

# FCC PART 15 CLASS B EMI MEASUREMENT AND TEST REPORT

FOR

**KM Information Technology Co., Ltd.**  
**408, Techno-Town, ChaAm-Dong, CheonAn-City**  
**ChungChongNam-Dol, Koera**

**Model Number :KM-0128M**

Issued Date: April 26, 2002  
Report No.: THRU-F020426B

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: M Drive KM-0128M
Test Date: April 19, 2002	
Tested By: <i>Kyoungh Moon Choi</i> K. M. Choi - Test Engineer	
Certified By: <i>Hae Woon Park</i> H.W. Park - M. Director, Compliance Engineering	
Prepared By: Thru Lab. & Engineering 1367-1, ShinKil-Dong, YoungDeungPo-Ku, Seoul 150-855, KOREA TEL: 82-(2)-846-5002 / FAX: 82-(2)-834-0969	

*Note:* This report may not be duplicated except in full without prior written consent of Thru Lab. & Engineering.

## Table of Contents

---

### 1. General Information

1.1	Test Facility . . . . .	4
1.2	Test Methodology. . . . .	4
1.3	Test Equipment List . . . . .	4
1.4	Product Description for Equipment Under Test (EUT) . . . . .	5
1.5	Support Equipment . . . . .	5
1.6	Host System Configuration . . . . .	6
1.7	External I/O Cabling . . . . .	6

### 2. System Test Configuration

2.1	Justification . . . . .	7
2.2	EUT Exercise . . . . .	7
2.3	Special Accessories. . . . .	7
2.4	Schematics/Block Diagram . . . . .	7
2.5	Configuration of Test System . . . . .	8
2.6	Conducted Emission Test Setup Block Diagram . . . . .	9

### 3. Conducted Emission Test

3.1	EUT Setup . . . . .	10
3.2	Test Equipment Setup. . . . .	10
3.3	Test Procedure . . . . .	10
3.4	Summary of Test Results. . . . .	11
3.5	Conducted Emission Test Result Data . . . . .	11
3.6	Plot of Conducted Emission Test Data . . . . .	11

### 4. Radiated Emission Test

4.1	EUT Setup . . . . .	12
4.2	Test Equipment Setup. . . . .	12
4.3	Test Procedure . . . . .	12
4.4	Corrected Amplitude and Margin Calculation. . . . .	12
4.5	Summary of Test Results. . . . .	13
4.6	Radiated Emission Test Result Data . . . . .	13

## **Table of Contents(cont'd)**

---

### **5. FCC Labelling Requirement**

5.1	FCC Statement. . . . .	14
5.2	Label Location. . . . .	14

### **6. Conducted and Radiated Setup Photographs**

6.1	Conducted Emission: Front View . . . . .	15
6.2	Conducted Emission: Side View . . . . .	15
6.3	Radiated Emission: Front View . . . . .	16
6.4	Radiated Emission: Rear View . . . . .	16

### **7. Photographs**

7.1	EUT: Front View . . . . .	17
7.2	EUT: Rear View . . . . .	17
7.3	EUT: Label View . . . . .	18
7.4	EUT: Internal View. . . . .	18
7.5	EUT: Board, Component View. . . . .	19
7.6	EUT: Board, Circuit View . . . . .	20

### **Appendix A - Plot of Conducted Emission Test Data**

### **Appendix B - EUT Schematics/Block Diagram**

### **Appendix C - User's Manual**

## 1. General Information

---

### 1.1 Test Facility

The open area test site (OATS) used by Thru Lab. & Engineering to collect radiated and conducted emissions measurement data is located in the 389 JeArm-Rhi, HyangNam-Myun, HwaSung-Gun, KyungKi-Do, Korea.

Test sites at Thru Lab. & Engineering has been fully described in reports submitted to the Federal Communication Commission and the details of the reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The test facility also complies with the radiated and AC line conducted test site criterion in ANSI C63.4-1992. The Federal Communications Commission has the reports on file and is listed under Registration Number 92583. The scope of the accreditation covers the FCC Method - 47 CFR Part 15 or 18 of the Commission's Rules.

