Measurement of RF Interference from a Model WGAPLM Wireless Intercom System with Call Forwarding Transmitter

For	:	The Chamberlain Group Elmhurst, IL 60126
P.O. No.	:	861451
Date Tested	:	March 9 and March 30-31, 2009
Test Personnel	:	Richard King, Dan Crowder
Specification	:	FCC "Code of Federal Regulations" Title 47 Part 15, Subpart C
	:	Industry Canada RSS-210
	:	Industry Canada RSS-GEN

Test Report By : Richard King

Witnessed By : Mark Zabre

Approved By : Raymond J. Klouda
Registered Professional Engineer of Illinois - 44894

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TABLE OF CONTENTS

REVISION HISTORY

Revision	Date	Description
—	31 March 2009	Initial release
A	June 2, 2009	Changed text in paragraph 5.2.1 from: “Rolling Code consists of the following: First Sync (0.5msec), 20 trinary bits (4msec each), Blank Time (59.5msec), Second Sync (1.5msec), 20 Trinary bits (4msec each) and blank time (58.5msec).” To: “Rolling Code consists of the following: First Sync (0.5msec), 20 trinary bits (2msec each, 1.5msec on time), Blank Time (59.5msec), Second Sync (1.5msec), 20 Trinary bits (2msec each) and blank time (58.5msec).”

Measurement of RF Emissions from a Wireless Intercom System with Call Forwarding WGAPLM Transmitter

1 INTRODUCTION

1.1 Scope of Tests

This document represents the results of the series of radio interference measurements performed on a model Wireless Intercom System with Call Forwarding, Part No. WGAPLM transmitter, no serial number was assigned (hereinafter referred to as the test item). The test item was designed to transmit at approximately 315MHz using an antenna. The test item was manufactured and submitted for testing by The Chamberlain Group located in Elmhurst, IL.

1.2 Purpose

The test series was performed to determine if the test item meets the conducted and radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.231(b) for Intentional Radiators and Industry Canada requirements, RSS-210. Testing was performed in accordance with ANSI C63.4-2003.

1.3 Deviations, Additions and Exclusions

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

1.4 EMC Laboratory Identification

This series of tests was performed by Elite Electronic Engineering Incorporated of Downers Grove, Illinois. The laboratory is accredited by the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP Lab Code: 100278-0.

1.5 Laboratory Conditions

The temperature at the time of the test was 23°C and the relative humidity was 21%.

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 2008
- 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 RSS-210, Issue 7, June 2007, “Spectrum Management and Telecommunications Radio Standards Specification, Low-power License-exempt radio communication devices (All Frequency Bands): Category I Equipment”
- Industry Canada RSS-GEN, Issue 2, June 2007, “Spectrum Management and Telecommunications Radio Standards Specification, General Requirements and Information for the Certification of radio communication equipment”

3 TEST ITEM SET-UP AND OPERATION

3.1 General Description

The test item is a Wireless Intercom System with Call Forwarding, Part No. WGAPLM. A block diagram of the

test item set-up is shown as Figure 1.

3.1.1 Power Input

The test item obtained 12VAC 60Hz power through 2 leads from the secondary of an ALL Co. step-down transformer, Part No. YHL-1250 serial number SN5300061. The primary of this transformer received 115V 60Hz power through lowpass powerline filters on the wall of the shielded enclosure. The 12VAC power from the secondary of the transformer was provided to the test item through a 2 wire, 4 foot long unshielded cord. Each primary lead was connected through a line impedance stabilization network (LISN) which was located on the copper ground plane. The network complies with the requirements of Paragraph 4.1.2 of ANSI C63.4-2001.

3.1.2 Peripheral Equipment

The test item does not require peripheral equipment to operate normally.

3.1.3 Interconnect Cables

The test item does not come equipped with interconnect cables.

3.1.4 Grounding

The test item was grounded through a third wire from the chassis ground to the earth ground.

3.2 Operational Mode

For all tests, the test item was placed on an 80cm high non-conductive stand. For test purposes, the test item was programmed to continuously transmit once the test item was powered up.

3.3 Test Item Modifications

The test item was not modified to meet the FCC Part 15C 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 9-1. All equipment was calibrated per the instruction manuals supplied by the manufacturer.

Conducted emission tests were performed with a spectrum analyzer in conjunction with a quasi-peak adapter.

Radiated emissions were performed with a spectrum analyzer. This receiver allows measurements with the bandwidths specified by the FCC and with the quasi-peak detector function. The receiver bandwidth was 120kHz for the 30MHz to 1000MHz 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 Emission Measurements		
Combined Standard Uncertainty	1.07	-1.07
Expanded Uncertainty (95% confidence)	2.1	-2.1

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

5 TEST PROCEDURES

5.1 Powerline Conducted Emissions

5.1.1 Requirements

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 of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56*	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

5.1.2 Procedures

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

5.1.3 Results

As can be seen from the data, all emissions measured from the test item were within the specification limits. The plots of the peak preliminary conducted voltage levels on each power line are presented on pages 15 and 16. The conducted limit for intentional radiators is shown as a reference. The final quasi-peak results are presented on pages 17 and 18.

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, conducted emission levels are shown on Figure 2.

5.2 Duty Cycle Factor Measurements

5.2.1 Procedures

The duty cycle factor is used to convert peak detected readings to average readings. This factor is computed from the time domain trace of the pulse modulation signal.

With the transmitter set up to transmit for maximum pulse density, the time domain trace is displayed on the spectrum analyzer. This trace is obtained by tuning center frequency to the transmitter frequency and then setting a zero span width with 10msec/div. The amplitude settings are adjusted so that the on/off transitions clear the 4th division from the bottom of the display. The markers are set at the beginning and end of a word period. If the word period exceeds 100 msec the word period is set to 100 msec. The on-time and off-time are then measured. The on-time is total time signal level exceeds the 4th division. Off-time is time under for the word period. The duty cycle is then computed as the (On-time/ word period) where the word period = (On-time + Off-time).

The following information was supplied by Chamberlain Manufacturing:

Rolling Code consists of the following: First Sync (0.5msec), 20 trinary bits (2msec each, 1.5msec on time), Blank Time (59.5msec), Second Sync (1.5msec), 20 Trinary bits (2msec each) and blank time (58.5msec).

The trinary bits change and roll over time via a proprietary coding scheme. Since the bits will change on a key press, a best and worst case situation is looked at. The best and worst case is then averaged. However the worst case situation is used when computing the rolling code modulation factor.

Worst Case- 31msec ON time over 100msec
Best Case- 11 msec ON time over 100msec
Average- 21 msec over 100msec
20 log (31/100) = -10.17dB. (ROLLING CODE MODULATION FACTOR)

5.2.2 Results

A representative plot of the duty cycle is shown on page 14. The worse case duty cycle factor was computed to be -10.2dB.

5.3 Radiated Measurements

5.3.1 Requirements

The following radiated emission limits apply:

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 315.02MHz, the limit at the fundamental is 6040.4uV/m @ 3m and the limit on the harmonics is 604.0uV/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.

5.3.2 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.

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 4.0GHz was investigated using a peak detector function. The data was then processed by the computer to calculate equivalent field intensity.

The final emissions 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.

5.3.3 Results

The preliminary plots, with the test item transmitting at 315MHz, are presented on pages 19 through 22. The plots are presented for a reference only, and are not used to determine compliance.

The final radiated levels, with the test item transmitting at 315MHz, are presented on data page 23. 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 Figure 3.

5.4 Occupied Bandwidth Measurements

5.4.1 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.

5.4.2 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 30 kHz and span was set to 2 MHz. The frequency spectrum near the fundamental was plotted.

5.4.3 Results

The plot of the emissions near the fundamental frequency is presented on data page 24. As can be seen from this data page, the transmitter met the occupied bandwidth requirements. The 99% bandwidth was measured to be 180.36kHz.

