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ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

Test report file number : E00DR-004

Applicant : SAROTECH CO., LTD.

Address : Hangang Bldg., 1549-7, Seocho-Dong, Seocho-Gu, 137-070, Korea

Manufacturer : SAROTECH CO., LTD.

Address : Hangang Bldg., 1549-7, Seocho-Dong, Seocho-Gu, 137-070, Korea

Type of Equipment : EXTERNAL HDD ENCLOSURE (Class B Computing Device Peripheral)

FCC ID : PBCFHD-252

Model / Type No. : FHD-252

Serial number : N/A

Total page of Report : 13 pages (including this page)

Date of Incoming : November 04, 2000

Date of issuing : December 04, 2000

SUMMARY

The equipment complies with the regulation; FCC PART 15 SUBPART B, SECTION 15.101

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: 

G. W. Lee/ Ass. Chief Engineer
EMC Dept.
ONETECH Corp.

Reviewed by: 

Y. K. Kwon/ Chief Engineer
EMC Dept.
ONETECH Corp.

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FCC-004 (Rev.0)

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea
(TEL: 82-31-746-8500 FAX: 82-31-746-8700)

EMC Testing Dept : 426-1 Daeanggyung-Ri Chowol-Myun Kwangju-Kun Kyunggi-Do 464-860 Korea (TEL: 82-31-765-8289 FAX: 82-31-766-2904)



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1. VERIFICATION OF COMPLIANCE

APPLICANT : SAROTECH CO., LTD.
 ADDRESS : Hangang Bldg., 1549-7, Seocho-Dong, Seocho-Gu, 137-070, Korea
 CONTACT PERSON : Chung-Young, So / Manager
 TELEPHONE NO : 82-2-585-4501
 FCC ID : PBCFHD-252
 MODEL NO/NAME : FHD-252
 SERIAL NUMBER : N/A
 DATE : December 04, 2000

DEVICE TYPE	Class B Computing Device Peripheral - Unintentional Radiator
E.U.T. DESCRIPTION	EXTERNAL HDD ENCLOSURE
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 PART 15, SECTION 15.101 (Class B)
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

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 FHD-252 (referred to as the EUT in this report) is an EXTERNAL HDD ENCLOSURE which has a USB port and two 1394 ports for a PC interface. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	48.00 MHz, 24.576MHz
POWER REQUIREMENT	DC 5V, 1A from PC interface
NUMBER OF LAYERS	4 Layers
EXTERNAL CONNECTOR	two 1394 ports, one USB port

Model Differences:

-. The difference(s) compared to the EUT is as follows: 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
FHD-252	SAROTECH CO., LTD.	PBCFHD-252	EXTERNAL HDD ENCLOSURE (EUT)	PC
M5183	Apple Computer Inc.	DOC	PC	-
M2452	Apple Computer Inc.	DOC	KEYBOARD	PC
M4848	Apple Computer Inc.	DOC	MOUSE	PC
AV-5T	Korea Data System	EVOKD-1510T	MONITOR	PC
LC-693	N/A	N/A	SPEAKER	PC
OK-2000	OKSORY	N/A	MIKE	PC
DCR-PC5	SONY	DoC	DVC	EUT (1394 Port)

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 12, 1999. (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
INTERFACE BOARD	SAROTECH CO., LTD.	FHD-252F/U	N/A

3.2 EUT exercise Software

The HDD in the EUT connected with a DVC was put through a read - write - erase sequence to the HDD in HOST through 1394 interface or USB interface. The complete cycle is repeated continuously.

3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
EXTERNAL HDD ENCLOSURE (EUT)	N/A	Y	1.5(D)
PC	N	-	1.5(P)
KEYBOARD	N/A	Y	1.2 (D)
MOUSE	N/A	Y	1.2(D)
MONITOR	N	Y	1.5 (P), 1.2 (D)
SPEAKER	N/A	N	1.2(D)
MIKE	N/A	Y	1.5(D)
DVC	N/A	Y	1.2 (D)

* The marked "(P)" means the Power Cable.



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3.4 Noise Suppression Parts on Cable

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EXTERNAL HDD ENCLOSURE (EUT)	Y	PC END	Y	BOTH END
PC	-	-	-	-
KEYBOARD	N	N/A	Y	PC END
MOUSE	N	N/A	Y	PC END
MONITOR	Y	BOTH END	Y	BOTH END
SPEAKER	N	N/A	Y	PC END
MIKE	N	N/A	Y	PC END
DVC	N	N/A	Y	BOTH 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 EUT was connected to the 1394 port of PC and the power line of PC 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 and the EUT does not support 2-interface type at simultaneously. So the EUT have to be tested at each mode, USB Interface and 1394 Interface.

