

# FCC TEST REPORT

**REPORT NO.:** RF930128R03

**MODEL NO.:** 5213RF

**RECEIVED:** Jan. 28, 2004

**TESTED:** Feb. 9 ~ Feb. 10, 2004

**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.

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## 1 CERTIFICATION

**PRODUCT :** Wireless Keyboard  
**BRAND NAME :** BTC  
**MODEL NO :** 5213RF  
**TEST ITEM:** PROTOTYPE  
**APPLICANT :** BEHAVIOR TECH COMPUTER CORP.  
**STANDARDS :** FCC Part 15, Subpart C (15.227)  
ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from Feb. 9, 2004 ~ Feb. 10, 2004. 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:** Wendy Liao, **DATE:** February 11, 2004  
Wendy Liao

**APPROVED BY:** Ellis Wu, **DATE:** February 11, 2004  
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	PASS	Power supply is 3Vdc from batteries
15.227	Radiated Emission Test	PASS	Minimum passing margin is -8.84dB at 706.47MHz

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

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Wireless Keyboard
<b>MODEL NO.</b>	5213RF
<b>POWER SUPPLY</b>	3.0Vdc from batteries
<b>MODULATION TYPE</b>	FSK
<b>CARRIER FREQUENCY OF EACH CHANNEL</b>	27.145MHz & 27.195MHz
<b>NUMBER OF CHANNEL</b>	2
<b>ANTENNA TYPE</b>	Printed antenna
<b>DATA CABLE</b>	NA
<b>ASSOCIATED DEVICES</b>	NA

**NOTE:**

1. The EUT is the transmitter part of a Wireless Keyboard.
2. For more detailed feature description of the EUT, please refer to user's manual.

### 3.2 DESCRIPTION OF TEST MODES

One sample was provided to this test.

Frequency (MHz)	
27.145MHz	27.195MHz

**NOTE:** Frequency 27.145MHz was the worst cases chosen for final test and recorded in the report.

### 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 (15.227)**

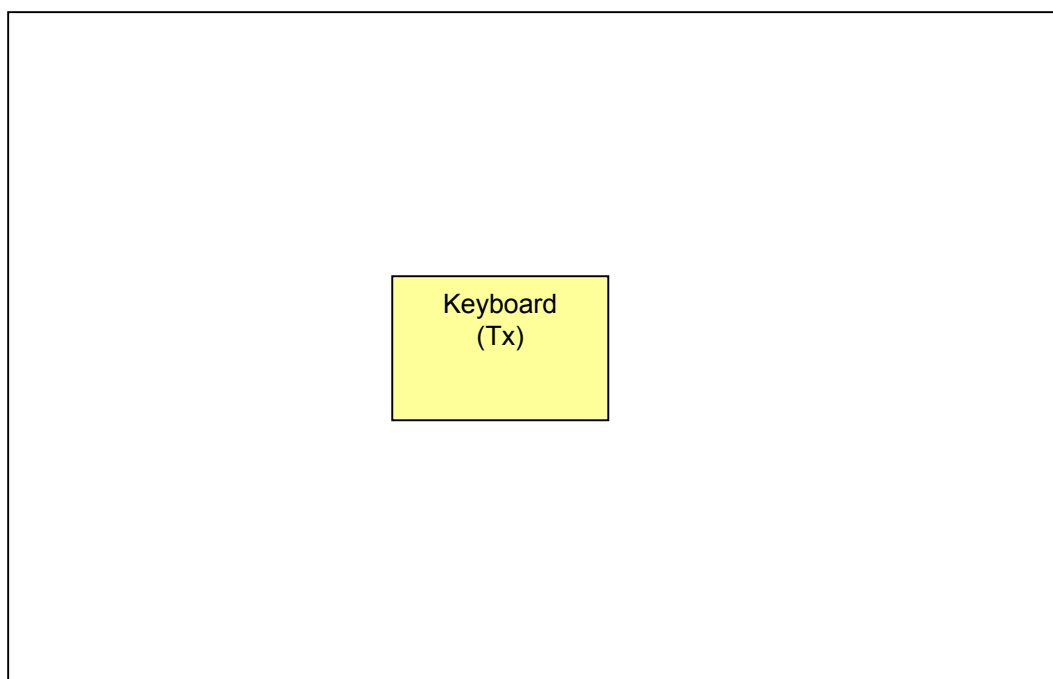
**ANSI C63.4-1992**

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 TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

