



**CERTIFICATION TEST REPORT**  
**FOR THE**  
**INTEGRATED SENSOR SUITE, 6320W**  
**FCC PART 15 SUBPART C**  
**COMPLIANCE**

**DATE OF ISSUE: AUGUST 23, 1999**

**PREPARED FOR:**

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**Report No: FC99-025**

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## **ADMINISTRATIVE INFORMATION**

|                                |                                                                                                                           |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>DATE OF TEST:</b>           | August 6, 9, 16, 1999                                                                                                     |
| <b>PURPOSE OF TEST:</b>        | To demonstrate the compliance of the Integrated Sensor Suite, 6320W, with the requirements FCC Part 15 Subpart C devices. |
| <b>MANUFACTURER:</b>           | Davis Instruments<br>3465 Diablo Ave.<br>Hayward, CA 94545                                                                |
| <b>REPRESENTATIVE:</b>         | Brett Preston                                                                                                             |
| <b>TEST LOCATION:</b>          | CKC Laboratories, Inc.<br>5473A Clouds Rest<br>Mariposa Ca 95338                                                          |
| <b>TEST PERSONNEL:</b>         | Wes Norris & Dustin Oaks                                                                                                  |
| <b>TEST METHOD:</b>            | ANSI C63.4 1992                                                                                                           |
| <b>FREQUENCY RANGE TESTED:</b> | 9 kHz - 9200 MHz                                                                                                          |

## **EQUIPMENT UNDER TEST:**

### **Integrated Sensor Suite**

Manuf: Davis Instruments  
Model: 6320W  
Serial: Prototype  
FCC ID: IR2DWW6320 (pending)

### **Rain Collector**

Manuf: Davis Instruments  
Model: TBD  
Serial: Prototype  
FCC ID:

### **Wind Vane and Anemometer**

Manuf: Davis Instruments  
Model: TBD  
Serial: Prototype  
FCC ID:

### **AC Adaptor**

Manuf: Ablex  
Model: TBD  
Serial: N/A  
FCC ID:

## **SUMMARY OF RESULTS**

The Davis Instruments Integrated Sensor Suite, 6320W, 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 Subpart C. The results in this report apply only to the items tested, as identified herein.

### **EQUIPMENT UNDER TEST (EUT) DESCRIPTION**

Device transmits every 2.5 seconds 6 bytes of data using OOK and <1mW of power at 916.5 MHz. Accessory for wired stations.

### **MEASUREMENT UNCERTAINTY**

Associated with data in this report is a  $\pm 4$ dB measurement uncertainty.

### **EUT OPERATING FREQUENCY**

The EUT was operating at 916.5 MHz.

### **TEMPERATURE AND HUMIDITY DURING TESTING**

The temperature during testing was within +15°C and + 35°C.  
The relative humidity was between 20% and 75%.

### **PERIPHERAL DEVICES**

The EUT was not tested with peripheral device.

## REPORT OF MEASUREMENTS

The following tables report the six highest worst case levels recorded during the tests performed on the Integrated Sensor Suite, 6320W. All readings taken are peak readings unless otherwise noted by a “Q” or “A”. The data sheets from which these tables were compiled are contained in Appendix B.

| Table 1: Six Highest Radiated Emission Levels-Below One GHz |                          |                    |           |             |            |                                |                         |              |       |
|-------------------------------------------------------------|--------------------------|--------------------|-----------|-------------|------------|--------------------------------|-------------------------|--------------|-------|
| FREQUENCY<br>MHz                                            | METER<br>READING<br>dBμV | CORRECTION FACTORS |           |             |            | CORRECTED<br>READING<br>dBμV/m | SPEC<br>LIMIT<br>dBμV/m | MARGIN<br>dB | NOTES |
|                                                             |                          | Ant<br>dB          | Amp<br>dB | Cable<br>dB | Dist<br>dB |                                |                         |              |       |
| 32.313                                                      | 30.2                     | 14.1               | -26.7     | 0.8         |            | 18.4                           | 40.0                    | -21.6        | V     |
| 36.063                                                      | 32.0                     | 13.7               | -26.7     | 0.8         |            | 19.8                           | 40.0                    | -20.2        | V     |
| 215.821                                                     | 28.8                     | 17.9               | -26.1     | 2.1         |            | 22.7                           | 43.5                    | -20.8        | V     |
| 231.638                                                     | 28.9                     | 18.2               | -26.0     | 2.2         |            | 23.3                           | 46.0                    | -22.7        | H     |
| 414.315                                                     | 32.9                     | 15.9               | -26.9     | 3.0         |            | 24.9                           | 46.0                    | -21.1        | H     |
| 478.565                                                     | 30.9                     | 16.9               | -27.4     | 3.3         |            | 23.7                           | 46.0                    | -22.3        | H     |

Test Method: ANSI C63.4 1992  
Spec Limit : FCC Part 15.209/15.231(e)  
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: Testing to FCC Part 15 Subpart C, Section 15.209/15.231(c). The EUT is fully operational, with Wind Vane and Rain Collector connected. The EUT is transmitting continuously, at full power, in CW Mode. The EUT is receiving its power from the AC Adaptor, which is powered from a 115V/60Hz source.

**Table 2: Six Highest Radiated Emission Levels - Above One GHz**

| FREQUENCY<br><br>MHz | METER<br>READING<br><br>dBμV | CORRECTION FACTORS |       |              |       | CORRECTED<br>READING<br><br>dBμV/m | SPEC<br>LIMIT<br><br>dBμV/m | MARGIN<br><br>dB | NOTES |
|----------------------|------------------------------|--------------------|-------|--------------|-------|------------------------------------|-----------------------------|------------------|-------|
|                      |                              | Horn               | Amp   | P            | Cable |                                    |                             |                  |       |
|                      |                              | dB                 | dB    | Factor<br>dB | dB    |                                    |                             |                  |       |
| 1833.000             | 70.9                         | 26.5               | -38.6 | 0.0          | 4.2   | 63.0                               | 74.0                        | -11.0            | H     |
| 2749.500             | 60.4                         | 29.7               | -37.6 | -20.0        | 5.4   | 37.9                               | 54.0                        | -16.1            | H     |
| 3666.000             | 67.1                         | 32.4               | -38.9 | -20.0        | 6.3   | 46.9                               | 54.0                        | -7.1             | H     |
| 4582.500             | 60.8                         | 32.3               | -39.7 | -20.0        | 7.2   | 40.6                               | 54.0                        | -13.4            | H     |
| 8248.500             | 50.1                         | 37.6               | -40.2 | -20.0        | 9.9   | 37.4                               | 54.0                        | -16.6            | V     |
| 9165.000             | 50.1                         | 38.5               | -39.0 | -20.0        | 10.0  | 39.6                               | 54.0                        | -14.4            | V     |

Test Method: ANSI C63.4 1992  
Spec Limit : FCC Part 15.209/15.231(e)  
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: Testing to FCC Part 15 Subpart C, Sections 15.209/15.231(c). The EUT is fully operational, with Wind Vane and Rain Collector connected. The EUT is transmitting continuously, at full power, in CW Mode. The EUT is receiving its power from the AC Adaptor, which is powered from a 115V/60Hz source.

| Table 3: Six Highest Conducted Emission Levels |                          |                    |    |    |    |                              |                       |              |       |
|------------------------------------------------|--------------------------|--------------------|----|----|----|------------------------------|-----------------------|--------------|-------|
| FREQUENCY<br>MHz                               | METER<br>READING<br>dBµV | CORRECTION FACTORS |    |    |    | CORRECTED<br>READING<br>dBµV | SPEC<br>LIMIT<br>dBµV | MARGIN<br>dB | NOTES |
|                                                |                          | Lisn<br>dB         | dB | dB | dB |                              |                       |              |       |
| 0.574360                                       | 35.8                     | 0.0                |    |    |    | 35.8                         | 48.0                  | -12.2        | W     |
| 1.013114                                       | 35.3                     | 0.0                |    |    |    | 35.3                         | 48.0                  | -12.7        | B     |
| 1.124838                                       | 37.4                     | 0.0                |    |    |    | 37.4                         | 48.0                  | -10.6        | W     |
| 3.791638                                       | 35.2                     | 0.0                |    |    |    | 35.2                         | 48.0                  | -12.8        | W     |
| 6.163022                                       | 35.7                     | 0.0                |    |    |    | 35.7                         | 48.0                  | -12.3        | B     |
| 7.663567                                       | 35.2                     | 0.0                |    |    |    | 35.2                         | 48.0                  | -12.8        | W     |

Test Method:  
Spec Limit :  
Test Distance:

ANSI C63.4 1992  
FCC Part 15.207  
No Distance

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

COMMENTS: Testing to FCC Part 15 Subpart C, Section 15.207. The EUT is fully operational, with Wind Vane and Rain Collector connected. The EUT is transmitting continuously, at full power, in CW Mode. The EUT is receiving its power from the AC Adaptor, which is powered from a 115V/60Hz source.

