DELL COMPUTER CORPORATION TEST REPORT

FOR THE

USB 2-PORT HUB KEYBOARD, RT7D10

FCC PART 15 SUBPART B CLASS B & CISPR 22 CLASS B COMPLIANCE

DATE OF ISSUE: SEPTEMBER 6, 2000

PREPARED FOR:

Dell Computer Corporation
One Dell Way
Round Rock, TX 78682

P.O. No: PQ011815
W.O. No: 74915

PREPARED BY:

Mary Ellen Clayton
CKC Laboratories, Inc.
5473A Clouds Rest
Mariposa, CA 95338

Date of test: August 28, 2000

Report No: FC00-057

DOCUMENTATION CONTROL:

Tracy Phillips
Documentation Control Supervisor
CKC Laboratories, Inc.

APPROVED BY:

Dennis Ward
Director of Laboratories
CKC Laboratories, Inc.

TABLE OF CONTENTS

CKC Laboratories, Inc. has Certificates of Accreditation from the following agencies:
DATech (Germany); A2LA (USA); FCC (USA); VCCI (Japan); BSMI (Taiwan); HOKLAS (Hong Kong).
CKC Laboratories, Inc. has Letters of Acceptance through an MRA for the following agencies:
ACA/NATA (Australia); SABS (South Africa); SWEDAC (Sweden); TUV Rheinland-Germany; TUV Rheinland-Korea; TUV Rheinland-Russia; Radio Communications Agency (RA); NEMKO (Norway).

ADMINISTRATIVE INFORMATION

DATE OF TEST:	August 28, 2000
DATE OF RECEIPT:	August 28, 2000
PURPOSE OF TEST:	To demonstrate the compliance of the USB 2-Port Hub Keyboard, RT7D10, with the requirements for FCC Part 15 Subpart B Class B & CISPR 22 Class B devices.
MANUFACTURER:	NMB Technologies Corporation 9730 Independence Avenue Chatsworth, CA 91311
REPRESENTATIVE:	Bob Dickerman
TEST LOCATION:	CKC Laboratories, Inc. 110 Olinda Place Brea, CA 92621
TEST PERSONNEL:	Eddie Wong
TEST METHOD:	ANSI C63.4 1992
FREQUENCY RANGE TESTED:	150 kHz - 1000 MHz
EQUIPMENT UNDER TEST:	**USB 2-Port Hub Keyboard** Manuf: NMB Technologies Corporation Model: RT7D10 Serial: N/A FCC ID: AQ6-7D10

SUMMARY OF RESULTS

The Dell Computer Corporation USB 2-Port Hub Keyboard, RT7D10, was tested in accordance with ANSI C63.4 1992 for compliance with the Class B requirements of FCC Part 15 Subpart B & CISPR 22 rules.

As received, the above equipment was found to be fully compliant with the Class B limits of FCC Part 15 Subpart B & CISPR 22 for both radiated and conducted emissions.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

USB 2-Port Hub Computer Keyboard.

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Printer
Manuf: HP
Model: C6410A
Serial: MY8C91B0RH
FCC ID: DOC

Game Pad
Manuf: Microsoft
Model: X04-63237
Serial: 51136-576-5122396-00000
FCC ID: DOC

Mouse
Manuf: Microsoft
Model: X03-98121
Serial: 81933-577-010123-00000
FCC ID: DoC

Mouse
Manuf: Microsoft
Model: X03-68761
Serial: 52463-OEM-1779326-00000
FCC ID: C3KKMP1

Monitor
Manuf: Gateway
Model: EV500
Serial: 15052D000578
FCC ID:

PC
Manuf: Dell
Model: MCM
Serial: EHR41
FCC ID: DoC

Keyboard
Manuf: Dell
Model: SK-1000REW
Serial: 3862A246
FCC ID: GYUR43SK

REPORT OF MEASUREMENTS

The following tables report the six highest worst case levels recorded during the tests performed on the USB 2-Port Hub Keyboard, RT7D10. All readings taken are peak readings unless otherwise noted by a "Q" or "A". The data sheets from which these tables were compiled are contained in Appendix B.

Table 1: Six Highest Radiated Emission Levels

FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Ant dB	Amp dB	Cable dB	Dist dB	CORRECTED READING dBµV/m	SPEC LIMIT dBµV/m	MARGIN DB	NOTES
132.644	33.0	16.2	-28.2	2.9		23.9	30.0	-6.1	H
144.002	33.0	16.9	-28.1	3.0		24.8	30.0	-5.2	HQ
325.503	34.2	20.5	-28.4	4.5		30.8	37.0	-6.2	H
367.473	36.6	17.6	-28.4	4.8		30.6	37.0	-6.4	H
599.878	34.3	19.2	-28.0	6.4		31.9	37.0	-5.1	VQ
635.874	32.0	20.6	-27.9	6.5		31.2	37.0	-5.8	HQ

Test Method: ANSI C63.4 1992
Spec Limit : CISPR 22 Class B
Test Distance: 10 Meters

NOTES:
H = Horizontal Polarization
V = Vertical Polarization
N = No Polarization
D = Dipole Reading
Q = Quasi Peak Reading
A = Average Reading

COMMENTS: The EUT is a USB keyboard. The EUT is connected to the host computer. A USB Mouse and a Game Pad are connected to the USB HUB ports of the EUT. The mouse cord is placed in the Keyboard cable management slot on the bottom of the keyboard. The computer is running EMI software that is exercising all peripherals. The EUT is continuously sending H's to the host computer and it is being displayed on the monitor (through Wordpad). Num Lock, Caps Lock, and Scroll Lock are all active. Connected to the host computer are a modem, a printer, a PS/2 mouse, PS2 Keyboard and monitor. 110 VAC, 60 Hz, 24.3°C, 45% relative humidity.

