Measurement of RF Interference from a Part No. PGC401M-B Home Automation Gateway Transceiver

For	Physical Graph Corporation 11654 Plaza America Drive, Suite 601 Reston, VA 20190
P.O. Number	Credit Card
Date Tested	December 7 through 10, 2012
Test Personnel	Richard King
Specification	FCC "Code of Federal Regulations" Title 47 Part15, Subpart C Industry Canada RSS-GEN Industry Canada RSS-210

Test Report By:

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REVISION HISTORY

Revision	Date	Description
—	12/13/2012	Initial release

Measurement of RF Emissions from a Home Automation Gateway, Part No. PGC401M-B Transceiver

1 INTRODUCTION

1.1 Scope of Tests

This document represents the results of the series of radio interference measurements performed on a Physical Graph Corporation Home Automation Gateway, Part No. PGC401M-B, Serial No. 1, transceiver (hereinafter referred to as the EUT). The EUT is a transceiver designed to transmit and receive in the 902-928 MHz band using an internal antenna. The EUT contained a super-heterodyne type receiver which utilizes an intermediate frequency (IF) of 220kHz. The EUT was manufactured and submitted for testing by Physical Graph Corporation located in Reston, VA.

1.2 Purpose

The test series was performed to determine if the EUT meets the conducted and radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Sections 15.107 and 15.109, for receivers and Subpart C, Sections 15.207 and 15.249 for Intentional Radiators Operating within the 902-928 MHz band.

The test series was also performed to determine if the EUT meets the conducted and radiated RF emission requirements of the Industry Canada Radio Standards Specification, RSS-Gen, Section 7.2.4 and Section 6 for receivers and the Industry Canada Radio Standards Specification RSS-Gen Section 7.2.4 and RSS-210 Annex 8, for transmitters.

Testing was performed in accordance with ANSI C63.4-2009.

1.3 Deviations, Additions and Exclusions

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

1.4 EMC Laboratory Identification

This series of tests was performed by Elite Electronic Engineering Incorporated of Downers Grove, Illinois. The laboratory is accredited by the 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 23C and the relative humidity was 21.4%.

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, Subparts B and C, dated 1 October 2012
- ANSI C63.4-2009, "American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"
- Industry Canada RSS-210, Issue 8, December 2010, “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 3, December 2010, “Spectrum Management and Telecommunications Radio Standards Specification, General Requirements and Information for the Certification of radio communication equipment”

3 EUT SETUP AND OPERATION

3.1 General Description

The EUT is a Home Automation Gateway, Part No. PGC401M-B. A block diagram of the EUT setup is shown as Figure 1.

3.1.1 Power Input

The EUT can be powered with 5VDC from the secondary of a USB power supply. The power supply is a Phihong USA Inc. Model PSM03A-050Q-3-R. The primary of this transformer received 115V 60Hz power through lowpass powerline filters on the wall of the shielded enclosure. The 5 VDC power from the secondary of the transformer was provided to the EUT through a 2 wire, 95 cm long unshielded cord. Each primary lead was 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 C63.4-2009.

3.1.2 Peripheral Equipment

No peripheral equipment was submitted with the EUT.

3.1.3 Interconnect Cables

The following interconnect cables were submitted with the EUT:

Item	Description
Ethernet cable	CAT 5 ethernet cable 35 feet long connected to a laptop for programming purposes.

3.1.4 Grounding

The EUT was ungrounded for during the test.

3.2 Operational Mode

For all tests the EUT was placed on an 80cm high non-conductive stand. The EUT was energized. The EUT was set to transmit continously at 908.42 MHz and receive at 908.42 MHz.

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 C63.4-2009 for site attenuation.

4.2 Test Instrumentation

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

4.3 Calibration Traceability

Test equipment is maintained and calibrated on a regular basis. All calibrations are traceable to the National Institute of Standards and Technology (NIST).

4.4 Measurement Uncertainty

All measurements are an estimate of their true value. The measurement uncertainty characterizes, with a specified confidence level, the spread of values which may be possible for a given measurement system.

The measurement uncertainty for these tests is presented below:

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

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

5 TEST PROCEDURES

5.1 Receiver

5.1.1 Powerline Conducted Emissions

5.1.1.1 Requirements

Per the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, 15.107(a) and Industry Canada RSS-Gen section 7.2.4, all radio frequency voltages on the power lines of a receiver shall be below the values shown below when using a quasi-peak or average detector:

CONDUCTED LIMITS FOR A RECEIVER

Frequency MHz	RFI Voltage dBuV(QP)	RFI Voltage dBuV(Average)
0.15-0.5	66 decreasing with logarithm of frequency to 56	56 decreasing with logarithm of frequency to 46
0.5-5	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.

5.1.1.2 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 908.42 MHz.

b) Measurements were first made on the 120VAC 60Hz high 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 return line.

5.1.1.3 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 908.42 MHz are shown on pages 16 and 18. The tabular quasi-peak and average results from each input power line with the EUT set to receive at 908.42 MHz are shown on pages 15 and 17. 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.

5.1.2 Radiated Measurements

5.1.2.1 Requirements

Per the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Section 15.109(a) and Industry Canada RSS-Gen, Section 6.1, all radio frequency emissions from a receiver shall be below the limits shown on the following table:

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.

5.1.2.2 Procedures

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2009 for site attenuation.

The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.

Since a quasi-peak detector and an average detector require 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.

   d) 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.

5.1.2.3 Results

The preliminary plots are presented on pages 20 through 21. The plots are presented for a reference only, and are not used to determine compliance. The final radiated levels are presented on page 22. As can be seen from the data, all emissions measured from the EUT were within the specification limits.

Photographs of the test configuration which yielded the highest or worst case, radiated emission levels are shown on Figure 3.

5.2 Transmitter

5.2.1 Powerline Conducted Emissions

5.2.1.1 Requirements

Per the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Per 15.207(a) and Industry Canada RSS-Gen section 7.2.4, all radio frequency voltages on the power lines of a transmitter shall be below the values shown below when using a quasi-peak or average detector:

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.

5.2.1.1 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 transmitting at 908.42 MHz.

b) Measurements were first made on the 120VAC 60Hz high 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 return line.

5.2.1.1 Results

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 908.42 MHz are shown on pages 32 and 33. The tabular quasi-peak and average results from each input power line with the EUT set to transmit at 908.42 MHz are shown on pages 15 and 17. 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.

5.2.2 Duty Cycle Factor Measurements

5.2.2.1 Requirements

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.

5.2.2.2 Procedures

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).

5.2.2.3 Results

The plots of the duty cycle are shown on data pages 29 through 31. The duty cycle correction factor was calculated to be -1.16dB (-1.16dB = 20*log(65.5msec/(65.5msec+9.4msec)).

5.2.3 Radiated Measurements Transmitter

5.2.3.1 Requirements

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

Paragraph 15.249 has the following radiated emission limits:

Fundamental Frequency MHz	Field Intensity uV/m @ 3 meters	Field Strength Harmonics and Spurious @ 3 meters
902 – 928	50,000	500

For radiated emissions below 1GHz, the field strength limits are based on quasi-peak readings. For radiated emissions above 1GHz, the field strength limits are based on average readings. In addition, the peak field strength of any emission shall not exceed the maximum permitted average limits by more than 20 dB under any condition of modulation.

5.2.3.2 Procedures

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2009 for site attenuation.

The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.

A preliminary radiated emissions test was performed to determine the emission characteristics of the EUT. For the preliminary test, a broadband measuring antenna was positioned at a 3 meter distance from the EUT. The entire frequency range from 30 MHz to 10 GHz was investigated using a peak detector function. The data was then processed by the computer to calculate equivalent field intensity.

The final open field emission tests were then manually performed over the frequency range of 30 MHz to 10000 MHz. Between 30 MHz and 10 GHz, 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 EUT 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 EUT was rotated through three orthogonal axes to determine which orientation produces the highest emission relative to the limit.

5.2.3.3 Results

The preliminary plots, with the EUT transmitting at 908.42 MHz are presented on data pages 37 through 38. The plots are presented for a reference only, and are not used to determine compliance.

The final radiated levels, with the EUT transmitting at 908.42 MHz are presented on data pages 39 and 40. As

can be seen from the data, all emissions measured from the EUT were within the specification limits.

Photographs of the test configuration which yielded the highest, or worst case, radiated emission levels are shown on Figure 3.

5.2.4 Occupied Bandwidth

5.2.4.1 Requirement

In accordance with paragraph 15.249(d), all emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuate by at least 50dB below the level of the fundamental or to the general radiated emissions limits in 15.209, which ever is the lesser attenuation.

5.2.4.2 Procedures

The EUT 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 100 kHz and span was set to 30 MHz. The frequency spectrum near the fundamental was plotted.

5.2.4.3 Results

The plot of the emissions near the fundamental frequency, with the EUT transmitting at 908.42 MHz is presented on data page 41. As can be seen from this data page, the transmitter met the occupied bandwidth requirements. The 99% bandwidth was measured to be 196.4 kHz.

6 CONCLUSIONS

It was determined that the Physical Graph Corporation Home Automation Gateway, Part No. PGC401M-B transceiver, Serial No. 1, did fully meet the conducted and radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Sections 15.107 and 15.109 for receivers and Subpart C, Sections 15.207 and 15.249 for Intentional Radiators Operating within the 902-928 MHz band, when tested per ANSI C63.4-2009.

It was also determined that the Physical Graph Corporation Home Automation Gateway, Part No. PGC401M-B transceiver, Serial No. 1, did fully meet the conducted and radiated RF emission requirements of the Industry Canada Radio Standards Specification, RSS-Gen, Section 7.2.4 and Section 6 for receivers and the Industry Canada Radio Standards Specification RSS-Gen Section 7.2.4 and RSS-210 Annex 8, for transmitters, when tested per ANSI C63.4-2009.

