FCC TEST REPORT

REPORT NO.: F90022105

MODEL NO.: 9113H

RECEIVED: Feb. 21, 2001

TESTED: Feb. 22, 2001

APPLICANT: BEHAVIOR TECH COMPUTER CORP.

ADDRESS: 2F, 51, TUNG HSING RD., TAIPEI, TAIWAN, R.O.C.

ISSUED BY: Advance Data Technology Corporation

LAB LOCATION: 47 14th Lin, Chiapau Tsun, Linko, Taipei, Taiwan, R.O.C.

Accredited Laboratory

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1 CERTIFICATION

PRODUCT:	USB KEYBOARD
BRAND NAME:	BTC
MODEL NO:	9113H
APPLICANT:	BEHAVIOR TECH COMPUTER CORP.
STANDARDS:	FCC Part 15, Subpart B, Class B CISPR 22: 1997, Class B ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility on Feb. 22, 2001. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

CHECKED BY: _____ , **DATE:** Feb. 23, 2001
(Yemmy Soong)

APPROVED BY: _____ , **DATE:** Feb. 23. 2001
(Mike Su)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Remarks
CISPR 22: 1997, Class B	Conducted Test	PASS	Meets Class B Limit Minimum passing margin is –12.05 dB at 0.208 MHz
	Radiated Test	PASS	Meets Class B Limit Minimum passing margin is –5.4 dB at 120 MHz

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	USB KEYBOARD
MODEL NO.	9113H
POWER SUPPLY	DC 5V (from PC)
DATA CABLE	Shielded 1.5m

NOTE: The EUT is a USB KEYBOARD with two USB connectors.

For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

3.2 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 were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	PERSONAL COMPUTER	IBM	2187-12W	1S218714ABNA 000D	FCC DoC APPROVED
2	19"COLOR MONITOR	HP	D2842A	KR93473113	BEJCB910
3	PRINTER	HP	2225C+	3030S79138	DSI6XU2225
4	MODEM	ACEEX	1414	980020509	IFAXDM1414
5	USB MOUSE	HP	M-U48a	LZE02300075	JNZ211360
6	USB JOYSTICK	MICROSOFT	SIDE WINDER	9760201272729	FCC DoC
7	SPEAKER	JAZZ	J-008	J798035	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
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	0.8 m foil shielded wire, terminated with USB connector via drain wire, w/o core.
6	2.2 m foil shielded wire, terminal by frame, with USB connector, w/o Core.
7	1.5 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).

4 EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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 in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

(3) All emanations 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.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESHS30	828109/007	July 6, 2001
ROHDE & SCHWARZ Artificial Mains Network	ESH3-Z5	839135/006	July 9, 2001
ROHDE & SCHWARZ 4-wire ISN	ENY41	837032/016	Nov. 28, 2001
ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/016	Dec. 3, 2001
EMCO-L.I.S.N.	3825/2	9204-1964	July 9, 2001
Shielded Room	Site 2	ADT-C02	NA
VCCI Site Registration No.	Site 2	C-240	NA

NOTE: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the 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.

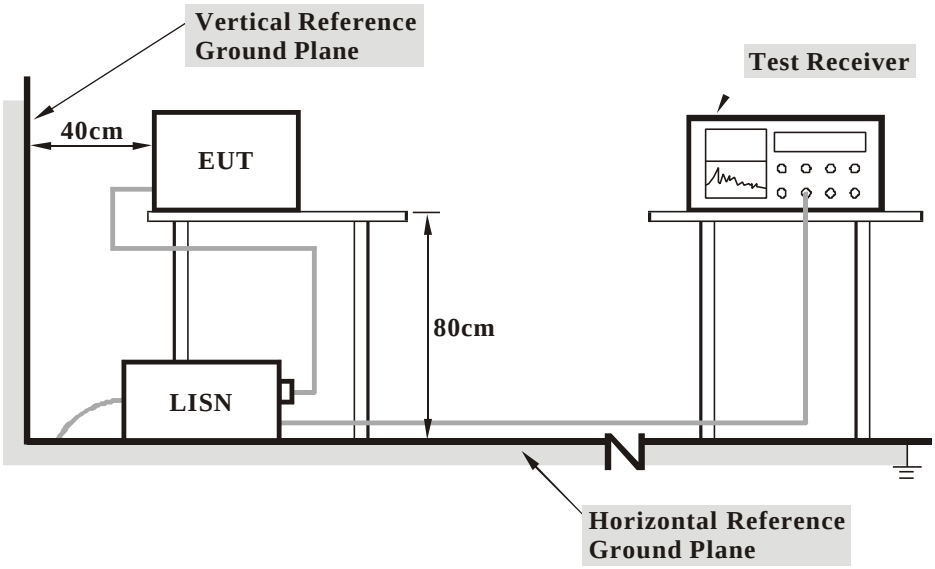
4.1.3 TEST PROCEDURE

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported.