Table 2: Six Highest Conducted Emission Levels									
FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Lisn dB	dB	dB	dB	CORRECTED READING dBµV	SPEC LIMIT dBµV	MARGIN dB	NOTES
0.160775	51.4	0.0				51.4	55.4	-4.0	B
0.405694	40.9	0.0				40.9	47.7	-6.8	W
0.505982	39.8	0.0				39.8	46.0	-6.2	W
0.607640	40.1	0.0				40.1	46.0	-5.9	W
0.150829	51.4	0.0				51.4	56.0	-4.6	B
0.200973	47.3	0.0				47.3	53.6	-6.3	W

Test Method: ANSI C63.4 1992
Spec Limit : CISPR 22 Class B

NOTES: Q = Quasi Peak Reading
A = Average Reading
B = Black Lead
W = White Lead

COMMENTS: The EUT is a USB keyboard. The EUT is connected to the host computer. A USB Mouse and a Game Pad are connected to the USB HUB ports of the EUT. The mouse cord is placed in the Keyboard cable management slot on the bottom of the keyboard. The computer is running EMI software that is exercising all peripherals. The EUT is continuously sending H's to the host computer and it is being displayed on the monitor (through Wordpad). Num Lock, Caps Lock, and Scroll Lock are all active. Connected to the host computer are a modem, a printer, a PS/2 mouse, PS2 Keyboard and monitor. 110 VAC, 60 Hz, 24.3°C, 45% relative humidity.

TABLE A

LIST OF TEST EQUIPMENT

Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal Due date
Radiated Emission					
Bicon Antenna	A & H	SAS-200/540	220	100599	100500
Log Periodic Antenna	A & H	SAS-200/526	331	100899	100800
Pre-amp	HP	8447D	1937A02548	030700	030701
Antenna cable	NA	RG214	Cable#1	070300	070301
Pre-amp to SA cable	NA	RG58	Cable#5	070300	070301
Spectrum Analyzer	HP	8566B	2532A02509	091199	091100
QP Adapter	HP	85680A	3303A01884	091199	091100
Conducted Emission					
LISN	Emco	3816/2NM	9809-1090	030800	030801
LISN	Solar	8028-50-TS-24-BNC	Brea #2	100799	100700
Spectrum Analyzer	HP	8566B	2532A02509	091199	091100
QP Adapter	HP	85680A	3303A01884	091199	091100

EUT SETUP

The equipment under test (EUT) and the peripheral(s) listed were set up in a manner that represented their normal use, as shown in the setup photographs in Appendix A. Any special conditions required for the EUT to operate normally are identified in the comments that accompany Table 1 for radiated emissions, and Table 2 for conducted emissions. Additionally, a complete description of all ports and the I/O cables is included on the information sheets contained in Appendix A.

During radiated emissions testing, the EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters. This configuration is typical for radiated emissions testing of table top devices.

During conducted emissions testing, the EUT was located on a wooden table measuring approximately 80 cm high, 1 meter deep, and 1.5 meters in length. One wall of the room where the EUT is located, has a minimum 2 meter by 2 meter conductive plane. The EUT was mounted on the wooden table 40 cm away from the conductive plane, and 80 cm from any other conductive surface.

The vertical metal plane used for conducted emissions was grounded to the earth. Power to the EUT was provided through a LISN. The LISN was grounded to the ground plane. All other objects were kept a minimum of 80 cm away from the EUT during the conducted test. Conducted emissions tests required the use of the LISN's listed in Table A.

The AC power line and I/O cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available I/O ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. This configuration was precisely noted in the test report. I/O cables were of the type and length specified in the individual requirements. The length of cable which produced maximum emissions was selected.

One module of each type was operative in each ITE evaluated in a test unit. For system units, one of each type of ITE that could have been included in the possible system configuration was included in the test unit.

The actual interfacing ITE or simulators were used to provide representative operating conditions provided the effects of the simulator were isolated or identified.

The interval between different pieces of equipment was about 10 centimeters. All excessive interconnecting cable was bundled in 30-40 centimeter lengths. For detail on the disposition of the cables during the test, refer to the "Cable Information Sheet" and the photographs contained in Appendix A.

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Table A was used to collect both the radiated and conducted emissions data for the USB 2-Port Hub Keyboard, RT7D10. For radiated measurements below 300 MHz, the biconical antenna listed was used. For frequencies from 300 to 1000 MHz, the log periodic antenna was used. The measurements listed in Table 1 incorporate any correction factors associated with the use of the antennas, preamplifiers, and cabling used during the radiated test. These correction factors are also listed for each measurement on the data sheets contained in Appendix B.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. For conducted emissions, an appropriate reference level and a vertical scale size of 10 dB per division was used. A 10 dB external attenuator was also used during conducted tests, with internal offset correction in the analyzer. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dBµV, and a vertical scale of 10 dB per division.

TABLE B: ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE

TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED	150 kHz	30 MHz	9 kHz
E-FIELD RADIATED	30 MHz	1000 MHz	120 kHz

SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in Tables 1 and 2 indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the six highest readings, this is indicated as a "Q" or an "A" in the appropriate table. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data for the USB 2-Port Hub Keyboard, RT7D10.

Peak

In this mode, the Spectrum Analyzer or test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the HP Quasi-Peak Adapter for the HP Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual were followed.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer. To make these measurements, the test engineer reduces the video bandwidth on the analyzer until the modulation of the signal is filtered out. At this point the analyzer is set into the linear mode and the scan time is reduced.

