EMC

TEST REPORT

REPORT NO. : F89112102
MODEL NO. : 9112H
DATE OF TEST : Jan. 04, 2001
DATE OF RECEIPT : Nov. 21, 2000

PREPARED FOR: BEHAVIOR TECH COMPUTER CORP.

ADDRESS : 2F, NO.51, TUNG HSING. RD.,
TAIPEI, TAIWAN, R.O.C.

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION

NVLAP®
Accredited Laboratory

11F, NO.1, SEC.4, NAN-KING EAST RD.,
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1. CERTIFICATION

Issue Date: Jan. 08, 2001

Product	:	USB KEYBOARD
Trade Name	:	BTC
Model No.	:	9112H
Applicant	:	BEHAVIOR TECH COMPUTER CORP.
Standard	:	FCC Part 15, Subpart B, Class B CISPR 22:1997, Class B ANSI C63.4-1992

We hereby certify that one sample of the designation has been tested in our facility on Jan. 04, 2001. 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 : Kenny Meng (Kenny Meng), DATE: 1/08/2001

CHECKED BY : Kathy Tseng (Kathy Tseng), DATE: 1/08/2001

APPROVED BY : Mike Su (Mike Su), DATE: 1/8/2001.

ADVANCE DATA TECHNOLOGY CORPORATION

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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	USB KEYBOARD
Model No.	:	9112H
Power Supply	:	DC 5V (from PC)
Data Cable	:	Shielded (1.7m)

Note: The EUT is a USB KEYBOARD.

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.	Serial No.	FCC ID
1	PERSONAL COMPUTER	IBM	2187-12W	1S218714AB NA0002	FCC DoC APPROVED
2	19"COLOR MONITOR	HP	D2842A	KR93473116	BEJCB910
3	MODEM	ACEEX	1414	980020505	IFAXDM1414
4	PRINTER	HP	2225C	2445S60648	BS46XU2225C
5	USB MOUSE	HP	M-U48A	N/A	FCC DoC APPROVED
6	SPEAKER	JAZZ	J-008	J791148	N/A
7	JOYSTICK	MICROSOFT	GP5	N/A	FCC DoC APPROVED

No.	Signal cable description
1	N/A
2	1.8 m braid shielded wire, terminated with VGA connector via metallic frame, w/o core.
3	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
4	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core.
5	1.0m shielded wire.
6	1.1 m wrapped shielded wire, terminated via drain wire, with 3.5 mm phone plug, w/o core.
7	1.8m shielded wire.

Note: All power cords of the above support units are non shielded (1.8m).

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	ESCS30	834115/016	Feb. 22, 2001
ROHDE & SCHWARZ Artificial Mains Network	ESH2-Z5	892107/003	July 11, 2001
ROHDE & SCHWARZ 4-wire ISN	ENY41	835154/007	Apr. 26, 2001
EMCO L.I.S.N.	3825/2	9504-2359	July 11, 2001
Shielded Room	Site 3	ADT-C03	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	8594A	3144A00308	Aug. 16, 2001
HP Preamplifier	8447D	2944A08119	Jan 11, 2001
HP Preamplifier	8449B	3008A01201	Dec. 13, 2001
ROHDE & SCHWARZ TEST RECEIVER	ESVP	893496/030	July 10, 2001
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 23, 2001
ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Aug. 3, 2001
CHASE Bilog Antenna	CBL6112A	2329	Sept. 19, 2001
EMCO Double Ridged Guide Antenna	3115	9312-4192	March 29, 2001
EMCO Turn Table	1060	1195	NA
EMCO Tower	1051	1163	NA
Open Field Test Site	Site 2	ADT-R02	Sept. 8, 2001

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) * dBuV/m	Class B (at 10m) * 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 (from PC)
Temperature	:	20 Degree C
Humidity	:	77 %
Atmospheric Pressure	:	1000 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -13.23 dB at 0.412 MHz Minimum passing margin of radiated emission: -6.0 dB at 48.00 MHz

4.2 EUT OPERATION CONDITION

1. Turn on the power of all equipment.
2. PC runs a test program to enable all functions.
3. PC reads and writes messages from FDD and HDD.
4. EUT sends "H" character to PC.
5. PC sends "H" messages to monitor and monitor displays "H" patterns on screen.
6. PC sends "H" messages to modem.
7. PC sends "H" messages to printer, and the printer prints them on paper.
8. PC sends audio messages to speaker.
9. Repeat steps 3-9.

