Measurement of RF Emissions from a RCQR-02 Wireless Keypad Transmitter

For	Turning Technologies LLC 255 W Federal Street Youngstown, OH 44503
P.O. Number	0000009939
Date Tested	December 21 through 31, 2015
Test Personnel	Richard King
Test Specification	FCC "Code of Federal Regulations" Title 47 Part15, Subpart C Industry Canada RSS-GEN Industry Canada RSS-210

Test Report By: Richard E. King

Richard King
EMC Engineer

Requested By: Josh Blackann
Turning Technologies LLC

Approved By: Raymond J. Klouda

Raymond J. Klouda
Registered Professional
Engineer of Illinois - 44894

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REVISION HISTORY

Revision	Date	Description
—	1 February 2016	Initial release

Measurement of RF Emissions from a Wireless Keypad, Model No. RCQR-02 Transmitter

1. INTRODUCTION

1.1. Scope of Tests

This report presents the results of the RF emissions measurements performed on a Wireless Keypad, Model No. RCQR-02, Serial No. #2, (hereinafter referred to as the Equipment Under Test (EUT)). The EUT was designed to transmit in the 2.4GHz band using an internal antenna. The EUT was manufactured and submitted for testing by Turning Technologies LLC located in Youngstown, OH.

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 C63.10-2013.

The test series was also performed to determine if the EUT meets the conducted and radiated RF emission requirements of the Industry Canada Radio Standards Specification, RSS-Gen, Section 7.2.4 and Section 6.1 for receivers and the Industry Canada Radio Standards Specification RSS-Gen Section 7.2.4 and RSS-210 Annex 2, for Transmitters.

1.3. Deviations, Additions and Exclusions

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

1.4. EMC Laboratory Identification

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

1.5. Laboratory Conditions

The temperature at the time of the test was 22°C and the relative humidity was 25%.

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 2015
- ANSI C63.4-2014, "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"
- ANSI C63.10-2013, " American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices"
- Industry Canada Radio Standards Specification, RSS-Gen, “General Requirements and Information for the Certification of Radiocommunication Equipment”, Issue 4, November 2014
- Industry Canada Radio Standards Specification, RSS-210, “Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment”, Issue 8, December 2010. Amendment 1 2015, Updated May 2015

3. EUT SETUP AND OPERATION

3.1. General Description

The EUT is a Turning Technologies LLC, Wireless Keypad, Model No. RCQR-02. A block diagram of the EUT setup is shown as Figure 1.

3.1.1. Power Input

The EUT was powered with EUT Voltage through two (2) AAA batteries.

3.1.2. Peripheral Equipment

No peripheral equipment was submitted with the EUT.

3.1.3. Signal Input/Output Leads

No interconnect cables were submitted with the EUT.

3.1.4. Grounding

The EUT was ungrounded during the tests.

3.2. Software

For all tests the EUT had Firmware Version 1.1.8 loaded onto the device to provide correct load characteristics.

3.3. Operational Mode

For all tests the EUT and all peripheral equipment were placed on a non-conductive stand per ANSI C63.4 and ANSI C63.10. ANSI C63.10 states for frequencies below 1GHz the non-conductive stand shall be 80cm and frequencies above 1GHz the non-conductive stand shall be 150cm.

Transmit at 2401MHz
Transmit at 2441MHz
Transmit at 2482MHz

3.4. 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 C63.4-2014 for site attenuation.

4.2. Test Instrumentation

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

Conducted and radiated emission measurements were performed with a spectrum analyzer. This receiver allows measurements with the bandwidths and detector functions specified in the requirements. The receiver bandwidth was 120kHz for the 30MHz to 1000MHz radiated emissions data and 1MHz for the 1000MHz to 5000MHz radiated emissions data.

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	1.06	-1.06
Expanded Uncertainty (95% confidence)	2.12	-2.12

Radiated Emissions Measurements		
Combined Standard Uncertainty	2.09	-2.09
Expanded Uncertainty (95% confidence)	4.19	-4.19

5. TEST PROCEDURES

5.1. Powerline Conducted Emissions

5.1.1. Requirements

Since the EUT was powered by internal batteries and has no connections for AC power, no conducted emissions tests are required.

5.2. Duty Cycle 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 16 through 19. The duty cycle factor was computed to be -37.8 dB for the small data packets and -29.8 dB for the large data packets.

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

Note: 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 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 C63.4-2014 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.

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 25.0GHz was investigated using a peak detector function. The data was then processed by the computer to calculate equivalent field intensity.

The final open field emission tests were then manually performed over the frequency range of 30MHz to 4000MHz. Between 30MHz and 1000MHz, a tuned dipole 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. The peak detected levels were converted to average levels using a duty cycle factor which was computed from the pulse train.

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

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

5.3.3. Results

The preliminary plots, with the EUT transmitting at 2401MHz, 2441MHz and 2482MHz are presented on pages 20 through 43.

The final open area radiated levels, with the EUT transmitting are presented on data pages 44 through 52. As can be seen from the data, all emissions measured from the EUT were within the specification limits.

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

5.4. Band Edge 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.
1) A The EUT was set to transmit continuously at the channel closest to the low band-edge.
2) A double ridged waveguide was placed 3 meters away from the EUT. The antenna was connected to the input of a spectrum analyzer.
3) The center frequency of the analyzer was set to the low band edge (2400MHz)
4) The resolution bandwidth was set to 1MHz.
5) To ensure that the maximum or worst case emission level was measured, the following steps were taken:

    a. The EUT 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.

6) The highest measured peak reading was recorded.
7) The highest measured average reading was recorded.

High Band Edge

8) The EUT was set to transmit continuously at the channel closest to the high band-edge.
9) A double ridged waveguide was placed 3 meters away from the EUT. The antenna was connected to the input of a spectrum analyzer.
10) The center frequency of the analyzer was set to the high band edge (2483.5MHz)
11) The resolution bandwidth was set to 1MHz.
12) To ensure that the maximum or worst case emission level was measured, the following steps were taken:

    d. The EUT was rotated so that all of its sides were exposed to the receiving antenna.
    e. Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
    f. The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.

13) The highest measured peak reading was recorded.
14) The highest measured average reading was recorded.

5.4.3. Results

Pages 53 through 56 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 893.8kHz for the small data packets. The 99% bandwidth was measured to be 909.8kHz for the large data packets.

6. OTHER TEST CONDITIONS

6.1. Test Personnel and Witnesses

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

6.2. Disposition of the EUT

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

7. CONCLUSIONS

It was determined that the Turning Technologies LLC Wireless Keypad, Model No. RCQR-02, Serial No. #2, 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 C63.10-2013.

It was also determined that the Turning Technologies LLC Wireless Keypad, Model No. RCQR-02 transmitter, Serial No. #2, did fully meet the conducted and radiated RF emission requirements of the Industry Canada Radio Standards Specification, RSS-Gen, Section 7.2.4 and Section 6.1 for receivers and the Industry Canada Radio Standards Specification RSS-Gen Section 7.2.4 and RSS-210 Annex 2 for transmitters, when tested per ANSI C63.10-2013.

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. 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 certification, approval, or endorsement by NVLAP, NIST or any agency of the Federal Government.

9. EQUIPMENT LIST

Table 9-1 Equipment List

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
ACU1	BROADBAND POWER AMPLIFIER	AMPLIFIER RESEARCH	500W1000M5	19833	80-1000MHZ	NOTE 1	
APW11	PREAMPLIFIER	PMI	PE2-35-120-5R0-10-12-SFF	PL11685/1241	1GHZ-20GHZ	3/5/2015	3/5/2016
CDY0	WORKSTATION	ELITE	WORKSTATION		WINDOWS 7	N/A	
GXA1	MXG MW ANALOG SIGNAL GENERATOR	AGILENT TECHNOLOGIES	N5183A	MY47420353	250KHz-40GHz	2/10/2015	2/10/2016
MML0	ELECTROMETER/MULTIMETER	KEITHLEY	619	220024	V/A/R	9/11/2015	9/11/2016
MPF0	POWER METER	GIGA-TRONICS INC.	8652A	8650777	0.045-18GHZ	5/4/2015	5/4/2016
MRK3	HYGRO-THERMOMETER	EXTECH	445715	004	---	5/19/2014	5/19/2016
NHG0	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ	NOTE 1	
NHG1	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ	NOTE 1	
NSA7	LOG PERIODIC ANTENNA	AMPLIFIER RESEARCH	AT1080	14239	80-1000MHZ	NOTE 1	
NTA2	BILOG ANTENNA	TESEQ	6112D	28040	25-1000MHz	10/27/2015	10/27/2016
NWF0	RIDGED WAVE GUIDE	EMCO	3105	2035	1-12.4GHZ	7/8/2014	7/8/2016
NWQ1	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS-LINDGREN	3117	66655	1GHZ-18GHZ	3/11/2014	3/11/2016
NWQ2	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS LINDGREN	3117	66659	1GHZ-18GHZ	2/9/2014	2/9/2016
RBB0	EMI TEST RECEIVER 20HZ TO 40 GHZ.	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	2/13/2015	2/13/2016
WKA1	SOFTWARE, UNIVERSAL RCV EMI	ELITE	UNIV_RCV_EMI	1	---	I/O	
XDS6	50DB, 400W BIDIRECTIONAL COUPLER	AMPLIFIER RESEARCH	DC7154A	0325108	.8-4.2GHZ	5/6/2015	5/6/2016
XOB1	ADAPTER	HEWLETT PACKARD	K281C	10422	18-26.5GHZ	NOTE 1	

I/O: Initial Only
N/A: Not Applicable
Note 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.

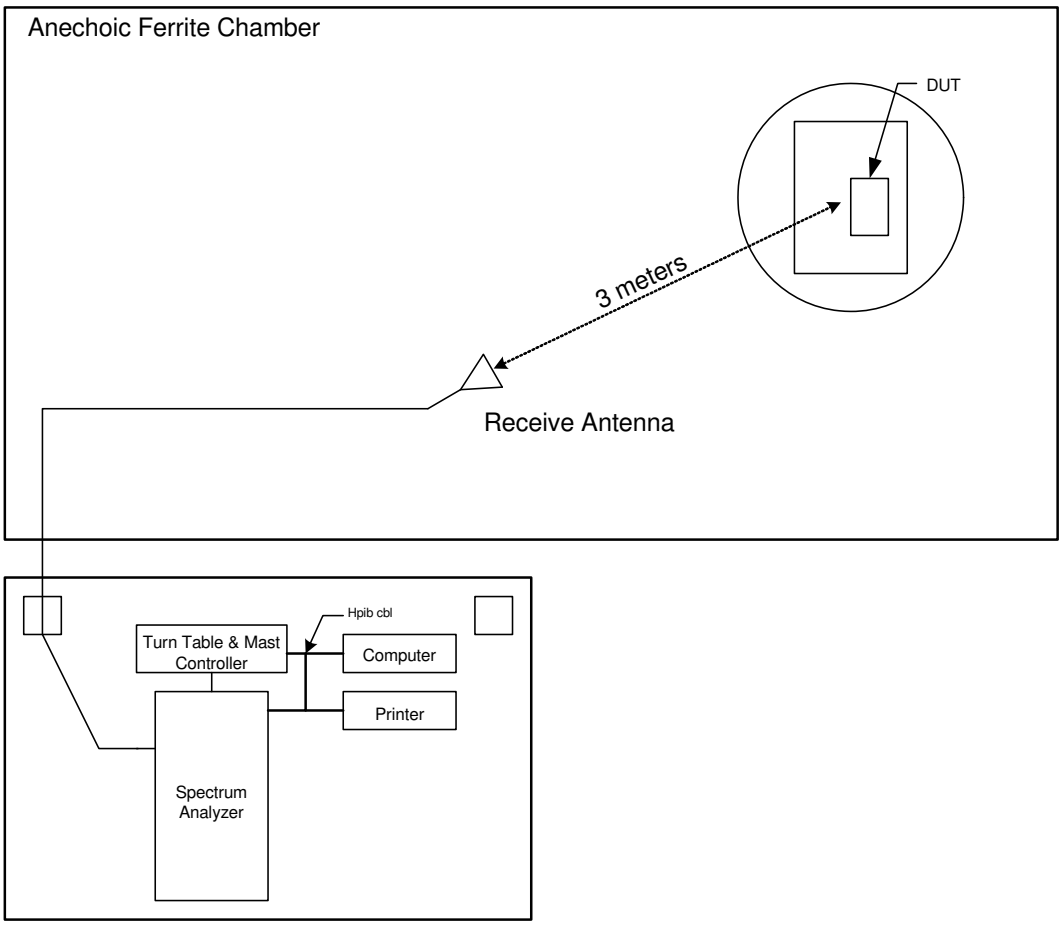


FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

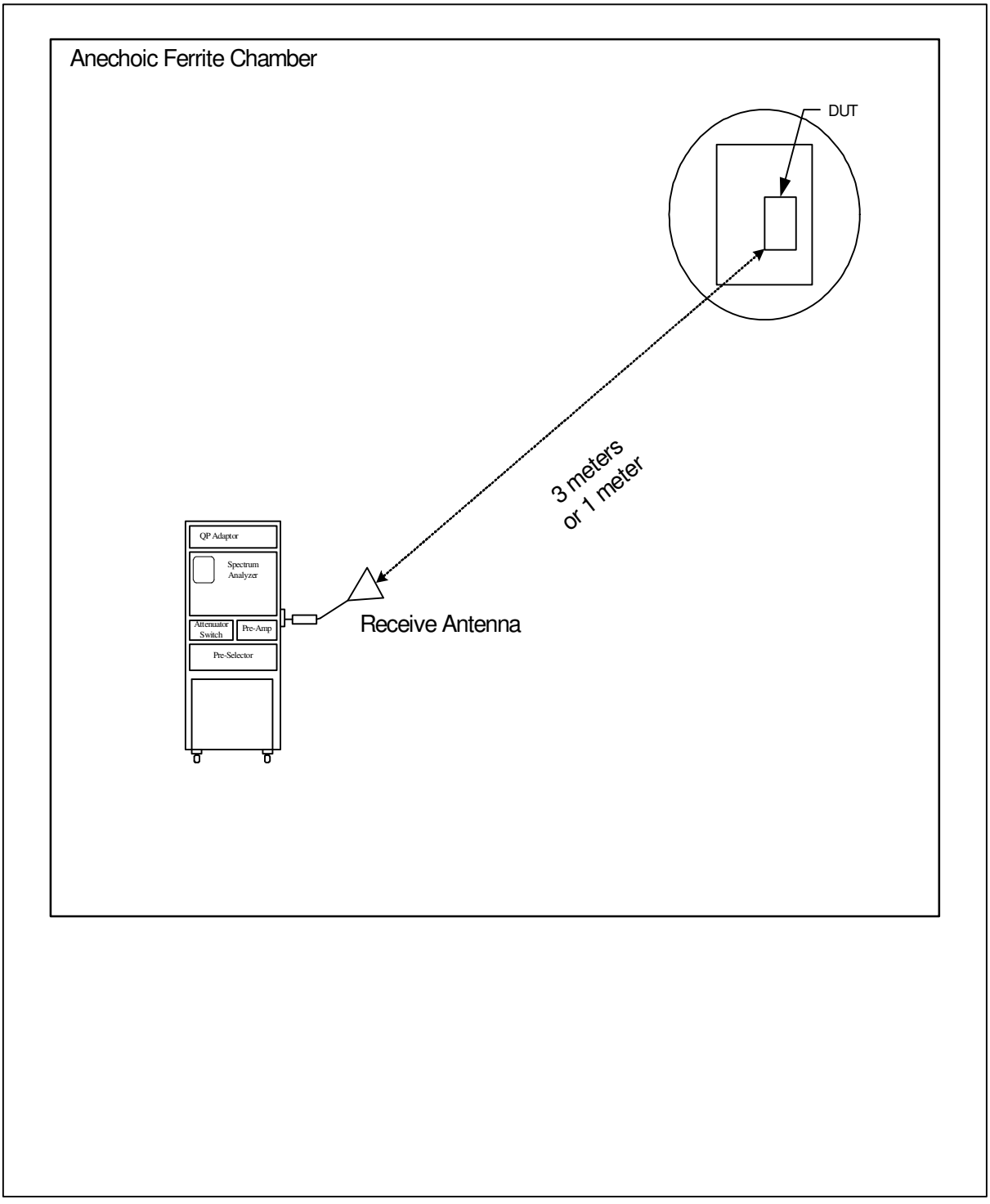
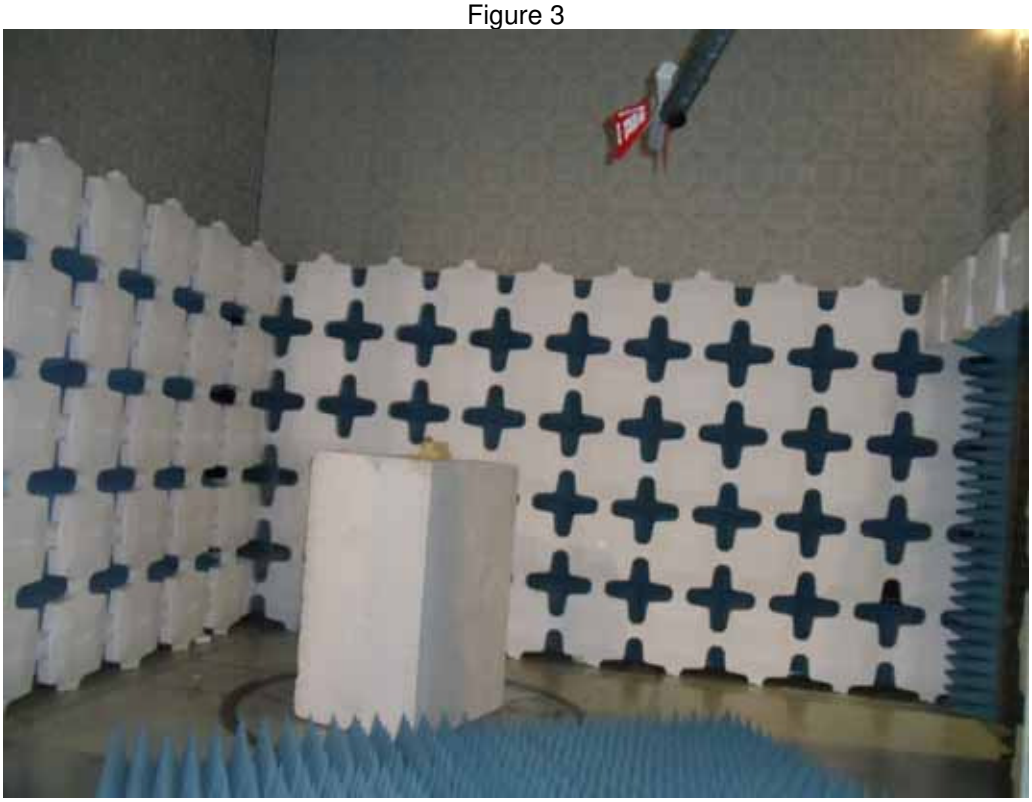

Anechoic Ferrite Chamber
DUT
3 meters
or 1 meter
QP Adaptor
Spectrum
Analyzer
Attenuator
Switch
Pre-Amp
Pre-Selector
Receive Antenna

