

# Certificate

Issue Date: 12/16/2010  
Ref. Report No. ISL-10HE364FB

Product Name: : Network Attached Storage  
: VS-2004 Pro; VS-2008 Pro; VS-2012 Pro; VS-2016 Pro; VS-2020 Pro;  
Model(s) : NVR-2004 Pro; NVR-2008 Pro; NVR-2012 Pro; NVR-2016 Pro; NVR-2020  
: Pro; NVR-2004G; NVR-2008G; NVR-2012G; NVR-2016G; NVR-2020G;  
: VS-2000 Pro; NVR-2000 Pro; NVR-2000G; TS-239 Pro II+; NAS-239GII+;  
: TS-259 Pro+  
Applicant : 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. (refer to Test Report if any modifications were made for compliance).

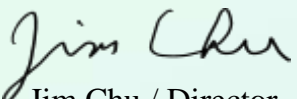


## Standards:

FCC CFR Title 47 Part 15 Subpart B: 2009- Section 15.107 and 15.109  
ANSI C63.4-2003  
Industry Canada Interference-Causing Equipment Standard ICES-003 Issue 4: 2004  
Class B

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:

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## Declaration of Conformity

This device complies with Part 15 of the FCC Rules. The test result has been shown in the ISL test report with number ISL-10HE364FB. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Product Name:	Network Attached Storage
Model(s):	VS-2004 Pro; VS-2008 Pro; VS-2012 Pro; VS-2016 Pro; VS-2020 Pro; NVR-2004 Pro; NVR-2008 Pro; NVR-2012 Pro; NVR-2016 Pro; NVR-2020 Pro; NVR-2004G; NVR-2008G; NVR-2012G; NVR-2016G; NVR-2020G; VS-2000 Pro; NVR-2000 Pro; NVR-2000G; TS-239 Pro II+; NAS-239GII+; TS-259 Pro+
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
Contact Person:	
Phone No.:	+886-2-8698-2000 Ext:1616
Fax No.:	+886-2-8698-2270

*We, QNAP Systems, Inc., hereby declare that the equipment bearing the trade name and model number specified above was tested conforming to the applicable FCC 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 Commissions requirements.*

-----  
QNAP Systems, Inc.  
**Issue Date: 12/16/2010**

# FCC TEST REPORT

of

## CFR 47 Part 15 Subpart B Class B

Application Type: Declaration of Conformity

Product : **Network Attached Storage**

Model(s): **VS-2004 Pro; VS-2008 Pro; VS-2012 Pro;  
VS-2016 Pro; VS-2020 Pro; NVR-2004 Pro;  
NVR-2008 Pro; NVR-2012 Pro; NVR-2016  
Pro; NVR-2020 Pro; NVR-2004G;  
NVR-2008G; NVR-2012G; NVR-2016G;  
NVR-2020G; VS-2000 Pro; NVR-2000 Pro;  
NVR-2000G; TS-239 Pro II+; NAS-239GII+;  
TS-259 Pro+**

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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Report No.: **ISL-10HE364FB**

Issue Date : **12/16/2010**

This report totally contains 27 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, NVLAP 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:** FCC CFR Title 47 Part 15 Subpart B: 2009- Section 15.107 and 15.109  
ANSI C63.4-2003  
Industry Canada Interference-Causing Equipment Standard ICES-003 Issue 4: 2004

**Equipment Tested:** Network Attached Storage

**Model:** VS-2004 Pro; VS-2008 Pro; VS-2012 Pro; VS-2016 Pro; VS-2020 Pro; NVR-2004 Pro; NVR-2008 Pro; NVR-2012 Pro; NVR-2016 Pro; NVR-2020 Pro; NVR-2004G; NVR-2008G; NVR-2012G; NVR-2016G; NVR-2020G; VS-2000 Pro; NVR-2000 Pro; NVR-2000G; TS-239 Pro II+; NAS-239GII+; TS-259 Pro+

**Applicant:** QNAP Systems, Inc.

**Sample received Date:** 12/8/2010

**Final test Date:** refer to the date of test data

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

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

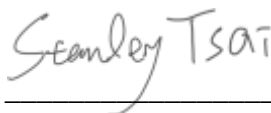
**Temperature:** refer to each site test data

