



Test Report

Test Report No.:	KT102EF0155		
Registration No.:	99058		
Applicant:	STORMBLUE CO.,LTD.		
Applicant Address:	3 rd Floor 144-9 Doksan-Dong Kumchun-Gu Seoul 153-011 Korea		
Product:	Memory Driver		
FCC ID:	PU9MD-2	Model No.	MD-2
Receipt No.:	KT120020110	Date of receipt:	January 10, 2002
Date of Issue:	January 30, 2002		
Testing location	Korea Technology Institute Co., Ltd. 51-19, Sanglim3-Ri, Docheok-Myeun, Gwangju-Shi, Gyeongki-Do, Korea		
Test Standards:	ANSI. C63.4 : 1992		
Rule Parts:	FCC Part 15, Subpart B		
Equipment Class:	JBP		
Test Result:	The above mentioned product has been tested and passed.		
Tested by: S. B. Kim/ Engineer		Approved by: G. C. Min/ President	
 Signature Date		 Signature Date	
Other Aspects :			
Abbreviations :	• OK, Pass=passed • Fail=failed • N/A=not applicable		
This test report is not permitted to copy partly without our permission. This test result is dependent on only equipment to be used. This test result is based on a single evaluation of one sample of the above mentioned. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S Government. We certify this test report has been based on the measurement standards that is traceable to the national or international standards.			



Contents

	Contents	2
	List of Tables	2
	List of Figures	2
	List of Photographs	3
1.	General	3
2.	Test Site	3
	2.1 Location	4
	2.2 List of Test and Measurement Instruments	4
	2.3 Test Data	4
	2.4 Test Environment	5
3.	Description of the tested samples	5
	3.1 Rating and Physical characteristics	5
	3.2 Submitted documents	6
4.	Measurement conditions	6
	4.1 Modes of operation	6
	4.2 Additional equipments	6
	4.3 Uncertainty	6
	4.4 Test Setup	7
5.	Emission Test	8
	5.1 Conducted Emissions	8
	5.2 Radiated Emissions	9
6.	Photographs of the Test Set-up	11
Annex1	Label	13
Annex2	Photographs of EUT	14~16

List of Tables

Table 1	List of test and measurement equipment	4
Table 2	Test Data. Radiated Emissions	10

List of Photographs

Photograph 1	Setup for Conducted Emissions	11
Photograph 2	Setup for Radiated Emissions	12



1. General

This equipment has been shown to be capable of compliance with the applicable technical standards and was tested in accordance with the measurement procedures as indicated in this report.

We attest to the accuracy of data. All measurements reported herein were performed by Korea Technology Institute Co., LTD. And were made under Chief Engineer's supervision. We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. Test Site

Korea Technology Institute Co., LTD

2.1 Location

51-19, Sanglim3-Ri, Docheok-Myeun, Gwangju-Shi, Gyeongki-Do, Korea

The Test Site is in compliance with ANSI C63.4/1992 for measurement of radio Interference.



2.2 List of Test and Measurement Instruments

Table 1 : List of Test and Measurement Equipment

• Conducted Emissions

Kind of Equipment
Type
S/N
Calibrated until

Spectrum Analyzer
R3261C
61720417
11.2002

Field Strength Meter
ESPC
832827/011
9.2002

LISN
KNW407
8-1157-2
10.2002

LISN
ESH2-Z5
8254601019
6.2002

Conducted Cable
N/A
N/A
11.2002

• Radiated Emissions

Kind of Equipment
Type
S/N
Calibrated until

Field Strength Meter
ESPC
832827/011
9.2002

Spectrum Analyzer
R3261C
61720417
11.2002

Pre Amplifier
8447D
2944A06874
11.2002

BiconiLog Antenna
3142B
1705
12.2002



3. Description of the tested samples

The EUT is Memory Driver.

