

**EXHIBIT 4**  
**RFI/EMI TEST REPORT**



# EMC

## TEST REPORT

REPORT NO. : F87091407  
MODEL NO. : 8113W  
DATE OF TEST : Sept. 15, 1998

PREPARED FOR: BEHAVIOR TECH COMPUTER CORP.

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PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION



Accredited Laboratory

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**1. CERTIFICATION**

Issue Date: Sept. 19, 1998

Product : USB KEYBOARD  
Trade Name : BTC  
Model No. : 8113W  
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 Sept. 15, 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: Alan Chang, DATE: 9/19/98  
( Alan Chang )

CHECKED BY: Yemmy, DATE: 9/19/98  
( Yemmy Soong )

APPROVED BY: Mike Su, DATE: 9/19/98  
( Mike Su )

**ADVANCE DATA TECHNOLOGY CORPORATION****NVLAP<sup>®</sup>**

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## **2. GENERAL INFORMATION**

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

Product	:	USB KEYBOARD
Model No.	:	8113W
Power Supply	:	DC (from PC)
Data Cable	:	Shielded

Note: For more detailed features description, please refer to ATTACHMENT 1 - TECHNICAL DESCRIPTION OF EUT and 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	D4579A	FCC Doc Approved	Nonshielded Power (1.8m)
2	MONITOR	ADI	PD-959	FCC Doc Approved	Shielded Signal (1.2m) Nonshielded Power (1.8m)
3	PRINTER	HP	2225C+	DSI6XU2225	Shielded Signal (1.2m) Nonshielded Power (1.8m)
4	MODEM	ACEEX	1414	IFAXDM1414	Shielded Signal (1.2m) Nonshielded Power (1.8m)
5	VGA CARD	GORDIA	DSV3365	LUT-DSV3365	N/A
6	MOUSE	DEXIN	A2P800A	NIYA2P800A	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 +/- 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	828765/002	July 29, 1999
ROHDE & SCHWARZ Artificial Mains Network	ESH2-Z5	828075/003	July 27, 1999
EMCO-L.I.S.N.	3825/2	90031627	July 27, 1999
Shielded Room	Site 5	ADT-C05	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 : 30 °C  
Humidity : 57 %  
Atmospheric Pressure : 998 mbar

TEST RESULT	Remarks
<b>PASS</b>	Minimum passing margin of conducted emission: -15.2 dB at 10.831 MHz Minimum passing margin of radiated emission: -3.6 dB at 240.04 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: **USB KEYBOARD**

MODEL: **8113W**

6 dB Bandwidth: 10 kHz

TEST PERSONNEL: *Alan Chang*

Freq. [MHz]	L Level [dB (μV)]		N Level [dB (μV)]		Limit [dB (μV)]		Margin [dB (μV)]			
							L		N	
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV
0.275	41.20	-	41.10	-	60.75	50.75	-19.6	-	-19.7	-
0.555	27.50	-	24.50	-	56.00	46.00	-28.5	-	-31.5	-
1.112	26.80	-	23.70	-	56.00	46.00	-29.2	-	-32.3	-
2.226	32.70	-	28.30	-	56.00	46.00	-23.3	-	-27.7	-
10.831	41.70	-	44.80	-	60.00	50.00	-18.3	-	-15.2	-
16.831	35.60	-	39.20	-	60.00	50.00	-24.4	-	-20.8	-

- 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.



#### 4.1.3 TEST DATA OF RADIATED EMISSION

EUT: **USB KEYBOARD**MODEL: **8113W**

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:

*Alan Chang*

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
48.00	12.2	10.5	22.7	30.0	-7.3
60.49	7.7	13.1	20.8	30.0	-9.2
108.91	12.8	7.1	19.9	30.0	-10.1
157.29	12.3	6.3	18.6	30.0	-11.4
169.42	11.8	8.4	20.2	30.0	-9.8
205.72	11.9	4.8	16.7	30.0	-13.3
240.04	14.2	19.2	33.4	37.0	-3.6

- 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: **USB KEYBOARD**MODEL: **8113W**

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:

*Alan Chang*

Frequency (MHz)	Correction Factor (dB/m)	Reading Data dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
48.04	10.5	15.4	25.9	30.0	-4.1
108.02	11.3	9.2	20.5	30.0	-9.5
120.01	13.3	8.1	21.4	30.0	-8.6
132.01	14.6	6.1	20.7	30.0	-9.3
144.01	14.9	5.8	20.7	30.0	-9.3
155.96	13.3	7.6	20.9	30.0	-9.1
180.57	11.5	10.0	21.5	30.0	-8.5
240.02	13.7	19.6	33.3	37.0	-3.7

- 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.

