Measurement of RF Emissions from a RRRF-03 USB Dongle Transceiver

For	Turning Technologies, LLC. 255 W Federal Street Youngstown, OH 44503
P.O. Number	
Date Tested	April 2 through 24, 2012
Test Personnel	Richard E. 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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Requested By:

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REVISION HISTORY

Revision	Date	Description
—	27 April 2012	Initial release
A	16 May 2012	Section 3.2: "For conducted emissions testing the EUT was programmed in the standby receive mode at 2441MHz" was changed to: "For conducted emissions testing the EUT was programmed in the transmit at 2441MHz mode." Page 51 (data page): average limit for 2401MHz was changed from 500,000uV/m to 50,000 uV/m and the passing margin for 2401MHz was reduced by 20dB. Page 53 (data page): average limit for 2441MHz was changed from 500,000uV/m to 50,000 uV/m and the passing margin for 2441MHz was reduced by 20dB. Page 55 (data page): average limit for 2482MHz was changed from 500,000uV/m to 50,000 uV/m and the passing margin for 2482MHz was reduced by 20dB.

Measurement of RF Emissions from a USB Dongle Transceiver, Model No. RRRF-03

1. INTRODUCTION

1.1. Scope of Tests

This report presents the results of the RF emissions measurements performed on a USB Dongle Transceiver, Model No. RRRF-03, Serial No. V1.9 #3, (hereinafter referred to as the Equipment Under Test (EUT)). The EUT was designed to transmit between 2401 to 2482MHz using an internal antenna. The EUT was manufactured and submitted for testing by Turning Technologies, LLC. located in Youngstown, Ohio.

1.2. Purpose

The test series was performed to determine if the EUT meets the conducted and radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.249 for Intentional Radiators. Testing was performed in accordance with ANSI C63.4-2009.

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 23^{o}C and the relative humidity was 40%.

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 2011
- ANSI C63.4-2009, "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 License-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 Turning Technologies, LLC., USB Dongle Transceiver, Model No. RRRF-03. A block diagram of the EUT setup is shown as Figure 1.

3.1.1.Power Input

The EUT obtained 5V power from the USB port of a laptop. The laptop obtained 20VDC power through 2 leads from the secondary of a Dell model PA-4 step-down transformer. The primary of this transformer received 120V 60Hz power through lowpass powerline filters on the wall of the shielded enclosure. The 20VDC power from the secondary of the transformer was provided to the EUT through a 2 wire, 6 foot long unshielded cord. Each primary lead 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 C63.4-2009.

3.1.2.Peripheral Equipment

The following peripheral equipment was submitted with the EUT:

Item	Description
Laptop	Dell Model No. PPI Inspirion 7000

3.1.3.Signal Input/Output Leads

The EUT was connected directly to the laptop.

3.1.4.Grounding

The EUT was grounded through a USB port on the laptop.

3.2. Operational Mode

The EUT was placed on an 80cm high non-conductive stand. The EUT was programmed so that it could transmit or receive continuously. All tests except conducted emissions were performed separately with the EUT transmitting at 2401MHz, 2441MHz and 2482MHz. For conducted emissions testing the EUT was programmed in the transmit at 2441MHz mode.

3.3. EUT Modifications

No modifications were required for compliance.

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 C63.4-2009 for site attenuation.

4.2. Test Instrumentation

The test instrumentation and auxiliary equipment used during the tests are listed in Table 9-1.

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

All radio frequency voltages on the power lines for any frequency or frequencies of an intentional radiator shall not exceed the limits in the following table:

Frequency MHz	Conducted Limit (dBuV)	
	Quasi-peak	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.

5.1.2. Procedures

The interference on each power lead of the host Laptop computer was measured by connecting the measuring equipment to the appropriate meter terminal of the Line Impedance Stabilization Network (LISN). The meter terminal of the LISN not under test was terminated with 50 ohms.

a) The EUT was operated in the transmit mode.

b) Measurements were first made on the 120VAC 60Hz L1 lead of the power supply to the laptop.

c) The frequency range from 150 kHz to 30 MHz was broken up into smaller frequency sub-bands.

d) Conducted emissions measurements were taken on the first frequency sub-band using a peak detector.

e) The data thus obtained was then searched by the computer for the highest levels. Any emissions levels that were within 10dB of the average limit were then measured again using both a quasi-peak detector and an average detector. (If no peak readings were within 10dB of the average limit, quasi-peak and average readings were taken on the highest emissions levels measured during the peak detector scan.)

f) Steps (d) and (e) were repeated for the remainder of the frequency sub-bands until the entire frequency range from 150kHz to 30MHz was investigated. The peak trace was automatically plotted. The plot also shows quasi-peak and average readings that were taken on discrete frequencies. A table showing the quasi-peak and average readings was also generated. This

tabular data compares the quasi-peak and average conducted emissions to the applicable conducted emissions limits.

g) Steps (c) through (f) were repeated on the 120VAC 60Hz L2 line.

5.1.3.Results

The plots of the peak, quasi-peak, and average conducted voltage levels acquired from each input power line with the EUT operated in the transmit mode are shown on pages 17 and 19. The tabular quasi-peak and average results from each input power line with the EUT operated in the transmit mode are shown on pages 18 and 20. All power line conducted emissions measured from the EUT were within the specification limits.

Photographs of the test configuration which yielded the highest or worst case, conducted emission levels are shown on Figure 2.

5.2. Duty Cycle Factor Measurements

5.2.1.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 100usec/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. The sweep time was then increased to 10msec to show the worst case time between each pulse. The duty cycle is then computed as the On-time/(On-time + Off-time).

5.2.2.Results

The plots of the duty cycle are shown on data pages 21 and 22. The duty cycle factor was computed to be -37.8 dB.

5.3. Radiated Measurements

5.3.1.Requirements

The EUT must comply with the requirements of FCC "Code of Federal Regulations Title 47", Part 15, Subpart C, Section 15.249(a) and Industry Canada RSS-210 Annex 2, Section A2.9. Both standards have the following radiated emission limits:

Fundamental Frequency MHz	Field Intensity mV/m @ 3 meter	Field Strength of Harmonics uV/m @ 3 meter
2400 – 2483.5	50	500

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

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits, whichever is the lesser attenuation.

5.3.2.Procedures

All 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. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2003 for site attenuation.

A preliminary radiated emissions test was performed to determine the emission characteristics of the EUT. For the preliminary test, a broadband measuring antenna was positioned at a 3 meter distance from the EUT. The

entire 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 emission tests were then manually performed over the frequency range of 30MHz to 25GHz. Between 30MHz and 1000MHz, a bilog antenna was used as the pick-up device. 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.

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) For hand-held or body-worn devices, the EUT was rotated through three orthogonal axes to determine which orientation produces the highest emission relative to the limit.
5) In some instances, it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer and the antenna could not be raised to 4 meters. The measuring antenna was raised and lowered as much as the cable would allow and the EUT is rotated through all axes to ensure the maximum readings are recorded. See attached Figure 2.

5.3.3. Results

The preliminary plots, with the EUT transmitting at 2401MHz, 2441MHz and 2482MHz are presented on pages 23 through 48. The plots are presented for a reference only, and are not used to determine compliance. The final radiated levels are presented on pages 49 through 55. As can be seen from the data, all emissions measured from the EUT were within the specification limits.

5.4. Bandedge Compliance

5.4.1. Requirement

In accordance with FCC "Code of Federal Regulations Title 47", Part 15, Subpart C, Section 15.249, 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.

In accordance with Industry Canada RSS-210 Annex 2, Section A2.9(b), emissions outside of the specified frequency bands shall be below the general radiated emissions limits of RSS-210 Annex 2, Section A2.9(a). Therefore the radiated emissions at the band edges (2400MHz and 2483.5MHz) must meet the general limits of Annex 2 Section A2.9.

5.4.2. Procedures

Low Band Edge

1) The EUT was set up inside the test chamber on a non-conductive stand.
2) A broadband measuring antenna was placed at a test distance of 3 meters from the EUT.
3) The EUT was maximized for worst case emissions at the measuring antenna. A peak reading was taken with a resolution bandwidth of 1MHz and a video bandwidth of 1MHz or greater The maximum peak meter readings were recorded.
4) To determine the band edge compliance, the following spectrum analyzer settings were used:

    a. Center frequency = low band-edge frequency.
    b. Span = Wide enough to capture both the peak level of the fundamental emission and the band-edge emission under investigation.

c. Resolution bandwidth (RBW) = 100kHz.
d. The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined.
e. The marker was set on the peak of the in-band emissions. This level corresponds to the maximized peak reading previously taken. The "marker-delta" method described in Public Notice DA 00-705 was then used to determine band edge compliance. The delta between the marker and the general limit (74dBuV/m for peak readings) was calculated by subtracting the general limit (74dBuV/m) from the maximum reading taken with a 1MHz bandwidth. This delta represents how far below the marker the emissions outside of the authorized band of operation must be. A display line was placed at this level. All emissions which fall outside of the authorized band of operation must be below the display line. (All emissions to the left of the center frequency (band-edge) must be below the display line.)
f. The analyzer's display was plotted using a 'screen dump' utility.

High Band Edge

1) The EUT was set up inside the test chamber on a non-conductive stand.
2) A broadband measuring antenna was placed at a test distance of 3 meters from the EUT.
3) The EUT was maximized for worst case emissions at the measuring antenna. A peak reading was taken with a resolution bandwidth of 1MHz and a video bandwidth of 1MHz or greater The maximum peak meter readings were recorded.
4) To determine the band edge compliance, the following spectrum analyzer settings were used:

a. Center frequency = high band-edge frequency.
b. Span = Wide enough to capture both the peak level of the fundamental emission and the band-edge emission under investigation.
c. Resolution bandwidth (RBW) = 100kHz.
d. The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined.
e. The marker was set on the peak of the in-band emissions. This level corresponds to the maximized peak reading previously taken. The "marker-delta" method described in Public Notice DA 00-705 was then used to determine bandedge compliance. The delta between the marker and the general limit (74dBuV/m for peak readings) was calculated by subtracting the general limit (74dBuV/m) from the maximum reading taken with a 1MHz bandwidth. This delta represents how far below the marker the emissions outside of the authorized band of operation must be. A display line was placed at this level. All emissions which fall outside of the authorized band of operation must be below the display line. (All emissions to the right of the center frequency (band-edge) must be below the display line.)
f. The analyzer's display was plotted using a 'screen dump' utility.

5.4.3.Results

Pages 56 through 59 show the radiated band-edge compliance results. As can be seen from these plots, the radiated emissions at the low end band edge and the high end band edge are within the general limits.
The 99% bandwidth was measured to be 876.4kHz for the small data packets.

6. OTHER TEST CONDITIONS

6.1. Test Personnel and Witnesses

All tests were performed by qualified personnel from Elite Electronic Engineering Incorporated. The test series was witnessed by Turning Technologies, LLC. personnel.

6.2. Disposition of the EUT

The EUT and all associated equipment were returned to Turning Technologies, LLC. upon completion of the

tests.

7. CONCLUSIONS

It was determined that the Turning Technologies, LLC. USB Dongle Transceiver, Model No. RRRF-03, Serial No. V1.9 #3, did fully 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 C63.4-2009.

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 as operated by Turning Technologies, LLC. personnel. 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	8/5/2011	8/5/2012
APW3	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-35-120-5R0-10-12	PL2924	1GHZ-20GHZ	6/3/2011	6/3/2012
CDX8	COMPUTER	ELITE	WORKSTATION			N/A	
NHG0	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ	NOTE 1	
NTA3	BILOG ANTENNA	TESEQ	6112D	28040	25-1000MHz	2/16/2012	2/16/2013
NWI0	RIDGED WAVE GUIDE	AEL	H1498	153	2-18GHZ	1/28/2012	1/28/2013
NWP1	DOUBLE RIDGED WAVEGUIDE ANTENNA	EATON	3115	2100	1GHZ-12.4GHZ	3/6/2012	3/6/2013
PLF6	CISPR16 50UH LISN	ELITE	CISPR16/15A	007	.15-30MHz	6/27/2011	6/27/2012
PLF8	CISPR16 50UH LISN	ELITE	CISPR16/15A	009	.15-30MHz	6/27/2011	6/27/2012
RAKI	RF SECTION	HEWLETT PACKARD	85462A	3411A00181	0.009-6500MHZ	3/15/2012	3/15/2013
RAKJ	RF FILTER SECTION	HEWLETT PACKARD	85460A	3330A00154	---	3/15/2012	3/15/2013
RBB0	EMI TEST RECEIVER 20HZ TO 40 GHZ.	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	3/5/2012	3/5/2013
XLQS	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	59	DC-2GHZ	8/4/2011	8/4/2012

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.

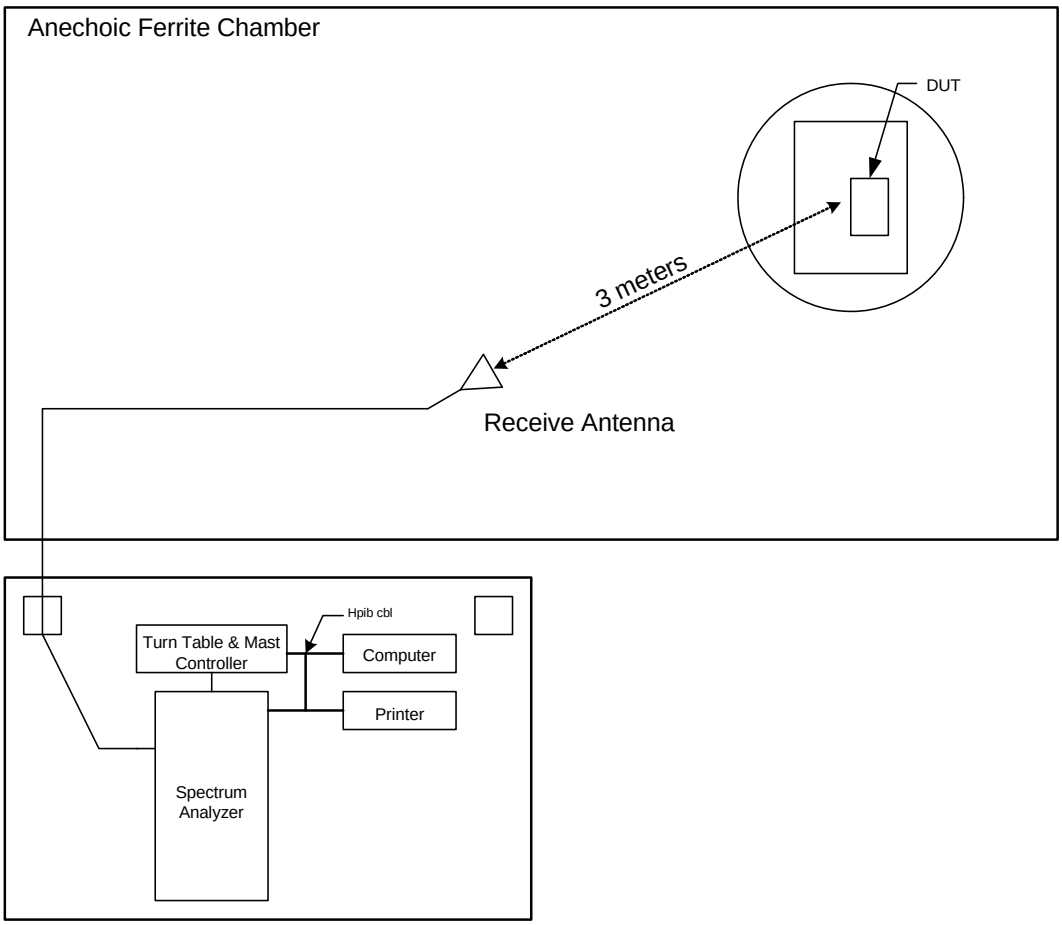


FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

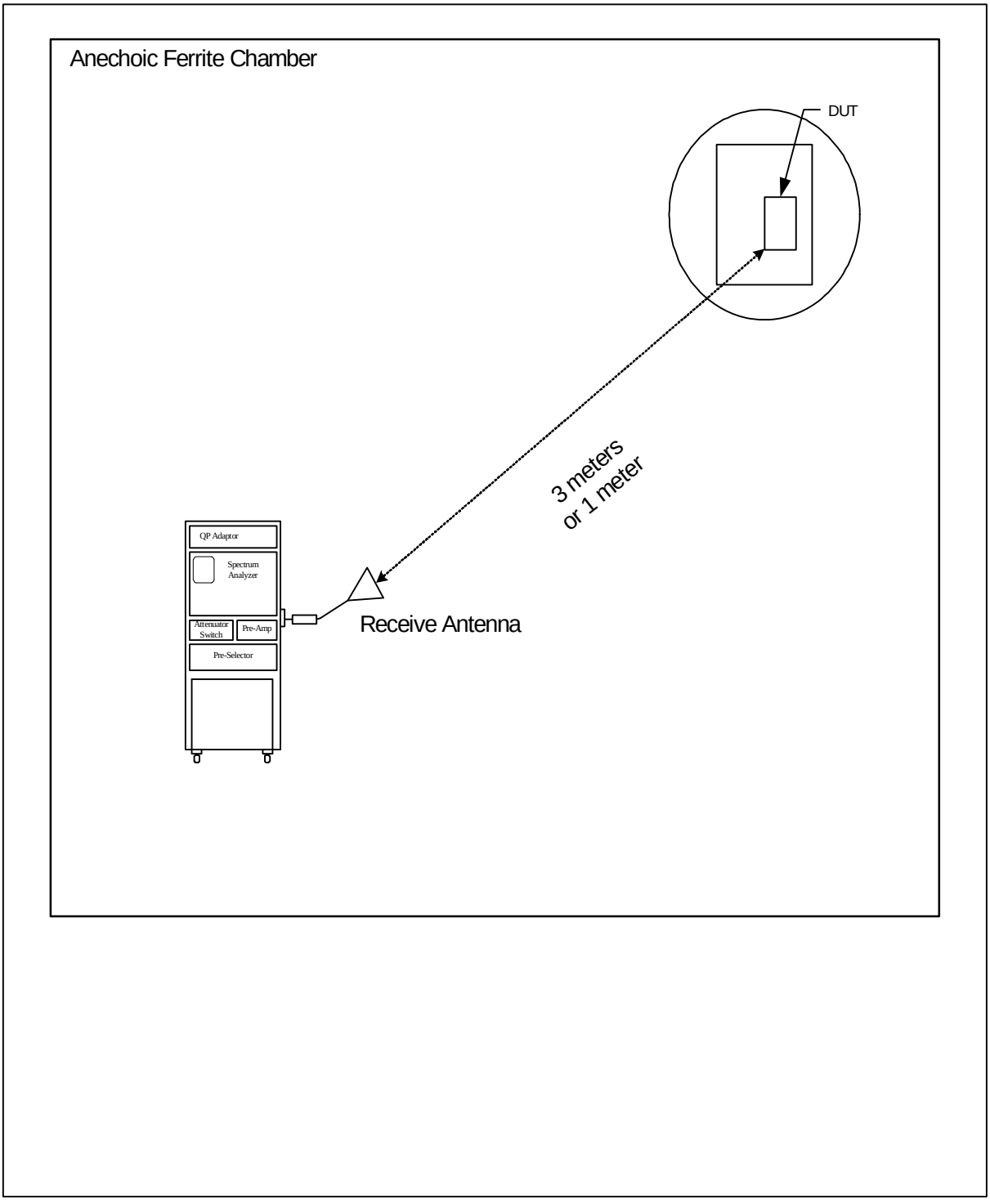
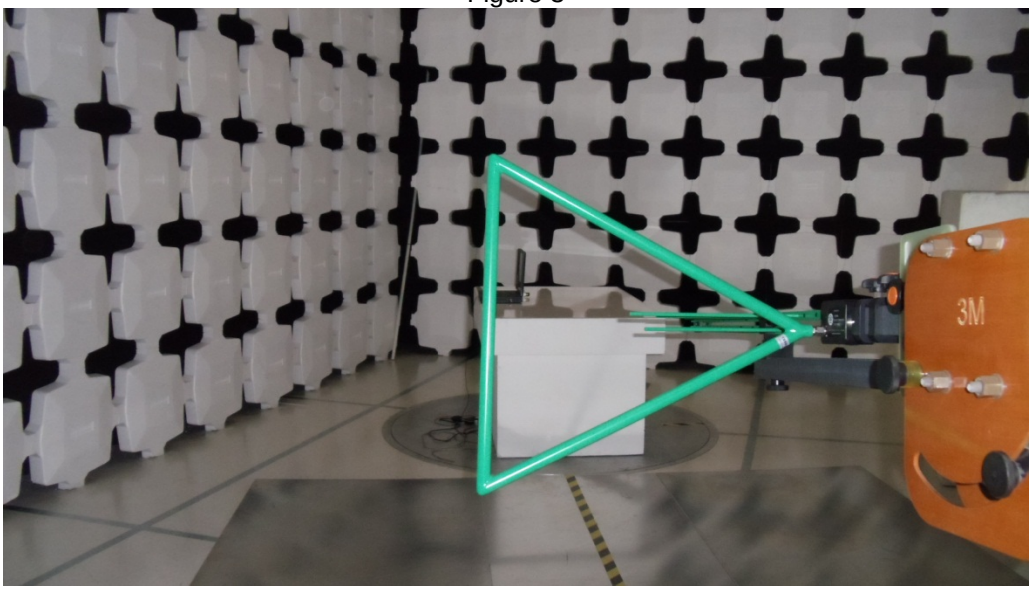

Anechoic Ferrite Chamber
DUT
3 meters
or 1 meter
QP Adaptor
Spectrum
Analyzer
Attenuator
Switch
Pre-Amp
Pre-Selector
Receive Antenna

