Measurement of RF Emissions from a 1A6801 Frequency Converter Garage Door Transmitter

For	The Chamberlain Group 845 Larch Ave Elmhurst, IL 60128
P.O. Number	867590
Date Tested	August 30 through September 3, 2010
Test Personnel	Richard King
Test Specification	FCC "Code of Federal Regulations" Title 47 Part15, Subpart C Industry Canada RSS-GEN Industry Canada RSS-210

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REVISION HISTORY

Revision	Date	Description
—	28 Sept 2010	Initial release

Measurement of RF Emissions from a Frequency Converter Garage Door Transceiver, Model No. 1A6801 Transmitter

1. INTRODUCTION

1.1. Scope of Tests

This report presents the results of the RF emissions measurements performed on a Frequency Converter Garage Door Transceiver, Model No. 1A6801, Serial number SMP 15817, (hereinafter referred to as the Equipment Under Test (EUT)).). The test item was designed to receive at approximately 310MHz and transmit at approximately 390MHz using an external 6 inch antenna. The EUT was manufactured and submitted for testing by The Chamberlain Group located in Elmhurst, IL.

The test item has a super-regenerative type receiver designed to tune at approximately 310MHz. It has a 6 inch external antenna.

1.2. Purpose

The test series was performed to determine if the EUT meets the technical requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Sections 15.107 and 15.109 for receivers.

The test series was performed to determine if the test item meets the technical requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.231 for Intentional Radiators.

The test series was also performed to determine if the EUT meets the technical requirements of the Industry Canada Radio Standards Specification, RSS-Gen, Section 7.2.2 and Section 7.2.3.

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 22.9^{o}C and the relative humidity was 45%.

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 B for Receivers, dated 1 October 2009

- 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"

- Industry Canada Radio Standards Specification, RSS-Gen, “General Requirements and Information for the Certification of Radiocommunication Equipment”, Issue 2, June 2007

- Industry Canada Radio Standards Specification, RSS-210, “Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment”, Issue 7, June 2007

3. EUT SETUP AND OPERATION

3.1. General Description

The EUT is a The Chamberlain Group, Frequency Converter Garage Door Transceiver, Model No. 1A6801. A block diagram of the EUT setup is shown as Figure 1.

3.1.1. Power Input

The EUT obtained 120V 60Hz power by pugging directly into the 120VAC 60Hz power source. The high and low leads were connected through a line impedance stabilization network (LISN) which was located on the ground plane. The network complies with the requirements of Paragraph 4.1.2 of ANSI C63.4-2003.

3.1.2. Peripheral Equipment

No peripheral equipment was submitted with the EUT.

3.1.3. Signal Input/Output Leads

No interconnect cables were submitted with the EUT.

3.1.4. Grounding

The EUT was ungrounded during testing.

3.1.5. Frequency of EUT

The EUT operates at a highest frequency of 390MHz. In accordance with 47 CFR 15.33 radiated emissions measurements were made up to 2GHz when testing in the receive mode and up to 3900 MHz in the transmit mode.

3.2. Operational Mode

For all tests the EUT and all peripheral equipment were placed on an 80cm high non-conductive stand. The EUT was energized.

For the transmitter testing the transmitter two units were supplied one unit was set to transmit continously once EUT was powered. A second unit was set to transmit in the normal operation mode waiting to receive a transmitted signal at 310MHz and then transmit at 390MHz.

For testing the receiver when the test item is energized, it is waiting for a transmitted signal at 310MHz using the rolling D code. The test item was operated both cohered by an external -63dBm (unmodulated) signal at 310MHz via a loop probe, and uncohered with no transmitted signal.

3.3. EUT Modifications

No modifications were required for compliance.

4. TEST FACILITY AND TEST INSTRUMENTATION

4.1. Shielded Enclosure

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. With the exception of the floor, the reflective surfaces of the shielded chamber are lined with ferrite tiles on the walls

and ceiling. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2003 for site attenuation.

4.2. Test Instrumentation

The test instrumentation and auxiliary equipment used during the tests are listed in Table 9-1. 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 above 1000MHz for the 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

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

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

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

5.1.2.Procedures

The interference on each power lead of the 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 operated in the receive mode un-cohered.

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 operated in the receive mode cohered.

i) Steps (b) through (g) were repeated with the EUT operated with the test item transmitting at 390MHz.

5.1.3.Results

The plots of the peak, quasi-peak, and average conducted voltage levels acquired from each input power line with the EUT operated in the receive both cohered and un-cohered and in the transmit modes, are shown on pages 19 through 24. The tabular quasi-peak and average results from each input power line are shown on pages 25 through 30. All power line conducted emissions measured from the EUT were within the specification limits.

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

5.2. Periodic Operation Measurements

5.2.1.Requirements

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released. Also, a transmitter activated automatically shall cease transmission within 5 seconds after activation.

5.2.2.Procedures

The spectrum analyzer was setup to display the time domain trace. The test item was set to transmit normally waiting for a transmitted signal. Once the transmitted signal was received the EUT transmitted at 390MHz.The

spectrum analyzer was used to record the amount of time that the test item remained active following activation.

5.2.3. Results

The plot of the periodic timing is shown on data page 31. The data shows that the test item ceases operation within the allotted time.

5.3. Duty Cycle Factor Measurements

5.3.1. 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.

The duty cycle factor was calculated from information supplied by the manufacturer. Since this test item utilizes a rolling code modulation, the duty is calculated based on the worst case. The following procedure was used to measure a representative sample:

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

b) The pulse width is measured and a plot of this measurement is recorded.

c) Next the number of pulses in the word period is measured and a plot is recorded.

d) Finally the length of the word period is measured and a third plot is recorded. If the word period exceeds 100 msec, the word period is limited to 100 msec.

e) The pulse width and number of pulses for the word period are used to compute the on-time. The duty cycle is then computed as the (on-time/ word period).

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

g) The first plot shows the approximate time of each bit.

h) The second plot shows the approximate time of each frame.

i) The third plot show the approximate time of the blank period.

5.3.2. Results

The plot of the duty cycle is shown on data pages 32 through 34. The duty cycle factor was computed to be -16.19 dB.

This information was supplied by The Chamberlain Group.

Pay Load 00- 20log(15.5/100**)= -16.19dB**
Pay Load 01- 20*LOG(21.5ms/100ms) = -13.35 dB
Pay Load 10- 20*LOG(21.5ms/100ms) = -13.35 dB

All codes are Manchester encoded.

The EUT does not support Pay Load 01 or 10 only the worst case Pay Load 00 is used. The message for Pay Load 00 is 2 frames at aproximately 31mS and two blank times at aproximately 69mS. Since the message is greater than 100mS the duty cycle factor is calculated over 100mS. Each frame is 62 bits long and each bit is approximately 500uS giving a frame time of 31mS. The ON time is the frame time divied by 50% or 15.5mS.

The Manchester encoded dutycyle factor for Pay Load 00 is computed to be 20log**(**15.5/100**)= -16.19dB**

5.4. Radiated Measurements

5.4.1.Receiver Requirements

All emanations from a receiver shall be below the levels shown on the following table.

RADIATION LIMITS FOR 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.

5.4.2.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 2GHz 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. The resultant field strength (FS) is a summation in decibels (dB) of the receiver meter reading (MTR), the antenna correction factor (AF), and the cable loss factor (CF). If an external pre-amplifier is used, the total is reduced by its gain (-PA). If a distance correction (DC) is required, it is added to the total.

Formula 1: FS (dBuV/m) = MTR (dBuV) + AF (dB/m) + CF (dB) + (- PA (dB)) + DC (dB)

To convert the Field Strength dBuV/m term to uV/m, the dBuV/m is first divided by 20. The Base 10 AntiLog is taken of this quotient. The result is the Field Strength value in uV/m terms.

Formula 2: FS (uV/m) = AntiLog [(FS (dBuV/m))/20]

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.

5.4.3.Results

The preliminary plots, with the test item receiving at 310MHz in both the cohered and un-cohered modes, are presented on data pages 42 through 42. The plots are presented for a reference only, and are not used to determine compliance.

The final open area radiated levels, with the test item recieving at 310MHz in both the cohered and un-cohered modes are presented on data pages 43 through 46. As can be seen from the data, all emissions measured from the test item were within the specification limits. Photographs of the test configuration which yielded the highest, or worst case, radiated emission levels are shown on Figures 3 and 4.

5.4.4.Transmitter Requirements

The test item must comply with the requirements of FCC "Code of Federal Regulations Title 47", Part 15, Subpart C, Section 15.205 et seq. 15.231.

Example Paragraph 15.231(b) has the following radiated emission limits:

Fundamental Frequency MHz	Field Intensity uV/m @ 3 meters	Field Strength Harmonics and Spurious @ 3 meters
260 to 470	3,750 to 12,500*	375 to 1,250*

* - Linear Interpolation

Example For 390MHz, the limit at the fundamental is 9166.7uV/m @ 3m and the limit on the harmonics is 916.7uV/m @ 3m.

In addition, emissions appearing in the Restricted Bands of Operation listed in paragraph 15.205(a) shall not exceed the general requirements shown in paragraph 15.209.

5.4.5.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.

A preliminary radiated emissions test was 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 5.0GHz was investigated using a peak detector function. The data was then processed by the computer to calculate equivalent field intensity. * Replace with the proper frequency range.

The final open field emission tests were then manually performed over the frequency range of 30MHz to 4000MHz. Between 30MHz and 1000MHz, a tuned dipole antenna was used as the pick-up device. A broadband double ridged waveguide antenna was used as the pick-up device for all frequencies above 1GHz. All significant broadband and narrowband signals were measured and recorded. The peak detected levels were converted to average levels using a duty cycle factor which was computed from the pulse train.

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

1) The test item was rotated so that all of its sides were exposed to the receiving antenna.
2) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
3) The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.
4) For hand-held or body-worn devices, the test item was rotated through three orthogonal axes to determine which orientation produces the highest emission relative to the limit.

5.4.6.Results

The preliminary plots, with the test item transmitting at 390MHz, are presented on data pages 47 and 50. The plots are presented for a reference only, and are not used to determine compliance.

The final open area radiated levels, with the test item transmitting at 390MHz, are presented on data page 51. As can be seen from the data, all emissions measured from the test item were within the specification limits. The effective radiated power was calculated to be -23dBm. Photographs of the test configuration which yielded the highest, or worst case, radiated emission levels are shown on Figures 3 and 4.

5.5. Occupied Bandwidth Measurements

5.5.1.Requirement

In accordance with paragraph 15.231(c), all emissions within 20dB of the peak amplitude level of the center frequency are required to be within a band less than 0.25% of the center frequency wide.

5.5.2.Procedures

The test item was placed on an 80cm high non-conductive stand. The unit was set to transmit continuously. With an antenna positioned nearby, occupied bandwidth emissions were displayed on the spectrum analyzer. The resolution bandwidth was set to 50 kHz and span was set to 2 MHz. The frequency spectrum near the fundamental was plotted. The 99% bandwidth was measured to be 487.5kHz.

5.5.3.Results

The plot of the emissions near the fundamental frequency is presented on data page 52. As can be seen from this data page, the transmitter met the occupied bandwidth requirements.

6. OTHER TEST CONDITIONS

6.1. Test Personnel and Witnesses

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

6.2. Disposition of the EUT

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

7. CONCLUSIONS

It was determined that The Chamberlain Group Frequency Converter Garage Door Transceiver, Model No. 1A6801, Serial No. SMP 15817, did meet the technical requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart, Subpart B, Sections 15.107 and 15.109 for receivers and the technical requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.231 for Intentional Radiators.

In addition, The Chamberlain Group Frequency Converter Garage Door Transceiver, Model No. 1A6801, Serial No. SMP 15817, did also meet the technical requirements of the Industry Canada Radio Standards Specification, RSS-Gen, Section 7.2.2 and Section 7.2.3.

All testing was performed in accordance with ANSI C63.4-2003.

8. CERTIFICATION

Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the test specifications.

The data presented in this test report pertains to the EUT at the test date. Any electrical or mechanical modification made to the EUT subsequent to the specified test date will serve to invalidate the data and void this certification.

This report must not be used to claim product endorsement by NVLAP or any agency of the US Government.

9. EQUIPMENT LIST

Table 9-1 Equipment List

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
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
RAKG	RF SECTION	HEWLETT PACKARD	85462A	3549A00284	0.009-6500MHZ	2/16/2010	2/16/2011
RAKH	RF FILTER SECTION	HEWLETT PACKARD	85460A	3448A00324	---	2/16/2010	2/16/2011
RBB0	EMI TEST RECEIVER 20HZ TO 40 GHZ	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	3/16/2010	3/16/2011
XLTH	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	017	DC-2GHZ	1/5/2010	1/5/2011

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.

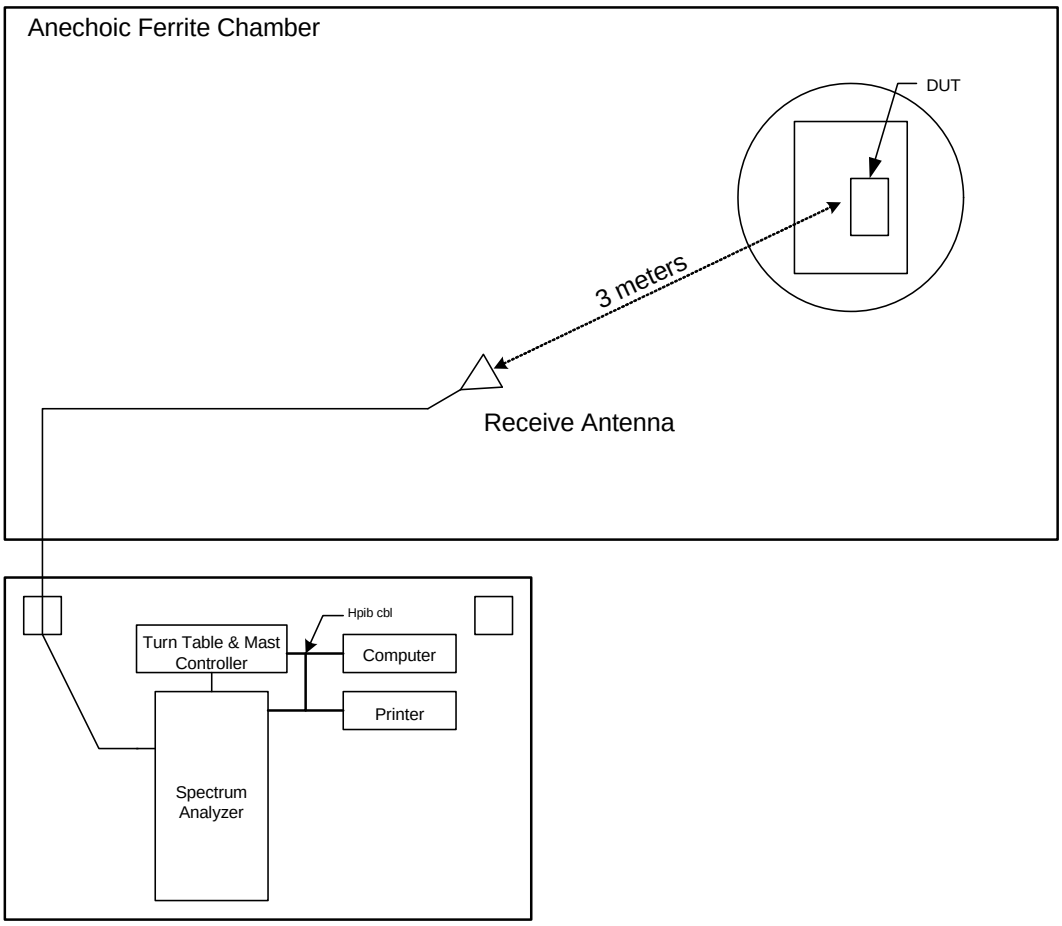
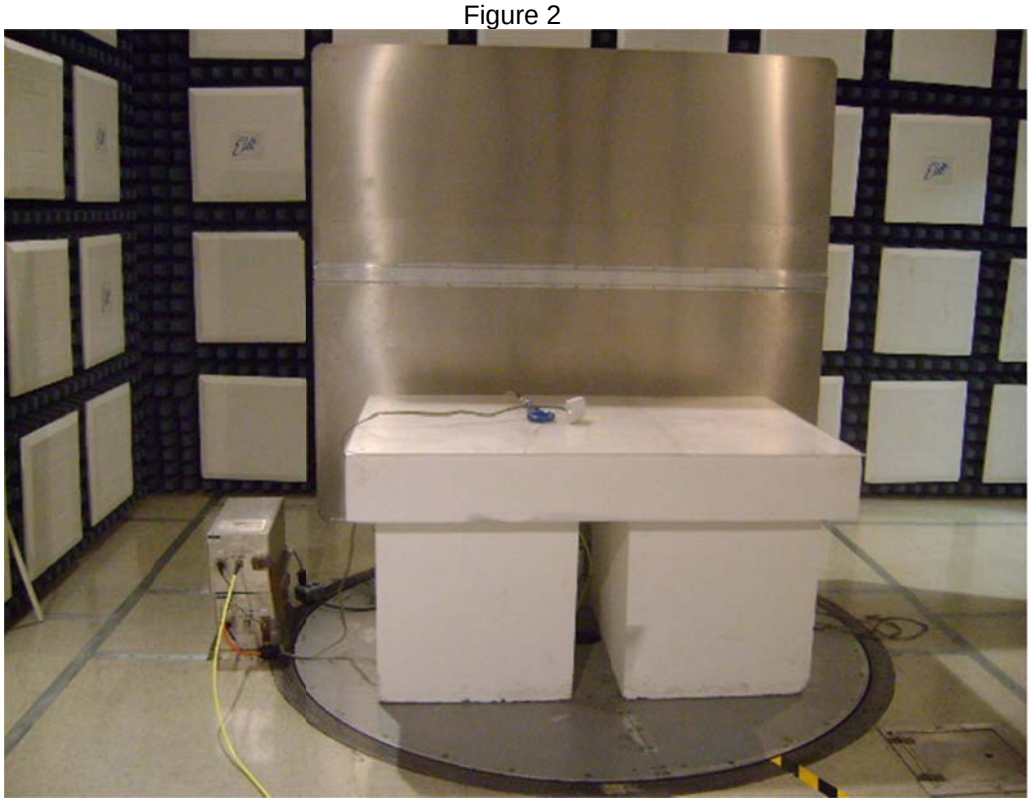


