Engineering and Testing for EMC and Safety Compliance

APPLICATION FOR FCC CERTIFICATION

CLASS B DIGITAL DEVICE

Korea Data Systems Co., Ltd.
170 Gongdan-Don, Gumi-Si
Gyungbuk 730-030 Korea

MODEL: KD-1770 17" Monitor

FCC ID: EVOKD-1770

April 6, 1998

This report concerns (check one): **Original Grant:** X **Class II Change:** **Equipment Type: Monitor**	
Deferred grant requested per 47 CFR 0.457 (d) (1) (ii)? **Yes:** **No:** X **If yes, defer until:** _____ *Date* **Company name agrees to notify the Commission by:** _____ **(date) of the intended date of announcement of the product so that the grant can be issued on that date.**	
Transition Rules Request per 15.37? Yes: **No:** X **If no, assumed Part 15, subpart B for unintentional radiators - the new 47 CFR [10-1-90 Edition] provision.**	

REPORT PREPARED BY:

EMI Technician: Christopher Shackleton
Administrative Writer: Dixie L. Shetter

Rhein Tech Laboratories, Inc.

Work Order # 980104

360 Herndon Parkway, Suite 1400
Herndon, VA 20170
703 689-0368 FAX 703 689-2056 METRO 703 471-6441

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1.0 GENERAL INFORMATION

The following Application for FCC Certification of a Class B Device is prepared on behalf of Korea Data Systems, Co. Ltd. in accordance with Part 2, and Part 15, Subparts A and B of the Federal Communications Commissions rules and regulations. The Equipment Under Test (EUT) was the Korea Data Systems, Co. Ltd., KD-1770 17" Monitor, FCC ID: EVOKD-1770. The test results reported in this document relate only to the item that was tested.

All measurements contained in this Application were conducted in accordance with ANSI C63.4 Methods of Measurement of Radio Noise Emissions, 1992. The instrumentation utilized for the measurements conforms with the ANSI C63.4 standard for EMI and Field Strength Instrumentation. Some accessories are used to increase sensitivity and prevent overloading of the measuring instruments. These are explained in the appendix of this report. Calibration checks are performed regularly on the instruments, and all accessories including the high pass filter, preamplifier and cables.

All radiated and conducted emissions measurements were performed manually at Rhein Tech Laboratories, Inc. The radiated emissions measurements required by the rules were performed on the ten meter, open field, test range maintained by Rhein Tech Laboratories, Inc., 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. Complete description and site attenuation measurement data have been placed on file with the Federal Communications Commission. The power line conducted emission measurements were performed in a shielded enclosure also located at the Herndon, Virginia facility. Rhein Tech Laboratories is accepted by the FCC as a Facility available to do measurement work for others on a contract basis.

1.1 PRODUCT DESCRIPTION

* Multi-scanning at horizontal frequencies of 30KHz to 95KHz, vertical frequencies of 50Hz to 160Hz.
* 17 inch (15.8" viewable) FST (Flat Square Technology) picture tube with ARASC/ARECS high-definition, anti-glare coating.
* 0.26mm fine dot pitch.
* Microprocessor-based design with digital controls
* Windows®95 plug and play (VESA®DDC2B)
* 13 preset modes.
* Overscan capablility for increased viewable area.
* Compatible with standard IBM VGA, extended VGA, super VGA, IBM XGA, XGA/2, as well as all VESA® ergonomic standards.
* Compatible with Apple® Macintosh™
* Universal power supply
* MPR II compliant
* VESA® Display Power Management Signaling (DPMS™) compatible.

ARASC: Anti-Reflection, Anti-Static Coating
ARECS: Anti-Reflection with Enhanced Contrast, Color fidelity an Conductivity

1.2 RELATED SUBMITTAL(S)/GRANT(S)

N/A. This is an original submittal.

