# Certificate

Issue Date: May 16, 2012
Ref. Report No. ISL-12HE131CE

| | | |
|---|---|---|
| Product Name | : | PCIe-PoE Card Series |
| Models | : | **PCIe-PoE4+; PCIe-PoE2+** |
| Responsible Party | : | **Neousys Technology Inc.** |
| Address | : | 15F., No.868-3, Zhongzheng Rd., Zhonghe Dist., New Taipei City 23586, Taiwan(R.O.C.) |

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

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

CE

**Standards:**

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

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

**International Standards Laboratory**

Jim Chu / Director

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

Nemko
ELA113A

# CE MARK TECHNICAL FILE

# AS/NZS EMC CONSTRUCTION FILE

of

Product Name

## PCIe-PoE Card Series

Models

## PCIe-PoE4+; PCIe-PoE2+

Contains:

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

# Declaration of Conformity

| | |
|---|---|
| Name of Responsible Party: | Neousys Technology Inc. |
| Address of Responsible Party: | 15F., No.868-3, Zhongzheng Rd., Zhonghe Dist., New Taipei City 23586, Taiwan(R.O.C.) |
| Declares that product: | PCIe-PoE Card Series |
| Models: | PCIe-PoE4+; PCIe-PoE2+ |
| Assembled by: | Same as above |
| Address: | Same as above |

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

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

| Standard | Description | Results | Criteria |
|---|---|---|---|
| EN 61000-4-2:2009<br>IEC 61000-4-2:2008 | Electrostatic Discharge | Pass | B |
| EN 61000-4-3:2006+A1:2008 +A2:2010<br>IEC 61000-4-3:2006+A1:2007+A2:2010 | Radio-Frequency, Electromagnetic Field | Pass | A |
| EN 61000-4-8:2010<br>IEC 61000-4-8:2009 | Power Frequency Magnetic Field | Pass | A |

*We, Neousys Technology 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.*

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Neousys Technology Inc.

**Date: May 16, 2012**

## Declaration of Conformity

| | |
|---|---|
| Name of Responsible Party: | Neousys Technology Inc. |
| Address of Responsible Party: | 15F., No.868-3, Zhongzheng Rd., Zhonghe Dist., New Taipei City 23586, Taiwan(R.O.C.) |
| Declares that product: | PCIe-PoE Card Series |
| Models: | PCIe-PoE4+; PCIe-PoE2+ |
| Assembled by: | Same as above |
| Address: | Same as above |

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

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

| Standard | Description | Results | Criteria |
|---|---|---|---|
| EN 61000-4-2:2009<br>IEC 61000-4-2:2008 | Electrostatic Discharge | Pass | B |
| EN 61000-4-3:2006+A1:2008 +A2:2010<br>IEC 61000-4-3:2006+A1:2007+A2:2010 | Radio-Frequency, Electromagnetic Field | Pass | A |
| EN 61000-4-8:2010<br>IEC 61000-4-8:2009 | Power Frequency Magnetic Field | Pass | A |

*We, Neousys Technology 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.*

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Neousys Technology Inc.

**Date: May 16, 2012**

# CE TEST REPORT

of

## EN55022 / CISPR 22 / AS/NZS CISPR 22
## Class A
## EN55024 / CISPR 24 / IMMUNITY

Product : **PCIe-PoE Card Series**

Models: **PCIe-PoE4+; PCIe-PoE2+**

Applicant: **Neousys Technology Inc.**

Address: **15F., No.868-3, Zhongzheng Rd., Zhonghe Dist., New Taipei City 23586, Taiwan(R.O.C.)**

Test Performed by:


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


Report No.: **ISL-12HE131CE**
Issue Date : **May 16, 2012**

This report totally contains 34 pages including this cover page and contents page.

## Contents of Report

# 1. General

## 1.1 Certification of Accuracy of Test Data

| | |
|---|---|
| **Standards:** | Please refer to 1.2 |
| **Equipment Tested:** | PCIe-PoE Card Series |
| **Models:** | PCIe-PoE4+; PCIe-PoE2+ |
| **Applicant:** | Neousys Technology Inc. |
| **Sample received Date:** | May 3, 2012 |
| **Final test Date:** | EMI: refer to the date of test data<br>EMS: May 15, 2012 |
| **Test Site:** | International Standards Laboratory<br>OATS 01; Chamber 01; Conduction 01; Immunity01 |
| **Test Distance:** | 10M; 3M (above1GHz) (EMI test) |
| **Temperature:** | refer to each site test data |
| **Humidity:** | refer to each site test data |
| **Input power:** | Conduction input power: AC 230 V / 50 Hz<br>Radiation input power: AC 230 V / 50 Hz<br>Immunity input power: AC 230 V / 50 Hz |
| **Test Result:** | **PASS** |
| **Report Engineer:** | Winnie Huang |
| **Test Engineer:** | Louis Yu |
| **Approved By:** | Eddy Hsiung |

## 1.2 Test Standards

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

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

| Standard | Description | Results | Criteria |
|---|---|---|---|
| EN 61000-4-2:2009<br>IEC 61000-4-2:2008 | Electrostatic Discharge | Pass | B |
| EN 61000-4-3:2006+A1:2008 +A2:2010<br>IEC 61000-4-3:2006+A1:2007+A2:2010 | Radio-Frequency, Electromagnetic Field | Pass | A |
| EN 61000-4-8:2010<br>IEC 61000-4-8:2009 | Power Frequency Magnetic Field | Pass | A |

### 1.3 Description of EUT

# EUT

| | |
|---|---|
| Product Name | PCIe-PoE Card Series |
| Condition | Pre-Production |
| Model Number(s) | PCIe-PoE4+; PCIe-PoE2+ |
| Serial Number | N/A |
| Power Supply | From Personal Computer Power Supply |
| LAN Port | four 8-pins (10/100/1000M bps) |
| Maximum Operating Frequency | 1GHz |

Radiated、Radiated Above1GHz、Conduction LISN test configurations are listed below.
We present the worst case test data (Configurations: 1) in the report.

| Configurations | Model |
|---|---|
| 1 | PCIe-PoE4+ |
| 2 | PCIe-PoE2+ |

ISN test configurations are listed below.

| Configurations | Speed | Contact |
|---|---|---|
| 1 | 1000M | POE |
| 2 | 100M | POE |
| 3 | 10M | PC |

EMS test configurations are listed below.

| Configurations | Model |
|---|---|
| 1 | PCIe-PoE4+ |

Model Difference

| Model | Port |
|---|---|
| PCIe-PoE4+ | 4 |
| PCIe-PoE2+ | 2 |

EMI Noise Source

| Crystal |
|---|
| 25MHz(X1), 25MHz(X2), 25MHz(X3), 25MHz(X4) |

EMI Solution
N/A

## 1.4 Description of Support Equipment

| Unit | Model<br>Serial No. | Brand | Power Cord | FCC ID |
|---|---|---|---|---|
| Personal Computer | LI945G5C<br>S/N: A70427-0369 | Lemel | N/A | FCC DOC |
| Keyboard | SK-8110, S/N:<br>MY-05N456-38843-2BK-3315 | DELL | N/A | FCC DOC |
| Mouse | MO71KC<br>S/N: N/A | DELL | N/A | FCC DOC |
| 17" LCD Monitor | VA703B | View Sonic | Non-shielded, Detachable | FCC DOC |
| Modem | DM1414<br>S/N: 0301000557 | Aceex | Non-shielded, Without Grounding Pin | IFAXDM1414 |
| Printer | LQ-300+II<br>S/N: G88Y109612 | EPSON | Non-shielded, Detachable | FCC DOC |
| Camera Gigabit Ethernet | acA2500-14gc<br>S/N:21134009 | BASLER | N/A | FCC DOC |
| Camera Gigabit Ethernet | acA1600-20gm<br>S/N:21137422 | BASLER | N/A | FCC DOC |
| Camera Gigabit Ethernet | acA640-100gc<br>S/N:21011292 | BASLER | N/A | FCC DOC |
| PoE Network Camera | FCS-1091<br>S/N:07122400144 | LevelOne | N/A | FCC DOC |