Figure 2 – Photograph of the Test Sample

Figure 3



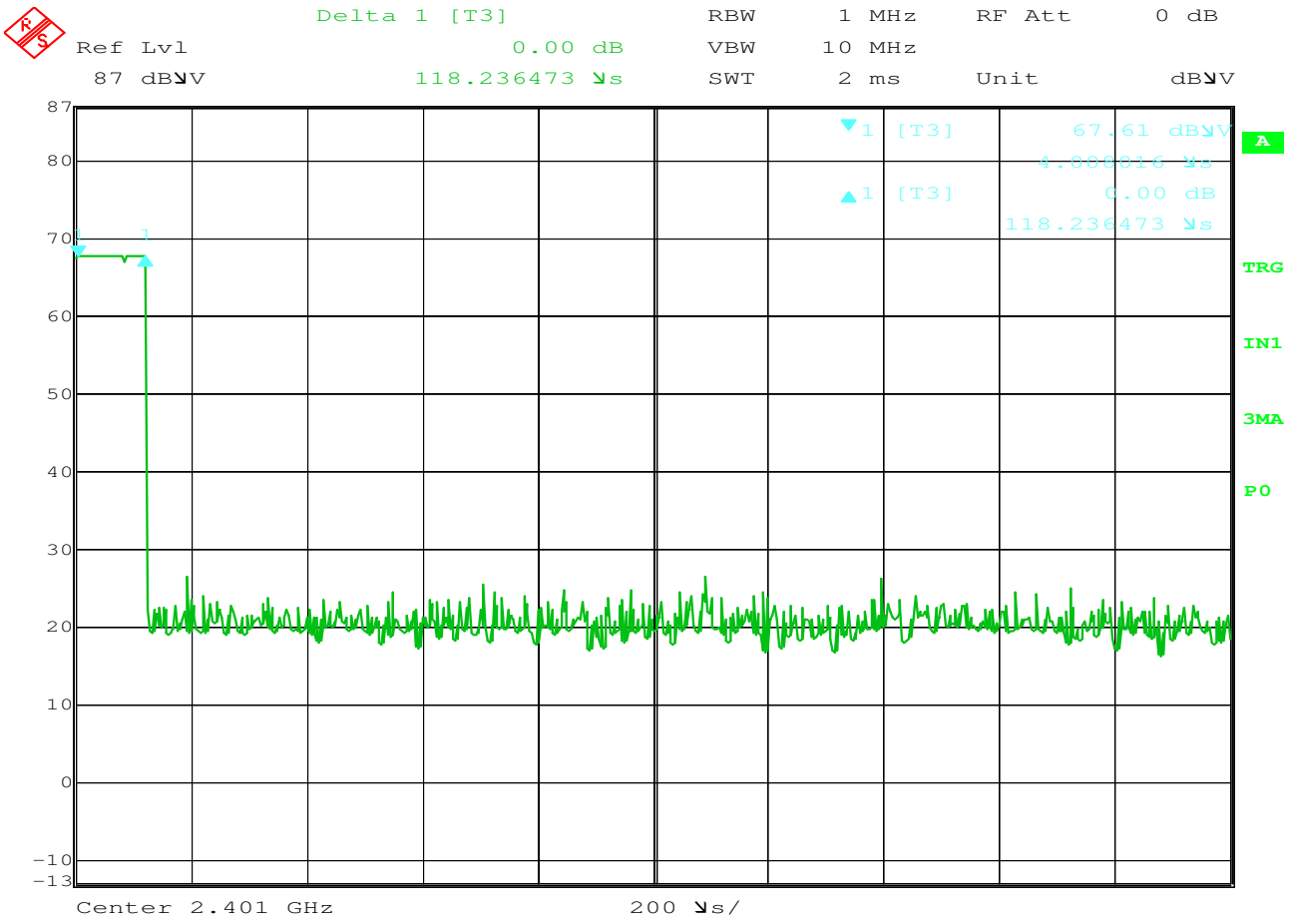
Test Setup for Radiated Emissions, 1 to 18GHz – Horizontal Polarization

Test Setup for Radiated Emissions, 1 to 18GHz – Vertical Polarization

Figure 4

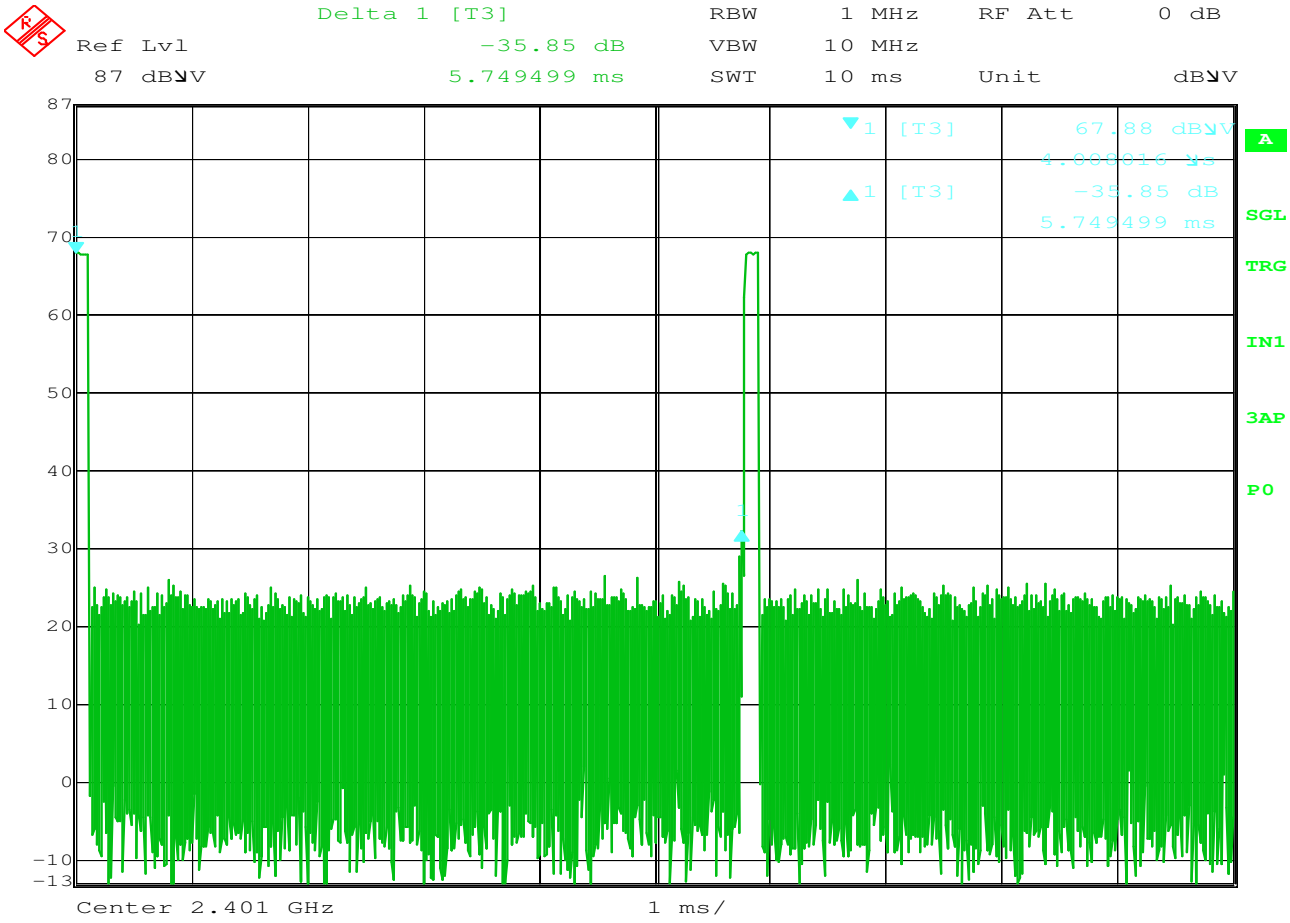
Test Setup for Radiated Emissions, Above 18GHz – Horizontal Polarization

Test Setup for Radiated Emissions, Above 18GHz – Vertical Polarization



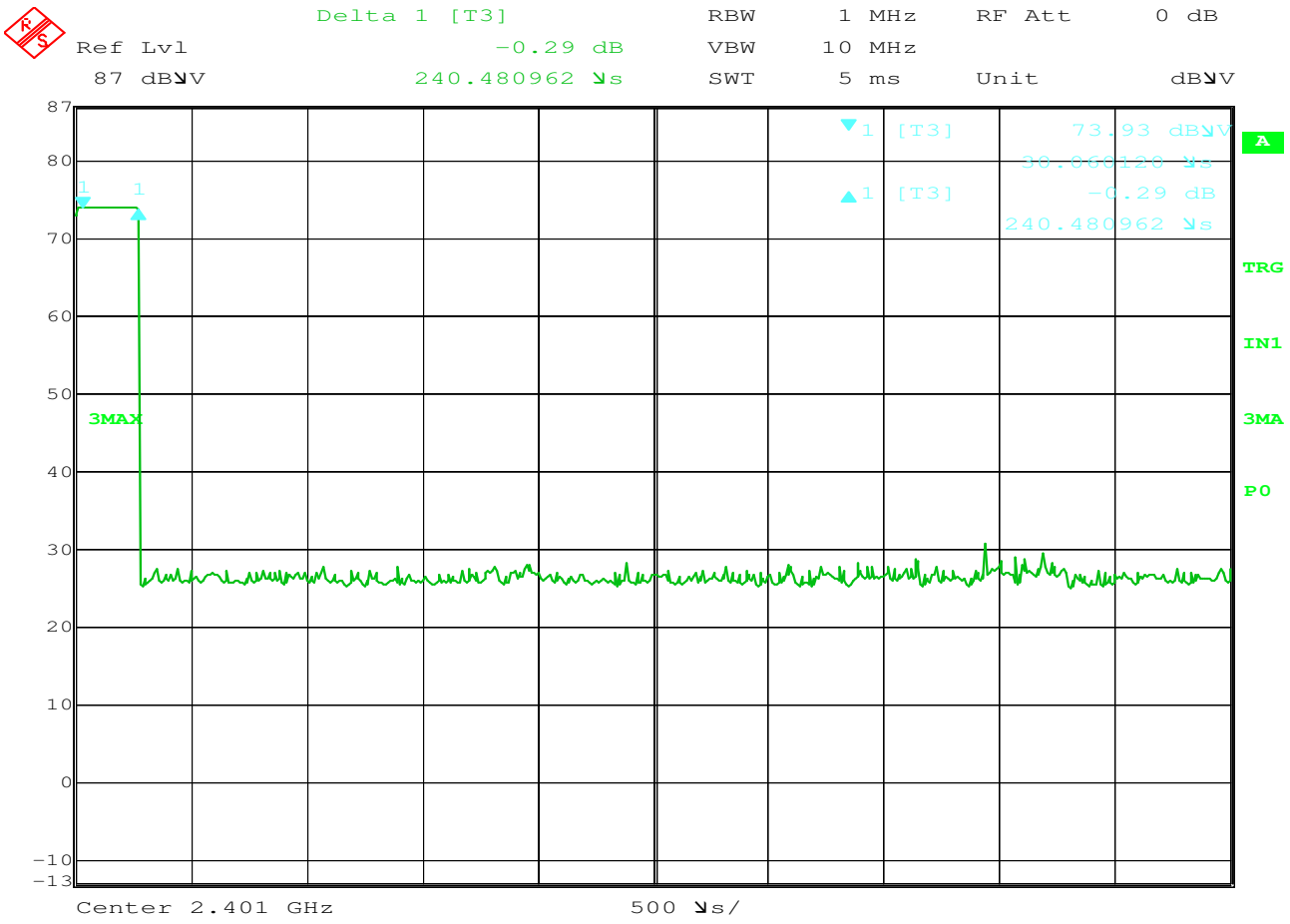
FCC 15.249 Duty Cycle Factor

MANUFACTURER	:	Turning Technologies
MODEL NUMBER	:	RCQR-02
SERIAL NUMBER	:	2
TEST MODE	:	Tx @ LOW CHANNEL
	:	Peak detector
NOTES	:	small data packets
NOTES	:	Pulse Width = 118.23uS
NOTES	:	Duty Cycle Factor = 20*log(118.23uS/5.74mS) = -33.72 dB



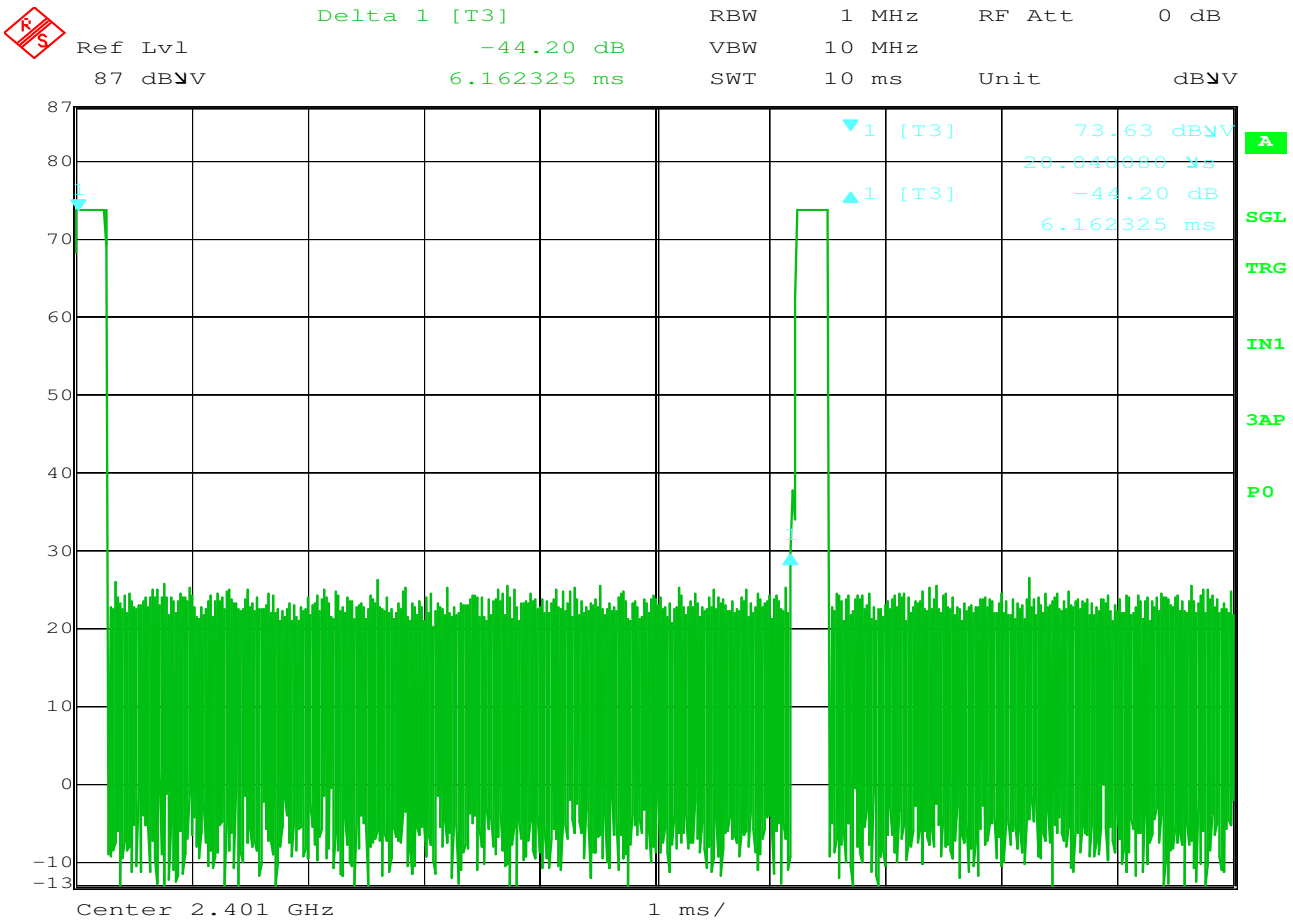
FCC 15.249 Duty Cycle Factor

MANUFACTURER	:	Turning Technologies
MODEL NUMBER	:	RCQR-02
SERIAL NUMBER	:	2
TEST MODE	:	Tx @ LOW CHANNEL
	:	Peak detector
NOTES	:	small data packets
NOTES	:	Word = 5.74mS
NOTES	:	Duty Cycle Factor = 20*log(118.23uS/5.74mS) = -33.72 dB



