



**ASYST TECHNOLOGIES TEST REPORT**  
**FOR THE**  
**8 ANTENNA INDUSTRIAL RADIO, ATR9800**  
**FCC PART 15 SUBPART C SECTION 15.209**  
**COMPLIANCE**

**DATE OF ISSUE: DECEMBER 15, 2005**

**PREPARED FOR:**

Asyst Technologies  
48633 Warm Springs Blvd.  
Fremont, CA 94539

P.O. No.: 337116  
W.O. No.: 84302

**PREPARED BY:**

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Mariposa, CA 95338

Date of test: October 17 - December 9, 2005

**Report No.: FC05-075**

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## **ADMINISTRATIVE INFORMATION**

|                         |                                                                                                                                                  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DATE OF TEST:</b>    | October 17 - December 9, 2005                                                                                                                    |
| <b>DATE OF RECEIPT:</b> | October 17, 2005                                                                                                                                 |
| <b>MANUFACTURER:</b>    | Asyst Technologies<br>48633 Warm Springs Blvd.<br>Fremont, CA 94539                                                                              |
| <b>REPRESENTATIVE:</b>  | Bhavin Shah                                                                                                                                      |
| <b>TEST LOCATION:</b>   | CKC Laboratories, Inc.<br>1120 Fulton Place<br>Fremont, CA 94539                                                                                 |
| <b>TEST METHOD:</b>     | ANSI C63.4 (2003)                                                                                                                                |
| <b>PURPOSE OF TEST:</b> | To demonstrate the compliance of the 8 Antenna Industrial Radio, ATR9800 with the requirements for FCC Part 15 Subpart C Section 15.209 devices. |

**CONDITIONS FOR COMPLIANCE**

No modifications to the EUT were necessary to comply. Conducted emissions not required for this device.

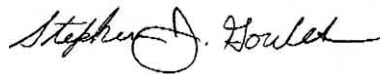
**APPROVALS**

Steve Behm, Director of Engineering Services

**QUALITY ASSURANCE:**

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Joyce Walker, Quality Assurance Administrative Manager

**TEST PERSONNEL:**

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Stephen J. Goulet, EMC Technician

**FCC 15.31(e) Voltage Variations**

Voltages were varied from 85 -115% of normal and no notable variations in RF output were observed.

**FCC 15.31(m) Number Of Channels**

This device operates on a single channel.

**FCC 15.33(a) Frequency Ranges Tested**

15.209 Radiated Emissions: 9 kHz – 1000 MHz

| <b>FCC SECTION 15.35:<br/>ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE</b> |                     |                  |                   |
|-------------------------------------------------------------------------------|---------------------|------------------|-------------------|
| TEST                                                                          | BEGINNING FREQUENCY | ENDING FREQUENCY | BANDWIDTH SETTING |
| RADIATED EMISSIONS                                                            | 9 kHz               | 150 kHz          | 200 Hz            |
| RADIATED EMISSIONS                                                            | 150 kHz             | 30 MHz           | 9 kHz             |
| RADIATED EMISSIONS                                                            | 30 MHz              | 1000 MHz         | 120 kHz           |

**EUT Operating Frequency**

The EUT was operating at 134 kHz.

**Temperature And Humidity During Testing**

The temperature during testing was within +15°C and + 35°C.

The relative humidity was between 20% and 75%.

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

The customer declares the EUT tested by CKC Laboratories was representative of a production unit.

## **EQUIPMENT UNDER TEST**

### **8 Antenna Industrial Radio**

Manuf: Asyst Technologies  
Model: ATR9800  
Serial: A1  
FCC ID: pending

## **PERIPHERAL DEVICES**

The EUT was tested with the following peripheral device(s):

### **Ethernet Hub**

Manuf: Air Link  
Model: asw105/A2  
Serial: 035A2A40573

### **AC Adapter for Laptop PC**

Manuf: Dell  
Model: AA20031  
Serial: 12761-04R-1374

### **EUT Power Supply**

Manuf: Ault Inc.  
Model: PW102  
Serial: 3443A

### **Serial Port Multiplexer**

Manuf: Asyst Technologies  
Model: HS-60  
Serial: LM1

### **Laptop PC**

Manuf: Dell  
Model: PPI  
Serial: 48DK0

## REPORT OF MEASUREMENTS

The following tables report the worst case emissions levels recorded during the tests performed on the EUT. All readings taken were peak readings unless otherwise stated. The data sheets from which the emissions tables were compiled are contained in Appendix C.

**Table 1: FCC 15.209 Six Highest Radiated Emission Levels: 9 kHz - 30 MHz**

| FREQUENCY<br>MHz | METER<br>READING<br>dB $\mu$ V | CORRECTION FACTORS |           |            |  | CORRECTED<br>READING<br>dB $\mu$ V/m | SPEC<br>LIMIT<br>dB $\mu$ V/m | MARGIN<br>dB | NOTES |
|------------------|--------------------------------|--------------------|-----------|------------|--|--------------------------------------|-------------------------------|--------------|-------|
|                  |                                | Cable<br>dB        | Ant<br>dB | Corr<br>dB |  |                                      |                               |              |       |
| 0.134            | 76.1                           | 0.1                | 9.6       | -80.0      |  | 5.8                                  | 25.0                          | -19.2        | V     |
| 0.536            | 32.7                           | 0.1                | 9.5       | -40.0      |  | 2.3                                  | 33.0                          | -30.7        | V     |
| 0.669            | 38.4                           | 0.2                | 9.7       | -40.0      |  | 8.3                                  | 31.1                          | -22.8        | V     |
| 0.808            | 33.0                           | 0.2                | 9.9       | -40.0      |  | 3.1                                  | 29.4                          | -26.3        | V     |
| 0.938            | 32.5                           | 0.2                | 10.0      | -40.0      |  | 2.7                                  | 28.1                          | -25.4        | V     |
| 13.621           | 32.6                           | 0.3                | 8.9       | -40.0      |  | 1.8                                  | 29.5                          | -27.7        | V     |