## 1.5 Software for Controlling Support Unit

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

A. Read and write to the disk drives.
B. Send H pattern to the parallel port device (Printer)
C. Send H pattern to the serial port device (Modem)
D. Send H pattern to the video port device (Monitor)
E. PC receive the Camera Gigabit Ethernet signal through the EUT with pylon Viewer.exe
F. PC receive the PoE Network Camera signal through the EUT with Internet Explorer.exe
G. Repeat the above steps.

| | Filename | Issued Date |
|---|---|---|
| Monitor | Intel EMCTEST.exe | 9/04/2000 |
| Modem | Intel EMCTEST.exe | 9/04/2000 |
| Printer | Wordpad.exe | 11/11/1999 |
| Camera Gigabit Ethernet | pylon Viewer.exe | 3/05/2012 |
| PoE Network Camera | Internet Explorer.exe | 4/30/2011 |

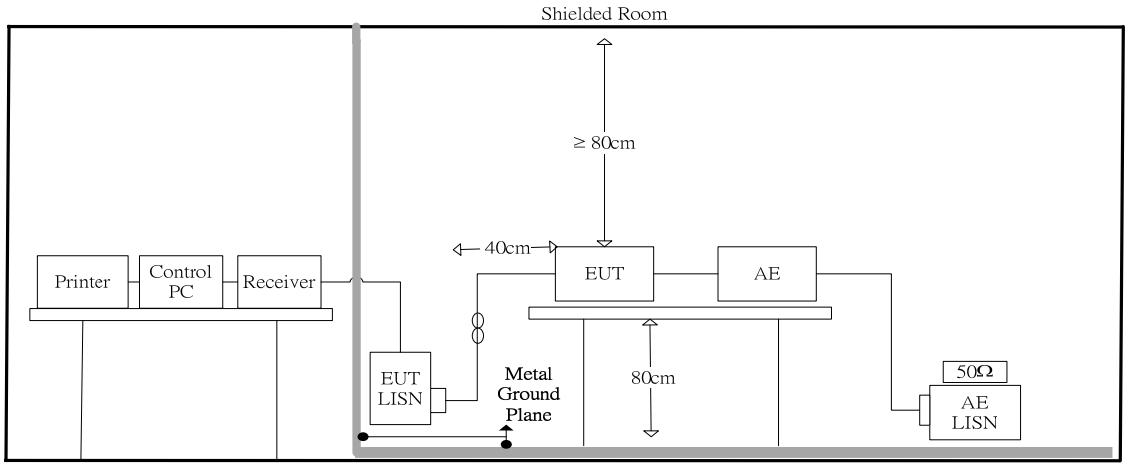
## 1.6 I/O Cable Condition of EUT and Support Units

| Description | Path | Cable Length | Cable Type | Connector Type |
|---|---|---|---|---|
| AC Power Cord | 110V (~240V) to PC SPS | 1.8M | Non-shielded, Detachable | Metal Head |
| Keyboard Data Cable | Keyboard to PC PS2 port | 1.8M | Shielded, Un-detachable | Metal Head |
| Mouse Data Cable | Mouse to PC PS2 port | 1.8M | Shielded, Un-detachable | Metal Head |
| LCD Monitor Data Cable | LCD Monitor D-Sub Port to PC D-Sub Port | 1.88M | Non-shielded, Detachable | Metal Head |
| Modem Data Cable | Modem to PC COM port | 1.5M | Shielded, Detachable | Metal Head |
| Printer Data Cable | Printer to PC Parallel port | 1.5M | Shielded, Detachable | Metal Head |
| LAN Data Cable*3 | EUT LAN port to Camera Gigabit Ethernet LAN Port | 10M | Non-shielded, Detachable | RJ-45, with Plastic Head |
| LAN Data Cable | EUT LAN Port to PoE Network Camera 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.

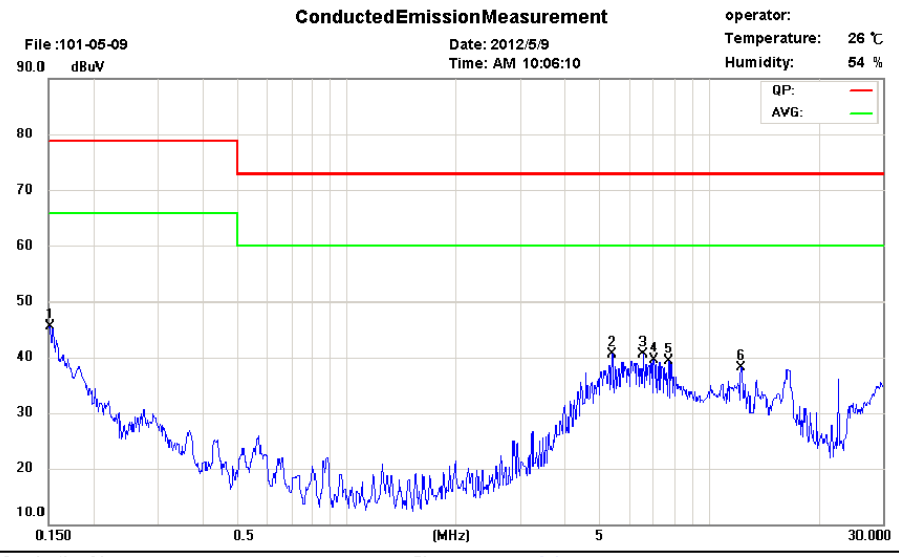
### 2.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

| | |
|---|---|
| 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)

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




Site: Conduction 01
Limit: CISPR22 Class A Conduction
Company:
EUT Model:
Execute Program:
Note:

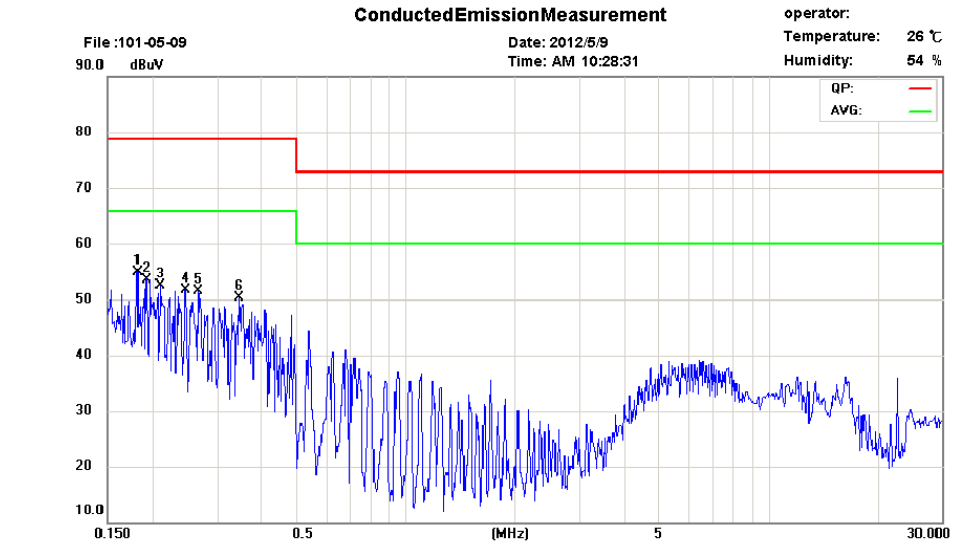
Phase: L1
Power:
Witness:

| No. | Frequency MHz | LISN Loss dB | Cable Loss dB | QP Correct dBuV | QP Limit dBuV | QP Margin dB | AVG Correct dBuV | AVG Limit dBuV | AVG Margin dB | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1510 | 0.29 | 0.01 | 45.34 | 79.0 | -33.6 | 45.34 | 66.0 | -20.6 | |
| 2 | 5.3750 | 0.53 | 0.17 | 40.45 | 73.0 | -32.5 | 40.45 | 60.0 | -19.5 | |
| 3 | 6.5250 | 0.58 | 0.19 | 40.42 | 73.0 | -32.5 | 40.42 | 60.0 | -19.5 | |
| 4 | 7.0000 | 0.6 | 0.19 | 39.55 | 73.0 | -33.4 | 39.55 | 60.0 | -20.4 | |
| 5 | 7.7000 | 0.64 | 0.2 | 39.36 | 73.0 | -33.6 | 39.36 | 60.0 | -20.6 | |
| 6 | 12.2000 | 0.85 | 0.23 | 38.08 | 73.0 | -34.9 | 38.08 | 60.0 | -21.9 | |

