Measurement of RF Emissions from a GDM Garage Door Manager Transceiver

For	The Chamberlain Group 845 Larch Ave. Elmhurst, IL 60126
P.O. Number	870589
Date Tested	February 7 through 10, 2011
Test Personnel	Richard E. King
Test Specification	FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B for receivers and Subpart C, Section 15.247 for Frequency Hopping Spread Spectrum Intentional Radiators Operating within the bands 902-928MHz Industry Canada RSS-GEN Industry Canada RSS-210

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REVISION HISTORY

Revision	Date	Description
—	Feb. 17, 2011	Initial release

Measurement of RF Emissions from a Garage Door Manager, Model No. GDM Transceiver

1. INTRODUCTION

1.1 Scope of Tests

This report represents the results of the series of radio interference measurements performed on a The Chamberlain Group Garage Door Manager, Model No. GDM, Serial No. none, transceiver (hereinafter referred to as the EUT). The EUT is a frequency hopping spread spectrum transceiver. The transceiver was designed to transmit in the 902-928 MHz band using an integral antenna. The EUT was manufactured and submitted for testing by The Chamberlain Group located in Elmhurst, IL.

The receive portion of the EUT is a super-heterodyne type receiver designed to receive over the 902-928MHz band. The EUT contains a tuner which utilizes one local oscillator (LO) at 937 kHz below the tuned frequency.

1.2 Purpose

The test series was performed to determine if the EUT meets the radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B for receivers and Subpart C, Sections 15.207 and 15.247 for Intentional Radiators.

The test series was also performed to determine if the EUT meets requirements of the Industry Canada Radio Standards Specification, RSS-210, Annex 8 for transceivers.

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 American Association for Laboratory Accreditation (A2LA). A2LA Certificate Number: 1786.01.

1.5 Laboratory Conditions

The temperature at the time of the test was 21°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, dated 1 October 2010
- 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 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 The Chamberlain Group, Garage Door Manager, Model No. GDM. A block diagram of the EUT setup is shown as Figure 1.

3.1.1 Power Input

The EUT obtained 9VDC power through two leads from the secondary of a HON-KWANG Co. step-down transformer, Model No. D9200CEC. The primary of this transformer received 120V 60Hz power through lowpass powerline filters on the wall of the shielded enclosure. The 9VDC power from the secondary of the transformer was provided to the EUT through a 2- wire, 5 foot long unshielded cord.

3.1.2 Peripheral Equipment

No peripheral equipment was required for the EUT to operate properly.

3.1.3 Signal Input/Output Leads

The EUT was not equipped with interconnect cables.

3.1.4 Grounding

The EUT was grounded only through the return wire of its input power cord.

3.2 Operational Mode

For all tests, the EUT was placed on an 80cm high non-conductive stand. The EUT was energized.

The unit was programmed to operate in one of the following modes:

- Transmit at 902.25MHz
- Transmit at 914.75MHHz
- Transmit at 926.75MHHz
- Receive at 902.25MHHz
- Receive at 914.75MHHz
- Receive at 926.75MHHz
- Frequency Hopping Enabled

3.3 EUT Modifications

No modifications were required for compliance to the CFR 47 15.247 requirements.

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 8-1. All equipment was calibrated per the instruction manuals supplied by the manufacturer.

Conducted and radiated emission measurements were performed with a spectrum analyzer. This receiver allows measurements with the bandwidths and detector functions specified by the FCC. 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	1.07	-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

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 transceiver shall be below the values shown below when using a quasi-peak or average detector:

Frequency MHz	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 – 0.5	66 decreasing with logarithm of frequency to 56	56 decreasing with logarithm of frequency to 46
0.5 - 5	56	46
5 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.
Note 2: If the levels measured using the QP detector meet both the QP and the Average limits, the EUT 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 of the EUT was measured by connecting the measuring equipment to the

appropriate meter terminal of the Line Impedance Stabilization Network (LISN). The meter terminal of the LISN not under test was terminated with 50 ohms.

a) The EUT was set to receive at 914.75MHz.

b) Measurements were first made on the 120VAC 60Hz (L1) line.

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

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

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

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

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

h) Steps (b) through (g) were repeated with the EUT set to transmit at 914.75MHz.

5.1.3 Results

The plots of the peak, quasi-peak, and average conducted voltage levels acquired from each input power line with the EUT set to receive at 914.75MHz are shown on pages 21 and 22. The tabular quasi-peak and average results from each input power line are shown on pages 25 and 26.

The plots of the peak, quasi-peak, and average conducted voltage levels acquired from each input power line with the EUT set to transmit at 914.75MHz are shown on pages 23 and 24. The tabular quasi-peak and average results from each input power line are shown on pages 27 and 28.

All power line conducted emissions measured from the EUT were within the specification limits.

5.2 20dB Bandwidth

5.2.1 Requirement

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 EUT was setup inside the chamber. With the hopping function disabled, the EUT 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 transceiver 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 218.43 kHz. The 99% bandwidth was measured to be 202.4 kHz. Therefore, since the 20dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping channels.

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 EUT was setup inside the chamber. With the hopping function enabled, the EUT 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 508.7kHz, which is greater than the 20dB bandwidth (218.43kHz).

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 EUT was setup inside the chamber. With the hopping function enabled, the EUT 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 EUT’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 to 50 which is 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 EUT was setup inside the chamber. With the hopping function enabled, the EUT 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 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 2.64mS multiplied by 84. This calculated value is equal to 0.22176 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.

Per section 15.247(b)(2), for frequency hopping systems operating in the 902-928MHz band and employing less than 50 hopping channels, but at least 25 hopping channels, the maximum peak output conducted power shall not be greater than 0.25W (24dBm). 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 1 Watt (30dBm).

If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below 24dBm by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.6.2 Procedures

The EUT was placed on the non-conductive stand and set to transmit. A bilog antenna was placed at a test distance of 3 meters from the EUT. 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 EUT 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 second dipole antenna was then set in place of the EUT 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 EIRP measured from the transceiver was 13.3 dBm or 0.021 W which is below the 4 Watt limit.

5.7 Duty Cycle Factor Measurements

5.7.1 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.

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).

5.7.2 Results

The plots of the duty cycle are shown on data pages 37 and 38. The duty cycle factor was computed to be -31.6 dB.

5.8 Radiated Spurious Emissions Measurements

5.8.1 Receiver

5.8.1.1 Requirements

RADIATION LIMITS FOR A RECEIVER

Frequency MHz	Distance between EUT 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.

5.8.1.2 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 2003 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.

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 EUT 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 EUT. 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 EUT 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 EUT 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 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.

a) 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

5.8.1.3 Results

Preliminary radiated emissions plots with the EUT receiving, at 902.25MHz, 914.75MHz, and 926.75MHz are shown on pages 39 through 50. Final radiated emissions data are presented on data pages 51 through 53. As can be seen from the data, all emissions measured from the EUT were within the specification limits. Photographs of the test setup are shown on Figures 2 and 3.

5.8.2 Transmitter

5.8.2.1 Requirements

Per section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated emissions measurement. Attenuation below the general limits specified in §15.209(a) is not required. In addition, 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 Procedures

Radiated measurements were performed in a 32ft. x 20ft. x 14ft. high shielded enclosure. The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.

Preliminary radiated emissions tests were 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 10.0GHz was investigated using a peak detector function.

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

1) For all harmonics not in the restricted bands, the following procedure was used:

   a) The field strength of the fundamental was 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 of the harmonics not in the restricted band were then 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 100 kHz was used on the spectrum analyzer.
   c) To ensure that maximum or worst case emission levels at the fundamental and harmonics were measured, the following steps were taken when measuring the fundamental emissions and the spurious emissions:
      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 where 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) All harmonics not in the restricted bands must be at least 20 dB below levels measured at the fundamental. However, attenuation below the general limits specified in §15.209(a) is not required.

2) 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 where 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).

a) 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.

5.8.2.3 Results

Preliminary radiated emissions plots with the EUT transmitting at 902.25MHz, 914.75MHz, and 926.75MHz are shown on pages 54 through 65. Final radiated emissions data are presented on data pages 66 through 71. As can be seen from the data, all emissions measured from the EUT were within the specification limits. Photographs of the test setup are shown on Figures 2 and 3.

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).

5.9 Band Edge Compliance

5.9.1 Requirement

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 EUT was setup inside the test chamber on a non-conductive stand.
2) A broadband measuring antenna was placed at a test distance of 3 meters from the EUT.
3) The EUT was set to transmit continuously at the channel closest to the low band-edge (hopping function disabled).
4) The EUT was maximized for worst case emissions at the measuring antenna. The maximum meter reading was recorded.
5) 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 transceiver 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.

6) Step 5) was repeated with the frequency hopping function enabled.

5.9.2.2 High Band Edge

1) The EUT was setup inside the test chamber on a non-conductive stand.
2) A broadband measuring antenna was placed at a test distance of 3 meters from the EUT.
3) The EUT was set to transmit continuously at the channel closest to the high band-edge (hopping function disabled).
4) The EUT was maximized for worst case emissions at the measuring antenna.
5) 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 transceiver 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.

6) Step 5) was repeated with the frequency hopping function enabled.

5.9.3 Results

Pages 72 through 75 show the radiated 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.

5.10 Test Personnel and Witnesses

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

5.11 Disposition of the EUT

The EUT and all associated equipment were returned to The Chamberlain Group upon completion of the tests.

6. CONCLUSIONS

It was determined that The Chamberlain Group Garage Door Manager, Model No. GDM, did fully meet the conducted and radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B for receivers and Subpart C, Section 15.205 et seq. for Intentional Radiators, when tested per ANSI C63.4-2003.

It was determined that the EUT did fully meet the requirements of the Industry Canada Radio Standards Specification, RSS-210, Annex 8 for transceivers.

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 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 endorsement by NVLAP or any agency of the US Government.

8. EQUIPMENT LIST

Table 8-1 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	8/27/2010	8/27/2011
CMA1	Controllers	EMCO	2090	9701-1213	---	N/A	
NTA2	BILOG ANTENNA	TESEQ	6112D	28040	25-1000MHz	6/7/2010	6/7/2011
NWH0	RIDGED WAVE GUIDE	TENSOR	4105	2081	1-12.4GHZ	8/31/2010	8/31/2011
PLL9	50UH LISN 462D	ELITE ELECTRONIC ENG	462D/70A	010	0.01-400MHZ	3/2/2010	3/2/2011
PLLA	50UH LISN 462D	ELITE ELECTRONIC ENG	462D/70A	011	0.01-400MHZ	3/3/2010	3/3/2011
RBB0	EMI TEST RECEIVER 20HZ TO 40 GHZ	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	3/16/2010	3/16/2011
SES1	24VDC POWER SUPPLY	P TRANS	FS-32024-1M	002	18-27VDC	NOTE 1	
XLTN	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	---	DC-2GHZ	8/11/2010	8/11/2011
XPQ3	HIGH PASS FILTER	K&L MICROWAVE	4IH30-1804/T10000-0	4	1.8GHZ-10GHZ	10/28/2010	10/28/2011

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.

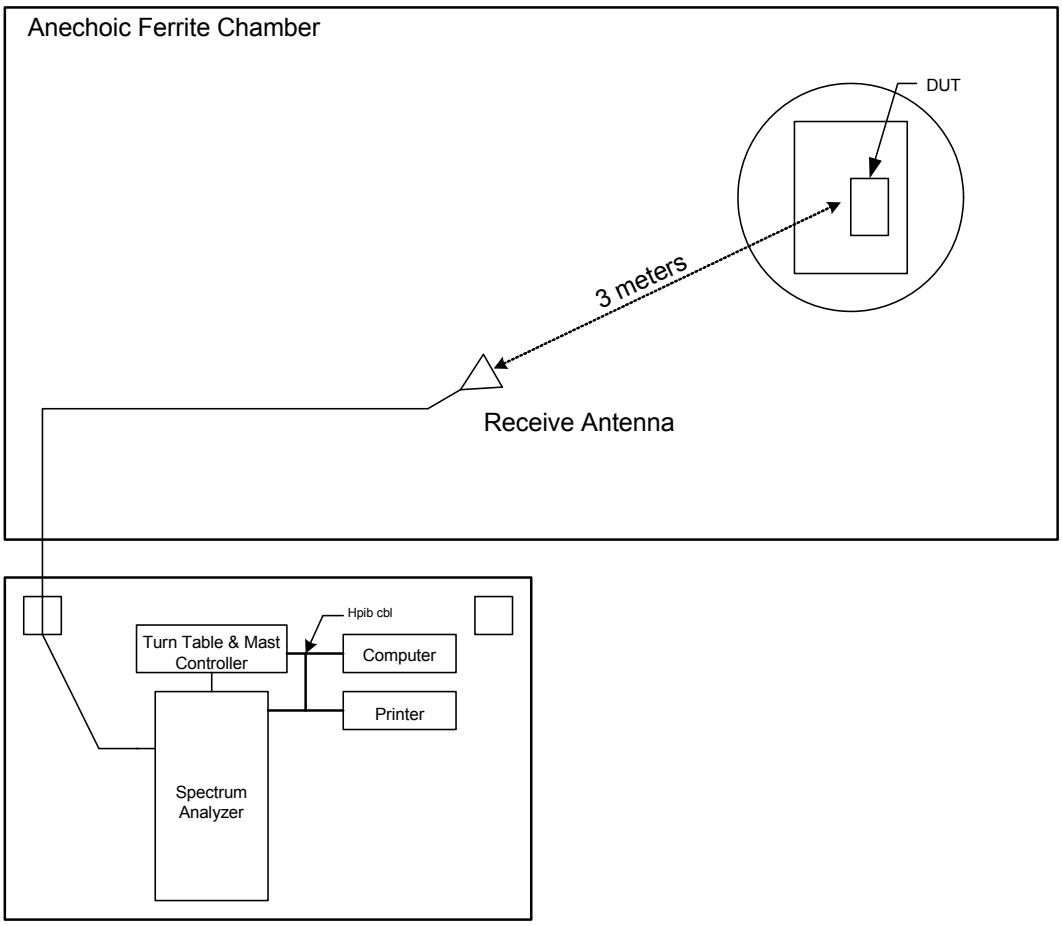
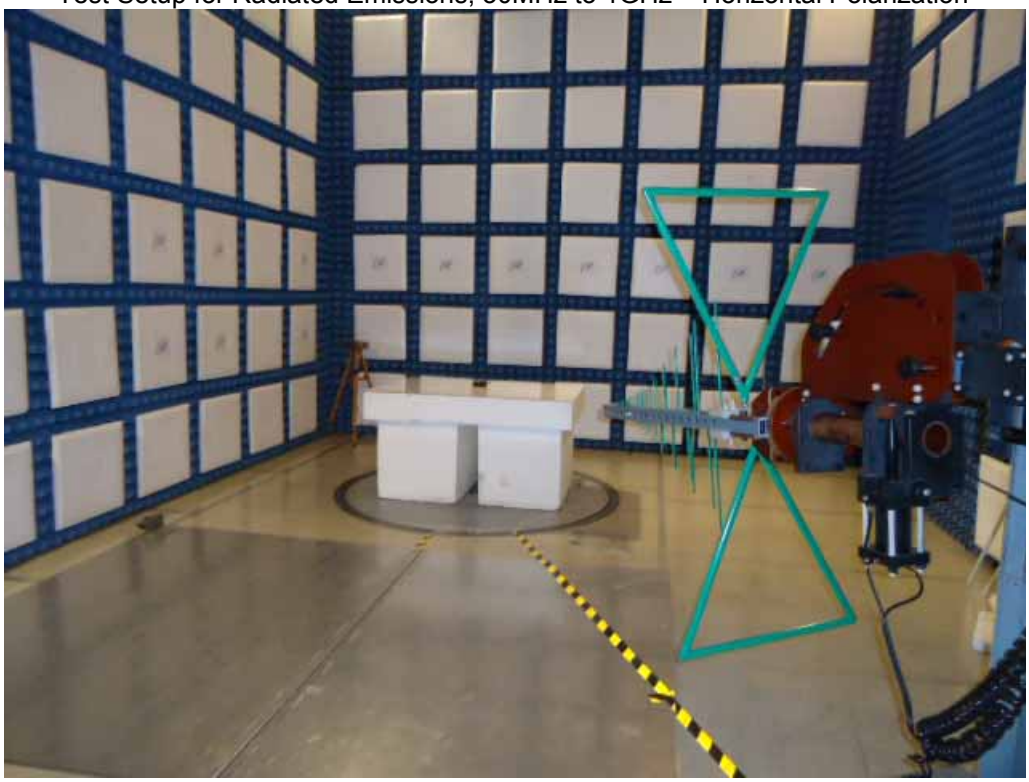


FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

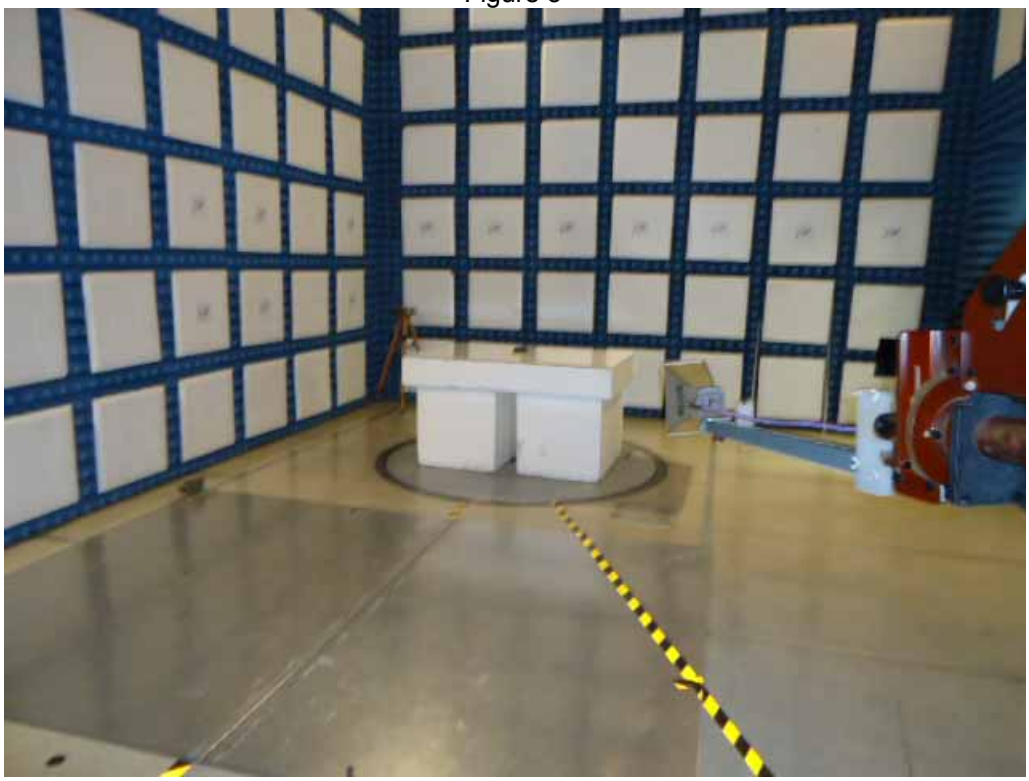
Figure 2

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



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

Figure 3



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

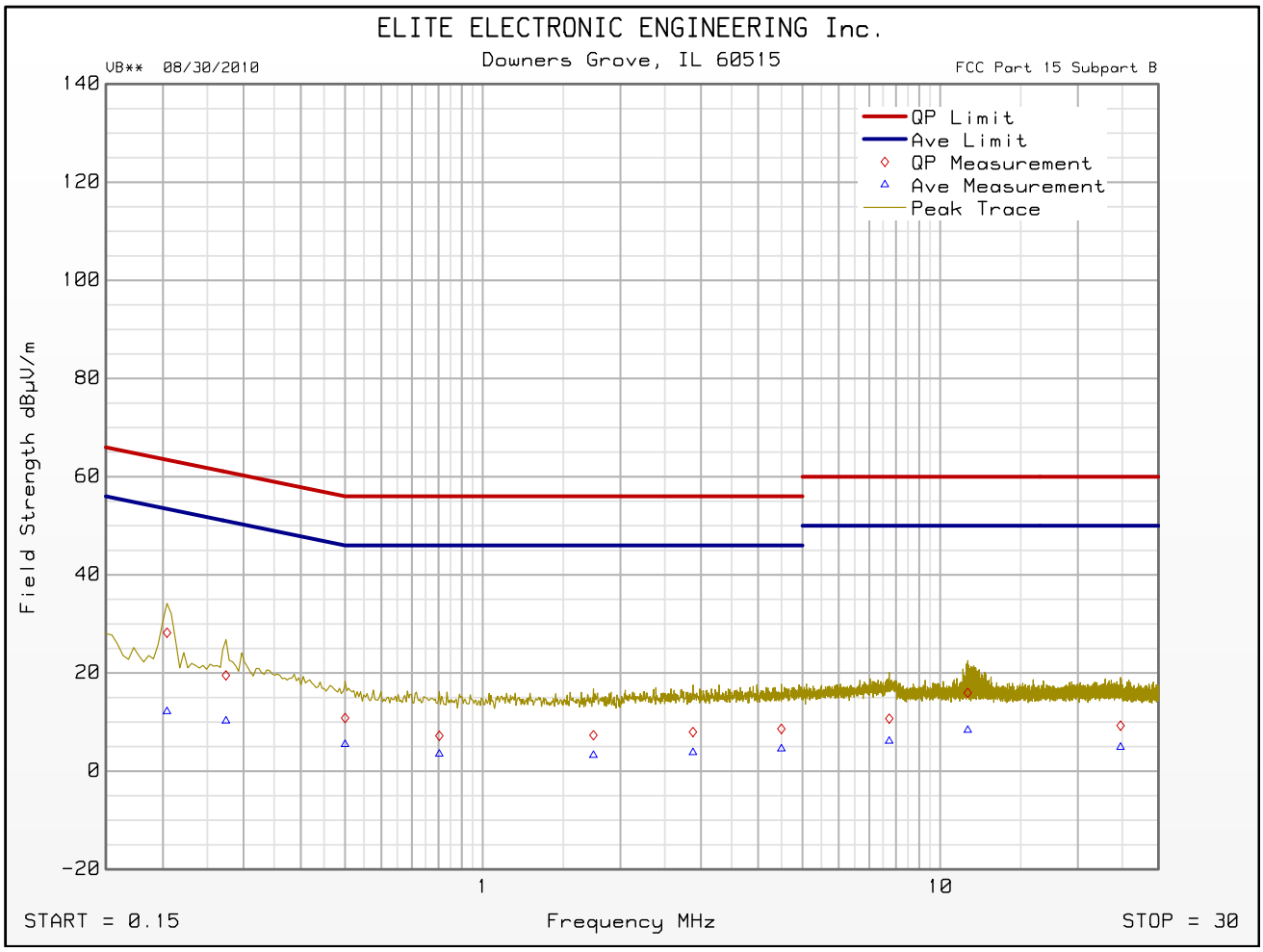
Test Setup for Radiated Emissions, Above 1GHz – Vertical Polarization

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 08/30/2010

Manufacturer	:	The Chamberlain Group
Model	:	GDM (Garage Door Manager)
Serial Number	:	None
DUT Mode	:	Rx @ 914.75MHZ
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Feb 09, 2011 06:59:32 AM



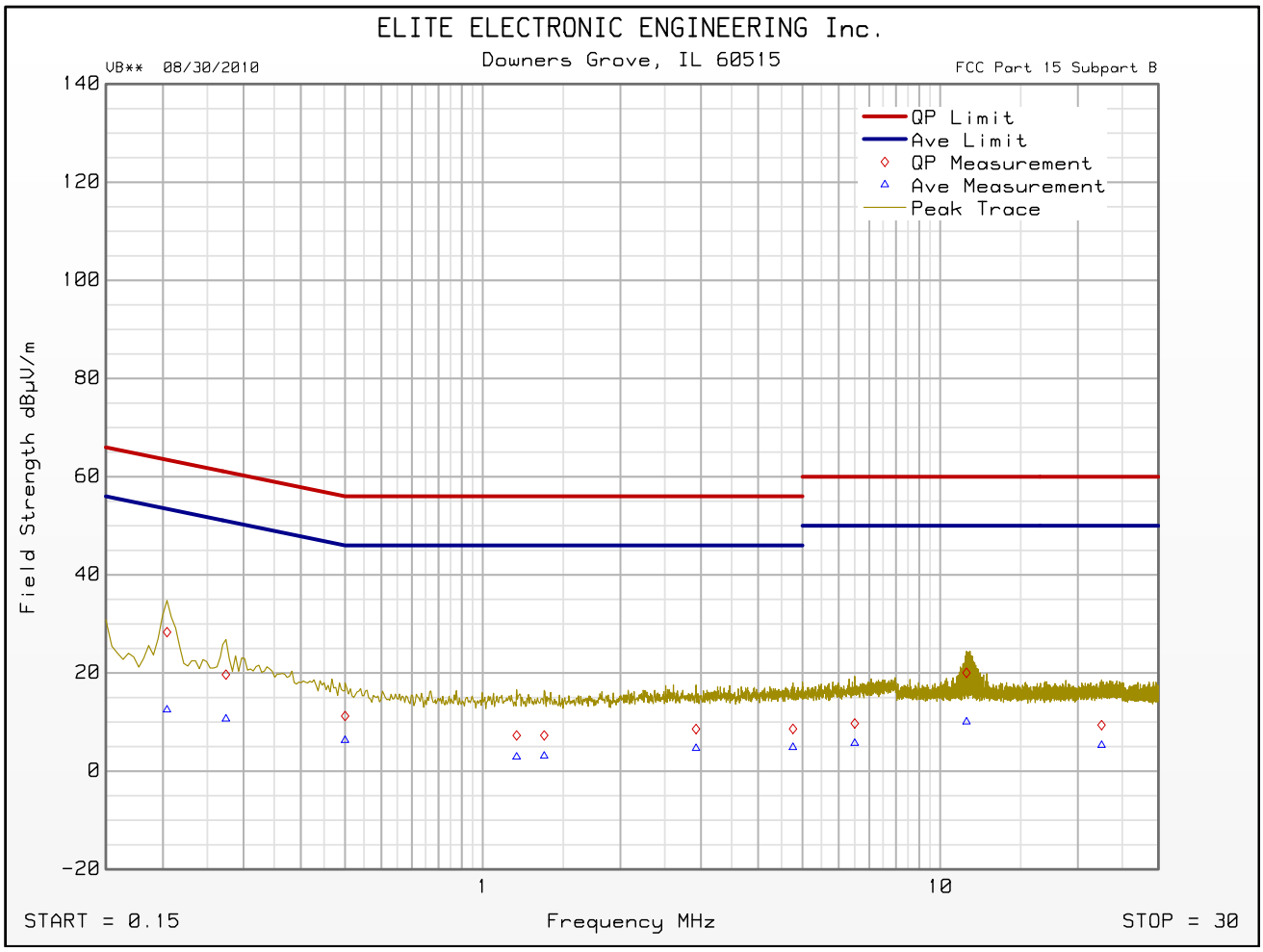
Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 08/30/2010

