Temperature: 30 ℃
Humidity: 68 %

File:97-08-04 Data:#1 Date:2008/08/04 Time:AM10:15:36



Site : OATS 01
Condition : EN55022 ClassA 10M
Company:
EUT Model:
Execute Program:
Note :

Polarization: Horizontal
Power:
Witness: 10m

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
	49.7583	18.46	8.13	0.72	0	27.23	40.00	-12.77	400	156	peak
	200.0000	11.15	12.71	1.48	0	25.43	40.00	-14.57	400	95	peak
	240.0100	16.07	11.1	1.67	0	28.84	47.00	-18.16	400	216	peak
	450.0030	14.07	16.9	2.51	0	33.48	47.00	-13.52	318	268	peak
	500.0100	14.15	17.7	2.68	0	34.53	47.00	-12.47	182	236	peak
	546.5850	12.34	18.17	2.84	0	33.35	47.00	-13.65	173	266	peak
	719.8820	10.30	20.42	3.39	0	34.11	47.00	-12.89	185	40	peak
	750.0170	9.66	20.6	3.47	0	33.73	47.00	-13.27	155	289	peak
	960.0050	5.49	23.3	4.06	0	32.85	47.00	-14.15	174	360	peak
*	999.9899	7.37	23.7	4.17	0	35.24	47.00	-11.76	176	60	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
BILOG Antenna Distance: 10 meter, Frequency: under 1000MHz
Horn Antenna Distance: 3 meter, Frequency: 1000MHz—18GHz

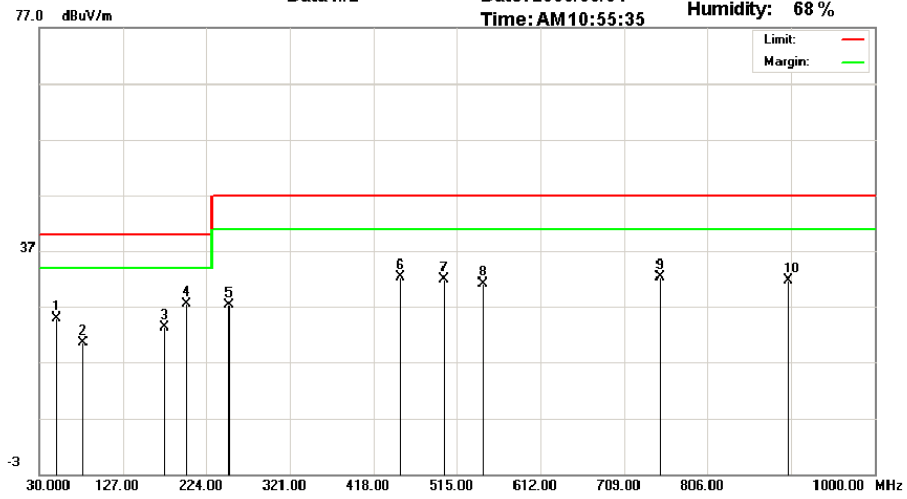
Table 7.2.1 Radiated Emissions (Vertical)

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

RadiatedEmissionMeasurement

Operator:
Temperature: 30 ℃
Humidity: 68 %

File:97-08-04
Data:#2
Date: 2008/08/04
Time: AM10:55:35



Site : OATS 01
Condition : EN55022 ClassA 10M
Company:
EUT Model:
Execute Program:
Note :

Polarization: Vertical
Power:
Witness: 10m

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
	50.0800	16.33	8	0.72	0	24.95	40.00	-15.05	100	243	peak
	79.9800	12.12	7.41	0.89	0	20.41	40.00	-19.59	100	29	peak
	175.0060	10.39	11.5	1.37	0	23.26	40.00	-16.74	100	177	peak
*	199.9992	13.27	12.71	1.48	0	27.55	40.00	-12.45	100	239	peak
	250.0720	14.30	11.21	1.71	0	27.21	47.00	-19.79	100	47	peak
	449.9600	12.86	16.9	2.51	0	32.27	47.00	-14.73	145	142	peak
	499.9960	11.44	17.7	2.68	0	31.82	47.00	-15.18	137	295	peak
	544.3550	10.20	18.14	2.83	0	31.17	47.00	-15.83	137	295	peak
	750.6000	8.24	20.61	3.47	0	32.32	47.00	-14.68	158	232	peak
	900.0100	5.11	22.7	3.89	0	31.70	47.00	-15.30	183	212	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
BILOG Antenna Distance: 10 meter, Frequency: under 1000MHz
Horn Antenna Distance: 3 meter, Frequency: 1000MHz—18GHz

8. Electrostatic discharge (ESD) immunity

8.1 Electrostatic discharge (ESD) immunity test

Port:	Enclosure
Basic Standard:	EN61000-4-2/ AS/NZS 61000.4.2 (details referred to Sec 2.2)
Test Level:	Air +/- 2 kV, +/- 4 kV, +/- 8 kV Contact +/- 2 kV, +/- 4 kV
Criteria:	B
Test Procedure	refer to ISL QA T04-S03
Temperature:	26 °C
Humidity:	50%

Selected Test Point

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

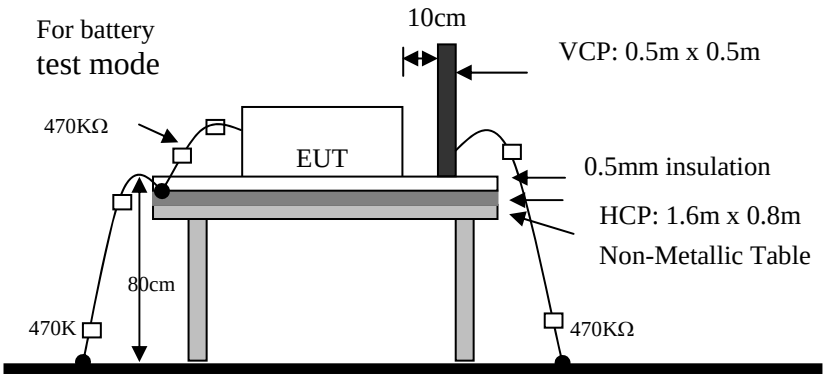
Contact: Total 200 points minimum were to the selected contact points.

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.

For final test points, please refer to EUT 6 to EUT 7 of "Appendix: Photographs of EUT". Red arrow lines indicate the contact points, and blue arrow lines indicate the air points.

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.



Test Result

Performance of EUT complies with the given specification.

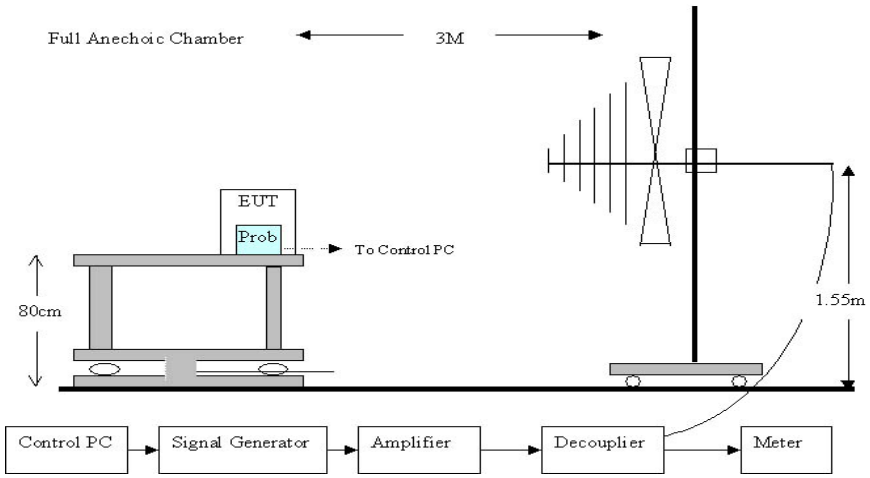
9. Radio-Frequency, Electromagnetic Field immunity

9.1 Radio-Frequency, Electromagnetic Field immunity test

Port:	Enclosure
Basic Standard:	EN61000-4-3/ AS/NZS 61000.4.3 (details referred to Sec 2.2)
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 T04-S017
Temperature:	25°C
Humidity:	49%

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.



