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:

TABLE 1: TESTED SYSTEM DETAILS

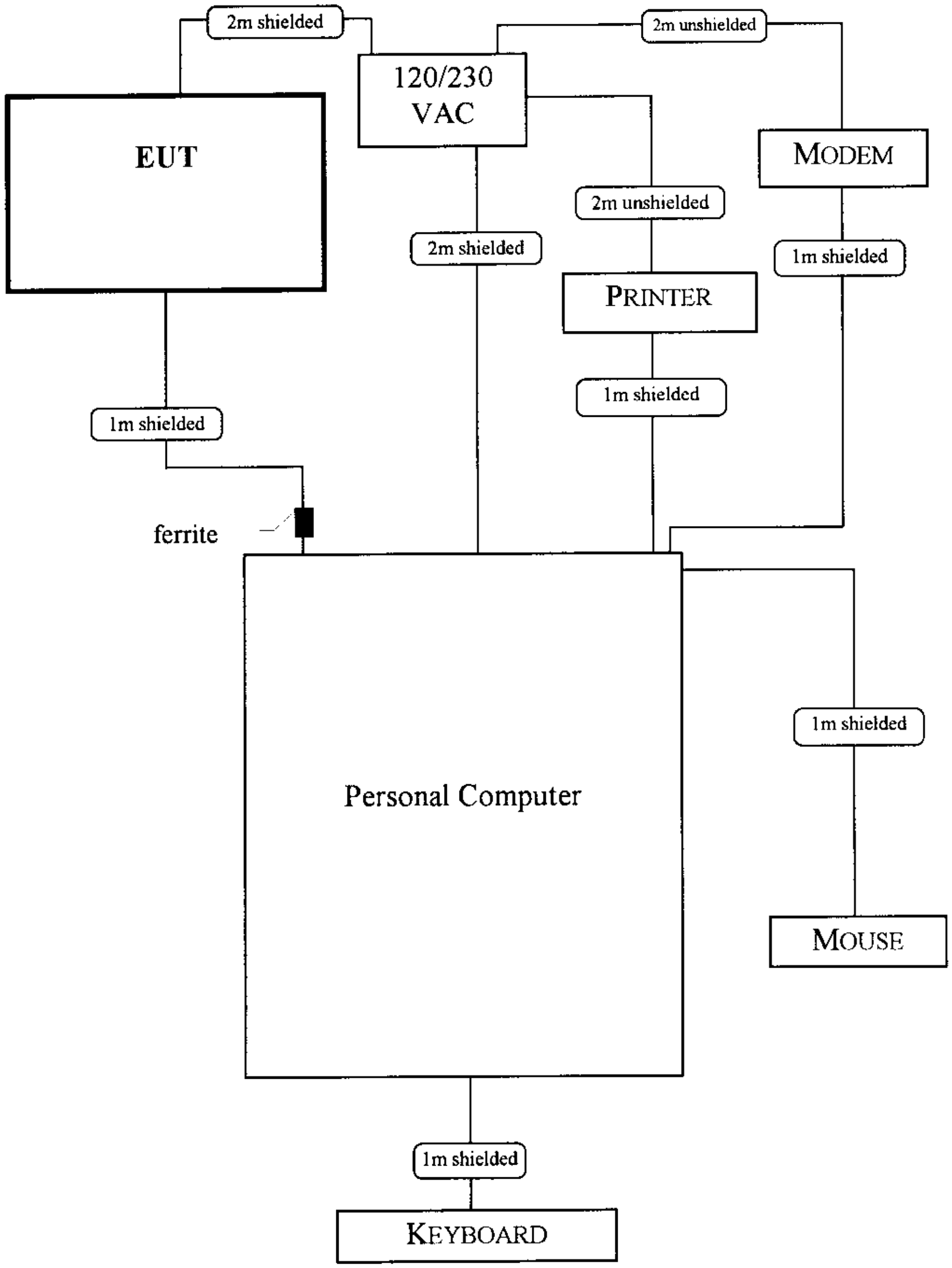
EXTERNAL COMPONENTS

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO	FCC ID	CABLE DESCRIPTIONS	RTL BAR CODE
KEYBOARD	MAXI SWITCH, INC.	219603-14-111	M907724746	D7J219603-XX	SHIELDED I/O	8873
MODEM	US ROBOTICS	0413	839032B86P9X3	DOC	SHIELDED I/O; UNSHIELDED POWER	900411
MONITOR	**KOREA DATA SYSTEMS, CO., LTD. (EUT)**	**KD-1900**	**N/A**	**EVOKD-1900**	**SHIELDED I/O, FERRITE ON COMPUTER END; SHIELDED POWER**	**8983**
MOUSE	MICROSOFT CORPORATION	INTELLIMOUSE 1.1A	01504624	C3KKMP5	SHIELDED I/O	8448
SYSTEM	GATEWAY 2000, INC.	HITMAN/BATC	0006555267	HWYMAP5200BATC	SHIELDED POWER	900495
PRINTER	EPSON	P880A	3BR1810257	BKMP880A	SHIELDED I/O; UNSHIELDED POWER	6714

INTERNAL COMPONENTS

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO	FCC ID	CABLE DESCRIPTIONS	RTL BAR CODE
CPU	INTEL	PENTIUM 233 MHZ	C803053W-0707	N/A	N/A	8737
FLOPPY DRIVE	PANASONIC	JU-256A2216P	00233033	N/A	INTERNAL RIBBON	8297
HARD DRIVE	QUANTUM	FIREBALL ST	853729147936G	N/A	INTERNAL RIBBON	8432
MOTHERBOARD	INTEL	HITMAN	GRCO124721H	N/A	INTERNAL RIBBON	900602
POWER SUPPLY	ASTEC	ATX 202-3515	N/A	N/A	SHIELDED I/O	7831
VIDEO CARD	STB SYSTEMS, INC.	RIVA 128	210-0274-001	DOC	SHIELDED I/O	7599

1.4 CONFIGURATION OF TESTED SYSTEM



1.6 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.

1.7 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).

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 in all video modes. Worst case conducted emissions are presented in 1600 x 1200 @ 75 Hz with D-SUB and BNC cables. Worst case radiated emissions are presented in 640 x 480 @ 120 Hz, 1280 x 1024 @ 85 Hz, and 1600 x 1200 @ 75 Hz, with both DSUB and BNC video cables.

The host computer was tested with all ports 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, 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 shielded. The end user is advised in the User's Manual that shielded cables are needed to maintain FCC Class B Compliance.

