Certificate

Issue Date: October 5, 2012
Ref. Report No. ISL-12HE263CE

Product Name	:	Network Attached Storage
Models	:	TS-1270U-RP; TS-870U-RP; TS-1270U-RP+; TS-870U-RP+; TS-1270U II-RP; TS-870U II-RP; NAS-1270UG-RP; NAS-870UG-RP; NAS-1270UG-RP+; NAS-870UG-RP+; NAS-1270UG II-RP; NAS-870UG II-RP
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 22179, 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-1270U-RP; TS-870U-RP; TS-1270U-RP+; TS-870U-RP+; TS-1270U II-RP; TS-870U II-RP; NAS-1270UG-RP; NAS-870UG-RP; NAS-1270UG-RP+; NAS-870UG-RP+; NAS-1270UG II-RP; NAS-870UG II-RP

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-1270U-RP; TS-870U-RP; TS-1270U-RP+; TS-870U-RP+; TS-1270U II-RP; TS-870U II-RP; NAS-1270UG-RP; NAS-870UG-RP; NAS-1270UG-RP+; NAS-870UG-RP+; NAS-1270UG II-RP; NAS-870UG II-RP
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
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

<to be continued>

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: October 5, 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-1270U-RP; TS-870U-RP; TS-1270U-RP+; TS-870U-RP+; TS-1270U II-RP; TS-870U II-RP; NAS-1270UG-RP; NAS-870UG-RP; NAS-1270UG-RP+; NAS-870UG-RP+; NAS-1270UG II-RP; NAS-870UG II-RP
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
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

<to be continued>

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: October 5, 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-1270U-RP; TS-870U-RP; TS-1270U-RP+; TS-870U-RP+; TS-1270U II-RP; TS-870U II-RP; NAS-1270UG-RP; NAS-870UG-RP; NAS-1270UG-RP+; NAS-870UG-RP+; NAS-1270UG II-RP; NAS-870UG II-RP**

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
FCC: TW1067; IC: IC4067A-1; NEMKO: ELA 113A
VCCI: <Conduction01>C-354, T-1749, <OATS01>R-341, <Chamber01>G-443
*Address:
No. 65, Gu Dai Keng St.
Hsichih District, New Taipei City 22179, Taiwan
*Tel: 886-2-2646-2550; Fax: 886-2-2646-4641

Report No.: **ISL-12HE263CE**
Issue Date : **October 5, 2012**

This report totally contains 61 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-1270U-RP; TS-870U-RP; TS-1270U-RP+; TS-870U-RP+; TS-1270U II-RP; TS-870U II-RP; NAS-1270UG-RP; NAS-870UG-RP; NAS-1270UG-RP+; NAS-870UG-RP+; NAS-1270UG II-RP; NAS-870UG II-RP
Brand:	QNAP
Applicant:	QNAP Systems, Inc.
Sample received Date:	September 14, 2012
Final test Date:	EMI: refer to the date of test data EMS: October 5, 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:	EDDIE CHUNG Eddie Chung
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: 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-1270U-RP; TS-870U-RP; TS-1270U-RP+; TS-870U-RP+; TS-1270U II-RP; TS-870U II-RP; NAS-1270UG-RP; NAS-870UG-RP; NAS-1270UG-RP+; NAS-870UG-RP+; NAS-1270UG II-RP; NAS-870UG II-RP
Serial Number	N/A
Power Supply1	EMACS (Model: M1P2-5500V4V)
	AC input: 100-240V~ 47-63Hz~8-4A
	DC output: 500W (MAX)
	+5V 0-32A
	+12V 41A
	+3.3V 0-25A
	-12V 0-0.5A
	+5VSB 0-3.5A
	+5V AND +3.3V TOTAL MAX:170W
	Include: EMACS (Model: M1P-2500V)*2
	AC input: 100-240V~ 47-63Hz~8-4A
	DC output: 500W(MAX)
	+12V 41A
	+5VSB 0-3.5A
Power Supply2	EMACS (Model: R1S2-5300V4V)
	AC input: 100-240V~ 47-63Hz~4.5-2A
	DC output: 300W (MAX)
	+5V 0-20A
	+12V 24A
	+3.3V 0-20A
	-12V 0-0.5A
	+5VSB 0-2.5A
	+5V AND +3.3V Total MAX: 140W
	Include: EMACS (Model: P1S-2300V-R)*2
	AC input: 100-240V~ 47-63Hz~4.5-2A
	DC output: 300W (MAX)
	+12V 24A
	+5VSB 0-2.5A
CPU	Intel Celeron G540 2.50GHz
Motherboard	(Model: TS-1270U V1.2)

SATA Board	(Model: TS-1270U BP V1.2)
SATA Hard Disk	Western Digital (Model: WD5000AADS-00S9B0) 500GB *12
Memory	One Transcend 4GB DDR3-1600MHz
USB Flash	One
USB 2.0 Port	Four 4-pins
USB 3.0 Port	Two 9-pins
Power Switch	One
E-SATA Port	Two 7-pins
RJ45 Port	Two 8-pins (10/100/1000Mbps)
HDMI Port	One 19-pins
AC Power Port	Two
Maximum Operating Frequency	2.50GHz

Radiation 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	Power Supply
1	Model: M1P-2500V *2
2	Model: M1P-2500V
3	Model: P1S-2300V-R *2
4	Model: P1S-2300V-R

Conduction LISN 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	Power Supply
1	Model: M1P-2500V *2
	Model: M1P-2500V
2	Model: P1S-2300V-R *2
	Model: P1S-2300V-R

Telecom Conduction LISN All types of EUT have been tested. We present the worst case test data (Configurations: 1,2,3,4,5,6) in the report. The test configurations are listed below:

Configurations	RJ45	Speed	Power Supply
1	port 1	10Mbps	Model: M1P-2500V *2
2	port 1	100Mbps	Model: M1P-2500V *2
3	port 1	1000Mbps	Model: M1P-2500V *2
4	port 2	10Mbps	Model: M1P-2500V *2
5	port 2	100Mbps	Model: M1P-2500V *2
6	port 2	1000Mbps	Model: M1P-2500V *2
7	port 1	1000Mbps	Model: P1S-2300V-R *2

8	port 2	1000Mbps	Model: P1S-2300V-R *2
9	port 1	1000Mbps	Model: M1P-2500V
10	port 2	1000Mbps	Model: M1P-2500V
11	port 1	1000Mbps	Model: P1S-2300V-R
12	port 2	1000Mbps	Model: P1S-2300V-R

EMI Noise Source

Mother board Crystal	25MHz (Y1)
	25MHz (Y2)
	25MHz (Y3)
	32.768KHz (Y4)
	25MHz (Y5)
SATA board Crystal	25MHz (Y1)
	25MHz (Y2)
	25MHz (Y3)
	25MHz (Y4)
	25MHz (Y5)
	25MHz (U3)
USB Flash Crystal	12MHz (Y1)

EMI Solution:

N/A

Model Differences:

Model	Package	Selling Markets
TS-1270U-RP	QNAP Carton Box	Commercial storage related products supply chain
TS-870U-RP	QNAP Carton Box	Commercial storage related products supply chain
TS-1270U-RP+	QNAP Carton Box	Commercial / Professional storage related products
TS-870U-RP+	QNAP Carton Box	Commercial / Professional storage related products
TS-1270U II-RP	QNAP Carton Box	Professional/Industrial storage related products supply
TS-870U II-RP	QNAP Carton Box	Professional/Industrial storage related products supply
NAS-1270UG-RP	Generic Carton Box (NO QNAP Logo)	Commercial Storage equipment Tender and Cooperation plan
NAS-870UG-RP	Generic Carton Box (NO QNAP Logo)	Commercial Storage equipment Tender and Cooperation plan
NAS-1270UG-RP+	Generic Carton Box (NO QNAP Logo)	Industrial Storage equipment Tender and Cooperation plan
NAS-870UG-RP+	Generic Carton Box (NO QNAP Logo)	Industrial Storage equipment Tender and Cooperation plan
NAS-1270UG II-RP	Generic Carton Box (NO QNAP Logo)	Professional/Industrial Storage equipment Tender and Cooperation plan
NAS-870UG II-RP	Generic Carton Box (NO QNAP Logo)	Professional/Industrial Storage equipment Tender and Cooperation plan

1.4 Description of Support Equipment

Unit	Model Serial No.	Brand	Power Cord	FCC ID
USB2.0 External HDD Enclosure*4	Ipod nano S/N: N/A	Apple	N/A	FCC DOC
USB3.0 External HDD Enclosure*2	WDBACY5000ABK-PESN S/N: XH1E31FSV80	WD	N/A	FCC DOC
E-SATA Hard Disk*2	NST-200SU-BK S/N:N/A	NexStar	Non-shielded, Detachable	FCC DOC
Notebook Personal Computer	Latitude D400 S/N: N/A	DELL	Non-shielded, Detachable	FCC DOC
Rack mountable Switch	DGS-1008D	D-Link	Non-shielded, Detachable	FCC DOC
24” LCD Monitor	U2410	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.

	File name	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 HDD Enclosure	InterEMC.exe	9/04/2000
RJ45	ping.exe	05/05/1999
RJ45	Tfgen.exe	06/23/1999
EUT	Finder.exe	11/15/2008
EUT Hard Disk	InterEMC.exe	9/04/2000

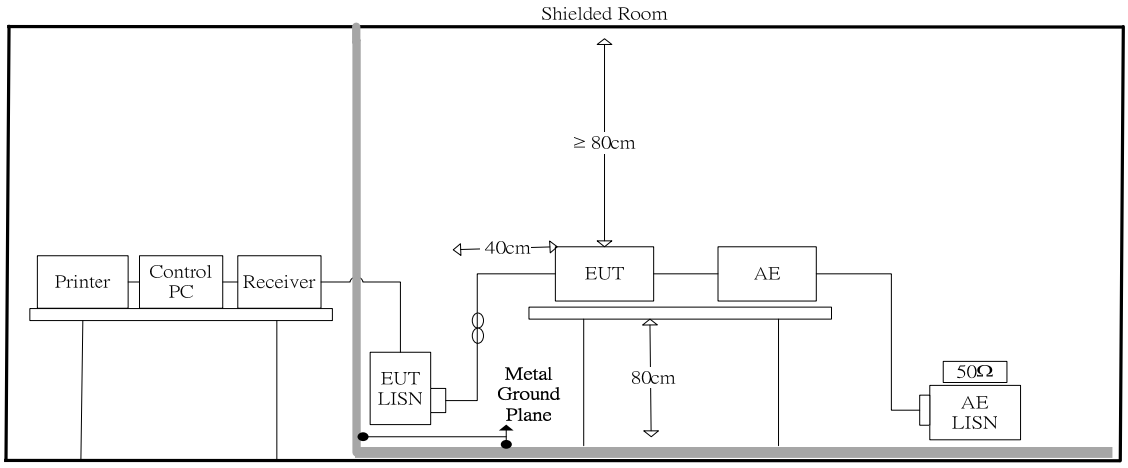
1.6 I/O Cable Condition of EUT and Support Units

Description	Path	Cable Length	Cable Type	Connector Type
AC Power Cord*2	110V (~240V) to EUT SPS	1.8M	Non-shielded, Detachable	Plastic Head
USB2.0 Data Cable*4	USB2.0 External HDD Enclosure USB 2.0Port to EUT USB 2.0Port	1M	Shielded, Detachable	Metal Head
USB3.0 Data Cable*2	USB3.0 External HDD Enclosure USB 3.0 Port to EUT USB 3.0Port	1M	Shielded, Detachable	Metal Head
E-SATA Data Cable*2	E-SATA External HDD Enclosure E-SATA Port to EUT E-SATA Port	1M	Non-Shielded, Detachable	Plastic Head
RJ45 Data Cable*2	EUT RJ45 Port to Switch HUB RJ45 Port	1.5M	Non-shielded, Detachable	RJ-45, with Plastic Head
RJ45 Data Cable	Switch HUB RJ45 port to Notebook RJ45 Port	10M	Non-shielded, Detachable	RJ-45, with Plastic Head
Display Data Cable	EUT HDMI Port to LCD Monitor 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.

