

# Certificate

Issue Date: 5/13/2011  
Ref. Report No. ISL-11HE129CE

Product Name : Network Attached Storage  
: TS-879 Pro; TS-1079 Pro; TS-879 Pro+; TS-1079 Pro+; TS-879 Pro II;  
TS-1079 Pro II; NAS-879G; NAS-1079G; NAS-879G+; NAS-1079G+;  
NAS-879G II; NAS-1079G II; VS-8040 Pro; VS-8032 Pro; VS-8024  
Pro; NVR-8040 Pro; NVR-8032 Pro; NVR-8024 Pro; NVR-8040G Pro;  
NVR-8032G Pro; NVR-8024G Pro; VS-8000 Pro; NVR-8000 Pro;  
NVR-8000G Pro; VS-10040 Pro; VS-10032 Pro; VS-10024 Pro;  
Model(s) : NVR-10040 Pro; NVR-10032 Pro; NVR-10024 Pro; NVR-10040G Pro;  
NVR-10032G Pro; NVR-10024G Pro; VS-10000 Pro; NVR-10000 Pro;  
NVR-10000G Pro; VS-8056 Pro; VS-8048 Pro; NVR-8056 Pro;  
NVR-8048 Pro; NVR-8056G Pro; NVR-8048G Pro; VS-10056 Pro;  
VS-10048 Pro; NVR-10056 Pro; NVR-10048 Pro; NVR-10056G Pro;  
NVR-10048G Pro  
Brand : QNAP  
Responsible Party : QNAP Systems, Inc.  
Address : 21F, No. 77, Sec. 1, Xintai 5th Rd.  
Xizhi District, 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 :



## Standards:

EN 55022:2006 +A1:2007 / CISPR 22:2005 +A1:2005 / AS/NZS CISPR 22: 2009  
EN 61000-3-2: 2006 and IEC 61000-3-2: 2005  
EN 61000-3-3: 2008 and IEC 61000-3-3: 2008  
EN55024:1998+A1:2001+A2:2003 / CISPR 24:1997+A1:2001+A2:2002  
EN 61000-4-2: 2009 and IEC 61000-4-2: 2008  
EN 61000-4-3: 2006 + A1:2008 and IEC 61000-4-3: 2006 +A1:2007  
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: 1993+A1: 2001 and IEC 61000-4-8: 1993+A1: 2000  
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,  
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# **CE MARK TECHNICAL FILE**

## **AS/NZS EMC CONSTRUCTION FILE**

of

Product Name

**Network Attached Storage**

Model

**TS-879 Pro; TS-1079 Pro; TS-879 Pro+; TS-1079 Pro+; TS-879 Pro II;  
TS-1079 Pro II; NAS-879G; NAS-1079G; NAS-879G+; NAS-1079G+;  
NAS-879G II; NAS-1079G II; VS-8040 Pro; VS-8032 Pro; VS-8024 Pro;  
NVR-8040 Pro; NVR-8032 Pro; NVR-8024 Pro; NVR-8040G Pro;  
NVR-8032G Pro; NVR-8024G Pro; VS-8000 Pro; NVR-8000 Pro;  
NVR-8000G Pro; VS-10040 Pro; VS-10032 Pro; VS-10024 Pro; NVR-10040  
Pro; NVR-10032 Pro; NVR-10024 Pro; NVR-10040G Pro; NVR-10032G  
Pro; NVR-10024G Pro; VS-10000 Pro; NVR-10000 Pro; NVR-10000G Pro;  
VS-8056 Pro; VS-8048 Pro; NVR-8056 Pro; NVR-8048 Pro; NVR-8056G  
Pro; NVR-8048G Pro; VS-10056 Pro; VS-10048 Pro; NVR-10056 Pro;  
NVR-10048 Pro; NVR-10056G Pro; NVR-10048G Pro**

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. Block Diagram and Schematics
5. Users' manual

## Declaration of Conformity

Name of Responsible Party: QNAP Systems, Inc.

Address of Responsible Party: 21F, No. 77, Sec. 1, Xintai 5th Rd.  
Xizhi District, New Taipei City 221, Taiwan,

Declares that product: Network Attached Storage

Model: TS-879 Pro; TS-1079 Pro; TS-879 Pro+; TS-1079 Pro+; TS-879 Pro II;  
TS-1079 Pro II; NAS-879G; NAS-1079G; NAS-879G+; NAS-1079G+;  
NAS-879G II; NAS-1079G II; VS-8040 Pro; VS-8032 Pro; VS-8024  
Pro; NVR-8040 Pro; NVR-8032 Pro; NVR-8024 Pro; NVR-8040G Pro;  
NVR-8032G Pro; NVR-8024G Pro; VS-8000 Pro; NVR-8000 Pro;  
NVR-8000G Pro; VS-10040 Pro; VS-10032 Pro; VS-10024 Pro;  
NVR-10040 Pro; NVR-10032 Pro; NVR-10024 Pro; NVR-10040G Pro;  
NVR-10032G Pro; NVR-10024G Pro; VS-10000 Pro; NVR-10000 Pro;  
NVR-10000G Pro; VS-8056 Pro; VS-8048 Pro; NVR-8056 Pro;  
NVR-8048 Pro; NVR-8056G Pro; NVR-8048G Pro; VS-10056 Pro;  
VS-10048 Pro; NVR-10056 Pro; NVR-10048 Pro; NVR-10056G Pro;  
NVR-10048G Pro

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 55022:2006 +A1:2007 / CISPR 22:2005 +A1:2005 / AS/NZS CISPR 22: 2009: Limits and methods of measurement of Radio Interference characteristics of Information Technology Equipment.

EN55024:1998+A1:2001+A2:2003 / CISPR 24:1997+A1:2001+A2:2002: 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 IEC 61000-4-3:2006+A1:2007	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: 1993+A1: 2001 IEC 61000-4-8: 1993+A1: 2000	Power Frequency Magnetic Field	Pass	A

<to be continued>

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

Standard	Description	Results
EN 61000-3-2: 2006 IEC 61000-3-2: 2005	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: 5/13/2011**

### Declaration of Conformity

Name of Responsible Party: QNAP Systems, Inc.

Address of Responsible Party: 21F, No. 77, Sec. 1, Xintai 5th Rd.  
Xizhi District, New Taipei City 221, Taiwan,

Declares that product: Network Attached Storage

Model: TS-879 Pro; TS-1079 Pro; TS-879 Pro+; TS-1079 Pro+; TS-879 Pro II;  
TS-1079 Pro II; NAS-879G; NAS-1079G; NAS-879G+; NAS-1079G+;  
NAS-879G II; NAS-1079G II; VS-8040 Pro; VS-8032 Pro; VS-8024  
Pro; NVR-8040 Pro; NVR-8032 Pro; NVR-8024 Pro; NVR-8040G Pro;  
NVR-8032G Pro; NVR-8024G Pro; VS-8000 Pro; NVR-8000 Pro;  
NVR-8000G Pro; VS-10040 Pro; VS-10032 Pro; VS-10024 Pro;  
NVR-10040 Pro; NVR-10032 Pro; NVR-10024 Pro; NVR-10040G Pro;  
NVR-10032G Pro; NVR-10024G Pro; VS-10000 Pro; NVR-10000 Pro;  
NVR-10000G Pro; VS-8056 Pro; VS-8048 Pro; NVR-8056 Pro;  
NVR-8048 Pro; NVR-8056G Pro; NVR-8048G Pro; VS-10056 Pro;  
VS-10048 Pro; NVR-10056 Pro; NVR-10048 Pro; NVR-10056G Pro;  
NVR-10048G Pro

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 55022:2006 +A1:2007 / CISPR 22:2005 +A1:2005 / AS/NZS CISPR 22: 2009: Limits and methods of measurement of Radio Interference characteristics of Information Technology Equipment.

EN55024:1998+A1:2001+A2:2003 / CISPR 24:1997+A1:2001+A2:2002: 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 IEC 61000-4-3:2006+A1:2007	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

<to be continued>

Standard	Description	Results	Criteria
EN 61000-4-8: 1993+A1: 2001 IEC 61000-4-8: 1993+A1: 2000	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 IEC 61000-3-2: 2005	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: 5/13/2011**

# 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**

Model(s): **TS-879 Pro; TS-1079 Pro; TS-879 Pro+; TS-1079 Pro+;  
TS-879 Pro II; TS-1079 Pro II; NAS-879G; NAS-1079G;  
NAS-879G+; NAS-1079G+; NAS-879G II; NAS-1079G II;  
VS-8040 Pro; VS-8032 Pro; VS-8024 Pro; NVR-8040 Pro;  
NVR-8032 Pro; NVR-8024 Pro; NVR-8040G Pro;  
NVR-8032G Pro; NVR-8024G Pro; VS-8000 Pro;  
NVR-8000 Pro; NVR-8000G Pro; VS-10040 Pro;  
VS-10032 Pro; VS-10024 Pro; NVR-10040 Pro;  
NVR-10032 Pro; NVR-10024 Pro; NVR-10040G Pro;  
NVR-10032G Pro; NVR-10024G Pro; VS-10000 Pro;  
NVR-10000 Pro; NVR-10000G Pro; VS-8056 Pro;  
VS-8048 Pro; NVR-8056 Pro; NVR-8048 Pro; NVR-8056G  
Pro; NVR-8048G Pro; VS-10056 Pro; VS-10048 Pro;  
NVR-10056 Pro; NVR-10048 Pro; NVR-10056G Pro;  
NVR-10048G Pro**

Brand: **QNAP**

Applicant: **QNAP Systems, Inc.**

Address: **21F, No. 77, Sec. 1, Xintai 5th Rd.  
Xizhi District, New Taipei City 221, Taiwan,**

Test Performed by:

**International Standards Laboratory**

<Hsi-Chih LAB>

\*Site Registration No.

BSMI:SL2-IN-E-0037; SL2-R1/R2-E-0037; TAF: 1178;

IC: IC4067A-1; VCCI: R-341,C-354, T-1749; NEMKO: ELA 113A

\*Address:

No. 65, Gu Dai Keng St.

Hsi\_Chih District, New Taipei City 22117, Taiwan

\*Tel: 886-2-2646-2550; Fax: 886-2-2646-4641

Report No.: **ISL-11HE129CE**

Issue Date : **5/13/2011**

This report totally contains 52 pages including this cover page and contents page.

Test results given in this report apply only to the specific sample(s) tested and are traceable to national or international standard through calibration of the equipment and evaluating measurement uncertainty herein.

This report MUST not be used to claim product endorsement by TAF, NEMKO or any agency of the Government.

This test report shall not be reproduced except in full, without the written approval of International Standards Laboratory.

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## 1. General

### 1.1 Certification of Accuracy of Test Data

**Standards:** Please refer to 1.2

**Equipment Tested:** Network Attached Storage

**Model:** TS-879 Pro; TS-1079 Pro; TS-879 Pro+; TS-1079 Pro+; TS-879 Pro II; TS-1079 Pro II; NAS-879G; NAS-1079G; NAS-879G+; NAS-1079G+; NAS-879G II; NAS-1079G II; VS-8040 Pro; VS-8032 Pro; VS-8024 Pro; NVR-8040 Pro; NVR-8032 Pro; NVR-8024 Pro; NVR-8040G Pro; NVR-8032G Pro; NVR-8024G Pro; VS-8000 Pro; NVR-8000 Pro; NVR-8000G Pro; VS-10040 Pro; VS-10032 Pro; VS-10024 Pro; NVR-10040 Pro; NVR-10032 Pro; NVR-10024 Pro; NVR-10040G Pro; NVR-10032G Pro; NVR-10024G Pro; VS-10000 Pro; NVR-10000 Pro; NVR-10000G Pro; VS-8056 Pro; VS-8048 Pro; NVR-8056 Pro; NVR-8048 Pro; NVR-8056G Pro; NVR-8048G Pro; VS-10056 Pro; VS-10048 Pro; NVR-10056 Pro; NVR-10048 Pro; NVR-10056G Pro; NVR-10048G Pro

**Brand:** QNAP

**Applicant:** QNAP Systems, Inc.

**Sample received Date:** 4/25/2011

**Final test Date:** EMI:refer to the date of test data  
EMS: 2011-05-06

**Test Site:** International Standards Laboratory  
OATS 01; Chamber 14; Conduction 01; Immunity01

**Test Distance:** 10M; 3M (above1GHz) (EMI test)

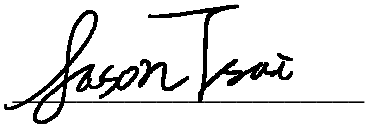
**Temperature:** refer to each site test data


**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:** Midori Su

**Test Engineer:**   
Jason Tsai

**Approved By:**   
Jim Chu / Director

## 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 55022:2006 +A1:2007 / CISPR 22:2005 +A1:2005 / AS/NZS CISPR 22: 2009: Class B: Limits and methods of measurement of Radio Interference characteristics of Information Technology Equipment.

