



ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B CERTIFICATION

Test report file number : E034R-069

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

FCC ID : PBCFHD-255

Model Name : FHD-255

Multiple Model Name : N/A

Serial number : N/A

Total page of Report : 12 pages (including this page)

Date of Incoming : March 10, 2003

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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.

Prepared by:

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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 : PBCFHD-255
- . MODEL NO/NAME : FHD-255
- . SERIAL NUMBER : N/A
- . DATE : April 23, 2003

| | |
|---|--|
| 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 C63.4/1992 |
| 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 |
| 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.



2. GENERAL INFORMATION

2.1 Product Description

The SAROTECH CO., LTD., Model FHD-255 (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 | Plastic (unshielded coating) | |
| INTERFACE | USB2.0 (PL), IEEE13984 | |
| DATA TRANSMISSION SPEED | USB 2.0 | Max. 480 Mbps |
| | IEEE 1394 | Min. 400 Mbps |
| LIST OF EACH OSC. Or CRY. FREQ.(FREQ.>=1MHz) | 12 MHz, 24.576 MHz | |
| NUMBER OF LAYERS | 4 Layers | |
| EXTERNAL CONNECTOR | USB, IEEE1394 and DC input port | |

Model Differences:

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

2.2 Related Submittal(s) / Grant(s)

Original submittal only

2.3 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-255 | SAROTECH CO., LTD. | PBCFHD-255 | POCKET HARD DISK DRIVE (EUT) | PC |
| GX240 | DELL Computer Corp. | DOC | PC | - |
| KB-9963 | Compaq | DOC | Keyboard | PC |
| X06-08477 | MICROSOFT CORP. | DOC | Mouse | PC |
| 2225C | HP | DSI6XU2225 | Printer | PC |
| 020-0470 | Cardinal | GDE0196 | Modem | PC |
| KP-106B | DSI6XU2225 | N/A | AC/DC Adaptor | EUT |
| MHS2040AT | FUJITSU (THAILAND) CO. LTD | N/A | HDD | EUT |
| E551 | DELL Computer Corp. | DOC | Monitor | PC |

*. The applicant not supplied user with adaptor.

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, Gyunggi-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 B'D | SAROTECH CO., LTD. | FHD-254UF2 (PL-2507) Rev 1.2 | 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. For DC Input port on the EUT, the output cable of the adapter was connected to the EUT.

The test was performed about each operation mode for getting maximum noise level, but worst emission levels were recorded in this test report.

3.3 Cable Description

| | Power Cord Shielded (Y/N) | I/O cable Shielded (Y/N) | Length (M) |
|------------------------------|------------------------------|-----------------------------|------------------|
| POCKET HARD DISK DRIVE (EUT) | N | Y | 1.5 (P), 0.8 (D) |
| Personal Computer | N | - | 1.5 (P), |
| Keyboard | N/A | N | 1.0 (D) |
| Mouse | N/A | N | 1.0 (D) |
| Printer | N | Y | 1.5 (P), 1.5 (D) |
| Modem | N | Y | 1.5 (P), 1.5 (D) |
| Adaptor for the EUT | N | N/A | 1.5 (P) |
| Monitor | N | Y | 1.5 (P), 1.0 (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 | EUT END | Y | BOTH END |
| Personal Computer | N | N/A | - | - |
| Keyboard | N | N/A | Y | PC END |
| Mouse | N | N/A | Y | PC END |
| Printer | N | N/A | Y | BOTH END |
| Modem | N | N/A | Y | BOTH END |
| Adaptor for the EUT | N | N/A | Y | EUT END |
| HDD | N | N/A | Y | BOTH END |
| Monitor | Y | PC END | 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 were no Modified items during EMI test”

3.6 Configuration of Test System

Line Conducted Test : The EUT was connected to USB port of Notebook PC and the power line of notebook PC was connected to LISN. All supporting equipments were connected to another LISN. Using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions performed preliminary Power line Conducted Emission test.

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.