## **TABLE A**

### **LIST OF TEST EQUIPMENT**

1. Spectrum Analyzer, Hewlett Packard, Model No. 85680A, S/N 2049A01408. Calibration date: April 9, 1999. Calibration due date: April 9, 2000.
2. Quasi Peak Adapter, Hewlett Packard, Model No. 85650A, S/N 2430A00541. Calibration date: March 3, 1999. Calibration due date: March 3, 2000.
3. Preamp, Hewlett Packard, Model No. 8447F, S/N 2944A03850. Calibration date: March 22, 1999. Calibration due date: March 22, 2000.
4. Biconical Antenna, Schwarzbeck, Model No. 3110, S/N 9205-1522. Calibration date: April 22, 1999. Calibration due date: April 22, 2000.
5. Log Periodic Antenna, A & H Systems, Model No. SAS-200/510, S/N 318. Calibration date: April 23, 1999. Calibration due date: April 23, 2000.
6. Horn Antenna, EMCO, Model No. 3115, S/N 9602-4660. Calibration date: September 16, 1998. Calibration due date: September 16, 1999.
7. Magloop Antenna, EMCO, Model 6502, S/N 2078. Calibration date June 1, 1998. Calibration due date: September 1, 1999.
8. LISN, Solar Electronics, Model No. 8028-50-TS-24-BNC, S/Ns 910489 & 910490. Calibration date: August 19, 1998. Calibration due date: August 19, 1999.
9. Hollister site A. Calibration date: February 12, 1997. Calibration due date: January 30, 2000.
10. Test software, EMI Test 2.91.

## **EUT SETUP**

The equipment under test (EUT) was set up 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 and 2 for 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.

I/O cables were connected to the EUT in the manner required for normal operation of the system. Excess cabling was bundled in the center in a serpentine fashion using 30-40 centimeter lengths.

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 were used to collect both the radiated and conducted emissions data for the Integrated Sensor Suite, 6320W. For frequencies below 30 MHz, the magloop antenna was used. For radiated measurements 30 - 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, an appropriate reference level 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 $\mu$ 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 | 150 kHz             | 30 MHz           | 9 kHz             |
| RADIATED EMISSIONS  | 9 kHz               | 150 kHz          | 200 Hz            |
| RADIATED EMISSIONS  | 150 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, 2 and 3 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 the appropriate table. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data for the Integrated Sensor Suite, 6320W.

### **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 Quasi-Peak Adapter for the HP 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 Integrated Sensor Suite, 6320W, 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. For frequencies below 30 MHz the magloop antenna was used. 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. 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 and antenna height. 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.

## **FCC Part 15.215(c) - Occupied Bandwidth Measurements**

In accordance with Part 15.215(c), the fundamental frequency was kept within the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

## **SAMPLE CALCULATIONS**

The basic spectrum analyzer reading was converted using correction factors as shown in the emissions readings in Tables 1, 2 and 3. For radiated emissions in dB $\mu$ V/m, the spectrum analyzer reading in dB $\mu$ 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.

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

| # | Freq<br>MHz | Rdng<br>dBuV | Cable | Amp. | Bicon | Horn | Log | Dist | Corr<br>dBuV/m | Spec | Margin | Polar |
|---|-------------|--------------|-------|------|-------|------|-----|------|----------------|------|--------|-------|
|---|-------------|--------------|-------|------|-------|------|-----|------|----------------|------|--------|-------|

# means reading number

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

**Rdng dBuV** is the reading obtained on the spectrum analyzer in dBμV.

**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.

**P Factor** is the correction factor in dB used for pulsed systems (FCC Part 15.35).

**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 dBμV/m** is the corrected reading which is now in dBμV/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:                          | N/A                                   |
| CRT was displaying:                              | N/A                                   |
| Power Supply Manufacturer:                       | <b>Ablex, Hong Kong 3VDC @ 200 ma</b> |
| Power Supply Part Number:                        | <b>118F-3-200D</b>                    |
| AC Line Filter Manufacturer:                     | N/A                                   |
| AC Line Filter Part Number:                      | N/A                                   |
| Line voltage used during testing: <b>115 VAC</b> |                                       |

| I/O PORTS                       |   |
|---------------------------------|---|
| Type                            | # |
| Digital/Analog (Wind Speed/Dir) | 1 |
| Digital (Rain Collector)        | 2 |
| Analog (Solar Radiation)        | 3 |
| Analog (UV Radiation)           | 4 |

| CRYSTAL OSCILLATORS  |              |
|----------------------|--------------|
| Type                 | Freq. In MHz |
| Surface Mount Quartz | .076         |

| PRINTED CIRCUIT BOARDS                                                                                                                    |             |             |        |                                |
|-------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|--------|--------------------------------|
| Function                                                                                                                                  | Model & Rev | Clocks, MHz | Layers | Location                       |
| Product is placed on roof or in yard and reads connected analog/digital sensors and transmits 6 byte data packets to console inside home. | 6320W REV A | .072        | 2      | Inside custom plastic housing. |

| REQUIRED EUT CHANGES TO COMPLY: |
|---------------------------------|
| None.                           |

## CABLE INFORMATION

|                                                                                                                                                                                           |                                                                                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cable #: 1                                                                                                                                                                                | Cable(s) of this type: 1                                                                                                                                                   |
| Cable Type: Standard Phone Wire<br>Construction:<br>Connected To End (1): Circuit Board<br>Connector At End (1): RJ11<br>Shield Grounded At (1): None<br>Part Number: 6410 for Anemometer | Shield Type: None<br>Length In Meters: 12<br>Connected To End (2): Anemometer<br>Connector At End (2): Soldered<br>Shield Grounded At (2): None<br>Number of Conductors: 4 |
| Notes: Magnet and Reed Switch for Speed. Pot for direction.                                                                                                                               |                                                                                                                                                                            |

|                                                                                                                                                                                               |                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cable #: 2                                                                                                                                                                                    | Cable(s) of this type:                                                                                                                                                        |
| Cable Type: Standard Phone Wire<br>Construction:<br>Connected To End (1): Circuit Board<br>Connector At End (1): RJ11<br>Shield Grounded At (1): None<br>Part Number: 6430 for Rain Collector | Shield Type: None<br>Length In Meters: 2<br>Connected To End (2): Rain Collector<br>Connector At End (2): Soldered<br>Shield Grounded At (2): None<br>Number of Conductors: 4 |
| Notes: Magnet and Reed Switch Sensor                                                                                                                                                          |                                                                                                                                                                               |

|                                                                                                                                                                                             |                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cable #: 3                                                                                                                                                                                  | Cable(s) of this type:                                                                                                                                                                |
| Cable Type: Standard Phone Wire<br>Construction:<br>Connected To End (1): Circuit Board<br>Connector At End (1): RJ11<br>Shield Grounded At (1): None<br>Part Number: 6450 for Solar Sensor | Shield Type: None<br>Length In Meters: 2<br>Connected To End (2): Solar Radiation Sensor<br>Connector At End (2): Soldered<br>Shield Grounded At (2): None<br>Number of Conductors: 4 |
| Notes: +5V Supply, 0 to 3V Output                                                                                                                                                           |                                                                                                                                                                                       |

|                                                                                                                                                                                             |                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cable #: 4                                                                                                                                                                                  | Cable(s) of this type:                                                                                                                                                             |
| Cable Type: Standard Phone Wire<br>Construction:<br>Connected To End (1): Circuit Board<br>Connector At End (1): RJ11<br>Shield Grounded At (1): None<br>Part Number: 6490 for UV Radiation | Shield Type: None<br>Length In Meters: 2<br>Connected To End (2): UV Radiation Sensor<br>Connector At End (2): Soldered<br>Shield Grounded At (2): None<br>Number of Conductors: 4 |
| Notes: +5V Supply, 0 to 3V Output                                                                                                                                                           |                                                                                                                                                                                    |

