



EMC

TEST REPORT

REPORT NO. : F87072106

MODEL NO. : 5122DW, 5122DXW,
5122XW, 5122W

DATE OF TEST : July 24, 1998

PREPARED FOR: BEHAVIOR TECH COMPUTER CORP.

ADDRESS : 12F, 18, SEC. 1, CHANG AN E. RD.,
TAIPEI, TAIWAN, R.O.C.

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION



Accredited Laboratory

12F, NO.1, SEC.4, NAN-KING EAST RD.,
TAIPEI, TAIWAN, R.O.C.

This test report consists of 13 pages in total. It may be duplicated completely for legal use with the allowance of the applicant. It shall not be reproduced except in full, without the written approval of our laboratory. It should not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. government. The test result in the report only applies to the tested sample.



TABLE OF CONTENTS

1. CERTIFICATION.....	3
2. GENERAL INFORMATION	4
2.1 GENERAL DESCRIPTION OF EUT	4
2.2 DESCRIPTION OF SUPPORT UNITS	5
2.3 TEST METHODOLOGY AND CONFIGURATION.....	5
3. TEST INSTRUMENTS	6
3.1 TEST INSTRUMENTS (EMISSION).....	6
3.2 LIMITS OF CONDUCTED AND RADIATED EMISSION.....	7
4. TEST RESULTS (EMISSION)	8
4.1 RADIO DISTURBANCE	8
4.1.1 EUT OPERATION CONDITION	8
4.1.2 TEST DATA OF CONDUCTED EMISSION	9
4.1.3 TEST DATA OF RADIATED EMISSION.....	10
5. PHOTOGRAPHS OF THE TEST CONFIGURATION WITH MINIMUM MARGIN.	12



1.

CERTIFICATION

Issue Date: Aug. 5, 1998

Product : KEYBOARD
Trade Name : BTC
Model No. : 5122DW, 5122DXW, 5122XW, 5122W
Applicant : BEHAVIOR TECH COMPUTER CORP.
Standard : FCC Part 15, Subpart B, Class B
ANSI C63.4-1992
CISPR 22: 1993 +A1+A2

We hereby certify that one sample of the designation has been tested in our facility on July 24, 1998. 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: 8.5.98
(Ken Liu)

CHECKED BY: Sharon Hsiung, DATE: 8/5/98
(Sharon Hsiung)

APPROVED BY: Mike Su, DATE: 8/5/98
(Mike Su)

ADVANCE DATA TECHNOLOGY CORPORATION**NVLAQ[®]**

Accredited Laboratory



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	KEYBOARD
Model No.	:	5122DW, 5122DXW, 5122XW, 5122W
Power Supply	:	DC 5V
Data Cable	:	Shielded

Note: The EUT has four model names which are identical to each other in all aspects except for the following:

- Model: 5122W (has one space bar key and with palm rest)
- Model: 5122DW (has two space bar key and with palm rest)
- Model: 5122XW (has one space bar key and without palm rest)
- Model: 5122DXW (has two space bar key and without palm rest)

From the above models, model: 5122DW was chosen as representative model for the test.

For more detailed features, 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	NTI	PII-233T	FCC Approved	Nonshielded Power (1.8m)
2	MONITOR	ADI	937G	BR8937G	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	IFAXDM1414	Shielded Signal (1.2m) Nonshielded Power (1.9m)
5	MOUSE	DEXIN	A2P800A	NIYASP800A	Shielded Signal (1.5m)

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)

RADIATED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
HP Spectrum Analyzer	8590L	3544A01042	April 29, 1999
HP Preamplifier	8447D	2944A08313	Sept. 18, 1998
ROHDE & SCHWARZ TEST RECEIVER	ESVS 30	841977/008	Oct. 5, 1998
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 28, 1998
CHASE BiLOG Antenna	CBL6111A	1647	July 3, 1999
EMCO Turn Table	1016	1722	N/A
EMCO Tower	1051	1825	N/A
Open Field Test Site	Site 4	ADT-R04	June 19, 1999

Note: 1. The measurement uncertainty is less than ± 3 dB, which is calculated as per NAMA's 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.