1.3 TESTED SYSTEM DETAILS

The FCC Identifiers for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

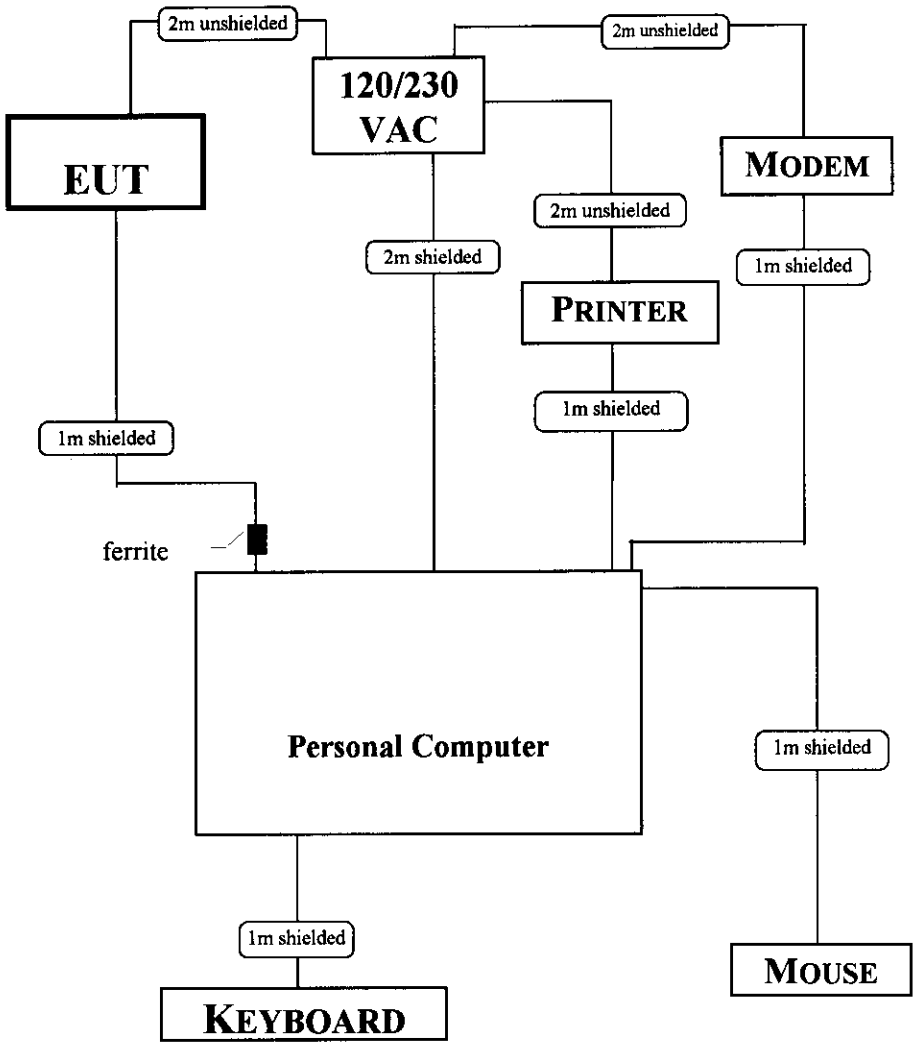
EXTERNAL COMPONENTS

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO	FCC ID	CABLE DESCRIPTIONS	RTL BAR CODE
SYSTEM	GATEWAY 2000, INC.	HITMAN/LOW PROFILE MINI-DESKTOP	812117	DoC	N/A	8860
PRINTER	HEWLETT PACKARD	C3990A	JPHJO23871	DoC	SHIELDED I/O, UNSHIELDED POWER	8971
MONITOR	**KOREA DATA SYSTEMS, CO., LTD. (EUT)**	**KD-1770**	**N/A**	**EVOKD-1770**	**SHIELDED I/O, FERRITE ON COMPUTER END, UNSHIELDED POWER**	**9085**
KEYBOARD	MAXI SWITCH, INC.	219603-14-111	M970724746	D7J219603-XX	SHIELDED I/O	8873
MODEM	US ROBOTICS	0413	839032B86P9X3	DoC	SHIELDED I/O, UNSHIELDED POWER	900411
MOUSE	MICROSOFT CORPORATION	INTELLIMOUSE 1.1A	01504624	C3KKMP5	SHIELDED I/O	8448

INTERNAL COMPONENTS

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO	FCC ID	CABLE DESCRIPTIONS	RTL BAR CODE
FLOPPY DISK DRIVE	PANASONIC	JU-256A2216P	00233033	N/A	INTERNAL RIBBON	8297
HARD DRIVE	QUANTUM	FIREBALL ST	853729147936G	N/A	INTERNAL RIBBON	8432
POWER SUPPLY	ASTEC	ATX202-3515	N/A	N/A	SHIELDED POWER	7831
VIDEO CARD	STB SYSTEMS, INC.	RIVA 128	210-0274-001	DoC	SHIELDED I/O	7599
MOTHERBOARD	INTEL	HITMAN	GRCO124721H	N/A	INTERNAL RIBBON	900602
CPU	INTEL	PENTIUM 233 MHZ	C803053W-0707	N/A	N/A	8737

1.4 CONFIGURATION OF TESTED SYSTEM



1.5 TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 1992. Radiated testing was performed at an antenna to EUT distance of 10 meters.

1.6 TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data is located on the parking lot of Rhein Tech Laboratories, Inc., 360 Herndon Parkway, Suite 1400 in Herndon, Virginia. This site has been fully described in a report dated June 24, 1996, submitted to and approved by the Federal Communication Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4 1992).

