

FCC TEST REPORT

REPORT NO.: RF930329L01

MODEL NO.: M960A

RECEIVED: Mar. 25, 2004

TESTED: Mar. 25 ~ Mar. 30, 2004

APPLICANT: BEHAVIOR TECH COMPUTER CORP.

ADDRESS: 2F, 51, Tung Hsing Rd., Taipei, Taiwan,
R.O.C.

ISSUED BY: Advance Data Technology Corporation

LAB LOCATION: 47 14th Lin, Chia Pau Tsuen, Linkou Hsiang,
Taipei, Taiwan, R.O.C.

This test report consists of 14 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by CNLA or any government agencies. The test results in the report only apply to the tested sample.



0528
ILAC MRA

Table of Contents

1	CERTIFICATION	3
2	SUMMARY OF TEST RESULTS	4
3	GENERAL INFORMATION	5
3.1	GENERAL DESCRIPTION OF EUT	5
3.2	DESCRIPTION OF TEST MODES	6
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS	6
3.4	DESCRIPTION OF SUPPORT UNITS	6
3.5	CONFIGURATION OF SYSTEM UNDER TEST	6
4	TEST PROCEDURE AND RESULT	7
4.1	CONDUCTED EMISSION MEASUREMENT	7
4.2	RADIATED EMISSION MEASUREMENT	7
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT	7
4.2.2	TEST INSTRUMENT	8
4.2.3	TEST PROCEDURE	9
4.2.4	DEVATION FROM TEST STANDARD	9
4.2.5	TEST SETUP	10
4.2.6	EUT OPERATING CONDITION	10
4.2.7	TEST RESULT	11
5	PHOTOGRAPHS OF THE TEST CONFIGURATION	13
6	INFORMATION ON THE TESTING LABORATORIES	14



1 CERTIFICATION

PRODUCT NAME : Wireless Optical Mouse
BRAND NO: BTC
MODEL NO. : M960A
TEST ITEM : PROTOTYPE
APPLICANT : BEHAVIOR TECH COMPUTER CORP.
STANDARDS : FCC Part 15, Subpart C(15.227)
ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from Mar. 25, 2004 to Mar. 30, 2004. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

PREPARED BY: Wendy Liao, **DATE:** Apr. 7, 2004
Wendy Liao
APPROVED BY: Ellis Wu, **DATE:** Apr. 7, 2004
Ellis Wu / Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD PARAGRAPH	TEST TYPE	RESULT	REMARK
15.207	Conducted Emission Test	N/A	Power supply is 3Vdc from batteries
15.227	Radiated Emission Test	PASS	Minimum passing margin is -9.53dB at 297.52MHz

NOTE: The receiver part to communicate with the EUT has been verified to comply with FCC Part 15, Subpart B, Class B (DoC). The test report can be provided upon request.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless Optical Mouse
MODEL NO.	M960A
POWER SUPPLY	3.0Vdc for Mouse from AA Battery x 2
MODULATION TYPE	FSK
CARRIER FREQUENCY OF EACH CHANNEL	27.045MHz, 27.095MHz
BANDWIDTH OF EACH CHANNEL	NA
NUMBER OF CHANNEL	2
ANTENNA TYPE	Printed antenna
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DDVCS	NA

NOTE:

1. The EUT is the transmitter part of a wireless mouse.
2. For more detailed features description of the EUT, please refer to the manufacturer's specifications or the User's Manual.

3.2 DESCRIPTION OF TEST MODES

Two channels were provided in this EUT.

CHENNEL	FREQUENCY
1	27.045MHz
2	27.095 MHz

Note: Frequency of 27.045MHz, the worst case one, was chosen for the final test.

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is the transmitter part of a Wireless Optical Mouse. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.227)

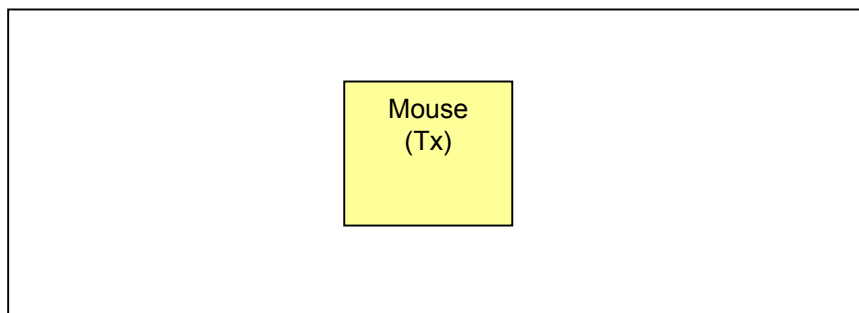
ANSI C63.4-1992

All test items have been performed and recorded as per the above standards.

