

EXHIBIT 3

RFI/EMI TEST REPORT



# EMC

## TEST REPORT

REPORT NO. : F86101001A

MODEL NO. : 5133

DATE OF TEST : Sept. 1, 1998

PREPARED FOR: BEHAVIOR TECH COMPUTER CORP.

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PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION



Accredited Laboratory

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1.

**CERTIFICATION**

Issue Date: Sept. 2, 1998

Product : KEYBOARD  
Trade Name : PACKARD BELL  
Model No. : 5133  
Applicant : BEHAVIOR TECH COMPUTER CORP.  
Standard : FCC Part 15, Subpart B, Class B  
ANSI C63.4-1992  
CISPR 22: 1993 +A1+A2

We hereby certify that one sample of the designation has been tested in our facility on Sept. 1, 1998. The test record, data evaluation and Equipment Under Test (EUT) configurations represent herein are true and accurate representation of the measurements of the sample's EMC characteristics under the conditions herein specified.

The test results show that the EUT as described in this report is in compliance with the Class B limits of conducted and radiated emission of applicable standards

PREPARED BY: Ariel Hsieh DATE: 9/2/98  
( Ariel Hsieh )

TESTED BY: Joey Chen , DATE: 8/2/98  
( Joey Chen )

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( Mike Su )

**ADVANCE DATA TECHNOLOGY CORPORATION****NVLAP<sup>®</sup>**

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## **2. GENERAL INFORMATION**

### **2.1 GENERAL DESCRIPTION OF EUT**

|              |   |                 |
|--------------|---|-----------------|
| Product      | : | KEYBOARD        |
| Model No.    | : | 5133            |
| Power Supply | : | DC 5V (from PC) |
| Data Cable   | : | Shielded (1.7m) |

Note: This report is prepared for Class II permissive change.

The main changes are as follows:

- 1) IC U1, brand: Winbond, model: 80C52, is updated to IC U1, brand: UMC6868.
- 2) Added a metal plate on the keyboard membrane.
- 3) Added a piece of metal plate on the solder side of control board. A ground wire was connected between two of the metal plates.

For more detailed features, please refer to ATTACHMENT 1 - TECHNICAL DESCRIPTION OF EUT and User's Manual.



## 2.2 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 are used to form representative test configuration during the tests.

| No | Product           | Brand   | Model No.  | FCC ID           | I/O Cable                                          |
|----|-------------------|---------|------------|------------------|----------------------------------------------------|
| 1  | PERSONAL COMPUTER | HP      | D4579A     | FCC Doc approved | Nonshielded Power (1.8m)                           |
| 2  | MONITOR           | ADI     | PD-959     | FCC Doc approved | Shielded Signal (1.2m)<br>Nonshielded Power (1.8m) |
| 3  | PRINTER           | HP      | 2225C+     | DSI6XU2225       | Shielded Signal (1.2m)<br>Nonshielded Power (1.8m) |
| 4  | MODEM             | ACEEX   | 1414       | IFAXDM1414       | Shielded Signal (1.2m)<br>Nonshielded Power (1.8m) |
| 5  | MOUSE             | DEXIN   | A2P800A    | NIYA2P800A       | Shielded Signal (1.5m)                             |
| 6  | VGA CARD          | DIAMOND | STEALTH 64 | FTUPCI968524     | N/A                                                |

## 2.3 TEST METHODOLOGY AND CONFIGURATION

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4:1992. Radiated testing was performed at an antenna to EUT distance of 10 m on an open area test site. Please refer to the photos of test configuration in Item 5.



### 3. TEST INSTRUMENTS

#### 3.1 TEST INSTRUMENTS (EMISSION)

##### RADIATED EMISSION MEASUREMENT

| Description & Manufacturer         | Model No.            | Serial No.         | Calibrated until |
|------------------------------------|----------------------|--------------------|------------------|
| HP Spectrum Analyzer               | 8590L                | 3544A00941         | Dec. 14, 1998    |
| HP Pre-Amplifier                   | 8447D                | 2944A08312         | Sept. 10, 1998   |
| R&S Receiver                       | ESVS10               | 844591/010         | Sept. 23, 1998   |
| SCHWARZBECK Tunable Dipole Antenna | VHA 9103<br>UHA 9105 | E101051<br>E101055 | Nov. 28, 1998    |
| CHASE BILOG Antenna                | CBL6111A             | 1500               | Sept. 12, 1998   |
| EMCO Turn Table                    | 1060-04              | 1196               | N/A              |
| EMCO Tower                         | 1051                 | 1264               | N/A              |
| Open Field Test Site               | Site 1               | ADT-R01            | Sept. 5, 1998    |

Note: 1. The measurement uncertainty is less than  $\pm 3$  dB, which is calculated as per NAMA's 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.