Operation Mode	The Worse operating condition (Please check one only)
USB Interface	
1394 Interface	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)
USB Interface	
1394 Interface	X



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5. FINAL RESULT OF MEASUREMENT

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 : 55 % Temperature: 20°C
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107
 Type of Test : CLASS B
 Result : PASSED BY -11.51 dB at 25.06 MHz

EUT : EXTERNAL HDD ENCLOSURE
 Operating Condition : 1394 Interface
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 9 kHz)

Date: December 17, 2000

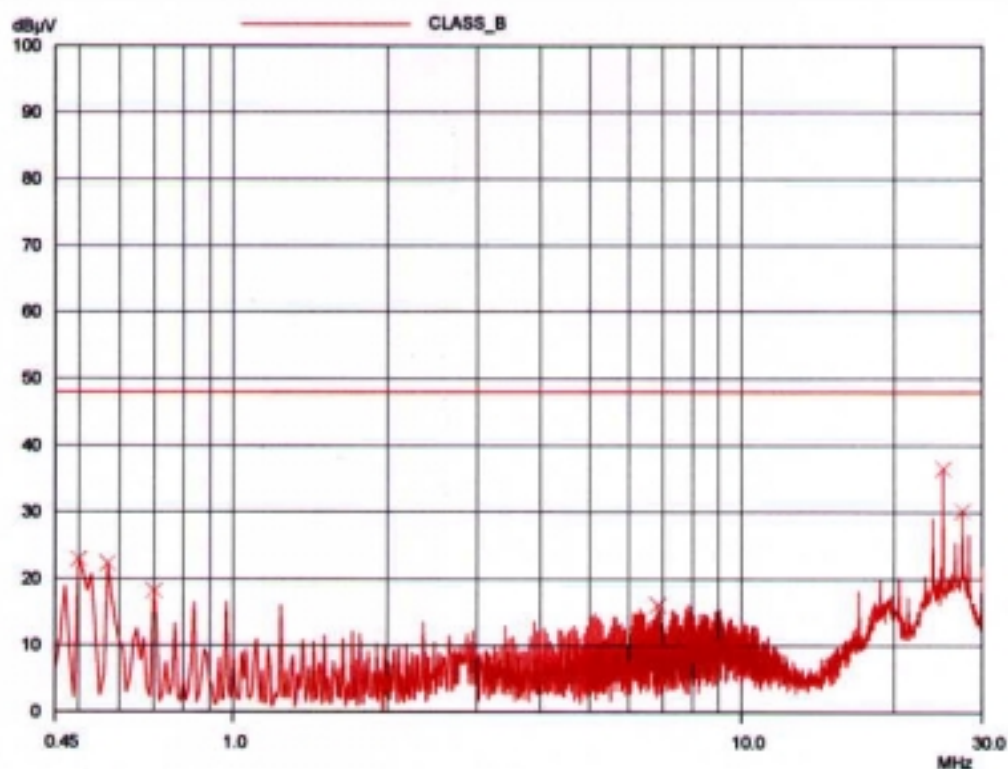
Power Line Conducted Emission			FCC CLASS B	
Frequency (MHz)	Amplitude (dBuV)	Conductor	Limit (dBuV)	Margin (dB)
0.50	23.00	HOT	48.00	-25.00
0.57	22.31	HOT	48.00	-25.69
0.70	20.30	NEUTRAL	48.00	-27.70
6.84	16.08	HOT	48.00	-31.92
25.06	36.49	HOT	48.00	-11.51
27.39	32.29	NEUTRAL	48.00	-15.71

