

TEST REPORT

Report Number: 3148894MPK-001

Project Number: 3148894

March 31, 2008

**Testing performed on the
Orthopedic Computer Mouse**

Model Number: 0999

to

**FCC Part 15, Subpart B
Industry Canada ICES-003**

Class: B

For

Orthovia



A2LA Certificate Number: 1755-01

Test Performed by:

Intertek

1365 Adams Court

Menlo Park, CA 94025

Test Authorized by:

Orthovia

9225 Katy freeway Suite#103

HOUSTON, TX 77024 USA

Prepared by:

A handwritten signature in blue ink, appearing to read 'Suresh Kondapalli'.

Suresh Kondapalli

Date: March 31, 2008

Reviewed by:

A handwritten signature in blue ink, appearing to read 'Krishna K Vemuri'.

Krishna K Vemuri

Date: March 31, 2008


This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to copy or distribute this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program. This report must not be used to claim product endorsement by A2LA, NIST nor any other agency of the U.S. Government.

VERIFICATION OF COMPLIANCE
Report No. 3148894MPK-001

Verification is hereby issued to the named APPLICANT and is VALID ONLY for the equipment identified hereon for use under the rules and regulations listed below.

Equipment Under Test:	Orthopedic Computer Mouse
Trade Name:	Orthovia
Model No.:	0999
Serial No.:	Not Labeled
Applicant:	Orthovia
Contact:	Mr. Ivan Toledo
Address:	9225 Katy freeway Suite#103 MIAMI, FL 33014
Country	USA
Tel. number:	713/208-9269
Applicable Regulation:	FCC Part 15, Subpart B Industry Canada ICES-003
Equipment Class:	Class B
Date of Test:	March 24, 2008

We attest to the accuracy of this report:


Suresh Kondapalli
Test Engineer


Krishna K Vemuri
EMC Senior Project Engineer

TABLE OF CONTENTS

EXECUTIVE SUMMARY	4
1.0 Job Description.....	5
1.1 Client Information.....	5
1.2 Test Plan Reference:	5
1.3 Equipment Under Test (EUT).....	5
1.4 System Support Equipment.....	6
1.5System Block Diagram	6
1.6 Justification.....	7
1.7 Mode(s) of operation	7
1.8 Modifications required for compliance.....	7
2.0 Test Environment for Emissions Testing.....	8
2.1 Test Facility	8
2.2 Test Equipment	8
2.3 Example Field Strength Calculation	9
2.4 Measurement Uncertainty.....	10
3.0 Emissions Test Results.....	11
3.1 Electromagnetic Radiated Disturbance	11
3.1.1Test Limits	11
3.1.2Test Procedure	12
3.1.3Test Results.....	13
3.1.4Test Configuration Photographs	15
3.2 AC Mains Line-Conducted Disturbance	17
3.2.1Test Limits	17
3.2.2Test Procedure	18
3.2.3Test Results.....	19
3.2.4Test Configuration Photographs	21
4.0 Labeling and Instruction Manual Requirements.....	23
4.1 Labeling - USA.....	23
4.2 Labeling - Canada.....	24
5.0 Document History	25

EXECUTIVE SUMMARY

Test Description	Class	Pass/Fail Comments
Radiated Emissions		
• FCC Part 15	B	Complies
• ICES 003	B	
Conducted Emissions (AC Mains)		
• FCC Part 15	B	Complies
• ICES 003	B	

1.0 Job Description

1.1 Client Information

The Model: 0999 was tested at the request of:

Company: Orthovia
9225 Katy freeway Suite#103
HOUSTON, TX 77024 USA

Name of contact: Mr. Ivan Toledo
Telephone: 713/208-9269

1.2 Test Plan Reference:

Tests were performed to the following standards:

- FCC Part 15, Subpart B
- Industry Canada ICES-003

1.3 Equipment Under Test (EUT)

Equipment Under Test		
Description	Model Number	Serial Number
The Orthopedic Computer Mouse	0999	Not Labeled

EUT receive date: March 24, 2008

EUT receive condition: The EUT was received in good condition with no apparent damage.

Test start date: March 24, 2008

Test completion date: March 24, 2008

The test results in this report pertain only to the item tested.

