# FCC TEST REPORT

**REPORT NO.:** RF930723L08
**MODEL NO.:** 5219CRF
**RECEIVED:** Jul. 23, 2004
**TESTED:** Aug. 11 ~ Aug. 16, 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:** No. 19, Hwa Ya 2nd rd., Kueishan, Taoyuan, Taiwan, R.O.C.



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# Table of Contents

# 1 CERTIFICATION

| | |
|---|---|
| **PRODUCT :** | Wireless Keyboard |
| **BRAND NAME :** | HP |
| **MODEL NO :** | 5219CRF |
| **TEST ITEM :** | PROTOTYPE |
| **TESTED:** | Aug. 11 ~ Aug. 16, 2004 |
| **APPLICANT :** | BEHAVIOR TECH COMPUTER CORP. |
| **STANDARDS :** | FCC Part 15, Subpart C (Section 15.227), ANSI C63.4-2001 |

The above equipment has been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**PREPARED BY** : Wendy Liao , **DATE:** Aug. 17, 2004
( Wendy Liao )

**TECHNICAL ACCEPTANCE** : Gary Chang , **DATE:** Aug. 17, 2004
Responsible for RF ( Gary Chang )

**APPROVED BY** : , **DATE:** Aug. 17, 2004
( Cody Chang, Supervisor )

# 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<br>15.209 | Radiated Emission Test | PASS | Minimum passing margin is –5.70dB at 523.75MHz |

## 2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4:

| Measurement | Frequency | Uncertainty |
|---|---|---|
| Conducted emissions | 9k~30MHz | 2.44 dB |
| Radiated emissions | 30MHz ~ 200MHz | 3.63 dB |
| | 200MHz ~1000MHz | 3.65 dB |
| | 1GHz ~ 18GHz | 2.20 dB |
| | 18GHz ~ 40GHz | 1.88 dB |

# 3 GENERAL INFORMATION

## 3.1 GENERAL DESCRIPTION OF EUT

| | |
|---|---|
| **PRODUCT** | Wireless Keyboard |
| **MODEL NO.** | 5219CRF |
| **POWER SUPPLY** | 3.0Vdc from batteries |
| **MODULATION TYPE** | FSK |
| **CARRIER FREQUENCY OF EACH CHANNEL** | 27.145MHz |
| **NUMBER OF CHANNEL** | 1 |
| **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. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

## 3.2 DESCRIPTION OF TEST MODES

One channels was provided to this EUT.

| Channel | Frequency |
|---|---|
| 1 | 27.145MHz |

## 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)**

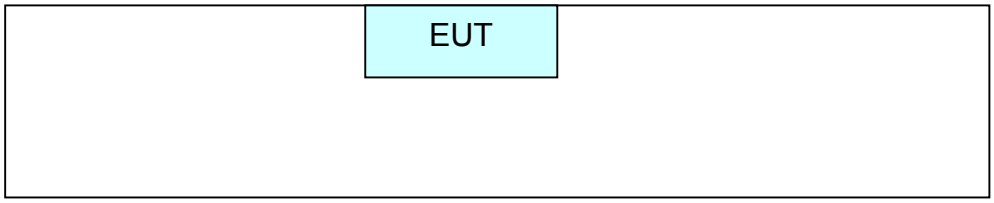
**ANSI C63.4-2001**

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 15.227 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) | |
|---|---|---|
| | Peak | Average |
| 26.96-27.28 | 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:

| Frequencies (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|---|---|---|
| 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 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

