

APPLICATION FOR CERTIFICATION
On Behalf of
LITE-ON IT Corp.
CD-RW DRIVE

Model : (1)LTR-24102B (2)LTR-24102M
(3)CDR-1640MM (4)CDR-1640MC
(5)AI-CDRW241040B

FCC ID: PPQRW1002

Prepared for : LITE-ON IT Corp.
6F., 16, Sec. 4, Nanking E. Rd.,
Taipei, Taiwan, R.O.C.

Prepared By : Taiwan Tokin EMC Eng. Corp.
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File Number : ATM-G90764R1
Report Number : TTEMC-F01101
Date of Test : Jun. 26 ~ Aug. 21, 2001
Date of Report : Aug. 22, 2001

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APPENDIX I (DIFFERENCES LIST OF MODELS)

TEST REPORT CERTIFICATION

Applicant : LITE-ON IT Corp.
 Manufacturer #1 : LITE-ON IT Corp.
 Manufacturer #2 : LITE-ON Electronic Technology (HK) Co., Ltd.
 EUT Description : CD-RW DRIVE
 FCC ID : PPQRW1002
 (A) MODEL NO. : (1)LTR-24102B (2)LTR-24102M
 (3)CDR-1640MM (4)CDR-1640MC
 (5)AI-CDRW241040B
 (B) SERIAL NO. : N/A
 (C) POWER SUPPLY : DC 5V/12V

Measurement Procedure Used :

FCC RULES AND CISPR 22 (DOCKET NO. 92-152, SEP. 1993) AND
FCC / ANSI C63.4-1992
(FCC Part 15/2001 and CISPR 22/1997)

The device described above was tested by TAIWAN TOKIN EMC ENG. CORP. to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the CISPR 22 Class B limits both radiated and conducted emissions.

The measurement results are contained in this test report and TAIWAN TOKIN EMC ENG. CORP. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC official limits.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Taiwan Tokin EMC Eng. corp.

Date of Test : Jun. 26 ~ Aug. 21, 2001

Prepared by :  Aug. 24, 2001
(NITA LEE)

Test Engineer : Allen Wang Aug. 24, 2000
(ALLEN WANG)

Approve & Authorized Signer : 
(JACKIE DENG)

GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	CD-RW DRIVE (ATAPI/E-IDE Interface)
Model Number	:	(1)LTR-24102B (2)LTR-24102M (3)CDR-1640MM (4)CDR-1640MC (5)AI-CDRW241040B Above five models have the same circuit and PCB, the differences are in Data Transfer Rate, Flash memory and brand, the details are attached in Appendix I. The Model LTR-24102B is test sample in this test report.
FCC ID	:	PPQRW1002
Applicant	:	LITE-ON IT Corp. 6F, 16, Sec. 4, Nanking E. Rd., Taipei, Taiwan, R.O.C.
Manufacturer #1	:	LITE-ON IT Corp. 3F., 60, Park Avenue. II, Hsinchu Science-Based Ind. Park, Hsinchu City, Taiwan, R.O.C.
Manufacturer #2	:	LITE-ON Electronic Technology (HK) Co., Ltd. N., San Heng Rd., Heng Jiao Ind. Zone, Xi Chen Zone, Shi Jie Town, Dong Guan City, Guang Dong Province, China.
Data of Receipt of Sample	:	Jun. 02, 2001
Date of Test	:	Jun. 26 ~ Aug. 21, 2001

1.2. Tested Supporting System Details

1.2.1. PERSONAL COMPUTER

Mother Board	:	ASUS Intel 812, M/N CUSL2 S/N 07Z7Y31473, FCC by DoC
CPU	:	Intel Pentium III 667MHz
RAM	:	128MB (PC-133)
PC Case	:	Enlight, M/N EN-7105A
S.P.S.	:	FSP, M/N FSP250-60PFN S/N S00769638
Floppy Driver 3.5"	:	Mitsumi, M/N D353M3, S/N 0G04JT1208
Hard Disk Driver	:	Seagate(4.3GB), M/N ST34321A S/N CT0006888
CD-RW DRIVE(EUT)	:	LITE-ON, M/N LTR-24102B
VGA Card	:	CP, M/N CM64A, S/N C02E050655 FCC by DoC
Power Cord	:	Non-Shielded, Detachable, 1.8m

1.2.2. MONITOR

Model Number	:	0180-05N
Serial Number	:	23-58600
FCC ID	:	ARSCM569N
Manufacturer	:	IBM
Data Cable	:	Shielded, Undetachable, 1.5m Bonded a ferrite core
Power Cord	:	Non-Shielded, Detachable, 1.8m

1.2.3. KEYBOARD

Model Number	:	5121
Serial Number	:	J83300803
FCC ID	:	E5XKBM104M10UC
Manufacturer	:	Behavior Tech Computer Corp.
Data Cable	:	Shielded, Undetachable, 1.0m

1.2.4. PRINTER

Model Number	:	2225C+
Serial Number	:	3123S97227
FCC ID	:	DSI6XU2225
Manufacturer	:	Hewlett Packard
Power Adapter	:	Kani, Model AD-09
	:	Non-Shielded, Detachable, 2.0m
Data Cable	:	Shielded, Detachable, 1.2m

1.2.5. MODEM

Model Number : DM-1414
 Serial Number : 980034393
 FCC ID : IFAXDM1414
 Manufacturer : Aceex
 Data Cable : Shielded, Detachable, 1.2m
 Power Adapter : Amigo, Model AM-91000A
 Non-Shielded, Undetachable, 1.8m

1.2.6. MOUSE

Model Number : M-S35
 Serial Number : LZA82103133
 FCC ID : DZL211029
 Manufacturer : Logitech
 Data Cable : Non-Shielded, Undetachable, 1.8m

1.2.7. USB MOUSE #1

Model Number : CREUBB
 Serial Number : N/A
 FCC ID : NHM-CREUBE
 Manufacturer : CRE Technology Co., Ltd.
 Data Cable : Shielded, Undetachable, 1.8m

1.2.8. USB MOUSE #2

Model Number : CREUBB
 Serial Number : N/A
 FCC ID : NHM-CREUBE
 Manufacturer : CRE Technology Co., Ltd.
 Data Cable : Shielded, Undetachable, 1.8m

1.2.9. MICROPHONE

Model Number : HD-303
 Serial Number : N/A
 Manufacturer : Multimedia Microphone System
 Data Cable : Non-Shielded, Undetachable, 2.2m

1.2.10. SPEAKER

Model Number : J-008
 Serial Number : J80547826
 Manufacturer : (J-S) JAZZ HIPSTER
 Data Cable : Non-Shielded, Undetachable, 1m

1.2.11. WALKMAN

Model Number : RQ-P35LT-K
 Serial Number : HA08715
 Manufacturer : Panasonic
 Data Cable : Non-Shielded, Detachable, 1.8m

1.2.12. EARPHONE #1

Model Number	:	N/A
Serial Number	:	N/A
Manufacturer	:	Panasonic
Data Cable	:	Non-Shielded, Undetachable, 1.1m

