Measurement of RF Emissions from a Cascade Networks, Inc. Model 430 - 360V Cyclone Transceiver using a Sectored 120 – 35 degree Directional antenna

For	Cascade Networks, Inc. 1111 11th Avenue Longview , WA 98632
P.O. Number	130441
Date Tested	December 17 through 28, 2010
Test Personnel	Richard King
Test Specification	FCC "Code of Federal Regulations" Title 47 Part15, Subpart C Industry Canada RSS-GEN Industry Canada RSS-210

Test Report By:

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EMC Engineer

Requested By:

Brian Magnuson
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Approved By:

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Registered Professional
Engineer of Illinois - 44894

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TABLE OF CONTENTS

REVISION HISTORY

Revision	Date	Description
—	December 29, 2010	Initial release

Measurement of RF Emissions from a Cyclone Transceiver, Model No. 430 - 360V Transmitter

1. INTRODUCTION

1.1. Scope of Tests

This report presents the results of the RF emissions measurements performed on a Cyclone Transceiver, Model No. 430 - 360V, no serial number was assigned, (hereinafter referred to as the Equipment Under Test (EUT)). The EUT was equipped with a Sectored 120 – 35 degree Directional antenna.

The EUT is a Motorola Canopy transceiver modified by Cascade Networks. It is designed to transmit in the 5725MHz to 5850MHz band.

The EUT was submitted for testing by Cascade Networks, Inc. located in Longview , WA.

1.2. Purpose

The test series was performed to determine if the EUT meets the radiated RF emission requirements in the restricted bands per the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.247 for Intentional Radiators. Testing was performed in accordance with ANSI C63.4-2003.

The test series was also performed to determine if the EUT meets the radiated RF emission requirements of the Industry Canada Radio Standards Specification RSS-Gen and RSS-210 for Transmitters.

1.3. Deviations, Additions and Exclusions

There were no deviations, additions to, or exclusions from the test specification during this test series.

1.4. EMC Laboratory Identification

This series of tests was performed by Elite Electronic Engineering Incorporated of Downers Grove, Illinois. The laboratory is accredited by The American Association for Laboratory Accreditation (A2LA). A2LA Certificate Number: 1786.01.

1.5. Laboratory Conditions

The temperature at the time of the test was 22^{o}C and the relative humidity was 16%.

2. 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, Subpart C, dated 1 October 2010
- 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"
- Industry Canada Radio Standards Specification, RSS-Gen, “General Requirements and Information for the Certification of Radiocommunication Equipment”, Issue 3, December 2010
- Industry Canada Radio Standards Specification, RSS-210, “Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment”, Issue 8, December 2010

3. EUT Setup and Operation

3.1. General Description

The EUT is a Cascade Networks, Inc., Cyclone Transceiver, Model No. 430 - 360V. A block diagram of the EUT setup is shown as Figure 1.

3.1.1. Power Input

The EUT was powered with 56VDC from a Motorola model PS145W-560(MOT) transformer via the 30 feet of CAT 5 ethernet cable.

3.1.2. Peripheral Equipment

The test item was submitted with a Sony Viao laptop that was used to power and communicate with the test item via one 30 foot long CAT 5 ethernet cable.

3.1.3. Signal Input/Output Leads

The EUT was connected to the laptop via a 30 foot long CAT 5 ethernet cable.

3.1.4. Grounding

The EUT was grounded via the 30 feet of CAT 5 ethernet cable to the transformer.

3.2. Operational Mode

For all tests the EUT was placed on an 80cm high non-conductive stand. The EUT and all peripheral equipment were energized.

For all tests, the EUT was controlled and powered by the laptop computer. Through the computer the EUT was set to transmit continuously in a continuous wave mode. The tests were performed with the EUT transmitting at 5730MHz, 5775MHz and 5845MHz.

3.3. EUT Modifications

No modifications were required for compliance to the requirements.

4. Test Facility and Test Instrumentation

4.1. Shielded Enclosure

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. With the exception of the floor, the reflective surfaces of the shielded chamber are lined with ferrite tiles on the walls and ceiling. 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.

4.2. Test Instrumentation

The test instrumentation and auxiliary equipment used during the tests are listed in Table 9-1. All equipment was calibrated per the instruction manuals supplied by the manufacturer.

Radiated emission measurements were performed with a spectrum analyzer. This receiver allows measurements with the bandwidths and detector functions specified by the FCC. The receiver bandwidth was 120kHz for the 30MHz to 1000MHz radiated emissions data and 1MHz for radiated emissions data above 1000MHz.

4.3. 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).

4.4. 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 Emissions Measurements		
Combined Standard Uncertainty	1.07	-1.07
Expanded Uncertainty (95% confidence)	2.1	-2.1

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

5. TEST PROCEDURES

5.1. Powerline Conducted Emissions

5.1.1. Requirements

The conducted emissions were not addressed in the test sequence.

5.2. Radiated Measurements

5.2.1. Requirements

Per section 15.247(c), the radiated emissions which fall in the restricted bands must meet the general limits of 15.209.

5.2.2. 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.

Preliminary radiated measurements are performed to determine the frequencies where the significant emissions might be found. With the EUT at one set position and the measurement antenna at a set height (i.e. without maximizing), the radiated emissions were measured using peak detection with 100 kHz BW. This data was then automatically plotted from 30MHz to 40GHz.

Next, the harmonic or spurious emissions falling in the restricted bands were measured up through 40GHz. For these measurements, the measurement bandwidths were set to 1 MHz RBW. The analyzer was set to linear mode with 10 Hz VBW in order to simulate an average detector. A pre-amplifier was used to increase the receiver sensitivity from 18GHz to 40GHz.

A -3.5dB (-3.5dB = 20 * Log (2m/3m)) distance correction factor was applied to the final emissions data below 18GHz.

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

1) The EUT 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) In instances where it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer and the antenna cannot be raised to 4 meters. The measuring antenna is raised or lowered as much as the cable will allow and the EUT is rotated through all axis to ensure the maximum readings are recorded.

5.2.3.Results

The preliminary plots, with the EUT transmitting are presented on data pages 12 and 42. The plots are presented for a reference only, and are not used to determine compliance.

The final open area radiated levels, with the EUT transmitting are presented on data pages 43 through 45. As can be seen from the data, all emissions measured from the EUT were within the specification limits. Photographs of the test configuration are shown on Figure 2.

6. OTHER TEST CONDITIONS

6.1. Test Personnel and Witnesses

All tests were performed by qualified personnel from Elite Electronic Engineering Incorporated.

6.2. Disposition of the EUT

The EUT and all associated equipment were returned to Cascade Networks, Inc. upon completion of the tests.

7. CONCLUSIONS

It was determined that the Cascade Networks, Inc. Cyclone Transceiver, Model No. 430 - 360V, when equipped with a Sectored 120 – 35 degree Directional antenna, did fully meet the radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.205 et seq. for Intentional Radiators, when tested per ANSI C63.4-2003.

It was determined that the Cascade Networks, Inc. Cyclone Transceiver, Model No. 430 - 360V, when equipped with a Sectored 120 – 35 degree Directional antenna, did fully meet the radiated emission requirements for the Industry Canada Radio Standards Specification RSS-Gen and RSS-210 for Transmitters.

8. 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 EUT at the test date. Any electrical or mechanical modification made to the EUT subsequent to the specified test date will serve to invalidate the data and void this certification.

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

9. EQUIPMENT LIST

Table 9-1 Equipment List

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
APW0	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-30-20G20R6G	PL2926/0646	20GHZ-26.5GHZ	8/27/2010	8/27/2011
APW5	PREAMPLIFIER	PLANAR	PE2-36-26D540G-5R0-1	PL3044/0651	26.5GHZ-40GHZ	8/27/2010	8/27/2011
NHG0	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ	NOTE 1	
NHH0	STANDARD GAIN HORN ANTENNA	NARDA	V637	---	26.5-40GHZ	NOTE 1	
NTA2	BILOG ANTENNA	TESEQ	6112D	28040	25-1000MHz	6/7/2010	6/7/2011
NWH0	RIDGED WAVE GUIDE	TENSOR	4105	2081	1-12.4GHZ	8/31/2010	8/31/2011
NWI0	RIDGED WAVE GUIDE	AEL	H1498	153	2-18GHZ	12/5/2009	2/5/2011
RBB0	EMI TEST RECEIVER 20HZ TO 40 GHZ.	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	3/16/2010	3/16/2011
XOA2	WAVE-TO-COAX ADAPTER	HEWLETT PACKARD	R281B	01138	26.5-65GHZ	NOTE 1	
XOB2	ADAPTER	HEWLETT PACKARD	K281C,012	09407	18-26.5GHZ	NOTE 1	

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.

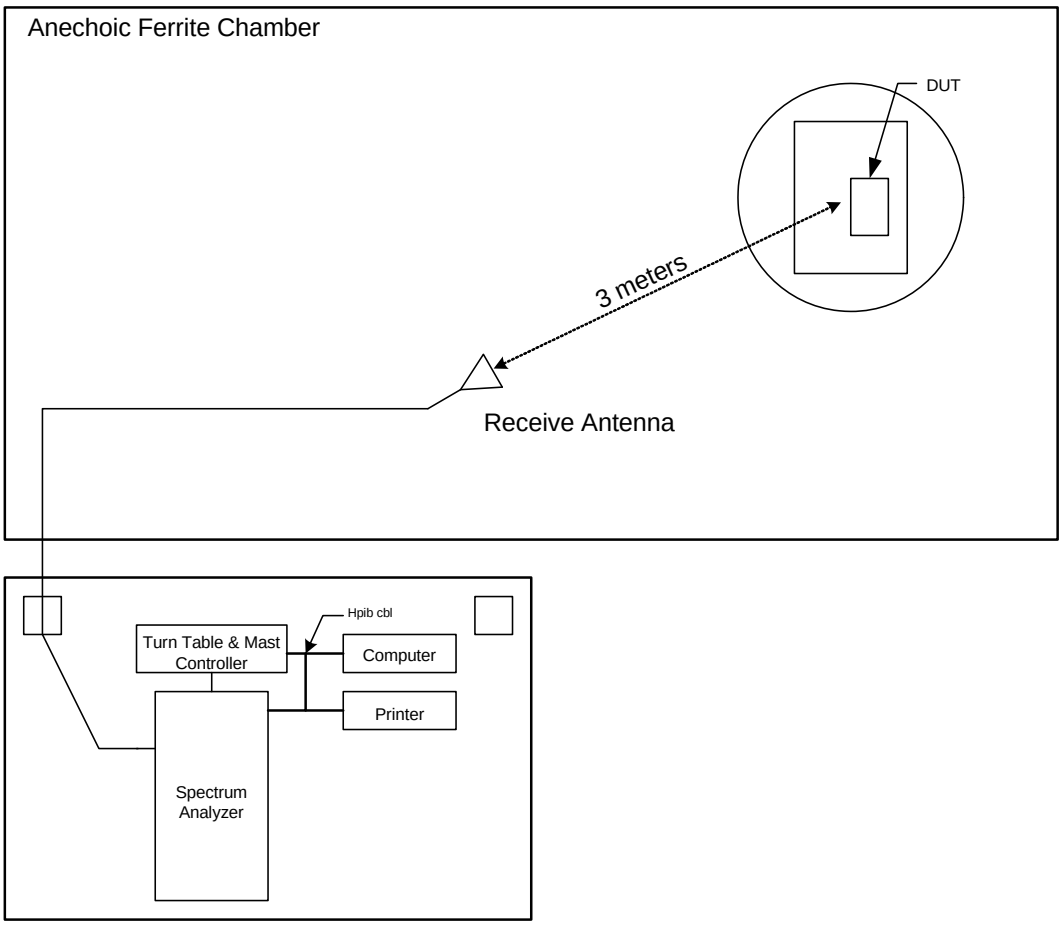


FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

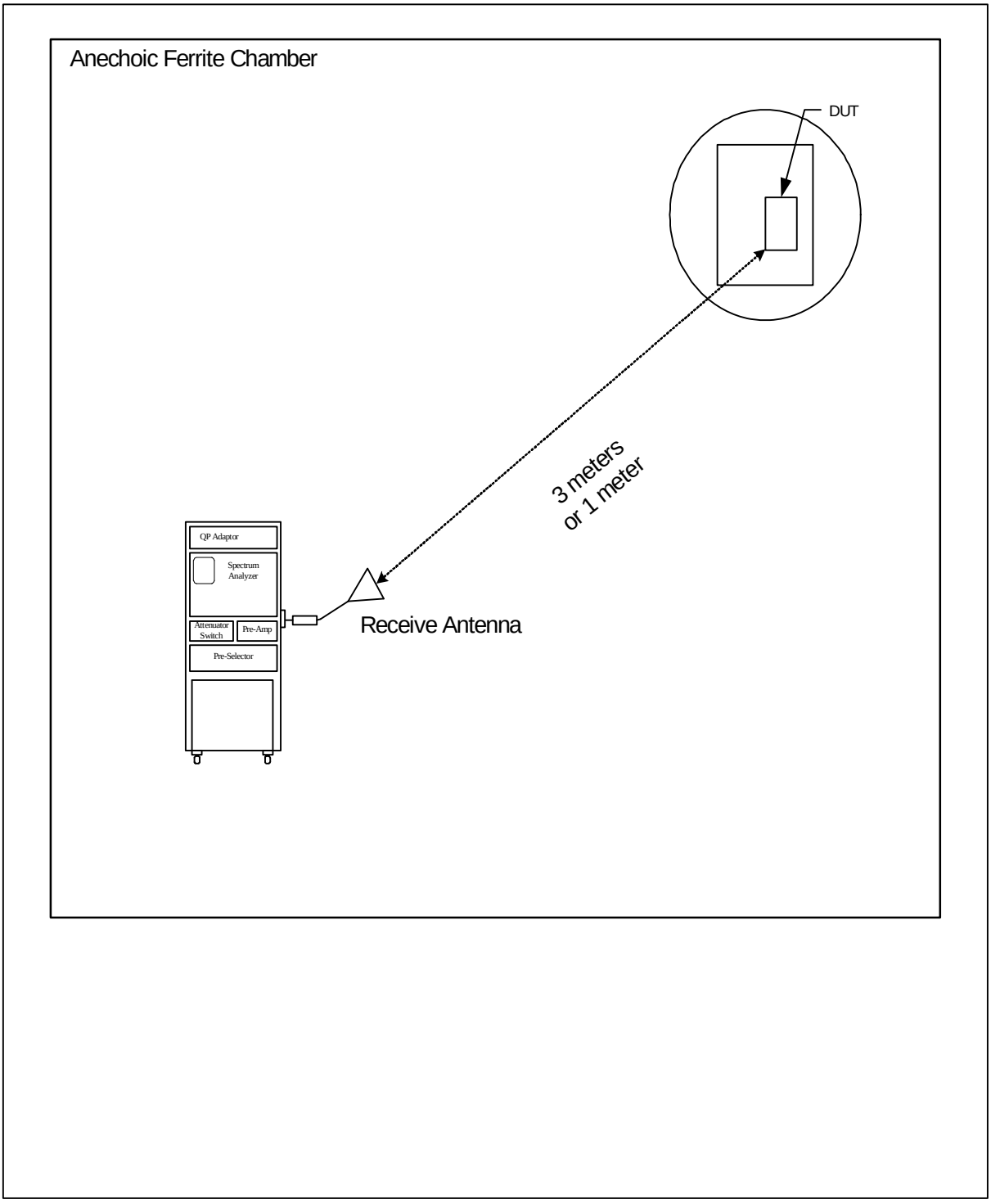
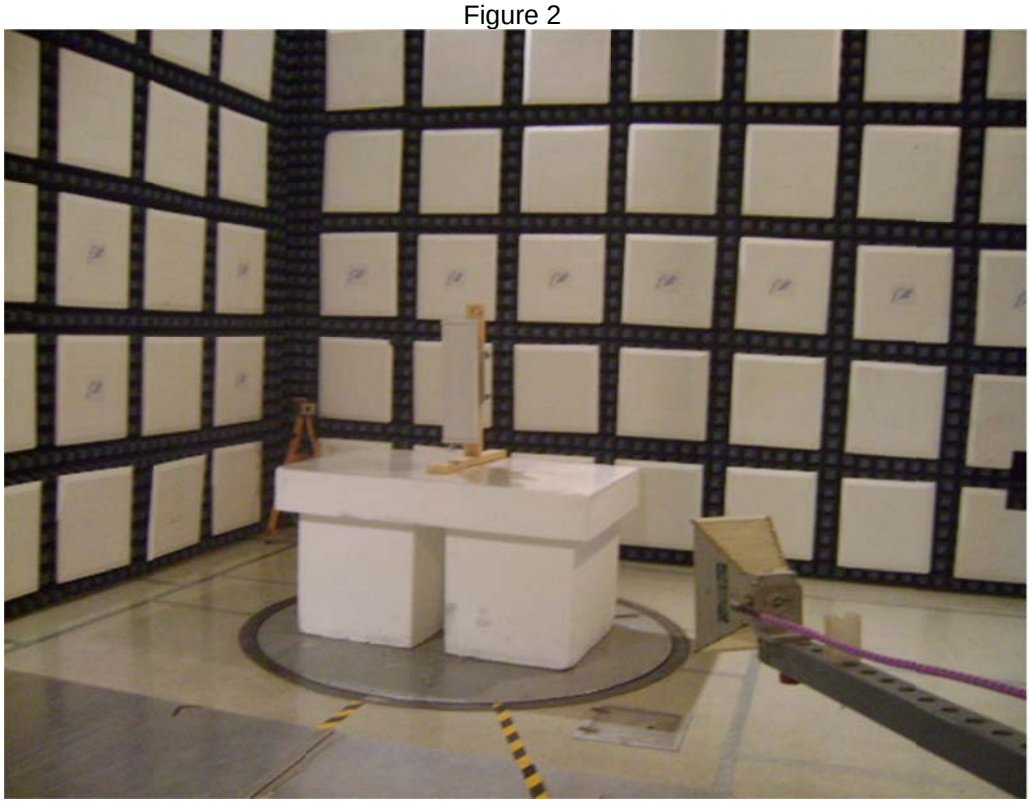
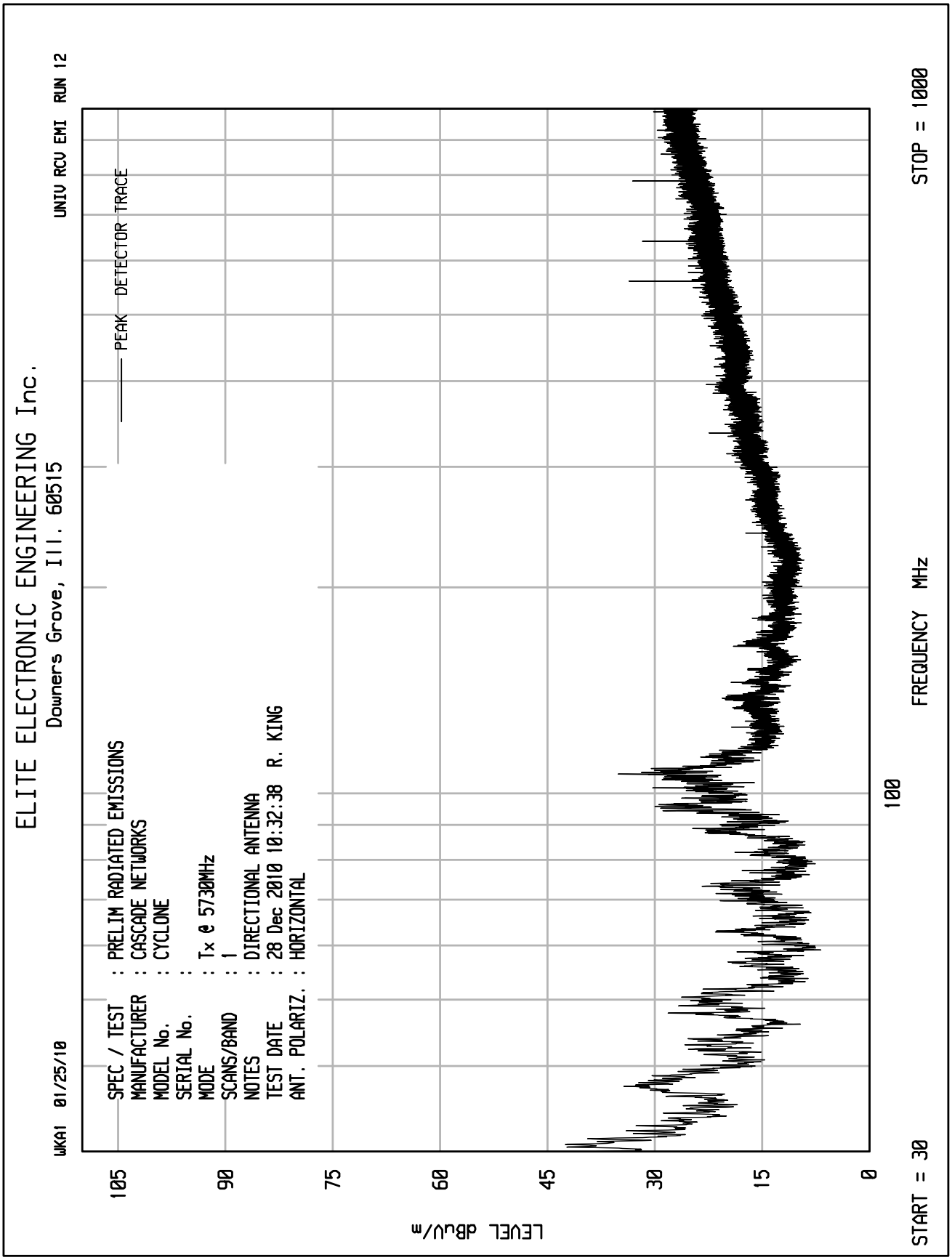