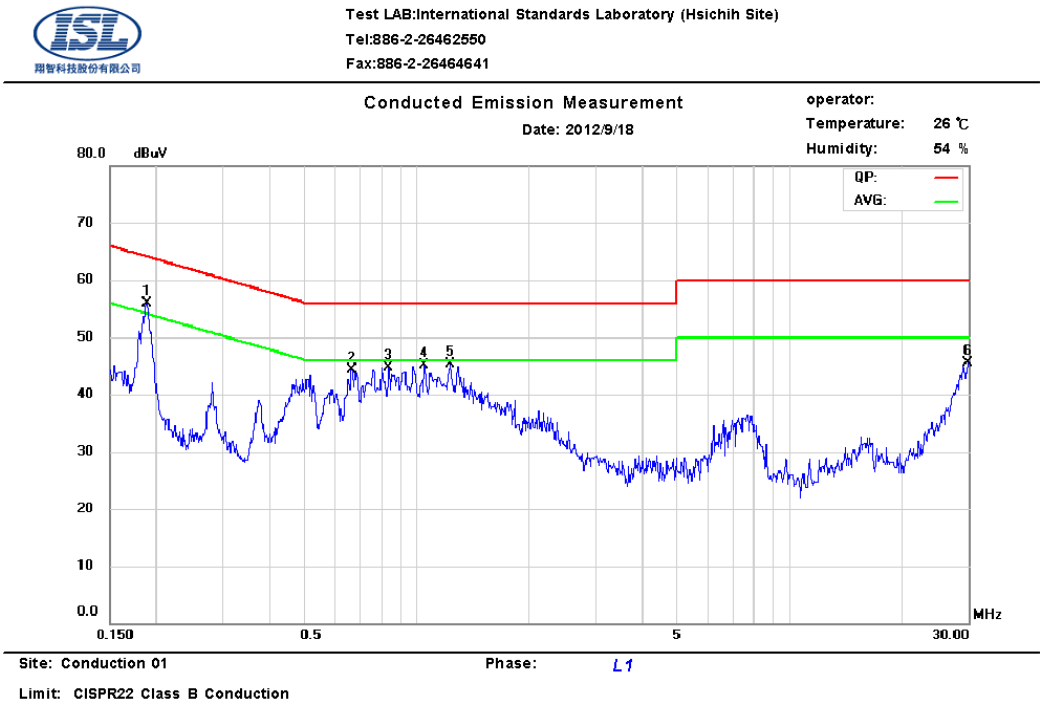
The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

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)

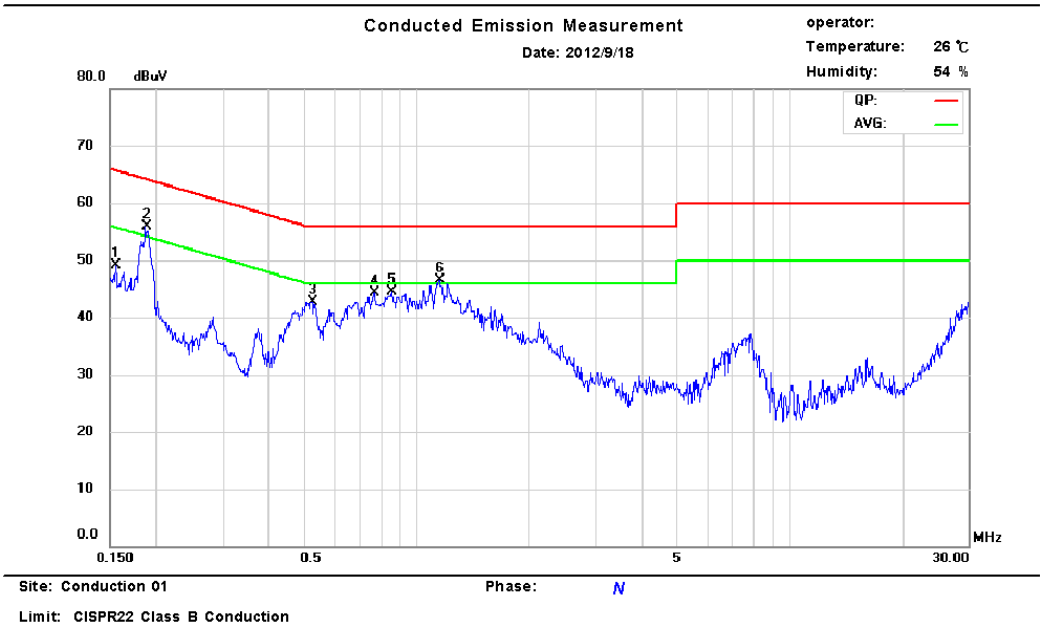


No.	Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
1	0.1870	0.17	0.01	52.29	64.17	-11.88	43.28	54.17	-10.89	
2	0.6665	0.19	0.05	35.08	56.00	-20.92	25.91	46.00	-20.09	
3	0.8420	0.20	0.06	38.05	56.00	-17.95	27.77	46.00	-18.23	
4	1.0444	0.21	0.07	36.67	56.00	-19.33	25.98	46.00	-20.02	
5	1.2245	0.22	0.08	38.16	56.00	-17.84	27.47	46.00	-18.53	
6	29.8000	1.58	0.33	38.16	60.00	-21.84	27.10	50.00	-22.90	

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



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	0.1560	0.18	0.01	42.03	65.67	-23.64	36.70	55.67	-18.97	
2	0.1856	0.17	0.01	50.85	64.23	-13.38	42.67	54.23	-11.56	
3	0.5224	0.18	0.04	36.12	56.00	-19.88	27.01	46.00	-18.99	
4	0.7654	0.19	0.05	37.75	56.00	-18.25	26.47	46.00	-19.53	
5	0.8554	0.19	0.06	37.92	56.00	-18.08	26.49	46.00	-19.51	
6	1.1434	0.20	0.08	38.68	56.00	-17.32	28.50	46.00	-17.50	

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.

2.3 Test Setup Photo

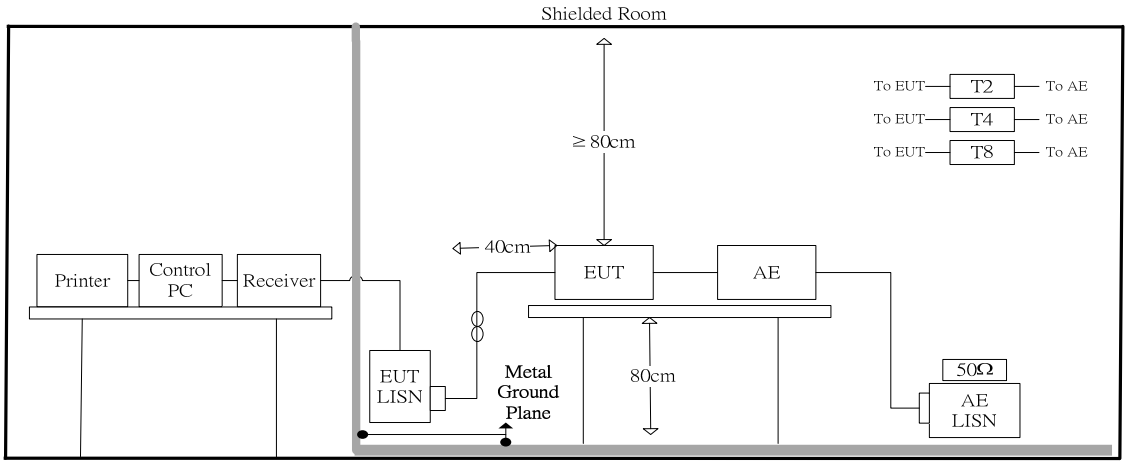
Front View

Back View

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.

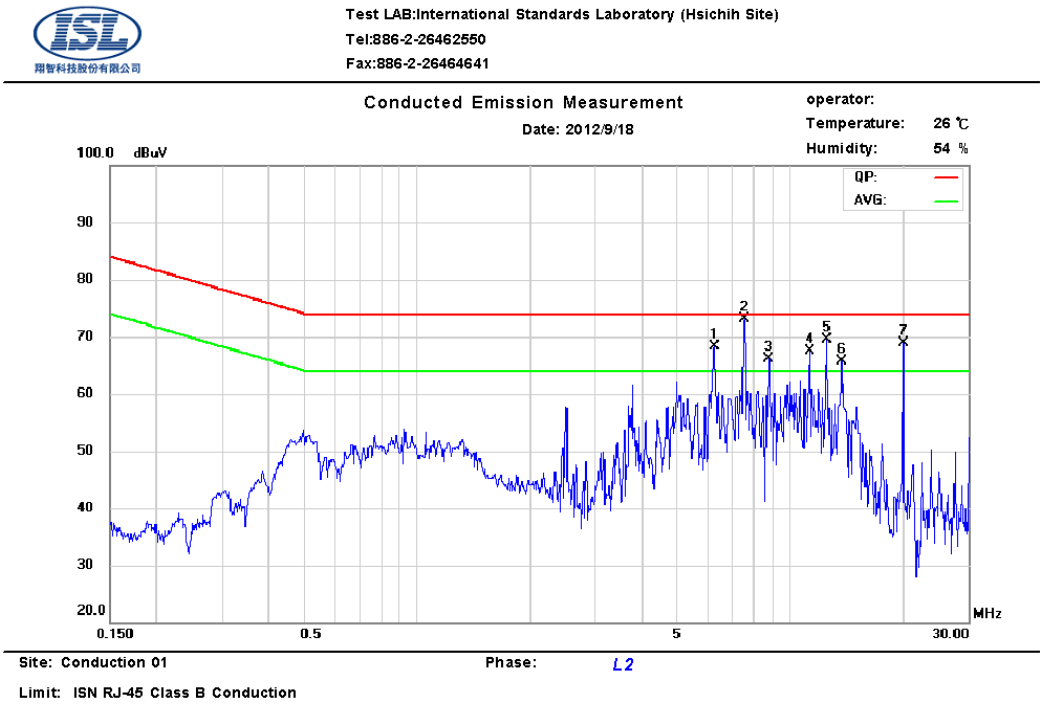
The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information could be useful in reducing their amplitude.

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

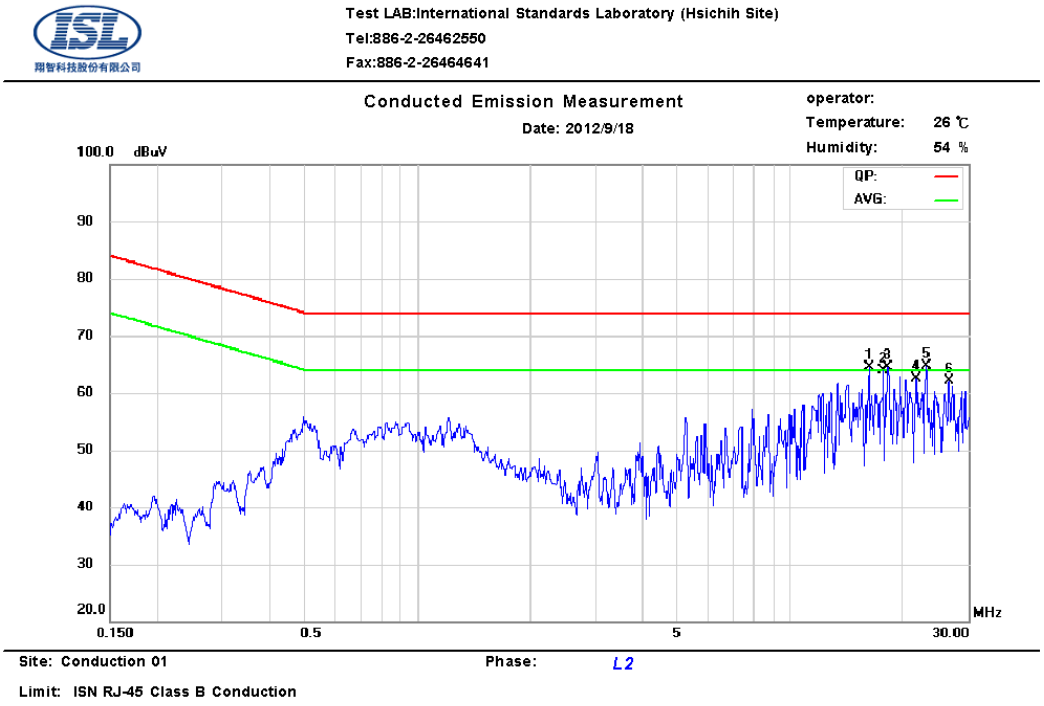


No.	Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
1	6.2500	9.96	0.18	61.13	74.00	-12.87	48.22	64.00	-15.78	
2	7.5000	9.96	0.20	65.72	74.00	-8.28	52.78	64.00	-11.22	
3	8.7500	9.96	0.21	59.98	74.00	-14.02	47.47	64.00	-16.53	
4	11.2500	9.96	0.23	59.00	74.00	-15.00	46.87	64.00	-17.13	
5	12.5000	9.96	0.23	63.41	74.00	-10.59	51.33	64.00	-12.67	
6	13.7500	9.96	0.23	57.85	74.00	-16.15	44.65	64.00	-19.35	
7	20.0000	9.97	0.28	60.40	74.00	-13.60	44.25	64.00	-19.75	