### 1.2 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-1992. All radiated and conducted emission measurements were performed at Thru Lab. & Engineering. The radiated testing was performed at an antenna-to-EUT distance of 10 meters for Class A devices and 3 meters for Class B devices.

### 1.3 Test Equipment List

Description	Model No.	Serial No.	Manufacturer	Cal. Due	Used
EMI Test Receiver	ESVS 10	830489/001	Rodhe&Schwarz	04/25/2003	RE
Biconical Antenna	94455-1	0977	Eaton	04/25/2003	RE
Log Periodic Antenna	3146	2051	EMCO	04/25/2003	RE
Spectrum Analyzer	8566B	2311A02394	Hewlett Packard	03/17/2003	RE
Spectrum Display	85662A	2542A12429	Hewlett Packard	04/27/2003	RE
Quasi-Peak Adapter	85650A	2521A00887	Hewlett Packard	04/27/2003	RE
RF Preselector	85685A	2648A00504	Hewlett Packard	04/27/2003	RE
Pre-Amplifier	8447F	3113A05367	Hewlett Packard	04/27/2003	
Horn Antenna	SAS-571	414	A.H. Systems	05/09/2002	
Dipole Antenna Set	TDA25/.1/.2	176/200/200	Electro Metrics	10/04/2001	
Signal Generator	SMS	872165/100	Rodhe&Schwarz	04/27/2003	
Spectrum Analyzer	R3261C	71720189	Advantest	04/27/2003	CE
LISN	KNW-242	8-923-2	Kyoritsu	N/A	CE
LISN	8012-50-R-24	8379121	Solar	N/A	CE
Plotter	7475A	2210A02802	Hewlett Packard	N/A	CE
Positioner Set	N/A	N/A	Dongsung Prec.	N/A	RE

## 1.4 Product Description for Equipment Under Test (EUT)

KM Information Technology Co., Ltd's M Drive or the "EUT" as referred to in this report is USB Removable Disk Drive.

### Main Features of EUT are:

- Applicable PC IBM PC/AT, LAPTOP, iMAC, POWER MAC  
(Support USB Port)
- Operating Systems Windows (98/Me/2000/XP/CE,MAC8.6 or Above)
- Memory Capacity 16MB---1GB
- Power Supply USB BUS-Powered(4.5~5.5V)
- Interface USB Spec 1.1
- Operating Current 40mA MAX.
- Reading Speed 800~1,000 Kbytes/Sec
- Writing Speed 500~600 Kbytes/Sec
- Operating Temperature 0 °C ~ 45 °C
- Dimensions 77.0 X 21.8 X 10.0 mm
- Weight 17g

## 1.5 Support Equipment

Description	Model Number	Serial Number	Manufacturer	Remarks
USB Removable Disk Drive	KM-0128M	-	KM Information Technology Co., Ltd.	EUT
Host Computer	Satellite Pro 4280	Y9012364 1	Toshiba Corporation	-
VGA Monitor	CGC5607L	H1BH900689	Samsung Electronics	15"
Keyboard	BTC-5560	K71200885	BTC Korea	PS/2
Printer	C2605	3221S66649	Hewlett Packard	300dpi
Modem	SM1200A1	71000230	Samsung Electronics	1200bps
Speaker	RP-SP10	6ACSA01550	Matsushita Electronics	-
Microphone	ECM	none	-	-
AC Adaptor	PA2444U	9708	Toshba Corporation	15V

## 1.6 Host System Configuration

Description	Model Number	Serial Number	Manufacturer	Remarks
Main Board	FSM7SS0	93J571272Y2	Toshiba Corporation	Japan
Hard Drive	MK6014MAP	Y9860027G	Toshiba Corporation	Japan
Floppy Drive	JU-226A202FC	00002445	Panasonic	China
CD-ROM Drive	CD-244E	0485644	TEAC Corporation	Indonesia
CPU	Pentium III	none	Intel Corporation	550MHz
Memory	SDRAM	none	Toshiba Corporation	192MB
Note book Chassis	Satellite Pro 4280	Y9012364 1	Toshiba Corporation	Note Book

