



MAUI INNOVATIVE PERIPHERALS, INC. TEST REPORT

FOR THE

3-D MOUSE, CYMOUSE

**EN61000-3-2 (1995 W/A1 & A2 1998), EN61000-3-3 (1995 W/A1 1998),
BS EN55024 (1998), BS EN55022 (1998) CLASS B AND CISPR 22 (1997) CLASS B**

COMPLIANCE

DATE OF ISSUE: NOVEMBER 15, 2001

PREPARED FOR:

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Date of test: September 14 - November 7, 2001

Report No.: CE01-226

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CKC Laboratories, Inc. has received Certificates of Accreditation from the following agencies:
A2LA (USA); DATech (Germany); BSMI (Taiwan); Nemko (Norway); and GOST (Russia).

CKC Laboratories, Inc has received test site Registration Acceptance from the following agencies:
FCC (USA); VCCI (Japan); and Industry Canada.

CKC Laboratories, Inc. has received Letters of Acceptance through an MRA for the following agencies:
ACA/NATA (Australia); SABS (South Africa); SWEDAC (Sweden); Radio Communications Agency (RA); HOKLAS (Hong Kong); Bakom (Swiss); BIPT (Belgium); Denmark Telestyrelsen; RvA (Netherlands); SEE (Luxembourg) SITTEL (Bolivia); and UKAS (UK).

ADMINISTRATIVE INFORMATION

DATE OF TEST:	September 14 - November 7, 2001
DATE OF RECEIPT:	September 14, 2001
PURPOSE OF TEST:	To demonstrate the compliance of the 3-D Mouse, CyMouse with the requirements for EN61000-3-2, EN61000-3-3, EN55024, EN55022 Class B and CISPR 22 Class B devices.
TEST METHOD:	EN61000-3-2 (1995 w/A1 & A2 1998), EN61000-3-3 (1995 w/A1 1998), BS EN55024 (1998), BS EN55022 (1998) and ANSI C63.4 (1992)
MANUFACTURER:	Maui Innovative Peripherals, Inc. 300 Ohukai Road, Suite C 325 Kihei, Maui HI 96753-8994
REPRESENTATIVE:	Tim
TEST LOCATION:	CKC Laboratories, Inc. 110 Olinda Place Brea, CA 92621

SUMMARY OF RESULTS

As received, the Maui Innovative Peripherals, Inc. 3-D Mouse, CyMouse was found to be fully compliant with the following standards and specifications:

European Union

- BS EN55024 (1998)
- BS EN55022 (1998) Class B
- EN61000-3-2 (1995 w/A1 & A2 1998)
- EN61000-3-3 (1995 w/A1 1998)

Australia/New Zealand

AS/NZS 3548 (w/A1 & A2 1997) Class B using:

- BS EN55022 (1998) Class B

Japan

VCCI (April 2000) Class B using:

- CISPR 22 (1997) Class B

The results in this report apply only to the items tested, as identified herein.

REQUIRED EUT CHANGES TO COMPLY

No modifications to the EUT were necessary to comply.

APPROVALS

QUALITY ASSURANCE:



Dennis Ward, Quality Manager



Steve Behm, EMC/Lab Manager



Christine Nicklas, EMC/Lab Manager

TEST PERSONNEL:



Hosai Omarkhil, Test Engineer



Philip Kim, Test Engineer



Bobby Keams, Test Engineer



Amrinder Brar, EMC Engineer

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The EUT tested by CKC Laboratories was a production unit.

3-D Mouse.

EQUIPMENT UNDER TEST

3-D Mouse

Manuf: Maui Innovative Peripherals, Inc.
Model: CyMouse
Serial: 3
FCC ID: OZZ (pending)

PERIPHERAL DEVICES

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

Monitor

Manuf: Sylvania
Model: TF721
Serial: 0GAB2011118
FCC ID: DoC

PC

Manuf: Dell
Model: DHS
Serial: 3LJCT01
FCC ID: DoC

Transformer of the Cardinal Modem

Manuf: Air Stack
Model: Class 2 Transformer
Serial: NA
FCC ID: DoC

External Modem

Manuf: Cardinal
Model: 020-0470
Serial: 215-93
FCC ID: DoC

Surge Protector

Manuf: APC
Model: PRO8T2MP1213
Serial: 1208R17520
FCC ID: DoC

Keyboard

Manuf: Dell
Model: RT7000
Serial: TH-025PGG-37171-16F-2156
FCC ID: DoC

Mouse

Manuf: Dell
Model: M-S34
Serial: LNA11912906
FCC ID: DoC

SPECIFICATIONS AND REQUIREMENTS

The following summarizes the specifications and requirements for the emission and immunity tests performed on the 3-D Mouse, CyMouse. If the actual test levels are higher or different than required, these levels are listed in the appropriate tables.

Test	Specification	Requirement
Radiated Emissions	BS EN55022 (1998), CISPR 22 (1997)	Class B
Mains Conducted Emissions	BS EN55022 (1998), CISPR 22 (1997)	Class B
Harmonic Emissions	BS EN61000-3-2 (1995)	See standard
Voltage Fluctuations and Flicker Emissions	BS EN61000-3-3 (1995)	See standard
Electrostatic Discharge	EN61000-4-2 (1995) BS EN55024 (1998)	<u>±4</u> kV contact <u>±8</u> kV air
Radiated Immunity	EN61000-4-3 (1997) BS EN55024 (1998)	3 V/m
Electrical Fast Transient Burst	EN61000-4-4 1995 BS EN55024 (1998)	1kV (AC) 0.5kV (I/O) - NA
Surge	EN61000-4-5 (1995) BS EN55024 (1998)	2kV (AC) 1kV (AC) 1kV (I/O) - NA
Conducted Immunity	EN61000-4-6 (1996) BS EN55024 (1998)	3V rms
Magnetic Immunity	EN61000-4-8 1994 BS EN55024 (1998)	1 A/m - NA
Voltage Dips & Interrupts	EN61000-4-11 (1994) BS EN55024 (1998)	>95%, 30% & >95%

NA = Not Applicable

REPORT OF MEASUREMENTS

The following tables report the worst case emissions levels recorded during the tests performed on the 3-D Mouse, CyMouse. 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: Six Highest Radiated Emission Levels - EN55022/CISPR 22

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				
60.022	41.7	5.8	-27.9	2.3	21.9	30.0	-8.1	V
72.086	42.6	6.7	-27.9	2.5	23.9	30.0	-6.1	V
76.064	40.1	7.1	-27.8	2.6	22.0	30.0	-8.0	VQ
399.680	33.3	15.9	-27.5	6.6	28.3	37.0	-8.7	V
414.284	35.7	16.1	-27.6	6.7	30.9	37.0	-6.1	V
453.107	32.7	16.7	-27.9	7.0	28.5	37.0	-8.5	H

Test Method: BS EN55022 (1998)/CISPR 22 (1997)
 Spec Limit: EN55022/CISPR 22 Class B
 Test Distance: 10 Meters

NOTES:

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

COMMENTS: EUT is on a wooden table, .8 m above the ground plane. EUT (HUB) is connected via USB to Dell PC. Coming out of the hub are 2 CAT V cables, one going to the headset and the other going to the unit on the other side (typically on the PC monitor). As long as the green and red LEDs are on, EUT is functioning, transferring data. Monitor is displaying the status of the EUT. Frequency range tested: 30-1000 MHz.

Table 2: Six Highest Conducted Emission Levels - EN55022

FREQUENCY MHz	METER READING dB μ V	CORRECTION FACTORS			CORRECTED READING dB μ V	SPEC LIMIT dB μ V	MARGIN dB	NOTES	
		Lisn dB	dB	Cable dB	dB				
0.179815	50.0	0.1		0.1		50.2	54.5	-4.3	W
0.181886	50.3	0.1		0.1		50.5	54.4	-3.9	W
0.200106	48.9	0.6		0.0		49.5	53.6	-4.1	B
0.200520	49.0	0.1		0.0		49.1	53.6	-4.5	W
0.207146	47.9	0.6		0.0		48.5	53.3	-4.8	B
1.143204	42.7	0.0		0.1		42.8	46.0	-3.2	W

Test Method: BS EN55022 (1998)
 Spec Limit: EN55022 Class B

NOTES: B = Black Lead
 W = White Lead

COMMENTS: EUT is on a wooden table, .8 m above the ground plane. EUT (HUB) is connected via USB to Dell PC. Coming out of the hub are 2 CAT V cables, one going to the headset and the other going to the unit on the other side (typically on the PC monitor). As long as the green and red LEDs are on, EUT is functioning, transferring data. Monitor is displaying the status of the EUT. 230V/50Hz. Frequency range tested: 150 kHz – 30 MHz.

Table 3: Six Highest Conducted Emission Levels - CISPR 22

FREQUENCY MHz	METER READING dB μ V	CORRECTION FACTORS			CORRECTED READING dB μ V	SPEC LIMIT dB μ V	MARGIN dB	NOTES
		Lisn dB	Cable dB	dB				
0.150000	47.1	0.6		0.2	47.9	56.0	-8.1	B
0.152485	47.1	0.1		0.2	47.4	55.9	-8.5	W
0.161595	46.9	0.1		0.1	47.1	55.4	-8.3	W
0.165736	46.5	0.6		0.1	47.2	55.2	-8.0	B
16.523760	39.3	1.8		0.8	41.9	50.0	-8.1	B
16.567800	39.5	1.0		0.8	41.3	50.0	-8.7	W

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

NOTES:
 B = Black Lead
 W = White Lead

COMMENTS: EUT is on a wooden table, .8 m above the ground plane. EUT (HUB) is connected via USB to Dell PC. Coming out of the hub are 2 CAT V cables, one going to the headset and the other going to the unit on the other side (typically on the PC monitor). As long as the green and red LEDs are on, EUT is functioning, transferring data. Monitor is displaying the status of the EUT. 120V/60Hz. Frequency range tested: 150 kHz – 30 MHz.

Table 4: EN61000-3-2
Tested By: Amrinder Brar

Harmonic Emissions	Pass / Fail
✓	Pass

Notes: See Appendix C for test data sheets.

Table 5: EN61000-3-3
Tested By: Amrinder Brar

Voltage Fluctuations and Flicker Emissions	Pass / Fail
✓	Pass

Notes: See Appendix C for test data sheets.

BS EN55024 (1998)

Table 6: EN61000-4-2 Electrostatic Discharge (ESD)

Tested By: Amrinder Brar

Location	Discharge		Performance Criterion Met
	Contact ± 4 kV	Air ± 8 kV	
Point 1: Horizontal Coupling Plane, Front Center	Pass	NA	A
Point 2: Metal piece surrounded by the lens of the headset	Pass	NA	A
Point 3: Metal piece surrounded by the lens of the monitor piece	Pass	NA	A
Point 4: Horizontal Coupling Plane, Back Center	Pass	NA	A
Point 5: Vertical Coupling Plane, Left side	Pass	NA	A
Point 6: Vertical Coupling Plane, Right Side	Pass	NA	A
Point 7: USB connector right side	NA	Pass	A
Point 8: USB connector left side	NA	Pass	A
Point 9: Front lens of the monitor piece	NA	Pass	A
Point 10: Front lens of the headset	NA	Pass	A

HCP=Horizontal Coupling Plane VCP=Vertical Coupling Plane NA=Not Applicable

Temperature: 21 °C

Relative Humidity: 48 %

Atmospheric Pressure: 101 kPa

Failure Criteria: No degradation in performance or loss of functionality.

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
ESD Simulator	02167	Schaffner	NSG 435	AA3125	4/24/01	4/24/02

BS EN55024 (1998)

Table 7: EN61000-4-3 Radiated Immunity

Tested By: Amrinder Brar

Frequency Range MHz	Front V/H	Back V/H	Left Side V/H	Right Side V/H	Performance Criterion Met
80-1000	Pass	Pass	Pass	Pass	A

V=Vertical H=Horizontal Test Level: 3 V/m, 80% 1 kHz Amplitude Modulated (AM)

Failure Criteria: No degradation in performance or loss of functionality.

Equipment	Manufacturer	Model #	Asset #	Serial #	Cal Date	Cal Due
Amplifier	AR	30W1000M7	01368	18694	08/04/01	08/04/02
Antenna	Emco	3143	None	9602-1239	9/05/01	9/05/02
Directional Coupler	Werlatone	C2630	866	5155	7/08/01	7/08/02
Spectrum Analyzer	HP	8568B	2258	2415AOO280	7/25/01	7/25/02
Signal Generator	Marconi	2022D	727	119190/018	10/18/01	10/18/02

BS EN55024 (1998)

Table 8: EN61000-4-4 Electrical Fast Transient Burst (EFTB) (Power Cable)

Tested By: Amrinder Brar

EFTB insertion point	+ 1 kV pass / fail	- 1 kV pass / fail	Performance Criterion Met
Line to Ground	Pass	Pass	A
Neutral to Ground	Pass	Pass	A
Protective Earth (PE) to Ground	Pass	Pass	A
Line/Neutral/PE to Ground	Pass	Pass	A

Temperature: 21 °C

Relative Humidity: 48 %

Atmospheric Pressure: 101 kPa

Failure Criteria: No degradation in performance or loss of functionality.

Equipment	Manufacturer	Model #	Asset #	Serial #	Cal Date	Cal Due
Surge Generator	Amplifier Research	UCS500M	None	23467	6/6/01	6/6/02

Table 9 EN61000-4-4 EFTB (I/O Cables)

Cable tested	+ 0.5 kV pass / fail	- 0.5 kV pass / fail	Performance Criterion Met
I/O Cable	NA	NA	NA
Signal Cable	NA	NA	NA

NA=Not Applicable

Notes: Unit does not have any cable 3 meters or longer.

BS EN55024 (1998)

Table 10: EN61000-4-5 Surge (Power Mains)

Tested By: Amrinder Brar

Voltage level kV	Insertion points	0 degrees input +voltage-	90 degrees input +voltage-	180 degrees input +voltage-	270 degrees input +voltage-	Performance Criterion Met
		pass / fail	pass / fail	pass / fail	pass / fail	
1	Line-Neutral	Pass	Pass	Pass	Pass	A
2	Line-Ground	Pass	Pass	Pass	Pass	A
2	Neutral-Ground	Pass	Pass	Pass	Pass	A

Temperature: 21 °C
 Relative Humidity: 48 %
 Atmospheric Pressure: 101 kPa

Failure Criteria: No degradation in performance or loss of functionality.

Equipment	Manufacturer	Model #	Asset #	Serial #	Cal Date	Cal Due
Surge Generator	Amplifier Research	UCS500M	None	23467	6/6/01	6/6/02

Table 11: EN61000-4-5 Surge (I/O Cables)

I/O Cables	+ 0.5 kV pass / fail	- 0.5 kV pass / fail	Performance Criterion Met
DC Power Lines	NA	NA	NA
Signal Lines	NA	NA	NA

NA=Not Applicable

Notes: Unit does not have DC power lines or any signal lines connecting to outdoors.

BS EN55024 (1998)

Table 12: EN61000-4-6 Conducted Immunity

Tested By:

Cable Tested	Amplitude	Frequency Range	Pass/fail	Performance Criterion
AC Power Line	3 Vrms	.15-80 MHz	Pass	A
Signal Line	3 Vrms	.15-80 MHz	NA	NA

Modulated with a 1 kHz sine wave at 80%

NA=Not Applicable

Notes: Unit does not have any cables 3 meters or longer.

Failure Criteria: No degradation in performance or loss of functionality.

