



## Measurement of RF Interference from a Model RRLR-01 Transceiver

For : Responsive Innovations  
Akron, OH

P.O. No. : 1065

Date Received: July 31, 2006

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Test Personnel: Mark E. Longinotti

Specification : FCC "Code of Federal Regulations" Title 47  
Part 15, Subpart B and  
Subpart C, Section 15.249 for Intentional Radiators  
Operating within the 2400-2483.5MHz band

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**REVISION HISTORY**

| Revision | Date              | Description                                  |
|----------|-------------------|----------------------------------------------|
| —        | August 11, 2006   | Initial release                              |
| A        | November 17, 2006 | Changed model number from RCRL-01 to RRLR-01 |

## Measurement of RF Emissions from a Transceiver, Model No. RRLR-01

### **1.0 INTRODUCTION:**

**1.1 Description of Test Item** - This document represents the results of the series of radio interference measurements performed on a transceiver, Model No. RRLR-01, (hereinafter referred to as the test item). Serial No. 3 was used for all tests except duty cycle factor measurement tests. Serial No. 4 was used for duty cycle factor measurement tests. The test item was designed to transmit and receive in the 2400MHz to 2483.5MHz band using an external, 6cm-long, non-detachable antenna. The test item was manufactured and submitted for testing by Responsive Innovations located in Akron, OH.

**1.2 Purpose** - The test series was performed to determine if the test item meets the conducted and radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Sections 15.107 and 15.109, and Subpart C, Sections 15.207 and 15.249 for Intentional Radiators Operating within the 2400-2483.5MHz band. Testing was performed in accordance with ANSI C63.4-2003.

**1.3 Deviations, Additions and Exclusions** - There were no deviations, additions to, or exclusions from the test specification during this test series.

**1.4 Applicable Documents** - The following documents of the exact issue designated form part of this document to the extent specified herein:

- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 15, dated 1 October 2004
- ANSI C63.4-2003, "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"

**1.5 Subcontractor Identification** - This series of tests was performed by Elite Electronic Engineering Incorporated of Downers Grove, Illinois. The laboratory is accredited by the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP Lab Code: 100278-0.

**1.6 Laboratory Conditions** The temperature at the time of the test was 23C and the relative humidity was 61%.

## **2.0 TEST ITEM SET-UP AND OPERATION:**

The test item is a transceiver, Model No. RRLR-01. A block diagram of the test item set-up is shown as Figure 1.

**2.1 Power Input** - The test item obtained 3VDC power from the USB port of a laptop computer. The laptop computer was powered with 20VDC via a 1.8 meter-long, 2 wire, unshielded cable from an AC adaptor. The AC adaptor obtained 115V 60Hz power through a 1.8 meter-long, 2 wire, unshielded power cable. For conducted emissions tests, each AC power lead to the AC adaptor was connected through a line impedance stabilization network (LISN) which was located on the ground plane. The network complies with the requirements of Paragraph 4.1.2 of ANSI C63.4-2003.

**2.2 Grounding** - The test item was ungrounded during the tests.

**2.3 Peripheral Equipment** - The following peripheral equipment was submitted with the test item:

| Item                    | Description                                        |
|-------------------------|----------------------------------------------------|
| Laptop Computer         | Dell PPI Inspiron 7000                             |
| AC Adaptor for computer | Dell ADP-70BB Model PA-4, P/N: 1243C, 20VDC output |

**2.4 Interconnect Cables** - The following interconnect cables were submitted with the test item:

| Item      | Description                                                                                                   |
|-----------|---------------------------------------------------------------------------------------------------------------|
| USB Cable | 9.85m Standard USB Cable used for radiated emissions<br>4.85m Standard USB Cable used for conducted emissions |

**2.5 Operational Mode** - For conducted emissions tests, the laptop computer was placed on an 80cm high non-conductive stand. The test item was connected to the USB port of the laptop computer via a 4.85m USB cable. Conducted emissions tests were performed with the test item transmitting at 2441MHz.

For radiated emissions tests, the test item was placed on an 80cm high non-conductive stand. The test item was connected to the USB port of the laptop computer via a 9.85m USB cable. The laptop computer was external to the test chamber. Radiated emissions tests were performed separately with the test item transmitting at 2401MHz, 2441MHz, and 2474MHz.

**2.6 Test Item Modifications** - No modifications were required for compliance to the FCC

"Code of Federal Regulations" Title 47, Part 15, Subpart B, Sections 15.107 and 15.109, and Subpart C, Sections 15.207 and 15.249 requirements.

### **3.0 TEST EQUIPMENT:**

**3.1 Test Equipment List** - A list of the test equipment used can be found on Table I. All equipment was calibrated per the instruction manuals supplied by the manufacturer.

**3.2 Calibration Traceability** Test equipment is maintained and calibrated on a regular basis. All calibrations are traceable to the National Institute of Standards and Technology (NIST).

**3.3 Measurement Uncertainty** - All measurements are an estimate of their true value. The measurement uncertainty characterizes, with a specified confidence level, the spread of values which may be possible for a given measurement system.

The measurement uncertainty budgets were based on guidelines in "ISO Guide to the Expression of Uncertainty in Measurements" and NAMAS NIS81 "The Treatment of Uncertainty in EMC Measurements".

The measurement uncertainty for these tests is presented below:

| Conducted Emission Measurements       |      |       |
|---------------------------------------|------|-------|
| Combined Standard Uncertainty         | 1.07 | -1.07 |
| Expanded Uncertainty (95% confidence) | 2.1  | -2.1  |

| Radiated Emission Measurements        |      |       |
|---------------------------------------|------|-------|
| Combined Standard Uncertainty         | 2.26 | -2.18 |
| Expanded Uncertainty (95% confidence) | 4.5  | -4.4  |

### **4.0 REQUIREMENTS, PROCEDURES AND RESULTS:**

#### **4.1 Powerline Conducted Emissions**

**4.1.1 Requirements** - Per 15.101(b), receivers operating above 960MHz are exempt from complying with the conducted emissions requirements of 15.107. Therefore no conducted emissions tests are required with the test item operating in the receive mode.

All radio frequency voltages on the power lines for any frequency or frequencies of an

intentional radiator shall not exceed the limits in the following table:

| Frequency of Emission (MHz) | Conducted Limit (dBuV) |           |
|-----------------------------|------------------------|-----------|
|                             | Quasi-peak             | Average   |
| 0.15 - 0.5                  | 66 to 56*              | 56 to 46* |
| 0.5 - 5                     | 56                     | 46        |
| 5 - 30                      | 60                     | 50        |

**4.1.2 Procedures** - The interference on each power lead of the laptop computer was measured by connecting the measuring equipment to the appropriate meter terminal of the LISN. The meter terminal of the LISN not under test was terminated with 50 ohm. Measurements were first made over the entire frequency range from 150kHz through 30MHz with a peak detector and the results were automatically plotted. The data thus obtained was then searched by the computer for the highest levels. Quasi-peak measurements were automatically performed at the frequencies selected from the highest peak measurements, and the results printed. Photographs of the test setup are shown as Figure 2.

**4.1.3 Results** - The plots of the peak preliminary conducted voltage levels on each power line from the Dell laptop computer **without** the test item installed in the USB port, are presented on pages 15 and 16. The conducted limits for intentional radiators and Class B devices are shown as a reference. The final quasi-peak results are presented on pages 17 and 18.

The plots of the peak preliminary conducted voltage levels on each power line from the Dell laptop computer **with** the test item installed in the USB port and transmitting at 2441MHz, are presented on pages 19 and 20. The conducted limits for intentional radiators are shown as a reference. The final quasi-peak results are presented on pages 21 and 22.

As can be seen from the data, all conducted emission levels met the requirements for Class B devices and for intentional radiators. The emissions level closest to the limit (worst case) occurred at 621kHz. The emissions level at this frequency was 7.5dB within the limit.

## 4.2 Duty Cycle Factor Measurements:

**4.2.1 Procedures:** The duty cycle factor is used to convert peak detected readings to average readings. This factor is computed from the time domain trace of the pulse modulation signal.

With the transmitter set up to transmit for maximum pulse density, the time domain trace is displayed on the spectrum analyzer. This trace is obtained by tuning center frequency to the transmitter frequency and then setting a zero span width with 2msec/div. The amplitude settings are adjusted so that the on/off transitions clear the 4th division from the bottom of the display. The markers are set at the

beginning and end of a word period. If the word period is less than 100msec, the display is set to show at least one word. The on-time and off-time are then measured. The on-time is total time signal level exceeds the 4th division. Off-time is time under for the word period. The duty cycle is then computed as the (On-time/ word period) where the word period = (On-time + Off-time).

**4.2.2 Results:** Plots of the duty cycle at 2401MHz, 2441MHz, and 2474MHz are shown on data pages 23 through 25. The duty cycle factor was computed to be -40dB at all three frequencies.

### 4.3 Radiated Measurements

**4.3.1 Requirements** - Per 15.101(b), receivers operating above 960MHz are exempt from complying with the radiated emissions requirements of 15.109. Therefore no radiated emissions tests are required with the test item operating in the receive mode.

The test item must comply with the requirements of FCC "Code of Federal Regulations Title 47", Part 15, Subpart C, Section 15.205 et seq.

Paragraph 15.249 has the following radiated emission limits:

| Fundamental<br>Frequency<br>MHz | Field Intensity<br>uV/m @ 3 meters | Field Strength<br>Harmonics and<br>Spurious @ 3 meters |
|---------------------------------|------------------------------------|--------------------------------------------------------|
| 2400-2483.5                     | 50,000                             | 500                                                    |

The field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits by more than 20 dB under any condition of modulation.

**4.3.2 Procedures** - Radiated emissions measurements were performed in a 32ft. x 20ft. x 14ft. high shielded enclosure. The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.

A preliminary radiated emissions test was performed to determine the emission characteristics of the test item. For the preliminary test, a broadband measuring antenna was positioned at a 3 meter distance from the test item. The frequency range from 30MHz to 18GHz was investigated using a peak detector function. The data was then processed by the computer to calculate equivalent field intensity.

The final radiated emission tests were then manually performed over the frequency range of 30MHz to 25GHz. A broadband double ridged waveguide antenna was used as the pick-up device for all

frequencies above 1GHz. All significant broadband and narrowband signals were measured and recorded. The peak detected levels were converted to average levels using a duty cycle factor which was computed from the pulse train.

To ensure that maximum or worst case, emission levels were measured, the following steps were taken:

- (1) The test item was rotated so that all of its sides were exposed to the receiving antenna.
- (2) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
- (3) The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.
- (4) For hand-held or body-worn devices, the test item was rotated through three orthogonal axes to determine which orientation produces the highest emission relative to the limit.

**4.3.3 Results** - The preliminary plots, with the test item transmitting at 2401MHz through 2474MHz, are presented on data pages 26 through 34. The plots are presented for a reference only, and are not used to determine compliance.

The final radiated levels, with the test item transmitting, are presented on data pages 35 through 40. As can be seen from the data, all emissions measured from the test item were within the specification limits. The emissions level closest to the limit (worst case) occurred at 2401MHz. The emissions level at this frequency was 7.3dB within the limit. See data page 35 for details. Photographs of the test configuration which yielded the highest, or worst case, radiated emission levels are shown on Figure 3.

#### **4.4 Band Edge Compliance**

**4.4.1 Requirement** - In accordance with paragraph 15.249(d), emissions outside of the specified frequency bands shall be below the general radiated emissions limits of 15.209. Therefore the radiated emissions at the band edges (2400MHz and 2483.5MHz) must meet the general limits of 15.209.

**4.4.2 Procedures** - For radiated emissions at the band edges, the “marker-delta” method described in Public Notice DA 00-705 was used.

The test item was placed on an 80cm high non-conductive stand. The unit was set to transmit continuously. A broadband measuring antenna was placed at a test distance of 3 meters from the test



item. Initially radiated emissions were performed at the lowest transmit frequency and the highest transmit frequency using a 1MHz bandwidth. Next, the band edge emissions were plotted using a peak detector and a 30kHz bandwidth. The “max-hold” function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined. The analyzer’s display was plotted using a “screen-dump” utility. The “delta” limit was applied to this plot to determine compliance at the band edge.

**4.4.3 Results** - Pages 41 and 42 show the radiated band-edge compliance results using the marker-delta method. As can be seen from these plots, the emissions at the band-edge are within the general limits. The 99% bandwidth was measured to be 741.5kHz using a 30 kHz measurement BW and a 2 MHz span.

## **5.0 CONCLUSIONS:**

It was determined that the Responsive Innovations Transceiver, Model No. RRLR-01, (Serial No. 4 was used for duty cycle factor measurements and Serial No. 3 was used for all other tests) did fully meet the conducted and radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Sections 15.107 and 15.109, and Subpart C, Sections 15.207 and 15.249 for Intentional Radiators Operating within the 2400-2483.5MHz band, when tested per ANSI C63.4-2003.

## **6.0 CERTIFICATION:**

Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the test specifications.

The data presented in this test report pertains to the test item at the test date. Any electrical or mechanical modification made to the test item subsequent to the specified test date will serve to invalidate the data and void this certification.

## **7.0 ENDORSEMENT DISCLAIMER:**

This report must not be used to claim product endorsement by NVLAP or any agency of the US Government.



TABLE I: TEST EQUIPMENT LIST

TABLE I: TEST EQUIPMENT LIST

| ELITE ELECTRONIC ENG. INC.                 |                            |                 |              |            |                 |          | Page: 1          |
|--------------------------------------------|----------------------------|-----------------|--------------|------------|-----------------|----------|------------------|
| Eq ID                                      | Equipment Description      | Manufacturer    | Model No.    | Serial No. | Frequency Range | Cal Date | Cal Inv Due Date |
| Equipment Type: ACCESSORIES, MISCELLANEOUS |                            |                 |              |            |                 |          |                  |
| XPR0                                       | HIGH PASS FILTER           | K&L MICROWAVE   | 11SH10-4800/ | 001        | 4.8-20GHZ       | 07/27/06 | 12 07/27/07      |
| XZG3                                       | ATTENUATOR/SWITCH DRIVER   | HEWLETT PACKARD | 11713A       | 2421A03059 | ---             |          | N/A              |
| XZG4                                       | ATTENUATOR/SWITCH DRIVER   | HEWLETT PACKARD | 11713A       | 2223A01683 | ---             |          | N/A              |
| Equipment Type: AMPLIFIERS                 |                            |                 |              |            |                 |          |                  |
| APK3                                       | PREAMPLIFIER               | AGILENT TECHNOL | 8449B        | 3008A01593 | 1-26.5GHZ       | 06/12/06 | 12 06/12/07      |
| APK4                                       | PREAMPLIFIER OPT H02       | HEWLETT PACKARD | 8449B        | 3008A00329 | 1-26.5GHZ       | 01/31/06 | 12 01/31/07      |
| Equipment Type: ANTENNAS                   |                            |                 |              |            |                 |          |                  |
| NTA0                                       | BILOG ANTENNA              | CHASE EMC LTD.  | BILOG CBL611 | 2057       | 0.03-2GHZ       | 08/15/05 | 12 08/15/06      |
| NW11                                       | RIDGED WAVE GUIDE          | AEL             | H1498        | 154        | 2-18GHZ         | 10/01/05 | 12 10/01/06      |
| NWN0                                       | DOUBLE RIDGED WAVE ANTENN  | ETS-LINDGREN    | 3116         | 00026778   | 18 TO 40 GHZ    | 09/06/05 | 12 09/06/06      |
| Equipment Type: ATTENUATORS                |                            |                 |              |            |                 |          |                  |
| T1N1                                       | 10DB 20W ATTENUATOR        | NARDA           | 766-10       |            | DC-4GHZ         | 09/07/05 | 12 09/07/06      |
| Equipment Type: CONTROLLERS                |                            |                 |              |            |                 |          |                  |
| CDW6                                       | DESKTOP COMPUTER           | ELITE           | PENTIUM 4    | 007        | 3.8 GHZ         |          | NOTE 1           |
| Equipment Type: PROBES; CLAMP-ON & LISNS   |                            |                 |              |            |                 |          |                  |
| PLL2                                       | 50UH LISN 462D             | ELITE           | 462D/70A     | 003        | 0.01-400MHZ     | 01/09/06 | 12 01/09/07      |
| PLL5                                       | 50UH LISN 462D             | ELITE           | 462D/70A     | 006        | 0.01-400MHZ     | 03/21/06 | 12 03/21/07      |
| Equipment Type: PRINTERS AND PLOTTERS      |                            |                 |              |            |                 |          |                  |
| HRG1                                       | LASERJET 2100XI            | HEWLETT PACKARD | C4170A       | USCD047809 | ---             |          | N/A              |
| Equipment Type: RECEIVERS                  |                            |                 |              |            |                 |          |                  |
| RAC2                                       | SPECTRUM ANALYZER          | HEWLETT PACKARD | 85660B       | 3638A08770 | 100HZ-22GHZ     | 02/10/06 | 12 02/10/07      |
| RACA                                       | RF PRESELECTOR             | HEWLETT PACKARD | 85685A       | 2926A00980 | 20HZ-2GHZ       | 02/11/06 | 12 02/11/07      |
| RACD                                       | RF PRESELECTOR             | HEWLETT PACKARD | 85685A       | 3010A01205 | 20HZ-2GHZ       | 12/23/05 | 12 12/23/06      |
| RAEC                                       | SPECTRUM ANALYZER          | HEWLETT PACKARD | 8566B        | 3014A06690 | 100HZ-22GHZ     | 02/10/06 | 12 02/10/07      |
| RAF4                                       | QUASIPeAK ADAPTER          | HEWLETT PACKARD | 85650A       | 2043A00320 | 0.01-1000MHZ    | 02/10/06 | 12 02/10/07      |
| RAF5                                       | QUASIPeAK ADAPTER W/ RECEI | HEWLETT PACKARD | 85650A       | 2043A00151 | 0.01-1000MHZ    | 02/11/06 | 12 02/11/07      |
| RBA0                                       | EMI TEST RECEIVER          | ROHDE & SCHWARZ | ESIB26       | 100145     | 20HZ-26.5GHZ    | 03/25/06 | 12 03/25/07      |

Cal. Interval: Listed in Months I/O: Initial Only N/A: Not Applicable

Note 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.