3.1 Rating and Physical Characteristics

Supported OS

Windows 98/SE, Windows ME, Windows 2000, Windows XP and Mac 8.6 or higher

Power Supply

USB Bus-powered (4.5V to 5.5V)

Capacities

16MB/32MB/64MB/128MB/256MB/512MB/1 GB

Data Retention

10 years

Illumination

Green : device connected

Red : Data receiving or transmitting

Data Reading/Writing Speed

Max 12Mbits/sec (depending on PC system)

Operating Temperature

0°C ~ +50°C

Storage Temperature

-20°C ~ +80°C

Dimension (LxWxH)

88mm x 25mm x 11mm

Weight

16g

Certification

Warranty

1 year limited liability warranty

3.2 Submitted Documents



4. Measurement Conditions

Testing Input Voltage: AC 220V.

4.1 Modes of Operation

The EUT was in the following operation mode during all testing;

1. Data back up in memory
2. 'H' pattern display

4.2 Additional Equipment

DEVICE TYPE

Manufacturer

M/N

S/N

FCC ID

PC

COMPAQ COMPUTER CORPORATION

Deskpro EXM

6F13JC8JN619

-

Monitor

Samsung Electronics

750S

P223HVAR502035

-

Keyboard

COMPAQ COMPUTER CORPORATION

KB-9963

B26960GBUKKOVW

-

Mouse

logitech

M-S48a

None

JNZ201213

Mouse

SEJIN ELECTRON INC.

SMB-400

0CIM004047

GJJS965M3

Printer

Hewlett Packard

C4569A

SG78M1H0CF

-

4.3 Uncertainty

1) Radiated disturbance

UC (Combined standard Uncertainty) = $\pm 1.8\text{dB}$

Expanded uncertainty $U = Kuc$

$K = 2$

$U = \pm 3.6\text{dB}$

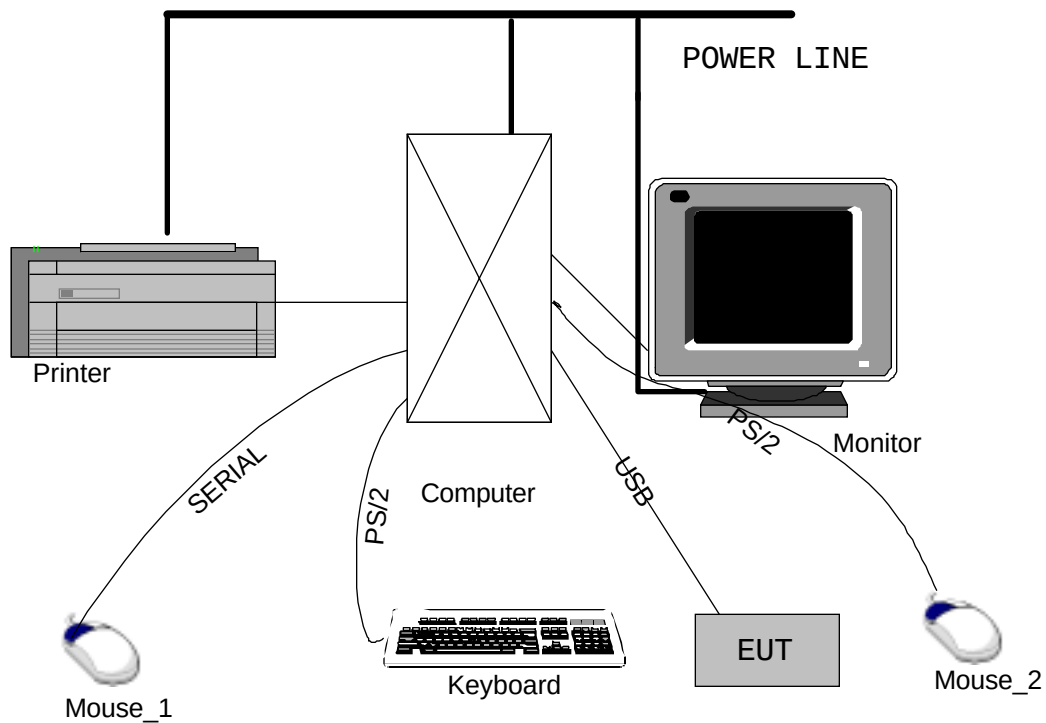
2) Conducted disturbance

UC = $\pm 0.88\text{dB}$

$U = Kuc = 2 \times Uc = \pm 1.8\text{dB}$



4.4 Test setup





5. EMISSION Test

5.1 Conducted Emissions

Result : **Pass**

The line-conducted facility is located inside a 2.3M x 3.5M x 5.5M shielded closure.

