

Test Report with EUT Detail Photograph
(Exhibit 3)

QTK 98-F01D

**Test Report
Application for Certification
On Behalf Of
National Datacomm Corporation
Plug-n-Switch
Model : NSH810SERIES**

FCC ID : IOUNSH810S01

Prepared For:
**National Datacomm Corporation
2F, No. 28, Industry East 9th Rd., Science Park,
Hisn-Chu , Taiwan, R.O.C.**

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The test results are traceable to the national or international standards
Test results given in this report only relate to the specimen(s) tested or measured.
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This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

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1. Test Report Certification

QTK98-F010

Applicant : National Datacomm Corporation

Manufacturer : National Datacomm Corporation

EUT Description

(A) Model Name : Plug-n-Switch / ETHERNET HUB

(B) Model No. : NSH810SERIES

(C) Serial Number : N/A

(D) Power : 120V/60Hz AC

MEASUREMENT STANDARD USED :

CISPR 22 Limits and methods of measurement of radio disturbance characteristics of information technology equipment: 1993

MEASUREMENT PROCEDURE USED :

ANSI C63.4 Methods of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9kHz to 40GHz. :1992

The device described above was tested by QuieTek Corporation to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the CISPR 22 limits for both radiated and conducted emissions.

The measurement results are contained in this test report and QuieTek Corporation is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the CISPR 22 limits.

Sample Received Date : November. 01, 1998

Test Date : November. 19, 1998

Documented by : Cindy Chiu



Test Engineer:

Approve & Authorized Signer:



JEFF CHEN



GENE CHANG

2. General Information

2.1 Production Description

Description : Plug-n-Switch / *ETHERNET HUB*
Model Number : **NSH810SERIES**
Serial Number : N/A
FCC ID : IOUNSH810S01
Applicant : **National Datacomm Corporation**
Address : 2F, No. 28, Industry East 9th Rd., Science Park,
Hisn-Chu , Taiwan, R.O.C.
Manufacturer : **National Datacomm Corporation**
Address : 2F, No. 28, Industry East 9th Rd., Science Park,
Hisn-Chu , Taiwan, R.O.C.
Adapter with cable : AKII , M/N: A15D3-05MP
Non-Shielded, Undetachable, 1.2m
Input: 100-240Vac, 50-60Hz, 40-50VA
Output: +5V / 3.0A
Power Cord : Shielded, Detachable, 1.5m

Remarks: The Plug-n-Switch (EUT) is a Lab Hub with light same ports. During the test,
Two ports of EUT ere connected to two PCS with Lan card with 10m shielded cable
separately. Other parts were connected to 1m shielded cable.

2.2 Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

2.2.1 The types for all peripheral devices

Host Personal Computer

Model Number : DCS
Serial Number : SKJ8H
Manufacturer : DELL
FCC ID : EZKZERL
Lan Card : Intel Corporation
FCC ID : EJMNPDSPD035

Host Personal Computer

Model Number : Vectra VE 5/200 MMX Series 4DT
Serial Number : SG81002279
Manufacturer : HP
FCC ID : DoC
Lan Card : Netgear,
FA310TX, S/N: FA31014942

Monitor (1)

Model Number : CM752ET-311
Serial Number : T8D003312
FCC ID : DoC
Manufacturer : HITACHI

Monitor (2)

Model Number : CM752ET-311
Serial Number : T8F005799
FCC ID : DoC
Manufacturer : HITACHI

Keyboard (1)

Model Number : 6311-TW2C
Serial Number : DoC
Manufacturer : ACER

Keyboard (2)

Model Number : 6311-TW2C
Serial Number : DoC
Manufacturer : ACER

Mouse (1)

Model Number : M-S34
Serial Number : LZB75078428
FCC ID : DZL211029
Manufacturer : HP

Mouse (2)

Model Number : M-S34
Serial Number : LZB71178588
FCC ID : DZL211029
Manufacturer : HP