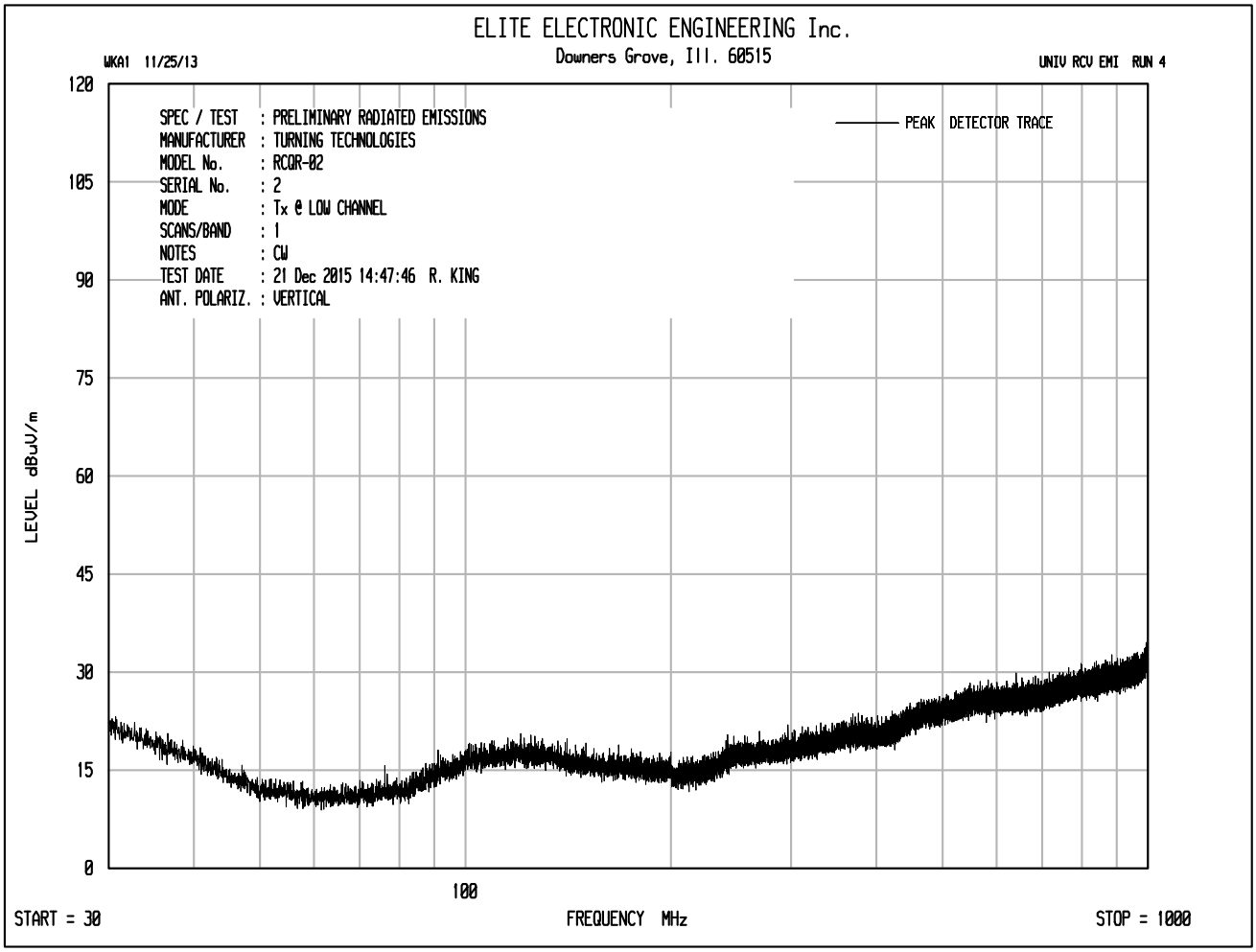
FCC 15.249 Duty Cycle Factor

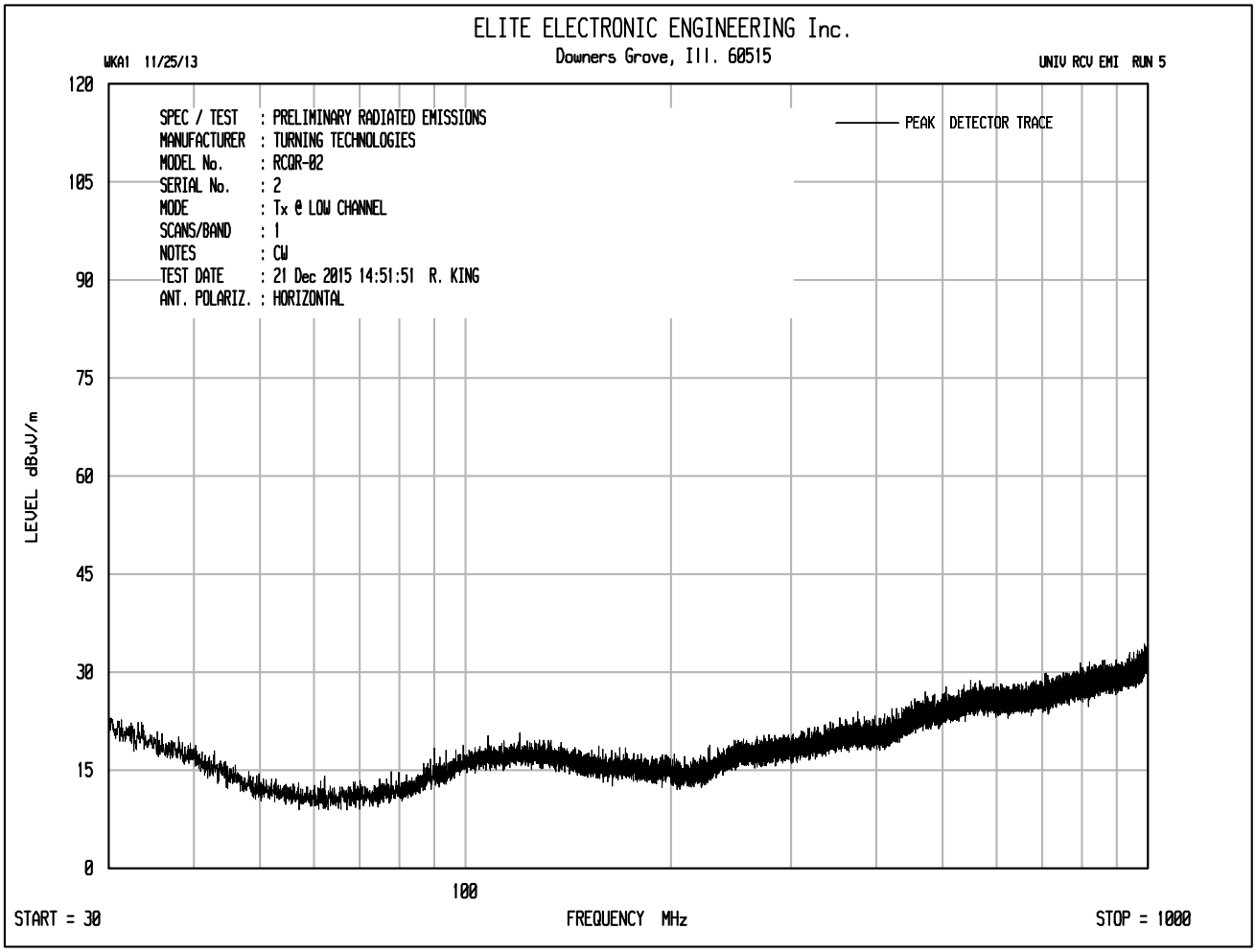
MANUFACTURER	:	Turning Technologies
MODEL NUMBER	:	RCQR-02
SERIAL NUMBER	:	2
TEST MODE	:	Tx @ LOW CHANNEL
	:	Peak detector
NOTES	:	Large data packets
NOTES	:	Pulse Width = 240.48uS
NOTES	:	Duty Cycle Factor = 20*log(240.48uS/6.16mS) = -28.17 dB



FCC 15.249 Duty Cycle Factor

MANUFACTURER	:	Turning Technologies
MODEL NUMBER	:	RCQR-02
SERIAL NUMBER	:	2
TEST MODE	:	Tx @ LOW CHANNEL
	:	Peak detector
NOTES	:	Large data packets
NOTES	:	Word = 6.16mS
NOTES	:	Duty Cycle Factor = 20*log(240.48uS/6.16mS) = -28.17 dB