Test Result

Performance of EUT complies with the given specification.

10. Electrical Fast transients/burst immunity

10.1 Electrical Fast transient/burst immunity test

Port:	AC mains; Twisted Pair LAN Port
Basic Standard:	EN61000-4-4/ AS/NZS 61000.4.4 (details referred to Sec 2.2)
Test Level:	**AC Power Port**: +/- 1 kV **Twisted Pair LAN Port** (I/O Cables): +/- 0.5 kV
Rise Time:	5ns
Hold Time:	50ns
Repetition Frequency:	5KHz
Criteria:	B
Test Procedure	refer to ISL QA T04-S05
Temperature:	26 °C
Humidity:	50%

Test Procedure

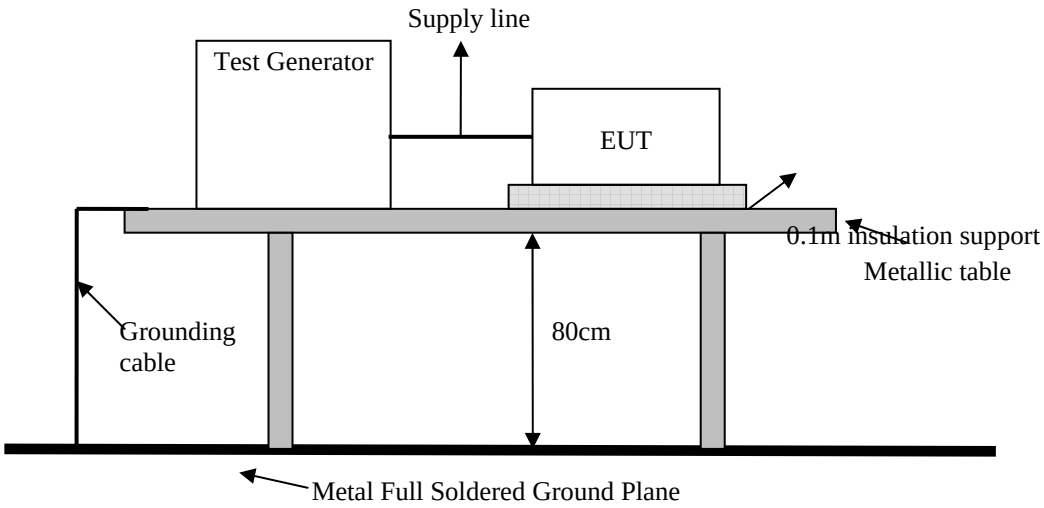
The EUT was setup on a nonconductive table 0.8 m above a reference ground plane.

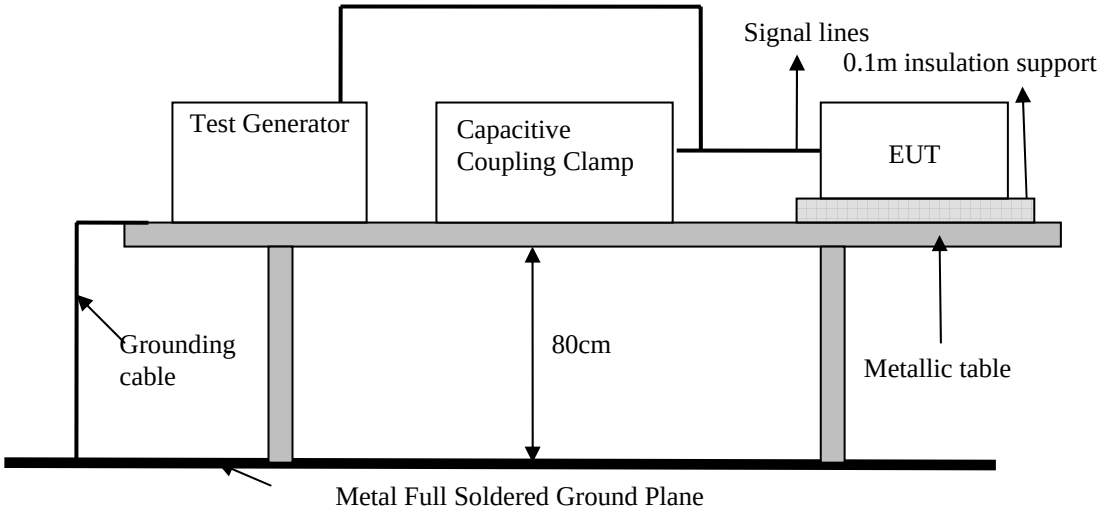
Test Points	Polarity	Result	Comment
Line	+	N	60 sec
	-	N	60 sec
Neutral	+	N	60 sec
	-	N	60 sec
Ground	+	N	60 sec
	-	N	60 sec
Line to Neutral	+	N	60 sec
	-	N	60 sec
Line to Ground	+	N	60 sec
	-	N	60 sec
Neutral to Ground	+	N	60 sec
	-	N	60 sec
Line to Neutral to Ground	+	N	60 sec
	-	N	60 sec
Capacitive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

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

Test Setup

EUT is at least 50cm from the conductive structure.





Test Result

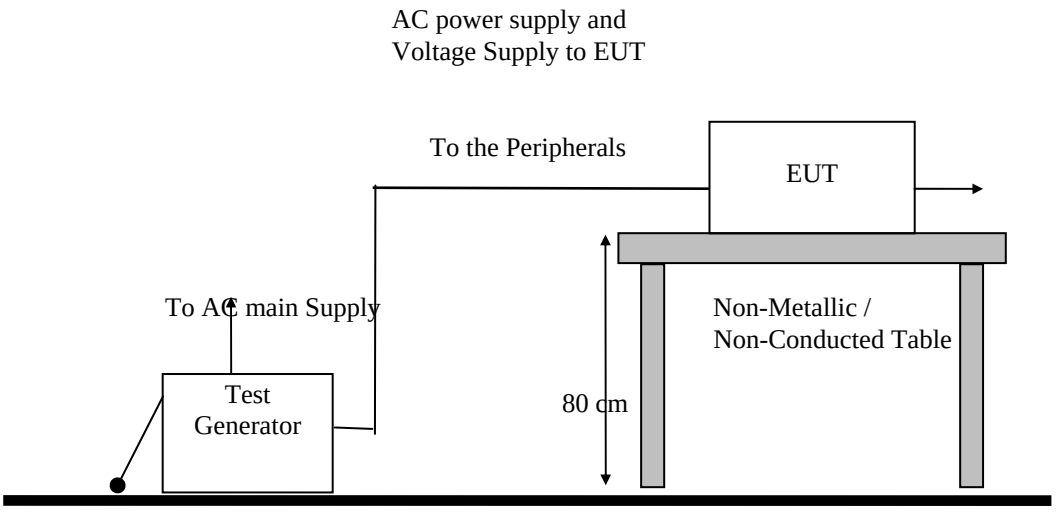
Performance of EUT complies with the given specification.

11. Surge Immunity

11.1 Surge immunity test

Port:	AC mains
Basic Standard:	EN61000-4-5/ AS/NZS 61000.4.5 (details referred to Sec 2.2)
Test Level:	**AC Power Port:** Line to Line: +/- 0.5 kV, +/- 1 kV Line to Earth: +/- 0.5 kV, +/- 1 kV, +/- 2kV
Rise Time:	1.2us
Hold Time:	50us
Repetition Rate:	30 second
Angle:	☒0° ☒90° ☒180° ☒270°
Criteria:	B
Test Procedure	refer to ISL QA T04-S04
Temperature:	26°C
Humidity:	50%

Test Setup



Metal Full Soldered Ground Plane

Test Result

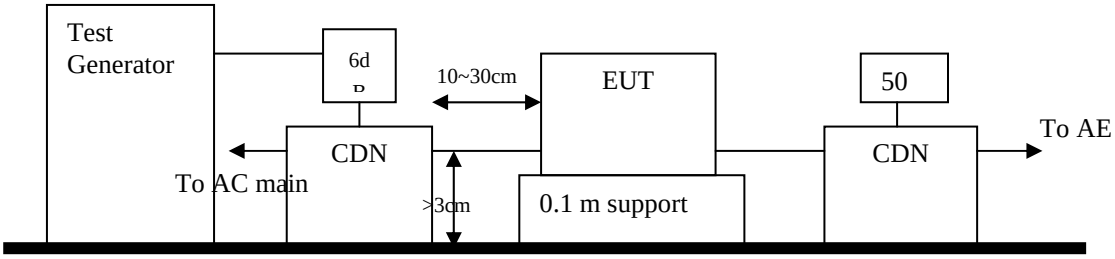
Performance of EUT complies with the given specification.