## 1.7 External I/O Cabling

Description	Length (m)	Port/From	Port/To	Remarks
VGA Cable	2.0	miniDIN/Host	Monitor	Shielded
Keyboard Cable	1.8	Keyboard/Host	Keyboard	Shielded
Printer Cable	1.5	Parallel/Host	Printer/Centronics	Shielded
Modem Cable	2.0	Serial/Host	Modem/RS232	Shielded
Speaker Cable	1.0	SPKR/Host	Speaker	Shielded
Microphone Cable	2.0	MIC/Host	Microphone	Shielded

## **2. System Test Configuration**

---

### **2.1 Justification**

The system was configured for testing in a typical fashion (as normally used by a typical user). Worst case conducted and radiated emissions are presented in section 3.5 and section 4.6 of this report.

The test was performed with a Note Book Computer as inserting the EUT to the USB port for the final qualification test. The Video port (VGA/DB15), PS/2 Keyboard/Mouse ports (miniDIN), Parallel port (LPT/DB25), Serial port (COM/DB9), Speaker/Microphone jacks (3.5mm stereo) provided by the host computer were also tested.

### **2.2 EUT Exercise**

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The test software, supplied by the client, was run on Windows 98SE operating system .

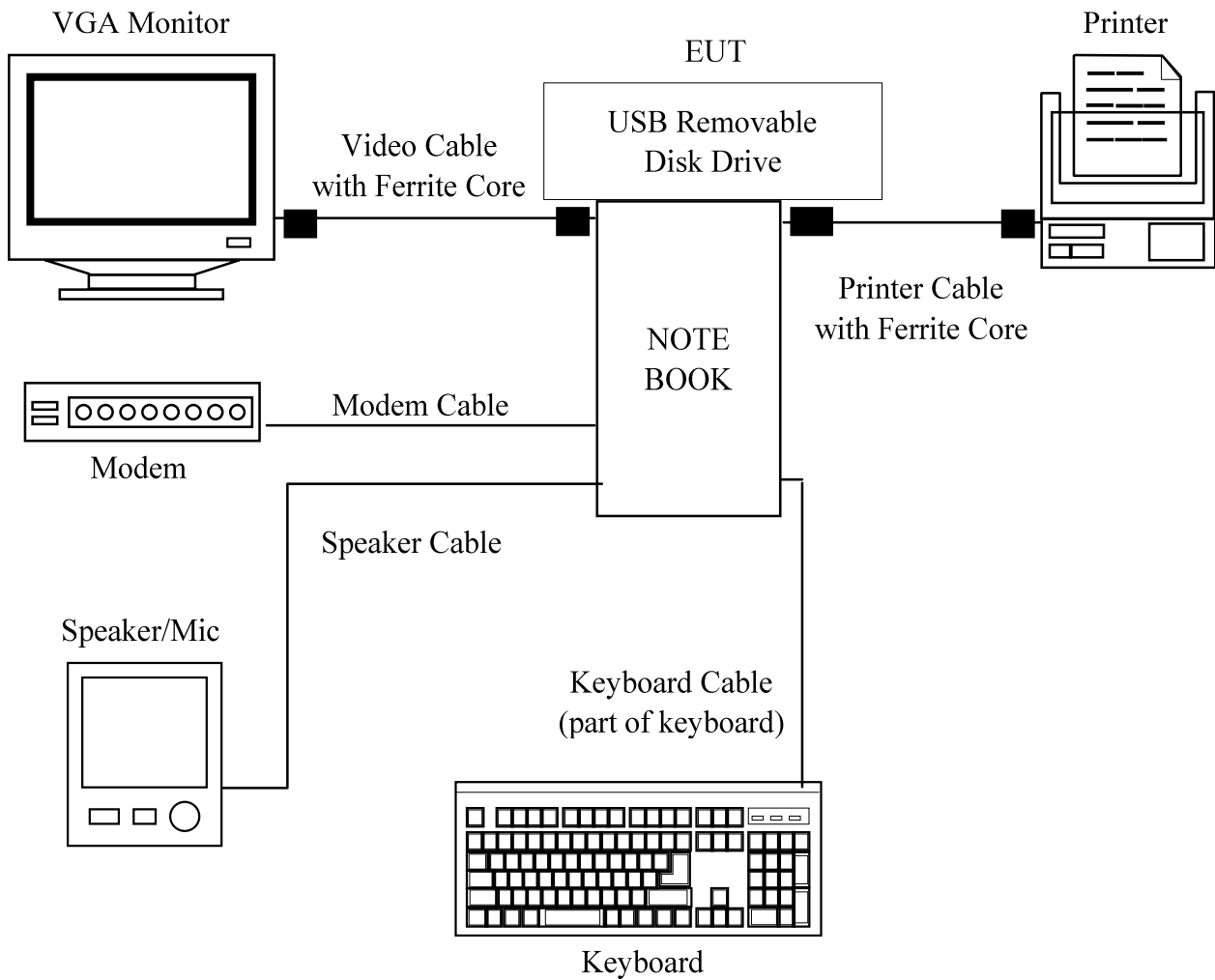
### **2.3 Special Accessories**

As shown in section 2.5, all interface cables used for compliance testing are shielded as normally supplied or by use respective component manufacturers. The Printer, Modem and Monitor featured shielded metal connectors.

### **2.4 Schematics/Block Diagram**

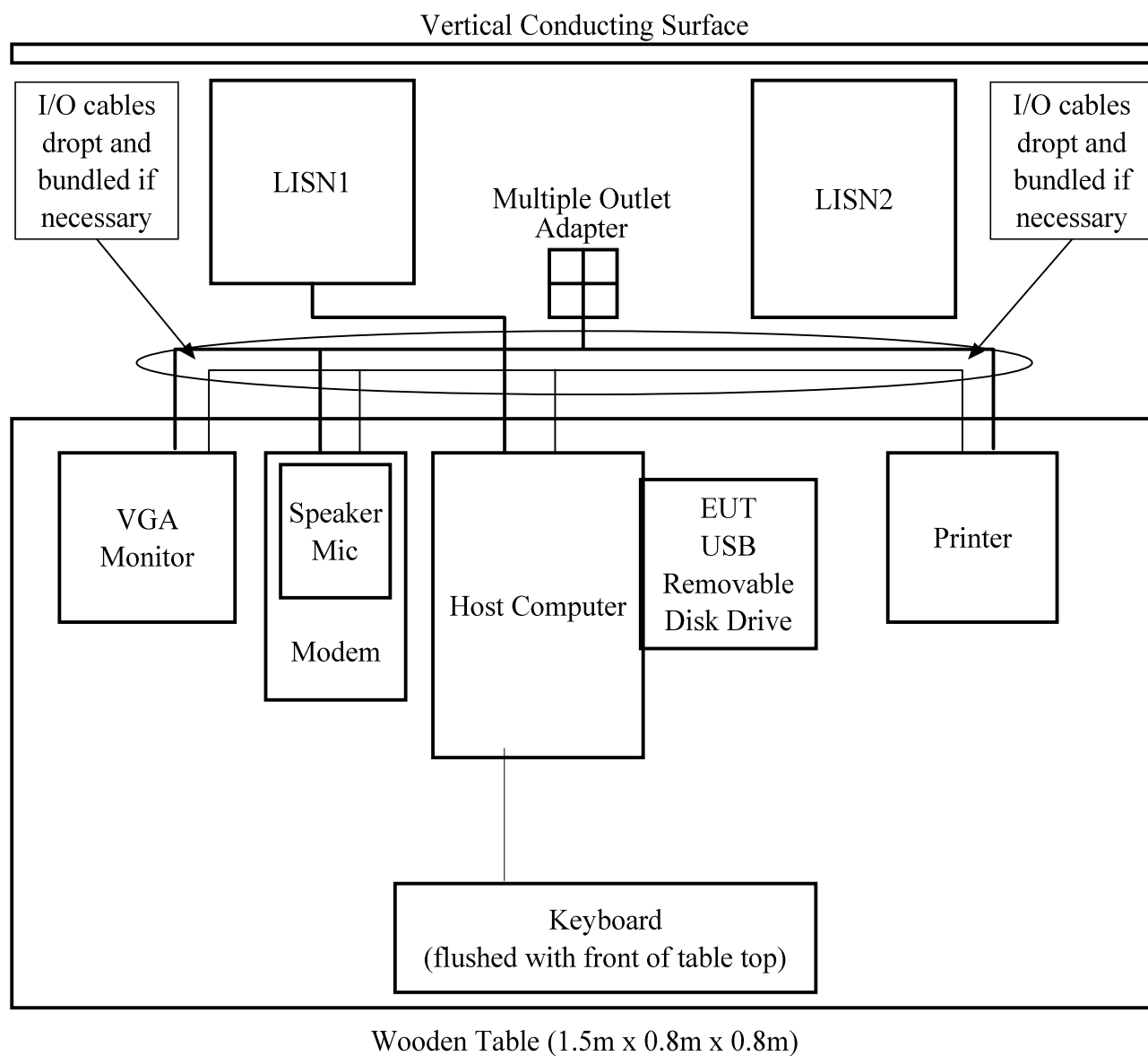
The EUT schematic or block diagram is presented in Appendix B as reference.

