

Exhibit C - Measurement Report



ELECTROMAGNETIC INTERFERENCE TEST REPORT

Company : ALFA, INC.
Address : 11-1 Industry East Road IV Science Based Industrial Park
Hsinchu, Taiwan, R.O.C.
Sample Name : Ethernet 10/100 Network Adapter
Model : AFC2202
Data applies to : GFC2202, 100TX(E), AD032-TX, LFE-8139TX
Date Received : OCT. 24, 1997
Date Tested : OCT. 28, 1997

MEASUREMENT PROCEDURE USED :
CISPR 22, CLASS B , 1996

WE HEREBY CERTIFY THAT: The measurements shown in the attachment were made in accordance with the procedures indicated, and the energy emitted by the equipment was found to be within the limits applicable. We assume full responsibility for the accuracy and completeness of these measurements and vouch for the qualifications of all persons taking them.

	Name	Signature	Date
Testing Engineer	C.F.Wu/NVLAP	C.F. Wu	Jun. 23, 1998
Approving Manager	Paul Y. Liao/NVLAP	Paul Y. Liao	Jun. 23, 1998

Notes :

1. This report will be invalid if duplicated or photocopied in part.
2. This report refers only to the specimen(s) submitted to test, and is invalid as separately used.
3. This report is invalid without examination stamp and signature of this institute.
4. The tested specimen(s) will be preserved for thirty days from the date issued.
5. This is a NIST/NVLAP accredited report but not constituted and endorsed by US government.



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1. GENERAL INFORMATION

1.1 DESCRIPTION OF EUT

MANUFACTURER : ALFA Inc.

SAMPLE NAME : Ethernet 10/100 Network Adapter

MODEL NUMBER : AFC2202

POWER SUPPLY : DC5V(from PC)



1.2 DESCRIPTION OF PERIPHERALS

(1) PC

PRODUCT NUMBER : D4944-60200/D4944A
SERIAL NUMBER : SG70100104
MANUFACTURER : HP CORP.
F.C.C. ID : -----
POWER CORD : Unshielded , Detachable , 1.8m

(2) MONITOR

MODEL NUMBER : JC-1404HMA
SERIAL NUMBER : 08D00346
MANUFACTURER : NEC CORP.
F.C.C. ID : A3D5YRJJC-1404HMA
POWER CORD : Shielded , Detachable , 1.8m

(3) KEYBOARD

PRODUCT NUMBER : C1405C#AB0
SERIAL NUMBER : 3625M60145
MANUFACTURER : HP CORP.
F.C.C. ID : B94C1405X

(4) PC

PRODUCT NUMBER : Vectra VL5/166 Series5DT
SERIAL NUMBER : SG71901207
MANUFACTURER : HP CORP.
F.C.C. ID : -----
POWER CORD : Unshielded , Detachable , 1.8m

(5) MONITOR

MODEL NUMBER : JC-1571VMA-2
SERIAL NUMBER : 6Z01162EA
MANUFACTURER : NEC CORP
F.C.C. ID : A3DJJC-1571VMA-2
POWER CORD : Shielded , Detachable , 1.8m



(6) KEYBOARD

PRODUCT NUMBER : C3758A AB0
PART NUMBER : C3758-60223
MANUFACTURER : HP CORP.
F.C.C. ID : CIGE03633

(7) Ethernet 10/100 Network Adapter

MODEL NUMBER : AFC 2202
SERIAL NUMBER : -----
MANUFACTURER : ALFA INC.