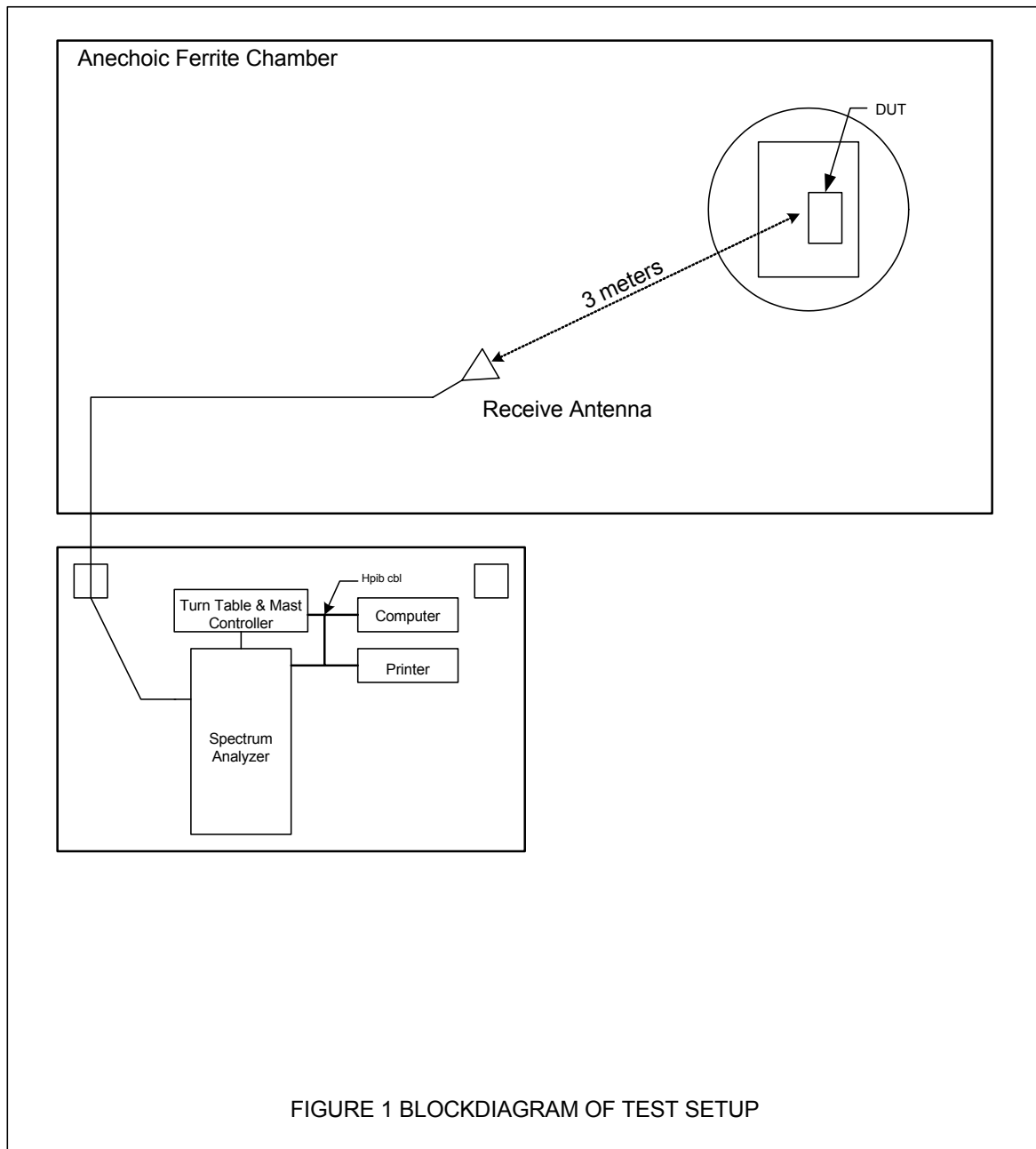
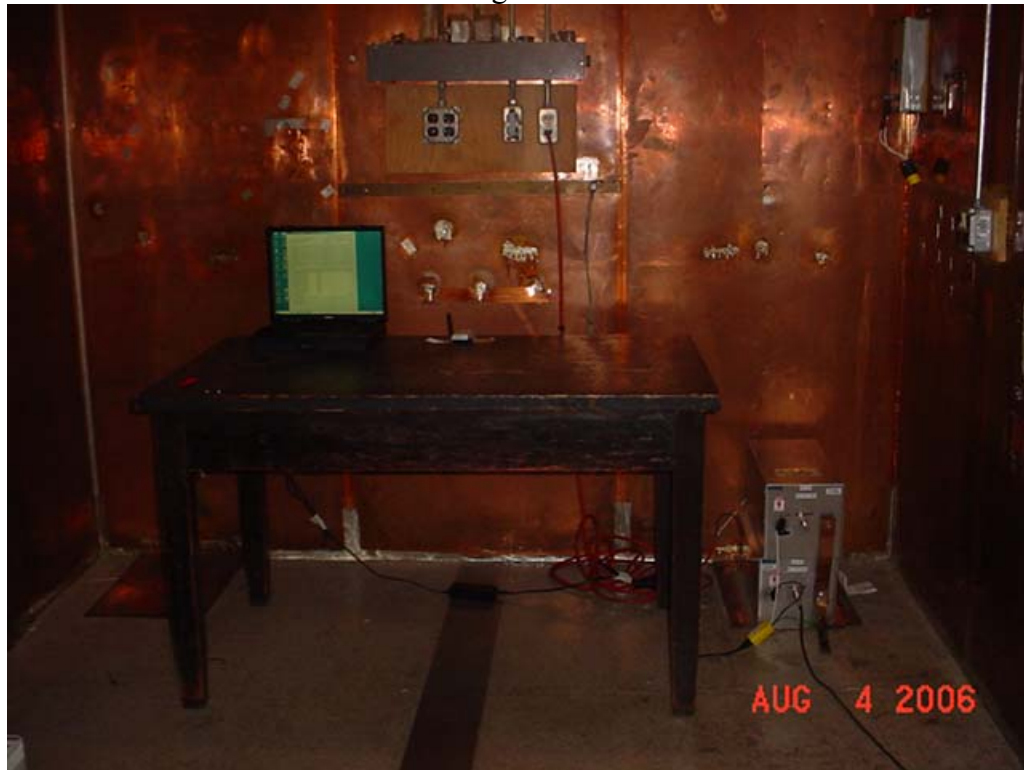


