



ADDENDUM TO FC03-018

FOR THE

**MICROSOFT® WIRELESS DESKTOP ELITE KEYBOARD, MODEL NO. 1011 &
MICROSOFT® WIRELESS OPTICAL DESKTOP RECEIVER 2.0A, MODEL NO. 1012**

FCC PART 15 SUBPART C SECTION 15.227

COMPLIANCE

DATE OF ISSUE: JULY 25, 2003

PREPARED FOR:

NMB Technologies, Inc.
9730 Independence Ave.
Chatsworth, CA 91311

W.O. No.: 80649

PREPARED BY:

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Date of test: June 16 - July 16, 2003

Report No.: FC03-018A

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ADMINISTRATIVE INFORMATION

DATE OF TEST: June 16 - July 16, 2003

DATE OF RECEIPT: June 16, 2003

PURPOSE OF TEST: To demonstrate the compliance of the Microsoft® Wireless Desktop Elite Keyboard, Model No. 1011 & Microsoft® Wireless Optical Desktop Receiver 2.0A, Model No. 1012 with the requirements for FCC Part 15 Subpart C Section 15.227 devices. **Addendum A** is to revise the FCC plots and add a Canadian compliance matrix.

TEST METHOD: ANSI C63.4 (1992)

MANUFACTURER: NMB/Minebea Thai LTD
1, Moo 7, Phaholyothin Road, Km.51
Tambon Chiang Rak Noi,
Amphoe Bang Pa-In
Ayutthaya Province 13180
Thailand

REPRESENTATIVE: Jamin Pandana

TEST LOCATION: CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92621

SUMMARY OF RESULTS

As received, the NMB Technologies, Inc. Microsoft® Wireless Desktop Elite Keyboard, Model No. 1011 & Microsoft® Wireless Optical Desktop Receiver 2.0A, Model No. 1012 was found to be fully compliant with the following standards and specifications:

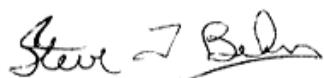
FCC Standard	FCC Section	Canadian Standard	Canadian Section	Test Description
47CFR	15.205	RSS 210	6.3	Restricted Bands of Operation
47CFR	15.209	RSS 210	6.2.1	General Radiated Emissions Requirement
NA	NA	RSS 210	5.9.1	99% Emissions Bandwidth Requirement
NA	NA	RSS 210	5.9.2	Emissions Designator
47CFR	15.227(a)	RSS 210	8.6.1	Carrier Output Limitation
47CFR	15.227(b)	RSS 210	8.6.1	Spurious Emissions Limitation
ANSI C63.4 (1992)		RSS 212		Test Method
100638		IC 3172-D		Site File No.

CONDITIONS FOR COMPLIANCE

No modifications to the EUT were necessary to comply. Conducted emissions not required for this device.

APPROVALS

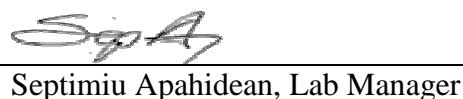
QUALITY ASSURANCE:



Steve Behm, Director of Engineering Services
and Quality Assurance



Joyce Walker, Quality Assurance Administrative
Manager



Septimiu Apahidean, Lab Manager

TEST PERSONNEL:



Stuart Yamamoto, EMC Engineer

FCC 15.31(e) Voltage Variations

Testing was performed with fresh batteries.

FCC 15.31(m) Number Of Channels

This device operates on two channels.

FCC 15.33(a) Frequency Ranges Tested

15.227 Radiated: 9 kHz – 1 GHz

FCC SECTION 15.35: ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz

FCC 15.203 Antenna Requirements

The antenna is an integral part of the EUT and is non-removable; therefore the EUT complies with Section 15.203 of the FCC rules.

FCC 15.205 Restricted Bands

The fundamental operating frequency lies outside the restricted bands and therefore complies with the requirements of Section 15.205 of the FCC rules. Any spurious emission coming from the EUT was investigated to determine if any portion lies inside the restricted band. If any portion of a spurious emissions signal was found to be within a restricted band, investigation was performed to ensure compliance with Section 15.209.

Eut Operating Frequency

The EUT was operating at 27.095 MHz and 27.195 MHz.

Temperature And Humidity During Testing

The temperature during testing was within +15°C and + 35°C.

The relative humidity was between 20% and 75%.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The RF 27 MHz Wireless Keyboard and Receiver tested by CKC Laboratories was representative of a production unit.

The following model was tested by CKC Laboratories on WO# **80649**

DVT MSDN Keyboard S/N 0295

DVT MSDN Receiver S/N 0122

Since the time of testing the manufacturer has chosen to use the following model names in their place. Any differences between the names does not affect their EMC characteristics and therefore complies to the level of testing equivalent to the tested model name shown on the data sheets:

Microsoft® Wireless Desktop Elite Keyboard, Model No. 1011

Microsoft® Wireless Optical Desktop Receiver 2.0A, Model No. 1012

EQUIPMENT UNDER TEST

Microsoft® Wireless Desktop Elite Keyboard

Manuf: NMB/Minebea Thai LTD

Model: 1011

Serial: 0295

Microsoft® Wireless Optical Desktop

Receiver 2.0A

Manuf: NMB/Minebea Thai LTD

Model: 1012

Serial: 0122

Microsoft® Wireless Desktop Elite Keyboard

Manuf: NMB/Minebea Thai LTD

Model: 1011

Serial: NA

Receiver (for Keyboard)

Manuf: NMB/Minebea Thai LTD

Model: USB and PS/2

Serial: NA

PERIPHERAL DEVICES

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

USB Zip Drive

Manuf: ZIP Disk
 Model: Z100USB
 Serial: PSA009A07M

Computer

Manuf: Dell Corporation
 Model: Optiplex GX260
 Serial: C4HVL11

Monitor

Manuf: Dell
 Model: P793
 Serial: KR-04D025-47602-23Q-D9ZX

Printer

Manuf: Lexmark
 Model: Z53
 Serial: 03230287625

Mouse

Manuf: Logitech
 Model: M-SAW34
 Serial: LZB21670338

Mouse

Manuf: Microsoft
 Model: 21A
 Serial: 1734893-50000NA

Mouse

Manuf: Microsoft
 Model: 93633
 Serial: NA

Computer

Manuf: Dell Corporation
 Model: MCM
 Serial: EHR4I

Printer

Manuf: Epson
 Model: P156A
 Serial: CMR1545596

Monitor

Manuf: Gateway
 Model: 500-069EV
 Serial: 15013A000011

REPORT OF MEASUREMENTS

The following tables report the worst case emissions levels recorded during the tests performed on the EUT. All readings taken were peak readings unless otherwise stated. The data sheets from which the emissions tables were compiled are contained in Appendix C.

Table 1: FCC 15.227 (a) Fundamental Emission Levels

FREQUENCY MHz	METER READING dB μ V	CORRECTION FACTORS				CORRECTED READING dB μ V/m	SPEC LIMIT dB μ V/m	MARGIN dB	NOTES
		Ant dB	Amp dB	Cable dB	Dist dB				
27.095	52.5	20.3	-27.2	1.3		46.9	80.0	-33.1	H
27.095	50.0	20.3	-27.2	1.3		44.4	80.0	-35.6	V
27.195	59.0	20.2	-27.2	1.3		53.3	80.0	-26.7	H
27.195	49.6	20.2	-27.2	1.3		43.9	80.0	-36.1	V

Test Method: ANSI C63.4 (1992)

NOTES:

H = Horizontal Polarization

Spec Limit: FCC Part 15 Subpart C Section 15.227(a)

V = Vertical Polarization

Test Distance: 3 Meters

COMMENTS: The keyboard EUT is placed on the wooden table. The support equipment and receiver EUT is placed on a cart adjacent to the EUT off of the turntable. The receiver is connected to the USB and PS/2 port of the host computer. Also connected to the host computer are a USB ZIP drive, parallel printer, PS2 mouse and a monitor. The "H" key of the EUT is pressed, sending data to the receiver and the computer displays the "H" character on the monitor. Cap lock, Num lock and F lock are all activated. 4.5 VDC to keyboard by batteries. 5VDC to Receiver by Computer USB/PS2 ports. Temperature: 25°C, Humidity: 55%, Pressure: 100kPa. Radiated Field Strength Test. Limit 500uV/m at 3 meters.

