Measurement of RF Emissions from a P1500-B Base Station Transmitter

For	TouchTronics, Inc. 57315 Nagy Drive Elkhart, IN 46517
P.O. Number	12247
Date Tested	December 16 and 17, 2013
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:

Richard E. King
EMC Engineer

Requested By:

David Evans
TouchTronics, Inc.

Approved By:

Raymond J. Klouda
Registered Professional
Engineer of Illinois - 44894

Elite Electronic Engineering, Inc.
1516 Centre Circle
Downers Grove, IL 60515
Tel : (630) 495-9770
Fax: (630) 495-9785
www.elitetest.com

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REVISION HISTORY

Revision	Date	Description
—	16 Jan 2014	Initial release

Measurement of RF Emissions from a Base Station Transmitter, Model No. P1500-B

1. INTRODUCTION

1.1. Scope of Tests

This report presents the results of the RF emissions measurements performed on a Base Station Transmitter, Model No. P1500-B, Serial No. prototype #5, (hereinafter referred to as the Equipment Under Test (EUT)). The EUT was designed to transmit at approximately 125 kHz using an M190-A2 or M190-A3 external antenna. The EUT was manufactured and submitted for testing by TouchTronics, Inc. located in Elkhart, IN.

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, for Intentional Radiators and Industry Canada Radio Standards Specification, RSS-210, “Low-power License-exempt Radiocommunication Devices 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 23.4^{o}C and the relative humidity was 17%.

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 2013
- 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 Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment”, Issue 8, December 2010

3. EUT SETUP AND OPERATION

3.1. General Description

The EUT is a TouchTronics, Inc., Base Station Transmitter, Model No. P1500-B. A block diagram of the EUT setup is shown as Figure 1.

3.1.1. Power Input

The EUT obtained 13.8VDC power through 2 leads from a power supply simulating an automotive battery.

3.1.2. Peripheral Equipment

No peripheral equipment was submitted with the EUT.

3.1.3. Signal Input/Output Leads

The following interconnect cables were submitted with the EUT:

Item	Description
Inter connect cable	Two – J1939 CAN bus cables 25 feet long. From the transceiver to the antennas
Alarm Status Cable	One – Alarm status cable 1 meter long terminated with a RED LED.

3.1.4. Grounding

The EUT was ungrounded during the tests.

3.2. Software

For all tests the EUT had Firmware Version 1.0.0 loaded onto the device to provide correct load characteristics.

3.3. Operational Mode

For all tests the EUT was placed on an 80cm high non-conductive stand. The EUT was energized and configured to transmit continuously.

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 C63.4-2009 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.

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

Since the EUT is powered by an automotive battery in its intended application, no conducted emissions tests are required.

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 10msec/div. The amplitude settings are adjusted so that the on/off transitions clear the 4th division from the bottom of the display. The markers are set at the beginning and end of a word period. If the word period exceeds 100 msec the word period is set to 100 msec. The on-time and off-time are then measured. The on-time is total time signal level exceeds the 4th division. Off-time is time under for the word period. The duty cycle is then computed as the (On-time/ word period) where the word period = (On-time + Off-time).

The duty cycle factor was calculated from information supplied by the manufacturer. The following procedure was used to measure the duty cycle:

a) With the transmitter set up to transmit for maximum pulse density, the time domain trace is displayed on the spectrum analyzer.

b) This trace is obtained by tuning center frequency to the transmitter frequency and then setting a zero span width with 10msec/div.

c) The amplitude settings are adjusted so that the on/off transitions clear the 4th division from the bottom of the display. The markers are set at the beginning and end of a word period. If the word period exceeds 100 msec the word period is set to 100 msec.

d) The on-time and off-time are then measured. The on-time is total time signal level exceeds the 4th division. Off-time is time under for the word period.

e) The duty cycle is then computed as the (On-time/ word period) where the word period = (On-time + Off-time).

f) The duty cycle factor is computed from the duty cycle measurements.

5.2.2.Results

The plots of the duty cycle are shown on data pages 13 through 18.

The following measurements were taken:

Pre-Amble OFF Time = 501uS
Pre-Amble ON Time = 3.9mS
Wake-up ON Time = 2.3mS
Wake-up OFF Time = 1.6mS
Serial Number (Manchester Encoded) ON Time = (15.5mS/2) = 7.75mS
Serial Number (Manchester Encoded) OFF Time = (15.5mS/2) = 7.75mS

Duty Cycle = ((ON Time)/((ON Time)+(OFF Time))).
Duty Cycle = ((3.9ms+7.75mS+2.3mS)/((3.9ms+7.75mS+2.3mS)+(.5mS+7.75mS+1.6mS))) = -4.6dB.

The duty cycle factor was computed to be -4.6dB.

5.3. Radiated Measurements

5.3.1.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)	Field Strength (uV/m)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	2400/F(kHz)	30
1.705 – 30.0	30	30

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 C63.4-2009 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 10kHz to 30MHz 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 133kHz to 1.3MHz using an active loop antenna at a 3 meter test distance. 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 test item was rotated so that all of its sides were exposed to the receiving antenna.
2) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were

measured. In the vertical polarization, the active loop antenna was rotated 360 degrees about its vertical axis.

3) For hand-held or body-worn devices, the test item was rotated through three orthogonal axes to determine which orientation produces the highest emission relative to the limit.

5.3.3.Results

The preliminary plots, with the EUT transmitting at 125 kHz with both the M190-A2 and M190-A3 antennas, are presented on data pages 19 through 22. The plots are presented for a reference only, and are not used to determine compliance.

The final radiated levels, with the test item transmitting at 125 kHz, are presented on data pages 23 and 24. 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 Figure 3.

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 TouchTronics, Inc. personnel.

6.2. Disposition of the EUT

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

7. CONCLUSIONS

It was determined that the TouchTronics, Inc. Base Station Transmitter, Model No. P1500-B, Serial No. prototype #5, 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 TouchTronics, Inc. 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
CDY0	WORKSTATION	ELITE	WORKSTATION			N/A	
NLS1	24" ACTIVE LOOP ANTENNA	EMCO	6502	8903-2329	0.01-30MHZ	6/20/2013	6/20/2014
NTA2	BILOG ANTENNA	TESEQ	6112D	28040	25-1000MHz	8/30/2013	8/30/2014
NWQ2	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS LINDGREN	3117	66659	1GHZ-18GHZ	3/18/2013	3/18/2014
RBB0	EMI TEST RECEIVER 20HZ TO 40 GHZ.	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	3/7/2013	3/7/2014
WKA1	SOFTWARE, UNIVERSAL RCV EMI	ELITE	UNIV_RCV_EMI	1	---	I/O	
WQB0	RE_8546A						
WQB0	RE_8546A						
WQC0	HF_8546A						
WQC0	HF_8546A						
XLQX	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	63	DC-2GHZ	8/5/2013	8/5/2014

