



LS Research, LLC  
W66 N220 Commerce Court  
Cedarburg, WI 53012  
262-375-4400

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## **COMPLIANCE TESTING OF:**

Synchronization Transmitter  
Model XR

## **PREPARED FOR:**

Primex  
Attn.: Mr. Scott Wickus  
965 Wells Street  
Lake Geneva, WI 53147

## **TEST REPORT NUMBER:**

306343

## **DATE(S) OF TESTING:**

July 10<sup>th</sup> and 11<sup>th</sup>, 2006

*All results of this report relate only to the items that were tested. This report is not to be reproduced, except in full, without written approval of LS Research, LLC.*

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## 1. LS Research, LLC In Review

LS Research, LLC is located in Cedarburg, Wisconsin – United States.

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**As an EMC Testing Laboratory, our Accreditation and Assessments are recognized through the following:**

A2LA – American Association for Laboratory Accreditation  
**Accreditation based on ISO/IEC 17025 : 1999**  
**with Electrical (EMC) Scope of Accreditation**  
**A2LA Certificate Number: 1255.01**

U. S. Conformity Assessment Body (CAB) Validation  
**Validated by the European Commission as a U. S. Conformity Assessment Body**  
**operating under the U. S. /EU, Mutual Recognition Agreement (MRA) operating**  
**under the European Union EMC Directive 89/336/EEC, Article 10.2.**  
**Date of Validation:** January 16, 2001

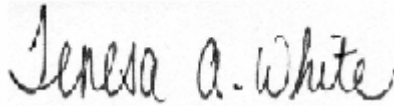
Federal Communications Commission (FCC) – USA  
**Listing of 3 Meter Semi-Anechoic Chamber based on 47CFR 2.948**  
**FCC Registration Number:** 90756

**Listing of 3 and 10 meter OATS based on 47CFR 2.948**  
**FCC Registration Number:** 90757

Industry Canada  
**On-file, 3 Meter Semi-Anechoic Chamber based on 47CRF 2.948**  
**File Number:** IC 3088

**On-file 3 and 10 Meter OATS based on RSS-210**  
**File Number:** IC 3088-A

## 2. Signature Page

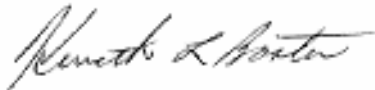


Prepared By:

August 24, 2006

Teresa A. White, Document Coordinator

Date

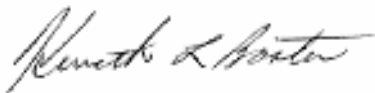


Tested By:

August 24, 2006

Kenneth L. Boston, EMC Lab Manager

Date



Approved By:

August 24, 2006

Kenneth L. Boston, EMC Lab Manager

Date

PE#31926 Licensed Professional Engineer

Registered in the State of Wisconsin, United States

### 3. Product and General Information

|                  |                                           |
|------------------|-------------------------------------------|
| Manufacturer:    | Primex                                    |
| Model No.:       | XR                                        |
| Serial No.:      | (Unit 1) 000100000 and (Unit 5) 000110000 |
| Description:     | Data Transmitter                          |
| Frequency Range: | 72.0 – 76.0 MHz                           |

### 4. Product Description

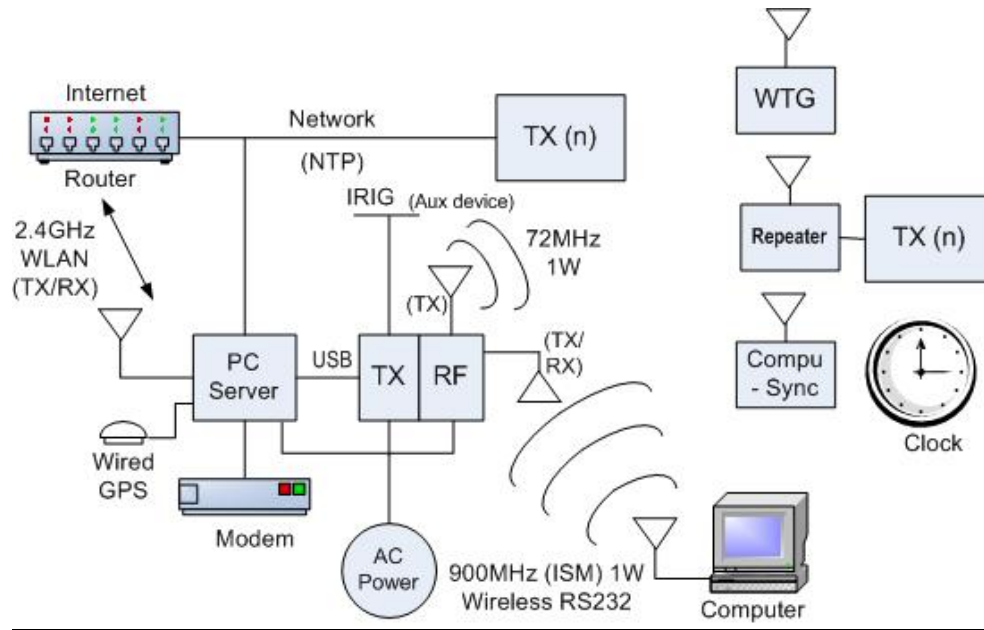
The XR is a data transmitter, which sends telemetry to various co-located paging receivers, which are located in wall clocks, for the purpose of time synchronization. It is provided for by 47 CFR, Part 90.238 as a telemetry device.

Two models were tested; the first sample was fully configured with all peripheral cables and modules and includes: The I/O connection possibilities are shown in the following table:

| Connector                | Description                                                                                                                                                                                                                                                                           | Connector type                      |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| GPS IN                   | Input from GPS receiver                                                                                                                                                                                                                                                               | 7 pin mini-DIN                      |
| NETWORK LAN              | Network connection, connects to Lantronix serial port internally. This is a population option with the next connector.                                                                                                                                                                | RJ45                                |
| WIRELESS NETWORK ANTENNA | Wireless bulkhead antenna mount. This a population option with the previous connector.                                                                                                                                                                                                | SMA                                 |
| SCHEDULER                | Com 1/Auxiliary Port/Scheduler Programming                                                                                                                                                                                                                                            | RS232 DB9 Fem.                      |
| GPS OUT                  | Serial port with 1PPS to drive NTP input for the server                                                                                                                                                                                                                               | RS232 DB9 Male                      |
| SERVER CONNECT           | USB 2.0                                                                                                                                                                                                                                                                               | USB Type B device connector         |
| BASEBAND / MONITOR       | Serial JTAG in for programming the micro; input line for monitoring a high power amp RF power; input line for monitoring VSWR on a high power RF amp (neither used in this model); non-inverted baseband output – a digital output of the pre-modulated baseband for external systems | 9 pin Mini-DIN socket               |
| TX RF                    | Main RF Output, found on top of the enclosure for this model                                                                                                                                                                                                                          | NMO antenna mount                   |
| Power                    | Connector from wall supply. DC output is 9V at 2.7A                                                                                                                                                                                                                                   | Two prong AC, DC is 2.5 mm pin size |
| EXTERNAL ANTENNA         | Not populated for this model, when populated, the TX RF NMO antenna mount on top is depopulated                                                                                                                                                                                       | N-Type Bulk-head                    |

The second sample is configured as a basic unit with no extra cables, using the installed whip antenna.

This is a synchronized time and data transmitter that transmits time and data packets using FM encoding in the 72 – 76 MHz frequency range. The transmitter can be locally connected (through a USB interface) or network connected (through a CAT5 cable or WLAN connection) to a server, can be connected via USB or serial cable to a PC for programming, or operate standalone. The system diagram is shown below.



## **5. Test Requirements**

The following FCC requirements are met: 47 CFR, 2.1053, 90.257(b)(2), 90.210.

## 6. Summary of Test Report

### **DECLARATION OF CONFORMITY**

The Equipment Under Test (EUT) was found to **MEET** the requirements as described within the specification of Title 47 CFR FCC, Part 90, Subpart J, and Part 2.1053 Radiated Spurious Emissions for a low-power non-broadcast transmitter.

## 7. Introduction

On July 10<sup>th</sup> and 11<sup>th</sup>, 2006 a series of Radiated Emission tests were performed on the EUT. These tests were performed using the procedures outlined in ANSI C63.4-2001 for unintentional radiators, and in accordance with the limits set forth in FCC Part 90 for a non-voice and other specialized operation transmitters. These tests were performed by Kenneth Boston, EMC Lab Manager of LS Research, LLC.

