

MEASUREMENT/TECHNICAL REPORT**APPLICANT:** EPO Technology Incorporation**MODEL NO.:** CR-836S,CR-840S**FCC ID:** NZKCR-840

This report concerns (check one) : **Original Grant**
Class II Change

Equipment type: CD-ROM

Deferred grant requested per 47CFR 0.457(d)(1)(ii)?

Yes No 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 No

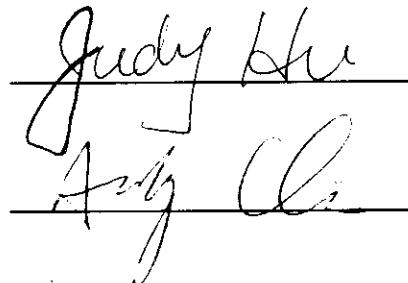
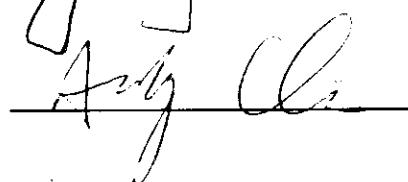
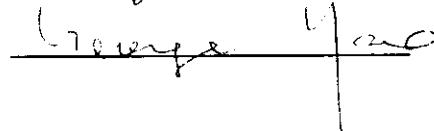
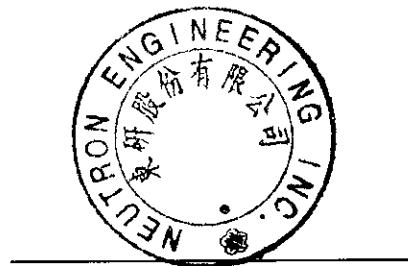
If no, assumed Part 15, Subpart B for unintentional radiator the new 47 CFR (10-1-90 Edition) provision.

Report Prepared**by Testing House :** Neutron Engineering Inc.**for Company Name:** EPO Technology Incorporation**Address:** 4F. 310 CHU KWANG RD. TAPEI R.O.C.**Applicant Signature :**

C. K. Chang / President

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) /CISPR22(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/CISPR22(1996).

Prepared by : Judy Hu**Reviewed by :** Andy Chiu**Approved by :** George Yao**Issued Date :** JULY 09, 1998**Report No. :** NEI-FCCB-98108**Company Stamp :**

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1. GENERAL INFORMATION

1-1. Product Description

The EPO Technology Incorporation model : CR-836S, CR-840S(referred to as the EUT in this report) are internal installation type CD-ROM drive designed for multimedia and other high performance applications. The drive allows IBM PC or compatible to effectively read data from CDs.

A more detailed descriptions, technical datas and/or specifications of EUT is enclosed as the User's Manual attached.

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

1-2-1. Models Covered

Models covering in this test report are:

EPO Technology Incorporation Brand: CR-836S,CR-840S

OEM:CTX / CR-836S,CR-840S

1-2-2. Models Difference

The model CR-836S and CR-840S are identical to each other except the MTRP(max. transfer rate performance) designation of drive speed.

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
CR-840S	NZKCR-840	CD-ROM	Cableless.
NE64	KFBNE64	Monitor	Shielded (2) Video Cable Un-Shielded Power Cord.
93V	ANO6282	PC	Shielded Power Cord.
HP2225C+	DSI6XU2225	Printer	Shielded Serial Data Cable Un-Shielded Power Cord
AT-1200CK	E2O5OV1200CK	Modem	Shielded Parallel Data Cable Un-Shielded Power Cord
FDA-102A	F4Z4K3FDA-102A	Keyboard	Shielded Data Cable
SERIES 2-7S	DZL6QBS2	Mouse	Shielded Data Cable
GRS-455		Speakers	Shielded Data Cable

Notes:

- (1) EUT submitted for grant.
- (2) Monitor's attached video cable without ferrite core.