## PHOTOGRAPH SHOWING RADIATED EMISSIONS



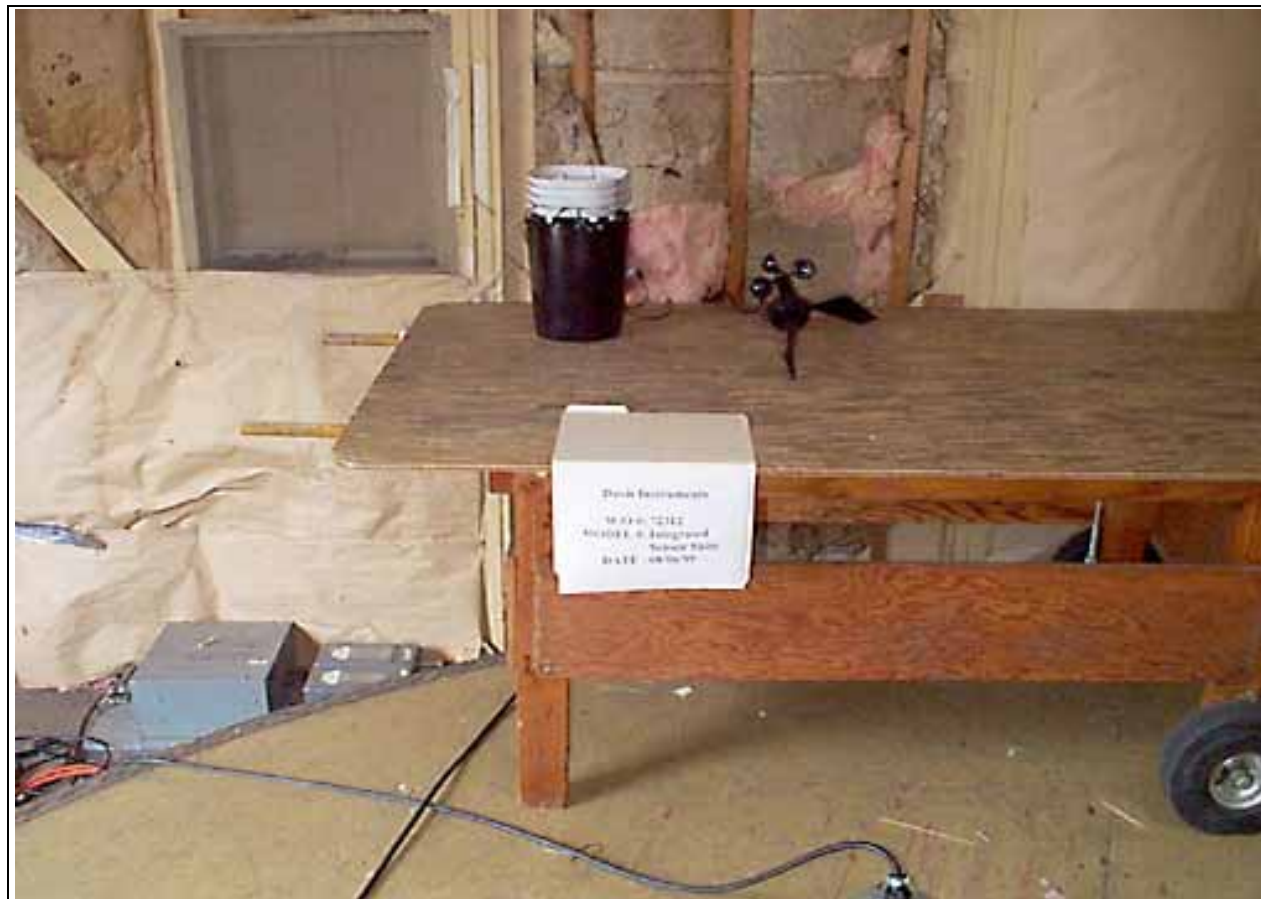
Radiated Emissions - Front View

## PHOTOGRAPH SHOWING RADIATED EMISSIONS



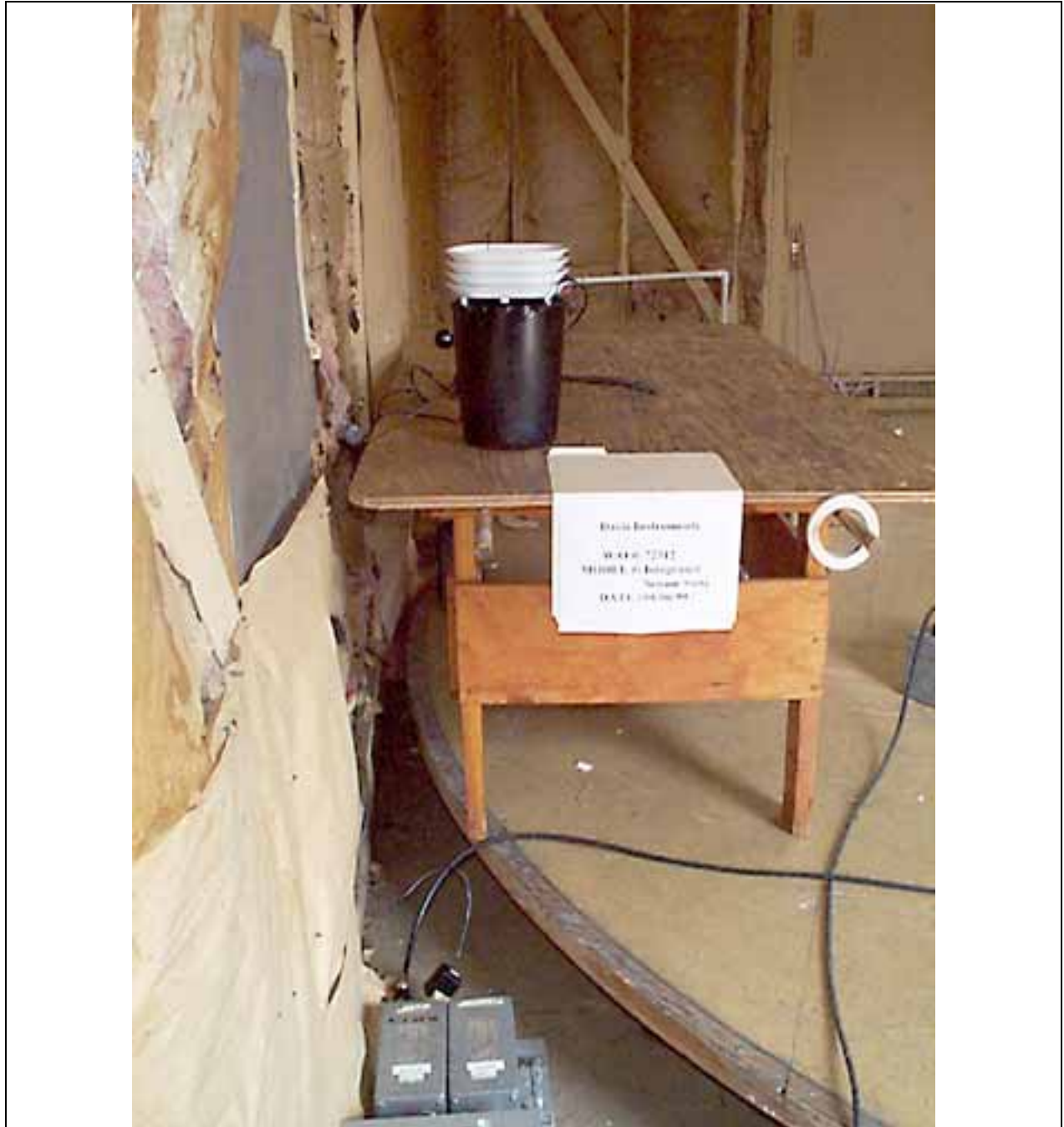
Radiated Emissions - Back View

## PHOTOGRAPH SHOWING CONDUCTED EMISSIONS



Conducted Emissions - Front View