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 4
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCQR-02
SERIAL No. : 2
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : CW
TEST DATE : 21 Dec 2015 14:47:46 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 5
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCQR-02
SERIAL No. : 2
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : CW
TEST DATE : 21 Dec 2015 14:51:51 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
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START = 30
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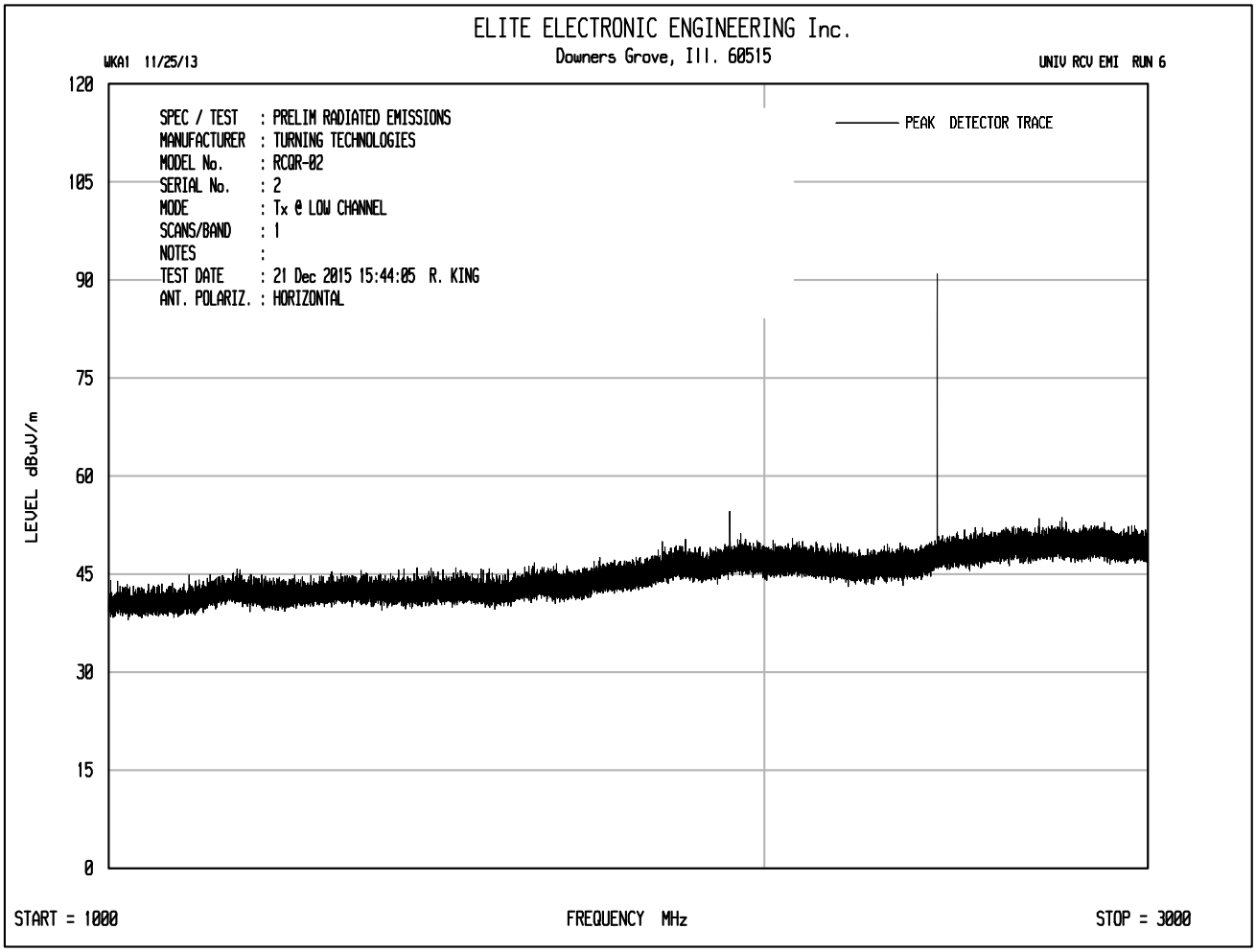
STOP = 1000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 6
SPEC / TEST : PRELIM RADIATED EMISSIONS
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SERIAL No. : 2
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SCANS/BAND : 1
NOTES :
TEST DATE : 21 Dec 2015 15:44:05 R. KING
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75
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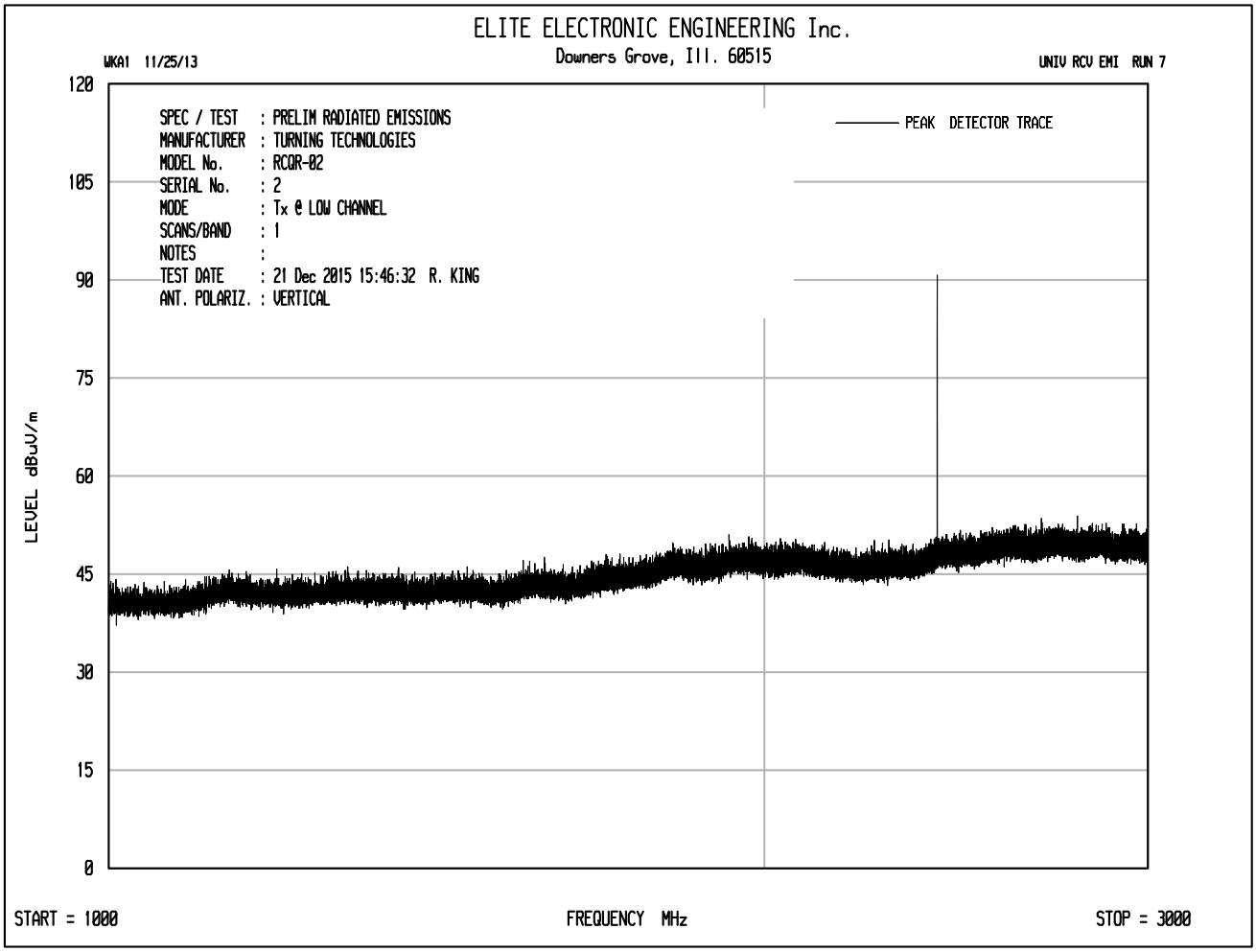
FREQUENCY MHz
STOP = 3000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 7
SPEC / TEST : PRELIM RADIATED EMISSIONS
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MODEL No. : RCQR-02
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SCANS/BAND : 1
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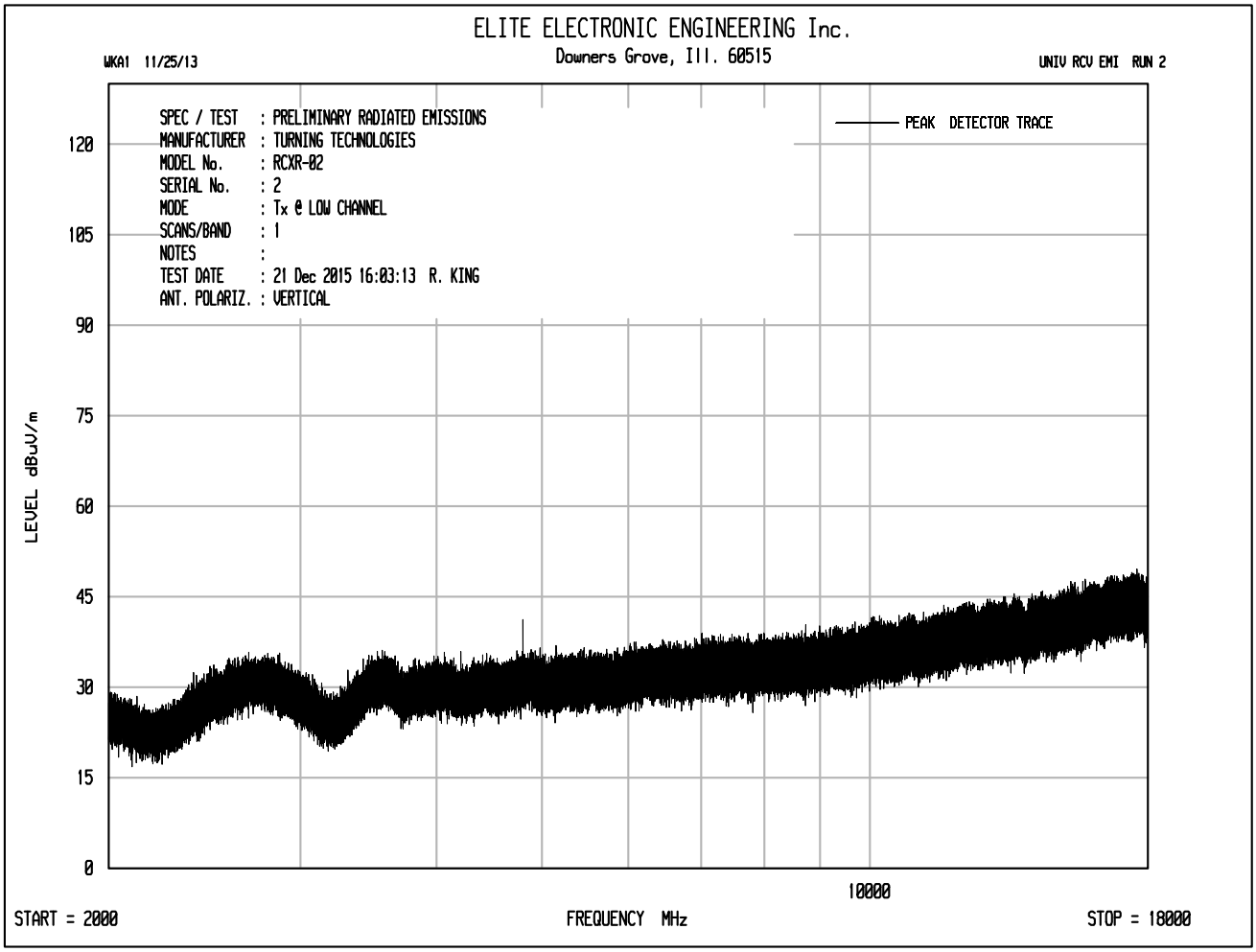
STOP = 3000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 2
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCXR-02
SERIAL No. : 2
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 21 Dec 2015 16:03:13 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
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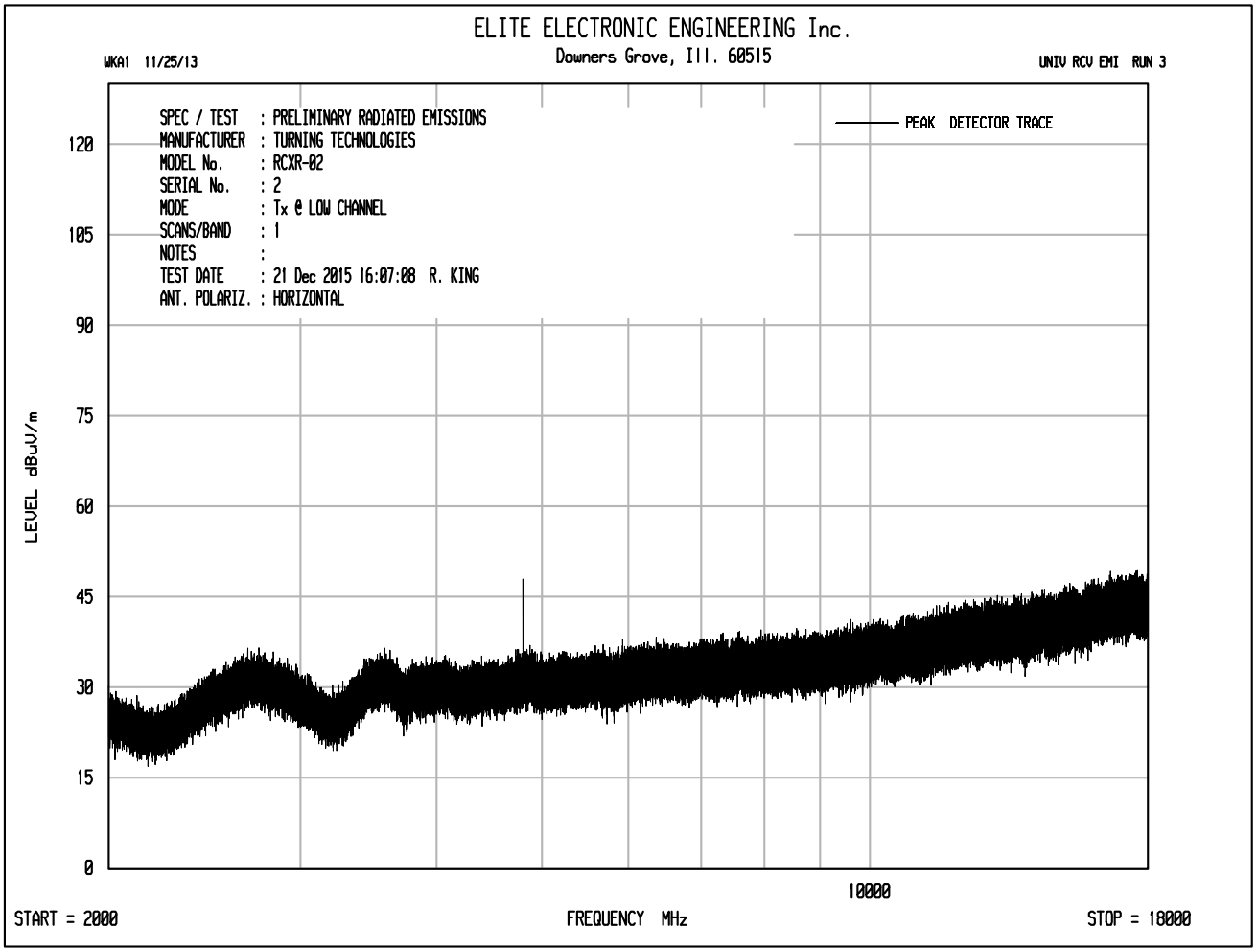
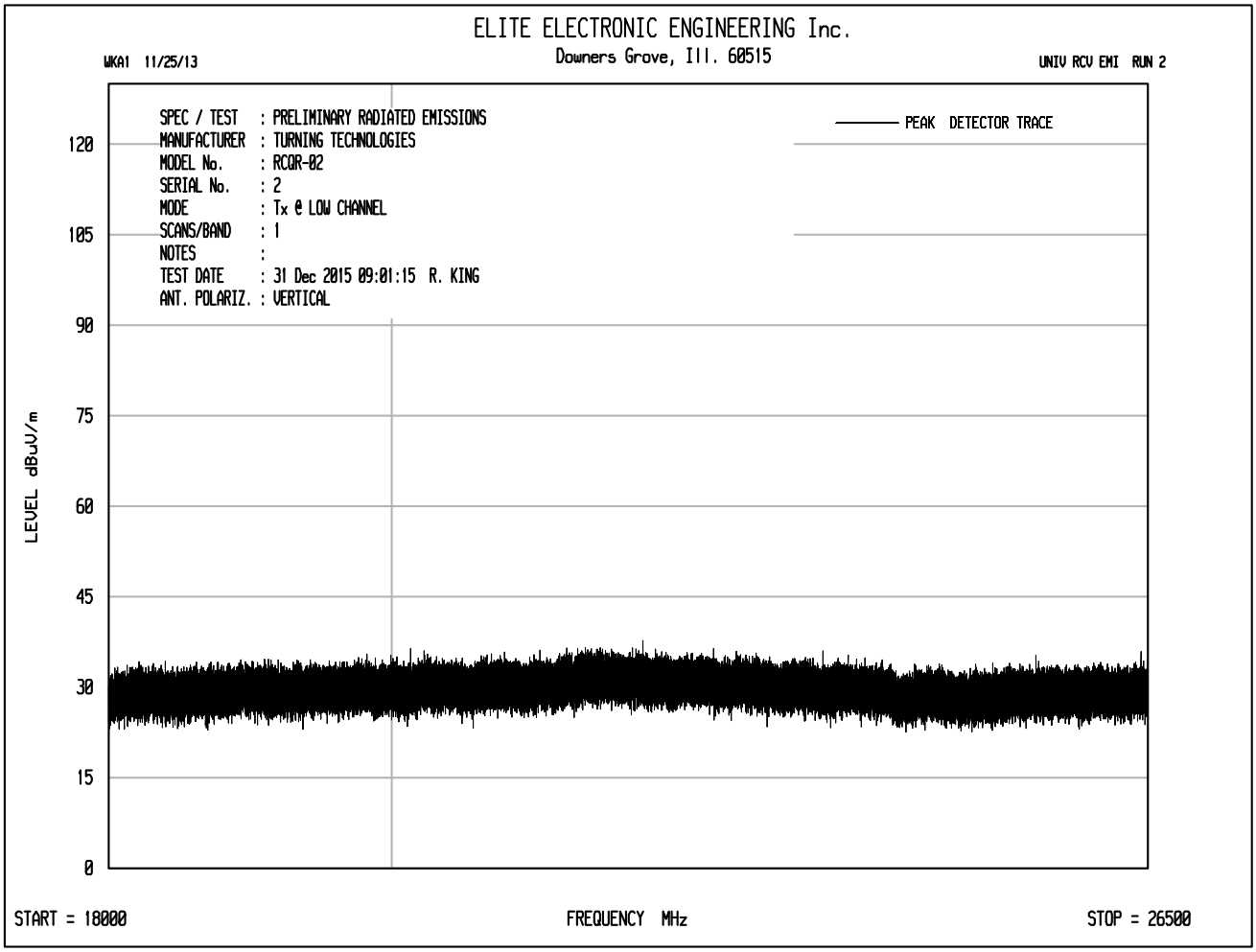
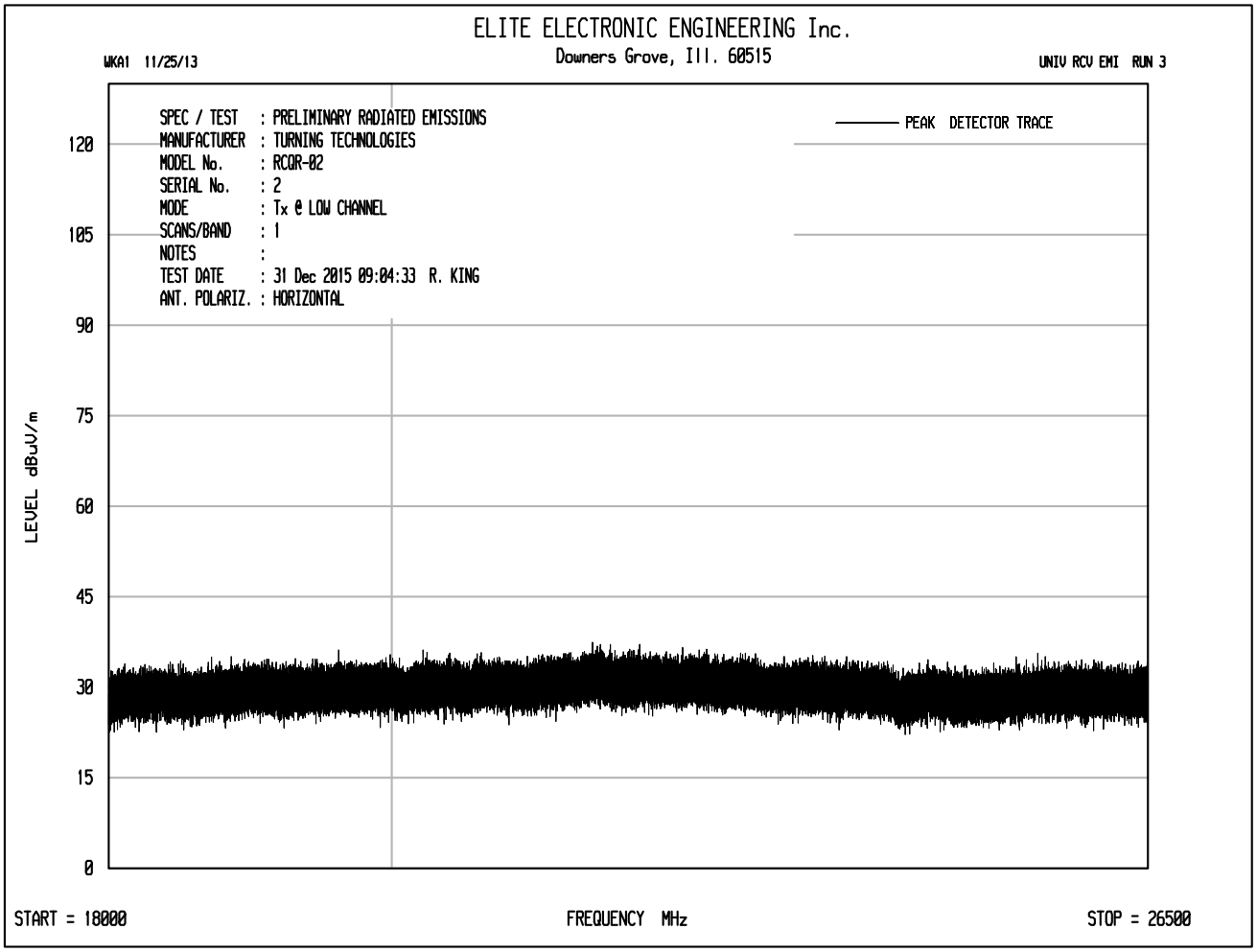
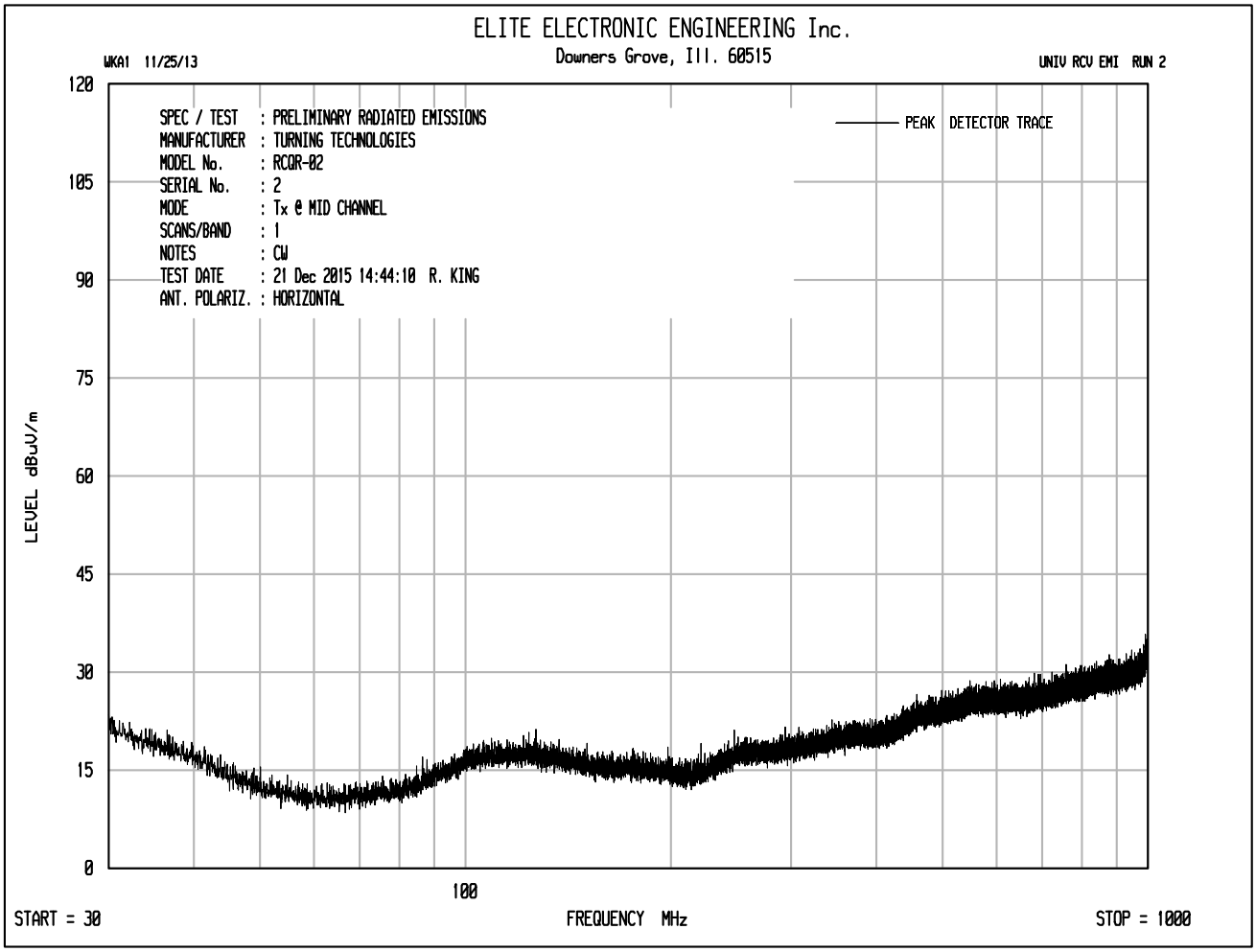
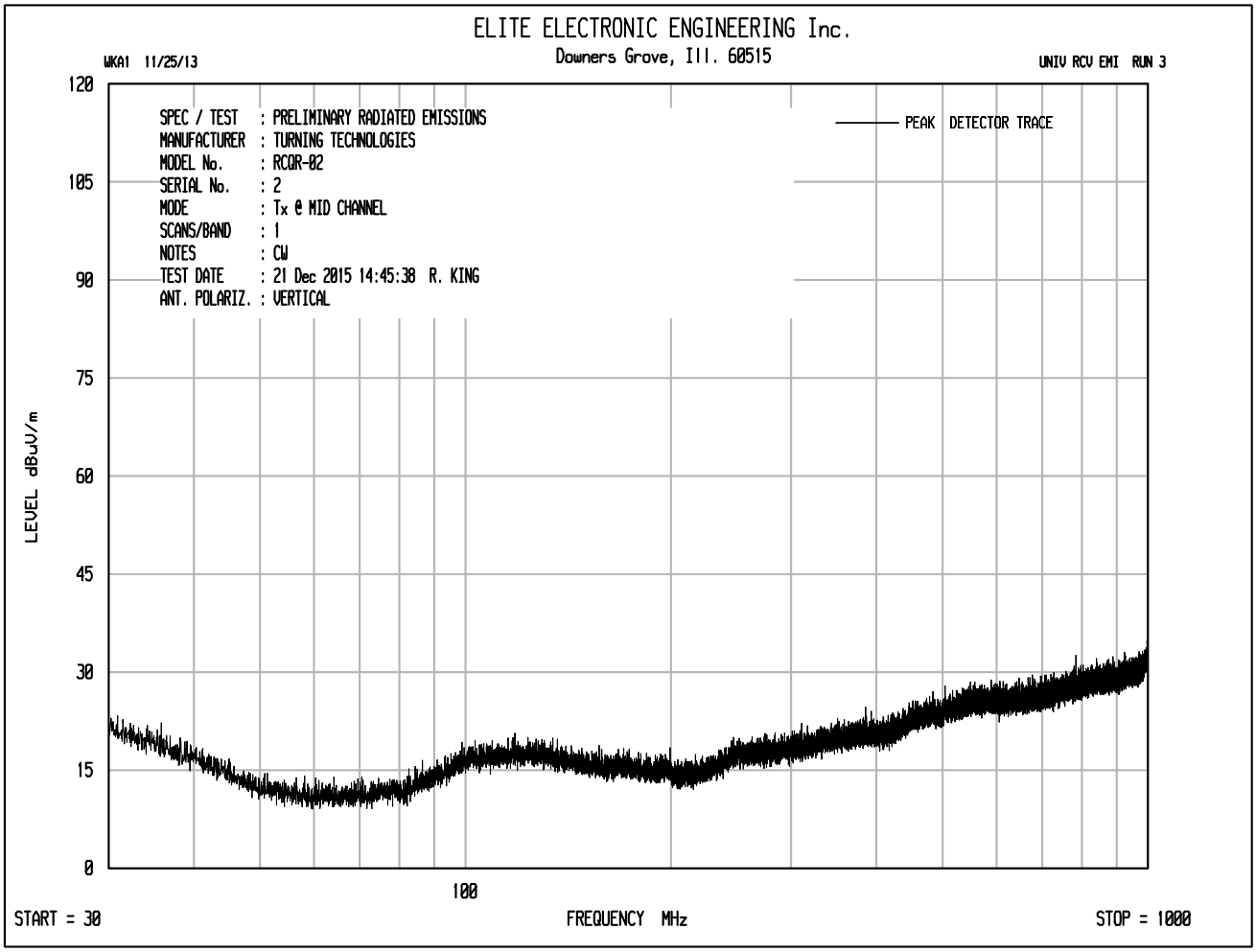
105
90
75
60
45
30
15
0
10000
START = 2000
FREQUENCY MHz
STOP = 18000

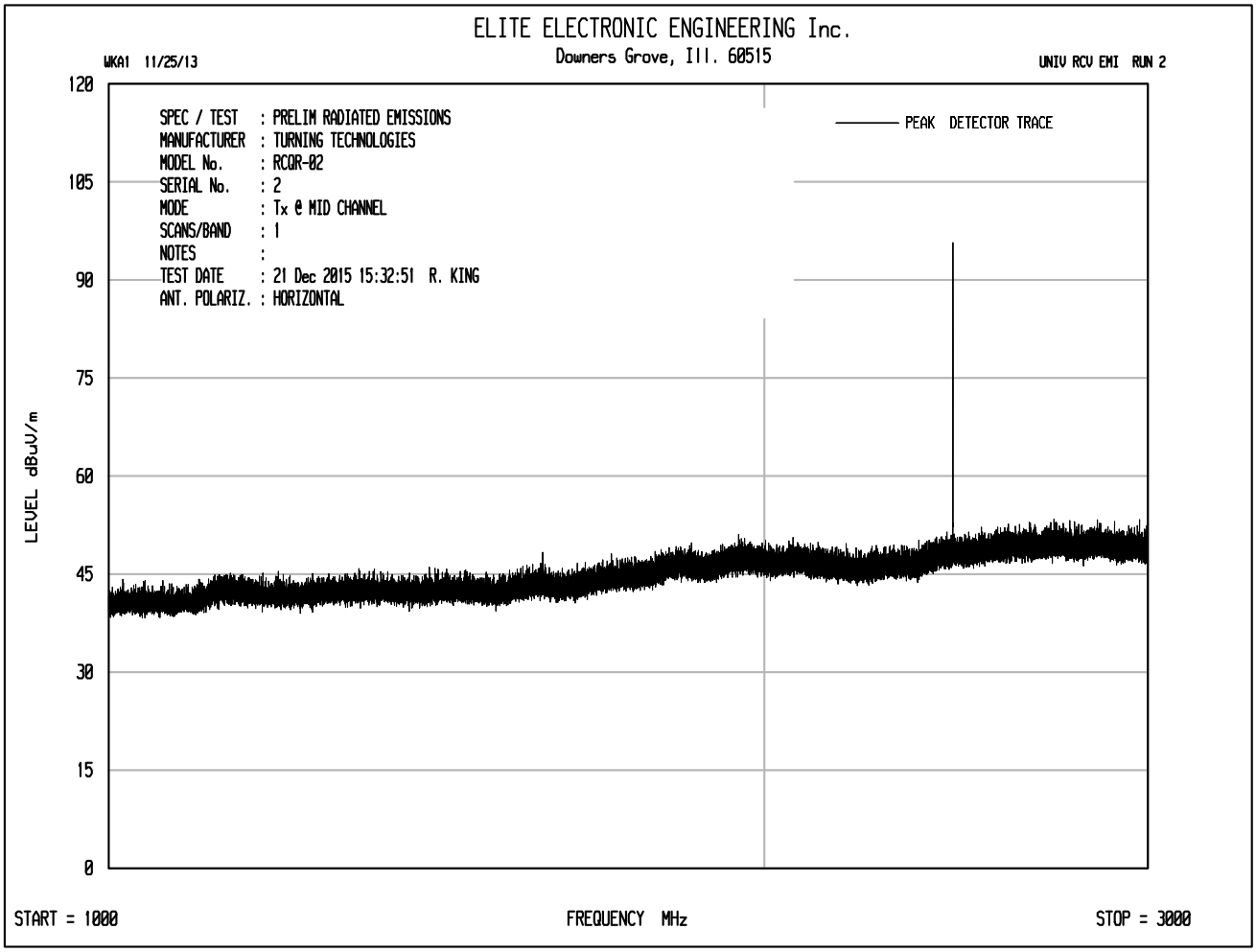

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 3
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCXR-02
SERIAL No. : 2
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 21 Dec 2015 16:07:08 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 2000
FREQUENCY MHz
STOP = 18000