1.2.13. EARPHONE #2 (LINK TO EUT)

Model Number	:	N/A
Serial Number	:	N/A
Manufacturer	:	Panasonic
Data Cable	:	Non-Shielded, Undetachable, 1.1m

1.2.14. GAME PAD

Model Number	:	S-2300
Serial Number	:	N/A
Manufacturer	:	Super Cobra
Data Cable	:	Non-Shielded, Undetachable, 1.35m

1.3. Description of Test Facility

Site Description (C3/R5)	:	Mar. 31, 2000 file on Federal Communication Commission FCC Engineering Laboratory 7435 Oakland Mills Road Columbia, MD 21046, U.S.A.
Name of Firm	:	Taiwan Tokin EMC Eng. Corp.
Site Location	:	No. 53-11, Tin-Fu Tsun, Lin-Kou, Taipei Hsien, Taiwan, R.O.C.
NVLAP Lab Code	:	200077-0

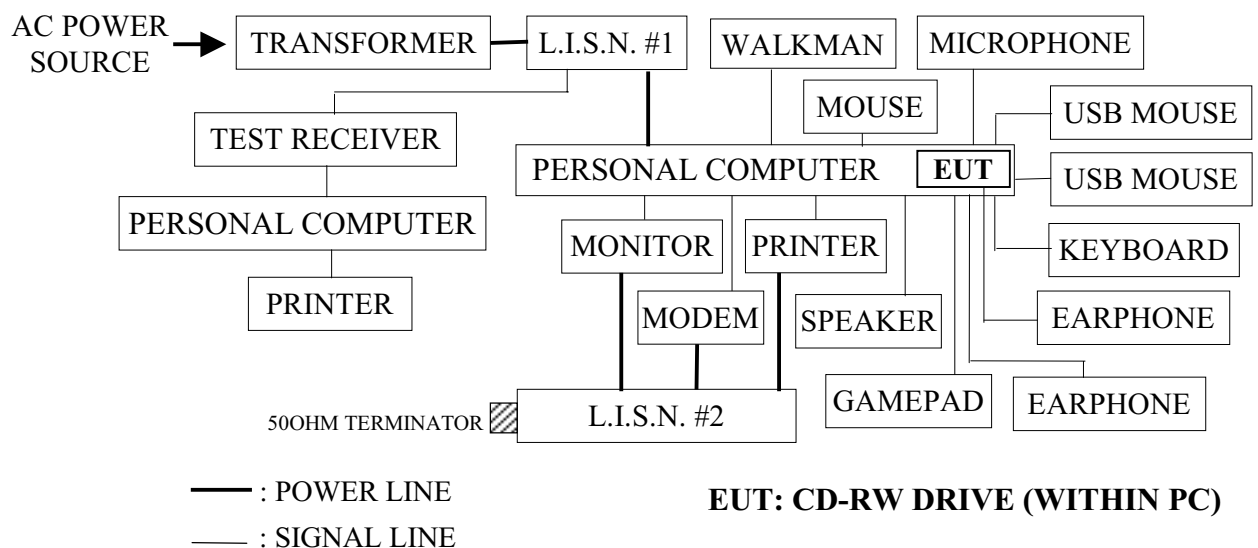
2. POWERLINE CONDUCTED TEST

2.1. Test Equipment

The following test equipment are used during the power line conducted tests :

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Personal Computer	TOKIN	586PC	N/A	N/A	N/A
2.	Test Receiver	Rohde & Schwarz	ESCS 30	825442/020	Jun. 27, 00'	1 Year
3.	L.I.S.N. #1	Kyoritsu	KNW-407	8-1370-10	May 28, 01'	1 Year
4.	L.I.S.N. #2	Kyoritsu	KNW-407	8-1370-9	May 28, 01'	1 Year
5.	Printer	HP	C2164A	SG58N1321Y	N/A	N/A

2.2. Block Diagram of Test Setup



2.3. Powerline Conducted Emission Limit (CISPR 22, Class B)

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level	Average Level
150KHz ~ 500KHz	66 ~ 56 dB	56 ~ 46 dB
500KHz ~ 5MHz	56 dB	46 dB
5MHz ~ 30MHz	60 dB	50 dB

Remark: If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary.

2.4. EUT's Configuration during Compliance Measurement

The following equipment are installed on RF LINE VOLTAGE measurement to meet the Commission requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

2.4.1. CD-RW DRIVE (EUT)

Model Number	:	LTR-24102B
Serial Number	:	N/A
FCC ID	:	PPQRW1002
Manufacturer	:	LITE-ON IT Corp.

2.4.2. Support Simulators : As in section 1.2.

2.5. Operating Condition of EUT

2.5.1. Setup the EUT and simulator as shown on 2.2.

2.5.2. Turned on the power of all equipment.

2.5.3. READ DATA Mode: The PC read "H.txt" file through EUT by MS DOS, and monitor displayed "H" during all testing.

2.5.4. WRITE DATA Mode: The personal computer wrote "Word, Excel, file" to EUT (CD-RW DRIVE) through "Easy CD Creator Deluxe" program.

2.5.5. The other peripheral devices were drove and operated in turn during all testing.

2.5.6. Repeat above procedure from 2.5.3. to 2.5.5.

2.6. Test Procedure

The EUT (within PC) was connected to the power mains through a line impedance stabilization network (L.I.S.N. #1) and the other peripheral devices power cord were connected to the power mains through a line impedance stabilization network (L.I.S.N. #2) This provided a 50 ohm coupling impedance for the measuring equipment. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to FCC ANSI C63.4-1992 on conducted measurement.

The bandwidth of R&S Test Receiver ESCS 30 was set at 10KHz.

The frequency range from 150KHz to 30MHz is checked.

All the test results are listed in section 2.7.

2.7. Test Results

PASSED.

Two kinds of test modes were done during conducted measurement and all the test results are listed in the following pages. (8 Page)

EUT : CD-RW DRIVE M/N : LTR-24102B

Test Date : Jun. 26, 2001 Temperature : 27°C Humidity : 57%

Test Mode		Reference Data #
1.	READ DATA	# 627, (631, 635) ; # 628, (632, 636).
2.	WRITE DATA	# 630, (634, 638) ; # 629, (633, 637).

