

N8x2904



EXHIBIT D

CKC TEST REPORT



CERTIFICATION TEST REPORT

FOR THE

KEYPAD, 1904

FCC PART 15 SUBPART C

COMPLIANCE

DATE OF ISSUE: OCTOBER 15, 1998

PREPARED FOR:

Microframe Corporation
909 S. 12th Street
Broken Arrow, OK 74012

P.O. No: Check #13875
W.O. No: 69991

Report No: FC98-024

DOCUMENTATION CONTROL:

A handwritten signature in cursive script, reading 'Tracy Phillips'.

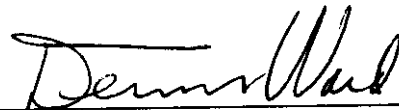
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PREPARED BY:

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CKC Laboratories, Inc.
5473A Clouds Rest
Mariposa, CA 95338

Date of test: October 6 & 7, 1998

APPROVED BY:

A handwritten signature in cursive script, reading 'Dennis Ward'.

Dennis Ward
Director of Laboratories
CKC Laboratories, Inc.

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TABLE OF CONTENTS

| | |
|---|----|
| Administrative Information | 3 |
| Summary Of Results..... | 4 |
| Equipment Under Test (EUT) Description..... | 4 |
| Measurement Uncertainty..... | 4 |
| EUT Operating Frequency..... | 4 |
| Peripheral Devices | 4 |
| Report Of Measurements | 5 |
| Table 1: Six Highest Radiated Emission Levels 15.249 (a) | 5 |
| Table 2: Six Highest Radiated Emission Levels 15.249 (c) / 15.209 | 6 |
| Table 2: Six Highest Conducted Emission Levels..... | 7 |
| Table A : List Of Test Equipment..... | 8 |
| EUT Setup..... | 9 |
| Test Instrumentation And Analyzer Settings..... | 10 |
| Table B : Analyzer Bandwidth Settings Per Frequency Range | 10 |
| Spectrum Analyzer Detector Functions | 11 |
| Peak..... | 11 |
| Quasi-Peak | 11 |
| Average..... | 11 |
| Test Methods..... | 12 |
| Radiated Emissions Testing..... | 12 |
| Conducted Emissions Testing..... | 13 |
| Transmitter Characteristics | 13 |
| Occupied Bandwidth..... | 13 |
| Power Output FCC Part 15.249 (a)..... | 13 |
| Sample Calculations..... | 14 |
| Appendix A : Information About The Equipment Under Test..... | 15 |
| I/O Ports..... | 16 |
| Crystal Oscillators..... | 16 |
| Printed Circuit Boards..... | 16 |
| Required EUT Changes To Comply | 16 |
| Cable Information | 17 |
| Photograph Showing Radiated Emissions | 18 |
| Photograph Showing Radiated Emissions | 19 |
| Photograph Showing Conducted Emissions | 20 |
| Photograph Showing Conducted Emissions | 21 |
| Appendix B : Measurement Data Sheets | 22 |
| Occupied Bandwidth Plot | 23 |
| Occupied Bandwidth Plot | 24 |
| Occupied Bandwidth Plot | 25 |
| Occupied Bandwidth Plot | 26 |

ADMINISTRATIVE INFORMATION

DATE OF TEST: October 6 & 7, 1998

PURPOSE OF TEST: To demonstrate the compliance of the Keypad, 1904, with the requirements for FCC Part 15, Subpart C devices.

MANUFACTURER: Microframe Corporation
909 S. 12th Street
Broken Arrow, OK 74012

REPRESENTATIVE: Bob McCullough

TEST LOCATION: CKC Laboratories, Inc.
5473A Clouds Rest
Mariposa, CA 95338

TEST PERSONNEL: Skip Doyle

TEST METHOD: ANSI C63.4 1992

FREQUENCY RANGE TESTED: 30 MHz – 10,000 MHz

EQUIPMENT UNDER TEST: **Keypad**
Manuf: Microframe Corporation
Model: 1904
Serial: 1263
FCC ID: Pending

SUMMARY OF RESULTS

The Microframe Corporation Keypad, 1904, was tested in accordance with ANSI C63.4 1992 for compliance with FCC Part 15, Subpart C.

As received, the above equipment was found to be fully compliant with the limits of FCC Part 15.249. The results in this report apply only to the items tested, as identified herein.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

Part of a visual paging system.

MEASUREMENT UNCERTAINTY

Associated with data in this report is a ± 4 dB measurement uncertainty.

EUT OPERATING FREQUENCY

The EUT was operating at 30 MHz – 10,000 MHz.

TEMPERATURE AND HUMIDITY DURING TESTING

The temperature during testing was within $+15^{\circ}\text{C}$ and $+35^{\circ}\text{C}$.
The relative humidity was between 20% and 75%.

PERIPHERAL DEVICES

The EUT was not tested with peripheral devices.

REPORT OF MEASUREMENTS

The following Tables 1 and 2 report the highest emissions levels recorded during the tests performed on the Keypad, 1904. The data sheets from which these tables were compiled are contained in Appendix B.

Table 1: Six Highest Radiated Emission Levels 15.249 (a)

| FREQUENCY MHz | METER READING dBμV | CORRECTION FACTORS | | | | CORRECTED READING dBμV/m | SPEC LIMIT dBμV/m | MARGIN dB | NOTES |
|------------------|--------------------------|--------------------|-----------|-------------|------------|--------------------------------|-------------------------|--------------|-------|
| | | Ant dB | Amp dB | Cable dB | Dist dB | | | | |
| 903.394 | 83.7 | 23.5 | -27.5 | 6.2 | | 85.9 | 93.9 | -8.0 | V |
| 903.399 | 85.2 | 23.5 | -27.5 | 6.2 | | 87.4 | 93.9 | -6.5 | V |
| 903.410 | 84.9 | 23.5 | -27.5 | 6.2 | | 87.1 | 93.9 | -6.8 | H |
| 903.486 | 81.7 | 23.5 | -27.5 | 6.2 | | 83.9 | 93.9 | -10.0 | H |
| 903.490 | 79.5 | 23.5 | -27.5 | 6.2 | | 81.7 | 93.9 | -12.2 | V |
| 903.527 | 84.8 | 23.5 | -27.5 | 6.2 | | 87.0 | 93.9 | -6.9 | H |

Test Method: ANSI C63.4 1992
Spec Limit : FCC Part 15.249 (a)
Test Distance: 3 Meters

NOTES: H = Horizontal Polarization
V = Vertical Polarization
N = No Polarization
D = Dipole Reading
Q = Quasi Peak Reading
A = Average Reading

COMMENTS: Microframe Visual Pager Transmitter Series 900. EUT uses 120 VAC to 24 VAC transformer power supply and has a continuous modulated signal. FCC 15.249(a) Fundamental Freqs. of 903.37 only.

