Measurement of RF Interference from an T1000 Transceiver

For : The Chamberlain Group, Inc.
: 845 Larch Ave
: Elmhurst, IL

P.O. No. : 864220
Date Tested : December 11, 2009 through January 5, 2010
Test Personnel : Richard E. King
Specification : FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.247 for Frequency Hopping Spread Spectrum Intentional Radiators within the 902-928MHz band.
: Industry Canada RSS-210 and RSS-GEN

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TABLE OF CONTENTS

REVISION HISTORY

Revision	Date	Description
—	January 14, 2010	Initial release

Measurement of RF Emissions from a Transceiver, Part No. T1000 transmitter

1 INTRODUCTION

1.1 Scope of Tests

This document represents the results of the series of radio interference measurements performed on a The Chamberlain Group, Inc. Transceiver, Part No. T1000, Serial No. None, transmitter (hereinafter referred to as the test item). The test item is a frequency hopping spread spectrum transmitter. The transmitter was designed to transmit in the 902 to 928 MHz band using an internal antenna. The test item was manufactured and submitted for testing by The Chamberlain Group, Inc. located in Elmhurst, IL.

The receive portion of the test item is a super-heterodyne type receiver designed to receive in the 902MHz to 928MHz band. The test item contains a tuner which utilizes one local oscillator (LO) at 800 kHz below the tuned frequency.

1.2 Purpose

The test series was performed to determine if the test item meets the conducted and radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.207 and 15.247 for Intentional Radiators. The test series was also performed to determine if the test item meets the conducted RF emission requirements of the Industry Canada Radio Standards Specification, RSS-Gen, Section 7.2.2 and the radiated RF emission requirements of the Industry Canada Radio Standards Specification, RSS-210, Annex 8 for transmitters. Testing was performed in accordance with ANSI C63.4-2003.

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

1.5 Laboratory Conditions

The temperature at the time of the test was 21.9°C and the relative humidity was 23%.

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 2009
- ANSI C63.4-2003, "American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"
- FCC Public Notice, DA 00-705, "Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems", Released March 30, 2000
- Industry Canada RSS-210, Issue 7, June 2007, “Spectrum Management and Telecommunications Radio Standards Specification, Low-power License-exempt radio communication devices (All Frequency Bands): Category I Equipment”
- Industry Canada RSS-GEN, Issue 2, June 2007, “Spectrum Management and Telecommunications Radio Standards Specification, General Requirements and Information for the Certification of radio communication equipment”

3 TEST ITEM SET-UP AND OPERATION

3.1 General Description

The test item is a Transceiver, Part No. T1000. A block diagram of the test item set-up is shown as Figure 1 and Figure 2.

3.1.1 Power Input

The test item obtained 24VDC power through 2 leads from the secondary of an Amseco Co. step-down transformer, Model No. XR-2440LED. The primary of this transformer received 115V 60Hz power through lowpass powerline filters on the wall of the shielded enclosure. The 24VDC power from the secondary of the transformer was provided to the test item through a 2 wire, 30 foot long unshielded cord. Each primary lead was connected through a line impedance stabilization network (LISN) which was located on the copper ground plane. The network complies with the requirements of Paragraph 4.1.2 of ANSI C63.4-2001.

3.1.2 Peripheral Equipment

The following peripheral equipment was submitted with the test item:

Item	Description
Control Panel	PTI Integrated Systems control board.

3.1.3 Interconnect Cables

The following interconnect cables were submitted with the test item:

Item	Description
Two wire twisted pair	30 feet of twisted pair leads from the test item to the power transformer.
4 wire control cable	20 feet for four wire control cable from the control board to the transmitter.

3.1.4 Grounding

Since only two wires were used to provide the input power, the test item was ungrounded during the tests.

3.2 Operational Mode

For all tests, the test item and peripheral equipment was placed on an 80cm high non-conductive stand. The test item was energized. The unit was programmed to operate in one of the following modes:

- Transmit at 902.25MHz
- Transmit at 914.75MHHz
- Transmit at 926.75HHz
- Receive at 902.24MHz
- Receive at 914.74MHz
- Receive at 926.74MHz
- Frequency Hopping Enabled

3.3 Test Item Modifications

No test item modifications were needed to meet the specification requirements for FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C.

4 TEST FACILITY AND TEST INSTRUMENTATION

4.1 Shielded Enclosure

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. With the exception of the floor, the reflective surfaces of the shielded chamber are lined with ferrite tiles on the walls and ceiling. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2003 for site attenuation.

4.2 Test Instrumentation

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

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 Emission Measurements		
Combined Standard Uncertainty	1.07	-1.07
Expanded Uncertainty (95% confidence)	2.1	-2.1

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

5 TEST PROCEDURES

5.1 Powerline Conducted Emissions

5.1.1 Requirements

Per the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Per 15.207(a) and Industry Canada RSS-Gen section 7.2.2, all radio frequency voltages on the power lines of a transmitter shall be below the values shown below when using a quasi-peak or average detector:

CONDUCTED LIMITS FOR AN INTENTIONAL RADIATOR

Frequency MHz	RFI Voltage dBuV(QP)	RFI Voltage dBuV(Average)
0.15-0.5	66 decreasing with logarithm of frequency to 56	56 decreasing with logarithm of frequency to 46
0.5 – 5.0	56	46
5.0 – 30.0	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: If the levels measured using the QP detector meet both the QP and the Average limits, the test item is considered to have met both requirements and measurements do not need to be performed using the Average detector.

5.1.2 Procedures

The interference on each power lead was measured by connecting the measuring equipment to the appropriate meter terminal of the LISN. The meter terminal of the LISN not under test was terminated with 50 ohms. Measurements were first made over the entire frequency range from 150kHz through 30MHz with a peak detector and the results were automatically plotted. The data thus obtained was then searched by the computer for the highest levels. Quasi-peak measurements were automatically performed at the frequencies selected from the highest peak measurements, and the results printed.

5.1.3 Results

The plots of the peak preliminary conducted voltage levels on each power line are presented on pages 21 through 24. The conducted limits for intentional radiators are shown as a reference. The final quasi-peak results are presented on pages 25 through 28.

As can be seen from the data, all emissions measured from the test item were within the specification limits.

Photographs of the test set-up are shown in Figure 2.

5.2 20dB Bandwidth

5.2.1 Requirements

Per 15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Per section 15.247(a)(1)(i), for frequency hopping systems operating in the 902-928MHz band, the 20dB bandwidth shall be measured for determination of the carrier frequency separation limits and must not exceed 500 kHz. If the 20dB bandwidth of the hopping channel is less than 250kHz, the system shall use at least 50 hopping channels. If the 20dB bandwidth of the hopping channel is 250kHz or greater (but not greater than 500kHz), the system shall use at least 25 hopping channels.

5.2.2 Procedures

The output of the test item was connected to the spectrum analyzer through 60dB of attenuation.

With the hopping function disabled, the test item was allowed to transmit continuously. The frequency hopping channel was set separately to low, middle, and high hopping channels. The resolution bandwidth (RBW) was set to > to 1% of the 20 dB BW. The span was set to approximately 2 to 3 times the 20 dB bandwidth.

The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined. The analyzer's display was plotted using a 'screen dump' utility.

5.2.3 Results

The plots on pages 29 through 31 show that the maximum 20 dB bandwidth was 240.48kHz. Therefore, since the 20dB bandwidth of the hopping channel is less than 250kHz, the system shall use at least 50 hopping channels. The 99% bandwidth was measured to be 266kHz.

5.3 Carrier Frequency Separation

5.3.1 Requirements

Per section 15.247 (a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

5.3.2 Procedures

The output of the test item was connected to the spectrum analyzer through 60dB of attenuation. With the hopping function enabled, the test item was allowed to transmit continuously.

The resolution bandwidth (RBW) was set to > to 1% of the span. The peak detector and 'Max-Hold' function were engaged. The span was set wide enough to capture the peaks of at least two adjacent channels. When the trace had stabilized after multiple scans, the marker-delta function was used to determine the separation between the peaks of the adjacent channels. The analyzer's display was plotted using a 'screen dump' utility.

5.3.3 Results

Page 32 shows the carrier frequency separation. As can be seen from this plot, the carrier frequency separation is 505.26kHz, which is greater than the 20dB bandwidth (240.48kHz).

5.4 Number of Hopping Frequencies

5.4.1 Requirements

Per section 15.247(a)(1)(i), for frequency hopping systems operating in the 902-928MHz band, the 20dB bandwidth shall be measured for determination of the carrier frequency separation limits and must not exceed 500 kHz. If the 20dB bandwidth of the hopping channel is less than 250kHz, the system shall use at least 50 hopping channels. If the 20dB bandwidth of the hopping channel is 250kHz or greater (but not greater than 500kHz), the system shall use at least 25 hopping channels.

5.4.2 Procedures

The output of the test item was connected to the spectrum analyzer through 60dB of attenuation. With the hopping function enabled, the test item was allowed to transmit continuously.

The resolution bandwidth (RBW) was set to > to 1% of the span. The peak detector and 'Max-Hold' function were engaged. The span was set wide enough to capture the entire frequency band of operation.

The test item’s signal was allowed to stabilize after multiple scans. The number of hopping frequencies was counted. The analyzer's display was plotted using a 'screen dump' utility.

5.4.3 Results

Page 33 shows the number of hopping frequencies. As can be seen from this plot, the number of hopping frequencies is 50 which is equal the minimum number of required hopping frequencies for systems with a 20dB bandwidth less than 250kHz.

5.5 Time of Occupancy

5.5.1 Requirements

Per section 15.247(a)(1)(i), for frequency hopping systems operating in the 902-928MHz band, if the 20dB bandwidth of the hopping channel is less than 250kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

5.5.2 Procedures

The output of the test item was connected to the spectrum analyzer through 40dB or 60dB of attenuation. With the hopping function enabled, the test item was allowed to transmit continuously.

The resolution bandwidth (RBW) was set to 1 MHz. The peak detector and 'Max-Hold' function were engaged. With the span set to 0Hz, the sweep time was adjusted to capture a single event in order to measure the dwell time per hop. The analyzer's display was plotted using a 'screen dump' utility. Then, the resolution bandwidth was

reduced to 100 kHz and the sweep time was expanded to 20seconds to capture the number of hops in the appropriate sweep time. A single sweep was made. The analyzer's display was plotted using a 'screen dump' utility.

The dwell time in the specified time period was then calculated from dwell time per hop multiplied by the number of hops in the specified time period.

5.5.3 Results

Pages 34 and 35 show the plots for the time of occupancy (dwell time). As can be seen from the plots, the time of occupancy can be determined by 2.42mS multiplied by 34. This calculated value is equal to .0823 seconds which is less than the 0.4 seconds maximum allowed.

5.6 Peak Output Power

5.6.1 Requirements

Per section 15.247(b)(2), for frequency hopping systems operating in the 902-928MHz band and employing at least 50 hopping channels, the maximum peak output conducted power shall not be greater than 1W (30dBm). Per section 15.247(b)(4), this limit is based on the use of antennas with directional gains that do not exceed 6dBi. Since the limit allows for a 6dBi antenna gain, the maximum EIRP can be increased by 6dB to 4 Watt (36dBm). If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below 30dBm by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.6.2 Procedures

The output of the test item was connected to the spectrum analyzer through 60dB of attenuation. With the hopping function disabled, the test item was allowed to transmit continuously. The frequency hopping channel was set separately to low, middle, and high hopping channels. The resolution bandwidth (RBW) was set to greater than the 20dB bandwidth. The span was set to approximately 5 times the 20 dB bandwidth. The 'Max-Hold' function was engaged. The maximum meter reading was recorded. The peak power output was calculated for the low, middle and high hopping frequencies.

The test item was placed on the non-conductive stand and set to transmit. A bi-log antenna was placed at a test distance of 3 meters from the test item. The resolution bandwidth (RBW) of the spectrum analyzer was set to greater than the 20dB bandwidth. The span was set to approximately 5 times the 20 dB bandwidth. The test item was maximized for worst case emissions (or maximum output power) at the measuring antenna. The maximum meter reading was recorded. The peak power output was measured for the low, middle and high hopping frequencies.

The equivalent power was determined from the field intensity levels measured at 3 meters using the substitution method. To determine the emission power, a dipole antenna was then set in place of the test item and connected to a calibrated signal generator. The output of the signal generator was adjusted to match the received level at the spectrum analyzer. The signal level was recorded. The reading was then corrected to compensate for cable loss, as required. The peak power output was calculated for low, middle, and high hopping frequencies.

5.6.3 Results

The results are presented on page 36. The maximum peak conducted output power from the transmitter was 0.036W (15.55 dBm) which is below the 1 Watt limit.

The results are presented on page 37. The maximum EIRP measured from the transmitter was 0.023W (13.7 dBm) which is below the 4 Watt limit.

5.7 Duty Cycle Factor Measurements

5.7.1 Procedures

Since the frequency hopping is turned off for the radiated measurements, a duty cycle factor is used to correct the average readings based on the dwell time. This factor is computed from the time domain trace of the dwell time in any 100 msec period. The duty cycle is calculated as the (dwell time/100msec) where the dwell time is limited to 100 msec. The duty cycle factor is 20 * Log (duty cycle)

5.7.2 Results

The plots of the dwell time are shown on data pages 38 and 39. The duty cycle correction factor was calculated to be -32.4dB (-32.4dB = 20*log(2.4msec/100msec).

5.8 Spurious Emissions

5.8.1 Antenna Conducted

5.8.1.1 Requirements

Per section 15.247(c), the spurious emissions in any 100 kHz BW outside the frequency band must be at least 20dB below the highest 100 kHz BW level measured within the band.

5.8.1.2 Procedures

The output of the test item was connected to the spectrum analyzer through 40dB of attenuation. The frequency hopping function was disabled. The resolution bandwidth (RBW) was set to 100kHz. The peak detector and 'Max-Hold' function were engaged. The emissions in the frequency range from 30MHz to 10GHz were observed and plotted separately with the test item transmitting at low, middle and high hopping frequencies.

5.8.1.3 Results

The results of the antenna conducted emissions levels were plotted. These plots are presented on pages 40 through 48. These plots show that the spurious emissions were at least 20 dB below the level of the fundamental.

5.8.2 Radiated Spurious Emissions

5.8.2.1 Receiver

5.8.2.1.1 Requirements

RADIATION LIMITS FOR A RECEIVER

Frequency MHz	Distance between Test Item And Antenna in Meters	Field Strength uV/m	Field Strength dBuV/m
30-88	3	100	40
88-216	3	150	43.5
216-960	3	200	46
Above 960	3	500	54

Note: The tighter limit shall apply at the edge between the two frequency bands.

5.8.2.1.2 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-year for site attenuation.

Since a quasi-peak detector and an average detector require(s) long integration times, it is not practical to automatically sweep through the quasi-peak and average levels. Therefore, radiated emissions from the test item were first scanned using a peak detector and automatically plotted. The frequencies where significant emission levels were noted were then remeasured using the quasi-peak detector or average detector.

The broadband measuring antenna was positioned at a 3 meter distance from the test item. The frequency range from 30MHz to 1GHz was investigated using a peak detector function with the bilog antenna at several heights, horizontal and vertical polarization, and with several different orientations of the test item with respect to the antenna. The frequency range from 1GHz to 5GHz was investigated using a peak detector function with the double ridged waveguide antenna at several heights, horizontal and vertical polarization, and with several different orientations of the test item with respect to the antenna. The maximum levels for each antenna polarization were plotted.

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

1) Measurements from 30MHz to 1GHz were made using a quasi-peak detector and a broadband bilog antenna. Measurements above 1GHz were made using an average detector and a broadband double ridged waveguide antenna.

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

    a) The test item was rotated so that all of its sides were exposed to the receiving antenna.

    b) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.

    c) The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.

a) 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

5.8.2.1.3 Results

Preliminary radiated emissions plots with the test item receiving at 902.24MHz, 914.74MHz, and 926.74MHz are shown on pages 49 through 58. Final radiated emissions data are presented on data pages 59 through 61. As can be seen from the data, all emissions measured from the test item were within the specification limits. Photographs of the test set-up are shown on Figures 3 and 4.

5.8.2.2 Transmitter

5.8.2.2.1 Requirements

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must comply with the radiated emission limits specified in §15.209(a).

Paragraph 15.209(a) has the following radiated emission limits:

Frequency MHz	Field Strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	3
30.0-88.0	100	3
88.0-216.0	150	3
216.0-960.0	200	3
Above 960	500	3

5.8.2.2.2 Procedures

Preliminary radiated emissions tests were performed to determine the emission characteristics of the test item. For the preliminary test, a broadband measuring antenna was positioned at a 3 meter distance from the test item. The entire frequency range from 30MHz to 10.0GHz was investigated using a peak detector function.

The final emission tests were then manually performed over the frequency range of 30MHz to 10.0GHz.

For all emissions in the restricted bands, the following procedure was used:

a) The field strengths of all emissions below 1 GHz were measured using a bi-log antenna. The bi-log antenna was positioned at a 3 meter distance from the test item. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer.

b) The field strengths of all emissions above 1 GHz were measured using a double-ridged waveguide antenna. The waveguide antenna was positioned at a 3 meter distance from the test item. A peak detector with a resolution bandwidth of 1 MHz was used on the spectrum analyzer.

c) To ensure that maximum or worst case emission levels were measured, the following steps were taken when taking all measurements:

   i) The test item was rotated so that all of its sides were exposed to the receiving antenna.

   ii) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.

   iii) The measuring antenna was raised and lowered for each antenna polarization to maximize the readings.

   iv) In instances were it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer. The measuring antenna was not raised or lowered to ensure maximized readings, instead the test item was rotated through all axis to ensure the maximum readings were recorded for the test item.

d) For all radiated emissions measurements below 1 GHz, if the peak reading is below the limits listed in 15.209(a), no further measurements are required. If however, the peak readings exceed the limits listed in 15.209(a), then the emissions are remeasured using a quasi-peak detector.

e) For all radiated emissions measurements above 1 GHz, the peak readings must comply with the 15.35(b) limits. 15.35(b) states that when average radiated emissions measurements are specified, there also is a limit on the peak level of the radiated emissions. The limit on the peak radio frequency emissions is 20 dB

above the maximum permitted average emission limit applicable to the equipment under test. Therefore, all peak readings above 1 GHz must be no greater than 20 dB above the limits specified in 15.209(a).

f) Next, for all radiated emissions measurements above 1GHz, the resolution bandwidth was set to 1MHz. The analyzer was set to linear mode with a 10Hz video bandwidth in order to simulate an average detector. An average reading was taken. If the dwell time per channel of the hopping signal is less than 100msec, then the reading obtained with the 10 Hz video bandwidth may be further adjusted by a "duty cycle correction factor", derived from 20*log(dwell time/100msec). These readings must be no greater than the limits specified in 15.209(a).

5.8.2.2.3 Results

Preliminary radiated emissions plots with the test item transmitting at 902.25MHz, 914.75MHz, and 926.75MHz are shown on pages 62 through 73. Final radiated emissions data are presented on data pages 74 through 79. As can be seen from the data, all emissions measured from the test item were within the specification limits. Photographs of the test set-up are shown on Figures 3 and 4.

5.9 Band Edge Compliance

5.9.1 Requirements

Per section 15.247(d), the emissions at the band-edges must be at least 20dB below the highest level measured within the band but attenuation below the general limits listed in 15.209(a) is not required.

5.9.2 Procedures

5.9.2.1 Low Band Edge

1) The output of the test item was connected to the spectrum analyzer through 60dB of attenuation.
2) The test item was set to transmit continuously at the channel closest to the low band-edge (hopping function disabled).
3) 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 the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation.
    c. Resolution bandwidth (RBW) ≥ 1% of the span.
    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. A display line was placed 20dB down from the peak of the in-band emissions. All emissions which fall outside of the authorized band of operation must be below the 20dB down 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.

4) Step 3) was repeated with the frequency hopping function enabled.

5.9.2.2 High Band Edge

1) The output of the test item was connected to the spectrum analyzer through 60dB of attenuation.
2) The test item was set to transmit continuously at the channel closest to the high band-edge (hopping function disabled).
3) 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 the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation.
c. Resolution bandwidth (RBW) ≥ 1% of the span.
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. A display line was placed 20dB down from the peak of the in-band emissions. All emissions which fall outside of the authorized band of operation must be below the 20dB down 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.

