

# Certificate

Issue Date: 12/2/2010  
Ref. Report No. ISL-10HE338CE

Product Name : Network Attached Storage  
: TS-419U+; NAS-419U-G; TS-419UII; TS-419U+ Pro II; TS-419U+ Pro-G; TS-419U+-G; TS-419U+ Pro II-G; TS-419U+ II-G; TS-419U+ Pro-M; TS-419U+ M; NAS-419U+ Pro-G; NAS-419U+ Pro II-G;  
Model(s) : NAS-419U+II-G; VS-4004L; VS-4008L; VS-4012L; VS-4016L; VS-4020L; NVR-4004L; NVR-4008L; NVR-4012L; NVR-4016L; NVR-4020L; NVR-4004LG; NVR-4008LG; NVR-4012LG; NVR-4016LG; NVR-4020LG; VS-4000L; NVR-4000L; NVR-4000LG  
Responsible Party : QNAP Systems, Inc.  
Address : 21F, No. 77, Sec. 1, Xintai 5th Rd.  
Xizhi City, Taipei County, 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: 1995+A1: 1998+A2: 2001 and IEC 61000-4-2: 1995+A1: 1998+A2: 2000  
EN 61000-4-3: 2006 + A1:2008 and IEC 61000-4-3: 2006 +A1:2007  
EN 61000-4-4: 2004 and IEC 61000-4-4: 2004  
EN 61000-4-5: 2006 and IEC 61000-4-5: 2005  
EN 61000-4-6: 2007 and IEC 61000-4-6: 2003+A1:2004+A2: 2006  
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*  
Jim Chu / Director

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# **CE MARK TECHNICAL FILE**

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

of

Product Name

**Network Attached Storage**

Model

**TS-419U+; NAS-419U-G; TS-419UII; TS-419U+ Pro II;  
TS-419U+ Pro-G; TS-419U+-G; TS-419U+ Pro II-G;  
TS-419U+ II-G; TS-419U+ Pro-M; TS-419U+ M;  
NAS-419U+ Pro-G; NAS-419U+ Pro II-G;  
NAS-419U+II-G; VS-4004L; VS-4008L; VS-4012L;  
VS-4016L; VS-4020L; NVR-4004L; NVR-4008L;  
NVR-4012L; NVR-4016L; NVR-4020L; NVR-4004LG;  
NVR-4008LG; NVR-4012LG; NVR-4016LG;  
NVR-4020LG; VS-4000L; NVR-4000L; NVR-4000LG**

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: 21F, No. 77, Sec. 1, Xintai 5th Rd.  
Xizhi City, Taipei County, 221, Taiwan

Declares that product: Network Attached Storage

Model: TS-419U+; NAS-419U-G; TS-419UII; TS-419U+ Pro II; TS-419U+ Pro-G; TS-419U+-G; TS-419U+ Pro II-G; TS-419U+ II-G; TS-419U+ Pro-M; TS-419U+ M; NAS-419U+ Pro-G; NAS-419U+ Pro II-G; NAS-419U+II-G; VS-4004L; VS-4008L; VS-4012L; VS-4016L; VS-4020L; NVR-4004L; NVR-4008L; NVR-4012L; NVR-4016L; NVR-4020L; NVR-4004LG; NVR-4008LG; NVR-4012LG; NVR-4016LG; NVR-4020LG; VS-4000L; NVR-4000L; NVR-4000LG

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: 1995+A1: 1998+A2: 2001 IEC 61000-4-2: 1995+A1: 1998+A2: 2000	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 IEC 61000-4-4: 2004	Electrical Fast Transient/Burst	Pass	B
EN 61000-4-5: 2006 IEC 61000-4-5: 2005	Surge	Pass	B
EN 61000-4-6: 2007 IEC 61000-4-6: 2003+A1:2004+A2: 2006	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

<to be continued>

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

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

EN60950-1: 2006: 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: 12/2/2010**

## Declaration of Conformity

Name of Responsible Party: QNAP Systems, Inc.  
 Address of Responsible Party: 21F, No. 77, Sec. 1, Xintai 5th Rd.  
 Xizhi City, Taipei County, 221, Taiwan  
 Declares that product: Network Attached Storage  
 Model: TS-419U+; NAS-419U-G; TS-419UII; TS-419U+  
 Pro II; TS-419U+ Pro-G; TS-419U+-G; TS-419U+  
 Pro II-G; TS-419U+ II-G; TS-419U+ Pro-M;  
 TS-419U+ M; NAS-419U+ Pro-G; NAS-419U+ Pro  
 II-G; NAS-419U+II-G; VS-4004L; VS-4008L;  
 VS-4012L; VS-4016L; VS-4020L; NVR-4004L;  
 NVR-4008L; NVR-4012L; NVR-4016L;  
 NVR-4020L; NVR-4004LG; NVR-4008LG;  
 NVR-4012LG; NVR-4016LG; NVR-4020LG;  
 VS-4000L; NVR-4000L; NVR-4000LG  
 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: 1995+A1: 1998+A2: 2001 IEC 61000-4-2: 1995+A1: 1998+A2: 2000	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 IEC 61000-4-4: 2004	Electrical Fast Transient/Burst	Pass	B
EN 61000-4-5: 2006 IEC 61000-4-5: 2005	Surge	Pass	B
EN 61000-4-6: 2007 IEC 61000-4-6: 2003+A1:2004+A2: 2006	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

<to be continued>

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: 12/2/2010**

# 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-419U+; NAS-419U-G; TS-419UII; TS-419U+ Pro II; TS-419U+ Pro-G; TS-419U+-G; TS-419U+ Pro II-G; TS-419U+ II-G; TS-419U+ Pro-M; TS-419U+ M; NAS-419U+ Pro-G; NAS-419U+ Pro II-G; NAS-419U+II-G; VS-4004L; VS-4008L; VS-4012L; VS-4016L; VS-4020L; NVR-4004L; NVR-4008L; NVR-4012L; NVR-4016L; NVR-4020L; NVR-4004LG; NVR-4008LG; NVR-4012LG; NVR-4016LG; NVR-4020LG; VS-4000L; NVR-4000L; NVR-4000LG**

Applicant: **QNAP Systems, Inc.**

Address: **21F, No. 77, Sec. 1, Xintai 5th Rd.  
Xizhi City, Taipei County, 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

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No. 65, Gu Dai Keng St.

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Report No.: **ISL-10HE338CE**

Issue Date : **12/2/2010**

This report totally contains 47 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  
TS-419U+; NAS-419U-G; TS-419UII; TS-419U+ Pro II;  
TS-419U+ Pro-G; TS-419U+-G; TS-419U+ Pro II-G;  
TS-419U+ II-G; TS-419U+ Pro-M; TS-419U+ M;  
NAS-419U+ Pro-G; NAS-419U+ Pro II-G;  
NAS-419U+II-G; VS-4004L; VS-4008L; VS-4012L;  
VS-4016L; VS-4020L; NVR-4004L; NVR-4008L;  
NVR-4012L; NVR-4016L; NVR-4020L; NVR-4004LG;  
NVR-4008LG; NVR-4012LG; NVR-4016LG;  
**Model:** NVR-4020LG; VS-4000L; NVR-4000L; NVR-4000LG

**Applicant:** QNAP Systems, Inc.

**Sample received Date:** 12/1/2010

**Final test Date:** EMI:refer to the date of test data  
EMS: 2010-11-25

**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

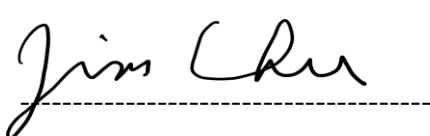
**Humidity:** refer to each site test data

**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:** Winnie Huang

**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: 1995+A1: 1998+A2: 2001 IEC 61000-4-2: 1995+A1: 1998+A2: 2000	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 IEC 61000-4-4: 2004	Electrical Fast Transient/Burst	Pass	B
EN 61000-4-5: 2006 IEC 61000-4-5: 2005	Surge	Pass	B
EN 61000-4-6: 2007 IEC 61000-4-6: 2003+A1:2004+A2: 2006	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-419U+; NAS-419U-G; TS-419UII; TS-419U+ Pro II;  
TS-419U+ Pro-G; TS-419U+-G; TS-419U+ Pro II-G;  
TS-419U+ II-G; TS-419U+ Pro-M; TS-419U+ M;  
NAS-419U+ Pro-G; NAS-419U+ Pro II-G; NAS-419U+II-G;  
VS-4004L; VS-4008L; VS-4012L; VS-4016L; VS-4020L;  
NVR-4004L; NVR-4008L; NVR-4012L; NVR-4016L;  
NVR-4020L; NVR-4004LG; NVR-4008LG; NVR-4012LG;  
NVR-4016LG; NVR-4020LG; VS-4000L; NVR-4000L;  
NVR-4000LG  
Serial Number: N/A  
Power Supply: Delta (Model: DPS-250AB-44D)  
AC input: 100-240V~ 47/63Hz, 3.5A  
DC output: +3.3V, 6A  
+5V, 12A  
+12V, 17A  
+5Vsb, 2A  
-12V, 0.5A  
Total Power: 250W  
Motherboard: (Model: TS-419 PRO II)  
SATA Board: (Model: TS-459U II BP)  
LED Board: one  
SATA Hard Disk: Western Digital (Model: WD5000AADS-00S9B0)  
500GB x4  
USB 2.0 Port: four 4-pin  
E-SATA Port: two 7-pin  
RJ45 Port: two 8-pin (10/100/1000M bps)  
AC Power Port: one  
Maximum operating frequency: 1.8GHz

Model different:  
Only Selling markets are different.

#### EMI Noise Source:

Motherboard Crystal: 25MHz (Y1), 32.768 kHz (Y2), 12MHz (Y3), 25MHz (Y4),  
25MHz (Y5)  
SATA Board Crystal: 25MHz (Y1), 25MHz (Y2)

#### EMI Solution:

N/A

### 1.4 Description of Support Equipment

Unit	Model Serial No.	Brand	Power Cord
Notebook Personal Computer	Latitude D400 S/N: N/A	DELL	Non-shielded, Detachable
External HDD Enclosure*4	OT-201 S/N: NA	A-TEC	N/A
E-SATA Hard Disk*2	NST-200SU-BK	NexStar	Non-shielded, Detachable
Rack mountable Switch	DGS-1008D	D-Link	D-Link (Model:AF-1205-B)

### 1.5 Software for Controlling Support Unit

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

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

	Filename	Issued Date
External Hard Disk	InterEMC.exe	9/04/2000
LAN	ping.exe	05/05/1999
LAN	Tfggen.exe	06/23/1999
EUT	Finder.exe	11/15/2008
EUT Hard Disk	InterEMC.exe	9/04/2000

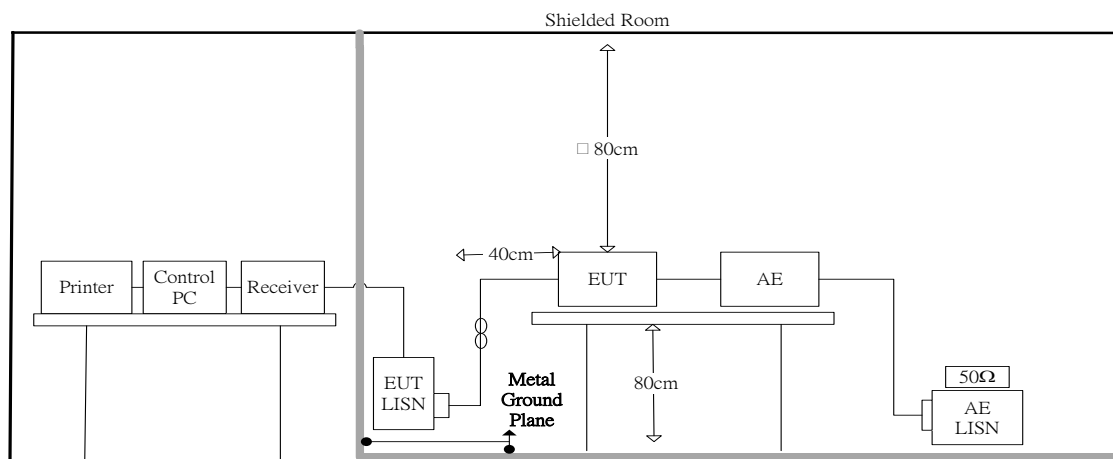
### 1.6 I/O Cable Condition of EUT and Support Units