## 2.5 Configuration of Test System





## 2.6 Conducted Emission Test Setup Block Diagram



### 3. Conducted Emission Test

---

#### 3.1 EUT Setup

The measurement was performed in the screen room of test site, using the setup in accordance with ANSI C63.4-1992 conducted emission measurement procedure.

The EUT was installed in a middle tower host computer. The host computer was placed on the center and back edge of the test table. The VGA monitor, modem, speaker and microphone were placed on one side of the host computer with the printer and TV monitor on the other side. The rear of the host computer and all support equipments were flushed with the rear and sides of the tabletop. The keyboard was placed in front of the host computer, flushed with the front of the tabletop. The mouse was placed flushed with the back of the keyboard.

Spacing between the peripherals was approximately 10 centimeters.

#### 3.2 Test Equipment Setup

The spectrum analyzer was configured during the conduction test in as follows:

Start Frequency . . . . .	450kHz
Stop Frequency . . . . .	30MHz
Resolution Bandwidth . . . . .	9kHz
Sweep Time . . . . .	Auto
Detector Mode . . . . .	QP

#### 3.3 Test Procedure

During the conducted emission test, the host computer power cord was connected to the auxiliary outlet of the LISN1 and all other peripherals power cords were connected to the multiple outlet adapter of the LISN2.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings were only performed when an emission was found to be marginal (less than -4dBuV). Quasi-peak readings are distinguished with a "QP".

The conducted emission test was performed with EUT exercise program loaded, and the emissions were scanned between 0.45MHz to 30MHz on the LINE side and NEUTRAL side, herein referred to as L and N, respectively. The final test data for this test configuration is recorded in the table listed under section 3.5 of this report.

### 3.4 Summary of Test Results

According to the data in section 3.5, the EUT complied with the FCC Part 15 Class B standards, and had the worst margin reading of:

-10.5dB at 1.864MHz in the LINE side with the Toshiba Corporation AC Adaptor,  
Model PA2444U AC Adaptor,

### 3.5 Conducted Emission Test Data

Line Conducted Emission				FCC Part15 Class B		
Frequency (MHz)	Amplitude (dBuV)	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit		Margin (dB)
				(dBuV/m)	(uV/m)	
0.150	26.3	QP	N	48.0	250	-21.7
0.469	28.5	QP	N	48.0	250	-19.5
0.513	33.9	QP	H	48.0	250	-14.1
0.700	28.1	QP	H	48.0	250	-19.9
0.979	30.3	QP	H	48.0	250	-17.7
1.864	37.5	QP	H	48.0	250	-10.5
2.684	36.5	QP	H	48.0	250	-11.5
16.642	33.4	QP	H	48.0	250	-14.6
17.483	28.1	QP	H	48.0	250	-19.9
26.983	31.7	QP	H	48.0	250	-16.3
27.436	34.9	QP	H	48.0	250	-13.1
29.948	36.4	QP	H	48.0	250	-11.6

### 3.6 Plot of Conducted Emission Test Data

Plot(s) of conducted emission test data for the Toshiba Corporation AC Adaptor, Model PA2444U AC Adaptor is presented in Appendix A of this report as reference.