EN55024:1998+A1:2001+A2:2003 / CISPR 24:1997+A1:2001+A2:2002: 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
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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: 1993+A1: 2001 IEC 61000-4-8: 1993+A1: 2000	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 IEC 61000-3-2: 2005	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

Description:	Network Attached Storage
Condition:	Pre-Production
Model:	TS-879 Pro; TS-1079 Pro; TS-879 Pro+; TS-1079 Pro+; TS-879 Pro II; TS-1079 Pro II; NAS-879G; NAS-1079G; NAS-879G+; NAS-1079G+; NAS-879G II; NAS-1079G II; VS-8040 Pro; VS-8032 Pro; VS-8024 Pro; NVR-8040 Pro; NVR-8032 Pro; NVR-8024 Pro; NVR-8040G Pro; NVR-8032G Pro; NVR-8024G Pro; VS-8000 Pro; NVR-8000 Pro; NVR-8000G Pro; VS-10040 Pro; VS-10032 Pro; VS-10024 Pro; NVR-10040 Pro; NVR-10032 Pro; NVR-10024 Pro; NVR-10040G Pro; NVR-10032G Pro; NVR-10024G Pro; VS-10000 Pro; NVR-10000 Pro; NVR-10000G Pro; VS-8056 Pro; VS-8048 Pro; NVR-8056 Pro; NVR-8048 Pro; NVR-8056G Pro; NVR-8048G Pro; VS-10056 Pro; VS-10048 Pro; NVR-10056 Pro; NVR-10048 Pro; NVR-10056G Pro; NVR-10048G Pro
Serial Number:	N/A
Power Supply:	FSP (Model: FSP350-710UJ) AC input: 100-240V, 60/50Hz, 6.3-3A DC output: +3.3V, 16A +5V, 18A +12V1, 16A +12V2, 16A +5Vsb, 3A -12V, 0.5A -5V, 0.3A Total Power: 350W
CPU:	Intel Core i3-2120 (FSB: 850MHz, 3.3GHz)
Motherboard:	(Model: TS-879 PRO V1.1)
SATA Board:	(Model: TS-879 PRO BP V1.1)
VFD Board:	(Model: A125C VER: 1.4)
Switch Board:	(Model: TS-459 PRO II SW V1.0)
LED Board:	(Model: TS-879 PRO LED V1.0)
SATA Hard Disk:	Western Digital (Model: WD10EURS-630AB1) 1TB x10
Memory:	ADATA DDR3 1333 2GB
USB Flash:	one
USB 2.0 Port:	four 4-pin
USB 3.0 Port:	two 9-pin
E-SATA Port:	two 7-pin
RJ45 Port:	two 8-pin (10/100/1000M bps)
D-Sub Port:	one 15-pin
HDMI Port:	one 19-pin
AC Power Port:	one
AC Power Core:	Non-shielded, Detachable (with ground pin)

Maximum operating frequency: 3.3GHz

Model different:

Only Selling markets are different.

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

Configuration	Display mode	RJ-45
1	D-sub & HDMI	1000Mbps

All types of Telecom have been tested. We present the worst case test data in the report. The test configurations are listed below:

Configuration	RJ-45 Port	LAN Transmission speed
1	LAN1	10/100/1000M bps
2	LAN2	10/100/1000M bps

## EMI Noise Source:

Motherboard Crystal: 32.768 kHz (X1), 25MHz (X2), 25MHz (Y1),  
25MHz (Y2), 24MHz (Y3)

SATA Board Crystal: 25MHz (Y1), 25MHz (Y2) , 25MHz (Y3) , 25MHz (Y4) ,  
25MHz (Y5)

USB Flash Crystal: 12MHz (Y1)

VFD Board Crystal: 4MHz (Y1)

## EMI Solution:

N/A

## 1.4 Description of Support Equipment

Unit	Model Serial No.	Brand	Power Cord	FCC ID
Notebook Personal Computer	Latitude D400 S/N: N/A	DELL	Non-shielded, Detachable	FCC DOC
Rack mountable Switch	DGS-1008D	D-Link	D-Link (Model:AF-1205-B)	FCC DOC
External HDD Enclosure*4	OT-201 S/N: NA	A-TEC	N/A	FCC DOC
Drive Station USB3.0 Hard Drive*2	BUF-HD-HXU3	Buffalo	Non-shielded, Detachable	FCC DOC
E-SATA Hard Disk*2	NST-200SU-BK	Vantec	Non-shielded, Detachable	FCC DOC
17" LCD Monitor	VA703B	View Sonic	Non-shielded, Detachable	FCC DOC

## 1.5 Software for Controlling Support Unit

- 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. Used Tfgen.exe to send signal to EUT RJ45 port through PC RJ45 Port.
- E. Search External HDD from PC RJ45 to EUT RJ45 with Finder.exe.
- F. R/W External HDD Enclosure from USB Port.
- G. Read and write data in the USB2.0 Hard Disk through EUT USB2.0 port.
- H. Read and write data in the USB3.0 Hard Disk through EUT USB3.0 port.
- I. Read and write data in the E-SATA Hard Disk through EUT E-SATA port.
- J. Send EUT Information to the video port device (LCD Monitor).
- K. Repeat the above steps.

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

### 1.6 I/O Cable Condition of EUT and Support Units

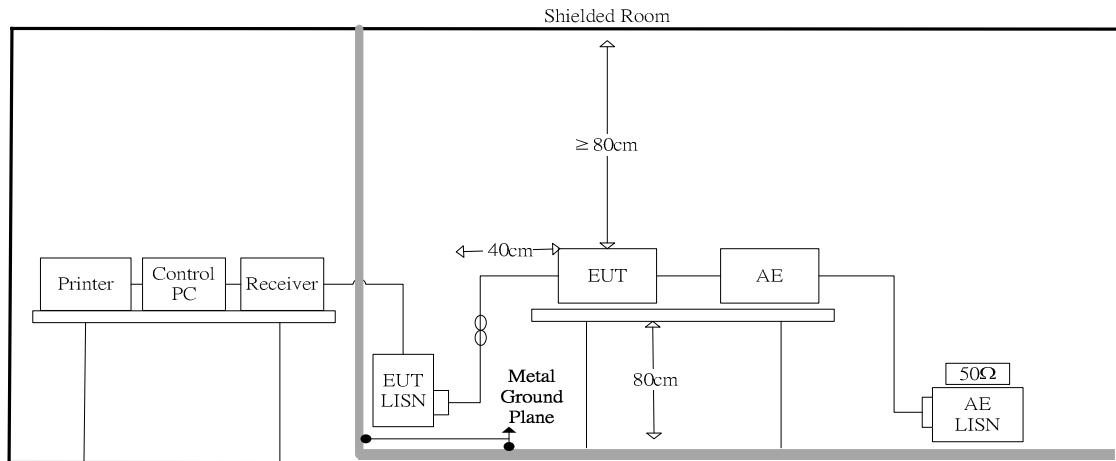
Description	Path	Cable Length	Cable Type	Connector Type
AC Power Cord	110V (~240V) to EUT SPS	1.8M	Non-shielded, Detachable	Plastic Head
USB Data Cable*4	External HDD Enclosure USB Port to PC USB 2.0Port	0.98M	Shielded, Detachable (With Core)	Metal Head
USB3.0 Data Cable*2	External HDD Enclosure USB Port to PC USB 3.0Port	1.0M	Shielded, Detachable	Metal Head
E-SATA Data Cable*2	External Hard disk E-SATA Port to EUT E-SATA Port	1.0M	Shielded, Detachable	Metal Head
LAN Data Cable	PC LAN Port to Router LAN Port.	1.0M	Non-shielded, Detachable	RJ-45, with Plastic Head
LAN Data Cable*2	EUT LAN Port to Switch HUB LAN Port	10M	Non-shielded, Detachable	RJ-45, with Plastic Head
Display Data Cable	EUT D-sub Port to LCD Monitor	1.98M	Shielded, Detachable (with cord)	Metal Head
Display Data Cable	EUT HDMI Port to LCD Monitor	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.

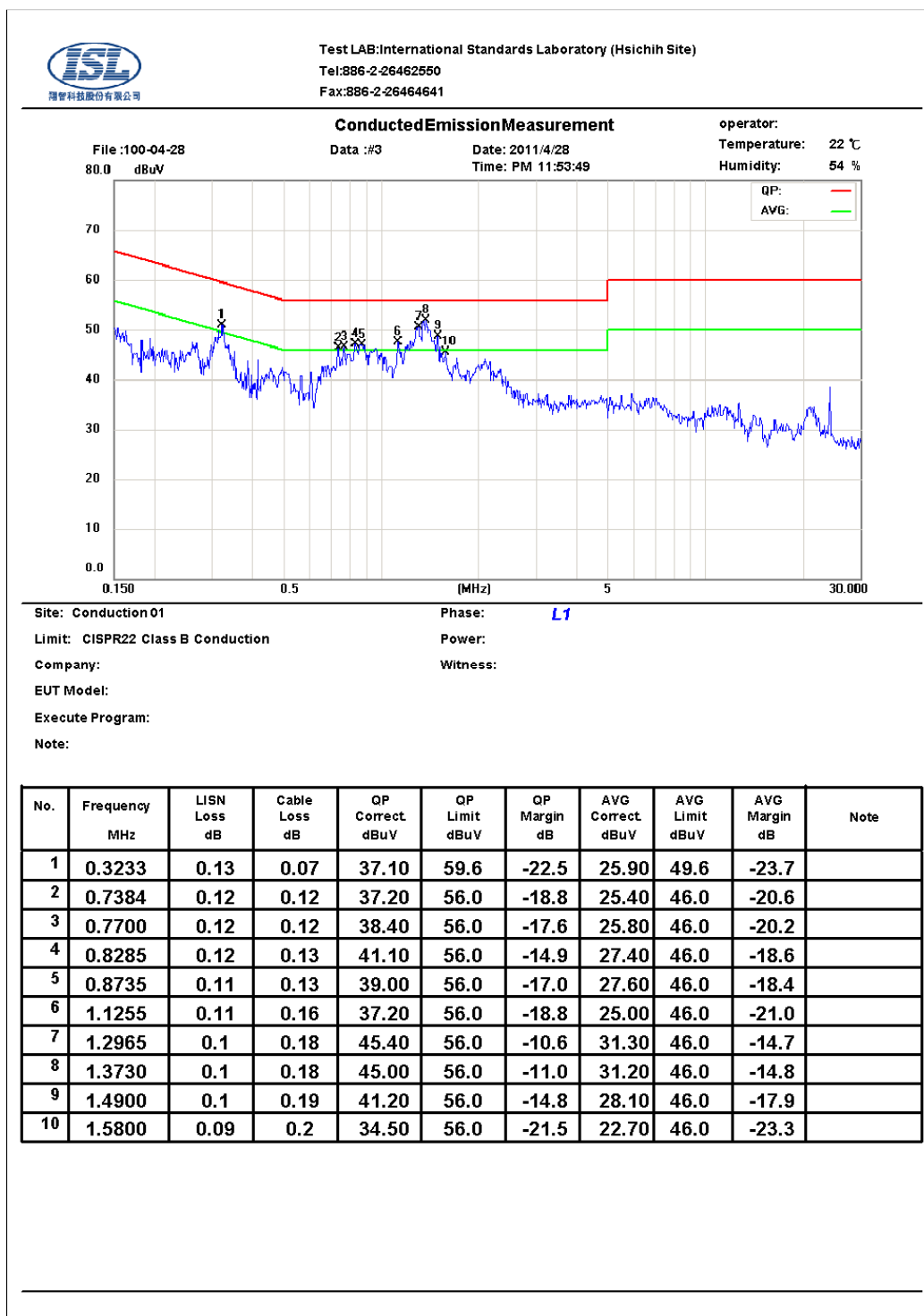
The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

#### 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)



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)**



Note:

Margin = Corrected Amplitude - Limit

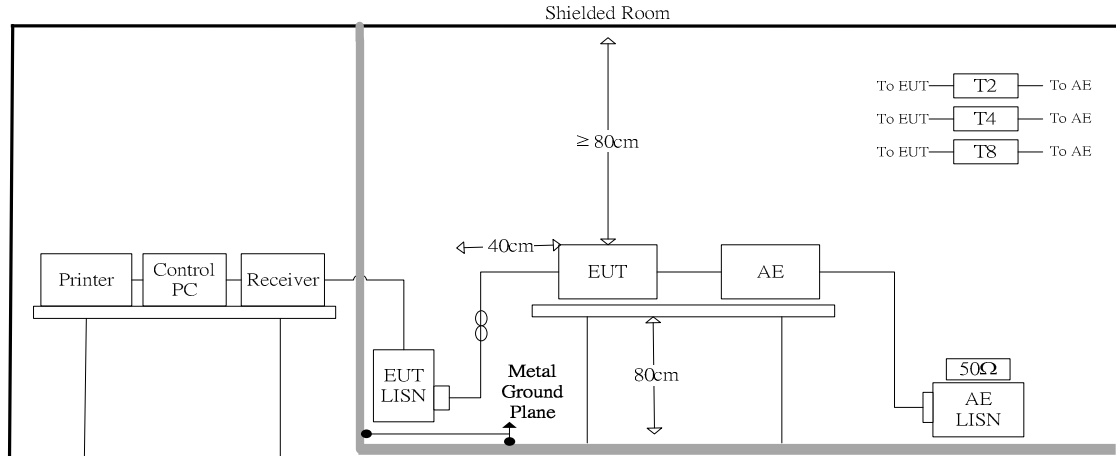
Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

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.

