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Engineering Test Report Number 31804-01

MEASUREMENT OF RF INTERFERENCE FROM A MODEL **MOTOROLA CANOPY** TRANSCEIVER

FOR: **Cascade Networks, Inc.**
1324 Vandercock Way
Longview, WA 98632

Dates Tested: February 4-7, 2003 and March 19th. 2003

Test Specifications: FCC "Code of Federal Regulations" Title 47
Part 15, Subpart C, Section 15.407

ENGINEERING TEST REPORT NO. 31804-01

ADMINISTRATIVE DATA AND SUMMARY OF TESTS

DESCRIPTION OF TEST ITEM: UNII Transceiver

MODEL NO: Motorola Canopy **SERIAL NO:** None Assigned

MANUFACTURER: Cascade Networks Inc.

APPLICABLE SPECIFICATIONS: FCC "Code of Federal Regulations"
Title 47, Part 15, Subpart C

QUANTITY OF ITEMS TESTED: One (1)

TEST PERFORMED BY: ELITE ELECTRONIC ENGINEERING
INCORPORATED
Radio Interference Consultants
Downers Grove, Illinois 60515

DATE RECEIVED: January 17 , 2003

DATE TESTED: February 4 through 7, 2003 and March 19, 2003

PERSONNEL (OPERATORS, OBSERVERS, AND CO-ORDINATORS):
CUSTOMER: No representative of Cascade Networks Inc., was present.
ELITE ELECTRONIC: Richard E. King

ELITE JOB NO.: 31804

ABSTRACT: The model Motorola Canopy Transceiver, does 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 C63.4-2001.

Report By:
Richard E. King
EMC Engineer

Approved By:
Raymond J. Klouda
Registered Professional
Engineer of Illinois - 44894

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TOTAL NUMBER OF PAGES IN THIS DOCUMENT, (INCLUDING DATA SHEETS): 68

THIS REPORT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF ELITE ELECTRONIC ENGINEERING INCORPORATED.

1.0 INTRODUCTION:

1.1 DESCRIPTION OF TEST ITEM: This document presents the results of a series of radio interference measurements performed on a model Motorola Canopy Transceiver (hereinafter referred to as the test item). The test item was designed to transmit in the 5725MHz to 5825MHz band using external antennas. The test series was performed to determine if the Motorola Canopy Transceiver, FCC ID: ABZ89FC4816, would continue to meet the FCC requirements when using a Radiowaves model SEC-5V-120-14 Antenna (Cylindrical), a Andrew model P2F-52-N7A Antenna (2' Dish), a Radiowaves model SEC-5.5V-90-16 Antenna (Panel), a Radiall /Larson model R380.700.205 omnidirectional antenna (Rod) or when placed in a metal box. The tests were performed for Cascade Networks Inc, of Longview, Washington.

1.2 PURPOSE: The test series was performed to determine if the test item meets the requirements of the radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections for Intentional Radiators. The test series was performed on the original Motorola Canapy, FCC ID: ABZ89FC4816, with the four external antennas listed above were connected to the device or the test item was enclosed in a metal box. All testing was performed in accordance with ANSI C63.4-1992.

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, Subpart C, dated 1 October 2001

- ANSI C63.4-2001, "American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"

1.5 SUBCONTRACTOR IDENTIFICATION: This series of tests was performed by Elite Electronic Engineering Incorporated of Downers Grove, Illinois. The laboratory is accredited

by the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP Lab Code: 100278-0.

1.6 LABORATORY CONDITIONS: The temperature at the time of the test was 23°C and the relative humidity was 11%.

2.0 TEST ITEM SETUP AND OPERATION:

A block diagram of the test item setup is included as Figure 1.

2.1 POWER INPUT: The test item was powered with 24VDC from a Motorola model AEC-T4824 Class 2 transformer.

2.2 GROUNDING: Since the test item was powered with two wires, it was ungrounded during the tests.

2.3 PERIPHERAL EQUIPMENT: There was no peripheral equipment submitted with the test item.

2.4 INTERCONNECT CABLES: The were no interconnect cables submitted with the test item.

2.5 OPERATIONAL MODE: For all tests the test item and all peripheral equipment were placed on a 80cm high non-conductive stand. The test item and all peripheral equipment was energized.

For all tests, the test item was set to transmit continuously. The tests were performed with the test item operating at 5745MHz and 5805MHz.

3.0 TEST EQUIPMENT:

3.1 TEST EQUIPMENT LIST: A list of the test equipment used can be found on Table I. All equipment was calibrated per the instruction manuals supplied by the manufacturer.

The fundamental, harmonics and spurious emissions were measured with a spectrum analyzer. All measurements were taken with the resolution and video bandwidth of the measuring instrument adjusted to 100kHz below 1GHz and 1MHz above 1GHz.

3.2 CALIBRATION TRACEABILITY: Test equipment is maintained and calibrated on a regular basis. All calibrations are traceable to the National Institute of Standards and

Technology (NIST).

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

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

The measurement uncertainty for these tests is presented below:

Conducted Emission Measurements:		
Combined Standard Uncertainty	1.07	-1.07
Expanded Uncertainty (95% confidence)	2.1	-2.1
Radiated Emission Measurements:		
Combined Standard Uncertainty	2.26	-2.18
Expanded Uncertainty (95% confidence)	4.5	-4.4

4.0 REQUIREMENTS, PROCEDURES AND RESULTS:

4.1 POWERLINE CONDUCTED EMISSIONS:

4.1.1 REQUIREMENTS: Since the purpose of the testing was to determine a class II permissive change to the test item and the changes made to the test item would not effect the conducted emissions no conducted emission measurements were taken.

4.2 BANDEDGE EMISSION MEASUREMENTS:

4.2.1 REQUIREMENTS: Per section 15.407(b)(3), For transmitters operating in the 5.725 - 5.825GHz range band: all emissions within the frequency range from the band edge to 10MHz above or 10MHz below the bandedge shall not exceed an EIRP of -17dBm/MHz; for frequencies 10MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27dBm/MHz. Per section 15.407(b)(5), Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in 15.209.

4.2.2 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

1992 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.

The spectrum analyzer was set to measure the 5.705MHz to 5.845MHz band. The test item was set to transmit at the low side of the authorized band. A spectrum analyzer "screen dump" program was used to plot out the frequency spectrum. The test was repeated with the test item transmitting at high side of the authorised band.

The bandedge test was performed with all three of the antennas mentioned in Para. 1.1.

4.2.3 RESULTS: The bandedge compliance measurements, with the test item transmitting at both 5745MHz and 5805MHz, with the cylindrical antenna, is presented on pages 13 and 14. The bandedge compliance measurements, with the test item transmitting at both 5745MHz and 5805MHz, with the dish antenna, are presented on pages 15 and 16. The bandedge compliance measurements, with the test item transmitting at both 5745MHz and 5805MHz, with the panel antenna, are presented on pages 17 and 18. The bandedge compliance measurements, with the test item transmitting at both 5745MHz and 5805MHz, with the Rod antenna and in the metal box, are presented on pages 19 and 20. As can be seen from the data, all emissions measured from the test item were within the specification limits.

4.3 OUT OF BAND RADIATED EMISSION MEASUREMENTS:

4.3.1 REQUIREMENTS: Per section 15.407(b)(3), For transmitters operating in the 5.725 - 5.835GHz range band: all emissions within the frequency range from the band edge to 10MHz above or 10MHz below the bandedge shall not exceed an EIRP of -17dBm/MHz; for frequencies 10MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27dBm/MHz. Per section 15.407(b)(5), Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in 15.209.

4.3.2 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 1992 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 emissions measurements were first performed using a peak detector and automatically plotted. The frequencies where significant emission levels were noted were then remeasured.

With the broadband measuring antennas positioned at a 3 meter distance from the test item, the frequency range from 30MHz to 18GHz was investigated using a peak detector function with the antennas set for vertical polarization. The frequency range from 18GHz to 40GHz was measured but not plotted.

Final radiated emissions were performed on all significant broadband and narrowband emissions found in the preliminary sweeps using the following methods:

1) Measurements were made using a peak detector and either a BiLog or 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.

The test item was set to transmit at either 5.745GHz ro 5.805GHz continuously. Th out of band tests were performed with all three antennas described in Para. 1.1.

4.3.3 RESULTS: The preliminary plots, with the test item transmitting at 5745 MHz and 5805MHz for cylindrical antenna, is presented on pages 21 through 30. The preliminary plots, with the test item transmitting at 5745 MHz and 5805MHz for dish antenna, is presented on pages 31 through 40. The preliminary plots, with the test item transmitting at 5745 MHz and 5805MHz for panel antenna, are presented on pages 41 through 50. The preliminary plots, with the test item transmitting at 5745 MHz and 5805MHz for rod antenna and in a metal box,

are presented on pages 51 through 60. The plots are presented for a reference only, and are not used to determine compliance.

The final radiated levels, with the test item transmitting at both 5745 and 5805MHz, with the cylindrical antenna, are presented on pages 61 and 62. The final radiated levels, with the test item transmitting at both 5745 and 5805MHz, with the dish antenna, are presented on pages 63 and 64. The final radiated levels, with the test item transmitting at both 5745 and 5805MHz, with the panel antenna, are presented on pages 65 and 66. The final radiated levels, with the test item transmitting at both 5745 and 5805MHz, with the rod antenna and in a metal box, are presented on pages 67 and 68. As can be seen from the data, all emissions measured from the test item were within the specification limits. Photographs of the test configuration which yielded the highest, or worst case, radiated emission levels are shown on Figure 2.

5.0 CONCLUSION:

It was found that the Cascade Networks model Motorola Canopy, does meet the conducted and 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 C63.4-2001.

6.0 CERTIFICATION:

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

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

7.0 ENDORSEMENT DISCLAIMER:

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

TABLE I: TEST EQUIPMENT LIST

ELITE ELECTRONIC ENG. INC.

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Cal Inv	Due Date
Equipment Type: ACCESSORIES, MISCELLANEOUS								
XYQ0	STUB TUNER	WEINSCHEL ENG.	DS 109	6023	1-10GHZ		N/A	
XZG0	ATTENUATOR/SWITCH DRIVER	HEWLETT PACKARD	11713A	3439A02724	---		N/A	
Equipment Type: AMPLIFIERS								
APH0	POWER AMPLIFIER	HEWLETT PACKARD	11975A	2304A00322	2-8GHZ		NOTE 1	
APK0	PRE-AMPLIFIER	HEWLETT PACKARD	8449B	3008A00662	1-26.5GHZ	02/22/02	12	02/22/03
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	06/25/02	12	06/25/03
NWH0	RIDGED WAVE GUIDE	TENSOR	4105	2081	1-12.4GHZ	08/25/02	12	08/25/03
NWI0	RIDGED WAVE GUIDE	AEL	H1498	153	2-18GHZ	08/09/02	12	08/09/03
Equipment Type: ATTENUATORS								
TVC0	VARIABLE ATTENUATOR	HEWLETT PACKARD	R382A	1281	26.5-40GHZ	07/29/02	12	07/29/03
Equipment Type: CONTROLLERS								
CDN3	COMPUTER	GATEWAY	PRO700C	0022368722	700MHZ		N/A	
CMA0	MULTI-DEVICE CONTROLLER	EMCO	2090	9701-1213	---		N/A	
Equipment Type: METERS								
MPA0	POWER METER	HEWLETT PACKARD	432A	1141A08696	0.01-40GHZ	06/27/02	12	06/27/03
MPAD	THERMISTOR MOUNT	HEWLETT PACKARD	R486A	3322	26.5-40GHZ	09/05/02	12	09/05/03
Equipment Type: PRINTERS AND PLOTTERS								
HRG7	LASERJET 2100	HEWLETT PACKARD	C1470A	USGG109762	---		N/A	
Equipment Type: RECEIVERS								
RAC1	SPECTRUM ANALYZER	HEWLETT PACKARD	85660B	3407A08369	100HZ-22GHZ	01/29/03	12	01/29/04
RACB	RF PRESELECTOR	HEWLETT PACKARD	85685A	3506A01491	20HZ-2GHZ	01/29/03	12	01/29/04
RAE1	SPECTRUM ANALYZER (DCC-CEM	HEWLETT PACKARD	85660A	2209A01336	100HZ-22GHZ	02/06/03	12	02/06/04
RAF3	QUASIPEAK ADAPTER	HEWLETT PACKARD	85650A	3303A01775	0.01-1000MHZ	01/29/03	12	01/29/04
RAI0	FREQUENCY MIXER	HEWLETT PACKARD	11970A	2332A00292	26-40GHZ		N/A	
Equipment Type: SIGNAL GENERATORS								
GSB1	SWEEP OSCILLATOR	HEWLETT PACKARD	8350A	2749A09916	0.01-40GHZ	06/18/02	12	06/18/03
GSBC	TUNING HEAD	HEWLETT PACKARD	83572B	2429A00203	26.5-40GHZ	06/19/02	12	06/19/03

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.

ELITE ELECTRONIC ENGINEERING INC.
ETR 31804-01
Radiated Emissions Test Setup Anechoic Ferrite Chamber

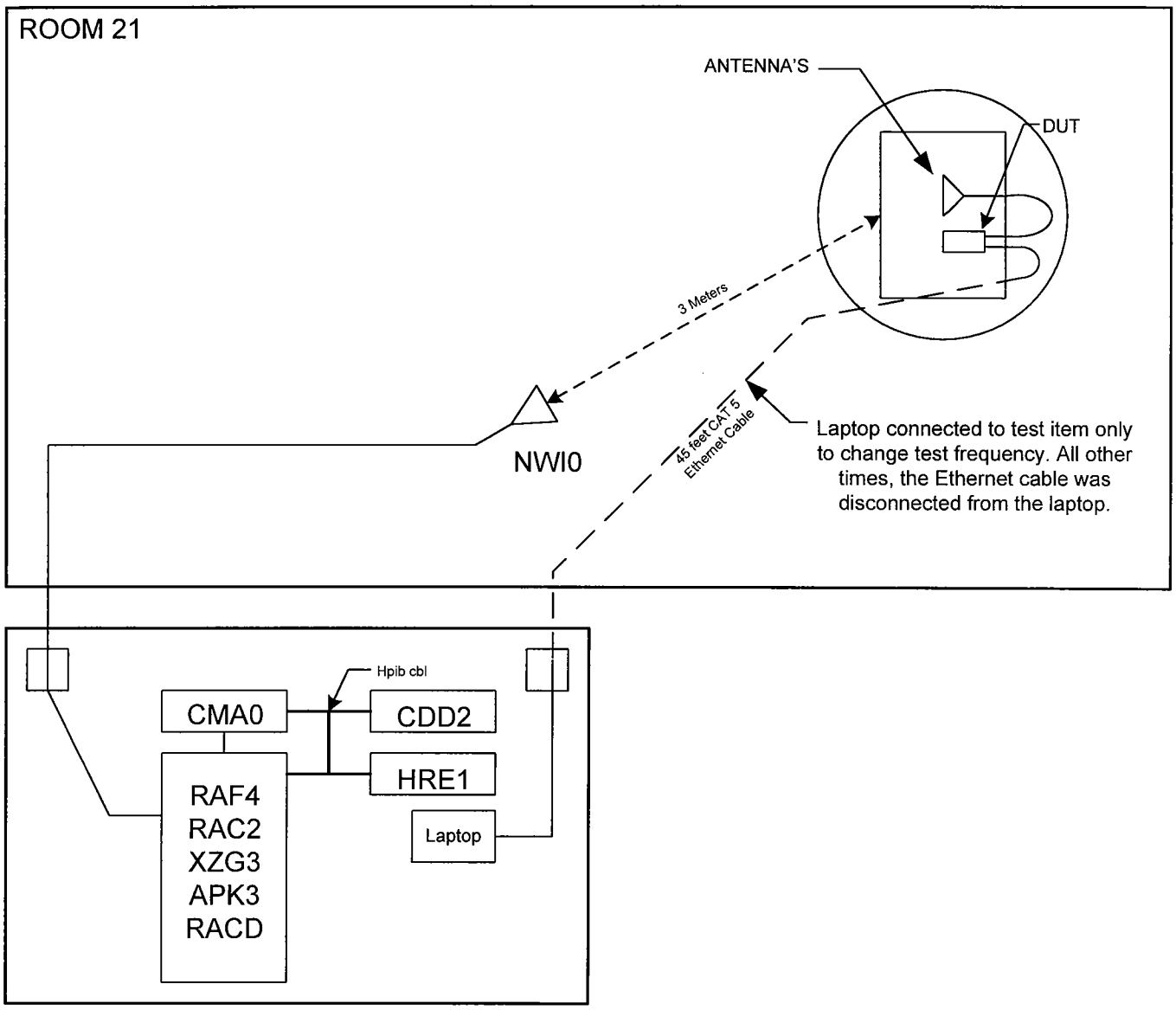
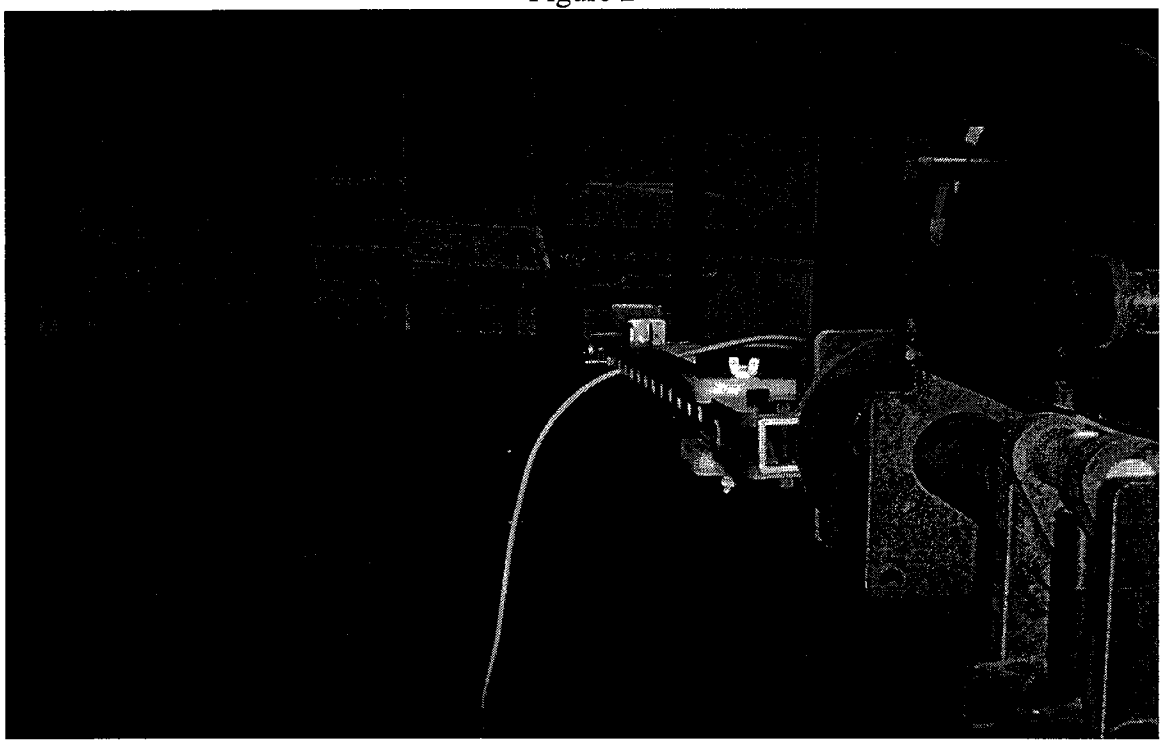
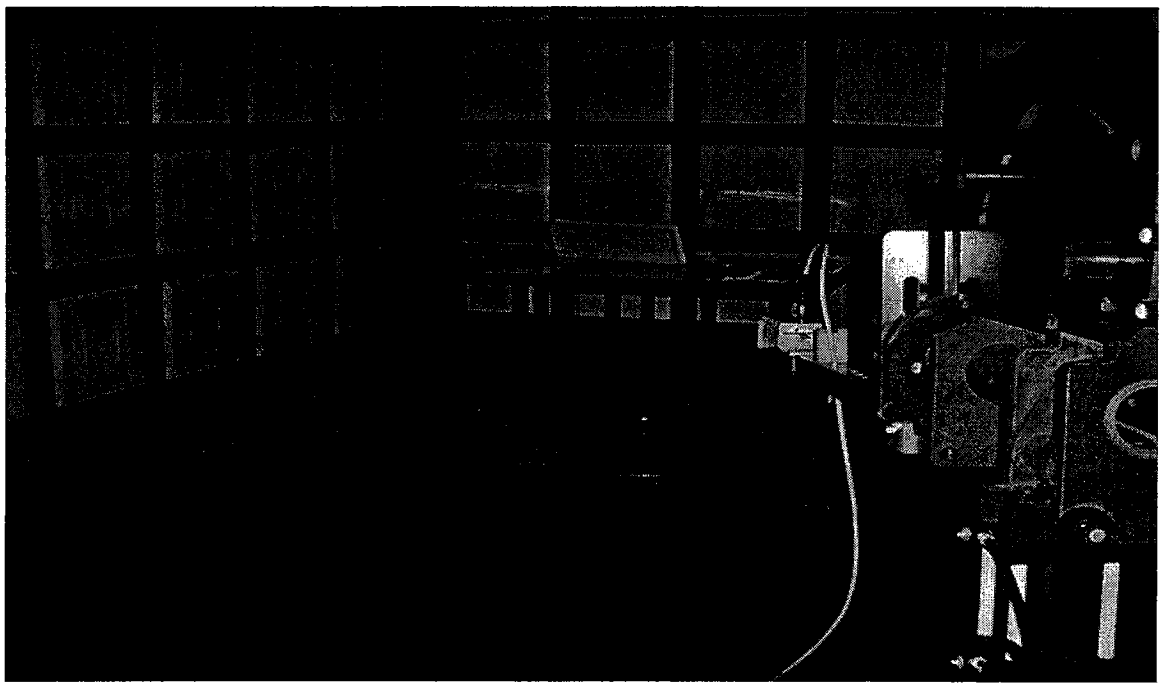


FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

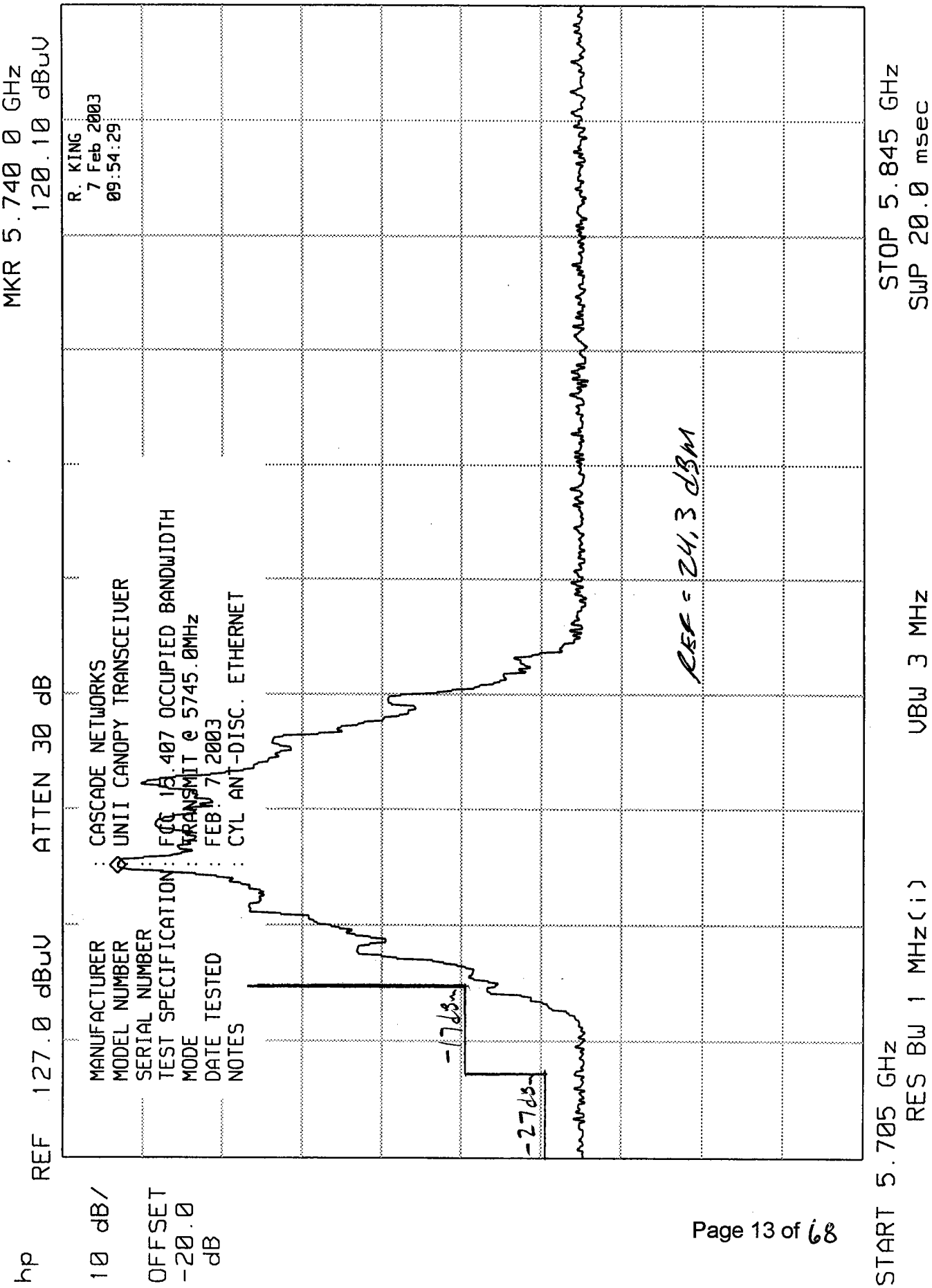
Figure 2

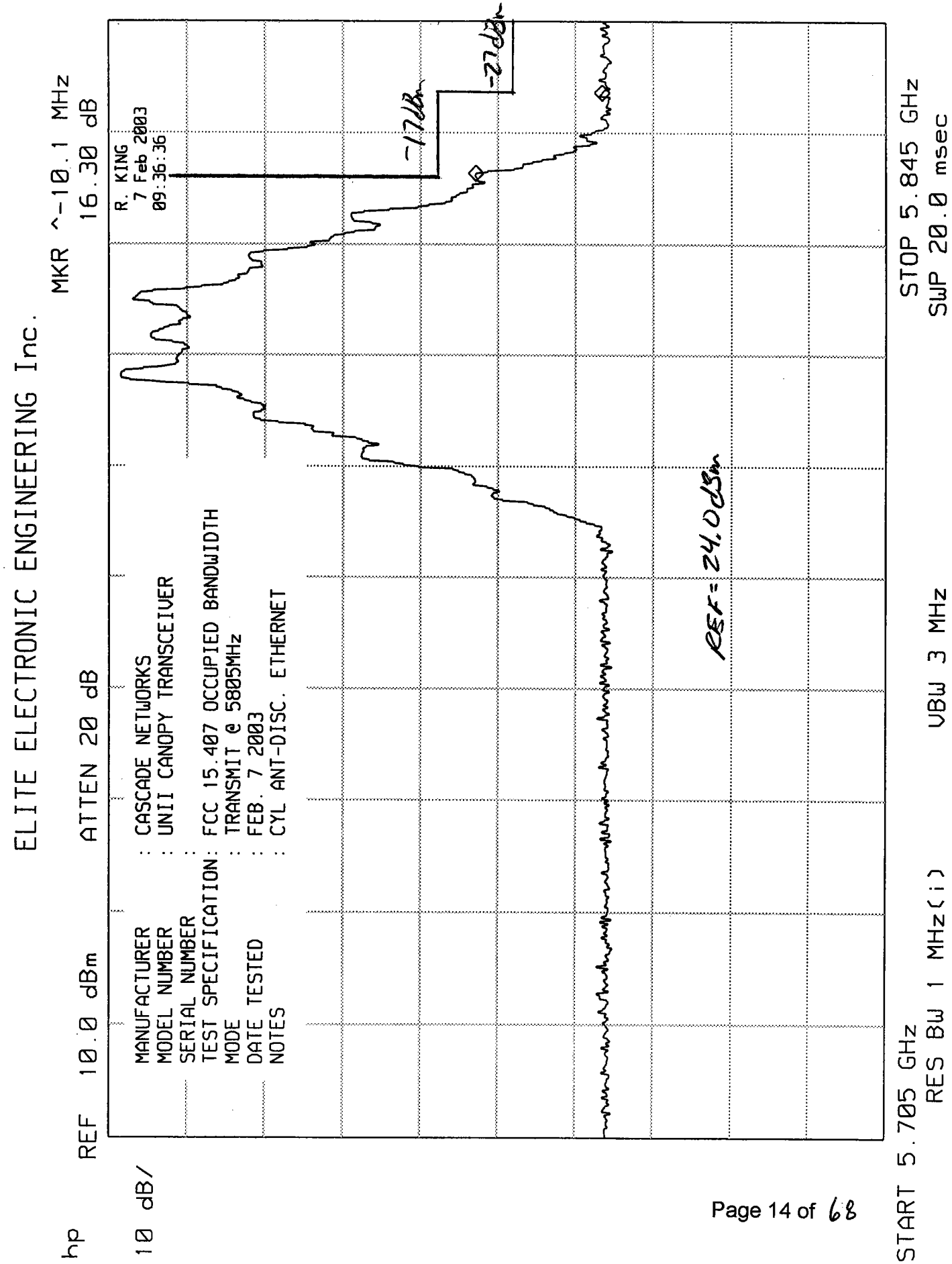


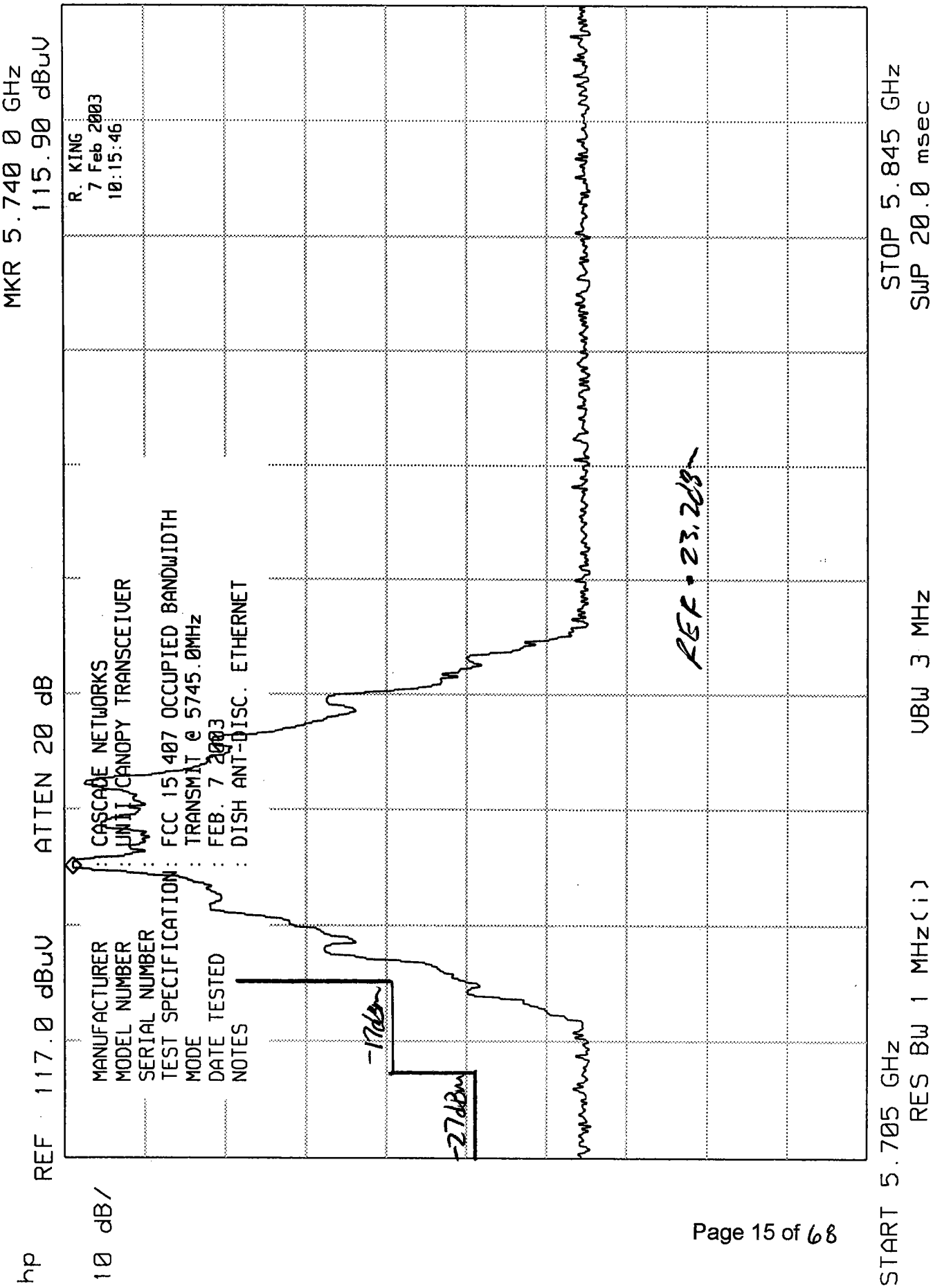
Radiated Emissions Worst Case Horizontal Polarization