QTR48-F010

2.2.2 Description of the used cable in tested system

No.	Name	Shielded	Shielded Connector	Detachable	Length	Port Name	
						From	TO
1.	EUT (PC) power cord	No	No	Yes	1.5m	EUT	Ac 120V
2	Monitor Cable (1)	No	No	Yes	1.5m	Monitor	PC/Video
3	Monitor Power cable (1)	No	No	Yes	1.5m	Monitor	AC 120V
4	Monitor Cable (2)	No	No	Yes	1.6m	Monitor	PC/Video
5	Monitor Power cable (2)	No	No	Yes	1.5m	Monitor	AC 120V
6	Keyboard Cable (1)	No	No	No	1.2m	Keyboard	PC/KB
7	Mouse Data Cable (1)	No	No	No	1.2m	Mouse	PC/PS2
8	Keyboard Cable (2)	No	No	No	1.2m	Keyboard	PC/KB
9	Mouse Data Cable (2)	No	No	No	1.2m	Mouse	PC/PS2
10	Data Cable	Yes	Yes	Yes	1.0m	PC1/Lan	EUT
11	Data Cable	Yes	Yes	Yes	1.0m	PC2/Lan	EUT
12	Data Cable	Yes	Yes	Yes	1.0m	EUT	None

2.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4-1992.

Radiated testing was performed at an antenna to EUT distance of 10 meters.

2.4 Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	24-27
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description : November 3, 1998 File on
 Federal Communications Commission
 FCC Engineering Laboratory
 7435 Oakland Mills Road
 Columbia, MD 21046
 Reference 31040/SIT1300F2

NVLAP Lab Code: 200347-0
 United States Department of commerce
 National Institute of Standards and Technology
 National Voluntary Laboratory Accreditation Program

Name of firm : QuieTek Corporation

Site location : No.75-1, Wang-Yeh Valley, Yung-Hsing Tsuen,
 Chiung-Lin, Hsin-Chu County, Taiwan, R.O.C.