Figure 2

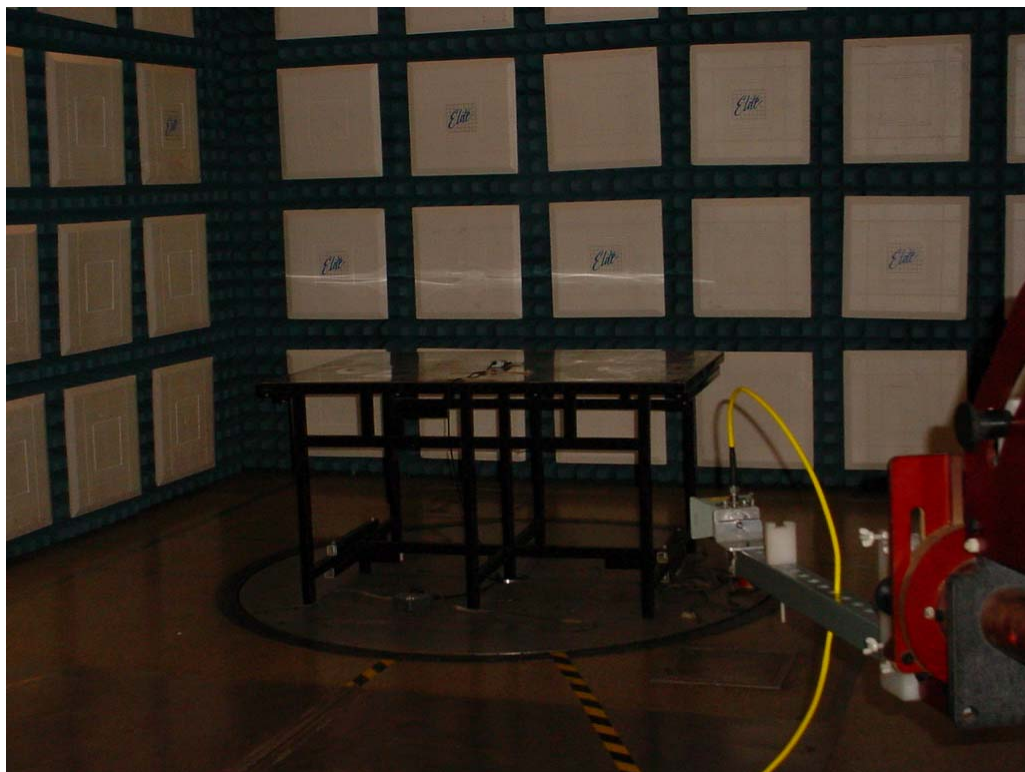


Test Set-up for Conducted Emissions

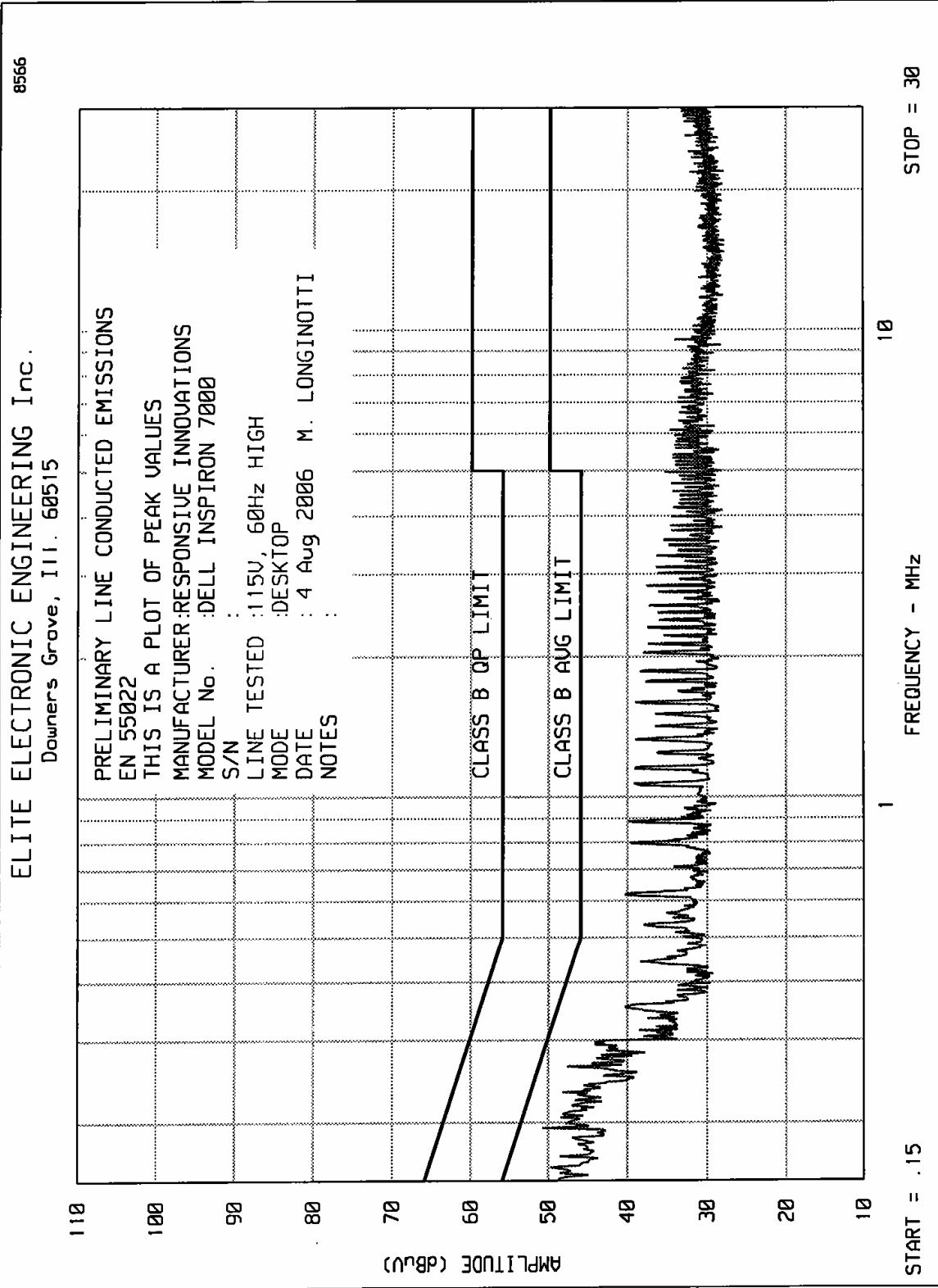
Figure 3

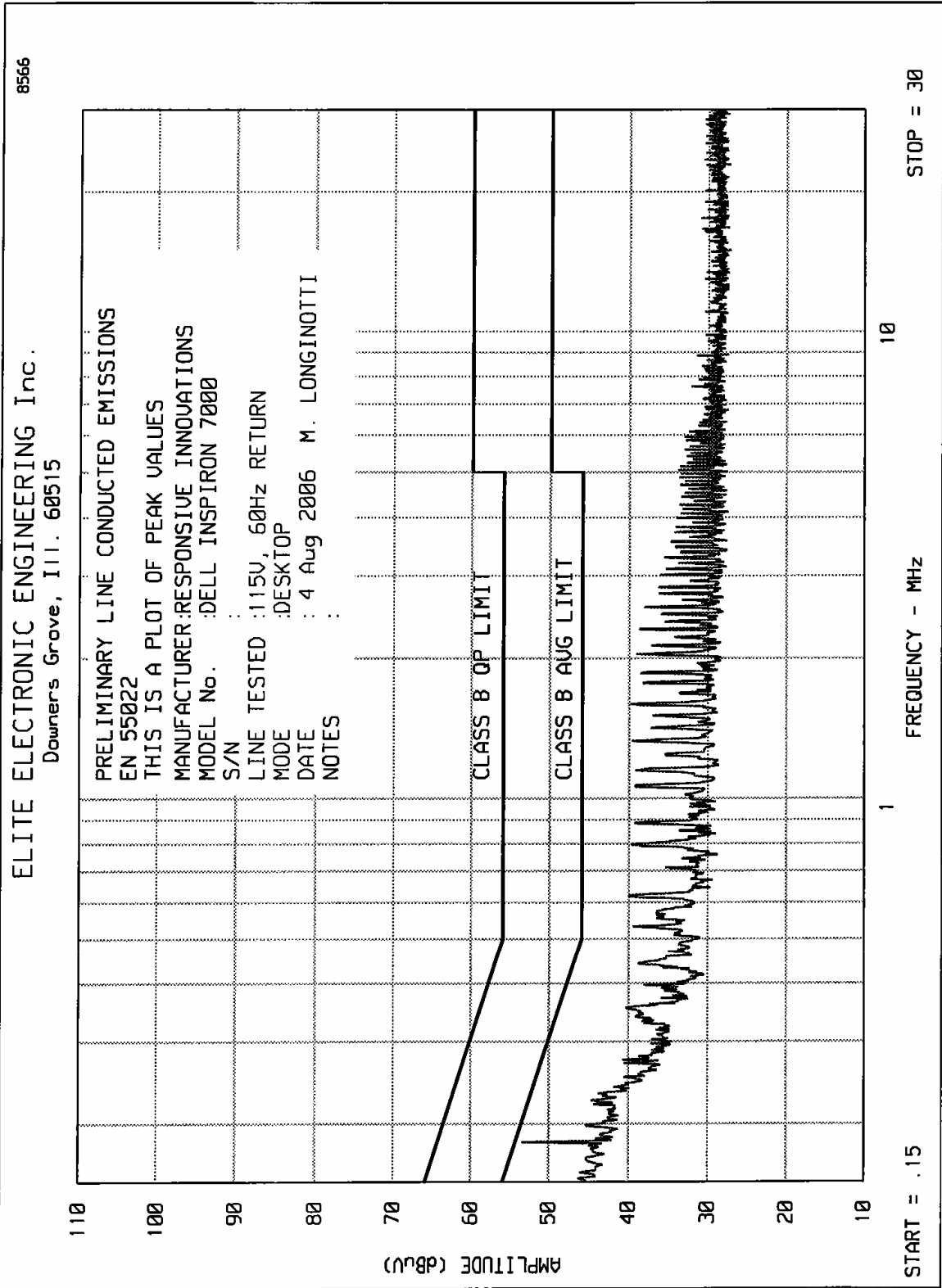


Test Set-up for Radiated Emissions – Horizontal Polarization



Test Set-up for Radiated Emissions – Vertical Polarization







ETR No.  
ELITE ELECTRONIC ENGINEERING CO.

MANUFACTURER : RESPONSIVE INNOVATIONS  
MODEL : DELL INSPIRON 7000  
S/N :  
SPECIFICATION : EN 55022, CLASS B  
TEST : LINE CONDUCTED EMISSIONS  
LINE TESTED : 115V, 60Hz HIGH  
MODE : DESKTOP  
DATE : 4 Aug 2006  
NOTES :  
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR  
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

| FREQUENCY<br>MHz | METER RDG.<br>dBuV | QP LIMIT<br>dBuV | AVG RDG<br>dBuV | AVG LIMIT<br>dBuV | NOTES |
|------------------|--------------------|------------------|-----------------|-------------------|-------|
| .199             | 38.7               | 63.7             |                 | 53.7              |       |
| .266             | 28.9               | 61.2             |                 | 51.2              |       |
| .355             | 35.7               | 58.8             |                 | 48.8              |       |
| .620             | 36.1               | 56.0             |                 | 46.0              |       |
| .797             | 34.6               | 56.0             |                 | 46.0              |       |
| .886             | 35.1               | 56.0             |                 | 46.0              |       |
| 1.063            | 35.0               | 56.0             |                 | 46.0              |       |
| 1.328            | 35.3               | 56.0             |                 | 46.0              |       |
| 1.858            | 34.0               | 56.0             |                 | 46.0              |       |
| 2.035            | 33.9               | 56.0             |                 | 46.0              |       |
| 2.831            | 32.3               | 56.0             |                 | 46.0              |       |
| 3.008            | 32.4               | 56.0             |                 | 46.0              |       |
| 3.096            | 31.4               | 56.0             |                 | 46.0              |       |
| 4.688            | 29.8               | 56.0             |                 | 46.0              |       |
| 4.953            | 29.5               | 56.0             |                 | 46.0              |       |
| 6.102            | 28.5               | 60.0             |                 | 50.0              |       |
| 9.486            | 25.6               | 60.0             |                 | 50.0              |       |
| 12.909           | 23.6               | 60.0             |                 | 50.0              |       |
| 16.113           | 23.4               | 60.0             |                 | 50.0              |       |
| 19.018           | 23.6               | 60.0             |                 | 50.0              |       |
| 20.582           | 23.6               | 60.0             |                 | 50.0              |       |
| 24.139           | 24.1               | 60.0             |                 | 50.0              |       |
| 28.031           | 25.1               | 60.0             |                 | 50.0              |       |

CHECKED BY:

  
M. LONGINOTTI

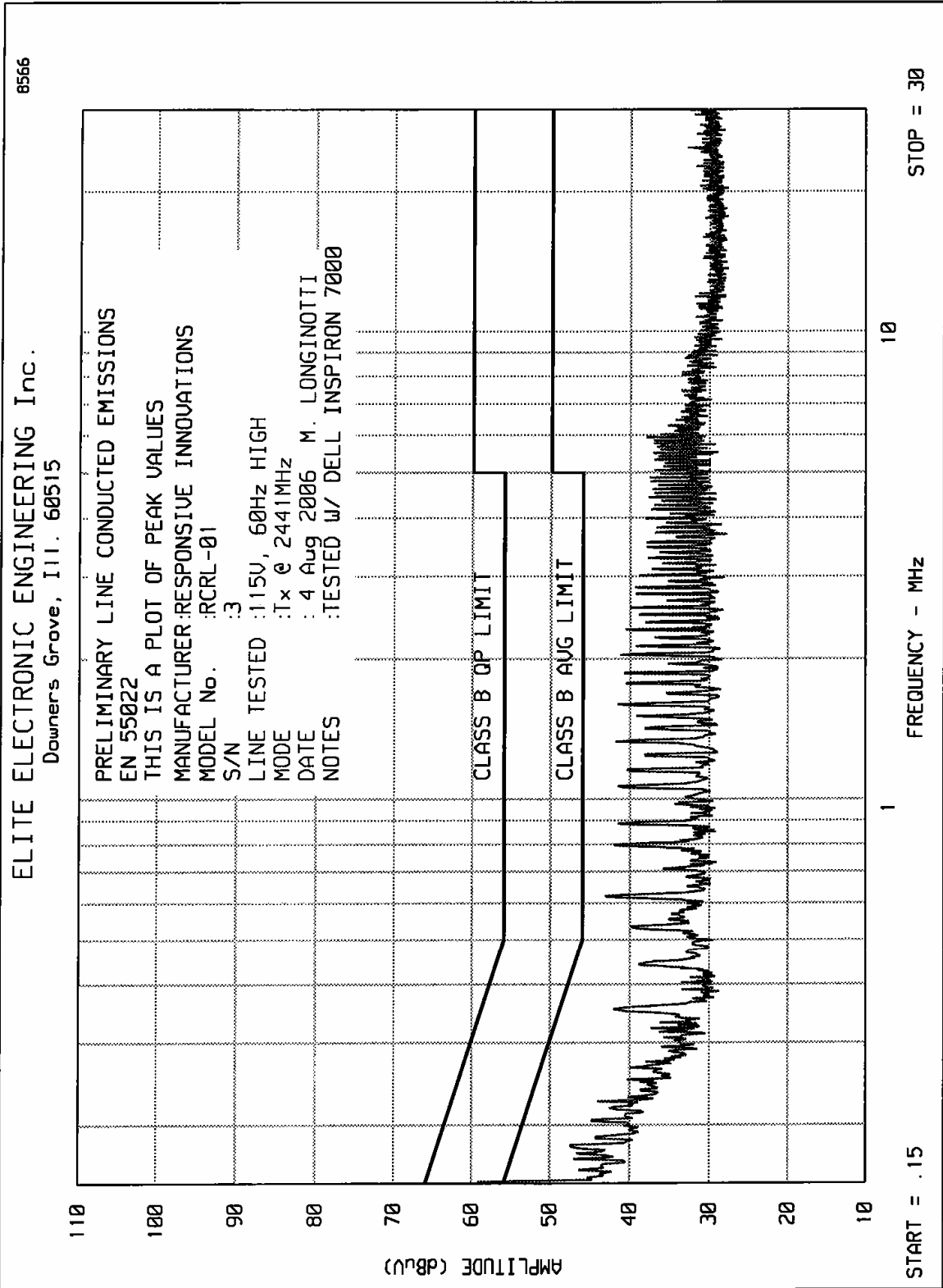


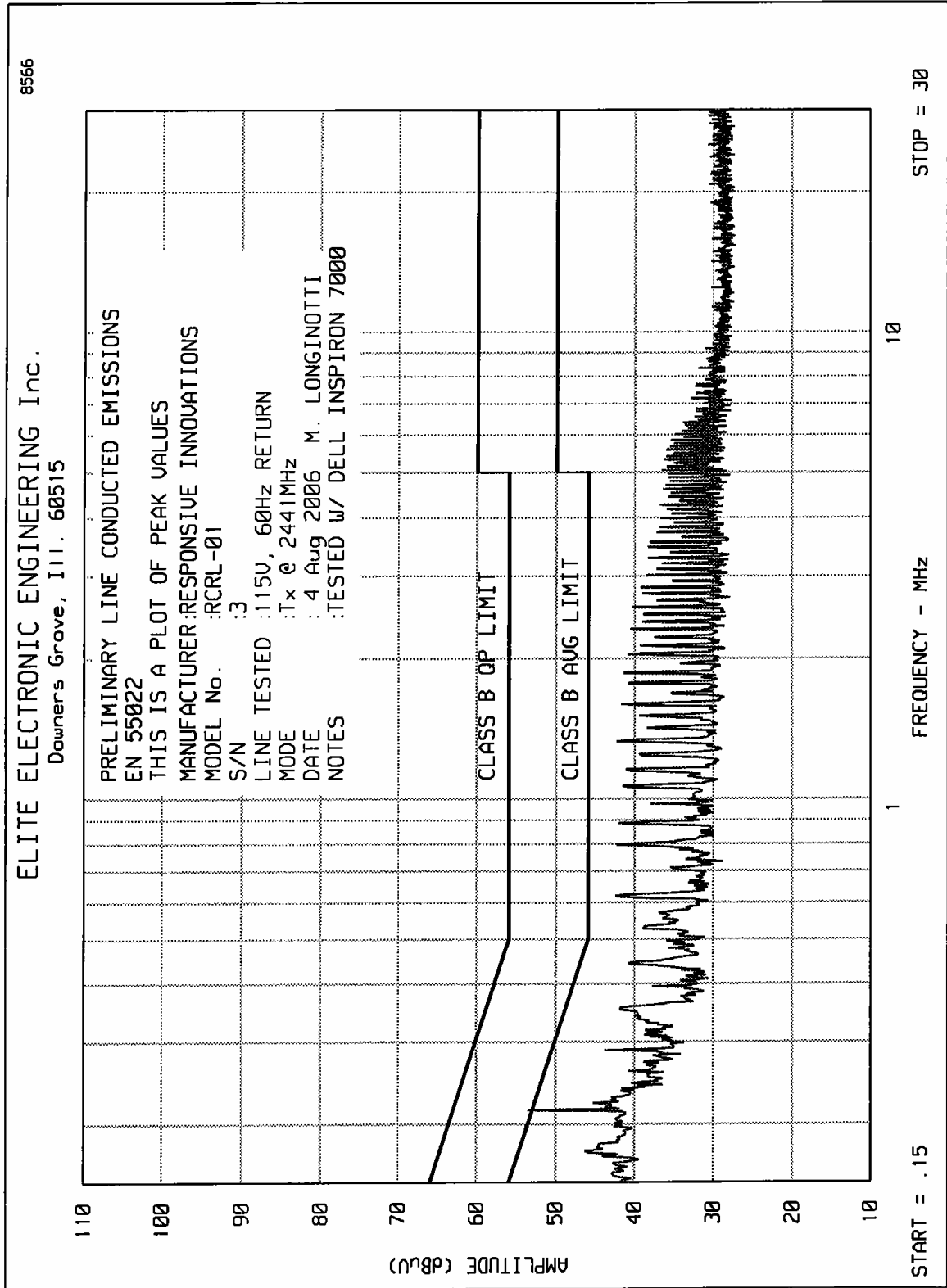
ETR No.  
ELITE ELECTRONIC ENGINEERING CO.

MANUFACTURER : RESPONSIVE INNOVATIONS  
MODEL : DELL INSPIRON 7000  
S/N :  
SPECIFICATION : EN 55022, CLASS B  
TEST : LINE CONDUCTED EMISSIONS  
LINE TESTED : 115V, 60Hz RETURN  
MODE : DESKTOP  
DATE : 4 Aug 2006  
NOTES :  
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR  
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

| FREQUENCY<br>MHz | METER RDG.<br>dBuV | QP LIMIT<br>dBuV | AVG RDG<br>dBuV | AVG LIMIT<br>dBuV | NOTES |
|------------------|--------------------|------------------|-----------------|-------------------|-------|
| .172             | 36.8               | 64.8             |                 | 54.8              |       |
| .266             | 29.5               | 61.3             |                 | 51.3              |       |
| .355             | 35.1               | 58.8             |                 | 48.8              |       |
| .620             | 35.7               | 56.0             |                 | 46.0              |       |
| .797             | 34.7               | 56.0             |                 | 46.0              |       |
| .886             | 35.2               | 56.0             |                 | 46.0              |       |
| 1.593            | 35.3               | 56.0             |                 | 46.0              |       |
| 2.035            | 34.5               | 56.0             |                 | 46.0              |       |
| 2.300            | 34.1               | 56.0             |                 | 46.0              |       |
| 2.565            | 33.6               | 56.0             |                 | 46.0              |       |
| 3.007            | 32.1               | 56.0             |                 | 46.0              |       |
| 3.272            | 31.6               | 56.0             |                 | 46.0              |       |
| 4.244            | 29.4               | 56.0             |                 | 46.0              |       |
| 4.952            | 29.1               | 56.0             |                 | 46.0              |       |
| 6.543            | 26.1               | 60.0             |                 | 50.0              |       |
| 9.284            | 24.0               | 60.0             |                 | 50.0              |       |
| 12.818           | 22.9               | 60.0             |                 | 50.0              |       |
| 16.093           | 22.9               | 60.0             |                 | 50.0              |       |
| 18.978           | 22.9               | 60.0             |                 | 50.0              |       |
| 20.230           | 22.9               | 60.0             |                 | 50.0              |       |
| 24.512           | 22.9               | 60.0             |                 | 50.0              |       |
| 27.848           | 23.6               | 60.0             |                 | 50.0              |       |

CHECKED BY:   
M. LONGINOTTI







ETR No.  
ELITE ELECTRONIC ENGINEERING CO.

