ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B CERTIFICATION

Test report file number	**: E036R-065**
Applicant	**: SAROTECH CO., LTD.**
Address	**: Hangang Bldg. 1549-7, Seocho-Dong, Seocho-Ku, Seoul, 137-070, Korea**
Manufacturer	**: SAROTECH CO., LTD.**
Address	**: Hangang Bldg. 1549-7, Seocho-Dong, Seocho-Ku, Seoul, 137-070, Korea**
Type of Equipment	**: External CD-ROM/CD-RW Case**
FCC ID	**: PBCFCD-524**
Model / Type No.	**: FCD-524**
Serial number	**: N/A**
Total page of Report	**: 16 pages (including this page)**
Date of Incoming	**: June 12, 2003**
Date of issuing	**: June 26, 2003**

SUMMARY

The equipment complies with the regulation; ***FCC CFR 47 PART 15 SUBPART B, Class B.***

This test report contains only the result of a single test of the sample supplied for the examination.

It is not a general valid assessment of the features of the respective products of the mass-production.

Prepared by:
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EMC Dept.
ONETECH Corp.

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1. VERIFICATION OF COMPLIANCE

APPLICANT	: SAROTECH CO., LTD.
ADDRESS	: Hangang Bldg. 1549-7, Seocho-Dong, Seocho-Ku, Seoul, 137-070, Korea
CONTACT PERSON	: Mr. Cheol-Young, Cho / Manager
TELEPHONE NO	: +82-2-585-4501
FCC ID	: PBCFCD-524
MODEL NO/NAME	: FCD-524
SERIAL NUMBER	: N/A
DATE	: June 26, 2003

DEVICE TYPE	Peripheral Device for Class B Computing Device - Unintentional Radiator
E.U.T. DESCRIPTION	External CD-ROM/CD-RW Case
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4/1992
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC CFR 47 PART 15 §15.101
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

-. This device has shown compliance with the conducted emissions limits in 15.107 adopted under FCC 02-107 (ET Docket 98-80). The device may be marketed after July 11, 2005 and is not affected by the 15.37(j) transition provisions.

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

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2. GENERAL INFORMATION

2.1 Product Description

The SAROTECH CO., LTD., Model FCD-524 (referred to as the EUT in this report) is an External CD-ROM/CD-RW Case that is a personal computer peripheral with IEEE 1394 port and USB Port. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Metal and Plastic
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	12 MHz and 24.576 MHz
DATA TRANSER RATE	Max. 400Mbps – IEEE1394, Max. 480bps – USB
NUMBER OF LAYERS	Main Board: 4 Layers
ELECTRICAL RATING	Input: AC 110-220 V, 60 Hz, 0.7 A, 40 W. Output: DC 5 V and 12 V, 1.5 A and 2.0 A, 31.5 W
DIMENSION (W X H X D)	254 X 178 X 55 mm
EXTERNAL TERMINALS	IEEE 1394(2EA), USB 2.0(1EA)

Model Differences

None

2.2 Related Submittal(s) / Grant(s)

Original submittal only

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2.3 Test System Details

The model numbers for all the equipments, which were used in the tested system, is:

Model	Manufacturer	FCC ID	Description	Connected to
FCD-524	SAROTECH CO., LTD.	PBCFCD-524	External CD-ROM/CD-RW Case (EUT)	-
GX240	DELL Computer Corp.	DoC	PC	EUT
E551	DELL Computer Corp.	DoC	Monitor	PC
SW-212	Sam Sung	A3LSW212	CD-R/W	EUT
X06-08477	Microsoft Corp.	DoC	Mouse	PC
C2145A	HP	DSI6XU2225	Printer	PC
020-0470	Cardinal	GDE0196	Modem	PC
N/A	N/A	N/A	Earphone	EUT

2.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4/1992. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.5 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-080 Korea. Description details of test facilities were submitted to the Commission on January 18, 2002. (Registration Number: 92819)

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3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
MAIN BOARD	SAROTECH CO., LTD.	FCD-524	N/A
CD-R/W	Sam Sung	A3LSW212	DoC

3.2 EUT exercise Software

The EUT was operated as following 2operating modes;

1. The speaker was connected to the Audio Line Out at the back of the EUT and then the EUT was continuously operated by the music CD.
2. After connecting the EUT to a personal computer, data were continuously read and written between the EUT and the Personal computer.

