Report No.	N1315266
Specifications Test Method	FCC Part 15.109(g), Class B ANSI C63.4 1992
Applicant address	2F, NO. 28, INDUSTRY EAST 9TH RD., SCIENCE PARK, HSIN-CHU, TAIWAN
Applicant Items tested Model No.	NATIONAL DATACOMM CORPORATION 5 PORT SOHOWARE 10/100 FAST HUB NDH305, DH305 (Sample # N13266)
Results Sample received data	**Compliance** (As detailed within this report) 04/26/1999 (month / day / year)
Prepared by	project engineer
Authorized by	Vice General Manager (Jacob Lin)
Issue date	June 2, 1999 (month / day / year)
Modifications	**None**
Tested by Office and Open site at	Training Research Co., Ltd. No. 15, Lane 530, Pa-Lian RD., Sec. 1, Hsi-Chih Town, Taipei Hsien, Taiwan, R.O.C.

Conditions of issue:

(1) ***This test report shall not be reproduced except in full, without written approval of TRC. And the test result contained within this report only relate to the sample submitted for testing.***

(2) ***This report must not be used by the client to claim product endorsement by NVLAP or any agency of U.S. Government.***

★ ***FCC ID: IOUNDH305S01***

Contents

Chapter 1 Introduction

Description of EUT:

HUB is a data transmission / receiver facility. It was connected to Lan card installed in the PC or compatible computer and makes your data equipment available to transmit / receive data via the EUT. During testing the EUT was operated at Tx or Rx mode for each emission measured. This was done in order to insure that maximum emission levels were attained.

Connections of EUT:

(1) The power jack of EUT was connected with the AC power source via a power adapter.
(2) UTP 1 port was connected with a Lan card installed in the nearby PC.
(3) UTP 5 port was connected with another Lan card installed in another PC located remotely.
(4) The other UTP ports were terminated.

Test method:

Pretest was found that the emission of operating mode is worse than standby mode. So, The final test is made at the operating mode.

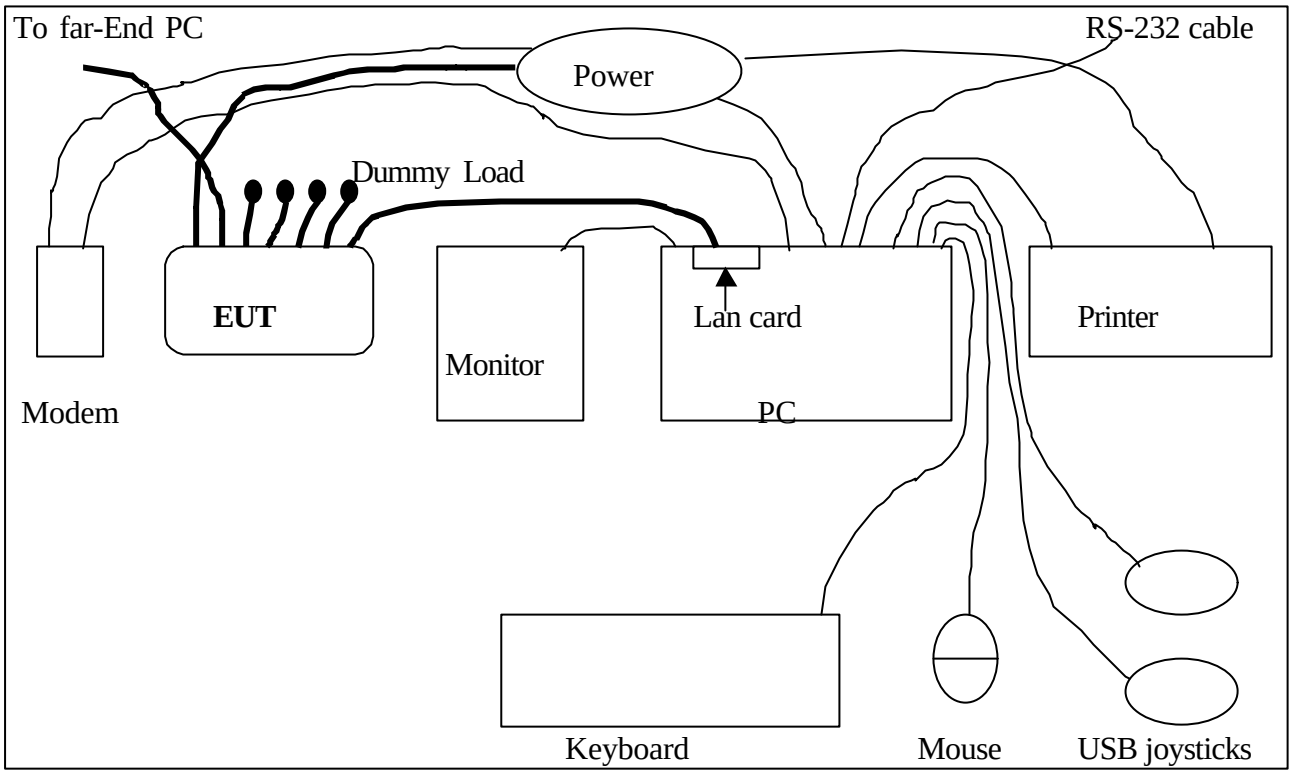
During pretest, there were three modes testing: 10 x 10MHz, 10 x 100MHz, 100 x 100MHz.