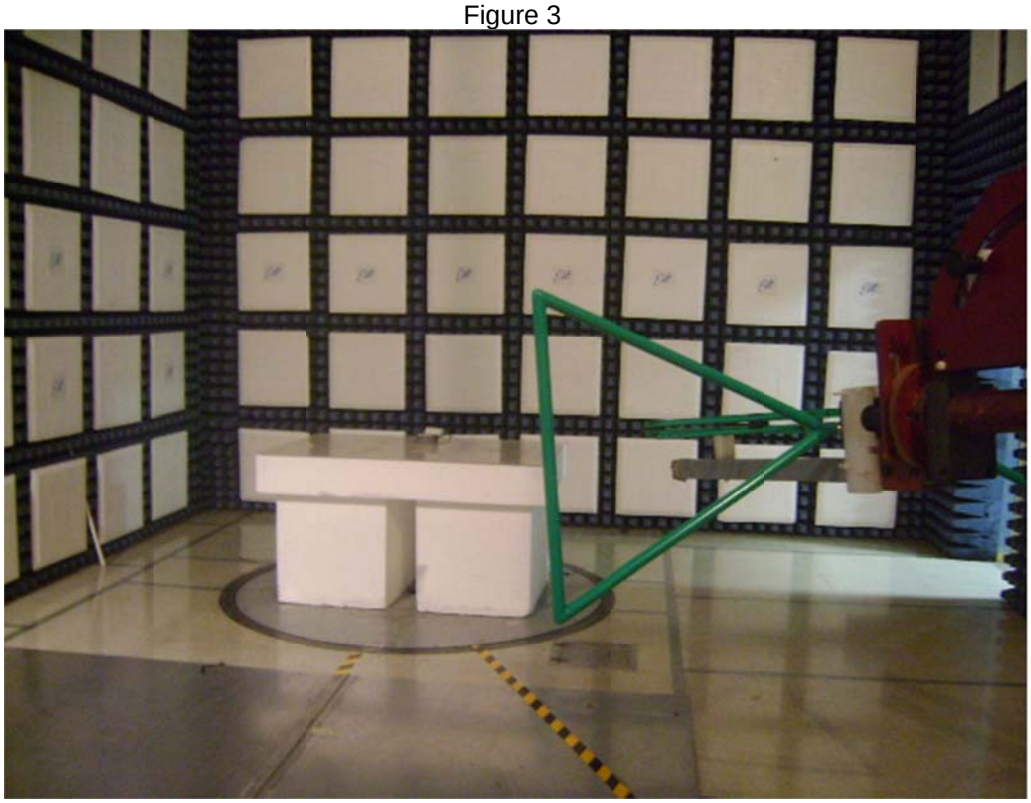
FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

Figure 2

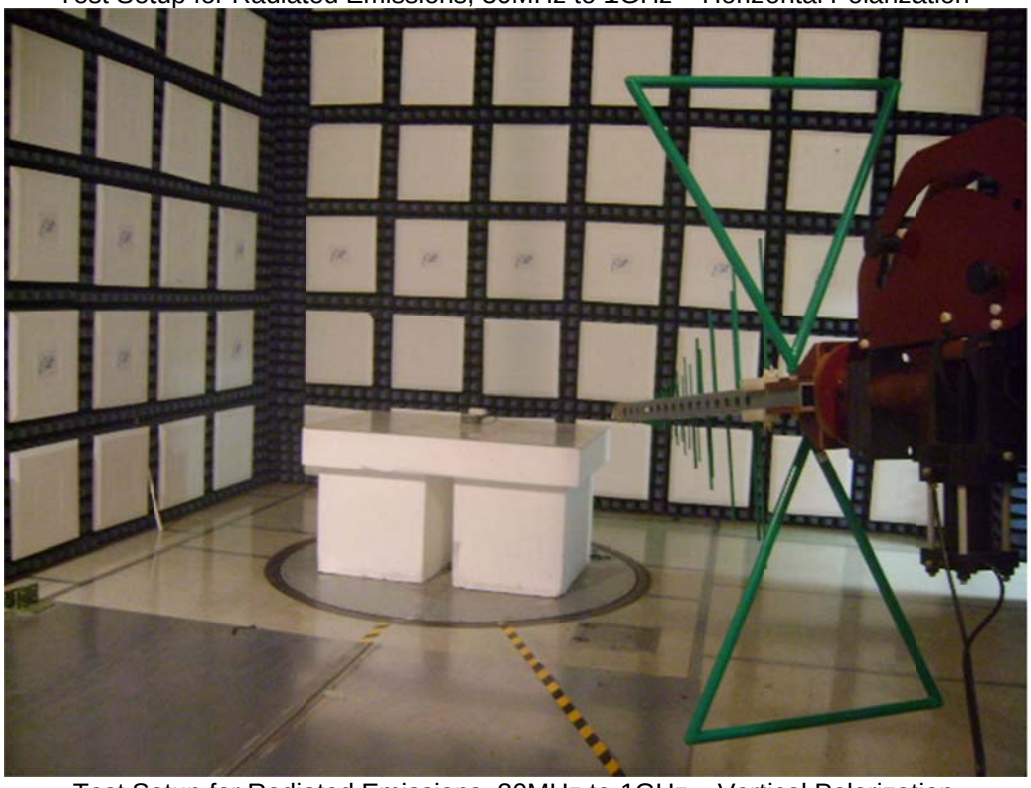


Test Setup for Conducted Emissions

Figure 3

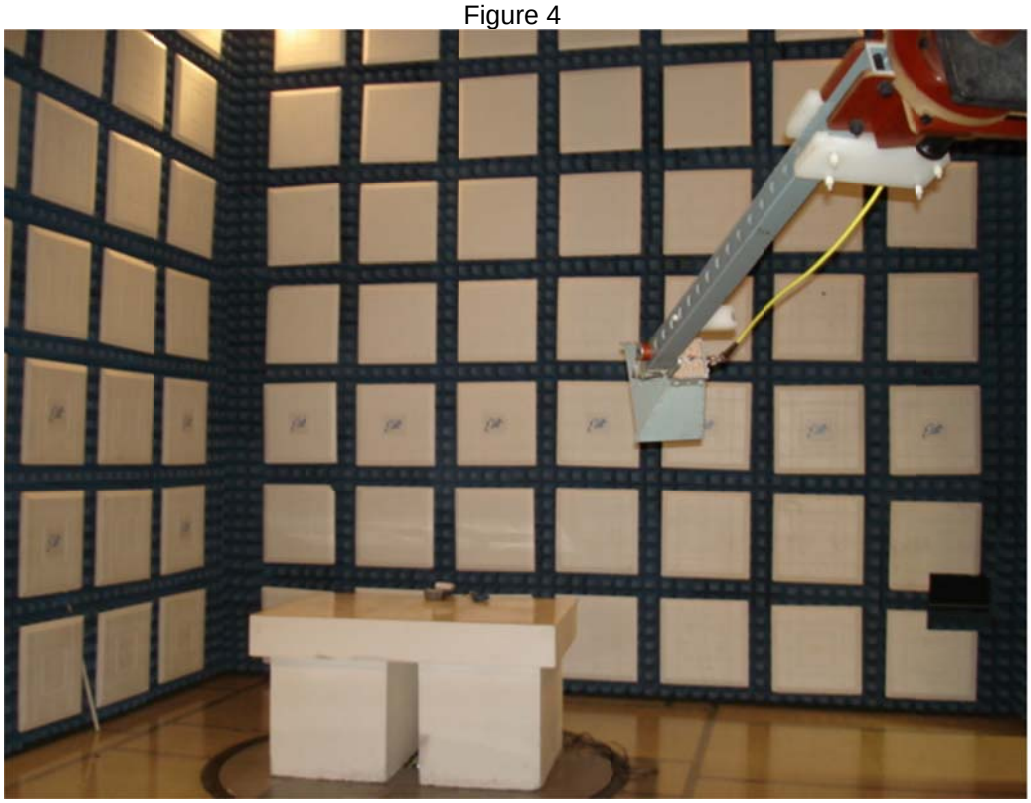


Test Setup for Radiated Emissions, 30MHz to 1GHz – Horizontal Polarization



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

Figure 4



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

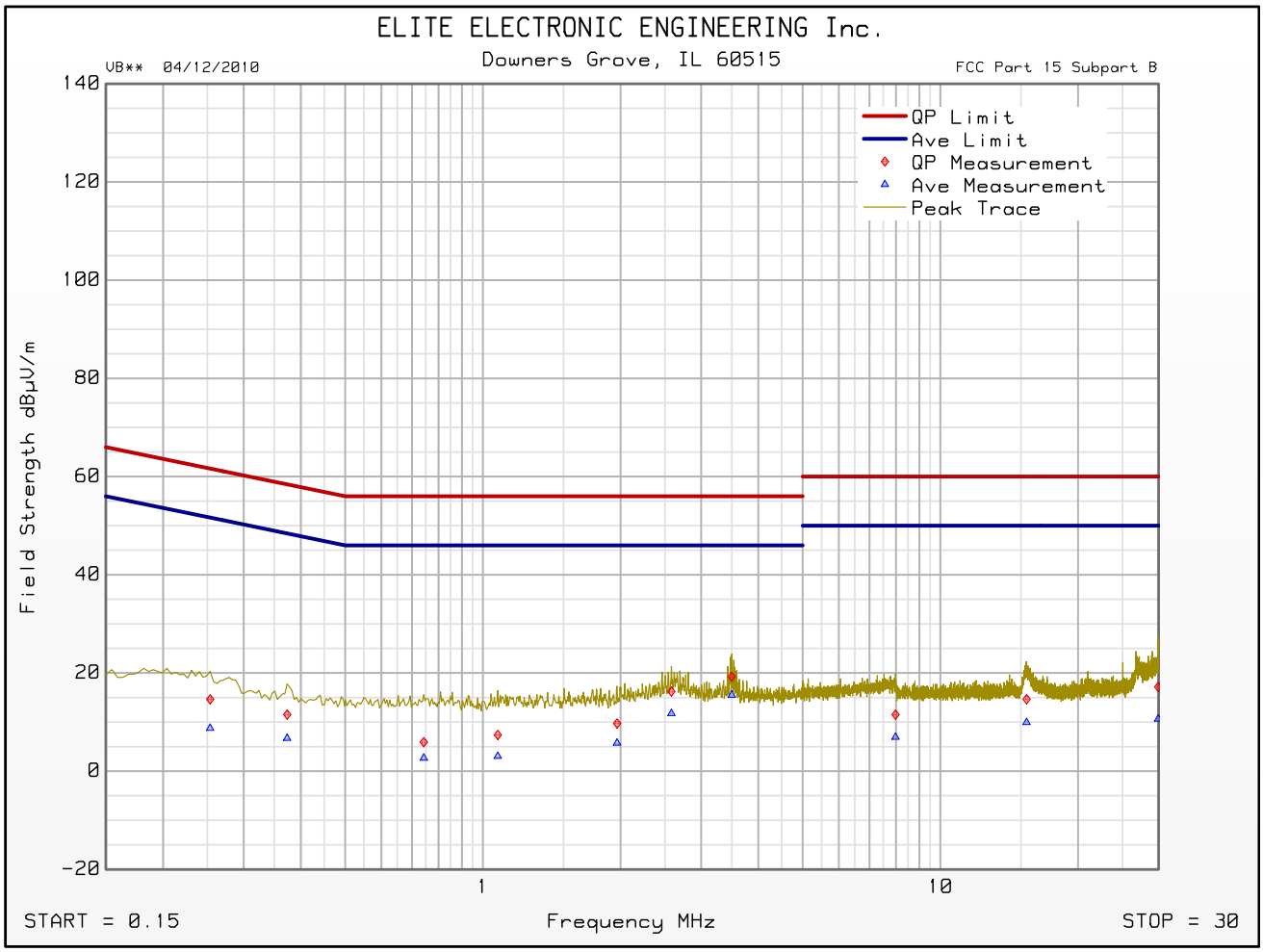
Test Setup for Radiated Emissions, Above 1GHz – Vertical Polarization

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 04/12/2010

Manufacturer	:	THE CHAMBERLAIN GROUP
Model	:	1A6801
DUT Revision	:	
Serial Number	:	SMP 15817
DUT Mode	:	Rx @ 310
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	UN-COHERED
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Sep 03, 2010 08:38:51 AM



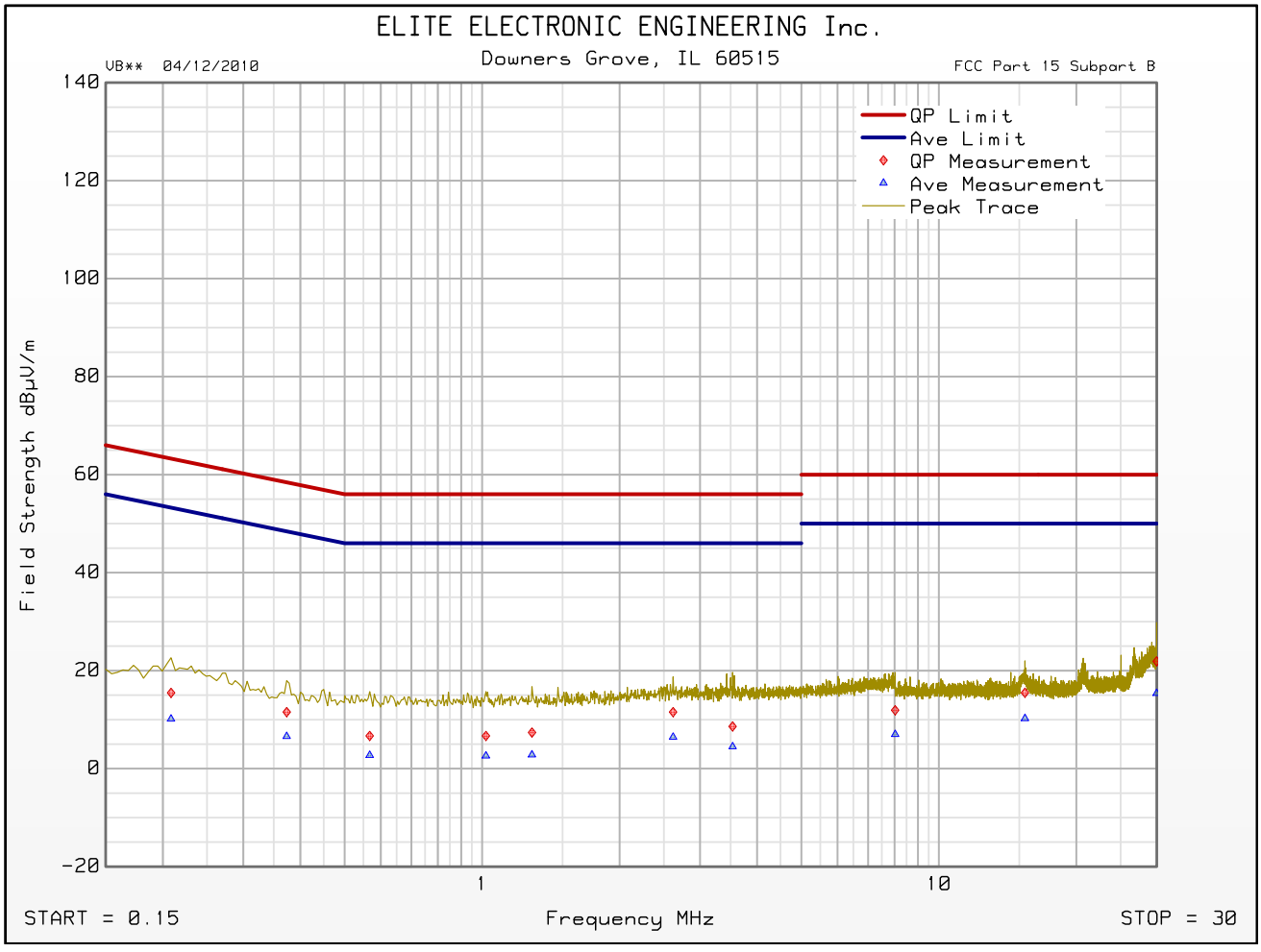
Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 04/12/2010

