HomeTek Technology Inc.

ADDRESS: No. 67-9, Shir Men Road, Tu Cheng City,
Taipei Hsien, Taiwan
PHONE : 886-2-22608375 FAX : 886-2-22748013
E - mail : hometek@ms15.hinet.net

# FCC TEST REPORT
# FOR

| | | |
|---|---|---|
| APPLICANT | : | QNAP SYSTEMS, INC |
| ADDRESS | : | 21F, No. 77, Sec. 1, Xintai 5th Rd, |
| | | Xizhi City, Taipei County, 221 Taiwan |
| EUT | : | Network Attached Storage |
| MODEL NO. | : | TS-109 Pro, TS-109, VioStor-109, VioStor-109P, VioStor-109V, VioStor-109A, VioStor-109C, VioStor-109D, VioStor-109S, VioStor-109PA, VioStor-109VA, VioStor-109CA, VioStor-109SA, VioStor-109AA, VioStor-109DA, TS-109 Pro II, TS-109 II, TS-109 Pro III, TS-109 III |

NVLAP Lab Code:200331-0

Accredited by the National Voluntary Laboratory Accreditation Program
for the specific scope of accreditation under Lab Code 200331-0

MEASUREMENT PROCEDURE USED

FCC RULES AND CISPR 22-1997 AND FCC / ANSI C63.4-2003

PREPARED BY :

HomeTek Technology Inc.

No. 67-9, Shir Men Road, Tu Cheng City,

Taipei Hsien. Taiwan

Report # : FD7E001

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EMC LAB HomeTek
HomeTek Technology Inc.

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E - mail : hometek@ms15.hinet.net

NVLAP
NVLAP Lab Code:200331-0

# CERTIFICATION

## for

## FCC Part 15, Subpart B Class B

APPLICANT : QNAP SYSTEMS, INC
ADDRESS : 21F, No. 77, Sec. 1, Xintai 5th Rd,
Xizhi City, Taipei County, 221 Taiwan
Receipt Date : 05/15/2007 Final Test Date: 06/01/2007
EUT : Network Attached Storage
MODEL NO. : TS-109 Pro, TS-109, VioStor-109, VioStor-109P, VioStor-109V, VioStor-109A, VioStor-109C, VioStor-109D, VioStor-109S, VioStor-109PA, VioStor-109VA, VioStor-109CA, VioStor-109SA, VioStor-109AA, VioStor-109DA, TS-109 Pro II, TS-109 II, TS-109 Pro III, TS-109 III

MEASUREMENT PROCEDURE USED :
PART 15 SUBPART B FCC RULES AND CISPR 22-1997
AND FCC / ANSI C63.4-2003
TEST PROCEDURE AND DATA ARE TRACEABLE TO NIST/USA,
TL or NML/TAIWAN.

- THE MAXIMUM EMISSION LEVELS WERE COMPARED TO THE CISPR 22 CLASS B LIMITS BOTH RADIATED AND CONDUCTED EMISSION.
- THE ABOVE DEVICE WAS TESTED BY HOMETEK TECHNOLOGY INC. TO SHOWS THE MAXIMUM EMISSION LEVEL FROM THE DEVICE.
- THIS TEST RESULTS OF THIS REPORT APPLIES TO ABOVE TESTED SAMPLE ONLY.
- THIS TEST REPORT SHALL NOT BE REPRODUCE IN PART WITHOUT WRITTEN APPROVAL OF HOMETEK TECHNOLOGY INC.
- THE REPORT MUST NOT BE USED BY THE CLIENT TO CLAIM PRODUCT ENDORSEMENT BY NVLAP, NIST OR ANY AGENCY OF THE U. S. GOVERNMENT.
- THE TEST RESULTS ARE TRACEABLE TO THE NATIONAL OR INTERNATIONAL STANDARD.

The new series model no. for OEM manufacturer

APPROVED BY : 5/13/2008

ALAIN LIN / Supervisor

## GENERAL INFORMATION

1 APPLICANT : QNAP SYSTEMS, INC

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

3 MANUFACTURER : QNAP SYSTEMS, INC

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

5 DESCRIPTION OF EUT :

EUT : Network Attached Storage

FCC ID : N/A

Model Number : TS-109 Pro, TS-109, VioStor-109, VioStor-109P, VioStor-109V, VioStor-109A, VioStor-109C, VioStor-109D, VioStor-109S, VioStor-109PA, VioStor-109VA, VioStor-109CA, VioStor-109SA, VioStor-109AA, VioStor-109DA, TS-109 Pro II, TS-109 II, TS-109 Pro III, TS-109 III

Serial # : N/A

5.1 The difference among series of models TS-109 Pro, TS-109, VioStor-109, VioStor-109P, VioStor-109V, VioStor-109A, VioStor-109C, VioStor-109D, VioStor-109S, VioStor-109PA, VioStor-109VA, VioStor-109CA, VioStor-109SA, VioStor-109AA and VioStor-109DA TS-109 Pro II, TS-109 II, TS-109 Pro III, TS-109 III are for different in OEM manufactures. The model TS-109 Pro is worst case, and the final test data were shown in this test report.

## 6 FEATURES OF EUT :

**Please refer to user manual or product specification.**

## 7 TEST MODE :

The EUT were investigated with three operation modes shown as below :

(1) 10M-10M Mode;
(2) 100M-100M Mode;
(3) 1G-1G Mode

The test mode of (3) 1G-1G is worst case, and the final test data were shown in this test report.

**MODIFICATION LIST**

THE FOLLOWING ACCESSORIES WERE ADDED TO THE EUT DURING TESTING :

NO MODIFICATION BY HOMETEK TECHNOLOGY INC.

# CONDUCTED POWER LINE TEST

## 1 TEST INSTRUMENTS & FACILITIES

The following test Instruments was used during the conducted test :

| Item | Instruments/ Facilities | Specification | Manufacturer | Model # S/N | Date Of Cal. |
|---|---|---|---|---|---|
| 1 | EMI Receiver | 9KHz ~ 30MHz | ROHDE & SCHWARZ | ESHS 30 844827/007 | FEB/2007 |
| 2 | LISN (for EUT) | 50Ω/50uH/100A 150KHz ~ 30MHz | SCHWARZ BECK | NNLK 8121 8121370 | OCT/2006 |
| 3 | LISN (for Support Unit) | 50Ω/50uH/10A 9KHz ~ 30MHz | ROHDE & SCHWARZ | ESH3-Z5 846128/007 | MAR/2007 |
| 4 | Terminator | 50Ω | N/A | N/A | NOV/2006 |
| 5 | Attenuation | 50Ω/10dB | Mini-Circuit | NAT-10 AT-002 | JUL/2006 |
| 6 | Cable | 5.4m | SUHNER | RG-223 CON2-002 | AUG/2006 |
| 7 | ESXS-K1 (software) | Version 2.03b 9KHz ~ 30MHz | ROHDE & SCHWARZ | 1082.9678.02 840.913/246 | N/A |

Note : Items 1 ~ 6 were calibrated within period of 1 year.

## 2 TEST PROCEDURE

2.1 The EUT was tested according to **ANSI C63.4 – 2003 Section 5.2, 7.1, 7.2 & CISPR 22 - 1997 & C18-01-12 (HomeTek test procedure)**.

2.2 The EUT was placed 0.4 meter from the conducting wall of shielding room and kept at least 0.8 meter from any other grounded conducting surface.