During testing, the EUT was operated at "transmitting" and "receiving" mode simultaneously.

The test placement as the photographs showed is the worst case emission placed. (If the emission is close to the ambient, the resolution BW and view resolution will be reduced and the data will be recorded by detection of maximum hold peak mode.)

The testing configuration of test setup is showing in the next page.

Configuration of test setup



Connections:

PC:

*Serial A port --- a external modem with 76 cm shielded RS-232 cable

*Serial B port --- a 76 cm shielded RS232 cable

*Printer port --- a Printer with 1.2m length data cable

*Monitor port --- a monitor with 1m length data cable

*Keyboard port --- a Keyboard with 1m length data cable

*Mouse port --- a Mouse with 0.7m long of data cable

*USB ports --- two USB joysticks with 1.5m long, shielded, no ferrite bead data cable

(Each port on PC is connected with suitable device)

Lan Card

*RJ-45 jack --- via a 3m long, non-shielded, no ferrite bead, RJ-45 cable to EUT.

EUT:

*UTP 1 port --- via a 3m long, non-shielded, no ferrite bead, RJ-45 cable to the RJ-45 jack of the Lan card that installed in PC.

*UTP 2~4 port --- connect with a 1m long, non-shielded, no ferrite bead, RJ-45 cable that terminated with 200ohm.

*UTP 5 port --- via a 30m long, non-shielded, no ferrite bead, RJ-45 cable to another Lan card that installed in another PC located in far-end.

*Power jack --- connect with a power adapter that the power cable is 1.8m long, non -shielded, with ferrite bead.

List of support equipment

Conducted (Radiated) test:

PC : HP

Model	:	VE6/350 SERIES 8
Serial No.	:	SG91002329
FCC ID	:	DoC Approval
Power type	:	AC 100~127 / 200~240 VAC, Switching
Power cord	:	non-Shielded, 1.7m long, Plastic, no ferrite core

Monitor : HP

Model No.	:	D2821
Serial No.	:	TW 73512262 (TW 73147163)
FCC ID	:	A3KMO64
Power type	:	AC 110~120 / 220~240 VAC, Switching
Power cord	:	Non-Shielded, 3m long, no ferrite core
Data cable	:	Shielded, 1.8m long, with ferrite core

Keyboard : Digital

Model No.	:	KB-5923
Serial No.	:	9S74904837 (9S74904665)
FCC ID	:	E8HKB-5923
Power type	:	By PC
Data cable	:	Shielded, 1.8m long, with ferrite core

Printer : HP

Model No.	:	C2642A
Serial No.:		SG69A196GV
FCC ID	:	B94C2642X
Power type	:	110 VAC, 60Hz
Power cord	:	Non-shielded, 2m long, no ferrite core
Data cable	:	Shielded, 1.84m long, no ferrite core (1.7m)