### 3.1.1 Test Setup

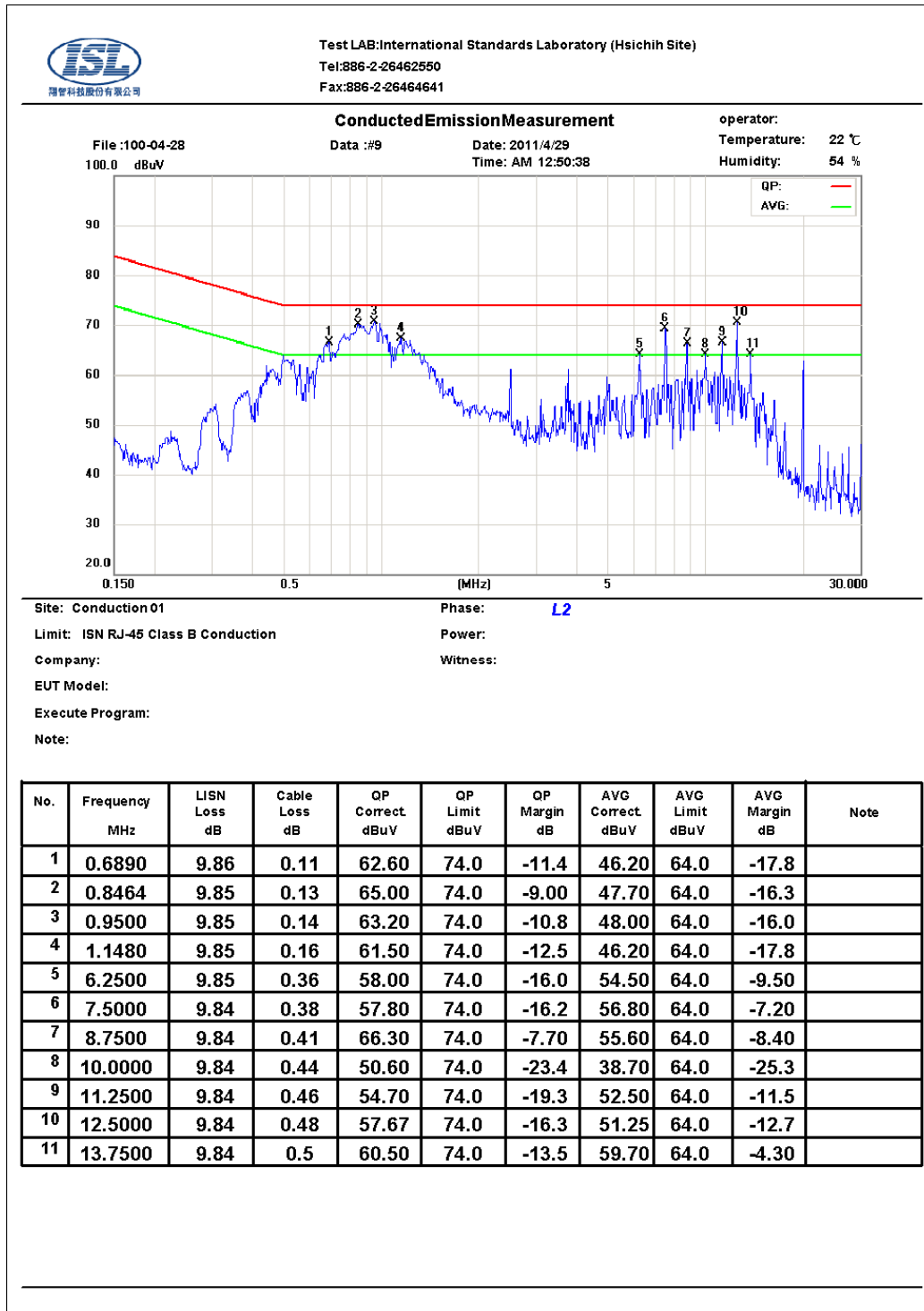


### 3.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

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



**Note :**

Margin = Corrected Amplitude - Limit

Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

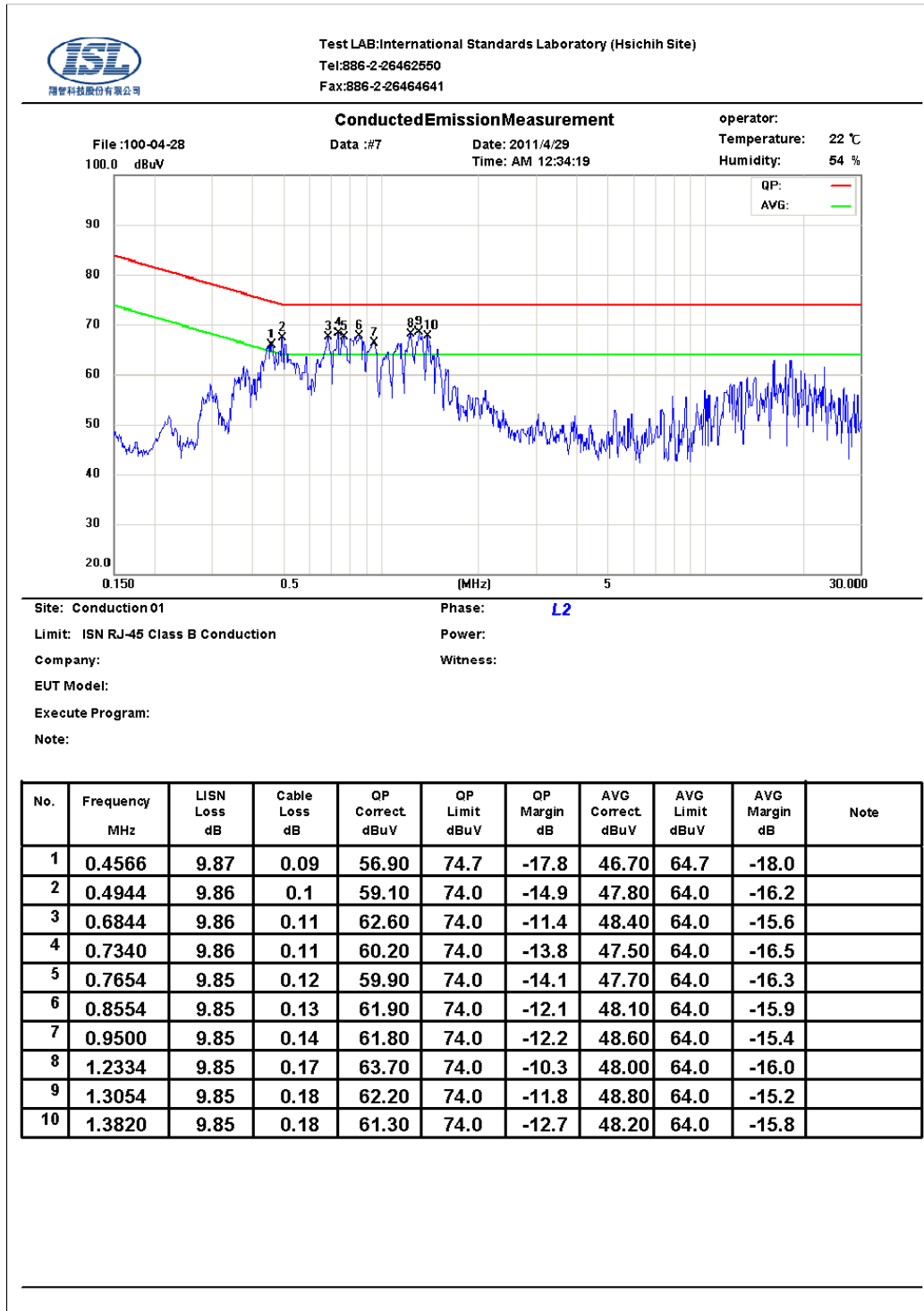
A margin of -8dB means that the emission is 8dB below the limit

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



**Note :**

Margin = Corrected Amplitude - Limit

Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

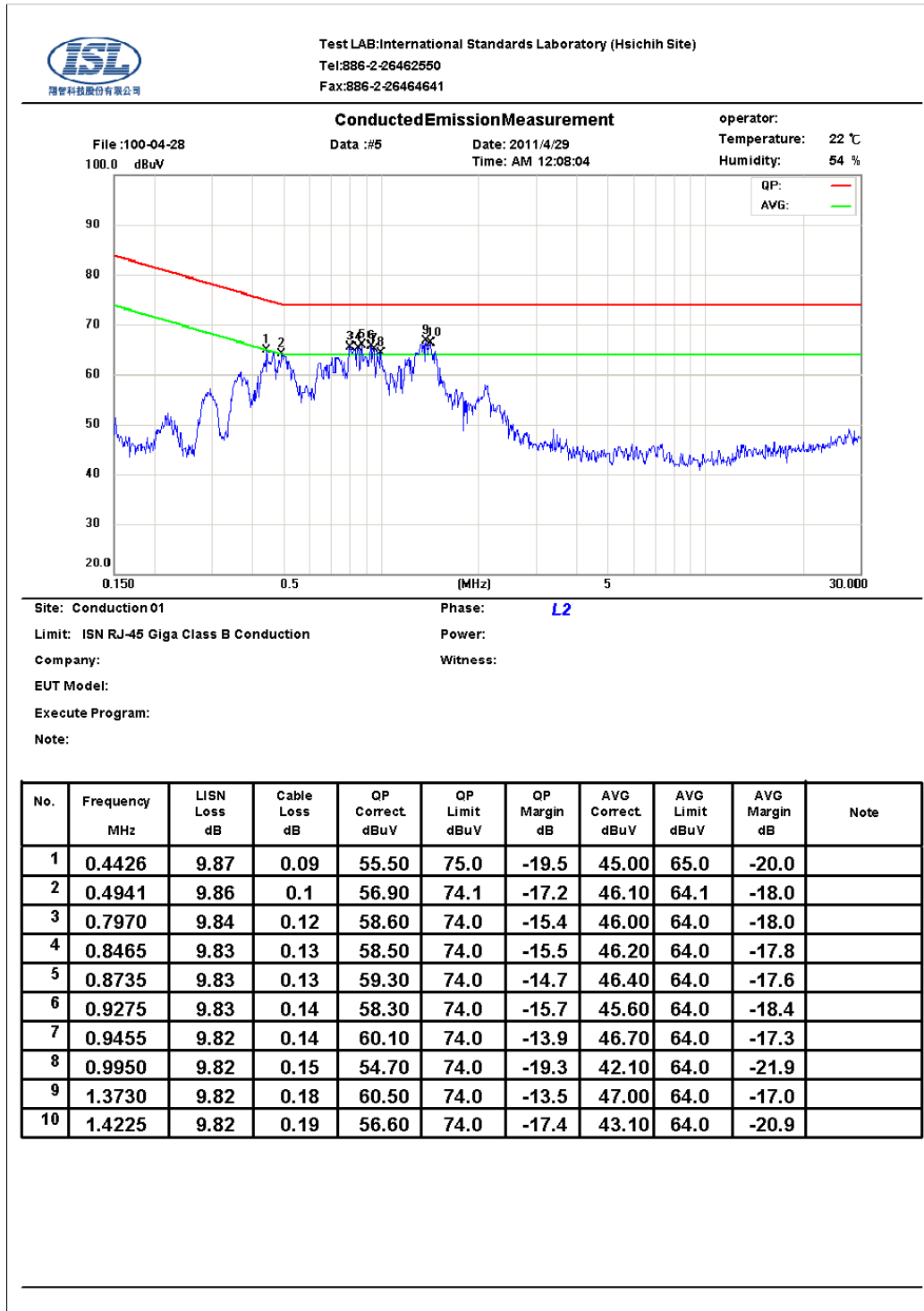
A margin of -8dB means that the emission is 8dB below the limit

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



**Note :**

Margin = Corrected Amplitude - Limit

Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

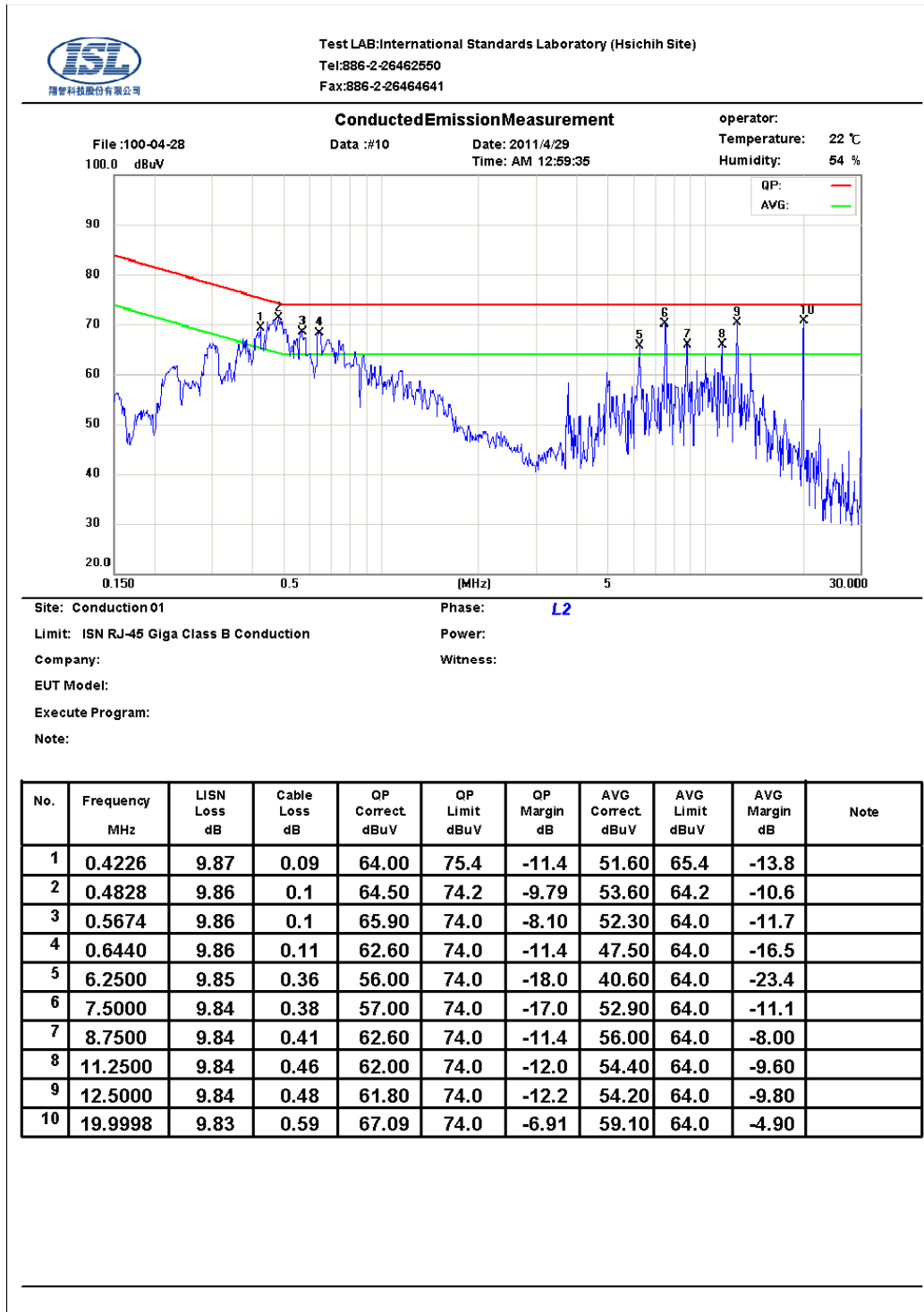
A margin of -8dB means that the emission is 8dB below the limit