2.3 The frequency range form 0.15 MHz to 30 MHz was investigated.

2.4 The LISN used was 50 Ohm / 50 uHenry as specified by Section 4.1.2 of **ANSI C63.4 - 2003**.

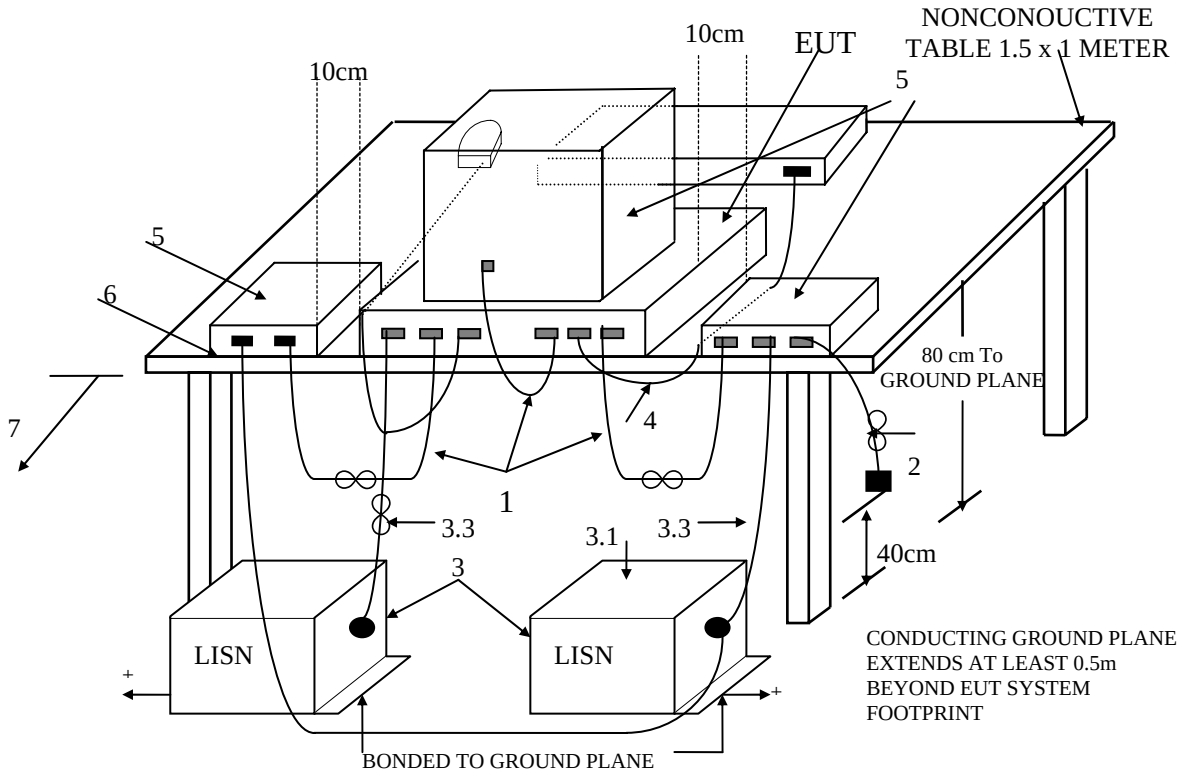
2.5 All the support peripherals are connect to the other LISN.

2.6 Cables and peripherals were moved to find the maximum emission levels for each frequency.

# 3 TEST SETUP

## 3.1 Typical : Setup Of Conducted Test

ELECTRICAL AND ELECTRONIC EQUIPMENT IN THE RANGE OF 9kHz TO 40 GHz — ANSI C63.4-2003




+LISNs may have to be moved to the side to meet 3.3 below.

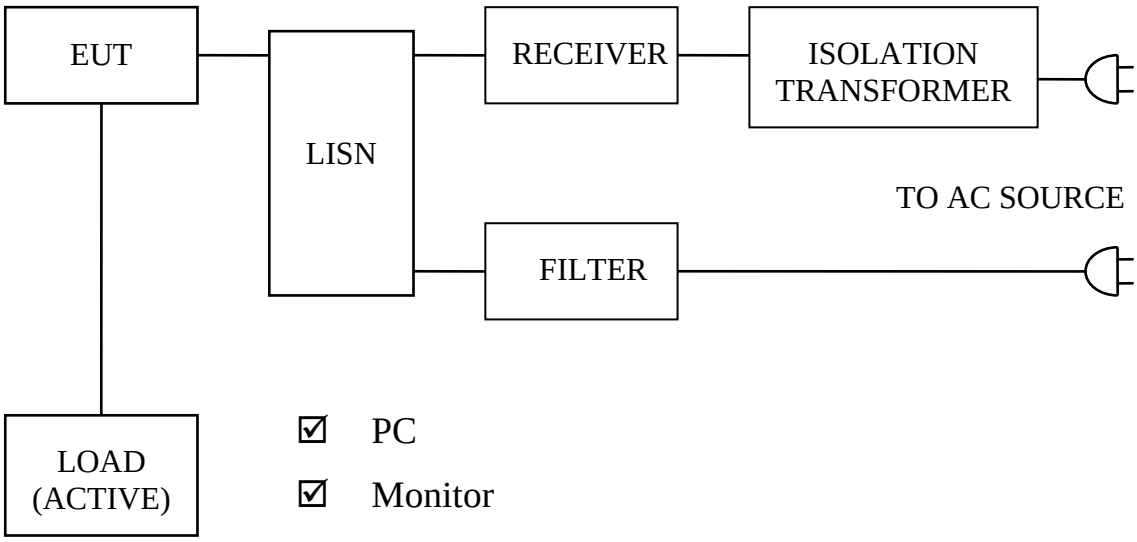
(Details for setup configuration, please refer to appendix A.)

LEGEND:

1. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 to 40 cm long, hanging approximately in the middle between ground plane and table.
2. I/O cables that are connected to a peripheral shall be bundled in center. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1m.
3. EUT connected to one LISN. Unused LISN connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, ground plane.
   - 3.1 All other equipment powered from second LISN.
   - 3.2 Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
   - 3.3 LISN at least 80 cm from nearest part of EUT chassis.
4. Cables of hand-operated devices, such as keyboards, mouses, etc., have to be placed as close as possible to the host.
5. Non-EUT components being tested.
6. Rear of EUT, including peripherals, shall be all aligned and flush with rear of tabletop.
7. Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the floor ground plane (see 5.2).

**Test Configuration**
**Tabletop Equipment Conducted Emission**

3.2 Block Diagram Of Conducted Test




- ☑ PC
- ☑ Monitor
- ☑ Printer
- ☑ Modem
- ☑ Mouse
- ☑ Key Board
- ☑ Mobile Disk x 3
- ☑ External HDD
- ☑ Power Adapter

# 4 CONFIGURATION OF THE EUT

The EUT was configured according to **ANSI C63.4 - 2003 & CISPR 22 - 1997**. All I/O ports were connected to the appropriate peripherals. All peripherals and cables are listed below (including internal device) :

## 4.1 EUT

| | | |
|---|---|---|
| EUT Type | : | ☐Proto Type ☑Engineer Type ☐Mass Production |
| Condition when received | : | ☑Good ☐Damage : _____ |
| Device | : | Network Attached Storage |
| Applicant | : | QNAP SYSTEMS, INC |
| Manufacturer | : | QNAP SYSTEMS, INC |
| Model Number | : | TS-109 Pro, TS-109, VioStor-109, VioStor-109P, VioStor-109V, VioStor-109A, VioStor-109C, VioStor-109D, VioStor-109S, VioStor-109PA, VioStor-109VA, VioStor-109CA, VioStor-109SA, VioStor-109AA, VioStor-109DA, TS-109 Pro II, TS-109 II, TS-109 Pro III, TS-109 III |
| Serial Number | : | N/A |
| FCC ID | : | N/A |
| USB Port x 3 | : | Metal Type Connector |
| RJ-45 Port | : | Plastics Type Connector |
| e SATA Port | : | Metal Type Connector |
| Power Cord (AC) | : | Un-Shielded, 1.8 m, 3 pin |
| Power Cord (DC) | : | Un-Shielded, 1.8 m, 2 pin |
| Power Supply Type | : | Switching Power Adapter |

