NATIONAL CERTIFICATION LABORATORY

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FCC REPORT OF RADIO INTERFERENCE

for

GVC International U.S.A., Inc.
6262 Katella Avenue
Cypress, California 90630

EPIQ-742 Pentium PC

FCC ID: PB3EPIQ-742

July 14, 2000

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NCL PROJ.# GVC-547

1.0 Introduction

This report has been prepared on behalf of GVC International U.S.A., Inc., to support the FCC Certification of a Part 15 Class "B" Digital Device. The Equipment Under Test was the GVC International U.S.A., Inc. EPIQ-742 Pentium PC.

Radio-Noise Emissions tests were performed according to the ANSI C63.4- 1992, Chapter 11 titled "Measurement of Information Technology Equipment". The measuring equipment conforms to ANSI C63.2 Specifications for electromagnetic Noise and Field Strength-Instrumentation.

Test was performed at National Certification Laboratory in Ellicott City, MD. Site description and site attenuation data have been placed on file with the FCC's sampling and Measurements Branch. FCC acceptance was granted on May 26, 1993.

1.1 Summary

The GVC International U.S.A., Inc. EPIQ-742 Pentium PC complies with the limits for Class "B" Digital Device.

2.0 Description of Equipment Under Test (EUT)

The EUT Features:

MICRO-PROCESSORS	**CLOCK SPEEDS**
Intel Celeron	66-133 MHz
OTHERS	**OSCILLATORS**
3 PCI Slots	Motherboard:
2 USB Ports	
2 DIMM Sockets	32.768 KHz
2 Serial Ports	14.318 MHz
1 Parallel Port	24.576 MHz
IDE/FDD Controllers	
Audio/Game Ports	
AGP Video Port	
52X CD ROM	
ATX Form	

2.1 EMI Countermeasure

The following modifications were made to the EUT, by the project engineer to assure compliance to Class “B” specifications:

None.

3.0 Test Program

The EUT was tested with a program written to send a continuous stream of "H's" to the video, serial, and parallel ports of the computer. Worst case emissions are recorded in the data tables.

BASIC program used:

```
10    FOR N=1 TO 35
15    FOR M=1 TO 80
20    PRINT “h”;:
25    NEXT M
30    NEXT N
40    OPEN “COM1:1200, E, 7, 1, CSO, DOS” FOR OUTPUT AS #1
50    OPEN “COM2:1200, E, 7, 1, CSO, DOS” FOR OUTPUT AS #2
52    FOR I=1 TO 160
54    PRINT #1, “H”;:
56    PRINT #2, “H”;:
58    NEXT I
60    FOR J=1 TO 80
65    LPRINT “H”;:
70    NEXT J
75    CLOSE
80    GOTO 10
```

4.0 Test Configuration

The computer system and support equipment were setup on the test table in a manner that follows the general guidelines of ANSI C63.4, Section 6.2.1. The support equipment consisted of a keyboard, video monitor, printer, mouse and modem, mic., speaker, and joystick, as prescribed in Section 11.2 (ANSI C63.4). The computer was centered on the table with it's rear flush with the rear of the table.

The video monitor was placed 10 cm from the right side of the computer with it's front flush with the front of the EUT. The modem was placed 10 cm from the right side of the video monitor, while the printer was set on the opposite side of the computer also 10 cm away. The keyboard was placed in front of the monitor, flush with the front of the test table. All other equipment such as mouse, speaker, mic., joystick were placed in the front part of table on either side of the keyboard, maintaining 10 cm spacing.

Serial, video and parallel I/O cables were draped over the back edge of the table, and the keyboard and mouse cables were placed on top of the table. Cables were more than 40 cm from the ground plane during radiated and conducted tests. The video monitor was powered from the computer's auxiliary 120 VAC IEC connector, which produced worst-case radiated emissions.

Photographs and interconnection diagrams are provided in Exhibit 1.

5.0 Conducted Emissions Scheme

The EUT is placed on an 80 cm high 1 X 1.5 meter non-conductive table. Power to the CPU is provided through a Solar Corporation 50 Ω/50 μH line Impedance Stabilization Network bonded to a 2.2 X 2 meter horizontal ground plane, and a 2.2 X 2 meter vertical ground plane. The LISN has its AC input supplied from filtered AC power source. A separate LISN provides AC power to the peripheral equipment. I/O cables are moved about to obtain maximum emissions.