Manufacturer	:	THE CHAMBERLAIN GROUP
Model	:	1A6801
DUT Revision	:	
Serial Number	:	SMP 15817
DUT Mode	:	Rx @ 310
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	UN-COHERED
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Sep 03, 2010 08:46:02 AM



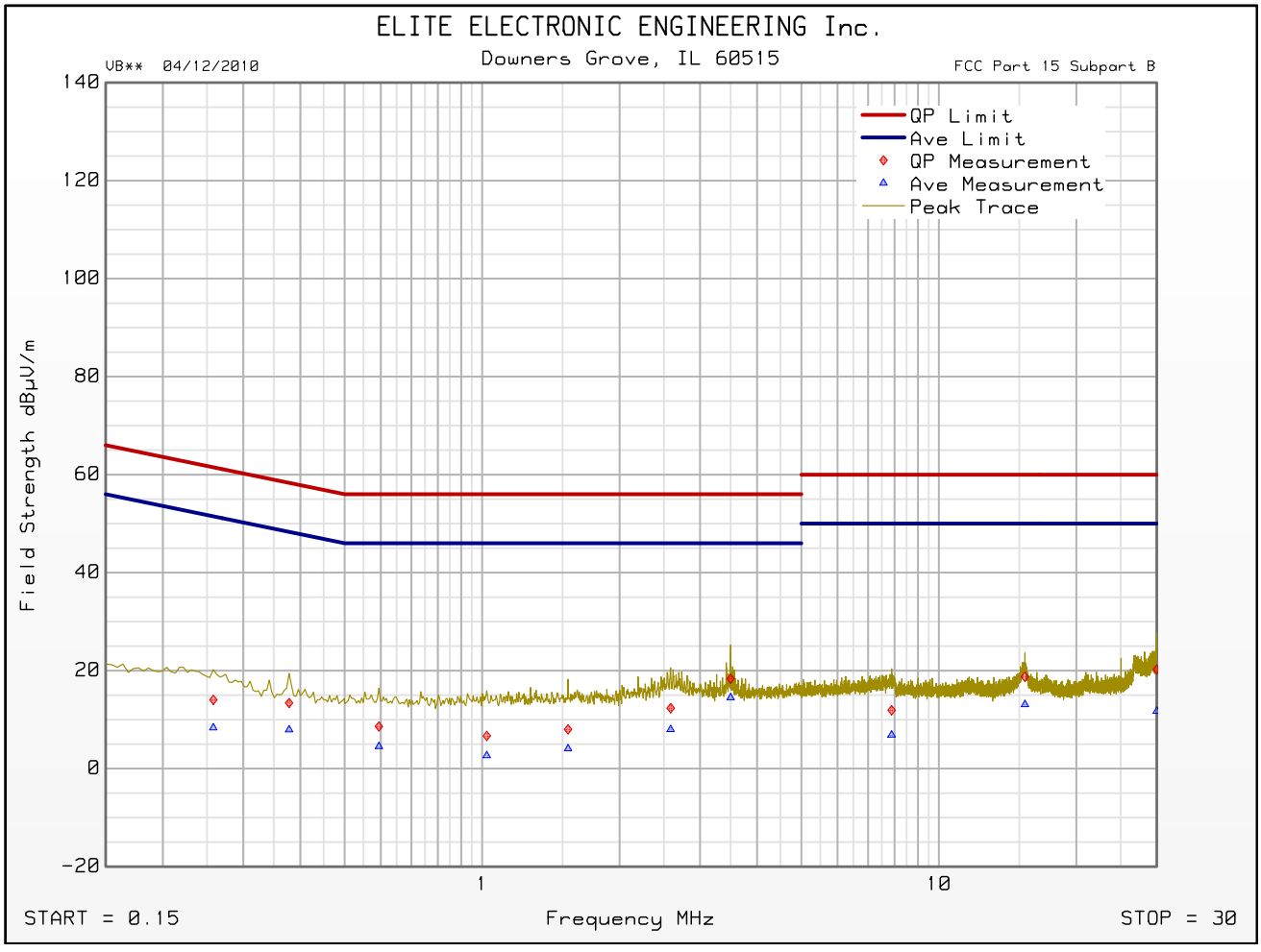
Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 04/12/2010

Manufacturer	:	THE CHAMBERLAIN GROUP
Model	:	1A6801
DUT Revision	:	1
Serial Number	:	SMP 15817
DUT Mode	:	Rx @ 310
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	COHERED
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Sep 03, 2010 08:59:01 AM



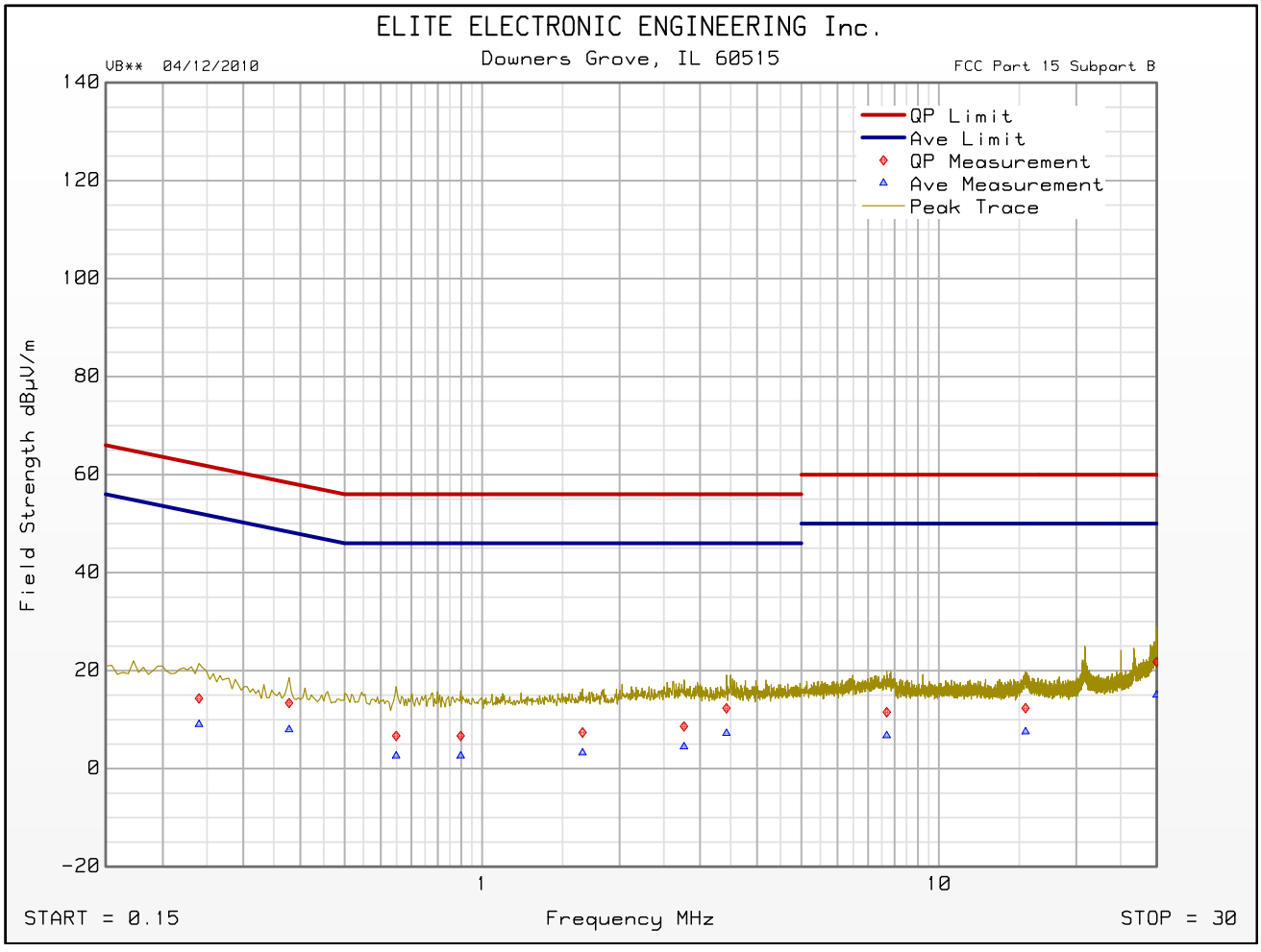
Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 04/12/2010

Manufacturer	:	THE CHAMBERLAIN GROUP
Model	:	1A6801
DUT Revision	:	1
Serial Number	:	SMP 15817
DUT Mode	:	Rx @ 310
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	COHERED
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Sep 03, 2010 08:52:14 AM



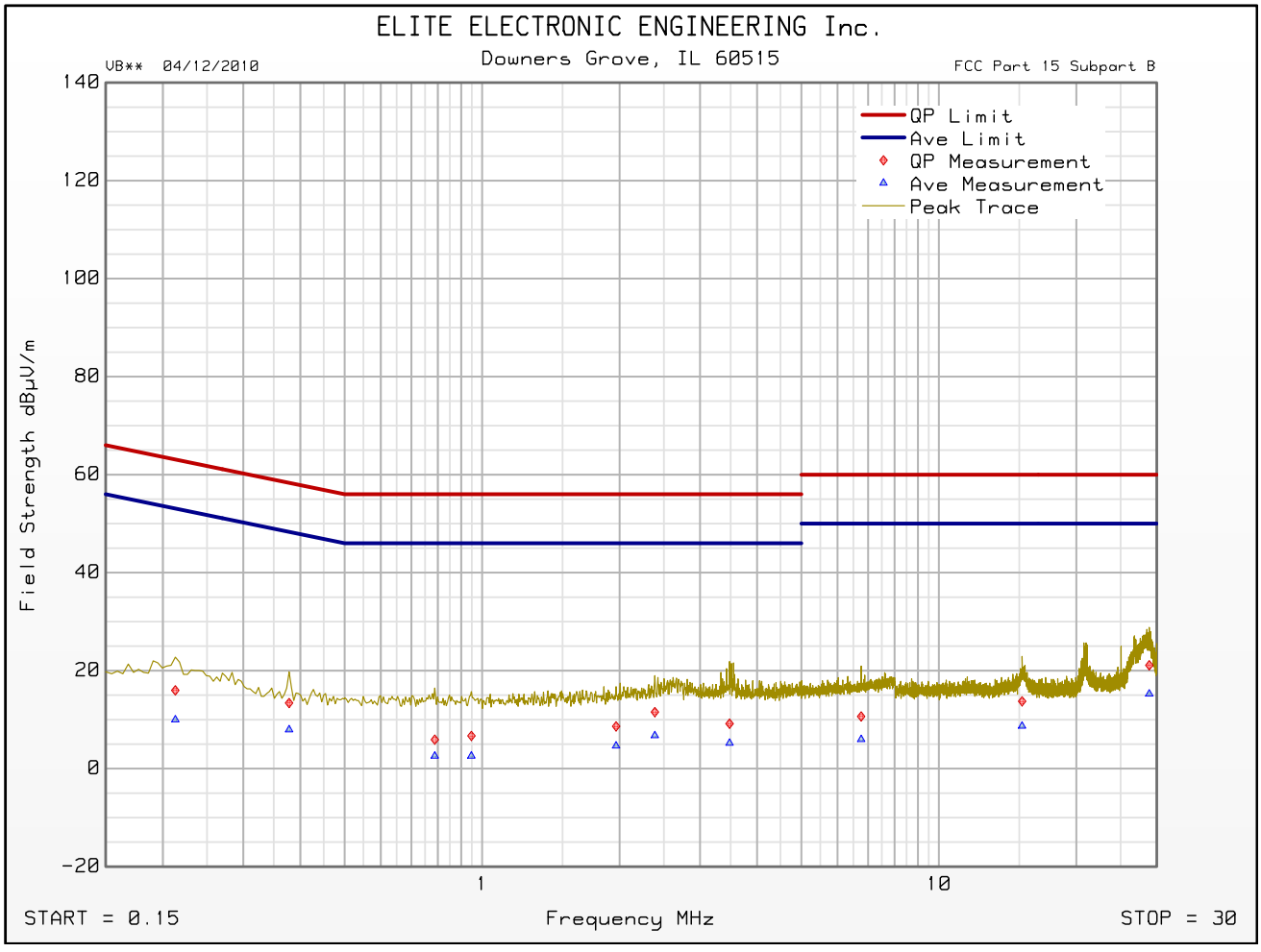
Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 04/12/2010

Manufacturer	:	THE CHAMBERLAIN GROUP
Model	:	1A6801
DUT Revision	:	1
Serial Number	:	SMP 15817
DUT Mode	:	Tx @ 390
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Sep 03, 2010 09:07:35 AM



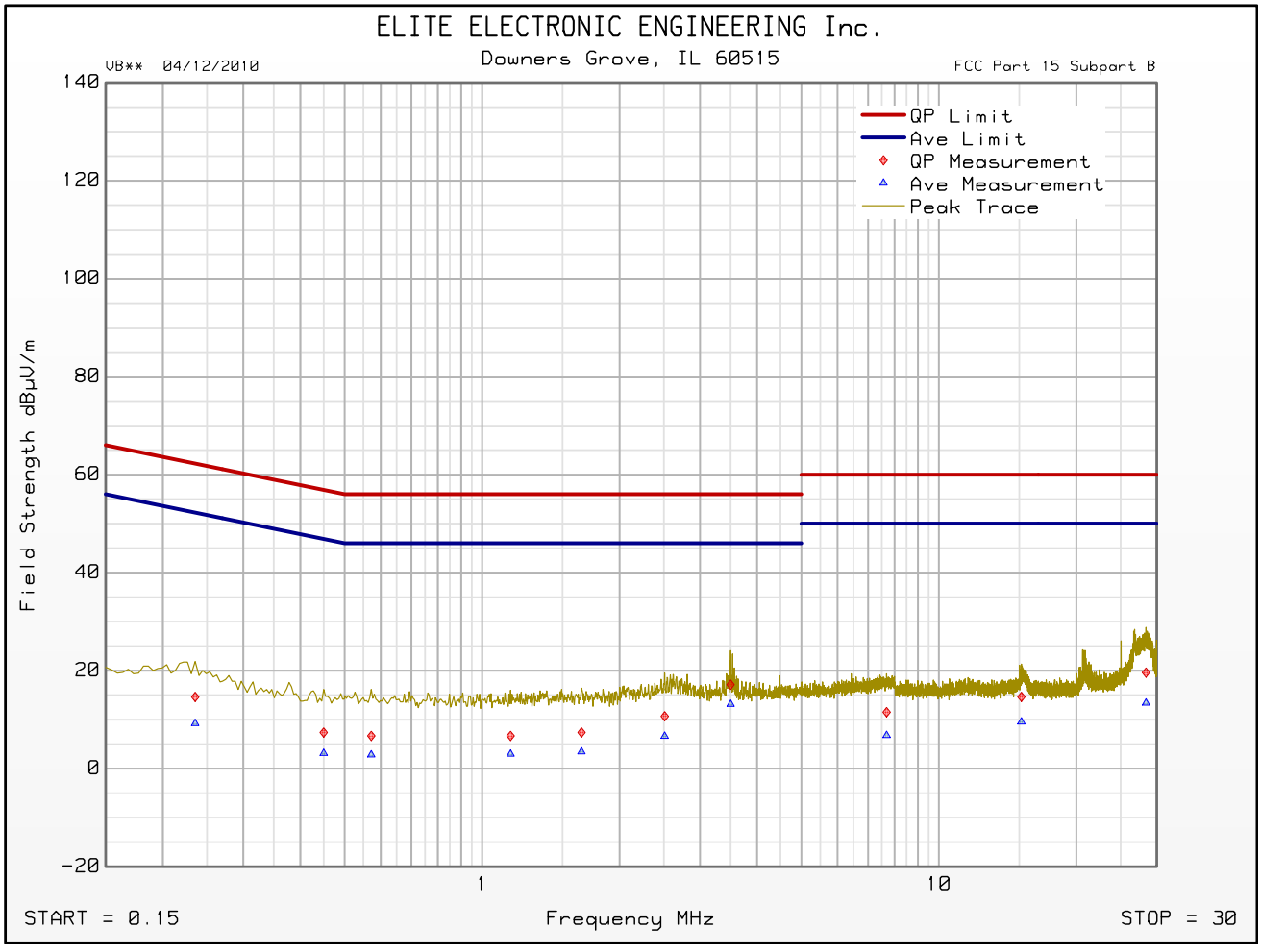
Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 04/12/2010

Manufacturer	:	THE CHAMBERLAIN GROUP
Model	:	1A6801
DUT Revision	:	1
Serial Number	:	SMP 15817
DUT Mode	:	Tx @ 390
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Sep 03, 2010 09:14:15 AM



Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 04/12/2010

Manufacturer	:	THE CHAMBERLAIN GROUP
Model	:	1A6801
DUT Revision	:	
Serial Number	:	SMP 15817
DUT Mode	:	Rx @ 310
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	UN-COHERED
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Sep 03, 2010 08:38:51 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
0.254	14.6	61.6		8.7	51.6	
0.374	11.5	58.4		6.7	48.4	
0.743	5.9	56.0		2.7	46.0	
1.078	7.4	56.0		3.0	46.0	
1.966	9.7	56.0		5.7	46.0	
2.583	16.2	56.0		11.8	46.0	
3.500	19.2	56.0		15.5	46.0	
7.984	11.5	60.0		6.9	50.0	
15.440	14.7	60.0		9.9	50.0	
29.944	17.2	60.0		10.6	50.0	

