

Date: 2003-11-07

# **TEST REPORT**

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No.: HM111637

## **FCC PART 15 SUBPART C CERTIFICATION REPORT**

### **FOR LOW POWER TRANSMITTER**

**TEST REPORT No.: HM111637**

Equipment Under Test [EUT]:

FM Audio Transmitter

Model Number:

F8V367

Applicant:

Belkin Corporation

FCC ID :

K7SF8V367

Date: 2003-11-07

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List of Measurement Equipment

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## Appendix B

Photographs

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### **CONCLUSION**

The submitted product was deemed to have COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

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Verified by  
Ivan Toa

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K C Lee  
for Chief Executive

Date: 2003-11-07

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## **1.0** **General Details**

### **1.1** **Test Laboratory**

The Hong Kong Standards and Testing Centre Ltd.  
EMC Laboratory  
10 Dai Wang Street, Taipo Industrial Estate  
New Territories, Hong Kong

Telephone: 852 2666 1888  
Fax: 852 2664 4353

### **1.2** **Applicant Details** **Applicant**

BELKIN CORPORATION  
501 West Walnut Street, Compton CA 90220-5221

**HKSTC Code Number for Applicant**

**SHT009**

**Manufacturer**

N/A

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### 1.3 Equipment Under Test [EUT]

#### Description of Sample

Product: FM Audio Transmitter  
Manufacturer: N/A  
Brand Name: BELKIN  
Model Number: F8V367  
Input Voltage: 3Vd.c ("AAA" size battery x 2)

#### 1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is an Belkin Corporation., FM Audio Transmitter. The transmitter is a 2 button transmitter. The EUT continues to transmit while button is being pressed., Modulation by IC. and tape is pulse modulation.

### 1.4 Date of Order

2003-09-05

### 1.5 Submitted Sample(s):

6 Samples per model

### 1.6 Test Duration

2003-10-23

### 1.7 Country of Origin

China

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## 1.8 Additional Information of EUT

|                                    | Submitted                           | Not Available            |
|------------------------------------|-------------------------------------|--------------------------|
| User Manual                        | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Part List                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Circuit Diagram                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Printed Circuit Board [PCB] Layout | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Block diagram                      | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| FCC ID Label                       | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

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## 2.0 Technical Details

### 2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 and ANSI C63.4: 2000 for FCC Certification.

### 2.2 Test Standards and Results Summary Tables

| EMISSION<br>Results Summary  |                  |                 |                     |                                     |                          |                                     |
|--|------------------|-----------------|---------------------|-------------------------------------|--------------------------|-------------------------------------|
| Test Condition   | Test Requirement | Test Method     | Class /<br>Severity | Test Result                         |                          |                                     |
|  |                  |                 |                     | Pass                                | Failed                   | N/A                                 |
| Field Strength of<br>Fundamental Emissions<br>& Spurious Emissions | FCC 47CFR 15.239 | ANSI C63.4:2000 | N/A                 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| Radiated Emissions,<br>30MHz to 1GHz                               | FCC 47CFR 15.209 | ANSI C63.4:2000 | Class B             | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            |
| Conducted Emissions on<br>AC, 0.15MHz to 30MHz                     | FCC 47CFR 15.207 | ANSI C63.4:2000 | Class B             | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Note: N/A - Not Applicable



**3.0 Test Results**

**3.1 Emission**

**3.1.1 Radiated Emissions (30 – 1000MHz)**

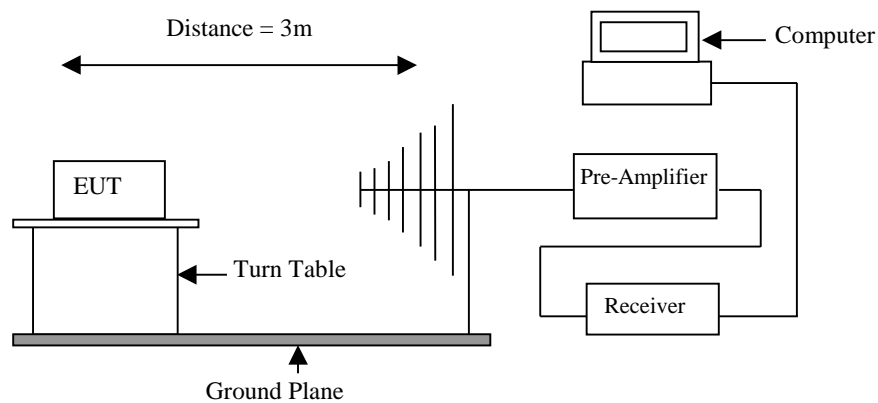
|                    |                          |
|--------------------|--------------------------|
| Test Requirement:  | FCC 47CFR 15.109 Class A |
| Test Method:       | ANSI C63.4:2000          |
| Test Date:         | 2003-10-23               |
| Mode of Operation: | On mode                  |