4.1.4 TEST SETUP



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes support units.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.5 EUT OPERATING CONDITIONS

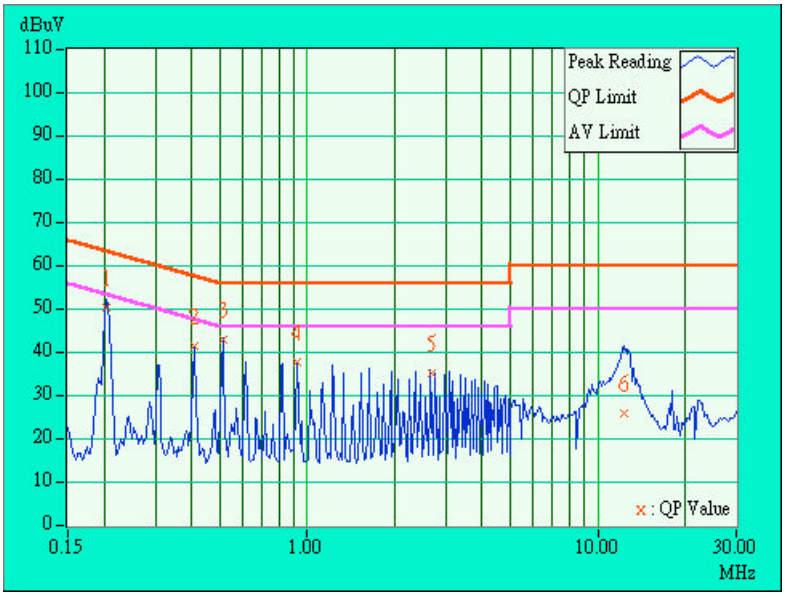
a. Turn on the power of all equipment.
b. PC runs a test program to enable all functions.
c. PC reads and writes messages from FDD and HDD.
d. EUT sends "H" character to PC.
e. PC sends "H" messages to monitor and monitor displays "H" patterns on screen.
f. PC sends "H" messages to modem.
g. PC sends "H" messages to printer.
h. PC sends audio messages to speakers.
i. Repeat steps c-i.

4.1.6 TEST RESULTS

EUT	USB KEYBOARD	**MODEL**	9113H
		6dB BANDWIDTH	10 kHz
INPUT POWER	120 Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	22 deg. C, 80 % RH, 1050 mbar	**TESTED BY**: Kan Liu	

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	0.203	0.20	50.22	-	50.42	-	63.51	53.51	-13.09	-
2	0.411	0.20	41.49	-	41.69	-	57.63	47.63	-15.94	-
3	0.513	0.20	43.10	-	43.30	-	56.00	46.00	-12.70	-
4	0.924	0.20	37.80	-	38.00	-	56.00	46.00	-18.00	-
5	2.670	0.27	35.04	-	35.31	-	56.00	46.00	-20.69	-
6	12.381	0.84	25.91	-	26.75	-	60.00	50.00	-33.25	-