Checked BY Richard E. King :

Richard E. King

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 04/12/2010

Manufacturer	:	THE CHAMBERLAIN GROUP
Model	:	1A6801
DUT Revision	:	
Serial Number	:	SMP 15817
DUT Mode	:	Rx @ 310
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	UN-COHERED
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Sep 03, 2010 08:46:02 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
0.209	15.5	63.3		10.1	53.3	
0.374	11.5	58.4		6.6	48.4	
0.568	6.7	56.0		2.7	46.0	
1.020	6.7	56.0		2.6	46.0	
1.286	7.4	56.0		2.8	46.0	
2.619	11.5	56.0		6.4	46.0	
3.536	8.6	56.0		4.5	46.0	
8.024	11.9	60.0		7.0	50.0	
15.435	15.5	60.0		10.2	50.0	
29.980	21.9	60.0		15.4	50.0	

Checked BY Richard E. King :

Richard E. King

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 04/12/2010

Manufacturer	:	THE CHAMBERLAIN GROUP
Model	:	1A6801
DUT Revision	:	1
Serial Number	:	SMP 15817
DUT Mode	:	Rx @ 310
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	COHERED
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Sep 03, 2010 08:59:01 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
0.258	14.0	61.5		8.3	51.5	
0.378	13.4	58.3		7.9	48.3	
0.595	8.6	56.0		4.5	46.0	
1.024	6.7	56.0		2.7	46.0	
1.543	8.0	56.0		4.1	46.0	
2.588	12.3	56.0		8.0	46.0	
3.500	18.4	56.0		14.5	46.0	
7.880	11.9	60.0		6.9	50.0	
15.435	18.7	60.0		13.1	50.0	
29.993	20.2	60.0		11.7	50.0	

Checked BY Richard E. King :

Richard E. King

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 04/12/2010

Manufacturer	:	THE CHAMBERLAIN GROUP
Model	:	1A6801
DUT Revision	:	1
Serial Number	:	SMP 15817
DUT Mode	:	Rx @ 310
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	COHERED
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Sep 03, 2010 08:52:14 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
0.240	14.3	62.1		9.0	52.1	
0.378	13.4	58.3		8.0	48.3	
0.649	6.7	56.0		2.6	46.0	
0.898	6.7	56.0		2.6	46.0	
1.660	7.4	56.0		3.2	46.0	
2.768	8.6	56.0		4.5	46.0	
3.428	12.3	56.0		7.2	46.0	
7.691	11.5	60.0		6.8	50.0	
15.485	12.3	60.0		7.5	50.0	
29.980	21.8	60.0		15.0	50.0	

Checked BY Richard E. King :

Richard E. King

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 04/12/2010

Manufacturer	:	THE CHAMBERLAIN GROUP
Model	:	1A6801
DUT Revision	:	1
Serial Number	:	SMP 15817
DUT Mode	:	Tx @ 390
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Sep 03, 2010 09:07:35 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
0.213	16.0	63.1		10.0	53.1	
0.378	13.4	58.3		8.0	48.3	
0.788	5.9	56.0		2.6	46.0	
0.948	6.7	56.0		2.6	46.0	
1.966	8.6	56.0		4.7	46.0	
2.390	11.5	56.0		6.7	46.0	
3.482	9.2	56.0		5.2	46.0	
6.760	10.6	60.0		6.0	50.0	
15.215	13.7	60.0		8.7	50.0	
28.891	21.1	60.0		15.2	50.0	

Checked BY Richard E. King :

Richard E. King

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

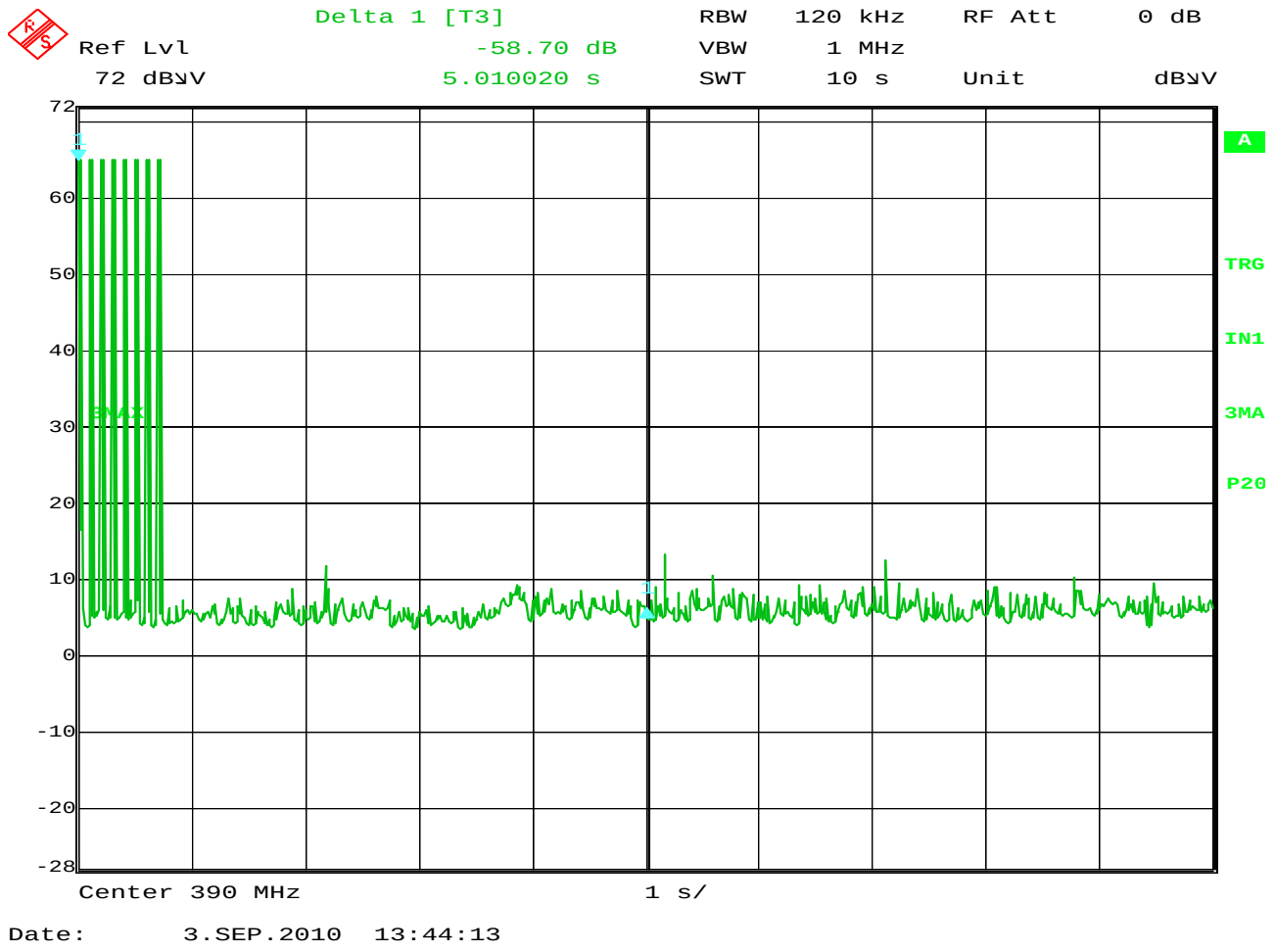
VB** 04/12/2010

Manufacturer	:	THE CHAMBERLAIN GROUP
Model	:	1A6801
DUT Revision	:	1
Serial Number	:	SMP 15817
DUT Mode	:	Tx @ 390
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Sep 03, 2010 09:14:15 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
0.236	14.6	62.3		9.2	52.3	
0.450	7.4	56.9		3.1	46.9	
0.572	6.7	56.0		2.8	46.0	
1.155	6.7	56.0		3.0	46.0	
1.651	7.4	56.0		3.5	46.0	
2.511	10.7	56.0		6.6	46.0	
3.500	17.1	56.0		13.2	46.0	
7.687	11.5	60.0		6.8	50.0	
15.161	14.7	60.0		9.5	50.0	
28.409	19.6	60.0		13.4	50.0	

Checked BY Richard E. King :

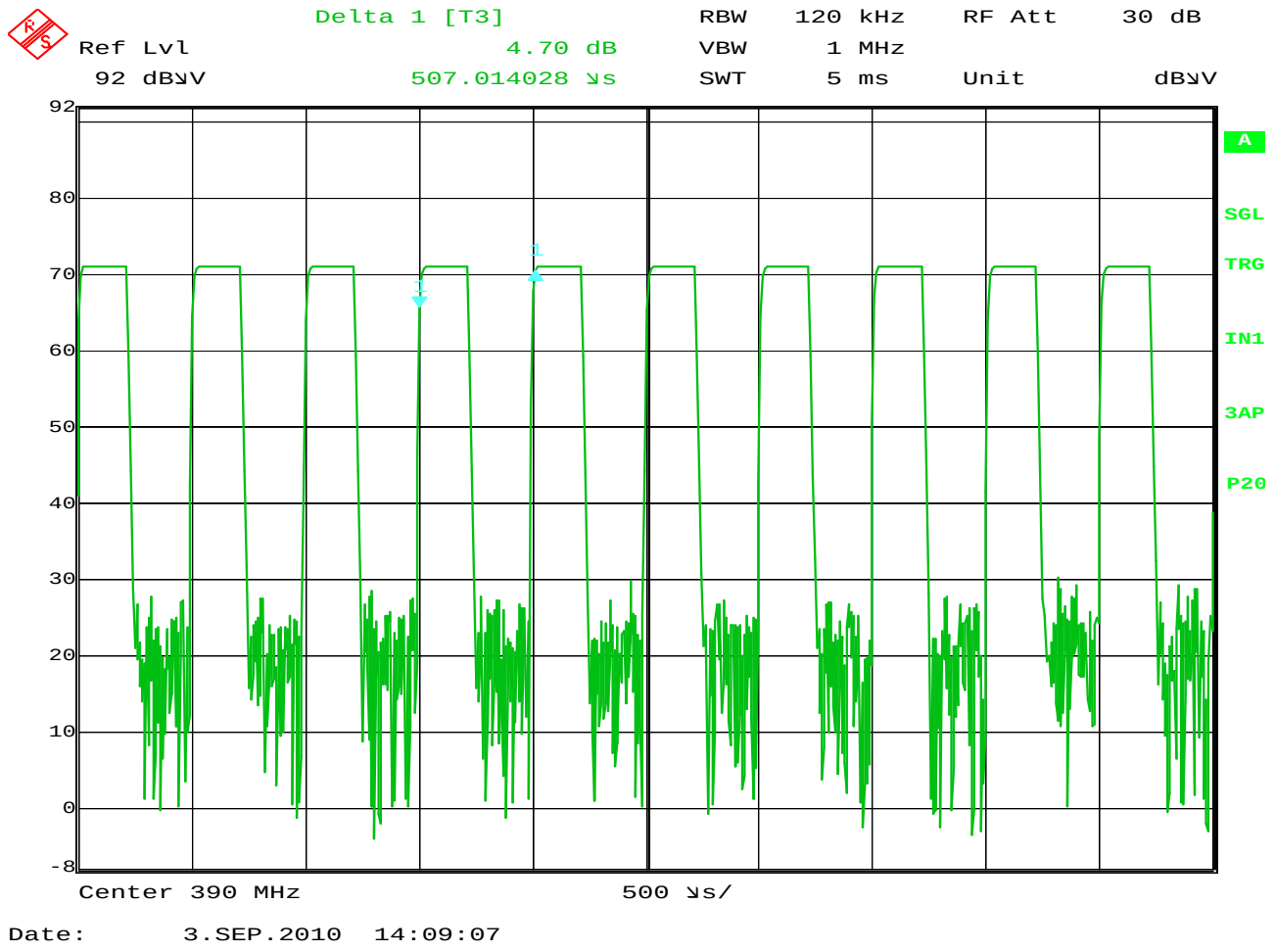
Richard E. King



Periodic Operation

MANUFACTURER : The Chamberlain Group
MODEL NUMBER : 1A6801
SAMPLE NUMBER : SMP15817
TEST MODE : Transmit at 390MHz
TEST PARAMETERS : The transmitter was set to transmit once.

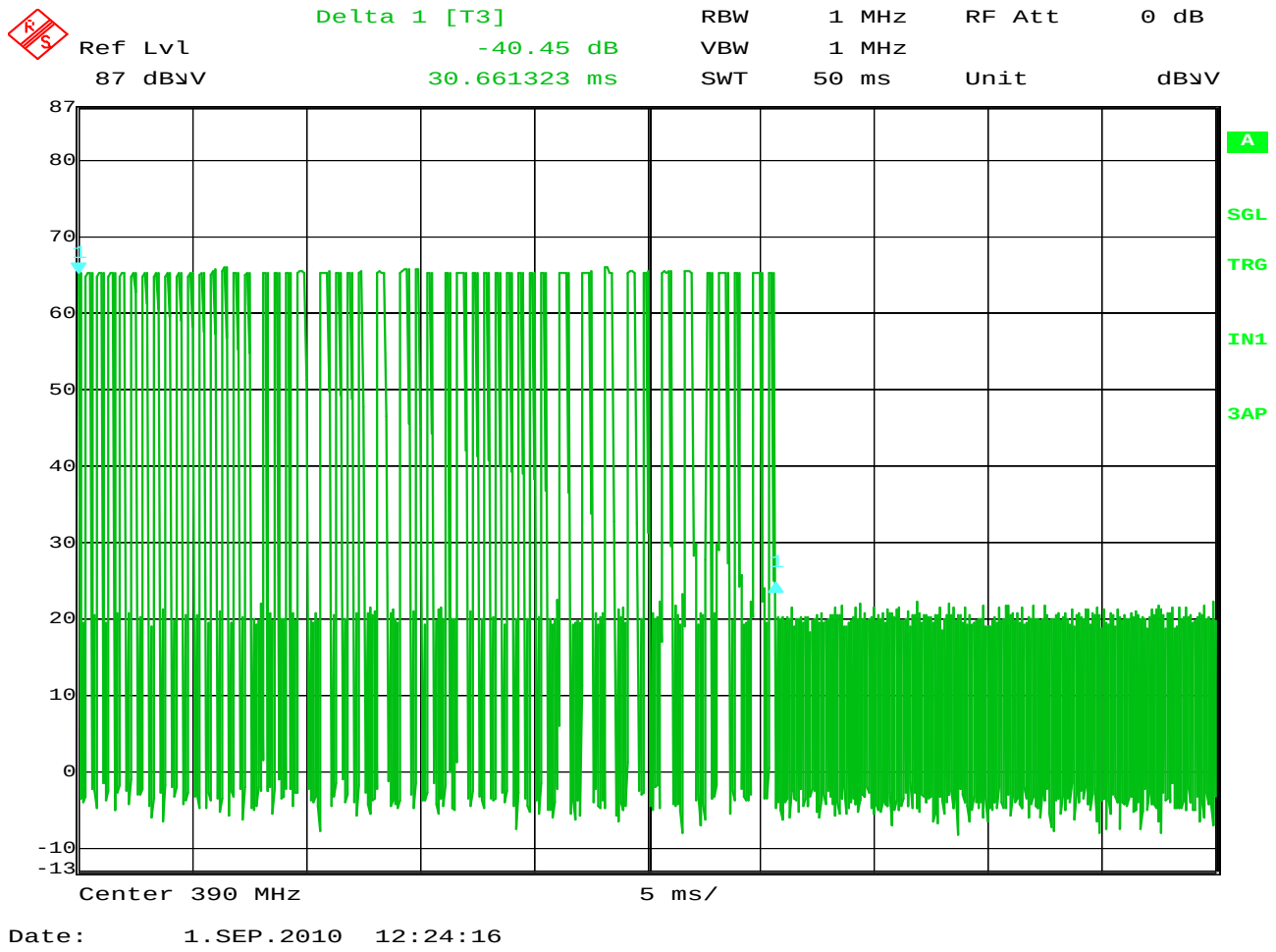
NOTES



Duty Cycle Factor

MANUFACTURER : The Chamberlain Group
MODEL NUMBER : 1A6801
SAMPLE NUMBER : SMP15817
TEST MODE : Transmit at 390MHz
TEST PARAMETERS : 1 Bit approximately 500uS