6 OTHER TEST CONDITIONS

6.1 Test Personnel and Witnesses

All tests were performed by qualified personnel from Elite Electronic Engineering Incorporated. The test series was witnessed by The Chamberlain Group personnel.

6.2 Disposition of the Test Item

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

7 CONCLUSIONS

It was determined that The Chamberlain Group Wireless Intercom System with Call Forwarding, Part No. WGAPLM, Serial No. none assigned, did fully meet the conducted and radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.205 et seq. for Intentional Radiators, when tested per ANSI C63.4-2003.

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 test item at the test date as operated by The Chamberlain Group personnel. Any electrical or mechanical modification made to the test item subsequent to the specified test date will serve to invalidate the data and void this certification.

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
APK0	PRE-AMPLIFIER	HEWLETT PACKARD	8449B	3008A00662	1-26.5GHZ	3/18/2009	3/18/2010
CDS1	COMPUTER	GATEWAY	MFATXPNT NMZ 500L	0028483110	1.8GHZ	N/A	
CDS2	COMPUTER	GATEWAY	MFATXPNT NMZ 500L	0028483108	1.8GHZ	N/A	
CMA0	MULTI-DEVICE CONTROLLER	EMCO	2090	9701-1213	---	N/A	
HRE1	LASER JET 5P	HEWLETT PACKARD	C3150A	USHB061052	---	N/A	
NTA1	BILOG ANTENNA	CHASE EMC LTD.	BILOG CBL6112	2054	0.03-2GHZ	9/2/2008	9/2/2009
NWH0	RIDGED WAVE GUIDE	TENSOR	4105	2081	1-12.4GHZ	10/25/2008	10/25/2009
PLA5	462D/70A LISN	CEMEC, INC.	462D/70A	06	0.01-400MHZ	6/5/2008	6/5/2009
PLLB	50UH LISN 462D	ELITE ELECTRONIC ENG	462D/70A	012	0.01-400MHZ	2/10/2009	2/10/2010
RAC1	SPECTRUM ANALYZER	HEWLETT PACKARD	85660B	3407A08369	100HZ-22GHZ	3/2/2009	3/2/2010
RACB	RF PRESELECTOR	HEWLETT PACKARD	85685A	3506A01491	20HZ-2GHZ	3/3/2009	3/3/2010
RAF3	QUASIPEAK ADAPTER	HEWLETT PACKARD	85650A	3303A01775	0.01-1000MHZ	3/3/2009	3/3/2010
RAKG	RF SECTION	HEWLETT PACKARD	85462A	3549A00284	0.009-6500MHZ	1/23/2009	1/23/2010
RAKH	RF FILTER SECTION	HEWLETT PACKARD	85460A	3448A00324	---	1/23/2009	1/23/2010
RBA1	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB26	100146	20HZ-26.5GHZ	9/10/2008	9/10/2009
T1N5	10DB 20W ATTENUATOR	NARDA	766-10		DC-4GHZ	8/29/2008	8/29/2009
XLQJ	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	56	DC-2GHZ	8/29/2008	8/29/2009
XZG0	ATTENUATOR/SWITCH DRIVER	HEWLETT PACKARD	11713A	3439A02724	---	N/A	

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.

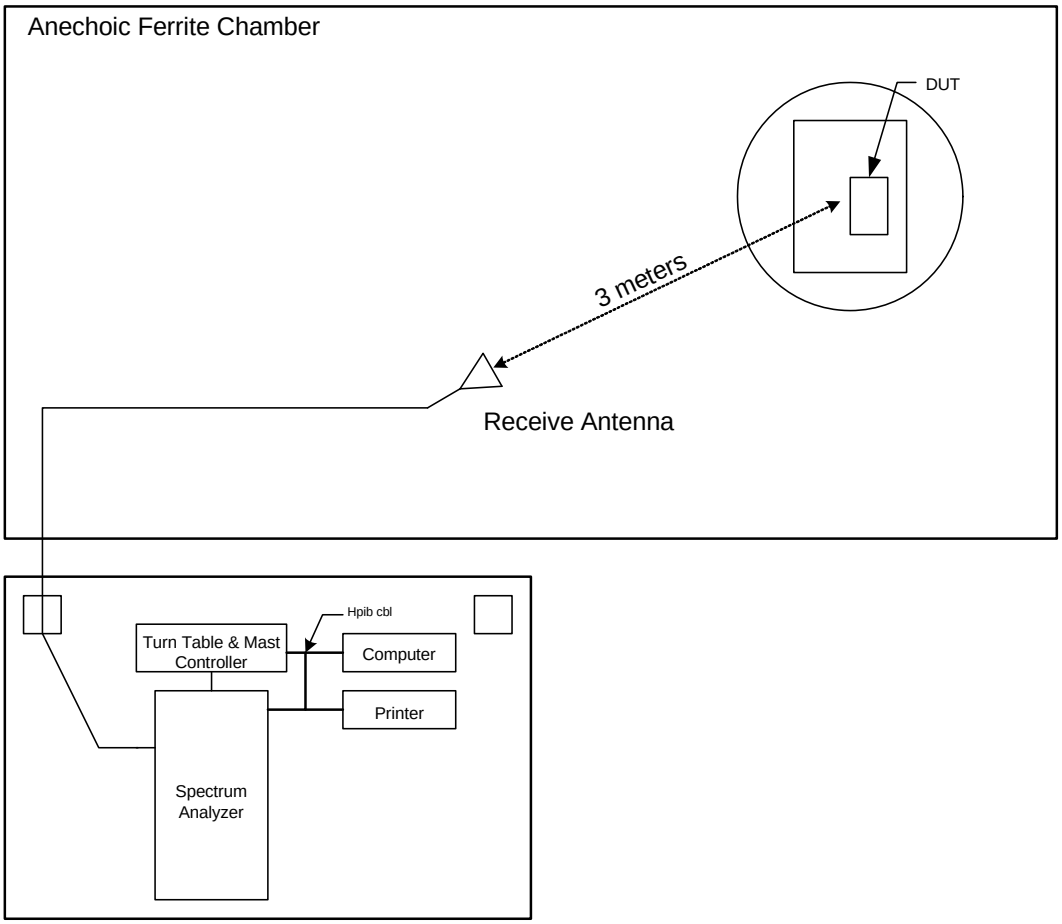
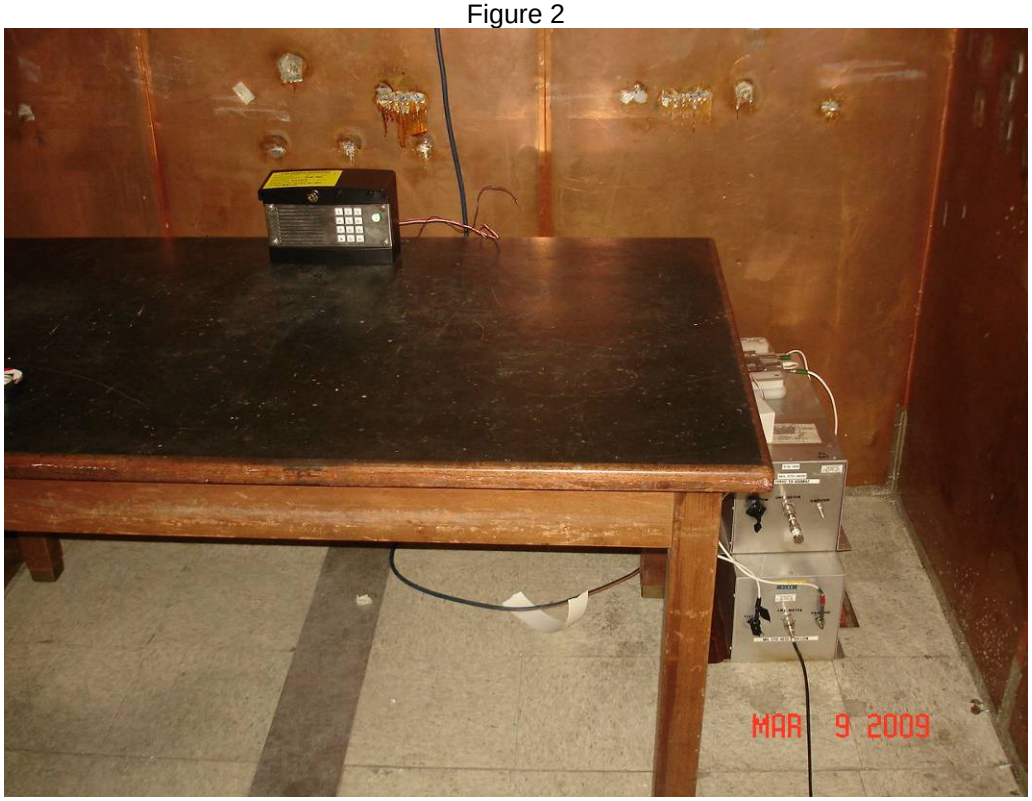