The 50Ω output of the LISN is connected to the input of the spectrum analyzer and emissions in the frequency range of 450 kHz to 30 MHz are searched. The detector function is set to quasi-peak and the resolution bandwidth is set at 9 kHz, with all post-detector filtering no less than 10 times the resolution bandwidth for final measurements. All emissions within 20 dB of the limit are recorded in the data tables.

6.0 Radiated Emissions Scheme

The EUT was initially scanned in the frequency range 30 to 2000 MHz indoor at a distance of 1 meter to determine its emissions profile. The EUT was then placed on an 80 cm high 1 x1.5 meter non-conductive motorized turntable for radiated testing on the 3-meter open area test site. The emissions from the EUT are measured continuously at every azimuth by rotating the turntable. Biconical, horn, and log periodic broadband antennas are mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna is varied between 1 to 4 meters. Cables are varied in position to produce maximum emissions. Both the horizontal and vertical field components are measured.

Measurements from 30-1000 MHz: The output from the antenna is connected to the input of the spectrum analyzer. The detector function is set to quasi-peak. The resolution bandwidth of the spectrum analyzer system is set at 120 kHz for the range 30-1000 MHz with all post-detector filtering no less than 10 times the resolution bandwidth.

Measurements from 1-2 GHz: The output from the horn antenna is connected to the input of a 30 dB pre-Amp, which is in turn attached to the spectrum analyzer. The detector function is set to Peak. The resolution bandwidth of the spectrum analyzer system is set at 1 MHz for the range 1-2 GHz. All emissions within 10 dB of the limit are recorded in the data tables.

To convert the spectrum analyzer reading into a quantified E-field level to allow comparison with the FCC limits. It is necessary to account for various calibration factors. These factors include cable loss (CL) and antenna factors (AF). The AF/CL in dB/m is algebraically added to the Spectrum Analyzer voltage in dBµV/m. This level is then compared with the FCC limit.

EXAMPLE:

Spectrum Analyzer Volt:	VdBµV
Composite factor:	AF/CLdB/m
Electric Field:	EdBµV/m= VdBµV + AF/CLdB/m
Linear Conversion:	EµV/m= Antilog (EdBµV/m/20)

FCC CLASS "B" CONDUCTED EMISSIONS DATA

CLIENT: GVC International U.S.A., Inc.
EUT: EPIQ-742
CPU: Intel Celeron
CLOCK 600 MHz
MODE:

LINE 1-Neutral: Quasi-Peak Level **Date: 07/13/2000**

FREOUENCY MHz	SPEC. Ana. dBuV	Calc. Volt. uV	FCC LIMIT uV	MARGIN dB	CONDITION
0.51	32.80	43.65	250.00	15.16	PASS
6.20	28.80	27.54	250.00	19.16	PASS
22.90	29.00	28.18	250.00	18.96	PASS
28.20	29.90	31.26	250.00	18.06	PASS
29.40	30.70	34.28	250.00	17.26	PASS

LINE 2-Phase: Quasi-Peak Level

FREOUENCY MHz	SPEC. Ana. dBuV	Calc. Volt. uV	FCC LIMIT uV	MARGIN dB	CONDITION
0.58	32.40	41.69	250.00	15.56	PASS
2.10	36.00	63.10	250.00	11.96	PASS
22.90	27.20	22.91	250.00	20.76	PASS
28.20	28.30	26.00	250.00	19.66	PASS
29.40	28.80	27.54	250.00	19.16	PASS

TEST ENGINEER:

Brian Haghtalab

FCC CLASS "B" RADIATED EMISSIONS DATA

CLIENT: GVC International U.S.A., Inc.
EUT: EPIQ-742
CPU: Intel Celeron
CLOCK 600 MHz
MODE:

3 METER TEST Quasi-Peak Level DATE: 07/13/2000

FREQUENCY MHz	POLARITY HORIZ.	POLARITY VERT.	SPEC A dBuV	AF/CL dB/m	E-FIELD dBuV/m	E-FIELD uV/m	LIMIT uV/m	MARGIN dB	CONDITION
36.05		V	18.40	15.30	33.70	48.42	100.00	6.30	PASS
144.00	H		22.60	14.40	37.00	70.79	150.00	6.52	PASS
149.96	H		20.20	14.80	35.00	56.23	150.00	8.52	PASS
161.96	H		20.40	15.60	36.00	63.10	150.00	7.52	PASS
167.96	H		20.40	15.60	36.00	63.10	150.00	7.52	PASS
173.95	H		20.20	15.80	36.00	63.10	150.00	7.52	PASS
179.93	H		21.20	16.60	37.80	77.62	150.00	5.72	PASS
185.94	H		20.00	16.80	36.80	69.18	150.00	6.72	PASS
191.89	H		21.80	17.00	38.80	87.10	150.00	4.72	PASS
305.90			17.60	14.90	32.50	42.17	200.00	13.52	PASS
501.30			20.60	18.10	38.70	86.10	200.00	7.32	PASS
700.89			20.60	21.60	42.20	128.82	200.00	3.82	PASS
898.48			17.80	23.80	41.60	120.23	200.00	4.42	PASS

TEST ENGINEER:

Brian Haghtalab

Table 1

Support Equipment

MANUFACTURER	FCC ID #	SERIAL #
MONITOR: Samsung CVB4917 SVGA	A3LCVB491	H2EB802157
SERIAL DEVICE: US Robotics 2400B Modem	CJE794COURIER2400	30-039207
PARALLEL DEVICE: Epson T-1000 Printer	BKM9A8P7ORA	OAOO59174
KEYBOARD: Fujitsu	C9S4D5KB4700	None
SERIAL MOUSE: Logitech	DZL6QBC	48ULTSL1901
AUDIO/GAME DEVICES Speakers/Mic./Joystick		

Table 2

Interface Cables Used

EUT to Printer	1.5 meter bundled to 1 meter in length - shielded
EUT to Modem	1 meter in length – shielded
Modem (connected to telephone jack)	Standard RJ-11 cable bundled to 40 cm unshielded
EUT Power	Shielded 120 VAC power cord
All other I/O cables such as monitor, keyboard, mouse are permanently attached to the peripherals - presume shielded.	
Note: 2 USB cables are attached to the USB connectors of the EUT.	

Table 3

Measurement Equipment Used

The following equipment is used to perform measurements:

EQUIPMENT	SERIAL NUMBER
Wavetek 2410A 1100 MHz Signal Generator	1362016
EMCO Model 3110 Biconical Antenna	1619
EMCO Model 3146 Log Periodic Antenna	1222
Antenna Research LPD-3500 Log Antenna	1005
Advantest Model R4131D Spectrum Analyzer	54378A
Solar 8012-50-R-24-BNC LISN	927230
4 Meter Antenna Mast	None
Motorized Turntable	None
RG-233U 50 ohm coax Cable	None