Manufacturer	:	The Chamberlain Group
Model	:	GDM (Garage Door Manager)
Serial Number	:	None
DUT Mode	:	Rx @ 914.75MHZ
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Feb 09, 2011 06:52:07 AM



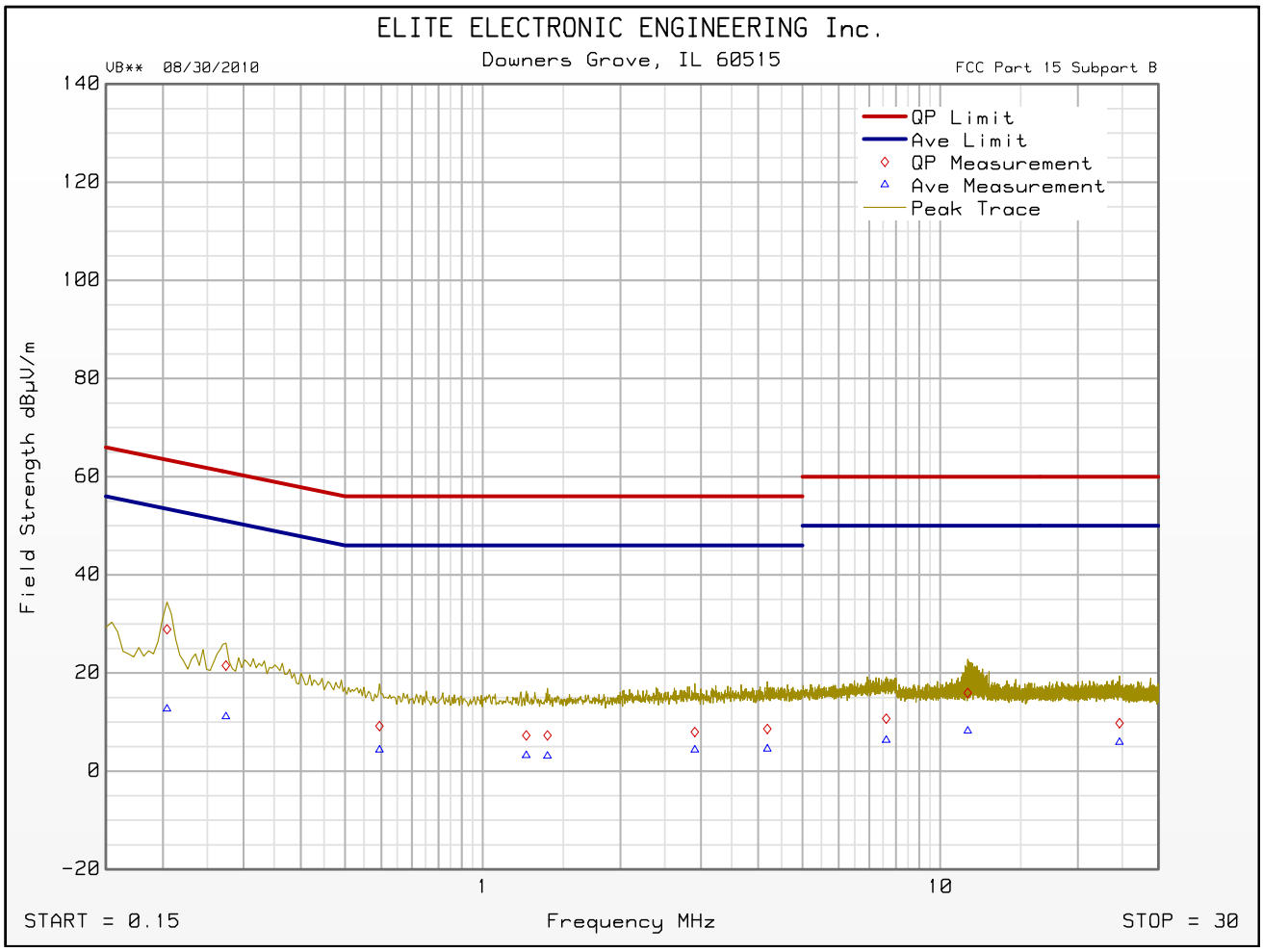
Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 08/30/2010

Manufacturer	:	The Chamberlain Group
Model	:	GDM (Garage Door Manager)
Serial Number	:	None
DUT Mode	:	Tx @ 914.75MHZ
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Feb 09, 2011 06:35:55 AM



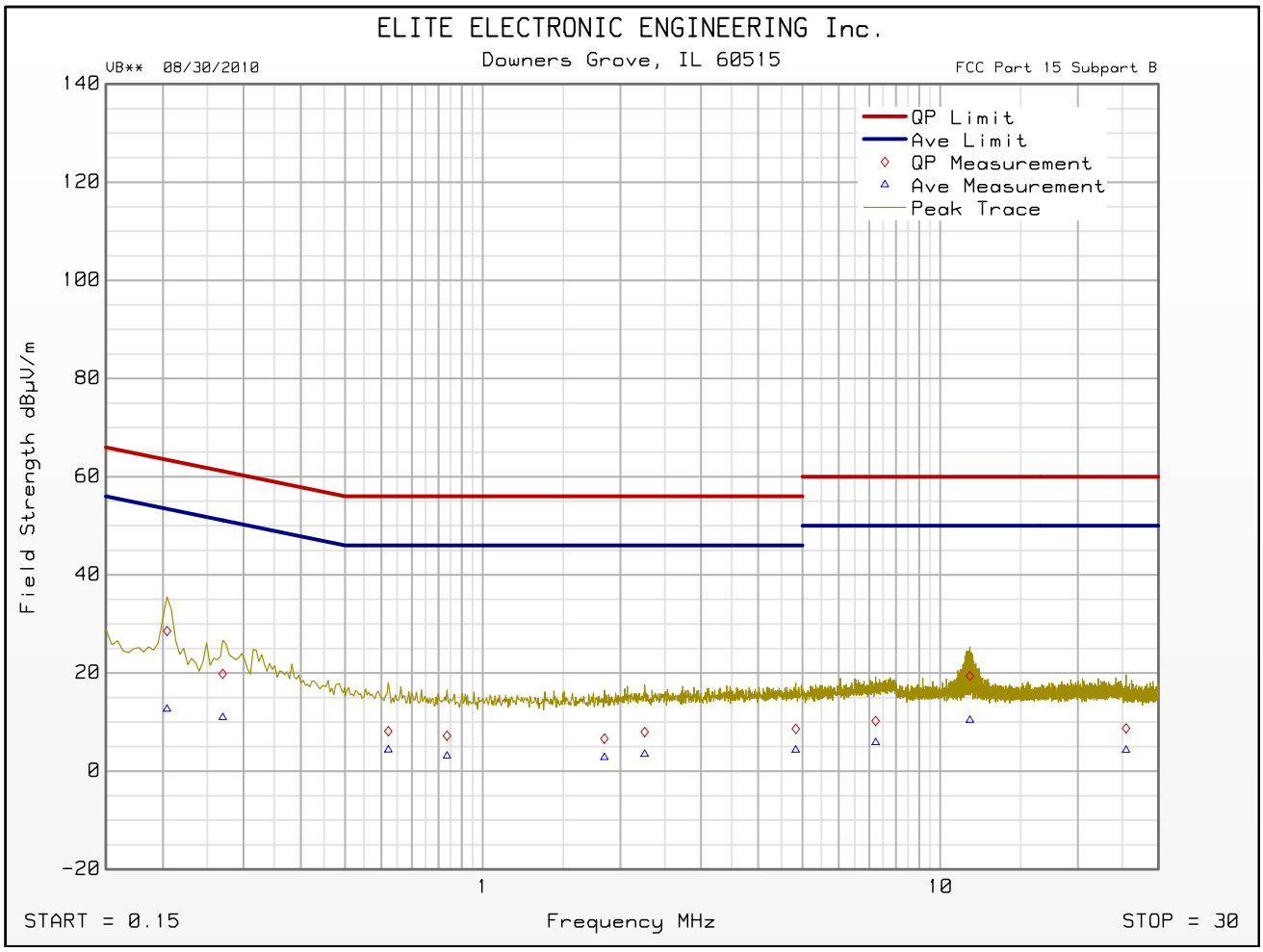
Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 08/30/2010

Manufacturer	:	The Chamberlain Group
Model	:	GDM (Garage Door Manager)
Serial Number	:	None
DUT Mode	:	Tx @ 914.75MHZ
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Feb 09, 2011 06:42:52 AM



Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 08/30/2010

Manufacturer	:	The Chamberlain Group
Model	:	GDM (Garage Door Manager)
Serial Number	:	None
DUT Mode	:	Rx @ 914.75MHZ
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Feb 09, 2011 06:59:32 AM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

Freq MHz	Quasi-peak Level dBµV/m	Quasi-peak Limit dBµV/m	Excessive Quasi-peak Emissions	Average Level dBµV/m	Average Limit dBµV/m	Excessive Average Emissions
0.204	28.2	63.4		12.2	53.4	
0.275	19.5	61.0		10.3	51.0	
0.500	10.8	56.0		5.5	46.0	
0.804	7.2	56.0		3.5	46.0	
1.745	7.3	56.0		3.3	46.0	
2.880	8.0	56.0		3.8	46.0	
4.495	8.6	56.0		4.6	46.0	
7.736	10.7	60.0		6.1	50.0	
11.484	16.0	60.0		8.4	50.0	
24.787	9.3	60.0		4.9	50.0	

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 08/30/2010

Manufacturer	:	The Chamberlain Group
Model	:	GDM (Garage Door Manager)
Serial Number	:	None
DUT Mode	:	Rx @ 914.75MHZ
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Feb 09, 2011 06:52:07 AM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

Freq MHz	Quasi-peak Level dBµV/m	Quasi-peak Limit dBµV/m	Excessive Quasi-peak Emissions	Average Level dBµV/m	Average Limit dBµV/m	Excessive Average Emissions
0.204	28.3	63.4		12.5	53.4	
0.275	19.7	61.0		10.7	51.0	
0.500	11.2	56.0		6.3	46.0	
1.186	7.3	56.0		2.9	46.0	
1.363	7.3	56.0		3.1	46.0	
2.925	8.6	56.0		4.6	46.0	
4.765	8.6	56.0		4.9	46.0	
6.503	9.7	60.0		5.7	50.0	
11.412	20.0	60.0		10.1	50.0	
22.528	9.4	60.0		5.3	50.0	

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 08/30/2010

Manufacturer	:	The Chamberlain Group
Model	:	GDM (Garage Door Manager)
Serial Number	:	None
DUT Mode	:	Tx @ 914.75MHZ
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Feb 09, 2011 06:35:55 AM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

Freq MHz	Quasi-peak Level dBµV/m	Quasi-peak Limit dBµV/m	Excessive Quasi-peak Emissions	Average Level dBµV/m	Average Limit dBµV/m	Excessive Average Emissions
0.204	28.9	63.4		12.7	53.4	
0.275	21.5	61.0		11.1	51.0	
0.595	9.2	56.0		4.4	46.0	
1.245	7.3	56.0		3.2	46.0	
1.385	7.3	56.0		3.1	46.0	
2.907	8.0	56.0		4.3	46.0	
4.189	8.6	56.0		4.6	46.0	
7.619	10.7	60.0		6.3	50.0	
11.484	16.0	60.0		8.2	50.0	
24.652	9.8	60.0		5.9	50.0	

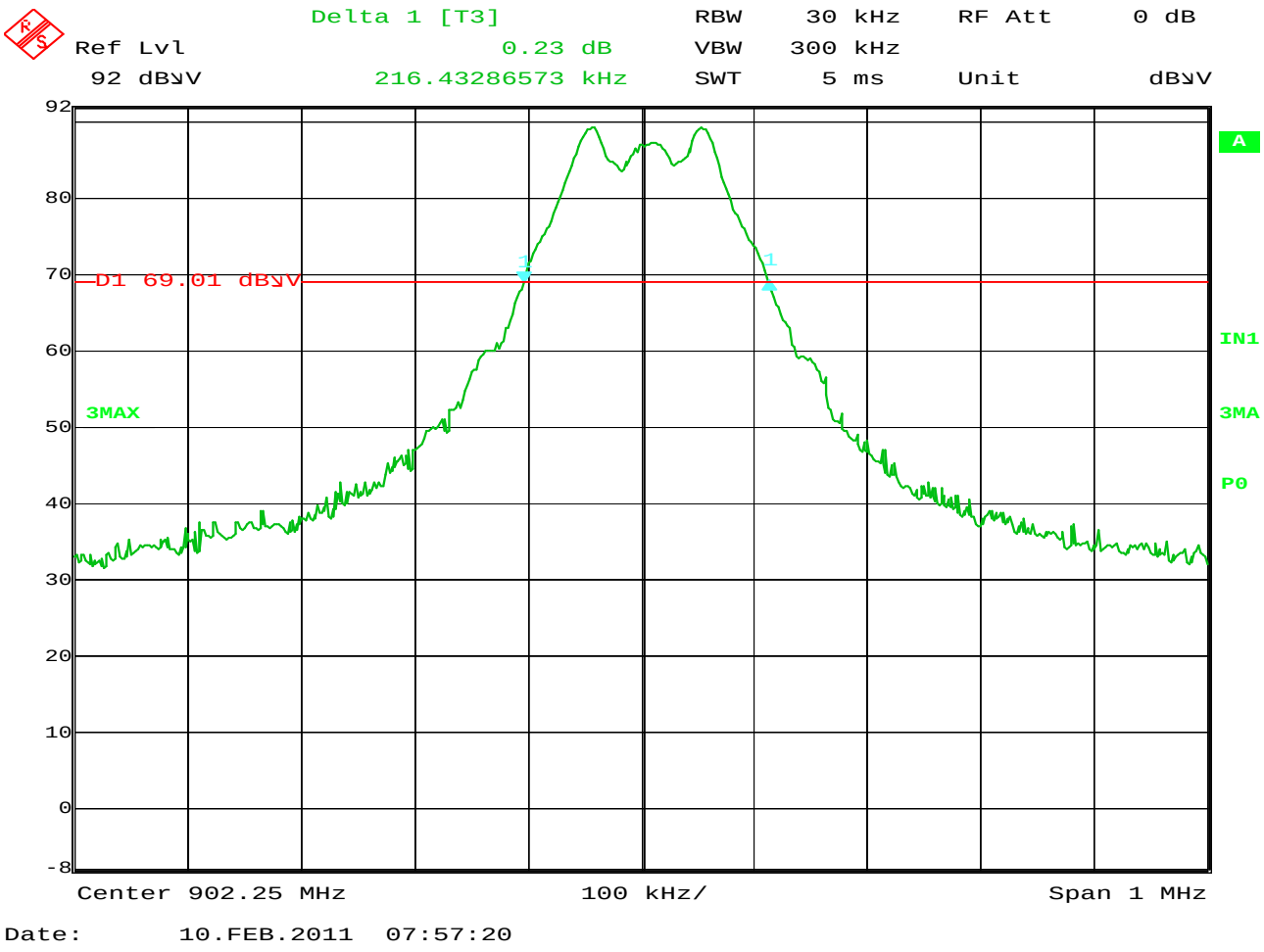
FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 08/30/2010

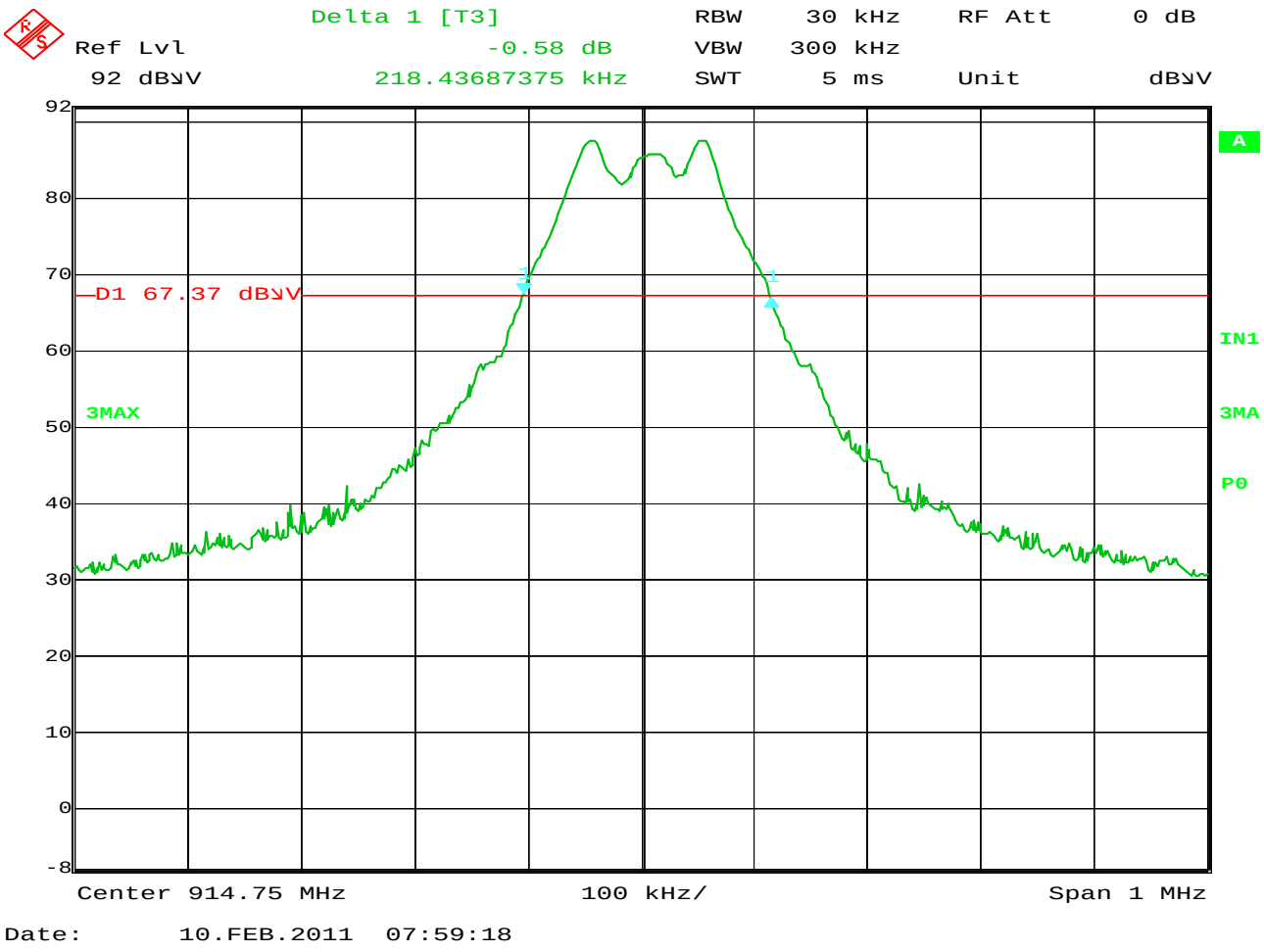
Manufacturer	:	The Chamberlain Group
Model	:	GDM (Garage Door Manager)
Serial Number	:	None
DUT Mode	:	Tx @ 914.75MHZ
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Feb 09, 2011 06:42:52 AM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

Freq MHz	Quasi-peak Level dBµV/m	Quasi-peak Limit dBµV/m	Excessive Quasi-peak Emissions	Average Level dBµV/m	Average Limit dBµV/m	Excessive Average Emissions
0.204	28.6	63.4		12.7	53.4	
0.270	19.8	61.1		10.9	51.1	
0.622	8.2	56.0		4.3	46.0	
0.835	7.2	56.0		3.1	46.0	
1.844	6.6	56.0		2.8	46.0	
2.259	8.0	56.0		3.5	46.0	
4.832	8.6	56.0		4.3	46.0	
7.223	10.2	60.0		5.9	50.0	
11.615	19.4	60.0		10.4	50.0	
25.484	8.7	60.0		4.3	50.0	



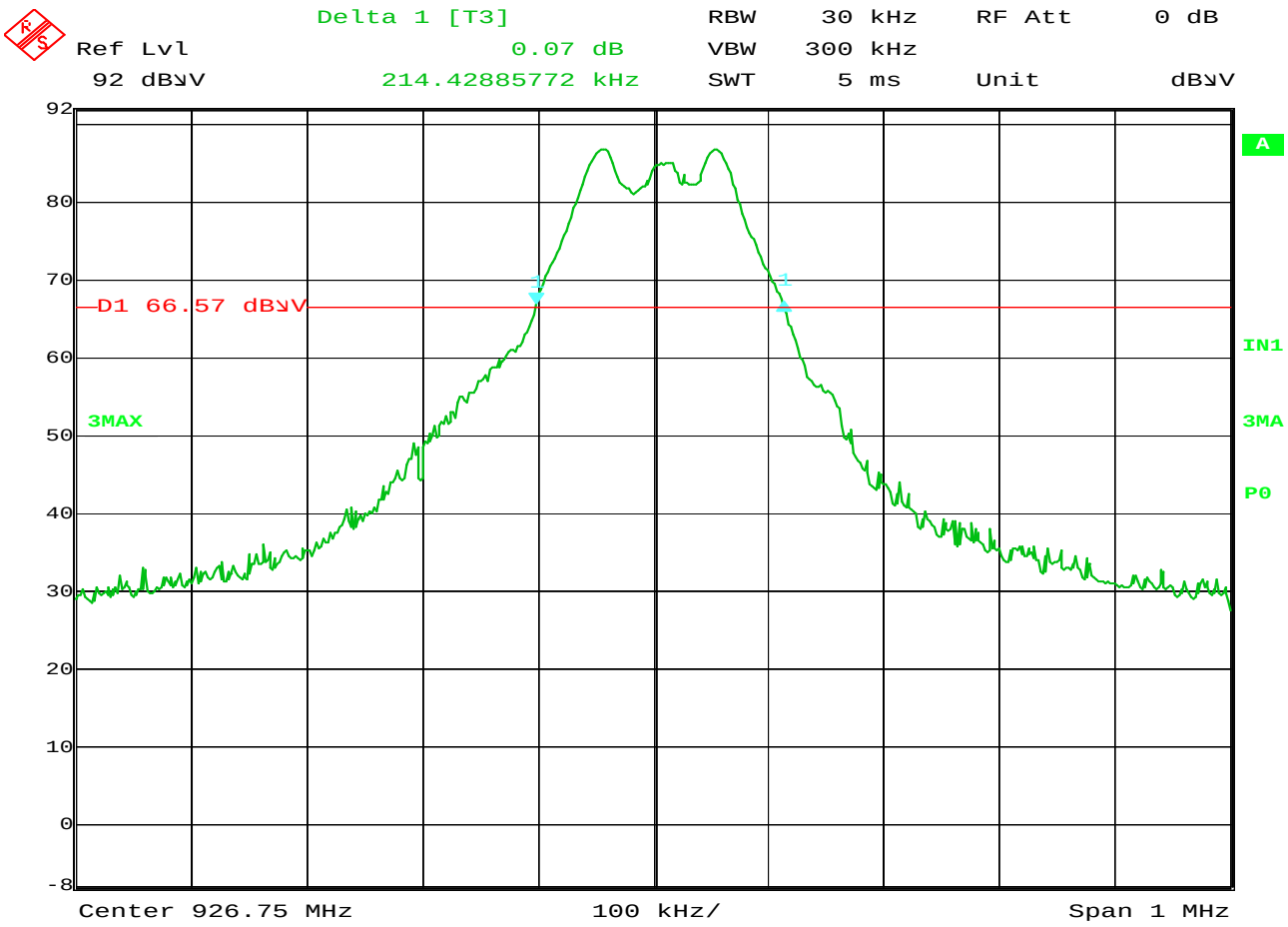
20 dB Bandwidth

MANUFACTURER : The Chamberlain Group
MODEL NUMBER : GDM (Garage Door Manager)
SERIAL NUMBER : None
EUT FREQUENCY : Tx @ 902.25MHz
NOTES :