4) Step 3) was repeated with the frequency hopping function enabled

5.9.3 Results

Pages 80 through 83 show the conducted band-edge compliance results. As can be seen from these plots, the emissions at the low end band edge and the high end band edge are within the 20 dB down limits.

6 CONCLUSIONS

It was determined that The Chamberlain Group, Inc. Transceiver, Part No. T1000 frequency hopping spread spectrum transmitter, Serial No. none, did fully meet the conducted and radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.207 and 15.247 for Intentional Radiators Operating within the 902-928 MHz band, and Industry Canada's RSS-210 for Low-power License-exempt radio communication devices when tested per ANSI C63.4-2003.

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

8 ENDORSEMENT DISCLAIMER

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
APW3	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-35-120-5R0-10-12	PL2924	1GHZ-20GHZ	7/28/2009	7/28/2010
GRE0	SIGNAL GENERATOR	AGILENT TECHNOLOGIES	E4438C	MY42083127	250KHZ-6GHZ	1/12/2010	1/12/2011
NDQ1	TUNED DIPOLE ANTENNA	EMCO	3121C-DB4	313	400-1000MHZ	3/24/2009	3/24/2010
NTA1	BILOG ANTENNA	CHASE EMC LTD.	BILOG CBL6112	2054	0.03-2GHZ	9/10/2009	9/10/2010
NWH0	RIDGED WAVE GUIDE	TENSOR	4105	2081	1-12.4GHZ	8/11/2009	8/11/2010
PLL1	50UH LISN 462D - FL	ELITE ELECTRONIC ENG	462D/70A	002	0.01-400MHZ	1/13/2010	1/13/2011
PLLC	50UH LISN 462D	ELITE ELECTRONIC ENG	462D/70A	013	0.01-400MHZ	7/28/2009	7/28/2010
RBA0	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB26	100145	20HZ-26.5GHZ	2/18/2009	2/18/2010
T1E8	10DB 25W ATTENUATOR	WEINSCHEL	46-10-34	BH7996	DC-18GHZ	12/8/2009	12/8/2010
T2D7	20DB, 25W ATTENUATOR	WEINSCHEL	46-20-43	AY9246	DC-18GHZ	8/24/2009	8/24/2010
T2DL	20DB, 25W ATTENUATOR	WEINSCHEL	46-20-34	BS0910	DC-18GHZ	8/24/2009	8/24/2010
T2DS	20DB, 25W ATTENUATOR	WEINSCHEL	46-20-34	BS0916	DC-18GHZ	8/24/2009	8/24/2010
XPQ2	HIGH PASS FILTER	K&L MICROWAVE	4IH30-1804/T10000-0	3	1.8-10GHZ	11/9/2009	11/9/2010

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

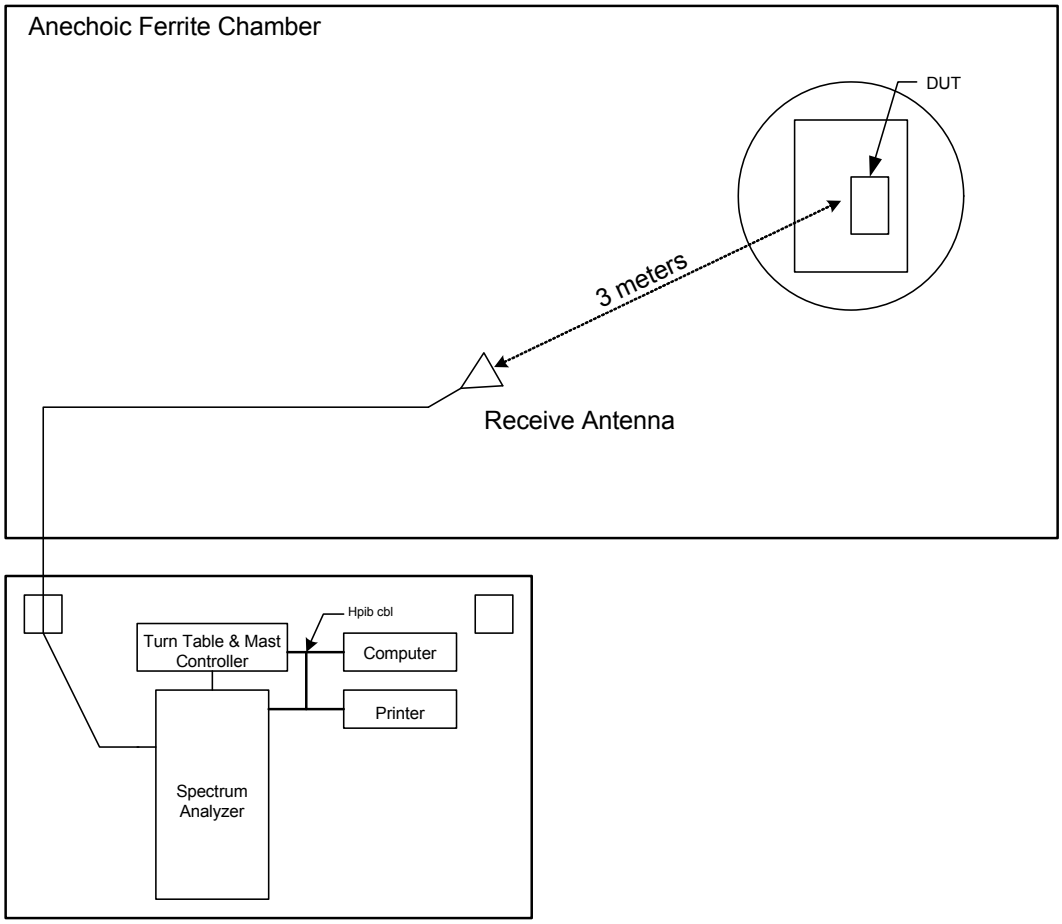
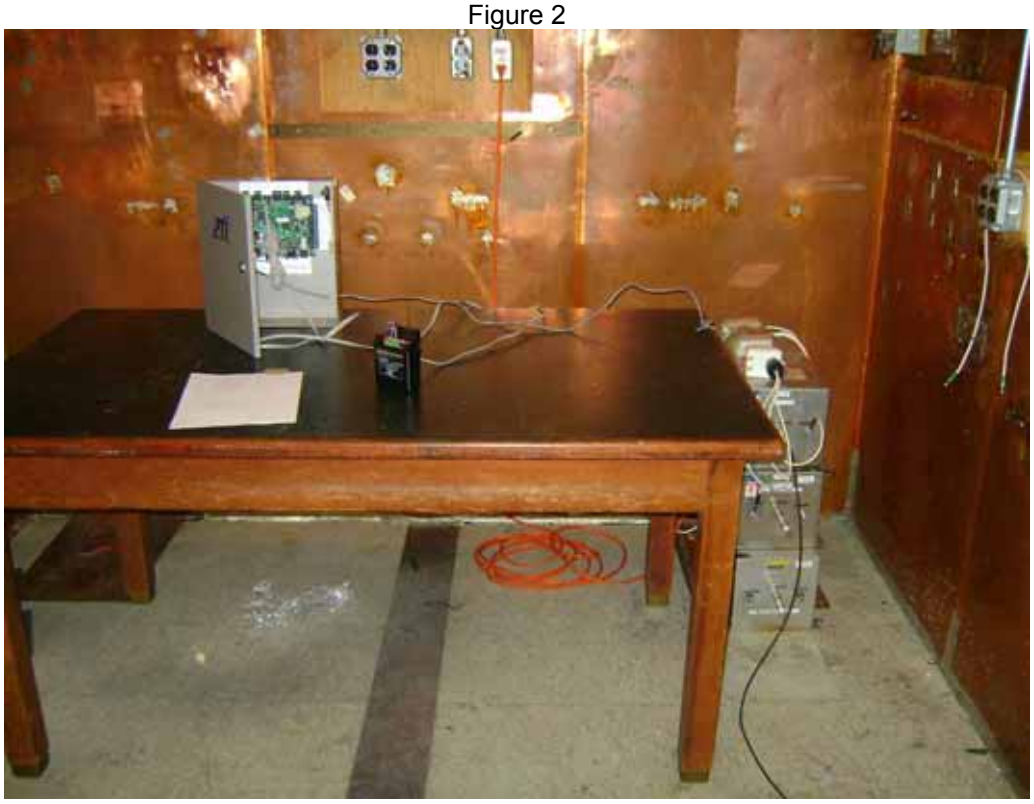


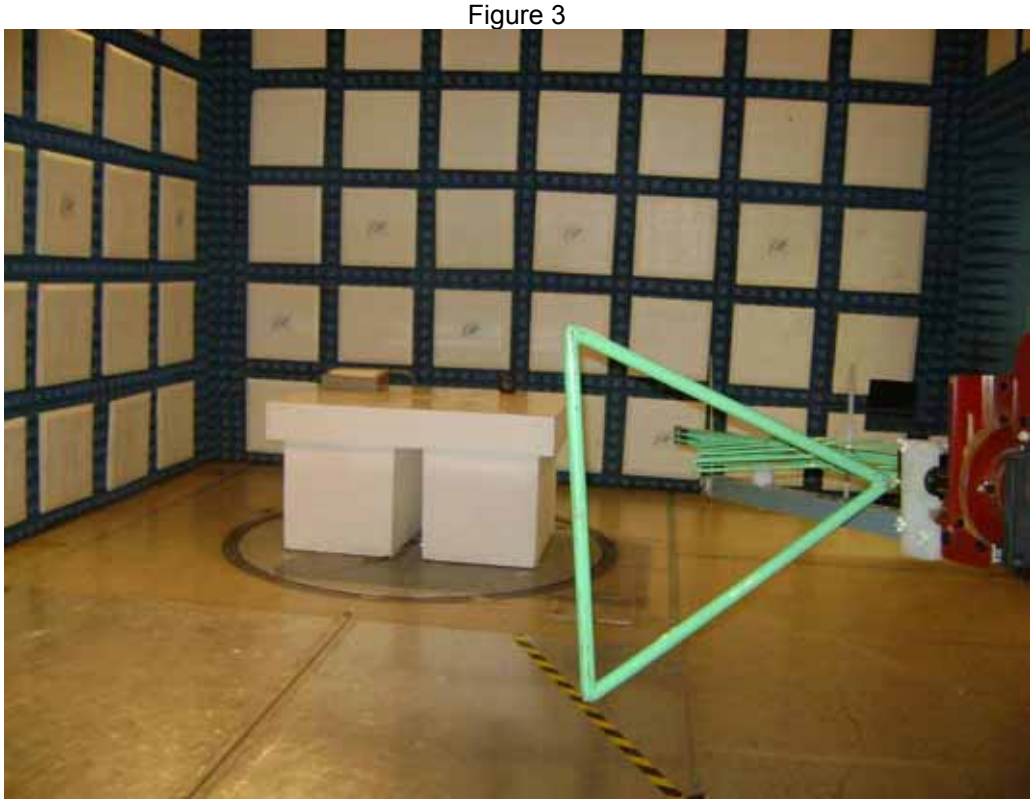
FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

Figure 2

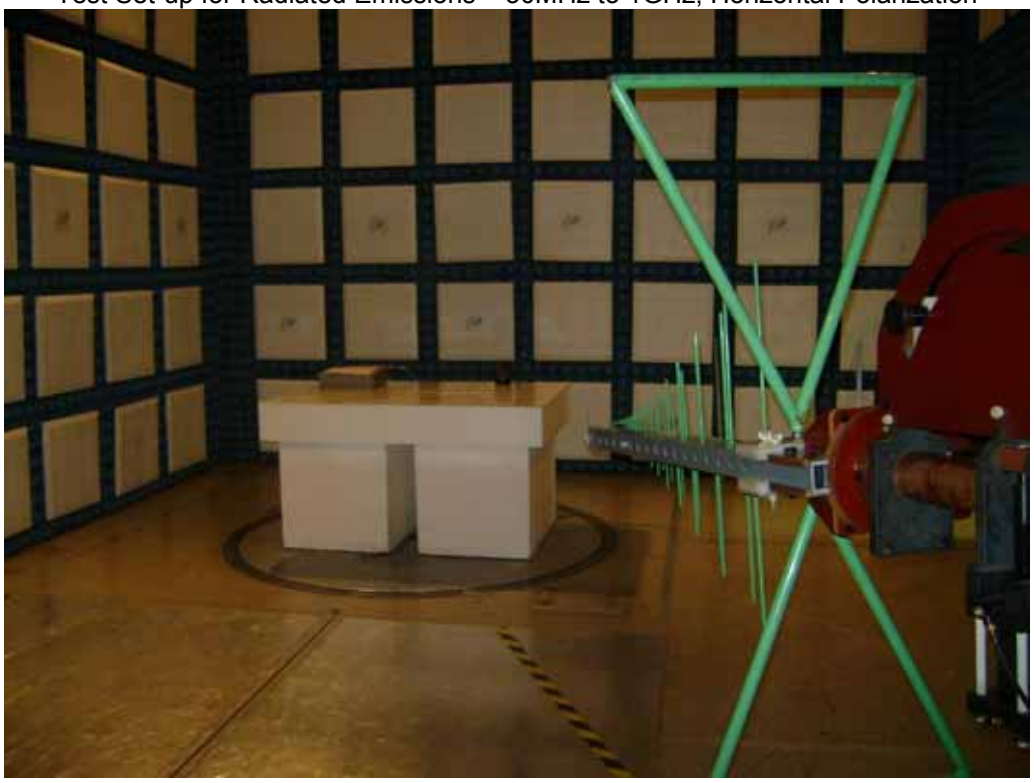


Test Set-up for Conducted Emissions

Figure 3

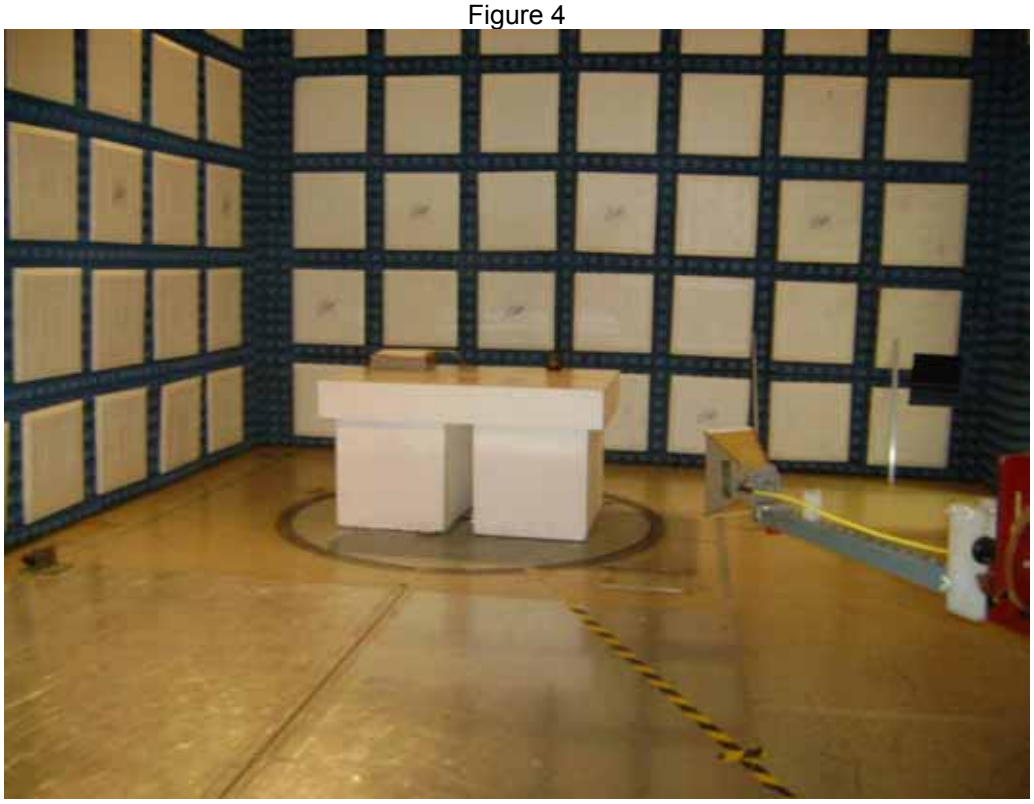


Test Set-up for Radiated Emissions – 30MHz to 1GHz, Horizontal Polarization

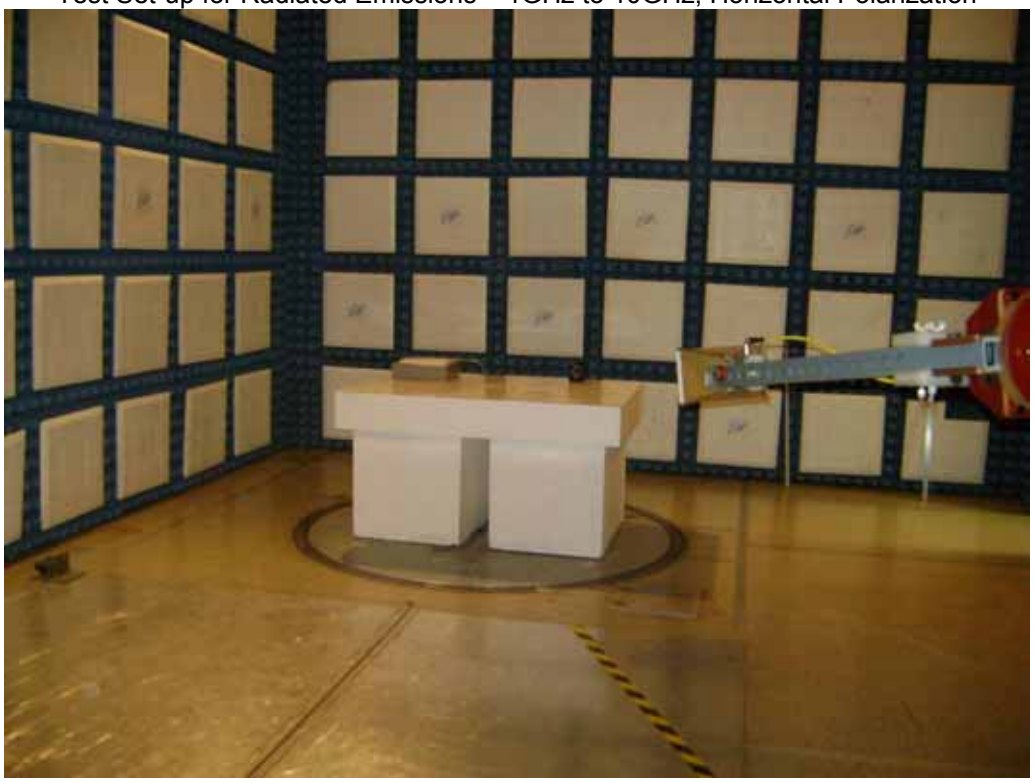


Test Set-up for Radiated Emissions – 30MHz to 1GHz, Vertical Polarization

Figure 4



Test Set-up for Radiated Emissions – 1GHz to 10GHz, Horizontal Polarization



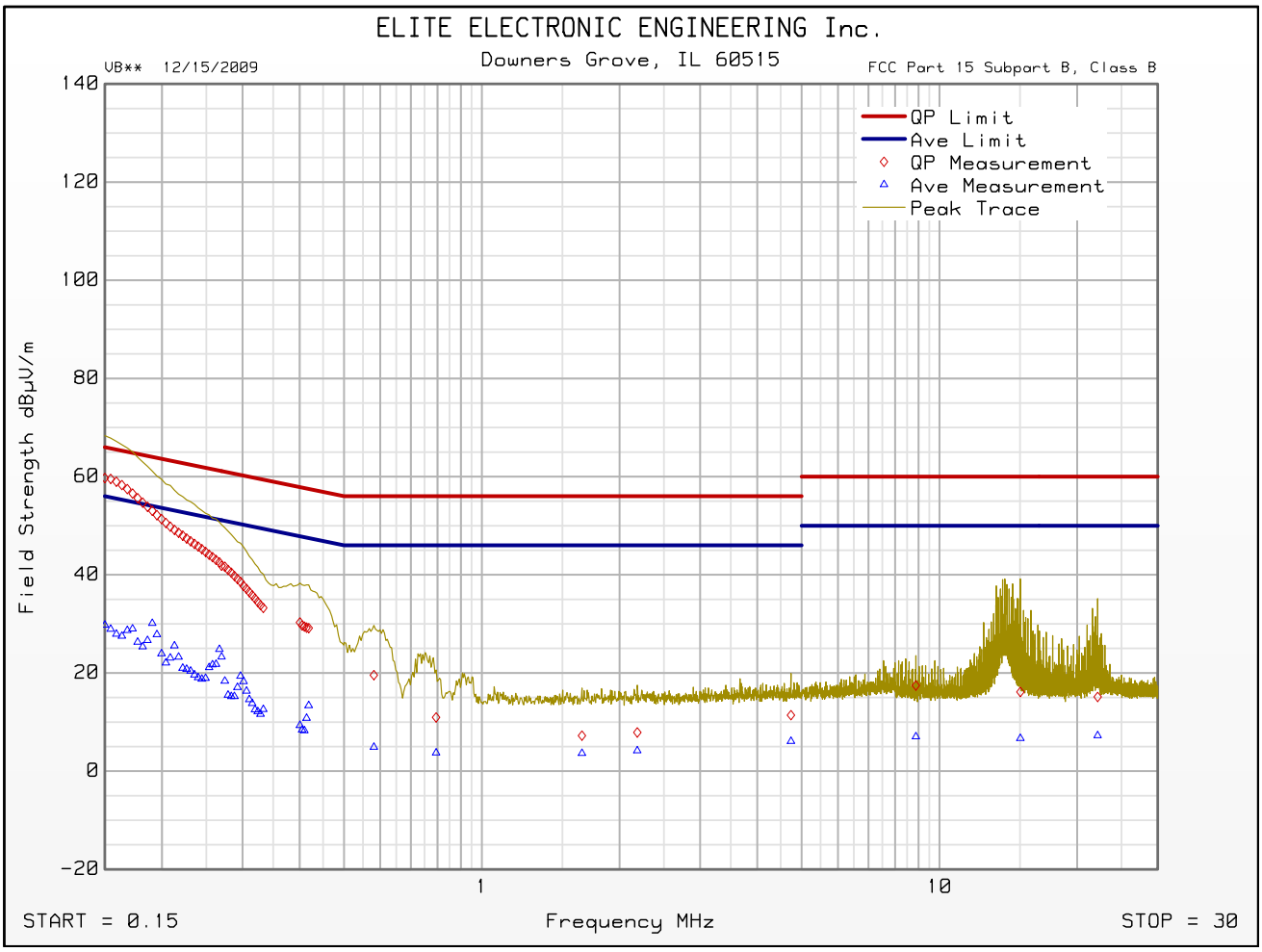
Test Set-up for Radiated Emissions – 1GHz to 10GHz, Vertical Polarization