Table 2: Six Highest Radiated Emission Levels 15.249 (c) / 15.209

| FREQUENCY MHz | METER READING dBμV | CORRECTION FACTORS | | | | CORRECTED READING dBμV/m | SPEC LIMIT dBμV/m | MARGIN dB | NOTES |
|------------------|--------------------------|--------------------|-----------|-------------|------------|--------------------------------|-------------------------|--------------|-------|
| | | Ant dB | Amp dB | Cable dB | Dist dB | | | | |
| 1806.724 | 52.3 | 28.1 | -35.8 | 6.9 | | 51.5 | 54.0 | -2.5 | HA |
| 2710.043 | 45.1 | 25.6 | -35.3 | 12.2 | | 47.6 | 54.0 | -6.4 | HA |
| 2710.380 | 48.4 | 25.6 | -35.3 | 12.2 | | 50.9 | 54.0 | -3.1 | H |
| 4516.677 | 38.3 | 26.9 | -33.5 | 13.5 | | 45.2 | 54.0 | -8.8 | H |
| 5420.005 | 30.1 | 29.4 | -33.3 | 16.3 | | 42.5 | 54.0 | -11.5 | HA |
| 5420.695 | 35.8 | 29.4 | -33.3 | 16.3 | | 48.2 | 54.0 | -5.8 | V |

Test Method: ANSI C63.4 1992
Spec Limit : FCC Part 15.249 (c) / 15.209
Test Distance: 3 Meters

NOTES: H = Horizontal Polarization
V = Vertical Polarization
N = No Polarization
D = Dipole Reading
Q = Quasi Peak Reading
A = Average Reading

COMMENTS: Microframe Visual Pager Transmitter Series 900. EUT uses 120 VAC to 24 VAC transformer power supply and has a continuous modulated signal. FCC 15.249(c) / 15.209

Table 2: Six Highest Conducted Emission Levels

| FREQUENCY MHz | METER READING dBμV | CORRECTION FACTORS | | | | CORRECTED READING dBμV | SPEC LIMIT dBμV | MARGIN dB | NOTES |
|------------------|--------------------------|--------------------|--|--|--|------------------------------|-----------------------|--------------|-------|
| | | Lisn dB | | | | | | | |
| 0.465924 | 41.8 | 0.0 | | | | 41.8 | 48.0 | -6.2 | B |
| 0.639574 | 41.0 | 0.0 | | | | 41.0 | 48.0 | -7.0 | B |
| 0.741944 | 36.3 | 0.0 | | | | 36.3 | 48.0 | -11.7 | W |
| 0.983786 | 38.2 | 0.0 | | | | 38.2 | 48.0 | -9.8 | B |
| 1.098304 | 36.7 | 0.0 | | | | 36.7 | 48.0 | -11.3 | B |
| | | | | | | | | | |

Test Method: ANSI C63.4 1992
Spec Limit : FCC Class B
Test Distance: No Distance

NOTES: Q = Quasi Peak Reading
A = Average Reading
B = Black Lead
W = White Lead

COMMENTS: Microframe Visual Pager Transmitter Series 900. EUT uses 120 VAC to 24 VAC transformer power supply and has a continuous modulated signal. FCC B Conducted Emissions

TABLE A

LIST OF TEST EQUIPMENT

The following list of test equipment is calibrated at regular intervals.

1. Spectrum Analyzer, Hewlett Packard, Model No. 85662A, S/N 2403A08241.
2. Preamp, Hewlett Packard, Model No. 8447D, S/N -1937A02604.
3. Quasi-Peak Adapter, Hewlett Packard, Model No. 85650A, S/N 2811A01267.
4. Biconical Antenna, A & H Systems, Model No. SAS-200/542, S/N 156.
5. Log Periodic Antenna, A & H Systems, Model No. SAS-200/512, S/N 154.
6. Horn Antenna, EMCO, Model No. 3115, S/N 4683.
7. Test software, EMI Test 2.91.

EUT SETUP

The equipment under test (EUT) listed was setup in a manner that represented its normal use. Any special conditions required for the EUT to operate normally are identified in the comments that accompany Tables 1 & 2 radiated emissions and Table 3 for conducted characteristics. Additionally, a complete description of all the ports and I/O cables is included on the information sheets contained in Appendix A.

During radiated emissions testing, the EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters. This configuration is typical for radiated emissions testing of table top devices.

During conducted emissions testing, the EUT was located on a wooden table measuring approximately 80 cm high, 1 meter deep, and 1.5 meters in length. One wall of the room where the EUT is located, has a minimum 2 meter by 2 meter conductive plane. The EUT was mounted on the wooden table 40 cm away from the conductive plane, and 80 cm from any other conductive surface.

The vertical metal plane used for conducted emissions was grounded to the earth. Power to the EUT was provided through a LISN. The LISN was grounded to the ground plane. All other objects were kept a minimum of 80 cm away from the EUT during the conducted test. Conducted emissions tests required the use of the LISN's listed in Table A.

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Table A was used to collect both the radiated and conducted emissions data for the Keypad, 1904. For radiated measurements below 300 MHz, the biconical antenna was used. For frequencies from 300 to 1000 MHz, the log periodic antenna was used. For frequencies above 1000 MHz, the horn antenna was used. All antennas were located at a distance of 3 meters from the edge of the EUT. Conducted emissions tests required the use of the FCC type LISN's.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. For conducted emissions, a reference level of 100 dB μ V and a vertical scale size of 10 dB per division were used. A 10 dB external attenuator was also used during conducted tests, with internal offset correction in the analyzer. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dB μ V, and a vertical scale of 10 dB per division.

TABLE B : ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE

| TEST | BEGINNING FREQUENCY | ENDING FREQUENCY | BANDWIDTH SETTING |
|---------------------|---------------------|------------------|-------------------|
| CONDUCTED EMISSIONS | 450 kHz | 30 MHz | 9 kHz |
| RADIATED EMISSIONS | 30 MHz | 1000 MHz | 120 kHz |
| RADIATED EMISSIONS | 1000 MHz | 40 GHz | 1 MHz |

SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in Tables 1 and 2 indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the six highest readings, this is indicated as a "Q" or an "A" in Table 1 or Table 2. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data for the Keypad, 1904.

Peak

In this mode, the Spectrum Analyzer or test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the HP 85650A Quasi-Peak Adapter for the HP 8568B Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual were followed.

