FCC TEST REPORT

REPORT NO.: RF940323L10
MODEL NO.: M957U
RECEIVED: Mar. 24, 2005
TESTED: Mar. 25, 2005
ISSUED: Mar. 28, 2005

APPLICANT: BEHAVIOR TECH COMPUTER CORP.

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

ISSUED BY: Advance Data Technology Corporation

LAB ADDRESS: No. 47, 14th Lin, Chiapau Tsun, Linko, Taipei, Taiwan, R.O.C.

TEST LOCATION: No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

ACCREDITED
No. 2177-01

CNLA
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Table of Contents

1 CERTIFICATION

PRODUCT NAME :	Wireless Optical Mouse
BRAND NAME :	BTC
OEM BRAND NAME:	EMPREX
MODEL NO. :	M957U
APPLICANT :	BEHAVIOR TECH COMPUTER CORP.
TEST SAMPLE :	PROTOTYPE
TESTED :	Mar. 25, 2005
STANDARDS :	FCC Part 15, Subpart C (15.227) ANSI C63.4-2003

The above equipment has been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Andrea Hsia (Andrea Hsia) , **DATE:** Mar. 28, 2005

TECHNICAL ACCEPTANCE : Gary Chang (Gary Chang) , **DATE:** Mar. 28, 2005
Responsible for RF

APPROVED BY : (Cody Chang / Deputy Manager) , **DATE:** Mar. 28, 2005

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 15.209	Radiated Emission Test	PASS	Meet the requirement of limit Minimum passing margin is –11.20dB at 39.72 MHz

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4:

Measurement	Frequency	Uncertainty
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.63 dB
	200MHz ~1000MHz	3.65 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless Optical Mouse
MODEL NO.	M957U
POWER SUPPLY	3Vdc from batteries
MODULATION TYPE	FSK
CARRIER FREQUENCY OF EACH CHANNEL	27.045MHz
NUMBER OF CHANNEL	1
ANTENNA TYPE	Loop antenna
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT is a Wireless Optical Mouse.
2. The brands as below are identical to each other expect for their brands due to marketing requirement.

Brand	Remark
BTC	
EMPREX	OEM

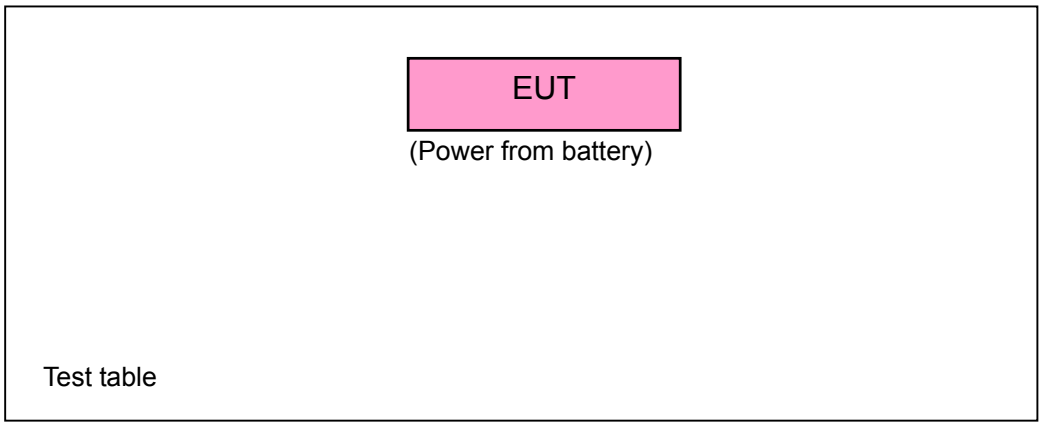
3. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

One channels was provided in this EUT.

CHANNEL	FREQUENCY
1	27.045 MHz

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT configure mode	Applicable to		Description
	PLC	RE<1G	
-	-	X	-

Where PLC: Power Line Conducted Emission RE<1G RE: Radiated Emission below 1GHz

Power Line Conducted Emission Test:

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT	Available Channel	Tested Channel	Modulation Type
Mouse	1	1	FSK

Radiated Emission Test (Below 1 GHz):

☒Following channel(s) was (were) selected for the final test as listed below.

EUT	Available Channel	Tested Channel	Modulation Type
Mouse	1	1	FSK

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 C63.4-2003

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

3.4 DESCRIPTION OF SUPPORT UNITS

NA

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF 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)	
26.96-27.28	Peak	Average
	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
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Jan. 07, 2006
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Nov. 29, 2005
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Jan. 22, 2006
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Jan. 05, 2006
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA 9170242	Jan. 23, 2006
Preamplifier Agilent	8447D	2944A10631	Nov. 17, 2005
Preamplifier Agilent	8449B	3008A01960	Nov. 14, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219272/4	Jan. 26, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219275/4	Jan. 26, 2006
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA
Turn Table ADT.	TT100.	TT93021704	NA
Turn Table Controller ADT.	SC100.	SC93021704	NA
Loop Antenna	HFH2-Z2	100070	Nov. 14, 2005

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. The test was performed in HwaYa Chamber 3.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The IC Site Registration No. is IC4924-4.