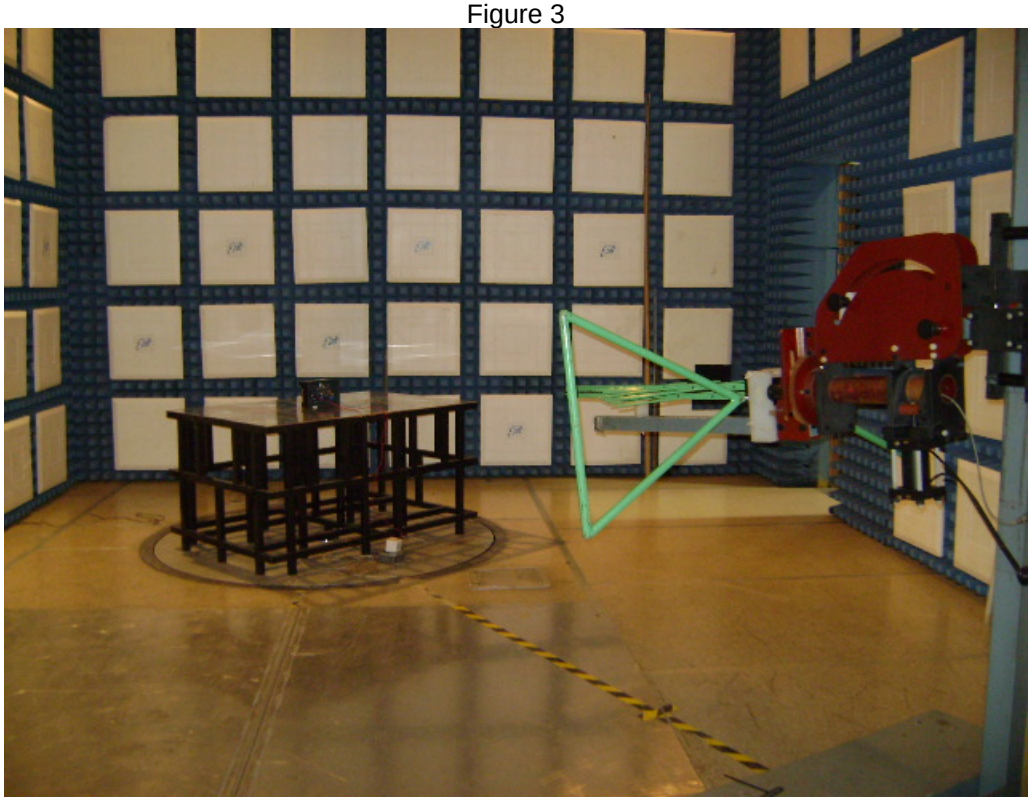
FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

