Measurement of RF Interference from a Model RCXR-01 Transceiver and Computer Peripheral

For : Responsive Innovations
Akron, OH

P.O. No. : 2005
Date Received : April 23, 2007
Date Tested : April 23, 2007 through April 30, 2007
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
—	May 4, 2007	Initial release

Measurement of RF Emissions from a Transceiver and Computer Peripheral, Model No. RCXR-01

1 INTRODUCTION

1.1 Description of Test Item

This document represents the results of the series of radio interference measurements performed on a transceiver and Computer Peripheral, Model No. RCXR-01, (hereinafter referred to as the test item). Serial No. 1 was programmed to transmit continuously. Serial Nos. 2 and 3 were programmed to continuously talk to the laptop computer via the USB cable. The test item was designed to transmit and receive in the 2401MHz to 2482MHz band using an internal, non-detachable antenna. The test item could transmit long data packets in the frequency range of 2409MHz to 2482MHz. The test item could transmit short data packets in the frequency range of 2401MHz to 2474MHz. When connected to a computer via a USB cable, the test item can only communicate with the computer via the USB cable. (The test item cannot transmit or receive data when connected to a computer via a USB cable). 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 2005
- 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 EMC Laboratory 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 22°C and the relative humidity was 33%.

2 TEST ITEM SET-UP AND OPERATION

The test item is a transceiver, Model No. RCXR-01. A block diagram of the test item set-up is shown as Figure 1. A photograph of the test item is shown as Figure 2.

2.1 Power Input

The test item, when operating as a transceiver, obtained 3VDC power from 2 “AAA” batteries. The test item, when operating as a computer peripheral, obtained 3VDC 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 (only used when the test item was configured as a computer peripheral device):

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	1.5m Standard USB Cable used for radiated emissions

2.5 Operational Mode

For conducted emissions and radiated emissions tests with the test item operating as a computer peripheral, 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 1.5m long USB cable. Conducted emissions tests were performed with the test item operating as a computer peripheral.

Also for radiated emissions tests, the test item was placed on an 80cm high non-conductive stand. The test item was programmed so that it could transmit continuously. Tests were performed separately with the test item transmitting large data packets at 2409MHz, 2441MHz, and 2482MHz. Additional tests were performed with the test item transmitting small data packets at 2401MHz 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 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 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 REQUIREMENTS, PROCEDURES AND RESULTS

4.1 Powerline Conducted Emissions

4.1.1 Computer Peripheral Device

4.1.1.1 Requirements

All radio frequency voltages on the power lines of a Class B device shall be below the values shown below when using a quasi-peak detector:

CONDUCTED LIMITS FOR CLASS B DEVICE

Frequency MHz	RFI Voltage dBuV(QP)	RFI Voltage dBuV(Average)
0.15-0.5	66 decreasing with logarithm of frequency to 56	56 decreasing with logarithm of frequency to 46
0.5-5	56	46
5-30	60	50

Note 1: The lower limit shall apply at the transition frequencies.
Note 2: If the levels measured using the QP detector meet both the QP and the Average limits, the test item is considered to have met both requirements and measurements do not need to be performed using the Average detector.

4.1.1.2 Procedures

The interference on each power lead 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.

4.1.1.3 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 19 and 20. The conducted limits for Class B devices are shown as a reference. The final quasi-peak results are presented on pages 21 and 22.

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 operating as a peripheral device, are presented on pages 23 and 24. The conducted limits for Class B devices are shown as a reference. The final quasi-peak results are presented on pages 25 and 26.

As can be seen from the data, all conducted emission levels met the requirements for Class B devices. The emissions level closest to the limit (worst case) occurred at 621kHz. The emissions level at this frequency was 5.7dB within the limit. Photographs of the test configuration which yielded the highest or worst case, conducted emission levels are shown on Figure 3.

4.1.2 Receiver

4.1.2.1 Requirements

Since the test item was powered by internal batteries, no conducted emissions tests were performed.

4.1.3 Transmitter

4.1.3.1 Requirements

Since the test item was powered by internal batteries, no conducted emissions tests were performed.

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 2409MHz, 2441MHz, and 2482MHz are shown on data pages 27 through 29. The duty cycle factor was computed to be -33.98dB at 2409MHz and 2441MHz. The duty cycle factor was computed to be -30.46dB at 2482MHz.

4.3 Radiated Measurements

4.3.1 Computer Peripheral Device

4.3.1.1 Requirements

All emanations from a Class B device shall be below the levels shown on the following table.

RADIATION LIMITS FOR CLASS B DEVICE

Frequency MHz	Distance between Test Item And Antenna in Meters	Field Strength uV/m	Field Strength dBuV/m
30-88	3	100	40
88-216	3	150	43.5
216-960	3	200	46
Above 960	3	500	54

Note: The tighter limit shall apply at the edge between the two frequency bands.

The laptop computer that was used to communicate with the test item was equipped with a microprocessor that operated at a frequency of 300MHz. In accordance with 47 CFR 15.33 radiated emissions measurements were made up to 2GHz.

4.3.1.2 Procedures

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2003 for site attenuation.

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.

Since a quasi-peak detector requires long integration times, it is not practical to automatically sweep through the quasi-peak levels. Therefore, radiated emissions from the test item were first scanned using a peak detector and automatically plotted. The frequencies where significant emission levels were noted were then remeasured using the quasi-peak detector.

Since a quasi-peak detector and an average detector require long integration times, it is not practical to automatically sweep through the quasi-peak and average levels. Therefore, radiated emissions from the test item were first scanned using a peak detector and automatically plotted. The frequencies where significant emission levels were noted were then remeasured using the quasi-peak detector or average detector.

The broadband measuring antenna was positioned at a 3 meter distance from the test item. The frequency range from 30MHz to 1GHz was investigated using a peak detector function with the bilog antenna at several heights, horizontal and vertical polarization, and with several different orientations of the test item with respect to the antenna. The frequency range from 1GHz to 2GHz was investigated using a peak detector function with the double ridged waveguide antenna at several heights, horizontal and vertical polarization, and with several different orientations of the test item with respect to the antenna. The maximum levels for each antenna polarization were plotted.

1) Measurements from 30MHz to 1GHz were made using a quasi-peak detector and a broadband bilog antenna. Measurements above 1GHz were made using an average detector and a broadband double ridged waveguide antenna.

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

a) The test item was rotated so that all of its sides were exposed to the receiving antenna.

b) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.

c) The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.

d) 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.

4.3.1.3 Results

The preliminary plots from 30MHz to 1GHz are presented on pages 30 and 31. The plots are presented for a reference only, and are not used to determine compliance. The final radiated levels from 30MHz to 1GHz are presented on page 32.

The preliminary plots from 1GHz to 2GHz are presented on pages 33 and 34. The plots are presented for a reference only, and are not used to determine compliance. The final radiated levels from 1GHz to 2GHz are presented on page 35.

As can be seen from the data, all emissions measured from the test item were within the specification limits. The emissions level closet to the limit (worst case) occurred at 632.97MHz. The emissions level at this frequency was 4.4dB within the limit. See data page 32 for details. Photographs of the test configuration which yielded the highest or worst case, radiated emission levels are shown on Figure 4 and Figure 5.

4.3.2 Receiver

4.3.2.1 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 were performed with the test item operating in the receive mode.

4.3.3 Transmitter

4.3.3.1 Requirements

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 Frequency MHz	Field Intensity uV/m @ 3 meters	Field Strength Harmonics and 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 mot exceed the maximum permitted average limits by more than 20 dB under any condition of modulation.

4.3.3.2 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 25GHz 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.

4.3.3.3 Results

The preliminary plots, with the test item transmitting at 2409MHz are presented on pages 36 through 39. The plots are presented for a reference only, and are not used to determine compliance. The final radiated levels, are presented on pages 40 and 41. As can be seen from the data, all emissions measured from the test item were within the specification limits. The emissions level closet to the limit (worst case) occurred at 7227MHz. The emissions level at this frequency was 16.3dB within the limit.

The preliminary plots, with the test item transmitting at 2441MHz are presented on pages 42 through 45. The plots are presented for a reference only, and are not used to determine compliance. The final radiated levels, are presented on pages 46 and 47. As can be seen from the data, all emissions measured from the test item were within the specification limits. The emissions level closet to the limit (worst case) occurred at 2441MHz. The emissions level at this frequency was 14.0dB within the limit.

The preliminary plots, with the test item transmitting at 2482MHz are presented on pages 48 through 51. The plots are presented for a reference only, and are not used to determine compliance. The final radiated levels are presented on pages 52 and 53. As can be seen from the data, all emissions measured from the test item were within the specification limits. The emissions level closet to the limit (worst case) occurred at 7446MHz. The emissions level at this frequency was 14.4dB within the limit.

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 54 and 55 show the radiated band-edge compliance results with the test item transmitting short data packets. The testing was performed using the marker-delta method. As can be seen from these plots, the emissions at the band-edge are within the general limits.

Pages 56 and 57 show the radiated band-edge compliance results with the test item transmitting long data packets. The testing was performed 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 909 kHz.

5 CONCLUSIONS

It was determined that the Responsive Innovations Transceiver, Model No. RCXR-01, (Serial No. 1 was programmed to transmit continuously. Serial Nos. 2 and 3 were programmed to continuously talk to the laptop computer via the USB cable.) 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, for receivers and computer peripherals 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 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 ENDORSEMENT DISCLAIMER

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

8 EQUIPMENT LIST

Table 8-1: 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								
XOB1	ADAPTER	HEWLETT PACKARD	K281C	10422	18-26.5GHZ		NOTE 1	
XPR0	HIGH PASS FILTER	K&L MICROWAVE	11SH10-4800/	001	4.8-20GHZ	07/27/06	12	07/27/07
XZG4	ATTENUATOR/SWITCH DRIVER	HEWLETT PACKARD	11713A	2223A01683	---		N/A	
Equipment Type: AMPLIFIERS								
APK4	PREAMPLIFIER OPT H02	HEWLETT PACKARD	8449B	3008A00329	1-26.5GHZ	03/12/07	12	03/12/08
APW0	PREAMPLIFIER	PLANAR ELECTRON	PE2-30-20G20	PL2926/0646	20GHZ-26.5GHZ	11/27/06	12	11/27/07
APW3	PREAMPLIFIER	PLANAR ELECTRON	PE2-35-120-5	PL2924	1GHZ-20GHZ	11/27/06	12	11/27/07
Equipment Type: ANTENNAS								
NHG0	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ		NOTE 1	
NTA0	BILOG ANTENNA	CHASE EMC LTD.	BILOG CBL611	2057	0.03-2GHZ	08/21/06	12	08/21/07
NWF0	RIDGED WAVE GUIDE	EMCO	3105	2035	1-12.4GHZ	10/09/06	12	10/09/07
NWI1	RIDGED WAVE GUIDE	AEL	H1498	154	2-18GHZ	10/09/06	12	10/09/07
Equipment Type: ATTENUATORS								
T1EA	10DB, 25W ATTENUATOR	WEINSCHEL	46-10-34	BN2316	DC-18GHZ	03/22/07	12	03/22/08
Equipment Type: CONTROLLERS								
CDS2	COMPUTER	GATEWAY	MFATXPNT NMZ	0028483108	1.8GHZ		N/A	
CMA0	MULTI-DEVICE CONTROLLER	EMCO	2090	9701-1213	---		N/A	
Equipment Type: PROBES; CLAMP-ON & LISNS								
PLL9	50UH LISN 462D	ELITE	462D/70A	010	0.01-400MHZ	03/08/07	12	03/08/08
PLLA	50UH LISN 462D	ELITE	462D/70A	011	0.01-400MHZ	03/08/07	12	03/08/08
Equipment Type: POWER SUPPLIES								
SRA7	DC POWER SUPPLY	TEKPOWER	HY3005D	0023471			NOTE 1	
Equipment Type: PRINTERS AND PLOTTERS								
HRE1	LASER JET 5P	HEWLETT PACKARD	C3150A	USHB061052	---		N/A	
Equipment Type: RECEIVERS								
RACA	RF PRESELECTOR	HEWLETT PACKARD	85685A	2926A00980	20HZ-2GHZ	02/16/07	12	02/16/08
RAEC	SPECTRUM ANALYZER	HEWLETT PACKARD	8566B	3014A06690	100HZ-22GHZ	02/16/07	12	02/16/08
RAF5	QUASIPEAK ADAPTOR W/ RECEI	HEWLETT PACKARD	85650A	2043A00151	0.01-1000MHZ	02/16/07	12	02/16/08
RAKG	RF SECTION	HEWLETT PACKARD	85462A	3549A00284	0.009-6500MHZ	11/27/06	12	11/27/07
RAKH	RF FILTER SECTION	HEWLETT PACKARD	85460A	3448A00324	---	11/27/06	12	11/27/07
RBB0	EMI TEST RECEIVER 20HZ TO	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	09/29/06	12	09/29/07

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.

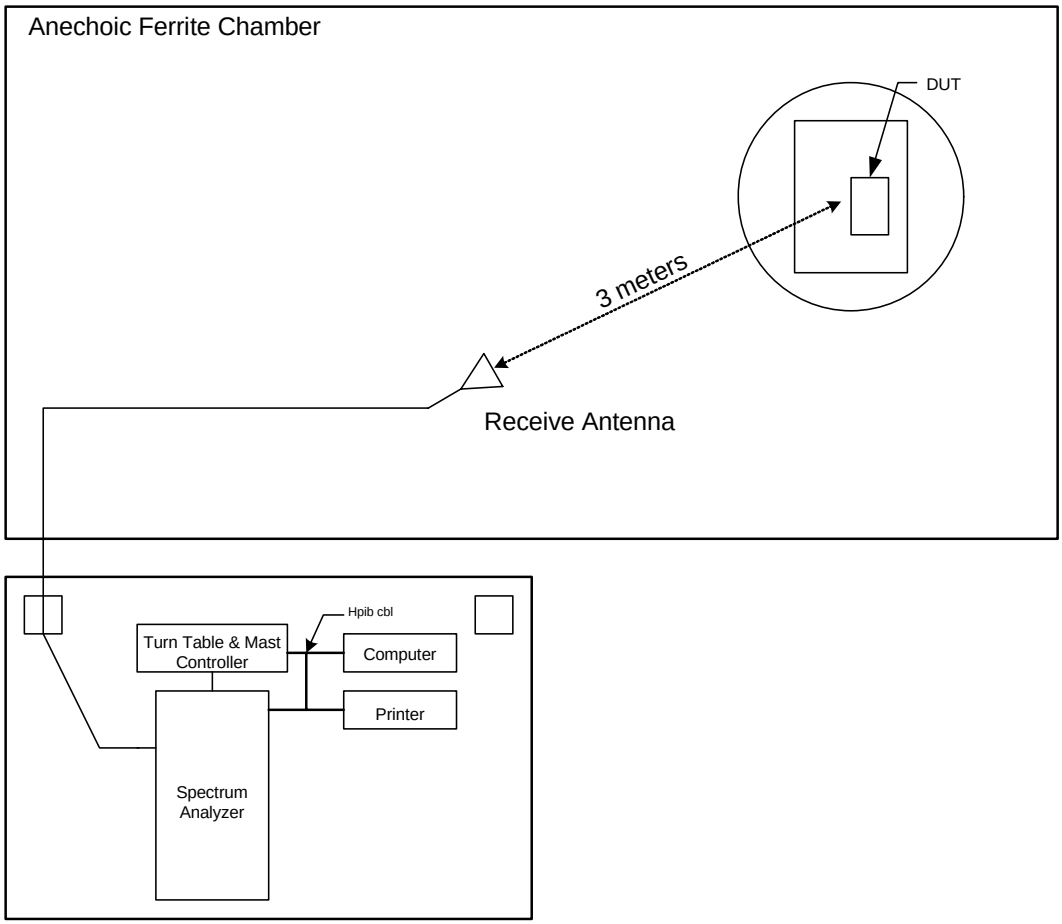


FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

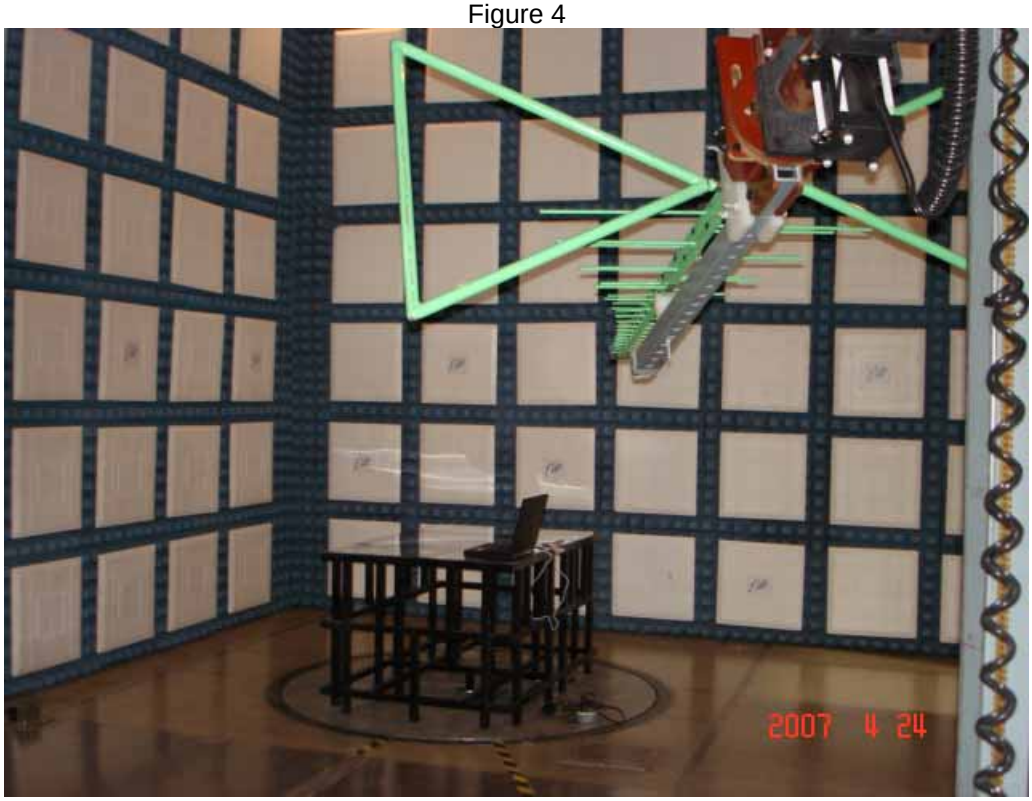
Figure 2

Test Item Setup

Figure 3

Test Setup for Conducted Emissions

Figure 4



Test Setup for Radiated Emissions, 30MHz to 1 GHz – Horizontal Polarization

Test Setup for Radiated Emissions, 30MHz to 1 GHz – Vertical Polarization

Figure 5

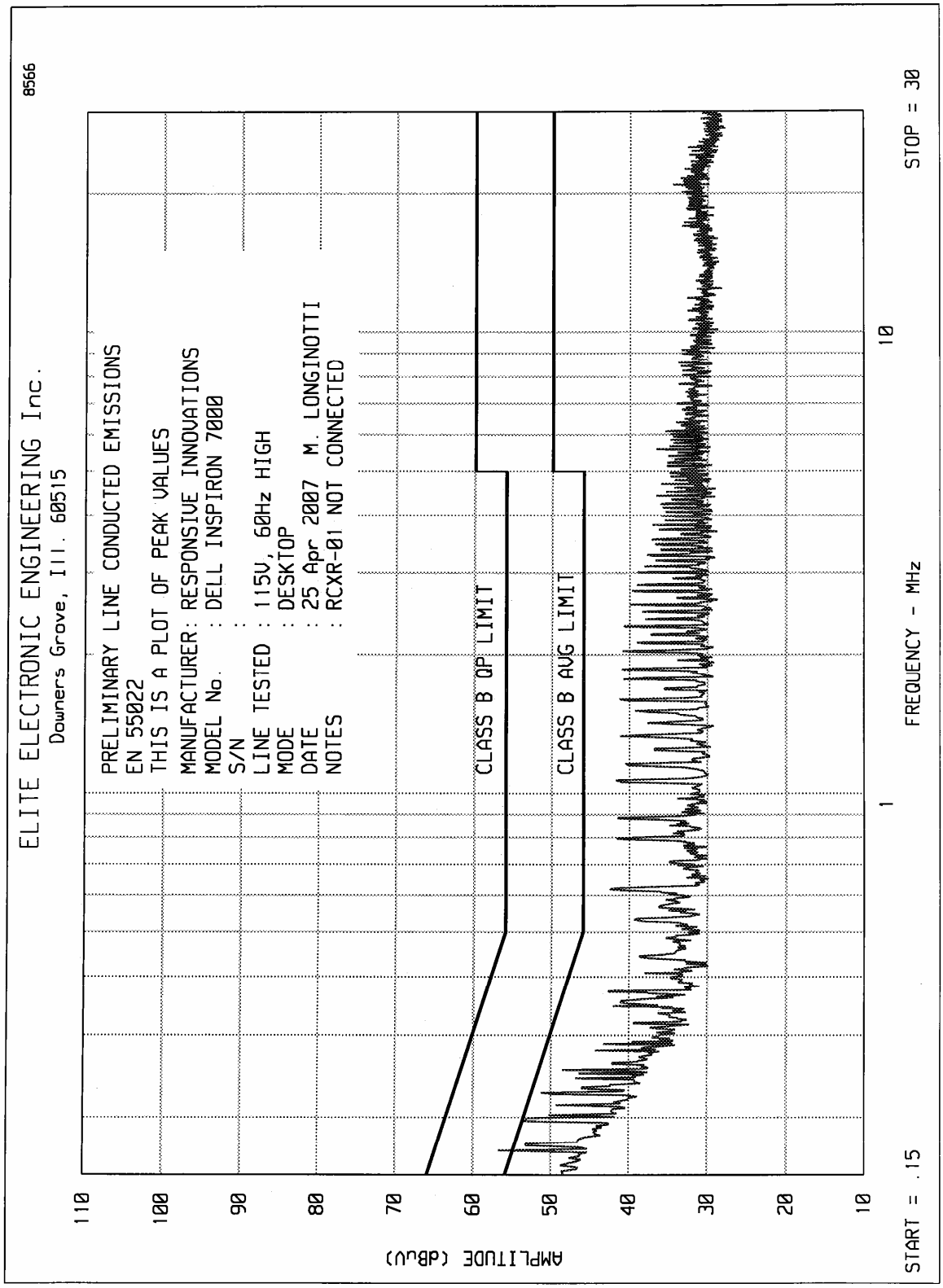
Test Setup for Radiated Emissions, 1 GHz to 2GHz – Horizontal Polarization