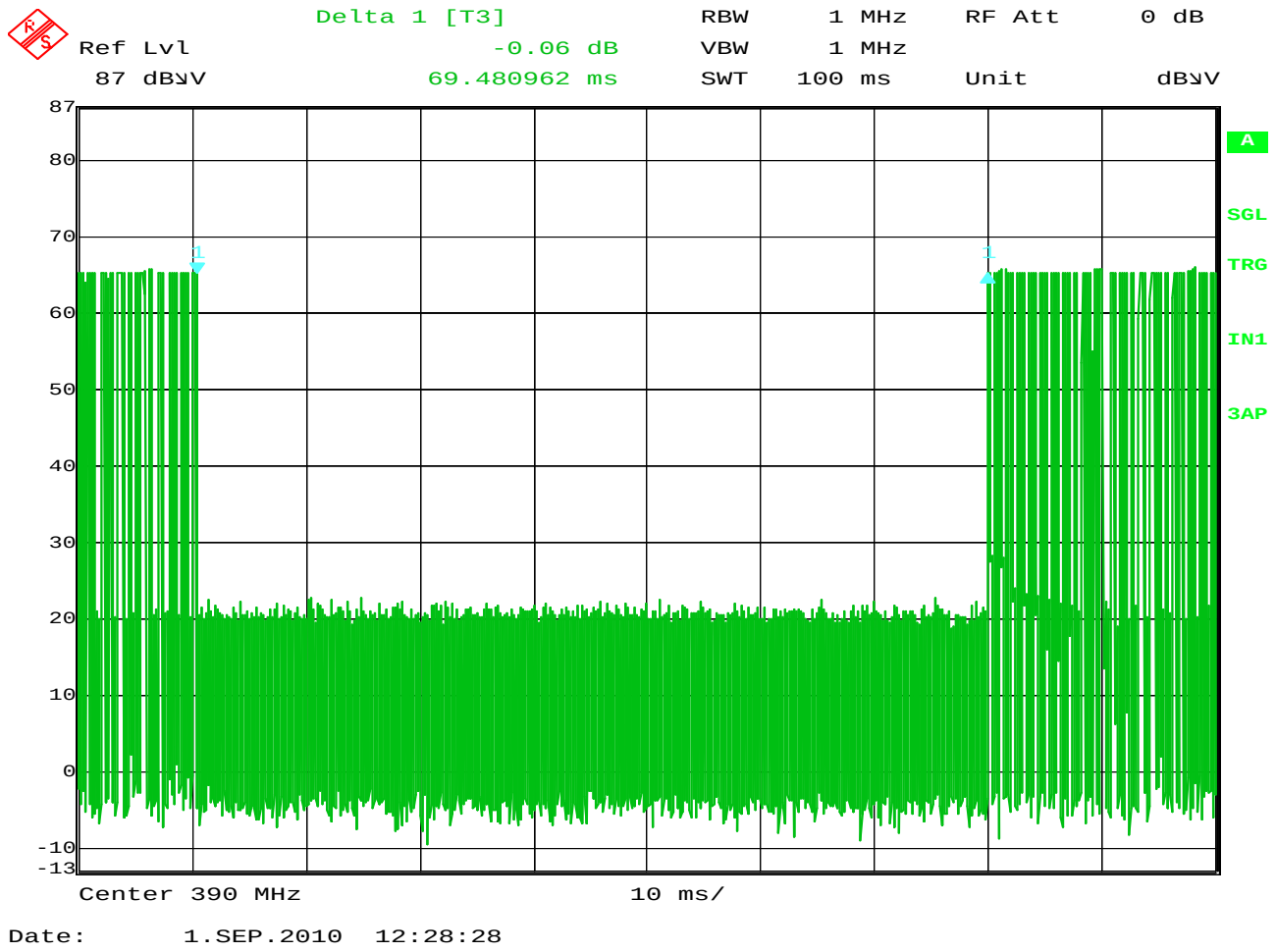
NOTES



Duty Cycle Factor

MANUFACTURER : The Chamberlain Group
MODEL NUMBER : 1A6801
SAMPLE NUMBER : SMP15817
TEST MODE : Transmit at 390MHz
TEST PARAMETERS : 1 Bit approximately 500uS

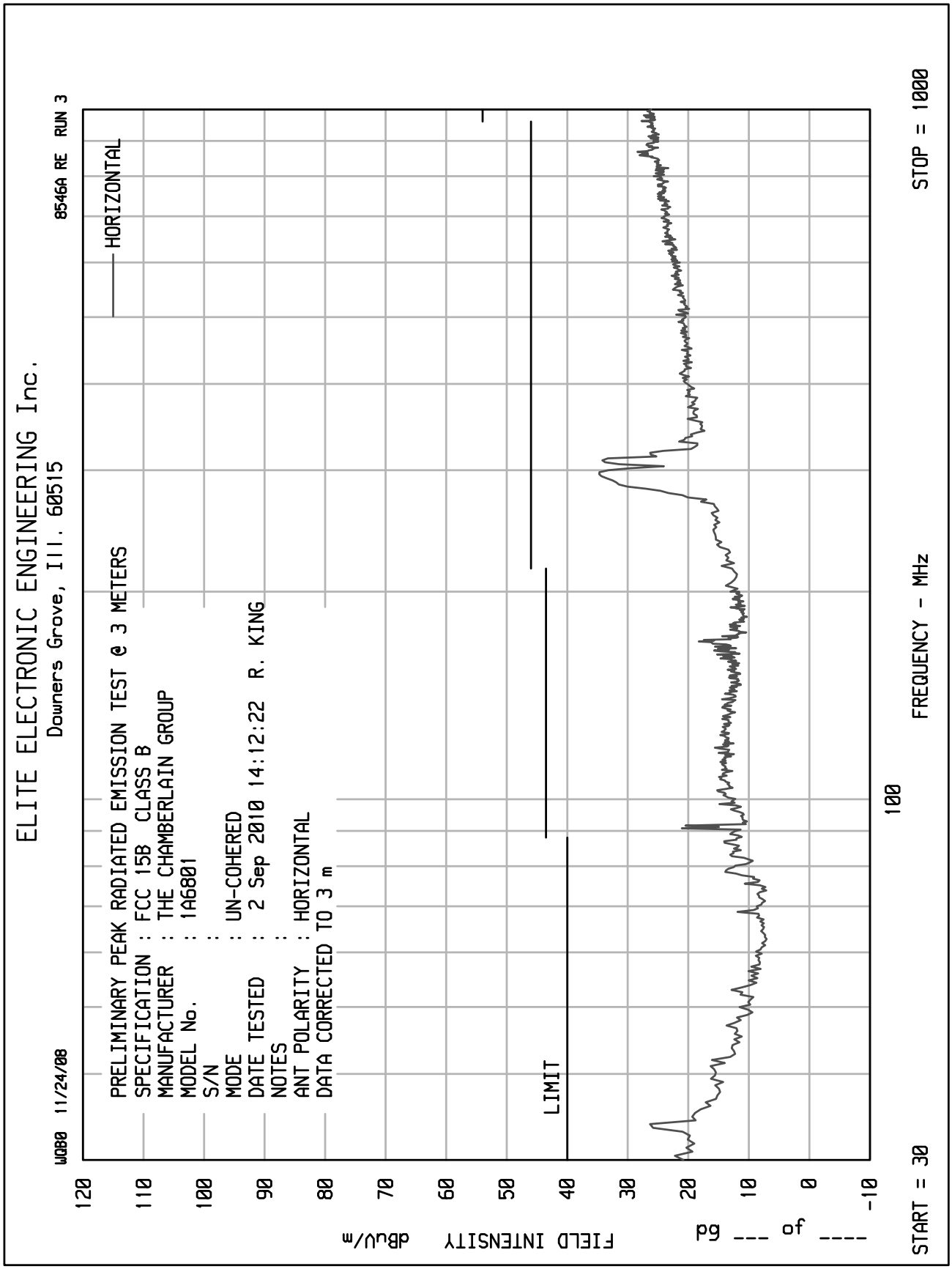
NOTES

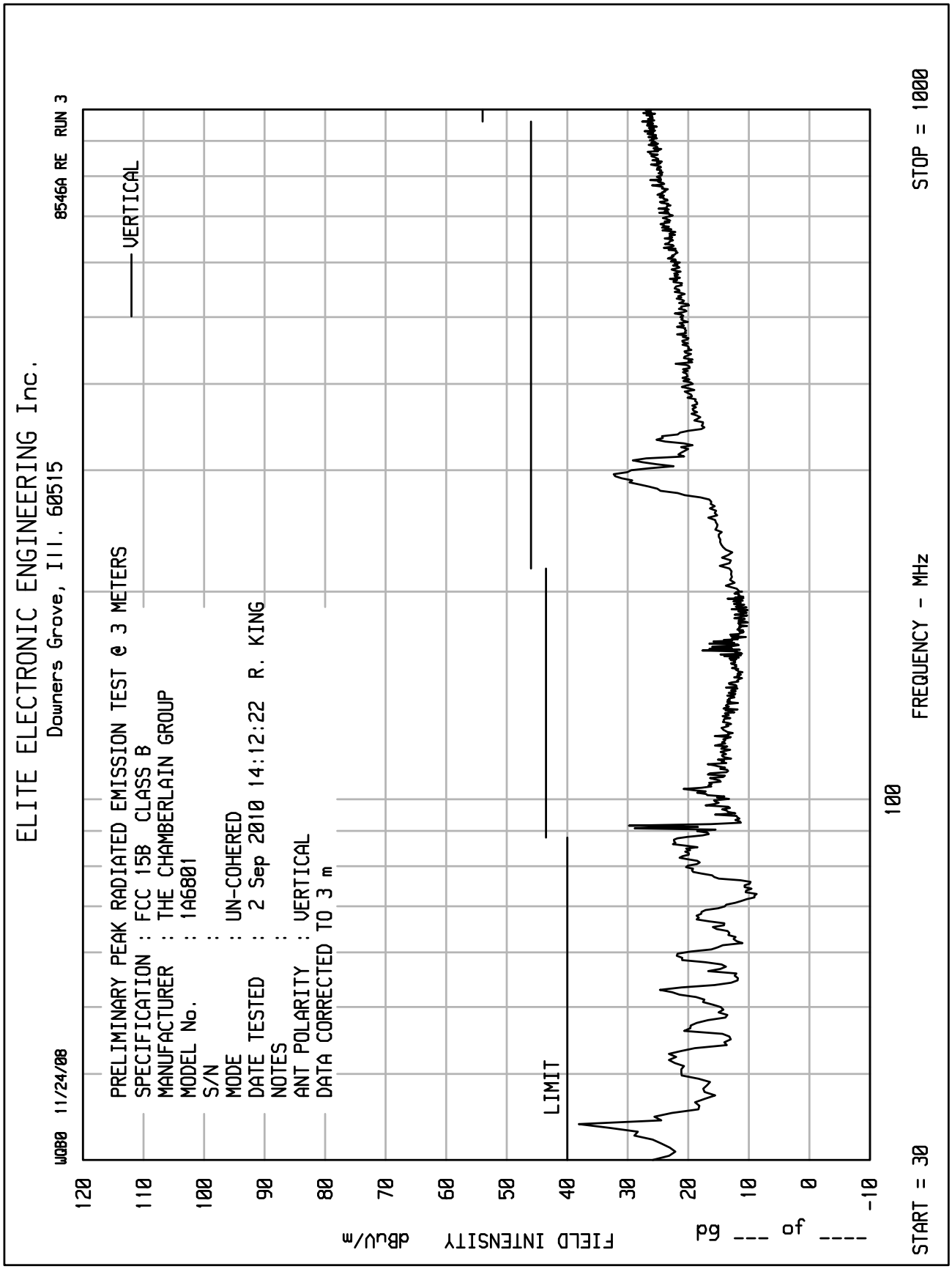


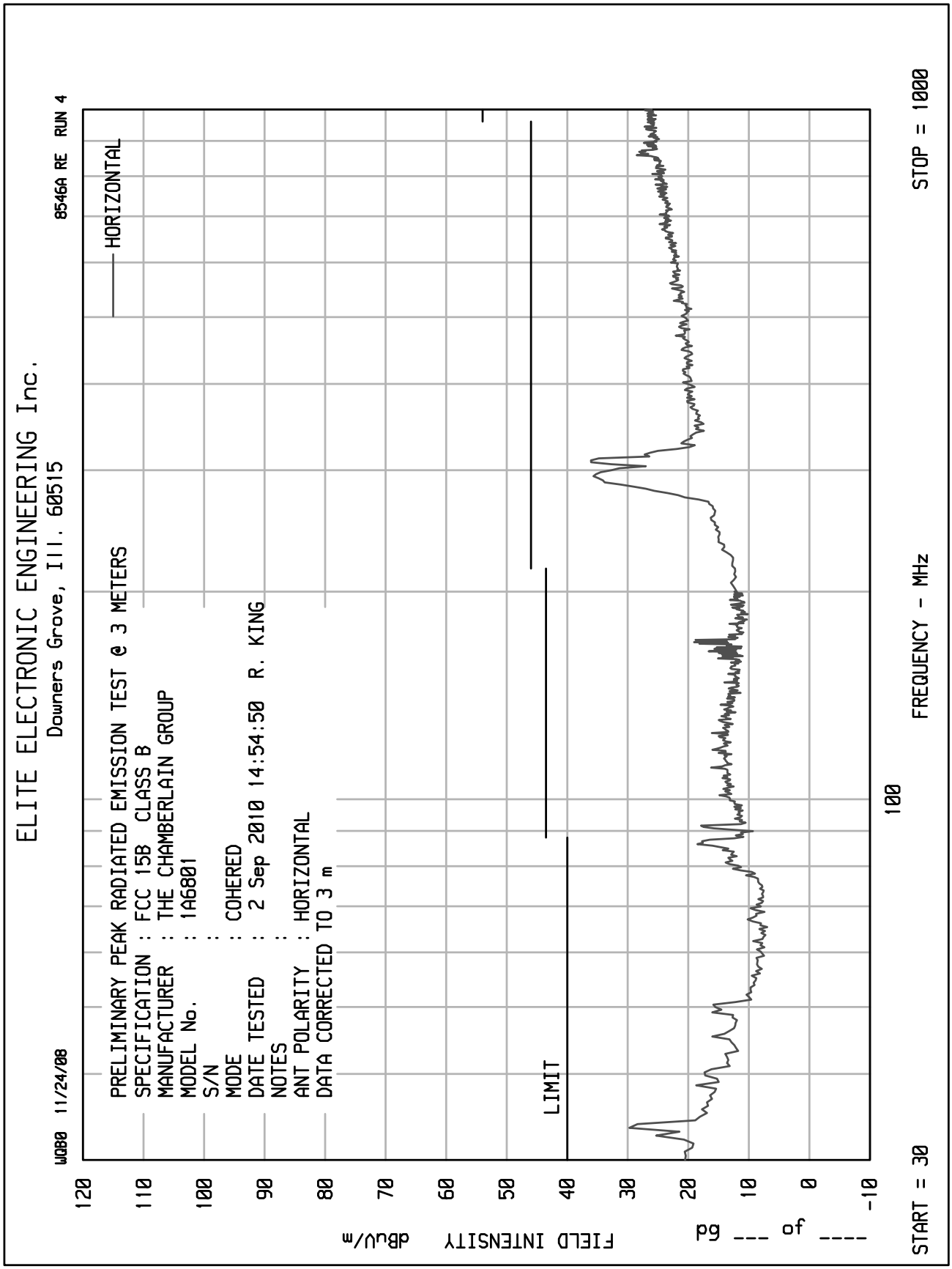
Duty Cycle Factor

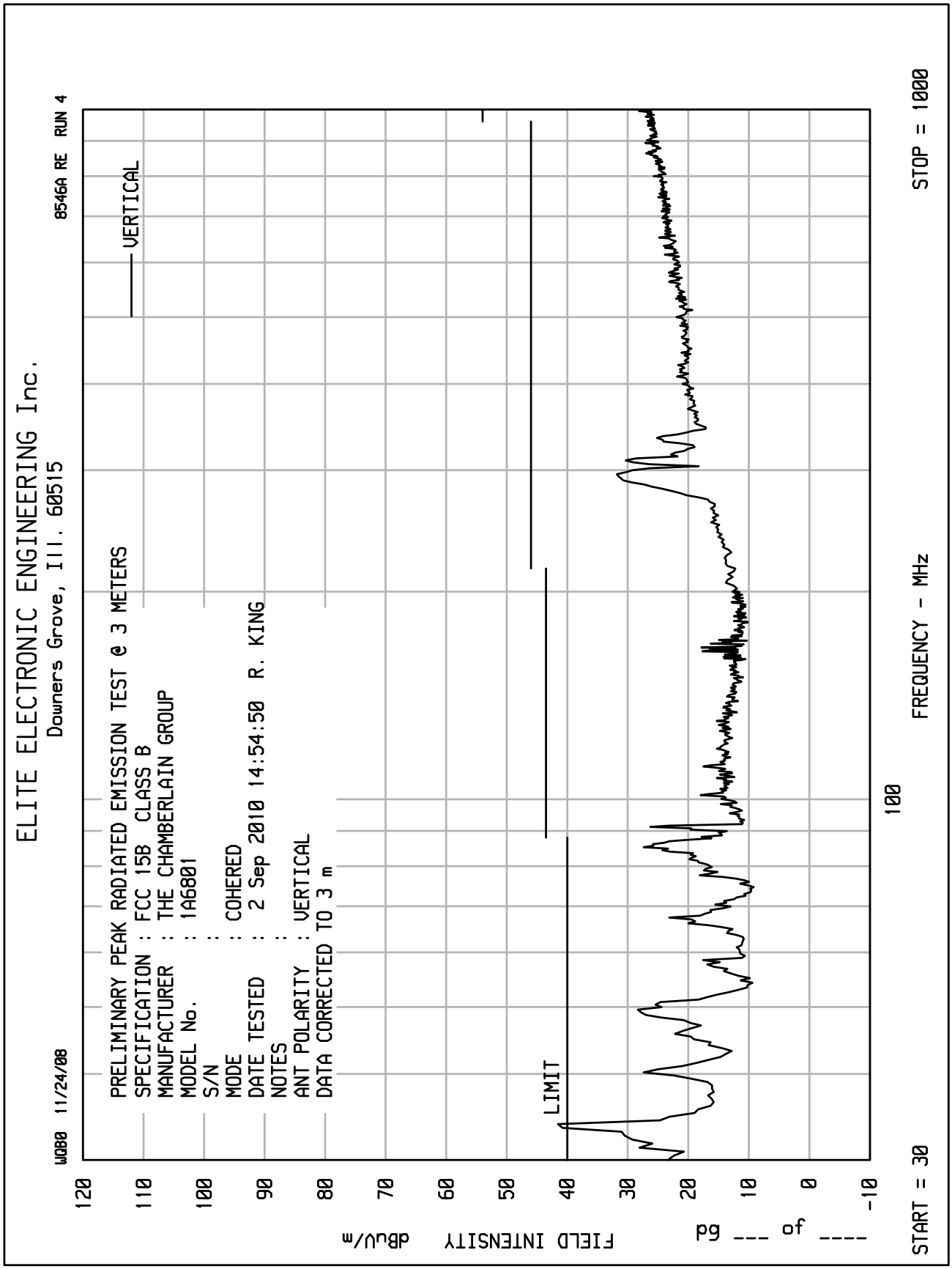
MANUFACTURER : The Chamberlain Group
MODEL NUMBER : 1A6801
SAMPLE NUMBER : SMP15817
TEST MODE : Transmit at 390MHz
TEST PARAMETERS : Blank approximately 69mS