Test Mode : READ DATA

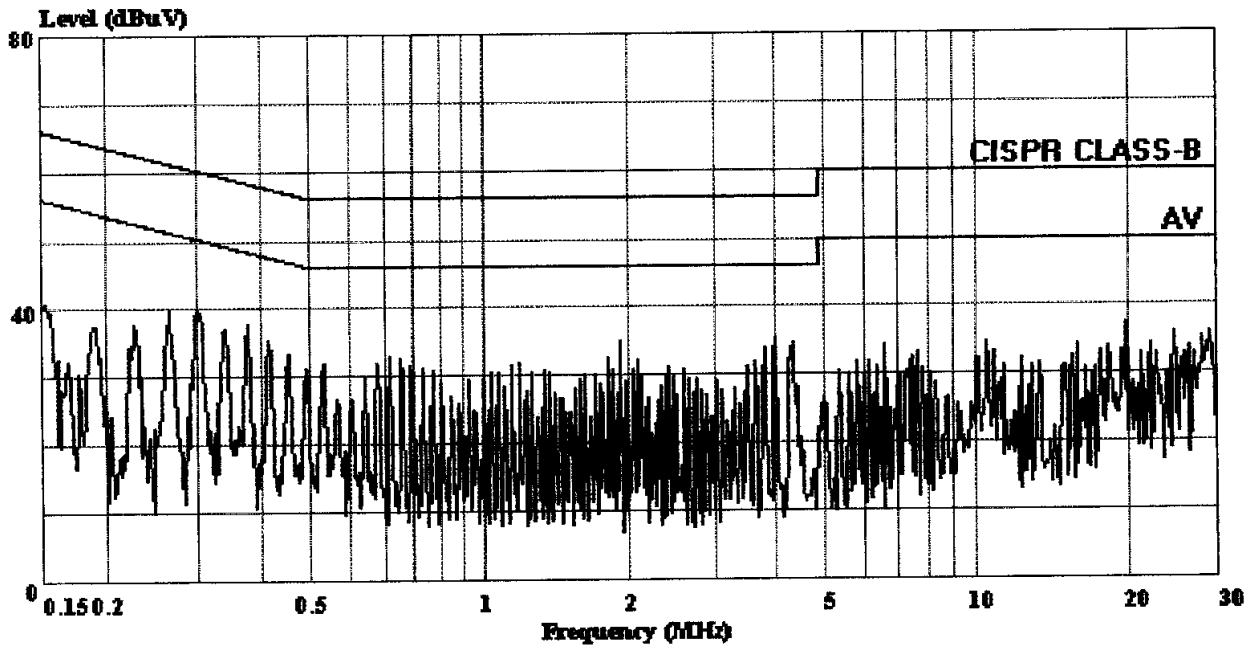
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TAIWAN TOKIN EMC ENG. CORP.

Data#: 627 File#: LITEON.emi

Date: 2001-06-26 Time: 14:52:55



TAIWAN TOKIN EMC ENG. CORP. (No.3 Shielded room)

Trace:

Ref Trace:

Condition: CISPR CLASS-B KNW-407 LINE
 EUT : CD-RW DRIVE M/N:LTR-24102B
 Power: 120Vac/60Hz
 Memo : READ

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TAIWAN TOKIN EMC ENG. CORP.

Data#: 631 File#: LITEON.emi
 No.3 Shielded room

Date: 2001-06-26 Time: 15:18:30

Condition: CISPR CLASS-B KNW-407 LINE
 EUT : CD-RW DRIVE M/N:LTR-24102B
 Power: 120Vac/60Hz
 Memo : READ

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.153	39.07	-26.75	65.82	38.47	0.40	0.20	QP
2	0.266	39.70	-21.55	61.25	39.30	0.20	0.20	QP
3	0.305	39.48	-20.62	60.10	39.08	0.20	0.20	QP
4	2.044	35.10	-20.90	56.00	34.30	0.40	0.40	QP
5	4.092	35.31	-20.69	56.00	34.21	0.50	0.60	QP
6	19.950	37.51	-22.49	60.00	35.71	1.10	0.70	QP

Data#: 635 File#: LITEON.emi
 No.3 Shielded room

Date: 2001-06-28 Time: 18:20:11

Condition: CISPR CLASS-B (AV) KNW-407 LINE
 EUT : CD-RW DRIVE M/N:LTR-24102B
 Power: 120Vac/60Hz
 Memo : READ

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.153	34.13	-21.70	55.82	33.53	0.40	0.20	Average
2	0.266	36.59	-14.66	51.25	36.19	0.20	0.20	Average
3	0.305	36.65	-13.46	50.10	36.25	0.20	0.20	Average
4	2.044	32.48	-13.52	46.00	31.68	0.40	0.40	Average
5	4.092	32.36	-13.64	46.00	31.26	0.50	0.60	Average
6	19.950	34.23	-15.77	50.00	32.43	1.10	0.70	Average

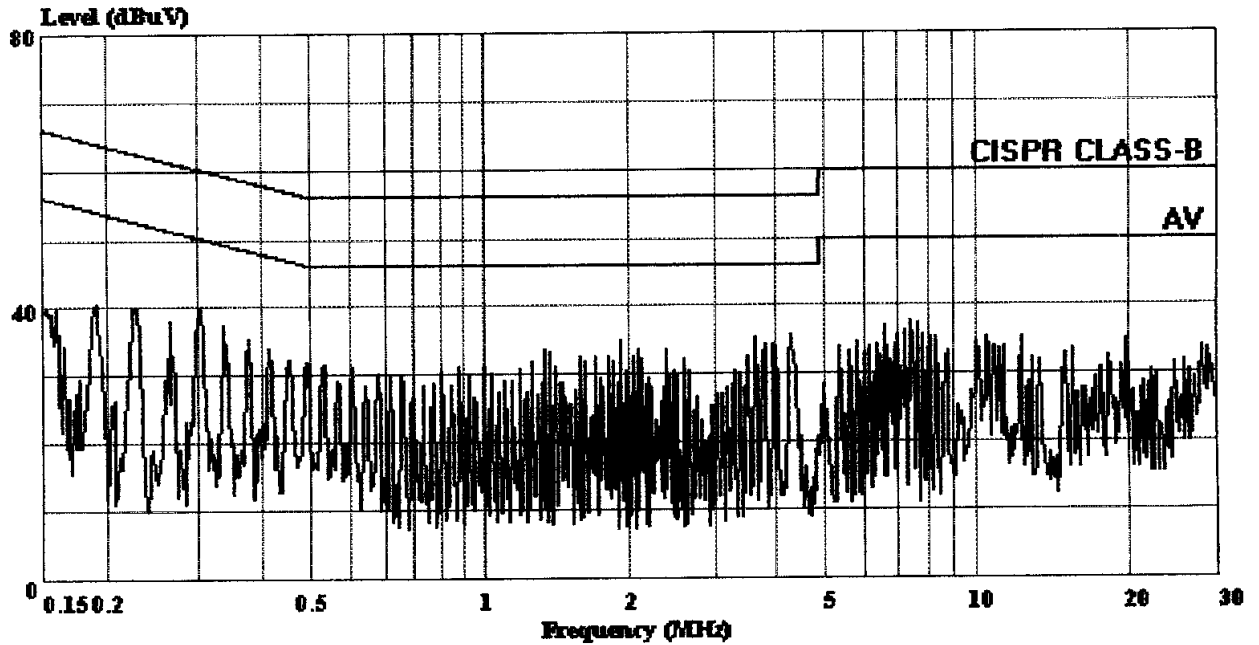
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TAIWAN TOKIN EMC ENG. CORP.

Data#: 628 File#: LITEON.emi

Date: 2001-06-26 Time: 14:55:47

**TAIWAN TOKIN EMC ENG. CORP. (No.3 Shielded room)**

Trace:

Ref Trace:

Condition: CISPR CLASS-B KNW-407 NEUTRAL
 EUT : CD-RW DRIVE M/N:LTR-24102B
 Power: 120Vac/60Hz
 Memo : READ

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TAIWAN TOKIN EMC ENG. CORP.

