

REPORT OF MEASUREMENTS
PART 15C - INTENTIONAL RADIATOR

DEVICE: WIRELESS MOUSE
MODEL: 64240 (TURBO MOUSE PRO WIRELESS)
MANUFACTURER: KENSINGTON TECHNOLOGY GROUP
A DIVISION OF ACCO BRANDS, INC.
ADDRESS: 2855 CAMPUS DRIVE
SAN MATEO, CA
USA 94403

THE DATA CONTAINED IN THIS REPORT WAS
COLLECTED ON DECEMBER 19 2000 AND COMPILED BY:



PAUL G. SLAVENS
CHIEF EMC ENGINEER

- 1. GENERAL3**
 - 1.1 PURPOSE.....3
 - 1.2 MANUFACTURER CONTACT INFORMATION.....3
 - 1.3 TEST LOCATION.....3
 - 1.4 TEST PERSONNEL3
- 2. TEST RESULTS SUMMARY.....4**
- 3. DESCRIPTION OF EQUIPMENT AND PERIPHERALS.....5**
 - 3.1 EQUIPMENT UNDER TEST (EUT).....5
 - 3.2 EUT PERIPHERALS5
 - 3.3 DESCRIPTION OF INTERFACE CABLES.....6
 - 3.4 MODE OF OPERATION DURING TESTS6
 - 3.5 MODIFICATIONS REQUIRED FOR COMPLIANCE.....6
- 4. ANTENNA REQUIREMENT7**
 - 4.1 REGULATION.....7
 - 4.2 RESULT.....7
- 5. CONDUCTED EMISSIONS TESTS.....8**
 - 5.1 TEST EQUIPMENT8
 - 5.2 PURPOSE.....8
 - 5.3 TEST PROCEDURES8
 - 5.4 TEST RESULTS.....9
- 6. RADIATED EMISSIONS TESTS.....10**
 - 6.1 REGULATION.....10
 - 6.2 TEST EQUIPMENT10
 - 6.3 TEST PROCEDURES11
 - 6.4 TEST RESULTS.....12
- 7. TEST SETUP PHOTOGRAPHS13**
- 8. MISCELLANEOUS COMMENTS AND NOTES.....14**

1. General

1.1 Purpose

The purpose of this report is to show compliance to the FCC regulations for unlicensed devices operating under section 15.227 of the Code of Federal Regulations title 47.

1.2 Manufacturer Contact Information

Company Name: ACCO Canada,
Gravis Research & Development Centre
Contact: Robert Shular
Street Address: #101-3750 North Fraser Way
City/State/Zip: Burnaby, British Columbia, Canada, V5J 5E9
Telephone: 1-604-431-5020 extension 1065
E-mail: rshular@gravis.com
Web: www.kensington.com

1.3 Test location

Company: Acme Testing Inc.
Street Address: 2002 Valley Highway
Mailing Address: PO Box 3
City/State/Zip: Acme WA 98220-0003
Laboratory: Test Site 2
Telephone: 888 226-3837
Fax: 360 595-2722
E-mail: acmetest@acmetesting.com
Web: www.acmetesting.com

1.4 Test Personnel

Paul G. Slavens, Chief EMC Engineer

2. Test Results Summary

Summary of Test Results

<u>Requirement</u>	<u>CFR Section</u>	<u>Test Result</u>
Antenna Requirements	15.203	PASS
Conducted Emissions < 48.0 dBuV	15.207	PASS
Fundamental Emission <10,000 μ V	15.227(a)	PASS
Radiated Spurs < 15.209	15.227(b)	PASS

The signed original of this report, supplied to the client, represents the only “official” copy. Retention of any additional copies (electronic or non-electronic media) is at Acme Testing’s discretion to meet internal requirements only. The client has made the determination that EUT Condition, Characterization, and Mode of Operation are representative of production units, and meet the requirements of the specifications referenced herein.

The measurements contained in this report were made in accordance with the procedure ANSI C63.4 - 1992 and all applicable Public Notices received prior to the date of testing. All emissions from the device were found to be within the limits outlined in this report. Acme Testing assumes responsibility only for the accuracy and completeness of this data as it pertains to the sample tested.