Modem	**:**	**ACEEX**
Model No.	:	XDM-56V14
FCC ID	:	IFAXDM-56V14
Power type	:	110VAC, 60HZ/ 9VAC, 1A
Power cord	:	Non-shielded, 1.9m long, no ferrite cord
Data cable	:	RS232, Shielded, 1.2m long, no ferrite core
		RJ11C x 2, 7’ long non-shielded, no ferrite core

Mouse	**:**	**Hewlett Packard Mouse**
Model No.	:	C3751B
Serial No.	:	LCA52707170
FCC ID	:	DZL210582
Power type	:	Powered by PC
Power Cable	:	Non – Shielded. 5.5' long, Plastic hoods, No ferrite bead

Joystick	**:**	**Padix**
Model	:	QF-3U, QF-305U, QF-606U, QF-707U (DoC Approval)
Power Type	:	By PC

Lan Card	**:**	**DELTA**
Model No.	:	AEF380-TX
Serial No.	:	N/A
Power Type	:	Powered by PC
Data Cable	:	UTP, 7', Plastic RJ-45 hoods, No ferrite bead.

Chapter 2 Conducted emission test

Test condition and setup:

All the equipment is placed and setup according to the ANSI C63.4-1992.
The EUT is assembled on a wooden table that is 80 cm high, is placed 40 cm from the back-wall that is a vertical conducting plane. One LISN is for EUT, the other LISN is for support equipment. They are all placed on the conductive ground. The EUT' s LISN connect a line switch box for selecting L1 or L2, then connect to a preamplifier and spectrum.

The spectrum scans from 450KHz to 30MHz. Conducted emission levels are detected at max. peak mode. But if the max. peak mode failed, it will be measured by CISPR' s quasi-peak detection mode.

While testing, there is the worst-emission plot printed at peak detection mode, and there are more than 6 highest emissions relative to limit recorded. The plot is kept as the original data, not included in test report.

List of test Instrument:

				Calibration Date	
Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
Spectrum analyzer	8594EM	H P	3710A00279	01/07/99	01/07/00
LISN (EUT)	3825/2	EMCO	9411-2284	05/20/99	05/20/00
LISN (Support E.)	AC3-001	TRC	- - - - - - - - -	05/20/99	05/20/00
Preamplifier	AC3-002	TRC	- - - - - - - - -	05/20/99	05/20/00
Line switch box	AC3-003	TRC	- - - - - - - - -	05/20/99	05/20/00

The level of confidence of 95%, the uncertainty of measurement of conducted emission is ± 2.4 dB.

Test Result: Pass (Appendix A)

Conducted Test Placement:

Chapter 3 Radiated emission test

Test condition and setup:

Pretest: Prior to the final test (OATS test), the EUT is placed in a anechoic chamber and scan from 30MHz to 1GHz. This is done to ensure the radiation exactly emits form the EUT.

Final test: Final radiation measurements are made on a **3 - meter,** open-field test site. The EUT is placed on a nonconductive table that is 0.8m height, the top surface is 1.0 x 1.5 meter. The placement is according to ANSI C63.4-1992.

The spectrum is examined from 30 MHz to 1000 MHz measured by HP spectrum.

The EMCO whole range Antenna is used to measure frequency from 30 MHz to 1GHz. The final test is used the spectrum HP 8594EM.

Measure more than six top marked frequencies generated form pretest by computer step by step at each frequency. The EUT is rotated 360 degrees, and antenna is raised and lowered from 1 to 4 meters to find the maximum emission levels. The antenna is used with both horizontal and vertical polarization.

Appropriated preamplifier which is made by TRC is used for improving sensitivity and precautions is taken to avoid overloading. The spectrum analyzer' s 6dB bandwidth is set to 120 KHz, and the EUT is measured at quasi-peak mode.

If the emission is close to the frequency band of ambient, the data will be rechecked by the tester and the corrected data will be written in the test data sheet. If the emission is just within the ambient, the data from anechoic chamber will be taken as the final data.