TEST METHODS

The radiated and conducted emissions data of the USB 2-Port Hub Keyboard, RT7D10, was taken with the HP Spectrum Analyzer. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the "Sample Calculations". The corrected data was then compared to the CISPR 22/85 Class B emission limits to determine compliance.

Preliminary and final measurements were taken in order to better ensure that all emissions from the EUT were found and maximized.

Radiated Emissions Testing (Electric Field)

During the preliminary radiated scan, the EUT was powered up and operating in its defined test mode with the I/O and line cords facing the antenna. The frequency range of 30 MHz - 88 MHz was then scanned with the biconical antenna located about 1.5 meter above the ground plane in the vertical configuration. During this scan, the turntable was rotated and all peaks which were at or near the limit were recorded. The frequency range of 100 - 300 MHz was scanned in the same manner, with the biconical antenna, and the peaks recorded. Lastly, a scan of the FM band from 88 - 110 MHz was made, using a reduced resolution bandwidth and a reduced frequency span. The biconical antenna was changed to the horizontal polarity and the above steps were repeated. After changing to the log periodic antenna in the horizontal configuration, the frequency range of 300 - 1000 MHz was scanned. The log periodic antenna was changed to the vertical polarity and the frequency range of 300 - 1000 MHz was again scanned. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

For the final radiated scan, the equipment was again positioned with its I/O and power cables facing the antenna. A thorough scan of all frequencies was manually made using a small frequency span, rotating the turntable as needed. Comparison with the previously recorded measurements was then made.

Using the peak readings from both scans as a guide, the test engineer then maximized the readings with respect to the table rotation, antenna height, and configuration of the peripheral(s) and cables. Maximizing of the cables and peripheral locations was achieved by monitoring the spectrum analyzer on a closed circuit television monitor while the EUT components and cables were being moved and rearranged on the EUT table for maximum emissions. Photographs showing the final worst case configuration of the EUT are contained in Appendix A.

Conducted Emissions Test

For the conducted emissions, the LISN's used were 50 µH-/+5 ohms. Above 150 kHz, a 0.15 µF series capacitor is added in-line prior to connecting the analyzer to restore the proper impedance for the range. A 30 to 50 second sweep time was used for automated measurements in the frequency bands of 150 kHz - 500 kHz, and 500 kHz to 30 MHz. All readings within 20 dB of the limit were recorded, and those within 6 dB of the limit were examined with additional measurements using a slower sweep time. The results of the conducted emissions test are shown in Table 2.

SAMPLE CALCULATIONS

The basic spectrum analyzer reading was converted using correction factors as shown in the six highest emissions readings in Tables 1 and 2. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula:

Meter reading (dBµV)
+ Antenna Factor (dB)
+ Cable Loss (dB)
- Distance Correction (dB)
- Pre-amplifier Gain (dB)

= Corrected Reading(dBµV/m)

This reading was then compared to the applicable specification limit to determine compliance.

APPENDIX A

INFORMATION ABOUT THE EQUIPMENT UNDER TEST

INFORMATION ABOUT THE EQUIPMENT UNDER TEST	
Test Software/Firmware:	**MS WordPad**
CRT was displaying:	**Scrolling "H's"**
Power Supply Manufacturer:	**N/A**
Power Supply Part Number:	**N/A**
AC Line Filter Manufacturer:	**N/A**
AC Line Filter Part Number:	**N/A**
Line voltage used during testing:	**N/A**

I/O PORTS	
Type	#
USB keyboard cable	1
USB 2-port hub	2

CRYSTAL OSCILLATORS	
Type	Freq In MHz
Crystal	12MHz

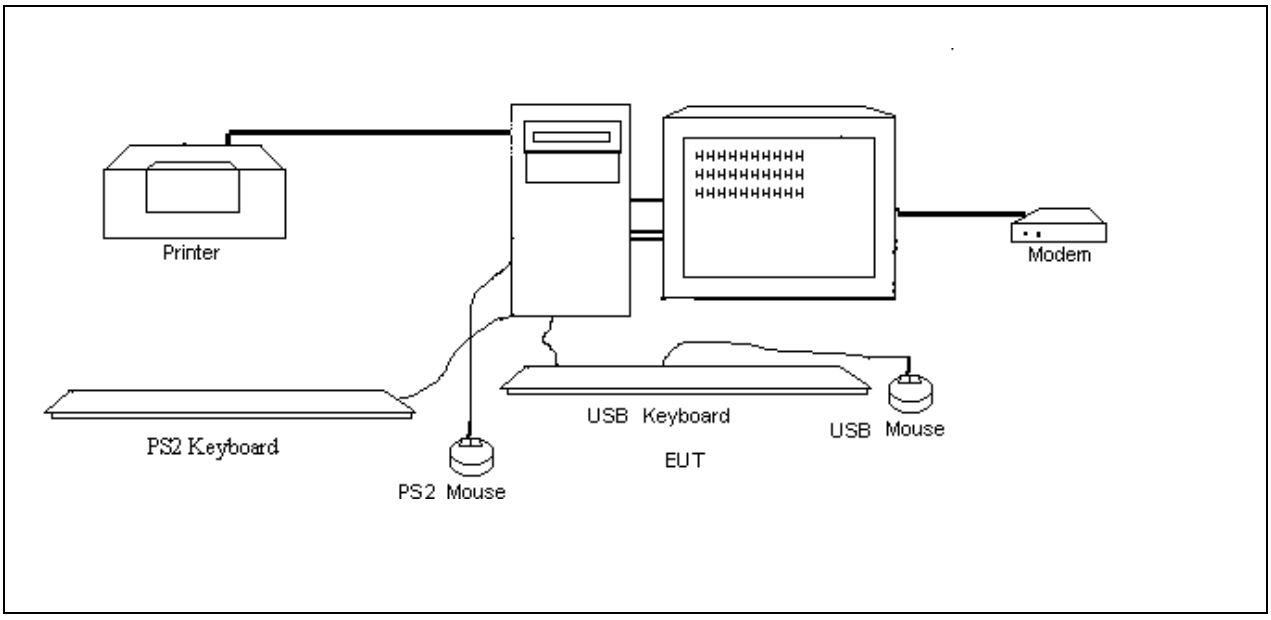
PRINTED CIRCUIT BOARDS				
Function	Model & Rev	Clocks, MHz	Layers	Location
Logic PCB w/ AU9472 MPU	P/N 125733 Rev. A	12MHz	2	Inside K/B