## 8. Purpose

All Radiated Emission tests upon the EUT were performed to measure the emissions in the frequency bands described in title 47 CFR, FCC Part 90, including 90.210 (general technical parts) to determine whether these emissions are below the limits expressed within the standards. These tests were performed in accordance with the procedure described in the American National Standard for methods of measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz TIA-603. Another document used as a reference for the EMI Receiver specification was the Comite International Special Des Perturbations Radioelectriques (CISPR) Number 16-1, 1993.

## **9. Radiated Emissions Test**

### **Test Setup**

The test setup was assembled in accordance with TIA-603. The Quartex FM-72 was placed on an 80cm high non-conductive pedestal centered on a flush mounted 2-meter diameter turntable inside the 3 Meter Semi-Anechoic, FCC listed Chamber located at LS Research, LLC in Cedarburg, Wisconsin. The EUT was operated in normal mode, using AC power as provided by a wall transformer. The transmitter was set to operate continuously, on two channels (72.01 and 75.98 MHz), and a suitable artificial 50 ohm antenna load was connected to the internal antenna port for the duration of the radiated emissions tests. Signal levels that were seen to be close to the regulatory limits were verified using a substitution method, with a tuned Dipole. The applicable limits are provided at a 3 meter distance. The calculations to determine these limits are detailed in the following pages. Please refer to Appendix A for a list of the test equipment.

### **Test Procedure**

Spurious radiation measurements were performed on the EUT in the 3 Meter Semi-Anechoic, FCC listed Chamber, located at LS Research, LLC in Cedarburg, Wisconsin. The frequency range from 30 MHz to 760 MHz was scanned, and levels were manually noted at the various fixed degree settings of azimuth on the turntable and antenna height. The EUT was placed on the non-conductive wooden table in the 3 Meter Semi-Anechoic Chamber, with the antenna mast placed such that the antenna was 3 meters from the test object. A Biconical Antenna was used to measure emissions from 30 MHz to 200 MHz, and a Log Periodic Antenna was used to measure emissions from 200 MHz to 760 MHz. The maximum radiated emissions were found by raising and lowering the antenna between 1 and 4 meters in height, using both horizontal and vertical antenna polarities.

### **Test Equipment Utilized**

A list of the test equipment and antennas utilized for the Radiated Emissions test can be found in Appendix A. Included in this list are calibration information and equipment descriptions. All equipment is calibrated and used according to the operations manual supplied by the manufacturer. All calibrations of the antennas used were performed at an N.I.S.T. traceable site. In addition, the Connecting Cables were measured for losses using a calibrated Signal Generator and a HP 8546A EMI Receiver. The resulting correction factors and the cable loss factors from these calibrations were entered into the HP 8546A EMI Receiver database. As a result, the data taken from the HP 8546A EMI Receiver accounts for the antenna correction factor as well as cable loss or other corrections, and can therefore be entered into the database as a corrected meter reading. The HP 8546A EMI Receiver was operated with a bandwidth of 120 kHz for measurements below 1 GHz. Both the Peak and Quasi-Peak Detector functions were utilized.

### **Test Results**

The EUT was found to MEET the Radiated Emissions requirements of Title 47 CFR, FCC Part 90.257(b)(2) for an unintentional radiator (Canada RSS-210). The frequencies with significant signals were recorded and plotted as shown in the Data Charts and Graphs.

## Calculation of Radiated Emissions Limits

### FIELD STRENGTH OF SPURIOUS/HARMONIC FREQUENCIES

In accordance with Section 90.210 (2.1053)

All out of band spurious emissions must be below the mean power of the carrier by at least:

$$43 + 10 \log(\text{carrier power})$$

which for a 1.0 watt rating on the test sample is:

$$\begin{aligned} 43 + 10 \log(1) \\ 43 &= 43 \text{ dBc} \end{aligned}$$

$$-43 \text{ dBc from } 30 \text{ dBm} = -13. \text{ dBm}$$

### FIELD STRENGTH OF PART 90 LIMIT: AT R = 3 METERS DISTANCE

FROM THE STANDARD REFERENCE FORMULA FOR POWER TRANSMITTED VERSUS ELECTRIC FIELD:

$$P_t = (R^{**}) \times |E|^{**} / 30$$

Then to convert to dB:

$$P_t = 20 \log |E| + 20 \log(R) - 10 \log(30)$$

Insert additional terms to convert watts to milli-watts (in dB) and volts to micro-volts (in dB $\mu$ V):

$$P_t = 20 \log |E_{\mu V}| - 20 \log(1,000,000) + 10 \log(1000) + 20 \log(3) - 10 \log(30)$$

$$P_t = 20 \log |E_{\mu V}| - 120 + 30 + 9.54 - 14.77$$

$$P_t = 20 \log |E_{\mu V}| - 95.23$$

$$\text{OR; } 20 \log |E_{\mu V}| = P_t (\text{in dBm}) + 95.23$$

$$|E| (\text{in dB}\mu\text{V}) = -13 \text{ dBm} + 95.23 = \underline{82.23 \text{ dB}\mu\text{V/m}}, \text{ at 3 meters}$$

### Summary of Results and Conclusions

Based on the procedures outlined in this report, and the test results included in Appendices A and B, it can be determined that the EUT does MEET the emission requirements of Title 47 CFR, FCC Part 90.

The enclosed test results pertain to the samples of the test item listed, and only for the tests performed per the data sheets. Any subsequent modification or changes to the test items could invalidate the data contained herein, and could therefore invalidate the findings of this report.

# Measurement of Electromagnetic Radiated Emissions at a 3 Meter F.C.C. Listed Site

Frequency Range inspected: 30 MHz - 760 MHz

|                    |                                                   |                                             |  |                |                  |            |
|--------------------|---------------------------------------------------|---------------------------------------------|--|----------------|------------------|------------|
| Manufacturer:      | Primex                                            |                                             |  |                |                  |            |
| Date(s) of Test:   | July 10 <sup>th</sup> and 11 <sup>th</sup> , 2006 |                                             |  |                |                  |            |
| Test Engineer(s):  |                                                   | Tom Smith                                   |  | Abtin Spantman | x                | Ken Boston |
|                    |                                                   |                                             |  |                |                  |            |
| Model #:           | XR                                                |                                             |  |                |                  |            |
| Serial #:          | (Unit 1) 000100000 and (Unit 5) 000110000         |                                             |  |                |                  |            |
| Voltage:           | 115 VAC, 60 hz                                    |                                             |  |                |                  |            |
| Operation Mode:    | Normal                                            |                                             |  |                |                  |            |
| Distance:          | X                                                 | 3 Meters                                    |  |                | 10 Meters        |            |
| EUT Power:         | X                                                 | Single Phase ____ VAC                       |  |                | 3 Phase ____ VAC |            |
|                    |                                                   | Battery                                     |  |                | Other:           |            |
| EUT Placement:     | X                                                 | 80cm non-conductive table                   |  |                | 10cm Spacers     |            |
| EUT Test Location: | X                                                 | 3 Meter Semi-Anechoic<br>FCC Listed Chamber |  |                | 3/10m OATS       |            |
| Configuration:     | 0.8 m height                                      |                                             |  |                |                  |            |
| Measurements:      |                                                   | Pre-Compliance                              |  |                | Preliminary      | X Final    |
| Detectors Used:    | X                                                 | Peak                                        |  | X              | Quasi-Peak       | Average    |

Environmental Conditions in the Lab:

Temperature: 20 – 25°C

Atmospheric Pressure: 86 kPa – 106 kPa

Relative Humidity: 30 – 60 %

Test Equipment Used:

EMI Measurement Instrument: HP8546A/Agilent E4407B

Biconical Antenna: EMCO #93110

Log Periodic Antenna: EMCO #93146

Horn Antenna: EMCO #3115

**The following table depicts the level of significant emissions found:**

| Frequency (MHz) | Antenna Polarity | Height (meters) | Azimuth (0° - 360°) | EMI Meter Reading (dBμV/m) | (dBμV/m) | Margin (dB) |
|-----------------|------------------|-----------------|---------------------|----------------------------|----------|-------------|
| 30.1            | V                | 1.0             | 180                 | 38.1                       | 82.2     | 44.1        |
| 192.0           | H                | 1.0             | 180                 | 27.9                       | 82.2     | 54.3        |
| 250.0           | H                | 1.3             | 240                 | 39.3                       | 82.2     | 42.9        |
| 288.0           | H                | 1.0             | 310                 | 35.4                       | 82.2     | 46.8        |
| 832.0           | V                | 1.25            | 155.0               | 45.3                       | 82.2     | 36.9        |
| 848.0           | V                | 1.25            | 155.0               | 46.1                       | 82.2     | 36.1        |

**Notes:** Emissions seen with antenna port terminated with a 50 ohm terminating load. All other signals seen were even further below the Part 90 limit of –13 dBm (82.2 dBuV/m at 3 meters equivalent field strength) except the fundamental, which is measured directly at the antenna port, and reported elsewhere in the report.