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 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.

8 ENDORSEMENT DISCLAIMER

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

9 EQUIPMENT LIST

Table 9-1 Equipment List

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
APW3	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-35-120-5R0-10-12	PL2924	1GHZ-20GHZ	8/22/2012	8/22/2013
CDY0	WORKSTATION	ELITE	WORKSTATION			N/A	
CMA1	Controllers	EMCO	2090	9701-1213	---	N/A	
NTA2	BILOG ANTENNA	TESEQ	6112D	28040	25-1000MHz	7/30/2012	7/30/2013
NWP1	DOUBLE RIDGED WAVEGUIDE ANTENNA	EATON	3115	2100	1GHZ-12.4GHZ	3/6/2012	3/6/2013
PLF2	CISPR16 50UH LISN	ELITE	CISPR16/70A	002	.15-30MHz	6/20/2012	6/20/2013
PLF4	CISPR16 50UH LISN	ELITE	CISPR16/70A	003	.15-30MHz	6/25/2012	6/25/2013
RAKG	RF SECTION	HEWLETT PACKARD	85462A	3549A00284	0.009-6500MHZ	3/12/2012	3/12/2013
RAKH	RF FILTER SECTION	HEWLETT PACKARD	85460A	3448A00324	---	3/12/2012	3/12/2013
RBB0	EMI TEST RECEIVER 20HZ TO 40 GHZ.	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	3/5/2012	3/5/2013
T1E1	10DB 25W ATTENUATOR	WEINSCHEL	46-10-43	AU1883	DC-18GHZ	8/6/2012	8/6/2013
XLQK	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	55	DC-2GHZ	8/6/2012	8/6/2013
XPQ3	HIGH PASS FILTER	K&L MICROWAVE	4IH30-1804/T10000-0	4	1.8GHZ-10GHZ	11/26/2012	11/26/2013

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.

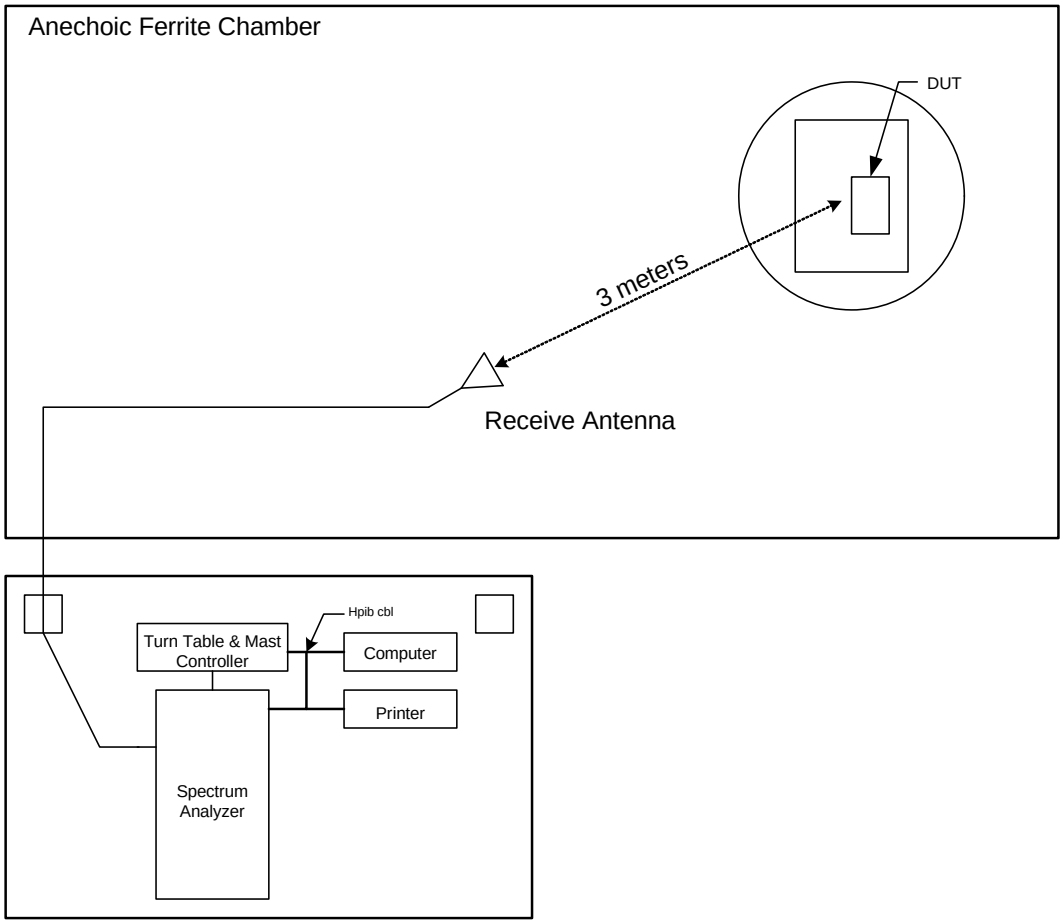


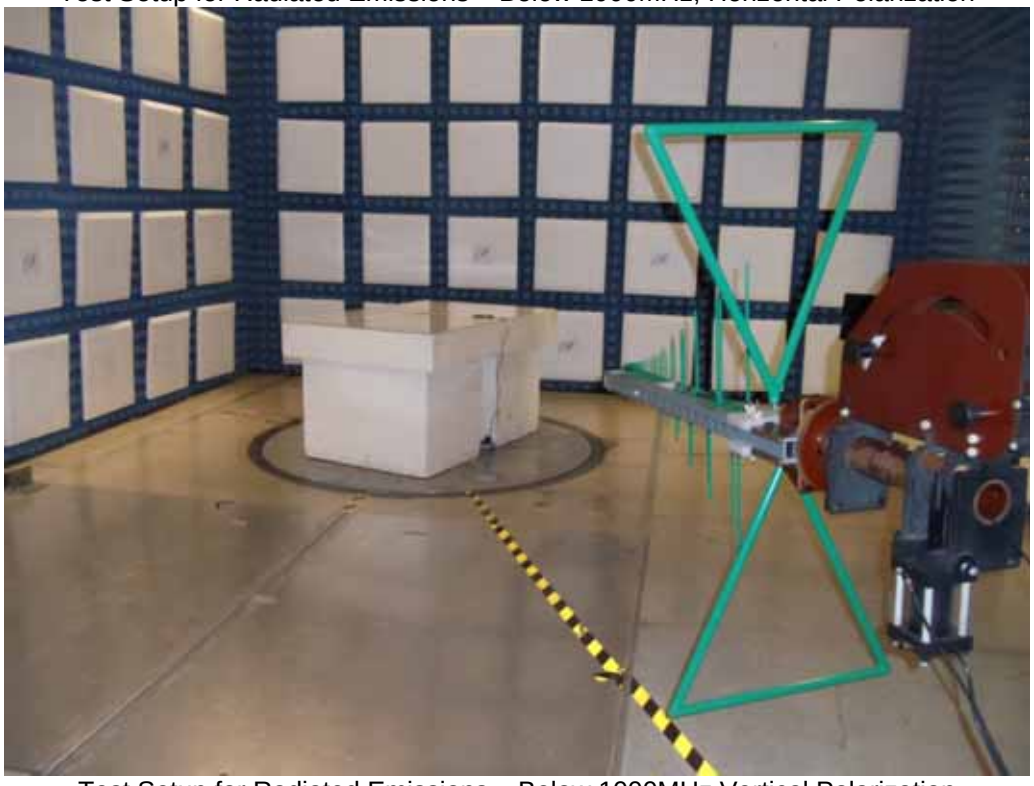
FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