## PHOTOGRAPH SHOWING CONDUCTED EMISSIONS

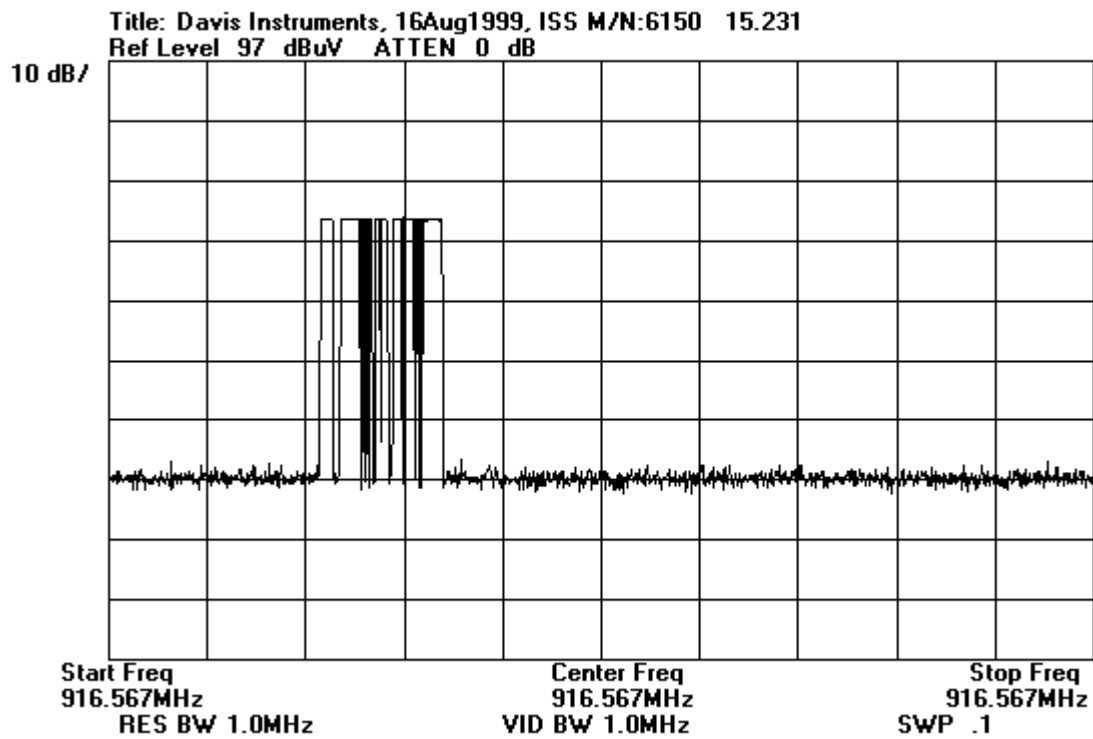


Conducted Emissions - Back View

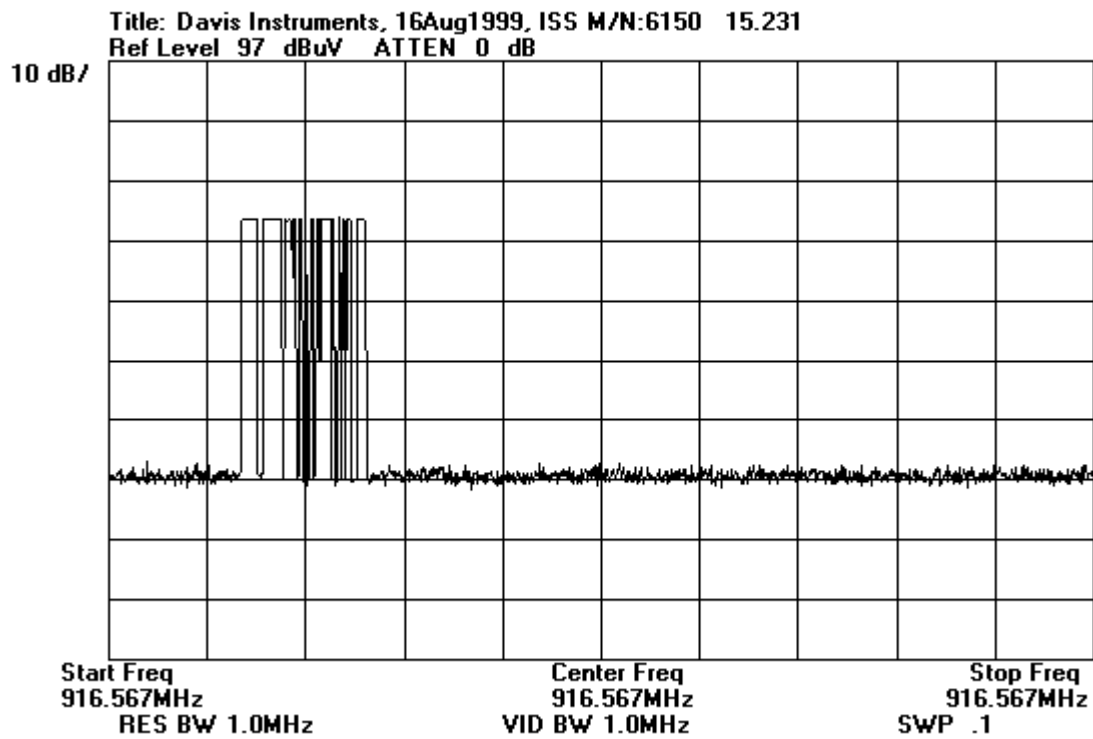
**APPENDIX B**

**MEASUREMENT DATA SHEETS**

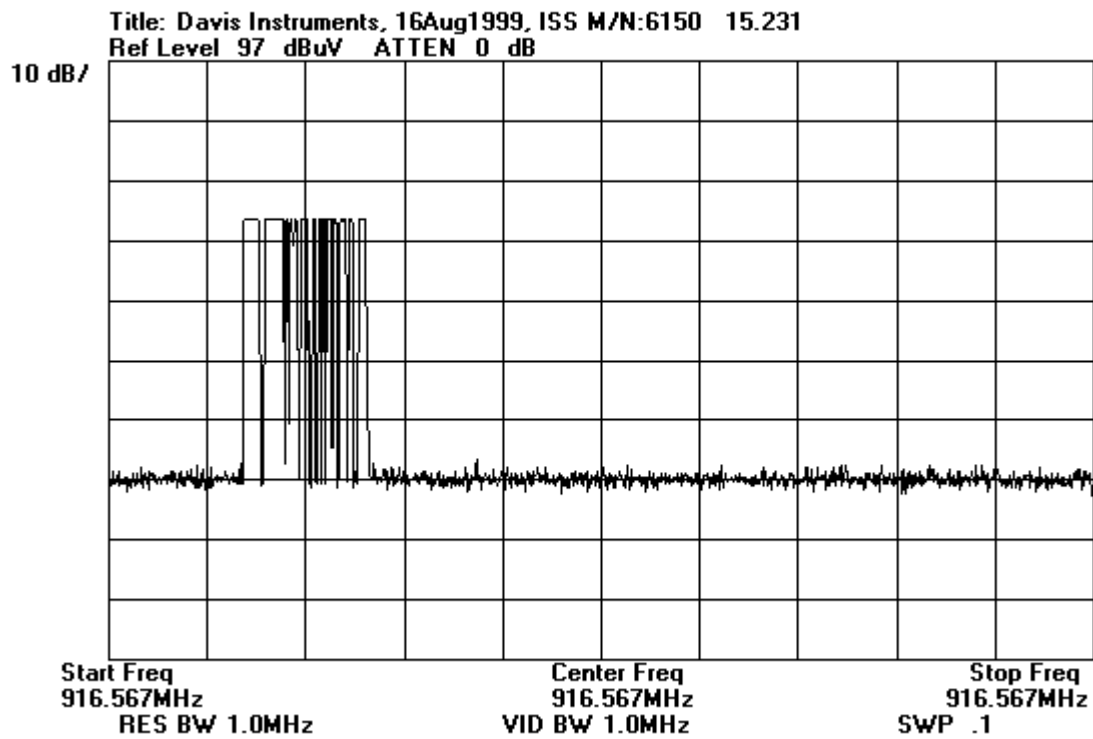
## Averaging for Pulsed Modulated Systems