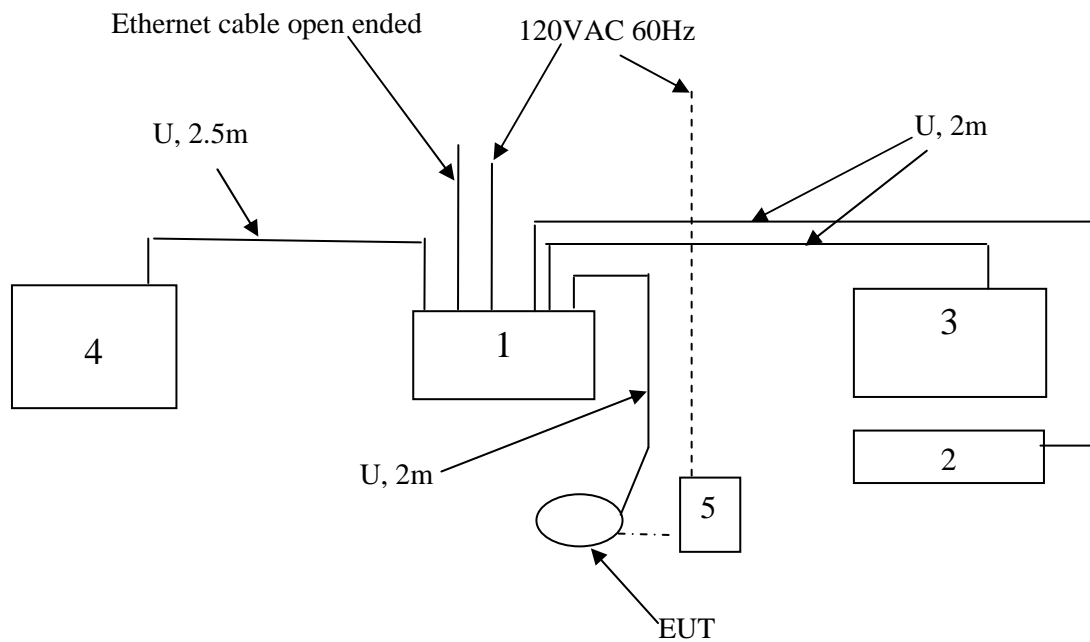
Orthovia supplied the following description of the EUT:

The Equipment Under Test (EUT) is a ergonomically designed orthopedic mouse.

1.4 System Support Equipment

Item #	Description	Model No.	Serial No.
1	Compaq Lap top	EV _o N610C	1J31KT8Z906J
2	Compaq Key board	KB-9963	3892A582
3	Deca View Monitor	G380+	3872A569
4	Epson Printer	C88	GS6Y143833
5	Motor	Not Labeled	Not Labeled

1.5 System Block Diagram



1.6 Justification

The EUT was configured for testing in a typical configuration, as specified by Orthovia.

1.7 Mode(s) of operation

The 0999 was connected to the Laptop and continuously moved with the help of test jig.

1.8 Modifications required for compliance

No modifications were made during compliance testing in order to bring the product into compliance (Please note that this does not include changes made specifically by Orthovia prior to compliance testing).

2.0 Test Environment for Emissions Testing

2.1 Test Facility

The test facility is located at 1365 Adams Court, Menlo Park, California. The test site is a 10-meter semi-anechoic chamber. The site meets the characteristics of CISPR 16-1 and ANSI C63.4. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters.

The A2LA certificate number for this site is 1755-01.

2.2 Test Equipment

Table 2-1 contains a list of the test equipment used during the testing.

Table 2-1 List of Test Equipment

Equipment	Manufacturer	Model/Type	Serial #	Cal Int	Cal Due
RF Filter Section	Hewlett Packard	85460A	3448A00267	12	10/02/08
EMI Receiver	Hewlett Packard	8546A	3710A00373	12	10/02/08
BI-Log Antenna	EMCO	3143	9509-1160	12	9/05/08
Pre-Amplifier	Sonoma	310N	185634	12	9/26/08
LISN	FCC	FCC-LISN-50-50-M-H	2011	12	9/05/08

2.3 Example Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor. Then by subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - PA$$

Where

- FS = Field Strength in dB ($\mu\text{V}/\text{m}$)
- RA = Receiver Amplitude (including preamplifier) in dB (μV)
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB (1/m)
- PA = Preamplifier Factor in dB

Assume a receiver reading of 52.0 dB (μV) is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dB ($\mu\text{V}/\text{m}$).

$$\begin{aligned} RA &= 52.0 \text{ dB } (\mu\text{V}) \\ AF &= 7.4 \text{ dB (1/m)} \\ CF &= 1.6 \text{ dB} \\ PA &= 29.0 \text{ dB} \\ FS &= RF + AF + CF - PA \\ FS &= 52.0 + 7.4 + 1.6 - 29.0 \\ FS &= 32 \text{ dB } (\mu\text{V}/\text{m}) \end{aligned}$$

2.4 Measurement Uncertainty

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes.