Figure 2

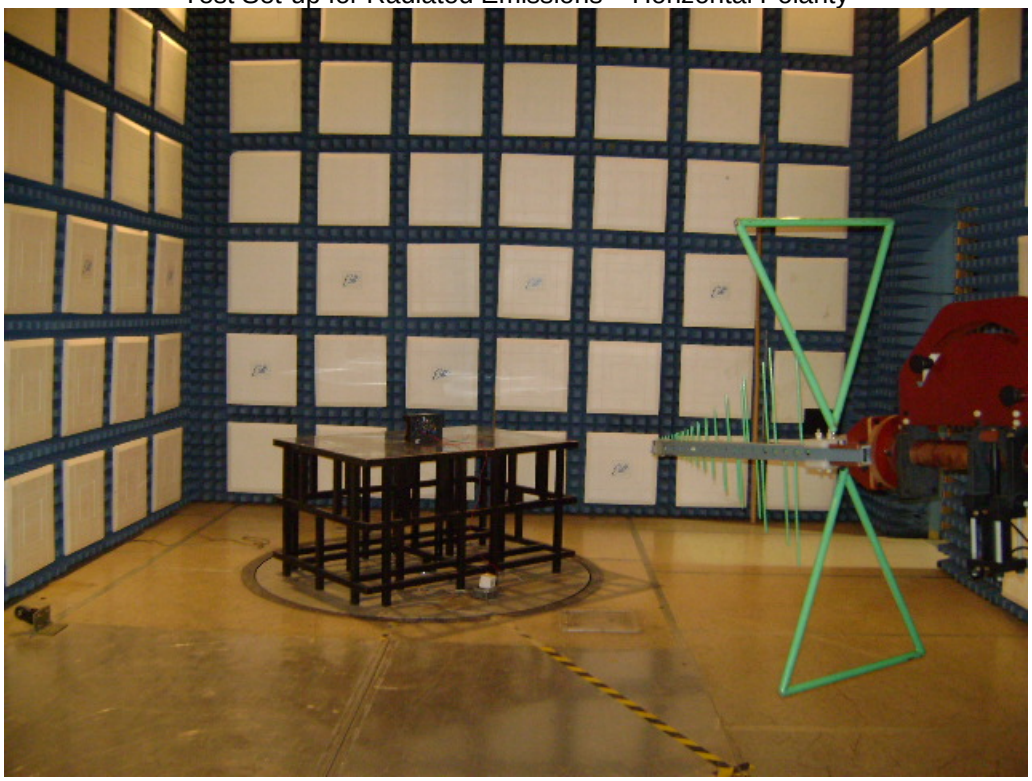


Test Set-up for Conducted Emissions

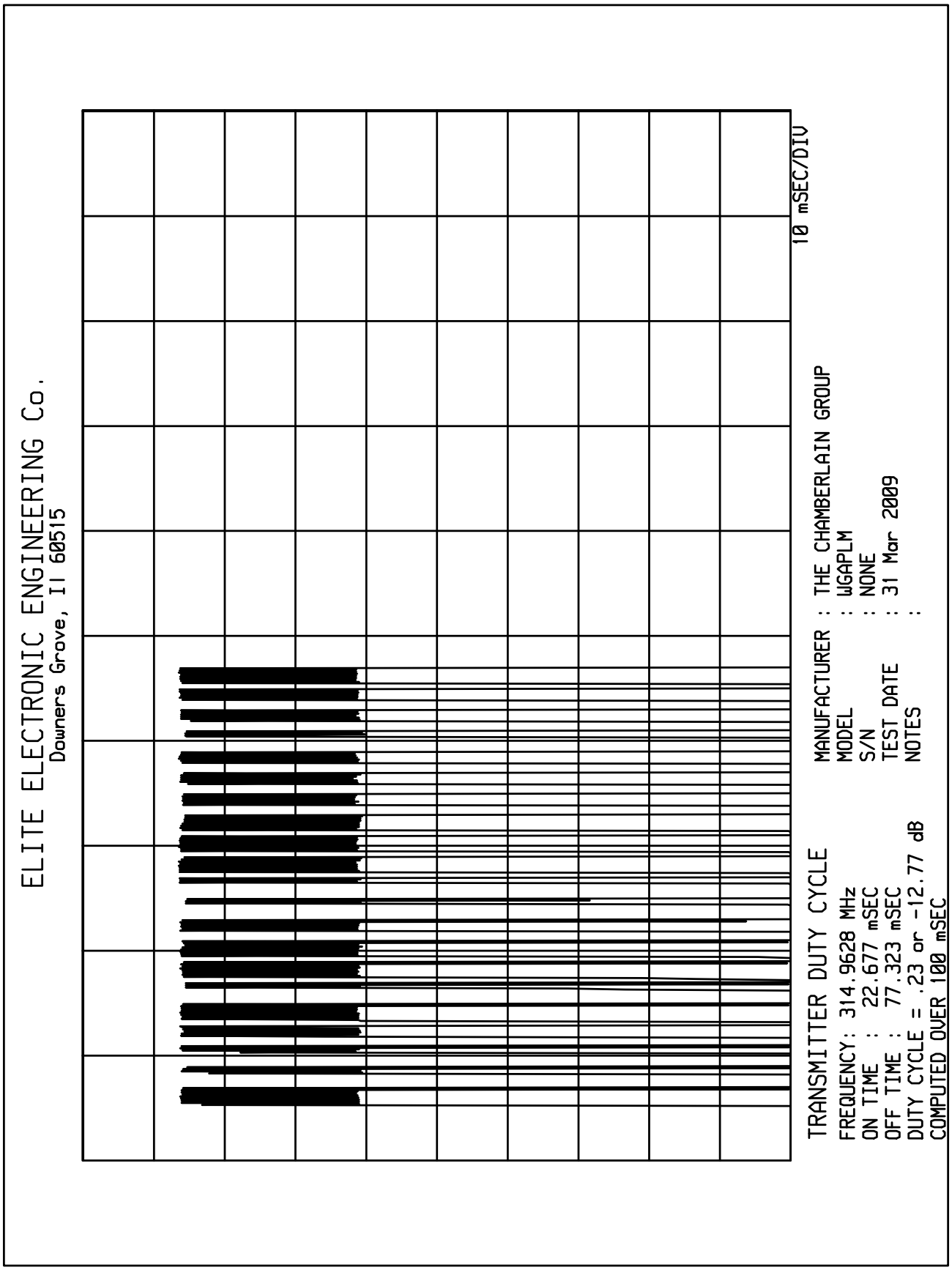
Figure 3

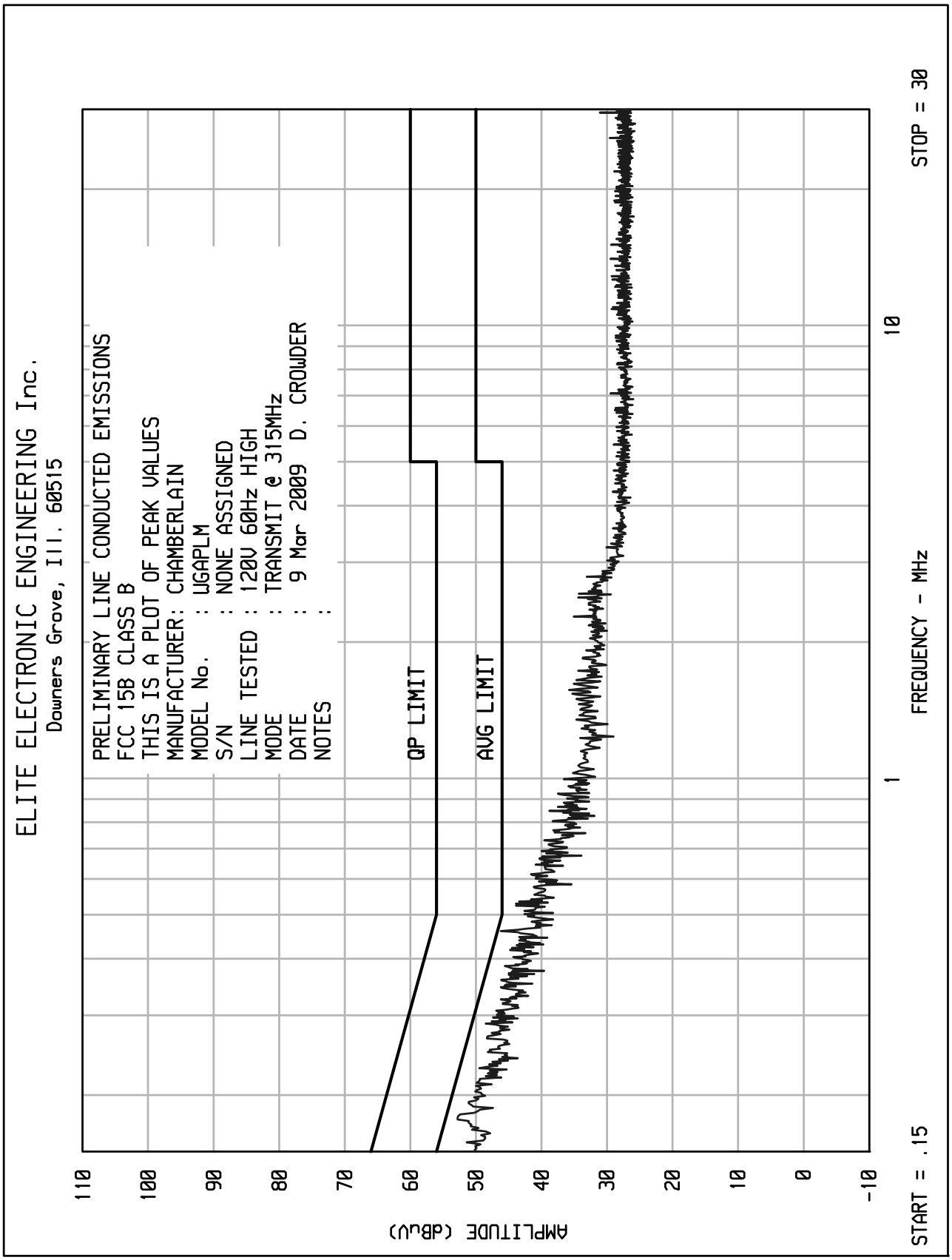


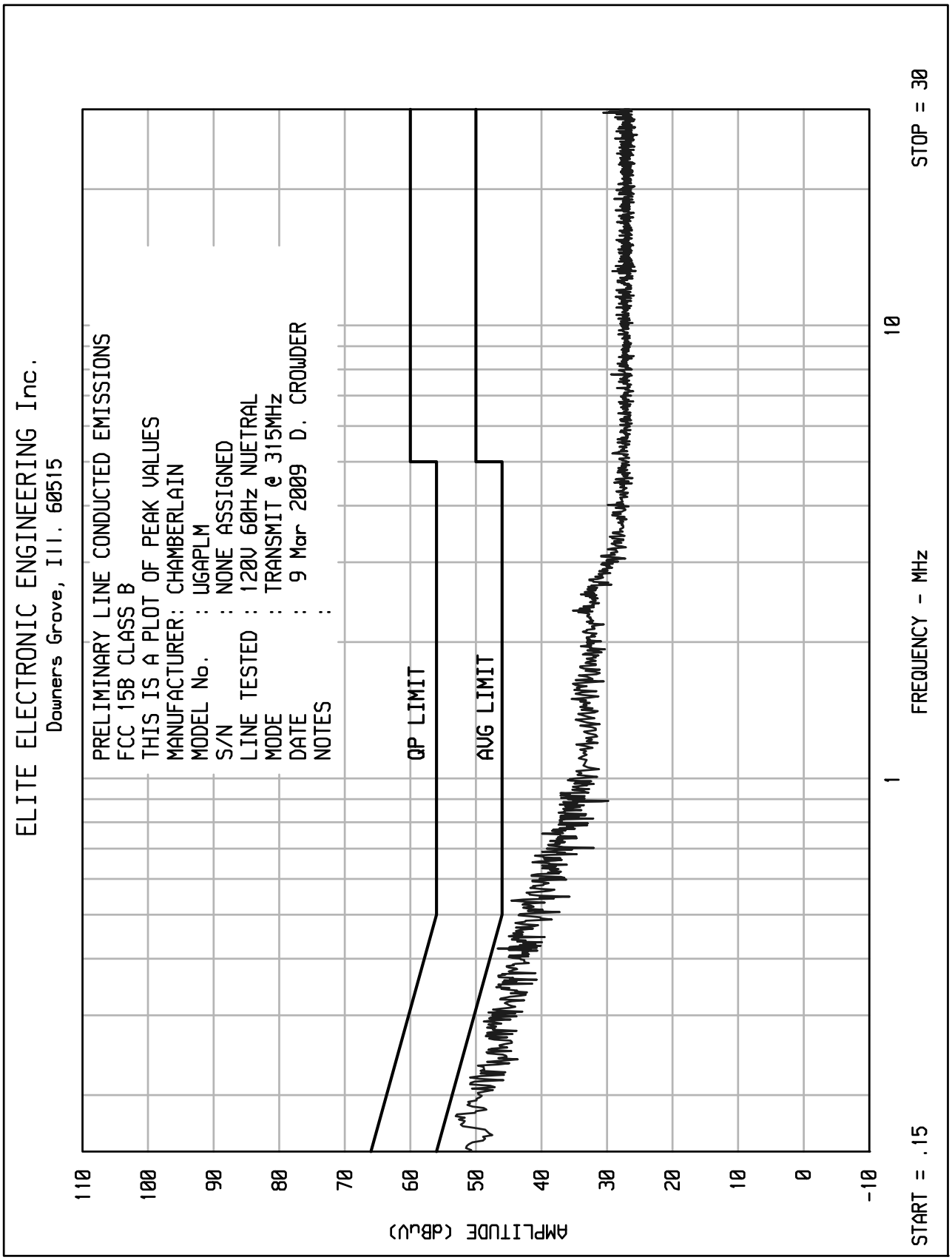
Test Set-up for Radiated Emissions – Horizontal Polarity



Test Set-up for Radiated Emissions – Vertical Polarity


ELITE ELECTRONIC ENGINEERING Co.
Downers Grove, Il 60515
10 mSEC/DIV
TRANSMITTER DUTY CYCLE
FREQUENCY: 314.9628 MHz
ON TIME : 22.677 mSEC
OFF TIME : 77.323 mSEC
DUTY CYCLE = .23 or -12.77 dB
COMPUTED OVER 100 mSEC
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL : WGAPLM
S/N : NONE
TEST DATE : 31 Mar 2009
NOTES :


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
PRELIMINARY LINE CONDUCTED EMISSIONS
FCC 15B CLASS B
THIS IS A PLOT OF PEAK VALUES
MANUFACTURER: CHAMBERLAIN
MODEL No. : WGAPLM
S/N : NONE ASSIGNED
LINE TESTED : 120V 60Hz HIGH
MODE : TRANSMIT @ 315MHz
DATE : 9 Mar 2009 D. CROWDER
NOTES : :
QP LIMIT
AVG LIMIT
AMPLITUDE (dBuV)
110
100
90
80
70
60
50
40
30
20
10
0
-10
START = .15
1
10
STOP = 30
FREQUENCY - MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
PRELIMINARY LINE CONDUCTED EMISSIONS