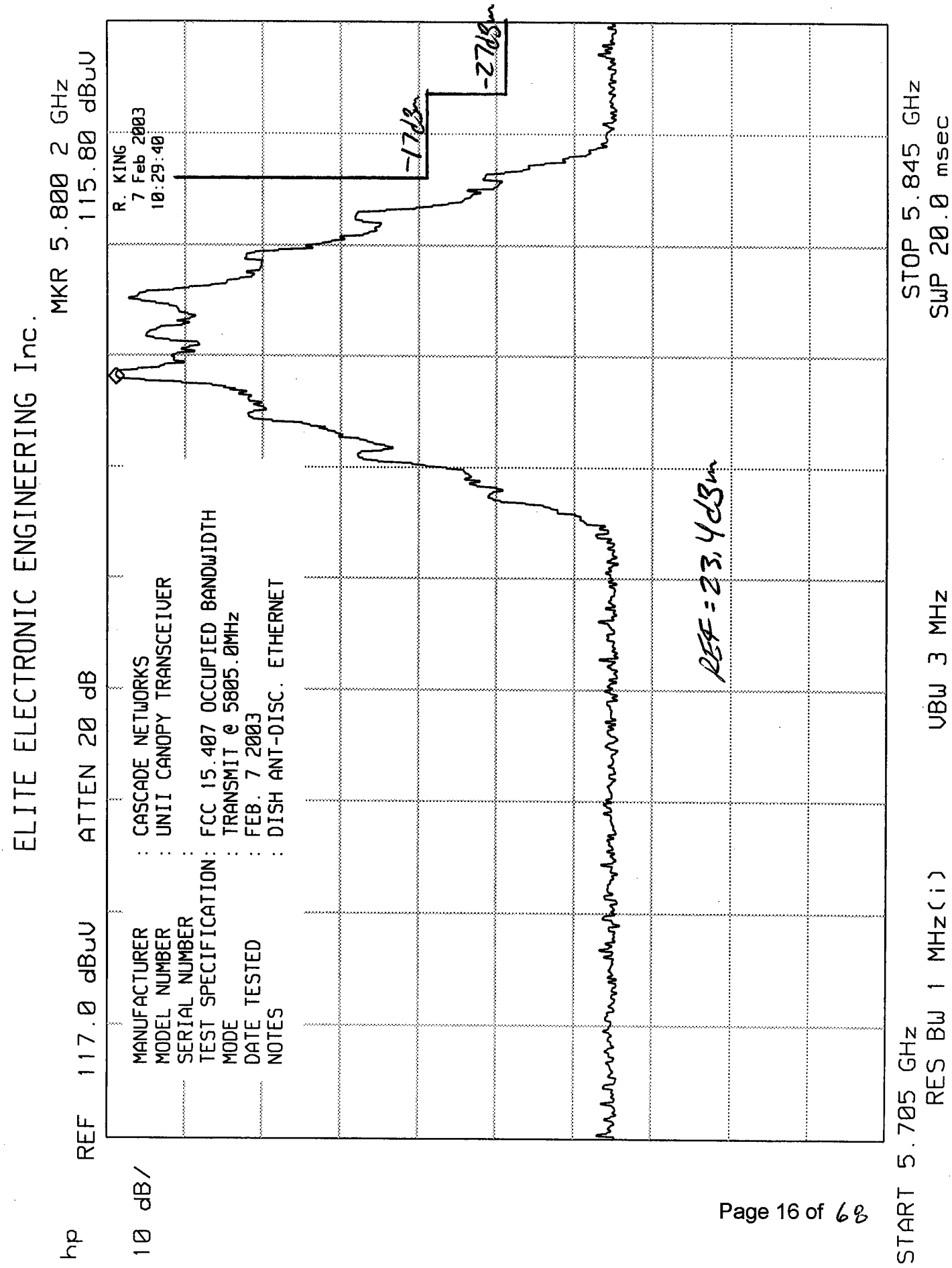


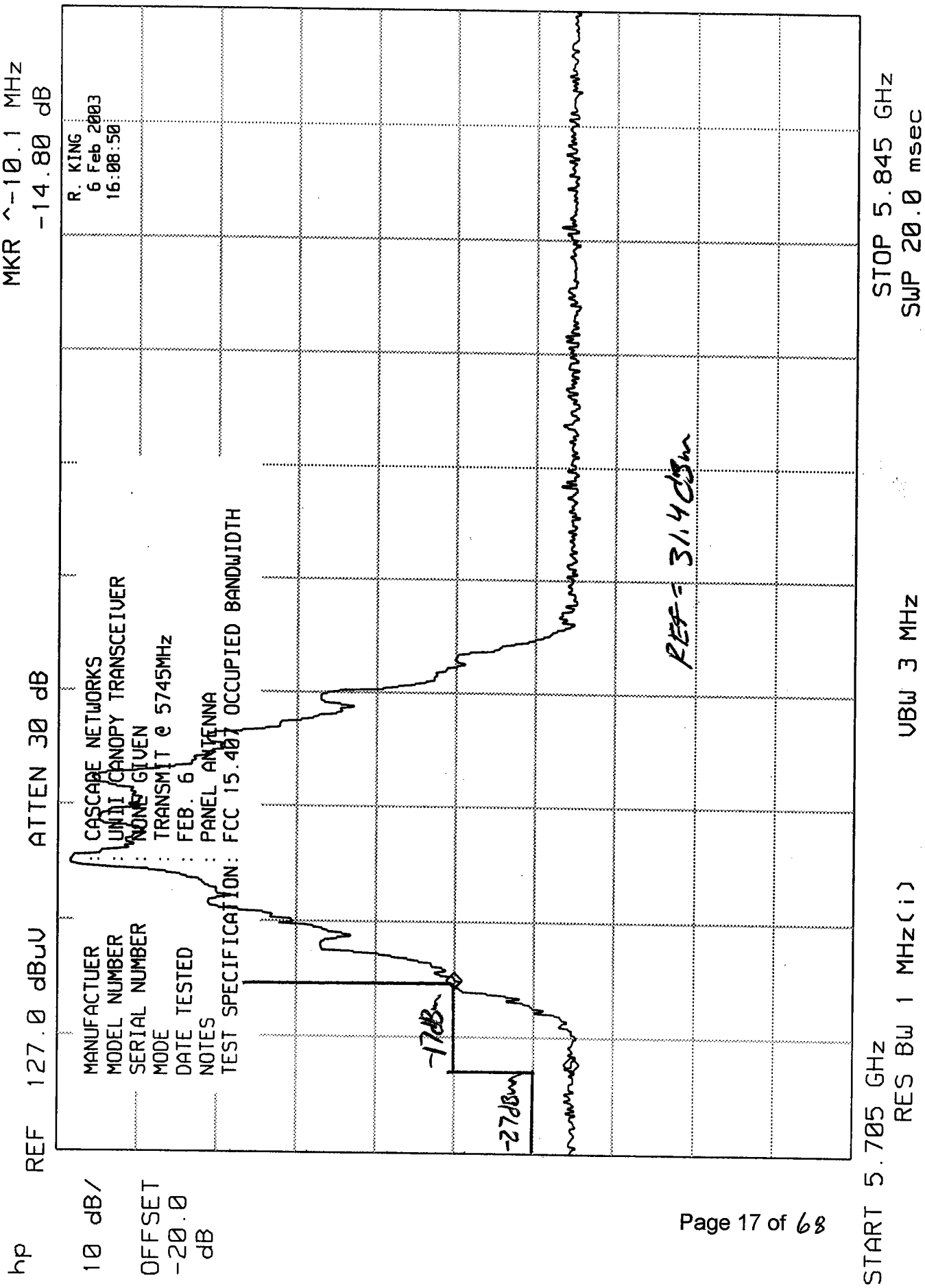
Radiated Emissions Worst Case Vertical Polarization

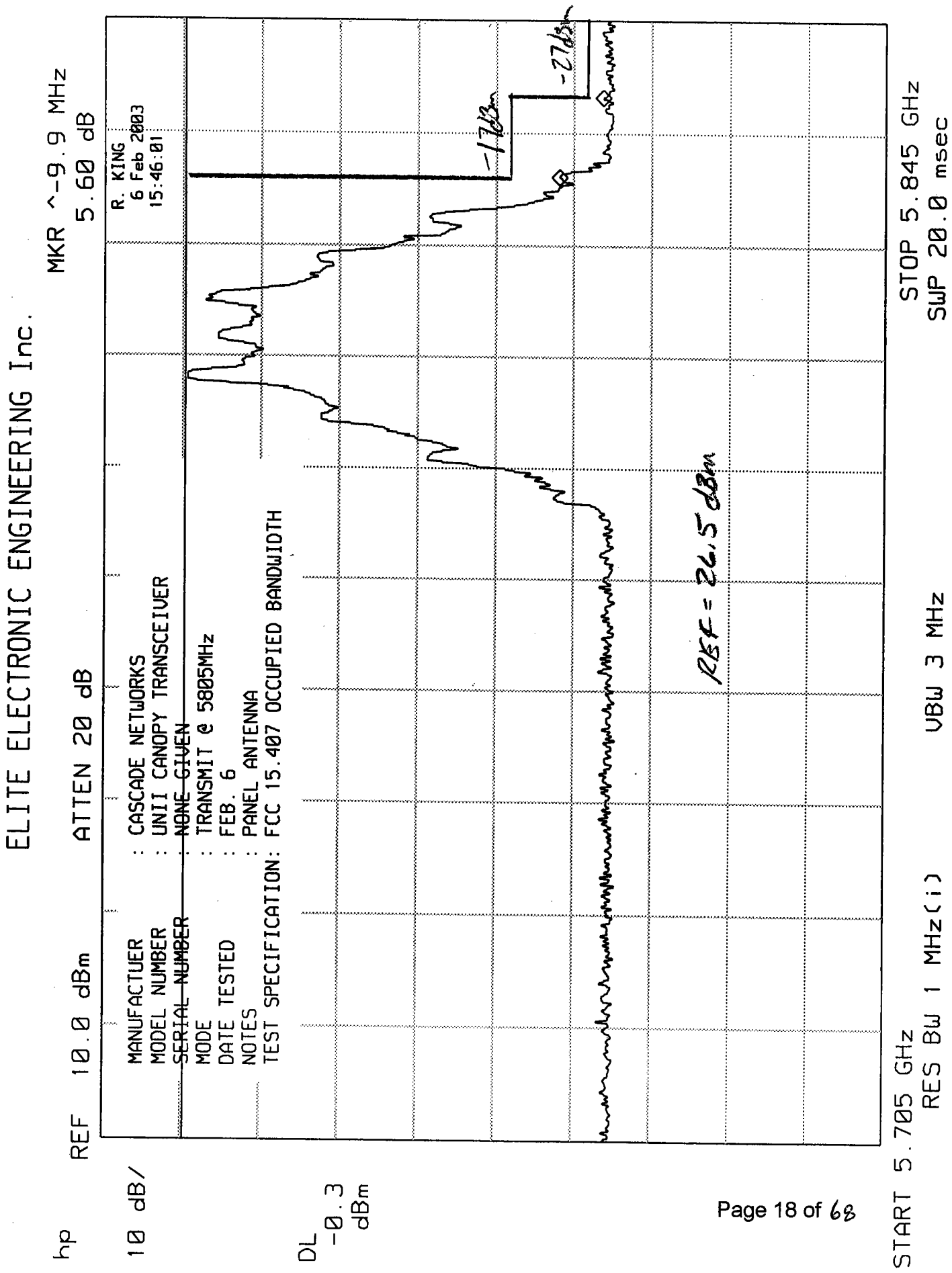

ELITE ELECTRONIC ENGINEERING Inc.
MKR 5.740 0 GHz
120.10 dBuV
R. KING
7 Feb 2003
09:54:29
REF 127.0 dBuV
ATTEN 30 dB
MANUFACTURER : CASCADE NETWORKS
MODEL NUMBER : UNII CANOPY TRANSCEIVER
SERIAL NUMBER :
TEST SPECIFICATION : FCC 15.407 OCCUPIED BANDWIDTH
MODE : TRANSMIT @ 5745.0MHz
DATE TESTED : FEB. 7 2003
NOTES : CYL ANT-DISC. ETHERNET
-17dB
-27dB
REF = 24.3 dBm
hp
10 dB/
OFFSET
-20.0
dB
START 5.705 GHz
RES BW 1 MHz(i)
VBW 3 MHz
STOP 5.845 GHz
SWP 20.0 msec


ELITE ELECTRONIC ENGINEERING Inc.
hp
REF 10.0 dBm
ATTEN 20 dB
MKR ^-10.1 MHz
16.30 dB
10 dB/
MANUFACTURER : CASCADE NETWORKS
MODEL NUMBER : UNII CANOPY TRANSCEIVER
SERIAL NUMBER :
TEST SPECIFICATION: FCC 15.407 OCCUPIED BANDWIDTH
MODE : TRANSMIT @ 5805MHz
DATE TESTED : FEB. 7 2003
NOTES : CYL ANT-DISC. ETHERNET
R. KING
7 Feb 2003
09:36:36
-17dBm
-27dBm
REF= 24.0dBm
START 5.705 GHz
RES BW 1 MHz(i)
VBW 3 MHz
STOP 5.845 GHz
SWP 20.0 msec

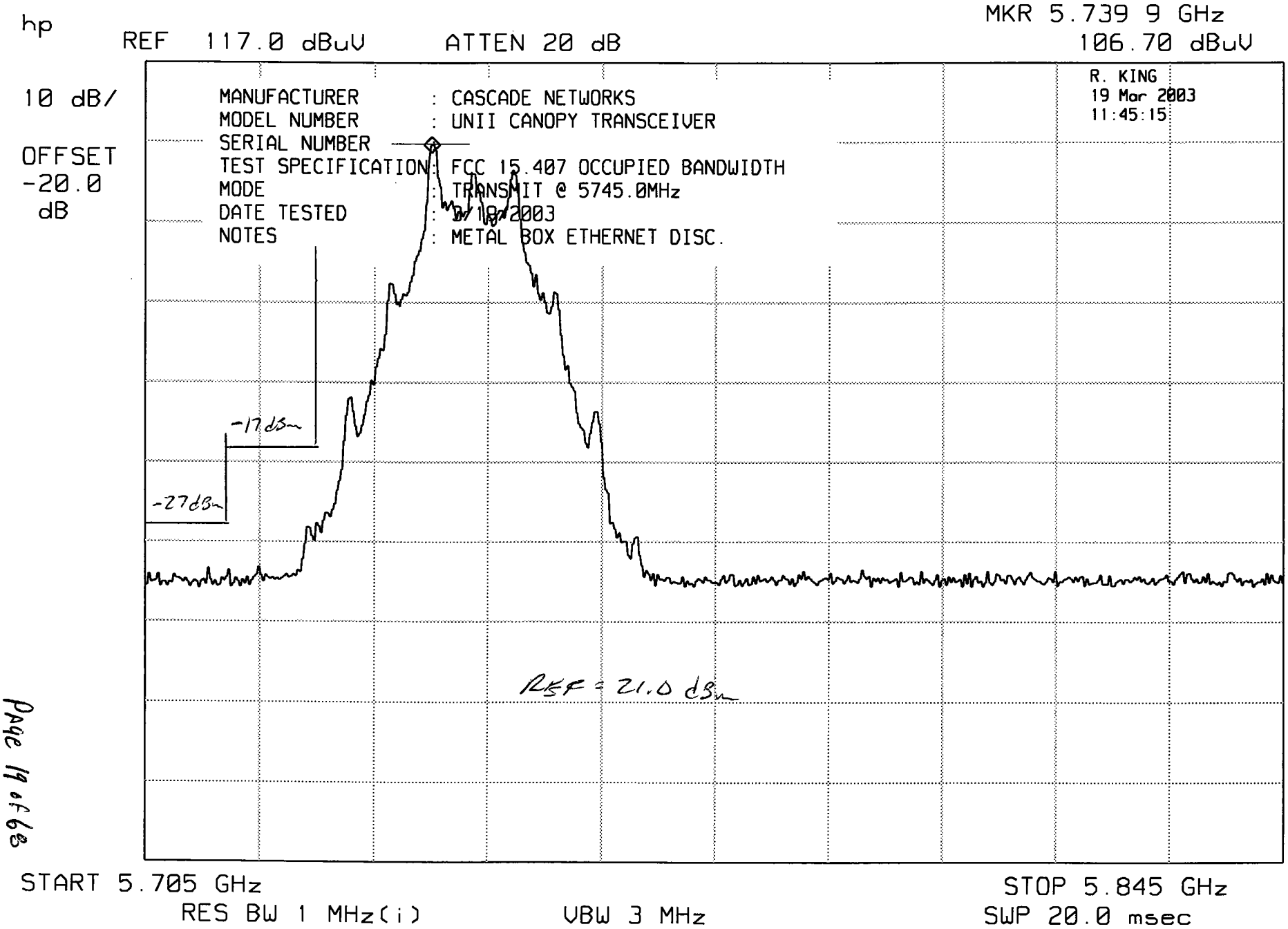

ELITE ELECTRONIC ENGINEERING Inc.
MKR 5.740 0 GHz
115.90 dBuV
R. KING
7 Feb 2003
10:15:46
REF 117.0 dBuV
ATTEN 20 dB
MANUFACTURER : CASCADE NETWORKS
MODEL NUMBER : UNII CANOPY TRANSCEIVER
SERIAL NUMBER :
TEST SPECIFICATION : FCC 15.407 OCCUPIED BANDWIDTH
MODE : TRANSMIT @ 5745.0MHz
DATE TESTED : FEB. 7 2003
NOTES : DISH ANT-DISC. ETHERNET
-17dBm
-27dBm
REF + 23.2dB
10 dB/
START 5.705 GHz
RES BW 1 MHz(i)
VBW 3 MHz
STOP 5.845 GHz
SWP 20.0 msec


ELITE ELECTRONIC ENGINEERING Inc.
MKR 5.800 2 GHz
115.80 dBuV
R. KING
7 Feb 2003
10:29:40
-17dBm
-27dBm
REF 117.0 dBuV
ATTEN 20 dB
MANUFACTURER : CASCADE NETWORKS
MODEL NUMBER : UNII CANOPY TRANSCEIVER
SERIAL NUMBER :
TEST SPECIFICATION: FCC 15.407 OCCUPIED BANDWIDTH
MODE : TRANSMIT @ 5805.0MHz
DATE TESTED : FEB. 7 2003
NOTES : DISH ANT-DISC. ETHERNET
REF = 23.4dBm
hp
10 dB/
START 5.705 GHz
RES BW 1 MHz(i)
VBW 3 MHz
STOP 5.845 GHz
SWP 20.0 msec


ELITE ELECTRONIC ENGINEERING Inc.
MKR ^-10.1 MHz
-14.80 dB
R. KING
6 Feb 2003
16:08:50
REF 127.0 dBuV
ATTEN 30 dB
MANUFACTUER : CASCADE NETWORKS
MODEL NUMBER : UNII CANOPY TRANSCEIVER
SERIAL NUMBER : NONE GIVEN
MODE : TRANSMIT @ 5745MHz
DATE TESTED : FEB. 6
NOTES : PANEL ANTENNA
TEST SPECIFICATION: FCC 15.407 OCCUPIED BANDWIDTH
-17dB
-27dBm
REF = 31.4 dBm
hp
10 dB/
OFFSET
-20.0
dB
START 5.705 GHz
RES BW 1 MHz(i)
VBW 3 MHz
STOP 5.845 GHz
SWP 20.0 msec

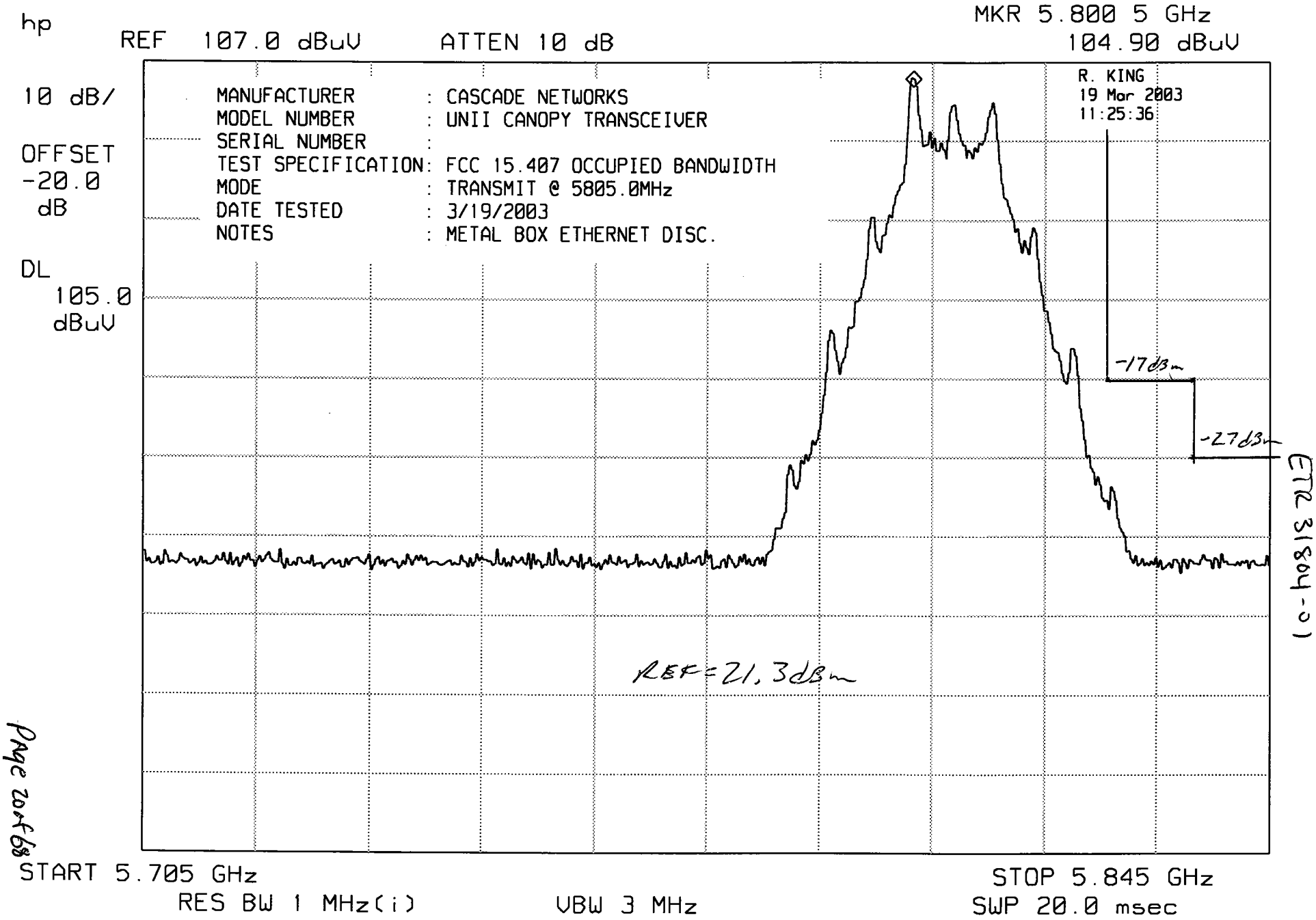

ELITE ELECTRONIC ENGINEERING Inc.
MKR ^-9.9 MHz
5.60 dB
R. KING
6 Feb 2003
15:46:01
REF 10.0 dBm
ATTEN 20 dB
MANUFACTUER : CASCADE NETWORKS
MODEL NUMBER : UNII CANOPY TRANSCEIVER
SERIAL NUMBER : NONE GIVEN
MODE : TRANSMIT @ 5805MHz
DATE TESTED : FEB. 6
NOTES : PANEL ANTENNA
TEST SPECIFICATION: FCC 15.407 OCCUPIED BANDWIDTH
-17dB
-27dB
REF = 26.5 dBm
hp
10 dB/
DL
-0.3
dBm
START 5.705 GHz
RES BW 1 MHz(i)
VBW 3 MHz
STOP 5.845 GHz
SWP 20.0 msec

ELITE ELECTRONIC ENGINEERING Inc.



ETR 31604-01

ELITE ELECTRONIC ENGINEERING Inc.