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 Port	0.98M	Shielded, Detachable (With Core)	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

## 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.

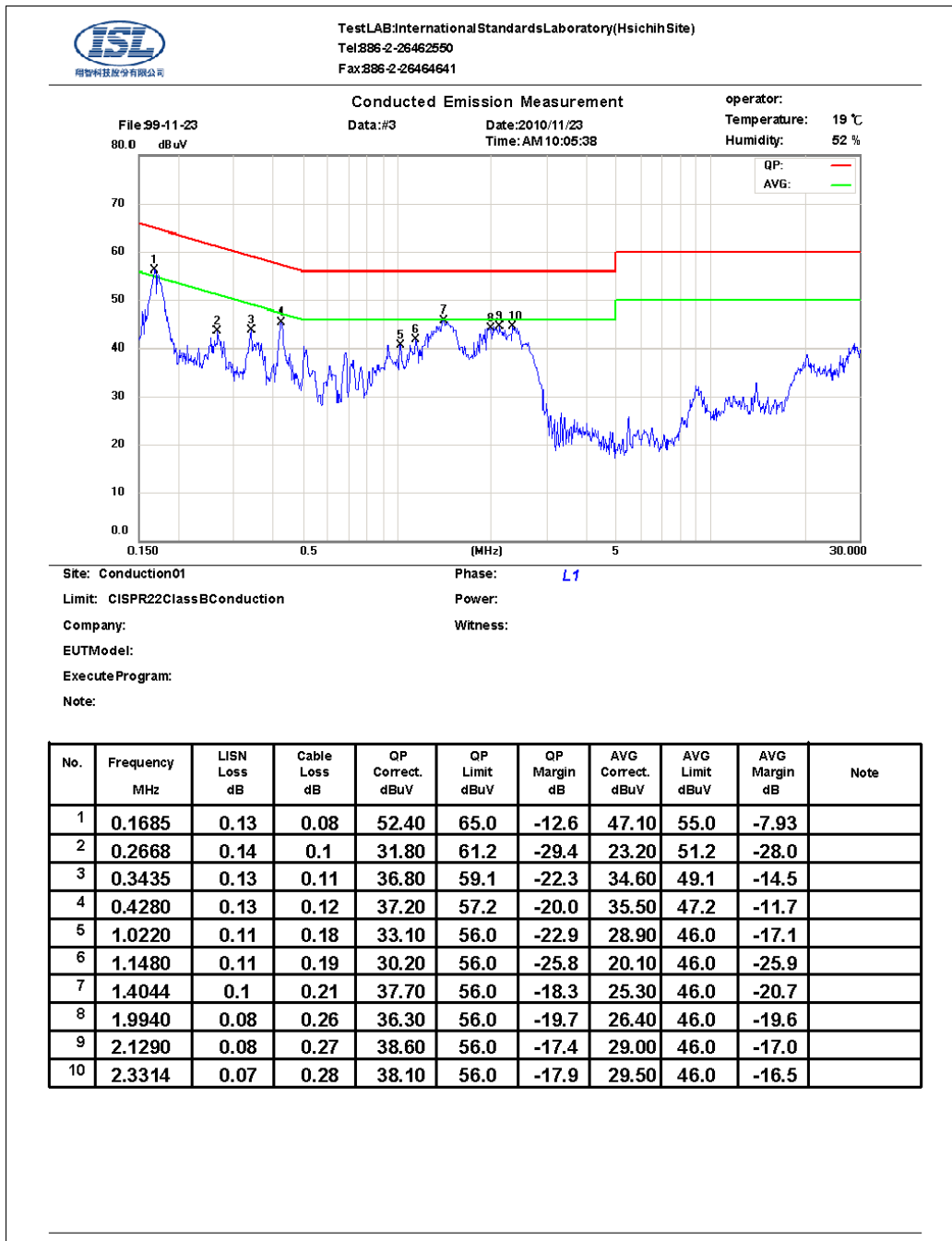
The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

#### 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

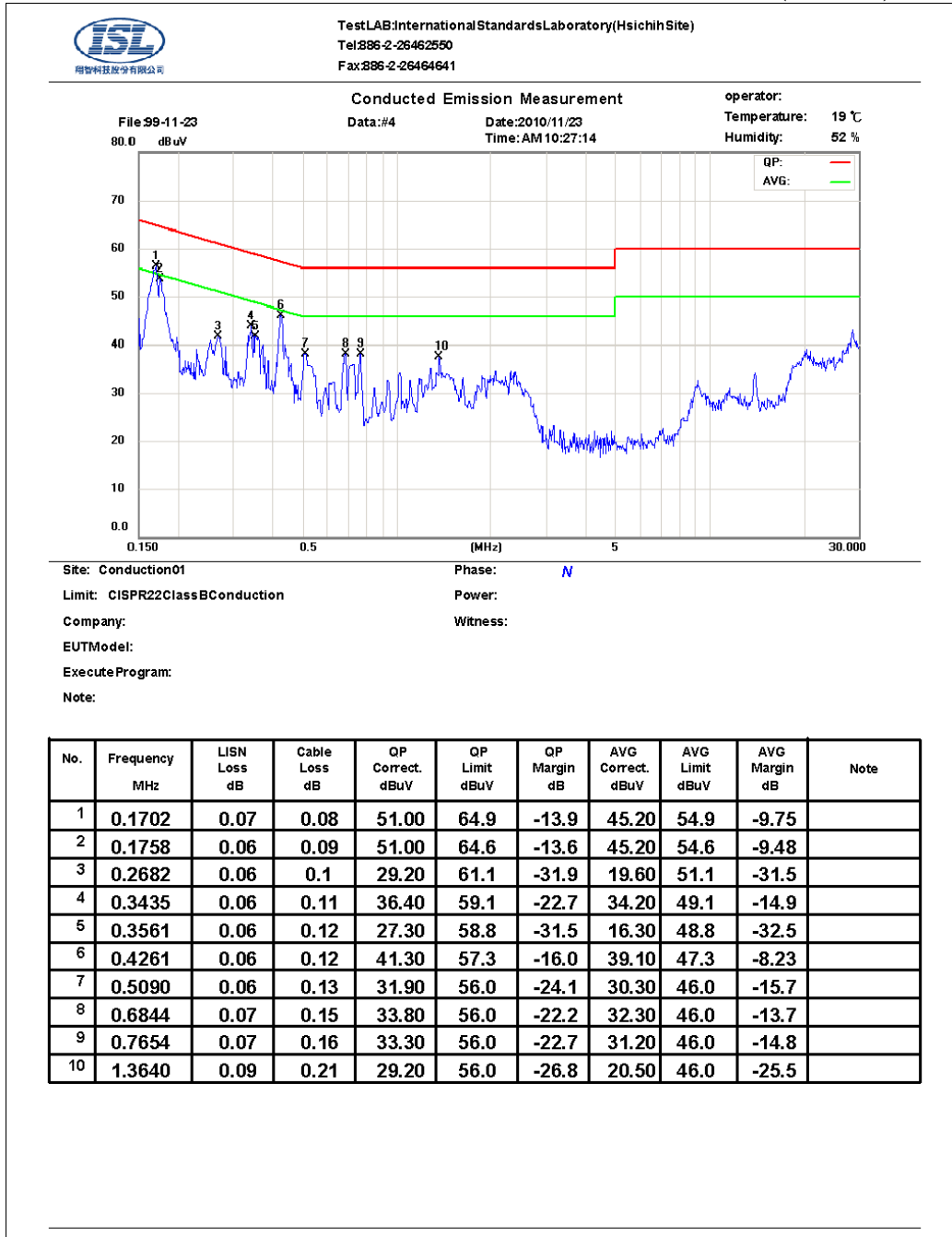
A margin of -8dB means that the emission is 8dB below the limit

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

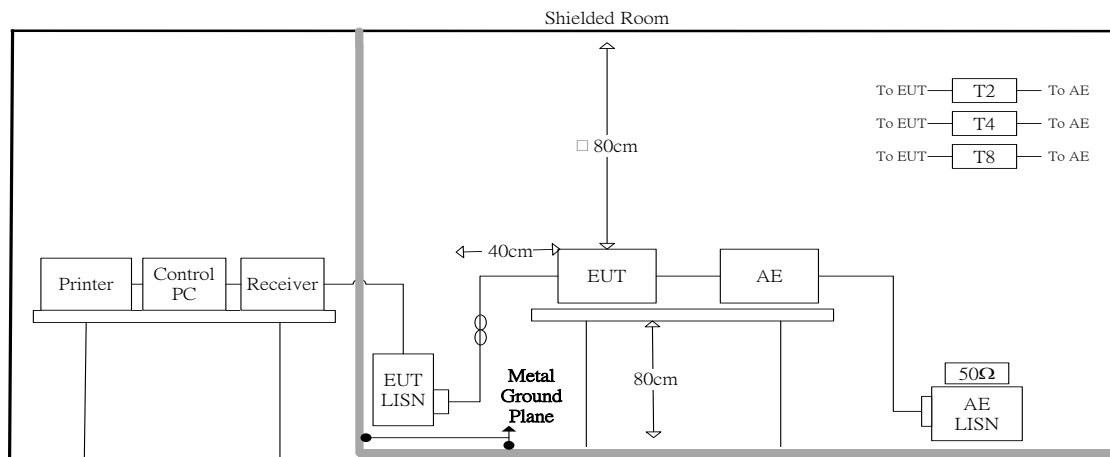
**The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.**

