FCC ID: MIVWG9701A

Prepared for:

INET INC.
1255 W. 15th Street
Plano, Texas 75075

By:

Professional Testing (EMI), Inc.
1303 West Industrial Blvd.
Round Rock, Texas 78681

Submitted to:

Federal Communications Commission
Equipment Approval Services
P.O. Box 358315
Pittsburgh, Pennsylvania 15251-3315

June 1998

FCC Application for Type Acceptance of an Intentional Radiator

INET INC.
SPIDER MITE
PCMCIA CDPD/CS Modem
(Transmitter Portion)

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Appendices

Certificate of Compliance

Applicant:	Inet Inc.
Applicant's Address:	1255 W. 15th Street Plano, Texas 75075
Model:	SPIDER MITE Wireless Local Loop Modem
Serial Number:	FCC#08
Project Number:	98-284
Test Dates:	February 25 through 27, 1988

I, Jeffrey A. Lenk, for Professional Testing (EMI), Inc., being familiar with the FCC rules and test procedures have reviewed the test setup, measurement data and this report. I believe them to be true and accurate. The **Inet Inc., Spider Mite Wireless Modem** was tested and found to be in compliance with FCC Parts 15 and 22 for Intentional Radiators.

_____

Jeffrey A. Lenk
President

1.0 Equipment Under Test (EUT) Description

The **Inet Inc., Spider Mite CDPD/CS PCMCIA Modem (Spider Mite)** was tested installed in a typical host laptop computer. The SPIDER MITE operating under ac power was determined to be "worst case"; therefore, only data taken for ac powered operation is included within this report.

The **Inet Inc., Spider Mite CDPD/CS PCMCIA Modem (Spider Mite)** is a dual mode (CDPD and AMPS protocols) wireless modem. This modem is constructed in a PCMCIA format with an antenna port on the external edge of the unit. The antenna (included with the **Spider Mite**) is intended for connection directly to the edge of the modem. The **Spider Mite** is designed for use in personal or commercial environments. This device is intended for operation under the requirements of Part 22 (Subpart H). Specific test requirements include the following:

47 CFR 2.995(a) & 47 CFR 22.905	Frequency Stability vs. Temperature
47 CFR 2.995(d) (2) & 47 CFR 22.905	Frequency Stability vs. Battery Power
47 CFR 22.913	Effective Radiated Power (ERP)
47 CFR 2.989	Occupied Bandwidth
47 CFR 22.915	Modulation Requirements
47 CFR 22.917 (b) & (e)	Out of Band Emissions - Radiated
47 CFR 22.917 (f)	Mobile Emissions in the Base Station Band
47 CFR 22.919	Electronic Serial Number (ESN)
47 CFR 2.1093	Specific Absorption Rate (SAR)

Testing of this device included evaluations for CDPD and AMPS modes of operation. Tests were also performed for voice and data traffic modes. The modem does possess voice transmission, while this is expected to be a little used feature.

The system tested consisted of the following components:

Manufacturer & Model	**Serial #**	**FCC ID #**	**Description**
Inet Inc., Spider Mite	FCC #08	MIVWG9701A	Spider Mite PCMCIA Wireless Modem
Spider Mite Modem Antenna	N/A	N/A	Spider Mite Modem Antenna

Host Systems:

Manufacturer & Model	Serial #	FCC ID #	Description
Inet Spider Mite Frequency Stability Test Fixture	N/A	N/A	Frequency Stability Test Fixture
Toshiba Satellite T313OCS	11581604-1	CI6UK323	Laptop Computer

System Peripherals:

Manufacturer & Model	Serial #	FCC ID #	Description
IBM P70	21-02514	AK8GDM17SE2T	Monitor
Worldport 01-0101	64831	ETI5V3T	Modem
Panasonic KX-P1180i	1JKBQA24181	ACJ5Z6KX-P1191	Printer
Koss SB-35	N/A	N/A	Hands Free Headset

The equipment within this report was tested to verify its compliance with FCC Rule Parts 2, and 22, for Intentional Radiators. Separate verification reports pursuant to Part 15, Subpart B has been prepared for the **Inet Inc., Spider Mite CDPD/CS PCMCIA Modem** as a Digital Device and for the receiver portion of the **Spider Mite**.

2.0 Frequency Stability

2.1 Frequency Stability versus Temperature

Measurements were made on the **SPIDER MITE** to verify compliance with the frequency stability requirements of §2.995(a). Under this specification, the EUT is tested to verify satisfactory frequency stability versus changes in the ambient temperature. For determination of frequency tolerance, §22.905 was used as a reference to calculate an acceptable limit.

2.1.1 Test Procedure

The tests were performed in a temperature and humidity test chamber. The **SPIDER MITE** was placed in a test fixture which maximized exposure of the device to the temperature in the chamber and allowed for variation of the DC input voltage to the device. The fixture also contained a tether which allowed the unit to be operated from a personal computer outside the test environment. The RF output of the EUT was fed into a Hewlett Packard 8591E Spectrum Analyzer. The frequency of the device was measured from the analyzer.

The temperature for the EUT was varied from -30 ^{o}C to +50 ^{o}C at 10 ^{o}C intervals. The EUT was allowed to soak at each temperature a minimum of 45 minutes prior to taking the frequency reading. The frequency was recorded at each data point and compared to the limit.

2.1.2 Test Criteria

When combined, Sections 2.995 (a), and 22.905 indicate that the output spectrum of the transmitter shall remain within the appropriate channel band with ambient temperature for the EUT ranging from -30 ^{o}C to +50 ^{o}C. Based on general channel width requirements, the frequency error for this test should not exceed 4.25 kHz. This was calculated based on a 0.0005% maximum variation for a nominal center frequency of 850 MHz.

2.1.3 Test Results

The **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** meets the frequency stability requirements for frequency stability versus temperature variation based on the criteria listed above. Data for this test is located in Appendix A of this report.

2.2 Frequency Stability versus DC Input Power

Measurements were made on the **SPIDER MITE** to verify compliance with the frequency stability requirements of §2.995(d)(1). Under this specification, the EUT is tested to verify satisfactory frequency stability versus changes in the amplitude of the primary power for operation from the AC mains.

2.2.1 Test Procedure

The tests were performed in a temperature and humidity test chamber. The **SPIDER MITE** was placed in a test fixture which maximized exposure of the device to the temperature in the chamber and allowed for variation of the DC input voltage to the device. The fixture also contained a tether which allowed the unit to be operated from a personal computer outside the test environment. The RF output of the EUT was fed into a Hewlett Packard 8591E Spectrum Analyzer. The frequency of the device was measured from the analyzer.

In order to determine the response of the EUT without the effects of host system power regulation, the power fluctuation requirements were translated to the DC power input to the PCMCIA card. The maximum frequency error was recorded at the nominal card input voltage over the required voltage variation range (4.25 to 5.75 VDC). The response of the EUT was monitored as the voltage was changed.

2.2.2 Test Criteria

When combined, Sections 2.995 (a), and 22.905 indicate that the output spectrum of the transmitter shall remain within the appropriate channel band with AC mains power being from 85% to 115% of the nominal value. Based on general channel width requirements, the frequency error for this test should not exceed 4.25 kHz. This was calculated based on a 0.0005% maximum variation for a nominal center frequency of 850 MHz.