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

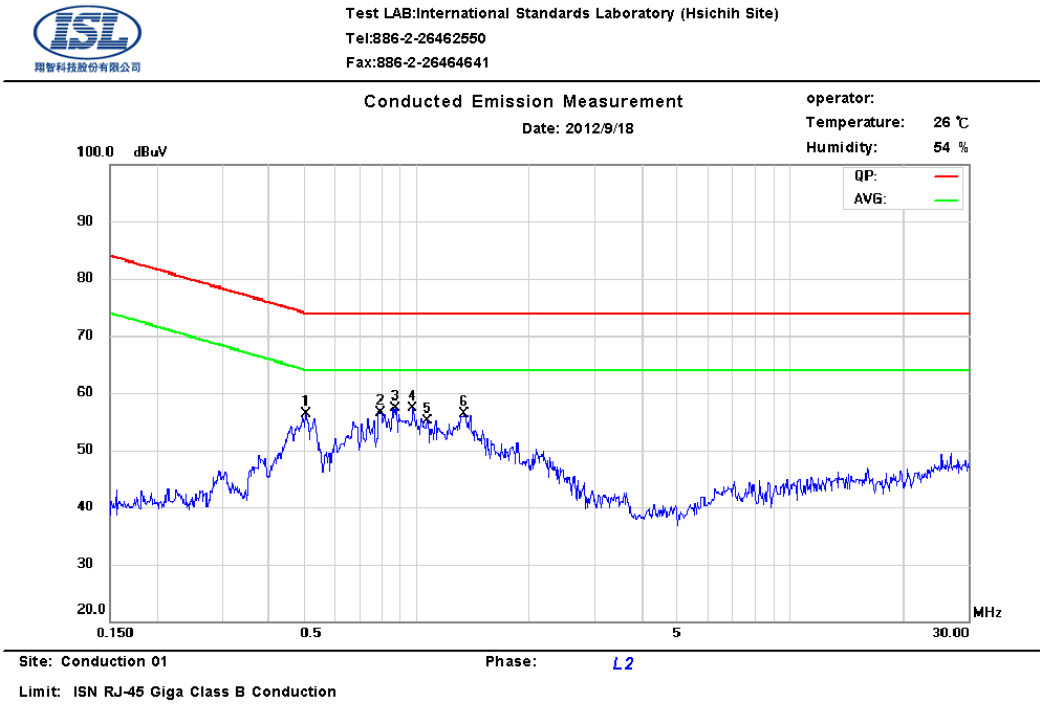


No.	Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
1	16.2250	9.96	0.25	61.35	74.00	-12.65	58.97	64.00	-5.03	
2	17.7000	9.97	0.26	50.03	74.00	-23.97	47.41	64.00	-16.59	
3	18.2500	9.97	0.27	48.96	74.00	-25.04	46.42	64.00	-17.58	
4	21.6750	9.97	0.29	34.78	74.00	-39.22	21.08	64.00	-42.92	
5	23.1250	9.98	0.30	61.26	74.00	-12.74	58.85	64.00	-5.15	
6	26.6250	9.99	0.32	33.77	74.00	-40.23	20.16	64.00	-43.84	

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

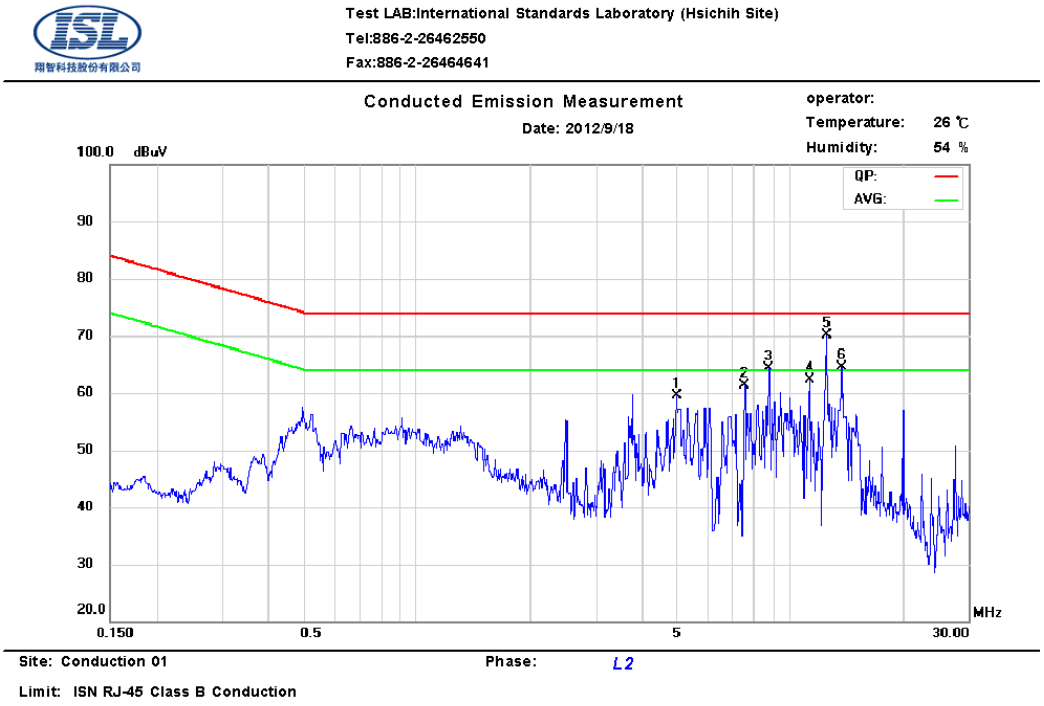


No.	Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
1	0.5045	9.95	0.04	50.91	74.00	-23.09	41.51	64.00	-22.49	
2	0.7970	9.93	0.06	45.91	74.00	-28.09	36.63	64.00	-27.37	
3	0.8780	9.92	0.06	49.76	74.00	-24.24	38.32	64.00	-25.68	
4	0.9770	9.91	0.07	48.13	74.00	-25.87	38.34	64.00	-25.66	
5	1.0670	9.91	0.07	46.12	74.00	-27.88	36.40	64.00	-27.60	
6	1.3370	9.91	0.08	47.43	74.00	-26.57	37.43	64.00	-26.57	

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



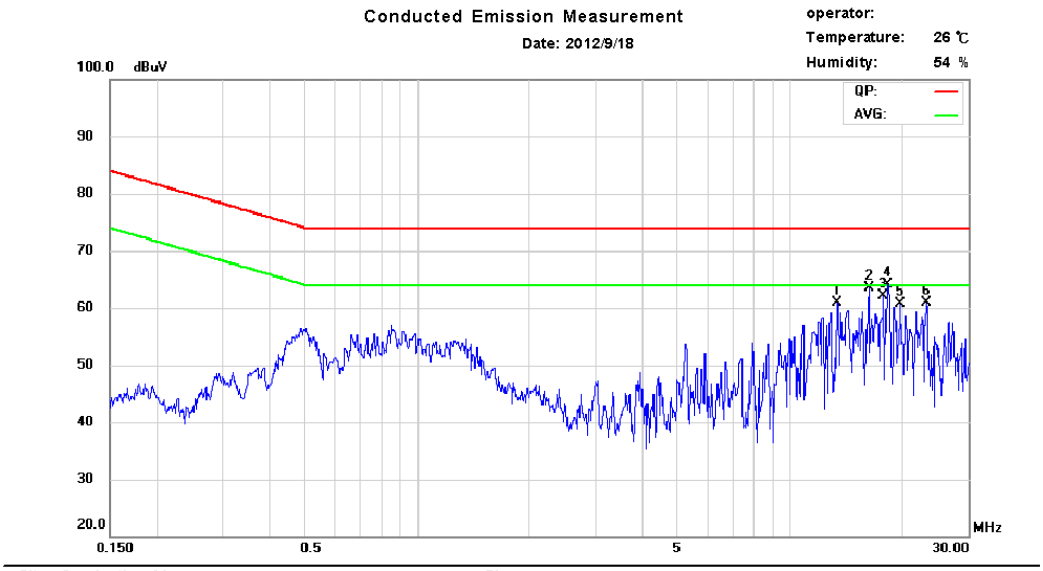
No.	Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
1	4.9415	9.96	0.17	47.86	74.00	-26.14	34.97	64.00	-29.03	
2	7.5500	9.96	0.20	48.92	74.00	-25.08	37.07	64.00	-26.93	
3	8.7500	9.96	0.21	56.89	74.00	-17.11	44.42	64.00	-19.58	
4	11.2500	9.96	0.23	57.45	74.00	-16.55	45.31	64.00	-18.69	
5	12.5000	9.96	0.23	61.26	74.00	-12.74	48.72	64.00	-15.28	
6	13.7500	9.96	0.23	55.61	74.00	-18.39	42.20	64.00	-21.80	

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

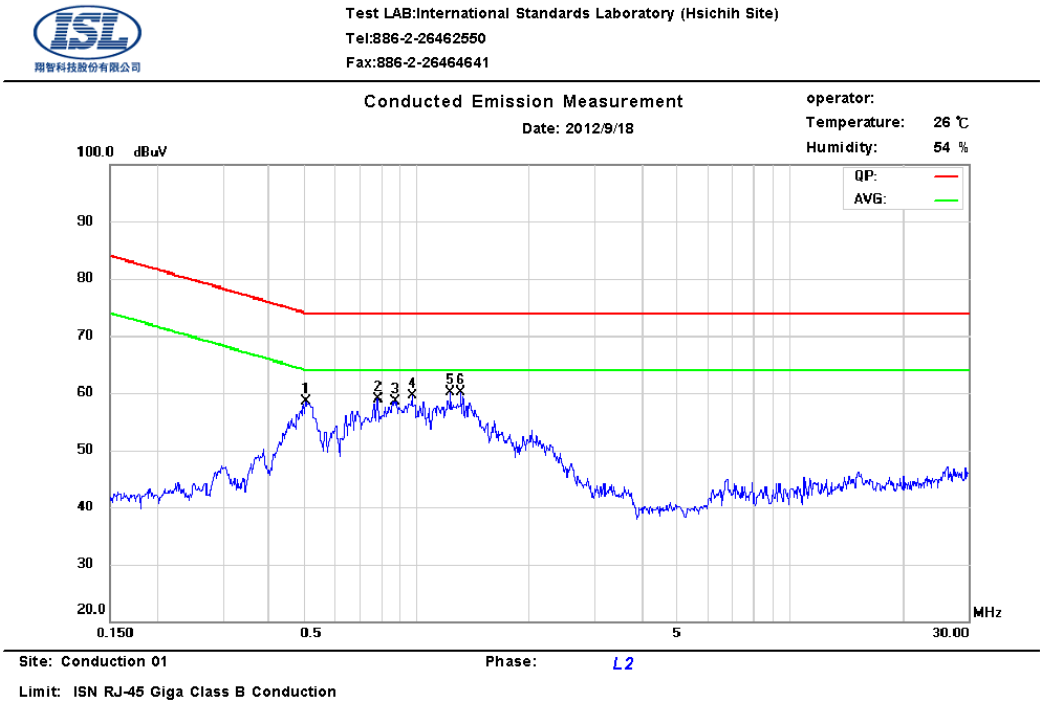


No.	Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
1	13.3500	9.96	0.23	44.43	74.00	-29.57	39.16	64.00	-24.84	
2	16.2250	9.96	0.25	59.76	74.00	-14.24	57.28	64.00	-6.72	
3	17.7000	9.97	0.26	50.48	74.00	-23.52	47.91	64.00	-16.09	
4	18.2500	9.97	0.27	49.41	74.00	-24.59	46.94	64.00	-17.06	
5	19.7000	9.97	0.28	38.98	74.00	-35.02	35.54	64.00	-28.46	
6	23.1250	9.98	0.30	56.76	74.00	-17.24	54.28	64.00	-9.72	

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



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	0.5045	9.95	0.04	52.01	74.00	-21.99	42.64	64.00	-21.36	
2	0.7835	9.93	0.06	51.23	74.00	-22.77	38.36	64.00	-25.64	
3	0.8780	9.92	0.06	51.50	74.00	-22.50	40.42	64.00	-23.58	
4	0.9680	9.91	0.07	50.13	74.00	-23.87	39.85	64.00	-24.15	
5	1.2290	9.91	0.08	50.84	74.00	-23.16	40.64	64.00	-23.36	
6	1.3100	9.91	0.08	51.66	74.00	-22.34	40.85	64.00	-23.15	

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.