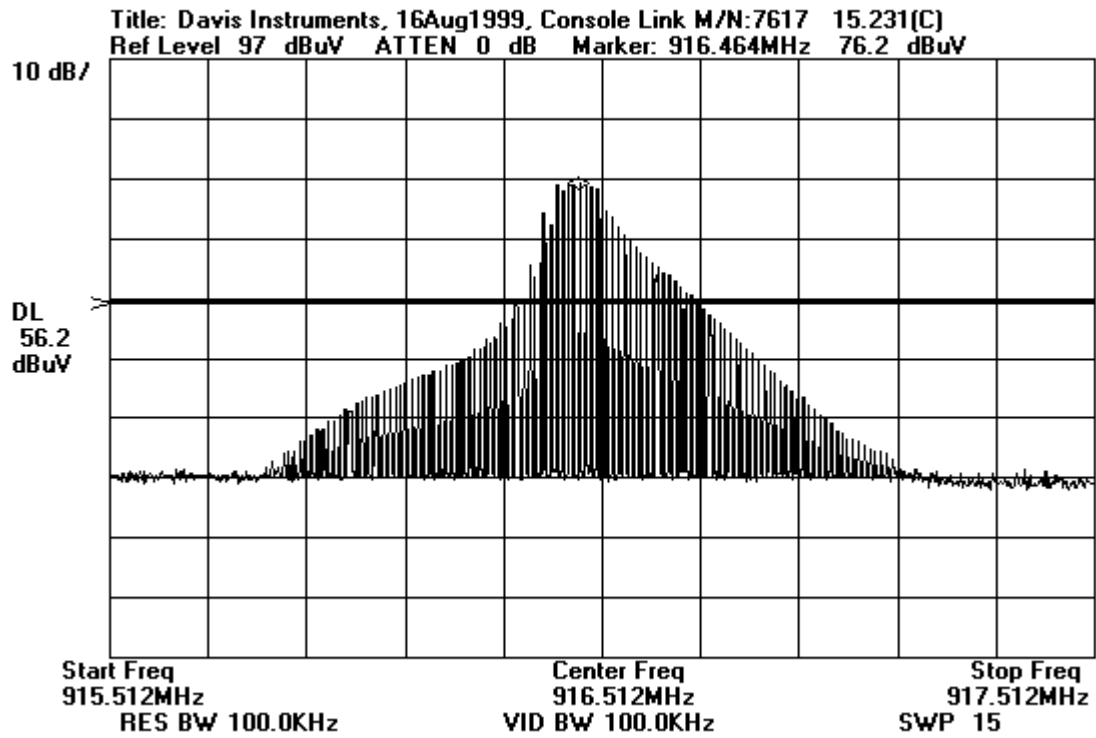
## Averaging for Pulsed Modulated Systems



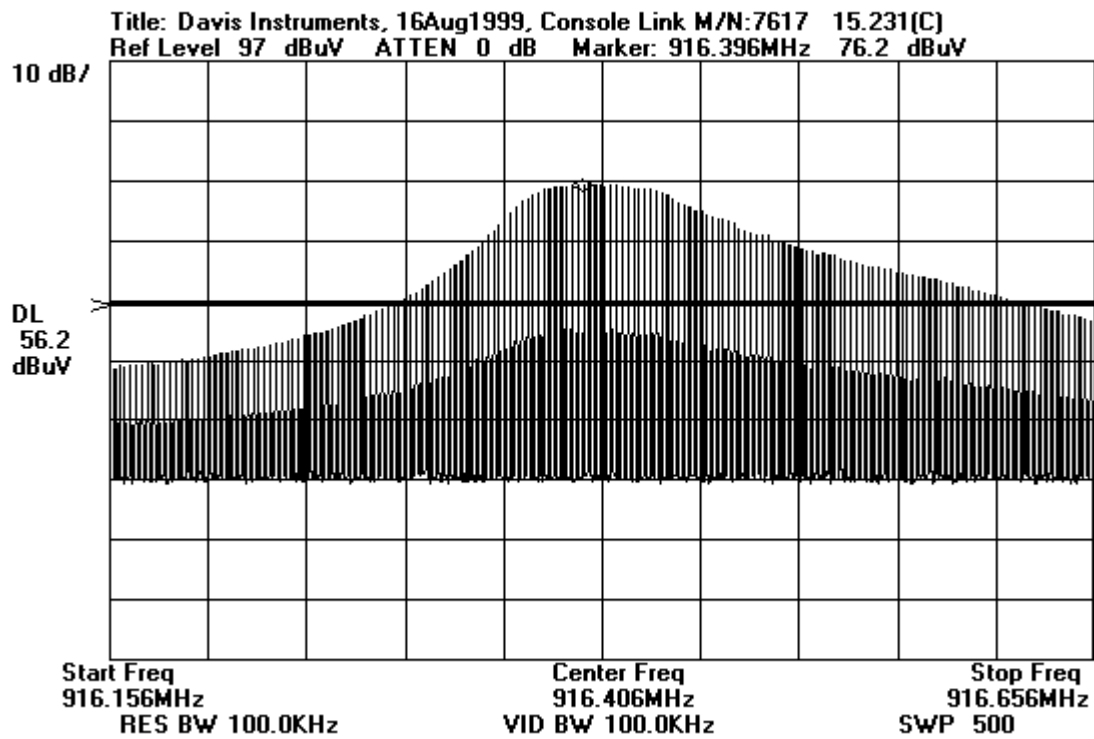
## Averaging for Pulsed Modulated Systems