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

## Table 2.2.2 Power Line Conducted Emissions (Neutral)

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




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

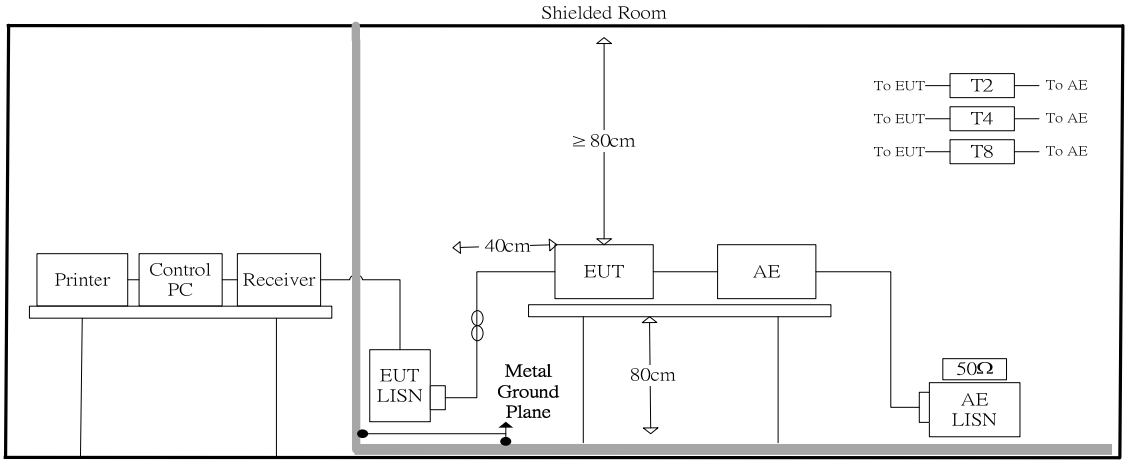
| No. | Frequency MHz | LISN Loss dB | Cable Loss dB | QP Correct dBuV | QP Limit dBuV | QP Margin dB | AVG Correct dBuV | AVG Limit dBuV | AVG Margin dB | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1804 | 0.13 | 0.01 | 54.86 | 79.0 | -24.1 | 54.86 | 66.0 | -11.1 | |
| 2 | 0.1916 | 0.13 | 0.01 | 53.60 | 79.0 | -25.4 | 53.60 | 66.0 | -12.4 | |
| 3 | 0.2091 | 0.13 | 0.01 | 52.52 | 79.0 | -26.4 | 52.52 | 66.0 | -13.4 | |
| 4 | 0.2455 | 0.13 | 0.02 | 48.35 | 79.0 | -30.6 | 48.35 | 66.0 | -17.6 | |
| 5 | 0.2651 | 0.13 | 0.02 | 51.44 | 79.0 | -27.5 | 51.44 | 66.0 | -14.5 | |
| 6 | 0.3460 | 0.14 | 0.02 | 50.29 | 79.0 | -28.7 | 50.29 | 66.0 | -15.7 | |

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

# 3. Telecommunication Port Conducted Emissions

## 3.1 Test Setup and Procedure

### 3.1.1 Test Setup




### 3.1.2 Test Procedure

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

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

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

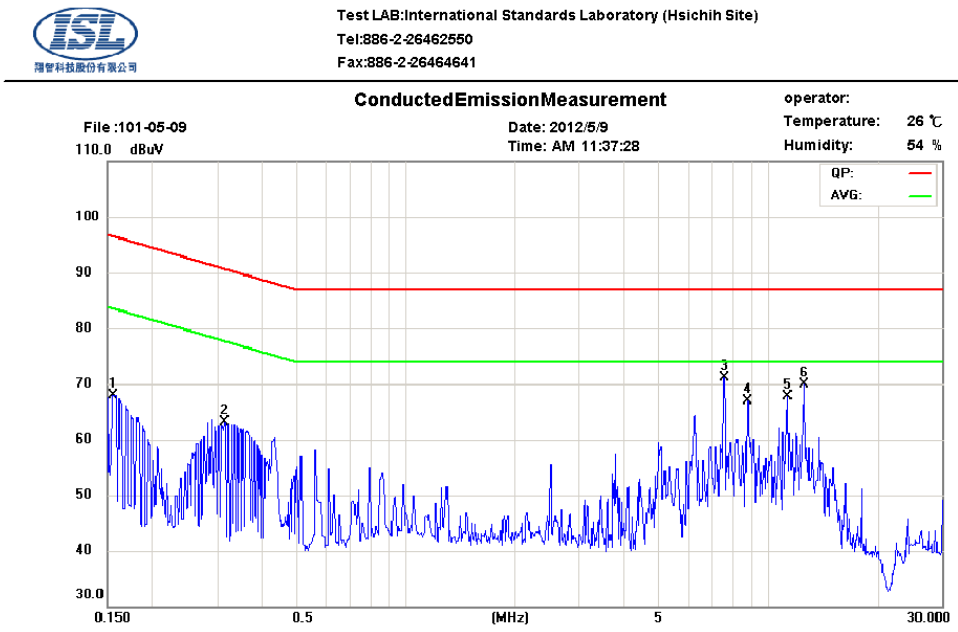
The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information could be useful in reducing their amplitude.

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

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

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

### Table 3.2.1 Telecommunication Port Conducted Emission




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

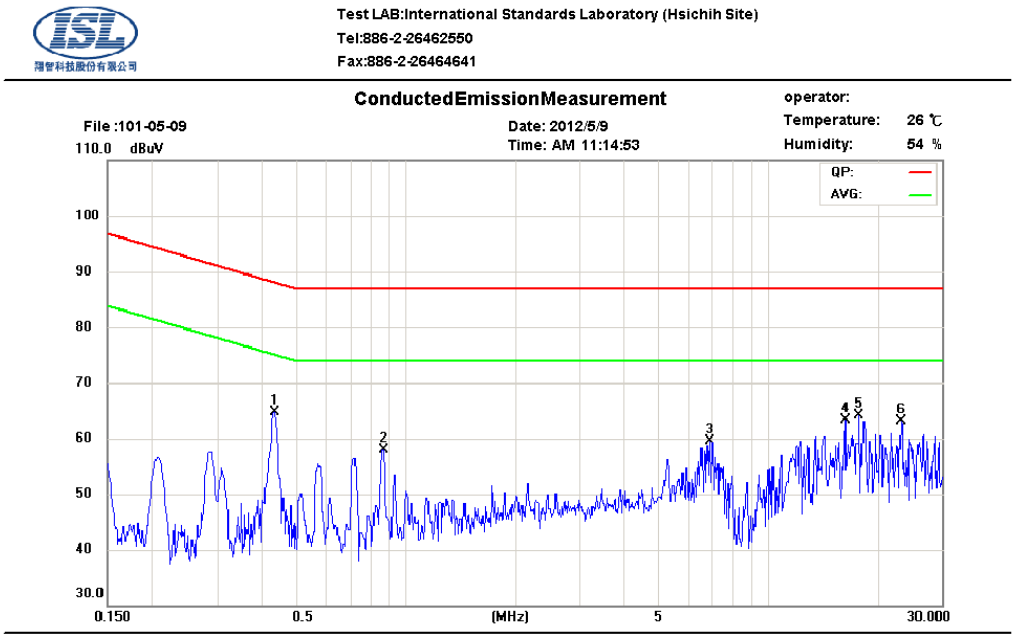
Phase: L2
Power:
Witness:

