FCC TEST REPORT

REPORT NO.: RF921204R07
MODEL NO.: 9116URF
RECEIVED: Dec. 04, 2003
TESTED: Dec. 06 ~ Dec. 16, 2003

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, Chia Pau Tsuen, Linkou Hsiang, Taipei, Taiwan, R.O.C.

0528
ILAC MRA

Lab Code: 200102-0

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1 CERTIFICATION

PRODUCT :	Wireless Keyboard
BRAND NAME :	BTC
MODEL NO :	9116URF
TEST ITEM :	PROTOTYPE
APPLICANT :	BEHAVIOR TECH COMPUTER CORP.
STANDARDS :	FCC Part 15, Subpart C(15.235) ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from Dec. 06 to Dec. 16, 2003. 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.

PREPARED BY: Windy Chou , **DATE:** Dec. 17, 2003

Windy Chou

APPROVED BY: , **DATE:** Dec. 17, 2003

Ellis Wu / Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD PARAGRAPH	**TEST TYPE**	**RESULT**	**REMARK**
15.207	Conducted Emission Test	N/A	Power supply is 3Vdc from batteries
15.235, 15.209	Radiated Emission Test	PASS	Minimum passing margin is –2.00dB at 98.04MHz
15.235(b)	Band Edges Test	PASS	Meet the requirement of limit

Note: The information of measurement uncertainty is available upon the customer's request.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless Keyboard
MODEL NO.	9116URF
POWER SUPPLY	3Vdc from batteries
MODULATION TYPE	FSK
CARRIER FREQUENCY OF EACH CHANNEL	49.845 & 49.865MHz
BANDWIDTH OF EACH CHANNEL	NA
NUMBER OF CHANNEL	2
ANTENNA TYPE	Integral antenna
DATA CABLE	NA
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT is the transmitter part of a Wireless Keyboard.
2. For more detailed features description of the EUT, please refer to the manufacturer's specifications or the User's Manual.

3.2 DESCRIPTION OF TEST MODES

Two channels was provided to this EUT.

Channel	Frequency
1	49.845MHz
2	49.865MHz

Note: Channel 49.845MHz, the worst case, was chosen for final test.

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is the transmitter part of a Wireless Keyboard. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.235)

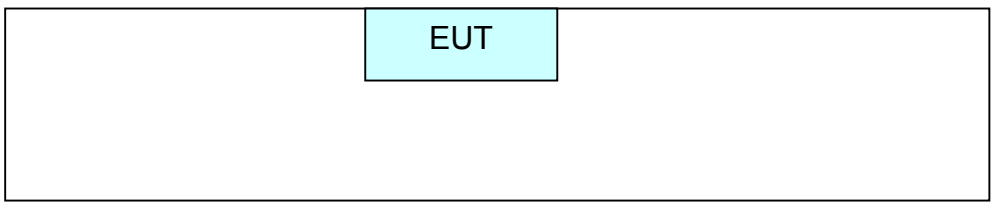
ANSI C63.4-1992

All test items have been performed and recorded as per the above standards.

3.4 DESCRIPTION OF SUPPORT UNITS

NA

3.5 CONFIGURATION OF SYSTEM UNDER TEST



4 TEST PROCEDURE AND RESULT

4.1 CONDUCTED EMISSION MEASUREMENT

NA

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

According to 15.235 the field strength of emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m)	
49.82 - 49.90	Peak	Average
	100	80

According to 15.235 (b) the field strength of and emissions appearing between the band edges and up to 10kHz above and below the band edges shall be attenuated at least 26dB below the level of the unmodulated carrier or to the general limits in 15.209, whichever permits the higher emission levels.