EXHIBIT 1

EUT PHOTOGRAPHS

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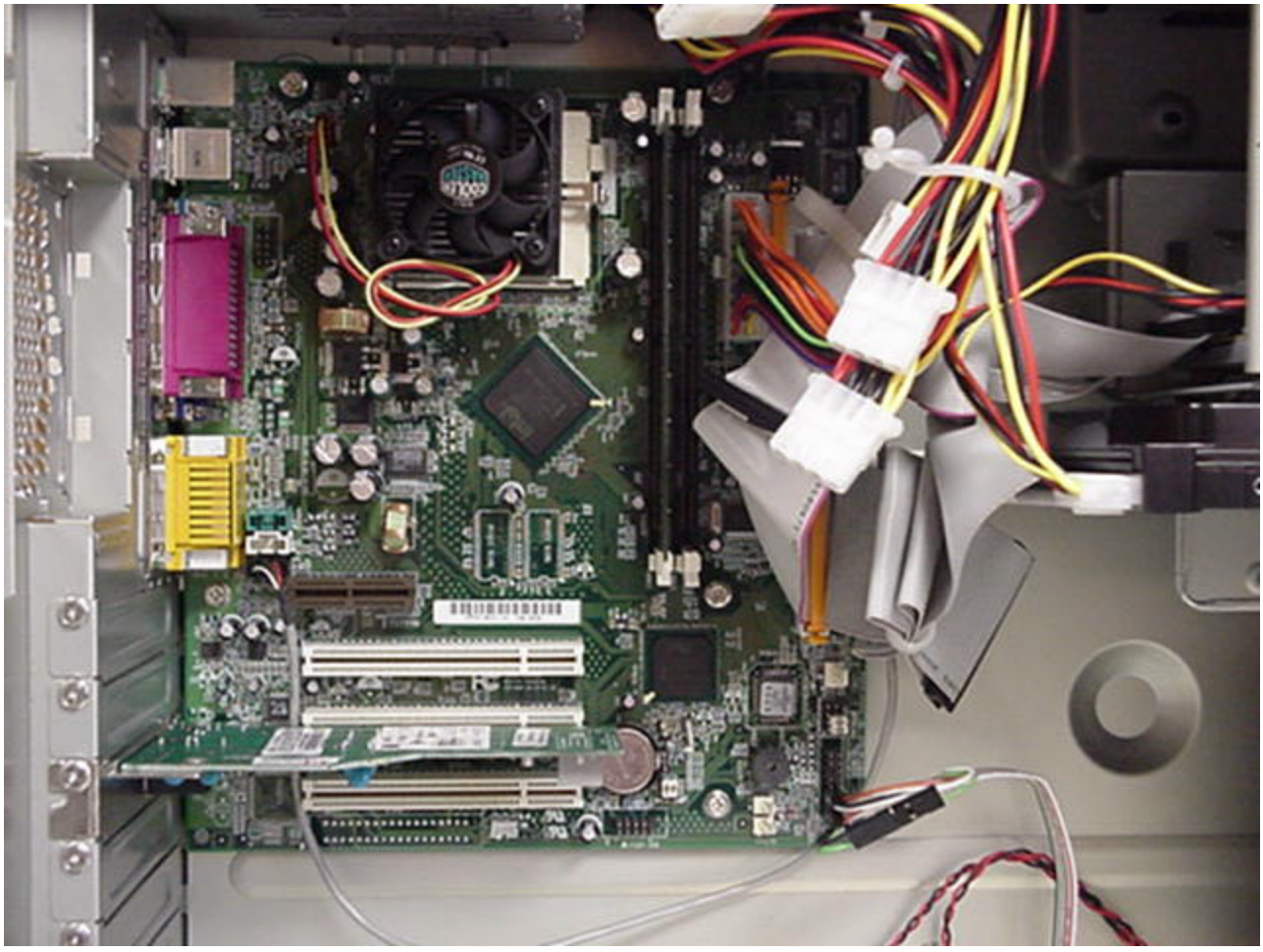

MAXIMUM RADIATED EMISSIONS CONFIGURATION

TEST CONFIGURATION

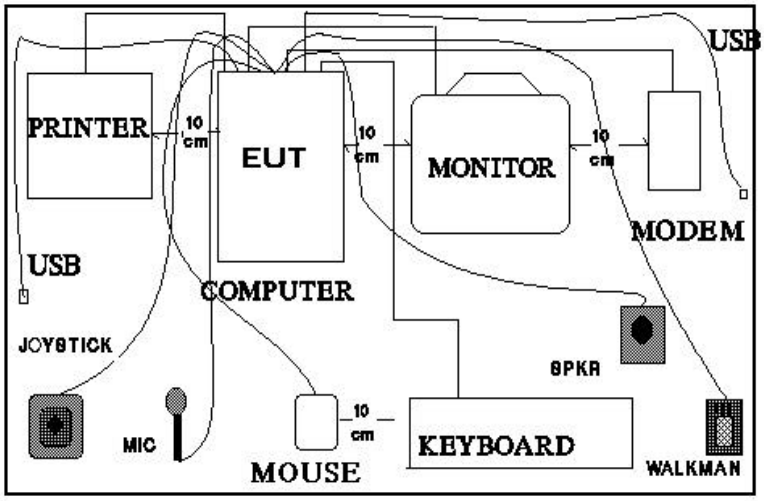

EXHIBIT 2

USER MANUAL STATEMENT

Each computing device which has been Certified as complying with the Class B limits, shall have the following statement printed in the User Manual:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.
-- Increase the separation between the equipment and receiver.
-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-- Consult the dealer or an experienced radio/TV technician for help.

EXHIBIT 3

Class "B" Labeling Format

FCC ID: PB3EPIQ-742
This device complies with Part 15 of FCC Rules: Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.