Radiated Emission:

The uncertainty in the measured field strength is estimated as follows, for a minimum confidence probability of 95 %

Freq. Range	Detection Mode	Uncertainty
30 MHz to 200 MHz	Quasi-peak	± 4.4 dB
200 MHz to 1000 MHz	Quasi-peak	+ 5.0 / - 3.6 dB

Conducted Emission:

The uncertainty in the measured voltage is estimated as follows, for a minimum confidence probability of 95 %

Freq. Range	Detection Mode	Uncertainty
9 kHz to 150 kHz	Average	± 2.1 dB
	Quasi-peak	± 2.5 dB
150 kHz to 30 MHz	Average	± 2.4 dB
	Quasi-peak	± 2.6 dB

3.0 Emissions Test Results

3.1 Electromagnetic Radiated Disturbance

3.1.1 Test Limits

Limits for Electromagnetic Radiated Disturbance, FCC Section 15.109(b) and ICES 003

Frequency (MHz)	Class A at 10m dB(μV/m)	Class B at 3m dB(μV/m)
30-88	39	40.0
88-216	43.5	43.5
216-960	46.4	46.0
Above 960	49.5	54.0

Note: Three sets of units are commonly used for EMI measurement, decibels below one milliwatt (-dBm), decibels above a microvolt (dBμV), and microvolts (μV). To convert between them, use the following formulas: $20 \text{ LOG}_{10}(\mu\text{V}) = \text{dB}\mu\text{V}$, $\text{dBm} = \text{dB}\mu\text{V} - 107$

3.1.2 Test Procedure

Measurements are conducted with a quasi-peak detector instrument in the frequency range of 30 MHz to 1000 MHz and with the average detector instrument in the frequency range above 1000 MHz. The measuring receiver meets the requirements of Section One of CISPR 16 and the measuring antenna correlates to a balanced dipole.

Measurements of the radiated field are made with the antenna located at a distance of 10 meters from the EUT. If the field-strength measurements at 10m cannot be made because of high ambient noise level or for other reasons, measurements of Class B equipment may be made at a closer distance, for example 3m. An inverse proportionality factor of 20 dB per decade should be used to normalize the measured data to the specified distance for determining compliance.

The antenna is adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.

The antenna-to-EUT azimuth is varied during the measurement to find the maximum field-strength readings.

The antenna-to-EUT polarization (horizontal and vertical) is varied during the measurements to find the maximum field-strength readings.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for a larger EUT.

Floor standing EUTs are placed on a horizontal metal ground plane and isolated from the ground plane by 3 to 12 mm of insulating material.

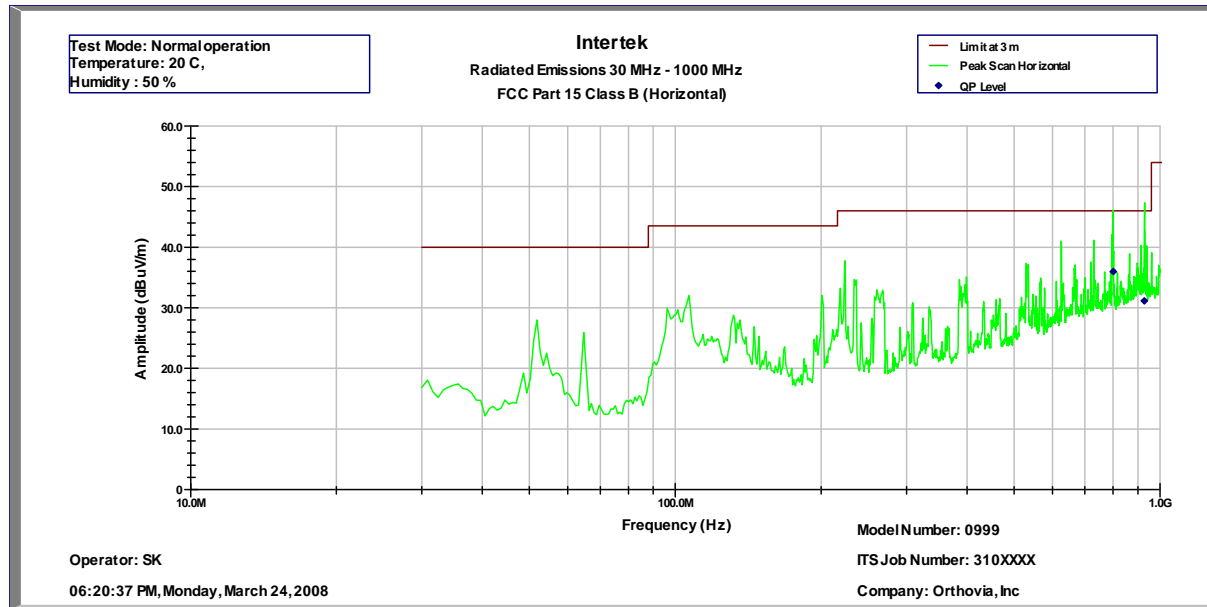
Equipment setup for radiated disturbance tests followed the guidelines of ANSI C63.4.