NA

### 4.2 RADIATED EMISSION MEASUREMENT

#### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

According to 15.227 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)	
26.96-27.28	Peak	Average
	100	80

Field strength limits are at the distance of 3 meters, emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Other Frequencies (MHz)	Field Strength of Fundamental	
	uV/meter	dBuV/meter
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	Jul. 7, 2004
* HP Preamplifier	8447D	2432A03504	Jun. 10, 2004
HP Preamplifier	8449B	3008A01292	Aug. 11, 2004
SCHAFFNER Tunable Dipole Antenna	VHBA 9123	459	Jun. 26, 2004
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
* 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	Jun. 30, 2004
* ADT. Turn Table	TT100	0306	NA
* ADT. Tower	AT100	0306	NA
* Software	ADT_Radiated_V5.14	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.

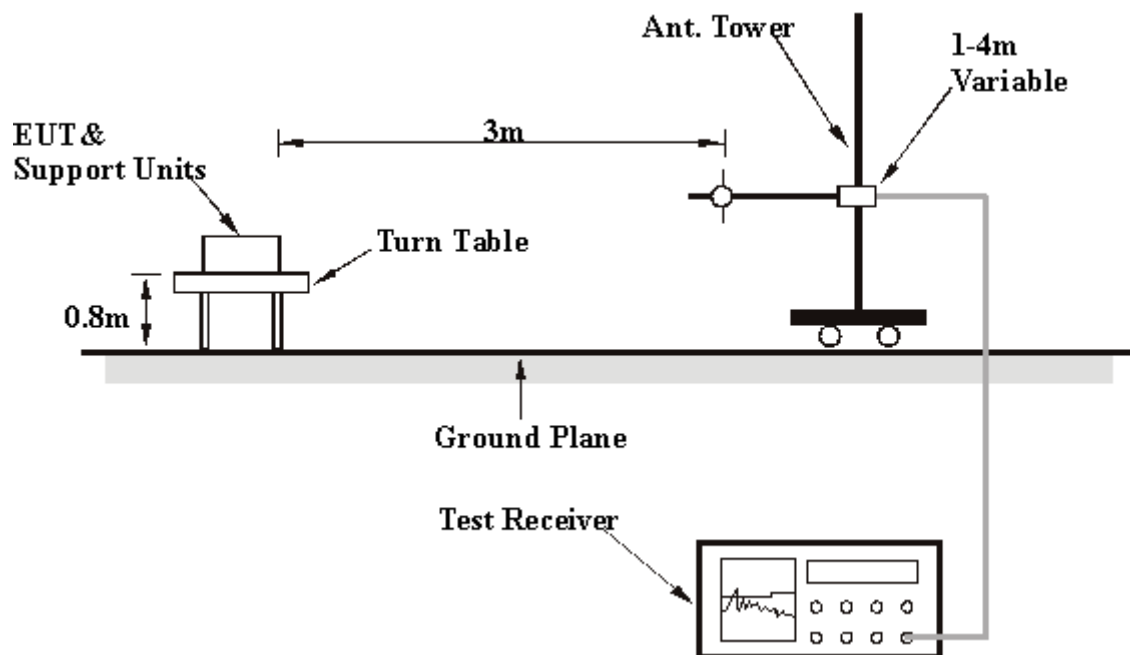
**NOTE:**

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.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.2.5 TEST SETUP



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

#### 4.2.6 EUT OPERATING CONDITION

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

## 4.2.7 TEST RESULT

<b>EUT</b>	Wireless Keyboard	<b>MODEL</b>	5213RF
<b>FREQUENCY RANGE</b>	Below 1000MHz	<b>DETECTOR FUNCTION</b>	Peak / Quasi-Peak / Average
<b>INPUT POWER</b>	3.0Vdc	<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 52 % RH, 991 hPa
<b>TESTED BY:</b>	Steven Lu		