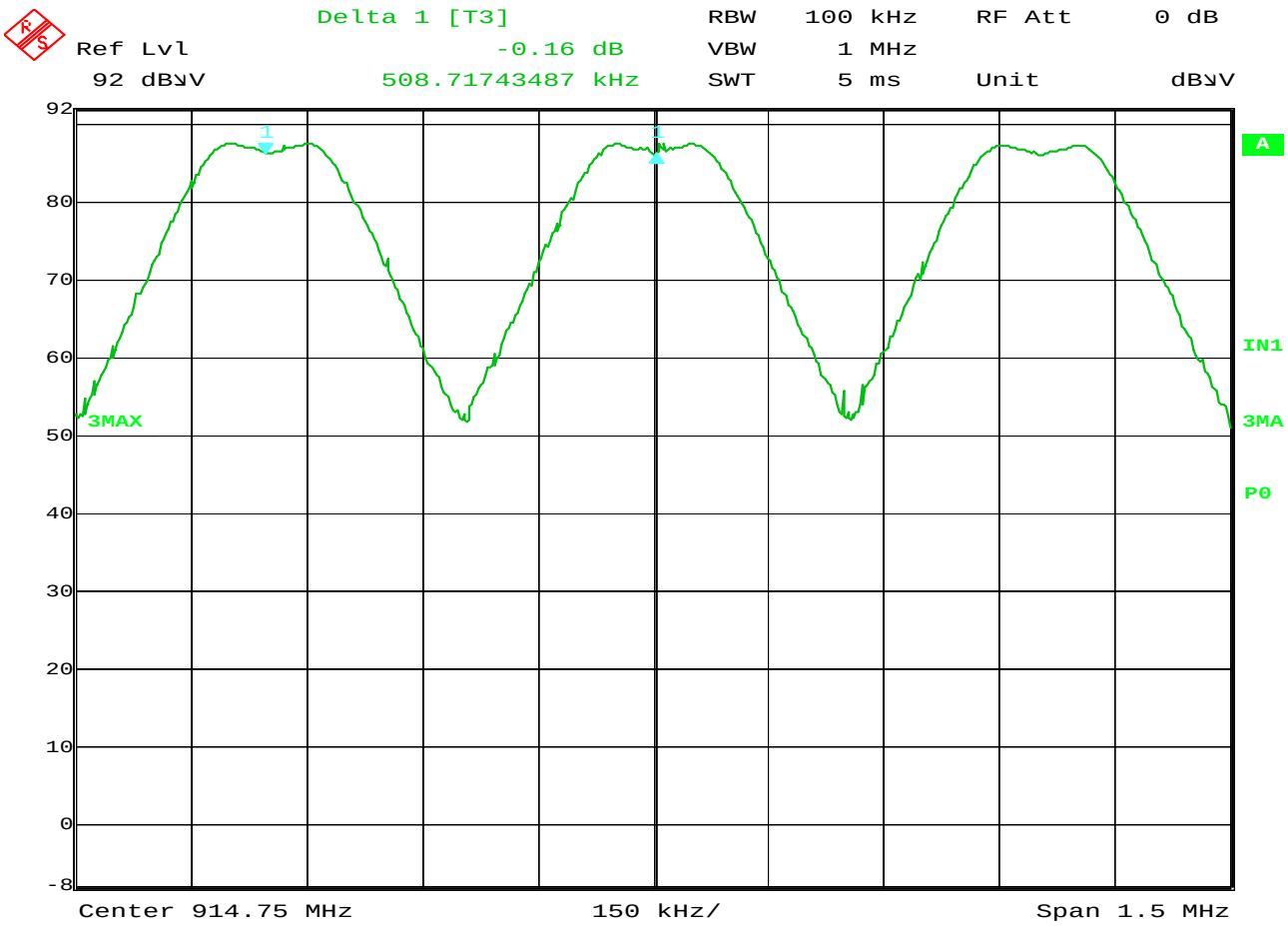
20 dB Bandwidth

MANUFACTURER : The Chamberlain Group
MODEL NUMBER : GDM (Garage Door Manager)
SERIAL NUMBER : None
EUT FREQUENCY : Tx @ 914.75MHz
NOTES :



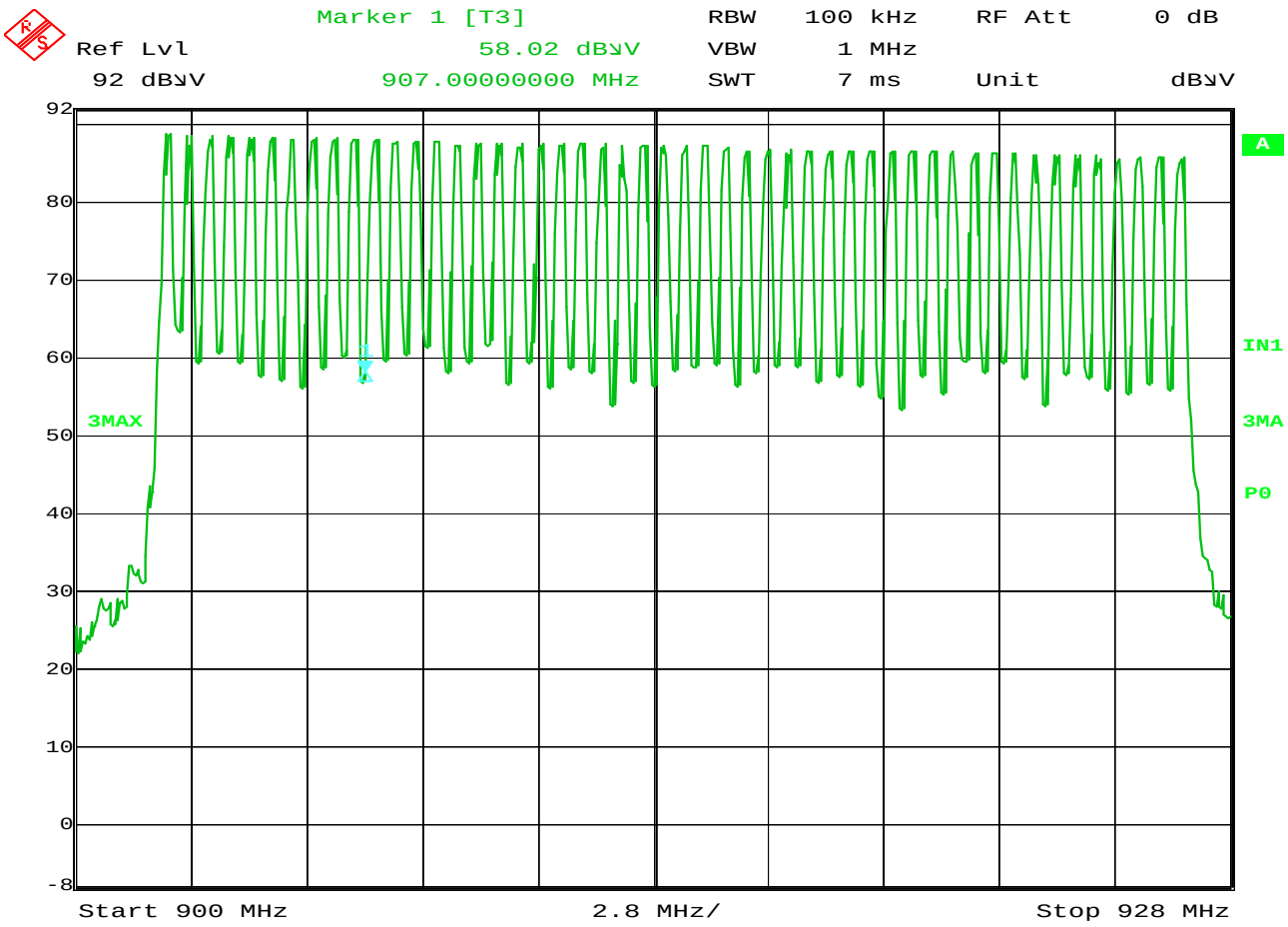
20 dB bandwidth

MANUFACTURER : The Chamberlain Group
MODEL NUMBER : GDM (Garage Door Manager)
SERIAL NUMBER : None
EUT FREQUENCY : Tx @ 926.75MHz
NOTES :



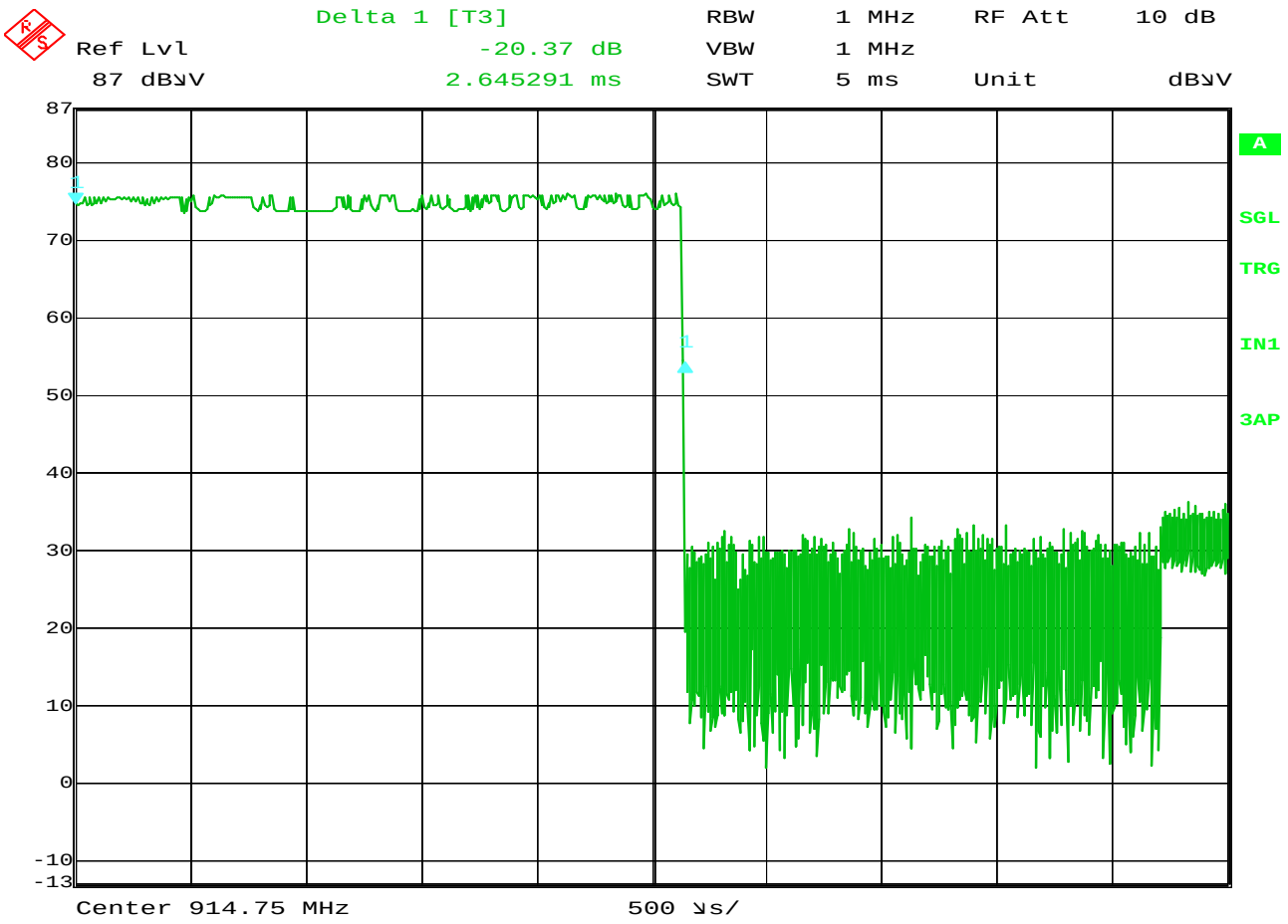
Carrier Frequency Separation

MANUFACTURER	:	The Chamberlain Group
MODEL NUMBER	:	GDM (Garage Door Manager)
SERIAL NUMBER	:	None
EUT FREQUENCY	:	Hopping Enabled
NOTES	:	



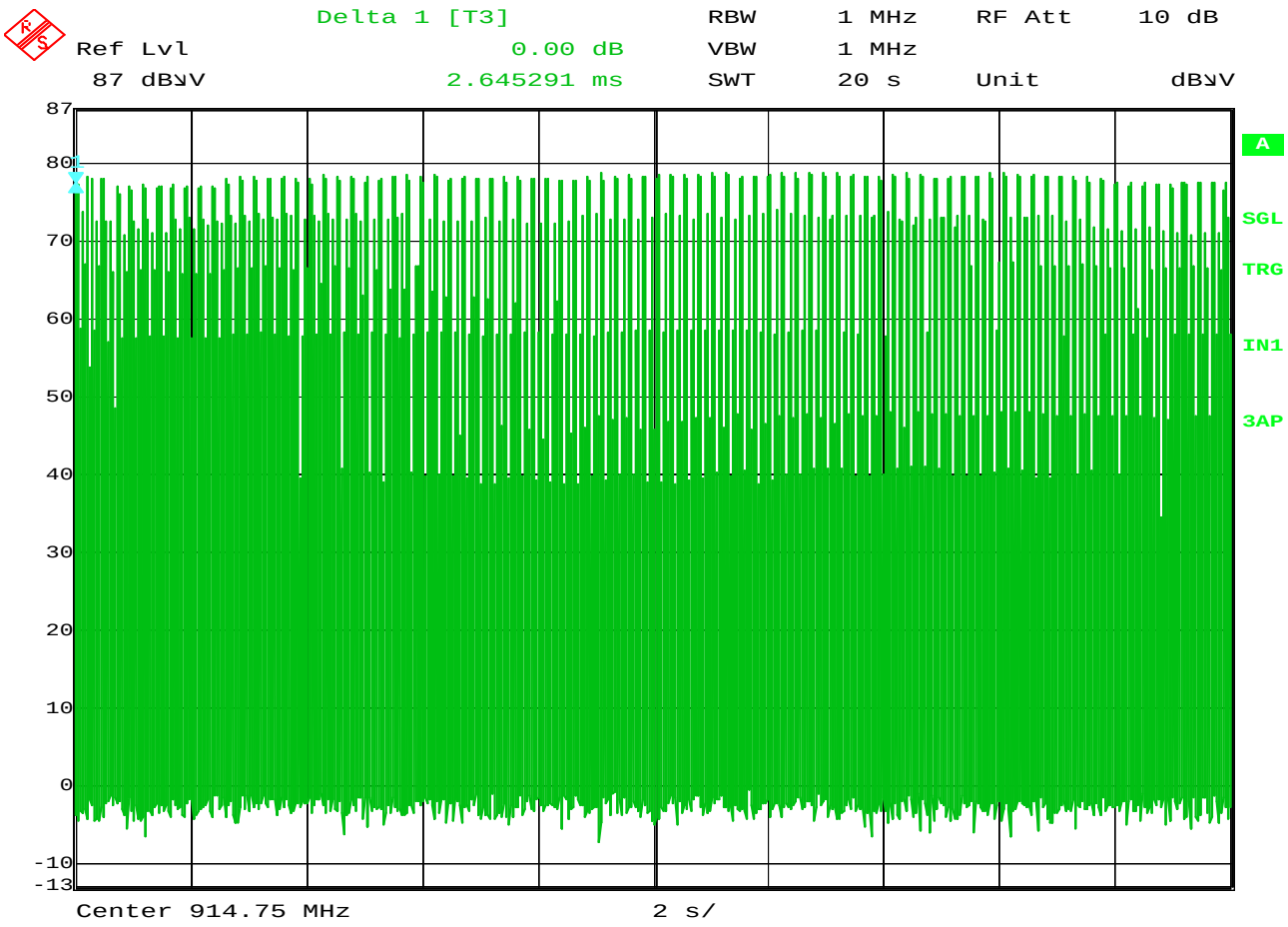
Number of Hopping Freqeuncies

MANUFACTURER	:	The Chamberlain Group
MODEL NUMBER	:	GDM (Garage Door Manager)
SERIAL NUMBER	:	None
EUT FREQUENCY	:	Hopping Enabled
NOTES	:	Number of hopping channels = 50



Dwell Time

MANUFACTURER : The Chamberlain Group
MODEL NUMBER : GDM (Garage Door Manager)
SERIAL NUMBER : None
EUT FREQUENCY : Hopping Enabled
NOTES : 2.64mS per hop



Dwell Time

MANUFACTURER : The Chamberlain Group
MODEL NUMBER : GDM (Garage Door Manager)
SERIAL NUMBER : None
EUT FREQUENCY : Hopping Enabled
NOTES : Number of hops in 20 seconds equals 84

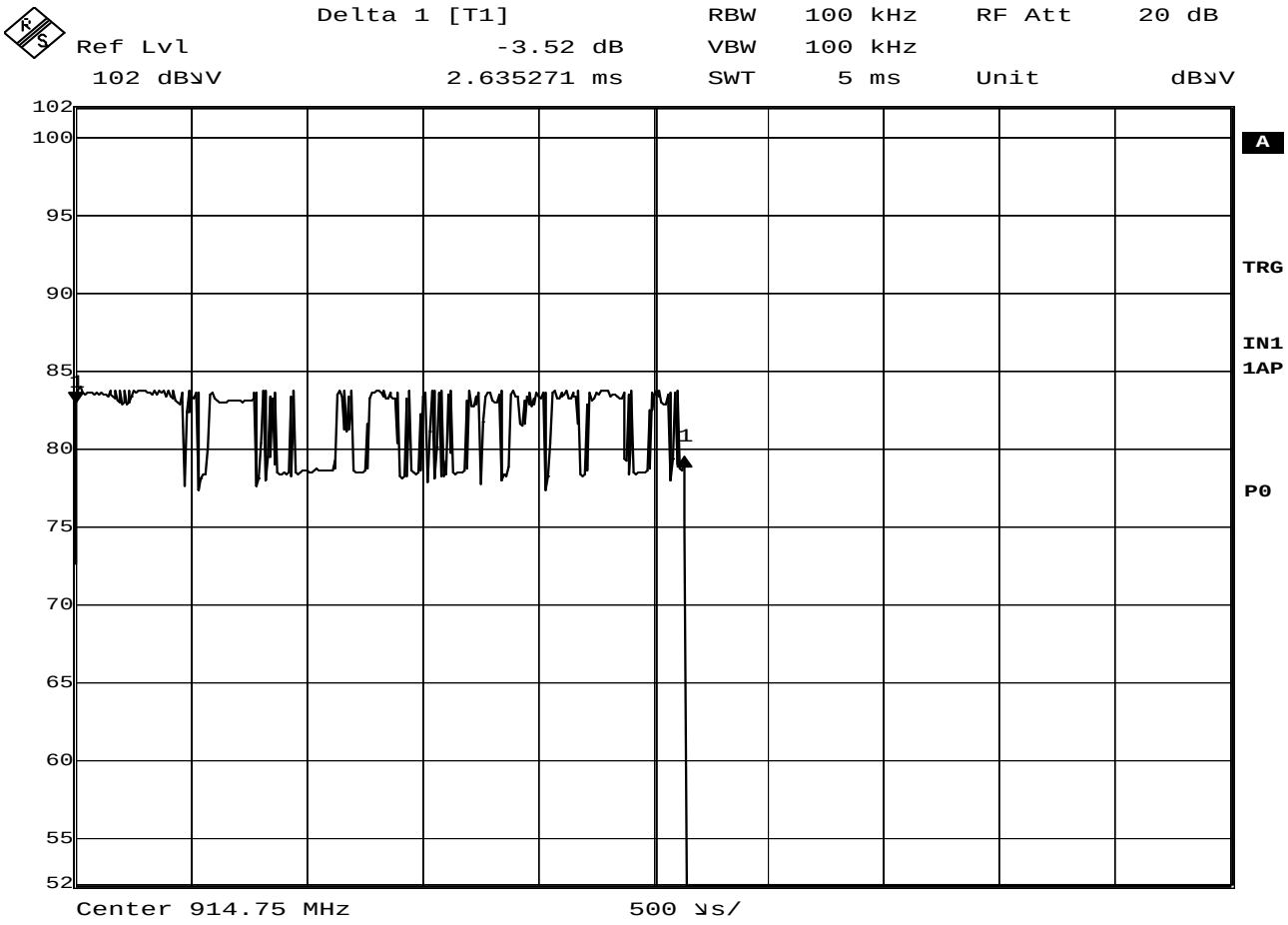
DATA SHEET

Manufacturer : The Chamberlain Group
EUT : Garage Door Manager
Model No. : GDM
Test Specification : FCC Part 15, Subpart C, Section 15.247, Peak Output Power
Date : February 7, 2010
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	89.5	12.8	2.2	2.0	13.0	36
902.3	V	84.8	10.8	2.2	2.0	11.0	36
914.8	H	88.9	13.1	2.2	2.0	13.3	36
914.8	V	84.3	10.4	2.2	2.0	10.6	36
926.8	H	89.0	13.1	2.2	2.0	13.3	36
926.8	V	83.9	9.2	2.2	2.0	9.4	36

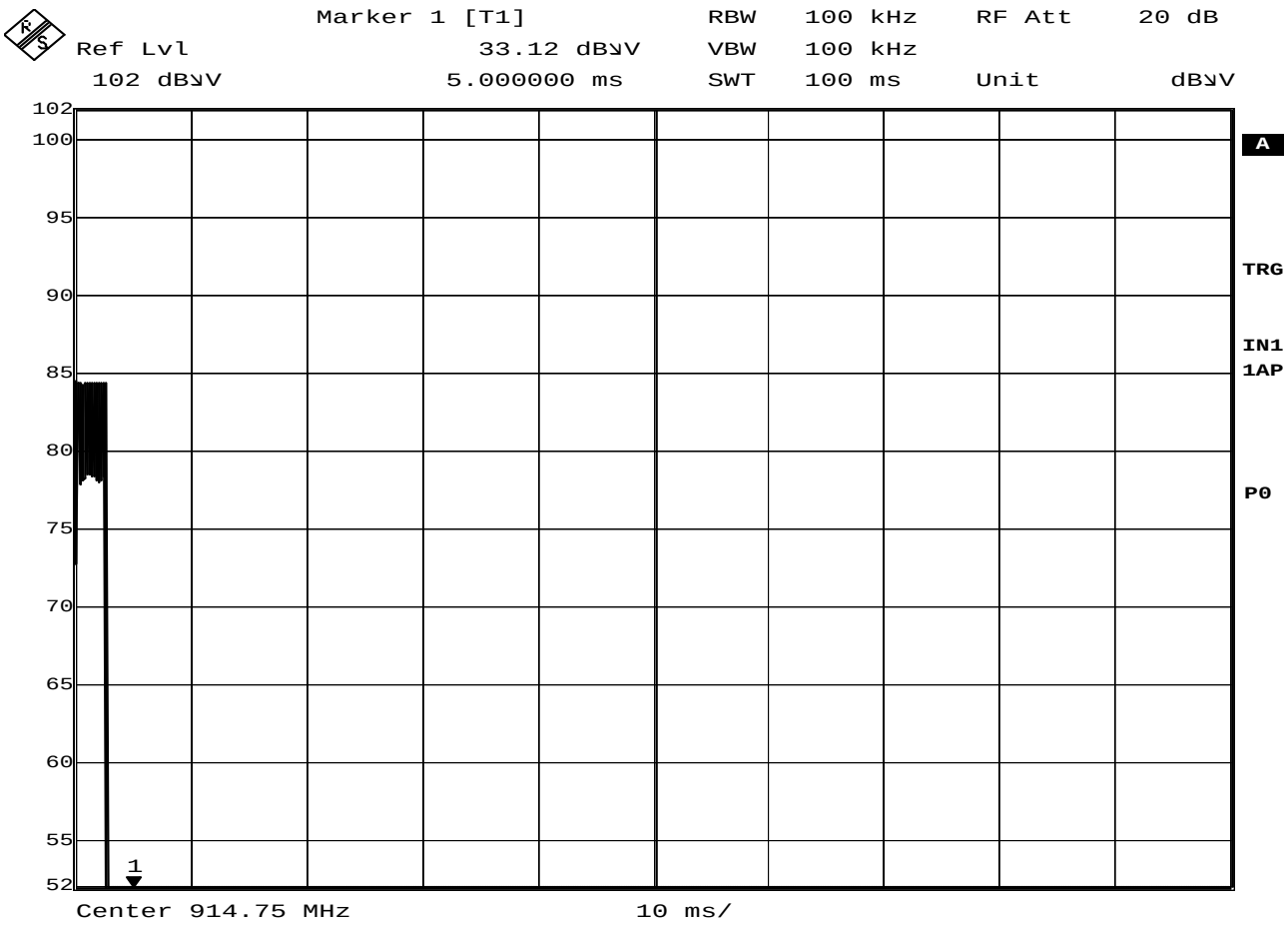
EIRP = Sig. Gen. Reading + Antenna Gain – Cable Loss