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

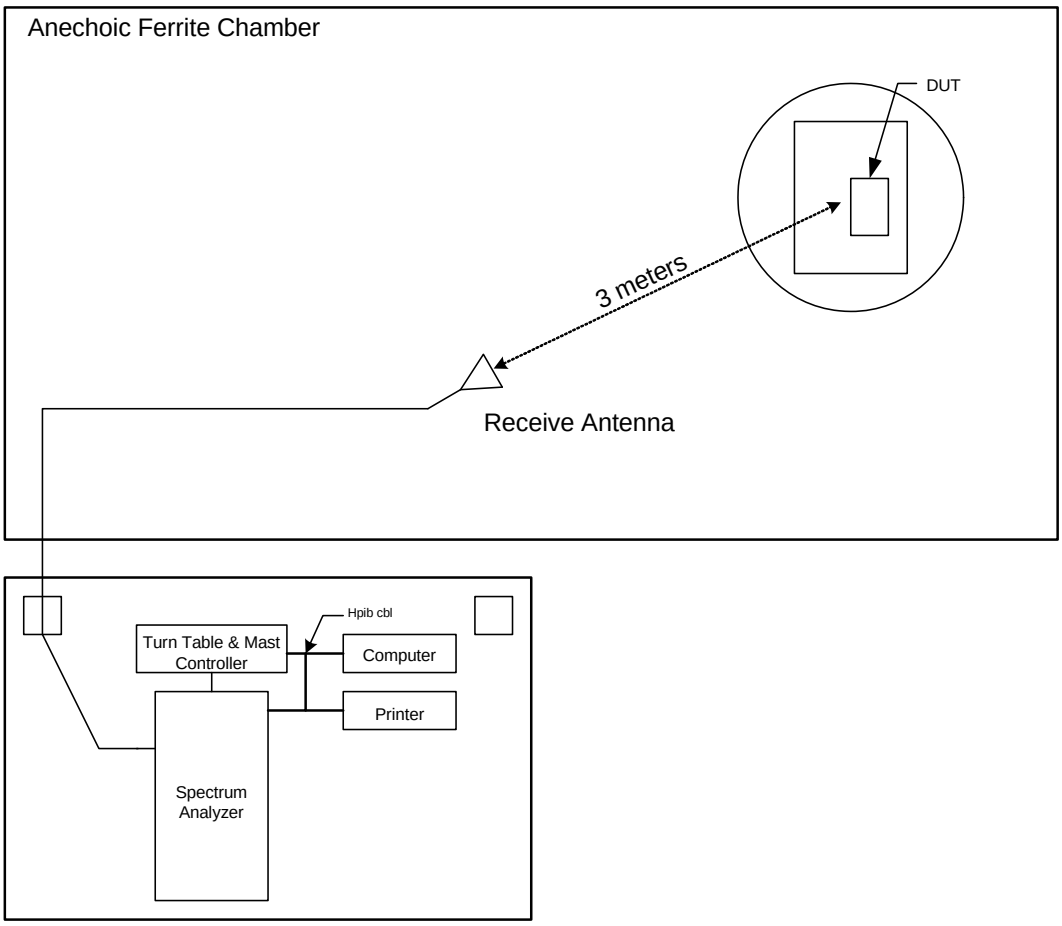
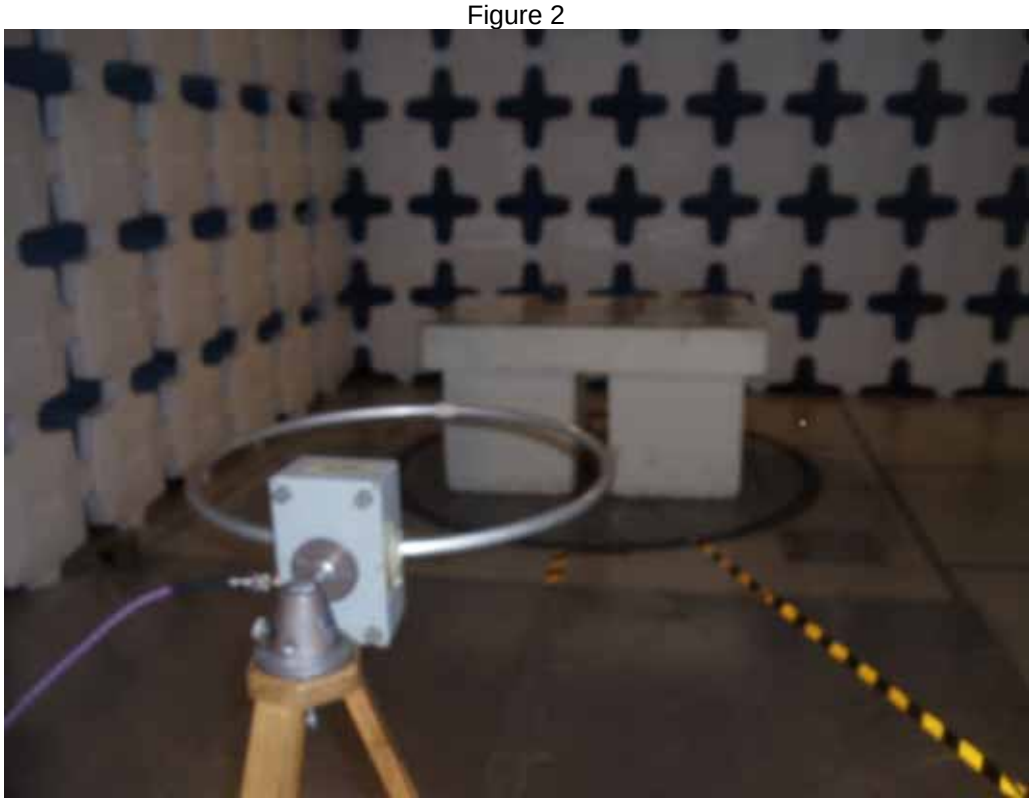
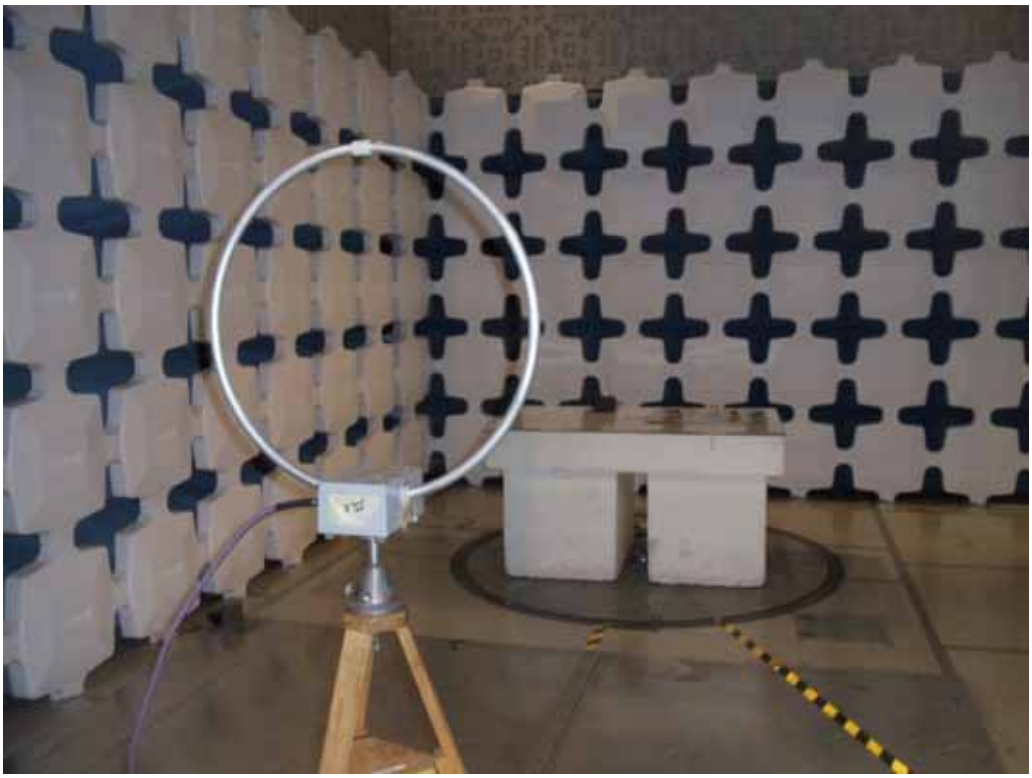


FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

Figure 2



Test Setup for Radiated Emissions, Below 1GHz – Horizontal Polarization With M190-A2 external antenna