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

### 3. 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.

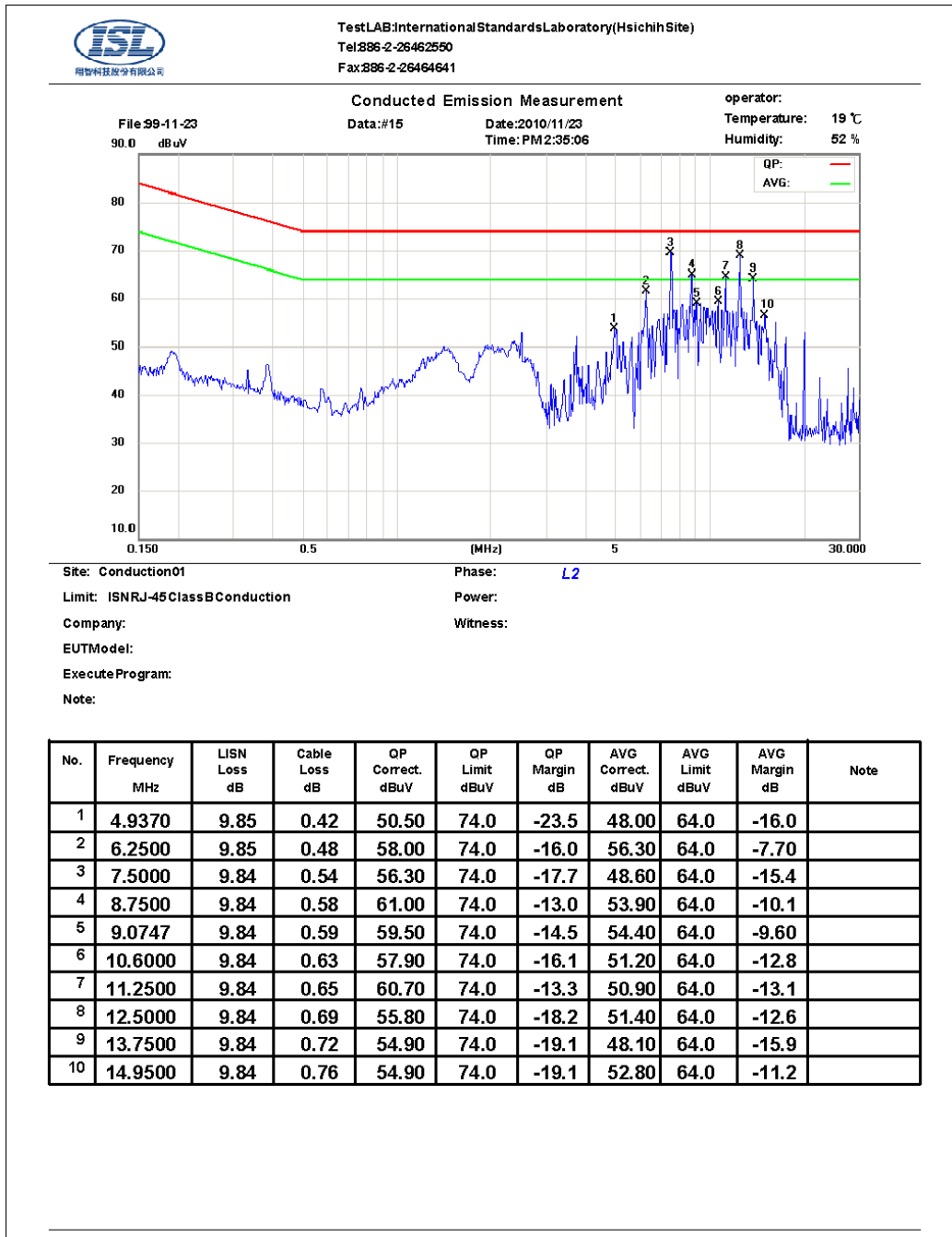
The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information could be useful in reducing their amplitude.

##### 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



**Note :**

Margin = Corrected Amplitude - Limit

Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

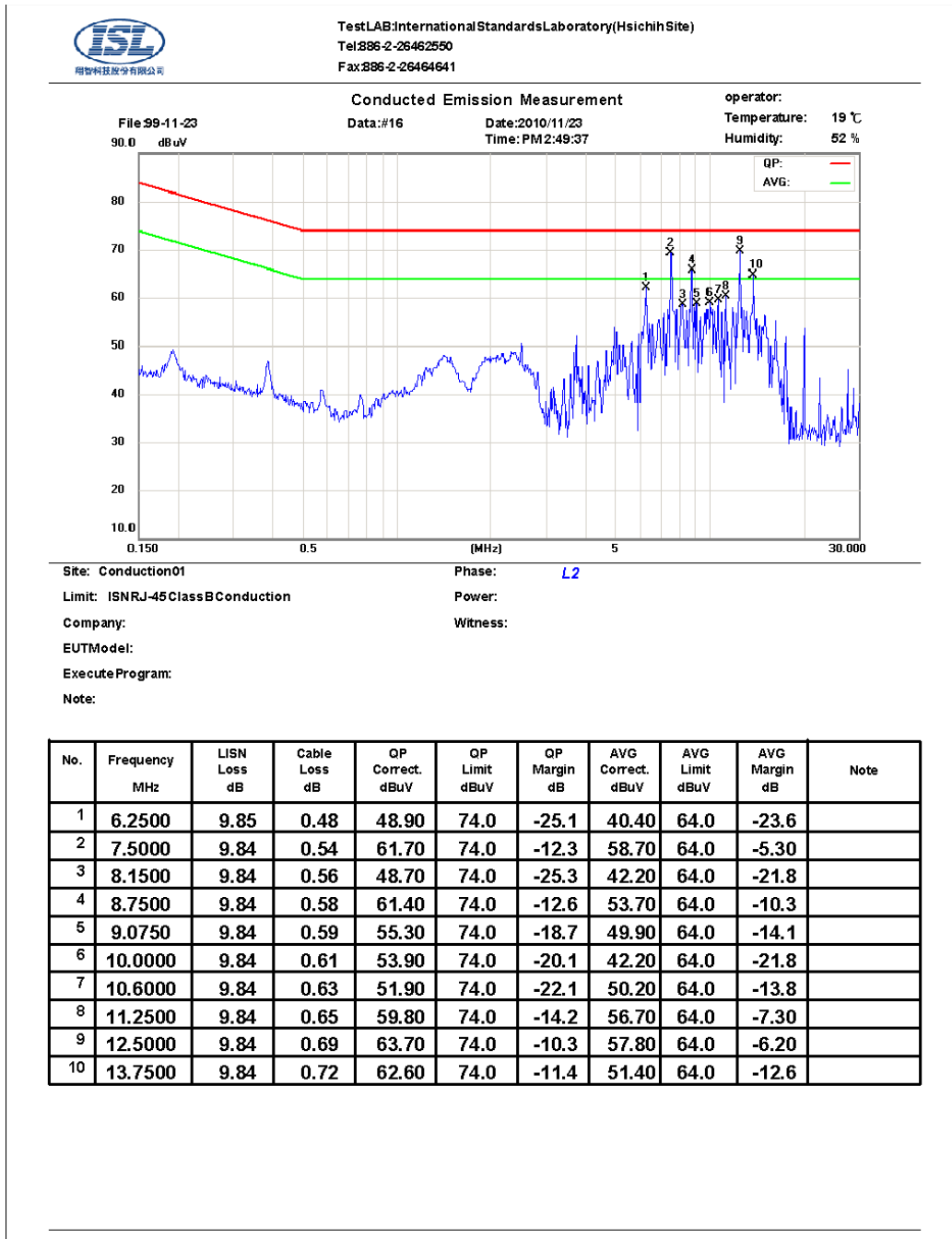
A margin of -8dB means that the emission is 8dB below the limit

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--10M: Configuration 2

Table 3.3.1 Telecommunication Port Conducted Emission



**Note :**

Margin = Corrected Amplitude - Limit

Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

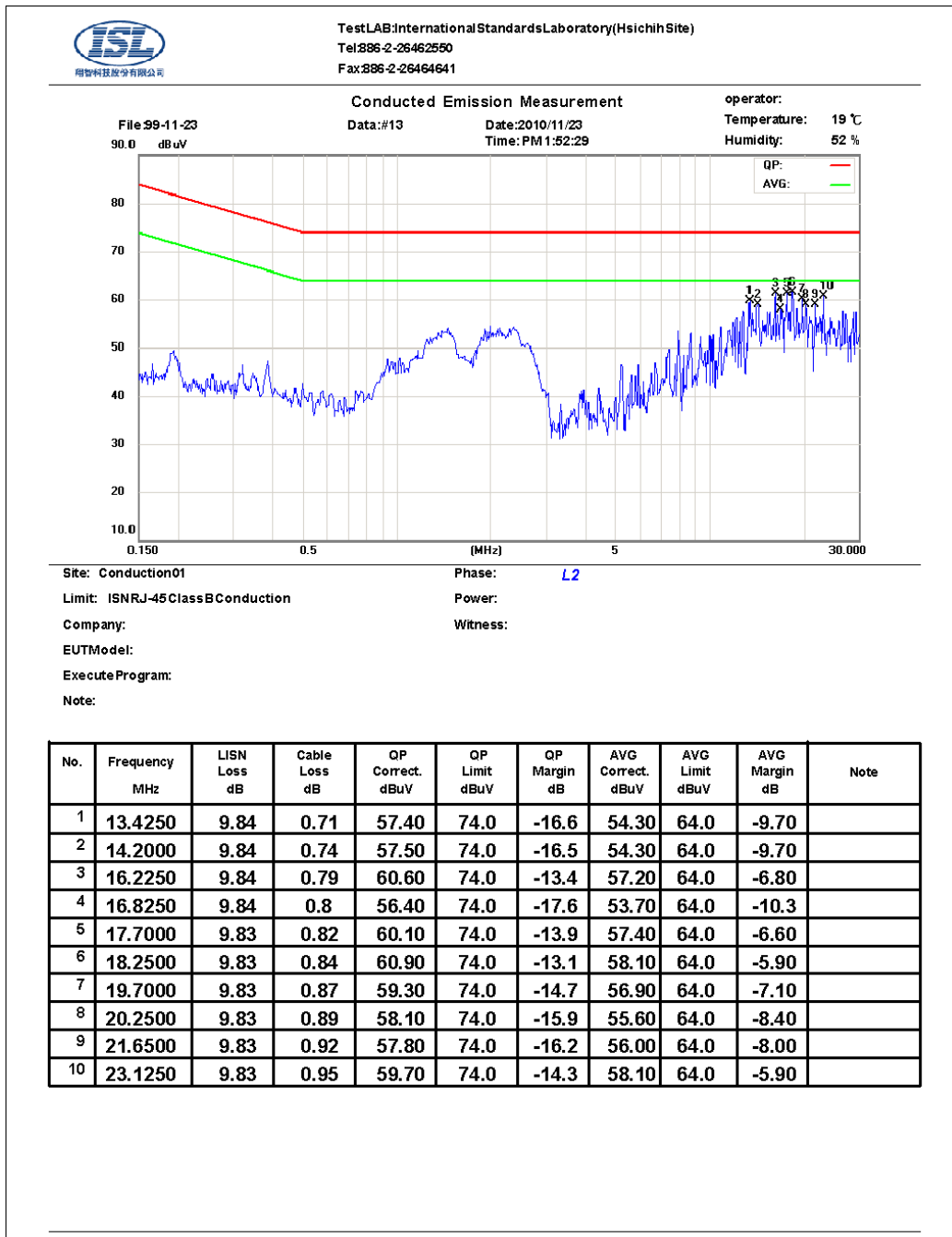
A margin of -8dB means that the emission is 8dB below the limit