Test Method: ANSI C63.4 (2003)  
Spec Limit: FCC Part 15 Subpart C Section 15.209  
Test Distance: 3 Meters

NOTES: V = Vertical Polarization

COMMENTS: The ATR9800 8 Antenna Industrial Radio: the host Dell PC is running Secsim Pro software and sending Read ID Commands over the ethernet connection. Only antenna #1 is active during communications. The remaining seven antennas are connected but not energized. This is a maximized emissions measurement taken outdoors over the ground.

**Table 2: FCC 15.209 Six Highest Radiated Emission Levels: 30-1000 MHz**

| FREQUENCY<br>MHz | METER<br>READING<br>dB $\mu$ V | CORRECTION FACTORS |           |             |            | CORRECTED<br>READING<br>dB $\mu$ V/m | SPEC<br>LIMIT<br>dB $\mu$ V/m | MARGIN<br>dB | NOTES |
|------------------|--------------------------------|--------------------|-----------|-------------|------------|--------------------------------------|-------------------------------|--------------|-------|
|                  |                                | Ant<br>dB          | Amp<br>dB | Cable<br>dB | Dist<br>dB |                                      |                               |              |       |
| 47.391           | 51.9                           | 9.9                | -26.1     | 0.8         |            | 36.5                                 | 40.0                          | -3.5         | VQ    |
| 47.392           | 50.3                           | 9.9                | -26.1     | 0.8         |            | 34.9                                 | 40.0                          | -5.1         | VQ    |
| 47.674           | 50.5                           | 9.8                | -26.0     | 0.7         |            | 35.0                                 | 40.0                          | -5.0         | VQ    |
| 124.015          | 53.9                           | 11.2               | -25.8     | 1.1         |            | 40.4                                 | 43.5                          | -3.1         | HQ    |
| 125.005          | 54.4                           | 11.2               | -25.7     | 1.1         |            | 41.0                                 | 43.5                          | -2.5         | HQ    |
| 168.000          | 53.1                           | 9.5                | -25.6     | 1.2         |            | 38.2                                 | 43.5                          | -5.3         | V     |

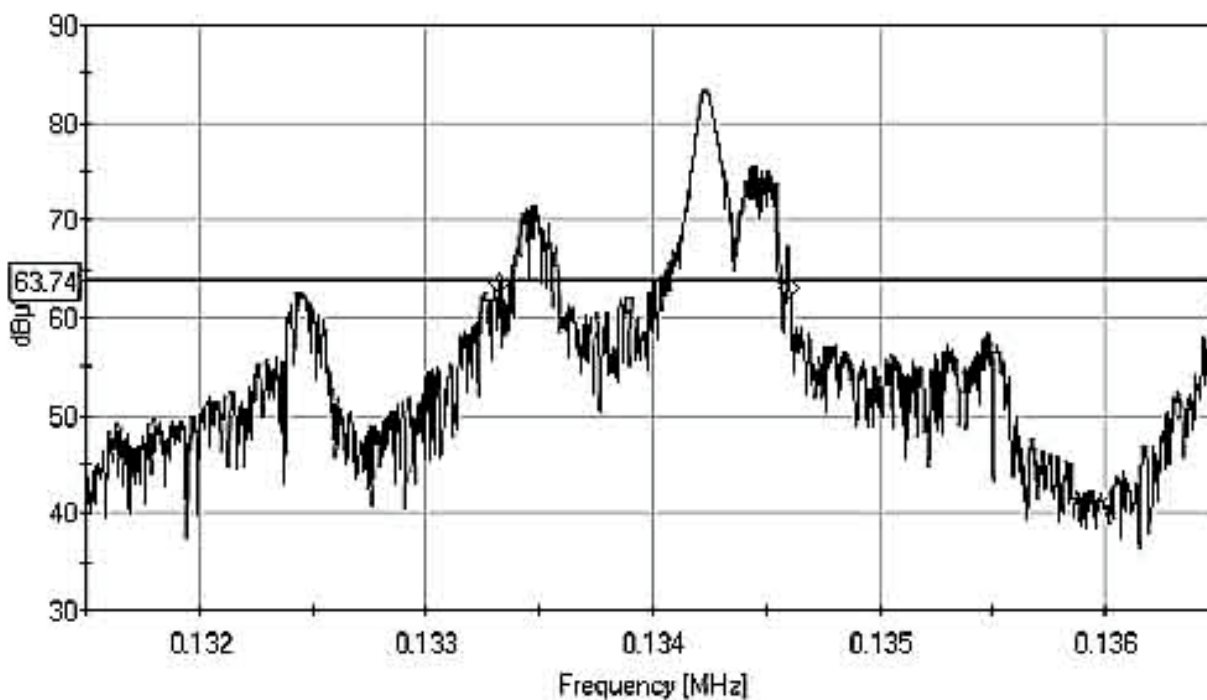
Test Method: ANSI C63.4 (2003)  
Spec Limit: FCC Part 15 Subpart C Section 15.209  
Test Distance: 3 Meters

NOTES: H = Horizontal Polarization  
V = Vertical Polarization  
Q = Quasi Peak Reading

COMMENTS: The ATR9800 8 Antenna Industrial Radio: the host Dell PC is running Secsim Pro software and sending Read ID Commands over the ethernet connection. Only antenna #1 is active during communications. The remaining seven antennas are connected but not energized. This is a maximized emissions measurement.