4.2 PERIPHERALS

☑ Host Personal Computer

| | | |
|---|---|---|
| Manufacturer | : | HP/COMPAQ |
| Model Number | : | dc7700CMT |
| Serial Number | : | SGH6510V4B |
| FCC ID | : | FCC DoC |
| Data Cable | : | Un-Shielded, 1.8 m, Connect to the RJ-45 Port |
| Power Cord | : | Un-Shielded, 1.8 m |

☑ Monitor

| | | |
|---|---|---|
| Manufacturer | : | SAMSUNG |
| Model Number | : | GH19BS |
| Serial Number | : | GH19H4JW103538B |
| FCC ID | : | FCC DoC |
| Data Cable | : | Shielded, 1.5 m, Connected to the VGA port |
| Power Cord | : | Un-Shielded, 1.8 m |

☑ Printer

| | | |
|---|---|---|
| Manufacturer | : | HP |
| Model Number | : | DJ400 |
| Serial Number | : | MY7781C1BB |
| FCC ID | : | B94C2642X |
| Data Cable | : | Shielded, 1.5 m, Connected to the Printer port |
| Power Cord & Adaptor | : | Un-Shielded, 1.8 m |

☑ Modem

| | | |
|---|---|---|
| Manufacturer | : | ACEEX |
| Model Number | : | 1414 |
| Serial Number | : | 9013524 |
| FCC ID | : | IFAXDM1414 |
| Data Cable | : | Shielded, 1.5 m, Connected to the COM port |
| Power Cord & Adaptor | : | Un-Shielded, 1.8 m |

☑ Mouse (PSII)

| | | |
|---|---|---|
| Manufacturer | : | HP |
| Model Number | : | M-S69 |
| Serial Number | : | 334684-002 |
| FCC ID | : | FCC DoC |
| Data Cable | : | Shielded, 1.8 m, Connected to the PSII port |
| Power Cord | : | N/A |

☑ KeyBoard (PSII)

| | | |
|---|---|---|
| Manufacturer | : | HP |
| Model Number | : | KB-0133 |
| Serial Number | : | 323686-AB1 |
| FCC ID | : | FCC DoC |
| Data Cable | : | Shielded, 1.5 m, Connected to the PSII port |
| Power Cord | : | N/A |

☑ Mobile Disk x 3

| | | |
|---|---|---|
| Manufacturer | : | A DATA |
| Model Number | : | PD4 (256M) |
| Serial Number | : | N/A |
| FCC ID | : | N/A |
| Data Cable | : | Connected to the USB port |
| Power Cord | : | N/A |

☑ External HDD

| | | |
|---|---|---|
| Manufacturer | : | RAIDON |
| Model Number | : | U6-2S-S2 |
| Serial Number | : | N/A |
| FCC ID | : | N/A |
| Data Cable | : | Shielded, 1 m, Connected to the e SATA port |
| Power Cord | : | Shielded, 1.8 m |

☑ Power Adapter

| | | |
|---|---|---|
| Manufacturer | : | DVE |
| Model Number | : | DSA-04215-121 |
| Serial Number | : | N/A |
| FCC ID | : | N/A |
| Data Cable | : | N/A |
| Power Cord | : | Un-Shielded, 1.8 m |

4.3 Internal Devices

☑ HDD

| | | |
|---|---|---|
| Manufacturer | : | WD |
| Model Number | : | WD1600AAJS |
| FCC ID | : | N/A |

4.4 REMARK : N/A

# 5 EUT OPERATING CONDITION

5.1 The crystal frequencies of the EUT are 32.768 KHz, 12 MHz and 25 MHz.

5.2 Configure the EUT according to the **ANSI C63.4 - 2003 & CISPR 22 - 1997**.

5.3 The test configuration included: PC, monitor, printer, modem, mouse, keyboard, external BOX, external HDD, mobile disk.

5.4 Connect USB external HDD and EUT.

5.5 Connect RJ-45 cable from PC to EUT, and connect necessary peripheral to PC with appropriate cables.

5.6 Turn on all the power of EUT and peripheral.

5.7 Execute read-write program at PC under windows to exercise the EUT via RJ-45 cable.

5.8 Measure the maximum emission noise.

**5.9 The photos of conducted test configuration, please refer to appendix A.**

# 6 LIMIT OF CONDUCTED POWER LINE EMISSION CLASS B

| Frequency Range | Quasi Peak | Average |
|---|---|---|
| 0.15 ~ 0.5 MHz | 66 - 56 dBuV | 56 - 46 dBuV |
| 0.5 ~ 5 MHz | 56 dBuV | 46 dBuV |
| 5 ~ 30 MHz | 60 dBuV | 50 dBuV |

6.1 In the above table, the tighter limit applies at the band edges.

# 7 RESULT OF CONDUCTED POWER LINE TEST

7.1 The frequency range from 0.15 MHz to 30 MHz was investigated. All readings are quasi-peak values and average.

7.2 IF bandwidth : 9 kHz, Meas Time : 1 sec.

7.3 Temperature : 25 ℃, Humidity : 61 % RH.

7.4 Deviations from the test standards and rules : None

7.5 The conducted test result were gained by following procedures :
Level = Reading Level + Insertion Loss of LISN + Cable Loss
(All calculation were done by ESHS30 EMI test receiver.)

7.6 Result : **PASSED**

# 8 CONDUCTED POWER LINE TEST DATA (PAGE 1)

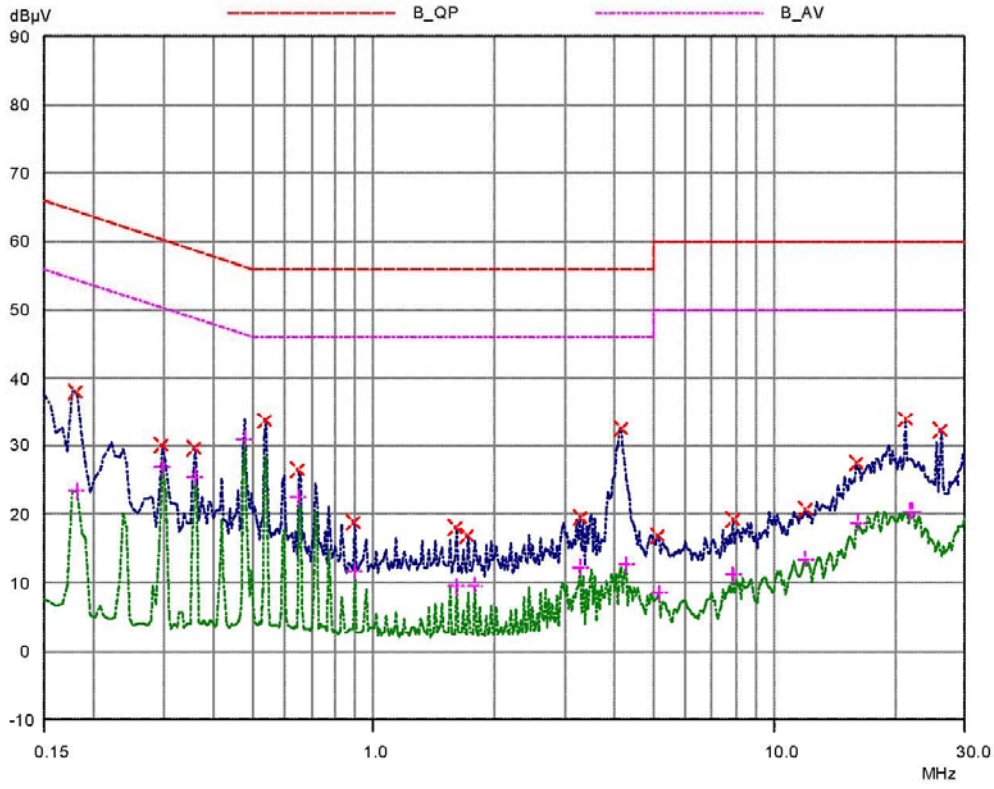
HomeTek EMC LAB. TEL :886-2-22608375

24 May 2007 10:49

CONDUCTED EMISSIONS

| | |
|---|---|
| EUT: | Network Attached Storage |
| Manuf: | 6E033 |
| Op Cond: | LINE 1 |
| Operator: | LIAO |
| Test Spec: | FOR CISPR22 CLASS B |
| Comment: | 110V/60Hz<br>TS-109 Pro(1Gbps-1Gbps) |
| Result File: | 6e03313b.dat : TS-109 Pro(1Gbps-1Gbps) |

| | | |
|---|---|---|
| Prescan Measurement: | Detectors: | X PK / + AV |
| | Meas Time: | see scan settings |
| | Subranges: | 16 |
| | Acc Margin: | 55 dB |