Tested By:	Suresh Kondapalli
Test Date:	March 24, 2008

3.1.3 Test Results

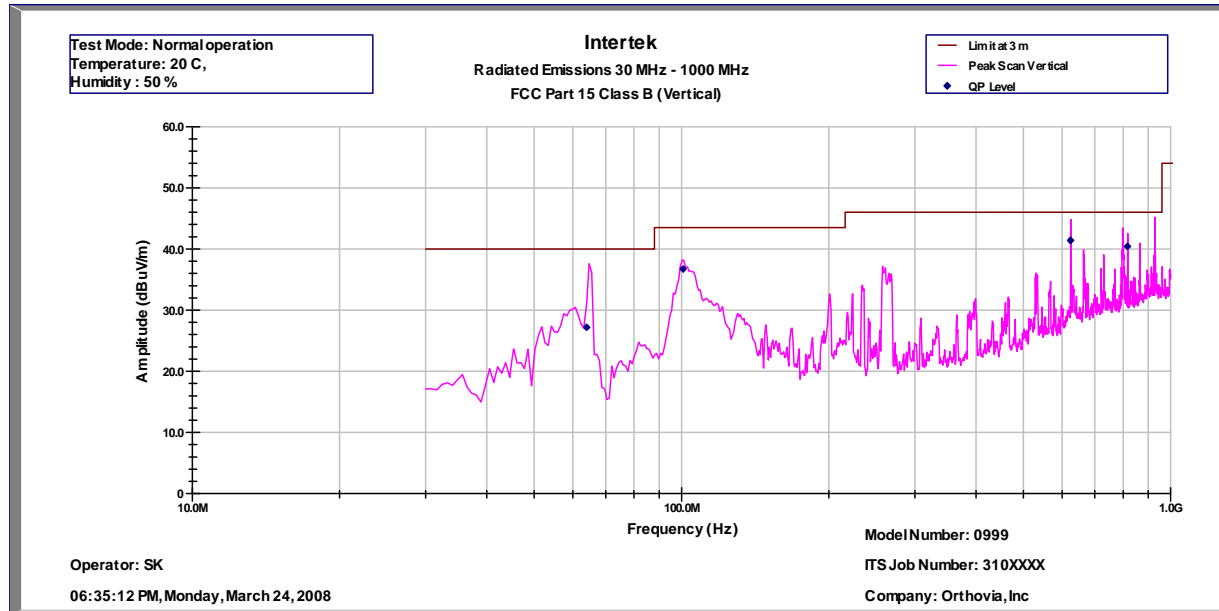
The EUT met the radiated disturbance requirements of FCC and ICES 003 for a Class B device.

FCC and ICES 003, Radiated Disturbance



Intertek Testing Services							
Radiated Emissions 30 MHz - 1000 MHz							
FCC Part 15 Class B (QP-Horizontal)							
Operator: SK			Model Number: 0999				
ITS Job Number: 3148894							
06:35:12 PM, Monday, March 24, 2008						Company: Orthovia	
Frequency	Quasi Pk FS	Limit@10m	Margin	RA	CF	AG	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB(1/m)
801.0	36.0	46	-10.0	32.1	3.0	31.2	10.5
928.0	31.1	46	-14.9	24.8	3.3	30.9	10.5
Test Mode: Normal Operation							
Temperature: 20 C							
Humidity : 50 %							

FCC and ICES 003 Radiated Disturbance



Intertek Testing Services							
Radiated Emissions 30 MHz - 1000 MHz							
FCC Part 15 Class B (QP-Vertical)							
Operator: SK			Model Number: 0999				
ITS Job Number: 3148894							
06:20:37 PM, Monday, March 24, 2008					Company: Orthovia		
Frequency	Quasi Pk FS	Limit@10m	Margin	RA	CF	AG	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB(1/m)
64.0	27.2	40.0	-12.8	43.0	0.8	32.0	10.5
101.0	36.7	43.5	-6.8	51.2	1.0	32.0	10.5
624.0	41.4	46.0	-4.6	38.0	2.7	32.1	10.5
816.0	40.4	46.0	-5.6	36.3	3.1	31.1	10.5
Test Mode: Normal Operation							
Temperature: 20 C							
Humidity : 50 %							

Results: Complies by 4.6 dB at 624.0 MHz

3.1.4 Test Configuration Photographs

The following photographs show the testing configurations used.