Anechoic Ferrite Chamber
DUT
3 meters
or 1 meter
QP Adaptor
Spectrum
Analyzer
Attenuator
Switch
Pre-Amp
Pre-Selector
Receive Antenna

Figure 2



Test Setup for Radiated Emissions Horizontal Polarization

Test Setup for Radiated Emissions Vertical Polarization


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 12
WKA1 01/25/10
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5730MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 10:32:38 R. KING
ANT. POLARIZ. : HORIZONTAL
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105
90
75
60
45
30
15
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START = 30
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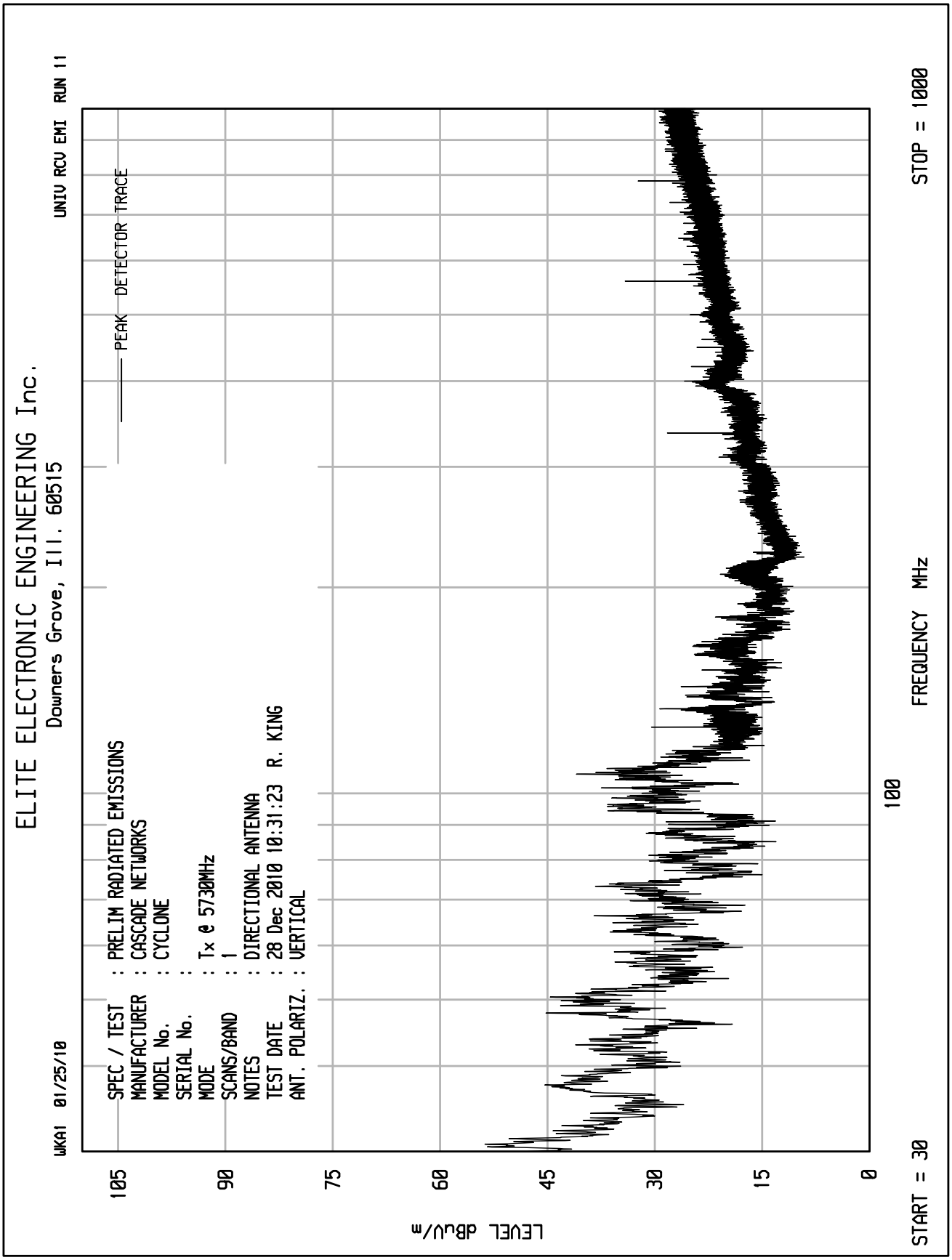
FREQUENCY MHz
STOP = 1000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Downers Grove, Ill. 60515
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SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5730MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 10:31:23 R. KING
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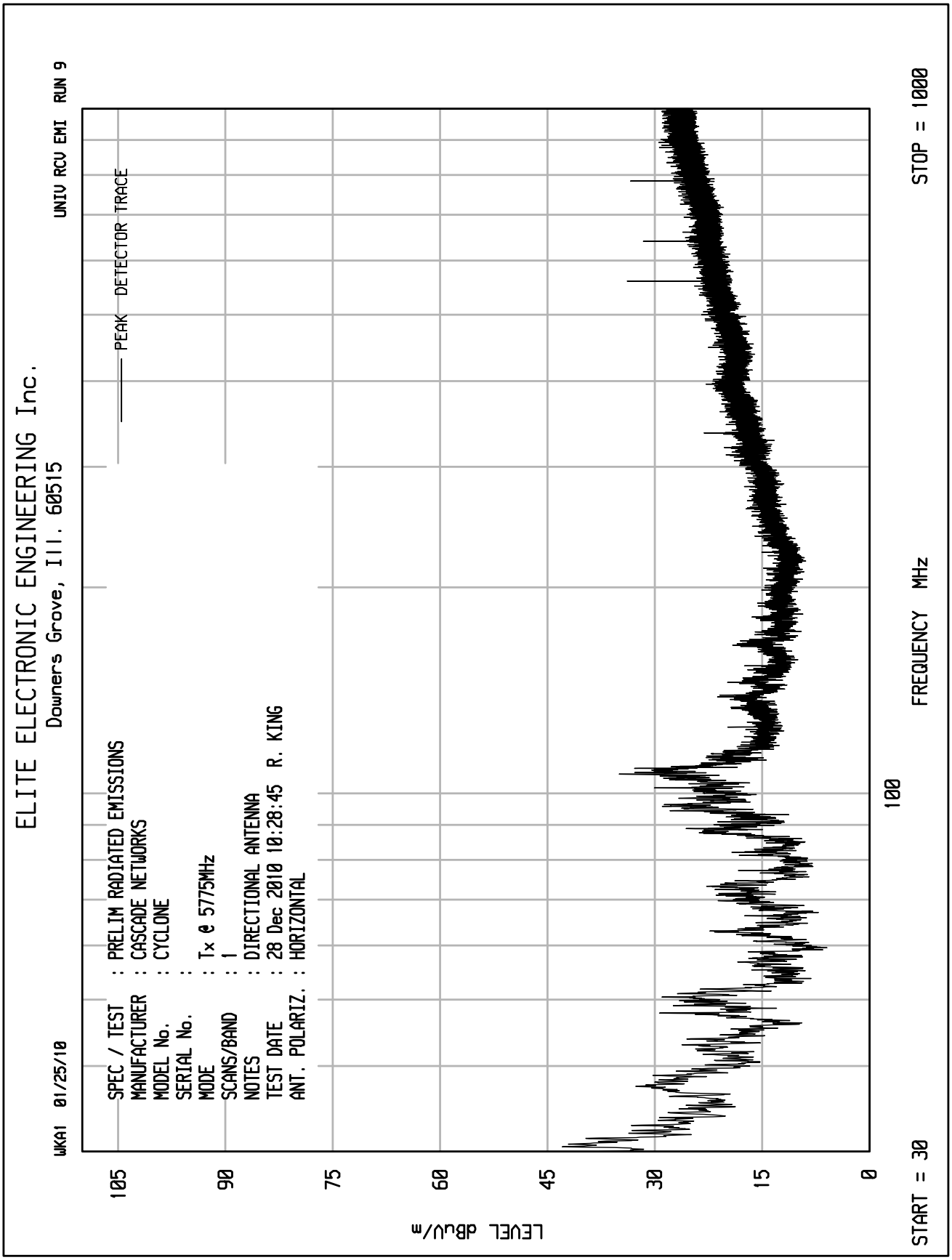
FREQUENCY MHz
STOP = 1000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Downers Grove, Ill. 60515
UNIV RCV EMI RUN 9
WKA1 01/25/10
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5775MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 10:28:45 R. KING
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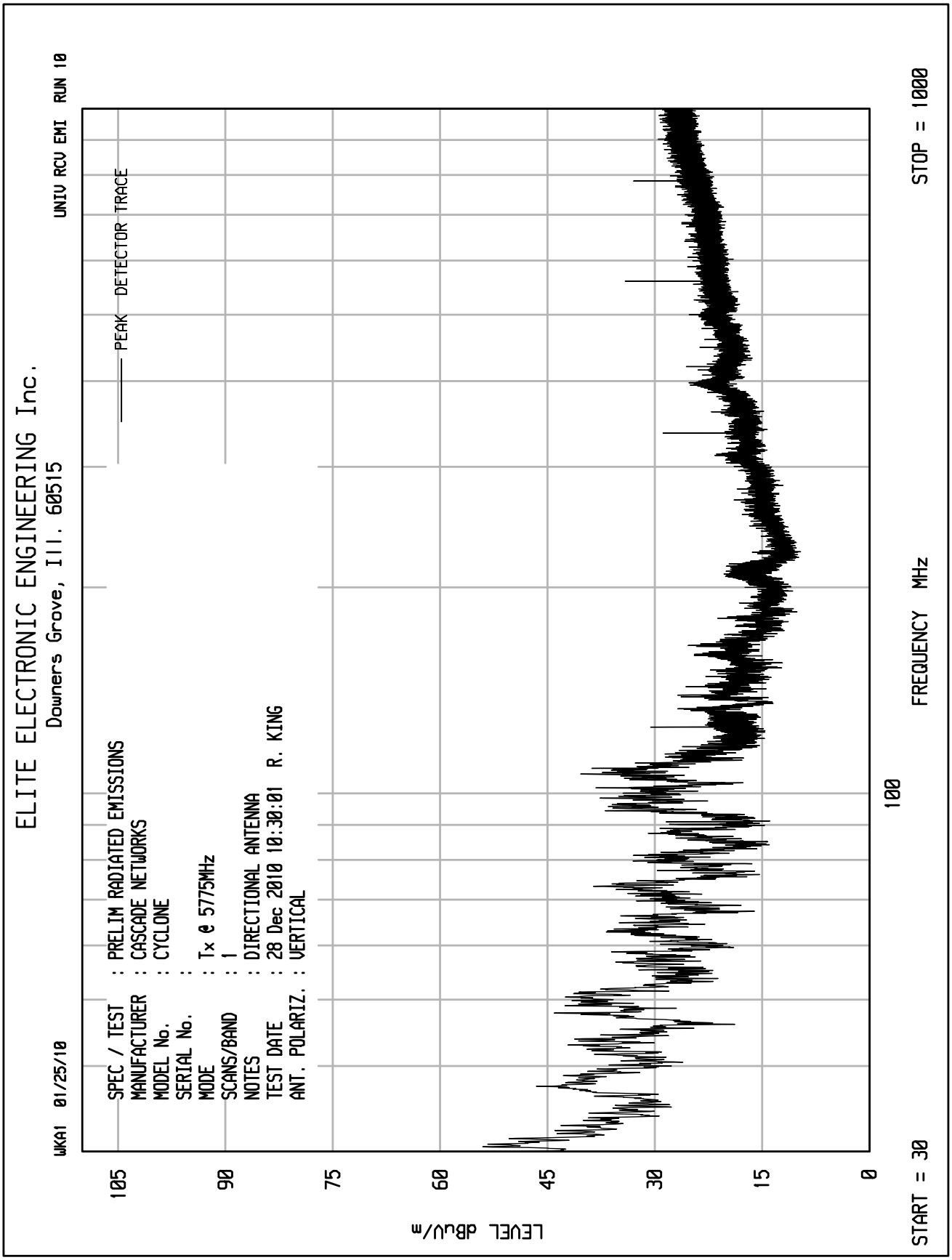
FREQUENCY MHz
STOP = 1000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
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SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
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SERIAL No. :
MODE : Tx @ 5775MHz
SCANS/BAND : 1