Average

When the frequencies exceed 1 GHz, average measurements may be made using the spectrum analyzer. To make these measurements, the test engineer reduces the video bandwidth on the analyzer until the modulation of the signal is filtered out. At this point the analyzer is set into the linear mode and the scan time is reduced.

TEST METHODS

The radiated and conducted emissions data of the Keypad, 1904, was taken with the HP Spectrum Analyzer. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the "Sample Calculations". The corrected data was then compared to the FCC Part 15, Subpart C, emissions limits to determine compliance.

Preliminary and final measurements were taken in order to better ensure that all emissions from the EUT were found and maximized.

Radiated Emissions Testing

During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode with the I/O cables and line cords facing the antenna. The frequency range of 30 MHz - 88 MHz was then scanned with the biconical antenna located about 1.5 meter above the ground plane in the vertical configuration. During this scan, the turntable was rotated and all peaks which were at or near the limit were recorded. The frequency range of 100 - 300 MHz was scanned with the biconical antenna in the same manner, and the peaks recorded. Lastly, a scan of the FM band from 88 - 110 MHz was made, using a reduced resolution bandwidth and a reduced frequency span. The biconical antenna was changed to the horizontal polarity and the above steps were repeated. After changing to the log periodic antenna in the horizontal configuration, the frequency range of 300 - 1000 MHz was scanned. The log periodic antenna was changed to the vertical polarity and the frequency range of 300 - 1000 MHz was again scanned. For frequencies above 1000 MHz, the horn antenna was used in the same manner stated above. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

For the final radiated scan, the equipment was again positioned with its I/O and power cables facing the antenna. A thorough scan of all frequencies was manually made using a small frequency span, rotating the turntable as needed. Comparison with the previously recorded measurements was then made.

Using the peak readings from both scans as a guide, the test engineer then maximized the readings with respect to the table rotation, antenna height and configuration of the cables. Maximizing of the cables was achieved by monitoring the spectrum analyzer on a closed circuit television monitor while the EUT cables were being moved and rearranged on the EUT table for maximum emissions. Photographs showing the final worst case configuration of the EUT are contained in Appendix A.

Conducted Emissions Testing

For conducted emissions testing, a 30 to 50 second sweep time was used for automated measurements in the frequency bands of 450 kHz to 1.705 MHz, 1.705 MHz to 3 MHz, and 3 MHz to 30 MHz. All readings within 20 dB of the limit were recorded. At frequencies where the recorded emissions were close to the limit, further investigation was performed manually at a slower sweep rate.

TRANSMITTER CHARACTERISTICS

Occupied Bandwidth Measurements

The fundamental frequency was kept within the permitted band 902 – 928 MHz. Refer to Appendix B for the occupied bandwidth plots.

Power Output FCC Part 15.249 (a)

The maximum ERP of this transmitter was measured to be (47.0 dB μ V/m in a 50 Ω system) when measured at a test distance of three meters. This measurement was made with the EUT's integral antenna, for there is no provision for connecting an external antenna.

SAMPLE CALCULATIONS

The basic spectrum analyzer reading was converted using correction factors as shown in the six highest emissions readings in Tables 1 and 2. For radiated emissions in dB μ V/m, the spectrum analyzer reading in dB μ V was corrected by using the following formula:

$$\begin{aligned}
 &\text{Meter reading (dB}\mu\text{V)} \\
 &+ \text{Antenna Factor (dB)} \\
 &+ \text{Cable Loss (dB)} \\
 &- \text{Distance Correction (dB)} \\
 &- \text{Pre-amplifier Gain (dB)} \\
 &= \text{Corrected Reading (dB}\mu\text{V/m)}
 \end{aligned}$$

This reading was then compared to the applicable specification limit to determine compliance. For conducted emissions, no correction factors were needed when 50 μ H LISN's were used.

A typical data sheet will display the following in column format:

| # | Freq MHz | Rdng dB μ V | Cable | Amp. | Bicon | Horn | Log | Dist | Corr dB μ V/m | Spec | Margin | Polar |
|---|-------------|--------------------|-------|------|-------|------|-----|------|----------------------|------|--------|-------|
|---|-------------|--------------------|-------|------|-------|------|-----|------|----------------------|------|--------|-------|

means reading number

Freq MHz is the frequency in MHz of the obtained reading.

Rdng dB μ V is the reading obtained on the spectrum analyzer in dB μ V.

Amp. is short for the preamplifier factor or gain in dB.

Bicon is the biconical antenna factor in dB.

Log is the log periodic antenna factor in dB.

Horn is the horn antenna factor in dB.

Cable is the cable loss in dB of the coaxial cable on the OATS.

Dist is the distance factor (in dB). It is used when testing at a different test distance than the one stated in the spec.

Corr dB μ V/m is the corrected reading which is now in dB μ V/m (field strength).

Spec is the specification limit (dB) stated in the agency's regulations.

Margin is the closeness to the specified limit in dB; + is over and - is under the limit.

Polar is the Polarity of the antenna with respect to earth.

APPENDIX A
INFORMATION ABOUT THE EQUIPMENT UNDER TEST

INFORMATION ABOUT THE EQUIPMENT UNDER TEST

| | |
|--|-------------------------------|
| Test Software/Firmware: | Rev 1.0 |
| CRT was displaying: | None |
| Power Supply Manufacturer: | 24 VAC Transformer by Globtek |
| Power Supply Part Number: | WA111200V00 |
| AC Line Filter Manufacturer: | None |
| AC Line Filter Part Number: | None |
| The AC power cord is removable and is NOT shielded | |
| Line voltage used during testing: 115 | |

I/O PORTS

| Type | # |
|------|---|
| None | 1 |

CRYSTAL OSCILLATORS

| Type | Freq. In MHz |
|--------------|--------------|
| MTRON ATS-49 | 4 |

PRINTED CIRCUIT BOARDS

| Function | Model & Rev | Clocks, MHz | Layers | Location |
|--|---------------|-------------|--------|------------------------|
| Keypad Motherboard | 4.3 | 4 MHz | 2 | In Keypad |
| Model 310 | 1.0 | None | 2 | On back of Motherboard |
| Transmitter Interface | | | | On back of Transmitter |
| Linx Model RXM-900-HP Transmitter Module | See Linx Data | | | Interface Bd. |