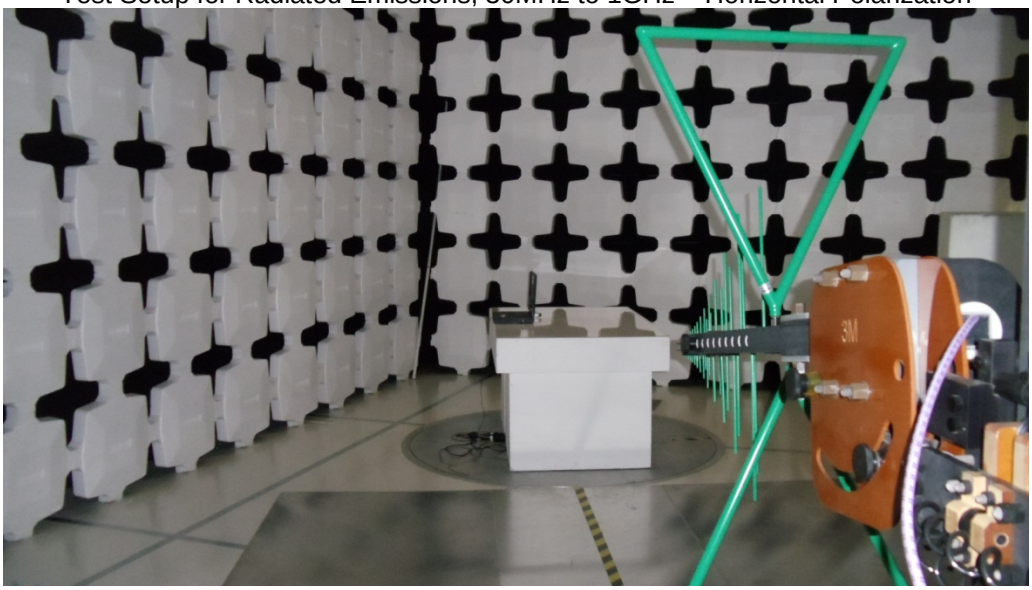
Figure 2

Test Setup for Conducted Emissions

Figure 3

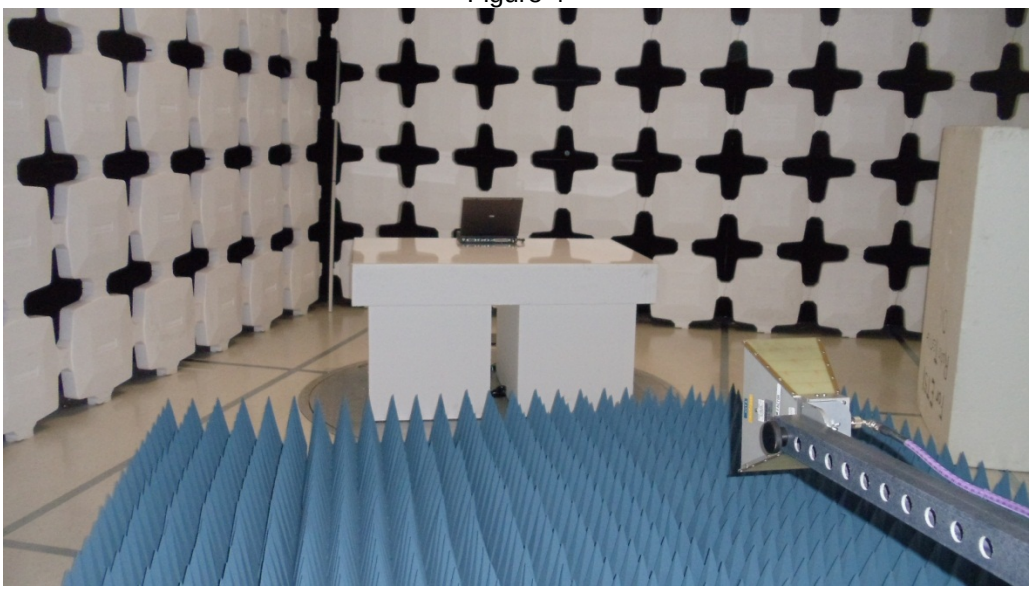


Test Setup for Radiated Emissions, 30MHz to 1GHz – Horizontal Polarization

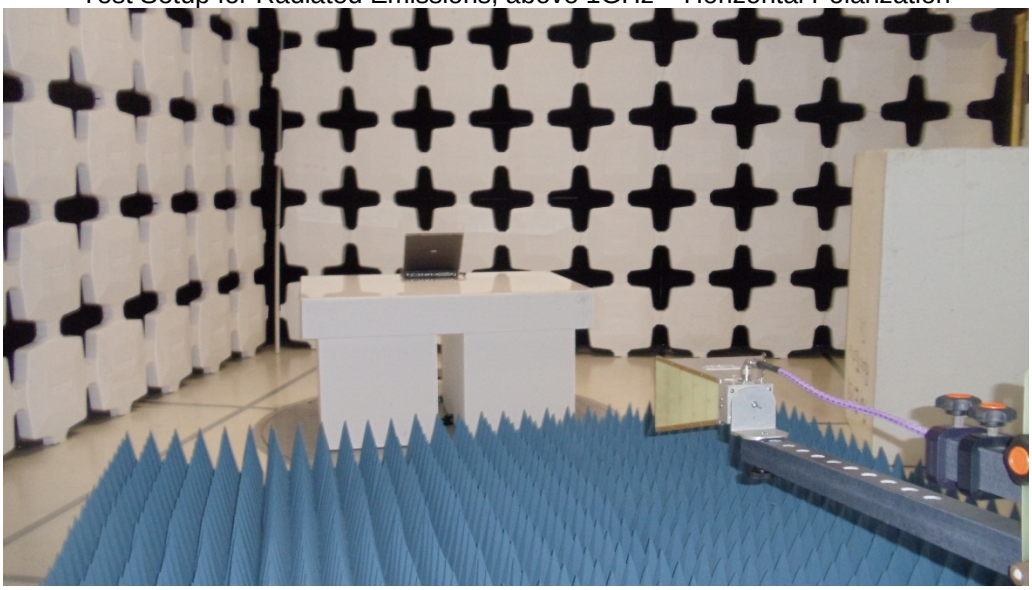


Test Setup for Radiated Emissions, 30MHz to 1GHz – Vertical Polarization

Figure 4



Test Setup for Radiated Emissions, above 1GHz – Horizontal Polarization



Test Setup for Radiated Emissions, above 1GHz – Vertical Polarization

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 02/09/2011

Manufacturer	:	Turning Technologies, LLC.
Model	:	RRRF-03
DUT Revision	:	
Serial Number	:	V1.9 #3
DUT Mode	:	Tx @ 2441MHz
Line Tested	:	
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Apr 24, 2012 05:08:52 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.164	45.2	65.3		22.7	55.3	
0.441	36.1	57.0		30.6	47.0	
0.617	34.7	56.0		34.1	46.0	
0.795	36.4	56.0		33.5	46.0	
1.327	36.0	56.0		35.4	46.0	
2.034	35.2	56.0		34.1	46.0	
3.271	30.6	56.0		29.7	46.0	
6.809	23.5	60.0		19.2	50.0	
16.412	14.2	60.0		7.3	50.0	
23.167	20.0	60.0		13.4	50.0	

Checked BY Richard E. King :

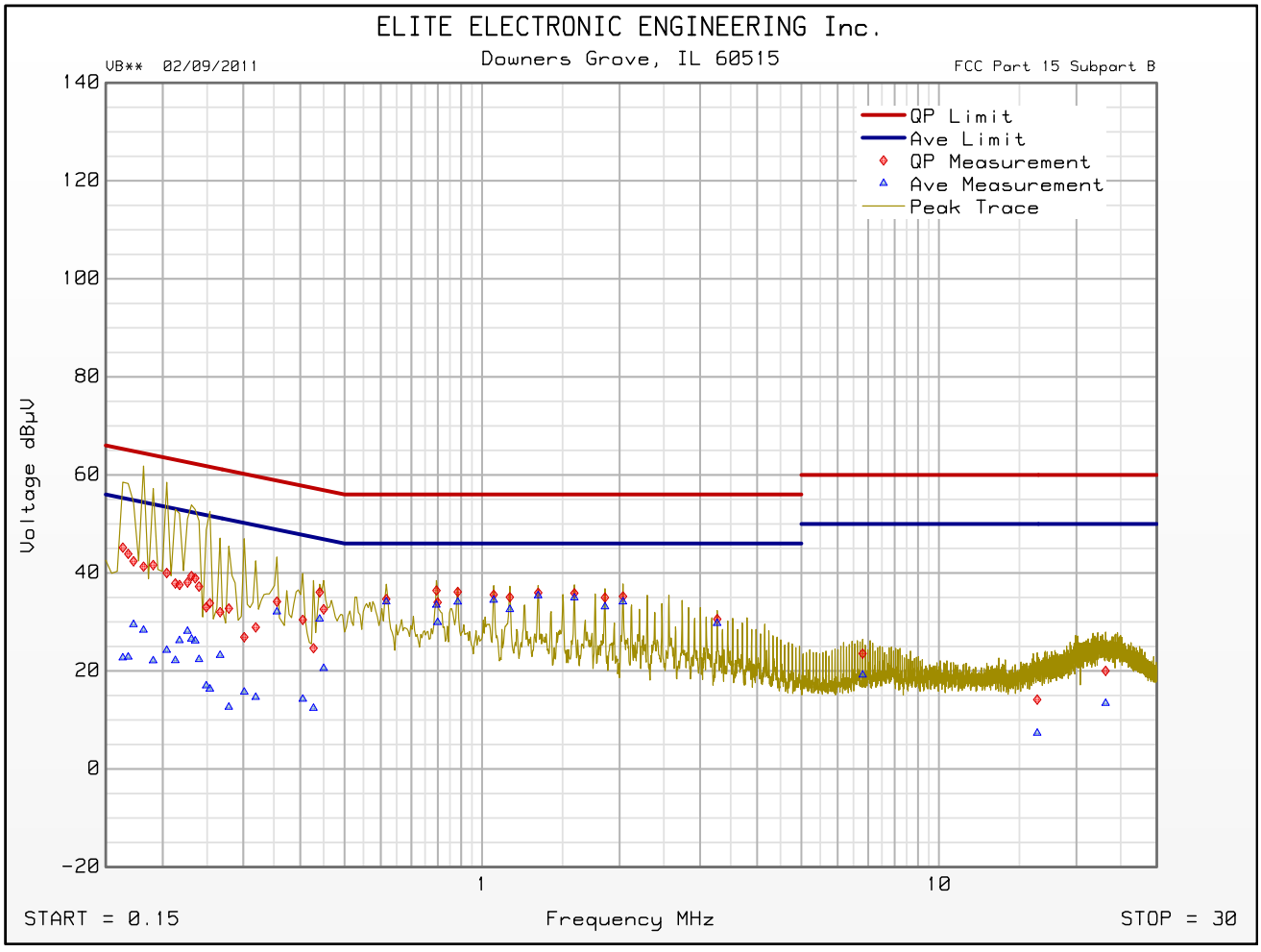
Richard E. King

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 02/09/2011

Manufacturer	:	Turning Technologies, LLC.
Model	:	RRRF-03
DUT Revision	:	
Serial Number	:	V1.9 #3
DUT Mode	:	Tx @ 2441MHz
Line Tested	:	
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Apr 24, 2012 05:08:52 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 02/09/2011

Manufacturer	:	Turning Technologies, LLC.
Model	:	RRRF-03
DUT Revision	:	
Serial Number	:	V1.9 #3
DUT Mode	:	Tx @ 2441MHz
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Apr 24, 2012 05:15:19 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.173	44.1	64.8		29.2	54.8	
0.284	30.6	60.7		8.7	50.7	
0.617	35.7	56.0		34.8	46.0	
0.795	36.0	56.0		33.5	46.0	
1.327	35.4	56.0		34.9	46.0	
2.034	34.2	56.0		33.1	46.0	
3.271	31.2	56.0		29.6	46.0	
6.364	26.0	60.0		20.5	50.0	
9.617	25.9	60.0		12.6	50.0	
21.524	25.0	60.0		15.7	50.0	

Checked BY Richard E. King :

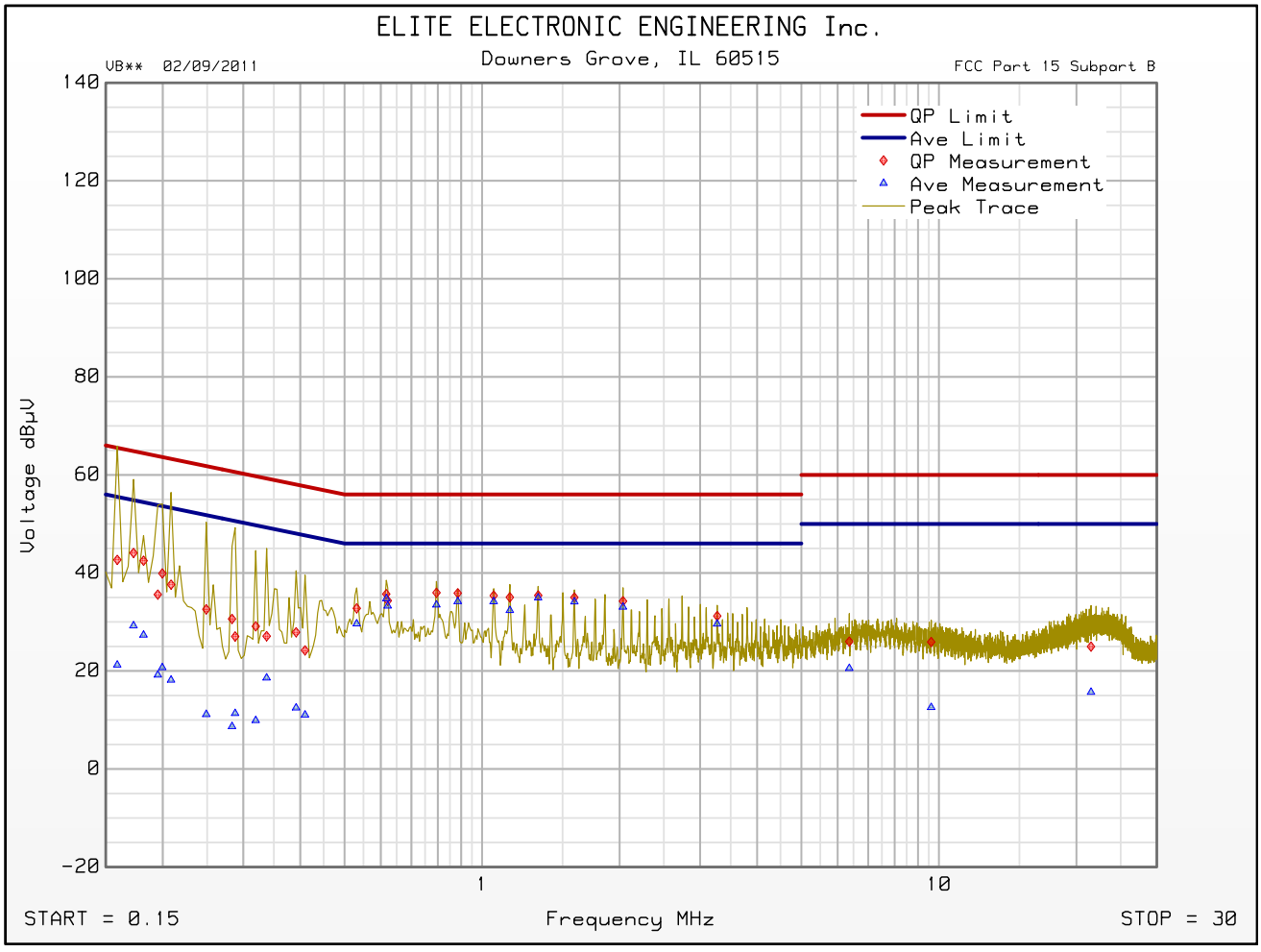
Richard E. King

FCC Part 15 Subpart B Conducted Emissions Test

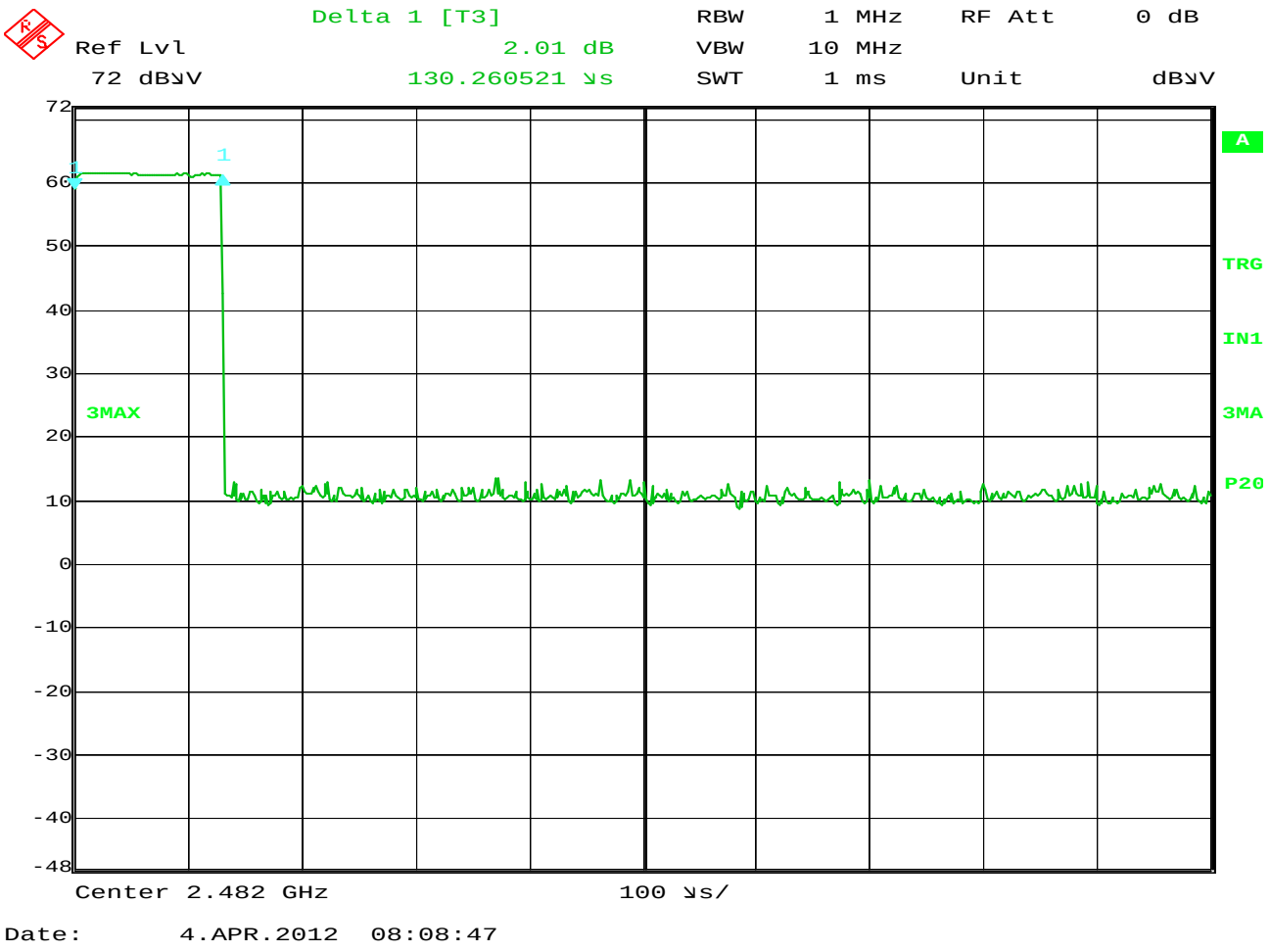
Cumulative Data

VB** 02/09/2011

Manufacturer	:	Turning Technologies, LLC.
Model	:	RRRF-03
DUT Revision	:	
Serial Number	:	V1.9 #3
DUT Mode	:	Tx @ 2441MHz
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Apr 24, 2012 05:15:19 PM



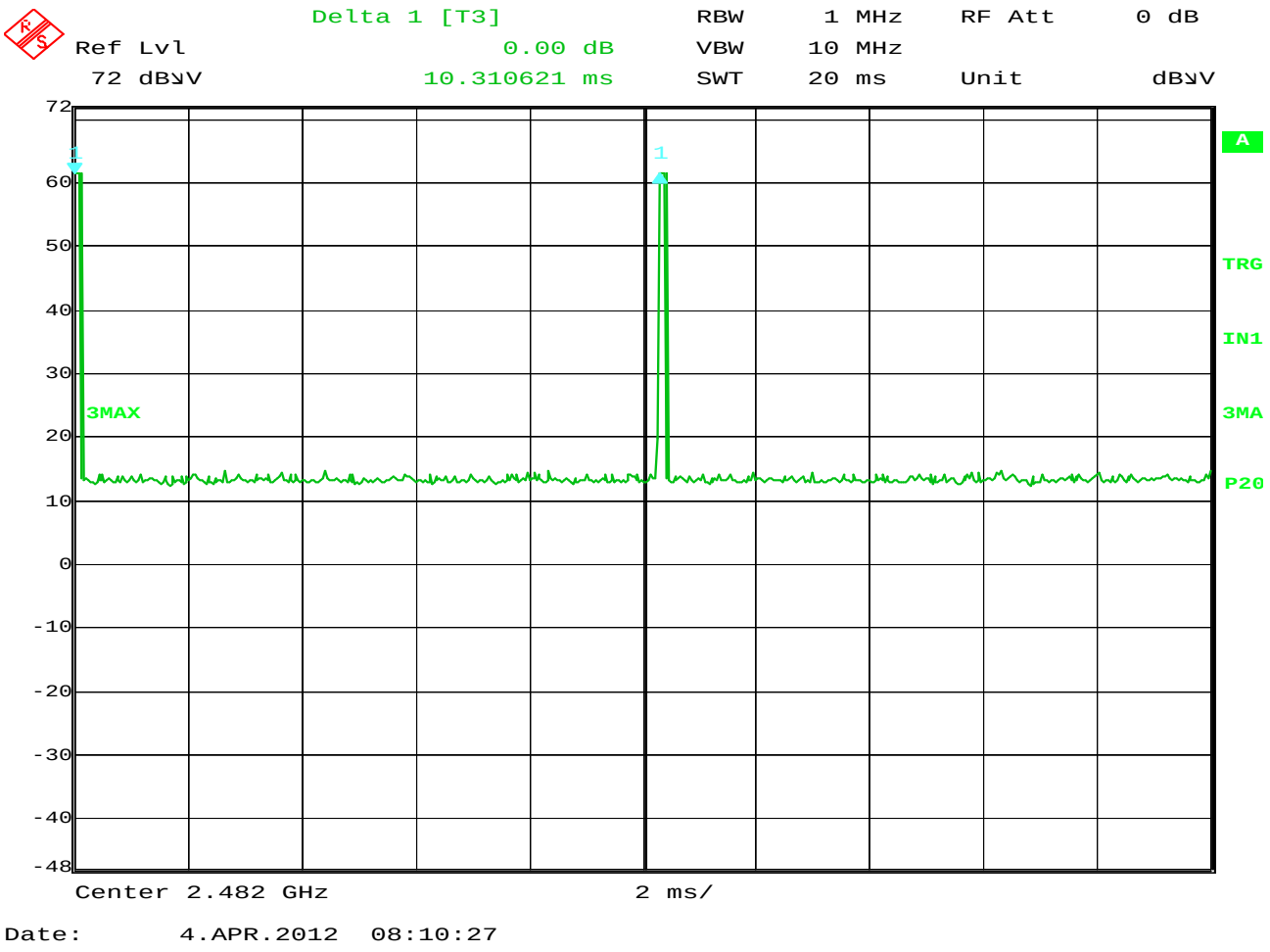
Emissions Meet QP Limit
Emissions Meet Ave Limit



