

MEASUREMENT/TECHNICAL REPORT

**APPLICANT: TECO INFORMATION SYSTEMS
CO., LTD.**

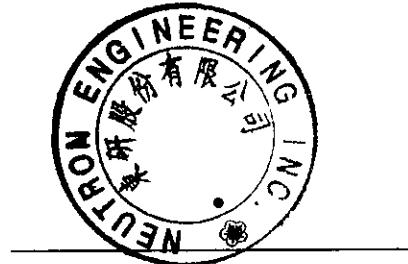
MODEL NO.: TE995B

FCC ID: E8OTE995

This report concerns (check one) :		Original Grant	<input type="checkbox"/>
		Class II Change	<input checked="" type="checkbox"/>
Equipment type: Monitor			
Deferred grant requested per 47CFR 0.457(d)(1)(ii)?			
Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes, defer until: _____ (date)			
We, the undersigned, agree to notify the Commission by (date) _____ / _____ / _____ of the intended date of announcement of the product so that the grant can be issued on that date.			
Transiyion Rules Request per 15.37?		Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
If no, assumed Part 15, Subpart B for unintentional radiator the new 47 CFR (10-1-90 Edition) provision.			

CERTIFICATION**We hereby certify that:**

The test data , data evaluation , test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (1992) / CISPR 22 (1996) and the energy emitted by the sample EUT tested as described in this report is in compliance with CLASS B conducted and radiated emission limits of FCC Rules Part 15 , Subpart B / CISPR 22 (1996)

Prepared by : Carol ChenCarol Chen**Reviewed by :** Andy ChiuAndy Chiu**Approved by :** George YaoGeorge Yao**Issued Date :** September 09, 1998**Report No. :** NEI-FCCB-98155**Company Stamp :**

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1. GENERAL INFORMATION

1-1. Product Description

The Teco Information Systems Co., Ltd. Model: TE995B(referred to as the EUT in this report) is a high performance multisync. color display monitor supports a maximum pixel resolution to 1600x1200 (Non-Interlaced). It is the microprocessor-based designation provide digital controls for precision, auto-synchronization, auto-sizing and auto-centering for convenience and user-programmability for flexibility.

Following described the summarized feature of EUT:

1. Display Tube	19" diagonal 90° deflection, full square, non-glare, Dot Pitch:0.26mm
2. Display Area	360 mm × 270mm (Hor. × Vert.)
3. Resolution	1280×1024 1024×768 1600×1200 800×600 640×480
4. Scanning frequency	Horizontal 30-95 KHz; Vertical 50-150 Hz
5. Pixel Rate	200 MHz (maximum)
6. Input Signal	Video: Analog (0.7Vp-p/75 ohm positive) Selected by OSD control Sync.: Separate sync, positive or negative TTL
7. Input Connector	15-pin D-connector/BNC connector
8. Power	Line voltage:100VAC-240VAC, Frequency: 50 ± 3Hz, 60 ± 3Hz

A more detailed and/or technical descriptions of EUT is attached in **attachment-A**

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

This submittals is intended for filing a Class II Permissive Change for the certified equipment FCC ID : E8OTE995(date of grant January 22, 1998).

Comparing with current model,the following change are initiated into the modified model:

A. I/O Interface Connector

Deletes the BNC connectors and keeps DB-15P VGA connector only.

B. I/O Interface PWB Assembly

Changing the I/O interface PWB assembly to be a single D-Sub VGA connector,instead of current dual I/O connectors.

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
TE995B ⁽¹⁾	E8OTE995	Monitor	Shielded Video Cable. ⁽²⁾ Un-Shielded Power Cord
93V	ANO6282	PC	Shielded Power Cord.
HP2225C+	DSI6XU2225	Printer	Shielded Parallel I/F Cable. Un-shielded Power Cord.
AT-1200CK	E2O5OV1200CK	Modem	Shielded Serial I/F Cable. Un-shielded Power Cord.
FDA-102A	F4Z4K3FDA-102A	Keyboard	Shielded Data Cable
Series 2-7S	DZL6QBS2	Mouse	Shielded Data Cable
Miro VIDEO 40SV ergo	LAHV40SV-PCI-1	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)/CISPR 22 (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 inserted in this system in order to comply with the ANSI C63.4(1992)/CISPR 22 (1996) standard requirement. The system was tested in the highest pixel resolution mode of 1600×1280 , Hsync. 93KHz, and the other resolution mode of 1024×768 , Hsync. 69KHz. Both modes were investigated and were 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 driver.
2. Send " H " pattern to parallel port device(Printer).
3. Send " H " pattern to video port device(Monitor).
4. Send " H " pattern to COM1 port device (Modem1).
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

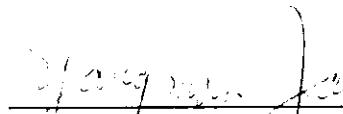
NA

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 modification described and cross reference of photos of tested EUT.