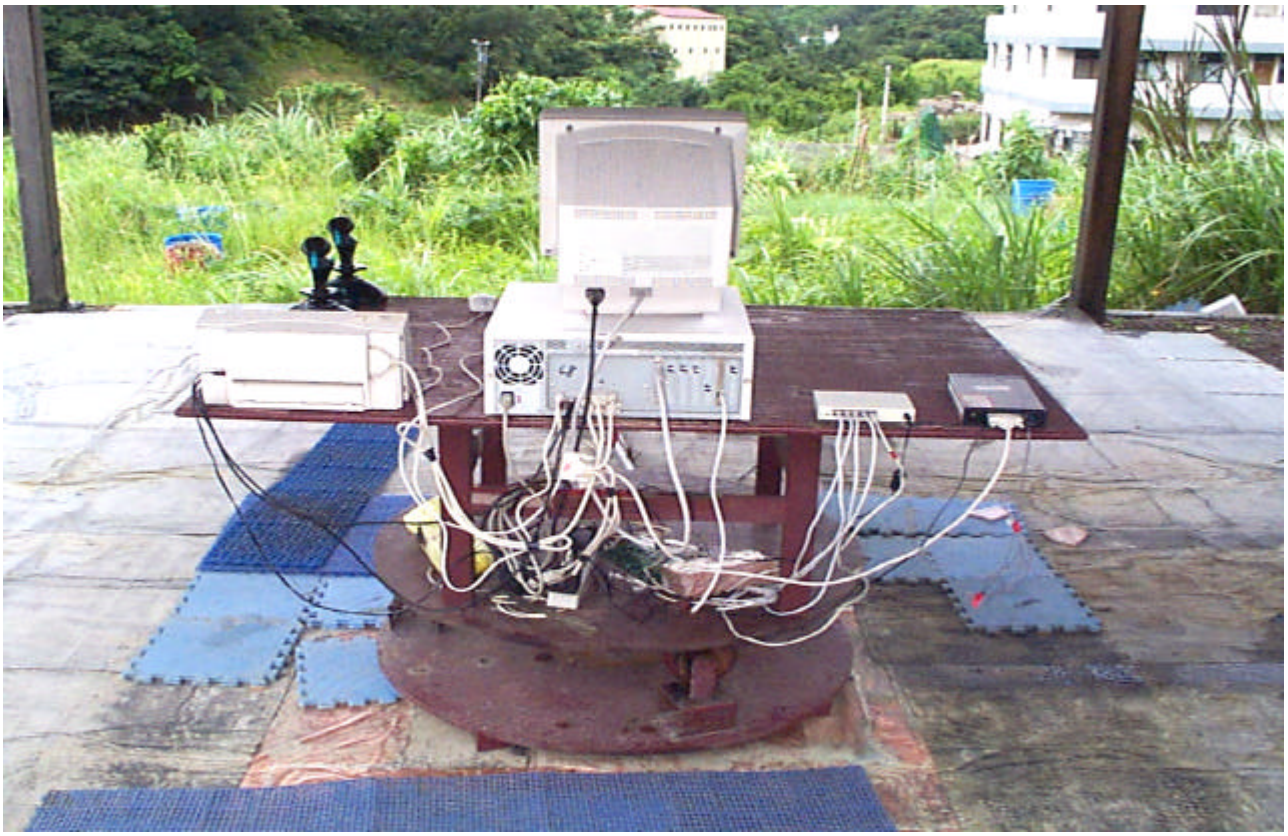
List of test Instrument:

				Calibration Date	
Instrument Name	Model No.	Brand	Serial No.	Last	Next
Spectrum analyzer	8594EM	H P	3619A00198	11/17/98	11/17/99
RF Pre-selector	AC4-001	TRC	- - - - - - - - -	05/20/99	05/20/00
Antenna (30M-2G Hz)	3141	EMCO	9711-1076	12/17/98	12/17/99
Open test side (Antenna, Amplify, cable calibrated together)				05/20/99	05/20/00

The level of confidence of 95%, the uncertainty of measurement of radiated emission is ± 4.96 dB.