| No. | Frequency MHz | LISN Loss dB | Cable Loss dB | QP Correct dBuV | QP Limit dBuV | QP Margin dB | AVG Correct dBuV | AVG Limit dBuV | AVG Margin dB | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1550 | 10.04 | 0.01 | 49.76 | 96.7 | -46.9 | 37.61 | 83.7 | -46.1 | |
| 2 | 0.3150 | 10.01 | 0.02 | 43.12 | 90.8 | -47.7 | 34.56 | 77.8 | -43.2 | |
| 3 | 7.5000 | 9.98 | 0.2 | 63.65 | 87.0 | -23.3 | 50.79 | 74.0 | -23.2 | |
| 4 | 8.7500 | 9.98 | 0.21 | 59.53 | 87.0 | -27.4 | 46.75 | 74.0 | -27.2 | |
| 5 | 11.2500 | 9.98 | 0.23 | 59.91 | 87.0 | -27.0 | 46.76 | 74.0 | -27.2 | |
| 6 | 12.5000 | 9.98 | 0.23 | 62.74 | 87.0 | -24.2 | 49.91 | 74.0 | -24.0 | |

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

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

### Table 3.3.1 Telecommunication Port Conducted Emission




Site: Conduction 01 Phase: L2

Limit: ISN RJ-45 Class A Conduction Power:

Company: Witness:

EUT Model:

Execute Program:

Note:

| No. | Frequency MHz | LISN Loss dB | Cable Loss dB | QP Correct dBuV | QP Limit dBuV | QP Margin dB | AVG Correct dBuV | AVG Limit dBuV | AVG Margin dB | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.4318 | 10 | 0.03 | 64.74 | 88.2 | -23.4 | 64.74 | 75.2 | -10.4 | |
| 2 | 0.8645 | 9.98 | 0.06 | 57.90 | 87.0 | -29.1 | 57.90 | 74.0 | -16.1 | |
| 3 | 6.8750 | 9.97 | 0.19 | 59.58 | 87.0 | -27.4 | 59.58 | 74.0 | -14.4 | |
| 4 | 16.2250 | 9.98 | 0.25 | 63.37 | 87.0 | -23.6 | 63.37 | 74.0 | -10.6 | |
| 5 | 17.7000 | 9.98 | 0.26 | 64.00 | 87.0 | -23.0 | 64.00 | 74.0 | -10.0 | |
| 6 | 23.1250 | 9.99 | 0.3 | 63.09 | 87.0 | -23.9 | 63.09 | 74.0 | -10.9 | |

**Note :**

Margin = Corrected Amplitude - Limit

Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

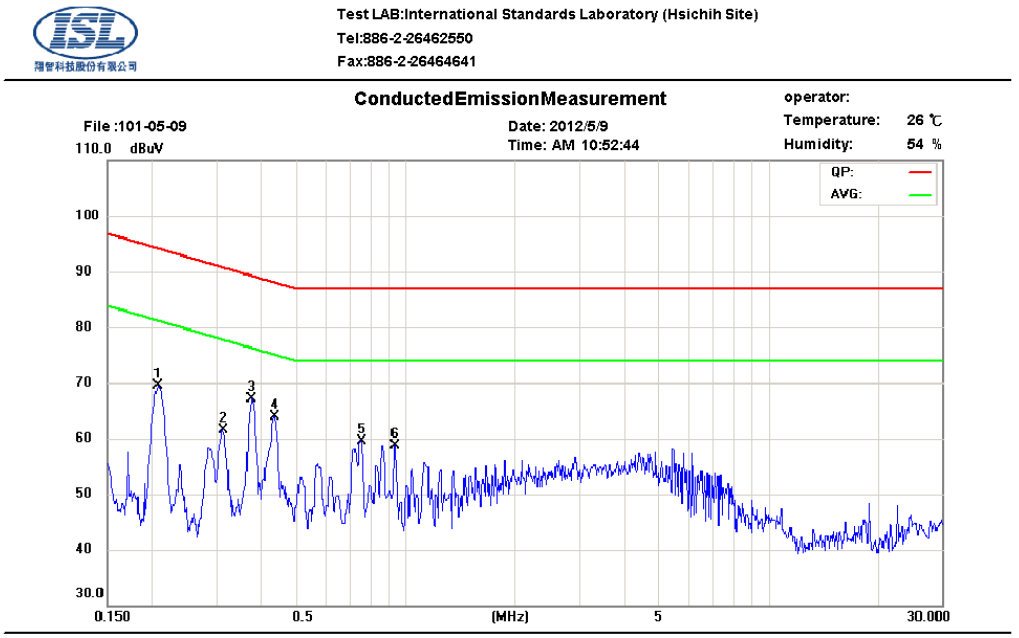
A margin of -8dB means that the emission is 8dB below the limit

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

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

## 3.4 Test Data: LAN--GIGA: Configuration 1

### Table 3.4.1 Telecommunication Port Conducted Emission




Site: Conduction 01 Phase: L2

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

Company: Witness:

EUT Model:

Execute Program:

Note:

| No. | Frequency MHz | LISN Loss dB | Cable Loss dB | QP Correct dBuV | QP Limit dBuV | QP Margin dB | AVG Correct dBuV | AVG Limit dBuV | AVG Margin dB | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.2067 | 10.1 | 0.01 | 69.43 | 94.3 | -24.9 | 69.43 | 81.3 | -11.9 | |
| 2 | 0.3103 | 10.08 | 0.02 | 61.45 | 90.9 | -29.5 | 61.45 | 77.9 | -16.5 | |
| 3 | 0.3754 | 10.07 | 0.03 | 67.09 | 89.3 | -22.2 | 67.09 | 76.3 | -9.29 | |
| 4 | 0.4314 | 10.06 | 0.03 | 63.98 | 88.2 | -24.2 | 63.98 | 75.2 | -11.2 | |
| 5 | 0.7475 | 10.03 | 0.05 | 59.57 | 87.0 | -27.4 | 59.57 | 74.0 | -14.4 | |
| 6 | 0.9275 | 10.02 | 0.07 | 58.70 | 87.0 | -28.3 | 58.70 | 74.0 | -15.3 | |

**Note :**

Margin = Corrected Amplitude - Limit

Corrected Amplitude = Receiver Reading + LISN Loss + Cable Loss

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

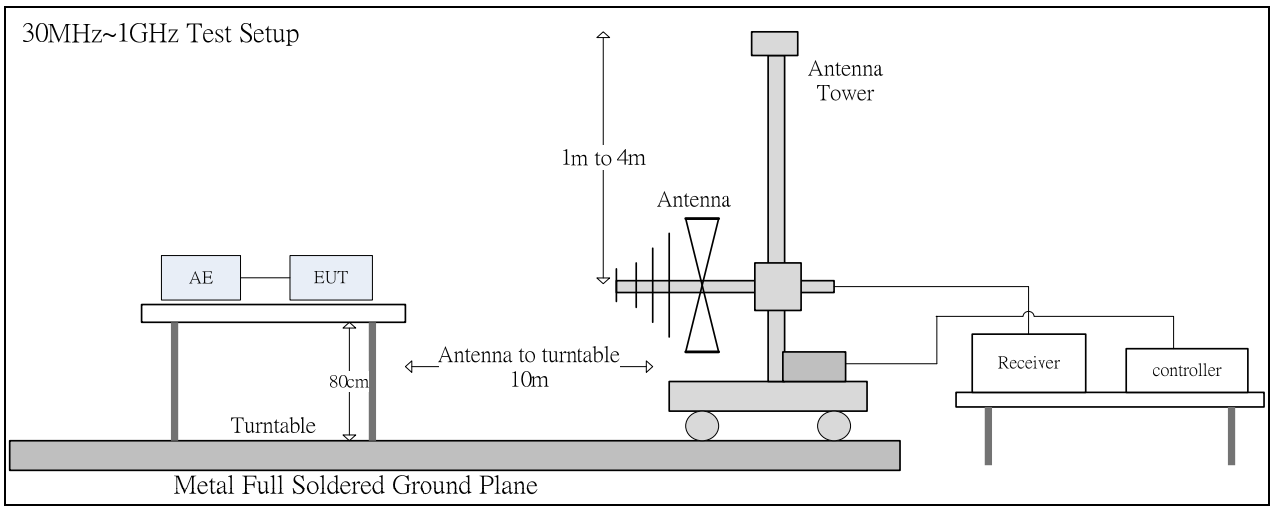
**The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.**