CABLE INFORMATION

Cable #:	1	Cable(s) of this type:	1
Cable Type:	USB Full-Speed	Shield Type:	Al/Mylar/Al foil & braided shield
Construction:	Round	Length In Meters:	1.5m
Connected To End (1):	PCB	Connected To End (2):	System USB port
Connector At End (1):		Connector At End (2):	
Shield Grounded At (1):	Chassis GND	Shield Grounded At (2):	Chassis GND
Part Number:		Number of Conductors:	4
Notes and/or description:			

REQUIRED EUT CHANGES TO COMPLY:
None

EQUIPMENT CONFIGURATION BLOCK DIAGRAM



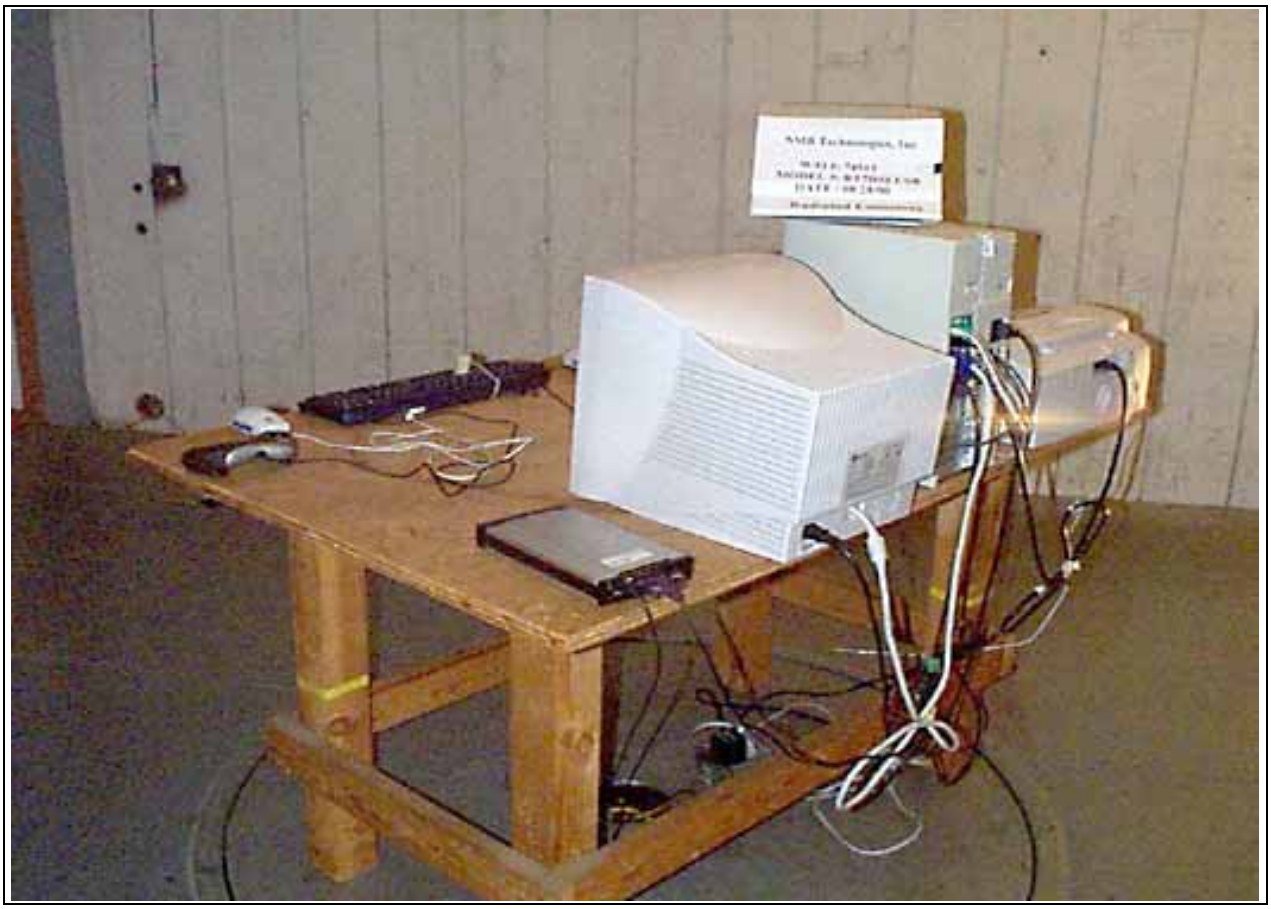
NOTES:

PHOTOGRAPH SHOWING RADIATED EMISSIONS

Radiated Emissions - Front View

NOTES:

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Back View

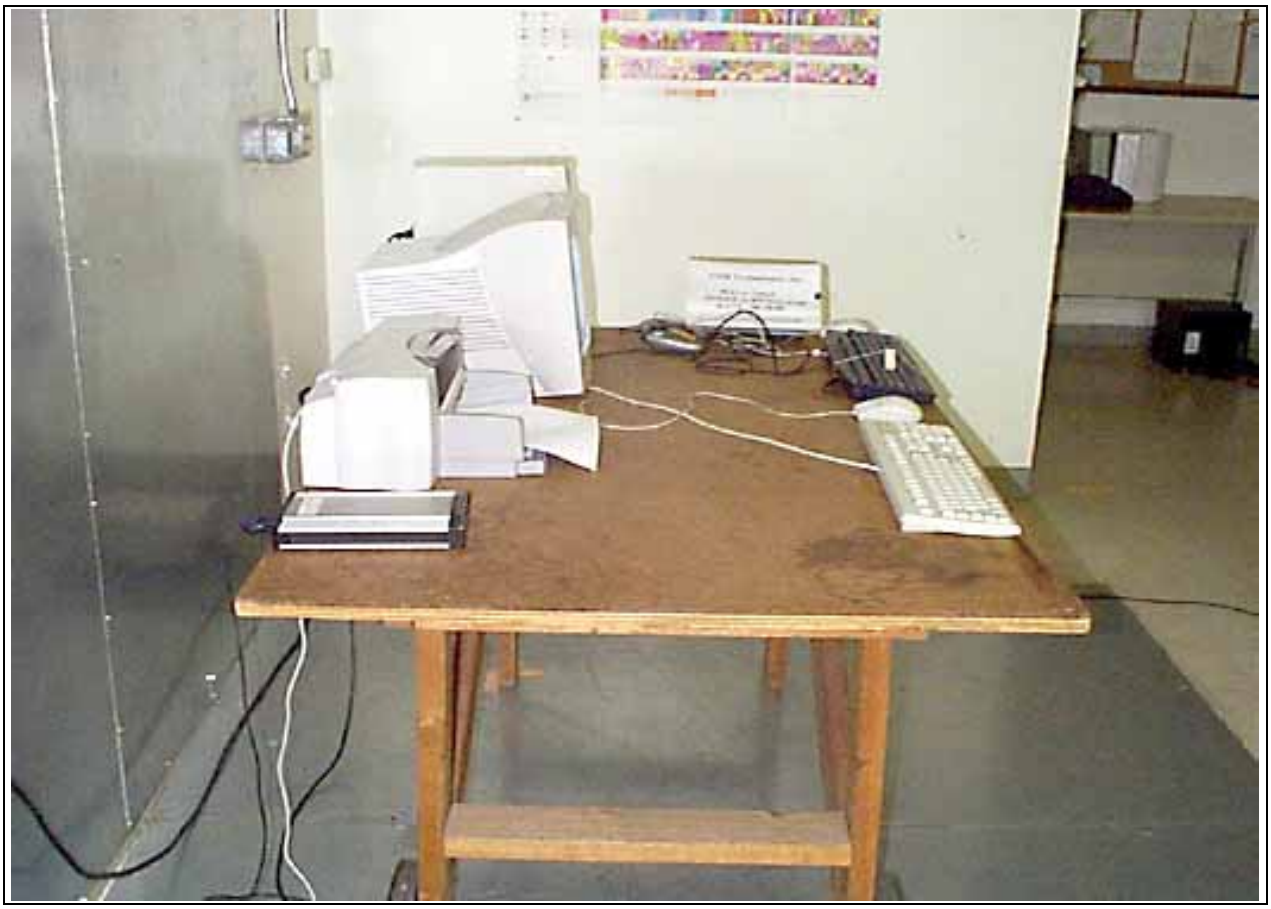
NOTES:

PHOTOGRAPH SHOWING CONDUCTED EMISSIONS

Conducted Emissions - Front View

NOTES:

PHOTOGRAPH SHOWING CONDUCTED EMISSIONS



Conducted Emissions - Side View

NOTES:

APPENDIX B

MEASUREMENT DATA SHEETS

Test Location: CKC LABORATORIES INC • 110 N. OLINDA PL. • BREA, CA 92823 • 714-993-6112

Customer: **NMB Technologies**
Specification: **CISPR 22 B RADIATED**
Work Order #: **74915** Date: 08/28/2000
Test Type: **Maximized Emissions** Time: 22:45:22
Equipment: **EUT** Sequence#: 6
Manufacturer: NMB Tested By: Eddie Wong
Model: RT7D10
S/N: N/A

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
EUT*	NMB	RT7D10	N/A

Support Devices:

Function	Manufacturer	Model #	S/N
Printer	HP	C6410A	MY8C91B0RH
Game Pad	Microsoft	X04-63237	51136-576-5122396-00000
Mouse	Microsoft	X03-98121	81933-577-010123-00000
Mouse	Microsoft	X03-68761	52463-OEM-1779326-00000
Monitor	Gateway	EV500	15052D000578
PC	Dell	MCM	EHR41
Keyboard	Dell	SK-1000REW	3862A246

Test Conditions / Notes:

The EUT is a USB keyboard. The EUT is connected to the host computer. A USB Mouse and a Game Pad are connected to the USB HUB ports of the EUT. The mouse cord is placed in the Keyboard cable management slot on the bottom of the keyboard. The computer is running EMI software that is exercising all peripherals. The EUT is continuously sending H's to the host computer and it is being displayed on the monitor (through Wordpad). Num Lock, Caps Lock, and Scroll Lock are all active. Connected to the host computer are a modem, a printer, a PS/2 mouse, PS2 Keyboard and monitor. 110 VAC, 60 Hz, 24.3°C, 45% relative humidity.