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Coupling Decoupling Network	0696	Fischer	FCC-801-M3-25	56	10/10/01	10/10/02
Amplifier	0639	AR	100A100	14330	8/9/01	8/9/02
Directional Coupler	0744	Werlatone	02630	3804	8/18/01	8/18/02
Spectrum Analyzer	784	HP	8596E	3346A00209	7/6/01	7/6/02
Signal Generator	727	Marconi	2022D	119190/018	10/18/01	10/18/02

Table 13: EN61000-4-8 Magnetic Immunity

Amplitude	X-Axis	Y-Axis	Z-Axis	Performance Criterion
1 A/m	NA	NA	NA	NA

NA=Not Applicable

Notes: Unit does not have any components susceptible to magnetic immunity.

BS EN55024 (1998)

Table 14: EN61000-4-11 Voltage Dips & Interrupts

Tested By:

Interrupts %	Duration	Pass/fail	Performance Criterion	Notes
>95	0.5 period	Pass	A	5 interrupts
30	25 periods	Pass	A	5 interrupts
>95	250 periods	Pass	C	1 drop out

Failure Criteria A: No degradation in performance or loss of functionality.

Failure Criteria C: User intervention allowed.

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Programmable Power Supply	864	Pacific	345AMXT-UPC32	0246	9/23/01	9/23/02

MEASUREMENT UNCERTAINTY

Associated with data in this report is a ± 4 dB measurement uncertainty.

TESTING

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 and susceptibility. I/O cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions and susceptibility was selected. The interval between different pieces of equipment was approximately 10 centimeters. All excessive interconnecting cable was bundled in 30-40 centimeter lengths.

EMISSIONS

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 radiated and conducted emissions data of the 3-D Mouse, CyMouse, 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. The corrected data was then compared to the applicable emission limits to determine compliance.

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 the radiated and conducted emissions data for the 3-D Mouse, CyMouse. For radiated measurements below 300 MHz, the biconilog antenna was used. For frequencies from 300 to 1000 MHz, the log periodic antenna was used.

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 were 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 $\text{dB}\mu\text{V}$, 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 EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz

SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions 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 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 3-D Mouse, CyMouse.

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 was 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.

RADIATED EMISSIONS

During the preliminary radiated scan, the host PC was powered up and operating in its defined test mode. The frequency range of 30 MHz - 88 MHz was scanned with the biconilog antenna located about 1.5 meter above the ground plane in the vertical configuration. During this scan, the turntable was rotated and all peaks at or near the limit were recorded. Lastly, a scan of the FM band from 88 - 110 MHz was made, using a reduced resolution bandwidth and frequency span. The biconilog 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.

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. Photographs showing the final worst case configuration of the EUT are contained in Appendix A.

CONDUCTED EMISSIONS

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.

The LISNs used were 50 μ H-/+50 ohms. Above 150 kHz, a 0.15 μ F series capacitor was 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 to 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.

HARMONIC EMISSIONS

Harmonics emissions data was taken with the Voltech Measuring Device. The harmonics of the 3-D Mouse, CyMouse power supply conductors were tested in accordance with EN61000-3-2 and measurements were found not to exceed the values calculated from EN61000-3-2 emission limits.

VOLTAGE FLUCTUATION AND FLICKER EMISSIONS

Voltage fluctuation and flicker emissions data was taken with the Voltech Measuring Device. The voltage fluctuation and flicker emissions of the 3-D Mouse, CyMouse power supply conductors were tested in accordance with EN61000-3-3 and measurements were found not to exceed the values calculated from EN61000-3-3 emission limits.

IMMUNITY

The EUT was set up in a manner that represented its 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 the immunity tables.

MONITORING OF OPERATING PARAMETERS

The device was monitored during the tests by means of a visual check whereby the essential parameters were displayed.

ELECTROSTATIC DISCHARGE

During Electrostatic Discharge testing, the EUT was located on a wooden table measuring approximately 80 cm high, 1 meter deep, and 1.5 meters in length. A horizontal coupling plane, 1.6 meters by 0.8 meters, was placed on top of the table. The EUT was then placed on a 0.5 mm thick insulating material. A 0.1 meter separation from the coupling plane was obtained. A vertical coupling plane, 0.5 m by 0.5 m, was placed parallel to, and positioned 0.1 m from, the EUT. The coupling plane was electrically bonded through two 470 k Ω series resistors to the earth reference plane on the floor, which was attached to the ground on the electrical outlet service. The ESD generator (ESD gun) was grounded to the metal ground reference plane on the floor. The ESD generator power supply was located on the ground reference plane. The ESD generator was positioned at least 0.1 meter from the EUT, with the discharge electrode touching the coupling plane.

The EUT was exposed to at least 100 (contact) discharges each at negative and positive polarity (50 discharges at each point), at a minimum of four test points, one being the horizontal coupling plane. At least 50 indirect discharges were applied to the center front edge of the horizontal coupling plane. The remaining test points received at least 50 direct contact discharges. If no direct contact test points were available, then at least 200 indirect discharges were applied to the vertical coupling plane. These tests were performed at a maximum repetition rate of one discharge per second. On the parts of the EUT where it was not possible to perform contact discharge testing, user accessible points were investigated using the air discharge method. A minimum of 10 single discharges were applied to the selected test points. The 3-D Mouse, CyMouse, was tested in accordance with EN55024 and EN61000-4-2 and meets Performance Criterion A.

RADIATED IMMUNITY

A field strength of 3 V/m was established from 80 MHz to 1000 MHz. This frequency range was modulated with a 1 kHz sine wave at 80%. The signal generators provided the modulated frequency at a 1% step size to the RF amplifiers. The RF amplifiers provided the necessary power to the antenna to establish the field levels. The antenna was positioned 1 meter from all four faces of the EUT. A biconilog antenna was used to cover the range of 80 to 1000 MHz in both polarizations. The 3-D Mouse, CyMouse, was tested in accordance with EN55024 and EN61000-4-3 and meets Performance Criterion A at a field strength of 3 V/m.

ELECTRICAL FAST TRANSIENT BURST

Test voltages of up to 1 kV in (+) and (-) polarities were applied to the AC power cords. The test voltages were at a 5 kHz pulse repetition frequency and were applied for 60 seconds between ground and each power supply terminal and between ground and protective earth. The 3-D Mouse, CyMouse, was tested in accordance with EN55024 and EN61000-4-4 and meets Performance Criterion A.

SURGE

Test voltages of up to 2 kV common mode and 1 kV differential mode in (+) and (-) polarities were applied to the EUT power cords. Characteristics of the test voltage were 1.2 μ s rise time and 50 μ s pulse width. These surges were synchronized to the 0, 90, 180 and 270 degree phase angles of the power frequency. The 3-D Mouse, CyMouse, was tested in accordance with EN55024 and EN61000-4-5 and meets Performance Criterion A.

CONDUCTED IMMUNITY

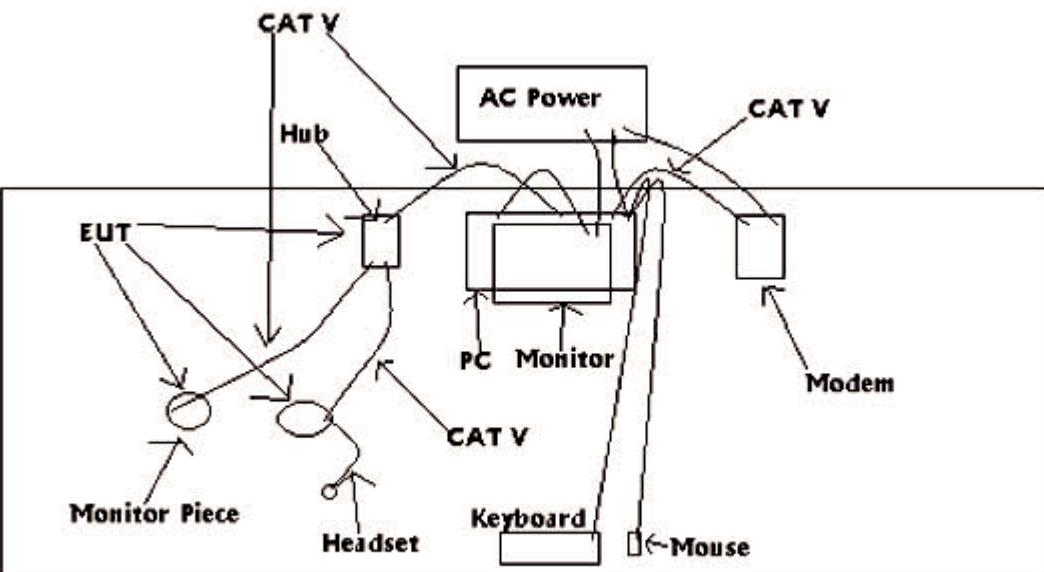
A 3 Vrms level was established from 150 kHz to 80 MHz. This frequency range was modulated with 1 kHz sine wave at 80%. The signal generators provided the modulated frequency at a 1% step size to the RF amplifiers. The RF amplifiers provided the necessary power to the CDN to establish the 3 volt level. The 3-D Mouse, CyMouse, was tested in accordance with EN55024 and EN61000-4-6 and meets Performance Criterion A at 3 Vrms.

VOLTAGE DIPS AND INTERRUPTS

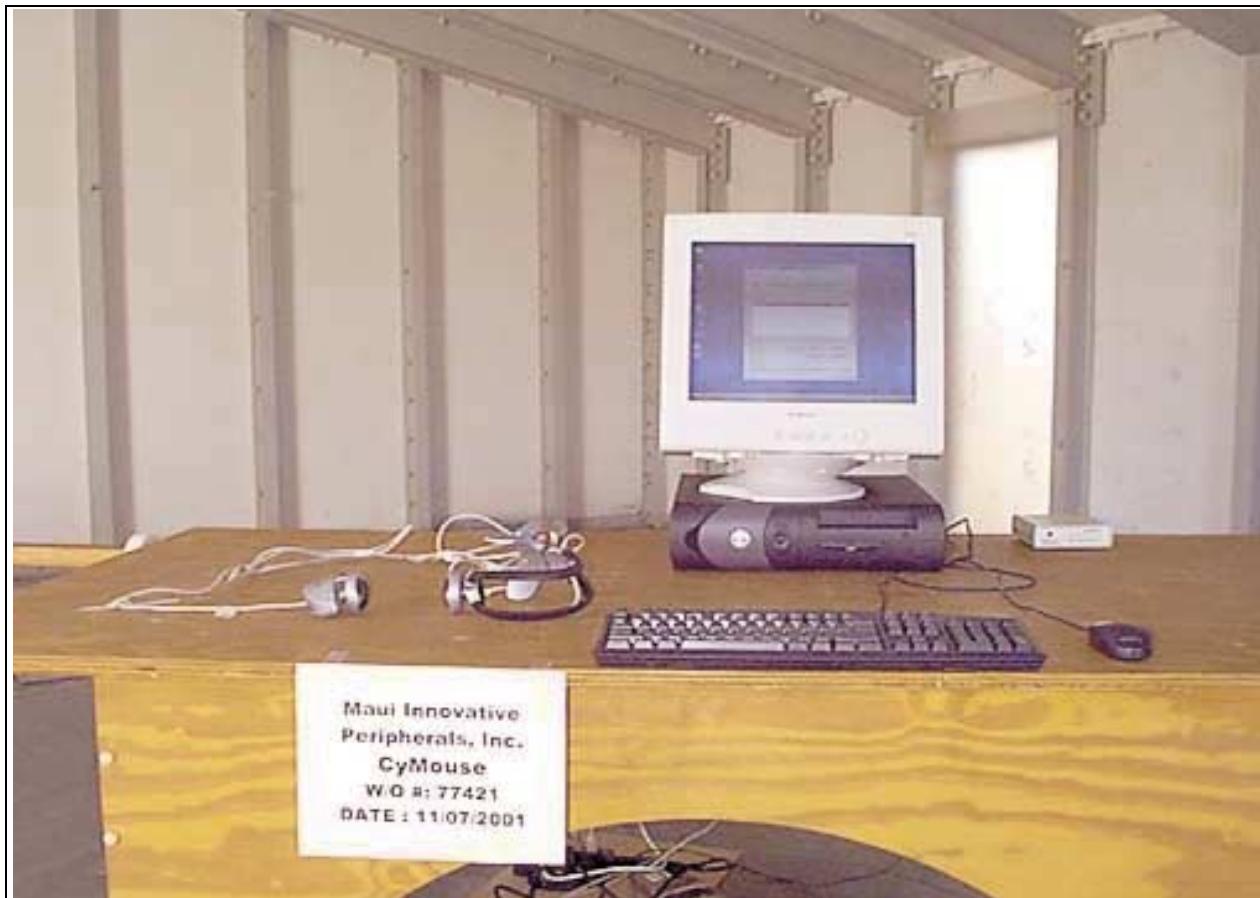
Power to the EUT was supplied by a programmable power supply. This power supply produced the following voltage dips and interrupts for EN55024: a greater than 95% reduction in voltage for 0.5 period, a 30% reduction in voltage for 25 periods, and a greater than 95% reduction in voltage for 250 periods. The 3-D Mouse, CyMouse, was tested in accordance EN55024 and EN61000-4-11 and meets performance Criteria A for a >95% reduction for 0.5 period, Criteria A for a 30% reduction for 25 periods and Criteria C for a >95% reduction in voltage for 250 periods.