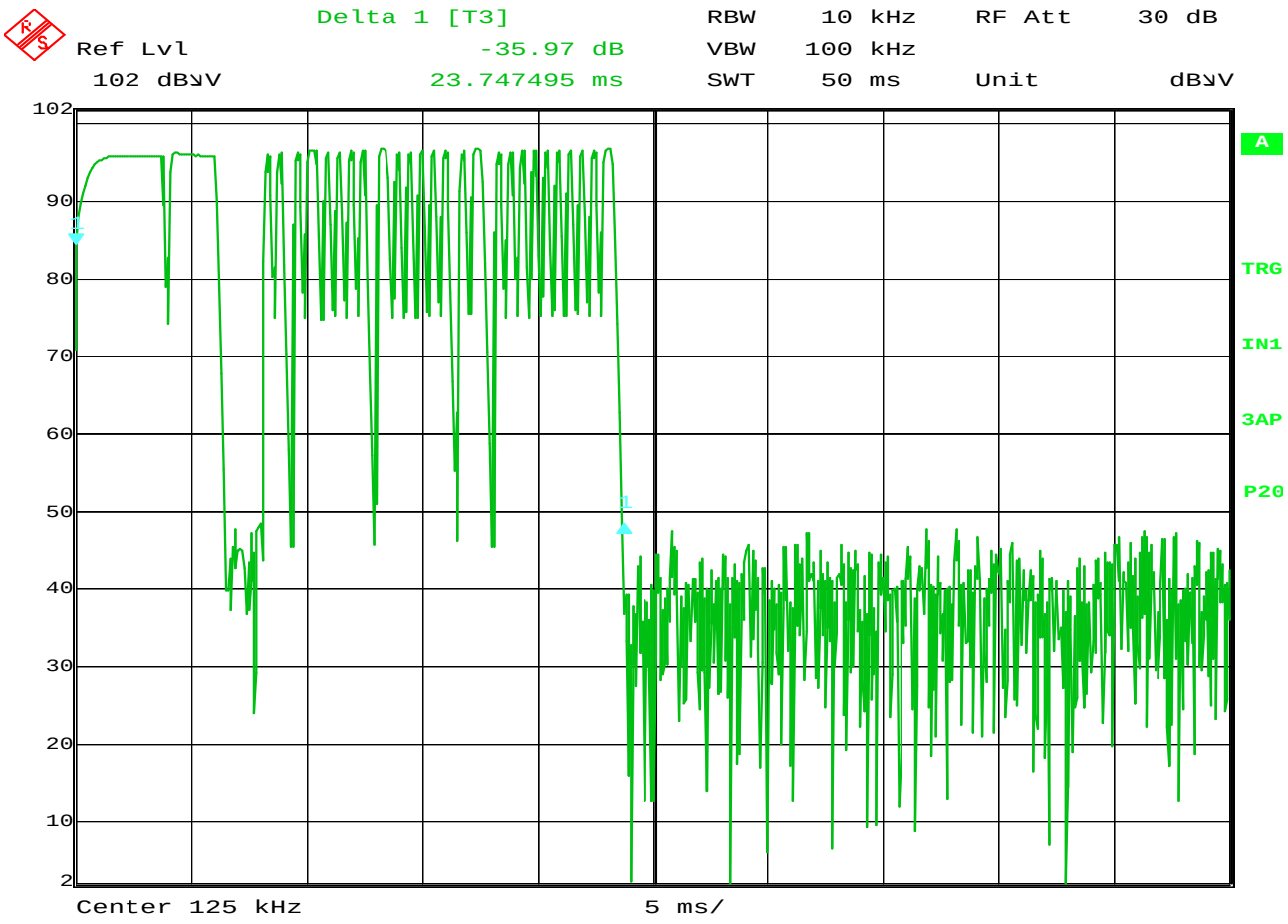


Test Setup for Radiated Emissions, Below 1GHz – Vertical Polarization With M190-A2 external antenna

Figure 3

Test Setup for Radiated Emissions, Below 1GHz – Horizontal Polarization With M190-A3 external antenna

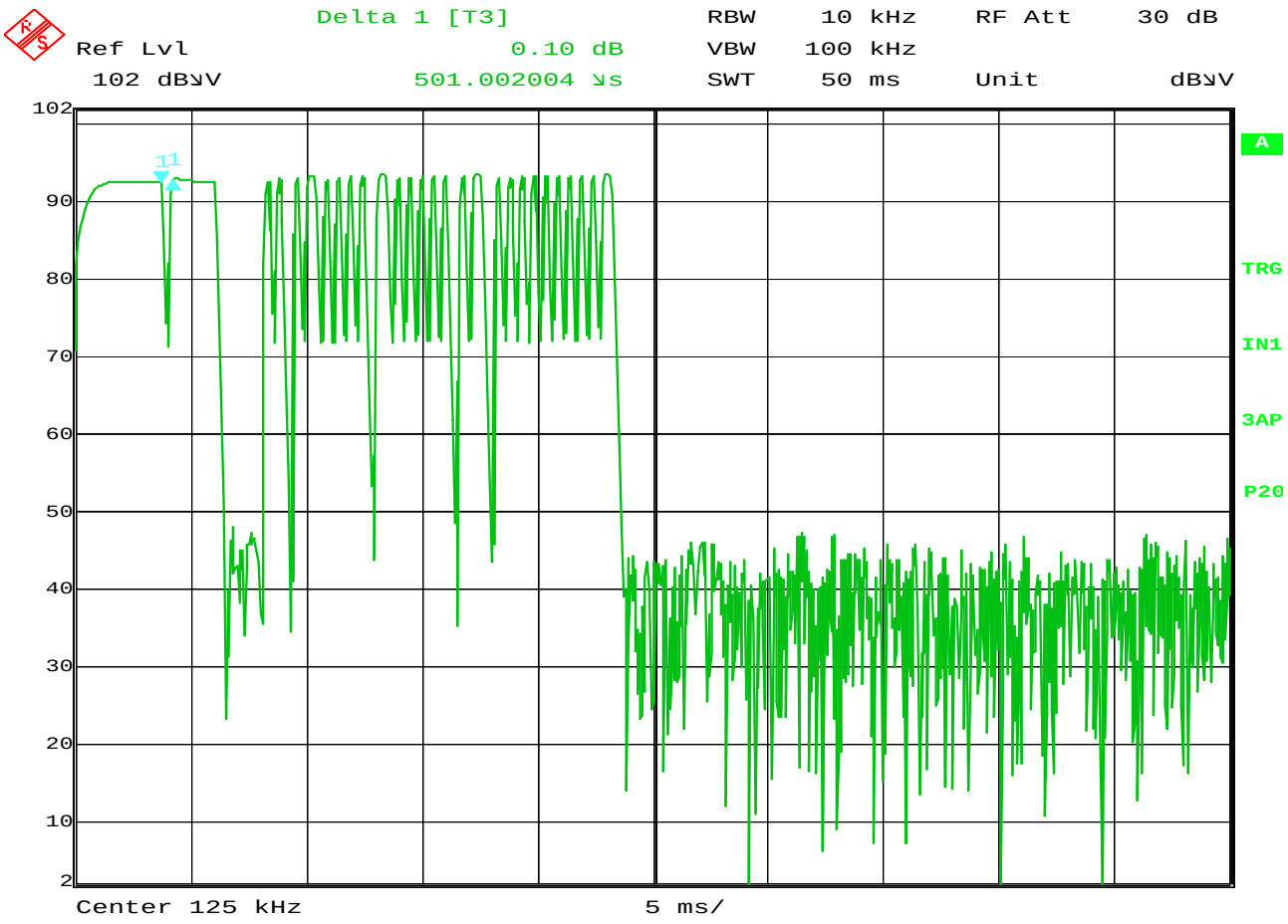
Test Setup for Radiated Emissions, Below 1GHz – Vertical Polarization With M190-A3 external antenna



FCC 15.35 Duty Cycle Correction Factor

MANUFACTURER	:	TouchTronics, Inc.
MODEL NUMBER	:	P1500-B
SERIAL NUMBER	:	Prototype #5
TEST MODE	:	Tx @ 125kHz
NOTES	:	M190-A2
NOTES	:	Manchester Encoded
NOTES	:	Duty Cycle = 20*log((ON Time/(ON Time+OFF Time)) = -4.6 dB