Figure 2

Test Setup for Conducted Emissions

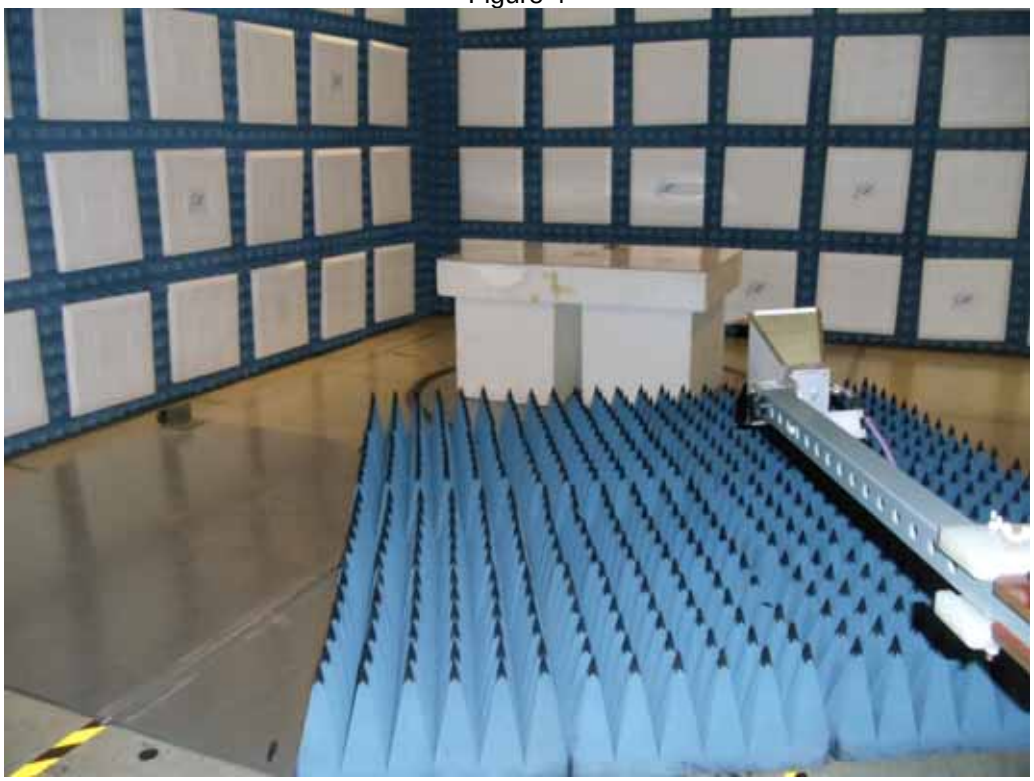
Figure 3

Test Setup for Radiated Emissions – Below 1000MHz, Horizontal Polarization

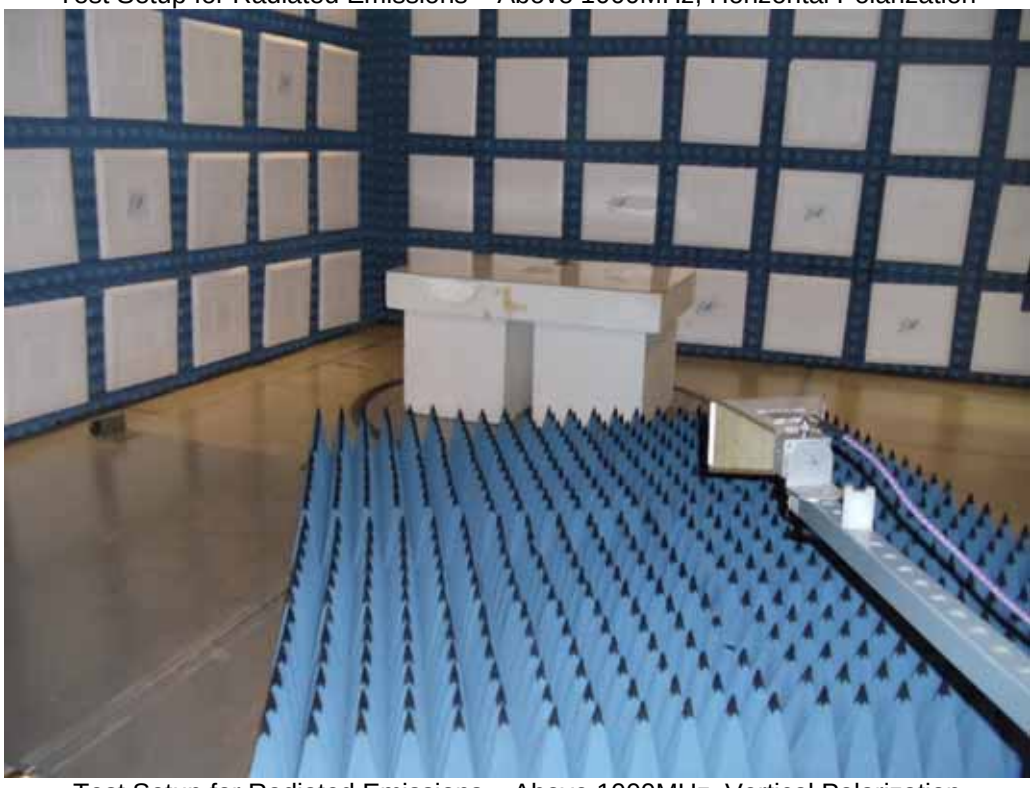


Test Setup for Radiated Emissions – Below 1000MHz Vertical Polarization

Figure 4



Test Setup for Radiated Emissions – Above 1000MHz, Horizontal Polarization



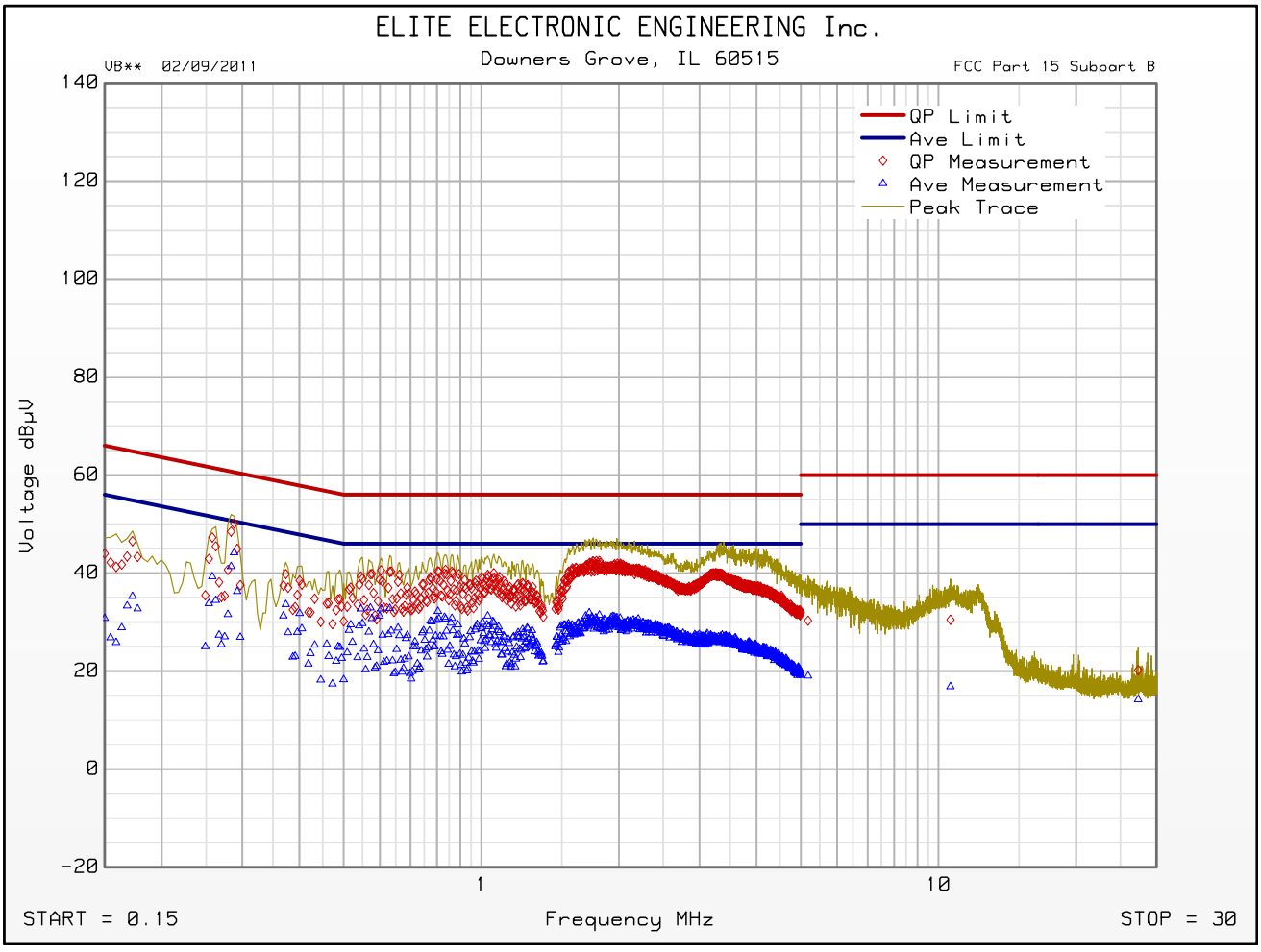
Test Setup for Radiated Emissions – Above 1000MHz, Vertical Polarization

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 02/09/2011

Manufacturer	:	PHYSICAL GRAPH CORP
Model	:	PGC401M-B
Serial Number	:	1
DUT Mode	:	Rx @ 908.42MHz
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Dec 10, 2012 04:06:01 PM



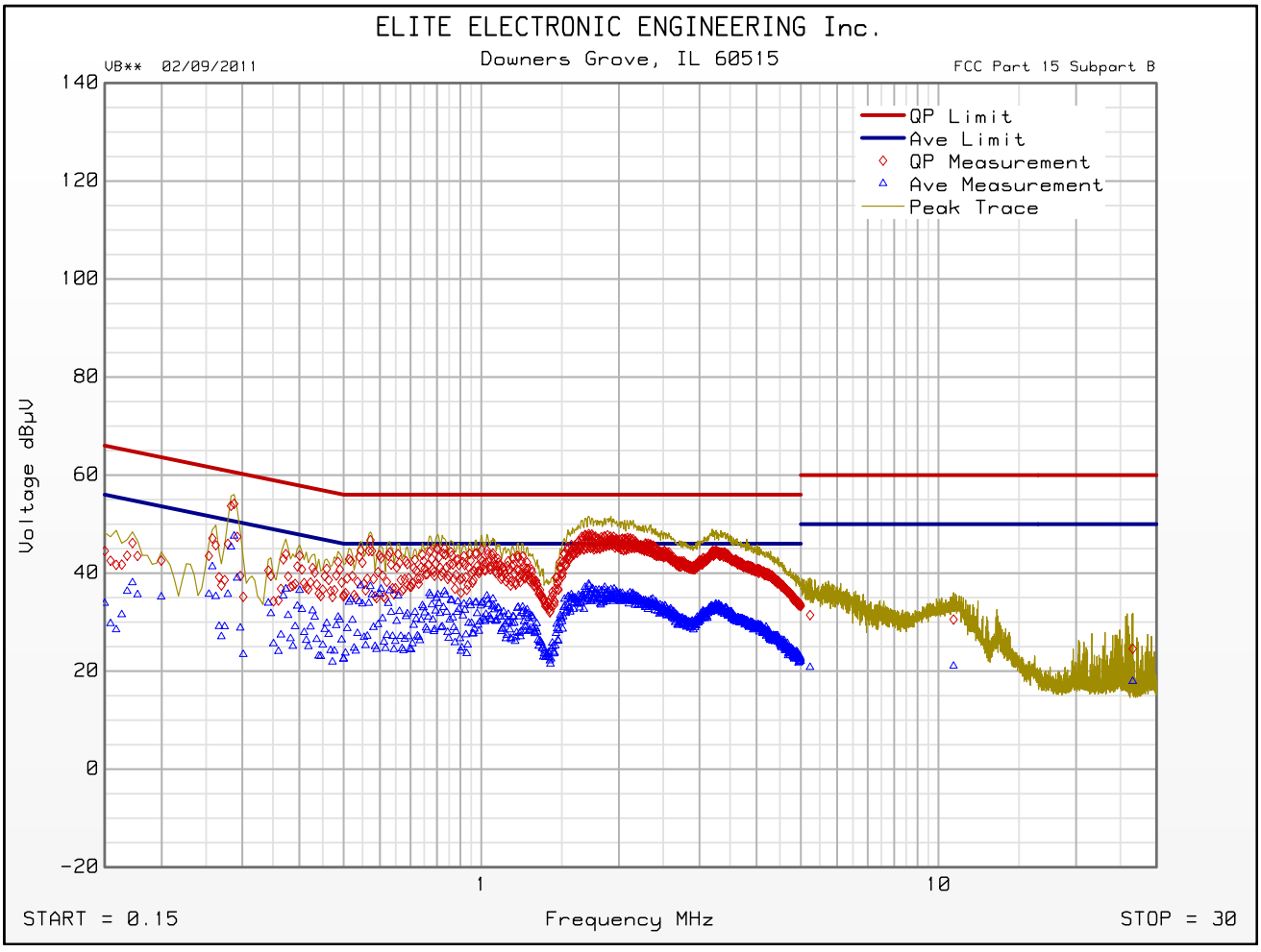
Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 02/09/2011

