EMC

TEST REPORT

REPORT NO. : F89120706
MODEL NO. : 9113
DATE OF TEST : Nov. 14, 2000
DATE OF RECEIPT : Nov. 9, 2000

PREPARED FOR: BEHAVIOR TECH COMPUTER CORP.

ADDRESS : 2F, 51, TUNG HSING RD.,
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PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION

Accredited Laboratory

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

TABLE OF CONTENTS

1. CERTIFICATION

Issue Date: Dec. 11, 2000

Product	:	KEYBOARD
Trade Name	:	BTC
Model No.	:	9113
Applicant	:	BEHAVIOR TECH COMPUTER CORP.
Standard	:	FCC Part 15, Subpart B, Class B ANSI C63.4-1992 CISPR 22: 1997, Class B

We hereby certify that one sample of the designation has been tested in our facility on Dec. 09, 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 : Jacko Liu (Jacko Liu), DATE: 12/11/2000

CHECKED BY : Kathy Tseng (Kathy Tseng), DATE: 12/11/2000

APPROVED BY : Mike Su (Mike Su), DATE: 12/11/2000

ADVANCE DATA TECHNOLOGY CORPORATION

NVLAP® Accredited Laboratory

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	KEYBOARD
Model No.	:	9113
Power Supply	:	DC 5V (from PC)
Data Cable	:	Non-shielded (1.8 m)

Note: 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	1S218714ABNA000D	FCC DoC APPROVED
2	19"COLOR MONITOR	HP	D2842A	KR93473116	BEJCB910
3	PRINTER	HP	2225C	2923S47245	DSI6XU2225
4	MODEM	ACEEX	1414	980020531	IFAXDM1414
5	MOUSE	LOGITECH	M-S43	LZE000703132	DZL211106
6	SPEAKER	JAZZ	J-008	J790537	NA

No.	Signal cable description
1	NA
2	1.8 m braid shielded wire, terminated with VGA connector via metallic frame, w/o core.
3	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core.
4	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.
5	1.5 m foil shielded wire, terminated with PS2 connector via drain wire, w/o core.
6	1.1 m wrapped shielded wire, terminated via drain wire, with 3.5 mm phone plug, w/o core.

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	8590L	3544A00941	Nov. 29, 2001
HP Pre-Amplifier	8447D	2944A08312	March 12, 2001
HP Preamplifier	8449B	3008A01201	Dec. 13, 2001
R&S Receiver	ESVS10	844594/010	Oct. 2, 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	CBL6111A	1500	Aug. 31, 2001
EMCO Double Ridged Guide Antenna	3115	9312-4192	March 29, 2001
EMCO Turn Table	1060-04	1196	NA
EMCO Tower	1051	1264	NA
Open Field Test Site	Site 1	ADT-R01	Aug. 25, 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
Temperature	:	23 Degree C
Humidity	:	70 %
Atmospheric Pressure	:	995 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -11.24 dB at 0.204 MHz Minimum passing margin of radiated emission: -6.0 dB at 229.12 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. Repeat steps 3-7.

