



# EMC

## TEST REPORT

REPORT NO. : F88082303B  
MODEL NO. : 5106, 5107  
DATE OF TEST : June 7, 2000

PREPARED FOR: BEHAVIOR TECH COMPUTER CORP.

ADDRESS : 2F, 51, TUNG HSING RD.,  
TAIPEI, TAIWAN, R.O.C.

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION



Accredited Laboratory

11F, NO.1, SEC.4, NAN-KING EAST RD.,  
TAIPEI, TAIWAN, R.O.C.

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## 1. CERTIFICATION

Issue Date: June 8, 2000

Reference No.: 89060515

Product : KEYBOARD  
Trade Name : BTC  
Model No. : 5106, 5107  
Applicant : BEHAVIOR TECH COMPUTER CORP.  
Standard : FCC Part 15, Subpart B, Class B  
ANSI C63.4-1992  
CISPR 22: 1993 +A1: 1995+A2: 1996, Class B

We hereby certify that one sample of the designation has been tested in our facility on June 7, 2000. The test record, data evaluation and Equipment Under Test (EUT) configurations represent herein are true and accurate representation of the measurements of the sample's EMC characteristics under the conditions herein specified.

The test results show that the EUT as described in this report is in compliance with the Class B limits of conducted and radiated emission of applicable standards

TESTED BY : Ken Liu , DATE: 6/8/2000  
( Ken Liu )

CHECKED BY : Yemmy Soong , DATE: 6/8/2000  
( Yemmy Soong )

APPROVED BY : Mike Su , DATE: 6/8/2000  
( Mike Su )

**ADVANCE DATA TECHNOLOGY CORPORATION**

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## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Product	:	KEYBOARD
Model No.	:	5106, 5107
Power Supply	:	DC 5V (from PC)
Data Cable	:	Non-shielded (1.5 m)

Note: This report is prepared for FCC Class II Permissive Change. The original report has been issued on Sept. 2, 1999 and granted on Oct. 13, 1999.

The main changes are as the following:

- ◆ Change of outer appearance.
- ◆ Signal cable was changed to non-shielded.
- ◆ Without metal plate.
- ◆ Change model name from 5301 to 5106.

The EUT has two model names: 5106, 5107, which are identical to each other except for their function keys outer appearances.

From the above model names, model: 5106 was selected as the representative for the test, and its data is recorded in this report.

For more detailed features description, please refer to manufacturer's specification or User's Manual.



## 2.2 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories are used to form representative test configuration during the tests.

No	Product	Brand	Model No.	FCC ID	I/O Cable
1	PERSONAL COMPUTER	COMPAQ	PRESARIO 5716	FCC DoC Approved	Nonshielded Power (1.8m)
2	MONITOR	HP	D2846A	FCC DoC Approved	Shielded Signal (1.5m) Nonshielded Power (1.8m)
3	PRINTER	HP	2225C+	DSI6XU2225	Shielded Signal (1.2m) Nonshielded Power (1.9m)
4	MODEM	ACEEX	1414	980020569	Shielded Signal (1.2m) Nonshielded Power (1.9m)
5	MOUSE	LOGITECH	M-S43	DZL211106	Shielded Signal (1.8m)
6	SPEAKER	J-S	J-008	NA	Shielded Signal (1.5m)
7	VGA CARD	GAINWARD	CARDEXPERT	ICUVGA-GW821	NA

## 2.3 TEST METHODOLOGY AND CONFIGURATION

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 1992. Radiated testing was performed at an antenna to EUT distance of 10 m on an open area test site.

Please refer to the photos of test configuration in Item 5.



### 3. TEST INSTRUMENTS

#### 3.1 TEST INSTRUMENTS (EMISSION)

##### CONDUCTED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ Test Receiver	ESH3	893495/006	July 7, 2000
ROHDE & SCHWARZ Spectrum Monitor	EZM	893787/013	July 8, 2000
ROHDE & SCHWARZ Artificial Mains Network	ESH3-Z5	839135/006	July 7, 2000
EMCO-L.I.S.N.	3825/2	9204-1964	July 7, 2000
Shielded Room	Site 2	ADT-C02	NA

Note: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per NAMAS document NIS81.

2. The calibration interval of the above test instruments is 12 months.

And the calibrations are traceable to NML/ROC and NIST/USA.