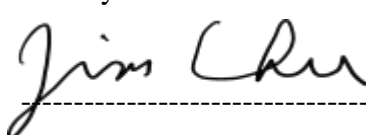
**Humidity:** refer to each site test data

**Input power:** Conduction input power: AC 120 V / 60 Hz  
Radiation input power: AC 120 V / 60 Hz

**Test Result:** **PASS**

**Report Engineer:** Midori Su

**Test Engineer:**   
\_\_\_\_\_  
Stanley Tsai

**Approved By:**   
-----  
Jim Chu / Director

## 1.2 Description of EUT

### EUT

Description:	Network Attached Storage
Condition:	Pre-Production
Model:	VS-2004 Pro; VS-2008 Pro; VS-2012 Pro; VS-2016 Pro; VS-2020 Pro; NVR-2004 Pro; NVR-2008 Pro; NVR-2012 Pro; NVR-2016 Pro; NVR-2020 Pro; NVR-2004G; NVR-2008G; NVR-2012G; NVR-2016G; NVR-2020G; VS-2000 Pro; NVR-2000 Pro; NVR-2000G; TS-239 Pro II+; NAS-239GII+; TS-259 Pro+
Serial Number:	N/A
Power Supply Type:	FSP (Model: FSP084-DMAA1) AC Input: 100~240V~1.3A, 50-60Hz DC Output: 12V 7.0A MAX (84W MAX)
DIMM Memory:	Adata (Model: AD2S800B1G6-B) 1GB DDR2-800MHz
ATA Disk Module:	Apacer (Model: 79700-M512-098-RS)512MB
Power Switch Button:	one
Back Up Button:	one
USB 2.0 Connector:	Five (4-pins)
E-Serial ATA Port:	two-7pin
RJ45 Connector:	two (8-pins) (10/100Mbps/1Gbps)
VGA Port:	one-15pin
Hard Disk1:	Seagate (Model: ST3160318AS) 160GB (Option)
Hard Disk2:	SAMSUN (Model: HD103UI) 1TB (Option)

Highest frequency of the internal sources of the EUT is 1.8GHz

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

Test Configuration:

Mode	Hard Disk	LAN1	LAN2
1	Seagate (Model: ST3160318AS) 160GB+ SAMSUN (Model: HD103UI) 1TB	1000Mbps	1000Mbps

## EMI Noise Source

Crystal: 32.768KHz (X1), 14.318MHz (X2), 25MHz (Y1), 25MHz (Y2)

Power Board: 1MHz (U20)

USB Flash Board: 12MHz (Y1)

## EMI Solution:

1. Added two Core on Power Supply Type cable ° (The same as EUT-14)

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**Model Different**

<b>Model</b>	<b>Package</b>	<b>Selling markets</b>
VS-2004 Pro	Carton Box	Household Monitor storage Tender product
VS-2008 Pro	Carton Box	Commercial Monitor storage Tender product
VS-2012 Pro	Carton Box	Commercial Monitor storage related products supply chain management
VS-2016 Pro	Carton Box	Professional Monitor storage related products supply chain management
VS-2020 Pro	Carton Box	Industrial Monitor storage Tender product
NVR-2004 Pro	Carton Box	Household Monitor storage Tender product
NVR-2008 Pro	Carton Box	Commercial Monitor storage Tender product
NVR-2012 Pro	Carton Box	Commercial Monitor storage Tender product
NVR-2016 Pro	Carton Box	Professional Monitor storage Tender product
NVR-2020 Pro	Carton Box	Industrial Monitor storage Tender product
NVR-2004G	Carton Box (No QNAP Logo)	Household Image storage Cooperation plan
NVR-2008G	Carton Box (No QNAP Logo)	General Image storage Cooperation plan
NVR-2012G	Carton Box (No QNAP Logo)	Commercial Image storage Cooperation plan
NVR-2016G	Carton Box (No QNAP Logo)	Professional Image storage Cooperation plan
NVR-2020G	Carton Box (No QNAP Logo)	Industrial Image storage Cooperation plan
VS-2000 Pro	Color Box	General Professional Monitor storage related products supply chain management
NVR-2000 Pro	White Box	General Professional Monitor storage Tender product
NVR-2000G	White Box	General Professional Image storage Cooperation plan
TS-239 Pro II+	Brown Box	Commercial Monitor storage Tender product
NAS-239GII+	Brown Box (No QNAP Logo)	Commercial Monitor storage related products supply chain management