# ADT CO. Shielded Room 5

## CISPR 22 CLASS B

15. Sep 98 16:13

EUT: 8113W  
Test Spec: LI8N : L

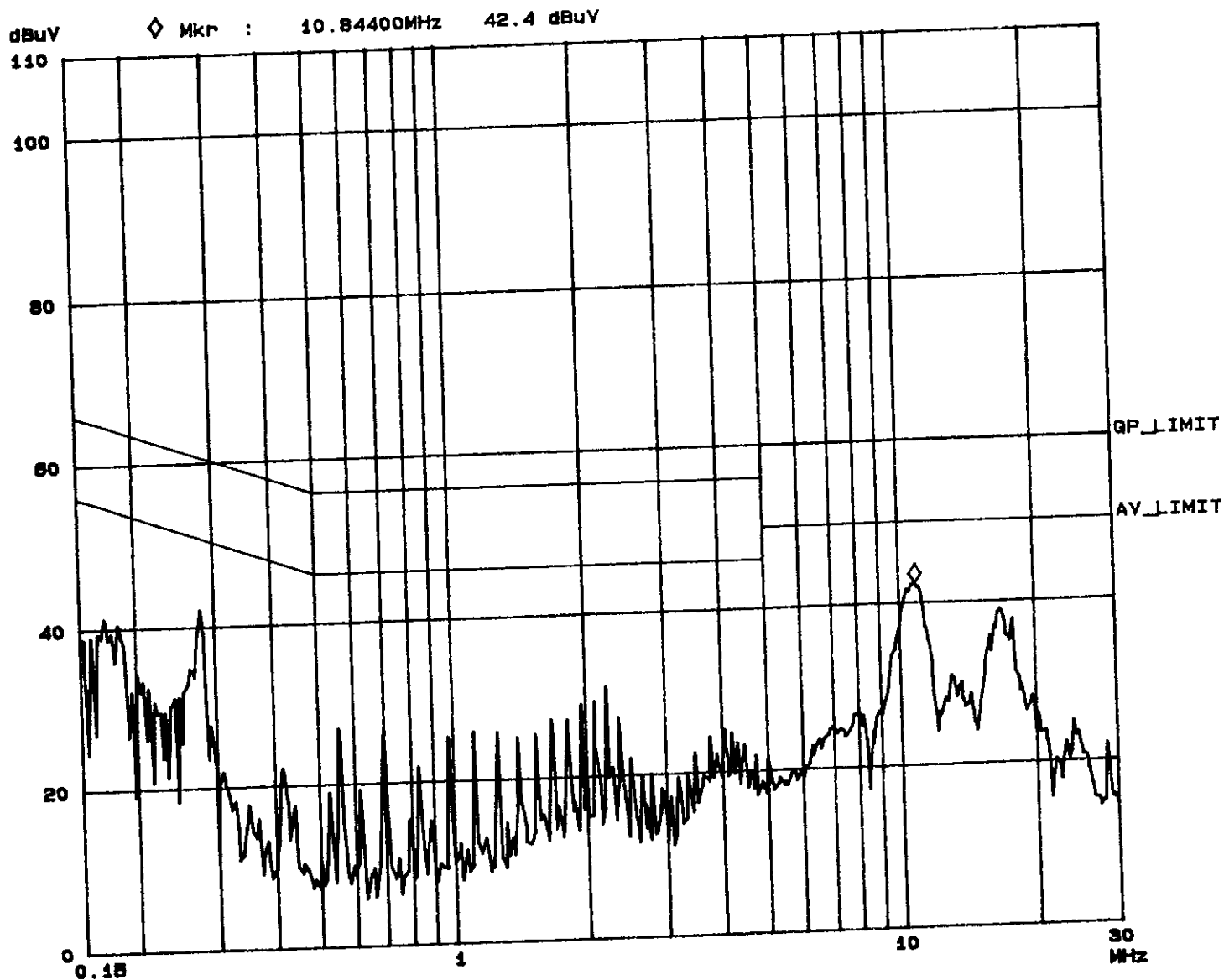
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Tested by Alan Chang

### 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	OFF	80dB
450k	5M	3k	10k	PK	1ms	10dB	OFF	80dB
5M	30M	3k	10k	PK	1ms	10dB	OFF	80dB



ADT CO. Shielded Room 5  
CISPR 22 CLASS B

EUT: 8113M  
Test Spec: LISN: N

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Fast Scan Settings (3 Ranges)  
Start 150K 450K 30M  
Stop 450K 3K 3K  
IF BW Detector M-Time Atten Preamp OpRge  
PK 10K 10K 10K  
1ms 10dB LN OFF 60dB  
1ms 10dB LN OFF 60dB  
1ms 10dB LN OFF 60dB  
Receiver Settings