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 3 meters semi-anechoic chamber. 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.

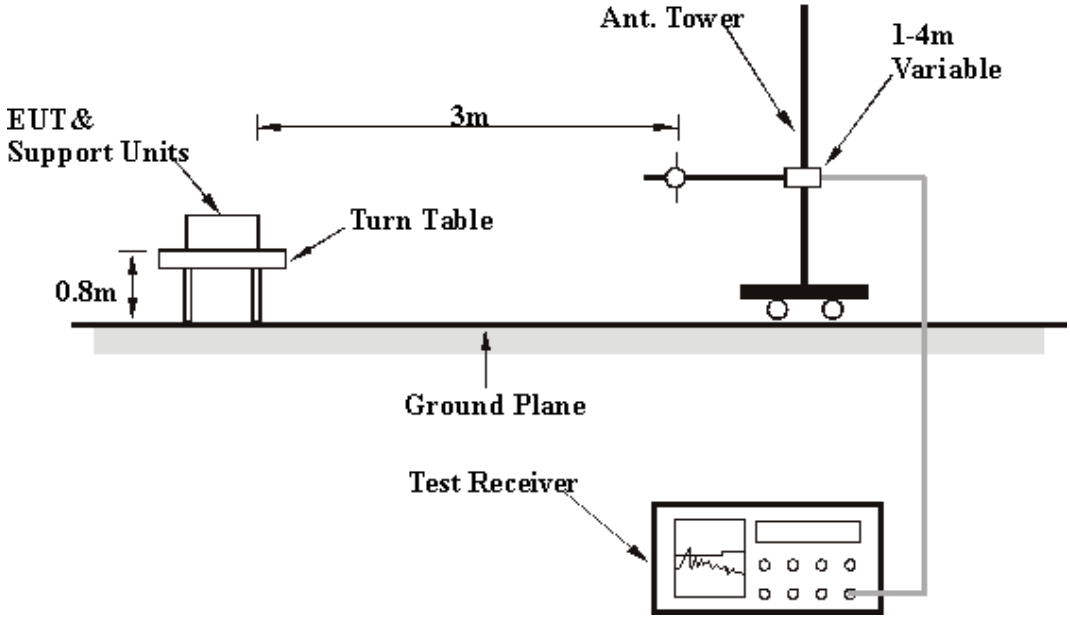
NOTE:

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.

4.2.4 DEVATION 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

Same as 4.1.6

4.2.7 TEST RESULTS

EUT	Wireless Optical Mouse	**MODEL**	M957U
INPUT POWER	3 Vdc	**FREQUENCY RANGE**	Below 1000 MHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 60% RH, 991 hPa	**DETECTOR FUNCTION**	Peak / Average
TESTED BY	Brad Wu		

TEST DISTANCE: 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	*27.045	46.15 PK	100.00	- 53.85	2.06	15	32.30	13.85
2	*27.045	35.26 AV	80.00	-43.74	1.00	313	21.41	13.85

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
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.
6. Loop Antenna was used for all frequency below 30MHz.

EUT	Wireless Optical Mouse	MODEL	M957U
INPUT POWER	3 Vdc	FREQUENCY RANGE	Below 1000 MHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 60% RH, 991 hPa	DETECTOR FUNCTION	Quasi-Peak
TESTED BY	Brad Wu		

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	**39.72**	**28.80 QP**	**40.00**	**-11.20**	**2.50 H**	**88**	**13.54**	**15.26**
2	743.41	22.58 QP	46.00	-23.42	3.00 H	304	-0.50	23.08
3	821.16	23.20 QP	46.00	-22.80	3.00 H	295	-0.45	23.65
4	856.15	23.82 QP	46.00	-22.18	3.00 H	205	-0.20	24.02
5	906.69	32.00 QP	46.00	-14.00	3.00 H	16	7.12	24.88
6	953.35	25.59 QP	46.00	-20.41	1.00 H	136	0.25	25.34