### 1.3 Description of Support Equipment

Unit	Model Serial No.	Brand	Power Cord	FCC ID
Notebook Personal Computer	Latitude D400 S/N: N/A	DELL	Non-shielded, Detachable	FCC DOC
17" LCD Monitor	VA703B	View Sonic	Non-shielded, Detachable	FCC DOC
External HDD Enclosure*5	OT-201 S/N: NA	A-TEC	N/A	FCC DOC
E-SATA External Hard Disk*2	QBack-35S	QNAP	Non-shielded, Detachable	FCC DOC
Rack mountable Switch	DGS-1008D	D-Link	D-Link (Model:AF-1205-B)	FCC DOC

### 1.4 Software for Controlling Support Unit

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

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

	Filename	Issued Date
LAN	ping.exe	05/05/1999
LAN	Tfggen.exe	06/23/1999
External Hard Disk	InterEMC.exe	9/04/2000
E-SATA	InterEMC.exe	9/04/2000
Rack mountable Switch	ping.exe	05/05/1999
Router LAN Port	Ping.exe	5/5/1999
EUT Hard Disk	InterEMC.exe	9/04/2000

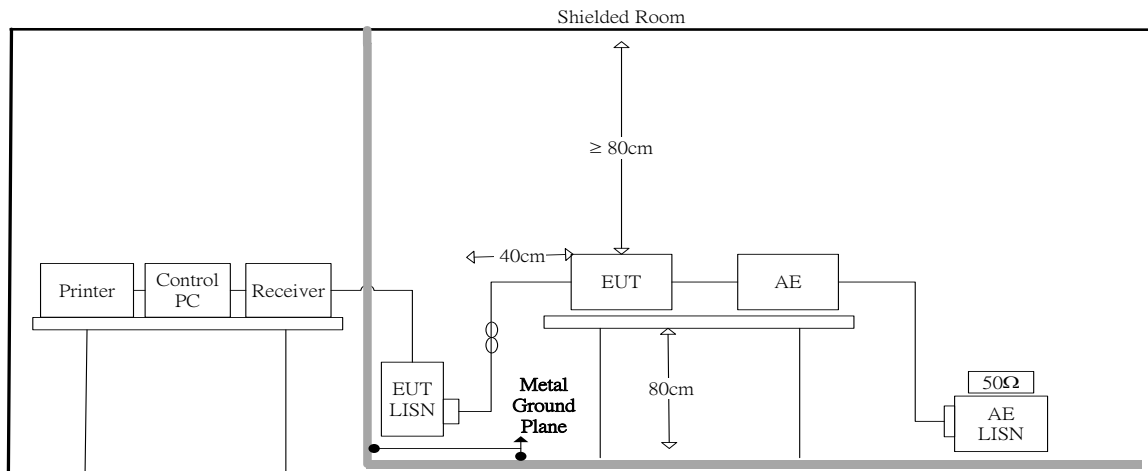
**1.5 I/O Cable Condition of EUT and Support Units**

Description	Path	Cable Length	Cable Type	Connector Type
AC Power Cord	110V (~240V) to EUT SPS	1.8M	Nonshielded, Detachable	Plastic Head
USB Data Cable*5	External HDD Enclosure USB Port to PC USB Port	0.98M	Non-shielded, Detachable (With Core)	Metal Head
E-SATA Data Cable*2	External Hard disk E-S ATA Port to EUT E-SATA Port	1.0M	Shielded, Detachable	Metal Head
LAN Data Cable	PC LAN Port to Router LAN Port.	1.0M	Nonshielded, Detachable	RJ-45, with Plastic Head
VGA Data Cable	EUT VGA Port to LCD Monitor	1.98M	Shielded, Detachable (with cord)	Metal Head
LAN Data Cable*2	EUT LAN Port to Switch HUB LAN Port	10M	Non-shielded, Detachable	RJ-45, with Plastic Head