**All Radiated Spurious Emissions seen were found to be greater than 20 dB below the limits** of 82 dB/uV/m, or below the noise floor of the instrumentation. Since the highest peak emissions seen were in the neighborhood of 45 dBuV/m or less, which is almost 40 dB below the radiated equivalent field strength of the -13 dBm limit level, no substitution method measurements were performed.

## Photos Taken During Radiated Emissions Testing

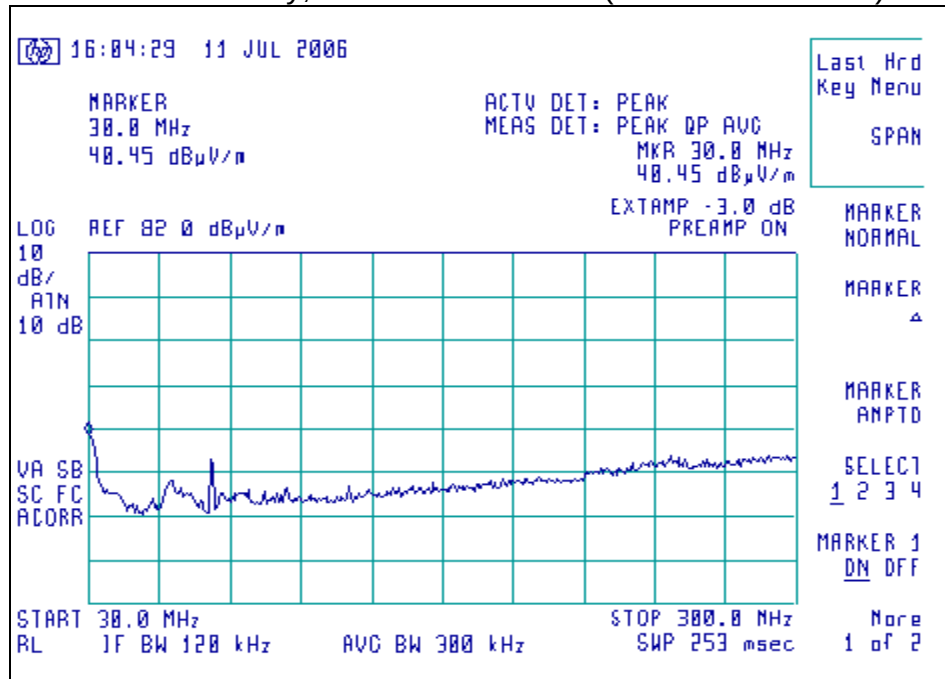
Test Setup for Radiated Emissions Testing in the 3 Meter Chamber



View of the EUT during the Radiated Emissions Testing.  
Antenna in place, but port internally terminated with a 50 Ohm load.

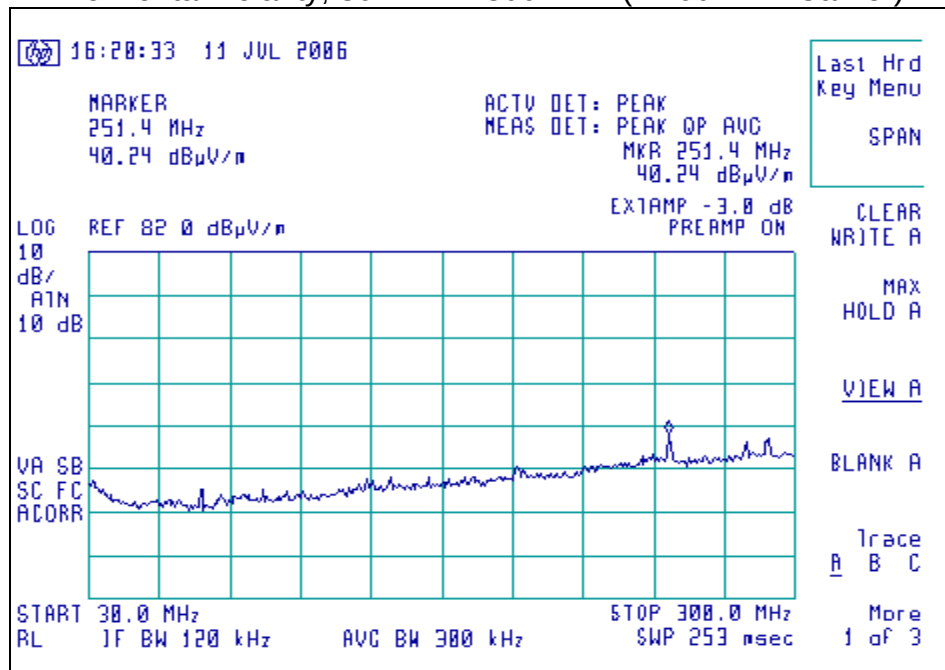
## Signature Scan of Radiated Emissions, Unit 1

Vertical Polarity, 30 MHz – 300 MHz (75.98 MHz Carrier)



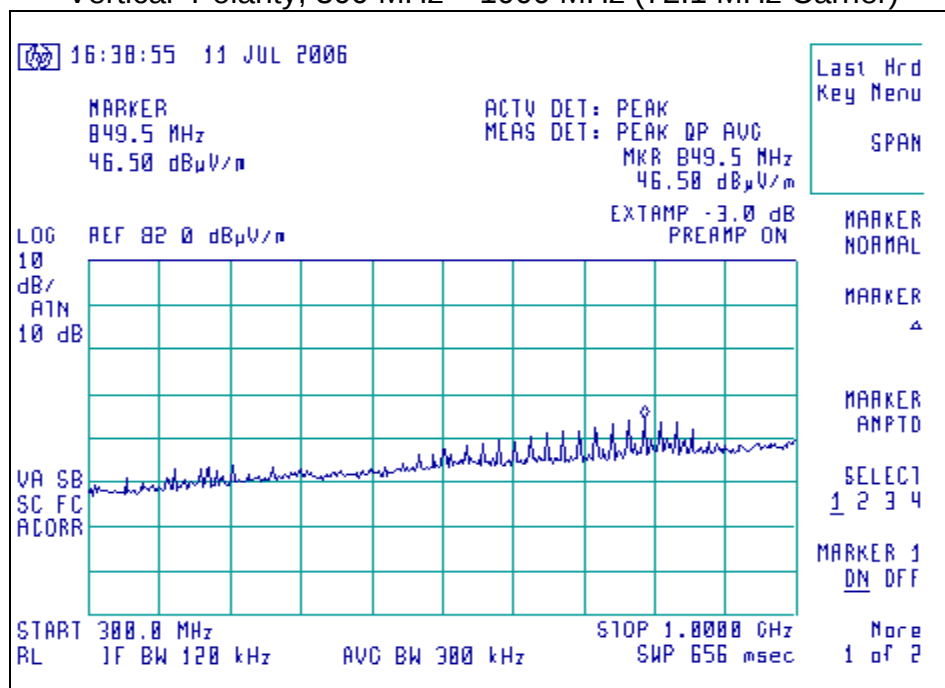
## Signature Scan of Radiated Emission, Unit 1

Horizontal Polarity, 30 MHz – 300 MHz (72.00 MHz Carrier)