The EUT has a USB port and two 1394 ports, so above operating modes were tested at each port, but the worst emission levels were recorded in this report. .

3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
External CD-ROM/CD-RW Case (EUT)	N	N	1.5(P), 1.2(D)
PC	N	-	1.5(P)
Monitor	N	Y	1.5(P), 1.8(D)
Earphone	N/A	N	1.0(D)
Keyboard	N/A	N	1.5(D)
Mouse	N/A	N	1.5(D)
Printer	N	Y	1.5(P), 1.5(D)
Modem	N	Y	1.5(P), 1.5(D)

* The marked “(P)” means the Power Cable and “(D)’ means Signal Cable.

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3.4 Noise Suppression Parts on Cable

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
External CD-ROM/CD-RW Case (EUT)	N	N/A	Y	EUT END
PC	N	N/A	Y	BOTH END
Keyboard	N	N/A	Y	PC END
Mouse	N	N/A	Y	PC END
Printer	N	N/A	Y	PC END
Modem	N	N/A	Y	PC END
Earphone	N	N/A	Y	EUT END
Monitor	N	N/A	Y	PC END

3.5 Equipment Modifications

To achieve compliance to CLASS B levels, the following change(s) was made by ONETECH Corp. during compliance testing:

"There was no Modified items during EMI test"

3.6 Configuration of Test System

Line Conducted Test: The power plug of the EUT was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emission test was conducted using the procedure in ANSI C63.4/1992 8.3.1.1 to determine the worse operating conditions. Final radiated emission test was conducted at 3 meters open area test site.

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4. PRELIMINARY TEST

4.1 AC Power line Conducted Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Data were transferred between the EUT and a PC using IEEE 1394 port	
Data were transferred between the EUT and a PC using USB port	
Music CD was continuously operated, and the EUT was connected to a PC using IEEE 1394 port.	
Music CD was continuously operated, and the EUT was connected to a PC using USB port.	X

4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Data were transferred between the EUT and a PC using IEEE 1394 port	
Data were transferred between the EUT and a PC using USB port	
Music CD was continuously operated, and the EUT was connected to a PC using IEEE 1394 port.	X
Music CD was continuously operated, and the EUT was connected to a PC using USB port.	

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5. FINAL RESULT OF MEASURMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level

5.1 Conducted Emission Test

Humidity Level : 48% Temperature : 24°C

Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107

Type of Test : CLASS B

Result : PASSED BY –4.46 dB at 0.18 MHz when measured with peak detector mode

EUT : External CD-ROM/CD-RW Case Date: June 14, 2003

Operating Condition : After connecting the EUT to PC through the USB 2.0 port, music CD was operated continuously.

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Frequency (MHz)	Line	Quasi-Peak (dBuV)			Margin (dB)	Average (dBuV)		Margin (dB)
		Emission Level	Detector Mode	Limits*		Emission level	Limits	
0.18	H	60.03	P	64.49	-4.46	47.36	54.49	-7.13
0.24	N	48.65	P	62.10	-13.45	42.84	52.10	-9.26
0.79	H	41.75	P	41.75	-14.25	36.54	46.00	-9.46
1.27	N	43.12	P	43.12	-12.88	37.25	46.00	-8.75
2.45	N	43.57	P	43.57	-12.43	24.00	46.00	-22.00
3.40	N	49.63	P	49.63	-6.37	31.28	46.00	-14.72
27.86	N	43.24	P	43.24	-16.76	35.25	50.00	-14.75

