



# EMC

## TEST REPORT

REPORT NO. : F87071402

MODEL NO. : 5121W

DATE OF TEST : July 14, 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.

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**1. CERTIFICATION**

Issue Date: July 17 , 1998

Product : KEYBOARD  
Trade Name : BTC  
Model No. : 5121W  
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 14, 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: Bruce Lu , DATE: 7/17/98  
( Bruce Lu )

CHECKED BY: Sharon Hsiung , DATE: 7/17/98  
( Sharon Hsiung )

APPROVED BY: Mike Su , DATE: 7/17/98  
( Mike Su )

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## **2. GENERAL INFORMATION**

### **2.1 GENERAL DESCRIPTION OF EUT**

Product	:	KEYBOARD
Model No.	:	5121W
Power Supply	:	DC ( from PC )
Data Cable	:	Shielded

Note: 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	HP	VL SERIES 4 5/100	B94VECTRA500T	Nonshielded Power (1.8m)
2	MONITOR	ACER	7134T	JVP7134T	Shielded Signal (1.4m) Nonshielded Power (1.8m)
3	PRINTER	HP	2225C+	DSI6XU2225	Shielded Signal (1.4m)
4	MODEM	ACEEX	1414	IFAXDM1414	Shielded Signal (1.5m)
5	MOUSE	DEXIN	A2P800A	NIYASP800A	Shielded Signal (1.5m)
6	VGA DISPLAY CARD	GORDIA	DSV3365	LUT-DSV3365	N/A

## 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	8594A	3144A00308	Sept. 1, 1998
HP Preamplifier	8447D	2944A08119	Aug. 2, 1998
ROHDE & SCHWARZ TEST RECEIVER	ESVP	893496/030	July 17, 1998
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 28, 1998
CHASE Bilog Antenna	CBL6112	2086	Dec. 26, 1998
EMCO Turn Table	1060	1195	N/A
EMCO Tower	1051	1163	N/A
Open Field Test Site	Site 2	ADT-R02	Sept. 26, 1998

Note: 1. The measurement uncertainty is less than +/- 3dB, 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	828109/007	Aug. 4, 1998
ROHDE & SCHWARZ Artificial Mains Network	ESH2-Z5	892107/003	July 22, 1998
EMCO L.I.S.N.	3825/2	9504-2359	Aug. 1, 1998
Shielded Room	Site 3	ADT-C03	N/A

Note: 1. The measurement uncertainty is less than +/- 2.6dB, 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 : 27 °C  
Humidity : 57 %  
Atmospheric Pressure : 997 mbar

TEST RESULT	Remarks
<b>PASS</b>	Minimum passing margin of conducted emission: -13.3 dB at 0.232 MHz Minimum passing margin of radiated emission: -3.9 dB at 40.60 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: **5121W**

6 dB Bandwidth: 10 kHz

TEST PERSONNEL: *Bruce Lu*

Freq.	L Level		N Level		Limit		Margin [dB (μV)]			
[MHz]	[dB (μV)]		[dB (μV)]		[dB (μV)]		L		N	
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV
0.232	43.00	-	49.10	-	62.38	52.38	-19.4	-	-13.3	-
0.368	39.40	-	40.80	-	58.55	48.55	-19.2	-	-17.8	-
1.088	22.00	-	14.80	-	56.00	46.00	-34.0	-	-41.2	-
3.265	20.60	-	12.50	-	56.00	46.00	-35.4	-	-43.5	-
7.111	31.60	-	32.30	-	60.00	50.00	-28.4	-	-27.7	-
15.943	33.10	-	36.90	-	60.00	50.000	-26.9	-	-23.1	-

