



ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B CERTIFICATION

Test Report No. : E04DR-046

Applicant : SAROTECH CO., LTD.

Address : Sarotech Bldg. 320-15, Sungnae-Dong, Gangdong-Gu, Seoul, 134-851, Korea

Manufacturer : SAROTECH CO., LTD.

Address : Hanlim Venture Town #204, 689-6, Gumjeong-Dong, Gunpo-City, Kyungki-Do, Korea

Type of Equipment : POCKET HARD DISK DRIVE (Peripheral Device for Class B Computing Device)

FCC ID : PBCFHD-181

Model Name : FHD-181

Multiple Model Name : N/A

Serial number : N/A

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

Date of Incoming : November 22, 2004

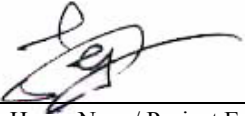
Date of Issuing : December 20, 2004

SUMMARY


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

This test report contains only the results 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.

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FCC-003 (Rev.0)

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CONTENTS

	Page
1. VERIFICATION OF COMPLIANCE.....	3
2. GENERAL INFORMATION.....	4
2.1 PRODUCT DESCRIPTION.....	4
2.2 MODEL DIFFERENCES.....	4
2.3 RELATED SUBMITTAL(S) / GRANT(S).....	4
2.4 TEST SYSTEM DETAILS.....	5
2.5 TEST METHODOLOGY.....	5
2.6 TEST FACILITY.....	5
3. SYSTEM TEST CONFIGURATION.....	6
3.1 JUSTIFICATION.....	6
3.2 EUT EXERCISE SOFTWARE.....	6
3.3 CABLE DESCRIPTION.....	6
3.4 NOISE SUPPRESSION PARTS ON CABLE.....	7
3.5 EQUIPMENT MODIFICATIONS.....	7
3.6 CONFIGURATION OF TEST SYSTEM.....	7
4. PRELIMINARY TEST.....	8
4.1 AC POWER LINE CONDUCTED EMISSION TEST.....	8
4.2 RADIATED EMISSION TEST.....	8
5. FINAL RESULT OF MEASUREMENT.....	9
5.1 CONDUCTED EMISSION TEST.....	9
5.3 RADIATED EMISSION TEST.....	11
6. FIELD STRENGTH CALCULATION.....	12
7. LIST OF TEST EQUIPMENT.....	13

**1. VERIFICATION OF COMPLIANCE**

- APPLICANT : SAROTECH CO., LTD.
- ADDRESS : Sarotech Bldg. 320-15, Sungnae-Dong, Gangdong-Gu, Seoul, 134-851, Korea
- CONTACT PERSON : Mr. Cheol-Young, Cho / Manager
- TELEPHONE NO : +82-2-480-5140
- FCC ID : PBCFHD-181
- MODEL NO/NAME : FHD-181
- SERIAL NUMBER : N/A
- DATE : December 20, 2004

DEVICE TYPE	Peripheral Device for Class B Computing Device - Unintentional Radiator
E.U.T. DESCRIPTION	POCKET HARD DISK DRIVE
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4: 2001
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
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	YES
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 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.



2. GENERAL INFORMATION

2.1 Product Description

The SAROTECH CO., LTD., Model FHD-181 (referred to as the EUT in this report) is a POCKET HARD DISK DRIVE that is interfaced to personal computer via USB or IEEE 1394 port. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Metal
LIST OF EACH OSC. or CRY. FREQ.(FREQ.>=1MHz)	12 MHz, 24.576 MHz
NUMBER OF LAYERS	2 Layers
EXTERNAL CONNECTOR	USB, IEEE1394 Connector

2.2 Model Differences

-. The difference(s) compared to the EUT is as follows: none

2.3 Related Submittal(s) / Grant(s)

-. Original submittal only



2.4 Test System Details

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

Model	Manufacturer	FCC ID	Description	Connected to
FHD-181	SAROTECH CO., LTD.	PBCMRE-461U	POCKET HARD DISK DRIVE (EUT)	PC
SRX-0520SP	SEORIM ELECTRIC CO., LTD.	N/A	AC ADAPTER	EUT
GX240	DELL COMPUTER CORP.	DoC	PERSONAL COMPUTER	-
LME-17S	HUMAX	N/A	MONITOR	PC
LYNX2DT	N/A	N/A	MOUSE	PC
SK-8110	SILITEK	DoC	KEYBOARD	PC
2225C	HP	DSI6XU2225	PRINTER	PC
020-0470	CARDINAL	GDE0196	MODEM	PC

2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4: 2001. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.6 Test Facility

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



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.	FHD-181 UF (OX911Plus) Rev 1.0	N/A
HDD	TOSHIBA	MK2004GAL	N/A

3.2 EUT exercise Software

After connecting the EUT to a personal computer using USB or IEEE1394 cable, data were continuously read and written from the HDD of the personal computer to the EUT.