FCC 15.35 Duty Cycle Correction Factor

MANUFACTURER	:	Turning Technologies, LLC
MODEL NUMBER	:	RRRF-03
SERIAL NUMBER	:	V1.9 #3
TEST MODE	:	Tx @ 2482MHz
TEST DATE	:	April 4, 2012
TEST PARAMETER	:	Pulse width = 130.26 uS

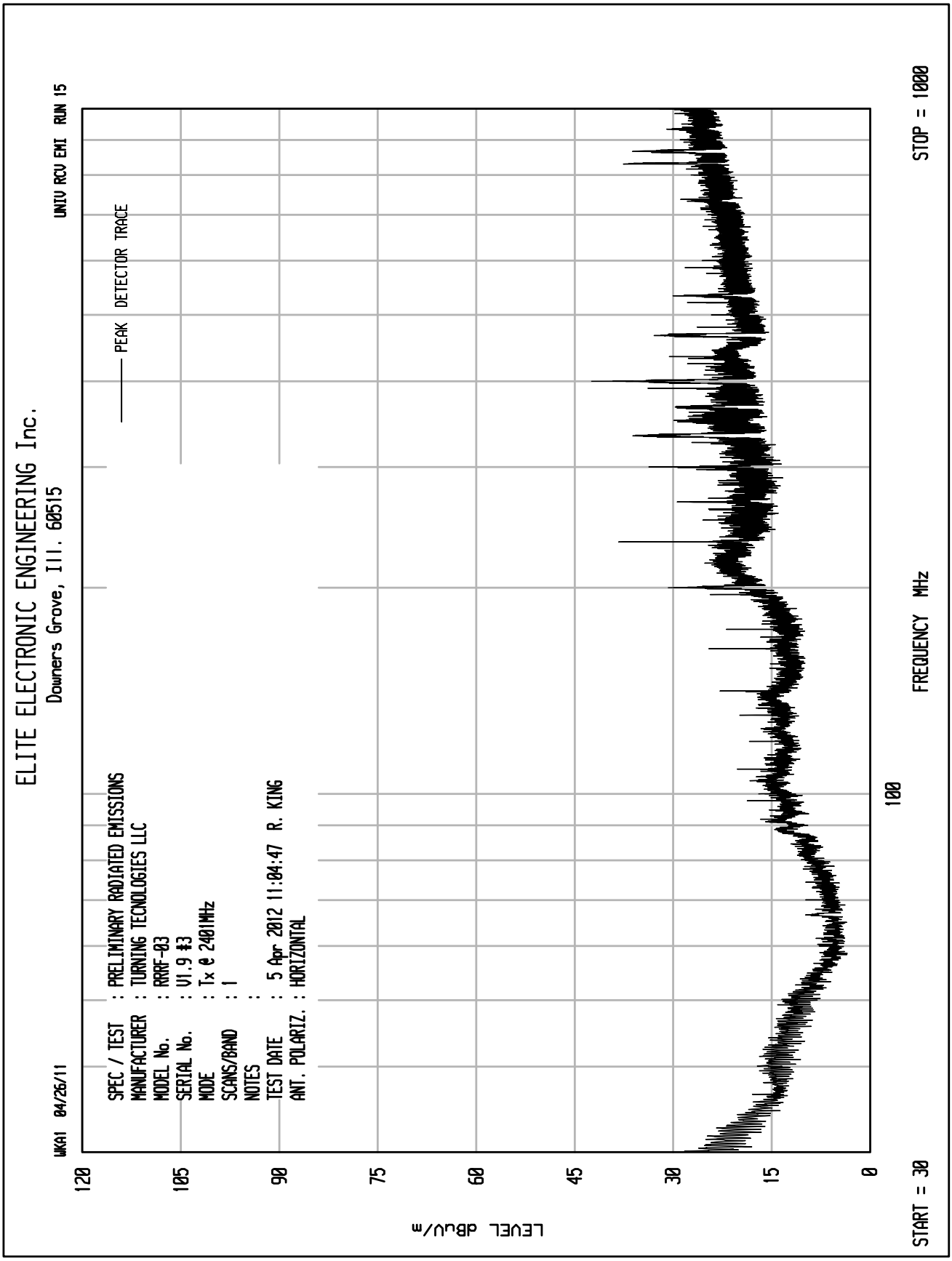
NOTES

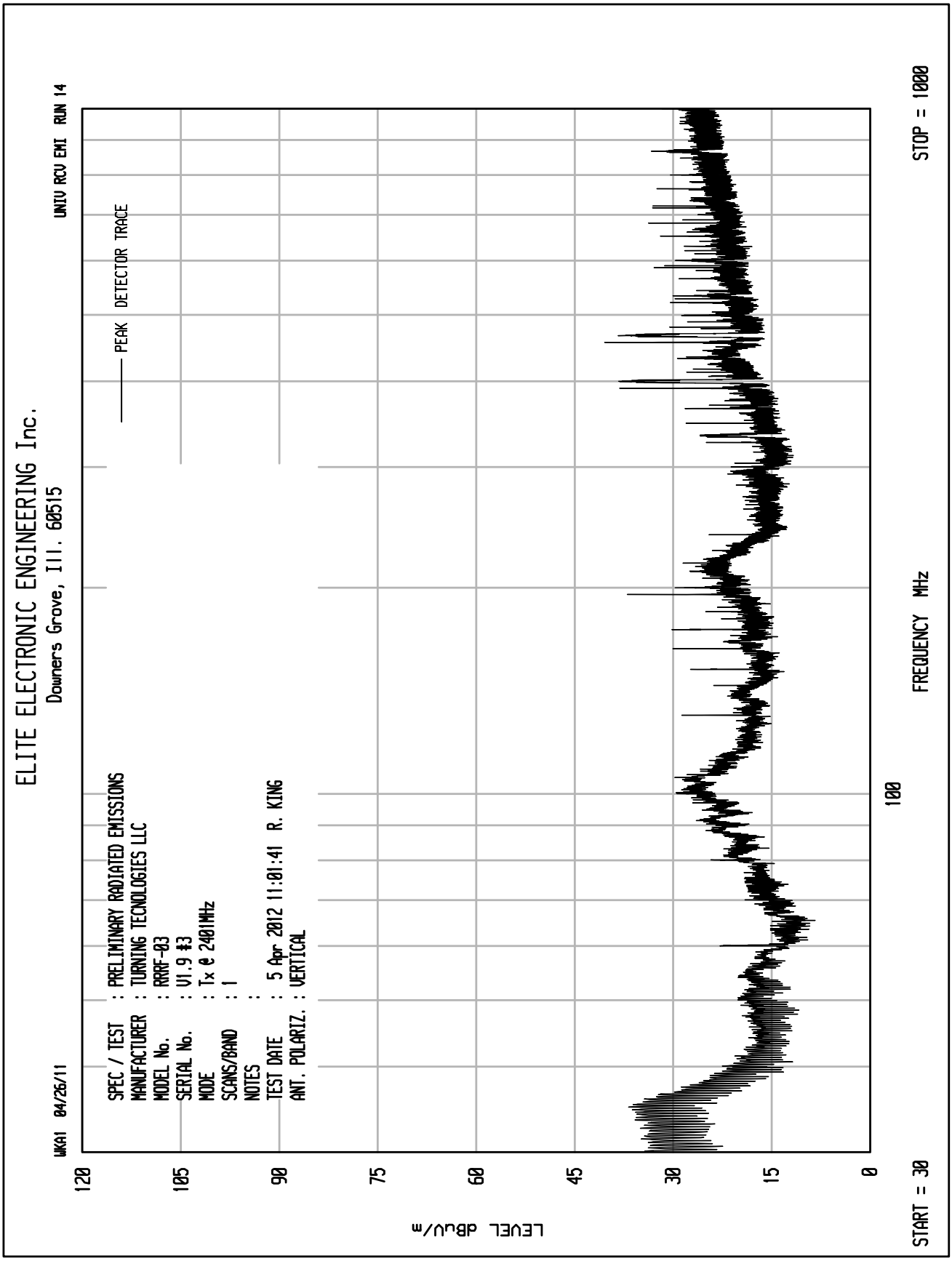


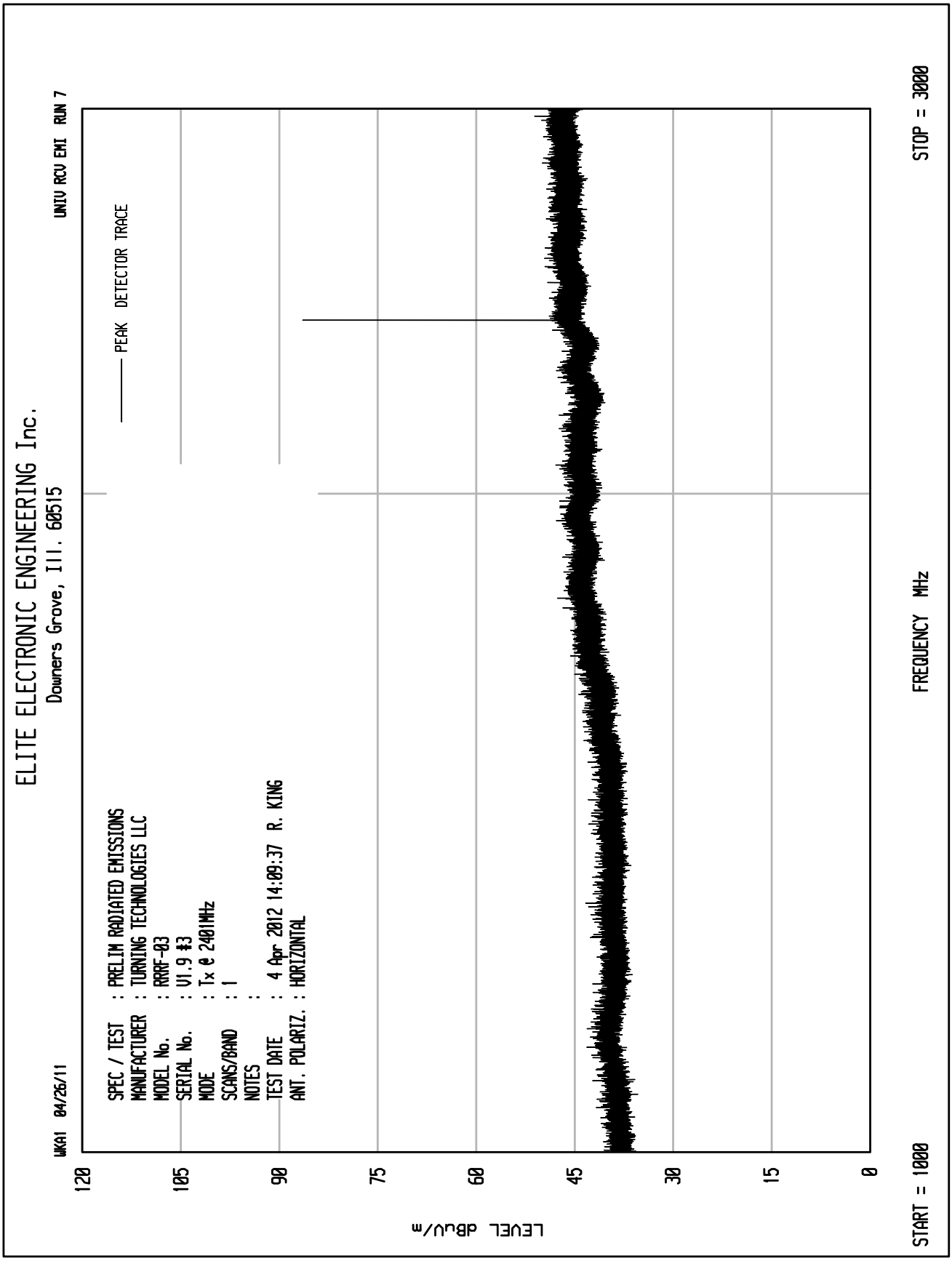
FCC 15.35 Duty Cycle Correction Factor

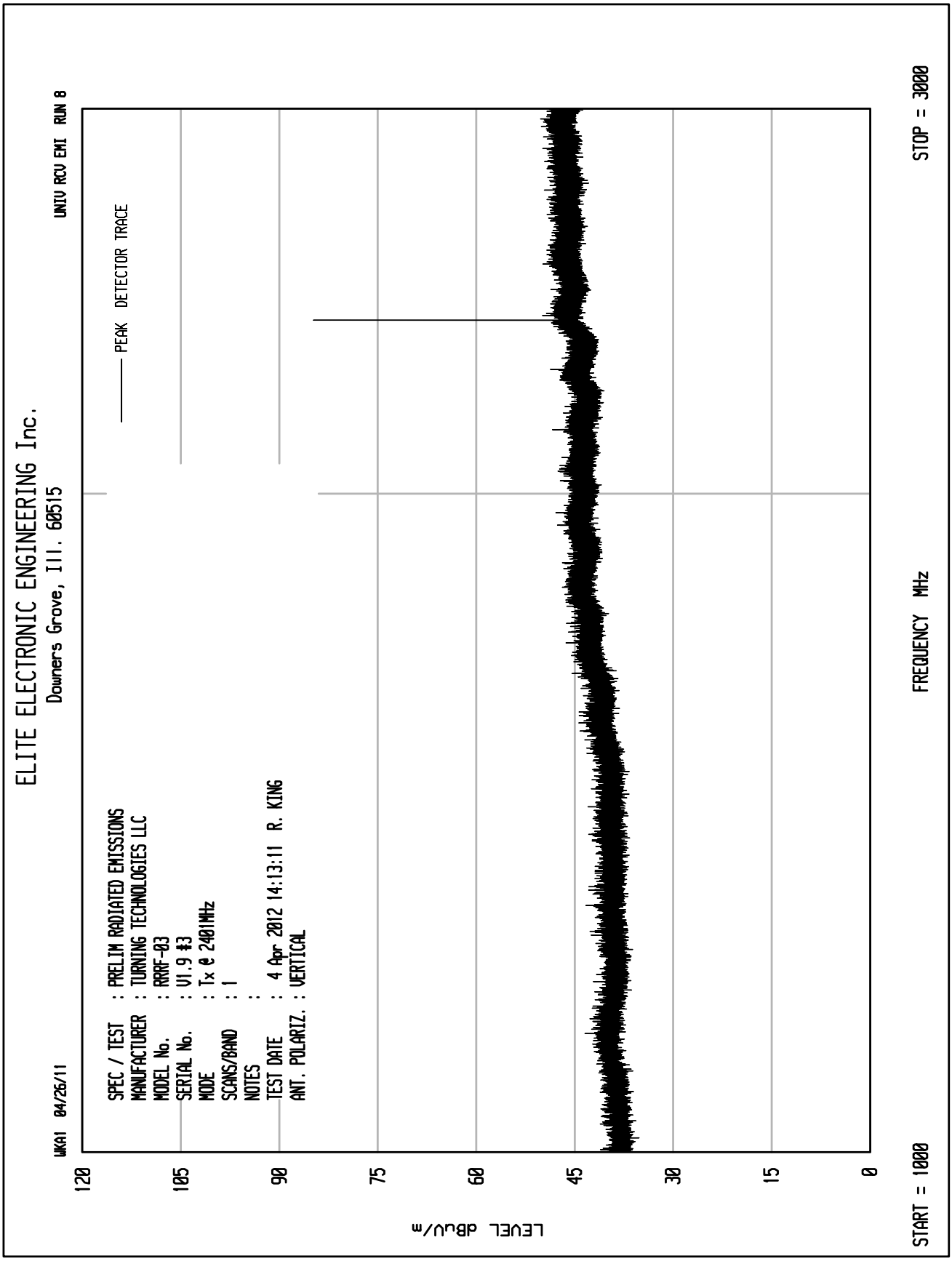
MANUFACTURER	: Turning Technologies, LLC
MODEL NUMBER	: RRRF-03
SERIAL NUMBER	: V1.9 #3
TEST MODE	: Tx @ 2482MHz
TEST DATE	: April 3, 2012
TEST PARAMETER	: Pulse width = 130.26 uS
	: Word = 10.3 mS
	: 20* log (130.26uS/10.3mS)
	: = -37.96 dB