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 continuously read and written via USB | |
| Data were continuously read and written via IEEE 1394 | |
| Data were continuously read and written via USB and AC/DC adaptor was connected to the EUT | X |
| Data were continuously read and written via IEEE 1394 and adaptor was connected to the EUT | |

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 continuously read and written via USB | |
| Data were continuously read and write via IEEE 1394 | |
| Data were continuously read and written via USB and adaptor was connected to the EUT | X |
| Data were continuously read and written via IEEE 1394 and adaptor was connected to the EUT | |



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 : 34 % Temperature: 19 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107 (a)
 Type of Test : CLASS B
 Result : PASSED BY -6.48 dB at 0.15 MHz at Peak mode

EUT : POCKET HARD DISK DRIVE Date: April 18, 2003

Operating Condition : Data were continuously read and written via USB and adaptor was connected to the EUT.

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 | |
| 0.15 | H | 59.52 | P | 66.00 | -6.48 | 43.21 | 56.00 | -12.79 |
| 0.20 | H | 53.63 | P | 63.82 | -10.19 | 43.11 | 53.82 | -10.71 |
| 0.79 | H | 38.21 | P | 56.00 | -17.79 | 35.96 | 46.00 | -10.04 |
| 1.83 | H | 36.88 | P | 56.00 | -19.12 | 33.06 | 46.00 | -12.94 |
| 10.17 | N | 38.55 | P | 60.00 | -21.45 | 27.15 | 50.00 | -22.85 |
| 19.89 | H | 43.88 | P | 60.00 | -16.12 | 32.61 | 50.00 | -17.39 |