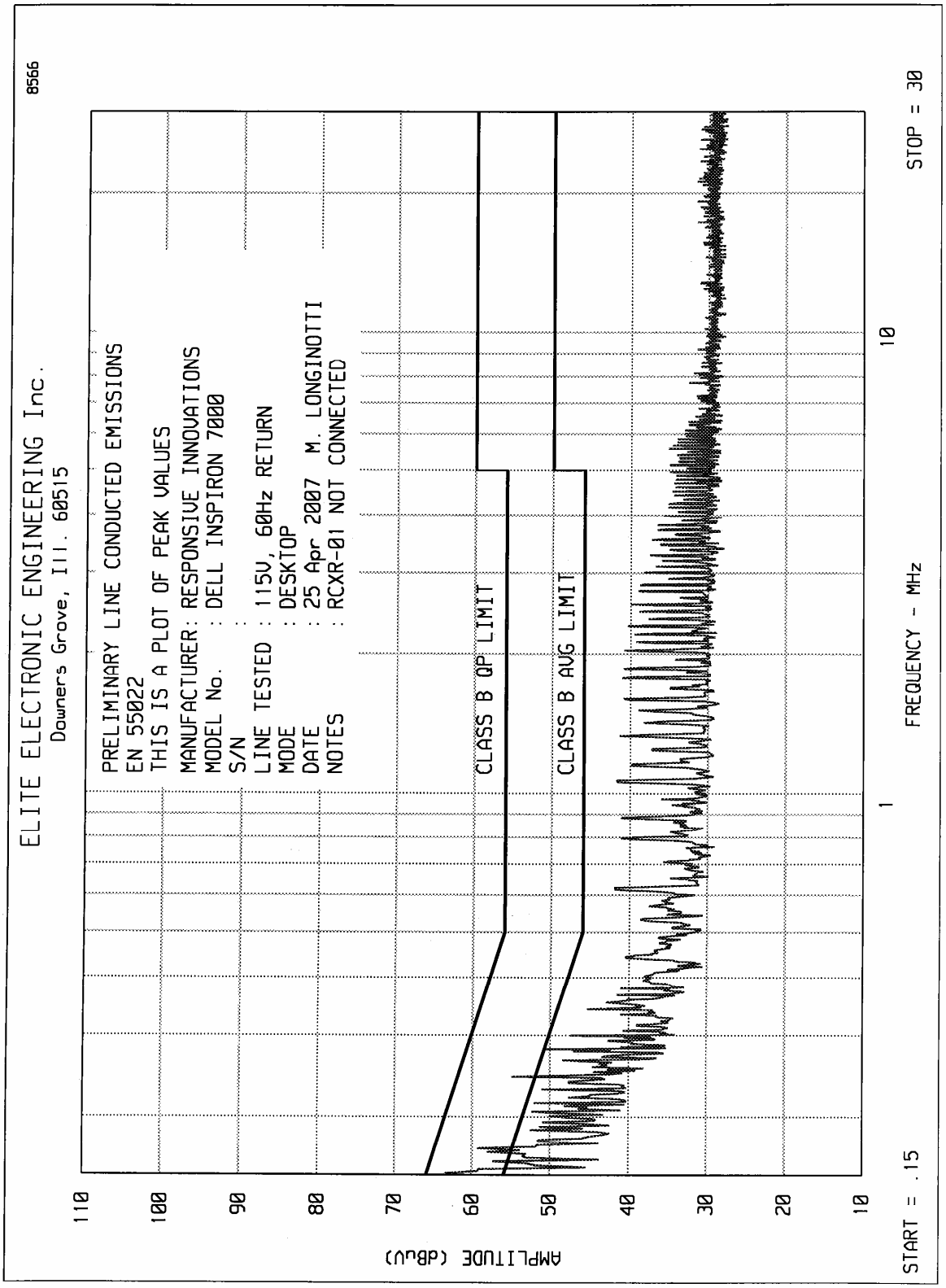
Test Setup for Radiated Emissions, 1 GHz to 2GHz – Vertical Polarization

Figure 6

Test Setup for Radiated Emissions, 2GHz to 18GHz – Horizontal Polarization

Test Setup for Radiated Emissions, 2GHz to 18GHz – Vertical Polarization


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
8566
PRELIMINARY LINE CONDUCTED EMISSIONS
EN 55022
THIS IS A PLOT OF PEAK VALUES
MANUFACTURER: RESPONSIVE INNOVATIONS
MODEL No. : DELL INSPIRON 7000
S/N : :
LINE TESTED : 115V, 60Hz HIGH
MODE : DESKTOP
DATE : 25 Apr 2007 M. LONGINOTTI
NOTES : RCXR-01 NOT CONNECTED
CLASS B QP LIMIT
CLASS B AVG LIMIT
AMPLITUDE (dBuV)
110
100
90
80
70
60
50
40
30
20
10
START = .15
1
10
STOP = 30
FREQUENCY - MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
8566
PRELIMINARY LINE CONDUCTED EMISSIONS
EN 55022
THIS IS A PLOT OF PEAK VALUES
MANUFACTURER: RESPONSIVE INNOVATIONS
MODEL No. : DELL INSPIRON 7000
S/N : :
LINE TESTED : 115V, 60Hz RETURN
MODE : DESKTOP
DATE : 25 Apr 2007 M. LONGINOTTI
NOTES : RCXR-01 NOT CONNECTED
CLASS B QP LIMIT
CLASS B AVG LIMIT
AMPLITUDE (dBuV)
110
100
90
80
70
60
50
40
30
20
10
START = .15
1
10
STOP = 30
FREQUENCY - MHz

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 : 25 Apr 2007
NOTES : RCXR-01 NOT CONNECTED
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

FREQUENCY MHz	METER RDG. dBuV	QP LIMIT dBuV	AVG RDG dBuV	AVG LIMIT dBuV	NOTES
.179	39.5	64.6		54.6	
.254	30.7	61.6		51.6	
.356	39.5	58.8		48.8	
.362	27.5	58.7		48.7	
.621	40.6	56.0		46.0	
.798	39.5	56.0		46.0	
.886	39.6	56.0		46.0	
1.063	40.0	56.0		46.0	
1.329	40.1	56.0		46.0	
1.859	39.0	56.0		46.0	
2.301	38.8	56.0		46.0	
2.566	38.3	56.0		46.0	
3.008	37.2	56.0		46.0	
3.273	36.9	56.0		46.0	
4.422	33.9	56.0		46.0	
6.102	32.6	60.0		50.0	
8.959	28.2	60.0		50.0	
12.197	27.5	60.0		50.0	
16.259	27.3	60.0		50.0	
18.492	27.8	60.0		50.0	
20.829	28.1	60.0		50.0	
24.149	27.4	60.0		50.0	
28.238	26.8	60.0		50.0	

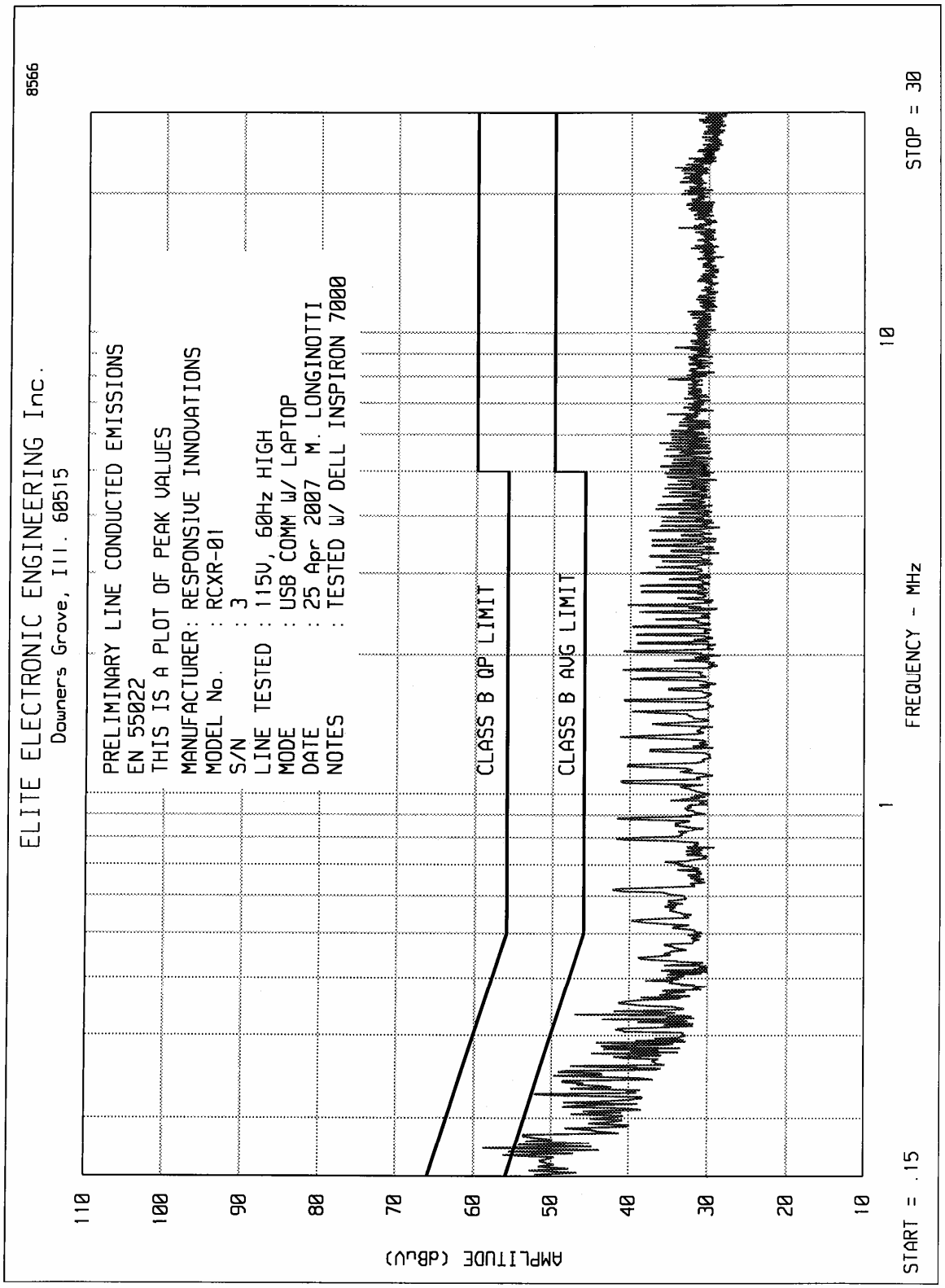
CHECKED BY: Mark E Longinotti
M. LONGINOTTI

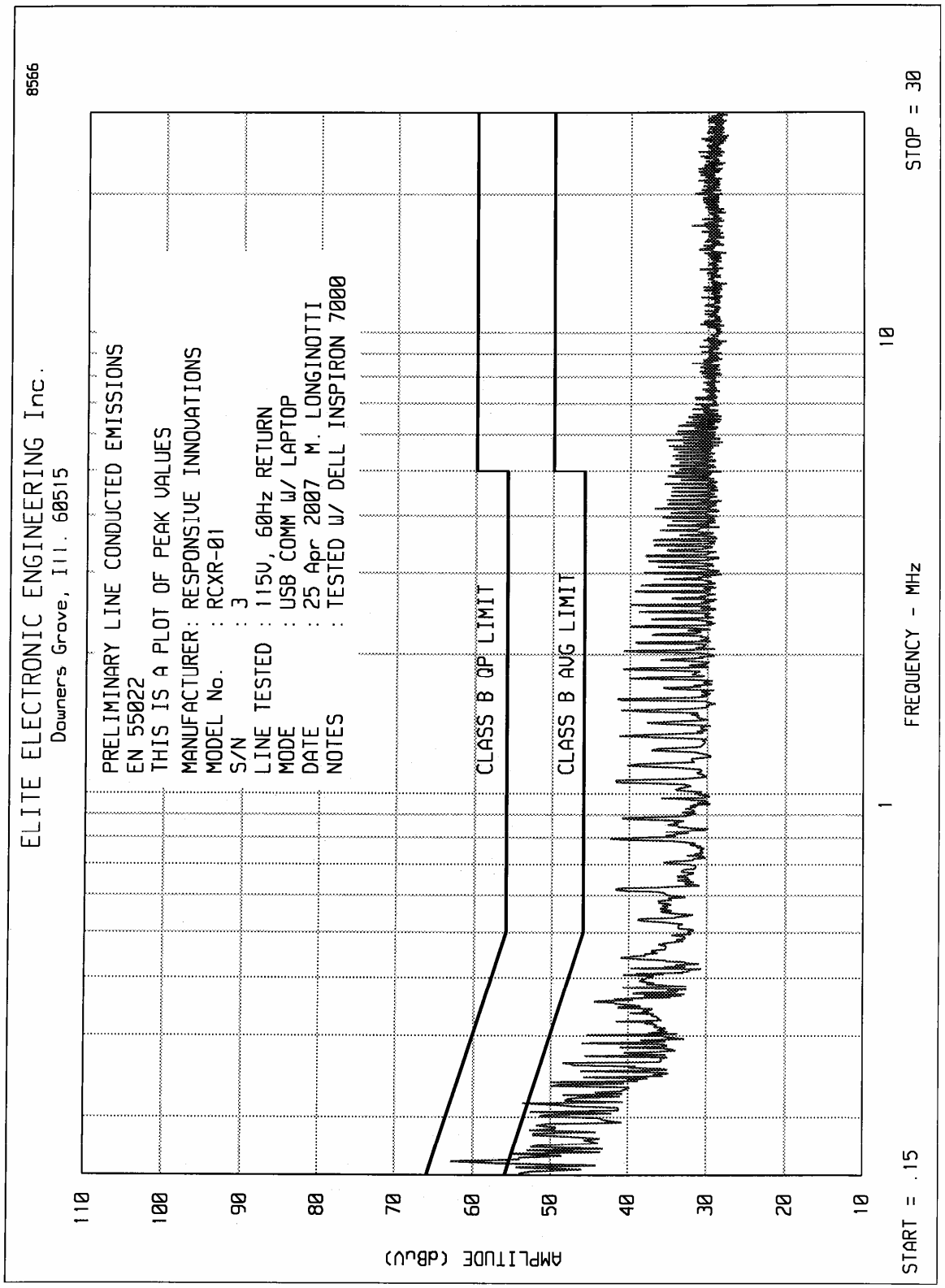
ETR No.
ELITE ELECTRONIC ENGINEERING CO.

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 : 25 Apr 2007
NOTES : RCXR-01 NOT CONNECTED
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

FREQUENCY MHz	METER RDG. dBuV	QP LIMIT dBuV	AVG RDG dBuV	AVG LIMIT dBuV	NOTES
.150	39.5	66.0		56.0	
.178	40.5	64.6		54.6	
.269	29.4	61.1		51.1	
.356	39.4	58.8		48.8	
.621	40.3	56.0		46.0	
.799	39.4	56.0		46.0	
.887	39.6	56.0		46.0	
1.064	40.0	56.0		46.0	
1.771	38.7	56.0		46.0	
2.036	39.4	56.0		46.0	
2.567	38.3	56.0		46.0	
3.009	37.3	56.0		46.0	
4.158	33.5	56.0		46.0	
4.512	33.2	56.0		46.0	
6.103	32.1	60.0		50.0	
9.197	27.5	60.0		50.0	
12.723	26.6	60.0		50.0	
15.472	26.8	60.0		50.0	
18.137	26.8	60.0		50.0	
21.665	27.1	60.0		50.0	
24.864	26.6	60.0		50.0	
27.424	26.5	60.0		50.0	

CHECKED BY: M. LONGINOTTI


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
8566
PRELIMINARY LINE CONDUCTED EMISSIONS
EN 55022
THIS IS A PLOT OF PEAK VALUES
MANUFACTURER: RESPONSIVE INNOVATIONS
MODEL No. : RCXR-01
S/N : 3
LINE TESTED : 115V, 60Hz HIGH
MODE : USB COMM W/ LAPTOP
DATE : 25 Apr 2007 M. LONGINOTTI
NOTES : TESTED W/ DELL INSPIRON 7000
CLASS B QP LIMIT
CLASS B AVG LIMIT
AMPLITUDE (dBuV)
110
100
90
80
70
60
50
40
30
20
10
START = .15
1
10
STOP = 30
FREQUENCY - MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
8566
PRELIMINARY LINE CONDUCTED EMISSIONS
EN 55022
THIS IS A PLOT OF PEAK VALUES
MANUFACTURER: RESPONSIVE INNOVATIONS
MODEL No. : RCXR-01
S/N : 3
LINE TESTED : 115V, 60Hz RETURN
MODE : USB COMM W/ LAPTOP
DATE : 25 Apr 2007 M. LONGINOTTI
NOTES : TESTED W/ DELL INSPIRON 7000
CLASS B QP LIMIT
CLASS B AVG LIMIT
AMPLITUDE (dBuV)
110
100
90
80
70
60
50
40
30
20
10
START = .15
1
10
STOP = 30
FREQUENCY - MHz

ETR No.
ELITE ELECTRONIC ENGINEERING CO.

MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL : RCXR-01
S/N : 3
SPECIFICATION : EN 55022, CLASS B
TEST : LINE CONDUCTED EMISSIONS
LINE TESTED : 115V, 60Hz HIGH
MODE : USB COMM W/ LAPTOP
DATE : 25 Apr 2007
NOTES : TESTED W/ DELL INSPIRON 7000
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

FREQUENCY MHz	METER RDG. dBuV	QP LIMIT dBuV	AVG RDG dBuV	AVG LIMIT dBuV	NOTES
.171	42.1	64.9		54.9	
.250	34.0	61.8		51.8	
.356	39.3	58.8		48.8	
.621	40.3	56.0		46.0	
.798	39.7	56.0		46.0	
.886	39.3	56.0		46.0	
1.328	40.0	56.0		46.0	
1.593	39.5	56.0		46.0	
1.859	38.9	56.0		46.0	
2.300	38.6	56.0		46.0	
2.566	38.2	56.0		46.0	
3.007	37.4	56.0		46.0	
4.157	34.1	56.0		46.0	
4.510	33.3	56.0		46.0	
6.631	29.9	60.0		50.0	
9.283	29.8	60.0		50.0	
11.845	27.4	60.0		50.0	
15.206	27.1	60.0		50.0	
19.371	27.9	60.0		50.0	
21.127	28.2	60.0		50.0	
24.668	27.0	60.0		50.0	
26.959	26.8	60.0		50.0	

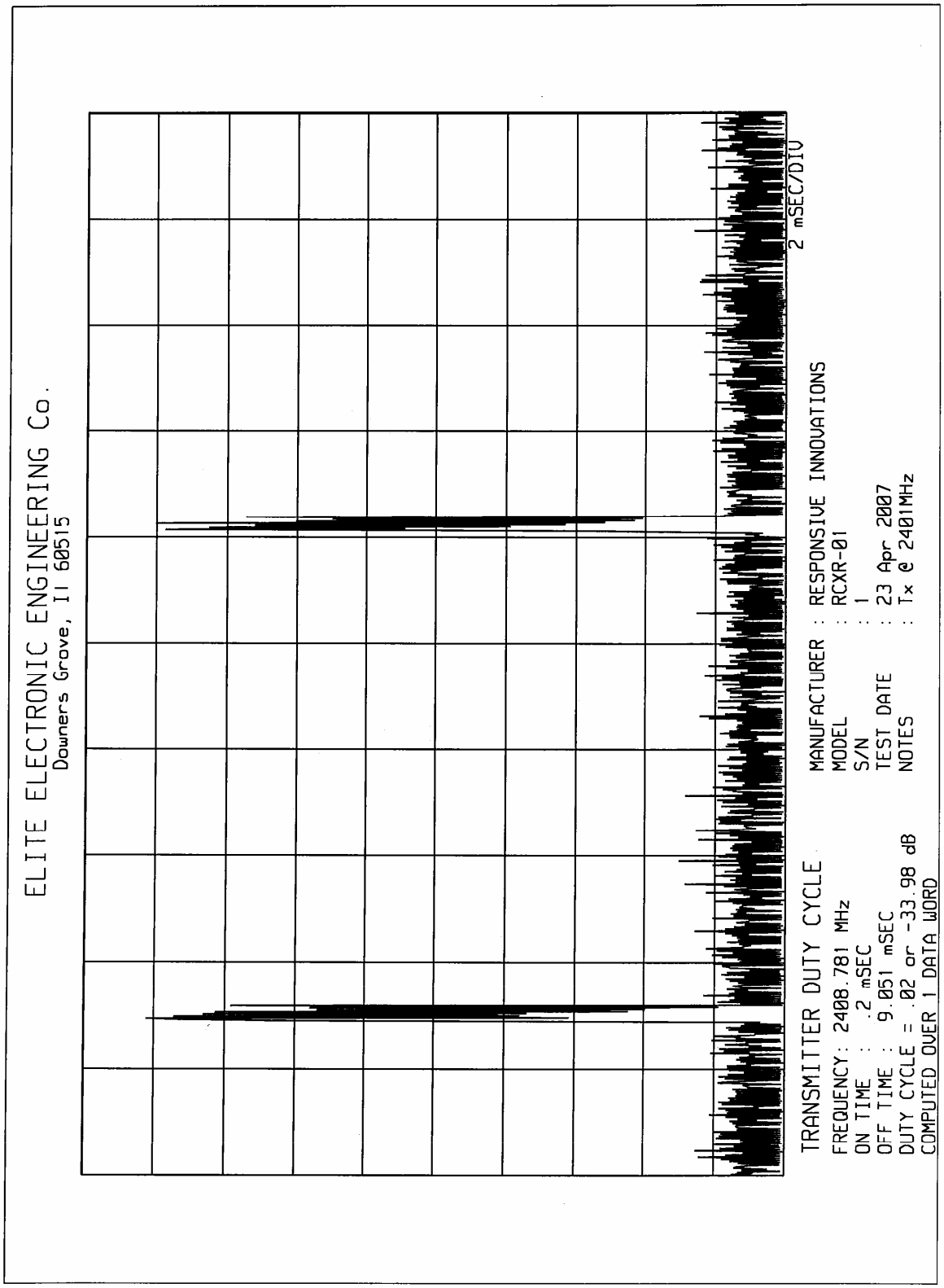
CHECKED BY: Mark E Longinotti
M. LONGINOTTI

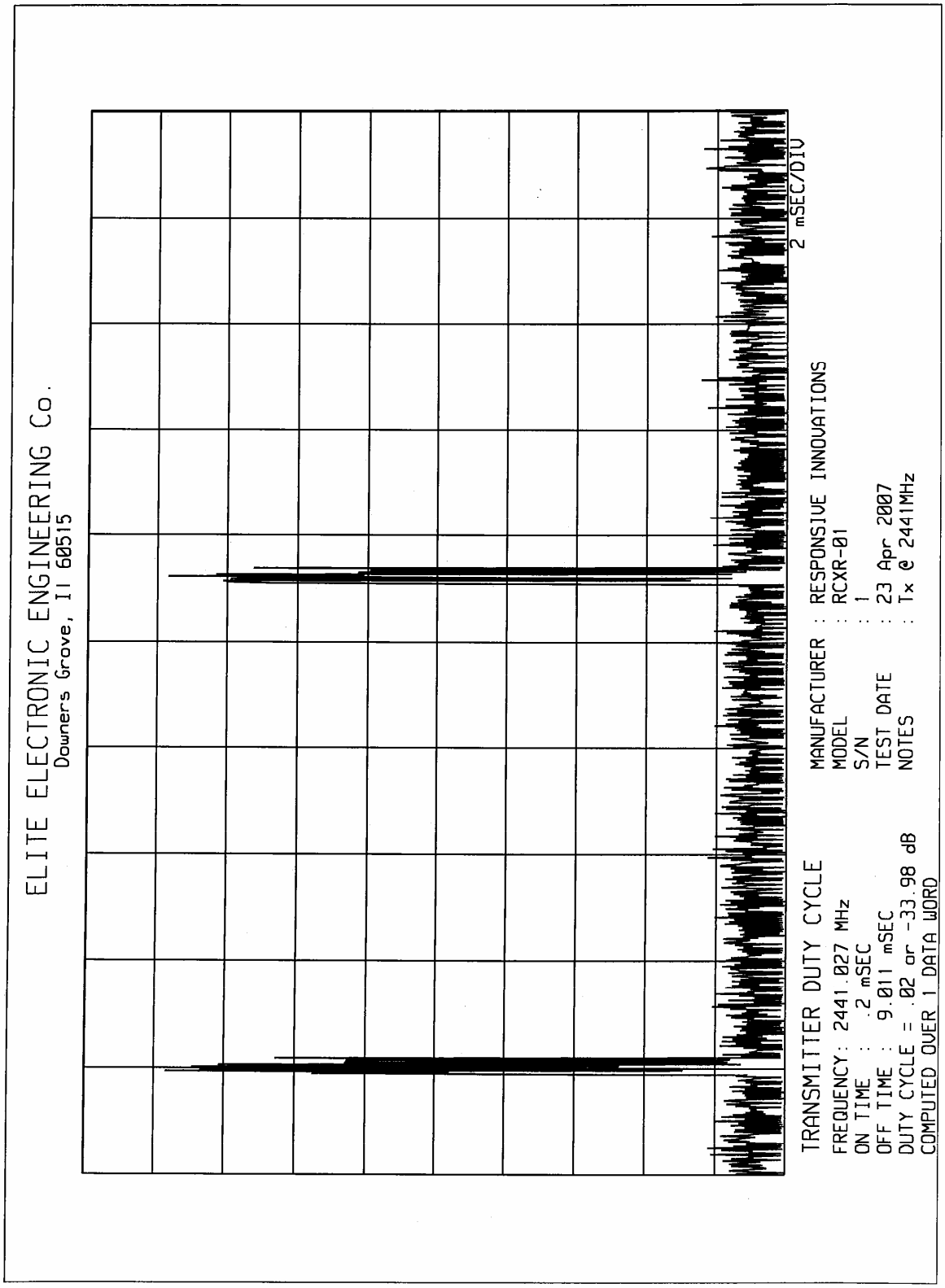
ETR No.
ELITE ELECTRONIC ENGINEERING CO.

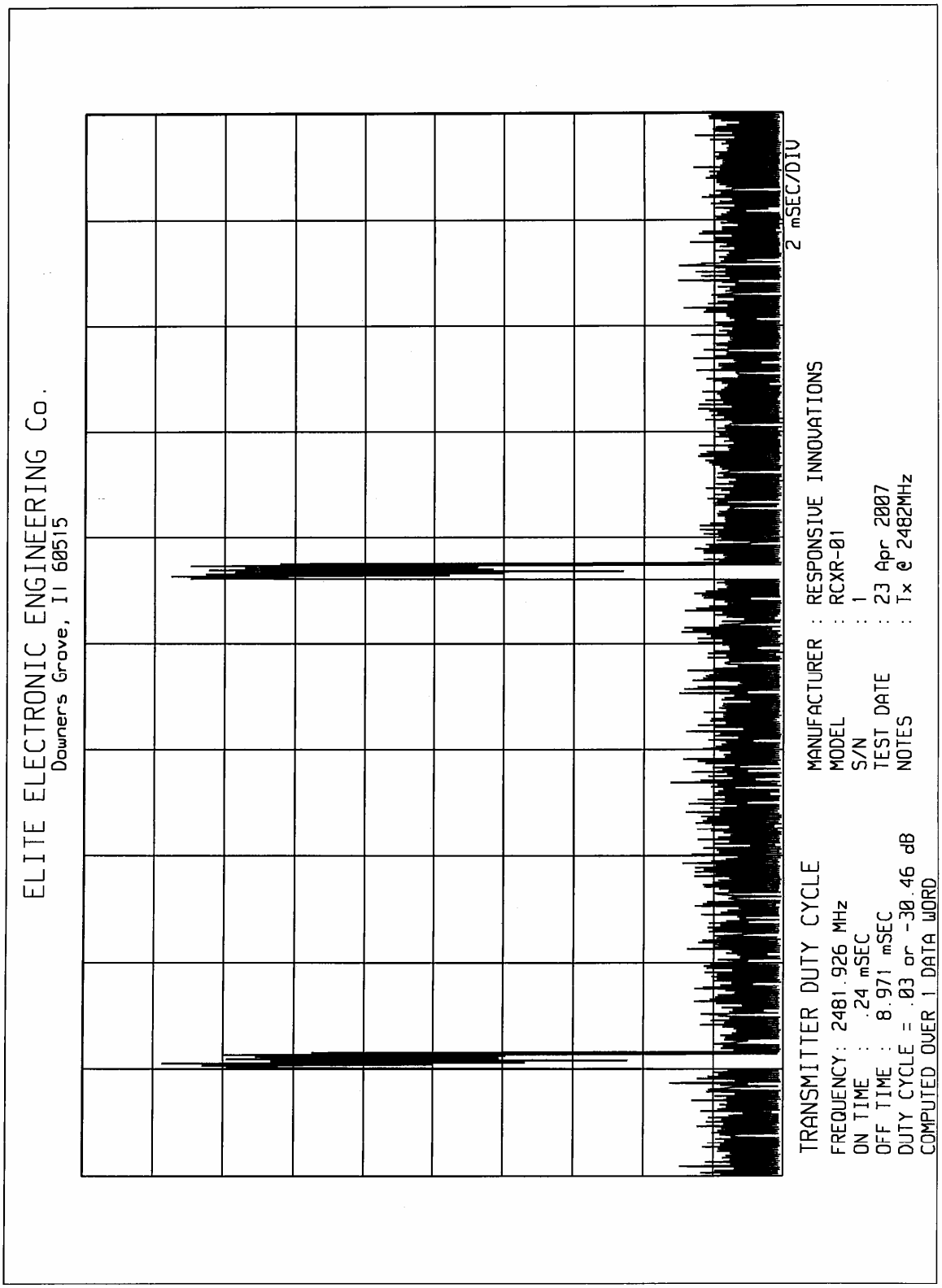
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL : RCXR-01
S/N : 3
SPECIFICATION : EN 55022, CLASS B
TEST : LINE CONDUCTED EMISSIONS
LINE TESTED : 115V, 60Hz RETURN
MODE : USB COMM W/ LAPTOP
DATE : 25 Apr 2007
NOTES : TESTED W/ DELL INSPIRON 7000
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

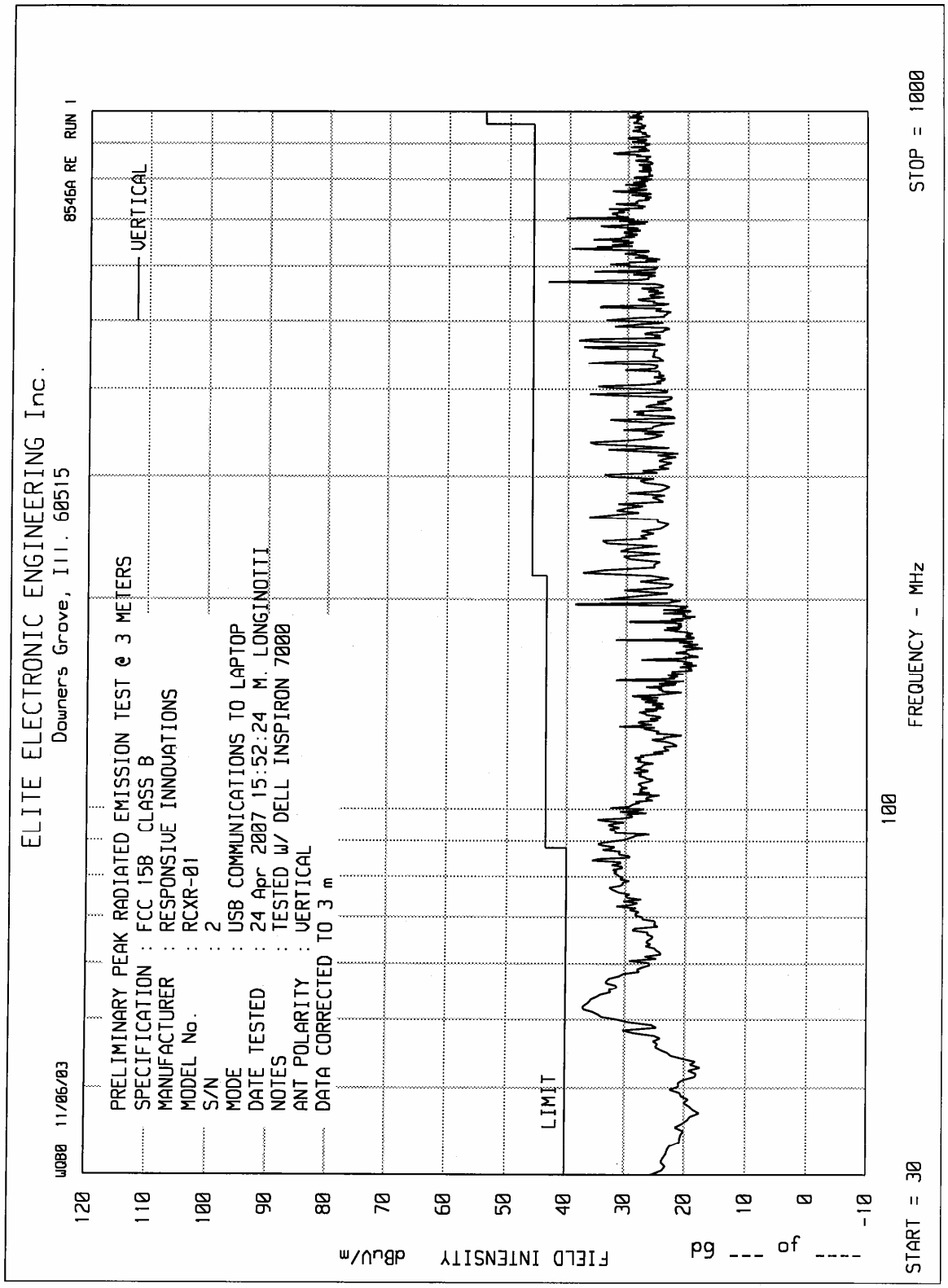
FREQUENCY MHz	METER RDG. dBuV	QP LIMIT dBuV	AVG RDG dBuV	AVG LIMIT dBuV	NOTES
.153	43.8	65.8		55.8	
.175	41.3	64.7		54.7	
.266	32.4	61.2		51.2	
.356	39.1	58.8		48.8	
.621	40.1	56.0		46.0	
.798	39.6	56.0		46.0	
.886	39.4	56.0		46.0	
1.063	39.9	56.0		46.0	
1.328	40.1	56.0		46.0	
1.858	39.0	56.0		46.0	
2.035	39.2	56.0		46.0	
2.565	38.3	56.0		46.0	
3.007	37.2	56.0		46.0	
4.156	33.9	56.0		46.0	
6.012	31.9	60.0		50.0	
8.751	27.7	60.0		50.0	
10.430	27.0	60.0		50.0	
15.113	26.9	60.0		50.0	
19.713	26.9	60.0		50.0	
20.416	26.9	60.0		50.0	
24.657	26.6	60.0		50.0	
27.020	26.5	60.0		50.0	

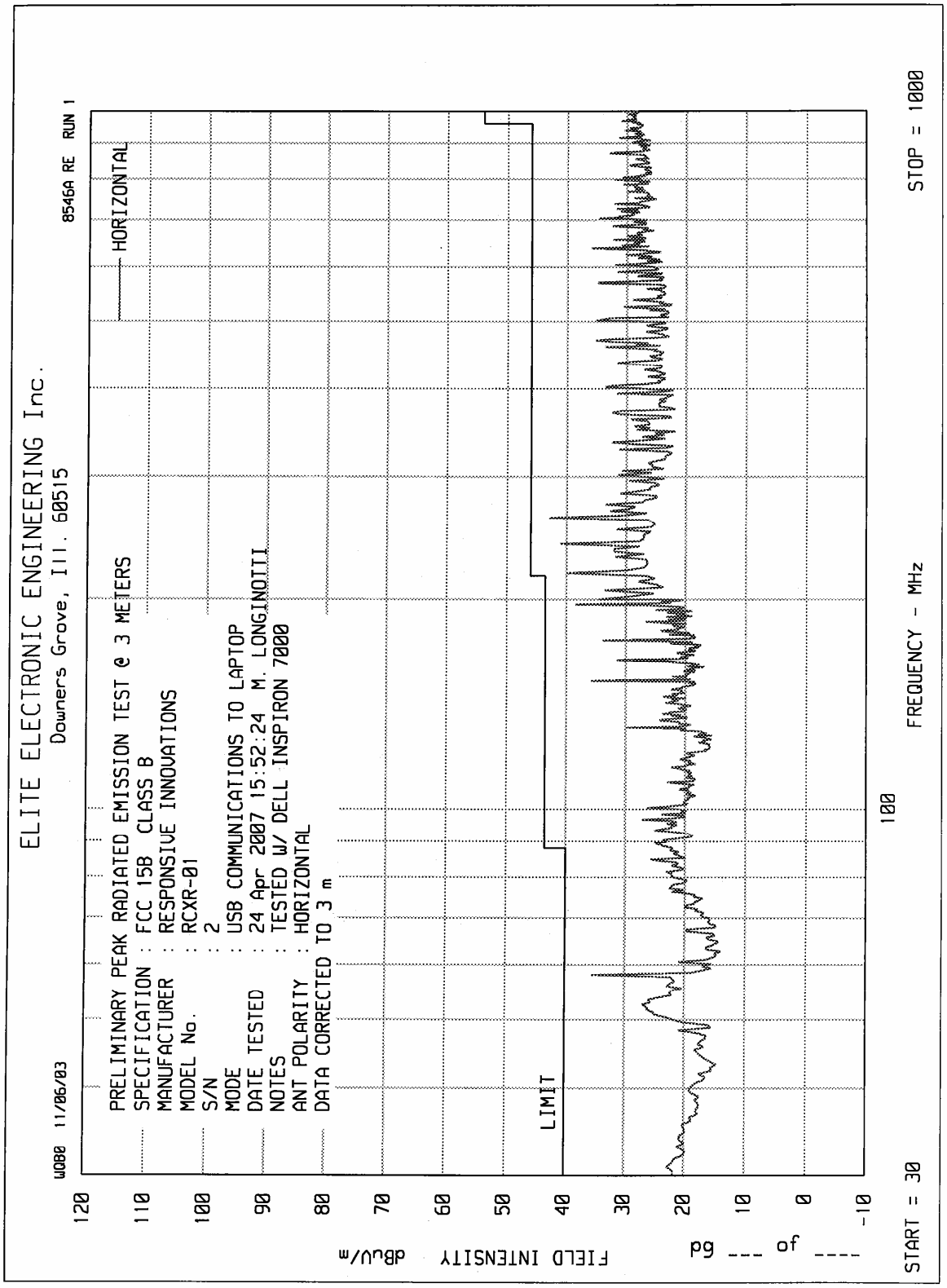
CHECKED BY: Mark E. Longinotti
M. LONGINOTTI