2.0 PRODUCT LABELING

FIGURE 1: FCC ID LABEL

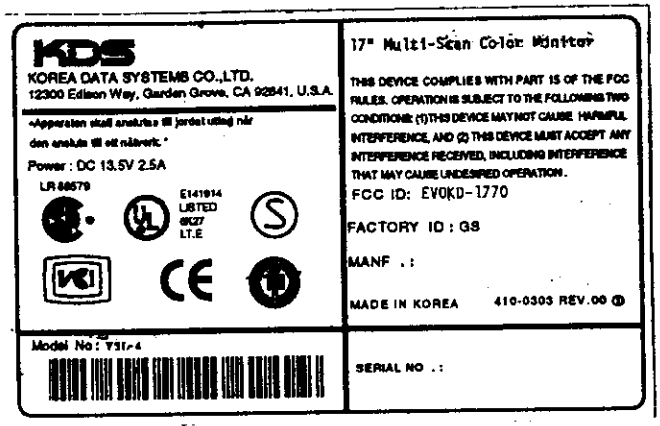
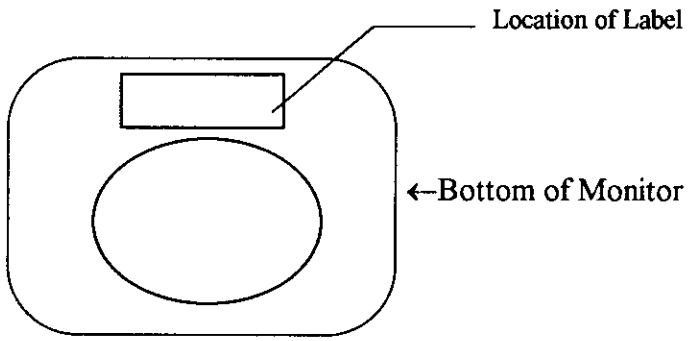


FIGURE 2: LOCATION OF LABEL ON EUT



3.0 SYSTEM TEST CONFIGURATION

3.1 JUSTIFICATION

The system was configured for testing in a typical fashion (as a customer would normally use it). Radiated and conducted emissions were investigated at 640 x 480, 800 x 600, 1024 x 768 and 1280 x 1024 modes. Worst case conducted and radiated emissions are presented in 640 X 480 @ 120Hz, 1280 X 1024 @ 85Hz and 1600 X 1200 @ 75Hz modes. CPU speed: 233 MHz.

The host computer was tested with the serial ports, parallel port, mouse port, and keyboard port attached to external peripherals. The monitor (EUT) was investigated as powered from the wall outlet since there is no auxiliary power outlet on the host computer.

3.2 EUT EXERCISE SOFTWARE

The EUT exercise program used during radiated and conducted testing has been designed to exercise the various system components in a manner similar to a typical use. The software, contained on the hard disk drive The program sequentially exercises each system component. 1) an H prints on the monitor,(2) an H prints on the printer 3) an H is sent to serial ports, 4) a file is read from the floppy diskette, 5) a file is read from the hard drive and any other hard drive present, 6) a file is read from the CD-ROM drive. In cases that implement the use of Universal Serial Bus (USB) ports, a looped batch program is initiated to render a continuous flow of data through the USB ports. The complete cycle takes less than one second and is repeated continually. Systems that utilize network cards are connected to a server and are configured to transmit and receive packets of data continuously. As the keyboard and mouse are strictly input devices, no data was transmitted to them during test. They are, however, continuously scanned for data input activity.

3.3 SPECIAL ACCESSORIES

All interface cables used for compliance testing are shielded. Additionally, the system power cord was shielded and the monitor (EUT) power cord was unshielded. The printer, monitor and modem feature integral metal hoods for shielding. The mouse and keyboard feature integral plastic hoods.

3.4 CONFORMANCE STATEMENT

I, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this attached test record. The modifications on the following page were made during testing to the equipment in order to achieve compliance with these standards.

Furthermore, there was no deviation from, additions to or exclusions from the ANSI 63.4 test methodology.

Signature: _____ Date: April 7, 1998

Typed/Printed Name: Bruno Clavier Position: Quality Manager (NVLAP Signatory)

NVLAP *Accredited by the National Voluntary Accreditation Program for the specific scope of accreditation under Lab Code 20061-0.*

Note: This report may not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

3.5 EQUIPMENT MODIFICATIONS

Statement of Manufacturer's Representative

Company Name	[illegible] Data Systems Co., Ltd
Representative's Name	[illegible] Lee
Product(Model Number)	17 Inch Monitor(KD-1770)
Date Tested	April 6, 1998

I hereby warrant that the test sample is [illegible] representative of the product to be marketed. That the test system configuration is representative of the product's intended use, and that the following modifications were made to the KD-1770 in order to comply with the standards described in the attached report.