(8) PRINTER

MODEL NUMBER : 5152-002
SERIAL NUMBER : 0754365
MANUFACTURER : IBM CORP.
FCC ID : BKM9A85152002

(9) MODEM

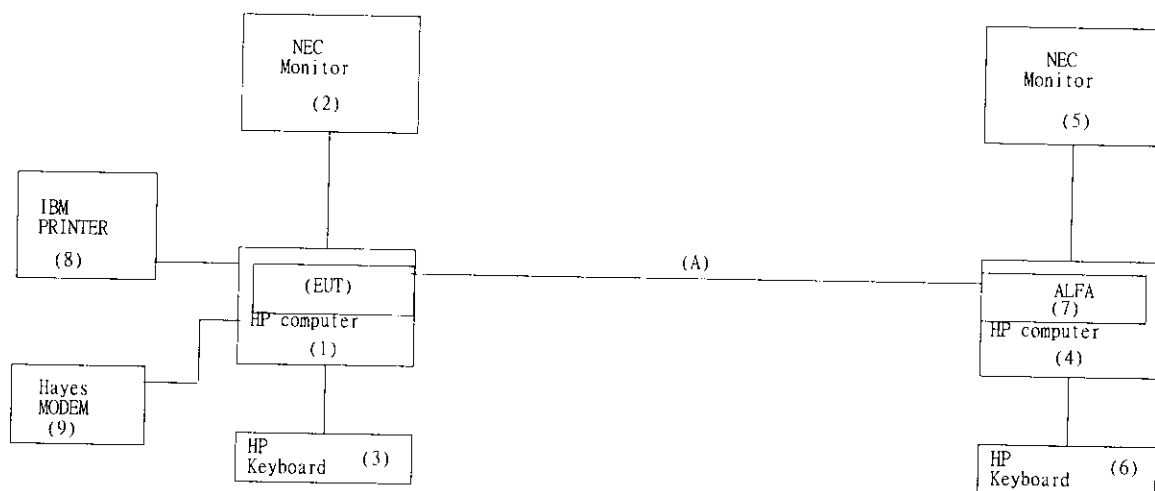
MODEL NUMBER : 4007AM
SERIAL NUMBER : A10740073303
MANUFACTURER : Hayes CORP.
FCC ID : BFJ4000AM

(10) Cables

	Type	Connector	Shielded	length
(A)	uncross-over twisted-pair	RJ-45, metal	No	50ft



1.3 EUT & PERIPHERALS SETUP DIAGRAM



The indicated numbers (1)(2)-----please refer to item 1.2.



1.4 EUT OPERATING CONDITION

1. Powered on all equipment.
2. The EUT was evaluated by transmitting packets between two sets.
3. The one was HP PC (1) AND THE OTHER ONE WAS HP PC (4)
4. The "ACCTEST.EXE" was used as the packet data which was accessed by two sets PC and displayed on the monitors.

1.5 DESCRIPTION OF TEST SITE

SITE DESCRIPTION	: FCC certificate NO. :31040/SIT VCCI certificate NO. :R-629 , C-650 DNV certificate NO. : 510-96-1016 TUV R. certificate NO. :I9664582-9610 Lloyd's certificate NO. :LA003 BCIQ certificate NO. :SL2-IN-E-02 NVLAP Lab code :200118-0
NAME OF SITE	: Electronics Research & Service Organization Industrial Technology Research Institute
SITE LOCATION	: K500, 195-4 , sec. 4, Chung Hsing Rd., Chu-Tung Chen. Hsin-Chu, Taiwan 31015 R.O.C.



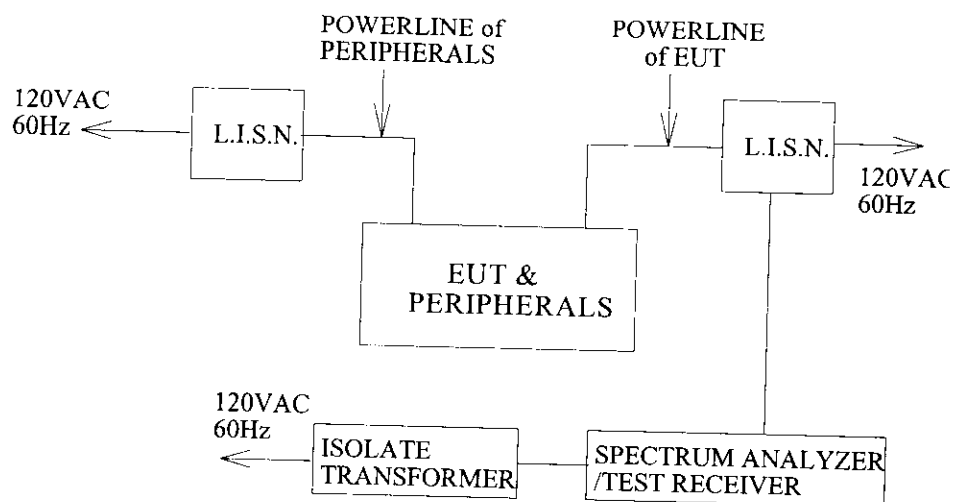
2. CONDUCTED POWERLINE TEST

2.1 TEST EQUIPMENTS

The following test equipments are used during the conducted powerline tests :