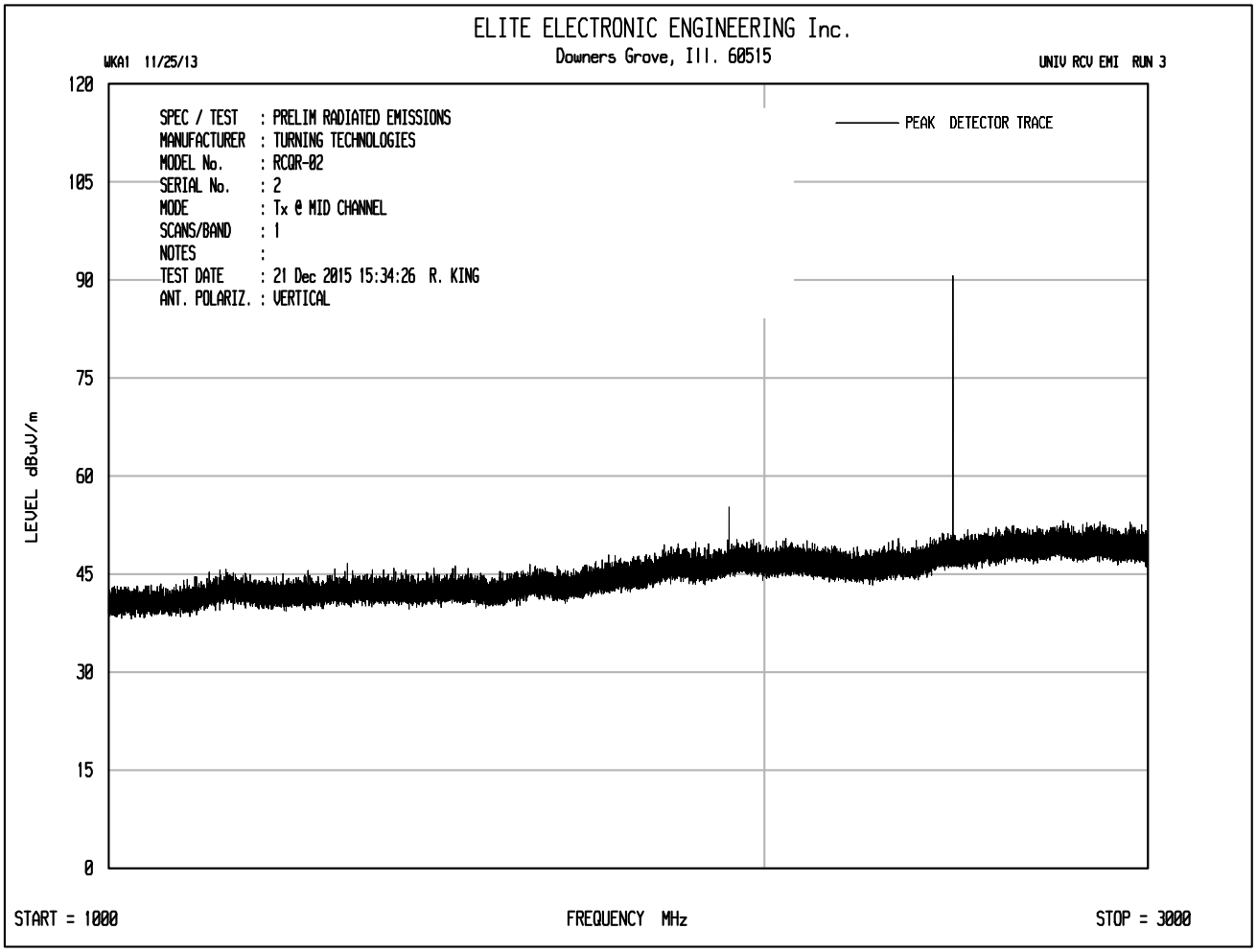

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 2
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCQR-02
SERIAL No. : 2
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 31 Dec 2015 09:01:15 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 26500

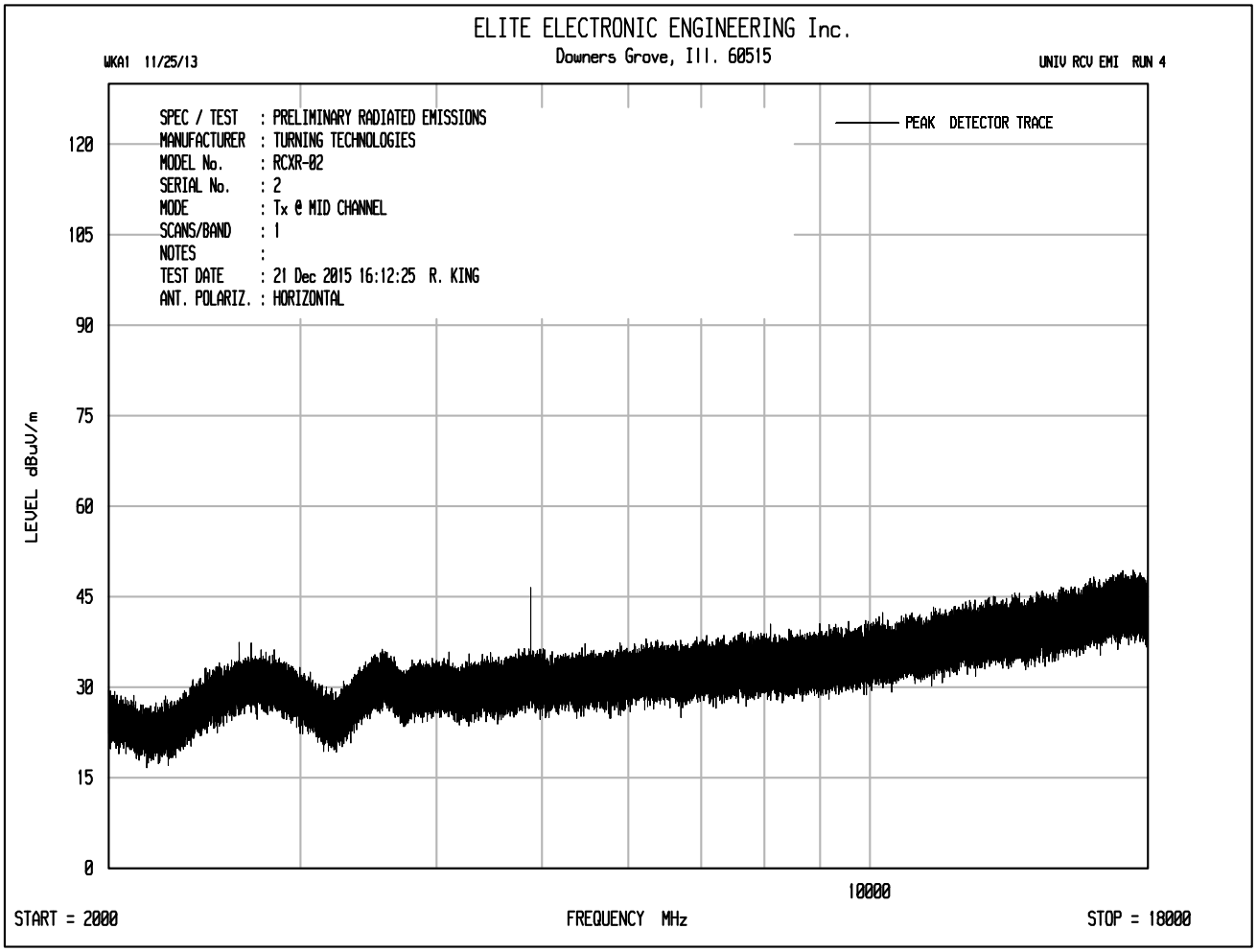

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 3
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCQR-02
SERIAL No. : 2
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 31 Dec 2015 09:04:33 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 26500

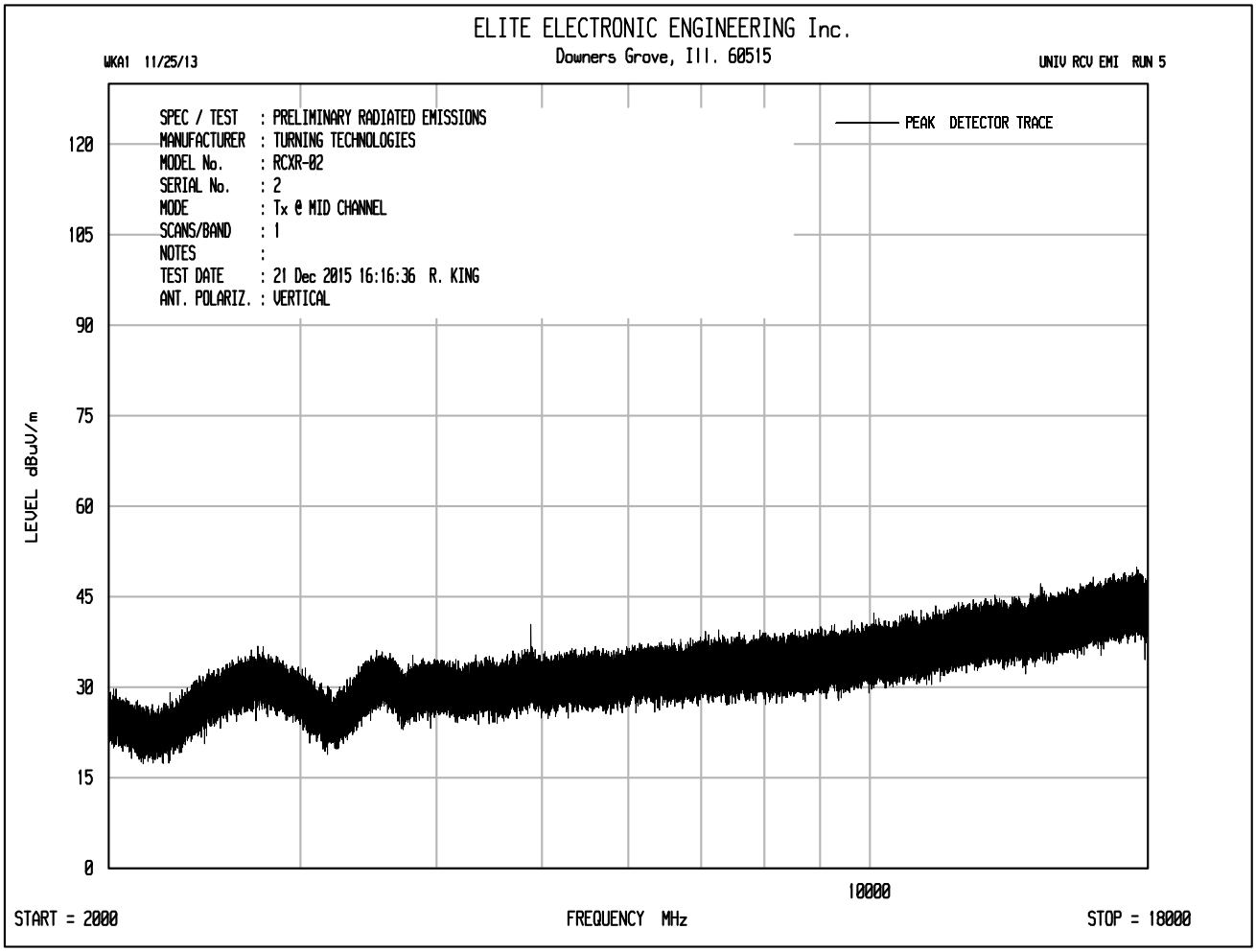

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 2
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCQR-02
SERIAL No. : 2
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES : CW
TEST DATE : 21 Dec 2015 14:44:10 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

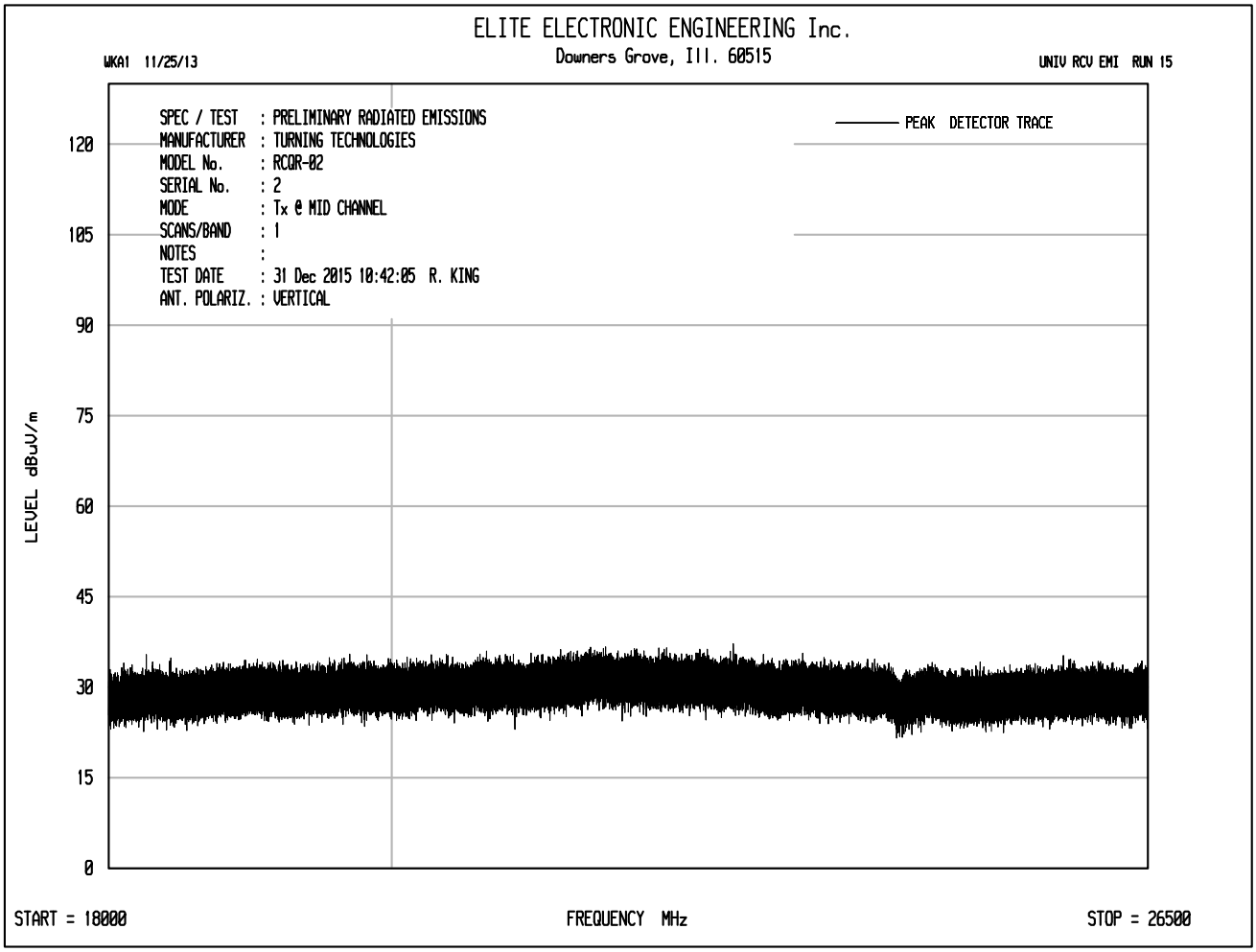

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 3
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCQR-02
SERIAL No. : 2
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES : CW
TEST DATE : 21 Dec 2015 14:45:38 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

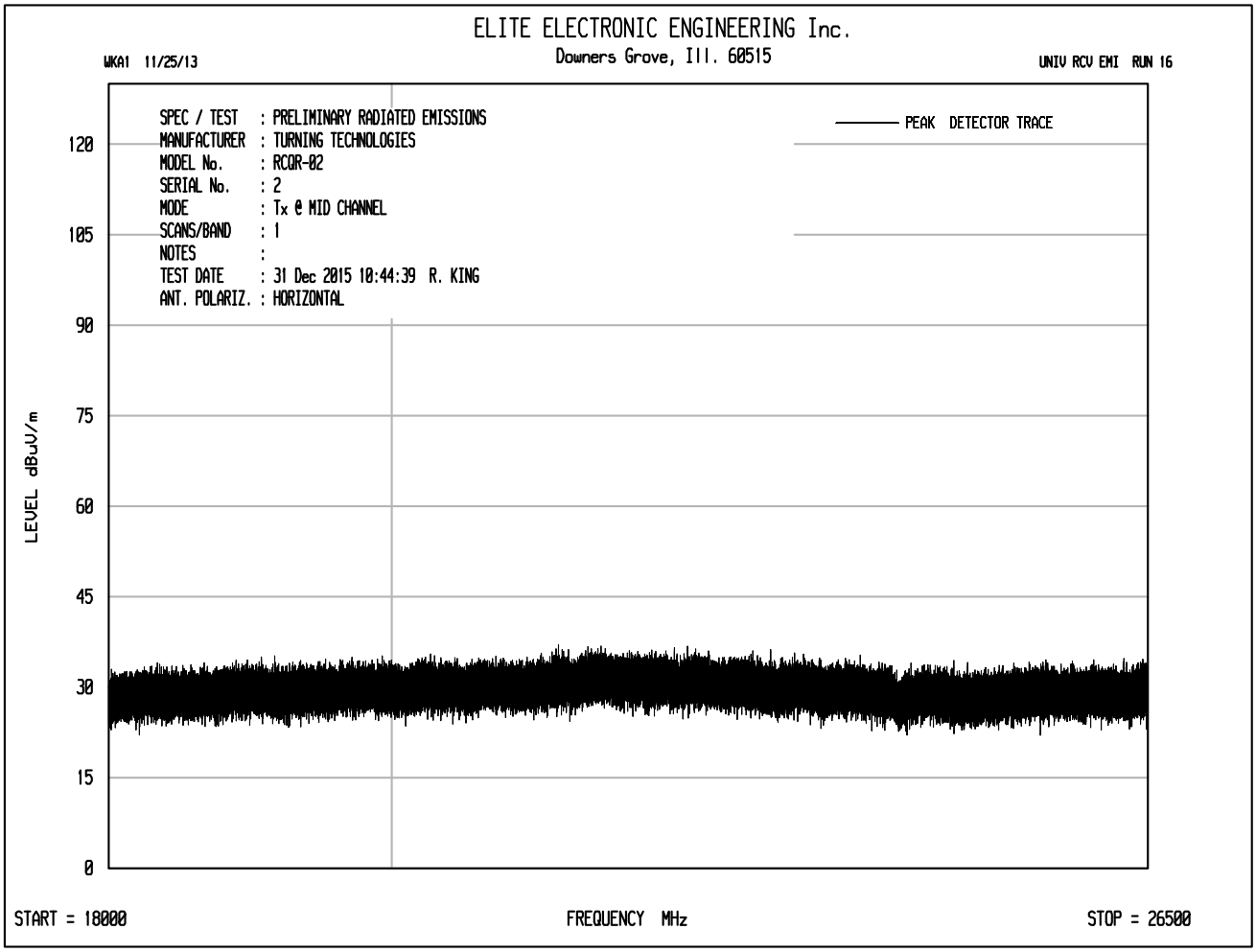

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 2
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCQR-02
SERIAL No. : 2
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 21 Dec 2015 15:32:51 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 3000