MANUFACTURER : RESPONSIVE INNOVATIONS  
MODEL : RCRL-01  
S/N : 3  
SPECIFICATION : EN 55022, CLASS B  
TEST : LINE CONDUCTED EMISSIONS  
LINE TESTED : 115V, 60Hz HIGH  
MODE : Tx @ 2441MHz  
DATE : 4 Aug 2006  
NOTES : TESTED W/ DELL INSPIRON 7000  
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR  
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

| FREQUENCY<br>MHz | METER RDG.<br>dBuV | QP LIMIT<br>dBuV | AVG RDG<br>dBuV | AVG LIMIT<br>dBuV | NOTES |
|------------------|--------------------|------------------|-----------------|-------------------|-------|
| .150             | 35.8               | 66.0             |                 | 56.0              |       |
| .267             | 30.2               | 61.2             |                 | 51.2              |       |
| .355             | 37.8               | 58.8             |                 | 48.8              |       |
| .621             | 38.5               | 56.0             |                 | 46.0              |       |
| .798             | 37.6               | 56.0             |                 | 46.0              |       |
| .886             | 37.6               | 56.0             |                 | 46.0              |       |
| 1.064            | 37.8               | 56.0             |                 | 46.0              |       |
| 1.329            | 38.1               | 56.0             |                 | 46.0              |       |
| 2.036            | 36.7               | 56.0             |                 | 46.0              |       |
| 2.568            | 36.0               | 56.0             |                 | 46.0              |       |
| 3.009            | 35.0               | 56.0             |                 | 46.0              |       |
| 4.424            | 32.4               | 56.0             |                 | 46.0              |       |
| 5.928            | 30.4               | 60.0             |                 | 50.0              |       |
| 6.018            | 31.0               | 60.0             |                 | 50.0              |       |
| 8.053            | 26.8               | 60.0             |                 | 50.0              |       |
| 10.706           | 24.0               | 60.0             |                 | 50.0              |       |
| 14.667           | 23.4               | 60.0             |                 | 50.0              |       |
| 17.518           | 23.3               | 60.0             |                 | 50.0              |       |
| 21.267           | 24.6               | 60.0             |                 | 50.0              |       |
| 24.773           | 23.4               | 60.0             |                 | 50.0              |       |
| 27.777           | 23.4               | 60.0             |                 | 50.0              |       |

CHECKED BY:   
M. LONGINOTTI



ETR No.  
ELITE ELECTRONIC ENGINEERING CO.

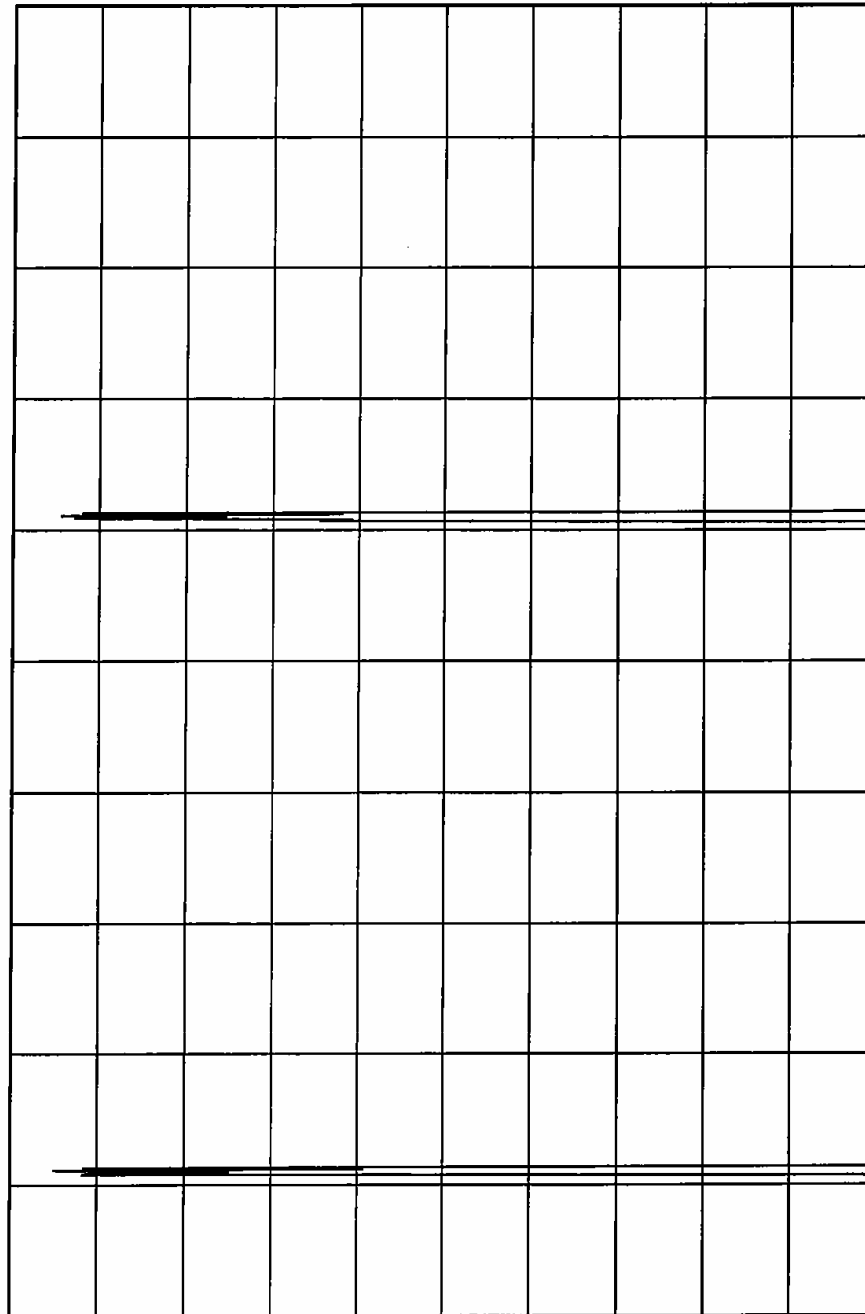
MANUFACTURER : RESPONSIVE INNOVATIONS  
MODEL : RCRL-01  
S/N : 3  
SPECIFICATION : EN 55022, CLASS B  
TEST : LINE CONDUCTED EMISSIONS  
LINE TESTED : 115V, 60Hz RETURN  
MODE : Tx @ 2441MHz  
DATE : 4 Aug 2006  
NOTES : TESTED W/ DELL INSPIRON 7000  
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR  
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

| FREQUENCY<br>MHz | METER RDG.<br>dBuV | QP LIMIT<br>dBuV | AVG RDG<br>dBuV | AVG LIMIT<br>dBuV | NOTES |
|------------------|--------------------|------------------|-----------------|-------------------|-------|
| .222             | 37.6               | 62.7             |                 | 52.7              |       |
| .294             | 28.3               | 60.4             |                 | 50.4              |       |
| .355             | 37.6               | 58.8             |                 | 48.8              |       |
| .621             | 38.1               | 56.0             |                 | 46.0              |       |
| .797             | 37.4               | 56.0             |                 | 46.0              |       |
| .886             | 37.6               | 56.0             |                 | 46.0              |       |
| 1.329            | 38.4               | 56.0             |                 | 46.0              |       |
| 1.594            | 37.9               | 56.0             |                 | 46.0              |       |
| 1.859            | 36.9               | 56.0             |                 | 46.0              |       |
| 2.302            | 36.8               | 56.0             |                 | 46.0              |       |
| 2.567            | 36.0               | 56.0             |                 | 46.0              |       |
| 3.009            | 34.9               | 56.0             |                 | 46.0              |       |
| 3.275            | 34.4               | 56.0             |                 | 46.0              |       |
| 4.248            | 32.1               | 56.0             |                 | 46.0              |       |
| 4.689            | 32.0               | 56.0             |                 | 46.0              |       |
| 6.017            | 30.7               | 60.0             |                 | 50.0              |       |
| 9.643            | 23.8               | 60.0             |                 | 50.0              |       |
| 12.441           | 22.9               | 60.0             |                 | 50.0              |       |
| 15.831           | 22.9               | 60.0             |                 | 50.0              |       |
| 18.952           | 22.9               | 60.0             |                 | 50.0              |       |
| 21.269           | 24.5               | 60.0             |                 | 50.0              |       |
| 24.419           | 23.1               | 60.0             |                 | 50.0              |       |
| 27.958           | 23.3               | 60.0             |                 | 50.0              |       |

CHECKED BY:   
M. LONGINOTTI



ELITE ELECTRONIC ENGINEERING Co.  
Downers Grove, IL 60515



2 mSEC/DIV

TRANSMITTER DUTY CYCLE

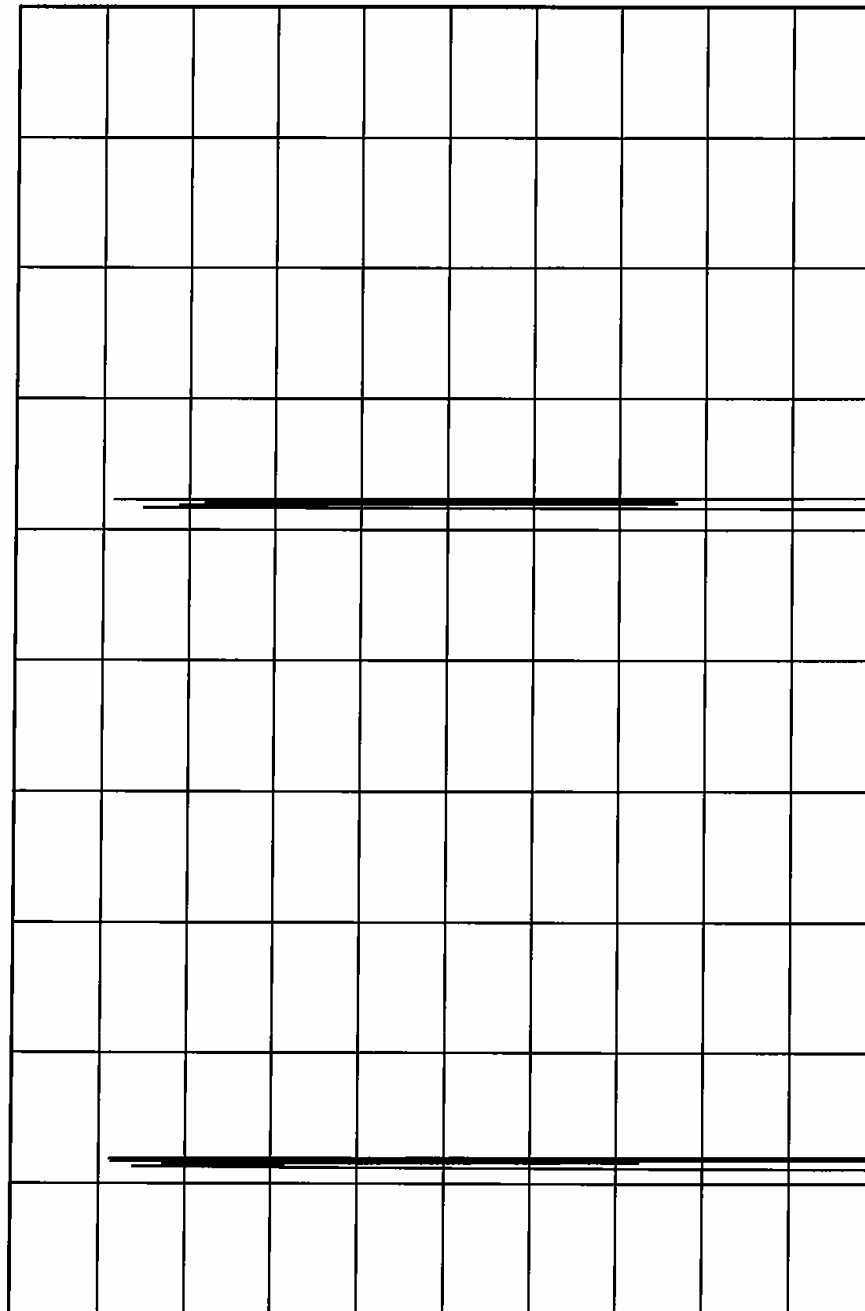
FREQUENCY : 2400.876 MHz  
ON TIME : .14 mSEC  
OFF TIME : 9.85 mSEC  
DUTY CYCLE = .01 or -40 dB  
COMPUTED OVER 1 DATA WORD

MANUFACTURER : RESPONSIVE INNOVATIONS

MODEL : RCRL-01  
S/N : 4  
TEST DATE : 4 Aug 2006  
NOTES : Tx @ 2401MHz



ELITE ELECTRONIC ENGINEERING Co.  
Dawners Grove, IL 60515



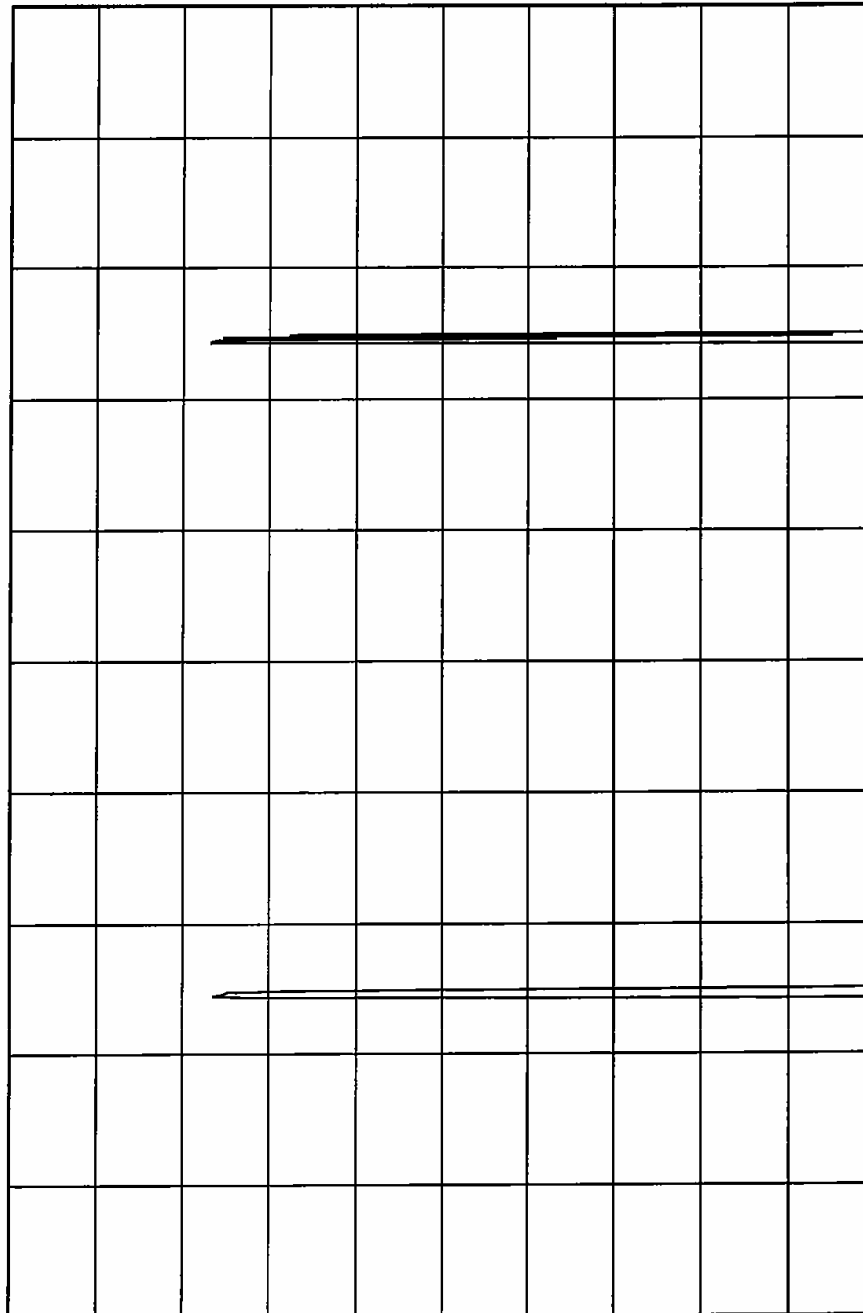
2 mSEC/DIV

TRANSMITTER DUTY CYCLE  
FREQUENCY : 2441.03 MHz  
ON TIME : .14 mSEC  
OFF TIME : 9.97 mSEC  
DUTY CYCLE = .01 or -40 dB  
COMPUTED OVER 1 DATA WORD