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 12/15/2009

Manufacturer	:	The Chamberlain group, Inc.
Model	:	T1000
DUT Revision	:	
Serial Number	:	none assigned
DUT Mode	:	Rx 914.75MHz
Line Tested	:	high side
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Test Date	:	Dec 16, 2009 08:47:33 AM



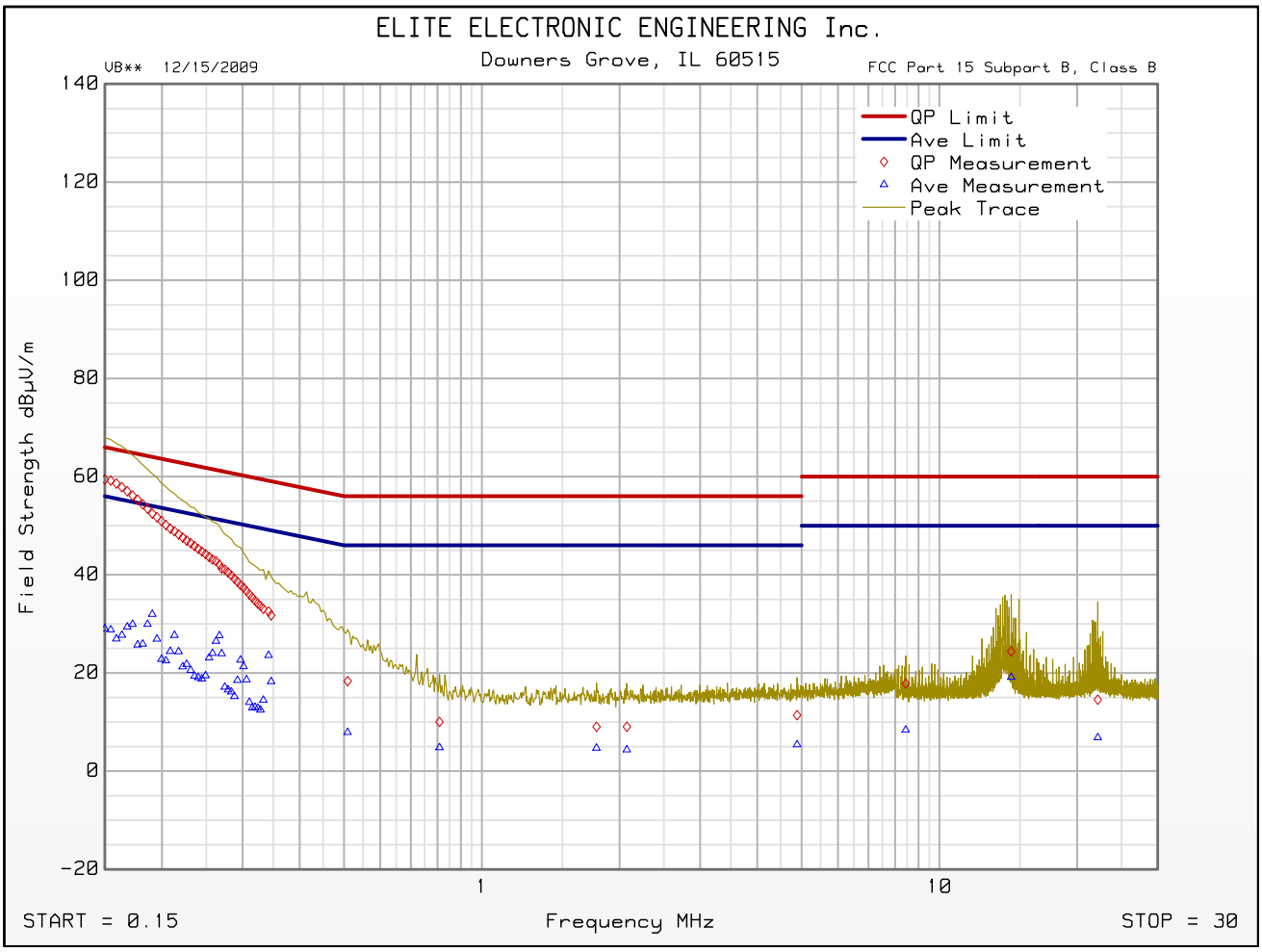
Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 12/15/2009

Manufacturer	:	The Chamberlain group, Inc.
Model	:	T1000
DUT Revision	:	
Serial Number	:	none assigned
DUT Mode	:	Rx 914.75MHz
Line Tested	:	return side
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Test Date	:	Dec 16, 2009 08:41:14 AM



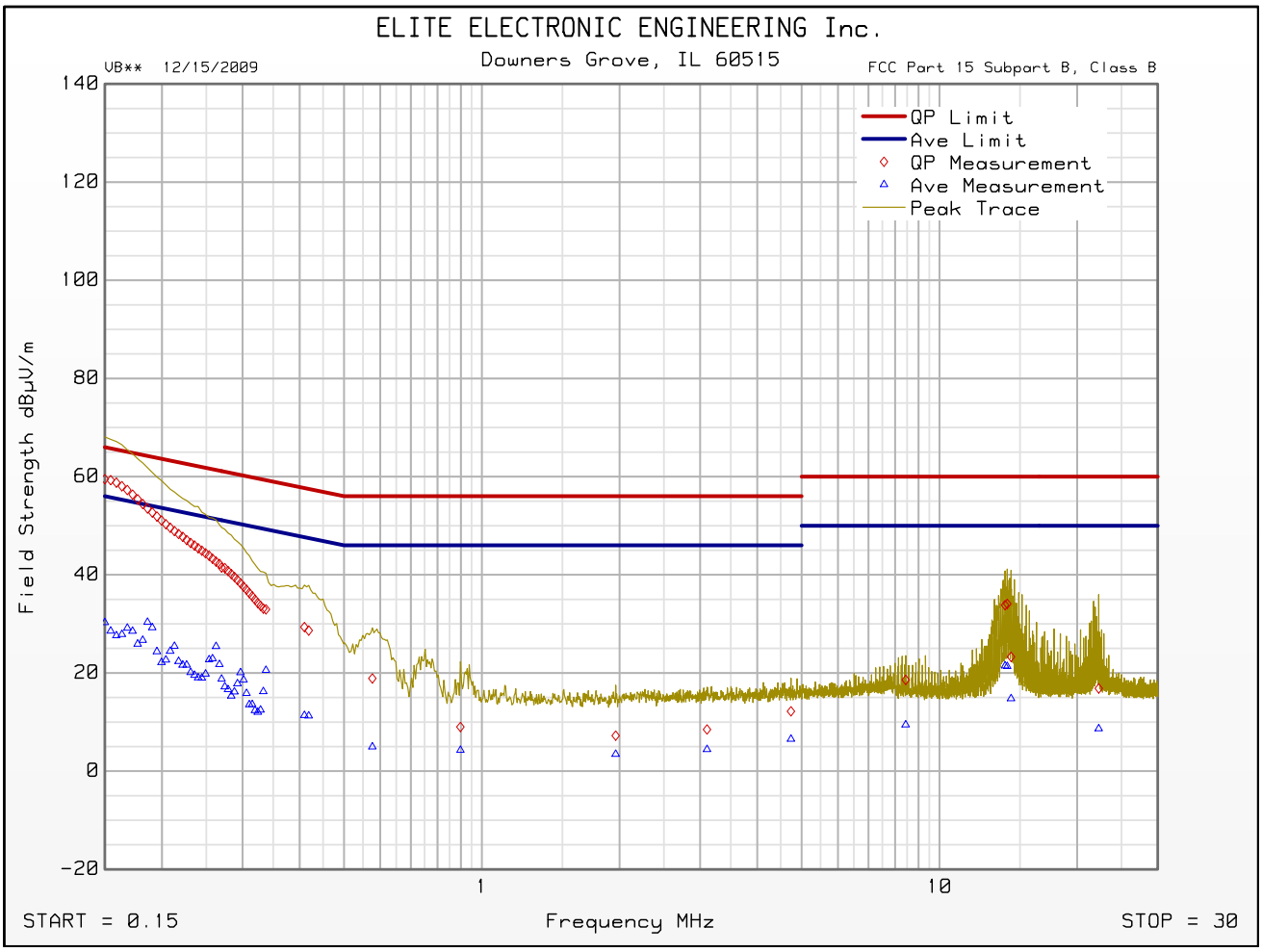
Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 12/15/2009

Manufacturer	:	The Chamberlain group, Inc.
Model	:	T1000
DUT Revision	:	
Serial Number	:	none assigned
DUT Mode	:	Tx 914.75MHz
Line Tested	:	high side
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Test Date	:	Dec 16, 2009 08:27:00 AM



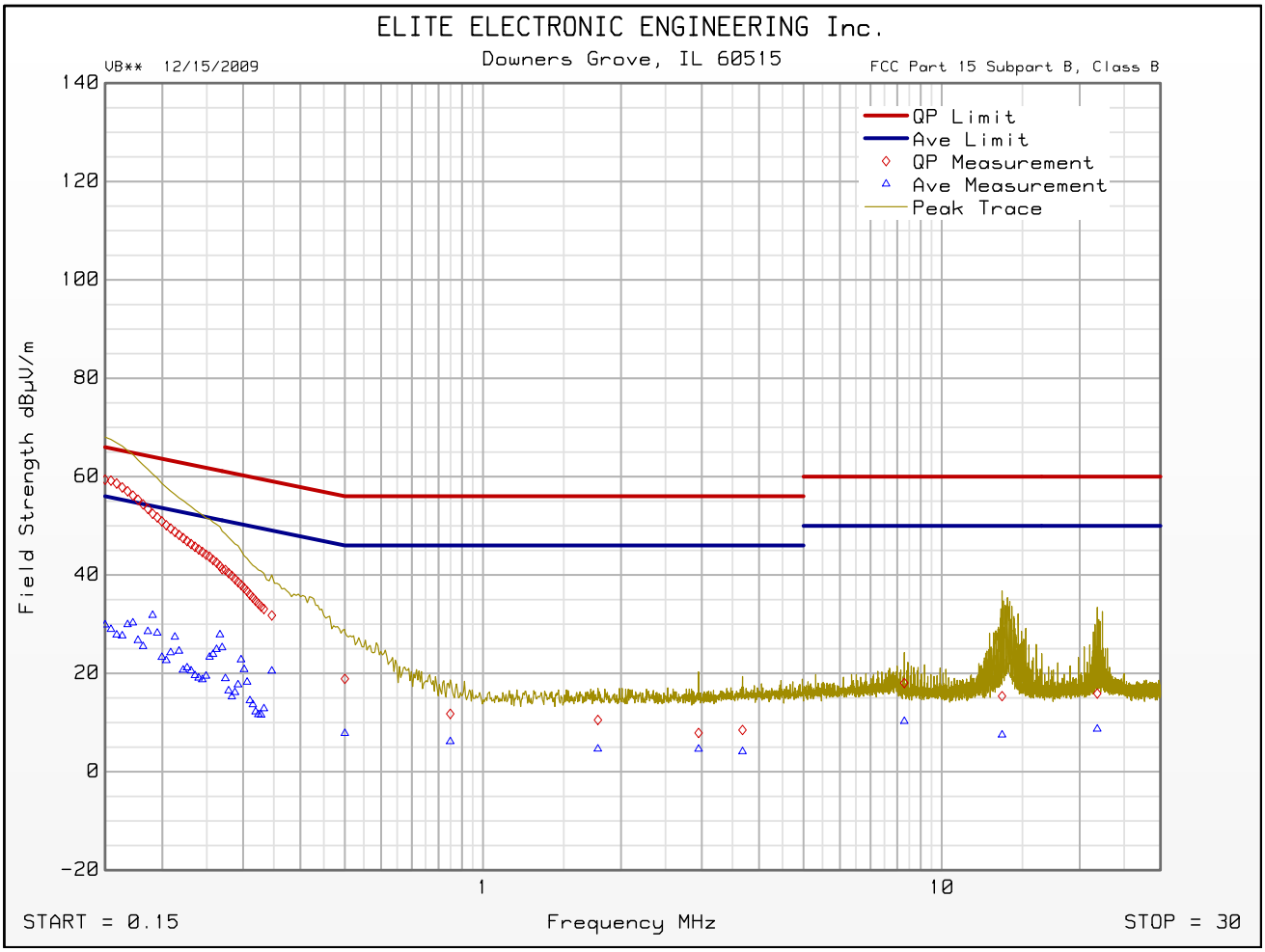
Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 12/15/2009

Manufacturer	:	The Chamberlain group, Inc.
Model	:	T1000
DUT Revision	:	
Serial Number	:	none assigned
DUT Mode	:	Tx 914.75MHz
Line Tested	:	return side
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Test Date	:	Dec 16, 2009 08:33:53 AM



Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 12/15/2009

Manufacturer	:	The Chamberlain group, Inc.
Model	:	T1000
DUT Revision	:	
Serial Number	:	none assigned
DUT Mode	:	Rx 914.75MHz
Line Tested	:	high side
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Test Date	:	Dec 16, 2009 08:47:33 AM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 6 dB margin below limit

Freq MHz	Quasi-peak Level dBµV/m	Quasi-peak Limit dBµV/m	Excessive Quasi-peak Emissions	Average Level dBµV/m	Average Limit dBµV/m	Excessive Average Emissions
0.150	59.7	66.0		29.8	56.0	
0.191	53.0	64.0		30.1	54.0	
0.401	30.3	57.8		9.3	47.8	
0.419	29.1	57.5		13.4	47.5	
0.581	19.6	56.0		4.9	46.0	
0.795	10.9	56.0		3.7	46.0	
1.655	7.2	56.0		3.6	46.0	
2.187	7.9	56.0		4.2	46.0	
4.738	11.4	56.0		6.1	46.0	
8.884	17.4	60.0		7.0	50.0	
15.030	16.1	60.0		6.7	50.0	
22.172	15.1	60.0		7.3	50.0	

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 12/15/2009

Manufacturer	:	The Chamberlain group, Inc.
Model	:	T1000
DUT Revision	:	
Serial Number	:	none assigned
DUT Mode	:	Rx 914.75MHz
Line Tested	:	return side
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Test Date	:	Dec 16, 2009 08:41:14 AM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 6 dB margin below limit

Freq MHz	Quasi-peak Level dBµV/m	Quasi-peak Limit dBµV/m	Excessive Quasi-peak Emissions	Average Level dBµV/m	Average Limit dBµV/m	Excessive Average Emissions
0.150	59.4	66.0		29.1	56.0	
0.191	52.5	64.0		32.0	54.0	
0.342	32.5	59.2		23.6	49.2	
0.509	18.3	56.0		7.9	46.0	
0.808	10.0	56.0		4.8	46.0	
1.781	9.0	56.0		4.7	46.0	
2.075	9.0	56.0		4.4	46.0	
4.886	11.4	56.0		5.4	46.0	
8.438	17.8	60.0		8.4	50.0	
14.351	24.4	60.0		19.1	50.0	
22.181	14.6	60.0		6.8	50.0	

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 12/15/2009

Manufacturer	:	The Chamberlain group, Inc.
Model	:	T1000
DUT Revision	:	
Serial Number	:	none assigned
DUT Mode	:	Tx 914.75MHz
Line Tested	:	high side
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Test Date	:	Dec 16, 2009 08:27:00 AM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 6 dB margin below limit

Freq MHz	Quasi-peak Level dBµV/m	Quasi-peak Limit dBµV/m	Excessive Quasi-peak Emissions	Average Level dBµV/m	Average Limit dBµV/m	Excessive Average Emissions
0.150	59.5	66.0		30.3	56.0	
0.186	53.5	64.2		30.4	54.2	
0.410	29.4	57.7		11.4	47.7	
0.419	28.7	57.5		11.3	47.5	
0.577	18.9	56.0		5.0	46.0	
0.898	9.0	56.0		4.3	46.0	
1.961	7.2	56.0		3.4	46.0	
3.105	8.5	56.0		4.4	46.0	
4.738	12.2	56.0		6.5	46.0	
8.438	18.6	60.0		9.4	50.0	
13.914	33.8	60.0		21.5	50.0	
14.067	34.1	60.0		21.3	50.0	
14.337	23.3	60.0		14.8	50.0	
22.294	16.8	60.0		8.7	50.0	