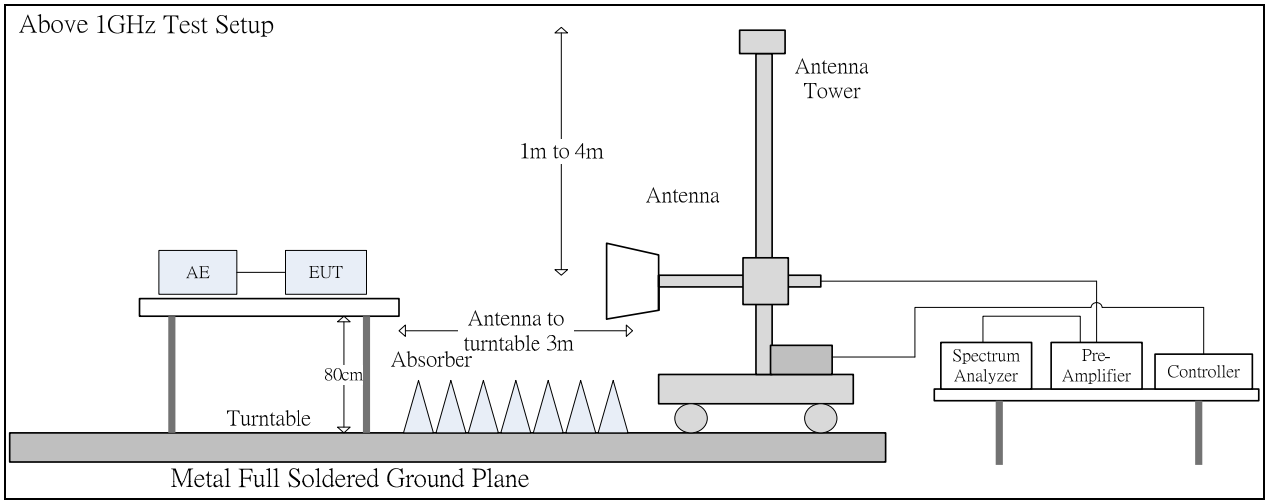
**If peak data can pass, it will be shown in "QP/AVG Correct" column, if not, QP/AVG data will instead.**

# 4. Radiated Disturbance Emissions

## 4.1 Test Setup and Procedure

### 4.1.1 Test Setup




### 4.1.2 Test Procedure

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

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

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

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

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

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

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

## 4.2 Radiation Test Data: Configuration 1

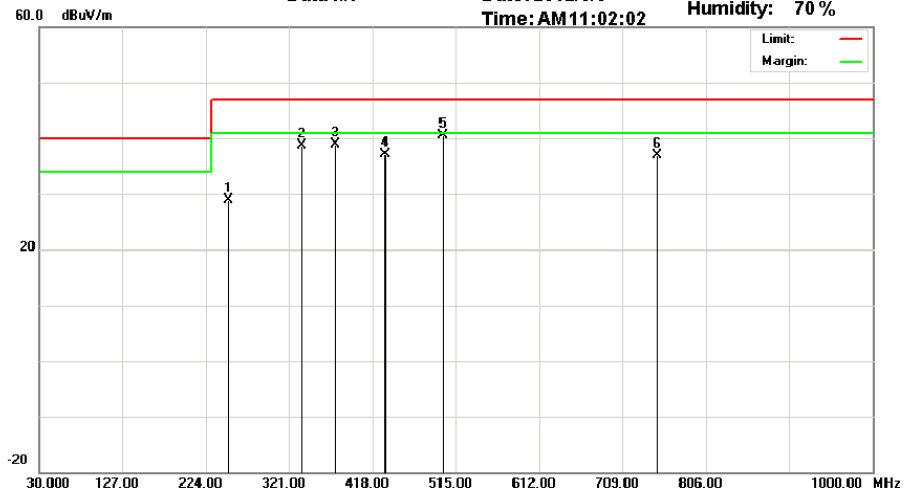
### Table 4.2.1 Radiated Emissions (Horizontal)

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

Radiated Emission Measurement

Operator:
Temperature: 27 ℃
Humidity: 70 %

File :101-05-08
Data :#7
Date: 2012/5/8
Time: AM11:02:02




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

Polarization: *Horizontal*
Power:
Witness:

| No. | Frequency (MHz) | RX_R (dBuV/m) | Ant_F (dB) | Cab_L (dB) | PreAmp (dB) | Emission (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant.Pos (cm) | Tab.Pos (deg.) | Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 249.6400 | 15.98 | 11.4 | 1.58 | 0 | 28.96 | 47.00 | -18.04 | 289 | 105 | QP |
| 2 | 335.4800 | 22.89 | 14.04 | 1.85 | 0 | 38.78 | 47.00 | -8.22 | 120 | 182 | QP |
| 3 | 374.2900 | 21.91 | 14.93 | 1.98 | 0 | 38.82 | 47.00 | -8.18 | 297 | 105 | QP |
| 4 | 431.6700 | 18.56 | 16.42 | 2.14 | 0 | 37.12 | 47.00 | -9.88 | 305 | 57 | QP |
| 5 | 499.8600 | 20.21 | 17.9 | 2.31 | 0 | 40.42 | 47.00 | -6.58 | 100 | 358 | QP |
| 6 | 749.2100 | 13.47 | 20.59 | 2.88 | 0 | 36.94 | 47.00 | -10.06 | 148 | 26 | QP |

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

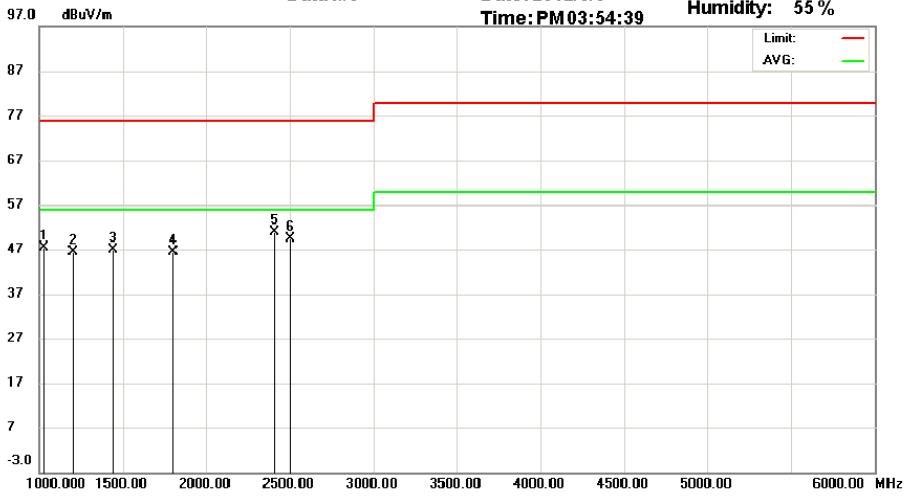
**Below 1GHz test, if the peak measured value meets the QP limit, it is unnecessary to perform the QP measurement. measurement.**