MANUFACTURER OR TYPE	MODEL No	DATE OF CALIBRATION
SPECTRUM ANALYZER & DISPLAY	HP 8568 A	MAR. 08, 1997
QUASI-PEAK ADAPTER	HP 85650 A	MAR. 08, 1997
ISOLATION TRANSFORMER	SOLAR 7032-1	N/A
L.I.S.N.	EMCO 3850/2	MAR. 25, 1997
L.I.S.N.	EMCO 3850/2	MAR. 25, 1997
TEST RECEIVER	R/S ESH3	MAR. 08, 1997
SHIELDED ROOM	KEENE 5983	N/A

2.2 TEST SETUP





2.3 CONDUCTED POWER LINE EMISSION LIMIT

FREQUENCY (MHz)	MAXIMUM RF LINE VOLTAGE (dB μ V)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56	56-46
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

2.4 TEST PROCEDURE

The test procedure is performed in a 12ft \times 12ft \times 8ft(L \times W \times H) shielded room. the EUT along with its peripherals were placed on a 1.0m(W) \times 1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chasis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chasis ground also bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

2.5 UNCERTAINTY OF CONDUCTED EMISSION

The uncertainty of conducted emission is ± 1.36 dB.



2.6 LINE CONDUCTED RF VOLTAGE MEASUREMENT

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported below are more than 20 dB below the prescribed limits.

All readings are Quasi-peak values.

Temperature : 26°C

Humidity : 49 % RH

Temperature : 20 °C Humidity : 49 % RH

FREQUENCY (MHz)	READING(dB μ V)				LIMITS (dB μ V)	
	ONE END & GRD'D		THE OTHER END & GRD'D			
	Q.P.	Ave.	Q.P.	Ave.	Q.P.	Ave.
0.150	*	*	60.14	*	66.00	56.00
0.154	52.64	*	52.74	*	65.78	55.78
0.189	49.60	47.90	49.60	47.90	64.06	54.06
0.217	52.06	*	52.19	*	62.92	62.92
0.249	*	*	48.17	*	61.78	51.78
0.251	47.87	*	*	*	61.73	51.73
0.408	38.49	*	38.39	*	57.68	47.68
0.788	32.92	*	32.32	*	56.00	46.00
0.848	32.53	*	32.43	*	56.00	46.00
6.285	33.12	*	32.52	*	60.00	50.00
11.933	*	*	32.25	*	60.00	50.00
12.516	35.56	*	35.16	*	60.00	50.00
13.768	35.46	*	*	*	60.00	50.00
13.841	*	*	35.56	*	60.00	50.00
15.066	34.57	*	34.37	*	60.00	50.00
20.162	30.48	*	29.88	*	60.00	50.00
30.000	*	*	*	*	60.00	50.00

REMARKS : 1. * Undetectable or the QP value is lower than Ave limit
2. For 10MHz mode



2.6 LINE CONDUCTED RF VOLTAGE MEASUREMENT

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All emissions not reported below are more than 20 dB below the prescribed limits.

All readings are Quasi-peak values.