MANUFACTURER : RESPONSIVE INNOVATIONS  
MODEL : RCRL-01  
S/N : 4  
TEST DATE : 31 Jul 2006  
NOTES : NORMAL PACKET SIZE



ELITE ELECTRONIC ENGINEERING Co.  
Downers Grove, IL 60515



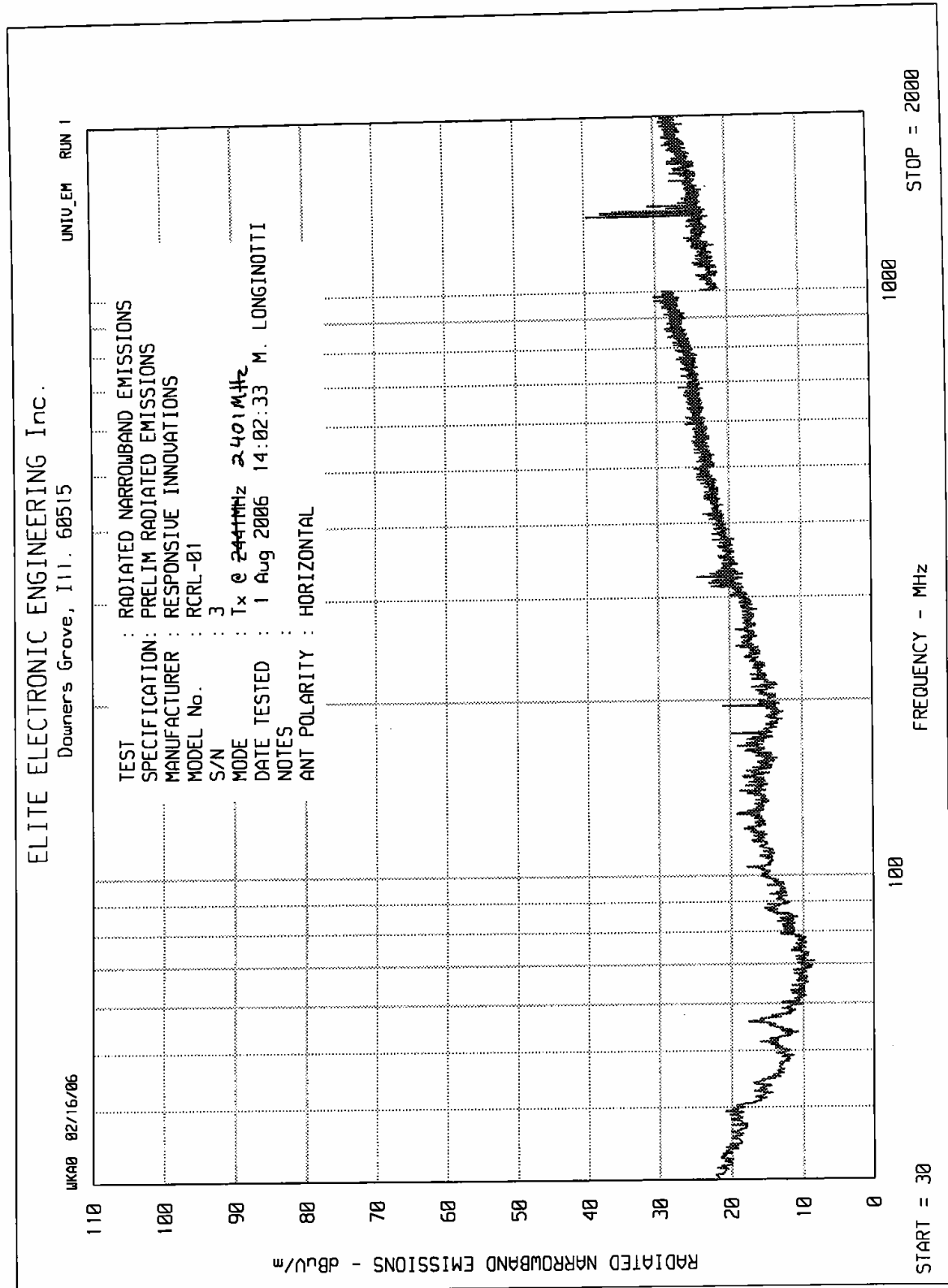
2 mSEC/DIV

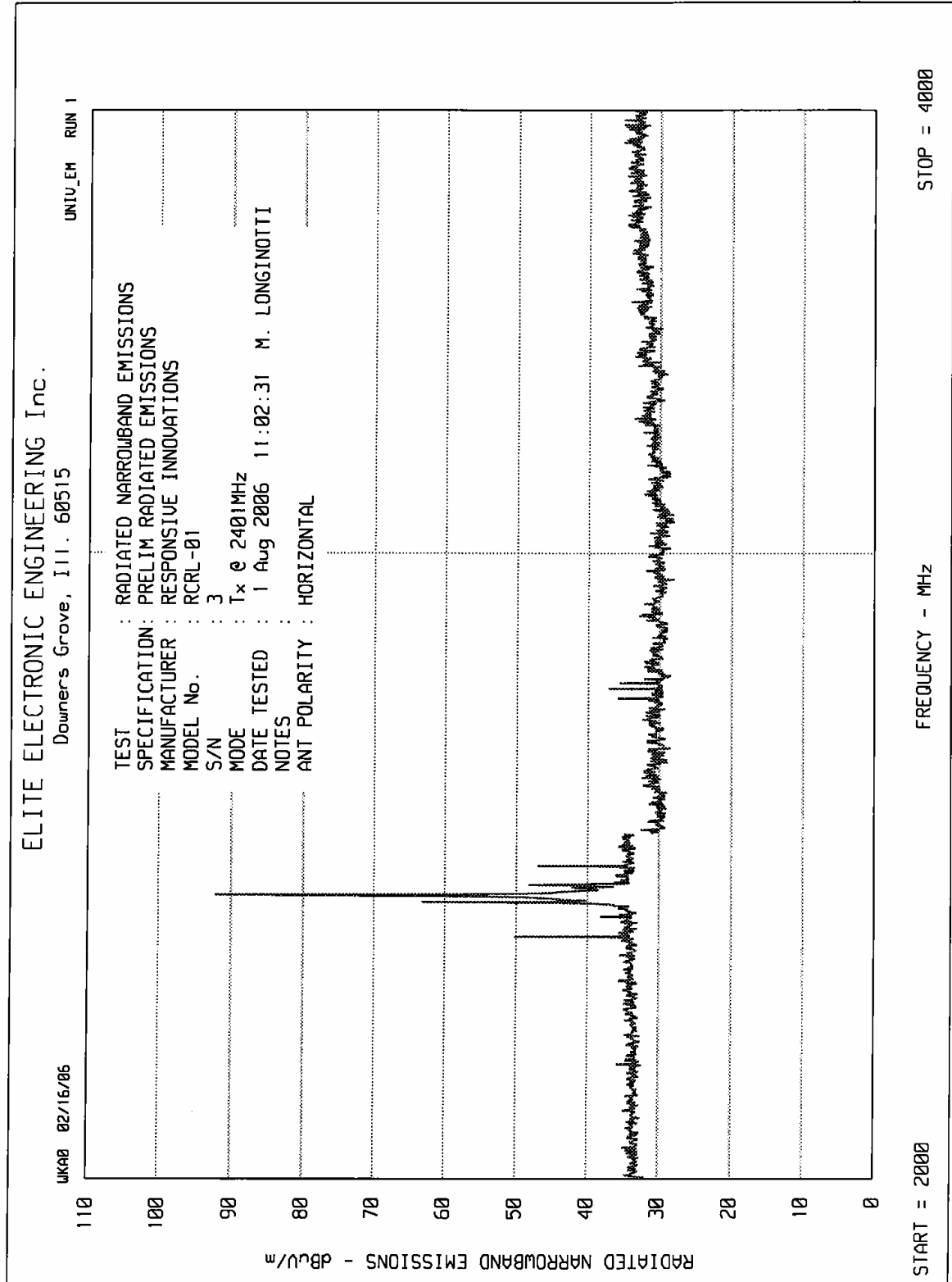
TRANSMITTER DUTY CYCLE

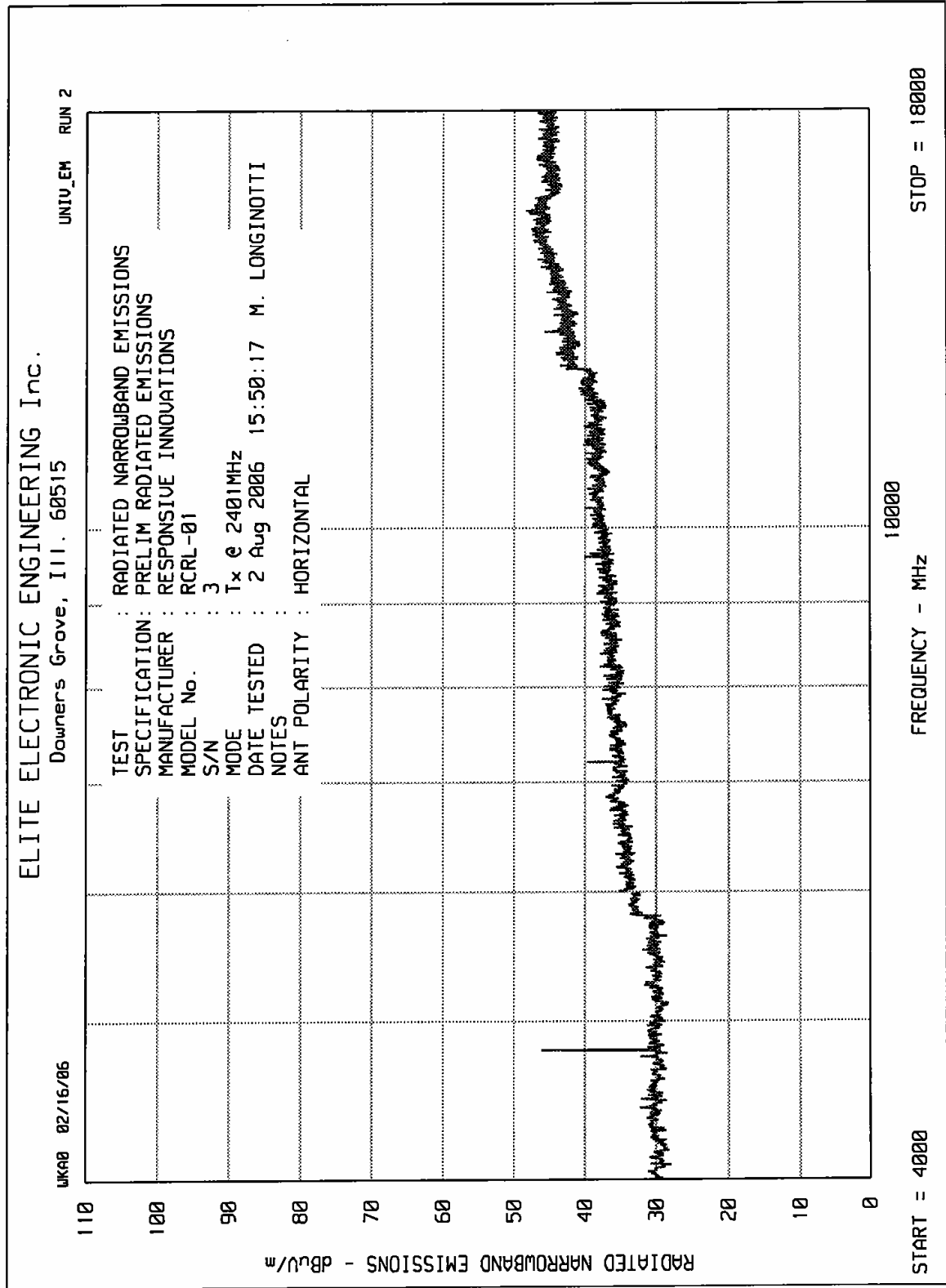
FREQUENCY: 2473.784 MHz  
ON TIME : .14 mSEC  
OFF TIME : 9.85 mSEC  
DUTY CYCLE = .01 or -40 dB  
COMPUTED OVER 1 DATA WORD