## OCCUPIED BANDWIDTH

Asyst Technologies, ATR9800, 20dB Bandwidth  
Ref Level 83.64 dB $\mu$ V ATTEN 10 dB  
RES BW: 100.0Hz VID BW: 100.0Hz SWP: 4.059sec  
Marker 1: 133.328kHz 63.5727 dB $\mu$ V Marker 2: 134.609kHz 63.0677 dB $\mu$ V Delta: 1.281 kHz



## EUT SETUP

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the photographs in Appendix A. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables. The corrected data was then compared to the applicable emission limits to determine compliance.

The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available I/O ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. I/O cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The radiated and conducted emissions data of the EUT 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 Table A.

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

## CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dB $\mu$ V/m, the spectrum analyzer reading in dB $\mu$ V was corrected by using the following formula in Table A. This reading was then compared to the applicable specification limit to determine compliance.

| TABLE A: SAMPLE CALCULATIONS |                     |                |
|------------------------------|---------------------|----------------|
|                              | Meter reading       | (dB $\mu$ V)   |
| +                            | Antenna Factor      | (dB)           |
| +                            | Cable Loss          | (dB)           |
| -                            | Distance Correction | (dB)           |
| -                            | Preamplifier Gain   | (dB)           |
| =                            | Corrected Reading   | (dB $\mu$ V/m) |

## **TEST INSTRUMENTATION AND ANALYZER SETTINGS**

The test instrumentation and equipment listed in Appendix B were used to collect both the radiated and conducted emissions data. For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. For frequencies from 30 to 1000 MHz, the biconilog antenna was used. Conducted emissions tests required the use of the FCC type LISNs.

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.

## **SPECTRUM ANALYZER DETECTOR FUNCTIONS**

The notes that accompany the measurements contained in the Tables 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.

### **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**

For certain frequencies, 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.

## EUT TESTING

### **Radiated Emissions**

For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. The equipment under test was set up on a non conductive surface 80 cm off the ground. The Magnetic Loop Antenna was located 3 meters away on a tripod one meter off the ground to the center of the loop. This antenna was placed first in the vertical polarization and then in the horizontal polarization and rotated to obtain the worst case emissions emanating from the EUT. The EUT was also rotated to find the worst case emissions.

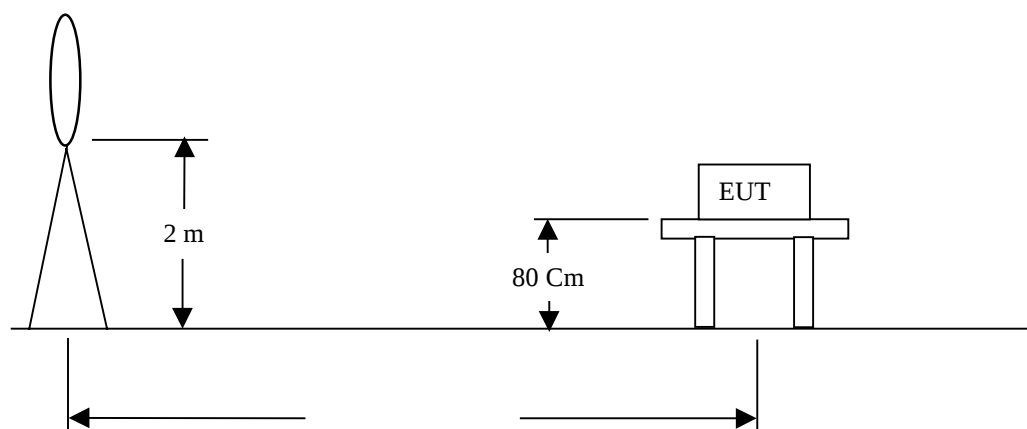
The frequency range of 30 MHz to 1000 MHz was scanned with the biconilog antenna located about 1.5 meter above the ground plane in the vertical polarity. The EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters. During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode. During this scan, the turntable was rotated and all peaks at or near the limit were recorded. A scan of the FM band from 88 to 110 MHz was then made using a reduced resolution bandwidth and frequency span. The biconilog antenna was changed to the horizontal polarity and the above steps were repeated. Care was taken to ensure that no frequencies were missed within the FM and TV bands.

A thorough scan of all frequencies was made manually using a small frequency span, rotating the turntable and raising and lowering the antenna from one to four meters as needed. The test engineer maximized the readings with respect to the table rotation, antenna height, and configuration of EUT. Maximizing of the EUT was achieved by monitoring the spectrum analyzer on a closed circuit television monitor.