##### RADIATED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
HP Spectrum Analyzer	8590L	3544A01042	April 6, 2001
HP Preamplifier	8447D	2944A08313	Sept. 19, 2000
HP Preamplifier	8347A	3307A01088	Aug. 30, 2000
HP Preamplifier	8449B	3008A01201	Dec. 14, 2000
ROHDE & SCHWARZ TEST RECEIVER	ESVS 30	841977/008	Oct. 5, 2000
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 23, 2000
ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Aug. 30, 2000
EMCO Double Ridged Guide Antenna	3115	9312-4192	March 29, 2001
CHASE BILOG Antenna	CBL6111A	1647	July 3, 2000
EMCO Turn Table	1016	1722	NA
EMCO Tower	1051	1825	NA
Open Field Test Site	Site 4	ADT-R04	June 11, 2000

Note: 1. The measurement uncertainty is less than +/- 3dB, which is calculated as per NAMAS document NIS81.

2. The calibration interval of the above test instruments is 12 months.

And the calibrations are traceable to NML/ROC and NIST/USA.



## 3.2 LIMITS OF CONDUCTED AND RADIATED EMISSION

### LIMIT OF RADIATED EMISSION OF CISPR 22

FREQUENCY (MHz)	Class A (at 10m) *	Class B (at 10m) *
	dBuV/m	dBuV/m
30 - 230	40	30
230 - 1000	47	37

\* Detector Function: Quasi-Peak

### LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	Peak	Average	Peak	Average
Above 1000	80.0	60.0	74.0	54.0

Note: (1) The lower limit shall apply at the transition frequencies.

(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### LIMIT OF CONDUCTED EMISSION OF CISPR 22

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Note: (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz

(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.



## 4. TEST RESULTS (EMISSION)

### 4.1 RADIO DISTURBANCE

Frequency Range : 0.15 - 30 MHz (Conducted Emission)  
30 - 1000 MHz (Radiated Emission)  
Input Voltage : 120 Vac, 60 Hz  
Temperature : 27 degree C  
Humidity : 50 %  
Atmospheric Pressure : 995 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -14.6 dB at 0.213 MHz Minimum passing margin of radiated emission: -6.5 dB at 43.05 MHz

### 4.2 EUT OPERATION CONDITION

1. Turn on the power of all equipment.
2. PC reads a test program to enable all functions.
3. EUT sends "H" character to PC.
4. PC sends "H" messages to monitor and monitor displays "H" patterns on screen.
5. PC sends "H" messages to modem.
6. PC sends "H" messages to printer, and the printer prints them on paper.
7. PC sends audio messages to speaker.
8. Repeat steps 3-8.





### 4.3 TEST DATA OF CONDUCTED EMISSION

EUT: **KEYBOARD**MODEL: **5106**6 dB Bandwidth: **10 kHz**PHASE: **LINE (L)**

Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.213	0.2	47.9	-	48.1	-	63.1	53.1	-15.0	-
0.321	0.2	35.9	-	36.1	-	59.7	49.7	-23.6	-
0.642	0.2	32.4	-	32.6	-	56.0	46.0	-23.4	-
1.497	0.2	30.2	-	30.4	-	56.0	46.0	-25.6	-
16.052	1.0	31.2	-	32.2	-	60.0	50.0	-27.8	-
23.870	1.2	32.4	-	33.6	-	60.0	50.0	-26.4	-

- Remarks:
1. "\*": Undetectable
  2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  3. "-": The Quasi-peak emission level also meets average limit and measurement with the average detector is unnecessary.
  4. The emission levels of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value
  6. Emission Level = Correction Factor + Reading Value.



## TEST DATA OF CONDUCTED EMISSION

EUT: **KEYBOARD**MODEL: **5106**6 dB Bandwidth: **10 kHz**PHASE: **NEUTRAL (N)**

Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.213	0.2	48.3	-	48.5	-	63.1	53.1	-14.6	-
0.321	0.2	39.0	-	39.2	-	59.7	49.7	-20.5	-
0.642	0.2	33.7	-	33.9	-	56.0	46.0	-22.1	-
1.497	0.2	30.2	-	30.4	-	56.0	46.0	-25.6	-
16.052	0.8	31.8	-	32.6	-	60.0	50.0	-27.4	-
23.870	1.1	32.8	-	33.9	-	60.0	50.0	-26.1	-

- Remarks:
1. "": Undetectable
  2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  3. "-": The Quasi-peak emission level also meets average limit and measurement with the average detector is unnecessary.
  4. The emission levels of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value
  6. Emission Level = Correction Factor + Reading Value.