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 |
|---|---|---|---|
| Test Receiver<br>ROHDE & SCHWARZ | ESI7 | 838496/016 | Feb. 09, 2005 |
| Spectrum Analyzer<br>ROHDE & SCHWARZ | FSP40 | 100041 | Dec. 15, 2004 |
| BILOG Antenna<br>SCHWARZBECK | VULB9168 | 9168-155 | Feb. 03, 2005 |
| HORN Antenna<br>SCHWARZBECK | BBHA 9120D | 9120D-404 | Feb. 03, 2005 |
| HORN Antenna<br>SCHWARZBECK | BBHA 9170 | BBHA 9170242 | Feb. 23, 2005 |
| Preamplifier<br>Agilent | 8447D | 2944A10631 | Jan. 15, 2005 |
| Preamplifier<br>Agilent | 8449B | 3008A01960 | Jan. 22, 2005 |
| RF signal cable<br>HUBER+SUHNNER | SUCOFLEX 104 | 219272/4 | Mar. 04, 2005 |
| RF signal cable<br>HUBER+SUHNNER | SUCOFLEX 104 | 219275/4 | Mar. 04, 2005 |
| Software<br>ADT. | ADT_Radiated_V5.14 | NA | NA |
| Antenna Tower<br>inn-co GmbH | MA 4000 | 010303 | NA |
| Antenna Tower Controller<br>inn-co GmbH | CO2000 | 019303 | NA |
| Turn Table<br>ADT. | TT100. | TT93021704 | NA |
| Turn Table Controller<br>ADT. | SC100. | SC93021704 | NA |

**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. The test was performed in HwaYa Chamber 3.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The IC Site Registration No. is IC4924-4.

### 4.2.3 TEST PROCEDURE

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground a 3 meter semi-anechoic chamber. 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.

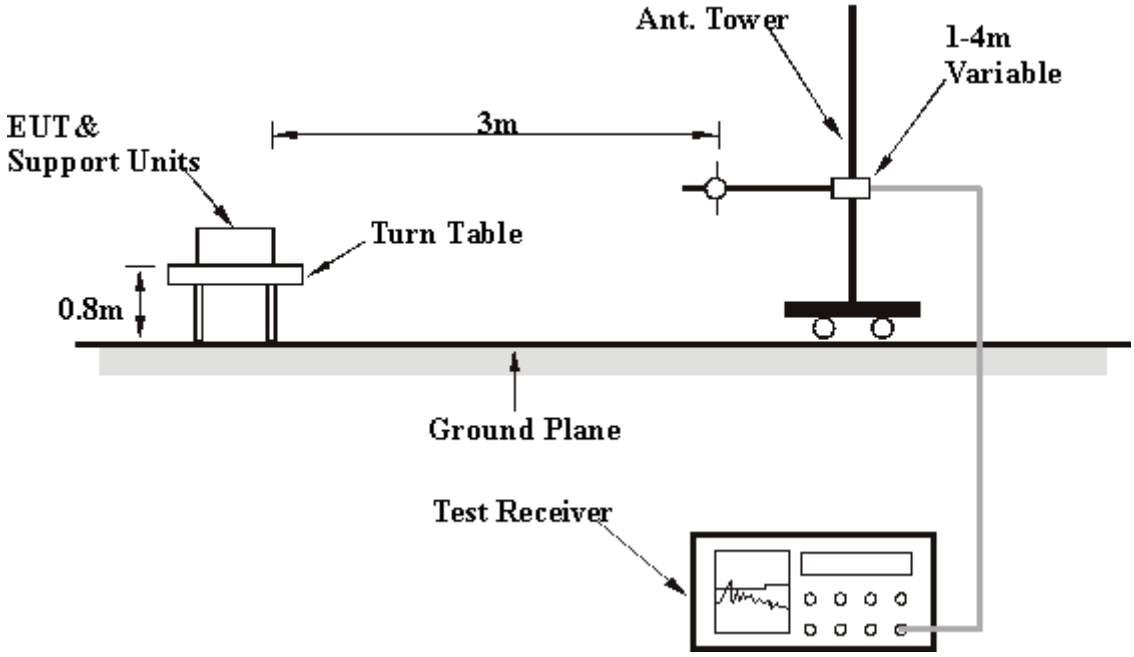
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

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** | 5219CRF |
| **INPUT POWER** | 3Vdc | **FREQUENCY RANGE** | Below 1000 MHz |
| **ENVIRONMENTAL CONDITIONS** | 25 deg. C, 65 % RH, 991 hPa | **DETECTOR FUNCTION** | Peak / Quasi-Peak / Average |
| **TESTED BY** | Rush Kao | | |