3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
POCKET HARD DISK DRIVE (EUT)	N	Y	1.2(P), 1.2(D)
AC ADAPTER	N/A	Y	1.2(D)
PERSONAL COMPUTER	N	Y	1.8(P), 1.2(D)
MONITOR	N	Y	1.5(P), 1.2(D)
MOUSE	N/A	Y	1.2(D)
KEYBOARD	N/A	Y	1.2(D)
PRINTER	N	Y	1.8(P), 1.2(D)
MODEM	N	Y	1.8(P), 1.2(D)

* The marked "(P)" means the Power Cable and "D" means the I/O Cable.

**3.4 Noise Suppression Parts on Cable**

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
POCKET HARD DISK DRIVE (EUT)	Y	BOTH END	Y	BOTH END
AC ADAPTER	N	N/A	Y	EUT END
PERSONAL COMPUTER	N/A	N/A	N/A	-
MONITOR	Y	BOTH END	Y	BOTH END
MOUSE	N	N/A	Y	PC END
KEYBOARD	N	N/A	Y	PC END
PRINTER	N	N/A	Y	BOTH END
MODEM	N	N/A	Y	BOTH END

3.5 Equipment Modifications

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

1. The cap (104) and ferrite bead (102) were added on the USB Vcc line on the main board.
2. The ferrite core was added on the both side of USB cable.
3. The paint was removed in the bottom enclosure.

3.6 Configuration of Test System

Line Conducted Test : The AC Adapter 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: 2001 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: 2001 8.3.1.1 to determine the worse operating conditions. Final radiated emission test was conducted at 3 meters open area test site.



4. PRELIMINARY TEST

4.1 AC Power line Conducted Emission Test

During Preliminary Test, the following operating mode was investigated

Coupling Condition	Operation Mode	The Worse operating condition (Please check one only)
Adaptor of the EUT	Data were continuously read and write by USB Port	X
	Data were continuously read and write by IEEE1394 Port	
PC	Data were continuously read and write by USB Port	
	Data were continuously read and write by IEEE1394 Port	

4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated

Coupling Condition	Operation Mode	The Worse operating condition (Please check one only)
Adaptor of the EUT	Data were continuously read and write by USB Port	X
	Data were continuously read and write by IEEE1394 Port	
PC	Data were continuously read and write by USB Port	
	Data were continuously read and write by IEEE1394 Port	

**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 TestHumidity Level : 40 %Temperature: 19 °CLimits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107 (a)Type of Test : CLASS BResult : PASSED BY -3.12 dB at 0.20 MHz under average detector mode

EUT : POCKET HARD DISK DRIVE

Date: November 30, 2004

Operating Condition : Data were continuously read and written.

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

Frequency (MHz)	Line	Peak (dBuV)		Margin (dB)
		Emission level	Q.P Limits	
0.20	H	56.20	63.61	-7.41
0.27	H	49.88	61.27	-11.39
0.40	N	44.74	57.85	-13.11
0.87	H	45.38	56.00	-10.62
1.47	H	46.82	56.00	-9.18
2.01	N	46.20	56.00	-9.80
Frequency (MHz)	Line	Average (dBuV)		Margin (dB)
		Emission level	Limits	
0.20	H	50.49	53.61	-3.12
0.27	H	44.02	51.27	-7.25
0.87	H	36.72	46.00	-9.28
1.47	H	34.27	46.00	-11.73

Line Conducted Emission Tabulated Data

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

See next page for an overview sweep performed with peak and average detector.