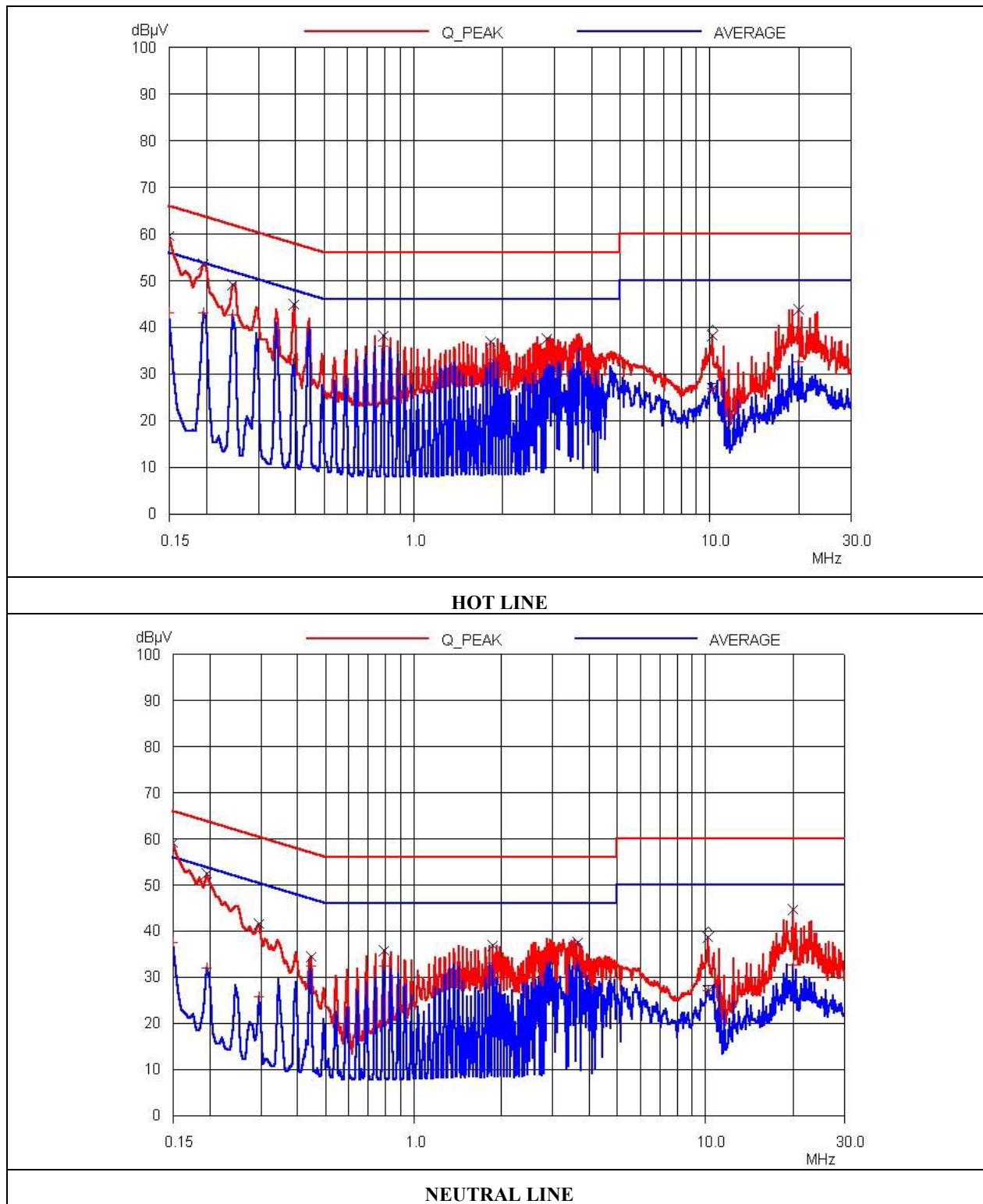
Line Conducted Emission Tabulated Data

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

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

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Tested by: Gi-Hong, Nam / Test Engineer



**5.2 Radiated Emission Test**

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

| | | |
|-----------------|---|---------------------------|
| Humidity Level | : <u>47 %</u> | Temperature: <u>19 °C</u> |
| Limits apply to | : <u>FCC CFR 47, PART 15, SUBPART B, SECTION 15.109 (a)</u> | |
| Type of Test | : <u>CLASS B</u> | |
| Result | : <u>PASSED BY -4.53 dB at 665.88 MHz</u> | |

| | | | | |
|---------------------|---|--|--|----------------------|
| EUT | : POCKET HARD DISK DRIVE | | | Date: April 21, 2003 |
| Operating Condition | : Data were continuously read and written via USB and adaptor was connected to the EUT. | | | |
| 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) | Ant. | Ant. (dBuV/m) | Cable (dB) | Amp. (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 59.99 | 19.80 | V | 9.41 | 0.98 | 30.19 | 40.00 | -9.81 |
| 84.02 | 21.30 | V | 7.32 | 1.08 | 29.70 | 40.00 | -10.30 |
| 120.00 | 20.10 | V | 13.47 | 1.23 | 34.80 | 43.50 | -8.70 |
| 143.05 | 17.20 | V | 12.84 | 1.32 | 31.36 | 43.50 | -12.14 |
| 168.03 | 13.50 | V | 15.75 | 1.42 | 30.67 | 43.50 | -12.83 |
| 180.07 | 15.90 | V | 16.12 | 1.45 | 33.47 | 43.50 | -10.03 |
| 240.00 | 19.90 | H | 11.62 | 1.78 | 33.30 | 46.00 | -12.70 |
| 432.00 | 14.70 | H | 15.89 | 2.50 | 33.09 | 46.00 | -12.91 |
| 480.00 | 17.60 | H | 17.07 | 2.62 | 37.29 | 46.00 | -8.71 |
| 665.88 | 17.86 | H | 20.47 | 3.14 | 41.47 | 46.00 | -4.53 |
| 720.00 | 15.10 | H | 20.80 | 3.42 | 39.32 | 46.00 | -6.68 |
| 796.40 | 13.45 | H | 21.20 | 3.70 | 38.35 | 46.00 | -7.65 |
| 960.07 | 14.20 | H | 23.44 | 4.12 | 41.76 | 54.00 | -12.24 |

Radiated Emissions Tabulated Data

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Testing & Evaluation Lab.

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FCC ID. : PBCFHD-255

File No. : E034R-069

Tested by: Gi-Hong, Nam / Test Engineer

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EMC-003 (Rev.0)

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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)

**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 | ■ |