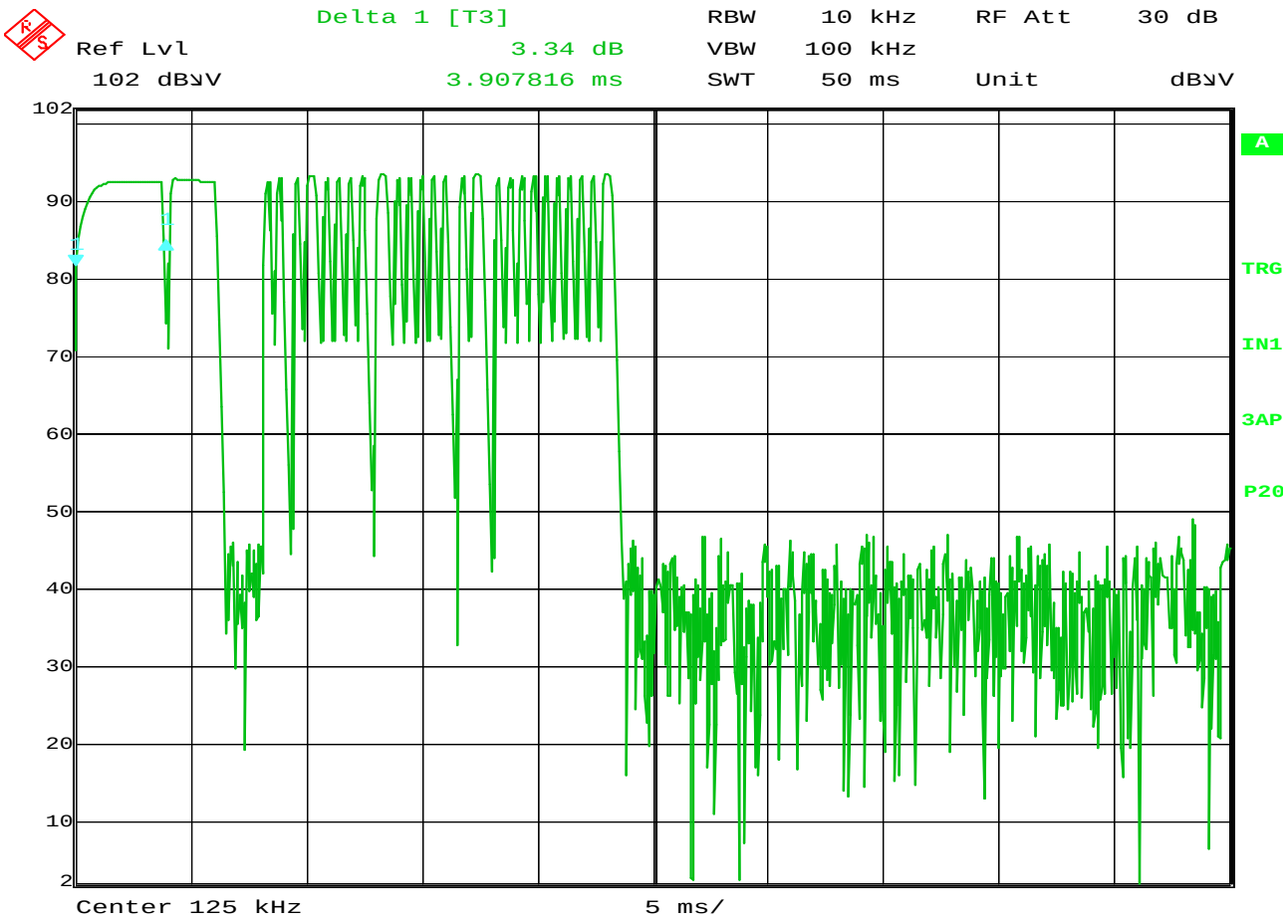
NOTES



FCC 15.35 Duty Cycle Correction Factor

MANUFACTURER	: TouchTronics, Inc.
MODEL NUMBER	: P1500-B
SERIAL NUMBER	: Prototype #5
TEST MODE	: Tx @ 125kHz
NOTES	: M190-A2
NOTES	: preAmble OFF = 501uS

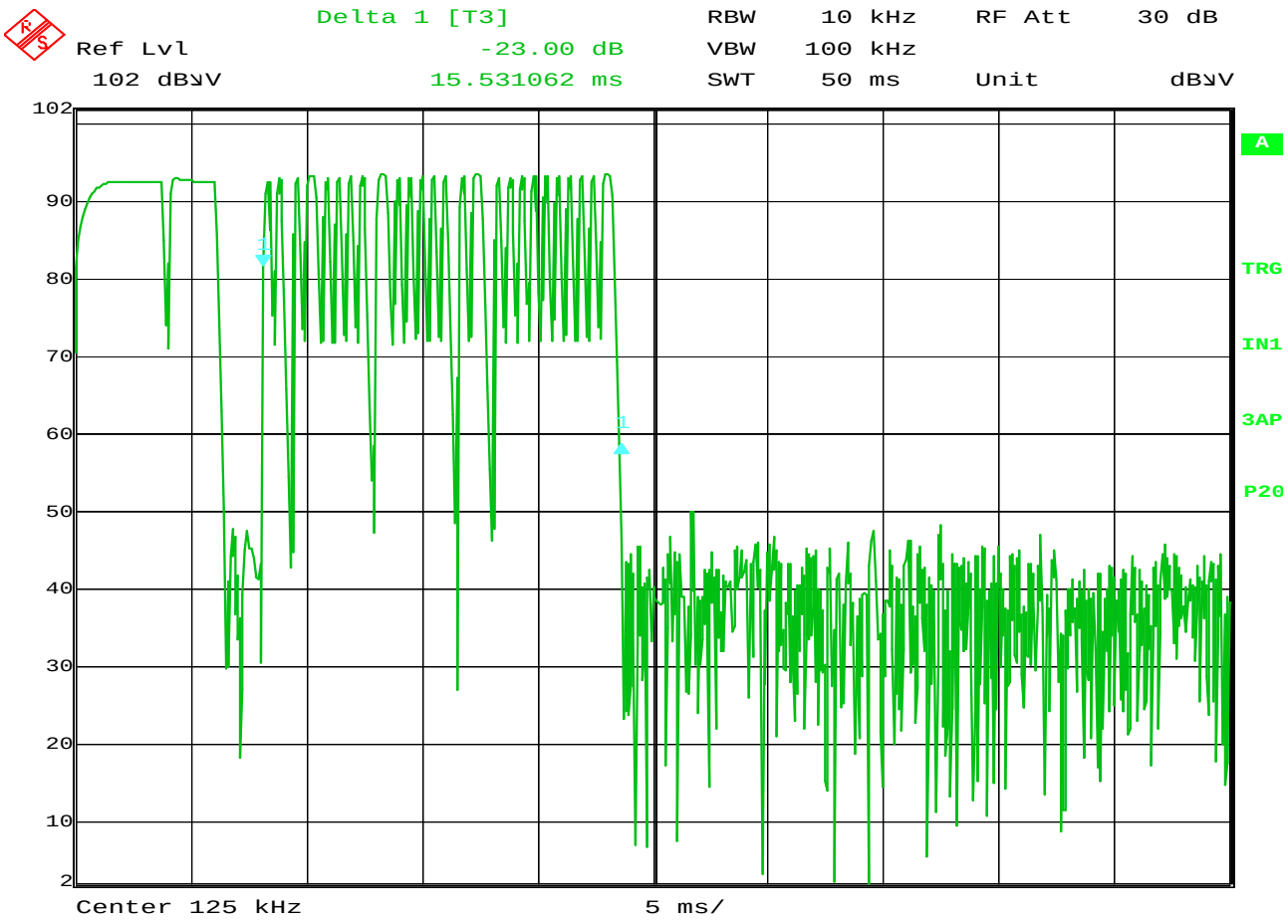
NOTES



FCC 15.35 Duty Cycle Correction Factor

MANUFACTURER	: TouchTronics, Inc.
MODEL NUMBER	: P1500-B
SERIAL NUMBER	: Prototype #5
TEST MODE	: Tx @ 125kHz
NOTES	: M190-A2
NOTES	: preAmble = 3.9mS