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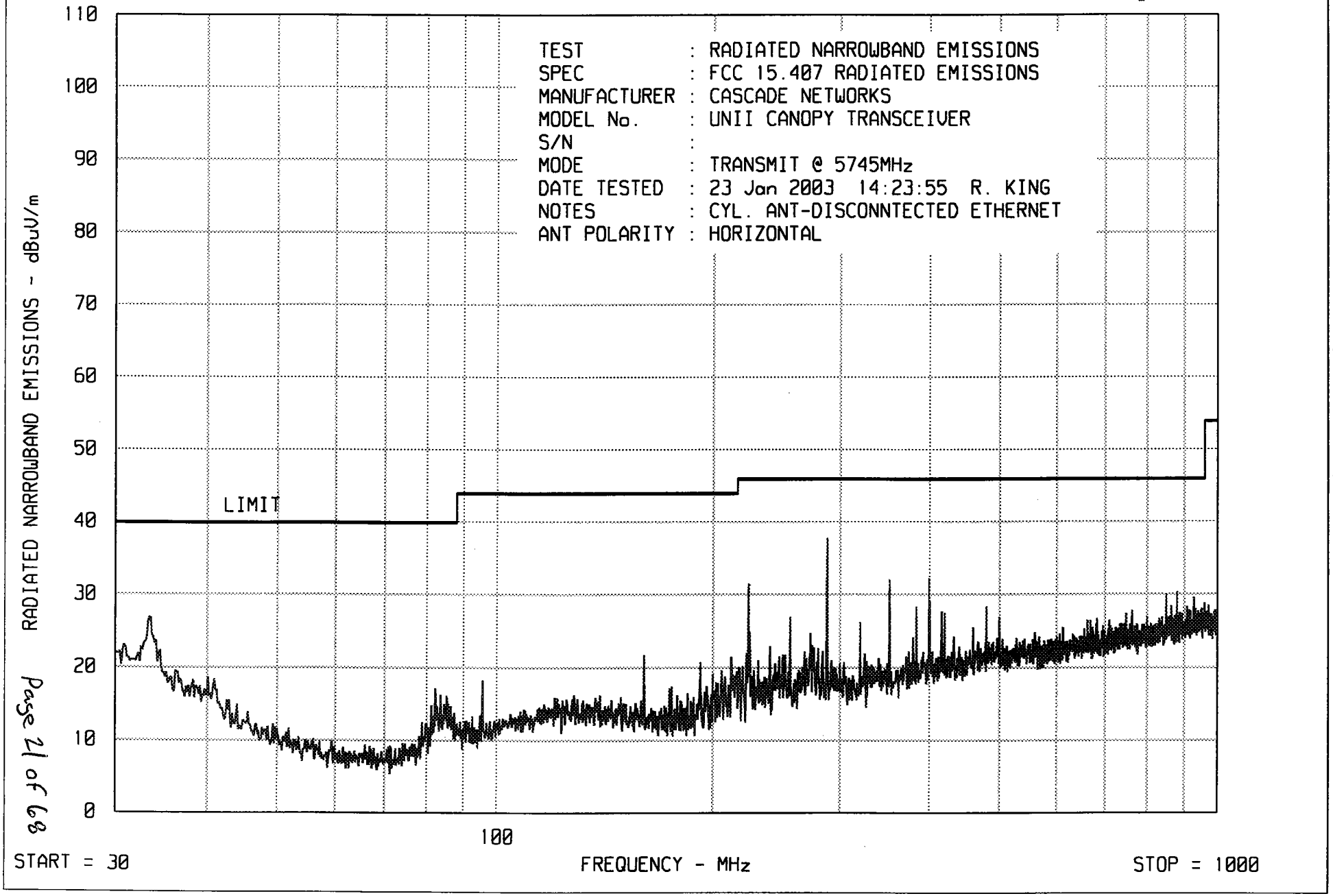
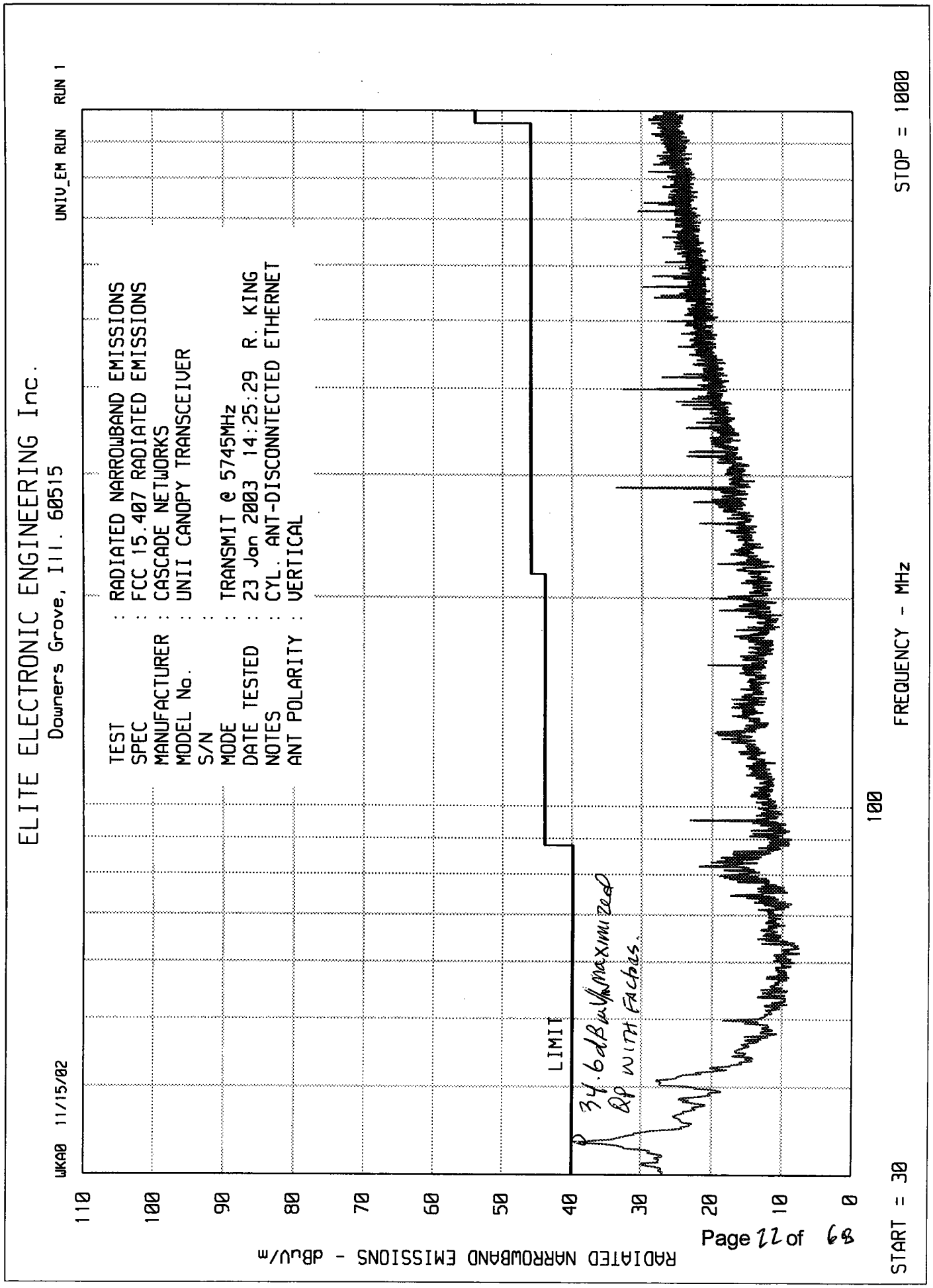
ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02 UNIV_EM RUN RUN 1



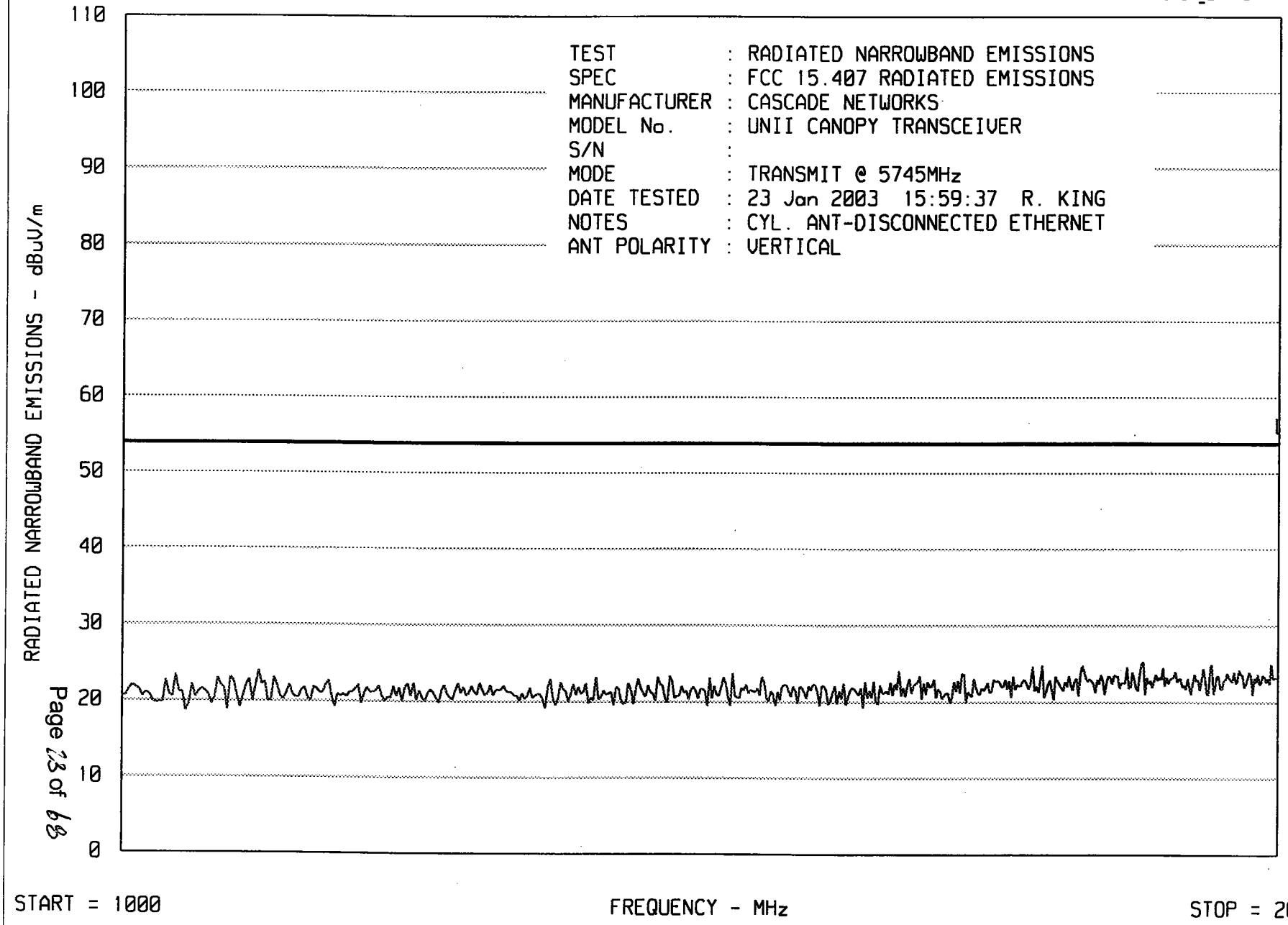
ETR 31804-01


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA0 11/15/02
UNIV_EM RUN RUN 1
TEST : RADIATED NARROWBAND EMISSIONS
SPEC : FCC 15.407 RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : UNII CANOPY TRANSCEIVER
S/N :
MODE : TRANSMIT @ 5745MHz
DATE TESTED : 23 Jan 2003 14:25:29 R. KING
NOTES : CYL. ANT-DISCONNTECTED ETHERNET
ANT POLARITY : VERTICAL
LIMIT
34.6dBuV/m maximized QP WITH Factors.
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 30
100
STOP = 1000
FREQUENCY - MHz

ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02 UNIV_EM RUN RUN 3

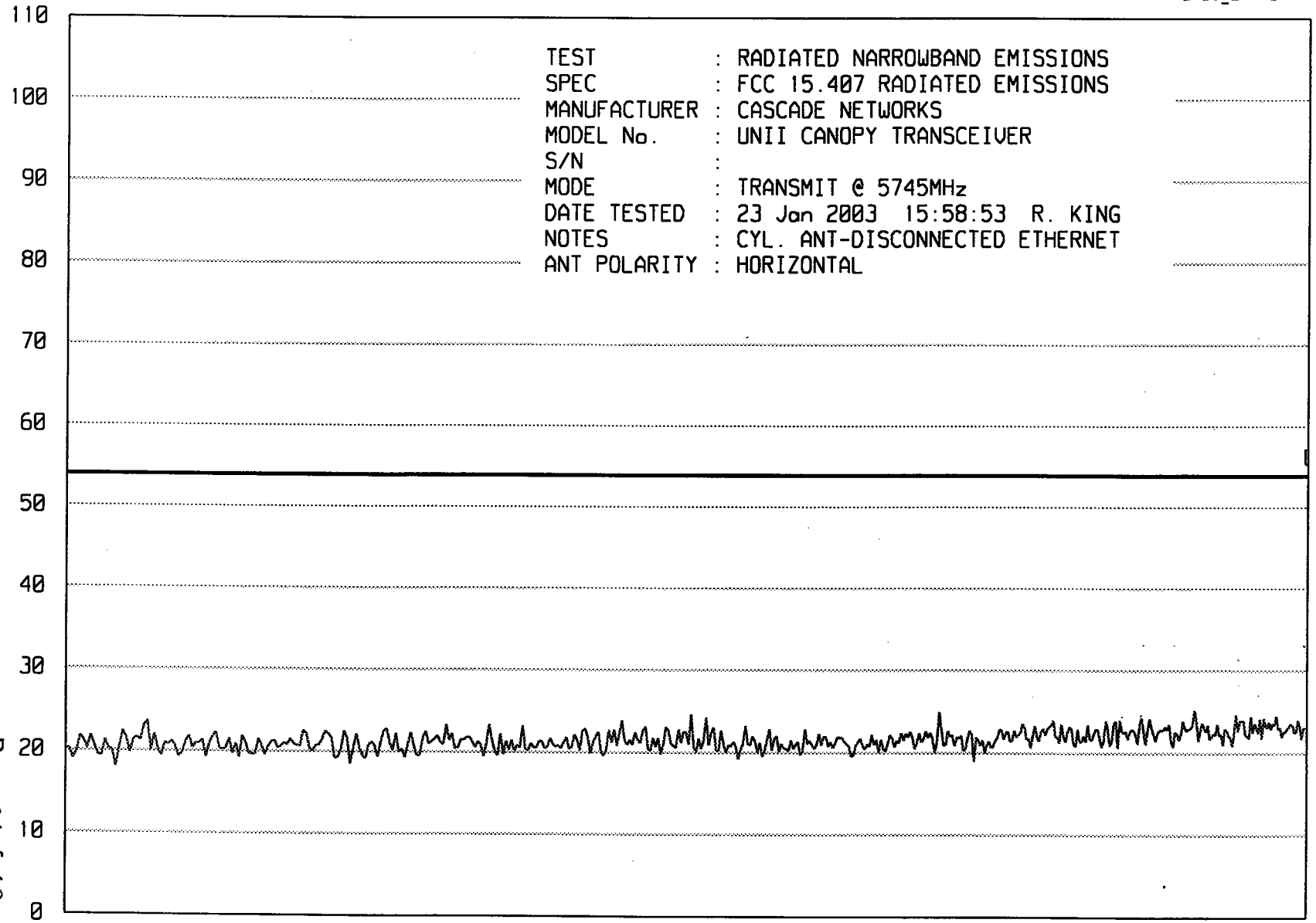


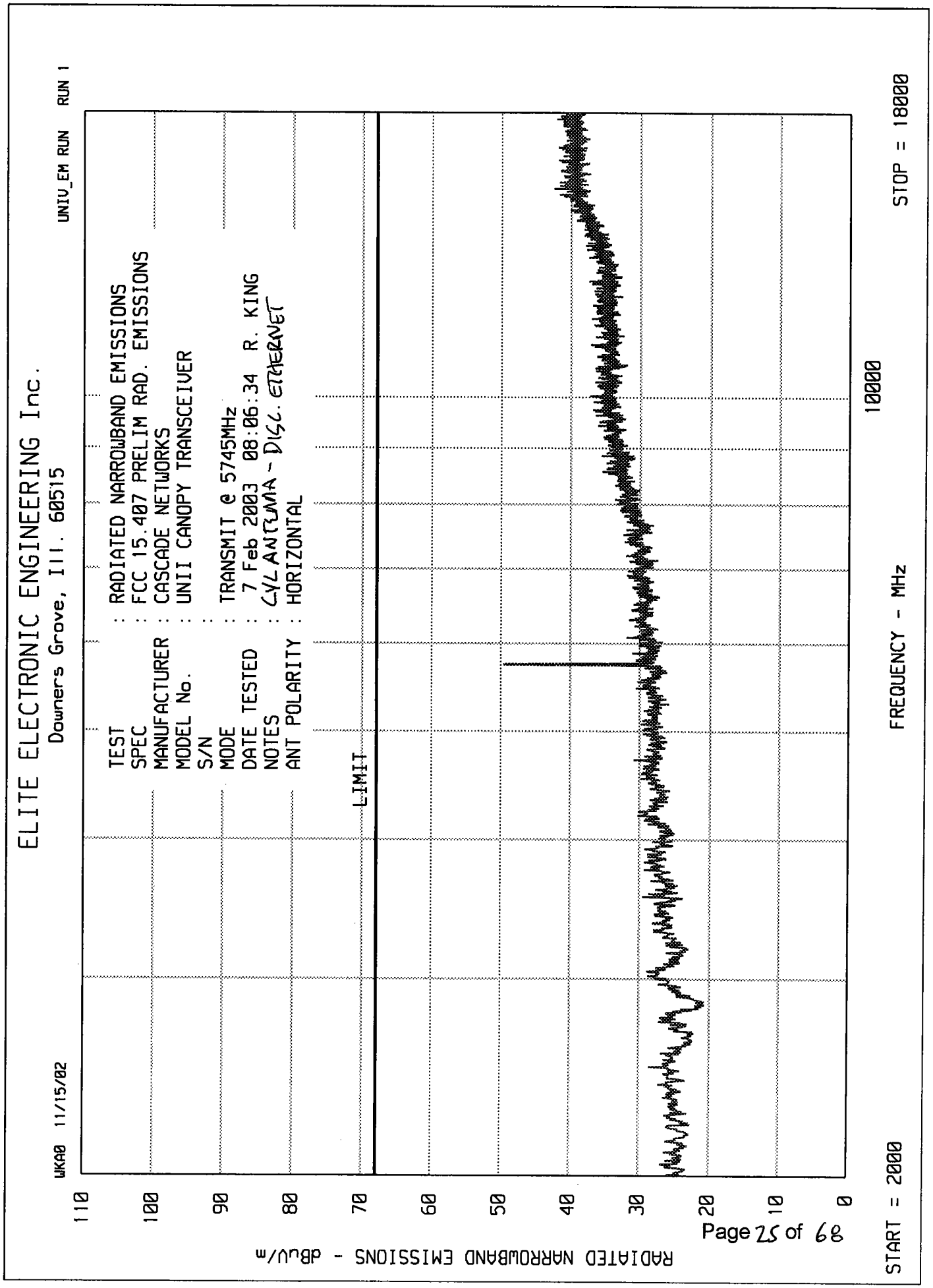
ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02

UNIV_EM RUN RUN 3

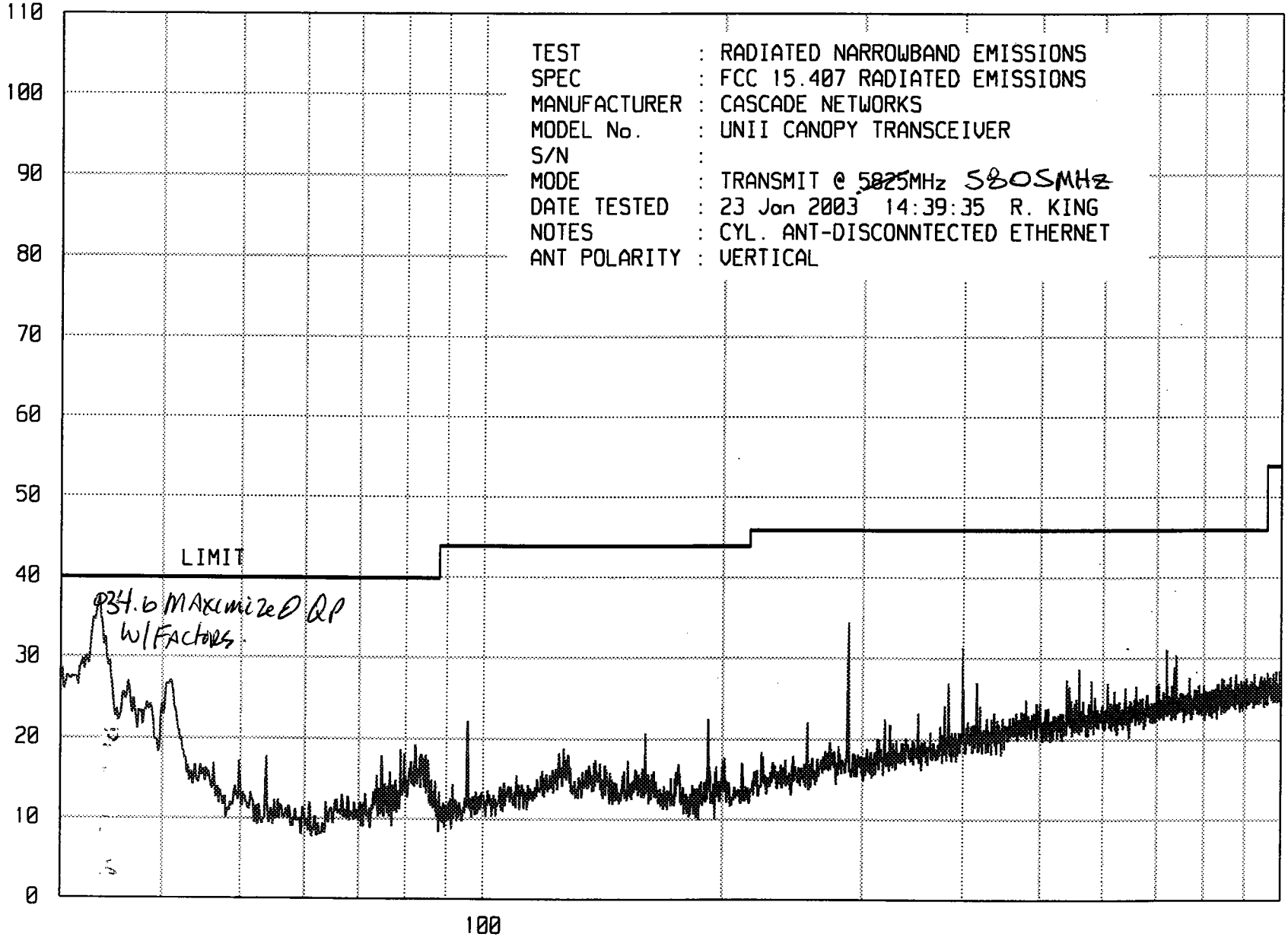



ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA0 11/15/02
UNIV_EM RUN RUN 1
TEST : RADIATED NARROWBAND EMISSIONS
SPEC : FCC 15.407 PRELIM RAD. EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : UNII CANOPY TRANSCEIVER
S/N :
MODE : TRANSMIT @ 5745MHz
DATE TESTED : 7 Feb 2003 08:06:34 R. KING
NOTES : CYL ANTENNA - DISC. ETHERNET
ANT POLARITY : HORIZONTAL
LIMIT
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 2000
FREQUENCY - MHz
10000
STOP = 18000

ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02 UNIV_EM RUN RUN 1



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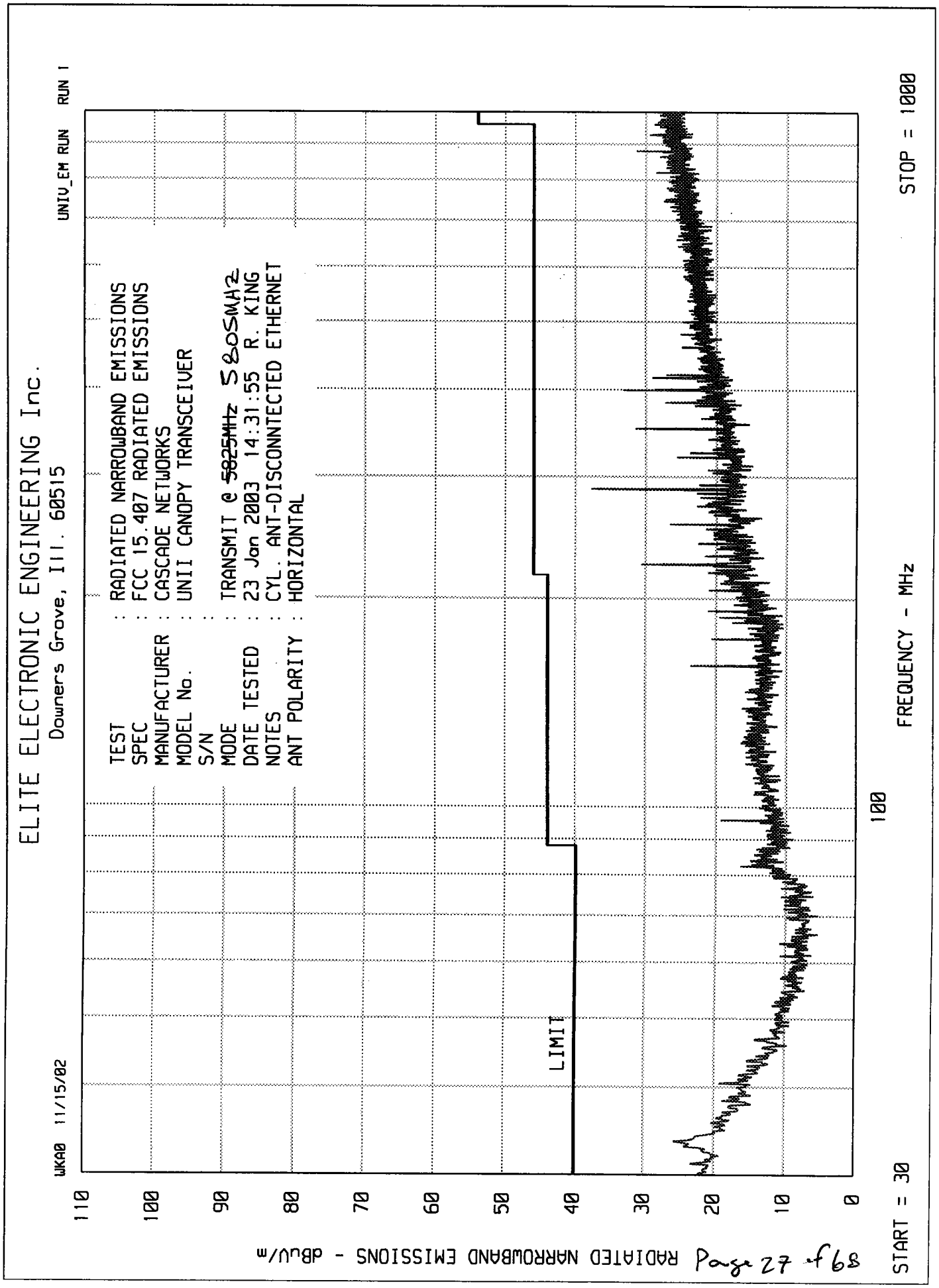
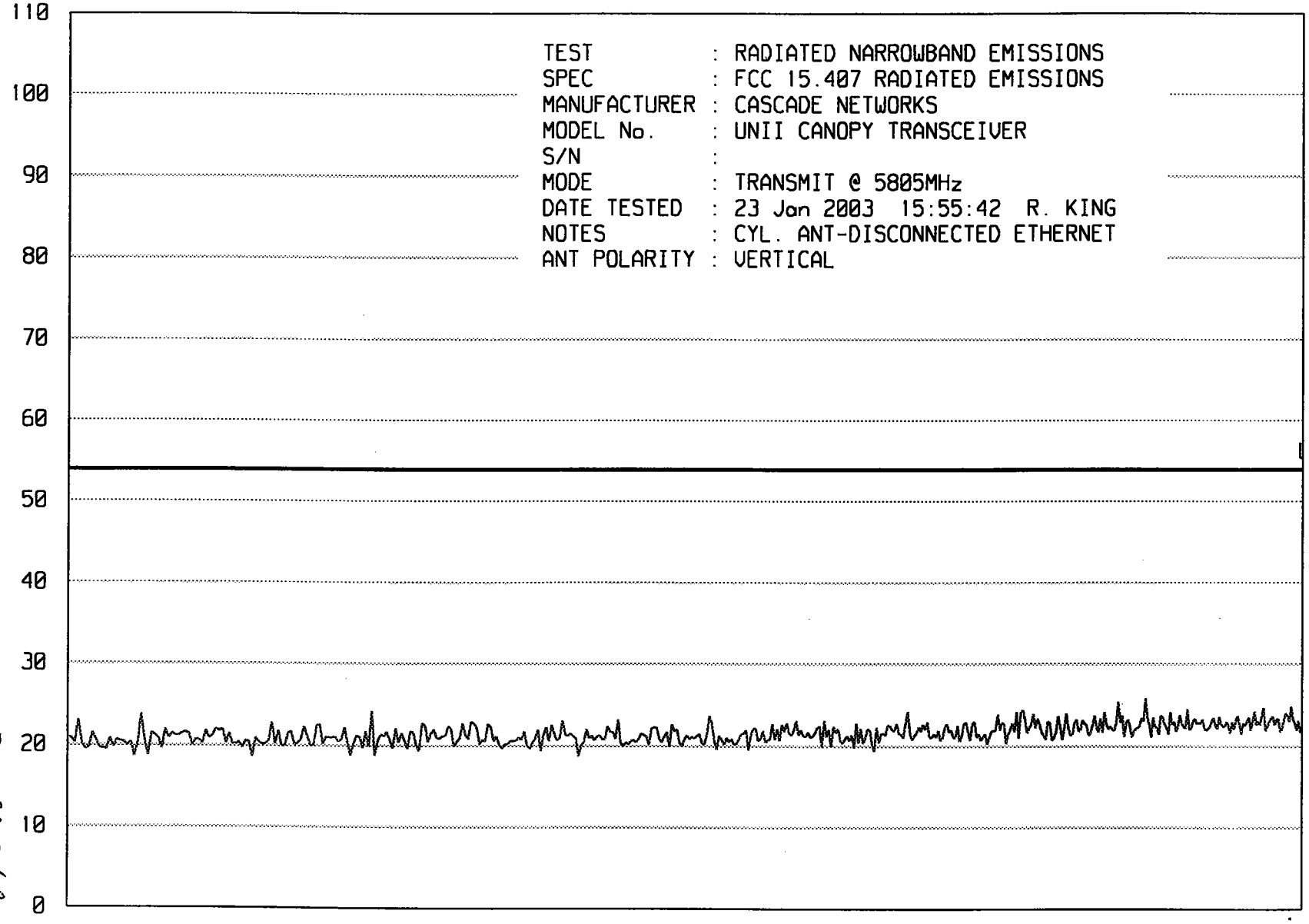