**APPENDIX A**

**TEST SETUP DIAGRAM AND PHOTOGRAPHS**

## TEST SET UP DIAGRAM FOR OUTDOOR 9 kHz TO 30 MHz TESTING

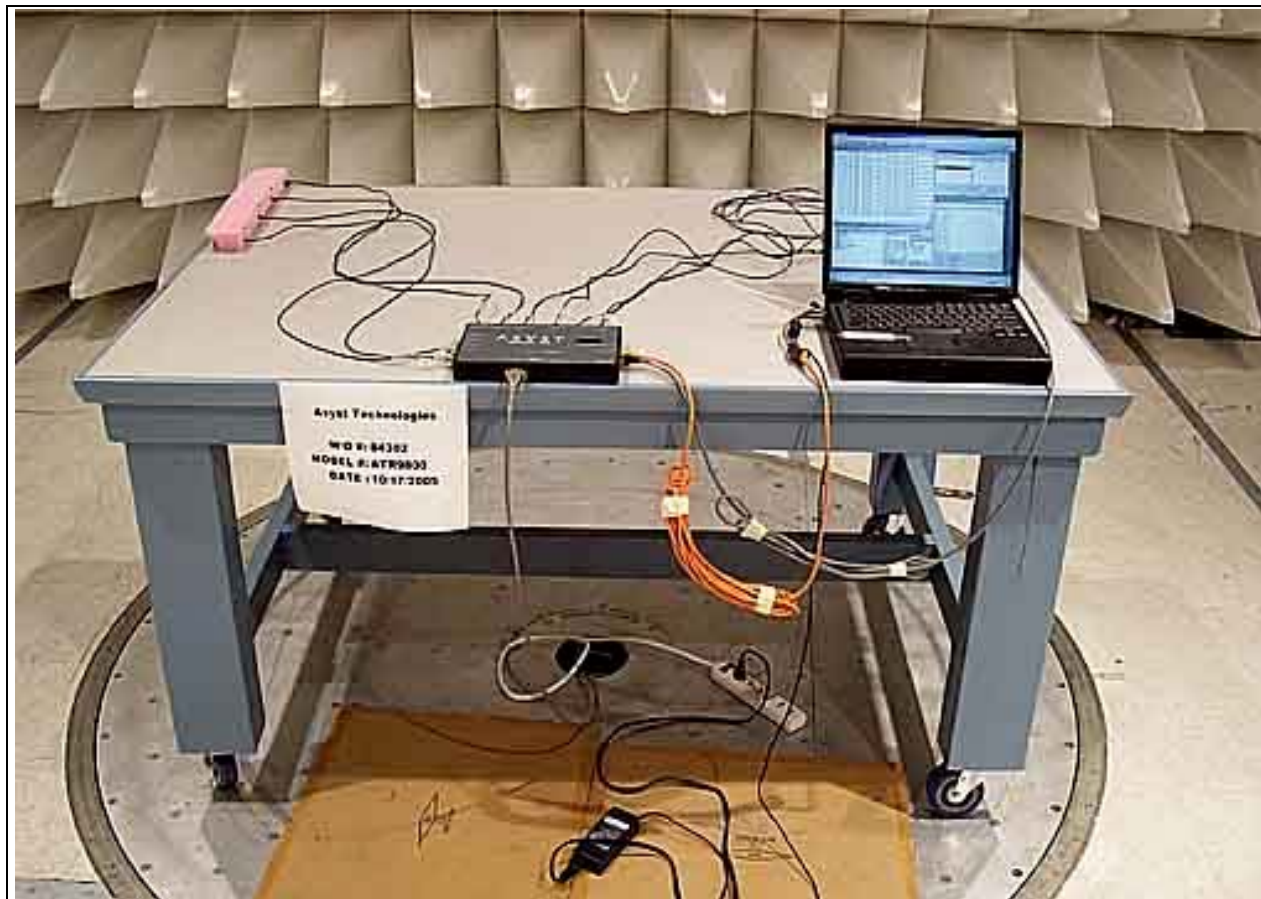


## PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions - Front View

**PHOTOGRAPH SHOWING RADIATED EMISSIONS**



Radiated Emissions - Back View

## APPENDIX B

### TEST EQUIPMENT LIST

#### *15.209 9 kHz – 30 MHz*

| Function                 | S/N        | Calibration Date | Cal Due Date | Asset # |
|--------------------------|------------|------------------|--------------|---------|
| Chase Bilog CBL6111C     | 2630       | 01/24/2005       | 01/24/2007   | 00852   |
| HP8447F opt H64 preamp   | 2944A03850 | 03/05/2005       | 03/05/2007   | 00501   |
| E4446A Spectrum Analyzer | US44300408 | 01/13/2005       | 01/13/2007   | 02668   |
| Mag Loop Antenna EMCO    | 2078       | 05/13/2005       | 05/13/2007   | 00432   |

#### *15.209 30-1000 MHz*

| Function                  | S/N        | Calibration Date | Cal Due Date | Asset # |
|---------------------------|------------|------------------|--------------|---------|
| Chase Bilog CBL6111C      | 2630       | 01/24/2005       | 01/24/2007   | 00852   |
| HP8447F opt H64 preamp    | 2944A03850 | 03/05/2005       | 03/05/2007   | 00501   |
| QP Adapter HP-85650A      | 2043A00188 | 10/23/2004       | 10/23/2006   | 01508   |
| S.A., RF Section HP-8568B | 2601A02378 | 06/20/2005       | 06/20/2007   | 01377   |
| S.A., Display HP-85662A   | 2542A10641 | 06/20/2005       | 06/20/2007   | 01377A  |