Data#: 632 File#: LITEON.emi
 No.3 Shielded room

Date: 2001-06-26 Time: 15:20:12

Condition: CISPR CLASS-B KNW-407 NEUTRAL
 EUT : CD-RW DRIVE M/N:LTR-24102B
 Power: 120Vac/60Hz
 Memo : READ

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.153	38.63	-27.19	65.82	38.03	0.40	0.20	QP
2	0.189	40.04	-24.02	64.06	39.44	0.40	0.20	QP
3	0.227	39.64	-22.93	62.57	39.24	0.20	0.20	QP
4	0.305	39.66	-20.44	60.10	39.26	0.20	0.20	QP
5	4.114	34.47	-21.53	56.00	33.37	0.50	0.60	QP
6	7.486	37.76	-22.24	60.00	36.66	0.50	0.60	QP

Data#: 636 File#: LITEON.emi
 No.3 Shielded room

Date: 2001-06-28 Time: 18:21:55

Condition: CISPR CLASS-B (AV) KNW-407 NEUTRAL
 EUT : CD-RW DRIVE M/N:LTR-24102B
 Power: 120Vac/60Hz
 Memo : READ

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.153	34.57	-21.26	55.82	33.97	0.40	0.20	Average
2	0.189	35.56	-18.50	54.06	34.96	0.40	0.20	Average
3	0.227	35.59	-16.98	52.57	35.19	0.20	0.20	Average
4	0.305	35.56	-14.55	50.10	35.16	0.20	0.20	Average
5	4.114	30.26	-15.74	46.00	29.16	0.50	0.60	Average
6	7.486	31.45	-18.55	50.00	30.35	0.50	0.60	Average

Test Mode : WRITE DATA

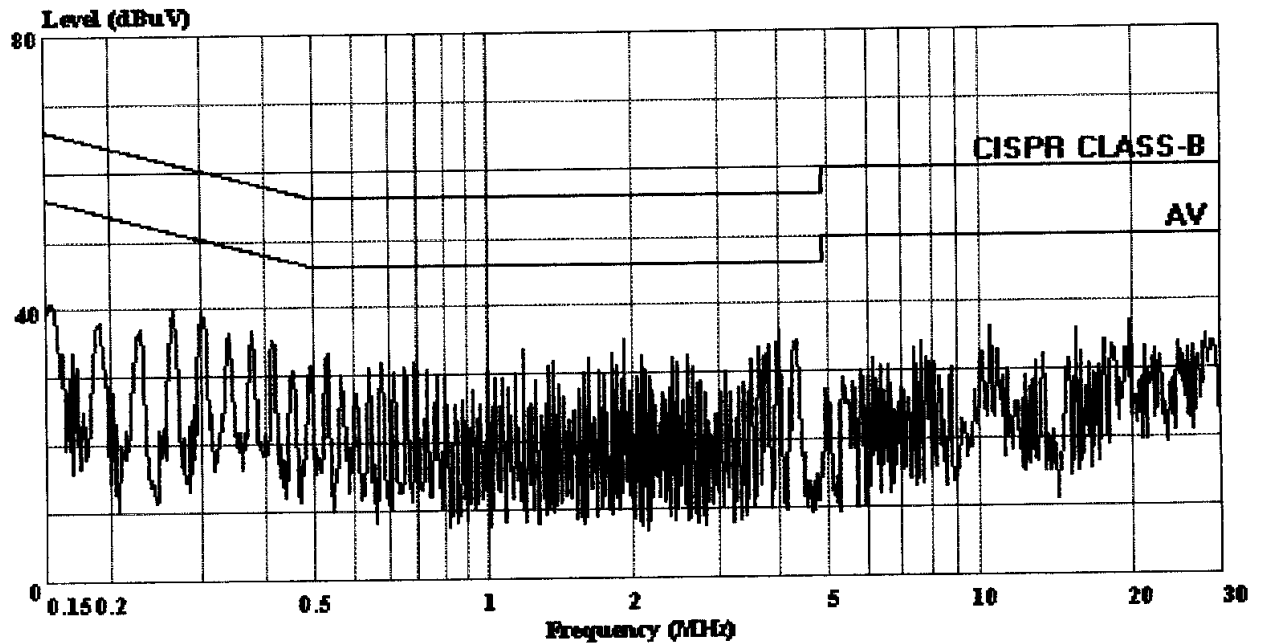
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TAIWAN TOKIN EMC ENG. CORP.

Data#: 630 File#: LITEON.emi

Date: 2001-06-26 Time: 14:57:07



TAIWAN TOKIN EMC ENG. CORP. (No.3 Shielded room)

Trace:

Ref Trace:

Condition: CISPR CLASS-B KRW-407 LINE
 EUT : CD-RW DRIVE M/N:LTR-24102B
 Power: 120Vac/60Hz
 Memo : WRITE

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TAIWAN TOKIN EMC ENG. CORP.

Data#: 634 File#: LITEON.emi
 No.3 Shielded room

Date: 2001-06-26 Time: 15:23:53

Condition: CISPR CLASS-B KNW-407 LINE
 EUT : CD-RW DRIVE M/N:LTR-24102B
 Power: 120Vac/60Hz
 Memo : WRITE

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.154	41.01	-24.77	65.78	40.41	0.40	0.20	QP
2	0.266	39.76	-21.49	61.25	39.36	0.20	0.20	QP
3	0.302	39.48	-20.71	60.19	39.08	0.20	0.20	QP
4	2.044	34.96	-21.04	56.00	34.16	0.40	0.40	QP
5	4.092	35.87	-20.13	56.00	34.77	0.50	0.60	QP
6	19.950	37.19	-22.81	60.00	35.39	1.10	0.70	QP

Data#: 638 File#: LITEON.emi
 No.3 Shielded room

Date: 2001-06-28 Time: 18:24:27

Condition: CISPR CLASS-B (AV) KNW-407 LINE
 EUT : CD-RW DRIVE M/N:LTR-24102B
 Power: 120Vac/60Hz
 Memo : WRITE

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.154	36.22	-19.56	55.78	35.62	0.40	0.20	Average
2	0.266	33.97	-17.28	51.25	33.57	0.20	0.20	Average
3	0.302	36.25	-13.94	50.19	35.85	0.20	0.20	Average
4	2.044	31.26	-14.74	46.00	30.46	0.40	0.40	Average
5	4.092	30.86	-15.14	46.00	29.76	0.50	0.60	Average
6	19.950	31.15	-18.85	50.00	29.35	1.10	0.70	Average