1-4. Test Methodology

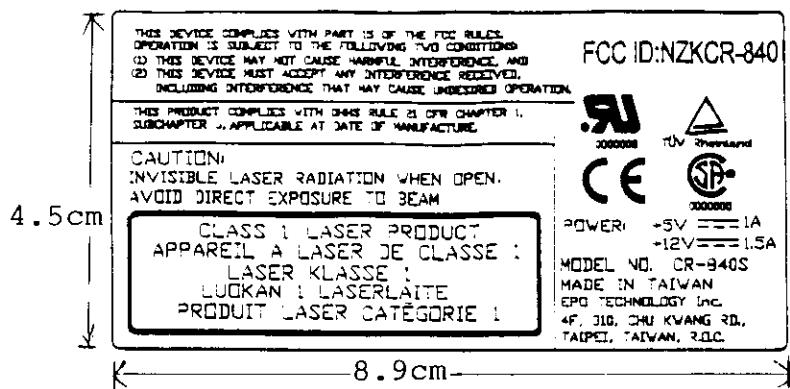
Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (1992)/CISPR22(1996). Radiated testing was performed at an antenna to EUT distance 10 meters.

1-5. Test Facility

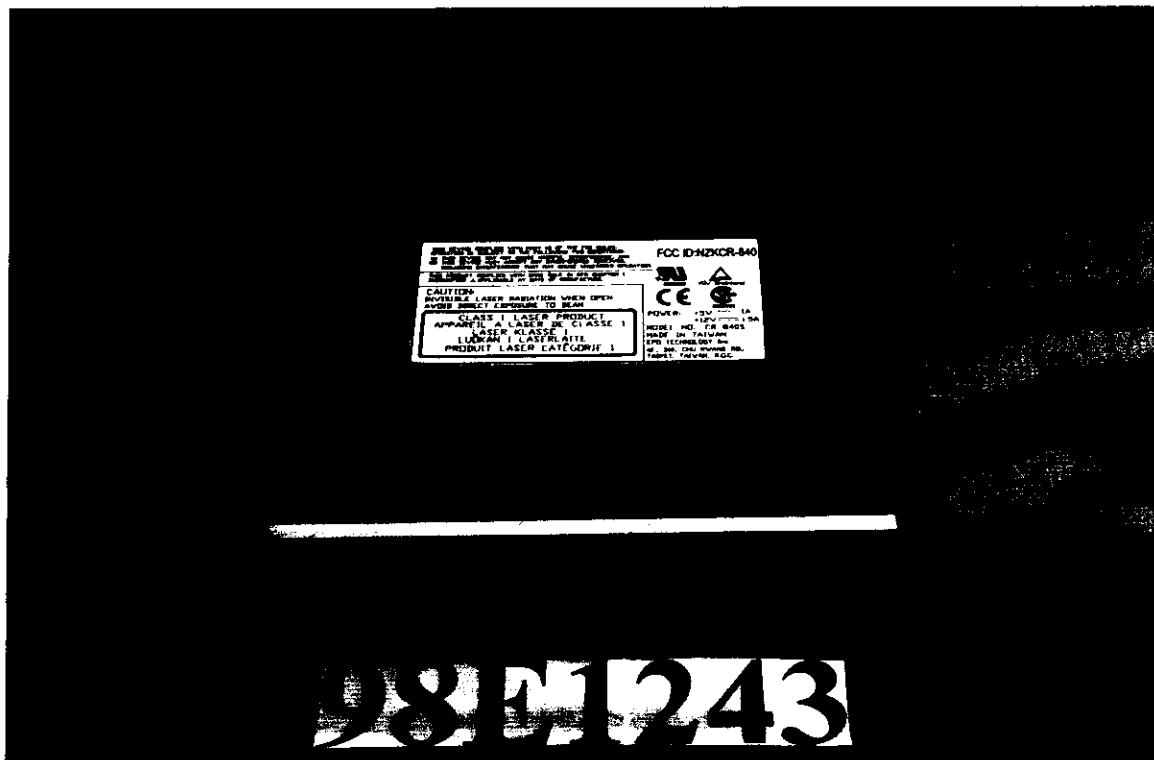
The open area test site and conducted measurement facility used to collect the radiated data is located on the address of No. 5, All 2, Lane 220, Kang Lo St., Nei Hwu, Taipei, Taiwan, R.O.C. of NEUTRON ENGINEERING INC. This site has been fully described in report dated Feb. 04, 1998 Submitted to your office, and accepted in a letter dated March 28, 1998 (31040/SIT-1300F2).