Line Conducted Emission Tabulated Data

Remark : "H": Hot Line, "N": Neutral line, "P": Peak detect

Tested by: Gi-Hong, Nam / Test Engineer

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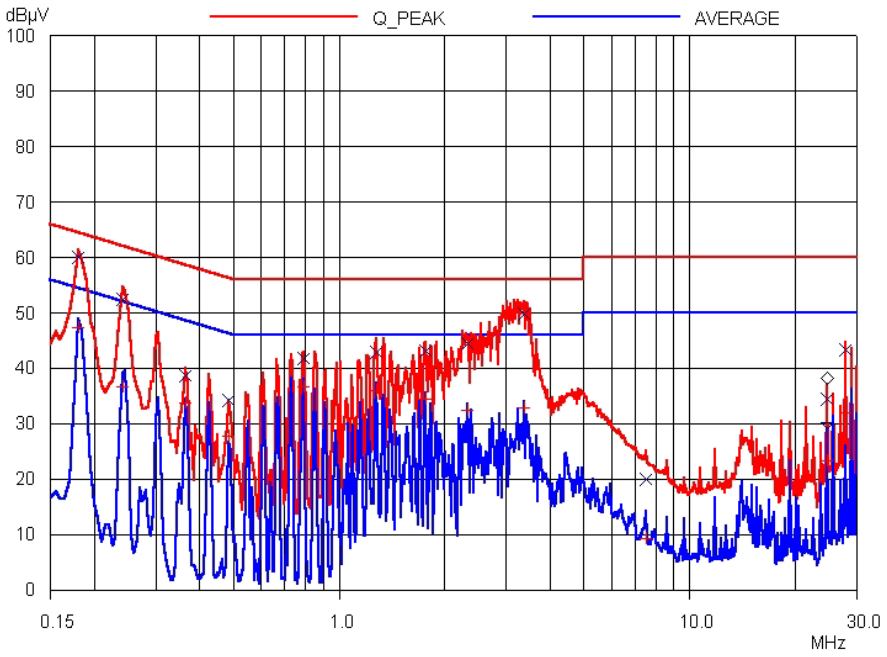
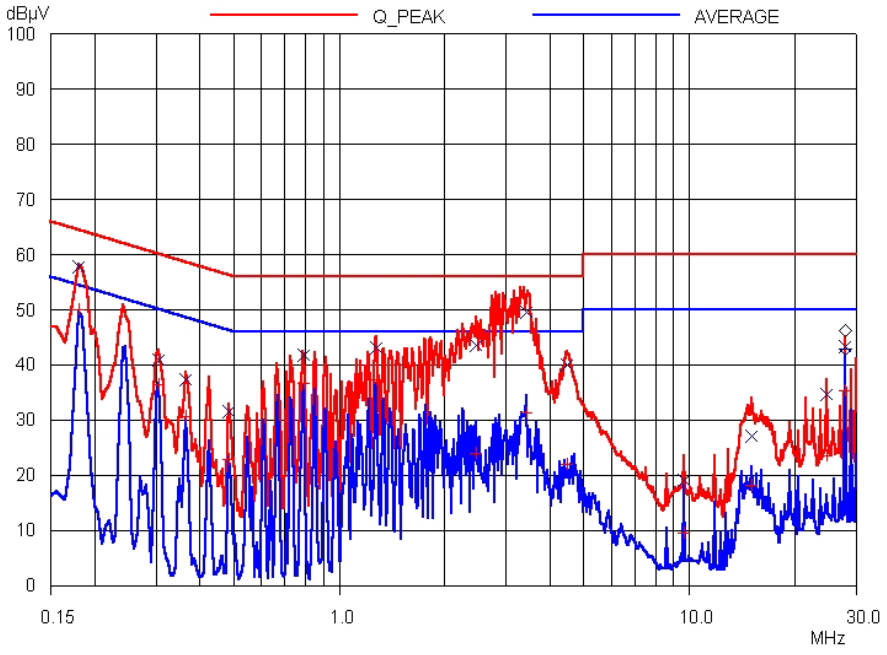