The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 605-05.

A 1m x 1.5m wooden table 80cm. High is placed 80cm away from the vertical wall and 1.5m away from the side wall of the shielded room. R&S Model ESH3-Z5(10kHz-30MHz)

50ohm/50 uH line-Impedance Stabilization Networks(LISN) are bonded to the shielded room.

The EUT is powered from the R&S LISN and the support equipment is powered from the Kyoritsu LISN. Power to the LISN are filtered by a high-current high-insertion loss shield enclosures power line filters(100dB 14kHz-1Ghz).

The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure.

All electrical cables are shielded by braided tinned copper zipper tubing with inner diameter of 1/2".

If the EUT is a DC-Powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the Kyoritsu LISN.

All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1-meter length.

Sufficient time for the EUT, Support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT.

The spectrum was scanned from 450kHz to 30MHz with 100sec. sweep time.

The frequency producing the maximum level was reexamined using EMI field Intensity meter (ESPC). The detector function was set to CISPR Q.P. mode.

The bandwidth of the receiver was set to 10kHz. The EUT, support equipment, and interconnecting each emission was maximized by: switching power lines; varying the mode of operation or resolution; clock or data exchange speed; if applicable; whichever determined the worst-case emission.

Photographs of the worst-case emission can be seen in photograph of conducted test.

Each EME reported was calibrated using self-calibrating mode.