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--100M : Configuration 1

Table 3.4.1 Telecommunication Port Conducted Emission



**Note :**

Margin = Corrected Amplitude - Limit

Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

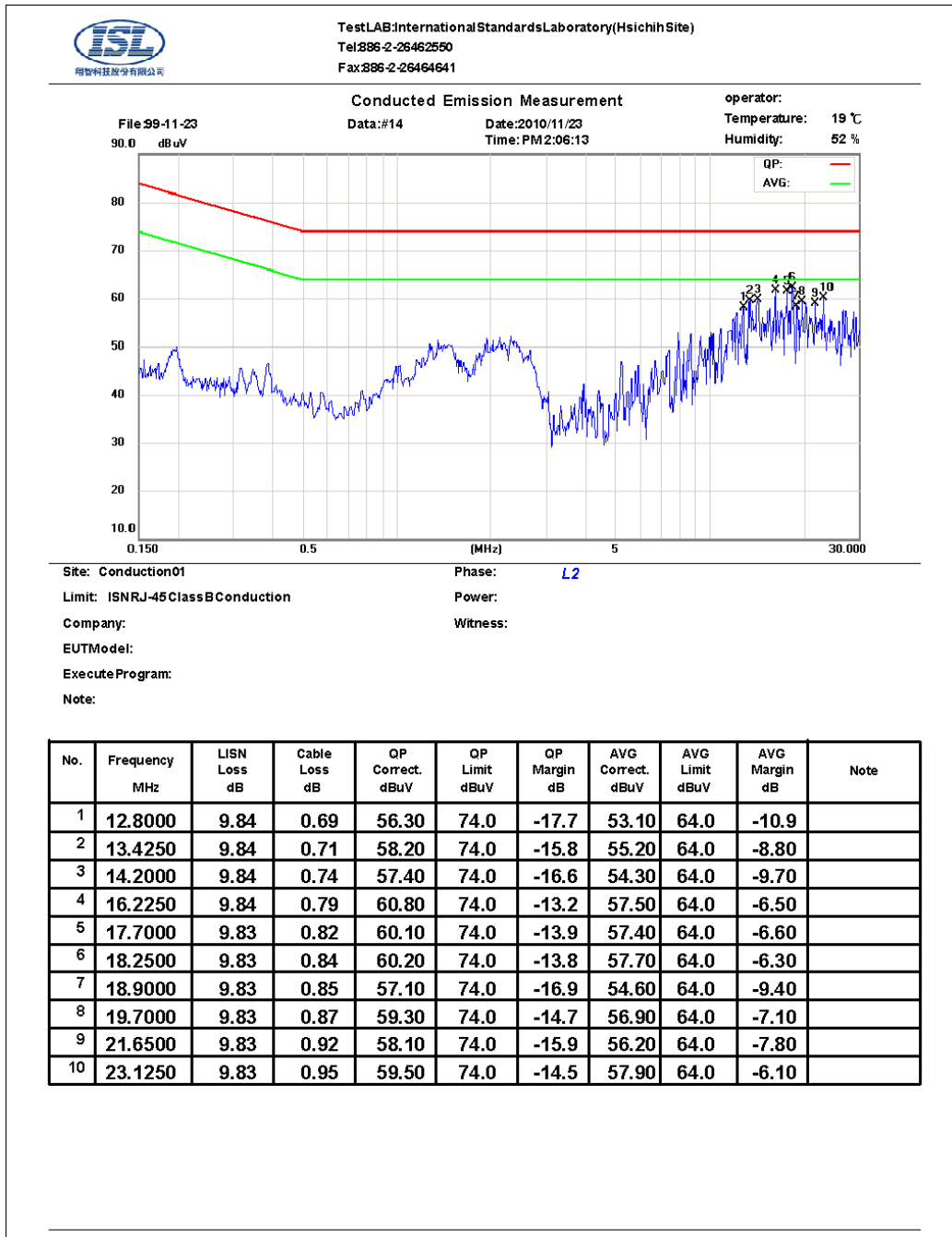
A margin of -8dB means that the emission is 8dB below the limit

**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--100M : Configuration 2

Table 3.5.1 Telecommunication Port Conducted Emission



**Note :**

Margin = Corrected Amplitude - Limit

Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

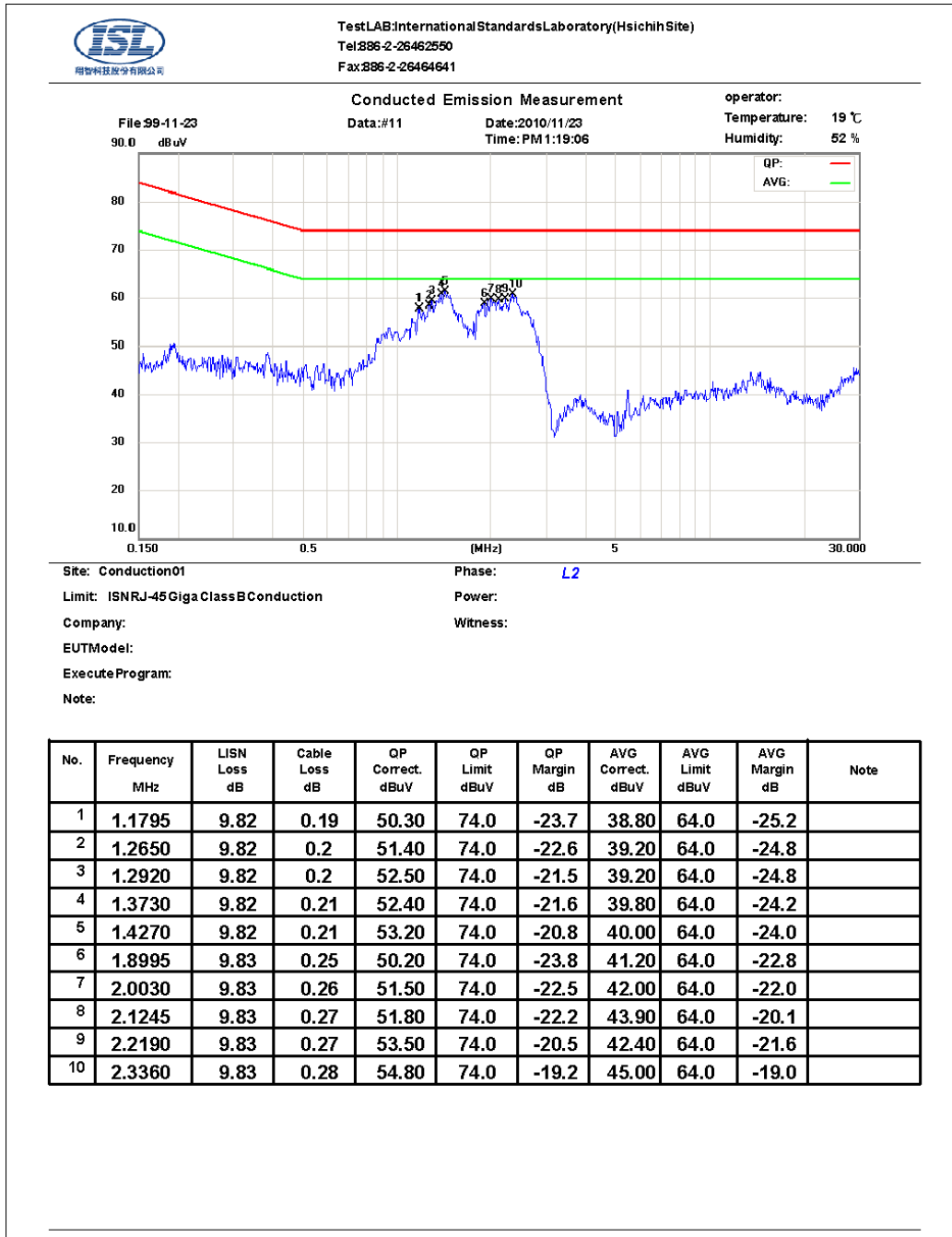
A margin of -8dB means that the emission is 8dB below the limit

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--GIGA (Voltage) : Configuration 1

Table 3.6.1 Telecommunication Port Conducted Emission



**Note :**

Margin = Corrected Amplitude - Limit

Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

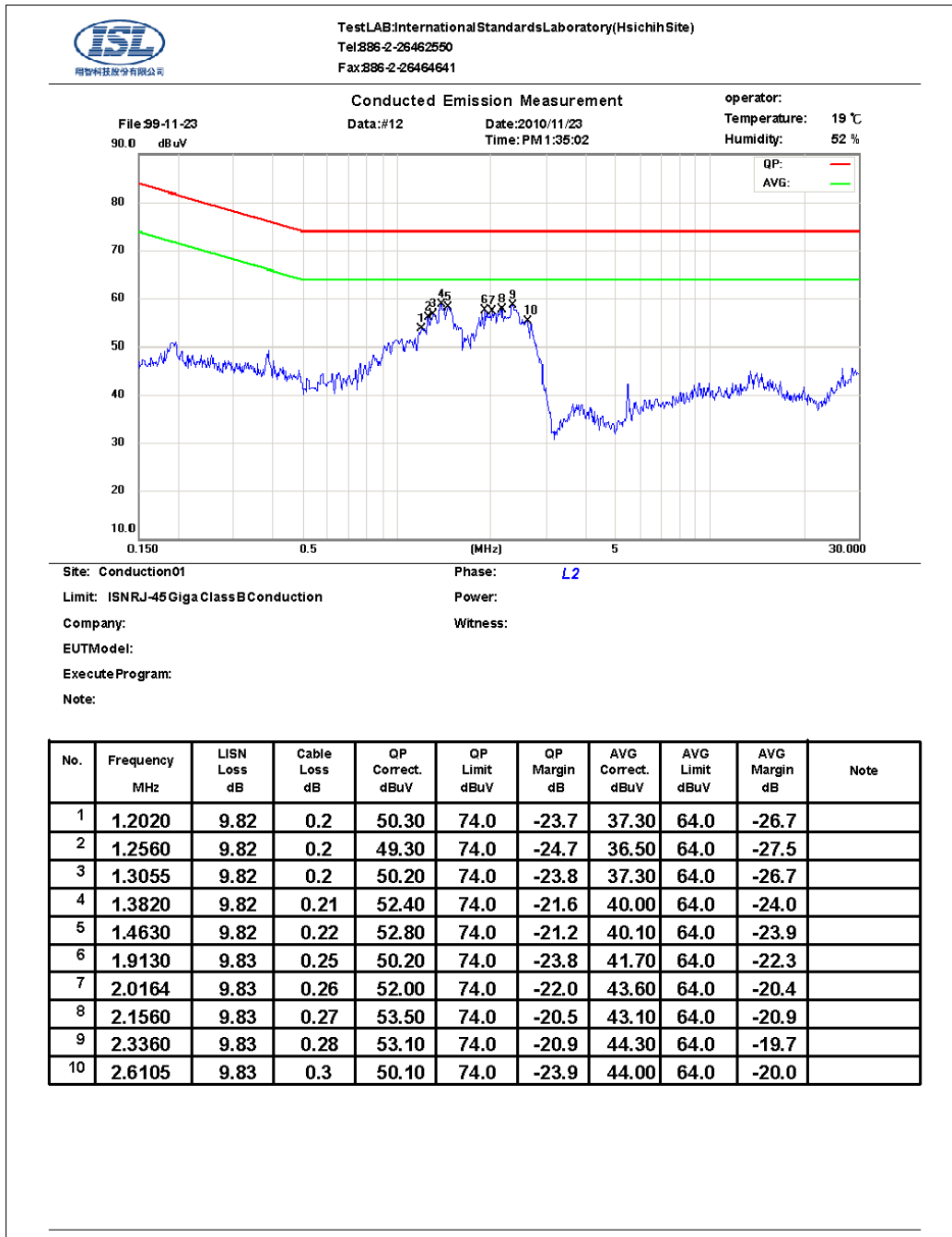
A margin of -8dB means that the emission is 8dB below the limit

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 (Voltage) : 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.