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA0 11/15/02
UNIV_EM RUN RUN 1
TEST : RADIATED NARROWBAND EMISSIONS
SPEC : FCC 15.407 RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : UNII CANOPY TRANSCEIVER
S/N :
MODE : TRANSMIT @ ~~5825MHz~~ 5805MHz
DATE TESTED : 23 Jan 2003 14:31:55 R. KING
NOTES : CYL. ANT-DISCONNTECTED ETHERNET
ANT POLARITY : HORIZONTAL
LIMIT
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 30
100
STOP = 1000
FREQUENCY - MHz

ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02 UNIV_EM RUN RUN 3

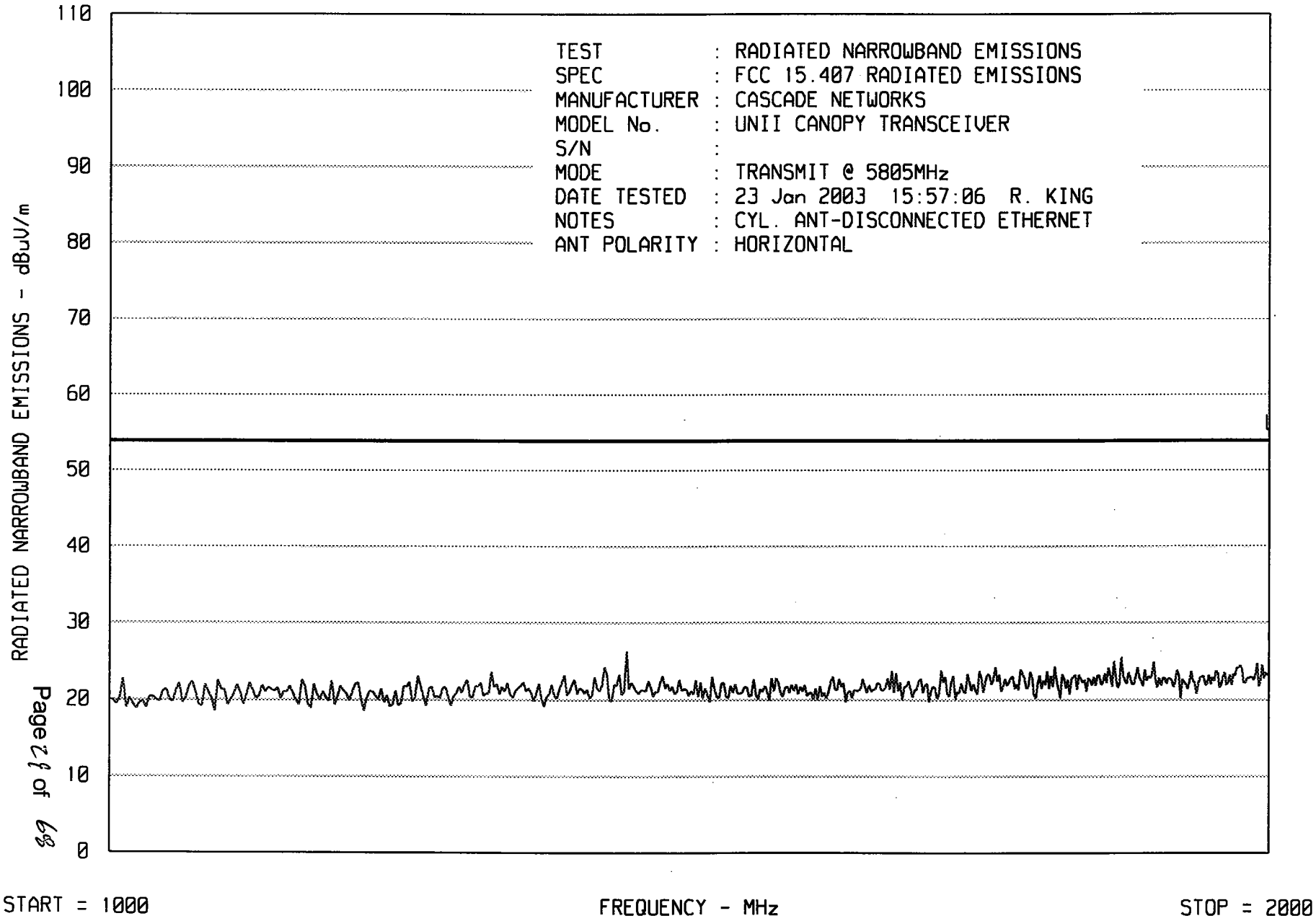


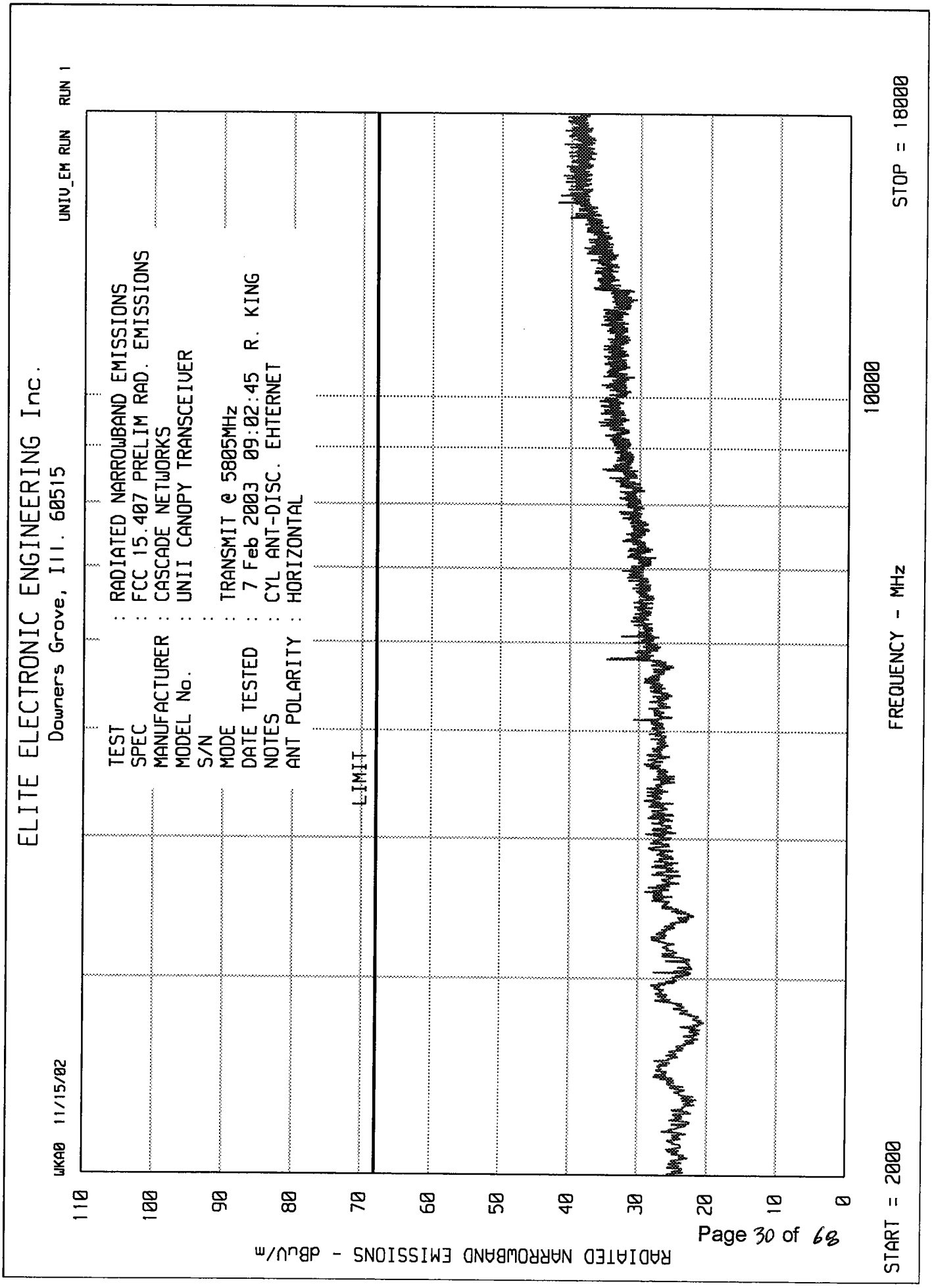
START = 1000 FREQUENCY - MHz STOP = 2000

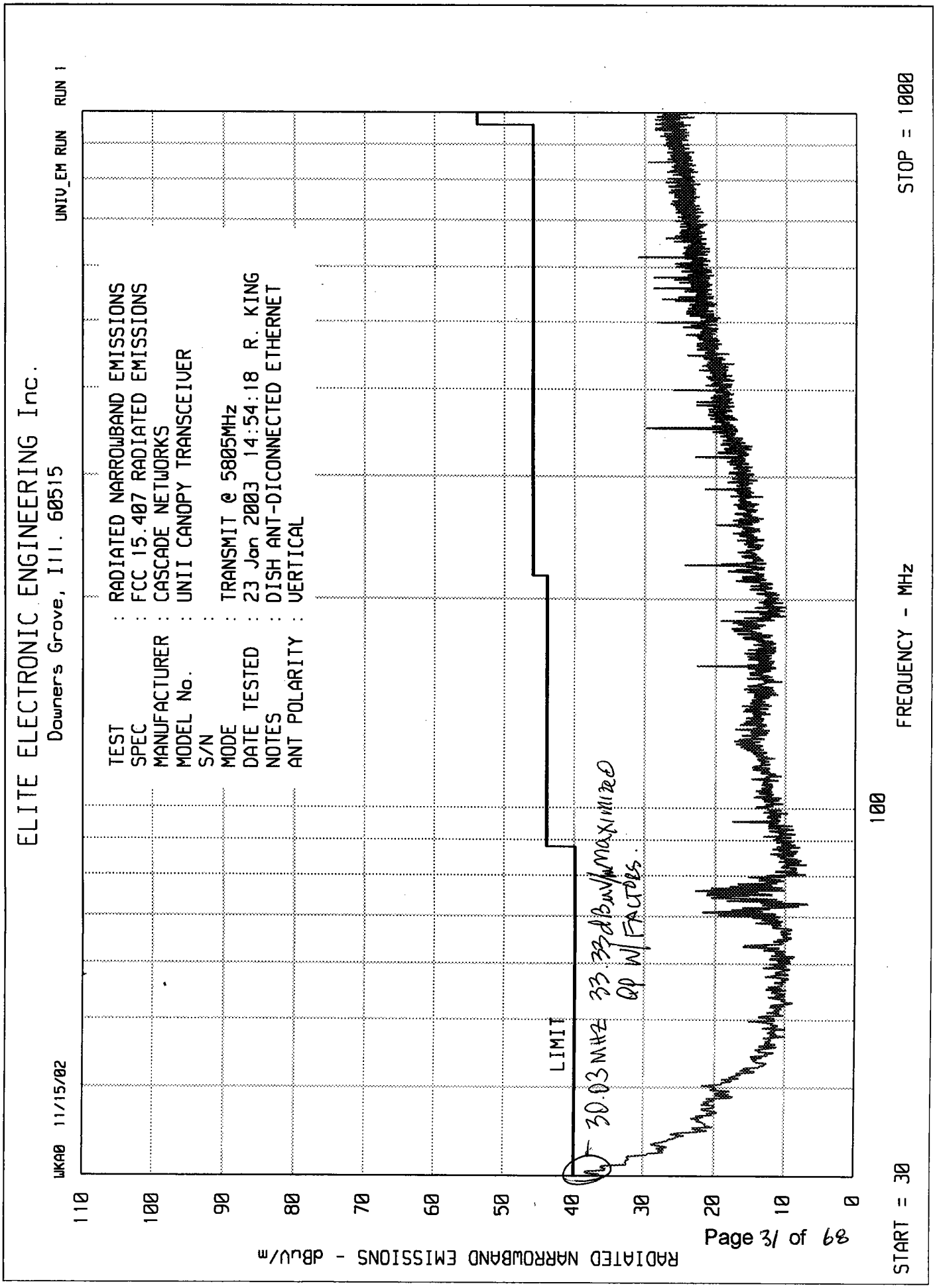
ELITE ELECTRONIC ENGINEERING Inc.

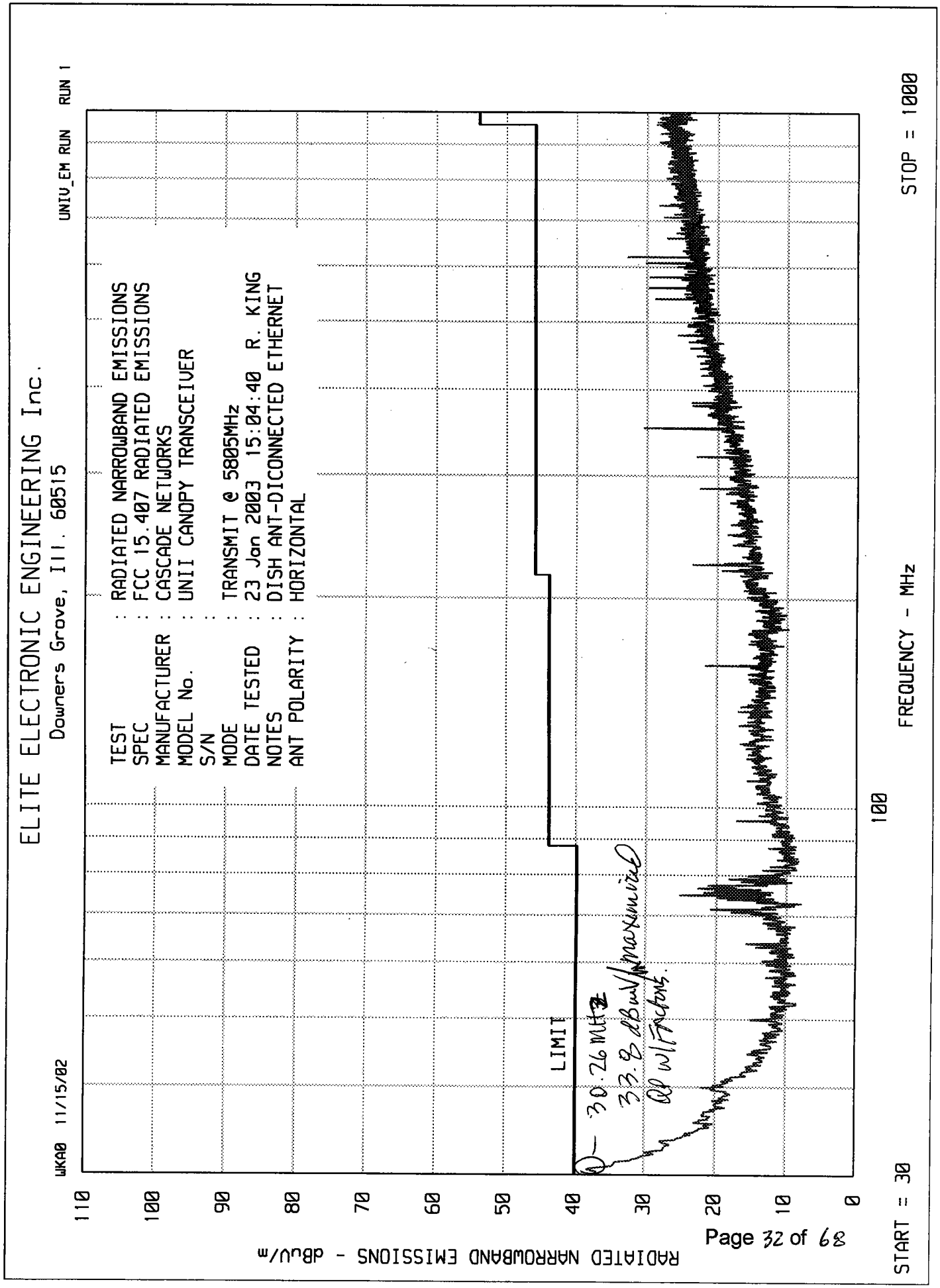
Downers Grove, Ill. 60515

WKA0 11/15/02 UNIV_EM RUN RUN 3




ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA0 11/15/02
UNIV_EM RUN RUN 1
TEST : RADIATED NARROWBAND EMISSIONS
SPEC : FCC 15.407 PRELIM RAD. EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : UNII CANOPY TRANSCEIVER
S/N :
MODE : TRANSMIT @ 5805MHz
DATE TESTED : 7 Feb 2003 09:02:45 R. KING
NOTES : CYL ANT-DISC. EHTERNET
ANT POLARITY : HORIZONTAL
LIMIT
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 2000
FREQUENCY - MHz
10000
STOP = 18000

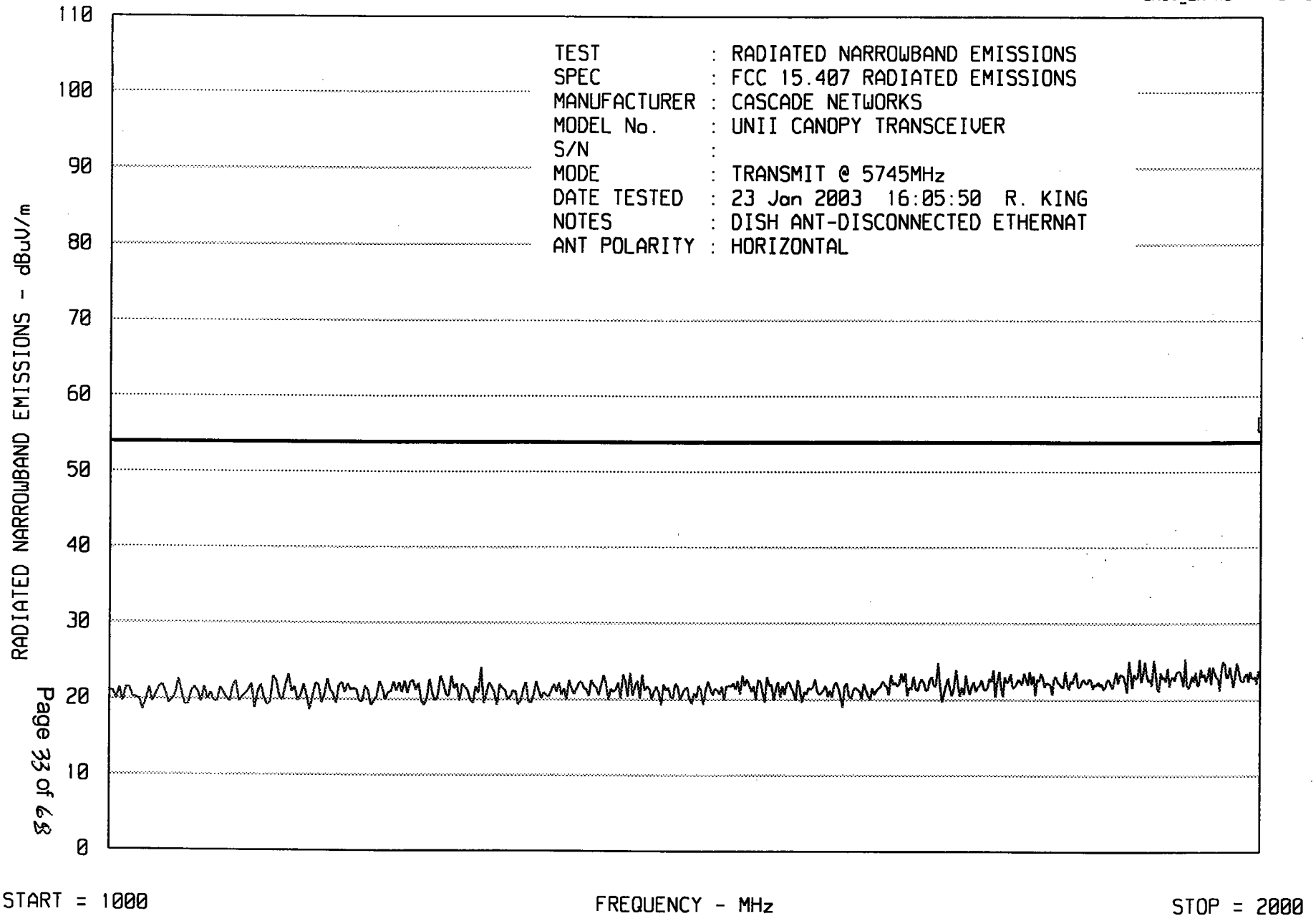

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA0 11/15/02
UNIV_EM RUN RUN 1
TEST : RADIATED NARROWBAND EMISSIONS
SPEC : FCC 15.407 RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : UNII CANOPY TRANSCEIVER
S/N :
MODE : TRANSMIT @ 5805MHz
DATE TESTED : 23 Jan 2003 14:54:18 R. KING
NOTES : DISH ANT-DICONNECTED ETHERNET
ANT POLARITY : VERTICAL
LIMIT
30.03 MHz 33.33 dBuV/m maximized QP W/ FACTORS.
110
100
90
80
70
60
50
40
30
20
10
0
RADIATED NARROWBAND EMISSIONS - dBuV/m
START = 30
100
FREQUENCY - MHz
STOP = 1000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA0 11/15/02
UNIV_EM RUN RUN 1
TEST : RADIATED NARROWBAND EMISSIONS
SPEC : FCC 15.407 RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : UNII CANOPY TRANSCEIVER
S/N :
MODE : TRANSMIT @ 5805MHz
DATE TESTED : 23 Jan 2003 15:04:40 R. KING
NOTES : DISH ANT-DICONNECTED ETHERNET
ANT POLARITY : HORIZONTAL
LIMIT
30.26 MHz
33.8 dBuV/m maximized
QP w/factors.
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 30
100
FREQUENCY - MHz
STOP = 1000

ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

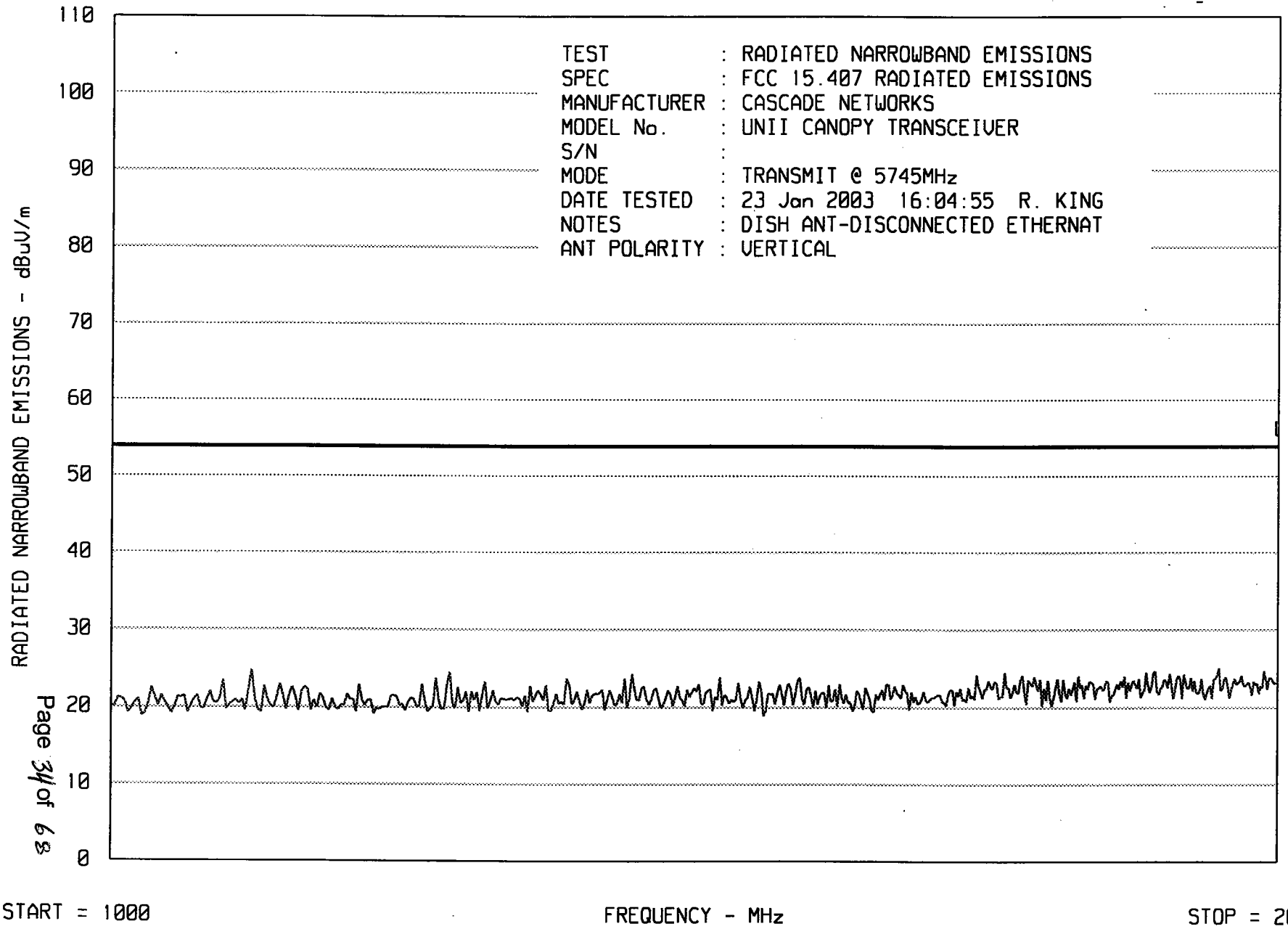
WKA0 11/15/02 UNIV_EM RUN RUN 3

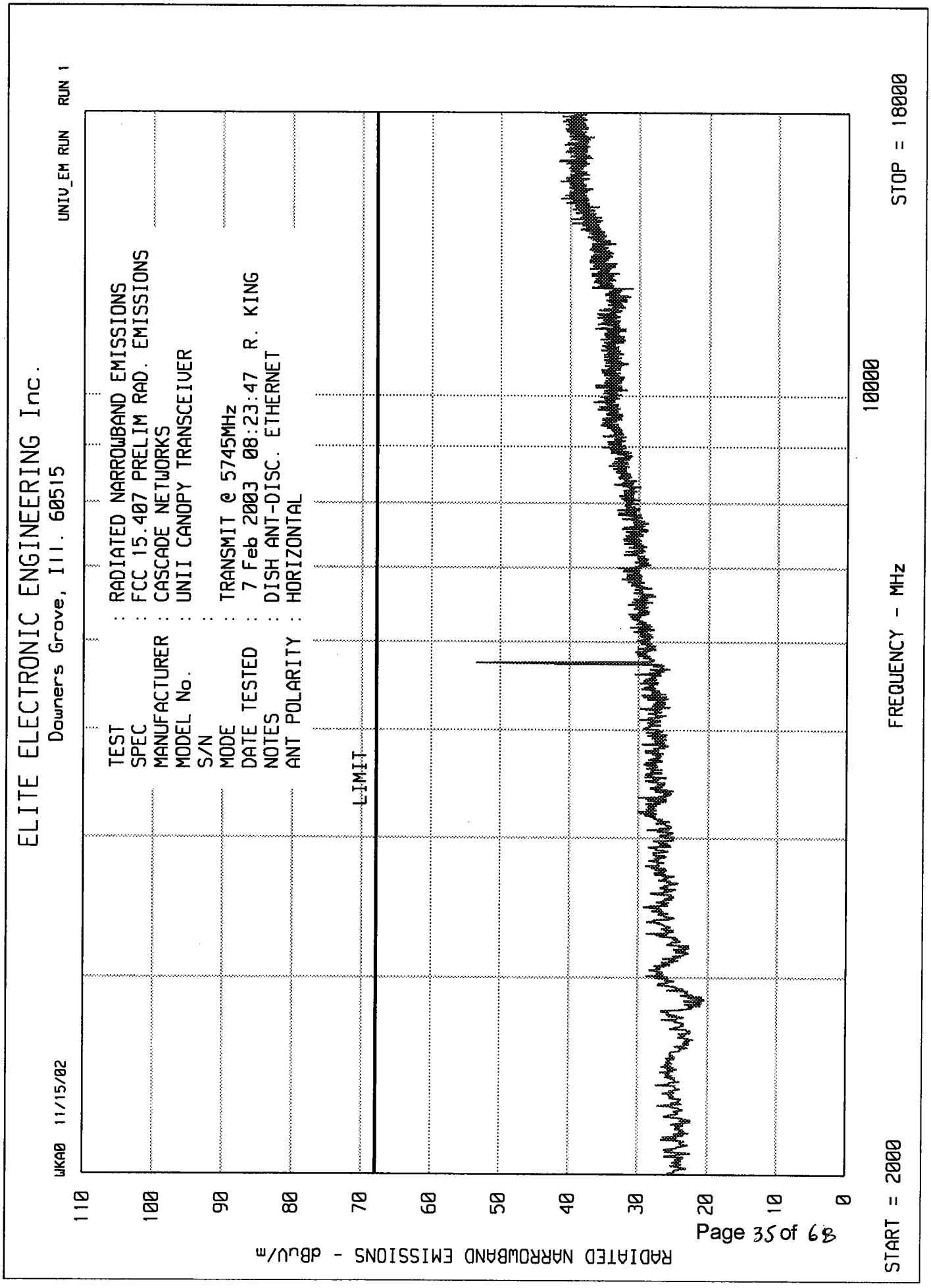


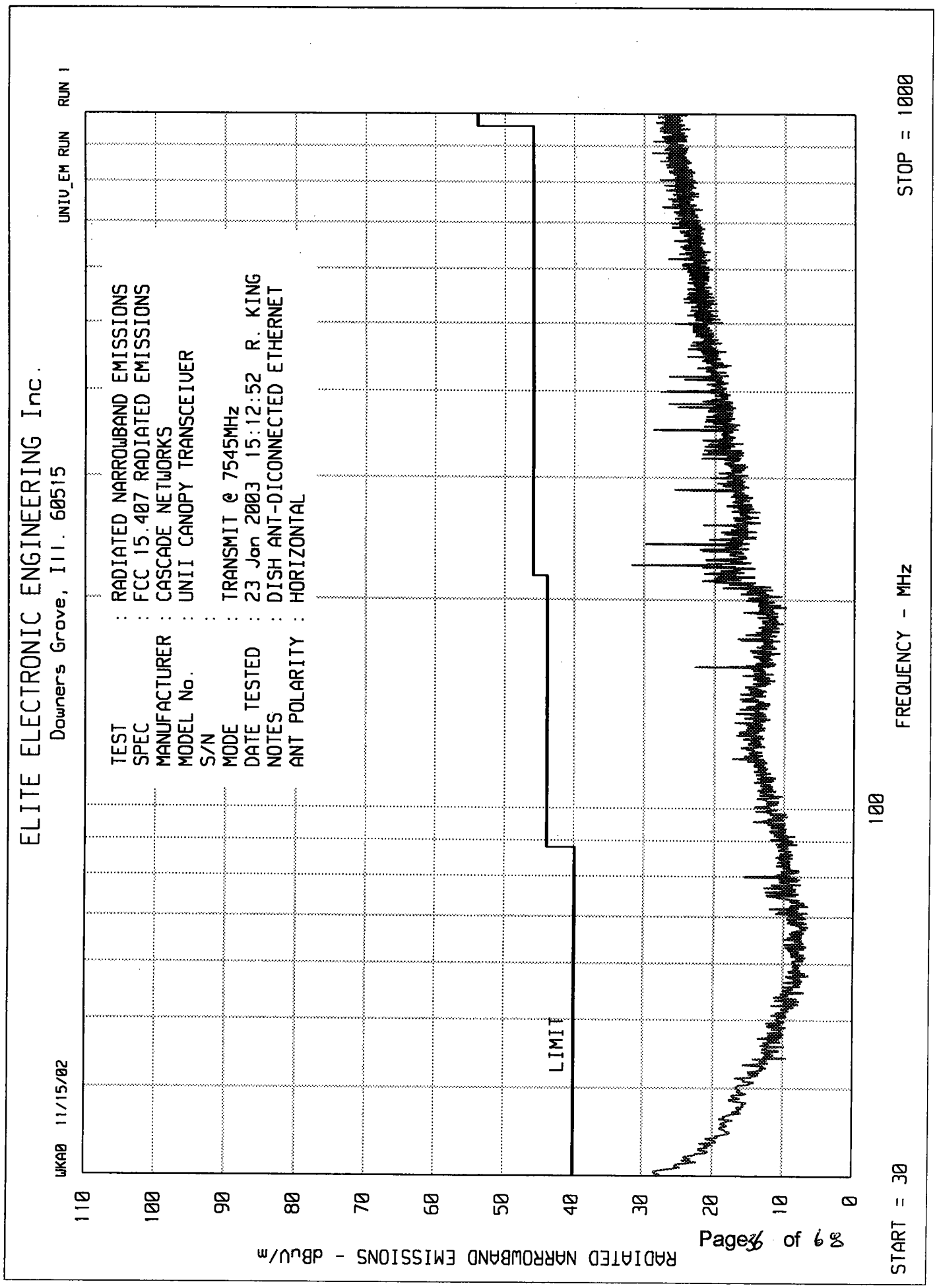
ELITE ELECTRONIC ENGINEERING Inc.

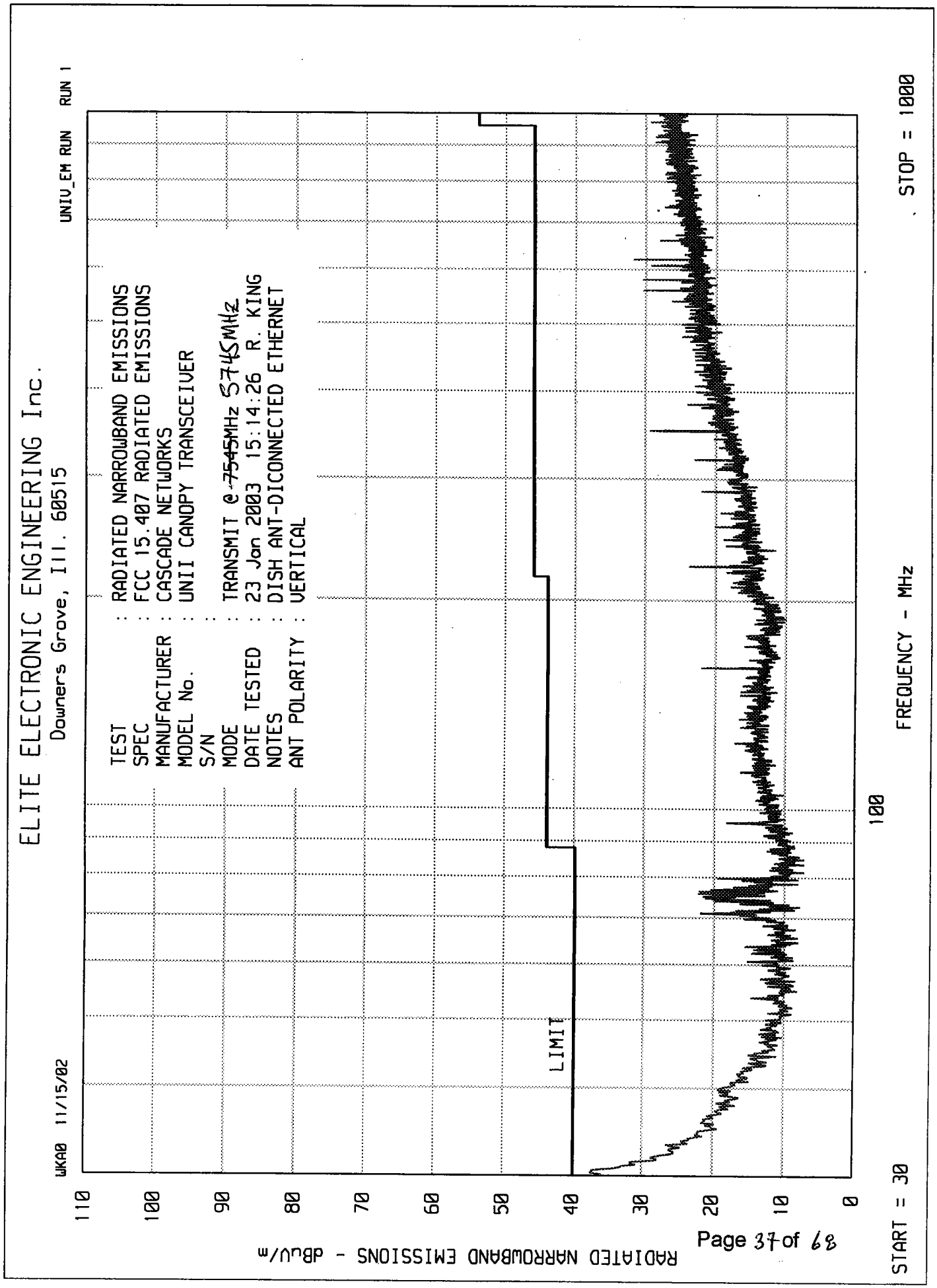
Downers Grove, Ill. 60515

WKA0 11/15/02 UNIV_EM RUN RUN 3




ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA0 11/15/02
UNIV_EM RUN RUN 1
TEST : RADIATED NARROWBAND EMISSIONS
SPEC : FCC 15.407 PRELIM RAD. EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : UNII CANOPY TRANSCEIVER
S/N :
MODE : TRANSMIT @ 5745MHz
DATE TESTED : 7 Feb 2003 08:23:47 R. KING
NOTES : DISH ANT-DISC. ETHERNET
ANT POLARITY : HORIZONTAL
LIMIT
110
100
90
80
70
60
50
40
30
20
10
0
RADIATED NARROWBAND EMISSIONS - dBuV/m
START = 2000
10000
STOP = 18000
FREQUENCY - MHz

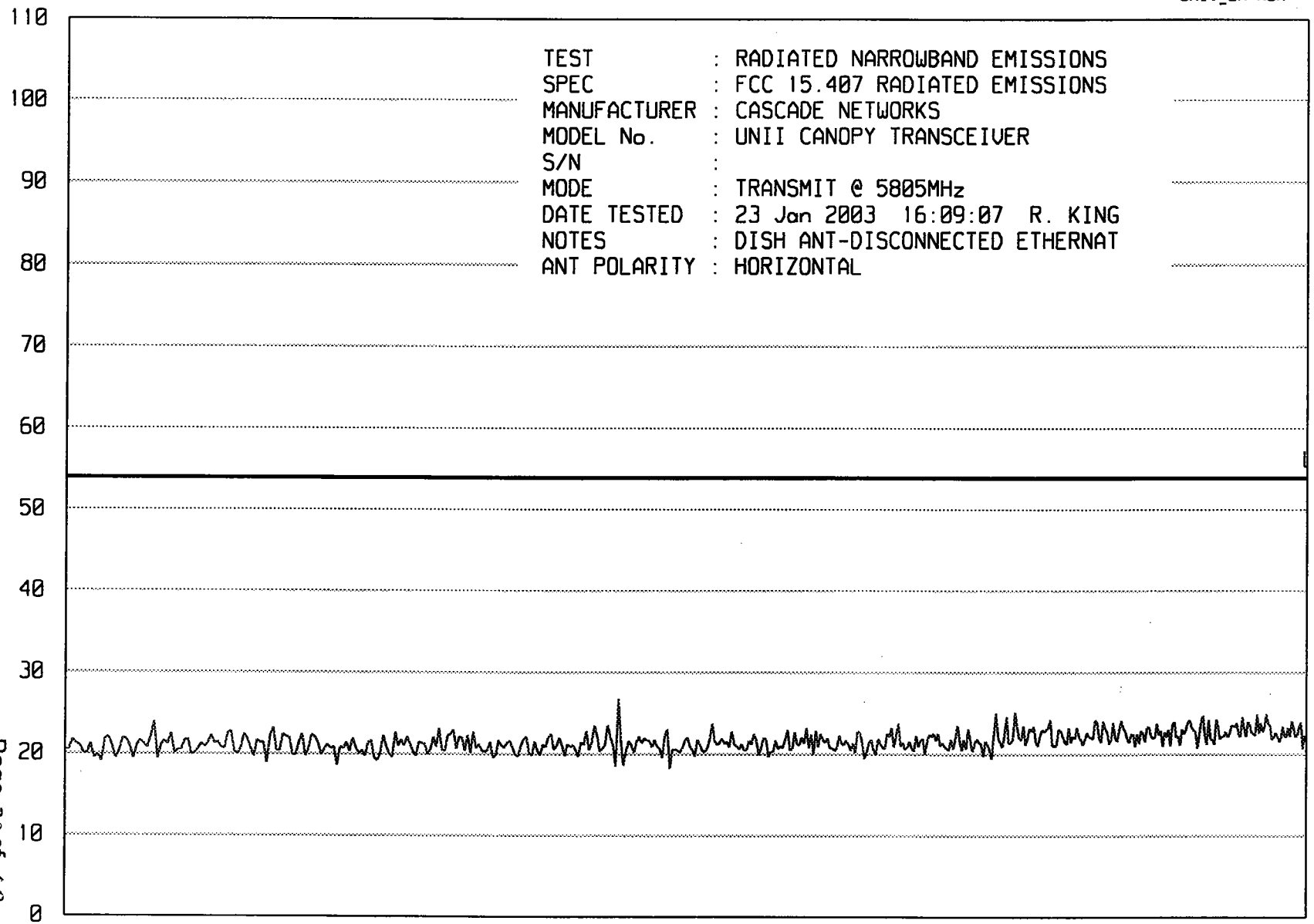

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA0 11/15/02
UNIV_EM RUN RUN 1
TEST : RADIATED NARROWBAND EMISSIONS
SPEC : FCC 15.407 RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : UNII CANOPY TRANSCEIVER
S/N :
MODE : TRANSMIT @ 7545MHz
DATE TESTED : 23 Jan 2003 15:12:52 R. KING
NOTES : DISH ANT-DICONNECTED ETHERNET
ANT POLARITY : HORIZONTAL
LIMIT
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 30
100
STOP = 1000
FREQUENCY - MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA0 11/15/02
UNIV_EM RUN RUN 1
TEST : RADIATED NARROWBAND EMISSIONS
SPEC : FCC 15.407 RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : UNII CANOPY TRANSCEIVER
S/N :
MODE : TRANSMIT @ ~~7545~~MHz 5745MHz
DATE TESTED : 23 Jan 2003 15:14:26 R. KING
NOTES : DISH ANT-DICONNECTED ETHERNET
ANT POLARITY : VERTICAL
LIMIT
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 30
100
STOP = 1000
FREQUENCY - MHz

ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02 UNIV_EM RUN RUN 3

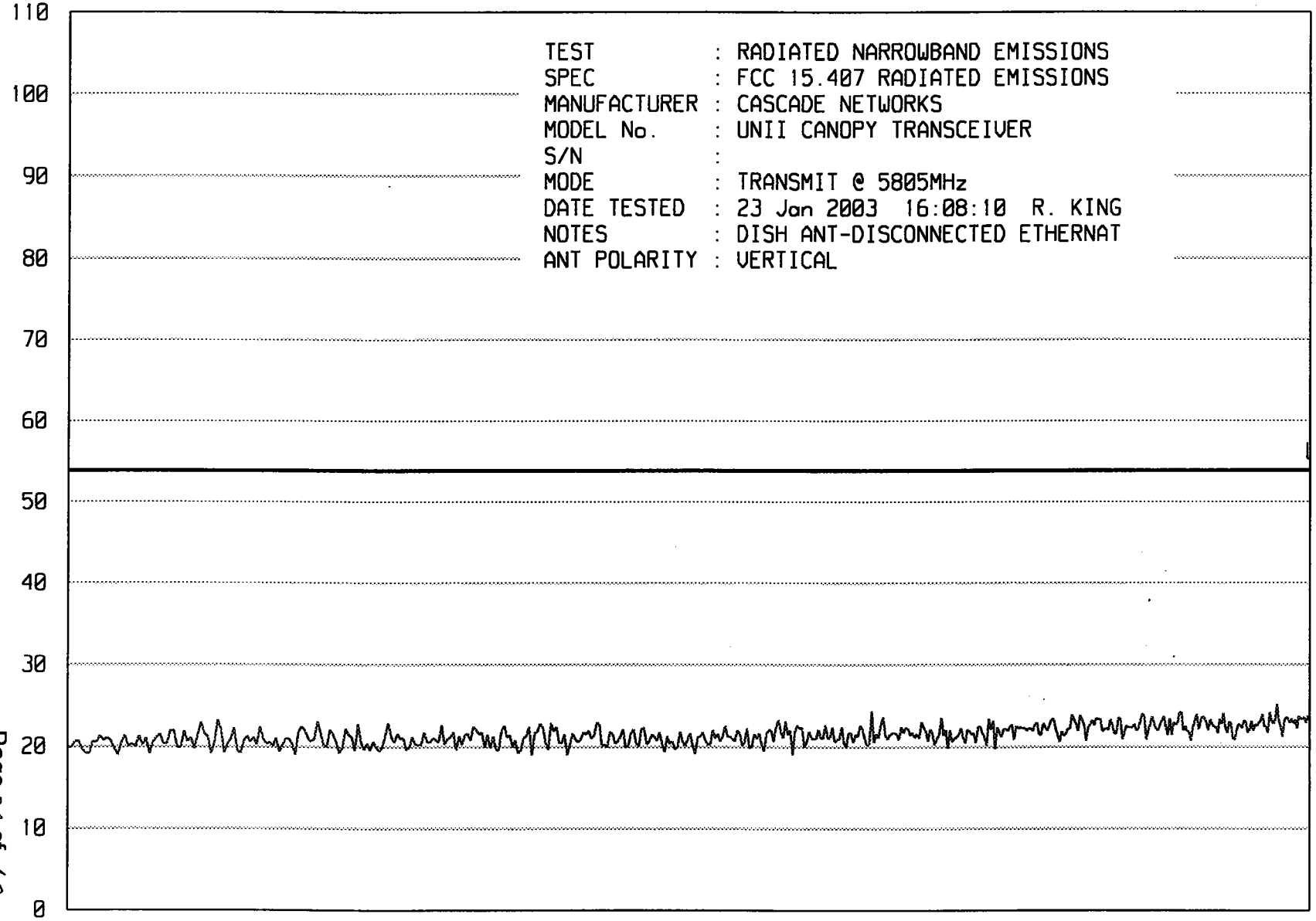


START = 1000 FREQUENCY - MHz STOP = 2000

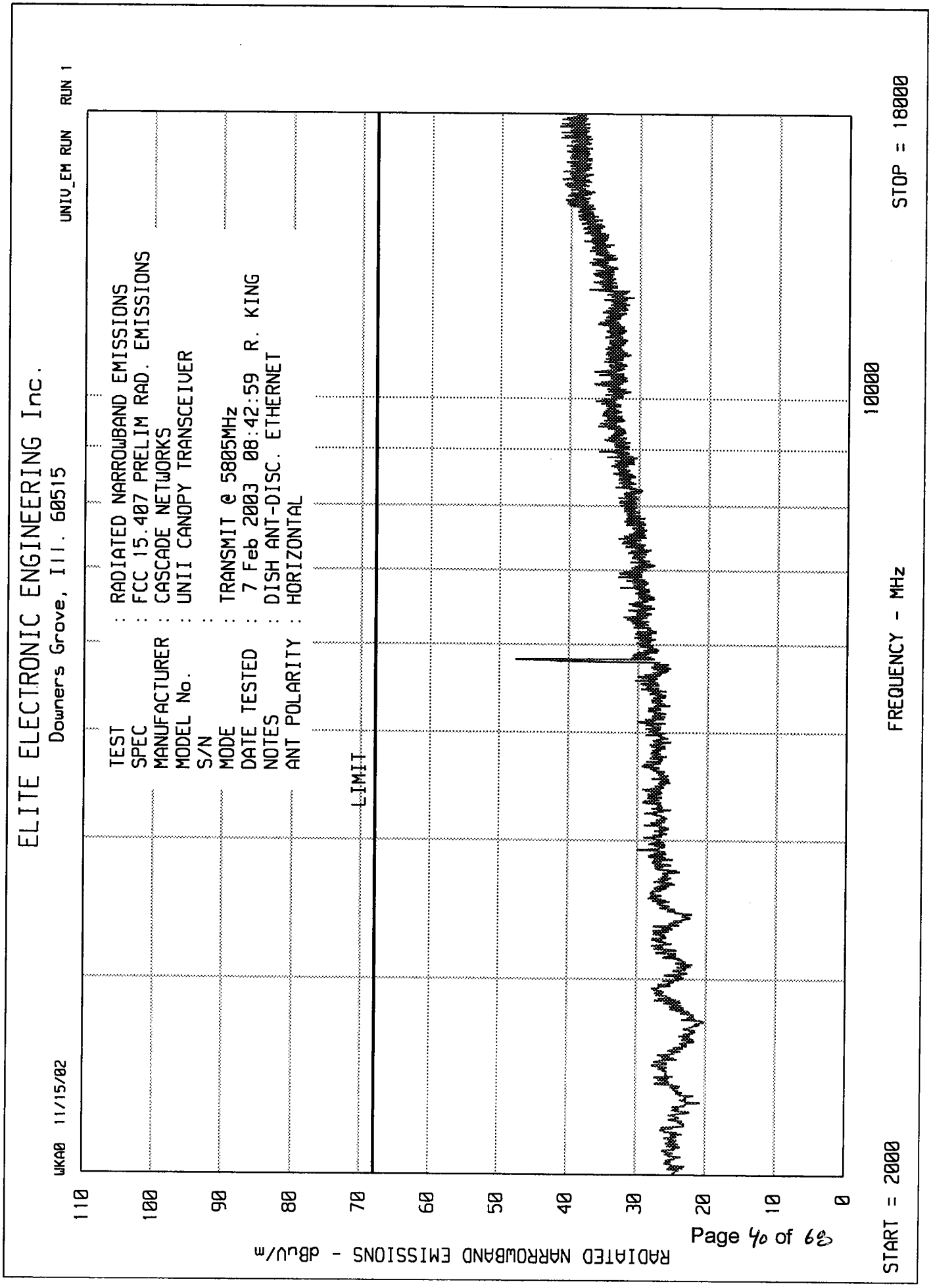
ELITE ELECTRONIC ENGINEERING Inc.

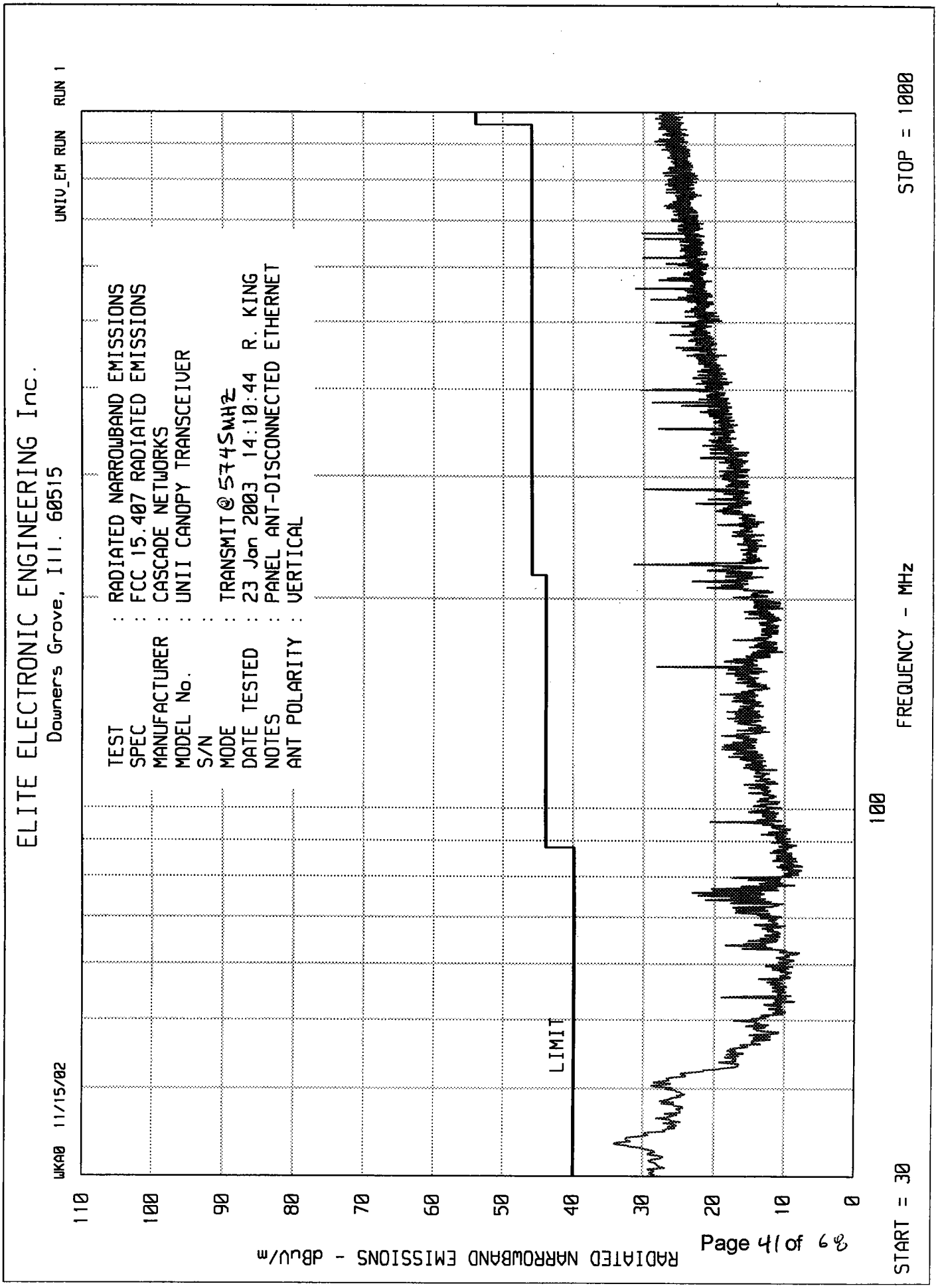
Downers Grove, Ill. 60515

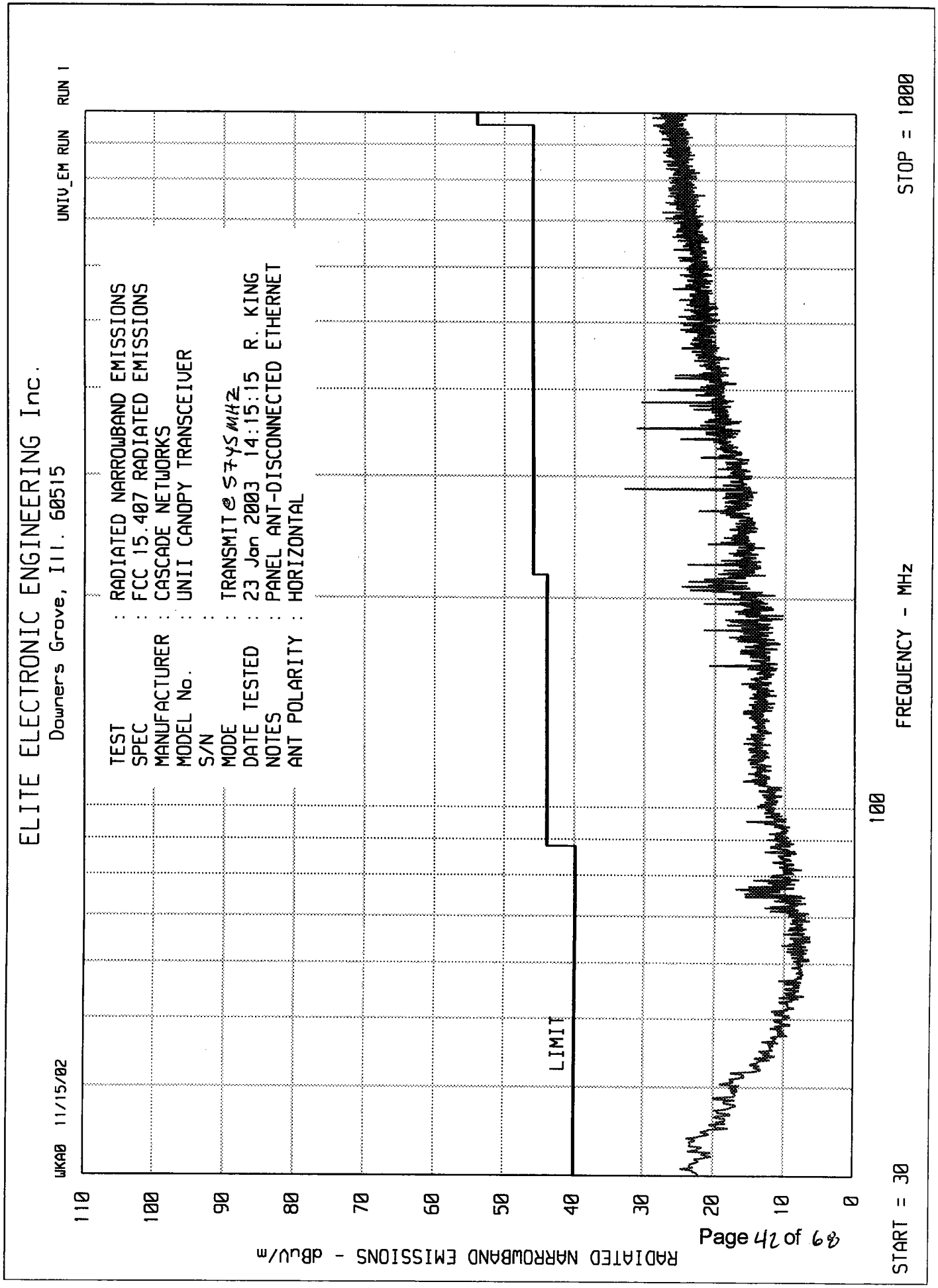
WKA0 11/15/02 UNIV_EM RUN RUN 3



START = 1000 FREQUENCY - MHz STOP = 2000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA0 11/15/02
UNIV_EM RUN RUN 1
TEST : RADIATED NARROWBAND EMISSIONS
SPEC : FCC 15.407 PRELIM RAD. EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : UNII CANOPY TRANSCEIVER
S/N :
MODE : TRANSMIT @ 5805MHz
DATE TESTED : 7 Feb 2003 08:42:59 R. KING
NOTES : DISH ANT-DISC. ETHERNET
ANT POLARITY : HORIZONTAL
LIMIT
110
100
90
80
70
60
50
40
30
20
10
0
RADIATED NARROWBAND EMISSIONS - dBuV/m
START = 2000
10000
STOP = 18000
FREQUENCY - MHz