2.2.3 Test Results

The **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** meets the frequency stability requirements for frequency stability versus power input variation based on the criteria listed above. Data for this test is located in Appendix A of this report.

3.0 Effective Radiated Power (ERP) Measurements

Measurements were made on the **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** to verify compliance with the maximum effective radiated power (ERP) requirements of §22.913.

ERP measurements were made at the Professional Testing "Open Field" Site 3, located in Marble Falls, Texas, to determine the radio noise radiated from the EUT. A “Description of Measurement Facilities” has been submitted to the FCC and approved pursuant to Section 2.948 of CFR 47 of the FCC rules.

3.1 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a motorized turntable which allows 360 degree rotation. A measurement antenna was positioned at a distance of 3 meters as measured from the closest point of the EUT. The radiated emissions were maximized by configuring the EUT, by rotating the EUT, and by raising and lowering the antenna from 1 to 4 meters.

A Spectrum Analyzer with peak detection was used to find the maximums of the radiated emissions during the variability testing. All final measurements were taken using a Quasi-Peak Adapter with a measurement bandwidth of 120 kHz. A drawing showing the test setup is given as Figure 2.

ERP testing of the **SPIDER MITE** was performed at 3 channel settings for both CDPD and AMPS transmission modes. The channel and transmission protocol for the **SPIDER MITE** was set via special software in the host system. This software was also set to maximize the traffic level/spectral density for this test.

3.2 Test Criteria

Section 22.913 requires that the effective radiated power of mobile and portable transmitters be no greater than 2 watts. ERP testing was performed by measuring the maximum electric field from the EUT for the **SPIDER MITE** and translating this level to ERP using the following formula:

$$\mathbf{ERP = (E*r)/(30)^{1/2}}$$

Where:

E = Electric Field in v/m

r = distance from the measurement antenna to the EUT in meters

This formula was obtained from the Industry Canada document, 'Guidelines for Measurement of Radio Frequency Fields at Frequencies from 10 kHz to 300 GHz, Document Reference NIR-E, dated January 1994'.

3.3 Test Results

Measurements were performed utilizing a spectrum analyzer IF/video bandwidth of 3 kHz/10 kHz. The frequency span was set for 3 MHz and was centered on the peak of the output signal.

Data for ERP testing is located in Appendix C of this report. **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** met the §22.913 ERP requirements.

4.0 Occupied Bandwidth Measurements

Measurements were made on the **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** to determine the occupied bandwidth in accordance with Part 2.989.

4.1 Test Procedure

All measurements were performed in a controlled laboratory environment. The occupied bandwidth of the **SPIDER MITE** was measured using a Hewlett Packard HP 8920A Test set. The data for the EUT was set to maximize the spectral density of the RF emission.

Occupied bandwidth was plotted for channels 367, 799 and 991 for CDPD and AMPS transmission modes. The occupied bandwidth was measured based on the emission width 26 dB below the peak emission level.

4.2 Test Criteria

Section 2.989 requires that the occupied bandwidth for Type Accepted units be measured and reported as part of the device filing.

4.3 Test Results

Data for occupied bandwidth testing is located in Appendix D of this report. **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** has a worst case occupied bandwidth of 37.8 kHz for AMPS based transmission and 25.2 kHz for CDPD transmission. Both bandwidth measurements are based on the 26 dBc criteria. In addition, the maximum conducted power for AMPS modulation is 16.5 dBm (0.446 watts) and 14.2 dBm (0.263 watts) for CDPD transmission modes.

5.0 Modulation Requirement Measurements

Measurements were made on **Inet Inc. Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** to verify compliance with the modulation requirements of Section 22.915.

5.1 Test Procedure

The tests were performed in a controlled laboratory environment. The **SPIDER MITE** was installed in a host computer system with the audio input of the **SPIDER MITE** connected to the audio test port of the HP 8920.

For this unit, the modulation characteristics of the device are independent of channel or modulation setting. Based on this analysis, the modulation characteristics of the SPIDER MITE were evaluated in the AMPS mode.

5.2 Test Criteria

Section 22.915 requires that the audio filter emissions of the device be attenuated based on the following table:

Frequency Range (kHz)	Minimum Attenuation (dB)
3.0 to 5.9	40 log (f/3)
5.9 to 6.1	35 dB
6.1 to 15	40 log (f/3)

Where f is the measurement frequency in kHz. The minimum attenuation level is referenced to the level of a 1 kHz reference tone. For this test, the input signals to the device must be configured based on the information in Section 22.915 (b).

5.3 Test Results

Data for audio modulation testing is located in Appendix C of this report. **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** met the §22.915 modulation requirements.

6.0 Out of Band Emissions - Radiated

Radiated emissions measurements were made to determine out of band radiated noise produced by the **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** transmitter in accordance with Section 22.917(b) and (e).

Radiated emissions measurements were made at the Professional Testing "Open Field" Site 3, located in Marble Falls, Texas, to determine the radio noise radiated from the EUT. A "Description of Measurement Facilities" has been submitted to the FCC and approved pursuant to Section 2.948 of CFR 47 of the FCC rules.

6.1 Test Procedure

The EUT (as installed in the Host system) was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a motorized turntable which allows 360 degree rotation. A measurement antenna was positioned at a distance of 3 meters as measured from the closest point of the EUT. For measurements above 1 GHz, the antenna distance was decreased to 1 meter. The radiated emissions were maximized by configuring the EUT, by rotating the EUT, and by raising and lowering the antenna from 1 to 4 meters.

A Spectrum Analyzer with peak detection was used to find the maximums of the radiated emissions during the variability testing. All final measurements below 1 GHz were taken using a Quasi-Peak Adapter with a measurement bandwidth of 120 kHz. Measurements above 1 GHz were made using a peak measurement method. The final measurements provided were determined by using the following formula:

Corrected Level = Recorded Level - Pre-Amp Gain + Antenna Factor + Cable Loss

6.2 Test Criteria

Based on the out of band emission criteria of §22.917, transmitter related emissions for the **SPIDER MITE** shall be reduced by the following amount with respect to the level of the fundamental:

Frequency offset versus the fundamental (kHz)	Attenuation versus the fundamental (dB)
20 to 45	26
45 to $2f_c$	60 or 43 + 10 log(P)
$2f_c$ to $10f_c$	43 + 10 log(P)

Based on the figures obtained from the occupied bandwidth tests, the peak power of this unit is 0.446 watts, which translates the 43 +10 log(P) term to a minimum attenuation of -40 dB.

6.3 Test Results

The **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** was tested for radiated spurious emissions at a channel setting of 799 for both CDPD and AMPS transmission modes. The signals were fully modulated for both tests.

Radiated emission data sheets are contained in Appendix F of this report. The **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** met the §22.917(b) and (e) radiated emission requirements.

7.0 Mobile Emissions in the Base Frequency Band

Conducted emissions measurements were made to determine the mobile emissions produced by the **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** transmitter inside the band of the Base Unit Band.

7.1 Test Procedure

The tests were performed in an controlled laboratory environment. A Hewlett Packard 8924C 800 MHz CDMA Test Set was used to simulate a CDMA cell site and to monitor the transmit frequency of the EUT. The HP 8924C was set to display the frequency variation from the nominal value for the channel under test. This test was performed at channel settings of 284, 384 and 760. The output of the EUT was placed in a constant transmit mode at a level near the maximum output level for the **SAU-800**.