Line Conducted Emission Tabulated Data

Measuring by: Seung Hyun, Nam / Test Engineer



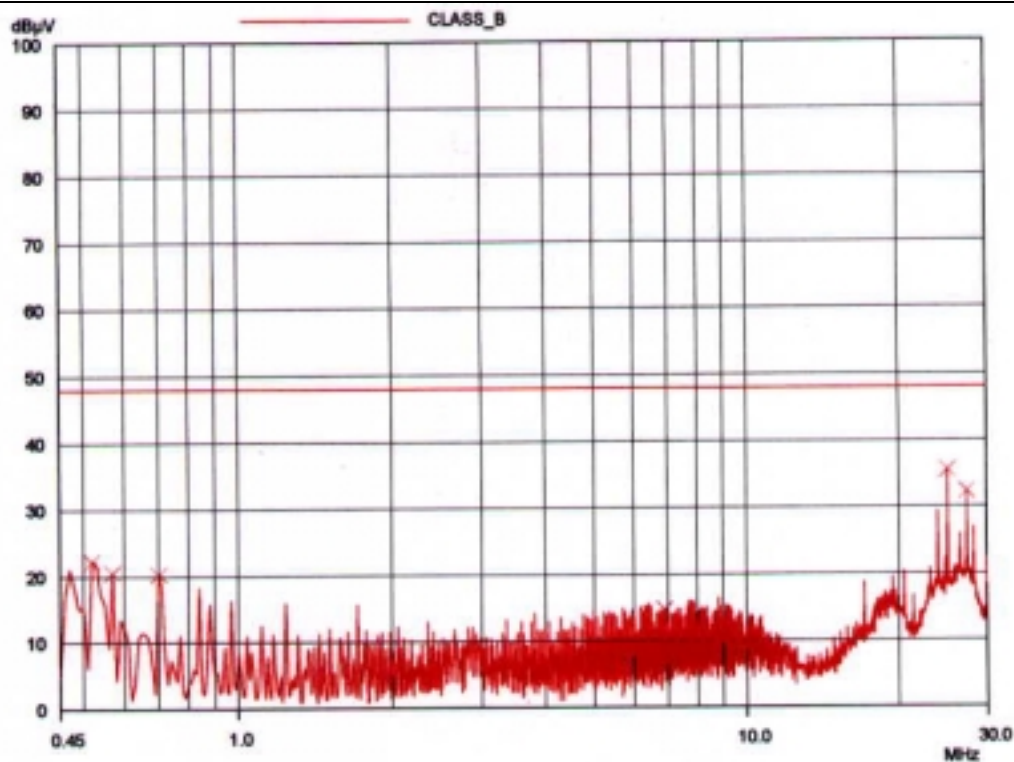
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HOT LINE



NEUTRAL LINE



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5.2 Radiated Emission Test

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

Humidity Level : 55 % Temperature: 17 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109
 Type of Test : CLASS B
 Result : PASSED BY -5.11 dB at 82.68 MHz

EUT : EXTERNAL HDD ENCLOSURE Date: November 17, 2000
 Operating Condition : 1394 Interface
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
 Distance : 3 Meter

Radiated Emissions		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)
48.20	21.70	V	11.23	0.91	33.84	40.00	-6.16
72.50	16.90	V	6.80	1.00	24.70	40.00	-15.30
104.90	21.20	V	12.21	1.17	34.58	43.50	-8.92
132.23	23.60	V	12.92	1.27	37.79	43.50	-5.71
196.76	17.10	V	16.52	1.55	35.17	43.50	-8.33
245.60	21.20	H	12.30	1.81	35.31	46.00	-10.69
295.00	20.90	H	15.00	1.98	37.88	46.00	-8.12
344.40	13.60	V	15.19	2.25	31.04	46.00	-14.96
369.00	14.70	H	15.43	2.36	32.49	46.00	-13.51
393.80	16.50	H	15.74	2.42	34.66	46.00	-11.34
417.40	10.70	V	16.21	2.46	29.37	46.00	-16.63
442.20	16.20	V	16.76	2.53	35.49	46.00	-10.51
567.60	12.40	V	18.63	2.84	33.87	46.00	-12.13
591.80	16.80	H	18.74	2.89	38.43	46.00	-7.57
786.40	10.90	H	21.16	3.66	35.72	46.00	-10.28

Radiated Emissions Tabulated Data

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Measuring by: Seung Hyun, 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	SEP/00	12MONTH	■
2.	Test receiver	R/S	ESHS10	834467/007	APRIL/00	12MONTH	■
3.	Spectrum analyzer	HP	8568B	3026A0226	SEP/00	12MONTH	■
4.	RF preselector	HP	85685A	3107A01264	SEP/00	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01542	SEP/00	12MONTH	■
6.	Dipole Antenna	EMCO	3121C	9107-745	JUN/00	12MONTH	
7.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	MAR/00	12MONTH	■
8.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	MAR/00	12MONTH	■
9.	LISN	EMCO	3825/2	9109-1867 9109-1869	FEB/00	12MONTH	■
10.	RF Amplifier	HP	8447F	3113A04554	JUN/00	N/A	
11.	Spectrum Analyzer	HP	8591A	3131A02312	APR/00	12MONTH	
12.	Computer System	HP	98581C	98543A	N/A	N/A	■
	Hard disk drive		9153C	CMC762Z9153	N/A	N/A	■
13.	Plotter	HP	7475A	30052 22986	N/A	N/A	■
14.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
15.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
16.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■