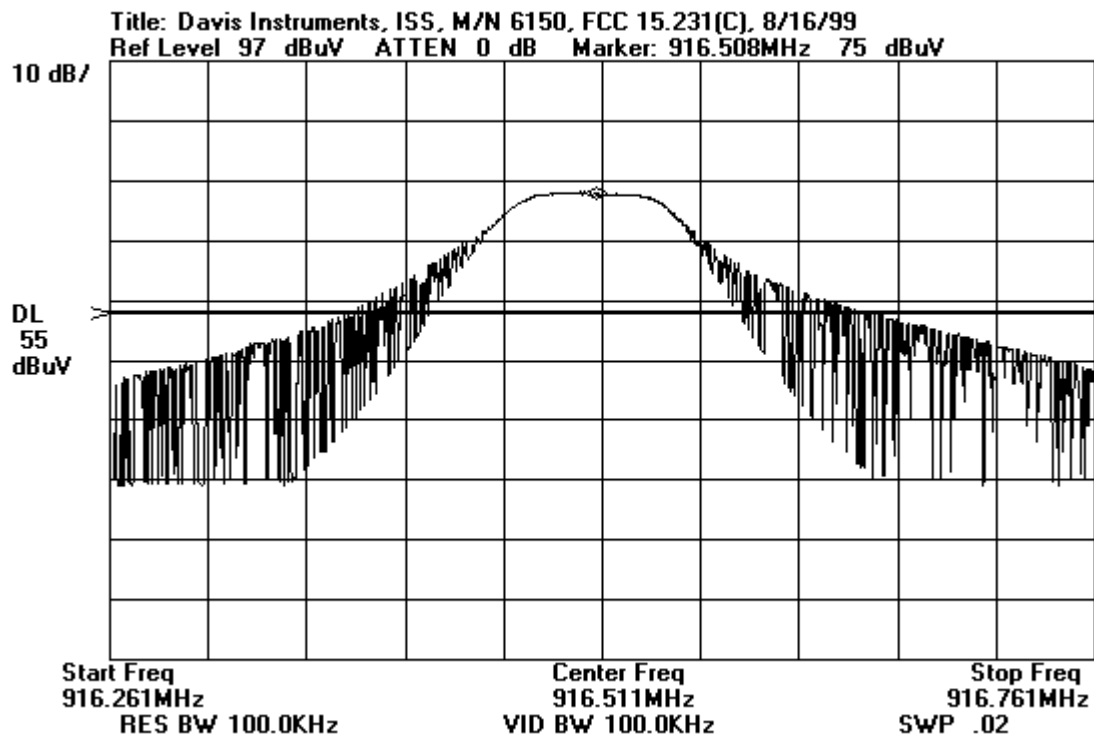
## Occupied Bandwidth Plot



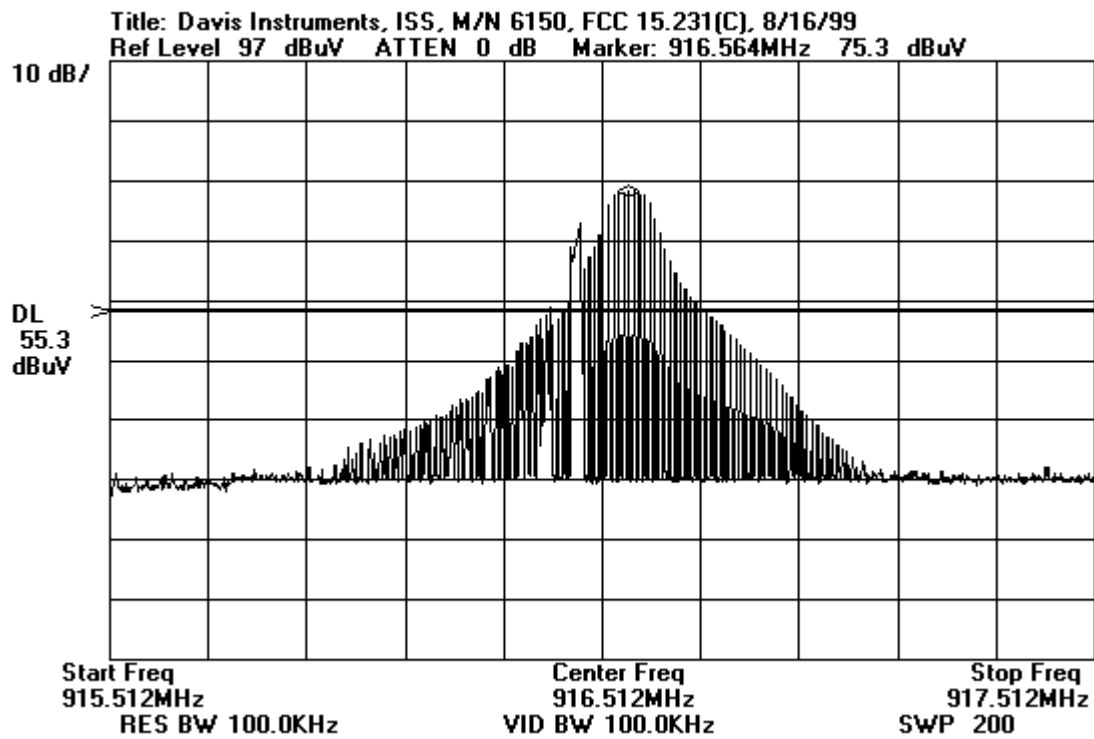
## Occupied Bandwidth Plot



## Occupied Bandwidth Plot



## Occupied Bandwidth Plot



Test Location: CKC Laboratories, Inc. • 1653 Los Viboras Rd., Site A • Hollister, Ca 95023 • (831) 637-0485

Customer: **Davis Instruments** Date: Aug-06-99  
 Specification: **FCC15.209/15.231( c)** Time: 13:28  
 Test Type: **Maximized Emissions** Sequence#: 2  
 Equipment: **Weather Data Telemetry**  
 Manufacturer: Davis Instruments Tested By: Wes Norris  
 Model: 6150  
 S/N: Prototype

***Equipment Under Test (\* = EUT):***

| Function                 | Manufacturer      | Model # | S/N       |
|--------------------------|-------------------|---------|-----------|
| Weather Data Telemetry*  | Davis Instruments | 6150    | Prototype |
| Wind Vane and Anemometer | Davis Instruments | TBD     | Prototype |
| Rain Collector           | Davis Instruments | TBD     | Prototype |
| AC Adaptor               | Davis Instruments | TBD     | Prototype |

***Support Devices:***

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

***Test Conditions / Notes:***

Testing to FCC Part 15 Subpart C, Section 15.209/15.231(c). The EUT is fully operational, with Wind Vane and Rain Collector connected. The EUT is transmitting continuously, at full power, in CW Mode. The EUT is receiving its power from the AC Adaptor, which is powered from a 115V/60Hz source.

***Measurement Data:***

Sorted by Margin

Test Distance: 3 Meters

| #  | Freq<br>MHz | Rdng<br>dBμV | Amp.<br>dB | Log<br>DB | Bicon<br>dB | Cable<br>dB | Dist<br>dB | Corr<br>dBμV/m | Spec<br>dBμV/m | Margin<br>dB | Polar |
|----|-------------|--------------|------------|-----------|-------------|-------------|------------|----------------|----------------|--------------|-------|
| 1  | 36.063      | 32.0         | -26.7      | +0.0      | +13.7       | +0.8        | +0.0       | 19.8           | 40.0           | -20.2        | Vert  |
| 2  | 215.821     | 28.8         | -26.1      | +0.0      | +17.9       | +2.1        | +0.0       | 22.7           | 43.5           | -20.8        | Vert  |
| 3  | 414.315     | 32.9         | -26.9      | +15.9     | +0.0        | +3.0        | +0.0       | 24.9           | 46.0           | -21.1        | Horiz |
| 4  | 32.313      | 30.2         | -26.7      | +0.0      | +14.1       | +0.8        | +0.0       | 18.4           | 40.0           | -21.6        | Vert  |
| 5  | 414.340     | 32.2         | -26.9      | +15.9     | +0.0        | +3.0        | +0.0       | 24.2           | 46.0           | -21.8        | Vert  |
| 6  | 478.565     | 30.9         | -27.4      | +16.9     | +0.0        | +3.3        | +0.0       | 23.7           | 46.0           | -22.3        | Horiz |
| 7  | 231.638     | 28.9         | -26.0      | +0.0      | +18.2       | +2.2        | +0.0       | 23.3           | 46.0           | -22.7        | Horiz |
| 8  | 32.070      | 28.9         | -26.6      | +0.0      | +14.1       | +0.8        | +0.0       | 17.2           | 40.0           | -22.8        | Horiz |
| 9  | 478.565     | 29.8         | -27.4      | +16.9     | +0.0        | +3.3        | +0.0       | 22.6           | 46.0           | -23.4        | Vert  |
| 10 | 131.287     | 29.3         | -26.4      | +0.0      | +14.1       | +1.6        | +0.0       | 18.6           | 43.5           | -24.9        | Vert  |

|    |         |      |       |      |       |      |      |      |      |       |       |
|----|---------|------|-------|------|-------|------|------|------|------|-------|-------|
| 11 | 132.298 | 28.5 | -26.4 | +0.0 | +14.2 | +1.6 | +0.0 | 17.9 | 43.5 | -25.6 | Horiz |
| 12 | 82.070  | 27.7 | -26.6 | +0.0 | +6.8  | +1.1 | +0.0 | 9.0  | 40.0 | -31.0 | Horiz |

Test Location: CKC Laboratories, Inc. • 1653 Los Viboras Rd., Site A • Hollister, Ca 95023 • (831) 637-0485

Customer: **Davis Instruments**  
 Specification: **FCC 15.209/15.321( c )**  
 Test Type: **Maximized Emissions**  
 Equipment: **Weather Data Telemetry**  
 Manufacturer: Davis Instruments  
 Model: 6150  
 S/N: Prototype

Date: Aug-09-99  
 Time: 14:33  
 Sequence#: 2  
 Tested By: Wes Norris

***Equipment Under Test (\* = EUT):***

| Function                 | Manufacturer      | Model # | S/N       |
|--------------------------|-------------------|---------|-----------|
| Weather Data Telemetry*  | Davis Instruments | 6150    | Prototype |
| Wind Vane and Anemometer | Davis Instruments | TBD     | Prototype |
| Rain Collector           | Davis Instruments | TBD     | Prototype |
| AC Adaptor               | Davis Instruments | TBD     | Prototype |

***Support Devices:***

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

***Test Conditions / Notes:***

Testing to FCC Part 15, Subpart C, Sections 15.209 and 15.231(c). The EUT is fully operational, with Wind Vane and Rain Collector connected. The EUT is transmitting continuously, at full power, in CW Mode. The EUT is receiving its power from the AC Adaptor, which is powered from a 115V/60Hz source.