4.3 TEST DATA OF CONDUCTED EMISSION

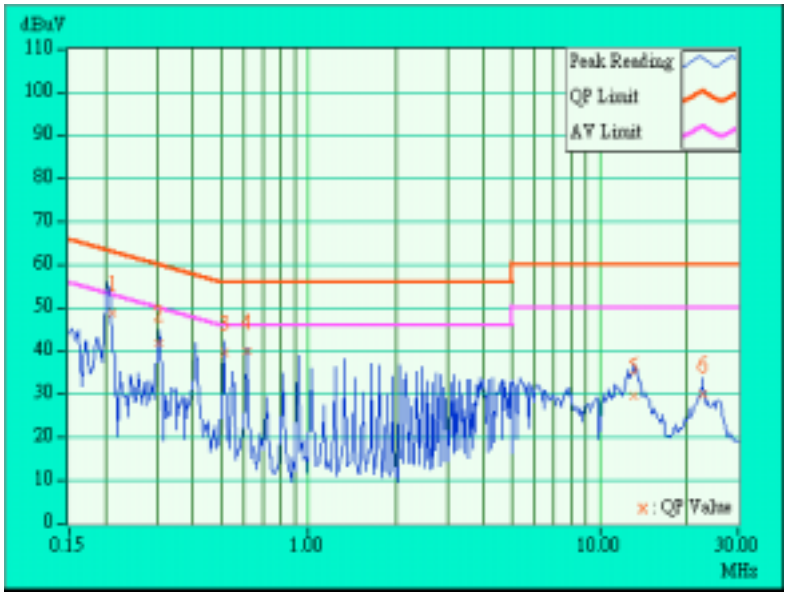
EUT: **USB KEYBOARD** MODEL: **9112H**

6 dB Bandwidth: 10 kHz PHASE: LINE (L)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.210	0.20	48.92	-	49.12	-	63.19	53.19	-14.07	-
2	0.307	0.20	41.94	-	42.14	-	60.05	50.05	-17.91	-
3	0.511	0.22	39.72	-	39.94	-	56.00	46.00	-16.06	-
4	0.617	0.24	39.84	-	40.08	-	56.00	46.00	-15.92	-
5	13.212	0.66	29.54	-	30.20	-	60.00	50.00	-29.80	-
6	22.569	1.10	30.01	-	31.11	-	60.00	50.00	-28.89	-

Remarks:

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



TEST DATA OF CONDUCTED EMISSION

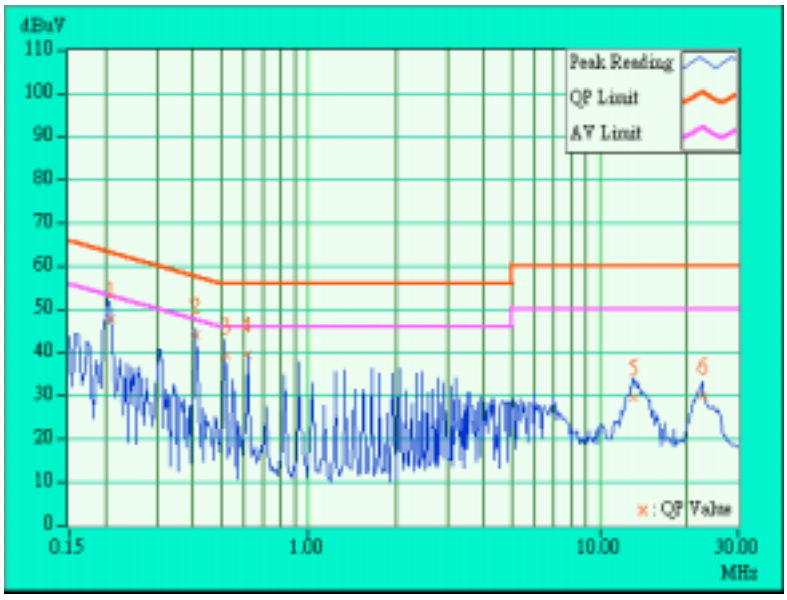
EUT: **USB KEYBOARD** MODEL: **9112H**

6 dB Bandwidth: 10 kHz PHASE: NEUTRAL (N)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.210	0.20	47.81	-	48.01	-	63.22	53.22	-15.21	-
2	0.412	0.20	44.18	-	44.38	-	57.62	47.62	-13.23	-
3	0.518	0.22	39.32	-	39.54	-	56.00	46.00	-16.46	-
4	0.618	0.24	39.56	-	39.80	-	56.00	46.00	-16.20	-
5	13.211	0.50	29.74	-	30.24	-	60.00	50.00	-29.76	-
6	22.571	0.75	30.17	-	30.92	-	60.00	50.00	-29.08	-