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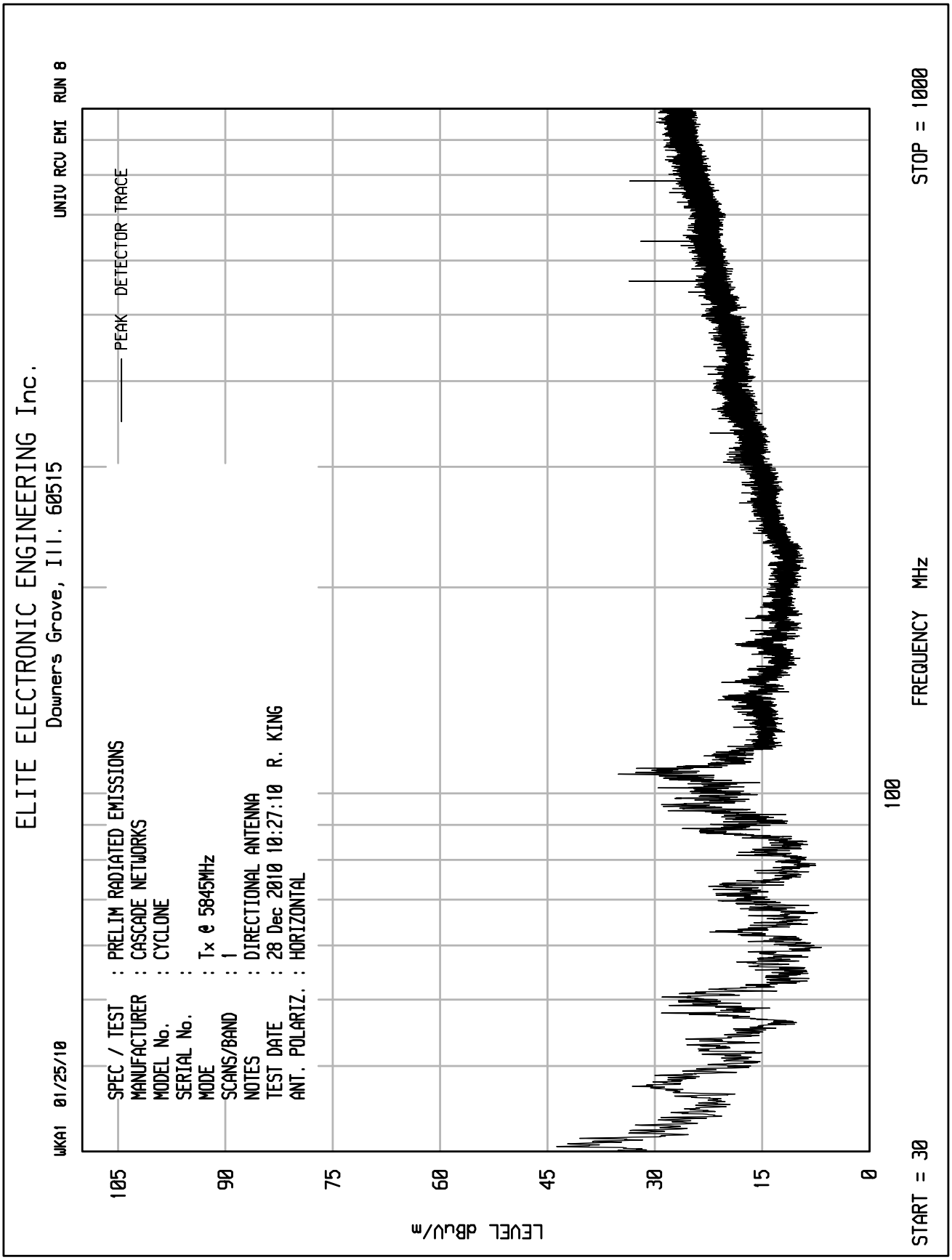
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Downers Grove, Ill. 60515
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SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5845MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 10:27:10 R. KING
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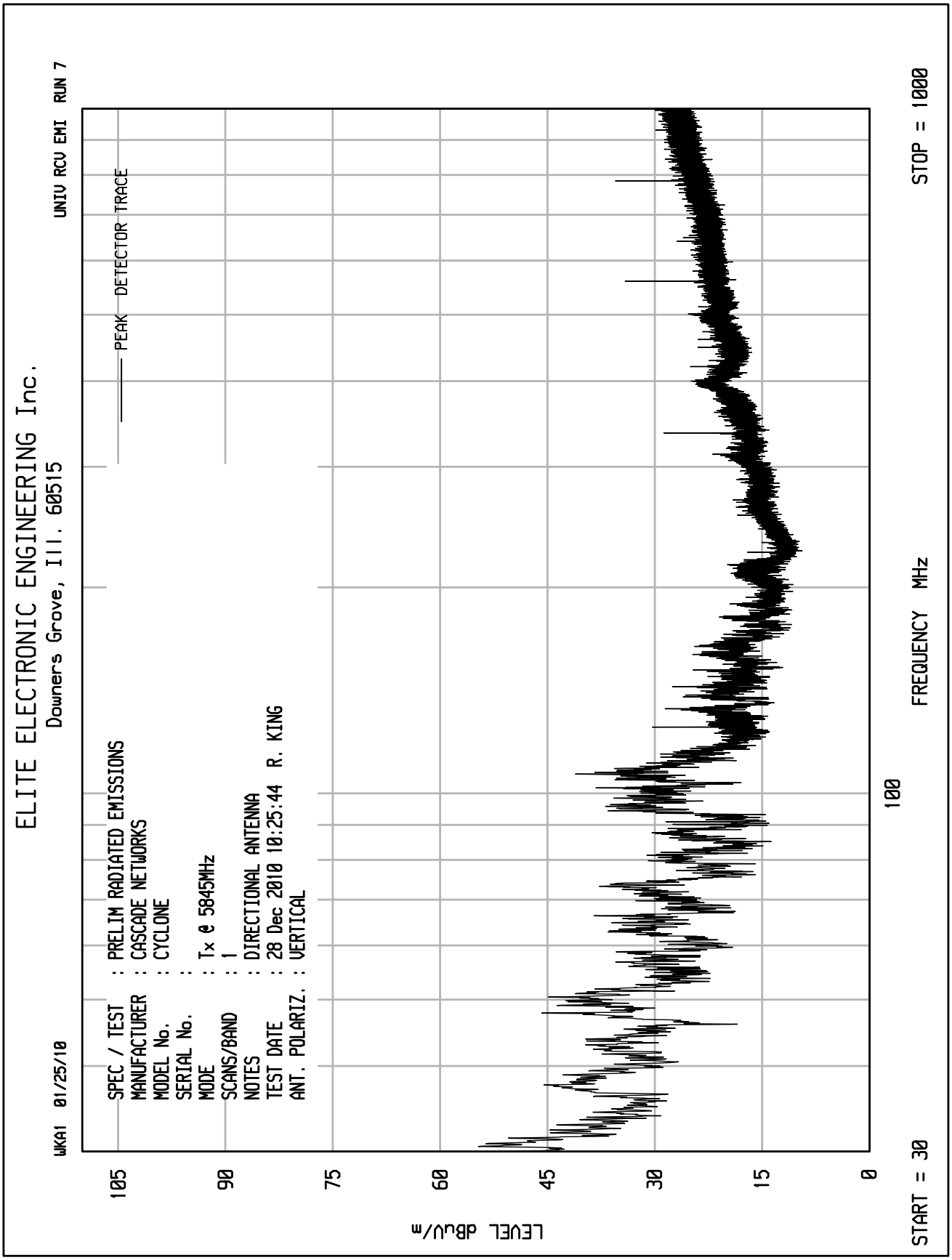
ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
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WKA1 01/25/10
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5845MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 10:25:44 R. KING
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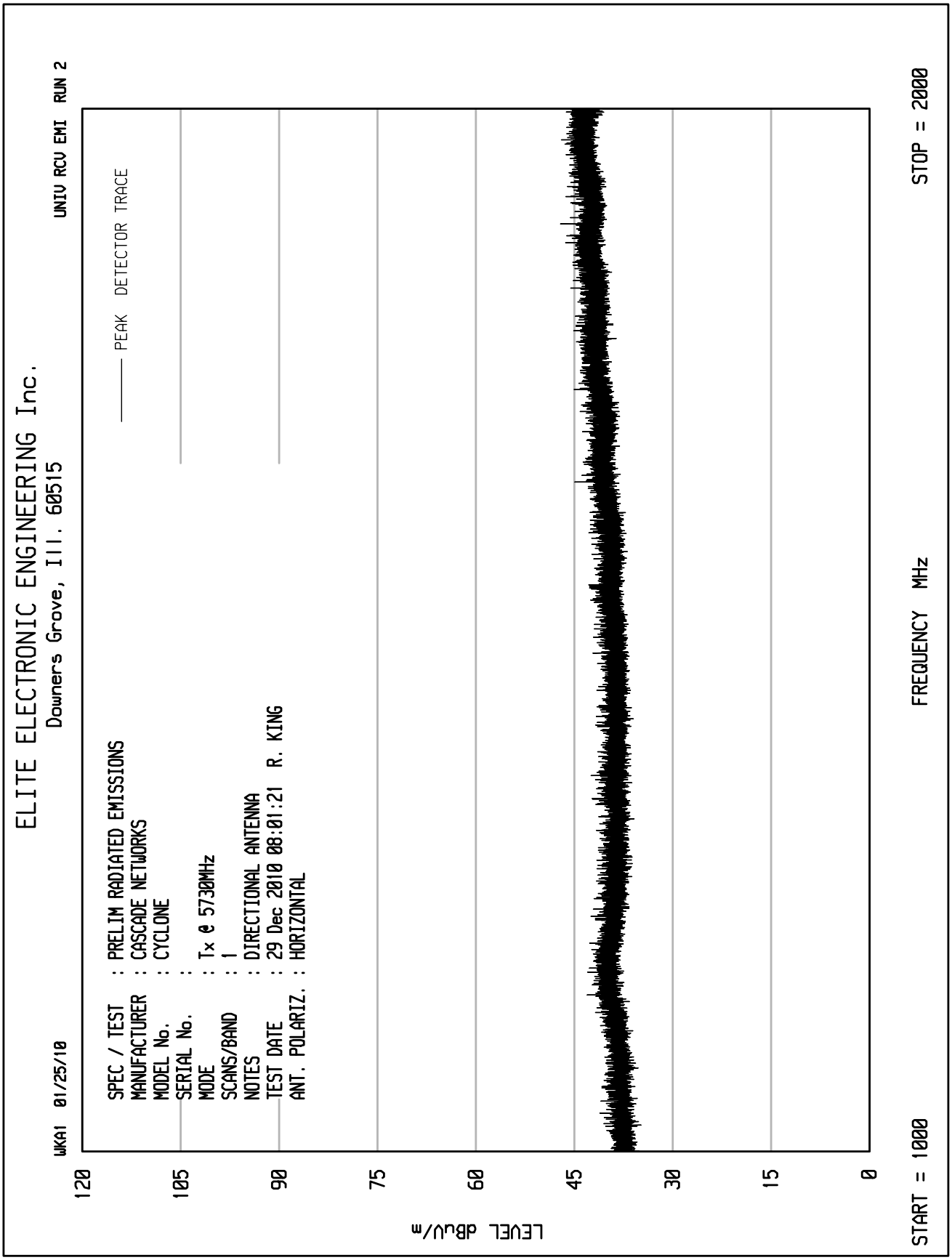
ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
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WKA1 01/25/10
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5730MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 29 Dec 2010 08:01:21 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
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75
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45
30
15
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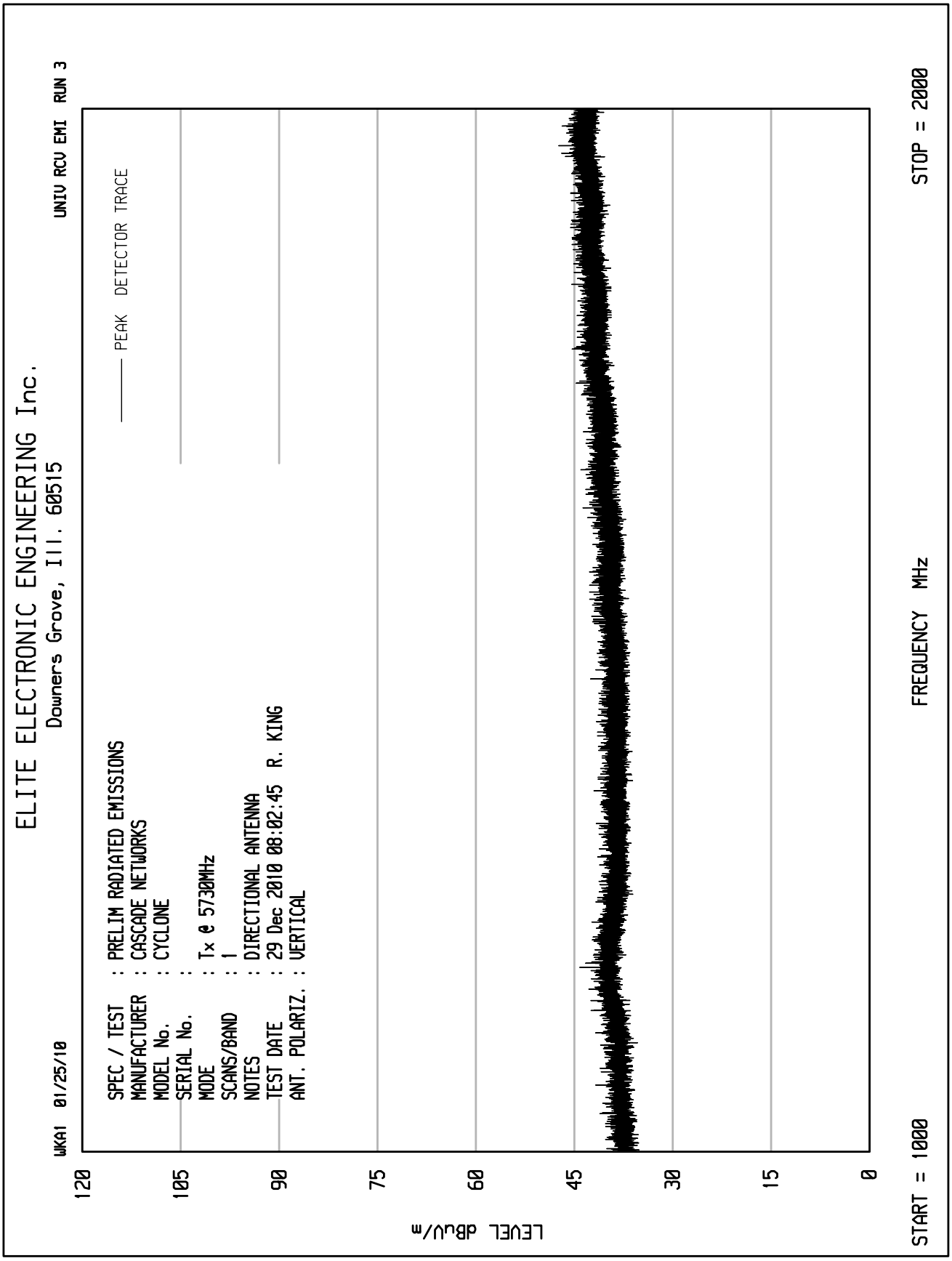
STOP = 2000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Downers Grove, Ill. 60515
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WKA1 01/25/10
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5730MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 29 Dec 2010 08:02:45 R. KING
ANT. POLARIZ. : VERTICAL
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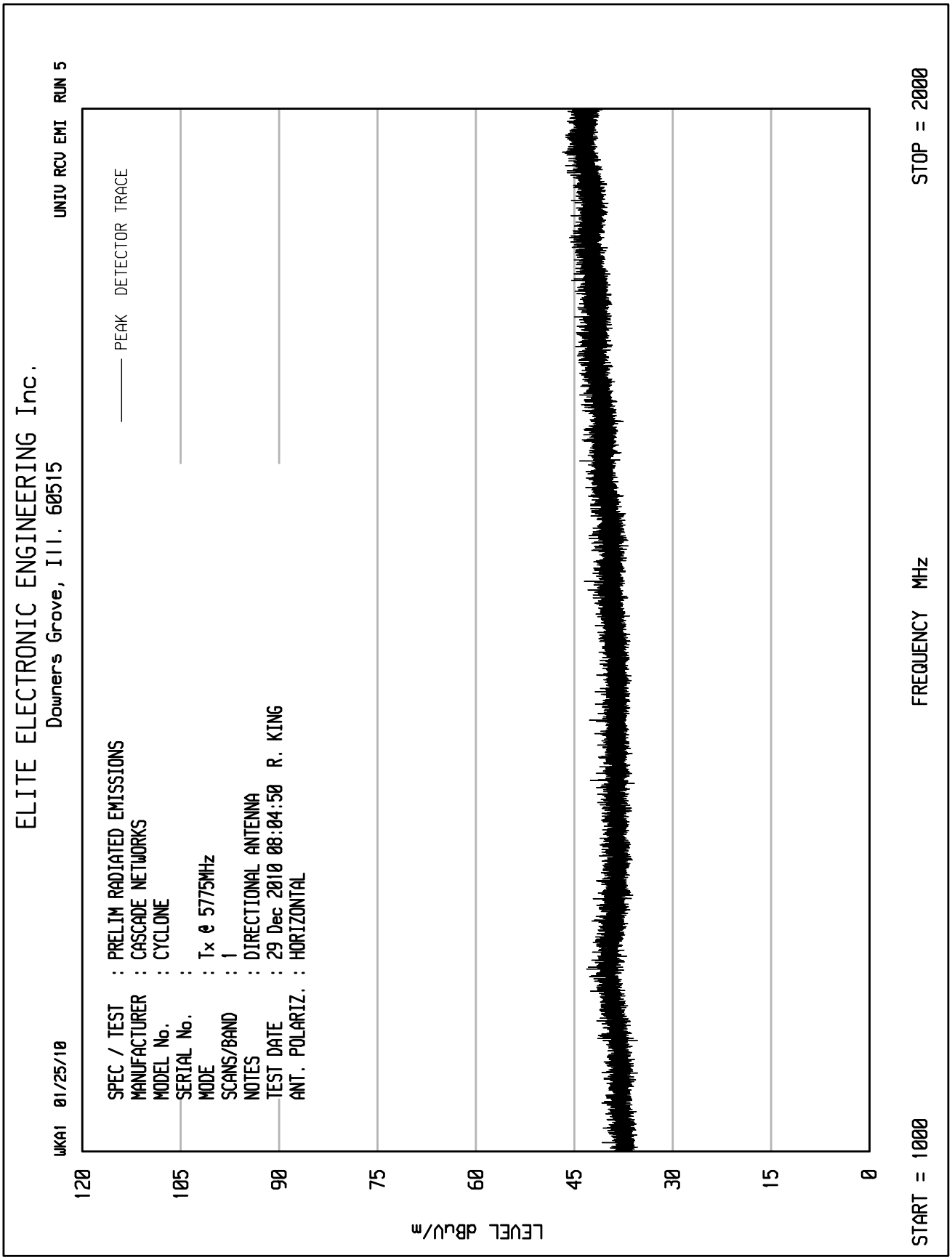
ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 5
WKA1 01/25/10