Table 2: FCC 15.227 (b)/15.209 Six Highest Radiated Emission Levels

FREQUENCY MHz	METER READING dB μ V	CORRECTION FACTORS			CORRECTED READING dB μ V/m	SPEC LIMIT dB μ V/m	MARGIN dB	NOTES	
		Ant dB	Amp dB	Cable dB					
240.064	49.7	12.0	-26.9	3.8		38.6	46.0	-7.4	HQ
297.601	48.1	13.4	-26.7	4.2		39.0	46.0	-7.0	H
315.074	47.4	13.9	-26.7	4.2		38.8	46.0	-7.2	HQ
331.279	46.9	14.4	-26.8	4.3		38.8	46.0	-7.2	H
335.624	46.8	14.5	-26.8	4.3		38.8	46.0	-7.2	H
446.371	44.0	17.2	-27.1	4.9		39.0	46.0	-7.0	VQ

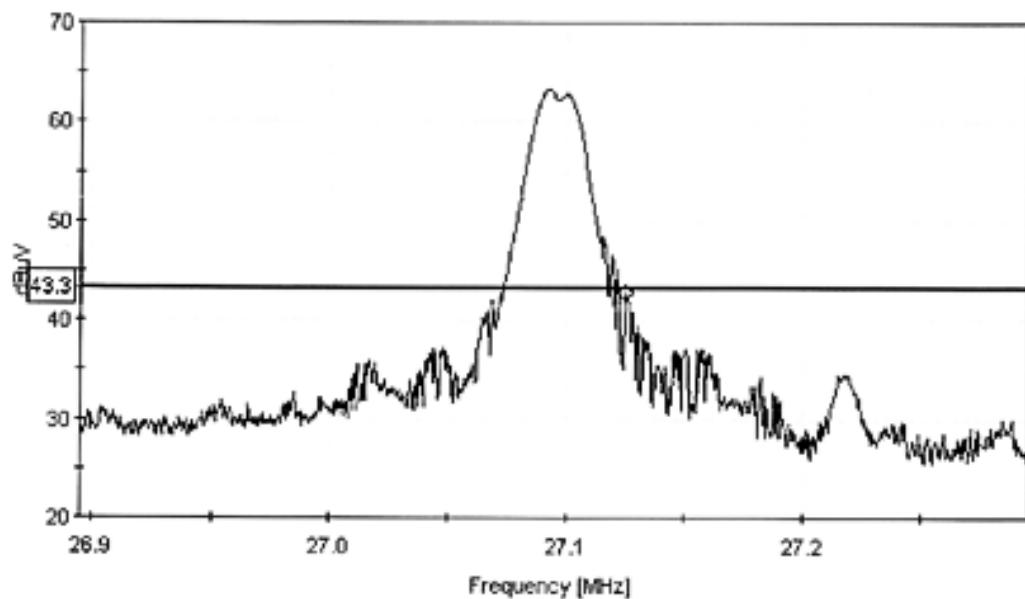
Test Method: ANSI C63.4 (1992)
 Spec Limit: FCC Part 15 Subpart C Section 15.227(b)/15.209
 Test Distance: 3 Meters

NOTES: H = Horizontal Polarization
 V = Vertical Polarization
 Q = Quasi Peak Reading

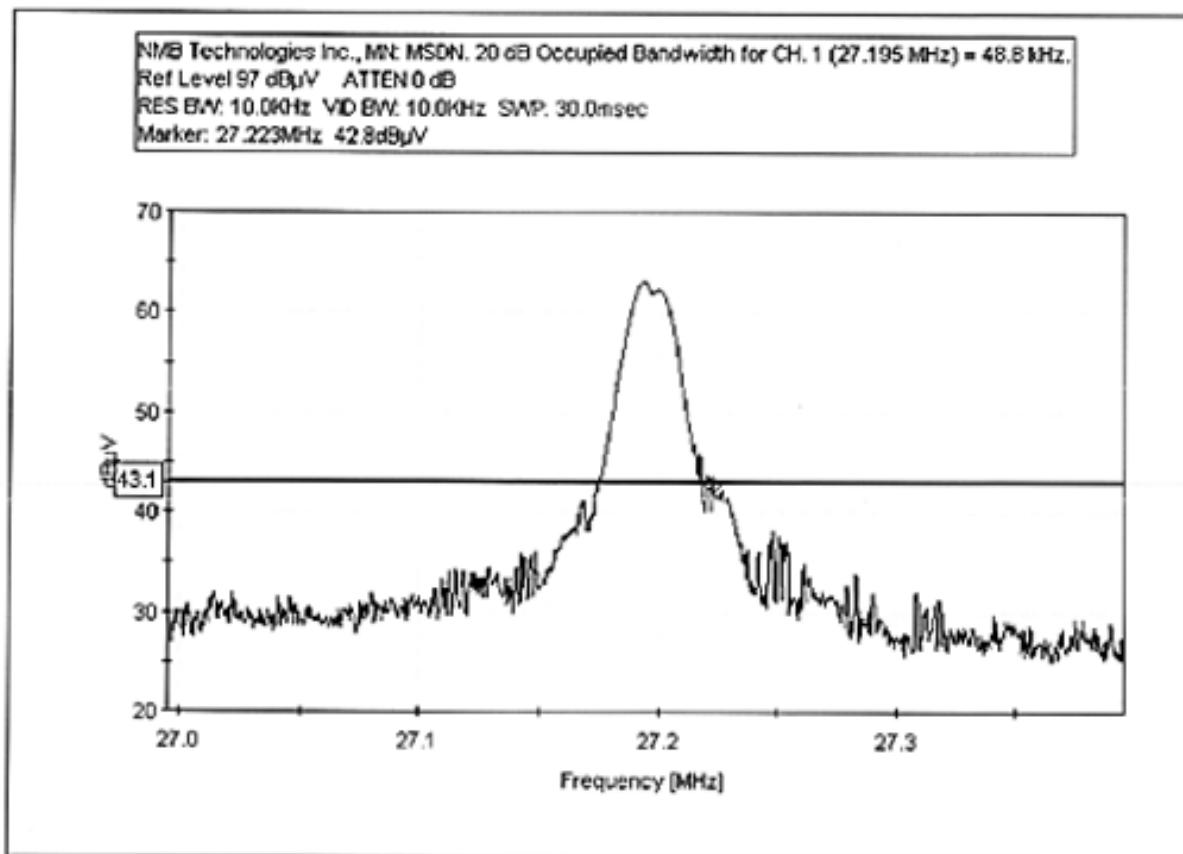
COMMENTS: The EUT's and support equipment are placed on the wooden table. The receiver is connected to the USB and PS/2 port of the host computer. Also connected to the host computer are a USB ZIP drive, parallel printer, PS/2 mouse and a monitor. The "H" key of the EUT is pressed, sending data to the receiver and the computer displays the "H" character on the monitor. Cap lock, Num lock and F lock are all activated. Tx = 27.095 MHz and 27.195 MHz. 4.5 VDC to keyboard by batteries. 5VDC to Receiver by Computer USB/PS2 ports. Temperature: 22°C, Humidity: 54%, Pressure: 100kPa. Frequency tested: 9 kHz – 1 GHz.