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 to the equipment during testing in order to achieve compliance with these standards.

Furthermore, there was no deviation from, additions to or exclusions from the ANSI C63.4 test methodology.

Signature: ____________________ Date: April 7, 1997

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.

Statement of Manufacturer's Representative

Company Name	Korea Data Systems Co.,Ltd.
Representative's Name	H.R.Lee
Product(Model Number)	19" Monitor(KD-1900)
Intended FCC ID	FVOKD-1900
Date Tested	[illegible] 1998

I hereby warrant that the test sample is 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-1900 in order to comply with the standards described in the attached report.

1. Changed the capacitance of C802 from 0.47uF to 0.22uF.
2. Added 0.22uF condenser in front of LF801.
3. Connected one ground wire between CRT lug and the ground of DC power switch PCB.
4. Changed BC204, bead core to 22uH peaking coil.
5. Moved the ground position of C237,C238 to the ground of CRT socket shortly.
6. Added bead core in front of R247, R248, R250 in serial.
7. Added bead core on R, G, B bias lines each.
8. Added two ground wires between CRT ground wire and neck shielded case.
9. Added one ferrite core on two focus wires.
10. Added one ferrite core on G2 wire.
11. Added 0.1uF and 0.001uF condensers between the ground and +5V, SW lines of W105 each.
12. Added 0.1uF and 0.01uF condensers between the ground and +8V, +80V lines of W206 each.
13. Added ferrite core on the wire to be connected W206.
14. Added fingers between Neck shielded case and main shielded case.
15. Added fingers between CRT chassis and CRT band.

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 2: CONDUCTED EMISSIONS 1600 X 1200 @75 HZ WITH BNC CABLE

NEUTRAL SIDE (Line 1)