REQUIRED EUT CHANGES TO COMPLY:

| |
|------|
| None |
|------|

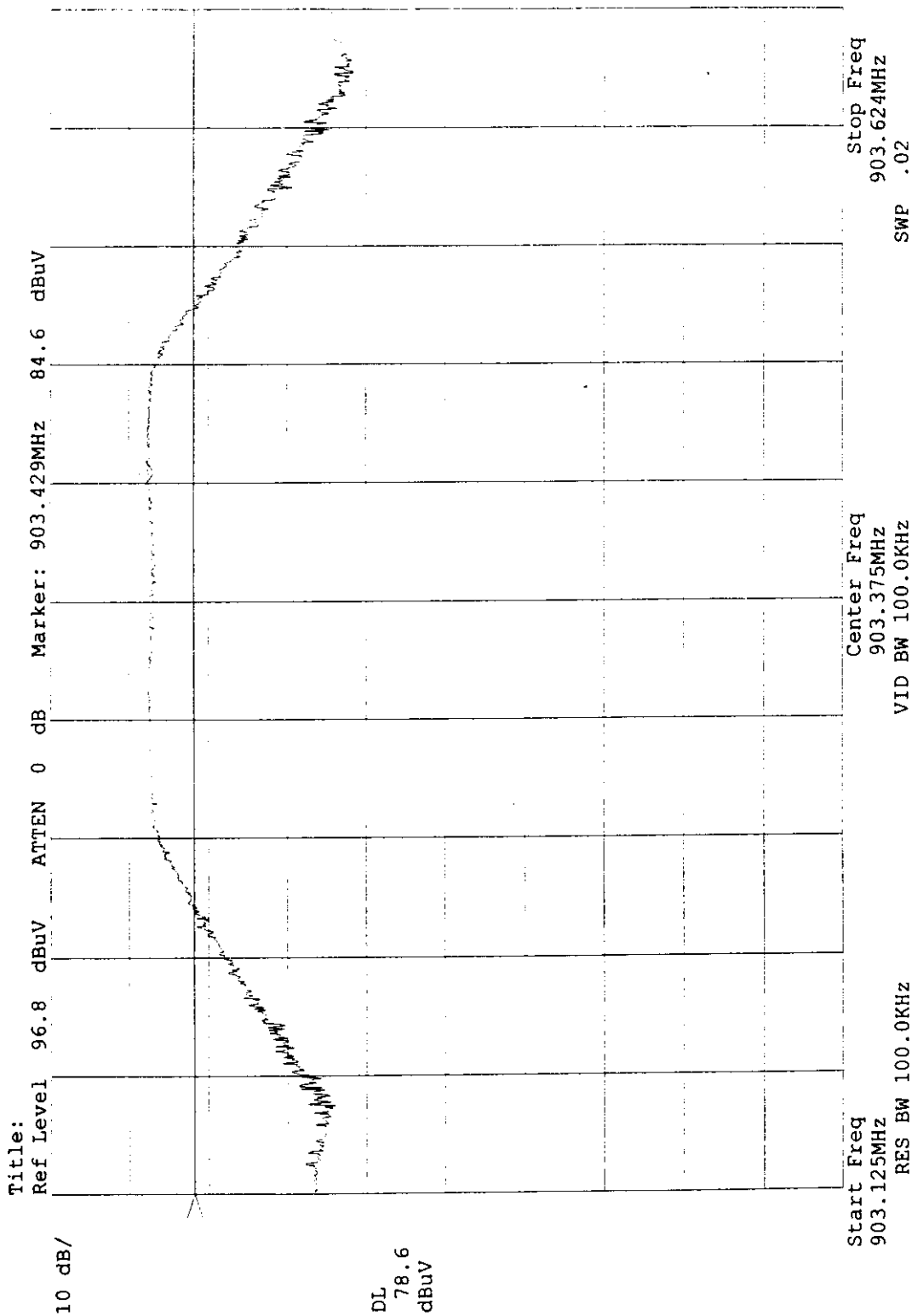
CABLE INFORMATION

| | |
|--|---|
| Cable #: 1 | Cable(s) of this type: 1 |
| Cable Type: RG/179 Construction: Connected To End (1): TXM-900-HP Transmitter Connector At End (1): Soldered to board Shield Grounded At (1): Board Part Number: Notes: | Shield Type: Length In Meters: Connected To End (2): Linx Antenna 900-CW-QWB Connector At End (2): Reverse SMA CONREVSMA0 5 Shield Grounded At (2): None Number of Conductors: 1+Shield |

Cable Routing For Worst Case Emissions.