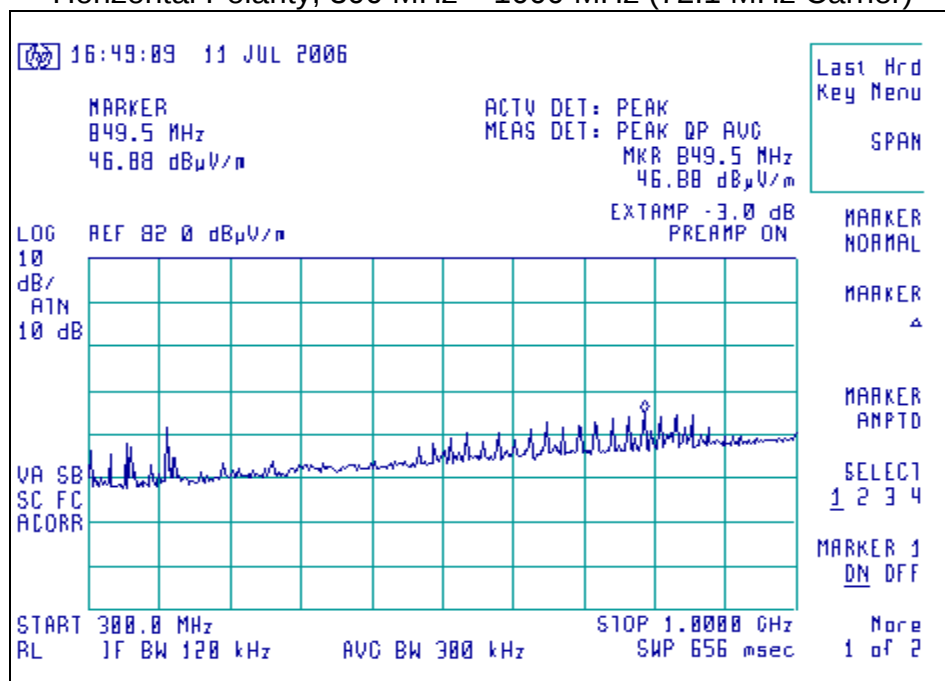
## Signature Scan of Radiated Emissions, Unit 1

Vertical Polarity, 300 MHz – 1000 MHz (72.1 MHz Carrier)



## Signature Scan of Radiated Emissions, Unit 1

Horizontal Polarity, 300 MHz – 1000 MHz (72.1 MHz Carrier)

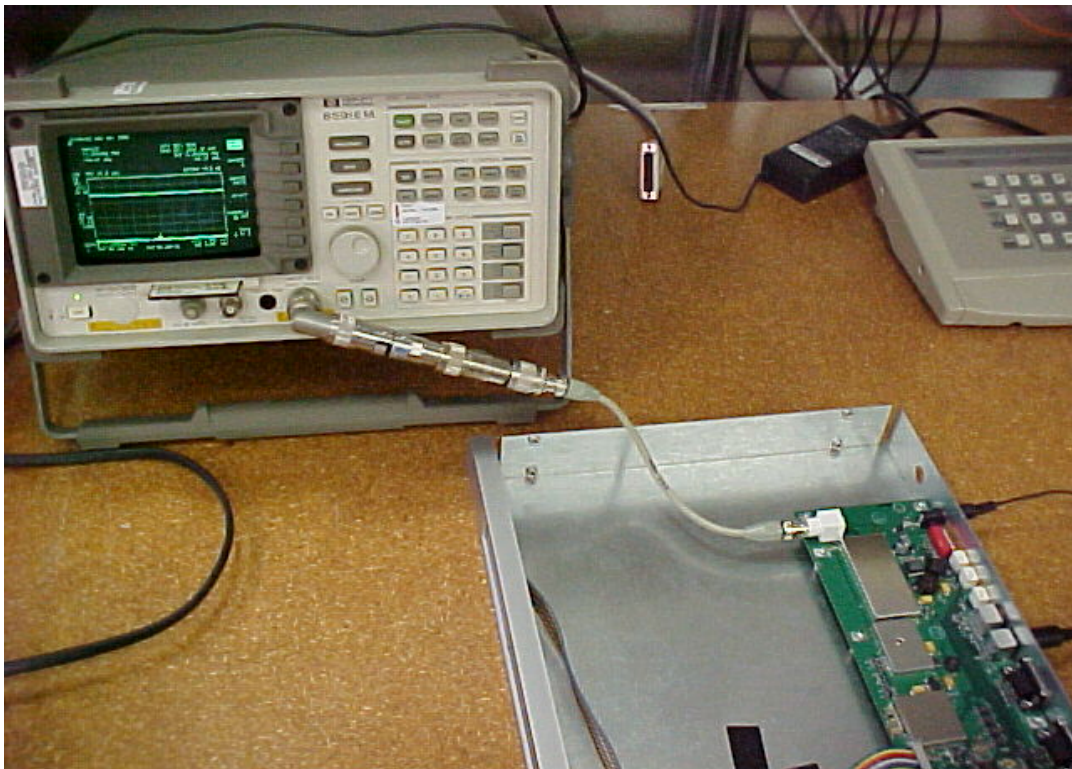


## 10. Power Output 47 CFR 2.1046

For the FCC Part 2.1046 measurement, the output of the sample unit 5 was connected via a short jumper cable, with a reverse-gender connector, through a 10 dB Attenuator to the input of the HP 8591A Spectrum Analyzer. The unit was configured to run in a normal continuous transmit mode, while being supplied with a random, internal full-frequency digital audio signal as a modulation source. The HP receiver was set to a 100 kHz Bandwidth, and the transmit signal was then stored, with the peak signal level stored. This power level was collected for two channels and can be seen in the chart presented below.

| CHANNEL | CENTER FREQ<br>(MHz) | LIMIT<br>(dBm) | MEASURED<br>POWER<br>(dBm) | MARGIN<br>(dB) |
|---------|----------------------|----------------|----------------------------|----------------|
| 01      | 72.1                 | 30             | 29.46                      | 0.54           |
| 94      | 75.9                 | 30             | 28.8                       | 1.2            |

### View of Test Setup During the Conducted RF measurements

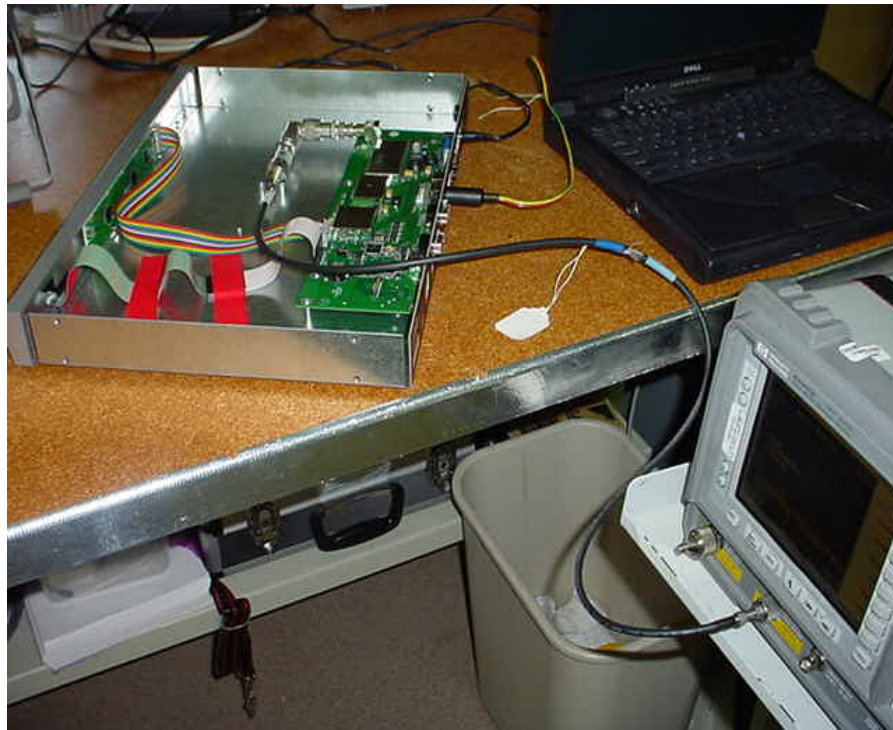


# 11. Conducted Spurious Emissions: 47 CFR 2.1051

FCC Part 2.1051 requires an antenna conducted measurement of conducted harmonic and spurious levels, as reference to the carrier frequency in a 30 kHz bandwidth. For this test, the transmitter was directly connected to the HP E4407B Spectrum Analyzer, through a very short Coaxial Cable and a 10 DB Attenuator. Plots were then taken, with any noticeable spurious or harmonic signals identified. No significant levels of any spurious products could be found within -18 dBc of the fundamental of the transmitter. The highest spurious signal seen was at 144.2 MHz which was measured at -30.8 dBm in a 30 kHz bandwidth, which is about 17.8 dB below the -13.0 dBm limit.