## 2. Powerline 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.

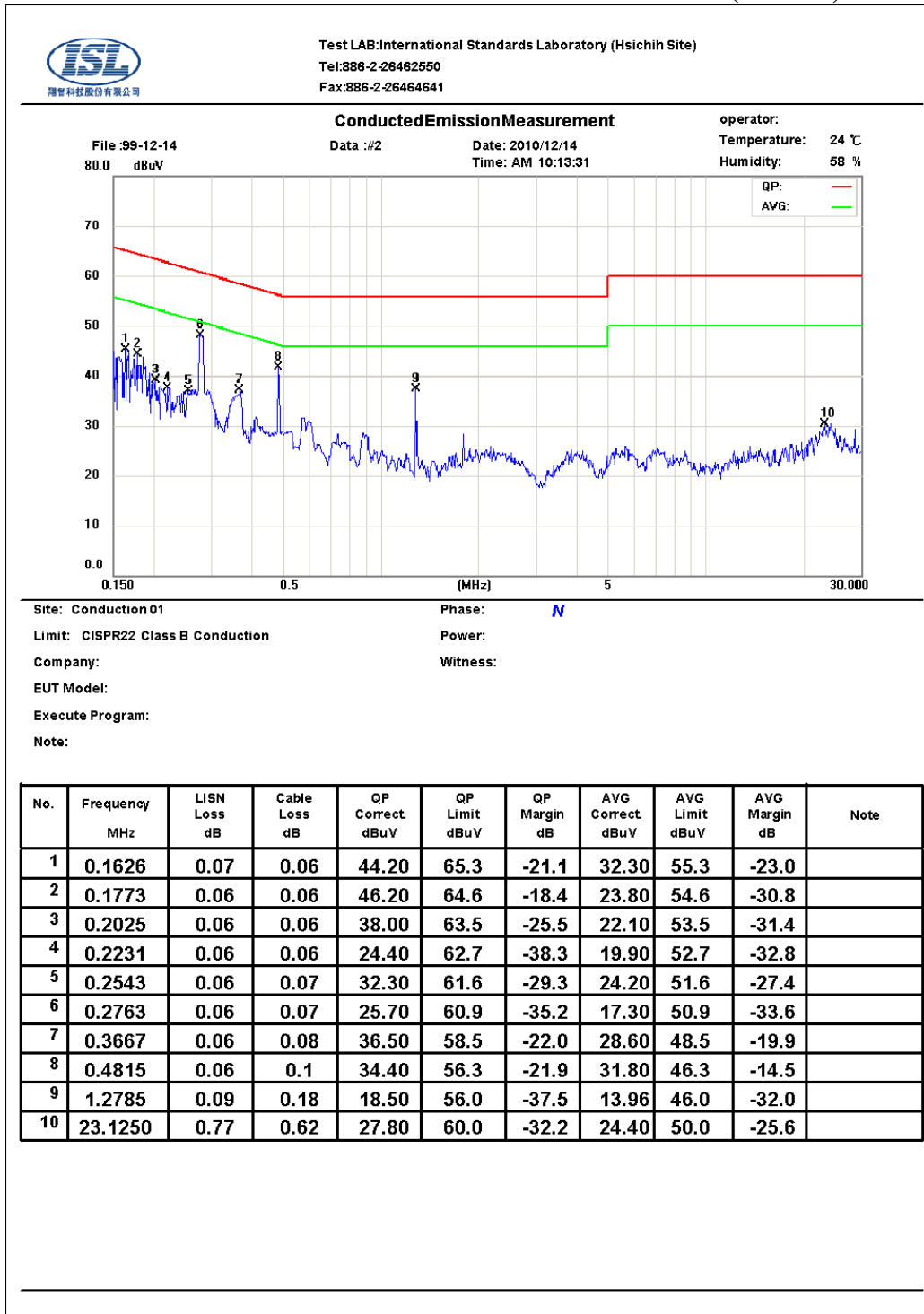
#### 2.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

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



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**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.**