7.2 Test Criteria

Based on the mobile emissions in the base frequency band criteria of §22.917(f), the mobile transmitter shall not produce conducted emissions inside the corresponding base frequency band greater than -80 dBm. For this unit, the base station band is completely covered over the frequency range of 869.00 to 892.00 MHz.

7.3 Test Results

The **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** operates over the frequency range 824 to 849 MHz. Testing was performed with the device tuned to Channel

Data for this test is contained in Appendix G of this report. The **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** met the §22.917(f) conducted emission requirements.

8.0 Electronic Serial Number Assignment

An engineering evaluation was made to determine if the **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** transmitter is compliant with the Electronic Serial Number (ESN) requirements of §22.919 criteria.

8.1 Test Procedure

The following engineering analysis of the **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** was provided by Inet regarding the encoding and implementation of the ESN for the EUT:

Inet SPIDER MITE ESN Analysis

Each modem has a unique 32-Bit Electronic Serial Number (ESN) assigned to it at the time of manufacture which identifies the modem to the cellular system when in the AMPS mode. The CDPD network uses a combination of an IP number and authentication exchange to uniquely identify the modem to the CDPD network even though each modem is assigned a 48-Bit electronic identification (EID) per the CDPD requirements.

The ESN host component is a 4 Mbit FLASH memory chip which is permanently attached to the circuit board of the modem.

The integrity of the modem's operating software is not alterable. A 32-Bit cyclic redundancy check (CRC) of the operating software is performed after system reset. If the CRC fails, the system remains in boot mode and will not execute the operating software.

In addition to the ESN, the host compartment contains the operating software. The ESN was encoded using the cyclic coding (32-Bit CRC). The ESN is factory set and is not alterable, transferable, removable, or otherwise able to be manipulated in the field.

8.2 Evaluation Criteria

Based on the ESN requirements of §22.919, the mobile transmitter shall meet the following criteria:

Each unit shall have a unique 32 bit electronic serial number

1. The ESN component must be permanently attached to a main circuit board component and cannot be altered, through either software or hardware means.

2. The ESN must utilize one or more of the following encryption means:

3. Multiplication or Division by a Polynomial

4. Cyclic Coding

5. Spreading of the ESN bits over non-sequential memory locations

The J-STD-008 CDMA protocol contains specific details regarding the structure of the ESN which is compliant with the guidelines for §22.919. Basically, if a valid ESN is returned from the **SPIDER MITE** using J-STD-008 CDMA protocol following interrogation by the test set and the ESN circuitry is hardwired into the unit, the **SPIDER MITE** will meet the requirements of §22.919.

8.3 Evaluation Results

Based on the analysis provided by Inet, the **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** meets the §22.919 ESN requirements.

9.0 Specific Absorption Rate Evaluation

An evaluation was performed to determine the near field emission profile of the **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** with respect to the Specific Absorption Rate (SAR) requirements of 47 CFR 2.1093.

9.1 Test Procedure

The tests were performed by the Lucent Technologies Holmdel New Jersey facility. The test methods and test configurations are contained in a separate report generated by Lucent Technologies.

9.2 Test Criteria

Based on the absorption criteria described in 47 CFR 2.1093, the near field absorption for **the SPIDER MITE** must not exceed 4.0 watts/kilogram.

9.3 Test Results

Data for this test is contained in a separate SAR report. The **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** met the §2.1093 near field absorption requirements requirements.

10.0 Form 731 Information

The following information is provided for inclusion in the FCC Form 731 for the **Inet Inc. SPIDER MITE Wireless Local Loop Modem.**

10.1 Emission Designator

Bandwidth:

The transmission bandwidth is determined by Carson's Rule:

BW = $2(\Delta f + f_{mod})$

where, Δf = frequency deviation and f_{mod} = modulation rate.

In CDPD mode, the data rate equals 19.2 Kbps and for equal number of "l's" and "0's", the modulation rate **(f_{mod}) =** Data rate/2 ~ fmod = 19.2KbpsI2 = 9.6 kHz. Further, Af = fmod x ~ where, the modulation index (~) equals *0.5* for CDPD. Therefore, Af = 9.6 kHz x *0.5* = 4.8 KRz. **BW** = 2(4.8 **kHz + 9.6 kHz) = 28.8 kHz.**

In AMPS mode, there are two bandwidth requirements; one for wideband data transmission and one for voice/modem transmission. For signaling tone and wideband data, the frequency deviation is set to 8 kHz and the modulation rate is 10 kHz. **BW** 2(8 **kHz + 10 kHz)** = 36 **kHz.** For AMPS voice or modem mode, the maximum frequency deviation allowed is 12 kHz at a modulation rate of 3 kHz. BW 2(12 **kHz + 3 kHz) =30 kHz.**

Emission Designator::

The RF output signals of the **SPIDER MITE** are complaint with the AMPS and CDPD protocol requirements. This output signal for this protocol is a frequency modulated signal containing voice, data and signaling information in a channel hopping mode. The emission for **the SPIDER MITE** can contain voice or non-voice data and will include signaling and traffic control information. This results in the emission designator being derived from the following components:

Symbol Position	**Parameter**	**Description**	**Resulting Symbol**
1	Type of Modulation	Frequency	F
2	Nature of Symbol(s) Modulating the Carrier	Single Channel Containing analog information	3
3	Type of Information Being Transmitted	Voice Data (Telephony)	E
3	Type of Information Being Transmitted	Digital Data	D

Since this unit can operate in multiple modes (data or voice) for either transmission mode, the **SPIDER MITE** has the following emission designators:

AMPS Mode

F3D36K0 (Data transmission) and F3E36K0 (Voice Transmission)

CDPD Mode

F3D28K8 (Data transmission) and F3E28K8 (Voice Transmission)

10.2 Output Power

In the occupied bandwidth tests, the highest antenna port power was measured for 3 channels for each traffic type. The power levels versus traffic type are listed below:

AMPS Mode

Channel	Conducted Power (dBm)	Conducted Power (watts)
367	15.2	0.331
799	13.8	0.239
991	16.5	0.446

CDPD Mode

Channel	Conducted Power (dBm)	Conducted Power (watts)
367	14.2	0.263
799	12.8	0.190
991	14.2	0.263

Based on these charts, the maximum power rating for AMPS mode would be 0.446 watts while the corresponding rating for CDPD would be 0.263 watts.

10.3 Frequency Band of Operation

The **SPIDER MITE** is rated to be used through the entire 800 MHz CDPD/AMPS communication band. Based on this requirement, the transmission range of the SPIDER MITE is 824.010 MHz to 848.010 MHz.

11.0 Modifications

No modifications were made to the **Inet Inc., Spider Mite Wireless Modem (SPIDER MITE)** during testing for compliance with either FCC Parts 22 or 15.

12.0 List of Test Equipment

A list of the test equipment utilized to perform the conducted and radiated emission measurements is given below. The date of calibration is given for each.