FCC 15B CLASS B
THIS IS A PLOT OF PEAK VALUES
MANUFACTURER: CHAMBERLAIN
MODEL No. : UGAPLM
S/N : NONE ASSIGNED
LINE TESTED : 120V 60Hz NUETRAL
MODE : TRANSMIT @ 315MHz
DATE : 9 Mar 2009 D. CROWDER
NOTES : :
QP LIMIT
AVG LIMIT
AMPLITUDE (dBuV)
110
100
90
80
70
60
50
40
30
20
10
0
-10
START = .15
1
10
STOP = 30
FREQUENCY - MHz

ELITE ELECTRONIC ENGINEERING CO.

MANUFACTURER : The Chamberlain Group
MODEL : WGAPLM
S/N : NONE ASSIGNED
SPECIFICATION : FCC 15B CLASS B
TEST : LINE CONDUCTED EMISSIONS
LINE TESTED : 120V 60Hz HIGH
MODE : TRANSMIT @ 315MHz
DATE : 9 Mar 2009
NOTES :
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

FREQUENCY MHz	METER RDG. dBuV	QP LIMIT dBuV	AVG RDG dBuV	AVG LIMIT dBuV	NOTES
.180	48.6	64.5		54.5	
.290	41.1	60.5		50.5	
.367	37.9	58.6		48.6	
.461	39.9	56.7		46.7	
.652	34.5	56.0		46.0	
.805	32.9	56.0		46.0	
.844	31.8	56.0		46.0	
1.016	28.4	56.0		46.0	
1.570	30.3	56.0		46.0	
2.275	27.6	56.0		46.0	
2.496	27.4	56.0		46.0	
4.248	26.4	56.0		46.0	
7.027	25.9	60.0		50.0	
9.351	26.0	60.0		50.0	
12.173	25.9	60.0		50.0	
13.963	25.9	60.0		50.0	
17.653	25.9	60.0		50.0	
19.993	25.9	60.0		50.0	
22.973	25.9	60.0		50.0	
25.887	25.9	60.0		50.0	