3. Conducted Power Line Test

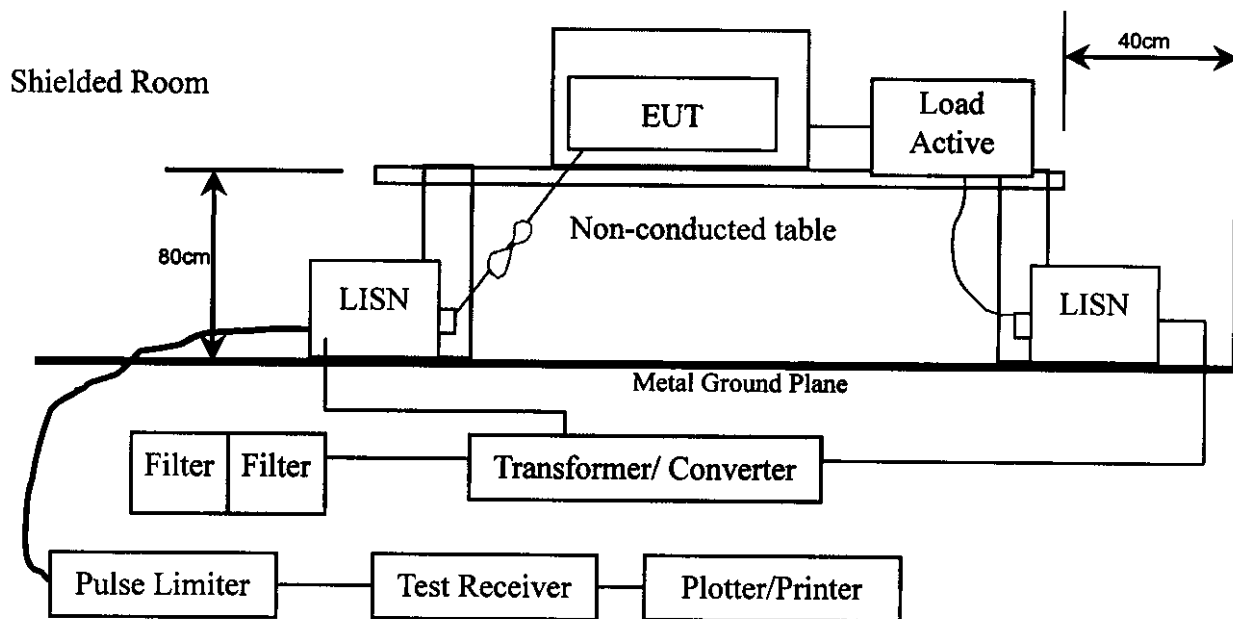
3.1 Test Equipments

The following test equipments are used during the conducted power line tests:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal..	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 1998	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 1998	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 1998	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	N/A	
5	N0.2 Shielded Room			N/A	

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

3.2 Block Diagram of Test Setup



3.3 Conducted Powerline Emission Limit

[] CISPR 22 Limits

Frequency	Maximum RF Line Voltage dB(uV)			
	Class A		Class B	
	QUASI-PEAK	AVERAGE	QUASI-PEAK	AVERAGE
0.15 - 0.50	79	66	66-56	56-46
0.50-5.0	73	60	56	46
5.0 - 30	73	60	60	50

Remarks : In the Above Table, the tighter limit applies at the band edges.

3.4 EUT Configuration on Measurement

The equipments which is listed 3.2 are installed on Conducted Power Line Test to meet the Commission requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

3.5 EUT Exercise Software

The EUT exercise program used during conducted testing was designed to exercise the EUT in a manner similar to a typical use. The exercise sequence is listed as below:

3.5.1 Setup the EUT and simulators as shown on 4.2.1.

3.5.2 Turn on the power of all equipments.

3.5.3 Data will communicate between host computer and partner computer through Plug-n-Switch

3.5.4 The host computer's and partner computer's monitor show data signals when the communication is success.

3.5.5 Repeat the above procedures from 3.5.3 to 3.5.4.

3.6 Test Procedure

The EUT is connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables must be changed according to ANSI C63.4-1992 on conducted measurement.

The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 10Khz.

The frequency range from 0.15 MHz to 30 MHz is checked.

3.7 Conducted Emission Data

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range for all the test modes. Then the worst modes were reported the following data pages.

The uncertainty is calculated in accordance with NAMAS NIS 81. The total uncertainty for this test is as follows:

- Uncertainty in the field strength measured: $< \pm 2.0$ dB

CONDUCTED EMISSION DATA

Date of Test	: Nov. 19, 1998	Temperature	: 20.8 °C
EUT	: Plug-n-Switch	Humidity	: 58 %
Test Mode	: Normal	Display Pattern	: Data Signal
Detector Mode	: Quasi-Peak & Average		

Frequency MHz	Cable Loss dB	LISN Factor dB	Reading Level Line1 dBuV	Measurement Level Line1 dBuV	Limits dBuV
0.160	0.00	0.10	32.99	33.09	65.47
0.212	0.02	0.10	31.67	31.79	63.13
0.591	0.07	0.10	28.25	28.42	56.00
1.306	0.12	0.11	43.61	43.84	56.00
2.505	0.16	0.14	37.59	37.89	56.00
* 3.385	0.18	0.15	45.06	45.39	56.00

Average:

0.160	0.00	0.10	24.00	24.10	55.47
0.212	0.02	0.10	20.28	20.40	53.13
0.591	0.07	0.10	16.43	16.60	46.00
1.306	0.12	0.11	28.67	28.90	46.00
2.505	0.16	0.14	25.80	26.10	46.00
3.385	0.18	0.15	30.47	30.80	46.00

Remarks :

1. " * " means that this data is the worse emission level.
2. All readings are Quasi-peak and average values.