Paul G. Slavens
Chief EMC Engineer

Date of Issuance

3. Description of Equipment and Peripherals

3.1 Equipment Under Test (EUT)

Device: Wireless Mouse
Model Number: 64240 (Turbo Mouse Pro Wireless)
Serial Number: None
FCC ID: GV364240
Power: 2 (two) "AA" Batteries
Grounding: Local
Antenna Distance: 3 Meters

3.2 EUT Peripherals

<u>Device</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>FCC ID</u>	<u>Serial Number</u>
Personal Computer	Dell	XPS T450	D.O.C.	19F4P
Monitor	Dell	UltraScan P991	D.O.C.	8164558
Keyboard	Microsoft Corporation	E06402PS2	D.O.C.	263864-40083
Printer	Hewlett Packard	C6410A	D.O.C.	MY9291B24N
IR Adapter	Extended Systems	Jeteye PC	D.O.C.	9828

3.3 Description of Interface Cables

EUT (Receiver)/Personal Computer

Shielded	Unshielded	Flat	Round	Length	Ferrite
Yes	No	No	Yes	2 m	NO

Personal Computer/Monitor

Shielded	Unshielded	Flat	Round	Length	Ferrite
Yes	No	No	Yes	1.9 m	Yes

Personal Computer /Keyboard

Shielded	Unshielded	Flat	Round	Length	Ferrite
Yes	No	No	Yes	2 m	No

Personal Computer /Printer

Shielded	Unshielded	Flat	Round	Length	Ferrite
Yes	No	No	Yes	1.8 m	No

Personal Computer /IR Adapter

Shielded	Unshielded	Flat	Round	Length	Ferrite
Yes	No	No	Yes	1.5 m	No

ARRANGEMENT OF INTERFACE CABLES: All interface cables were positioned for worst-case maximum emissions within the manner assumed to be a typical operation condition (please reference photographs).

3.4 Mode of Operation During Tests

The EUT was modified to constantly transmit during testing.

3.5 Modifications Required for Compliance

1. None.

4. Antenna requirement

4.1 Regulation

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of Part 15C. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

4.2 Result

The transmitter uses a single loop of wire soldered on the PCB internal to the case of the wireless mouse.

5. Conducted Emissions Tests

Test Requirement: FCC CFR47, Part 15C

Test Procedure: ANSI C63.4: 1992

5.1 Test Equipment

- ⇒ Spectrum Analyzer (blue): Hewlett-Packard 8566B, Serial Number 2410A00168, Calibrated: 17 March 2000, Calibration due Date: 17 March 2001
- ⇒ RF Preselector (blue): Hewlett-Packard 85685A, Serial Number 2648A-00519, Calibrated: 17 March 2000, Calibration due Date: 17 March 2001
- ⇒ Quasi Peak Adapter (blue): Hewlett-Packard 85650A, Serial Number 2043A00327, Calibrated: 17 March 2000, Calibration due Date: 17 March 2001
- ⇒ Line Impedance Stabilization Network: EMCO 3825/2, Serial Number 9002-1601, Calibrated: 2 January 2000, Calibration due Date: 2 January 2001

5.2 Purpose

The purpose of this test is to evaluate the level of conducted noise the EUT imposes on the AC mains.

5.3 Test Procedures

For tabletop equipment, the EUT is placed on a 1 meter by 1.5 meters wide and 0.8 meter high nonconductive table that is placed above the groundplane. Floor standing equipment is placed directly on the groundplane. Any supplemental grounding mechanisms are connected, if appropriate. The EUT is connected to its associated peripherals, with any excess I/O cabling bundled to approximately 1 meter. The EUT is connected to a dedicated LISN and all peripherals are connected to a second separate LISN circuit. The LISNs are bonded to the groundplane.

Preview tests are performed to determine the “worst case” mode of operation. With the EUT operating in “worst case” mode, final conducted measurements are taken. Conducted measurements are made on each current carrying conductor with respect to ground.

Conducted Emissions Test Characteristics

Frequency range	0.45 MHz - 30.0 MHz
Test instrumentation resolution bandwidth	9 kHz
Lines Tested	Line 1/Line 2

5.4 Test Results

* Not applicable the transmitter is battery powered

6. Radiated Emissions Tests

6.1 Regulation

Section 15.227 Operation within the band 26.96 - 27.28 MHz.