15.215 (c) OCCUPIED BANDWIDTH PLOT CHANNEL 0

NMB Technologies Inc., MN: MSDN 20 dB Occupied Bandwidth for CH. 0 (27.095 MHz) = 51.6 kHz.
Ref Level 97 dB μ V ATTN 0 dB
RES BW: 10.0KHz VID BW: 10.0KHz SWP: 30.0msec
Marker: 27.125MHz 42.9dB μ V

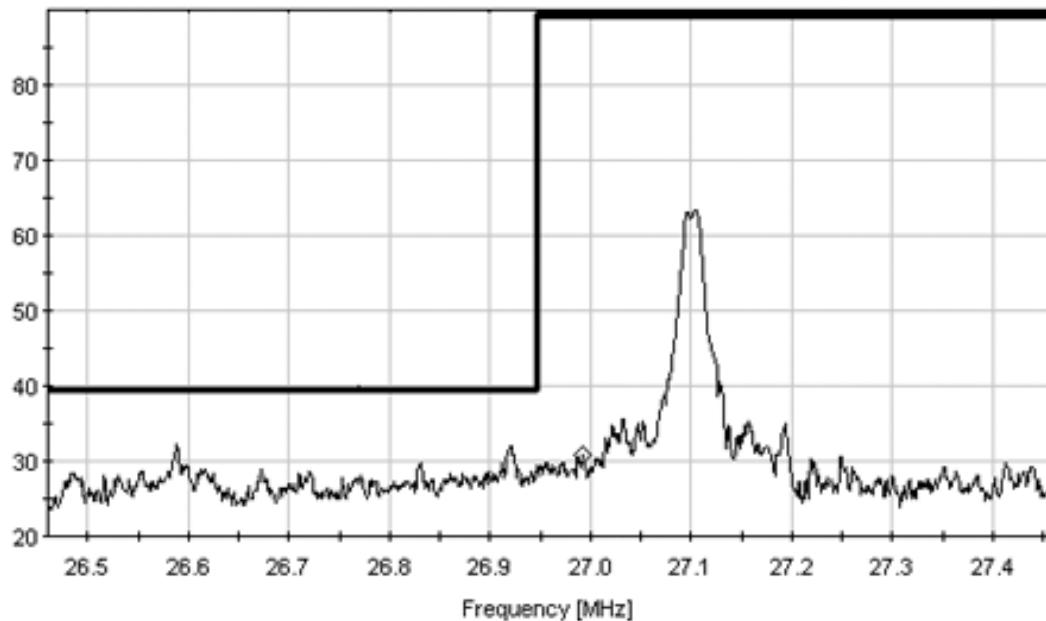


15.215 (c) OCCUPIED BANDWIDTH PLOT CHANNEL 1



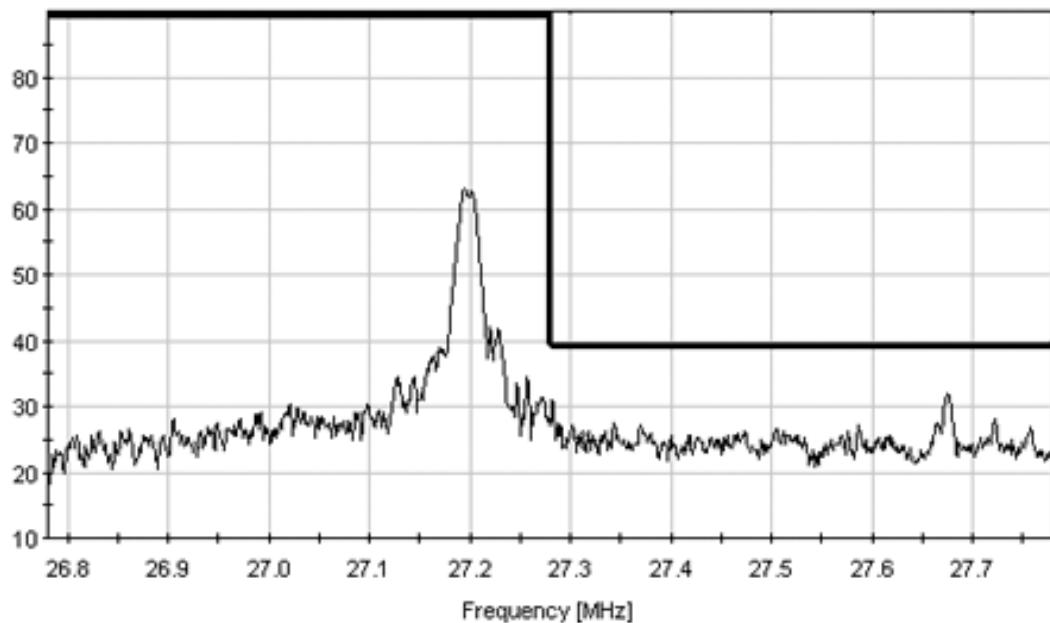
BANDEDGE PLOT CHANNEL 0

NMB Technologies Inc., MN: MSDN. Band Edge Compliance for CH. 0. Lower limit is 30uV/m at 30m.
Ref Level 97 dB μ V ATTN 0 dB
RES BW: 100.0KHz VID BW: 100.0kHz SWP: 30.0insec
Marker: 26.992MHz 30.8dB μ V



BANDEDGE PLOT CHANNEL 1

NMB Technologies Inc., MN: MSDN. Band Edge Compliance for CH. 1. Lower limit is 30uV/m at 30m.
Ref Level 97 dB μ V ATTN 0 dB
RES BW: 100.0KHz VID BW: 100.0KHz SWP: 30.0msec
Marker: 27.312MHz 25dB μ V



MEASUREMENT UNCERTAINTY

TEST	HIGHEST UNCERTAINTY
Radiated Emissions	+/- 2.94 dB

Note: Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k=2$. Statements of compliance are based on the nominal values only.

EUT SETUP

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the photographs in Appendix A. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables. The corrected data was then compared to the applicable emission limits to determine compliance.

The 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. I/O cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The radiated data of the EUT 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 Table A.

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

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in $\text{dB}\mu\text{V}/\text{m}$, the spectrum analyzer reading in $\text{dB}\mu\text{V}$ was corrected by using the following formula in Table A. This reading was then compared to the applicable specification limit to determine compliance.

TABLE A: SAMPLE CALCULATIONS

Meter reading	($\text{dB}\mu\text{V}$)
+ Antenna Factor	(dB)
+ Cable Loss	(dB)
- Distance Correction	(dB)
- Preamplifier Gain	(dB)
= Corrected Reading	($\text{dB}\mu\text{V}/\text{m}$)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Appendix B were used to collect both the radiated and conducted emissions data. For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. For frequencies from 30 to 1000 MHz, the biconilog antenna was used. The horn antenna was used for frequencies above 1000 MHz. Conducted emissions tests required the use of the FCC type LISNs.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dB μ V, and a vertical scale of 10 dB per division.

SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the Tables 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.

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.

EUT TESTING

Radiated Emissions

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.

During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode. For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. The frequency range of 30 MHz to 1000 MHz was scanned with the biconilog antenna located about 1.5 meter above the ground plane in the vertical polarity. During this scan, the turntable was rotated and all peaks at or near the limit were recorded. A scan of the FM band from 88 to 110 MHz was then made using a reduced resolution bandwidth and frequency span. The biconilog antenna was changed to the horizontal polarity and the above steps were repeated. For frequencies exceeding 1000 MHz, the horn antenna was used. 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.