Figure 1 : Spectral Diagram, LINE – PE

LINE CONDUCTION

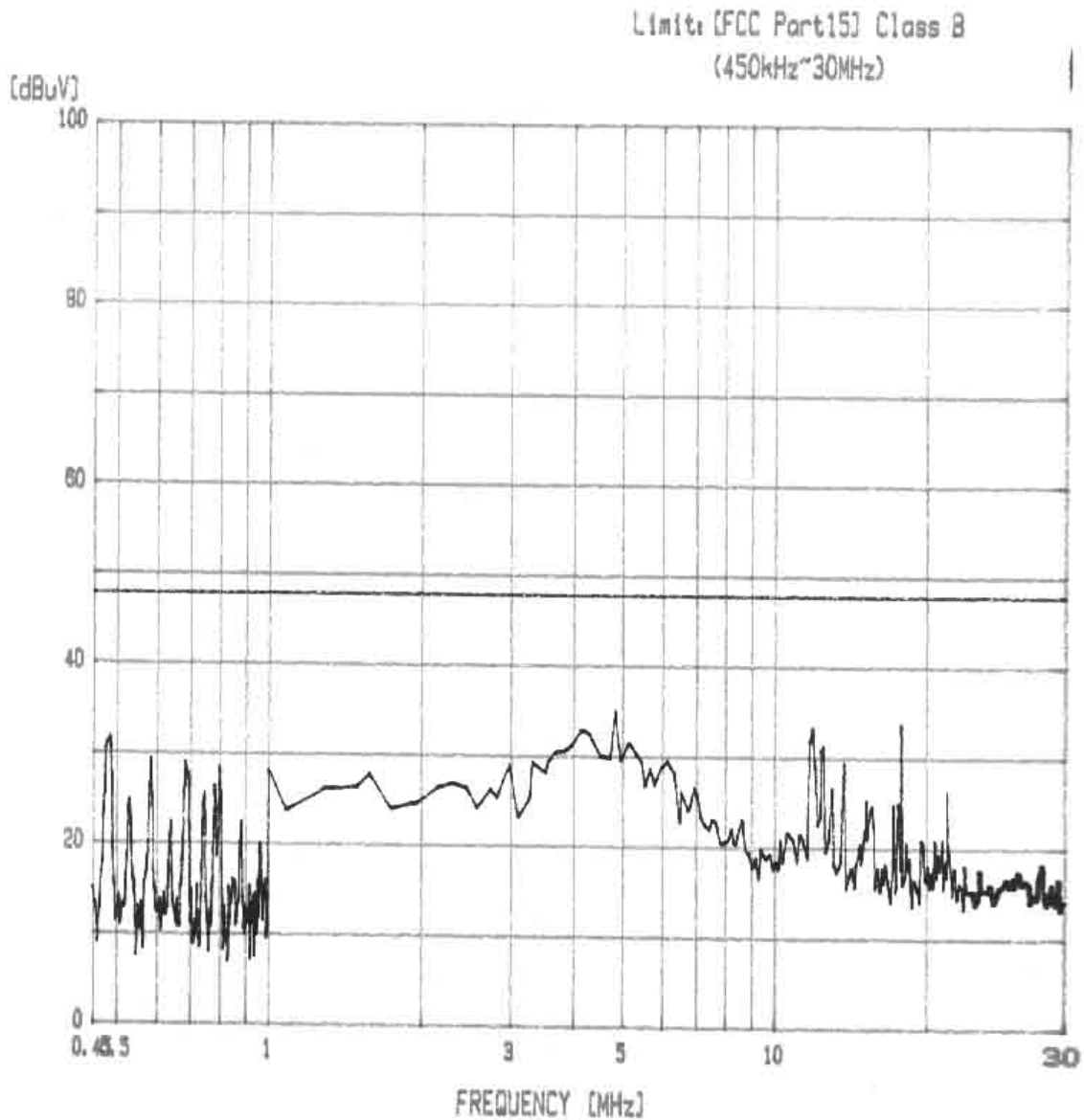




Figure 2 : Spectral Diagram, NEUTRAL – PE

LINE CONDUCTION

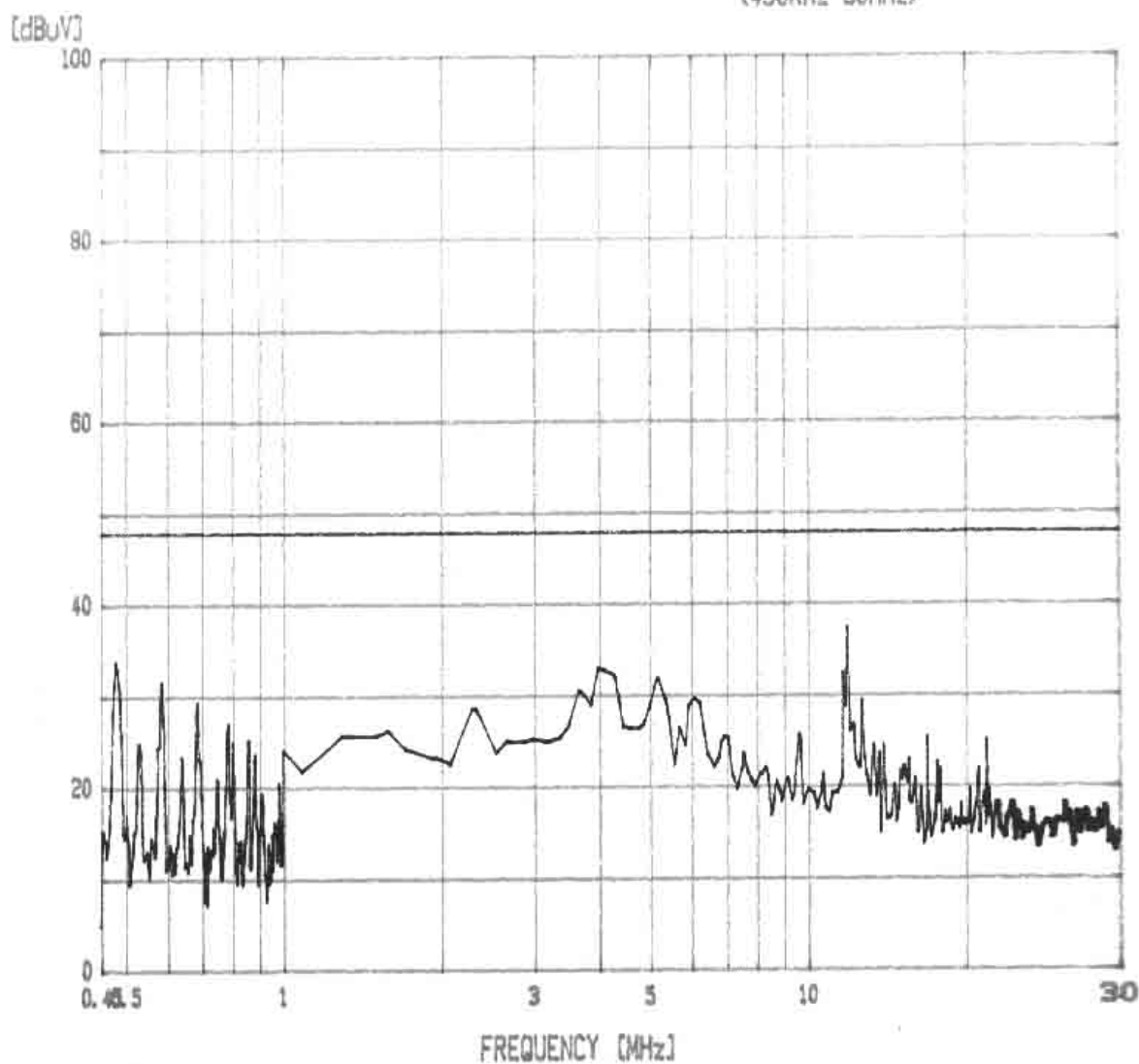
Limit: (FCC Part15) Class B
(450kHz~30MHz)