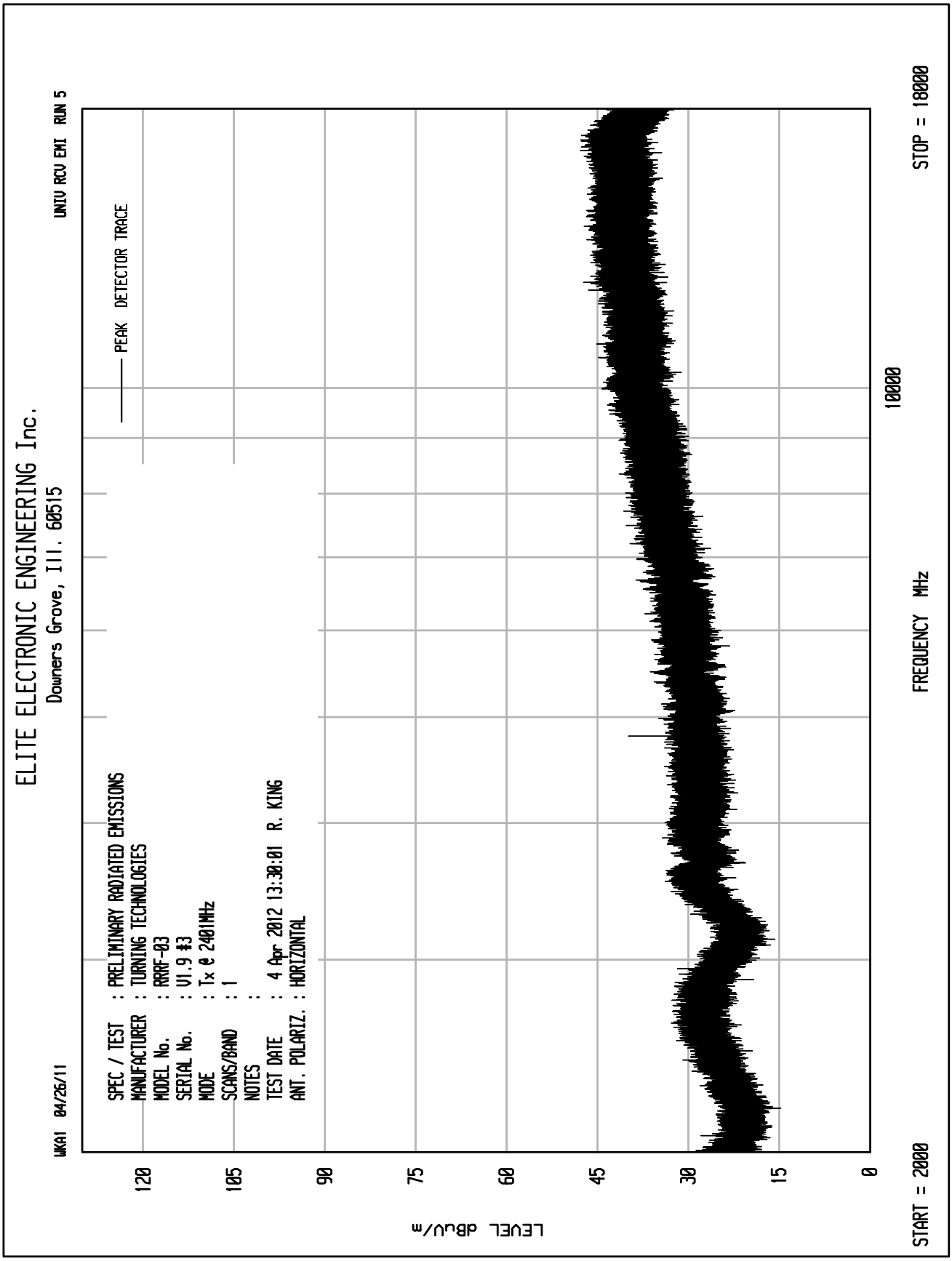
NOTES

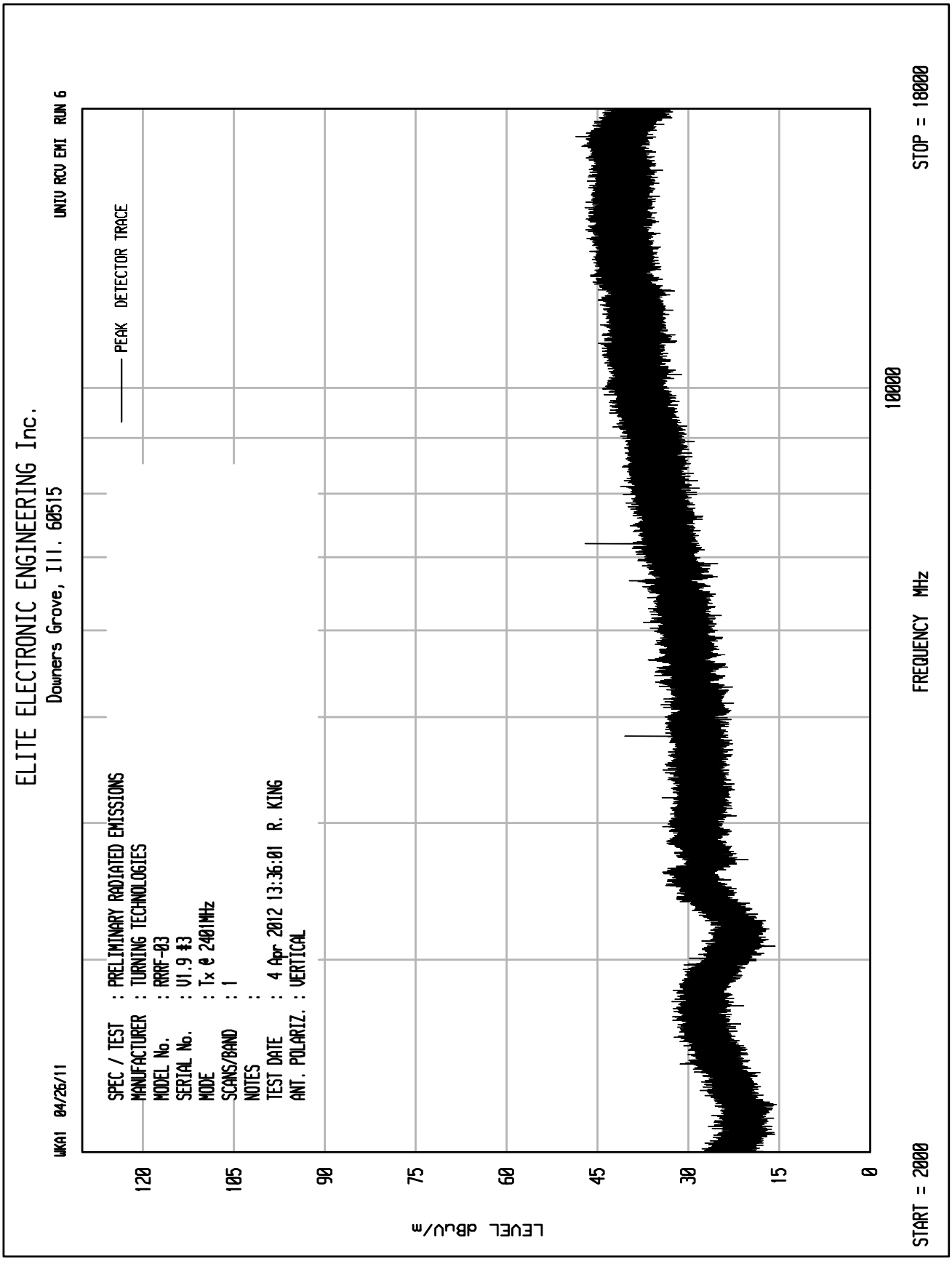

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 15
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECNOLOGIES LLC
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2401MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 5 Apr 2012 11:04:47 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

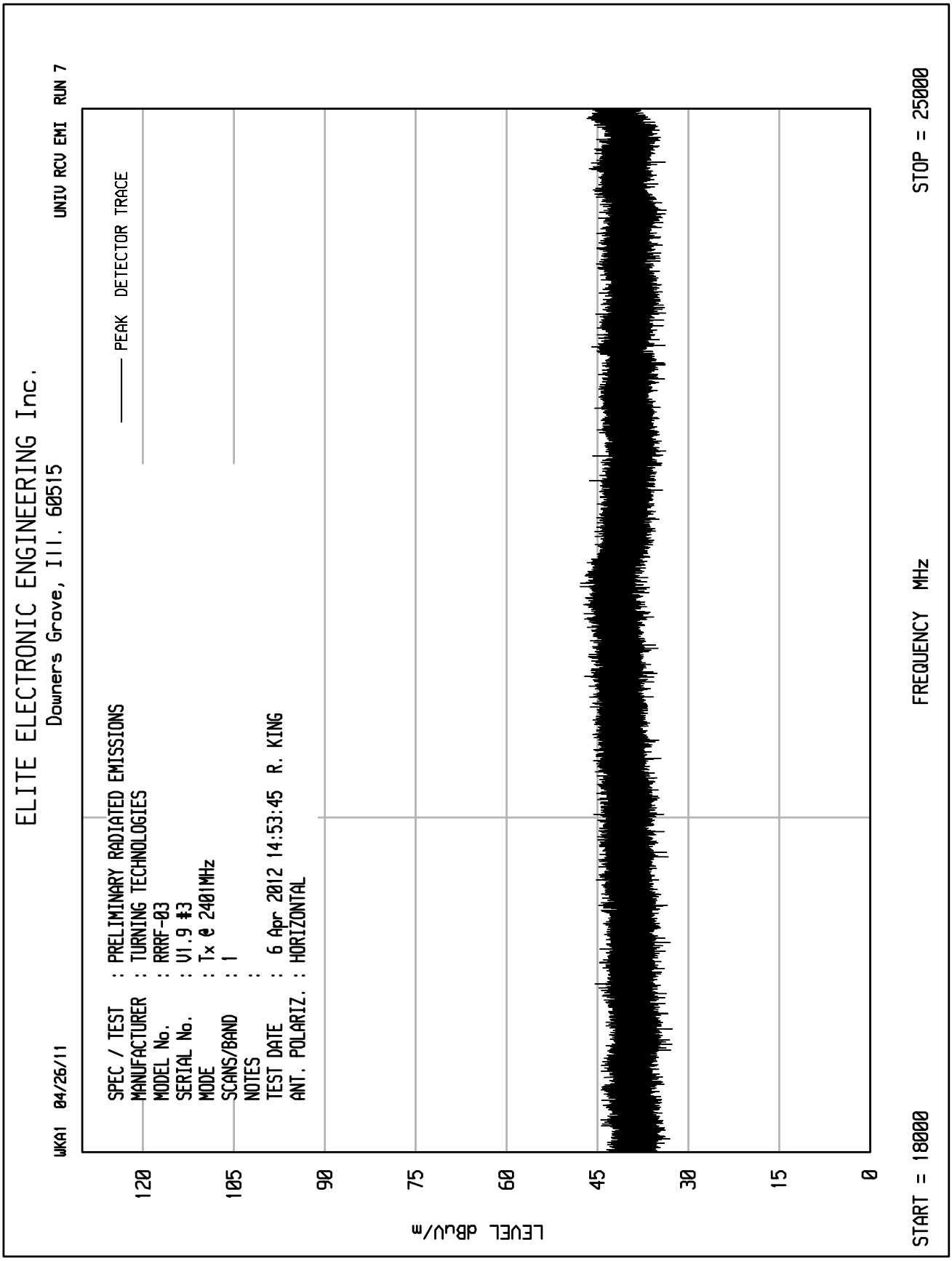

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 14
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECNOLOGIES LLC
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2401MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 5 Apr 2012 11:01:41 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

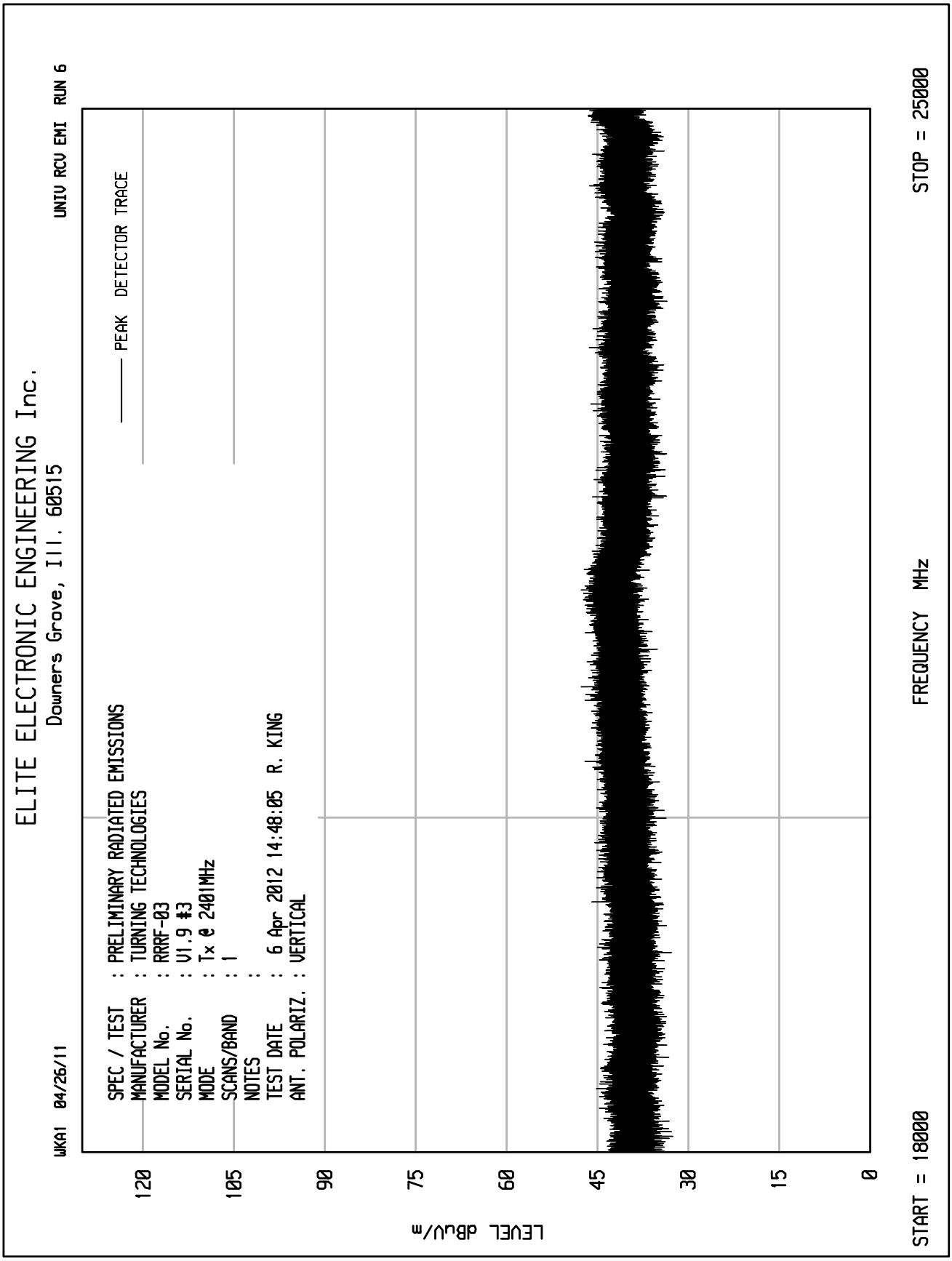

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 7
WKA1 04/26/11
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES LLC
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2401MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 4 Apr 2012 14:09:37 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 3000

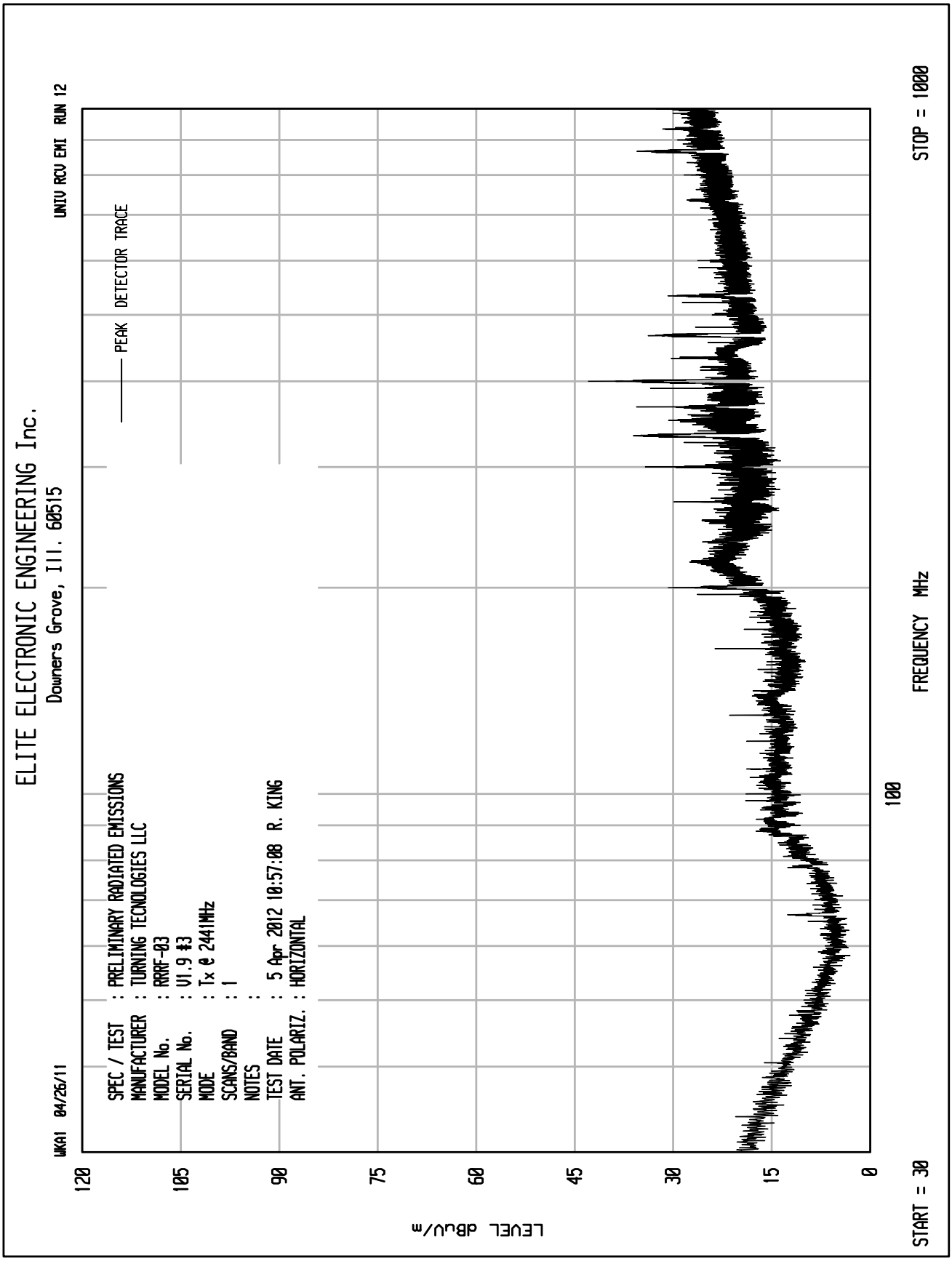

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 8
WKA1 04/26/11
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES LLC
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2401MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 4 Apr 2012 14:13:11 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 3000

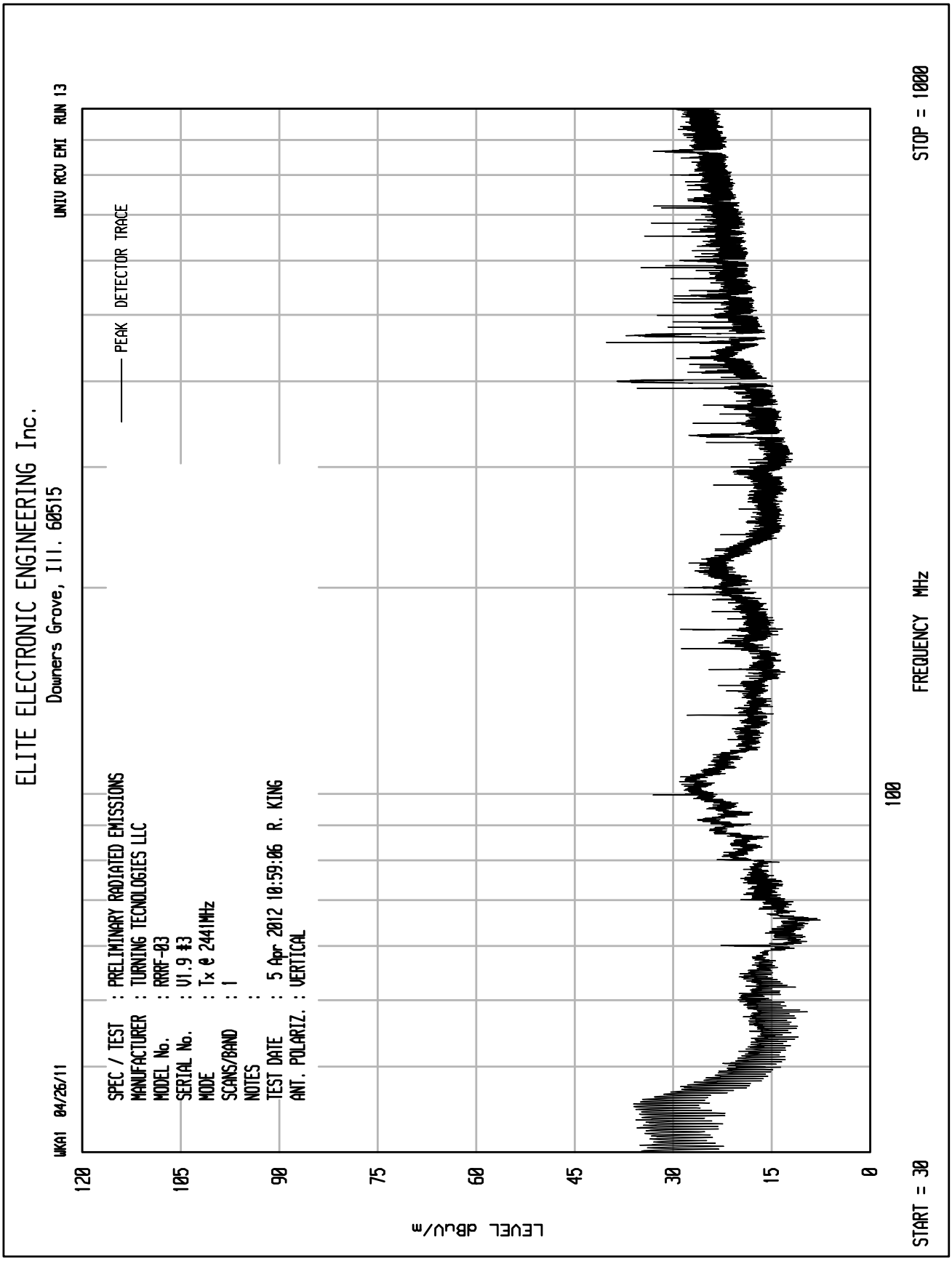

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 5
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2401MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 4 Apr 2012 13:30:01 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
10000
STOP = 18000
FREQUENCY MHz

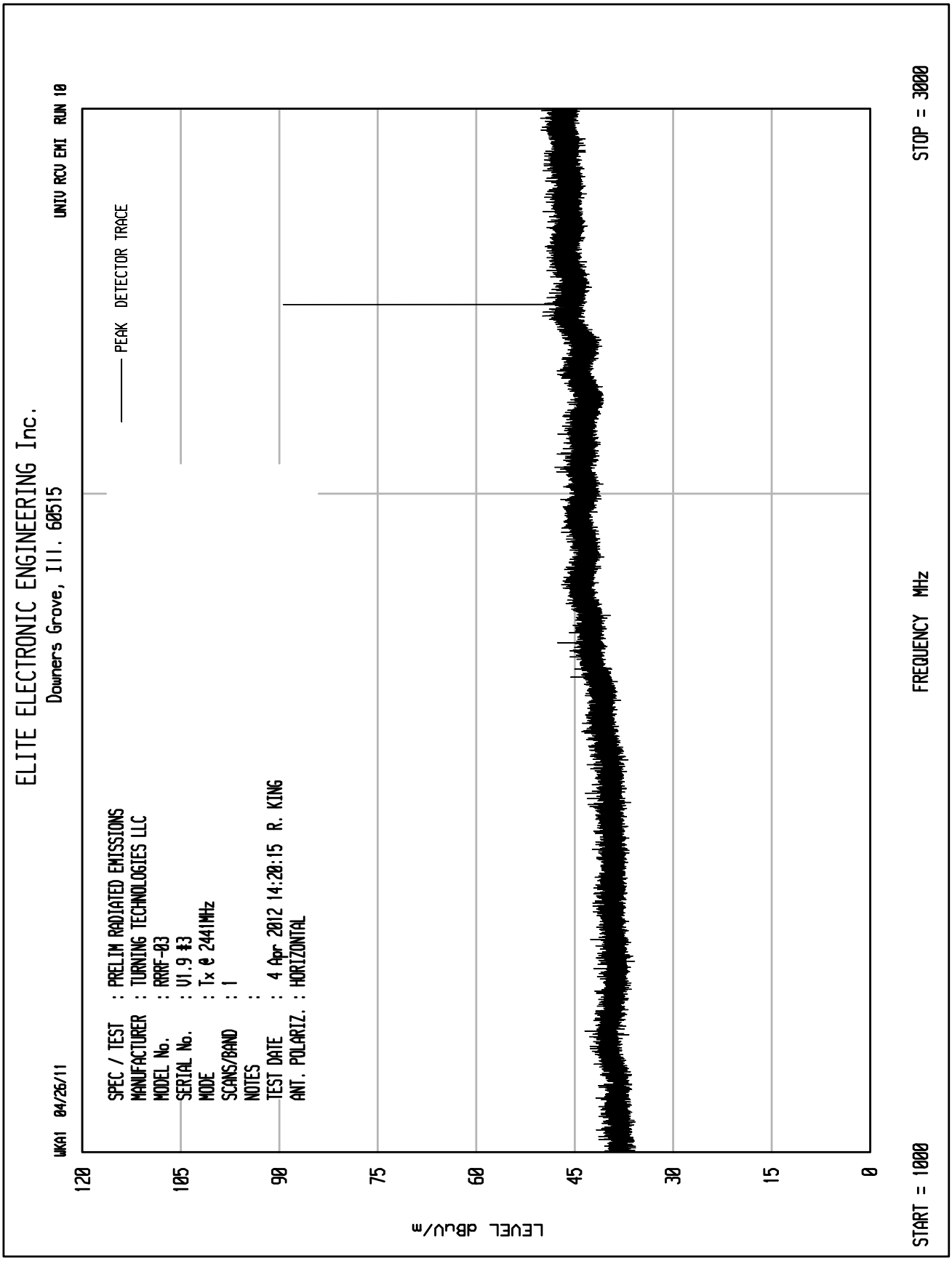

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 6
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2401MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 4 Apr 2012 13:36:01 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
10000
STOP = 18000
FREQUENCY MHz