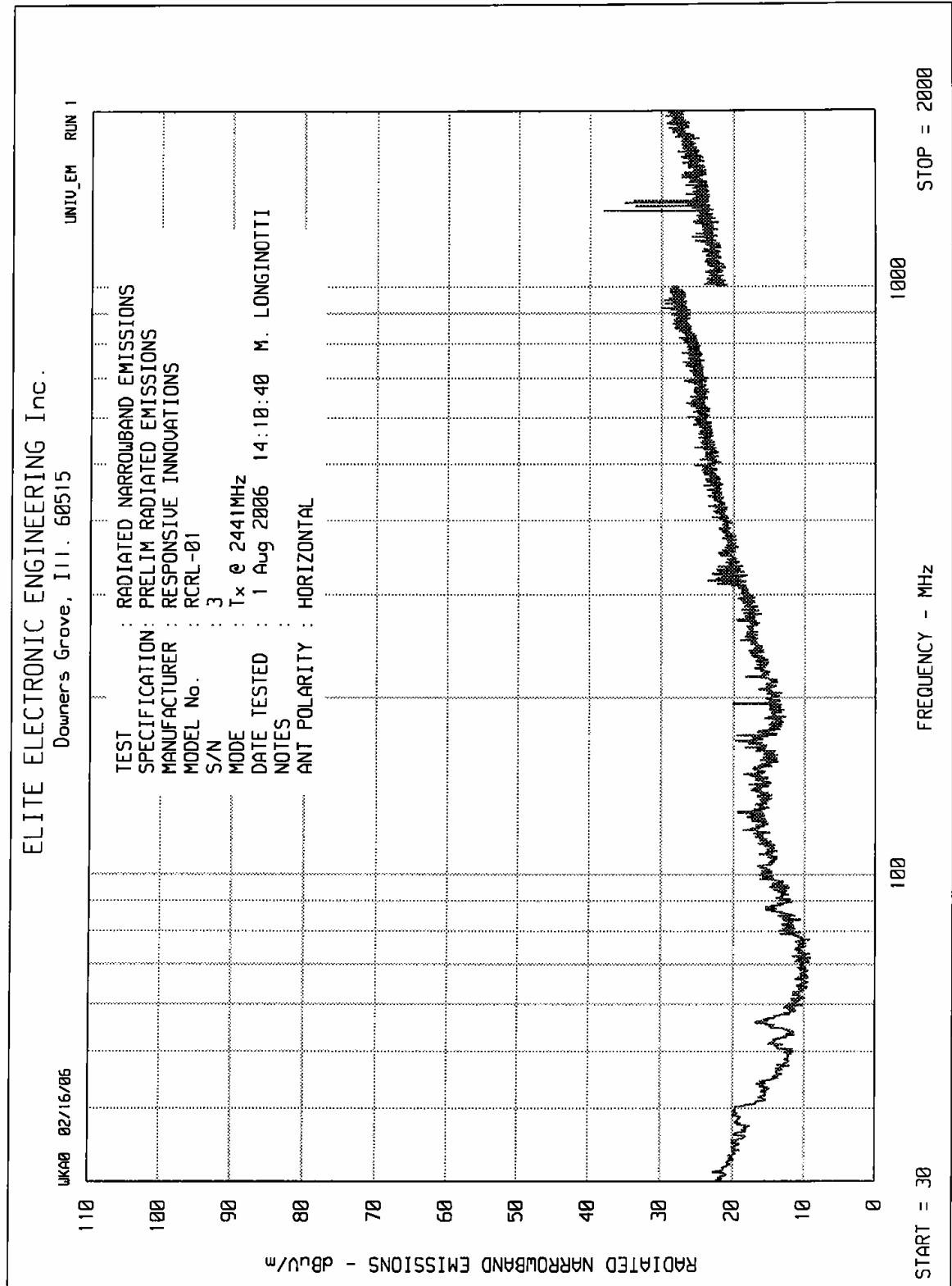
MANUFACTURER : RESPONSIVE INNOVATIONS

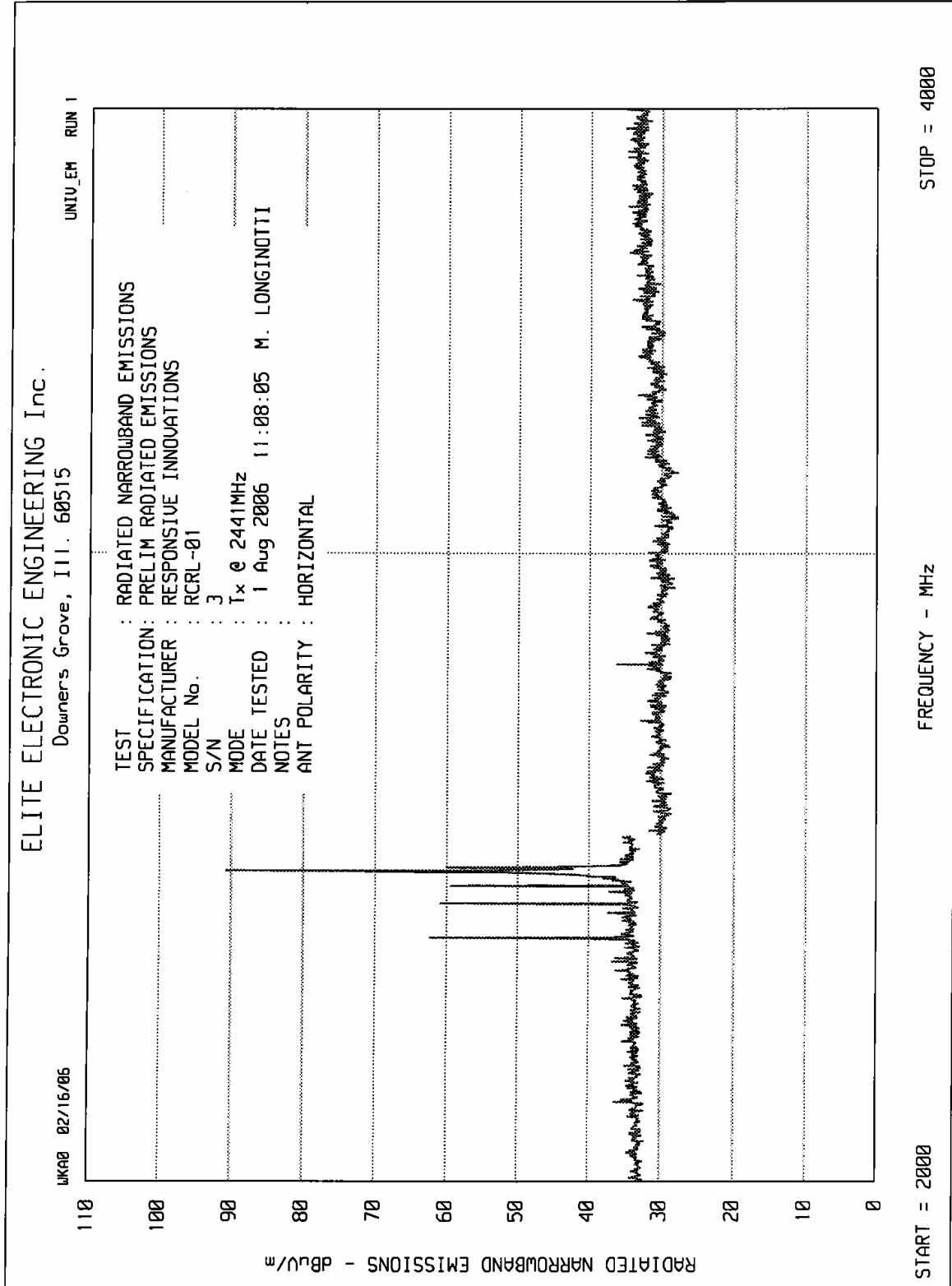
MODEL : RCRL-01  
S/N : 4  
TEST DATE : 4 Aug 2006  
NOTES : Tx @ 2474MHz

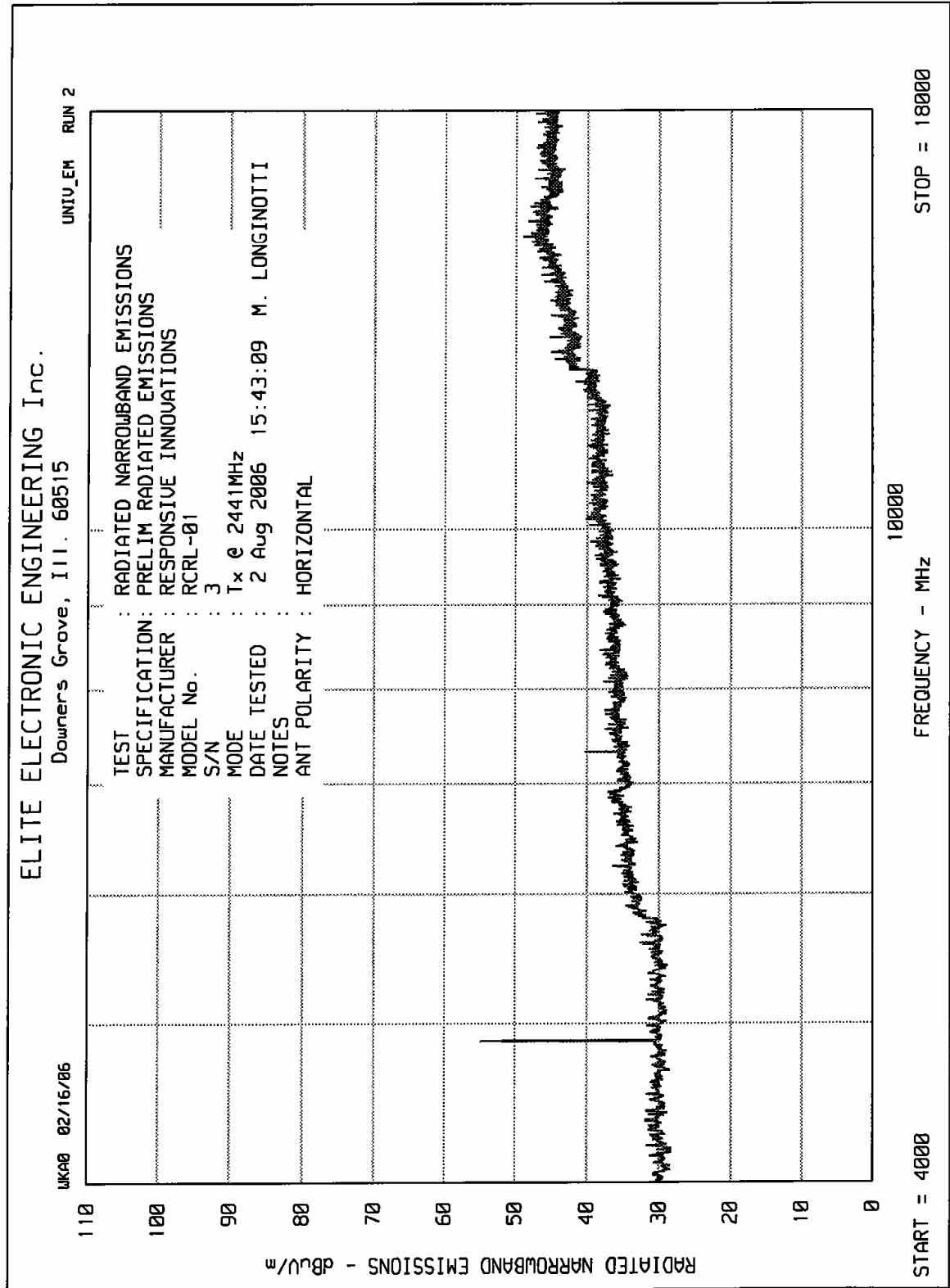


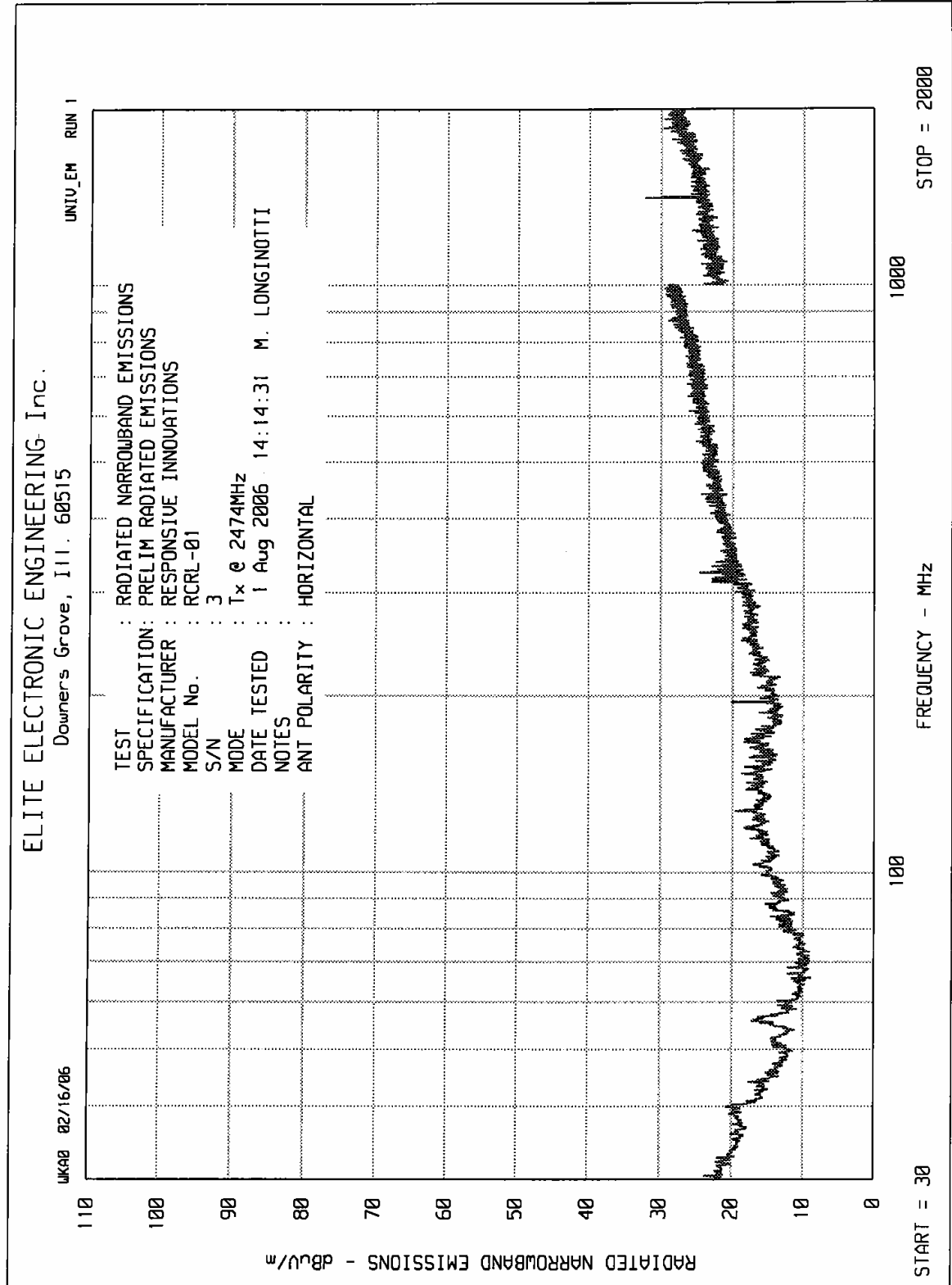


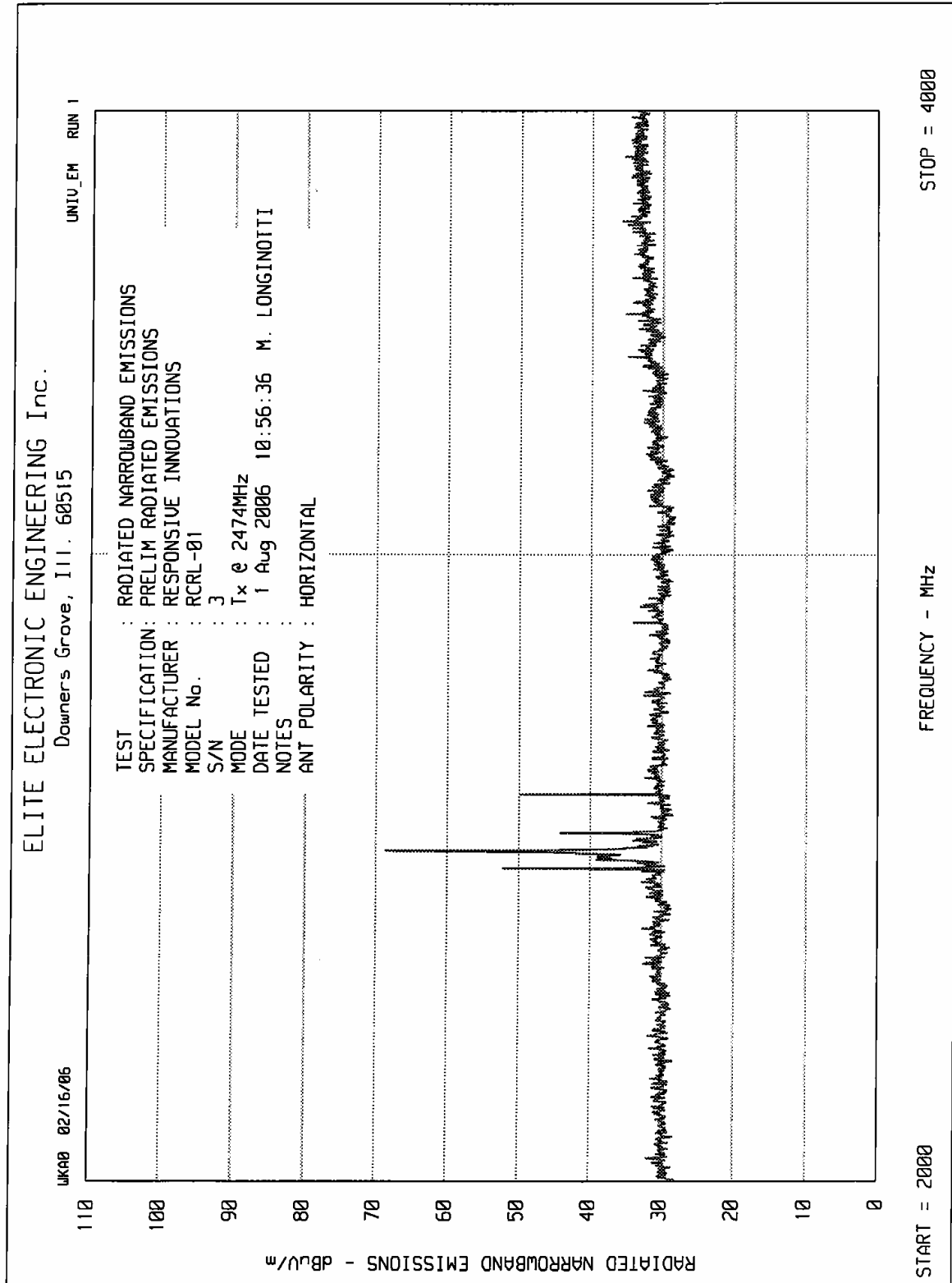


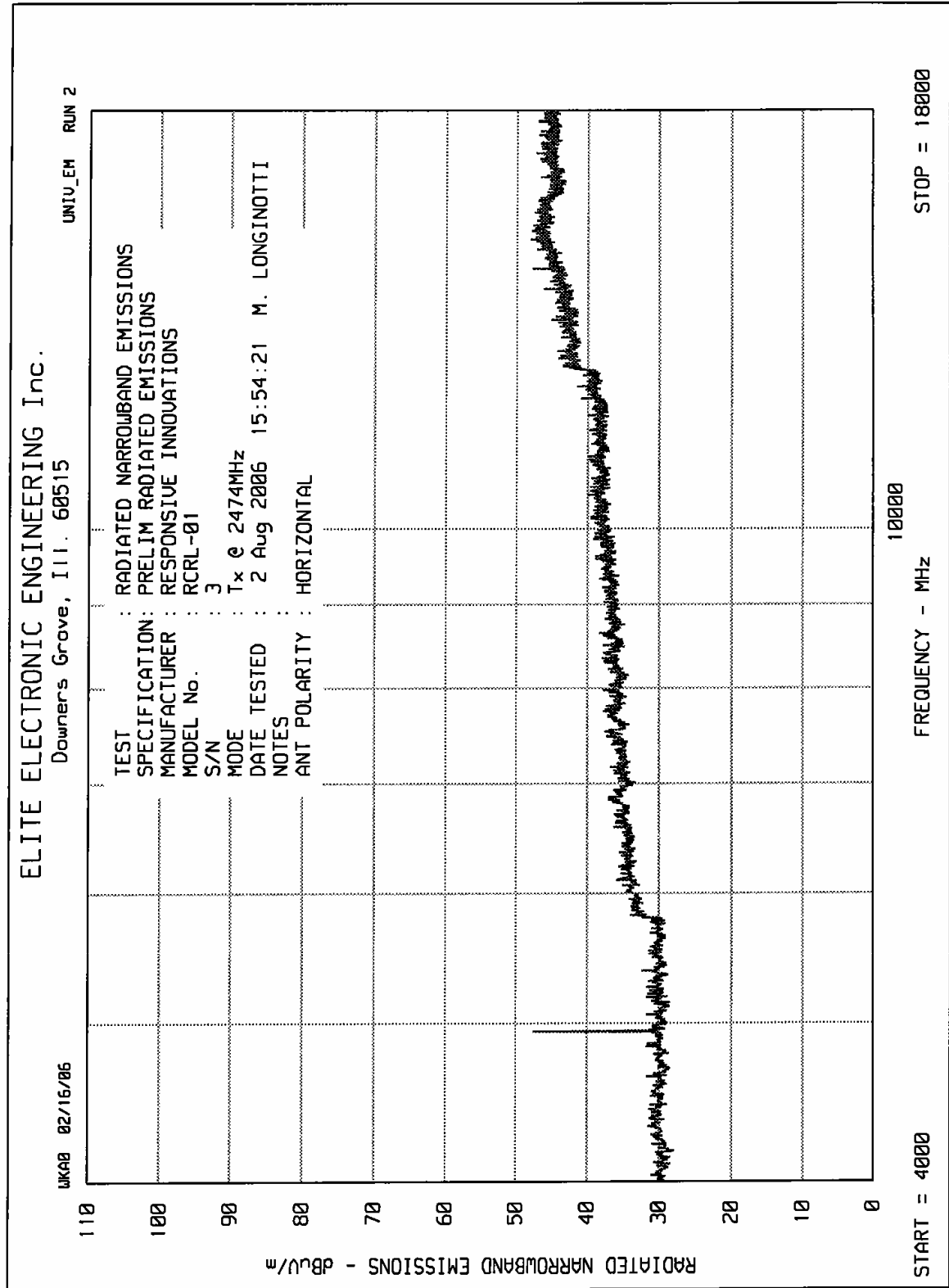














MANUFACTURER : Responsive Innovations  
MODEL NO. : RRLR-01  
SERIAL NO. : 3  
TEST SPECIFICATION : FCC 15.249, Radiated Emissions  
MODE : Transmit @ 2401MHz  
TEST DATE : July 31, 2006 through August 8, 2006  
TEST DISTANCE : 3 meters