EMISSION FREQUENCY (MHz)	TEST DETECTOR (1)	ANALYZER READING (dBuV)	SITE CORRECTION FACTOR (dB)	EMISSION LEVEL (dBuV)	EN55022 / CISPR22 QUASI PEAK LIMIT (dBuV)	EN55022 / CISPR22 QUASI PEAK MARGIN (dBuV)	EN55022 / CISPR22 AVERAGE LIMIT (dBuV)	EN55022 / CISPR22 AVERAGE MARGIN (dBuV)
0.163	Pk	55.1	0.9	56.0	65.3	-9.3	55.3	0.7
0.163	Av	49.2	0.9	50.1	65.3	-15.2	55.3	-5.2
0.163	Qp	52.3	0.9	53.2	65.3	-12.1	55.3	-2.1
0.255	Pk	45.3	0.7	46.0	61.6	-15.6	51.6	-5.6
0.349	Pk	38.7	0.7	39.4	59.0	-19.6	49.0	-9.6
0.444	Pk	27.6	0.6	28.2	57.0	-28.8	47.0	-18.8
0.538	Pk	27.0	0.5	27.5	56.0	-28.5	46.0	-18.5
0.630	Pk	24.7	0.6	25.3	56.0	-30.7	46.0	-20.7

HOT SIDE (Line 2)

EMISSION FREQUENCY (MHz)	TEST DETECTOR (1)	ANALYZER READING (dBuV)	SITE CORRECTION FACTOR (dB)	EMISSION LEVEL (dBuV)	EN55022 / CISPR22 QUASI PEAK LIMIT (dBuV)	EN55022 / CISPR22 QUASI PEAK MARGIN (dBuV)	EN55022 / CISPR22 AVERAGE LIMIT (dBuV)	EN55022 / CISPR22 AVERAGE MARGIN (dBuV)
0.162	Pk	54.2	0.4	54.6	65.4	-10.8	55.4	-0.8
0.162	Av	48.2	0.4	48.6	65.4	-16.8	55.4	-6.8
0.162	Qp	51.6	0.4	52.0	65.4	-13.4	55.4	-3.4
0.256	Pk	45.7	0.5	46.2	61.6	-15.4	51.6	-5.4
0.349	Pk	40.0	0.6	40.6	59.0	-18.4	49.0	-8.4
0.444	Pk	26.6	0.6	27.2	57.0	-29.8	47.0	-19.8
0.538	Pk	27.9	0.6	28.5	56.0	-27.5	46.0	-17.5
0.631	Pk	20.7	0.6	21.3	56.0	-34.7	46.0	-24.7

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

TEST PERSONNEL:

Signature: ______________________ **Date:** 3/30/98

Typed/Printed Name: Jon Wilson

TABLE 3: CONDUCTED EMISSIONS 1600 X 1200 @ 75Hz WITH D-SUB CABLE

NEUTRAL SIDE (Line 1)

EMISSION FREQUENCY (MHz)	TEST DETECTOR (1)	ANALYZER READING (dBuV)	SITE CORRECTION FACTOR (Db)	EMISSION LEVEL (dBuV)	EN55022 / CISPR22 QUASI PEAK LIMIT (dBuV)	EN55022 / CISPR22 QUASI PEAK MARGIN (dBuV)	EN55022 / CISPR22 AVERAGE LIMIT (dBuV)	EN55022 / CISPR22 AVERAGE MARGIN (dBuV)
0.157	Pk	53.1	0.2	53.3	65.6	-12.3	55.6	-2.3
0.157	Qp	60.8	0.2	61.0	65.6	-4.6	55.6	5.4
0.157	Av	49.4	0.2	49.6	65.6	-16.0	55.6	-6.0
0.252	Pk	42.2	0.3	42.5	61.7	-19.2	51.7	-9.2
0.342	Pk	43.9	0.2	44.1	59.2	-15.1	49.2	-5.1
0.439	Pk	37.9	0.3	38.2	57.1	-18.9	47.1	-8.9
0.531	Pk	34.0	0.3	34.3	56.0	-21.7	46.0	-11.7
20.070	Pk	23.9	3.1	27.0	60.0	-33.0	50.0	-23.0

HOT SIDE (Line 2)

EMISSION FREQUENCY (MHz)	TEST DETECTOR (1)	ANALYZER READING (dBuV)	SITE CORRECTION FACTOR (dB)	EMISSION LEVEL (DbuV)	EN55022 / CISPR22 QUASI PEAK LIMIT (dBuV)	EN55022 / CISPR22 QUASI PEAK MARGIN (dBuV)	EN55022 / CISPR22 AVERAGE LIMIT (dBuV)	EN55022 / CISPR22 AVERAGE MARGIN (dBuV)
0.157	Pk	54.0	0.2	54.2	65.7	-11.5	55.7	-1.5
0.157	Qp	60.6	0.2	60.8	65.6	-4.8	55.6	5.2
0.157	Av	50.7	0.2	50.9	65.6	-14.7	55.6	-4.7
0.250	Pk	50.5	0.3	50.8	61.8	-11.0	51.8	-1.0
0.250	Qp	53.9	0.3	54.2	61.8	-7.6	51.8	2.4
0.250	Av	42.7	0.3	43.0	61.8	-18.8	51.8	-8.8
0.343	Pk	39.7	0.3	40.0	59.1	-19.1	49.1	-9.1
0.437	Pk	36.9	0.3	37.2	57.1	-19.9	47.1	-9.9
0.532	Pk	30.2	0.3	30.5	56.0	-25.5	46.0	-15.5
11.240	Pk	24.4	2.3	26.7	60.0	-33.3	50.0	-23.3