**APPENDIX C:**  
**MEASUREMENT DATA SHEETS**

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170

Customer: **Asyst Technologies**

Specification: **FCC 15.209**

Work Order #: **84302**

Date: 10/21/2005

Test Type: **Magnetic Loop Measurement**

Time: 15:20:23

Equipment: **8 Antenna Industrial Radio**

Sequence#: 7

Manufacturer: Asyst Technologies

Tested By: S. Goulet

Model: ATR9800

S/N: A1

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

| Function                    | Manufacturer       | Model # | S/N |
|-----------------------------|--------------------|---------|-----|
| 8 Antenna Industrial Radio* | Asyst Technologies | ATR9800 | A1  |

**Support Devices:**

| Function                 | Manufacturer | Model #   | S/N            |
|--------------------------|--------------|-----------|----------------|
| Ethernet Hub             | Air Link     | asw105/A2 | 035A2A40573    |
| EUT power supply         | Ault Inc.    | PW102     | 3443A          |
| AC Adapter for Laptop PC | Dell         | AA20031   | 12761-04R-1374 |
| Laptop PC                | Dell         | PPI       | 48DK0          |
| Serial Port Multiplexer  | Asyst        | HS-60     | LM1            |

**Test Conditions / Notes:**

The ATR9800 8 Antenna Industrial Radio: the host Dell PC is running Secsim Pro software and sending Read ID Commands over the ethernet connection. Only antenna #1 is active during communications. The remaining seven antennas are connected but not energized. This is a maximized emissions measurement taken outdoors over the ground.

**Transducer Legend:**

|                                 |                                 |
|---------------------------------|---------------------------------|
| T1=Cable P05296 25' RG214 N-N   | T2=Cable P05300 12' RG214 N-N   |
| T3=Mag Loop A/N 00432, S/N 2078 | T4=15.31 3m 40dB/Dec Correction |

**Measurement Data:** Reading listed by margin. Test Distance: 3 Meters

| # | Freq<br>MHz | Rdng<br>dBμV | T1<br>dB | T2<br>dB | T3<br>dB | T4<br>dB | Dist<br>Table | Corr<br>dBμV/m | Spec<br>dBμV/m  | Margin<br>dB | Polar<br>Ant |
|---|-------------|--------------|----------|----------|----------|----------|---------------|----------------|-----------------|--------------|--------------|
| 1 | 134.290k    | 76.1         | +0.0     | +0.1     | +9.6     | -80.0    | +0.0          | 5.8            | 25.0            | -19.2        | Vert         |
| 2 | 668.830k    | 38.4         | +0.1     | +0.1     | +9.7     | -40.0    | +0.0          | 8.3            | 31.1            | -22.8        | Vert         |
| 3 | 937.590k    | 32.5         | +0.1     | +0.1     | +10.0    | -40.0    | +0.0          | 2.7            | 28.1            | -25.4        | Vert         |
| 4 | 808.080k    | 33.0         | +0.1     | +0.1     | +9.9     | -40.0    | +0.0          | 3.1            | 29.4            | -26.3        | Vert         |
| 5 | 13.621M     | 32.6         | +0.2     | +0.1     | +8.9     | -40.0    | +0.0          | 1.8            | 29.5            | -27.7        | Vert         |
| 6 | 536.000k    | 32.7         | +0.0     | +0.1     | +9.5     | -40.0    | +0.0          | 2.3            | 33.0            | -30.7        | Vert         |
| 7 | 15.563M     | 22.2         | +0.2     | +0.1     | +8.8     | -40.0    | +0.0          | -8.7           | 29.5<br>Ambient | -38.2        | Horiz        |

|    |          |      |      |      |      |       |      |       |      |       |       |
|----|----------|------|------|------|------|-------|------|-------|------|-------|-------|
| 8  | 13.629M  | 21.2 | +0.2 | +0.1 | +8.9 | -40.0 | +0.0 | -9.6  | 29.5 | -39.1 | Horiz |
| 9  | 403.740k | 45.9 | +0.0 | +0.1 | +9.4 | -80.0 | +0.0 | -24.6 | 15.5 | -40.1 | Vert  |
| 10 | 16.000M  | 16.5 | +0.2 | +0.1 | +8.8 | -40.0 | +0.0 | -14.4 | 29.5 | -43.9 | Vert  |
| 11 | 271.030k | 45.5 | +0.0 | +0.1 | +9.0 | -80.0 | +0.0 | -25.4 | 18.9 | -44.3 | Vert  |
| 12 | 265.100k | 45.0 | +0.0 | +0.1 | +9.0 | -80.0 | +0.0 | -25.9 | 19.1 | -45.0 | Vert  |
| 13 | 25.000M  | 16.0 | +0.2 | +0.1 | +7.6 | -40.0 | +0.0 | -16.1 | 29.5 | -45.6 | Vert  |

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170

Customer: **Asyst Technologies**

Specification: **FCC 15.209**

Work Order #: **84302**

Date: 10/18/2005

Test Type: **Maximized Emissions**

Time: 14:52:14

Equipment: **8 Antenna Industrial Radio**

Sequence#: 5

Manufacturer: Asyst Technologies

Tested By: S. Goulet

Model: ATR9800

S/N:

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

| Function                   | Manufacturer       | Model # | S/N |
|----------------------------|--------------------|---------|-----|
| 8 Antenna Industrial Radio | Asyst Technologies | ATR9800 | A1  |

**Support Devices:**

| Function                 | Manufacturer | Model # | S/N            |
|--------------------------|--------------|---------|----------------|
| EUT power supply         | Ault Inc.    | PW102   | 3443A          |
| AC Adapter for Laptop PC | Dell         | AA20031 | 12761-04R-1374 |
| Laptop PC                | Dell         | PPI     | 48DK0          |

**Test Conditions / Notes:**

The ATR9800 8 Antenna Industrial Radio: the host Dell PC is running Secsim Pro software and sending Read ID Commands over the ethernet connection. Only antenna #1 is active during communications. The remaining seven antennas are connected but not energized. This is a maximized emissions measurement.