The field strength of and emissions removed by more than 10kHz from the band edges shall not exceed the general radiated emission limits in 15.209. as following:

Other Frequencies (MHz)	Field Strength of Fundamental	
	uV/meter	dBuV/meter
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.2.2 TEST INSTRUMENT

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
* HP Spectrum Analyzer	8593E	3911A07465	July 07, 2004
* HP Preamplifier	8447D	2432A03504	June 10, 2004
HP Preamplifier	8449B	3008A01201	Dec. 11, 2004
SCHAFFNER Tunable Dipole Antenna SCHWARZBECK Tunable Dipole Antenna	VHBA 9123 UHA 9105	459 977	Jun. 26, 2004
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Feb. 13, 2004
*Schwarzbeck Antenna	VULB9168	137	Apr. 03, 2004
SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	June 30, 2004
*ADT. Turn Table	TT100	0306	NA
*ADT. Tower	AT100	0306	NA
*Software	ADT_Radiated_V 5.14	NA	NA
*TIMES RF cable	LL142	CABLE-CH6-01	Apr. 30, 2004

NOTE: 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. "*" = These equipment are used for the final measurement.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The test was performed in ADT Chamber No. 6.

4.2.3 TEST PROCEDURE

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

b. The EUT was set 3 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

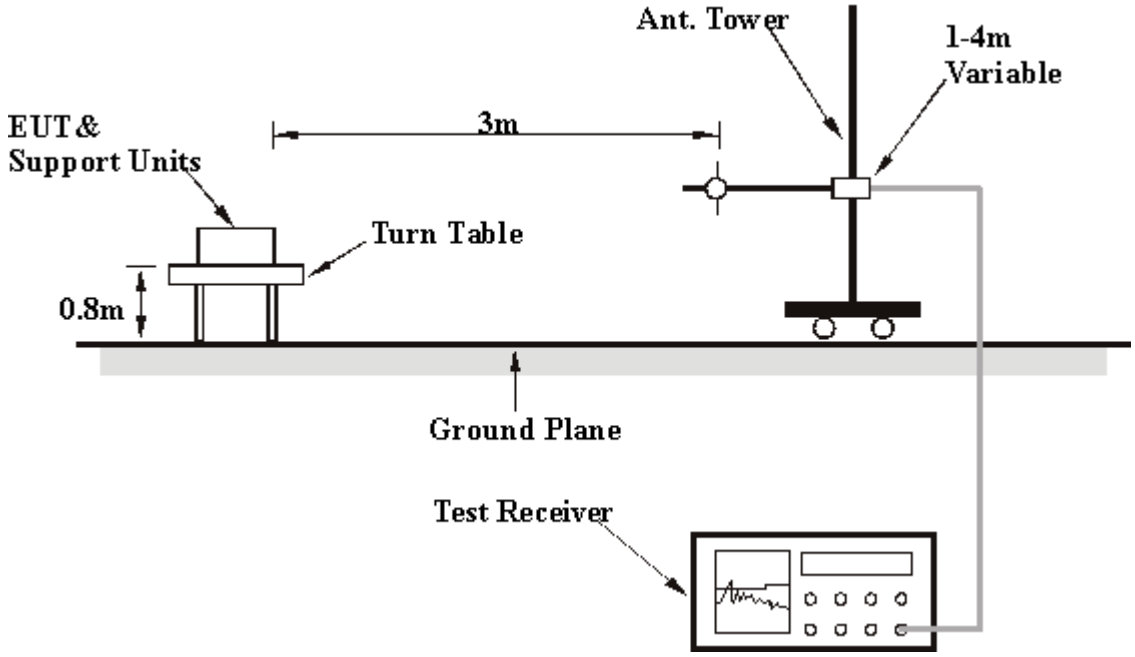
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

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.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.

4.2.4 TEST SETUP



For the actual test configuration, please refer to the related item in this test report - Photographs of the Test Configuration.

4.2.5 EUT OPERATING CONDITION

Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.