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



**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

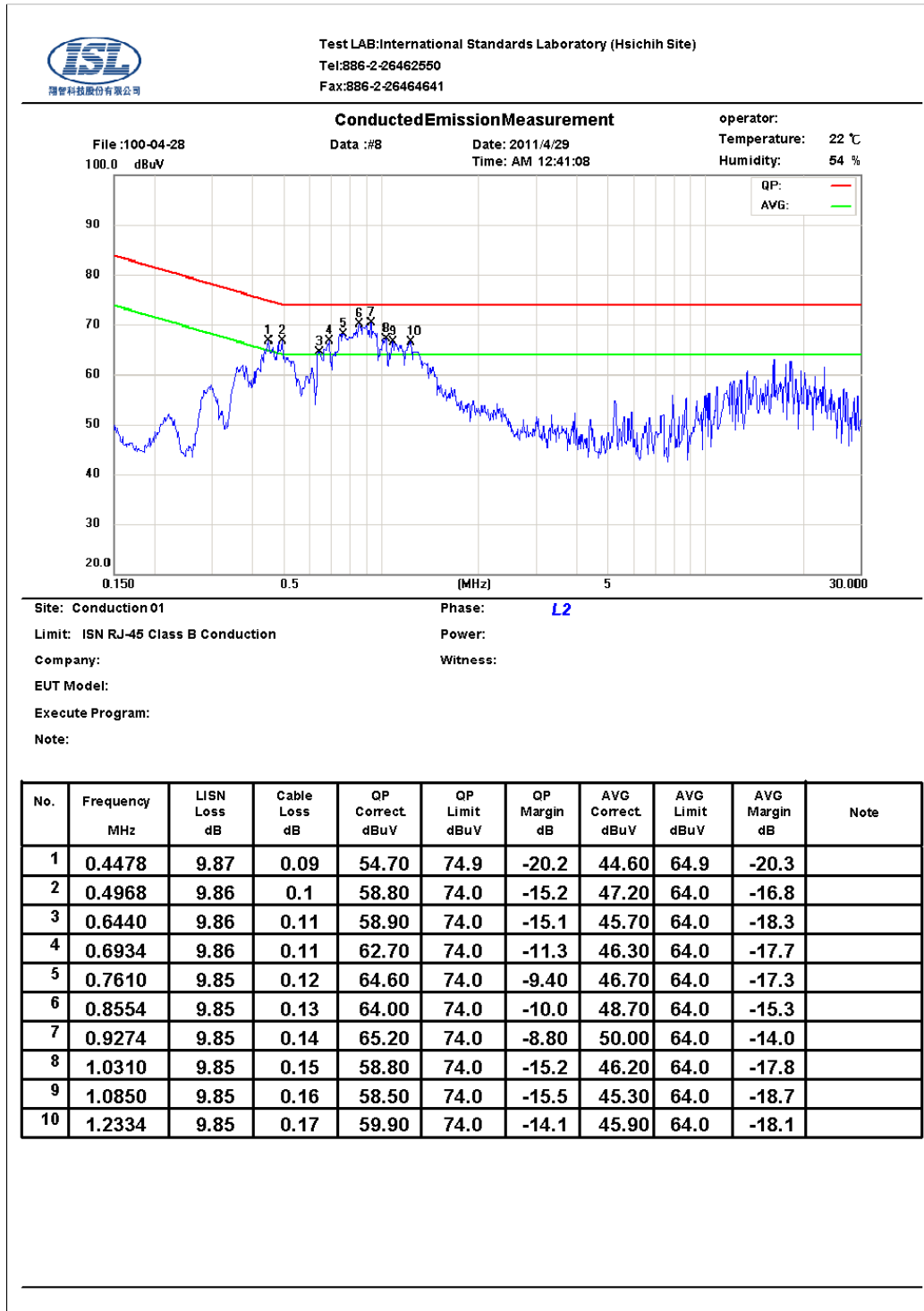
**The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.**

**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



**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



**Note :**

Margin = Corrected Amplitude - Limit

Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

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

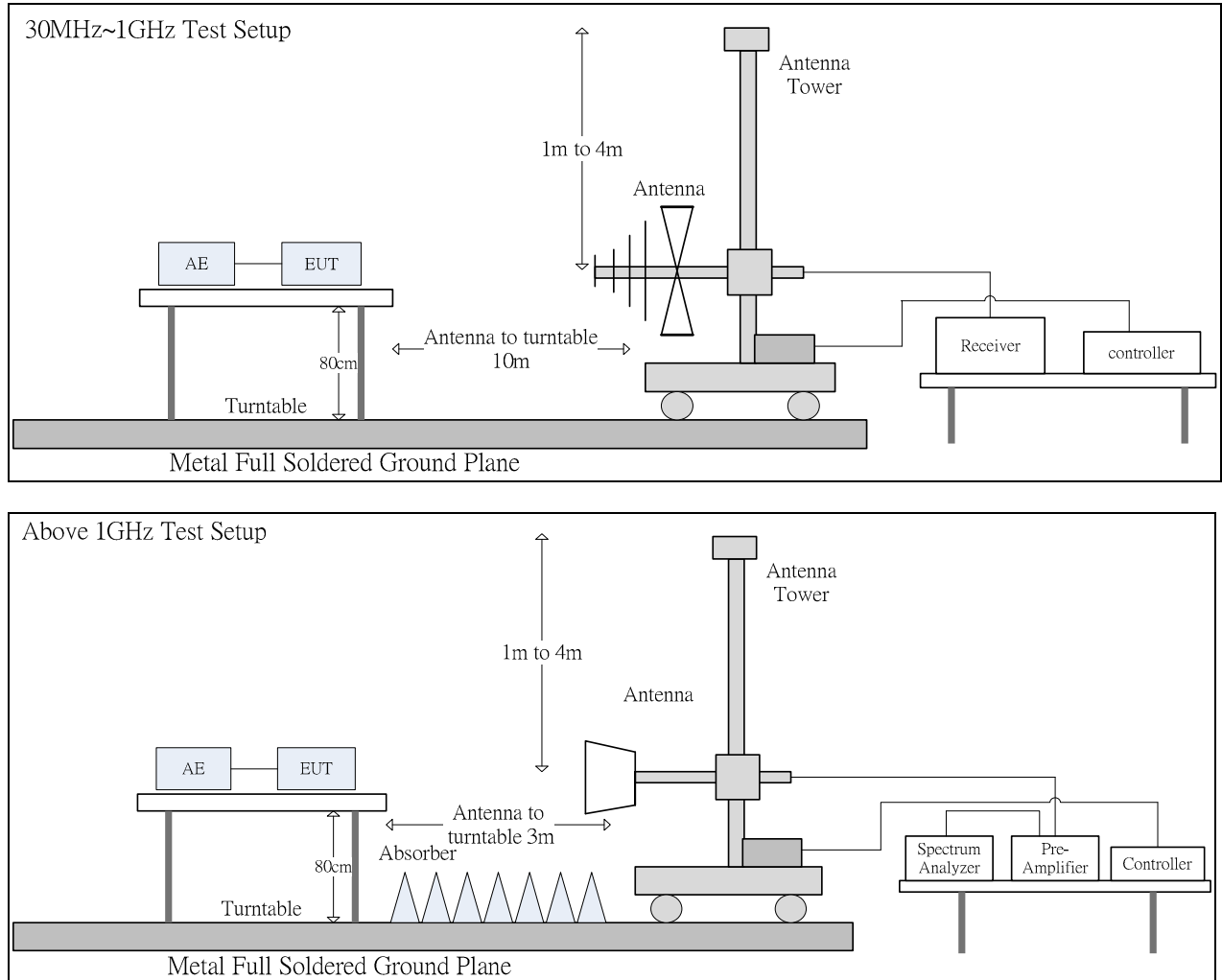
The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.

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

## 4. Radiated Disturbance Emissions

### 4.1 Test Setup and Procedure

#### 4.1.1 Test Setup



#### 4.1.2 Test Procedure

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

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

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

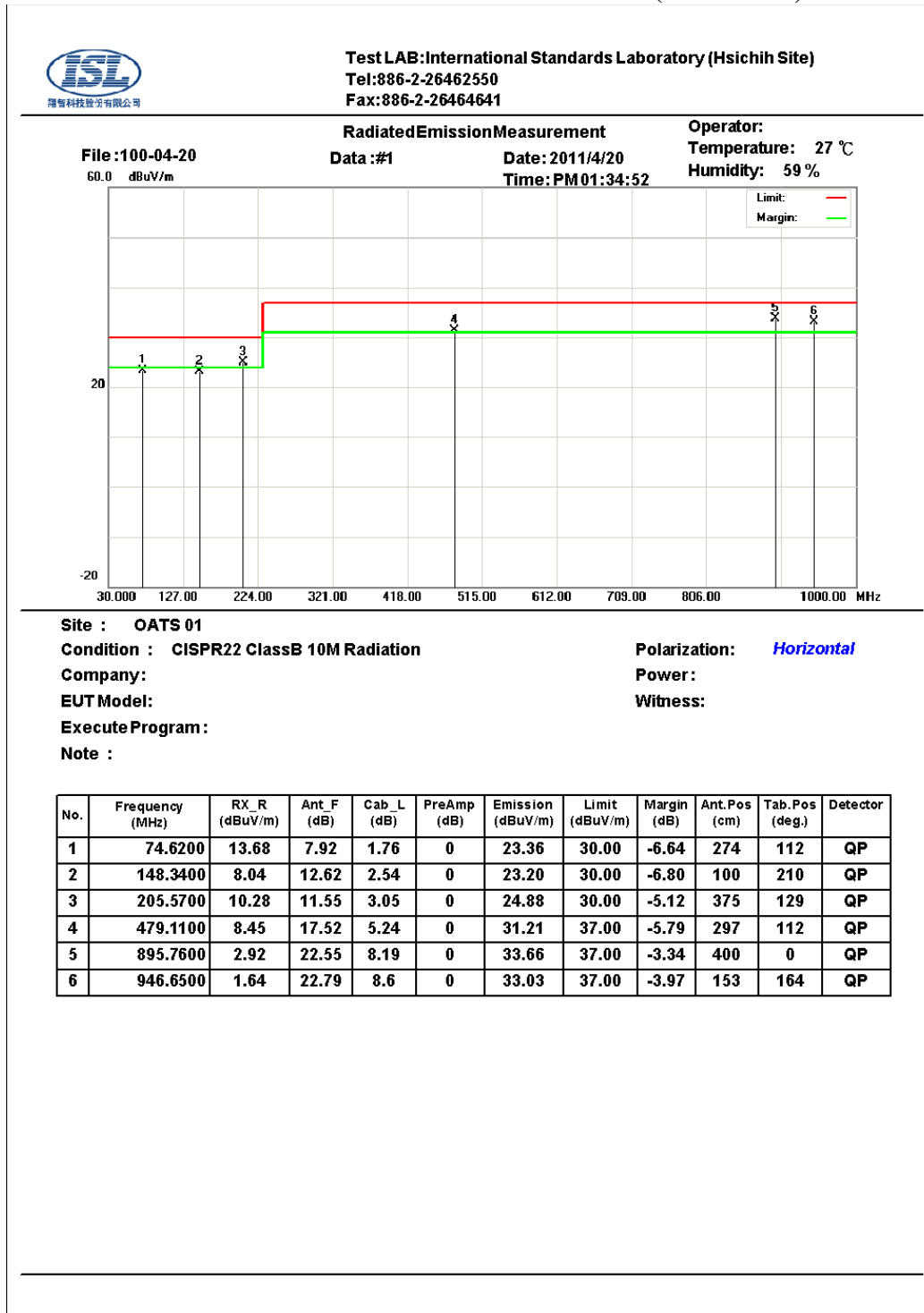
The highest internal source of an EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes. If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. If the highest frequency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

#### 4.1.3 Spectrum Analyzer Configuration (for the frequencies tested)

Frequency Range:	30MHz--1000MHz
Detector Function:	Quasi-Peak Mode
Resolution Bandwidth:	120KHz
Frequency Range:	Above 1 GHz to 6 GHz
Detector Function:	Peak/Average Mode
Resolution Bandwidth:	1MHz

## 4.2 Radiation Test Data: Configuration 1

Table 4.2.1 Radiated Emissions (Horizontal)



