Certificate

Issue Date: 2009/02/19
Ref. Report No. ISL-09HE051FB

Product Name:	:	Network Attached Storage
Model Number(s)	:	**TS-119 Pro; TS-119; TS-119 Pro II; TS-119 II; TS-119 Pro-G; TS-119-G; TS-119 Pro II-G; TS-119 II-G; VioStor-1104; VioStor-1106; VioStor-1109; VioStor-1112; VioStor-1116; NVR-1104; NVR-1106; NVR-1109; NVR-1112; NVR-1116; NV-1104; NV-1106; NV-1109; NV-1112; NV-1116**
Responsible Party	:	**QNAP Systems, Inc.**
Address	:	21F,No.77,Sec. 1,Xintai 5th Rd. Xizhi City,Taipei Country,221 Taiwan,R.O.C
Contact Person	:	

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

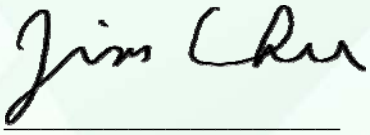
The device bearing the trade name and model specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified. (refer to Test Report if any modifications were made for compliance).

Standards:

FCC CFR Title 47 Part 15 Subpart B: 2008- 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.

We certify that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988.21 U.S.C. 853(a)



Jim Chu/ Director

International Standards Laboratory
Lung-Tan LAB:
No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd.
Lung-Tan Hsiang, Tao Yuan County 325, Taiwan
Tel: 886-3-407-1718; Fax: 886-3407-1738
Hsi-Chih LAB:
No. 65, Gu Dai Keng St.. Hsichih, Taipei Hsien 22117, Taiwan.
Tel: 886-2-2646-2550; Fax: 886-2-2646-4641

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-09HE051FB. 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:	TS-119 Pro; TS-119; TS-119 Pro II; TS-119 II; TS-119 Pro-G; TS-119-G; TS-119 Pro II-G; TS-119 II-G; VioStor-1104; VioStor-1106; VioStor-1109; VioStor-1112; VioStor-1116; NVR-1104; NVR-1106; NVR-1109; NVR-1112; NVR-1116; NV-1104; NV-1106; NV-1109; NV-1112; NV-1116
Name of Responsible Party:	QNAP Systems, Inc.
Address of Responsible Party:	21F,No.77,Sec. 1,Xintai 5th Rd. Xizhi City,Taipei Country,221 Taiwan,R.O.C
Contact Person:	
Phone No.:	(02)8698-2000
Fax No.:	(02)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: 2009/02/19

FCC TEST REPORT

of

CFR 47 Part 15 Subpart B Class B

Application Type: Declaration of Conformity

Product : **Network Attached Storage**

Model(s): **TS-119 Pro; TS-119; TS-119 Pro II; TS-119 II; TS-119 Pro-G; TS-119-G; TS-119 Pro II-G; TS-119 II-G; VioStor-1104; VioStor-1106; VioStor-1109; VioStor-1112; VioStor-1116; NVR-1104; NVR-1106; NVR-1109; NVR-1112; NVR-1116; NV-1104; NV-1106; NV-1109; NV-1112; NV-1116**

Applicant: **QNAP Systems, Inc.**

Address: **21F,No.77,Sec. 1,Xintai 5th Rd.**
Xizhi City,Taipei Country,221
Taiwan,R.O.C

NVLAP LAB CODE: 200234-0

Test Performed by:

International Standards Laboratory

<HC LAB>
*Site Registration No.
BSMI:SL2-IN-E-0037; SL2-R1/R2-E-0037; TAF: 1178;
IC: IC4067; VCCI: R-341,C-354, T-313; NEMKO: ELA 113A

*Address:
No. 65, Gu Dai Keng St.
Hsichih, Taipei Hsien 22117, Taiwan
*Tel: 886-2-2646-2550; Fax: 886-2-2646-4641

Report No.: **ISL-09HE051FB**
Issue Date : **2009/02/19**

Contents of Report

1. General

1.1 Certification of Accuracy of Test Data

Standards:	FCC CFR Title 47 Part 15 Subpart B: 2008- 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:	TS-119 Pro; TS-119; TS-119 Pro II; TS-119 II; TS-119 Pro-G; TS-119-G; TS-119 Pro II-G; TS-119 II-G; VioStor-1104; VioStor-1106; VioStor-1109; VioStor-1112; VioStor-1116; NVR-1104; NVR-1106; NVR-1109; NVR-1112; NVR-1116; NV-1104; NV-1106; NV-1109; NV-1112; NV-1116
Applied by	QNAP Systems, Inc.
Sample received Date:	2009/02/05
Final test Date :	refer to the date of test data
Test Result:	**PASS**
Report Engineer:	Lily L.C. Tseng
Test Engineer:	David Y.Y. Wu

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory.

The test results contained in this report accurately represent the radiated and power line conducted electromagnetic emissions generated by sample equipment under test at the time of the test.

The sample equipment tested as described in this report is in compliance with the limits of above standards.

Approve & Signature

Jim Chu / Director

This test data shown below is traceable to NIST or national or international standard.
International Standards Laboratory certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a).

1.2 Applicant Information

Applicant: QNAP Systems, Inc.
21F,No.77,Sec. 1,Xintai 5th Rd.
Xizhi City,Taipei Country,221
Taiwan,R.O.C

1.3 Operation Environment

Test Site: OATS 01,Chamber 01(above 1GHz); Conduction 01

Test Distance 10M

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

2. Description of EUT

EUT

Product Name:	Network Attached Storage
Condition:	Pre-Production
Model Number(s)**:**	**TS-119 Pro; TS-119; TS-119 Pro II; TS-119 II; TS-119 Pro-G; TS-119-G; TS-119 Pro II-G; TS-119 II-G; VioStor-1104; VioStor-1106; VioStor-1109; VioStor-1112; VioStor-1116; NVR-1104; NVR-1106; NVR-1109; NVR-1112; NVR-1116; NV-1104; NV-1106; NV-1109; NV-1112; NV-1116**
Serial Number:	N/A
Power Supply Type:	DVE (Model: DSA-0421S-12) Input: 100~240V~ 50-60Hz 1.2A 80VA Output: +12V 3A
Power Switch Button:	one
Back Up Button:	one
DC Jack:	one
USB 2.0 Connector:	three (4-pins)
E-Serial ATA Port:	one-7pin
RJ45 Connector:	one (8-pins) (100Mbps/1Gbps)
Hard Disk:	Seagate (Model: ST3500320AS) 500GB (Option)

EMI Noise Source:

Crystal: 25MHz (Y1), 12MHz (Y3), 32.768KHz (Y4), 25MHz (Y5).