***Measurement Data:***

Sorted by Margin

Test Distance: 3 Meters

| #  | Freq<br>MHz | Rdng<br>dBµV | Horn<br>P Factor<br>dB | Amp<br>dB | Cable<br>dB | Cable<br>dB | Dist<br>dB | Corr<br>dBµV/m | Spec<br>dBµV/m | Margin<br>dB | Polar |
|----|-------------|--------------|------------------------|-----------|-------------|-------------|------------|----------------|----------------|--------------|-------|
| 1  | 3666.000    | 67.1         | +32.4<br>-20.0         | -38.9     | +0.5        | +5.8        | +0.0       | 46.9           | 54.0           | -7.1         | Horiz |
| 2  | 1833.000    | 70.9         | +26.5<br>+0.0          | -38.6     | +0.3        | +3.9        | +0.0       | 63.0           | 74.0           | -11.0        | Horiz |
| 3  | 4582.500    | 60.8         | +32.3<br>-20.0         | -39.7     | +0.6        | +6.6        | +0.0       | 40.6           | 54.0           | -13.4        | Horiz |
| 4  | 3666.000    | 60.3         | +32.4<br>-20.0         | -38.9     | +0.5        | +5.8        | +0.0       | 40.1           | 54.0           | -14.0        | Vert  |
| 5  | 9165.000    | 50.1         | +38.5<br>-20.0         | -39.0     | +0.6        | +9.4        | +0.0       | 39.6           | 54.0           | -14.4        | Vert  |
| 6  | 9165.100    | 49.2         | +38.5<br>-20.0         | -39.0     | +0.6        | +9.4        | +0.0       | 38.7           | 54.0           | -15.3        | Horiz |
| 7  | 2749.500    | 60.4         | +29.7<br>-20.0         | -37.6     | +0.4        | +5.0        | +0.0       | 37.9           | 54.0           | -16.1        | Horiz |
| 8  | 8248.500    | 50.1         | +37.6<br>-20.0         | -40.2     | +0.8        | +9.1        | +0.0       | 37.4           | 54.0           | -16.6        | Vert  |
| 9  | 7332.000    | 51.0         | +36.6<br>-20.0         | -39.2     | +0.3        | +8.3        | +0.0       | 37.0           | 54.0           | -17.0        | Horiz |
| 10 | 8248.500    | 49.7         | +37.6<br>-20.0         | -40.2     | +0.8        | +9.1        | +0.0       | 37.0           | 54.0           | -17.1        | Horiz |

|    |          |      |                |       |      |      |      |      |      |       |       |
|----|----------|------|----------------|-------|------|------|------|------|------|-------|-------|
| 11 | 4582.500 | 57.1 | +32.3<br>-20.0 | -39.7 | +0.6 | +6.6 | +0.0 | 36.9 | 54.0 | -17.1 | Vert  |
| 12 | 7332.000 | 50.6 | +36.6<br>-20.0 | -39.2 | +0.3 | +8.3 | +0.0 | 36.6 | 54.0 | -17.4 | Vert  |
| 13 | 5499.000 | 53.5 | +34.9<br>+0.0  | -39.9 | +0.4 | +7.3 | +0.0 | 56.2 | 74.0 | -17.8 | Horiz |
| 14 | 1833.000 | 63.6 | +26.5<br>+0.0  | -38.6 | +0.3 | +3.9 | +0.0 | 55.7 | 74.0 | -18.3 | Vert  |
| 15 | 6415.500 | 50.9 | +35.4<br>+0.0  | -40.3 | +0.6 | +7.9 | +0.0 | 54.5 | 74.0 | -19.5 | Vert  |
| 16 | 6415.500 | 50.8 | +35.4<br>+0.0  | -40.3 | +0.6 | +7.9 | +0.0 | 54.4 | 74.0 | -19.6 | Horiz |
| 17 | 2749.500 | 55.6 | +29.7<br>-20.0 | -37.6 | +0.4 | +5.0 | +0.0 | 33.1 | 54.0 | -20.9 | Vert  |
| 18 | 5499.000 | 49.5 | +34.9<br>+0.0  | -39.9 | +0.4 | +7.3 | +0.0 | 52.2 | 74.0 | -21.8 | Vert  |

Test Location: CKC Laboratories, Inc. • 1653 Los Viboras Rd., Site A • Hollister, Ca 95023 • (831) 637-0485

Customer: **Davis Instruments** Date: Aug-06-99  
 Specification: **FCC 15.207 COND** Time: 16:48  
 Test Type: **Conducted Emissions** Sequence#: 5  
 Equipment: **Weather Data Telemetry**  
 Manufacturer: Davis Instruments Tested By: Wes Norris  
 Model: 6150  
 S/N: Prototype

***Equipment Under Test (\* = EUT):***

| Function                 | Manufacturer      | Model # | S/N       |
|--------------------------|-------------------|---------|-----------|
| Weather Data Telemetry*  | Davis Instruments | 6150    | Prototype |
| Wind Vane and Anemometer | Davis Instruments | TBD     | Prototype |
| Rain Collector           | Davis Instruments | TBD     | Prototype |
| AC Adaptor               | Davis Instruments | TBD     | Prototype |

***Support Devices:***

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

***Test Conditions / Notes:***

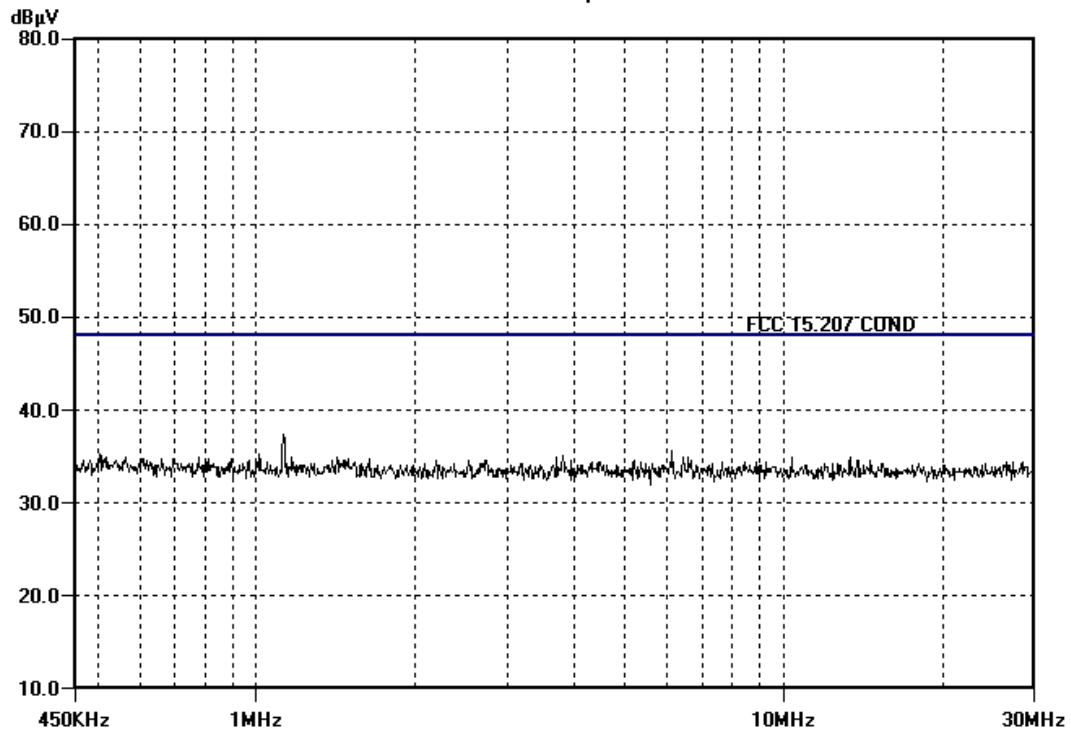
Testing to FCC Part 15 Subpart C, Section 15.207. The EUT is fully operational, with Wind Vane and Rain Collector connected. The EUT is transmitting continuously, at full power, in CW Mode. The EUT is receiving its power from the AC Adaptor, which is powered from a 115V/60Hz source.