\* 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

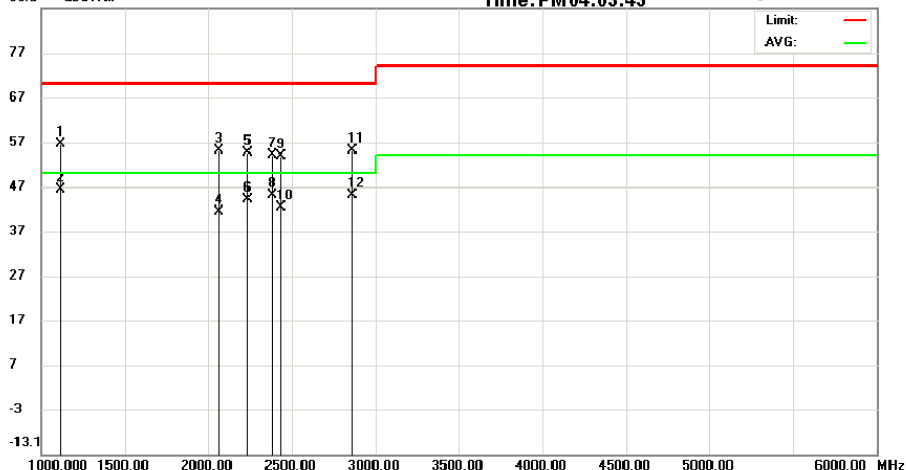
BILOG Antenna Distance: 10 meters

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



Address: No.120, Lane 180, San Ho Tsuen, Hsin Ho Road  
Lung-Tan Hsiang, Tao Yuan Conty, Taiwan R.O.C.  
Tel: 03-4071718

**Radiated Emission Measurement**  
File: 100-05-09 Data: #5 Date: 2011/5/9 Time: PM 04:03:43  
Operator: Temperature: 28 °C Humidity: 55 %



Site : Chamber14  
Condition : CISPR22 ClassB Radiation(Peak)  
Company :  
EUT Model :  
Execute Program :  
Note :  
Polarization: Horizontal  
Power :  
Witness:

Mk.	Frequency (MHz)	RX_R (dBuV/m)	Ant_F (dB)	Cab_L (dB)	PreAmp (dB)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
1	1115.000	72.81	28.6	1.53	46.3	56.64	70.00	-13.36	128	89	peak
2	1115.000	62.42	28.6	1.53	46.3	46.25	50.00	-3.75	128	89	AVG
3	2060.000	67.16	32.21	2.12	46.41	55.08	70.00	-14.92	100	35	peak
4	2060.000	53.42	32.21	2.12	46.41	41.34	50.00	-8.66	100	35	AVG
5	2230.700	66.20	32.52	2.22	46.45	54.49	70.00	-15.51	100	14	peak
6	2230.700	55.79	32.52	2.22	46.45	44.08	50.00	-5.92	100	14	AVG
7	2380.000	65.55	32.78	2.3	46.48	54.15	70.00	-15.85	100	237	peak
8	2380.000	56.42	32.78	2.3	46.48	45.02	50.00	-4.98	100	237	AVG
9	2435.000	65.14	32.88	2.33	46.49	53.86	70.00	-16.14	100	29	peak
10	2435.000	53.48	32.88	2.33	46.49	42.20	50.00	-7.80	100	29	AVG
11	2865.000	65.59	33.44	2.56	46.57	55.02	70.00	-14.98	199	360	peak
12	2865.000	55.69	33.44	2.56	46.57	45.12	50.00	-4.88	199	360	AVG

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

\* Note:

Margin = Corrected Amplitude – Limit

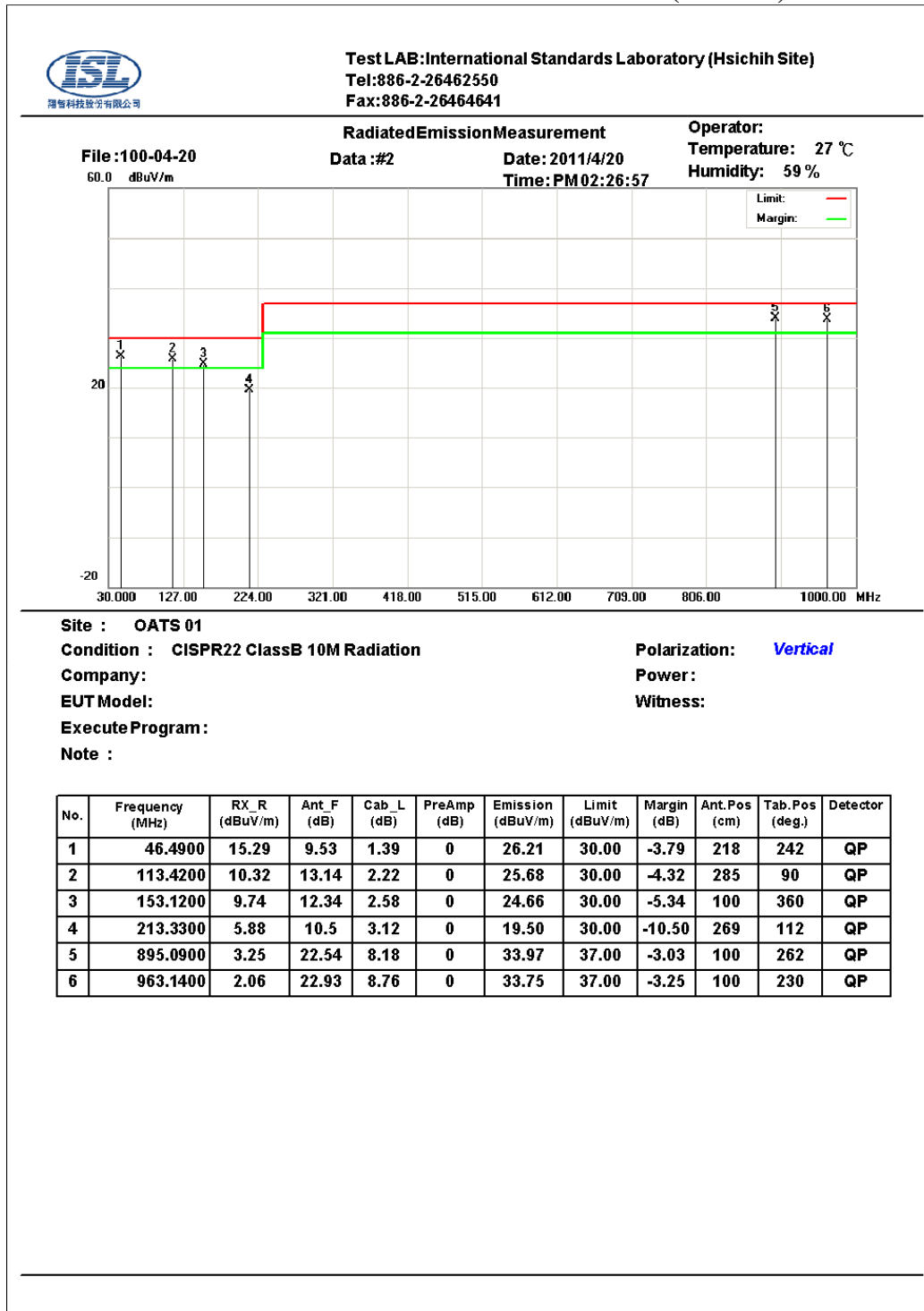
Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain

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.

**Table 4.2.2 Radiated Emissions (Vertical)**



\* 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

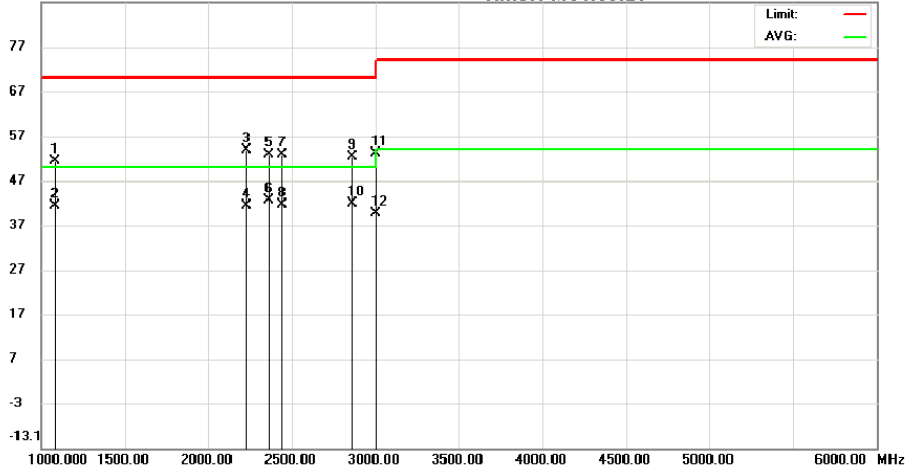
BILOG Antenna Distance: 10 meters

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



Address: No.120, Lane 180, San Ho Tsuen, Hsin Ho Road  
Lung-Tan Hsiang, Tao Yuan Conty, Taiwan R.O.C.  
Tel: 03-4071718

**File:** 100-05-09  
**86.9** dBuV/m  
**Radiated Emission Measurement**  
**Data:** #6  
**Date:** 2011/5/9  
**Time:** PM 04:36:21  
**Operator:**  
**Temperature:** 28 °C  
**Humidity:** 55 %



**Site :** Chamber 14  
**Condition :** CISPR22 Class B Radiation(Peak)  
**Company:**  
**EUT Model:**  
**Execute Program :**  
**Note :**  
**Polarization:** Vertical  
**Power :**  
**Witness:**

Mk.	Frequency (MHz)	RX_R (dBuV/m)	Ant_F (dB)	Cab_L (dB)	PreAmp (dB)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
1	1085.000	67.36	28.6	1.51	46.3	51.17	70.00	-18.83	200	360	peak
2	1085.000	57.51	28.6	1.51	46.3	41.32	50.00	-8.68	200	360	AVG
3	2230.000	65.41	32.51	2.22	46.45	53.69	70.00	-16.31	100	360	peak
4	2230.000	52.96	32.51	2.22	46.45	41.24	50.00	-8.76	100	360	AVG
5	2360.000	64.22	32.75	2.29	46.47	52.79	70.00	-17.21	100	323	peak
6	2360.000	53.95	32.75	2.29	46.47	42.52	50.00	-7.48	100	323	AVG
7	2438.800	64.14	32.89	2.34	46.49	52.88	70.00	-17.12	159	1	peak
8	2438.800	52.82	32.89	2.34	46.49	41.56	50.00	-8.44	159	1	AVG
9	2865.000	62.74	33.44	2.56	46.57	52.17	70.00	-17.83	203	360	peak
10	2865.000	52.25	33.44	2.56	46.57	41.68	50.00	-8.32	203	360	AVG
11	3000.000	63.39	33.6	2.63	46.6	53.02	70.00	-16.98	200	360	peak
12	3000.000	50.00	33.6	2.63	46.6	39.63	50.00	-10.37	200	360	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.



## 5. Electrostatic discharge (ESD) immunity

### 5.1 Electrostatic discharge (ESD) immunity test

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    +/- 2 kV, +/- 4 kV
Criteria:	B
Test Procedure	refer to ISL QA -T4-E-S7
Temperature:	27 °C
Humidity:	53%

#### Selected Test Point

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

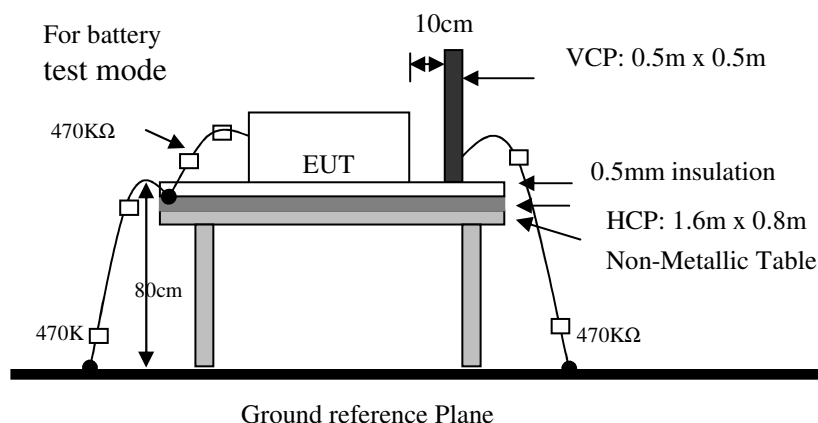
Contact: Total 200 discharges minimum were to the selected contact points.

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.

For final test points, please refer to EUT 37 to EUT 38 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 470K $\Omega$  resistor 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.