EMI Solution:

1. Added ten Spring-fingers on PCB Board contact with HDD Disk chassis ground. (Reference photo EUT-5)
2. Added DVE Switching Adapter Power Cable with Ferrite Core.(Reference photo EUT-11)
3. Added one Gasket on back chassis contact with chassis ground. (Reference photo EUT-13)

3. Description of Support Equipment

3.1 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
External HDD Enclosure*3	OT-201 S/N: NA	A-TEC	N/A	FCC DOC
E-SATA External Hard Disk	QBack-35S	QNAP	Non-shielded, Detachable	FCC DOC

3.2 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 signal from EUT to server through LAN port.
C. Used Tfgen.exe to Send signal to EUT RJ45 port through PC RJ45 Port.
D. Search External HDD from PC RJ45 to EUT RJ45 with InterEMC.exe.
E. Read and write data in the E-SATA Hard Disk through EUT E-SATA port.
F. R/W External HDD Enclosure from USB Port.
G. Repeat the above steps.

	Filename	Issued Date
LAN	ping.exe	05/05/1999
LAN	Tfgen.exe	06/23/1999
EUT Hard Disk	InterEMC.exe	04/16/2003
E-SATA	InterEMC.exe	5/21/1996
External Hard Disk	InterEMC.exe	5/21/1996

3.3 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
LAN Data Cable	Server to EUT RJ 45 Connector	33 feet	Non-shielded, Detachable	RJ-45, with Plastic Head
USB Data Cable	External HDD Enclosure USB Port to PC USB Port	0.98M	Non-shielded, Detachable (With Core)	Metal Head
E-SATA Data Cable	External Hard disk E-S ATA Port to EUT E-SATA Port	1.0M	Shielded, Detachable	Metal Head

4. Powerline Conducted Emissions

4.1 Configuration and Procedure

4.1.1 EUT Configuration

The EUT was set up on the non-conductive table that is 1.0 by 1.5 meter, 80cm above ground. The wall was 40cm to the rear of the EUT.

Power to the EUT was provided through the LISN. The impedance vs. frequency characteristic of the LISN is complied with the limit of standards used.

Both lines (neutral and hot) were connected to the LISN in series at testing. A coaxial-type connector which provides one 50 ohms impedance termination was connected to the test instrument. The excess length of the power cord was folded back and forth at the center of the lead to form a bundle 30cm to 40cm in length.

Any changes made to the configuration or modifications made to EUT during testing, are noted in the following test record.

If EUT has an extra auxiliary AC outlet which can provide power to an external monitor, all measurements will be made with the monitor power from EUT-mounted AC outlet and then from floor-mounted AC outlet.

4.1.2 Test Procedure

The system was set up as described above, with the EMI diagnostic software running. The main power line conducted EMI tests were run on both hot and neutral conductors of the power cord and the results were recorded. The effect of varying the position of the interface cables has been investigated to find the configuration that produces maximum emission.

At the frequencies where the peak values of the emissions were higher than 6dß below the applicable limits, the emissions were also measured with the quasi-peak detectors. At the frequencies where the quasi-peak values of the emissions were higher than 6dß below the applicable average limits, the emissions were also measured with the average detectors.

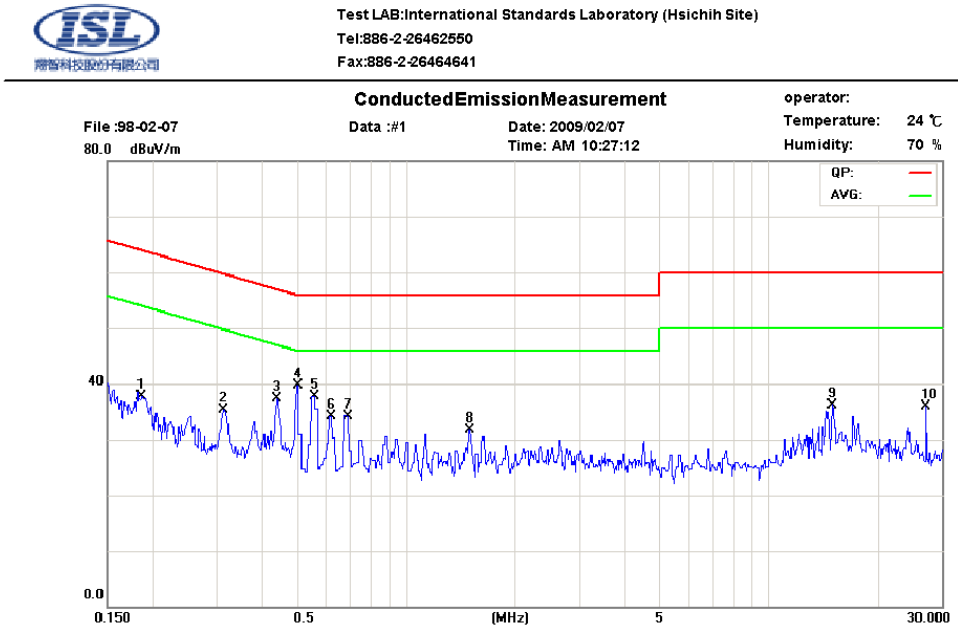
The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

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

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

4.2 Conduction Test Data: Configuration 1

Table 4.2.1 Power Line Conducted Emissions (Hot)



Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct dBuV/m	QP Limit dBuV/m	QP Margin dB	AVG Correct dBuV/m	AVG Limit dBuV/m	AVG Margin dB	Note
0.1884	0.18	0.08	41.90	64.1	-22.2	35.20	54.1	-18.9	
0.3154	0.19	0.09	35.40	59.8	-24.4	30.50	49.8	-19.3	
0.4423	0.19	0.11	38.20	57.0	-18.8	33.20	47.0	-13.8	
0.5000	0.19	0.12	40.80	56.0	-15.2	34.70	46.0	-11.3	
0.5562	0.2	0.12	41.40	56.0	-14.6	34.90	46.0	-11.1	
0.6237	0.2	0.13	42.80	56.0	-13.2	36.80	46.0	-9.20	
0.6912	0.2	0.13	38.10	56.0	-17.9	32.50	46.0	-13.5	
* 1.4900	0.22	0.21	47.20	56.0	-8.80	33.30	46.0	-12.7	
14.9375	0.59	0.73	25.90	60.0	-34.1	22.40	50.0	-27.6	
27.1250	0.63	0.94	27.80	60.0	-32.2	20.30	50.0	-29.7	

*:Maximum data x:Over limit

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.