ELITE ELECTRONIC ENGINEERING Co.
Downers Grove, Il 60515
2 mSEC/DIV
TRANSMITTER DUTY CYCLE
FREQUENCY: 2408.781 MHz
ON TIME : .2 mSEC
OFF TIME : 9.051 mSEC
DUTY CYCLE = .02 or -33.98 dB
COMPUTED OVER 1 DATA WORD
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL : RCXR-01
S/N : 1
TEST DATE : 23 Apr 2007
NOTES : Tx @ 2401MHz


ELITE ELECTRONIC ENGINEERING Co.
Downers Grove, Il 60515
2 mSEC/DIV
TRANSMITTER DUTY CYCLE
FREQUENCY: 2441.027 MHz
ON TIME : .2 mSEC
OFF TIME : 9.011 mSEC
DUTY CYCLE = .02 or -33.98 dB
COMPUTED OVER 1 DATA WORD
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL : RCXR-01
S/N : 1
TEST DATE : 23 Apr 2007
NOTES : Tx @ 2441MHz


ELITE ELECTRONIC ENGINEERING Co.
Downers Grove, Il 60515
2 mSEC/DIV
TRANSMITTER DUTY CYCLE
FREQUENCY: 2481.926 MHz
ON TIME : .24 mSEC
OFF TIME : 8.971 mSEC
DUTY CYCLE = .03 or -30.46 dB
COMPUTED OVER 1 DATA WORD
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL : RCXR-01
S/N : 1
TEST DATE : 23 Apr 2007
NOTES : Tx @ 2482MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
W080 11/06/03
8546A RE RUN 1
PRELIMINARY PEAK RADIATED EMISSION TEST @ 3 METERS
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RCXR-01
S/N : 2
MODE : USB COMMUNICATIONS TO LAPTOP
DATE TESTED : 24 Apr 2007 15:52:24 M. LONGINOTTI
NOTES : TESTED W/ DELL INSPIRON 7000
ANT POLARITY : VERTICAL
DATA CORRECTED TO 3 m
VERTICAL
LIMIT
FIELD INTENSITY dBuV/m
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
START = 30
100
STOP = 1000
FREQUENCY - MHz
pg ___ of ____


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
W080 11/06/03
8546A RE RUN 1
PRELIMINARY PEAK RADIATED EMISSION TEST @ 3 METERS
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RCXR-01
S/N : 2
MODE : USB COMMUNICATIONS TO LAPTOP
DATE TESTED : 24 Apr 2007 15:52:24 M. LONGINOTTI
NOTES : TESTED W/ DELL INSPIRON 7000
ANT POLARITY : HORIZONTAL
DATA CORRECTED TO 3 m
HORIZONTAL
LIMIT
FIELD INTENSITY dBuV/m
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
START = 30
100
STOP = 1000
FREQUENCY - MHz
pg ___ of ____

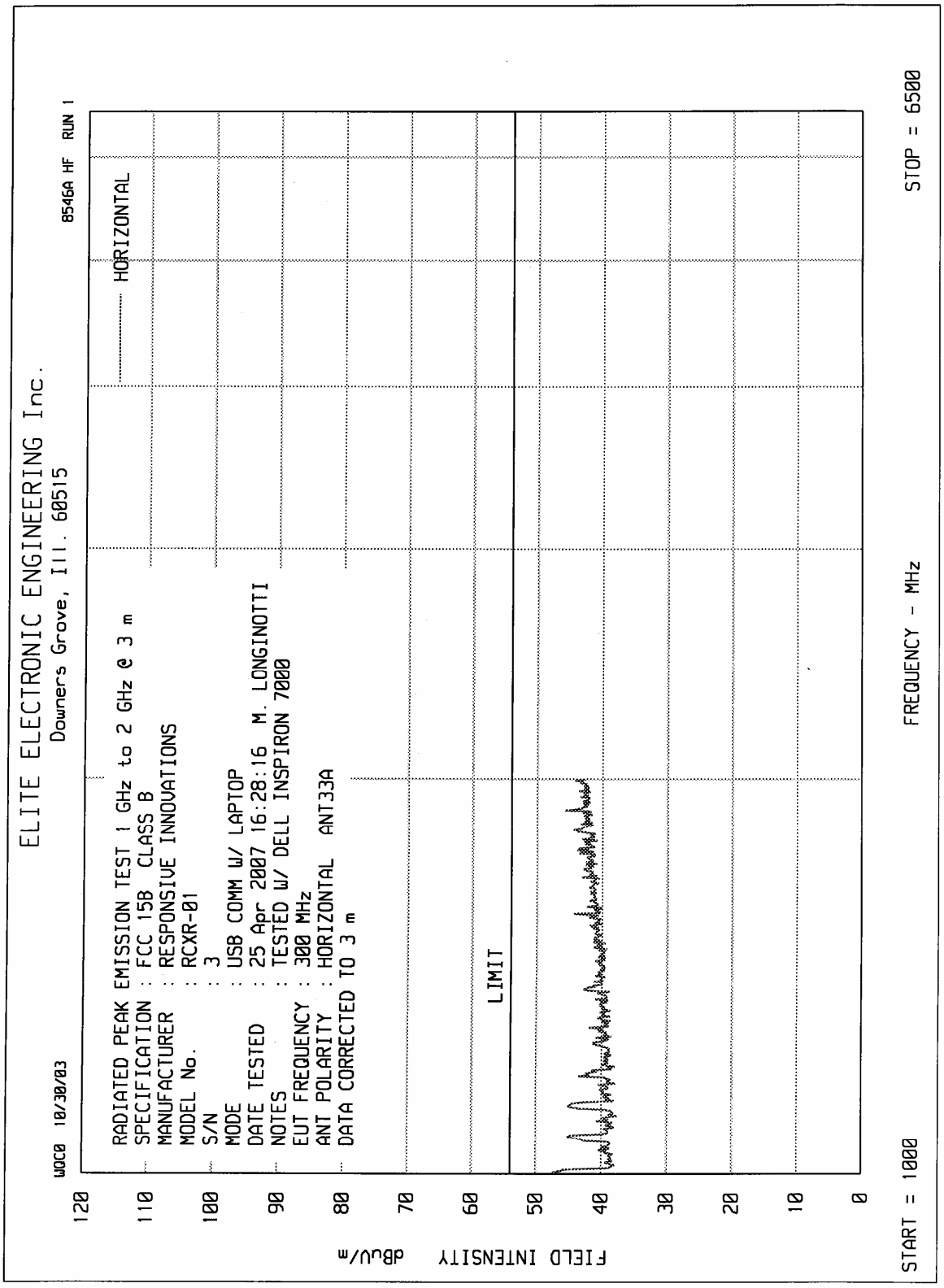
ETR No. 8546A
DATA SHEET TEST NO. 1

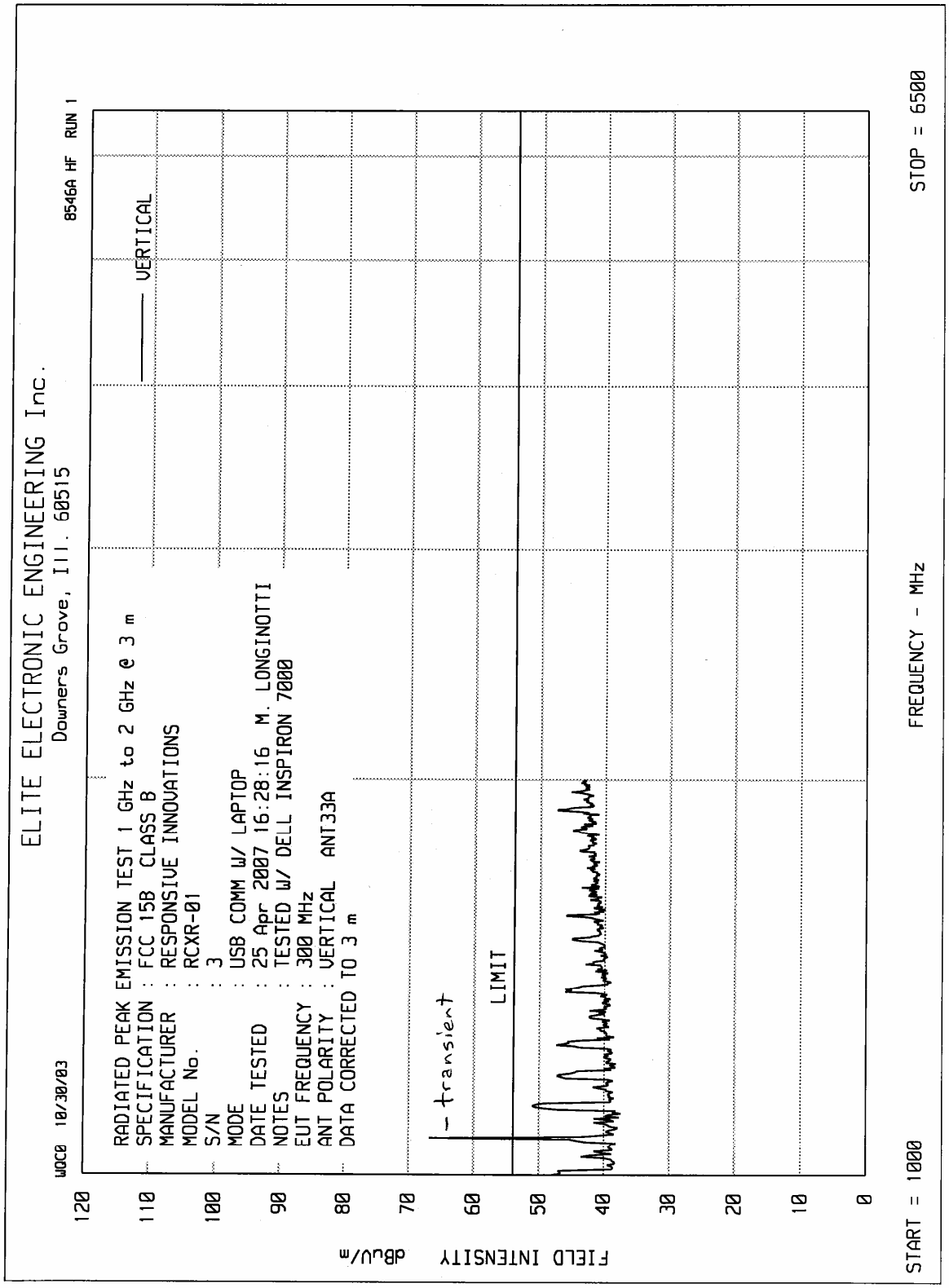
RADIATED QP EMISSION MEASUREMENTS in a 3 m SEMI-ANECHOIC ROOM
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL NO. : RCXR-01
SERIAL NO. : 2
TEST MODE : USB COMMUNICATIONS TO LAPTOP
NOTES : TESTED W/ DELL INSPIRON 7000
TEST DATE : 24 Apr 2007 15:52:24
TEST DISTANCE : 3 m (DATA EXTRAPOLATED TO 3 m)

FREQUENCY MHz	QP READING dBuV	ANT FAC dB	CBL FAC dB	EXT ATTN dB	DIST FAC dB	TOTAL dBuV/m	QP LIMIT dBuV/m	AZ deg	ANT HT cm	POLAR
51.74	24.5	9.2	.5	0.0	0.0	34.1	40.0	135	120	V
52.12	24.8	9.0	.5	0.0	0.0	34.3	40.0	45	120	V
84.03	24.2	9.0	.5	0.0	0.0	33.7	40.0	135	120	V
100.03	21.6	11.3	.5	0.0	0.0	33.4	43.5	90	120	V
130.30	17.5	12.9	.7	0.0	0.0	31.1	43.5	135	120	V
152.01	20.0	11.9	.8	0.0	0.0	32.6	43.5	90	200	H
173.82	18.4	10.6	.9	0.0	0.0	29.9	43.5	270	340	H
195.45	27.4	10.7	1.0	0.0	0.0	39.0	43.5	180	340	V
266.60	17.1	13.6	1.2	0.0	0.0	31.9	46.0	90	120	H
466.43	17.6	17.9	1.6	0.0	0.0	37.1	46.0	135	120	V
572.97	1.7	19.4	1.7	0.0	0.0	22.8	46.0	90	120	V
632.97	19.6	20.2	1.8	0.0	0.0	41.6	46.0	180	120	V
703.50	10.0	20.6	1.8	0.0	0.0	32.4	46.0	180	120	V
866.19	4.8	22.3	1.9	0.0	0.0	29.0	46.0	135	120	H
922.86	1.5	22.5	2.0	0.0	0.0	26.0	46.0	135	120	H

pg ___ of ____

tested by: Mark E Longinotti
M. LONGINOTTI


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WOC0 10/30/03
8546A HF RUN 1
RADIATED PEAK EMISSION TEST 1 GHz to 2 GHz @ 3 m
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RCXR-01
S/N : 3
MODE : USB COMM W/ LAPTOP
DATE TESTED : 25 Apr 2007 16:28:16 M. LONGINOTTI
NOTES : TESTED W/ DELL INSPIRON 7000
EUT FREQUENCY : 300 MHz
ANT POLARITY : HORIZONTAL ANT33A
DATA CORRECTED TO 3 m
HORIZONTAL
LIMIT
FIELD INTENSITY dBuV/m
120
110
100
90
80
70
60
50
40
30
20
10
0
START = 1000
FREQUENCY - MHz
STOP = 6500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WDC8 10/30/03
8546A HF RUN 1
RADIATED PEAK EMISSION TEST 1 GHz to 2 GHz @ 3 m
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RCXR-01
S/N : 3
MODE : USB COMM W/ LAPTOP
DATE TESTED : 25 Apr 2007 16:28:16 M. LONGINOTTI
NOTES : TESTED W/ DELL INSPIRON 7000
EUT FREQUENCY : 300 MHz
ANT POLARITY : VERTICAL ANT33A
DATA CORRECTED TO 3 m
VERTICAL
transient
LIMIT
FIELD INTENSITY dBµV/m
120
110
100
90
80
70
60
50
40
30
20
10
0
START = 1000
FREQUENCY - MHz
STOP = 6500

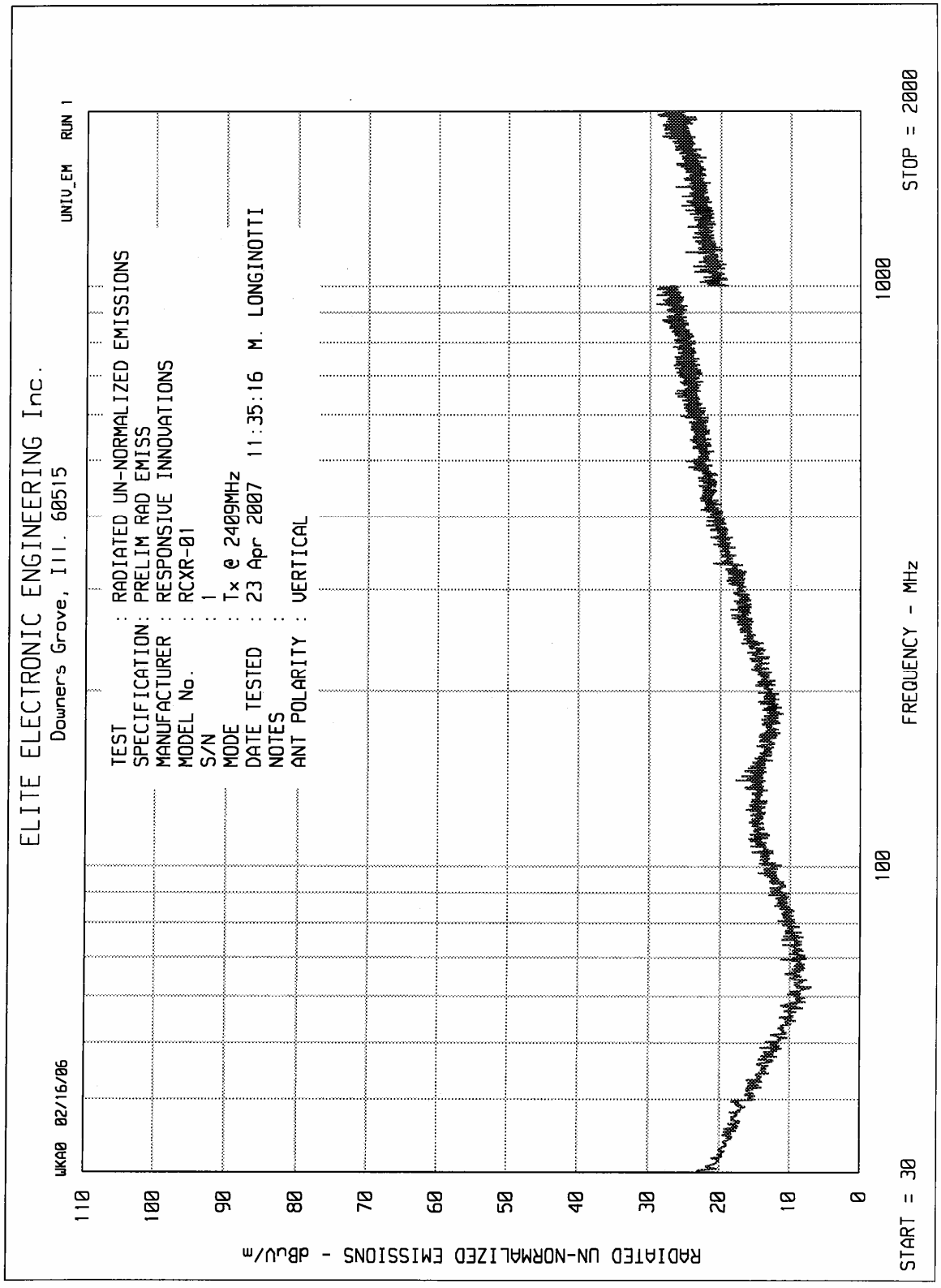
ETR No.
DATA SHEET HF TEST NO. 1

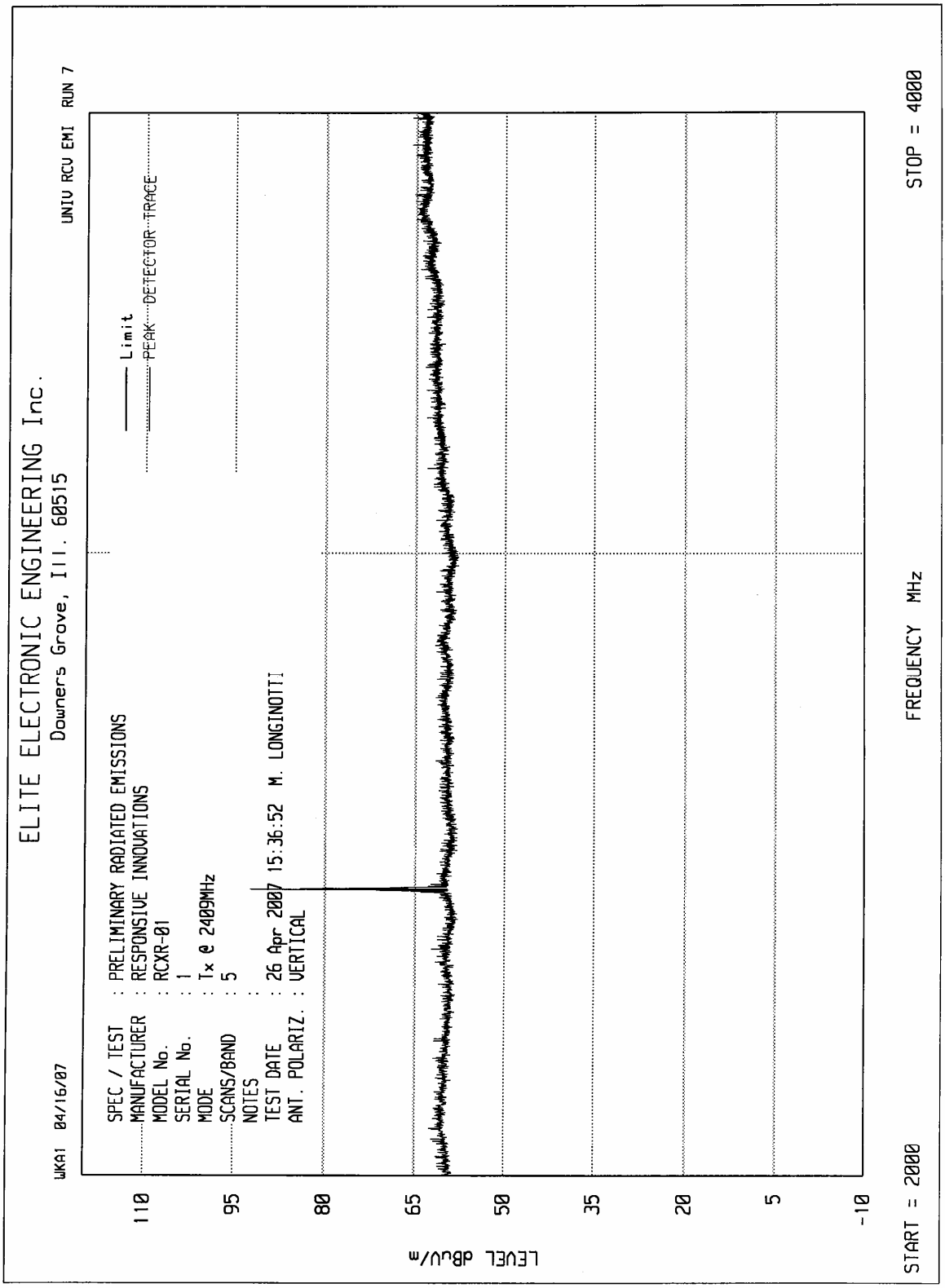
RADIATED AVG EMISSION MEASUREMENTS >=1000 MHz in a 3 m ANECHOIC ROOM