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

Applicant Signature :**Date :**

September 10, 1998

Type/Printed Name :

Yangman Jang

Position :

Project Manager

TECO Image Systems Co., Ltd.

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Modification Report

Company:TECO Information Systems Co., Ltd.

Model No.: TE995B

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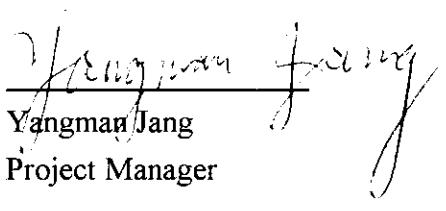
FCC ID: E8OTE995

Date: Sep. 09 , 1998

- A. Add toroid cores on the signal cable.(R.G.B.)
- B. Add a gasket to touch CRT.
- C. Add a toroid core on the discharge cable.
- D. Add a toroid core on the G2 cable.
- E. Add a toroid core on the safety ground line.
- F. Add a toroid core on the Dy cable.
- G. Add a ferrite bead on the G1.

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

TECO Information Systems Co., Ltd.


Yangman Jang
Project Manager

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	Monitor	TECO	TE995B	VGA Port	E8OTE995	EUT
E-2	PC	IBM	93V		ANO6282	
E-3	Printer	HP	HP2225C+	Print Port	DSI6XU2225	
E-4	Modem	Datronics	AT-1200CK	Com Port	E2O5OV1200CK	
E-5	Keyboard	Forward	FDA-102A	K/B Port	F4Z4K3FDA-102A	
E-6	Mouse	Logitech	Series 2 -7S	PS/2 Port	DZL6QBS2	
E-7	VGA Card	Miro	Miro VIDEO 40SV ergo	Card Slot	LAHV40SV-PCI-1	

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.

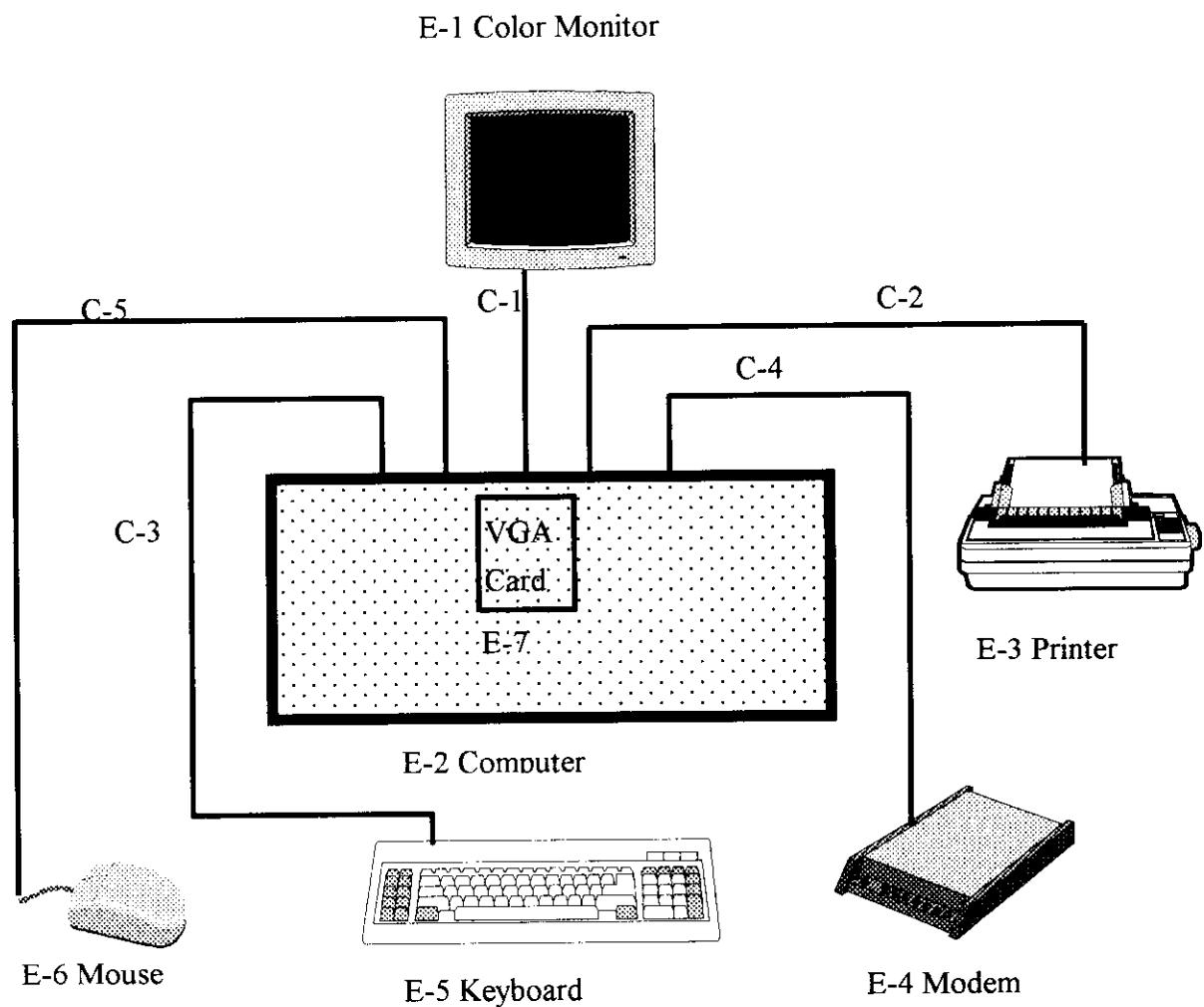
Table B. - Informations Cable Information