## 4. Radiated Emission Test

---

### 4.1 EUT Setup

The radiated emission tests were performed in the open area test site, using the setup in accordance with ANSI C63.4-1992 radiated emission measurement procedure.

The host computer was placed on the center of the test table. The VGA monitor and all peripherals were placed on the test table same as section 3.1.

Spacing between the peripherals was approximately 10 centimeters.

### 4.2 Test Equipment Setup

During the radiated emission test, the EMI test receiver was set with the following configurations:

Start Frequency . . . . .	30MHz
Stop Frequency . . . . .	1000MHz
IF Bandwidth . . . . .	120kHz
Sweep Time . . . . .	10msec
Detector Mode . . . . .	QP

### 4.3 Test Procedure

For the radiated emission test, the host computer and all support equipments power cords was connected to the AC floor outlet.

Maximizing procedure was performed on the six (6) highest emissions to verify that the EUT complied with all installation combination.

The radiated emission test was performed with EUT exercise program loaded, and the emissions were scanned between 30MHz to 1000MHz. At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum emission levels. Measurements were taken using both HORIZONTAL and VERTICAL antenna polarization. The final test data for this test configuration is recorded in the table listed under section 4.6 of this report.

### 4.4 Corrected Amplitude and Margin Calculation

The Corrected Amplitude is calculated by adding the antenna and cable Correction Factor from the Indicated Amplitude reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Indicated Amplitude} + \text{Antenna Factor} + \text{Cable Factor}$$

The Margin column of the data table in section 4.6 indicates the degree of compliance with the applicable limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corrected Amplitude} - \text{Applicable Limit}$$

## 4.5 Summary of Test Results

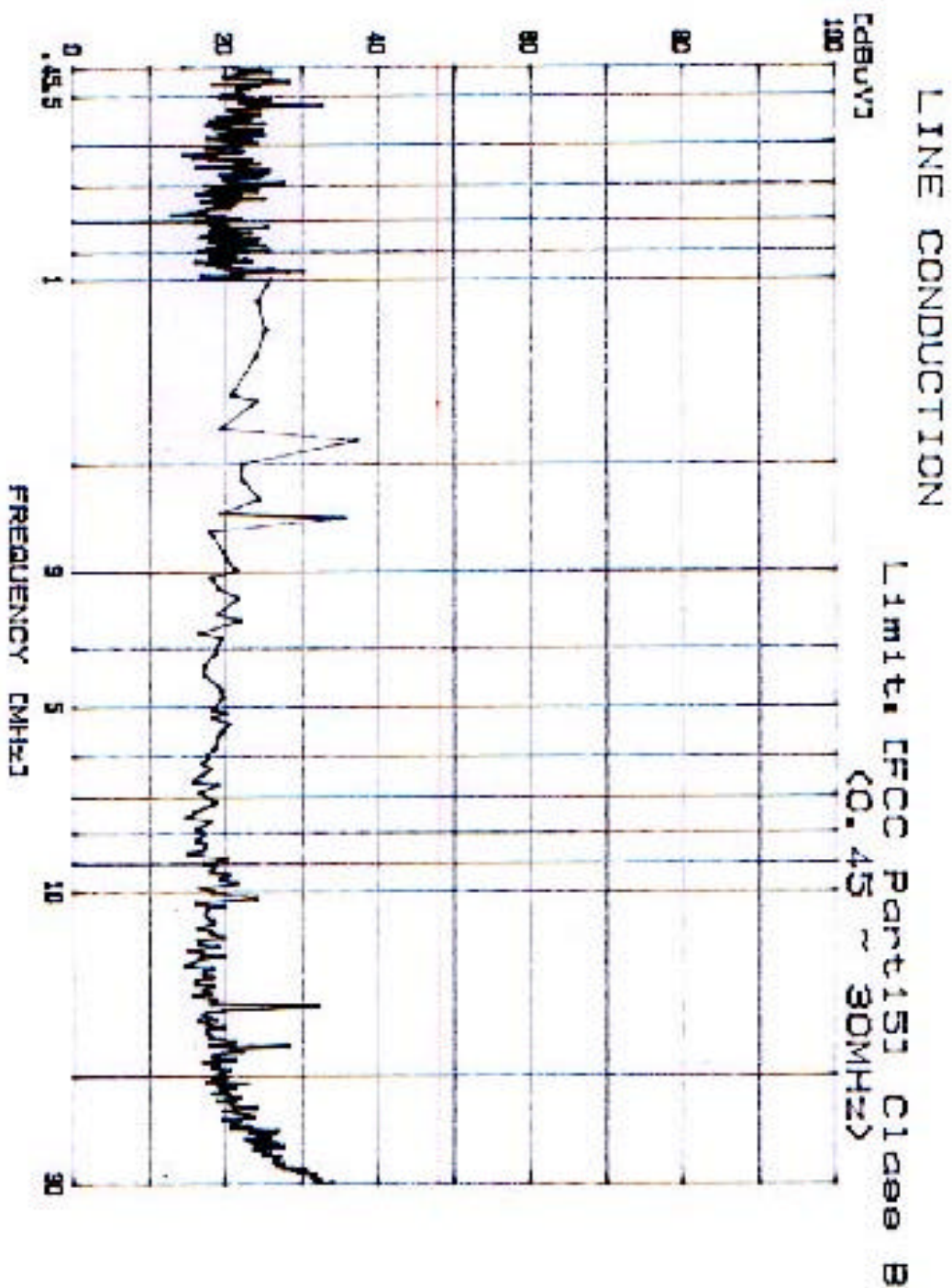
According to the data in section 4.6, the EUT complied with the FCC Part 15 Class B standards, and had the worst margin of:

-9.7dB at 75.22MHz in the Horizontal polarization at an antenna-to-EUT distance of 3 meters.

## 4.6 Radiated Emission Test Result Data

Indicated		Antenna		Table	Correction Factor		Corrected Amplitude	FCC Part15 Class B		
Freq. (MHz)	Ampl. (dBuV/m)	Polar. (H/V)	Height (m)	Angle (deg.)	Ant. (dB)	Cable (dB)	(dBuV/m)	Applicable Limit		Margin (dB)
35.12	11.9	H	3.2	300	12.9	0.5	25.3	40.0	100	-14.7
51.15	15.9	H	3.6	260	10.7	1.5	28.1	40.0	100	-11.9
59.36	11.6	V	2.0	310	7.5	1.5	20.6	40.0	100	-19.4
63.69	15.6	H	3.6	270	6.4	1.7	23.7	40.0	100	-16.3
75.22	17.1	H	3.5	110	12.0	1.2	30.3	40.0	100	-9.7
79.36	15.5	H	4.0	130	7.6	1.9	25.0	40.0	100	-15.0
169.23	4.9	H	3.1	260	16.2	3.2	24.3	43.5	150	-19.2
172.10	5.5	V	1.6	100	15.8	3.3	24.6	43.5	150	-18.9
183.98	7.3	H	2.8	150	14.2	3.4	24.9	43.5	150	-18.6
195.38	8.0	H	3.4	290	13.3	3.5	24.8	43.5	150	-18.7
199.94	8.5	H	1.5	350	13.0	3.5	25.0	43.5	150	-18.5
208.04	12.7	H	3.1	200	12.6	3.6	28.9	43.5	150	-14.6
231.96	12.1	H	3.6	150	12.3	3.9	28.3	46.0	200	-17.7
233.43	12.7	V	1.2	290	12.3	3.9	28.9	46.0	200	-17.1
260.52	12.3	H	3.0	320	13.1	4.2	29.6	46.0	200	-16.4
288.03	9.8	H	2.6	330	16.7	4.4	30.9	46.0	200	-15.1
311.90	10.9	V	2.7	280	15.9	4.7	31.5	46.0	200	-14.5
325.62	10.2	H	2.4	190	15.9	4.8	30.9	46.0	200	-15.1