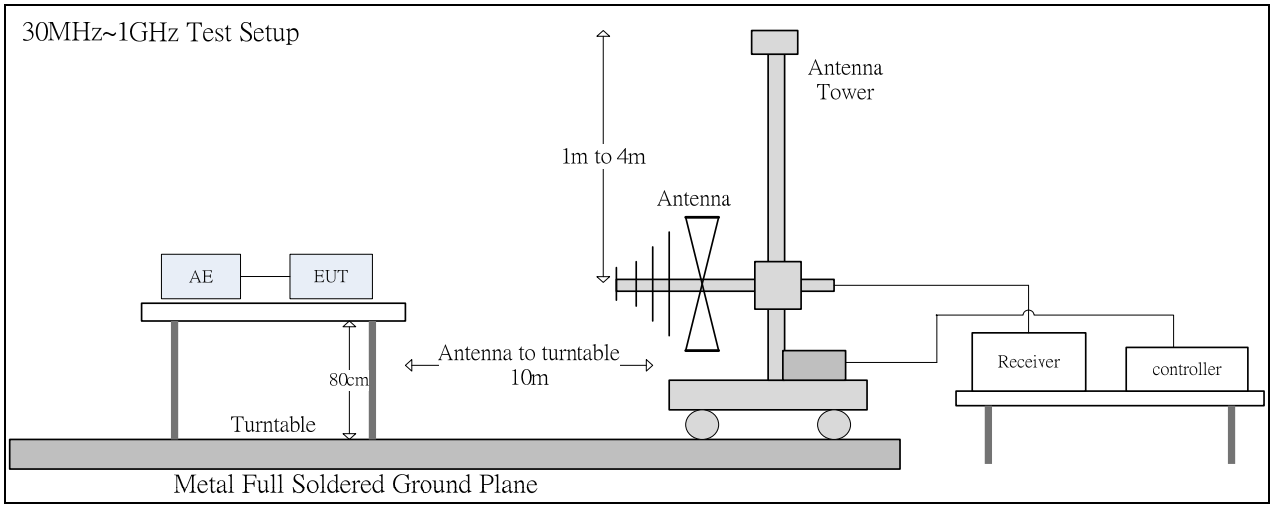
3.8 Test Setup Photo

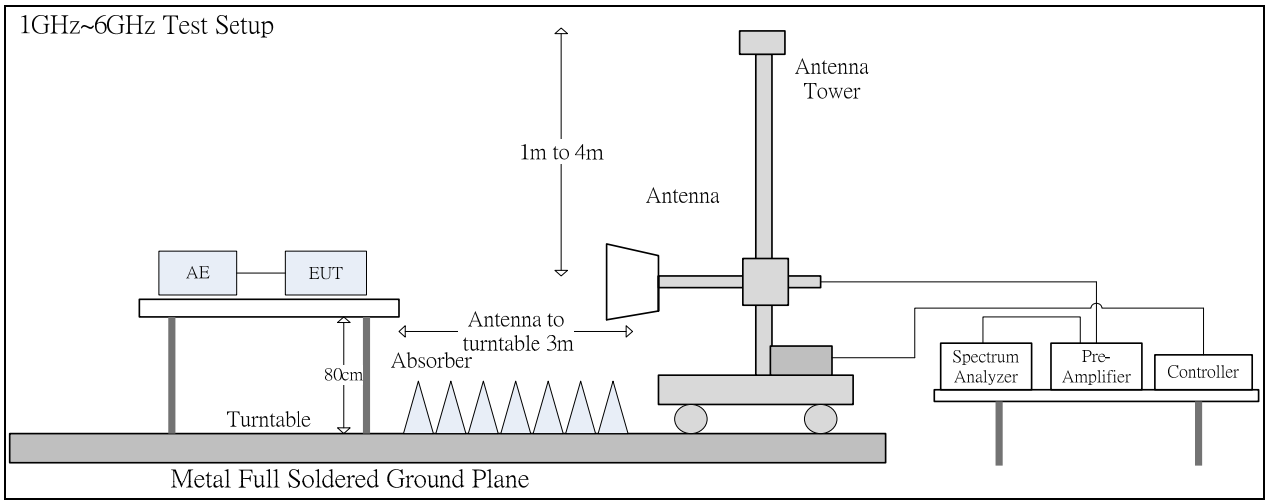
Refer to the Setup Photos for Power Main Port Conducted Emissions

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.

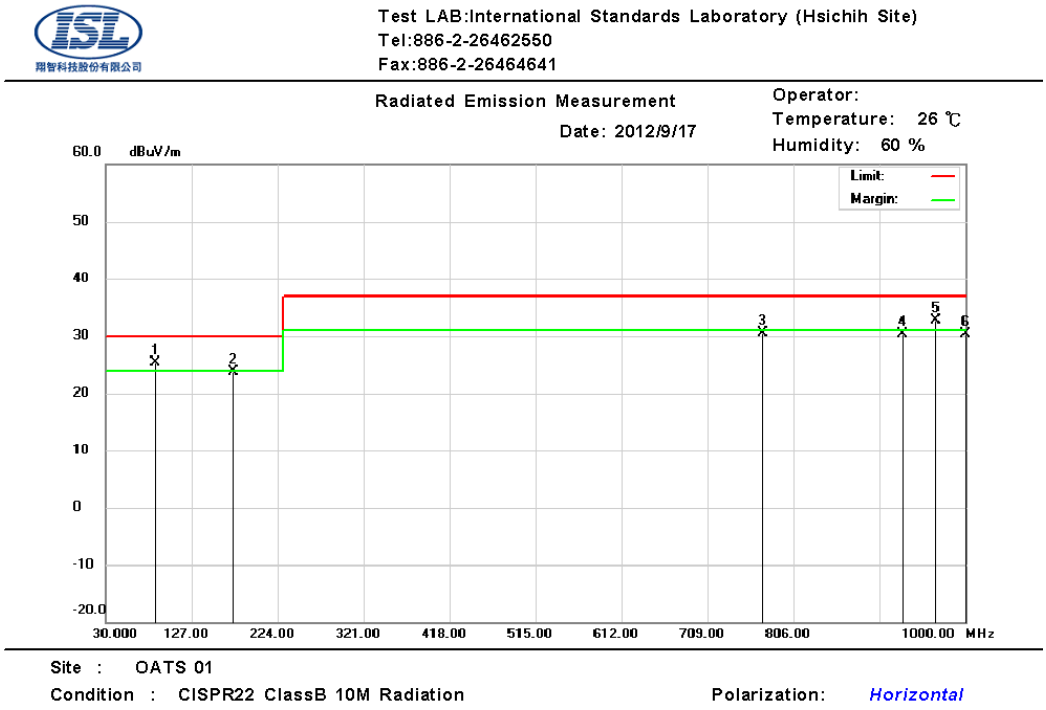
4.1.3 Spectrum Analyzer Configuration (for the frequencies tested)

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)



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	85.3400	16.60	7.8	0.93	0.00	25.33	30.00	-4.67	105	146	QP
2	172.6700	10.52	11.87	1.31	0.00	23.70	30.00	-6.30	206	310	QP
3	772.0500	6.66	20.95	2.92	0.00	30.53	37.00	-6.47	198	284	QP
4	928.3100	4.22	22.97	3.2	0.00	30.39	37.00	-6.61	379	91	QP
5	967.0200	6.26	23.24	3.28	0.00	32.78	37.00	-4.22	100	259	QP
6	999.9500	3.37	23.5	3.36	0.00	30.23	37.00	-6.77	160	143	QP

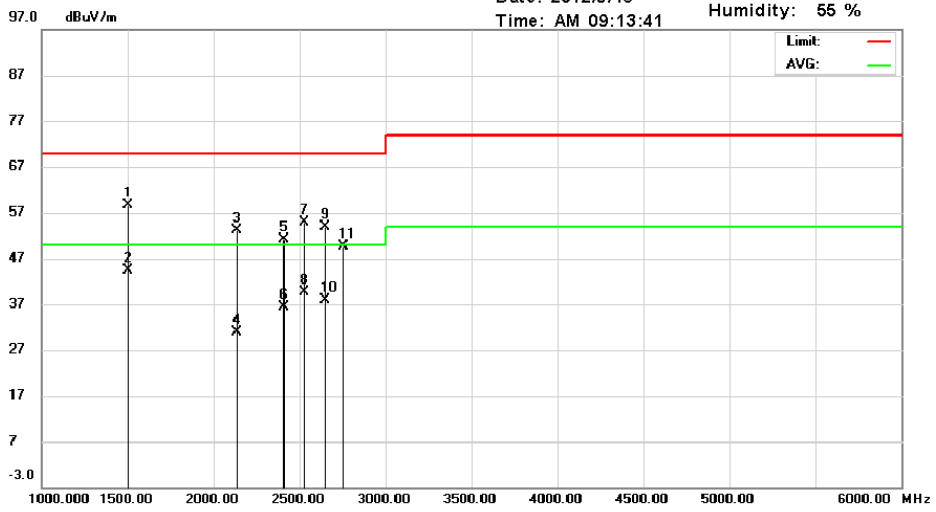
* Note:
Margin = Corrected Amplitude – Limit
Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
BILOG Antenna Distance: 10 meters

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 %
Date: 2012/9/18
Time: AM 09:13:41



Site : Chamber 01
Condition : CISPR22 ClassB 3M Radiation Polarization: *Horizontal*

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	1500.128	78.87	28.3	3.62	52.05	58.74	70.00	-11.26	100	319	peak
2	1500.128	64.52	28.3	3.62	52.05	44.39	50.00	-5.61	100	319	AVG
3	2131.106	69.36	31.5	4.36	52.12	53.10	70.00	-16.90	122	151	peak
4	2131.106	47.07	31.5	4.36	52.12	30.81	50.00	-19.19	122	151	AVG
5	2403.520	66.71	31.85	4.64	52.09	51.11	70.00	-18.89	102	233	peak
6	2403.520	52.01	31.85	4.64	52.09	36.41	50.00	-13.59	102	233	AVG
7	2523.157	70.26	32.03	4.76	52.08	54.97	70.00	-15.03	100	216	peak
8	2523.157	54.96	32.03	4.76	52.08	39.67	50.00	-10.33	100	216	AVG
9	2650.625	68.81	32.18	4.89	52.1	53.78	70.00	-16.22	113	239	peak
10	2650.625	52.91	32.18	4.89	52.1	37.88	50.00	-12.12	113	239	AVG
11	2747.885	64.59	32.3	4.98	52.12	49.75	70.00	-20.25	100	292	peak

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

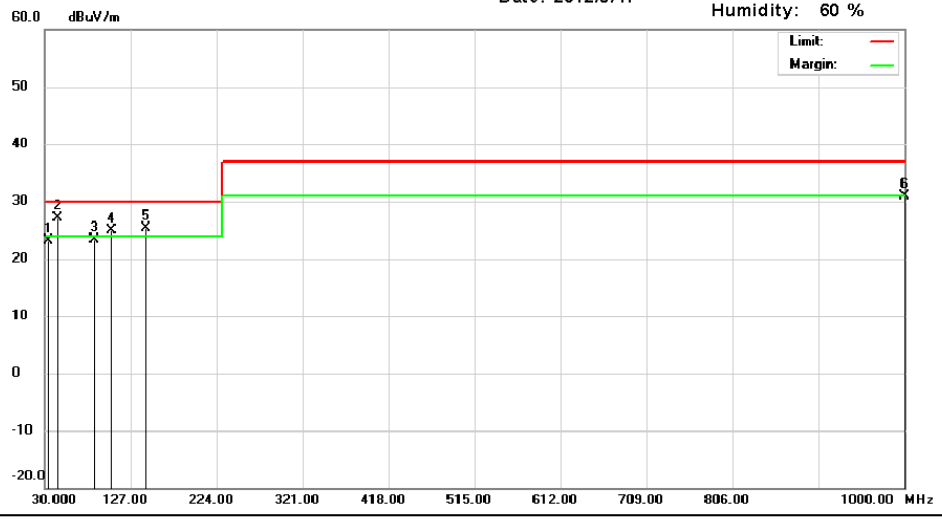
* Note:
Margin = Corrected Amplitude – Limit
Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
Horn Antenna Distance: 3 meters

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
Date: 2012/9/17
Operator:
Temperature: 26 ℃
Humidity: 60 %



Site : OATS 01
Condition : CISPR22 ClassB 10M Radiation
Polarization: *Vertical*

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	33.0500	3.33	19.23	0.6	0.00	23.16	30.00	-6.84	308	47	QP
2	43.7200	15.10	11.37	0.69	0.00	27.16	30.00	-2.84	169	64	QP
3	85.3900	14.57	7.8	0.93	0.00	23.30	30.00	-6.70	136	301	QP
4	104.8700	12.06	11.82	1.02	0.00	24.90	30.00	-5.10	104	211	QP
5	143.5100	11.08	13.09	1.19	0.00	25.36	30.00	-4.64	245	151	QP
6	999.5400	3.97	23.5	3.36	0.00	30.83	37.00	-6.17	141	158	QP

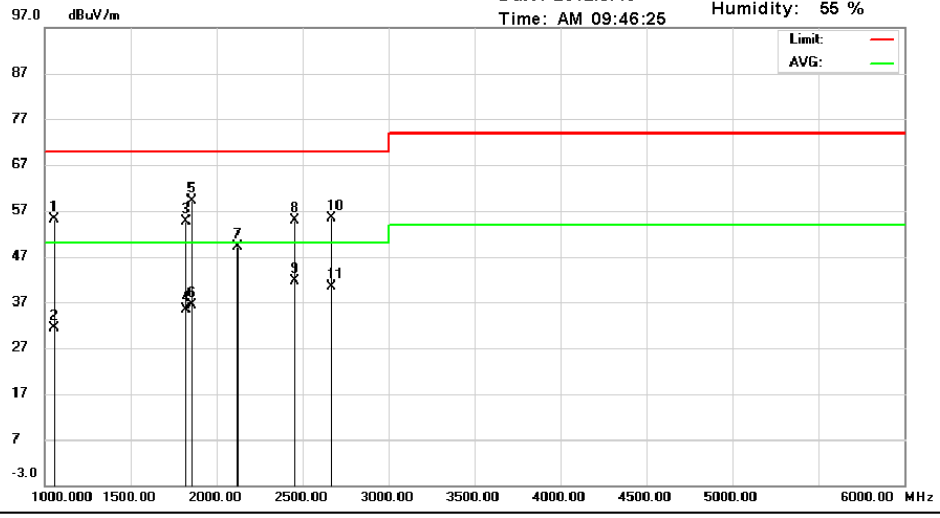
* Note:
Margin = Corrected Amplitude – Limit
Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
BILOG Antenna Distance: 10 meters