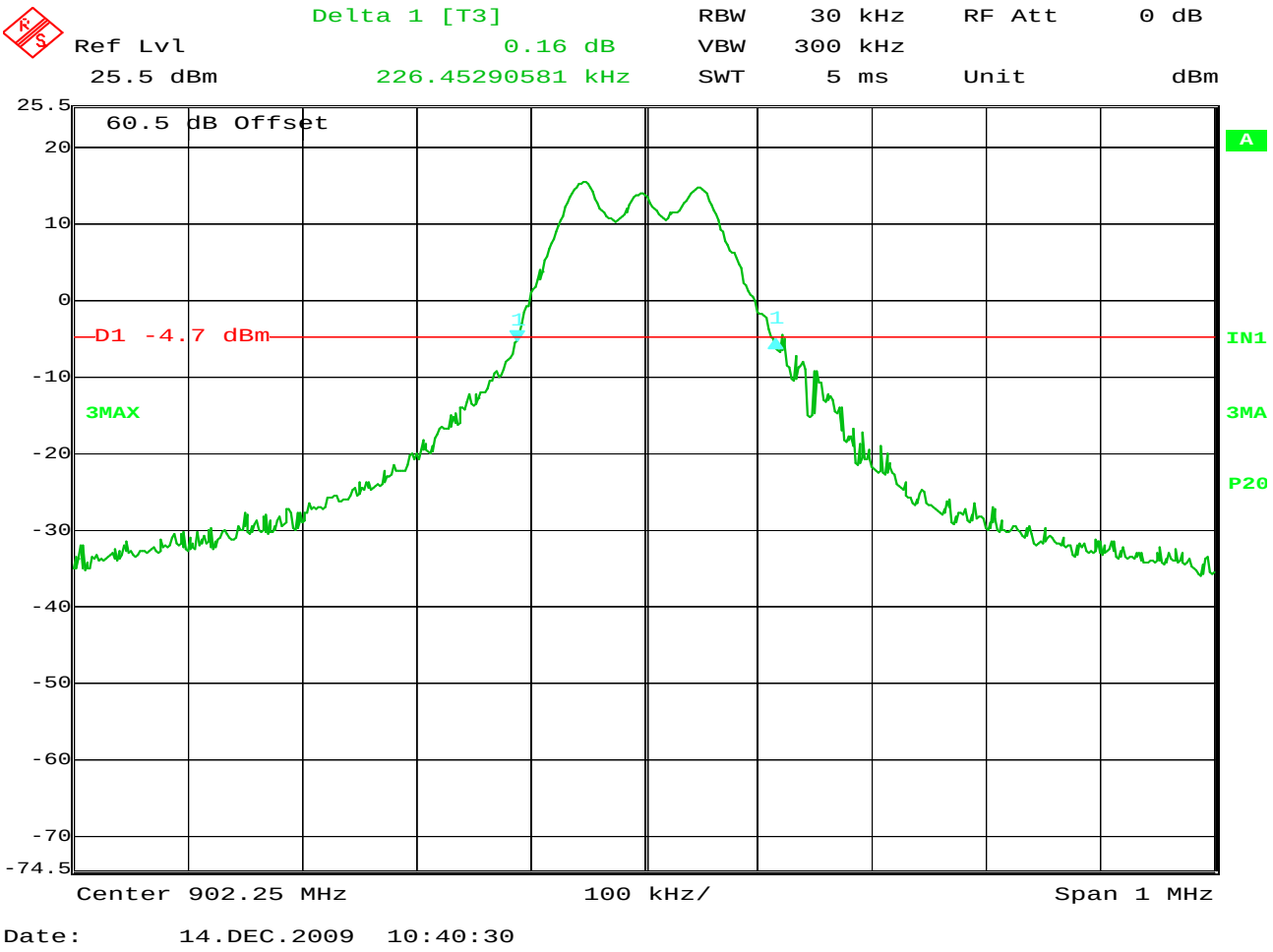
FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 12/15/2009

Manufacturer	:	The Chamberlain group, Inc.
Model	:	T1000
DUT Revision	:	
Serial Number	:	none assigned
DUT Mode	:	Tx 914.75MHz
Line Tested	:	return side
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Test Date	:	Dec 16, 2009 08:33:53 AM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 6 dB margin below limit

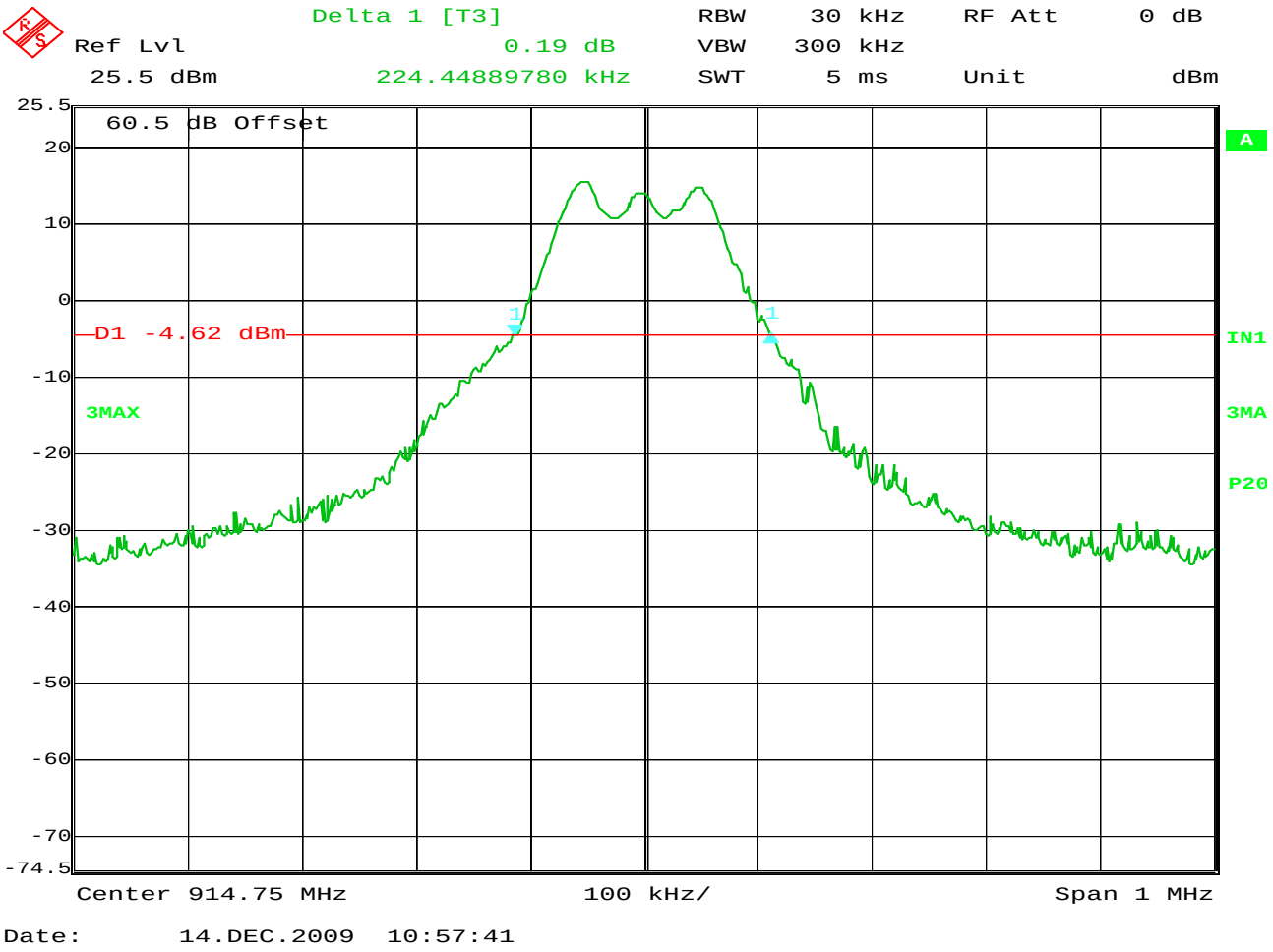
Freq MHz	Quasi-peak Level dBµV/m	Quasi-peak Limit dBµV/m	Excessive Quasi-peak Emissions	Average Level dBµV/m	Average Limit dBµV/m	Excessive Average Emissions
0.150	59.4	66.0		29.9	56.0	
0.191	52.5	64.0		31.8	54.0	
0.347	31.8	59.0		20.5	49.0	
0.500	18.9	56.0		7.8	46.0	
0.849	11.8	56.0		6.2	46.0	
1.781	10.5	56.0		4.7	46.0	
2.952	7.9	56.0		4.6	46.0	
3.680	8.5	56.0		4.1	46.0	
8.290	18.0	60.0		10.3	50.0	
13.541	15.4	60.0		7.5	50.0	
21.839	15.9	60.0		8.7	50.0	



FCC 15.247 20 dB bandwidth measurement

MANUFACTURER : The Chamberlain Group, Inc.
MODEL NUMBER : T1000
SERIAL NUMBER : None
TEST MODE : Tx @ 902.25MHz
TEST PARAMETERS : 20 dB bandwidth measurement
EQUIPMENT USED : RBA0, T2D7, T2DL, T2DS

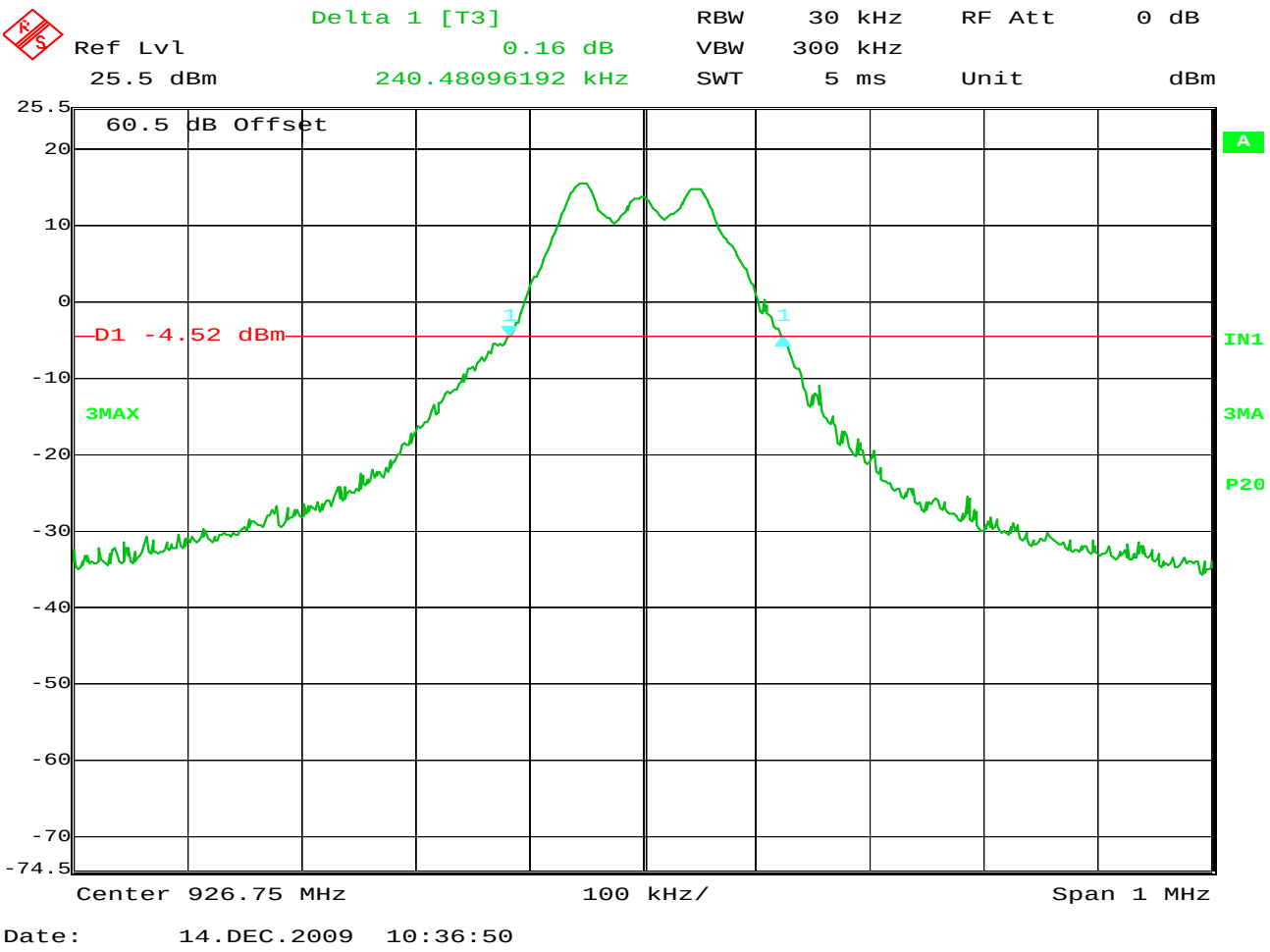
NOTES



FCC 15.247 20 dB bandwidth measurement

MANUFACTURER : The Chamberlain Group, Inc.
MODEL NUMBER : T1000
SERIAL NUMBER : None
TEST MODE : Tx @ 914.75MHz
TEST PARAMETERS : 20 dB bandwidth measurement
EQUIPMENT USED : RBA0, T2D7, T2DL, T2DS

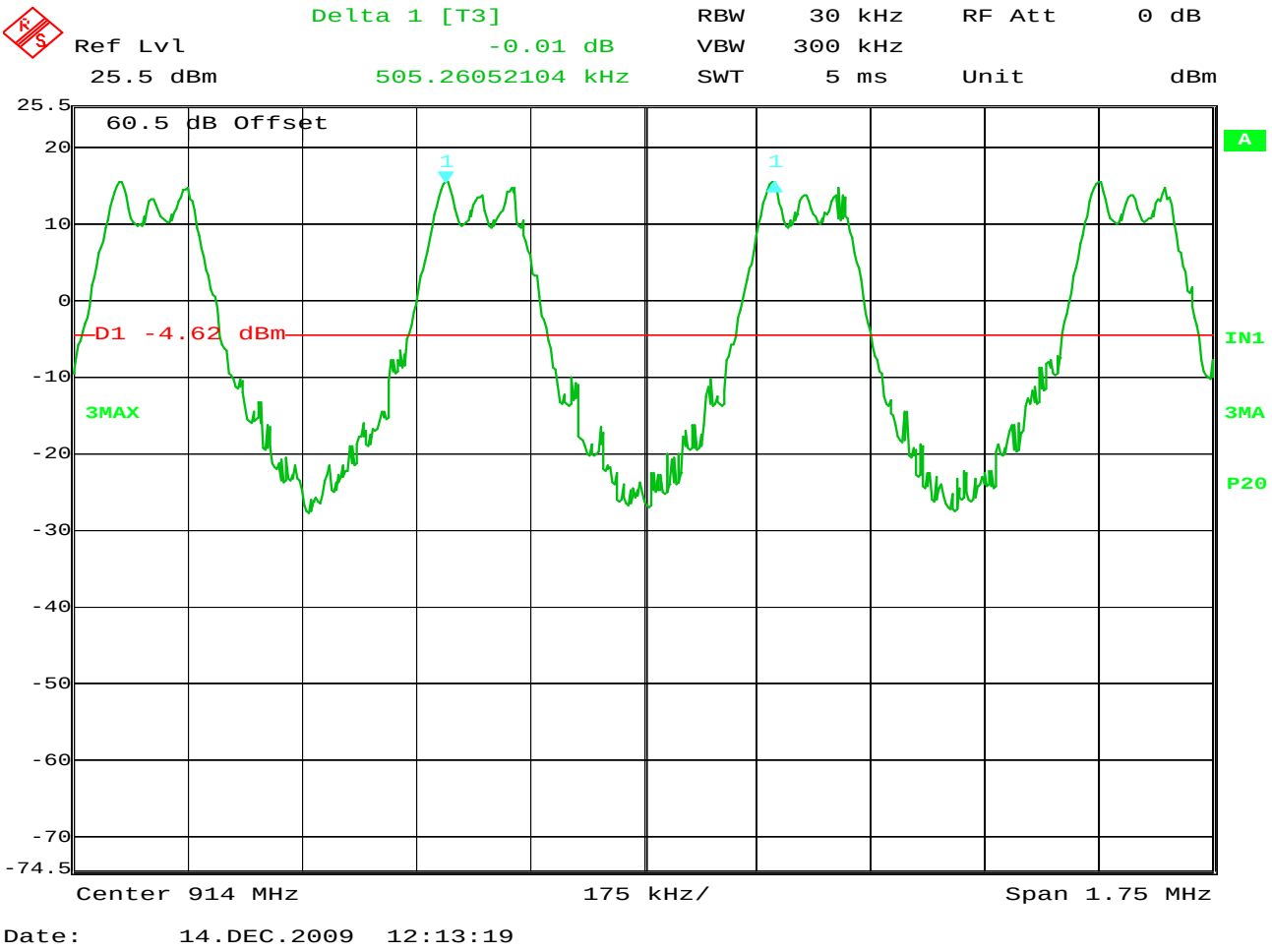
NOTES



FCC 15.247 20 dB bandwidth measurement

MANUFACTURER : The Chamberlain Group, Inc.
MODEL NUMBER : T1000
SERIAL NUMBER : None
TEST MODE : Tx @ 926.75MHz
TEST PARAMETERS : 20 dB bandwidth measurement
EQUIPMENT USED : RBA0, T2D7, T2DL, T2DS

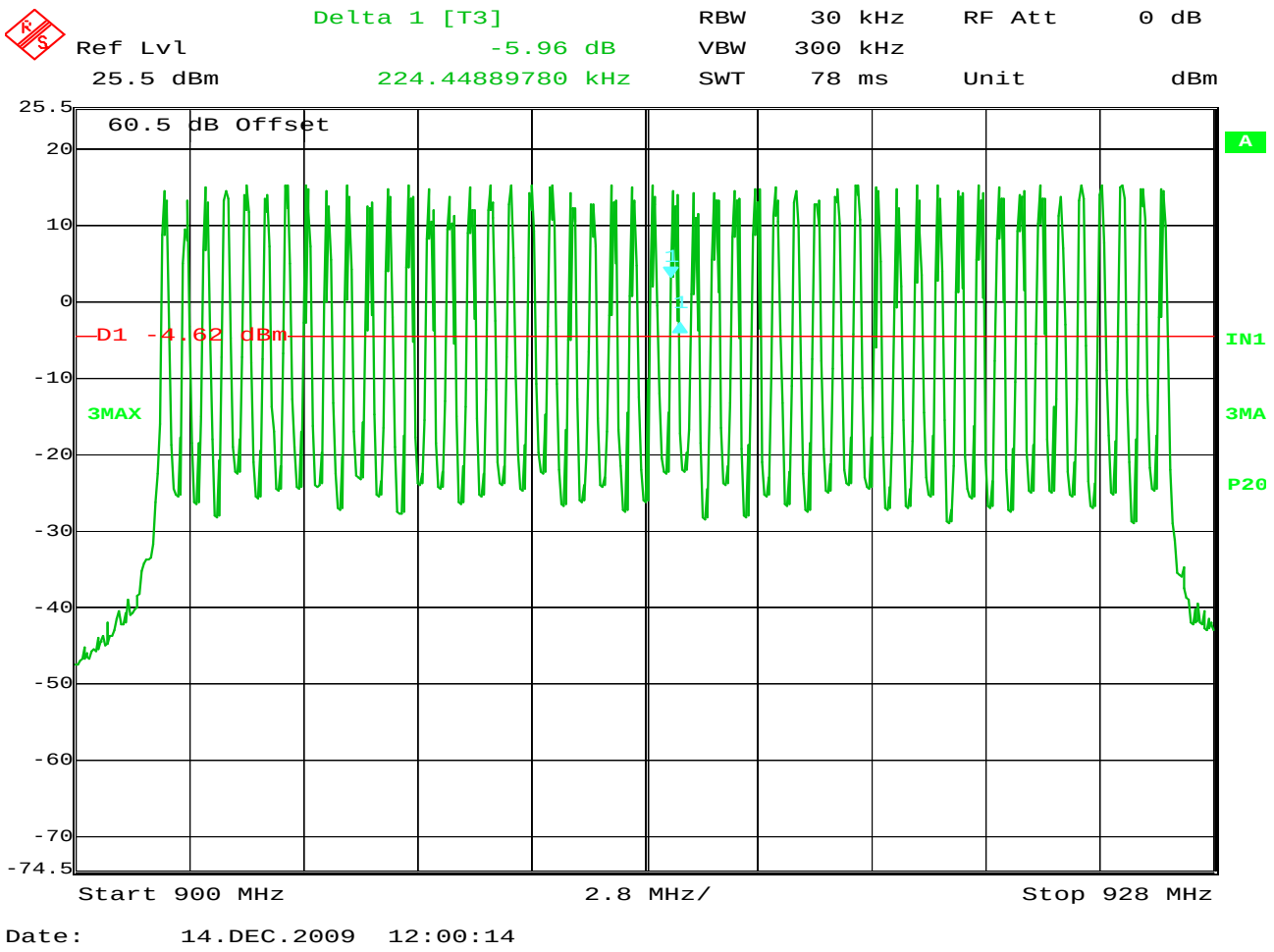
NOTES



FCC 15.247 Carrier Frequency Separation

MANUFACTURER : The Chamberlain Group, Inc.
MODEL NUMBER : T1000
SERIAL NUMBER : None
TEST MODE : Hopping Enabled
TEST PARAMETERS : Carrier Frequency Separation
EQUIPMENT USED : RBA0, T2D7, T2DL, T2DS