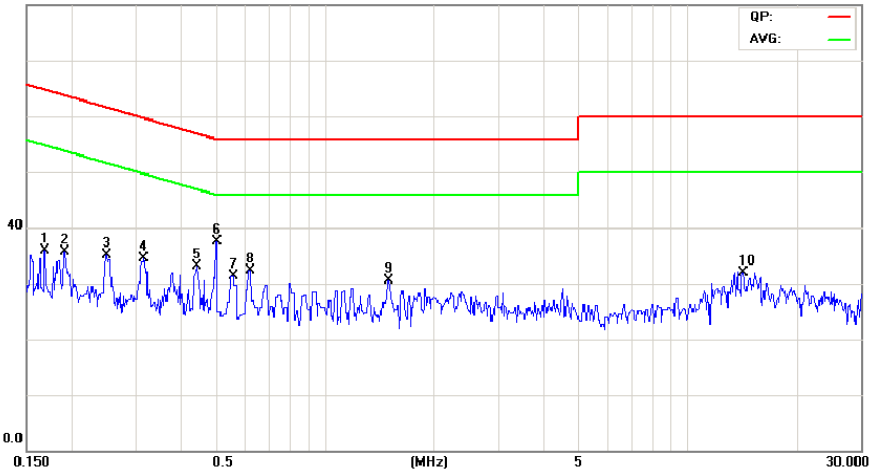
Table 4.2.2 Power Line Conducted Emissions (Neutral)

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

ConductedEmissionMeasurement

operator:
Temperature: 24 ℃
Humidity: 70 %

File :98-02-07 Data :#2 Date: 2009/02/07 Time: AM 10:32:03



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

Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct dBuV/m	QP Limit dBuV/m	QP Margin dB	AVG Correct dBuV/m	AVG Limit dBuV/m	AVG Margin dB	Note
0.1684	0.2	0.07	41.50	65.0	-23.5	34.90	55.0	-20.1	
0.1911	0.2	0.08	40.70	63.9	-23.2	34.30	53.9	-19.6	
0.2524	0.2	0.08	39.20	61.6	-22.4	33.80	51.6	-17.8	
0.3162	0.2	0.09	35.40	59.8	-24.4	30.50	49.8	-19.3	
0.4440	0.2	0.11	35.30	56.9	-21.6	30.40	46.9	-16.5	
0.5000	0.21	0.12	40.70	56.0	-15.3	34.70	46.0	-11.3	
* 0.5562	0.21	0.12	42.00	56.0	-14.0	35.80	46.0	-10.2	
0.6237	0.21	0.13	38.80	56.0	-17.2	33.00	46.0	-13.0	
1.4900	0.24	0.21	45.00	56.0	-11.0	32.80	46.0	-13.2	
14.1875	0.73	0.71	30.00	60.0	-30.0	26.90	50.0	-23.1	

*:Maximum data x:Over limit

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.

5. Open Field Radiated Emissions

5.1 Configuration and Procedure

5.1.1 EUT Configuration

The equipment under test was set up on a non-conductive table 80cm above ground, on a 10 meter open field or 10 meter chamber. The excess length of the power cord was folded back and forth at the center of the lead to form a bundle 30cm to 40cm in length.

Any changes made to the configuration, or modifications made to the EUT, during testing are noted in the following test record.

If EUT has an extra auxiliary AC outlet which can provide power to an external monitor, all measurements will be made with the monitor power from EUT-mounted AC outlet and then from floor-mounted AC outlet.

5.1.2 Test Procedure

The system was set up as described above, with the EMI diagnostic software running. The maximum emission was measured by varying the height of antenna and then by rotating the turntable. Both polarization of antenna, horizontal and vertical, were measured.

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. While doing so, the interconnecting cables and major parts of the system were moved around, the antenna height was varied between one and four meters, its polarization was varied between vertical and horizontal, and the turntable was slowly rotated, to maximize the emission. The highest emissions of frequency higher than 1000 MHz was analyzed in peak mode and/or average mode to determine the precise amplitude of the emission.

5.1.3 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

5.2 Radiation Test Data: Configuration 1

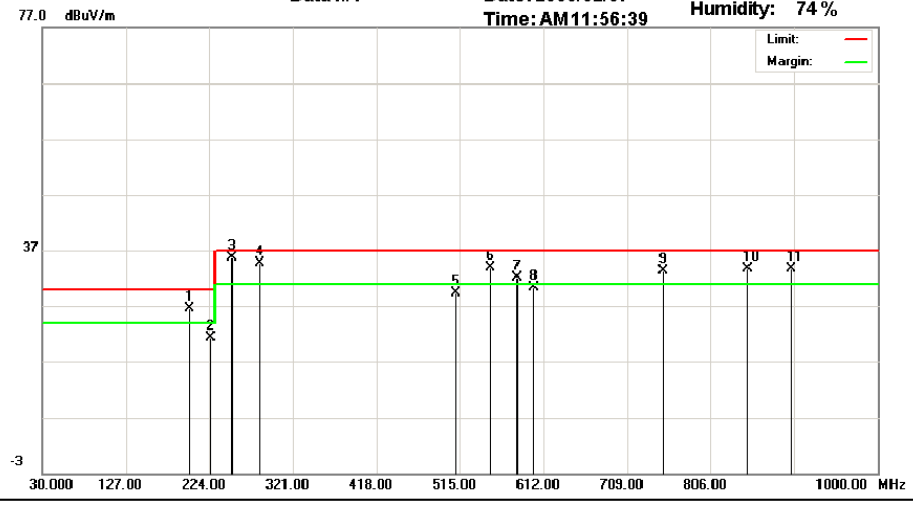
Table 5.2.1 Radiated Emissions (Horizontal)