APPENDIX A
TEST SETUP PHOTOGRAPHS

EQUIPMENT TEST SETUP DIAGRAM

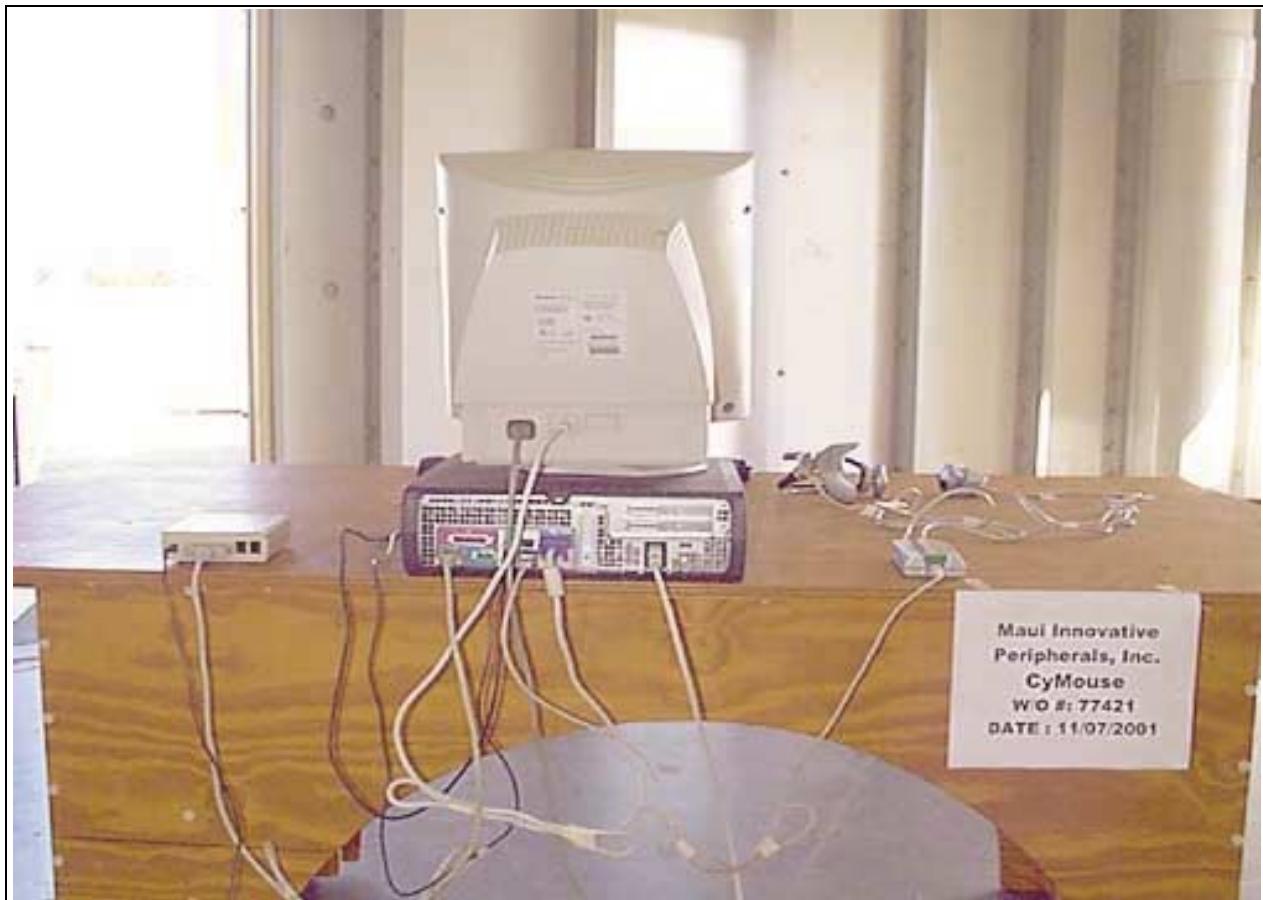


PHOTOGRAPH SHOWING RADIATED EMISSIONS



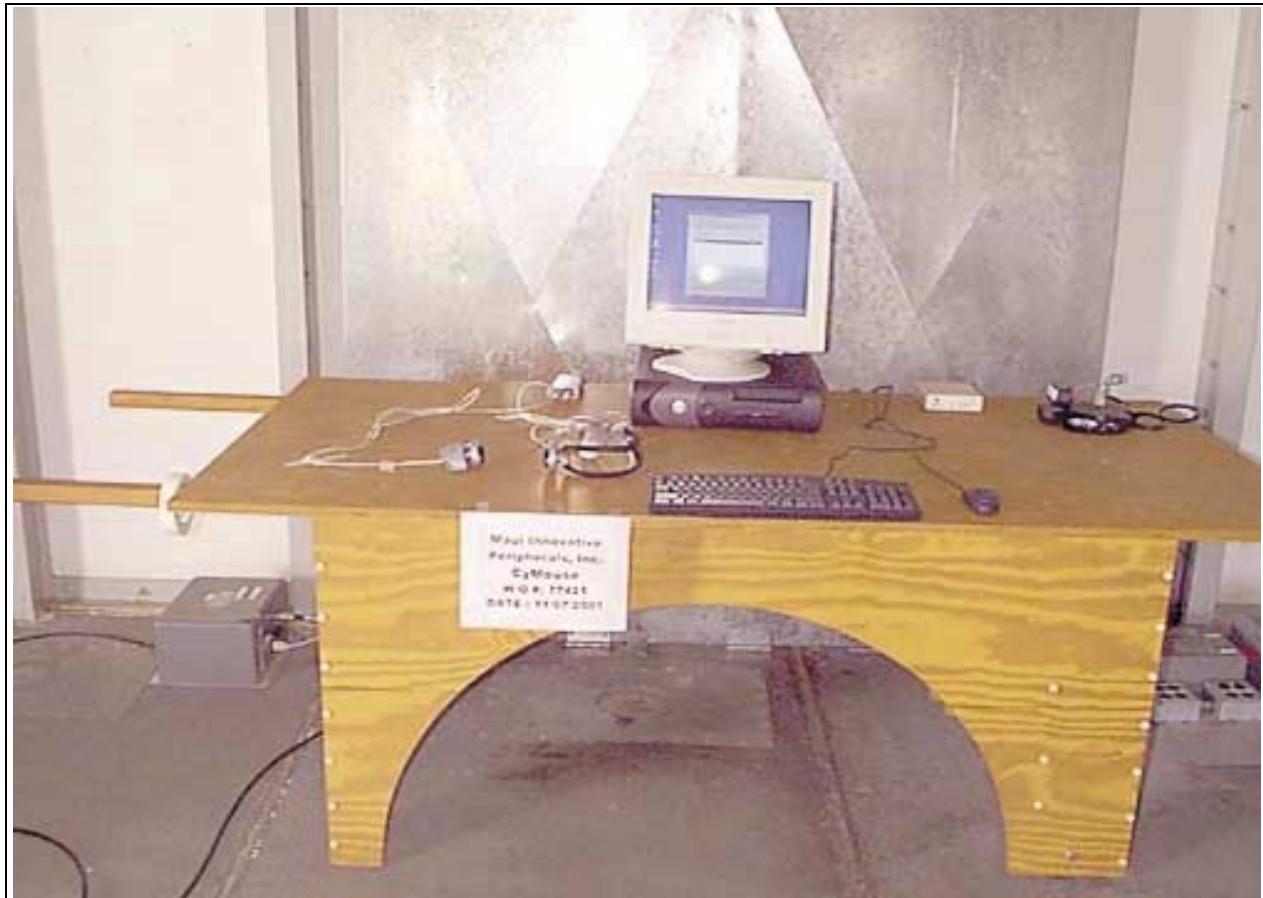
Radiated Emissions - Front View

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Back View

PHOTOGRAPH SHOWING MAINS CONDUCTED EMISSIONS



Mains Conducted Emissions - Front View

PHOTOGRAPH SHOWING MAINS CONDUCTED EMISSIONS



Mains Conducted Emissions - Side View

PHOTOGRAPH SHOWING HARMONIC EMISSIONS



Harmonic Emissions

PHOTOGRAPH SHOWING VOLTAGE FLUCTUATIONS AND FLICKER EMISSIONS



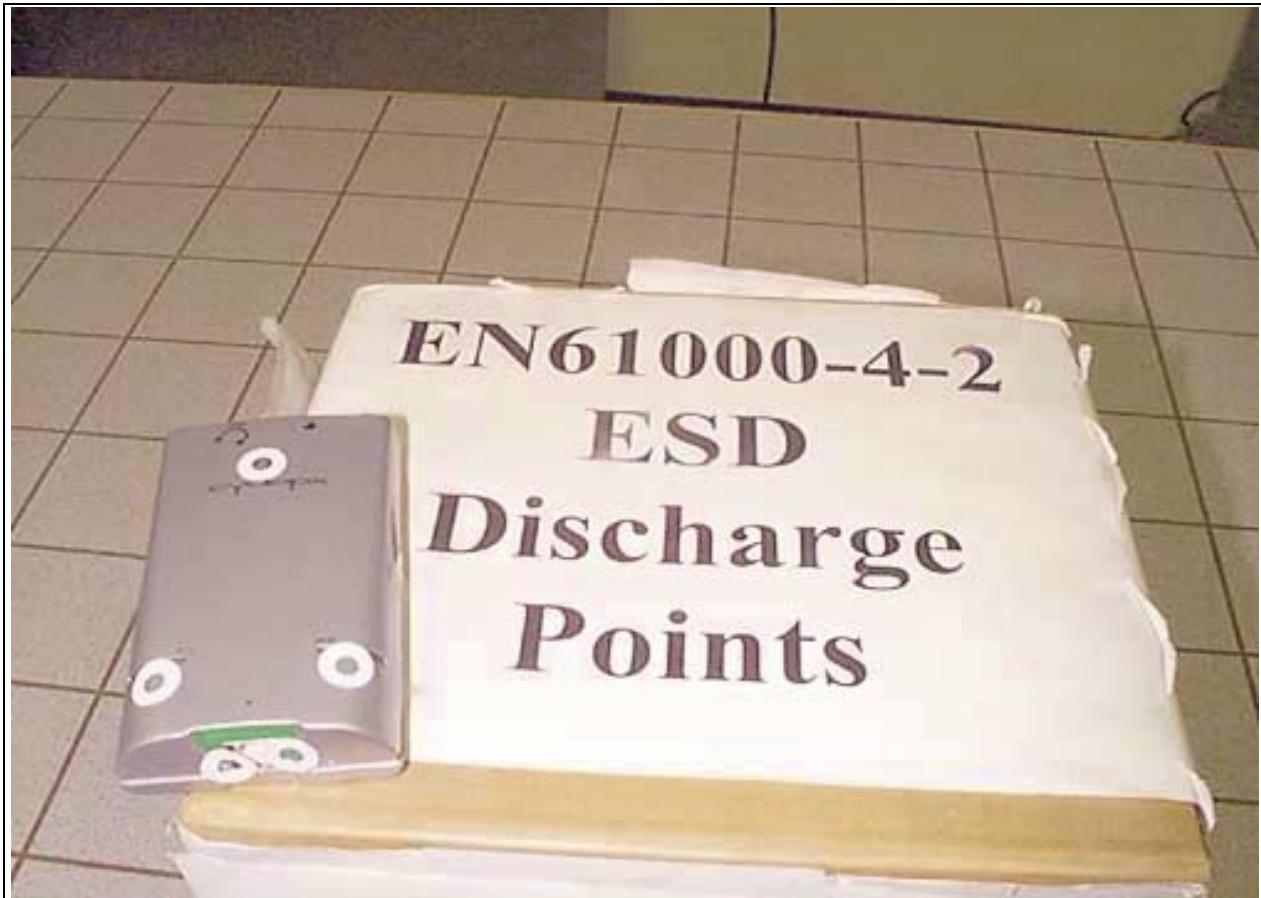
Voltage Fluctuations and Flicker Emissions