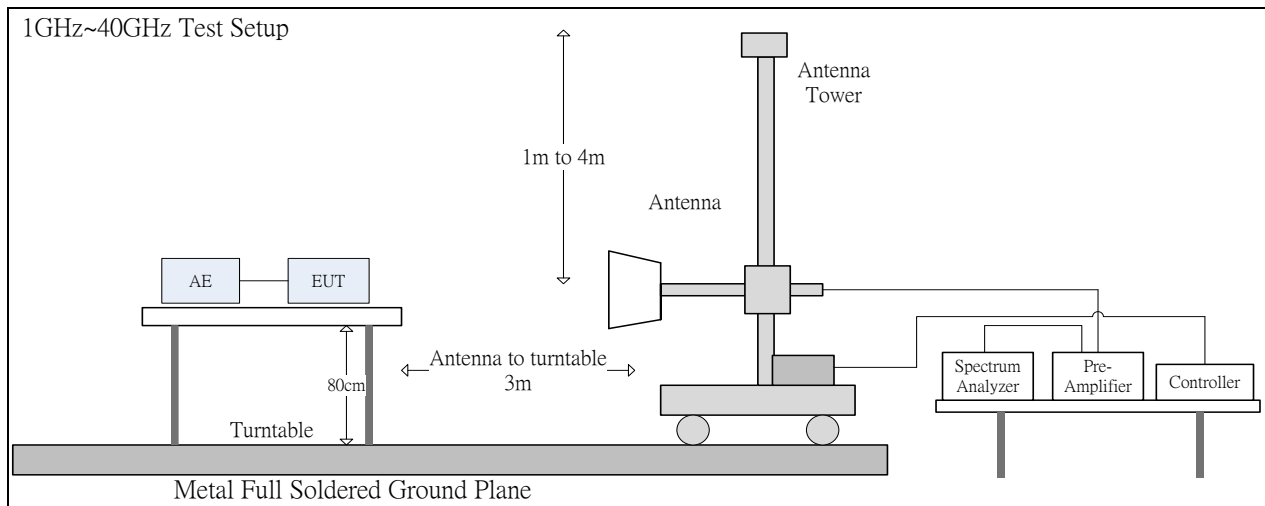
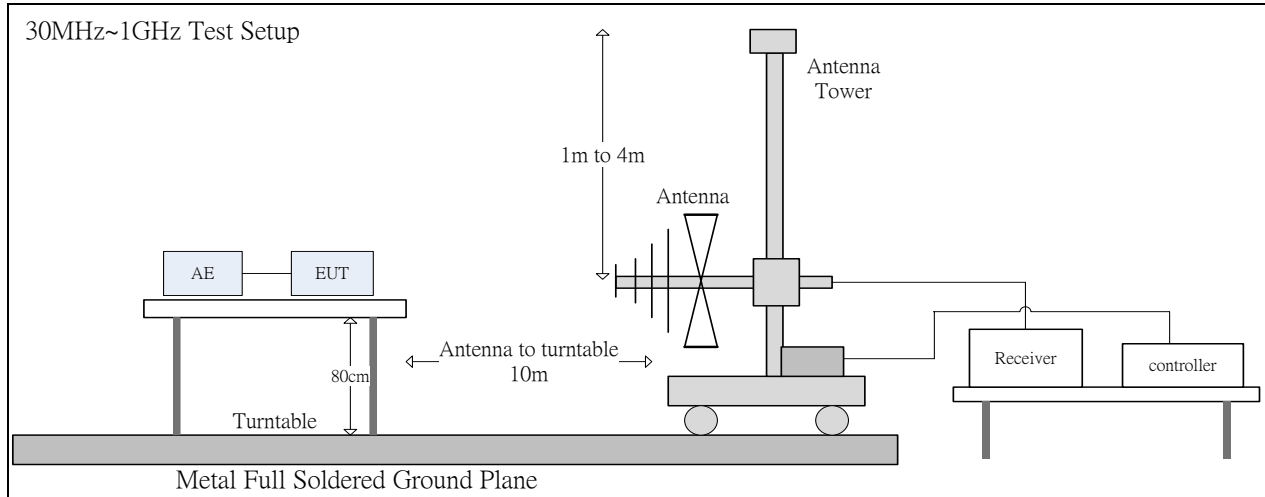
**If peak data can pass, it will be shown in "QP/AVG Correct" column, if not, QP/AVG data will instead.**

**The CISPR 22 limits would be applied to all FCC Part 15 devices.**

### 3. Radiated Emissions

#### 3.1 Test Setup and Procedure

##### 3.1.1 Test Setup



##### 3.1.2 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 6 times the highest frequency or 40 GHz, whichever is less.