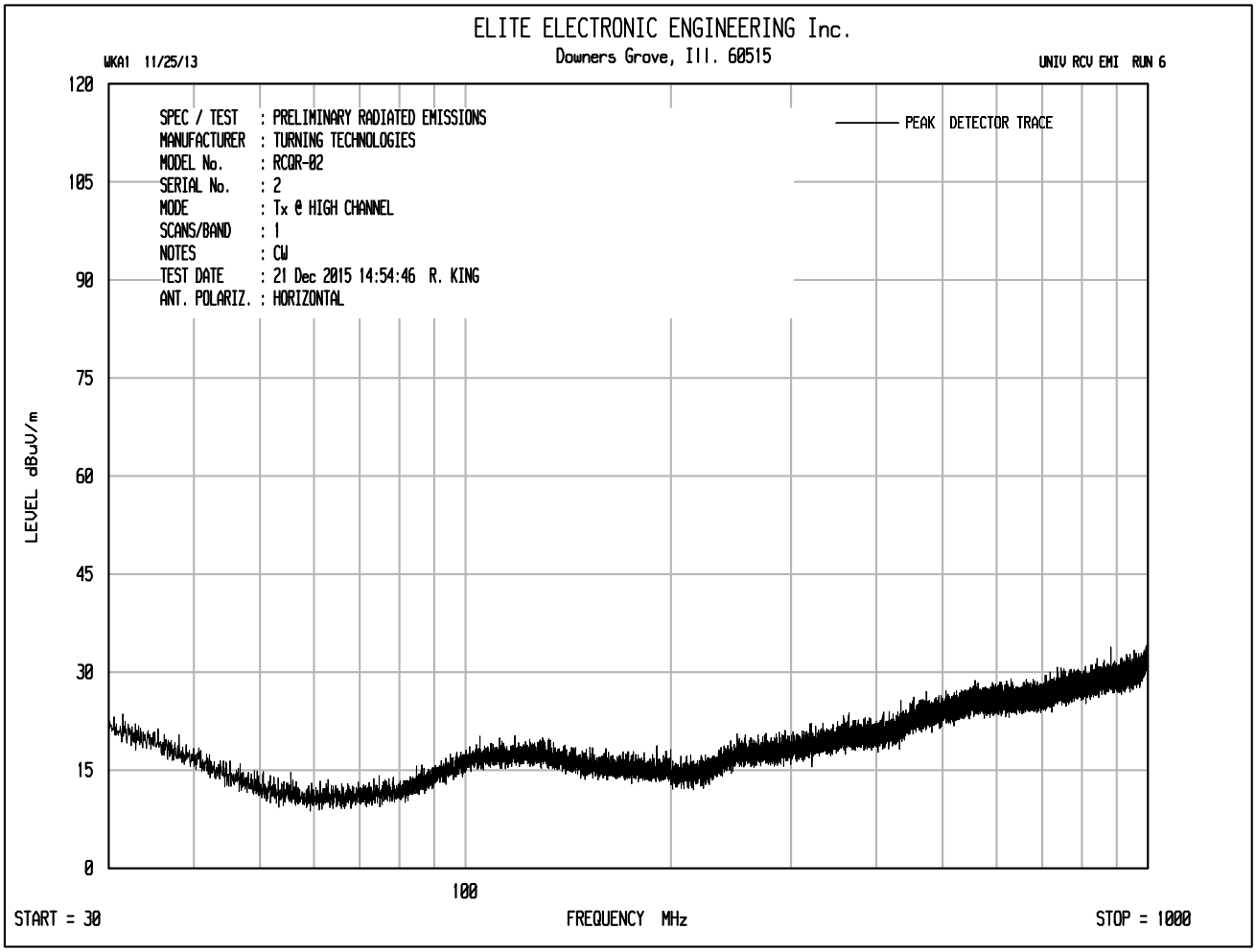

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 3
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCQR-02
SERIAL No. : 2
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 21 Dec 2015 15:34:26 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 3000

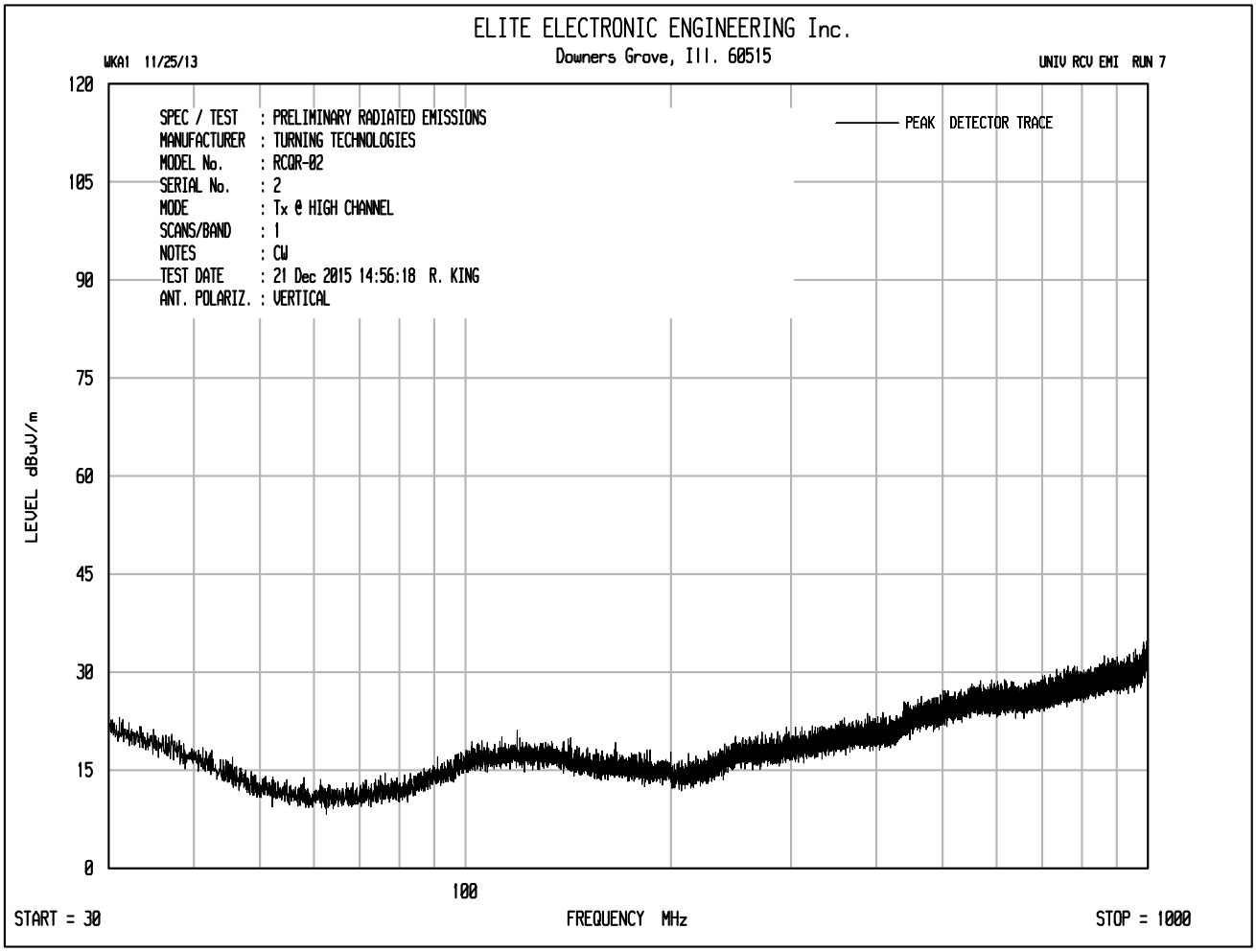

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 4
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCXR-02
SERIAL No. : 2
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 21 Dec 2015 16:12:25 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 2000
FREQUENCY MHz
STOP = 18000

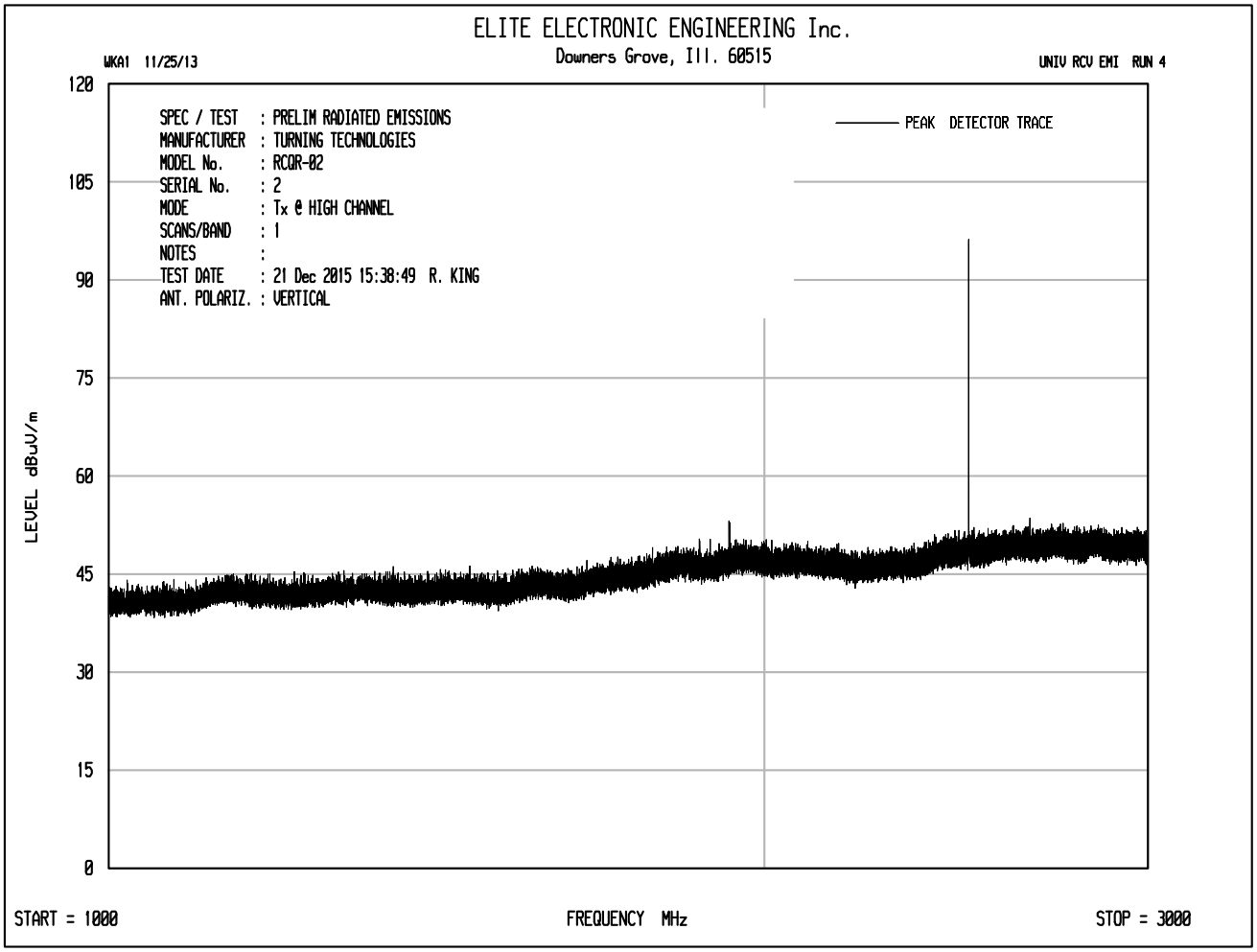

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 5
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCXR-02
SERIAL No. : 2
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 21 Dec 2015 16:16:36 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 2000
FREQUENCY MHz
STOP = 18000

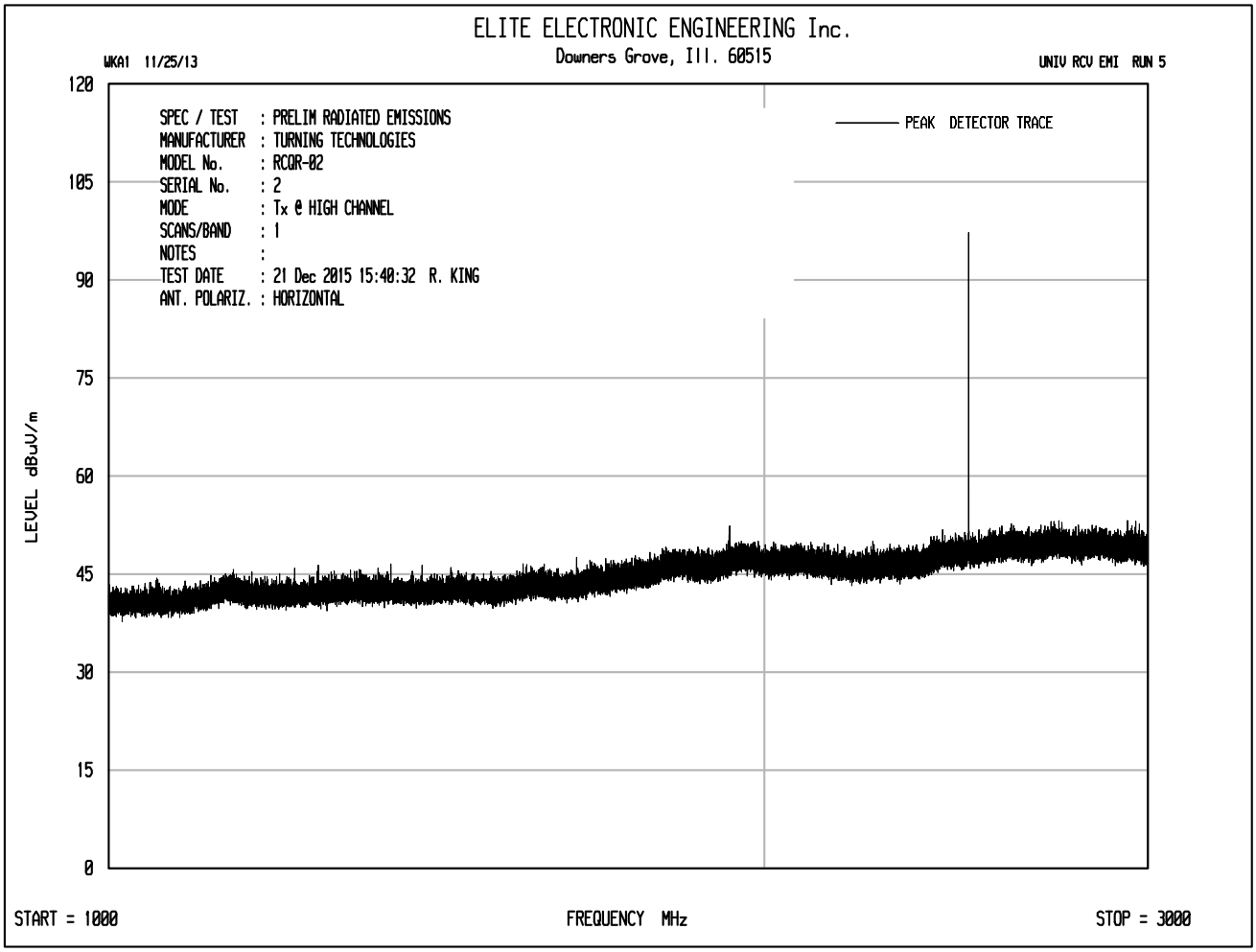

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 15
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCQR-02
SERIAL No. : 2
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 31 Dec 2015 10:42:05 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 26500

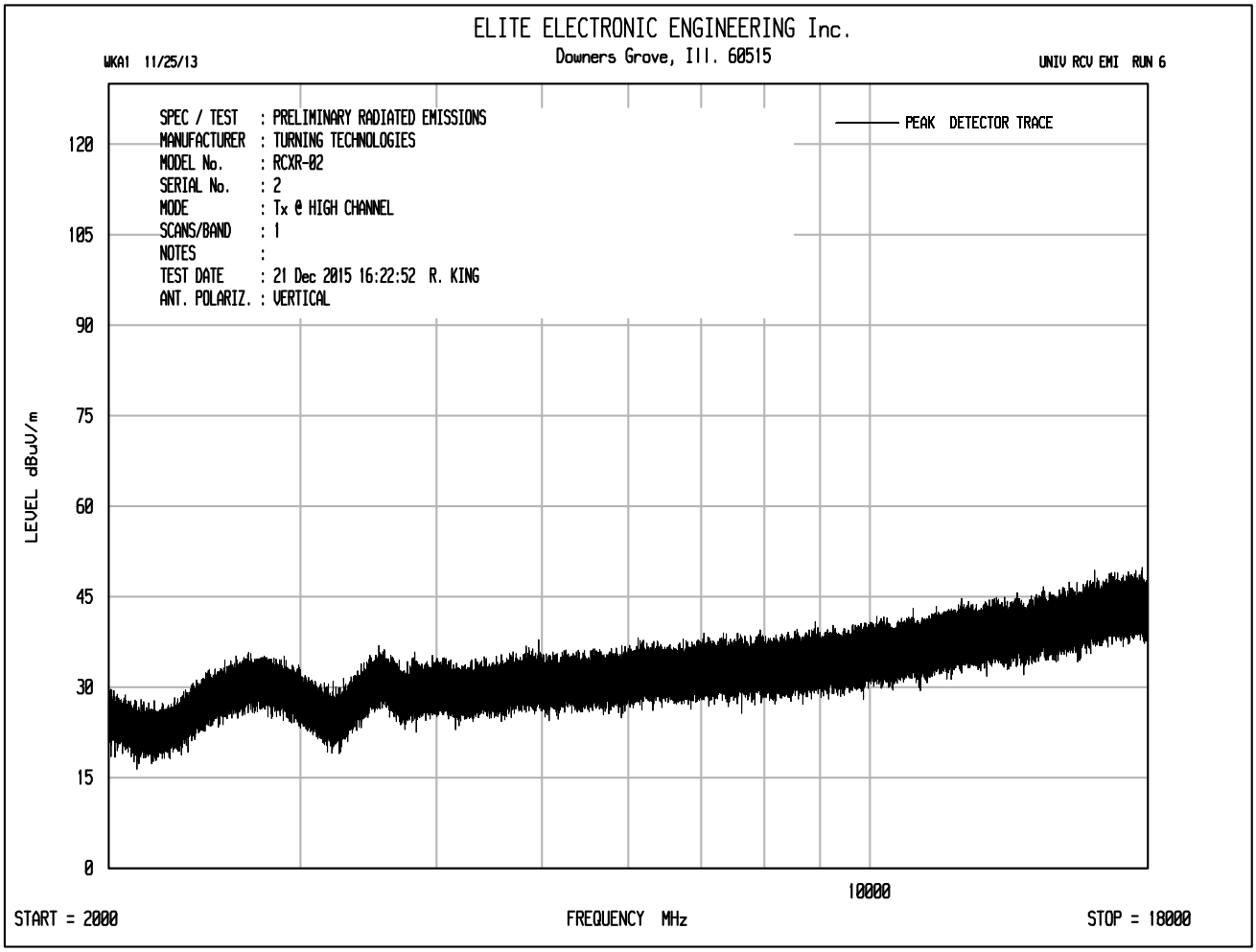

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 16
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCQR-02
SERIAL No. : 2
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 31 Dec 2015 10:44:39 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 26500