**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 | *27.13 | 49.07 PK | 100.00 | -50.93 | 1.86 H | 196 | 35.23 | 13.84 |
| 2 | *27.13 | 44.15 AV | 80.00 | -35.85 | 1.86 H | 196 | 30.31 | 13.84 |
| 3 | 107.76 | 32.48 QP | 43.50 | -11.02 | 1.75 H | 181 | 20.81 | 11.67 |
| 4 | 216.61 | 40.20 QP | 46.00 | -5.80 | 1.50 H | 310 | 28.56 | 11.64 |
| 5 | 461.54 | 38.15 QP | 46.00 | -7.85 | 2.00 H | 160 | 20.02 | 18.13 |
| **6** | **523.75** | **40.30 QP** | **46.00** | **-5.70** | **1.50 H** | **76** | **21.31** | **18.99** |
| 7 | 733.69 | 37.67 QP | 46.00 | -8.33 | 1.00 H | 112 | 14.83 | 22.84 |
| 8 | 815.33 | 35.69 QP | 46.00 | -10.31 | 1.00 H | 208 | 12.10 | 23.60 |

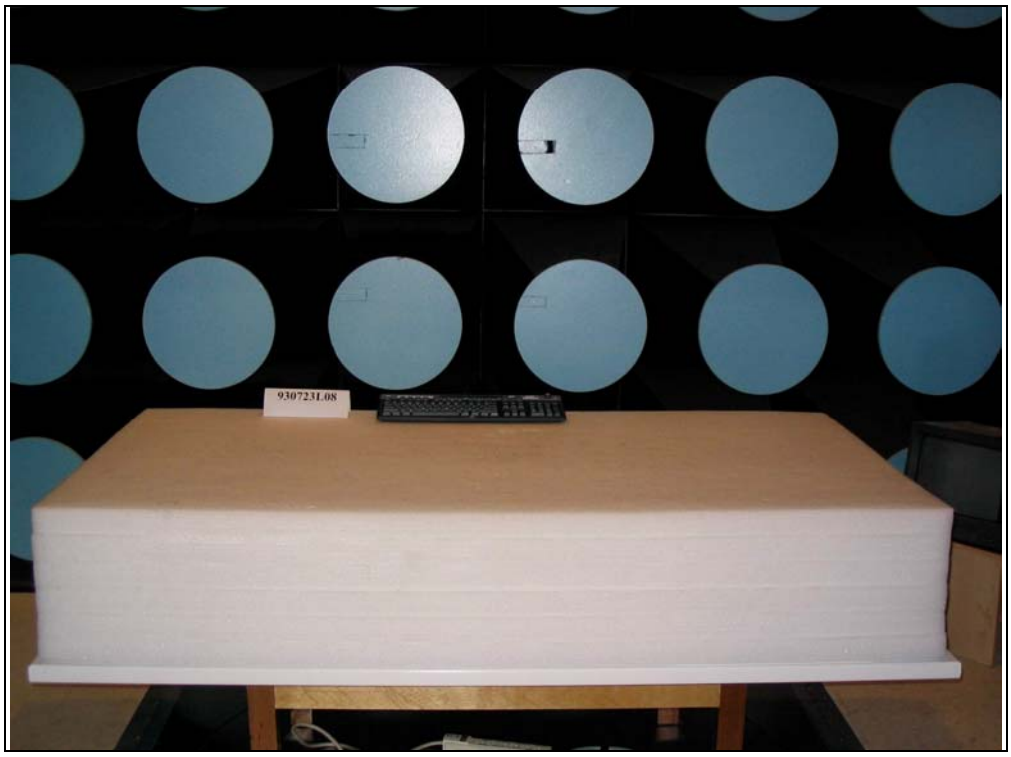
**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