2. Product Labeling

2-1. FCC ID label



2-2 Location of Label on EUT



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 internal CD-ROM subsystem which built into the support equipment-personal computer was replaced by the EUT. Peripherals of PC such as monitor, keyboard, modem, printer, mouse and speakers were contained in this testing system in order to comply with the ANSI C63.4(1992)/ CISPR22(1996) Rules requirement. The PC operated in the default 640x480/31.5KHz VGA Graphic mode. This operating condition was tested and 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) mass storage device(CD-ROM).
2. Send "H" pattern to video port device(Monitor).
3. Send " H " pattern to parallel port device(Printer).
4. Send " H " pattern to serial port device (Modem).
5. Repeated from 2 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.

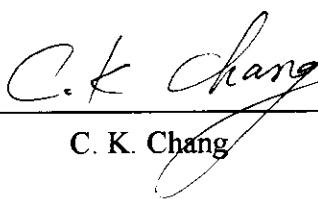
3-3. Special Accessories

No any other special accessory used for compliance testing.

3-4. Equipment Modifications

Not available for this EUT intended for grant.

Applicant Signature :



Date :

JULY 09, 1998

Type/Printed Name :

C. K. Chang

Position :

President

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	CD-ROM	EPO	CR-840S	N/A	NZKCR-840	EUT
E-2	Monitor	Chern-Yih	NE64	VGA Port	KFBNE64	
E-3	PC	IBM	93V		ANO6282	
E-4	Printer	HP	HP2225C+	Centronic Port	DSI6XU2225	
E-5	Modem	Datatronics	AT-1200CK	COM Port	E2050V1200CK	
E-6	Keyboard	Forward	FDA-102A	KB DIN Port	F4Z4K3FDA102A	
E-7	Mouse	Logitech	Series 2 -7S	PS/2 Port	DZL6QBS2	
E-8	Speakers	N/A	GRS-455	N/A	N/A	

Note:

- (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 support equipment(s) to the tested system.

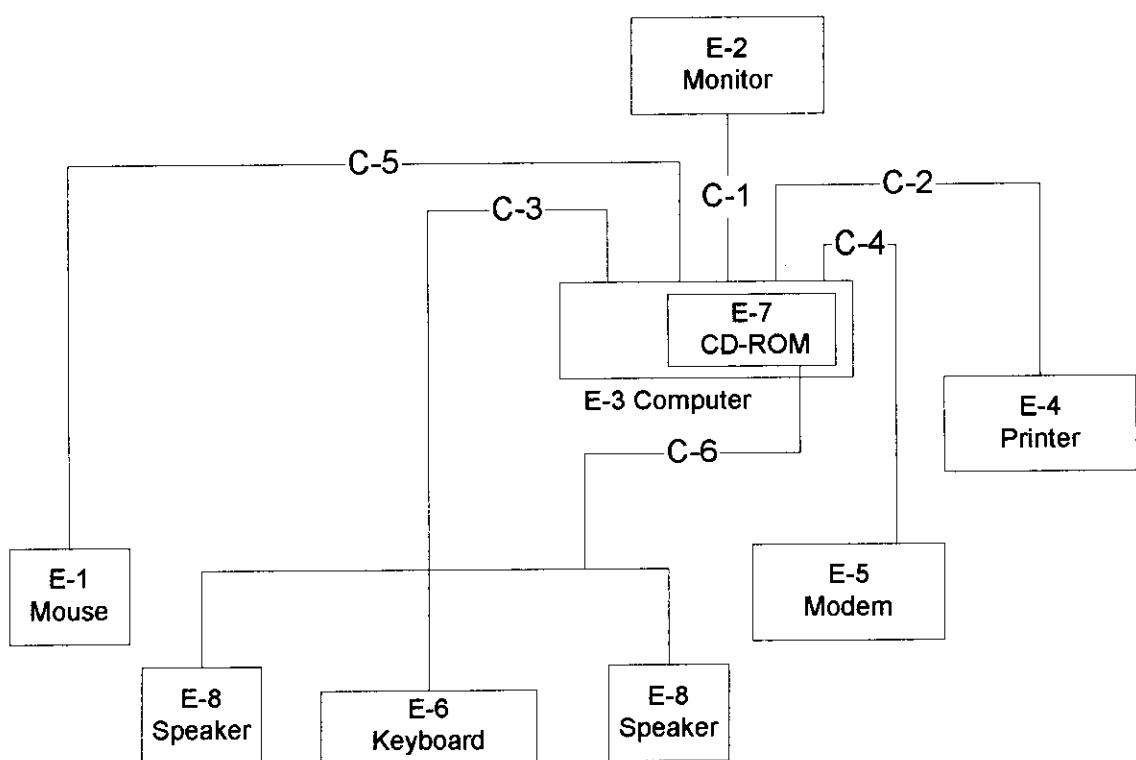
Table B. - Informations Cable Information