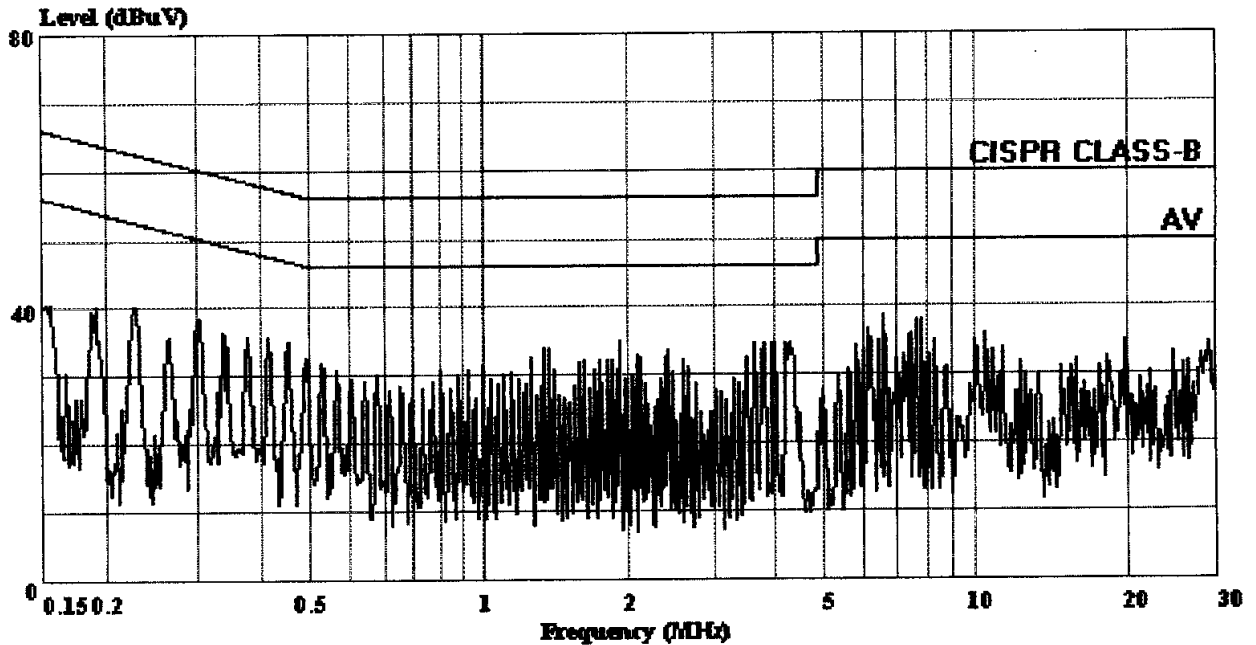
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TAIWAN TOKIN EMC ENG. CORP.

Data#: 629 File#: LITEON.emi

Date: 2001-06-26 Time: 14:56:32

**TAIWAN TOKIN EMC ENG. CORP. (No.3 Shielded room)**

Trace:

Ref Trace:

Condition: CISPR CLASS-B KNW-407 NEUTRAL
 EUT : CD-RW DRIVE M/N:LTR-24102B
 Power: 120Vac/60Hz
 Memo : WRITE

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TAIWAN TOKIN EMC ENG. CORP.

Data#: 633 File#: LITEON.emi
 No.3 Shielded room

Date: 2001-06-26 Time: 15:22:23

Condition: CISPR CLASS-B KNW-407 NEUTRAL
 EUT : CD-RW DRIVE M/N:LTR-24102B
 Power: 120Vac/60Hz
 Memo : WRITE

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.152	40.59	-25.28	65.87	39.99	0.40	0.20	QP
2	0.190	40.15	-23.87	64.02	39.55	0.40	0.20	QP
3	0.228	40.04	-22.48	62.52	39.64	0.20	0.20	QP
4	2.044	34.82	-21.18	56.00	34.02	0.40	0.40	QP
5	6.698	38.63	-21.37	60.00	37.53	0.50	0.60	QP
6	7.810	38.02	-21.98	60.00	36.92	0.50	0.60	QP

Data#: 637 File#: LITEON.emi
 No.3 Shielded room

Date: 2001-06-28 Time: 18:23:14

Condition: CISPR CLASS-B (AV) KNW-407 NEUTRAL
 EUT : CD-RW DRIVE M/N:LTR-24102B
 Power: 120Vac/60Hz
 Memo : WRITE

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.152	35.24	-20.63	55.87	34.64	0.40	0.20	Average
2	0.190	34.55	-19.47	54.02	33.95	0.40	0.20	Average
3	0.228	37.85	-14.67	52.52	37.45	0.20	0.20	Average
4	2.044	32.46	-13.54	46.00	31.66	0.40	0.40	Average
5	6.698	34.79	-15.21	50.00	33.69	0.50	0.60	Average
6	7.810	34.23	-15.77	50.00	33.13	0.50	0.60	Average

3. RADIATED EMISSION TEST

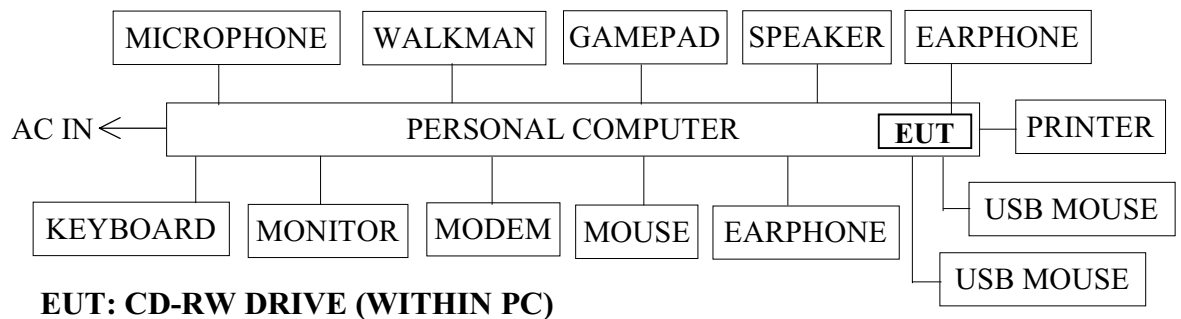
3.1. Test Equipment

The following test equipment are used during the radiated emission tests :