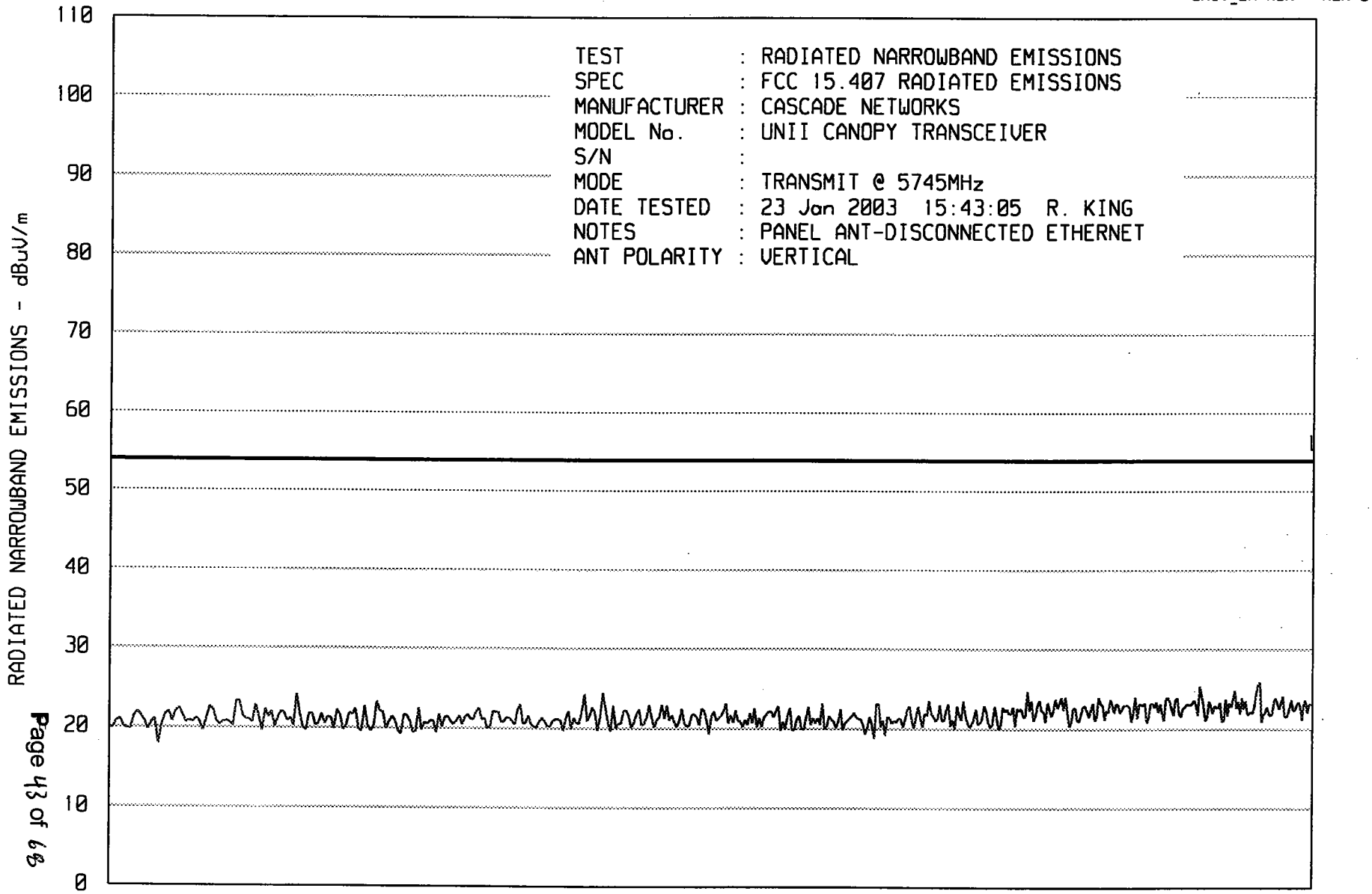

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA0 11/15/02
UNIV_EM RUN RUN 1
TEST : RADIATED NARROWBAND EMISSIONS
SPEC : FCC 15.407 RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : UNII CANOPY TRANSCEIVER
S/N :
MODE : TRANSMIT @ 5745MHz
DATE TESTED : 23 Jan 2003 14:10:44 R. KING
NOTES : PANEL ANT-DISCONNECTED ETHERNET
ANT POLARITY : VERTICAL
LIMIT
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 30
100
STOP = 1000
FREQUENCY - MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA0 11/15/02
UNIV_EM RUN RUN 1
TEST : RADIATED NARROWBAND EMISSIONS
SPEC : FCC 15.407 RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : UNII CANOPY TRANSCEIVER
S/N :
MODE : TRANSMIT @ 5745 MHz
DATE TESTED : 23 Jan 2003 14:15:15 R. KING
NOTES : PANEL ANT-DISCONNECTED ETHERNET
ANT POLARITY : HORIZONTAL
LIMIT
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 30
100
FREQUENCY - MHz
STOP = 1000

ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02 UNIV_EM RUN RUN 3

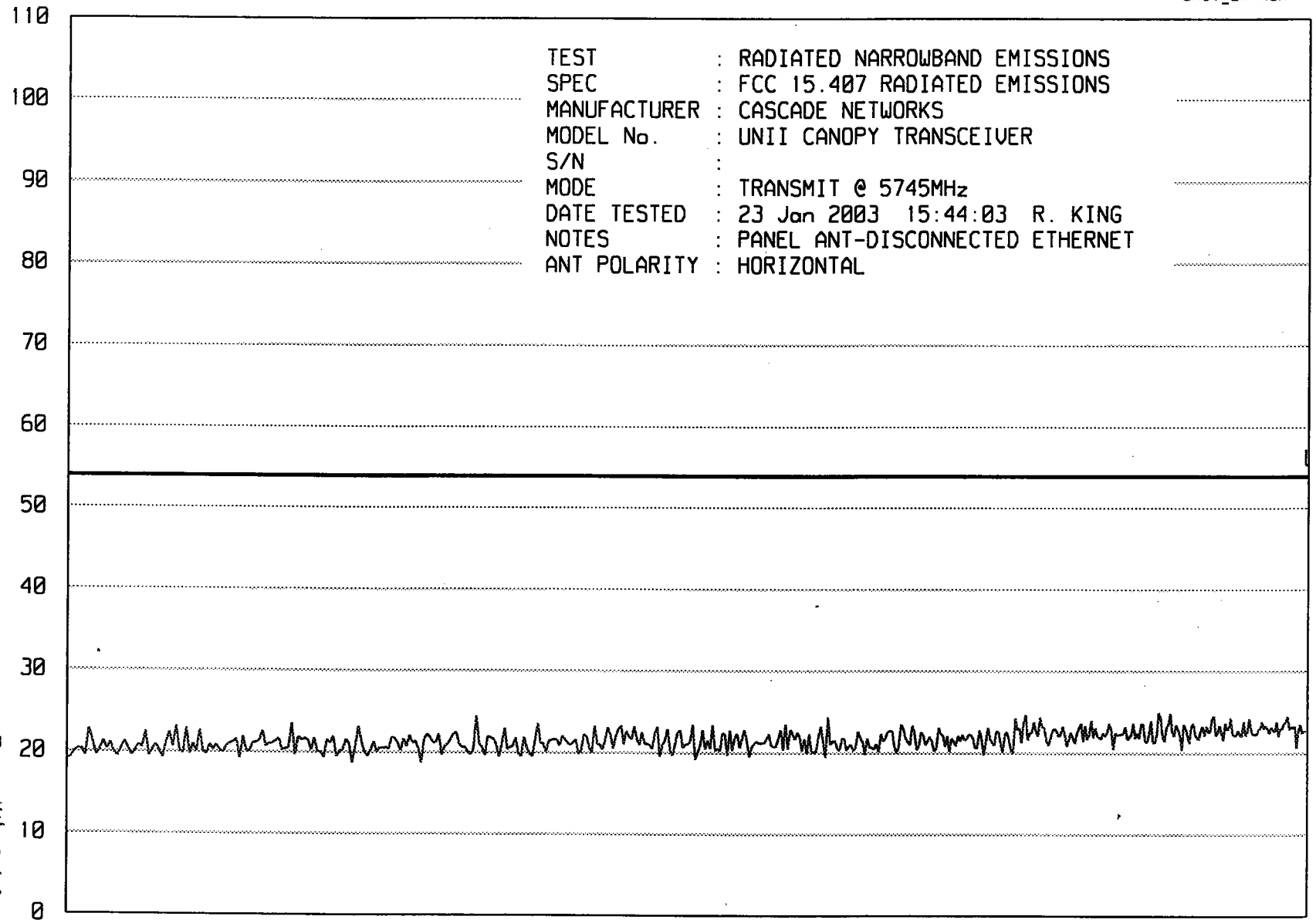


ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02

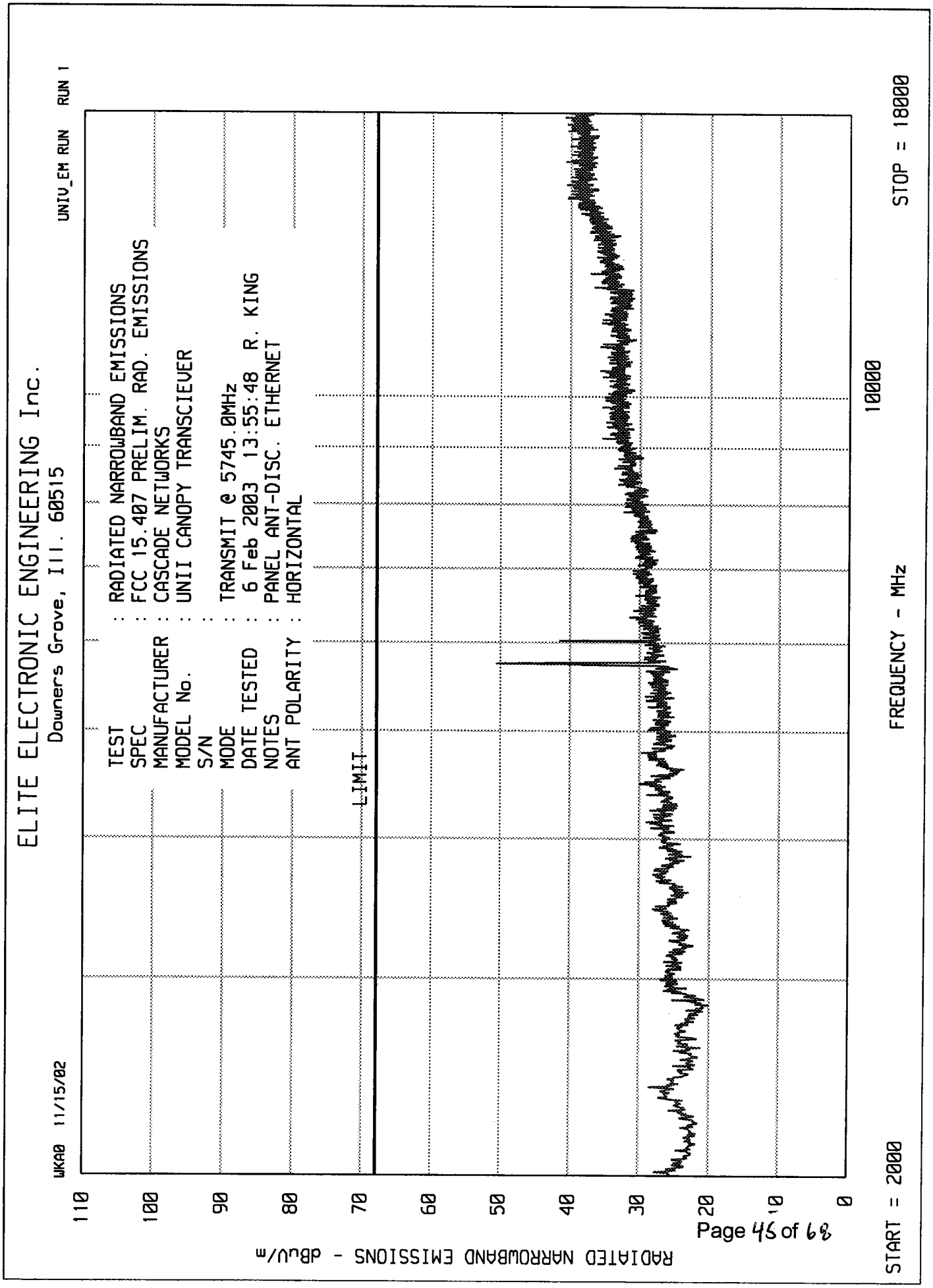
UNIV_EM RUN RUN 3

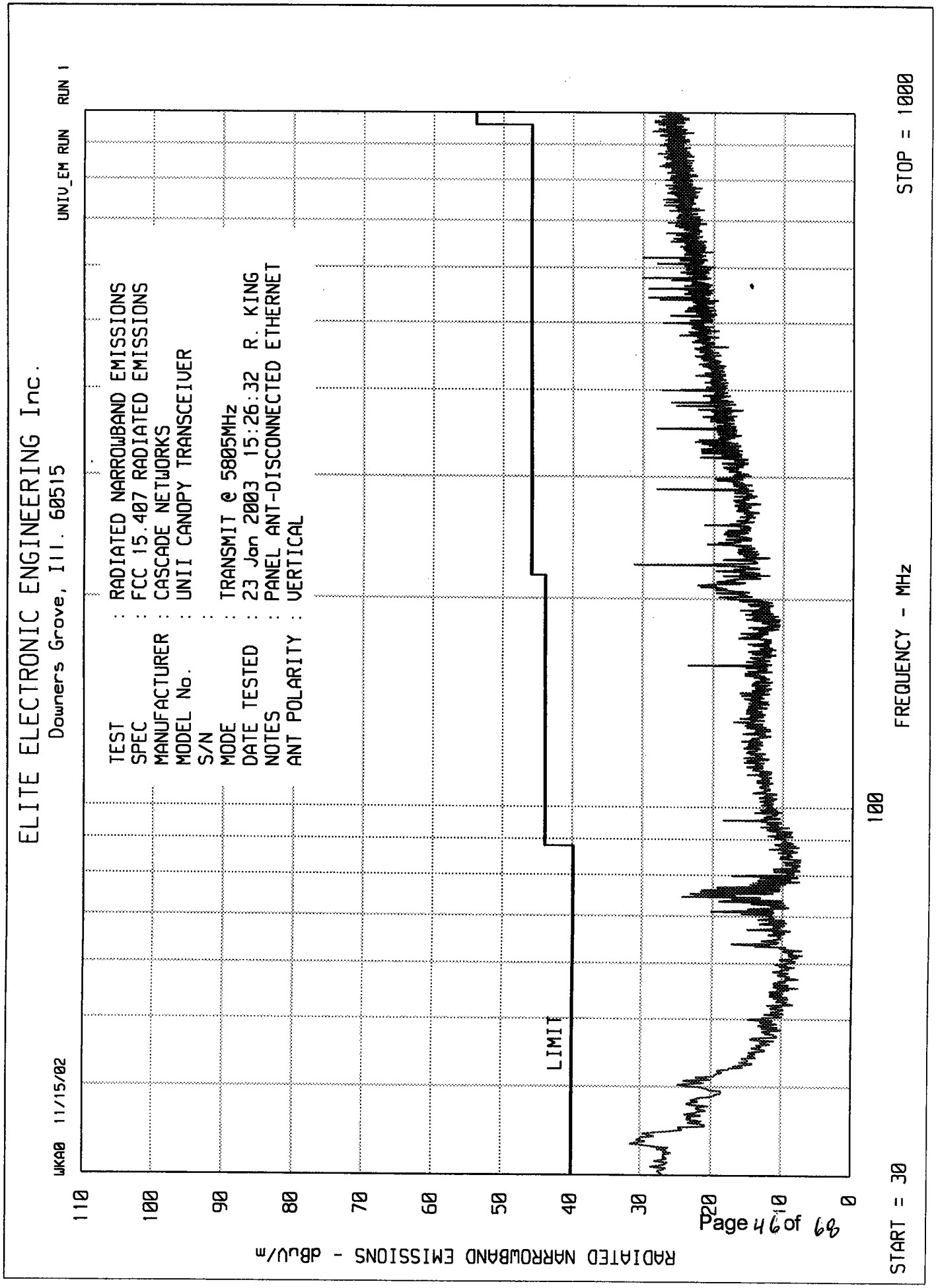


START = 1000

FREQUENCY - MHz

STOP = 2000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV_EM RUN RUN 1
WKA0 11/15/02
TEST : RADIATED NARROWBAND EMISSIONS
SPEC : FCC 15.407 PRELIM. RAD. EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : UNII CANOPY TRANSCIEVER
S/N :
MODE : TRANSMIT @ 5745.0MHz
DATE TESTED : 6 Feb 2003 13:55:48 R. KING
NOTES : PANEL ANT-DISC. ETHERNET
ANT POLARITY : HORIZONTAL
LIMIT
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 2000
10000
STOP = 18000
FREQUENCY - MHz

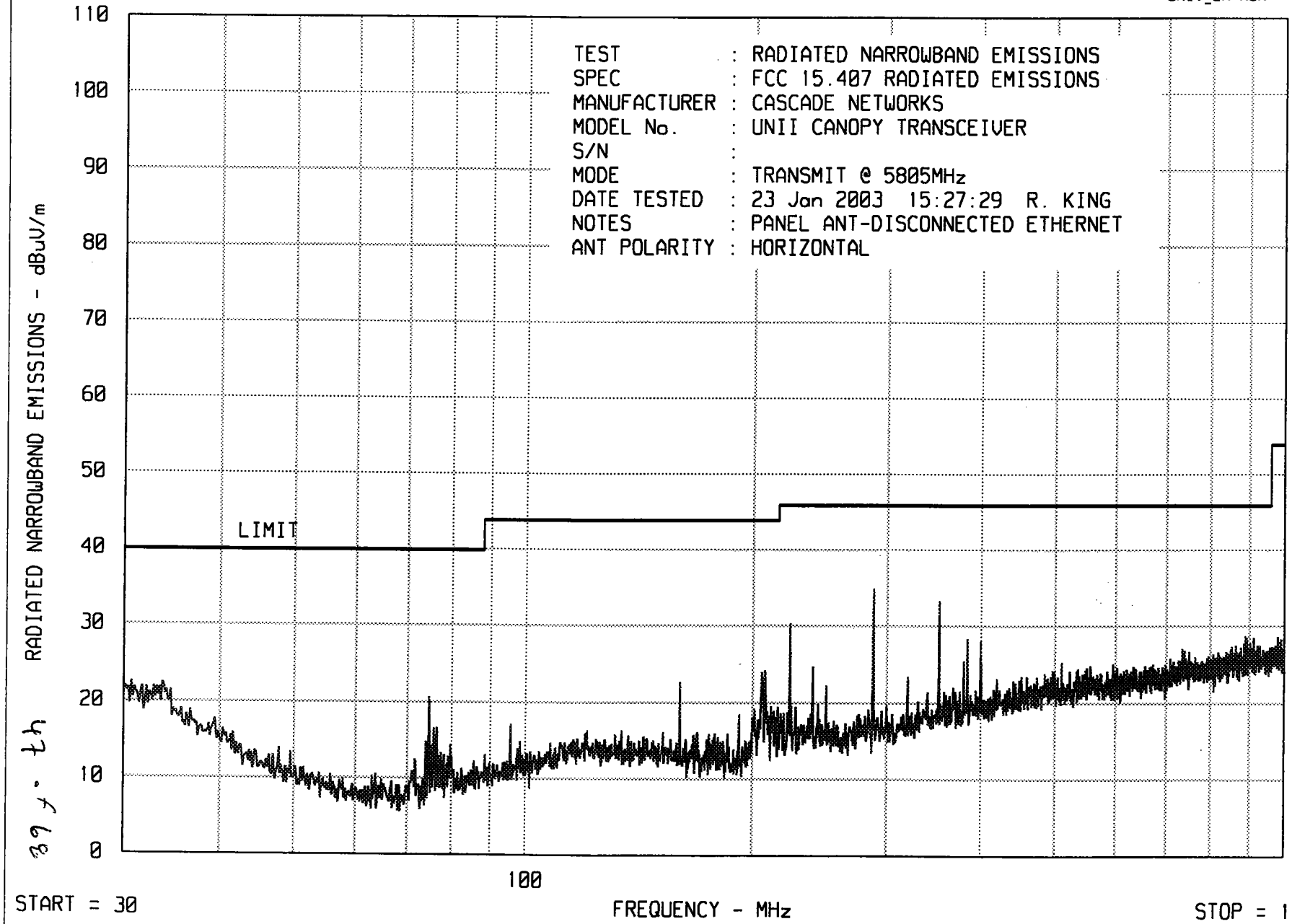

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA0 11/15/02
UNIV_EM RUN RUN 1
TEST : RADIATED NARROWBAND EMISSIONS
SPEC : FCC 15.407 RADIATED EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : UNII CANOPY TRANSCEIVER
S/N :
MODE : TRANSMIT @ 5805MHz
DATE TESTED : 23 Jan 2003 15:26:32 R. KING
NOTES : PANEL ANT-DISCONNECTED ETHERNET
ANT POLARITY : VERTICAL
LIMIT
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 30
100
STOP = 1000
FREQUENCY - MHz

ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02

UNIV_EM RUN RUN 1



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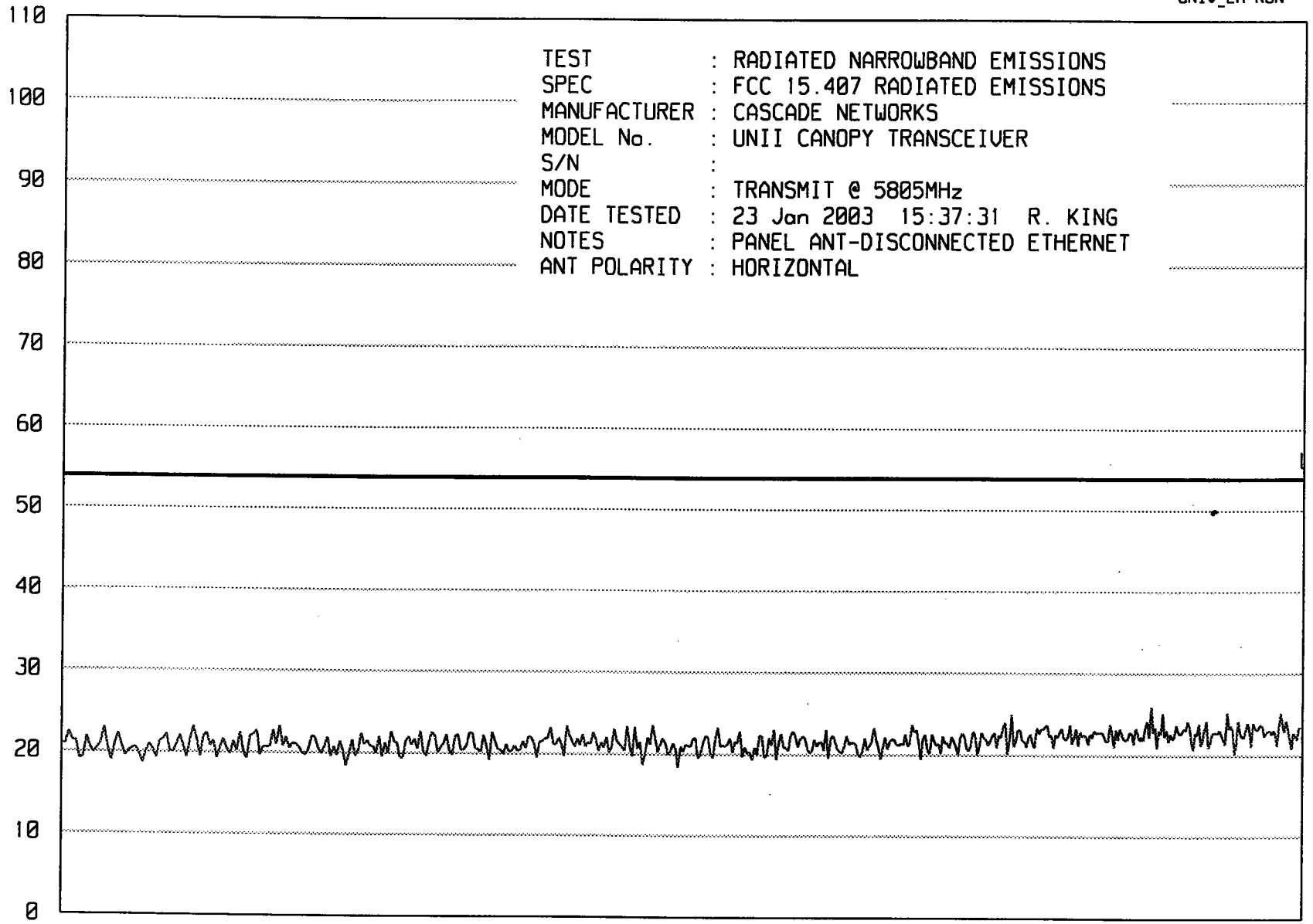
ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02