3.4 DESCRIPTION OF SUPPORT UNITS

NA

3.5 CONFIGURATION OF SYSTEM UNDER TEST



4 TEST PROCEDURE AND RESULT

4.1 CONDUCTED EMISSION MEASUREMENT

NA

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

According to 15.227 the field strength of Emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m)	
	Peak	Average
26.96-27.28	100	80

Field strength limits are at the distance of 3 meters, Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any Emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.2.2 TEST INSTRUMENT

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
*HP Spectrum Analyzer	8594E	3911A07465	Jul. 07, 2004
*HP Preamplifier	8447D	2944A10386	Aug. 12, 2004
HP Preamplifier	8449B	3008A01292	Aug. 11, 2004
SCHAFFNER Tunable Dipole Antenna	VHBA 9123	459	Jun. 26, 2004
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	836858/008	Dec.11, 2004
* SCHAFFNER BILOG Antenna	CBL6111C	2727	Jul. 15, 2004
ANTENNA (Large Biconical)	VHBA9123	449	Dec. 21, 2004
SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	Jun. 30, 2004
EMCO Horn Antenna	3115	9312-4192	Feb. 30, 2005
* ADT. Turn Table	TT100	0201	NA
* ADT. Tower	AT100	0201	NA
* Software	ADT_Radiated_V5.06	NA	NA
* ANRITSU RF Switches	MP59B	6100237246	Oct. 17, 2004
* TIMES RF cable	LMR-600	CABLE-ST10-01	Oct. 17, 2004

- NOTE:** 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. "*" = These equipment are used for the final measurement.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The test was performed in ADT Open Site No. 10.
5. The VCCI Site Registration No. is R-1248.

4.2.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected Emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the Emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the Emissions that did not have 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

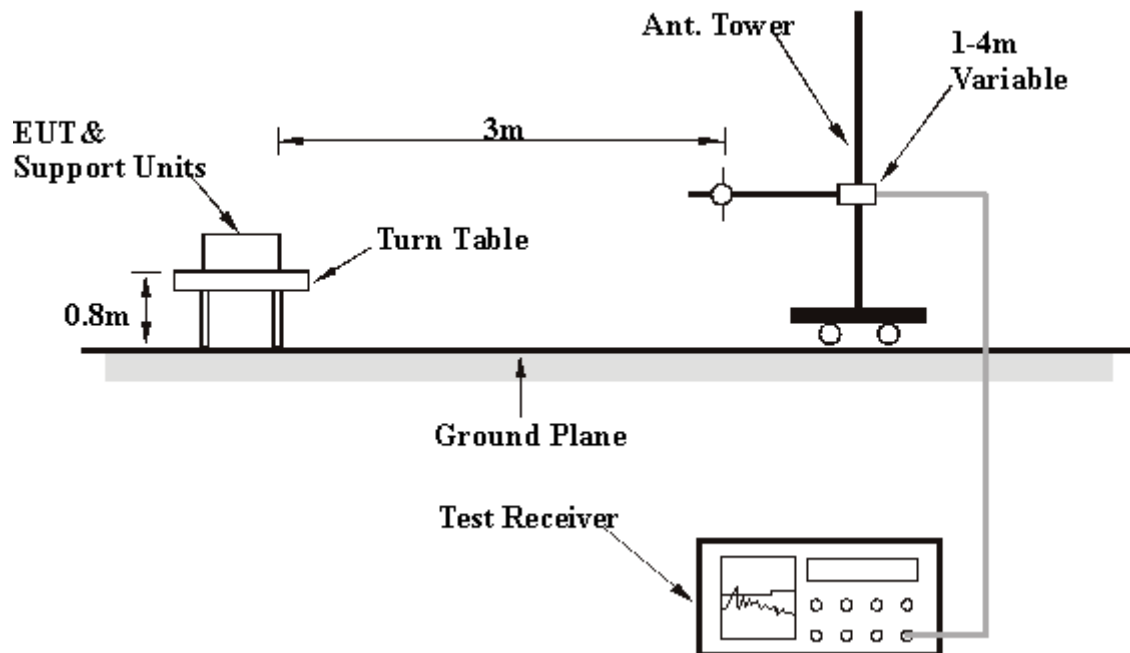
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



For the actual test configuration, please refer to the related item in this test report - Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITION

Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.