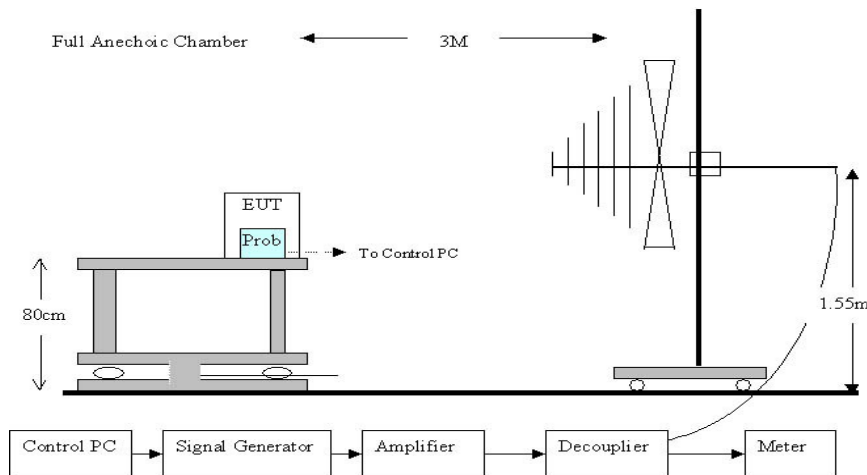
## 6. Radio-Frequency, Electromagnetic Field immunity

### 6.1 Radio-Frequency, Electromagnetic Field immunity test

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	<input checked="" type="checkbox"/> 0° <input checked="" type="checkbox"/> 90° <input checked="" type="checkbox"/> 180° <input checked="" type="checkbox"/> 270°
Criteria:	A
Test Procedure	refer to ISL QA -T4-E-S8
Temperature:	29°C
Humidity:	55%

#### 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.**

## 7. Electrical Fast transients/burst immunity

### 7.1 Electrical Fast transient/burst immunity test

Port:	AC mains; Twisted Pair LAN Port
Basic Standard:	EN 61000-4-4/ IEC EN61000-4-4 (details referred to Sec 1.2)
Test Level:	<b>AC Power Port:</b> +/- 1 kV <b>Twisted Pair LAN Port (I/O Cables):</b> +/- 0.5 kV
Rise Time:	5ns
Hold Time:	50ns
Repetition Frequency:	5KHz
Criteria:	B
Test Procedure	refer to ISL QA -T4-E-S9
Temperature:	30 °C
Humidity:	57%

#### Test Procedure

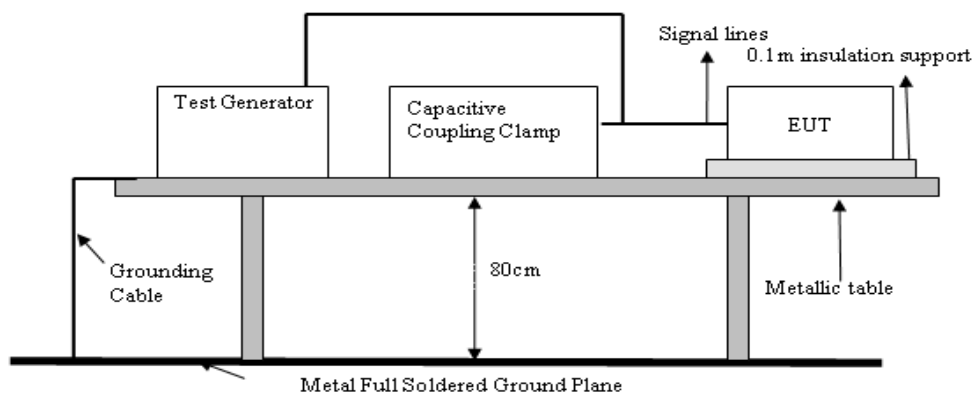
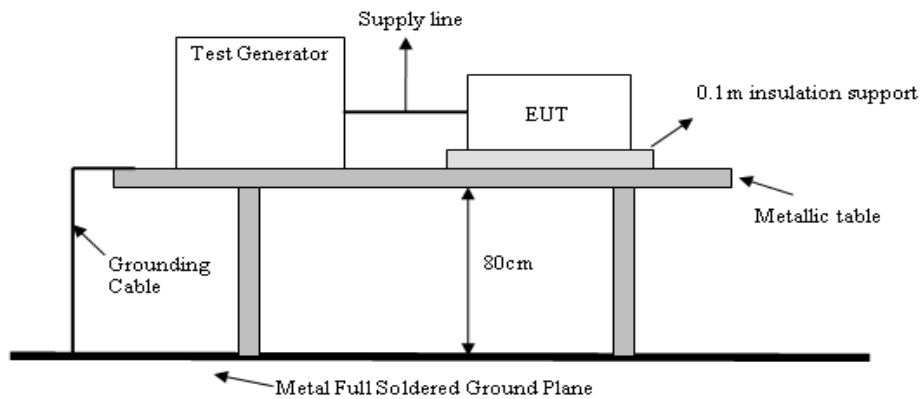
The EUT was setup on a nonconductive table 0.1 m above a reference ground plane.

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.

### **Test Setup**

EUT is at least 50cm from the conductive structure.



### **Test Result**

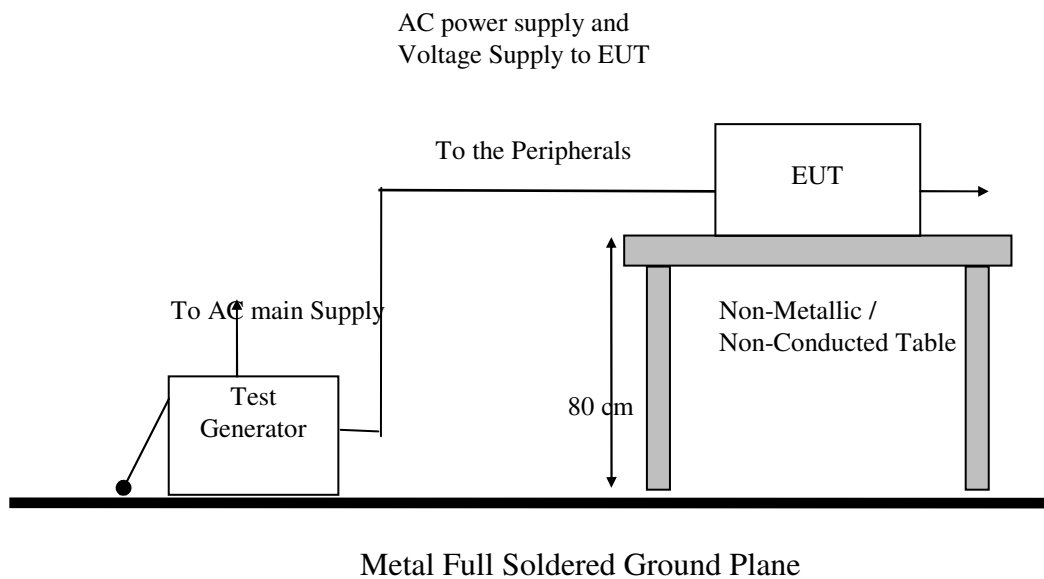
Performance of EUT complies with the given specification.

## 8. Surge Immunity

### 8.1 Surge immunity test

Port:	AC mains
Basic Standard:	EN 61000-4-5/ IEC EN61000-4-5 (details referred to Sec 1.2)
Test Level:	<b>AC Power Port:</b> 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:	<input checked="" type="checkbox"/> 0° <input checked="" type="checkbox"/> 90° <input checked="" type="checkbox"/> 180° <input checked="" type="checkbox"/> 270°
Criteria:	B
Test Procedure	refer to ISL QA -T4-E-S10
Temperature:	29°C
Humidity:	55%

#### Test Setup



#### Test Result

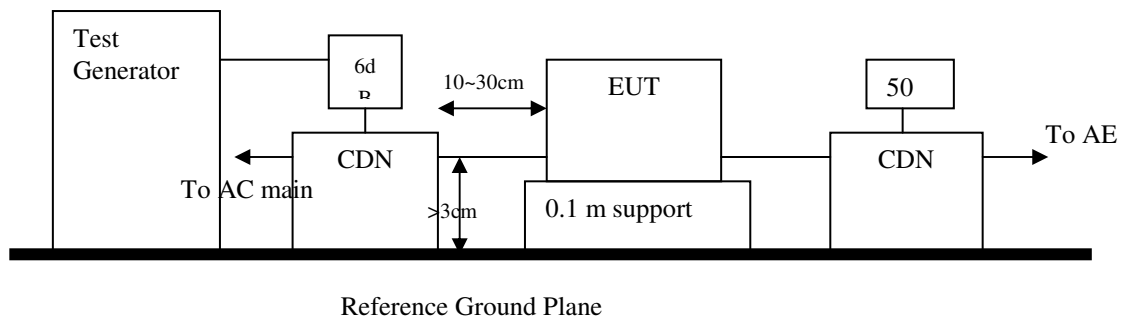
**Performance of EUT complies with the given specification.**

## 9. Immunity to Conductive Disturbance

### 9.1 Immunity to Conductive Disturbance

Port:	AC mains; Twisted Pair LAN Port
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:	26°C
Humidity:	55%

#### Test Setup



#### Test Result

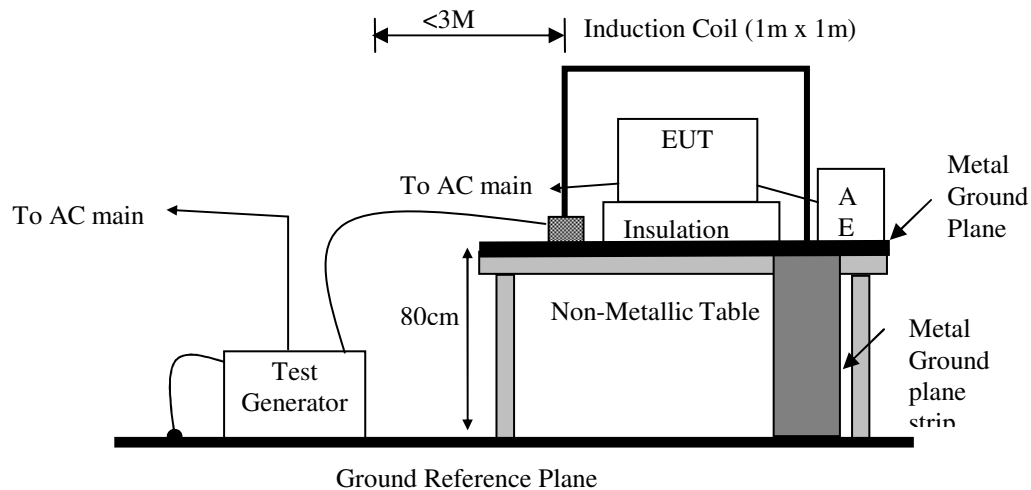
Performance of EUT complies with the given specification.

## 10. Power Frequency Magnetic Field immunity

### 10.1 Power Frequency Magnetic field immunity test

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:	29°C
Humidity:	55%

#### Test Setup



#### Test Result

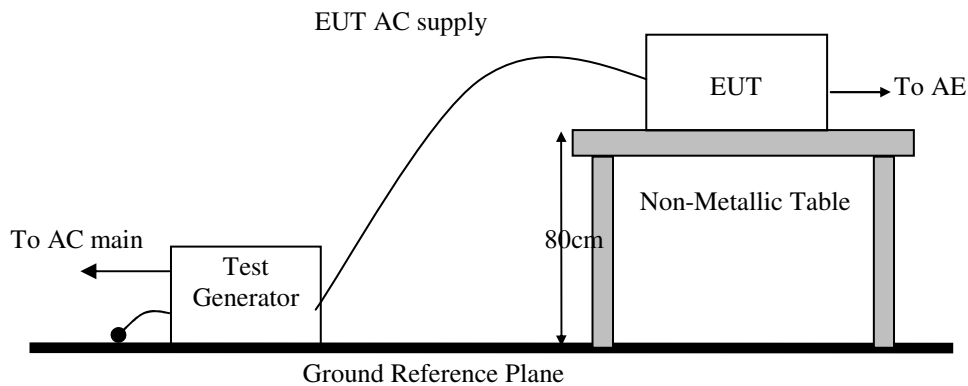
**Performance of EUT complies with the given specification.**

## 11. Voltage Dips, Short Interruption and Voltage Variation immunity

### 11.1 Voltage Dips, Short Interruption and Voltage Variation immunity test

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:	27°C
Humidity:	53%

#### Test Setup



#### Test Result

Performance of EUT complies with the given specification.



## 12. Harmonics

### 12.1 Harmonics test

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:	28°C
Humidity:	52%

#### **Test Procedure**

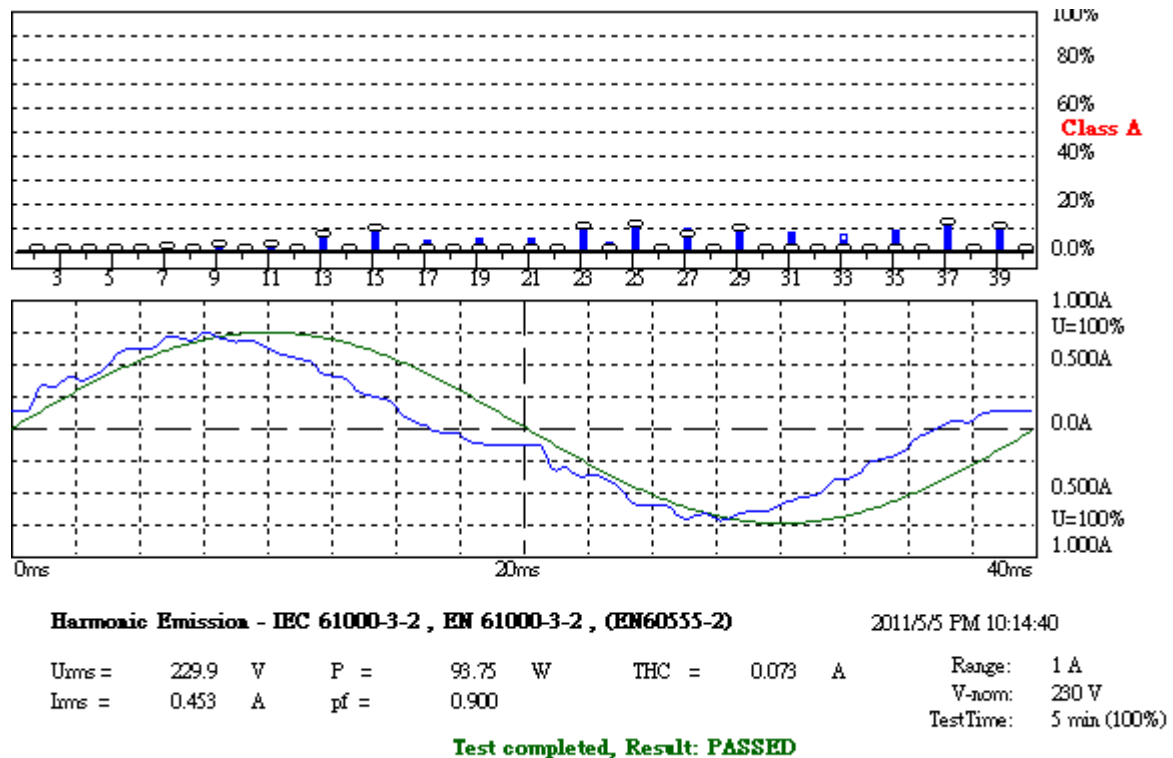
The EUT is supplied in series with shunts or current transformers from a source having the same nominal voltage and frequency as the rated supply voltage and frequency of the EUT. The EUT is configured to its rated current with additional resistive load when the testing is performed.