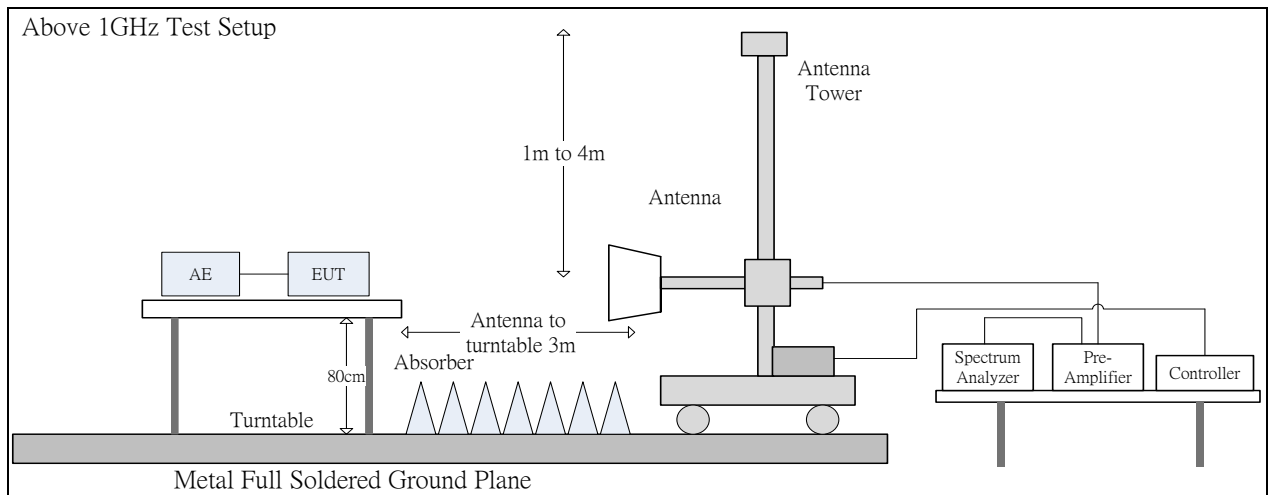
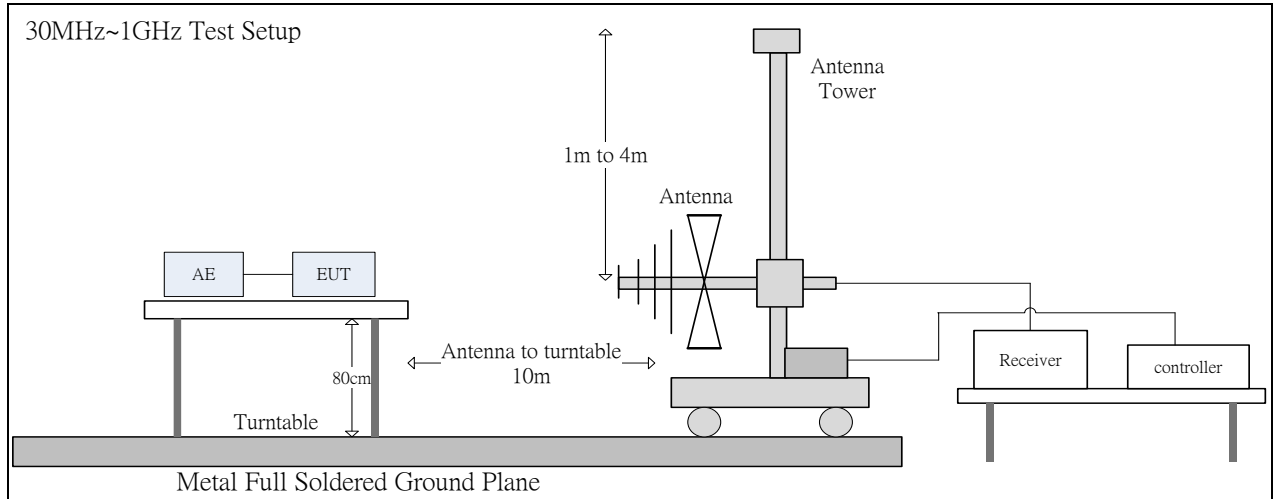
If peak data can pass, it will be shown in "QP/AVG Correct" column, if not, QP/AVG data will instead.



## 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.

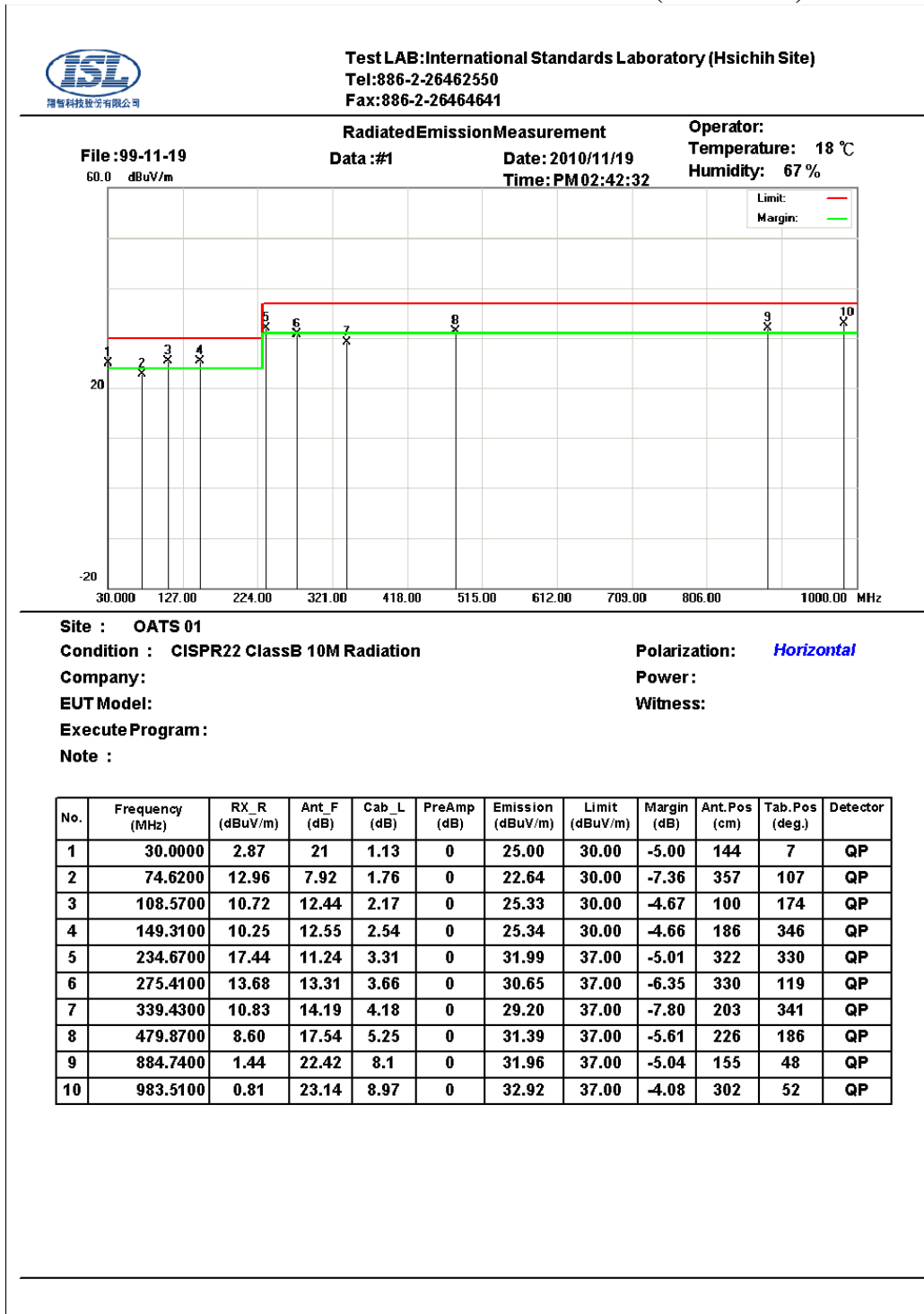
The highest internal source of an EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes. If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. If the highest frequency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

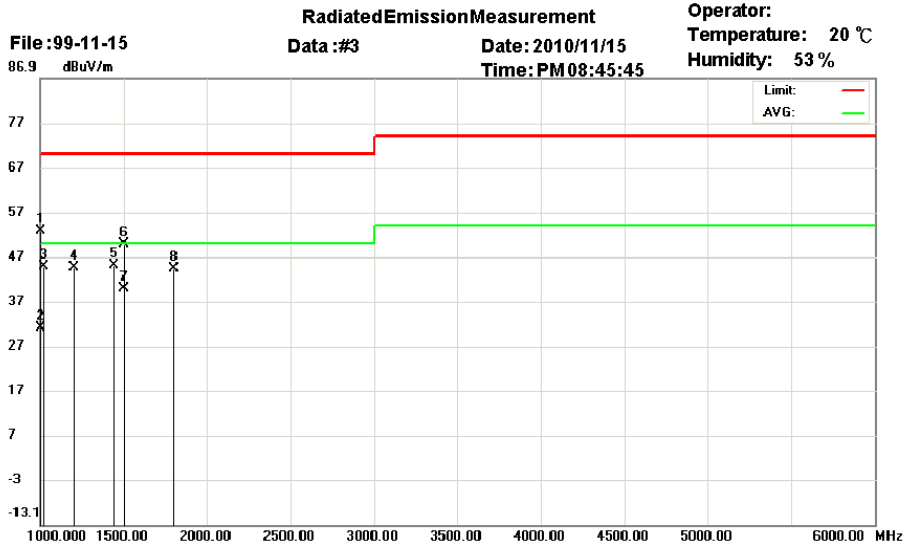
A margin of -8dB means that the emission is 8dB below the limit

BILOG Antenna Distance: 10 meter, Frequency: under 1000MHz

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



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

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	1000.020	69.00	28.6	1.5	46.3	52.80	70.00	-17.20	160	217	peak
2	1000.020	47.17	28.6	1.5	46.3	30.97	50.00	-19.03	160	217	AVG
3	1020.000	61.03	28.6	1.52	46.3	44.85	70.00	-25.15	100	296	peak
4	1200.000	60.68	28.6	1.66	46.3	44.64	70.00	-25.36	237	152	peak
5	1440.000	60.92	28.6	1.85	46.3	45.07	70.00	-24.93	302	271	peak
6	1500.000	65.67	28.6	1.9	46.3	49.87	70.00	-20.13	202	240	peak
7	1500.000	55.49	28.6	1.9	46.3	39.69	50.00	-10.31	202	240	AVG
8	1800.000	58.01	30.7	2.02	46.36	44.37	70.00	-25.63	363	133	peak

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

\* Note:

Margin = Corrected Amplitude – Limit

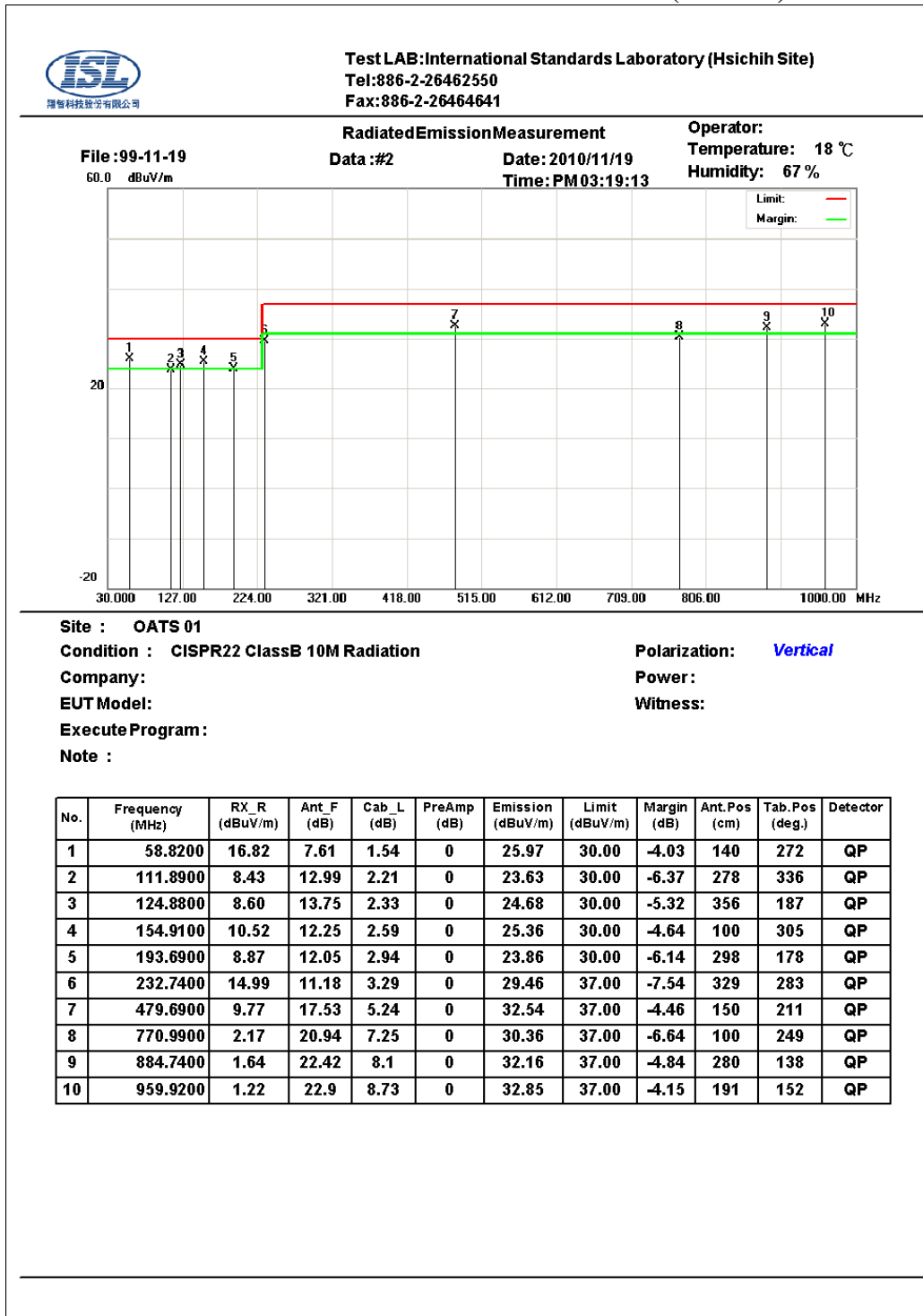
Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain

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

Horn Antenna      Distance: 3 meter,      Frequency: 1000MHz—18GHz

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

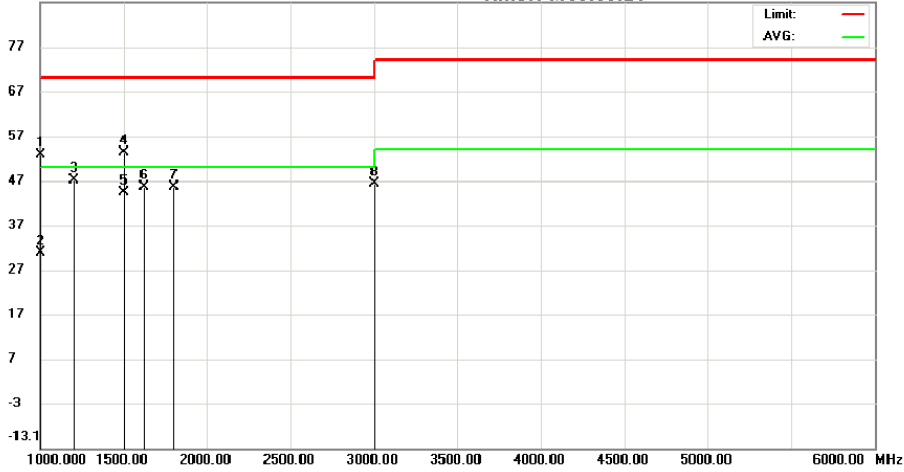
BILOG Antenna Distance: 10 meter, Frequency: under 1000MHz

**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: 99-11-15      Data: #4      Date: 2010/11/15      Operator:      Temperature: 20 °C  
 86.9 dBuV/m      Time: PM09:08:24      Humidity: 53 %



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

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	1000.100	68.92	28.6	1.5	46.3	52.72	70.00	-17.28	202	169	peak
2	1000.100	47.03	28.6	1.5	46.3	30.83	50.00	-19.17	202	169	AVG
3	1200.000	63.07	28.6	1.66	46.3	47.03	70.00	-22.97	315	126	peak
4	1500.070	68.98	28.6	1.9	46.3	53.18	70.00	-16.82	203	27	peak
5	1500.070	60.10	28.6	1.9	46.3	44.30	50.00	-5.70	203	27	AVG
6	1620.000	60.52	29.44	1.95	46.32	45.59	70.00	-24.41	333	51	peak
7	1800.000	59.08	30.7	2.02	46.36	45.44	70.00	-24.56	100	138	peak
8	3000.000	56.76	33.6	2.6	46.6	46.36	70.00	-23.64	204	4	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 meter,      Frequency: 1000MHz—18GHz

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 2.2)
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:	18 °C
Humidity:	54%

#### Selected Test Point

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

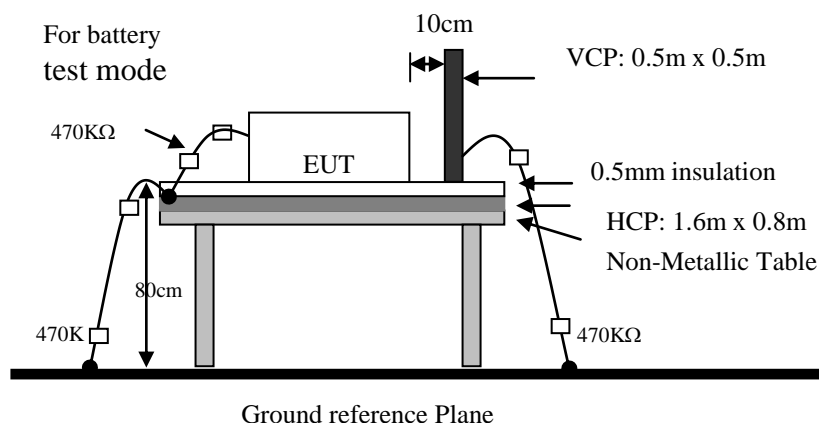
**Contact:** Total 200 discharges minimum were to the selected contact points.

**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 22 & EUT23 of Appendix: Photographs of EUT. Red arrow lines indicate the contact points, and blue arrow lines indicate the air points.

#### Test Setup

EUT is 1m from the wall and other metallic structure. When Battery test mode is needed, a cable with one 470KΩ 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.**

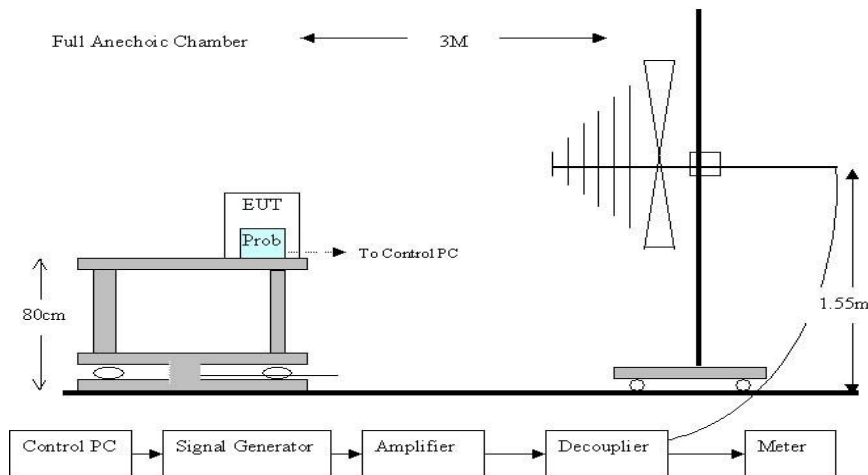
## 6. Radio-Frequency, Electromagnetic Field immunity

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

Port:	Enclosure
Basic Standard:	EN 61000-4-3/ IEC EN61000-4-3 (details referred to Sec 2.2)
Test Level::	3 V/m
Modulation:	AM 1KHz 80%
Frequency range:	80 MHz~1 GHz
Frequency Step:	1% of last step frequency
Dwell time:	3s
Polarization:	Vertical and Horizontal
EUT Azimuth Angle	<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:	20°C
Humidity:	63%

#### 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 2.2)
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:	20 °C
Humidity:	63%

#### Test Procedure

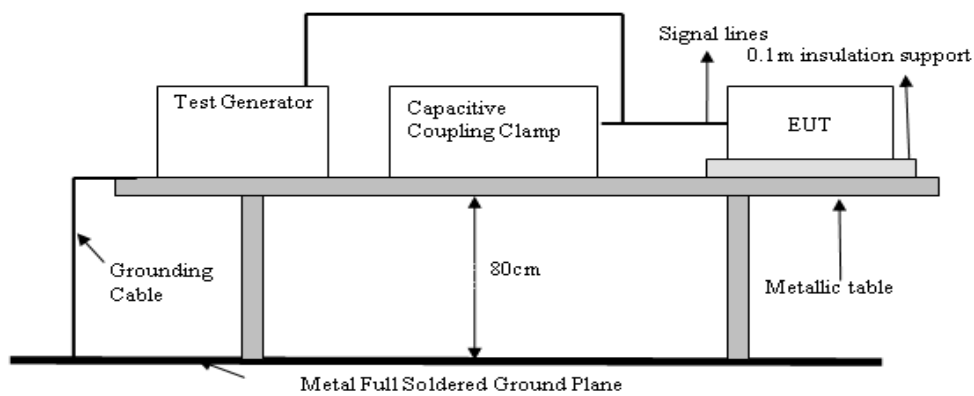
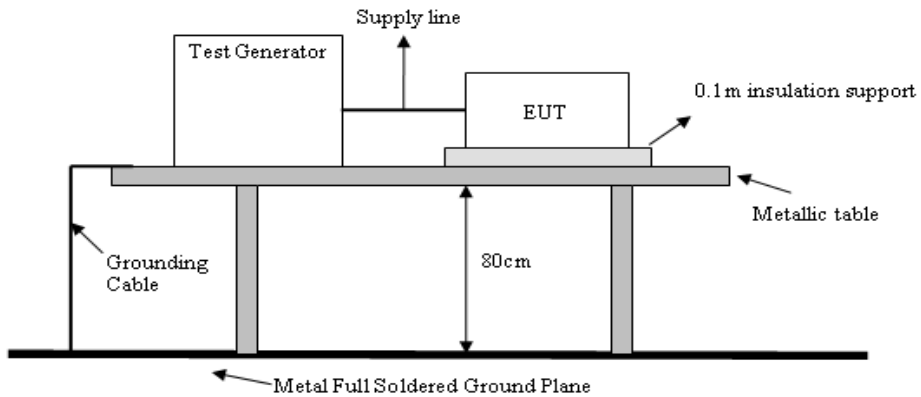
The EUT was setup on a nonconductive table 0.1 m above a reference ground plane.

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

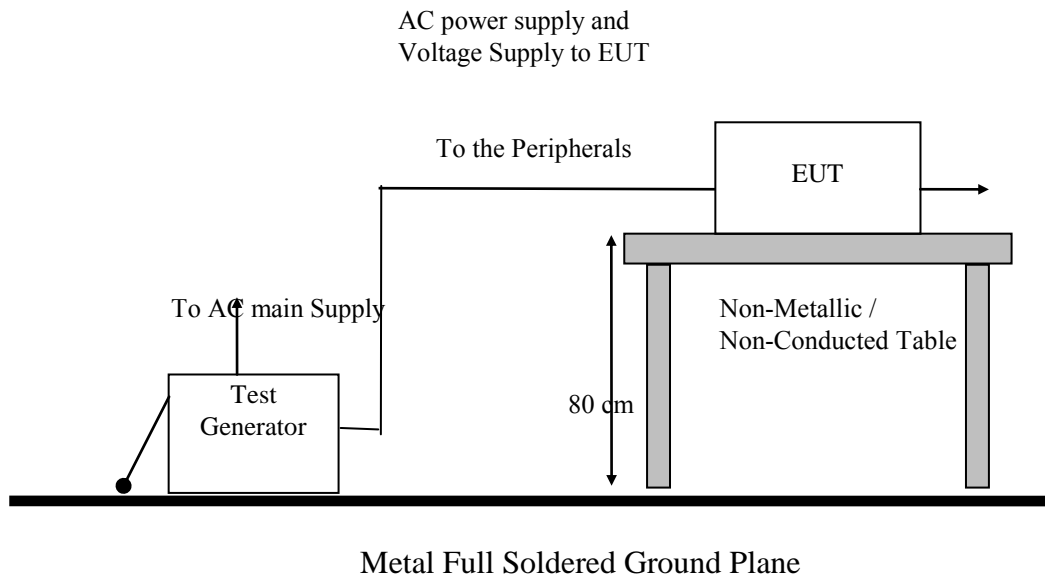
Performance of EUT complies with the given specification.