**Test Method:**

The sample was placed 0.8m above the ground plane on the OATS \*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

\*: OATS [Open Area Test Site] located at HKSTC with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 90657.

**Test Setup:**



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## Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.239]:

| Frequency Range of Fundamental [MHz] | Peak Limits [ $\mu\text{V}/\text{m}$ ] | Average Limits [ $\mu\text{V}/\text{m}$ ] |
|--------------------------------------|--|---|
| 88-108                               | 2,500                                  | 250                                       |

### Results:

| Field Strength of Fundamental Emissions<br>Peak Value |   |  |   |  |                                     |                  |
|---|---|--|---|--|-------------------------------------|------------------|
| Frequency<br>MHz                                      | Measured Level @3m<br>dB $\mu\text{V}/\text{m}$ | Correction Factor<br>dB $\mu\text{V}/\text{m}$ | Field Strength<br>dB $\mu\text{V}/\text{m}$ | Field Strength<br>$\mu\text{V}/\text{m}$ | Limit @3m<br>$\mu\text{V}/\text{m}$ | E-Field Polarity |
| 88.10   | 30.4  | 10.4   | 40.8  | 109.6                                    | 2,500                               | Horizontal       |

| Field Strength of Fundamental Emissions<br>Average Value |   |  |   |  |                                     |                  |
|--|---|--|---|--|-------------------------------------|------------------|
| Frequency<br>MHz   | Measured Level @3m<br>dB $\mu\text{V}/\text{m}$ | Correction Factor<br>dB $\mu\text{V}/\text{m}$ | Field Strength<br>dB $\mu\text{V}/\text{m}$ | Field Strength<br>$\mu\text{V}/\text{m}$ | Limit @3m<br>$\mu\text{V}/\text{m}$ | E-Field Polarity |
| 88.10  | 30.1  | 10.4   | 40.5  | 105.9                                    | 250                                 | Horizontal       |

### Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz  $\pm 5.7\text{dB}$

According to FCC 47CFR15.35, the limit on the radio frequency emissions as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

For effective averaging, the bandwidth of the video filter must be smaller than the resolution bandwidth. The higher the ratio of resolution bandwidth to video bandwidth, the greater the averaging will be. Below setting for HP8572A EMI Receiver.

Resolution Bandwidth : 3MHz

Video Bandwidth 1Hz

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## Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

| Frequency Range [MHz] | Quasi-Peak Limits [ $\mu\text{V}/\text{m}$ ] |
|-----------------------|--|
| 30-88                 | 100  |
| 88-216                | 150  |
| 216-960               | 200  |
| Above960              | 500  |

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

## Results :

| Radiated Emissions<br>Quasi-Peak |  |   |  |   |                                     |                     |
|----------------------------------|--|---|--|---|-------------------------------------|---------------------|
| Frequency<br>MHz                 | Measured<br>Level @3m<br>$\text{dB}\mu\text{V}/\text{m}$ | Correction<br>Factor<br>$\text{dB}\mu\text{V}/\text{m}$ | Field<br>Strength<br>$\text{dB}\mu\text{V}/\text{m}$ | Field<br>Strength<br>$\mu\text{V}/\text{m}$ | Limit @3m<br>$\mu\text{V}/\text{m}$ | E-Field<br>Polarity |
| 176.20                           | < 1.0  | 13.2  | < 14.2   | < 5.1                                       | 150                                 | Vertical            |
| 264.30                           | < 1.0  | 9.8   | < 10.8   | < 3.5                                       | 150                                 | Vertical            |
| 352.40                           | < 1.0  | 11.5  | < 12.5   | < 4.2                                       | 150                                 | Vertical            |
| 440.50                           | < 1.0  | 15.9  | < 16.9   | < 7.0                                       | 200                                 | Vertical            |
| 528.60                           | < 1.0  | 17.4  | < 18.4   | < 8.3                                       | 200                                 | Vertical            |
| 616.70                           | < 1.0  | 17.2  | < 18.2   | < 8.1                                       | 200                                 | Vertical            |
| 704.80                           | < 1.0  | 18.8  | < 19.8   | < 9.8                                       | 200                                 | Vertical            |
| 792.90                           | < 1.0  | 19.7  | < 20.7   | < 10.8                                      | 200                                 | Vertical            |
| 881.00                           | < 1.0  | 20.6  | < 21.6   | < 12.0                                      | 200                                 | Vertical            |

Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz  $\pm 5.7\text{dB}$

**Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.239]:**

| Frequency Range of Fundamental [MHz] | Peak Limits [ $\mu\text{V/m}$ ] | Average Limits [ $\mu\text{V/m}$ ] |
|--------------------------------------|---------------------------------|------------------------------------|
| 88-108                               | 2,500                           | 250                                |

**Results:**

| Field Strength of Fundamental Emissions<br>Peak Value |                                       |                                      |                                   |                                |                           |                  |
|---|---------------------------------------|--------------------------------------|-----------------------------------|--------------------------------|---------------------------|------------------|
| Frequency MHz   | Measured Level @3m dB $\mu\text{V/m}$ | Correction Factor dB $\mu\text{V/m}$ | Field Strength dB $\mu\text{V/m}$ | Field Strength $\mu\text{V/m}$ | Limit @3m $\mu\text{V/m}$ | E-Field Polarity |
| 88.30   | 30.3                                  | 10.4                                 | 40.7                              | 108.4                          | 2,500                     | Horizontal       |

| Field Strength of Fundamental Emissions<br>Average Value |                                       |                                      |                                   |                                |                           |                  |
|--|---------------------------------------|--------------------------------------|-----------------------------------|--------------------------------|---------------------------|------------------|
| Frequency MHz  | Measured Level @3m dB $\mu\text{V/m}$ | Correction Factor dB $\mu\text{V/m}$ | Field Strength dB $\mu\text{V/m}$ | Field Strength $\mu\text{V/m}$ | Limit @3m $\mu\text{V/m}$ | E-Field Polarity |
| 88.30  | 30.1                                  | 10.4                                 | 40.5                              | 105.9                          | 250                       | Horizontal       |

**Remarks:**

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz  $\pm 5.7\text{dB}$

According to FCC 47CFR15.35, the limit on the radio frequency emissions as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

For effective averaging, the bandwidth of the video filter must be smaller than the resolution bandwidth. The higher the ratio of resolution bandwidth to video bandwidth, the greater the averaging will be. Below setting for HP8572A EMI Receiver.

Resolution Bandwidth : 3MHz

Video Bandwidth 1Hz

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### Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

| Frequency Range [MHz] | Quasi-Peak Limits [ $\mu\text{V}/\text{m}$ ] |
|-----------------------|--|
| 30-88                 | 100  |
| 88-216                | 150  |
| 216-960               | 200  |
| Above960              | 500  |

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

### Results :

| Radiated Emissions<br>Quasi-Peak |  |   |  |                                       |                                  |                  |
|----------------------------------|--|---|--|---------------------------------------|----------------------------------|------------------|
| Frequency MHz                    | Measured Level @3m dB $\mu\text{V}/\text{m}$ | Correction Factor dB $\mu\text{V}/\text{m}$ | Field Strength dB $\mu\text{V}/\text{m}$ | Field Strength $\mu\text{V}/\text{m}$ | Limit @3m $\mu\text{V}/\text{m}$ | E-Field Polarity |
| 176.60                           | < 1.0  | 13.2  | < 14.2                                   | < 5.1                                 | 150                              | Vertical         |
| 264.90                           | < 1.0  | 9.8   | < 10.8                                   | < 3.5                                 | 150                              | Vertical         |
| 353.20                           | < 1.0  | 11.5  | < 12.5                                   | < 4.2                                 | 150                              | Vertical         |
| 441.50                           | < 1.0  | 15.9  | < 16.9                                   | < 7.0                                 | 200                              | Vertical         |
| 529.80                           | < 1.0  | 17.4  | < 18.4                                   | < 8.3                                 | 200                              | Vertical         |
| 618.10                           | < 1.0  | 17.2  | < 18.2                                   | < 8.1                                 | 200                              | Vertical         |
| 706.40                           | < 1.0  | 18.8  | < 19.8                                   | < 9.8                                 | 200                              | Vertical         |
| 794.70                           | < 1.0  | 19.7  | < 20.7                                   | < 10.8                                | 200                              | Vertical         |
| 883.00                           | < 1.0  | 20.6  | < 21.6                                   | < 12.0                                | 200                              | Vertical         |

### Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz  $\pm 5.7\text{dB}$

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## Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.239]:

| Frequency Range of Fundamental [MHz] | Peak Limits [ $\mu\text{V/m}$ ] | Average Limits [ $\mu\text{V/m}$ ] |
|--------------------------------------|---------------------------------|------------------------------------|
| 88-108                               | 2,500                           | 250                                |

## Results:

| Field Strength of Fundamental Emissions |                                       |                                      |                                   |                                |                           |                  |
|---|---------------------------------------|--------------------------------------|-----------------------------------|--------------------------------|---------------------------|------------------|
| Peak Value                              |                                       |                                      |                                   |                                |                           |                  |
| Frequency MHz                           | Measured Level @3m dB $\mu\text{V/m}$ | Correction Factor dB $\mu\text{V/m}$ | Field Strength dB $\mu\text{V/m}$ | Field Strength $\mu\text{V/m}$ | Limit @3m $\mu\text{V/m}$ | E-Field Polarity |
| 88.50                                   | 31.2                                  | 10.4                                 | 41.6                              | 120.2                          | 2,500                     | Horizontal       |

| Field Strength of Fundamental Emissions |                                       |                                      |                                   |                                |                           |                |
|---|---------------------------------------|--------------------------------------|-----------------------------------|--------------------------------|---------------------------|----------------|
| Average Value                           |                                       |                                      |                                   |                                |                           |                |
| Frequency MHz                           | Measured Level @3m dB $\mu\text{V/m}$ | Correction Factor dB $\mu\text{V/m}$ | Field Strength dB $\mu\text{V/m}$ | Field Strength $\mu\text{V/m}$ | Limit @3m $\mu\text{V/m}$ | Field Polarity |
| 88.50                                   | 31.1                                  | 10.4                                 | 41.5                              | 118.9                          | 250                       | Horizontal     |

## Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz  $\pm 5.7\text{dB}$

According to FCC 47CFR15.35, the limit on the radio frequency emissions as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

For effective averaging, the bandwidth of the video filter must be smaller than the resolution bandwidth. The higher the ratio of resolution bandwidth to video bandwidth, the greater the averaging will be. Below setting for HP8572A EMI Receiver.

Resolution Bandwidth : 3MHz  
Video Bandwidth 1Hz

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### Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

| Frequency Range [MHz] | Quasi-Peak Limits [ $\mu\text{V}/\text{m}$ ] |
|-----------------------|--|
| 30-88                 | 100  |
| 88-216                | 150  |
| 216-960               | 200  |
| Above960              | 500  |

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

### Results :

| Radiated Emissions<br>Quasi-Peak |  |   |  |                                       |                                  |                  |
|----------------------------------|--|---|--|---------------------------------------|----------------------------------|------------------|
| Frequency MHz                    | Measured Level @3m dB $\mu\text{V}/\text{m}$ | Correction Factor dB $\mu\text{V}/\text{m}$ | Field Strength dB $\mu\text{V}/\text{m}$ | Field Strength $\mu\text{V}/\text{m}$ | Limit @3m $\mu\text{V}/\text{m}$ | E-Field Polarity |
| 177.00                           | < 1.0  | 13.2  | < 14.2                                   | < 5.1                                 | 150                              | Vertical         |
| 265.50                           | < 1.0  | 9.8   | < 10.8                                   | < 3.5                                 | 150                              | Vertical         |
| 354.00                           | < 1.0  | 11.5  | < 12.5                                   | < 4.2                                 | 150                              | Vertical         |
| 442.50                           | < 1.0  | 15.9  | < 16.9                                   | < 7.0                                 | 200                              | Vertical         |
| 531.00                           | < 1.0  | 17.4  | < 18.4                                   | < 8.3                                 | 200                              | Vertical         |
| 619.50                           | < 1.0  | 17.2  | < 18.2                                   | < 8.1                                 | 200                              | Vertical         |
| 708.00                           | < 1.0  | 18.8  | < 19.8                                   | < 9.8                                 | 200                              | Vertical         |
| 796.50                           | < 1.0  | 19.7  | < 20.7                                   | < 10.8                                | 200                              | Vertical         |
| 885.00                           | < 1.0  | 20.6  | < 21.6                                   | < 12.0                                | 200                              | Vertical         |

### Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz  $\pm 5.7\text{dB}$

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## Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.239]:

| Frequency Range of Fundamental [MHz] | Peak Limits [ $\mu\text{V/m}$ ] | Average Limits [ $\mu\text{V/m}$ ] |
|--------------------------------------|---------------------------------|------------------------------------|
| 88-108                               | 2,500                           | 250                                |

## Results:

| Field Strength of Fundamental Emissions |                                       |                                      |                                   |                                |                           |                  |
|---|---------------------------------------|--------------------------------------|-----------------------------------|--------------------------------|---------------------------|------------------|
| Peak Value                              |                                       |                                      |                                   |                                |                           |                  |
| Frequency MHz                           | Measured Level @3m dB $\mu\text{V/m}$ | Correction Factor dB $\mu\text{V/m}$ | Field Strength dB $\mu\text{V/m}$ | Field Strength $\mu\text{V/m}$ | Limit @3m $\mu\text{V/m}$ | E-Field Polarity |
| 88.70                                   | 31.8                                  | 10.4                                 | 42.2                              | 128.8                          | 2,500                     | Horizontal       |

| Field Strength of Fundamental Emissions |                                       |                                      |                                   |                                |                           |                |
|---|---------------------------------------|--------------------------------------|-----------------------------------|--------------------------------|---------------------------|----------------|
| Average Value                           |                                       |                                      |                                   |                                |                           |                |
| Frequency MHz                           | Measured Level @3m dB $\mu\text{V/m}$ | Correction Factor dB $\mu\text{V/m}$ | Field Strength dB $\mu\text{V/m}$ | Field Strength $\mu\text{V/m}$ | Limit @3m $\mu\text{V/m}$ | Field Polarity |
| 88.70                                   | 31.5                                  | 10.4                                 | 41.9                              | 124.5                          | 250                       | Horizontal     |

## Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz  $\pm 5.7\text{dB}$

According to FCC 47CFR15.35, the limit on the radio frequency emissions as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

For effective averaging, the bandwidth of the video filter must be smaller than the resolution bandwidth. The higher the ratio of resolution bandwidth to video bandwidth, the greater the averaging will be. Below setting for HP8572A EMI Receiver.

Resolution Bandwidth : 3MHz  
Video Bandwidth 1Hz



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### Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

| Frequency Range [MHz] | Quasi-Peak Limits [ $\mu\text{V}/\text{m}$ ] |
|-----------------------|--|
| 30-88                 | 100  |
| 88-216                | 150  |
| 216-960               | 200  |
| Above960              | 500  |

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

### Results :

| Radiated Emissions<br>Quasi-Peak |  |   |  |   |                                     |                     |
|----------------------------------|--|---|--|---|-------------------------------------|---------------------|
| Frequency<br>MHz                 | Measured<br>Level @3m<br>$\text{dB}\mu\text{V}/\text{m}$ | Correction<br>Factor<br>$\text{dB}\mu\text{V}/\text{m}$ | Field<br>Strength<br>$\text{dB}\mu\text{V}/\text{m}$ | Field<br>Strength<br>$\mu\text{V}/\text{m}$ | Limit @3m<br>$\mu\text{V}/\text{m}$ | E-Field<br>Polarity |
| 177.40                           | < 1.0  | 13.2  | < 14.2   | < 5.1                                       | 150                                 | Vertical            |
| 266.10                           | < 1.0  | 9.8   | < 10.8   | < 3.5                                       | 150                                 | Vertical            |
| 354.80                           | < 1.0  | 11.5  | < 12.5   | < 4.2                                       | 150                                 | Vertical            |
| 443.50                           | < 1.0  | 15.9  | < 16.9   | < 7.0                                       | 200                                 | Vertical            |
| 532.20                           | < 1.0  | 17.4  | < 18.4   | < 8.3                                       | 200                                 | Vertical            |
| 620.90                           | < 1.0  | 17.2  | < 18.2   | < 8.1                                       | 200                                 | Vertical            |
| 709.60                           | < 1.0  | 18.8  | < 19.8   | < 9.8                                       | 200                                 | Vertical            |
| 798.30                           | < 1.0  | 19.7  | < 20.7   | < 10.8                                      | 200                                 | Vertical            |
| 887.00                           | < 1.0  | 20.6  | < 21.6   | < 12.0                                      | 200                                 | Vertical            |

Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz  $\pm 5.7\text{dB}$

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### 3.1.1 Conducted Emissions (0.15MHz to 30MHz)

|                    |                  |
|--------------------|------------------|
| Test Requirement:  | FCC 47CFR 15.107 |
| Test Method:       | ANSI C63.4:2000  |
| Test Date:         | 2003-10-23       |
| Mode of Operation: | N/A              |

**Results:** N/A

The EUT is operated by a single source of internal battery power [located in the battery compartment], therefore power line conducted emission was deemed unnecessary.

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## 3.2 20B Bandwidth of Fundamental Emission

|                    |                                  |
|--------------------|----------------------------------|
| Test Requirement:  | FCC 47 CFR 15.227                |
| Test Method:       | ANSI C63.4:2000 (Section 13.1.7) |
| Test Date:         | 2003-10-23                       |
| Mode of Operation: | On mode                          |

### Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

### Test Setup:

As Test Setup of clause 3.1.1 in this test report.

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Limits for 20dB Bandwidth of Fundamental Emission:

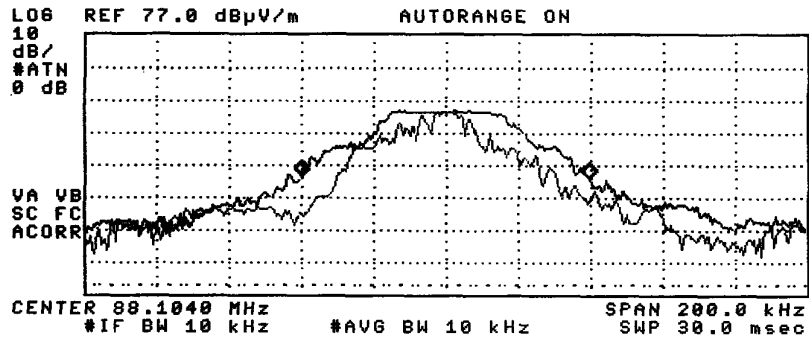
| Frequency Range<br>[MHz] | 26dB Bandwidth<br>[KHz] | FCC Limits<br>[MHz] |
|--------------------------|-------------------------|---------------------|
| 88.1                     | 79.5                    | 200                 |

Result:

The following figure is the measured bandwidth of Fundamental Emission.

## 20 Bandwidth of Fundamental Emission

09:11:24 JAN 16, 1995 23:49:37 NOV 12, 1997  
MARKER  $\Delta$  ACTV DET: PEAK  
79.5 kHz MEAS DET: PEAK QP AVG  
-.85 dB MKR  $\Delta$  79.5 kHz  
-.85 dB



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Limits for 20dB Bandwidth of Fundamental Emission:

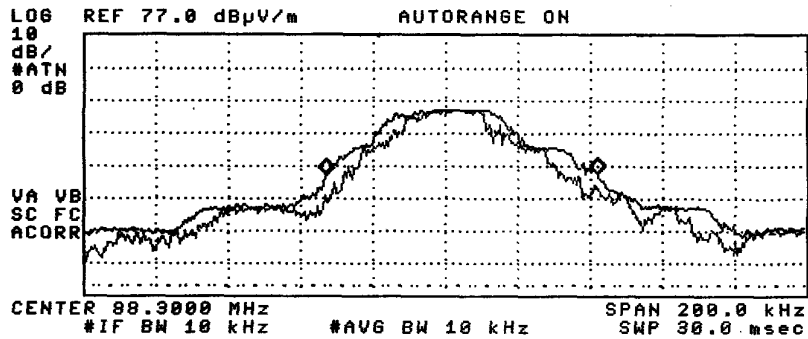
| Frequency Range<br>[MHz] | 26dB Bandwidth<br>[KHz] | FCC Limits<br>[KHz] |
|--------------------------|-------------------------|---------------------|
| 88.3                     | 75                      | 200                 |

Result:

The following figure is the measured bandwidth of Fundamental Emission.