PHOTOGRAPH SHOWING ELECTROSTATIC DISCHARGE



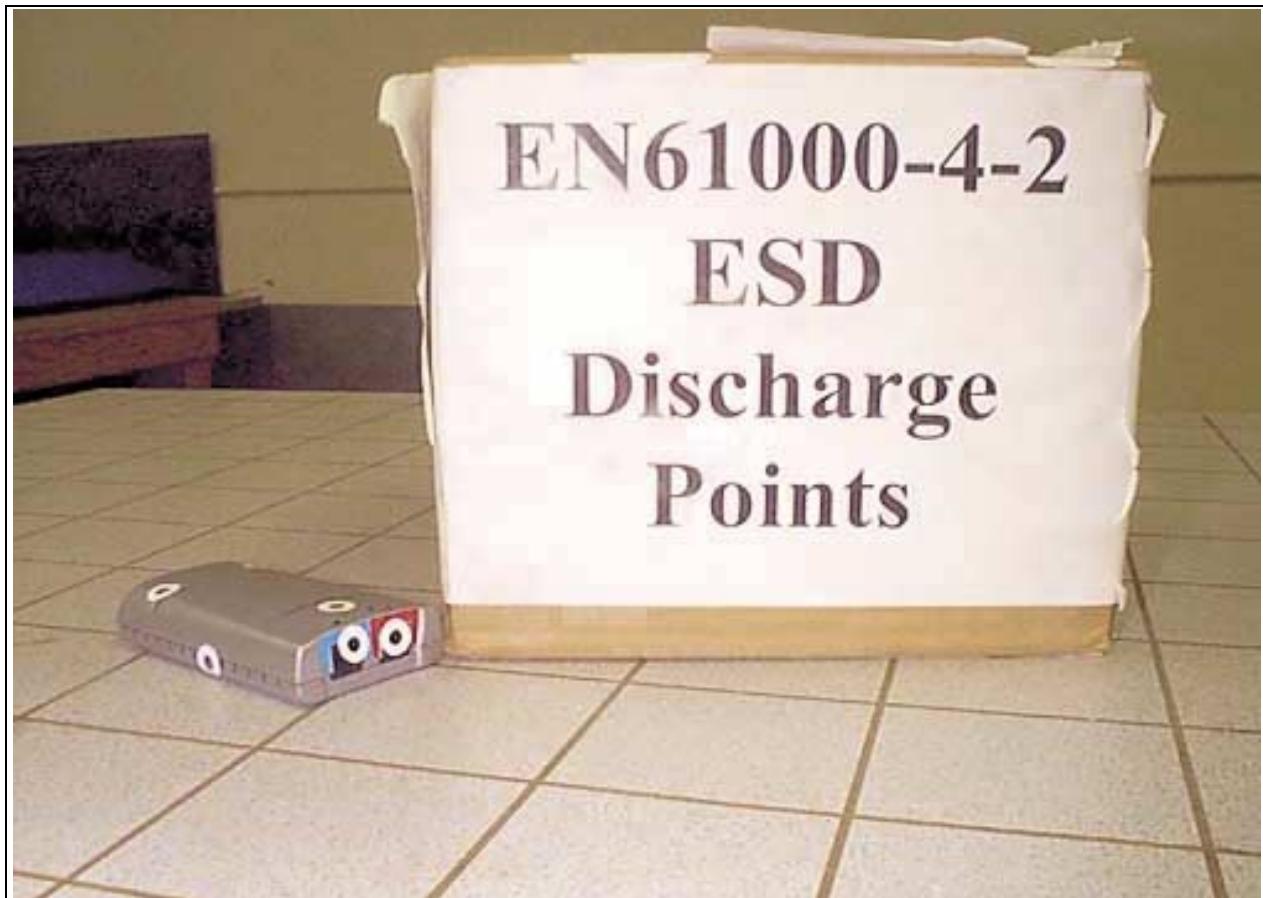
Electrostatic Discharge

PHOTOGRAPH SHOWING ELECTROSTATIC DISCHARGE POINTS



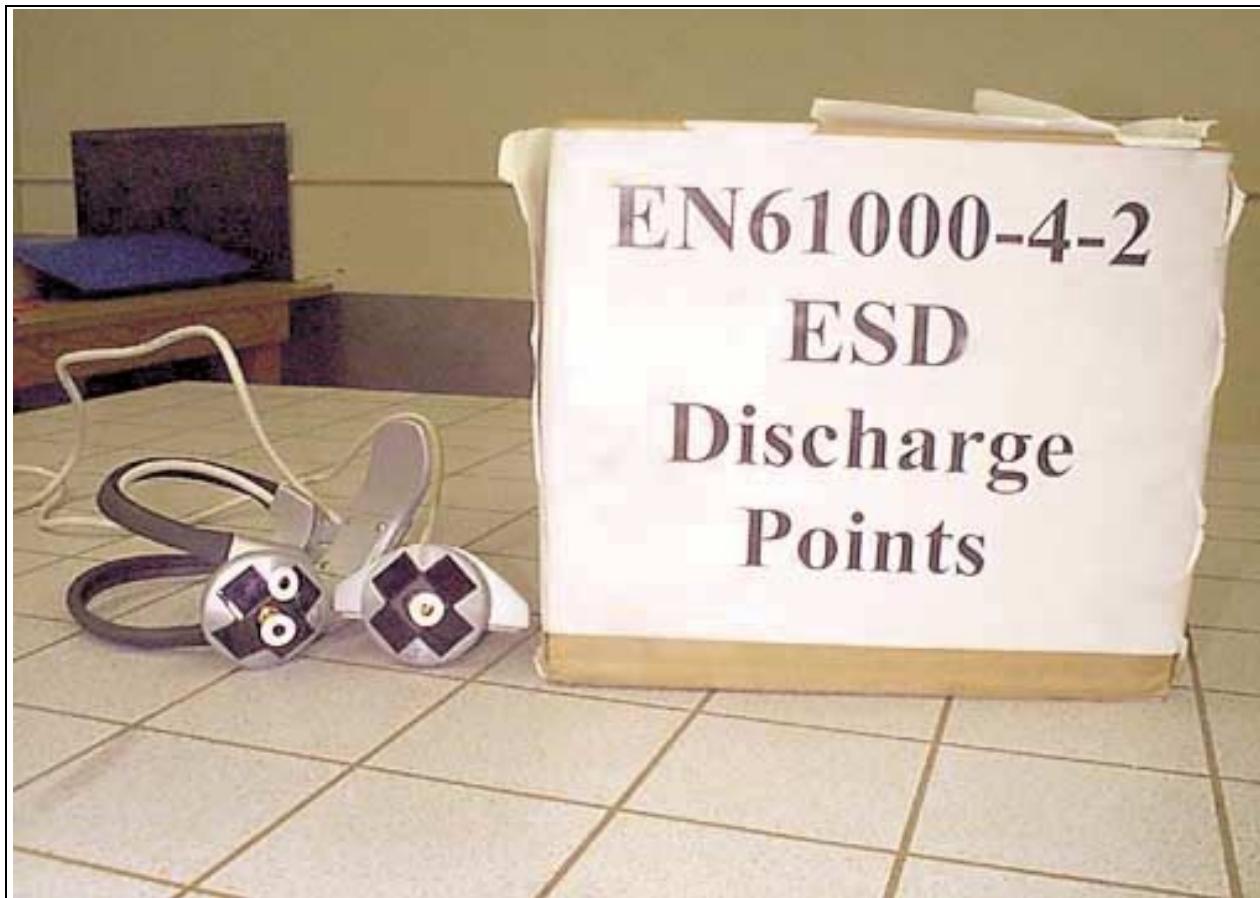
Electrostatic Discharge Points

PHOTOGRAPH SHOWING ELECTROSTATIC DISCHARGE POINTS



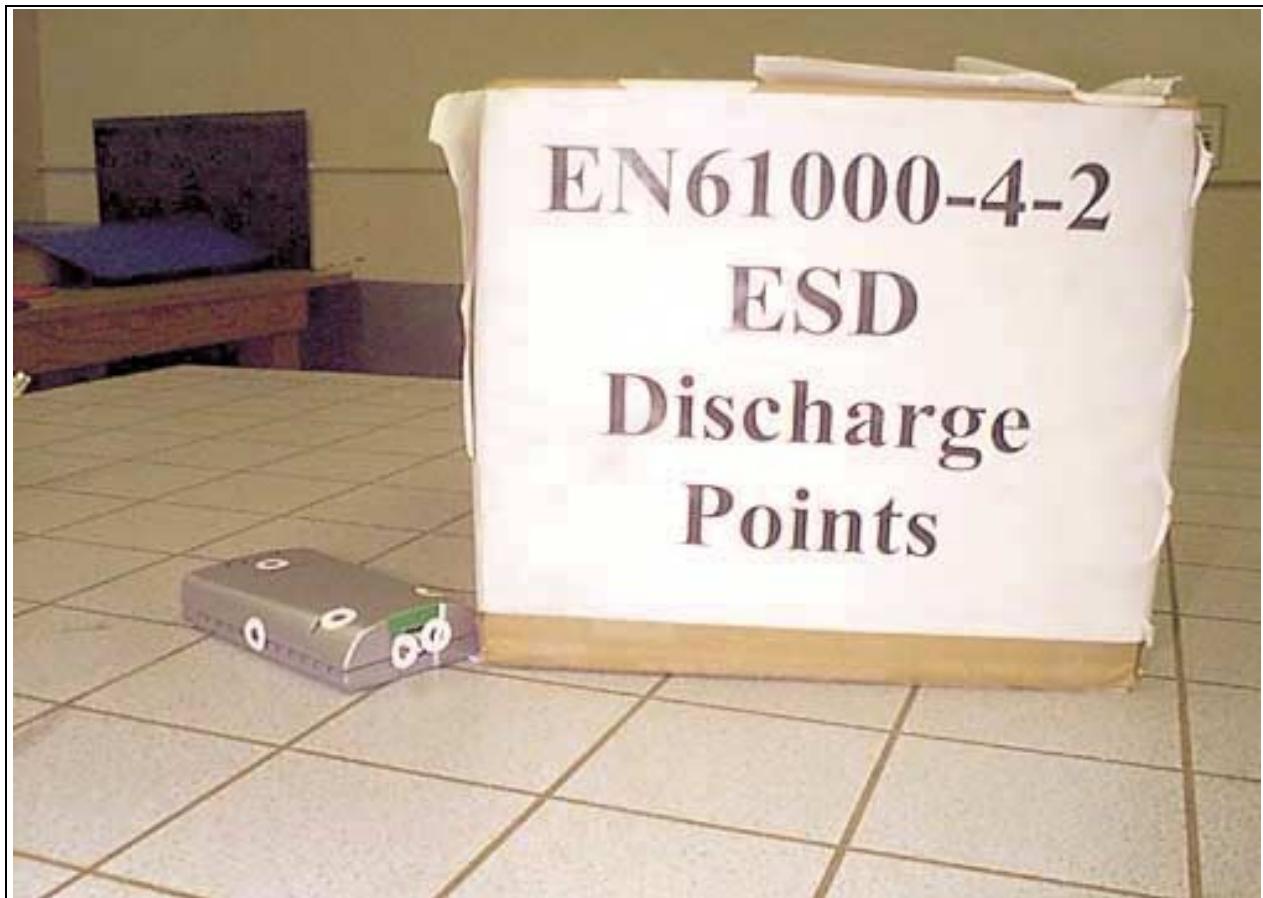
Electrostatic Discharge Points

PHOTOGRAPH SHOWING ELECTROSTATIC DISCHARGE POINTS



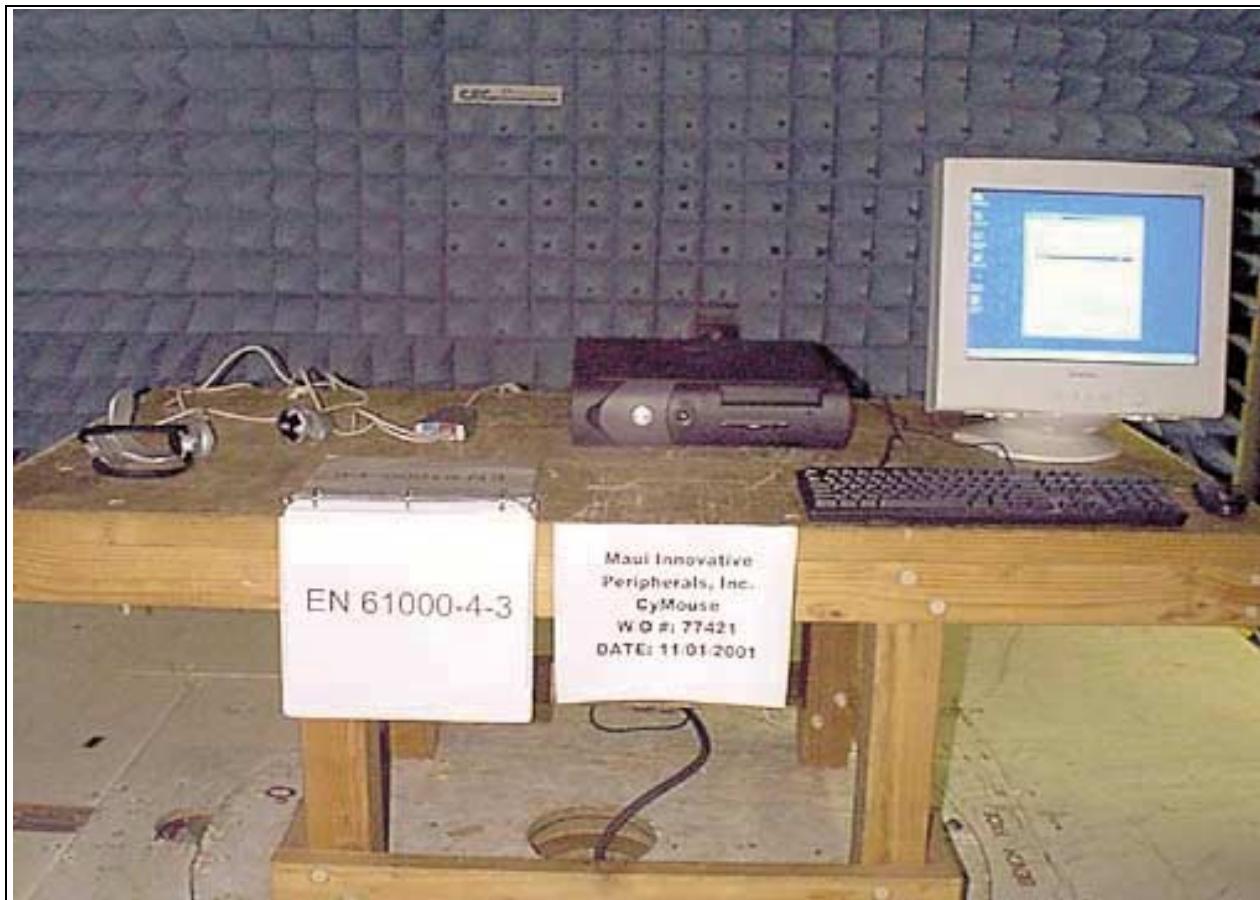
Electrostatic Discharge Points

PHOTOGRAPH SHOWING ELECTROSTATIC DISCHARGE POINTS



Electrostatic Discharge Points

PHOTOGRAPH SHOWING RADIATED IMMUNITY



Radiated Immunity - Front View

PHOTOGRAPH SHOWING RADIATED IMMUNITY



Radiated Immunity - Back View

PHOTOGRAPH SHOWING ELECTRICAL FAST TRANSIENT BURST



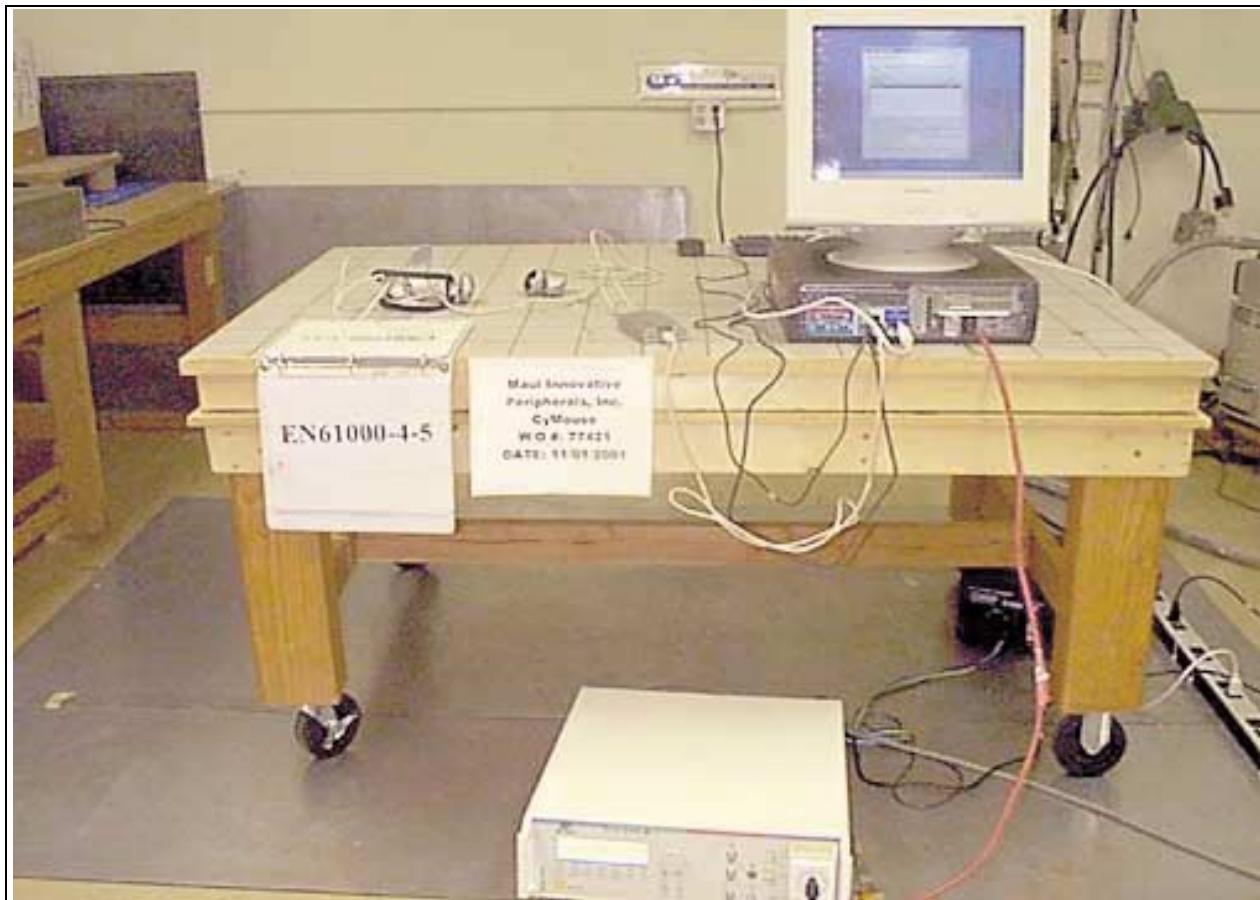
Electrical Fast Transient Burst - Power Lines

PHOTOGRAPH SHOWING CONDUCTED IMMUNITY



Conducted Immunity - Power Lines

PHOTOGRAPH SHOWING SURGE IMMUNITY



Surge Immunity

PHOTOGRAPH SHOWING VOLTAGE DIPS AND INTERRUPTS



Voltage Dips and Interrupts

APPENDIX B

TEST EQUIPMENT LIST - EMISSIONS

The following list of test equipment was used during emissions testing. For equipment used during immunity testing, refer to the individual immunity tables.

Hollister D

VCCI Acceptance Nos. R-794 & C-828
 Industry of Canada File No. IC 3171-D

Radiated Emissions

Function	S/N	Calibration Date	Cal Due Date	Asset #
rad cable 10M or 3M	rad_cab_10M_01_hd	07/24/2001	07/24/2002	0
Preamp, HP 8447D	2964A06739	12/15/2000	12/15/2001	705
Bilog Antenna CBL6111C	2451	10/10/2001	10/10/2002	1995
Log Periodic AH Systems SAS-200/510	318	05/16/2001	05/16/2002	0
S.A. Display	2237A04350	09/25/2001	09/25/2002	446
Q.P. Adapter	2043A00286	09/25/2001	09/25/2002	445
S.A. 8568A	2235A02391	09/25/2001	09/25/2002	446

Conducted Emissions

Function	S/N	Calibration Date	Cal Due Date	Asset #
S.A. Display	2237A04350	09/25/2001	09/25/2002	446
Q.P. Adapter	2043A00286	09/25/2001	09/25/2002	445
S.A. 8568A	2235A02391	09/25/2001	09/25/2002	446
Cond cable, HD	cond_cbl_hd_00	11/13/2000	11/13/2001	0
LISN, Solar 9252-50-R-24-BNC	927109	03/07/2001	03/07/2002	612

Harmonics and Flicker Emissions

Function	S/N	Calibration Date	Cal Due Date	Asset #
Voltech Universal Power Analyzer, PM3000A	AM50/4710	1/10/01	1/10/02	2298

APPENDIX C
MEASUREMENT DATA SHEETS

Test Location: CKC Laboratories, Inc. • 480 Los Viboras Road, Site D • Hollister, CA 95023 • 831-637-8176

Customer: **Maui Innovative Peripherals, Inc.**
 Specification: **EN55022B/CISPR 22B RADIATED**
 Work Order #: **77421** Date: **11/07/2001**
 Test Type: **Maximized Emissions** Time: **12:15:33**
 Equipment: **3-D Mouse** Sequence#: **2**
 Manufacturer: Maui Innovative Peripherals, Inc. Tested By: **A. Brar**
 Model: CyMouse
 S/N: **3**

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
3-D Mouse*	Maui Innovative Peripherals, Inc.	CyMouse	3

Support Devices:

Function	Manufacturer	Model #	S/N
Monitor	Sylvania	TF721	0GAB2011118
PC	Dell	DHS	3LJCT01
Transformer of the Cardinal Modem	Air Stack	Class 2 Transformer	None
External Modem	Cardinal	020-0470	215-93
Surge Protector	APC	PRO8T2MP1213	1208R17520
Keyboard	Dell	RT7000	TH-025PGG-37171-16F-2156
Mouse	Dell	M-S34	LNA11912906

Test Conditions / Notes:

EUT is on a wooden table, .8 above the ground plane. EUT (HUB) is connected via USB to Dell PC. Coming out of the hub are 2 CAT V cables, one going to the headset and the other going to the unit on the other side (typically on the PC monitor). As long as the green and red LEDs are on, EUT is functioning, transferring data. Monitor is displaying the status of the EUT. Frequency range tested: 30-1000 MHz.