Electromagnetic Radiated Disturbance Setup Photograph

3.1.4 Test Configuration Photograph (Continued)



Electromagnetic Radiated Disturbance Setup Photograph

3.2 AC Mains Line-Conducted Disturbance

3.2.1 Test Limits

Table 3-1 FCC Part 15 Subpart B and ICES 003 Limits for Conducted Disturbance at the Mains Ports

Frequency Band MHz	Class A Limit dB (μ V)		Class B Limit dB (μ V)	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15-0.50	79	66	66 to 56 Decreases linearly with the logarithm of the frequency	56 to 46 Decreases linearly with the logarithm of the frequency
0.50-5.00	73	60	56	46
5.00-30.00	73	60	60	50

Note: At the transition frequency the lower limit applies.

3.2.2 Test Procedure

Measurements are carried out using quasi-peak and average detector receivers in accordance with CISPR 16. An AMN is required to provide a defined impedance at high frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. An AMN as defined in CISPR 16 shall be used.

The EUT is located so that the distance between the boundary of the EUT and the closest surface of the AMN is 0.8m.

Where a flexible mains cord is provided by the manufacturer, this shall be 1m long or if in excess of 1m, the excess cable is folded back and forth as far as possible so as to form a bundle not exceeding 0.4m in length.

The EUT is arranged and connected with cables terminated in accordance with the product specification.

Conducted disturbance is measured between the phase lead and the reference ground, and between the neutral lead and the reference ground. Both measured values are reported.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. A vertical, metal reference plane is placed 0.4m from the EUT. The vertical metal reference-plane is at least 2m by 2m. The EUT shall be kept at least 0.8m from any other metal surface or other ground plane not being part of the EUT. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for larger EUT.

Floor standing EUTs are placed on a horizontal metal ground plane and isolated from the ground plane by 3 to 12 mm of insulating material. The metal ground plane extends at least 0.5m beyond the boundaries of the EUT and has minimum dimensions of 2m by 2m.

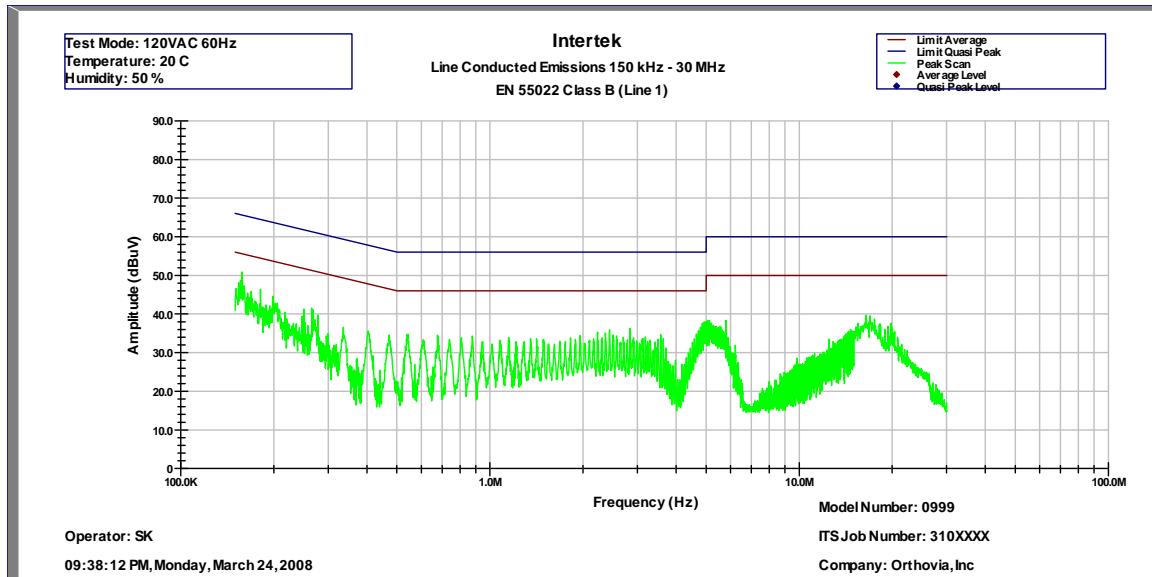
Equipment setup for conducted disturbance tests followed the guidelines of ANSI C63.4.