Measurement Data: Reading listed by margin. Test Distance: 10 Meters

#	Freq MHz	Rdng dBµV	Log dB	Bicon dB	Cable dB	Pream dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	599.878M QP	34.3	+19.2	+0.0	+6.4	-28.0	+0.0 113	31.9	37.0	-5.1	Vert 100
^	599.893M	37.1	+19.2	+0.0	+6.4	-28.0	+0.0 113	34.7	37.0	-2.3	Vert 100
3	144.002M QP	33.0	+0.0	+16.9	+3.0	-28.1	+0.0	24.8	30.0	-5.2	Horiz 201
^	143.988M	35.2	+0.0	+16.9	+3.0	-28.1	+0.0	27.0	30.0	-3.0	Horiz 201
5	635.874M QP	32.0	+20.6	+0.0	+6.5	-27.9	+0.0 259	31.2	37.0	-5.8	Horiz 151
^	635.923M	34.4	+20.6	+0.0	+6.5	-27.9	+0.0 259	33.6	37.0	-3.4	Horiz 151

7	599.878M QP	33.5	+19.2	+0.0	+6.4	-28.0	+0.0 258	31.1	37.0	-5.9	Horiz 184
^	599.884M	36.2	+19.2	+0.0	+6.4	-28.0	+0.0 258	33.8	37.0	-3.2	Horiz 100
9	132.644M	33.0	+0.0	+16.2	+2.9	-28.2	+0.0	23.9	30.0	-6.1	Horiz 255
10	325.503M	34.2	+20.5	+0.0	+4.5	-28.4	+0.0 85	30.8	37.0	-6.2	Horiz 100
11	367.473M	36.6	+17.6	+0.0	+4.8	-28.4	+0.0 360	30.6	37.0	-6.4	Horiz 100
12	635.872M QP	31.4	+20.6	+0.0	+6.5	-27.9	+0.0 127	30.6	37.0	-6.4	Vert 100
^	635.878M	34.4	+20.6	+0.0	+6.5	-27.9	+0.0 127	33.6	37.0	-3.4	Vert 102
14	432.010M	37.5	+16.1	+0.0	+5.2	-28.3	+0.0 262	30.5	37.0	-6.5	Horiz 141
15	224.009M	31.0	+0.0	+16.9	+3.7	-28.4	+0.0 360	23.2	30.0	-6.8	Horiz 173
16	366.357M	35.8	+17.6	+0.0	+4.8	-28.4	+0.0 283	29.8	37.0	-7.2	Vert 212
17	637.377M	30.3	+20.6	+0.0	+6.6	-27.8	+0.0 104	29.7	37.0	-7.3	Vert 100
18	336.033M QP	33.6	+19.7	+0.0	+4.6	-28.4	+0.0 63	29.5	37.0	-7.5	Horiz 100
^	336.012M	35.7	+19.7	+0.0	+4.6	-28.4	+0.0 63	31.6	37.0	-5.4	Horiz 100
20	323.968M	32.7	+20.6	+0.0	+4.5	-28.4	+0.0 45	29.4	37.0	-7.6	Horiz 233
21	359.990M	34.7	+18.1	+0.0	+4.8	-28.4	+0.0	29.2	37.0	-7.8	Horiz 100
22	539.884M	33.2	+18.0	+0.0	+6.1	-28.2	+0.0 241	29.1	37.0	-7.9	Horiz 224
23	432.016M	35.7	+16.1	+0.0	+5.2	-28.3	+0.0 108	28.7	37.0	-8.3	Vert 163
24	179.986M QP	29.5	+0.0	+17.1	+3.3	-28.4	+0.0 135	21.5	30.0	-8.5	Horiz 100
^	179.971M	35.8	+0.0	+17.1	+3.3	-28.4	+0.0 135	27.8	30.0	-2.2	Horiz 126
26	331.540M	32.1	+20.1	+0.0	+4.6	-28.4	+0.0 59	28.4	37.0	-8.6	Horiz 112
27	551.904M	32.0	+18.2	+0.0	+6.1	-28.2	+0.0 109	28.1	37.0	-8.9	Horiz 156
28	399.427M	35.7	+15.5	+0.0	+5.1	-28.4	+0.0 294	27.9	37.0	-9.1	Horiz 100
29	383.446M	34.2	+16.5	+0.0	+5.0	-28.4	+0.0 186	27.3	37.0	-9.7	Horiz 236
30	587.884M	29.9	+19.0	+0.0	+6.3	-28.0	+0.0 305	27.2	37.0	-9.8	Vert 285

31	527.903M	31.6	+17.7	+0.0	+6.0	-28.2	+0.0 360	27.1	37.0	-9.9	Horiz 190
32	239.993M	34.1	+0.0	+17.3	+3.9	-28.3	+0.0 277	27.0	37.0	-10.0	Vert 270
33	623.997M	28.0	+20.1	+0.0	+6.5	-27.9	+0.0	26.7	37.0	-10.3	Vert 100
34	611.880M QP	27.1	+19.7	+0.0	+6.4	-28.0	+0.0 162	25.2	37.0	-11.8	Horiz 100
^	611.884M	33.5	+19.7	+0.0	+6.4	-28.0	+0.0 162	31.6	37.0	-5.4	Horiz 100

Test Location: CKC LABORATORIES INC • 110 N. OLINDA PL. • BREA, CA 92823 • 714-993-6112

Customer: **NMB Technologies**
Specification: **CISPR22 B COND [AVE]**
Work Order #: **74915** Date: 08/28/2000
Test Type: **Conducted Emissions** Time: 23:19:33
Equipment: **EUT** Sequence#: 9
Manufacturer: NMB Tested By: Eddie Wong
Model: RT7D10
S/N: N/A

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
EUT*	NMB	RT7D10	N/A

Support Devices:

Function	Manufacturer	Model #	S/N
Printer	HP	C6410A	MY8C91B0RH
Game Pad	Microsoft	X04-63237	51136-576-5122396-00000
Mouse	Microsoft	X03-98121	81933-577-010123-00000
Mouse	Microsoft	X03-68761	52463-OEM-1779326-00000
Monitor	Gateway	EV500	15052D000578
PC	Dell	MCM	EHR41
Keyboard	Dell	SK-1000REW	3862A246

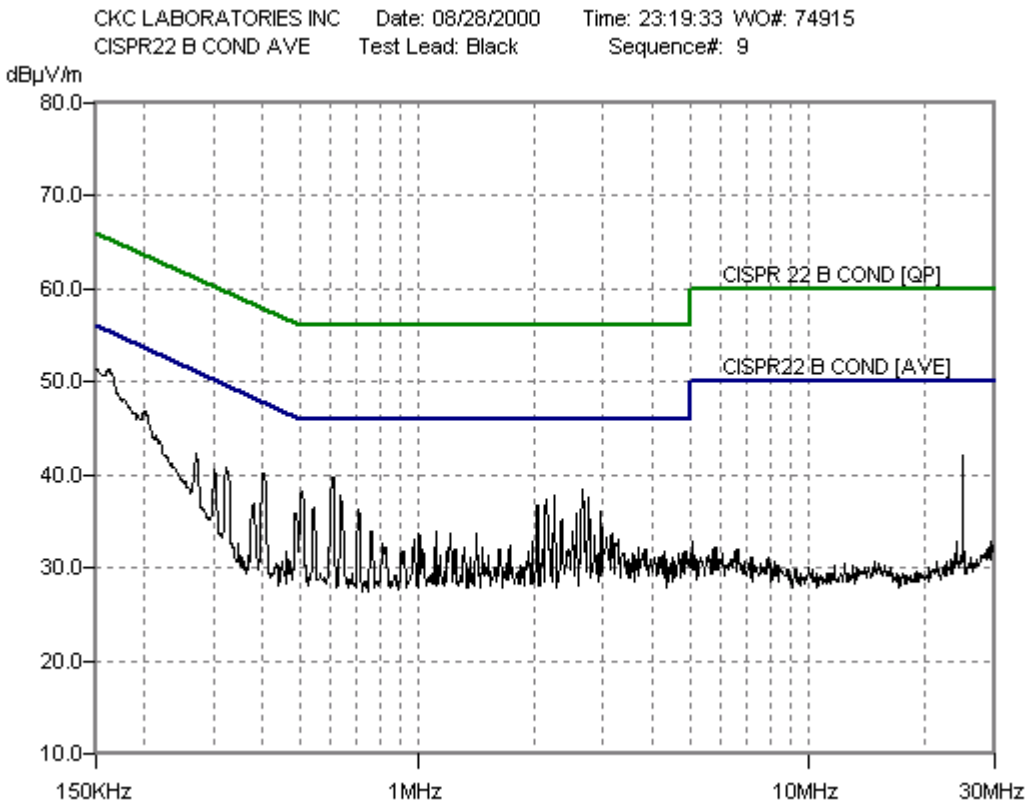
Test Conditions / Notes:

The EUT is a USB keyboard. The EUT is connected to the host computer. A USB Mouse and a Game Pad are connected to the USB HUB ports of the EUT. The mouse cord is placed in the Keyboard cable management slot on the bottom of the keyboard. The computer is running EMI software that is exercising all peripherals. The EUT is continuously sending H's to the host computer and it is being displayed on the monitor (through Wordpad). Num Lock, Caps Lock, and Scroll Lock are all active. Connected to the host computer are a modem, a printer, a PS/2 mouse, PS2 Keyboard and monitor. 110 VAC, 60 Hz, 24.3°C, 45% relative humidity.

Measurement Data: Reading listed by margin. Test Lead: Black

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	160.775k	51.4					+0.0	51.4	55.4	-4.0	Black
2	150.829k	51.4					+0.0	51.4	56.0	-4.6	Black
3	609.198k	39.8					+0.0	39.8	46.0	-6.2	Black
4	198.901k	46.8					+0.0	46.8	53.7	-6.9	Black
5	2.649M	38.4					+0.0	38.4	46.0	-7.6	Black
6	504.739k	38.3					+0.0	38.3	46.0	-7.7	Black
7	24.906M	42.2					+0.0	42.2	50.0	-7.8	Black

8	638.811k	37.9	+0.0	37.9	46.0	-8.1	Black
9	2.250M	37.8	+0.0	37.8	46.0	-8.2	Black
10	2.754M	37.5	+0.0	37.5	46.0	-8.5	Black
11	271.423k	42.4	+0.0	42.4	51.1	-8.7	Black
12	2.144M	37.3	+0.0	37.3	46.0	-8.7	Black
13	2.027M	36.7	+0.0	36.7	46.0	-9.3	Black
14	543.694k	36.5	+0.0	36.5	46.0	-9.5	Black
15	707.387k	36.2	+0.0	36.2	46.0	-9.8	Black


CKC LABORATORIES INC Date: 08/28/2000 Time: 23:19:33 WO#: 74915
CISPR22 B COND AVE Test Lead: Black Sequence#: 9
dBµV/m
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
150KHz
1MHz
10MHz
30MHz
CISPR 22 B COND [QP]
CISPR22 B COND [AVE]

Test Location: CKC LABORATORIES INC • 110 N. OLINDA PL. • BREA, CA 92823 • 714-993-6112