Manufacturer	:	PHYSICAL GRAPH CORP
Model	:	PGC401M-B
Serial Number	:	1
DUT Mode	:	Rx @ 908.42MHz
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Dec 10, 2012 03:46:23 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 02/09/2011

Manufacturer	:	PHYSICAL GRAPH CORP
Model	:	PGC401M-B
Serial Number	:	1
DUT Mode	:	Rx @ 908.42MHz
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Dec 10, 2012 04:06:01 PM
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	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.258	47.3	61.5		39.3	51.5	
0.288	50.1	60.6		44.2	50.6	
0.604	40.6	56.0		32.7	46.0	
0.835	40.7	56.0		30.7	46.0	
1.813	42.5	56.0		31.4	46.0	
1.985	42.0	56.0		30.1	46.0	
3.257	40.0	56.0		26.9	46.0	
5.185	30.3	60.0		19.0	50.0	
10.625	30.5	60.0		16.9	50.0	
27.343	20.2	60.0		14.2	50.0	

Checked BY Richard E. King :

Richard E. King

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 02/09/2011

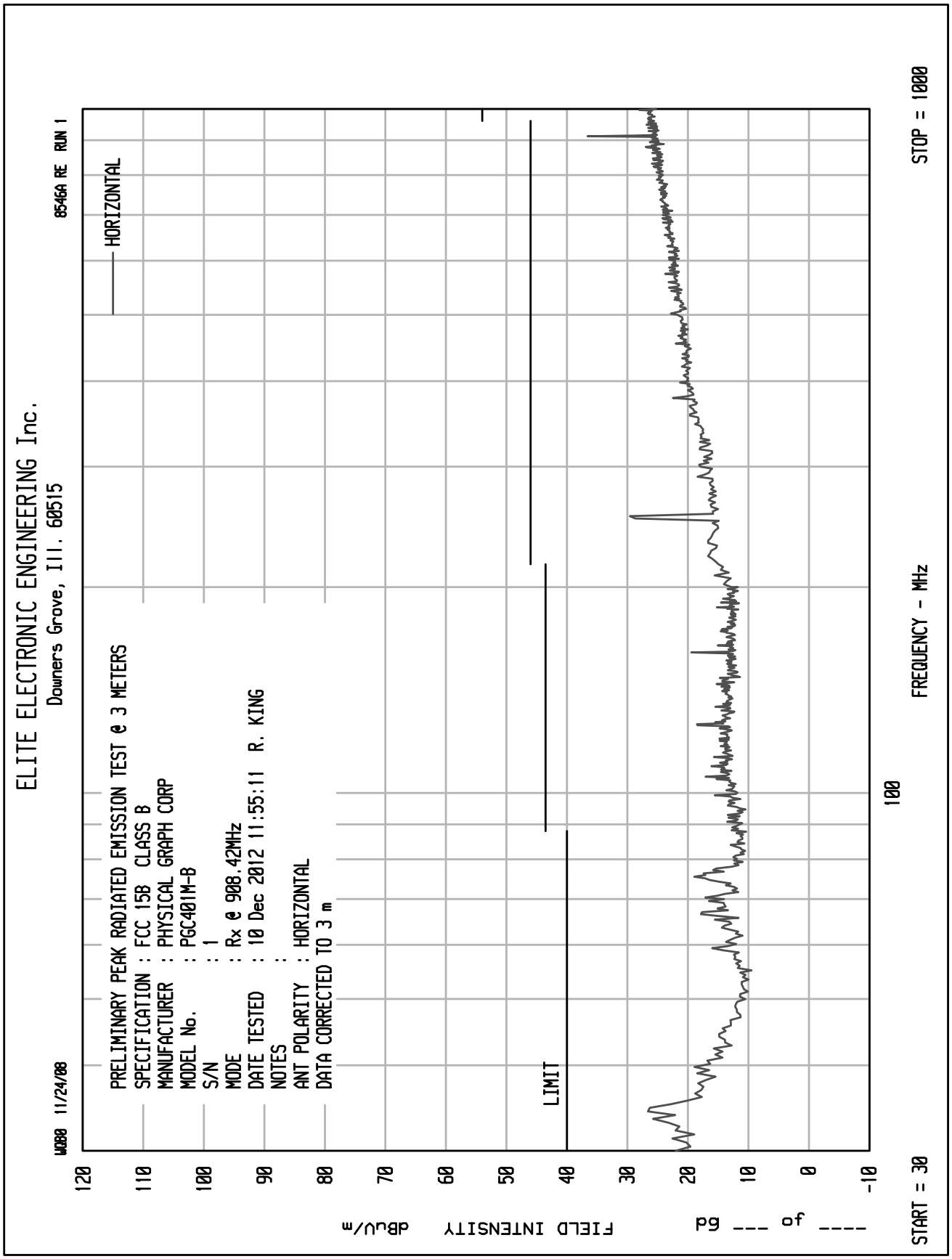
Manufacturer : PHYSICAL GRAPH CORP
Model : PGC401M-B
Serial Number : 1
DUT Mode : Rx @ 908.42MHz
Line Tested : L2
Scan Step Time [ms] : 30
Meas. Threshold [dB] : -10
Test Engineer : R. King
Limit : Class B
Test Date : Dec 10, 2012 03:46:23 PM
Data Filter : Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