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5775MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 29 Dec 2010 08:04:50 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
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105
90
75
60
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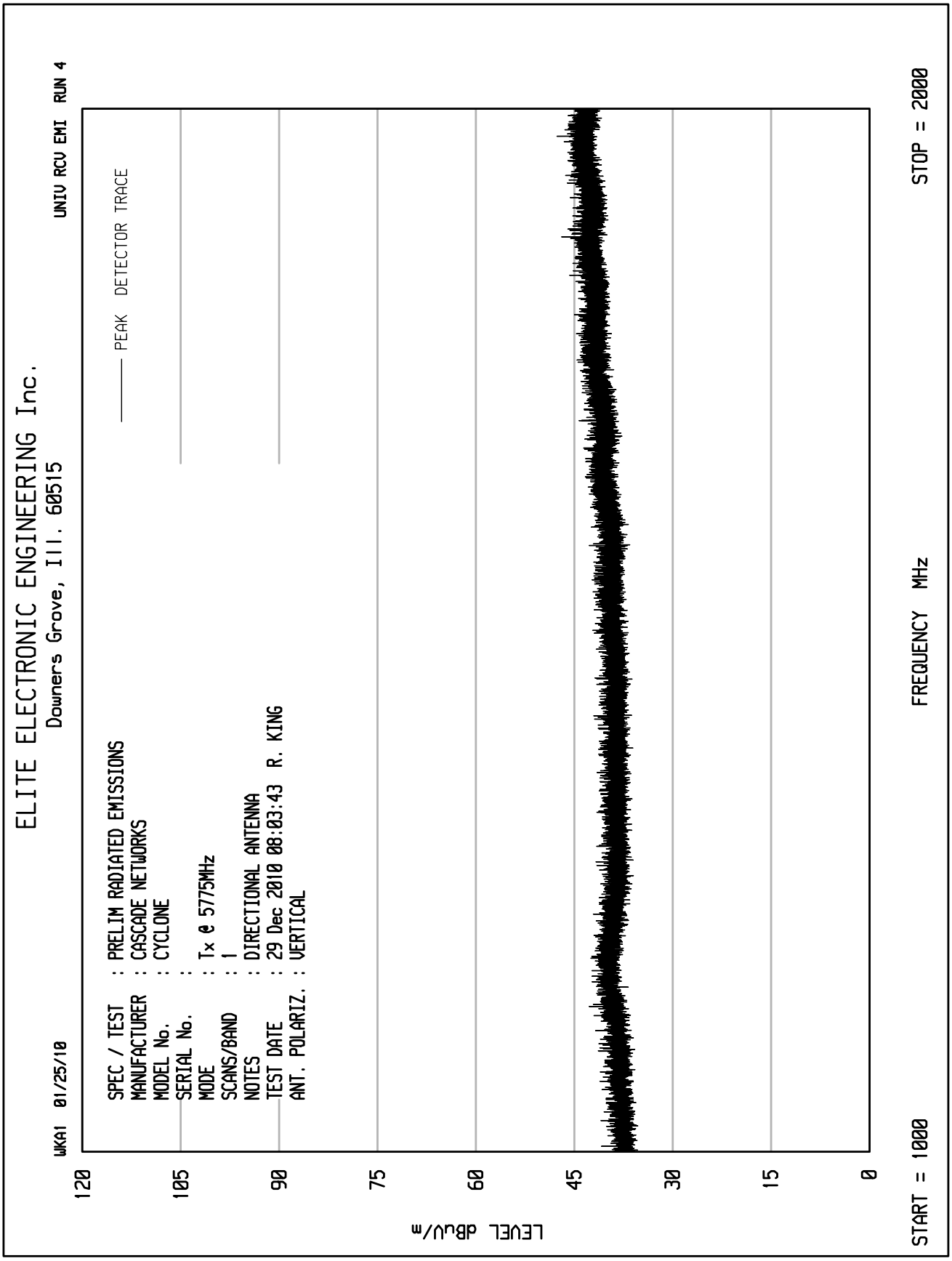
ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 4
WKA1 01/25/10
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5775MHz
SCANS/BAND : 1
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TEST DATE : 29 Dec 2010 08:03:43 R. KING
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15
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FREQUENCY MHz
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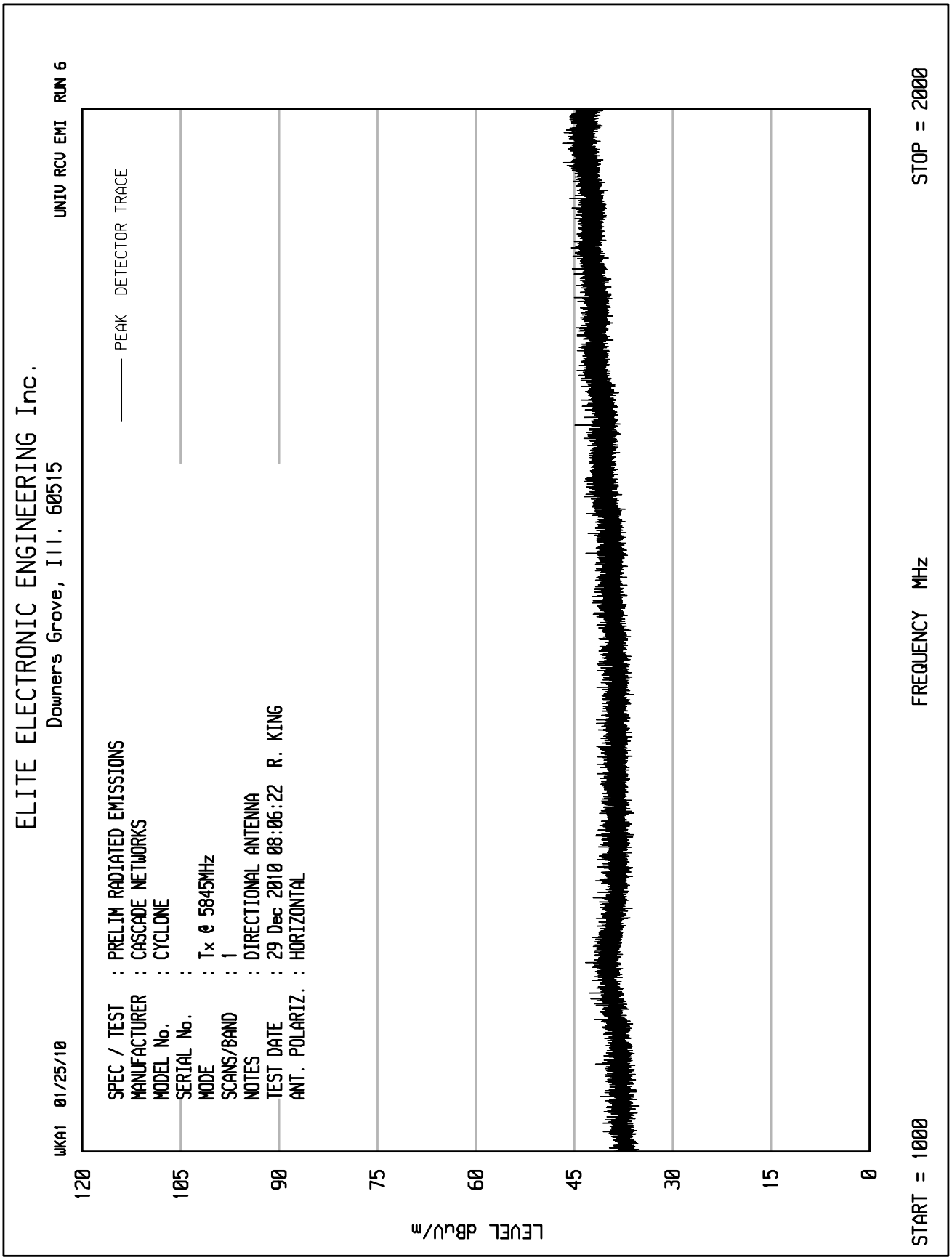
ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 6
WKA1 01/25/10
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5845MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 29 Dec 2010 08:06:22 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
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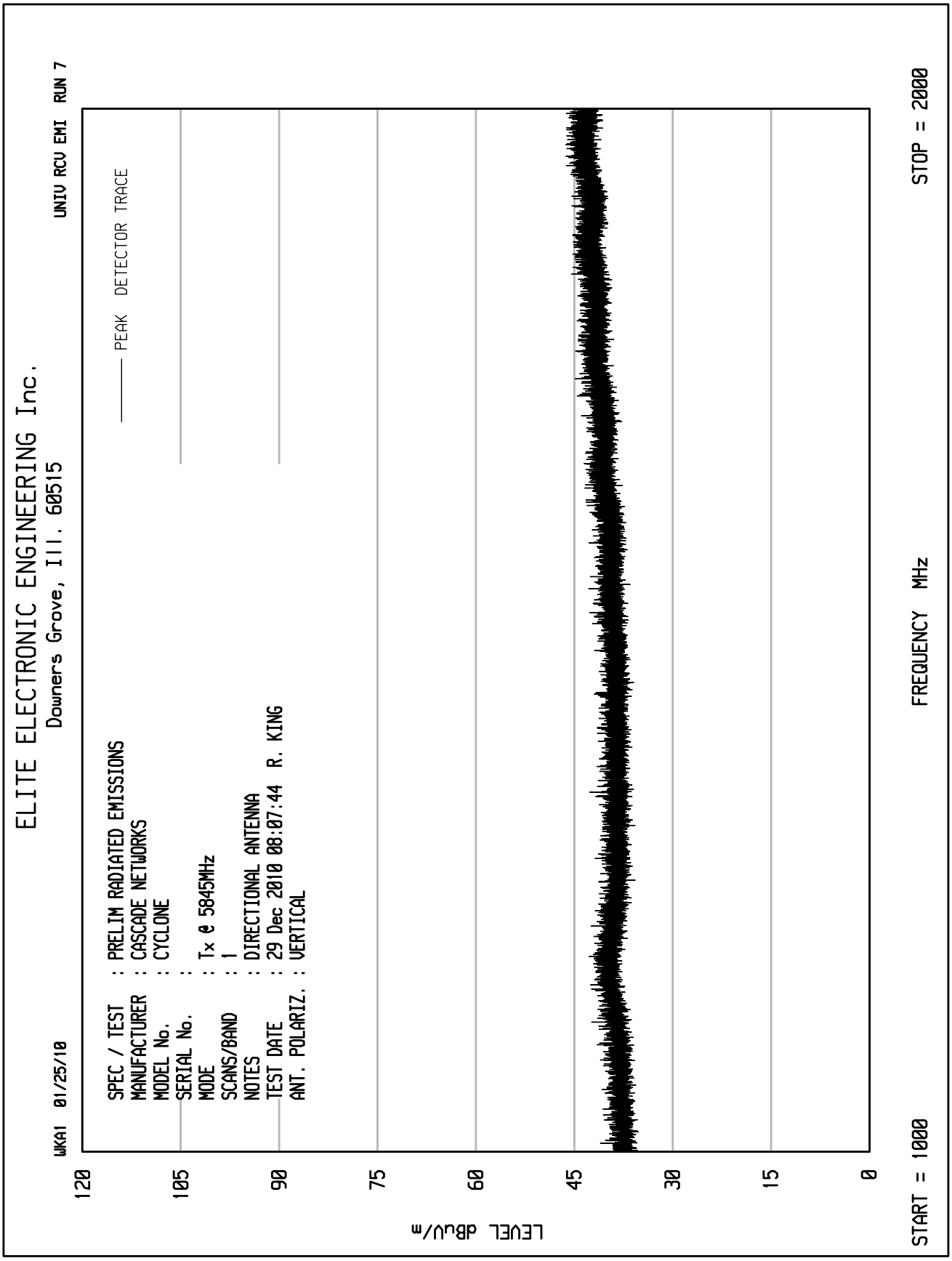
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 2000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 7
WKA1 01/25/10
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5845MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 29 Dec 2010 08:07:44 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
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90
75
60
45
30
15
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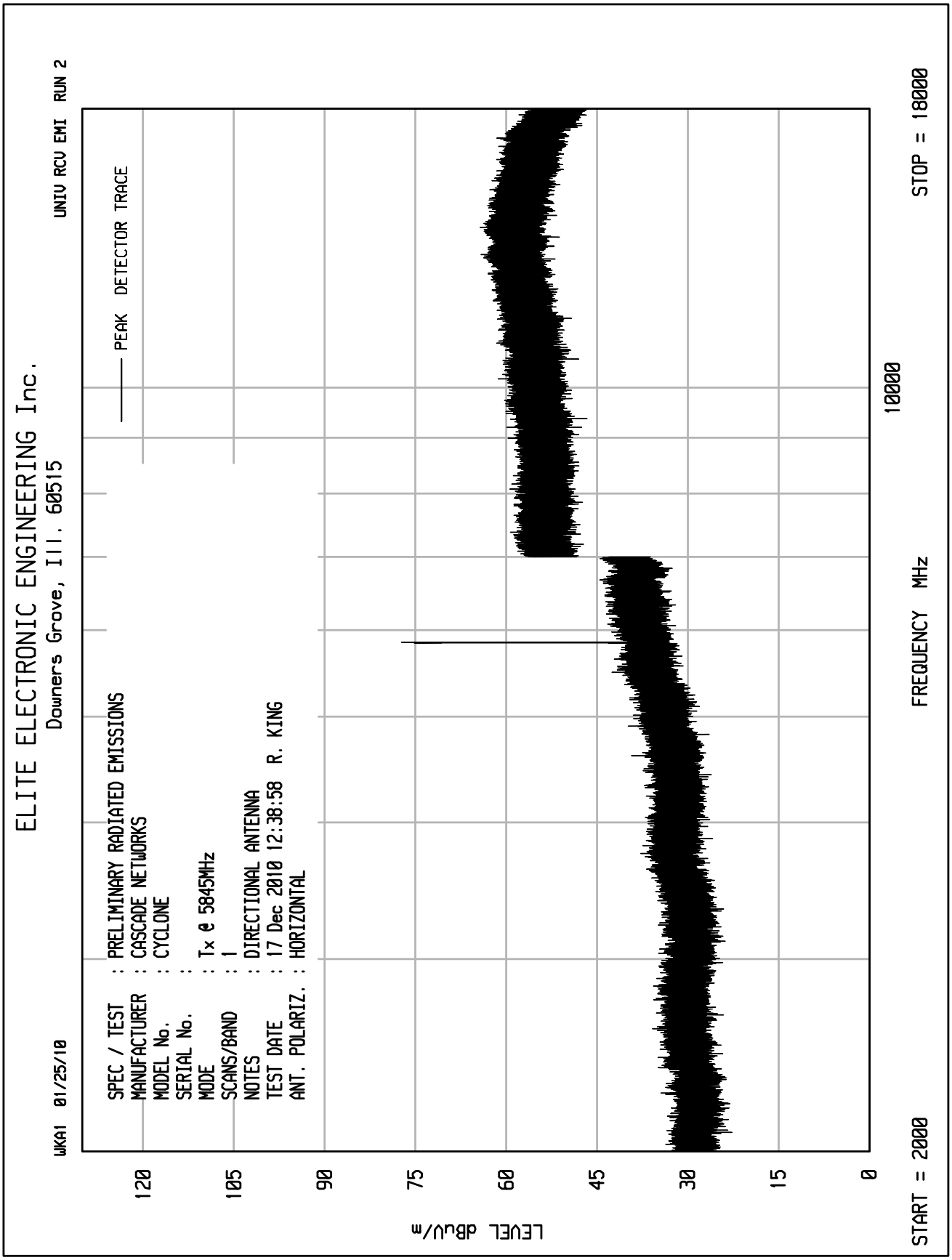
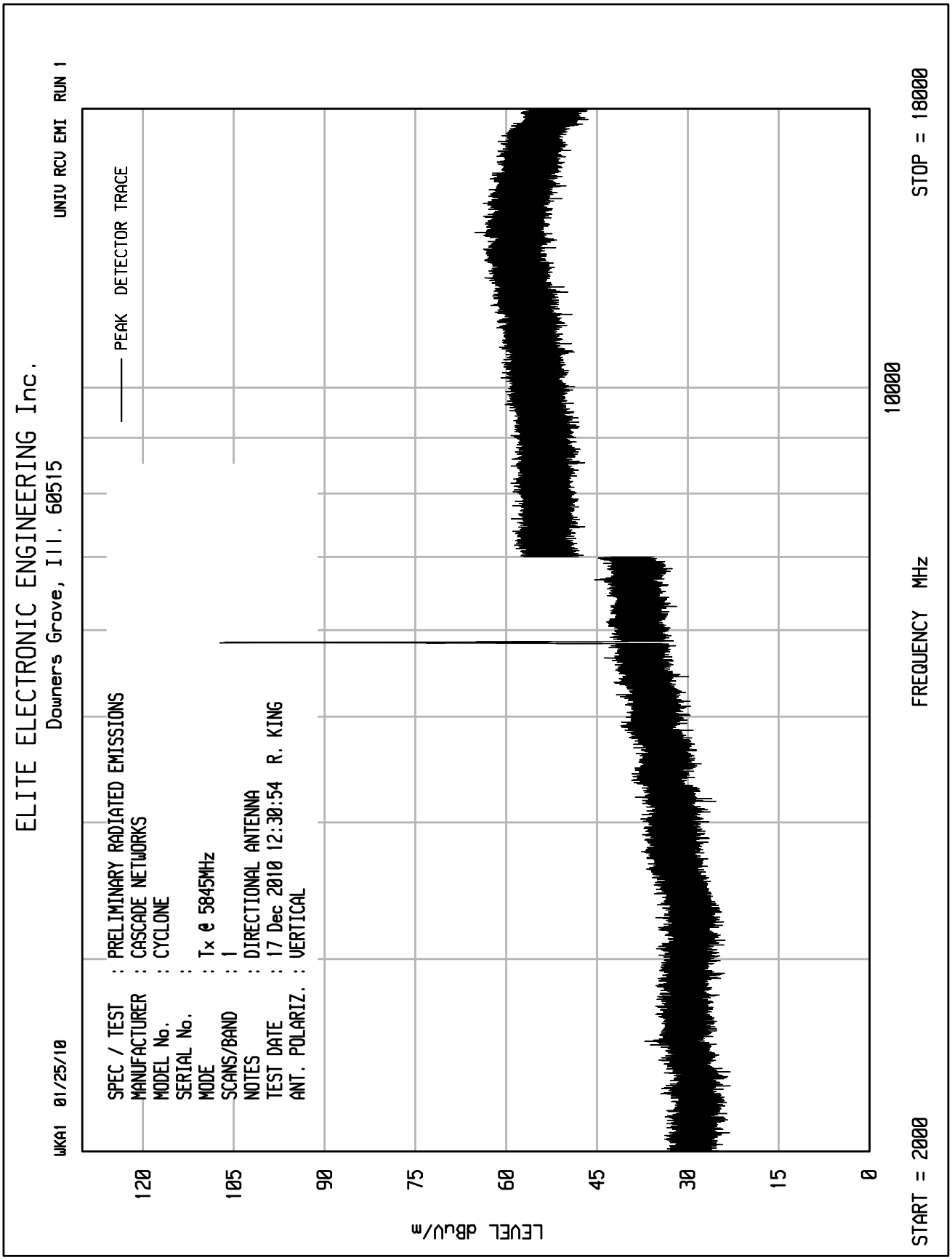
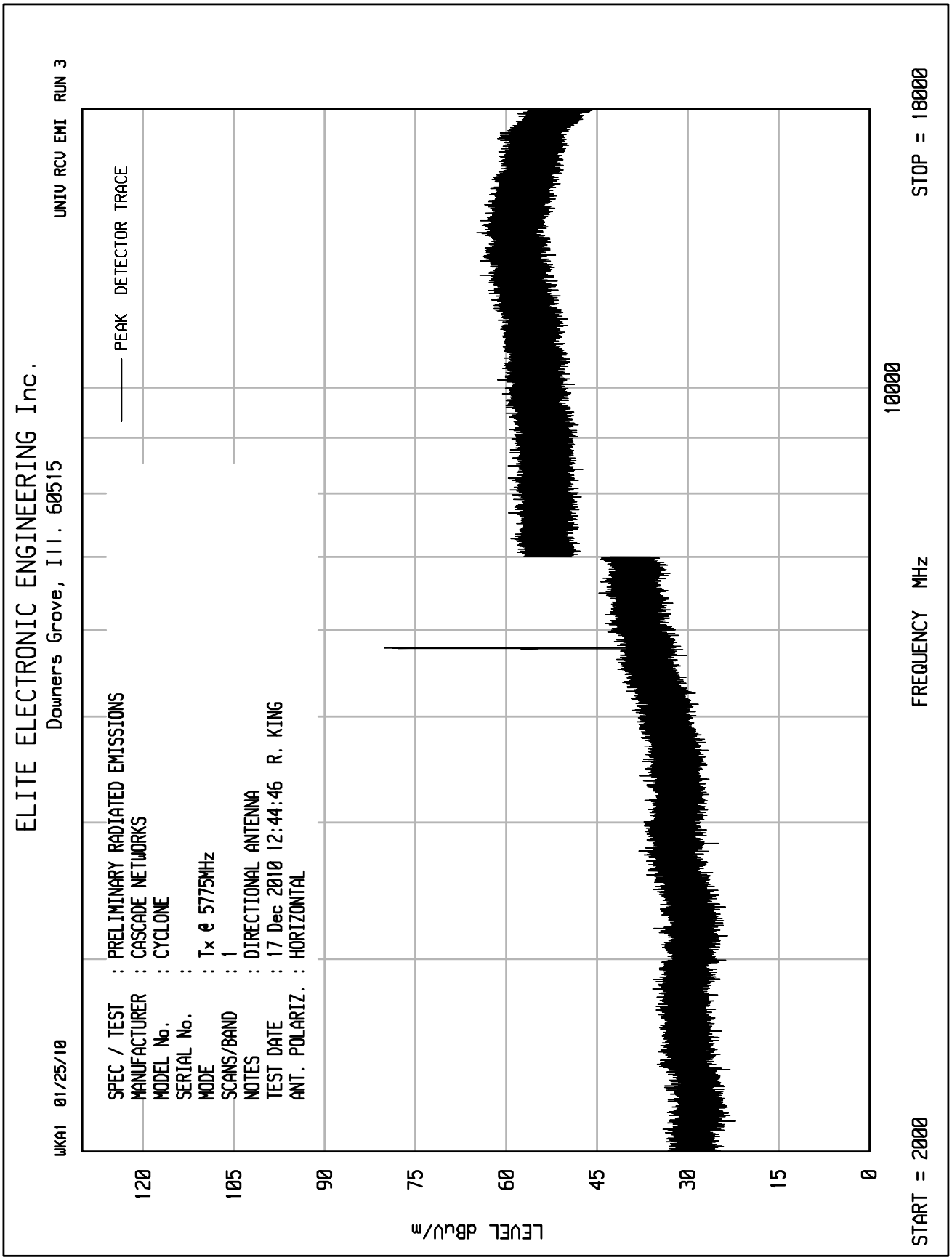
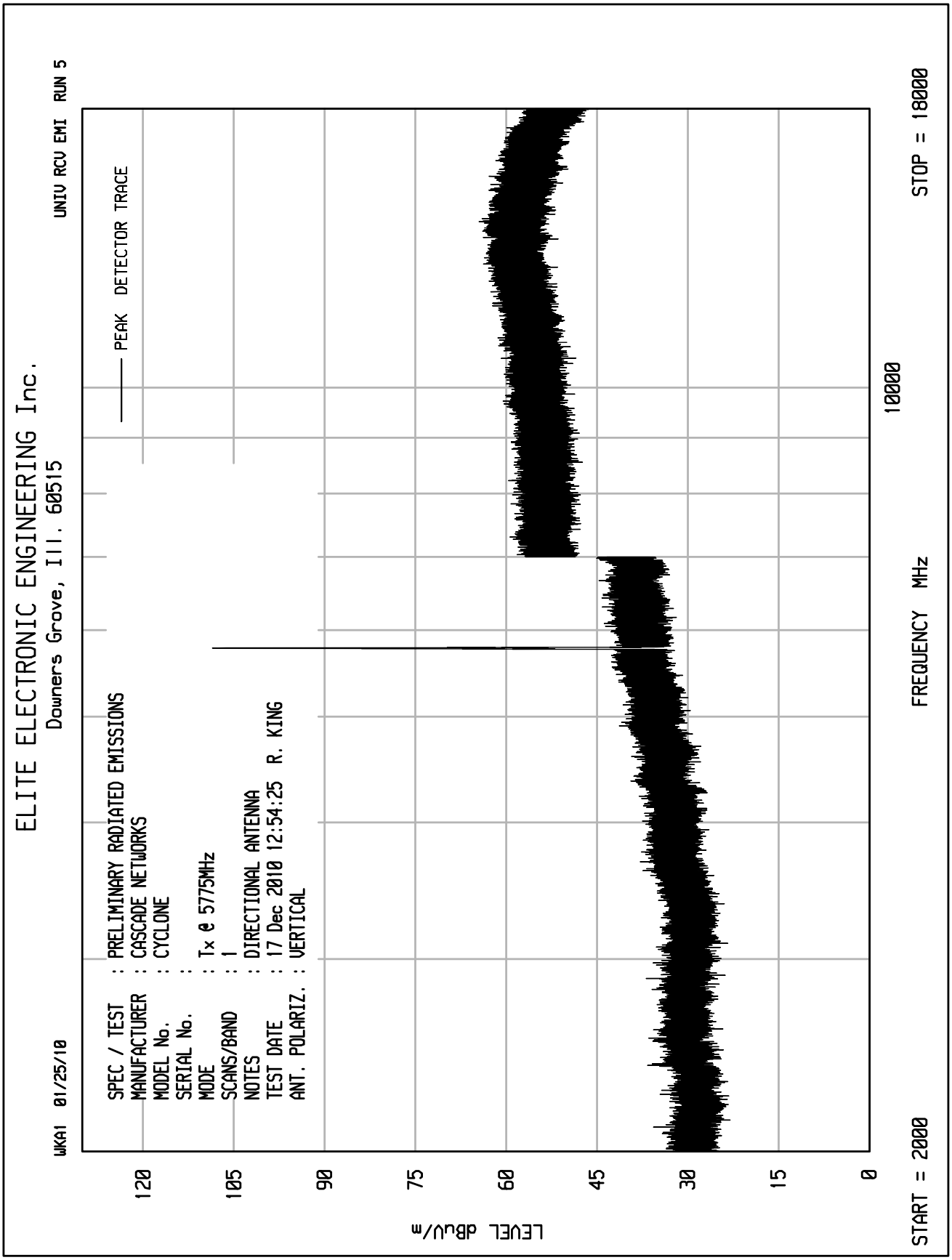
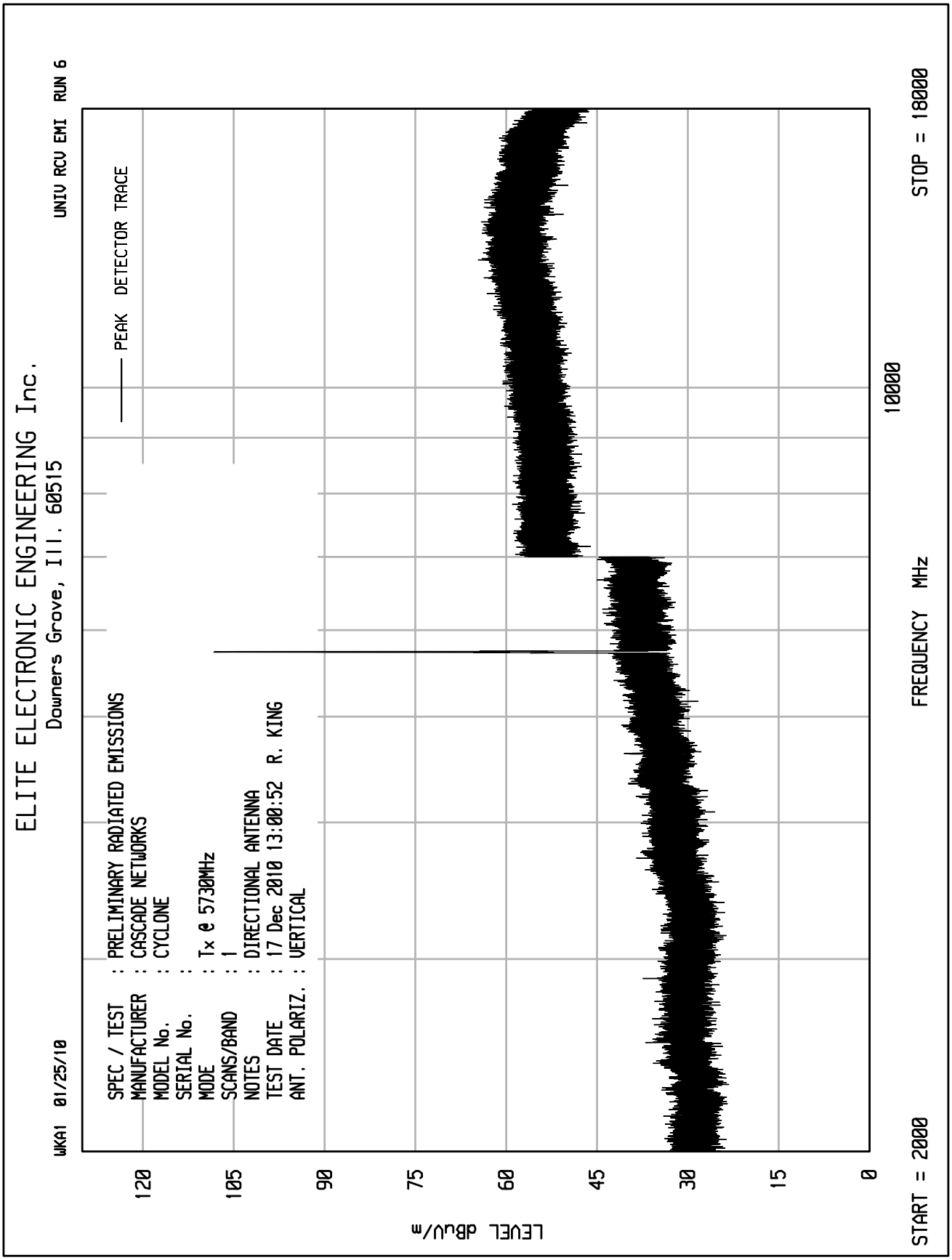
FREQUENCY MHz
STOP = 2000