APPENDIX B
MEASUREMENT DATA SHEETS

Occupied Bandwidth Plot

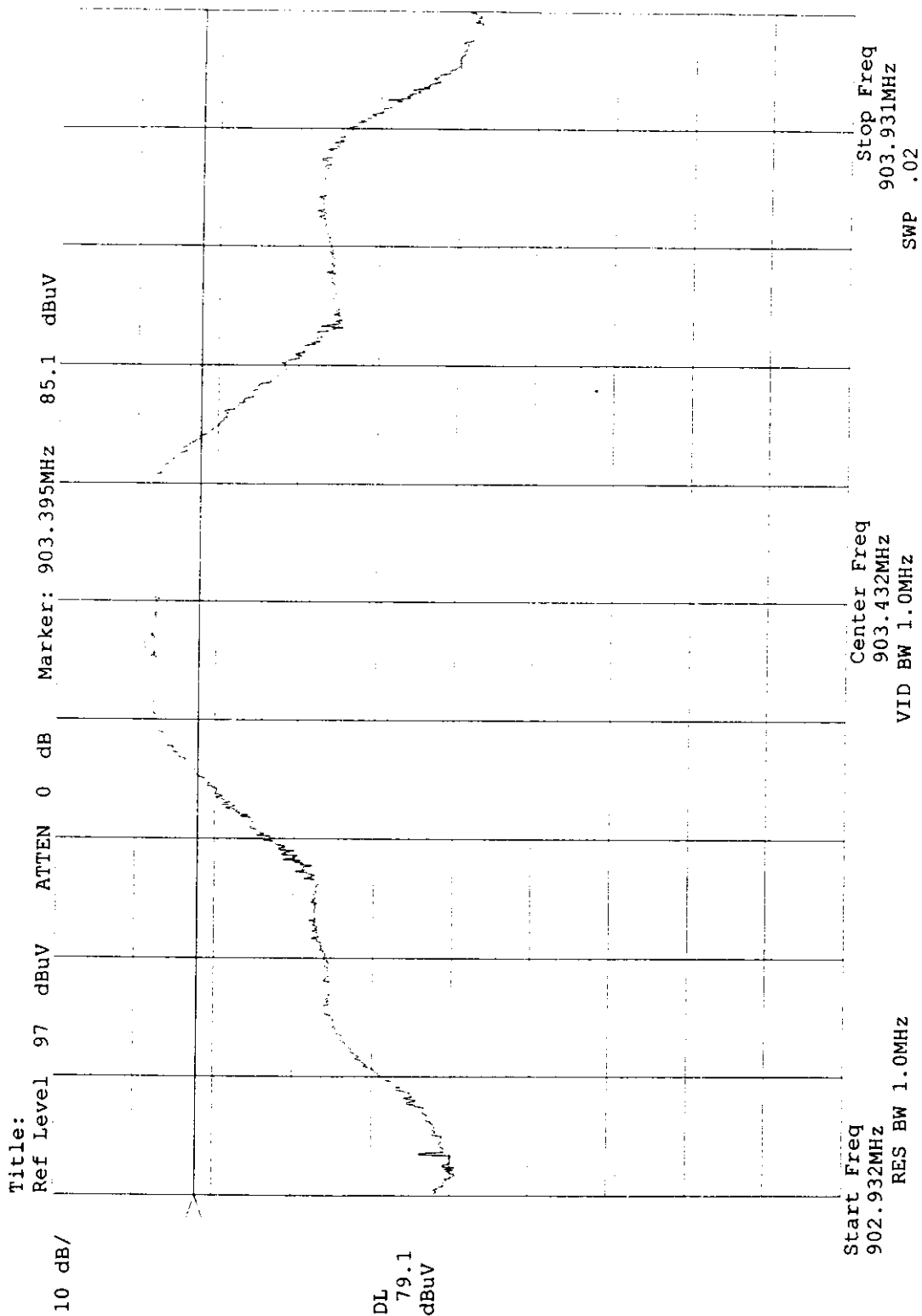




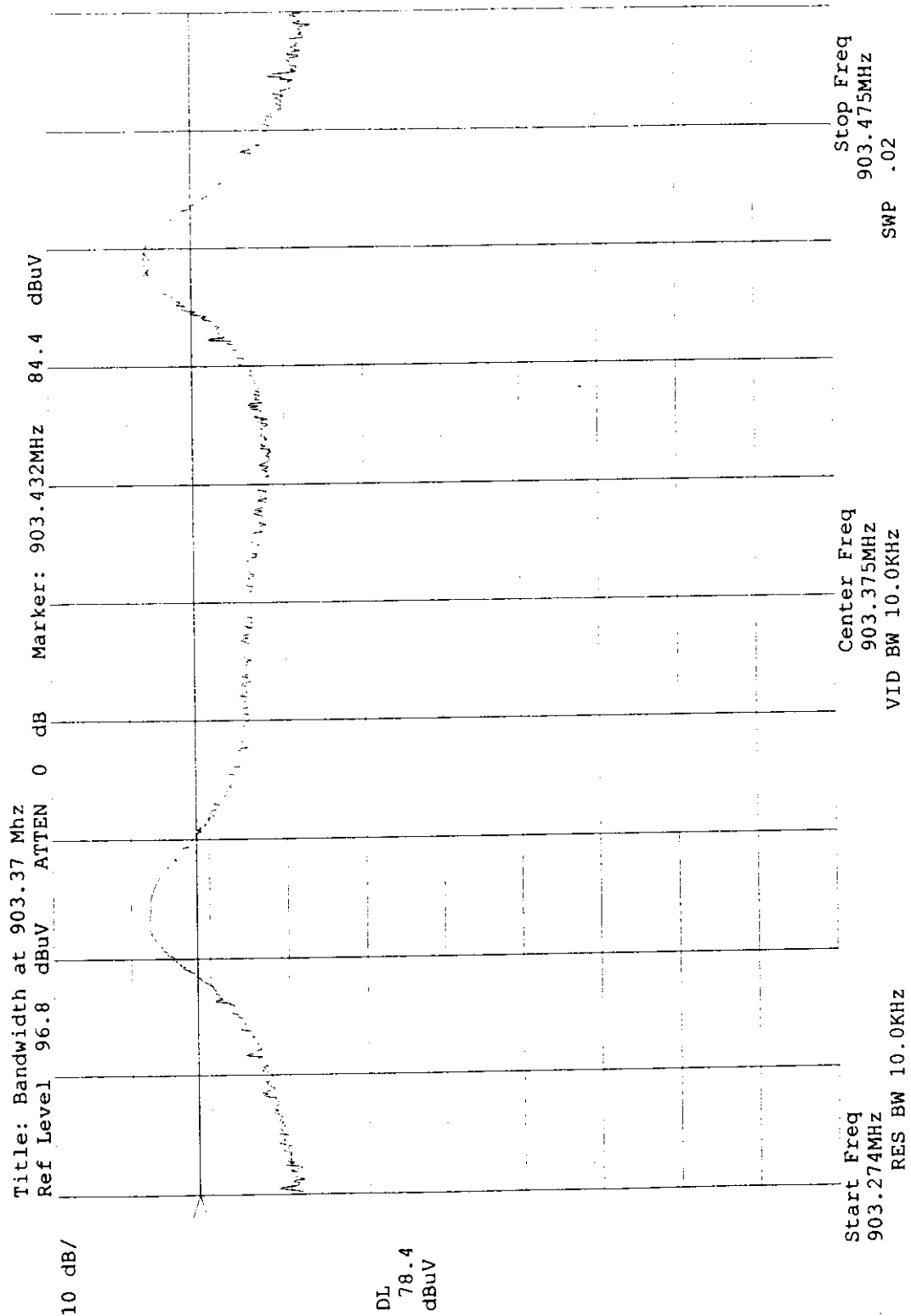
Testing the Future

LABORATORIES, INC.