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

RadiatedEmissionMeasurement

Operator:
Temperature: 19 ℃
Humidity: 74 %

File :98-02-07
Data :#1
Date: 2009/02/07
Time: AM11:56:39



Site : OATS 01
Condition : EN55022 ClassB 10M
Company:
EUT Model:
Execute Program:
Note :

Polarization: *Horizontal*
Power:
Witness: 10m

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
!	199.9920	11.36	12.72	2.28	0	26.44	30.00	-3.56	400	101	QP
	224.9900	8.33	10.65	2.42	0	21.40	30.00	-8.60	400	306	QP
*	250.0020	21.93	11.21	2.57	0	35.70	37.00	-1.30	366	54	QP
!	282.2000	19.00	13	2.75	0	34.75	37.00	-2.25	352	111	QP
	510.0500	7.71	17.8	3.86	0	29.37	37.00	-7.63	248	232	QP
!	550.0200	11.70	18.2	4.03	0	33.93	37.00	-3.07	226	184	QP
!	581.6150	9.50	18.52	4.16	0	32.18	37.00	-4.82	217	209	QP
	600.0100	7.31	18.7	4.24	0	30.25	37.00	-6.75	231	171	QP
!	750.0140	7.82	20.6	4.82	0	33.24	37.00	-3.76	236	178	QP
!	849.1000	6.28	22.19	5.21	0	33.68	37.00	-3.32	249	338	QP
!	900.0500	5.58	22.7	5.4	0	33.68	37.00	-3.32	212	360	QP

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

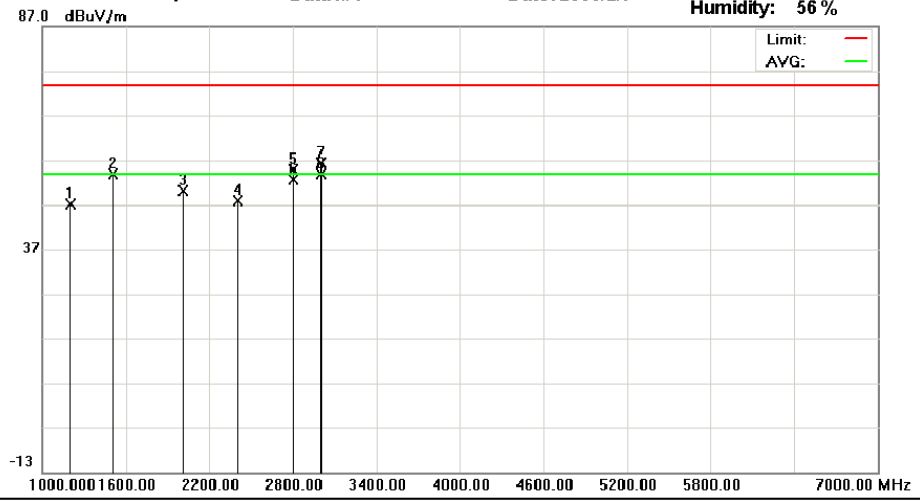
* Note:
Margin = Corrected Amplitude – Limit
Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
BILOG Antenna Distance: 10 meter, Frequency: under 1000MHz
Horn Antenna Distance: 3 meter, Frequency: 1000MHz—18GHz
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.
Above 1GHz test, if the peak measured value meets the average limit, it is unnecessary to perform the average measurement.

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

Radiated Emission Measurement

Operator:
Temperature: 20 ℃
Humidity: 56 %

File :98-02-07-1Gup Data :#4 Date: 2009/2/7



Site : OATS 01
Condition : FCC Class B Radiation
EUT :
Model Name :
Mode :
Note :

Polarization: *Horizontal*
Power:
Distance: 3m

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
	1199.880	35.11	24.68	5.46	18.24	47.01	74.00	-26.99	100	119	peak
	1499.870	40.52	25.4	6.3	18.3	53.92	74.00	-20.08	100	201	peak
	1999.940	33.19	27.4	7.5	18	50.09	74.00	-23.91	100	186	peak
	2399.800	29.19	28.28	8.22	17.76	47.93	74.00	-26.07	100	203	peak
	2799.760	33.71	29.52	9	17.46	54.77	74.00	-19.23	100	187	peak
	2799.760	31.68	29.52	9	17.46	52.74	54.00	-1.26	100	187	AVG
	2999.830	33.99	30.2	9.4	17.3	56.29	74.00	-17.71	100	147	peak
*	2999.830	31.49	30.2	9.4	17.3	53.79	54.00	-0.21	100	147	AVG

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

* Note:
Margin = Corrected Amplitude – Limit
Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
BILOG Antenna Distance: 10 meter, Frequency: under 1000MHz
Horn Antenna Distance: 3 meter, Frequency: 1000MHz—18GHz
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.
Above 1GHz test, if the peak measured value meets the average limit, it is unnecessary to perform the average measurement.

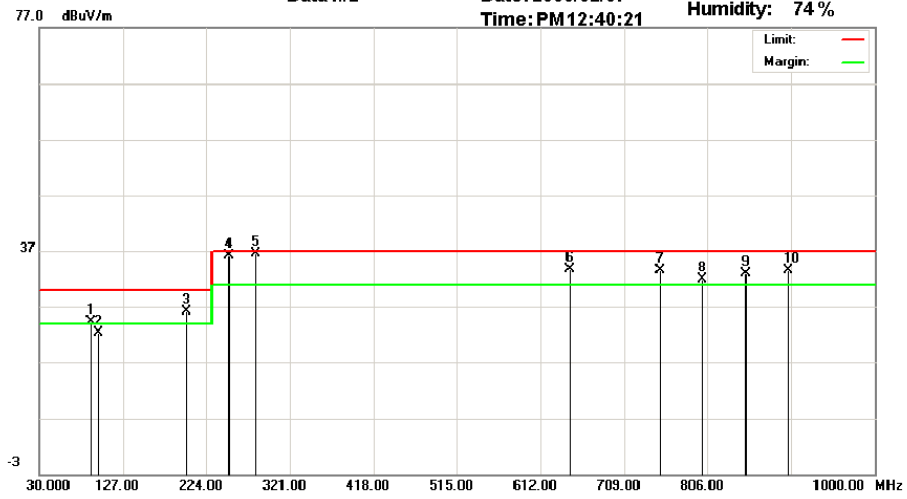
Table 5.2.1 Radiated Emissions (Vertical)