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

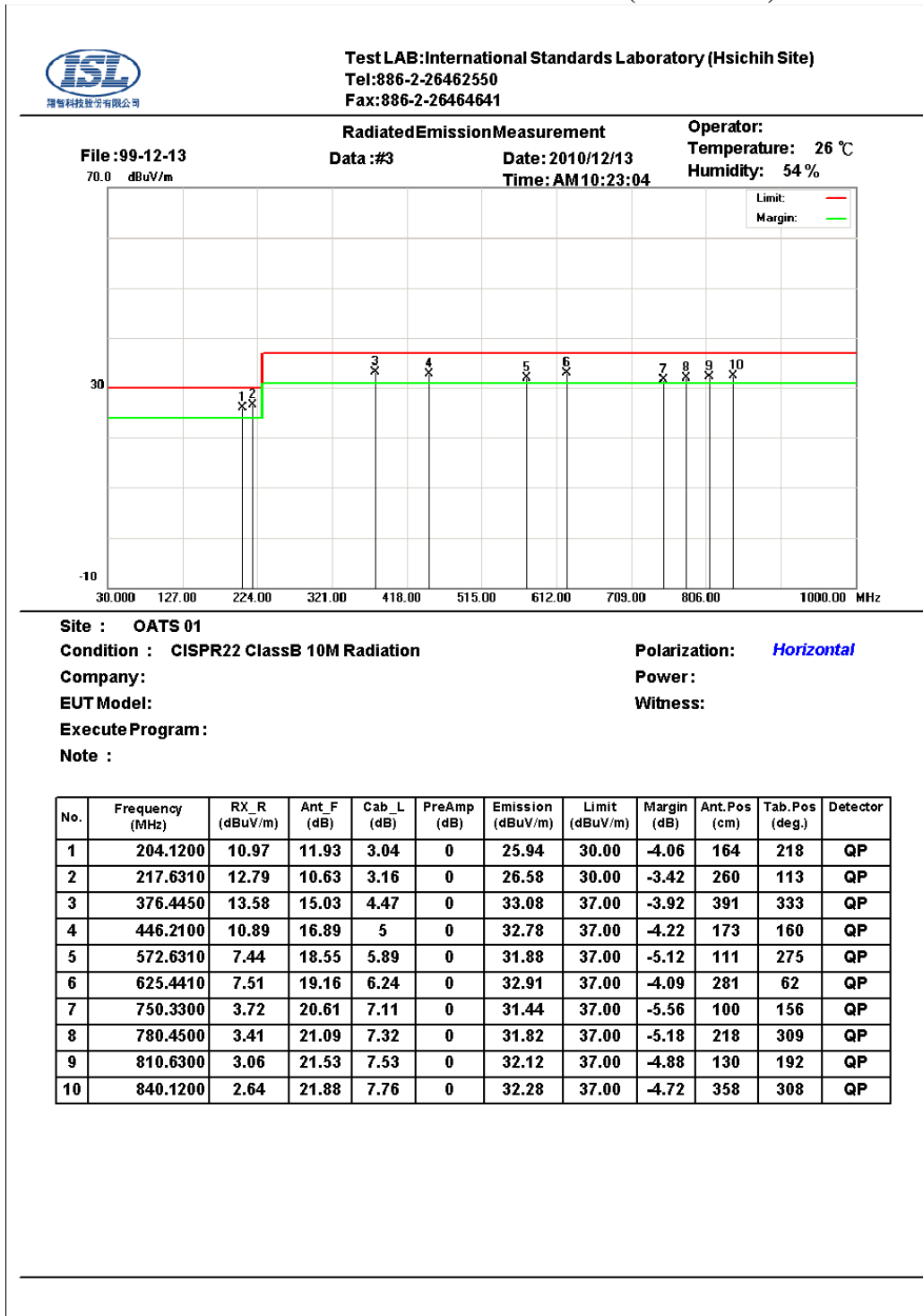
Frequency Range:	30MHz--1000MHz
Detector Function:	Quasi-Peak Mode
Resolution Bandwidth:	120KHz

Frequency Range:	Above 1000MHz
Detector Function:	Peak/Average Mode
Resolution Bandwidth:	1MHz