Checked By: Richard E. King



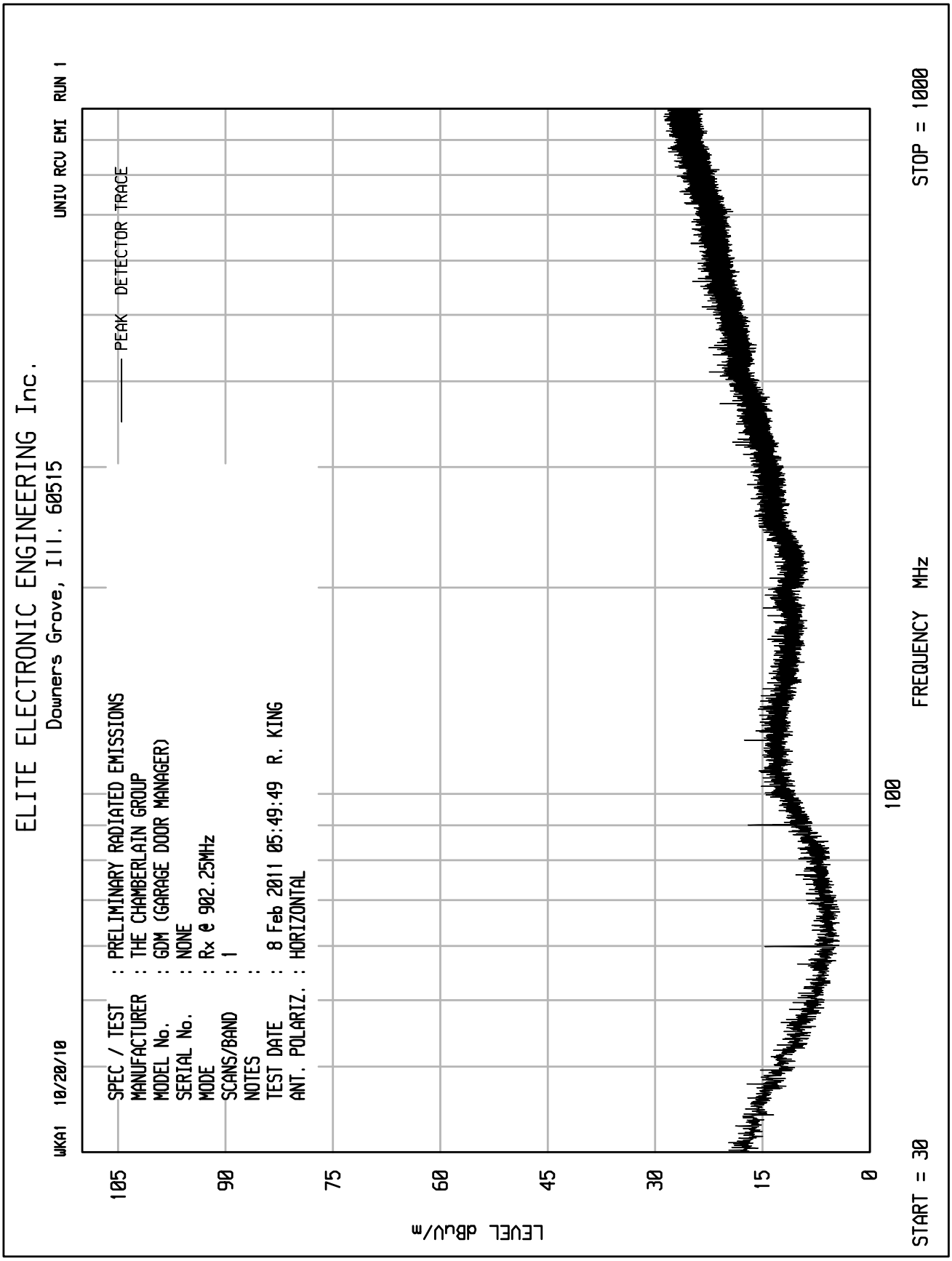
Duty Cycle Correction Factor

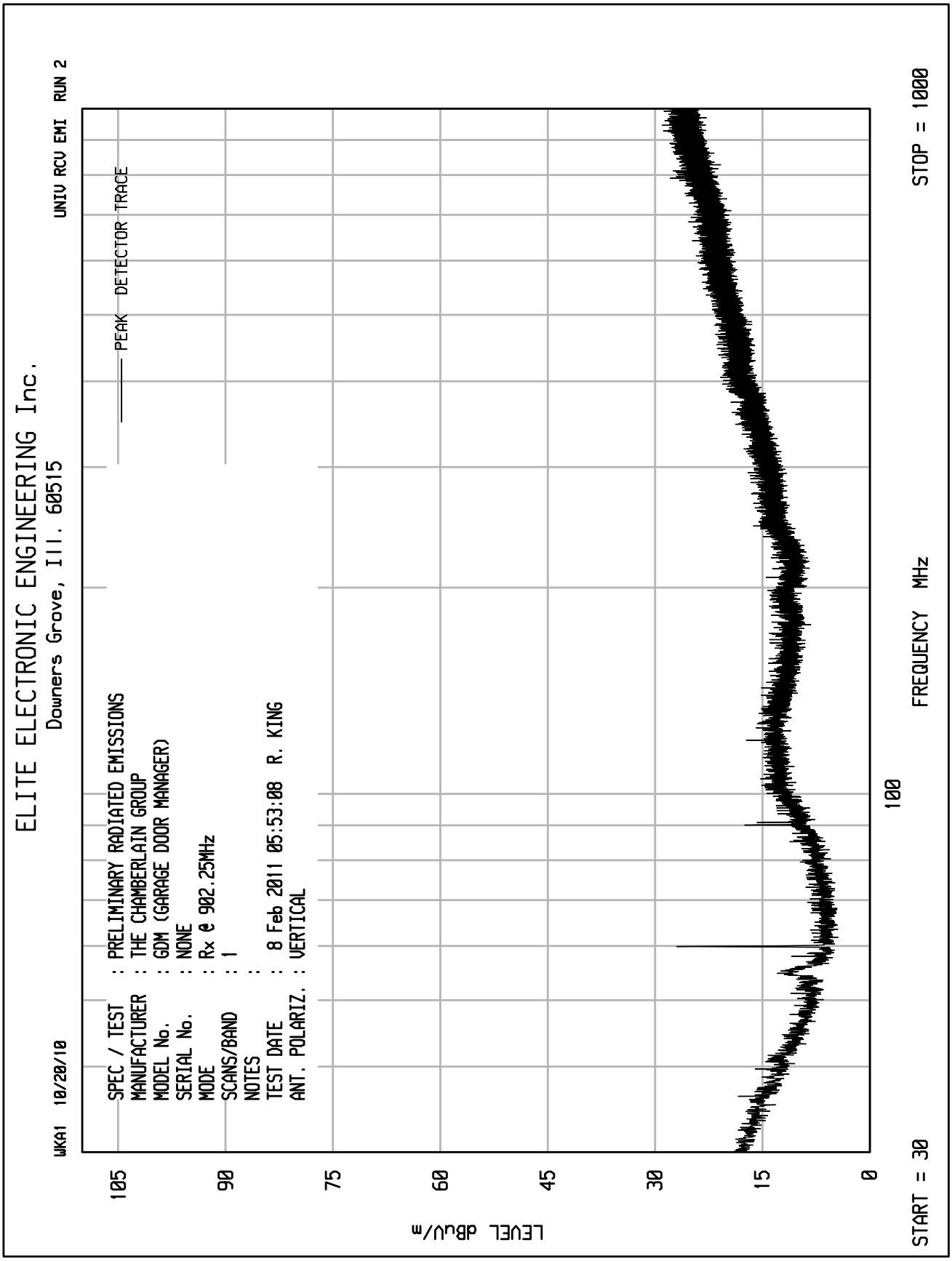
MANUFACTURER	: Chamberlain Group, Inc.
MODEL NUMBER	: GDM (Garage Door Manager)
SERIAL NUMBER	: None Assigned
TEST MODE	: Hopping Enabled
NOTES	: Single pulse is 2.64msec long
EQUIPMENT USED	: NTA2, RBB0, CMA1

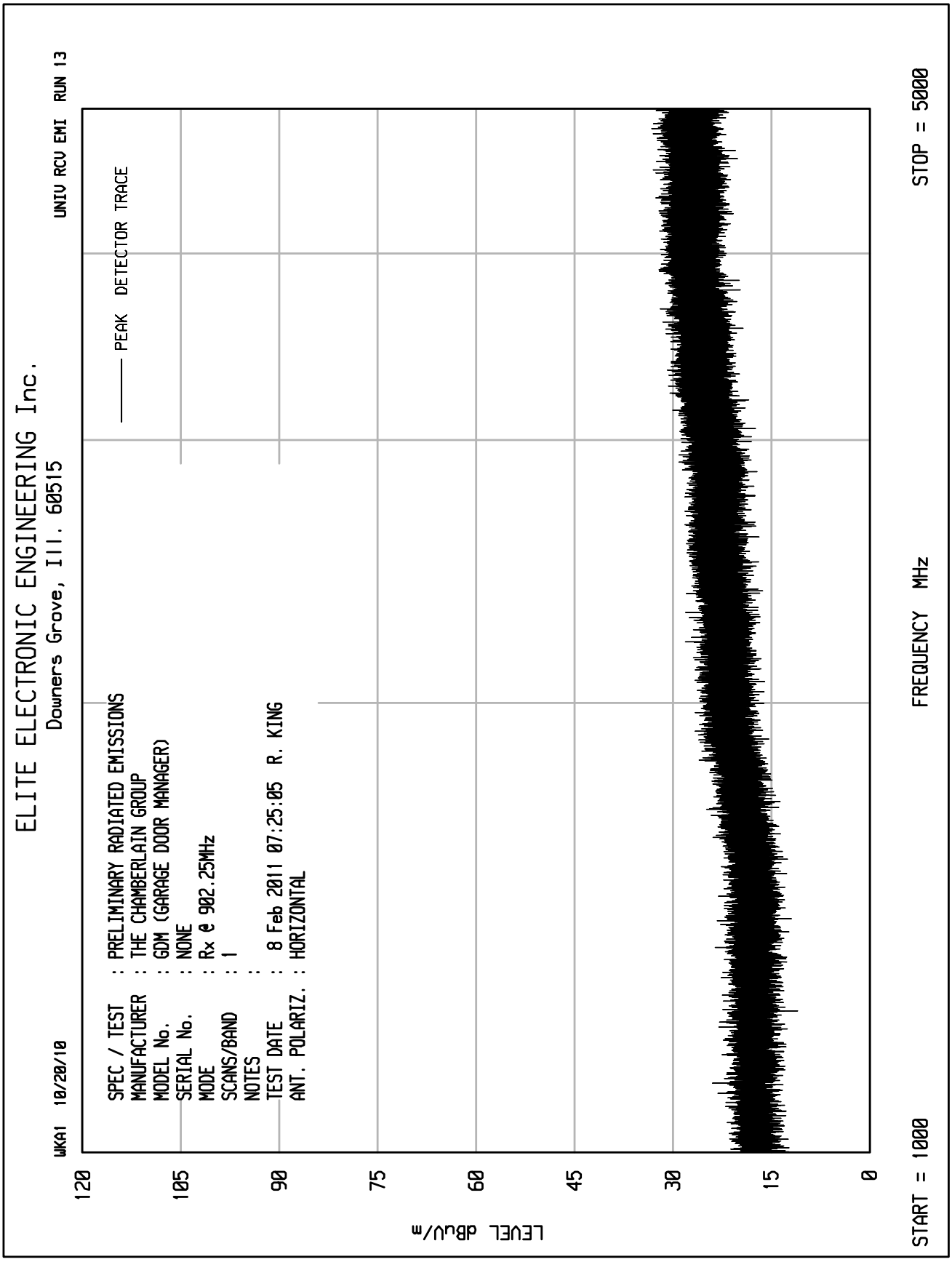


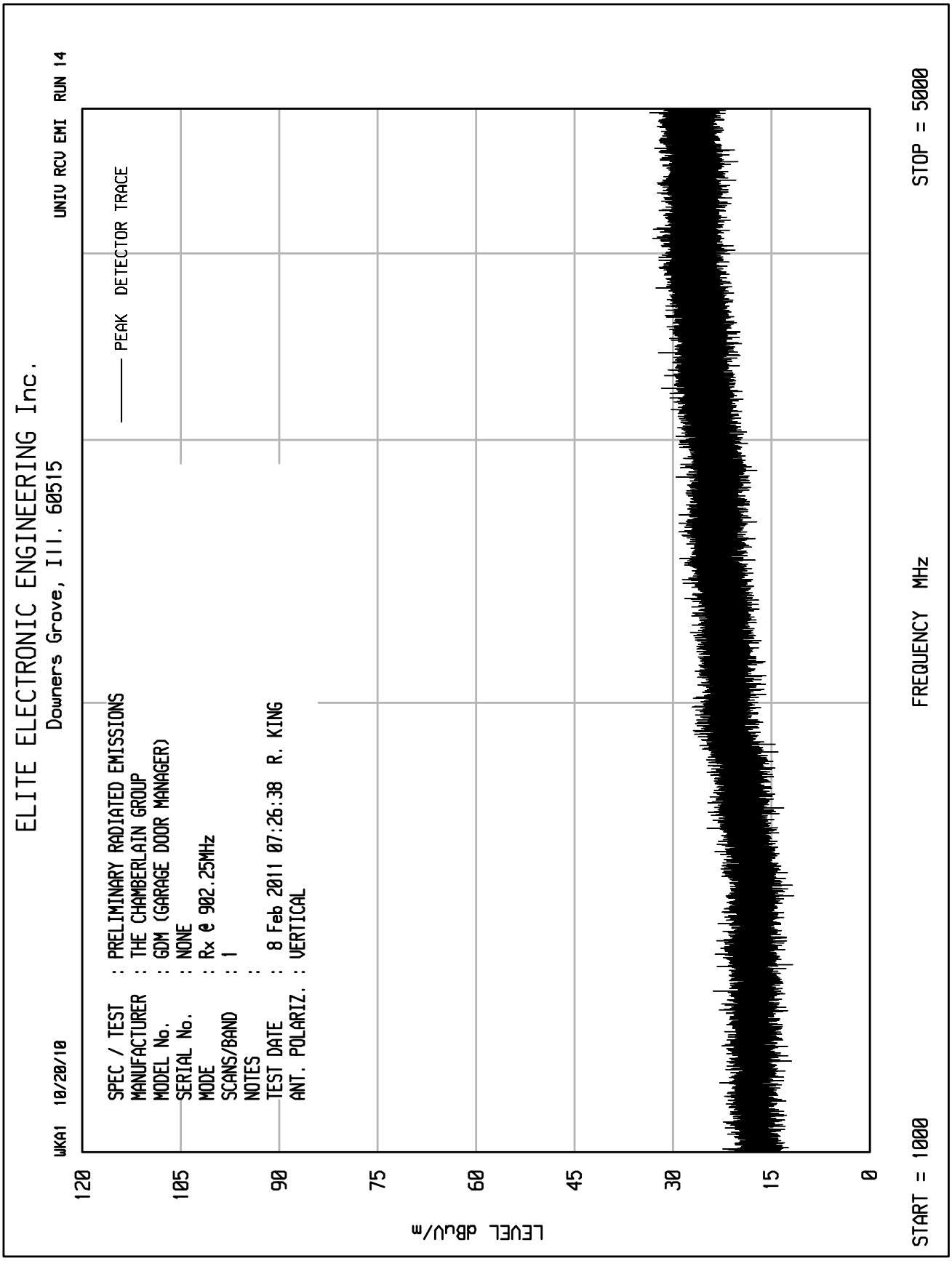
Duty Cycle Correction Factor

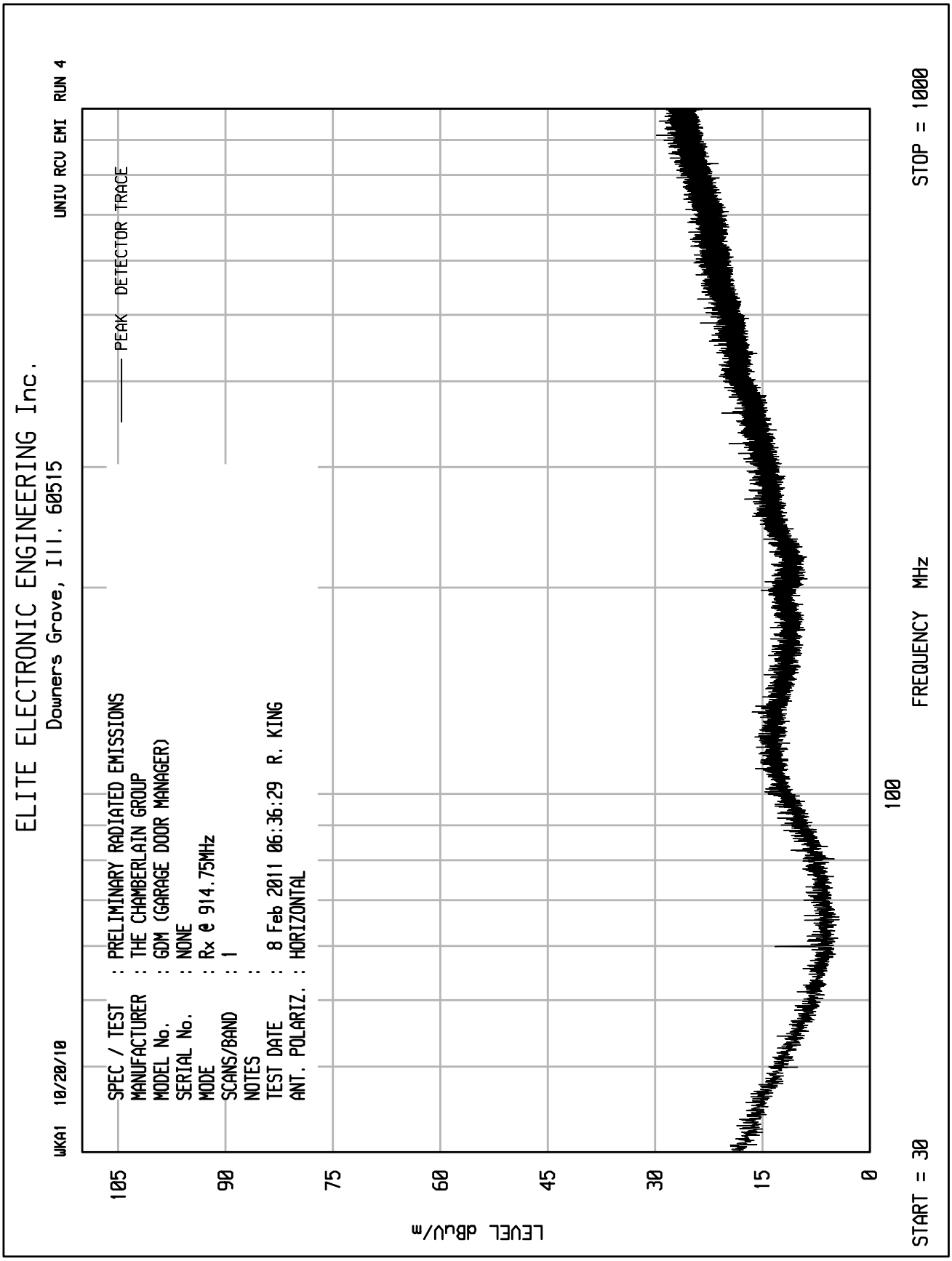
MANUFACTURER	: Chamberlain Group, Inc.
MODEL NUMBER	: GDM (Garage Door Manager)
SERIAL NUMBER	: None Assigned
TEST MODE	: Hopping Enabled
NOTES	: Number of Hops in a 100msec period = 1. On time per hop is 2.64msec.
	: Therefore the duty cycle correction factor = 20 x log((on-time/hop)x(number of
	: hops)/100msec)
	: duty cycle correction factor = 20 x log ((2.64msec x1)/100msec)
	: duty cycle correction factor = -31.6
EQUIPMENT USED	: NTA2, RBB0, CMA1

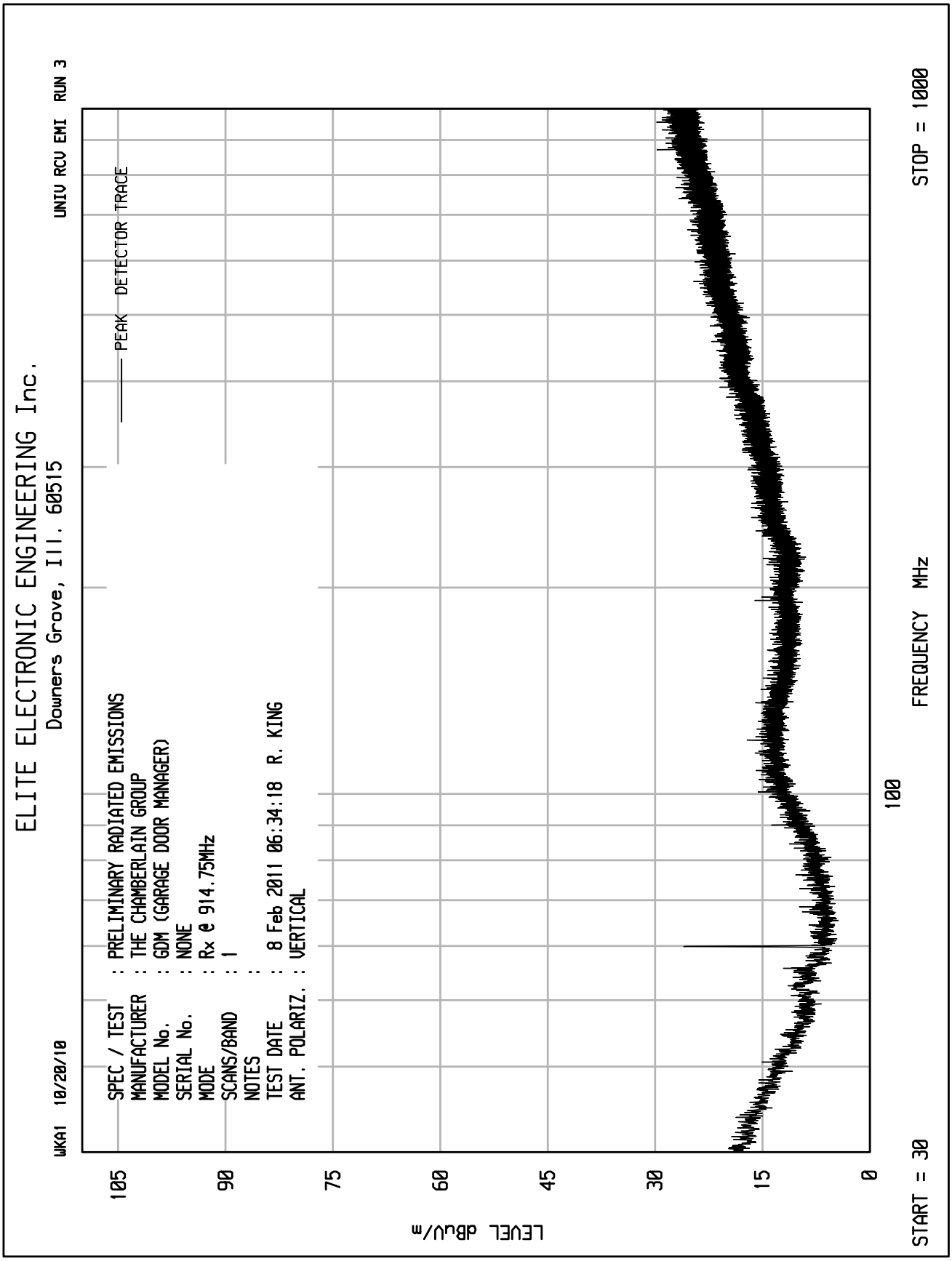

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 1
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Rx @ 902.25MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 05:49:49 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