1. Changed the capacitance of C245 from 0.1 uF to 10 uF.
2. Changed the resistor of R254,255,256 from 180 ohm to 680 ohm.
3. Added bead core on IC202 pin 1,3,5 [illegible]
4. Moved the ground position of C248,C[illegible] to the ground of CRT socket shortly.
5. Cut trace between IC202 pin 7 and [illegible]
6. Added 0.1 uF and 10 uF between the ground and heater, +80V line of LW801 each.
7. Added one ferrite core on G2 wire.
8. Added one ferrite core on W205, W203, W202, W206.
9. Connected one ground wire between CRT lug and D412 heat sink.
10. Connected one ground wire between D412 heat sink and neck shielded case.
11. Added fingers between neck shielded case and main shielded case.

Hwa Ryong Lee / Manager of R&D Center

6.0 CONDUCTED EMISSION DATA

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. If the conducted emissions exceed the average limit with the instrument set to the quasi-peak mode, then measurements are made in the average mode.

The conducted test was performed with the EUT exercise program loaded, and the emissions were scanned between 150 kHz to 30 MHz on the NEUTRAL SIDE and HOT SIDE, herein referred to as L1 and L2, respectively.

TABLE 1: CONDUCTED EMISSIONS 640 X 480 @120Hz

NEUTRAL SIDE (Line 1)

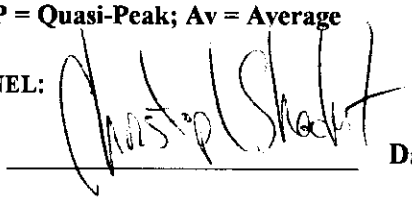
EMISSION FREQUENCY (MHz)	TEST DETECTOR	ANALYZER READING (dBuV)	SITE CORRECTION FACTOR (dB)	EMISSION LEVEL (dBuV)	EN55022 / CISPR22 QP(1) LIMIT (dBuV)	EN55022 / CISPR22 QP(1) MARGIN (dBuV)	EN55022 / CISPR22 AV(1) LIMIT (dBuV)	EN55022 / CISPR22 AV(1) MARGIN (dBuV)
0.154	Pk	55.5	0.9	56.4	65.8	-9.4	55.8	0.6
0.155	Qp	52.3	0.9	53.2	65.7	-12.5	55.7	-2.5
0.157	Av	42.9	0.9	43.8	65.6	-21.8	55.6	-11.8
0.217	Pk	47.0	0.8	47.8	62.9	-15.1	52.9	-5.1
0.280	Pk	42.2	0.7	42.9	60.8	-17.9	50.8	-7.9
0.340	Pk	36.4	0.7	37.1	59.2	-22.1	49.2	-12.1
0.402	Pk	33.4	0.6	34.0	57.8	-23.8	47.8	-13.8
0.464	Pk	31.6	0.6	32.2	56.6	-24.4	46.6	-14.4
13.548	Pk	27.2	3.0	30.2	60.0	-29.8	50.0	-19.8
24.941	Pk	33.9	4.0	37.9	60.0	-22.1	50.0	-12.1

HOT SIDE (Line 2)

EMISSION FREQUENCY (MHz)	TEST DETECTOR	ANALYZER READING (dBuV)	SITE CORRECTION FACTOR (dB)	EMISSION LEVEL (dBuV)	EN55022 / CISPR22 QP(1) LIMIT (dBuV)	EN55022 / CISPR22 QP(1) MARGIN (dBuV)	EN55022 / CISPR22 AV(1) LIMIT (dBuV)	EN55022 / CISPR22 AV(1) MARGIN (dBuV)
0.156	Pk	55.1	0.4	55.5	65.7	-10.2	55.7	-0.2
0.155	Qp	49.8	0.4	50.2	65.7	-15.5	55.7	-5.5
0.155	Av	42.4	0.4	42.8	65.7	-22.9	55.7	-12.9
0.218	Pk	46.6	0.5	47.1	62.9	-15.8	52.9	-5.8
0.341	Pk	35.9	0.6	36.5	59.2	-22.7	49.2	-12.7
0.402	Pk	33.0	0.6	33.6	57.8	-24.2	47.8	-14.2
0.522	Pk	28.8	0.6	29.4	56.0	-26.6	46.0	-16.6
13.305	Pk	26.9	3.4	30.3	60.0	-29.7	50.0	-19.7
24.933	Pk	34.7	4.5	39.2	60.0	-20.8	50.0	-10.8

[1]Pk = Peak; QP = Quasi-Peak; Av = Average

TEST PERSONNEL:

Signature:  **Date:** 4/6/98

Typed/Printed Name: Christopher Shackleton

TABLE 2: CONDUCTED EMISSIONS 1280 X 1024 @ 85HZ

NEUTRAL SIDE (Line 1)