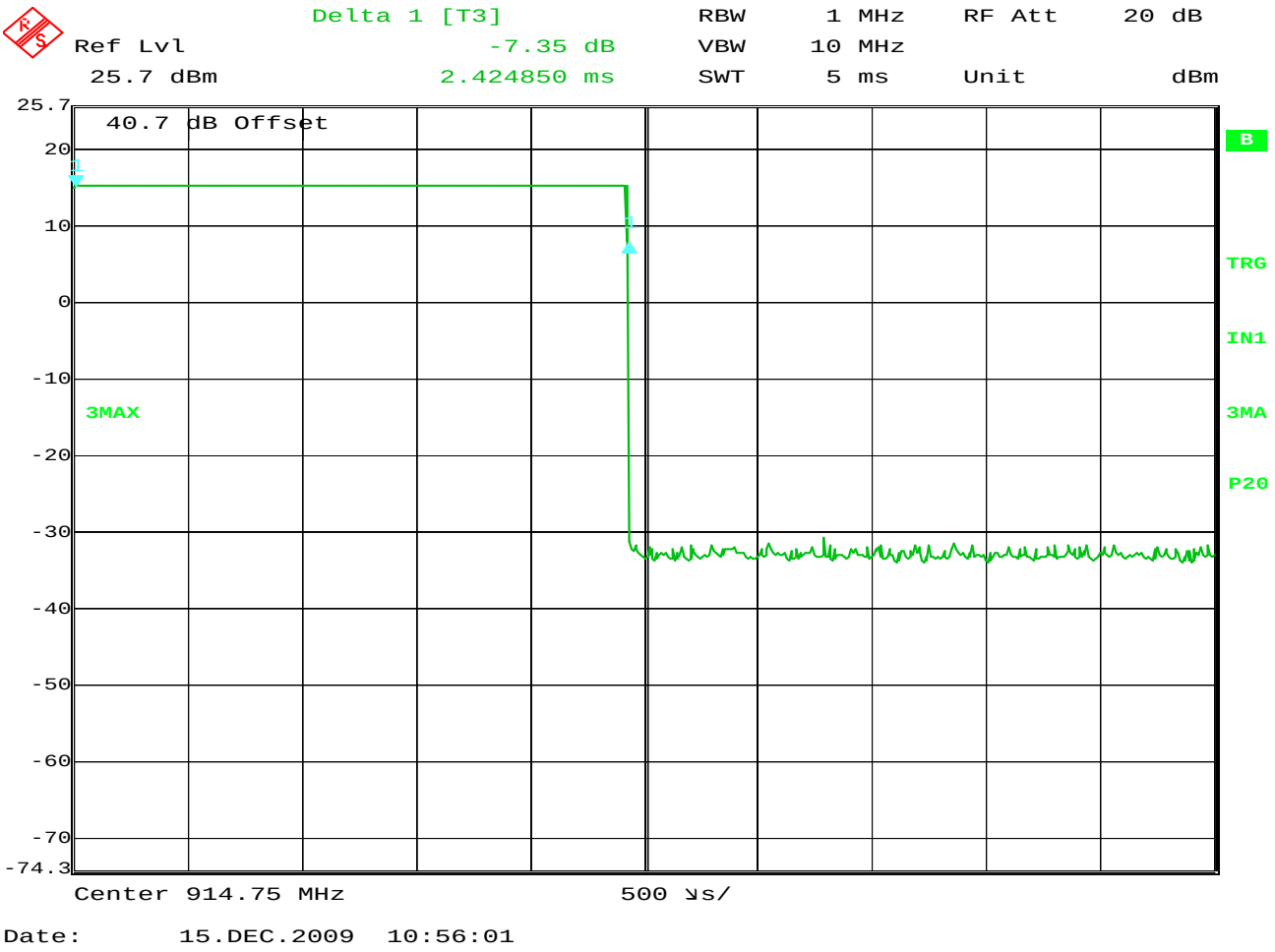
NOTES



FCC 15.247 Number of Hopping Frequencies

MANUFACTURER : The Chamberlain Group, Inc.
MODEL NUMBER : T1000
SERIAL NUMBER : None
TEST MODE : Hopping Enabled
TEST PARAMETERS : Number of Hopping Frequencies = 50
EQUIPMENT USED : RBA0, T2D7, T2DL, T2DS

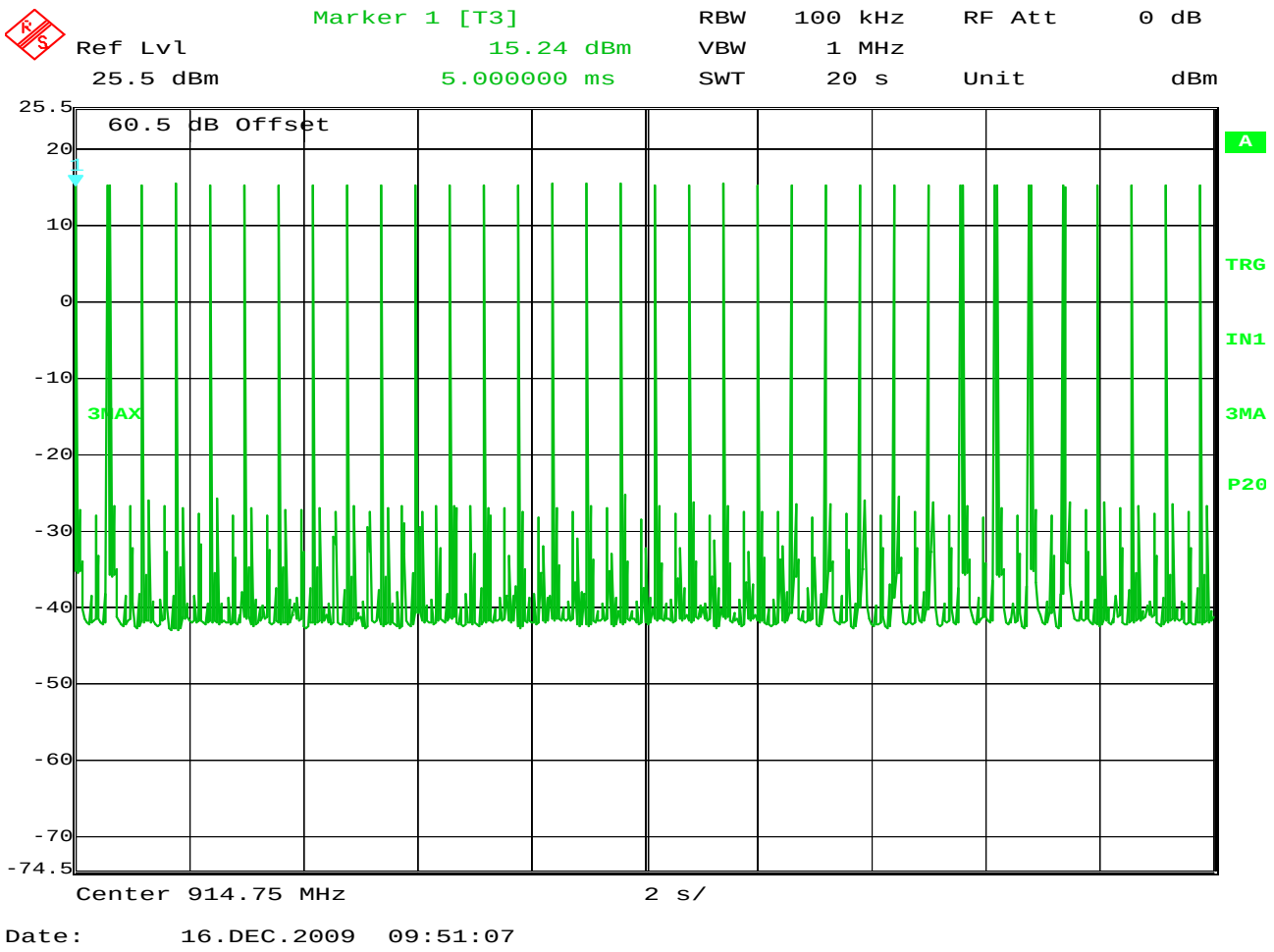
NOTES



FCC 15.247 Dwell Time / Time of Occupancy

MANUFACTURER	:	The Chamberlain Group, Inc.
MODEL NUMBER	:	T1000
SERIAL NUMBER	:	None
TEST MODE	:	Hopping Enabled
TEST PARAMETERS	:	Time of Occupancy
TEST PARAMETERS	:	Pulse Width = 2.4mS
EQUIPMENT USED	:	RBA0, T2DL, T2DS

NOTES



FCC 15.247 Dwell Time / Time of Occupancy

MANUFACTURER	:	The Chamberlain Group, Inc.
MODEL NUMBER	:	T1000
SERIAL NUMBER	:	None
TEST MODE	:	Hopping Enabled
TEST PARAMETERS	:	Time of Occupancy
TEST PARAMETERS	:	Number of Pulses in 20 seconds = 34
EQUIPMENT USED	:	RBA0, T2D7, T2DL, T2DS

NOTES

DATA SHEET

Manufacturer : The Chamberlain Group, Inc.
Test Item : Transceiver
Model No. : T1000
Test Specification : FCC Part 15, Subpart C, Section 15.247, Peak Output Power
Date : December 11, 2009
Notes :

Freq (MHz)	Total (dBm)	Total (Watts)	Limit (dBm)	Limit (Watts)
902.25	15.37	0.034	30	1
914.75	15.55	0.036	30	1
926.75	15.55	0.036	30	1

Checked BY Richard E. King :

Richard E. King

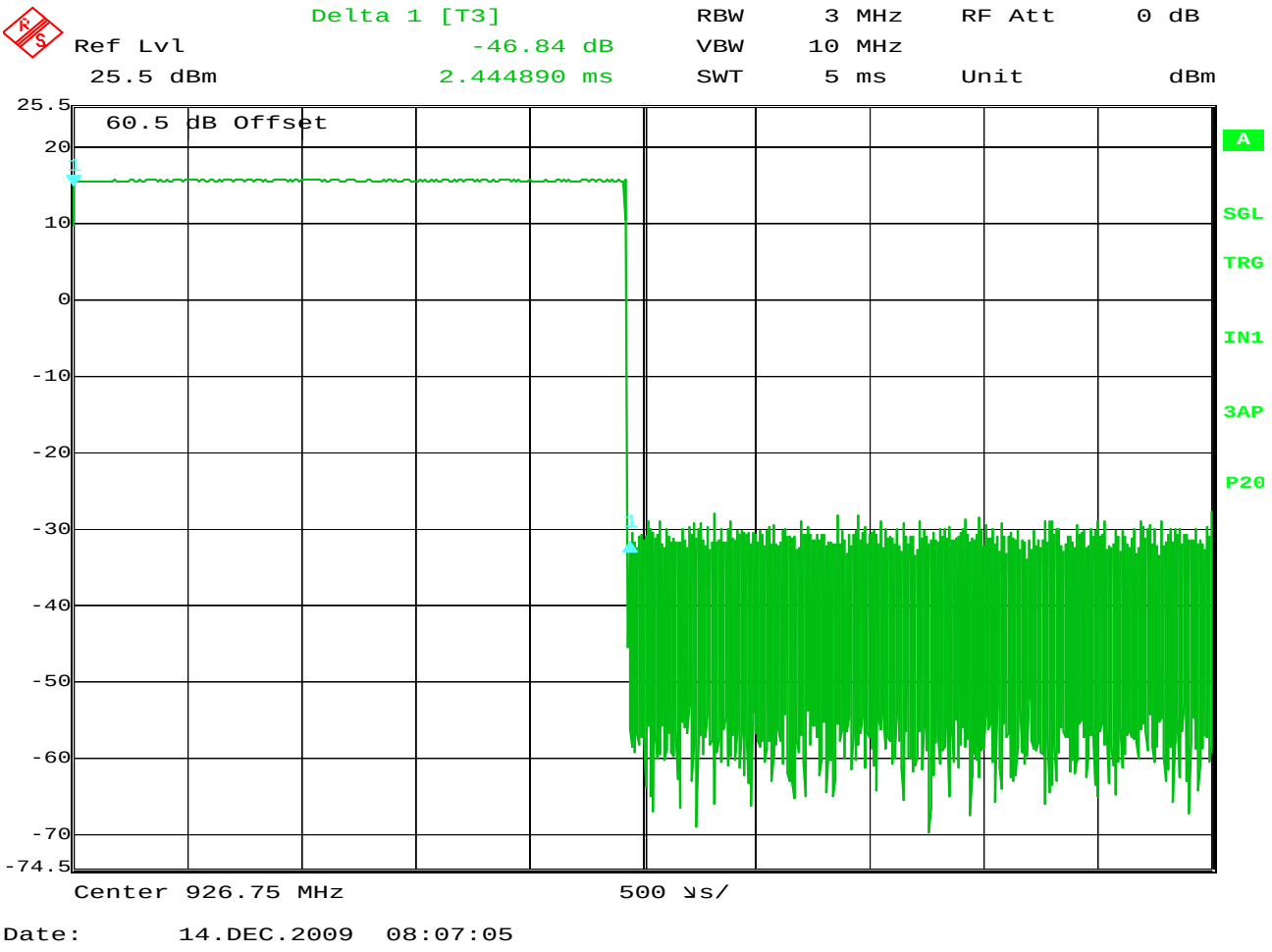
DATA SHEET

Manufacturer : The Chamberlain Group, Inc.
Test Item : Transceiver
Model No. : T1000
Test Specification : FCC Part 15, Subpart C, Section 15.247, Peak Output Power
Date : December 11, 2009
Notes :

Frequency MHz	Antenna Polarity	Meter Reading dBuV	Matched Signal Generator Reading dBm	Antenna Gain dB	Cable Loss dB	EIRP dBm	Limit dBm
902.3	H	85.8	11.9	0.0	1.9	10.0	36
902.3	V	87.8	15.0	0.0	1.9	13.1	36
914.8	H	85.4	10.9	0.0	1.9	9.0	36
914.8	V	87.1	14.6	0.0	1.9	12.7	36
926.8	H	85.2	12.0	0.0	1.9	10.1	36
926.8	V	86.8	15.6	0.0	1.9	13.7	36

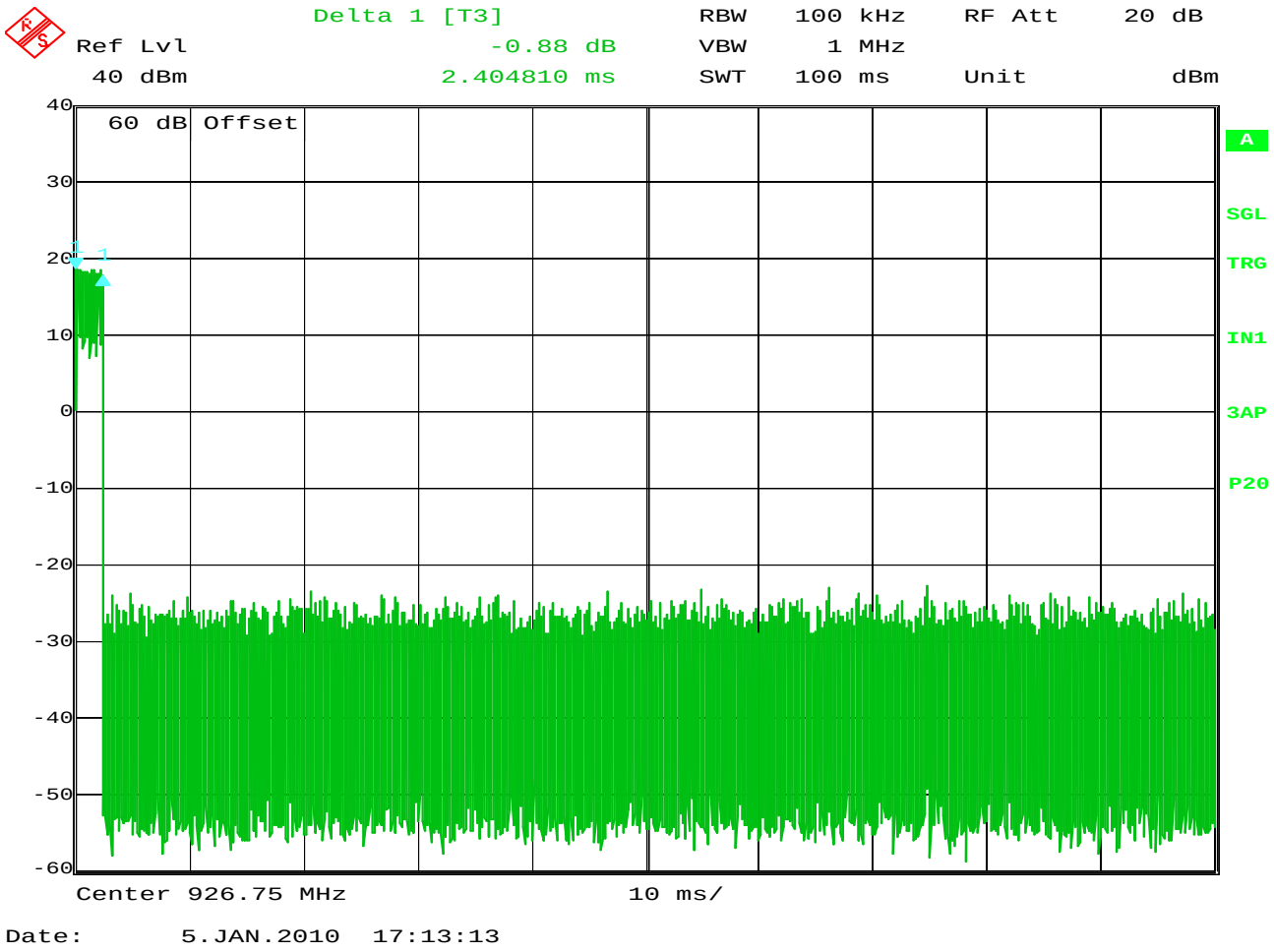
EIRP = Sig. Gen. Reading + Antenna Gain – Cable Loss