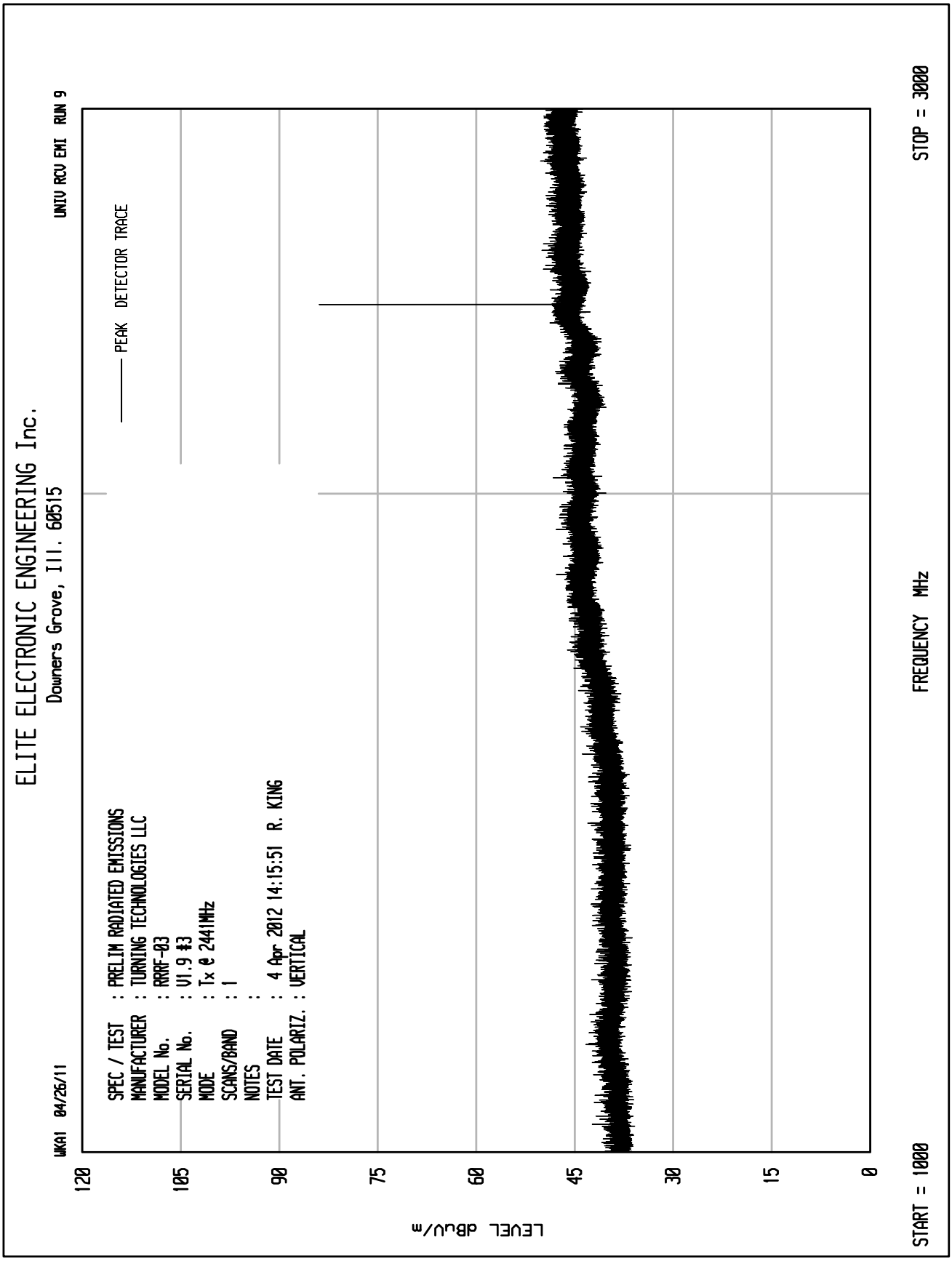

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 7
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2401MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 6 Apr 2012 14:53:45 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

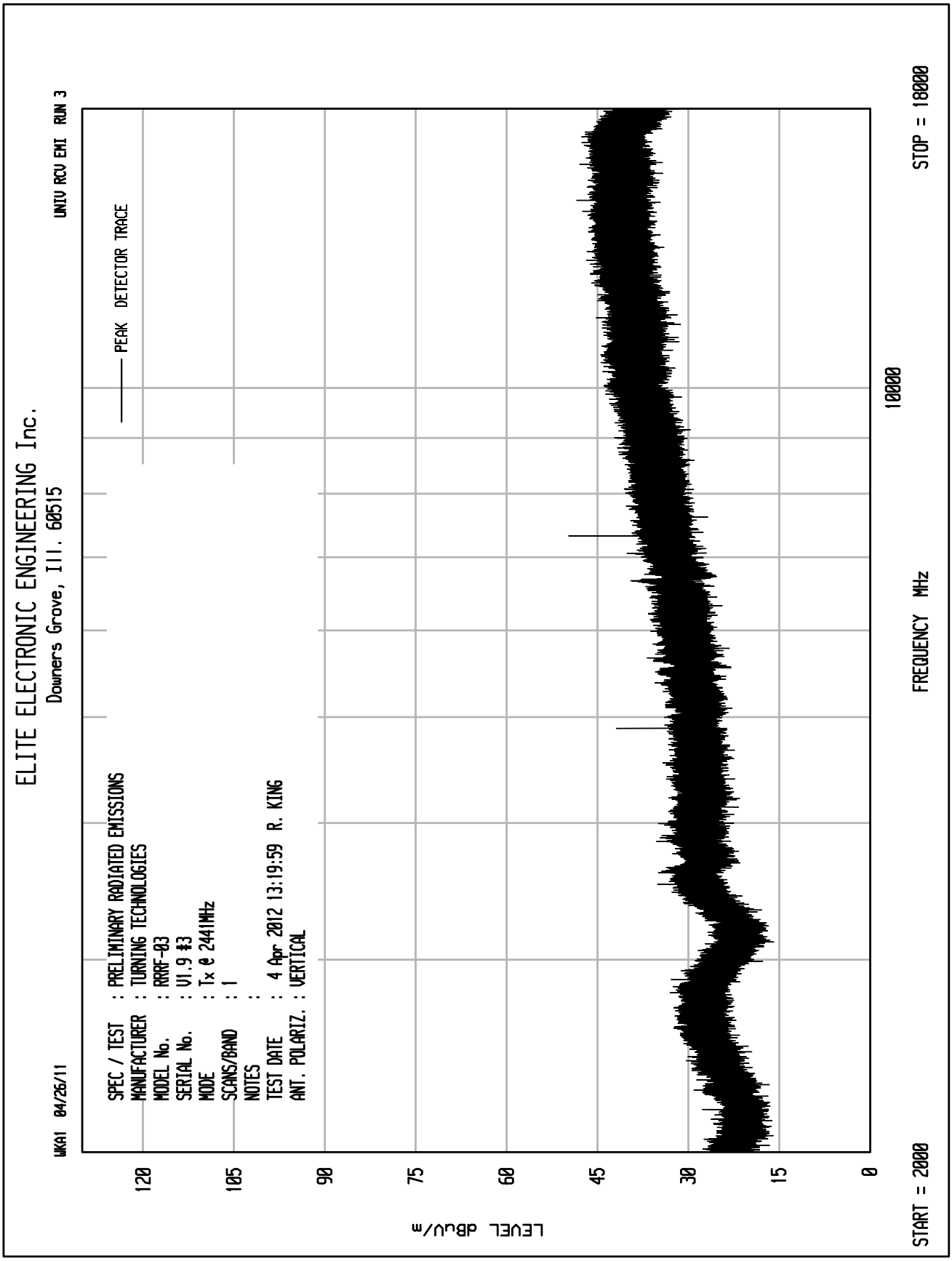

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 6
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2401MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 6 Apr 2012 14:48:05 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

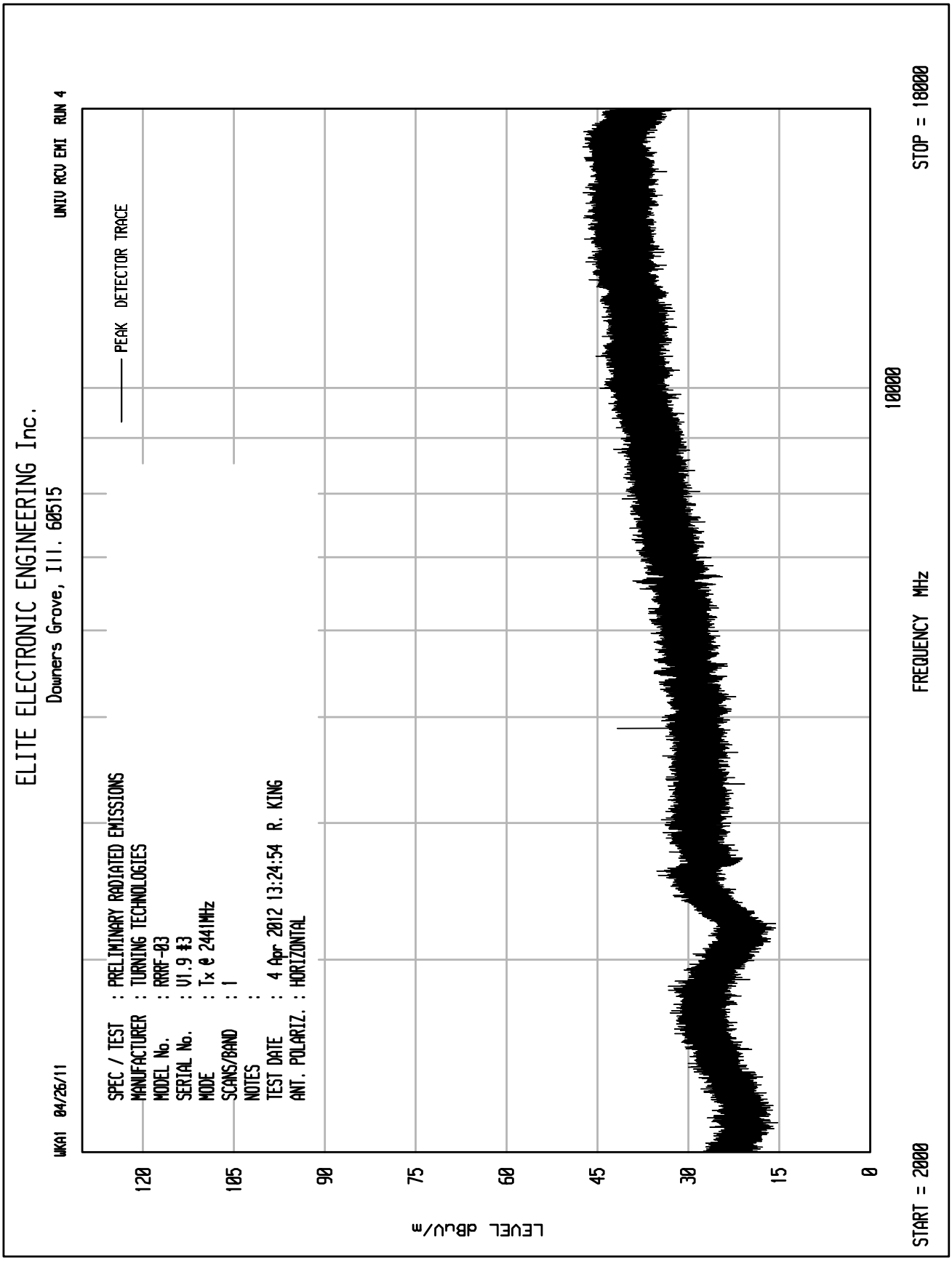

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 12
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECNOLOGIES LLC
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2441MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 5 Apr 2012 10:57:08 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

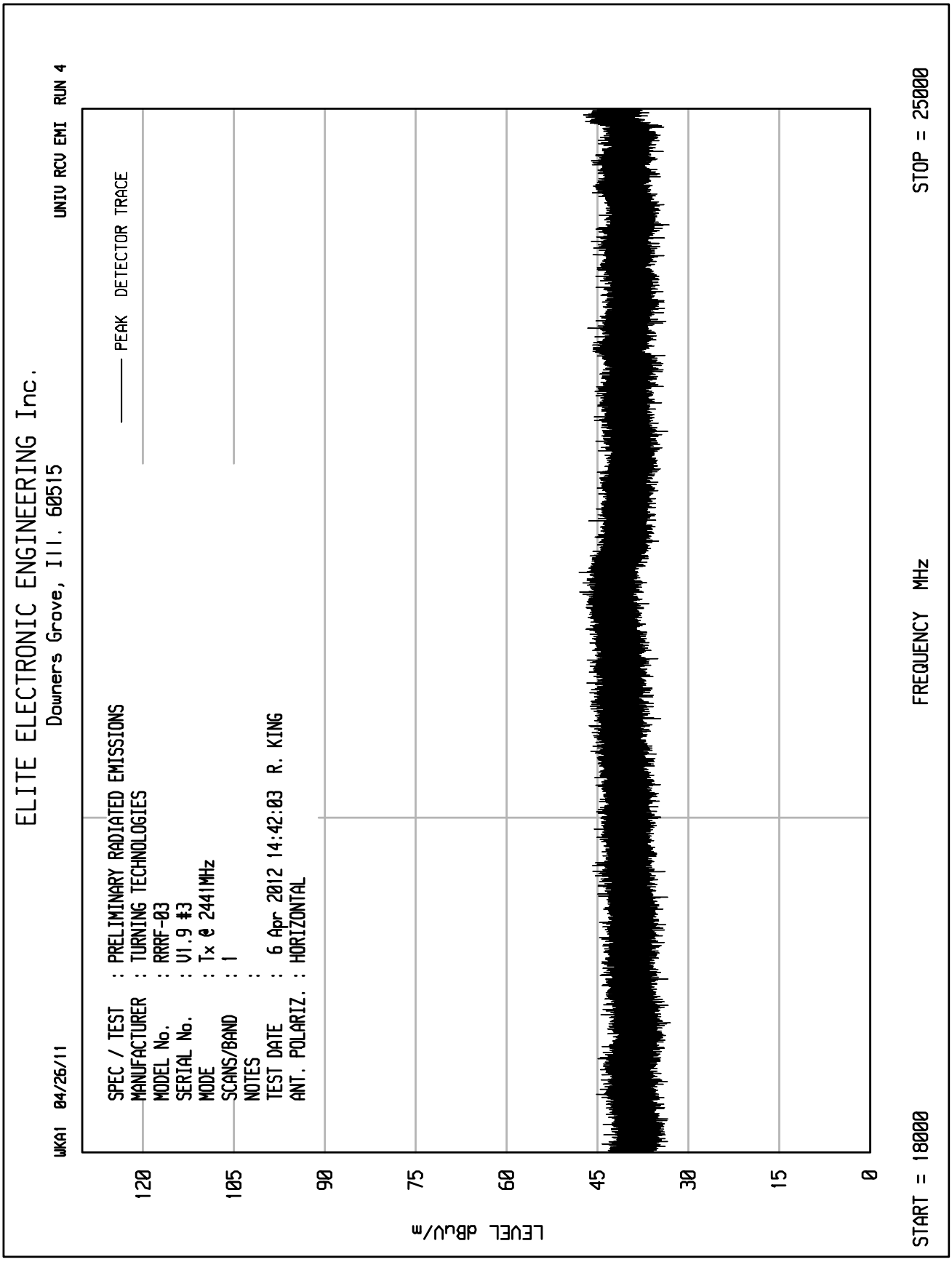

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 13
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECNOLOGIES LLC
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2441MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 5 Apr 2012 10:59:06 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

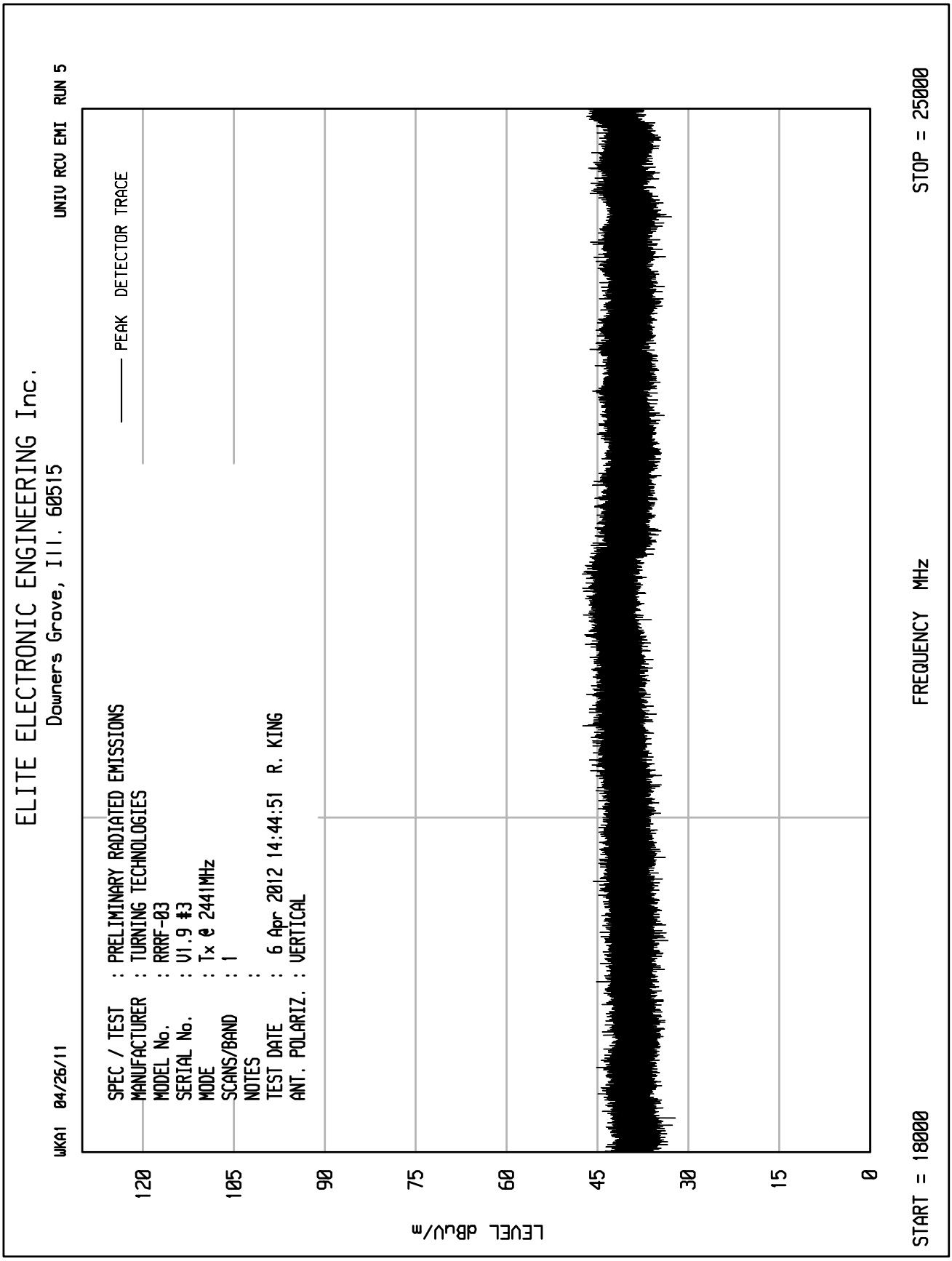

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 10
WKA1 04/26/11
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES LLC
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2441MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 4 Apr 2012 14:20:15 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 3000