Occupied Bandwidth Plot



Occupied Bandwidth Plot

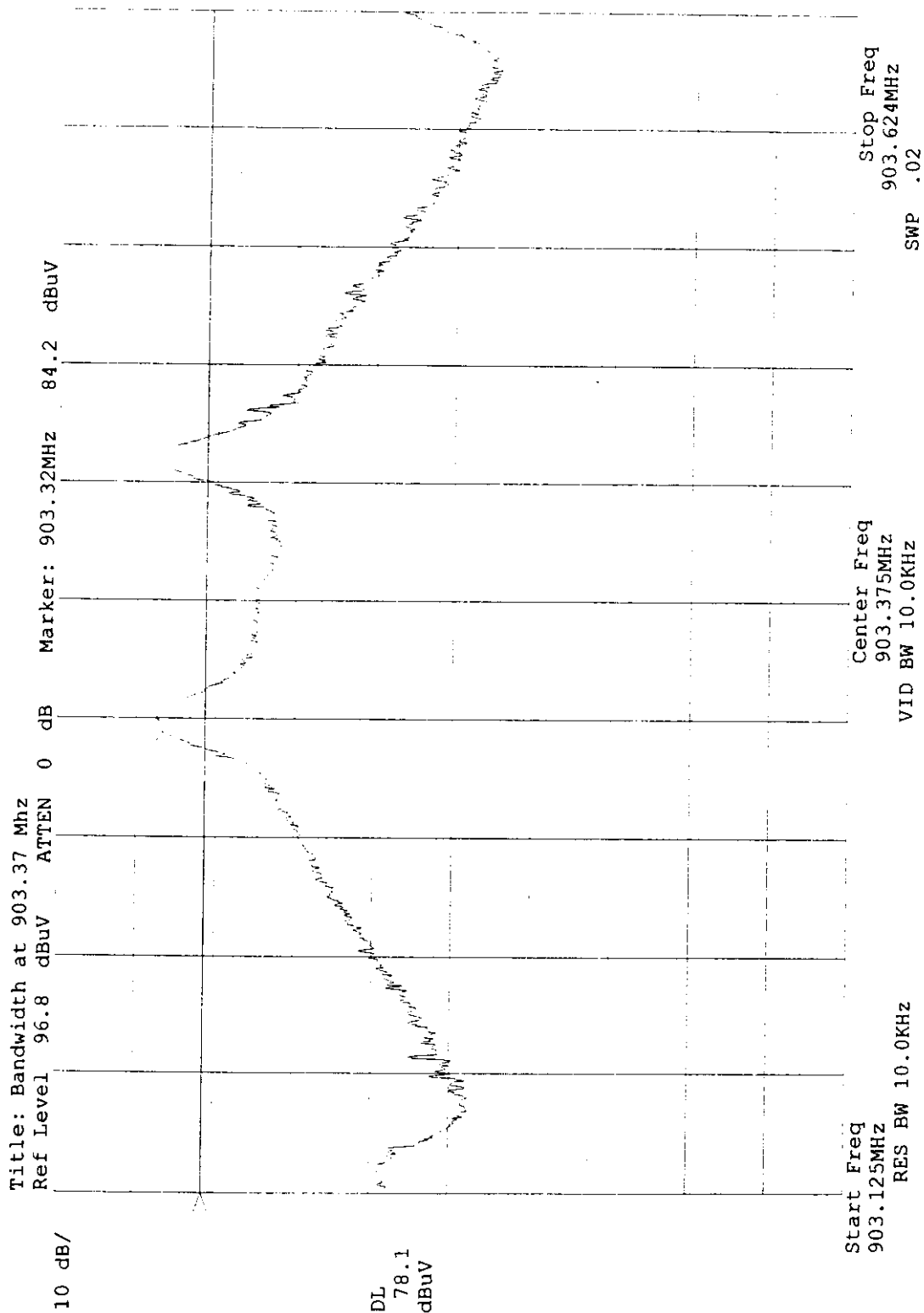




Testing the Future

LABORATORIES, INC.

Occupied Bandwidth Plot



Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest Rd, Barn • Mariposa, CA 95338 • (800)-500-4EMC

Customer: Microframe Corp. Date: Oct-07-98
 Specification: FCC 15.249 (a) Time: 10:50
 Test Type: Maximized Emissions Sequence#: 1
 Equipment: Visual Pager Series 900 Transmitter
 Manufacturer: Microframe Corp Tested By: Skip Doyle
 Model: 904-1.5
 S/N: 1263

Equipment Under Test (* = EUT):

| Function | Manufacturer | Model # | S/N |
|-------------|--------------|---------|------|
| Transmitter | Microframe | 904-1.5 | 1263 |

Support Devices:

| Function | Manufacturer | Model # | S/N |
|----------|--------------|---------|-----|
| None | | | |

Test Conditions / Notes:

Microframe Visual Pager Transmitter Series 900. EUT uses 120 VAC to 24 VAC transformer power supply and has a continuous modulated signal. FCC 15.249(a) Fundamental Freqs. of 903.37 only.

Measurement Data:

Sorted by Margin

Test Distance: 3 Meters

| # | Freq MHz | Rdng dBμV | Pream dB | Barn dB | Log l dB | Dist dB | Corr dBμV/m | Spec dBμV/m | Margin dB | Polar |
|----------|-------------|--------------|-------------|------------|-------------|------------|----------------|----------------|--------------|-------|
| 1 | 903.399 | 85.2 | -27.5 | +6.2 | +23.5 | +0.0 | 87.4 | 93.9 | -6.5 | Vert |
| Side | | | | | | | | | | |
| 2 | 903.410 | 84.9 | -27.5 | +6.2 | +23.5 | +0.0 | 87.1 | 93.9 | -6.8 | Horiz |
| Side | | | | | | | | | | |
| 3 | 903.527 | 84.8 | -27.5 | +6.2 | +23.5 | +0.0 | 87.0 | 93.9 | -6.9 | Horiz |
| Back | | | | | | | | | | |
| 4 | 903.394 | 83.7 | -27.5 | +6.2 | +23.5 | +0.0 | 85.9 | 93.9 | -8.0 | Vert |
| Standing | | | | | | | | | | |
| 5 | 903.486 | 81.7 | -27.5 | +6.2 | +23.5 | +0.0 | 83.9 | 93.9 | -10.0 | Horiz |
| Standing | | | | | | | | | | |
| 6 | 903.490 | 79.5 | -27.5 | +6.2 | +23.5 | +0.0 | 81.7 | 93.9 | -12.2 | Vert |
| Back | | | | | | | | | | |

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest Rd, Barn • Mariposa, CA 95338 • (800)-500-4EMC

Customer: **Microframe Corp.** Date: Oct-07-98
 Specification: **FCC 15.249(C) / 15.209** Time: 10:19
 Test Type: **Maximized Emissions** Sequence#: 3
 Equipment: **Visual-Pager Series 900 Transmitter**
 Manufacturer: **Microframe Corp.** Tested By: Skip Doyle
 Model: **904-1.5**
 S/N: **1263**

Equipment Under Test (* = EUT):

| Function | Manufacturer | Model # | S/N |
|-------------|--------------|---------|------|
| Transmitter | Microframe | 904-1.5 | 1263 |

Support Devices:

| Function | Manufacturer | Model # | S/N |
|----------|--------------|---------|-----|
| None | | | |

Test Conditions / Notes:

Microframe Visual Pager Transmitter Series 900. EUT uses 120 VAC to 24 VAC transformer power supply and has a continuous modulated signal. FCC 15.249(c) / 15.209.