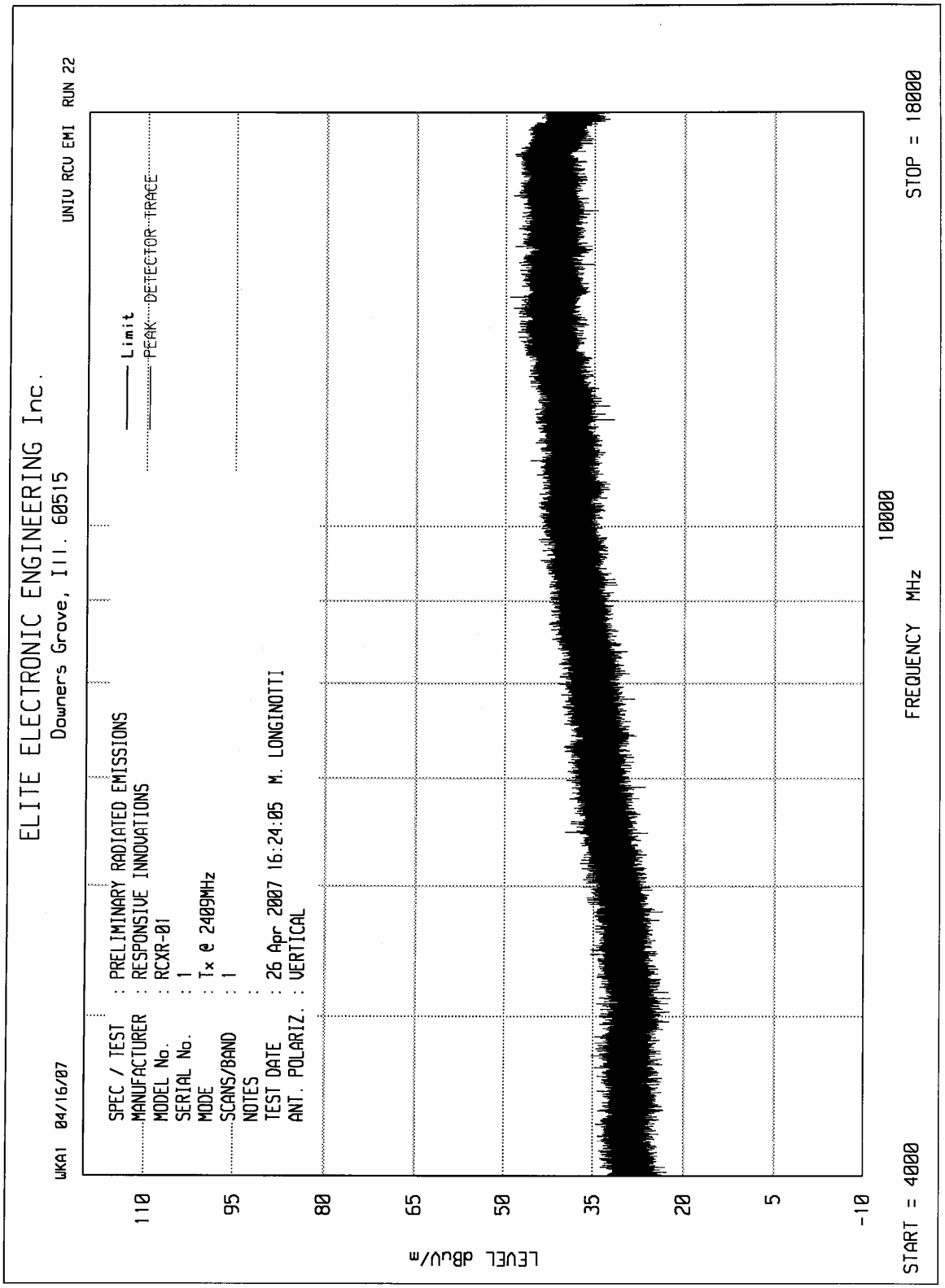
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL NO. : RCXR-01
SERIAL NO. : 3
TEST MODE : USB COMM W/ LAPTOP
NOTES : TESTED W/ DELL INSPIRON 7000
TEST DATE : 25 Apr 2007 16:28:16
EUT FREQUENCY : 300 MHz
TEST DISTANCE : 3 m (DATA EXTRAPOLATED TO 3 m
ANTENNA : ANT33A

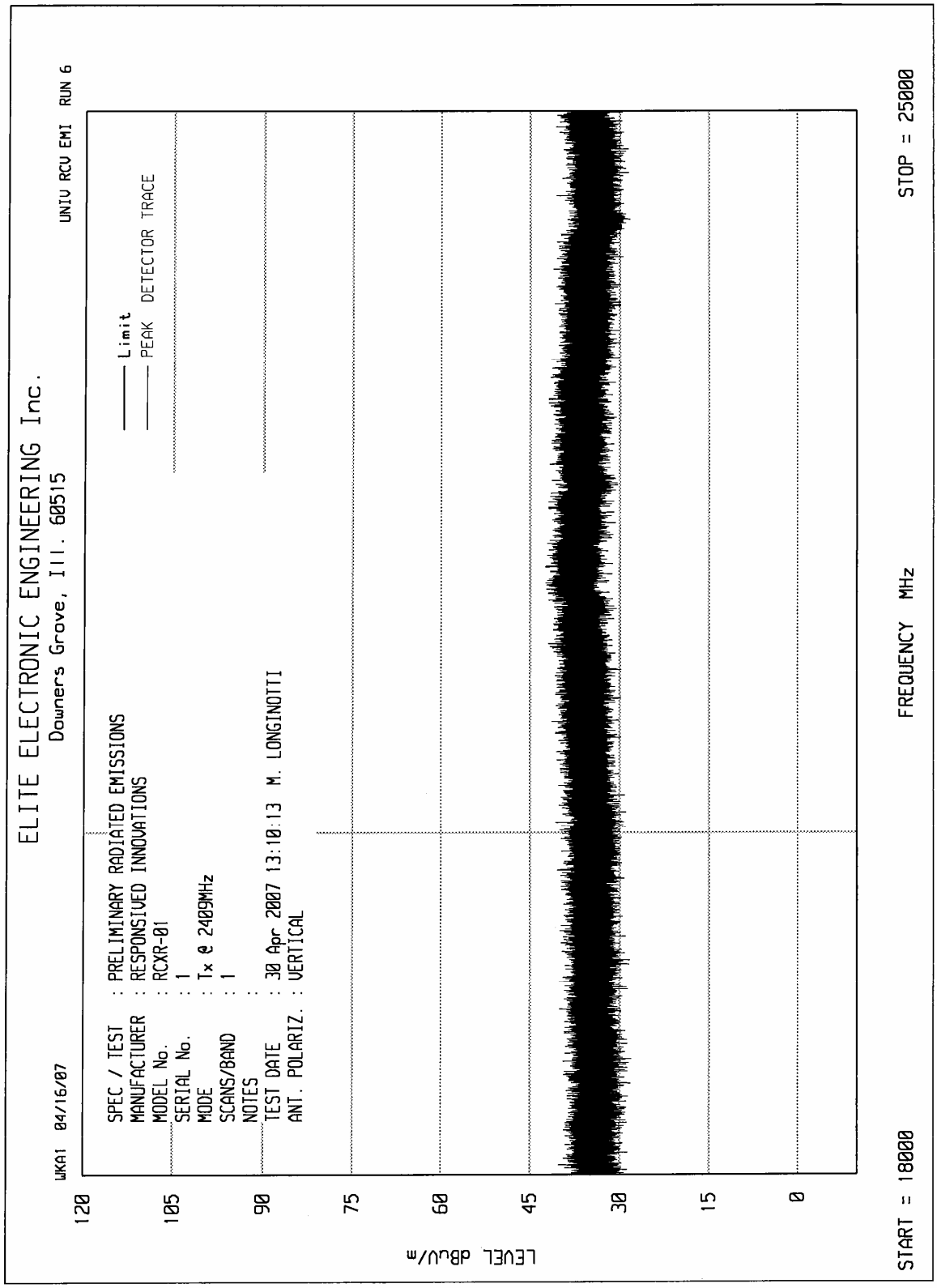
FREQUENCY MHz	AVG READING dBuV	ANT FAC dB	CBL FAC dB	DIST FAC dB	TOTAL dBuV/m	AVG LIMIT dBuV/m	PASS/ FAIL	AZ deg	ANT HT cm	POLAR
1067.60	-0.0	25.7	2.1	0.0	27.8	54.0		136	200	V
1134.05	8.4	25.9	2.2	0.0	36.5	54.0		180	120	V
1401.10	8.1	26.5	2.5	0.0	37.1	54.0		0	200	V
1532.30	2.2	26.9	2.6	0.0	31.7	54.0		315	200	V
1599.55	2.9	27.2	2.7	0.0	32.8	54.0		315	120	V
1757.91	-1.6	28.0	2.8	0.0	29.2	54.0		225	120	V
1867.91	1.1	28.5	2.9	0.0	32.5	54.0		225	120	V
1934.76	.9	28.7	3.0	0.0	32.6	54.0		225	120	V

tested by: Mark E Longinotti
M. LONGINOTTI


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV_EM RUN 1
WKA0 02/16/06
TEST : RADIATED UN-NORMALIZED EMISSIONS
SPECIFICATION: PRELIM RAD EMISS
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RCXR-01
S/N : 1
MODE : Tx @ 2409MHz
DATE TESTED : 23 Apr 2007 11:35:16 M. LONGINOTTI
NOTES :
ANT POLARITY : VERTICAL
RADIATED UN-NORMALIZED EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 30
100
1000
STOP = 2000
FREQUENCY - MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 7
WKA1 04/16/07
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RCXR-01
SERIAL No. : 1
MODE : Tx @ 2409MHz
SCANS/BAND : 5
NOTES :
TEST DATE : 26 Apr 2007 15:36:52 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
110
95
80
65
50
35
20
5
-10
START = 2000
FREQUENCY MHz
STOP = 4000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 22
WKA1 04/16/07
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RCXR-01
SERIAL No. : 1
MODE : Tx @ 2409MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 26 Apr 2007 16:24:05 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
110
95
80
65
50
35
20
5
-10
START = 4000
10000
FREQUENCY MHz
STOP = 18000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 6
WKA1 04/16/07
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : RESPONSIVED INNOVATIONS
MODEL No. : RCXR-01
SERIAL No. : 1
MODE : Tx @ 2409MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 30 Apr 2007 13:10:13 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

MANUFACTURER : Responsive Innovations
MODEL NO. : RCXR-01
SERIAL NO. : 1
TEST SPECIFICATION : FCC 15.249, Radiated Emissions
MODE : Transmit @ 2409MHz
TEST DATE : April 23, 2007 through April 30, 2007
TEST DISTANCE : 3 meters
NOTES: ; Peak Limits

Frequency MHz	Antenna Polarity	Peak Meter Reading dBuV	Ambient	Cable Factor dB	Antenna Factor dB	Preamp Gain dB	Distance Correction Factor dB	Peak Total dBuV/m	Peak Limit dBuV/m
2409.0	H	62.0		3.5	31.4	0.0	0.0	96.8	114
2409.0	V	60.1		3.5	31.4	0.0	0.0	94.9	114
4818.0	H	51.7		4.9	34.5	-40.1	0.0	51.0	74
4818.0	V	47.0	Ambient	4.9	34.5	-40.1	0.0	46.3	74
7227.0	H	52.8		6.6	38.0	-39.7	0.0	57.7	74
7227.0	V	48.9	Ambient	6.6	38.0	-39.7	0.0	53.8	74
9636.0	H	48.9	Ambient	7.5	39.8	-38.7	0.0	57.5	74
9636.0	V	50.0	Ambient	7.5	39.8	-38.7	0.0	58.6	74
12045.0	H	47.6	Ambient	8.5	41.4	-39.4	0.0	58.1	74
12045.0	V	47.9	Ambient	8.5	41.4	-39.4	0.0	58.4	74
14454.0	H	48.3	Ambient	9.7	43.8	-40.1	0.0	61.7	74
14454.0	V	48.7	Ambient	9.7	43.8	-40.1	0.0	62.1	74
16863.0	H	48.5	Ambient	10.4	44.6	-38.7	0.0	64.9	74
16863.0	V	48.4	Ambient	10.4	44.6	-38.7	0.0	64.8	74
19272.0	H	34.9	Ambient	2.2	40.3	-27.2	-9.5	40.7	74
19272.0	V	35.3	Ambient	2.2	40.3	-27.2	-9.5	41.1	74
21681.0	H	35.6	Ambient	2.2	40.5	-26.9	-9.5	41.9	74
21681.0	V	35.9	Ambient	2.2	40.5	-26.9	-9.5	42.2	74
24090.0	H	34.3	Ambient	2.2	40.6	-27.5	-9.5	40.1	74
24090.0	V	33.7	Ambient	2.2	40.6	-27.5	-9.5	39.5	74

V – Vertical

H – Horizontal

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

Checked By : MARK E. LONGINOTTI

MANUFACTURER : Responsive Innovations
MODEL NO. : RCXR-01
SERIAL NO. : 1
TEST SPECIFICATION : FCC 15.249, Radiated Emissions
MODE : Transmit @ 2409MHz
TEST DATE : April 23, 2007 through April 30, 2007
TEST DISTANCE : 3 meters
NOTE : Average Limits

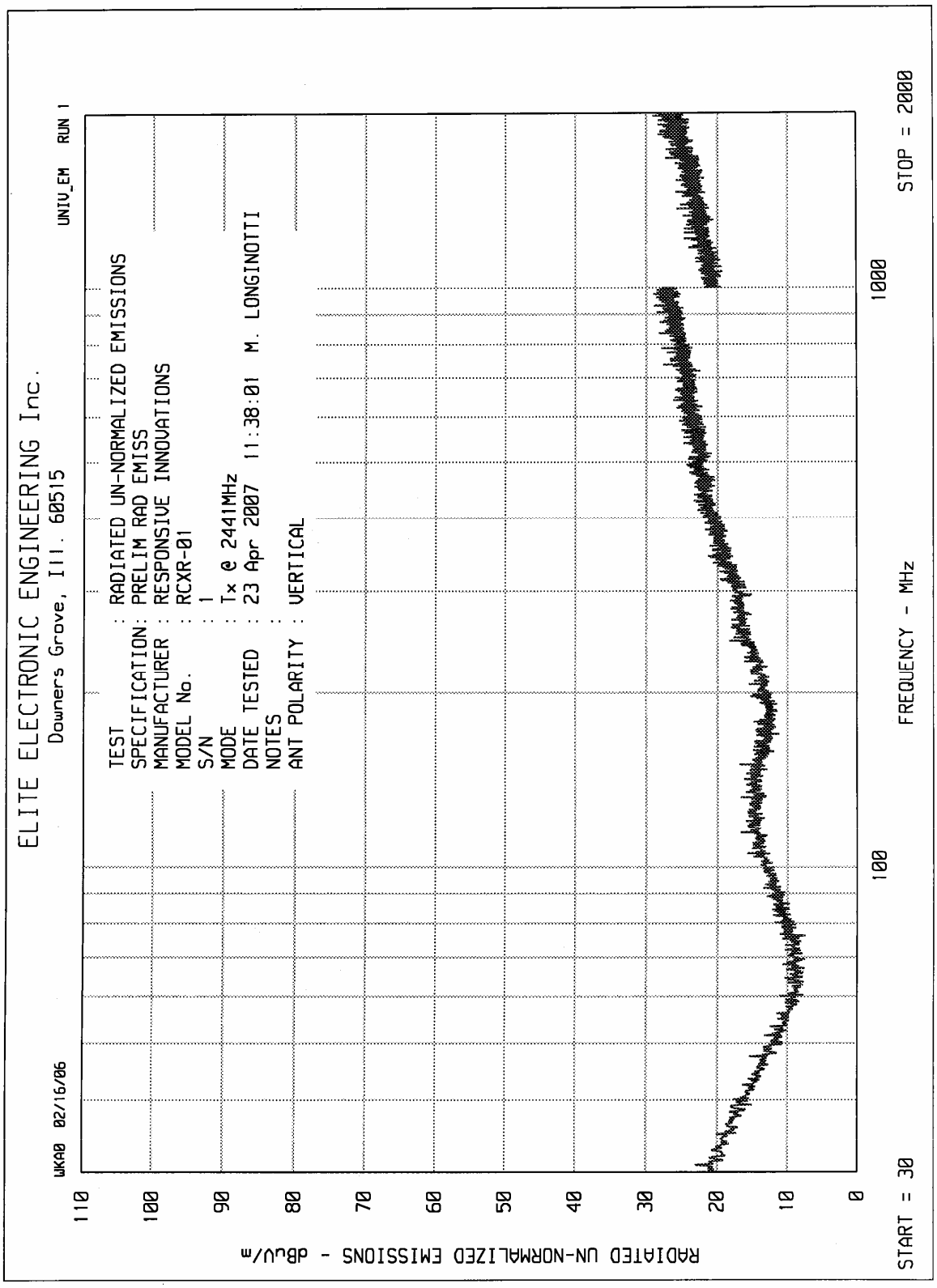
Frequency MHz	Antenna Polarity	Peak Meter Reading dBuV	Ambient	Cable Factor dB	Antenna Factor dB	Preamp Gain dB	Distance Correction Factor dB	Duty Cycle Corr. Factor dB	Average Total dBuV/m	Average Limit dBuV/m
2409.0	H	62.0		3.5	31.4	0.0	0.0	-34.0	62.8	94
2409.0	V	60.1		3.5	31.4	0.0	0.0	-34.0	60.9	94
4818.0	H	51.7		4.9	34.5	-40.1	0.0	-34.0	17.0	54
4818.0	V	47.0	Ambient	4.9	34.5	-40.1	0.0	-34.0	12.3	54
7227.0	H	52.8		6.6	38.0	-39.7	0.0	-34.0	23.7	54
7227.0	V	48.9	Ambient	6.6	38.0	-39.7	0.0	-34.0	19.8	54
9636.0	H	48.9	Ambient	7.5	39.8	-38.7	0.0	-34.0	23.5	54
9636.0	V	50.0	Ambient	7.5	39.8	-38.7	0.0	-34.0	24.6	54
12045.0	H	47.6	Ambient	8.5	41.4	-39.4	0.0	-34.0	24.1	54
12045.0	V	47.9	Ambient	8.5	41.4	-39.4	0.0	-34.0	24.4	54
14454.0	H	48.3	Ambient	9.7	43.8	-40.1	0.0	-34.0	27.7	54
14454.0	V	48.7	Ambient	9.7	43.8	-40.1	0.0	-34.0	28.1	54
16863.0	H	48.5	Ambient	10.4	44.6	-38.7	0.0	-34.0	30.9	54
16863.0	V	48.4	Ambient	10.4	44.6	-38.7	0.0	-34.0	30.8	54
19272.0	H	34.9	Ambient	2.2	40.3	-27.2	-9.5	-34.0	6.8	54
19272.0	V	35.3	Ambient	2.2	40.3	-27.2	-9.5	-34.0	7.2	54
21681.0	H	35.6	Ambient	2.2	40.5	-26.9	-9.5	-34.0	7.9	54
21681.0	V	35.9	Ambient	2.2	40.5	-26.9	-9.5	-34.0	8.2	54
24090.0	H	34.3	Ambient	2.2	40.6	-27.5	-9.5	-34.0	6.2	54
24090.0	V	33.7	Ambient	2.2	40.6	-27.5	-9.5	-34.0	5.6	54