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

Radiated Emission Measurement

Operator:
Temperature: 25 ℃
Humidity: 55 %

File :101-05-08 Data :#5 Date: 2012/5/8 Time: PM 03:54:39




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

Polarization: *Horizontal*
Power:
Witness:

| Mk. | Frequency (MHz) | RX_R (dBuV/m) | Ant_F (dB) | Cab_L (dB) | PreAmp (dB) | Emission (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant.Pos (cm) | Tab.Pos (deg.) | Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1024.039 | 71.90 | 24.44 | 2.96 | 51.95 | 47.35 | 76.00 | -28.65 | 118 | 357 | peak |
| 2 | 1192.308 | 70.46 | 24.75 | 3.2 | 51.98 | 46.43 | 76.00 | -29.57 | 193 | 232 | peak |
| 3 | 1440.705 | 70.31 | 25.19 | 3.54 | 52.04 | 47.00 | 76.00 | -29.00 | 100 | 282 | peak |
| 4 | 1801.282 | 67.83 | 26.57 | 3.98 | 52.1 | 46.28 | 76.00 | -29.72 | 116 | 138 | peak |
| 5 | 2405.225 | 70.12 | 28.29 | 4.64 | 52.09 | 50.96 | 76.00 | -25.04 | 100 | 41 | peak |
| 6 | 2506.410 | 68.08 | 28.52 | 4.75 | 52.08 | 49.27 | 76.00 | -26.73 | 172 | 78 | peak |

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

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

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

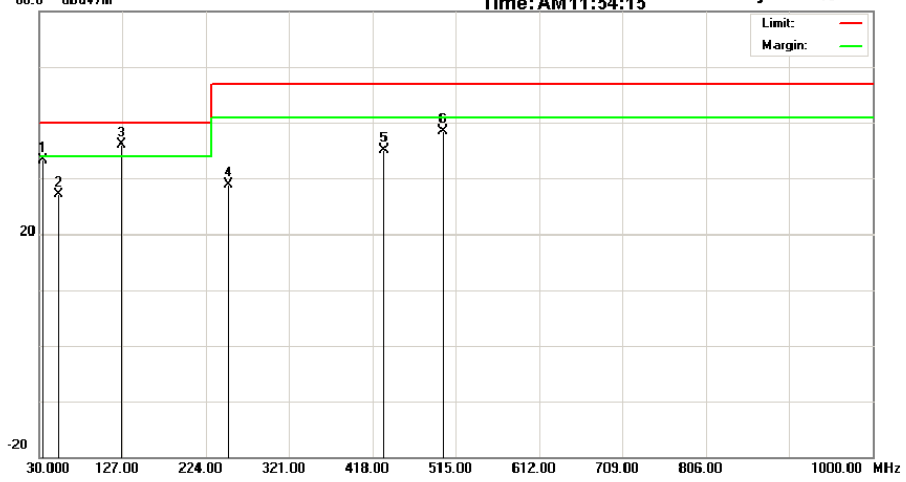
## Table 4.2.2 Radiated Emissions (Vertical)

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

Radiated Emission Measurement

Operator:
Temperature: 27 ℃
Humidity: 70 %

File :101-05-08
Data :#8
Date: 2012/5/8
Time: AM11:54:15




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

Polarization: Vertical
Power:
Witness:

| No. | Frequency (MHz) | RX_R (dBuV/m) | Ant_F (dB) | Cab_L (dB) | PreAmp (dB) | Emission (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant.Pos (cm) | Tab.Pos (deg.) | Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 33.5600 | 14.15 | 18.54 | 0.61 | 0 | 33.30 | 40.00 | -6.70 | 153 | 313 | QP |
| 2 | 51.4700 | 18.55 | 7.81 | 0.74 | 0 | 27.10 | 40.00 | -12.90 | 113 | 185 | QP |
| 3 | 125.8800 | 21.09 | 13.98 | 1.11 | 0 | 36.18 | 40.00 | -3.82 | 100 | 289 | QP |
| 4 | 249.6200 | 15.98 | 11.4 | 1.58 | 0 | 28.96 | 47.00 | -18.04 | 384 | 325 | QP |
| 5 | 431.4500 | 16.56 | 16.42 | 2.14 | 0 | 35.12 | 47.00 | -11.88 | 100 | 28 | QP |
| 6 | 499.7700 | 18.21 | 17.9 | 2.31 | 0 | 38.42 | 47.00 | -8.58 | 260 | 97 | QP |

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

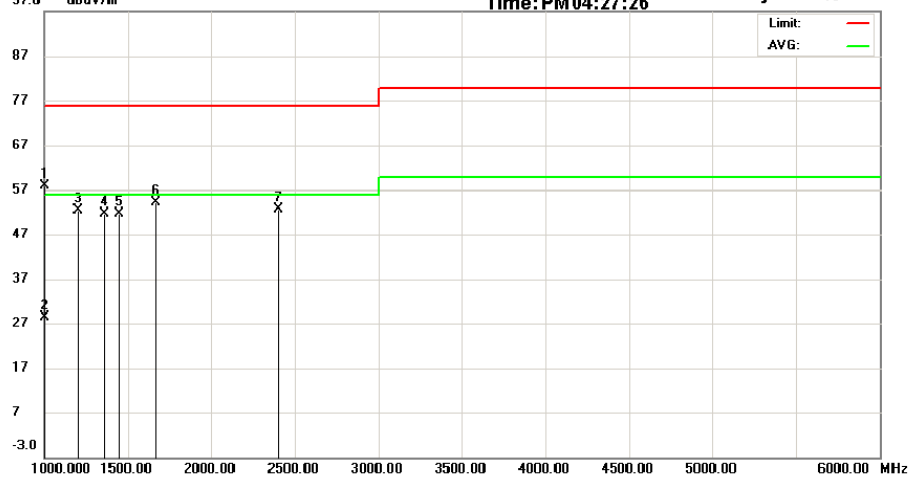
**Below 1GHz test, if the peak measured value meets the QP limit, it is unnecessary to perform the QP measurement. measurement.**

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

Radiated Emission Measurement

Operator:
Temperature: 25 ℃
Humidity: 55 %

File :101-05-08
Data :#6
Date: 2012/5/8
Time: PM 04:27:26




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

Polarization: *Vertical*
Power:
Witness:

| Mk. | Frequency (MHz) | RX_R (dBuV/m) | Ant_F (dB) | Cab_L (dB) | PreAmp (dB) | Emission (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Ant.Pos (cm) | Tab.Pos (deg.) | Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1000.067 | 82.54 | 24.4 | 2.93 | 51.94 | 57.93 | 76.00 | -18.07 | 100 | 0 | peak |
| 2 | 1000.067 | 52.88 | 24.4 | 2.93 | 51.94 | 28.27 | 56.00 | -27.73 | 100 | 0 | AVG |
| 3 | 1199.936 | 76.31 | 24.76 | 3.21 | 51.98 | 52.30 | 76.00 | -23.70 | 100 | 193 | peak |
| 4 | 1352.692 | 75.29 | 25.03 | 3.42 | 52.02 | 51.72 | 76.00 | -24.28 | 100 | 341 | peak |
| 5 | 1446.154 | 75.03 | 25.2 | 3.55 | 52.04 | 51.74 | 76.00 | -24.26 | 100 | 0 | peak |
| 6 | 1666.859 | 76.39 | 26 | 3.82 | 52.08 | 54.13 | 76.00 | -21.87 | 100 | 42 | peak |
| 7 | 2395.112 | 71.74 | 28.27 | 4.63 | 52.09 | 52.55 | 76.00 | -23.45 | 100 | 54 | peak |

