FCC TEST REPORT

REPORT NO.: F90011505

MODEL NO.: 9116, 9118

RECEIVED: Jan. 15, 2001

TESTED: Jan. 16, 2001

APPLICANT: BEHAVIOR TECH COMPUTER CORP.

ADDRESS: 2F, NO.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:	Keyboard
BRAND NAME:	BTC
MODEL NO:	9116, 9118
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 Jan. 16, 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: Vickie Yu , **DATE:** Jan. 30, 2001
(Vickie Yu)

APPROVED BY: Mike Su , **DATE:** Jan. 30, 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 -11.59 dB at 0.202 MHz
	Radiated Test	PASS	Meets Class B Limit Minimum passing margin is -7.20 dB at 158.90 MHz

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Keyboard
MODEL NO.	9116, 9118
POWER SUPPLY	DC 5V (from PC)
DATA CABLE	Shielded 1.8m

NOTE: The EUT is a PS2 type Keyboard.

The EUT has two model names, which are identical to each other in all aspects, except for the function key.

- ✧ 9116 with function key
- ✧ 9118 without function key

From the above models, model: 9116 was chosen as representative model for the test, and its test data was recorded in this report.

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
2	19"COLOR MONITOR	HP	D2842A	KR93473113	BEJCB910
3	PRINTER	HP	2225C+	3030S79138	DSI6XU2225
4	MODEM	ACEEX	1414	980020531	IFAXDM1414
5	MOUSE	LOGITECH	M-S43	LZE000703132	DZL211106

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.

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

NOTES: (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	835154/007	Apr. 26, 2001
EMCO-L.I.S.N.	3825/2	9204-1964	July 9, 2001
Shielded Room	Site 2	ADT-C02	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.

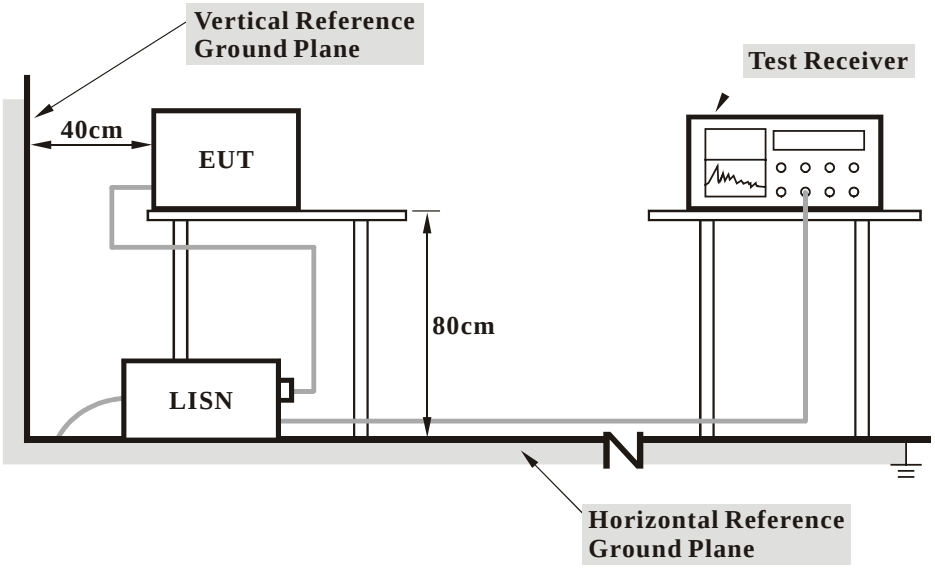
4.1.3 TEST PROCEDURE

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. Repeat steps c-h.