Table 2 : Test Data, Conducted Emissions

Frequency
(MHz)
(1)Reading
(dB V)
Line

(2)Limit
(dB V)
(3)Margin
(dB)

0.48

33.9

H

48

14.1

0.59

32.1

H

15.9

4.87

35.2

N

12.8

5.19

31.8

H

16.2

12.81

38.6

H

9.4

18.34

33.7

N

14.3

NOTES:

1. All modes of operation were investigated
And the worst-case emission are reported.
2. All other emissions are non-significant.
3. All readings are calibrated by self-mode in receiver.
4. Measurements using CISPR quasi-peak mode.
5. Line H = LINE-PE, Line N = NEUTRAL-PE
6. C/F = Correction Factor
7. C/L = Cable Loss
8. The limit for Class B digital device is 250 uV (48dBuV)
from 450KHz to 30MHz

Margin Calculation

$$(6)\text{Margin} = (2)\text{Limit} - (1)\text{Reading}$$



5.2 Radiated Emissions

Result: **Pass**

Preliminary measurements were made indoors at 3 meter using B.C & L.P antennas, broadband Amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and Investigated. The system configurations, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 to 300 MHz using biconical antenna and from 300 to 1000 MHz using log-periodic antenna. Above 1 GHz, linearly polarized double ridge horn antennas were used.

Final measurements were made outdoors at 3-meter test range using EMCO antennas. The test equipment was placed on a wooden table situated on a 4x4 meter area adjacent to the measurement area. Turntable was to protect from weather in the dome that made with Polyethylene film. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using EMI/Field Intensity Meter (ESPC) R & S. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120kHz or 1 MHz depending on the frequency or type or signal.

The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8meter high non-metallic 1 x 1.5 meter table.

The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed, and/or support equipment, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission.

Photographs of the worst-case emission can be seen in photograph of radiated emission test. Each EME reported was calibrated using self-calibrating mode.



Table 3 : Test Data, Radiated Emissions

Frequency
 (MHz)
 Pol.
 Height
 [m]
 Angle
 [°]
 (1)
 Reading
 (dB V)
 (2)
 AFCL
 (dB/m)
 (3)
 Actual
 (dB V/m)
 (4)
 Limit
 (dB V/m)
 (5)
 Margin
 (dB)

36.95

H

3.165

132

13.11

16.4

29.51

40

10.49

67.1

H

3.148

195

11.48

12.2

23.68

16.32

72.1

H

2.61

268

11.74

12.2

23.94

16.06

73.0

H

2.56

195

11.59

12.2

23.79

16.21

80.0

H