#	Freq MHz	Reading listed by margin.					Test Distance: 10 Meters				
		Log31		Chase	HP-84	10m o	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
		Rdng dB μ V	dB	dB	dB	dB					
1	414.284M	35.7	+16.1	+0.0	-27.6	+6.7	+0.0	30.9	37.0	-6.1	Vert
2	72.086M	42.6	+0.0	+6.7	-27.9	+2.5	+0.0	23.9	30.0	-6.1	Vert
3	76.064M QP	40.1	+0.0	+7.1	-27.8	+2.6	+0.0	22.0	30.0	-8.0	Vert
^	76.064M	43.1	+0.0	+7.1	-27.8	+2.6	+0.0	25.0	30.0	-5.0	Vert
5	60.022M	41.7	+0.0	+5.8	-27.9	+2.3	+0.0	21.9	30.0	-8.1	Vert
6	453.107M	32.7	+16.7	+0.0	-27.9	+7.0	+0.0	28.5	37.0	-8.5	Horiz

7	399.680M	33.3	+15.9	+0.0	-27.5	+6.6	+0.0	28.3	37.0	-8.7	Vert
8	64.042M	40.2	+0.0	+6.1	-27.9	+2.3	+0.0	20.7	30.0	-9.3	Vert
QP											
^	64.042M	43.5	+0.0	+6.1	-27.9	+2.3	+0.0	24.0	30.0	-6.0	Vert
10	49.904M	36.2	+0.0	+8.6	-27.9	+2.1	+0.0	19.0	30.0	-11.0	Horiz

Test Location: CKC Laboratories, Inc. • 480 Los Viboras Road, Site D • Hollister, CA 95023 • 831-637-8176

Customer: **Maui Innovative Peripherals, Inc.**
 Specification: **EN55022 B COND [AVE]**
 Work Order #: **77421** Date: **11/07/2001**
 Test Type: **Conducted Emissions** Time: **14:45:10**
 Equipment: **3-D Mouse** Sequence#: **6**
 Manufacturer: Maui Innovative Peripherals, Inc. Tested By: A. Brar
 Model: CyMouse
 S/N: 3

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
3-D Mouse*	Maui Innovative Peripherals, Inc.	CyMouse	3

Support Devices:

Function	Manufacturer	Model #	S/N
Monitor	Sylvania	TF721	0GAB2011118
PC	Dell	DHS	3LJCT01
Transformer of the Cardinal Modem	Air Stack	Class 2 Transformer	None
External Modem	Cardinal	020-0470	215-93
Surge Protector	APC	PRO8T2MP1213	1208R17520
Keyboard	Dell	RT7000	TH-025PGG-37171-16F-2156
Mouse	Dell	M-S34	LNA11912906

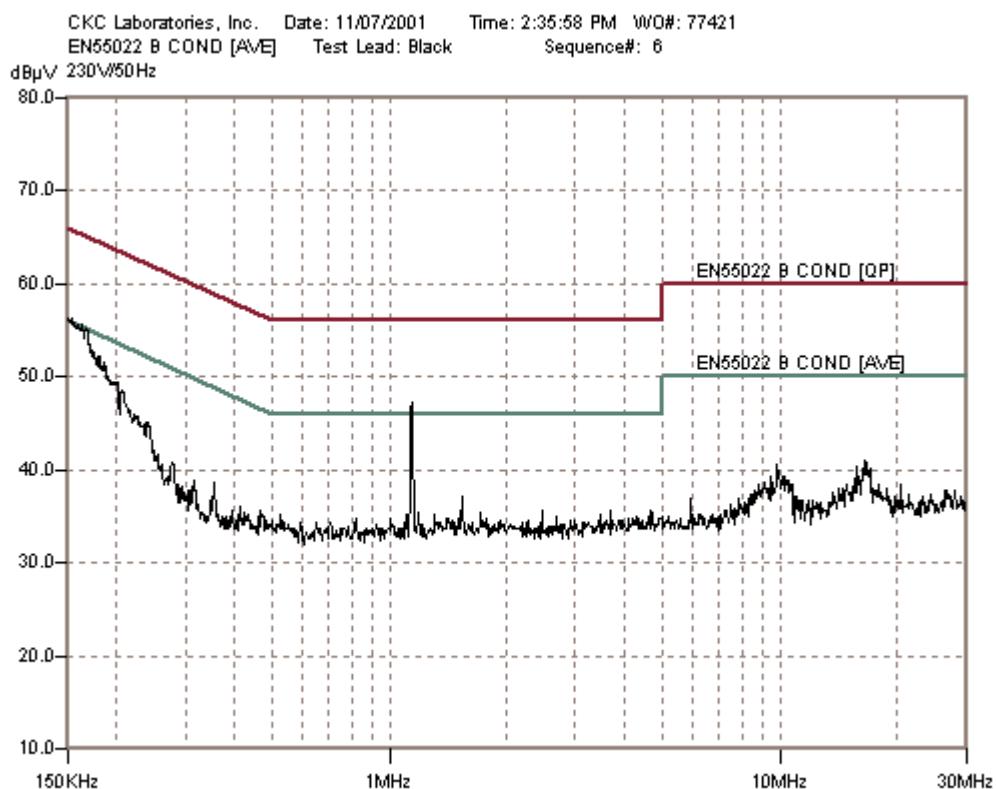
Test Conditions / Notes:

EUT is on a wooden table, .8 above the ground plane. EUT (HUB) is connected via USB to Dell PC. Coming out of the hub are 2 CAT V cables, one going to the headset and the other going to the unit on the other side (typically on the PC monitor). As long as the green and red LEDs are on, EUT is functioning, transferring data. Monitor is displaying the status of the EUT. 230V/50Hz. Frequency range tested: 150 kHz – 30 MHz.

Measurement Data:

#	Freq MHz	Rdng dB μ V	cond_ LISN			LISN			Test Lead: Black		
			cond	LISN	LISN	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant	
1	1.132M	41.7	+0.1	+0.1		+0.7	+0.0	42.6	46.0	-3.4	Black
Ave									Ambient		
^	1.132M	46.3	+0.1	+0.1		+0.7	+0.0	47.2	46.0	+1.2	Black
Ambient											
3	200.106k	48.9	+0.0	+0.2		+0.4	+0.0	49.5	53.6	-4.1	Black
4	207.146k	47.9	+0.0	+0.2		+0.4	+0.0	48.5	53.3	-4.8	Black
5	217.084k	45.9	+0.0	+0.2		+0.4	+0.0	46.5	52.9	-6.4	Black
6	222.053k	45.3	+0.0	+0.2		+0.4	+0.0	45.9	52.7	-6.8	Black
7	241.102k	44.7	+0.0	+0.1		+0.4	+0.0	45.2	52.1	-6.9	Black
8	239.446k	44.6	+0.0	+0.1		+0.4	+0.0	45.1	52.1	-7.0	Black

9	236.961k	44.3	+0.0	+0.1	+0.4	+0.0	44.8	52.2	-7.4	Black
10	1.539M	36.0	+0.2	+0.2	+0.8	+0.0	37.2	46.0	-8.8	Black
11	16.568M	38.4	+0.8	+0.5	+1.3	+0.0	41.0	50.0	-9.0	Black
12	16.788M	38.2	+0.8	+0.5	+1.3	+0.0	40.8	50.0	-9.2	Black
13	9.786M	38.5	+0.6	+0.3	+1.1	+0.0	40.5	50.0	-9.5	Black
14	15.643M	38.0	+0.7	+0.4	+1.3	+0.0	40.4	50.0	-9.6	Black
15	17.008M	37.5	+0.8	+0.5	+1.3	+0.0	40.1	50.0	-9.9	Black
16	16.260M	37.5	+0.8	+0.5	+1.3	+0.0	40.1	50.0	-9.9	Black
17	255.181k	41.1	+0.0	+0.1	+0.4	+0.0	41.6	51.6	-10.0	Black
18	9.962M	37.9	+0.6	+0.3	+1.1	+0.0	39.9	50.0	-10.1	Black
19	277.957k	40.2	+0.0	+0.2	+0.4	+0.0	40.8	50.9	-10.1	Black
20	4.639M	34.1	+0.4	+0.2	+1.0	+0.0	35.7	46.0	-10.3	Black
21	2.461M	34.3	+0.3	+0.2	+0.9	+0.0	35.7	46.0	-10.3	Black
22	353.737k	37.9	+0.1	+0.1	+0.5	+0.0	38.6	48.9	-10.3	Black
23	3.702M	34.2	+0.3	+0.2	+0.9	+0.0	35.6	46.0	-10.4	Black
24	163.000k Ave	43.4	+0.1	+0.2	+0.4	+0.0	44.1	55.3	-11.2	Black
^	163.000k	55.0	+0.1	+0.2	+0.4	+0.0	55.7	55.3	+0.4	Black
26	153.000k Ave	43.8	+0.2	+0.2	+0.4	+0.0	44.6	55.8	-11.2	Black
^	153.000k	55.5	+0.2	+0.2	+0.4	+0.0	56.3	55.8	+0.5	Black
28	174.000k Ave	41.1	+0.1	+0.2	+0.4	+0.0	41.8	54.8	-13.0	Black
^	174.000k	52.2	+0.1	+0.2	+0.4	+0.0	52.9	54.8	-1.9	Black
30	186.000k Ave	39.7	+0.1	+0.2	+0.4	+0.0	40.4	54.2	-13.8	Black
^	186.000k	50.8	+0.1	+0.2	+0.4	+0.0	51.5	54.2	-2.7	Black



Test Location: CKC Laboratories, Inc. • 480 Los Viboras Road, Site D • Hollister, CA 95023 • 831-637-8176

Customer: **Maui Innovative Peripherals, Inc.**
 Specification: **EN55022 B COND [AVE]**
 Work Order #: **77421** Date: **11/07/2001**
 Test Type: **Conducted Emissions** Time: **14:35:05**
 Equipment: **3-D Mouse** Sequence#: **5**
 Manufacturer: Maui Innovative Peripherals, Inc. Tested By: A. Brar
 Model: CyMouse
 S/N: 3

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
3-D Mouse*	Maui Innovative Peripherals, Inc.	CyMouse	3

Support Devices:

Function	Manufacturer	Model #	S/N
Monitor	Sylvania	TF721	0GAB2011118
PC	Dell	DHS	3LJCT01
Transformer of the Cardinal Modem	Air Stack	Class 2 Transformer	None
External Modem	Cardinal	020-0470	215-93
Surge Protector	APC	PRO8T2MP1213	1208R17520
Keyboard	Dell	RT7000	TH-025PGG-37171-16F-2156
Mouse	Dell	M-S34	LNA11912906

Test Conditions / Notes:

EUT is on a wooden table, .8 above the ground plane. EUT (HUB) is connected via USB to Dell PC. Coming out of the hub are 2 CAT V cables, one going to the headset and the other going to the unit on the other side (typically on the PC monitor). As long as the green and red LEDs are on, EUT is functioning, transferring data. Monitor is displaying the status of the EUT. 230V/50Hz. Frequency range tested: 150 kHz – 30 MHz.

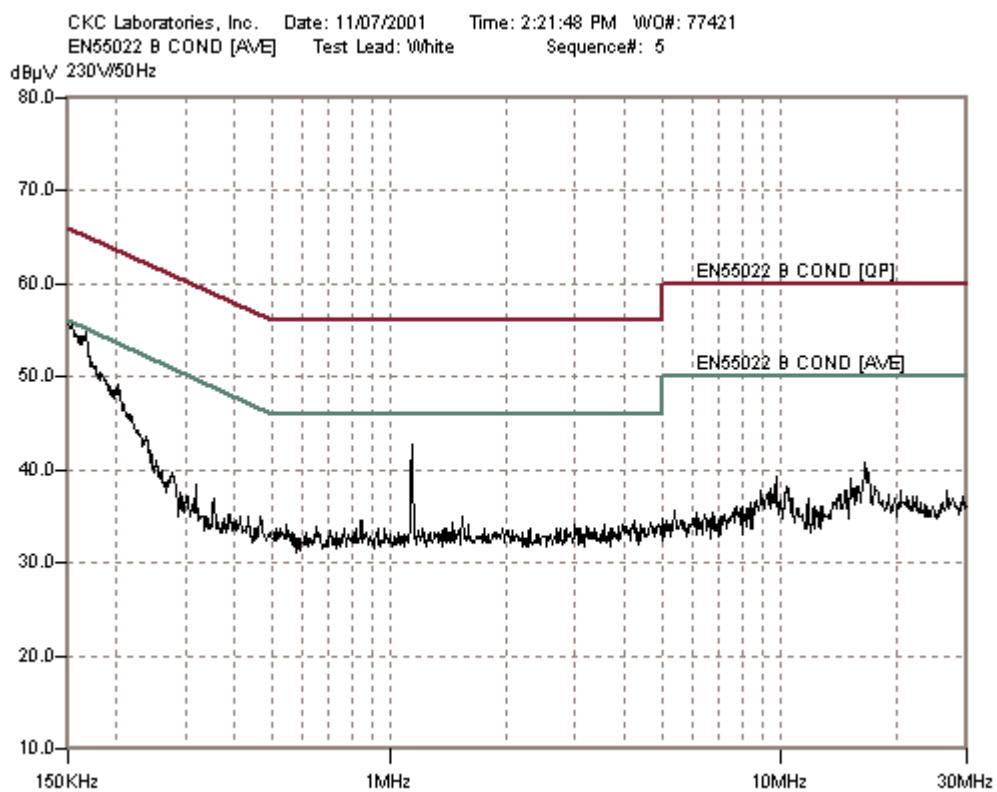
Measurement Data:

Reading listed by margin.