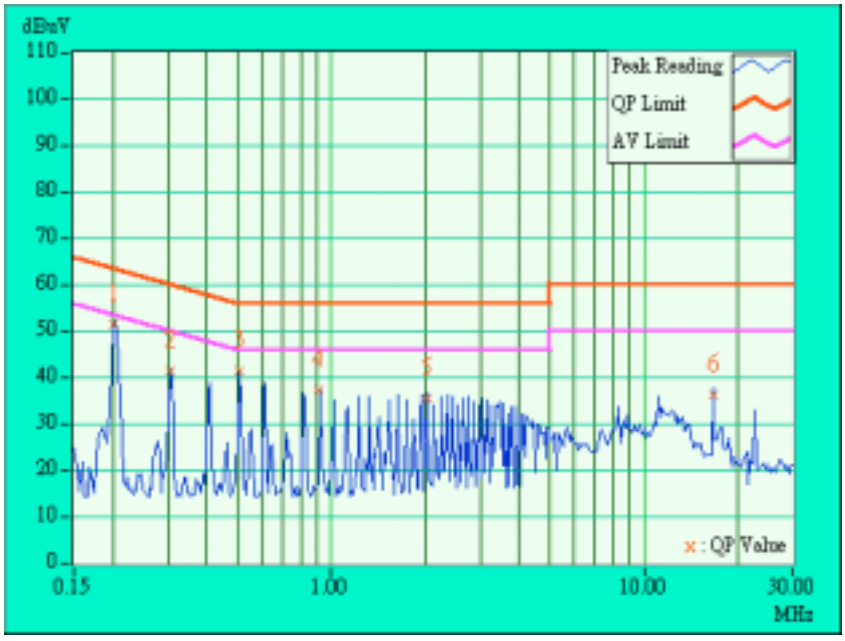
4.1.6 TEST RESULTS

EUT	Keyboard	**MODEL**	9116
		6dB BANDWIDTH	10 kHz
INPUT POWER	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 60 % RH, 1050 mbar	**TESTED BY**:	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.202	0.20	51.54	-	51.74	-	63.52	53.52	-11.78	-
2	0.306	0.20	41.50	-	41.70	-	60.09	50.09	-18.39	-
3	0.510	0.20	41.37	-	41.57	-	56.00	46.00	-14.43	-
4	0.917	0.20	37.27	-	37.47	-	56.00	46.00	-18.53	-
5	2.038	0.20	35.68	-	35.88	-	56.00	46.00	-20.12	-
6	16.691	1.03	36.16	-	37.19	-	60.00	50.00	-22.81	-

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.

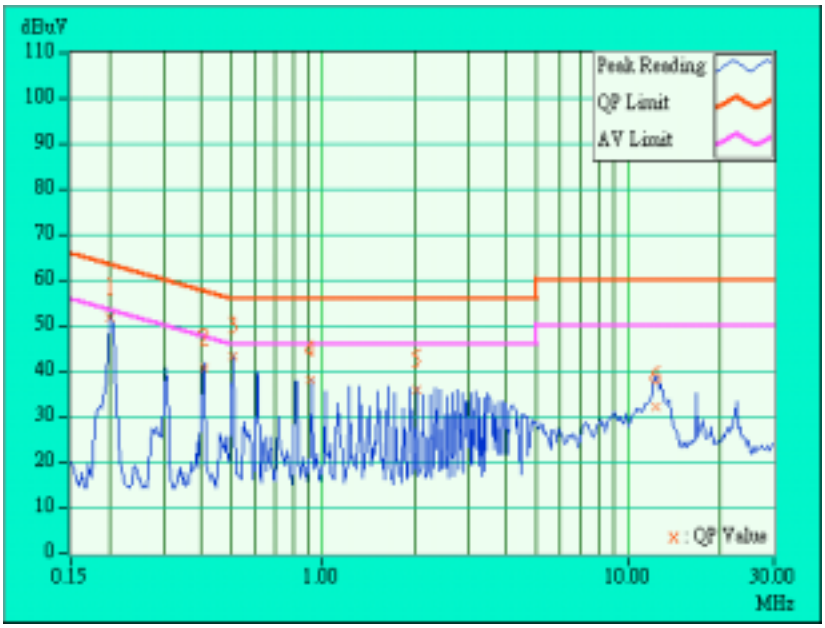


EUT	Keyboard	**MODEL**	9116
		6dB BANDWIDTH	10 kHz
INPUT POWER	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 60 % RH, 1050 mbar	**TESTED BY**:	Ken Lin

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.202	0.20	51.74	-	51.94	-	63.53	53.53	-11.59	-
2	0.408	0.20	40.70	-	40.90	-	57.69	47.69	-16.79	-
3	0.509	0.20	43.28	-	43.48	-	56.00	46.00	-12.52	-
4	0.915	0.20	38.05	-	38.25	-	56.00	46.00	-17.75	-
5	2.035	0.20	35.94	-	36.14	-	56.00	46.00	-19.86	-
6	12.318	0.74	32.28	-	33.02	-	60.00	50.00	-26.98	-

Remarks:

1. . 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

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 – 230	40	30
230 - 1000	47	37

NOTES: (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.

4.2.2 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	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 +/- 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.

4.2.3 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.