4.2.7 TEST RESULT

EUT	Wireless Optical Mouse	MODEL	M960A
FREQUENCY	27.045MHz	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	3Vdc	DETECTOR FUNCTION	Peak / Quasi-Peak / Average
ENVIRONMENTAL CONDITIONS	20deg. C, 70%RH, 991hPa	TESTED BY: Steven Lu	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*27.05	52.40 PK	100.00	-47.60	2.59 H	172	44.75	7.65
2	*27.05	50.65 AV	80.00	-29.35	2.59 H	172	43.00	7.65
3	54.10	18.73 QP	40.00	-21.27	1.26 H	92	11.69	7.04
4	81.14	23.89 QP	40.00	-16.11	2.10 H	298	15.92	7.97
5	108.19	21.33 QP	43.50	-22.17	1.51 H	263	10.03	11.30
6	135.23	22.53 QP	43.50	-20.97	2.38 H	333	10.03	12.50
7	162.26	22.08 QP	43.50	-21.42	1.66 H	284	11.40	10.68
8	189.34	25.45 QP	43.50	-18.05	1.66 H	300	15.19	10.26
9	216.35	24.76 QP	46.00	-21.24	2.10 H	295	13.16	11.60
10	243.43	30.47 QP	46.00	-15.53	1.09 H	280	17.00	13.47
11	270.43	32.67 QP	46.00	-13.33	1.04 H	296	17.46	15.21
12	297.52	36.47 QP	46.00	-9.53	1.04 H	128	20.27	16.20
13	324.52	31.80 QP	46.00	-14.20	1.00 H	316	15.03	16.77
14	351.57	25.39 QP	46.00	-20.61	1.21 H	291	8.05	17.34

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other Emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. "*" = Fundamental frequency.

EUT	Wireless Optical Mouse	MODEL	M960A
FREQUENCY	27.045MHz	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	3Vdc	DETECTOR FUNCTION	Peak / Quasi-Peak / Average
ENVIRONMENTAL CONDITIONS	20deg. C, 70%RH, 991hPa	TESTED BY: Steven Lu	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*27.05	50.20 PK	100.00	-49.80	1.00 V	276	42.55	7.65
2	*27.05	47.35 AV	80.00	-32.65	1.00 V	276	39.70	7.65
3	54.05	18.05 QP	40.00	-21.95	1.29 V	287	11.00	7.05
4	81.14	16.01 QP	40.00	-23.99	2.00 V	150	8.04	7.97
5	108.19	20.09 QP	43.50	-23.41	1.64 V	276	8.79	11.30
6	135.25	21.49 QP	43.50	-22.01	1.79 V	208	8.99	12.50
7	189.34	22.11 QP	43.50	-21.39	1.50 V	213	11.85	10.26
8	243.43	22.21 QP	46.00	-23.79	1.44 V	190	8.74	13.47
9	270.43	23.18 QP	46.00	-22.82	1.32 V	211	7.97	15.21
10	297.52	24.18 QP	46.00	-21.82	2.22 V	201	7.98	16.20
11	324.52	20.82 QP	46.00	-25.18	1.86 V	193	4.05	16.77

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other Emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. "*" = Fundamental frequency.

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

RADIATED EMISSION TEST



6 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

USA	FCC, NVLAP, UL
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	CNLA, BSMI, DGT
Netherlands	Telefication
Singapore	PSB , GOST-ASIA(MOU)
Russia	CERTIS(MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Lab:

Tel: 886-3-3183232

Fax: 886-3-3185050

Linko RF & Telecom Lab.

Tel: 886-3-3270910

Fax: 886-3-3270892

Email: service@mail.adt.com.tw

Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also.