Device	**Description**	**Date Last Calibrated**	**Calibration Due**
HP 8566B	Spectrum Analyzer	09/22/97	09/22/98
HP 85650A	Quasi Peak Adapter	02/10/97	02/10/98
MITEQ AFS4-00101800-40-10P-N	Preamplifier	10/23/97	10/23/98
EMCO 3108	Biconical Antenna	07/22/97	07/22/98
EMCO 3146	Log Periodic Antenna	07/22/97	07/22/98
EMCO 3115	Double Ridged Horn Antenna	04/30/97	04/30/98
HP 8920A	Cellular Test Set	07/16/98	07/16/99
Fluke 45	Digital Multimeter	08/19/97	08/19/98
Astron Model VS-35M	Adjustable DC Power Supply	Not Required	Not Required
Thermotron SM-32	Environmental Chamber	11/19/97	11/19/98

Appendix A Frequency Stability Test Data

Frequency Stability Versus Temperature Data Sheet

Inet Inc.
SPIDER MITE Wireless Local Loop Modem

SERIAL #: FCC #08 PROJECT #: 98-284
DATE: February 25, 1998

EUT Temperature (Degrees C)	Measured Frequency (MHz)	Absolute Frequency Error (Hz)	Frequency Error vs. Margin (Hz)
50	836.009735	265.00	-3985.00
40	836.009660	340.00	-3910.00
30	836.009620	380.00	-3870.00
20	836.009740	260.00	-3990.00
10	836.009730	270.00	-3980.00
0	836.009570	430.00	-3820.00
-10	836.009365	635.00	-3615.00
-20	836.010020	20.00	-4230.00

COMMENT #1: Reference Limit = 4.25 kHz

COMMENT #2: 45 minute soak at each temperature

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Frequency Stability Versus Input Power Data Sheet

Inet Inc.
SPIDER MITE Wireless Local Loop Modem

SERIAL #: FCC #08 PROJECT #: 98-284
DATE: February 25, 1998

Input Voltage (VDC)	Measured Frequency (MHz)	Absolute Frequency Error (Hz)	Frequency Error vs. Margin (Hz)
4.25	836.009770	230.00	-4020.00
4.50	836.009770	230.00	-4020.00
4.75	836.009770	230.00	-4020.00
5.00	836.009790	210.00	-4040.00
5.25	836.009770	230.00	-4020.00
5.50	836.009770	230.00	-4020.00
5.75	836.009765	235.00	-4015.00

COMMENT #1: Reference Limit = 4.25 kHz

COMMENT #2: Nominal Input Voltage = 5.00 VDC

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Appendix B Effective Radiated Power (ERP) Test Data

Effective Radiated Power Data Sheet

Inet Inc.
SPIDER MITE Wireless Local Loop Modem

SERIAL #: FCC #10 PROJECT #: 98-284
DATE: February 25, 1998

CDPD Mode

Channel	Freq. (MHz)	Recorded Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
367	836.00	95.10	24.30	5.70	125.10	131.20	-6.10
799	849.00	95.00	26.20	6.10	127.30	131.20	-3.90
991	824.00	97.10	23.10	5.60	125.80	131.20	-5.40

AMPS Mode

Channel	Freq. (MHz)	Recorded Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
367	836.00	93.40	24.30	5.70	123.40	131.20	-7.80
799	849.00	91.70	26.20	6.10	124.00	131.20	-7.20
991	824.00	95.80	23.10	5.60	124.50	131.20	-6.70

COMMENT #1: Limit = 2 watts. At a test distance of 3 meter, an EIRP of 2 watts can be converted to field strength as:

$E = (EIRP * (30)^{1/2})/r$ for r = 3 meter and EIRP = 2 watts, this becomes:

$= \{2 * (30)^{1/2})\}/3 = 3.65$ v/m = 131.2 dBuV/m

COMMENT #2: Worst case emission direction for all measurements was 70 degrees.

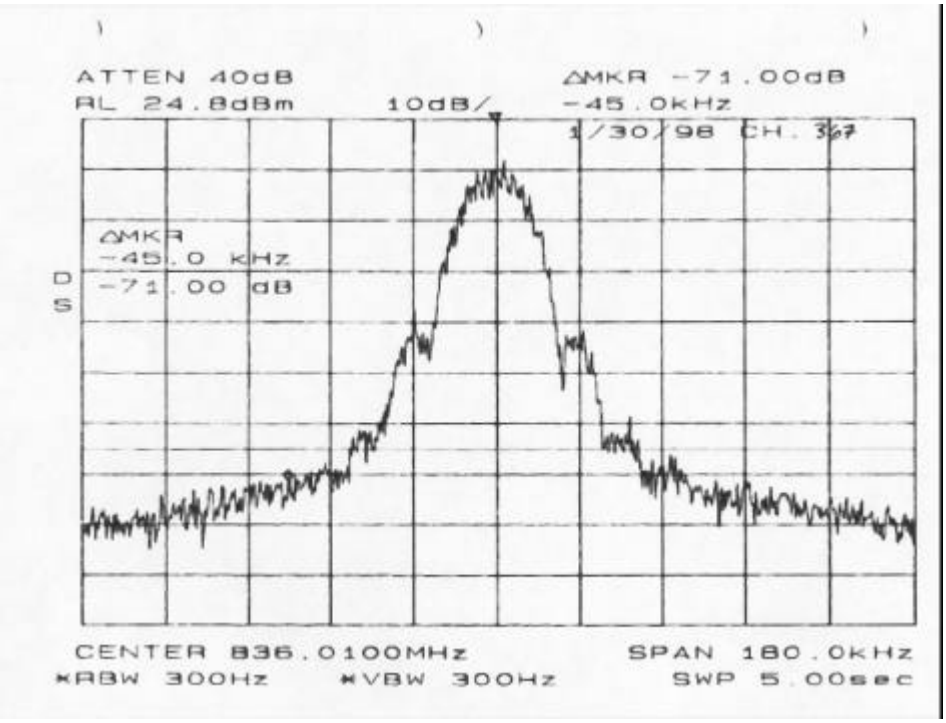
TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Appendix C Occupied Bandwidth Test Data