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 %
Date: 2012/9/18
Time: AM 09:46:25



Site : Chamber 01
Condition : CISPR22 ClassB 3M Radiation
Polarization: *Vertical*

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	1050.385	75.71	28.3	3	51.95	55.06	70.00	-14.94	141	349	peak
2	1050.385	51.93	28.3	3	51.95	31.28	50.00	-18.72	141	349	AVG
3	1818.173	72.60	30.16	4	52.1	54.66	70.00	-15.34	127	22	peak
4	1818.173	53.28	30.16	4	52.1	35.34	50.00	-14.66	127	22	AVG
5	1857.196	76.76	30.43	4.05	52.11	59.13	70.00	-10.87	100	361	peak
6	1857.196	54.12	30.43	4.05	52.11	36.49	50.00	-13.51	100	361	AVG
7	2121.795	65.52	31.5	4.35	52.12	49.25	70.00	-20.75	148	174	peak
8	2455.449	70.35	31.93	4.69	52.08	54.89	70.00	-15.11	100	268	peak
9	2455.449	57.17	31.93	4.69	52.08	41.71	50.00	-8.29	100	268	AVG
10	2663.133	70.32	32.2	4.9	52.11	55.31	70.00	-14.69	120	260	peak
11	2663.133	55.33	32.2	4.9	52.11	40.32	50.00	-9.68	120	260	AVG

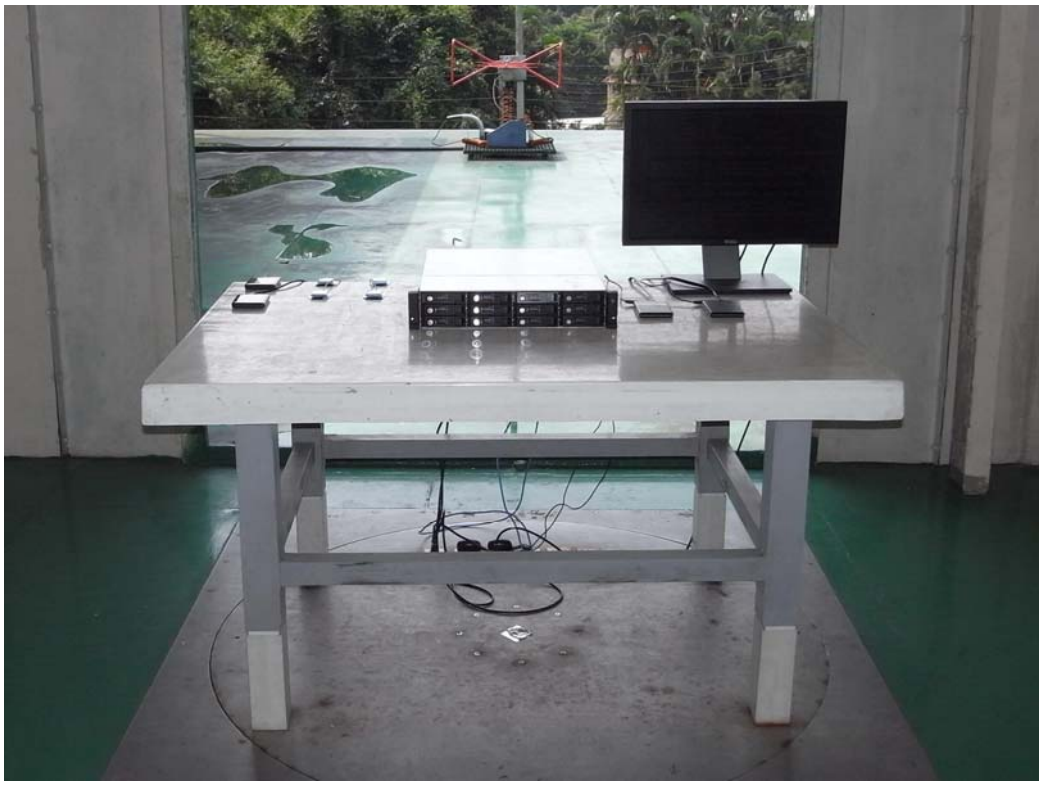
*:Maximum data x:Over limit !:over margin

* 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

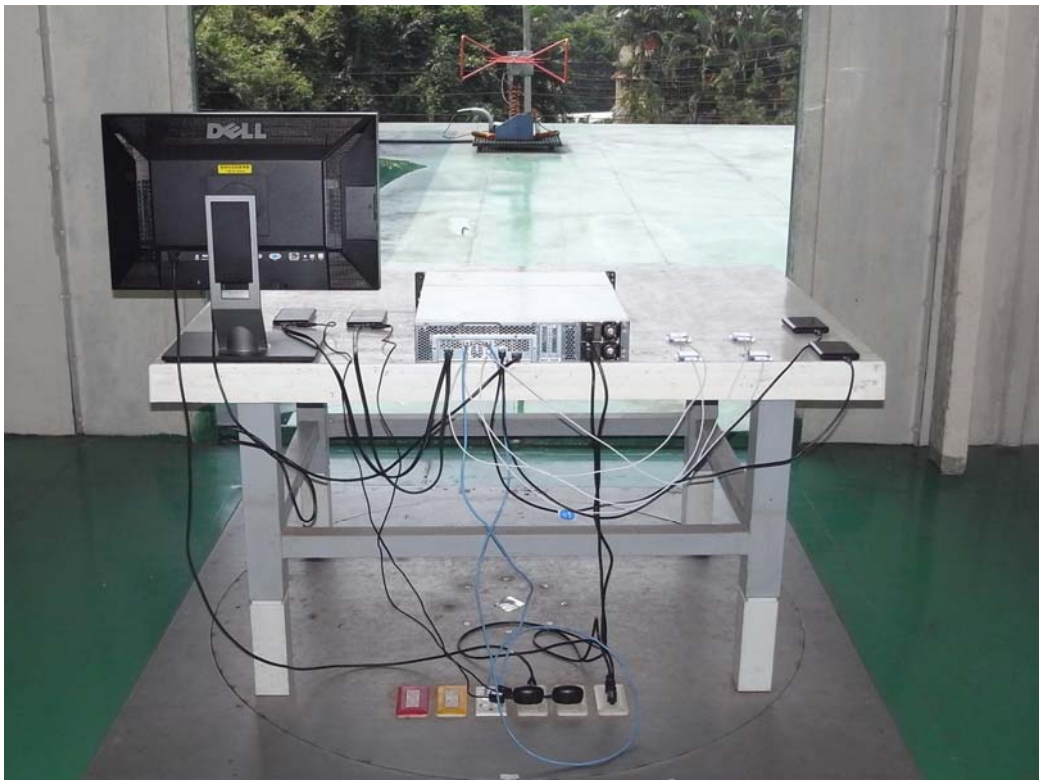
Above 1GHz test, if the peak measured value meets the average limit, it is unnecessary to perform the average measurement.

4.3 Test Setup Photo

Front View (30MHz~1GHz)

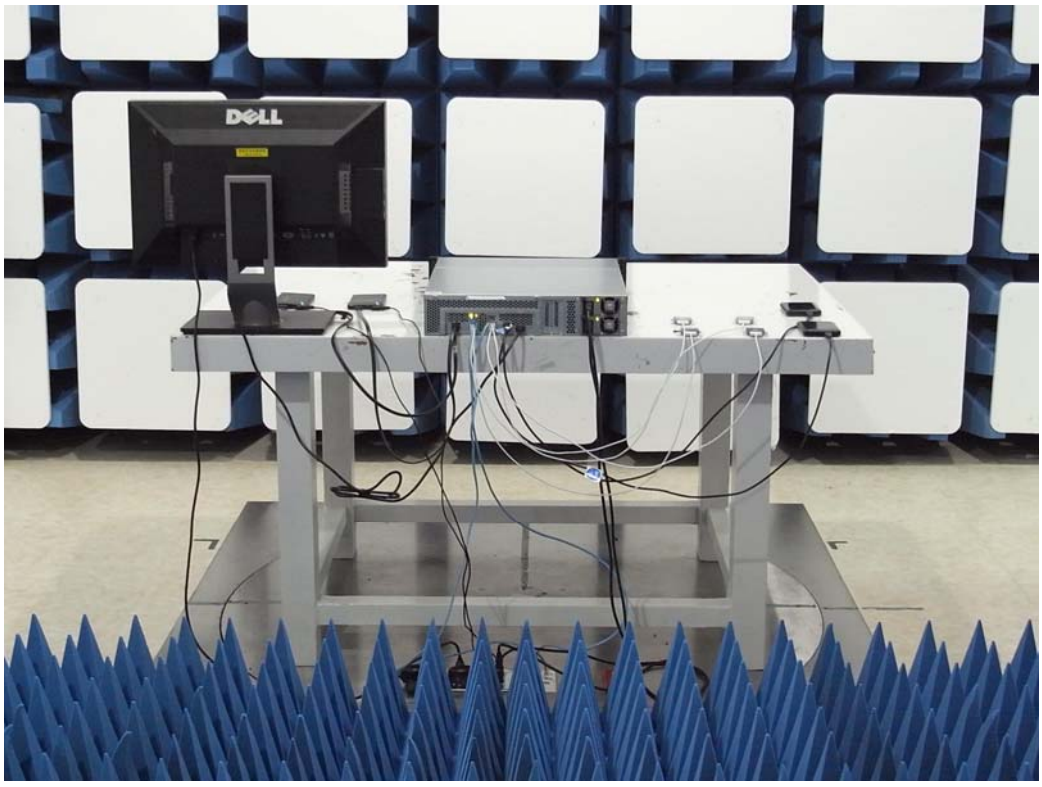


Back View (30MHz~1GHz)



Front View (above 1GHz)

Back View (above 1GHz)



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:	25 °C
Humidity:	56%

Selected Test Point

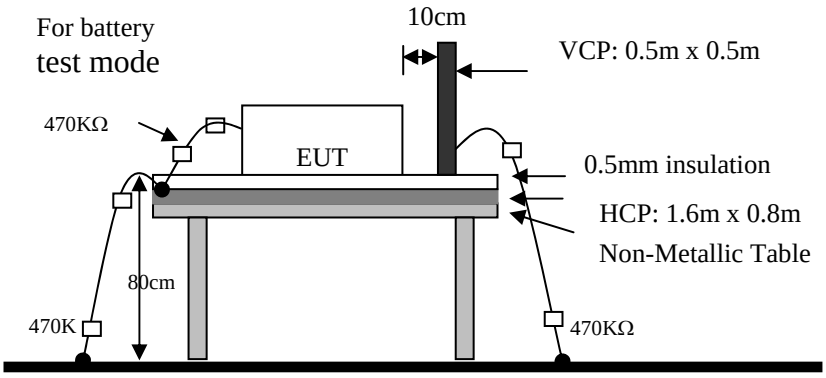
Air: discharges were applied to slots, aperture or insulating surfaces. 10 single air discharges were applied to each selected points.

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.

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.



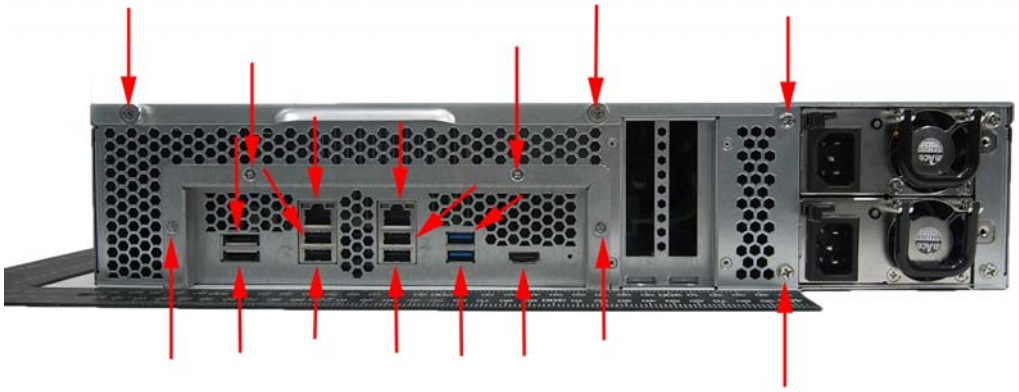
Ground reference Plane

5.3 Test Result

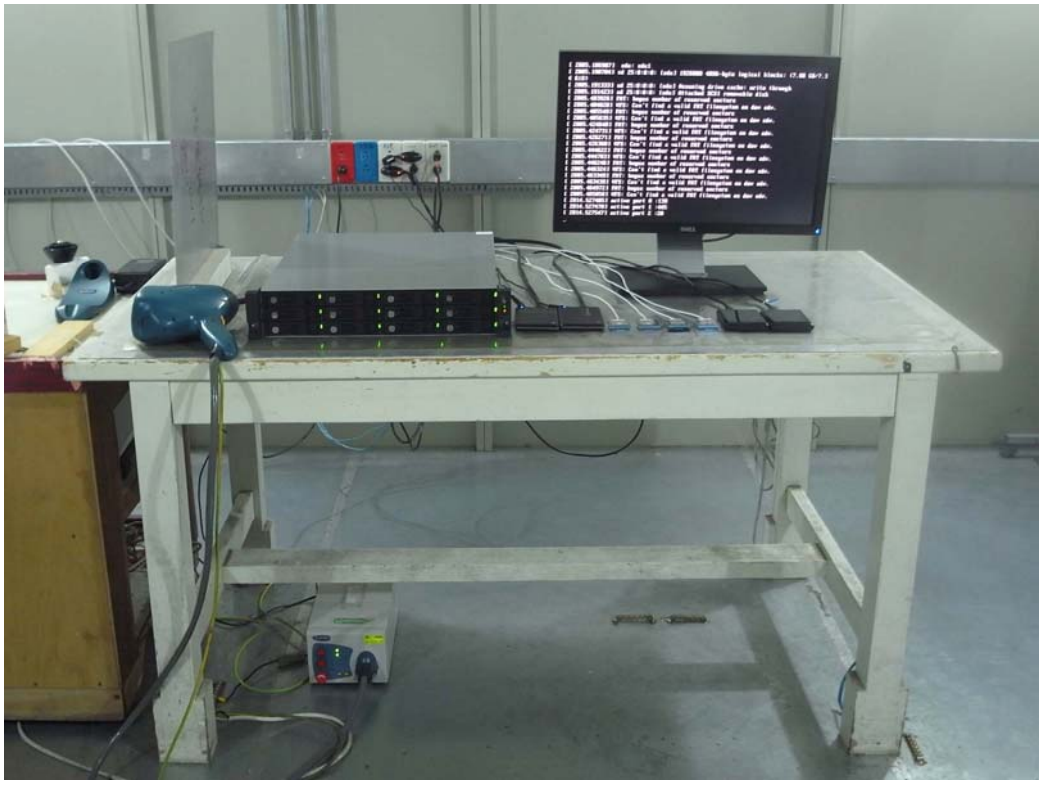
Performance of EUT complies with the given specification.