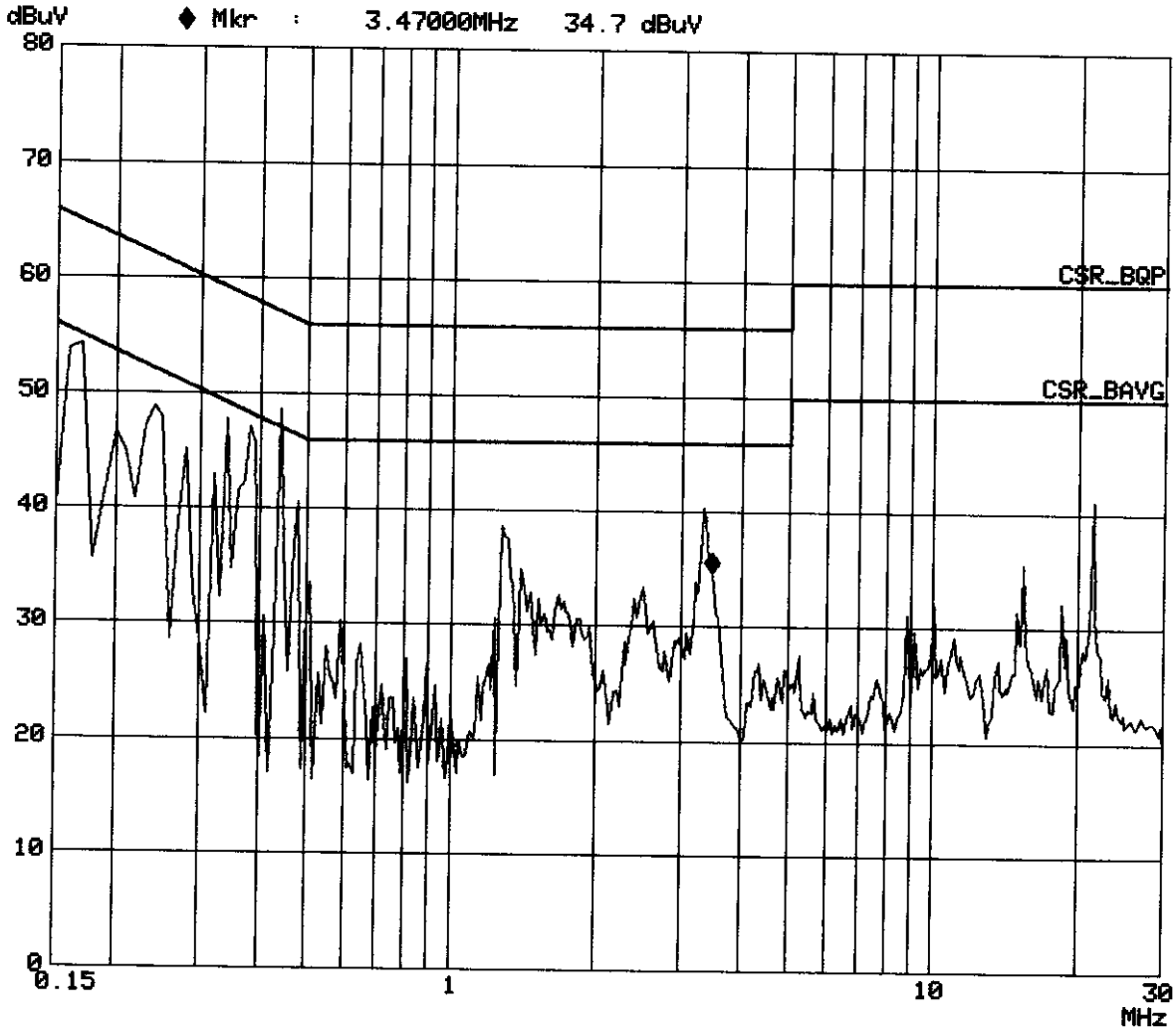
Attached individual pages of peak scan curve data sheets.