## UNIT 5

| TRANSMIT CHANNEL FREQUENCY | Test FREQ (MHz) | LIMIT (dBm) | MEASURED POWER (dBm) | MARGIN (dB) |
|----------------------------|-----------------|-------------|----------------------|-------------|
| 72.1                       | 61.4            | -13.0       | -33.6                | 20.6        |
| 72.1                       | 144.2           | -13.0       | -30.8                | 17.8        |
| 72.1                       | 216.3           | -13.0       | -39.7                | 26.7        |
| 75.98                      | 65.3            | -13.0       | -34.9                | 21.9        |
| 75.98                      | 151.96          | -13.0       | -31.3                | 18.3        |
| 75.98                      | 227.95          | -13.0       | -40.2                | 27.2        |



## 12. Bandwidth Measurements 47 CFR 2.1049

Direct measurement of the transmitted signal, via a cabled connection to the HP E4407B Analyzer, was then used to determine the signal bandwidth. For each of the representative channels, refer to the graphs found on the following pages.

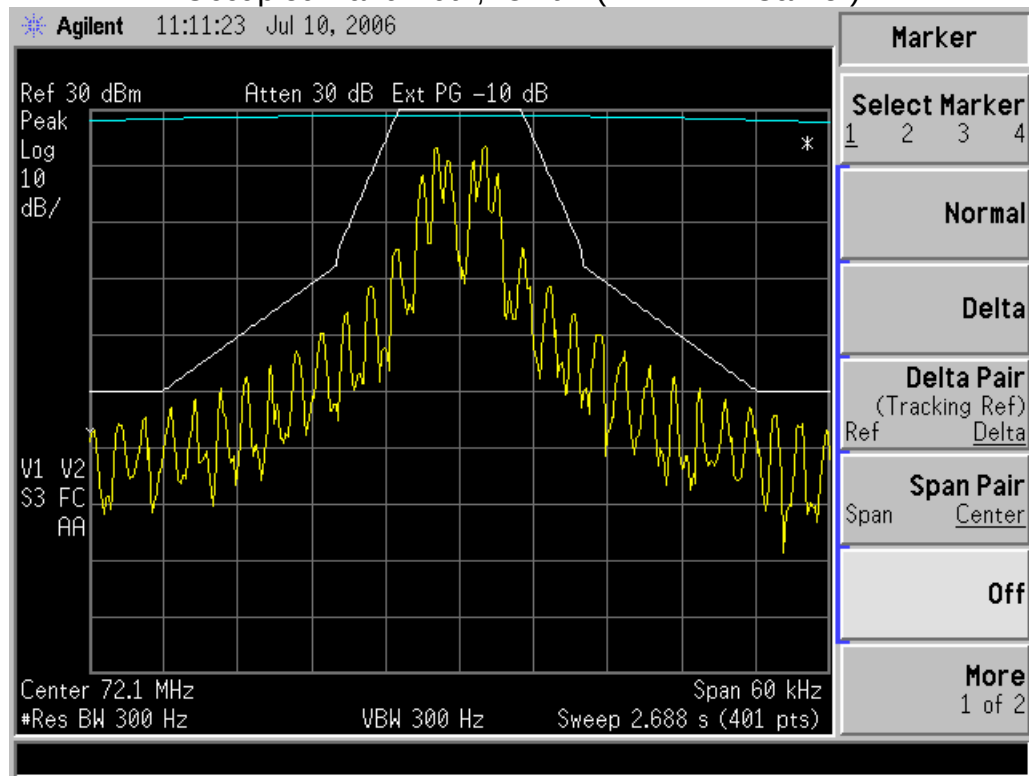
### Calculation of 90.210 (c) emission mask:

- (1) On any frequency from the center of the authorized channel to 5.0 kHz removed from center frequency: Zero dB.
- (2) On any frequency removed from the center of the authorized channel by a displacement frequency ( $f_d$  in kHz) of more than 5.0 kHz but no more than 10 kHz: At least  $83 \log (F_d/5)$  dB.
- (3) On any frequency removed from the center of the authorized band by a displacement frequency ( $f_d$  in kHz) of more than 10 kHz but no more than 50 kHz : At least  $29 \log (F_d^{**}/11)$  dB or 50 dB, whichever is the lesser attenuation.
- (4) On any frequency removed from the center of the authorized band by a displacement frequency ( $f_d$  in kHz) of more than 50 kHz: at least 43 db,

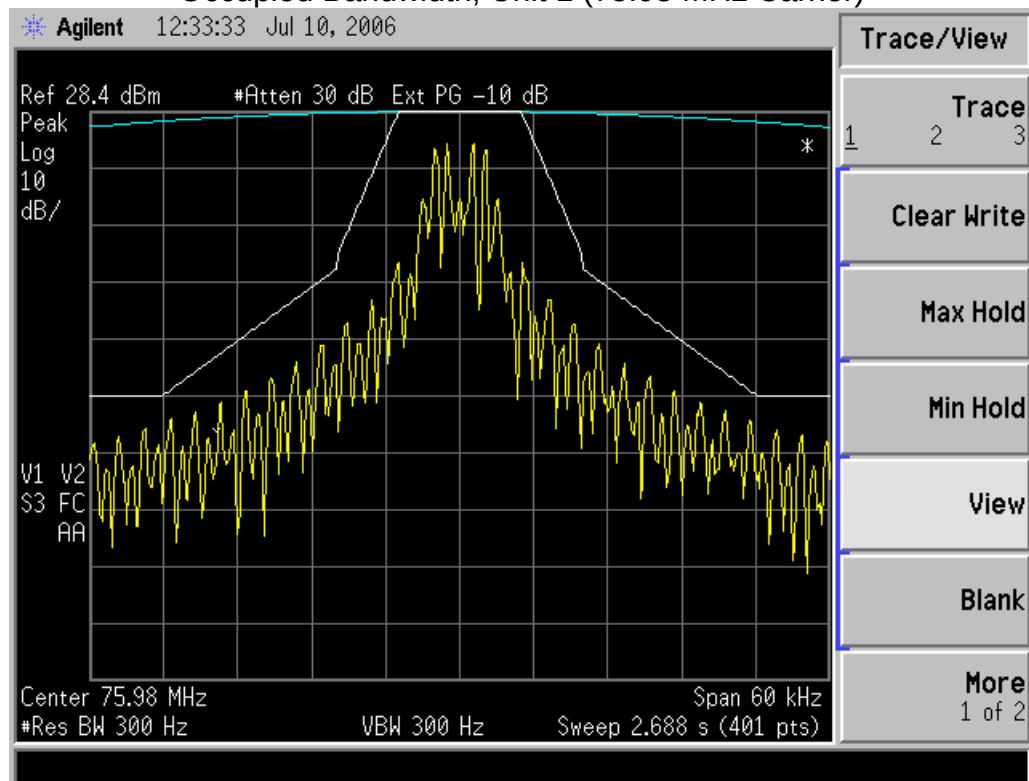
The test condition is presented in Tabular form below. The definition of the spectrum mask as indicated on the spectrum analyzer is also presented, where the display line set to -20 dBm applies to  $|f_m| > 12.5$  kHz.

| 90.210 ( c ) | Absolute Frequency Offset Range: $ f_d $ | Attenuation relative to Carrier power (P). |
|--------------|------------------------------------------|--------------------------------------------|
| 1            | 0 to 5 KHz                               | 0 db                                       |
| 2            | 5 to 10 khz                              | 0 to 24.9 db                               |
| 3            | 10 to 50 khz                             | 27.8 to 50 db                              |
| 4            | Greater than 50 khz                      | 43 db ( -13 dbm )                          |