(a) The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

(b) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

6.2 Test Equipment

- ⇒ Spectrum Analyzer (blue): Hewlett-Packard 8566B, Serial Number 2410A00168, Calibrated: 17 March 2000, Calibration due Date: 17 March 2001
- ⇒ RF Preselector (blue): Hewlett-Packard 85685A, Serial Number 2648A-00519, Calibrated: 17 March 2000, Calibration due Date: 17 March 2001
- ⇒ Quasi Peak Adapter (blue): Hewlett-Packard 85650A, Serial Number 2043A00327, Calibrated: 17 March 2000, Calibration due Date: 17 March 2001
- ⇒ LF Loop Antenna: EMCO 6502, Serial Number 2016 Calibrated: 27 December 1999, Calibration Due Date: 27 December 2000
- ⇒ Open Area Test Site: Acme Testing Co., Test Site Number 2, Calibrated: 20 June 2000, Calibration due Date: 20 June 2001
- ⇒ Broadband Biconical Antenna (red) (20 MHz to 200 MHz): EMCO 3110, Serial Number 1115, Calibrated: 26 December 1999, Calibration due Date: 26 December 2000
- ⇒ Broadband Log Periodic Antenna (red) (200 MHz to 1000 MHz): EMCO 3146, Serial Number 2853, 26 December 1999, Calibration due Date: 26 December 2000
- ⇒ EUT Turntable Position Controller: EMCO 1061-3M, Serial Number 9003-1441, No Calibration Required
- ⇒ Antenna Mast with Controller: EMCO 1051, Serial Number 9002-1457, No Calibration Required

6.3 Test Procedures

For tabletop equipment, the EUT is placed on a 1 meter by 1.5 meters wide and 0.8 meter high nonconductive table that sits on a flush mounted metal turntable. Floor standing equipment is placed directly on the flush mounted metal turntable. The EUT is connected to its associated peripherals with any excess I/O cabling bundled to approximately 1 meter.

Preview tests are performed to determine the “worst case” mode of operation. With the EUT operating in “worst case” mode, emissions from the unit are maximized by adjusting the polarization and height of the receive antenna and rotating the EUT on the turntable on all three axis. Manipulating the system cables also maximizes EUT emissions.

Radiated Emissions Test Characteristics

Frequency range	0.15 MHz - 10000 MHz
Test distance	3 m
Test instrumentation resolution bandwidth	9 kHz (0.15 MHz - 30 MHz) 120 kHz (30 MHz - 1000 MHz) 1 MHz (1000 MHz - 10000 MHz)
Receive antenna scan height	1 m - 4 m
Receive antenna polarization	Vertical/Horizontal
Loop antenna orientation	360-degree rotation
EUT orientation	Rotated on all three axis

6.4 Test Results

TRANSMITTER FUNDAMENTAL EMISSIONS

No	EMISSION	SPEC LIMIT	MEASUREMENTS			SITE		
	FREQUENCY MHz		ABS	dLIM dB	MODE	HGT cm	AZM deg	
1	26.997	80.0	60.9	-19.1	PK	100	74	Channel 1
2	27.195	80.0	60.0	-20.0	PK	100	82	Channel 2

TRANSMITTER SPURIOUS EMISSIONS

No	EMISSION	SPEC LIMIT	MEASUREMENTS			POL	SITE		
	FREQUENCY MHz		ABS	dLIM dB	MODE		HGT cm	AZM deg	
1	40.493	40.0	29.8	-10.2	PK	V	100	74	Channel 1
2	40.793	40.0	27.3	-12.7	PK	V	100	82	Channel 2
3	53.990	40.0	23.4	-16.6	PK	V	100	74	Channel 1
4	54.390	40.0	21.6	-18.4	PK	V	100	82	Channel 2
5	80.985	40.0	20.7	-19.3	PK	V	100	74	Channel 1
6	81.585	40.0	20.5	-29.5	PK	V	100	82	Channel 2
7	107.980	43.5	25.4	-18.1	PK	V	100	74	Channel 1
8	108.780	43.5	24.8	-18.7	PK	V	100	82	Channel 2
9	134.975	43.5	24.2	-19.3	PK	V	100	74	Channel 1
10	135.975	43.5	24.8	-18.7	PK	V	100	82	Channel 2
11	161.970	43.5	22.9	-20.6	PK	V	100	74	Channel 1
12	163.170	43.5	25.6	-17.9	PK	V	100	82	Channel 2
13	188.965	43.5	24.1	-19.4	PK	V	100	74	Channel 1
14	190.365	43.5	24.3	-19.2	PK	V	100	82	Channel 2

7. Test Setup Photographs



8. Miscellaneous Comments and Notes

1. None.