| Frequency<br>MHz | Antenna<br>Polarity | Peak<br>Meter<br>Reading<br>dBuV | Ambient | Antenna<br>Factor<br>dB | Cable<br>Loss*<br>dB | Preamplifier<br>Gain<br>dB | Distance<br>Correction<br>Factor<br>dB | Peak<br>Total<br>dBuV/m | Peak<br>Limit<br>dBuV/m |
|------------------|---------------------|----------------------------------|---------|-------------------------|----------------------|----------------------------|----------------------------------------|-------------------------|-------------------------|
| 2401             | H                   | 71.8                             |         | 31.4                    | 3.5                  | 0                          | 0                                      | 106.7                   | 114                     |
| 2401             | V                   | 58.8                             |         | 31.4                    | 3.5                  | 0                          | 0                                      | 93.7                    | 114                     |
| 4802             | H                   | 21.5                             |         | 34.5                    | 4.9                  | 0                          | 0                                      | 60.9                    | 74                      |
| 4802             | V                   | 24.2                             |         | 34.5                    | 4.9                  | 0                          | 0                                      | 63.6                    | 74                      |
| 7203.0           | H                   | 41.6                             | Ambient | 38.0                    | 0.8                  | -31.4                      | 0                                      | 49.0                    | 74                      |
| 7203.0           | V                   | 41.9                             | Ambient | 38.0                    | 0.8                  | -31.4                      | 0                                      | 49.3                    | 74                      |
| 9604.0           | H                   | 45.2                             |         | 39.7                    | 0.9                  | -31.9                      | 0                                      | 54.0                    | 74                      |
| 9604.0           | V                   | 41.2                             | Ambient | 39.7                    | 0.9                  | -31.9                      | 0                                      | 50.0                    | 74                      |
| 12005.0          | H                   | 40.4                             | Ambient | 41.4                    | 1.0                  | -30.5                      | -9.5                                   | 42.8                    | 74                      |
| 12005.0          | V                   | 39.8                             | Ambient | 41.4                    | 1.0                  | -30.5                      | -9.5                                   | 42.2                    | 74                      |
| 14406.0          | H                   | 42.8                             | Ambient | 43.7                    | 1.2                  | -30.0                      | -9.5                                   | 48.2                    | 74                      |
| 14406.0          | V                   | 42.4                             | Ambient | 43.7                    | 1.2                  | -30.0                      | -9.5                                   | 47.8                    | 74                      |
| 16807.0          | H                   | 42.3                             | Ambient | 44.6                    | 1.2                  | -30.2                      | -9.5                                   | 48.5                    | 74                      |
| 16807.0          | V                   | 42.3                             | Ambient | 44.6                    | 1.2                  | -30.2                      | -9.5                                   | 48.5                    | 74                      |
| 19208.0          | H                   | 34.6                             | Ambient | 45.6                    | 1.1                  | -21.3                      | -9.5                                   | 50.5                    | 74                      |
| 19208.0          | V                   | 35.9                             | Ambient | 45.6                    | 1.1                  | -21.3                      | -9.5                                   | 51.8                    | 74                      |
| 21609.0          | H                   | 38.3                             | Ambient | 46.2                    | 4.4                  | -20.8                      | -9.5                                   | 58.6                    | 74                      |
| 21609.0          | V                   | 38.0                             | Ambient | 46.2                    | 4.4                  | -20.8                      | -9.5                                   | 58.3                    | 74                      |
| 24010.0          | H                   | 34.6                             | Ambient | 45.8                    | 2.3                  | -16.6                      | -9.5                                   | 56.6                    | 74                      |
| 24010.0          | V                   | 35.0                             | Ambient | 45.8                    | 2.3                  | -16.6                      | -9.5                                   | 57.0                    | 74                      |

V – Vertical

H – Horizontal

Peak Total = Peak Meter Reading + Antenna Factor + Cable Loss + Preamp Gain + Distance Correction

Checked By : MARK E. LONGINOTTI



MANUFACTURER : Responsive Innovations  
MODEL NO. : RRLR-01  
SERIAL NO. : 3  
TEST SPECIFICATION : FCC 15.249, Radiated Emissions  
MODE : Transmit @ 2401MHz  
TEST DATE : July 31, 2006 through August 8, 2006  
TEST DISTANCE : 3 meters

| Frequency<br>MHz | Antenna<br>Polarity | Peak<br>Meter<br>Reading<br>dBuV | Ambient | Antenna<br>Factor<br>dB | Cable<br>Loss*<br>dB | Preamp<br>Gain<br>dB | Distance<br>Correction<br>Factor<br>dB | Duty<br>Cycle<br>Corr.<br>Factor<br>dB | Average<br>Total<br>dBuV/m | Average<br>Limit<br>dBuV/m |
|------------------|---------------------|----------------------------------|---------|-------------------------|----------------------|----------------------|----------------------------------------|----------------------------------------|----------------------------|----------------------------|
| 2401             | H                   | 71.8                             |         | 31.4                    | 3.5                  | 0                    | 0                                      | -40                                    | 66.7                       | 94                         |
| 2401             | V                   | 58.8                             |         | 31.4                    | 3.5                  | 0                    | 0                                      | -40                                    | 53.7                       | 94                         |
| 4802             | H                   | 21.5                             |         | 34.5                    | 4.9                  | 0                    | 0                                      | -40                                    | 20.9                       | 54                         |
| 4802             | V                   | 24.2                             |         | 34.5                    | 4.9                  | 0                    | 0                                      | -40                                    | 23.6                       | 54                         |
| 7203.0           | H                   | 41.6                             | Ambient | 38.0                    | 0.8                  | -31.4                | 0                                      | -40                                    | 9.0                        | 54                         |
| 7203.0           | V                   | 41.9                             | Ambient | 38.0                    | 0.8                  | -31.4                | 0                                      | -40                                    | 9.3                        | 54                         |
| 9604.0           | H                   | 45.2                             |         | 39.7                    | 0.9                  | -31.9                | 0                                      | -40                                    | 14.0                       | 54                         |
| 9604.0           | V                   | 41.2                             | Ambient | 39.7                    | 0.9                  | -31.9                | 0                                      | -40                                    | 10.0                       | 54                         |
| 12005.0          | H                   | 40.4                             | Ambient | 41.4                    | 1.0                  | -30.5                | -9.5                                   | -40                                    | 2.8                        | 54                         |
| 12005.0          | V                   | 39.8                             | Ambient | 41.4                    | 1.0                  | -30.5                | -9.5                                   | -40                                    | 2.2                        | 54                         |
| 14406.0          | H                   | 42.8                             | Ambient | 43.7                    | 1.2                  | -30.0                | -9.5                                   | -40                                    | 8.2                        | 54                         |
| 14406.0          | V                   | 42.4                             | Ambient | 43.7                    | 1.2                  | -30.0                | -9.5                                   | -40                                    | 7.8                        | 54                         |
| 16807.0          | H                   | 42.3                             | Ambient | 44.6                    | 1.2                  | -30.2                | -9.5                                   | -40                                    | 8.5                        | 54                         |
| 16807.0          | V                   | 42.3                             | Ambient | 44.6                    | 1.2                  | -30.2                | -9.5                                   | -40                                    | 8.5                        | 54                         |
| 19208.0          | H                   | 34.6                             | Ambient | 45.6                    | 1.1                  | -21.3                | -9.5                                   | -40                                    | 10.5                       | 54                         |
| 19208.0          | V                   | 35.9                             | Ambient | 45.6                    | 1.1                  | -21.3                | -9.5                                   | -40                                    | 11.8                       | 54                         |
| 21609.0          | H                   | 38.3                             | Ambient | 46.2                    | 4.4                  | -20.8                | -9.5                                   | -40                                    | 18.6                       | 54                         |
| 21609.0          | V                   | 38.0                             | Ambient | 46.2                    | 4.4                  | -20.8                | -9.5                                   | -40                                    | 18.3                       | 54                         |
| 24010.0          | H                   | 34.6                             | Ambient | 45.8                    | 2.3                  | -16.6                | -9.5                                   | -40                                    | 16.6                       | 54                         |
| 24010.0          | V                   | 35.0                             | Ambient | 45.8                    | 2.3                  | -16.6                | -9.5                                   | -40                                    | 17.0                       | 54                         |

V – Vertical

H – Horizontal

Average Total = Peak Meter Reading + Antenna Factor + Cable Loss + Preamp Gain + Distance  
Correction Factor + Duty Cycle Correction Factor

Checked By : MARK E. LONGINOTTI



MANUFACTURER : Responsive Innovations  
MODEL NO. : RRLR-01  
SERIAL NO. : 3  
TEST SPECIFICATION : FCC 15.249, Radiated Emissions  
MODE : Transmit @ 2441MHz  
TEST DATE : July 31, 2006 through August 8, 2006  
TEST DISTANCE : 3 meters

| Frequency<br>MHz | Antenna<br>Polarity | Peak<br>Meter<br>Reading<br>dBuV | Ambient | Antenna<br>Factor<br>dB | Cable<br>Loss*<br>dB | Preamp<br>Gain<br>dB | Distance<br>Correctio<br>n<br>Factor<br>dB | Peak<br>Total<br>dBuV/m | Peak<br>Limit<br>dBuV/m |
|------------------|---------------------|----------------------------------|---------|-------------------------|----------------------|----------------------|--------------------------------------------|-------------------------|-------------------------|
| 2441.0           | H                   | 70.5                             |         | 31.4                    | 3.5                  | 0.0                  | 0.0                                        | 105.4                   | 114.0                   |
| 2441.0           | V                   | 57.6                             |         | 31.4                    | 3.5                  | 0.0                  | 0.0                                        | 92.5                    | 114.0                   |
| 4882.0           | H                   | 22.5                             |         | 34.5                    | 5.0                  | 0.0                  | 0.0                                        | 62.0                    | 74.0                    |
| 4882.0           | V                   | 22.7                             |         | 34.5                    | 5.0                  | 0.0                  | 0.0                                        | 62.2                    | 74.0                    |
| 7323.0           | H                   | 48.1                             |         | 38.1                    | 0.8                  | -31.4                | 0.0                                        | 55.5                    | 74.0                    |
| 7323.0           | V                   | 47.3                             |         | 38.1                    | 0.8                  | -31.4                | 0.0                                        | 54.7                    | 74.0                    |
| 9764.0           | H                   | 41.2                             | Ambient | 39.9                    | 0.9                  | -31.9                | 0.0                                        | 50.1                    | 74.0                    |
| 9764.0           | V                   | 41.7                             | Ambient | 39.9                    | 0.9                  | -31.9                | 0.0                                        | 50.6                    | 74.0                    |
| 12205.0          | H                   | 42.0                             | Ambient | 41.4                    | 1.0                  | -30.4                | -9.5                                       | 44.5                    | 74.0                    |
| 12205.0          | V                   | 41.8                             | Ambient | 41.4                    | 1.0                  | -30.4                | -9.5                                       | 44.3                    | 74.0                    |
| 14646.0          | H                   | 42.3                             | Ambient | 44.1                    | 1.2                  | -29.9                | -9.5                                       | 48.1                    | 74.0                    |
| 14646.0          | V                   | 41.7                             | Ambient | 44.1                    | 1.2                  | -29.9                | -9.5                                       | 47.5                    | 74.0                    |
| 17087.0          | H                   | 42.7                             | Ambient | 44.5                    | 1.3                  | -30.5                | -9.5                                       | 48.5                    | 74.0                    |
| 17087.0          | V                   | 42.8                             | Ambient | 44.5                    | 1.3                  | -30.5                | -9.5                                       | 48.6                    | 74.0                    |
| 19528.0          | H                   | 36.5                             | Ambient | 45.8                    | 1.5                  | -20.9                | -9.5                                       | 53.4                    | 74.0                    |
| 19528.0          | V                   | 35.8                             | Ambient | 45.8                    | 1.5                  | -20.9                | -9.5                                       | 52.7                    | 74.0                    |
| 21969.0          | H                   | 37.6                             | Ambient | 46.4                    | 2.1                  | -19.0                | -9.5                                       | 57.6                    | 74.0                    |
| 21969.0          | V                   | 37.3                             | Ambient | 46.4                    | 2.1                  | -19.0                | -9.5                                       | 57.3                    | 74.0                    |
| 24410.0          | H                   | 35.5                             | Ambient | 46.2                    | 3.0                  | -15.9                | -9.5                                       | 59.3                    | 74.0                    |
| 24410.0          | V                   | 35.8                             | Ambient | 46.2                    | 3.0                  | -15.0                | -9.5                                       | 60.5                    | 74.0                    |

V – Vertical

H – Horizontal

Peak Total = Peak Meter Reading + Antenna Factor + Cable Loss + Preamp Gain + Distance Correction