EMISSION FREQUENCY (MHz)	TEST DETECTOR	ANALYZER READING (dBuV)	SITE CORRECTION FACTOR (dB)	EMISSION LEVEL (dBuV)	EN55022 / CISPR22 QP(1) LIMIT (dBuV)	EN55022 / CISPR22 QP(1) MARGIN (dBuV)	EN55022 / CISPR22 AV(1) LIMIT (dBuV)	EN55022 / CISPR22 AV(1) MARGIN (dBuV)
0.154	Qp	53.6	0.9	54.5	65.8	-11.3	55.8	-1.3
0.155	Pk	56.6	0.9	57.5	65.7	-8.2	55.7	1.8
0.155	Av	44.4	0.9	45.3	65.7	-20.4	55.7	-10.4
0.246	Pk	45.1	0.7	45.8	61.9	-16.1	51.9	-6.1
0.337	Pk	40.1	0.7	40.8	59.3	-18.5	49.3	-8.5
0.427	Pk	32.8	0.6	33.4	57.3	-23.9	47.3	-13.9
0.520	Pk	31.6	0.5	32.1	56.0	-23.9	46.0	-13.9
14.641	Pk	28.9	3.2	32.1	60.0	-27.9	50.0	-17.9
24.930	Pk	35.2	4.0	39.2	60.0	-20.8	50.0	-10.8

HOT SIDE (Line 2)

EMISSION FREQUENCY (MHz)	TEST DETECTOR	ANALYZER READING (dBuV)	SITE CORRECTION FACTOR (dB)	EMISSION LEVEL (dBuV)	EN55022 / CISPR22 QP(1) LIMIT (dBuV)	EN55022 / CISPR22 QP(1) MARGIN (dBuV)	EN55022 / CISPR22 AV(1) LIMIT (dBuV)	EN55022 / CISPR22 AV(1) MARGIN (dBuV)
0.154	Av	43.6	0.4	44.0	65.8	-21.8	55.8	-11.8
0.157	Pk	56.7	0.4	57.1	65.6	-8.5	55.6	1.5
0.157	Qp	51.7	0.4	52.1	65.6	-13.5	55.6	-3.5
0.246	Pk	43.8	0.5	44.3	61.9	-17.6	51.9	-7.6
0.339	Pk	39.6	0.6	40.2	59.2	-19.0	49.2	-9.0
0.427	Pk	32.7	0.6	33.3	57.3	-24.0	47.3	-14.0
0.519	Pk	31.9	0.6	32.5	56.0	-23.5	46.0	-13.5
14.170	Pk	28.5	3.5	32.0	60.0	-28.0	50.0	-18.0
24.929	Pk	35.2	4.5	39.7	60.0	-20.3	50.0	-10.3

[1]Pk = Peak; QP = Quasi-Peak; Av = Average

TEST PERSONNEL:

Signature: _____ **Date:** 4/6/98

Typed/Printed Name: Christopher Shackleton

TABLE 3: CONDUCTED EMISSIONS 1600 X 1200 @ 75Hz

NEUTRAL SIDE (Line 1)

EMISSION FREQUENCY (MHz)	TEST DETECTOR	ANALYZER READING (dBuV)	SITE CORRECTION FACTOR (dB)	EMISSION LEVEL (dBuV)	EN55022 / CISPR22 QP(1) LIMIT (dBuV)	EN55022 / CISPR22 QP(1) MARGIN (dBuV)	EN55022 / CISPR22 AV(1) LIMIT (dBuV)	EN55022 / CISPR22 AV(1) MARGIN (dBuV)
0.160	Av	43.6	0.9	44.5	65.5	-21.0	55.5	-11.0
0.161	Pk	55.1	0.9	56.0	65.4	-9.4	55.4	0.6
0.162	Qp	52.2	0.9	53.1	65.4	-12.3	55.4	-2.3
0.255	Pk	43.8	0.7	44.5	61.6	-17.1	51.6	-7.1
0.348	Pk	38.9	0.7	39.6	59.0	-19.4	49.0	-9.4
0.534	Pk	30.9	0.5	31.4	56.0	-24.6	46.0	-14.6
14.042	Pk	30.9	3.1	34.0	60.0	-26.0	50.0	-16.0
24.925	Pk	35.0	4.0	39.0	60.0	-21.0	50.0	-11.0

HOT SIDE (Line 2)