Item	I/O Cable	Device Connected	Shielded	Ferrite	Detachable/Permanently	Note
C-1	Video Cable	PC-Monitor	Yes	Yes	Detachable type	※
C-2	Centronics Cable	PC-Printer	Yes	No	Part of Printer, Detachable	
C-3	Keyboard Cable	PC-Keyboard	Yes	No	Permanently attached on KB	
C-4	RS-232C Cable	PC-Modem	Yes	No	Part of Modem, Detachable	
C-5	Mouse Cable	PC-Mouse	Yes	No	Permanently attached on Mouse	

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

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.

Test Mode : 1024*768 69KHz 85Hz

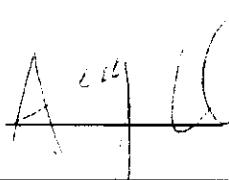
Judgement: Passed by **-13.26 dB** in mode of **Neutral terminal 15.80 MHz**

Freq. (MHz)	Terminal	Measured(dBuV)		Limits(dBuV)		Safe (dBuV)	Margins Note	
		L/N	QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.21	Line		46.17	*	63.33	53.33	-17.16	(QP)
0.48	Line		41.59	*	56.27	46.27	-14.68	(QP)
0.83	Line		38.87	*	56.00	46.00	-17.13	(QP)
6.09	Line		40.27	*	60.00	50.00	-19.73	(QP)
15.72	Line		43.81	*	60.00	50.00	-16.19	(QP)
0.20	Neutral		44.93	*	63.45	53.45	-18.52	(QP)
0.28	Neutral		44.06	*	60.91	50.91	-16.85	(QP)
1.23	Neutral		39.62	*	56.00	46.00	-16.38	(QP)
10.56	Neutral		40.60	*	60.00	50.00	-19.40	(QP)
15.80	Neutral		46.74	*	60.00	50.00	-13.26	(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 :



Test Personnel :



Date: September 04, 1998

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.

Test Mode : 1600*1280 92.6KHz 70Hz

Judgement: Passed by **-14.90 dB** in mode of **Neutral terminal 15.31 MHz**

Freq. (MHz)	Terminal	Measured(dBuV)		Limits(dBuV)		Safe (dBuV)	Margins (Note)	
		L/N	QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.18	Line		48.12	*	64.35	54.35	-16.23	(QP)
0.28	Line		44.51	*	60.85	50.85	-16.34	(QP)
1.36	Line		38.21	*	56.00	46.00	-17.79	(QP)
6.09	Line		40.80	*	60.00	50.00	-19.20	(QP)
14.52	Line		44.19	*	60.00	50.00	-15.81	(QP)
0.19	Neutral		45.78	*	64.21	54.21	-18.43	(QP)
0.28	Neutral		44.63	*	60.85	50.85	-16.22	(QP)
1.36	Neutral		40.42	*	56.00	46.00	-15.58	(QP)
6.22	Neutral		39.24	*	60.00	50.00	-20.76	(QP)
15.31	Neutral		45.10	*	60.00	50.00	-14.90	(QP)

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 : A. S. L. Test Personnel : H. H. H. Date: September 03, 1998

7. Radiated Emission Datas

7.1 The following data lists the significant emission frequencies, 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.