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

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

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

# 5. Electrostatic discharge (ESD) immunity

## 5.1 Test Specification

| | |
|---|---|
| Port: | Enclosure |
| Basic Standard: | EN 61000-4-2/ IEC EN61000-4-2 (details referred to Sec 1.2) |
| Test Level: | Air +/- 2 kV, +/- 4 kV, +/- 8 kV<br>Contact +/- 4 kV |
| Criteria: | B |
| Test Procedure | refer to ISL QA -T4-E-S7 |
| Temperature: | 22 °C |
| Humidity: | 56% |

**Selected Test Point**

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

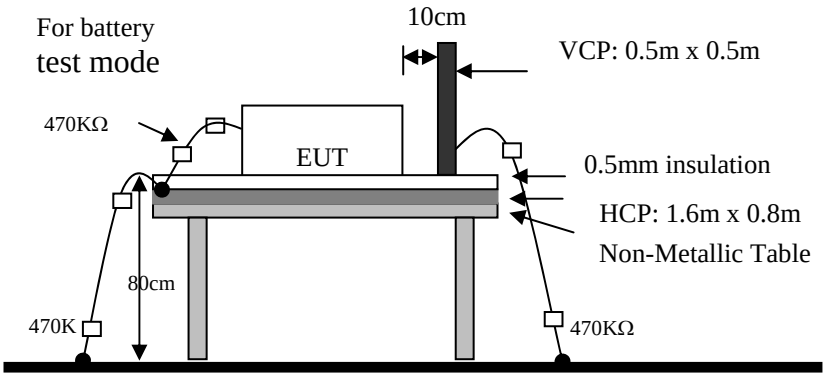
Contact: Total 200 discharges minimum were to the selected contact points.