Measurement Data:

Sorted by Margin

Test Distance: 3 Meters

| # | Freq MHz | Rdng dBμV | 8449B Horn Barn | | | | Dist dB | Corr dBμV/m | Spec dBμV/m | Margin dB | Polar |
|---------|-------------|--------------|-----------------|-------|-------|----|------------|----------------|----------------|--------------|-------|
| | | | dB | dB | dB | dB | | | | | |
| 1 | 1806.724 | 52.3 | -35.8 | +28.1 | +6.9 | | +0.0 | 51.5 | 54.0 | -2.5 | Horiz |
| Average | | | | | | | | | | | |
| ^ | 1806.729 | 54.2 | -35.8 | +28.1 | +6.9 | | +0.0 | 53.4 | 54.0 | -0.6 | Horiz |
| 3 | 2710.380 | 48.4 | -35.3 | +25.6 | +12.2 | | +0.0 | 50.9 | 54.0 | -3.1 | Horiz |
| 4 | 5420.695 | 35.8 | -33.3 | +29.4 | +16.3 | | +0.0 | 48.2 | 54.0 | -5.8 | Vert |
| 5 | 2710.043 | 45.1 | -35.3 | +25.6 | +12.2 | | +0.0 | 47.6 | 54.0 | -6.4 | Horiz |
| Average | | | | | | | | | | | |
| 6 | 4516.677 | 38.3 | -33.5 | +26.9 | +13.5 | | +0.0 | 45.2 | 54.0 | -8.8 | Horiz |
| 7 | 4516.681 | 35.9 | -33.5 | +26.9 | +13.5 | | +0.0 | 42.8 | 54.0 | -11.2 | Vert |
| 8 | 5420.005 | 30.1 | -33.3 | +29.4 | +16.3 | | +0.0 | 42.5 | 54.0 | -11.5 | Horiz |
| Average | | | | | | | | | | | |
| ^ | 5420.004 | 36.1 | -33.3 | +29.4 | +16.3 | | +0.0 | 48.5 | 54.0 | -5.5 | Horiz |
| 10 | 2710.105 | 38.4 | -35.3 | +25.6 | +12.2 | | +0.0 | 40.9 | 54.0 | -13.1 | Vert |
| 11 | 3613.368 | 35.8 | -33.9 | +25.7 | +12.7 | | +0.0 | 40.3 | 54.0 | -13.7 | Horiz |

| | | | | | | | | | | |
|----|----------|------|-------|-------|-------|------|------|------|-------|------|
| 12 | 3613.383 | 35.6 | -33.9 | +25.7 | +12.7 | +0.0 | 40.1 | 54.0 | -13.9 | Vert |
| 13 | 1806.723 | 40.1 | -35.8 | +28.1 | +6.9 | +0.0 | 39.3 | 54.0 | -14.7 | Vert |

Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest Rd, Barn • Mariposa, CA 95338 • (800)-500-4EMC

Customer: **Microframe**
Specification: **FCC B COND**
Test Type: **Conducted Emissions**
Equipment: **Transmitter**
Manufacturer: **Microframe**
Model: **904-1.5**
S/N:

Date: Oct-19-98
Time: 15:47
Sequence#: 4
Tested By: Skip Doyle

Equipment Under Test (* = EUT):

| Function | Manufacturer | Model # | S/N |
|-------------|--------------|---------|------|
| Transmitter | Microframe | 904-1.5 | 1263 |

Support Devices:

| Function | Manufacturer | Model # | S/N |
|----------|--------------|---------|-----|
| None | | | |

Test Conditions / Notes:

Microframe Visual Pager Transmitter Series 900. EUT uses 120 VAC to 24 VAC transformer power supply and has a continuous modulated signal. FCC B Conducted Emissions

Measurement Data:

Sorted by Margin

Test Lead: Black

| # | Freq | Rdng dBμV | DB | dB | dB | dB | Dist dB | Corr dBμV/m | Spec dBμV/m | Margin dB | Polar |
|----|------------|--------------|----|----|----|----|------------|----------------|----------------|--------------|-------|
| 1 | 465.924k | 41.8 | | | | | +0.0 | 41.8 | 48.0 | -6.2 | Black |
| 2 | 639.574k | 41.0 | | | | | +0.0 | 41.0 | 48.0 | -7.0 | Black |
| 3 | 479.953k | 39.6 | | | | | +0.0 | 39.6 | 48.0 | -8.4 | Black |
| 4 | 457.583k | 39.1 | | | | | +0.0 | 39.1 | 48.0 | -8.9 | Black |
| 5 | 494.300k | 38.5 | | | | | +0.0 | 38.5 | 48.0 | -9.5 | Black |
| | Quasi Peak | | | | | | | | | | |
| ^ | 493.223k | 43.3 | | | | | +0.0 | 43.3 | 48.0 | -4.7 | Black |
| 7 | 620.616k | 38.3 | | | | | +0.0 | 38.3 | 48.0 | -9.7 | Black |
| 8 | 983.786k | 38.2 | | | | | +0.0 | 38.2 | 48.0 | -9.8 | Black |
| 9 | 608.484k | 38.2 | | | | | +0.0 | 38.2 | 48.0 | -9.8 | Black |
| 10 | 932.114k | 37.8 | | | | | +0.0 | 37.8 | 48.0 | -10.2 | Black |
| 11 | 615.308k | 37.7 | | | | | +0.0 | 37.7 | 48.0 | -10.3 | Black |