**Transducer Legend:**

|                                       |                               |
|---------------------------------------|-------------------------------|
| T1=Cable P05296 25' RG214 N-N         | T2=Cable P05300 12' RG214 N-N |
| T3=Cable P05299 2' RG214 N-N          | T4=0852-Bi-Log Antenna        |
| T5=Amp Cal.HP-8447F OPT H64- AN 00501 |                               |

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

| # | Freq     | Rdng       | T1<br>T5 | T2   | T3   | T4    | Dist  | Corr         | Spec         | Margin | Polar |
|---|----------|------------|----------|------|------|-------|-------|--------------|--------------|--------|-------|
|   | MHz      | dB $\mu$ V | dB       | dB   | dB   | dB    | Table | dB $\mu$ V/m | dB $\mu$ V/m | dB     | Ant   |
| 1 | 125.005M | 54.4       | +0.6     | +0.4 | +0.1 | +11.2 | +0.0  | 41.0         | 43.5         | -2.5   | Horiz |
|   | QP       |            | -25.7    |      |      |       | 188   |              |              |        | 260   |
| ^ | 125.013M | 56.3       | +0.6     | +0.4 | +0.1 | +11.2 | +0.0  | 42.9         | 43.5         | -0.6   | Horiz |
|   |          |            | -25.7    |      |      |       | 188   |              |              |        | 260   |
| 3 | 124.015M | 53.9       | +0.6     | +0.4 | +0.1 | +11.2 | +0.0  | 40.4         | 43.5         | -3.1   | Horiz |
|   | QP       |            | -25.8    |      |      |       | 269   |              |              |        | 260   |
| ^ | 124.025M | 57.0       | +0.6     | +0.4 | +0.1 | +11.2 | +0.0  | 43.5         | 43.5         | +0.0   | Horiz |
|   |          |            | -25.8    |      |      |       | 269   |              |              |        | 260   |
| 5 | 47.391M  | 51.9       | +0.4     | +0.3 | +0.1 | +9.9  | +0.0  | 36.5         | 40.0         | -3.5   | Vert  |
|   | QP       |            | -26.1    |      |      |       | 290   |              |              |        | 226   |
| 6 | 47.674M  | 50.5       | +0.4     | +0.2 | +0.1 | +9.8  | +0.0  | 35.0         | 40.0         | -5.0   | Vert  |
|   | QP       |            | -26.0    |      |      |       | 316   |              |              |        | 145   |
| 7 | 47.392M  | 50.3       | +0.4     | +0.3 | +0.1 | +9.9  | +0.0  | 34.9         | 40.0         | -5.1   | Vert  |
|   | QP       |            | -26.1    |      |      |       | 89    |              |              |        | 198   |
| ^ | 47.384M  | 62.6       | +0.4     | +0.3 | +0.1 | +9.9  | +0.0  | 47.2         | 40.0         | +7.2   | Vert  |
|   |          |            | -26.1    |      |      |       | 290   |              |              |        | 226   |
| 9 | 168.000M | 53.1       | +0.7     | +0.4 | +0.1 | +9.5  | +0.0  | 38.2         | 43.5         | -5.3   | Vert  |
|   |          |            | -25.6    |      |      |       | 179   |              |              |        | 180   |