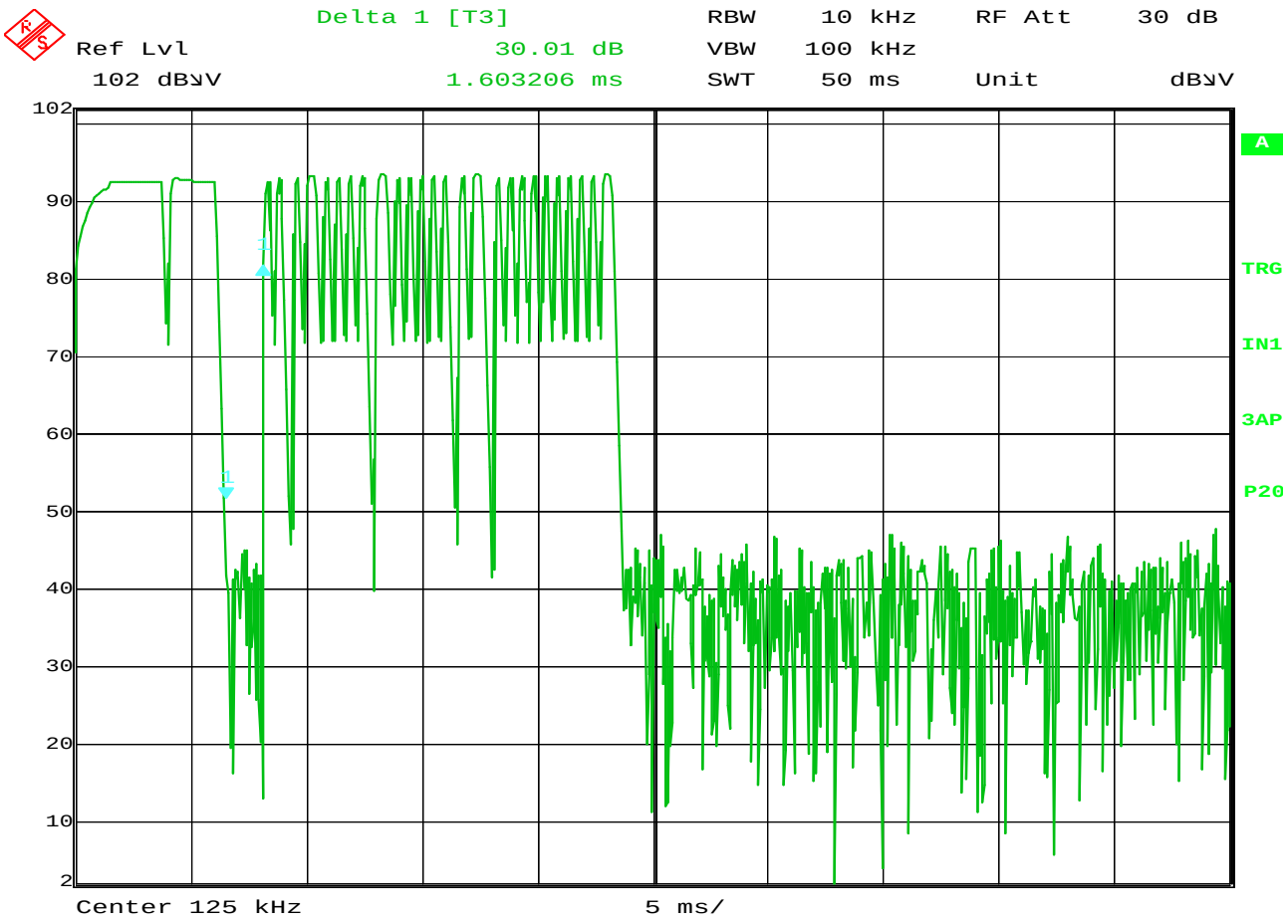
NOTES



FCC 15.35 Duty Cycle Correction Factor

MANUFACTURER	:	TouchTronics, Inc.
MODEL NUMBER	:	P1500-B
SERIAL NUMBER	:	Prototype #5
TEST MODE	:	Tx @ 125kHz
NOTES	:	M190-A2
NOTES	:	Serial Number (either 1 or 0) = 15.5 mS
NOTES	:	ON Time = 15.5mS/2
NOTES	:	OFF Time = 15.5mS/2

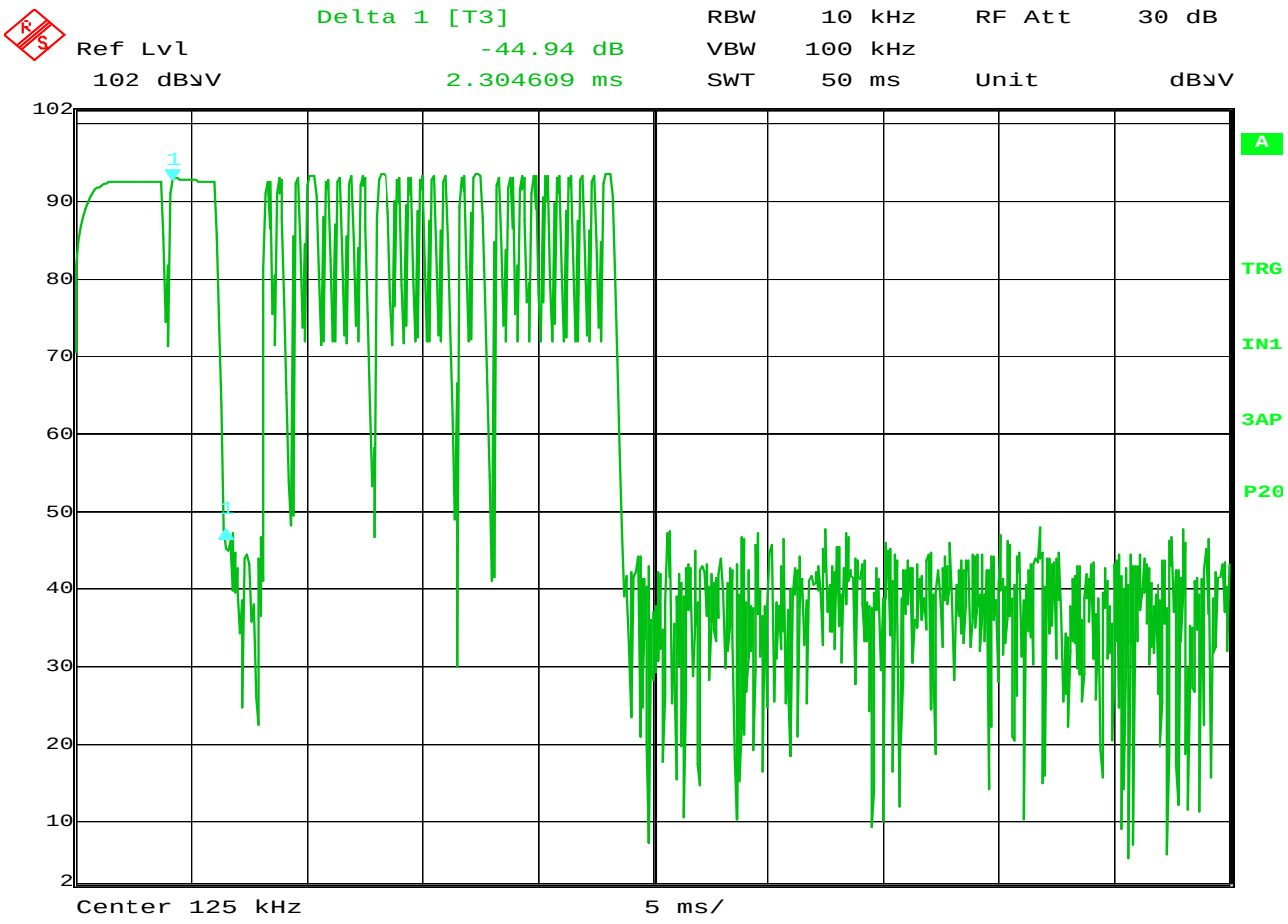
NOTES



FCC 15.35 Duty Cycle Correction Factor

MANUFACTURER	: TouchTronics, Inc.
MODEL NUMBER	: P1500-B
SERIAL NUMBER	: Prototype #5
TEST MODE	: Tx @ 125kHz
NOTES	: M190-A2
NOTES	: Wake-up OFF time = 1.6 mS