CONDUCTED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ Test Receiver	ESHS30	828765/002	July 31, 1998
ROHDE & SCHWARZ Artificial Mains Network	ESH2-Z5	828075/003	July 28, 1998
EMCO-L.I.S.N.	3825/2	90031627	July 28, 1998
Shielded Room	Site 5	ADT-C05	N/A

Note: 1. The measurement uncertainty is less than ± 2.6 dB, which is calculated as per NAMA's 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

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

FREQUENCY (MHz)	Class A (at 10m)		Class B (at 3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
Above 1000	300	49.5	500	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 : 36 °C

Humidity : 45 %

Atmospheric Pressure : 998 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -16.4 dB at 1.026 MHz Minimum passing margin of radiated emission: -8.5 dB at 60.25 MHz

4.1.1 EUT OPERATION CONDITION

1. Turn on the power of all equipments.
2. PC reads a test program to enable all functions.
3. PC sends "H" messages to monitor and monitor display "H" patterns on screen.
4. PC sends "H" messages to modem.
5. PC sends "H" messages to printer, and the printer prints them on paper.
6. Repeat steps 3-6.



4.1.2 TEST DATA OF CONDUCTED EMISSION

EUT: **KEYBOARD**MODEL: **5122DW**

6 dB Bandwidth: 10 kHz

TEST PERSONNEL:

KEN

Freq. [MHz]	L Level [dB (μV)]		N Level [dB (μV)]		Limit [dB (μV)]		Margin [dB (μV)]			
	QP	AV	QP	AV	QP	AV	L		N	
0.156	42.70	-	39.00	-	65.67	55.67	-23.0	-	-26.7	-
0.405	37.30	-	38.60	-	57.75	47.75	-20.5	-	-19.2	-
1.026	39.40	-	39.60	-	56.00	46.00	-16.6	-	-16.4	-
1.962	37.30	-	33.90	-	56.00	46.00	-18.7	-	-22.1	-
5.417	38.00	-	41.00	-	60.00	50.00	-22.0	-	-19.0	-
13.589	31.40	-	33.60	-	60.00	50.000	-28.6	-	-26.4	-

- Remarks:
1. "***": Undetectable
 2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 4. The emission level of other frequencies were very low against the limit.