|    |                |      |               |      |      |       |             |      |      |       |              |
|----|----------------|------|---------------|------|------|-------|-------------|------|------|-------|--------------|
| 10 | 200.023M       | 52.9 | +0.8<br>-25.6 | +0.5 | +0.1 | +8.6  | +0.0<br>244 | 37.3 | 43.5 | -6.2  | Horiz<br>248 |
| 11 | 250.014M       | 51.1 | +0.9<br>-25.1 | +0.5 | +0.1 | +12.3 | +0.0<br>331 | 39.8 | 46.0 | -6.2  | Horiz<br>179 |
| 12 | 500.059M<br>QP | 46.5 | +1.3<br>-26.7 | +0.7 | +0.2 | +17.5 | +0.0<br>306 | 39.5 | 46.0 | -6.5  | Horiz<br>242 |
| ^  | 499.997M       | 49.2 | +1.3<br>-26.7 | +0.7 | +0.2 | +17.5 | +0.0<br>306 | 42.2 | 46.0 | -3.8  | Horiz<br>242 |
| 14 | 46.856M        | 48.5 | +0.4<br>-26.1 | +0.3 | +0.1 | +10.2 | +0.0<br>151 | 33.4 | 40.0 | -6.6  | Horiz<br>311 |
| 15 | 100.012M<br>QP | 52.0 | +0.5<br>-25.7 | +0.2 | +0.0 | +9.6  | +0.0<br>234 | 36.6 | 43.5 | -6.9  | Horiz<br>290 |
| ^  | 100.004M       | 60.8 | +0.5<br>-25.7 | +0.2 | +0.0 | +9.6  | +0.0<br>234 | 45.4 | 43.5 | +1.9  | Horiz<br>290 |
| 17 | 124.038M<br>QP | 49.7 | +0.6<br>-25.8 | +0.4 | +0.1 | +11.2 | +0.0<br>139 | 36.2 | 43.5 | -7.3  | Vert<br>99   |
| ^  | 124.034M       | 52.6 | +0.6<br>-25.8 | +0.4 | +0.1 | +11.2 | +0.0<br>139 | 39.1 | 43.5 | -4.4  | Vert<br>99   |
| 19 | 170.332M       | 51.2 | +0.7<br>-25.5 | +0.4 | +0.1 | +9.3  | +0.0<br>10  | 36.2 | 43.5 | -7.3  | Vert<br>140  |
| 20 | 47.385M<br>QP  | 48.0 | +0.4<br>-26.1 | +0.3 | +0.1 | +9.9  | +0.0<br>82  | 32.6 | 40.0 | -7.4  | Vert<br>117  |
| 21 | 500.010M<br>QP | 45.6 | +1.3<br>-26.7 | +0.7 | +0.2 | +17.5 | +0.0<br>170 | 38.6 | 46.0 | -7.5  | Vert<br>280  |
| ^  | 500.012M       | 49.3 | +1.3<br>-26.7 | +0.7 | +0.2 | +17.5 | +0.0<br>170 | 42.3 | 46.0 | -3.7  | Vert<br>280  |
| ^  | 500.013M       | 47.9 | +1.3<br>-26.7 | +0.7 | +0.2 | +17.5 | +0.0<br>15  | 40.9 | 46.0 | -5.1  | Vert<br>100  |
| 24 | 150.008M<br>QP | 49.8 | +0.7<br>-25.7 | +0.4 | +0.1 | +10.7 | +0.0<br>142 | 36.0 | 43.5 | -7.5  | Vert<br>99   |
| ^  | 150.008M       | 51.7 | +0.7<br>-25.7 | +0.4 | +0.1 | +10.7 | +0.0<br>258 | 37.9 | 43.5 | -5.6  | Vert<br>132  |
| ^  | 150.013M       | 46.6 | +0.7<br>-25.7 | +0.4 | +0.1 | +10.7 | +0.0<br>135 | 32.8 | 43.5 | -10.7 | Vert<br>100  |
| 27 | 47.397M<br>QP  | 47.9 | +0.4<br>-26.1 | +0.3 | +0.1 | +9.9  | +0.0<br>82  | 32.5 | 40.0 | -7.5  | Vert<br>117  |
| 28 | 150.000M       | 49.5 | +0.7<br>-25.7 | +0.4 | +0.1 | +10.7 | +0.0<br>166 | 35.7 | 43.5 | -7.8  | Horiz<br>272 |
| 29 | 175.013M<br>QP | 51.0 | +0.7<br>-25.6 | +0.4 | +0.1 | +9.0  | +0.0<br>327 | 35.6 | 43.5 | -7.9  | Vert<br>99   |
| ^  | 175.004M       | 52.2 | +0.7<br>-25.6 | +0.4 | +0.1 | +9.0  | +0.0<br>327 | 36.8 | 43.5 | -6.7  | Vert<br>173  |
| 31 | 125.022M<br>QP | 48.8 | +0.6<br>-25.7 | +0.4 | +0.1 | +11.2 | +0.0<br>140 | 35.4 | 43.5 | -8.1  | Vert<br>99   |
| ^  | 125.008M       | 53.8 | +0.6<br>-25.7 | +0.4 | +0.1 | +11.2 | +0.0<br>140 | 40.4 | 43.5 | -3.1  | Vert<br>99   |
| ^  | 124.990M       | 53.0 | +0.6<br>-25.7 | +0.4 | +0.1 | +11.2 | +0.0<br>158 | 39.6 | 43.5 | -3.9  | Vert<br>235  |
| ^  | 125.017M       | 52.1 | +0.6<br>-25.7 | +0.4 | +0.1 | +11.2 | +0.0<br>146 | 38.7 | 43.5 | -4.8  | Vert<br>100  |

