

3. System Test Configuration

3-1. Justification

The system was configured for testing in a typical fashion (as a customer would normally use it). The EUT was connected to support equipment-personal computer. Peripherals of PC, such as printer, modem, mouse and keyboard as well as the VGA add-on card were contained in this system in order to comply with the ANSI C63.4/CISPR22(1996) standard requirement. The system was tested in the highest pixel resolution mode of 1280 x 1024, Hsync. 64KHz, and the highest horizontal sweep rate mode of 1024 x 768, Hsync. 69KHz. Both modes were investigated, and the mode of 1024 x 768, Hsync. 69KHz was found to be the worst case. This mode was used to collect the included data.

3-2. EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software, contained on a 3-1/2 inch disk, was inserted into driver A and is auto-starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is:

1. Read (write) from(to)the disk desk driver.
2. Send " H " pattern to the parallel port device (Printer).
3. Send " H " pattern to the video port device (Monitor).
4. Send " H " pattern to the serial port device (Modem).
5. Repeated from 1 to 4 continuously.

As the Keyboard and mouse are strictly input devices, no data is transmitted to (from) them during test. They are, however, continuously scanned for data input activity.

3-3. Special Accessories

As shown in Figure 3-1, all interface cables used for compliance testing are shielded type except the power cord which marked as Un-shielded. All cable connectors are integrated by metal hoods for shielding. This equipment is required to use a shielded video interface cable with a ferrite attached in order to comply with FCC requirements.

3-4. Equipment Modifications

In order to achieve in compliance with Class B levels, the following change(s) were made by NEUTRON test house during the compliance testing:

Please refer to the next page as the modifications described and cross reference of photos of tested EUT.

The above modifications will be implemented in all product models of this equipment.

Applicant Signature :

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Date : Oct. 30, 1998

Type/Printed Name :

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Modification Report

Company: A PLUS INFO CORP.

Model No.: AS1770

FCC ID: I84AS1770

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Date: Nov. 3 , 1998

- A. Add a trorid core on the video cable.
- B. Add a trorid core on the video cable.
- C. Add a trorid core on the data cable.
- D. Add a trorid core on the G2 and Focus cable.
- E. Add a trorid core on the safety ground line.

All the above modification will be implemented and relayout in the mass production to meer the FCC Class B requirements.

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3.5 Configuration of Tested System

The configuration of tested system is described as the block diagram shown in next page Figure 3.1 and details information of I/O cable and power cord connection are tabulated as Table A and B. The monitor is powered from a floor mounted receptacle (referred to as the wall outlet in the previous described) was tested.

TABLE A - Test Equipment

Item	Equipment	Mfr.	Model/Type No.	I/O Port	FCC ID	Remark
E-1	17" Monitor	A PLUS	AS1770	VGA Port	I84AS1770	EUT
E-2	PC	COMPAQ	PRESARIO7222		EJH3326	
E-3	Printer	HP	HP2225C+	Printer Port	DSI6XU2225	
E-4	Modem	Datatronics	AT-1200CK	Com Port	E2O5OV1200CK	
E-5	Keyboard	Forward	FDA-102A	PS/2 Port	F4Z4K3FDA-102A	
E-6	Mouse	Logitech	SERIES 2-7S	PS/2 Port	DZL6QBS2	
E-7	VGA Card	Gainward	S3 Trio64+	PCI slot	ICUVGA-GW503B	
E-8	Earphone	N/A	N/A	Line Port	N/A	※

Remark:

- (1) Unless otherwise denoted as EUT in 「Remark」 column, device(s) used in tested system is a support equipment.
- (2) Unless otherwise marked as ※ in 「Remark」 column, Neutron consigns the supporting equipment(s) to the tested system.