Tested By:	Suresh Kondapalli
Test Date:	March 24, 2008

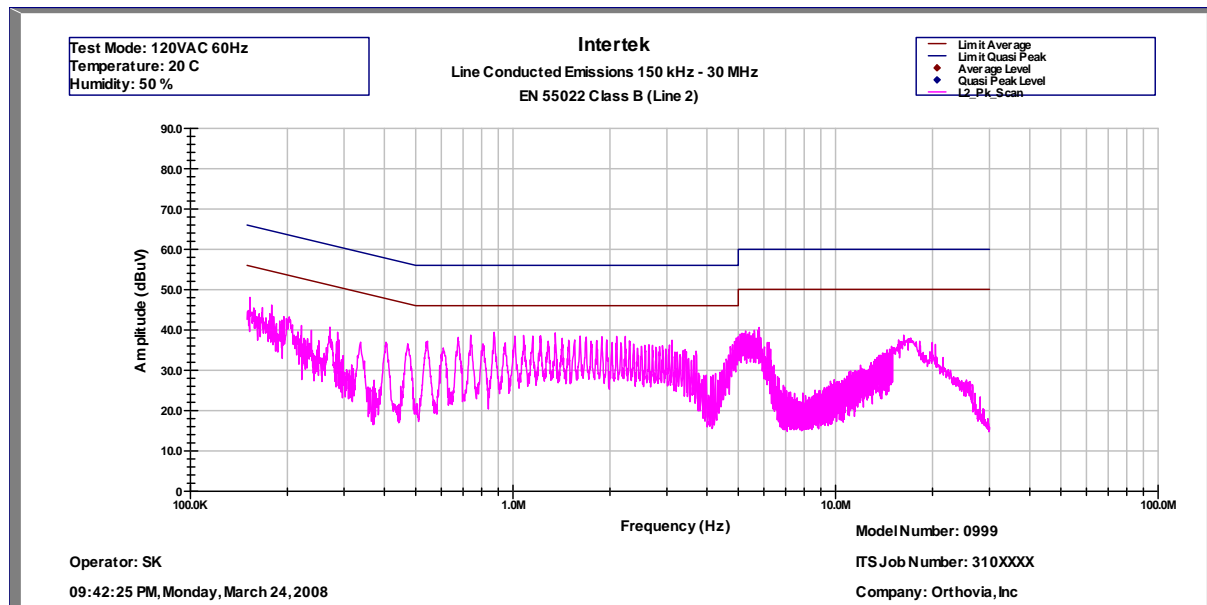
3.2.3 Test Results

The EUT met the conducted disturbance requirement of FCC and ICES 003 for a Class B device.

FCC and ICES 003 Conducted Disturbance at AC Mains



Intertek Testing Services				
Line Conducted Emissions 150 kHz - 30 MHz				
EN 55022 Class B (Line 1)				
Operator: SK		Model Number: 0999		
ITS Job Number: 3148894		Company: Orthovia		
Frequency (MHz)	PK Level (dBUV)	Av Limit (dBUV)	QP Limit (dBUV)	Worst case Margin (dB)
0.157	50.9	55.8	65.8	-4.9
0.169	45.8	55.5	65.5	-9.6
0.181	46.4	55.1	65.1	-8.7
0.198	44.6	54.6	64.6	-10.1
5.06	38.4	50.0	60.0	-11.6
16.5	39.7	50.0	60.0	-10.3