Checked By: Richard E. King



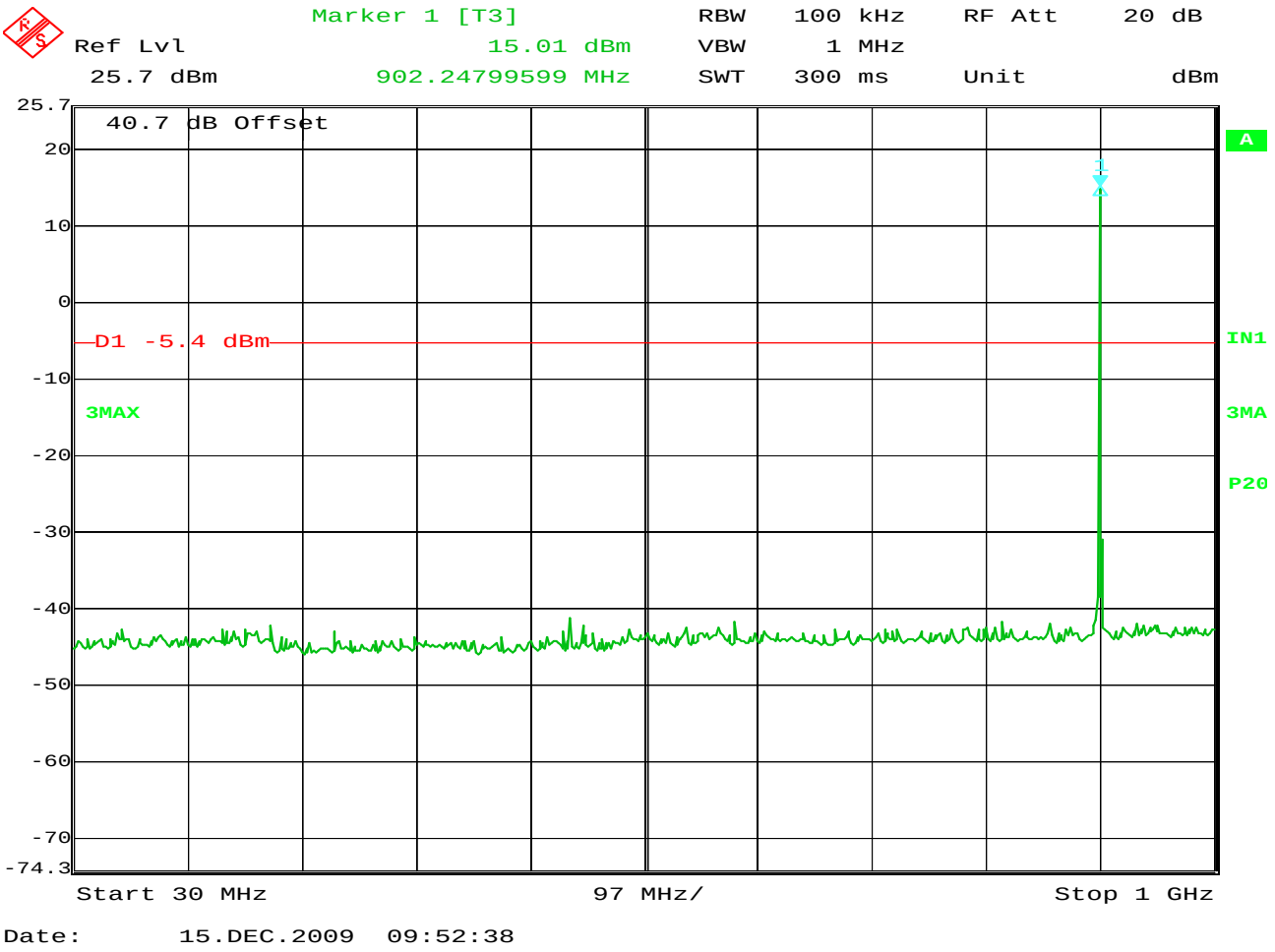
FCC 15.247 Transmitter Duty Cycle

MANUFACTURER	:	The Chamberlain Group, Inc.
MODEL NUMBER	:	T1000
SERIAL NUMBER	:	None
TEST MODE	:	Centered on 926.75MHz
TEST PARAMETERS	:	Pulse Width
EQUIPMENT USED	:	RBA0, T2D7, T2DL, T2DS



FCC 15.247 Transmitter Duty Cycle

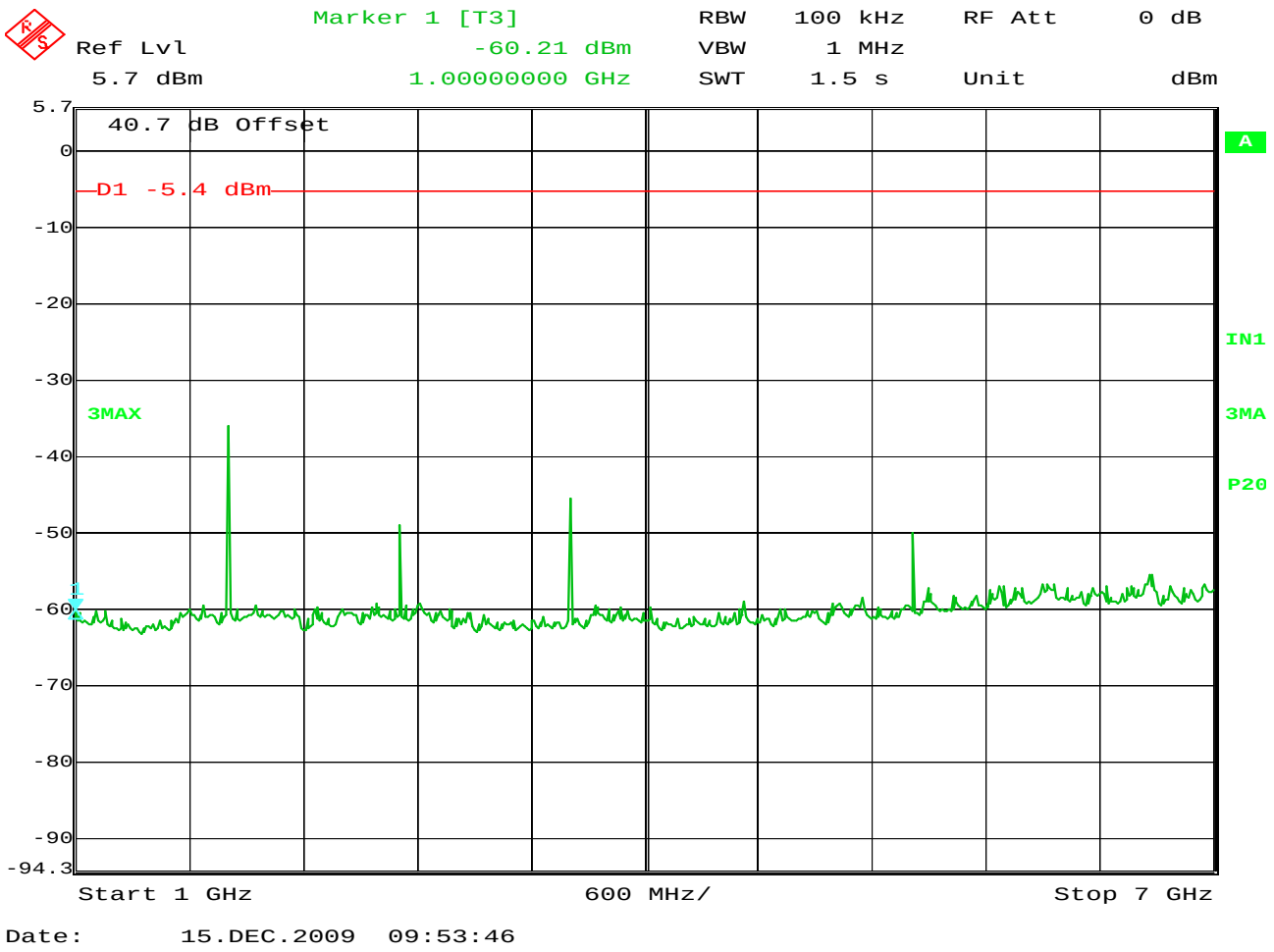
MANUFACTURER	:	The Chamberlain Group, Inc.
MODEL NUMBER	:	T1000
SERIAL NUMBER	:	None
TEST MODE	:	Centered on 926.75MHz
TEST PARAMETERS	:	Number of pulses in 100mS
EQUIPMENT USED	:	RBA0, T2D7, T2DL, T2DS



FCC 15.247 Spurious Emissions Conducted

MANUFACTURER	:	The Chamberlain Group, Inc.
MODEL NUMBER	:	T1000
SERIAL NUMBER	:	None
TEST MODE	:	Tx @ 902.25MHz
TEST PARAMETERS	:	Carrier Frequency Separation
EQUIPMENT USED	:	RBA0, T2DL, T2DS

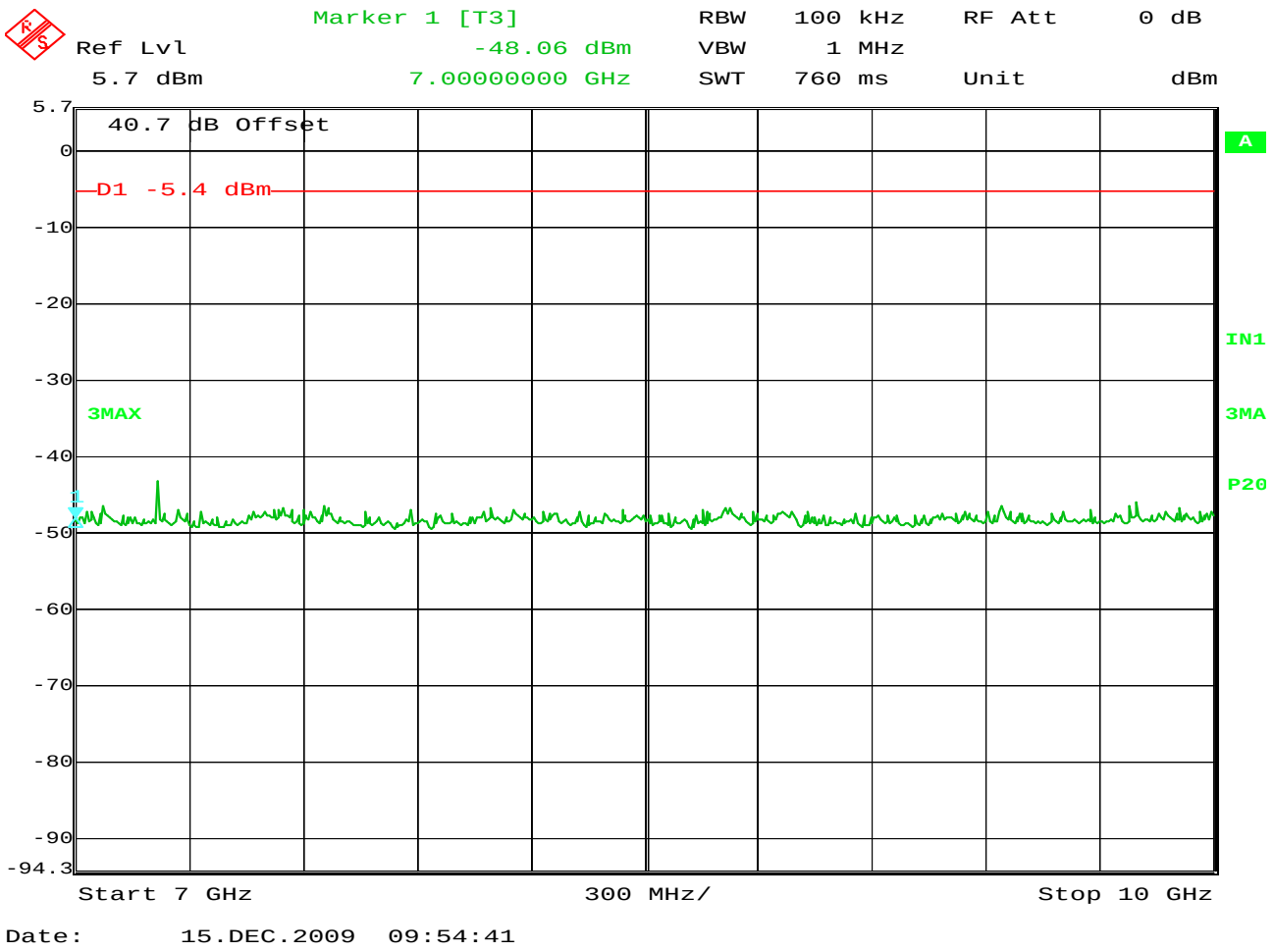
NOTES



FCC 15.247 Spurious Emissions Conducted

MANUFACTURER	:	The Chamberlain Group, Inc.
MODEL NUMBER	:	T1000
SERIAL NUMBER	:	None
TEST MODE	:	Tx @ 902.25MHz
EQUIPMENT USED	:	RBA0, T2DL, T2DS

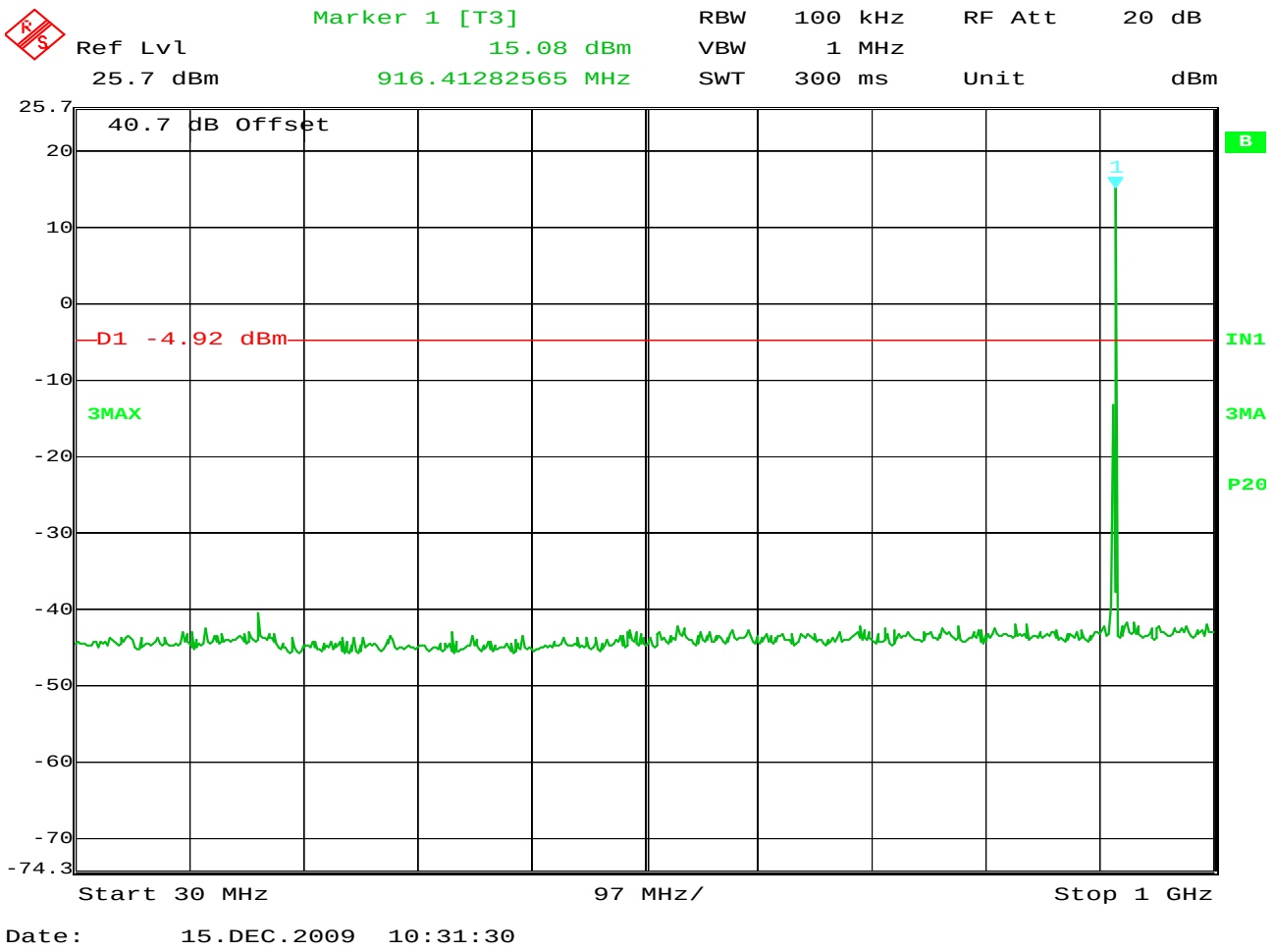
NOTES



FCC 15.247 Spurious Emissions Conducted

MANUFACTURER	:	The Chamberlain Group, Inc.
MODEL NUMBER	:	T1000
SERIAL NUMBER	:	None
TEST MODE	:	Tx @ 902.25MHz
EQUIPMENT USED	:	RBA0, T2DL, T2DS

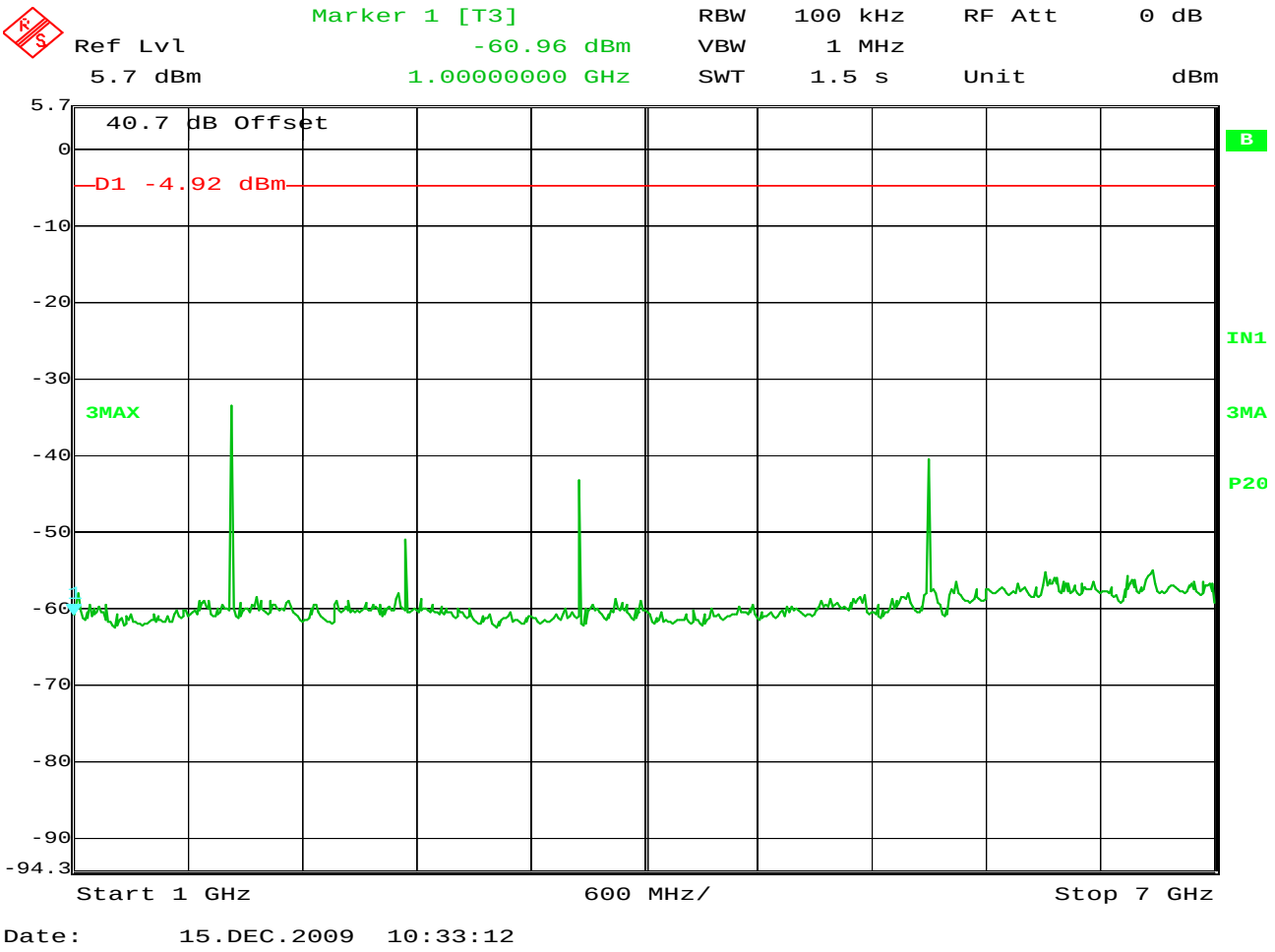
NOTES



FCC 15.247 Spurious Emissions Conducted

MANUFACTURER	:	The Chamberlain Group, Inc.
MODEL NUMBER	:	T1000
SERIAL NUMBER	:	None
TEST MODE	:	Tx @ 914.75MHz
EQUIPMENT USED	:	RBA0, T2DL, T2DS