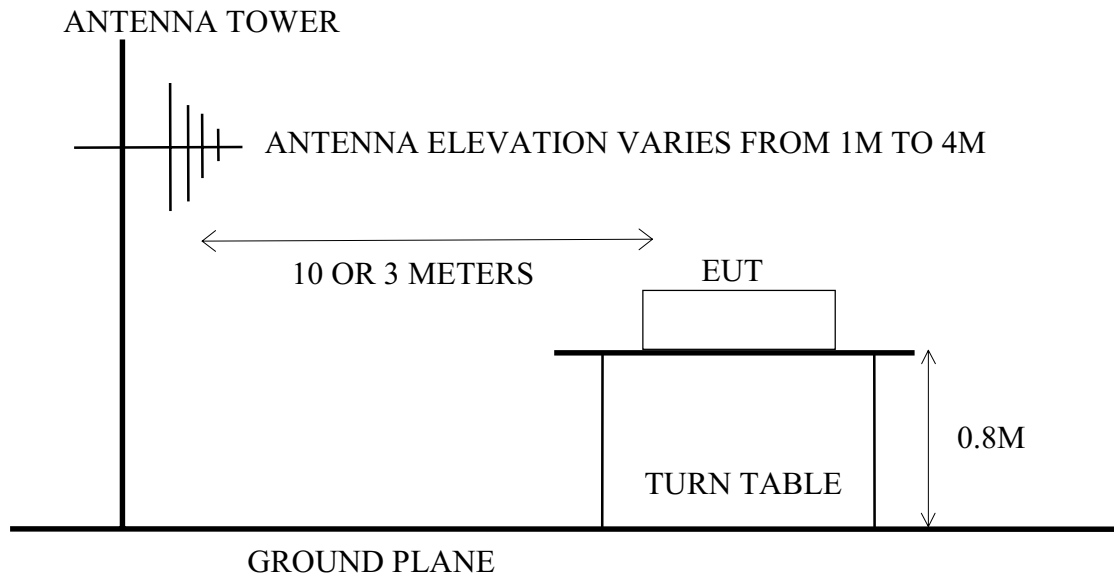
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	HP	8393EM	3826A00248	Aug.30, 00'	1 Year
2.	Test Receiver	R&S	ESVS10	849231/017	Dec. 01, 00'	1 Year
3.	Computer	TOKIN	586PC	N/A	N/A	NA
4.	Printer	Panasonic	KX-2135	N/A	N/A	N/A
5.	Amplifier	HP	8447D	2944A07185	N/A	N/A
6.	Biconical Antenna	Chase	VBA6106A	1264	Apr. 16, 01'	1 Year
7.	Log Periodic Antenna	Chase	UPA6109	1035	Apr. 16, 01'	1 Year
8.	Pre-Amplifier (1GHz~7GHz)	HP	8449B	3008A01284	Jul. 03, 00'	1 Year
9.	Double Ridge Horn. Antenna (1GHz~7GHz)	EMCO	3115	9609-4920	Jul. 05, 00'	1 Year

3.2. Block Diagram of Test Setup

3.2.1. Block Diagram of connection between EUT and simulators



3.2.2. Open Field Test Site Setup Diagram (10M for 30MHz~ 1000MHz; 3M for 1GHz~7GHz)



3.3. Radiation Limit (CISPR 22, Class B)

All emanations from a class B computing devices or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified below:

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMITS (dB μ V/m)
30 ~ 230	10	30
230 ~ 1000	10	37
1000 ~ 5000	3	53.5 (Average)
1000 ~ 5000	3	73.5 (Peak)

- Notes :
- (1) The tighter limit applies at the edge between two frequency bands.
 - (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
 - (3) There is no over 1GHz limit in CISPR 22 standard. Therefore, a FCC limit is used based on CFR 47 Part 15.35 (b) and Part 15.109 (g).

3.4. EUT's Configuration during Compliance Measurement

The configuration of EUT and its simulators are same as those used in conducted measurement. Please refer to 2.4.

3.5. Operating Condition of EUT

Same as conducted measurement which is listed in 2.5.

3.6. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. For 30MHz to 1000MHz frequency range, EUT was set 10 meters and for 1GHz to 7GHz frequency range, EUT was set at 3 meters away from the receiving antenna which was mounted on a antenna tower. The antenna moved up and down between 1 to 4 meters for 30MHz to 1000MHz frequency range and for 1GHz to 7GHz frequency range to find out the maximum emission level. Broadband antenna such as calibrated biconical and log- periodical antenna or horn antenna were used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4-1992 regulation.

The bandwidth of test receiver ESVS10 was set at 120KHz and resolution bandwidth of spectrum analyzer was set at 1MHz.

The frequency range from 30MHz to 7GHz was checked.

Two kinds of test modes were done during 30MHz~1000MHz frequency range radiated measurement and all the test results are listed in section 3.7.1.

(1) READ DATA (2)WRITE DATA

Two kinds of test modes were done during 1GHz~7GHz frequency range radiated measurement and all the test results are listed in section 3.7.2.

(2) READ DATA (2)WRITE DATA

3.7. Test Results

PASSED. Please refer to the following pages.

3.8. Radiated Emission Measurement Results

3.8.1. 30MHz to 1000GHz Frequency Range Measurement Results

Distance: 10Meters

All the emissions not report below are too low against the CISPR 22 Class B limit.

Date of Test : Jun. 27, 2001 Temperature : 27°C
 EUT : CD-RW DRIVE Humidity : 57%
 Test Mode : READ DATA

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dBμV	Emission Level Horizontal dBμV/m	Limits dBμV/m	Margin dB
33.771	19.27	1.26	1.61	22.14	30.00	7.86
67.639	12.49	1.77	0.50	14.76	30.00	15.24
135.375	19.67	2.53	- 1.70	20.50	30.00	9.50
169.243	20.76	2.90	- 1.60	22.06	30.00	7.94
* 203.111	20.90	3.20	- 1.40	22.70	30.00	7.30
270.847	23.03	3.70	- 0.09	26.64	37.00	10.36
338.572	15.18	4.42	- 0.60	19.00	37.00	18.00
372.440	15.96	4.54	4.32	24.82	37.00	12.18
440.176	17.16	5.13	- 1.76	20.53	37.00	16.47
541.780	20.08	5.89	- 3.88	22.09	37.00	14.91
609.516	20.94	6.12	- 2.33	24.73	37.00	12.27
677.252	22.59	6.70	- 2.79	26.50	37.00	10.50
778.856	24.03	7.40	- 2.87	28.56	37.00	8.44

- Remarks :
1. All readings are Quasi-Peak values.
 2. The worst emission was detected at 203.111MHz with corrected signal level of 22.70dBμV/m (limit is 30dBμV/m) when the antenna was at horizontal polarization and was at 4m high and the turn table was at 120° .
 3. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Date of Test : Jun. 27, 2001 Temperature : 27°C
 EUT : CD-RW DRIVE Humidity : 57%
 Test Mode : READ DATA

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB
33.707	20.86	1.26	1.40	23.52	30.00	6.48
67.575	13.40	1.77	2.60	17.77	30.00	12.23
135.247	21.44	2.53	- 1.57	22.40	30.00	7.60
* 169.179	20.64	2.90	1.44	24.98	30.00	5.02
202.983	20.74	3.20	0.00	23.94	30.00	6.06
236.842	21.16	3.57	- 0.30	24.43	37.00	12.57
270.719	22.27	3.70	0.50	26.47	37.00	10.53
304.812	14.78	4.11	1.50	20.39	37.00	16.61
372.549	16.29	4.54	1.10	21.93	37.00	15.07
440.313	17.69	5.13	- 0.11	22.71	37.00	14.29
508.021	19.49	5.50	0.75	25.74	37.00	11.26
677.360	23.23	6.70	- 2.00	27.93	37.00	9.07
711.229	22.02	6.73	- 3.15	25.60	37.00	11.40
812.833	23.03	7.84	- 2.65	28.22	37.00	8.78