ADT CO. Shielded Room 5
CISPR 22 CLASS B

24. Jul 98 11:09

EUT: 5122DW
Test Spec: LISN : L

Report No. F87072106

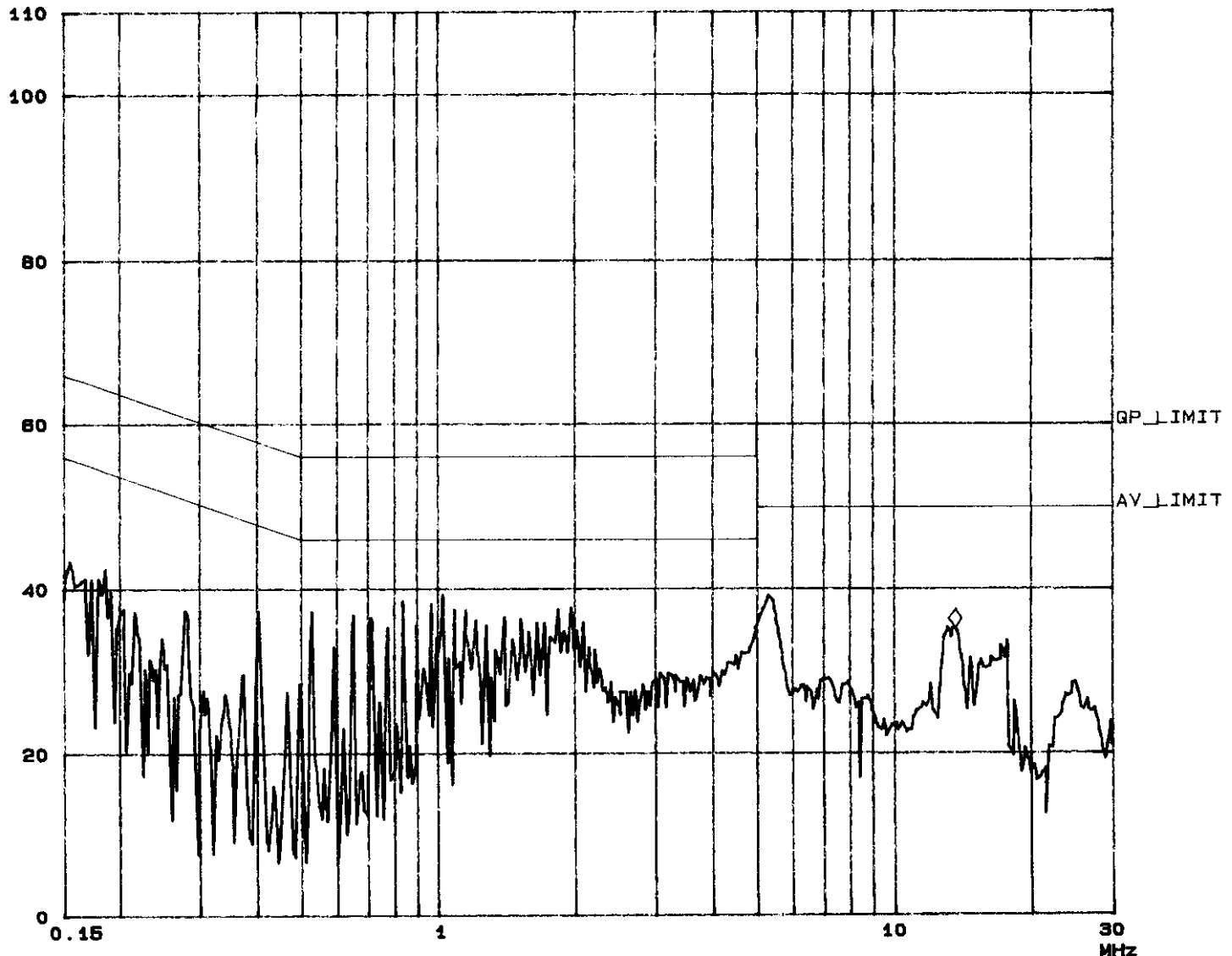
Page 9-1

Tested by KEN

Fast Scan Settings (3 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	450k	3k	10k	PK	1ms	10dB	LN OFF	60dB
450k	5M	3k	10k	PK	1ms	10dB	LN OFF	60dB
5M	30M	3k	10k	PK	1ms	10dB	LN OFF	60dB