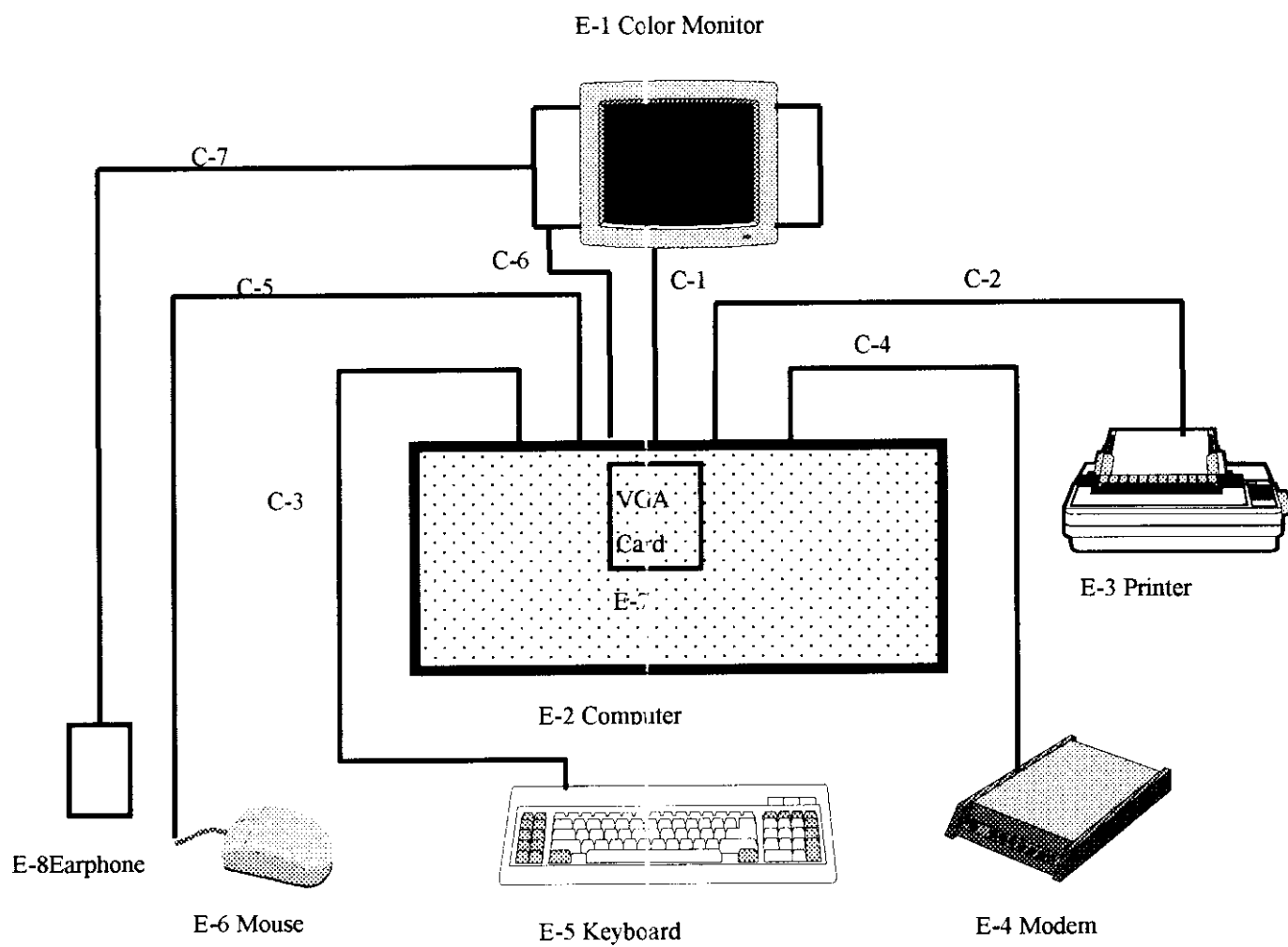
Table B. - Informations Cable Information

Item	I/O Cable	Device Connected	Shielded	Ferrite	Detachable/Permanently	Note
C-1	Video Cable	PC-EUT	Yes	Yes	Permanently attached	※
C-2	Centronics Cable	PC-Printer	Yes	No	Detachable type	
C-3	Keyboard Cable	PC-Keyboard	Yes	No	Permanently attached	
C-4	RS-232 Cable	PC-Keyboard	Yes	No	Detachable type	
C-5	Mouse Cable	PC-Mouse	Yes	No	Permanently attached.	
C-6	Speaker Cable	PC-Speaker	No	No	Permanently attached.	※
C-7	Earphone Cable	EUT-Earphone	No	No	Permanently attached.	※

Note:

(1) Unless otherwise marked as ※ in 「Remark」 column, Neutron consigns the supporting equipment(s) to the tested system.

