1. GENERAL INFORMATION

1-1. Product Description

The Compmate Industrial Co., Ltd. Model CM8588D (referred to as the EUT in this report) is a VGA, and VESA compatible multi-sync. color monitor featuring a maximum pixel resolution of 1280x768 (Non-Interlaced).
The EUT provides a permanently attached video interface cable, approx. 1.2 meter, incorporated with a 15-pin, D-shell male, connector in addition to a permanently attached power cord.

Following described the summarized feature of EUT:

1. Display Tube :	14" color, 90 degree deflection, non-glare, dard-tint, screen phosphor P22, 0.28 mm dot pitch.
2. Display Area :	260mm x 195mm(Hor. x Vert.)
3. Compatibility :	VGA and VESA
4. Resolution :	Typical Modes are
VGA:	(H)640x(V)350; (H) 31.5Khz / (V)70Hz
	(H)640x(V)400; (H) 31.5Khz / (V)70Hz
	(H)640x(V)480; (H) 31.5Khz / (V)60Hz
VESA:	(H)800x(V)600; (H) 38Khz / (V)60Hz
	(H)1024x(V)768; (H) 48Khz / (V)60Hz
	(H)800x(V)600; (H) 54Khz / (V)85Hz
5. Synchronization:	Horizontal 30-54 KHz Vertical 45-90Hz
6. Input Signal:	Video: Analog (0.7Vp-p/75 ohm positive)
7. Input Connector:	15-pin D-Sub connector
8. Power:	100-240Vac, 50-60Hz
9. Video Bandwidth	55MHz

1-2. Related Submittal(s) / Grant (s)

1-2-1. Models Covered

Only the EUT model CM8588D is submitted for FCC ID filing.

1-2-2. Models Difference

N/A

1-3. Tested System Details

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

Model No.	FCC ID	Equipment	Cable
CM8588D(1)	KWKCM8588D	14" Monitor	Shielded Data Cable Un-Shielded Power Cord(2)
PRESARIO7222	EJH3326	PC	Shielded Power Cord
HP2225C+	DSI6XU2225	Printer	Shielded Parallel Data Cable Un-Shielded Power Cord
AT-1200CK	E2O5OV1200CK	Modem	Shielded Serial Data Cable Un-Shielded Power Cord
FDA-102A	F4ZAK3FDA-102A	Keyboard	Shielded Data Cable
SERIES 2/7S	DZL6QBS2	Mouse	Shielded Data Cable
S3 Trio64+	ICUVGA-GW503B	VGA Card	Add-on Card Cableless

Notes:

(1) EUT submitted for grant.
(2) Monitor's attached video cable with ferrite core.

1-4. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (1992)/CISPR22(1996). Radiated testing was performed at an antenna to EUT distance 10 meters.

1-5. Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the address of No. 5, All 2, Lane 220, Kang Lo St., Nei Hwu, Taipei, Taiwan, R.O.C. of NEUTRON ENGINEERING INC. This site has been fully described in report dated Feb.4,1998 Submitted to your office, and accepted in a letter dated March 28, 1998 (31040/SIT-1300F2).

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 standard requirement, The system was tested in the highest pixel resolution mode of 800x600 Hsync. 54KHz, and the highest horizontal sweep rate mode of 1024 x 768, Hsync. 48KHz. Both modes were investigated, and the mode of 1024 x 768, Hsync. 48KHz was found to be the worst case. This mode was used to collect the included data.

The second serial port(COM2) was tested in addition to the first port (COM1) ANSI C63.4, second paragraph. The simultaneous testing of this identical port did not take the system out of compliance. Therefore, the final qualification testing was completed with COM1 port connected by a stand along modem.

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 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 : Kao-wan Lee **Date** : March 18, 1998

Type/Printed Name : Kao-wan Lee **Position** : Engineer

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Organization: | Telephone No: Department:
Date: | Fax No.
From: | Telephone No: Fax No:

Message:

Modification Report

Company: Compmate Industrial Co., Ltd.

Model No.: CM8588D

FCC ID: KWKCM8588D

Date: MAY 05 , 1998

A. Add a trorid core on the video cable.

B. Add a trorid core on the safety ground line.

C. Add a trorid core on the G1 , G4 cable.

D. Add a trorid core on the data cable.

E. Add a trorid core on the video cable to close the video board.

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

Compmate Industrial Co., Ltd.