A thorough scan of all frequencies was made manually using a small frequency span, rotating the turntable as needed. The test engineer maximized the readings with respect to the table rotation, antenna height, and configuration of EUT. Maximizing of the EUT was achieved by monitoring the spectrum analyzer on a closed circuit television monitor.

APPENDIX A
INFORMATION ABOUT THE EQUIPMENT UNDER TEST

INFORMATION ABOUT THE EQUIPMENT UNDER TEST

Test Software/Firmware:	WordPad / Scroll Wheel Driver
CRT was displaying:	Scrolling "H"
Power Supply Manufacturer:	(3 AA batteries, Energizer E91)
Power Supply Part Number:	NA
AC Line Filter Manufacturer:	NA
AC Line Filter Part Number:	NA

Tx CRYSTAL OSCILLATORS	
Type	Freq In MHz
Ceramic Resonator	8MHz
RC-Oscillator	3MHz
Crystal Oscillator	27.095MHz
Crystal Oscillator	27.195MHz

Rx CRYSTAL OSCILLATORS	
Type	Freq In MHz
Crystal Oscillator	12MHz
Crystal Oscillator	26.59MHz
Crystal Oscillator	26.69MHz
Crystal Oscillator	26.64MHz
Crystal Oscillator	26.74MHz

PRINTED CIRCUIT BOARDS				
Function	Model & Rev	Clocks, MHz	Layers	Location
Main PCB	130171 Rev 09	8MHz	2	Keyboard Tx
RF Module	130175 Rev 04	27.095MHz 27.195MHz	2	Keyboard Tx
Z-Wheel	130276 Rev 08	3MHz	1	Keyboard Tx
Hercules Receiver	130565 Rev	12MHz 26.59MHz 26.69MHz 26.64MHz 26.74MHz	2	Receiver Rx

CABLE INFORMATION

Cable #:	1. Receiver Y Cable	Cable(s) of this type:	1
Cable Type:	PS2 /USB	Shield Type:	Foil shielded
Construction:	Round	Length In Meters:	1.80 meters
Connected To End (1):	Computer	Connected To End (2):	Computer
Connector At End (1):	KB/Mouse	Connector At End (2):	USB low speed
Shield Grounded At (1):	Computer	Shield Grounded At (2):	Chassis Ground
Part Number:	X01-04252 RevX9	Number of Conductors:	10
Notes and/or description:	9x30Awg, 9 signal wires/jacket + 1x28Awg drain wire with ferrite at USB connector		

Cable #:	2	Cable(s) of this type:	1
Cable Type:	Serial	Shield Type:	Foil
Construction:	Round	Length In Meters:	2.0 meters
Connected To End (1):	Computer	Connected To End (2):	Modem
Connector At End (1):	DB9	Connector At End (2):	DB25
Shield Grounded At (1):	Computer	Shield Grounded At (2):	Modem
Part Number:		Number of Conductors:	9
Notes and/or description:			

Cable #:	3	Cable(s) of this type:	1
Cable Type:	Parallel	Shield Type:	Foil/Braided Shield
Construction:	Round	Length In Meters:	2.0 meters
Connected To End (1):	Computer	Connected To End (2):	Printer
Connector At End (1):	DB25	Connector At End (2):	Centronics
Shield Grounded At (1):	Computer	Shield Grounded At (2):	Printer
Part Number:		Number of Conductors:	25
Notes and/or description:			

Cable #:	4	Cable(s) of this type:	1
Cable Type:	PS2 mini-din	Shield Type:	Foil
Construction:	Round	Length In Meters:	2 meters
Connected To End (1):	Computer	Connected To End (2):	PS/2 Mouse
Connector At End (1):	Mouse mini din	Connector At End (2):	PS/2 Mouse
Shield Grounded At (1):	Computer	Shield Grounded At (2):	PS/2 Mouse
Part Number:		Number of Conductors:	5
Notes and/or description:			

Cable #:	5	Cable(s) of this type:	1
Cable Type:	Serial	Shield Type:	Braided
Construction:	Round	Length In Meters:	1.3 meters
Connected To End (1):	Computer	Connected To End (2):	Monitor
Connector At End (1):	HDBB15	Connector At End (2):	Monitor
Shield Grounded At (1):	Computer	Shield Grounded At (2):	Monitor
Part Number:		Number of Conductors:	14
Notes and/or description:	With Ferrite		

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Front View - Transmitter

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Back View - Transmitter

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Front View - Receiver

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Back View - Receiver

APPENDIX B

TEST EQUIPMENT LIST

Radiated Emissions

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Quasi Peak Adapter (Site C)	02325	HP	85650A	2521A00932	073102	073103
Spectrum Analyzer	00312	HP	8568A	2106A02107	073102	073103
Spectrum Analyzer Display	00312	HP	8568A	2049A01287	073102	073103
Bilog Antenna	01996	Schaffner-Chase EMC	CBL6111C	2452	100402	100403
Pre-amp	02320	HP	8447D	2443A03665	010403	010404
Antenna cable from bulkhead to antenna	N/A	Belden	9268	Cable #6	051203	051204
Antenna cable (10 meter site D)	NA	Andrew	LDF1-50	Cable#17	091102	091103
Preamp to SA Cable (3 feet)	NA	Pasternack	E100316-I	Cable #22	100702	100703
Magnetic Loop Antenna	00314	Emco	6502	2014	072302	072303

APPENDIX C:
MEASUREMENT DATA SHEETS

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **NMB Technologies, Inc.**
 Specification: **FCC 15.227(a)**
 Work Order #: **80649** Date: 07/14/2003
 Test Type: **Maximized Emissions** Time: 09:25:16
 Equipment: **Wireless Keyboard** Sequence#: 3
 Manufacturer: NMB Technologies, Inc. Tested By: Stuart Yamamoto
 Model: MSDN
 S/N: 0295

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Wireless Keyboard*	NMB Technologies, Inc.	MSDN	0295
Receiver (for Keyboard)	Microsoft	MSDN Receiver	0122

Support Devices:

Function	Manufacturer	Model #	S/N
Mouse	Logitech	M-SAW34	LZB21670338
Printer	Lexmark	Z53	03230287625
Monitor	Dell	P793	KR-04D025-47602-23Q-D9ZX
Computer	Dell Corporation	Optiplex GX260	C4HVL11
USB Zip Drive	ZIP Disk	Z100USB	PSA009A07M

Test Conditions / Notes:

The keyboard EUT is placed on the wooden table. The support equipment and receiver EUT is placed on a cart adjacent to the EUT off of the turntable. The receiver is connected to the USB and PS/2 port of the host computer. Also connected to the host computer are a USB ZIP drive, parallel printer, PS2 mouse and a monitor. The "H" key of the EUT is pressed, sending data to the receiver and the computer displays the "H" character on the monitor. Cap lock, Num lock and F lock are all activated. 4.5 VDC to keyboard by batteries. 5VDC to Receiver by Computer USB/PS2 ports. Temperature: 25°C, Humidity: 55%, Pressure: 100kPa. Radiated Field Strength Test. Limit 500uV/m at 3 meters.