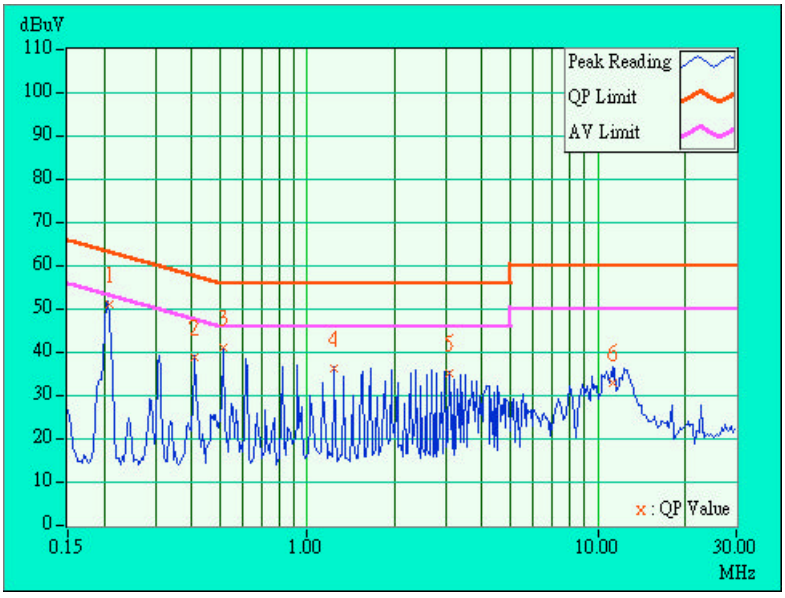
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission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



EUT	USB KEYBOARD	**MODEL**	9113H
		6dB BANDWIDTH	10 kHz
INPUT POWER	120 Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	22 deg. C, 70 % RH, 1050 mbar	**TESTED BY**: Ken Liu	

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	0.208	0.20	51.03	-	51.23	-	63.28	53.28	-12.05	-
2	0.412	0.20	38.92	-	39.12	-	57.62	47.62	-18.50	-
3	0.515	0.20	41.26	-	41.46	-	56.00	46.00	-14.54	-
4	1.234	0.20	36.35	-	36.55	-	56.00	46.00	-19.45	-
5	3.086	0.31	35.05	-	35.36	-	56.00	46.00	-20.64	-
6	11.245	0.67	32.98	-	33.65	-	60.00	50.00	-26.35	-

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.



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT FOR FREQUENCY BELOW 1000 MHz

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 (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.

4.2.2 TEST INSTRUMENTS

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	Jan. 25, 2002
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
VCCI Site Registration No.	Site 1	R-236	NA

NOTE: 1. The measurement uncertainty is less than +/-3.0dB, which is calculated as per the 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.

4.2.3 TEST PROCEDURE

a. The EUT was placed on the top of a ratable table 0.8 meters above the ground at a 10-meter open field site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.

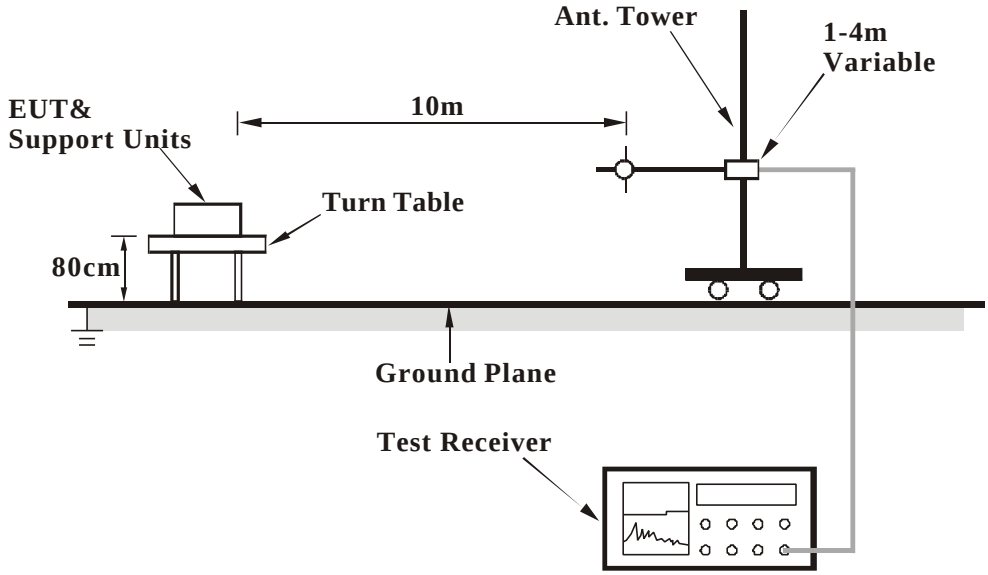
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-

tested one by one using the quasi- peak method or average method as specified and then reported In Data sheet peak mode and QP mode.

g. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the interference antenna and the detect function was set to Peak or Average.