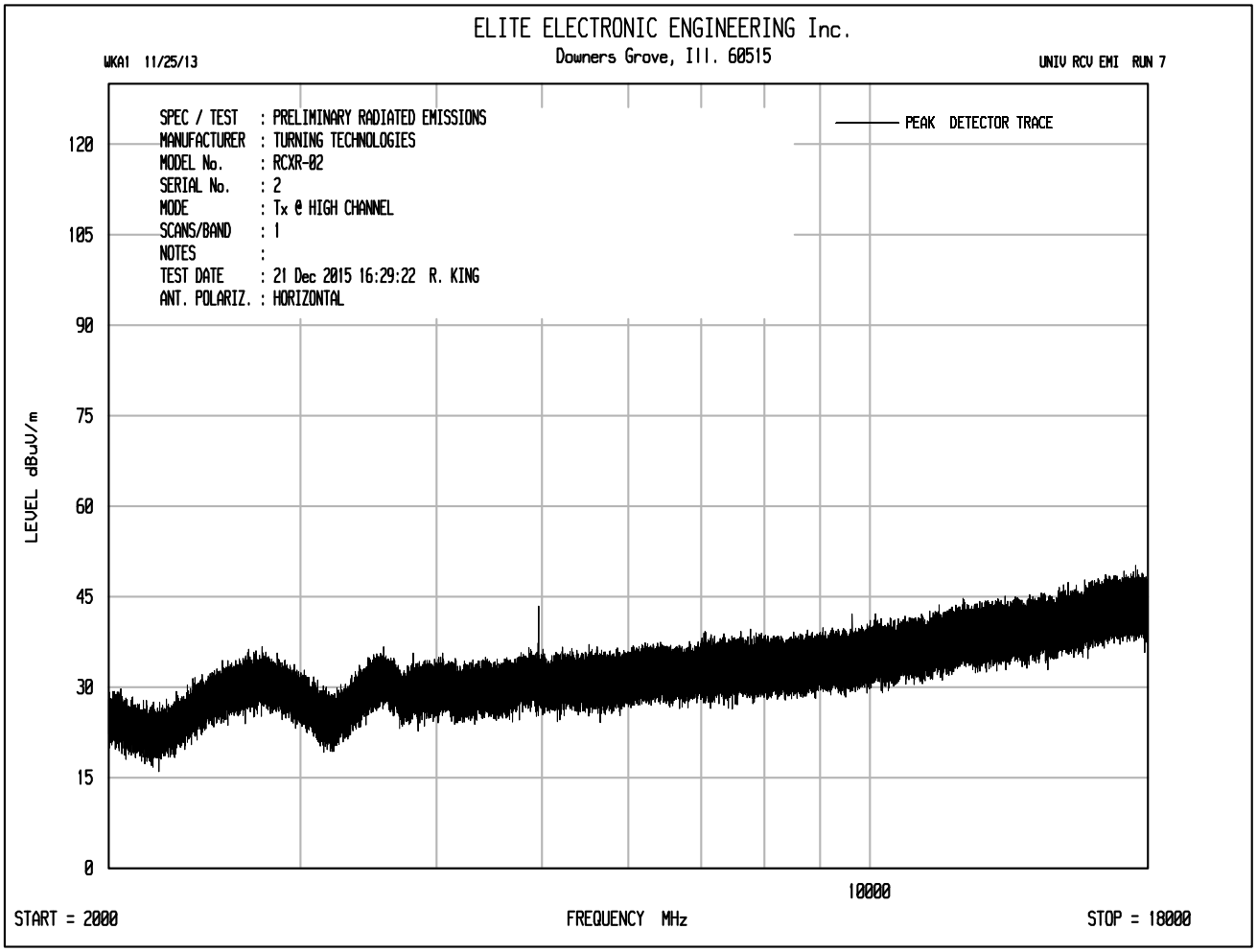

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 6
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCQR-02
SERIAL No. : 2
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES : CW
TEST DATE : 21 Dec 2015 14:54:46 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

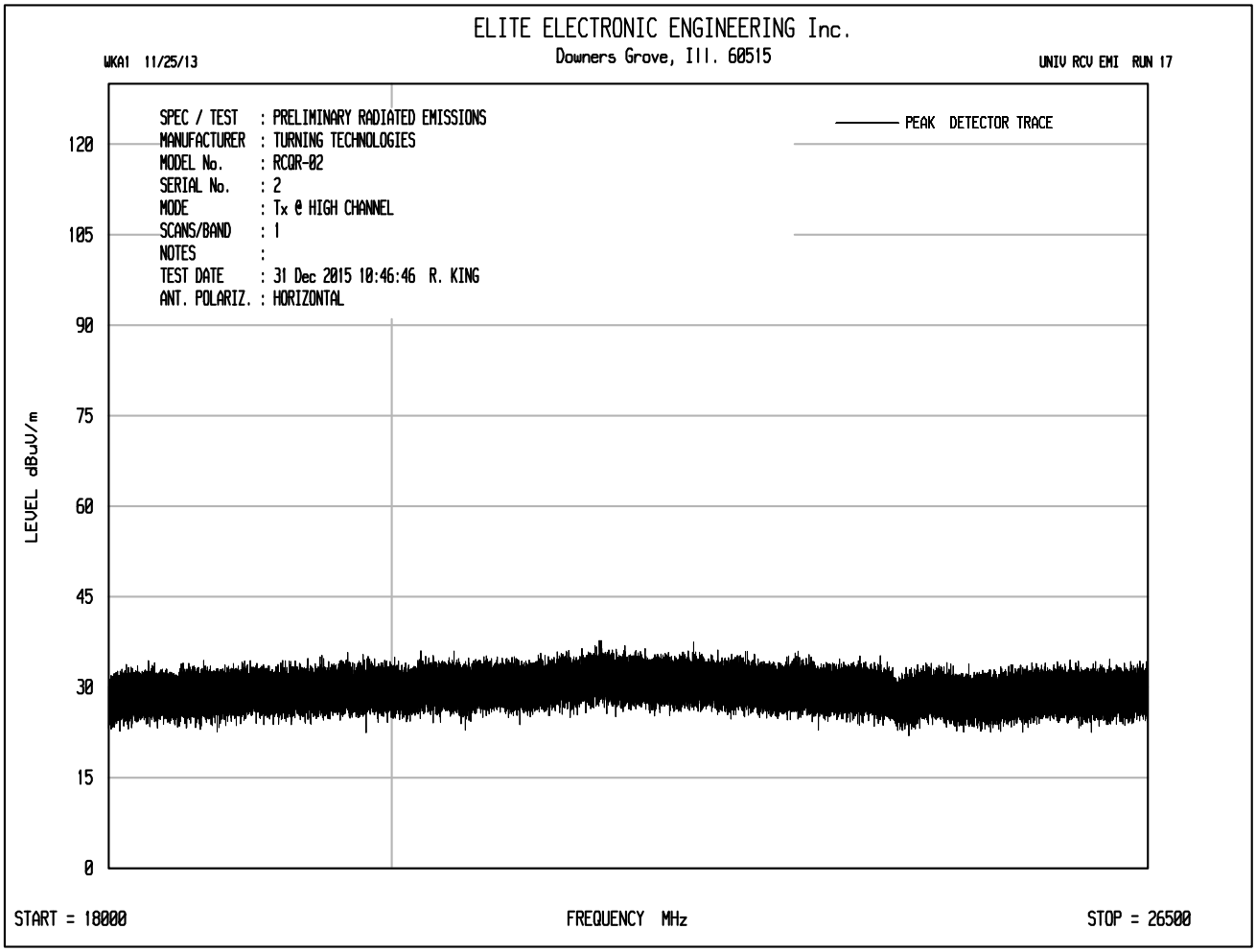

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 7
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCQR-02
SERIAL No. : 2
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES : CW
TEST DATE : 21 Dec 2015 14:56:18 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

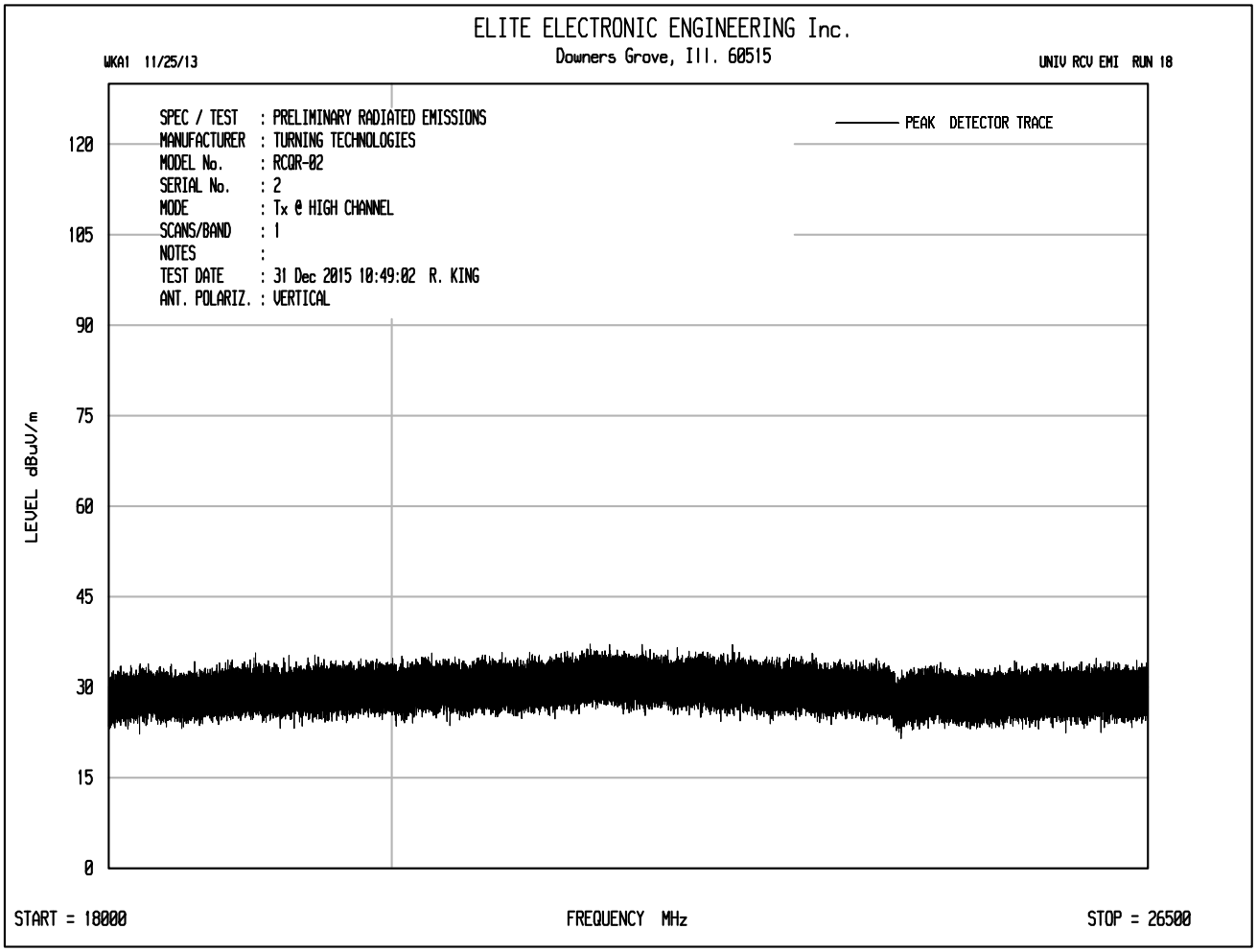

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 4
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCQR-02
SERIAL No. : 2
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 21 Dec 2015 15:38:49 R. KING
ANT. POLARIZ. : 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
WKA1 11/25/13
UNIV RCV EMI RUN 5
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCQR-02
SERIAL No. : 2
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 21 Dec 2015 15:40:32 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
WKA1 11/25/13
UNIV RCV EMI RUN 6
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCXR-02
SERIAL No. : 2
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 21 Dec 2015 16:22:52 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 2000
FREQUENCY MHz
STOP = 18000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 7
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCXR-02
SERIAL No. : 2
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 21 Dec 2015 16:29:22 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 2000
FREQUENCY MHz
STOP = 18000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 17
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCQR-02
SERIAL No. : 2
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 31 Dec 2015 10:46:46 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 = 26500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 18
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TURNING TECHNOLOGIES
MODEL No. : RCQR-02
SERIAL No. : 2
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 31 Dec 2015 10:49:02 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 = 26500

Manufacturer : Turning Technologies LLC
Test Item : Wireless Keypad
Model No. : RCQR-02
Serial No. : #2
Mode : Transmit at 2401MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : December 31, 2015
Test Distance : 3 meters
Note : Peak readings

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	AMB	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)
2401.000	H	64.4		3.4	32.4	0.0	100.2	102603.0	500000.0	-13.8
2401.000	V	59.3		3.4	32.4	0.0	95.2	57300.7	500000.0	-18.8
4802.000	H	56.2		4.8	34.2	-39.3	55.9	626.8	5000.0	-18.0
4802.000	V	50.8		4.8	34.2	-39.3	50.5	336.2	5000.0	-23.4
7203.000	H	47.5		6.1	36.1	-39.4	50.3	327.1	5000.0	-23.7
7203.000	V	47.1		6.1	36.1	-39.4	49.9	312.8	5000.0	-24.1
9604.000	H	45.8	*	6.8	36.8	-39.3	50.2	322.9	5000.0	-23.8
9604.000	V	44.9	*	6.8	36.8	-39.3	49.3	291.1	5000.0	-24.7
12005.000	H	46.7	*	8.0	39.1	-39.2	54.6	539.9	5000.0	-19.3
12005.000	V	45.7	*	8.0	39.1	-39.2	53.6	481.2	5000.0	-20.3
14406.000	H	45.4	*	8.7	39.5	-38.3	55.3	584.3	5000.0	-18.6
14406.000	V	44.4	*	8.7	39.5	-38.3	54.3	520.8	5000.0	-19.6
16807.000	H	45.0	*	9.4	42.5	-37.5	59.5	938.8	5000.0	-14.5
16807.000	V	46.7	*	9.4	42.5	-37.5	61.2	1141.8	5000.0	-12.8
19208.000	H	28.8	*	1.7	40.4	-28.6	42.2	129.4	5000.0	-31.7
19208.000	V	28.8	*	1.7	40.4	-28.6	42.3	129.7	5000.0	-31.7
21609.000	H	31.1	*	1.7	40.6	-28.7	44.7	170.8	5000.0	-29.3
21609.000	V	31.1	*	1.7	40.6	-28.7	44.7	170.8	5000.0	-29.3
24010.000	H	30.6	*	1.7	40.6	-30.0	43.0	140.9	5000.0	-31.0
24010.000	V	30.6	*	1.7	40.6	-30.0	43.0	140.9	5000.0	-31.0

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 : Wireless Keypad
Model No. : RCQR-02
Serial No. : #2
Mode : Transmit at 2401MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : December 31, 2015
Test Distance : 3 meters
Note : Average readings (small pulse)

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	AMB	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)
2401.00	H	64.4		3.4	32.4	0.0	-33.7	66.5	2114.3	50000.0	-27.5
2401.00	V	59.3		3.4	32.4	0.0	-33.7	61.4	1180.8	50000.0	-32.5
4802.00	H	56.2		4.8	34.2	-39.3	-33.7	22.2	12.9	500.0	-31.8
4802.00	V	50.8		4.8	34.2	-39.3	-33.7	16.8	6.9	500.0	-37.2
7203.00	H	47.5		6.1	36.1	-39.4	-33.7	16.6	6.7	500.0	-37.4
7203.00	V	47.1		6.1	36.1	-39.4	-33.7	16.2	6.4	500.0	-37.8
9604.00	H	45.8	*	6.8	36.8	-39.3	-33.7	16.5	6.7	500.0	-37.5
9604.00	V	44.9	*	6.8	36.8	-39.3	-33.7	15.6	6.0	500.0	-38.4
12005.00	H	46.7	*	8.0	39.1	-39.2	-33.7	20.9	11.1	500.0	-33.1
12005.00	V	45.7	*	8.0	39.1	-39.2	-33.7	19.9	9.9	500.0	-34.1
14406.00	H	45.4	*	8.7	39.5	-38.3	-33.7	21.6	12.0	500.0	-32.4
14406.00	V	44.4	*	8.7	39.5	-38.3	-33.7	20.6	10.7	500.0	-33.4
16807.00	H	45.0	*	9.4	42.5	-37.5	-33.7	25.7	19.3	500.0	-28.2
16807.00	V	46.7	*	9.4	42.5	-37.5	-33.7	27.4	23.5	500.0	-26.5
19208.00	H	28.8	*	1.7	40.4	-28.6	-33.7	8.5	2.7	500.0	-45.5
19208.00	V	28.8	*	1.7	40.4	-28.6	-33.7	8.5	2.7	500.0	-45.4
21609.00	H	31.1	*	1.7	40.6	-28.7	-33.7	10.9	3.5	500.0	-43.0
21609.00	V	31.1	*	1.7	40.6	-28.7	-33.7	10.9	3.5	500.0	-43.0
24010.00	H	30.6	*	1.7	40.6	-30.0	-33.7	9.3	2.9	500.0	-44.7
24010.00	V	30.6	*	1.7	40.6	-30.0	-33.7	9.3	2.9	500.0	-44.7

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 : Wireless Keypad
Model No. : RCQR-02
Serial No. : #2
Mode : Transmit at 2401MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : December 31, 2015
Test Distance : 3 meters
Note : Average readings (large pulse)