Manuf: NDC
Operator: Jeff
Test Spec: AC 120V/60Hz
Comment: M/N: NSH810SERIES
LINE 1
File name: CISPR22B.SPC
Date: 19. Nov 98 18:31

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	10k	9k	PK	1ms	10dBLN	OFF

Final Measurement: x QP
Meas Time: 1 s



CONDUCTED EMISSION DATA

Date of Test	Nov. 19, 1998	Temperature	20.8 °C
EUT	Plug-n-Switch	Humidity	58 %
Test Mode	Normal	Display Pattern	Data Signal
Detector Mode	Quasi-Peak & Average		

Frequency MHz	Cable Loss dB	LISN Factor dB	Reading Level Line2 dBuV	Measurement Level Line2 dBuV	Limits dBuV
0.162	0.00	0.10	32.85	32.95	65.36
0.212	0.02	0.10	31.71	31.83	63.11
0.339	0.04	0.10	28.40	28.54	59.22
0.401	0.05	0.10	28.10	28.25	57.83
1.271	0.11	0.11	42.90	43.13	56.00
* 3.387	0.18	0.15	45.23	45.56	56.00

Average:

0.162	0.00	0.10	24.50	24.60	55.36
0.212	0.02	0.10	19.78	19.90	53.11
0.339	0.04	0.10	16.36	16.50	49.22
0.401	0.05	0.10	15.75	15.90	47.83
1.271	0.11	0.11	29.37	29.60	46.00
3.387	0.18	0.15	30.77	31.10	46.00

Remarks :

1. " * " means that this data is the worse emission level.
2. All readings are Quasi-peak values.

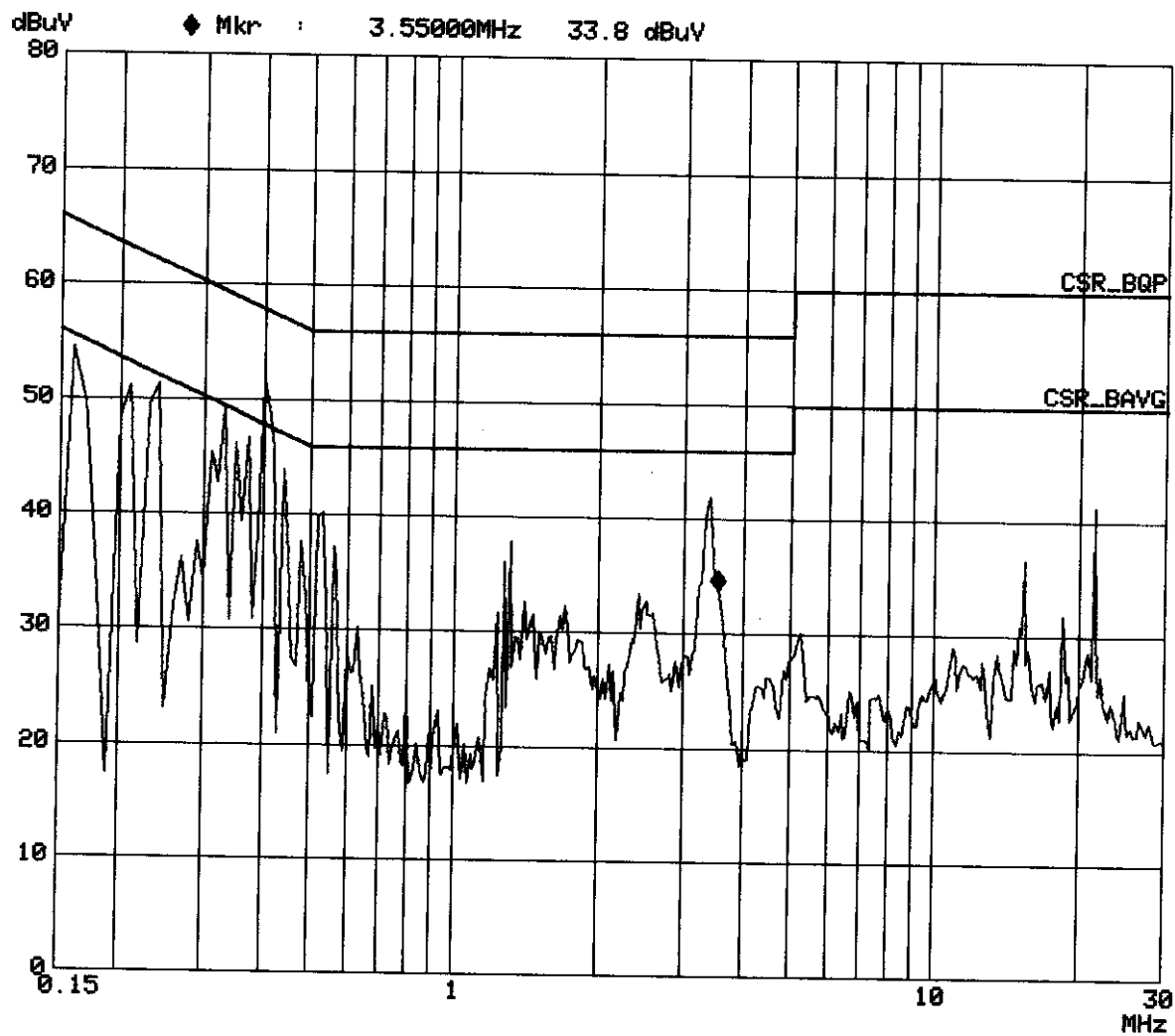
Attached individual pages of peak scan curve data sheets.