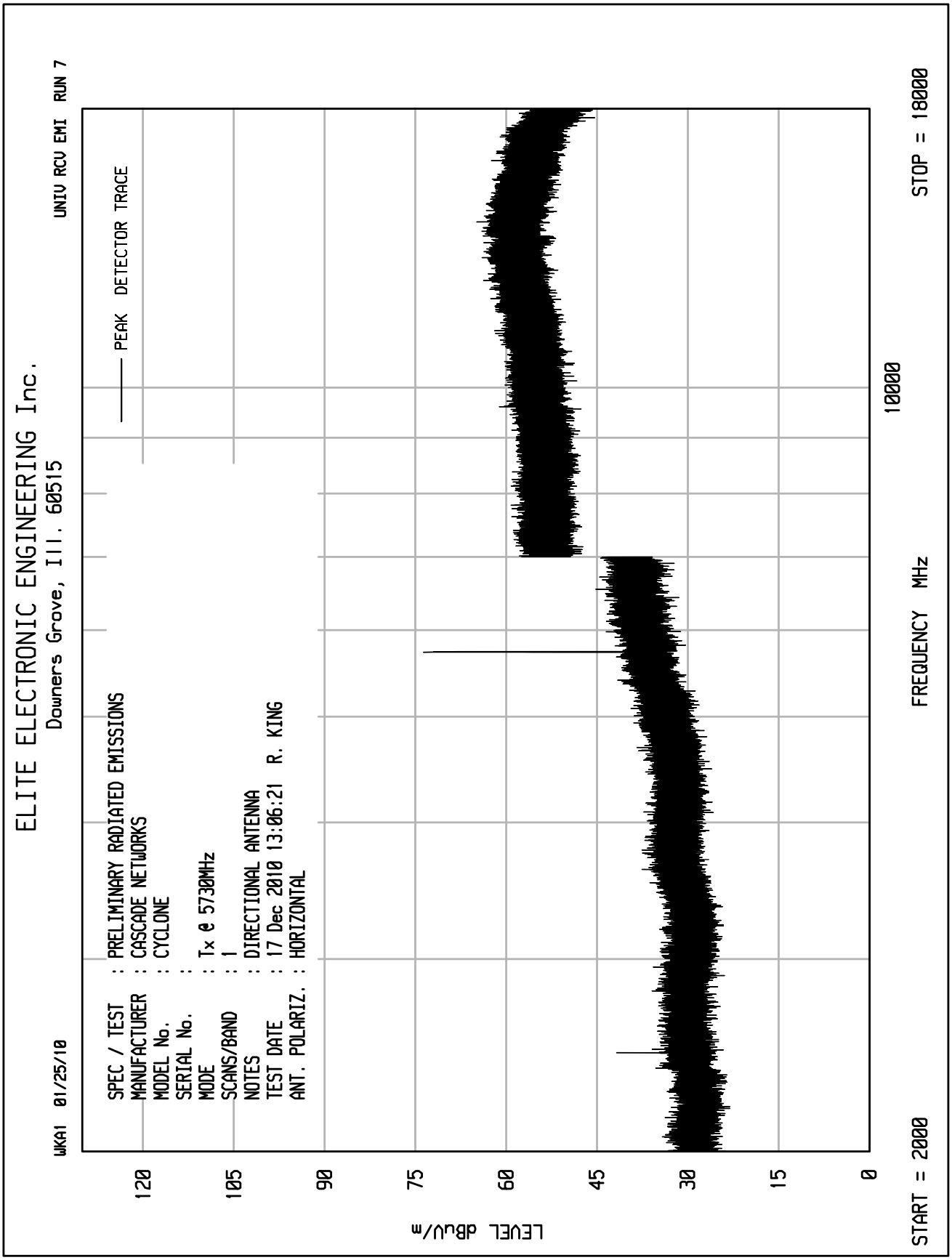

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 2
WKA1 01/25/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5845MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 17 Dec 2010 12:38:58 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
10000
STOP = 18000
FREQUENCY MHz