12. Immunity to Conductive Disturbance

12.1 Immunity to Conductive Disturbance

Port:	AC mains; Twisted Pair LAN Port
Basic Standard:	EN61000-4-6/ AS/NZS 61000.4.6 (details referred to Sec 2.2)
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
Test Procedure	refer to ISL QA T04-S08
Temperature:	26°C
Humidity:	50%

Test Setup



Reference Ground Plane

Test Result

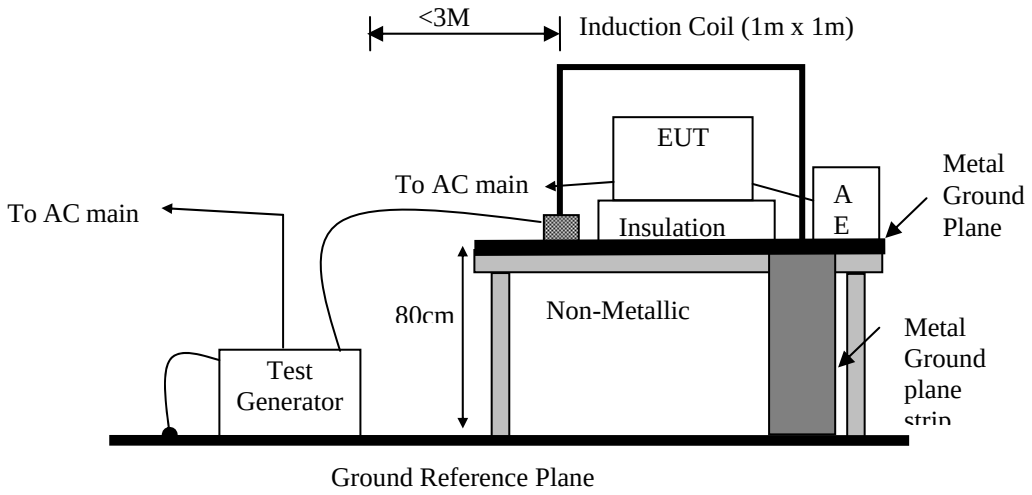
Performance of EUT complies with the given specification.

13. Power Frequency Magnetic Field immunity

13.1 Power Frequency Magnetic field immunity test

Port:	Enclosure
Basic Standard:	EN61000-4-8/ AS/NZS 61000.4.8 (details referred to Sec 2.2)
Test Level:	1A/m
Polarization:	X, Y, Z
Criteria:	A
Test Procedure	refer to ISL QA T04-S02
Temperature:	26°C
Humidity:	50%

Test Setup



Test Result

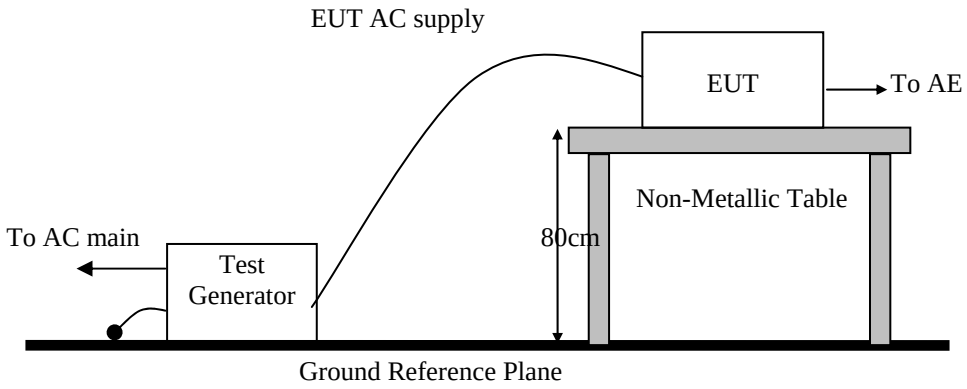
Performance of EUT complies with the given specification.

14. Voltage Dips, Short Interruption and Voltage Variation immunity

14.1 Voltage Dips, Short Interruption and Voltage Variation immunity test

Port:	AC mains
Basic Standard:	EN61000-4-11/ AS/NZS 61000.4.11 (details referred to Sec 2.2)
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 T04-S01
Temperature:	26°C
Humidity:	50%

Test Setup



Test Result

Performance of EUT complies with the given specification.

15. Harmonics

15.1 Harmonics test

Port:	AC mains
Active Input Power:	>75W
Basic Standard:	EN61000-3-2/AS/NZS61000.3.2 (details referred to Sec 2.2)
Test Duration:	2.5min
Class:	D
Test Procedure	refer to ISL QA T04-S43
Temperature:	27°C
Humidity:	56%

Test Procedure

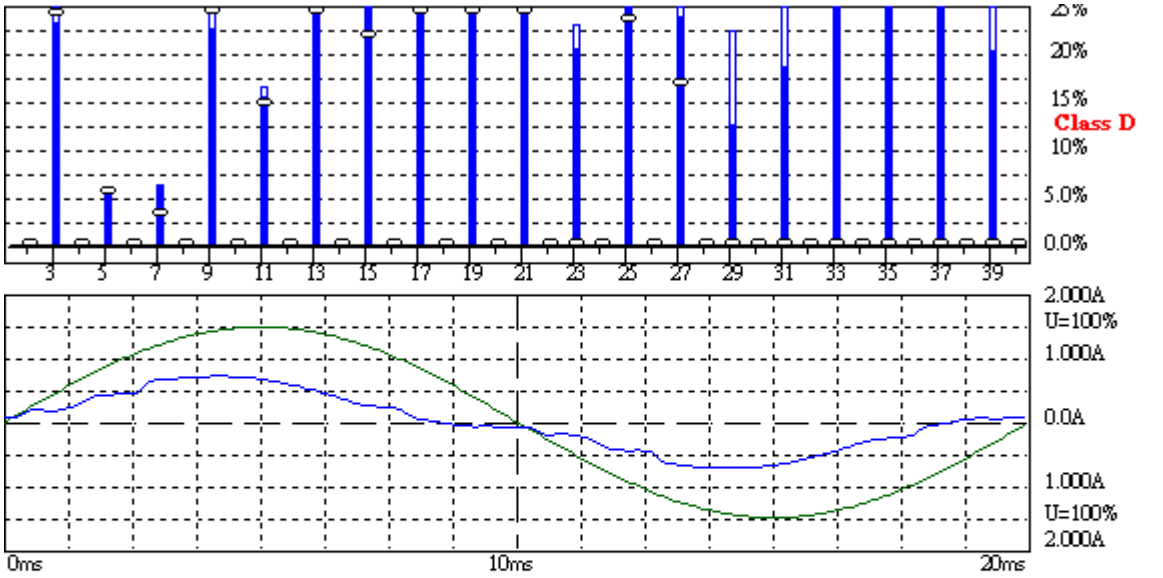
The EUT is supplied in series with shunts or current transformers from a source having the same nominal voltage and frequency as the rated supply voltage and frequency of the EUT. The EUT is configured to its rated current with additional resistive load when the testing is performed.

Equipment having more than one rated voltage shall be tested at the rated voltage producing the highest harmonics as compared with the limits.

Result

Performance of EUT complies with the given specification.