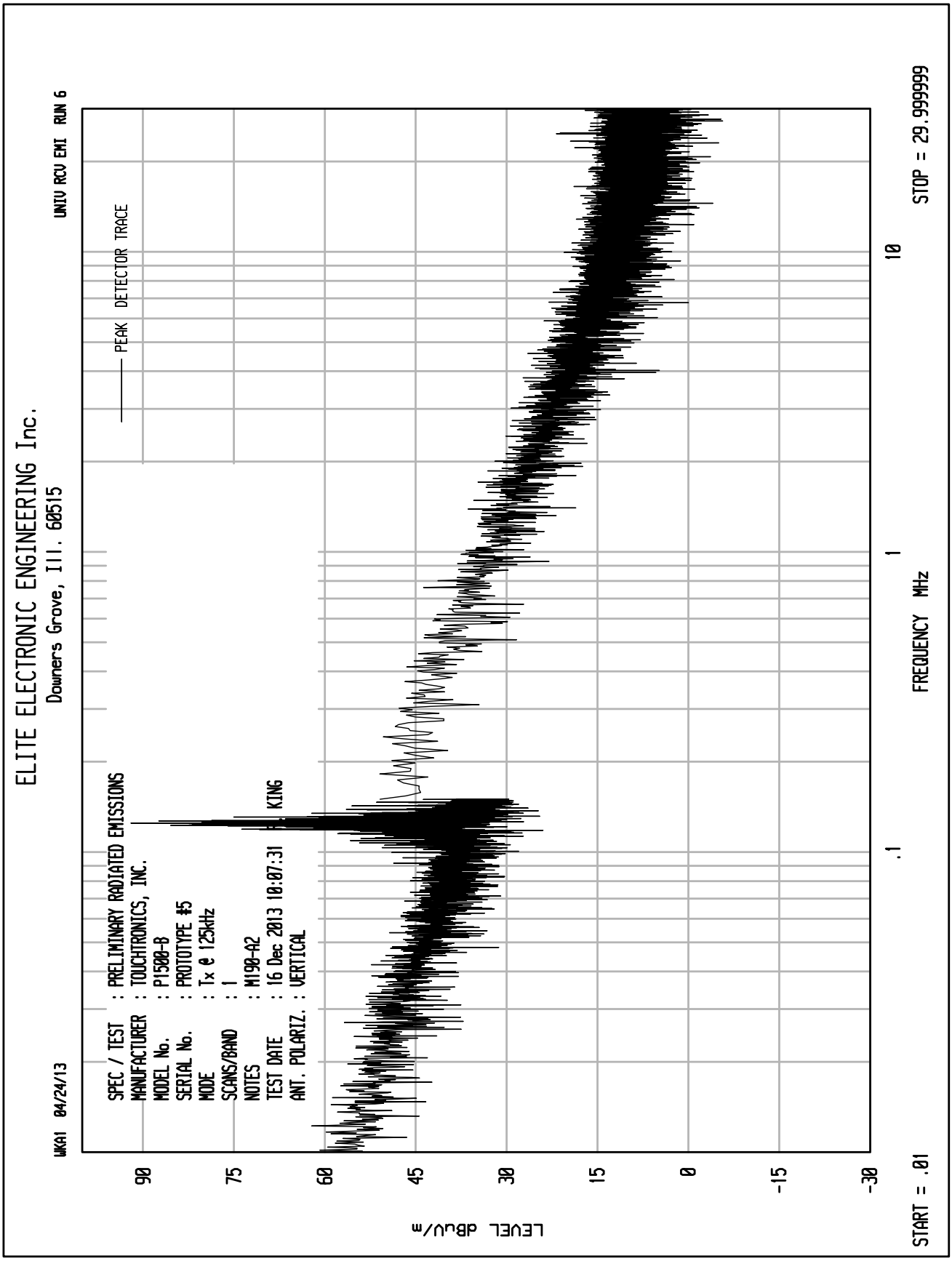
NOTES

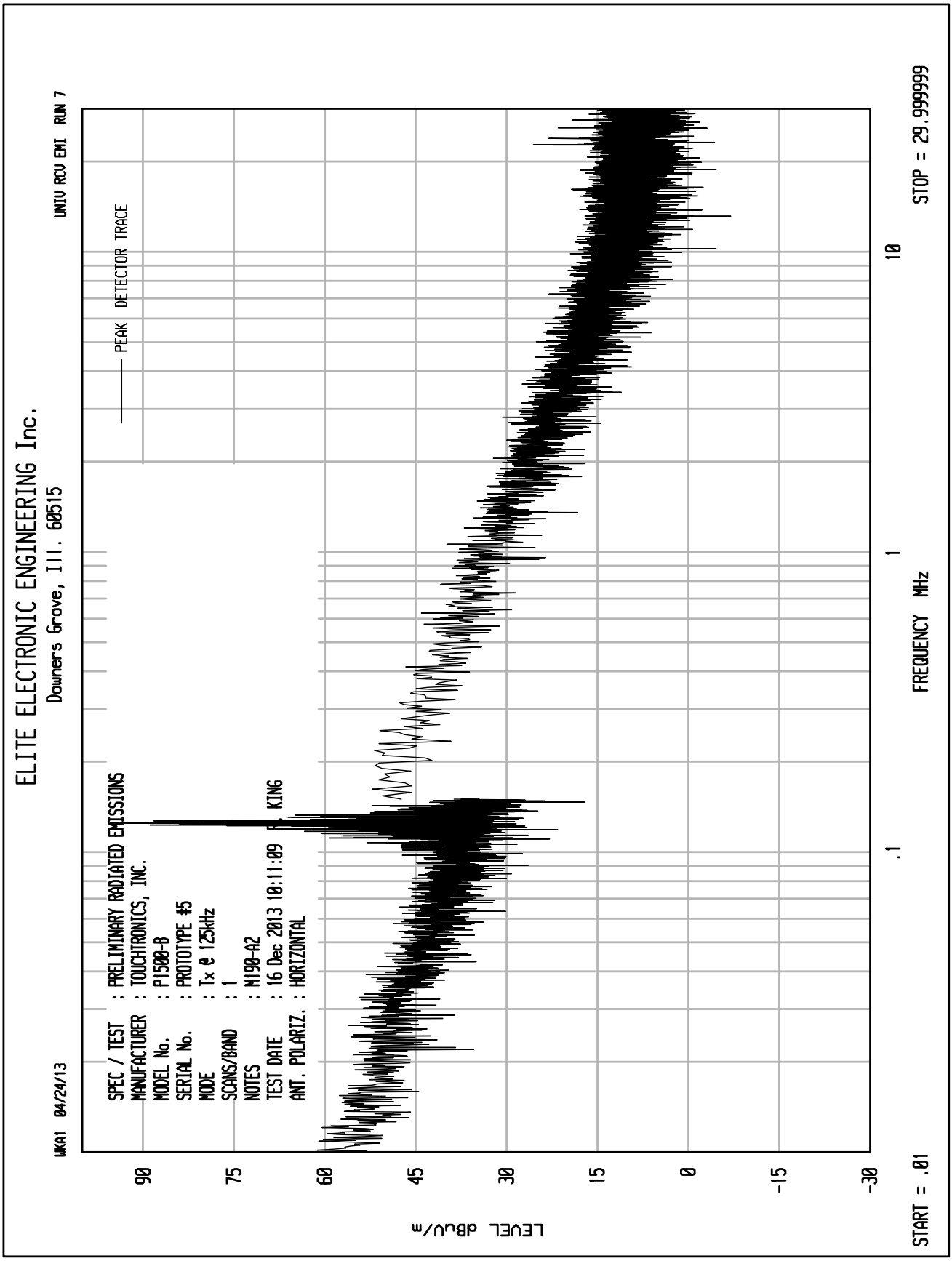


FCC 15.35 Duty Cycle Correction Factor

MANUFACTURER	: TouchTronics, Inc.
MODEL NUMBER	: P1500-B
SERIAL NUMBER	: Prototype #5
TEST MODE	: Tx @ 125kHz
NOTES	: M190-A2
NOTES	: Wake-up ON time = 2.3 mS