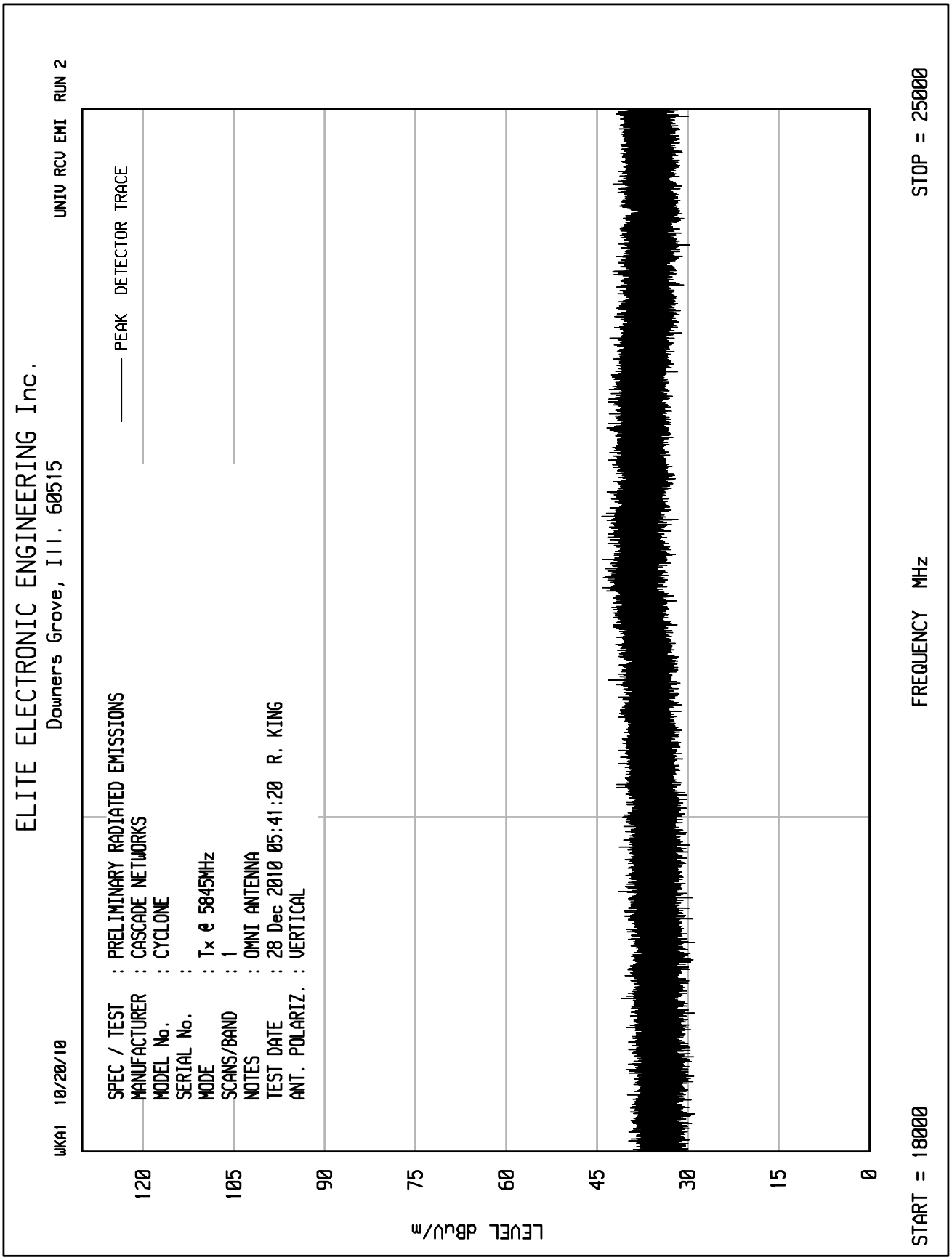

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 1
WKA1 01/25/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5845MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 17 Dec 2010 12:30:54 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
10000
STOP = 18000
FREQUENCY MHz

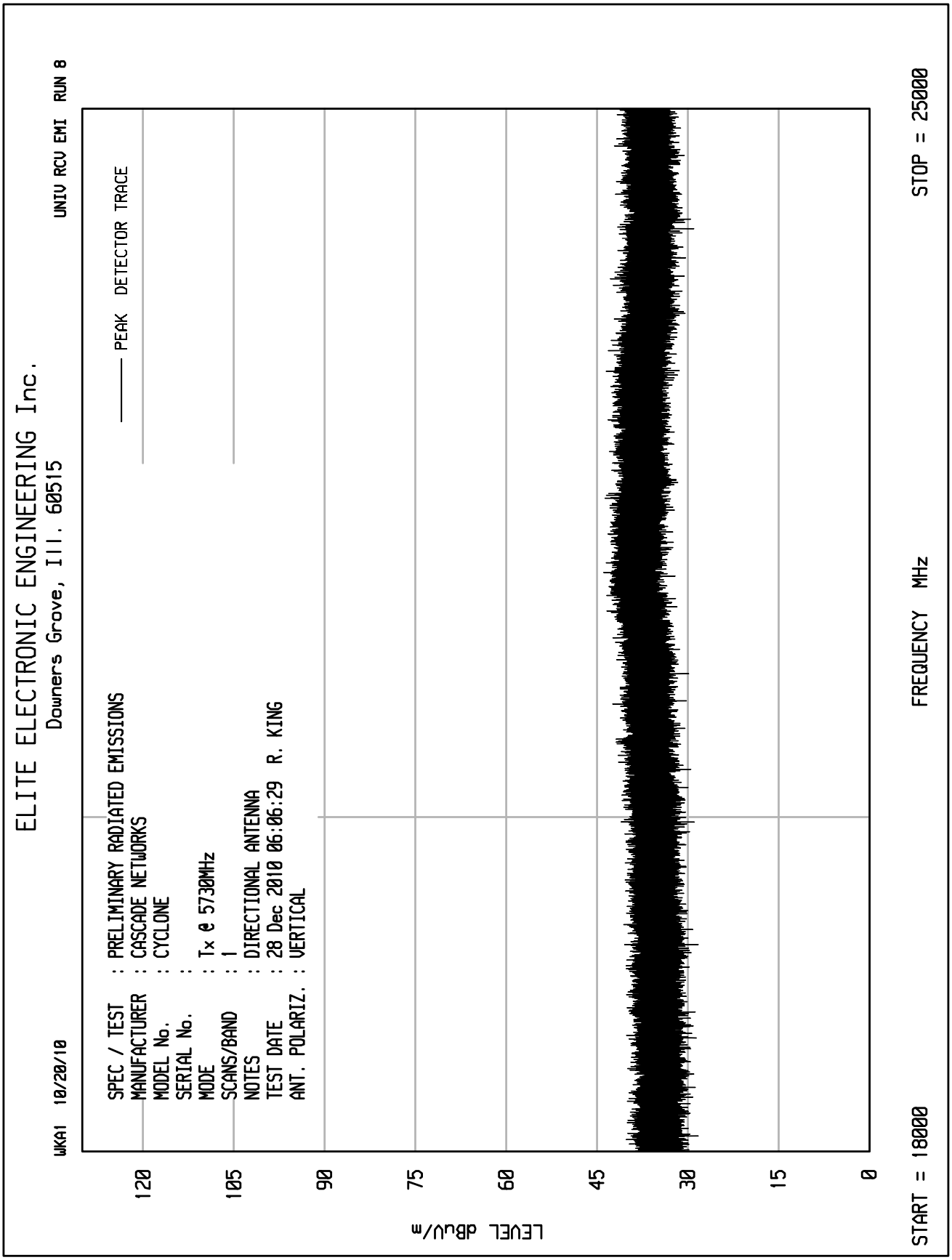

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 3
WKA1 01/25/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5775MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 17 Dec 2010 12:44:46 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
10000
STOP = 18000
FREQUENCY MHz

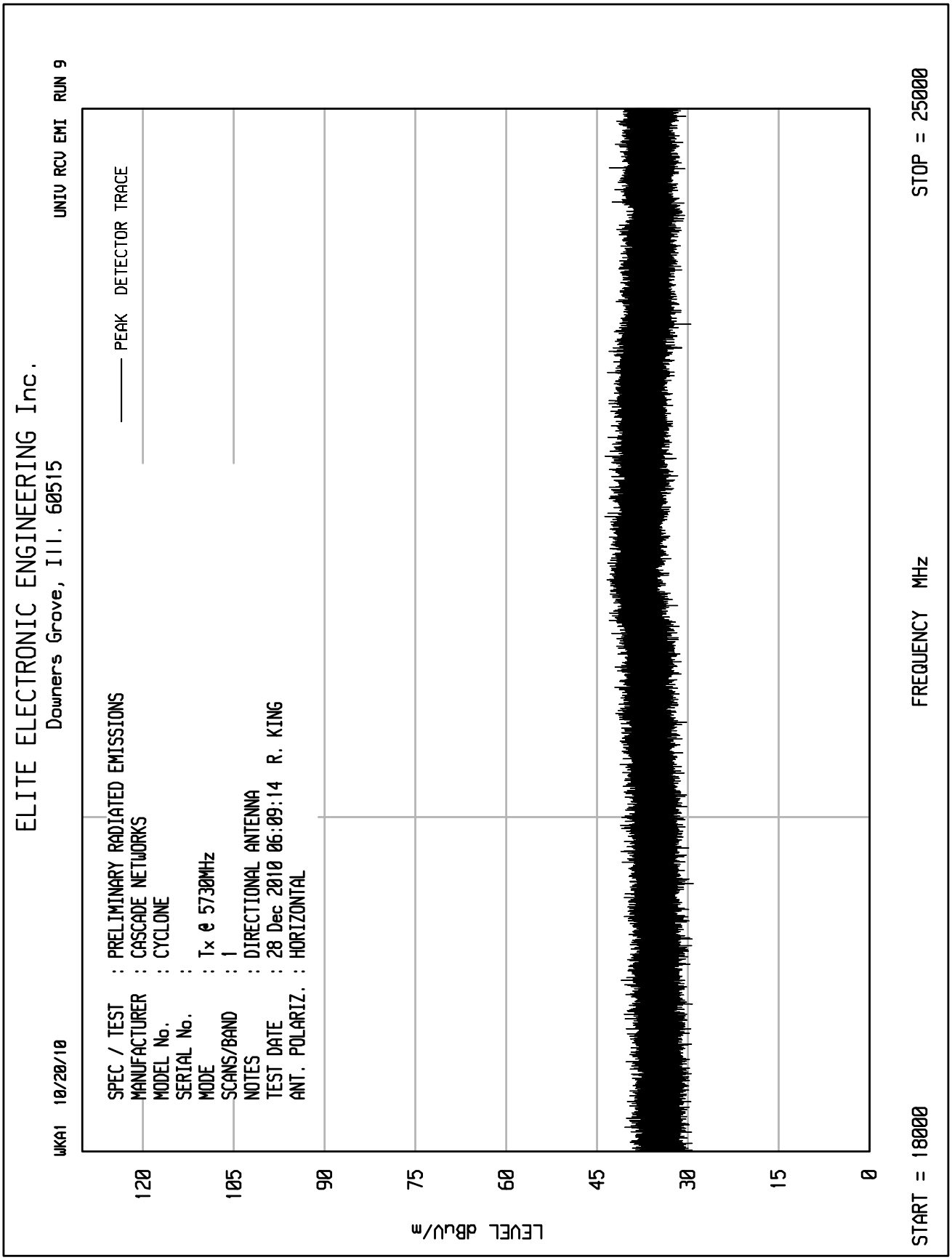

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 5
WKA1 01/25/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5775MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 17 Dec 2010 12:54:25 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
10000
STOP = 18000
FREQUENCY MHz

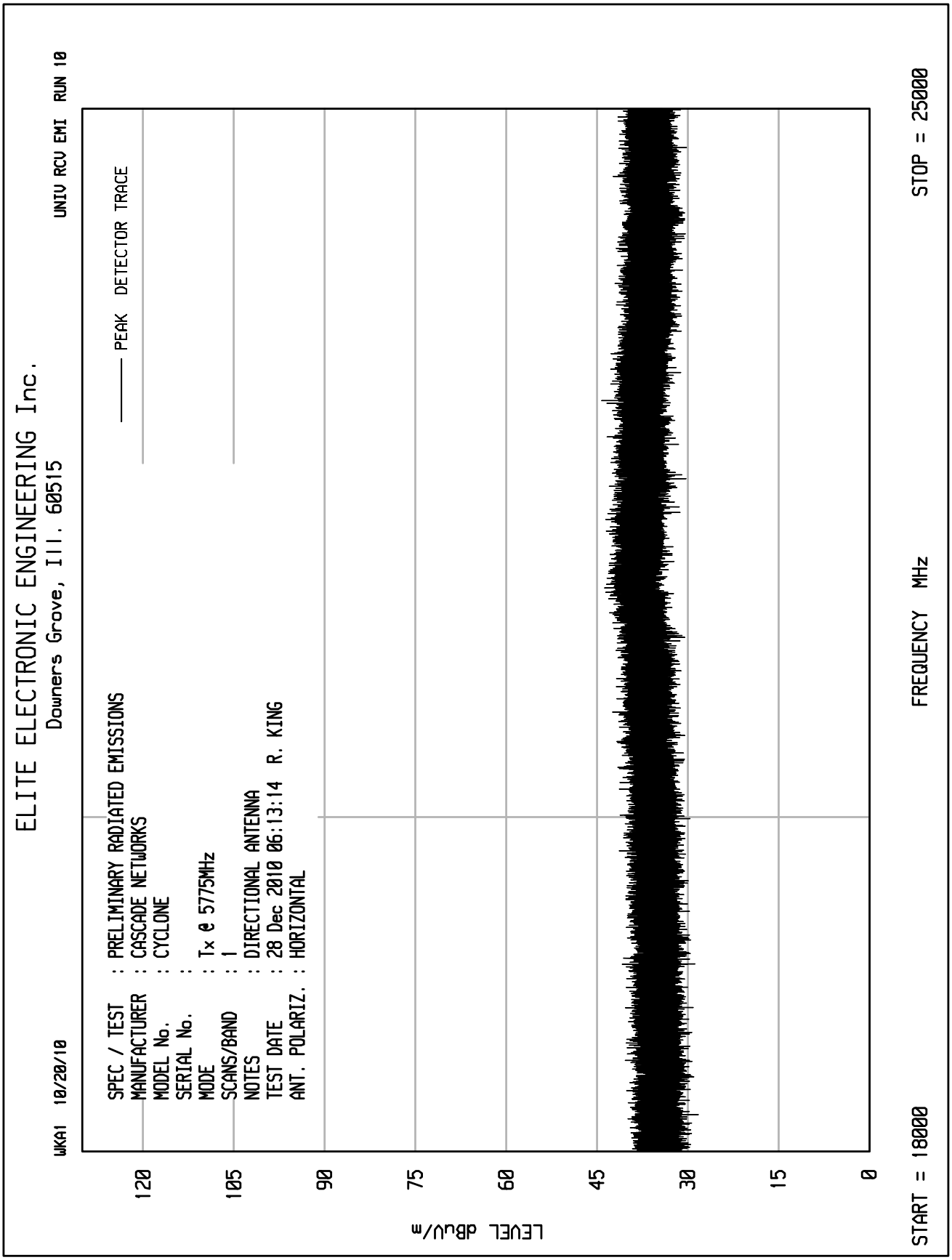

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 6
WKA1 01/25/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5730MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 17 Dec 2010 13:00:52 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
10000
STOP = 18000
FREQUENCY MHz

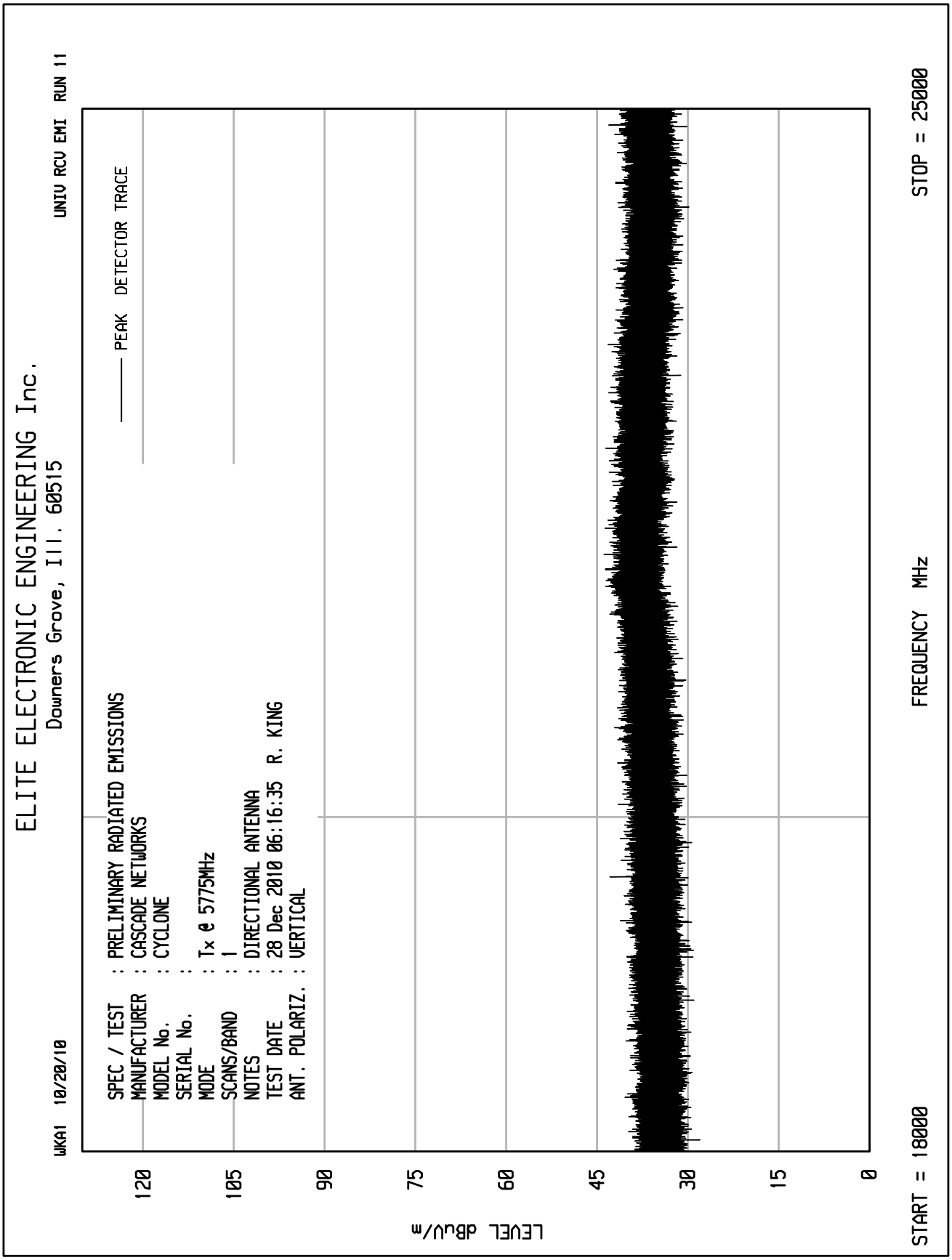

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 7
WKA1 01/25/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5730MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 17 Dec 2010 13:06:21 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
10000
STOP = 18000
FREQUENCY MHz