Test Data



Harmonic Emission - IEC 61000-3-2 , EN 61000-3-2 , (EN60555-2) 2008/8/5 AM 09:36:10

Urms =	229.9	V	P =	96.35	W	THC =	0.093	A	Range:	2 A
Irms =	0.446	A	pf =	0.939		Pmax =	111.8	W	V-nom:	230 V
									TestTime:	5 min (100%)

Test completed, Result: PASSED

HAR-1000 EMC-Partner

Date : 2008/8/5 AM 09:36:10 V4.16

Urms =	229.9V	Freq =	49.987	Range:	2 A
Irms =	0.446A	Ipk =	0.767A	cf =	1.718
P =	96.35W	S =	102.6VA	pf =	0.939
THDi =	21.0 %	THDu =	0.20 %	Class D	

Test - Time : 5min (100 %)

Limit Reference: Pmax = 111.76W

Test completed, Result: PASSED

Order	Freq. [Hz]	Iavg [A]	Iavg%L [%]	Imax [A]	Imax%L [%]	Limit [A]	Status
1	50	0.4608		0.4991			
2	100	0.0007		0.0060			
3	150	0.0918	24.163	0.0964	25.378	0.3800	
4	200	0.0000		0.0007			
5	250	0.0115	5.3964	0.0118	5.5760	0.2124	
6	300	0.0000		0.0005			
7	350	0.0035	3.1244	0.0067	6.0071	0.1118	
8	400	0.0000		0.0006			
9	450	0.0138	24.753	0.0154	27.524	0.0559	
10	500	0.0000		0.0009			
11	550	0.0058	14.720	0.0063	16.227	0.0391	
12	600	0.0000		0.0010			
13	650	0.0103	31.009	0.0114	34.298	0.0331	
14	700	0.0000		0.0011			
15	750	0.0062	21.620	0.0109	37.873	0.0287	
16	800	0.0000		0.0012			
17	850	0.0136	53.802	0.0143	56.426	0.0253	
18	900	0.0000		0.0011			
19	950	0.0095	42.068	0.0138	60.908	0.0226	
20	1000	0.0000		0.0011			
21	1050	0.0068	33.378	0.0084	41.107	0.0205	
22	1100	0.0000		0.0010			
23	1150	0.0000	0.0000	0.0043	22.837	0.0187	
24	1200	0.0000		0.0009			
25	1250	0.0040	23.083	0.0071	41.135	0.0172	
26	1300	0.0000		0.0009			
27	1350	0.0027	16.863	0.0062	39.064	0.0159	
28	1400	0.0000		0.0006			
29	1450	0.0000	0.0000	0.0033	22.213	0.0148	
30	1500	0.0000		0.0007			
31	1550	0.0000	0.0000	0.0046	33.419	0.0139	
32	1600	0.0000		0.0010			
33	1650	0.0000	0.0000	0.0049	37.447	0.0130	
34	1700	0.0000		0.0010			
35	1750	0.0000	0.0000	0.0040	32.766	0.0123	
36	1800	0.0000		0.0009			
37	1850	0.0000	0.0000	0.0048	40.936	0.0116	
38	1900	0.0000		0.0009			
39	1950	0.0000	0.0000	0.0038	34.298	0.0110	
40	2000	0.0000		0.0007			

16. Voltage Fluctuations

16.1 Voltage Fluctuations test

Port:	AC mains
Basic Standard:	EN61000-3-3/AS/NZS61000.3.3 (details referred to Sec 2.2)
Test Procedure	refer to ISL QA T04-S44
Observation period:	For Pst 10min
	For Plt 2 hours
Temperature:	27°C
Humidity:	56%

Test Procedure

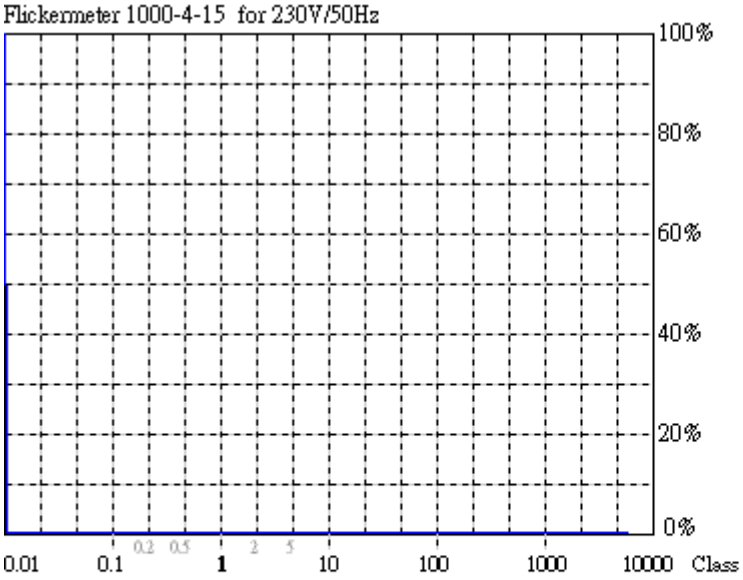
The EUT is supplied in series with reference impedance from a power source with the voltage and frequency as the nominal supply voltage and frequency of the EUT.

Result

Performance of EUT complies with the given specification.

Test Data

10 min
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):	**0.02%**
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)

2008/8/5 AM 10:27:28

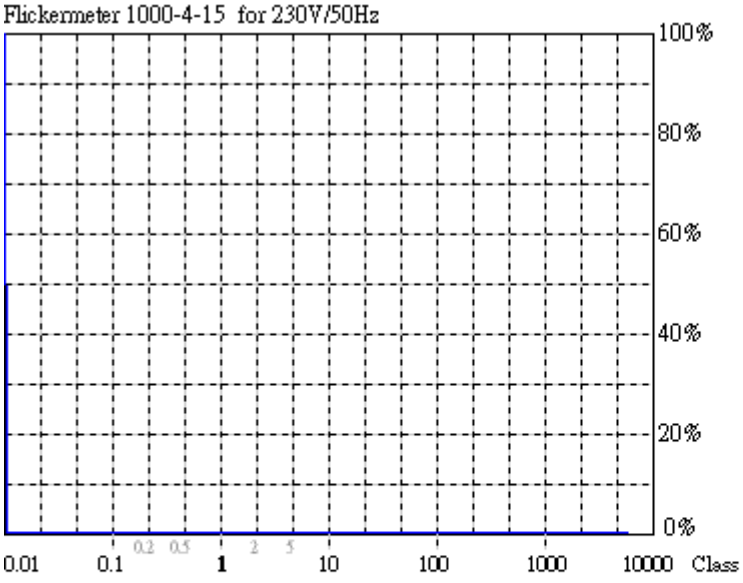
Urms =	229.7	V	P =	91.94	W
Irms =	0.427	A	pf =	0.938	

Range:	1 A
V-nom:	230 V
TestTime:	10 min (100%)

Test completed, Result: PASSED

HAR-1000 EMC-Retest

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):	**0.03%**
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)

2008/8/5 PM 12:30:37

Urms =	229.7	V	P =	90.88	W
Irms =	0.422	A	pf =	0.938	

Range:	1 A
V-nom:	230 V
TestTime:	120 min (10000%)

Test completed, Result: PASSED

HAR-1000 EMC-Retest

17. Appendix

17.1 Appendix A: Measurement Procedure for Main Power Port Conducted Emissions

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.

If the EUT is supplied with a flexible power cord, the power cord length in excess of the distance separating the EUT from the LISN shall be folded back and forth at the center of the lead so as to form a bundle not exceeding 40cm in length. If the EUT is provided with a permanently coiled power cord, bundling of the cord is not required. If the EUT is supplied without a power cord, the EUT shall be connected to the LISN by a power cord of the type specified by the manufacturer which shall not be longer than 1 meter. The excess power cord shall be bundled as described above. If a non-flexible power cord is provided with the EUT, it shall be cut to the length necessary to attach the EUT to the LISN and shall not be bundled.

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.

17.2 Appendix B: Measurement Procedure for Telecommunication Port Conducted Emissions

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.