5.4 Test Point

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



5.5 Test Setup Photo



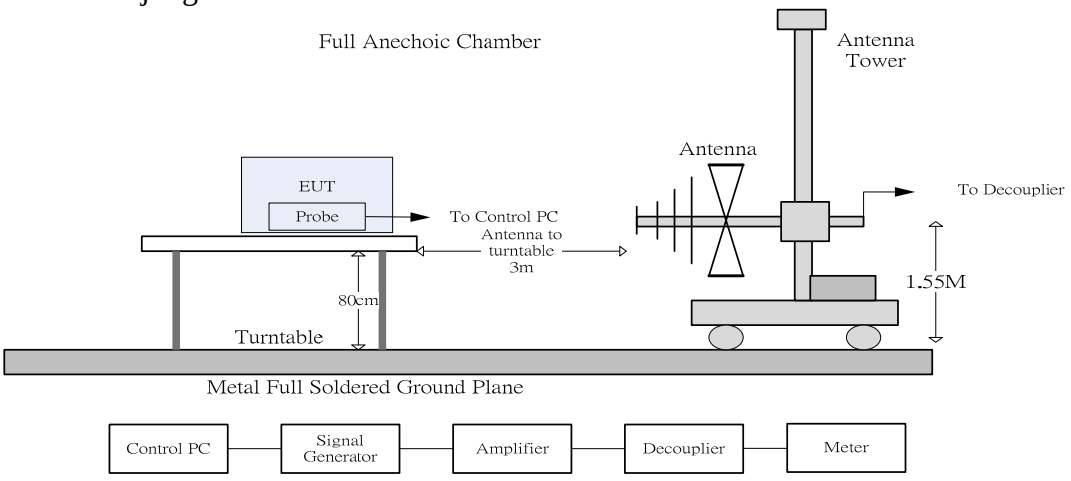
6. Radio-Frequency, Electromagnetic Field immunity

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:	24°C
Humidity:	67%

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.

6.4 Test Setup Photo

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
Rise Time:	5ns
Hold Time:	50ns
Repetition Frequency:	5KHz
Criteria:	B
Test Procedure	refer to ISL QA -T4-E-S9
Temperature:	25 °C
Humidity:	56%

Test Procedure

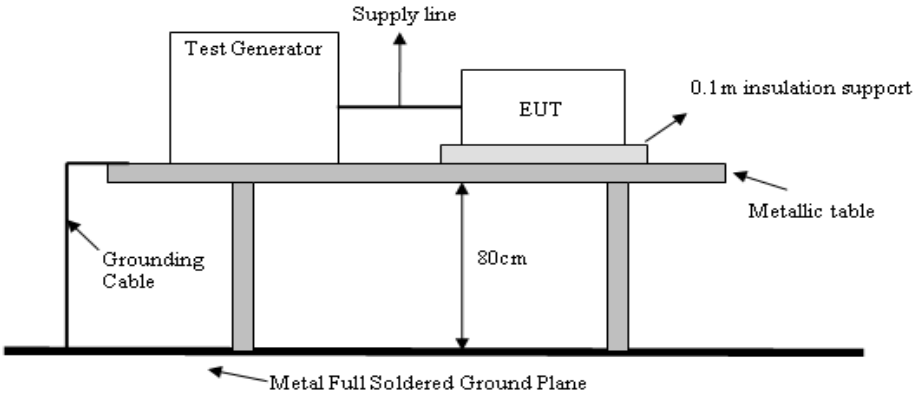
The EUT was setup on a nonconductive table 0.1 m above a reference ground plane.

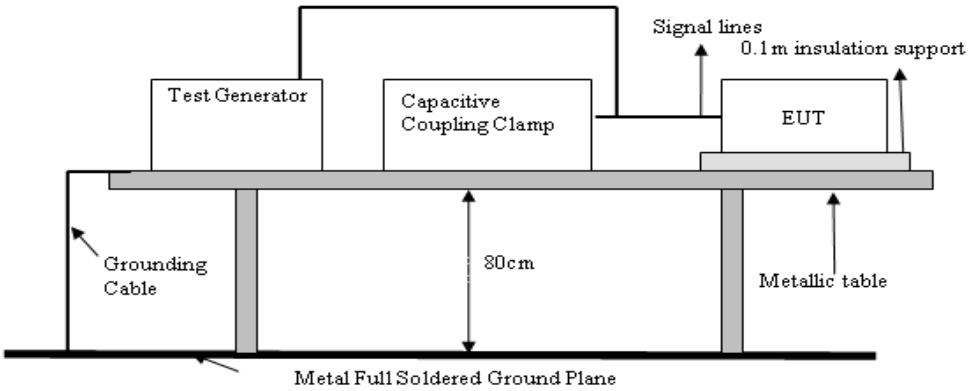
Test Points	Polarity	Result	Comment
Line	+	N	60 sec
	-	N	60 sec
Neutral	+	N	60 sec
	-	N	60 sec
Ground	+	N	60 sec
	-	N	60 sec
Line to Neutral	+	N	60 sec
	-	N	60 sec
Line to Ground	+	N	60 sec
	-	N	60 sec
Neutral to Ground	+	N	60 sec
	-	N	60 sec
Line to Neutral to Ground	+	N	60 sec
	-	N	60 sec
Capacitive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

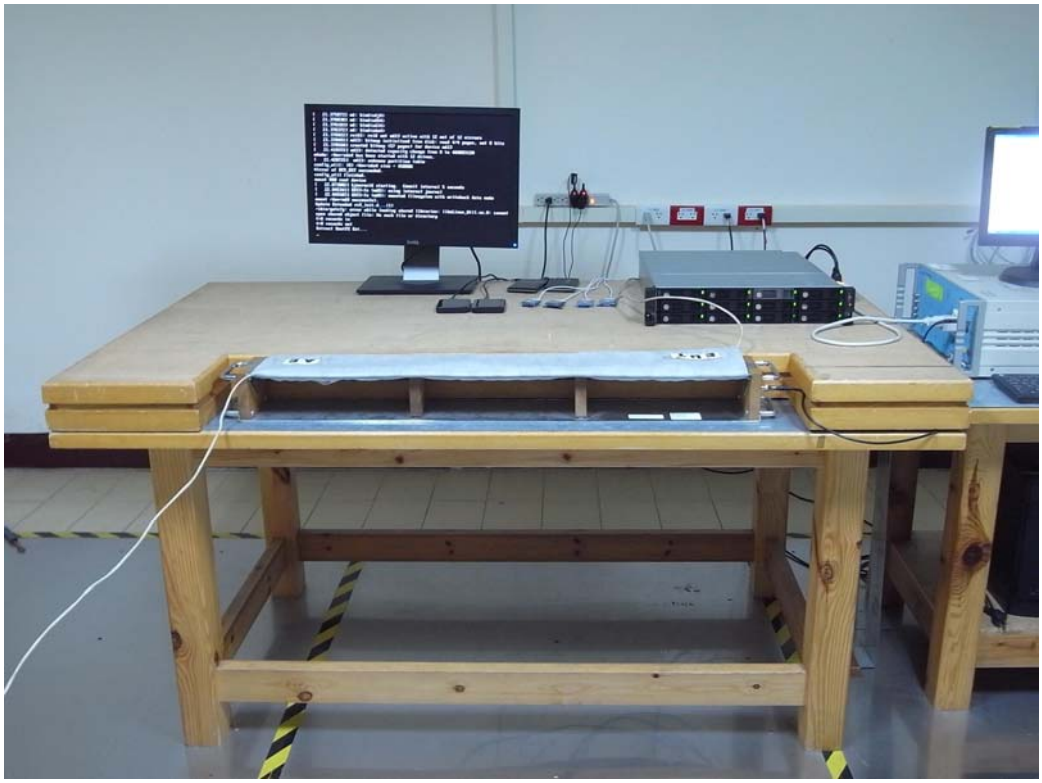




7.3 Test Result

Performance of EUT complies with the given specification.

7.4 Test Setup Photo

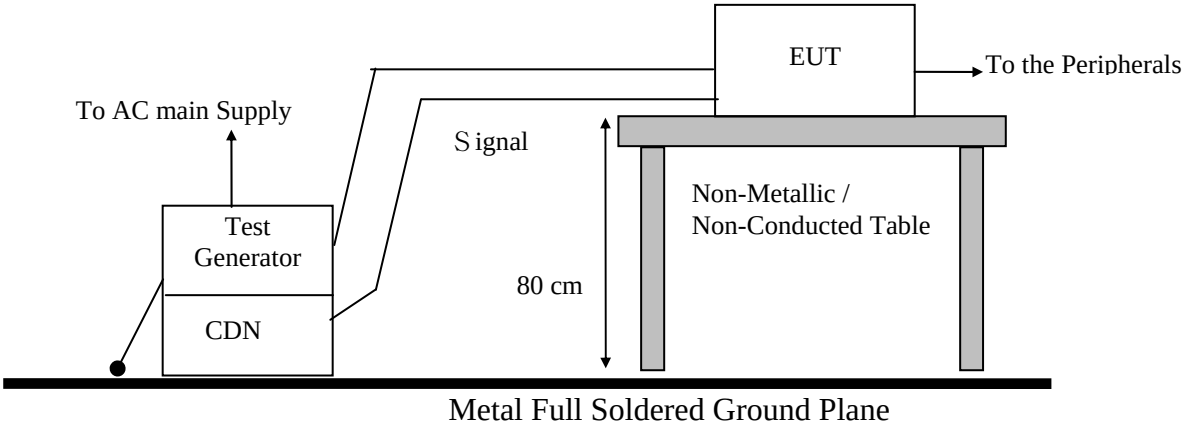


8. Surge Immunity

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:	25°C	
Humidity:	56%	

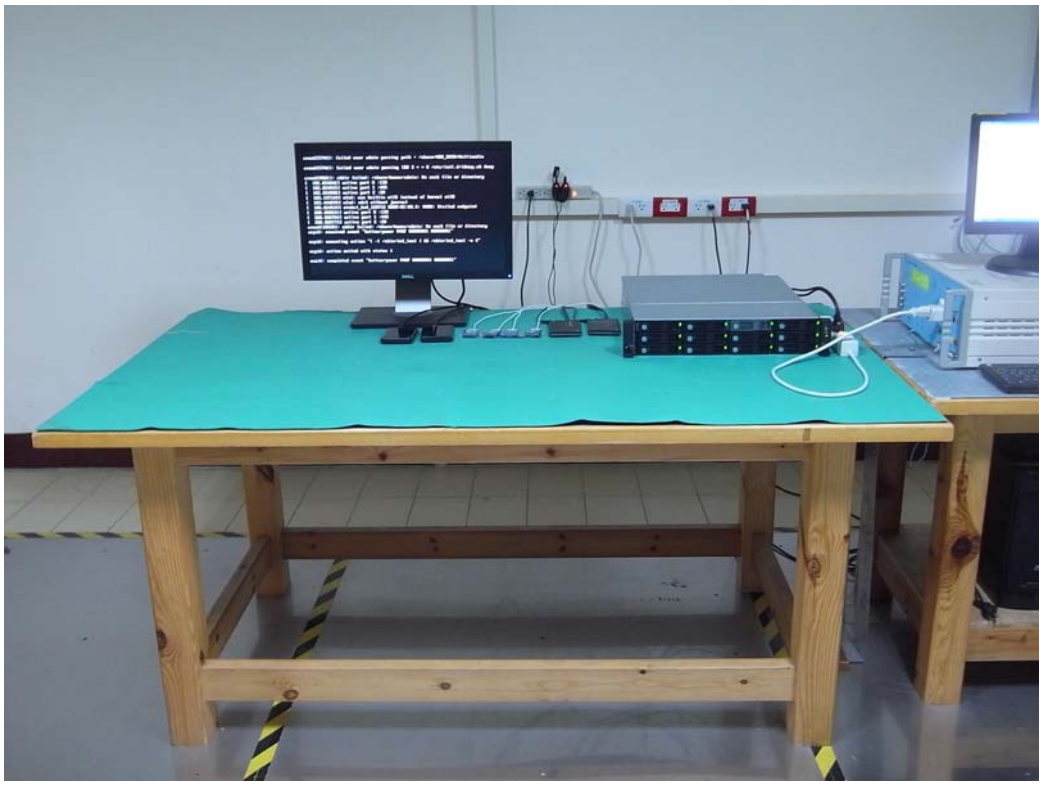
8.2 Test Setup



8.3 Test Result

Performance of EUT complies with the given specification.