NOTES


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 6
WKA1 04/24/13
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TOUCHTRONICS, INC.
MODEL No. : P1500-B
SERIAL No. : PROTOTYPE #5
MODE : Tx @ 125kHz
SCANS/BAND : 1
NOTES : M190-A2
TEST DATE : 16 Dec 2013 10:07:31 KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
90
75
60
45
30
15
0
-15
-30
START = .01
.1
1
10
STOP = 29.999999
FREQUENCY MHz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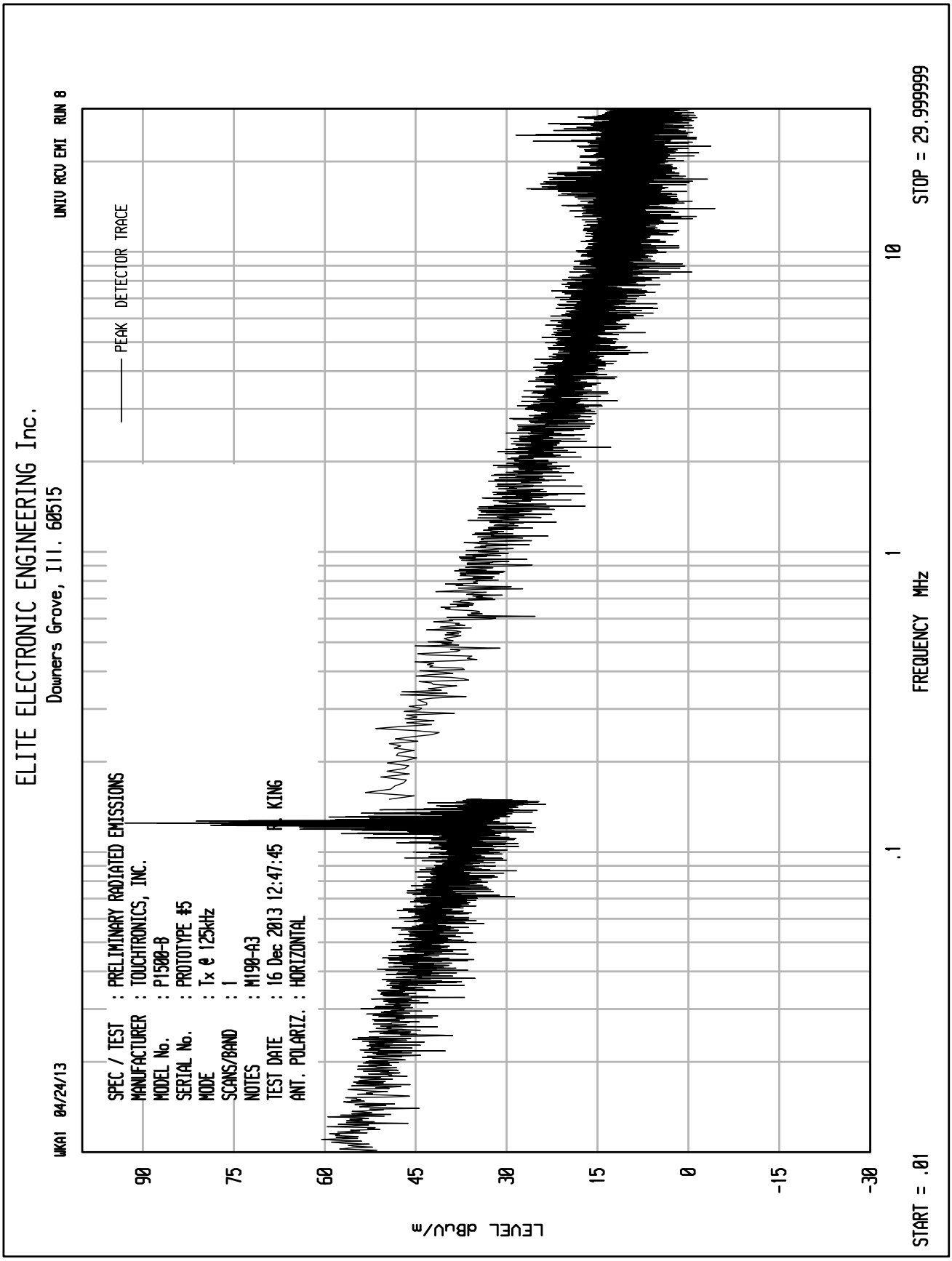
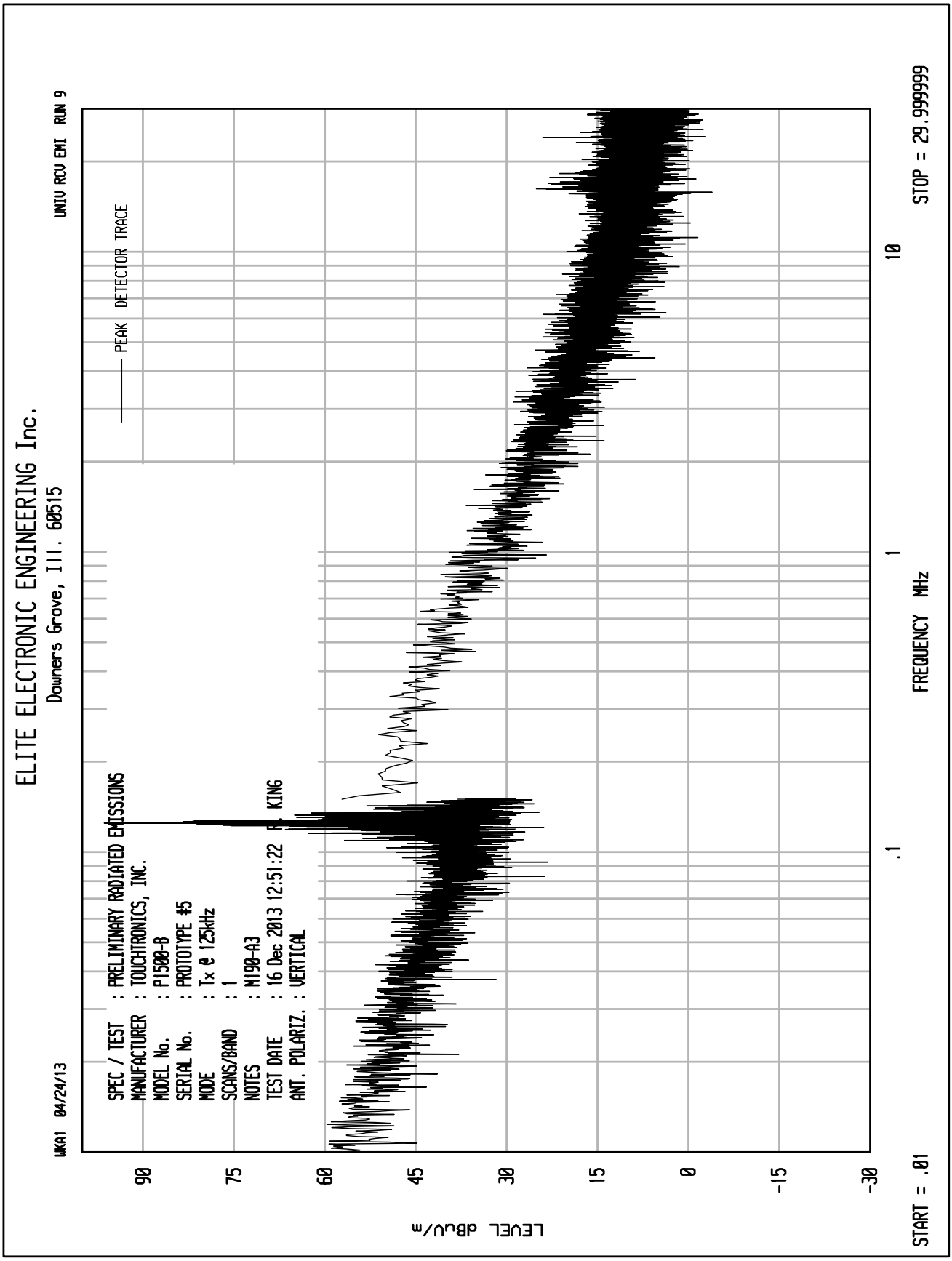
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 7
WKA1 04/24/13
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TOUCHTRONICS, INC.
MODEL No. : P1500-B
SERIAL No. : PROTOTYPE #5
MODE : Tx @ 125kHz
SCANS/BAND : 1
NOTES : M190-A2
TEST DATE : 16 Dec 2013 10:11:09 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
90
75
60
45
30
15
0
-15
-30
START = .01
.1
1
10
STOP = 29.999999
FREQUENCY MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 8
WKA1 04/24/13
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TOUCHTRONICS, INC.
MODEL No. : P1500-B
SERIAL No. : PROTOTYPE #5
MODE : Tx @ 125kHz
SCANS/BAND : 1
NOTES : M190-A3
TEST DATE : 16 Dec 2013 12:47:45 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
90
75
60
45
30
15
0
-15
-30
START = .01
.1
1
10
STOP = 29.999999
FREQUENCY MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 9
WKA1 04/24/13
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : TOUCHTRONICS, INC.
MODEL No. : P1500-B
SERIAL No. : PROTOTYPE #5
MODE : Tx @ 125kHz
SCANS/BAND : 1
NOTES : M190-A3
TEST DATE : 16 Dec 2013 12:51:22
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
90
75
60
45
30
15
0
-15
-30
START = .01
.1
1
10
STOP = 29.999999
FREQUENCY MHz