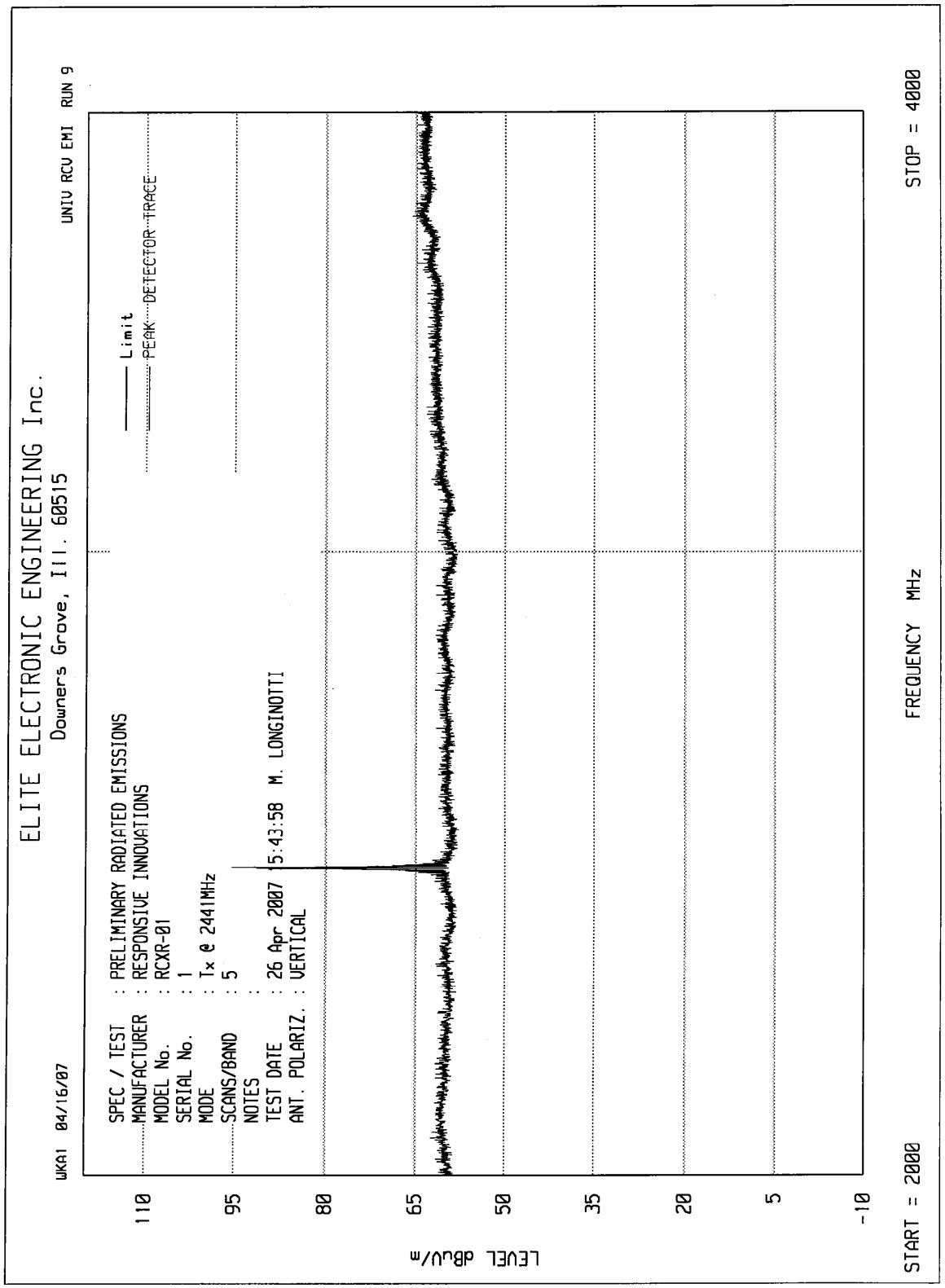
V – Vertical

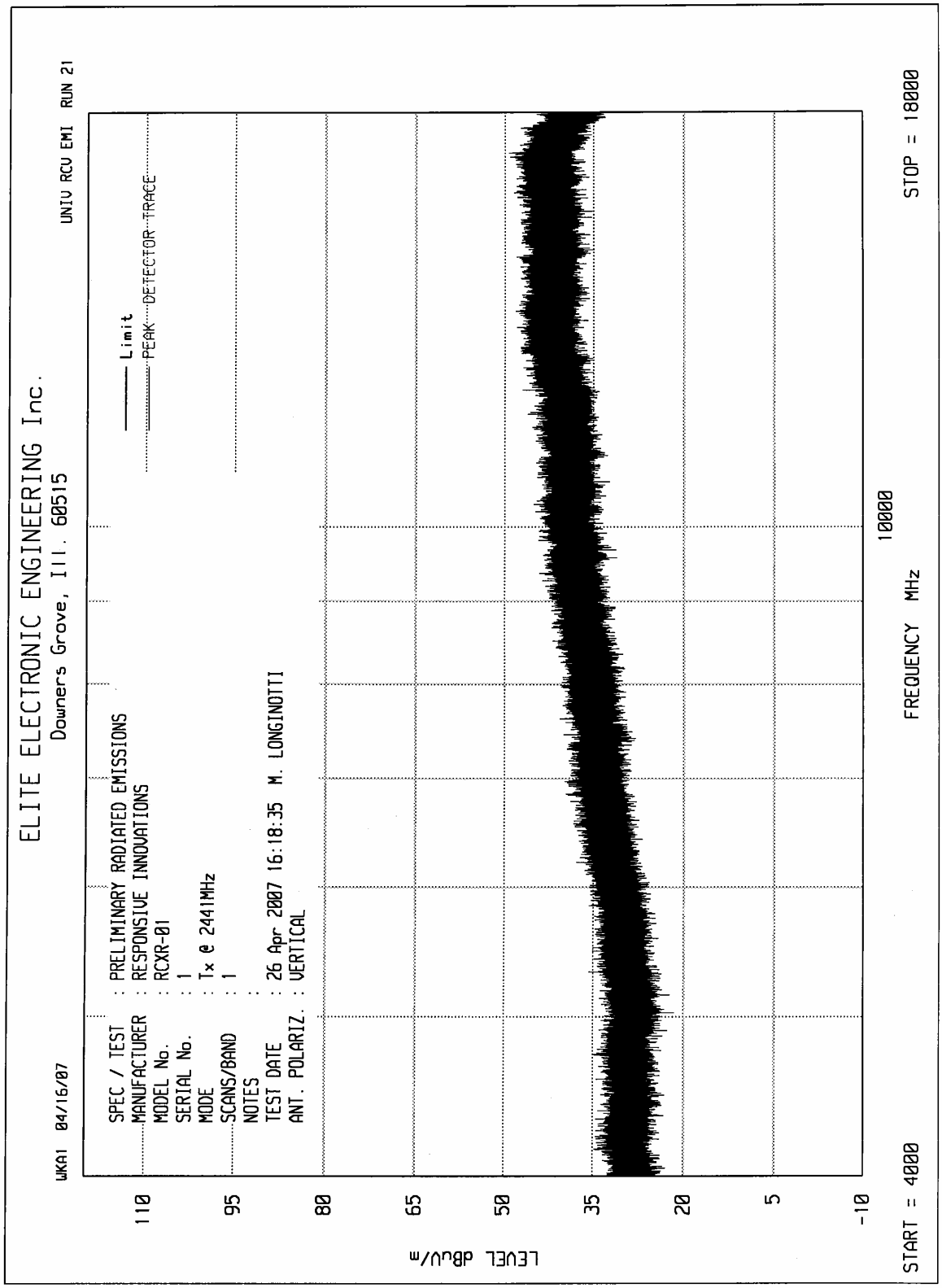
H – Horizontal

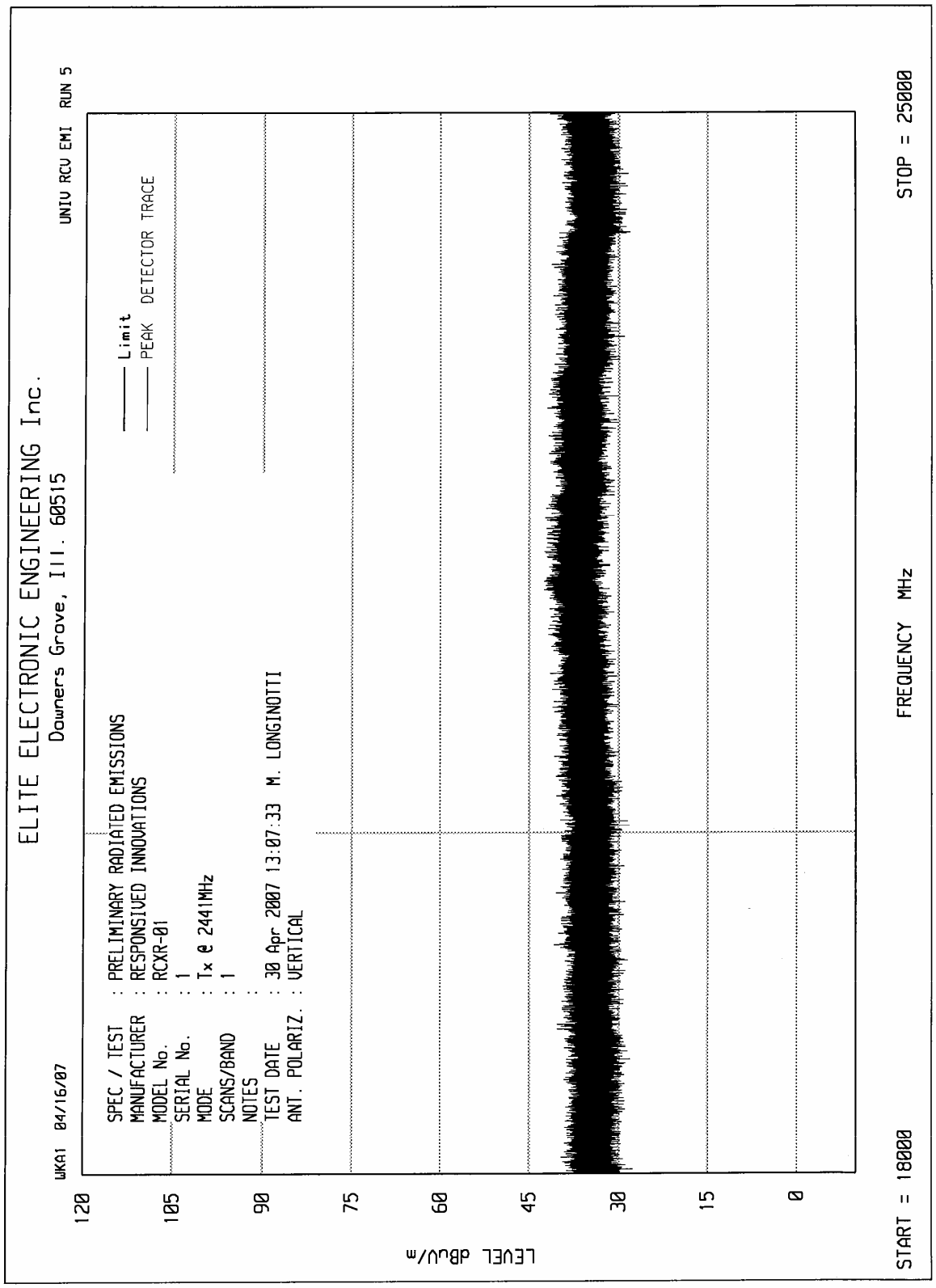
Average Total = Peak Meter Reading + Cable Factor + Antenna Factor + Preamp Gain + Distance Correction Factor + Duty Cycle Correction Factor

Checked By : MARK E. LONGINOTTI


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV_EM RUN 1
WKA0 02/16/06
TEST : RADIATED UN-NORMALIZED EMISSIONS
SPECIFICATION: PRELIM RAD EMISS
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RCXR-01
S/N : 1
MODE : Tx @ 2441MHz
DATE TESTED : 23 Apr 2007 11:38:01 M. LONGINOTTI
NOTES :
ANT POLARITY : VERTICAL
RADIATED UN-NORMALIZED EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 30
100
1000
STOP = 2000
FREQUENCY - MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 9
WKA1 04/16/07
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RCXR-01
SERIAL No. : 1
MODE : Tx @ 2441MHz
SCANS/BAND : 5
NOTES :
TEST DATE : 26 Apr 2007 15:43:58 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
110
95
80
65
50
35
20
5
-10
START = 2000
FREQUENCY MHz
STOP = 4000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 21
WKA1 04/16/07
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RCXR-01
SERIAL No. : 1
MODE : Tx @ 2441MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 26 Apr 2007 16:18:35 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
110
95
80
65
50
35
20
5
-10
START = 4000
10000
FREQUENCY MHz
STOP = 18000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 5
WKA1 04/16/07
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : RESPONSIVED INNOVATIONS
MODEL No. : RCXR-01
SERIAL No. : 1
MODE : Tx @ 2441MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 30 Apr 2007 13:07:33 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

MANUFACTURER : Responsive Innovations
MODEL NO. : RCXR-01
SERIAL NO. : 1
TEST SPECIFICATION : FCC 15.249, Radiated Emissions
MODE : Transmit @ 2441MHz
TEST DATE : April 23, 2007 through April 30, 2007
TEST DISTANCE : 3 meters

Frequency MHz	Antenna Polarity	Peak Meter Reading dBuV	Ambient	Cable Factor dB	Antenna Factor dB	Preamp Gain dB	Distance Correction Factor dB	Peak Total dBuV/m	Peak Limit dBuV/m
2441.0	H	65.1		3.5	31.4	0.0	0.0	100.0	114
2441.0	V	61.5		3.5	31.4	0.0	0.0	96.4	114
4882.0	H	48.8	Ambient	5.0	34.5	-40.1	0.0	48.2	74
4882.0	V	49.1	Ambient	5.0	34.5	-40.1	0.0	48.5	74
7323.0	H	54.4		6.7	38.1	-39.7	0.0	59.4	74
7323.0	V	51.8	Ambient	6.7	38.1	-39.7	0.0	56.8	74
9764.0	H	51.6	Ambient	7.5	39.9	-38.7	0.0	60.3	74
9764.0	V	48.3	Ambient	7.5	39.9	-38.7	0.0	57.0	74
12205.0	H	48.5	Ambient	8.7	41.4	-39.4	0.0	59.1	74
12205.0	V	48.6	Ambient	8.7	41.4	-39.4	0.0	59.2	74
14646.0	H	49.0	Ambient	9.8	44.1	-40.1	0.0	62.9	74
14646.0	V	48.9	Ambient	9.8	44.1	-40.1	0.0	62.8	74
17087.0	H	48.7	Ambient	10.5	44.5	-38.7	0.0	65.0	74
17087.0	V	48.6	Ambient	10.5	44.5	-38.7	0.0	64.9	74
19528.0	H	35.0	Ambient	2.2	40.3	-27.2	-9.5	40.9	74
19528.0	V	35.0	Ambient	2.2	40.3	-27.2	-9.5	40.9	74
21969.0	H	36.0	Ambient	2.2	40.5	-26.9	-9.5	42.3	74
21969.0	V	35.1	Ambient	2.2	40.5	-26.9	-9.5	41.4	74
24410.0	H	35.0	Ambient	2.2	40.6	-27.5	-9.5	40.9	74
24410.0	V	34.9	Ambient	2.2	40.6	-27.5	-9.5	40.8	74

V – Vertical

H – Horizontal

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

Checked By : MARK E. LONGINOTTI

MANUFACTURER : Responsive Innovations
MODEL NO. : RCXR-01
SERIAL NO. : 1
TEST SPECIFICATION : FCC 15.249, Radiated Emissions
MODE : Transmit @ 2441MHz
TEST DATE : April 23, 2007 through April 30, 2007
TEST DISTANCE : 3 meters