If the EUT is supplied with a flexible power cord, if the power cord length in excess of 1 m, the excess cable shall be bundled at approximate center of the power cord with the bundles 30 cm to 40 cm in length. If the EUT is provided with a permanently coiled power cord, bundling of the cord is not required. If the EUT is supplied without a power cord, the EUT shall be connected to the LISN by a power cord of the type specified by the manufacturer which shall be 1 meter in length. If a non-flexible power cord is provided with the EUT, it shall be cut to the length necessary to attach the EUT to the LISN and shall not be bundled.

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.

17.3 Appendix C: Test Procedure for Radiated Emissions

Preliminary Measurements in the Anechoic Chamber

The radiated emissions are initially measured in the anechoic chamber at a measurement distance of 3 meters. Desktop EUT are placed on a wooden stand 0.8 meter in height. The measurement antenna is 3 meters from the EUT. The test setup in anechoic chamber is the same as open site. The turntable rotated 360°C. The antenna height is varied from 1-2.5m. The primary objective of the radiated measurements in the anechoic chamber is to identify the frequency spectrum in the absence of the electromagnetic environment existing on the open test site. The frequencies can then be pre-selected on the open test site to obtain the corresponding amplitude. The initial scan is made with the spectrum analyzer in automatic sweep mode. The spectrum peaks are then measured manually to determine the exact frequencies.

Measurements on the Open Site or Chamber

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. Desktop EUT are set up on a wooden stand 0.8 meter above the ground.

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. Both reading are recorded with the quasi-peak detector with 120KHz bandwidth. For frequency between 30 MHz and 1000MHz, the reading is recorded with peak detector or quasi-peak detector.

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.

17.4 Appendix D: Test Equipment

17.4.1 Test Equipment List

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conduction	Coaxial Cable 1F-C1	Harbourindustries	RG400	1F-C1	10/25/2007	10/25/2008
Conduction	Hygro-Thermo Meter 11	N/A	TH-400	ISL-002	02/19/2008	02/19/2009
Conduction	LISN 02	EMCO	3825/2	1407	07/07/2008	07/07/2009
Conduction	LISN 03	R&S	ESH3-Z5 831.5518.52	828874/010	07/07/2008	07/07/2009
Conduction	ISN T4 04	Schaffner	ISN T400	21644	02/19/2008	02/19/2009
Conduction	Current Probe 01	SOLAR	9208-1	0411602	02/19/2008	02/19/2009
Conduction	Capacitive Voltage Probe 01	Schaffner	CVP2200A	18711	07/12/2008	07/12/2009
Conduction	EMI Receiver 08	Schwarzbeck Mess-Elektronik	FCKL 1528	1528-202	09/05/2007	09/05/2008
Conduction	Spectrum Analyzer 05	HP	8594EM	3619A00192	02/19/2008	02/19/2009
Radiation	BILOG Antenna 10	Sumol Sciences	JB1	A013004-1	07/24/2008	07/24/2009
Radiation	Coaxial Cable 3F-10M	MIYAZAKI	8D-8F	10M-1	10/25/2007	10/25/2008
Radiation	Coaxial Cable 3F-3M	BELDEN	RG-8/U	3F-3M	10/25/2007	10/25/2008
Radiation	Spectrum Analyzer 12	Advantest	R3132	130200208	03/05/2008	03/05/2009
Radiation	Hygro-Thermo Meter 10	N/A	TH-400	ISL-001	02/19/2008	02/19/2009
Rad. above 1Ghz	Horn Antenna 01	EMCO	3115	9504-4462	10/30/2007	10/30/2008
Rad. above 1Ghz	Horn Antenna 03	COM-Power	AH-826	100A	02/20/2008	02/20/2009
Rad. above 1Ghz	Microwave Cable RF07-3	HUBER+SUHNER AG.	Sucoflex 103	42728/3	07/17/2008	07/17/2009
Rad. above 1Ghz	Preamplifier 01	R&S	ESMI-Z7	1045.502	07/17/2008	07/17/2009
Radiation	Signal Generator 01	HP	8656B	2635A04675	08/17/2007	08/17/2008
Radiation	EMI Receiver 09	Schwarzbeck Mess-Elektronik	FCVU 1534	1534-150	05/08/2008	05/08/2009

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	03/27/2008	03/27/2009
EN61K-3-2/3	Hygro-Thermo Meter 15	N/A	TH-400	ISL-006	02/19/2008	02/19/2009
EN61K-4	Hygro-Thermo Meter 14	N/A	TH-400	ISL-005	02/19/2008	02/19/2009
EN61K-4-,4,5, 8,11	TRANSIENT 2000 01	EMC Partner	TRANSIENT-2000	950	10/30/2007	10/30/2008
EN61K-4-2	ESD GUN 04	Schaffner	NSG 438	489	03/07/2008	03/07/2009
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	02/27/2008	02/27/2009
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-Kit -4	Precision	1604243	CDNKIT1000-32	N/A	N/A
EN61K-4-5	CDN Surge Kit 01	EMC-PARTNER	CDNKIT1000T; DN-T1; DN-T2; CN-T1; CN-T2	CDNKIT1000-24	08/06/2006	08/06/2009
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	07/08/2008	07/08/2009
EN61K-4-6	CDN T2 01	Frankonia	T2	A3010003	07/08/2008	07/08/2009
EN61K-4-6	CDN T4 01	FCC Inc.	FCC-801-T4	9721	07/08/2008	07/08/2009
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 01	HP	8656B	2635A04675	08/17/2007	08/17/2008
EN61K-4-8	Clamp Meter 4-8	TES	3090	990900322	07/11/2008	07/11/2009
EN61K-4-8	Magnetic Field Antenna	Precision	TRAIZ44B	MF1000-23	N/A	N/A

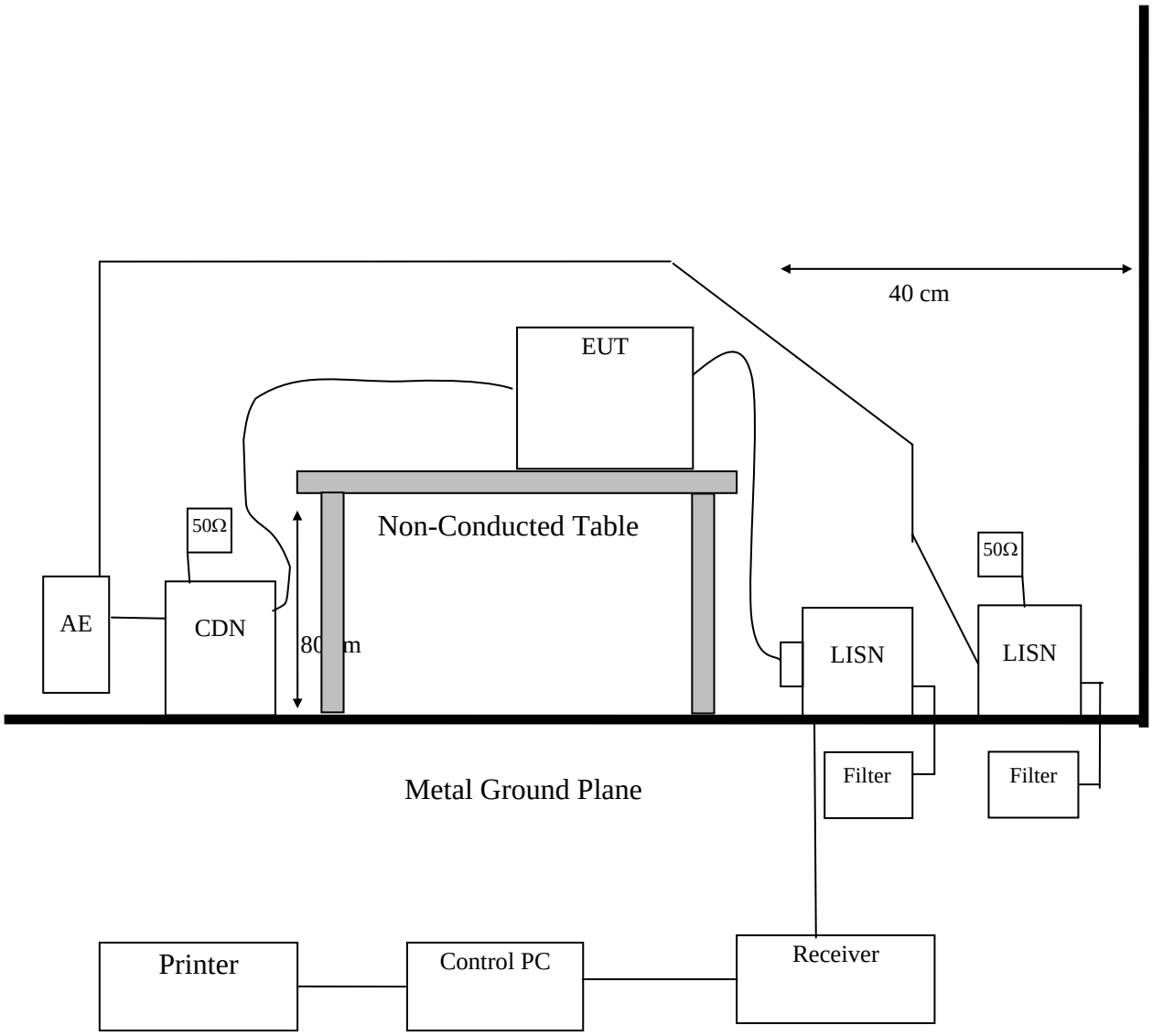
17.5 Software for Controlling Spectrum/Receiver and Calculating Test Data