# 9 CONDUCTED POWER LINE TEST DATA (PAGE 2)

HomeTek EMC LAB. TEL :886-2-22608375 24 May 2007 10:49

CONDUCTED EMISSIONS

| | |
|---|---|
| EUT: | Network Attached Storage |
| Manuf: | 6E033 |
| Op Cond: | LINE 1 |
| Operator: | LIAO |
| Test Spec: | FOR CISPR22 CLASS B |
| Comment: | 110V/60Hz<br>TS-109 Pro(1Gbps-1Gbps) |
| Result File: | 6e03313b.dat : TS-109 Pro(1Gbps-1Gbps) |

| | | |
|---|---|---|
| Prescan Measurement: | Detectors: | X PK / + AV |
| | Meas Time: | see scan settings |
| | Subranges: | 16 |
| | Acc Margin: | 55 dB |

Peak Search Results

| Frequency MHz | PK Level dBµV | PK Limit dBµV | PK Delta dB |
|---|---|---|---|
| 0.18 | 38.00 | 64.49 | 26.49 |
| 0.295 | 30.10 | 60.38 | 30.28 |
| 0.355 | 29.60 | 58.84 | 29.24 |
| 0.535 | 33.78 | 56.00 | 22.22 |
| 0.65 | 26.38 | 56.00 | 29.62 |
| 0.89 | 18.83 | 56.00 | 37.17 |
| 1.6 | 17.98 | 56.00 | 38.02 |
| 1.72 | 16.89 | 56.00 | 39.11 |
| 3.26 | 19.58 | 56.00 | 36.42 |
| 4.12 | 32.51 | 56.00 | 23.49 |
| 5.1 | 16.96 | 60.00 | 43.04 |
| 7.83 | 19.17 | 60.00 | 40.83 |
| 11.92 | 20.71 | 60.00 | 39.29 |
| 16.01 | 27.34 | 60.00 | 32.66 |
| 21.18 | 34.01 | 60.00 | 25.99 |
| 25.92 | 32.26 | 60.00 | 27.74 |

| Frequency MHz | AV Level dBµV | AV Limit dBµV | AV Delta dB |
|---|---|---|---|
| 0.18 | 23.44 | 54.49 | 31.05 |
| 0.295 | 26.82 | 50.38 | 23.56 |
| 0.355 | 25.52 | 48.84 | 23.32 |
| 0.475 | 30.98 | 46.43 | 15.45 |
| 0.65 | 22.42 | 46.00 | 23.58 |
| 0.89 | 11.69 | 46.00 | 34.31 |
| 1.6 | 9.45 | 46.00 | 36.55 |
| 1.78 | 9.63 | 46.00 | 36.37 |
| 3.26 | 12.22 | 46.00 | 33.78 |
| 4.27 | 12.55 | 46.00 | 33.45 |
| 5.16 | 8.55 | 50.00 | 41.45 |
| 7.83 | 11.19 | 50.00 | 38.81 |
| 11.92 | 13.43 | 50.00 | 36.57 |
| 16.19 | 18.68 | 50.00 | 31.32 |
| 21.94 | 20.36 | 50.00 | 29.64 |
| 22.12 | 20.43 | 50.00 | 29.57 |

* limit exceeded

# 10 CONDUCTED POWER LINE TEST DATA (PAGE 3)

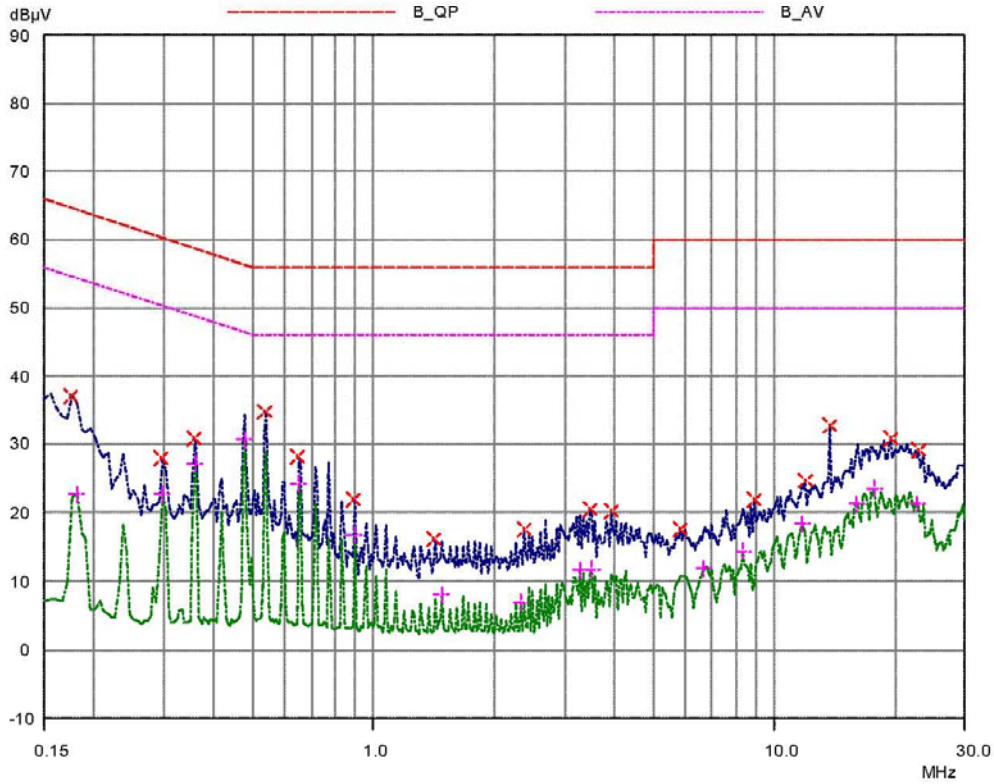
HomeTek EMC LAB. TEL :886-2-22608375

24 May 2007 10:54

CONDUCTED EMISSIONS

| | |
|---|---|
| EUT: | Network Attached Storage |
| Manuf: | 6E033 |
| Op Cond: | LINE 2 |
| Operator: | LIAO |
| Test Spec: | FOR CISPR22 CLASS B |
| Comment: | 110V/60Hz |
| | TS-109 Pro(1Gbps-1Gbps) |
| Result File: | 6e03323b.dat : TS-109 Pro(1Gbps-1Gbps) |

| | | |
|---|---|---|
| Prescan Measurement: | Detectors: | X PK / + AV |
| | Meas Time: | see scan settings |
| | Subranges: | 16 |
| | Acc Margin: | 55 dB |



