

1. GENERAL INFORMATION

1-1. Product Description

The LITE-ON TECHNOLOGY CORP model : LTN-503,LTN-483,LTN-443,LTN-403,LTN-323 (referred to as the EUT in this report) is an 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.

Detailed features and/or technical specification enclosed as Use's Manual attached.

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

1-2-1. Models Covered

LITE-ON Brand : LTN-503,LTN-483,LTN-443,LTN-403,LTN-323

1-2-2. Models Difference

Model LTN-XX3, X maybe 32, 40, 44, 48 or 50. The models are indential to each other expect the software designation and Max driver speed. Model difference is described as the reference table:

Model	Speed
LTN-503	50X
LTN-483	48X
LTN-443	44X
LTN-403	40X
LTN-323	32X

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
LTN-503	H4ICDR1004 (1)	CD-ROM	Cable less
93V	ANO6282	PC	Shielded Power Cord
4500DC-E	GWGMULTI82	Monitor	Shielded Data Cable ⁽²⁾ Un-Shielded Power Cord
93V	ANO6282	PC	Shielded Power Cord
DPV-414	N/A (3)	Printer	Shielded Parallel Data Cable Un-Shielded Power Cord
AT-1200CK	E2O5OV1200CK	Modem	Shielded Serial Data Cable Un-Shielded Power Cord
FDA-102A	F4Z4K3FDA-102A	Keyboard	Shielded Data Cable
Series 2-7S	DZL6QBS2	Mouse	Shielded Data Cable
N/A	N/A	Earphone	Un-Shielded Line-On Cable.

Notes:

(1) EUT submitted for grant.

(2) Monitor's attached video cable without ferrite core.

(3) The support equipment was passed by declaration of Conformity.

1-4. Test Methodology

Both conducted and redial 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 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 640 × 480/31.5KHz VGA Graphic mode. This operating condition was tested and used to 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

Not available for this EUT intended for grant.

3-4. Equipment Modifications

Not available for this EUT intended for grant.

Applicant Signature :


Patrick Yen

Date :

March 01, 1999

Type/Printed Name :

Position :

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 tabalized 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	LITE-ON	LTN-503	IDE Port	H4ICDR1004	EUT
E-2	Monitor	Optquest	4500DC-E	VGA Port	GWGMULTI82	
E-3	PC	IBM	93V		ANO6282	
E-4	Printer	SII	DPV-414	Printer Port	N/A	
E-5	Modem	Datatronics	AT-1200CK	COM Port	E2O5OV1200CK	
E-6	Keyboard	Forward	FDA-102A	KB Port	F4Z4K3FDA-102A	
E-7	Mouse	Logitech	SERIES 2-7S	Mouse Port	DZL6QBS2	
E-8	Earphone	N/A	N/A	Phone Jack	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.

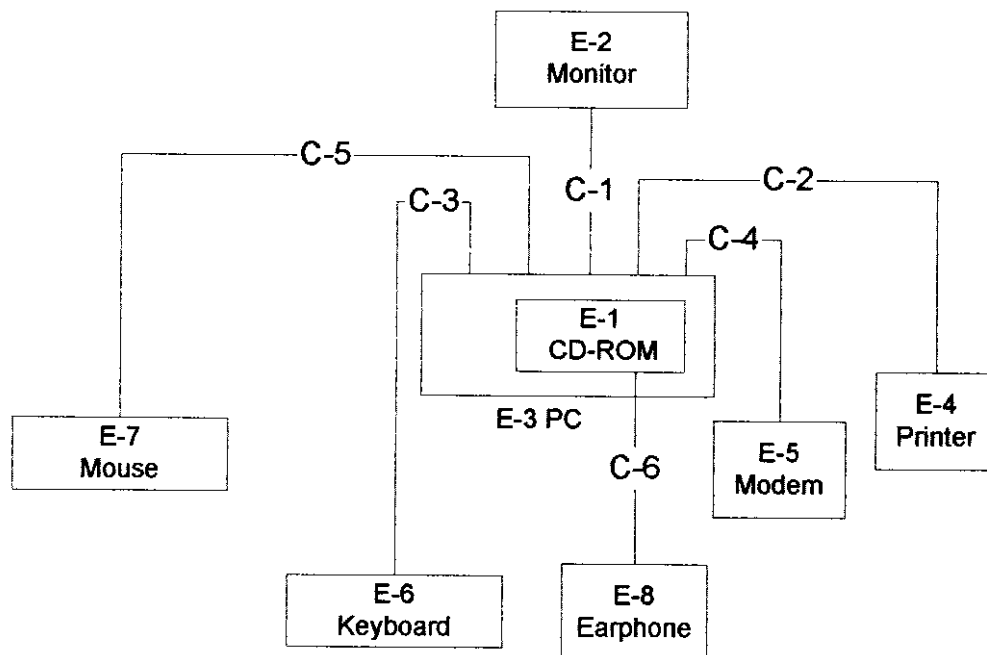
Table B. - Informations Cable Information