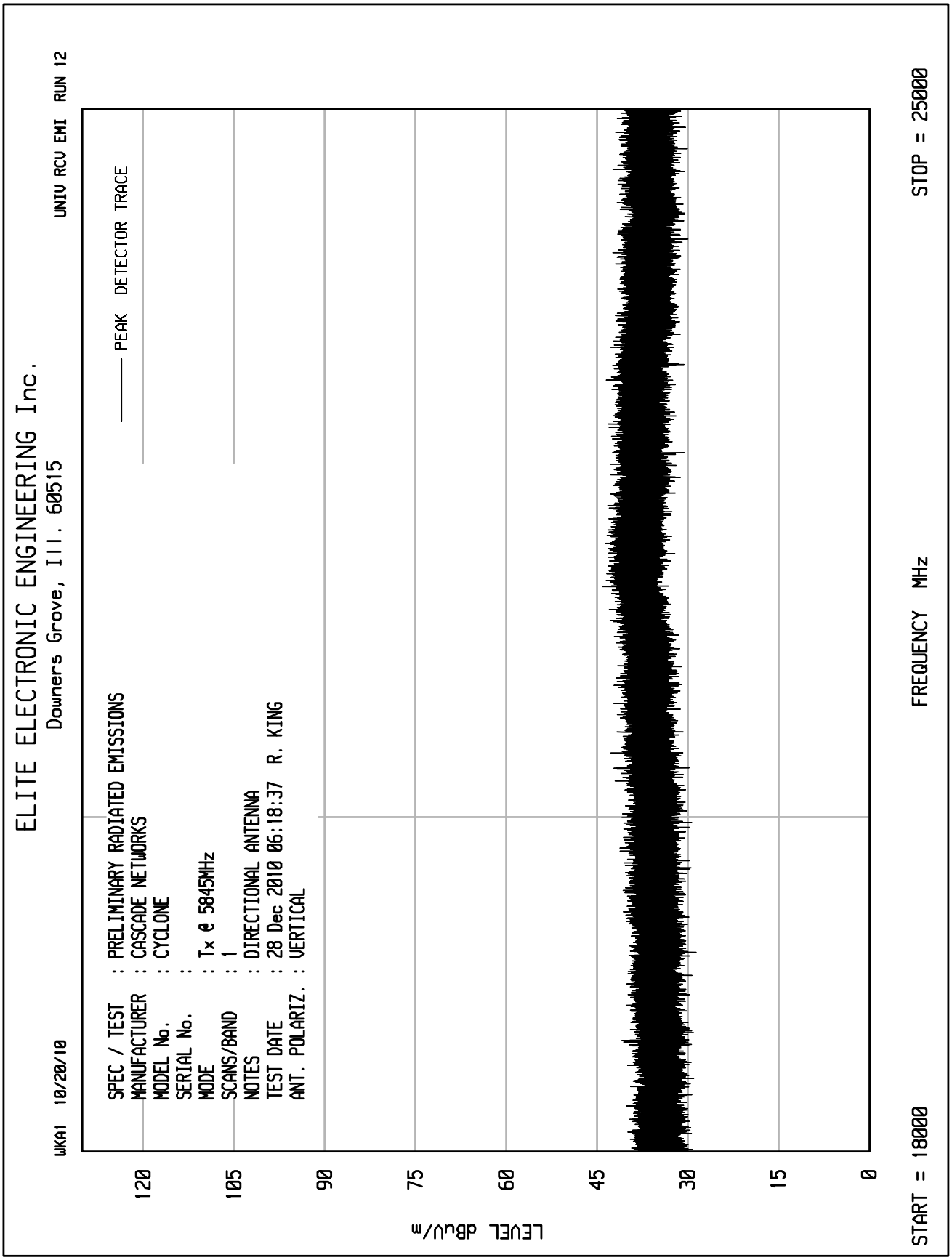

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 2
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5845MHz
SCANS/BAND : 1
NOTES : OMNI ANTENNA
TEST DATE : 28 Dec 2010 05:41:20 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

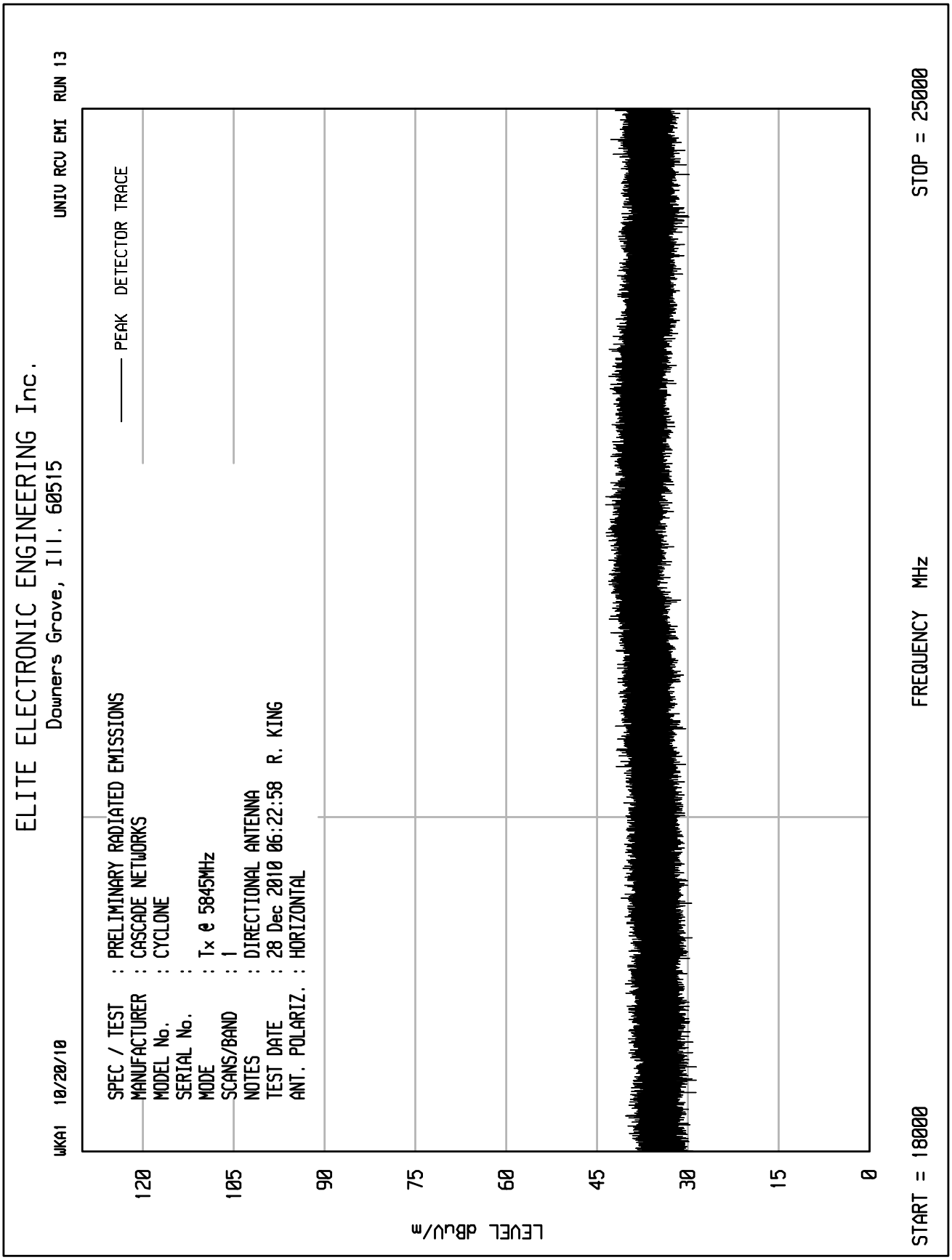

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 8
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5730MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 06:06:29 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

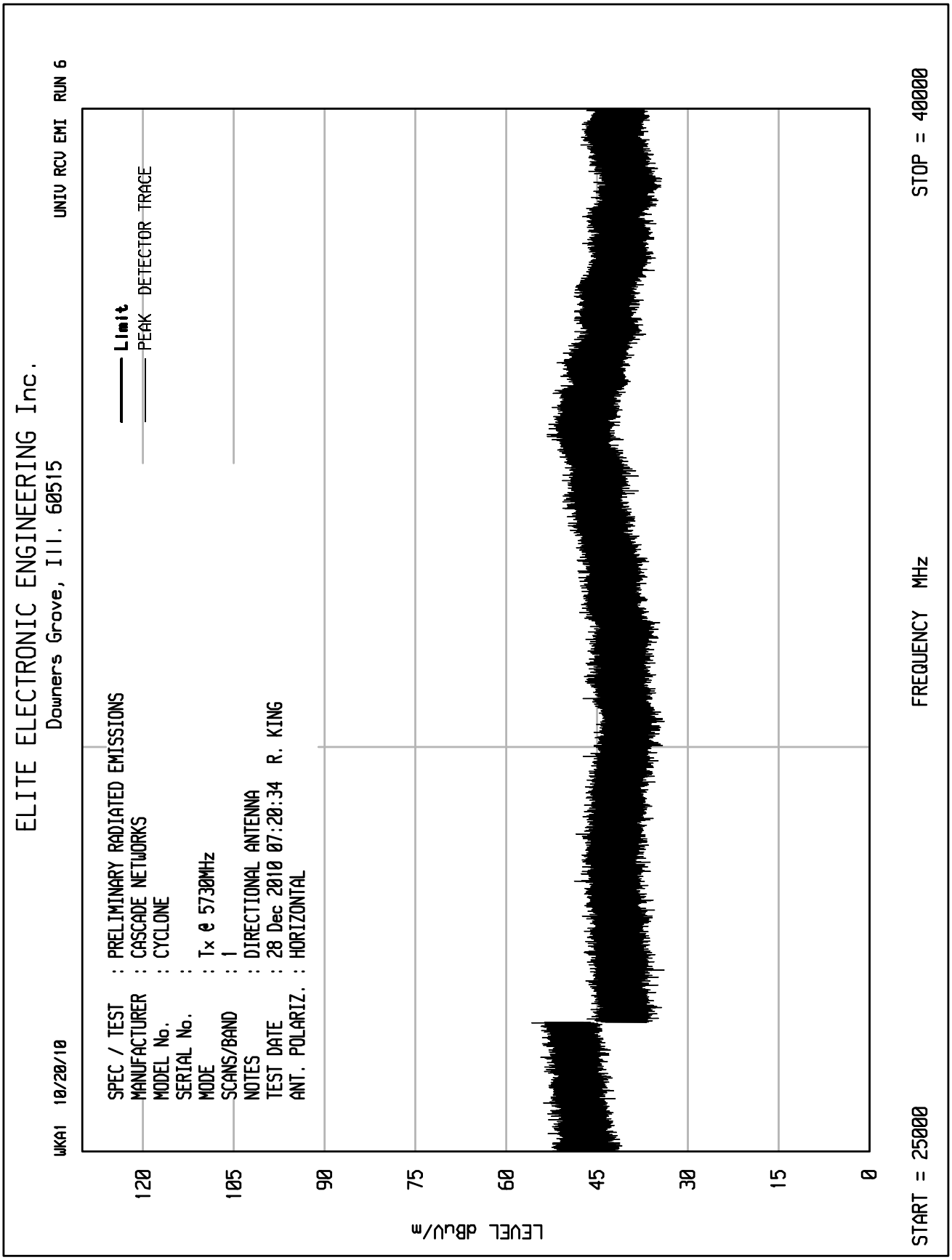

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 9
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5730MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 06:09:14 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

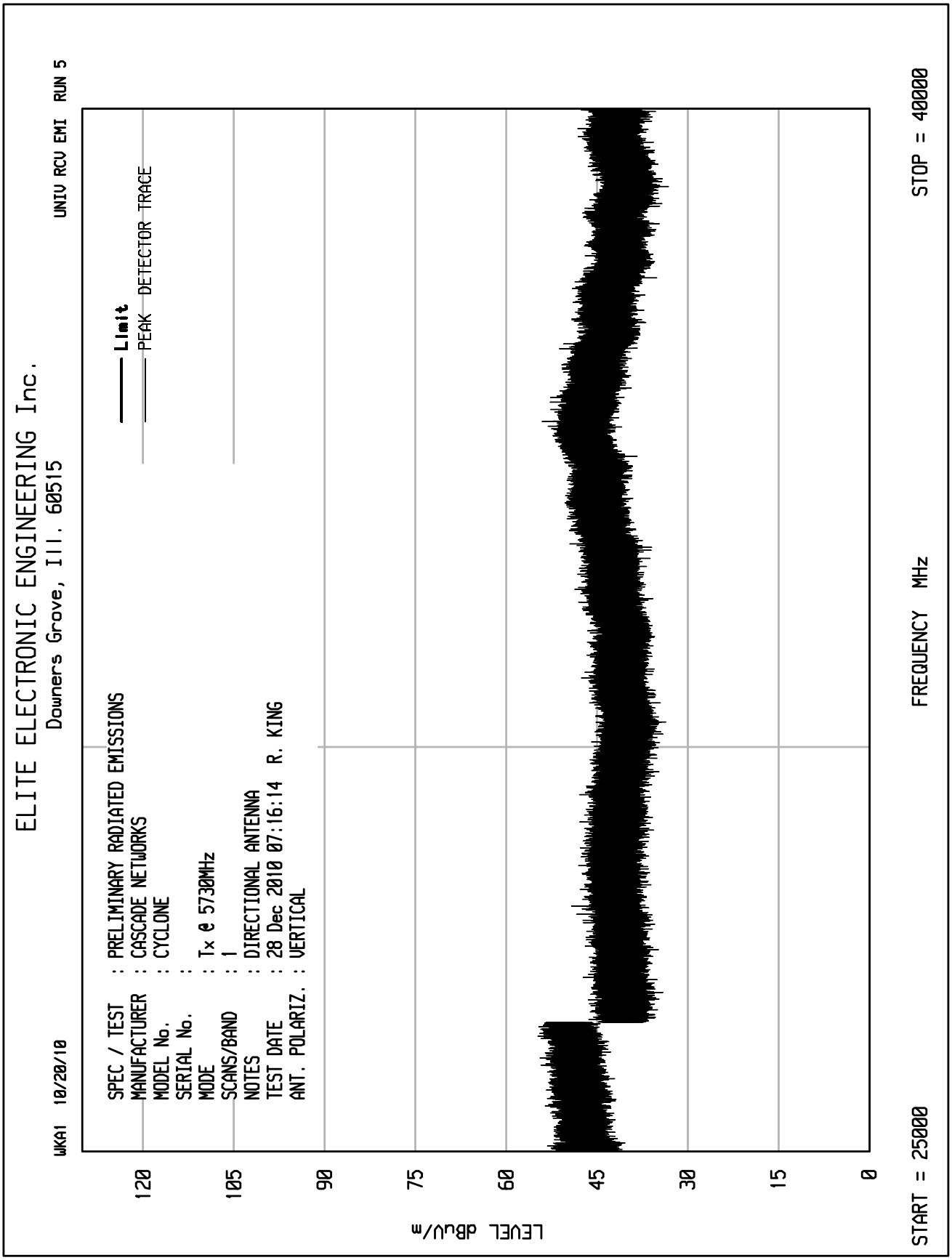

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 10
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5775MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 06:13:14 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