## 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 2.2)
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:	☒0° ☒90° ☒180° ☒270°
Criteria:	B
Test Procedure	refer to ISL QA -T4-E-S10
Temperature:	19°C
Humidity:	71%

#### Test Setup



#### Test Result

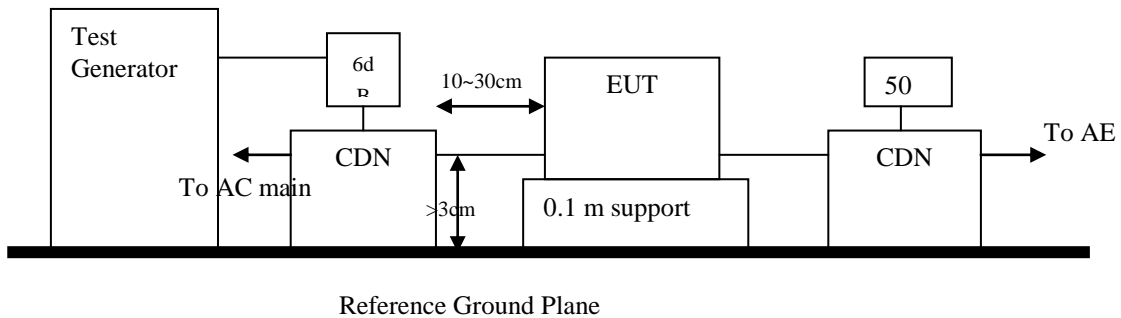
**Performance of EUT complies with the given specification.**

## 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 2.2)
Test Level::	3 V
Modulation:	AM 1KHz 80%
Frequency range:	0.15 MHz - 80MHz
Frequency Step:	1% of last Frequency
Dwell time:	3s
Criteria:	A
CDN Type:	CDN M2+M3, CDN T2, CDN T4, CDN T8, EM Clamp
Test Procedure	refer to ISL QA -T4-E-S11
Temperature:	18°C
Humidity:	54%

#### Test Setup



#### Test Result

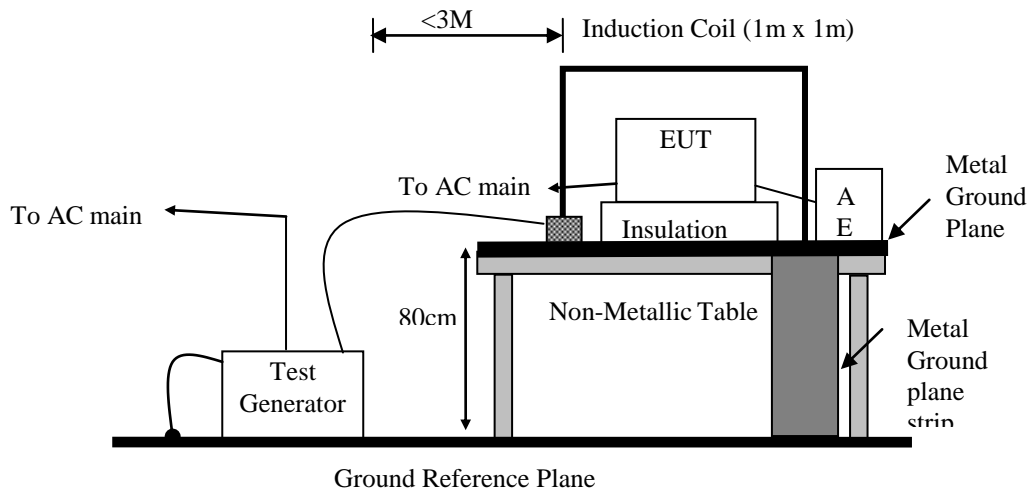
**Performance of EUT complies with the given specification.**

## 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 2.2)
Test Level:	1A/m
Polarization:	X, Y, Z
Criteria:	A
Test Procedure	refer to ISL QA -T4-E-S12
Temperature:	19°C
Humidity:	71%

#### Test Setup



#### Test Result

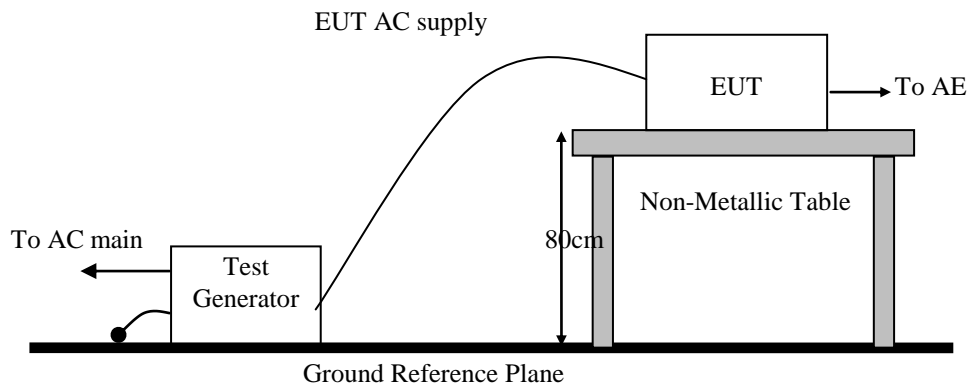
Performance of EUT complies with the given specification.

# 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 2.2)
Test Level: Criteria:	>95% in 0.5 period B
Test Level: Criteria:	30% in 25 period C
Test Level: Criteria:	>95% in 250 period C
Phase:	0°; 180°
Test intervals:	3 times with 10s each
Test Procedure	refer to ISL QA -T4-E-S13
Temperature:	19°C
Humidity:	71%

### 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 2.2)
Test Duration:	2.5min
Class:	D
Test Procedure	refer to ISL QA -T4-E-S14
Temperature:	20°C
Humidity:	63%

#### **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**

**Active input power under 75W, no limit apply, declare compliance**

## 13. Voltage Fluctuations

### 13.1 Voltage Fluctuations test

Port:	AC mains
Basic Standard:	EN61000-3-3/IEC61000-3-3 (details referred to Sec 2.2)
Test Procedure	refer to ISL QA -T4-E-S14
Observation period:	For Pst 10min For Plt 2 hours
Temperature:	20°C
Humidity:	63%

#### **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**

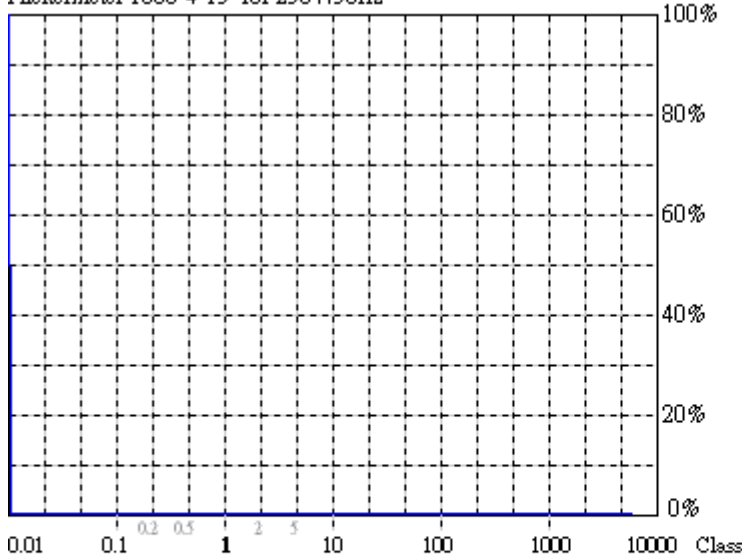
**Performance of EUT complies with the given specification.**



**Test Data**

10Min

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



**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): 0.01%**  
 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)**

2010/11/25 PM 08:53:

U<sub>rms</sub> = 229.7 V P = 42.16 W  
 I<sub>rms</sub> = 0.214 A pf = 0.856

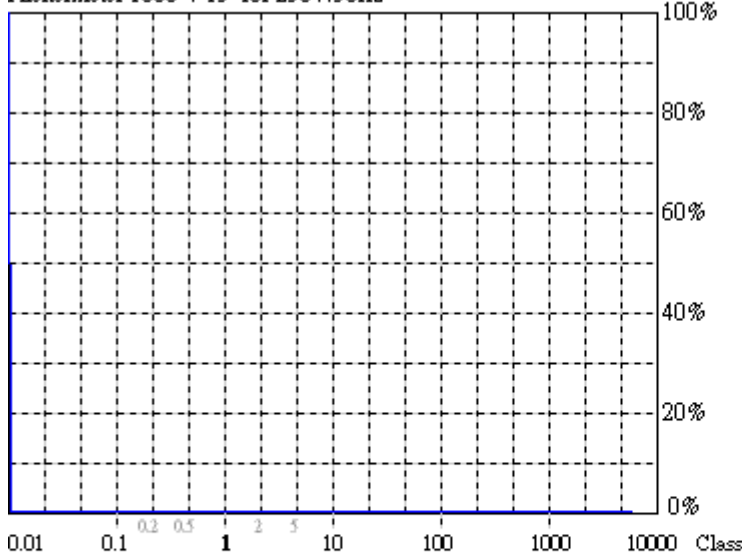
Range: 1 A  
 V-nom: 230 V  
 TestTime: 10 min (100%)

**Test completed, Result: PASSED**

HAR-1000 EMC-Retre

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): 0.00%**  
 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)**

2010/11/25 PM 07:36:

U<sub>rms</sub> = 229.9 V P = 24.35 W  
 I<sub>rms</sub> = 0.138 A pf = 0.769

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

**Test completed, Result: PASSED**

HAR-1000 EMC-Retre

## 14. Appendix

### 14.1 Appendix A: Test Equipment

#### 14.1.1 Test Equipment List

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
CON01						
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	12/10/2009	12/10/2010

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
OATS01						
Radiation	BILOG Antenna 10	Sumol Sciences	JB1	A013004-1	07/22/2010	07/22/2011
Radiation	Coaxial Cable 3F-10M	MIYAZAKI	8D-8F	10M-1	10/25/2010	10/25/2011
Radiation	Coaxial Cable 3F-3M	BELDEN	RG-8/U	3F-3M	10/25/2010	10/25/2011
Radiation	Spectrum Analyzer 12	Advantest	R3132	130200208	03/08/2010	03/08/2011
Radiation	EMI Receiver 13	ROHDE & SCHWARZ	ESCI	101015	01/14/2010	01/14/2011

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Chmb14						
Radiation Above 1G (Chamber14)	Spectrum Analyzer 21	Agilent	N9010A	MY49060537	07/13/2010	07/13/2011
Radiation Above 1G (Chamber14)	Horn Antenna 06	ETS	3117	00066665	09/28/2010	09/28/2011
Radiation Above 1G (Chamber14)	SUCOFLEX 1GHz~26.5GHz cable	HUBER+SU HNER AG.	Sucoflex 104	286305/4	09/30/2010	09/30/2011
Radiation Above 1G (Chamber14)	Preamplifier 13	MITEQ	JS44-0010180 0-25-10P-44	1329256	06/10/2010	06/10/2011
Rad.below 1GHz (Chamber14)	Spectrum Analyzer 20	Agilent Technologies	E4443A	MY48250315	05/11/2010	05/11/2011
Rad.below 1GHz (Chamber14)	RF.Pre-selector 01	Agilent Technologies	N9039A	MY46520296	05/11/2010	05/11/2011
Rad.below 1GHz (Chamber14)	BILOG.Antenna 14	Schaffner	CBL6112D	22612	03/19/2010	03/19/2011
Rad.below 1GHz (Chamber14)	Coaxial.Cable Chmb 14	PACIFIC	8D-FB	Chmb14-3M	2010/10/18	2011/10/18