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

RadiatedEmissionMeasurement

Operator:
Temperature: 19 ℃
Humidity: 74 %

File :98-02-07
Data :#2
Date: 2009/02/07
Time: PM12:40:21



Site : OATS 01
Condition : EN55022 ClassB 10M
Company:
EUT Model:
Execute Program:
Note :

Polarization: Vertical
Power:
Witness: 10m

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
!	89.1910	15.46	7.4	1.54	0	24.40	30.00	-5.60	100	115	QP
	97.9145	11.39	9.22	1.61	0	22.22	30.00	-7.78	100	360	QP
!	200.0150	11.05	12.71	2.28	0	26.13	30.00	-3.87	100	261	QP
!	249.9960	22.33	11.21	2.57	0	36.10	37.00	-0.90	100	175	QP
*	280.8550	20.86	13	2.74	0	36.60	37.00	-0.40	100	360	QP
!	645.2500	9.49	19.79	4.41	0	33.69	37.00	-3.31	196	219	QP
!	749.9990	8.00	20.6	4.82	0	33.42	37.00	-3.58	192	196	QP
!	799.9800	5.52	21.4	5.01	0	31.93	37.00	-5.07	185	202	QP
!	849.8900	5.59	22.2	5.21	0	33.00	37.00	-4.00	190	150	QP
!	900.0900	5.47	22.7	5.4	0	33.57	37.00	-3.43	231	286	QP

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

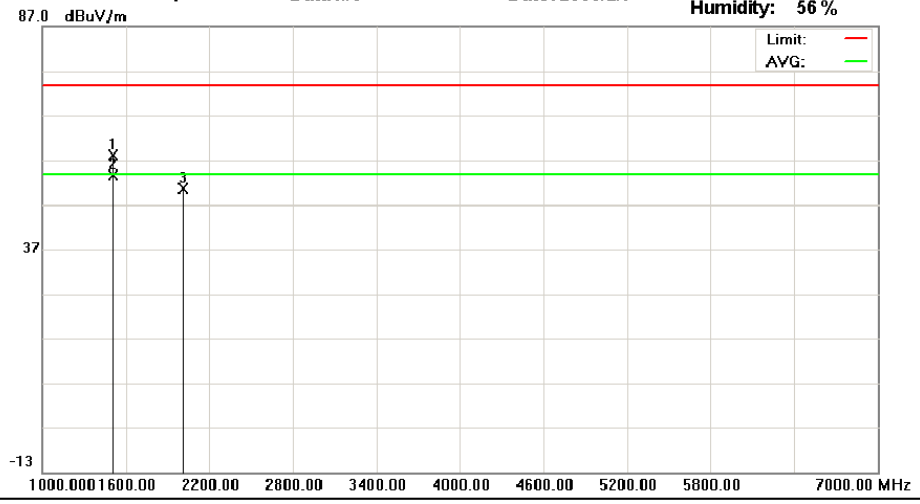
* Note:
Margin = Corrected Amplitude – Limit
Corrected Amplitude = Radiated Amplitude + Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
BILOG Antenna Distance: 10 meter, Frequency: under 1000MHz
Horn Antenna Distance: 3 meter, Frequency: 1000MHz—18GHz
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.
Above 1GHz test, if the peak measured value meets the average limit, it is unnecessary to perform the average measurement.

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

RadiatedEmissionMeasurement

File :98-02-07-1Gup Data :#3 Date: 2009/2/7

Operator:
Temperature: 20 ℃
Humidity: 56 %



Site : OATS 01
Condition : FCC Class B Radiation
EUT :
Model Name :
Mode :
Note :

Polarization: Vertical
Power:
Distance: 3m

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
	1500.000	44.78	25.4	6.3	18.3	58.18	74.00	-15.82	100	162	peak
*	1500.000	40.33	25.4	6.3	18.3	53.73	54.00	-0.27	100	162	AVG
	2000.000	33.84	27.4	7.5	18	50.74	74.00	-23.26	100	211	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
BILOG Antenna Distance: 10 meter, Frequency: under 1000MHz
Horn Antenna Distance: 3 meter, Frequency: 1000MHz—18GHz
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.
Above 1GHz test, if the peak measured value meets the average limit, it is unnecessary to perform the average measurement.

6. Appendix

6.1 Appendix A: Warning Labels

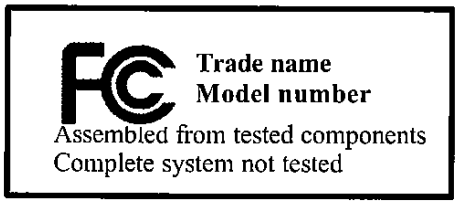
Label Requirements

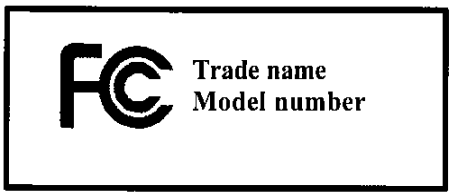
A Class B digital device subject to Declaration of Conformity of FCC shall carry a label which includes the following statement:

*** * * 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.





6.2 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.

6.3 Appendix C: Measurement Procedure for Powerline Conducted Emissions

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.

If the EUT is supplied with a flexible power cord, the power cord length in excess of the distance separating the EUT from the LISN shall be folded back and forth at the center of the lead so as to form a bundle not exceeding 40cm in length. If the EUT is provided with a permanently coiled power cord, bundling of the cord is not required. If the EUT is supplied without a power cord, the EUT shall be connected to the LISN by a power cord of the type specified by the manufacturer which shall not be longer than 1 meter. The excess power cord shall be bundled as described above. If a non-flexible power cord is provided with the EUT, it shall be cut to the length necessary to attach the EUT to the LISN and shall not be bundled.

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.