4.2.6 TEST RESULT

EUT	Wireless Keyboard	**MODEL**	9116URF
FREQUENCY RANGE	30-1000 MHz		
INPUT POWER	3Vdc	**DETECTOR FUNCTION**	Peak / Quasi-Peak / Average
ENVIRONMENTAL CONDITIONS	20 deg. C, 60 % RH, 991 hPa	**TESTED BY**: Jamison Chang	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*49.80	64.09 PK	100.00	-35.91	2.00 H	22	50.01	14.08
2	*49.80	62.32 AV	80.00	-17.68	2.00 H	32	48.24	14.08
3	74.71	36.60 QP	40.00	-3.40	2.50 H	4	25.92	10.68
4	**98.04**	**41.50 QP**	**43.50**	**-2.00**	**2.00 H**	**43**	**31.37**	**10.13**
5	123.31	36.99 QP	43.50	-6.51	3.00 H	250	24.43	12.56
6	148.58	40.27 QP	43.50	-3.23	2.00 H	277	26.28	13.99
7	173.85	39.56 QP	43.50	-3.94	1.50 H	112	26.51	13.05
8	199.12	35.86 QP	43.50	-7.64	1.75 H	121	24.61	11.25
9	224.39	29.31 QP	46.00	-16.69	1.50 H	310	16.91	12.40
10	249.66	23.64 QP	46.00	-22.36	1.00 H	148	10.26	13.37
11	272.99	43.38 QP	46.00	-2.62	1.00 H	334	29.11	14.27
12	298.26	25.03 QP	46.00	-20.97	1.00 H	343	9.98	15.05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*49.80	57.80 PK	100.00	-42.20	1.00 V	274	43.73	14.08
2	*49.80	56.32 AV	80.00	-23.68	1.00 V	274	42.24	14.08
3	74.71	30.43 QP	40.00	-9.57	1.00 V	268	19.75	10.68
4	98.04	36.79 QP	43.50	-6.71	1.25 V	292	26.66	10.13
5	123.31	29.43 QP	43.50	-14.07	1.50 V	172	16.87	12.56
6	148.58	34.64 QP	43.50	-8.86	2.00 V	181	20.65	13.99
7	173.85	30.65 QP	43.50	-12.85	2.00 V	238	17.60	13.05
8	199.12	26.08 QP	43.50	-17.42	1.50 V	67	14.83	11.25
9	224.39	17.32 QP	46.00	-28.68	1.50 V	43	4.92	12.40
10	272.99	34.35 QP	46.00	-11.65	1.25 V	43	20.08	14.27

REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. ”*”= Fundamental frequency.

4.3 BAND EDGES MEASUREMENT

4.3.1 LIMITS OF BAND EDGES MEASUREMENT

The field strength of any emissions appearing between the band edges and up to 10kHz above and below the band edges shall be attenuated at least 26dB below the level of the unmldulated carrier or to the general limits in 15.209, whichever permits the higher emissions levels.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2004

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 1kHz with suitable frequency span including 10kHz bandwidth from band edge. The band edges was measured and recorded.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