|    |                |      |               |      |      |       |             |      |      |       |              |
|----|----------------|------|---------------|------|------|-------|-------------|------|------|-------|--------------|
| 35 | 943.721M       | 37.5 | +1.8<br>-26.5 | +1.0 | +0.2 | +23.4 | +0.0<br>370 | 37.4 | 46.0 | -8.6  | Horiz<br>130 |
| 36 | 250.000M       | 47.9 | +0.9<br>-25.1 | +0.5 | +0.1 | +12.3 | +0.0<br>370 | 36.6 | 46.0 | -9.4  | Vert<br>170  |
| 37 | 937.975M       | 36.6 | +1.8<br>-26.5 | +1.0 | +0.2 | +23.3 | +0.0<br>370 | 36.4 | 46.0 | -9.6  | Horiz<br>130 |
| 38 | 46.860M<br>QP  | 45.4 | +0.4<br>-26.1 | +0.3 | +0.1 | +10.2 | +0.0<br>159 | 30.3 | 40.0 | -9.7  | Vert<br>165  |
| ^  | 46.859M        | 56.4 | +0.4<br>-26.1 | +0.3 | +0.1 | +10.2 | +0.0<br>159 | 41.3 | 40.0 | +1.3  | Vert<br>165  |
| 40 | 168.086M<br>QP | 48.7 | +0.7<br>-25.6 | +0.4 | +0.1 | +9.5  | +0.0<br>184 | 33.8 | 43.5 | -9.7  | Horiz<br>199 |
| ^  | 168.068M       | 54.9 | +0.7<br>-25.6 | +0.4 | +0.1 | +9.5  | +0.0<br>184 | 40.0 | 43.5 | -3.5  | Horiz<br>199 |
| 42 | 159.996M       | 47.6 | +0.7<br>-25.8 | +0.4 | +0.1 | +10.2 | +0.0<br>370 | 33.2 | 43.5 | -10.3 | Vert<br>100  |
| 43 | 250.002M       | 46.9 | +0.9<br>-25.1 | +0.5 | +0.1 | +12.3 | +0.0<br>336 | 35.6 | 46.0 | -10.4 | Vert<br>215  |
| 44 | 46.046M<br>QP  | 43.8 | +0.4<br>-26.2 | +0.3 | +0.1 | +10.7 | +0.0<br>82  | 29.1 | 40.0 | -10.9 | Vert<br>117  |
| 45 | 155.074M<br>QP | 46.8 | +0.7<br>-25.8 | +0.4 | +0.1 | +10.4 | +0.0<br>164 | 32.6 | 43.5 | -10.9 | Horiz<br>272 |
| ^  | 155.098M       | 57.3 | +0.7<br>-25.8 | +0.4 | +0.1 | +10.4 | +0.0<br>164 | 43.1 | 43.5 | -0.4  | Horiz<br>272 |
| 47 | 100.004M<br>QP | 47.4 | +0.5<br>-25.7 | +0.2 | +0.0 | +9.6  | +0.0<br>167 | 32.0 | 43.5 | -11.5 | Vert<br>99   |
| ^  | 100.006M       | 57.0 | +0.5<br>-25.7 | +0.2 | +0.0 | +9.6  | +0.0<br>167 | 41.6 | 43.5 | -1.9  | Vert<br>99   |
| ^  | 100.002M       | 53.2 | +0.5<br>-25.7 | +0.2 | +0.0 | +9.6  | +0.0<br>266 | 37.8 | 43.5 | -5.7  | Vert<br>132  |
| 50 | 947.360M       | 34.3 | +1.8<br>-26.4 | +1.0 | +0.2 | +23.5 | +0.0<br>370 | 34.4 | 46.0 | -11.6 | Vert<br>130  |
| 51 | 155.085M<br>QP | 45.7 | +0.7<br>-25.8 | +0.4 | +0.1 | +10.4 | +0.0<br>162 | 31.5 | 43.5 | -12.0 | Vert<br>220  |
| ^  | 155.102M       | 56.0 | +0.7<br>-25.8 | +0.4 | +0.1 | +10.4 | +0.0<br>162 | 41.8 | 43.5 | -1.7  | Vert<br>244  |
| ^  | 155.040M       | 54.4 | +0.7<br>-25.8 | +0.4 | +0.1 | +10.4 | +0.0<br>179 | 40.2 | 43.5 | -3.3  | Vert<br>180  |
| 54 | 949.823M       | 33.7 | +1.8<br>-26.4 | +1.0 | +0.2 | +23.6 | +0.0<br>370 | 33.9 | 46.0 | -12.1 | Vert<br>130  |
| 55 | 47.386M<br>QP  | 43.1 | +0.4<br>-26.1 | +0.3 | +0.1 | +9.9  | +0.0<br>61  | 27.7 | 40.0 | -12.3 | Horiz<br>272 |
| ^  | 47.392M        | 51.8 | +0.4<br>-26.1 | +0.3 | +0.1 | +9.9  | +0.0<br>61  | 36.4 | 40.0 | -3.6  | Horiz<br>272 |
| 57 | 952.719M       | 33.5 | +1.8<br>-26.5 | +1.0 | +0.2 | +23.6 | +0.0<br>370 | 33.6 | 46.0 | -12.4 | Vert<br>130  |
| 58 | 200.015M<br>QP | 46.6 | +0.8<br>-25.6 | +0.5 | +0.1 | +8.6  | +0.0<br>195 | 31.0 | 43.5 | -12.5 | Vert<br>100  |
| ^  | 200.014M       | 51.6 | +0.8<br>-25.6 | +0.5 | +0.1 | +8.6  | +0.0<br>195 | 36.0 | 43.5 | -7.5  | Vert<br>100  |

|    |                |      |               |      |      |       |             |      |      |       |              |
|----|----------------|------|---------------|------|------|-------|-------------|------|------|-------|--------------|
| 60 | 946.234M       | 33.4 | +1.8<br>-26.4 | +1.0 | +0.2 | +23.5 | +0.0<br>370 | 33.5 | 46.0 | -12.5 | Horiz<br>130 |
| 61 | 125.016M<br>QP | 44.1 | +0.6<br>-25.7 | +0.4 | +0.1 | +11.2 | +0.0<br>158 | 30.7 | 43.5 | -12.9 | Vert<br>235  |
| 62 | 170.182M<br>QP | 44.2 | +0.7<br>-25.5 | +0.4 | +0.1 | +9.4  | +0.0<br>10  | 29.3 | 43.5 | -14.2 | Vert<br>140  |
| 63 | 152.255M<br>QP | 41.9 | +0.7<br>-25.7 | +0.4 | +0.1 | +10.6 | +0.0<br>30  | 28.0 | 43.5 | -15.5 | Vert<br>133  |
| ^  | 152.281M       | 49.5 | +0.7<br>-25.7 | +0.4 | +0.1 | +10.6 | +0.0<br>30  | 35.6 | 43.5 | -7.9  | Vert<br>133  |