Transducer Legend:

T1=Bilog SN2629 062604	T2=Cable #6 (Ant to Bulkhead) 050603
T3=Cable Heliax #17 84ft(10 meter)	T4=Cable#22 BNC (preamp to SA)
T5=Preamp 8447D 02320 (site D) 010404	

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	27.195M	59.0	+20.2 -27.2	+0.6	+0.6	+0.1	+0.0	53.3	80.0	-26.7	Horiz
2	27.095M	52.5	+20.3 -27.2	+0.6	+0.6	+0.1	+0.0	46.9	80.0	-33.1	Horiz
3	27.095M	50.0	+20.3 -27.2	+0.6	+0.6	+0.1	+0.0	44.4	80.0	-35.6	Vert
4	27.195M	49.6	+20.2 -27.2	+0.6	+0.6	+0.1	+0.0	43.9	80.0	-36.1	Vert

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **NMB Technologies, Inc.**
 Specification: **FCC 15.209**
 Work Order #: **80649** Date: 07/15/2003
 Test Type: **Maximized Emissions** Time: 16:59:01
 Equipment: **Wireless Keyboard** Sequence#: 4
 Manufacturer: NMB Technologies, Inc. Tested By: Stuart Yamamoto
 Model: MSDN
 S/N: 0295

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Wireless Keyboard*	NMB Technologies, Inc.	MSDN	0295
Receiver (for Keyboard)	Microsoft	MSDN Receiver	0122

Support Devices:

Function	Manufacturer	Model #	S/N
USB Zip Drive	ZIP Disk	Z100USB	PSA009A07M
Computer	Dell Corporation	Optiplex GX260	C4HVL11
Monitor	Dell	P793	KR-04D025-47602-23Q-D9ZX
Printer	Lexmark	Z53	03230287625
Mouse	Logitech	M-SAW34	LZB21670338

Test Conditions / Notes:

The EUT's and support equipment are placed on the wooden table. The receiver is connected to the USB and PS/2 port of the host computer. Also connected to the host computer are a USB ZIP drive, parallel printer, PS/2 mouse and a monitor. The "H" key of the EUT is pressed, sending data to the receiver and the computer displays the "H" character on the monitor. Cap lock, Num lock and F lock are all activated. Tx = 27.095 MHz and 27.195 MHz. 4.5 VDC to keyboard by batteries. 5VDC to Receiver by Computer USB/PS2 ports. Temperature: 22°C, Humidity: 54%, Pressure: 100kPa. Frequency tested: 9 kHz – 1 GHz.

Transducer Legend:

T1=Bilog SN2629 062604	T2=Cable #6 (Ant to Bulkhead) 050603
T3=Cable Heliax #17 84ft(10 meter)	T4=Cable#22 BNC (preamp to SA)
T5=Preamp 8447D 02320 (site D) 010404	

Measurement Data:				Reading listed by margin.								Test Distance: 3 Meters				
#	Freq	Rdng		T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar				
				T5				Table	dB μ V/m	dB μ V/m						
				MHz	dB μ V	dB	dB	dB	Table	dB μ V/m	dB μ V/m					
1	210.076M	54.3		+9.8	+1.5	+1.6	+0.3	+0.0	40.6	43.5	-2.9	Horiz				
	QP				-26.9								Non-EUT signal (host computer video port) [EUT does not affect level]			
^	210.079M	55.6		+9.8	+1.5	+1.6	+0.3	+0.0	41.9	43.5	-1.6	Horiz				
					-26.9								Non-EUT signal (host computer video port) [EUT does not affect level]			

3	262.601M	51.2	+12.9 QP	+1.8 -26.8	+1.8	+0.4	+0.0	41.3	46.0	-4.7	Horiz
									Non-EUT signal (host computer video port) [EUT does not affect level]		
^	262.600M	52.4	+12.9 -26.8	+1.8	+1.8	+0.4	+0.0	42.5	46.0	-3.5	Horiz
									Non-EUT signal (host computer video port) [EUT does not affect level]		
5	341.367M	48.9	+14.7 QP	+2.0 -26.8	+2.0	+0.4	+0.0	41.2	46.0	-4.8	Horiz
									Non-EUT signal (host computer video port) [EUT does not affect level]		
^	341.365M	50.2	+14.7 -26.8	+2.0	+2.0	+0.4	+0.0	42.5	46.0	-3.5	Horiz
									Non-EUT signal (host computer video port) [EUT does not affect level]		
7	80.329M	51.6	+7.7 QP	+1.0 -27.1	+1.0	+0.1	+0.0	34.3	40.0	-5.7	Vert
									Non-EUT signal (parallel printer power supply) [EUT does not affect level]		
^	80.269M	55.4	+7.7 -27.1	+1.0	+1.0	+0.1	+0.0	38.1	40.0	-1.9	Vert
									Non-EUT signal (parallel printer power supply) [EUT does not affect level]		
9	79.746M	51.5	+7.7 QP	+1.0 -27.1	+1.0	+0.1	+0.0	34.2	40.0	-5.8	Vert
									Non-EUT signal (parallel printer power supply) [EUT does not affect level]		
^	79.710M	54.2	+7.7 -27.1	+1.0	+1.0	+0.1	+0.0	36.9	40.0	-3.1	Vert
									Non-EUT signal (parallel printer power supply) [EUT does not affect level]		

11	420.134M	45.7	+16.7	+2.2	+1.9	+0.5	+0.0	40.0	46.0	-6.0	Vert
	QP			-27.0							Non-EUT signal (host computer video port) [EUT does not affect level]
^	420.132M	47.3	+16.7	+2.2	+1.9	+0.5	+0.0	41.6	46.0	-4.4	Vert
			-27.0								Non-EUT signal (host computer video port) [EUT does not affect level]
13	367.607M	46.9	+15.4	+2.1	+1.9	+0.4	+0.0	39.8	46.0	-6.2	Vert
			-26.9								Non-EUT signal (host computer chassis) [EUT does not affect level]
14	131.309M	49.8	+11.7	+1.3	+1.2	+0.2	+0.0	37.2	43.5	-6.3	Horiz
	QP			-27.0							Non-EUT signal (host computer video port) [EUT does not affect level]
^	131.314M	51.5	+11.7	+1.3	+1.2	+0.2	+0.0	38.9	43.5	-4.6	Horiz
			-27.0								Non-EUT signal (host computer video port) [EUT does not affect level]
16	331.231M	47.5	+14.4	+2.0	+1.9	+0.4	+0.0	39.4	46.0	-6.6	Vert
			-26.8								Non-EUT signal (host computer chassis) [EUT does not affect level]
17	236.315M	51.1	+11.8	+1.6	+1.6	+0.3	+0.0	39.4	46.0	-6.6	Horiz
	QP			-27.0							Non-EUT signal (host computer video port) [EUT does not affect level]
^	236.339M	52.6	+11.8	+1.6	+1.6	+0.3	+0.0	40.9	46.0	-5.1	Horiz
			-27.0								Non-EUT signal (host computer video port) [EUT does not affect level]