HOT LINE



NEUTRAL LINE

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5.2 Radiated Emission Test

5.2.1 Radiated Emission Test for USB 2.0 Operating Mode

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 48 % Temperature : 24°C
Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109
Type of Test : CLASS B
Result : PASSED BY –5.56 dB at 718.00 MHz

EUT : External CD-ROM/CD-RW Case Date: June 14, 2003
Operating Condition : After connecting the EUT to PC through the USB 2.0 port, music CD was operated continuously.
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
Distance : 3 Meter

Radiated Emission		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
38.94	17.50	V	15.08	0.42	33.00	40.00	-7.00
171.20	16.10	V	15.69	0.63	32.42	40.00	-7.58
179.98	16.80	V	15.95	0.66	33.41	40.00	-6.59
299.78	22.30	H	13.63	0.54	36.47	47.00	-10.53
328.40	25.50	H	14.10	0.94	40.54	47.00	-6.46
351.50	22.60	H	14.53	0.77	37.90	47.00	-9.10
380.40	23.90	H	15.27	0.96	40.13	47.00	-6.87
419.40	24.00	H	16.16	0.72	40.88	47.00	-6.12
449.40	19.80	H	16.78	1.14	37.72	47.00	-9.28
718.00	19.61	H	20.47	1.36	41.44	47.00	-5.56
750.00	19.20	H	20.28	1.12	40.60	47.00	-6.40

Radiated Emission Tabulated Data

Remark: “H”: Horizontal, “V”: Vertical, “P”: Peak Detector mode

Tested by: Gi-Hong, Nam / Test Engineer

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5.2.2 Radiated Emission Test for IEEE 1394 Operating Mode

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level : 48 % Temperature : 24°C
Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109
Type of Test : CLASS B
Result : PASSED BY –4.36 dB at 554.2 MHz

EUT : External CD-ROM/CD-RW Case Date: June 14, 2003
Operating Condition : After connected the EUT to PC through the IEEE1394 port, music CD was operated continuously.
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
Distance : 3 Meter

Radiated Emission		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
69.29	19.80	V	6.11	0.28	26.19	40.00	-5.25
119.89	21.50	H	13.00	0.25	34.75	40.00	-5.59
179.99	17.80	V	15.95	0.66	34.41	40.00	-9.01
209.79	13.70	V	16.56	0.73	30.99	40.00	-9.08
299.81	22.45	H	13.62	0.54	36.61	47.00	-4.97
326.50	27.00	H	14.07	0.96	42.03	47.00	-6.47
380.40	24.30	H	15.27	0.96	40.53	47.00	-8.44
393.50	22.10	H	15.60	0.86	38.56	47.00	-7.21
419.60	22.90	H	16.17	0.72	39.79	47.00	-8.59
449.20	20.50	H	16.77	1.14	38.41	47.00	-5.40
554.20	21.90	H	18.60	1.10	41.60	47.00	-4.36
786.59	20.60	H	20.75	1.29	42.64	47.00	-8.17

Radiated Emission Tabulated Data

Remark: “H”: Horizontal, “V”: Vertical, “P”: Peak Detector mode

Tested by: Gi-Hong, Nam / Test Engineer

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6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+	Meter reading	(dBuV)
+	Cable Loss	(dB)
+	Antenna Factor (Loss)	(dB/meter)
=	Corrected Reading	(dBuV/meter)
-	Specification Limit	(dBuV/meter)
=	dB Relative to Spec	(+/- dB)

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7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS 10	827864/005	OCT/02	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	APR/03	12MONTH	■
3.	Spectrum analyzer	HP	8568B	3109A05456	APR/03	12MONTH	■
4.	RF preselector	HP	85685A	3107A01264	APR/03	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01542	APR/03	12MONTH	■
6.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	APR/03	12MONTH	■
7.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	APR/03	12MONTH	■
8.	LISN	EMCO	3825/2	9109-1867 9109-1869	AUG/02	12MONTH	■
11.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
12.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
13.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■

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