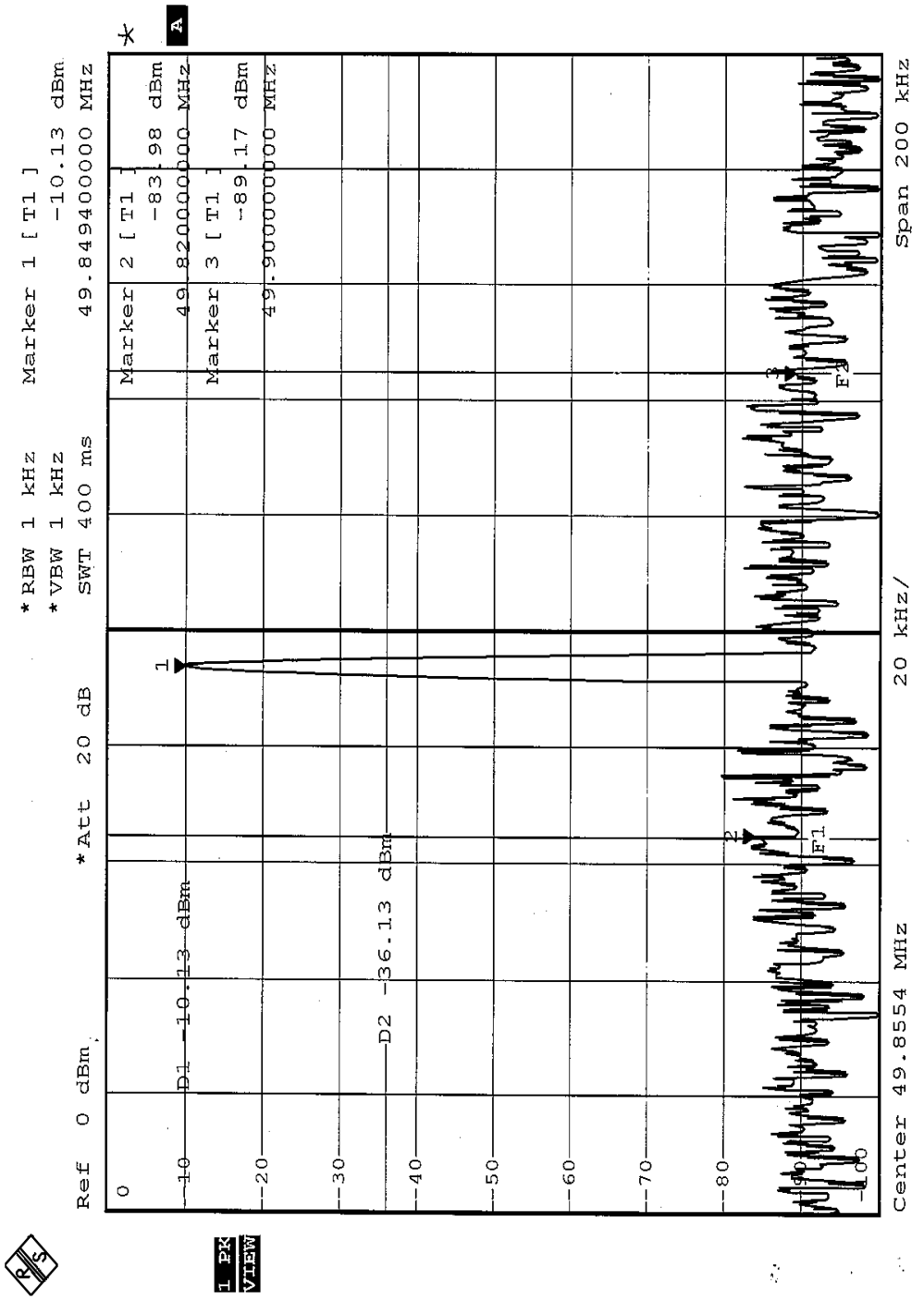
4.3.5 EUT OPERATING CONDITION

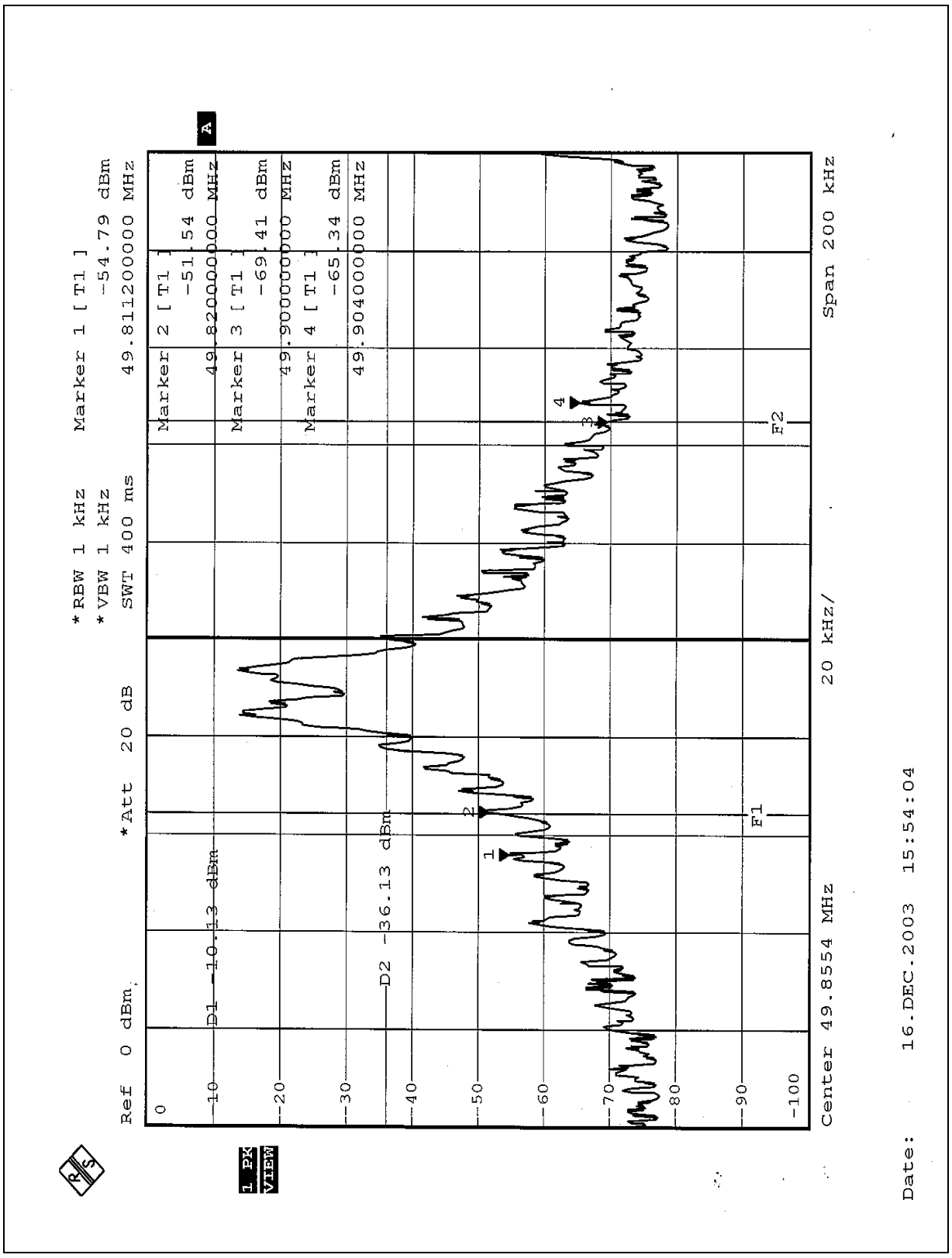
Same as Item 4.2.5