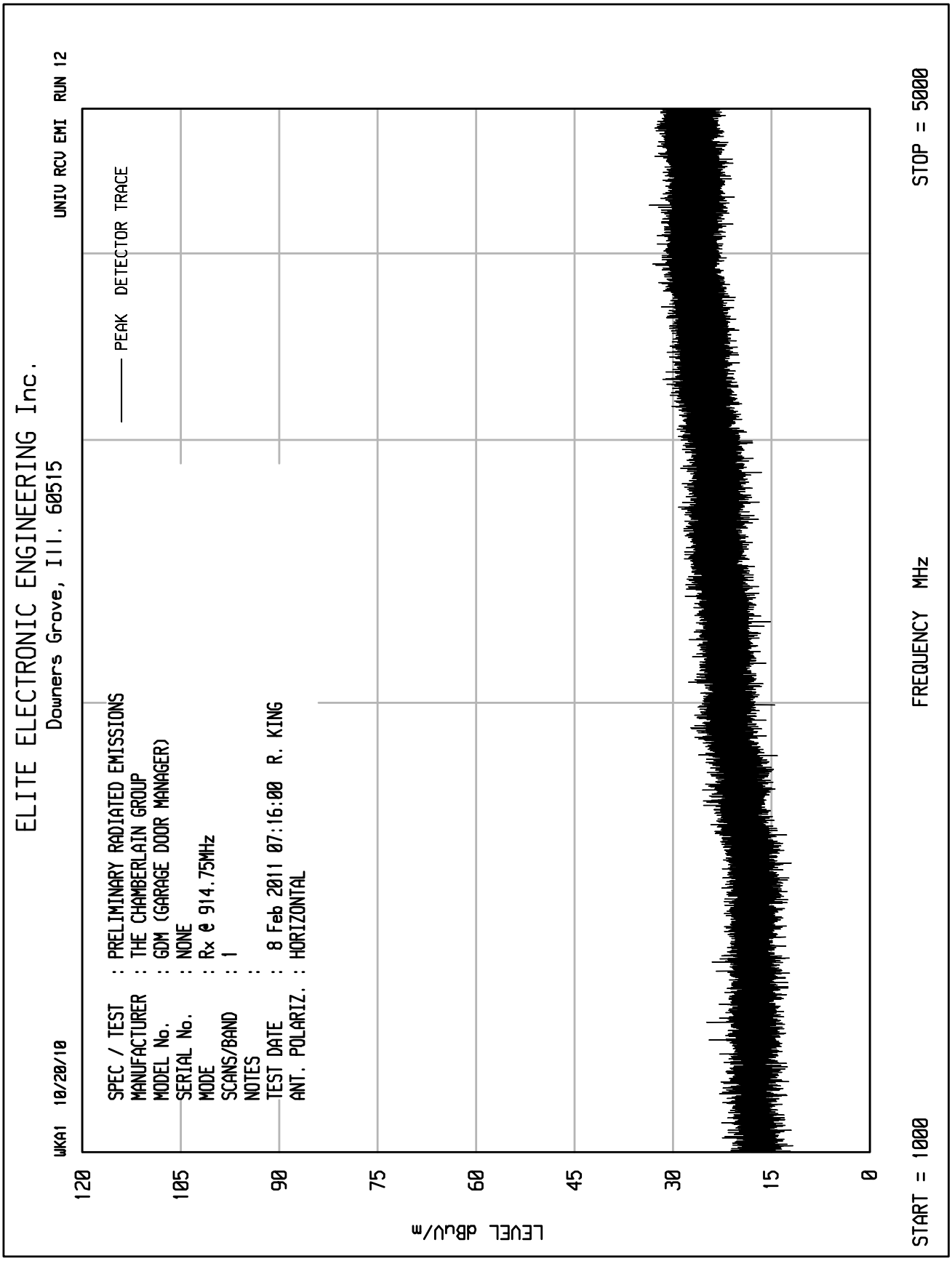

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 2
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Rx @ 902.25MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 05:53:08 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

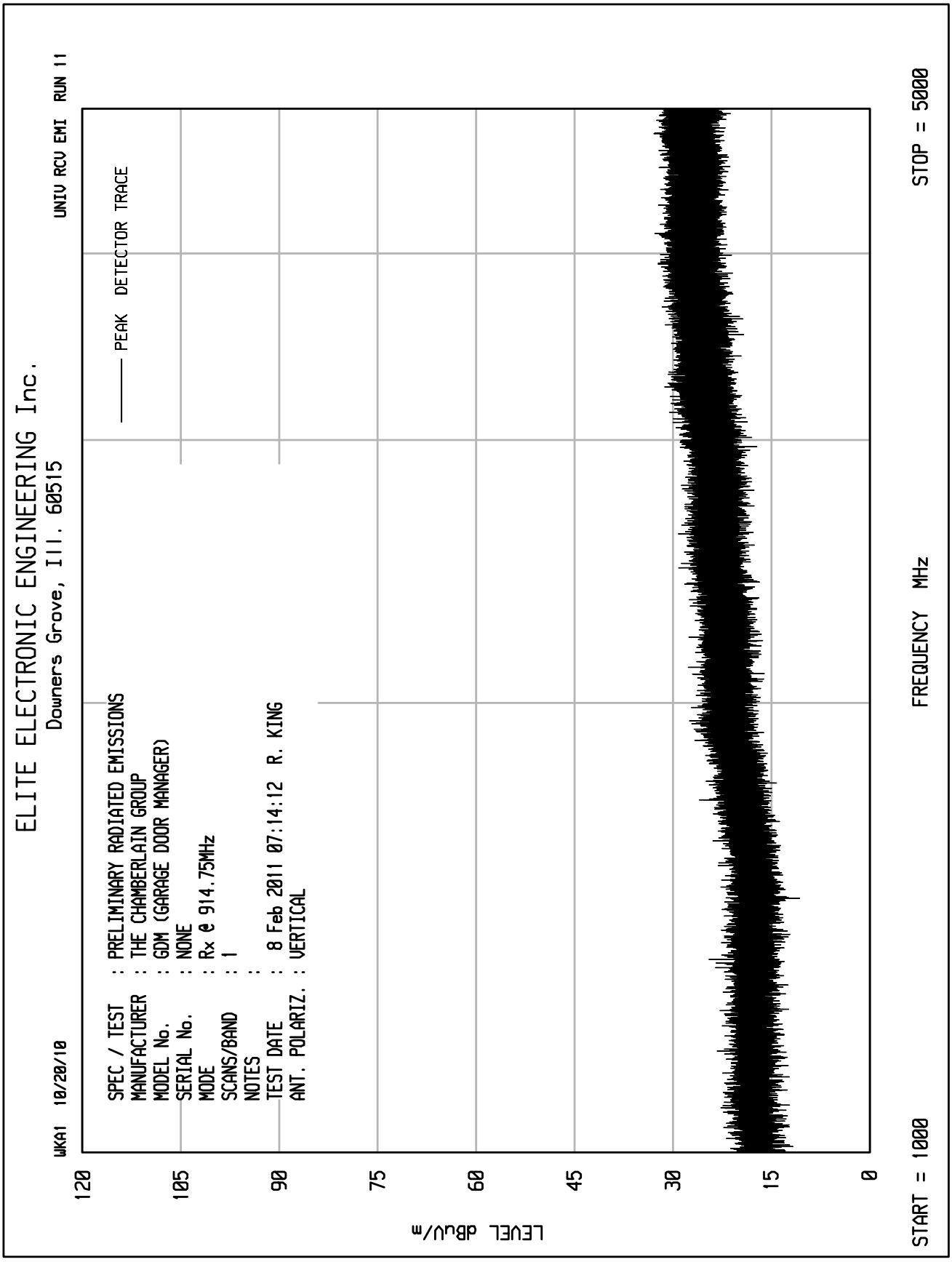

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 13
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Rx @ 902.25MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 07:25:05 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 = 5000

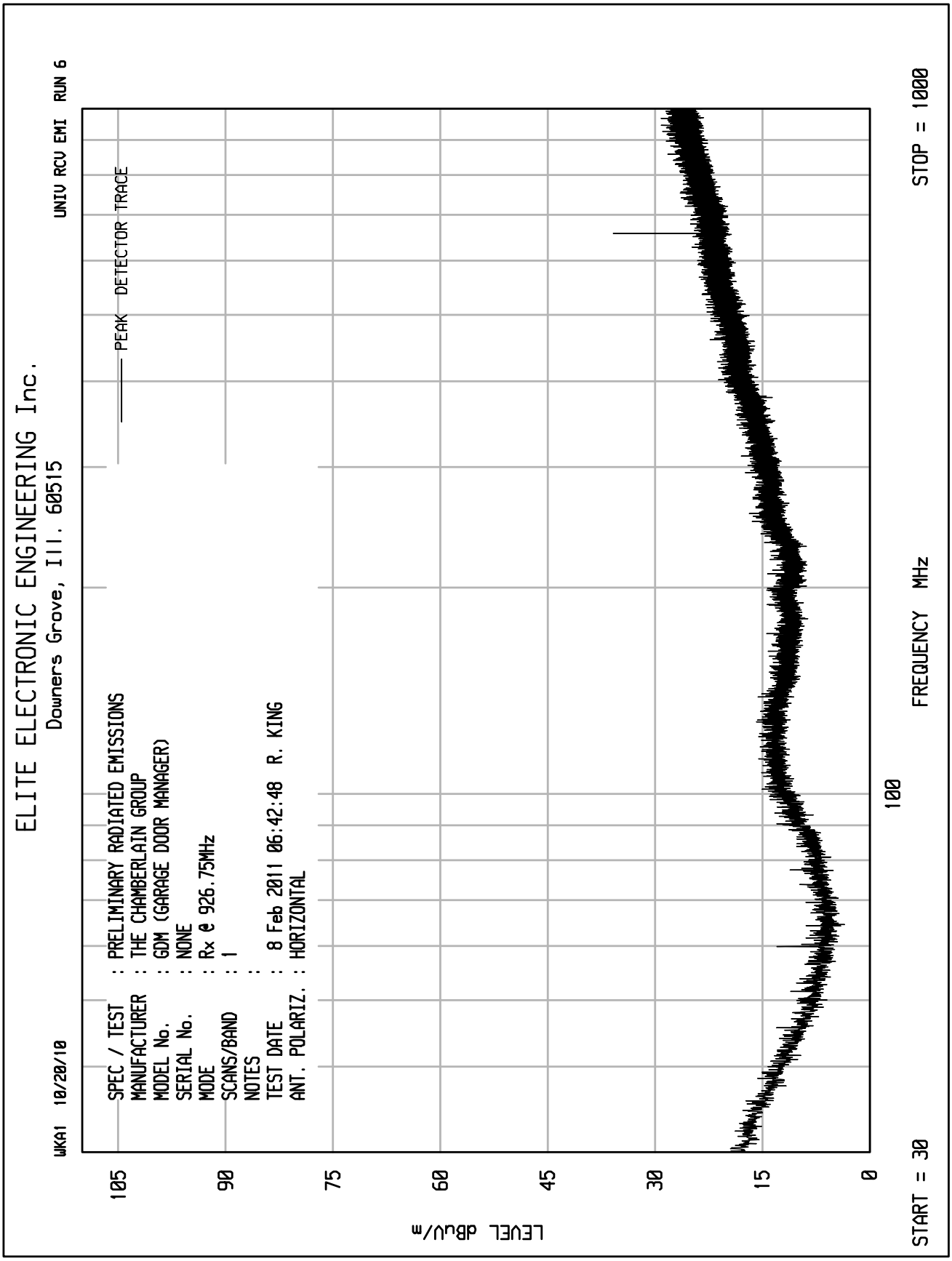

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 14
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Rx @ 902.25MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 07:26:38 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 = 5000

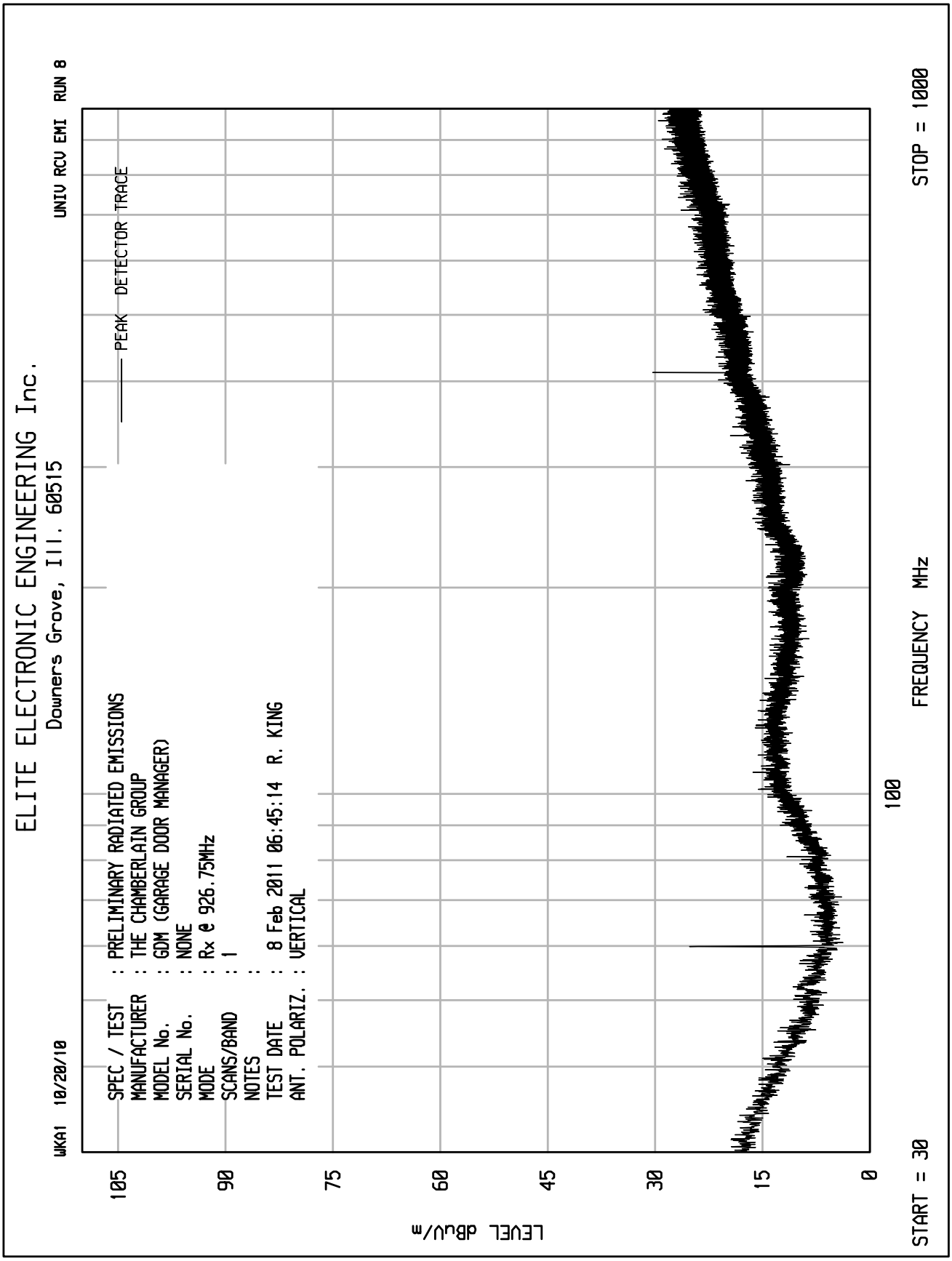

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 4
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Rx @ 914.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 06:36:29 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

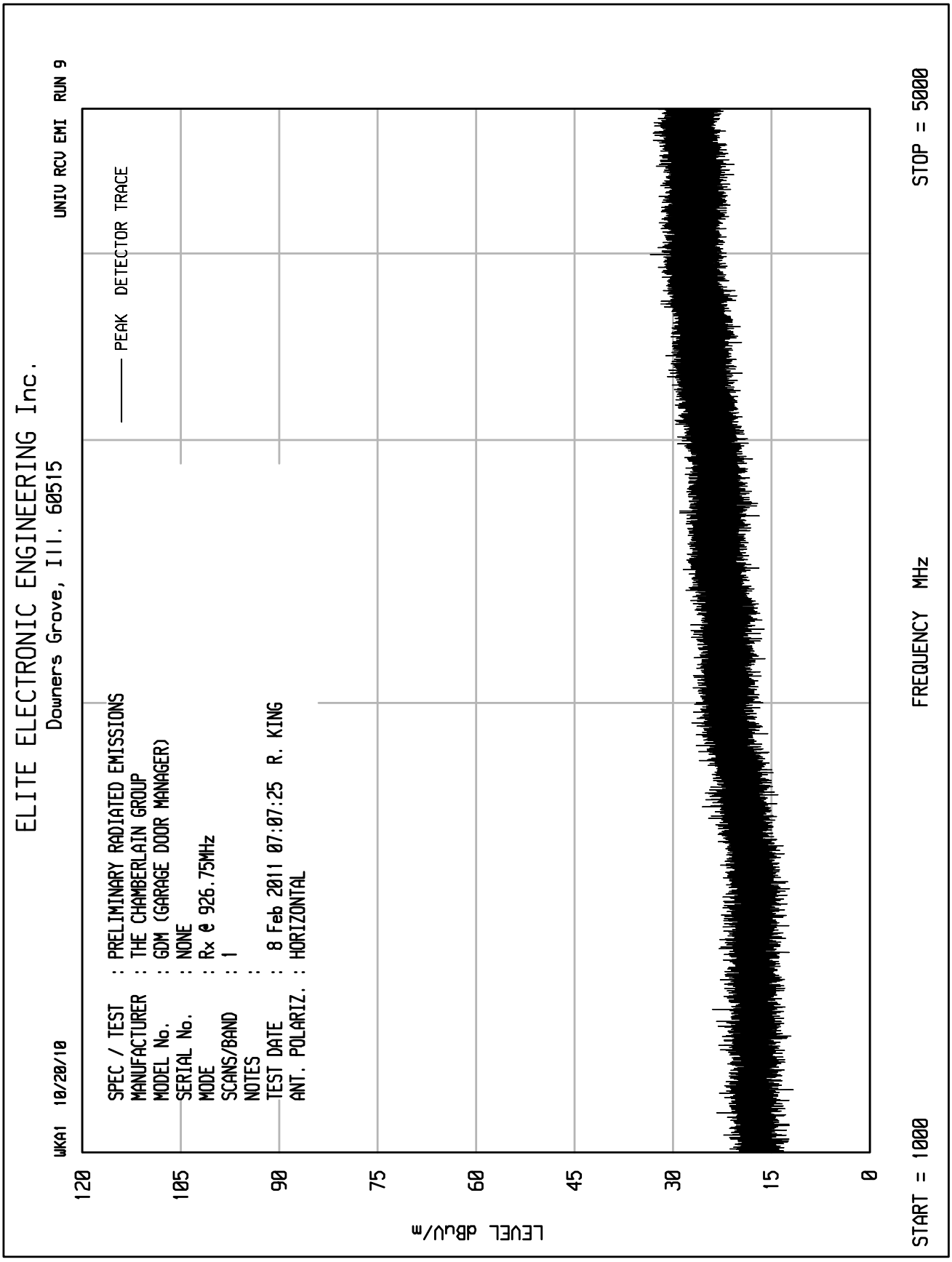

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 3
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Rx @ 914.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 06:34:18 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

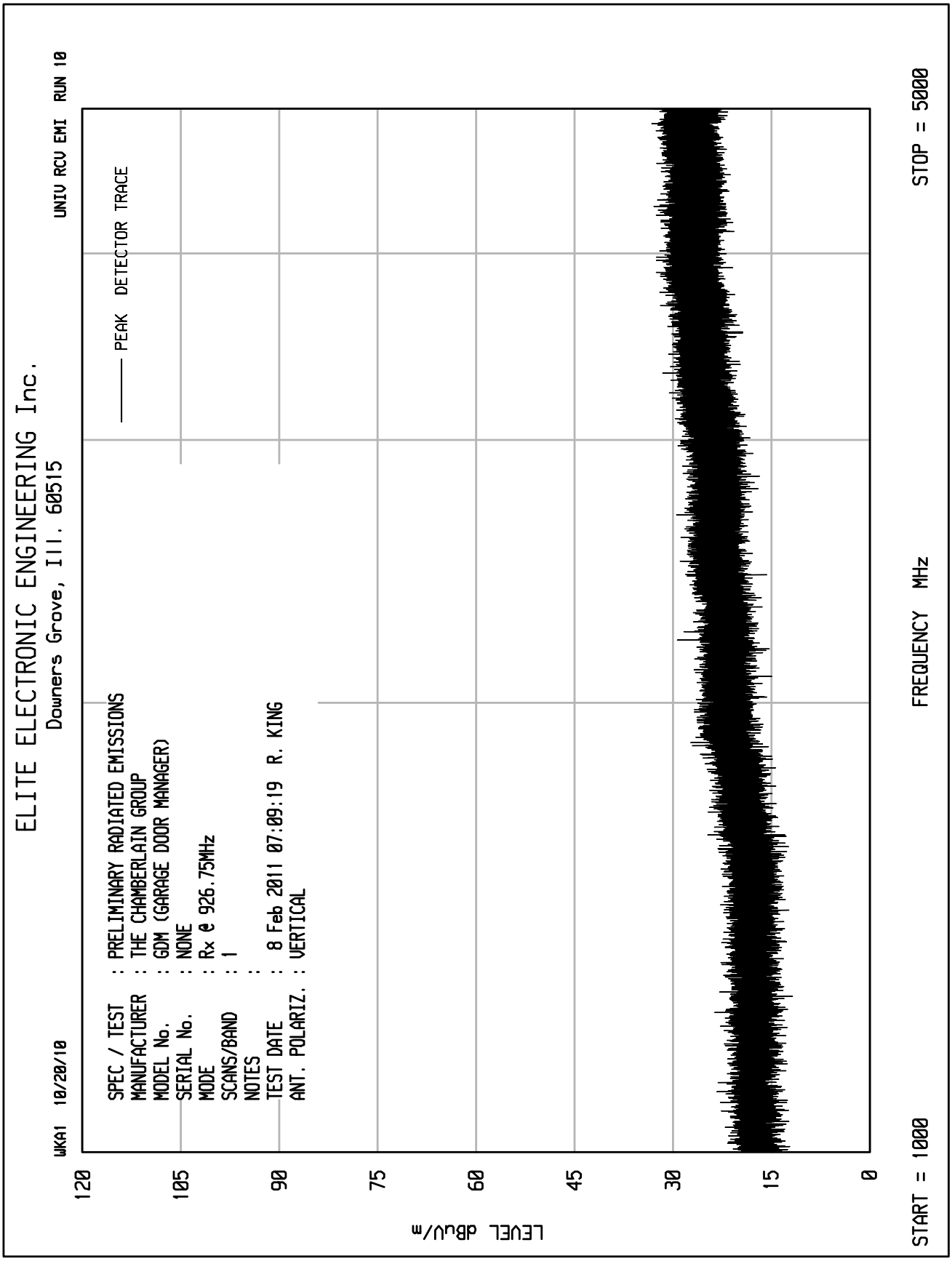

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 12
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Rx @ 914.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 07:16:00 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 = 5000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 11
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Rx @ 914.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 07:14:12 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 = 5000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 6
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Rx @ 926.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 06:42:48 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 8
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Rx @ 926.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 06:45:14 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 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Rx @ 926.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 07:07:25 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 = 5000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 10
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Rx @ 926.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 07:09:19 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 = 5000

Manufacturer : The Chamberlain Group
EUT : Garage Door Manager
Model No. : GDM
Serial No. : none
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : February 8, 2011
Mode : Receive @ 902.25MHz
Test Distance : 3 meters
Notes : QP/AVG Detector
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	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)
901.313	H	-1.2	*	2.0	21.8	0.0	22.6	13.6	200.0	-23.4
901.313	V	-1.2	*	2.0	21.8	0.0	22.6	13.5	200.0	-23.4
1802.626	H	34.3		2.9	26.5	-40.7	23.0	14.1	500.0	-31.0
1802.626	V	34.2		2.9	26.5	-40.7	22.8	13.9	500.0	-31.1
2703.939	H	33.3	*	3.7	29.6	-40.3	26.2	20.3	500.0	-27.8
2703.939	V	33.3	*	3.7	29.6	-40.3	26.2	20.3	500.0	-27.8
3605.252	H	32.0	*	4.3	32.0	-39.9	28.4	26.4	500.0	-25.6
3605.252	V	32.1	*	4.3	32.0	-39.9	28.5	26.5	500.0	-25.5
4506.565	H	31.4	*	4.8	32.9	-40.0	29.1	28.5	500.0	-24.9
4506.565	V	31.4	*	4.8	32.9	-40.0	29.1	28.5	500.0	-24.9

Checked BY Richard E. King :

Richard E. King

Manufacturer : The Chamberlain Group
EUT : Garage Door Manager
Model No. : GDM
Serial No. : none
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : February 8, 2011
Mode : Receive @ 914.75MHz
Test Distance : 3 meters
Notes : QP/AVG Detector
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	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)
913.813	H	-0.9	*	2.0	21.8	0.0	23.0	14.0	200.0	-23.1
913.813	V	-0.9	*	2.0	21.8	0.0	22.9	13.9	200.0	-23.1
1827.626	H	34.1		2.9	26.7	-40.6	23.2	14.4	500.0	-30.8
1827.626	V	34.4		2.9	26.7	-40.6	23.5	14.9	500.0	-30.5
2741.439	H	33.3	*	3.7	29.6	-40.3	26.2	20.4	500.0	-27.8
2741.439	V	33.3	*	3.7	29.6	-40.3	26.2	20.4	500.0	-27.8
3655.252	H	32.1	*	4.3	32.2	-39.8	28.9	27.8	500.0	-25.1
3655.252	V	32.2	*	4.3	32.2	-39.8	29.0	28.1	500.0	-25.0
4569.065	H	31.7	*	4.8	33.1	-40.0	29.6	30.1	500.0	-24.4
4569.065	V	31.6	*	4.8	33.1	-40.0	29.5	30.0	500.0	-24.4

Checked BY Richard E. King :