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	AMB	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)
2401.00	H	64.4		3.4	32.4	0.0	-28.2	72.1	4005.5	50000.0	-21.9
2401.00	V	59.3		3.4	32.4	0.0	-28.2	67.0	2237.0	50000.0	-27.0
4802.00	H	56.2		4.8	34.2	-39.3	-28.2	27.8	24.5	500.0	-26.2
4802.00	V	50.8		4.8	34.2	-39.3	-28.2	22.4	13.1	500.0	-31.6
7203.00	H	47.5		6.1	36.1	-39.4	-28.2	22.1	12.8	500.0	-31.9
7203.00	V	47.1		6.1	36.1	-39.4	-28.2	21.7	12.2	500.0	-32.2
9604.00	H	45.8	*	6.8	36.8	-39.3	-28.2	22.0	12.6	500.0	-32.0
9604.00	V	44.9	*	6.8	36.8	-39.3	-28.2	21.1	11.4	500.0	-32.9
12005.00	H	46.7	*	8.0	39.1	-39.2	-28.2	26.5	21.1	500.0	-27.5
12005.00	V	45.7	*	8.0	39.1	-39.2	-28.2	25.5	18.8	500.0	-28.5
14406.00	H	45.4	*	8.7	39.5	-38.3	-28.2	27.2	22.8	500.0	-26.8
14406.00	V	44.4	*	8.7	39.5	-38.3	-28.2	26.2	20.3	500.0	-27.8
16807.00	H	45.0	*	9.4	42.5	-37.5	-28.2	31.3	36.7	500.0	-22.7
16807.00	V	46.7	*	9.4	42.5	-37.5	-28.2	33.0	44.6	500.0	-21.0
19208.00	H	28.8	*	1.7	40.4	-28.6	-28.2	14.1	5.1	500.0	-39.9
19208.00	V	28.8	*	1.7	40.4	-28.6	-28.2	14.1	5.1	500.0	-39.9
21609.00	H	31.1	*	1.7	40.6	-28.7	-28.2	16.5	6.7	500.0	-37.5
21609.00	V	31.1	*	1.7	40.6	-28.7	-28.2	16.5	6.7	500.0	-37.5
24010.00	H	30.6	*	1.7	40.6	-30.0	-28.2	14.8	5.5	500.0	-39.2
24010.00	V	30.6	*	1.7	40.6	-30.0	-28.2	14.8	5.5	500.0	-39.2

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 : Wireless Keypad
Model No. : RCQR-02
Serial No. : #2
Mode : Transmit at 2441MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : December 31, 2015
Test Distance : 3 meters
Note : Peak readings

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	AMB	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)
2441.000	H	63.5		3.5	32.5	0.0	99.5	93918.9	500000.0	-14.5
2441.000	V	57.6		3.5	32.5	0.0	93.5	47397.2	500000.0	-20.5
4882.000	H	54.8		4.9	34.2	-39.3	54.5	531.1	5000.0	-19.5
4882.000	V	49.2		4.9	34.2	-39.3	48.9	279.1	5000.0	-25.1
7323.000	H	49.1		6.2	36.2	-39.4	52.0	397.8	5000.0	-22.0
7323.000	V	49.1		6.2	36.2	-39.4	52.0	397.8	5000.0	-22.0
9764.000	H	46.0	*	6.9	36.9	-39.3	50.6	337.7	5000.0	-23.4
9764.000	V	46.2	*	6.9	36.9	-39.3	50.7	344.7	5000.0	-23.2
12205.000	H	47.0	*	8.0	39.3	-39.1	55.2	573.5	5000.0	-18.8
12205.000	V	47.0	*	8.0	39.3	-39.1	55.2	573.5	5000.0	-18.8
14646.000	H	45.7	*	8.8	39.8	-38.2	56.0	634.4	5000.0	-17.9
14646.000	V	45.0	*	8.8	39.8	-38.2	55.4	587.3	5000.0	-18.6
17087.000	H	46.3	*	9.5	42.2	-37.6	60.5	1057.3	5000.0	-13.5
17087.000	V	44.5	*	9.5	42.2	-37.6	58.7	859.4	5000.0	-15.3
19528.000	H	28.8	*	1.7	40.4	-28.5	42.4	131.2	5000.0	-31.6
19528.000	V	28.8	*	1.7	40.4	-28.5	42.4	131.5	5000.0	-31.6
21969.000	H	31.1	*	1.7	40.6	-29.2	44.1	160.9	5000.0	-29.9
21969.000	V	31.1	*	1.7	40.6	-29.2	44.1	160.9	5000.0	-29.9
24410.000	H	30.6	*	1.7	40.6	-30.2	42.7	136.9	5000.0	-31.3
24410.000	V	30.6	*	1.7	40.6	-30.2	42.7	136.9	5000.0	-31.3

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 : Wireless Keypad
Model No. : RCQR-02
Serial No. : #2
Mode : Transmit at 2441MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : December 31, 2015
Test Distance : 3 meters
Note : Average readings (small pulse)

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	AMB	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)
2441.00	H	63.5		3.5	32.5	0.0	-33.7	65.7	1935.3	50000.0	-28.2
2441.00	V	57.56		3.5	32.5	0.0	-33.7	59.8	976.7	50000.0	-34.2
4882.00	H	54.76		4.9	34.2	-39.3	-33.7	20.8	10.9	500.0	-33.2
4882.00	V	49.17		4.9	34.2	-39.3	-33.7	15.2	5.8	500.0	-38.8
7323.00	H	49.09		6.2	36.2	-39.4	-33.7	18.3	8.2	500.0	-35.7
7323.00	V	49.09		6.2	36.2	-39.4	-33.7	18.3	8.2	500.0	-35.7
9764.00	H	46.02	*	6.9	36.9	-39.3	-33.7	16.8	7.0	500.0	-37.1
9764.00	V	46.2	*	6.9	36.9	-39.3	-33.7	17.0	7.1	500.0	-36.9
12205.00	H	46.99	*	8.0	39.3	-39.1	-33.7	21.5	11.8	500.0	-32.5
12205.00	V	46.99	*	8.0	39.3	-39.1	-33.7	21.5	11.8	500.0	-32.5
14646.00	H	45.67	*	8.8	39.8	-38.2	-33.7	22.3	13.1	500.0	-31.7
14646.00	V	45	*	8.8	39.8	-38.2	-33.7	21.7	12.1	500.0	-32.3
17087.00	H	46.3	*	9.5	42.2	-37.6	-33.7	26.8	21.8	500.0	-27.2
17087.00	V	44.5	*	9.5	42.2	-37.6	-33.7	25.0	17.7	500.0	-29.0
19528.00	H	28.78	*	1.7	40.4	-28.5	-33.7	8.6	2.7	500.0	-45.3
19528.00	V	28.8	*	1.7	40.4	-28.5	-33.7	8.7	2.7	500.0	-45.3
21969.00	H	31.07	*	1.7	40.6	-29.2	-33.7	10.4	3.3	500.0	-43.6
21969.00	V	31.07	*	1.7	40.6	-29.2	-33.7	10.4	3.3	500.0	-43.6
24410.00	H	30.64	*	1.7	40.6	-30.2	-33.7	9.0	2.8	500.0	-45.0
24410.00	V	30.64	*	1.7	40.6	-30.2	-33.7	9.0	2.8	500.0	-45.0

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 : Wireless Keypad
Model No. : RCQR-02
Serial No. : #2
Mode : Transmit at 2441MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : December 31, 2015
Test Distance : 3 meters
Note : Average readings (large pulse)

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	AMB	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)
2441.00	H	63.5		3.5	32.5	0.0	-33.7	65.7	1935.3	50000.0	-28.2
2441.00	V	57.56		3.5	32.5	0.0	-33.7	59.8	976.7	50000.0	-34.2
4882.00	H	54.76		4.9	34.2	-39.3	-33.7	20.8	10.9	500.0	-33.2
4882.00	V	49.17		4.9	34.2	-39.3	-33.7	15.2	5.8	500.0	-38.8
7323.00	H	49.09		6.2	36.2	-39.4	-33.7	18.3	8.2	500.0	-35.7
7323.00	V	49.09		6.2	36.2	-39.4	-33.7	18.3	8.2	500.0	-35.7
9764.00	H	46.02	*	6.9	36.9	-39.3	-33.7	16.8	7.0	500.0	-37.1
9764.00	V	46.2	*	6.9	36.9	-39.3	-33.7	17.0	7.1	500.0	-36.9
12205.00	H	46.99	*	8.0	39.3	-39.1	-33.7	21.5	11.8	500.0	-32.5
12205.00	V	46.99	*	8.0	39.3	-39.1	-33.7	21.5	11.8	500.0	-32.5
14646.00	H	45.67	*	8.8	39.8	-38.2	-33.7	22.3	13.1	500.0	-31.7
14646.00	V	45	*	8.8	39.8	-38.2	-33.7	21.7	12.1	500.0	-32.3
17087.00	H	46.3	*	9.5	42.2	-37.6	-33.7	26.8	21.8	500.0	-27.2
17087.00	V	44.5	*	9.5	42.2	-37.6	-33.7	25.0	17.7	500.0	-29.0
19528.00	H	28.78	*	1.7	40.4	-28.5	-33.7	8.6	2.7	500.0	-45.3
19528.00	V	28.8	*	1.7	40.4	-28.5	-33.7	8.7	2.7	500.0	-45.3
21969.00	H	31.07	*	1.7	40.6	-29.2	-33.7	10.4	3.3	500.0	-43.6
21969.00	V	31.07	*	1.7	40.6	-29.2	-33.7	10.4	3.3	500.0	-43.6
24410.00	H	30.64	*	1.7	40.6	-30.2	-33.7	9.0	2.8	500.0	-45.0
24410.00	V	30.64	*	1.7	40.6	-30.2	-33.7	9.0	2.8	500.0	-45.0

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 : Wireless Keypad
Model No. : RCQR-02
Serial No. : #2
Mode : Transmit at 2482MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : December 31, 2015
Test Distance : 3 meters
Note : Peak readings

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	AMB	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)
2482.000	H	63.5		3.5	32.6	0.0	99.6	95146.2	500000.0	-14.4
2482.000	V	61.4		3.5	32.6	0.0	97.5	74712.2	500000.0	-16.5
4964.000	H	51.5		4.9	34.2	-39.4	51.2	363.7	5000.0	-22.8
4964.000	V	48.3		4.9	34.2	-39.4	48.0	251.9	5000.0	-26.0
7446.000	H	49.3		6.2	36.3	-39.4	52.4	416.4	5000.0	-21.6
7446.000	V	48.3		6.2	36.3	-39.4	51.4	369.9	5000.0	-22.6
9928.000	H	45.8	*	7.0	37.1	-39.2	50.6	340.5	5000.0	-23.3
9928.000	V	44.9	*	7.0	37.1	-39.2	49.7	307.0	5000.0	-24.2
12410.000	H	46.7	*	8.0	39.4	-39.0	55.1	566.0	5000.0	-18.9
12410.000	V	45.7	*	8.0	39.4	-39.0	54.1	504.4	5000.0	-19.9
14892.000	H	45.4	*	8.9	40.0	-38.2	56.2	642.1	5000.0	-17.8
14892.000	V	44.4	*	8.9	40.0	-38.2	55.2	572.3	5000.0	-18.8
17374.000	H	45.0	*	9.7	41.8	-37.7	58.7	865.9	5000.0	-15.2
17374.000	V	46.7	*	9.7	41.8	-37.7	60.4	1053.1	5000.0	-13.5
19856.000	H	28.8	*	1.7	40.4	-28.2	42.7	135.8	5000.0	-31.3
19856.000	V	28.8	*	1.7	40.4	-28.2	42.7	136.1	5000.0	-31.3
22338.000	H	31.1	*	1.7	40.6	-29.1	44.2	162.5	5000.0	-29.8
22338.000	V	31.1	*	1.7	40.6	-29.1	44.2	162.5	5000.0	-29.8
24820.000	H	30.6	*	1.7	40.6	-30.8	42.1	127.8	5000.0	-31.9
24820.000	V	30.6	*	1.7	40.6	-30.8	42.1	127.8	5000.0	-31.9

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 : Wireless Keypad
Model No. : RCQR-02
Serial No. : #2
Mode : Transmit at 2482MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : December 31, 2015
Test Distance : 3 meters
Note : Average readings (small pulse)

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	AMB	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)
2482.00	H	63.5		3.5	32.6	0.0	-33.7	65.8	1960.6	50000.0	-28.1
2482.00	V	61.4		3.5	32.6	0.0	-33.7	63.7	1539.5	50000.0	-30.2
4964.00	H	51.5		4.9	34.2	-39.4	-33.7	17.5	7.5	500.0	-36.5
4964.00	V	48.3		4.9	34.2	-39.4	-33.7	14.3	5.2	500.0	-39.7
7446.00	H	49.3		6.2	36.3	-39.4	-33.7	18.7	8.6	500.0	-35.3
7446.00	V	48.3		6.2	36.3	-39.4	-33.7	17.6	7.6	500.0	-36.3
9928.00	H	45.8	*	7.0	37.1	-39.2	-33.7	16.9	7.0	500.0	-37.1
9928.00	V	44.9	*	7.0	37.1	-39.2	-33.7	16.0	6.3	500.0	-38.0
12410.00	H	46.7	*	8.0	39.4	-39.0	-33.7	21.3	11.7	500.0	-32.6
12410.00	V	45.7	*	8.0	39.4	-39.0	-33.7	20.3	10.4	500.0	-33.6
14892.00	H	45.4	*	8.9	40.0	-38.2	-33.7	22.4	13.2	500.0	-31.5
14892.00	V	44.4	*	8.9	40.0	-38.2	-33.7	21.4	11.8	500.0	-32.5
17374.00	H	45.0	*	9.7	41.8	-37.7	-33.7	25.0	17.8	500.0	-29.0
17374.00	V	46.7	*	9.7	41.8	-37.7	-33.7	26.7	21.7	500.0	-27.3
19856.00	H	28.8	*	1.7	40.4	-28.2	-33.7	8.9	2.8	500.0	-45.0
19856.00	V	28.8	*	1.7	40.4	-28.2	-33.7	9.0	2.8	500.0	-45.0
22338.00	H	31.1	*	1.7	40.6	-29.1	-33.7	10.5	3.3	500.0	-43.5
22338.00	V	31.1	*	1.7	40.6	-29.1	-33.7	10.5	3.3	500.0	-43.5
24820.00	H	30.6	*	1.7	40.6	-30.8	-33.7	8.4	2.6	500.0	-45.6
24820.00	V	30.6	*	1.7	40.6	-30.8	-33.7	8.4	2.6	500.0	-45.6

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 : Wireless Keypad
Model No. : RCQR-02
Serial No. : #2
Mode : Transmit at 2482MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : December 31, 2015
Test Distance : 3 meters
Note : Average readings (large pulse)

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	AMB	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)
2482.00	H	63.5		3.5	32.6	0.0	-28.2	71.4	3714.4	50000.0	-22.6
2482.00	V	61.4		3.5	32.6	0.0	-28.2	69.3	2916.7	50000.0	-24.7
4964.00	H	51.5		4.9	34.2	-39.4	-28.2	23.0	14.2	500.0	-30.9
4964.00	V	48.3		4.9	34.2	-39.4	-28.2	19.9	9.8	500.0	-34.1
7446.00	H	49.3		6.2	36.3	-39.4	-28.2	24.2	16.3	500.0	-29.8
7446.00	V	48.3		6.2	36.3	-39.4	-28.2	23.2	14.4	500.0	-30.8
9928.00	H	45.8	*	7.0	37.1	-39.2	-28.2	22.5	13.3	500.0	-31.5
9928.00	V	44.9	*	7.0	37.1	-39.2	-28.2	21.6	12.0	500.0	-32.4
12410.00	H	46.7	*	8.0	39.4	-39.0	-28.2	26.9	22.1	500.0	-27.1
12410.00	V	45.7	*	8.0	39.4	-39.0	-28.2	25.9	19.7	500.0	-28.1
14892.00	H	45.4	*	8.9	40.0	-38.2	-28.2	28.0	25.1	500.0	-26.0
14892.00	V	44.4	*	8.9	40.0	-38.2	-28.2	27.0	22.3	500.0	-27.0
17374.00	H	45.0	*	9.7	41.8	-37.7	-28.2	30.6	33.8	500.0	-23.4
17374.00	V	46.7	*	9.7	41.8	-37.7	-28.2	32.3	41.1	500.0	-21.7
19856.00	H	28.8	*	1.7	40.4	-28.2	-28.2	14.5	5.3	500.0	-39.5
19856.00	V	28.8	*	1.7	40.4	-28.2	-28.2	14.5	5.3	500.0	-39.5
22338.00	H	31.1	*	1.7	40.6	-29.1	-28.2	16.0	6.3	500.0	-37.9
22338.00	V	31.1	*	1.7	40.6	-29.1	-28.2	16.0	6.3	500.0	-37.9
24820.00	H	30.6	*	1.7	40.6	-30.8	-28.2	14.0	5.0	500.0	-40.0
24820.00	V	30.6	*	1.7	40.6	-30.8	-28.2	14.0	5.0	500.0	-40.0

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 : Wireless Keypad
Model No. : RCQR-02
Serial No. : #2
Mode : Transmit at 2401MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : December 21, 2015
Test Distance : 3 meters
Note : Peak readings

Small Pulse

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)
2400.000	H	29.8	3.4	32.4	0.0	65.6	1914.3	5000.0	-8.3

Large Pulse

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)
2400.000	H	30.5	3.4	32.4	0.0	66.3	2075.0	5000.0	-7.6

Checked BY Richard E. King :

Richard E. King

Manufacturer : Turning Technologies LLC
Test Item : Wireless Keypad
Model No. : RCQR-02
Serial No. : #2
Mode : Transmit at 2401MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : December
Test Distance : 3 meters
Note : Average readings

Small Pulse

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	H	29.8	3.4	32.4	0.0	-33.7	31.9	39.5	500.0	-22.0

Large Pulse

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	-29.8	43.0	141.3	500.0	-11.0

Checked BY Richard E. King :

Richard E. King

Manufacturer : Turning Technologies LLC
Test Item : Wireless Keypad
Model No. : RCQR-02
Serial No. : #2
Mode : Transmit at 2482MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : December 21, 2015
Test Distance : 3 meters
Note : Peak readings

Small Pulse

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)
2483.500	H	35.5	3.5	32.6	0.0	71.6	3789.6	5000.0	-2.4

Large Pulse

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)
2483.500	H	33.7	3.5	32.6	0.0	69.8	3076.8	5000.0	-4.2

Checked BY Richard E. King :

Richard E. King

Manufacturer : Turning Technologies LLC
Test Item : Wireless Keypad
Model No. : RCQR-02
Serial No. : #2
Mode : Transmit at 2482MHz
Test Specification : FCC 15.249 and Industry Canada RSS-210 Annex 2, section A2.9
Date : December 21, 2015
Test Distance : 3 meters
Note : Average readings

Small Pulse

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	H	33.69	3.5	32.6	0.0	-33.7	36.1	63.5	500.0	-17.9

Large Pulse

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	H	35.5	3.5	32.6	0.0	-28.2	43.4	147.4	500.0	-10.6

Checked BY Richard E. King :

Richard E. King