6.4 Appendix D: Test Procedure for Radiated Emissions

Preliminary Measurements in the Anechoic Chamber

The radiated emissions are initially measured in the anechoic chamber at a measurement distance of 3 meters. Desktop EUT are placed on a wooden stand 0.8 meter in height. The measurement antenna is 3 meters from the EUT. The test setup in anechoic chamber is the same as open site. The turntable rotated 360°. The antenna height is varied from 1-2.5m. The primary objective of the radiated measurements in the anechoic chamber is to identify the frequency spectrum in the absence of the electromagnetic environment existing on the open test site. The frequencies can then be pre-selected on the open test site to obtain the corresponding amplitude. The initial scan is made with the spectrum analyzer in automatic sweep mode. The spectrum peaks are then measured manually to determine the exact frequencies.

Measurements on the Open Site or 10m EMC Chamber

The radiated emissions test will then be repeated on the open site or 10m EMC 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 3 or 10 meter open field sites. Desktop EUT are set up on a wooden stand 0.8 meter above the ground.

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. Both reading are recorded with the quasi-peak detector with 120KHz bandwidth. For frequency between 30 MHz and 1000MHz, the reading is recorded with peak detector or quasi-peak detector. For frequency above 1 GHz, the reading is recorded with peak detector or average detector with 1 MHz bandwidth.

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.

6.5 Appendix E: Test Equipment

6.5.1 Test Equipment List

Equipment List for ISL HC LAB

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conduction	Coaxial Cable 1F-C1	Harbourindustries	RG400	1F-C1	10/23/2008	10/23/2009
Conduction	Hygro-Thermo Meter 11	N/A	TH-400	ISL-002	02/19/2008	02/19/2009
Conduction	LISN 02	EMCO	3825/2	1407	07/07/2008	07/07/2009
Conduction	LISN 03	R&S	ESH3-Z5 831.5518.52	828874/010	07/07/2008	07/07/2009
Conduction	ISN T2 03	FCC	FCC-TLISN-T2-02	20618	08/05/2008	08/05/2009
Conduction	ISN T4 05	FCC	FCC-TLISN-T4-02	20619	08/06/2008	08/06/2009
Conduction	ISN T8 03	FCC	FCC-TLINS-T8-02	20620	08/05/2008	08/05/2009
Conduction	EMI Receiver 08	Schwarzbeck Mess-Elektronik	FCKL 1528	1528-202	09/05/2008	09/05/2009
Conduction	Spectrum Analyzer 05	HP	8594EM	3619A00192	02/19/2008	02/19/2009
Radiation	BILOG Antenna 10	Sumol Sciences	JB1	A013004-1	07/24/2008	07/24/2009
Radiation	Coaxial Cable 3F-10M	MIYAZAKI	8D-8F	10M-1	10/23/2008	10/23/2009
Radiation	Coaxial Cable 3F-3M	BELDEN	RG-8/U	3F-3M	10/23/2008	10/23/2009
Radiation	Spectrum Analyzer 12	Advantest	R3132	130200208	03/05/2008	03/05/2009
Radiation	Hygro-Thermo Meter 10	N/A	TH-400	ISL-001	02/19/2008	02/19/2009
Rad. above 1Ghz	Horn Antenna 01	EMCO	3115	9504-4462	11/04/2008	11/04/2009
Rad. above 1Ghz	Horn Antenna 03	COM-Power	AH-826	100A	02/20/2008	02/20/2009
Rad. above 1Ghz	Microwave Cable RF07-3	HUBER+SUHNER AG.	Sucoflex 103	42728/3	07/17/2008	07/17/2009
Rad. above 1Ghz	Preamplifier 01	R&S	ESMI-Z7	1045.502	07/17/2008	07/17/2009
Radiation	Signal Generator 01	HP	8656B	2635A04675	08/21/2008	08/21/2009
Radiation	EMI Receiver 09	Schwarzbeck Mess-Elektr	FCVU 1534	1534-150	05/08/2008	05/08/2009