UNIV_EM RUN RUN 3



START = 1000

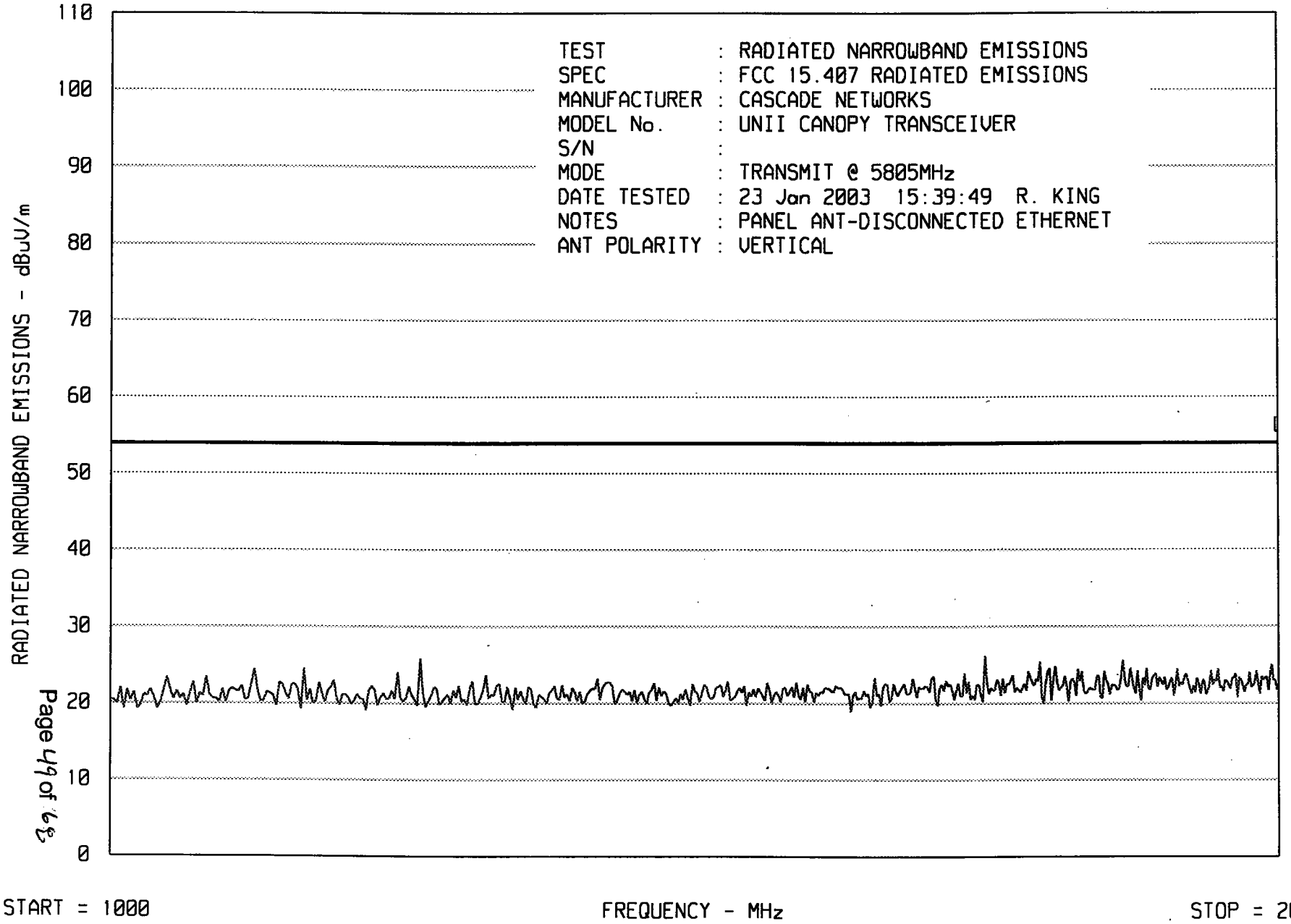
FREQUENCY - MHz

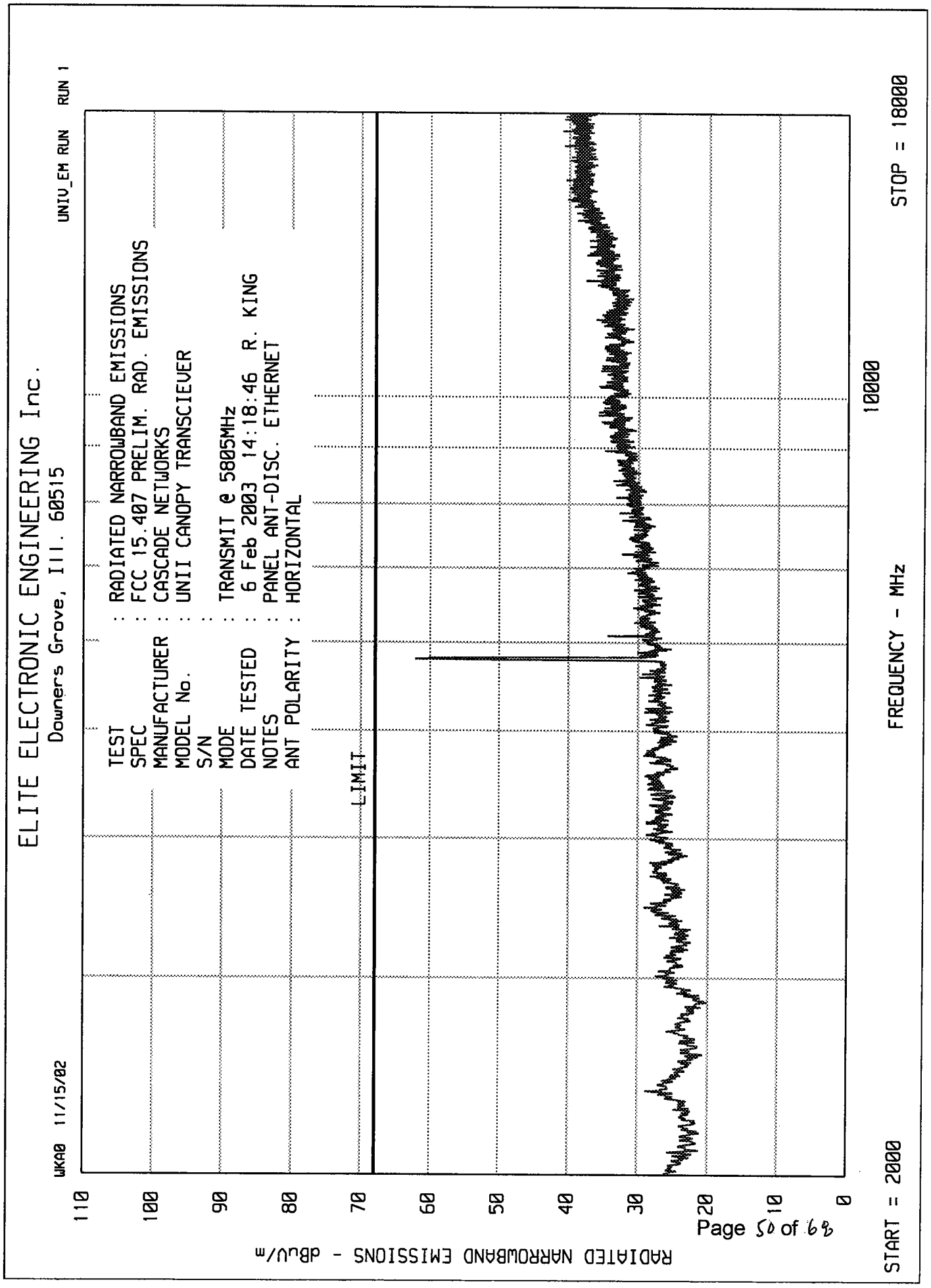
STOP = 2000

ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02 UNIV_EM RUN RUN 3




ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA0 11/15/02
UNIV_EM RUN RUN 1
TEST : RADIATED NARROWBAND EMISSIONS
SPEC : FCC 15.407 PRELIM. RAD. EMISSIONS
MANUFACTURER : CASCADE NETWORKS
MODEL No. : UNII CANOPY TRANSCIEVER
S/N :
MODE : TRANSMIT @ 5805MHz
DATE TESTED : 6 Feb 2003 14:18:46 R. KING
NOTES : PANEL ANT-DISC. ETHERNET
ANT POLARITY : HORIZONTAL
LIMIT
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
START = 2000
FREQUENCY - MHz
10000
STOP = 18000

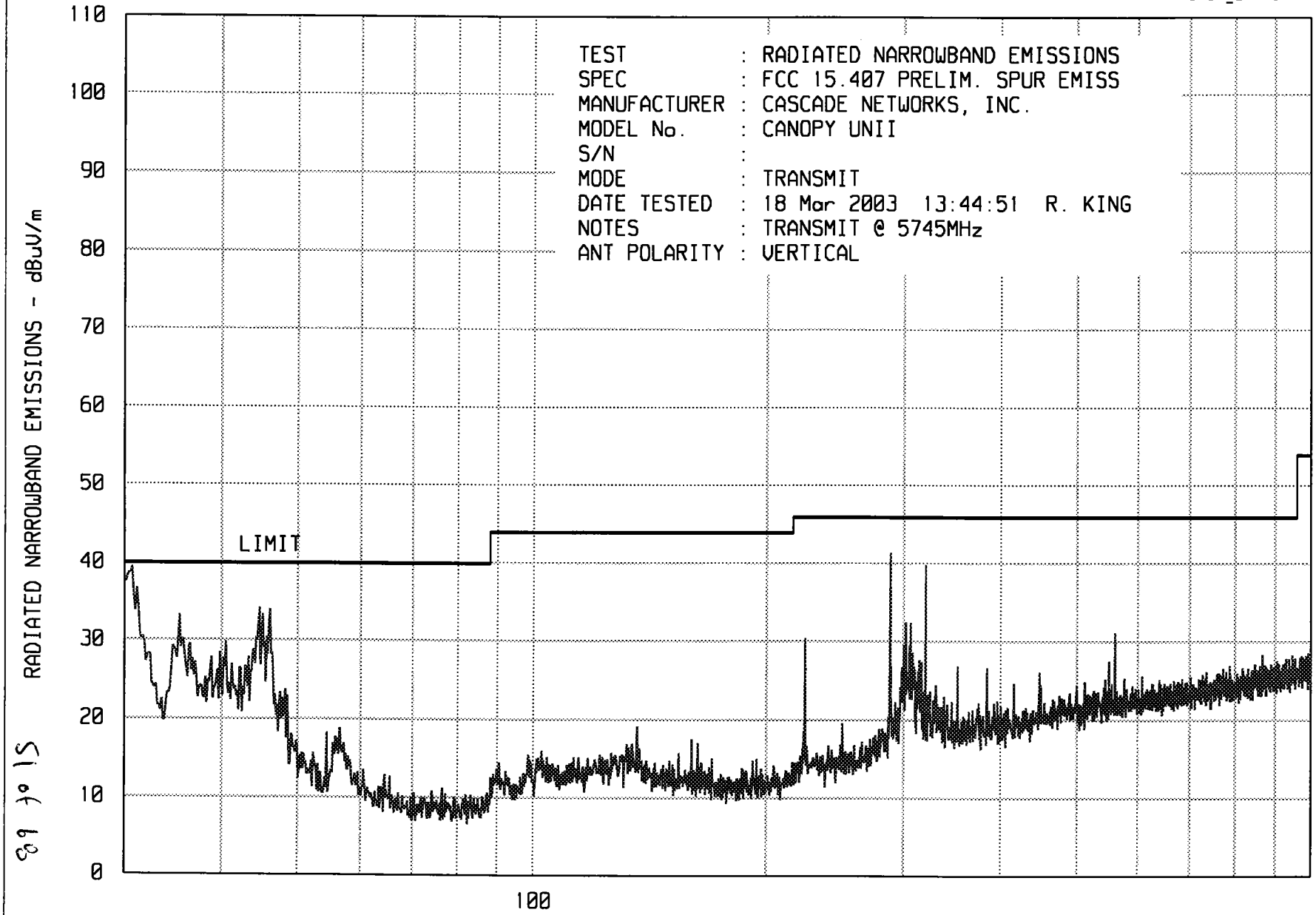
ETR 31804-01

ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02

UNIV_EM RUN RUN 2

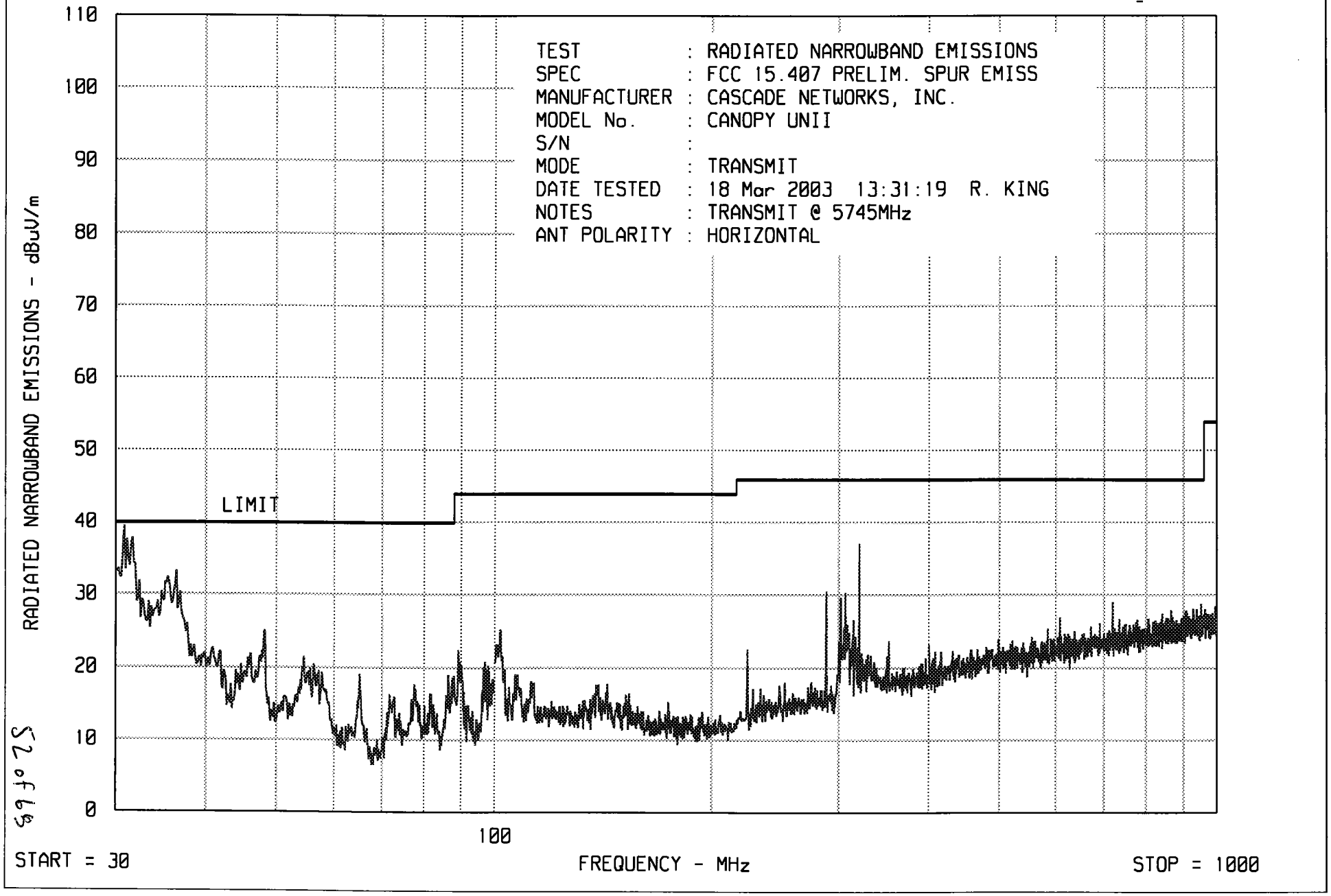


Sl of 65

ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02 UNIV_EM RUN RUN 2



ETR 31864-21

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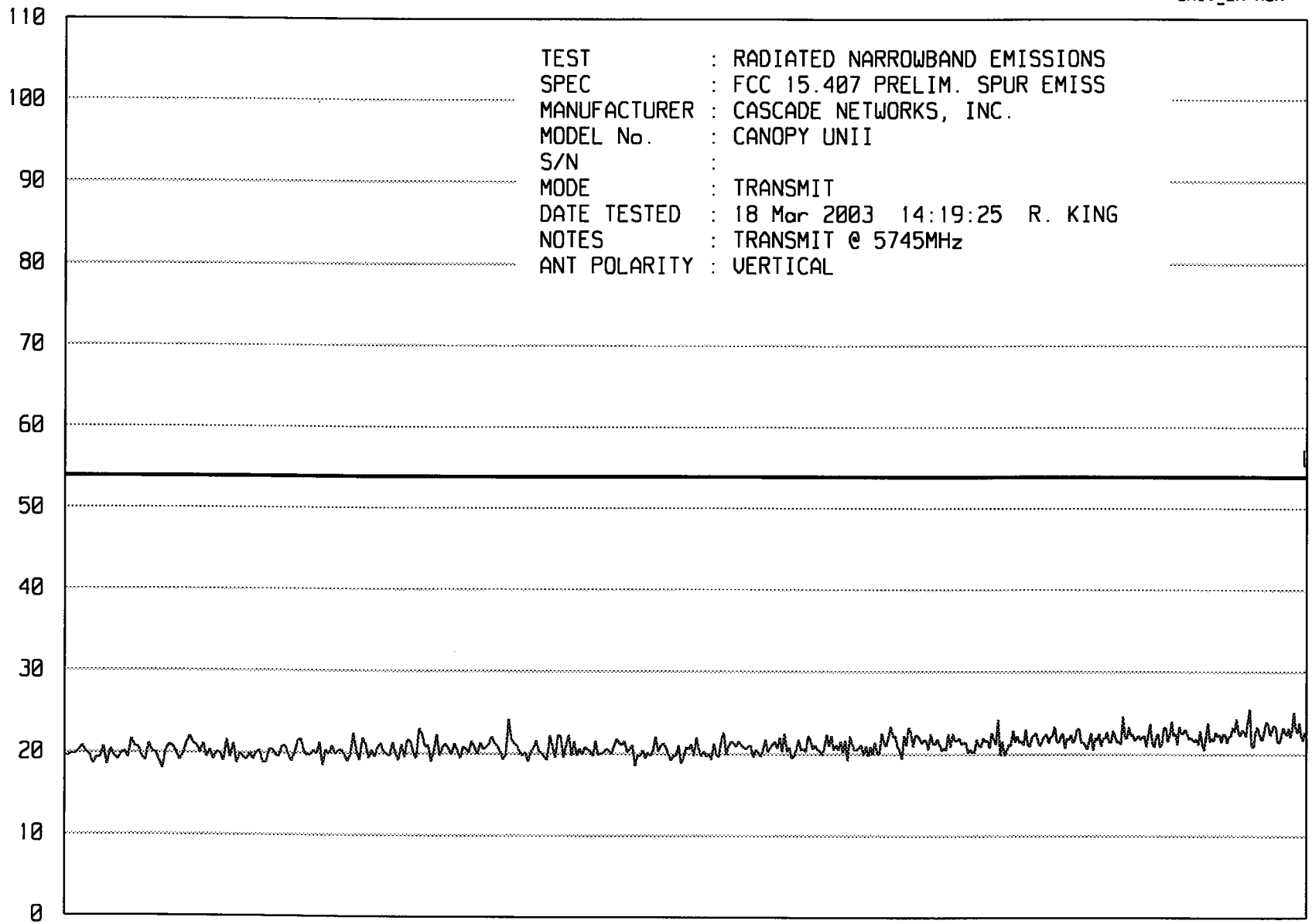
ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02

UNIV_EM RUN RUN 3



START = 1000

FREQUENCY - MHz

STOP = 2000

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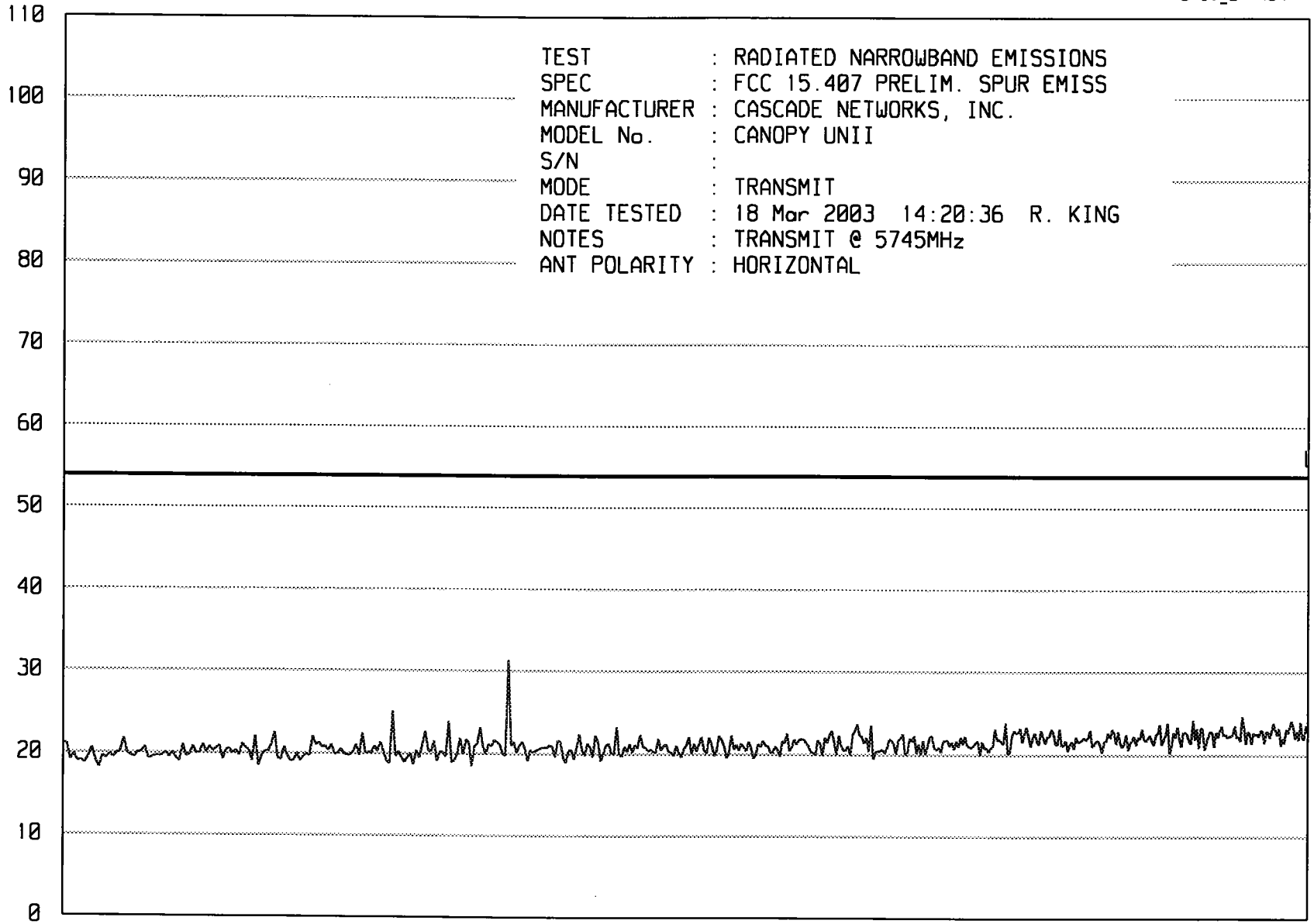
FCC 31804-01

ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02

UNIV_EM RUN RUN 3



START = 1000

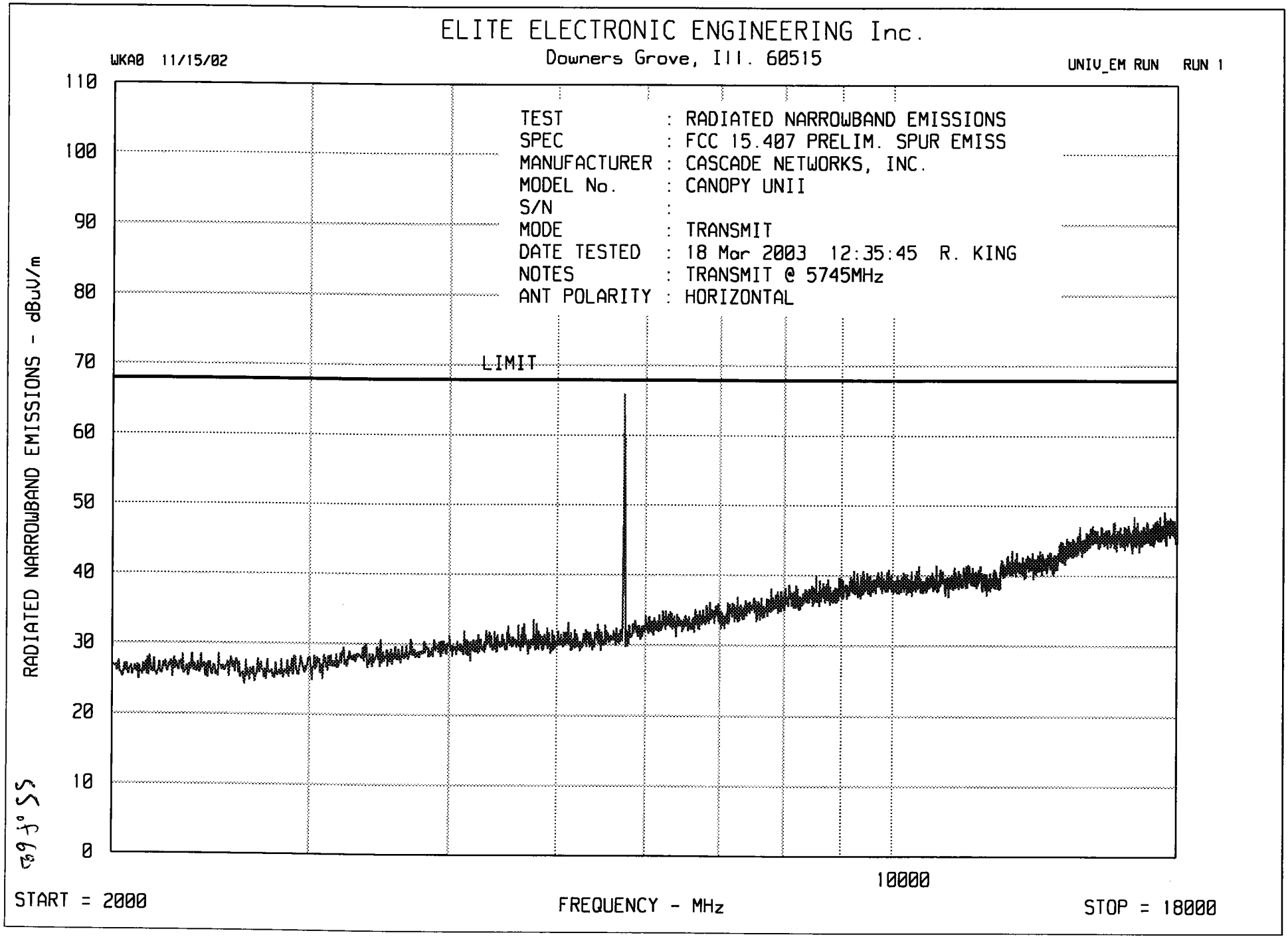
FREQUENCY - MHz

STOP = 2000

ETR 31804-01

Sy of 68

ETR 31804-01



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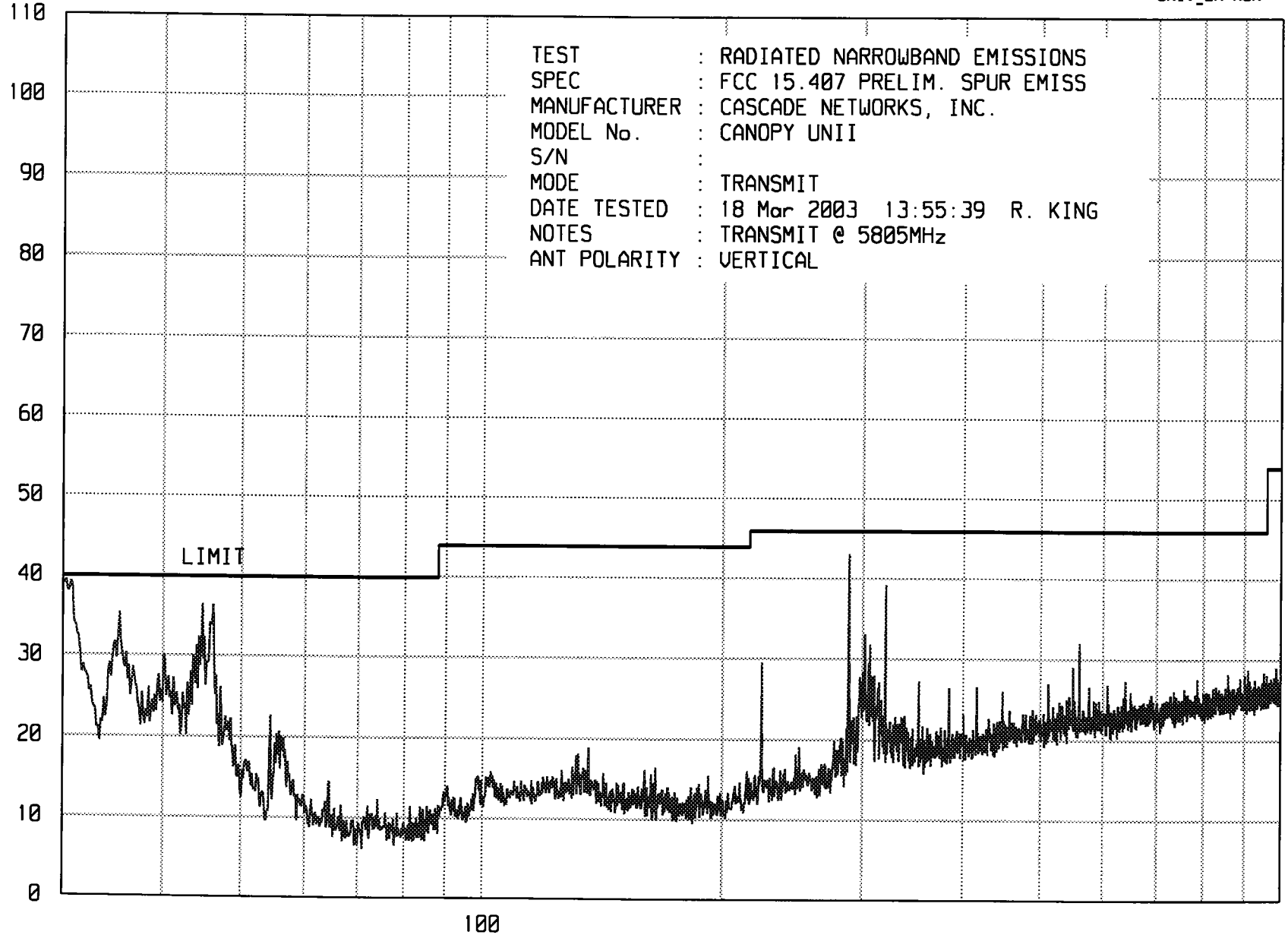
ELITE ELECTRONIC ENGINEERING Inc.