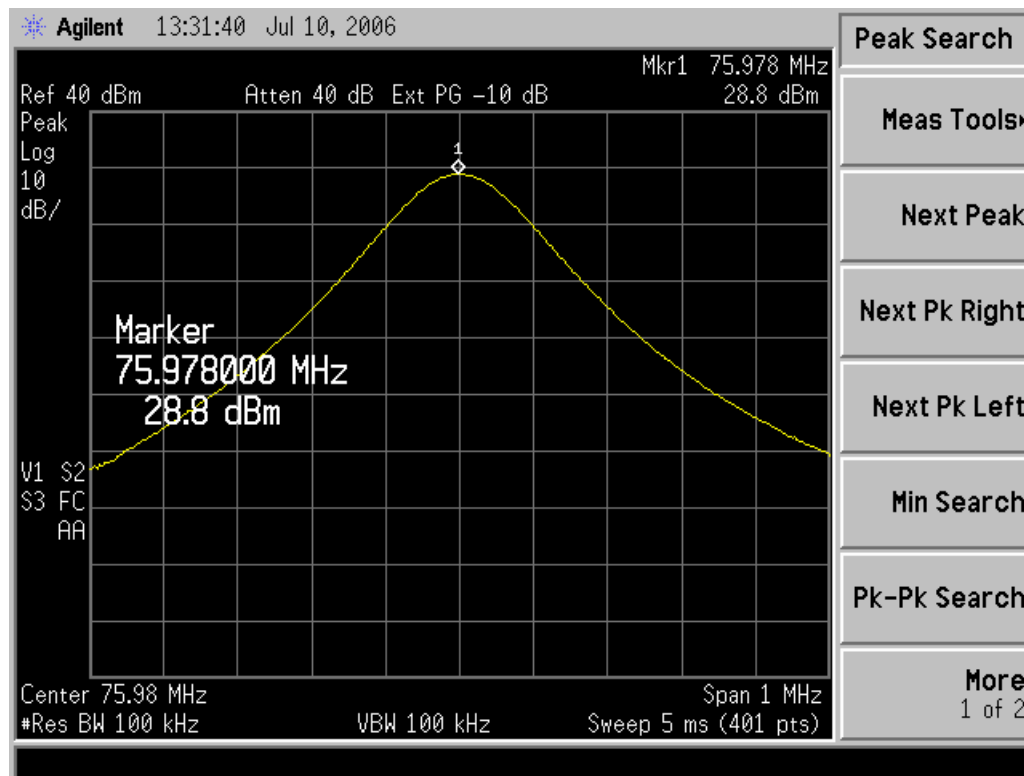
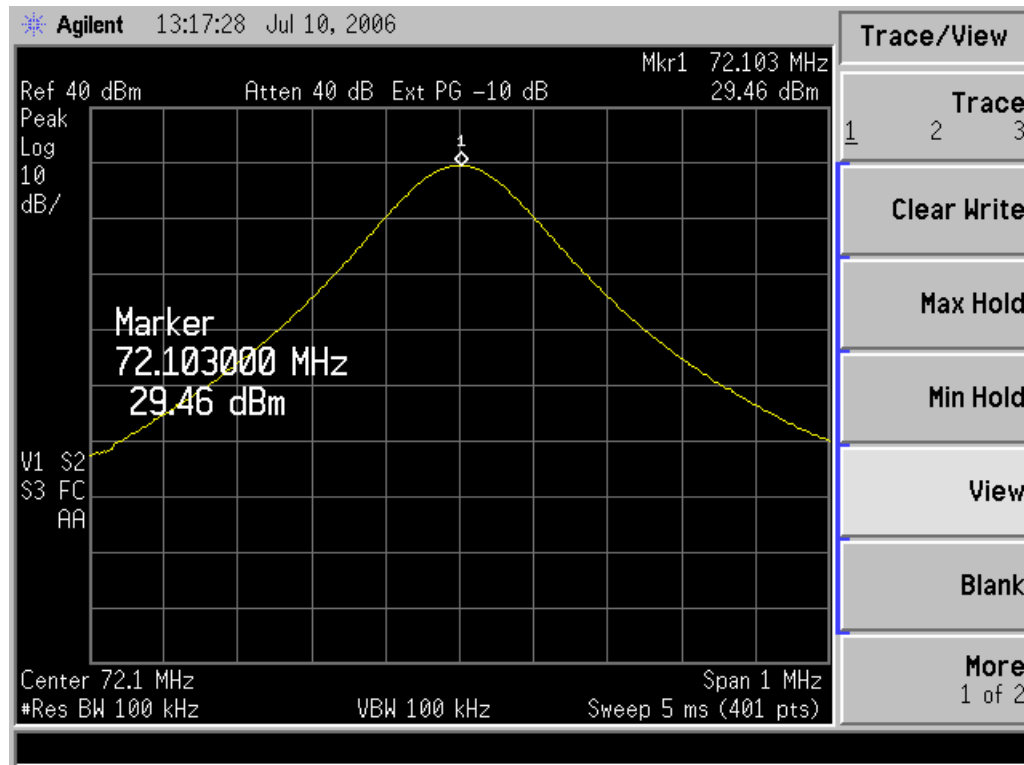
### Occupied Bandwidth; Unit 1 (72.1 MHz Carrier)



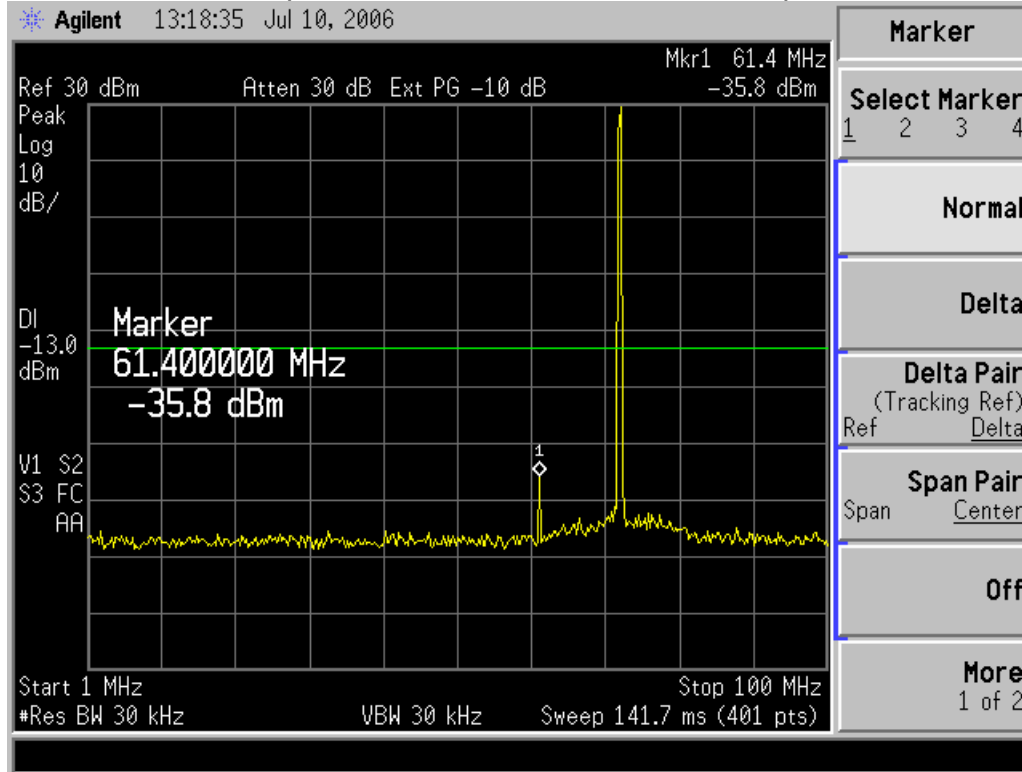
### Occupied Bandwidth; Unit 1 (75.98 MHz Carrier)