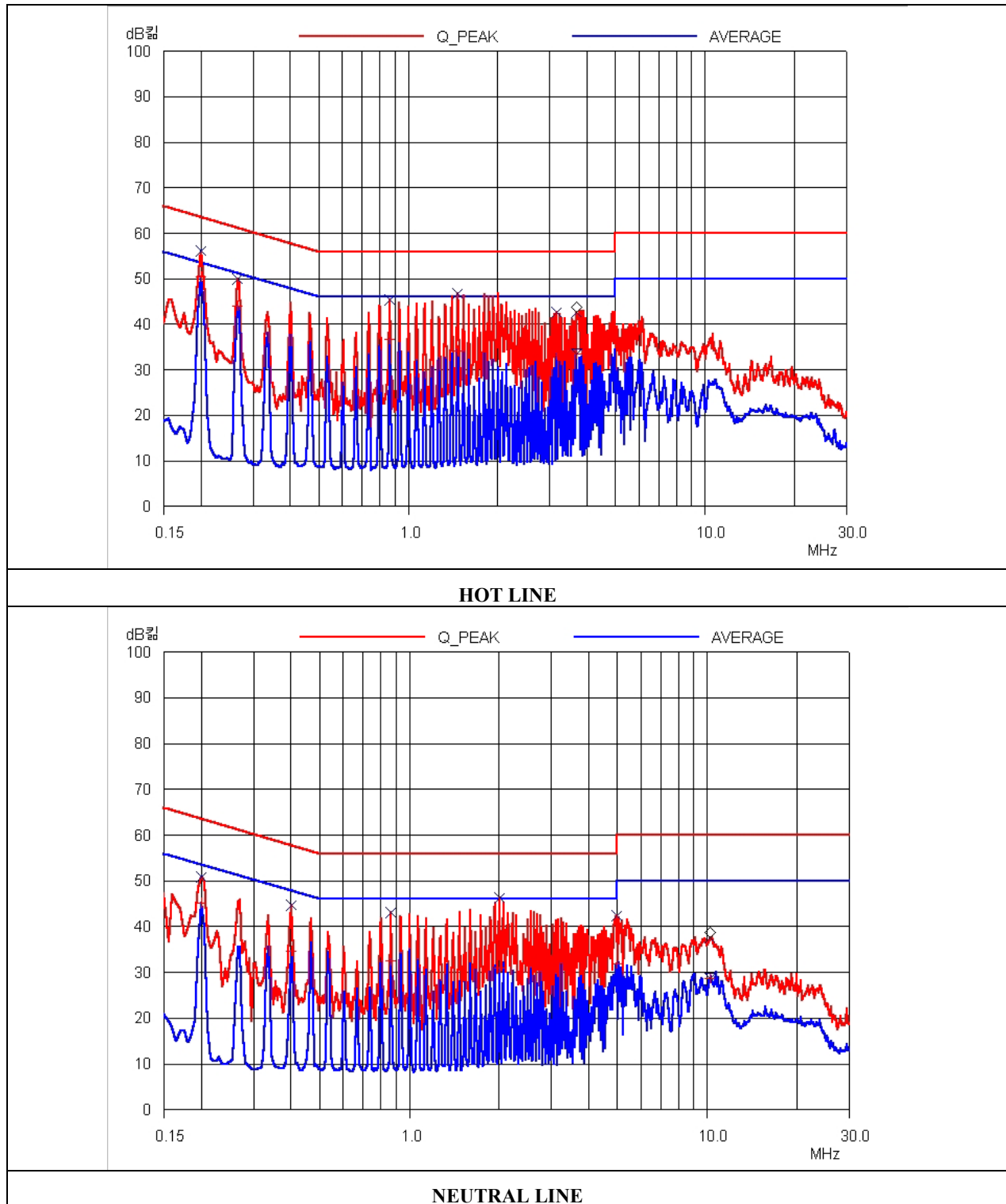
Tested by: Seung-Hyun, Nam / Project Engineer

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**5.3 Radiated Emission Test**

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

Humidity Level : 32 % Temperature: 13 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.109 (a)
 Type of Test : CLASS B
 Result : PASSED BY -12.80 dB at 960.00 MHz

EUT : POCKET HARD DISK DRIVE Date: December 04, 2004
 Operating Condition : Data were continuously read and written.
 Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
 Frequency Range : 30 MHz – 1000 MHz
 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)
90.00	13.00	V	8.40	1.90	23.30	43.52	-20.22
120.00	8.00	V	12.99	2.20	23.19	43.52	-20.33
240.00	7.00	V	17.09	2.56	26.65	46.02	-19.37
480.00	12.00	V	17.39	3.60	32.99	46.02	-13.03
720.00	7.50	V	21.13	4.34	32.97	46.02	-13.05
960.00	5.00	V	22.96	5.26	33.22	46.02	-12.80

Radiated Emissions Tabulated Data

Tested by: Seung-Hyun, Nam / Project Engineer



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)

**7. LIST OF TEST EQUIPMENT**

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVD	838453/018	MAR/04	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	MAY/04	12MONTH	■
3.	Spectrum analyzer	HP	8566B	3407A08547	JUL/04	12MONTH	
4.	Spectrum analyzer	HP	8568B	3109A05456	JUL/04	12MONTH	■
5.	RF preselector	HP	85685A	3107A01264	APR/04	12MONTH	■
6.	Quasi-Peak Adapter	HP	85650A	3107A01542	JUL/04	12MONTH	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163 166	FEB/04	12MONTH	
8	Biconical antenna	EMCO	3104C	9109-4443	MAY/04	12MONTH	
		Schwarzbeck	VHA9103	91031852	JAN/04		■
9.	Log Periodic antenna	EMCO	3146	9109-3213	FEB/04	12MONTH	
				9109-3217	MAY/04		
		Schwarzbeck	9108-A(494)	62281001	JAN/04		■
10.	LISN	EMCO	3825/2	9109-1867	JUL/04	12MONTH	■
				9109-1869	OCT/04		■
11.	Position Controller	HD GmbH	HD100	N/A	N/A	N/A	■
12.	Turn Table	HD GmbH	DS420S	N/A	N/A	N/A	■
13.	Antenna Master	HD GmbH	MA240	N/A	N/A	N/A	■