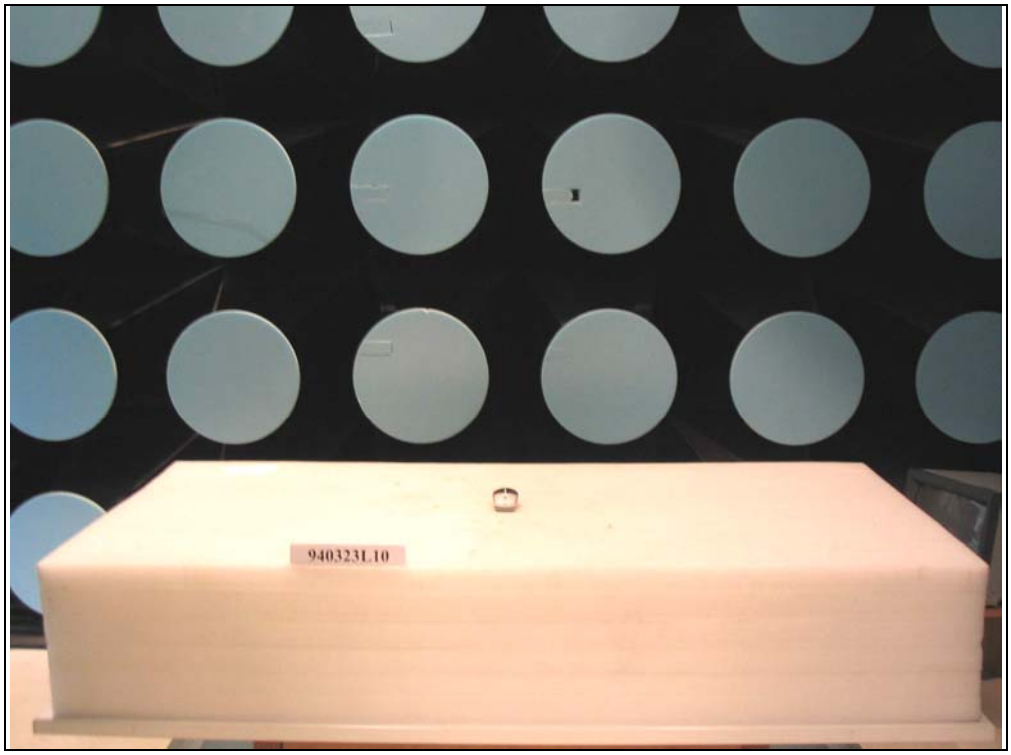
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

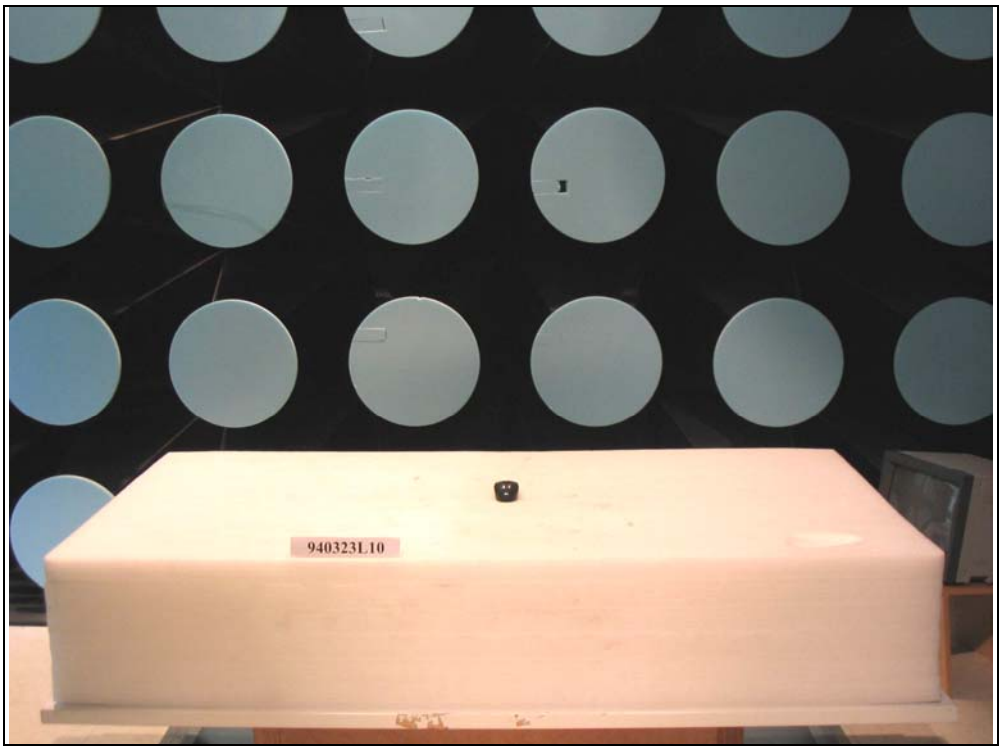
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	39.72	20.77 QP	40.00	-19.23	4.00 V	217	5.51	15.26
2	760.90	22.68 QP	46.00	-23.32	1.50 V	34	-0.61	23.29
3	807.56	23.16 QP	46.00	-22.84	1.00 V	292	-0.37	23.53
4	861.98	24.07 QP	46.00	-21.93	4.00 V	292	-0.06	24.13
5	908.64	32.85 QP	46.00	-13.15	1.00 V	325	7.95	24.90
6	951.40	25.43 QP	46.00	-20.57	3.00 V	241	0.10	25.33

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
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.

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

RADIATED EMISSION TEST





5 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

USA	FCC, NVLAP, UL , A2LA
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:

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