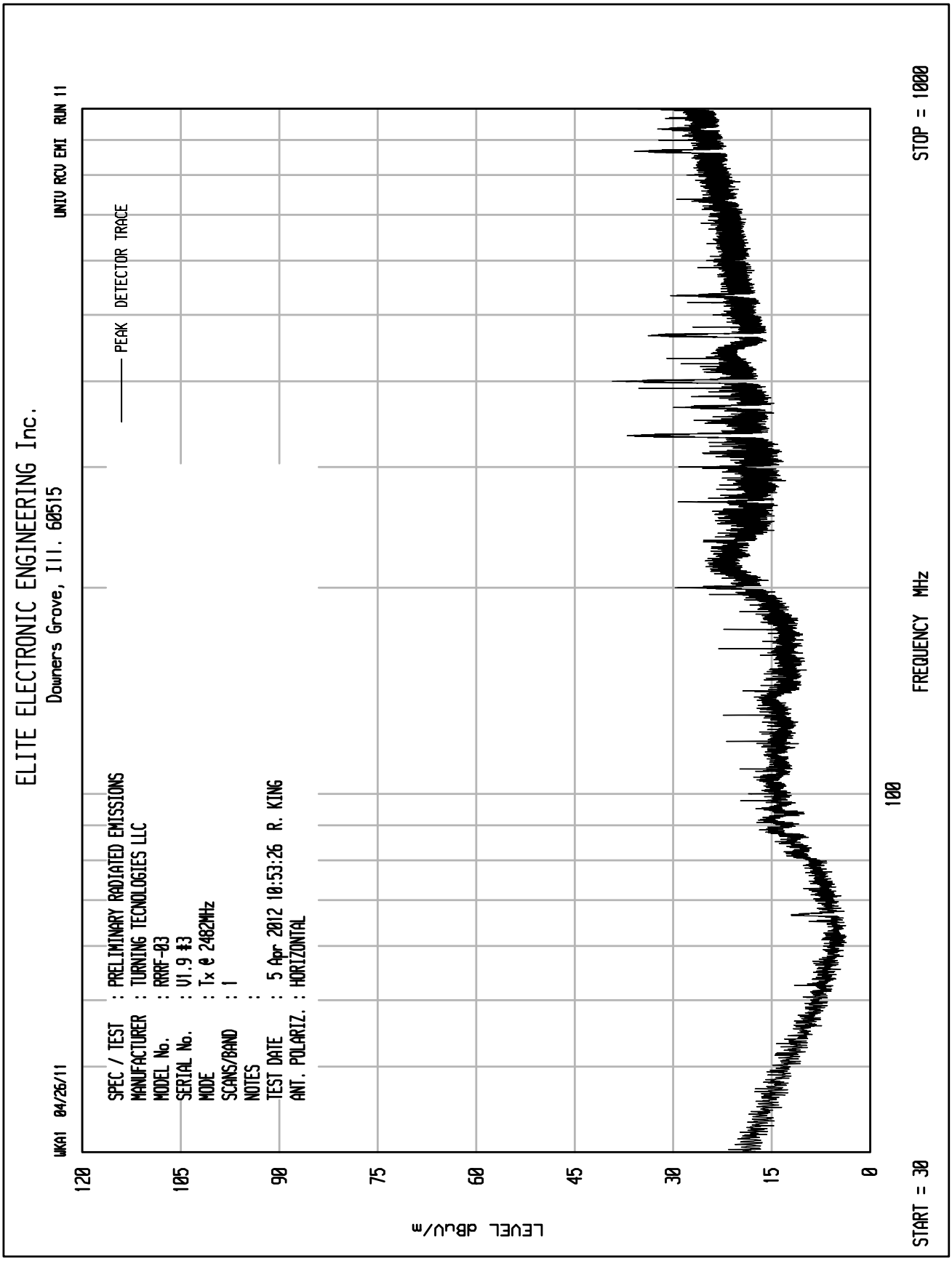

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 9
WKA1 04/26/11
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES LLC
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2441MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 4 Apr 2012 14:15:51 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 3000

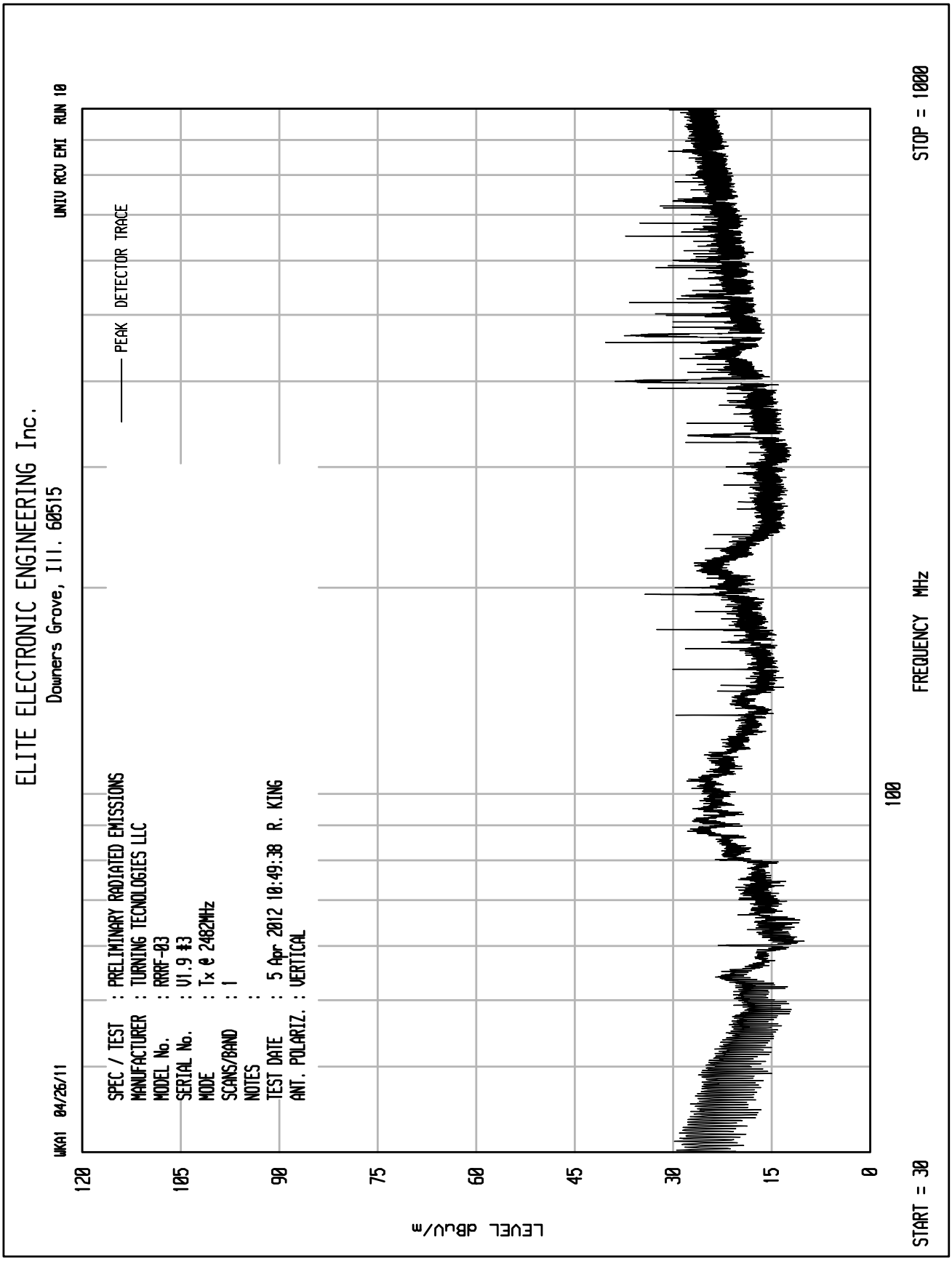

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 3
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2441MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 4 Apr 2012 13:19:59 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
10000
STOP = 18000
FREQUENCY MHz

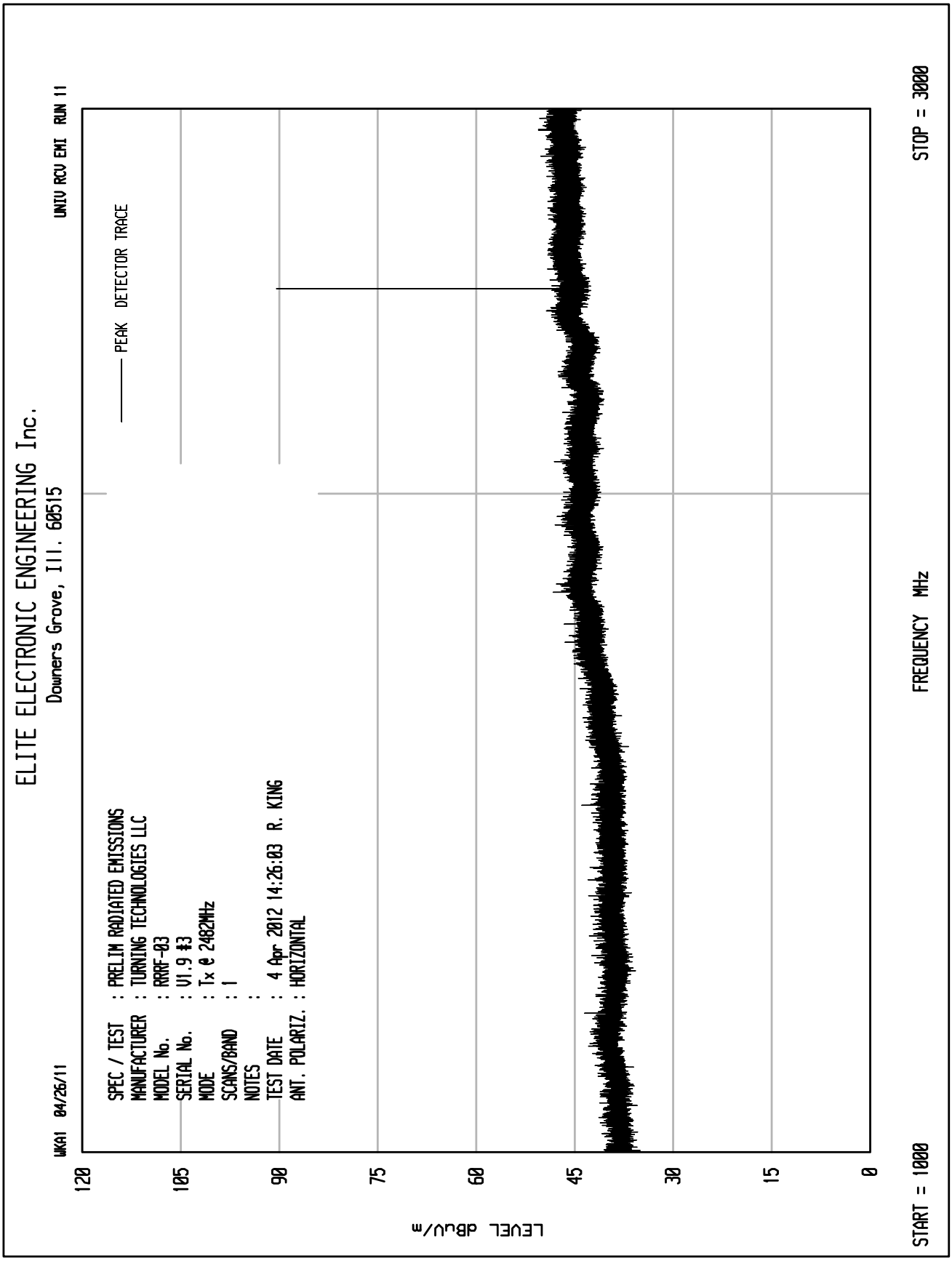

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 4
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2441MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 4 Apr 2012 13:24:54 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
10000
FREQUENCY MHz
STOP = 18000

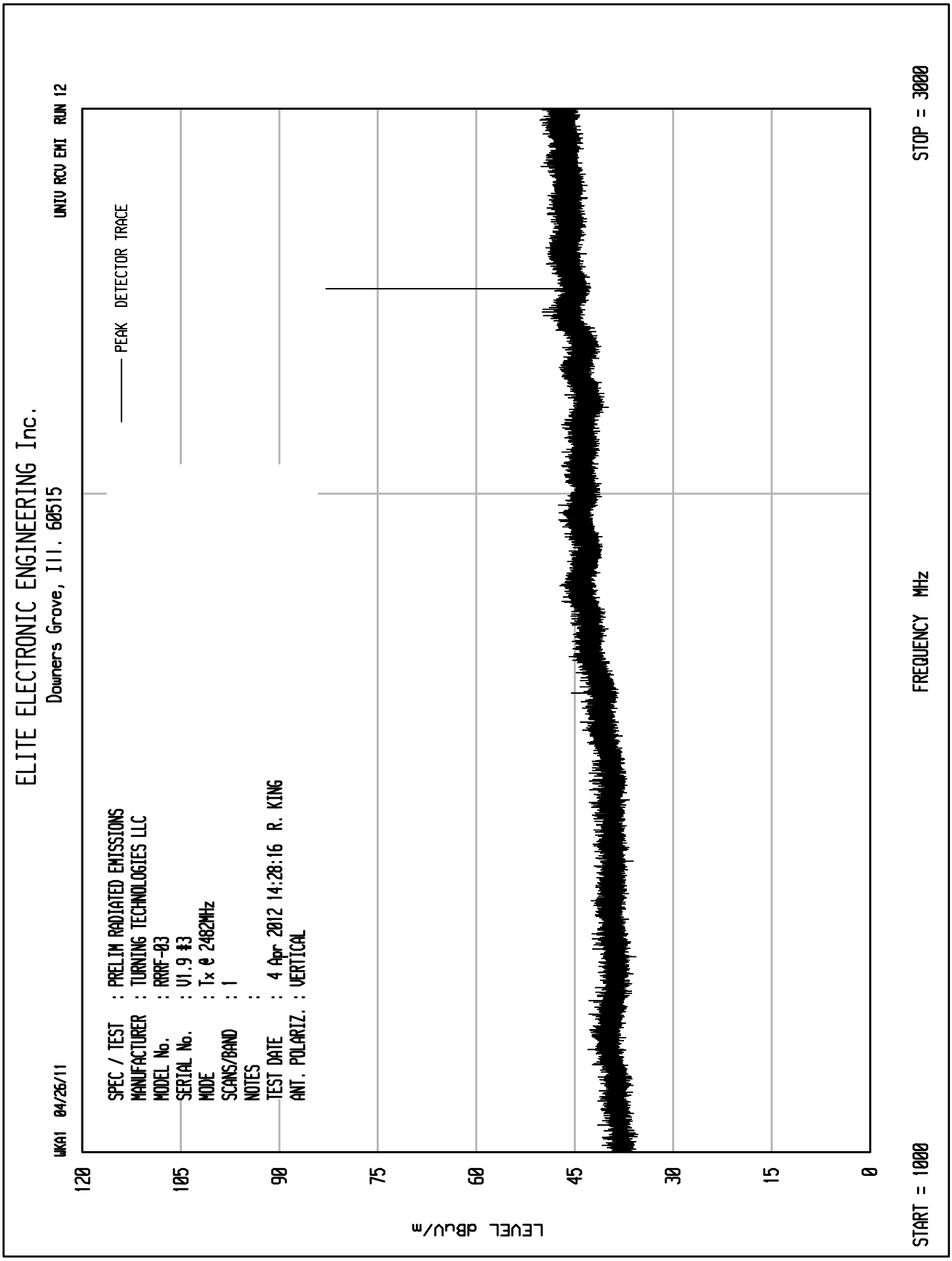

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 4
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2441MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 6 Apr 2012 14:42:03 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

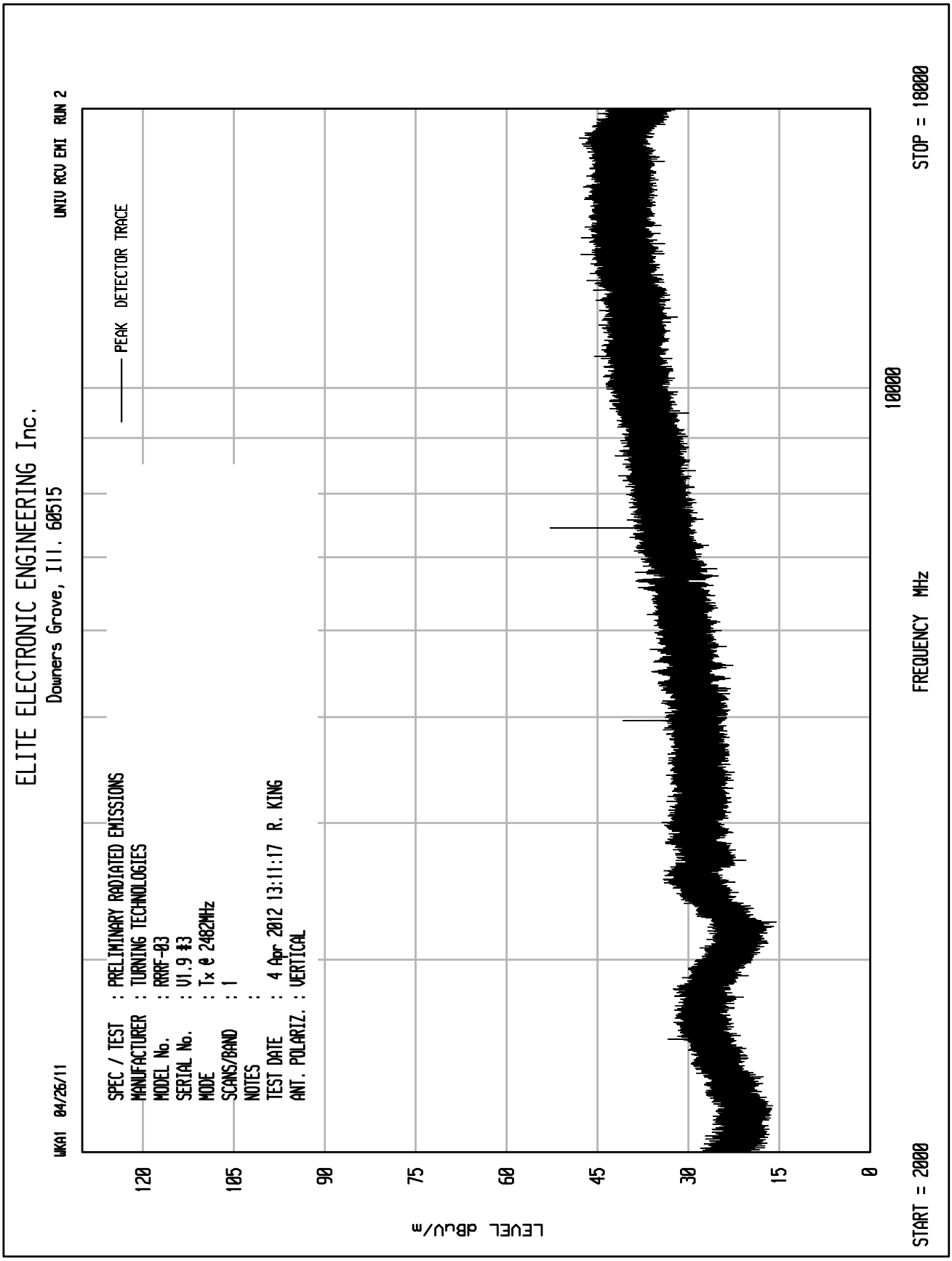

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 5
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2441MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 6 Apr 2012 14:44:51 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

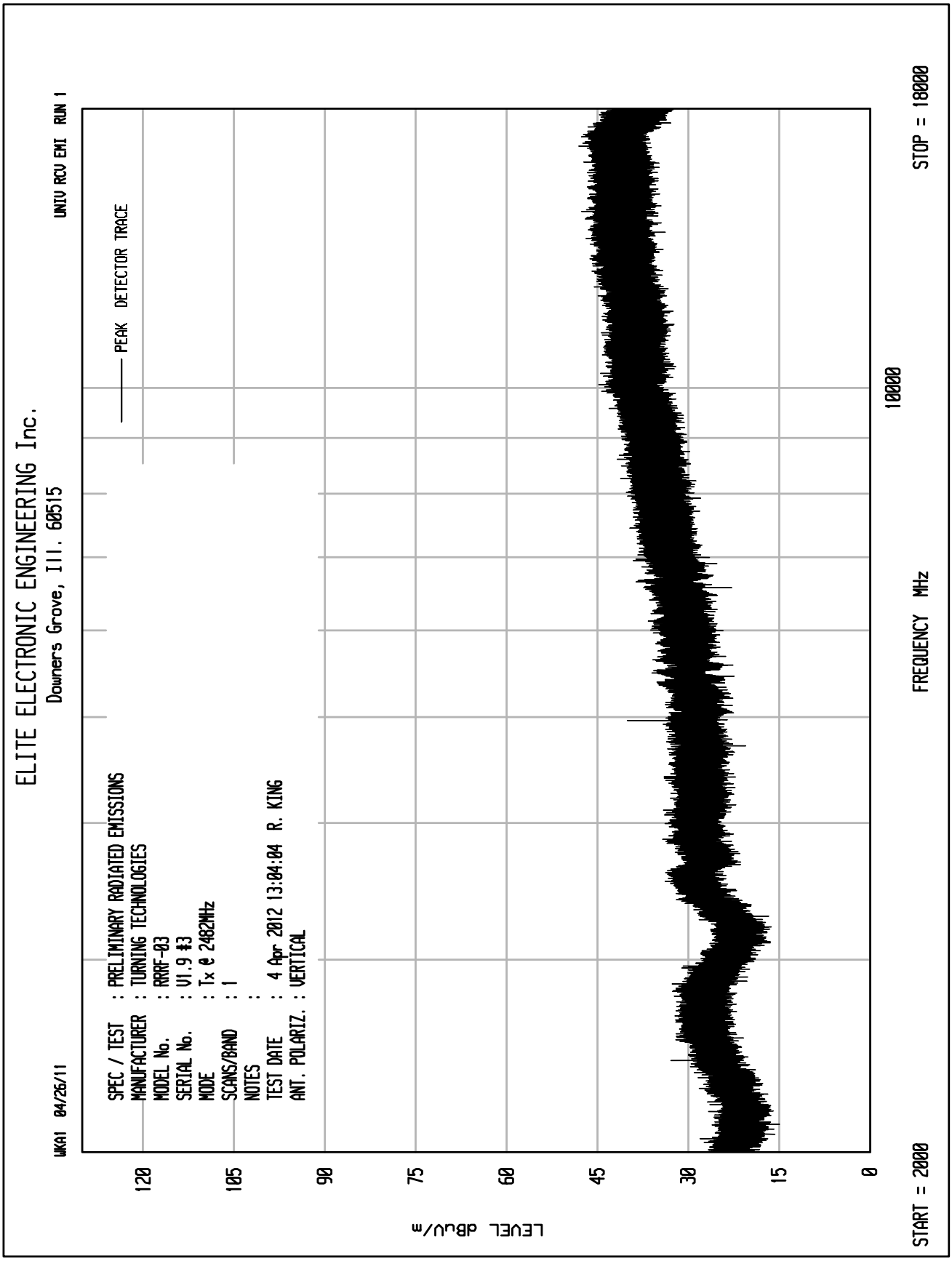

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 11
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECNOLOGIES LLC
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2402MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 5 Apr 2012 10:53:26 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