4.3.6 TEST RESULTS

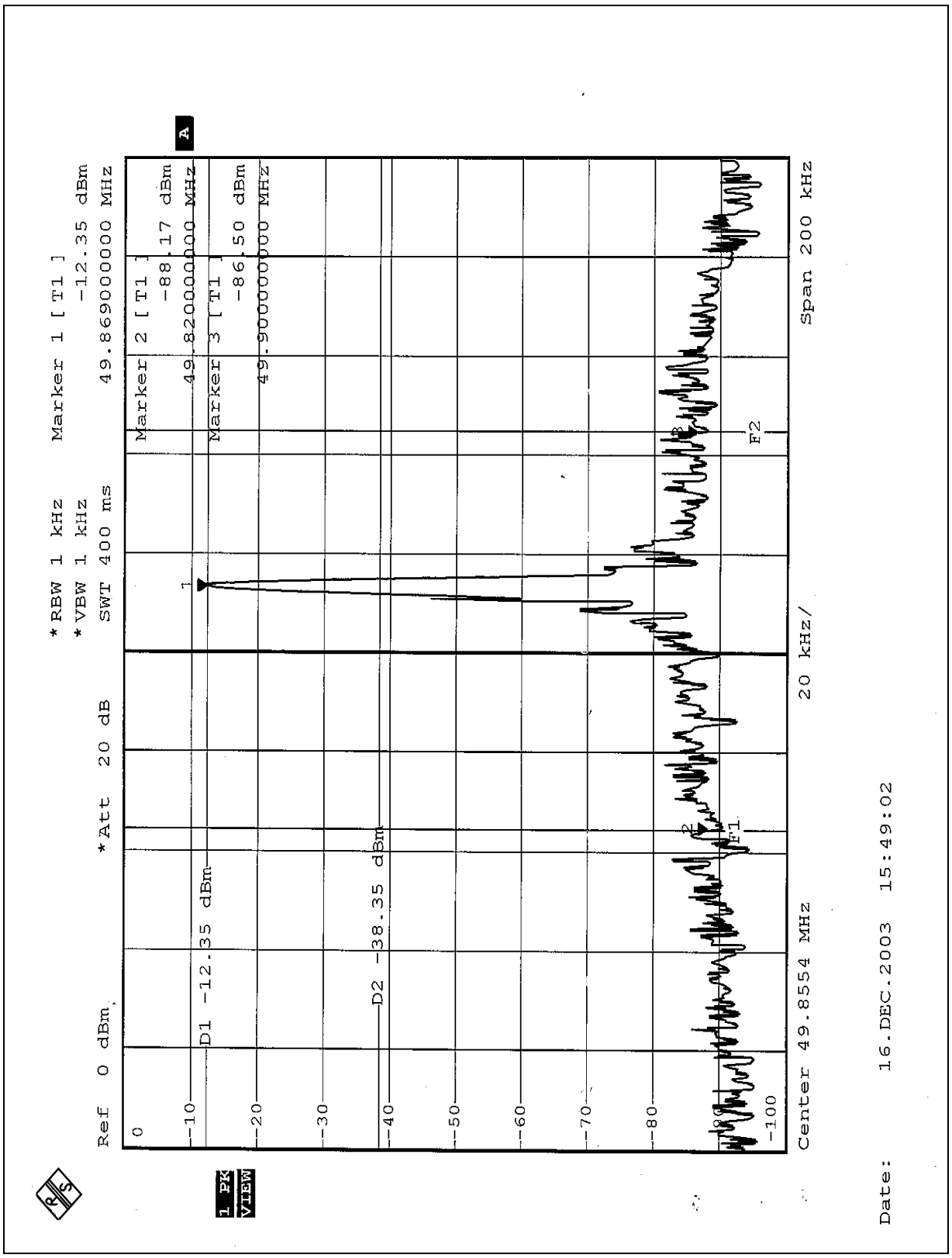
The spectrum plots are attached on the following pages. D2 line indicates the highest level, D1 line indicates the 26dB offset below D2. It shows compliance with the requirement in part 15.235(C).