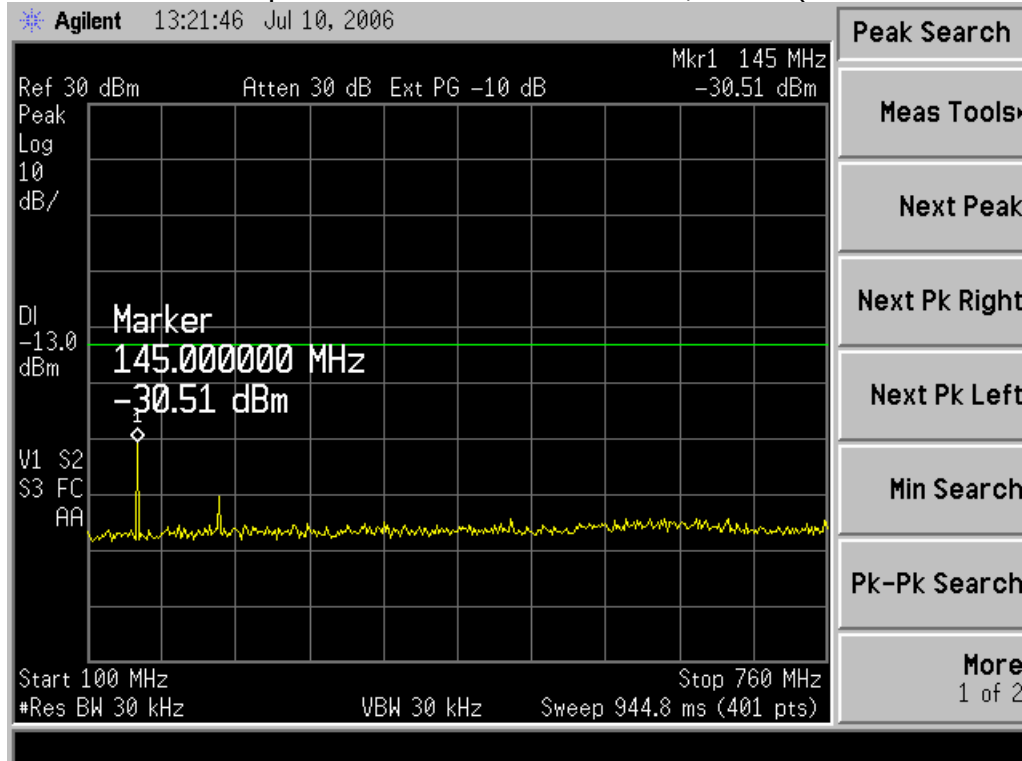
# Power Output; Unit 5 (highest output observed)



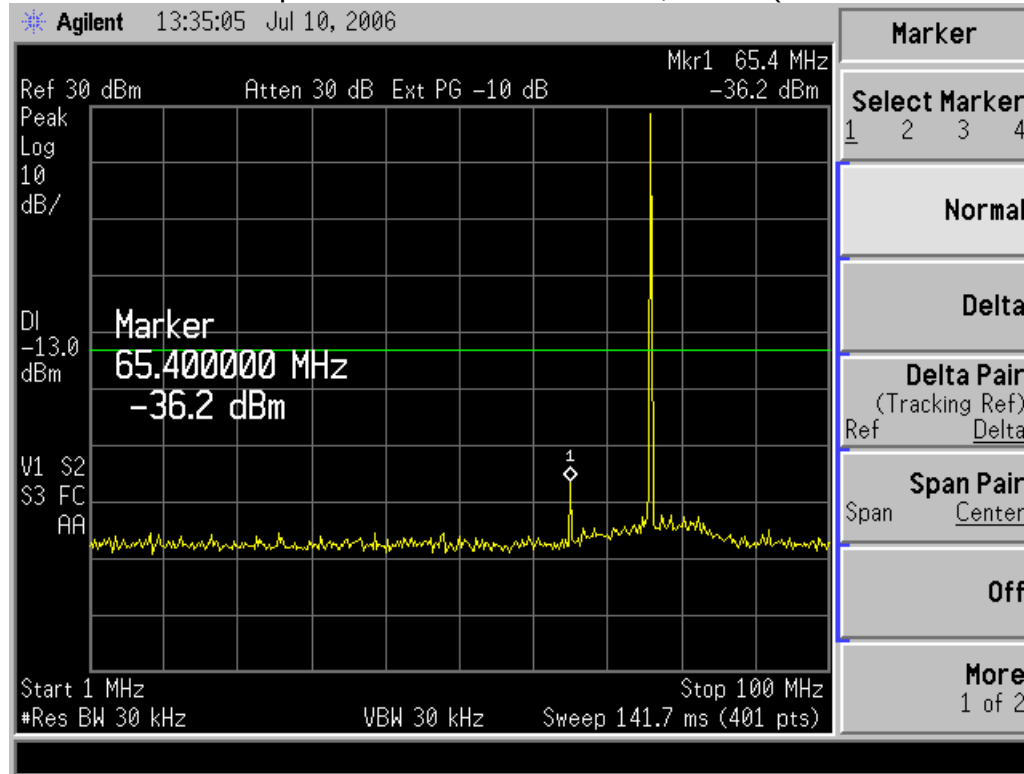
Conducted antenna port emissions, 0-100 MHz; Unit 5 (75.1 MHz Carrier)



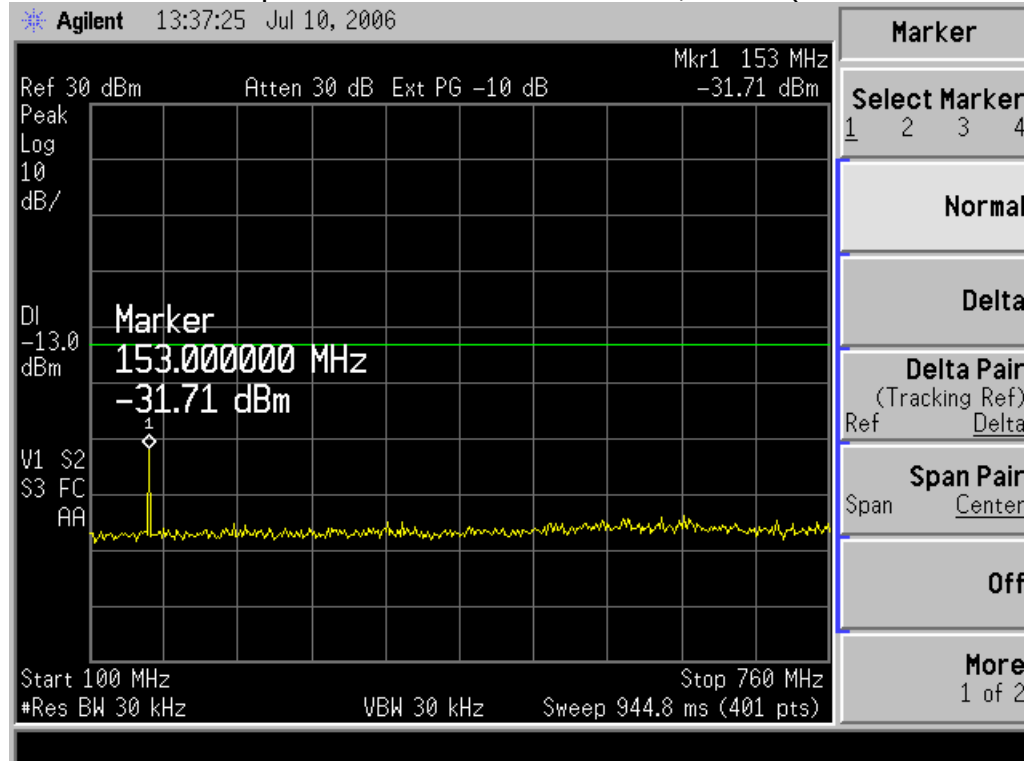
Conducted antenna port emissions, 100-760 MHz; Unit 5 (72.1 MHz Carrier)



Conducted antenna port emissions, 0-100 MHz; Unit 5 (75.98 MHz Carrier)



Conducted antenna port emissions, 100-750 MHz; Unit 5 (75.98 MHz Carrier)



### 13. Frequency Stability (47 CFR 2.1055; 90.213a)

Mobile stations below 2W output power must have an absolute frequency stability of **5 ppm** when operating with a 12.5 kHz bandwidth.