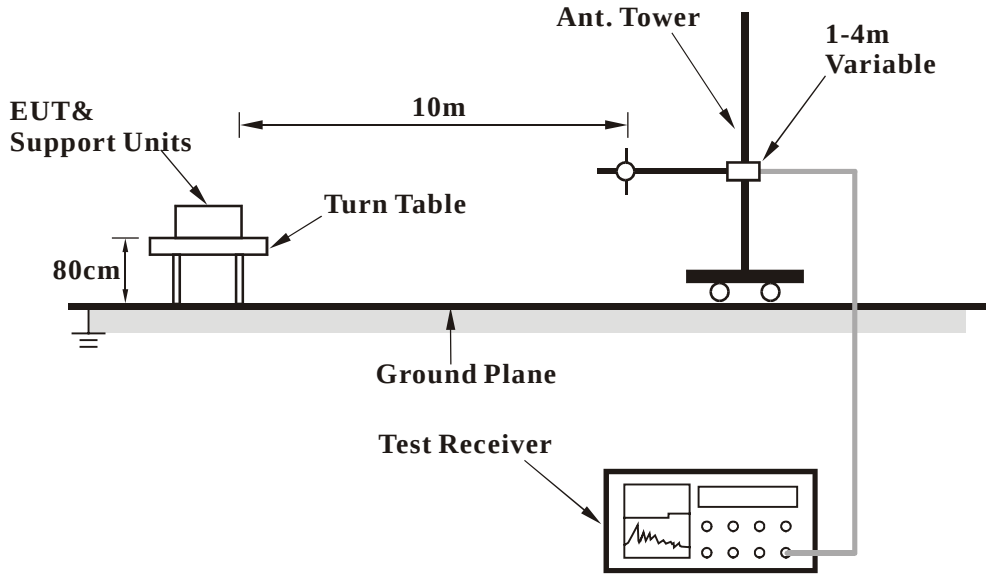
c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

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 ratable 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.

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	Keyboard	**MODEL**	9116
		FREQUENCY RANGE	30-1000 MHz
INPUT POWER	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	15 deg. C, 43 % RH, 1050 mbar	**TESTED BY**:	

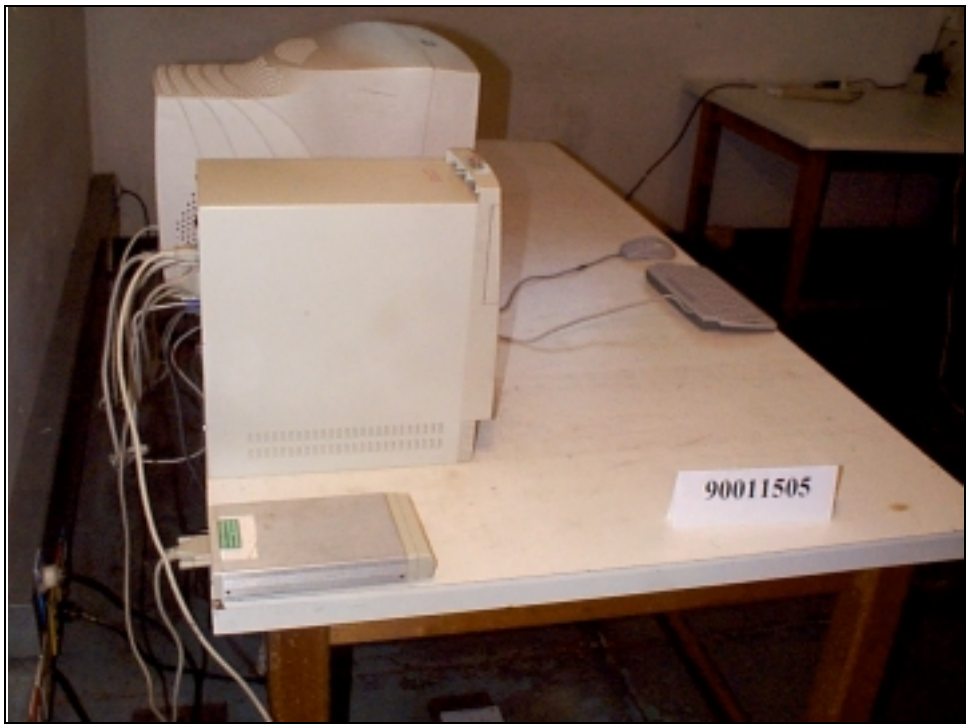
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M											
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	48.31	22.5 QP	30.00	-7.50	3.56H	337	14.28	7.52	0.70	0.00	-8.22
2	60.08	21.9 QP	30.00	-8.10	3.66H	189	15.35	5.79	0.76	0.00	-6.55
3	108.10	20.3 QP	30.00	-9.70	4.01H	114	9.12	10.13	1.05	0.00	-11.18
4	136.10	18.5 QP	30.00	-11.50	4.01H	319	6.08	11.28	1.14	0.00	-12.42
5	158.32	20.4 QP	30.00	-9.60	4.01H	234	9.82	9.33	1.25	0.00	-10.58
6	188.08	18.7 QP	30.00	-11.30	4.00H	59	9.11	8.18	1.37	0.00	-9.56
7	216.17	21.7 QP	30.00	-8.30	4.01H	300	10.97	9.27	1.46	0.00	-10.73
8	229.34	20.1 QP	30.00	-9.90	4.01H	39	8.56	10.02	1.52	0.00	-11.54