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	*27.15	51.74 PK	100.00	-48.26	2.00 H	168	44.40	7.34
2	*27.15	48.38 AV	80.00	-31.62	2.00 H	168	41.04	7.34
3	189.40	28.85 QP	43.50	-14.65	1.00 H	16	16.97	11.88
4	216.61	31.28 QP	46.00	-14.72	1.00 H	67	19.27	12.01
5	243.83	29.19 QP	46.00	-16.81	1.00 H	52	15.94	13.25
6	271.04	35.09 QP	46.00	-10.91	1.00 H	88	20.92	14.17
7	298.26	33.86 QP	46.00	-12.14	1.00 H	88	18.81	15.05
8	325.47	33.71 QP	46.00	-12.29	1.00 H	22	17.95	15.77
9	352.69	36.04 QP	46.00	-9.96	1.00 H	22	19.55	16.49
10	379.90	30.53 QP	46.00	-15.47	1.00 H	22	13.34	17.19
11	407.11	28.88 QP	46.00	-17.12	1.00 H	22	10.95	17.94
12	434.33	34.17 QP	46.00	-11.83	1.00 H	73	15.37	18.80
13	461.54	36.44 QP	46.00	-9.56	1.00 H	58	16.98	19.46
14	679.26	34.69 QP	46.00	-11.31	1.00 H	85	11.02	23.68
15	<b>706.47</b>	<b>37.16 QP</b>	<b>46.00</b>	<b>-8.84</b>	<b>1.00 H</b>	<b>70</b>	<b>13.01</b>	<b>24.16</b>
16	842.55	31.54 QP	46.00	-14.46	1.00 H	55	5.48	26.06
17	896.97	36.85 QP	46.00	-9.15	1.00 H	91	9.77	27.08
18	951.40	34.96 QP	46.00	-11.04	1.00 H	76	7.25	27.72

- 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.

<b>EUT</b>	Wireless Keyboard	<b>MODEL</b>	5213RF
<b>FREQUENCY RANGE</b>	Below 1000MHz	<b>DETECTOR FUNCTION</b>	Peak / Quasi-Peak / Average
<b>INPUT POWER</b>	3.0Vdc	<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 52 % RH, 991 hPa
<b>TESTED BY:</b>	Steven Lu		

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	*27.15	47.32 PK	100.00	-52.68	1.14 V	273	39.98	7.34
2	*27.15	44.44 AV	80.00	-35.56	1.14 V	273	37.10	7.34
3	125.25	14.96 QP	43.50	-28.54	1.00 V	253	2.26	12.70
4	171.90	12.98 QP	43.50	-30.52	1.00 V	352	-0.24	13.22
5	185.51	14.56 QP	43.50	-28.94	1.00 V	145	2.42	12.14
6	203.01	16.13 QP	43.50	-27.37	1.50 V	232	4.79	11.34
7	261.32	15.20 QP	46.00	-30.80	1.00 V	127	1.52	13.69
8	302.14	18.27 QP	46.00	-27.73	1.00 V	64	3.12	15.15
9	358.52	17.49 QP	46.00	-28.51	1.00 V	97	0.85	16.64
10	412.95	19.19 QP	46.00	-26.81	3.00 V	319	1.06	18.12
11	469.32	21.93 QP	46.00	-24.07	1.00 V	316	2.35	19.57
12	580.12	23.07 QP	46.00	-22.93	4.00 V	205	1.05	22.01
13	778.40	25.48 QP	46.00	-20.52	1.00 V	235	-0.03	25.50
14	809.50	25.99 QP	46.00	-20.01	1.00 V	169	0.27	25.72
15	854.21	27.09 QP	46.00	-18.91	2.00 V	49	0.87	26.22
16	885.31	27.45 QP	46.00	-18.55	1.00 V	355	0.61	26.85
17	937.80	27.78 QP	46.00	-18.22	3.50 V	142	0.21	27.57

- 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.

## 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:

<b>USA</b>	FCC, NVLAP, UL
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>New Zealand</b>	MoC
<b>Norway</b>	NEMKO
<b>Canada</b>	INDUSTRY CANADA
<b>R.O.C.</b>	CNLA, 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](http://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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The address and road map of all our labs can be found in our web site also.