## 20B Bandwidth of Fundamental Emission

09:11:24 JAN 16, 1995 23:49:37 NOV 12, 1997  
MARKER  $\Delta$  ACTV DET: PEAK  
75.0 kHz MEAS DET: PEAK QP AVG  
.56 dB MKR  $\Delta$  75.0 kHz  
.56 dB



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Limits for 20dB Bandwidth of Fundamental Emission:

| Frequency Range<br>[MHz] | 20B Bandwidth<br>[KHz] | FCC Limits<br>[KHz] |
|--------------------------|------------------------|---------------------|
| 88.5                     | 76.5                   | 200                 |

Result:

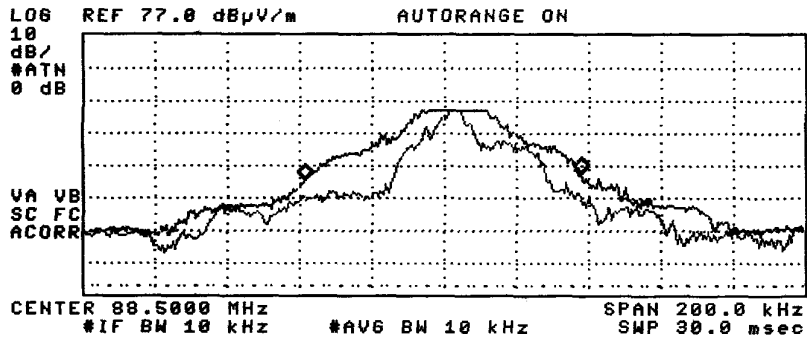
The following figure is the measured bandwidth of Fundamental Emission.

|  |
|--|
| <b>20B Bandwidth of Fundamental Emission</b> |
|--|

```

09:11:24 JAN 16, 1995 23:49:37 NOV 12, 1997
MARKER Δ ACTV DET: PEAK
76.5 kHz MEAS DET: PEAK QP AVG
2.08 dB MKRΔ 76.5 kHz
2.08 dB

```



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Limits for 20dB Bandwidth of Fundamental Emission:

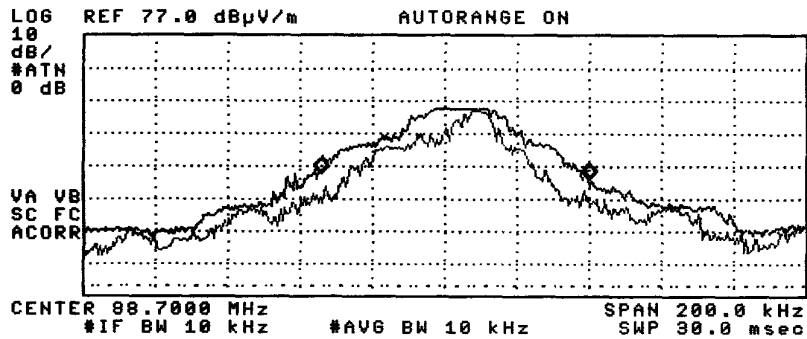
| Frequency Range<br>[MHz] | 20B Bandwidth<br>[KHz] | FCC Limits<br>[KHz] |
|--------------------------|------------------------|---------------------|
| 88.7                     | 74                     | 200                 |

Result:

The following figure is the measured bandwidth of Fundamental Emission.

## 20B Bandwidth of Fundamental Emission

09:11:24 JAN 16, 1995 23:49:37 NOV 12, 1997  
MARKER Δ ACTV DET: PEAK  
74.0 kHz MEAS DET: PEAK QP AVG  
-1.62 dB MKRΔ 74.0 kHz  
-1.62 dB



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**Appendix A****Test Equipment Audit****Radiated Emission**