Figure 3.1 Configuration of Tested System



6. Conducted Emission Datas

- 6.1 The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Judgement: Passed by **-10.45 dB** in mode of **Line** terminal **0.15 MHz**

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Safe Margins	
		QP-Mode	AV-Mode	QP-Mode	AV-Mode	(dBuV)	Note
0.15	Line	55.39	33.60	65.84	55.84	-10.45	(QP)
0.22	Line	45.37	*	62.67	52.67	-17.30	(QP)
9.91	Line	42.36	*	60.00	50.00	-17.64	(QP)
12.00	Line	40.22	*	60.00	50.00	-19.78	(QP)
23.51	Line	41.69	*	60.00	50.00	-18.31	(QP)
0.15	Neutral	54.78	37.60	66.00	56.00	-11.22	(QP)
0.16	Neutral	53.99	32.80	65.67	55.67	-11.68	(QP)
0.20	Neutral	49.05	*	63.65	53.65	-14.60	(QP)
9.86	Neutral	41.81	*	60.00	50.00	-18.19	(QP)
15.72	Neutral	43.81	*	60.00	50.00	-16.19	(QP)

Remark :

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=100KHz, VBW=100KHz, Swp. Time = 0.3 sec./MHz . Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz, VBW=10Hz, Swp. Time =0.3 sec./MHz .
- (2) All readings are QP Mode value unless otherwise stated AVG in colum of 『Note』 . If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform . In this case, a " * " marked in AVG Mode colum of Interference Voltage Measured .
- (3) Measuring frequency range from 150KHz to 30MHz .

Review : [Signature] Test Personnel : Riku Hsu Date: Sep. 30, 1998

7. Radiated Emission Datas

- 7.1 The following data lists the significant emission frequency, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, as well as the limit. Explanation of the Correction Factor is given in paragraph 7.2.

Judgement: Passed by **-3.29 dB** in polarity of **Vertical 172.89 MHz**

Freq. (MHz)	Polar. H/V	Reading(RA) (dBuV/m)	Corr. Factor. (dBuV/m)	Corrected F (dBuV/m)	Limits (QP) (dBuV/m)	Margins (dBuV/m)	Note
51.60	H	13.00	11.66	24.66	30.00	- 5.34	
111.90	V	11.80	13.28	25.08	30.00	- 4.92	QP
119.80	H	12.30	13.59	25.89	30.00	- 4.11	
131.80	V	11.70	12.84	24.54	30.00	- 5.46	
146.30	H	11.90	12.63	24.53	30.00	- 5.47	
172.89	V	9.70	17.01	26.71	30.00	- 3.29	QP
224.80	V	10.80	11.61	22.41	30.00	- 7.59	
228.80	H	10.90	11.92	22.82	30.00	- 7.18	
391.20	V	10.20	17.69	27.89	37.00	- 9.11	
420.00	H	9.90	18.32	28.22	37.00	- 8.78	
438.40	V	10.00	18.96	28.96	37.00	- 8.04	
478.40	H	9.20	20.48	29.68	37.00	- 7.32	

Remark :

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz ; SPA setting in RBW=1MHz, VBW =1MHz, Swp. Time = 0.3 sec./MHz.
- (2) All readings are Peak unless otherwise stated QP in column of 'Note'. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- (3) Measuring frequency range from 30MHz to 1000MHz.
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

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Test Personnel :

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Date:

Sep. 17, 1998

7. Radiated Emission Datas

- 7.1 The following data lists the significant emission frequencise, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, as well as the limit. Explanation of the Correction Factor is given in paragraph 7.2.