MANUFACTURER : TouchTronics, Inc.
MODEL : P1500-B
SPECIFICATION : FCC-15C Radiated Emissions
DATE : 12/16/2013
NOTES : M190a2 antenna

Freq. (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Duty Cycle Corr. (dB)	Dist. Corr. (dB)	Total (dBuV/m)	Total (uV/m)	Limit (uV/m)	Specified Test Distance (meters)	Margin (dB)
0.125	H	90.9		0.0	10.5	-4.6	-80.0	16.8	6.89543	19.2	300.0	-8.9
0.125	V	95.9		0.0	10.5	-4.6	-80.0	21.8	12.26200	19.2	300.0	-3.9
0.250	H	43.7		0.0	10.3	-4.6	-80.0	-30.7	0.02922	9.6	300.0	-50.3
0.250	V	43.8		0.0	10.3	-4.6	-80.0	-30.5	0.02970	9.6	300.0	-50.2
0.375	H	42.6		0.0	10.3	-4.6	-80.0	-31.7	0.02600	6.4	300.0	-47.8
0.375	V	44.0	*	0.0	10.3	-4.6	-80.0	-30.3	0.03041	6.4	300.0	-46.5
0.500	H	38.9	*	0.0	10.5	-4.6	-40.0	4.8	1.73780	48.0	30.0	-28.8
0.500	V	39.0	*	0.0	10.5	-4.6	-40.0	4.9	1.75590	48.0	30.0	-28.7
0.625	H	37.2	*	0.0	10.5	-4.6	-40.0	3.1	1.42069	38.4	30.0	-28.6
0.625	V	36.9	*	0.0	10.5	-4.6	-40.0	2.8	1.37721	38.4	30.0	-28.9
0.750	H	35.5	*	0.0	10.6	-4.6	-40.0	1.5	1.18736	32.0	30.0	-28.6
0.750	V	35.9	*	0.0	10.6	-4.6	-40.0	1.9	1.23761	32.0	30.0	-28.3
0.875	H	33.9	*	0.0	10.7	-4.6	-40.0	-0.1	0.99153	27.4	30.0	-28.8
0.875	V	33.2	*	0.0	10.7	-4.6	-40.0	-0.7	0.92322	27.4	30.0	-29.5
1.000	H	31.1	*	0.0	10.6	-4.6	-40.0	-3.0	0.71203	24.0	30.0	-30.6
1.000	V	31.0	*	0.0	10.6	-4.6	-40.0	-3.0	0.71040	24.0	30.0	-30.6
1.125	H	29.8	*	0.0	10.7	-4.6	-40.0	-4.1	0.62540	21.3	30.0	-30.7
1.125	V	30.0	*	0.0	10.7	-4.6	-40.0	-3.9	0.63923	21.3	30.0	-30.5
1.250	H	28.5	*	0.0	10.8	-4.6	-40.0	-5.3	0.54228	19.2	30.0	-31.0
1.250	V	29.6	*	0.0	10.8	-4.6	-40.0	-4.2	0.61408	19.2	30.0	-29.9

Checked BY Richard E. King :

Richard E. King

MANUFACTURER : TouchTronics, Inc.
MODEL : P1500-B
SPECIFICATION : FCC-15C Radiated Emissions
DATE : 12/16/2013
NOTES : M190a3 antenna

Freq. (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Duty Cycle Corr. (dB)	Dist. Corr. (dB)	Total (dBuV/m)	Total (uV/m)	Limit (uV/m)	Specified Test Distance (meters)	Margin (dB)
0.125	H	88.0		0.0	10.5	-4.6	-80.0	13.8	4.92109	19.2	300.0	-11.8
0.125	V	91.6		0.0	10.5	-4.6	-80.0	17.5	7.48275	19.2	300.0	-8.2
0.250	H	51.5		0.0	10.3	-4.6	-80.0	-22.8	0.07240	9.6	300.0	-42.5
0.250	V	50.9		0.0	10.3	-4.6	-80.0	-23.4	0.06726	9.6	300.0	-43.1
0.375	H	54.9		0.0	10.3	-4.6	-80.0	-19.4	0.10656	6.4	300.0	-35.6
0.375	V	55.2		0.0	10.3	-4.6	-80.0	-19.1	0.11105	6.4	300.0	-35.2
0.500	H	50.0	*	0.0	10.5	-4.6	-40.0	15.9	6.23017	48.0	30.0	-17.7
0.500	V	58.4	*	0.0	10.5	-4.6	-40.0	24.3	16.46266	48.0	30.0	-9.3
0.625	H	49.8	*	0.0	10.5	-4.6	-40.0	15.7	6.07435	38.4	30.0	-16.0
0.625	V	49.9	*	0.0	10.5	-4.6	-40.0	15.8	6.14469	38.4	30.0	-15.9
0.750	H	50.1	*	0.0	10.6	-4.6	-40.0	16.0	6.31805	32.0	30.0	-14.1
0.750	V	49.8	*	0.0	10.6	-4.6	-40.0	15.8	6.14587	32.0	30.0	-14.3
0.875	H	50.0	*	0.0	10.7	-4.6	-40.0	16.1	6.36508	27.4	30.0	-12.7
0.875	V	52.5	*	0.0	10.7	-4.6	-40.0	18.6	8.51734	27.4	30.0	-10.2
1.000	H	49.5	*	0.0	10.6	-4.6	-40.0	15.5	5.95662	24.0	30.0	-12.1
1.000	V	48.7	*	0.0	10.6	-4.6	-40.0	14.7	5.42001	24.0	30.0	-12.9
1.125	H	50.0	*	0.0	10.7	-4.6	-40.0	16.1	6.39971	21.3	30.0	-10.5
1.125	V	49.0	*	0.0	10.7	-4.6	-40.0	15.1	5.71690	21.3	30.0	-11.4
1.250	H	50.1	*	0.0	10.8	-4.6	-40.0	16.3	6.53467	19.2	30.0	-9.4
1.250	V	48.9	*	0.0	10.8	-4.6	-40.0	15.1	5.69802	19.2	30.0	-10.6

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