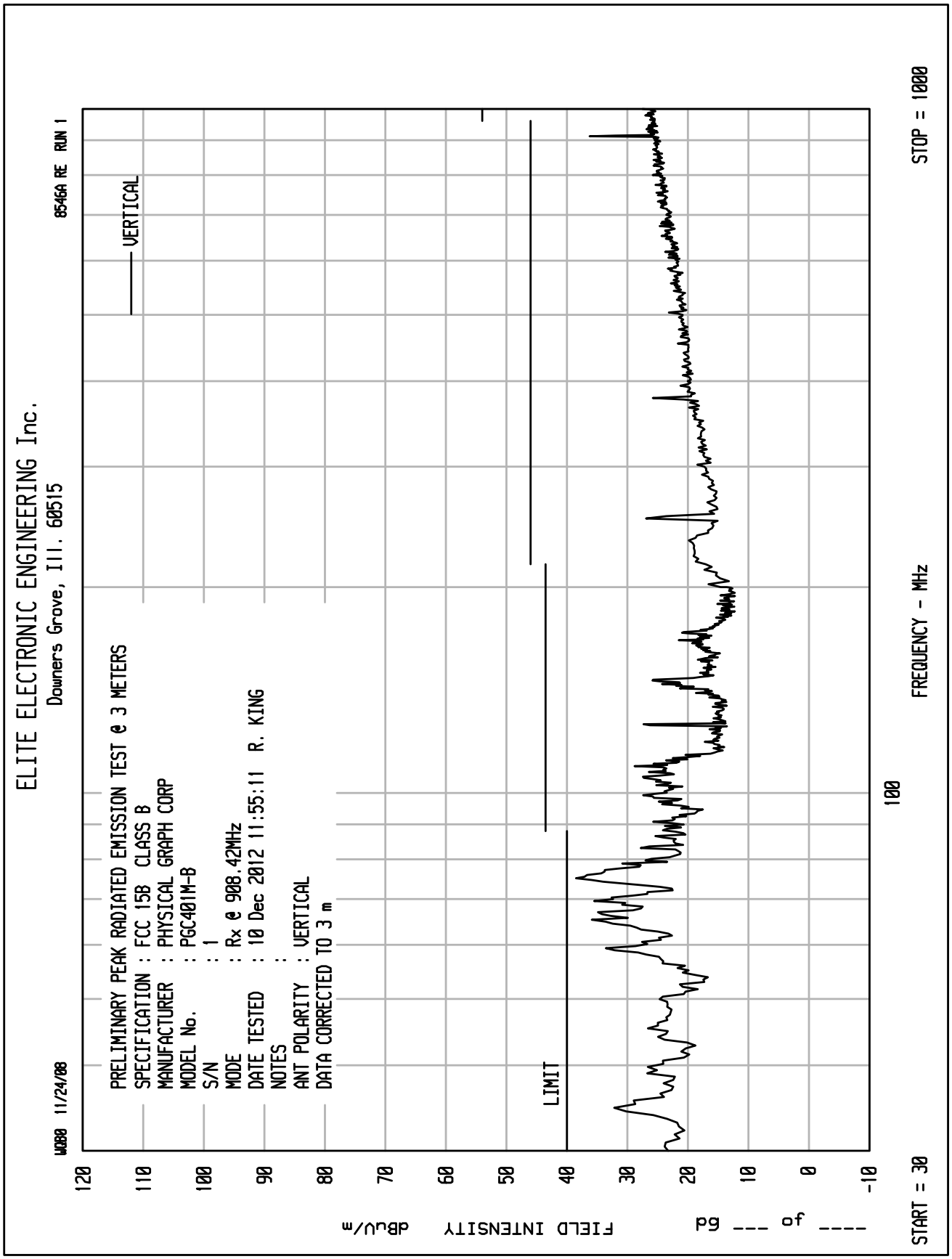
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.258	47.1	61.5		41.3	51.5	
0.288	54.1	60.6		47.6	50.6	
0.545	44.6	56.0		37.5	46.0	
0.572	46.7	56.0		37.3	46.0	
0.604	43.1	56.0		36.7	46.0	
0.631	44.2	56.0		36.5	46.0	
0.831	45.0	56.0		36.3	46.0	
1.633	46.5	56.0		35.5	46.0	
1.660	47.4	56.0		35.5	46.0	
1.687	47.8	56.0		37.1	46.0	
1.696	47.0	56.0		36.8	46.0	
1.718	48.0	56.0		37.8	46.0	
1.745	47.9	56.0		36.5	46.0	
1.750	47.5	56.0		36.9	46.0	
1.777	47.5	56.0		35.6	46.0	
1.781	46.5	56.0		36.5	46.0	
1.804	47.0	56.0		35.4	46.0	
1.808	46.4	56.0		36.6	46.0	
1.831	47.3	56.0		36.4	46.0	
1.858	47.5	56.0		36.5	46.0	
1.862	47.5	56.0		37.1	46.0	
1.889	47.7	56.0		36.0	46.0	
1.894	46.6	56.0		36.4	46.0	
1.916	47.5	56.0		35.6	46.0	
1.921	46.9	56.0		36.7	46.0	
1.948	47.4	56.0		36.1	46.0	
1.952	46.6	56.0		36.8	46.0	
1.975	47.0	56.0		36.3	46.0	
1.980	46.4	56.0		35.8	46.0	
2.003	46.8	56.0		35.7	46.0	
2.034	47.1	56.0		35.9	46.0	

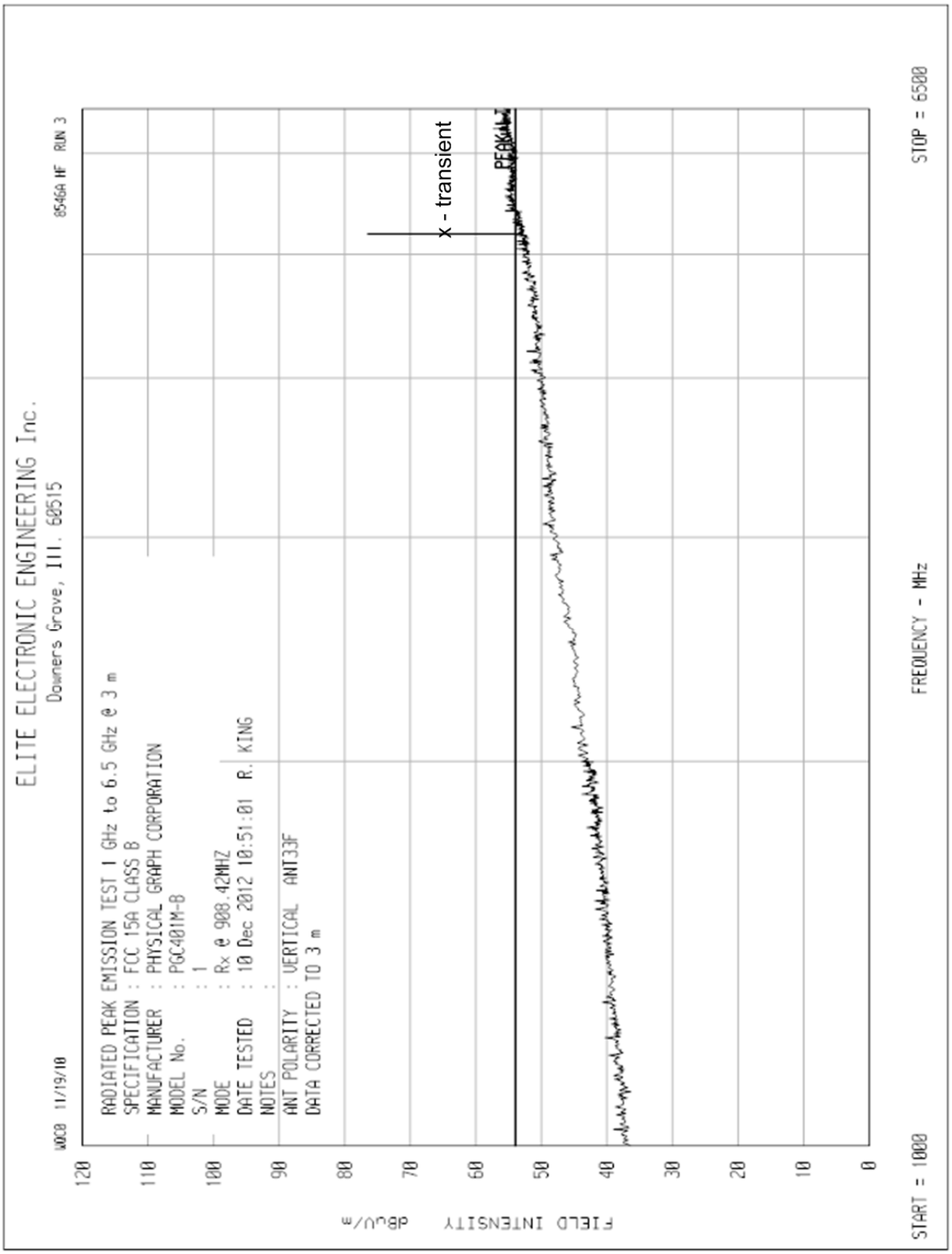
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
2.061	47.0	56.0		35.3	46.0	
2.088	47.2	56.0		35.6	46.0	
2.115	47.1	56.0		36.0	46.0	
2.147	46.9	56.0		34.6	46.0	
2.174	46.4	56.0		35.3	46.0	
2.286	46.1	56.0		34.4	46.0	
2.318	46.0	56.0		34.2	46.0	
3.262	44.6	56.0		33.6	46.0	
5.239	31.4	60.0		20.8	50.0	
10.791	30.5	60.0		21.0	50.0	
26.609	24.6	60.0		17.9	50.0	

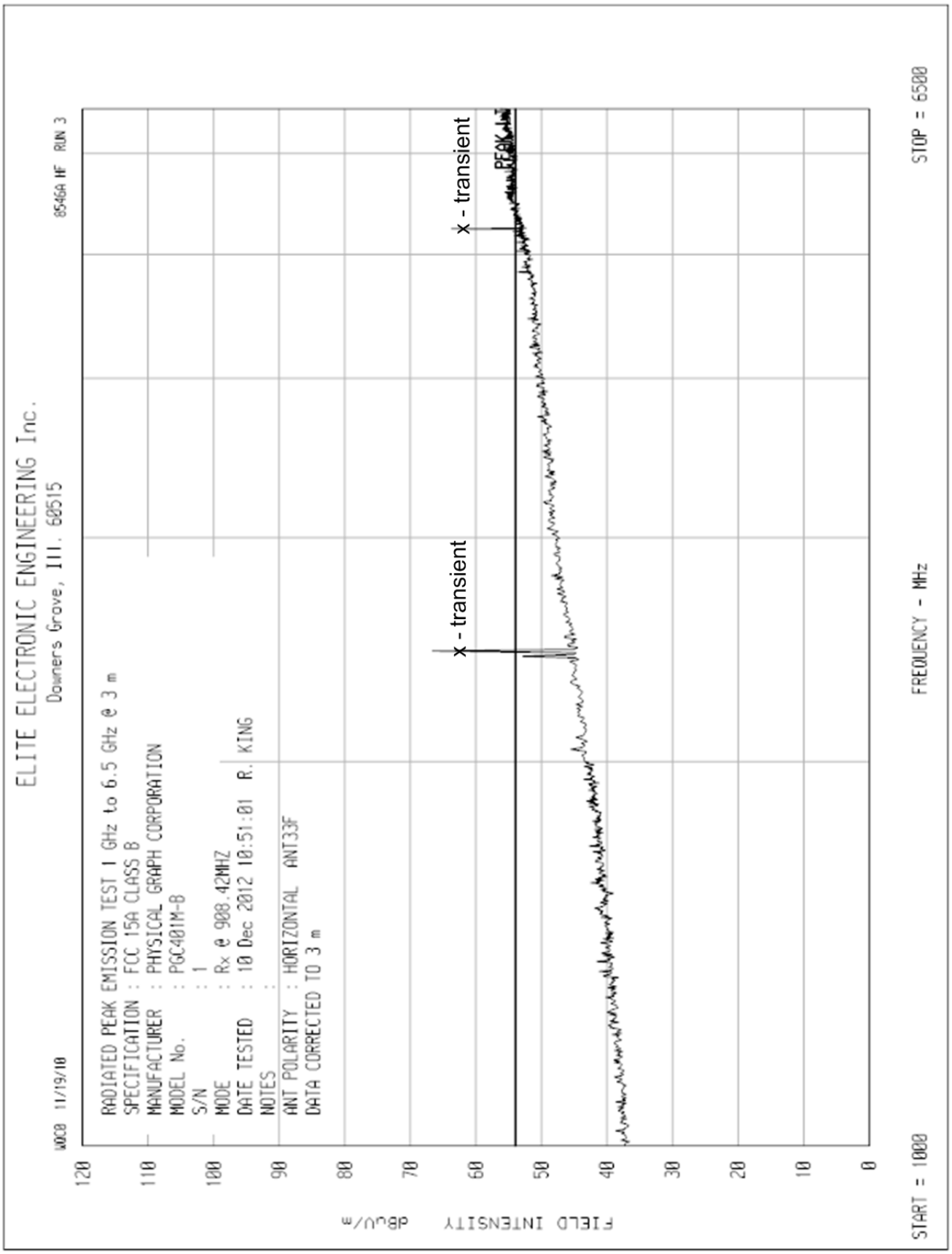
Checked BY Richard E. King :