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

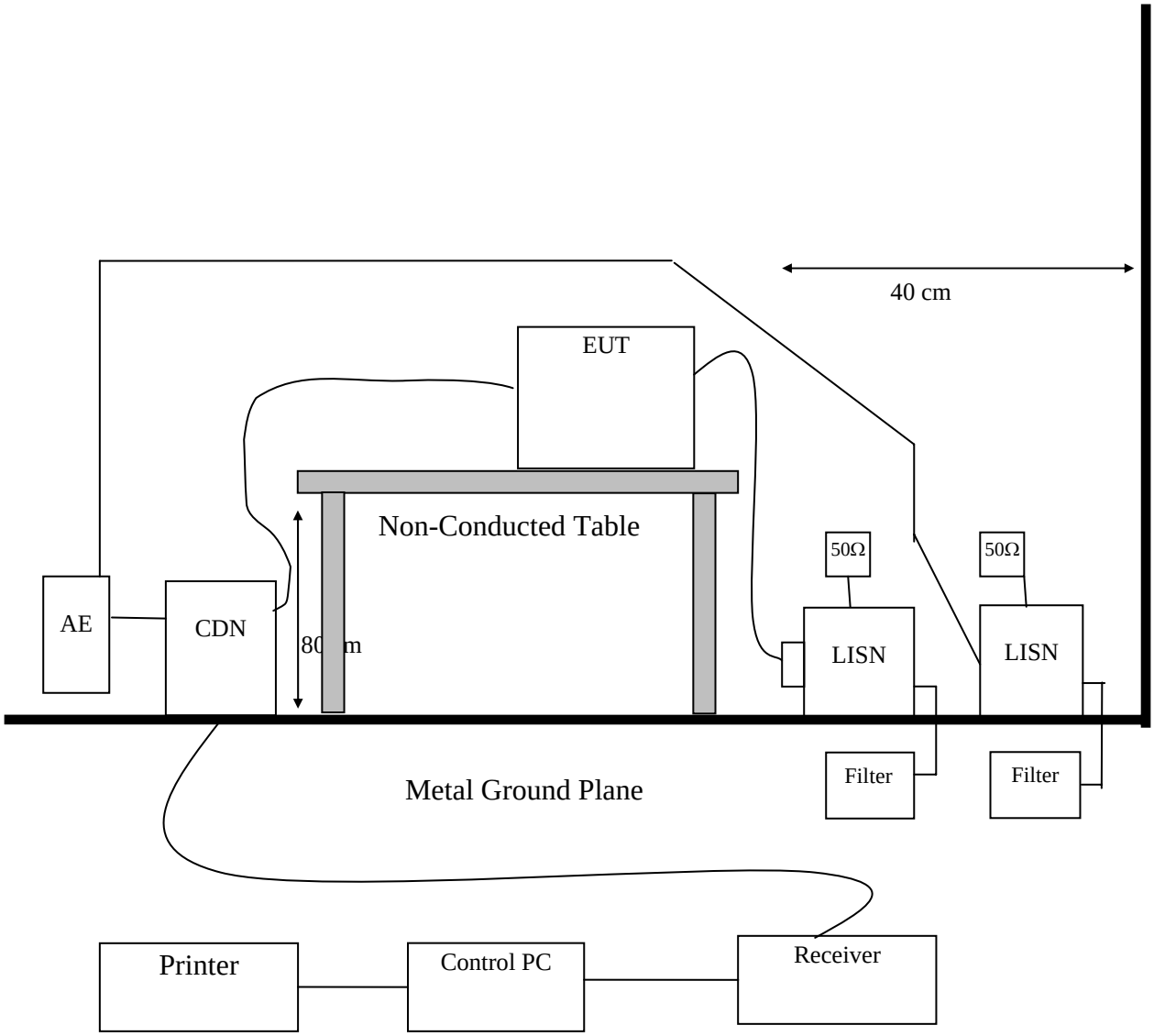
Radiation/Conduction	Filename	Version	Issued Date
Hsichih Conduction	EZ EMC	1.1.4.2	2/10/2007
Hsichih Radiation	EZ EMC	1.1.4.2	1/24/2007
Lung_Tan Conduction	EZ EMC	1.1.4.2	2/10/2007
Lung_Tan Radiation	EZ EMC	1.1.4.2	1/24/2007

17.6 Appendix E: Layout of EUT and Support Equipment

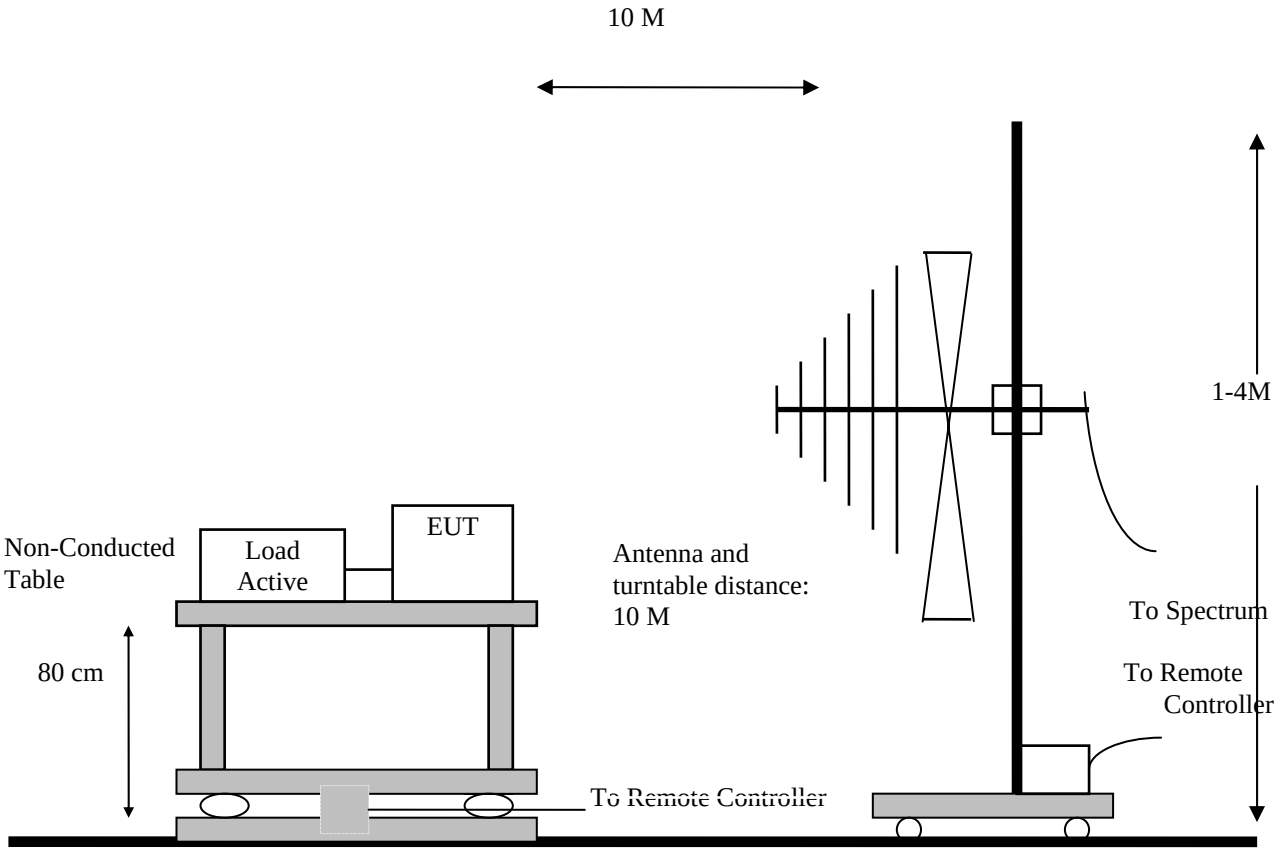
17.6.1 General Power Main Port Conducted Test Configuration