##### CONDUCTED EMISSION MEASUREMENT

| Description & Manufacturer               | Model No. | Serial No. | Calibrated Until |
|------------------------------------------|-----------|------------|------------------|
| ROHDE & SCHWARZ Test Receiver            | ESHS30    | 828109/007 | July 22, 1999    |
| ROHDE & SCHWARZ Artificial Mains Network | ESH2-Z5   | 892107/003 | July 20, 1999    |
| EMCO L.I.S.N.                            | 3825/2    | 9504-2359  | July 20, 1999    |
| Shielded Room                            | Site 3    | ADT-C03    | N/A              |

Note: 1. The measurement uncertainty is less than  $\pm 2.6$  dB, which is calculated as per NAMA's 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.



## 3.2 LIMITS OF CONDUCTED AND RADIATED EMISSION

### LIMIT OF RADIATED EMISSION OF CISPR 22

| FREQUENCY<br>(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<br>(MHz) | Class A (at 10m) |        | Class B (at 3m) |        |
|--------------------|------------------|--------|-----------------|--------|
|                    | uV/m             | dBuV/m | uV/m            | dBuV/m |
| Above 1000         | 300              | 49.5   | 500             | 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.

### LIMIT OF CONDUCTED EMISSION OF CISPR 22

| FREQUENCY<br>(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 linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz

(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. TEST RESULTS (EMISSION)

##### 4.1 RADIO DISTURBANCE

Frequency Range : 0.15 - 30 MHz (Conducted Emission)  
30 - 1000 MHz (Radiated Emission)  
Input Voltage : 120 Vac, 60 Hz  
Temperature : 27 °C  
Humidity : 53 %  
Atmospheric Pressure : 998 mbar

| TEST RESULT | Remarks                                                             |
|-------------|---------------------------------------------------------------------|
| PASS        | Minimum passing margin of conducted emission: -20.0 dB at 0.280 MHz |
|             | Minimum passing margin of radiated emission: -6.5 dB at 71.56 MHz   |

##### 4.1.1 EUT OPERATION CONDITION

1. Turn on the power of all equipments.
2. PC reads a test program to enable all functions.
3. PC sends "H" messages to monitor and monitor display "H" patterns on screen.
4. PC sends "H" messages to modem.
5. PC sends "H" messages to printer, and the printer prints them on paper.
6. Repeat steps 3-6.