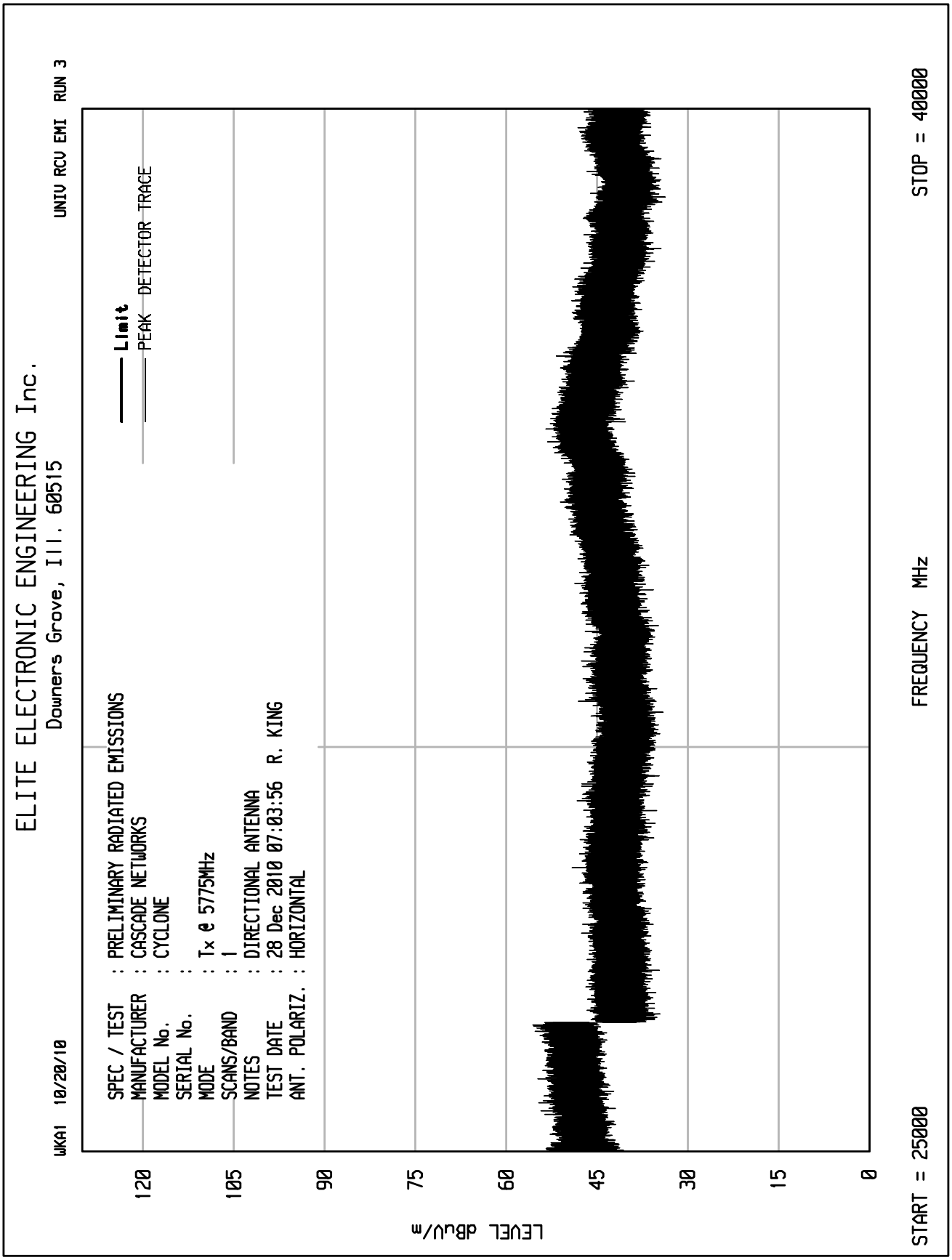

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 11
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5775MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 06:16:35 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

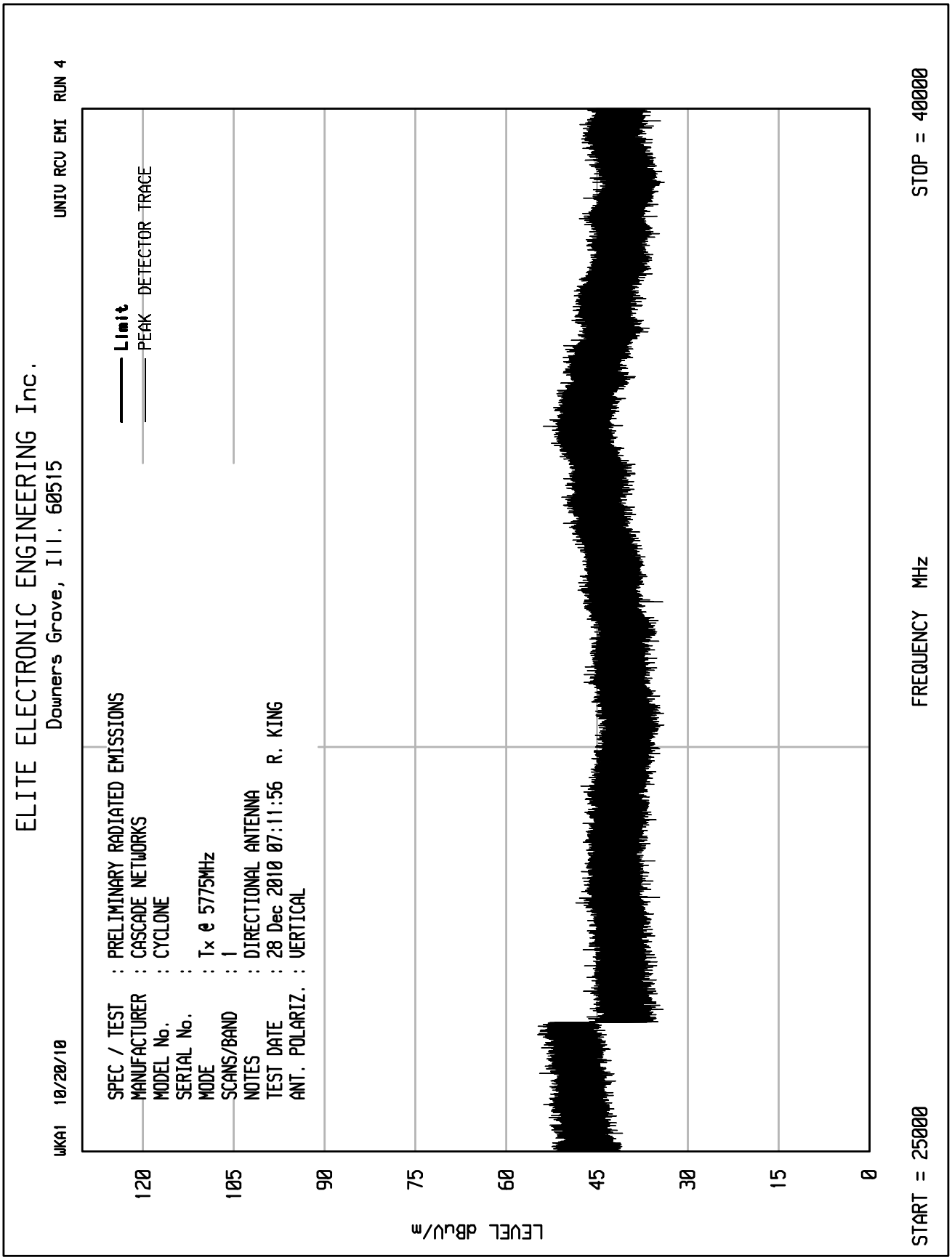

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 12
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5845MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 06:18:37 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

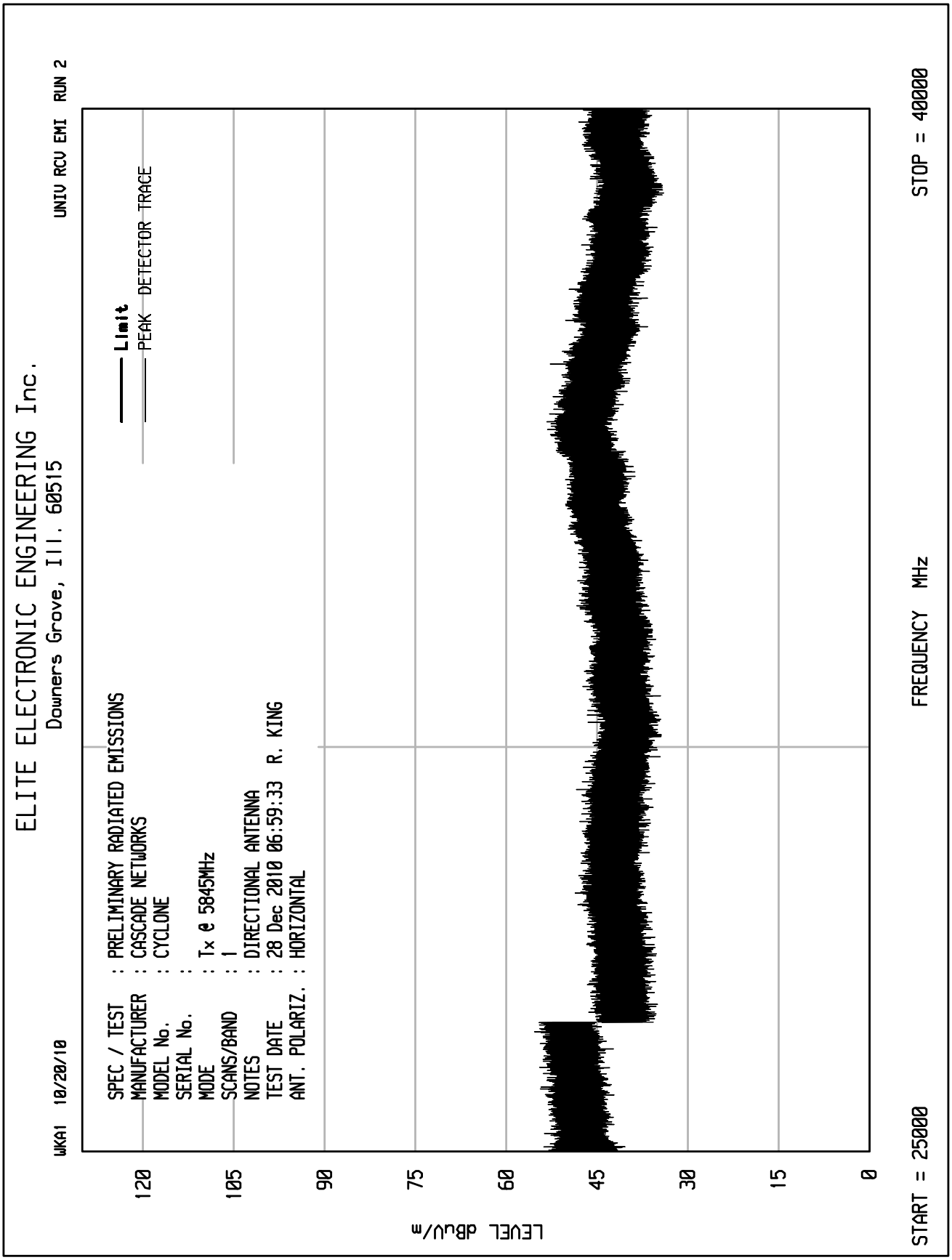

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 13
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5845MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 06:22:58 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

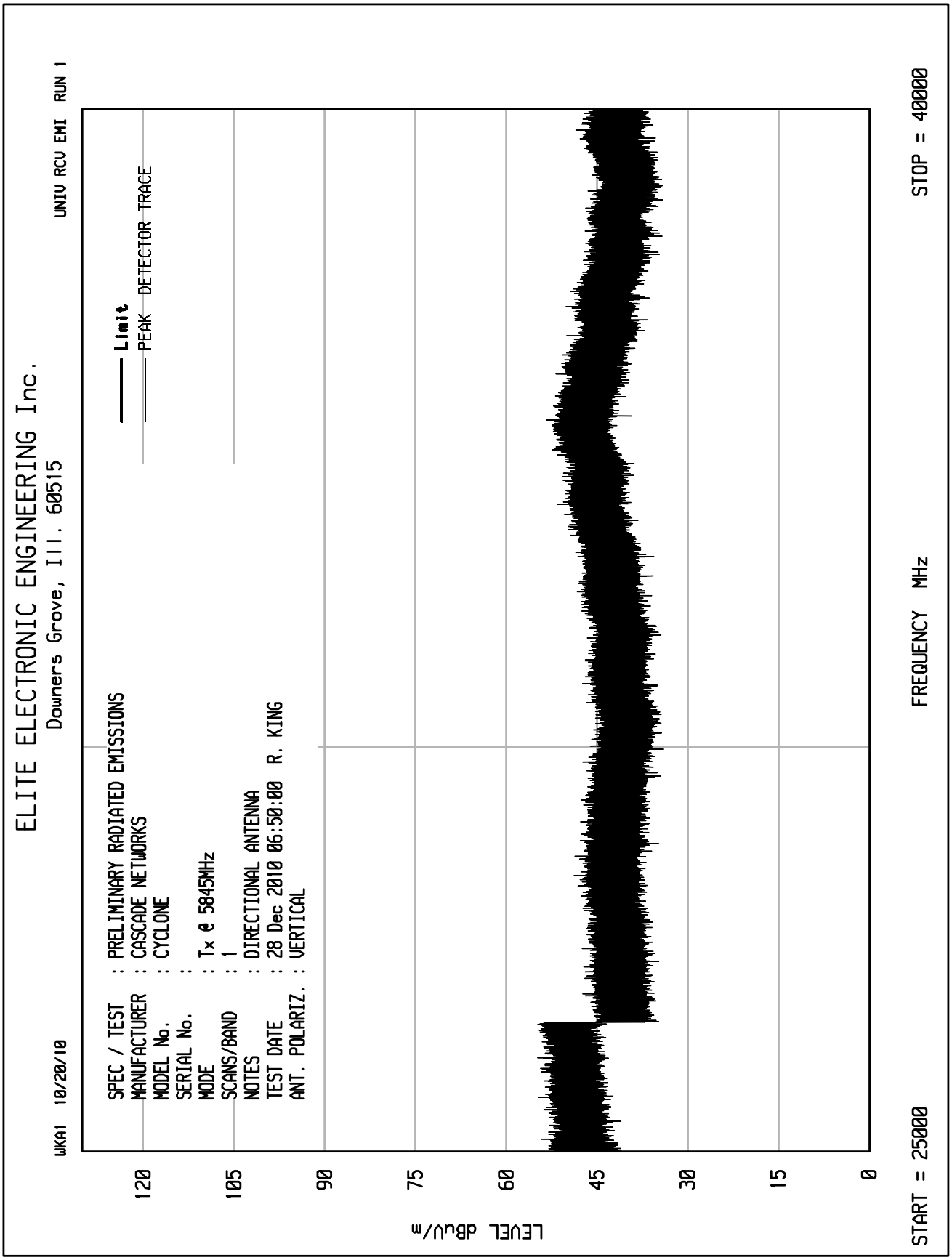

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 10/20/10
UNIV RCV EMI RUN 6
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5730MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 07:20:34 R. KING
ANT. POLARIZ. : HORIZONTAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 25000
FREQUENCY MHz
STOP = 40000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 5
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5730MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 07:16:14 R. KING
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 25000
FREQUENCY MHz
STOP = 40000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 3
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5775MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 07:03:56 R. KING
ANT. POLARIZ. : HORIZONTAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 25000
FREQUENCY MHz
STOP = 40000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 4
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5775MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 07:11:56 R. KING
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 25000
FREQUENCY MHz
STOP = 40000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 2
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5845MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 06:59:33 R. KING
ANT. POLARIZ. : HORIZONTAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 25000
FREQUENCY MHz
STOP = 40000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 1
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : CYCLONE
SERIAL No. :
MODE : Tx @ 5845MHz
SCANS/BAND : 1
NOTES : DIRECTIONAL ANTENNA
TEST DATE : 28 Dec 2010 06:50:00 R. KING
ANT. POLARIZ. : VERTICAL
Limit
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 25000
FREQUENCY MHz
STOP = 40000

RADIATED EMISSION MEASUREMENTS in a 3 m ANECHOIC ROOM

MANUFACTURER	:	Cascade Networks, Inc.
MODEL NO.	:	430 - 360V
TEST MODE	:	Tx @ 5730MHz
NOTES	:	Directional Antenna
TEST DATE	:	December 17, 2010

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Dist. Corr. (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
11460.0	H	13.7	*	1.1	41.2	0.0	-3.5	52.5	423.7	500.0	-1.4
11460.0	V	13.7	*	1.1	41.2	0.0	-3.5	52.5	423.7	500.0	-1.4
22920.0	H	26.1	*	2.2	40.6	-26.8	0.0	42.1	126.7	500.0	-11.9
22920.0	V	26.1	*	2.2	40.6	-26.8	0.0	42.1	126.7	500.0	-11.9

Checked BY Richard E. King :

Richard E. King

RADIATED EMISSION MEASUREMENTS in a 3 m ANECHOIC ROOM

MANUFACTURER	:	Cascade Networks, Inc.
MODEL NO.	:	430 - 360V
TEST MODE	:	Tx @ 5775MHz
NOTES	:	Directional Antenna
TEST DATE	:	December 17, 2010

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Dist. Corr. (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
11550.0	H	13.7	*	1.1	41.3	0.0	-3.5	52.6	425.7	500.0	-1.4
11550.0	V	13.7	*	1.1	41.3	0.0	-3.5	52.6	425.7	500.0	-1.4
23100.0	H	26.2	*	2.2	40.6	-27.0	0.0	42.0	126.6	500.0	-11.9
23100.0	V	26.2	*	2.2	40.6	-27.0	0.0	42.0	126.6	500.0	-11.9

Checked BY Richard E. King :

Richard E. King

RADIATED EMISSION MEASUREMENTS in a 3 m ANECHOIC ROOM

MANUFACTURER	:	Cascade Networks, Inc.
MODEL NO.	:	430 - 360V
TEST MODE	:	Tx @ 5845MHz
NOTES	:	Directional Antenna
TEST DATE	:	December 17, 2010

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Dist. Corr. (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
11690.0	H	13.6	*	1.1	41.3	0.0	-3.5	52.5	423.8	500.0	-1.4
11690.0	V	13.6	*	1.1	41.3	0.0	-3.5	52.5	423.8	500.0	-1.4

Checked BY Richard E. King :

Richard E. King