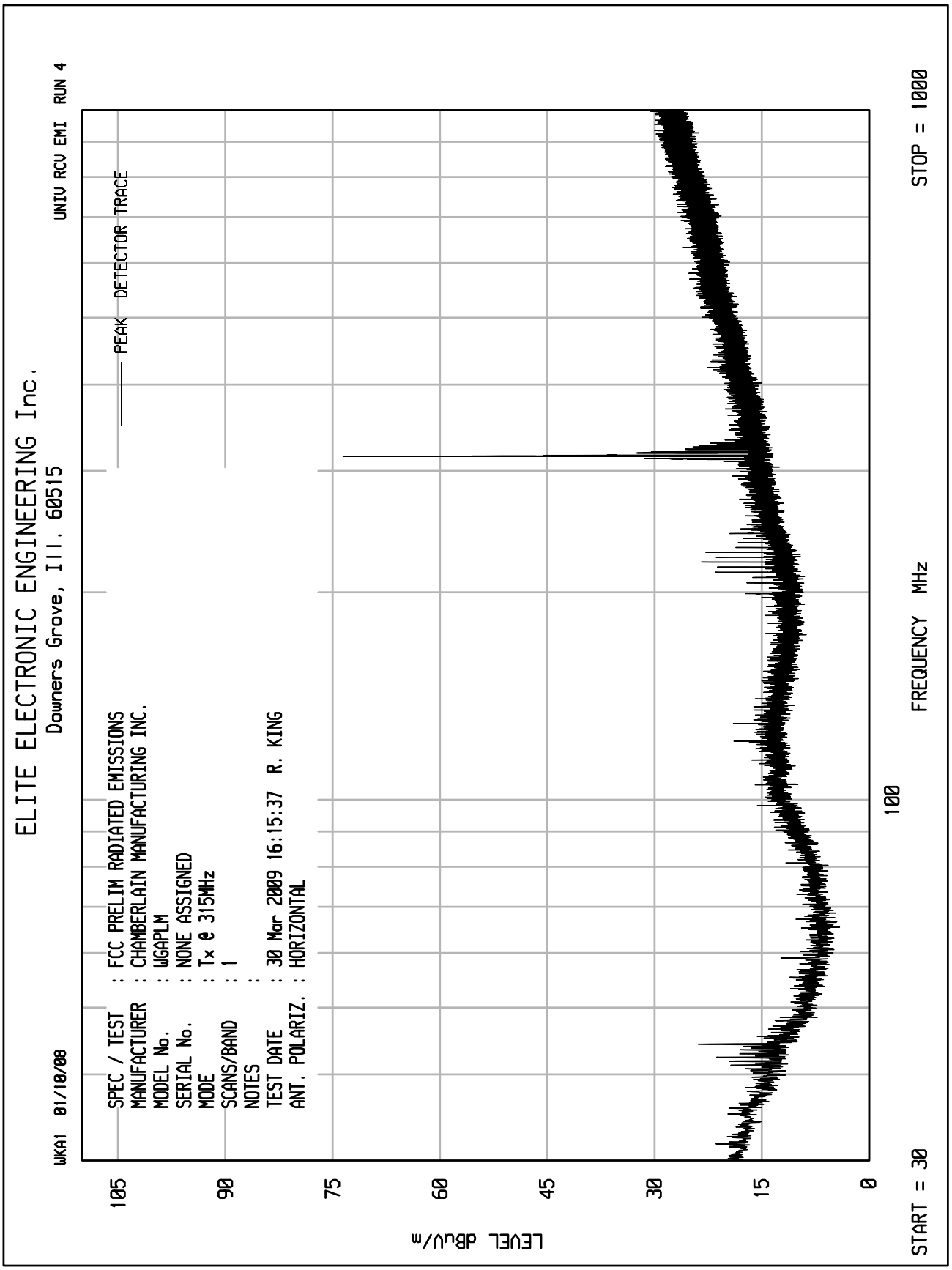
CHECKED BY: _____
D. CROWDER

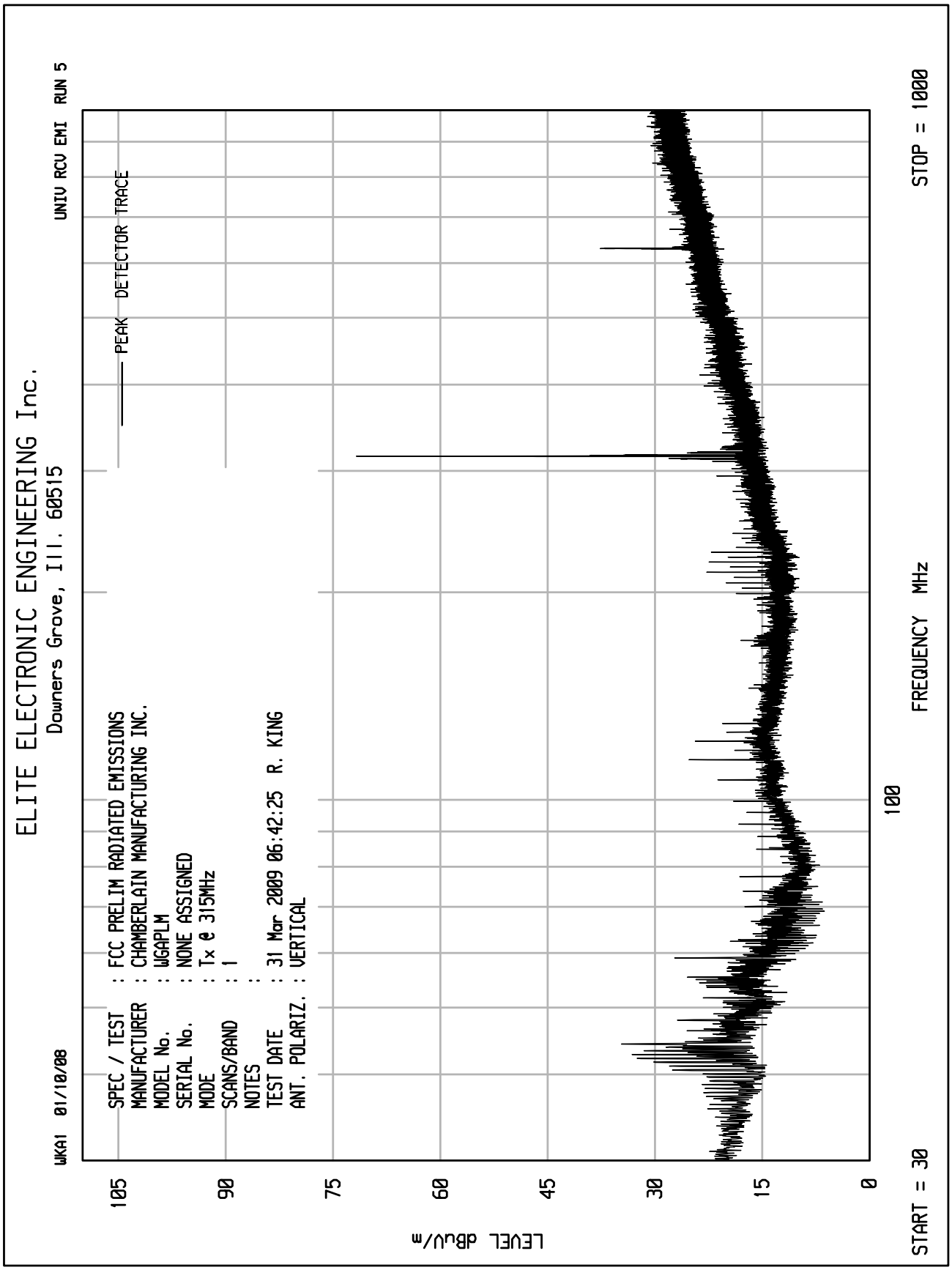
ELITE ELECTRONIC ENGINEERING CO.