19	288.845M	48.3	+13.3 -26.7	+1.9	+1.9	+0.4	+0.0	39.1	46.0	-6.9	Horiz
	QP										Non-EUT signal (host computer video port) [EUT does not affect level]
^	288.840M	50.3	+13.3 -26.7	+1.9	+1.9	+0.4	+0.0	41.1	46.0	-4.9	Horiz
											Non-EUT signal (host computer video port) [EUT does not affect level]
21	446.371M	44.0	+17.2 -27.1	+2.3	+2.1	+0.5	+0.0	39.0	46.0	-7.0	Vert
	QP										
^	446.368M	45.9	+17.2 -27.1	+2.3	+2.1	+0.5	+0.0	40.9	46.0	-5.1	Vert
23	297.601M	48.1	+13.4 -26.7	+1.9	+1.9	+0.4	+0.0	39.0	46.0	-7.0	Horiz
24	331.279M	46.9	+14.4 -26.8	+2.0	+1.9	+0.4	+0.0	38.8	46.0	-7.2	Horiz
25	315.074M	47.4	+13.9 -26.7	+1.9	+1.9	+0.4	+0.0	38.8	46.0	-7.2	Horiz
	QP										
^	315.074M	47.7	+13.9 -26.7	+1.9	+1.9	+0.4	+0.0	39.1	46.0	-6.9	Horiz
27	335.624M	46.8	+14.5 -26.8	+2.0	+1.9	+0.4	+0.0	38.8	46.0	-7.2	Horiz
28	240.064M	49.7	+12.0 -26.9	+1.7	+1.7	+0.4	+0.0	38.6	46.0	-7.4	Horiz
	QP										
^	240.064M	51.0	+12.0 -26.9	+1.7	+1.7	+0.4	+0.0	39.9	46.0	-6.1	Horiz
30	446.371M	43.6	+17.2 -27.1	+2.3	+2.1	+0.5	+0.0	38.6	46.0	-7.4	Horiz
31	287.682M	47.8	+13.2 -26.7	+1.9	+1.9	+0.4	+0.0	38.5	46.0	-7.5	Horiz
32	840.206M	34.0	+22.6 -25.5	+3.3	+3.2	+0.8	+0.0	38.4	46.0	-7.6	Vert
33	341.360M	46.1	+14.7 -26.8	+2.0	+2.0	+0.4	+0.0	38.4	46.0	-7.6	Vert
34	630.161M	38.6	+20.2 -26.6	+2.9	+2.7	+0.6	+0.0	38.4	46.0	-7.6	Vert
35	80.358M	49.6	+7.7 -27.1	+1.0	+1.0	+0.1	+0.0	32.3	40.0	-7.7	Horiz
36	925.760M	32.7	+23.7 -26.1	+3.5	+3.3	+1.2	+0.0	38.3	46.0	-7.7	Horiz
37	351.606M	45.5	+15.0 -26.8	+2.0	+2.0	+0.4	+0.0	38.1	46.0	-7.9	Horiz
38	332.599M	46.2	+14.4 -26.8	+2.0	+1.9	+0.4	+0.0	38.1	46.0	-7.9	Horiz
39	761.432M	35.5	+21.7 -26.0	+3.1	+3.0	+0.8	+0.0	38.1	46.0	-7.9	Vert

40	480.024M	41.5	+17.9 -27.0	+2.4	+2.5	+0.6	+0.0	37.9	46.0	-8.1	Vert
41	420.130M	43.6	+16.7 -27.0	+2.2	+1.9	+0.5	+0.0	37.9	46.0	-8.1	Horiz
42	728.559M	35.7	+21.3 -26.1	+3.1	+3.0	+0.8	+0.0	37.8	46.0	-8.2	Horiz
QP											
^	728.525M	38.8	+21.3 -26.1	+3.1	+3.0	+0.8	+0.0	40.9	46.0	-5.1	Horiz
44	245.079M	48.5	+12.4 -26.9	+1.7	+1.7	+0.4	+0.0	37.8	46.0	-8.2	Horiz
45	236.316M	49.5	+11.8 -27.0	+1.6	+1.6	+0.3	+0.0	37.8	46.0	-8.2	Vert
46	367.601M	44.7	+15.4 -26.9	+2.1	+1.9	+0.4	+0.0	37.6	46.0	-8.4	Horiz
47	720.166M	35.8	+21.2 -26.2	+3.0	+2.9	+0.8	+0.0	37.5	46.0	-8.5	Horiz
48	253.840M	47.8	+12.8 -26.9	+1.7	+1.7	+0.4	+0.0	37.5	46.0	-8.5	Horiz
49	245.096M	48.1	+12.4 -26.9	+1.7	+1.7	+0.4	+0.0	37.4	46.0	-8.6	Vert
50	925.712M	31.7	+23.7 -26.1	+3.5	+3.3	+1.2	+0.0	37.3	46.0	-8.7	Vert
QP											
^	925.760M	35.6	+23.7 -26.1	+3.5	+3.3	+1.2	+0.0	41.2	46.0	-4.8	Vert
52	656.426M	37.0	+20.5 -26.5	+2.9	+2.8	+0.6	+0.0	37.3	46.0	-8.7	Vert
QP											
^	656.430M	39.7	+20.5 -26.5	+2.9	+2.8	+0.6	+0.0	40.0	46.0	-6.0	Vert
54	813.947M	33.5	+22.3 -25.6	+3.2	+3.1	+0.8	+0.0	37.3	46.0	-8.7	Vert
55	288.840M	46.4	+13.3 -26.7	+1.9	+1.9	+0.4	+0.0	37.2	46.0	-8.8	Vert
56	728.546M	35.1	+21.3 -26.1	+3.1	+3.0	+0.8	+0.0	37.2	46.0	-8.9	Vert
QP											
^	728.554M	38.1	+21.3 -26.1	+3.1	+3.0	+0.8	+0.0	40.2	46.0	-5.8	Vert
58	432.018M	42.4	+17.0 -27.1	+2.3	+2.0	+0.5	+0.0	37.1	46.0	-8.9	Horiz
59	48.021M	46.4	+10.1 -27.2	+0.8	+0.8	+0.1	+0.0	31.0	40.0	-9.0	Vert
QP											
^	48.086M	50.5	+10.1 -27.2	+0.8	+0.8	+0.1	+0.0	35.1	40.0	-4.9	Vert
61	630.158M	37.1	+20.2 -26.6	+2.9	+2.7	+0.6	+0.0	36.9	46.0	-9.1	Horiz

62	218.838M	49.8	+10.5 -27.0	+1.6	+1.6	+0.3	+0.0	36.8	46.0	-9.2	Horiz
	QP										Non-EUT signal (host computer video port) [EUT does not affect level]
^	218.839M	51.4	+10.5 -27.0	+1.6	+1.6	+0.3	+0.0	38.4	46.0	-7.6	Horiz
											Non-EUT signal (host computer video port) [EUT does not affect level]
64	79.727M	48.0	+7.7 -27.1	+1.0	+1.0	+0.1	+0.0	30.7	40.0	-9.3	Horiz
	QP										
^	79.734M	50.3	+7.7 -27.1	+1.0	+1.0	+0.1	+0.0	33.0	40.0	-7.0	Horiz
66	72.883M	48.7	+6.9 -27.0	+1.0	+1.0	+0.1	+0.0	30.7	40.0	-9.3	Vert
67	551.373M	38.7	+19.1 -27.2	+2.5	+2.6	+0.6	+0.0	36.3	46.0	-9.7	Vert
68	682.666M	35.2	+20.7 -26.3	+3.0	+2.9	+0.7	+0.0	36.2	46.0	-9.8	Vert
69	428.839M	41.7	+16.9 -27.1	+2.3	+1.9	+0.5	+0.0	36.2	46.0	-9.8	Vert
70	157.557M	46.7	+10.9 -27.1	+1.4	+1.3	+0.3	+0.0	33.5	43.5	-10.0	Horiz
	QP										Non-EUT signal (host computer video port) [EUT does not affect level]
^	157.579M	50.0	+10.9 -27.1	+1.4	+1.3	+0.3	+0.0	36.8	43.5	-6.7	Horiz
											Non-EUT signal (host computer video port) [EUT does not affect level]
72	432.015M	41.2	+17.0 -27.1	+2.3	+2.0	+0.5	+0.0	35.9	46.0	-10.1	Vert
73	525.130M	38.6	+18.7 -27.1	+2.5	+2.6	+0.6	+0.0	35.9	46.0	-10.1	Vert