Test Lead: White

#	Freq MHz	Rdng dB μ V	cond_			LISN dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
			LISN	LISN	LISN						
1	1.143M	42.7	+0.1 -0.2		+0.2		+0.0	42.8	46.0	-3.2	White
2	181.886k	50.3	+0.1 -0.1		+0.2		+0.0	50.5	54.4	-3.9	White
3	179.815k	50.0	+0.1 -0.1		+0.2		+0.0	50.2	54.5	-4.3	White
4	200.520k	49.0	+0.0 -0.1		+0.2		+0.0	49.1	53.6	-4.5	White
5	198.864k	48.6	+0.0 -0.1		+0.2		+0.0	48.7	53.7	-5.0	White
6	191.824k	48.8	+0.0 -0.1		+0.2		+0.0	48.9	54.0	-5.1	White
7	195.965k	48.5	+0.0 -0.1		+0.2		+0.0	48.6	53.8	-5.2	White
8	207.560k	47.0	+0.0 -0.1		+0.2		+0.0	47.1	53.3	-6.2	White

9	218.741k	45.7	+0.0 -0.1	+0.2	+0.0	45.8	52.9	-7.1	White
10	216.256k	45.8	+0.0 -0.1	+0.2	+0.0	45.9	53.0	-7.1	White
11	239.446k	43.6	+0.0 -0.2	+0.1	+0.0	43.5	52.1	-8.6	White
12	16.524M	39.1	+0.8 +0.4	+0.6	+0.0	40.9	50.0	-9.1	White
13	233.648k	43.2	+0.0 -0.2	+0.1	+0.0	43.1	52.3	-9.2	White
14	243.587k	42.3	+0.0 -0.2	+0.1	+0.0	42.2	52.0	-9.8	White
15	16.744M	38.3	+0.8 +0.4	+0.6	+0.0	40.1	50.0	-9.9	White
16	253.525k	41.2	+0.0 -0.2	+0.1	+0.0	41.1	51.6	-10.5	White
17	9.830M	38.2	+0.6 +0.2	+0.3	+0.0	39.3	50.0	-10.7	White
18	248.556k	41.0	+0.0 -0.2	+0.1	+0.0	40.9	51.8	-10.9	White
19	15.247M	37.3	+0.7 +0.4	+0.6	+0.0	39.0	50.0	-11.0	White
20	1.542M	34.7	+0.2 -0.1	+0.1	+0.0	34.9	46.0	-11.1	White
21	277.543k	39.8	+0.0 -0.3	+0.2	+0.0	39.7	50.9	-11.2	White
22	4.990M	34.0	+0.4 +0.1	+0.2	+0.0	34.7	46.0	-11.3	White
23	468.029k	35.2	+0.0 -0.2	+0.1	+0.0	35.1	46.5	-11.4	White
24	318.125k	38.5	+0.0 -0.3	+0.2	+0.0	38.4	49.8	-11.4	White
25	260.565k	40.1	+0.0 -0.2	+0.1	+0.0	40.0	51.4	-11.4	White
26	150.000k	44.2	+0.2 +0.0	+0.1	+0.0	44.5	56.0	-11.5	White
Ave	150.000k	55.3	+0.2 +0.0	+0.1	+0.0	55.6	56.0	-0.4	White
28	4.229M	33.8	+0.4 +0.1	+0.2	+0.0	34.5	46.0	-11.5	White
29	845.817k	34.3	+0.1 -0.1	+0.2	+0.0	34.5	46.0	-11.5	White
30	167.000k	42.9	+0.1 +0.0	+0.1	+0.0	43.1	55.1	-12.0	White
Ave	167.000k	54.5	+0.1 +0.0	+0.1	+0.0	54.7	55.1	-0.4	White
32	162.000k	43.0	+0.1 +0.0	+0.1	+0.0	43.2	55.4	-12.2	White
Ave	162.000k	54.2	+0.1 +0.0	+0.1	+0.0	54.4	55.4	-1.0	White



Test Location: CKC Laboratories, Inc. • 480 Los Viboras Road, Site D • Hollister, CA 95023 • 831-637-8176

Customer: **Maui Innovative Peripherals, Inc.**
 Specification: **CISPR 22 B COND [AVE]**
 Work Order #: **77421** Date: **11/07/2001**
 Test Type: **Conducted Emissions** Time: **14:13:34**
 Equipment: **3-D Mouse** Sequence#: **3**
 Manufacturer: Maui Innovative Peripherals, Inc. Tested By: **A. Brar**
 Model: CyMouse
 S/N: **3**

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
3-D Mouse*	Maui Innovative Peripherals, Inc.	CyMouse	3

Support Devices:

Function	Manufacturer	Model #	S/N
Monitor	Sylvania	TF721	0GAB2011118
PC	Dell	DHS	3LJCT01
Transformer of the Cardinal Modem	Air Stack	Class 2 Transformer	None
External Modem	Cardinal	020-0470	215-93
Surge Protector	APC	PRO8T2MP1213	1208R17520
Keyboard	Dell	RT7000	TH-025PGG-37171-16F-2156
Mouse	Dell	M-S34	LNA11912906

Test Conditions / Notes:

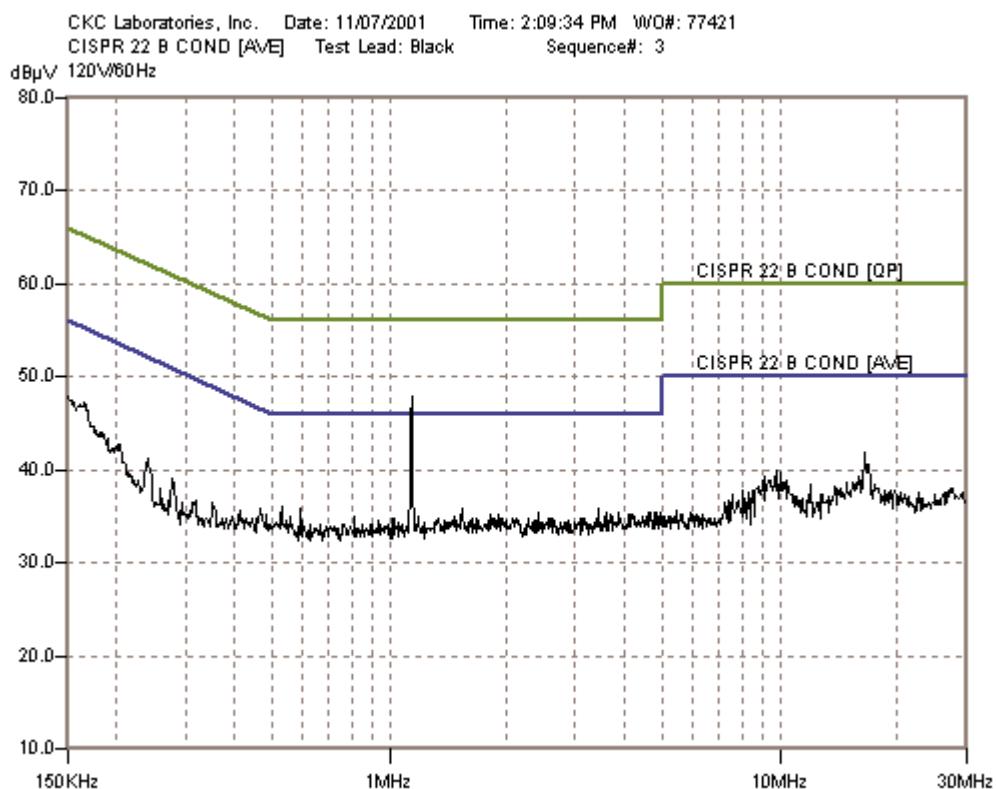
EUT is on a wooden table, .8 above the ground plane. EUT (HUB) is connected via USB to Dell PC. Coming out of the hub are 2 CAT V cables, one going to the headset and the other going to the unit on the other side (typically on the PC monitor). As long as the green and red LEDs are on, EUT is functioning, transferring data. Monitor is displaying the status of the EUT. 120V/60Hz. Frequency range tested: 150 kHz – 30 MHz.

Measurement Data:

Reading listed by margin.

#	Freq MHz	Rdng dB μ V	cond_ LISN			LISN			Test Lead: Black		
			cond	LISN	LISN	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant	
1	1.136M	40.1	+0.1	+0.1		+0.7	+0.0	41.0	46.0	-5.0	Black
Ave									Ambient		
^	1.136M	47.1	+0.1	+0.1		+0.7	+0.0	48.0	46.0	+2.0	Black
Ambient											
3	165.736k	46.5	+0.1	+0.2		+0.4	+0.0	47.2	55.2	-8.0	Black
4	16.524M	39.3	+0.8	+0.5		+1.3	+0.0	41.9	50.0	-8.1	Black
5	150.000k	47.1	+0.2	+0.2		+0.4	+0.0	47.9	56.0	-8.1	Black
6	16.832M	38.0	+0.8	+0.5		+1.3	+0.0	40.6	50.0	-9.4	Black
7	530.144k	35.4	+0.0	+0.1		+0.6	+0.0	36.1	46.0	-9.9	Black
8	9.874M	38.0	+0.6	+0.3		+1.1	+0.0	40.0	50.0	-10.0	Black

9	3.421M	34.5	+0.3	+0.2		+0.9	+0.0	35.9	46.0	-10.1	Black
10	1.536M	34.6	+0.2	+0.2		+0.8	+0.0	35.8	46.0	-10.2	Black
11	592.026k	34.9	+0.1	+0.2		+0.6	+0.0	35.8	46.0	-10.2	Black
12	10.050M	37.7	+0.6	+0.3		+1.1	+0.0	39.7	50.0	-10.3	Black
13	4.809M	33.9	+0.4	+0.2		+1.0	+0.0	35.5	46.0	-10.5	Black
14	3.597M	34.1	+0.3	+0.2		+0.9	+0.0	35.5	46.0	-10.5	Black
15	9.698M	37.4	+0.6	+0.3		+1.1	+0.0	39.4	50.0	-10.6	Black
16	4.955M	33.8	+0.4	+0.2		+1.0	+0.0	35.4	46.0	-10.6	Black
17	4.633M	33.8	+0.4	+0.2		+1.0	+0.0	35.4	46.0	-10.6	Black
18	3.890M	33.8	+0.4	+0.2		+1.0	+0.0	35.4	46.0	-10.6	Black
19	2.390M	34.0	+0.3	+0.2		+0.9	+0.0	35.4	46.0	-10.6	Black
20	15.995M	36.9	+0.7	+0.4		+1.3	+0.0	39.3	50.0	-10.7	Black
21	9.125M	37.3	+0.6	+0.3		+1.1	+0.0	39.3	50.0	-10.7	Black
22	4.112M	33.7	+0.4	+0.2		+1.0	+0.0	35.3	46.0	-10.7	Black
23	1.903M	34.1	+0.2	+0.2		+0.8	+0.0	35.3	46.0	-10.7	Black
24	1.813M	34.1	+0.2	+0.2		+0.8	+0.0	35.3	46.0	-10.7	Black
25	467.201k	35.2	+0.0	+0.1		+0.6	+0.0	35.9	46.6	-10.7	Black
26	203.419k	42.2	+0.0	+0.2		+0.4	+0.0	42.8	53.5	-10.7	Black
27	190.582k	42.7	+0.0	+0.2		+0.4	+0.0	43.3	54.0	-10.7	Black
28	4.165M	33.6	+0.4	+0.2		+1.0	+0.0	35.2	46.0	-10.8	Black
29	3.702M	33.8	+0.3	+0.2		+0.9	+0.0	35.2	46.0	-10.8	Black
30	240.274k	40.8	+0.0	+0.1		+0.4	+0.0	41.3	52.1	-10.8	Black
31	556.646k	34.3	+0.1	+0.1		+0.6	+0.0	35.1	46.0	-10.9	Black



Test Location: CKC Laboratories, Inc. • 480 Los Viboras Road, Site D • Hollister, CA 95023 • 831-637-8176

Customer: **Maui Innovative Peripherals, Inc.**
 Specification: **CISPR 22 B COND [AVE]**
 Work Order #: **77421** Date: **11/07/2001**
 Test Type: **Conducted Emissions** Time: **14:20:24**
 Equipment: **3-D Mouse** Sequence#: **4**
 Manufacturer: Maui Innovative Peripherals, Inc. Tested By: A. Brar
 Model: CyMouse
 S/N: 3

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
3-D Mouse*	Maui Innovative Peripherals, Inc.	CyMouse	3

Support Devices:

Function	Manufacturer	Model #	S/N
Monitor	Sylvania	TF721	0GAB2011118
PC	Dell	DHS	3LJCT01
Transformer of the Cardinal Modem	Air Stack	Class 2 Transformer	None
External Modem	Cardinal	020-0470	215-93
Surge Protector	APC	PRO8T2MP1213	1208R17520
Keyboard	Dell	RT7000	TH-025PGG-37171-16F-2156
Mouse	Dell	M-S34	LNA11912906

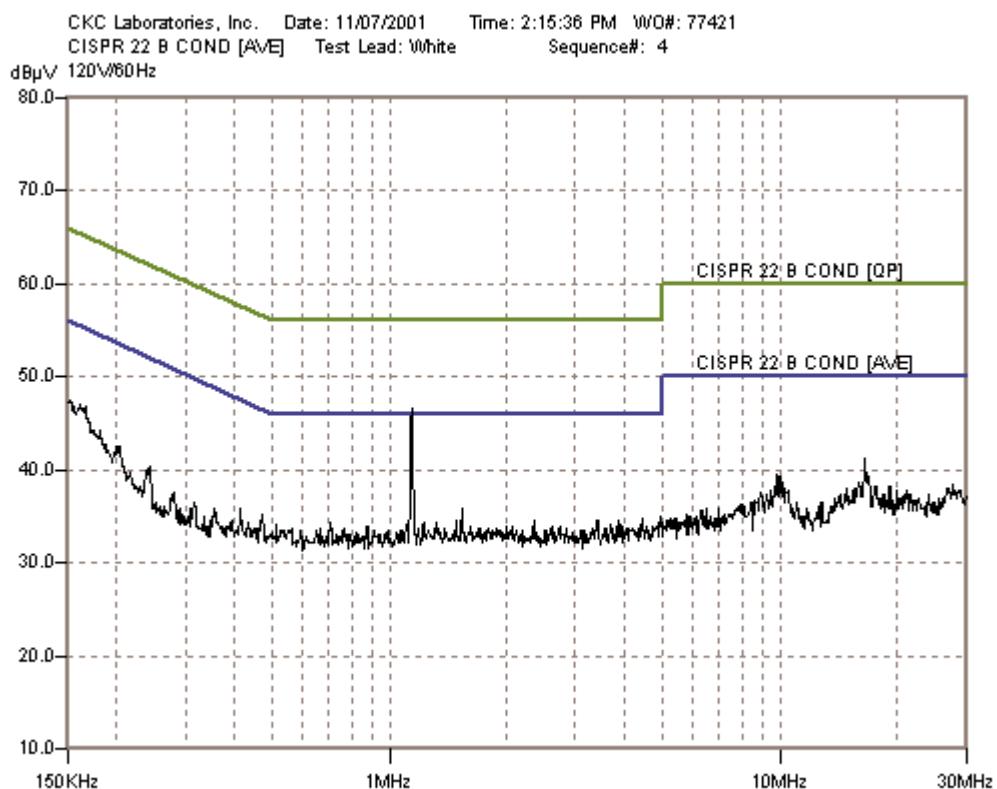
Test Conditions / Notes:

EUT is on a wooden table, .8 above the ground plane. EUT (HUB) is connected via USB to Dell PC. Coming out of the hub are 2 CAT V cables, one going to the headset and the other going to the unit on the other side (typically on the PC monitor). As long as the green and red LEDs are on, EUT is functioning, transferring data. Monitor is displaying the status of the EUT. 120V/60Hz. Frequency range tested: 150 kHz – 30 MHz.