Kao-wan Lee

Kao-wan Lee

Engineer

Notes: 1. *If message is not received completely or not received by intended party, please contact sender.*
2. *No classified information shall be sent via facsimile.*
3. *No 'Company Private' materiel shall be sent to an unattended machine and transmission to an attended machine requires telephone confirmation intended recipient upon receipt.*

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 an power cord connection are tablized as Table A and B. The monitor is powered from a floor mounted receptale (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	14" Monitor	Compmate	CM8588D	VGA Port	KWKCM8588D	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+		ICUVGA-GW503B	

Remark:

(1) Unless otherwise denoted as EUT in 「Remark」 colum , device(s) used in tested system is a support equipment.

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

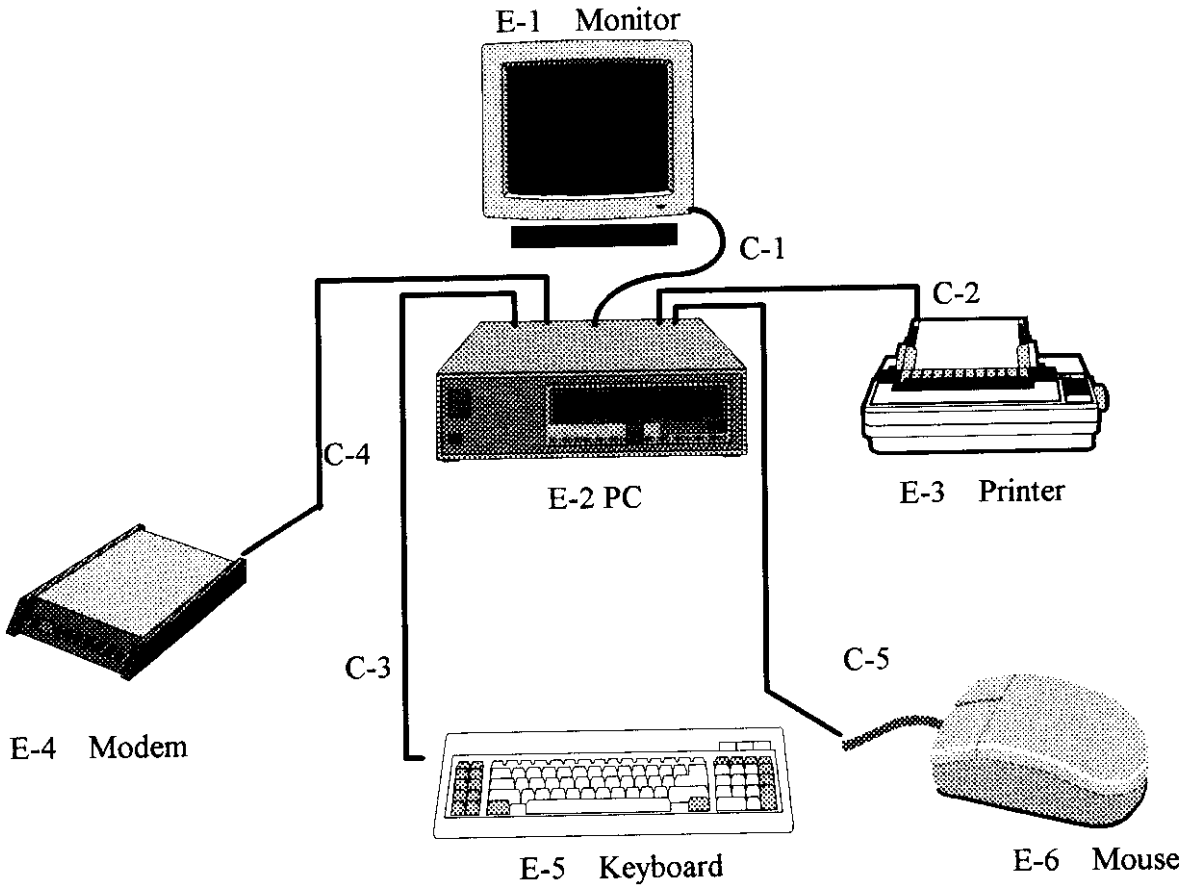
Table B. - Informations Cable Information

Item	I/O Cable	Device Connected	Shielded	Ferrite	Detachable/Permanently	Note
C-1	Video Cable	PC-Monitor	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.	