***Measurement Data:*** Sorted by Margin Test Lead: Black

| #  | Freq     | Rdng<br>dB $\mu$ V |  |  |  |  | Dist<br>dB | Corr<br>dB $\mu$ V | Spec<br>dB $\mu$ V | Margin<br>dB | Polar |
|----|----------|--------------------|--|--|--|--|------------|--------------------|--------------------|--------------|-------|
| 1  | 1.126M   | 37.4               |  |  |  |  | +0.0       | 37.4               | 48.0               | -10.6        | Black |
| 2  | 6.163M   | 35.7               |  |  |  |  | +0.0       | 35.7               | 48.0               | -12.3        | Black |
| 3  | 1.013M   | 35.3               |  |  |  |  | +0.0       | 35.3               | 48.0               | -12.7        | Black |
| 4  | 503.839k | 35.2               |  |  |  |  | +0.0       | 35.2               | 48.0               | -12.8        | Black |
| 5  | 451.517k | 35.2               |  |  |  |  | +0.0       | 35.2               | 48.0               | -12.8        | Black |
| 6  | 3.815M   | 35.1               |  |  |  |  | +0.0       | 35.1               | 48.0               | -12.9        | Black |
| 7  | 509.147k | 35.1               |  |  |  |  | +0.0       | 35.1               | 48.0               | -12.9        | Black |
| 8  | 10.370M  | 35.0               |  |  |  |  | +0.0       | 35.0               | 48.0               | -13.0        | Black |
| 9  | 6.460M   | 35.0               |  |  |  |  | +0.0       | 35.0               | 48.0               | -13.0        | Black |
| 10 | 1.168M   | 35.0               |  |  |  |  | +0.0       | 35.0               | 48.0               | -13.0        | Black |

|    |          |      |      |      |      |       |       |
|----|----------|------|------|------|------|-------|-------|
| 11 | 777.583k | 35.0 | +0.0 | 35.0 | 48.0 | -13.0 | Black |
| 12 | 563.744k | 35.0 | +0.0 | 35.0 | 48.0 | -13.0 | Black |
| 13 | 13.375M  | 34.9 | +0.0 | 34.9 | 48.0 | -13.1 | Black |
| 14 | 6.617M   | 34.9 | +0.0 | 34.9 | 48.0 | -13.1 | Black |
| 15 | 3.725M   | 34.9 | +0.0 | 34.9 | 48.0 | -13.1 | Black |
| 16 | 1.424M   | 34.9 | +0.0 | 34.9 | 48.0 | -13.1 | Black |
| 17 | 519.005k | 34.9 | +0.0 | 34.9 | 48.0 | -13.1 | Black |
| 18 | 662.323k | 34.7 | +0.0 | 34.7 | 48.0 | -13.3 | Black |
| 19 | 607.346k | 34.7 | +0.0 | 34.7 | 48.0 | -13.3 | Black |
| 20 | 514.455k | 34.7 | +0.0 | 34.7 | 48.0 | -13.3 | Black |

CKC Laboratories, Inc. Date: Fri Aug-06-1999 Time: 16:42:22 WO#: 72312  
FCC C COND Test Lead: Black Sequence#: 6



Test Location: CKC Laboratories, Inc. • 1653 Los Viboras Rd., Site A • Hollister, Ca 95023 • (831) 637-0485

Customer: **Davis Instruments** Date: Aug-06-99  
 Specification: **FCC 15.207 COND** Time: 16:53  
 Test Type: **Conducted Emissions** Sequence#: 6  
 Equipment: **Weather Data Telemetry**  
 Manufacturer: Davis Instruments Tested By: Wes Norris  
 Model: 6150  
 S/N: Prototype

***Equipment Under Test (\* = EUT):***

| Function                 | Manufacturer      | Model # | S/N       |
|--------------------------|-------------------|---------|-----------|
| Weather Data Telemetry*  | Davis Instruments | 6150    | Prototype |
| Wind Vane and Anemometer | Davis Instruments | TBD     | Prototype |
| Rain Collector           | Davis Instruments | TBD     | Prototype |
| AC Adaptor               | Davis Instruments | TBD     | Prototype |

***Support Devices:***

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

***Test Conditions / Notes:***

Testing to FCC Part 15 Subpart C, Section 15.207. The EUT is fully operational, with Wind Vane and Rain Collector connected. The EUT is transmitting continuously, at full power, in CW Mode. The EUT is receiving its power from the AC Adaptor, which is powered from a 115V/60Hz source.

***Measurement Data:***

Sorted by Margin

Test Lead: White

| #  | Freq     | Rdng<br>dB $\mu$ V |  |  |  |  | Dist<br>dB | Corr<br>dB $\mu$ V | Spec<br>dB $\mu$ V | Margin<br>dB | Polar |
|----|----------|--------------------|--|--|--|--|------------|--------------------|--------------------|--------------|-------|
| 1  | 1.125M   | 37.4               |  |  |  |  | +0.0       | 37.4               | 48.0               | -10.6        | White |
| 2  | 574.360k | 35.8               |  |  |  |  | +0.0       | 35.8               | 48.0               | -12.2        | White |
| 3  | 24.409M  | 35.2               |  |  |  |  | +0.0       | 35.2               | 48.0               | -12.8        | White |
| 4  | 7.664M   | 35.2               |  |  |  |  | +0.0       | 35.2               | 48.0               | -12.8        | White |
| 5  | 3.792M   | 35.2               |  |  |  |  | +0.0       | 35.2               | 48.0               | -12.8        | White |
| 6  | 493.981k | 35.1               |  |  |  |  | +0.0       | 35.1               | 48.0               | -12.9        | White |
| 7  | 9.347M   | 34.9               |  |  |  |  | +0.0       | 34.9               | 48.0               | -13.1        | White |
| 8  | 5.061M   | 34.9               |  |  |  |  | +0.0       | 34.9               | 48.0               | -13.1        | White |
| 9  | 1.647M   | 34.9               |  |  |  |  | +0.0       | 34.9               | 48.0               | -13.1        | White |
| 10 | 922.338k | 34.9               |  |  |  |  | +0.0       | 34.9               | 48.0               | -13.1        | White |

|    |          |      |      |      |      |       |       |
|----|----------|------|------|------|------|-------|-------|
| 11 | 29.365M  | 34.8 | +0.0 | 34.8 | 48.0 | -13.2 | White |
| 12 | 2.743M   | 34.8 | +0.0 | 34.8 | 48.0 | -13.2 | White |
| 13 | 1.699M   | 34.8 | +0.0 | 34.8 | 48.0 | -13.2 | White |
| 14 | 1.526M   | 34.8 | +0.0 | 34.8 | 48.0 | -13.2 | White |
| 15 | 1.003M   | 34.8 | +0.0 | 34.8 | 48.0 | -13.2 | White |
| 16 | 592.559k | 34.8 | +0.0 | 34.8 | 48.0 | -13.2 | White |
| 17 | 994.959k | 34.7 | +0.0 | 34.7 | 48.0 | -13.3 | White |
| 18 | 669.147k | 34.7 | +0.0 | 34.7 | 48.0 | -13.3 | White |
| 19 | 621.375k | 34.7 | +0.0 | 34.7 | 48.0 | -13.3 | White |
| 20 | 585.735k | 34.7 | +0.0 | 34.7 | 48.0 | -13.3 | White |

CKC Laboratories, Inc. Date: Fri Aug-06-1999 Time: 16:49:23 WO#: 72312  
FCC C COND Test Lead: White Sequence#: 6