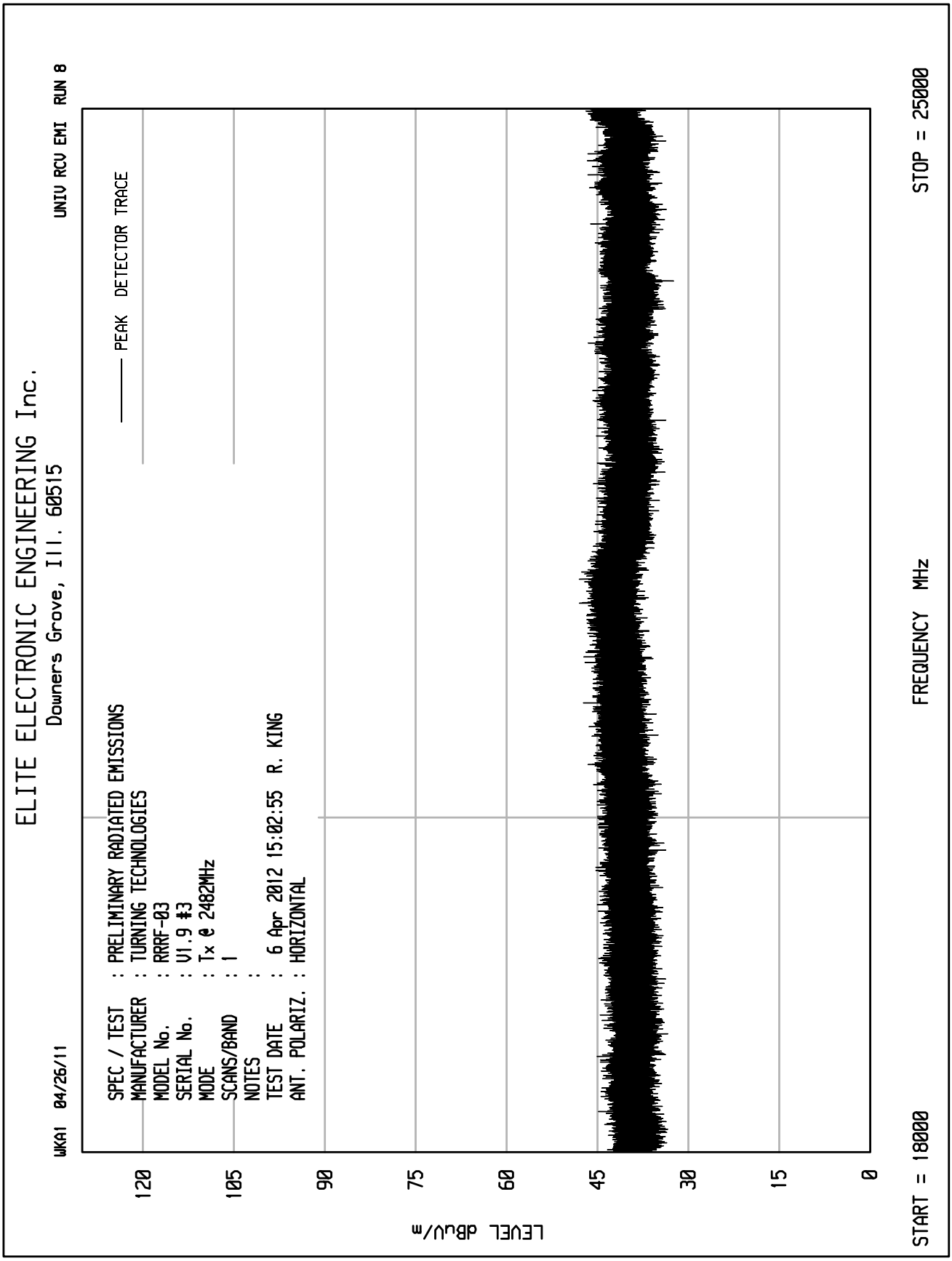

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 10
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECNOLOGIES LLC
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2402MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 5 Apr 2012 10:49:38 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000

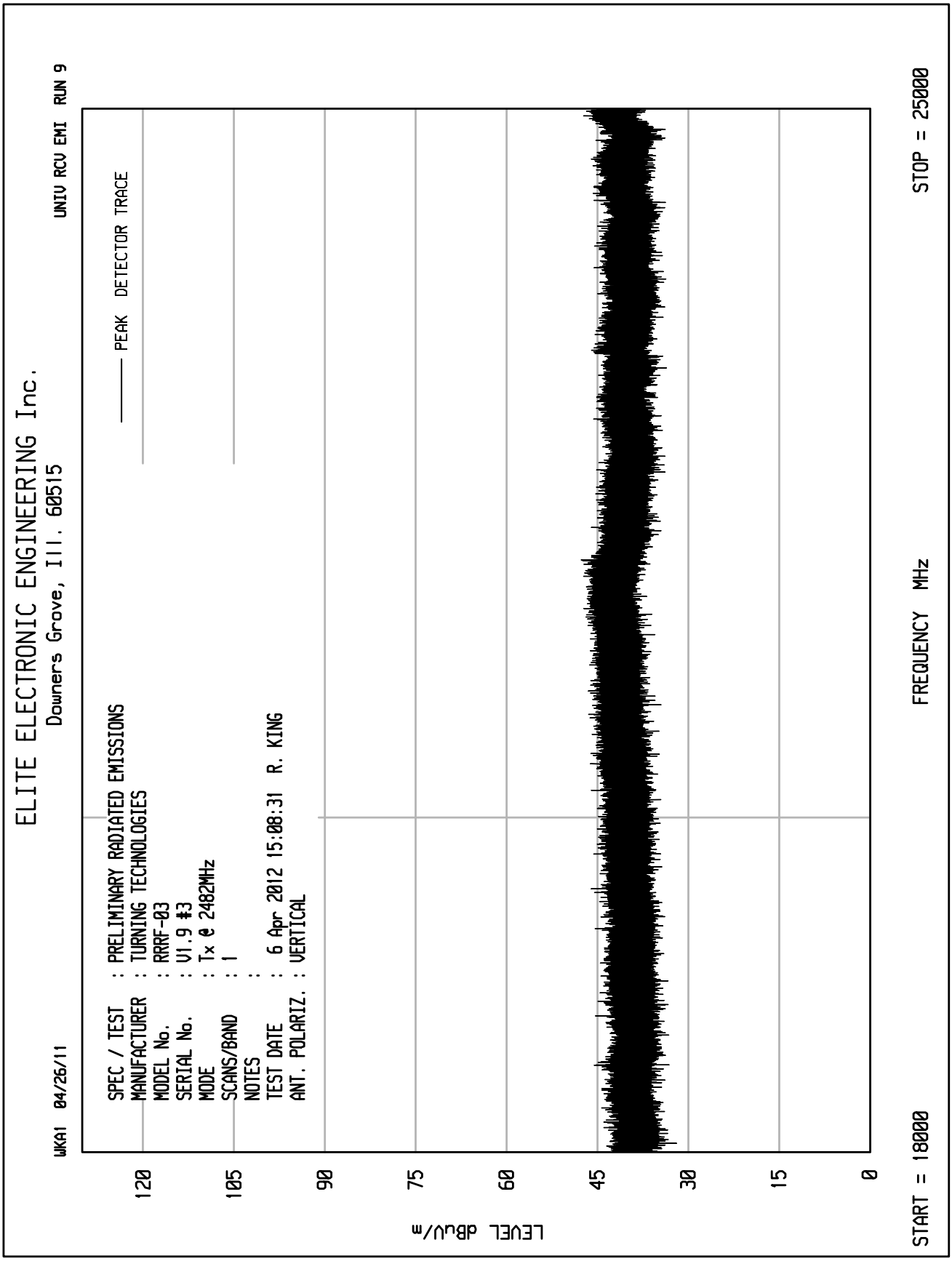

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 11
WKA1 04/26/11
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES LLC
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2402MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 4 Apr 2012 14:26:03 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 3000

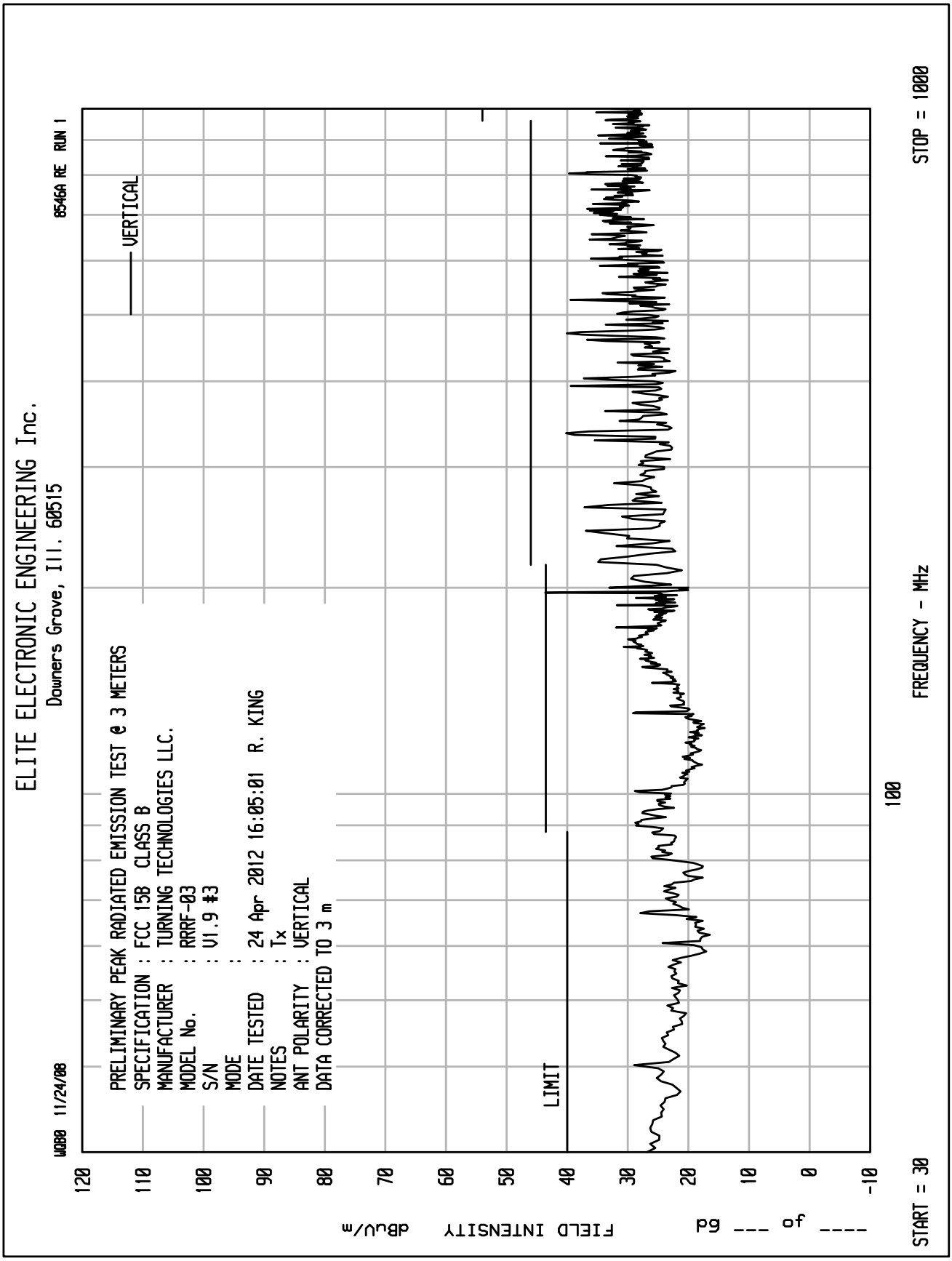

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 12
WKA1 04/26/11
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES LLC
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2402MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 4 Apr 2012 14:28:16 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 3000

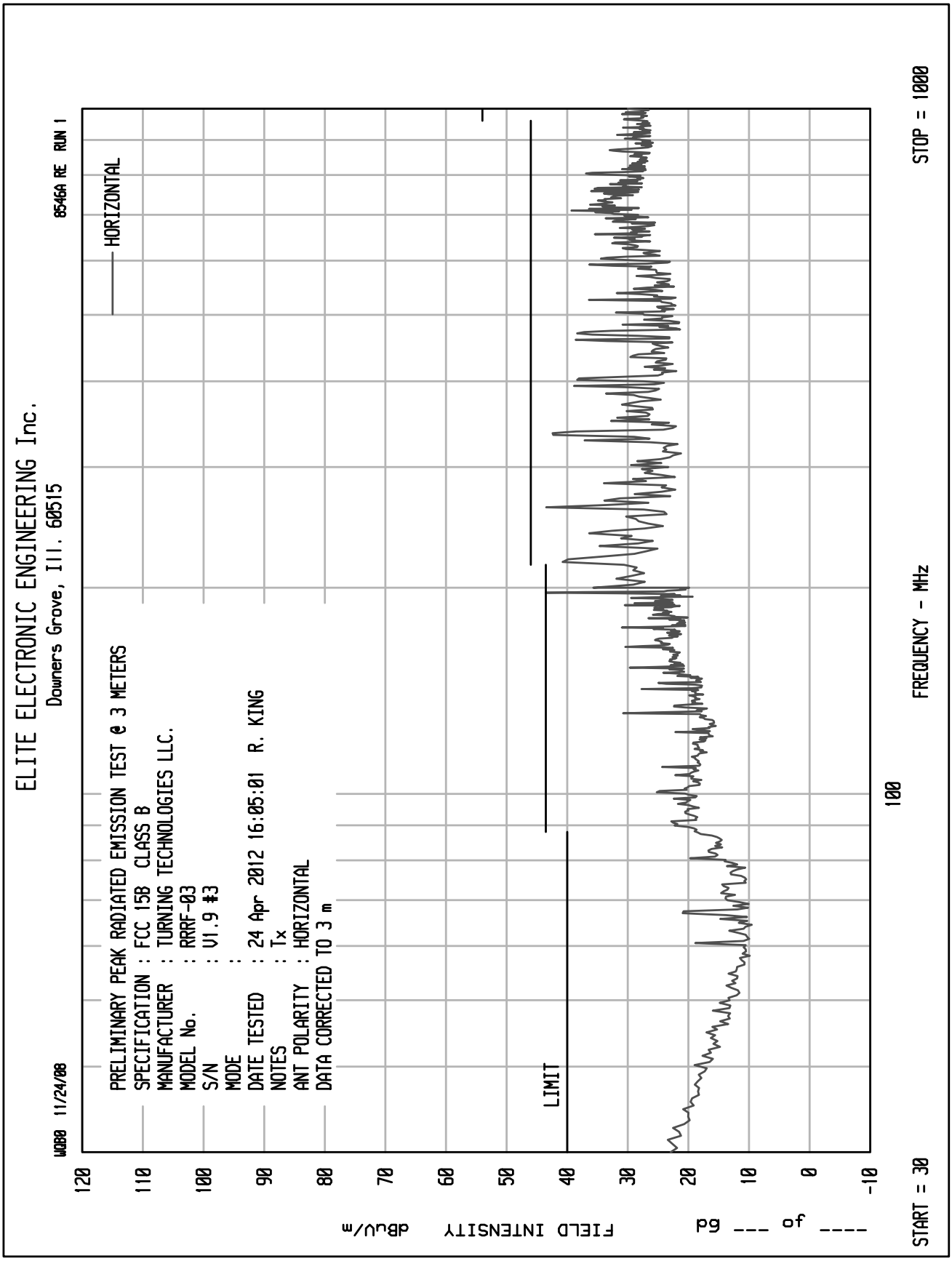

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 2
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2402MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 4 Apr 2012 13:11:17 R. KING
ANT. 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 1
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2402MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 4 Apr 2012 13:04:04 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
10000
FREQUENCY MHz
STOP = 18000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 04/26/11
UNIV RCV EMI RUN 8
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2482MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 6 Apr 2012 15:02:55 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 9
WKA1 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RRRF-03
SERIAL No. : V1.9 #3
MODE : Tx @ 2482MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 6 Apr 2012 15:08:31 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
8546A RE RUN 1
WOBO 11/24/08
PRELIMINARY PEAK RADIATED EMISSION TEST @ 3 METERS
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : TURNING TECHNOLOGIES LLC.
MODEL No. : RRRF-03
S/N : V1.9 #3
MODE :
DATE TESTED : 24 Apr 2012 16:05:01 R. KING
NOTES : Tx
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
FREQUENCY - MHz
STOP = 1000
pg ___ of ____


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
8546A RE RUN 1
WOBO 11/24/08
PRELIMINARY PEAK RADIATED EMISSION TEST @ 3 METERS
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : TURNING TECHNOLOGIES LLC.
MODEL No. : RRRF-03
S/N : V1.9 #3
MODE :
DATE TESTED : 24 Apr 2012 16:05:01 R. KING
NOTES : Tx
ANT POLARITY : HORIZONTAL
DATA CORRECTED TO 3 m
HORIZONTAL
LIMIT
FIELD INTENSITY dBuV/m
FREQUENCY - MHz
START = 30
100
STOP = 1000
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
dB ___ 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 : TURNING TECHNOLOGIES LLC.
MODEL NO. : RRRF-03
SERIAL NO. : V1.9 #3
TEST MODE :
NOTES : Tx
TEST DATE : 24 Apr 2012 16:05:01
TEST DISTANCE : 3 m (DATA EXTRAPOLATED TO 3 m)

FREQUENCY	QP READING	ANT FAC	CBL FAC	EXT ATTN	DIST FAC	TOTAL	QP LIMIT	AZ	ANT HT	POLAR
MHz	dBuV	dB	dB	dB	dB	dBuV/m	dBuV/m	deg	cm	
40.07	11.6	14.1	.5	0.0	0.0	26.1	40.0	315	120	V
66.48	15.3	6.5	.5	0.0	0.0	22.3	40.0	270	200	V
80.13	12.9	7.7	.5	0.0	0.0	21.2	40.0	315	120	V
100.03	17.0	11.2	.5	0.0	0.0	28.7	43.5	135	120	V
130.27	18.4	12.2	.7	0.0	0.0	31.3	43.5	90	200	H
162.85	16.8	10.6	.9	0.0	0.0	28.2	43.5	135	340	V
173.80	20.2	10.0	.9	0.0	0.0	31.1	43.5	315	340	V
195.42	28.1	10.4	1.0	0.0	0.0	39.5	43.5	270	200	V
260.57	30.1	13.3	1.0	0.0	0.0	43.4	46.0	225	120	H
466.90	20.0	17.4	1.5	0.0	0.0	38.9	46.0	225	120	V
521.13	17.6	18.4	1.5	0.0	0.0	37.5	46.0	180	120	V
586.27	12.8	19.4	1.5	0.0	0.0	33.7	46.0	45	200	H
716.58	8.0	20.6	1.8	0.0	0.0	30.4	46.0	135	120	H
800.10	5.4	21.4	2.0	0.0	0.0	28.8	46.0	-0	200	V
912.00	6.8	22.5	2.0	0.0	0.0	31.3	46.0	180	120	V

Checked BY Richard E. King :

Richard E. King

Manufacturer : Turning Technologies, LLC.
Test Item : USB Dongle Transceiver
Model No. : RRRF-03
Serial No. : V1.9 #3
Mode : Transmit at 2401MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : April 6, 2012
Test Distance : 3 meters
Note : Peak readings

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL FAC (dB)	Ant Fac (dB)	Pre Amp (dB)	Total dBuV/m at 3 m	Total uV/m at 3m	Limit uV/m at 3m	Margin (dB)
2401.00	H	58.9	3.4	31.3	0.0	93.6	47942.9	500000.0	-20.4
2401.00	V	64.7	3.4	31.3	0.0	99.4	93051.7	500000.0	-14.6
4802.00	H	49.0	4.9	34.8	-40.1	48.7	271.3	5000.0	-25.3
4802.00	V	48.9	4.9	34.8	-40.1	48.5	267.5	5000.0	-25.4
7203.00	H	49.8	6.1	38.1	-39.8	54.2	513.8	5000.0	-19.8
7203.00	V	45.5	6.1	38.1	-39.8	49.9	314.3	5000.0	-24.0
9604.00	H	44.1	6.8	39.6	-38.8	51.8	387.8	5000.0	-22.2
9604.00	V	46.6	6.8	39.6	-38.8	54.2	515.4	5000.0	-19.7
12005.00	H	44.5	8.0	41.4	-39.6	54.3	518.0	5000.0	-19.7
12005.00	V	46.1	8.0	41.4	-39.6	55.8	618.5	5000.0	-18.2
14406.00	H	46.3	8.7	43.6	-39.9	58.8	869.6	5000.0	-15.2
14406.00	V	44.7	8.7	43.6	-39.9	57.1	717.5	5000.0	-16.9
16807.00	H	46.2	9.4	44.8	-38.8	61.6	1201.4	5000.0	-12.4
16807.00	V	44.4	9.4	44.8	-38.8	59.8	975.4	5000.0	-14.2
19208.00	H	35.7	1.6	40.4	-27.5	50.2	325.1	5000.0	-23.7
19208.00	V	35.2	1.6	40.4	-27.5	49.7	306.9	5000.0	-24.2
21609.00	H	36.0	1.6	40.6	-26.1	52.1	401.6	5000.0	-21.9
21609.00	V	37.1	1.6	40.6	-26.1	53.2	455.9	5000.0	-20.8
24010.00	H	36.8	1.7	40.6	-27.4	51.7	384.5	5000.0	-22.3
24010.00	V	36.8	1.7	40.6	-27.4	51.7	384.5	5000.0	-22.3

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp

Checked BY Richard E. King :

Richard E. King

Manufacturer : Turning Technologies, LLC.
Test Item : USB Dongle Transceiver
Model No. : RRRF-03
Serial No. : V1.9 #3
Mode : Transmit at 2401MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : April 6, 2012
Test Distance : 3 meters
Note : Average readings