Manuf: NDC
Operator: Jeff
Test Spec: AC 120V/60Hz
Comment: M/N: NSH810SERIES
LINE 2
File name: CISPR22B.SPC
Date: 19. Nov 98 18:58

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	10k	9k	PK	1ms	10dBLN	OFF

Final Measurement: x QP
Meas Time: 1 s



4. Radiation Emission Test

4.1 Test Equipment

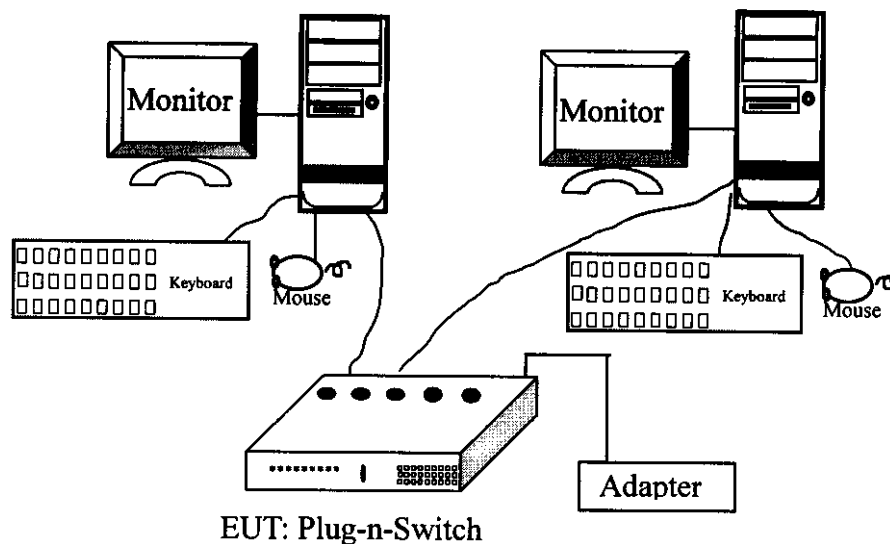
The following test equipments are used during the radiated emission tests:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.	Remark
Site # 1	Test Receiver	R & S	ESCS 30 / 825442/14	May, 1998	
	Spectrum Analyzer	Advantest	R3261C / 71720140	May, 1998	
	Pre-Amplifier	HP	8447D/3307A01812	May, 1998	
	Bilog Antenna	Chase	CBL6112B / 12452	Sep, 1998	
	Horn Antenna	EM	EM6917 / 103325	May, 1998	
	Dipole Antenna	Schwarzbeck	VHAP/866,UHAP/543	May, 1998	
Site # 2	Test Receiver	R & S	ESCS 30 / 825442/17	May, 1998	
	Spectrum Analyzer	Advantest	R3261C / 71720609	May, 1998	
	Pre-Amplifier	HP	8447D/3307A01814	May, 1998	
	Bilog Antenna	Chase	CBL6112B / 2455	Sep, 1998	
	Horn Antenna	EM	EM6917 / 103325	May, 1998	
	Dipole Antenna	Schwarzbeck	VHAP/866,UHAP/543	May, 1998	