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

TEST PERSONNEL:

Signature: ______________________ **Date:** 3/27/98

Typed/Printed Name: Jon Wilson

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 @ 120 HZ WITH BNC CABLE

(Temperature: 81°F, Humidity: 22%)

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)
50.961	H	42.5	-23.8	18.7	30.0	-11.3
140.019	H	41.4	-27.9	13.5	30.0	-16.5
182.425	H	43.1	-27.0	16.1	30.0	-13.9
216.361	H	40.4	-25.2	15.2	30.0	-14.8
280.075	H	41.8	-22.5	19.3	37.0	-17.7
301.245	H	38.4	-21.8	16.6	37.0	-20.4

TABLE 5: RADIATED EMISSIONS 1280 X 1024 @ 85 HZ WITH BNC CABLE

(Temperature: 81°F, Humidity: 22%)

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)
65.695	V	53.4	-28.9	24.5	30.0	-5.5
118.254	V	43.3	-25.2	18.1	30.0	-11.9
288.823	H	41.3	-22.5	18.8	37.0	-18.2
367.572	V	38.0	-20.1	17.9	37.0	-19.1
420.060	V	40.0	-18.3	21.7	37.0	-15.3
538.158	V	37.3	-15.8	21.5	37.0	-15.5

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

TEST PERSONNEL:

Signature: ____________ **Date:** 3/30/98

Typed/Printed Name: Jon Wilson

TABLE 6: RADIATED EMISSIONS 1600 X 1200 @ 75 HZ WITH BNC CABLE

(Temperature: 92°F, Humidity: 12%)

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)
50.720	V	43.8	-23.7	20.1	30.0	-9.9
118.194	V	43.1	-25.2	17.9	30.0	-12.1
201.003	V	43.3	-26.6	16.7	30.0	-13.3
354.353	V	42.7	-20.5	22.2	37.0	-14.8
427.961	V	38.7	-18.4	20.3	37.0	-16.7
523.038	V	38.5	-16.6	21.9	37.0	-15.1

TABLE 7: RADIATED EMISSIONS 640 X 480 @ 120 HZ WITH D-SUB CABLE

(Temperature: 90°F, Humidity: 30%)

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)
114.579	H	42.1	-25.3	16.8	30.0	-13.2
182.434	H	44.2	-27.0	17.2	30.0	-12.8
216.345	H	40.1	-25.2	14.9	30.0	-15.1
224.819	V	42.2	-24.9	17.3	30.0	-12.7
271.465	H	38.7	-22.1	16.6	37.0	-20.4
301.139	H	38.0	-21.8	16.2	37.0	-20.8

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

TEST PERSONNEL:

Signature: ______________ **Date:** 3/30/98

Typed/Printed Name: Jon Wilson

TABLE 8: RADIATED EMISSIONS 1280 X 1024 @ 85 HZ WITH D-SUB CABLE

(Temperature: 63°F, Humidity: 55%)

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)
65.707	V	50.6	-27.7	22.9	30.0	-7.1
118.165	V	45.1	-24.0	21.1	30.0	-8.9
131.314	H	39.3	-24.6	14.7	30.0	-15.3
288.790	V	39.9	-20.2	19.7	37.0	-17.3
446.360	H	40.0	-14.2	25.8	37.0	-11.2
472.575	V	43.4	-11.8	31.6	37.0	-5.4
498.825	V	37.3	-11.4	25.9	37.0	-11.1
538.200	V	37.8	-11.3	26.5	37.0	-10.5

TABLE 9: RADIATED EMISSIONS 1600 X 1200 @ 75 HZ WITH D-SUB CABLE

(Temperature: 63°F, Humidity: 55%)