4.2.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.5 EUT OPERATING CONDITIONS

Same as 4.1.5

4.2.6 TEST RESULTS

EUT	USB KEYBOARD	**MODEL**	9113H
		FREQUENCY RANGE	30-1000 MHz
INPUT POWER	120 Vac, 60 Hz	**DETECTOR FUNCTION & BANDWIDTH**	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	22 deg. C, 80 % RH, 1050 mbar	**TESTED BY**: Kan Liu	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M

No.	Freq. (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	48.02	18.8 QP	30.00	-11.20	3.75H	172	9.88	8.25	0.67	0.00	-8.92
2	120.00	21.4 QP	30.00	-8.60	4.01H	249	9.72	10.59	1.09	0.00	-11.68
3	144.03	20.1 QP	30.00	-9.90	4.01H	88	7.95	10.97	1.17	0.00	-12.15
4	168.01	21.8 QP	30.00	-8.20	4.01H	332	11.75	8.74	1.30	0.00	-10.05
5	180.01	19.3 QP	30.00	-10.70	4.01H	71	9.79	8.15	1.36	0.00	-9.51
6	192.20	21.8 QP	30.00	-8.20	4.01H	187	12.23	8.20	1.37	0.00	-9.57
7	216.02	20.7 QP	30.00	-9.30	4.01H	223	9.97	9.27	1.46	0.00	-10.73
8	240.01	25.9 QP	37.00	-11.10	4.01H	4	13.55	10.77	1.58	0.00	-12.35
9	360.01	24.7 QP	37.00	-12.30	2.58H	133	8.46	14.21	2.04	0.00	-16.24
10	624.01	23.1 QP	37.00	-13.90	2.07H	291	0.64	19.51	2.97	0.00	-22.48

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M

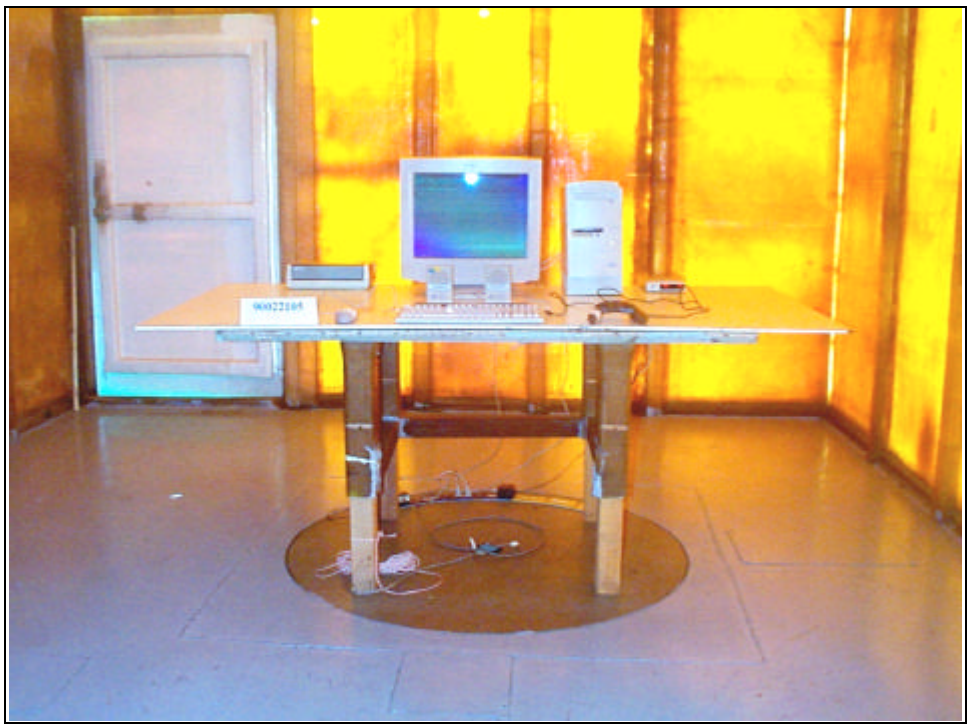
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	48.25	22.1 QP	30.00	-7.90	1.32V	217	13.88	7.52	0.70	0.00	-8.22
2	61.25	20.2 QP	30.00	-9.80	1.61V	152	13.87	5.56	0.77	0.00	-6.33
3	120.00	24.6 QP	30.00	-5.40	1.00V	21	12.97	10.59	1.09	0.00	-11.68
4	144.00	23.4 QP	30.00	-6.60	1.00V	152	11.30	10.97	1.17	0.00	-12.14
5	180.00	22.3 QP	30.00	-7.70	1.00V	284	12.79	8.15	1.36	0.00	-9.51
6	240.15	25.9 QP	37.00	-11.10	1.00V	223	13.55	10.77	1.58	0.00	-12.35
7	300.01	24.2 QP	37.00	-12.80	1.00V	145	9.93	12.46	1.82	0.00	-14.28
8	324.56	27.4 QP	37.00	-9.60	1.00V	324	12.44	13.10	1.90	0.00	-15.01
9	420.01	26.9 QP	37.00	-10.10	3.14V	212	8.64	16.04	2.25	0.00	-18.30
10	480.00	27.7 QP	37.00	-9.30	3.83V	108	8.21	16.98	2.51	0.00	-19.50