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



HAR-1000 EMC-Better U<sub>rms</sub>

= 229.9V Freq = 50.000 Range: 1 A  
I<sub>rms</sub> = 0.453A I<sub>pk</sub> = 0.756A cf = 1.668  
P = 93.75W S = 104.2VA pf = 0.900  
THDi = 16.2 % THDu = 0.10 % Class A

Test - Time : 5min ( 100 %)

Test completed, Result: PASSED

Order	Freq. [Hz]	Iavg [A]	Iavg%L [%]	Irms [A]	Irms%L [%]	I <sub>max</sub> [A]	I <sub>max</sub> %L [%]	Limit [A]	Status
1	50	0.4410		0.4424		0.4534			
2	100	0.0000	0.0000	0.0009	0.0848	0.0027	0.2487	1.0800	
3	150	0.0641	2.7867	0.0640	2.7837	0.0643	2.7943	2.3000	
4	200	0.0000	0.0000	0.0002	0.0426	0.0007	0.1561	0.4300	
5	250	0.0171	1.4994	0.0171	1.4991	0.0172	1.5098	1.1400	
6	300	0.0000	0.0000	0.0001	0.0407	0.0006	0.2035	0.3000	
7	350	0.0078	1.0121	0.0078	1.0146	0.0089	1.1494	0.7700	
8	400	0.0000	0.0000	0.0001	0.0531	0.0007	0.2919	0.2300	
9	450	0.0078	1.9505	0.0078	1.9531	0.0081	2.0142	0.4000	
10	500	0.0000	0.0000	0.0002	0.0995	0.0007	0.3981	0.1840	
11	550	0.0064	1.9461	0.0064	1.9420	0.0076	2.2934	0.3300	
12	600	0.0000	0.0000	0.0002	0.1194	0.0008	0.5175	0.1533	
13	650	0.0118	5.6087	0.0118	5.6094	0.0121	5.7547	0.2100	

14	700	0.0000	0.0000	0.0003	0.2322	0.0009	0.6966	0.1314
15	750	0.0131	8.7305	0.0131	8.7077	0.0134	8.9518	0.1500
16	800	0.0000	0.0000	0.0002	0.2123	0.0008	0.6900	0.1150
17	850	0.0000	0.0000	0.0042	3.1820	0.0048	3.6431	0.1324
18	900	0.0000	0.0000	0.0002	0.1791	0.0008	0.7762	0.1022
19	950	0.0000	0.0000	0.0046	3.8656	0.0048	4.0202	0.1184
20	1000	0.0000	0.0000	0.0003	0.3317	0.0011	1.1942	0.0920
21	1050	0.0000	0.0000	0.0036	3.3610	0.0047	4.3864	0.1071
22	1100	0.0000	0.0000	0.0004	0.4379	0.0015	1.7514	0.0836
23	1150	0.0093	9.4941	0.0092	9.4211	0.0095	9.7331	0.0978
24	1200	0.0000	0.0000	0.0005	0.6369	0.0018	2.3087	0.0767
25	1250	0.0091	10.097	0.0091	10.105	0.0099	11.054	0.0900
26	1300	0.0000	0.0000	0.0004	0.6037	0.0013	1.8974	0.0708
27	1350	0.0047	5.5920	0.0052	6.2988	0.0068	8.2031	0.0833
28	1400	0.0000	0.0000	0.0004	0.5573	0.0011	1.6718	0.0657
29	1450	0.0064	8.1883	0.0063	8.1028	0.0066	8.4961	0.0776
30	1500	0.0000	0.0000	0.0004	0.5971	0.0011	1.7912	0.0613
31	1550	0.0001	0.1915	0.0048	6.6433	0.0050	6.8956	0.0726
32	1600	0.0000	0.0000	0.0003	0.5307	0.0009	1.5922	0.0575
33	1650	0.0000	0.0000	0.0023	3.4017	0.0040	5.9082	0.0682
34	1700	0.0000	0.0000	0.0002	0.4511	0.0007	1.2406	0.0541
35	1750	0.0000	0.0000	0.0046	7.1208	0.0047	7.3107	0.0643
36	1800	0.0000	0.0000	0.0003	0.5971	0.0007	1.4330	0.0511
37	1850	0.0067	10.963	0.0067	10.940	0.0068	11.241	0.0608
38	1900	0.0000	0.0000	0.0004	0.8824	0.0007	1.5126	0.0484
39	1950	0.0053	9.1064	0.0053	9.2041	0.0056	9.7331	0.0577
40	2000	0.0000	0.0000	0.0004	0.9288	0.0007	1.5922	0.0460

## 13. Voltage Fluctuations

### 13.1 Voltage Fluctuations test

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:	28°C
Humidity:	52%

#### **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.

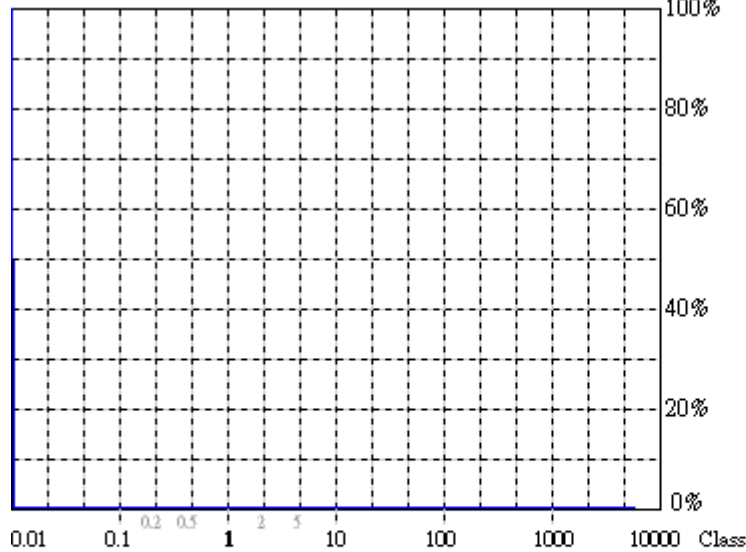
#### **Result**

**Performance of EUT complies with the given specification.**

# Test Data

10Min

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



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

U<sub>rms</sub> = 229.7 V P = 93.70 W  
I<sub>rms</sub> = 0.454 A pf = 0.899

2011/5/5 PM 10:33:32

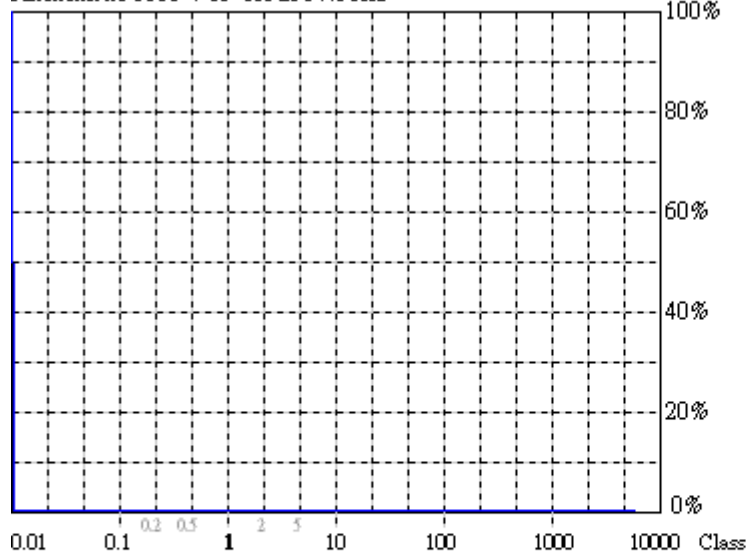
Range: 1 A  
V<sub>nom</sub>: 230 V  
TestTime: 10 min (100%)

**Test completed, Result: PASSED**

HAR-1000 EMC-Retwer

120Min

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



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

U<sub>rms</sub> = 229.7 V P = 93.70 W  
I<sub>rms</sub> = 0.454 A pf = 0.899

2011/5/6 AM 01:42:23

Range: 1 A  
V<sub>nom</sub>: 230 V  
TestTime: 120 min (10000%)

**Test completed, Result: PASSED**

HAR-1000 EMC-Retwer

## 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	10/25/2010	10/25/2011
Conduction	LISN 02	EMCO	3825/2	1407	07/22/2010	07/22/2011
Conduction	LISN 03	R&S	ESH3-Z5 831.5518.52	828874/010	07/22/2010	07/22/2011
Conduction	ISN T2 03	FCC	FCC-TLISN-T 2-02	20618	08/23/2010	08/23/2011
Conduction	ISN T4 05	FCC	FCC-TLISN-T 4-02	20619	08/23/2010	08/23/2011
Conduction	ISN T8 03	FCC	FCC-TLINS-T 8-02	20620	08/23/2010	08/23/2011
Conduction	EMI Receiver 08	Schwarzbeck Mess-Elektronik	FCKL 1528	1528-202	09/15/2010	09/15/2011
Conduction	Spectrum Analyzer 10	Advantest	R3132	111000879	12/17/2010	12/17/2011

Location OATS01	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Radiation	BILOG Antenna 10	Sumol Sciences	JB1	A013004-1	07/22/2010	07/22/2011
Radiation	Coaxial Cable 3F-10M	EMCI	CFD400-NL	ISL-R001	03/15/2011	03/15/2012
Radiation	Coaxial Cable 3F-3M	BELDEN	RG-8/U	3F-3M	10/25/2010	10/25/2011
Radiation	EMI Receiver 13	ROHDE & SCHWARZ	ESCI	101015	02/17/2011	02/17/2012

Location Chamber14	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Radiation (Chamber14)	Spectrum Analyzer 21	Agilent	N9010A	MY49060537	07/13/2010	07/13/2011
Rad. Above 1GHz (Chamber14)	Horn Antenna 06	ETS	3117	00066665	09/28/2010	09/28/2011
Rad. Above 1GHz (Chamber14)	Horn Antenna 04	Com-Power	AH-826	081-001	03/09/2011	03/09/2013
Rad. Above 1GHz (Chamber14)	Horn Antenna 05	Com-Power	AH-640	100A	01/11/2011	01/10/2013
Rad. Above 1GHz (Chamber14)	SUCOFLEX 1GHz~18GHz cable	HUBER SUHNER	Sucoflex 106	67618/6 and 67619/6	02/09/2011	02/09/2012
Rad. Above 1GHz (Chamber14)	Preamplifier 15	Agilent	8449B	3008A2471	02/16/2011	02/16/2012
Rad. Above 1GHz (Chamber14)	Preamplifier 13	MITEQ	JS44-0010180 0-25-10P-44	1329256	06/10/2010	06/10/2011

Location Chamber14	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Rad. Above 1GHz (Chamber14)	Spectrum Analyzer 19	R&S	FSP40	100116	10/18/2010	10/18/2011
Rad. Above 1GHz (Chamber14)	Spectrum Analyzer 20	Agilent Technologies	E4443A	MY48250315	05/11/2010	05/11/2011
Rad. Above 1GHz (Chamber14)	RF.Pre-selector 01	Agilent Technologies	N9039A	MY46520296	05/11/2010	05/11/2011

Location Immunity01	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	03/29/2011	03/29/2012
EN61K-4-,4,5, 8,11	TRANSIENT 2000 01	EMC Partner	TRANSIENT- 2000	950	12/01/2010	12/01/2011
EN61K-4-2	ESD GUN 04	Schaffner	NSG 438	489	03/23/2011	03/23/2012
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	03/18/2011	03/18/2012
EN61K-4-4	Digital Oscilloscope	Tektronix	TDS 684A	B010761	N/A	N/A
EN61K-4-4	EFT Clamp	Precision	1604242	CNEFT1000-1 03	N/A	N/A
EN61K-4-5	CDN-UTP8 01	EMC Partner	CDN-UTP8	032	12/01/2010	12/01/2011
EN61K-4-5	SURGE-TESTER 01	EMC Partner	MIG0603IN3	778	12/01/2010	12/01/2011
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	07/22/2010	07/22/2011
EN61K-4-6	CDN T2 01	Frankonia	T2	A3010003	07/22/2010	07/22/2011
EN61K-4-6	CDN T4 05	FCC Inc.	FCC-801-T4-R J45	08020	08/20/2010	08/20/2011
EN61K-4-6	CDN T8 01	FCC Inc.	FCC-801-T8-R J45	08021	08/20/2010	08/20/2011
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-RG4 00	4-6 01-1	N/A	N/A

Location Immunity01	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
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	06/24/2010	06/24/2011
EN61K-4-8	Clamp Meter 4-8	TES	3090	990900322	07/30/2010	07/30/2011
EN61K-4-8	Magnetic Field Antenna	Precision	TRAIZ44B	MF1000-23	N/A	N/A

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

#### 14.1.2 Software for Controlling Spectrum/Receiver and Calculating Test Data

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

Radiation/Conduction	Filename	Version	Issued Date
Hsichih Conduction	EZ EMC	1.1.4.2	2/10/2007
Hsichih Radiation	EZ EMC	1.1.4.2	1/24/2007
Lung_Tan 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>       $\pm 2.946 \text{ dB}$