Richard E. King


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
8546A RE RUN 1
11/24/08
PRELIMINARY PEAK RADIATED EMISSION TEST @ 3 METERS
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : PHYSICAL GRAPH CORP
MODEL No. : PGC401M-B
S/N : 1
MODE : Rx @ 908.42MHz
DATE TESTED : 10 Dec 2012 11:55:11 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
STOP = 1000
FREQUENCY - MHz
---- of ---- pg


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
8546A RE RUN 1
11/24/08
PRELIMINARY PEAK RADIATED EMISSION TEST @ 3 METERS
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : PHYSICAL GRAPH CORP
MODEL No. : PGC401M-B
S/N : 1
MODE : Rx @ 908.42MHz
DATE TESTED : 10 Dec 2012 11:55:11 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
dB ___ of ____
START = 30
100
FREQUENCY - MHz
STOP = 1000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WDC8 11/19/10
8546A HF RUN 3
RADIATED PEAK EMISSION TEST 1 GHz to 6.5 GHz @ 3 m
SPECIFICATION : FCC 15A CLASS B
MANUFACTURER : PHYSICAL GRAPH CORPORATION
MODEL No. : PGC401M-B
S/N : 1
MODE : Rx @ 908.42MHZ
DATE TESTED : 10 Dec 2012 10:51:01 R. KING
NOTES :
ANT POLARITY : VERTICAL ANT33F
DATA CORRECTED TO 3 m
x - transient
PEAK
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
WDC8 11/19/10
8546A HF RUN 3
RADIATED PEAK EMISSION TEST 1 GHz to 6.5 GHz @ 3 m
SPECIFICATION : FCC 15A CLASS B
MANUFACTURER : PHYSICAL GRAPH CORPORATION
MODEL No. : PGC401M-B
S/N : 1
MODE : Rx @ 908.42MHZ
DATE TESTED : 10 Dec 2012 10:51:01 R. KING
NOTES :
ANT POLARITY : HORIZONTAL ANT33F
DATA CORRECTED TO 3 m
x - transient
x - transient
PEAK
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. 1

RADIATED QP EMISSION MEASUREMENTS in a 3 m SEMI-ANECHOIC ROOM
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : PHYSICAL GRAPH CORP
MODEL NO. : PGC401M-B
SERIAL NO. : 1
TEST MODE : Rx @ 908.42MHz
TEST DATE : 10 Dec 2012 11:55:11
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
34.55	-4.3	16.7	.5	0.0	0.0	12.8	40.0	225	120	V
75.13	22.1	9.9	.5	0.0	0.0	32.6	40.0	180	120	V
76.22	16.4	10.0	.5	0.0	0.0	26.8	40.0	225	120	V
108.79	13.7	12.2	.6	0.0	0.0	26.5	43.5	135	120	V
125.00	12.8	12.8	.7	0.0	0.0	26.2	43.5	135	120	V
145.24	12.4	11.5	.8	0.0	0.0	24.6	43.5	180	120	V
166.30	.7	11.0	.9	0.0	0.0	12.6	43.5	135	120	V
249.99	15.9	12.9	1.0	0.0	0.0	29.8	46.0	225	120	H
364.55	-6.5	15.7	1.3	0.0	0.0	10.5	46.0	180	340	V
375.00	8.8	16.0	1.4	0.0	0.0	26.2	46.0	90	200	V
579.06	-7.8	19.1	1.5	0.0	0.0	12.8	46.0	315	340	H
666.38	-6.8	19.7	1.7	0.0	0.0	14.6	46.0	90	340	V
778.04	-7.0	20.7	2.0	0.0	0.0	15.7	46.0	90	200	V
883.46	-7.3	21.6	2.0	0.0	0.0	16.3	46.0	270	200	H
908.20	13.0	21.8	2.0	0.0	0.0	36.7	46.0	90	200	H

Checked BY Richard E. King :

Richard E. King

DATA SHEET HF TEST NO. 3

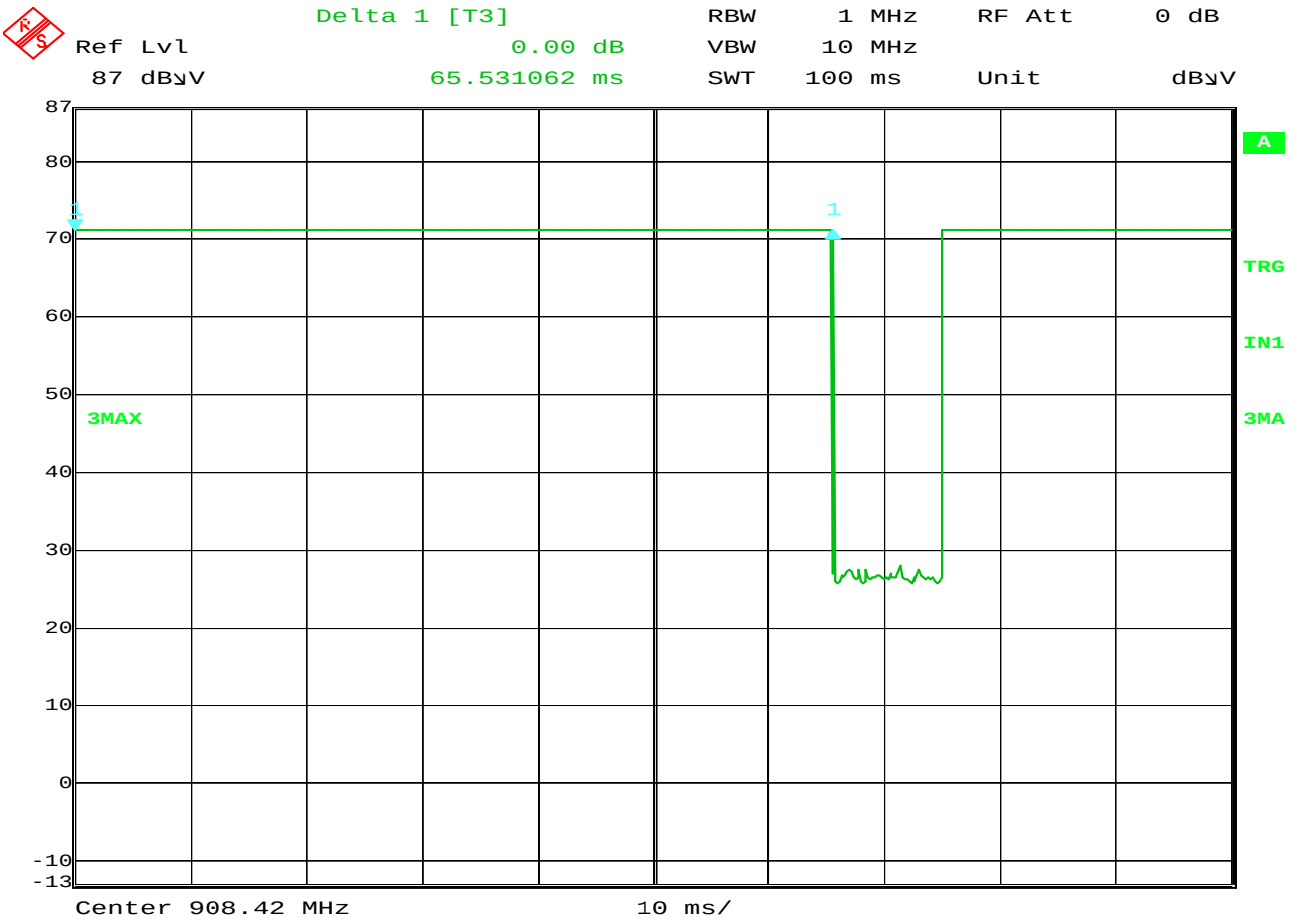
RADIATED AVG EMISSION MEASUREMENTS >=1000 MHz in a 3 m ANECHOIC ROOM

SPECIFICATION : FCC 15A CLASS B
MANUFACTURER : PHYSICAL GRAPH CORPORATION
MODEL NO. : PGC401M-B
SERIAL NO. : 1
TEST MODE : Rx @ 908.42MHZ
TEST DATE : 10 Dec 2012 10:51:01
TEST DISTANCE : 3 m