- Remarks :
1. All readings are Quasi-Peak values.
 2. The worst emission was detected at 169.179MHz with corrected signal level of 24.98dBμV/m (limit is 30dBμV/m) when the antenna was at vertical polarization and was at 1m high and the turn table was at 300° .
 3. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Date of Test : Jun. 27, 2001 Temperature : 27°C
 EUT : CD-RW DRIVE Humidity : 57%
 Test Mode : WRITE DATA

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading		Emission Level		Margin dB
			Horizontal dBμV		Horizontal dBμV/m	Limits dBμV/m	
47.211	15.74	1.41	- 2.30		14.85	30.00	15.15
69.787	12.27	1.80	- 3.20		10.87	30.00	19.13
126.227	19.21	2.46	- 3.10		18.57	30.00	11.43
182.667	20.69	3.07	- 2.60		21.16	30.00	8.84
227.819	22.15	3.41	- 3.30		22.26	30.00	7.74
284.259	23.45	3.88	- 3.30		24.03	37.00	12.97
307.234	14.87	3.98	- 2.50		16.35	37.00	20.65
352.386	15.52	4.35	- 3.10		16.77	37.00	20.23
499.130	18.68	5.44	- 2.50		21.62	37.00	15.38
566.858	21.57	6.01	- 3.30		24.28	37.00	12.72
657.162	22.39	6.57	- 3.10		25.86	37.00	11.14
792.618	24.27	7.38	- 3.40		28.25	37.00	8.75

Remarks : 1. All readings are Quasi-Peak values.

Date of Test : Jun. 27, 2001 Temperature : 27°C
 EUT : CD-RW DRIVE Humidity : 57%
 Test Mode : WRITE DATA

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading		Emission Level	
			Vertical dBμV	Vertical dBμV/m	Limits dBμV/m	Margin dB
46.950	16.96	1.41	- 0.42	17.95	30.00	12.05
71.736	12.68	1.82	4.62	19.12	30.00	10.88
80.814	13.13	2.01	- 0.50	14.64	30.00	15.36
125.966	19.82	2.45	- 3.34	18.93	30.00	11.07
159.830	20.38	2.84	1.25	24.47	30.00	5.53
216.270	20.53	3.38	- 1.09	22.82	30.00	7.18
283.998	23.35	3.88	- 2.60	24.63	37.00	12.37
340.699	15.26	4.34	0.00	19.60	37.00	17.40
397.139	17.34	4.71	- 2.30	19.75	37.00	17.25
464.000	19.59	5.46	- 2.30	22.75	37.00	14.25
532.595	19.71	5.56	- 1.30	23.97	37.00	13.03
622.900	20.87	6.21	- 3.14	23.94	37.00	13.06
747.067	24.31	7.17	- 2.50	28.98	37.00	8.02

Remarks : 1. All readings are Quasi-Peak values.

Date of Test : Aug. 21, 2001 Temperature : 26°C

EUT : CD-RW DRIVE Humidity : 55%

Test Mode : Audio /CD Play

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading		Emission Level		Margin dB
			Horizontal dBμV		Horizontal dBμV/m	Limits dBμV/m	
35.123	19.38	1.32	- 1.00		19.70	30.00	10.30
72.186	12.34	1.83	0.76		14.93	30.00	15.07
109.250	18.33	2.34	- 1.80		18.87	30.00	11.13
133.959	19.63	2.55	1.61		23.79	30.00	6.21
183.378	20.75	3.06	- 1.88		21.93	30.00	8.07
195.732	20.62	3.13	- 1.67		22.08	30.00	7.92
232.796	22.27	3.42	0.86		26.55	37.00	10.45
294.569	24.48	3.98	- 1.20		27.26	37.00	9.74
343.988	15.39	4.59	2.66		22.64	37.00	14.36
393.406	16.87	4.61	0.55		22.03	37.00	14.97
442.824	17.12	5.00	- 0.63		21.49	37.00	15.51
529.307	19.70	5.75	0.14		25.59	37.00	11.41
603.434	21.40	6.27	- 0.15		27.52	37.00	9.48
665.207	22.49	6.65	- 0.31		28.83	37.00	8.17
739.335	23.27	7.01	- 1.26		29.02	37.00	7.98
813.462	24.41	7.84	- 2.15		30.10	37.00	6.90

Remarks : 1. All readings are Quasi-Peak values.

Date of Test : Aug. 21, 2001 Temperature : 26°C
 EUT : CD-RW DRIVE Humidity : 55%
 Test Mode : Audio /CD Play

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading		Emission Level	
			Vertical dBμV	Vertical dBμV/m	Limits dBμV/m	Margin dB
36.273	19.68	1.39	0.97	22.04	30.00	7.96
60.982	14.11	1.61	- 1.92	13.80	30.00	16.20
85.692	14.10	1.98	1.18	17.26	30.00	12.74
135.110	21.17	2.53	- 0.14	23.56	30.00	6.44
184.529	20.81	3.09	- 1.43	22.47	30.00	7.53
221.592	19.88	3.43	0.31	23.62	30.00	6.38
271.011	22.27	3.73	1.16	27.16	37.00	9.84
320.429	15.19	4.21	2.69	22.09	37.00	14.91
357.493	16.10	4.52	2.69	23.31	37.00	13.69
419.266	17.25	4.92	1.57	23.74	37.00	13.26
456.330	18.31	5.17	0.33	23.81	37.00	13.19
505.748	19.77	5.56	0.21	25.54	37.00	11.46
604.585	20.52	6.18	- 0.23	26.47	37.00	10.53
691.067	22.98	7.00	- 1.25	28.73	37.00	8.27
777.549	23.48	7.32	- 1.37	29.43	37.00	7.57

Remarks : 1. All readings are Quasi-Peak values.

3.8.2. 1GHz ~ 7GHz Frequency Range Measurement Results

Distance: 3Meters

The emissions not report below are too low against the FCC official limits.

Date of Test : Jun. 27, 2001 Temperature : 27°C

EUT : CD-RW DRIVE Humidity : 57%

Test Mode : READ DATA

Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Pre-Amp Factor dB	Meter Reading Horizontal dBμV	Emission Level (Peak) Horizontal dBμV/m	Limits dBμV/m	Margin dB
1093.000	24.88	4.27	32.48	53.33	50.00	73.50	23.50
1843.000	26.54	5.69	32.12	56.40	56.51	73.50	16.99
2518.000	27.65	6.85	32.21	37.93	40.22	73.50	33.28
3173.000	29.12	7.70	32.32	35.63	40.13	73.50	33.37
4050.000	32.55	8.68	32.33	32.70	41.60	73.50	31.90
6079.000	34.34	11.33	32.44	33.27	46.50	73.50	27.00

Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Pre-Amp Factor dB	Meter Reading Vertical dBμV	Emission Level (Peak) Vertical dBμV/m	Limits dBμV/m	Margin dB
1093.000	24.88	4.27	32.48	63.02	59.69	73.50	13.81
1843.000	26.54	5.69	32.12	56.74	56.85	73.50	16.65
2098.000	26.97	6.20	32.09	38.97	40.05	73.50	33.45
2518.000	27.65	6.85	32.21	35.65	37.94	73.50	35.56
3533.000	30.67	8.13	32.33	34.02	40.49	73.50	33.01
4513.000	33.03	9.27	32.38	34.37	44.29	73.50	29.21
5754.000	34.12	10.98	32.42	34.00	46.68	73.50	26.82

- Remark :
1. Measurement at Anechoic Chamber with test voltage 120V/60Hz.
 2. Emission Level = Antenna Factor + Cable Loss + Meter Reading – Pre-Amp Factor.
 3. Measurement was up to 7GHz, but above 6GHz the emissions level were too low against the official limit and not report.