Measurement Data:

#	Freq MHz	Rdng dB μ V	cond_			LISN dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
			LISN	LISN	LISN						
1	1.135M	41.1	+0.1		+0.2		+0.0	41.2	46.0	-4.8	White
Ave			-0.2							Ambient	
^	1.135M	46.5	+0.1		+0.2		+0.0	46.6	46.0	+0.6	White
			-0.2							Ambient	
3	161.595k	46.9	+0.1		+0.1		+0.0	47.1	55.4	-8.3	White
			+0.0								
4	152.485k	47.1	+0.2		+0.1		+0.0	47.4	55.9	-8.5	White
			+0.0								
5	16.568M	39.5	+0.8		+0.6		+0.0	41.3	50.0	-8.7	White
			+0.4								
6	154.969k	46.6	+0.2		+0.1		+0.0	46.9	55.7	-8.8	White
			+0.0								
7	169.049k	45.4	+0.1		+0.1		+0.0	45.6	55.0	-9.4	White
			+0.0								
8	1.539M	35.7	+0.2		+0.1		+0.0	35.9	46.0	-10.1	White
			-0.1								

9	181.472k	44.0	+0.1 -0.1	+0.2	+0.0	44.2	54.4	-10.2	White
10	9.830M	38.4	+0.6 +0.2	+0.3	+0.0	39.5	50.0	-10.5	White
11	16.964M	37.6	+0.8 +0.4	+0.6	+0.0	39.4	50.0	-10.6	White
12	9.984M	38.1	+0.6 +0.2	+0.3	+0.0	39.2	50.0	-10.8	White
13	203.833k	42.5	+0.0 -0.1	+0.2	+0.0	42.6	53.5	-10.9	White
14	4.944M	34.3	+0.4 +0.1	+0.2	+0.0	35.0	46.0	-11.0	White
15	200.106k	42.4	+0.0 -0.1	+0.2	+0.0	42.5	53.6	-11.1	White
16	472.998k	35.4	+0.0 -0.2	+0.1	+0.0	35.3	46.5	-11.2	White
17	15.907M	37.0	+0.7 +0.4	+0.6	+0.0	38.7	50.0	-11.3	White
18	10.182M	37.6	+0.6 +0.2	+0.3	+0.0	38.7	50.0	-11.3	White
19	4.463M	34.0	+0.4 +0.1	+0.2	+0.0	34.7	46.0	-11.3	White
20	3.878M	33.9	+0.4 +0.1	+0.2	+0.0	34.6	46.0	-11.4	White
21	3.403M	34.2	+0.3 +0.0	+0.1	+0.0	34.6	46.0	-11.4	White
22	2.344M	34.2	+0.3 +0.0	+0.1	+0.0	34.6	46.0	-11.4	White
23	1.480M	34.4	+0.2 -0.1	+0.1	+0.0	34.6	46.0	-11.4	White
24	187.269k	42.7	+0.0 -0.1	+0.2	+0.0	42.8	54.2	-11.4	White
25	16.260M	36.7	+0.8 +0.4	+0.6	+0.0	38.5	50.0	-11.5	White
26	27.622M	35.5	+1.0 +0.9	+1.0	+0.0	38.4	50.0	-11.6	White
27	707.244k	34.3	+0.2 -0.2	+0.1	+0.0	34.4	46.0	-11.6	White
28	1.324M	34.0	+0.2 -0.1	+0.2	+0.0	34.3	46.0	-11.7	White
29	1.224M	34.2	+0.1 -0.2	+0.2	+0.0	34.3	46.0	-11.7	White
30	416.680k	35.7	+0.1 -0.2	+0.2	+0.0	35.8	47.5	-11.7	White
31	242.758k	40.4	+0.0 -0.2	+0.1	+0.0	40.3	52.0	-11.7	White



Maui Innovative Peripherals, Inc WO 77421

Product:	CYMOUSE	Nov 05 2001 9:30am
Serial no:		Page 1 of 1
Description: Eut running in full mode		
Voltech IEC1000-3 Windows Software 2.09		
Test Date: Nov 02 2001 2:12pm		
Result:	STEADYSTATE	
Type of Test:	Steady State Harmonics Test - Table	
Power Analyzer:	Voltech PM3000A v2.16 s/n 1730	
AC Source:	Mains / Manual Source	
PASS	Below Class D power limit	

Class	D
Class Multiplier	1
Power	33.5 W

Harmonic	Reading	Limit	Result	Harmonic	Reading	Limit	Result
2	2.70mA	None	N/A	3	130mA	2.300A	Pass
4	1.38mA	None	N/A	5	80.30mA	1.140A	Pass
6	0.54mA	None	N/A	7	34.88mA	770mA	Pass
8	0.45mA	None	N/A	9	14.36mA	400mA	Pass
10	0.45mA	None	N/A	11	12.06mA	330mA	Pass
12	0.39mA	None	N/A	13	7.61mA	210mA	Pass
14	0.24mA	None	N/A	15	4.94mA	150mA	N/A
16	0.25mA	None	N/A	17	4.81mA	132mA	N/A
18	0.24mA	None	N/A	19	3.04mA	118mA	N/A
20	0.26mA	None	N/A	21	2.60mA	107mA	N/A
22	0.21mA	None	N/A	23	2.31mA	98mA	N/A
24	0.25mA	None	N/A	25	1.59mA	90mA	N/A
26	0.14mA	None	N/A	27	1.50mA	83mA	N/A
28	0.19mA	None	N/A	29	1.31mA	78mA	N/A
30	0.17mA	None	N/A	31	1.05mA	73mA	N/A
32	0.10mA	None	N/A	33	0.90mA	68mA	N/A
34	0.26mA	None	N/A	35	0.81mA	64mA	N/A
36	0.06mA	None	N/A	37	0.53mA	61mA	N/A
38	0.22mA	None	N/A	39	0.65mA	58mA	N/A
40	0.07mA	None	N/A				

Maui Innovative Peripherals, Inc WO 77421

Product:	CYMOUSE	Nov 05 2001 9:30am
Serial no:		Page 1 of 1

Description:	Eut running in full mode
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Voltech IEC1000-3 Windows Software 2.09	Test Date: Nov 02 2001 2:12pm
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Result:	STEADYSTATE
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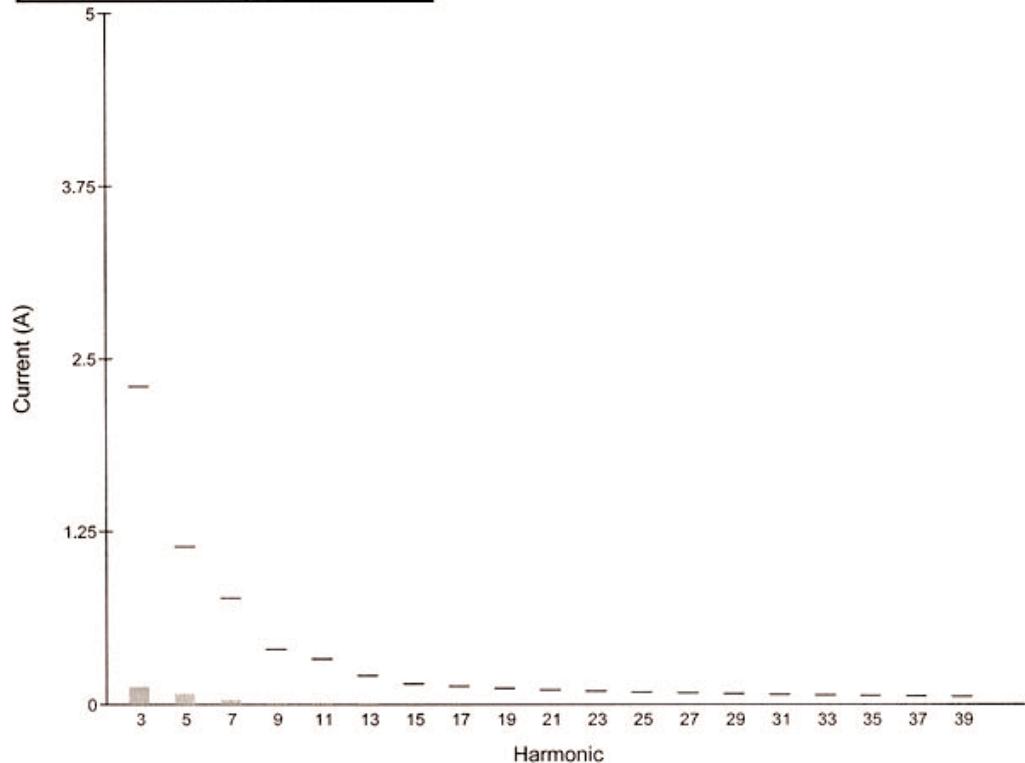
Type of Test:	Steady State Harmonics Test - Linear Bar Chart
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Power Analyzer:	Voltech PM3000A v2.16 s/n 1730
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AC Source:	Mains / Manual Source
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PASS	Below Class D power limit
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Class	D
Class Multiplier	1
Power	33.5 W

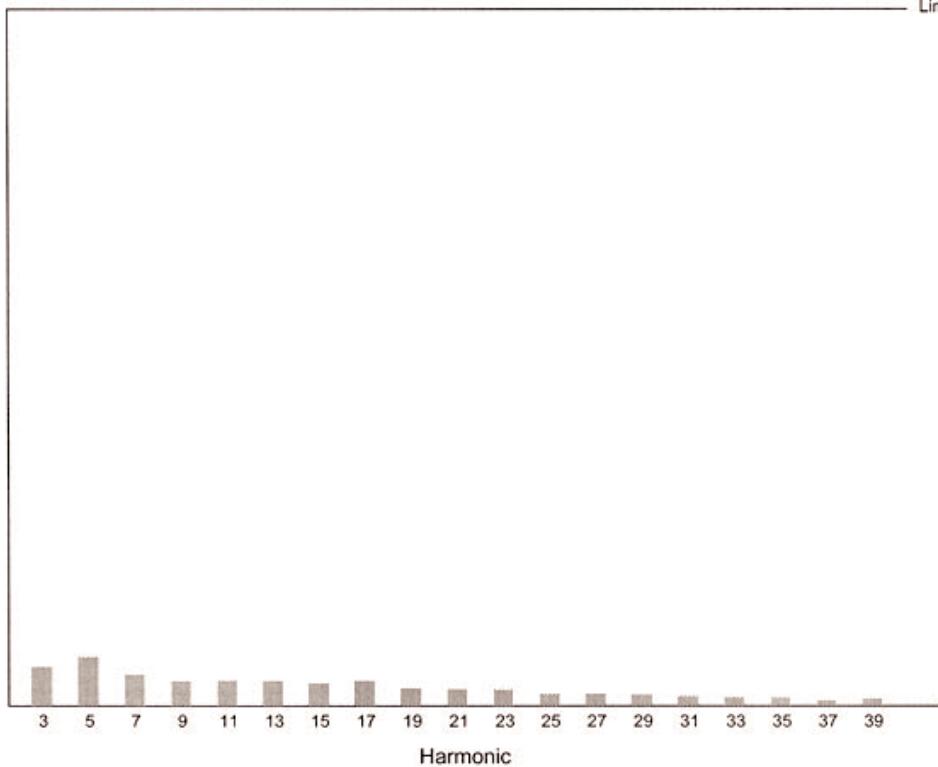


Maui Innovative Peripherals, Inc WO 77421

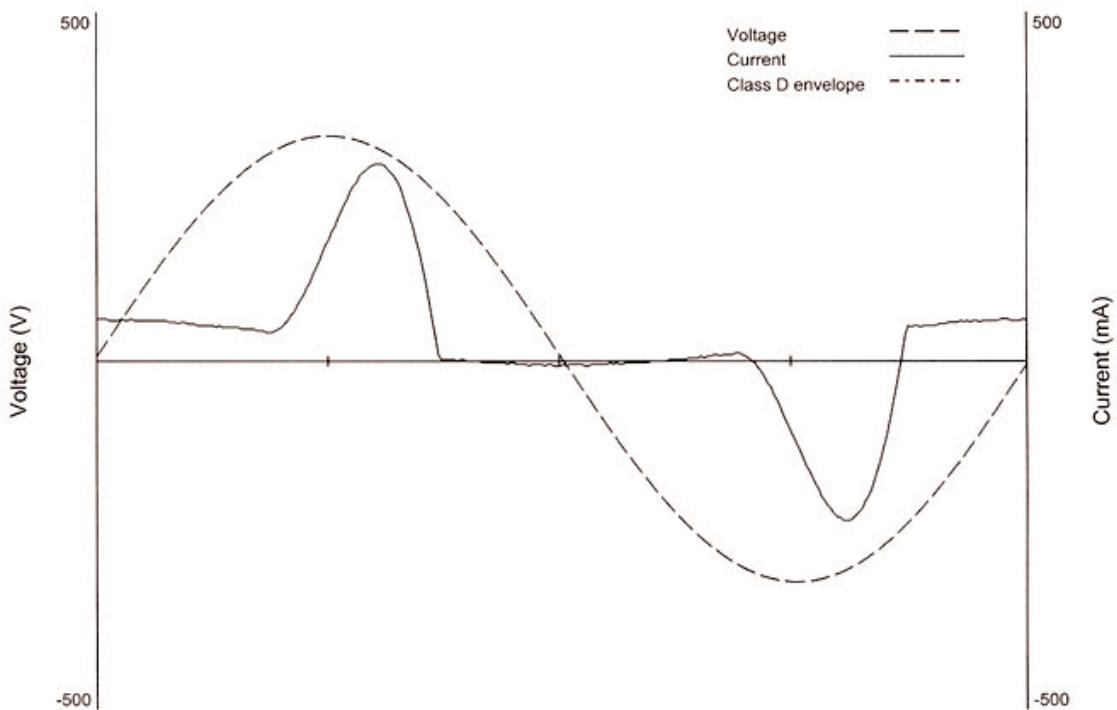
Product:	CYMOUSE	Nov 05 2001 9:30am
Serial no:		Page 1 of 1
Description:	Eut running in full mode	
Voltech IEC1000-3 Windows Software 2.09		Test Date: Nov 02 2001 2:12pm
Result:	STEADYSTATE	
Type of Test:	Steady State Harmonics Test - Normalised Bar Chart	
Power Analyzer:	Voltech PM3000A v2.16 s/n 1730	
AC Source:	Mains / Manual Source	
PASS	Below Class D power limit	

Class	D
Class Multiplier	1
Power	33.5 W

Normalised Current



Maui Innovative Peripherals, Inc WO 77421	
Product:	CYMOUSE
Serial no:	Nov 05 2001 9:32am Page 1 of 1
Description:	Eut running in full mode
Voltech IEC1000-3 Windows Software 2.09	Test Date: Nov 02 2001 2:13pm
Result:	STEADYSTATE WAVEFORM
Type of Test:	Waveform
Power Analyzer:	Voltech PM3000A v2.16 s/n 1730
AC Source:	Mains / Manual Source
	Waveform is Class D



Maui Innovative Peripherals, Inc WO 77421		
Product:	CYMOUSE	Nov 05 2001 9:30am
Serial no:		Page 1 of 1
Description:	Eut running in full mode	
Voltech IEC1000-3 Windows Software	2.09	Test Date: Nov 02 2001 2:24pm
Result:	FLUCTUATING HARMONIC	
Type of Test:	Fluctuating Harmonics Test - Worst Case Table	
Power Analyzer:	Voltech PM3000A v2.16 s/n 1730	
AC Source:	Mains / Manual Source	
PASS	Below Class D power limit.	