dBuV ◇ Mkr : 13.58900MHz 35.2 dBuV



ADT CO. Shielded Room 5
CISPR 22 CLASS B

24. Jul 98 11:37

EUT: 5122DW
Test Spec: LISN : N

Report No. F87072106

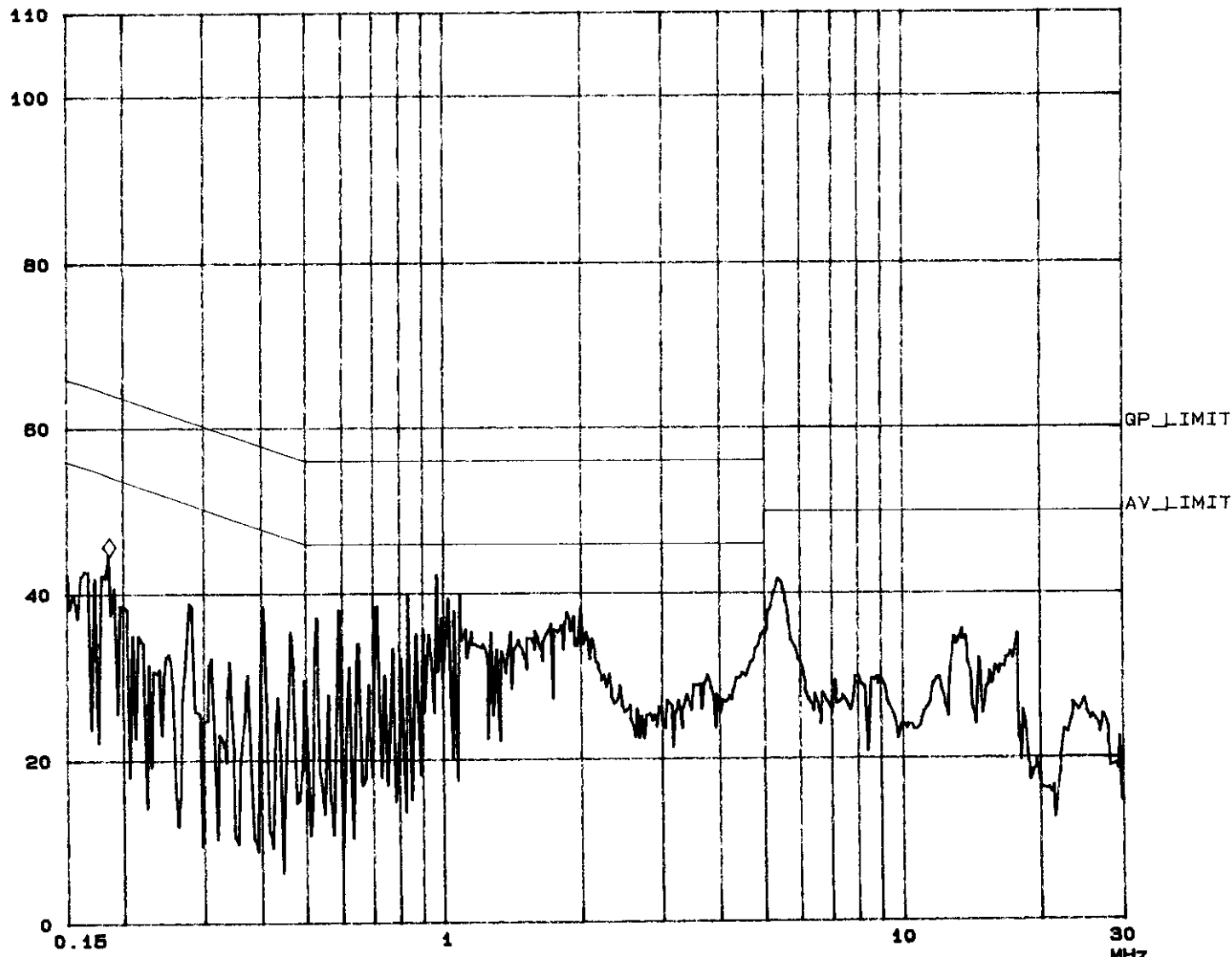
Page 9-2

Tested by KEN

Fast Scan Settings (3 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	450k	3k	10k	PK	1ms	10dB	BLN OFF	80dB
450k	5M	3k	10k	PK	1ms	10dB	BLN OFF	80dB
5M	30M	3k	10k	PK	1ms	10dB	BLN OFF	80dB

dBuV ◇ Mkr : 186.00 kHz 44.7 dBuV



**4.1.3 TEST DATA OF RADIATED EMISSION**EUT: **KEYBOARD**MODEL: **5122DW**

ANTENNA: CHASE BILOG CBL6111A

POLARITY: Horizontal

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

TEST PERSONNEL:

KEN

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
60.84	7.8	8.6	16.4	30.0	-13.6
112.04	13.2	6.7	19.9	30.0	-10.1
144.07	13.9	6.6	20.5	30.0	-9.5
152.03	13.0	5.7	18.7	30.0	-11.3
171.85	11.8	7.5	19.3	30.0	-10.7
184.06	11.6	3.5	15.1	30.0	-14.9

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



TEST DATA OF RADIATED EMISSION

EUT: **KEYBOARD**MODEL: **5122DW**

ANTENNA: CHASE BILOG CBL6111A

POLARITY: Vertical

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

TEST PERSONNEL:

KEN

Frequency (MHz)	Correction Factor (dB/m)	Reading Data dBuV	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
60.25	7.7	13.8	21.5	30.0	-8.5
79.19	7.1	11.6	18.7	30.0	-11.3
84.38	8.3	12.4	20.7	30.0	-9.3
110.19	11.7	7.2	18.9	30.0	-11.1
136.07	15.1	3.0	18.1	30.0	-11.9
192.35	11.8	4.0	15.8	30.0	-14.2

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