74	183.837M	48.1	+9.1	+1.3	+1.5	+0.3	+0.0	33.3	43.5	-10.2	Horiz
	QP		-27.0								Non-EUT signal (host computer video port) [EUT does not affect level]
^	183.841M	49.3	+9.1	+1.3	+1.5	+0.3	+0.0	34.5	43.5	-9.0	Horiz
			-27.0								Non-EUT signal (host computer video port) [EUT does not affect level]
76	472.616M	39.7	+17.7	+2.4	+2.5	+0.5	+0.0	35.8	46.0	-10.2	Vert
			-27.0								
77	315.083M	44.4	+13.9	+1.9	+1.9	+0.4	+0.0	35.8	46.0	-10.2	Vert
			-26.7								
78	271.359M	45.4	+13.0	+1.8	+1.8	+0.4	+0.0	35.6	46.0	-10.4	Horiz
			-26.8								
79	350.121M	43.0	+15.0	+2.0	+2.0	+0.4	+0.0	35.6	46.0	-10.4	Vert
			-26.8								
80	525.135M	38.1	+18.7	+2.5	+2.6	+0.6	+0.0	35.4	46.0	-10.6	Horiz
			-27.1								
81	351.612M	42.7	+15.0	+2.0	+2.0	+0.4	+0.0	35.3	46.0	-10.7	Vert
			-26.8								
82	358.840M	42.5	+15.2	+2.0	+2.0	+0.4	+0.0	35.3	46.0	-10.7	Horiz
			-26.8								
83	717.673M	33.7	+21.1	+3.0	+2.9	+0.8	+0.0	35.3	46.0	-10.7	Vert
			-26.2								
84	203.324M	47.0	+9.3	+1.4	+1.6	+0.3	+0.0	32.7	43.5	-10.8	Horiz
	QP		-26.9								
^	203.324M	48.8	+9.3	+1.4	+1.6	+0.3	+0.0	34.5	43.5	-9.0	Horiz
			-26.9								
86	264.500M	45.0	+12.9	+1.8	+1.8	+0.4	+0.0	35.1	46.0	-10.9	Horiz
			-26.8								
87	262.591M	45.0	+12.9	+1.8	+1.8	+0.4	+0.0	35.1	46.0	-10.9	Vert
			-26.8								
88	232.329M	47.0	+11.5	+1.6	+1.6	+0.3	+0.0	35.0	46.0	-11.0	Horiz
			-27.0								EUT signal
89	227.600M	47.3	+11.1	+1.6	+1.6	+0.3	+0.0	34.9	46.0	-11.1	Horiz
	QP		-27.0								Non-EUT signal (host computer video port) [EUT does not affect level]
^	227.597M	49.2	+11.1	+1.6	+1.6	+0.3	+0.0	36.8	46.0	-9.2	Horiz
			-27.0								Non-EUT signal (host computer video port) [EUT does not affect level]

91	148.800M	45.1	+11.4 -27.1	+1.4	+1.3	+0.3	+0.0	32.4	43.5	-11.1	Horiz
92	240.068M	45.9	+12.0 -26.9	+1.7	+1.7	+0.4	+0.0	34.8	46.0	-11.2	Vert
93	157.523M	45.4	+10.9 -27.1	+1.4	+1.3	+0.3	+0.0	32.2	43.5	-11.3	Vert
	QP										
^	157.519M	48.1	+10.9 -27.1	+1.4	+1.3	+0.3	+0.0	34.9	43.5	-8.6	Vert
95	201.311M	46.6	+9.1 -26.9	+1.4	+1.6	+0.3	+0.0	32.1	43.5	-11.4	Horiz
	QP										
^	201.313M	48.6	+9.1 -26.9	+1.4	+1.6	+0.3	+0.0	34.1	43.5	-9.4	Horiz
97	130.140M	44.7	+11.7 -27.0	+1.2	+1.2	+0.2	+0.0	32.0	43.5	-11.5	Vert
									EUT signal (wheel)		
98	143.203M	44.5	+11.7 -27.1	+1.3	+1.3	+0.3	+0.0	32.0	43.5	-11.5	Horiz
99	192.611M	46.8	+9.0 -27.0	+1.4	+1.5	+0.3	+0.0	32.0	43.5	-11.5	Horiz
100	280.105M	44.2	+13.1 -26.8	+1.8	+1.8	+0.4	+0.0	34.5	46.0	-11.5	Vert
101	481.376M	37.8	+17.9 -27.0	+2.4	+2.6	+0.6	+0.0	34.3	46.0	-11.7	Vert
102	140.067M	44.1	+11.8 -27.1	+1.3	+1.3	+0.3	+0.0	31.7	43.5	-11.8	Vert
103	200.294M	46.3	+9.0 -26.9	+1.4	+1.6	+0.3	+0.0	31.7	43.5	-11.9	Horiz
	QP								EUT signal		
^	200.315M	49.3	+9.0 -26.9	+1.4	+1.6	+0.3	+0.0	34.7	43.5	-8.8	Horiz
									EUT signal		
105	479.453M	37.8	+17.8 -27.0	+2.4	+2.5	+0.6	+0.0	34.1	46.0	-11.9	Horiz
106	201.320M	46.0	+9.1 -26.9	+1.4	+1.6	+0.3	+0.0	31.5	43.5	-12.0	Vert
107	210.078M	45.1	+9.8 -26.9	+1.5	+1.6	+0.3	+0.0	31.4	43.5	-12.1	Vert
	QP										
^	210.077M	47.2	+9.8 -26.9	+1.5	+1.6	+0.3	+0.0	33.5	43.5	-10.0	Vert
109	113.832M	44.8	+11.1 -27.1	+1.1	+1.2	+0.2	+0.0	31.3	43.5	-12.2	Vert
110	253.837M	44.0	+12.8 -26.9	+1.7	+1.7	+0.4	+0.0	33.7	46.0	-12.3	Vert
111	105.053M	45.6	+10.6 -27.2	+1.0	+1.1	+0.1	+0.0	31.2	43.5	-12.3	Vert
112	297.591M	42.7	+13.4 -26.7	+1.9	+1.9	+0.4	+0.0	33.6	46.0	-12.4	Vert
113	160.017M	44.3	+10.7 -27.1	+1.4	+1.3	+0.3	+0.0	30.9	43.5	-12.6	Vert
114	288.019M	42.7	+13.2 -26.7	+1.9	+1.9	+0.4	+0.0	33.4	46.0	-12.6	Horiz