Customer: **NMB Technologies**
Specification: **CISPR22 B COND [AVE]**
Work Order #: **74915** Date: 08/28/2000
Test Type: **Conducted Emissions** Time: 23:28:43
Equipment: **EUT** Sequence#: 10
Manufacturer: NMB Tested By: Eddie Wong
Model: RT7D10
S/N: N/A

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
EUT*	NMB	RT7D10	N/A

Support Devices:

Function	Manufacturer	Model #	S/N
Printer	HP	C6410A	MY8C91B0RH
Game Pad	Microsoft	X04-63237	51136-576-5122396-00000
Mouse	Microsoft	X03-98121	81933-577-010123-00000
Mouse	Microsoft	X03-68761	52463-OEM-1779326-00000
Monitor	Gateway	EV500	15052D000578
PC	Dell	MCM	EHR41
Keyboard	Dell	SK-1000REW	3862A246

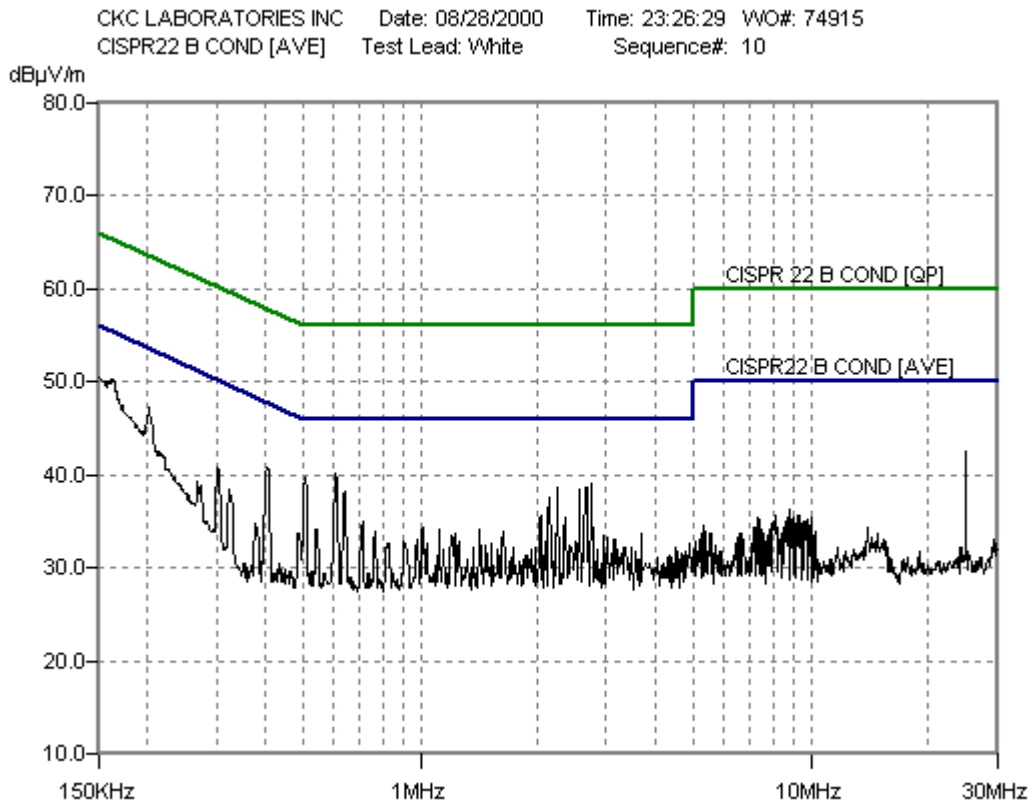
Test Conditions / Notes:

The EUT is a USB keyboard. The EUT is connected to the host computer. A USB Mouse and a Game Pad are connected to the USB HUB ports of the EUT. The mouse cord is placed in the Keyboard cable management slot on the bottom of the keyboard. The computer is running EMI software that is exercising all peripherals. The EUT is continuously sending H'S to the host computer and it is being displayed on the monitor (through Wordpad). Num Lock, Caps Lock, and Scroll Lock are all active. Connected to the host computer are a modem, a printer, a PS/2 mouse, PS2 Keyboard and monitor. 110 VAC, 60 Hz, 24.3°C, 45% relative humidity.

Measurement Data: Reading listed by margin. Test Lead: White

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	163.676k	50.2					+0.0	50.2	55.3	-5.1	White
2	160.775k	50.2					+0.0	50.2	55.4	-5.2	White
3	150.000k	50.5					+0.0	50.5	56.0	-5.5	White
4	157.460k	50.0					+0.0	50.0	55.6	-5.6	White
5	607.640k	40.1					+0.0	40.1	46.0	-5.9	White
6	505.982k	39.8					+0.0	39.8	46.0	-6.2	White

7	200.973k	47.3	+0.0	47.3	53.6	-6.3	White
8	405.694k	40.9	+0.0	40.9	47.7	-6.8	White
9	2.754M	39.0	+0.0	39.0	46.0	-7.0	White
10	2.250M	38.7	+0.0	38.7	46.0	-7.3	White
11	173.207k	47.5	+0.0	47.5	54.8	-7.3	White
12	2.654M	38.6	+0.0	38.6	46.0	-7.4	White
13	24.906M	42.5	+0.0	42.5	50.0	-7.5	White
14	2.555M	38.5	+0.0	38.5	46.0	-7.5	White
15	641.928k	38.2	+0.0	38.2	46.0	-7.8	White


CKC LABORATORIES INC Date: 08/28/2000 Time: 23:26:29 WO#: 74915
CISPR22 B COND [AVE] Test Lead: White Sequence#: 10
dBµV/m
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
CISPR 22 B COND [QP]
CISPR22 B COND [AVE]
150KHz
1MHz
10MHz
30MHz