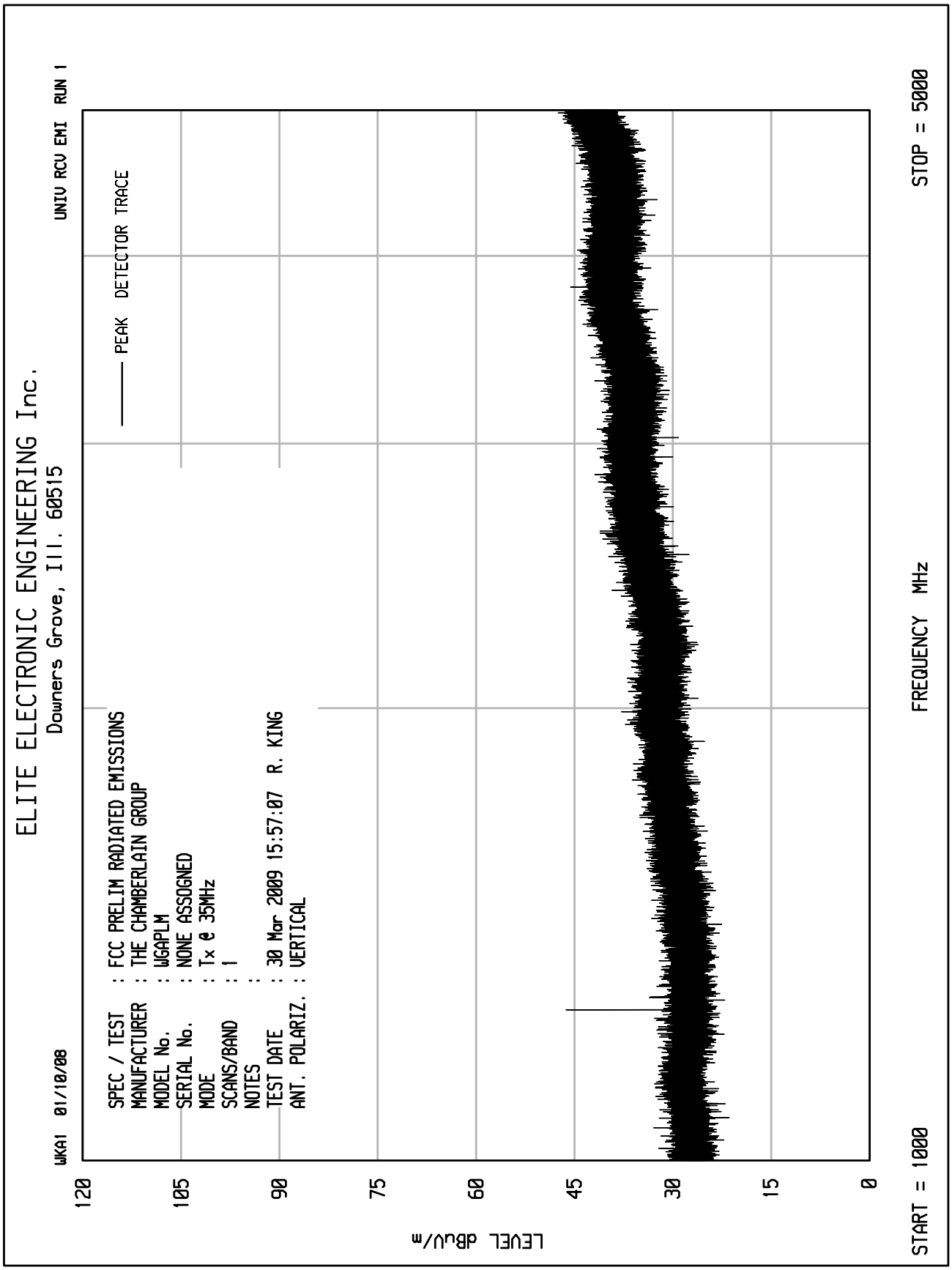
MANUFACTURER : The Chamberlain Group
MODEL : WGAPLM
S/N : NONE ASSIGNED
SPECIFICATION : FCC 15B CLASS B
TEST : LINE CONDUCTED EMISSIONS
LINE TESTED : 120V 60Hz NUETRAL
MODE : TRANSMIT @ 315MHz
DATE : 9 Mar 2009
NOTES :
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

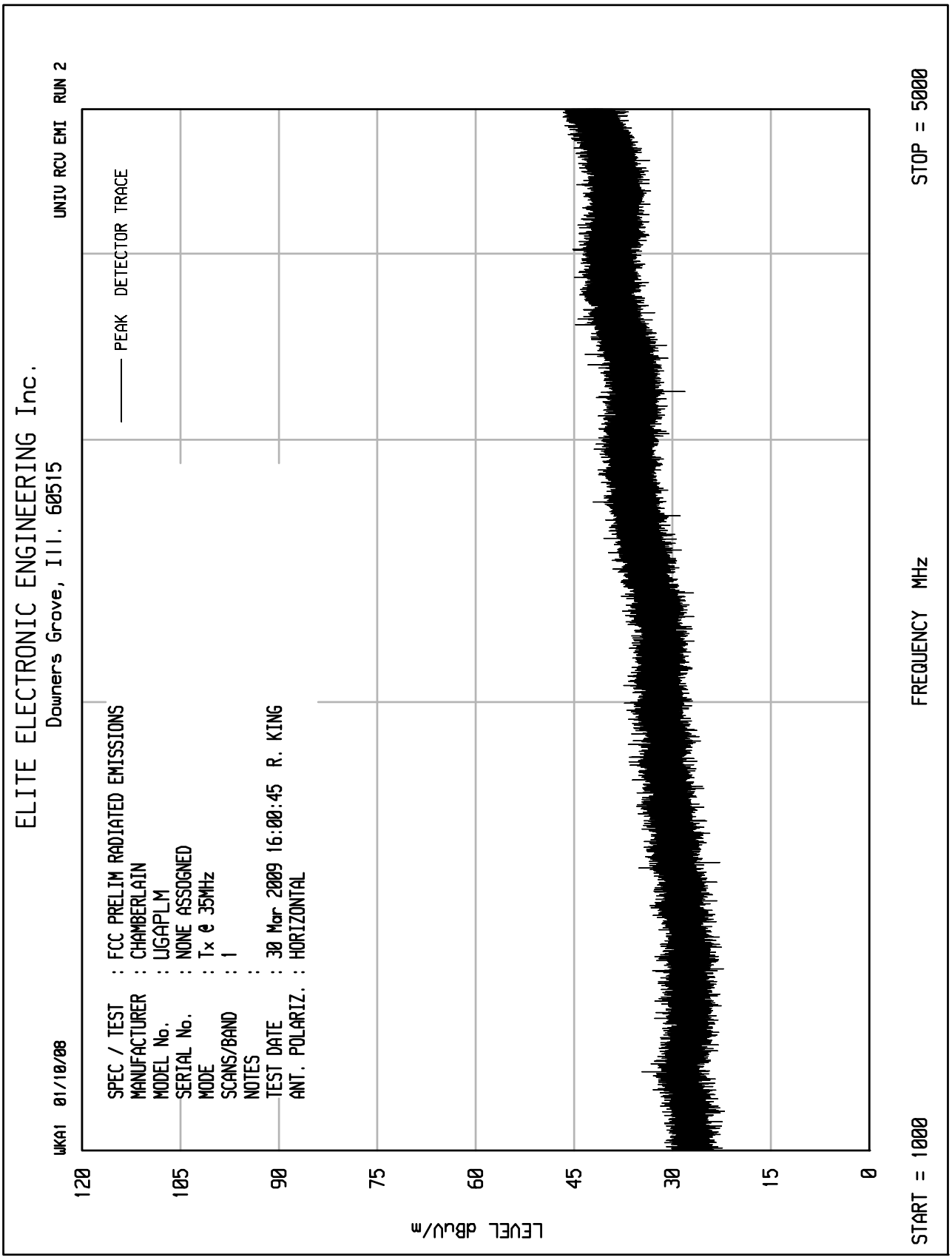
FREQUENCY MHz	METER RDG. dBuV	QP LIMIT dBuV	AVG RDG dBuV	AVG LIMIT dBuV	NOTES
.179	48.9	64.5		54.5	
.289	41.8	60.6		50.6	
.321	41.0	59.7		49.7	
.422	38.4	57.4		47.4	
.537	36.9	56.0		46.0	
.652	34.9	56.0		46.0	
.690	34.4	56.0		46.0	
.844	31.8	56.0		46.0	
1.493	30.4	56.0		46.0	
2.334	28.1	56.0		46.0	
3.059	26.7	56.0		46.0	
4.535	26.4	56.0		46.0	
7.519	25.9	60.0		50.0	
9.511	25.9	60.0		50.0	
12.688	25.9	60.0		50.0	
15.388	26.0	60.0		50.0	
18.338	26.0	60.0		50.0	
20.483	25.9	60.0		50.0	
24.176	25.9	60.0		50.0	
26.785	25.9	60.0		50.0	

CHECKED BY: _____
D. CROWDER


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 4
WKAI 01/10/08
SPEC / TEST : FCC PRELIM RADIATED EMISSIONS
MANUFACTURER : CHAMBERLAIN MANUFACTURING INC.
MODEL No. : WGAPLM
SERIAL No. : NONE ASSIGNED
MODE : Tx @ 315MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 30 Mar 2009 16:15:37 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 5
WKAI 01/10/08
SPEC / TEST : FCC PRELIM RADIATED EMISSIONS
MANUFACTURER : CHAMBERLAIN MANUFACTURING INC.
MODEL No. : WGAPLM
SERIAL No. : NONE ASSIGNED
MODE : Tx @ 315MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 31 Mar 2009 06:42:25 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 01/10/08
SPEC / TEST : FCC PRELIM RADIATED EMISSIONS
MANUFACTURER : THE CHAMBERLAIN GROUP
MODEL No. : WGAPLM
SERIAL No. : NONE ASSOGNED
MODE : Tx @ 35MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 30 Mar 2009 15:57:07 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 5000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 2
WKA1 01/10/08
SPEC / TEST : FCC PRELIM RADIATED EMISSIONS
MANUFACTURER : CHAMBERLAIN
MODEL No. : LJGAPLM
SERIAL No. : NONE ASSOGNED
MODE : Tx @ 35MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 30 Mar 2009 16:00:45 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

ETR No.