Item	I/O Cable	Device Connected	Shielded Type	Ferrite Core	Detachable/ Permanently	Length	Note
C-1	Video Cable	PC-Monitor	Yes	No	Permanently attached	170cm	
C-2	Centronics Cable	PC-Printer	Yes	No	Detachable type	200cm	
C-3	Keyboard Cable	PC-Keyboard	Yes	No	Permanently attached	280cm	
C-4	RS-232 Cable	PC-Modem	Yes	No	Detachable type	175cm	
C-5	Mouse Cable	PC-Mouse	Yes	No	Permanently attached	200cm	
C-6	Earphone Cable	EUT-Earphone	No	No	Detachable type.	180cm	

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



4. Block Diagram(s)

Figure 4.1 Block diagram of system, Page 13.A

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 **-12.32 dB** in mode of **Line** terminal **0.23 MHz**

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Safe Margins (dBuV)	
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		Note
0.23	Line	49.99	*	62.31	52.31	-12.32	(QP)
0.31	Line	44.42	*	60.05	50.05	-15.63	(QP)
1.25	Line	38.21	*	56.00	46.00	-17.79	(QP)
12.06	Line	47.54	*	60.00	50.00	-12.46	(QP)
22.18	Line	43.44	*	60.00	50.00	-16.56	(QP)
0.24	Neutral	49.83	*	62.20	52.20	-12.37	(QP)
0.31	Neutral	44.10	*	60.11	50.11	-16.01	(QP)
1.25	Neutral	37.24	*	56.00	46.00	-18.76	(QP)
12.72	Neutral	47.05	*	60.00	50.00	-12.95	(QP)
22.18	Neutral	45.57	*	60.00	50.00	-14.43	(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 column 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 column of Interference Voltage Measured .
- (3) Measuring frequency range from 150KHz to 30MHz .

Review :

Test Personnel. :

Riker 1/34

Date:

March 01, 1999

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.

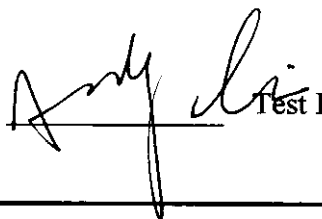
Judgement: Passed by **-2.14 dB** in polarity of **Vertical 219.20 MHz**

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
43.77	V	30.58	- 4.65	25.93	30.00	- 4.07	
125.03	H	28.60	- 2.41	26.19	30.00	- 3.81	
129.11	V	28.40	- 2.65	25.75	30.00	- 4.25	
129.11	H	28.10	- 2.65	25.45	30.00	- 4.55	
133.36	V	28.83	- 2.84	25.99	30.00	- 4.01	
192.18	H	23.60	2.52	26.12	30.00	- 3.88	
209.60	H	29.72	- 3.69	26.03	30.00	- 3.97	
211.20	V	30.39	- 3.69	26.70	30.00	- 3.30	
219.20	V	31.62	- 3.76	27.86	30.00	- 2.14	
221.60	H	29.14	- 3.78	25.36	30.00	- 4.64	
403.20	H	30.53	2.98	33.51	37.00	- 3.49	
438.00	V	29.47	4.13	33.60	37.00	- 3.40	

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 :

Riker Hsu

Date:

Feb. 26, 1999

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:

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

7-3. Correction Factor VS Frequency

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30.00	11.10	0.90
35.00	10.80	0.50
40.00	11.20	1.00
45.00	11.50	0.80
50.00	11.30	1.00
55.00	10.50	1.30
60.00	9.90	1.00
65.00	8.70	1.50
70.00	7.60	1.20
75.00	6.40	1.40
80.00	6.10	1.30
85.00	7.00	1.40
90.00	8.00	1.70
95.00	10.00	1.50
100.00	11.20	1.90
110.00	12.60	2.00
120.00	13.00	1.80
130.00	12.50	1.80
140.00	12.00	2.00
150.00	12.00	2.20
160.00	13.20	2.40
170.00	14.80	2.50
180.00	16.30	2.50
190.00	17.00	2.50
200.00	17.30	2.40
225.00	10.50	2.70
250.00	11.70	3.10
275.00	12.80	3.70
300.00	14.50	4.00
325.00	14.00	4.50
350.00	14.20	4.50
375.00	14.60	4.60
400.00	15.10	4.80
450.00	16.20	5.40
500.00	17.60	6.50
550.00	17.80	7.00
600.00	18.40	7.10
650.00	19.50	7.10
700.00	20.80	7.20
750.00	20.50	7.50
800.00	21.10	8.00
850.00	22.40	8.60
900.00	23.50	8.90
950.00	24.00	9.70
1000.00	24.80	10.30

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