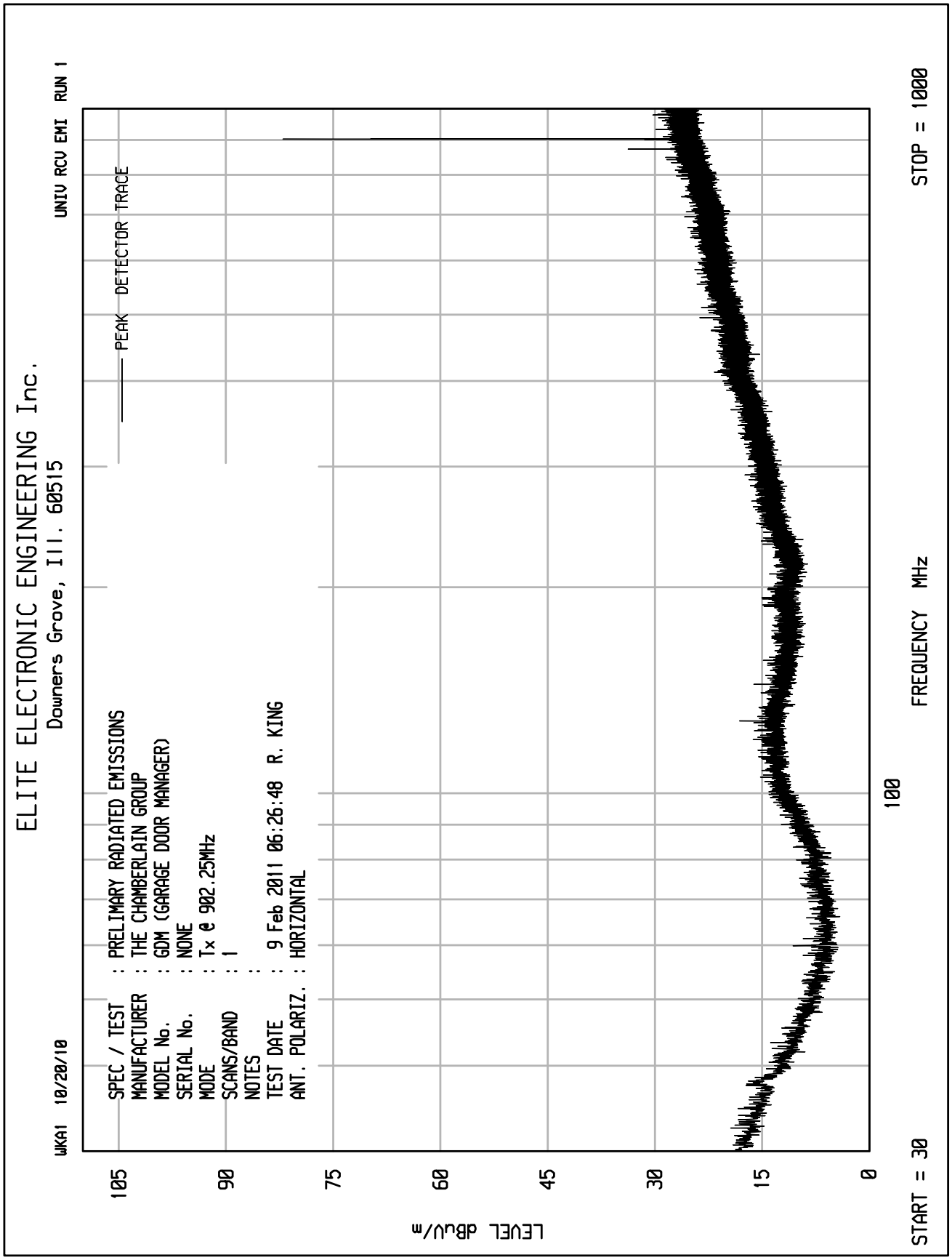
Richard E. King

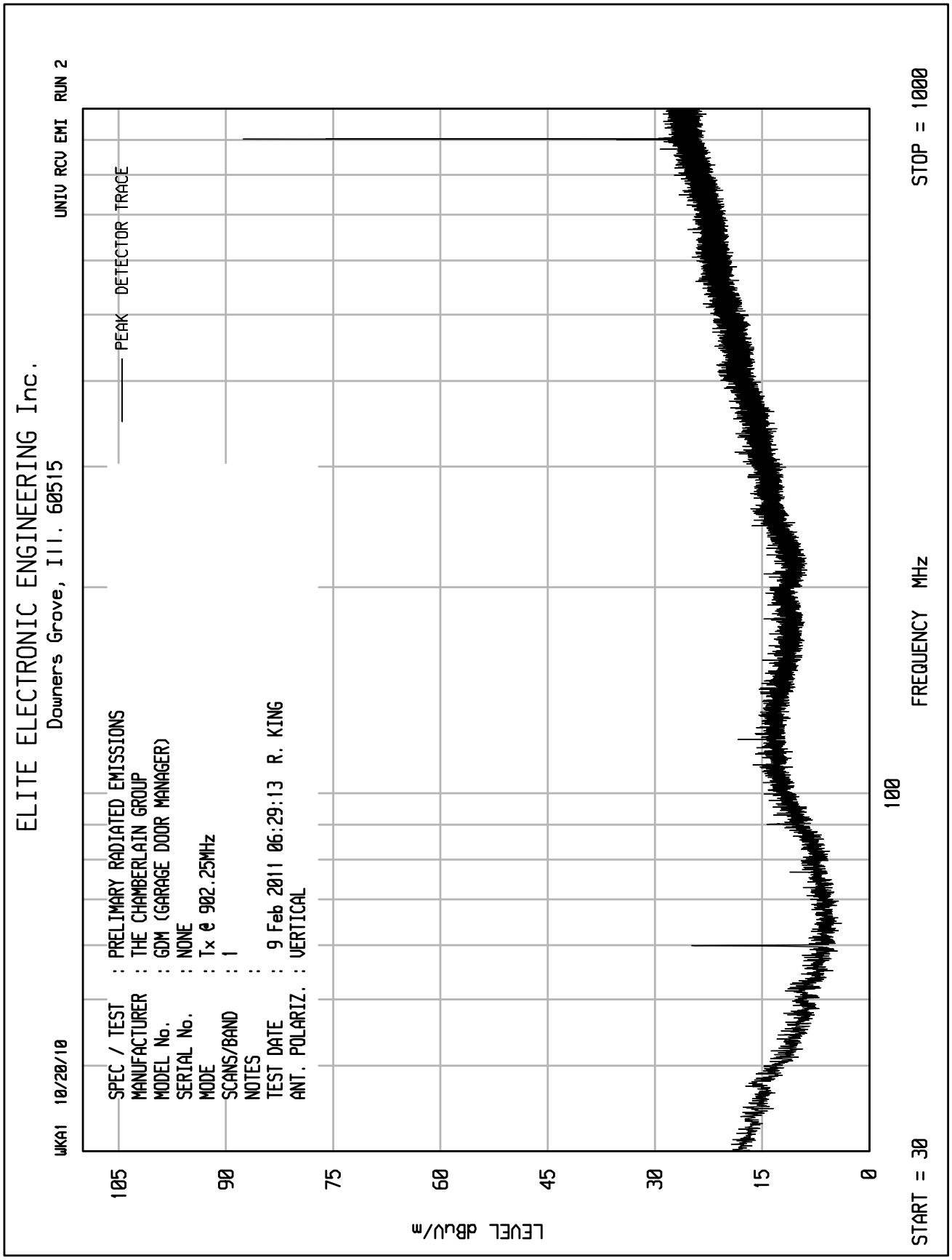
Manufacturer : The Chamberlain Group
EUT : Garage Door Manager
Model No. : GDM
Serial No. : none
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : February 8, 2011
Mode : Receive @ 926.75MHz
Test Distance : 3 meters
Notes : QP/AVG Detector
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain

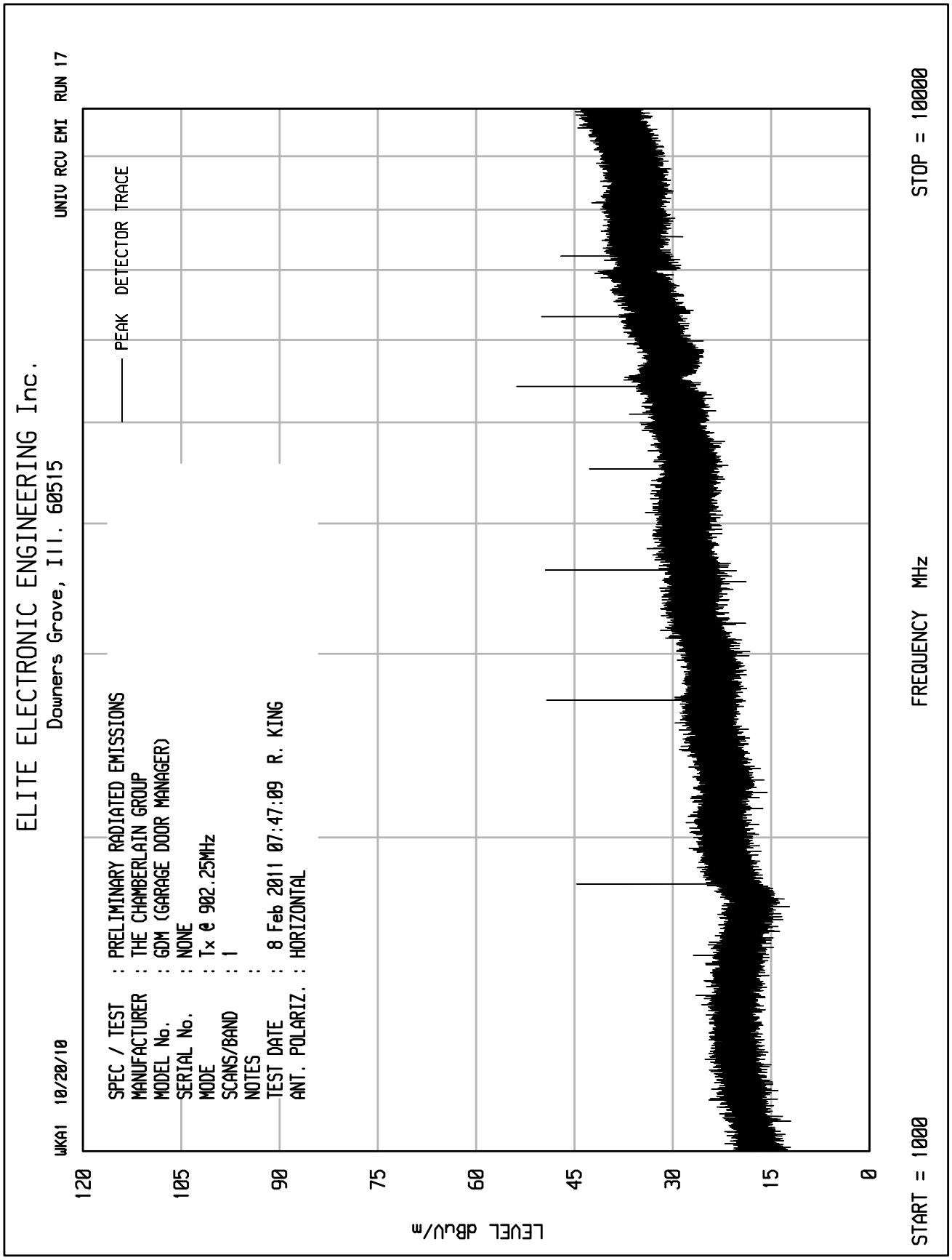
Freq (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
925.813	H	-1.0	*	2.0	21.9	0.0	22.9	14.0	200.0	-23.1
925.813	V	-0.9	*	2.0	21.9	0.0	22.9	14.0	200.0	-23.1
1851.626	H	33.6	*	2.9	27.0	-40.5	23.0	14.1	500.0	-31.0
1851.626	V	33.6	*	2.9	27.0	-40.5	23.0	14.1	500.0	-31.0
2777.439	H	32.9	*	3.7	29.6	-40.4	25.8	19.5	500.0	-28.2
2777.439	V	32.9	*	3.7	29.6	-40.4	25.8	19.5	500.0	-28.2
3703.252	H	32.2	*	4.3	32.4	-39.6	29.3	29.2	500.0	-24.7
3703.252	V	32.2	*	4.3	32.4	-39.6	29.3	29.2	500.0	-24.7
4629.065	H	31.5	*	4.8	33.3	-40.0	29.6	30.2	500.0	-24.4
4629.065	V	31.5	*	4.8	33.3	-40.0	29.6	30.3	500.0	-24.3

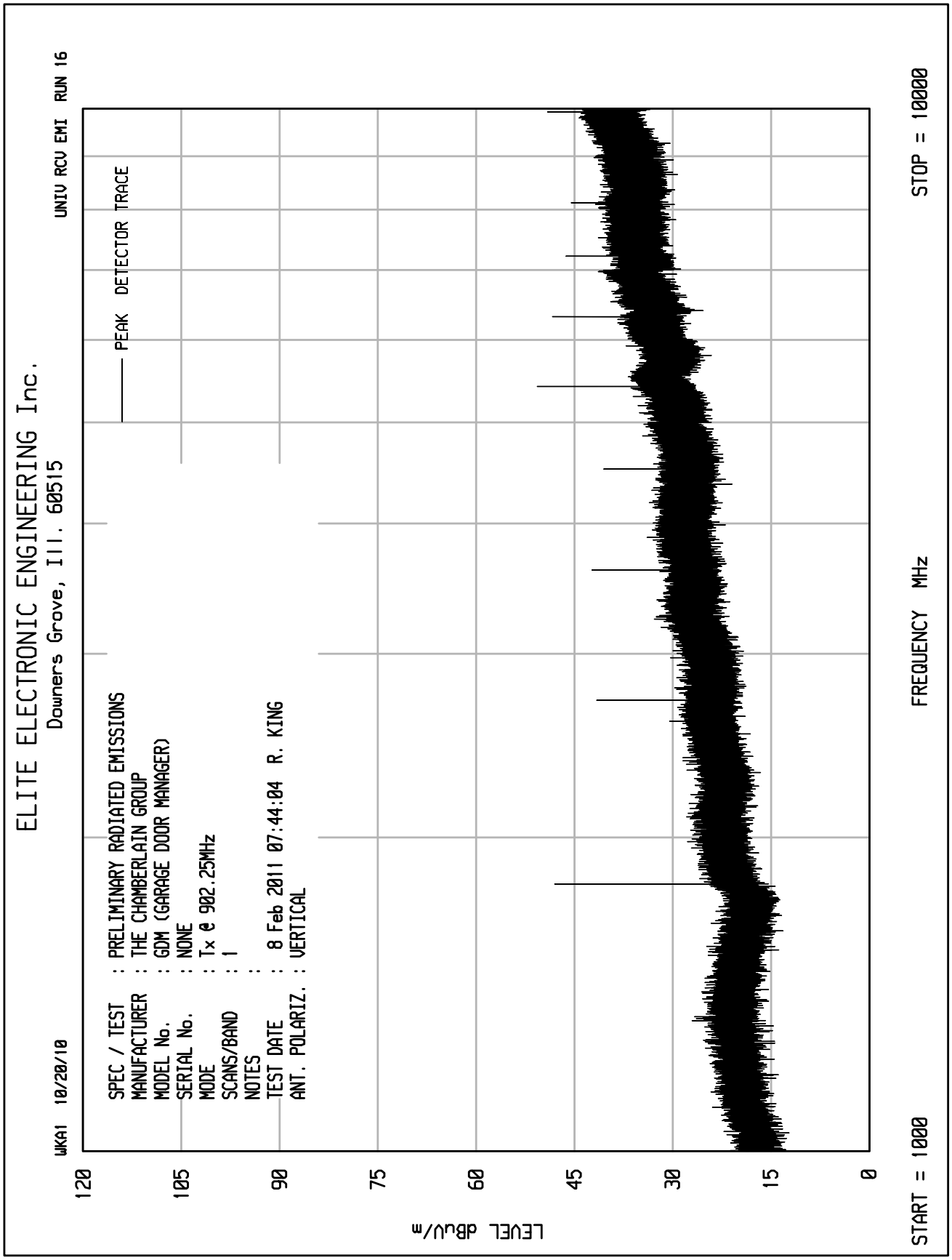
Checked BY Richard E. King :

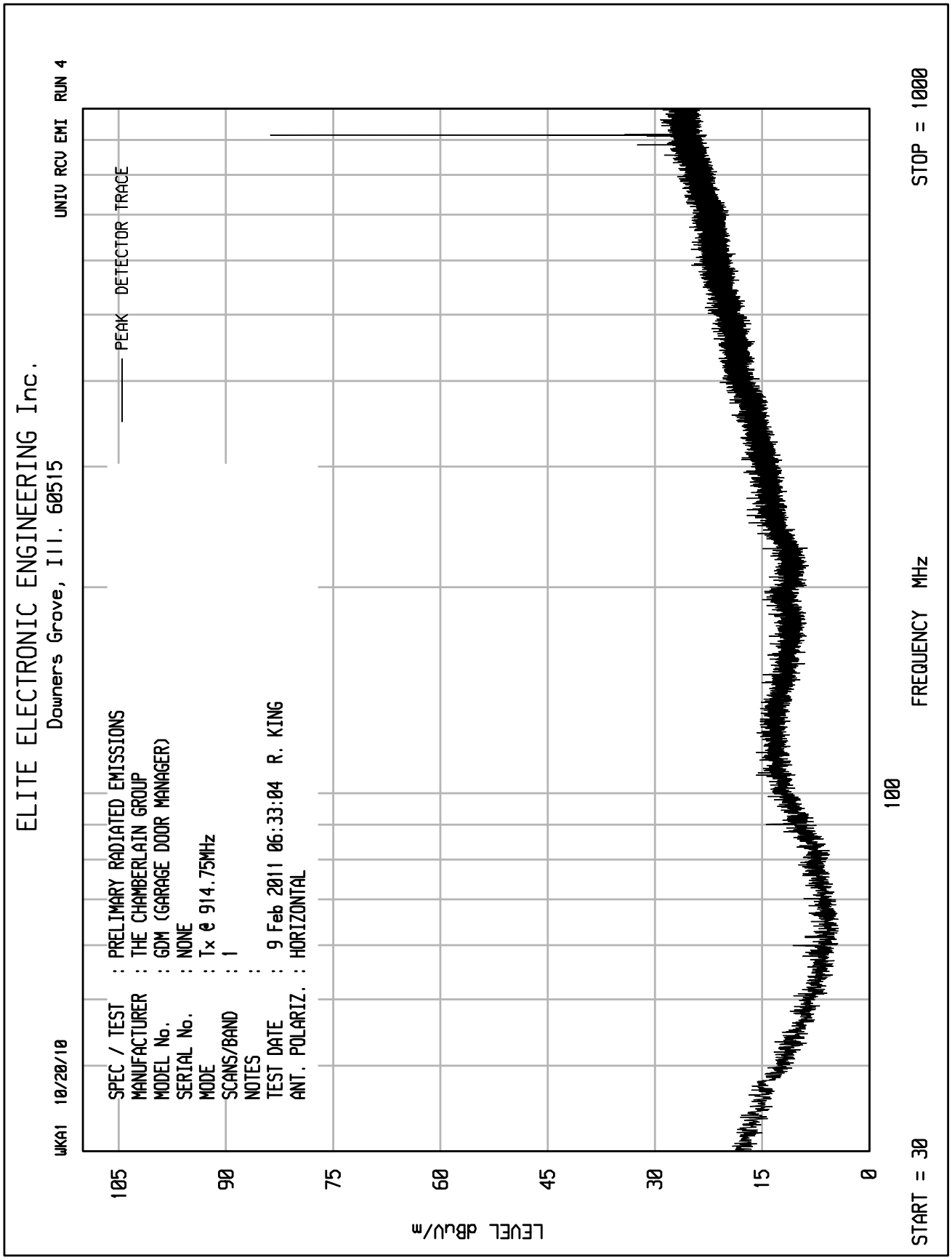
Richard E. King

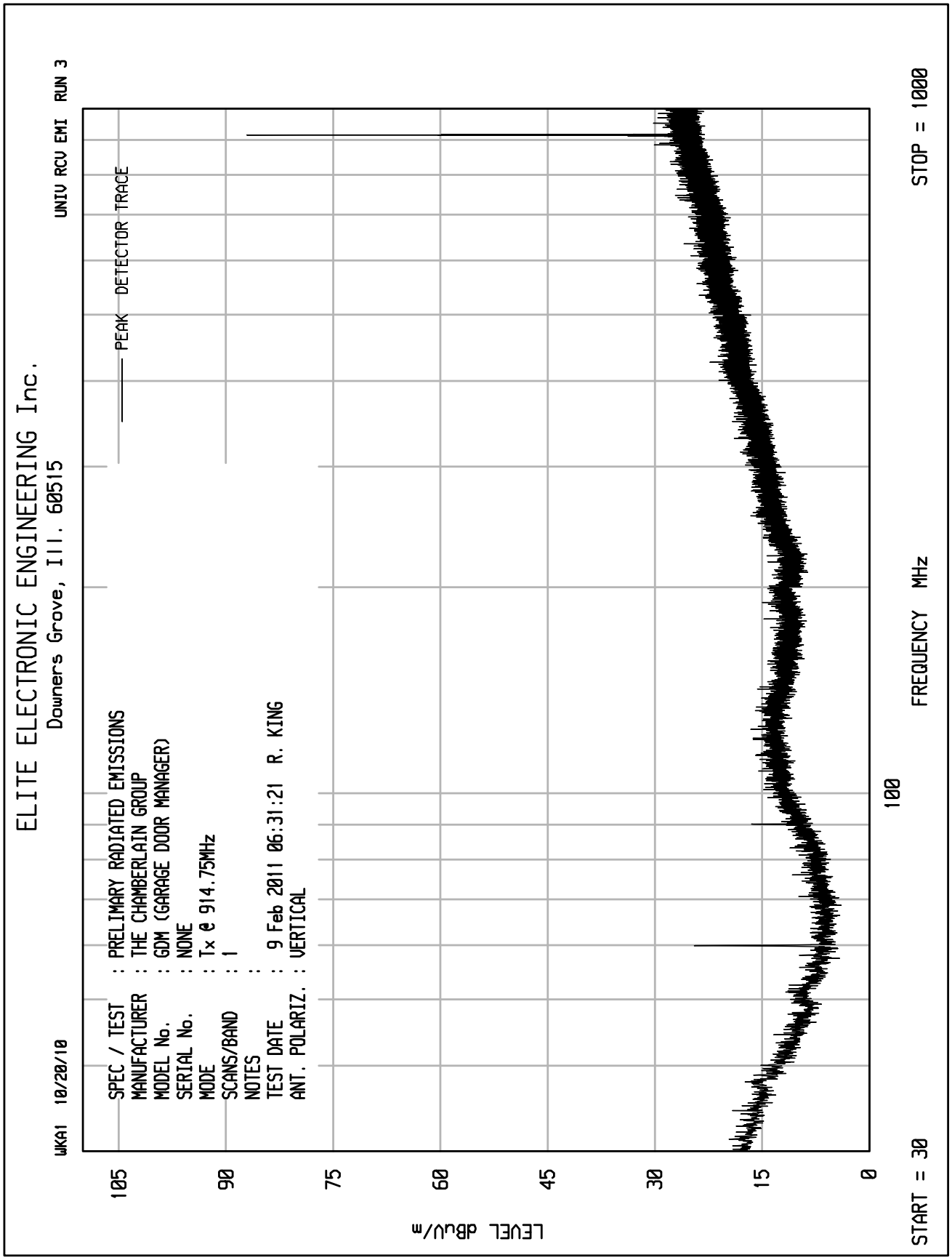

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 1
WKA1 10/20/10
SPEC / TEST : PRELIMARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Tx @ 902.25MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 9 Feb 2011 06:26:48 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