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
1030.01	-2.8	24.7	2.0	0.0	24.0	54.0		90	120	V
1237.64	-3.0	26.0	2.3	0.0	25.4	54.0		270	340	V
1388.89	-2.8	26.6	2.5	0.0	26.2	54.0		225	200	H
1552.71	-2.2	27.1	2.6	0.0	27.5	54.0		45	340	H
1631.80	-3.2	27.4	2.7	0.0	26.9	54.0		90	340	H
1796.50	-2.8	28.1	2.8	0.0	28.2	54.0		315	120	V
1865.74	-3.0	28.5	2.9	0.0	28.3	54.0		-0	340	V
2059.24	-2.5	29.2	3.1	0.0	29.8	54.0		90	120	H
2447.88	-2.4	30.1	3.4	0.0	31.2	54.0		0	340	H
2919.03	-2.5	31.9	3.8	0.0	33.3	54.0		135	340	V
3330.47	-2.8	32.9	4.1	0.0	34.2	54.0		225	340	V
3734.91	-2.8	33.6	4.4	0.0	35.1	54.0		90	120	H
4208.61	-2.3	34.0	4.6	0.0	36.3	54.0		45	200	V
4573.43	-2.0	34.2	4.8	0.0	37.1	54.0		45	120	V
4821.03	-2.2	34.9	4.9	0.0	37.6	54.0		270	200	H
5180.29	8.7	35.3	5.0	0.0	49.0	54.0		-0	200	V
5204.60	-2.2	35.3	5.0	0.0	38.1	54.0		135	340	H
5587.56	-1.6	35.3	5.0	0.0	38.7	54.0		0	340	H
5793.51	8.5	35.3	5.0	0.0	48.8	54.0		225	340	H
5914.94	-2.3	35.3	5.0	0.0	38.0	54.0		135	200	H
6222.54	-1.7	35.3	5.0	0.0	38.6	54.0		45	340	V

Checked BY Richard E. King :

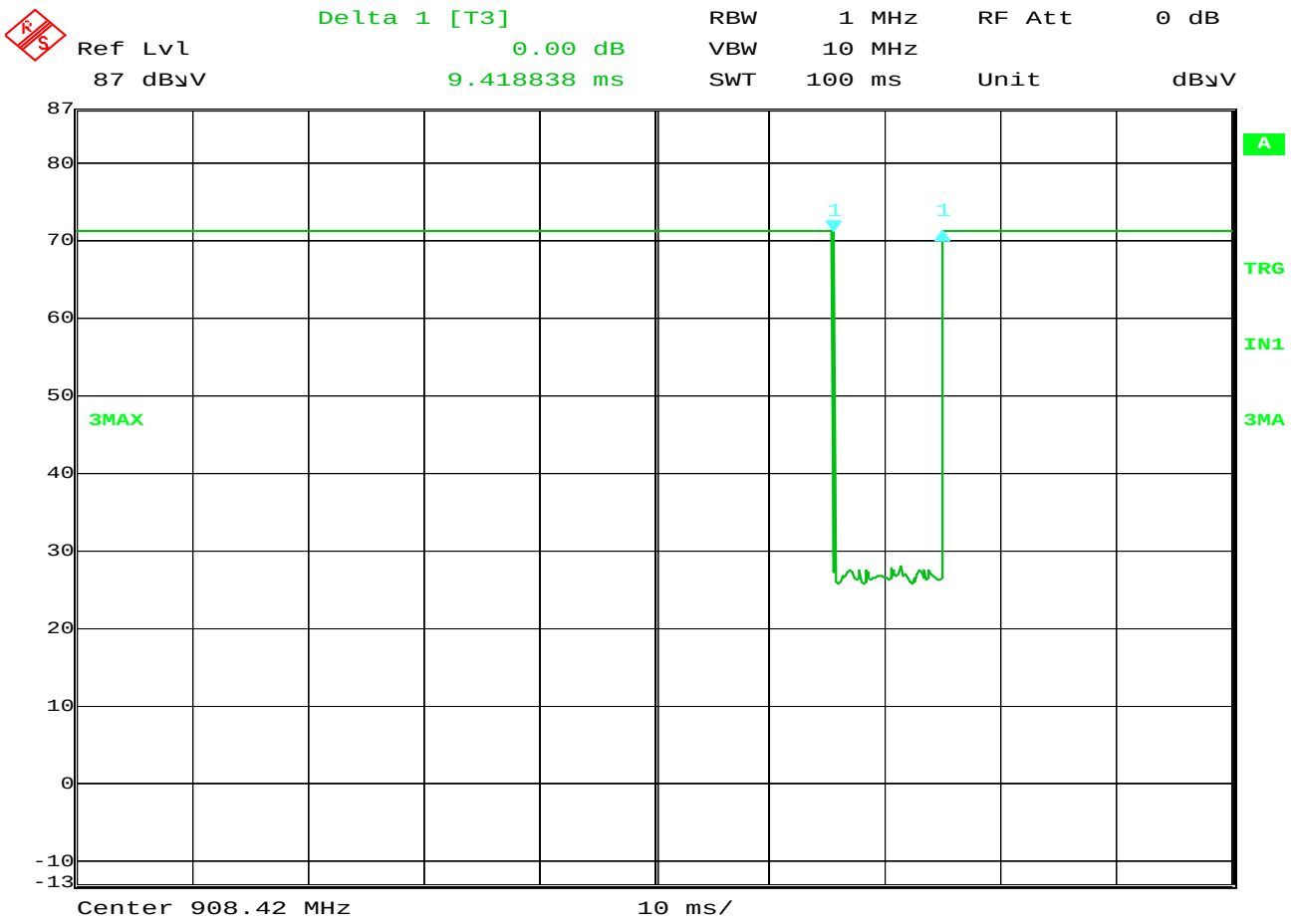
Richard E. King



15C Duty Cycle

MANUFACTURER	:	Physical Graph Corp
MODEL NUMBER	:	PGC401M-b
SERIAL NUMBER	:	1
TEST MODE	:	Tx @ 908.42MHz
TEST DATE	:	December 10, 2012
TEST PARAMETER	:	ON TIME = 65.5 mS

NOTES

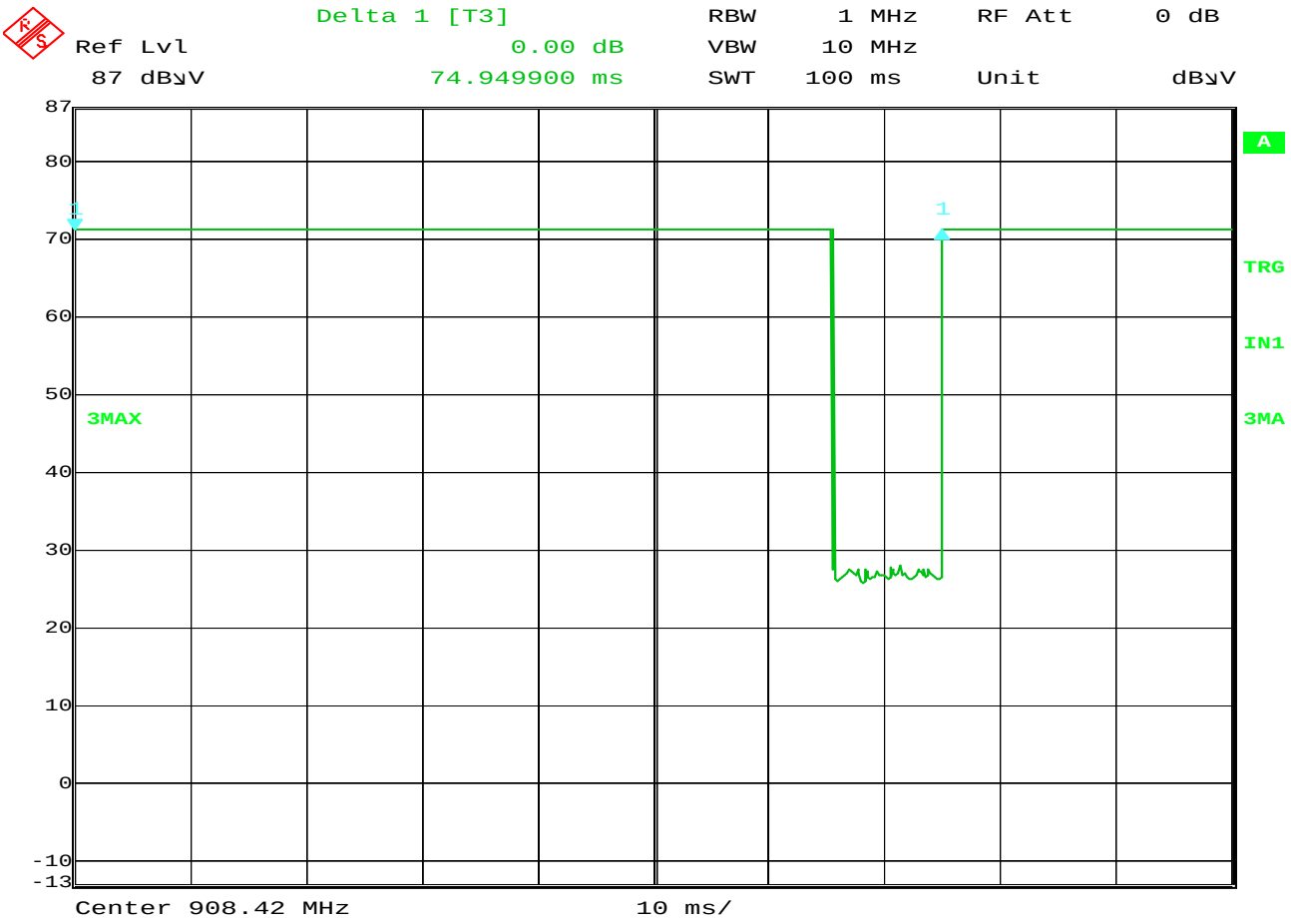


Date: 10.DEC.2012 14:27:28

15C Duty Cycle

MANUFACTURER	: Physical Graph Corp
MODEL NUMBER	: PGC401M-B
SERIAL NUMBER	: 1
TEST MODE	: Tx @ 908.42MHz
TEST DATE	: December 10, 2012
TEST PARAMETER	: OFF TIME = 9.4 mS