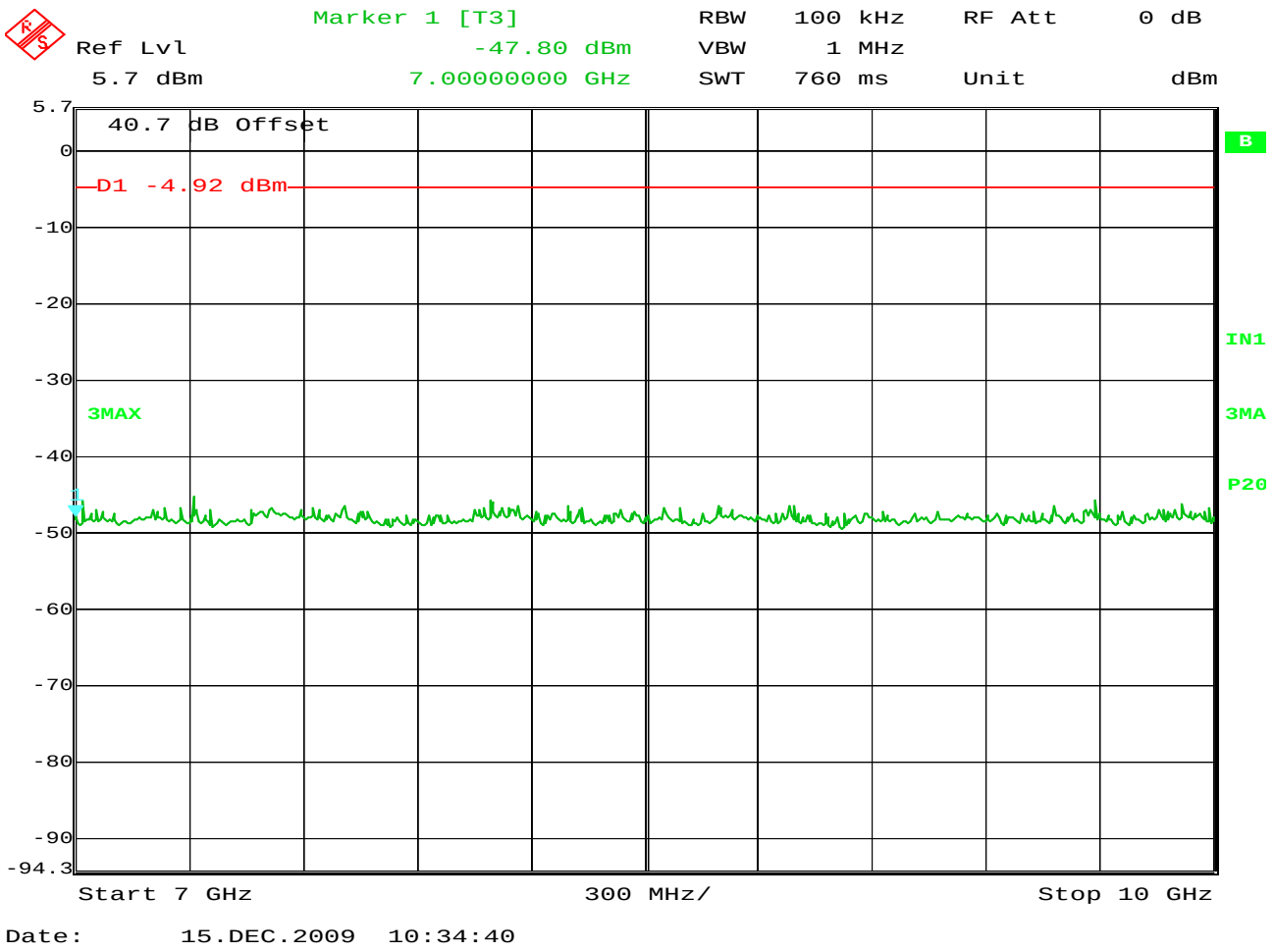
NOTES



FCC 15.247 Spurious Emissions Conducted

MANUFACTURER	:	The Chamberlain Group, Inc.
MODEL NUMBER	:	T1000
SERIAL NUMBER	:	None
TEST MODE	:	Tx @ 914.75MHz
EQUIPMENT USED	:	RBA0, T2DL, T2DS

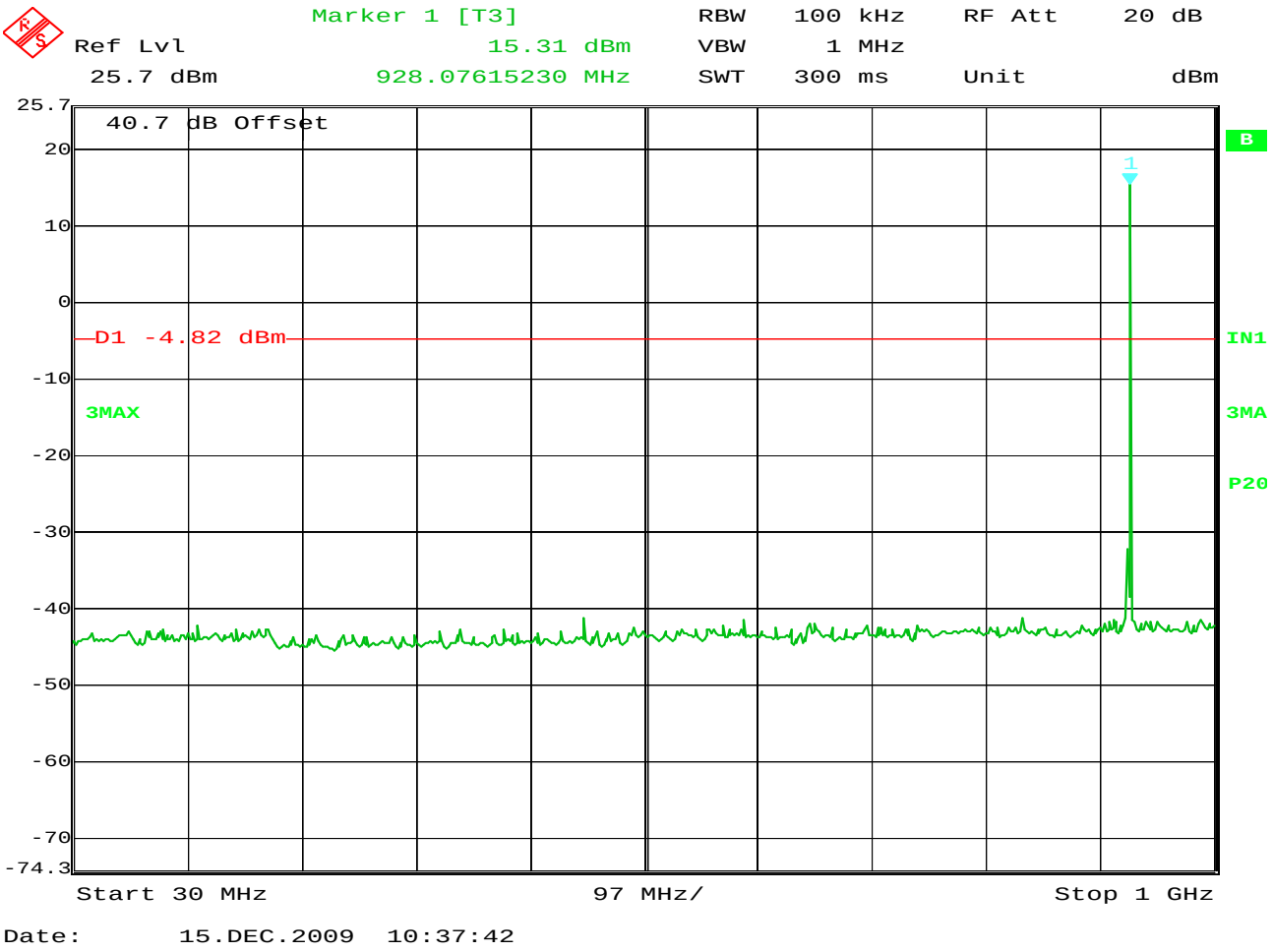
NOTES



FCC 15.247 Spurious Emissions Conducted

MANUFACTURER	:	The Chamberlain Group, Inc.
MODEL NUMBER	:	T1000
SERIAL NUMBER	:	None
TEST MODE	:	Tx @ 914.75MHz
EQUIPMENT USED	:	RBA0, T2DL, T2DS

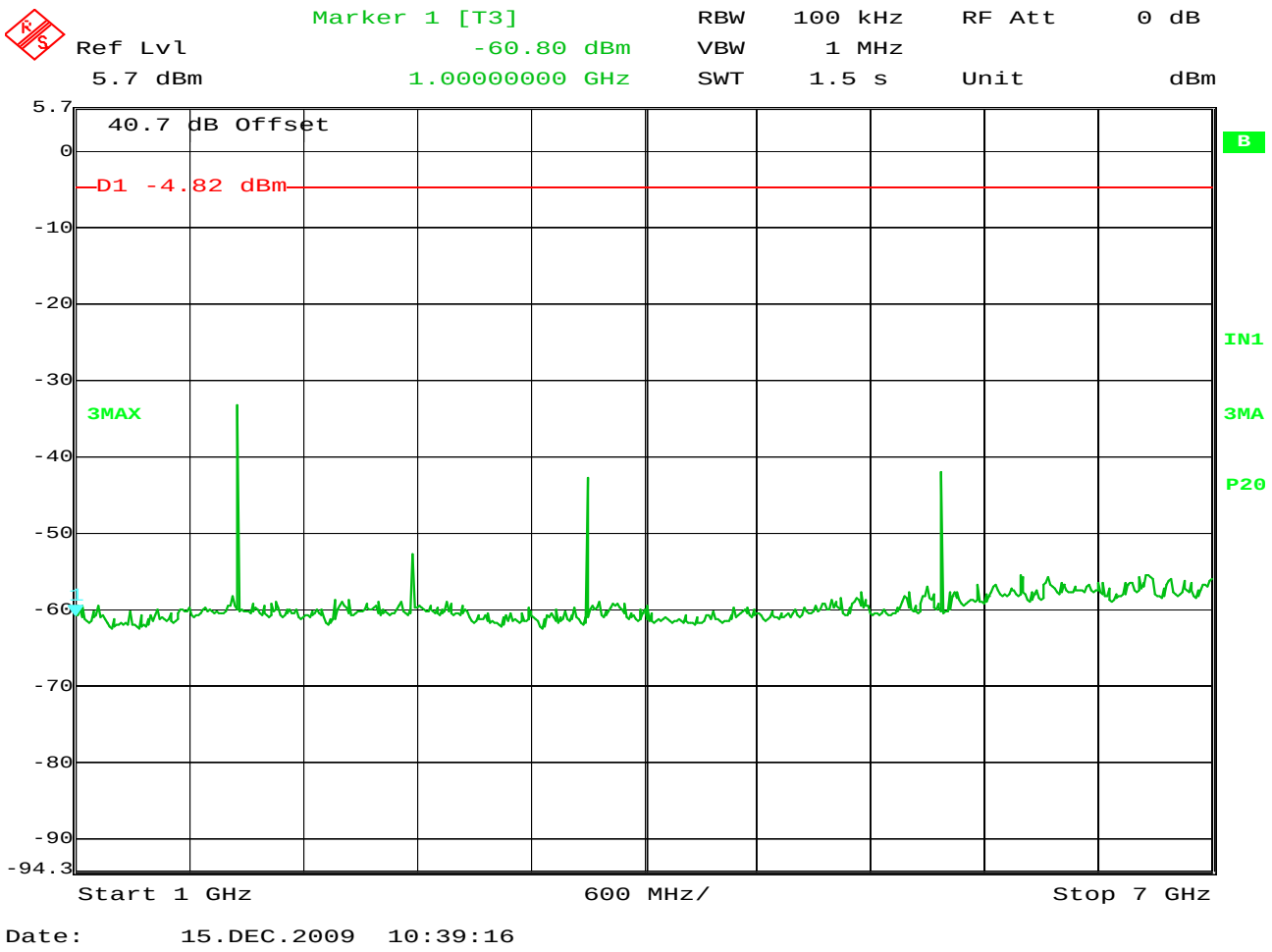
NOTES



FCC 15.247 Spurious Emissions Conducted

MANUFACTURER	:	The Chamberlain Group, Inc.
MODEL NUMBER	:	T1000
SERIAL NUMBER	:	None
TEST MODE	:	Tx @ 926.75MHz
EQUIPMENT USED	:	RBA0, T2DL, T2DS

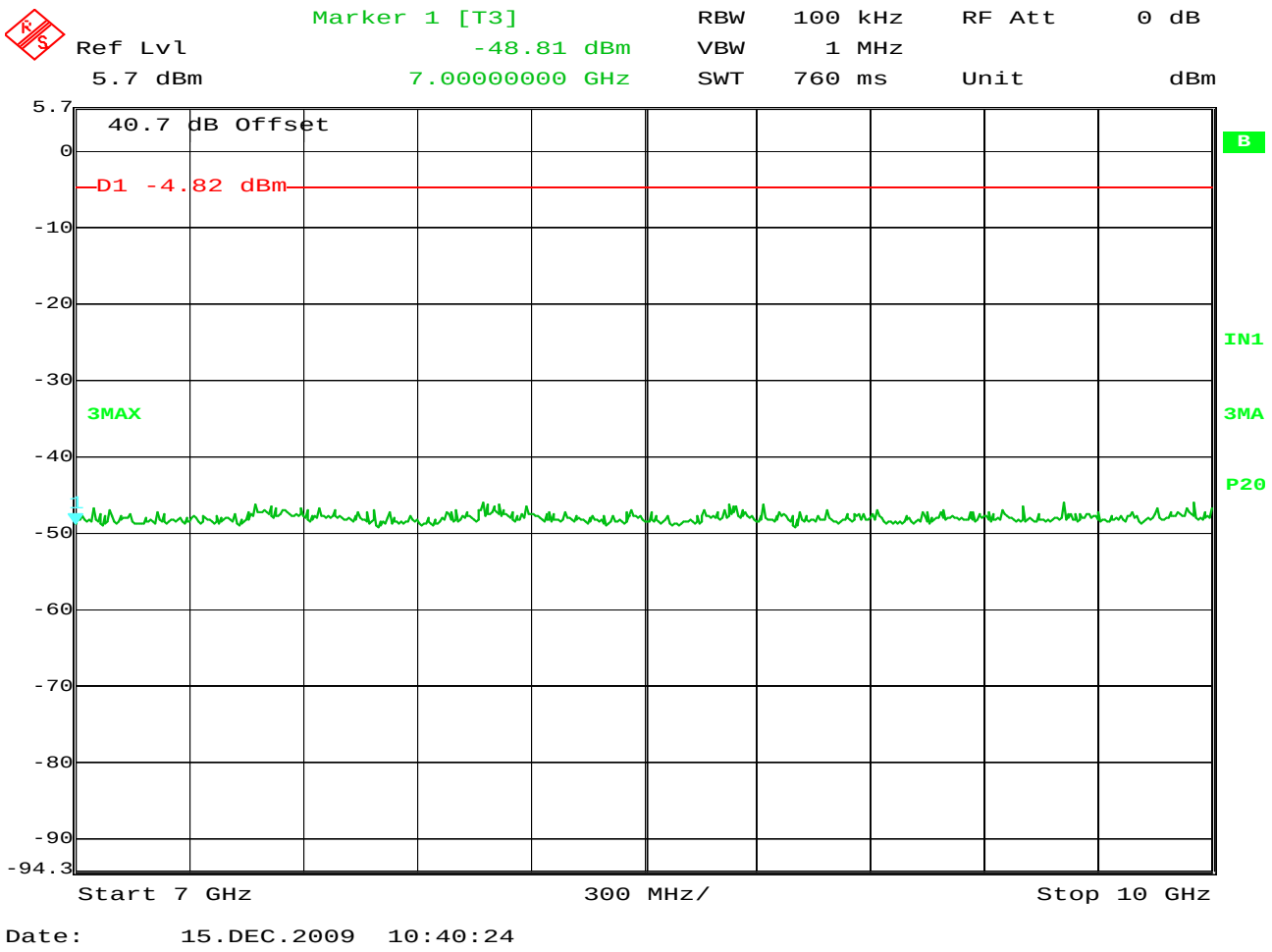
NOTES



FCC 15.247 Spurious Emissions Conducted

MANUFACTURER	:	The Chamberlain Group, Inc.
MODEL NUMBER	:	T1000
SERIAL NUMBER	:	None
TEST MODE	:	Tx @ 926.75MHz
EQUIPMENT USED	:	RBA0, T2DL, T2DS