Remarks:

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



4.4 TEST DATA OF RADIATED EMISSION

EUT: **USB KEYBOARD** MODEL: **9112H**

ANT. POLARITY: Horizontal

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz MEASURED DISTANCE: 10 M

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	48.00	23.7 QP	30.00	-6.30	4.00H	156	13.00	9.90	0.80	0.00	-10.70
2	72.20	20.2 QP	30.00	-9.80	4.00H	298	13.99	5.23	0.98	0.00	-6.21
3	120.03	20.7 QP	30.00	-9.30	4.00H	67	7.07	12.58	1.05	0.00	-13.63
4	144.00	22.5 QP	30.00	-7.50	4.00H	237	10.97	10.28	1.25	0.00	-11.53
5	167.99	21.9 QP	30.00	-8.10	4.00H	100	11.93	8.69	1.28	0.00	-9.97
6	191.99	20.1 QP	30.00	-9.90	4.00H	242	10.25	8.49	1.36	0.00	-9.86
7	312.22	26.5 QP	37.00	-10.50	2.49H	262	11.57	13.21	1.72	0.00	-14.93

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) – Correction Factor(dB)
2. Correction Factor(dB) = Pre-Amplifier Factor (dB) - Antenna Factor (dB) - Cable Factor (dB)
3. Pre-Amplifier Factor (dB) = 0, when the test receiver is used to read the value and because it did not use the Pre-Amplifier.
4. The other emission levels were very low against the limit.
5. Margin value = Emission level – Limit value.

TEST DATA OF RADIATED EMISSION

EUT: **USB KEYBOARD** MODEL: **9112H**

ANT. POLARITY: Vertical

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz MEASURED DISTANCE: 10 M

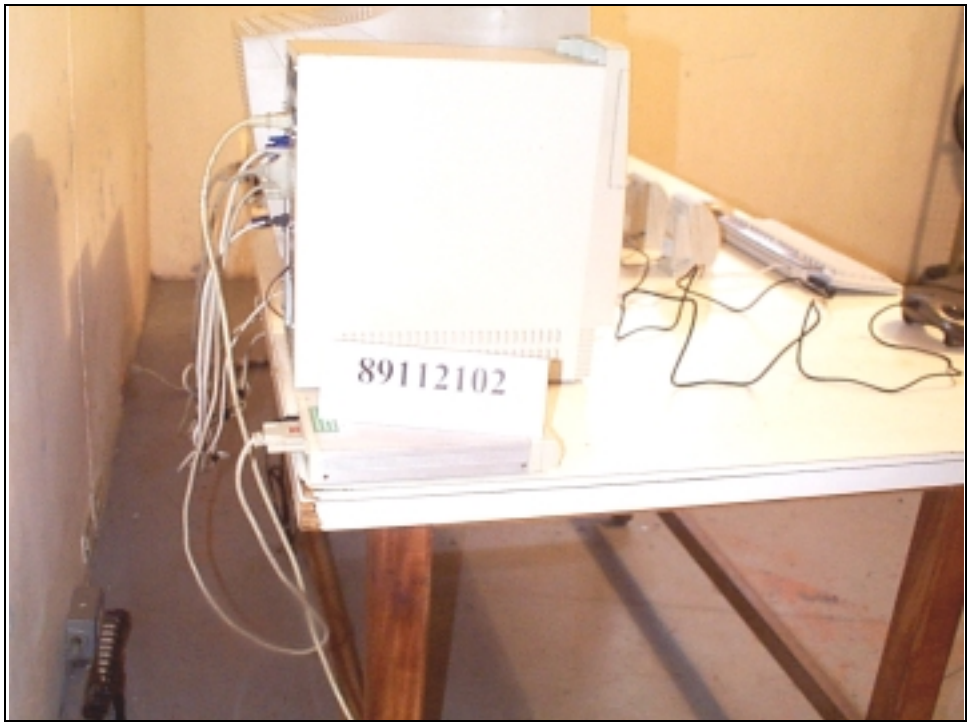
No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	48.00	24.0 QP	30.00	-6.00	1.00V	291	13.80	9.90	0.80	0.00	-10.70
2	60.00	23.8 QP	30.00	-6.20	1.68V	121	17.65	5.22	0.93	0.00	-6.15
3	72.00	23.6 QP	30.00	-6.40	1.85V	294	17.39	5.23	0.98	0.00	-6.21
4	120.00	21.4 QP	30.00	-8.60	1.00V	240	7.77	12.58	1.05	0.00	-13.63
5	167.98	21.4 QP	30.00	-8.60	1.00V	338	11.43	8.69	1.28	0.00	-9.97
6	191.99	21.4 QP	30.00	-8.60	1.00V	353	11.55	8.49	1.36	0.00	-9.85
7	520.08	28.3 QP	37.00	-8.70	3.82V	277	8.27	17.81	2.25	0.00	-20.05
8	623.96	27.2 QP	37.00	-9.80	2.90V	8	5.79	18.91	2.50	0.00	-21.41