Occupied Bandwidth Data Sheet

Inet Inc.
SPIDER MITE Wireless Local Loop Modem

SERIAL #: FCC #08 PROJECT #: 98-284
DATE: February 25, 1998 MODE: CDPD



COMMENT #1: Channel = 367

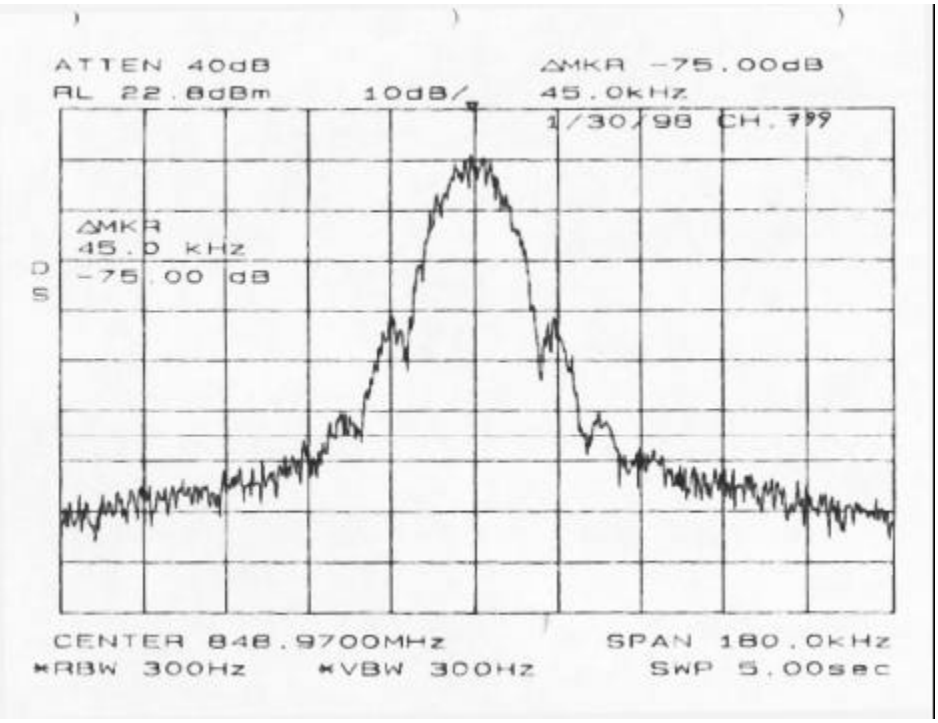
COMMENT #2: 26 dB Bandwidth = 23.4 kHz

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Occupied Bandwidth Data Sheet

Inet Inc.
SPIDER MITE Wireless Local Loop Modem

SERIAL #: FCC #08 PROJECT #: 98-284
DATE: February 25, 1998 MODE: CDPD



COMMENT #1: Channel = 799

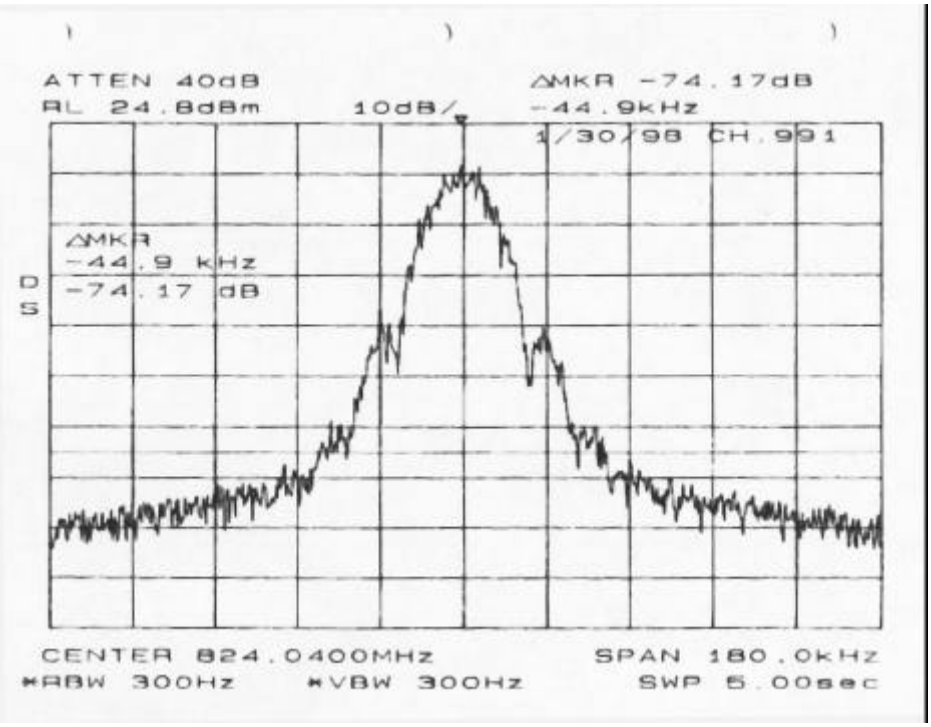
COMMENT #2: 26 dB Bandwidth = 25.2 kHz

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Occupied Bandwidth Data Sheet

Inet Inc.
SPIDER MITE Wireless Local Loop Modem

SERIAL #: FCC #08 PROJECT #: 98-284
DATE: February 25, 1998 MODE: CDPD



COMMENT #1: Channel = 991

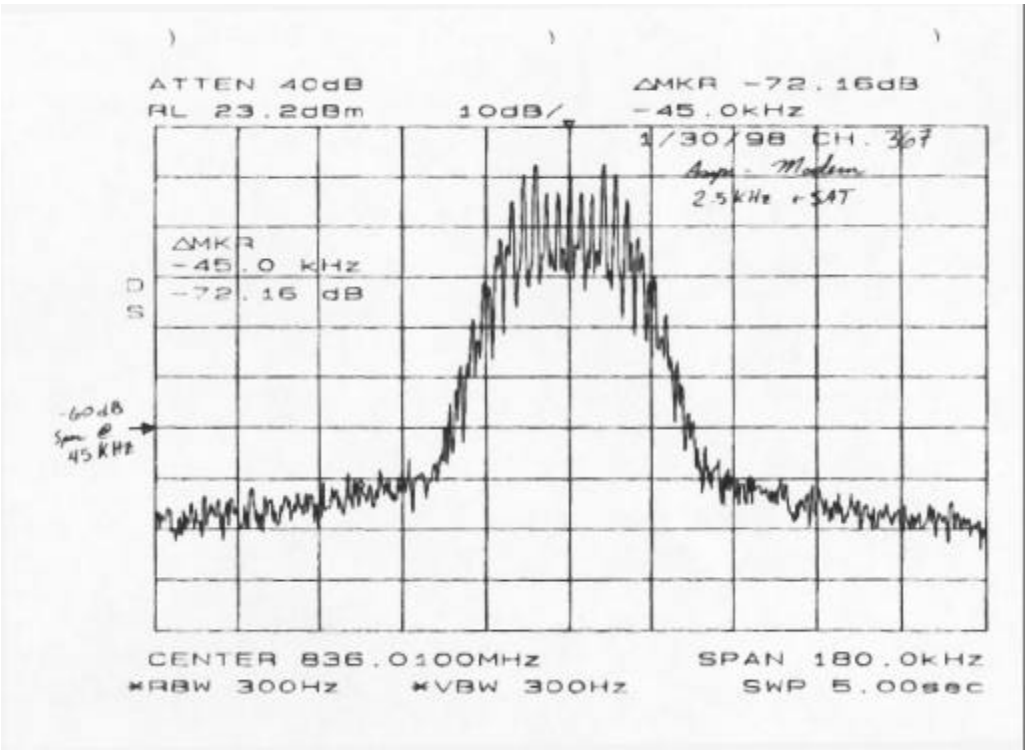
COMMENT #2: 26 dB Bandwidth = 25.0 kHz

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Occupied Bandwidth Data Sheet