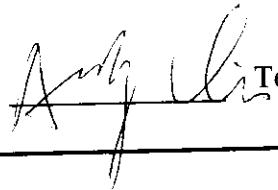
Test Mode : 1024*768 85Hz 69KHz

Judgement: Passed by **-2.85 dB** in polarity of **Horizon 195.40 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
47.30	H	15.10	12.04	27.14	30.00	-	2.86
77.30	V	18.50	6.58	25.08	30.00	-	4.92
120.40	V	12.10	13.58	25.68	30.00	-	4.32
178.40	H	8.80	17.96	26.76	30.00	-	3.24
179.10	V	7.20	18.06	25.26	30.00	-	4.74
195.40	H	8.40	18.75	27.15	30.00	-	2.85
201.60	H	10.00	12.35	22.35	30.00	-	7.65
221.60	V	12.10	11.71	23.81	30.00	-	6.19
252.80	V	18.70	13.87	32.57	37.00	-	4.43
252.80	H	13.90	13.87	27.77	37.00	-	9.23
263.20	V	15.50	14.49	29.99	37.00	-	7.01
405.60	H	12.00	17.95	29.95	37.00	-	7.05

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.

Review :  Test Personnel : Ricky Wu Date: September 01, 1998

7. Radiated Emission Data

7.1 The following data lists the significant emission frequencies, 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.

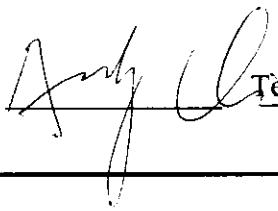
Test Mode : 1600*1280 70Hz 92.6KHz

Judgement: Passed by **-4.04 dB** in polarity of **Vertical 244.80 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
51.91	V	11.10	11.55	22.65	30.00	-	7.35
74.00	H	18.00	7.04	25.04	30.00	-	4.96
74.69	V	9.10	13.38	22.48	30.00	-	7.52
124.50	V	9.10	13.38	22.48	30.00	-	7.52
124.50	H	11.50	13.38	24.88	30.00	-	5.12
174.20	H	6.20	17.28	23.48	30.00	-	6.52
212.90	V	10.90	11.99	22.89	30.00	-	7.11
224.94	H	12.30	11.60	23.90	30.00	-	6.10
244.80	V	19.70	13.26	32.96	37.00	-	4.04
249.42	H	15.70	13.65	29.35	37.00	-	7.65
432.26	H	13.10	18.73	31.83	37.00	-	5.17
437.80	V	12.60	18.94	31.54	37.00	-	5.46

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.

Review :  Test Personnel : Riley Hsu Date: September 02, 1998

7. Radiated Emission Data (30MHz~1GHz)

7.1 The following data lists the significant emission frequencies, 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 : 1600*1280 92.7KHz 70Hz

Judgement: Passed by -13.96 dB in polarity of Vertical 1020.00 MHz

Freq. (MHz)	Polar. H/V	Reading(RA) (dBuV)	Corr.Factor. (dB)	Corrected FS (dBuV/m)	Limits 3m(AV) (dBuV/m)	Margins (dBuV/m)	Note (AV)
1012.00	H	41.20	-3.54	37.66	54.00	-16.34	
1020.00	V	43.60	-3.56	40.04	54.00	-13.96	
1046.00	V	39.50	-3.05	36.45	54.00	-17.55	
1050.00	H	39.70	-3.05	36.65	54.00	-17.35	
1110.00	H	40.80	-2.63	38.17	54.00	-15.83	
1110.00	V	41.10	-2.63	38.47	54.00	-15.53	
1200.00	V	40.30	-1.48	38.82	54.00	-15.18	
1204.00	H	39.60	-1.48	38.12	54.00	-15.88	

Remark :

- (1) Reading in which 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 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.
- (3) Measuring frequency range from 1000MHz to 2000MHz.
- (4) All readings are Peak unless otherwise stated AV in column 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 : Arif Ali Test Personnel : Rikar Hoss Date: September 03, 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:

$$\mathbf{FS = RA + AF + CL - AG}$$

Where **FS = Field Strength**

RA = Receiver Amplitude

AF = Antenna Factor (1)

CL = Cable Attenuation Factor (1)

AG = Amplifier Gain (1) (2)

Remark :

- (1) The Correction Factor = AF + CL - 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 dB and a Cable Factor of 1.1 dB. Then:

1. The Correction Factor will be calculated by

$$\mathbf{Correction Factor = AF + CL - AG = 7.2 + 1.1 - 0 = 8.3 \text{ (dB)}}$$

as shown in the data tables' Correction Factor column.

2. The Field Strength will be calculated by

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

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:

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

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:

The following photos are attached:

Photo # 1. Front View

Photo # 2. Rear View

Photo # 3.-18. Unit Partially Disassembled