Test Result: Pass (Appendix B)

Radiated Test Placement: (Photographs)



Appendix A

Conducted Emission Test Result: (10 X 10 MHz)

Testing room: Temperature : 28 ° C Humidity : 45 % RH

Line 1

FREQUENCY (KHz)	READING AMPLITUDE			LIMIT		MARGIN (dB)
	Peak (dBµV/m)	Quasi-peak (dBµV/m)	Average (dBµV/m)	Quasi-Peak (dBµV/m)	Average (dBµV/m)	
590	25.03	***.**	***.**	48.00	***.**	-22.97
749	23.80	***.**	***.**	48.00	***.**	-24.20
803	23.51	***.**	***.**	48.00	***.**	-24.49
862	23.04	***.**	***.**	48.00	***.**	-24.96
3750	24.03	***.**	***.**	48.00	***.**	-23.97
13740	22.36	***.**	***.**	48.00	***.**	-25.64
16260	24.53	***.**	***.**	48.00	***.**	-23.47
17570	23.99	***.**	***.**	48.00	***.**	-24.01
23650	26.94	***.**	***.**	48.00	***.**	-21.06
28160	23.73	***.**	***.**	48.00	***.**	-24.27

Line 2

FREQUENCY (KHz)	READING AMPLITUDE			LIMIT		MARGIN (dB)
	Peak (dBµV/m)	Quasi-peak (dBµV/m)	Average (dBµV/m)	Quasi-Peak (dBµV/m)	Average (dBµV/m)	
586	26.12	***.**	***.**	48.00	***.**	-21.88
645	29.29	***.**	***.**	48.00	***.**	-18.71
749	28.95	***.**	***.**	48.00	***.**	-19.05
808	31.30	***.**	***.**	48.00	***.**	-16.70
910	26.74	***.**	***.**	48.00	***.**	-21.26
3750	36.34	***.**	***.**	48.00	***.**	-11.66
13740	30.41	***.**	***.**	48.00	***.**	-17.59
15050	25.31	***.**	***.**	48.00	***.**	-22.69
26220	25.94	***.**	***.**	48.00	***.**	-22.06
28160	25.63	***.**	***.**	48.00	***.**	-22.37

Conducted Emission Test Result: (10 X 100 MHz)

Testing room: Temperature : 28 ° C Humidity : 45 % RH

Line 1

FREQUENCY (KHz)	READING AMPLITUDE			LIMIT		MARGIN (dB)
	Peak (dBμV/m)	Quasi-peak (dBμV/m)	Average (dBμV/m)	Quasi-Peak (dBμV/m)	Average (dBμV/m)	
862	29.39	***.**	***.**	48.00	***.**	-18.61
3750	34.38	***.**	***.**	48.00	***.**	-13.62
15600	27.94	***.**	***.**	48.00	***.**	-20.06
16260	30.85	***.**	***.**	48.00	***.**	-17.15
17700	28.05	***.**	***.**	48.00	***.**	-19.95
18210	31.62	***.**	***.**	48.00	***.**	-16.38
18850	27.87	***.**	***.**	48.00	***.**	-20.13
19750	30.08	***.**	***.**	48.00	***.**	-17.92
21560	27.89	***.**	***.**	48.00	***.**	-20.11
23050	28.02	***.**	***.**	48.00	***.**	-19.98

Line 2

FREQUENCY (KHz)	READING AMPLITUDE			LIMIT		MARGIN (dB)
	Peak (dBμV/m)	Quasi-peak (dBμV/m)	Average (dBμV/m)	Quasi-Peak (dBμV/m)	Average (dBμV/m)	
862	34.58	***.**	***.**	48.00	***.**	-13.42
3750	36.17	***.**	***.**	48.00	***.**	-11.83
6260	33.13	***.**	***.**	48.00	***.**	-14.87
13740	30.20	***.**	***.**	48.00	***.**	-17.80
15600	29.87	***.**	***.**	48.00	***.**	-18.13
16260	33.13	***.**	***.**	48.00	***.**	-14.87
18850	30.23	***.**	***.**	48.00	***.**	-17.77
19750	31.77	***.**	***.**	48.00	***.**	-16.23
20260	30.13	***.**	***.**	48.00	***.**	-17.87
26220	31.60	***.**	***.**	48.00	***.**	-16.40

Conducted Emission Test Result: (100 X 100 MHz)