# 11 CONDUCTED POWER LINE TEST DATA (PAGE 4)

HomeTek EMC LAB. TEL :886-2-22608375 24 May 2007 10:54

CONDUCTED EMISSIONS

| | |
|---|---|
| EUT: | Network Attached Storage |
| Manuf: | 6E033 |
| Op Cond: | LINE 2 |
| Operator: | LIAO |
| Test Spec: | FOR CISPR22 CLASS B |
| Comment: | 110V/60Hz<br>TS-109 Pro(1Gbps-1Gbps) |
| Result File: | 6e03323b.dat : TS-109 Pro(1Gbps-1Gbps) |

| | | |
|---|---|---|
| Prescan Measurement: | Detectors: | X PK / + AV |
| | Meas Time: | see scan settings |
| | Subranges: | 16 |
| | Acc Margin: | 55 dB |

Peak Search Results

| Frequency MHz | PK Level dBµV | PK Limit dBµV | PK Delta dB |
|---|---|---|---|
| 0.175 | 37.11 | 64.72 | 27.61 |
| 0.295 | 27.81 | 60.38 | 32.57 |
| 0.355 | 30.78 | 58.84 | 28.06 |
| 0.535 | 34.77 | 56.00 | 21.23 |
| 0.65 | 28.13 | 56.00 | 27.87 |
| 0.89 | 21.94 | 56.00 | 34.06 |
| 1.42 | 16.14 | 56.00 | 39.86 |
| 2.37 | 17.58 | 56.00 | 38.42 |
| 3.44 | 20.50 | 56.00 | 35.50 |
| 3.91 | 20.12 | 56.00 | 35.88 |
| 5.81 | 17.54 | 60.00 | 42.46 |
| 8.9 | 21.97 | 60.00 | 38.03 |
| 11.92 | 24.69 | 60.00 | 35.31 |
| 13.7 | 32.68 | 60.00 | 27.32 |
| 19.51 | 30.79 | 60.00 | 29.21 |
| 22.95 | 29.11 | 60.00 | 30.89 |

| Frequency MHz | AV Level dBµV | AV Limit dBµV | AV Delta dB |
|---|---|---|---|
| 0.18 | 22.66 | 54.49 | 31.83 |
| 0.295 | 22.69 | 50.38 | 27.69 |
| 0.355 | 27.14 | 48.84 | 21.70 |
| 0.475 | 30.67 | 46.43 | 15.76 |
| 0.65 | 24.21 | 46.00 | 21.79 |
| 0.89 | 16.77 | 46.00 | 29.23 |
| 1.48 | 8.05 | 46.00 | 37.95 |
| 2.31 | 6.93 | 46.00 | 39.07 |
| 3.26 | 11.70 | 46.00 | 34.30 |
| 3.5 | 11.75 | 46.00 | 34.25 |
| 6.64 | 11.92 | 50.00 | 38.08 |
| 8.3 | 14.44 | 50.00 | 35.56 |
| 11.74 | 18.38 | 50.00 | 31.62 |
| 15.95 | 21.25 | 50.00 | 28.75 |
| 17.67 | 23.50 | 50.00 | 26.50 |
| 22.65 | 21.31 | 50.00 | 28.69 |

* limit exceeded

## RADIATED EMISSION TEST

1 TEST INSTRUMENTS & FACILITIES

The following test Instruments was used during the radiated emission test :

| Item | Instruments /facilities | Specification | Manufacturer | Model # / S/N# | Date of Cal. |
|---|---|---|---|---|---|
| 1 | OPEN AREA TEST SITE | ☑ OATS 3 | | | JUL/2006 |
| 2 | EMI TEST RECEIVER | 20Hz ~ 26.5GHz | ROHDE & SCHWARZ | ESMI 845442/006 | FEB/2007 |
| 3 | PRE-AMPLIFIER | 9KHz ~ 3000MHz | ADVANTEST | BB525C 90081001 | OCT/2006 |
| 4 | ANTENNA (BI-LOG) | 25MHz ~ 2GHz | SCHAFFNER | CBL6112B S/N : 2614 | JUN/2006 |
| 5 | Attenuation | 50Ω/6dB | JYE BAO | FAT-N (M-F) 001 | JUL/2006 |
| 6 | Cable | 10m | SUHNER | RG214/U OS3-003 | DEC/2006 |
| 7 | Cable | 14m | BELDEN | 9913 OS3-001 | DEC/2006 |
| 8 | EMI 32 (software) | N/A | AUDIX | 19991013-0923 | N/A |

Note : Items 1 ~ 7 were calibrated within period of 1 year.

# 2 TEST PROCEDURE

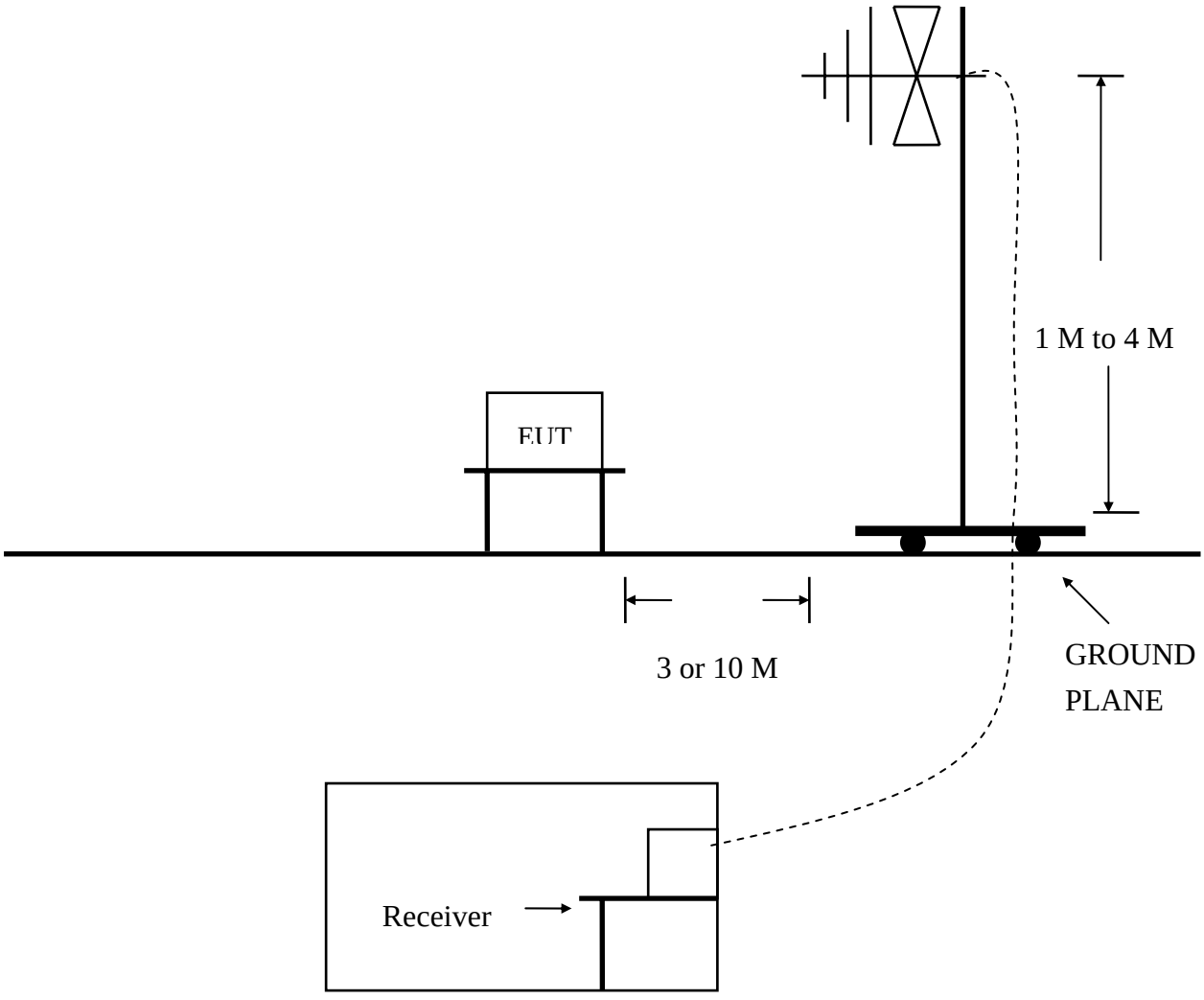
2.1 The EUT was test according to **ANSI C63.4 – 2003 Section 5.4, 5.5, 8.1, 8.2, 8.3 & CISPR 22 - 1997 & C18-01-11 (HomeTek test procedure)**.