Date of Test : Jun. 27, 2001 Temperature : 27°C

EUT : CD-RW DRIVE Humidity : 57%

Test Mode : READ DATA

Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Pre-Amp Factor dB	Meter Reading Horizontal dBμV	Emission Level (Average) Horizontal dBμV/m	Limits dBμV/m	Margin dB
1093.000	24.88	4.27	32.48	22.38	19.05	53.50	34.45
1843.000	26.54	5.69	32.12	19.24	19.35	53.50	34.15
2518.000	27.65	6.85	32.21	18.84	21.13	53.50	32.37
3173.000	29.12	7.70	32.32	20.56	25.06	53.50	28.44
4050.000	32.55	8.68	32.33	19.29	28.19	53.50	25.31
6079.000	34.34	11.33	32.44	20.15	33.38	53.50	20.12

Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Pre-Amp Factor dB	Meter Reading Vertical dBμV	Emission Level (Average) Vertical dBμV/m	Limits dBμV/m	Margin dB
1093.000	24.8	4.27	32.48	24.09	20.68	53.50	32.82
1843.000	26.54	5.69	32.12	23.51	23.62	53.50	29.88
2098.000	26.97	6.20	32.09	24.06	25.14	53.50	28.36
2518.000	27.65	6.85	32.21	23.75	26.04	53.50	27.46
3533.000	30.67	8.13	32.33	22.02	28.49	53.50	25.01
4513.000	33.03	9.27	32.38	22.03	31.95	53.50	21.55
5754.000	34.12	10.98	32.42	21.76	34.44	53.50	19.06

- Remark :
1. Measurement at Anechoic Chamber with test voltage 120V/60Hz.
 2. Emission Level = Antenna Factor + Cable Loss + Meter Reading – Pre-Amp Factor.
 3. Measurement was up to 7GHz, but above 6GHz the emissions level were too low against the official limit and not report.

Date of Test : Jun. 27, 2001 Temperature : 27°C
 EUT : CD-RW DRIVE Humidity : 57%
 Test Mode : WRITE DATA

Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Pre-Amp Factor dB	Meter Reading Horizontal dBμV	Emission Level (Peak) Horizontal dBμV/m	Limits dBμV/m	Margin dB
1090.000	24.88	4.27	32.48	57.37	54.04	73.50	19.46
1843.000	26.54	5.69	32.12	52.78	52.89	73.50	20.61
2090.000	26.96	6.19	32.09	40.01	41.07	73.50	32.43
3050.000	28.55	7.55	32.32	36.95	40.73	73.50	32.77
3703.000	31.35	8.31	32.33	34.40	41.73	73.50	31.77
5370.000	33.80	10.40	32.43	33.58	45.35	73.50	28.15
6150.000	34.38	11.35	32.46	32.51	45.78	73.50	27.72

Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Pre-Amp Factor dB	Meter Reading Vertical dBμV	Emission Level (Peak) Vertical dBμV/m	Limits dBμV/m	Margin dB
1069.000	24.81	4.23	32.49	56.41	52.96	73.50	20.54
1825.000	26.51	5.64	32.12	52.20	52.23	73.50	21.27
2196.000	27.14	6.37	32.12	37.21	38.60	73.50	34.90
2705.000	27.91	7.11	32.25	33.98	36.75	73.50	36.75
2856.000	28.12	7.31	32.29	33.80	36.94	73.50	36.56
4025.000	32.52	8.65	32.33	33.66	42.50	73.50	31.00
4768.000	33.28	9.57	32.41	33.32	43.76	73.50	29.74
5854.000	34.19	11.12	32.42	32.79	45.68	73.50	27.82

- Remark :
1. Measurement at Anechoic Chamber with test voltage 120V/60Hz.
 2. Emission Level = Antenna Factor + Cable Loss + Meter Reading – Pre-Amp Factor.
 3. Measurement was up to 7GHz, but above 6GHz the emissions level were too low against the official limit and not report.

Date of Test : Jun. 27, 2001 Temperature : 27°C
 EUT : CD-RW DRIVE Humidity : 57%
 Test Mode : WRITE DATA

Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Pre-Amp Factor dB	Meter Reading Horizontal dBμV	Emission Level (Average) Horizontal dBμV/m	Limits dBμV/m	Margin dB
1090.000	24.88	4.27	32.48	22.98	19.65	53.50	33.85
1838.500	26.53	5.67	32.12	33.32	33.40	53.50	20.10
2090.000	26.96	6.19	32.09	20.78	21.84	53.50	31.66
3050.000	28.55	7.55	32.32	22.84	26.62	53.50	26.88
3703.000	31.35	8.31	32.33	18.85	26.18	53.50	27.32
5370.000	33.80	10.40	32.43	19.89	31.66	53.50	21.84
6150.000	34.38	11.35	32.46	19.60	32.87	53.50	20.63

Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Pre-Amp Factor dB	Meter Reading Vertical dBμV	Emission Level (Average) Vertical dBμV/m	Limits dBμV/m	Margin dB
1069.000	24.81	4.23	32.49	21.72	18.27	53.50	35.23
1825.000	26.51	5.64	32.12	20.33	20.36	53.50	33.14
2196.000	27.14	6.37	32.12	19.72	21.11	53.50	32.39
2705.000	27.91	7.11	32.25	20.11	22.88	53.50	30.62
2856.000	28.12	7.31	32.29	20.25	23.39	53.50	30.11
4025.000	32.52	8.65	32.33	19.76	28.60	53.50	24.90
4768.000	33.28	9.57	32.41	18.46	28.90	53.50	24.60
5854.000	34.19	11.12	32.42	18.78	31.67	53.50	21.83

- Remark :
1. Measurement at Anechoic Chamber with test voltage 120V/60Hz.
 2. Emission Level = Antenna Factor + Cable Loss + Meter Reading – Pre-Amp Factor.
 3. Measurement was up to 7GHz, but above 6GHz the emissions level were too low against the official limit and not report.

4. DEVIATION TO TEST SPECIFICATIONS

【NONE】

APPENDIX I

(Differences List of Models)

Model Number	Brand	Flash Memery	Data Transfer Rate
LTR-24102B	LITE-ON	2 Mbits	24X10X40X
LTR-24102M	LITE-ON	4 Mbits	24X10X40X
CDR-1640MM	No Brand	4 Mbits	16X10X40X
CDR-1640MC	No Brand	2 Mbits	16X10X40X
AI-CDRW241040B	TDK	2 Mbits	24X10X40X