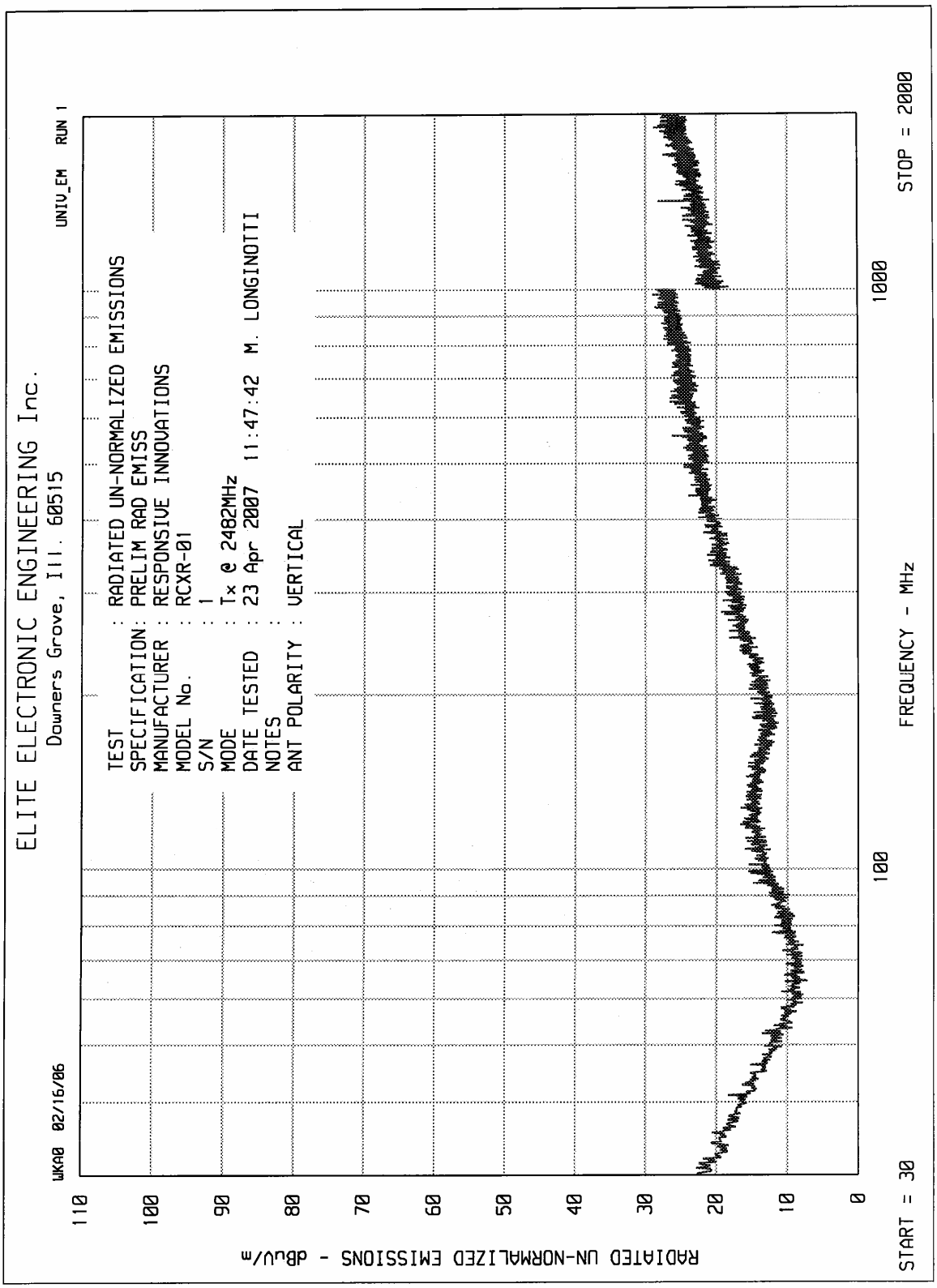
Frequency MHz	Antenna Polarity	Peak Meter Reading dBuV	Ambient	Cable Factor dB	Antenna Factor dB	Preamp Gain dB	Distance Correction Factor dB	Duty Cycle Corr. Factor dB	Average Total dBuV/m	Average Limit dBuV/m
2441.0	H	65.1		3.5	31.4	0.0	0.0	-34.0	66.0	94
2441.0	V	61.5		3.5	31.4	0.0	0.0	-34.0	62.4	94
4882.0	H	48.8	Ambient	5.0	34.5	-40.1	0.0	-34.0	14.2	54
4882.0	V	49.1	Ambient	5.0	34.5	-40.1	0.0	-34.0	14.5	54
7323.0	H	54.4		6.7	38.1	-39.7	0.0	-34.0	25.4	54
7323.0	V	51.8	Ambient	6.7	38.1	-39.7	0.0	-34.0	22.8	54
9764.0	H	51.6	Ambient	7.5	39.9	-38.7	0.0	-34.0	26.3	54
9764.0	V	48.3	Ambient	7.5	39.9	-38.7	0.0	-34.0	23.0	54
12205.0	H	48.5	Ambient	8.7	41.4	-39.4	0.0	-34.0	25.1	54
12205.0	V	48.6	Ambient	8.7	41.4	-39.4	0.0	-34.0	25.2	54
14646.0	H	49.0	Ambient	9.8	44.1	-40.1	0.0	-34.0	28.9	54
14646.0	V	48.9	Ambient	9.8	44.1	-40.1	0.0	-34.0	28.8	54
17087.0	H	48.7	Ambient	10.5	44.5	-38.7	0.0	-34.0	31.0	54
17087.0	V	48.6	Ambient	10.5	44.5	-38.7	0.0	-34.0	30.9	54
19528.0	H	35.0	Ambient	2.2	40.3	-27.2	-9.5	-34.0	6.9	54
19528.0	V	35.0	Ambient	2.2	40.3	-27.2	-9.5	-34.0	6.9	54
21969.0	H	36.0	Ambient	2.2	40.5	-26.9	-9.5	-34.0	8.3	54
21969.0	V	35.1	Ambient	2.2	40.5	-26.9	-9.5	-34.0	7.4	54
24410.0	H	35.0	Ambient	2.2	40.6	-27.5	-9.5	-34.0	6.9	54
24410.0	V	34.9	Ambient	2.2	40.6	-27.5	-9.5	-34.0	6.8	54

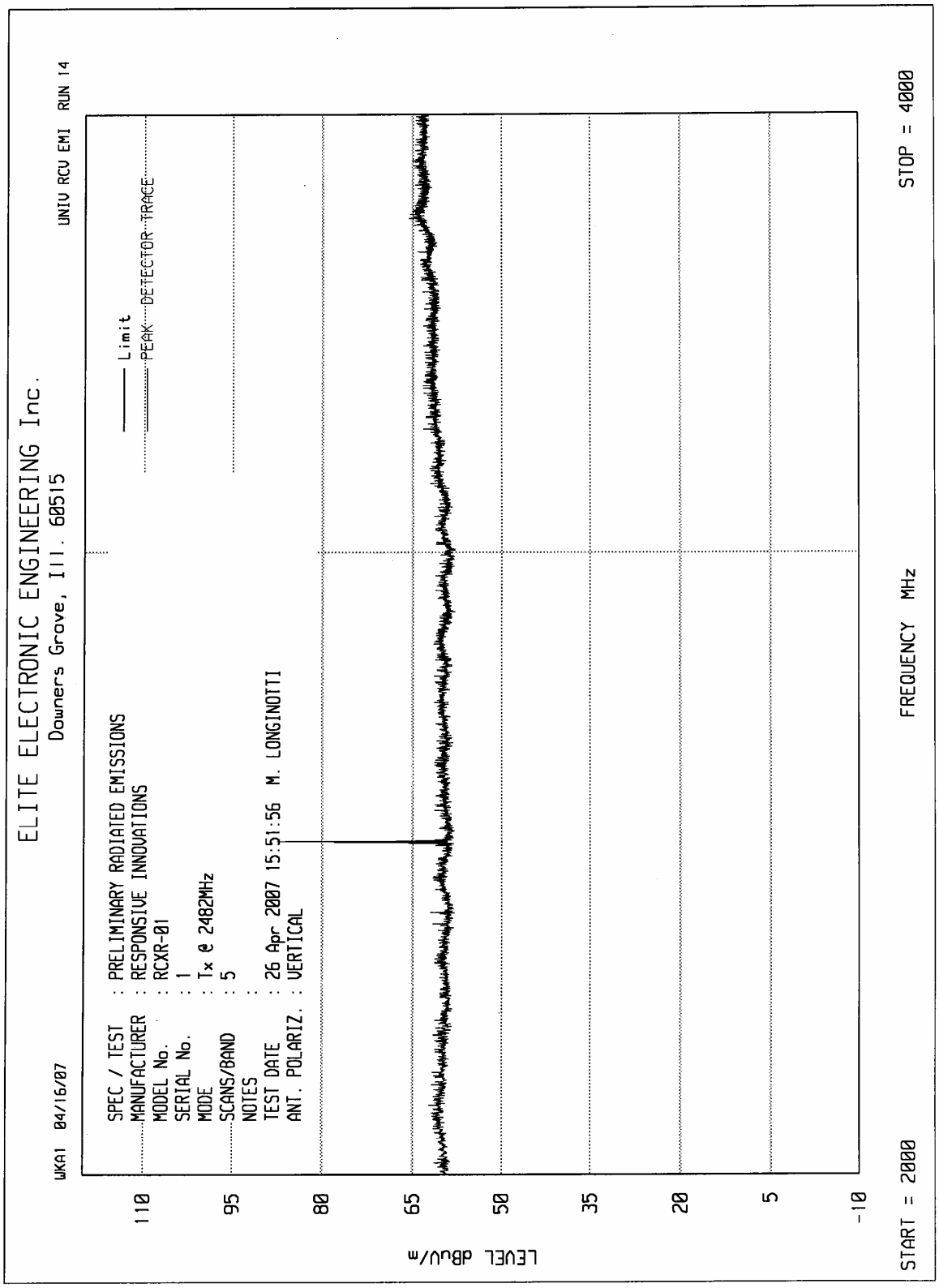
V – Vertical

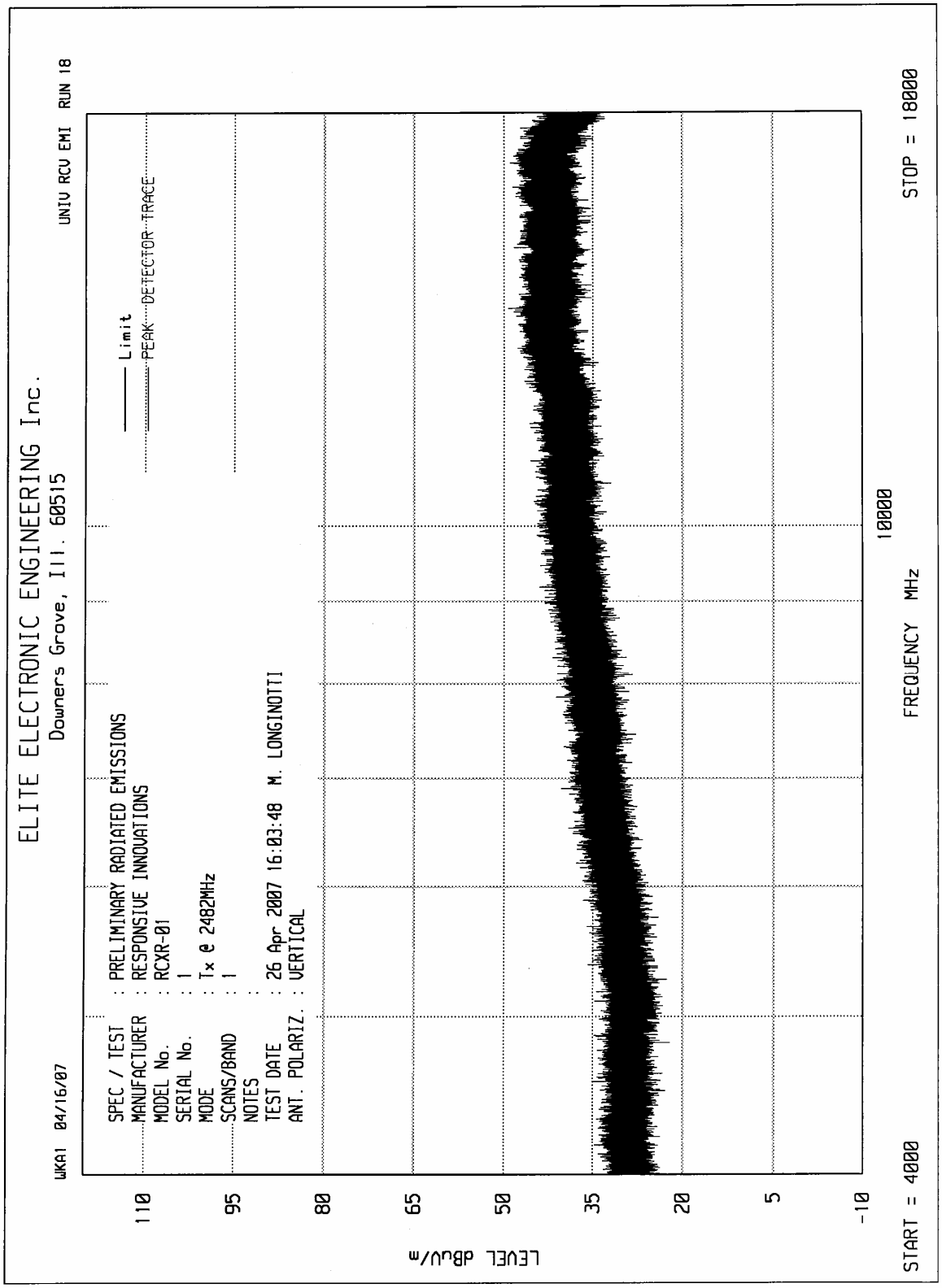
H – Horizontal

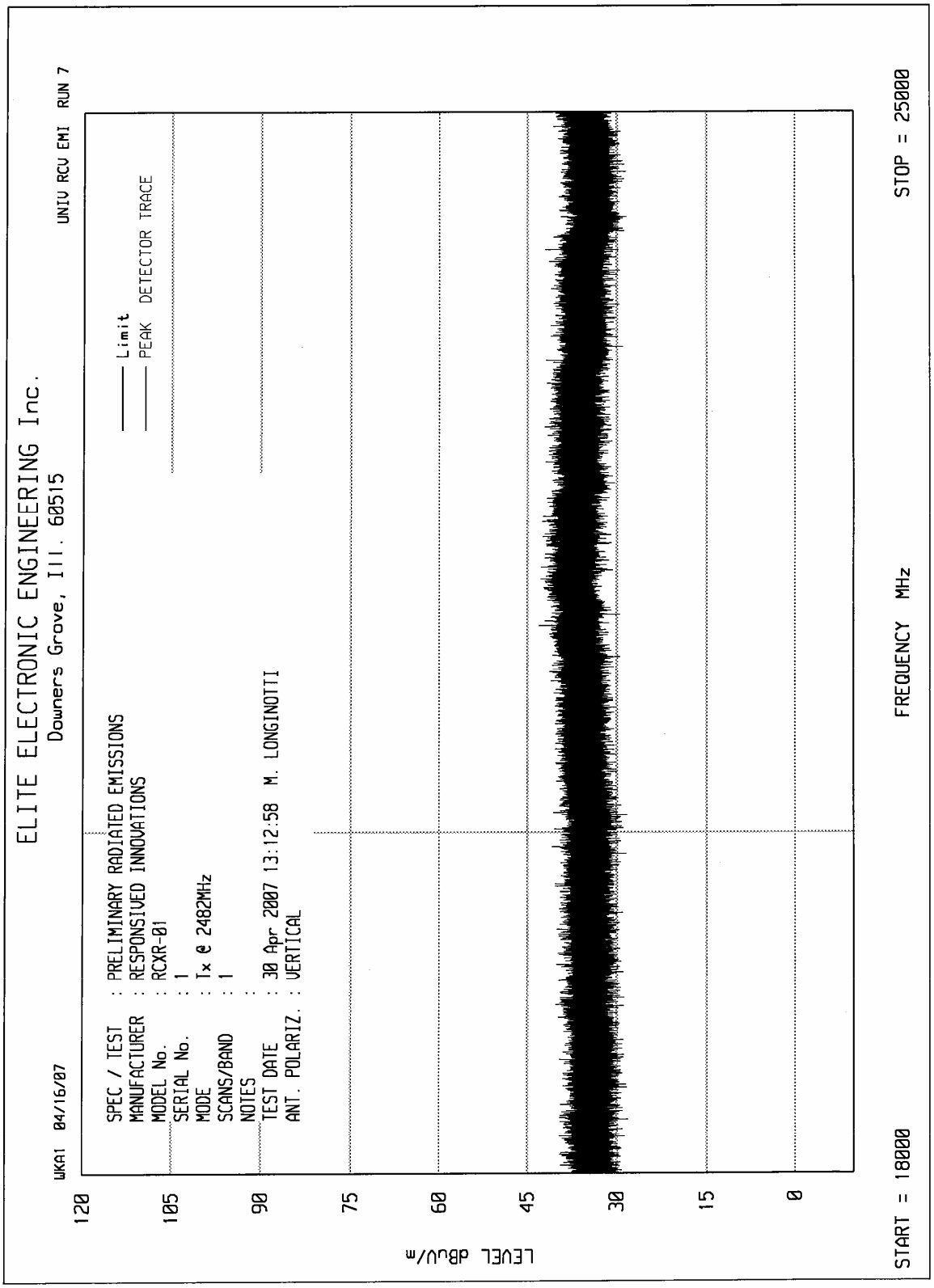
Average Total = Peak Meter Reading + Cable Factor + Antenna Factor + Preamp Gain + Distance Correction Factor + Duty Cycle Correction Factor

Checked By: MARK E. LONGINOTTI


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV_EM RUN 1
WKA0 02/15/06
TEST : RADIATED UN-NORMALIZED EMISSIONS
SPECIFICATION: PRELIM RAD EMISS
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RCXR-01
S/N : 1
MODE : Tx @ 2482MHz
DATE TESTED : 23 Apr 2007 11:47:42 M. LONGINOTTI
NOTES :
ANT POLARITY : VERTICAL
RADIATED UN-NORMALIZED EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 30
100
1000
STOP = 2000
FREQUENCY - MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 14
WKA1 04/16/07
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RCXR-01
SERIAL No. : 1
MODE : Tx @ 2482MHz
SCANS/BAND : 5
NOTES :
TEST DATE : 26 Apr 2007 15:51:56 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
110
95
80
65
50
35
20
5
-10
START = 2000
FREQUENCY MHz
STOP = 4000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 18
WKA1 04/16/07
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : RESPONSIVE INNOVATIONS
MODEL No. : RCXR-01
SERIAL No. : 1
MODE : Tx @ 2402MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 26 Apr 2007 16:03:48 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
110
95
80
65
50
35
20
5
-10
START = 4000
10000
STOP = 18000
FREQUENCY MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 7
WKA1 04/16/07
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : RESPONSIVED INNOVATIONS
MODEL No. : RCXR-01
SERIAL No. : 1
MODE : Tx @ 2482MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 30 Apr 2007 13:12:58 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

MANUFACTURER : Responsive Innovations
MODEL NO. : RCXR-01
SERIAL NO. : 1
TEST SPECIFICATION : FCC 15.249, Radiated Emissions
MODE : Transmit @ 2482MHz
TEST DATE : April 23, 2007 through April 30, 2007
TEST DISTANCE : 3 meters

Frequency MHz	Antenna Polarity	Peak Meter Reading dBuV	Ambient	Cable Factor dB	Antenna Factor dB	Preamp Gain dB	Distance Correction Factor dB	Peak Total dBuV/m	Peak Limit dBuV/m
2482.0	H	61.2		3.5	31.4	0.0	0.0	96.1	114
2482.0	V	62.4		3.5	31.4	0.0	0.0	97.3	114
4964.0	H	52.8		5.0	34.5	-40.1	0.0	52.2	74
4964.0	V	49.7	Ambient	5.0	34.5	-40.1	0.0	49.1	74
7446.0	H	54.5		6.7	38.1	-39.7	0.0	59.6	74
7446.0	V	51.7		6.7	38.1	-39.7	0.0	56.8	74
9928.0	H	49.4	Ambient	7.5	40.0	-38.7	0.0	58.2	74
9928.0	V	51.0	Ambient	7.5	40.0	-38.7	0.0	59.8	74
12410.0	H	49.8	Ambient	8.9	41.3	-39.4	0.0	60.6	74
12410.0	V	49.0	Ambient	8.9	41.3	-39.4	0.0	59.8	74
14892.0	H	48.8	Ambient	9.9	44.5	-40.1	0.0	63.2	74
14892.0	V	48.3	Ambient	9.9	44.5	-40.1	0.0	62.7	74
17374.0	H	48.2	Ambient	10.7	44.3	-38.7	0.0	64.6	74
17374.0	V	48.9	Ambient	10.7	44.3	-38.7	0.0	65.3	74
19856.0	H	34.1	Ambient	2.2	40.3	-27.2	-9.5	39.9	74
19856.0	V	34.8	Ambient	2.2	40.3	-27.2	-9.5	40.6	74
22338.0	H	35.4	Ambient	2.2	40.5	-26.9	-9.5	41.7	74
22338.0	V	35.2	Ambient	2.2	40.5	-26.9	-9.5	41.5	74
24820.0	H	34.2	Ambient	2.2	40.6	-27.5	-9.5	40.0	74
24820.0	V	34.0	Ambient	2.2	40.6	-27.5	-9.5	39.8	74

V – Vertical

H – Horizontal

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

Checked By : MARK E. LONGINOTTI

MANUFACTURER : Responsive Innovations
MODEL NO. : RCXR-01
SERIAL NO. : 1
TEST SPECIFICATION : FCC 15.249, Radiated Emissions
MODE : Transmit @ 2482MHz
TEST DATE : April 23, 2007 through April 30, 2007
TEST DISTANCE : 3 meters