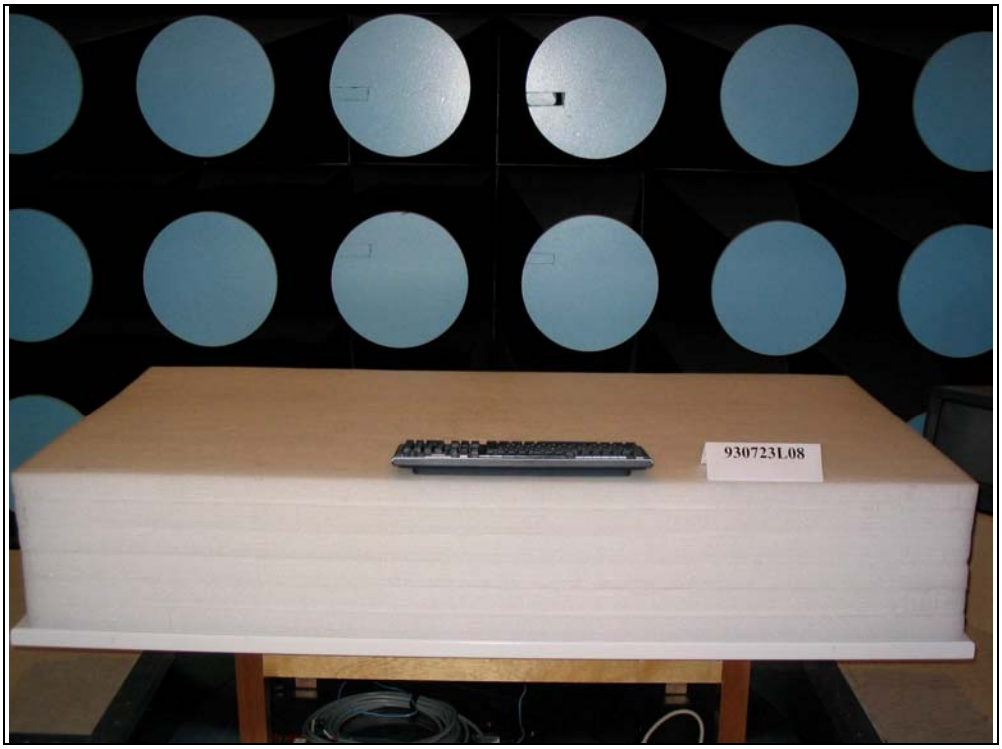
| No. | Freq. (MHz) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
|---|---|---|---|---|---|---|---|---|
| 1 | *27.13 | 43.78 PK | 100.00 | -56.22 | 1.07 V | 80 | 29.94 | 13.84 |
| 2 | *27.13 | 41.02 AV | 80.00 | -38.98 | 1.07 V | 80 | 27.18 | 13.84 |
| 3 | 43.61 | 21.64 QP | 40.00 | -18.36 | 3.00 V | 154 | 6.26 | 15.39 |
| 4 | 107.76 | 27.01 QP | 43.50 | -16.49 | 4.00 V | 85 | 15.35 | 11.67 |
| 5 | 216.61 | 25.51 QP | 46.00 | -20.49 | 3.00 V | 187 | 13.87 | 11.64 |
| 6 | 597.62 | 25.11 QP | 46.00 | -20.89 | 3.00 V | 160 | 4.35 | 20.76 |
| 7 | 815.33 | 25.62 QP | 46.00 | -20.38 | 3.00 V | 181 | 2.03 | 23.60 |
| 8 | 957.23 | 25.12 QP | 46.00 | -20.88 | 4.00 V | 319 | -0.23 | 25.35 |

**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 PHOTOGRAPHS OF THE TEST CONFIGURATION

## RADIATED EMISSION TEST



# 5 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom 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, UL |
| **Germany** | TUV Rheinland |
| **Japan** | VCCI |
| **Norway** | NEMKO |
| **Canada** | INDUSTRY CANADA , CSA |
| **R.O.C.** | CNLA, BSMI, DGT |
| **Netherlands** | Telefication |
| **Singapore** | PSB , GOST-ASIA(MOU) |
| **Russia** | CERTIS(MOU) |

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:

**Linko EMC/RF Lab**:
Tel: 886-2-26052180
Fax: 886-2-26052943

**Hsin Chu EMC/RF Lab**:
Tel: 886-3-5935343
Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety/Telecom Lab**:
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Fax: 886-3-3185050

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

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