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	48.27	21.8 QP	30.00	-8.20	1.52V	183	13.58	7.52	0.70	0.00	-8.22
2	59.99	21.9 QP	30.00	-8.10	1.33V	14	15.35	5.79	0.76	0.00	-6.55
3	74.60	20.6 QP	30.00	-9.40	1.05V	200	14.18	5.58	0.84	0.00	-6.42
4	110.11	21.2 QP	30.00	-8.80	0.98V	135	9.95	10.22	1.06	0.00	-11.28
5	138.76	19.2 QP	30.00	-10.80	0.98V	207	6.68	11.38	1.15	0.00	-12.53
6	158.90	22.8 QP	30.00	-7.20	1.00V	161	12.22	9.33	1.25	0.00	-10.58
7	187.76	18.5 QP	30.00	-11.50	0.98V	208	8.95	8.18	1.37	0.00	-9.56
8	219.74	16.6 QP	30.00	-13.40	0.98V	217	5.67	9.42	1.47	0.00	-10.89
9	229.14	18.1 QP	30.00	-11.90	0.98V	157	6.58	10.02	1.52	0.00	-11.54

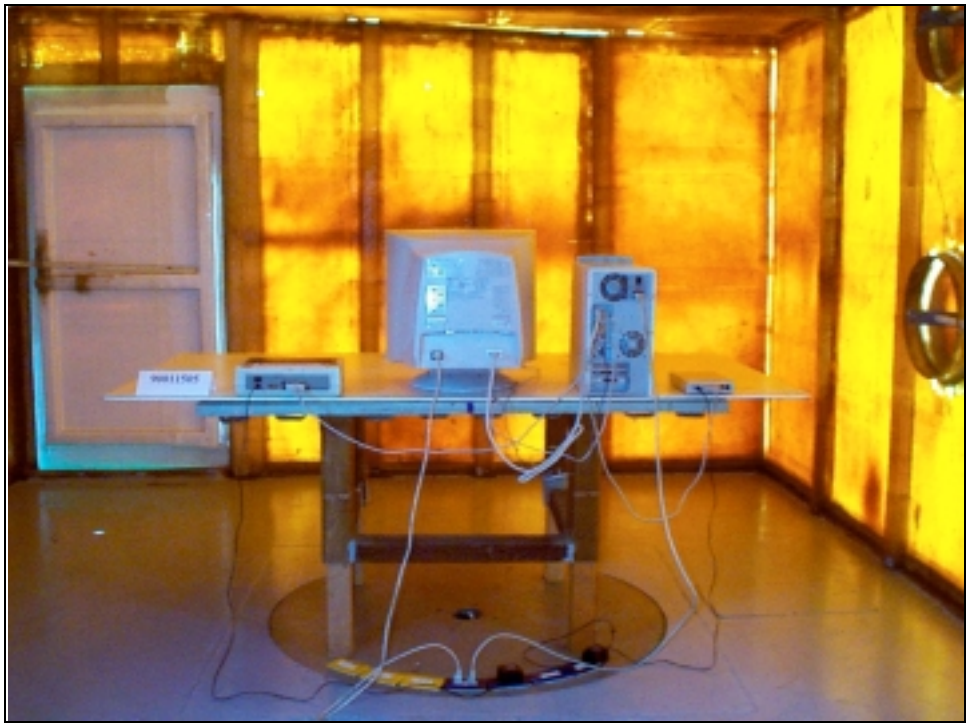
REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) – Correction Factor(dB)
2. Correction Factor(dB) = Pre-Amplifier Factor (dB) - Antenna Factor (dB) - Cable Factor (dB)
3. Pre-Amplifier Factor (dB) = 0, when the test receiver is used to read the value and because it did not use the Pre-Amplifier.
4. 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

Lin Kou Safety Lab:
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Design Center:
Tel: 886-2-26093195
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The address and road map of all our labs can be found in our web site also.