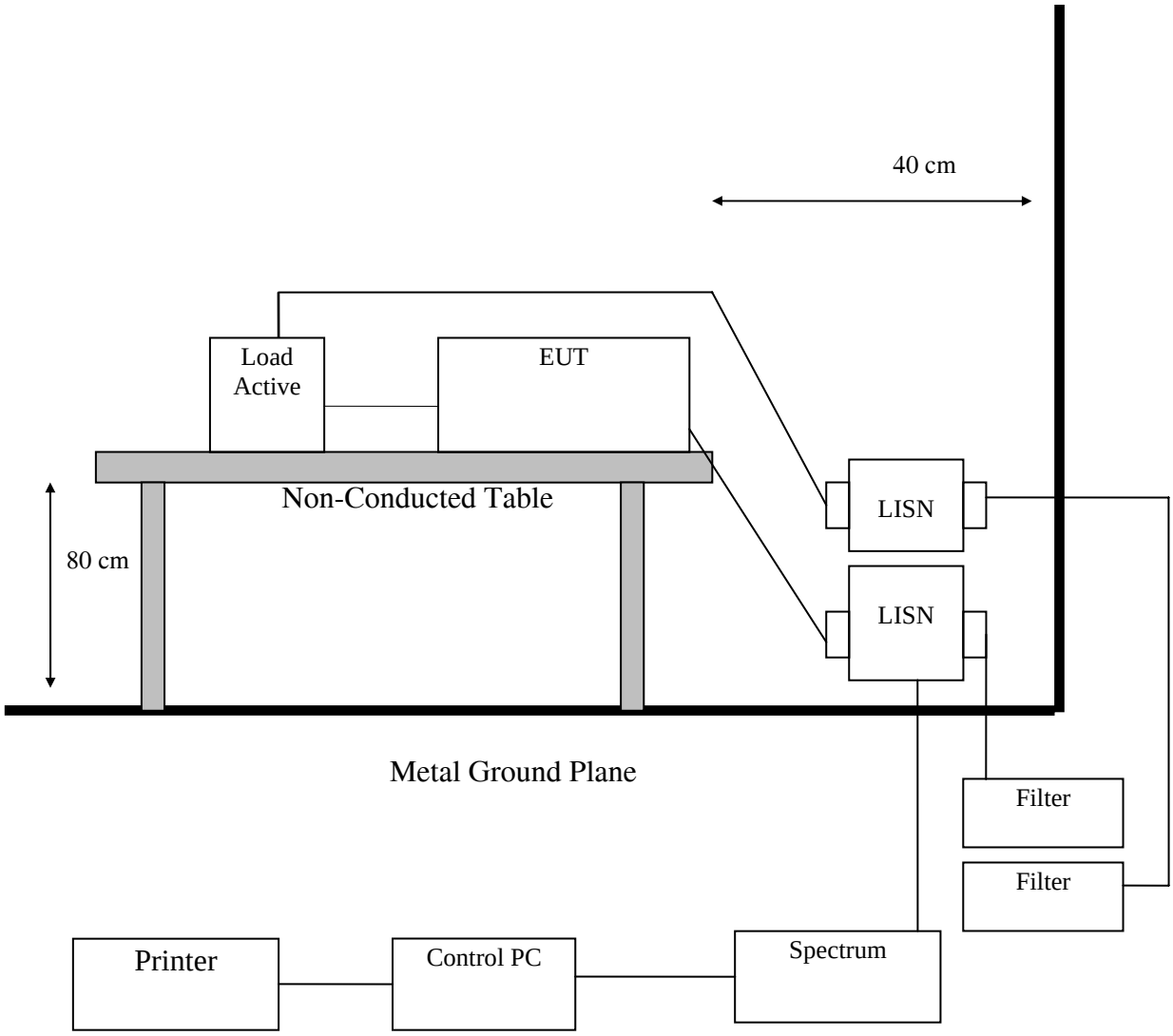
		onik				

6.5.2 Software for Controlling Spectrum/Receiver and Calculating Test Data

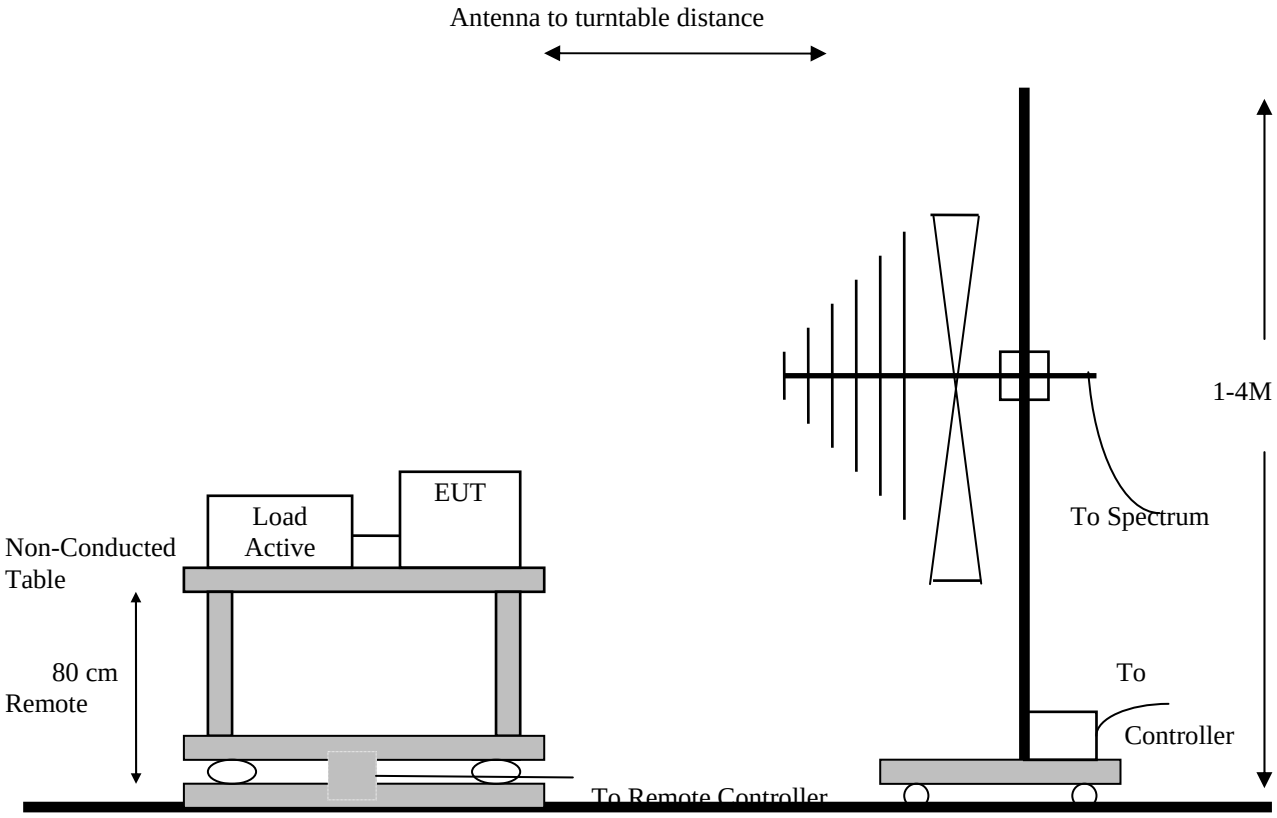
Radiation/Conduction	Filename	Version	Issued Date
Hsichih Conduction	EZ EMC	1.1.4.2	2/10/2007
Hsichih Radiation	EZ EMC	1.1.4.2	1/24/2007
Lung_Tan Conduction	EZ EMC	1.1.4.2	2/10/2007
Lung_Tan Radiation	EZ EMC	1.1.4.2	1/24/2007

6.6 Appendix F: Layout of EUT and Support Equipment

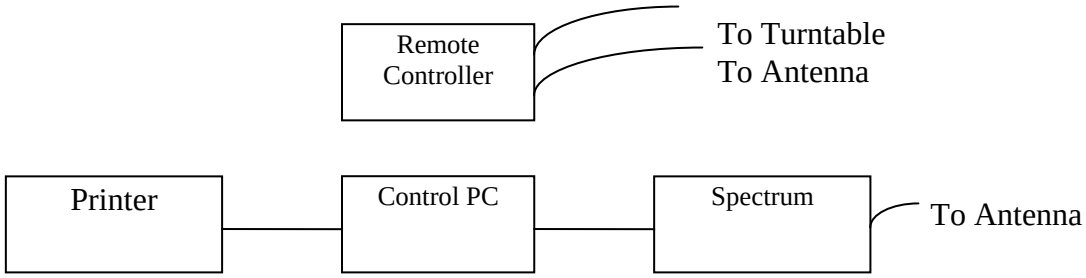
6.6.1 General Conducted Test Configuration