4.3 TEST DATA OF CONDUCTED EMISSION

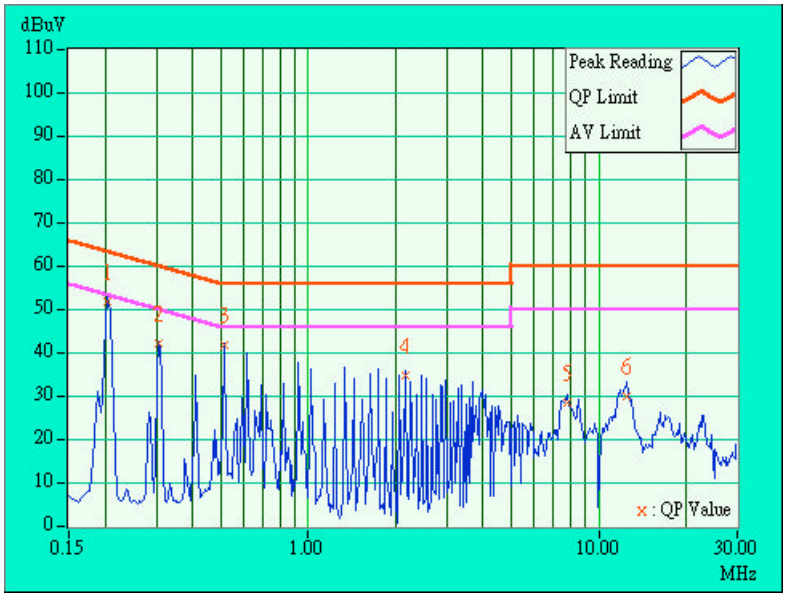
EUT: **KEYBOARD** MODEL: **9113**

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	0.204	0.20	52.02	-	52.22	-	63.46	53.46	-11.24	-
2	0.307	0.20	42.27	-	42.47	-	60.04	50.04	-17.57	-
3	0.513	0.22	41.97	-	42.19	-	56.00	46.00	-13.81	-
4	2.154	0.31	34.96	-	35.27	-	56.00	46.00	-20.73	-
5	7.809	0.53	28.41	-	28.94	-	60.00	50.00	-31.06	-
6	12.523	0.65	30.01	-	30.66	-	60.00	50.00	-29.34	-

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

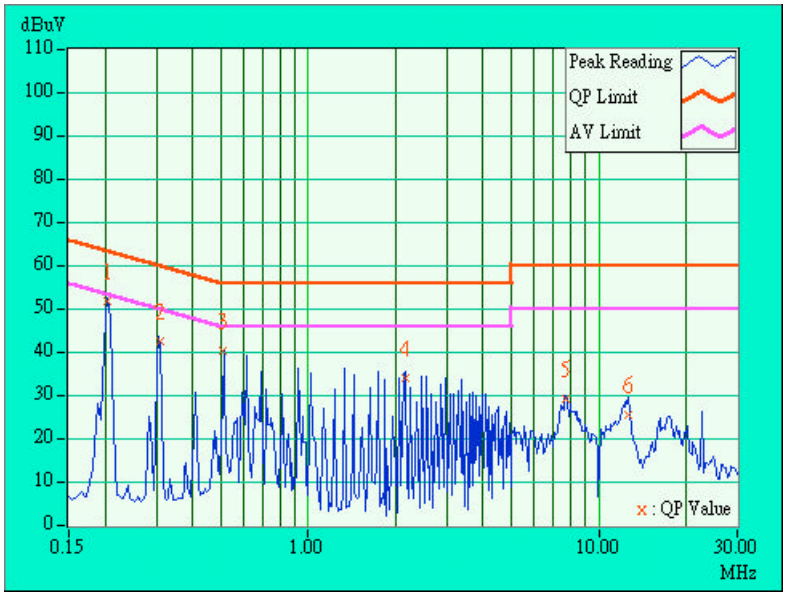
EUT: **KEYBOARD** MODEL: **9113**

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	0.205	0.20	51.73	-	51.93	-	63.42	53.42	-11.49	-
2	0.308	0.20	42.66	-	42.86	-	60.01	50.01	-17.15	-
3	0.511	0.22	40.22	-	40.44	-	56.00	46.00	-15.56	-
4	2.152	0.31	34.05	-	34.36	-	56.00	46.00	-21.64	-
5	7.688	0.46	29.34	-	29.80	-	60.00	50.00	-30.20	-
6	12.594	0.50	25.73	-	26.23	-	60.00	50.00	-33.77	-

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 DATA OF RADIATED EMISSION

EUT: **KEYBOARD** MODEL: **9113**

ANT. POLARITY: Horizontal

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

FREQUENCY RANGE: 30-1000 MHz MEASURED 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)
76.01	6.7	12.4	19.1	30.0	-10.9	356	158
112.52	11.4	10.2	21.6	30.0	-8.4	400	229
120.00	11.7	7.1	18.8	30.0	-11.2	400	152
144.25	12.1	5.2	17.3	30.0	-12.7	400	51
206.13	10.0	9.3	19.3	30.0	-10.7	400	273
219.57	10.9	9.8	20.7	30.0	-9.3	400	353
229.11	11.5	7.2	18.7	30.0	-11.3	400	123