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	HARMONIC S-1000	178	03/29/2010	03/29/2011
EN61K-4-,4,5,8,11	TRANSIENT 2000 01	EMC Partner	TRANSIENT -2000	950	12/01/2009	12/01/2010
EN61K-4-2	ESD GUN 04	Schaffner	NSG 438	489	03/19/2010	03/19/2011
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	03/18/2010	03/18/2011
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	12/01/2009	12/01/2010
EN61K-4-5	SURGE-TESTER 01	EMC Partner	MIG0603IN3	778	12/01/2009	12/01/2010
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-RJ45	08020	08/20/2010	08/20/2011
EN61K-4-6	CDN T8 01	FCC Inc.	FCC-801-T8-RJ45	08021	08/20/2010	08/20/2011
EN61K-4-6	EM-Clamp 01	FCC	F-203I-23M M	539	N/A	N/A
EN61K-4-6	Coaxial Cable 4-6 01-1	Harbour Industries	M17/128-RG 400	4-6 01-1	N/A	N/A
EN61K-4-6	Coaxial Cable 4-6 01-2	Harbour Industries	M17/128-RG 400	4-6 01-2	N/A	N/A
EN61K-4-6	Coaxial Cable 4-6 01-3	Harbour Industries	M17/128-RG 400	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

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
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 Conduction	EZ EMC	1.1.4.2	2/10/2007
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>  $\pm 2.946$ dB

<OATS 01 (10M)>

Horizontal

30MHz~200MHz:  $\pm 4.216$  dB

200MHz~1GHz:  $\pm 4.438$  dB

Vertical

30MHz~200MHz:  $\pm 4.342$  dB

200MHz~1GHz:  $\pm 4.426$  dB

<Chamber 14 (3M)>

1GHz~18GHz  $\pm 3.722$  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)	$\pm 1.776$ 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)	$\pm 1.892$ 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)

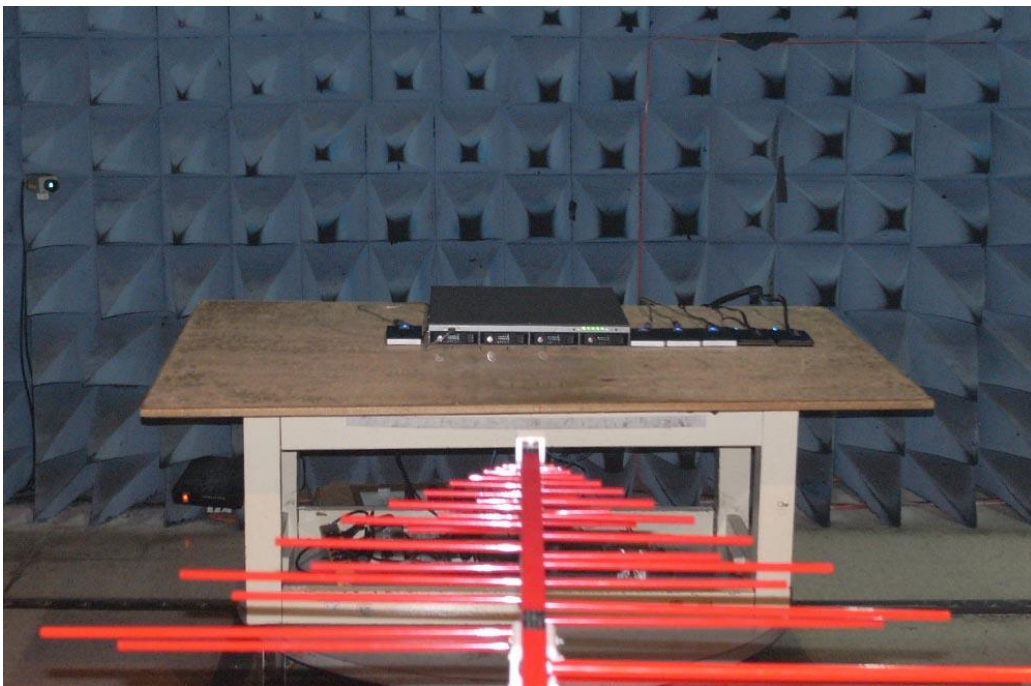




### 14.3.3 Photo of ESD Measurement



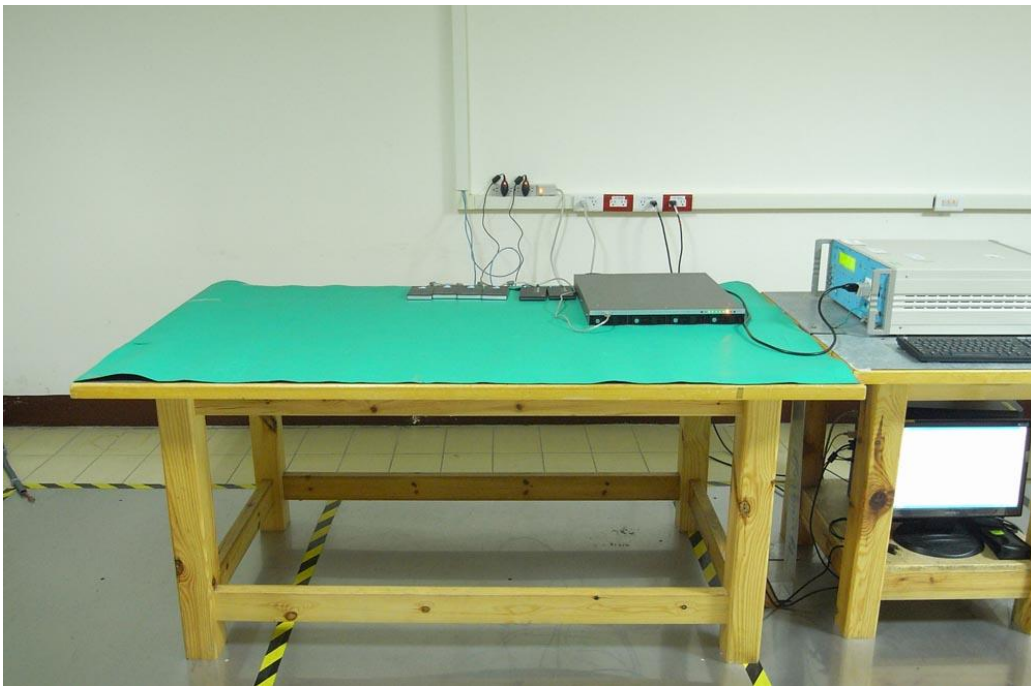
### 14.3.4 Photo of RF Field Strength Susceptibility Measurement



**14.3.5 Photo of Electrical Fast Transient/Burst Measurement**



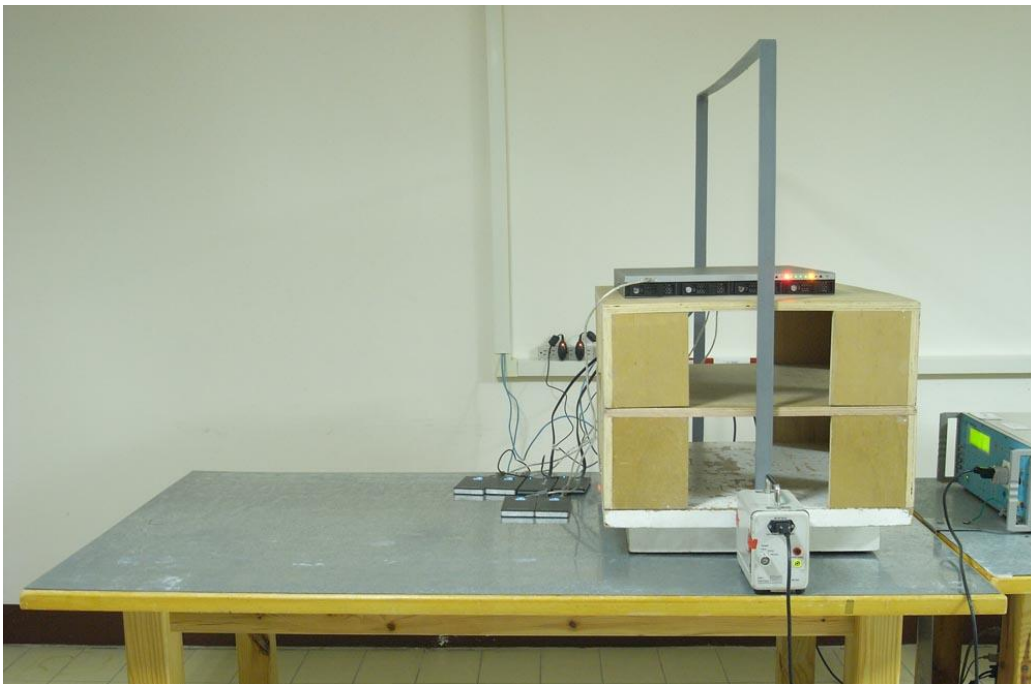
**14.3.6 Photo of Surge Measurement**



### 14.3.7 Photo of Conductive Measurement

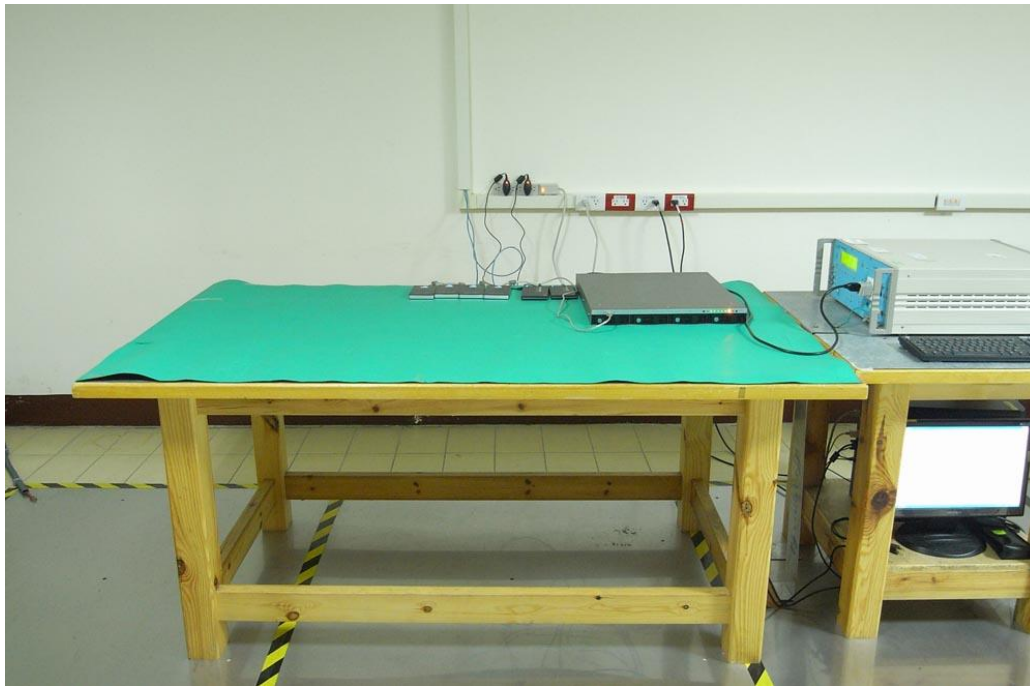


### 14.3.8 Photo of Magnetic field Measurement





### 14.3.9 Photo of Voltage Dips Measurement



### 14.3.10 Photo of Harmonics and Voltage Fluctuations



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

**Please refer to the File of ISL-10HE338P**