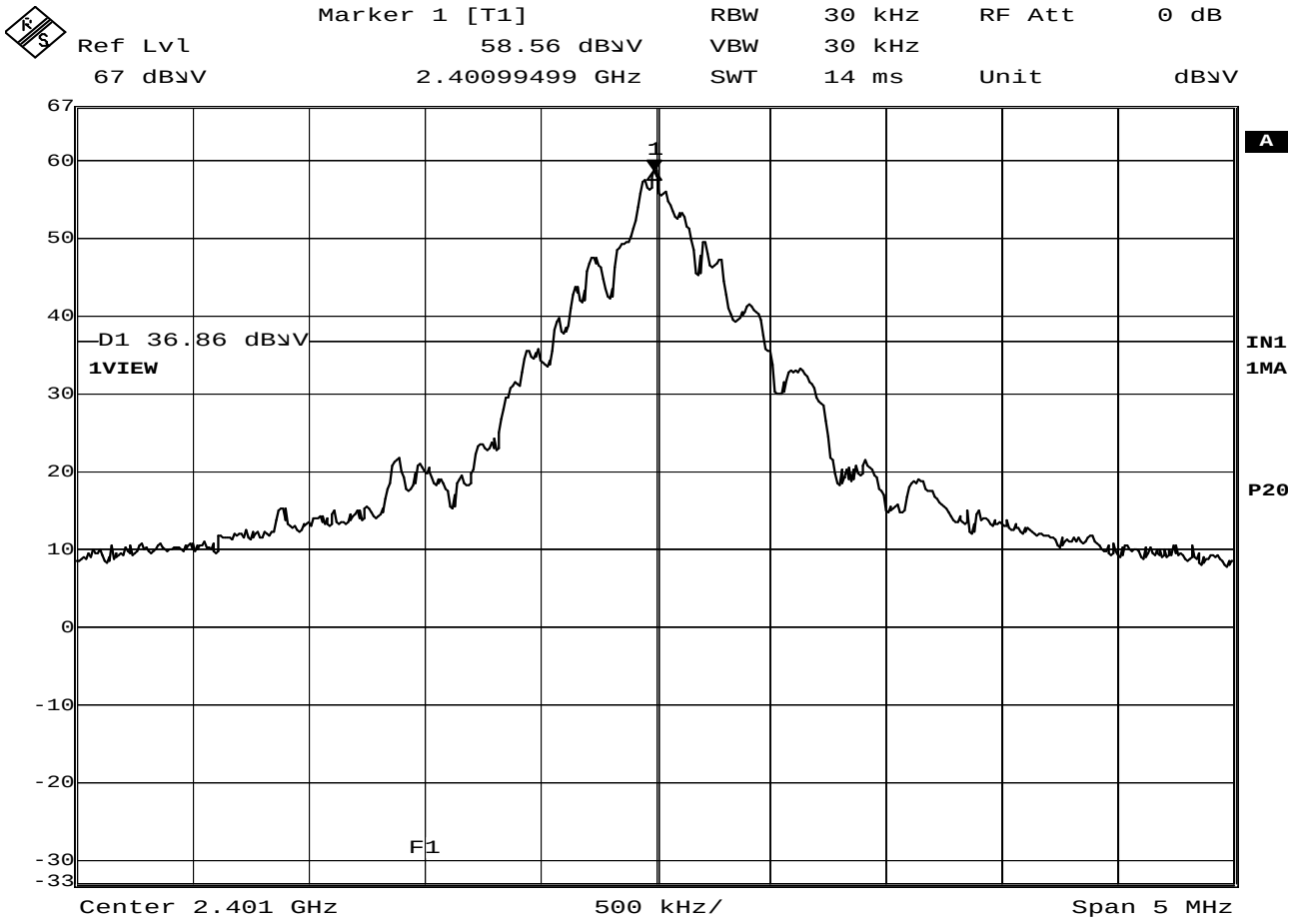
Frequency MHz	Antenna Polarity	Peak Meter Reading dBuV	Ambient	Cable Factor dB	Antenna Factor dB	Preamp Gain dB	Distance Correction Factor dB	Duty Cycle Corr. Factor dB	Average Total dBuV/m	Average Limit dBuV/m
2482.0	H	61.2		3.5	31.4	0.0	0.0	-30.5	65.7	94
2482.0	V	62.4		3.5	31.4	0.0	0.0	-30.5	66.9	94
4964.0	H	52.8		5.0	34.5	-40.1	0.0	-30.5	21.7	54
4964.0	V	49.7	Ambient	5.0	34.5	-40.1	0.0	-30.5	18.6	54
7446.0	H	54.5		6.7	38.1	-39.7	0.0	-30.5	29.1	54
7446.0	V	51.7		6.7	38.1	-39.7	0.0	-30.5	26.3	54
9928.0	H	49.4	Ambient	7.5	40.0	-38.7	0.0	-30.5	27.8	54
9928.0	V	51.0	Ambient	7.5	40.0	-38.7	0.0	-30.5	29.4	54
12410.0	H	49.8	Ambient	8.9	41.3	-39.4	0.0	-30.5	30.2	54
12410.0	V	49.0	Ambient	8.9	41.3	-39.4	0.0	-30.5	29.4	54
14892.0	H	48.8	Ambient	9.9	44.5	-40.1	0.0	-30.5	32.7	54
14892.0	V	48.3	Ambient	9.9	44.5	-40.1	0.0	-30.5	32.2	54
17374.0	H	48.2	Ambient	10.7	44.3	-38.7	0.0	-30.5	34.1	54
17374.0	V	48.9	Ambient	10.7	44.3	-38.7	0.0	-30.5	34.8	54
19856.0	H	34.1	Ambient	2.2	40.3	-27.2	-9.5	-30.5	9.5	54
19856.0	V	34.8	Ambient	2.2	40.3	-27.2	-9.5	-30.5	10.2	54
22338.0	H	35.4	Ambient	2.2	40.5	-26.9	-9.5	-30.5	11.2	54
22338.0	V	35.2	Ambient	2.2	40.5	-26.9	-9.5	-30.5	11.0	54
24820.0	H	34.2	Ambient	2.2	40.6	-27.5	-9.5	-30.5	9.6	54
24820.0	V	34.0	Ambient	2.2	40.6	-27.5	-9.5	-30.5	9.4	54

V – Vertical

H – Horizontal

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

Checked By: MARK E. LONGINOTTI

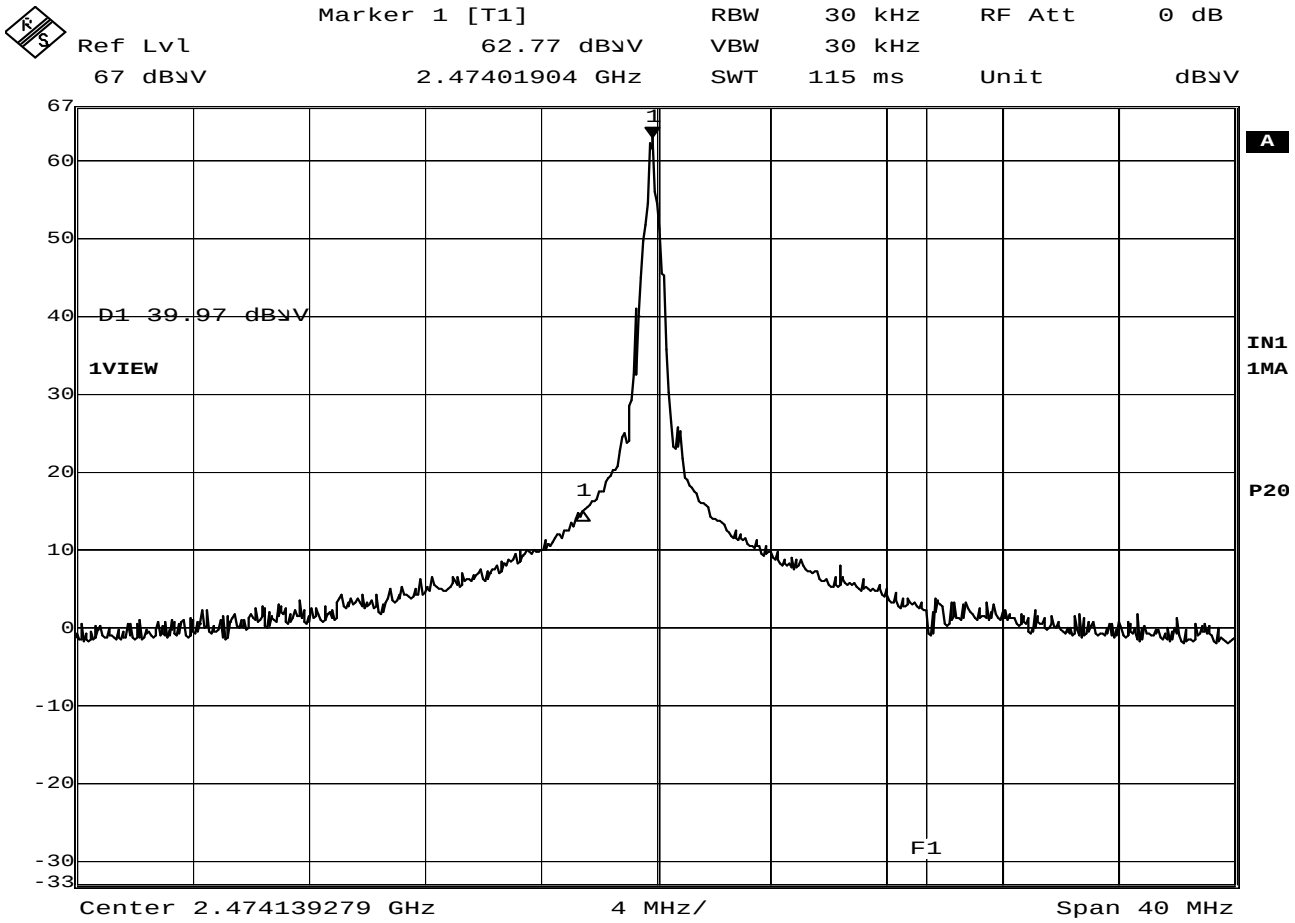


Date: 26.APR.2007 20:21:57

FCC 15.249 Band Edge Test

MANUFACTURER	:	Responsive Innovations
MODEL NUMBER	:	RCXR-01
SERIAL NUMBER	:	1
TEST MODE	:	Transmit @ 2401MHz (short packet)
TEST PARAMETERS	:	Bandedge
NOTES	:	The peak reading at 2401MHz is 95.7dBuV/m (with a
	:	1MHz bandwidth). In order for the band edge
	:	(2400MHz) to be below the general limit of
	:	74dBuV/m (peak), it must be down (95.7dBuV/m –
	:	74dBuV/m) 21.7dB from the fundamental at 2401MHz.
EQUIPMENT USED	:	RBB0, NWI1

NOTES

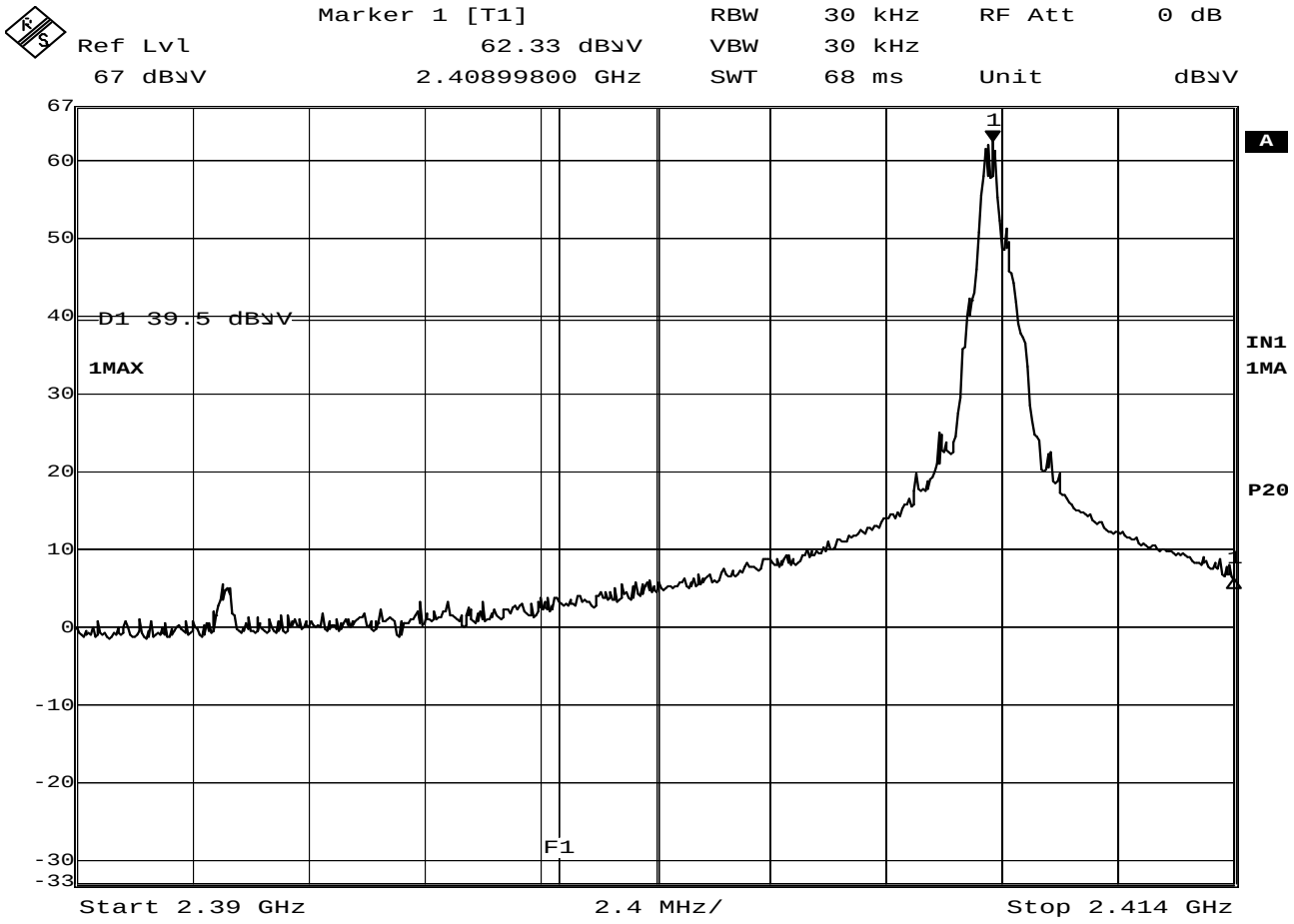


Date: 26.APR.2007 20:54:46

FCC 15.249 Band Edge Test

MANUFACTURER	:	Responsive Innovations
MODEL NUMBER	:	RCXR-01
SERIAL NUMBER	:	1
TEST MODE	:	Transmit @ 2474MHz (short packet)
TEST PARAMETERS	:	Bandedge
NOTES	:	The peak reading at 2474MHz is 99.8dBuV/m (with a
	:	1MHz bandwidth). In order for the band edge
	:	(2483.5MHz) to be below the general limit of
	:	74dBuV/m (peak), it must be down (99.8dBuV/m –
	:	74dBuV/m) 25.8dB from the fundamental at 2474MHz.
EQUIPMENT USED	:	RBB0, NWI1

NOTES

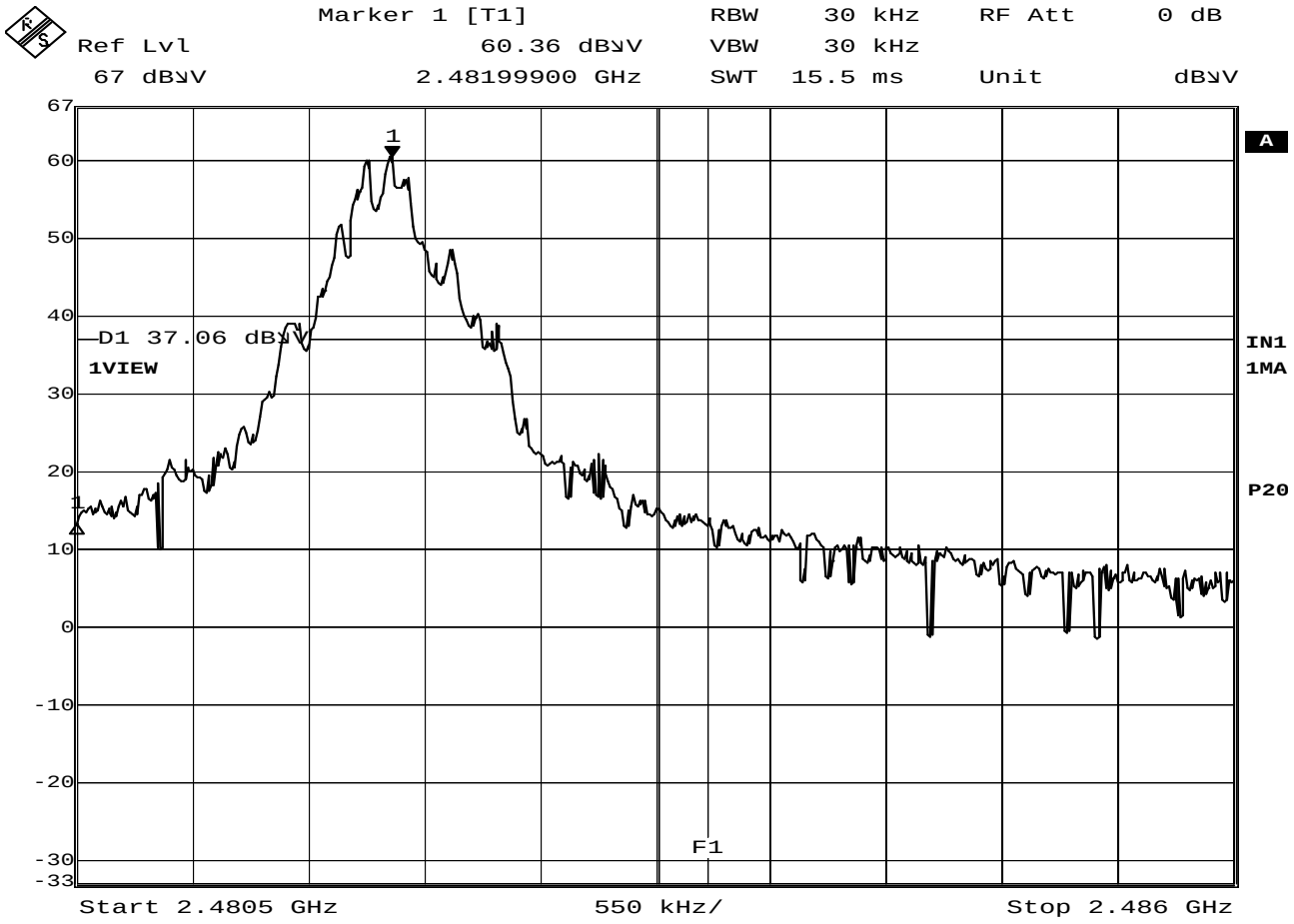


Date: 26.APR.2007 21:20:14

FCC 15.249 Band Edge Test

MANUFACTURER	:	Responsive Innovations
MODEL NUMBER	:	RCXR-01
SERIAL NUMBER	:	1
TEST MODE	:	Transmit @ 2409MHz (long packet)
TEST PARAMETERS	:	Bandedge
NOTES	:	The peak reading at 2409MHz is 96.8dBuV/m (with a 1MHz bandwidth). In order for the band edge (2400MHz) to be below the general limit of 74dBuV/m (peak), it must be down (96.8dBuV/m – 74dBuV/m) 22.8dB from the fundamental at 2474MHz.
EQUIPMENT USED	:	RBB0, NWI1

NOTES



Date: 26.APR.2007 21:34:41

FCC 15.249 Band Edge Test

MANUFACTURER	:	Responsive Innovations
MODEL NUMBER	:	RCXR-01
SERIAL NUMBER	:	1
TEST MODE	:	Transmit @ 2482MHz (long packet)
TEST PARAMETERS	:	Bandedge
NOTES	:	The peak reading at 2482MHz is 97.3dBuV/m (with a
	:	1MHz bandwidth). In order for the band edge
	:	(2483.5MHz) to be below the general limit of
	:	74dBuV/m (peak), it must be down (97.3dBuV/m –
	:	74dBuV/m) 23.3dB from the fundamental at 2482MHz.
EQUIPMENT USED	:	RBB0, NWI1

NOTES