3.2 Radiation Test Data: Configuration 1

Table 3.2.1 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

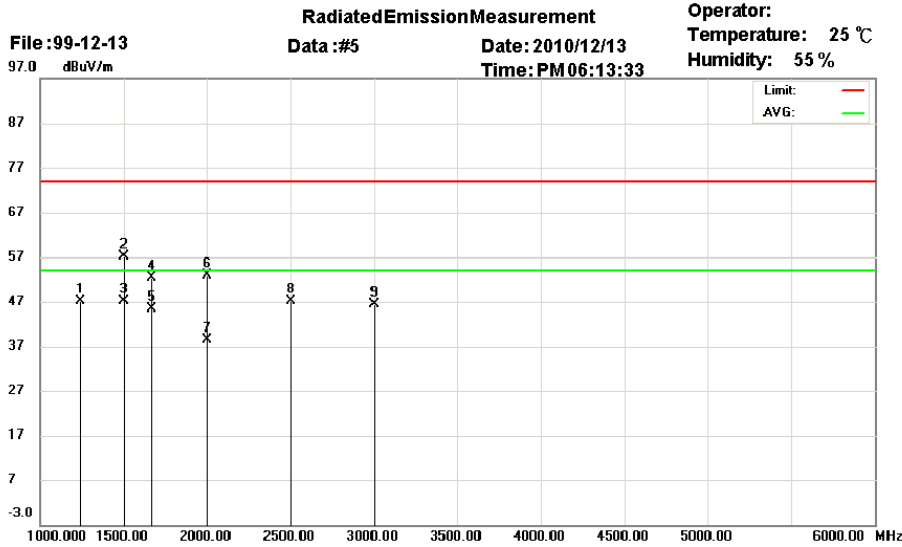
The CISPR 22 limits would be applied to all FCC Part 15 devices.

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

**-14- Declaration of Conformity**



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 : **FCC Class B Radiation(Peak)**      Polarization: **Horizontal**  
 Company:  
 EUT Model:  
 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	1235.210	63.48	28.25	1.69	46.41	47.01	74.00	-26.99	316	302	peak
2	1500.630	73.19	28.3	1.9	46.3	57.09	74.00	-16.91	100	102	peak
3	1500.630	63.22	28.3	1.9	46.3	47.12	54.00	-6.88	100	356	AVG
4	1665.410	67.27	29.42	1.97	46.3	52.36	74.00	-21.64	100	321	peak
5	1665.410	60.27	29.42	1.97	46.3	45.36	54.00	-8.64	238	122	AVG
6	2000.750	65.48	31.7	2.1	46.3	52.98	74.00	-21.02	229	264	peak
7	2000.750	50.99	31.7	2.1	46.3	38.49	54.00	-15.51	194	313	AVG
8	2495.120	58.87	32.49	2.4	46.6	47.16	74.00	-26.84	156	86	peak
9	3000.110	57.23	33.2	2.6	46.7	46.33	74.00	-27.67	151	288	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  
**The CISPR 22 limits would be applied to all FCC Part 15 devices.**  
**Above 1GHz test, if the peak measured value meets the average limit, it is unnecessary to perform the average measurement.**

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**Table 3.2.2 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

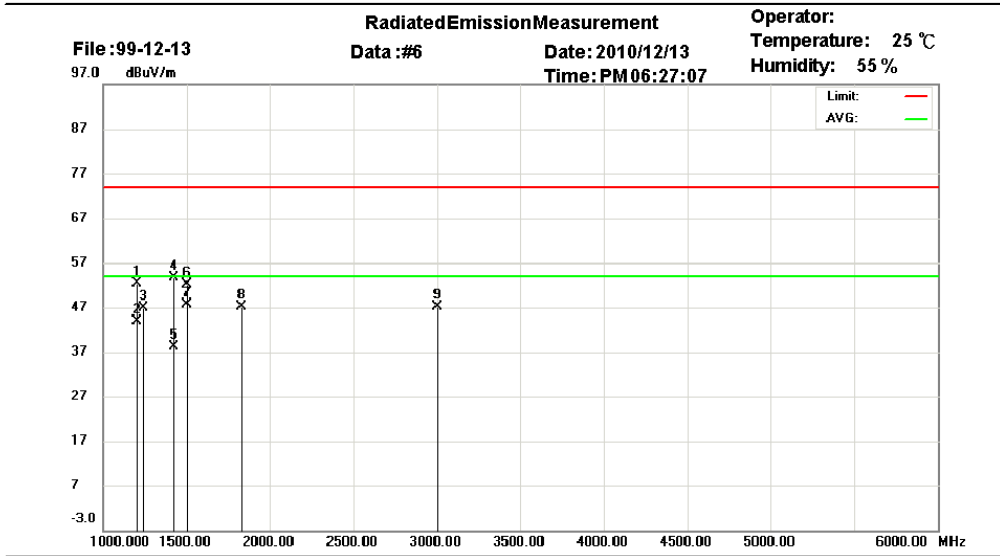
**The CISPR 22 limits would be applied to all FCC Part 15 devices.**