2.2 The radiated test was performed at HomeTek Lab's Open Site III.

2.3 The frequency range from 30 MHz to 2 GHz, the measurement were made at 10 meters, with a BI-log antenna.

# 3 TEST SETUP

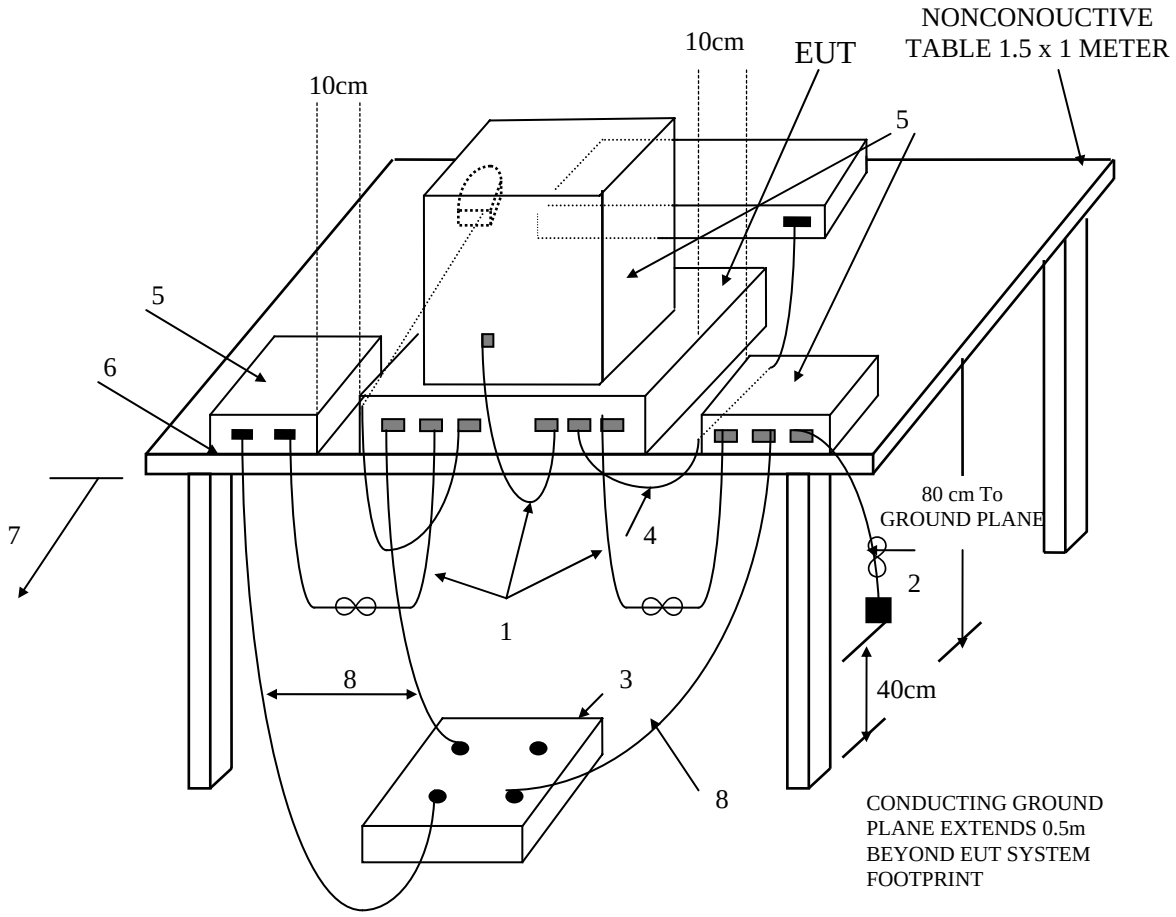
## 3.1 TEST SETUP OF OPEN SITE.



## 3.2 TEST SETUP OF EUT

ELECTRICAL AND ELECTRONIC EQUIPMENT IN THE RANGE OF 9kHz TO 40 GHz

ANSI C63.4-2003




(Details for setup configuration, please refer to appendix A.)

LEGEND:

1. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 to 40 cm long, hanging approximately in the middle between ground plane and table.
2. I/O cables that are connected to a peripheral shall be bundled in center. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1m.
3. If LISNs are kept in the test setup for radiated emissions, it is preferred that they be installed under the ground plane with the receptacle flush with the ground plane.
4. Cables of hand-operated devices, such as keyboards, mouses, etc., have to be placed as close as possible to the controller.
5. Non-EUT components of EUT system being tested.
6. The rear of all components of the system under test shall be located flush with the rear of the table.
7. No vertical conducting wall used.
8. Power cords drape to the floor and are routed over to receptacle.

**Test Configuration**

**Tabletop Equipment Radiated Emission**

# 4 CONFIGURATION OF THE EUT

Same as “Conducted Power Line test”, section 4

# 5 EUT OPERATING CONDITION

5.1 Same as “Conducted Power Line test”, section 5

5.2 The radiated emission in the frequency range from 30 MHz - 2000 MHz was test in a horizontal and vertical polarization at HomeTek Lab’s open site III.

**5.3 The photos of radiated test configuration, please refer to appendix A.**

# 6 LIMIT OF RADIATED EMISSION CLASS B

CISPR 22

| Frequency (MHz) | Measurement Distance | Limit (dBuV/m) |
|---|---|---|
| 30 - 230 | 10 (M) | 30 |
| 230 - 1000 | 10 (M) | 37 |
| Above 1000 | 10 (M) | 43.5 |

6.1 The tighter limit shall apply at the edge between two frequency bands.

6.2 Measurement distance in meters between the measuring instrument antenna and the closed point of any part of the EUT or peripherals.

# 7 RESULT OF RADIATED EMISSION TEST

7.1 The frequency range from 30 MHz to 2 GHz was investigated.

7.2 All readings below or equal 1 GHz are quasi-peak or peak values with resolution bandwidth of 120 KHz.

7.3 All readings above 1 GHz are average or peak values with resolution bandwidth of 1 MHz

7.4 The measurements were made at 10 meters of HomeTek Lab's open site III.

7.5 Temperature : 29 ℃, Humidity : 45 % RH.

7.6 Deviation form the test standards and rules : None

7.7 The radiation emission result were gained by the following method :
Level = Reading Level + Probe Factor (Antenna Factor) + Cable Loss – Preamp Factor
Over Limit = Level – Limit Line