EMISSION FREQUENCY (MHz)	TEST DETECTOR	ANALYZER READING (dBuV)	SITE CORRECTION FACTOR (dB)	EMISSION LEVEL (dBuV)	EN55022 / CISPR22 QP(1) LIMIT (dBuV)	EN55022 / CISPR22 QP(1) MARGIN (dBuV)	EN55022 / CISPR22 AV(1) LIMIT (dBuV)	EN55022 / CISPR22 AV(1) MARGIN (dBuV)
0.160	Pk	55.8	0.4	56.2	65.5	-9.3	55.5	0.7
0.160	Qp	51.2	0.4	51.6	65.5	-13.9	55.5	-3.9
0.160	Av	43.4	0.4	43.8	65.5	-21.7	55.5	-11.7
0.253	Pk	42.9	0.5	43.4	61.7	-18.3	51.7	-8.3
0.349	Pk	39.6	0.6	40.2	59.0	-18.8	49.0	-8.8
0.440	Pk	31.9	0.6	32.5	57.1	-24.6	47.1	-14.6
0.534	Pk	30.8	0.6	31.4	56.0	-24.6	46.0	-14.6
13.840	Pk	29.7	3.5	33.2	60.0	-26.8	50.0	-16.8
24.926	Pk	34.6	4.5	39.1	60.0	-20.9	50.0	-10.9

(1)Pk = Peak; QP = Quasi-Peak; Av = Average

TEST PERSONNEL:

Signature: _____ **Date:** 4/6/98

Typed/Printed Name: Christopher Shackleton

7.0 RADIATED EMISSION DATA

The following data lists the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, plus the limit. Explanation of the Correction Factor is given in paragraph 7.1.

TABLE 4 RADIATED EMISSIONS 640 X 480 @ 120Hz

(Temperature: 53°, Humidity: 39%)

EMISSION FREQUENCY (MHz)	ANTENNA POLARITY (H/V)	ANALYZER READING (dBuV)	SITE CORRECTION FACTOR (dB/m)	EMISSION LEVEL (dBuV/m)	EN55022 / CISPR22 LIMIT (dBuV/m)	EN55022 / CISPR22 MARGIN (dBuV/m)
178.162	V	46.4	-24.4	22.0	30.0	-8.0
213.782	V	39.4	-22.5	16.9	30.0	-13.1
218.872	V	38.8	-22.2	16.6	30.0	-13.4
290.117	V	39.5	-20.2	19.3	37.0	-17.7
330.812	V	38.2	-17.6	20.6	37.0	-16.4
356.262	V	36.1	-16.8	19.3	37.0	-17.7

TABLE 5 RADIATED EMISSIONS 1280 X 1024 @ 85Hz

(Temperature: 49°, Humidity: 35%)

EMISSION FREQUENCY (MHz)	ANTENNA POLARITY (H/V)	ANALYZER READING (dBuV)	SITE CORRECTION FACTOR (dB/m)	EMISSION LEVEL (dBuV/m)	EN55022 / CISPR22 LIMIT (dBuV/m)	EN55022 / CISPR22 MARGIN (dBuV/m)
170.695	V	43.5	-25.1	18.4	30.0	-11.6
183.815	V	46.1	-24.2	21.9	30.0	-8.1
196.920	V	43.6	-23.9	19.7	30.0	-10.3
249.420	V	43.4	-20.3	23.1	37.0	-13.9
315.055	V	46.8	-18.1	28.7	37.0	-8.3
328.180	V	44.1	-17.7	26.4	37.0	-10.6
446.305	V	38.6	-14.2	24.4	37.0	-12.6

All readings are quasi-peak, unless stated otherwise. See Appendix B for Radiated Test Methodology.

TEST PERSONNEL:

Signature: _____ **Date:** 4/6/98

Typed/Printed Name: Christopher Shackleton

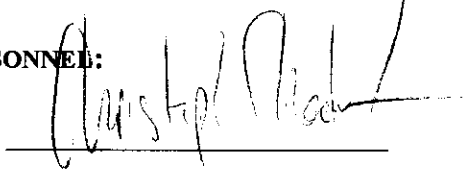
TABLE 6 RADIATED EMISSIONS 1600 X 1200 @ 75Hz

(Temperature: 45°, Humidity: 35%)

EMISSION FREQUENCY (MHz)	ANTENNA POLARITY (H/V)	ANALYZER READING (dBuV)	SITE CORRECTION FACTOR (dB/m)	EMISSION LEVEL (dBuV/m)	EN55022 / CISPR22 LIMIT (dBuV/m)	EN55022 / CISPR22 MARGIN (dBuV/m)
84.413	V	52.5	-28.4	24.1	30.0	-5.9
168.813	V	49.6	-25.4	24.2	30.0	-5.8
202.561	V	46.3	-23.9	22.4	30.0	-7.6
286.931	V	47.5	-20.3	27.2	37.0	-9.8
337.553	V	46.5	-17.1	29.4	37.0	-7.6
354.427	V	46.1	-16.8	29.3	37.0	-7.7
523.167	V	43.7	-11.6	32.1	37.0	-4.9

All readings are quasi-peak, unless stated otherwise. See Appendix B for Radiated Test Methodology.