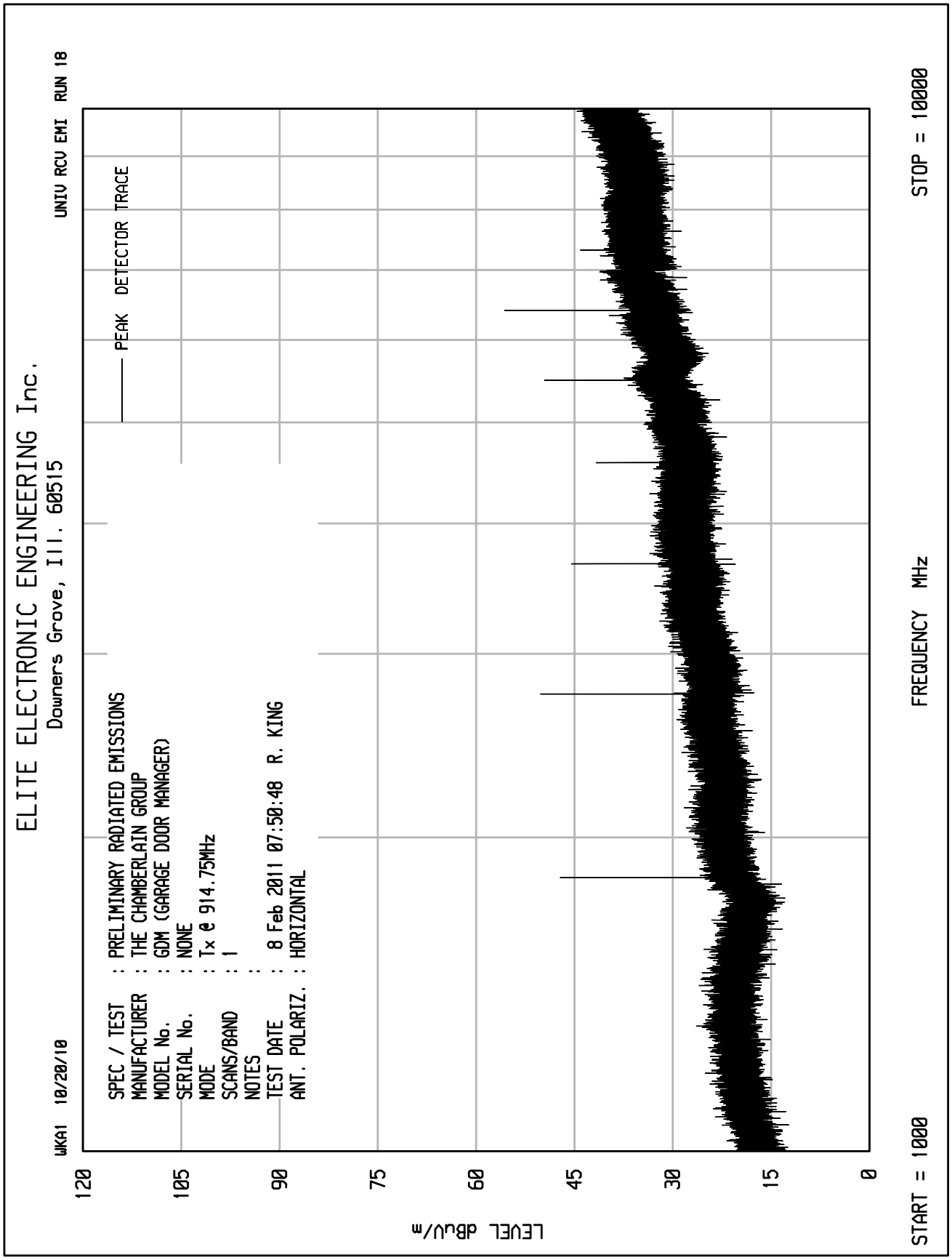

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 2
WKA1 10/20/10
SPEC / TEST : PRELIMARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Tx @ 902.25MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 9 Feb 2011 06:29:13 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

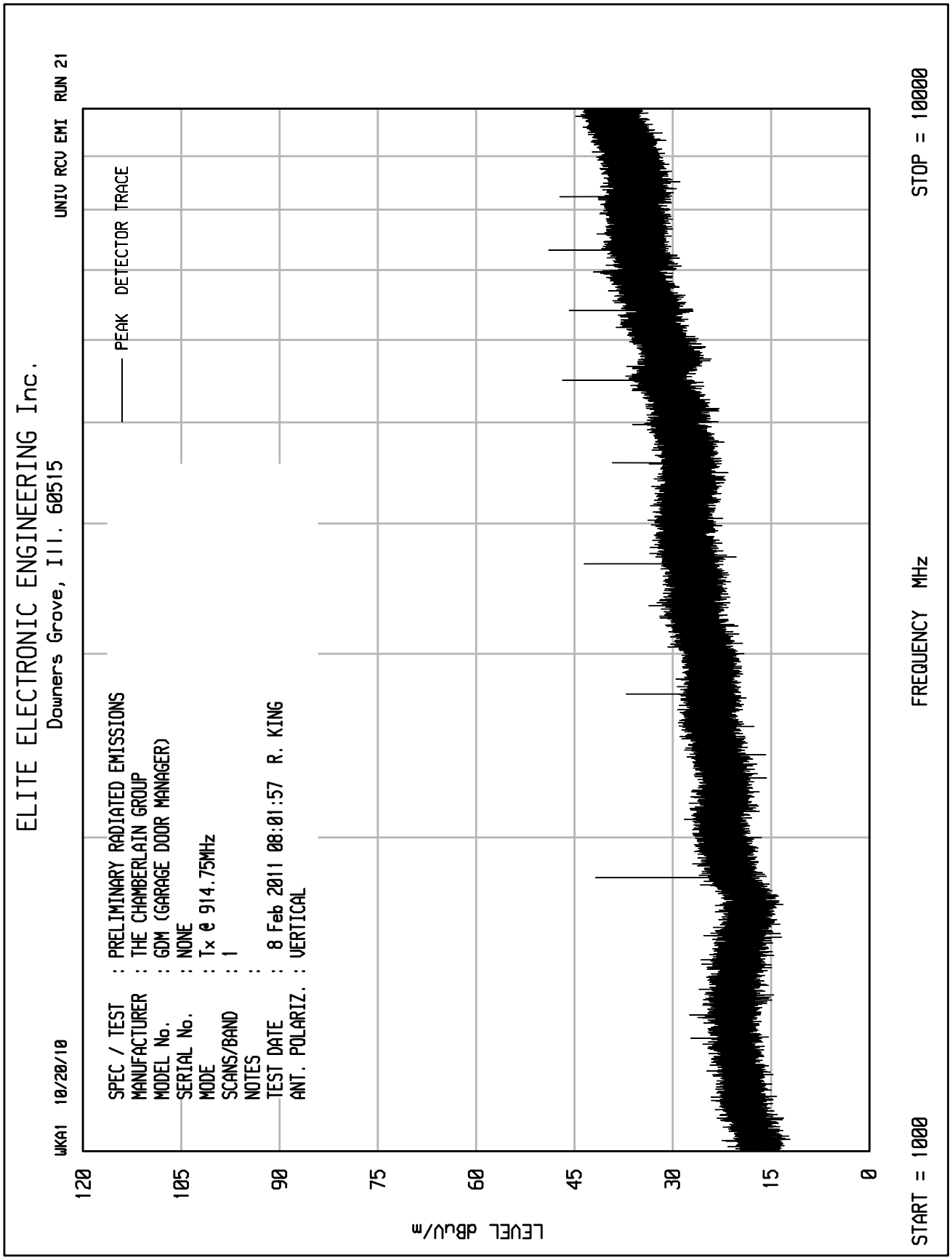

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 17
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Tx @ 902.25MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 07:47:09 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

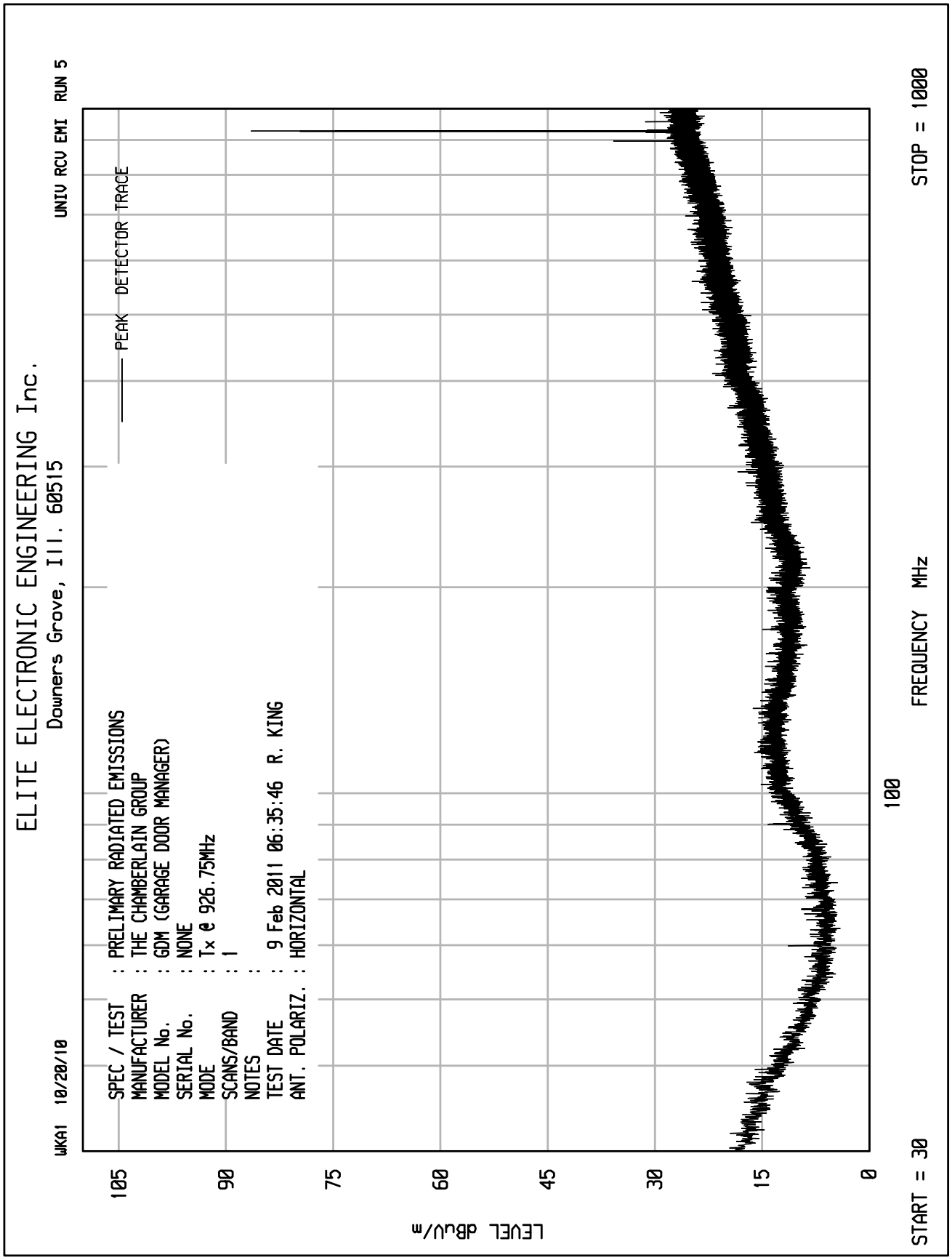

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 16
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Tx @ 902.25MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 07:44:04 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

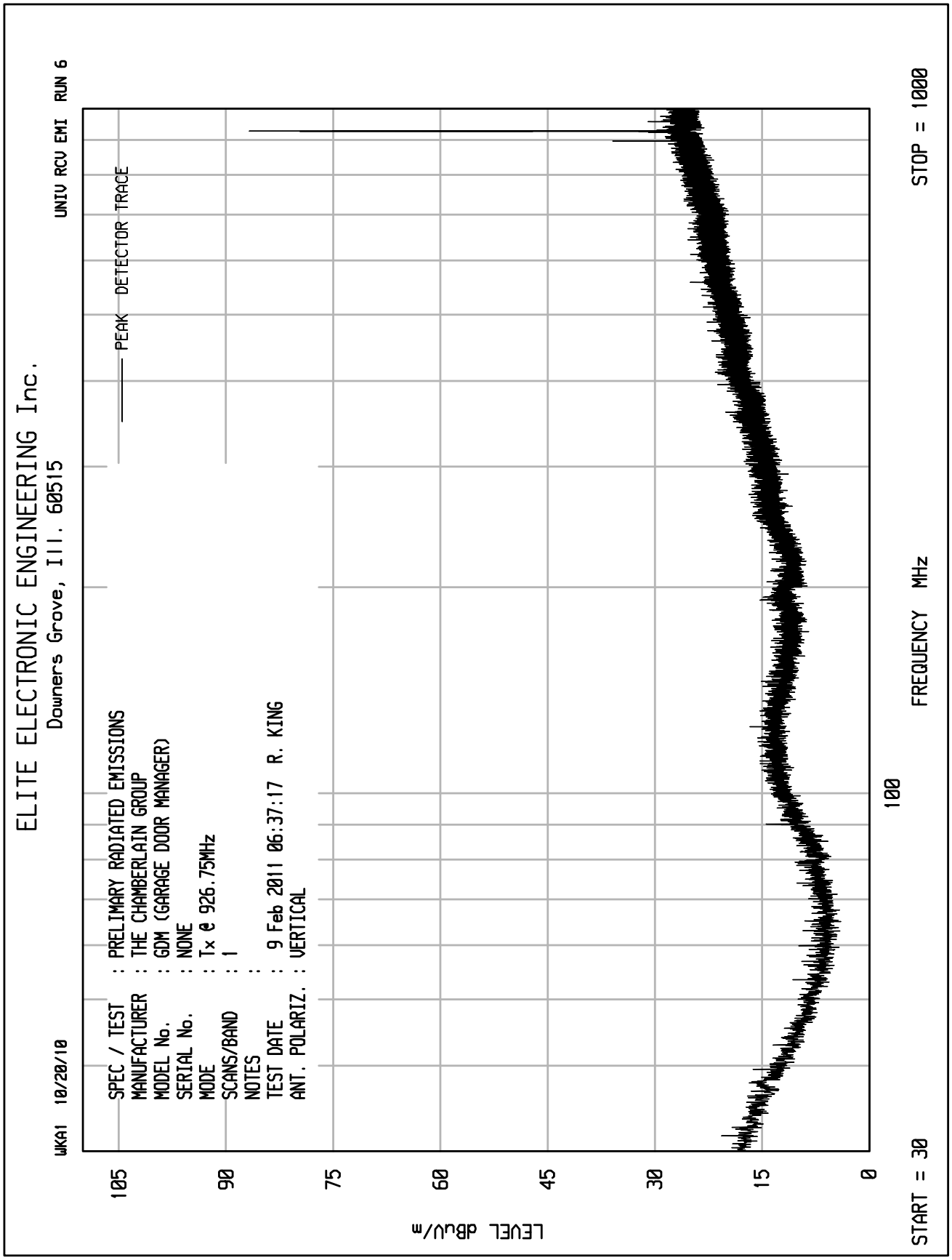

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 4
WKA1 10/20/10
SPEC / TEST : PRELIMARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Tx @ 914.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 9 Feb 2011 06:33:04 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

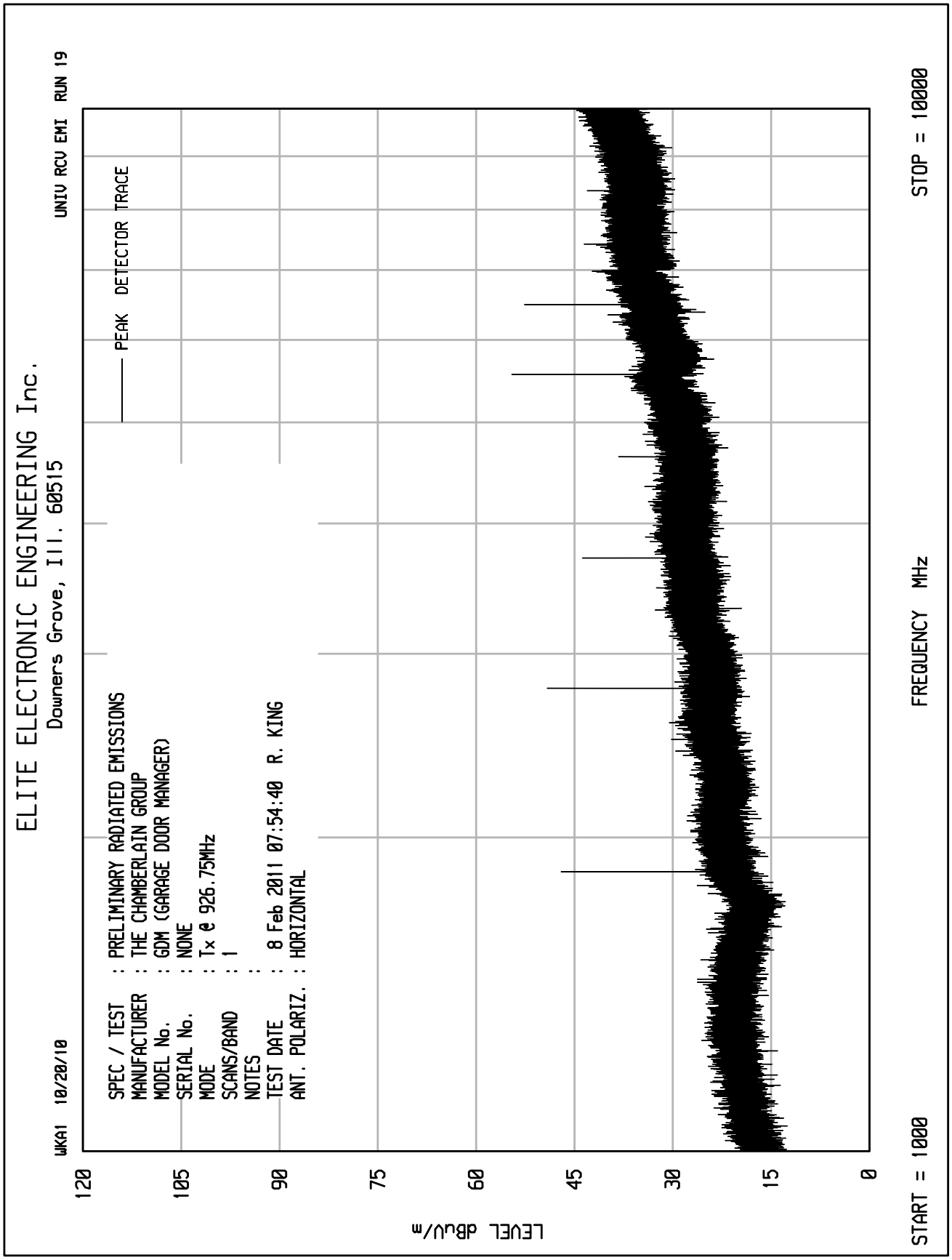

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 3
WKA1 10/20/10
SPEC / TEST : PRELIMARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Tx @ 914.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 9 Feb 2011 06:31:21 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

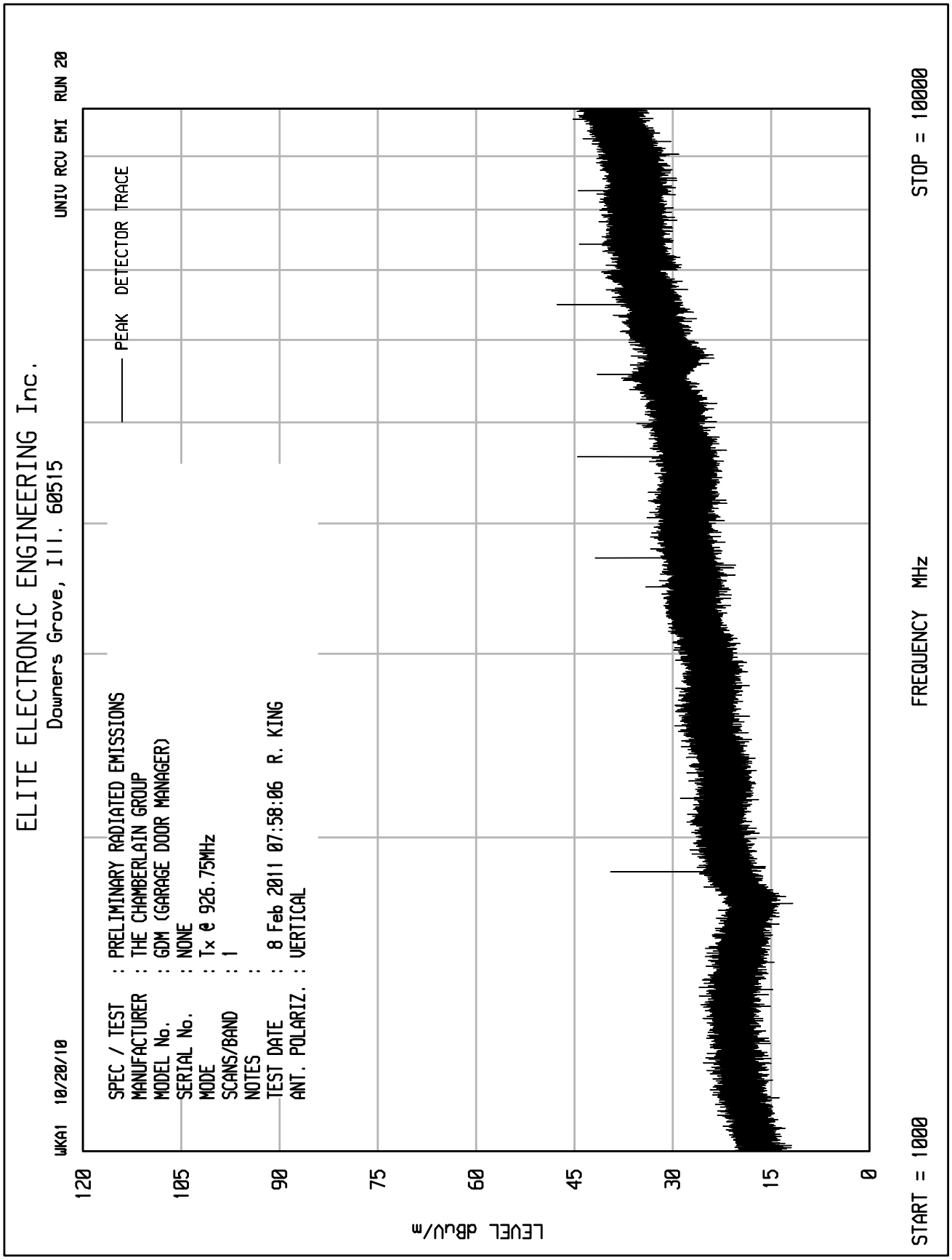

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 18
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Tx @ 914.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 07:50:48 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 21
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Tx @ 914.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 08:01:57 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
WKAI 10/20/10
SPEC / TEST : PRELIMARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Tx @ 926.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 9 Feb 2011 06:35:46 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 10/20/10
SPEC / TEST : PRELIMARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Tx @ 926.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 9 Feb 2011 06:37:17 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 19
WKAI 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Tx @ 926.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 07:54:40 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 20
WKA1 10/20/10
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : GDM (GARAGE DOOR MANAGER)
SERIAL No. : NONE
MODE : Tx @ 926.75MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 8 Feb 2011 07:58:06 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

DATA PAGE

Manufacturer : The Chamberlain Group
EUT : Garage Door Manager
Model No. : GDM
Serial No. : none
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : 2/7/2011
Mode : Transmit @ 902.25MHz
Test Distance : 3 meters
Notes : Peak Readings

Total (dBuV/m) = Meter Reading (dBuV) + Cable Factor (dB) + Antenna Factor (dB) + Pre Amp (dB)

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	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)
902.250	H	89.5		2.0	21.8	0.0	113.3	462381.0		
902.250	V	84.6		2.0	21.8	0.0	108.4	263026.8		
1804.500	H	79.2		2.9	26.5	-40.6	67.9	2484.4	46238.1	-25.4
1804.500	V	79.3		2.9	26.5	-40.6	68.0	2513.1	46238.1	-25.3
2706.750	H	72.1		3.7	29.6	-40.3	65.0	1778.1	5000.0	-9.0
2706.750	V	64.4		3.7	29.6	-40.3	57.3	732.8	5000.0	-16.7
3609.000	H	68.1		4.3	32.0	-39.9	64.5	1681.6	5000.0	-9.5
3609.000	V	64.4		4.3	32.0	-39.9	60.8	1098.3	5000.0	-13.2
4511.250	H	65.8		4.8	32.9	-40.0	63.5	1500.9	5000.0	-10.5
4511.250	V	61.8		4.8	32.9	-40.0	59.5	947.0	5000.0	-14.5
5413.500	H	66.2		5.2	35.2	-40.1	66.5	2111.9	5000.0	-7.5
5413.500	V	64.6		5.2	35.2	-40.1	64.9	1756.6	5000.0	-9.1
6315.750	H	62.1		5.7	35.6	-39.9	63.4	1487.6	46238.1	-29.9
6315.750	V	65.9		5.7	35.6	-39.9	67.2	2304.0	46238.1	-26.1
7218.000	H	50.3		6.1	37.1	-39.8	53.8	487.4	46238.1	-39.5
7218.000	V	45.7		6.1	37.1	-39.8	49.2	287.0	46238.1	-44.1
8120.250	H	53.8		6.5	38.4	-39.6	59.2	908.0	5000.0	-14.8
8120.250	V	53.8		6.5	38.4	-39.6	59.2	908.0	5000.0	-14.8
9022.500	H	51.2		6.5	39.6	-39.1	58.3	818.9	5000.0	-15.7
9022.500	V	53.5		6.5	39.6	-39.1	60.6	1067.2	5000.0	-13.4

Checked BY Richard E. King :

Richard E. King

DATA PAGE

Manufacturer : The Chamberlain Group
EUT : Garage Door Manager
Model No. : GDM
Serial No. : none
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : 2/7/2011
Mode : Transmit @ 902.25MHz
Test Distance : 3 meters
Notes : Average Readings

Total (dBuV/m) = Meter Reading (dBuV) + Cable Factor (dB) + Antenna Factor (dB) + Pre Amp (dB) + Duty Cycle (dB)

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	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)
2706.8	H	66.8		3.7	29.6	-40.3	-31.6	28.1	25.4	500.0	-25.9
2706.8	V	58.9		3.7	29.6	-40.3	-31.6	20.2	10.2	500.0	-33.8
3609.0	H	62.9		4.3	32.0	-39.9	-31.6	27.7	24.3	500.0	-26.3
3609.0	V	58.9		4.3	32.0	-39.9	-31.6	23.7	15.3	500.0	-30.3
4511.3	H	58.6		4.8	32.9	-40.0	-31.6	24.7	17.2	500.0	-29.3
4511.3	V	54.9		4.8	32.9	-40.0	-31.6	21.0	11.3	500.0	-33.0
5413.5	H	60.5		5.2	35.2	-40.1	-31.6	29.2	28.8	500.0	-24.8
5413.5	V	58.8		5.2	35.2	-40.1	-31.6	27.5	23.7	500.0	-26.5
8120.3	H	45.3		6.5	38.4	-39.6	-31.6	19.1	9.0	500.0	-34.9
8120.3	V	44.8		6.5	38.4	-39.6	-31.6	18.6	8.5	500.0	-35.4
9022.5	H	40.2		6.5	39.6	-39.1	-31.6	15.7	6.1	500.0	-38.3
9022.5	V	45.2		6.5	39.6	-39.1	-31.6	20.7	10.8	500.0	-33.3