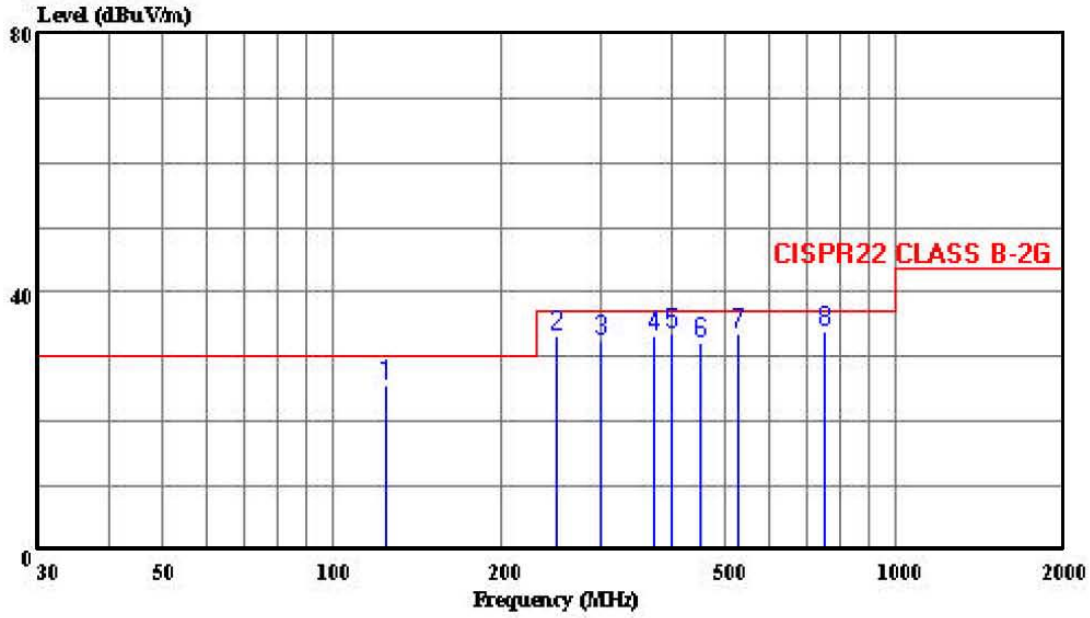
7.8 The radiated mission test was passed at minimum margin :
Horizontal 750.00 MHz/ 33.99 dBuV/m, Antenna Height 3.6 Meter,
Turn Table 125 degree, The Mode : 1G-1G Mode , Model : TS-109 Pro .

7.9 Result : **PASSED**

# 8 RADIATED EMISSION TEST DATA (PAGE 1)

HomeTek Technology Inc.
No 67-9,Shi-Men Rd;,Tu-Chen City,
Taipei County, Taiwan R.O.C.
Tel:02-22608375
Fax:02-22748013

Data#: 1 File#: 6e033.emi Date: 2007-06-01 Time: 15:25:38




Trace: Ref Trace:

Condition: CISPR22 CLASS B-2G 10m CHASE 2614 060506 HORIZONTAL
eut : Network Attached Storage
power: 110V/60Hz
memo : TS-109 Pro(1Gbps-1Gbps)

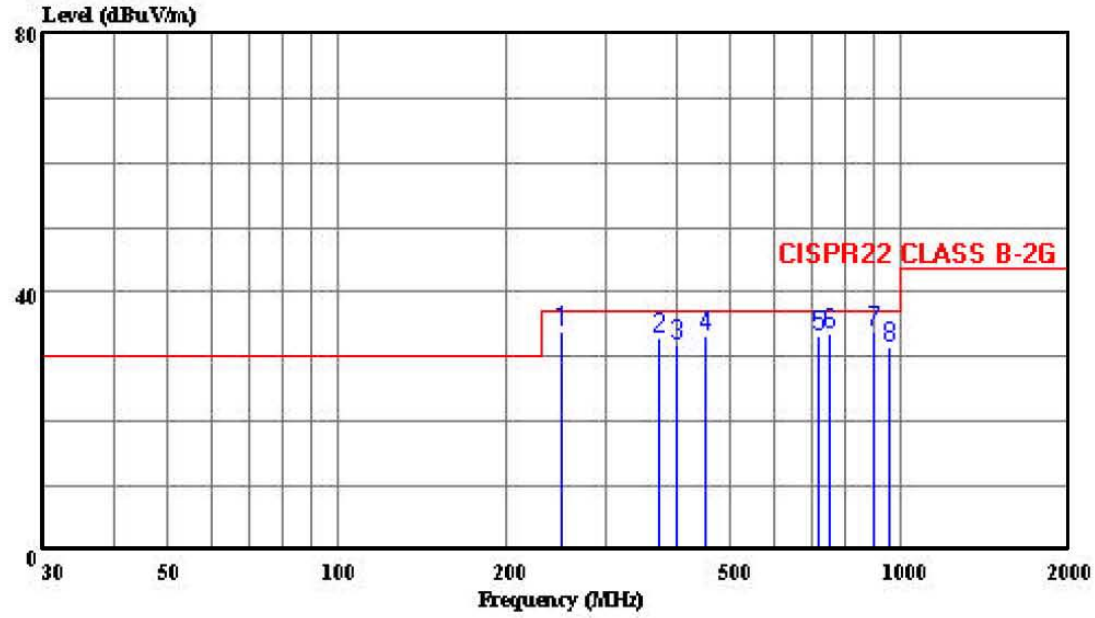
Page: 1

| | Freq | Level | Limit Line | Over Limit | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB/m | dB | dB | |
| 1 | 125.013 | 25.65 | 30.00 | -4.35 | 37.90 | 11.93 | 1.67 | 25.85 | Peak |
| 2 | 250.013 | 33.19 | 37.00 | -3.81 | 44.02 | 12.30 | 2.47 | 25.60 | Peak |
| 3 | 300.160 | 32.60 | 37.00 | -4.40 | 42.20 | 13.13 | 2.77 | 25.50 | Peak |
| 4 | 375.024 | 33.09 | 37.00 | -3.91 | 40.16 | 15.00 | 3.21 | 25.29 | Peak |
| 5 | 400.008 | 33.72 | 37.00 | -3.28 | 39.98 | 15.60 | 3.35 | 25.21 | Peak |
| 6 | 449.980 | 32.27 | 37.00 | -4.73 | 37.04 | 16.60 | 3.65 | 25.02 | Peak |
| 7 | 525.013 | 33.59 | 37.00 | -3.41 | 35.88 | 18.02 | 4.42 | 24.74 | Peak |
| 8 | 750.003 | 33.99 | 37.00 | -3.01 | 33.09 | 19.70 | 5.10 | 23.91 | Peak |

# 9 RADIATED EMISSION TEST DATA (PAGE 2)

HomeTek Technology Inc.
No 67-9,Shi-Men Rd;,Tu-Chen City,
Taipei County, Taiwan R.O.C.
Tel:02-22608375
Fax:02-22748013

Data#: 2 File#: 6e033.emi Date: 2007-06-01 Time: 15:26:56




Trace: Ref Trace:

Condition: CISPR22 CLASS B-2G 10m CHASE 2614 060506 VERTICAL
eut : Network Attached Storage
power: 110V/60Hz
memo : TS-109 Pro(1Gbps-1Gbps)

Page: 1

| | Freq | Level | Limit Line | Over Limit | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB/m | dB | dB | |
| 1 | 250.013 | 33.81 | 37.00 | -3.19 | 44.64 | 12.30 | 2.47 | 25.60 | Peak |
| 2 | 374.154 | 32.93 | 37.00 | -4.07 | 40.00 | 15.00 | 3.21 | 25.29 | Peak |
| 3 | 401.257 | 31.79 | 37.00 | -5.21 | 38.00 | 15.64 | 3.36 | 25.21 | Peak |
| 4 | 451.658 | 33.27 | 37.00 | -3.73 | 37.99 | 16.63 | 3.66 | 25.01 | Peak |
| 5 | 720.060 | 33.17 | 37.00 | -3.83 | 32.87 | 19.16 | 5.12 | 23.98 | Peak |
| 6 | 750.000 | 33.69 | 37.00 | -3.31 | 32.79 | 19.70 | 5.10 | 23.91 | Peak |
| 7 | 899.775 | 33.88 | 37.00 | -3.12 | 31.67 | 20.40 | 5.26 | 23.45 | Peak |
| 8 | 960.058 | 31.45 | 37.00 | -5.55 | 29.04 | 20.80 | 4.88 | 23.27 | Peak |

**SAMPLE OF FCC DoC LABEL 1**

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.