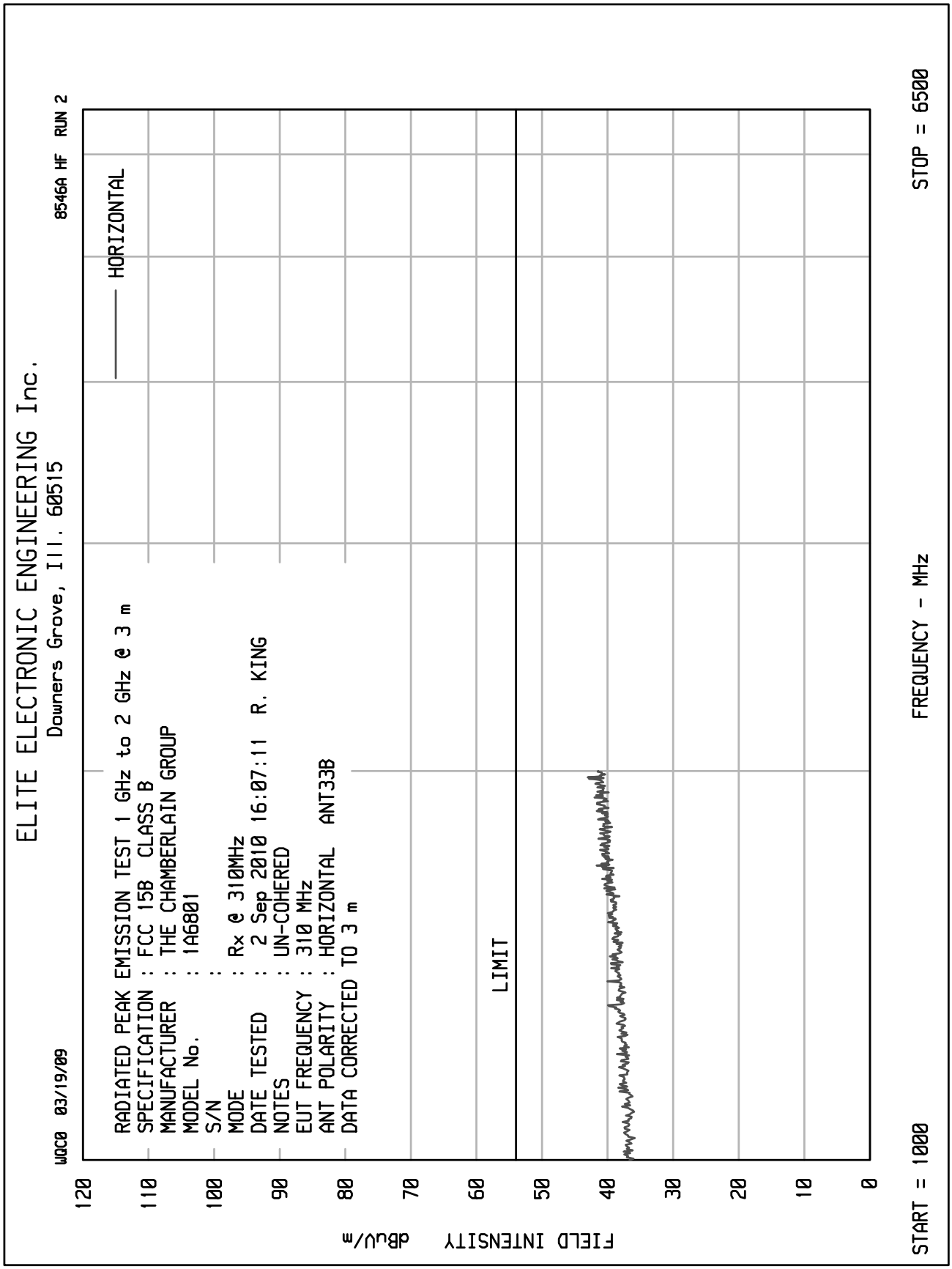
NOTES

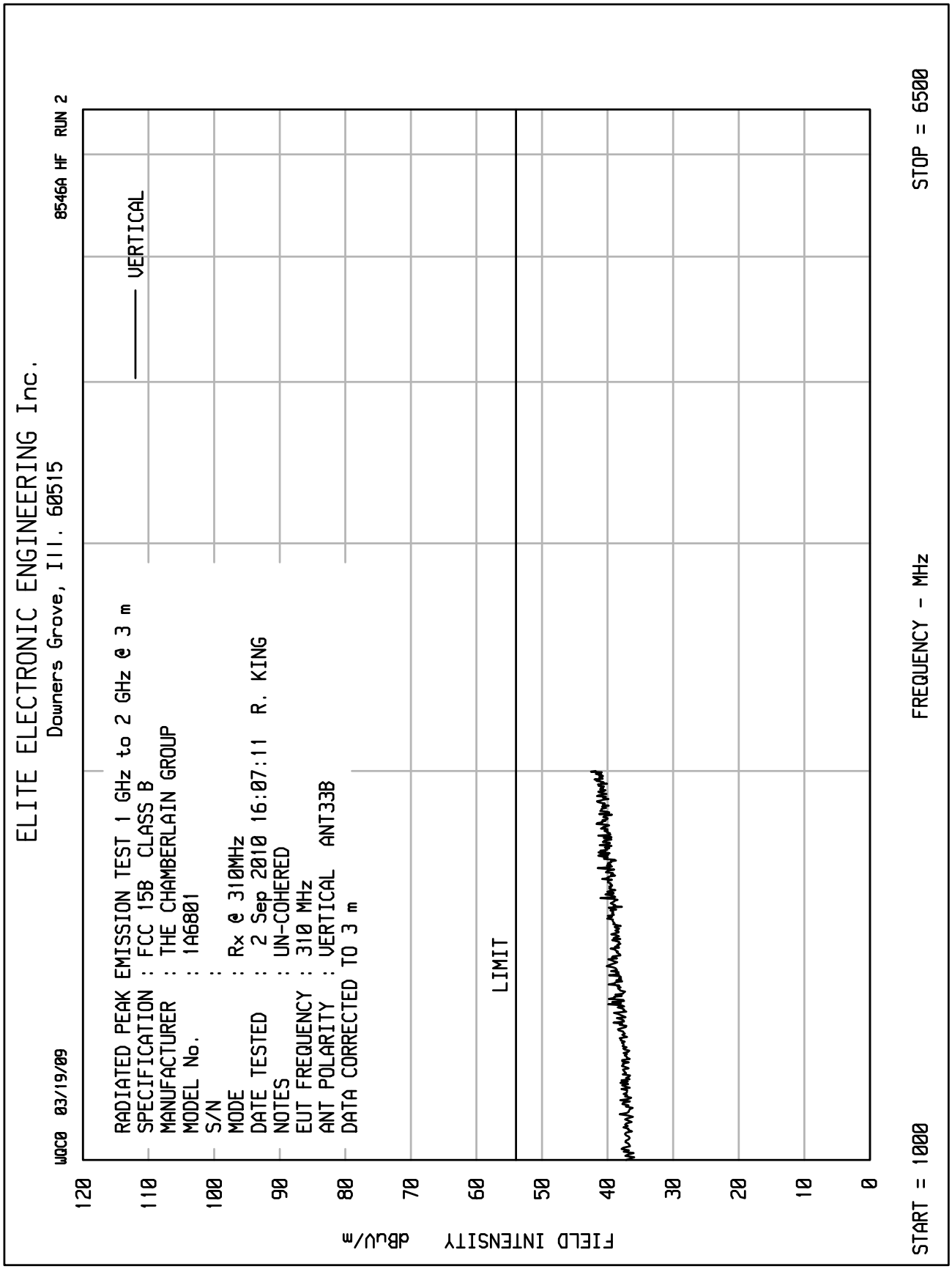

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
8546A RE RUN 3
WQ80 11/24/08
PRELIMINARY PEAK RADIATED EMISSION TEST @ 3 METERS
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : 1A6801
S/N : :
MODE : UN-COHERED
DATE TESTED : 2 Sep 2010 14:12:22 R. KING
NOTES : :
ANT POLARITY : HORIZONTAL
DATA CORRECTED TO 3 m
HORIZONTAL
LIMIT
FIELD INTENSITY dBuV/m
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
pg ___ of ____
START = 30
100
FREQUENCY - MHz
STOP = 1000

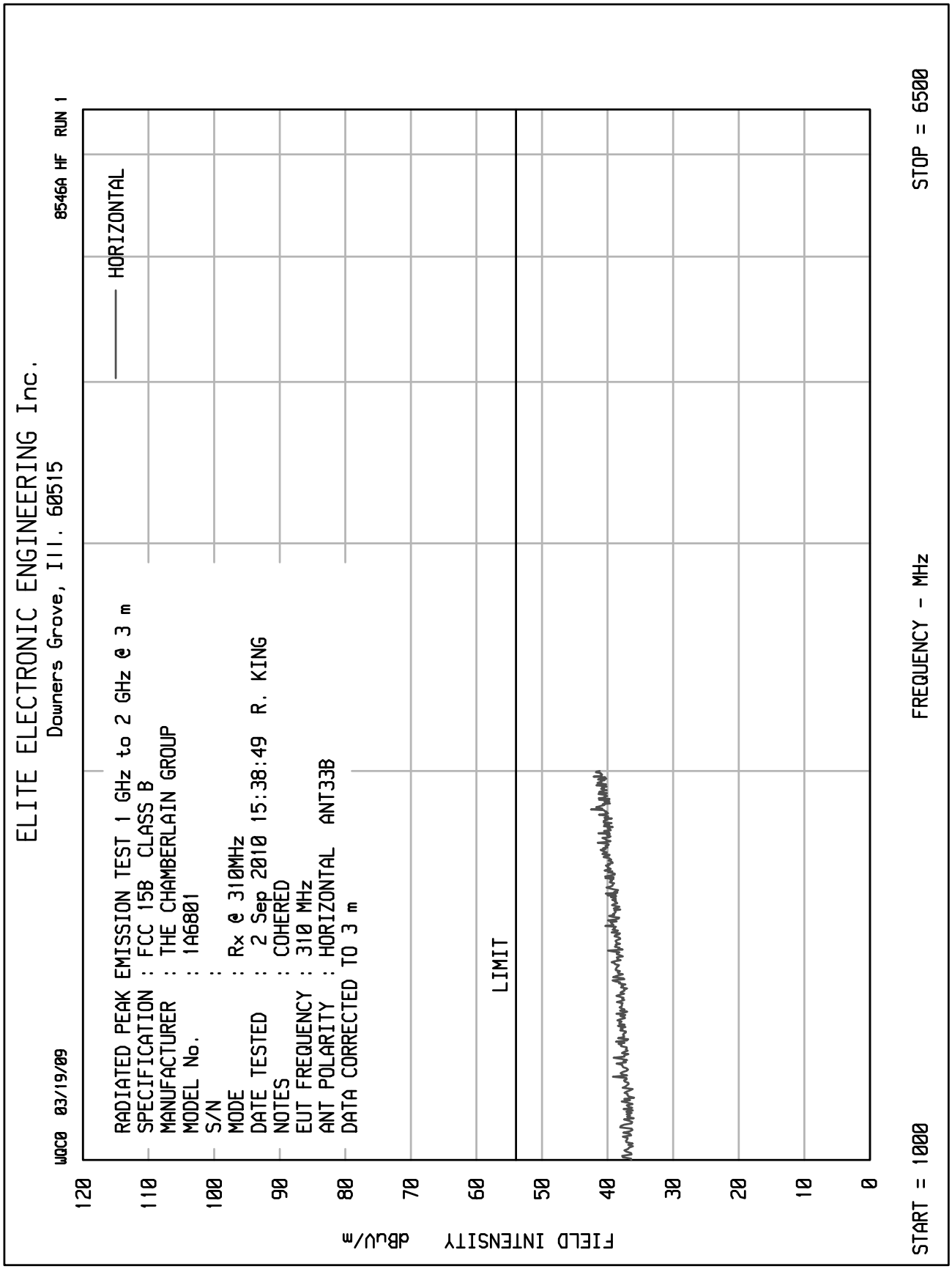

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
8546A RE RUN 3
WQ80 11/24/08
PRELIMINARY PEAK RADIATED EMISSION TEST @ 3 METERS
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : 1A6801
S/N :
MODE : UN-COHERED
DATE TESTED : 2 Sep 2010 14:12:22 R. KING
NOTES :
ANT POLARITY : VERTICAL
DATA CORRECTED TO 3 m
VERTICAL
LIMIT
FIELD INTENSITY dBuV/m
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
START = 30
100
FREQUENCY - MHz
STOP = 1000
pg ___ of ____

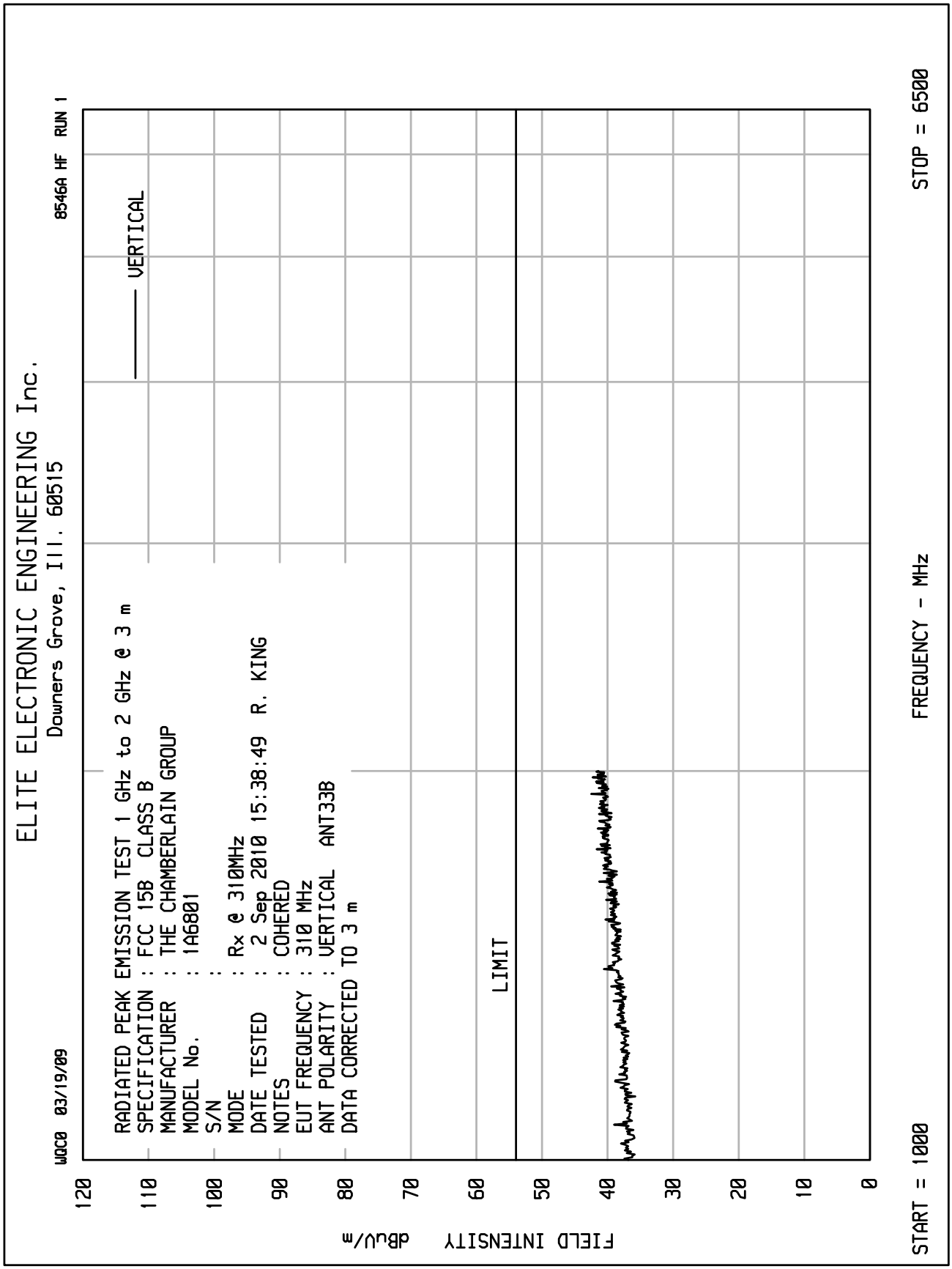

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
8546A RE RUN 4
WQ80 11/24/08
PRELIMINARY PEAK RADIATED EMISSION TEST @ 3 METERS
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : 1A6801
S/N : :
MODE : COHERED
DATE TESTED : 2 Sep 2010 14:54:50 R. KING
NOTES : :
ANT POLARITY : HORIZONTAL
DATA CORRECTED TO 3 m
HORIZONTAL
LIMIT
FIELD INTENSITY dBuV/m
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
START = 30
100
FREQUENCY - MHz
STOP = 1000
pg ___ of ____