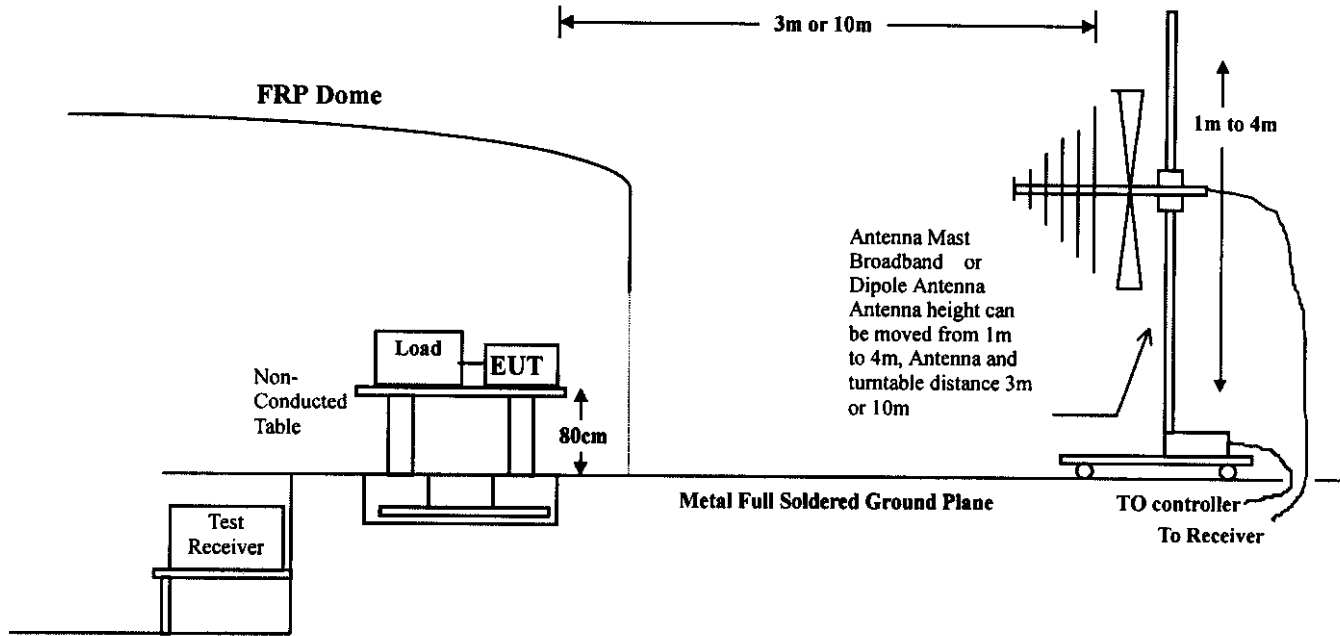
Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.
2. Test Site : Site #1 , Site #2

4.2 Test Setup

4.2.1 Block Diagram of Connections between EUT and simulators



4.2.2 Open Test Site Setup Diagram



4.3 Radiated Emission Limit

[] CISPR 22 Limits:

Frequency MHz	Class A		Class B	
	Distance (m)	Limits (dBuV/m)	Distance (m)	Limits (dBuV/m)
30 – 230	10	40	10	30
230 – 1000	10	47	10	37

Remark: 1. The tighter limit shall apply at the edge between two frequency bands.