115	166.319M	44.9	+10.1	+1.3	+1.4	+0.3	+0.0	30.9	43.5	-12.6	Horiz
	QP		-27.1								
^	166.316M	49.3	+10.1	+1.3	+1.4	+0.3	+0.0	35.3	43.5	-8.2	Horiz
			-27.1								
117	131.311M	43.4	+11.7	+1.3	+1.2	+0.2	+0.0	30.8	43.5	-12.7	Vert
	QP		-27.0								
^	131.309M	46.7	+11.7	+1.3	+1.2	+0.2	+0.0	34.1	43.5	-9.4	Vert
			-27.0								
119	140.071M	43.2	+11.8	+1.3	+1.3	+0.3	+0.0	30.8	43.5	-12.7	Horiz
	QP		-27.1								
^	140.068M	45.9	+11.8	+1.3	+1.3	+0.3	+0.0	33.5	43.5	-10.0	Horiz
			-27.1								
121	200.437M	45.3	+9.0	+1.4	+1.6	+0.3	+0.0	30.7	43.5	-12.8	Vert
			-26.9								
122	96.123M	45.9	+9.6	+1.0	+1.1	+0.1	+0.0	30.6	43.5	-12.9	Vert
			-27.1						EUT signal		
123	96.131M	45.9	+9.6	+1.0	+1.1	+0.1	+0.0	30.6	43.5	-12.9	Horiz
			-27.1						EUT signal		
124	175.063M	45.2	+9.4	+1.3	+1.4	+0.3	+0.0	30.5	43.5	-13.0	Horiz
	QP		-27.1								
^	175.058M	51.2	+9.4	+1.3	+1.4	+0.3	+0.0	36.5	43.5	-7.0	Horiz
			-27.1								
126	166.322M	44.5	+10.1	+1.3	+1.4	+0.3	+0.0	30.5	43.5	-13.0	Vert
			-27.1								
127	181.398M	45.2	+9.1	+1.3	+1.5	+0.3	+0.0	30.4	43.5	-13.1	Vert
			-27.0								
128	122.547M	42.7	+11.6	+1.2	+1.2	+0.2	+0.0	29.9	43.5	-13.6	Horiz
	QP		-27.0								
^	122.594M	45.9	+11.6	+1.2	+1.2	+0.2	+0.0	33.1	43.5	-10.4	Horiz
			-27.0								
130	192.032M	44.7	+9.0	+1.4	+1.5	+0.3	+0.0	29.9	43.5	-13.6	Horiz
			-27.0								
131	200.279M	44.4	+9.0	+1.4	+1.6	+0.3	+0.0	29.8	43.5	-13.7	Vert
			-26.9						EUT signal		
132	114.548M	43.0	+11.2	+1.1	+1.2	+0.2	+0.0	29.6	43.5	-13.9	Vert
			-27.1								
133	171.817M	44.0	+9.7	+1.3	+1.4	+0.3	+0.0	29.6	43.5	-13.9	Vert
			-27.1								
134	216.315M	45.0	+10.3	+1.5	+1.6	+0.3	+0.0	31.7	46.0	-14.3	Horiz
	QP		-27.0						EUT signal		
^	216.319M	46.8	+10.3	+1.5	+1.6	+0.3	+0.0	33.5	46.0	-12.5	Horiz
			-27.0						EUT signal		
136	122.557M	41.9	+11.6	+1.2	+1.2	+0.2	+0.0	29.1	43.5	-14.4	Vert
			-27.0								
137	192.331M	43.7	+9.0	+1.4	+1.5	+0.3	+0.0	28.9	43.5	-14.6	Horiz
			-27.0						EUT signal		
138	192.025M	43.4	+9.0	+1.4	+1.5	+0.3	+0.0	28.6	43.5	-14.9	Vert
			-27.0								
139	271.338M	40.9	+13.0	+1.8	+1.8	+0.4	+0.0	31.1	46.0	-14.9	Vert
			-26.8								

140	218.839M	44.0	+10.5	+1.6	+1.6	+0.3	+0.0	31.0	46.0	-15.0	Vert
	QP		-27.0								
^	218.831M	46.4	+10.5	+1.6	+1.6	+0.3	+0.0	33.4	46.0	-12.6	Vert
-27.0											
142	227.600M	43.3	+11.1	+1.6	+1.6	+0.3	+0.0	30.9	46.0	-15.2	Vert
	QP		-27.0								
^	227.598M	45.5	+11.1	+1.6	+1.6	+0.3	+0.0	33.1	46.0	-12.9	Vert
-27.0											
144	183.833M	43.1	+9.1	+1.3	+1.5	+0.3	+0.0	28.3	43.5	-15.2	Vert
			-27.0								
145	148.773M	41.0	+11.4	+1.4	+1.3	+0.3	+0.0	28.3	43.5	-15.2	Vert
			-27.1								
146	298.368M	39.9	+13.4	+1.9	+1.9	+0.4	+0.0	30.8	46.0	-15.2	Vert
			-26.7								
147	120.192M	40.1	+11.5	+1.2	+1.2	+0.2	+0.0	27.2	43.5	-16.3	Horiz
			-27.0						EUT signal		
148	208.335M	40.8	+9.7	+1.5	+1.6	+0.3	+0.0	27.0	43.5	-16.5	Horiz
			-26.9						EUT signal		
149	216.332M	40.7	+10.3	+1.5	+1.6	+0.3	+0.0	27.4	46.0	-18.6	Vert
			-27.0						EUT signal		
150	260.198M	29.9	+12.9	+1.7	+1.7	+0.4	+0.0	19.7	46.0	-26.3	Horiz
	QP		-26.9						EUT signal (wheel)		
^	260.198M	73.0	+12.9	+1.7	+1.7	+0.4	+0.0	62.8	46.0	+16.8	Horiz
			-26.9						EUT signal (wheel)		
152	130.200M	28.5	+11.7	+1.2	+1.2	+0.2	+0.0	15.8	43.5	-27.7	Horiz
	QP		-27.0						EUT signal (wheel)		
^	130.200M	54.0	+11.7	+1.2	+1.2	+0.2	+0.0	41.3	43.5	-2.2	Horiz
			-27.0						EUT signal (wheel)		
154	260.270M	27.5	+12.9	+1.7	+1.7	+0.4	+0.0	17.3	46.0	-28.7	Vert
	QP		-26.9						EUT signal (wheel)		
^	260.270M	65.0	+12.9	+1.7	+1.7	+0.4	+0.0	54.8	46.0	+8.8	Vert
			-26.9						EUT signal (wheel)		

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **NMB Technologies, Inc.**
 Specification: **FCC 15.209**
 Work Order #: **80649** Date: 07/03/2003
 Test Type: **Maximized Emissions** Time: 12:01:34
 Equipment: **Wireless Keyboard** Sequence#: 5
 Manufacturer: NMB Technologies, Inc. Tested By: Stuart Yamamoto
 Model: Denali Pre-DV
 S/N: See Data List Notes

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Receiver (for Keyboard)		USB and PS/2	
Wireless Keyboard*	NMB Technologies, Inc.	Denali Pre-DV	See Data List Notes

Support Devices:

Function	Manufacturer	Model #	S/N
PS/2 Mouse	Microsoft	2.1A	1734893-50000NA
Printer	Epson	P156A	CMR1545596
Monitor	Gateway	500-069EV	15013A000011
PS/2 Mouse	Microsoft	93633	
Computer	Dell Corporation	MCM	EHR4I

Test Conditions / Notes:

The EUT's and support equipment are placed on the wooden table. The receiver is connected to the USB and PS/2 port of the host computer. Also connected to the host computer are a USB ZIP drive, parallel printer, PS/2 mouse and a monitor. The "H" key of the EUT is pressed, sending data to the receiver and the computer displays the "H" character on the monitor. Cap lock, Num lock and F lock are all activated. Tx = 27.095 MHz and 27.195 MHz. 4.5 VDC to keyboard by batteries. 5VDC to Receiver by Computer USB/PS2 ports. Temperature: 26°C, Humidity: 53%, Pressure: 100kPa. Frequency tested: 9 kHz – 1 GHz.

Transducer Legend:

T1=Bilog SN2629 062604	T2=Cable #6 (Ant to Bulkhead) 050603
T3=Cable Heliax #17 84ft(10 meter)	T4=Cable#22 BNC (preamp to SA)
T5=Preamp 8447D 02320 (site D) 010404	

<i>Measurement Data:</i>				Reading listed by margin.								Test Distance: 3 Meters			
#	Freq	Rdng		T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar			
				dB	dB	dB	dB	Table	dB	dB	dB				
1	190.319M	47.6		+9.0	+1.4	+1.5	+0.3	+0.0	32.8	41.0	-8.2	Horiz			
				-27.0											
2	189.608M	45.9		+9.1	+1.4	+1.5	+0.3	+0.0	31.2	41.0	-9.8	Horiz			
				-27.0											
3	190.319M	41.7		+9.0	+1.4	+1.5	+0.3	+0.0	26.9	41.0	-14.1	Vert			
				-27.0											
4	189.650M	41.1		+9.1	+1.4	+1.5	+0.3	+0.0	26.4	41.0	-14.6	Vert			
				-27.0											