REMARKS:

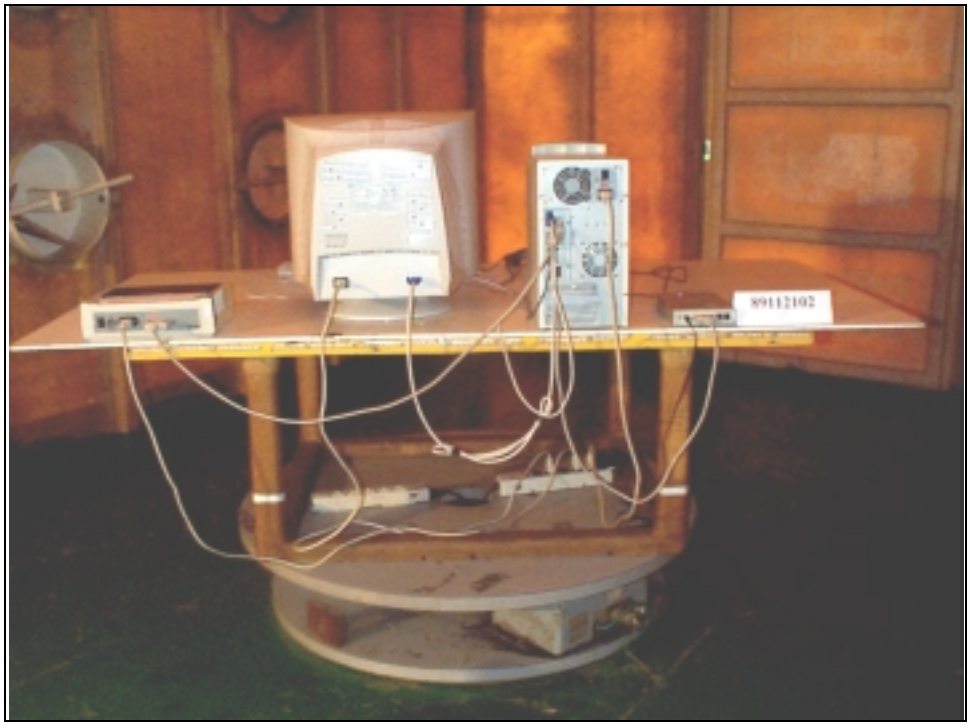
1. Emission level(dBuV/m)=Raw Value(dBuV) – Correction Factor(dB)
2. Correction Factor(dB) = Pre-Amplifier Factor (dB) - Antenna Factor (dB) - Cable Factor (dB)
3. Pre-Amplifier Factor (dB) = 0, when the test receiver is used to read the value and because it did not use the Pre-Amplifier.
4. The other emission levels were very low against the limit.
5. 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
	TUV Product Service
● Japan	VCCI
● New Zealand	RFS
● Norway	NEMKO, DNV
● U.K.	INCHCAPE
● R.O.C.	BSMI

Copies of accreditation certificates of our laboratory 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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