Testing room: Temperature : 28 ° C Humidity : 45 % RH

Line 1

FREQUENCY (KHz)	READING AMPLITUDE			LIMIT		MARGIN (dB)
	Peak (dBμV/m)	Quasi-peak (dBμV/m)	Average (dBμV/m)	Quasi-Peak (dBμV/m)	Average (dBμV/m)	
15600	28.56	***.**	***.**	48.00	***.**	-19.44
16260	36.33	***.**	***.**	48.00	***.**	-11.67
16800	30.36	***.**	***.**	48.00	***.**	-17.64
17700	34.95	***.**	***.**	48.00	***.**	-13.05
18980	32.48	***.**	***.**	48.00	***.**	-15.52
19750	32.97	***.**	***.**	48.00	***.**	-15.03
22310	28.39	***.**	***.**	48.00	***.**	-19.61
23050	33.85	***.**	***.**	48.00	***.**	-14.15
24300	29.34	***.**	***.**	48.00	***.**	-18.66
29180	29.23	***.**	***.**	48.00	***.**	-18.77

Line 2

FREQUENCY (KHz)	READING AMPLITUDE			LIMIT		MARGIN (dB)
	Peak (dBμV/m)	Quasi-peak (dBμV/m)	Average (dBμV/m)	Quasi-Peak (dBμV/m)	Average (dBμV/m)	
803	31.46	***.**	***.**	48.00	***.**	-16.54
851	33.07	***.**	***.**	48.00	***.**	-14.93
16480	32.00	***.**	***.**	48.00	***.**	-16.00
16800	32.43	***.**	***.**	48.00	***.**	-15.57
17350	32.50	***.**	***.**	48.00	***.**	-15.50
18340	33.96	***.**	***.**	48.00	***.**	-14.04
19620	32.76	***.**	***.**	48.00	***.**	-15.24
20510	32.47	***.**	***.**	48.00	***.**	-15.53
21560	32.50	***.**	***.**	48.00	***.**	-15.50
24470	32.55	***.**	***.**	48.00	***.**	-15.45

Appendix B

Radiated Emission Test Result: (Horizontal) (10 X 100 MHz)

Test Conditions:

Testing room : Temperature : 25 ° C Humidity : 30 % RH

Testing site : Temperature : 25 ° C Humidity : 42 % RH

Frequency	Reading Amplitude	Ant. Heigh	Table	Correction Factors	Corrected Amplitude	Class B limit	Margin
MHz	dBμV	m	degree	dB/m	dBμV/m	dBμV/m	dB
350.000	61.69	0.99	98	-19.58	42.11	46.00	-3.89
375.000	57.66	0.99	283	-18.73	38.93	46.00	-7.07
400.010	53.67	0.99	131	-17.95	35.72	46.00	-10.28
***							

Note:

1.Margin = Amplitude - limit, if margin is minus means under limit.

2.Corrected Amplitude = Reading Amplitude + Correction Factors

3.Correction factor = Antenna factor + (Cable Loss - Amplitude gain)

(For example: 30MHz correction factor = 15.5 + (-15.26) = 0.24 dB/m)

Radiated Emission Test Result: (Vertical) (10 X 100 MHz)

Frequency	Reading Amplitude	Ant. Heigh	Table	Correction Factors	Corrected Amplitude	Class B limit	Margin
MHz	dBμV	m	degree	dB/m	dBμV/m	dBμV/m	dB
32.020	48.44	0.99	340	-23.40	25.04	40.00	-14.96
43.520	50.26	0.99	233	-22.17	28.09	40.00	-11.91
77.220	61.68	2.50	235	-24.17	37.51	40.00	-2.49
81.200	59.81	0.99	320	-25.96	33.85	40.00	-6.15
125.000	53.23	4.00	345	-21.89	31.34	43.50	-12.16
130.020	53.55	0.99	115	-21.75	31.80	43.50	-11.70
250.000	58.27	0.99	81	-22.68	35.59	46.00	-10.41
350.000	54.28	0.99	74	-19.58	34.70	46.00	-11.30
***							

Final statement:

This test report, measurements made by TRC are traceable to the NIST.

EXHIBIT B

Test Report