- 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 3  
CISPR 22 CLASS B

14. Jul 98 15:58

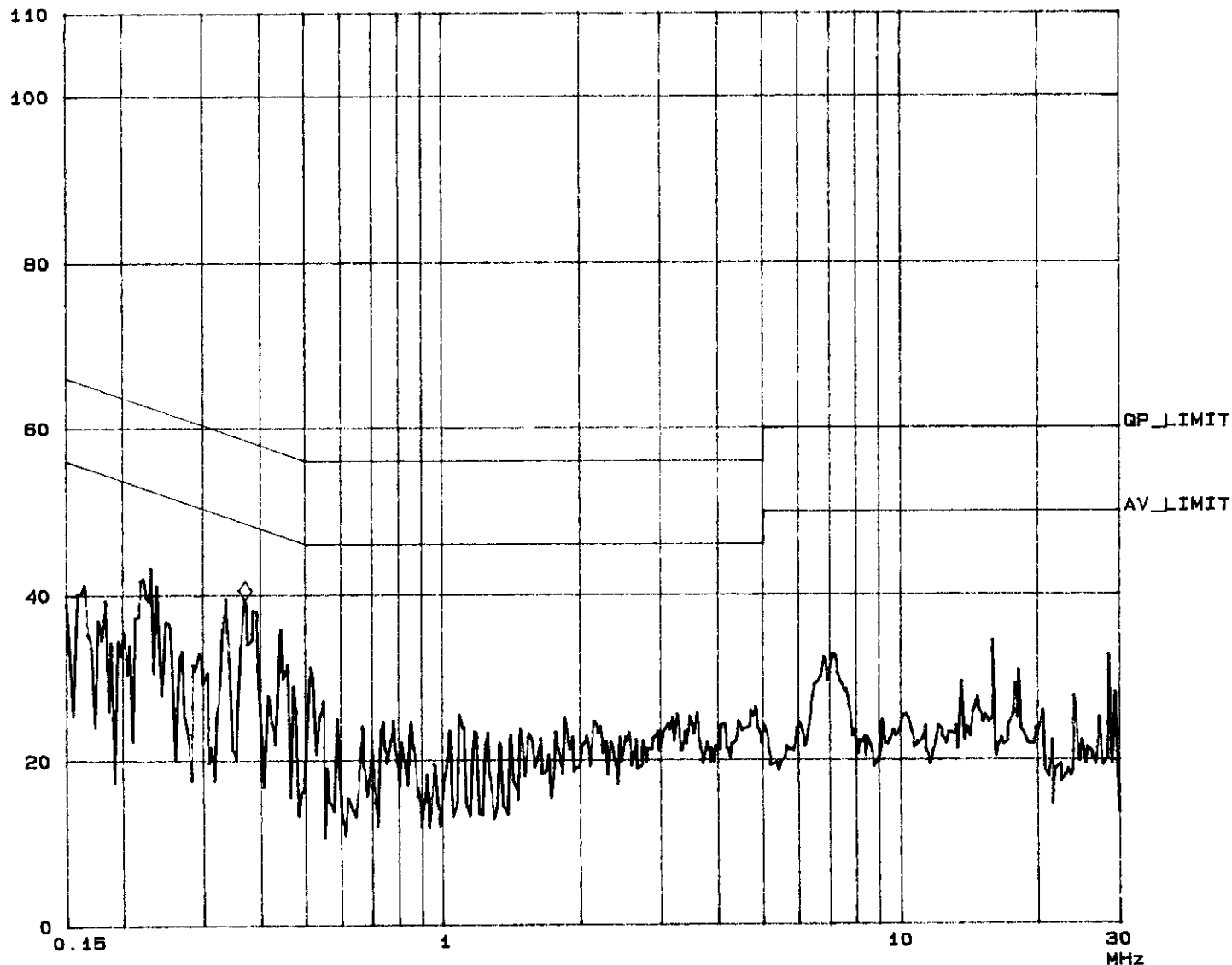
EUT: 5121W  
Operator: BRUCE  
Test Spec: LISN : L  
Comment: 120V / 60Hz

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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	60dB
450k	5M	3k	10k	PK	1ms	10dB	BLN OFF	60dB
5M	30M	3k	10k	PK	1ms	10dB	BLN OFF	60dB