ADT CO. Shielded Room 3  
CISPR 22 CLASS B

01. Sep 98 16:04

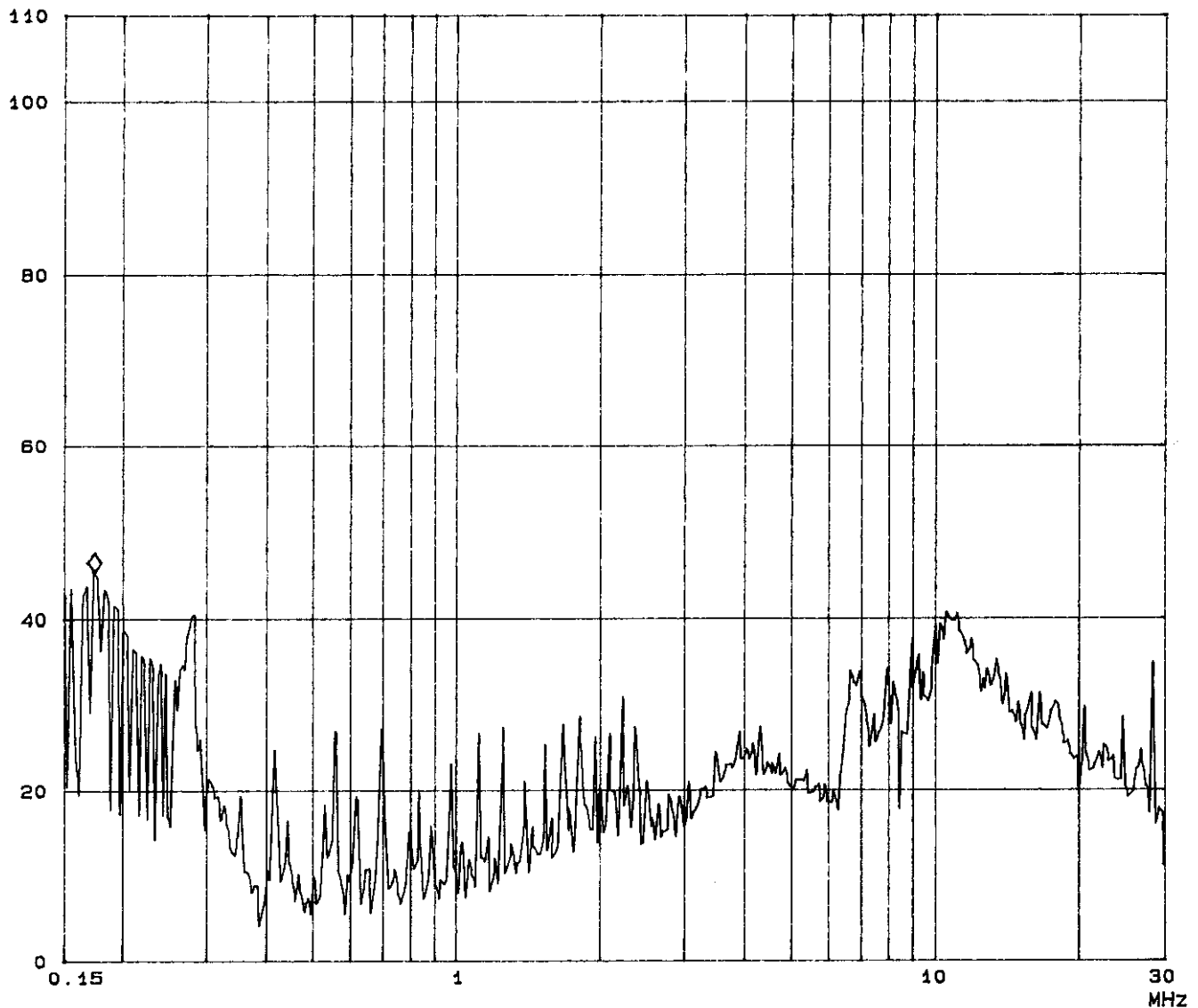
EUT: 5133  
Test Spec: LISN : L  
Comment: 120V AC/60 HZ

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Fast Scan Settings (3 Ranges)

| Frequencies |      |      | Receiver Settings |          |        |        |        |       |
|-------------|------|------|-------------------|----------|--------|--------|--------|-------|
| Start       | Stop | Step | IF BW             | Detector | M-Time | Atten  | Preamp | OpRge |
| 150k        | 450k | 3k   | 10K               | PK       | 1ms    | 10dBLN | OFF    | 60dB  |
| 450k        | 5M   | 3k   | 10k               | PK       | 1ms    | 10dBLN | OFF    | 60dB  |
| 5M          | 30M  | 3k   | 10K               | PK       | 1ms    | 10dBLN | OFF    | 60dB  |