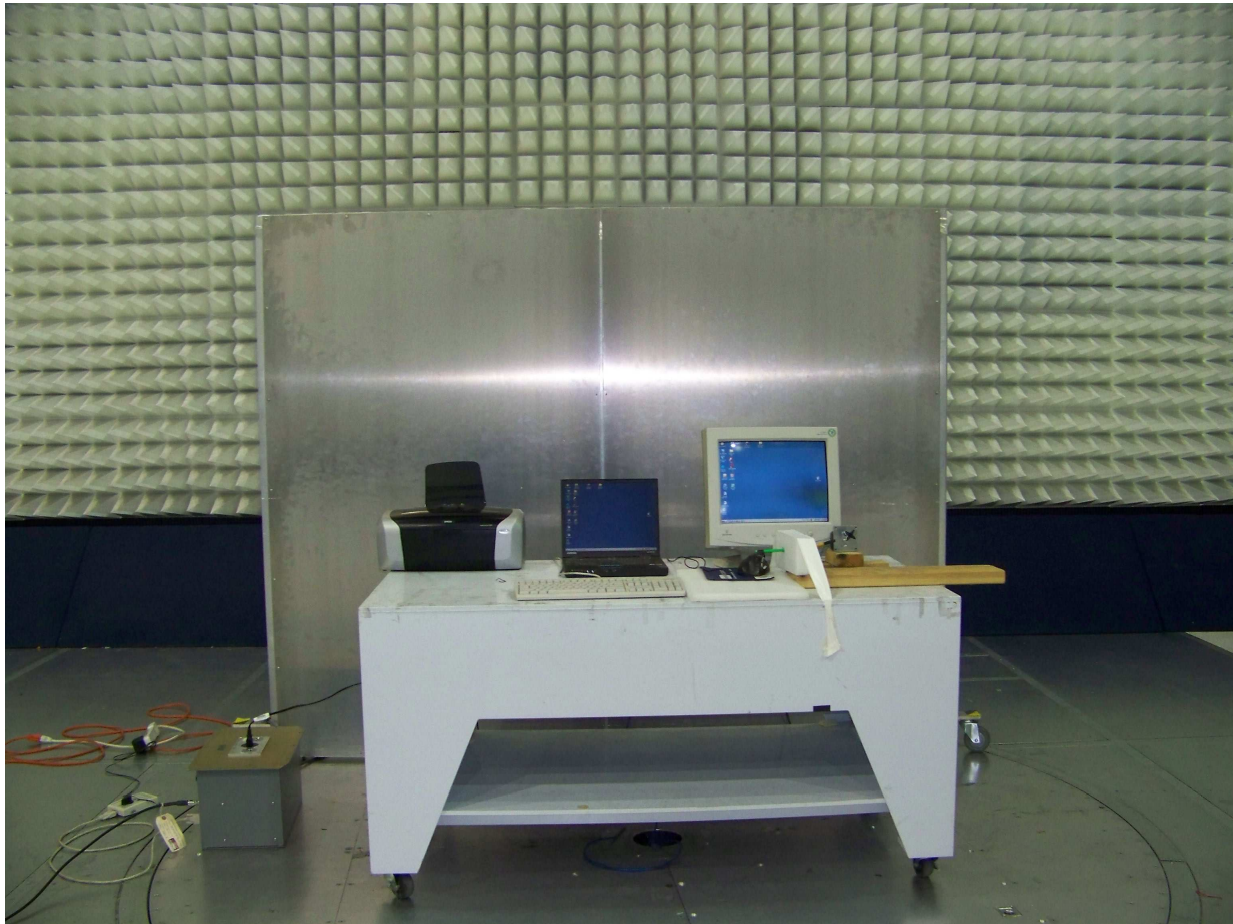


Intertek Testing Services				
Line Conducted Emissions 150 kHz - 30 MHz				
EN 55022 Class B (Line 2)				
Operator: SK		Model Number: 0999		
ITS Job Number: 3148894			Company: Orthovia	
Frequency	PK Level	Av Limit	QP Limit	Worst case Margin
(MHz)	(dBuV)	(dBuV)	(dBuV)	(dB)
0.157	48.0	55.9	65.9	-7.9
0.179	46.1	55.2	65.2	-9.0
0.181	43.3	55.1	65.1	-11.9
5.60	39.9	50.0	60.0	-10.1
5.74	39.9	50.0	60.0	-10.1
5.80	40.6	50.0	60.0	-9.4