#### 4.4 TEST DATA OF RADIATED EMISSION

EUT: **KEYBOARD**MODEL: **5106**ANT. POLARITY: HorizontalDETECTOR FUNCTION: Quasi-peak6 dB BANDWIDTH: 120 kHzFREQUENCY RANGE: 30-1000 MHzMEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
42.53	14.0	8.4	22.4	30.0	-7.6	364	288
56.71	8.0	14.6	22.6	30.0	-7.4	387	203
70.13	6.9	8.4	15.3	30.0	-14.7	393	225
132.84	13.6	5.6	19.2	30.0	-10.8	400	99
150.01	13.3	5.3	18.6	30.0	-11.4	400	3
161.45	12.5	6.0	18.5	30.0	-11.5	400	241
214.10	12.2	5.2	17.4	30.0	-12.6	400	10
224.30	13.0	6.1	19.1	30.0	-10.9	400	40

- REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB) + Reading value (dBuV).
  2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level - Limit value



## TEST DATA OF RADIATED EMISSION

EUT: **KEYBOARD**MODEL: **5106**ANT. POLARITY: VerticalDETECTOR FUNCTION: Quasi-peak6 dB BANDWIDTH: 120 kHzFREQUENCY RANGE: 30-1000 MHzMEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
43.05	13.9	9.6	23.5	30.0	-6.5	116	74
56.75	8.0	12.0	20.0	30.0	-10.0	107	243
68.50	6.8	10.8	17.6	30.0	-12.4	101	187
114.23	12.6	9.3	21.9	30.0	-8.1	100	113
124.85	13.2	8.6	21.8	30.0	-8.2	100	201
143.60	13.7	6.1	19.8	30.0	-10.2	100	107
165.73	12.4	4.8	17.2	30.0	-12.8	100	18
180.60	11.9	6.7	18.6	30.0	-11.4	100	70

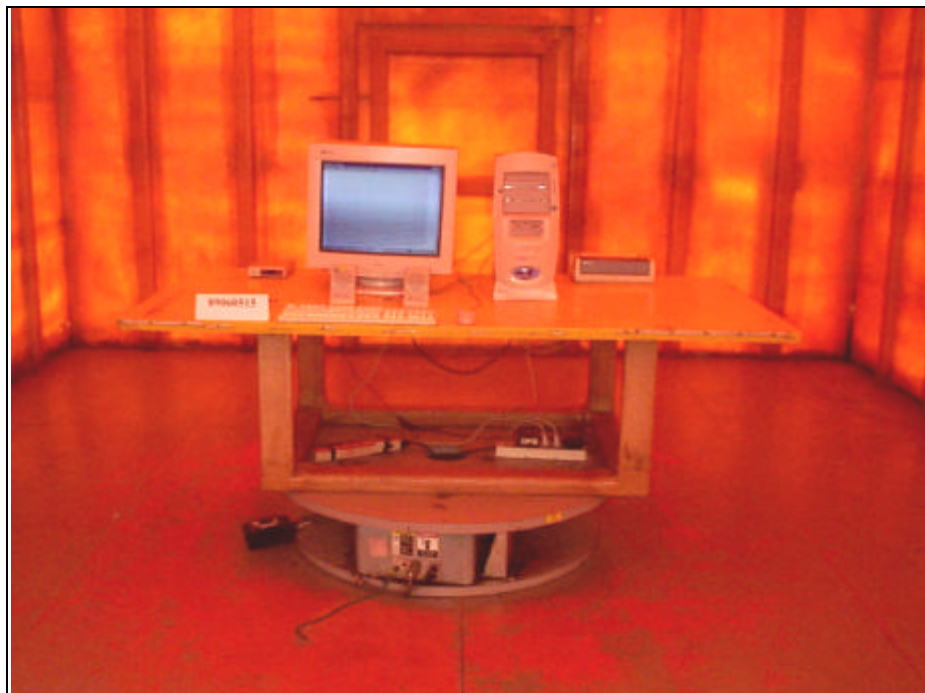
- REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB)  
+ Reading value (dBuV).
  2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level - Limit value

## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION WITH MINIMUM MARGIN

### CONDUCTED EMISSION TEST



## RADIATED EMISSION TEST





## 6. APPENDIX - INFORMATION OF THE TESTING LABORATORY

### Information of the testing laboratory

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

- |               |                                      |
|---------------|--------------------------------------|
| ● USA         | FCC, UL, NVLAP                       |
| ● Germany     | TUV Rheinland<br>TUV Product Service |
| ● Japan       | VCCI                                 |
| ● New Zealand | RFS                                  |
| ● Norway      | NEMKO, DNV                           |
| ● U.K.        | INCHCAPE                             |
| ● R.O.C.      | BSMI                                 |

Enclosed please find some certificates of our laboratory obtained from approval agencies. If you have any comments, please feel free to contact us with the following:

**Lin Kou EMC Lab.:**  
Tel: 886-2-26032180  
Fax: 886-2-26022943

**Hsin Chu EMC Lab:**  
Tel: 886-35-935343  
Fax: 886-35-935342

**Lin Kou Safety Lab.:**  
Tel: 886-2-26093195  
Fax: 886-2-26093184

**Design Center:**  
Tel: 886-2-26093195  
Fax: 886-2-26093184

E-mail: [service@mail.adt.com.tw](mailto:service@mail.adt.com.tw)  
<http://www.adt.com.tw>