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
8546A RE RUN 4
WQ80 11/24/08
PRELIMINARY PEAK RADIATED EMISSION TEST @ 3 METERS
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : 1A6801
S/N : :
MODE : COHERED
DATE TESTED : 2 Sep 2010 14:54:50 R. KING
NOTES : :
ANT POLARITY : VERTICAL
DATA CORRECTED TO 3 m
VERTICAL
LIMIT
FIELD INTENSITY dBuV/m
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
START = 30
100
FREQUENCY - MHz
STOP = 1000
pg ___ of ____


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WQC0 03/19/09
8546A HF RUN 2
RADIATED PEAK EMISSION TEST 1 GHz to 2 GHz @ 3 m
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : 1A6801
S/N : :
MODE : Rx @ 310MHz
DATE TESTED : 2 Sep 2010 16:07:11 R. KING
NOTES : UN-COHERED
EUT FREQUENCY : 310 MHz
ANT POLARITY : HORIZONTAL ANT33B
DATA CORRECTED TO 3 m
HORIZONTAL
LIMIT
FIELD INTENSITY dBuV/m
120
110
100
90
80
70
60
50
40
30
20
10
0
START = 1000
FREQUENCY - MHz
STOP = 6500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WQC0 03/19/09
8546A HF RUN 2
RADIATED PEAK EMISSION TEST 1 GHz to 2 GHz @ 3 m
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : 1A6801
S/N : :
MODE : Rx @ 310MHz
DATE TESTED : 2 Sep 2010 16:07:11 R. KING
NOTES : UN-COHERED
EUT FREQUENCY : 310 MHz
ANT POLARITY : VERTICAL ANT33B
DATA CORRECTED TO 3 m
VERTICAL
LIMIT
FIELD INTENSITY dBuV/m
120
110
100
90
80
70
60
50
40
30
20
10
0
START = 1000
FREQUENCY - MHz
STOP = 6500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WQC0 03/19/09
8546A HF RUN 1
RADIATED PEAK EMISSION TEST 1 GHz to 2 GHz @ 3 m
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : 1A6801
S/N : :
MODE : Rx @ 310MHz
DATE TESTED : 2 Sep 2010 15:38:49 R. KING
NOTES : COHERED
EUT FREQUENCY : 310 MHz
ANT POLARITY : HORIZONTAL ANT33B
DATA CORRECTED TO 3 m
HORIZONTAL
LIMIT
FIELD INTENSITY dBuV/m
120
110
100
90
80
70
60
50
40
30
20
10
0
START = 1000
FREQUENCY - MHz
STOP = 6500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WQC0 03/19/09
8546A HF RUN 1
RADIATED PEAK EMISSION TEST 1 GHz to 2 GHz @ 3 m
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : 1A6801
S/N : :
MODE : Rx @ 310MHz
DATE TESTED : 2 Sep 2010 15:38:49 R. KING
NOTES : COHERED
EUT FREQUENCY : 310 MHz
ANT POLARITY : VERTICAL ANT33B
DATA CORRECTED TO 3 m
VERTICAL
LIMIT
FIELD INTENSITY dBuV/m
120
110
100
90
80
70
60
50
40
30
20
10
0
START = 1000
FREQUENCY - MHz
STOP = 6500

ETR No. 8546A
DATA SHEET TEST NO. 3

RADIATED QP EMISSION MEASUREMENTS in a 3 m SEMI-ANECHOIC ROOM
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL NO. : 1A6801
SERIAL NO. : SMP 15817
TEST MODE : UN-COHERED
NOTES :
TEST DATE : 2 Sep 2010 14:12:22
TEST DISTANCE : 3 m (DATA EXTRAPOLATED TO 3 m)

FREQUENCY	QP READING	ANT FAC	CBL FAC	EXT ATTN	DIST FAC	TOTAL	QP LIMIT	AZ	ANT HT	POLAR
MHz	dBuV	dB	dB	dB	dB	dBuV/m	dBuV/m	deg	cm	
33.53	2.8	17.3	.5	0.0	0.0	20.6	40.0	-0	120	V
53.46	10.5	7.7	.7	0.0	0.0	18.9	40.0	135	120	V
90.88	19.2	9.6	.9	0.0	0.0	29.7	43.5	135	120	V
102.20	3.0	11.8	1.0	0.0	0.0	15.7	43.5	135	120	V
125.98	-7.1	12.9	1.0	0.0	0.0	6.7	43.5	225	200	V
164.99	2.9	10.5	1.0	0.0	0.0	14.4	43.5	135	340	V
167.98	3.6	10.4	1.0	0.0	0.0	15.0	43.5	90	340	H
260.48	-7.9	13.2	1.3	0.0	0.0	6.7	46.0	45	120	V
291.94	17.4	13.8	1.5	0.0	0.0	32.7	46.0	315	120	H
425.24	-7.4	17.1	1.6	0.0	0.0	11.3	46.0	225	200	V
572.78	-7.7	19.0	1.9	0.0	0.0	13.3	46.0	315	340	V
684.69	-7.2	19.8	2.2	0.0	0.0	14.8	46.0	45	200	V
794.92	-7.8	20.7	2.5	0.0	0.0	15.4	46.0	225	200	V
865.43	-3.7	21.4	2.5	0.0	0.0	20.2	46.0	-0	120	H
955.62	-7.7	22.2	2.5	0.0	0.0	16.9	46.0	315	340	V

Checked BY Richard E. King :

Richard E. King

ETR No. 8546A

DATA SHEET TEST NO. 4

RADIATED QP EMISSION MEASUREMENTS in a 3 m SEMI-ANECHOIC ROOM

SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL NO. : 1A6801
SERIAL NO. : SMP 15817
TEST MODE : COHERED
NOTES :
TEST DATE : 2 Sep 2010 14:54:50
TEST DISTANCE : 3 m (DATA EXTRAPOLATED TO 3 m)

FREQUENCY MHz	QP READING dBuV	ANT FAC dB	CBL FAC dB	EXT ATTN dB	DIST FAC dB	TOTAL dBuV/m	QP LIMIT dBuV/m	AZ deg	ANT HT cm	POLAR
33.45	12.6	17.3	.5	0.0	0.0	30.3	40.0	180	120	V
68.76	8.3	6.4	.8	0.0	0.0	15.5	40.0	180	340	V
86.13	6.2	8.5	.9	0.0	0.0	15.7	40.0	90	120	V
102.89	-5.4	11.9	1.0	0.0	0.0	7.4	43.5	90	200	V
122.55	-8.9	12.9	1.0	0.0	0.0	5.0	43.5	315	340	H
164.99	1.3	10.5	1.0	0.0	0.0	12.8	43.5	136	340	V
166.99	-1.5	10.4	1.0	0.0	0.0	10.0	43.5	90	340	H
263.39	-7.3	13.3	1.3	0.0	0.0	7.3	46.0	270	200	H
305.98	20.3	14.1	1.5	0.0	0.0	36.0	46.0	315	120	H
463.77	-7.4	17.4	1.7	0.0	0.0	11.7	46.0	90	200	H
581.60	-8.3	19.1	2.0	0.0	0.0	12.7	46.0	135	200	V
654.97	-8.0	19.9	2.2	0.0	0.0	14.0	46.0	45	200	V
795.39	-7.7	20.7	2.5	0.0	0.0	15.5	46.0	225	200	H
860.42	-1.5	21.4	2.5	0.0	0.0	22.4	46.0	-0	120	H
941.77	-7.8	22.0	2.5	0.0	0.0	16.7	46.0	180	340	H

Checked BY Richard E. King :

Richard E. King

ETR No.
DATA SHEET HF TEST NO. 2

RADIATED AVG EMISSION MEASUREMENTS >=1000 MHz in a 3 m ANECHOIC ROOM

SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL NO. : 1A6801
SERIAL NO. : SMP 15817
TEST MODE : Rx @ 310MHz
NOTES : UN-COHERED
TEST DATE : 2 Sep 2010 16:07:11
EUT FREQUENCY : 310 MHz
TEST DISTANCE : 3 m (DATA EXTRAPOLATED TO 3 m
ANTENNA : ANT33B

FREQUENCY MHz	AVG READING dBuV	ANT FAC dB	CBL FAC dB	DIST FAC dB	TOTAL dBuV/m	AVG LIMIT dBuV/m	PASS/ FAIL	AZ deg	ANT HT cm	POLAR
1141.10	-3.2	24.7	2.7	0.0	24.2	54.0		-0	120	H
1186.17	-3.0	24.8	2.7	0.0	24.6	54.0		-0	200	H
1362.20	-3.1	25.3	2.9	0.0	25.2	54.0		-0	200	H
1437.14	-1.7	25.5	3.0	0.0	26.9	54.0		-0	120	V
1567.45	-2.5	26.0	3.1	0.0	26.6	54.0		225	200	V
1674.60	-2.8	26.5	3.2	0.0	26.9	54.0		180	340	H
1908.97	-2.9	27.4	3.4	0.0	27.9	54.0		225	120	H
2003.27	-3.2	0.0	0.0	0.0	-3.2	54.0		225	200	H

Checked BY Richard E. King :

Richard E. King

ETR No.

DATA SHEET HF TEST NO. 1

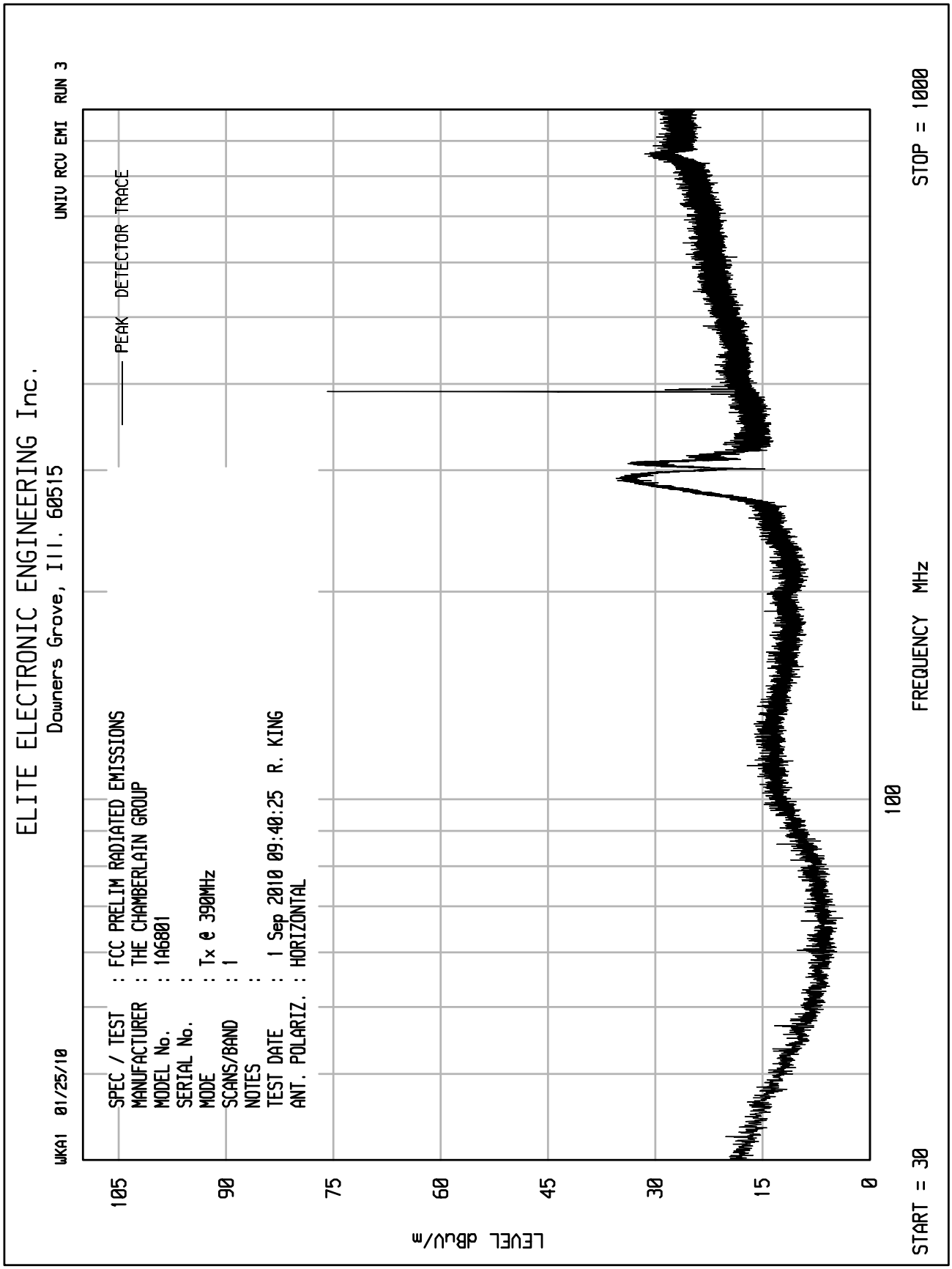
RADIATED AVG EMISSION MEASUREMENTS >=1000 MHz in a 3 m ANECHOIC ROOM

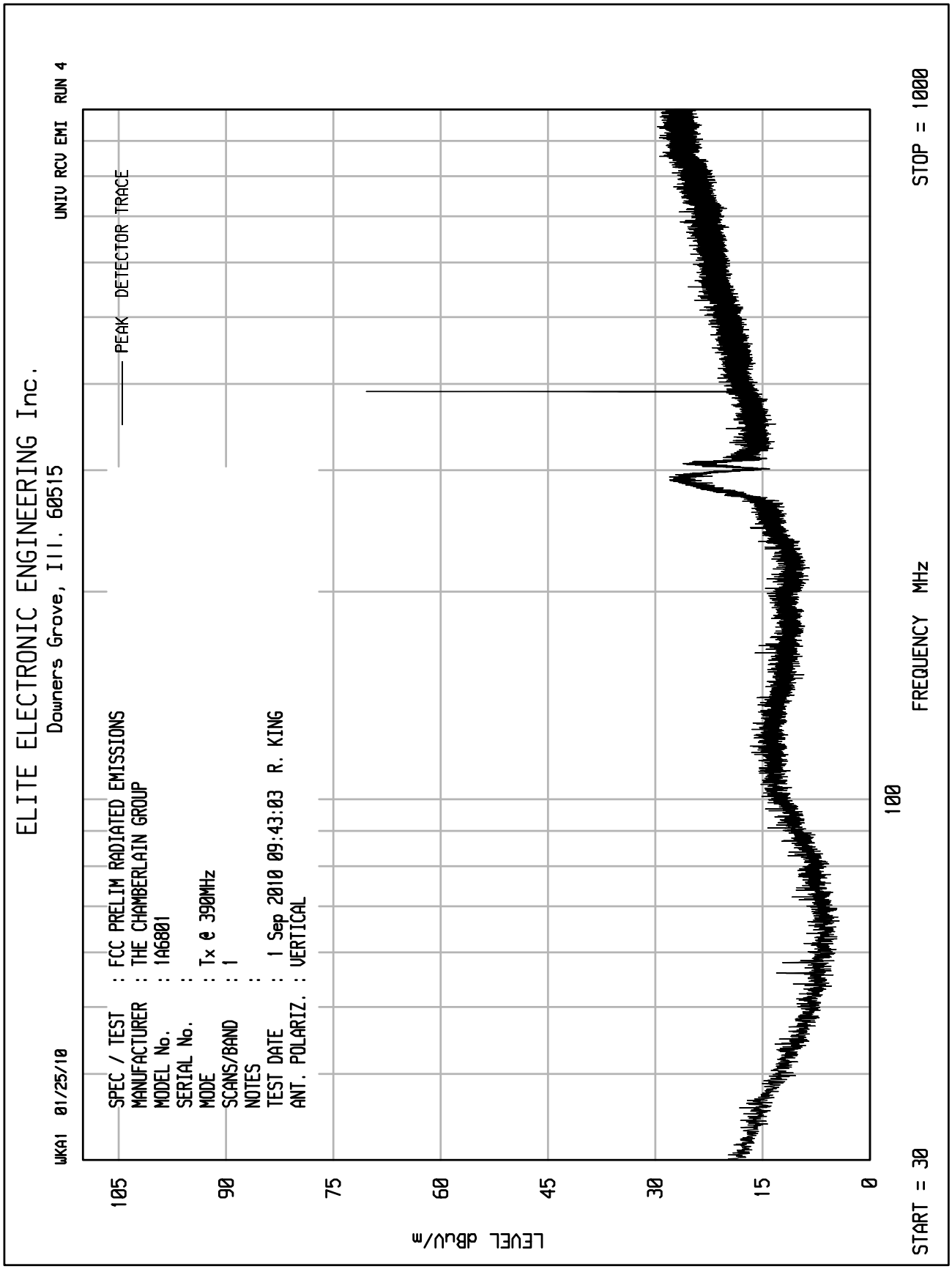
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL NO. : 1A6801
SERIAL NO. : SMP 15817
TEST MODE : Rx @ 310MHz
NOTES : COHERED
TEST DATE : 2 Sep 2010 15:38:49
EUT FREQUENCY : 310 MHz
TEST DISTANCE : 3 m (DATA EXTRAPOLATED TO 3 m
ANTENNA : ANT33B