dBuV  $\diamond$  Mkr : 174.00 kHz 45.3 dBuV



ADT CO. Shielded Room 3  
CISPR 22 CLASS B

01. Sep 98 15:10

EUT: 5133  
Test Spec: LISN : N  
Comment: 120V AC/60 HZ

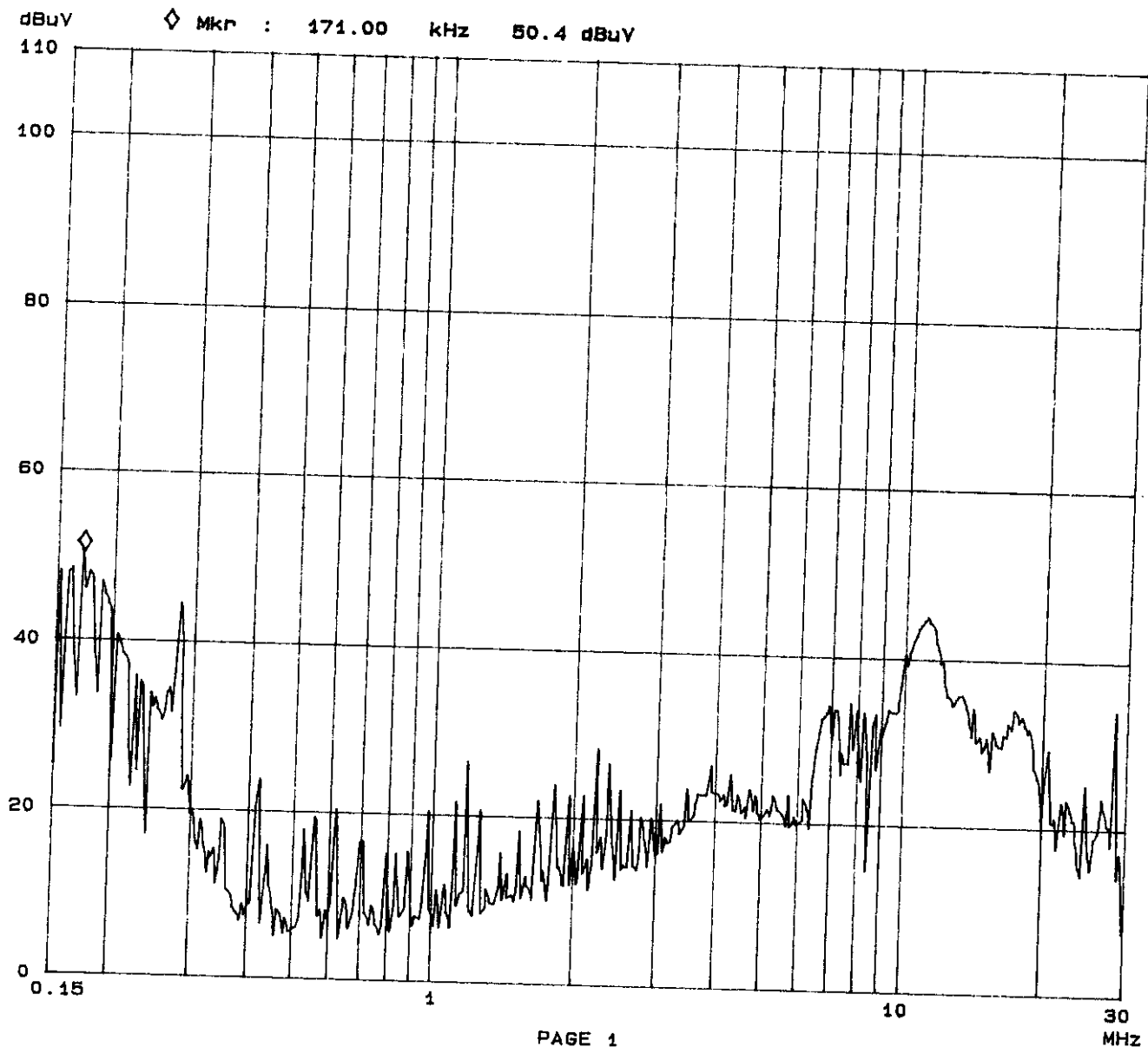
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Tested by *Jerry Chen*

Fast Scan Settings (3 Ranges)

| Frequencies |      |      | Receiver Settings |          |        |        |        |       |
|-------------|------|------|-------------------|----------|--------|--------|--------|-------|
| Start       | Stop | Step | IF BW             | Detector | M-Time | Atten  | Preamp | OpRge |
| 150k        | 450k | 3k   | 10k               | PK       | 1ms    | 10dBLN | OFF    | 60dB  |
| 450k        | 5M   | 3k   | 10k               | PK       | 1ms    | 10dBLN | OFF    | 60dB  |
| 5M          | 30M  | 3k   | 10k               | PK       | 1ms    | 10dBLN | OFF    | 60dB  |





### 4.1.3 TEST DATA OF RADIATED EMISSION

EUT: KEYBOARDMODEL: 5133ANTENNA: CHASE BILOG CBL6111APOLARITY: HorizontalDETECTOR FUNCTION: Quasi-peak6 dB BANDWIDTH: 120 kHzFREQUENCY RANGE: 30-1000 MHzMEASURED DISTANCE: 10 M

TEST PERSONNEL:

| Frequency<br>(MHz) | Correction<br>Factor<br>(dB/m) | Reading<br>Data<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|--------------------|--------------------------------|---------------------------|-------------------------------|-------------------|----------------|
| 49.87              | 10.9                           | 8.2                       | 19.1                          | 30.0              | -10.9          |
| 64.27              | 8.0                            | 11.1                      | 19.1                          | 30.0              | -10.9          |
| 71.56              | 8.2                            | 15.3                      | 23.5                          | 30.0              | -6.5           |
| 134.92             | 14.7                           | 5.1                       | 19.8                          | 30.0              | -10.2          |
| 139.86             | 14.7                           | 5.8                       | 20.5                          | 30.0              | -9.5           |
| 144.05             | 14.2                           | 8.2                       | 22.4                          | 30.0              | -7.6           |