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

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

## 5.2 Test Setup

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

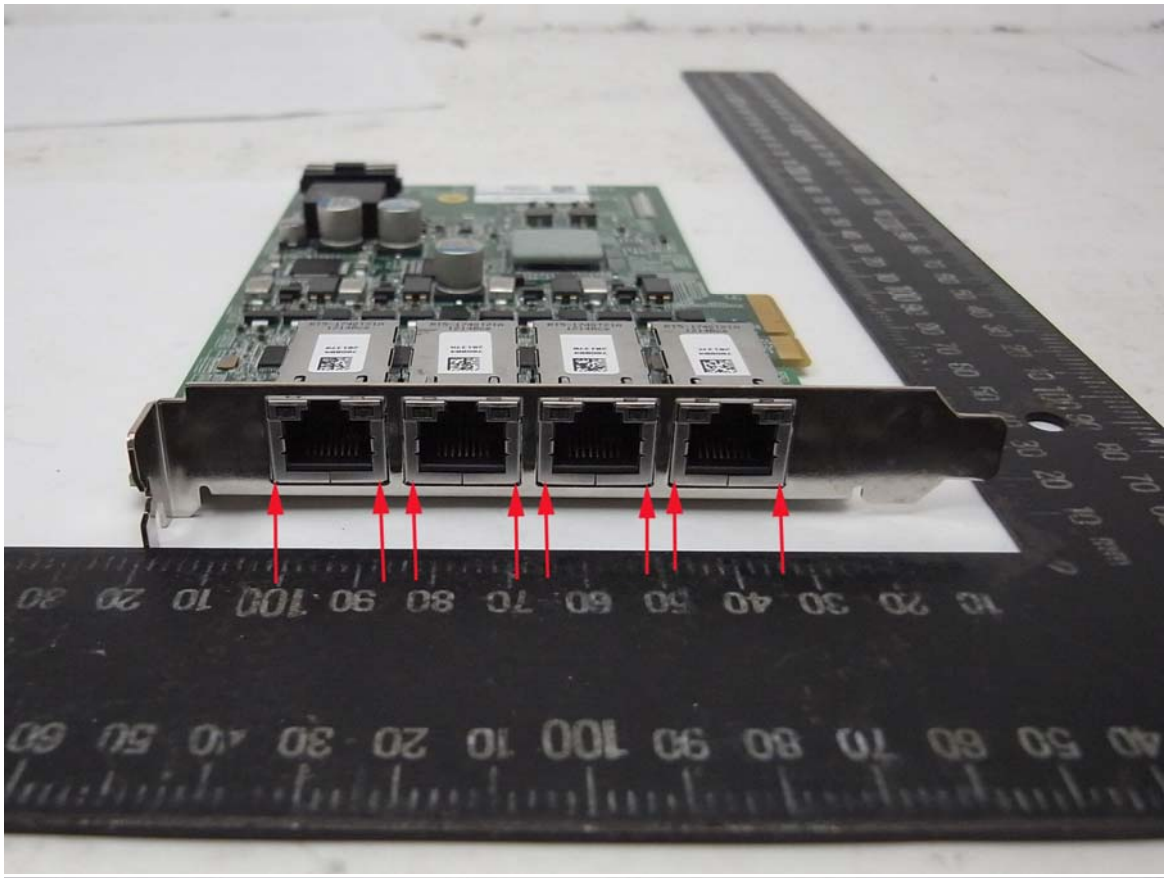


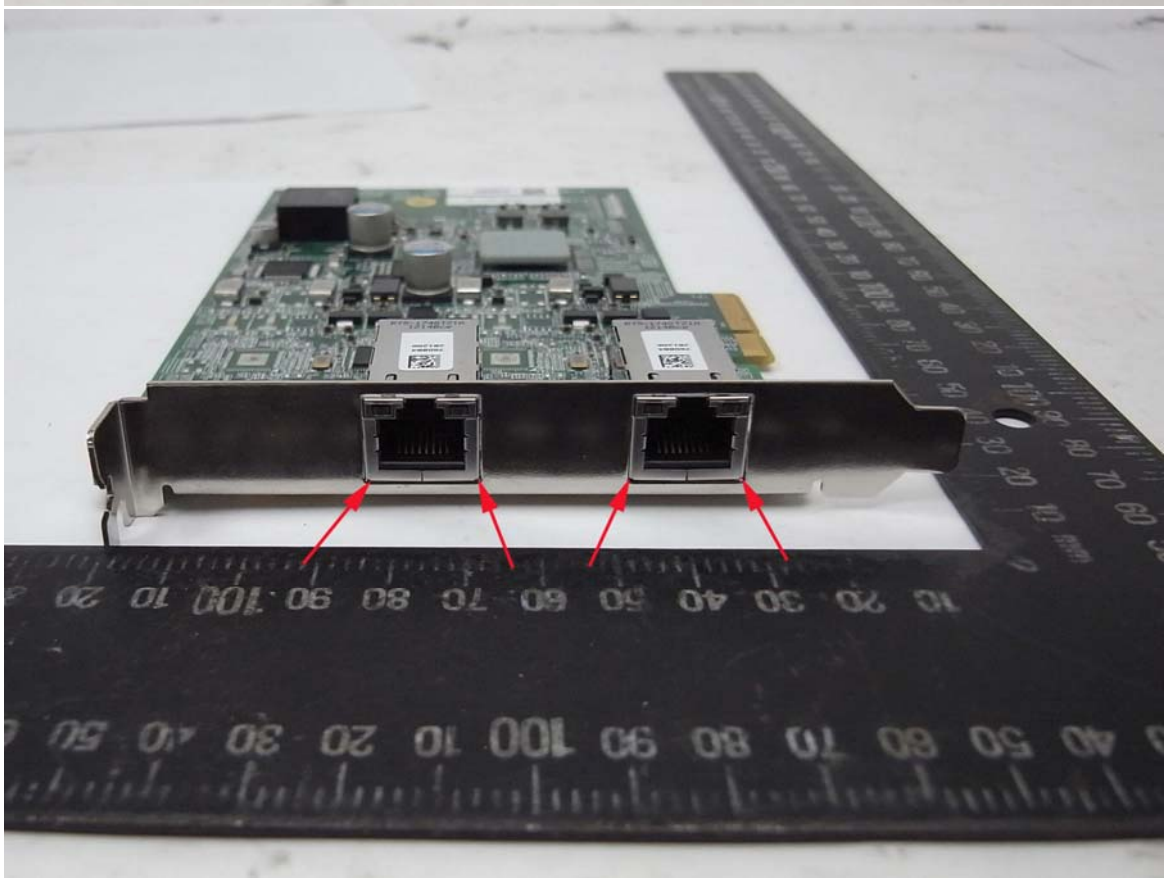

Ground reference Plane

## 5.3 Test Result

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

**TestPoint:**





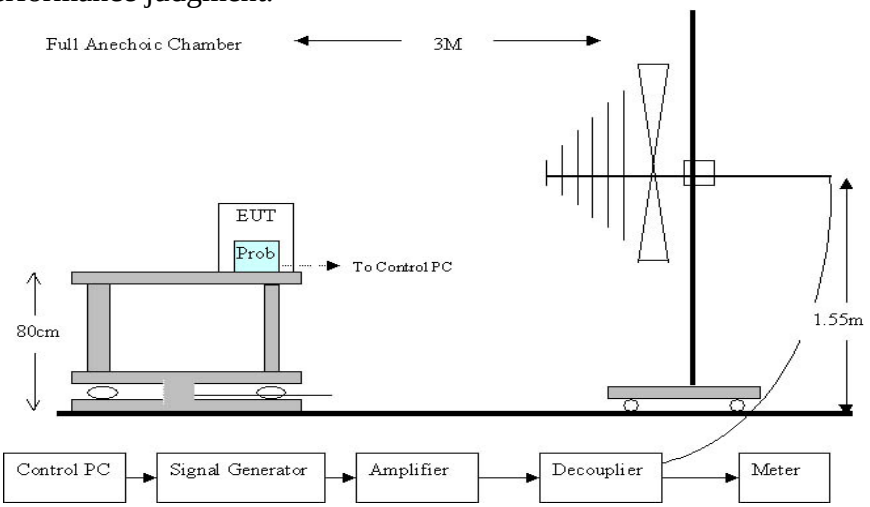
# 6. Radio-Frequency, Electromagnetic Field immunity

## 6.1 Test Specification

| | |
|---|---|
| Port: | Enclosure |
| Basic Standard: | EN 61000-4-3/ IEC EN61000-4-3 (details referred to Sec 1.2) |
| Test Level: | 3 V/m |
| Modulation: | AM 1KHz 80% |
| Frequency range: | 80 MHz~1 GHz |
| Frequency Step: | 1% of last step frequency |
| Dwell time: | 3s |
| Polarization: | Vertical and Horizontal |
| EUT Azimuth Angle | ☒0° ☒90° ☒180° ☒270° |
| Criteria: | A |
| Test Procedure | refer to ISL QA -T4-E-S8 |
| Temperature: | 24°C |
| Humidity: | 62% |

## 6.2 Test Setup

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




## 6.3 Test Result

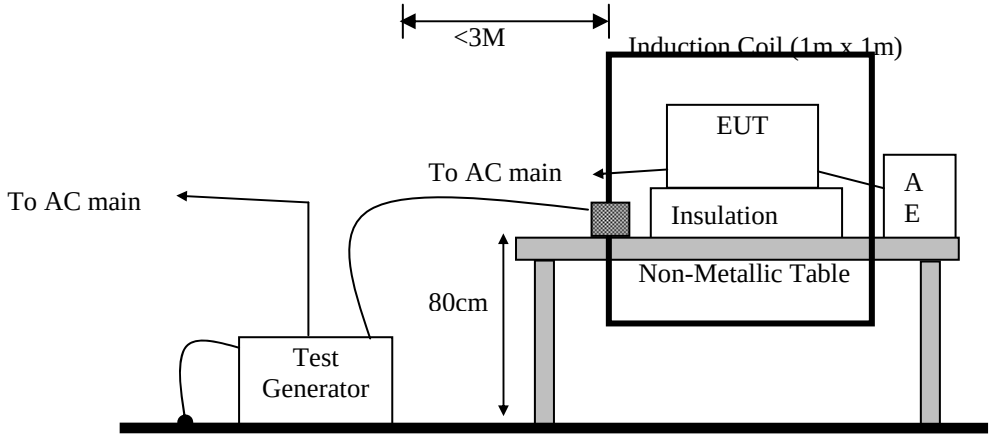
**Performance of EUT complies with the given specification.**

# 7. Power Frequency Magnetic Field immunity

## 7.1 Test Specification

| | |
|---|---|
| Port: | Enclosure |
| Basic Standard: | EN 61000-4-8/ IEC EN61000-4-8 (details referred to Sec 1.2) |
| Test Level: | 1A/m |
| Polarization: | X, Y, Z |
| Criteria: | A |
| Test Procedure | refer to ISL QA -T4-E-S12 |
| Temperature: | 24°C |
| Humidity: | 65% |

## 7.2 Test Setup




## 7.3 Test Result

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

# 8. Appendix

## 8.1 Appendix A: Test Equipment

### 8.1.1 Test Equipment List

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

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

| Location | Equipment Name | Brand | Model | S/N | Last Cal. Date | Next Cal. Date |
|---|---|---|---|---|---|---|
| EN61K-4-8 | TRANSIENT 2000 01 | EMC Partner | TRANSIENT-2000 | 950 | 12/01/2011 | 12/01/2012 |
| EN61K-4-2 | ESD GUN 04 | Schaffner | NSG 438 | 489 | 03/28/2012 | 03/28/2013 |
| EN61K-4-3 | BILOG Antenna 06 | Schaffner | CBL6112B | 2754 | N/A | N/A |
| EN61K-4-3 | Amplifier 80Mz~1GHz 250W | AR | 250W1000A | 312494 | N/A | N/A |
| EN61K-4-3 | Amplifier 800MHz~3.0GHz 60W | AR | 60S1G3 | 312762 | N/A | N/A |
| EN61K-4-3 | Broadband coupler 10K~220Mhz | Amplifier Research | DC2500 | 19810 | N/A | N/A |
| EN61K-4-3 | Broadband Coupler 80M~1GHz | Amplifier Research | DC6180 | 20364 | N/A | N/A |
| EN61K-4-3 | Broadband Coupler 1~4GHz | Werlatone | C5291 | 6516 | N/A | N/A |
| EN61K-4-3 | Coaxial Cable Chmb 04-3M-2 | Belden | RG-8/U | Chmb 04-3M-2 | N/A | N/A |
| EN61K-4-3 | Signal Generator 03 | Anritsu | MG3642A | 6200162550 | 06/10/2011 | 06/10/2012 |
| EN61K-4-8 | Magnetic Field Antenna | Precision | TRAIZ44B | MF1000-23 | N/A | N/A |

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

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

| Test Item | Filename | Version |
|---|---|---|
| EN61000-4-2 | N/A | 2.0 |
| EN61000-4-3 | Tile.Exe | 2.0.P |
| EN61000-4-8 | N/A | |

| 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 |

## 8.2 Appendix B: Uncertainty of Measurement

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

<Conduction 01> ± 3.262dB

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

<Immunity 01>

| Test item | Uncertainty |
|---|---|
| EN61000-4-2 (ESD) | |
| Rise time tr | ≦ 15% |
| Peak current Ip | ≦ 6.3% |
| current at 30 ns | ≦ 6.3% |
| current at 60 ns | ≦ 6.3% |
| EN61000-4-3 (RS) | ± 1.776dB |
| EN61000-4-8 (Magnetic) | ± 1.728% |

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

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

Front View

Back View

### 8.3.2 Photo of Radiated Emission Measurement

Front View (30MHz~1GHz)

Back View (30MHz~1GHz)

Front View (Above 1GHz)

Back View (Above 1GHz)

### 8.3.3 Photo of ESD Measurement

### 8.3.4 Photo of RF Field Strength Susceptibility Measurement

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### 8.3.5 Photo of Magnetic field Measurement

## 8.4 Appendix D: Photographs of EUT

**Please refer to the File of ISL-12HE131P**