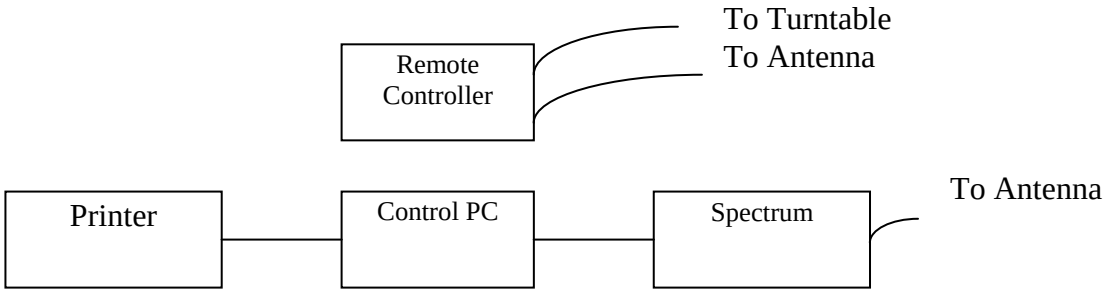


17.6.2 General Telecommunication Port Conducted Emission Test Configuration



17.6.3 General Radiation Test Configuration





17.7 Appendix F: 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>: ±1.57dB

<OATS 01 (10M)>
30MHz~1GHz: ±2.60dB

<Immunity 01>

Test item	Uncertainty
EN61000-4-2 (ESD)	±38.43%
EN61000-4-3 (RS)	±2.56dB
EN61000-4-4 (EFT)	±17.16%
EN61000-4-5 (Surge)	±14.79%
EN61000-4-6 (CS)	±2.93dB
EN61000-4-8 (Magnetic)	±0.01%
EN61000-4-11 (Dips)	±4.61%
EN61000-3-2 (Harmonics)	±0.01%
EN61000-3-3 (Fluctuations and Flicker)	±0.01%

17.8 Appendix G: Photographs of EUT Configuration Test Set Up

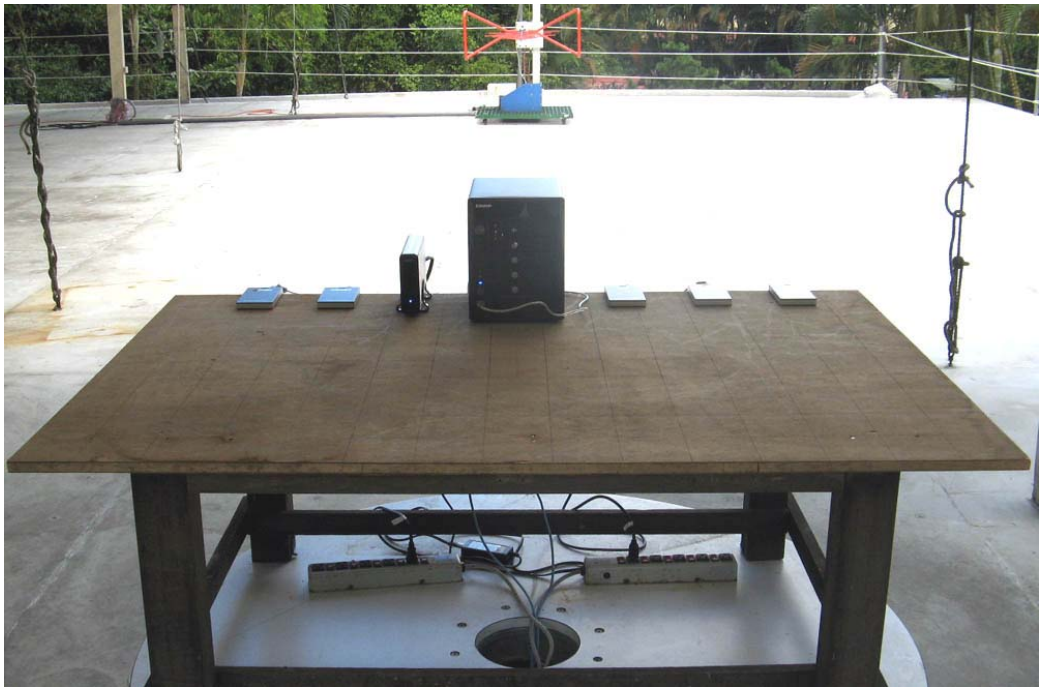
17.8.1 Photo of Main Power Port Conducted Emission and Telecommunication Port Conducted Emission Measurement