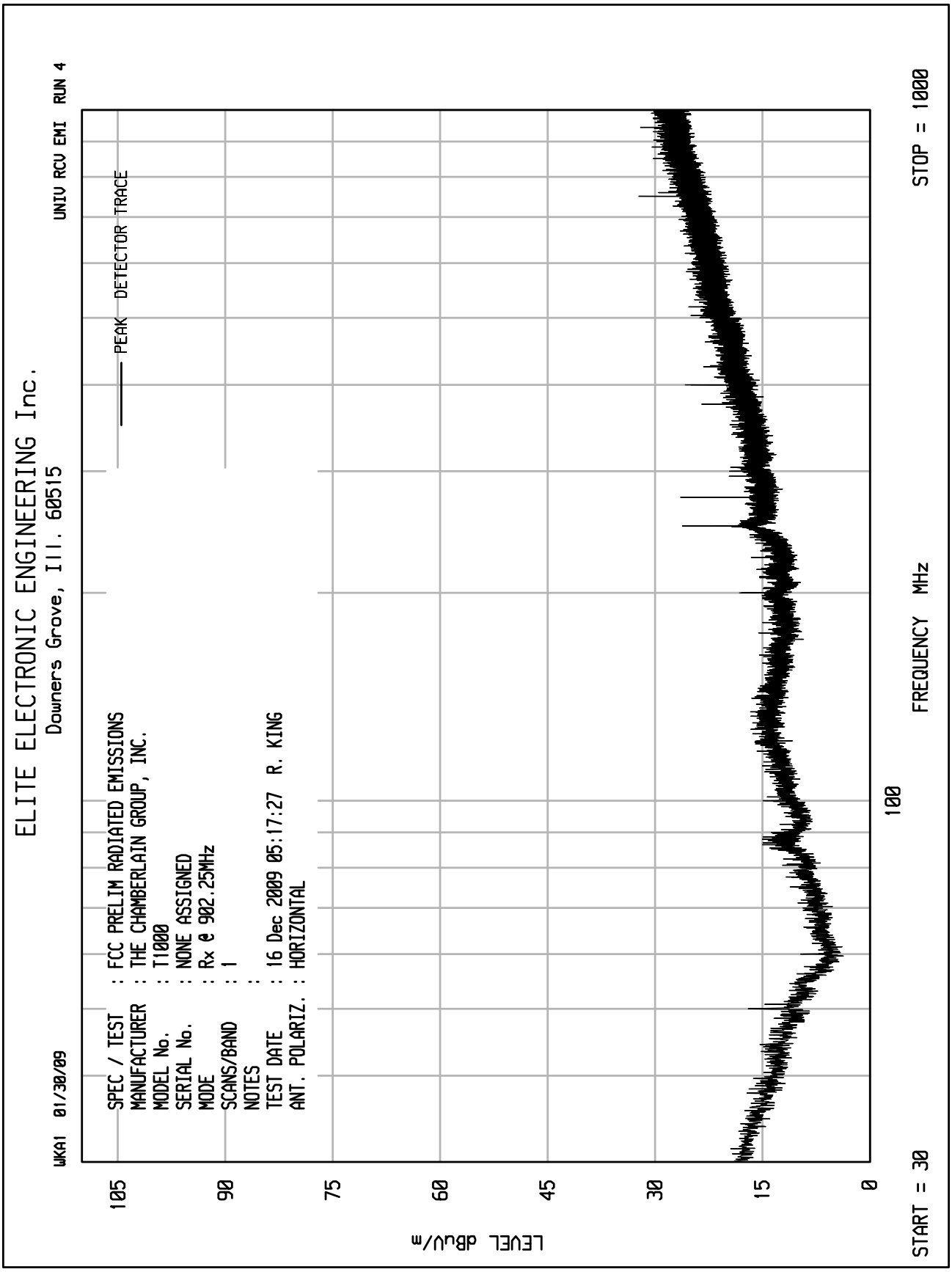
NOTES

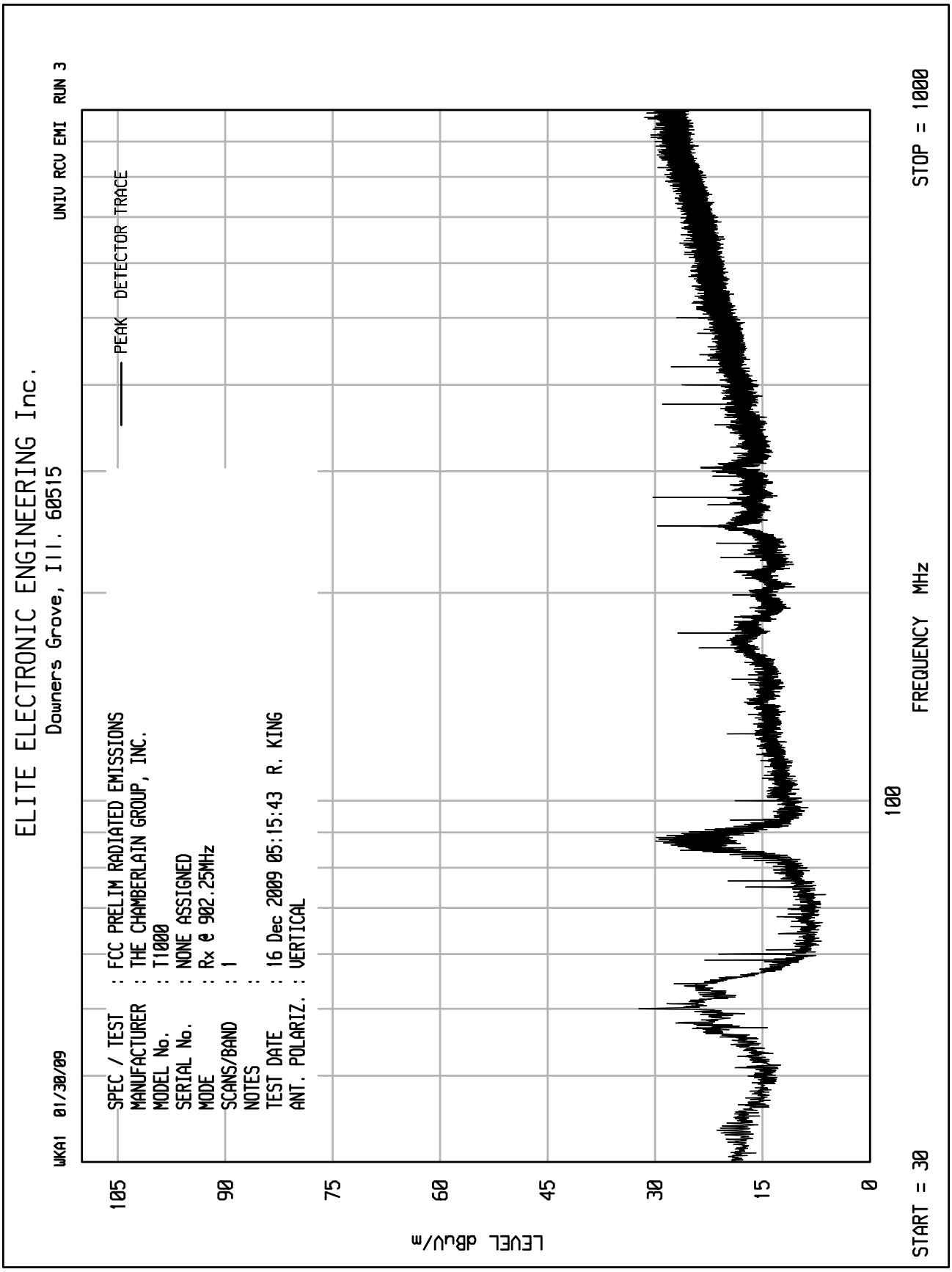


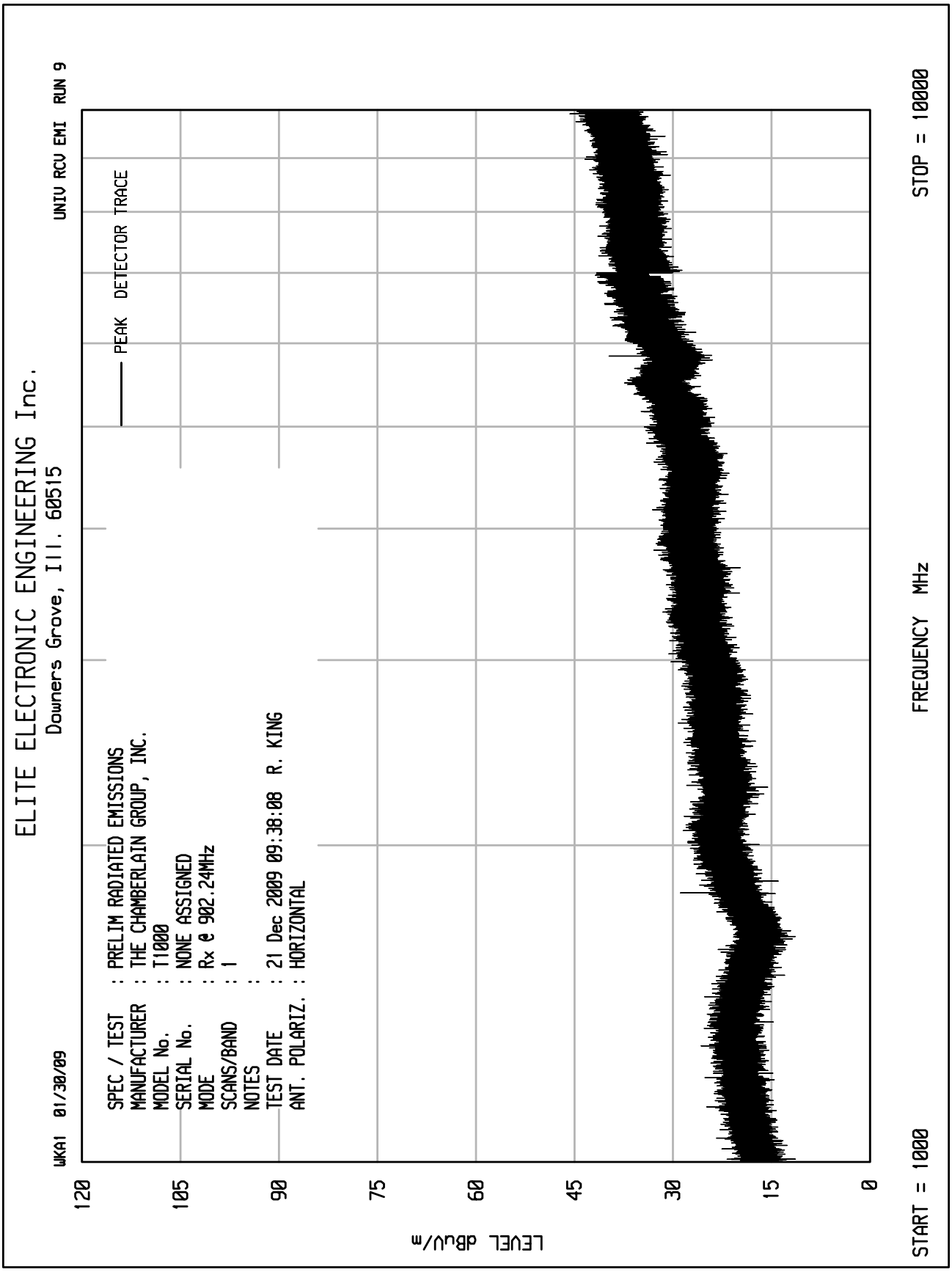
FCC 15.247 Spurious Emissions Conducted

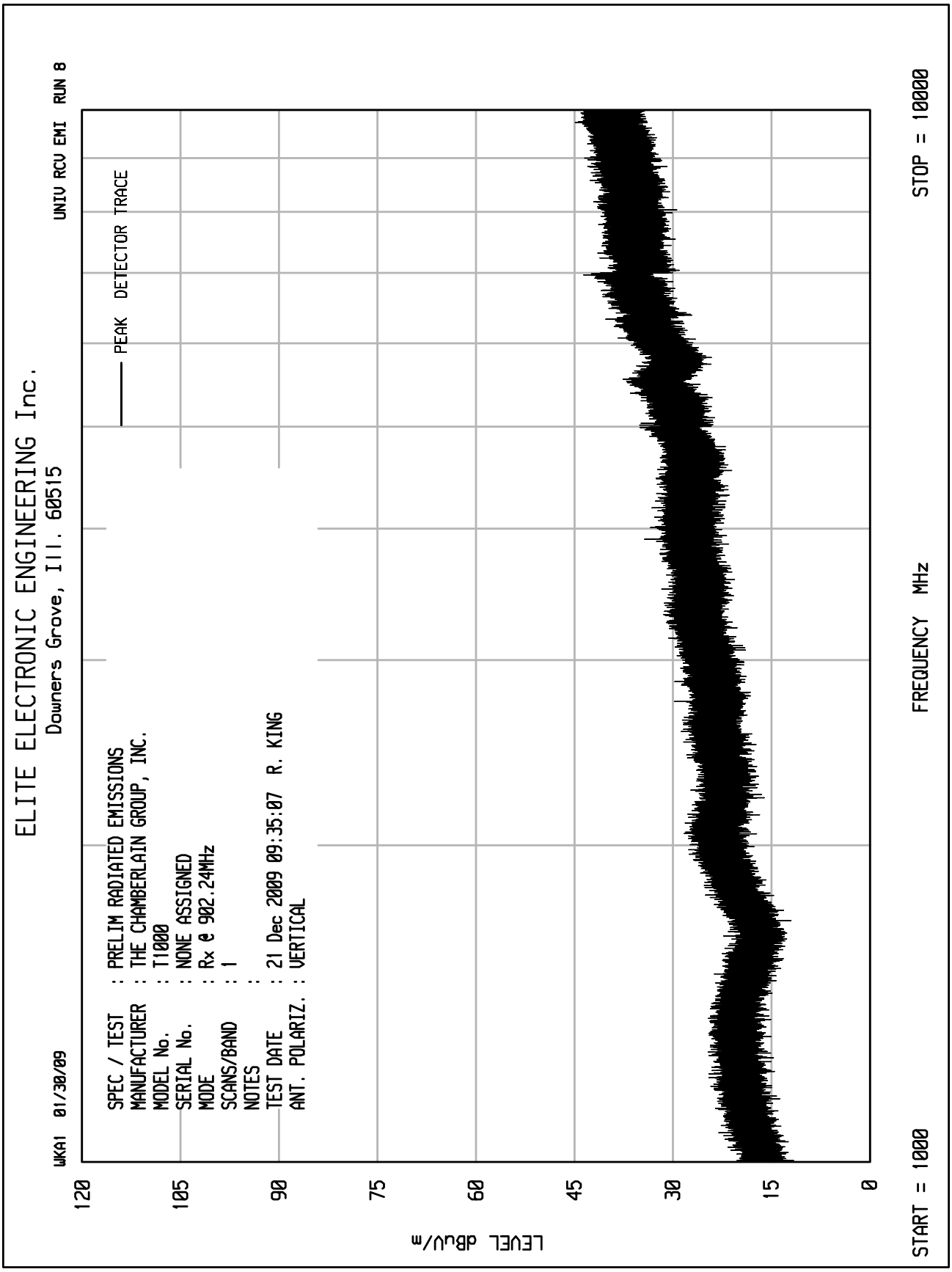
MANUFACTURER	:	The Chamberlain Group, Inc.
MODEL NUMBER	:	T1000
SERIAL NUMBER	:	None
TEST MODE	:	Tx @ 926.75MHz
EQUIPMENT USED	:	RBA0, T2DL, T2DS

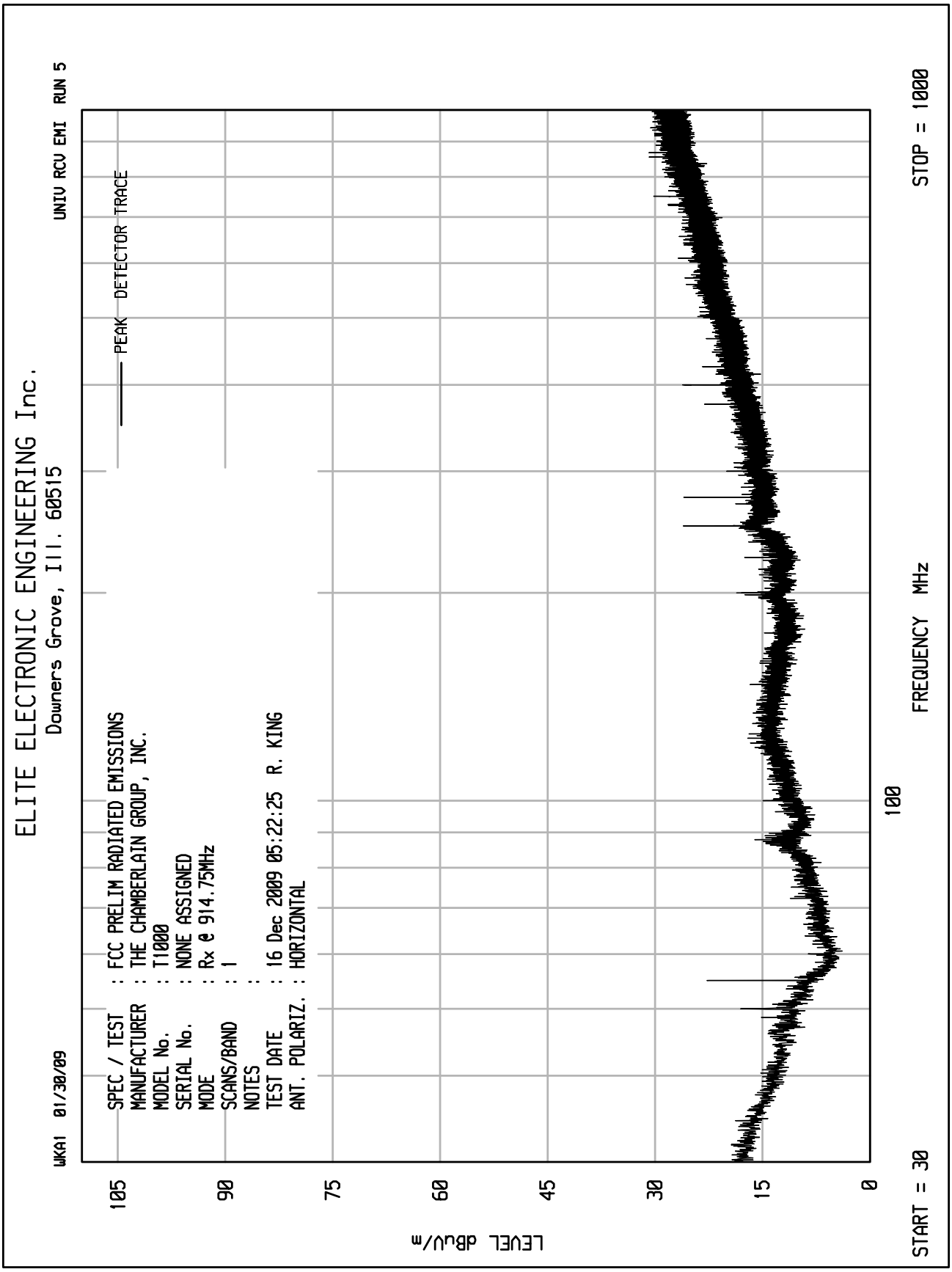
NOTES

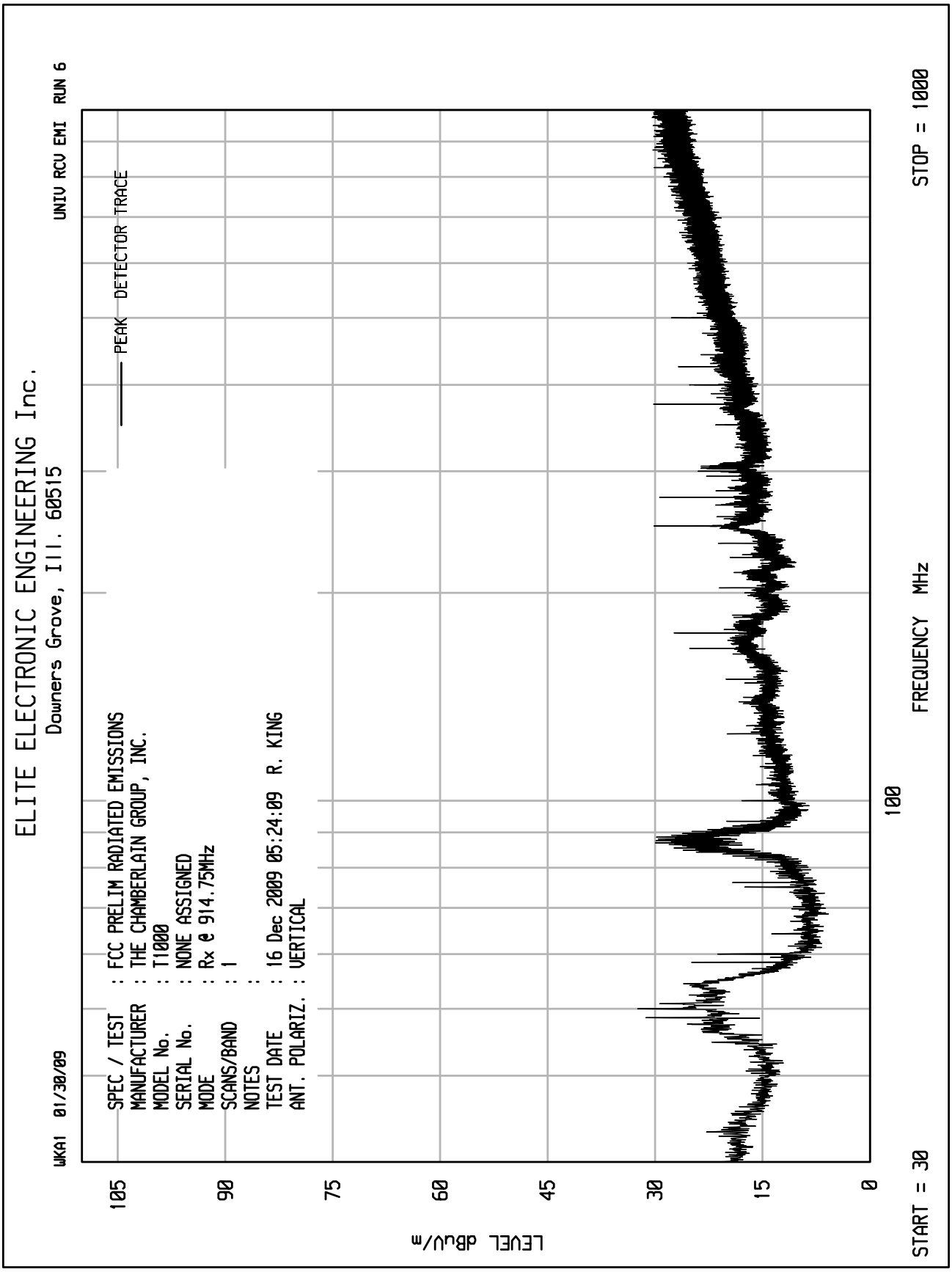

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 4
WKA1 01/30/09
SPEC / TEST : FCC PRELIM RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP, INC.
MODEL No. : T1000
SERIAL No. : NONE ASSIGNED
MODE : Rx @ 902.25MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 16 Dec 2009 05:17:27 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
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 3
WKA1 01/30/09
SPEC / TEST : FCC PRELIM RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP, INC.
MODEL No. : T1000
SERIAL No. : NONE ASSIGNED
MODE : Rx @ 902.25MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 16 Dec 2009 05:15:43 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
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 9
WKA1 01/30/09
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP, INC.
MODEL No. : T1000
SERIAL No. : NONE ASSIGNED
MODE : Rx @ 902.24MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 21 Dec 2009 09:38:00 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 = 10000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 8
WKA1 01/30/09
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP, INC.
MODEL No. : T1000
SERIAL No. : NONE ASSIGNED
MODE : Rx @ 902.24MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 21 Dec 2009 09:35:07 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 = 10000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 5
WKA1 01/30/09
SPEC / TEST : FCC PRELIM RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP, INC.
MODEL No. : T1000
SERIAL No. : NONE ASSIGNED
MODE : Rx @ 914.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 16 Dec 2009 05:22:25 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
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 6
WKA1 01/30/09
SPEC / TEST : FCC PRELIM RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP, INC.
MODEL No. : T1000
SERIAL No. : NONE ASSIGNED
MODE : Rx @ 914.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 16 Dec 2009 05:24:09 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
105
90
75
60
45
30
15
0
START = 30
100
FREQUENCY MHz
STOP = 1000