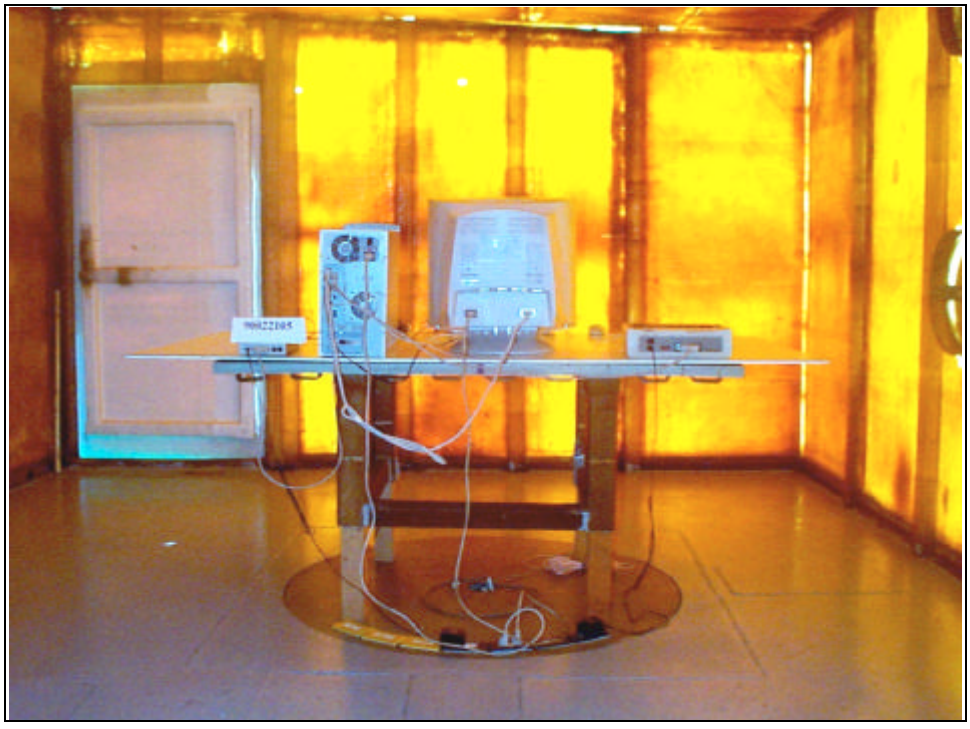
REMARKS: 1. Emission level(dBuV/m)=Raw Value(dBuV) – Correction Factor(dB)
2. Correction Factor(dB) = Pre-Amplifier Factor (dB) - Antenna Factor (dB) - Cable Factor (dB)
3. Pre-Amplifier Factor (dB) = 0, when the test receiver is used to read the value and because it did not use the Pre-Amplifier.
4.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

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

RADIATED EMISSION TEST





6 APPENDIX - INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

USA	FCC, NVLAP
Germany	TUV Rheinland
Japan	VCCI
New Zealand	MoC
Norway	NEMKO, DNV
U.K.	INCHCAPE
R.O.C.	BSMI

Copies of accreditation certificates of our laboratories 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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Fax: 886-2-26052943

Hsin Chu EMC Lab:
Tel: 886-35-935343
Fax: 886-35-935342

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The address and road map of all our labs can be found in our web site also.