Temperature : 26°C

Humidity : 49 % RH

FREQUENCY (MHz)	READING(dB μ V)				LIMITS	
	ONE END & GRD'D		THE OTHER END & GRD'D		(dB μ V)	
	Q.P.	Ave.	Q.P.	Ave.	Q.P.	Ave.
0.150	*	*	*	*	66.00	56.00
0.154	52.64	*	52.84	*	65.78	55.78
0.189	49.80	48.10	49.60	48.00	64.06	54.06
0.217	51.96	*	52.16	*	62.92	52.92
0.251	48.17	*	48.17	*	61.73	51.73
0.410	38.49	*	38.19	*	57.64	47.64
0.783	32.72	*	32.32	*	56.00	46.00
0.853	*	*	32.63	*	56.00	46.00
1.928	31.67	*	*	*	56.00	46.00
1.939	*	*	31.17	*	60.00	50.00
14.288	31.26	*	*	*	60.00	50.00
16.312	36.57	*	36.07	*	60.00	50.00
17.755	36.27	*	*	*	60.00	50.00
17.849	*	*	35.47	*	60.00	50.00
18.328	36.18	*	35.78	*	60.00	50.00
23.263	34.99	*	35.39	*	60.00	50.00
30.000	*	*	*	*	60.00	50.00

REMARKS : 1. * Undetectable or the QP value is lower than Ave limit
2. For 100MHz mode



3. RADIATED EMISSION TEST

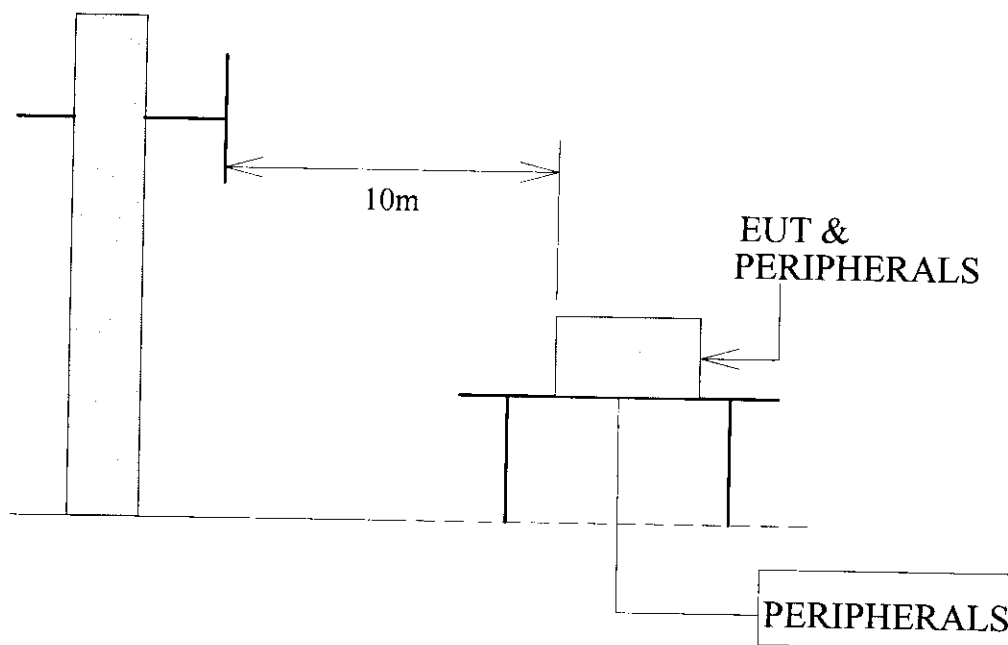
3.1 TEST EQUIPMENTS

The following test equipments are utilized in making the measurements contained in this report.

MANUFACTURER OR TYPE	MODEL NO	DATE OF CALIBRATION
CHASE BILOG ANTENNA	CBL6111A	MAY.26,1997
R/S TEST RECEIVER	ESMI	MAY.22, 1997
ANECHOIC/SHIELDED ROOM	KEENE 5981	N/A

3.2 TEST SETUP

The diagram below shows the test setup which is utilized to make these measurements.



Antenna Elevation Variable



3.3 RADIATION LIMIT

All emanation from a class B computing device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below :

FREQUENCY (MHz)	DISTANCE (METERS)	FIELD STRENGTHS(dB μ V/M)	
		CLASS A	CLASS B
30 – 230	10	40	30
230 – 1000	10	47	37

Note : (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 closest point of any part of the device or system.