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

**-16- Declaration of Conformity**



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 :** FCC Class B Radiation(Peak)      **Polarization:** Vertical  
**Company:**      **Power:**  
**EUT Model:**      **Distance:**  
**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	1200.120	68.97	28.24	1.66	46.42	52.45	74.00	-21.55	258	226	peak
2	1200.120	60.31	28.24	1.66	46.42	43.79	54.00	-10.21	100	193	AVG
3	1235.410	63.28	28.25	1.69	46.41	46.81	74.00	-27.19	223	167	peak
4	1415.220	69.85	28.28	1.83	46.33	53.63	74.00	-20.37	330	148	peak
5	1415.220	54.33	28.28	1.83	46.33	38.11	54.00	-15.89	123	158	AVG
6	1500.630	68.29	28.3	1.9	46.3	52.19	74.00	-21.81	184	297	peak
7	1500.630	63.79	28.3	1.9	46.3	47.69	54.00	-6.31	297	266	AVG
8	1825.140	60.81	30.51	2.03	46.3	47.05	74.00	-26.95	100	34	peak
9	3000.630	57.99	33.2	2.6	46.7	47.09	74.00	-26.91	166	309	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

The CISPR 22 limits would be applied to all FCC Part 15 devices.

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

## 4. Appendix

### 4.1 Appendix A: Warning Labels

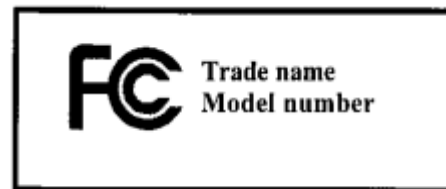
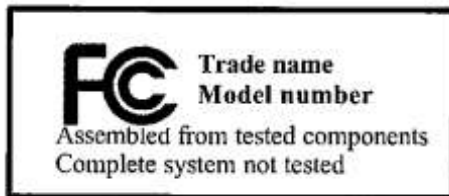
#### Label Requirements

A Class B digital device subject to Declaration of Conformity of FCC shall carry a label which includes the following statement:

**\* \* \* W A R N I N G \* \* \***

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The sample label shown shall be permanently affixed at a conspicuous location on the device and be readily visible to the user at the time of purchase.





## 4.2 Appendix B: Warning Statement

### Statement Requirements

The operators' manual for a Class B digital device shall contain the following statements or their equivalent:

**\* \* \* W A R N I N G \* \* \***

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

Notice: The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equivalent.

\* \* \* \* \*

If the EUT was tested with special shielded cables the operators manual for such product shall also contain the following statements or their equivalent:

Shielded interface cables and/or AC power cord, if any, must be used in order to comply with the emission limits.

**4.3 Appendix C: Test Equipment**

**4.3.1 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	828874/010	07/22/2010	07/22/2011
			831.5518.52			
Conduction	ISN T2 03	FCC	FCC-TLISN-T	20618	08/23/2010	08/23/2011
			2-02			
Conduction	ISN T4 05	FCC	FCC-TLISN-T	20619	08/23/2010	08/23/2011
			4-02			
Conduction	ISN T8 03	FCC	FCC-TLINS-T	20620	08/23/2010	08/23/2011
			8-02			
Conduction	EMI Receiver 08	Schwarzbeck Mess-Elektronik	FCKL 1528	1528-202	09/15/2010	09/15/2011
Conduction	Spectrum Analyzer 10	Advantest	R3132	111000879	12/10/2010	12/10/2011

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

**4.3.2 Software for Controlling Spectrum/Receiver and Calculating Test Data**

<b>Radiation/Conduction</b>	<b>Filename</b>	<b>Version</b>	<b>Issued Date</b>
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



#### 4.4 Appendix D: 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

#### 4.5 Appendix E: Photographs of EUT Configuration Test Set Up

##### 4.5.1 Photo of Main Power Port Conducted Emission Measurement

Front View



Back View



#### 4.5.2 Photo of Radiated Emission Measurement

Front View (below 1GHz)



Back View (below 1GHz)





#### 4.6 Appendix F: Photographs of EUT

Please refer to the File of **ISL-10HE364P**