Test Mode : 1024x768 85Hz 69KHz

Judgement: Passed by **-27.45 dB** in polarity of **Horizon 1017.40 MHz**

Freq. (MHz)	Polar. H/V	Reading(RA) (dBuV)	Corr.Factor. (dB)	Corrected F (dBuV)	Limits (QP) (dBuV/m)	Margins (dBuV/m)	Note (AV)
1017.40	H	23.48	- 3.07	26.55	54.00	- 27.45	
1033.80	V	23.82	- 3.06	26.88	59.00	- 32.12	
1080.80	H	22.51	- 2.63	25.14	55.00	- 29.86	
1090.20	V	23.61	- 2.63	26.24	60.00	- 33.76	
1110.10	H	24.80	- 2.39	27.19	56.00	- 28.81	
1180.20	V	24.24	- 2.39	26.63	61.00	- 34.37	
1213.20	V	23.59	- 1.40	24.99	62.00	- 37.01	
1232.20	H	23.47	- 2.29	25.76	57.00	- 31.24	
1288.80	H	23.82	- 0.44	24.26	58.00	- 33.74	
1293.20	V	23.52	- 0.44	23.96	63.00	- 39.04	

Remark :

- (1) Reading inwhich marked as Peak means measurements by using are Peak Mode with instrument setting in RBW=1 MHz ,VBW =1MHz, Swp. Time = 0.3 sec./MHz ◦
- (2) Reading inwhich marked as AV means measurements by using are Average Mode with instrument setting in RBW= 1MHz,VBW=10Hz, Swp. Time =0.3 sec./MHz ◦
- (3) Measuring frequency range from 1000MHz to 2000MHz.
- (4) All readings are Peak unless otherwise stated AV in colum of 『Note』 . ※ marked denotes that the Peak reading compliance with the Average Limits in FCC 15.109 and then the AV Mode measurement didn't perform.
- (5) If the peak scan value lower limit more than 20dB, then this signal data does not show in table

Review :

Test Personnel :

Date: June 30, 1998

7-2. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor (1)

CF = Cable Attenuation Factor (1)

AG = Amplifier Gain (1) (2)

Remark :

(1) The Correction Factor = AF + CF - AG, as shown in the data tables' Correction Factor column.

(2) AG is not available for Neutron's Open Site Facility

Example of Calculation:

Assume a Receiver Reading of 23.7 dBuV is obtained with an Antenna Factor of 7.2 dBuV and a Cable Factor of 1.1 dBuV. Then:

1. The Correction Factor will be calculated by

$$\text{Correction Factor} = AF + CF - AG = 7.2 + 1.1 - 0 = 8.3 \text{ (dBuV)}$$

as shown in the data tables' Correction Factor column.

2. The Field Strength will be calculated by

$$FS = RA + \text{Correction Factor} = 23.7 + 8.3 = 32 \text{ (dBuV)}.$$

FS is the value shown in the data tables' Corrected Reading column and RA is the value shown in

the data tables' Receiver Reading column. The 32 dBuV/m value was mathematically converted

to its corresponding level in uV/m as:

$$\text{Log}^{-1} \left[\frac{(32.0 \text{ dBuV/m})}{20} \right] = 39.8 \text{ (uV/m)}$$

7-3. Correction Factor VS Frequency

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30.00	11.10	0.20
35.00	10.80	0.00
40.00	11.20	0.40
45.00	11.50	0.40
50.00	11.30	0.90
55.00	10.50	0.00
60.00	9.90	0.00
65.00	8.70	0.20
70.00	7.60	0.00
75.00	6.40	0.50
80.00	6.10	0.10
85.00	7.00	0.80
90.00	8.00	0.30
95.00	10.00	0.40
100.00	11.20	0.60
110.00	12.60	0.60
120.00	13.00	0.60
130.00	12.50	0.50
140.00	12.00	0.20
150.00	12.00	1.00
160.00	13.20	1.20
170.00	14.80	1.60
180.00	16.30	1.90
190.00	17.00	1.90
200.00	17.30	1.40
225.00	10.50	1.10
250.00	11.70	2.00
275.00	12.80	2.40
300.00	14.50	2.40
325.00	14.00	1.90
350.00	14.20	2.40
375.00	14.60	2.90
400.00	15.10	2.70
450.00	16.20	3.20
500.00	17.60	3.70
550.00	17.80	3.90
600.00	18.40	4.30
650.00	19.50	4.00
700.00	20.80	4.10
750.00	20.50	5.30
800.00	21.10	5.90
850.00	22.40	5.80
900.00	23.50	5.50
950.00	24.00	6.30
1000.00	24.80	5.20

8. Photos of Tested EUT:

1. Photo # 1. Front View
2. Photo # 2. Rear View
3. Photo # 3. Front View
4. Photo # 4. Rear View
5. Photo #5. Unit Partially Disassembled