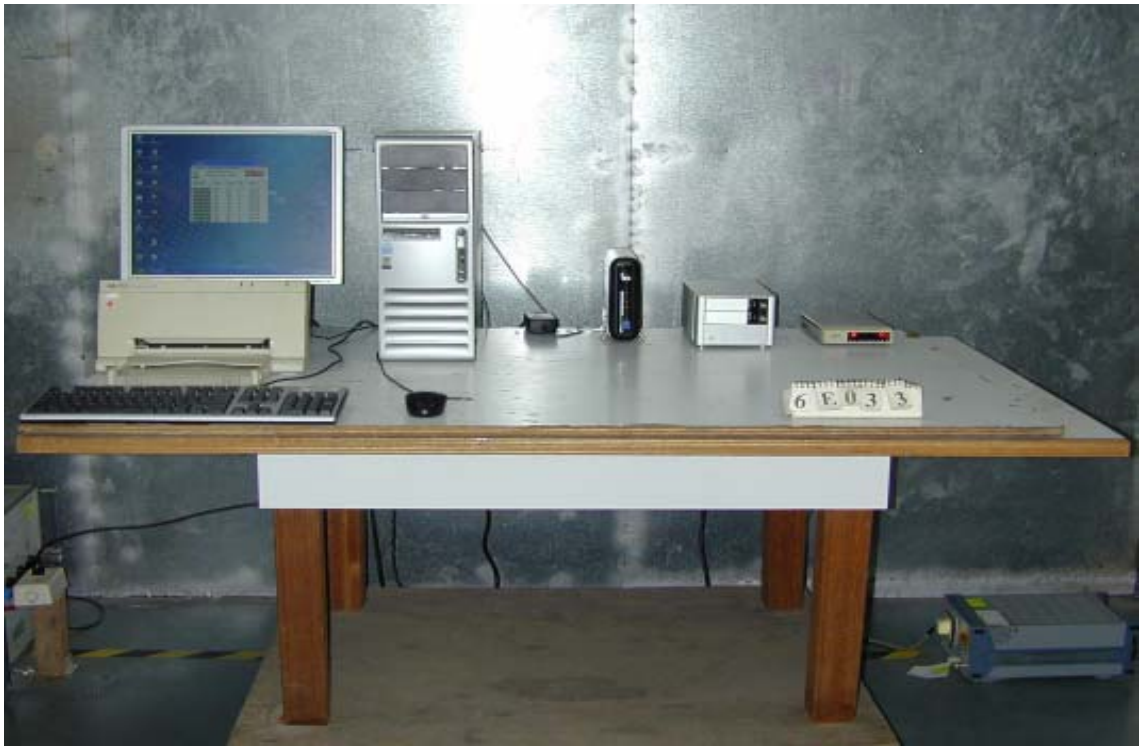
**SAMPLE OF FCC DoC LABEL 2**

# Appendix A

# PHOTOS OF TEST CONFIGURATION

# PHOTO OF CONDUCTED POWER LINE TEST

Test Mode : 1Gbps-1Gbps , Model : TS-109 Pro



Front View

Rear View

## PHOTO OF RADIATED EMISSION TEST

Test Mode : 1Gbps-1Gbps , Model : TS-109 Pro

Front View

Rear View

# Appendix B

# PHOTOS OF EUT

# PHOTO OF EUT

Model : TS-109 Pro


Full View of EUT

**PHOTO OF EUT**

Full View of Support Unit

**PHOTO OF EUT**

Component Side of Main Board

Solder Side of Main Board

# Declaration of Conformity

Responsible Party Name :

Address :

Phone No :

Fax No :

Declares under our sole responsibility that the product

Product Name : Network Attached Storage

Model No. : TS-109 Pro, TS-109, VioStor-109, VioStor-109P, VioStor-109V, VioStor-109A, VioStor-109C, VioStor-109D, VioStor-109S, VioStor-109PA, VioStor-109VA, VioStor-109CA, VioStor-109SA, VioStor-109AA, VioStor-109DA, TS-109 Pro II, TS-109 II, TS-109 Pro III, TS-109 III

to which this declaration relates is in conformity with the following standards or other normative documents

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.

Representative Person's Name :

Signature :

Date :

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

# Certificate of Accreditation to ISO/IEC 17025:2005

**NVLAP LAB CODE: 200331-0**

## HomeTek Technology Inc.

Taipei Shien 236
TAIWAN

*is recognized by the National Voluntary Laboratory Accreditation Program for conformance with criteria set forth in NVLAP accreditation documents and all requirements of ISO/IEC 17025:2005.*
*Accreditation is granted for specific services, listed on the Scope of Accreditation, for:*

## ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

2006-10-01 through 2007-09-30
*Effective dates*


Sally S. Bruce
*For the National Institute of Standards and Technology*

NVLAP® National Voluntary Laboratory Accreditation Program

# SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

**HomeTek Technology Inc.**
P.O Box: 13-131, Pan-Chiao City
No. 67-9 Shir Men Rd., Tu Chen City
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TAIWAN
Mr. Grant Huang
Phone: 886-2-22608375 Fax: 886-2-22748013
E-Mail: hometek@ms15.hinet.net

**ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS** **NVLAP LAB CODE 200331-0**

| *NVLAP Code* | *Designation / Description* |
|---|---|
| **Emissions Test Methods:** | |
| 12/CIS14a | EN 55014-1 (1993), A1 (1997), A2 (1999): |
| 12/CIS14a2 | BS EN 55014-1 (2001) with A1 and A2: Electromagnetic compatibility - Requriements for household appliances, electric tools and similar apparatus - Part 1: Emission |
| 12/CIS14b1 | AS/NZS CISPR 14-1 (2003): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission |
| 12/CIS14c | CNS 13783-1: Electromagnetic Compatibility Requirements for household appliances, electric tools and similar apparatus - Part 1: Emissions |
| 12/CIS14d | IEC/CISPR 14-1 (2001) and A1 (2001): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emissions |
| 12/CIS14x | IEC/CISPR 14-1, Ed. 4 (2003): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission |
| 12/CIS22 | IEC/CISPR 22 (1997) & EN 55022 (1998) + A1(2000): Limits and methods of measurement of radio disturbance characteristics of information technology equipment |

2006-10-01 through 2007-09-30
*Effective dates*

Sally S. Bruce
*For the National Institute of Standards and Technology*

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**NVLAP LAB CODE 200331-0**

| *NVLAP Code* | *Designation / Description* |
|---|---|
| 12/CIS22a | IEC/CISPR 22 (1993) and EN 55022 (1994): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1 (1995) and Amendment 2 (1996) |
| 12/CIS22b | CNS 13438 (1997): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment |
| 12/CIS22c | IEC/CISPR 22, Fourth Edition (2003-04) & EN 55022 (1998): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement |
| 12/FCC15b | ANSI C63.4 (2003) with FCC Method 47 CFR Part 15, Subpart B: Unintentional Radiators |
| 12/T51a | AS/NZS CISPR 22 (2004): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement |
| 12/VCCIa | VCCI: Agreement of Voluntary Control Council for Interference by Information Technology Equipment - Technical Requirements: V-3/2005.04 |

2006-10-01 through 2007-09-30

*Effective dates*

Sally L. Bruce

*For the National Institute of Standards and Technology*

United States Department of Commerce
National Institute of Standards and Technology

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*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated 18 June 2005).*

2007-10-01 through 2008-09-30
*Effective dates*

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

Sally S. Bruce
*For the National Institute of Standards and Technology*

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| 12/CIS14c | CNS 13783-1: Electromagnetic Compatibility Requirements for household appliances, electric tools and similar apparatus - Part 1: Emissions |
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