8.4 Test Setup Photo

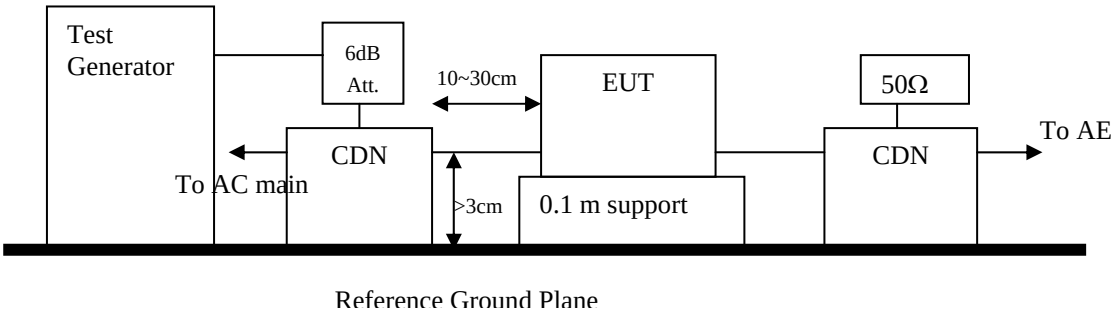


9. Immunity to Conductive Disturbance

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:	25°C
Humidity:	56%

9.2 Test Setup



9.3 Test Result

Performance of EUT complies with the given specification.

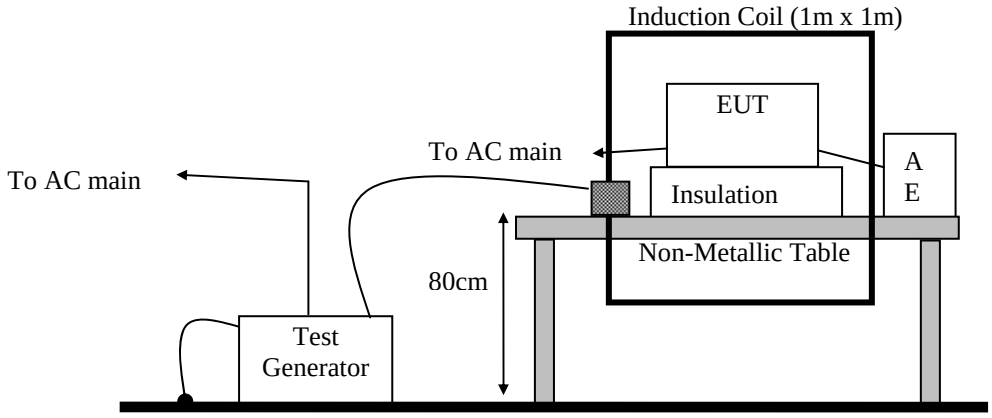
9.4 Test Setup Photo

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:	25°C
Humidity:	56%

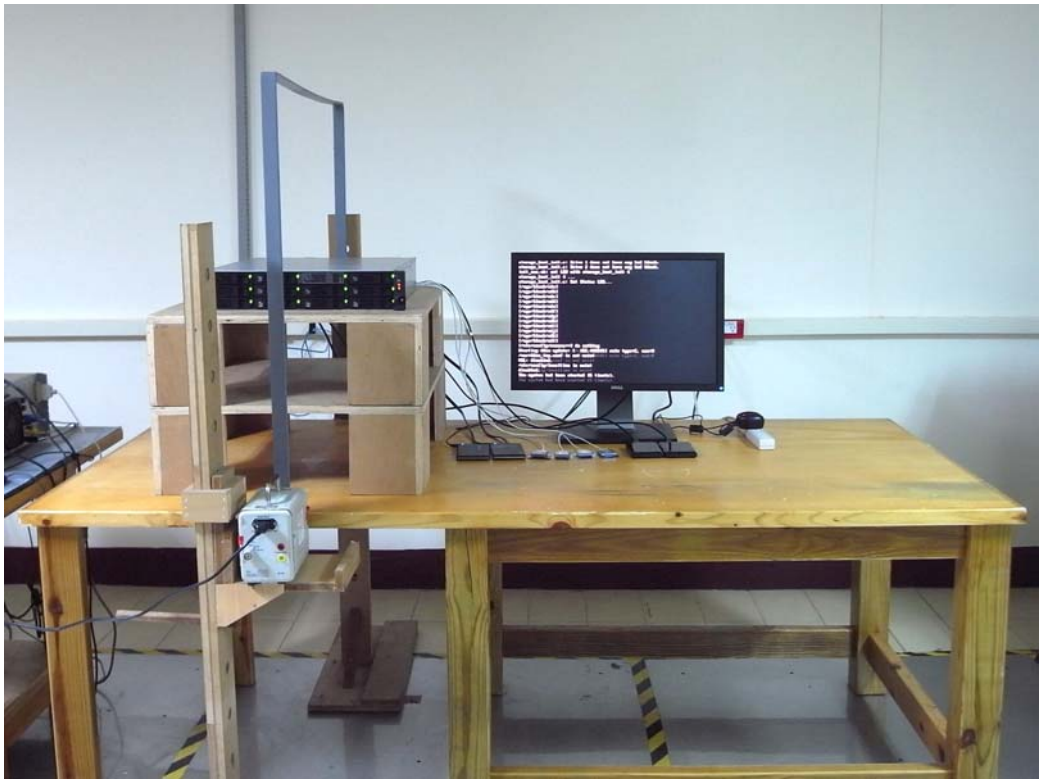
10.2 Test Setup



10.3 Test Result

Performance of EUT complies with the given specification.

10.4 Test Setup Photo

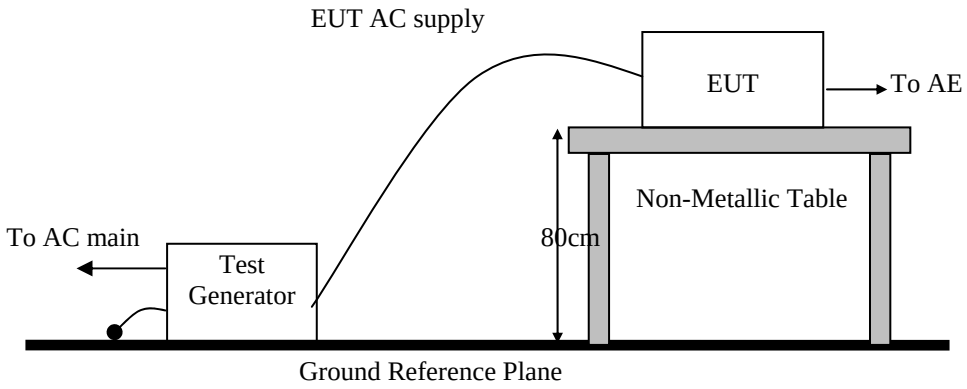


11. Voltage Dips, Short Interruption and Voltage Variation immunity

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:	25°C
Humidity:	56%

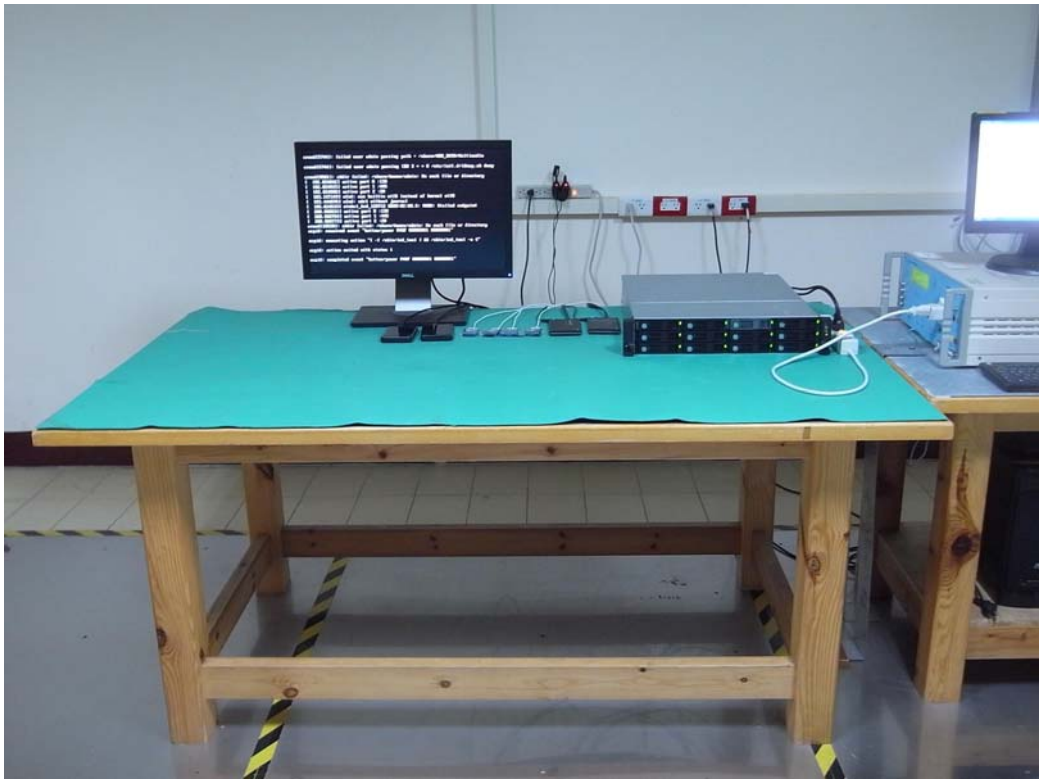
11.2 Test Setup



11.3 Test Result

Performance of EUT complies with the given specification.

11.4 Test Setup Photo



12. Harmonics

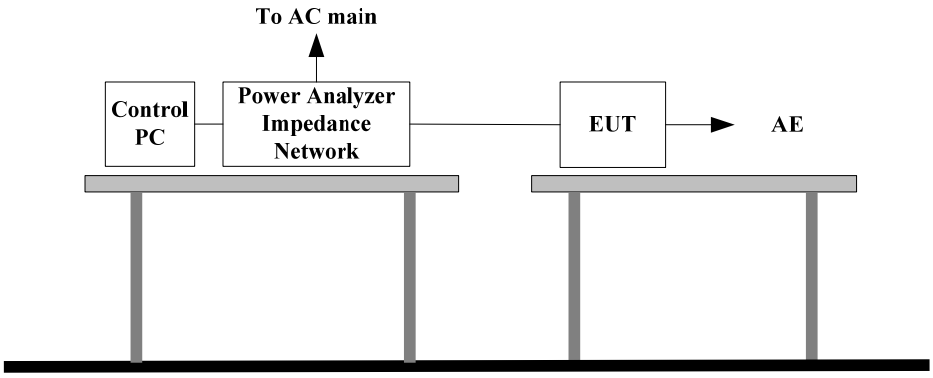
12.1 Test Specification

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:	25°C
Humidity:	68%

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.