Class	D
Class Multiplier	1

Harm	Reading	Limit 1	Limit 2	<L1 >L1 →L1 >L2	Result	Harm	Reading	Limit 1	Limit 2	<L1 >L1 →L1 >L2	Result
2	0.57mA	None	None		N/A	3	118mA	None	None	✓	Pass
4	0.44mA	None	None		N/A	5	75.10mA	None	None	✓	Pass
6	0.20mA	None	None		N/A	7	34.59mA	None	None	✓	Pass
8	0.31mA	None	None		N/A	9	13.86mA	None	None	✓	Pass
10	0.17mA	None	None		N/A	11	11.61mA	None	None	✓	Pass
12	0.11mA	None	None		N/A	13	7.88mA	None	None	✓	Pass
14	0.13mA	None	None		N/A	15	4.69mA	None	None		N/A
16	0.13mA	None	None		N/A	17	4.80mA	None	None		N/A
18	0.10mA	None	None		N/A	19	3.41mA	None	None		N/A
20	0.12mA	None	None		N/A	21	2.39mA	None	None		N/A
22	0.11mA	None	None		N/A	23	2.48mA	None	None		N/A
24	0.21mA	None	None		N/A	25	1.77mA	None	None		N/A
26	0.13mA	None	None		N/A	27	1.51mA	None	None		N/A
28	0.19mA	None	None		N/A	29	1.38mA	None	None		N/A
30	0.11mA	None	None		N/A	31	1.21mA	None	None		N/A
32	0.30mA	None	None		N/A	33	1.03mA	None	None		N/A
34	0.11mA	None	None		N/A	35	0.90mA	None	None		N/A
36	0.10mA	None	None		N/A	37	0.79mA	None	None		N/A
38	0.13mA	None	None		N/A	39	0.82mA	None	None		N/A
40	0.13mA	None	None		N/A						

<L1 : Reading is below limit 1.

>L1 : Reading is above limit 1 for less than 10% of a 2½ minute window.

→ L1 : Reading is above limit 1 for more than 10% of a 2½ minute window.

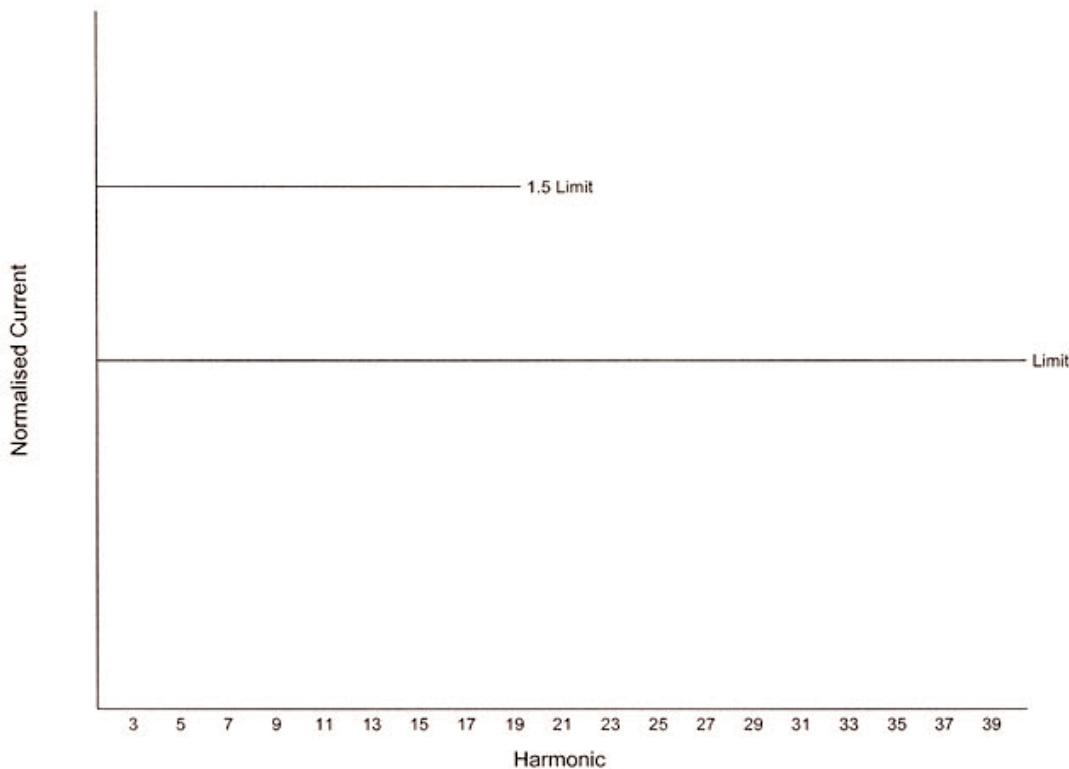
≥1.2 : Reading is above limit 2.

N/A : Harmonic current below 0.6% of rated current or 5mA, whichever is greater, are disregarded.

Maui Innovative Peripherals, Inc WO 77421

Product:	CYMOUSE	Nov 05 2001 9:31am
Serial no:		Page 1 of 1
Description:	Eut running in full mode	
Voltech IEC1000-3 Windows Software 2.09		Test Date: Nov 02 2001 2:24pm
Result:	FLUCTUATING HARMONIC	
Type of Test:	Fluctuating Harmonics Test - Normalised Worst Case Bar Chart	
Power Analyzer:	Voltech PM3000A v2.16 s/n 1730	
AC Source:	Mains / Manual Source	
PASS	Below Class D power limit.	

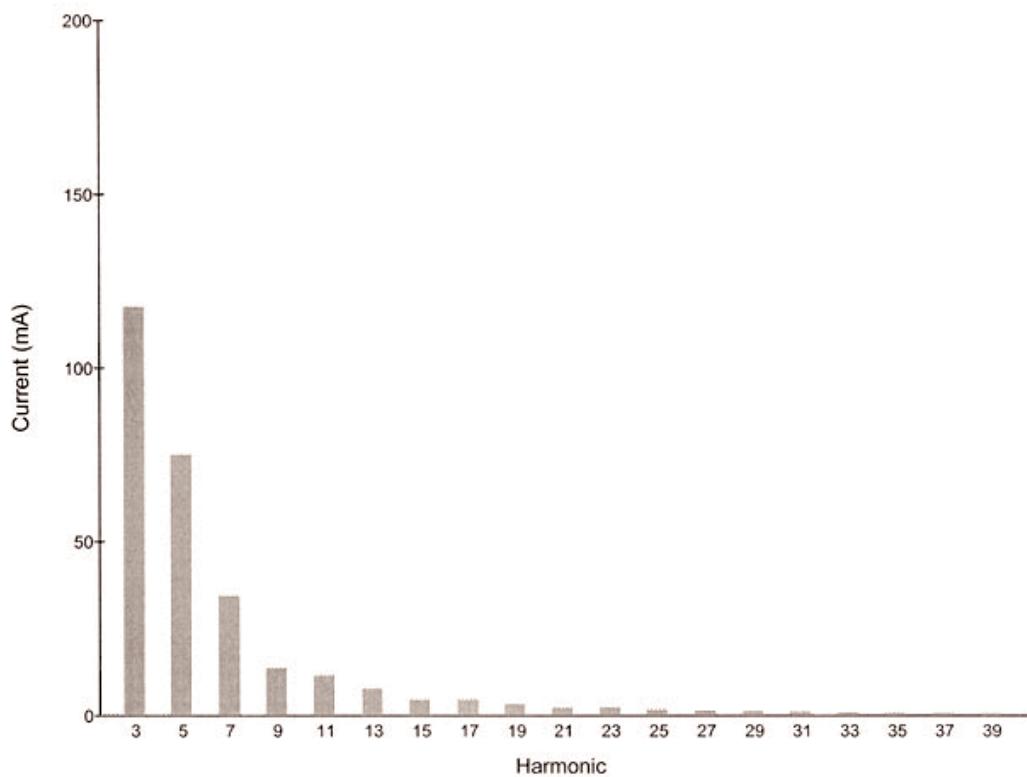
Class	D
Class Multiplier	1



Maui Innovative Peripherals, Inc WO 77421

Product:	CYMOUSE	Nov 05 2001 9:31am
Serial no:		Page 1 of 1
Description:	Eut running in full mode	
Voltech IEC1000-3 Windows Software 2.09	Test Date: Nov 02 2001 2:24pm	
Result:	FLUCTUATING HARMONIC	
Type of Test:	Fluctuating Harmonics Test - Linear Worst Case Bar Chart	
Power Analyzer:	Voltech PM3000A v2.16 s/n 1730	
AC Source:	Mains / Manual Source	
PASS	Below Class D power limit.	

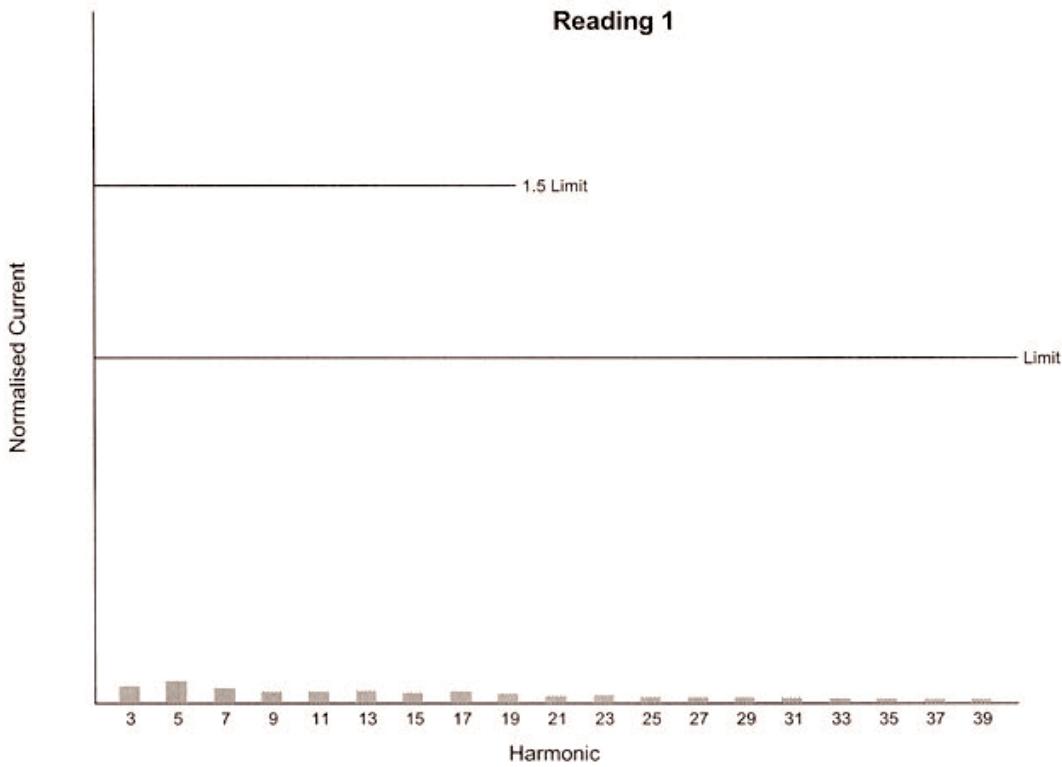
Class	D
Class Multiplier	1



Maui Innovative Peripherals, Inc WO 77421

Product:	CYMOUSE	Nov 05 2001 9:31am
Serial no:		Page 1 of 1
Description:	Eut running in full mode	
Voltech IEC1000-3 Windows Software 2.09	Test Date: Nov 02 2001 2:24pm	
Result:	FLUCTUATING HARMONIC	
Type of Test:	Fluctuating Harmonics Test - Normalised Bar Chart	
Power Analyzer:	Voltech PM3000A v2.16 s/n 1730	
AC Source:	Mains / Manual Source	
	Below Class D power limit.	

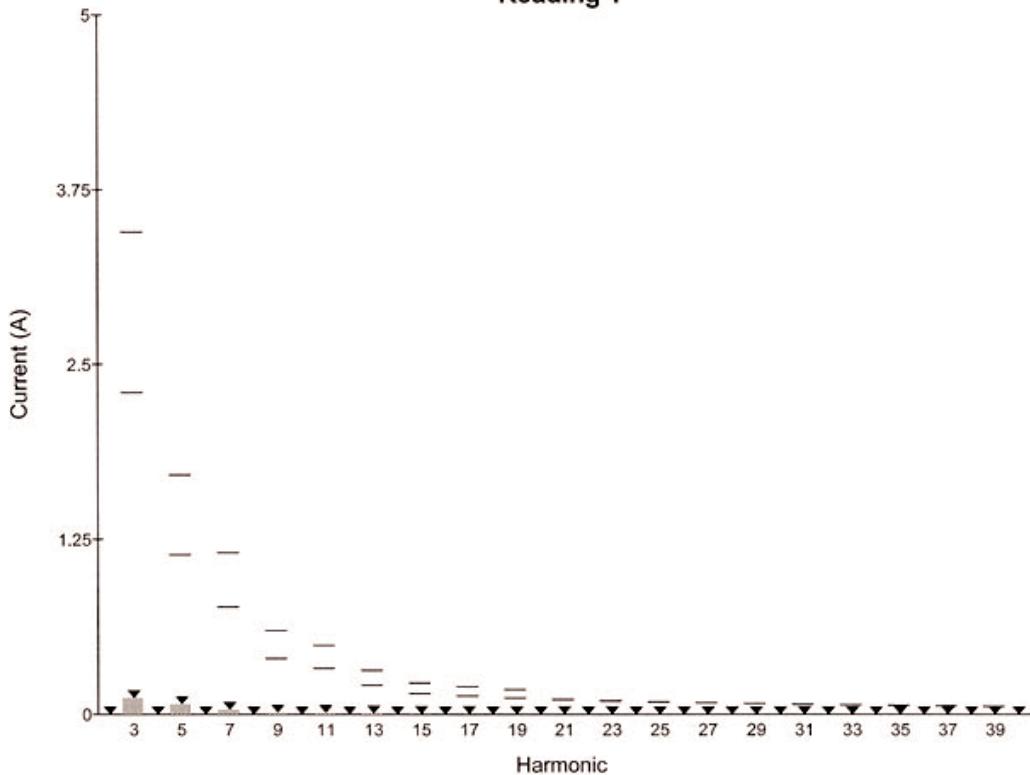
Class	D
Class Multiplier	1
Power	32.6 W

Reading 1


Maui Innovative Peripherals, Inc WO 77421

Product:	CYMOUSE	Nov 05 2001 9:31am
Serial no:		Page 1 of 1
Description:	Eut running in full mode	
Voltech IEC1000-3 Windows Software 2.09		Test Date: Nov 02 2001 2:24pm
Result:	FLUCTUATING HARMONIC	
Type of Test:	Fluctuating Harmonics Test - Linear Bar Chart	
Power Analyzer:	Voltech PM3000A v2.16 s/n 1730	
AC Source:	Mains / Manual Source	
	Below Class D power limit.	

Class	D
Class Multiplier	1
Power	32.6 W

Reading 1


Maui Innovative Peripherals, Inc WO 77421

Product:	CYMOUSE	Nov 05 2001 9:32am		
Serial no:		Page 1 of 1		
Description: Eut running in full mode				
Voltech IEC1000-3 Windows Software 2.09	Test Date:	Nov 02 2001 2:19pm		
Result: FLICKER				
Type of Test: Flickermeter Test - Table				
Power Analyzer: Voltech PM3000A v2.16 s/n 1730				
AC Source: Mains / Manual Source				
PASS	Measurement method - Voltage			
	Pst	dc (%)	dmax (%)	d(t) > 3%(ms)
Limit	1.000	3.000	4.000	200
Reading 1	0.074	0.017	0.053	0