dBuV      ◇ Mkr : 369.00    kHz    39.4 dBuV



ADT CO. Shielded Room 3  
CISPR 22 CLASS B

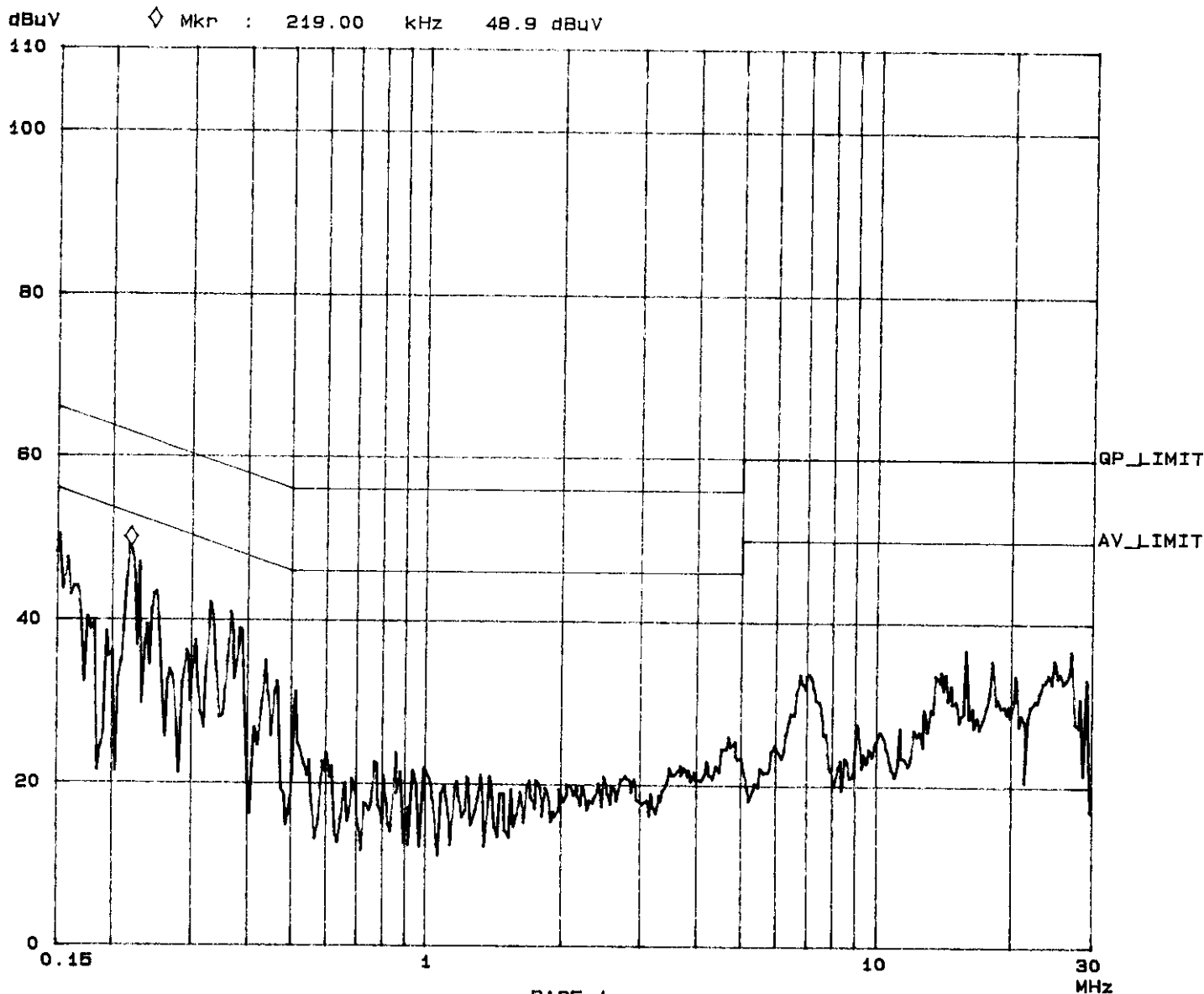
14. Jul 98 16:17

EUT: 5121W  
Operator: BRUCE  
Test Spec: LISN : N  
Comment: 120V / 60Hz

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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	10dBLN	OFF	60dB
450k	5M	3k	10k	PK	1ms	10dBLN	OFF	60dB
5M	30M	3k	10k	PK	1ms	10dBLN	OFF	60dB





### 4.1.3 TEST DATA OF RADIATED EMISSION

EUT: **KEYBOARD**MODEL: **5121W**

ANTENNA: CHASE BILOG CBL6112

POLARITY: Horizontal

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

TEST PERSONNEL:

Bruce Lu

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
40.65	15.1	6.0	21.1	30.0	-8.9
76.05	8.5	6.2	14.7	30.0	-15.3
118.04	14.9	1.2	16.1	30.0	-13.9
155.63	12.8	2.3	15.1	30.0	-14.9
190.50	12.7	4.8	17.5	30.0	-12.5
228.90	14.7	1.2	15.9	30.0	-14.1

- 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: **5121W**

ANTENNA: CHASE BILOG CBL6112

POLARITY: Vertical

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

TEST PERSONNEL: *Bruce Lu*

Frequency (MHz)	Correction Factor (dB/m)	Reading Data dBuV	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
40.60	13.7	12.4	26.1	30.0	-3.9
75.75	7.6	4.2	11.8	30.0	-18.2
145.38	14.3	2.5	16.8	30.0	-13.2
209.53	14.0	4.6	18.6	30.0	-11.4
219.05	14.4	3.1	17.5	30.0	-12.5
229.05	14.7	3.2	17.9	30.0	-12.1

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.