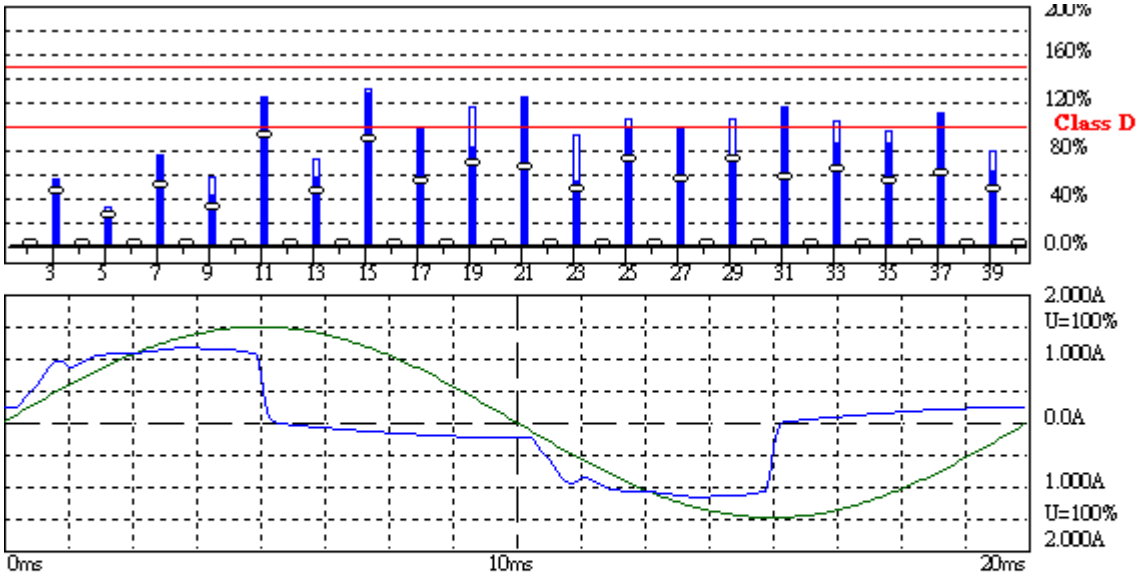
12.2 Test Setup



12.3 Test Result

Performance of EUT complies with the given specification.

Test Data:



Harmonic Emission - IEC 61000-3-2 , EN 61000-3-2 , (EN60555-2) 2012/9/19 PM 01:51:3

Urms =	230.9	V	P =	101.9	W	THC =	0.308	A	Range:	2 A
Irms =	0.716	A	pf =	0.616		Pmax =	142.8	W	V-nom:	231 V
									TestTime:	5 min (100%)

Test completed, Result: PASSED

HAR-1000 EMC-Partner

Urms = 230.9V Freq = 50.000 Range: 2 A
Irms = 0.716A Ipk = 1.182A cf = 1.651
P = 101.9W S = 165.3VA pf = 0.616
THDi = 43.0 % THDu = 0.10 % Class D

Test - Time : 5min (100 %)

Limit Reference: Pmax = 142.76W

Test completed, Result: PASSED

Order	Freq. [Hz]	Iavg [A]	Irms [A]	Imax [A]	Limit [A]	Status
1	50	0.6708	0.6479	0.7461		
2	100	0.0052	0.0027	0.0208		
3	150	0.2142	0.2610	0.2609	0.4854	
4	200	0.0078	0.0050	0.0189		
5	250	0.0627	0.0603	0.0820	0.2712	
6	300	0.0013	0.0032	0.0089		
7	350	0.0692	0.1056	0.1055	0.1428	
8	400	0.0044	0.0045	0.0127		
9	450	0.0217	0.0287	0.0391	0.0714	
10	500	0.0035	0.0035	0.0118		
11	550	0.0451	0.0610	0.0612	0.0500	
12	600	0.0047	0.0040	0.0129		
13	650	0.0185	0.0237	0.0294	0.0423	
14	700	0.0040	0.0039	0.0122		
15	750	0.0318	0.0458	0.0475	0.0366	
16	800	0.0039	0.0038	0.0115		
17	850	0.0169	0.0309	0.0306	0.0323	
18	900	0.0020	0.0042	0.0096		
19	950	0.0194	0.0234	0.0331	0.0289	
20	1000	0.0019	0.0035	0.0101		
21	1050	0.0165	0.0322	0.0321	0.0262	
22	1100	0.0022	0.0046	0.0078		
23	1150	0.0109	0.0126	0.0215	0.0239	
24	1200	0.0025	0.0027	0.0079		
25	1250	0.0155	0.0211	0.0229	0.0220	
26	1300	0.0036	0.0051	0.0082		
27	1350	0.0109	0.0195	0.0194	0.0204	
28	1400	0.0023	0.0023	0.0073		
29	1450	0.0134	0.0127	0.0195	0.0190	
30	1500	0.0031	0.0052	0.0072		
31	1550	0.0098	0.0201	0.0203	0.0177	
32	1600	0.0006	0.0027	0.0062		
33	1650	0.0104	0.0139	0.0170	0.0167	
34	1700	0.0019	0.0048	0.0066		
35	1750	0.0081	0.0133	0.0148	0.0157	
36	1800	0.0008	0.0034	0.0071		
37	1850	0.0088	0.0161	0.0161	0.0149	
38	1900	0.0012	0.0042	0.0067		
39	1950	0.0063	0.0085	0.0107	0.0141	
40	2000	0.0017	0.0039	0.0070		

12.4 Test Setup Photo

Refer to the Setup Photo for Voltage Fluctuations

13. Voltage Fluctuations

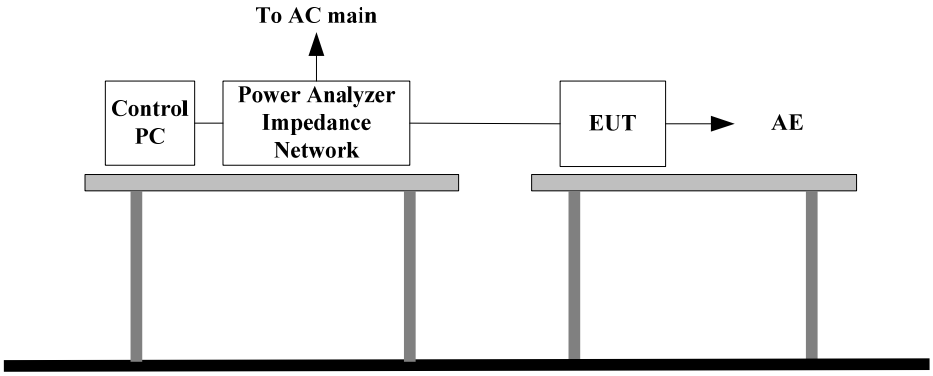
13.1 Test Specification

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:	25°C
Humidity:	68%

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



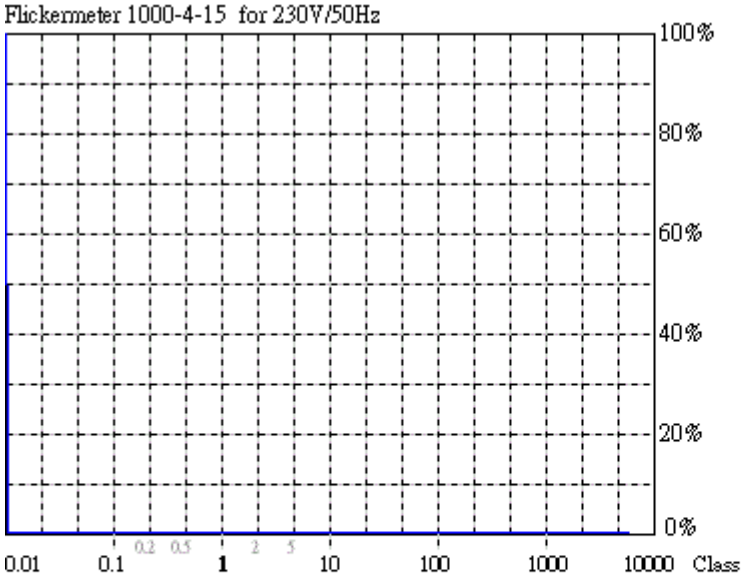
13.3 Test Result

Performance of EUT complies with the given specification.

Test Data:

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):	**0.09%**
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)

2012/9/19 AM 10:48:50

Urms =	229.7	V	P =	121.5	W
Irms =	0.757	A	pf =	0.699	

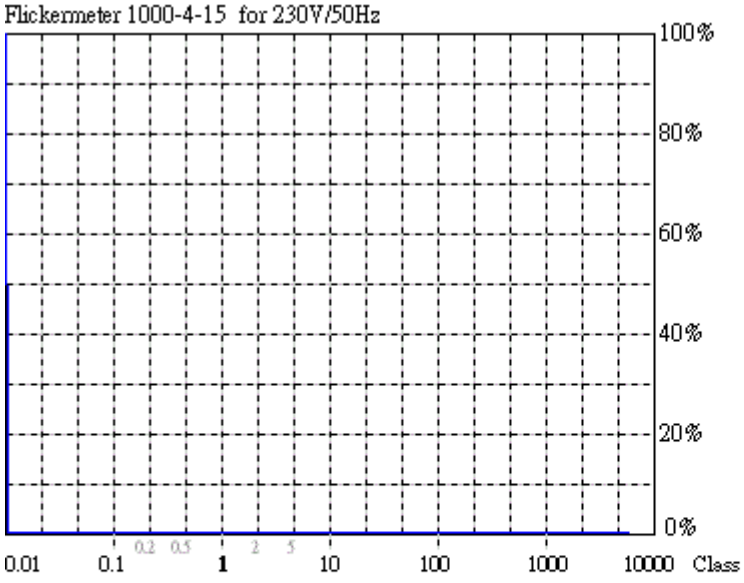
Range:	2 A
V-nom:	230 V
TestTime:	10 min (100%)

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)

2012/9/19 PM 12:57:19

Urms =	229.7	V	P =	119.7	W
Irms =	0.774	A	pf =	0.673	

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

Test completed, Result: PASSED

HAR-1000 EMC-Retest

13.4 Test Setup Photo

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	08/03/2012	08/03/2013
Conduction	LISN 03	R&S	ESH3-Z5 831.5518.52	828874/010	08/03/2012	08/03/2013
Conduction	ISN T2 03	FCC	FCC-TLISN-T2-02	20618	08/03/2012	08/03/2013
Conduction	ISN T4 05	FCC	FCC-TLISN-T4-02	20619	08/03/2012	08/03/2013
Conduction	ISN T8 03	FCC	FCC-TLINS-T8-02	20620	08/03/2012	08/03/2013
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	07/18/2012	07/18/2013
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 11	ETS-LINDGREN	3117	00114397	03/07/2012	03/07/2013
Rad. above 1Ghz	Horn Antenna 03	COM-Power	AH-826	100A	03/15/2011	03/15/2013
Rad. above 1Ghz	Horn Antenna 05	Com-Power	AH-640	100A	01/11/2011	01/11/2013
Rad. above 1Ghz	Microwave Cable-16	HUBER SUHNER	SUCFLEX 104	345760/4	12/13/2011	12/13/2012
Rad. above 1Ghz	Preamplifier 20	EMCI	EMC051845	980084	10/26/2011	10/26/2012
Rad. above 1Ghz	Microwave Cable-19	HUBER SUHNER	SUCFLEX 102	MY 2151/2	05/03/2012	05/03/2013
Rad. above 1Ghz	Preamplifier 22	EMCI	EMC184045	980124	04/02/2012	04/02/2013
Rad. above 1Ghz	Spectrum Analyzer 23	ROHDE & SCHWARZ	FSU43	101255	10/06/2012	10/06/2013

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	06/26/2012	06/26/2013
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	07/31/2012	07/31/2013
EN61K-4-6	CDN T2 01	Frankonia	T2	A3010003	07/31/2012	07/31/2013
EN61K-4-6	CDN T4 05	FCC Inc.	FCC-801-T4-RJ45	08020	09/01/2012	09/01/2013
EN61K-4-6	CDN T8 01	FCC Inc.	FCC-801-T8-RJ45	08021	09/01/2012	09/01/2013
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	08/28/2012	08/28/2013
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
EN61000-4-2	N/A	2.0
EN61000-4-3	Tile.Exe	2.0.P
EN61000-4-4	Tema.EXE	1.69
EN61000-4-5	Tema.EXE	1.69
EN61000-4-6	EN61000-4-6 Application Software	1.13.e
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>
AMN: ±3.29dB
ISN: ±4.43dB

<OATS 01 (10M)>
Horizontal
30MHz~200MHz: ±3.06dB
200MHz~1000MHz: ±3.22dB
Vertical
30MHz~200MHz: ±3.41dB
200MHz~1000MHz: ±3.20dB

<Chamber 01 (3M)>
1GHz~6GHz: ±4.69dB
6GHz~18GHz: ±4.72dB
18GHz~26.5GHz: ±3.44dB
18GHz~26.5GHz: ±3.49dB

<Immunity 01>

Test item	Uncertainty	Test item	Uncertainty
EN61000-4-2 (ESD)		EN61000-4-5 (Surge)	
Rise time tr	≦ 15%	Time	± 1.16%
Peak current Ip	≦ 6.3%	Voltage	± 1.63%
current at 30 ns	≦ 6.3%	Current	± 1.28%
current at 60 ns	≦ 6.3%	EN61000-4-6 (CS)	
EN61000-4-3 (RS)	±2.19dB	CDN	± 1.36dB
EN61000-4-4 (EFT)		EM Clamp	± 3.19dB
Time	± 1.43%	EN61000-4-8 (Magnetic)	±1.12%
Voltage	± 1.11%	EN61000-4-11 (Dips)	
Current	± 1.85%	Time	± 1.16%
		Voltage	± 0.10%

Test item	Uncertainty	Test item	Uncertainty
EN61000-3-2 (Harmonics)	± 4.43 %	EN61000-3-3 (Fluctuations and Flicker)	± 4.43 %

14.3 Appendix C: Photographs of EUT

Please refer to the File of **ISL-12HE263P**