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL FAC (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Total dBuV/m at 3 m	Total uV/m at 3m	Limit uV/m at 3m	Margin (dB)
2401.0	H	58.9	3.4	31.3	0.0	-37.8	55.8	617.6	50000.0	-38.2
2401.0	V	64.7	3.4	31.3	0.0	-37.8	61.6	1198.7	50000.0	-32.4
4802.0	H	49.0	4.9	34.8	-40.1	-37.8	10.9	3.5	500.0	-43.1
4802.0	V	48.9	4.9	34.8	-40.1	-37.8	10.7	3.4	500.0	-43.2
7203.0	H	49.8	6.1	38.1	-39.8	-37.8	16.4	6.6	500.0	-37.6
7203.0	V	45.5	6.1	38.1	-39.8	-37.8	12.1	4.0	500.0	-41.8
9604.0	H	44.1	6.8	39.6	-38.8	-37.8	14.0	5.0	500.0	-40.0
9604.0	V	46.6	6.8	39.6	-38.8	-37.8	16.4	6.6	500.0	-37.5
12005.0	H	44.5	8.0	41.4	-39.6	-37.8	16.5	6.7	500.0	-37.5
12005.0	V	46.1	8.0	41.4	-39.6	-37.8	18.0	8.0	500.0	-36.0
14406.0	H	46.3	8.7	43.6	-39.9	-37.8	21.0	11.2	500.0	-33.0
14406.0	V	44.7	8.7	43.6	-39.9	-37.8	19.3	9.2	500.0	-34.7
16807.0	H	46.2	9.4	44.8	-38.8	-37.8	23.8	15.5	500.0	-30.2
16807.0	V	44.4	9.4	44.8	-38.8	-37.8	22.0	12.6	500.0	-32.0
19208.0	H	35.7	1.6	40.4	-27.5	-37.8	12.4	4.2	500.0	-41.5
19208.0	V	35.2	1.6	40.4	-27.5	-37.8	11.9	4.0	500.0	-42.0
21609.0	H	36.0	1.6	40.6	-26.1	-37.8	14.3	5.2	500.0	-39.7
21609.0	V	37.1	1.6	40.6	-26.1	-37.8	15.4	5.9	500.0	-38.6
24010.0	H	36.8	1.7	40.6	-27.4	-37.8	13.9	5.0	500.0	-40.1
24010.0	V	36.8	1.7	40.6	-27.4	-37.8	13.9	5.0	500.0	-40.1

Amb = Ambient

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp + Duty Cycle

Checked BY Richard E. King :

Richard E. King

Manufacturer : Turning Technologies, LLC.
Test Item : USB Dongle Transceiver
Model No. : RRRF-03
Serial No. : V1.9 #3
Mode : Transmit at 2441MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : April 6, 2012
Test Distance : 3 meters
Note : Peak readings

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL FAC (dB)	Ant Fac (dB)	Pre Amp (dB)	Total dBuV/m at 3 m	Total uV/m at 3m	Limit uV/m at 3m	Margin (dB)
2441.00	H	64.3	3.4	31.3	0.0	99.1	89921.0	500000.0	-14.9
2441.00	V	67.0	3.4	31.3	0.0	101.7	122281.6	500000.0	-12.2
4882.00	H	50.4	4.9	34.9	-40.1	50.1	318.7	5000.0	-23.9
4882.00	V	50.1	4.9	34.9	-40.1	49.8	309.6	5000.0	-24.2
7323.00	H	50.4	6.2	38.2	-39.7	55.0	560.9	5000.0	-19.0
7323.00	V	45.9	6.2	38.2	-39.7	50.5	335.7	5000.0	-23.5
9764.00	H	45.4	6.9	39.8	-38.7	53.3	463.3	5000.0	-20.7
9764.00	V	45.4	6.9	39.8	-38.7	53.3	463.3	5000.0	-20.7
12205.00	H	44.8	8.0	41.5	-39.4	54.8	550.1	5000.0	-19.2
12205.00	V	40.3	8.0	41.5	-39.4	50.4	329.6	5000.0	-23.6
14646.00	H	44.6	8.8	44.1	-40.1	57.5	749.8	5000.0	-16.5
14646.00	V	45.8	8.8	44.1	-40.1	58.6	855.9	5000.0	-15.3
17087.00	H	46.3	9.5	44.7	-38.7	61.9	1240.1	5000.0	-12.1
17087.00	V	44.1	9.5	44.7	-38.7	59.7	962.7	5000.0	-14.3
19528.00	H	35.7	1.6	40.4	-27.2	50.6	337.8	5000.0	-23.4
19528.00	V	35.2	1.6	40.4	-27.2	50.1	318.9	5000.0	-23.9
21969.00	H	36.0	1.6	40.6	-26.9	51.3	367.1	5000.0	-22.7
21969.00	V	37.1	1.6	40.6	-26.9	52.4	416.7	5000.0	-21.6
24410.00	H	36.8	1.7	40.6	-27.5	51.6	381.5	5000.0	-22.3
24410.00	V	36.8	1.7	40.6	-27.5	51.6	381.5	5000.0	-22.3

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp

Checked BY Richard E. King :

Richard E. King

Manufacturer : Turning Technologies, LLC.
Test Item : USB Dongle Transceiver
Model No. : RRRF-03
Serial No. : V1.9 #3
Mode : Transmit at 2441MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : April 6, 2012
Test Distance : 3 meters
Note : Average readings

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL FAC (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Total dBuV/m at 3 m	Total uV/m at 3m	Limit uV/m at 3m	Margin (dB)
2441.0	H	64.3	3.4	31.3	0.0	-37.8	61.3	1158.4	50000.0	-32.7
2441.0	V	67.0	3.4	31.3	0.0	-37.8	63.9	1575.3	50000.0	-30.0
4882.0	H	50.4	4.9	34.9	-40.1	-37.8	12.3	4.1	500.0	-41.7
4882.0	V	50.1	4.9	34.9	-40.1	-37.8	12.0	4.0	500.0	-42.0
7323.0	H	50.4	6.2	38.2	-39.7	-37.8	17.2	7.2	500.0	-36.8
7323.0	V	45.9	6.2	38.2	-39.7	-37.8	12.7	4.3	500.0	-41.3
9764.0	H	45.4	6.9	39.8	-38.7	-37.8	15.5	6.0	500.0	-38.5
9764.0	V	45.4	6.9	39.8	-38.7	-37.8	15.5	6.0	500.0	-38.5
12205.0	H	44.8	8.0	41.5	-39.4	-37.8	17.0	7.1	500.0	-37.0
12205.0	V	40.3	8.0	41.5	-39.4	-37.8	12.6	4.2	500.0	-41.4
14646.0	H	44.6	8.8	44.1	-40.1	-37.8	19.7	9.7	500.0	-34.3
14646.0	V	45.8	8.8	44.1	-40.1	-37.8	20.8	11.0	500.0	-33.1
17087.0	H	46.3	9.5	44.7	-38.7	-37.8	24.1	16.0	500.0	-29.9
17087.0	V	44.1	9.5	44.7	-38.7	-37.8	21.9	12.4	500.0	-32.1
19528.0	H	35.7	1.6	40.4	-27.2	-37.8	12.8	4.4	500.0	-41.2
19528.0	V	35.2	1.6	40.4	-27.2	-37.8	12.3	4.1	500.0	-41.7
21969.0	H	36.0	1.6	40.6	-26.9	-37.8	13.5	4.7	500.0	-40.5
21969.0	V	37.1	1.6	40.6	-26.9	-37.8	14.6	5.4	500.0	-39.4
24410.0	H	36.8	1.7	40.6	-27.5	-37.8	13.8	4.9	500.0	-40.1
24410.0	V	36.8	1.7	40.6	-27.5	-37.8	13.8	4.9	500.0	-40.1

Amb = Ambient

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp + Duty Cycle

Checked BY Richard E. King :

Richard E. King

Manufacturer : Turning Technologies, LLC.
Test Item : USB Dongle Transceiver
Model No. : RRRF-03
Serial No. : V1.9 #3
Mode : Transmit at 2482MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : April 6, 2012
Test Distance : 3 meters
Note : Peak readings

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL FAC (dB)	Ant Fac (dB)	Pre Amp (dB)	Total dBuV/m at 3 m	Total uV/m at 3m	Limit uV/m at 3m	Margin (dB)
2482.00	H	63.8	3.5	31.4	0.0	98.6	85413.7	500000.0	-15.3
2482.00	V	67.4	3.5	31.4	0.0	102.3	129576.9	500000.0	-11.7
4964.00	H	49.8	5.0	34.9	-40.2	49.5	297.8	5000.0	-24.5
4964.00	V	49.1	5.0	34.9	-40.2	48.8	276.9	5000.0	-25.1
7446.00	H	52.1	6.2	38.2	-39.7	56.8	690.4	5000.0	-17.2
7446.00	V	49.6	6.2	38.2	-39.7	54.3	521.3	5000.0	-19.6
9928.00	H	44.7	7.0	39.9	-38.6	52.9	443.2	5000.0	-21.0
9928.00	V	45.4	7.0	39.9	-38.6	53.6	480.4	5000.0	-20.3
12410.00	H	45.6	8.0	41.5	-39.2	55.9	625.4	5000.0	-18.1
12410.00	V	41.5	8.0	41.5	-39.2	51.8	388.3	5000.0	-22.2
14892.00	H	45.2	8.9	44.6	-40.3	58.5	838.9	5000.0	-15.5
14892.00	V	45.2	8.9	44.6	-40.3	58.5	838.9	5000.0	-15.5
17374.00	H	45.1	9.7	44.6	-39.0	60.4	1044.6	5000.0	-13.6
17374.00	V	45.5	9.7	44.6	-39.0	60.8	1097.6	5000.0	-13.2
19856.00	H	35.7	1.6	40.4	-26.8	50.9	350.4	5000.0	-23.1
19856.00	V	35.2	1.6	40.4	-26.8	50.4	330.8	5000.0	-23.6
22338.00	H	36.0	1.7	40.6	-27.1	51.2	362.1	5000.0	-22.8
22338.00	V	37.1	1.7	40.6	-27.1	52.3	410.9	5000.0	-21.7
24820.00	H	36.8	1.7	40.7	-27.2	51.9	394.8	5000.0	-22.1
24820.00	V	36.8	1.7	40.7	-27.2	51.9	394.8	5000.0	-22.1

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp

Checked BY Richard E. King :

Richard E. King

Manufacturer : Turning Technologies, LLC.
Test Item : USB Dongle Transceiver
Model No. : RRRF-03
Serial No. : V1.9 #3
Mode : Transmit at 2482MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : April 6, 2012
Test Distance : 3 meters
Note : Average readings

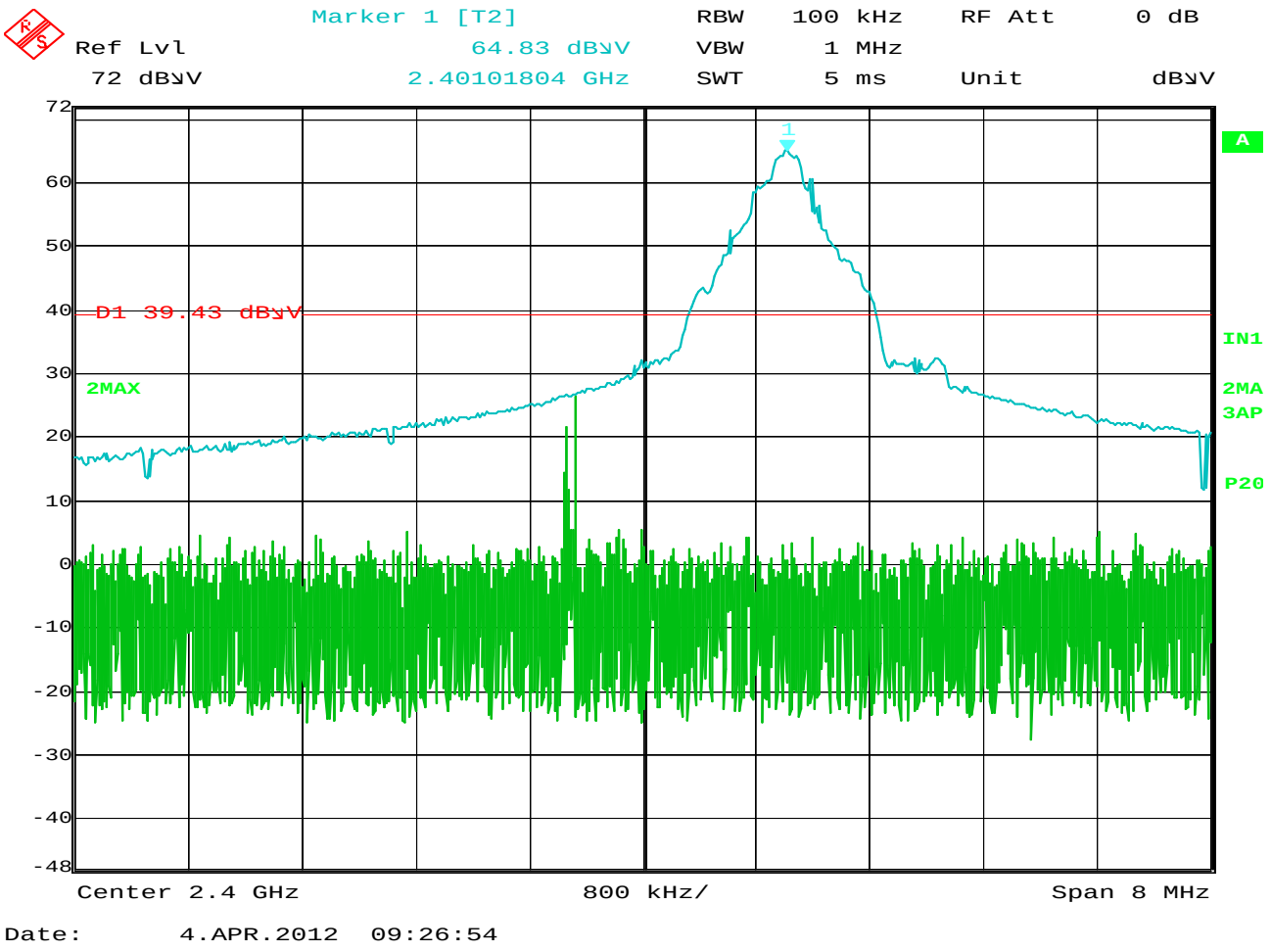
Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL FAC (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Total dBuV/m at 3 m	Total uV/m at 3m	Limit uV/m at 3m	Margin (dB)
2482.0	H	63.8	3.5	31.4	0.0	-37.8	60.8	1100.3	50000.0	-33.1
2482.0	V	67.4	3.5	31.4	0.0	-37.8	64.5	1669.3	50000.0	-39.5
4964.0	H	49.8	5.0	34.9	-40.2	-37.8	11.7	3.8	500.0	-42.3
4964.0	V	49.1	5.0	34.9	-40.2	-37.8	11.0	3.6	500.0	-42.9
7446.0	H	52.1	6.2	38.2	-39.7	-37.8	19.0	8.9	500.0	-35.0
7446.0	V	49.6	6.2	38.2	-39.7	-37.8	16.5	6.7	500.0	-37.4
9928.0	H	44.7	7.0	39.9	-38.6	-37.8	15.1	5.7	500.0	-38.8
9928.0	V	45.4	7.0	39.9	-38.6	-37.8	15.8	6.2	500.0	-38.1
12410.0	H	45.6	8.0	41.5	-39.2	-37.8	18.1	8.1	500.0	-35.9
12410.0	V	41.5	8.0	41.5	-39.2	-37.8	14.0	5.0	500.0	-40.0
14892.0	H	45.2	8.9	44.6	-40.3	-37.8	20.7	10.8	500.0	-33.3
14892.0	V	45.2	8.9	44.6	-40.3	-37.8	20.7	10.8	500.0	-33.3
17374.0	H	45.1	9.7	44.6	-39.0	-37.8	22.6	13.5	500.0	-31.4
17374.0	V	45.5	9.7	44.6	-39.0	-37.8	23.0	14.1	500.0	-31.0
19856.0	H	35.7	1.6	40.4	-26.8	-37.8	13.1	4.5	500.0	-40.9
19856.0	V	35.2	1.6	40.4	-26.8	-37.8	12.6	4.3	500.0	-41.4
22338.0	H	36.0	1.7	40.6	-27.1	-37.8	13.4	4.7	500.0	-40.6
22338.0	V	37.1	1.7	40.6	-27.1	-37.8	14.5	5.3	500.0	-39.5
24820.0	H	36.8	1.7	40.7	-27.2	-37.8	14.1	5.1	500.0	-39.9
24820.0	V	36.8	1.7	40.7	-27.2	-37.8	14.1	5.1	500.0	-39.9

Amb = Ambient

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp + Duty Cycle

Checked BY Richard E. King :

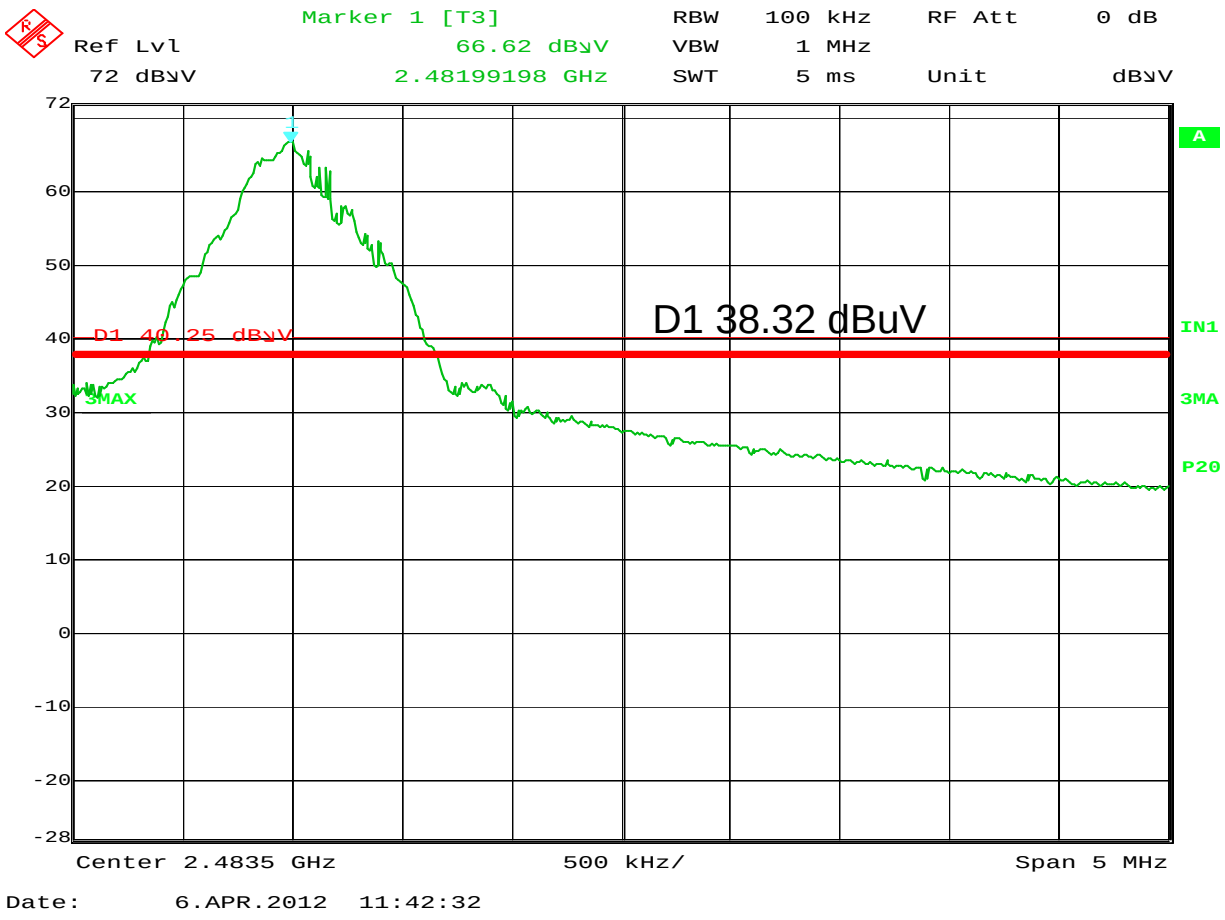
Richard E. King



FCC 15C bandedge Compliance

MANUFACTURER	:	Turning Technologies, LLC
MODEL NUMBER	:	RRRF-03
SERIAL NUMBER	:	V1.9 #3
TEST MODE	:	Tx @ 2401MHz
TEST DATE	:	April 3, 2012
TEST PARAMETER	:	99.4dBuV/m (peak) -74 dBuV/m = 25.4 dB
	:	64.83dBuV – 25.4 dB = 39.43 dBuV
	:	

NOTES



FCC 15.35 bandedge Compliance

MANUFACTURER	:	Turning Technologies, LLC
MODEL NUMBER	:	RRRF-03
SERIAL NUMBER	:	V1.9 #3
TEST MODE	:	Tx @ 2482MHz
TEST DATE	:	April 3, 2012
TEST PARAMETER	:	102.3dBuV/m (peak) -74 dBuV/m = 28.3 dB
	:	66.6 dBuV – 28.3 dB = 38.3 dBuV
	:	

NOTES

Manufacturer : Turning Technologies, LLC.
Test Item : USB Dongle Transceiver
Model No. : RRRF-03
Serial No. : V1.9 #3
Mode : Transmit at 2401MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : April 6, 2012
Test Distance : 3 meters
Note : Average readings

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle Corr. (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
2400.00	V	38.1	3.4	31.3	0.0	-37.9	34.9	55.6	500.0	-19.1

Checked BY Richard E. King :

Richard E. King

Manufacturer : Turning Technologies, LLC.
Test Item : USB Dongle Transceiver
Model No. : RRRF-03
Serial No. : V1.9 #3
Mode : Transmit at 2482MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : April 6, 2012
Test Distance : 3 meters
Note : Average readings

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle Corr. (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
2483.50	V	38.0	3.5	31.4	0.0	-37.9	35.0	55.9	500.0	-19.0

Checked BY Richard E. King :

Richard E. King