Note:

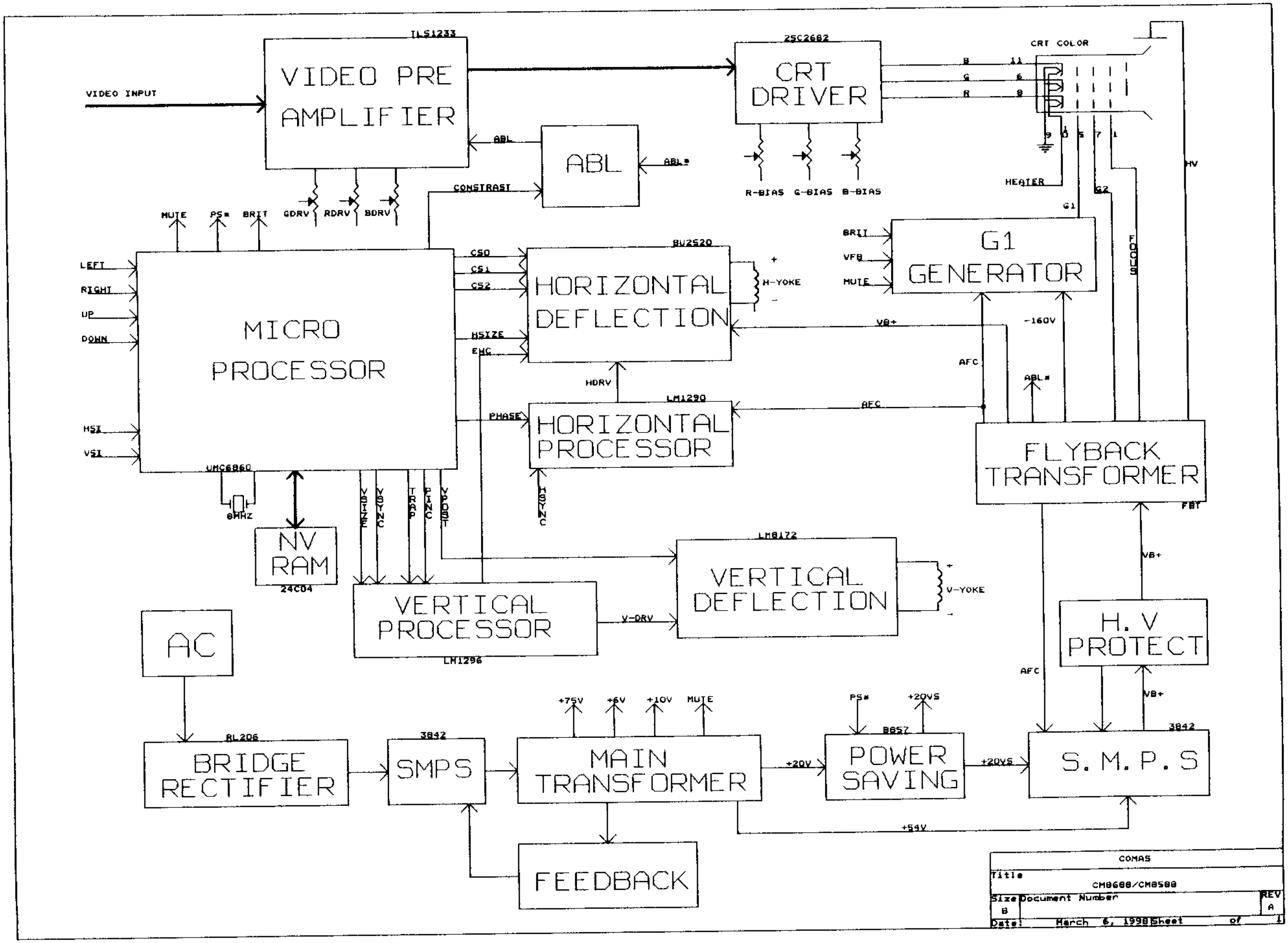
(1) Unless otherwise marked as ※ in 「Remark」 colum, Neutron consigns the supporting equipment(s) to the tested system.