3.4 TEST PROCEDURE

The devices under test were placed on a rotatable table top 0.8 meter above ground. The table was rotated 360 degrees to determine the position of the highest radiation. EUT is set 10 meters from the interference receiving antenna which is mounted on the top of a variable height mast. The antenna height is varied between one meter and four meters above ground to find the maximum value of the field strength Both horizontal polarization and vertical polarization of the antenna are set to make the measurement.

The bandwidth setting on the E.M.I. meter (R/S TEST RECEIVER ESMI) is 120 KHz.

The levels are quasi peak value readings. The frequency spectrum from 30MHz to 1000MHz was investigated.

3.5 UNCERTAINTY OF RADIATED EMISSION

The uncertainty of radiated emission is ± 2.72 dB.



3.6 RADIATED RF NOISE MEASUREMENT

The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions not reported below are more than 20 dB below the prescribed limits.

All readings are quasi-peak values.

Temperature : 19°C

Humidity : 85 % RH

FREQ- UENCY (MHz)	ANTENNA FACTOR (dB)	CABLE LOSS (dB)	METER READING AT10m(dB μ V/M)		LIMITS (dB μ V/M)	EMISSION LEVEL AT10m(dB μ V/M)	
			HORIZON- TAL	VERTICAL		HORIZON- TAL	VERTICAL
30.00	19.71	1.20	*	*	30.00	*	*
125.00	11.98	2.30	6.12	*	30.00	20.40	*
150.00	11.15	2.50	3.32	4.44	30.00	16.97	18.09
175.00	9.57	2.60	*	10.88	30.00	*	23.05
200.00	8.95	2.80	5.00	7.52	30.00	16.75	19.27
220.01	10.34	2.92	*	7.80	30.00	*	21.06
225.00	10.69	2.95	6.12	7.80	30.00	19.76	21.44
250.01	12.43	3.10	3.32	9.76	37.00	18.85	25.29
270.01	12.77	3.18	*	6.12	37.00	*	22.07
359.26	14.77	3.60	12.00	*	37.00	30.36	*
449.07	16.80	4.00	5.84	*	37.00	26.63	*
490.01	17.64	4.16	*	2.20	37.00	*	24.00
500.01	17.84	4.20	6.68	7.80	37.00	28.72	29.84
1000	24.69	5.70	*	*	37.00	*	*

REMARKS : 1. * Undetectable

2. Emission level (dB μ V/M) = Antenna Factor (dB) + Cable loss (dB)
+ Meter Reading (dB μ V/M).

3. For 10MHz mode



3.6 RADIATED RF NOISE MEASUREMENT

The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions not reported below are more than 20 dB below the prescribed limits.

All readings are quasi-peak values.

Temperature : 23°C

Humidity : 76 % RH

FREQ- UENCY (MHz)	ANTENNA FACTOR (dB)	CABLE LOSS (dB)	METER READING AT10m(dB μ V/M)		LIMITS (dB μ V/M)	EMISSION LEVEL AT10m(dB μ V/M)	
			HORIZON- TAL	VERTICAL		HORIZON- TAL	VERTICAL
30.00	19.71	1.20	*	*	30.00	*	*
125.00	11.98	2.30	*	6.40	30.00	*	20.68
175.00	9.57	2.60	*	10.04	30.00	*	22.21
200.01	8.95	2.80	6.68	12.56	30.00	18.43	24.31
225.00	10.69	2.95	*	9.48	30.00	*	23.12
250.01	12.43	3.10	12.28	20.96	37.00	27.81	36.49
275.01	12.86	3.20	*	8.64	37.00	*	24.70
300.00	13.28	3.30	*	8.92	37.00	*	25.50
359.26	14.77	3.60	6.12	*	37.00	24.48	*
499.99	17.84	4.20	*	3.32	37.00	*	25.36
500.01	17.84	4.20	2.76	*	37.00	24.80	*
625.02	20.05	4.60	2.20	3.88	37.00	26.85	28.53
1000	24.69	5.70	*	*	37.00	*	*

REMARKS : 1. * Undetectable

2. Emission level (dB μ V/M) = Antenna Factor (dB) + Cable loss (dB)
+ Meter Reading (dB μ V/M).

3. For 100MHz mode

4. The test data marked in gray background means the EUT emission data is located in the margin uncertainty range of emission limits.