Results:	Complies by 4.9 dB at 0.157 MHz
-----------------	--

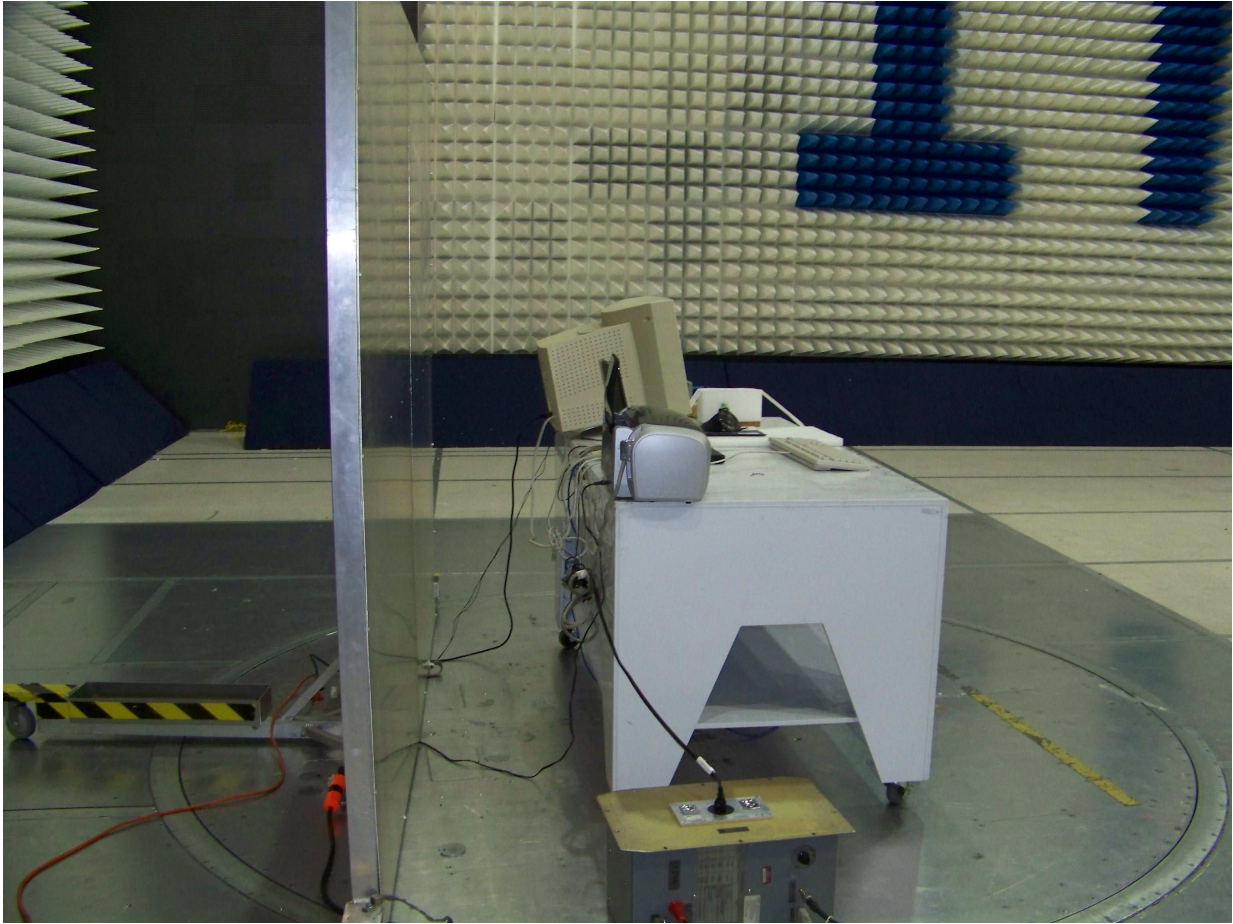
3.2.4 Test Configuration Photographs

The following photographs show the testing configurations used.



AC Mains Line-Conducted Disturbance Setup Photograph

3.2.4 Test Configuration Photographs (Continued)



AC Mains Line-Conducted Disturbance Setup Photograph

4.0 Labeling and Instruction Manual Requirements

4.1 Labeling - USA

Class B Labeling and Instruction Manual Requirements

Devices subject to Class B verification (not certification) must be labeled with the following statement:

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

In addition, for a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

***Warning:* Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.**

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

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

If shielded cables or other specialized accessories are necessary for the unit to achieve compliance, a statement similar to the following should be added:

Shielded cables must be used with this unit to ensure compliance with the Class B FCC limits.

4.2 Labeling - Canada

Canadian Emissions Labeling Requirements

According to Industry Canada Notice ICES-003, Issue 2:

A written notice indicating compliance must accompany each unit of digital apparatus to the end user. The notice shall be in the form of a label that is affixed to the apparatus. Where because of insufficient space or other restrictions it is not feasible to affix a label to the apparatus, the notice may be in form of a statement included in the user's manual.

A suggested text for the notice, in English and French, is as follows:

This Class [*] digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe [*] respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

*Insert either "A" or "B" but not both as appropriate for the equipment requirements.

This text may be added to the FCC-required label to satisfy both US and Canadian EMI requirements.

5.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / 3148894	SK	March 31, 2008	Original document