Front View

Back View

17.8.2 Photo of Radiated Emission Measurement

Front View

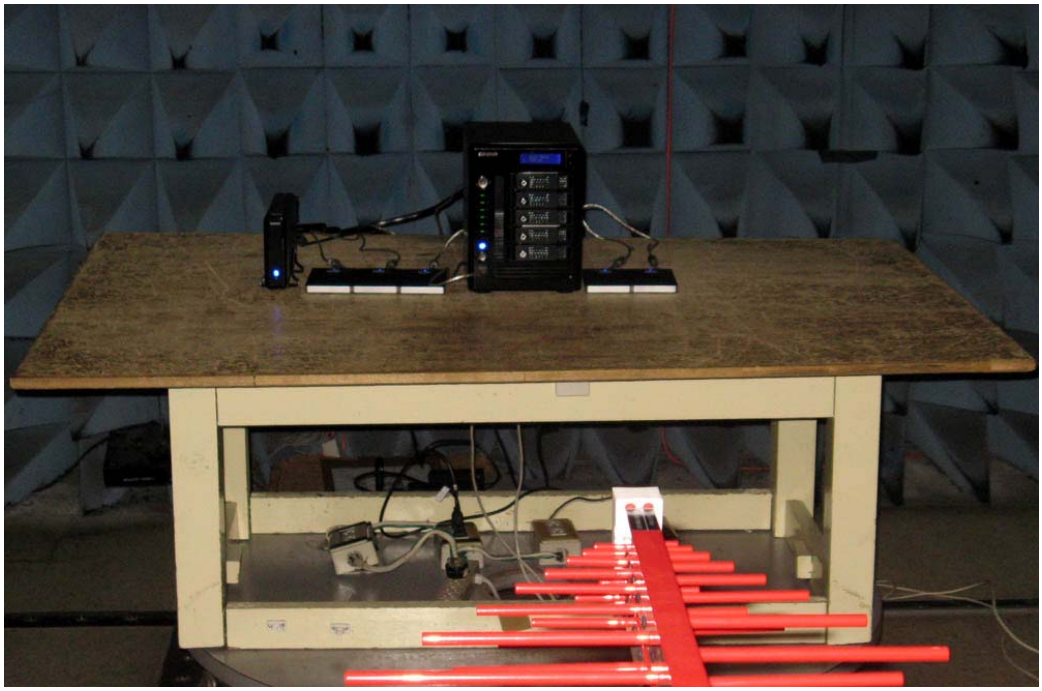


Back View

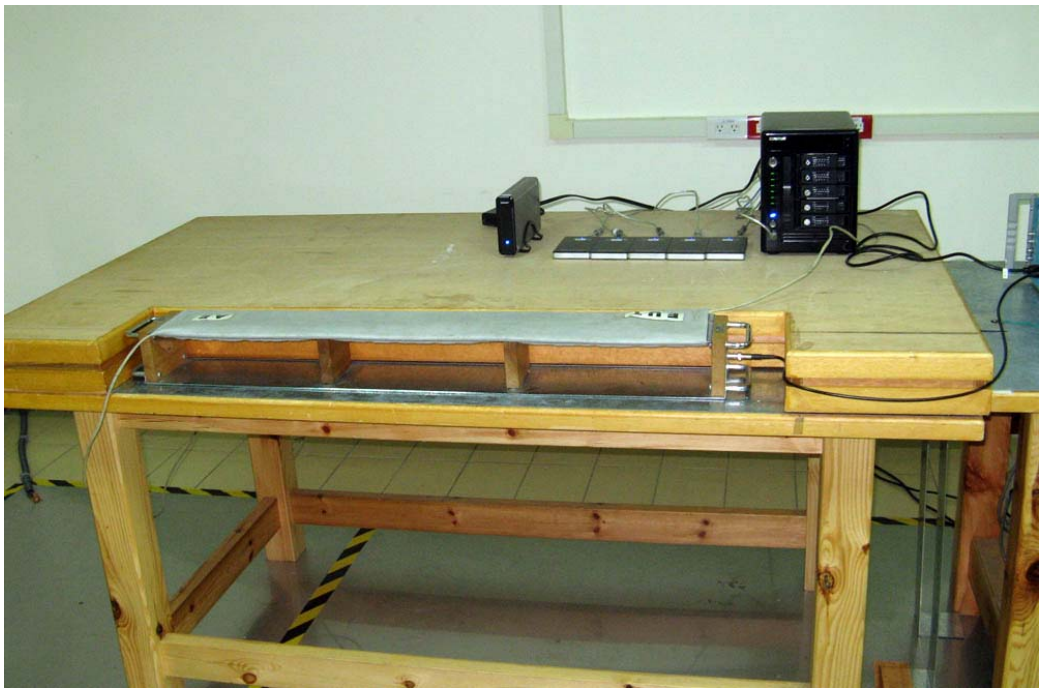
17.8.3 Photo of ESD Measurement

17.8.4 Photo of RF Field Strength Susceptibility Measurement

.

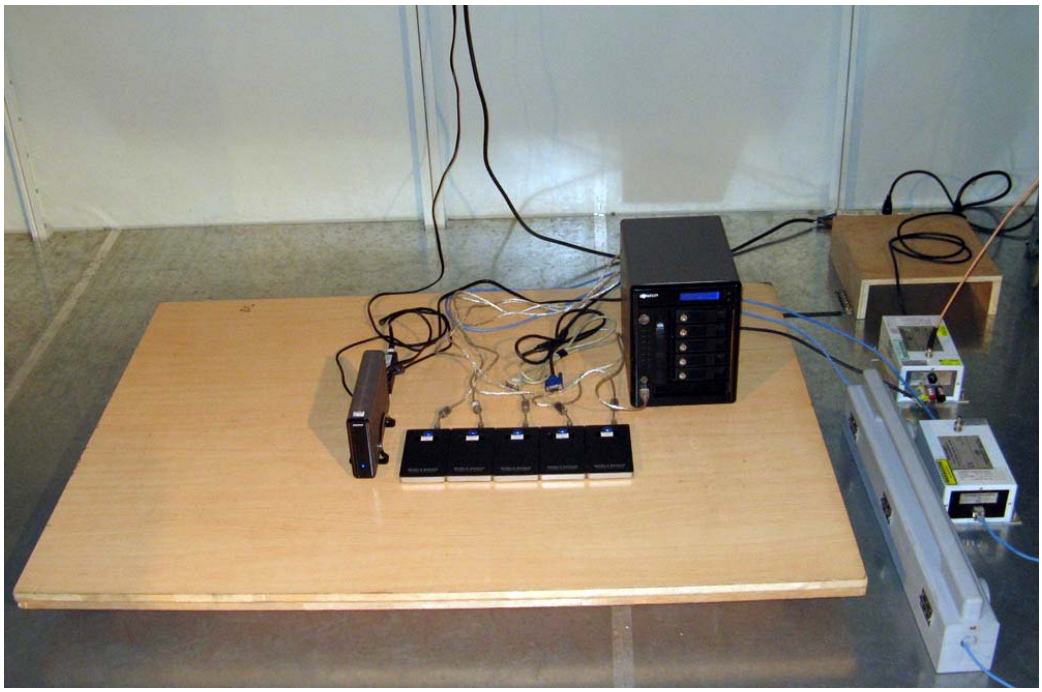


17.8.5 Photo of Electrical Fast Transient/Burst Measurement

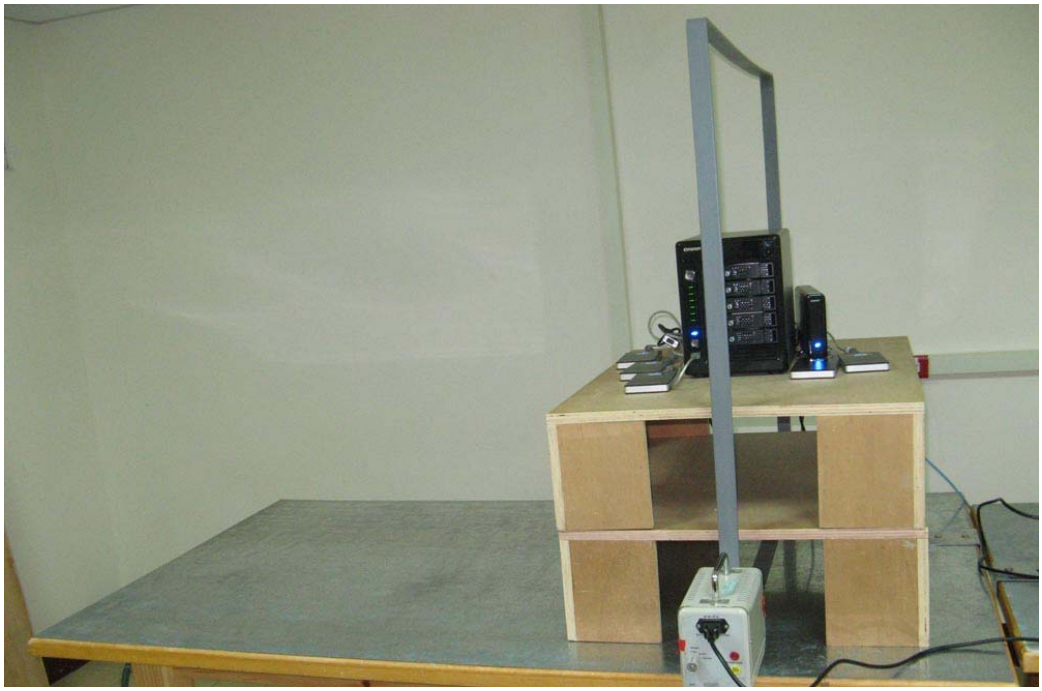


17.8.6 Photo of Surge Measurement

17.8.7 Photo of Conductive Measurement



17.8.8 Photo of Magnetic field Measurement



17.8.9 Photo of Voltage Dips Measurement

17.8.10 Photo of Harmonics and Voltage Fluctuations

17.9 Photographs of EUT

Please refer to the File of **ISL-*08HE175*P**