DATA PAGE

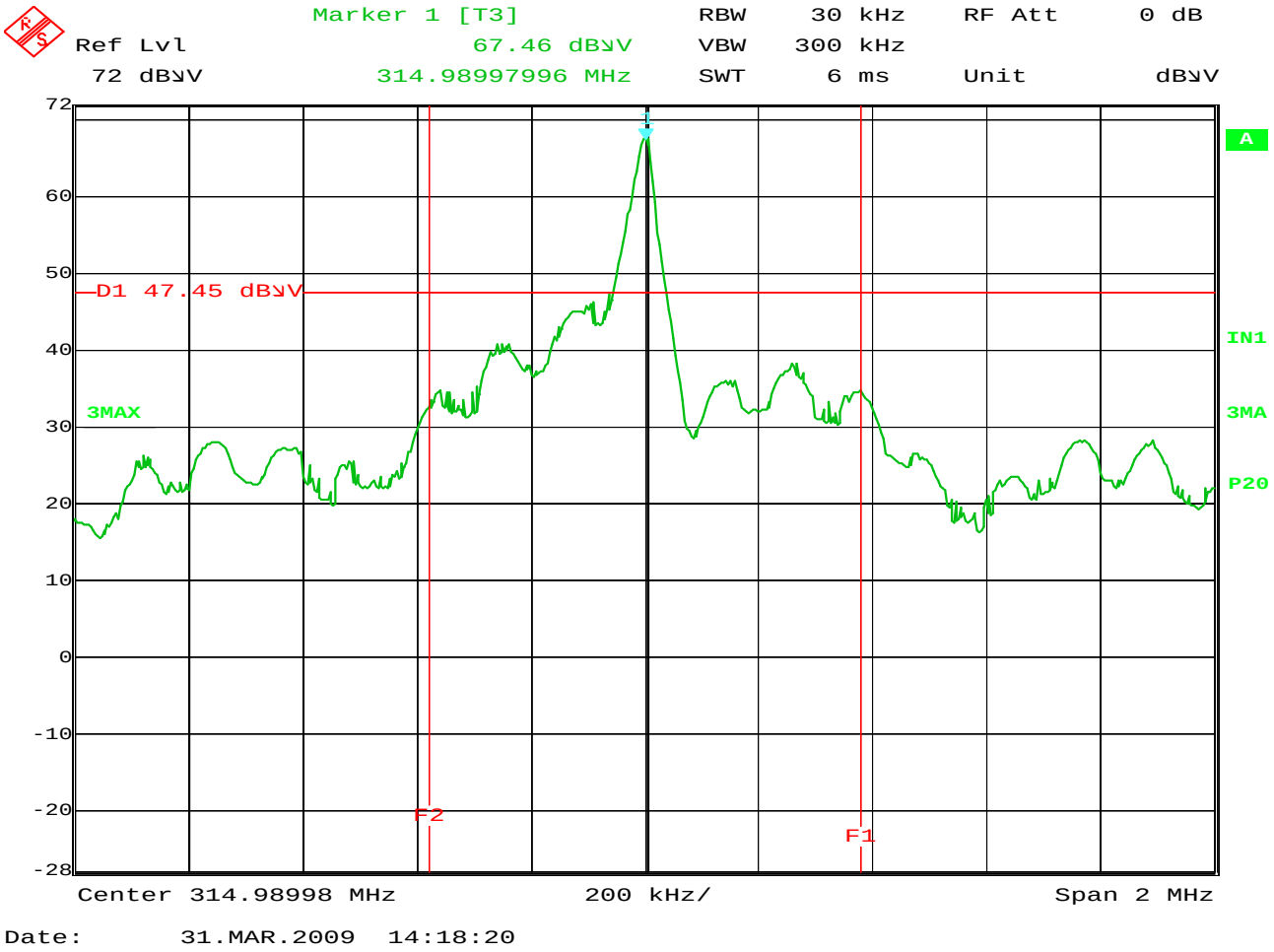
SPECIFICATION : FCC PART 15C TRANSMITTER OPEN FIELD DATA
MANUFACTURER : The Chamberlain Group
MODEL : WGAPLM
S/N : none assigned
TEST DATE : 30 Mar 2009
NOTES :
TEST ANTENNA : CHASE BI-LOG & DRWG ANTENNAS

FREQUENCY MHz	ANT POL	MTR RDG dBuV	CBL FAC dB	ANT FAC dB	DUTY CYCLE dB	TOTAL dBuV/m @3m	TOTAL uV/m @3m	LIMIT uV/m @3m	NOTES
315.00	H	68.9	1.5	14.5	-10.2	74.7	5424.8	6041.7	
315.00	V	63.1	1.5	14.5	-10.2	68.9	2782.2	6041.7	
630.00	H	26.6	2.1	20.1	-10.2	38.5	84.6	604.2	
630.00	V	32.1	2.1	20.1	-10.2	44.0	159.3	604.2	
945.00	H	24.2	2.5	22.7	-10.2	39.2	91.1	604.2	
945.00	V	25.9	2.5	22.7	-10.2	40.9	110.8	604.2	
1260.00	H	20.9	2.8	25.6	-10.2	39.1	90.2	604.2	
1260.00	V	22.6	2.8	25.6	-10.2	40.8	109.7	604.2	
1575.00	H	16.4	3.2	26.4	-10.2	35.7	61.2	500.0	*
1575.00	V	17.1	3.2	26.4	-10.2	36.4	66.3	500.0	*
1890.00	H	14.7	3.4	27.8	-10.2	35.7	60.9	604.2	
1890.00	V	15.6	3.4	27.8	-10.2	36.6	67.5	604.2	
2205.00	H	13.3	3.8	28.8	-10.2	35.6	60.5	500.0	*
2205.00	V	13.2	3.8	28.8	-10.2	35.5	59.8	500.0	*
2520.00	H	14.4	4.1	29.6	-10.2	37.9	78.7	604.2	
2520.00	V	13.3	4.1	29.6	-10.2	36.8	69.3	604.2	
2835.00	H	14.1	4.5	30.9	-10.2	39.2	91.5	500.0	*
2835.00	V	13.8	4.5	30.9	-10.2	38.9	88.4	500.0	*
3150.00	H	13.6	4.7	31.8	-10.2	40.0	99.9	604.2	
3150.00	V	13.4	4.7	31.8	-10.2	39.8	98.1	604.2	

* DENOTES A FREQUENCY CONFLICT WITH RESTRICTED BANDS

Checked BY Richard E. King :

Richard E. King



FCC 15.231 20dB bandwidth

MANUFACTURER	: The Chamberlain Group
TEST ITEM	: Wireless Intercom System with Call Forwarding
MODEL NUMBER	: WGAPLM
TEST MODE	: Tx @ 315MHz
NOTES	: Display line D1 represents the 20dB down point. Display lines F1 and F2 represent the 0.25% span from the center frequency