Figure 3.1 Configuration of Tested System



4. Block Diagram(s)

Figure 4.1 Block diagram of system, Page 13.A


VIDEO INPUT
VIDEO PRE AMPLIFIER
ILS1233
CRT DRIVER
2SC2682
CRT COLOR
B
G
R
11
6
8
9
0
5
7
1
HEATER
G1
G2
FOCUS
HV
R-BIAS
G-BIAS
B-BIAS
ABL
ABL*
CONSTRAST
MUTE
PS*
BRIT
GDRV
RDRV
BDRV
MICRO PROCESSOR
UMC6860
LEFT
RIGHT
UP
DOWN
HSI
VSI
8MHZ
NV RAM
24C04
CS0
CS1
CS2
HSIZE
EHC
PHASE
HORIZONTAL DEFLECTION
BU2520
H-YOKE
+
-
HORIZONTAL PROCESSOR
LM1290
HDRV
HSYNC
VB+
AFC
G1 GENERATOR
BRIT
VFB
MUTE
-160V
ABL*
FLYBACK TRANSFORMER
FBT
VSIZE
VSYNC
TRAP
PINC
VPOST
VERTICAL PROCESSOR
LM1296
V-DRV
VERTICAL DEFLECTION
LM8172
V-YOKE
H. V PROTECT
VB+
AC
BRIDGE RECTIFIER
RL206
SMPS
3842
MAIN TRANSFORMER
+75V
+6V
+10V
MUTE
+20V
POWER SAVING
8857
PS*
+20VS
S. M. P. S
3842
+54V
FEEDBACK
COMAS
Title
CM8688/CM8588
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March 6, 1998
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1

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 **-5.20** **dB** in mode of **Line** terminal **22.36** **MHz**

Freq.	Terminal	Measured(dBuV)		Limits(dBuV)		Safe Margins	
(MHz)	L/N	QP-Mode	AV-Mode	QP-Mode	AVG-Mode	(dBuV)	Note
0.23	Line	45.70	43.40	62.45	52.45	-9.05	(AV)
0.47	Line	39.30	36.90	56.51	46.51	-9.61	(AV)
4.45	Line	36.30	34.10	56.00	46.00	-11.90	(AV)
22.36	Line	47.30	44.80	60.00	50.00	-5.20	(AV)
22.98	Line	46.10	44.30	60.00	50.00	-5.70	(AV)
0.23	Neutral	45.90	43.50	62.45	52.45	-8.95	(AV)
0.47	Neutral	37.50	35.10	56.51	46.51	-11.41	(AV)
2.09	Neutral	39.70	37.30	56.00	46.00	-8.70	(AV)
22.33	Neutral	47.40	44.60	60.00	50.00	-5.40	(AV)
22.74	Neutral	46.70	44.20	60.00	50.00	-5.80	(AV)

Remark：

(1) Reading inwhich 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 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。

(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 deemd 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：Andy CC Test Personnel.：Robert Tseng Date: March 18, 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.

Judgement: Passed by **-5.57** **dB** in polarity of **Vertical** **38.30** **MHz**

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Safe Margins (dBuV/m)	Note
33.70	H	12.50	10.93	23.43	30.00	- 6.57	
38.30	V	13.10	11.33	24.43	30.00	- 5.57	
41.60	V	12.60	11.70	24.30	30.00	- 5.70	
143.10	H	11.30	12.39	23.69	30.00	- 6.31	
159.00	H	9.60	14.24	23.84	30.00	- 6.16	
172.00	V	7.00	16.82	23.82	30.00	- 6.18	
219.20	H	9.70	11.79	21.49	30.00	- 8.51	
219.20	V	12.40	11.79	24.19	30.00	- 5.81	
226.40	V	10.80	11.72	22.52	30.00	- 7.48	
257.60	H	9.80	14.16	23.96	37.00	-13.04	
266.40	H	7.90	14.68	22.58	37.00	-14.42	
296.00	V	10.50	16.63	27.13	37.00	- 9.87	

Remark :

(1) Reading inwhich 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 colum 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 ◦

Review : Test Personnel. : Robert Tseng Date: March 17, 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 caculated by

Correction Factor = AF + CF - AG = 7.2 + 1.1 - 0 = 8.3 (dBuV)

as shown in the data tables' Correction Factor column.

2. The Field Strength will be calculated by

FS = RA + Correction Factor = 23.7 + 8.3 = 32 (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:

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

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. -- 5 Rear Cover Removed
4. Photo # 6 Unit Partially Disassembled
5. Photo # 7 -- 8 Processor PC Board, Component Side
6. Photo # 9 -- 10 Processor PC Board, Foil Side
7. Photo # 11 Inside Rear Cover