## REMARKS :

1. Emission level (dBuV/m) = Correction Factor(dB/m) + Meter Reading (dBuV).
2. Correction Factor(dB/m) = Ant. Factor(dB/m)+Cable loss(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value

**TEST DATA OF RADIATED EMISSION**EUT: KEYBOARDMODEL: 5133ANTENNA: CHASE BILOG CBL6111APOLARITY: VerticalDETECTOR FUNCTION: Quasi-peak6 dB BANDWIDTH: 120 kHzFREQUENCY RANGE: 30-1000 MHzMEASURED DISTANCE: 10 MTEST PERSONNEL: Jay Chen

| Frequency<br>(MHz) | Correction<br>Factor<br>(dB/m) | Reading<br>Data<br>dBuV | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|--------------------|--------------------------------|-------------------------|-------------------------------|-------------------|----------------|
| 39.11              | 15.4                           | 7.0                     | 22.4                          | 30.0              | -7.6           |
| 63.99              | 7.7                            | 10.6                    | 18.3                          | 30.0              | -11.7          |
| 79.99              | 8.1                            | 7.2                     | 15.3                          | 30.0              | -14.7          |
| 114.55             | 14.3                           | 3.4                     | 17.7                          | 30.0              | -12.3          |
| 124.15             | 15.7                           | 6.4                     | 22.1                          | 30.0              | -7.9           |
| 174.51             | 12.8                           | 6.4                     | 19.2                          | 30.0              | -10.8          |
| 219.57             | 14.8                           | 5.3                     | 20.1                          | 30.0              | -9.9           |

REMARKS : 1. Emission level (dBuV/m) = Correction Factor(dB/m)  
+Meter Reading (dBuV).  
2. Correction Factor(dB/m) = Ant. Factor(dB/m)+Cable loss(dB)  
3. The other emission levels were very low against the limit.  
4. Margin value = Emission level - Limit value



## 6. ATTACHMENT 1 - TECHNICAL DESCRIPTION OF EUT

### Specifications:

|                                    |                                |
|------------------------------------|--------------------------------|
| * Input Power                      | +5Vdc                          |
| * Operating temperature            | 0°C to 50°C                    |
| Relative humidity                  | 20% to 90% non-condensing      |
| Altitude                           | 1000 ft. To 10000 ft.          |
| * Mechanical Data                  |                                |
| Total travel                       | 3.5+/-0.5mm                    |
| Pretravel                          | 1.0+/-0.5mm                    |
| Operating Life (normal key)        | 10 million cycles min. per key |
| Peak Load before Make (normal key) | 55+/-20 grams                  |



#### 4.1.2 TEST DATA OF CONDUCTED EMISSION

EUT: KEYBOARDMODEL: 5133

6 dB Bandwidth: 10 kHz

TEST PERSONNEL:

| Freq.  | L Level   |    | N Level   |    | Limit     |       | Margin [dB (μV)] |    |       |    |
|--------|-----------|----|-----------|----|-----------|-------|------------------|----|-------|----|
| [MHz]  | [dB (μV)] |    | [dB (μV)] |    | [dB (μV)] |       | L                |    | N     |    |
|        | QP        | AV | QP        | AV | QP        | AV    | QP               | AV | QP    | AV |
| 0.181  | 37.40     | -  | 44.20     | -  | 64.44     | 54.44 | -27.0            | -  | -20.2 | -  |
| 0.280  | 40.80     | -  | 38.10     | -  | 60.82     | 50.82 | -20.0            | -  | -22.7 | -  |
| 0.558  | 24.90     | -  | 21.10     | -  | 56.00     | 46.00 | -31.1            | -  | -34.9 | -  |
| 1.947  | 29.60     | -  | 25.60     | -  | 56.00     | 46.00 | -26.4            | -  | -30.4 | -  |
| 6.803  | 29.10     | -  | 33.20     | -  | 60.00     | 50.00 | -30.9            | -  | -26.8 | -  |
| 13.457 | 33.60     | -  | 34.90     | -  | 60.00     | 50.00 | -26.4            | -  | -25.1 | -  |

- Remarks:
1. "\*": Undetectable
  2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  4. The emission level of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value