TEST PERSONNEL:

Signature:  **Date:** 4/6/98

Typed/Printed Name: Christopher Shackleton

7.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FI(dBuV/m) = SAR(dBuV) + SCF(dB/m)$$

FI = Field Intensity
SAR = Spectrum Analyzer Reading
SCF = Site Correction Factor

The Site Correction Factor (SCF) used in the above equation is determined empirically, and is expressed in the following equation:

$$SCF(dB/m) = -PG(dB) + AF(dB/m) + CL(dB)$$

SCF = Site Correction Factor
PG = Pre-amplifier Gain
AF = Antenna Factor
CL = Cable Loss

The field intensity in microvolts per meter can then be determined according to the following equation:

$$FI(uV/m) = 10^{FI(dBuV/m)/20}$$

For example, assume a signal at a frequency of 125 MHz has a received level measured as 49.3 dBuV. The total Site Correction Factor (antenna factor plus cable loss minus preamplifier gain) for 125 MHz is -11.5 dB/m. The actual radiated field strength is calculated as follows:

$$49.3 \text{ dBuV} - 11.5 \text{ dB/m} = 37.8 \text{ dBuV/m}$$

$$10^{37.8/20} = 10^{1.89} = 77.6 \text{ uV/m}$$

8.0 PHOTOS OF TESTED EUT

The following photos are attached:

FIGURE 3	Front of Monitor
FIGURE 4	Right Side of Monitor
FIGURE 5	Left Side of Monitor
FIGURE 6	Back of Monitor, with Shield
FIGURE 7	Back of Monitor
FIGURE 8	Bottom of Monitor
FIGURE 9	Bottom Cover of Monitor
FIGURE 10	Bottom Side of Monitor
FIGURE 11	Bottom without Main Board
FIGURE 12	Back of Monitor, without Shield
FIGURE 13	Shield for Monitor
FIGURE 14	CRT
FIGURE 15	CRT Board, Component Side
FIGURE 16	CRT Board, Solder Side
FIGURE 17	Main Board, Component Side
FIGURE 18	Main Board, Solder Side

APPENDIX A: Emissions Equipment List

DESCRIPTION	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE	CAL. LAB
AMPLIFIER	HEWLETT PACKARD	11975A	2304A00348	1/14/98	1/14/99	TEST EQUITY
AMPLIFIER (S/A 1)	RHEIN TECH	PR-1040	N/A	12/8/97	12/8/98	RTL
AMPLIFIER (S/A 2)	RHEIN TECH	RTL2	N/A	11/16/97	11/16/98	RTL
AMPLIFIER (S/A 3)	RHEIN TECH	8447F	2944A03783	12/12/97	12/12/98	RTL
AMPLIFIER (S/A 4)	RHEIN TECH	8447D	2727A05397	12/8/97	12/8/98	RTL
BICONICAL/LOG ANTENNA 1	ANTENNA RESEARCH	LPB-2520	1037	12/30/97	12/30/98	LIBERTY LABS
BICONICAL/LOG ANTENNA 2	ANTENNA RESEARCH	LPB-2520	1036	1/16/98	1/16/99	LIBERTY LABS
FIELD SITE SOURCE	EMCO	4610	9604-1313	6/2/97	6/2/98	RTL
FILTER (ROOM 1)	SOLAR	8130	947305	8/15/97	8/15/98	RTL
FILTER (ROOM 2)	SOLAR	8130	947306	8/15/97	8/15/98	RTL
HARMONIC MIXER 1	HEWLETT PACKARD	11970K	2332A00563	11/27/96	11/27/98	TELOGY
HARMONIC MIXER 2	HEWLETT PACKARD	11970A	2332A01199	11/27/96	11/27/98	TELOGY
HORN ANTENNA 1	EMCO	3160-10	9606-1033	6/17/96	6/17/98	EMCO
HORN ANTENNA 2	EMCO	3160-9	9605-1051	6/17/96	6/17/98	EMCO
HORN ANTENNA 3	EMCO	3160-7	9605-1054	6/17/96	6/17/98	EMCO
HORN ANTENNA 4	EMCO	3160-8	9605-1044	6/17/96	6/17/98	EMCO
HORN ANTENNA 5	EMCO	3160-03	9508-1024	6/17/96	6/17/98	EMCO
LISN (ROOM 1/L1)	SOLAR	7225-1		8/15/97	8/15/98	ACUCAL
LISN (ROOM 1/L2)	SOLAR	7225-1		8/15/97	8/15/98	ACUCAL
LISN (ROOM 2/L1)	SOLAR	7225-1	900078	8/15/97	8/15/98	ACUCAL
LISN (ROOM 2/L2)	SOLAR	7225-1	900077	8/15/97	8/15/98	ACUCAL
PRE-AMPLIFIER	HEWLETT PACKARD	8449B OPT	3008A00505	1/8/98	1/8/00	TELOGY
QUASI-PEAK ADAPTER (S/A 1)	HEWLETT PACKARD	85650A	3145A01599	3/24/97	3/24/98	ACUCAL
QUASI-PEAK ADAPTER (S/A 2)	HEWLETT PACKARD	85650A	2811A01276	11/8/97	11/8/98	ACUCAL
QUASI-PEAK ADAPTER (S/A 3)	HEWLETT PACKARD	85650A	2521A00473	7/2/97	7/2/98	ACUCAL
QUASI-PEAK ADAPTER (S/A 4)	HEWLETT PACKARD	85650A	2521A01032	3/24/97	3/24/98	ACUCAL
RF PRESELECTOR (S/A 1)	HEWLETT PACKARD	85685A	3146A01309			ACUCAL
SIGNAL GENERATOR (HP)	HEWLETT PACKARD	8660C	1947A02956	3/26/97	3/26/98	ACUCAL
SIGNAL GENERATOR (WAVETEK)	WAVETEK	3510B	4952044	3/21/97	3/20/98	ACUCAL
SPECTRUM ANALYZER 1	HEWLETT PACKARD	8566B	3138A07771	8/28/97	8/28/98	ACUCAL
SPECTRUM ANALYZER 2	HEWLETT PACKARD	8567A	2841A00614	11/9/97	11/9/98	ACUCAL
SPECTRUM ANALYZER 4	HEWLETT PACKARD	8567A	2727A00535	11/8/97	11/6/98	ACUCAL
TUNABLE DIPOLE	EMCO	3121	274	1/19/98	1/19/99	LIBERTY LABS