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)
50.688	V	41.9	-22.9	19.0	30.0	-11.0
84.440	V	51.7	-28.4	23.3	30.0	-6.7
118.192	V	48.3	-24.0	24.3	30.0	-5.7
202.572	V	47.8	-23.9	23.9	30.0	-6.1
286.976	V	43.5	-20.3	23.2	37.0	-13.8
303.852	V	39.5	-18.9	20.6	37.0	-16.4
320.728	V	42.0	-17.7	24.3	37.0	-12.7
354.461	V	40.5	-16.8	23.7	37.0	-13.3
405.082	H	46.4	-14.6	31.8	37.0	-5.2
438.858	H	41.9	-14.2	27.7	37.0	-9.3
455.722	H	37.9	-13.2	24.7	37.0	-12.3
472.780	H	42.3	-11.8	30.5	37.0	-6.5
479.139	H	43.2	-12.2	31.0	37.0	-6.0
489.505	H	43.2	-12.2	31.0	37.0	-6.0
500.225	V	42.3	-11.4	30.9	37.0	-6.1
523.224	V	37.4	-11.6	25.8	37.0	-11.2
556.979	H	36.8	-11.2	25.6	37.0	-11.4
675.113	V	36.2	-9.8	26.4	37.0	-10.6

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

TEST PERSONNEL:

Signature: ______________________ **Date:** 3/30/98

Typed/Printed Name: Jon Wilson

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:

APPENDIX A: Emissions Equipment List

TABLE 10: Emissions Equipment List

DESCRIPTION	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. LAB
Amplifier	Hewlett Packard	11975A	2304A00348	TEST EQUITY
Amplifier (s/a 1)	Rhein Tech	PR-1040	N/A	RTL
Amplifier (s/a 2)	Rhein Tech	RTL2	N/A	RTL
Amplifier (s/a 3)	Rhein Tech	8447F	2944A03783	RTL
Amplifier (s/a 4)	Rhein Tech	8447D	2727A05397	RTL
Biconical/Log Antenna 1	Antenna Research	LPB-2520	1037	LIBERTY LABS
Biconical/Log Antenna 2	Antenna Research	LPB-2520	1036	LIBERTY LABS
Field Site Source	EMCO	4610	9604-1313	RTL
Filter (Room 1)	Solar	8130	947305	RTL
Filter (Room 2)	Solar	8130	947306	RTL
Harmonic Mixer 1	Hewlett Packard	11970K	2332A00563	TELOGY
Harmonic Mixer 2	Hewlett Packard	11970A	2332A01199	TELOGY
Horn Antenna 1	EMCO	3160-10	9606-1033	EMCO
Horn Antenna 2	EMCO	3160-9	9605-1051	EMCO
Horn Antenna 3	EMCO	3160-7	9605-1054	EMCO
Horn Antenna 4	EMCO	3160-8	9605-1044	EMCO
Horn Antenna 5	EMCO	3160-03	9508-1024	EMCO
LISN (Room 1/L1)	Solar	7225-1	N/A	ACUCAL
LISN (Room 1/L2)	Solar	7225-1	N/A	ACUCAL
LISN (Room 2/L1)	Solar	7225-1	900078	ACUCAL
LISN (Room 2/L2)	Solar	7225-1	900077	ACUCAL
Pre-Amplifier	Hewlett Packard	8449B OPT	3008A00505	TELOGY
Quasi-Peak Adapter (S/A 1)	Hewlett Packard	85650A	3145A01599	ACUCAL
Quasi-Peak Adapter (S/A 2)	Hewlett Packard	85650A	2811A01276	ACUCAL
Quasi-Peak Adapter (S/A 3)	Hewlett Packard	85650A	2521A00473	ACUCAL
Quasi-Peak Adapter (S/A 4)	Hewlett Packard	85650A	2521A01032	ACUCAL
RF Preselector (S/A 1)	Hewlett Packard	85685A	3146A01309	ACUCAL
Signal Generator (HP)	Hewlett Packard	8660C	1947A02956	ACUCAL
Signal Generator (Wavetek)	Wavetek	3510B	4952044	ACUCAL
Spectrum Analyzer 1	Hewlett Packard	8566B	3138A07771	ACUCAL
Spectrum Analyzer 2	Hewlett Packard	8567A	2841A00614	ACUCAL
Spectrum Analyzer 4	Hewlett Packard	8567A	2727A00535	ACUCAL
Tunable Dipole	EMCO	3121	274	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 (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, 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 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 any 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 well as daily calibration methods, technician training, and emphasis to employees on avoiding error.