Checked BY Richard E. King :

Richard E. King

DATA PAGE

Manufacturer : The Chamberlain Group
EUT : Garage Door Manager
Model No. : GDM
Serial No. : none
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : 2/7/2011
Mode : Transmit @ 914.75MHz
Test Distance : 3 meters
Notes : Peak Readings

Total (dBuV/m) = Meter Reading (dBuV) + Cable Factor (dB) + Antenna Factor (dB) + Pre Amp (dB)

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	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)
914.750	H	88.8		2.0	21.8	0.0	112.6	426579.5		
914.750	V	84.2		2.0	21.8	0.0	108.0	251188.6		
1829.500	H	84.9		2.9	26.8	-40.6	74.0	4988.2	42658.0	-18.6
1829.500	V	80.9		2.9	26.8	-40.6	70.0	3147.4	42658.0	-22.6
2744.250	H	70.6		3.7	29.6	-40.3	63.5	1499.7	5000.0	-10.5
2744.250	V	63.1		3.7	29.6	-40.3	56.0	632.4	5000.0	-18.0
3659.000	H	70.6		4.3	32.2	-39.8	67.4	2342.5	5000.0	-6.6
3659.000	V	65.2		4.3	32.2	-39.8	62.0	1258.0	5000.0	-12.0
4573.750	H	67.0		4.8	33.1	-40.0	64.9	1764.4	5000.0	-9.0
4573.750	V	64.9		4.8	33.1	-40.0	62.8	1385.5	5000.0	-11.1
5488.500	H	61.9		5.3	35.2	-40.1	62.3	1307.4	42658.0	-30.3
5488.500	V	61.8		5.3	35.2	-40.1	62.2	1292.5	42658.0	-30.4
6403.250	H	62.4		5.7	35.8	-39.9	64.0	1578.6	42658.0	-28.6
6403.250	V	67.8		5.7	35.8	-39.9	69.4	2939.4	42658.0	-23.2
7318.000	H	50.9		6.2	37.3	-39.8	54.6	535.8	5000.0	-19.4
7318.000	V	48.7		6.2	37.3	-39.8	52.4	415.9	5000.0	-21.6
8232.750	H	53.2		6.5	38.6	-39.5	58.8	869.2	5000.0	-15.2
8232.750	V	52.1		6.5	38.6	-39.5	57.7	765.8	5000.0	-16.3
9147.500	H	51.3		6.6	39.8	-39.0	58.7	856.2	5000.0	-15.3
9147.500	V	53.9		6.6	39.8	-39.0	61.3	1155.0	5000.0	-12.7

Checked BY Richard E. King :

Richard E. King

DATA PAGE

Manufacturer : The Chamberlain Group
EUT : Garage Door Manager
Model No. : GDM
Serial No. : none
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : 2/7/2011
Mode : Transmit @ 914.75MHz
Test Distance : 3 meters
Notes : Average Readings

Total (dBuV/m) = Meter Reading (dBuV) + Cable Factor (dB) + Antenna Factor (dB) + Pre Amp (dB) + Duty Cycle (dB)

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	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)
2744.3	H	63.4		3.7	29.6	-40.3	-31.6	24.7	17.2	500.0	-29.3
2744.3	V	57.6		3.7	29.6	-40.3	-31.6	18.9	8.8	500.0	-35.1
3659.0	H	65.1		4.3	32.2	-39.8	-31.6	30.3	32.7	500.0	-23.7
3659.0	V	59.8		4.3	32.2	-39.8	-31.6	25.0	17.8	500.0	-29.0
4573.8	H	61.5		4.8	33.1	-40.0	-31.6	27.8	24.6	500.0	-26.1
4573.8	V	59.1		4.8	33.1	-40.0	-31.6	25.4	18.7	500.0	-28.5
7318.0	H	36.2		6.2	37.3	-39.8	-31.6	8.3	2.6	500.0	-45.7
7318.0	V	34.9		6.2	37.3	-39.8	-31.6	7.0	2.2	500.0	-47.0
8232.8	H	44.5		6.5	38.6	-39.5	-31.6	18.5	8.4	500.0	-35.5
8232.8	V	42.9		6.5	38.6	-39.5	-31.6	16.9	7.0	500.0	-37.1
9147.5	H	42.0		6.6	39.8	-39.0	-31.6	17.8	7.7	500.0	-36.2
9147.5	V	44.5		6.6	39.8	-39.0	-31.6	20.3	10.3	500.0	-33.7

Checked BY Richard E. King :

Richard E. King

DATA PAGE

Manufacturer : The Chamberlain Group
EUT : Garage Door Manager
Model No. : GDM
Serial No. : none
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : 2/7/2011
Mode : Transmit @ 926.75MHz
Test Distance : 3 meters
Notes : Peak readings

Total (dBuV/m) = Meter Reading (dBuV) + Cable Factor (dB) + Antenna Factor (dB) + Pre Amp (dB)

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	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)
926.750	H	89.0		2.0	21.9	0.0	0.0	112.9	439945.7	
926.750	V	83.7		2.0	21.9	0.0	0.0	107.6	239000.7	
1853.500	H	84.6		2.9	27.0	-40.5	0.0	74.0	5008.9	43994.6
1853.500	V	80.4		2.9	27.0	-40.5	0.0	69.8	3088.5	43994.6
2780.250	H	72.2		3.7	29.6	-40.4	0.0	65.1	1807.2	5000.0
2780.250	V	64.7		3.7	29.6	-40.4	0.0	57.6	762.1	5000.0
3707.000	H	70.7		4.3	32.4	-39.6	0.0	67.8	2467.2	5000.0
3707.000	V	66.3		4.3	32.4	-39.6	0.0	63.4	1486.6	5000.0
4633.750	H	68.2		4.8	33.3	-40.0	0.0	66.3	2071.5	5000.0
4633.750	V	66.8		4.8	33.3	-40.0	0.0	64.9	1763.1	5000.0
5560.500	H	59.5		5.3	35.1	-40.1	0.0	59.9	985.6	43994.6
5560.500	V	62.8		5.3	35.1	-40.1	0.0	63.2	1441.1	43994.6
6487.250	H	62.0		5.8	35.9	-39.9	0.0	63.8	1543.4	43994.6
6487.250	V	66.3		5.8	35.9	-39.9	0.0	68.1	2532.1	43994.6
7414.000	H	48.4		6.2	37.4	-39.7	0.0	52.3	411.7	5000.0
7414.000	V	47.9		6.2	37.4	-39.7	0.0	51.8	388.7	5000.0
8340.750	H	50.7		6.5	38.7	-39.5	0.0	56.5	667.7	5000.0
8340.750	V	51.3		6.5	38.7	-39.5	0.0	57.1	715.5	5000.0
9267.500	H	47.6		6.6	39.9	-39.0	0.0	55.2	576.9	43994.6
9267.500	V	50.4		6.6	39.9	-39.0	0.0	58.0	796.4	43994.6

Checked BY Richard E. King :

Richard E. King

DATA PAGE

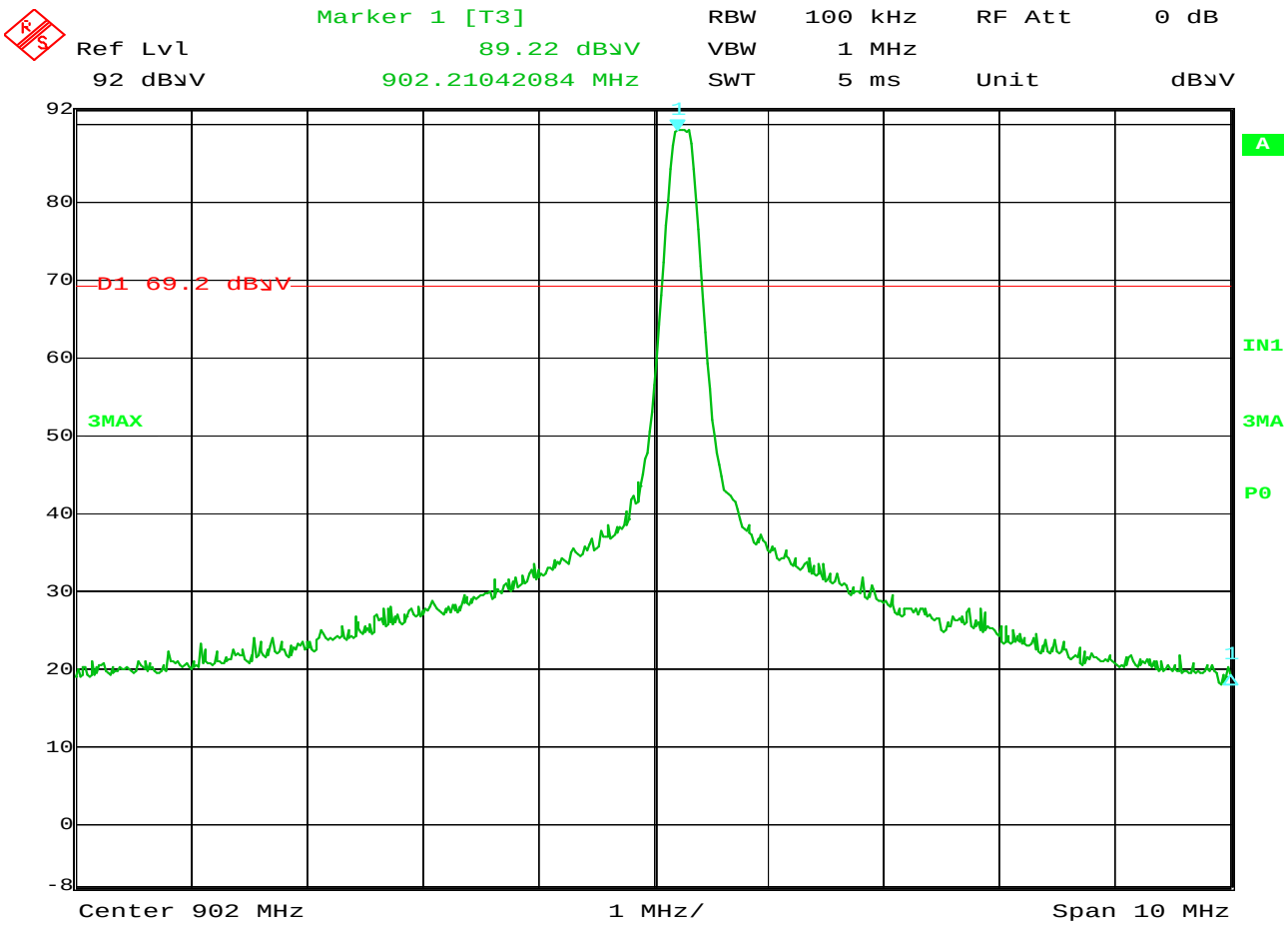
Manufacturer : The Chamberlain Group
EUT : Garage Door Manager
Model No. : GDM
Serial No. : none
Test Specification : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
Date : 2/7/2011
Mode : Transmit @ 926.75MHz
Test Distance : 3 meters
Notes : Average readings

Total (dBuV/m) = Meter Reading (dBuV) + Cable Factor (dB) + Antenna Factor (dB) + Pre Amp (dB) + Duty Cycle (dB)

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	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)
2780.3	H	67.2		3.7	29.6	-40.4	-31.6	28.5	26.7	500.0	-25.4
2780.3	V	59.3		3.7	29.6	-40.4	-31.6	20.6	10.8	500.0	-33.3
3707.0	H	65.5		4.3	32.4	-39.6	-31.6	31.0	35.7	500.0	-22.9
3707.0	V	60.6		4.3	32.4	-39.6	-31.6	26.1	20.3	500.0	-27.8
4633.8	H	62.7		4.8	33.3	-40.0	-31.6	29.2	28.9	500.0	-24.8
4633.8	V	61.4		4.8	33.3	-40.0	-31.6	27.9	24.9	500.0	-26.1
7414.0	H	34.3		6.2	37.4	-39.7	-31.6	6.6	2.1	500.0	-47.4
7414.0	V	34.3		6.2	37.4	-39.7	-31.6	6.6	2.1	500.0	-47.4
8340.8	H	41.8		6.5	38.7	-39.5	-31.6	16.0	6.3	500.0	-38.0
8340.8	V	41.5		6.5	38.7	-39.5	-31.6	15.7	6.1	500.0	-38.3

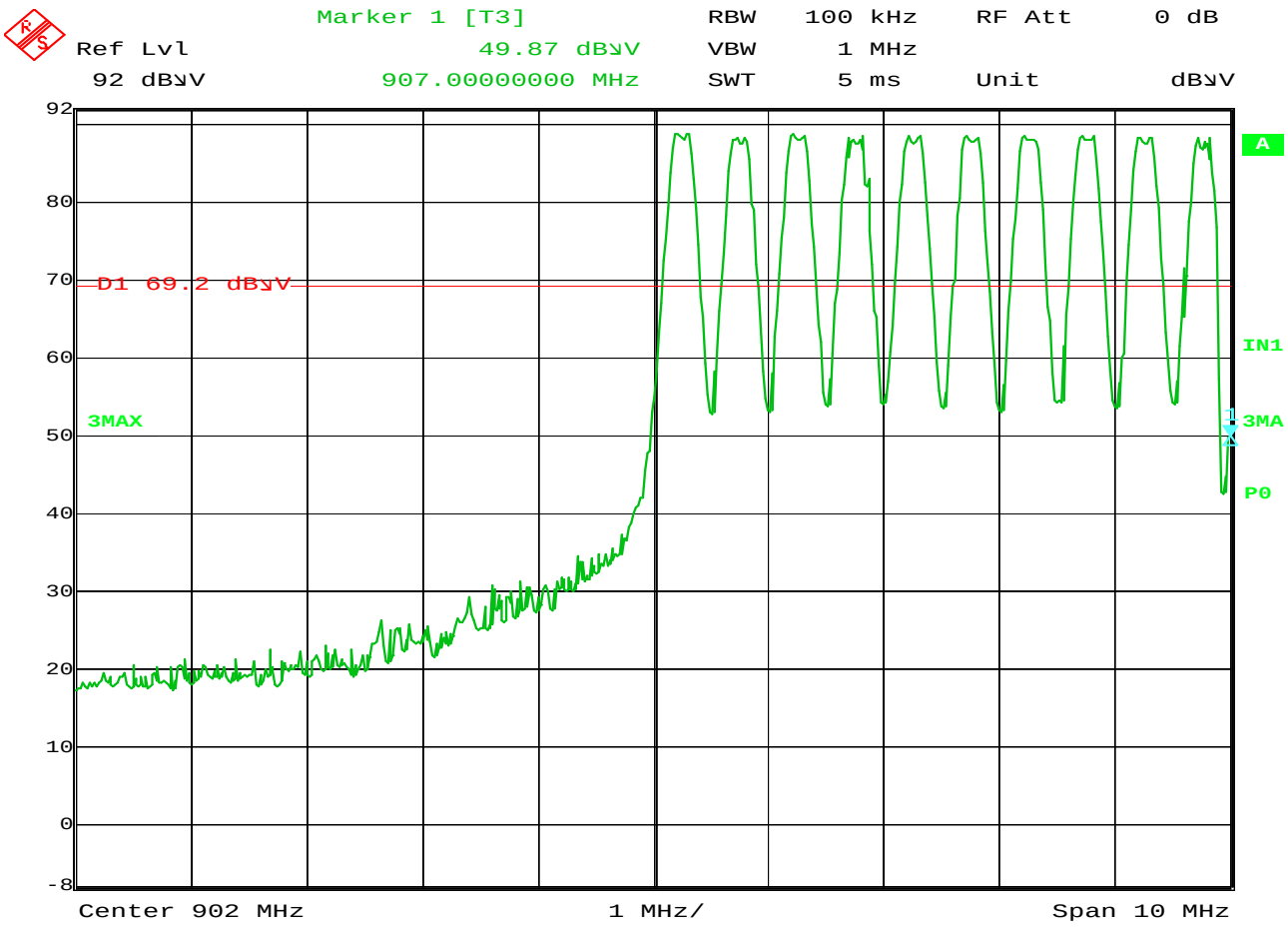
Checked BY Richard E. King :

Richard E. King



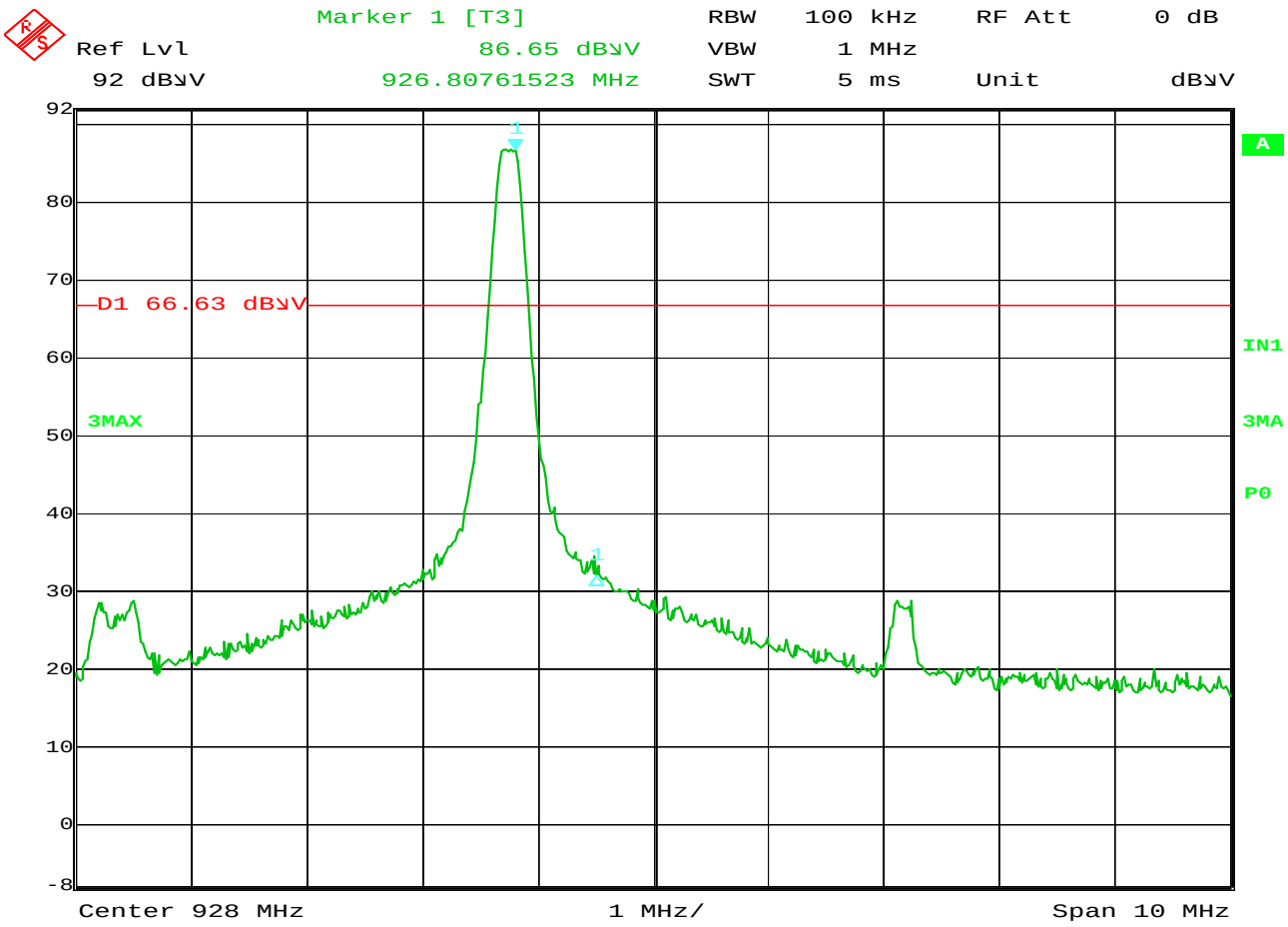
Bandedge compliance

MANUFACTURER : The Chamberlain Group
MODEL NUMBER : GDM (Garage Door Manager)
SERIAL NUMBER : None
EUT FREQUENCY : Tx @ 902.25MHz
NOTES :



Bandedge Compliance

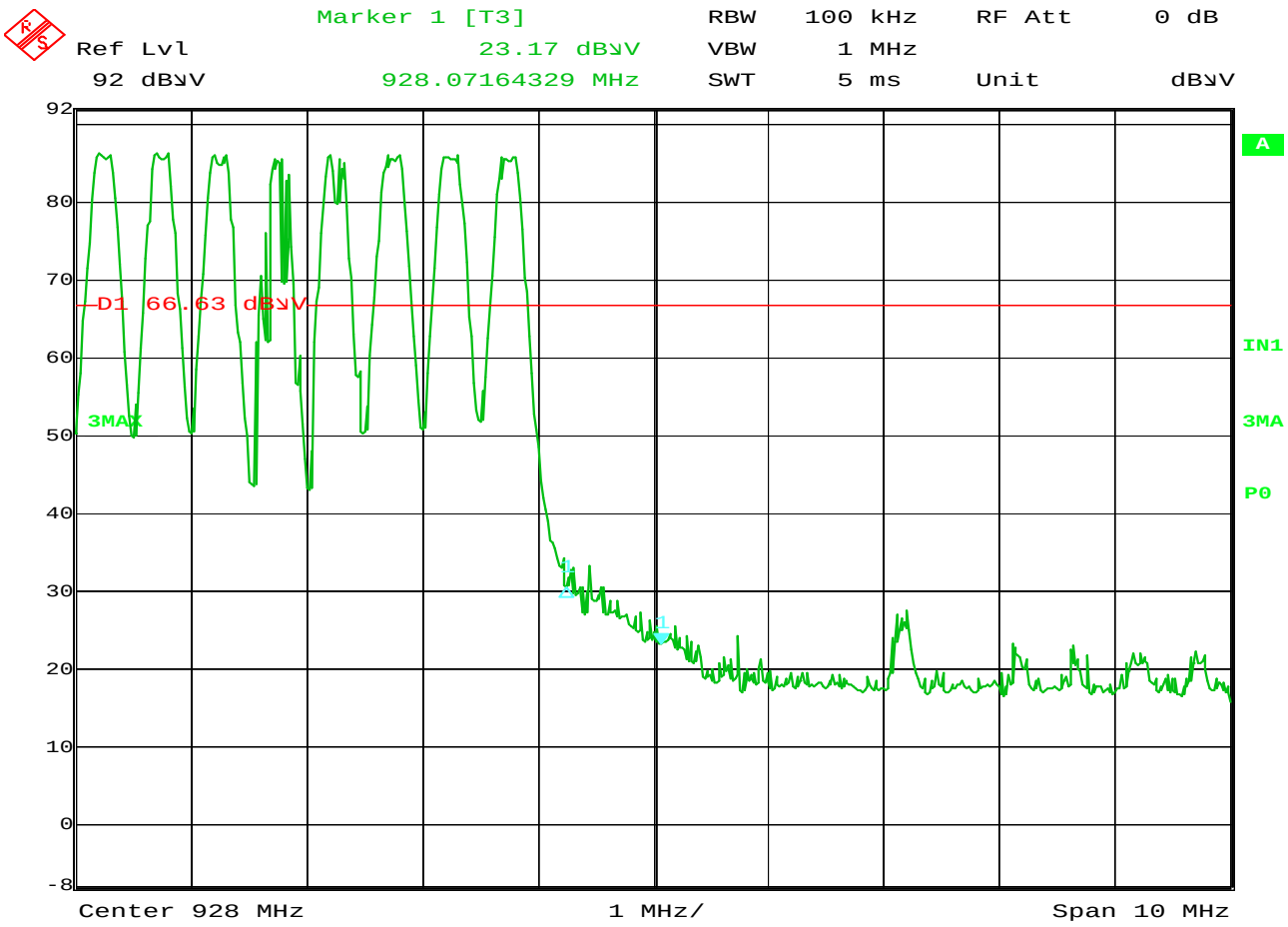
MANUFACTURER : The Chamberlain Group
MODEL NUMBER : GDM (Garage Door Manager)
SERIAL NUMBER : None
EUT FREQUENCY : Hopping Enabled
NOTES :



Date: 10.FEB.2011 07:53:58

Bandedge Compliance

MANUFACTURER : The Chamberlain Group
MODEL NUMBER : GDM (Garage Door Manager)
SERIAL NUMBER : None
EUT FREQUENCY : Tx @ 926.75MHz
NOTES :



Date: 10.FEB.2011 08:04:18

Bandedge Compliance

MANUFACTURER : The Chamberlain Group
MODEL NUMBER : GDM (Garage Door Manager)
SERIAL NUMBER : None
EUT FREQUENCY : Hopping Enabled
NOTES :