Page 30 of 35
Report No: FC96 21

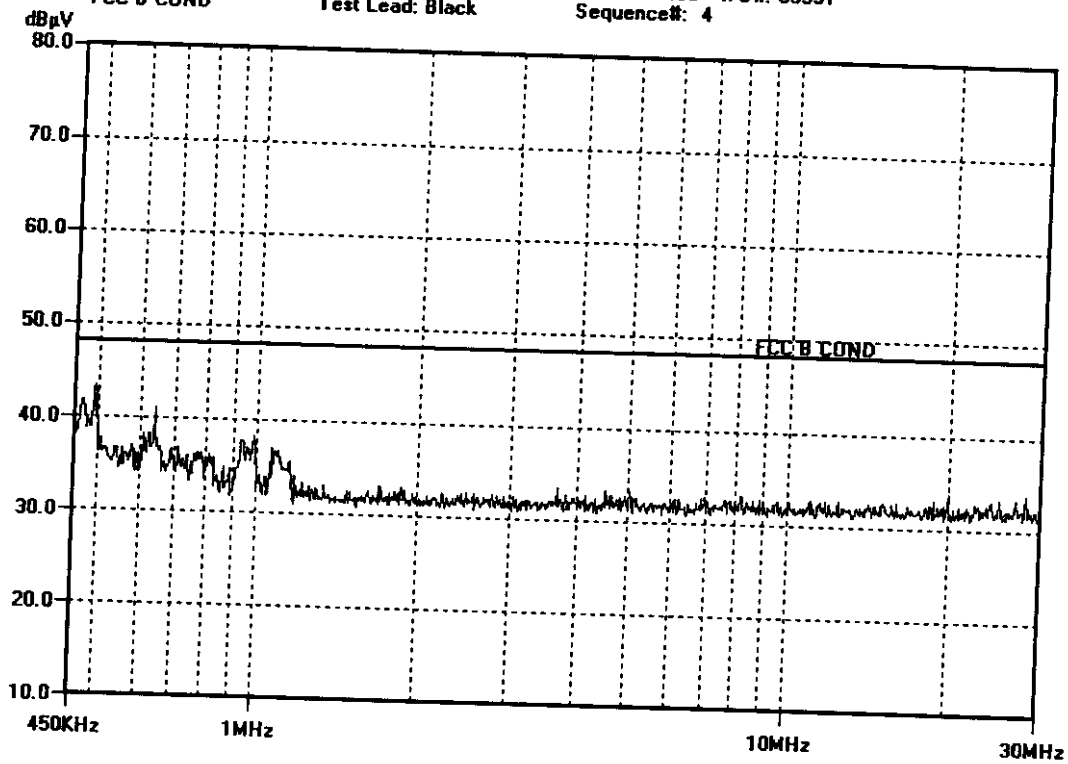


Testing the Future

LABORATORIES, INC.

| | | | | | | | |
|----|----------|------|------|------|------|-------|-------|
| 12 | 505.355k | 37.7 | +0.0 | 37.7 | 48.0 | -10.3 | Black |
| 13 | 1.058M | 37.1 | +0.0 | 37.1 | 48.0 | -10.9 | Black |
| 14 | 955.855k | 37.1 | +0.0 | 37.1 | 48.0 | -10.9 | Black |
| 15 | 578.910k | 37.1 | +0.0 | 37.1 | 48.0 | -10.9 | Black |
| 16 | 712.370k | 36.8 | +0.0 | 36.8 | 48.0 | -11.2 | Black |
| 17 | 1.098M | 36.7 | +0.0 | 36.7 | 48.0 | -11.3 | Black |
| 18 | 690.379k | 36.7 | +0.0 | 36.7 | 48.0 | -11.3 | Black |
| 19 | 539.858k | 36.7 | +0.0 | 36.7 | 48.0 | -11.3 | Black |
| 20 | 1.080M | 36.6 | +0.0 | 36.6 | 48.0 | -11.4 | Black |
| 21 | 556.161k | 36.6 | +0.0 | 36.6 | 48.0 | -11.4 | Black |

CKC Laboratories, Inc. Date: Mon Oct-19-1998 Time: 15:38:05 WO#: 69991
FCC B COND Test Lead: Black Sequence#: 4



Test Location: CKC Laboratories, Inc. • 5473A Clouds Rest Rd, Barn • Mariposa, CA 95338 • (800)-500-4EMC

Customer: **Microframe**
Specification: **FCC B COND**
Test Type: **Conducted Emissions**
Equipment: **Transmitter**
Manufacturer: **Microframe**
Model: **904-1.5**
S/N:

Date: Oct-19-98
Time: 16:03
Sequence#: 5
Tested By: Skip Doyle

Equipment Under Test (* = EUT):

| Function | Manufacturer | Model # | S/N |
|-------------|--------------|---------|------|
| Transmitter | Microframe | 904-1.5 | 1263 |

Support Devices:

| Function | Manufacturer | Model # | S/N |
|----------|--------------|---------|-----|
| None | | | |

Test Conditions / Notes:

Microframe Visual Pager Transmitter Series 900. EUT uses 120 VAC to 24 VAC transformer power supply and has a continuous modulated signal. FCC B Conducted Emissions

Measurement Data:

Sorted by Margin

Test Lead: White

| # | Freq | Rdng dBμV | DB | dB | dB | dB | Dist dB | Corr dBμV/m | Spec dBμV/m | Margin dB | Polar |
|----|----------|--------------|----|----|----|----|------------|----------------|----------------|--------------|-------|
| 1 | 653.223k | 38.8 | | | | | +0.0 | 38.8 | 48.0 | -9.2 | White |
| 2 | 642.607k | 38.4 | | | | | +0.0 | 38.4 | 48.0 | -9.6 | White |
| 3 | 635.782k | 37.9 | | | | | +0.0 | 37.9 | 48.0 | -10.1 | White |
| 4 | 624.408k | 37.7 | | | | | +0.0 | 37.7 | 48.0 | -10.3 | White |
| 5 | 497.773k | 37.6 | | | | | +0.0 | 37.6 | 48.0 | -10.4 | White |
| 6 | 539.479k | 37.5 | | | | | +0.0 | 37.5 | 48.0 | -10.5 | White |
| 7 | 579.668k | 37.1 | | | | | +0.0 | 37.1 | 48.0 | -10.9 | White |
| 8 | 543.270k | 36.9 | | | | | +0.0 | 36.9 | 48.0 | -11.1 | White |
| 9 | 515.213k | 36.9 | | | | | +0.0 | 36.9 | 48.0 | -11.1 | White |
| 10 | 559.953k | 36.8 | | | | | +0.0 | 36.8 | 48.0 | -11.2 | White |
| 11 | 523.555k | 36.6 | | | | | +0.0 | 36.6 | 48.0 | -11.4 | White |

| | | | | | | | |
|----|----------|------|------|------|------|-------|-------|
| 12 | 493.981k | 36.6 | +0.0 | 36.6 | 48.0 | -11.4 | White |
| 13 | 599.763k | 36.4 | +0.0 | 36.4 | 48.0 | -11.6 | White |
| 14 | 570.569k | 36.4 | +0.0 | 36.4 | 48.0 | -11.6 | White |
| 15 | 565.261k | 36.4 | +0.0 | 36.4 | 48.0 | -11.6 | White |
| 16 | 464.408k | 36.4 | +0.0 | 36.4 | 48.0 | -11.6 | White |
| 17 | 741.943k | 36.3 | +0.0 | 36.3 | 48.0 | -11.7 | White |
| 18 | 584.218k | 36.2 | +0.0 | 36.2 | 48.0 | -11.8 | White |
| 19 | 450.758k | 36.1 | +0.0 | 36.1 | 48.0 | -11.9 | White |
| 20 | 506.114k | 36.0 | +0.0 | 36.0 | 48.0 | -12.0 | White |



Testing the Future

LABORATORIES, INC.

CKC Laboratories, Inc. Date: Mon Oct-19-1998 Time: 15:59:41 WO#: 69991
FCC B COND Test Lead: White Sequence#: 5