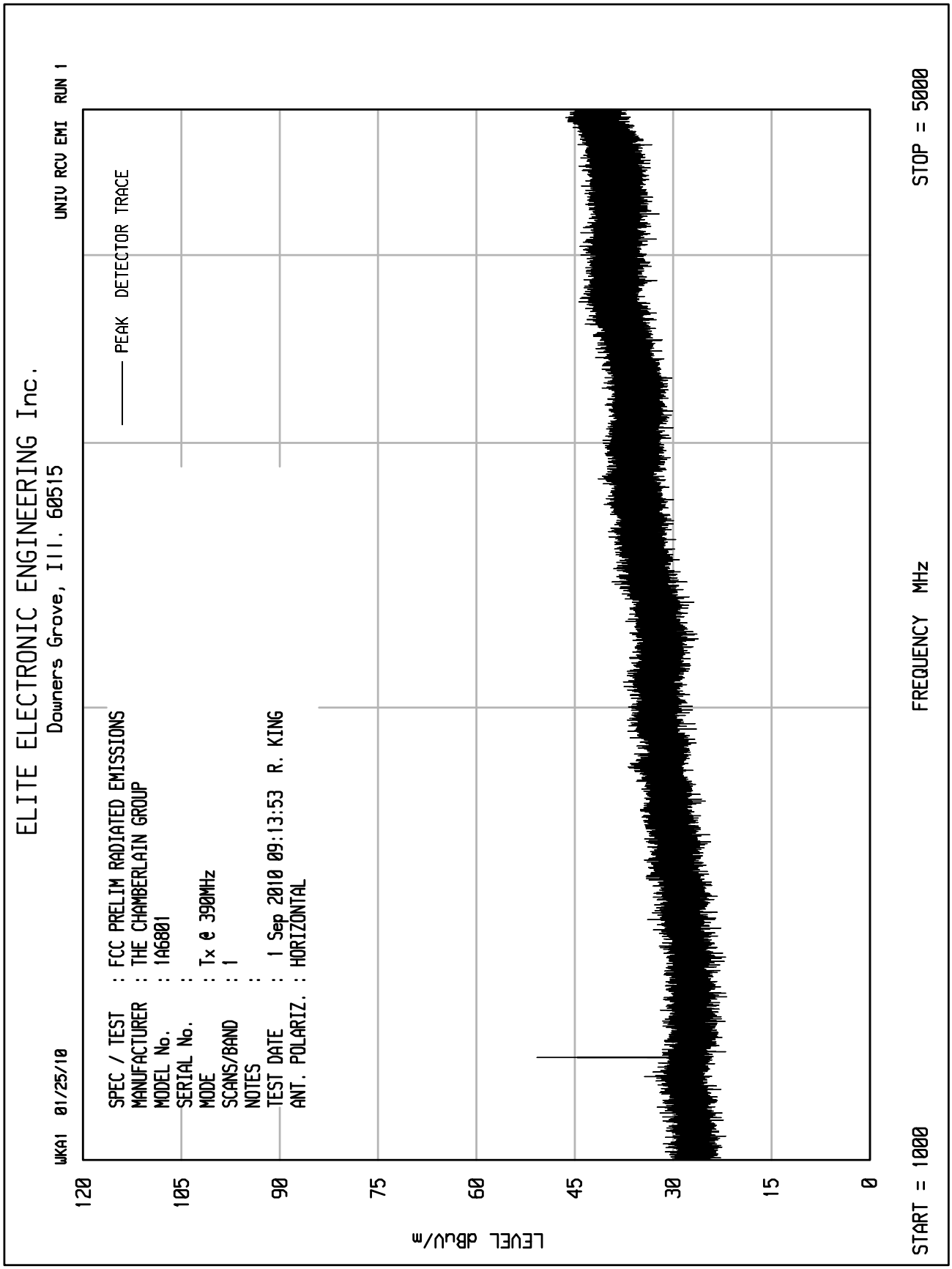
FREQUENCY MHz	AVG READING dBuV	ANT FAC dB	CBL FAC dB	DIST FAC dB	TOTAL dBuV/m	AVG LIMIT dBuV/m	PASS/ FAIL	AZ deg	ANT HT cm	POLAR
1037.33	-3.1	24.3	2.6	0.0	23.8	54.0		45	200	V
1143.62	-3.0	24.7	2.7	0.0	24.3	54.0		90	340	H
1364.76	-3.3	25.4	2.9	0.0	25.0	54.0		45	120	V
1429.45	-1.3	25.5	3.0	0.0	27.2	54.0		135	120	V
1643.27	-3.2	26.3	3.2	0.0	26.3	54.0		90	200	V
1747.06	-3.1	26.8	3.3	0.0	27.0	54.0		180	200	V
1862.83	-3.1	27.2	3.4	0.0	27.5	54.0		180	120	H
1951.89	-3.4	27.5	3.5	0.0	27.6	54.0		-1	120	V

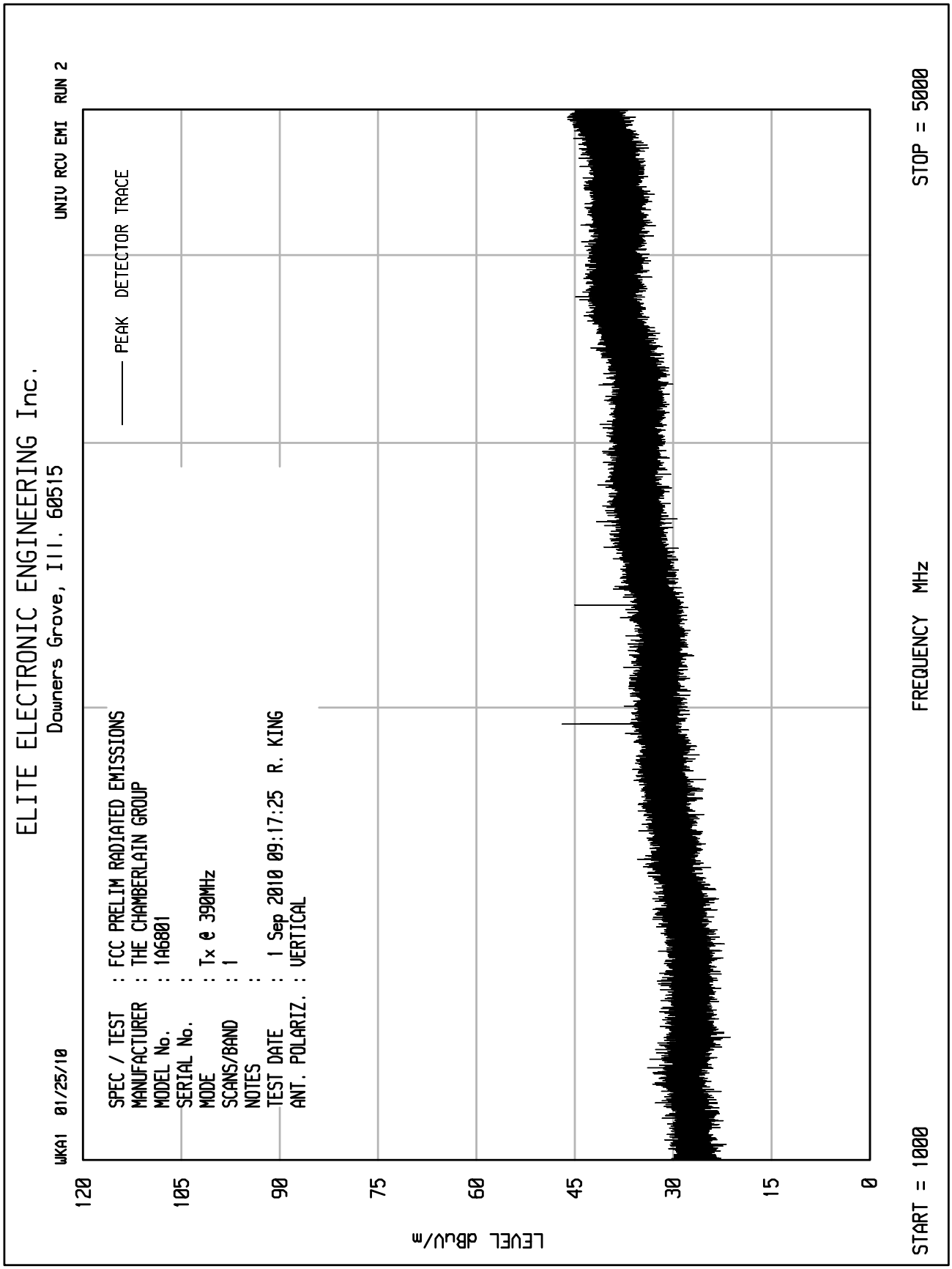
Checked BY Richard E. King :

Richard E. King


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 3
WKA1 01/25/10
SPEC / TEST : FCC PRELIM RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : 1A6801
SERIAL No. :
MODE : Tx @ 390MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 1 Sep 2010 09:40:25 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 4
WKA1 01/25/10
SPEC / TEST : FCC PRELIM RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : 1A6001
SERIAL No. :
MODE : Tx @ 390MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 1 Sep 2010 09:43:03 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 1
WKA1 01/25/10
SPEC / TEST : FCC PRELIM RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : 1A6001
SERIAL No. :
MODE : Tx @ 390MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 1 Sep 2010 09:13:53 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 2
WKAI 01/25/10
SPEC / TEST : FCC PRELIM RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : 1A6001
SERIAL No. :
MODE : Tx @ 390MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 1 Sep 2010 09:17:25 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

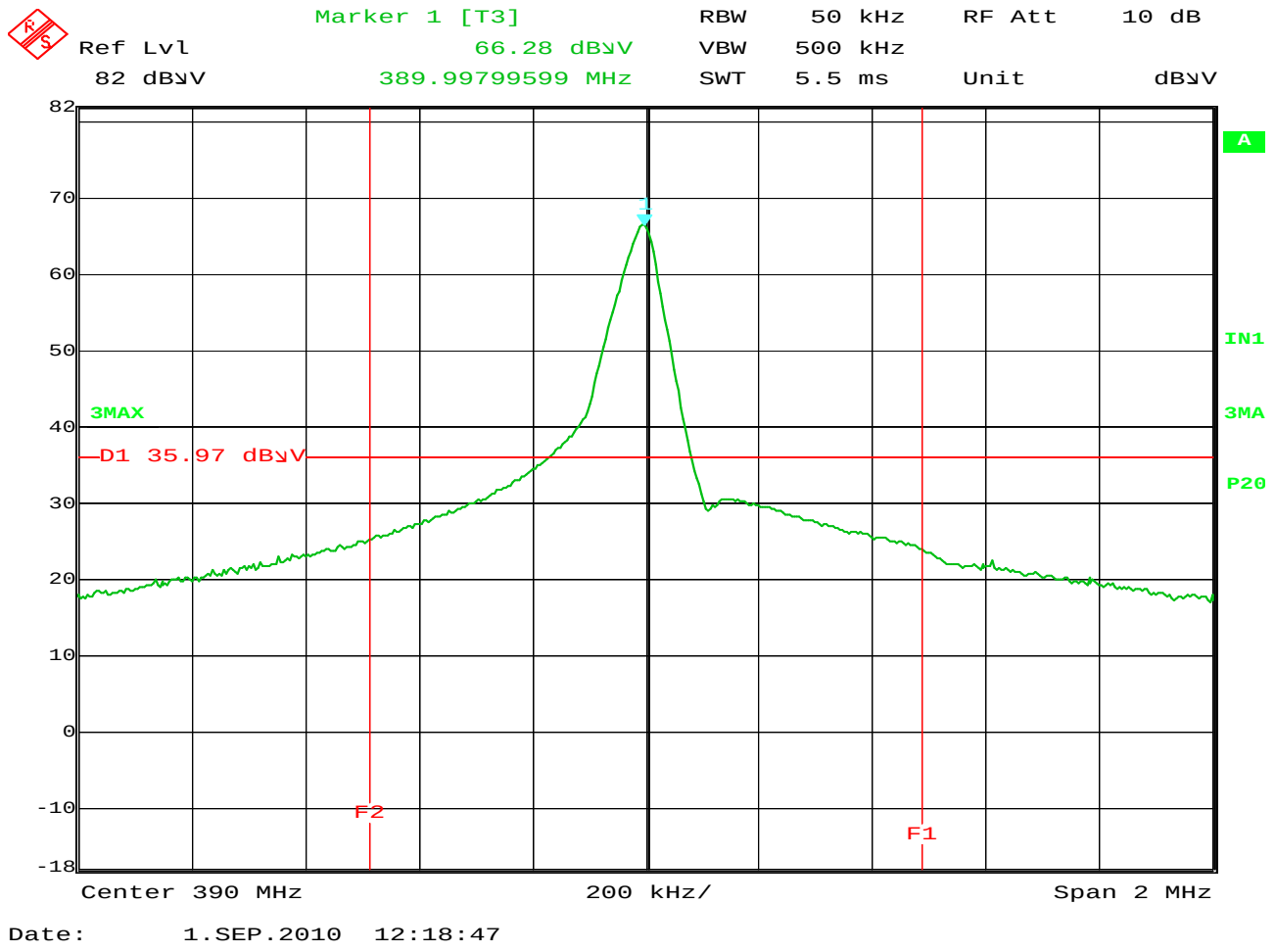
RADIATED EMISSION MEASUREMENTS in a 3 m ANECHOIC ROOM

MANUFACTURER	:	THE CHAMBERLAIN GROUP
MODEL NO.	:	1A6801
SERIAL NO.	:	SMP 15817
TEST MODE	:	Tx @ 390MHz
NOTES	:	
TEST DATE	:	2 Sep 2010

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Duty Cycle Factor (dB)	Total dBuV/m at 3 M	Total uV/m at 3M	Limit uV/m at 3M	Margin (dB)
390.00	H	72.6		1.6	16.2	-16.2	74.2	5115.9	9166.7	-5.1
390.00	V	54.9		1.6	16.2	-16.2	56.4	663.6	9166.7	-22.8
780.00	H	36.2		2.2	20.5	-16.2	42.7	136.3	916.7	-16.6
780.00	V	31.9		2.2	20.5	-16.2	38.5	83.9	916.7	-20.8
1170.00	H	31.8		2.7	25.3	-16.2	43.7	152.5	500.0	-10.3
1170.00	V	33.9		2.7	25.3	-16.2	45.7	192.9	500.0	-8.3
1560.00	H	34.0		3.2	26.4	-16.2	47.4	234.5	500.0	-6.6
1560.00	V	29.2		3.2	26.4	-16.2	42.7	136.0	500.0	-11.3
1950.00	H	24.1		3.6	28.5	-16.2	40.0	99.8	916.7	-19.3
1950.00	V	24.8		3.6	28.5	-16.2	40.7	108.3	916.7	-18.5
2340.00	H	22.8		3.8	29.3	-16.2	39.7	96.8	500.0	-14.3
2340.00	V	21.8		3.8	29.3	-16.2	38.7	85.9	500.0	-15.3
2730.00	H	18.5		3.9	30.3	-16.2	36.6	67.2	500.0	-17.4
2730.00	V	20.2		3.9	30.3	-16.2	38.2	81.5	500.0	-15.8
3120.00	H	13.6	*	4.2	31.5	-16.2	33.0	44.7	916.7	-26.2
3120.00	V	12.8	*	4.2	31.5	-16.2	32.2	40.8	916.7	-27.0
3510.00	H	15.0	*	4.6	32.7	-16.2	36.0	63.4	916.7	-23.2
3510.00	V	14.7	*	4.6	32.7	-16.2	35.8	61.6	916.7	-23.4
3900.00	H	14.8	*	5.0	33.7	-16.2	37.3	73.2	500.0	-16.7
3900.00	V	15.5	*	5.0	33.7	-16.2	38.0	79.2	500.0	-16.0

Checked BY Richard E. King :

Richard E. King



Occupied Bandwidth

MANUFACTURER : The Chamberlain Group
MODEL NUMBER : 1A6801
SERIAL NUMBER : SMP 15817
TEST MODE : Tx @ 390MHz
TEST PARAMETERS :

NOTES