Checked By : MARK E. LONGINOTTI



MANUFACTURER : Responsive Innovations  
MODEL NO. : RRLR-01  
SERIAL NO. : 3  
TEST SPECIFICATION : FCC 15.249, Radiated Emissions  
MODE : Transmit @ 2441MHz  
TEST DATE : July 31, 2006 through August 8, 2006  
TEST DISTANCE : 3 meters

| Frequency<br>MHz | Antenna<br>Polarity | Peak<br>Meter<br>Reading<br>dBuV | Ambient | Antenna<br>Factor<br>dB | Cable<br>Loss*<br>dB | Preamp<br>Gain<br>dB | Distance<br>Correction<br>Factor<br>dB | Duty<br>Cycle<br>Corr.<br>Factor<br>dB | Average<br>Total<br>dBuV/m | Average<br>Limit<br>dBuV/m |
|------------------|---------------------|----------------------------------|---------|-------------------------|----------------------|----------------------|----------------------------------------|----------------------------------------|----------------------------|----------------------------|
| 2441.0           | H                   | 70.5                             |         | 31.4                    | 3.5                  | 0.0                  | 0.0                                    | -40                                    | 65.4                       | 94                         |
| 2441.0           | V                   | 57.6                             |         | 31.4                    | 3.5                  | 0.0                  | 0.0                                    | -40                                    | 52.5                       | 94                         |
| 4882.0           | H                   | 22.5                             |         | 34.5                    | 5.0                  | 0.0                  | 0.0                                    | -40                                    | 22.0                       | 54                         |
| 4882.0           | V                   | 22.7                             |         | 34.5                    | 5.0                  | 0.0                  | 0.0                                    | -40                                    | 22.2                       | 54                         |
| 7323.0           | H                   | 48.1                             |         | 38.1                    | 0.8                  | -31.4                | 0.0                                    | -40                                    | 15.5                       | 54                         |
| 7323.0           | V                   | 47.3                             |         | 38.1                    | 0.8                  | -31.4                | 0.0                                    | -40                                    | 14.7                       | 54                         |
| 9764.0           | H                   | 41.2                             | Ambient | 39.9                    | 0.9                  | -31.9                | 0.0                                    | -40                                    | 10.1                       | 54                         |
| 9764.0           | V                   | 41.7                             | Ambient | 39.9                    | 0.9                  | -31.9                | 0.0                                    | -40                                    | 10.6                       | 54                         |
| 12205.0          | H                   | 42.0                             | Ambient | 41.4                    | 1.0                  | -30.4                | -9.5                                   | -40                                    | 4.5                        | 54                         |
| 12205.0          | V                   | 41.8                             | Ambient | 41.4                    | 1.0                  | -30.4                | -9.5                                   | -40                                    | 4.3                        | 54                         |
| 14646.0          | H                   | 42.3                             | Ambient | 44.1                    | 1.2                  | -29.9                | -9.5                                   | -40                                    | 8.1                        | 54                         |
| 14646.0          | V                   | 41.7                             | Ambient | 44.1                    | 1.2                  | -29.9                | -9.5                                   | -40                                    | 7.5                        | 54                         |
| 17087.0          | H                   | 42.7                             | Ambient | 44.5                    | 1.3                  | -30.5                | -9.5                                   | -40                                    | 8.5                        | 54                         |
| 17087.0          | V                   | 42.8                             | Ambient | 44.5                    | 1.3                  | -30.5                | -9.5                                   | -40                                    | 8.6                        | 54                         |
| 19528.0          | H                   | 36.5                             | Ambient | 45.8                    | 1.5                  | -20.9                | -9.5                                   | -40                                    | 13.4                       | 54                         |
| 19528.0          | V                   | 35.8                             | Ambient | 45.8                    | 1.5                  | -20.9                | -9.5                                   | -40                                    | 12.7                       | 54                         |
| 21969.0          | H                   | 37.6                             | Ambient | 46.4                    | 2.1                  | -19.0                | -9.5                                   | -40                                    | 17.6                       | 54                         |
| 21969.0          | V                   | 37.3                             | Ambient | 46.4                    | 2.1                  | -19.0                | -9.5                                   | -40                                    | 17.3                       | 54                         |
| 24410.0          | H                   | 35.5                             | Ambient | 46.2                    | 3.0                  | -15.9                | -9.5                                   | -40                                    | 19.3                       | 54                         |
| 24410.0          | V                   | 35.8                             | Ambient | 46.2                    | 3.0                  | -15.0                | -9.5                                   | -40                                    | 20.5                       | 54                         |

V – Vertical

H – Horizontal

Average Total = Peak Meter Reading + Antenna Factor + Cable Loss + Preamp Gain + Distance  
Correction Factor + Duty Cycle Correction Factor

Checked By : MARK E. LONGINOTTI



MANUFACTURER : Responsive Innovations  
MODEL NO. : RRLR-01  
SERIAL NO. : 3  
TEST SPECIFICATION : FCC 15.249, Radiated Emissions  
MODE : Transmit @ 2474MHz  
TEST DATE : July 31, 2006 through August 8, 2006  
TEST DISTANCE : 3 meters

| Frequency<br>MHz | Antenna<br>Polarity | Peak<br>Meter<br>Reading<br>dBuV | Ambient | Antenna<br>Factor<br>dB | Cable<br>Loss*<br>dB | Preamp<br>Gain<br>dB | Distance<br>Correctio<br>n<br>Factor<br>dB | Peak<br>Total<br>dBuV/m | Peak<br>Limit<br>dBuV/m |
|------------------|---------------------|----------------------------------|---------|-------------------------|----------------------|----------------------|--------------------------------------------|-------------------------|-------------------------|
| 2474.0           | H                   | 69.6                             |         | 31.4                    | 3.5                  | 0.0                  | 0.0                                        | 104.5                   | 114.0                   |
| 2474.0           | V                   | 56.5                             |         | 31.4                    | 3.5                  | 0.0                  | 0.0                                        | 91.4                    | 114.0                   |
| 4948.0           | H                   | 23.1                             |         | 34.5                    | 5.0                  | 0.0                  | 0.0                                        | 62.6                    | 74.0                    |
| 4948.0           | V                   | 25.4                             |         | 34.5                    | 5.0                  | 0.0                  | 0.0                                        | 64.9                    | 74.0                    |
| 7422.0           | H                   | 41.9                             | Ambient | 38.1                    | 0.8                  | -31.5                | 0.0                                        | 49.3                    | 74.0                    |
| 7422.0           | V                   | 41.3                             | Ambient | 38.1                    | 0.8                  | -31.5                | 0.0                                        | 48.7                    | 74.0                    |
| 9896.0           | H                   | 40.8                             | Ambient | 40.0                    | 0.9                  | -31.9                | 0.0                                        | 49.8                    | 74.0                    |
| 9896.0           | V                   | 40.4                             | Ambient | 40.0                    | 0.9                  | -31.9                | 0.0                                        | 49.4                    | 74.0                    |
| 12370.0          | H                   | 39.5                             | Ambient | 41.3                    | 1.1                  | -30.3                | -9.5                                       | 42.1                    | 74.0                    |
| 12370.0          | V                   | 40.5                             | Ambient | 41.3                    | 1.1                  | -30.3                | -9.5                                       | 43.1                    | 74.0                    |
| 14844.0          | H                   | 41.8                             | Ambient | 44.4                    | 1.2                  | -29.9                | -9.5                                       | 48.0                    | 74.0                    |
| 14844.0          | V                   | 42.3                             | Ambient | 44.4                    | 1.2                  | -29.9                | -9.5                                       | 48.5                    | 74.0                    |
| 17318.0          | H                   | 42.3                             | Ambient | 44.4                    | 1.3                  | -30.7                | -9.5                                       | 47.8                    | 74.0                    |
| 17318.0          | V                   | 42.2                             | Ambient | 44.4                    | 1.3                  | -30.7                | -9.5                                       | 47.7                    | 74.0                    |
| 19792.0          | H                   | 35.4                             | Ambient | 45.9                    | 1.0                  | -20.2                | -9.5                                       | 52.6                    | 74.0                    |
| 19792.0          | V                   | 36.7                             | Ambient | 45.9                    | 1.0                  | -20.2                | -9.5                                       | 53.9                    | 74.0                    |
| 22266.0          | H                   | 36.0                             | Ambient | 46.5                    | 3.0                  | -19.0                | -9.5                                       | 57.0                    | 74.0                    |
| 22266.0          | V                   | 36.4                             | Ambient | 46.5                    | 3.0                  | -19.0                | -9.5                                       | 57.4                    | 74.0                    |
| 24740.0          | H                   | 36.1                             | Ambient | 46.5                    | 8.8                  | -18.6                | -9.5                                       | 63.3                    | 74.0                    |
| 24740.0          | V                   | 36.0                             | Ambient | 46.5                    | 8.8                  | -18.6                | -9.5                                       | 63.2                    | 74.0                    |

V – Vertical

H – Horizontal

Peak Total = Peak Meter Reading + Antenna Factor + Cable Loss + Preamp Gain + Distance Correction

Checked By : MARK E. LONGINOTTI



MANUFACTURER : Responsive Innovations  
MODEL NO. : RRLR-01  
SERIAL NO. : 3  
TEST SPECIFICATION : FCC 15.249, Radiated Emissions  
MODE : Transmit @ 2474MHz  
TEST DATE : July 31, 2006 through August 8, 2006  
TEST DISTANCE : 3 meters

| Frequency<br>MHz | Antenna<br>Polarity | Peak<br>Meter<br>Reading<br>dBuV | Ambient | Antenna<br>Factor<br>dB | Cable<br>Loss*<br>dB | Preamp<br>Gain<br>dB | Distance<br>Correction<br>Factor<br>dB | Duty<br>Cycle<br>Corr.<br>Factor<br>dB | Average<br>Total<br>dBuV/m | Average<br>Limit<br>dBuV/m |
|------------------|---------------------|----------------------------------|---------|-------------------------|----------------------|----------------------|----------------------------------------|----------------------------------------|----------------------------|----------------------------|
| 2474             | H                   | 69.6                             |         | 31.4                    | 3.5                  | 0                    | 0                                      | -40                                    | 64.5                       | 94                         |
| 2474             | V                   | 56.5                             |         | 31.4                    | 3.5                  | 0                    | 0                                      | -40                                    | 51.4                       | 94                         |
| 4948             | H                   | 23.1                             |         | 34.5                    | 5                    | 0                    | 0                                      | -40                                    | 22.6                       | 54                         |
| 4948             | V                   | 25.4                             |         | 34.5                    | 5                    | 0                    | 0                                      | -40                                    | 24.9                       | 54                         |
| 7422.0           | H                   | 41.9                             | Ambient | 38.1                    | 0.8                  | -31.5                | 0                                      | -40                                    | 9.3                        | 54                         |
| 7422.0           | V                   | 41.3                             | Ambient | 38.1                    | 0.8                  | -31.5                | 0                                      | -40                                    | 8.7                        | 54                         |
| 9896.0           | H                   | 40.8                             | Ambient | 40.0                    | 0.9                  | -31.9                | 0                                      | -40                                    | 9.8                        | 54                         |
| 9896.0           | V                   | 40.4                             | Ambient | 40.0                    | 0.9                  | -31.9                | 0                                      | -40                                    | 9.4                        | 54                         |
| 12370.0          | H                   | 39.5                             | Ambient | 41.3                    | 1.1                  | -30.3                | -9.5                                   | -40                                    | 2.1                        | 54                         |
| 12370.0          | V                   | 40.5                             | Ambient | 41.3                    | 1.1                  | -30.3                | -9.5                                   | -40                                    | 3.1                        | 54                         |
| 14844.0          | H                   | 41.8                             | Ambient | 44.4                    | 1.2                  | -29.9                | -9.5                                   | -40                                    | 8.0                        | 54                         |
| 14844.0          | V                   | 42.3                             | Ambient | 44.4                    | 1.2                  | -29.9                | -9.5                                   | -40                                    | 8.5                        | 54                         |
| 17318.0          | H                   | 42.3                             | Ambient | 44.4                    | 1.3                  | -30.7                | -9.5                                   | -40                                    | 7.8                        | 54                         |
| 17318.0          | V                   | 42.2                             | Ambient | 44.4                    | 1.3                  | -30.7                | -9.5                                   | -40                                    | 7.7                        | 54                         |
| 19792.0          | H                   | 35.4                             | Ambient | 45.9                    | 1.0                  | -20.2                | -9.5                                   | -40                                    | 12.6                       | 54                         |
| 19792.0          | V                   | 36.7                             | Ambient | 45.9                    | 1.0                  | -20.2                | -9.5                                   | -40                                    | 13.9                       | 54                         |
| 22266.0          | H                   | 36.0                             | Ambient | 46.5                    | 3.0                  | -19.0                | -9.5                                   | -40                                    | 17.0                       | 54                         |
| 22266.0          | V                   | 36.4                             | Ambient | 46.5                    | 3.0                  | -19.0                | -9.5                                   | -40                                    | 17.4                       | 54                         |
| 24740.0          | H                   | 36.1                             | Ambient | 46.5                    | 8.8                  | -18.6                | -9.5                                   | -40                                    | 23.3                       | 54                         |
| 24740.0          | V                   | 36.0                             | Ambient | 46.5                    | 8.8                  | -18.6                | -9.5                                   | -40                                    | 23.2                       | 54                         |

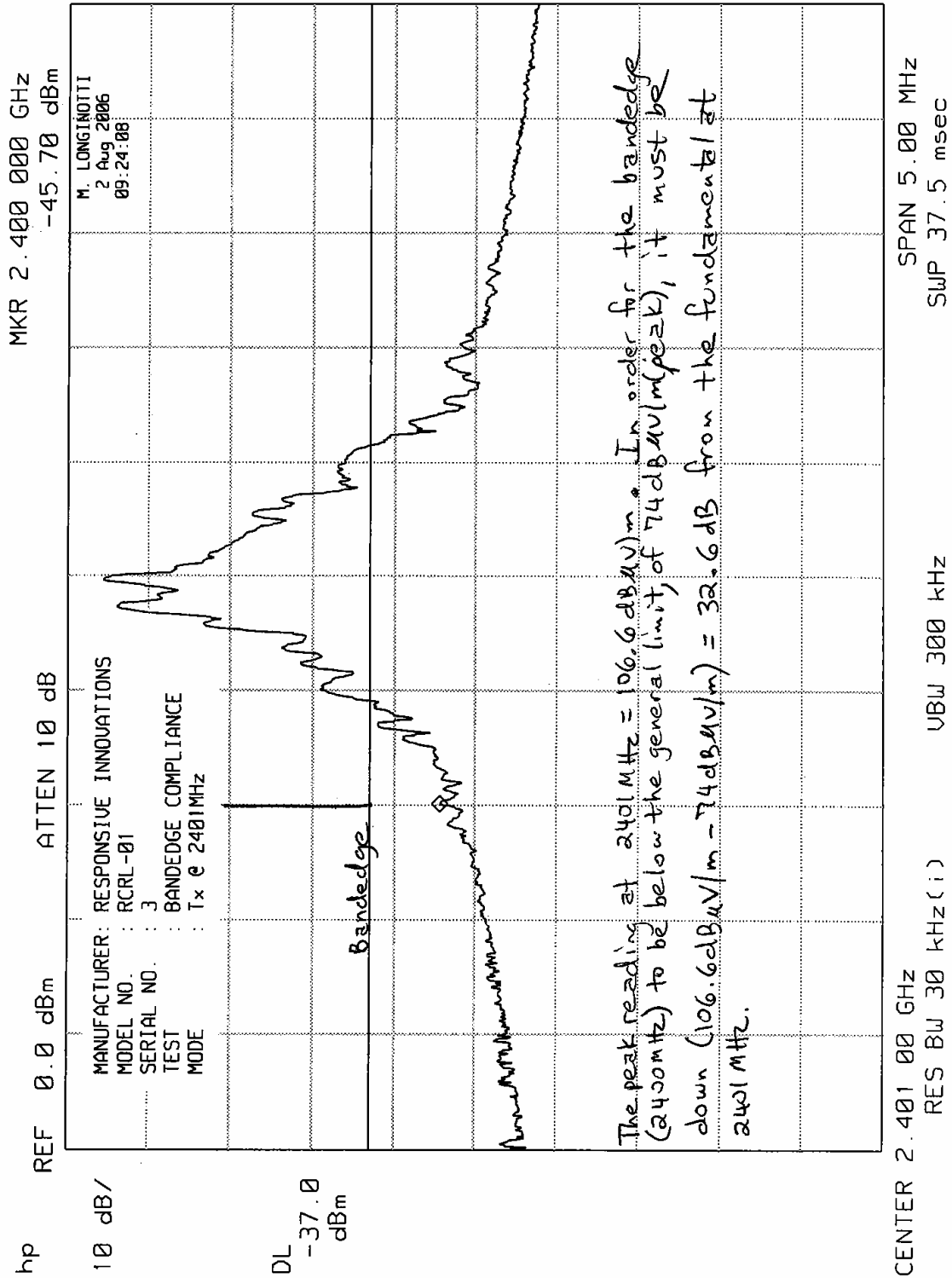
V – Vertical

H – Horizontal

Average Total = Peak Meter Reading + Antenna Factor + Cable Loss + Preamp Gain + Distance  
Correction Factor + Duty Cycle Correction Factor

Checked By : MARK E. LONGINOTTI

ELITE ELECTRONIC ENGINEERING Inc.



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