APPENDIX B: Conducted and Radiated Test Methodology

CONDUCTED EMISSIONS MEASUREMENTS

The power line conducted emission measurements were performed in a Series 81 type shielded enclosure manufactured by Rayproof. The EUT was assembled on a wooden table 80 centimeters high. Power was fed to the EUT through a 50 ohm / 50 microhenry Line Impedance Stabilization Network (EUT LISN). The EUT LISN was fed power through an A.C. filter box on the outside of the shielded enclosure. The filter box and EUT LISN housing are bonded to the ground plane of the shielded enclosure. A second LISN, the peripheral LISN, provides isolation for the EUT test peripherals. This peripheral LISN was also fed A.C. power. A metal power outlet box, which is bonded to the ground plane and electrically connected to the peripheral LISN, powers the EUT host peripherals.

The spectrum analyzer was connected to the A.C. line through an isolation transformer. The 50-ohm output of the EUT LISN was connected to the spectrum analyzer input through a Solar 400 kHz high-pass filter. The filter is used to prevent overload of the spectrum analyzer from noise below 400 kHz. Conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The analyzer's 6 dB bandwidth was set to 9 kHz. No video filter less than 10 times the resolution bandwidth was used. Average measurements are performed in linear mode using a 10 kHz resolution bandwidth, a 1 Hz video bandwidth, and by increasing the sweep time in order to obtain a calibrated measurement. The emission spectrum was scanned from (150/450) kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in this report.

RADIATED EMISSIONS MEASUREMENTS

Before final measurements of radiated emissions were made on the open-field three/ten meter range, the EUT was scanned indoors at one meter and three meter distances if necessary in order to determine its emissions spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements on the open-field range, at each frequency, in order to insure that maximum emission amplitudes were attained.

Final radiated emissions measurements were made on the three/ten-meter, open-field test site. The EUT was placed on a nonconductive turntable approximately 0.8 meters above the ground plane. The spectrum was examined from 30 MHz to 1000 MHz using a Hewlett Packard 8566B spectrum analyzer, a Hewlett Packard 85650A quasi-peak adapter, and EMCO log periodic and biconical antenna. In order to gain sensitivity, a New Circuits ZHL-4240W preamplifier was connected in series between the antenna and the input of the spectrum analyzer.

At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters in order to determine the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarizations. The spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. No video filter less than 10 times the resolution bandwidth was used. When the dot clock or CPU clock exceeds 108 MHz, the EUT was tested between 1 to 2 Gigahertz in peak mode with the resolution bandwidth set at 1 MHz as stated in ANSI C63.4. The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

Note: Rhein Tech Laboratories, Inc. has implemented procedures to minimize errors that occur from test instruments, calibration, procedures, and test setups. Test instrument and calibration errors are documented from the manufacturer or calibration lab. Other errors have been defined and calculated within the Rhein Tech quality manual, section 6.1. Rhein Tech implements the following procedures to minimize errors that may occur: yearly as daily calibration methods, technician training, and emphasis to employees on avoiding error.