2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.4 EUT Configuration

The equipments which is listed 4.2.1 are installed on Radiated Emission Test to meet the Commission requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

4.5 Operating Condition of EUT

Same as Conducted Power Line Test which is listed in 3.5.

4.6 Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 10 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Broadband antenna (calibrated bi-log and horn antenna) are used as a eceiving antenna.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4-1992 on radiated measurement.

The bandwidth below 1Ghz setting on the field strength meter (R&S Test Receiver ESCS 30) is 120 KHz, above 1Ghz are 1 MHz.

The frequency range from 30Mhz to 1000Mhz is checked.

4.7 Radiated Emission Data

The initial step in collecting radiated data is a spectrum analyzer peak scan of the measurement range for all the test modes. Then the worst modes were reported the following data pages.

The uncertainty is calculated in accordance with Namas NIS 81. The total uncertainty for this test is as follows:

- Uncertainty in the field strength measured: $< \pm 4.0$ dB

Radiated Emission Data

Test of Mode	Nov. 19, 1998	Temperature	20.8 °C
EUT	Plug-n-Switch	Humidity	58 %
Test Mode	Mode 1	Display Pattern	Data Signal

Frequency	Cable	Ant	Reading Level	Emission Level	Limits	Ant	Table
MHz	Loss	Factor	Horizontal	Horizontal	dBuV/m	Pos	Pos
	dB	dB/m	dBuV/m	dBuV/m		cm	deg
150.000	2.31	10.72	1.12	14.15	30.00	401	75
275.000	3.51	12.91	5.23	21.66	37.00	401	65
475.000	4.67	17.06	2.80	24.53	37.00	401	12
650.000	5.58	19.15	3.37	28.10	37.00	142	66
* 675.000	5.71	19.11	8.06	32.87	37.00	142	66
700.000	5.83	19.19	6.83	31.85	37.00	130	5

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worse emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

Radiated Emission Data

Test of Mode	Nov. 19, 1998	Temperature	20.8 °C
EUT	Plug-n-Switch	Humidity	58 %
Test Mode	Normal	Display Pattern	Data Signal

Frequency	Cable	Ant	Reading Level	Emission Level	Limits	Ant	Table
MHz	Loss	Factor	Vertical	Vertical	dBuV/m	Pos	Pos
	dB	dB/m	dBuV/m	dBuV/m		cm	deg
50.000	1.35	7.39	14.23	22.97	30.00	99	105
* 75.000	1.58	6.83	16.35	24.76	30.00	99	181
124.999	2.07	11.49	3.27	16.83	30.00	99	10
150.000	2.31	10.43	10.10	22.84	30.00	99	138
250.001	3.27	12.26	8.33	23.86	37.00	99	4
700.000	5.83	18.69	3.01	27.53	37.00	99	155

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worse emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

5. Summarization of Test Results

The test results in the conducted and radiated emission were performed according to the requirements of measurement standard and process. QuieTek Corporation is assumed full responsibility for the accuracy and completeness of these measurements. The summarization of the worst value of conducted and radiated emission test is described as below:

[] The worse value of Conducted Emission Test

Frequency (MHz)	Line	Measurement Level dB(uV)	Limit Level dB(uV)	Comment
3.385	L1	45.39	56.00	Pass
3.387	L2	45.56	56.00	Pass

[] The worse value of Radiated Emission Test

Frequency (MHz)	Polarization	Measurement Level dB(uV)	Limit Level dB(uV)	Comment
675.000	H	32.87	37.00	Pass
75.000	V	27.53	37.00	Pass

6. EMI Reduction Method During Compliance Testing

No modification was made during testing.