Inet Inc.
SPIDER MITE Wireless Local Loop Modem

SERIAL #: FCC #08 PROJECT #: 98-284
DATE: February 25, 1998 MODE: AMPS



COMMENT #1: Channel = 367

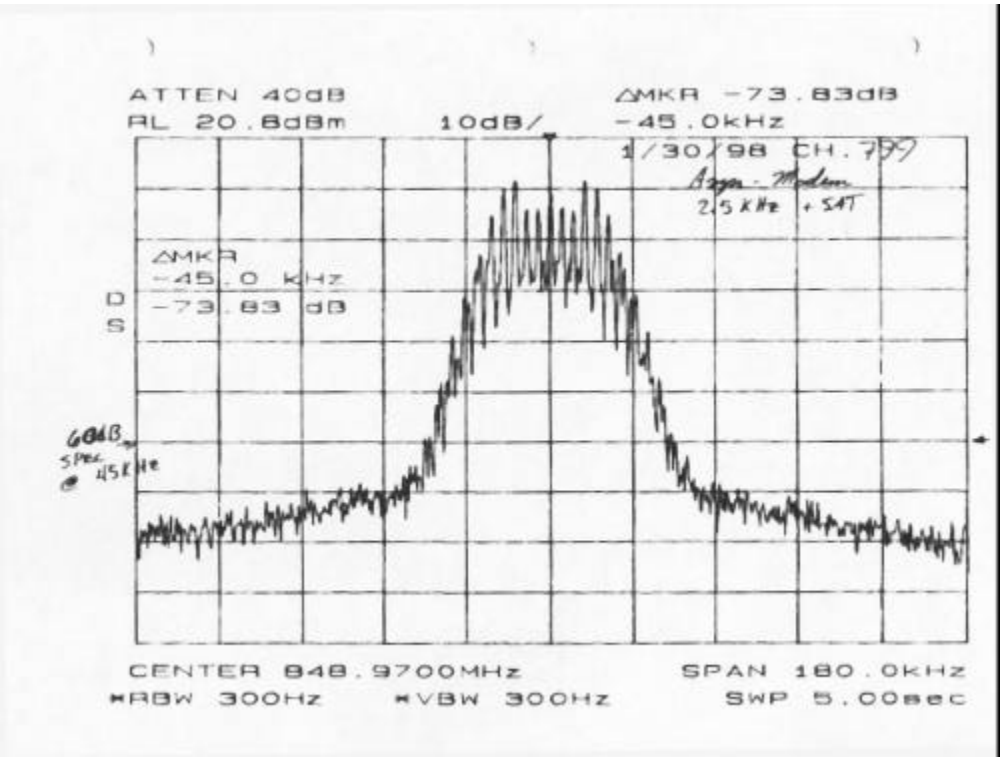
COMMENT #2: 26 dB Bandwidth = 37.8 kHz

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Occupied Bandwidth Data Sheet

Inet Inc.
SPIDER MITE Wireless Local Loop Modem

SERIAL #: FCC #08 PROJECT #: 98-284
DATE: February 25, 1998 MODE: AMPS



COMMENT #1: Channel = 799

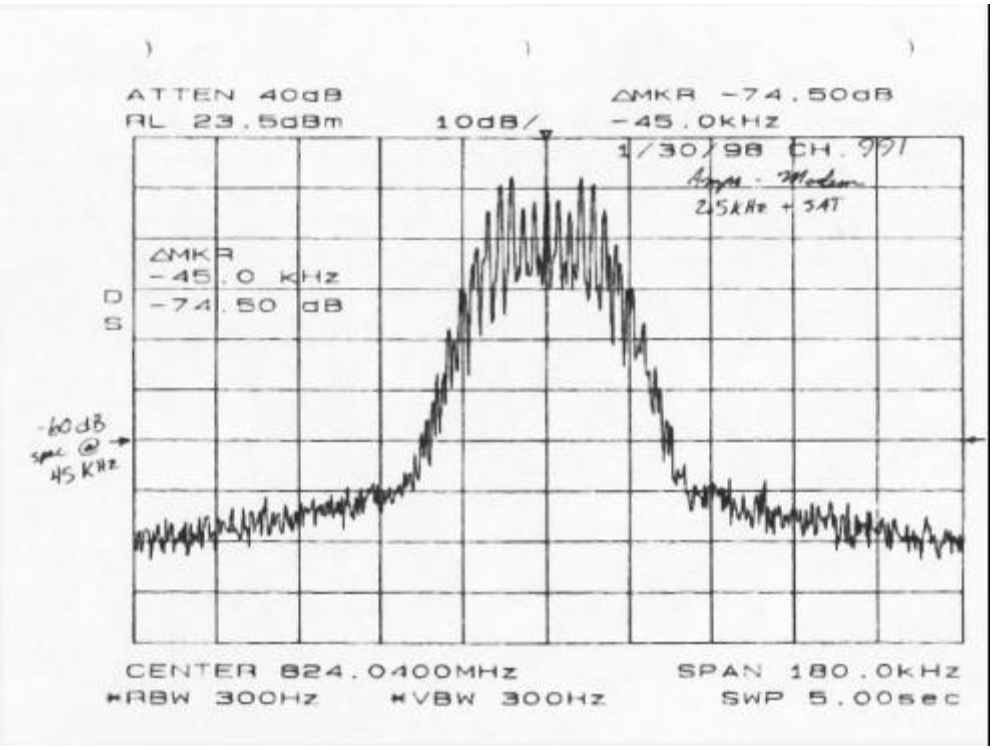
COMMENT #2: 26 dB Bandwidth = 37.5 kHz

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Occupied Bandwidth Data Sheet

Inet Inc.
SPIDER MITE Wireless Local Loop Modem

SERIAL #: FCC #08 PROJECT #: 98-284
DATE: February 25, 1998 MODE: AMPS



COMMENT #1: Channel = 991

COMMENT #2: 26 dB Bandwidth = 36.8 kHz

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Appendix D Modulation Requirements Test Data

Modulation Requirements Data Sheet

Inet Inc.
SPIDER MITE Wireless Local Loop Modem

SERIAL #: FCC #08 PROJECT #: 98-284
DATE: February 26, 1998

Audio Freq. (kHz)	Recorded Attenuation (dB)	Attenuation Limit (Min) (dB)	Marging (dB)
1.0	Ref	Ref	Ref
3.0	-0.22	0.0	-0.22
5.9	-35.20	-11.7	-23.50
6.0	-38.80	-35.0	-3.80
6.1	-38.00	-12.3	-25.70
9.0	-39.30	-19.0	-20.30
12.0	-39.20	-24.0	-15.20
15.0	-39.50	-27.8	-11.70

COMMENT #1: Initial reading of attenuation at 1 kHz was normalized to zero

COMMENT #2:

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Appendix E

Out of Band Emissions
Radiated Test Data

Out of Band Emission - Radiated Data Sheet

Inet Inc.
SPIDER MITE Wireless Local Loop Modem

SERIAL #: FCC #08 PROJECT #: 98-284
DATE: February 25, 1998 POLARIZATION: Vertical

Freq. (MHz)	EUT Direction (Deg)	Recorded Level (dBuV)	Cable Loss (dB)	Antenna Factor (dBuV/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
848.900	70.0	95.0	6.1	26.2	127.3	Ref	Ref
848.920	70.0	47.6	6.1	26.2	79.9	101.3	-21.4
848.945	70.0	17.8	6.1	26.2	50.1	87.3	-37.2
848.990	70.0	13.1	6.1	26.2	45.4	87.3	-41.9
1698.00	90.0	48.0	1.7	26.6	76.3	96.8	-20.5
2547.00	90.0	38.4	1.5	28.8	68.7	96.8	-28.1
3396.00	90.0	37.2	1.5	32.2	70.9	96.8	-25.9
4245.00	90.0	35.1	1.7	33.1	69.9	96.8	-27.0
5094.00	270.0	29.5	1.7	34.0	65.2	96.8	-31.7
5943.00	90.0	36.8	1.7	33.0	71.5	96.8	-25.4
6792.00	90.0	37.5	1.7	37.3	76.5	96.8	-20.4
7642.00	90.0	36.0	1.7	36.6	74.3	96.8	-22.6
8490.00	90.0	35.0	1.7	36.3	73.0	96.8	-23.9

COMMENT #1: Mode: CDPD; Channel = 799

COMMENT #2: Measurements < 1 GHz made at 3 meters. Measurements made > 1 GHz made at 1 meter. No EUT emissions detected from 5 to 9 GHz.