Item	I/O Cable	Device Connected	Shielded	Ferrite Core	Detachable/Permanently	Length	Note
C-1	Video Cable	PC-Monitor	Yes	No	Permanently attached on Monitor	150 cm	
C-2	Centronics Cable	PC-Printer	Yes	No	Part of Printer, Detachable	200 cm	
C-3	Keyboard Cable	PC-Keyboard	Yes	No	Permanently attached on KB	200 cm	
C-4	RS-232 Cable	PC-Modem	Yes	No	Part of Modem, detachable type	175 cm	
C-5	Mouse Cable	PC-Mouse	Yes	No	Permanently attached on Mouse	280 cm	
C-6	Speakers Cable	EUT-Speaker	No	No	Permanently attached on Speaker	200 cm	

Note:

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

Fig. 3-1 Configuration of Tested System



6. Conducted Emission Data

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 **-13.31 dB** in mode of **Line** terminal **15.72 MHz**

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Safe (dBuV)	Margins Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.19	Line	45.47	*	63.86	53.86	-18.39	(QP)
4.98	Line	36.90	*	56.00	46.00	-19.10	(QP)
8.68	Line	37.45	*	60.00	50.00	-22.55	(QP)
15.72	Line	46.69	*	60.00	50.00	-13.31	(QP)
28.30	Line	38.75	*	60.00	50.00	-21.25	(QP)
0.23	Neutral	45.59	*	62.45	52.45	-16.86	(QP)
4.98	Neutral	37.09	*	56.00	46.00	-18.91	(QP)
8.68	Neutral	37.11	*	60.00	50.00	-22.89	(QP)
15.80	Neutral	45.01	*	60.00	50.00	-14.99	(QP)
28.30	Neutral	38.26	*	60.00	50.00	-21.74	(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 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 : Asif Iqbal Test Personnel : R.Kar H/Sy Date: JUNE 11, 1998

7. Radiated Emission Datas

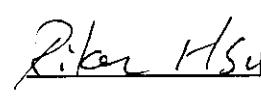
7.1 The following data lists the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, as well as the limit. Explanation of the Correction Factor is given in paragraph 7.2.

Judgement: Passed by **-6.06 dB** in polarity of **Vertical 140.70 MHz**

Freq. (MHz)	Polar. H/V	Reading(RA) (dBuV)	Corr.Factor. (dB)	Corrected F (dB)	Limits (QP) (dBuV/m)	Margins (dBuV/m)	Note (QP)
41.90	V	11.50	11.71	23.21	30.00	-	6.79
54.80	H	13.00	10.57	23.57	30.00	-	6.43
64.70	H	14.80	8.96	23.76	30.00	-	6.24
71.70	H	15.80	7.36	23.16	30.00	-	6.84
140.70	V	11.70	12.24	23.94	30.00	-	6.06
152.60	V	10.60	13.31	23.91	30.00	-	6.09
202.40	V	10.50	12.32	22.82	30.00	-	7.18
203.20	H	11.00	12.30	23.30	30.00	-	6.70
208.00	V	11.00	12.14	23.14	30.00	-	6.86
215.20	V	12.00	11.91	23.91	30.00	-	6.09
224.80	H	11.00	11.61	22.61	30.00	-	7.39
228.80	H	10.20	11.92	22.12	30.00	-	7.88

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 :  Date: JUNE 10 , 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

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

as shown in the data tables' Correction Factor column.

2. The Field Strength will be calculated by

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

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:

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

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. Unit Partially Disassembled
4. Photo # 4. Unit Partially Disassembled
5. Photo # 5. Unit Partially Disassembled
6. Photo # 6. Unit Partially Disassembled
7. Photo # 7. Unit Partially Disassembled
8. Photo # 8. Unit Partially Disassembled
9. Photo # 9. Unit Partially Disassembled
10. Photo # 10. Unit Partially Disassembled