6.6.2 General Radiation Test Configuration



Metal Full Soldered Ground Plane



Note: BILOG Antenna Distance: 10 meter, Frequency: under 1000MHz
Horn Antenna Distance: 3 meter, Frequency: 1000MHz-18GHz

6.7 Appendix G: 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>: ±2.946dB

<OATS 01 (3M)>
1GHz~18GHz: ±3.343dB
18GHz~26GHz: ±3.583dB

<OATS 01 (10M)>
30MHz~1GHz: ±2.547dB

6.8 Appendix H: Photographs of EUT Configuration Test Set Up

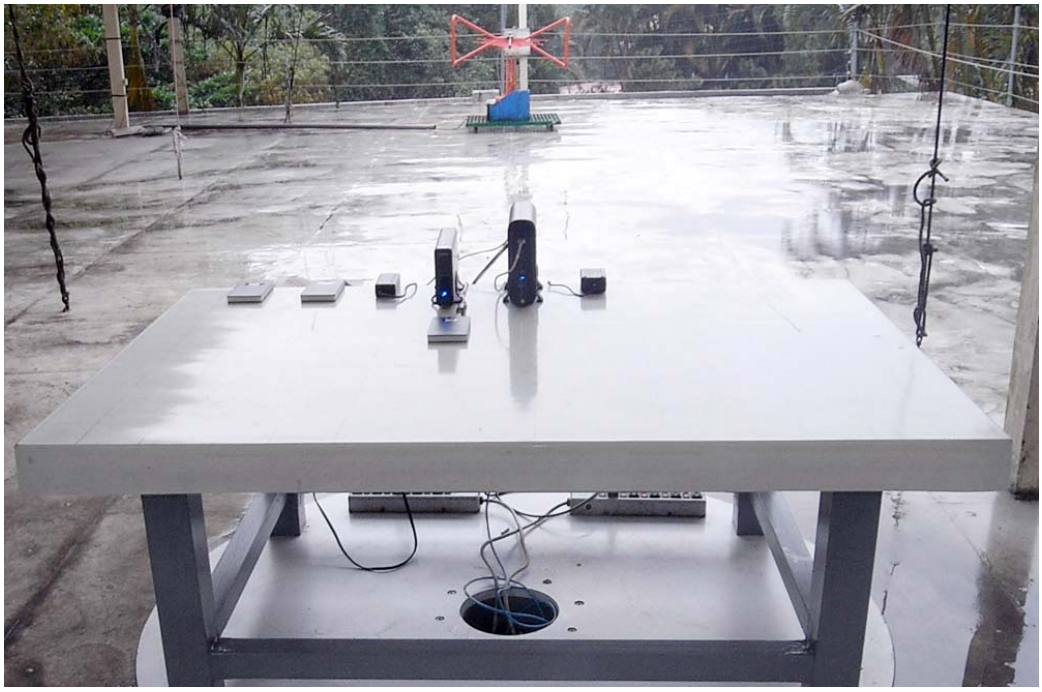
The measurement results along with the appropriate limits for comparison shall be presented in tabular form. If an alternate test method is used, the test report must identify that method and justification for its use shall be provided. Instrumentation, instrument attenuator and bandwidth settings, detector function, EUT arrangements, a sample calculation with all conversion factors and all other pertinent details shall be included along with the measurement results. When automatic scan techniques are used, an explanation of how each emission from the EUT was maximized shall be included in the test report along with the scan rate used to obtain each level.

The justification for selecting a particular EUT configuration and particular length of interface cable to produce maximized emissions must be documented in the test report. Photographs clearly showing the test set-up and interface cable arrangement for the highest radiated and line conducted emission measured shall be included.

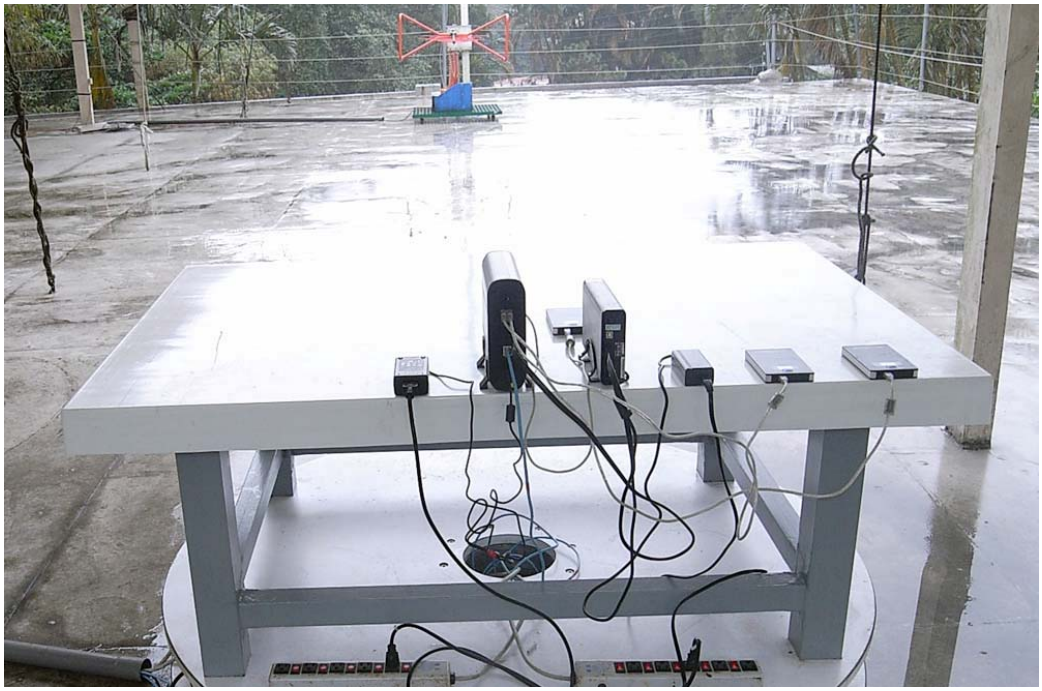
The Front View of Highest Conducted Set-up For EUT

The Back View of Highest Conducted Set-up For EUT

The Front View of Highest Radiated Set-up For EUT



The Back View of Highest Radiated Set-up For EUT



6.9 Appendix I: Photographs of EUT

Please refer to the File of **ISL-*09HE051*P**