<OATS 01 (10M)>

Horizontal

30MHz~200MHz:       $\pm 4.216 \text{ dB}$

200MHz~1GHz:       $\pm 4.438 \text{ dB}$

Vertical

30MHz~200MHz:       $\pm 4.342 \text{ dB}$

200MHz~1GHz:       $\pm 4.426 \text{ dB}$

<Chamber 14 (3M)>

1GHz~18GHz       $\pm 3.722 \text{ dB}$

<Immunity 01>

Test item	Uncertainty
EN61000-4-2 (ESD)	
Voltage	$\pm 1.848\%$
First Peak current	$\pm 3.233\%$
current at 30ns	$\pm 3.272\%$
current at 60ns	$\pm 3.376\%$
EN61000-4-3 (RS)	$\pm 1.776\text{dB}$
EN61000-4-4 (EFT)	
Time	$\pm 0.632\%$
Voltage	$\pm 1 \%$
EN61000-4-5 (Surge)	
Time	$\pm 1.159 \%$
Voltage	$\pm 1.633 \%$
Current	$\pm 1.177 \%$
EN61000-4-6 (CS)	$\pm 1.892\text{dB}$
EN61000-4-8 (Magnetic)	$\pm 1.165\%$
EN61000-4-11 (Dips)	
Time	$\pm 1.159\%$
Voltage	$\pm 1.414\%$
Current	$\pm 1.177\%$
EN61000-3-2 (Harmonics)	$\pm 1.224 \%$
EN61000-3-3 (Fluctuations and Flicker)	$\pm 1.224 \%$

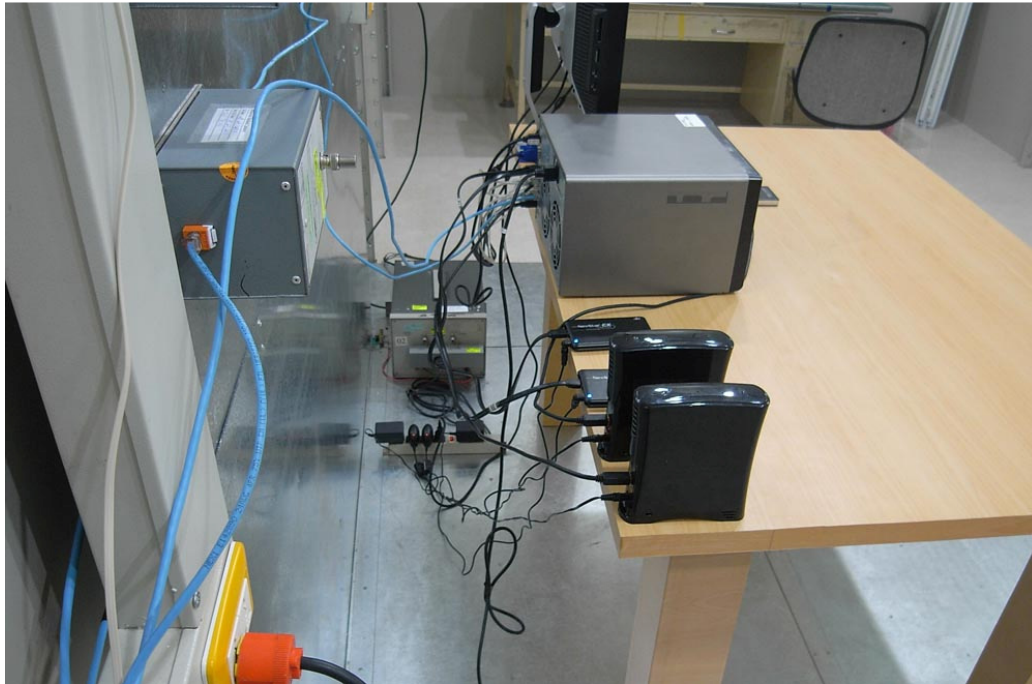
### 14.3 Appendix C: Photographs of EUT Configuration Test Set Up

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

Front View



Back View



### 14.3.2 Photo of Radiated Emission Measurement

Front View (30MHz~1GHz)



Back View (30MHz~1GHz)

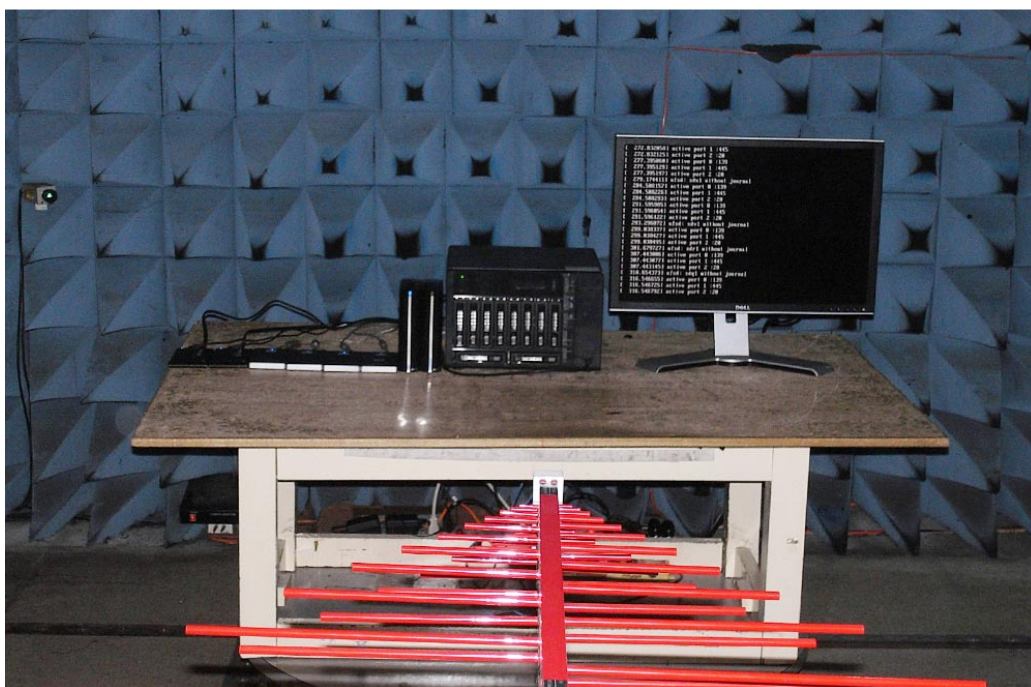




### 14.3.3 Photo of ESD Measurement



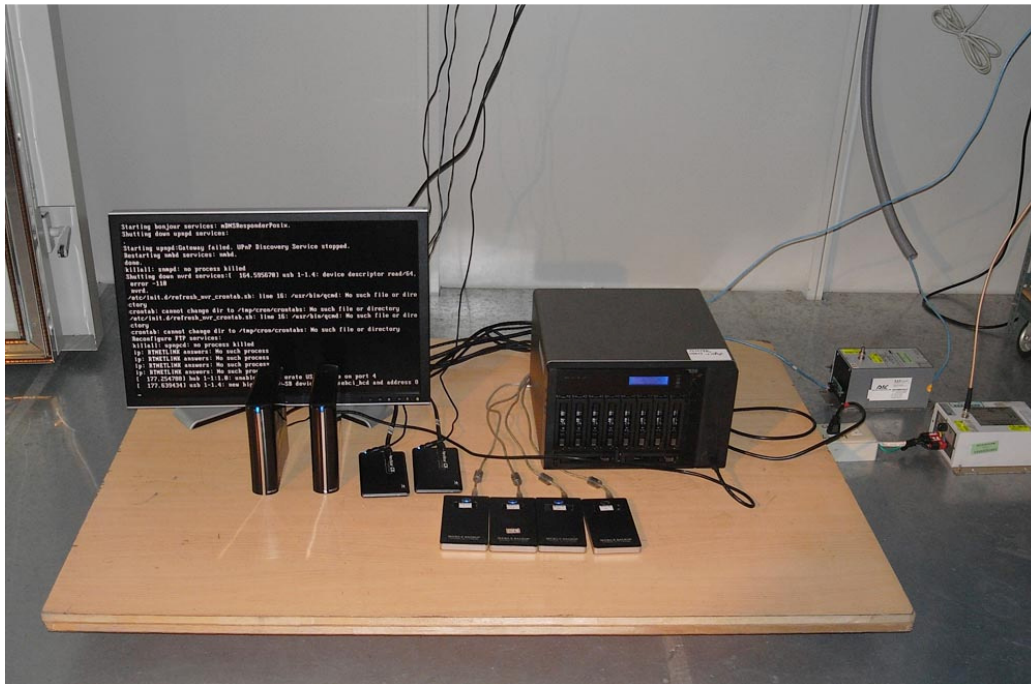
### 14.3.4 Photo of RF Field Strength Susceptibility Measurement



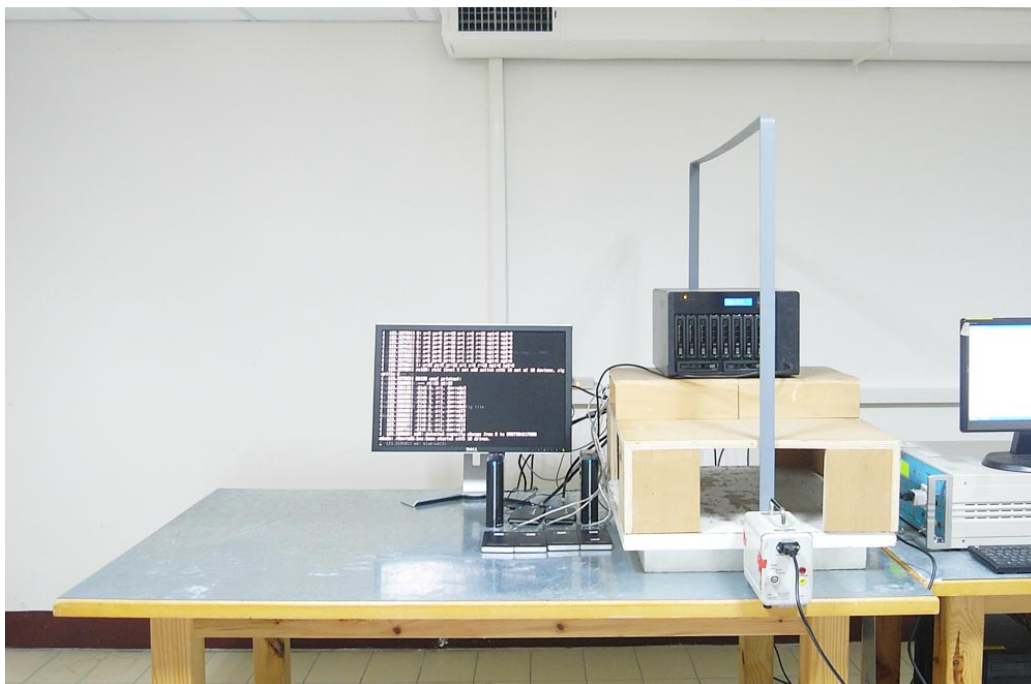




### 14.3.7 Photo of Conductive Measurement

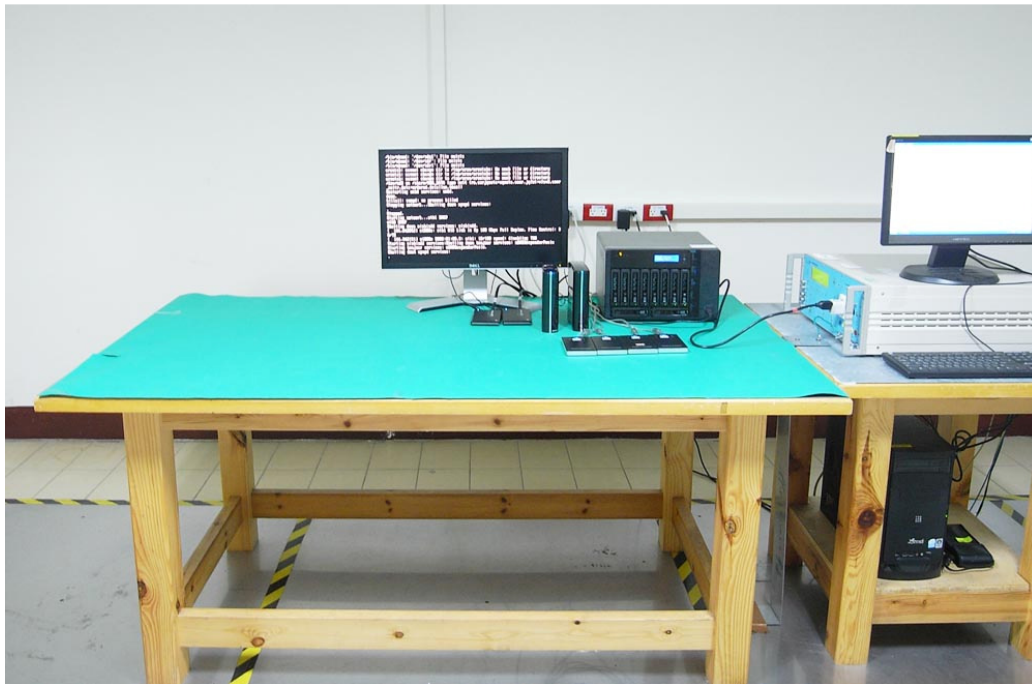


### 14.3.8 Photo of Magnetic field Measurement





### 14.3.9 Photo of Voltage Dips Measurement



### 14.3.10 Photo of Harmonics and Voltage Fluctuations



#### **14.4 Appendix D: Photographs of EUT**

**Please refer to the File of ISL-11HE129P**