COMMENT #3: Worst case emissions were for EUT antenna in vertical position. Data is presented for this configuration.

COMMENT #4: BW decreased to 300 Hz for measurements within 90 kHz of the fundamental.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Radiated Data Sheet

Inet Inc.
SPIDER MITE Wireless Local Loop Modem

SERIAL #: FCC #08 PROJECT #: 98-284
DATE: February 25, 1998 POLARIZATION: Horizontal

Freq. (MHz)	EUT Direction (Deg)	Recorded Level (dBuV)	Cable Loss (dB)	Antenna Factor (dBuV/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
848.900	70.0	65.7	6.1	26.2	98.0	Ref	Ref
848.920	70.0	42.1	6.1	26.2	74.4	101.3	-26.9
848.945	70.0	20.2	6.1	26.2	52.5	87.3	-34.8
848.990	70.0	16.5	6.1	26.2	48.8	87.3	-38.5
1698.00	180.0	46.9	1.7	26.6	75.2	96.8	-21.6
2547.00	180.0	35.5	1.5	28.8	65.8	96.8	-31.0
3396.00	190.0	33.7	1.7	32.2	67.6	96.8	-29.3
4245.00	190.0	34.7	1.7	33.1	69.5	96.8	-27.4
5094.00	180.0	31.1	1.7	34.0	66.8	96.8	-30.1
5943.00	180.0	32.1	1.7	33.0	66.8	96.8	-30.1
6792.00	180.0	35.7	1.7	37.3	74.7	96.8	-22.2
7642.00	180.0	29.9	1.7	36.6	68.2	96.8	-28.7
8490.00	180.0	35.2	1.7	36.3	73.2	96.8	-23.7

COMMENT #1: Mode: CDPD; Channel = 799

COMMENT #2: Measurements < 1 GHz made at 3 meters. Measurements made > 1 GHz made at 1 meter. No EUT emissions detected from 5 to 9 GHz.

COMMENT #3: Worst case emissions were for EUT antenna in vertical position. Data is presented for this configuration.

COMMENT #4: BW decreased to 300 Hz for measurements within 90 kHz of the fundamental. Vertical Fundamental emission used for limit calculation

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Radiated Data Sheet

Inet Inc.
SPIDER MITE Wireless Local Loop Modem

SERIAL #: FCC #08 PROJECT #: 98-284
DATE: February 25, 1998 POLARIZATION: Vertical

Freq. (MHz)	EUT Direction (Deg)	Recorded Level (dBuV)	Cable Loss (dB)	Antenna Factor (dBuV/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
848.900	70.0	91.7	6.1	26.2	124.0	Ref	Ref
848.920	70.0	44.7	6.1	26.2	77.0	98.0	-21.0
848.945	70.0	15.4	6.1	26.2	47.7	84.0	-36.3
848.990	70.0	12.5	6.1	26.2	44.8	84.0	-39.2
1698.00	90.0	43.2	1.7	26.6	71.5	93.5	-22.0
2547.00	90.0	38.7	1.5	28.8	69.0	93.5	-24.5
3396.00	90.0	38.6	1.5	32.2	72.3	93.5	-21.2
4245.00	90.0	31.4	1.7	33.1	66.2	93.5	-27.4
5094.00	270.0	29.5	1.7	34.0	65.2	93.5	-28.4
5943.00	90.0	36.8	1.7	33.0	71.5	93.5	-22.1
6792.00	90.0	37.5	1.7	37.3	76.5	93.5	-17.1
7642.00	90.0	36.0	1.7	36.6	74.3	93.5	-19.3
8490.00	90.0	35.0	1.7	36.3	73.0	93.5	-20.6

COMMENT #1: Mode: AMPS; Channel = 799

COMMENT #2: Measurements < 1 GHz made at 3 meters. Measurements made > 1 GHz made at 1 meter. No EUT emissions detected from 5 to 9 GHz.

COMMENT #3: Worst case emissions were for EUT antenna in vertical position. Data is presented for this configuration.

COMMENT #4: BW decreased to 300 Hz for measurements within 90 kHz of the fundamental.

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Out of Band Emission - Radiated Data Sheet

Inet Inc.
SPIDER MITE Wireless Local Loop Modem

SERIAL #: FCC #08 PROJECT #: 98-284
DATE: February 25, 1998 POLARIZATION: Horizontal

Freq. (MHz)	EUT Direction (Deg)	Recorded Level (dBuV)	Cable Loss (dB)	Antenna Factor (dBuV/m)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
848.900	70.0	63.4	6.1	26.2	95.7	Ref	Ref
848.920	70.0	40.2	6.1	26.2	72.5	98.0	-25.5
848.945	70.0	21.4	6.1	26.2	53.7	84.0	-30.3
848.990	70.0	14.5	6.1	26.2	46.8	84.0	-37.2
1698.00	180.0	41.2	1.7	26.6	69.5	93.5	-24.0
2547.00	180.0	39.2	1.5	28.8	69.5	93.5	-24.0
3396.00	190.0	36.1	1.7	32.2	70.0	93.5	-23.6
4245.00	190.0	30.1	1.7	33.1	64.9	93.5	-28.7
5094.00	180.0	31.1	1.7	34.0	66.8	93.5	-26.8
5943.00	180.0	32.1	1.7	33.0	66.8	93.5	-26.8
6792.00	180.0	35.7	1.7	37.3	74.7	93.5	-18.9
7642.00	180.0	29.9	1.7	36.6	68.2	93.5	-25.4
8490.00	180.0	35.2	1.7	36.3	73.2	93.5	-20.4

COMMENT #1: Mode: CDPD; Channel = 799

COMMENT #2: Measurements < 1 GHz made at 3 meters. Measurements made > 1 GHz made at 1 meter. No EUT emissions detected from 5 to 9 GHz.

COMMENT #3: Worst case emissions were for EUT antenna in vertical position. Data is presented for this configuration.