| EQP NO. | DESCRIPTION  | MANUFACTURER  | MODEL NO.                      | SERIAL NO.                             | LAST CAL |
|---------|--|---|--------------------------------|--|----------|
| EM007   | SPECTRUM ANALYZER  | HEWLETT PACKARD                                       | HP85660B                       | 3144A21192                             | 14/03/03 |
| EM008   | SPECTRUM ANALYZER DISPLAY  | HEWLETT PACKARD                                       | HP85662A                       | 3144A20514                             | 14/03/03 |
| EM009   | QUASI PEAK ADAPTOR   | HEWLETT PACKARD                                       | HP85650A                       | 3303A01702                             | 14/03/03 |
| EM010   | RF PRESELECTOR   | HEWLETT PACKARD                                       | HP85685A                       | 3221A01410                             | 14/03/03 |
| EM011   | ATTENUATOR/SWITCH  | HEWLETT PACKARD                                       | HP11713A                       | 2508A10595                             | 14/03/03 |
| EM012   | PRE-AMPLIFIER  | HEWLETT PACKARD                                       | HP8449B                        | 3008A00262                             | 14/03/03 |
| EM013   | CONTROLLER (COMPUTER),<br>COLOR MONITOR, KEYBOARD &<br>MOUSE<br>FLOPPY DRIVE | HEWLETT PACKARD<br>HEWLETT PACKARD<br>HEWLETT PACKARD | HP9000<br>HP A1097C<br>HP9133L | 6226A60314<br>3151J39517<br>2623A02468 | CM       |
| EM020   | HORN ANTENNA   | EMCO  | 3115                           | 4032                                   | 19/07/00 |
| EM022   | LOOP ANTENNA   | EMCO  | 6502                           | 1189-2424                              | 04/08/00 |
| EM072   | SIGNAL GENERATOR   | HEWLETT PACKARD                                       | 8640B                          | 1948A11892                             | N/A      |
| EM083   | HKSTC OPEN AREA TEST SITE  | HKSTC   | N/A                            | N/A                                    | 08/11/02 |
| EM131   | PORTABLE SPECTRUM<br>ANALYSER  | HEWLETT PACKARD                                       | 8595EM                         | 3710A00155                             | 18/12/01 |
| EM145   | EMI TEST RECEIVER  | R & S   | ESCS 30                        | 830245/021                             | 02/08/03 |
| EM194   | BICONILOG ANTENNA  | EMCO  | 3142B                          | 1795                                   | 14/05/02 |
| EM195   | ANTENNA POSITIONING MAST   | EMCO  | 2075                           | 2368                                   | N/A      |
| EM196   | MULTI-DEVICE CONTROLLER  | EMCO  | 2090                           | 1662                                   | N/A      |

**Conducted Emission**

| EQP NO. | DESCRIPTION                         | MANUFACTURER                     | MODEL NO.  | SERIAL NO.          | LAST CAL |
|---------|-------------------------------------|----------------------------------|------------|---------------------|----------|
| EM078   | VARIAC                              | SHANGHAI VOLTAGE                 | TDGC-3/0.5 | N/A                 | CM       |
| EM081   | SMALL SCREENED ROOM                 | MIKO INST HK                     | N/A        | N/A                 | 18/10/02 |
| EM119   | LISN                                | R & S                            | ESH3-Z5    | 0831.5518.5<br>2    | 01/10/02 |
| EM127   | ISOLATION TRANSFORMER 220<br>TO 300 | WING SUN                         | N/A        | N/A                 | CM       |
| EM142   | PULSES LIMITER                      | R & S                            | ESH3Z2     | 357.8810.52         | 03/07/02 |
| EM181   | EMI TEST RECEIVER                   | R & S                            | ESIB7      | 100072              | 28/11/01 |
| EM154   | SHIELDING ROOM                      | SIEMENA MATSUSHITA<br>COMPONENTS | N/A        | 803-740-057-<br>99A | 18/10/02 |
| EM197   | LISN                                | EMCO                             | 4825/2     | 1193                | 08/04/03 |

Remarks:

CM Corrective Maintenance  
N/A Not Applicable or Not Available  
TBD To Be Determined



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## Appendix B

### Photographs of EUT

Front View of the product



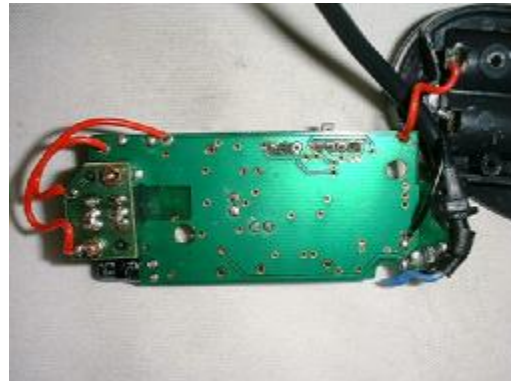
Rear View of the product



Inner Circuit Top View



Inner Circuit Bottom View



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Photographs of EUT

Measurement of Radiated Emission Test Set Up



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