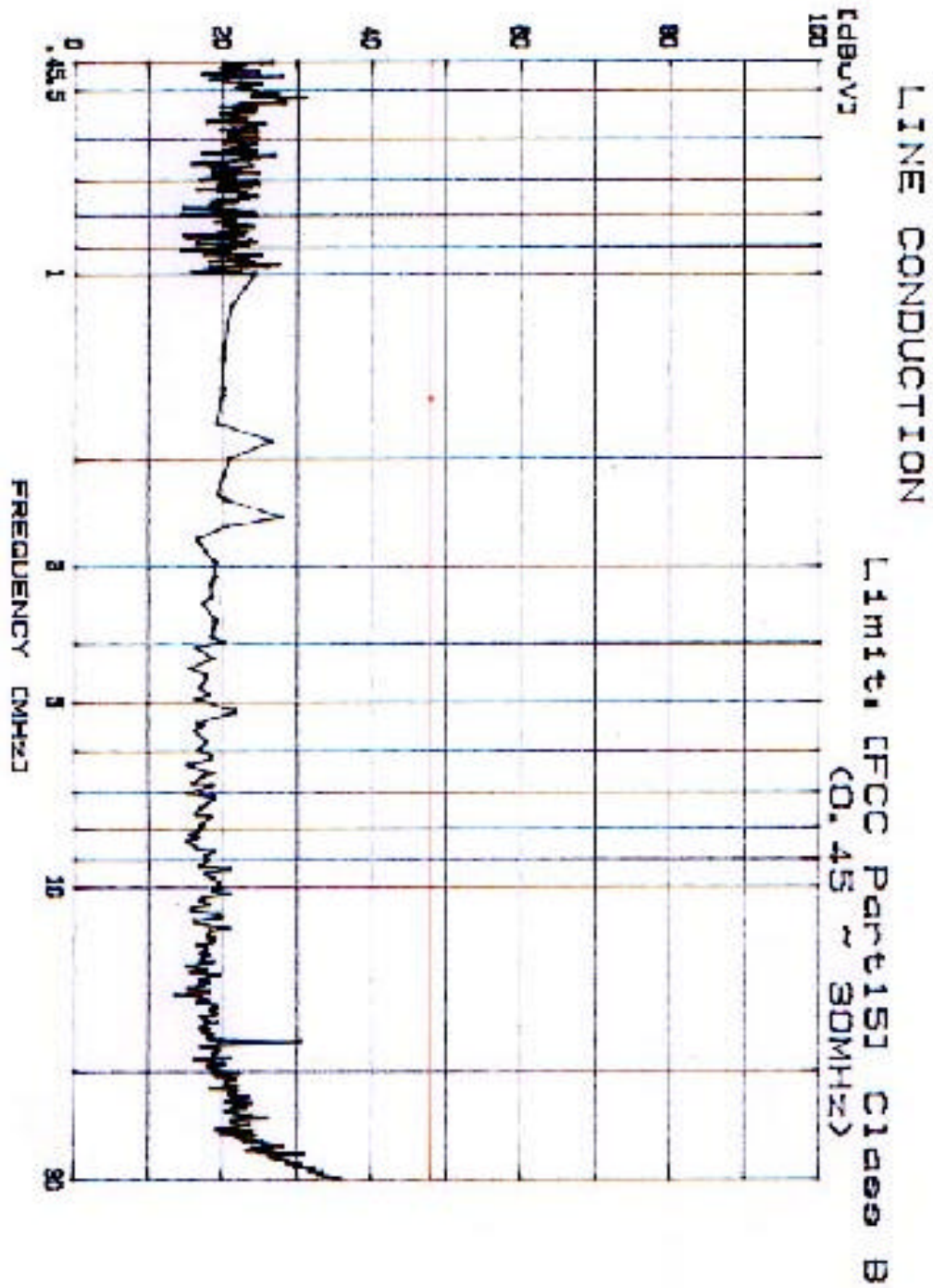
## **Appendix A - Plot of Conducted Emission Test Data**



KM Information Technology Co., Ltd.  
USB Removable Disk Drive

April 19, 2002  
MODEL: KM-0128M  
PLEASE LINE





KM Information Technology Co., Ltd.  
USB Removable Disk Drive

April 19, 2002  
MODEL: KM-0128M  
PHASE: NEUTRAL