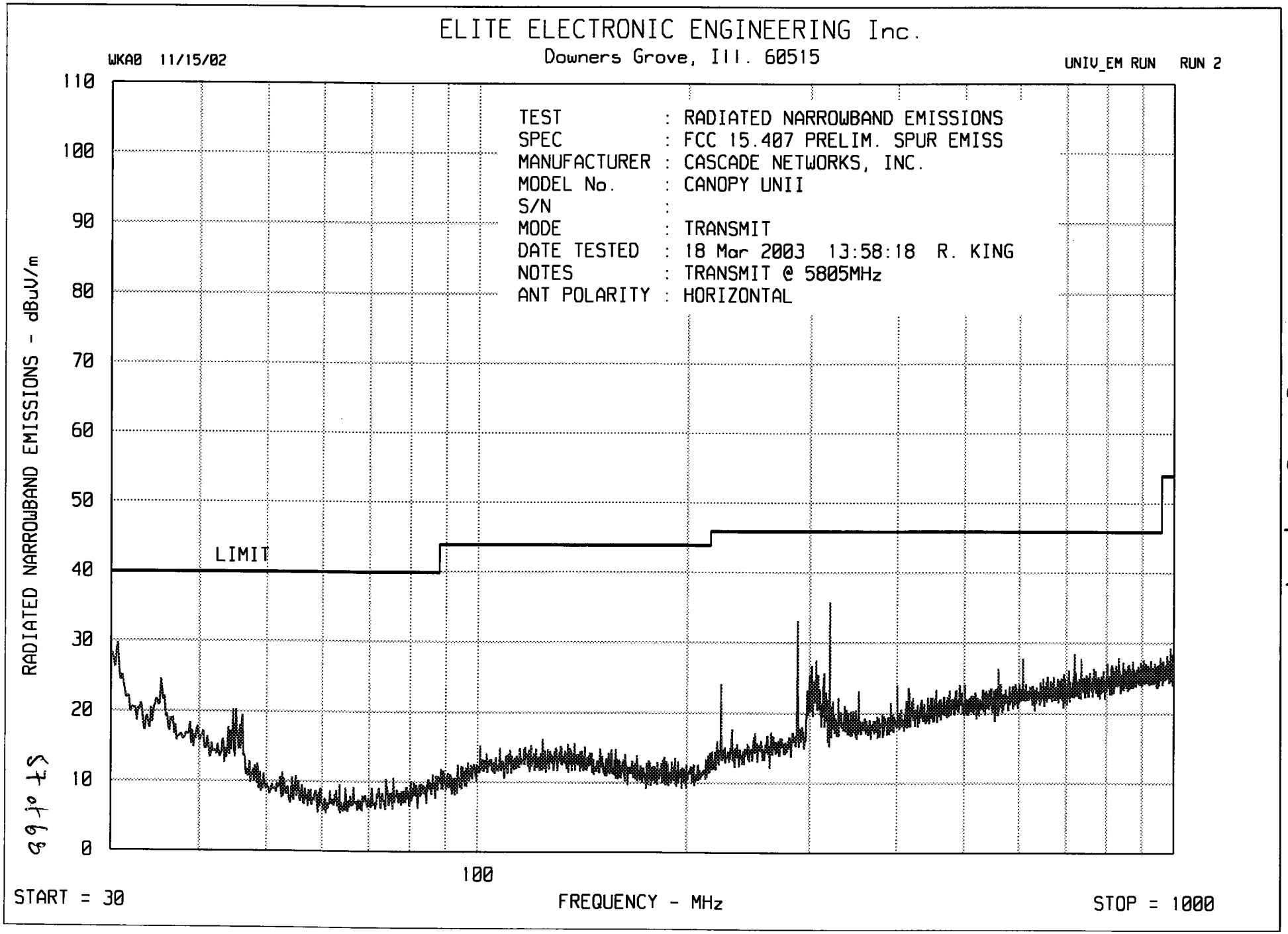
Downers Grove, Ill. 60515

WKA0 11/15/02

UNIV_EM RUN RUN 2



ETR 31804-01


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA0 11/15/02
UNIV_EM RUN RUN 2
TEST : RADIATED NARROWBAND EMISSIONS
SPEC : FCC 15.407 PRELIM. SPUR EMISS
MANUFACTURER : CASCADE NETWORKS, INC.
MODEL No. : CANOPY UNII
S/N :
MODE : TRANSMIT
DATE TESTED : 18 Mar 2003 13:58:18 R. KING
NOTES : TRANSMIT @ 5805MHz
ANT POLARITY : HORIZONTAL
LIMIT
RADIATED NARROWBAND EMISSIONS - dBuV/m
110
100
90
80
70
60
50
40
30
20
10
0
100
START = 30
FREQUENCY - MHz
STOP = 1000

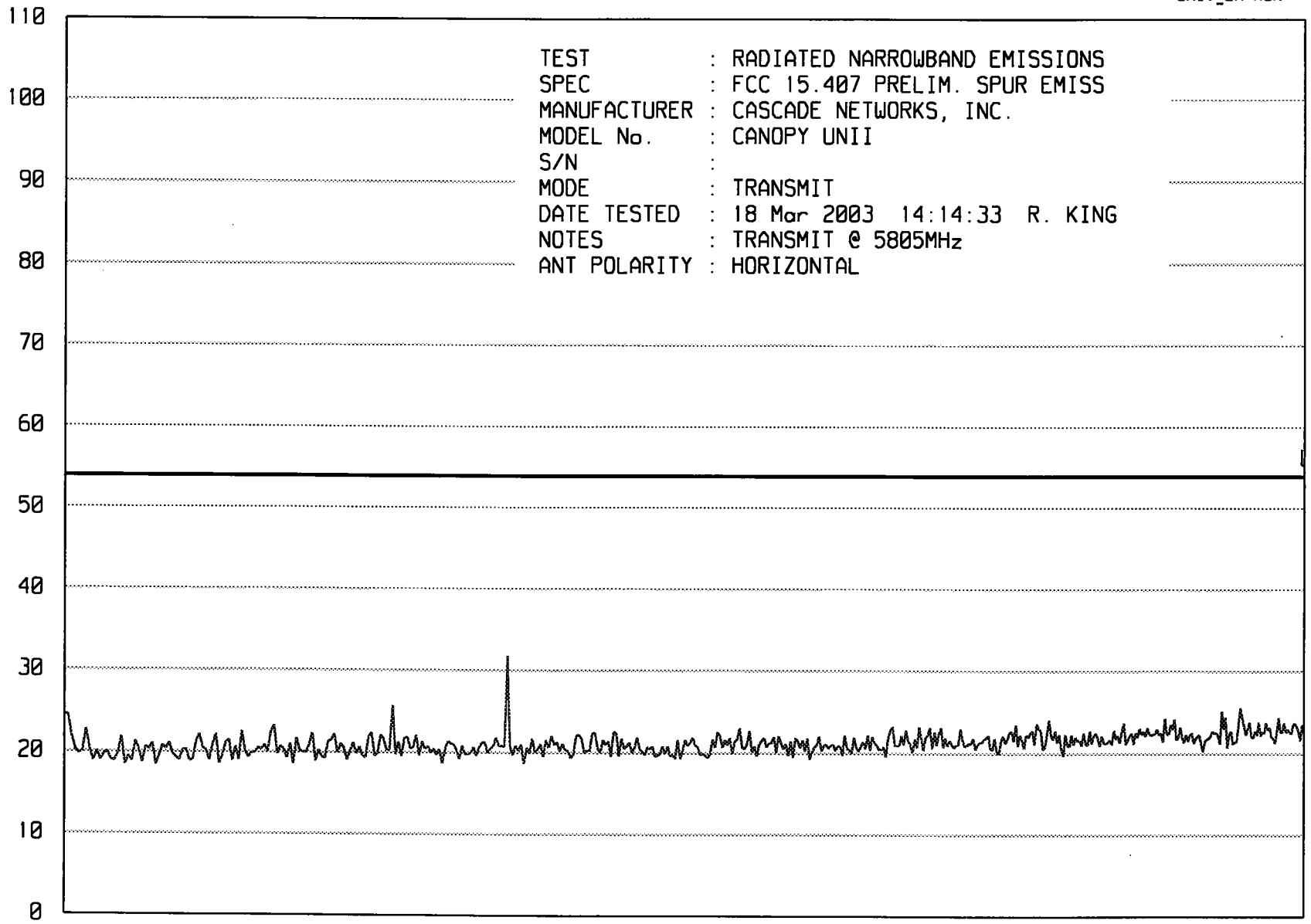
ETR 31804-01

ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02

UNIV_EM RUN RUN 3



ETR 31804-01

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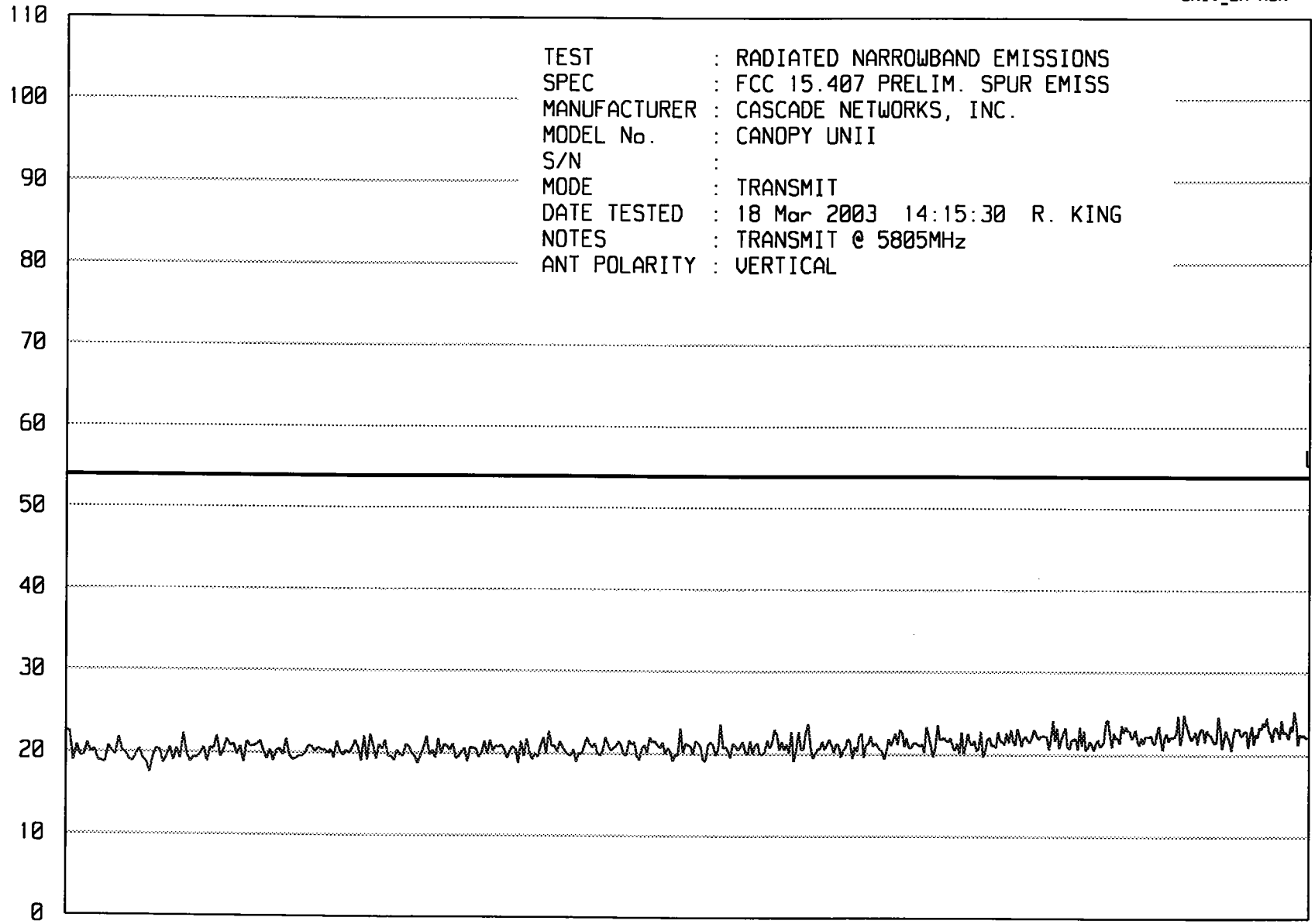
ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02

UNIV_EM RUN RUN 3



START = 1000

FREQUENCY - MHz

STOP = 2000

Sy of 68

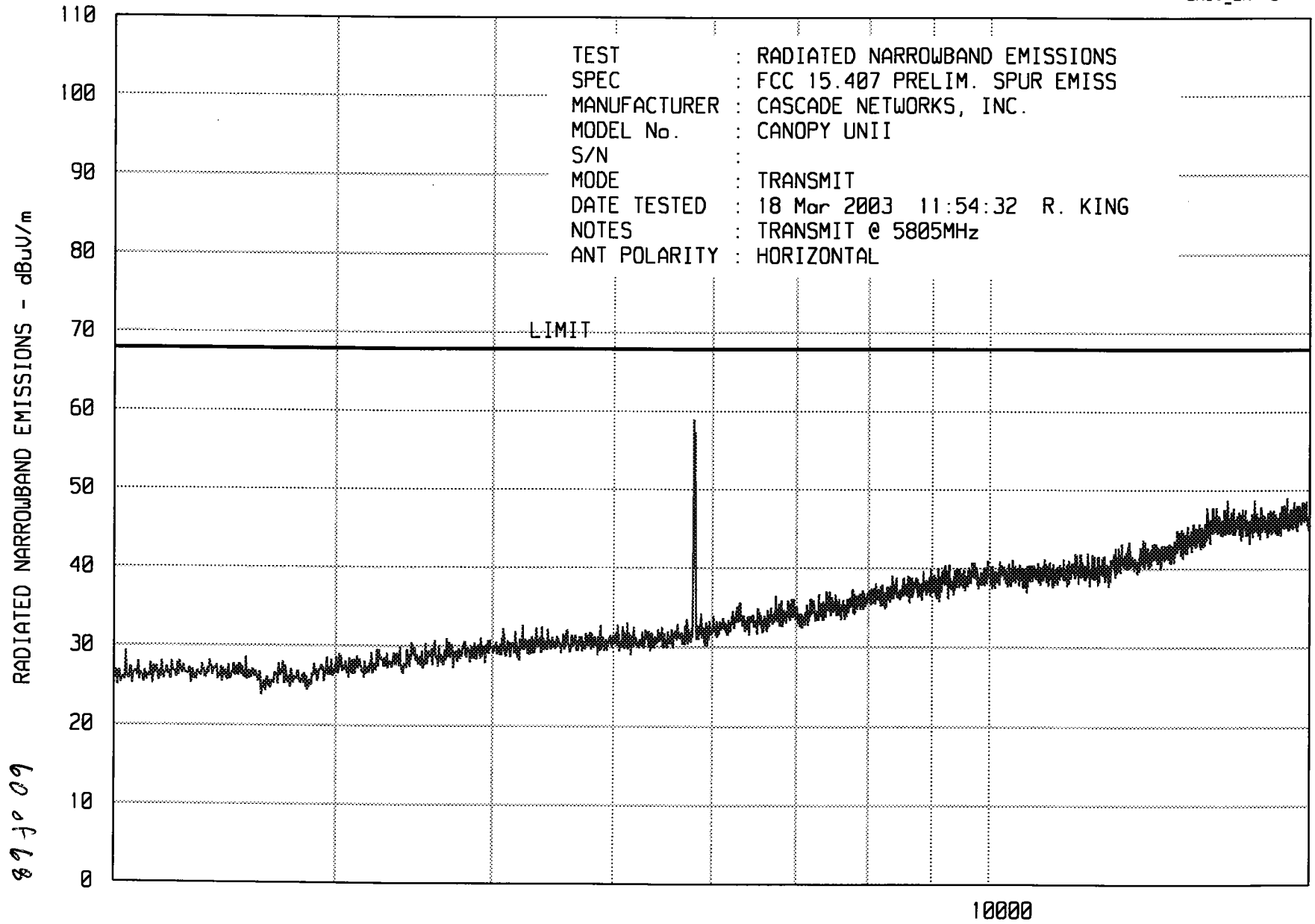
ETR 31804-01

ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

WKA0 11/15/02

UNIV_EM RUN RUN 1



ETR 31804-01

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ETR 31804-01
DATA SHEET

MANUFACTURER : CASCADE NETWORKS
MODEL : MOTOROLA CANOPY
S/N : NONE ASSIGNED
SPECIFICATION : FCC 15.407
DATE : JANUARY 20, 2003
NOTES : CYLINDER ANTENNA TRANSMITTING AT 5745.0MHz
: TEST DISTANCE IS 3 METERS
: EIRP (1MHz) + 13dB = TOTAL EIRP

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP (dBm)	LIMIT (dBm)
5745.0	H	TOTAL					34.9	36
5745.0	V	TOTAL					26.7	36
5745.0	H	1MHz	117.4	18.3	9.0	-5.4	21.9	
5745.0	V	1MHz	107.5	10.1	9.0	-5.4	13.7	
11490.0	H	1MHz	37.9	-41.8	15.0	-8.3	-35.1	-27
11490.0	V	1MHz	38.1	-42.0	15.0	-8.3	-35.3	-27
17235.0	H	1MHz	42.0	-54.8	13.6	-10.1	-51.2	-27
17235.0	V	1MHz	40.9	-55.1	13.6	-10.1	-51.5	-27
22980.0	H	1MHz	42.0	-53.9	12.7	0.0	-41.2	-27
22980.0	V	1MHz	41.8	-53.7	12.7	0.0	-41.0	-27
28725.0	H	1MHz	33.6	-57.8	15.4	0.0	-42.4	-27
28725.0	V	1MHz	33.1	-57.6	15.4	0.0	-42.2	-27
34470.0	H	1MHz	32.9	-61.1	16.8	0.0	-44.3	-27
34470.0	V	1MHz	33.0	-61.2	16.8	0.0	-44.4	-27

CHECKED BY: Richard E. King
RICHARD E. KING

ETR 31804-01
DATA SHEET

MANUFACTURER : CASCADE NETWORKS
MODEL : MOTOROLA CANOPY
S/N : NONE ASSIGNED
SPECIFICATION : FCC 15.407
DATE : JANUARY 20, 2003
NOTES : CYLINDER ANTENNA TRANSMITTING AT 5805.0MHz
: TEST DISTANCE IS 3 METERS
: MEASUREMENT BANDWIDTH IS 1MHz
: EIRP (1MHz) + 13dB = TOTAL EIRP

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP (dBm)	LIMIT (dBm)
5805.0	H	TOTAL					34.6	36
5805.0	V	TOTAL					21.8	36
5805.0	H	1MHz	115.4	17.9	9.1	-5.4	21.6	
5805.0	V	1MHz	104.3	5.1	9.1	-5.4	8.8	
11610.0	H	1MHz	37.7	-39.2	15.1	-8.3	-32.4	-27
11610.0	V	1MHz	38.4	-41.2	15.1	-8.3	-34.4	-27
17415.0	H	1MHz	40.3	-55.3	13.7	-10.1	-51.7	-27
17415.0	V	1MHz	40.0	-54.9	13.7	-10.1	-51.3	-27
23220.0	H	1MHz	41.6	-54.7	12.8	0.0	-41.9	-27
23220.0	V	1MHz	41.4	-54.3	12.8	0.0	-41.5	-27
29025.0	H	1MHz	33.4	-57.4	15.5	0.0	-41.9	-27
29025.0	V	1MHz	32.9	-57.8	15.5	0.0	-42.3	-27
34830.0	H	1MHz	32.4	-61.3	16.8	0.0	-44.5	-27
34830.0	V	1MHz	32.8	-60.8	16.8	0.0	-44.0	-27

CHECKED BY: Richard E. King
RICHARD E. KING

ETR 31804-01
DATA SHEET

MANUFACTURER : CASCADE NETWORKS
MODEL : MOTOROLA CANOPY
S/N : NONE ASSIGNED
SPECIFICATION : FCC 15.407
DATE : JANUARY 20, 2003
NOTES : PANEL ANTENNA TRANSMITTING AT 5745.0MHz
: TEST DISTANCE IS 3 METERS
: MEASUREMENT BANDWIDTH IS 1MHz
: EIRP (1MHz) + 13dB = TOTAL EIRP

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP (dBm)	LIMIT (dBm)
5745.0	H	TOTAL					33.8	36
5745.0	V	TOTAL					23.4	36
5745.0	H	1MHz	115.7	17.2	9.0	-5.4	20.8	
5745.0	V	1MHz	107.7	6.8	9.0	-5.4	10.4	
11490.0	H	1MHz	37.9	-39.2	15.0	-8.3	-32.5	-27
11490.0	V	1MHz	38.0	-43.1	15.0	-8.3	-36.4	-27
17235.0	H	1MHz	40.4	-54.6	13.6	-10.1	-51.1	-27
17235.0	V	1MHz	40.5	-55.3	13.6	-10.1	-51.7	-27
22980.0	H	1MHz	41.7	-53.1	12.7	0.0	-40.4	-27
22980.0	V	1MHz	41.2	-53.8	12.7	0.0	-41.1	-27
28725.0	H	1MHz	33.8	-57.6	15.4	0.0	-42.2	-27
28725.0	V	1MHz	33.3	-57.9	15.4	0.0	-42.5	-27
34470.0	H	1MHz	32.6	-61.3	16.8	0.0	-44.5	-27
34470.0	V	1MHz	33.1	-61.5	16.8	0.0	-44.7	-27

CHECKED BY: Richard E. King
RICHARD E. KING

ETR 31804-01
DATA SHEET

MANUFACTURER : CASCADE NETWORKS
MODEL : MOTOROLA CANOPY
S/N : NONE GIVEN
SPECIFICATION : FCC 15.407
DATE : JANUARY 20, 2003
NOTES : PANEL ANTENNA TRANSMITTING AT 5805.0MHz
: TEST DISTANCE IS 3 METERS
: MEASUREMENT BANDWIDTH IS 1MHz
: EIRP (1MHz) + 13dB = TOTAL EIRP

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP (dBm)	LIMIT (dBm)
5805.0	H	TOTAL					34.0	36
5805.0	V	TOTAL					23.0	36
5805.0	H	1MHz	115.6	17.3	9.1	-5.4	21.0	
5805.0	V	1MHz	106.6	6.3	9.1	-5.4	10.0	
11610.0	H	1MHz	38.6	-40.0	15.1	-8.3	-33.2	-27
11610.0	V	1MHz	40.0	-42.0	15.1	-8.3	-35.2	-27
17415.0	H	1MHz	39.9	-55.5	13.7	-10.1	-51.9	-27
17415.0	V	1MHz	40.9	-54.7	13.7	-10.1	-51.1	-27
23220.0	H	1MHz	42.7	-54.2	12.8	0.0	-41.4	-27
23220.0	V	1MHz	42.8	-54.1	12.8	0.0	-41.3	-27
29025.0	H	1MHz	33.6	-57.2	15.5	0.0	-41.7	-27
29025.0	V	1MHz	32.1	-57.8	15.5	0.0	-42.3	-27
34830.0	H	1MHz	32.7	-61.2	16.8	0.0	-44.4	-27
34830.0	V	1MHz	32.6	-60.9	16.8	0.0	-44.1	-27

CHECKED BY: Richard E. King
RICHARD E. KING

ETR 31804-01
DATA SHEET

MANUFACTURER : CASCADE NETWORKS
MODEL : MOTOROLA CANOPY
S/N : NONE ASSIGNED
SPECIFICATION : FCC 15.407
DATE : JANUARY 20, 2003
NOTES : DISH ANTENNA TRANSMITTING AT 5745MHz
: TEST DISTANCE IS 3 METERS
: MEASUREMENT BANDWIDTH IS 1MHz
: EIRP (1MHz) + 13dB = TOTAL EIRP

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP (dBm)	LIMIT (dBm)
5745.0	H	TOTAL					42.0	53
5745.0	V	TOTAL					32.8	53
5745.0	H	1MHz	125.9	25.4	9.0	-5.4	29.0	
5745.0	V	1MHz	114.3	16.2	9.0	-5.4	19.8	
11490.0	H	1MHz	37.7	-39.2	15.0	-8.3	-32.5	-27
11490.0	V	1MHz	36.2	-43.1	15.0	-8.3	-36.4	-27
17235.0	H	1MHz	40.2	-54.6	13.6	-10.1	-51.0	-27
17235.0	V	1MHz	41.6	-55.3	13.6	-10.1	-51.7	-27
22980.0	H	1MHz	41.4	-53.1	12.7	0.0	-40.4	-27
22980.0	V	1MHz	42.1	-53.8	12.7	0.0	-41.1	-27
28725.0	H	1MHz	33.9	-57.6	15.4	0.0	-42.2	-27
28725.0	V	1MHz	33.2	-57.9	15.4	0.0	-42.5	-27
34470.0	H	1MHz	32.6	-61.3	16.8	0.0	-44.5	-27
34470.0	V	1MHz	32.9	-61.5	16.8	0.0	-44.7	-27

CHECKED BY: Richard E. King
RICHARD E. KING

ETR 31804-01
DATA SHEET

MANUFACTURER : CASCADE NETWORKS
MODEL : MOTOROLA CANOPY
S/N : NONE ASSIGNED
SPECIFICATION : FCC 15.407
DATE : JANUARY 20, 2003
NOTES : DISH ANTENNA TRANSMITTING AT 5805MHz
: TEST DISTANCE IS 3 METERS
: EIRP (1MHz) + 13dB = TOTAL EIRP

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP (dBm)	LIMIT (dBm)
5805.0	H	TOTAL					37.1	53
5805.0	V	TOTAL					33.5	53
5805.0	H	1MHz	118.4	20.4	9.1	-5.4	24.1	
5805.0	V	1MHz	114.3	16.8	9.1	-5.4	20.5	
11610.0	H	1MHz	38.4	-39.2	15.1	-8.3	-32.4	-27
11610.0	V	1MHz	39.1	-42.3	15.1	-8.3	-35.5	-27
17415.0	H	1MHz	39.5	-55.1	13.7	-10.1	-51.5	-27
17415.0	V	1MHz	39.9	-54.6	13.7	-10.1	-51.0	-27
23220.0	H	1MHz	41.4	-54.1	12.8	0.0	-41.3	-27
23220.0	V	1MHz	42.1	-54.4	12.8	0.0	-41.6	-27
29025.0	H	1MHz	33.2	-57.2	15.5	0.0	-41.7	-27
29025.0	V	1MHz	32.5	-57.6	15.5	0.0	-42.1	-27
34830.0	H	1MHz	32.5	-60.9	16.8	0.0	-44.1	-27
34830.0	V	1MHz	32.9	-61.2	16.8	0.0	-44.4	-27

CHECKED BY: Richard E. King
RICHARD E. KING

ETR 31804-01
DATA SHEET

MANUFACTURER : CASCADE NETWORKS
MODEL : MOTOROLA CANOPY
S/N : NONE ASSIGNED
SPECIFICATION : FCC 15.407
DATE : MARCH 19, 2003
NOTES : METAL BOX ROD ANTENNA TRANSMITTING AT 5745MHz
: TEST DISTANCE IS 3 METERS
: MEASUREMENT BANDWIDTH IS 1MHz
: EIRP (1MHz) + 13dB = TOTAL EIRP

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP (dBm)	LIMIT (dBm)
5745.0	H	TOTAL					17.1	36
5745.0	V	TOTAL					31.6	36
5745.0	H	1MHz	91.7	0.5	9.0	-5.4	4.1	
5745.0	V	1MHz	111.5	15.0	9.0	-5.4	18.6	
11490.0	H	1MHz	36.9	-39.2	15.0	-8.3	-32.5	-27
11490.0	V	1MHz	36.1	-43.1	15.0	-8.3	-36.4	-27
17235.0	H	1MHz	40.4	-54.6	13.6	-10.1	-51.0	-27
17235.0	V	1MHz	41.6	-55.3	13.6	-10.1	-51.7	-27
22980.0	H	1MHz	42.8	-52.0	12.7	0.0	-39.3	-27
22980.0	V	1MHz	41.6	-52.0	12.7	0.0	-39.3	-27
28725.0	H	1MHz	35.1	-57.1	15.4	0.0	-41.7	-27
28725.0	V	1MHz	34.2	-57.2	15.4	0.0	-41.8	-27
34470.0	H	1MHz	34.4	-60.0	16.8	0.0	-43.2	-27
34470.0	V	1MHz	35.4	-59.0	16.8	0.0	-42.2	-27

CHECKED BY: Richard E. King
RICHARD E. KING

ETR 31804-01
DATA SHEET

MANUFACTURER : CASCADE NETWORKS
MODEL : MOTOROLA CANOPY
S/N : NONE GIVEN
SPECIFICATION : FCC 15.407
DATE : MARCH 19, 2003
NOTES : METAL BOX ROD ANTENNA TRANSMITTING AT 5805MHz
: TEST DISTANCE IS 3 METERS
: MEASUREMENT BANDWIDTH IS 1MHz
: EIRP (1MHz) + 13dB = TOTAL EIRP

FREQ. (MHz)	ANT. POL.	BW	MTR. READING (dBuV)	MATCHED SIGNAL (dBm)	ANT. GAIN	CABLE LOSS (dB)	EIRP (dBm)	LIMIT (dBm)
5805.0	H	TOTAL					11.9	36
5805.0	V	TOTAL					31.9	36
5805.0	H	1MHz	90.3	-4.8	9.1	-5.4	-1.1	
5805.0	V	1MHz	111.8	15.2	9.1	-5.4	18.9	
11610.0	H	1MHz	34.1	-39.2	15.1	-8.3	-32.4	-27
11610.0	V	1MHz	34.3	-42.3	15.1	-8.3	-35.5	-27
17415.0	H	1MHz	39.4	-55.1	13.7	-10.1	-51.5	-27
17415.0	V	1MHz	39.2	-54.6	13.7	-10.1	-51.0	-27
23220.0	H	1MHz	41.3	-51.0	12.8	0.0	-38.2	-27
23220.0	V	1MHz	42.3	-52.0	12.8	0.0	-39.2	-27
29025.0	H	1MHz	35.1	-57.2	15.5	0.0	-41.7	-27
29025.0	V	1MHz	35.0	-57.3	15.5	0.0	-41.8	-27
34830.0	H	1MHz	35.8	-59.0	16.8	0.0	-42.2	-27
34830.0	V	1MHz	34.8	-59.1	16.8	0.0	-42.3	-27

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