COMMENT #4: BW decreased to 300 Hz for measurements within 90 kHz of the fundamental. Vertical Fundamental emission used for limit calculation

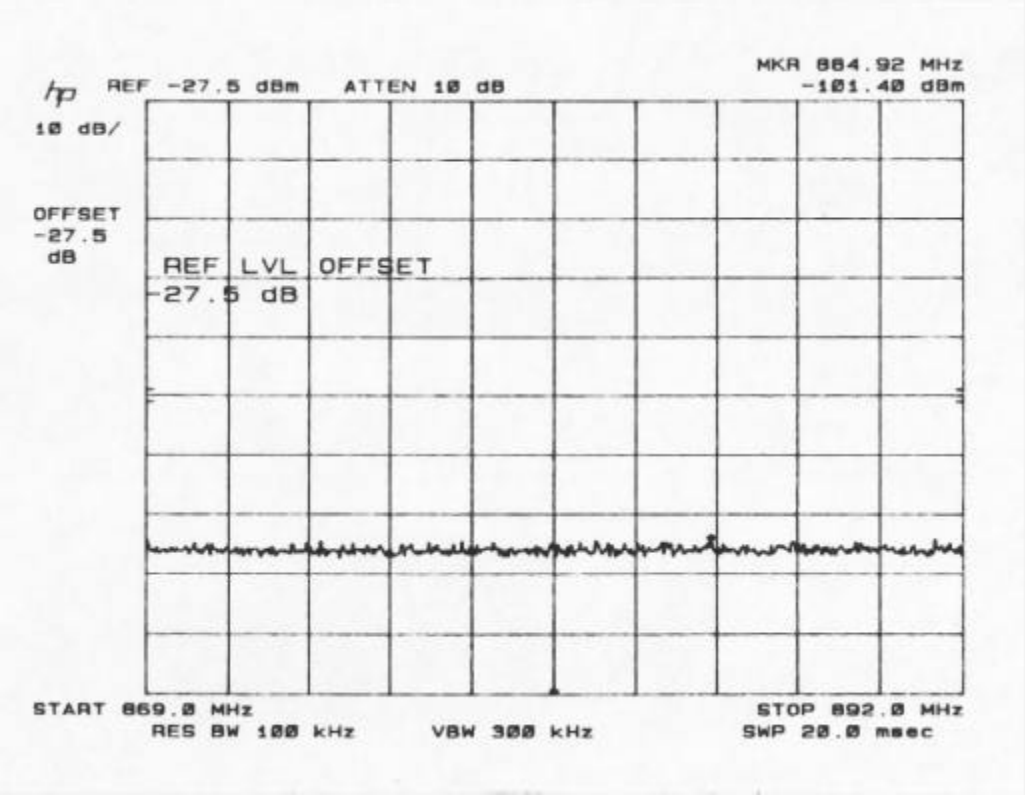
TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Appendix F Mobile Emissions in the Base Frequency Band Test Data

Mobile Emissions in the Base Band -Conducted Data Sheet

Inet Inc.
SPIDER MITE Wireless Local Loop Modem

SERIAL #: FCC #08 PROJECT #: 98-284
DATE: February 25, 1998 MODE: AMPS



COMMENT #1: Channel = 799

COMMENT #2: Sample Emissions for CDPD

TEST ENGINEER:_____ **APPROVED BY**: _____
John O'Brien **Jeff Lenk**

Appendix G Photographs

Inet Inc.
SPIDER MITE Wireless Local Loop Modem
(FCC ID# MIVWG9701A)

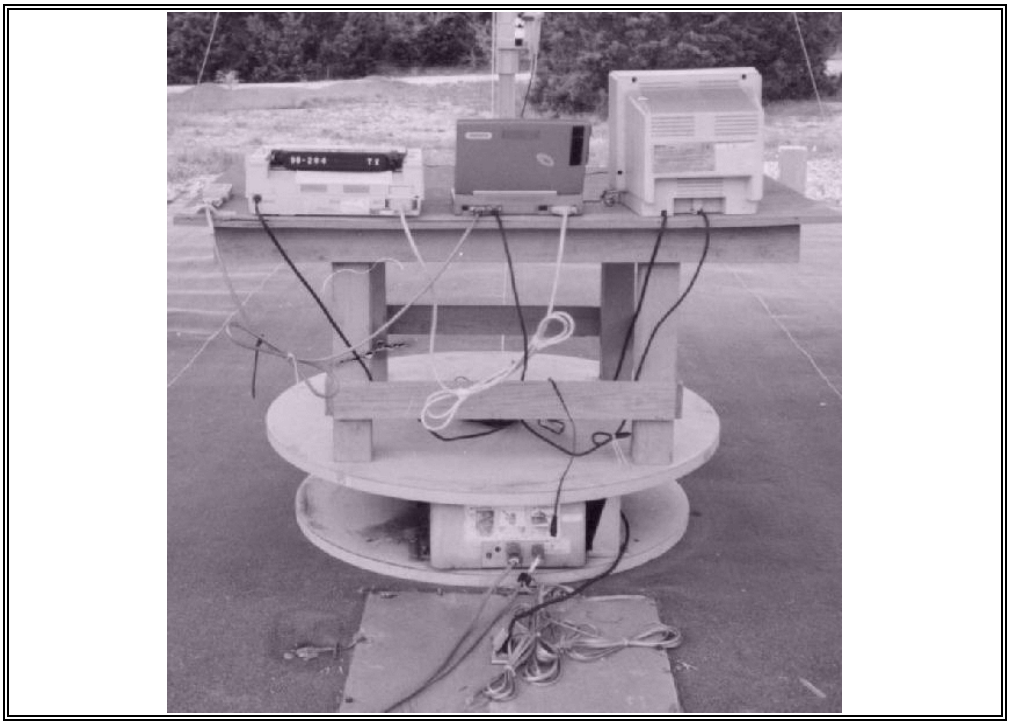
Frequency Stability Test Setup

Modulation Requirements Test Setup

Inet Inc.
SPIDER MITE Wireless Local Loop Modem
(FCC ID# MIVWG9701A)

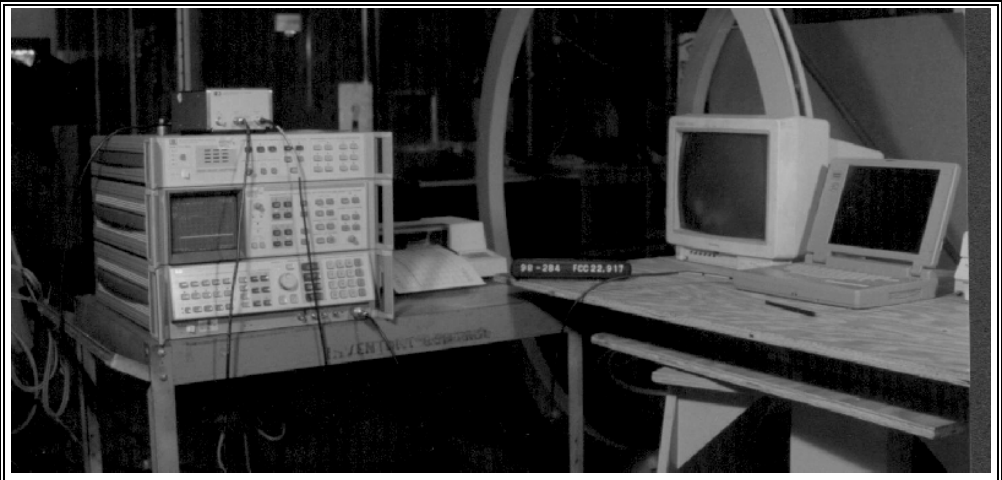
Radiated Emissions Test Setup (Front)

Radiated Emissions Test Setup (Rear)



Inet Inc.
SPIDER MITE Wireless Local Loop Modem
(FCC ID# MIVWG9701A)

Mobile Emissions in the Base Band Test Setup



(Same Setup used for Occupied Bandwidth