Test in accordance to conditions called out in Part 2.995 (a) (1): Frequency stability must be measured from **-30 to 50 degrees centigrade for (b) steps of 10 degrees** Allowing for thermal equilibrium, the measurement was performed after the desired temperature was maintained for 30 minutes.

| Temperature<br>(degree C) | Frequency<br>(Mhz) | Frequency Delta<br>(Mhz) | Frequency Delta<br>(PPM) |
|---------------------------|--------------------|--------------------------|--------------------------|
| -30                       | 72.09995           | .00002                   | 0.2                      |
| -20                       | 72.10003           | .0001                    | 1.3                      |
| -10                       | 72.09998           | .00005                   | 0.65                     |
| 0                         | 72.10000           | .0001                    | 0.1                      |
| 10                        | 72.09995           | .00002                   | 0.2                      |
| 20                        | 72.09998           | .00005                   | 0.65                     |
| 30                        | 72.09995           | .00002                   | 0.2                      |
| 40                        | 72.09993           | 0                        | 0.0                      |
| 50                        | 72.09993           | 0                        | 0.0                      |
| Start 23°                 | 72.09993           | 0                        | 0.0                      |

### **APPENDIX A - Test Equipment List**

| Asset #  | Manufacturer   | Model #              | Serial #    | Description                  | Date     | Due      |
|----------|----------------|----------------------|-------------|------------------------------|----------|----------|
| AA960007 | EMCO           | 3115                 | 9311-4138   | Horn Antenna                 | 1/25/06  | 1/25/07  |
| AA960008 | EMCO           | 3816/2NM             | 9701-1057   | Line Impedance Stabilization | 9/27/05  | 9/27/06  |
| AA960014 | Fischer        | FCC-801-M3-25        | 148         | Coupler/De-coupler Network   | 9/27/05  | 9/27/06  |
| AA960015 | Fischer        | F-120-9B             | 27          | Bulk Current Injection Probe | 9/27/05  | 9/27/06  |
| AA960016 | Haefely Trench | 093 506-1            | 083 874-03  | EFT Capacitive Clamp         | Note 1   | Note 1   |
| AA960020 | Solar          | 9230-1               | n/a         | Radiating Loop for RS101     | Note 1   | Note 1   |
| AA960021 | Solar          | 7334-1               | 965308      | Mag. Field Loop Sensor       | 9/28/05  | 9/28/06  |
| AA960023 | Werlatone      | C3910                | 5167        | Directional Coupler 40 dB    | Note 1   | Note 1   |
| AA960024 | Pasternack     | 100 Watt             | PE 7021-6   | DC-1.5 GHz Attenuator        | Note 1   | Note 1   |
| AA960031 | HP             | 119474A              | 3107A01708  | Transient Limiter            | Note 1   | Note 1   |
| AA960050 | Chase          | CBL6140A             | 1106        | Bilog Antenna                | Note 1   | Note 1   |
| AA960054 | Giga-Tronics   | 80301A               | 1830164     | Power Sensor                 | 9/28/05  | 9/28/06  |
| AA960061 | Solar          | 9229-1               | 2708        | Loop Sensor for RS101        | 9/28/05  | 9/28/06  |
| AA960067 | Fischer        | FCC-LISN-50-100-4-01 | 9901        | 100 A (4 line) LISN          | 9/27/05  | 9/27/06  |
| AA960071 | Fischer        | FCC-801-M4-63A       | 9902        | Coupler/De-coupler Network   | 9/27/05  | 9/27/06  |
| AA960074 | Fischer        | F2031-32mm           | 361         | EM Injection Clamp           | 3/21/05  | 3/21/07  |
| AA960076 | Fischer        | F201-32mm            | 347         | Absorbing Clamp              | 3/07/05  | 3/07/07  |
| AA960077 | EMCO           | 93110B               | 9702-2918   | Biconical Antenna            | 9/27/05  | 9/27/06  |
| AA960078 | EMCO           | 93146                | 9701-4855   | Log-Periodic Antenna         | 9/27/05  | 9/27/06  |
| AA960080 | Fischer        | FCC-801-M3-63A       | 9906        | Coupler/De-coupler Network   | 5/30/06  | 5/30/07  |
| AA960081 | EMCO           | 3115                 | 6907        | Double Ridge Horn Antenna    | 12/07/05 | 12/07/06 |
| AA960082 | Wandel & Golt. | EMC-20               | E-0016      | EM Radiation Meter & Probe   | 6/02/06  | 6/02/07  |
| CC00122C | HP             | 331A                 | 914-03669   | Distortion Analyzer          | Note 1   | Note 1   |
| CC00181C | HP             | 33120A               | US36013549  | Arb. Wave Form Generator     | 9/28/05  | 9/28/06  |
| CC00221C | Agilent        | E4407B               | US39160256  | Spectrum Analyzer            | 12/29/05 | 12/29/06 |
| CC00284C | Agilent        | E4421B               | MY41000402  | Signal Generator             | 5/20/05  | 5/20/06  |
| EE960003 | Amplifier Res. | 100W 1000M1A         | 19821       | 100 Watt Amp                 | Note 1   | Note 1   |
| EE960005 | Giga-Tronics   | 8542C                | 1831450     | Dual Channel Power Meter     | 9/28/05  | 9/28/06  |
| EE960006 | Haefely Trench | PESD 1600            | H604079     | ESD Gun                      | 9/27/05  | 9/27/06  |
| EE960007 | Haefely Trench | Pline 1610           | 083732-19   | Line Fluctuation Generator   | 9/28/05  | 9/28/06  |
| EE960008 | Haefely Trench | DEC1A                | 083 793-09  | De-Coupling Network          | Note 1   | Note 1   |
| EE960009 | Haefely Trench | IP6.2                | 083 811-07  | Coupling Network             | Note 1   | Note 1   |
| EE960010 | Haefely Trench | P-Surge-4.1          | 083061-08   | Power Surge Generator        | 9/15/04  | 9/15/06  |
| EE960013 | HP             | 8546A                | 3617A00320  | Receiver RF Section          | 9/29/05  | 9/29/06  |
| EE960014 | HP             | 85460A               | 3448A00296  | Receiver Pre-Selector        | 9/29/05  | 9/29/06  |
| EE960015 | HP             | 6843A                | 3531A-00145 | AC Power Source/Analyzer     | Note 1   | Note 1   |
| EE960016 | Marconi        | 2024                 | 112120/044  | Signal Generator             | 1/10/06  | 1/10/08  |
| EE960042 | Haefely Trench | MAG 100.1            | O8013610    | Magnetic Susceptibility Loop | Note 1   | Note 1   |
| EE960052 | Amplifier Res. | 5S1G4                | 25582       | 5 Watt Amp                   | Note 1   | Note 1   |
| EE960055 | Amplifier Res. | 75A250               | 21952       | 75 Watt Amp                  | Note 1   | Note 1   |

***Note 1 - Equipment calibrated within a traceable system.***

**APPENDIX A - Test Equipment List (continued)**

| Asset #  | Manufacturer    | Model #            | Serial #   | Description                | Date     | Due      |
|----------|-----------------|--------------------|------------|----------------------------|----------|----------|
| EE960067 | HP              | 8648A              | 3636A02735 | Signal Generator           | 12/19/05 | 12/19/06 |
| EE960070 | Cal Instruments | 1251RP             | n/a        | Power Supply               | Note 1   | Note 1   |
| EE960071 | EM Test         | UCS 500-M4; CNI503 | 0804-35    | EFT/Burst, Surge Generator | 09/28/05 | 09/28/06 |
| EE960072 | EM Test         | DPA 500            | 064-04     | Harmonic & Flicker         | 11/10/04 | 11/10/06 |
| EE960073 | Agilent         | E4446A             | US45300564 | Spectrum Analyzer          | 2/01/06  | 2/01/07  |
| N/A      | Narda           | 3203B-10           | 3202B10    | Directional Coupler 10 dB  | Note 1   | Note 1   |

***Note 1 - Equipment calibrated within a traceable system.***

## **Appendix B - Uncertainty Statement**

***This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level, using a coverage factor of  $k=2$ .***

*Table of Expanded Uncertainty Values, ( $K=2$ ) for Specified Measurements*

| Measurement Type    | Particular Configuration              | Uncertainty Values |
|---------------------|---------------------------------------|--------------------|
| Radiated Emissions  | 3 – Meter chamber, Biconical Antenna  | 4.24 dB            |
| Radiated Emissions  | 3-Meter Chamber, Log Periodic Antenna | 4.8 dB             |
| Radiated Emissions  | 10-Meter OATS, Biconical Antenna      | 4.18 dB            |
| Radiated Emissions  | 10-Meter OATS, Log Periodic Antenna   | 3.92 dB            |
| Conducted Emissions | Shielded Room/EMCO LISN               | 1.60 dB            |
| Radiated Immunity   | 3 Volts/Meter in 3-Meter Chamber      | 1.128 Volts/Meter  |
| Conducted Immunity  | 3 Volts level                         | 1.0 V              |