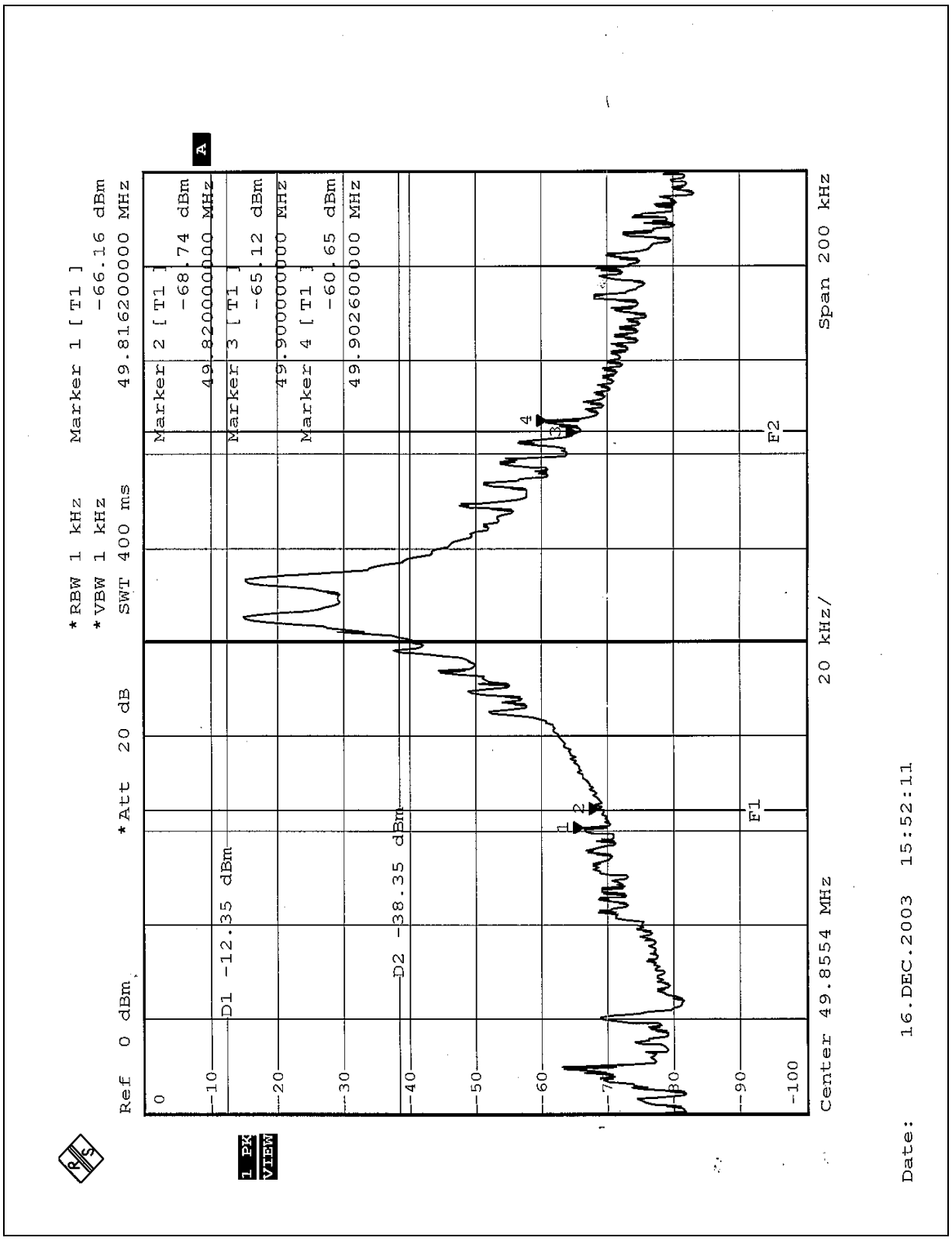
49.845MHz


Ref 0 dBm
*Att 20 dB
*RBW 1 kHz
*VBW 1 kHz
SWT 400 ms
Marker 1 [T1]
-10.13 dBm
49.84940000 MHz
Marker 2 [T1]
-83.98 dBm
49.82000000 MHz
Marker 3 [T1]
-89.17 dBm
49.90000000 MHz
D1 -10.13 dBm
D2 -36.13 dBm
Center 49.8554 MHz
20 kHz/
Span 200 kHz
Date: 16.DEC.2003 15:43:30
1 PK VIEW


*RBW 1 kHz
*VBW 1 kHz
SWT 400 ms
*Att 20 dB
Ref 0 dBm
D1 -10.13 dBm
D2 -36.13 dBm
Marker 1 [T1]
-54.79 dBm
49.811200000 MHz
Marker 2 [T1]
-51.54 dBm
49.820000000 MHz
Marker 3 [T1]
-69.41 dBm
49.900000000 MHz
Marker 4 [T1]
-65.34 dBm
49.904000000 MHz
1 PK VIEW
Center 49.8554 MHz
20 kHz/
Span 200 kHz
F1
F2
Date: 16.DEC.2003 15:54:04

49.865MHz


*RBW 1 kHz
*VBW 1 kHz
SWT 400 ms
Marker 1 [T1]
-12.35 dBm
49.869000000 MHz
Marker 2 [T1]
-88.17 dBm
49.820000000 MHz
Marker 3 [T1]
-86.50 dBm
49.900000000 MHz
Ref 0 dBm
*Att 20 dB
D1 -12.35 dBm
D2 -38.35 dBm
Center 49.8554 MHz
20 kHz/
Span 200 kHz
Date: 16.DEC.2003 15:49:02


*RBW 1 kHz
*VBW 1 kHz
SWT 400 ms
Marker 1 [T1]
-66.16 dBm
49.816200000 MHz
*Att 20 dB
Marker 2 [T1]
-68.74 dBm
49.820000000 MHz
Marker 3 [T1]
-65.12 dBm
49.900000000 MHz
Marker 4 [T1]
-60.65 dBm
49.902600000 MHz
Ref 0 dBm
D1 -12.35 dBm
D2 -38.35 dBm
F1
F2
Center 49.8554 MHz
20 kHz/
Span 200 kHz
Date: 16.DEC.2003 15:52:11

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

RADIATED EMISSION TEST

6 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 and approved 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
R.O.C.	BSMI, DGT, CNLA

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:
Tel: 886-2-26093195
Fax: 886-2-26093184

Lin Kou RF&Telecom Lab:
Tel: 886-3-3270910
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The address and road map of all our labs can be found in our web site also.