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: **9113**

ANT. POLARITY: Vertical

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

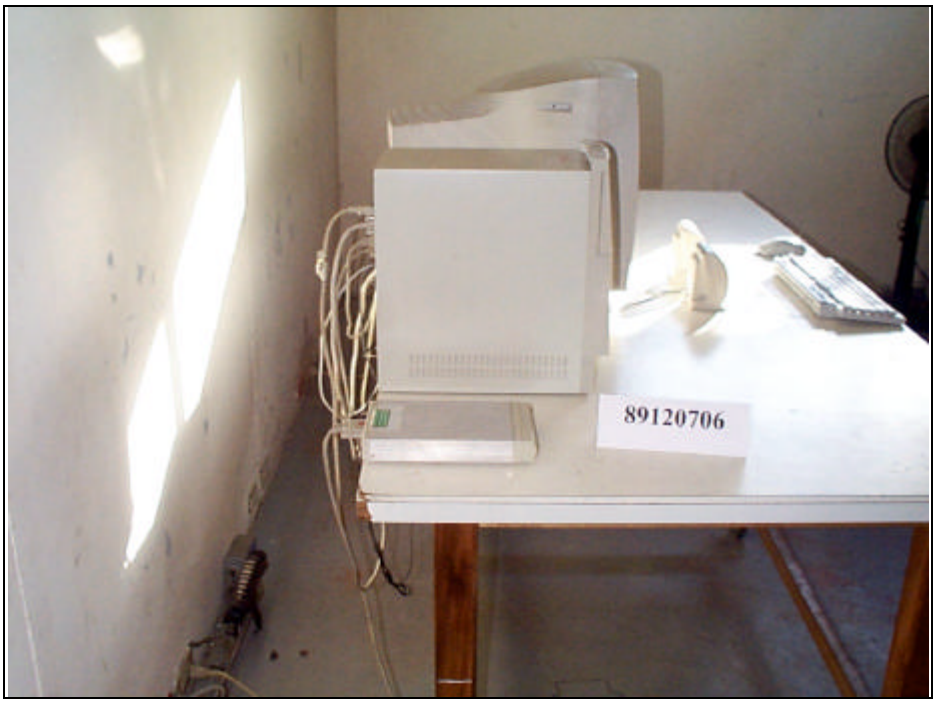
FREQUENCY RANGE: 30-1000 MHz MEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
72.58	6.3	15.2	21.5	30.0	-8.5	168	179
112.83	11.4	7.6	19.0	30.0	-11.0	100	255
120.00	11.7	9.6	21.3	30.0	-8.7	100	96
133.67	12.3	9.8	22.1	30.0	-7.9	100	201
144.44	12.1	7.6	19.7	30.0	-10.3	100	245
168.00	10.1	7.6	17.7	30.0	-12.3	100	59
199.85	9.6	9.7	19.3	30.0	-10.7	100	280
206.07	10.0	10.8	20.8	30.0	-9.2	100	89
219.60	10.9	11.3	22.2	30.0	-7.8	100	30
229.12	11.5	12.5	24.0	30.0	-6.0	100	127

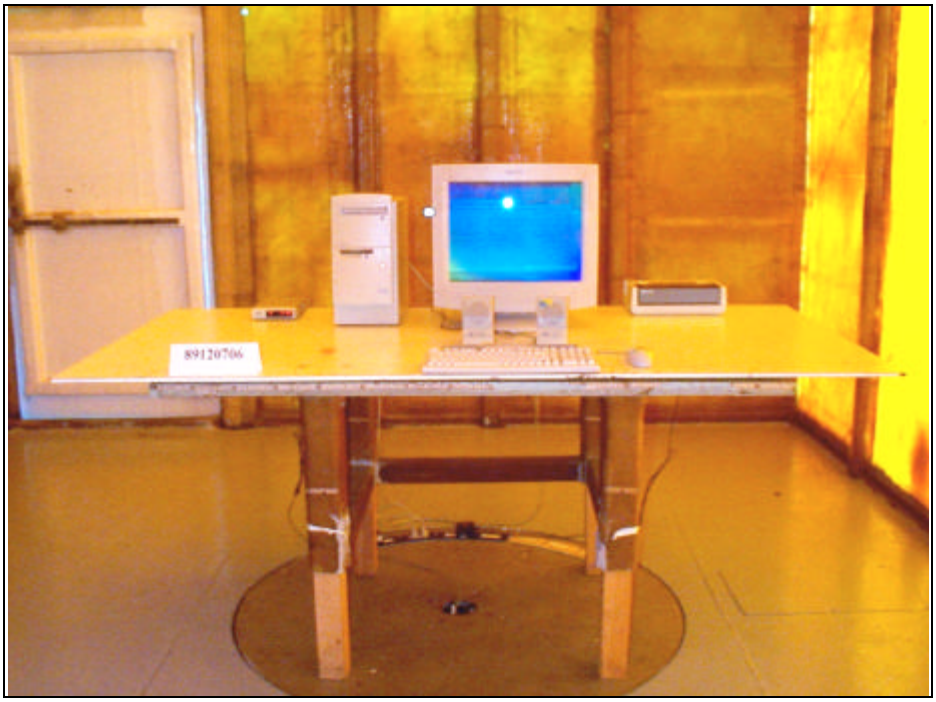
REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB) + Reading value (dBuV).
2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value

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, NVLAP
✍ Germany	TUV Rheinland
✍ 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:

Lin Kou EMC Lab.:
Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC Lab:
Tel: 886-35-935343
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Design Center:
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