NOTES



15C Duty Cycle

MANUFACTURER	: Physical Graph Corp
MODEL NUMBER	: PGC401M-b
SERIAL NUMBER	: 1
TEST MODE	: Tx @ 908.42MHz
TEST DATE	: December 10, 2012
TEST PARAMETER	: Word Period = 74.9mS
	: Duty Cycle = 20*log(65.5mS/74.9mS)= -1.16 dB

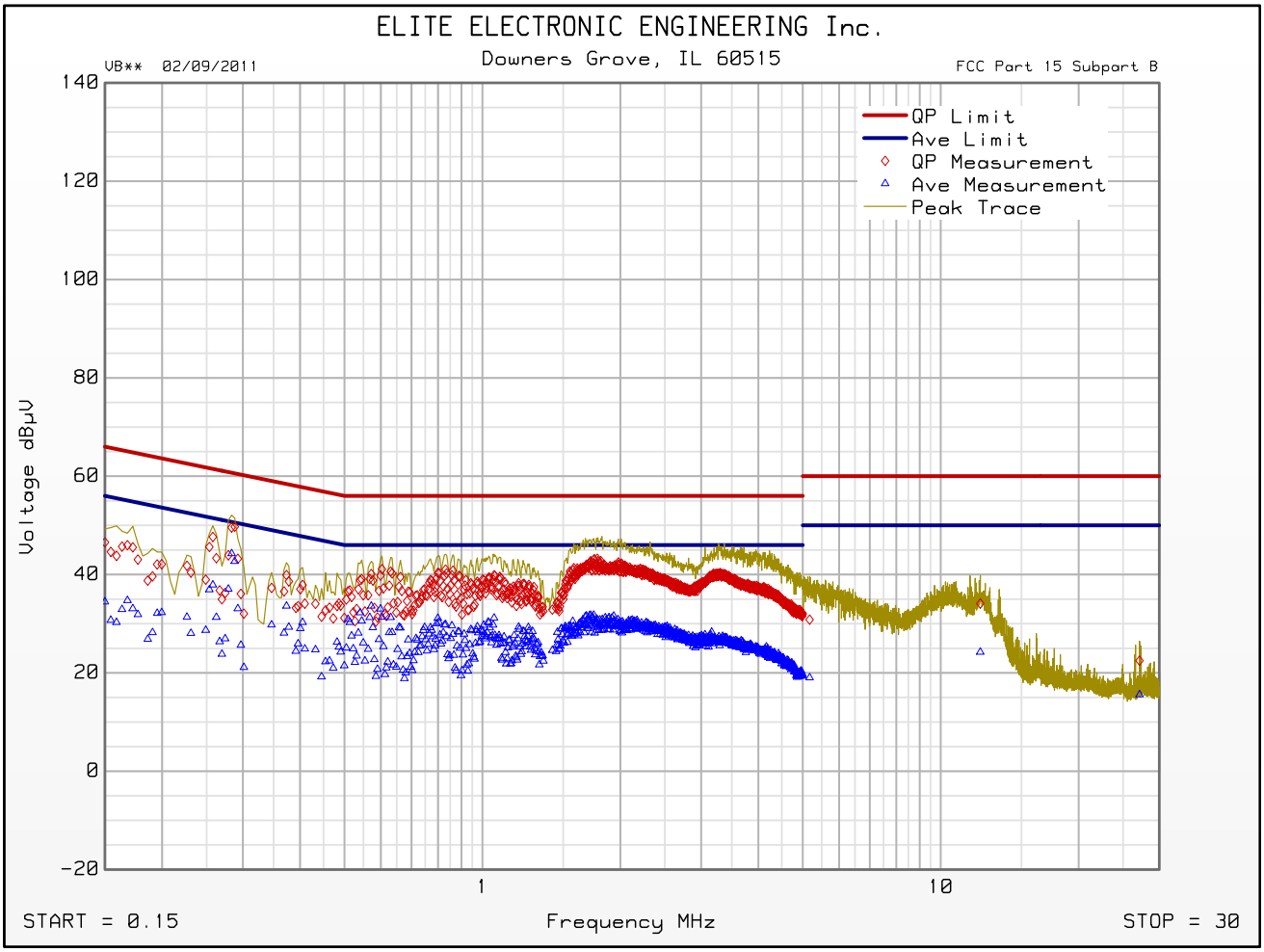
NOTES

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 02/09/2011

Manufacturer	:	PHYSICAL GRAPH CORP
Model	:	PGC401M-B
Serial Number	:	1
DUT Mode	:	Tx @ 908.42MHz
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Dec 10, 2012 03:05:39 PM



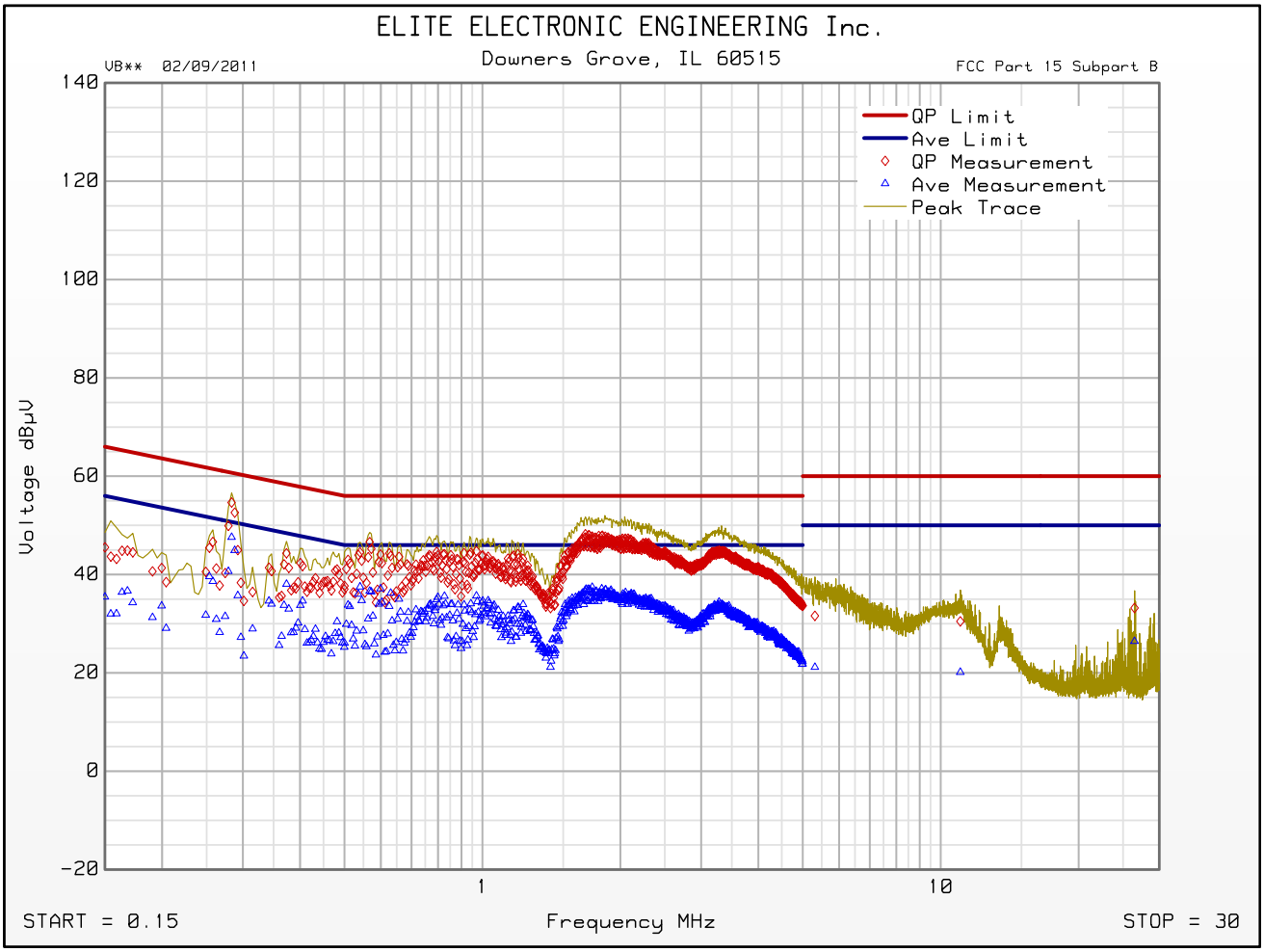
Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VB** 02/09/2011

Manufacturer	:	PHYSICAL GRAPH CORP
Model	:	PGC401M-B
Serial Number	:	1
DUT Mode	:	Tx @ 908.42MHz
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Dec 10, 2012 03:26:13 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 02/09/2011

Manufacturer	:	PHYSICAL GRAPH CORP
Model	:	PGC401M-B
Serial Number	:	1
DUT Mode	:	Tx @ 908.42MHz
Line Tested	:	L1
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Dec 10, 2012 03:05:39 PM
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	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.258	47.6	61.5		37.9	51.5	
0.284	49.6	60.7		44.3	50.7	
0.604	41.1	56.0		31.3	46.0	
0.831	41.0	56.0		29.8	46.0	
1.781	43.2	56.0		29.3	46.0	
2.012	42.2	56.0		29.6	46.0	
3.302	40.3	56.0		26.1	46.0	
5.176	30.8	60.0		19.0	50.0	
12.200	34.1	60.0		24.2	50.0	
27.158	22.5	60.0		15.6	50.0	

Checked BY Richard E. King :

Richard E. King

FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VB** 02/09/2011

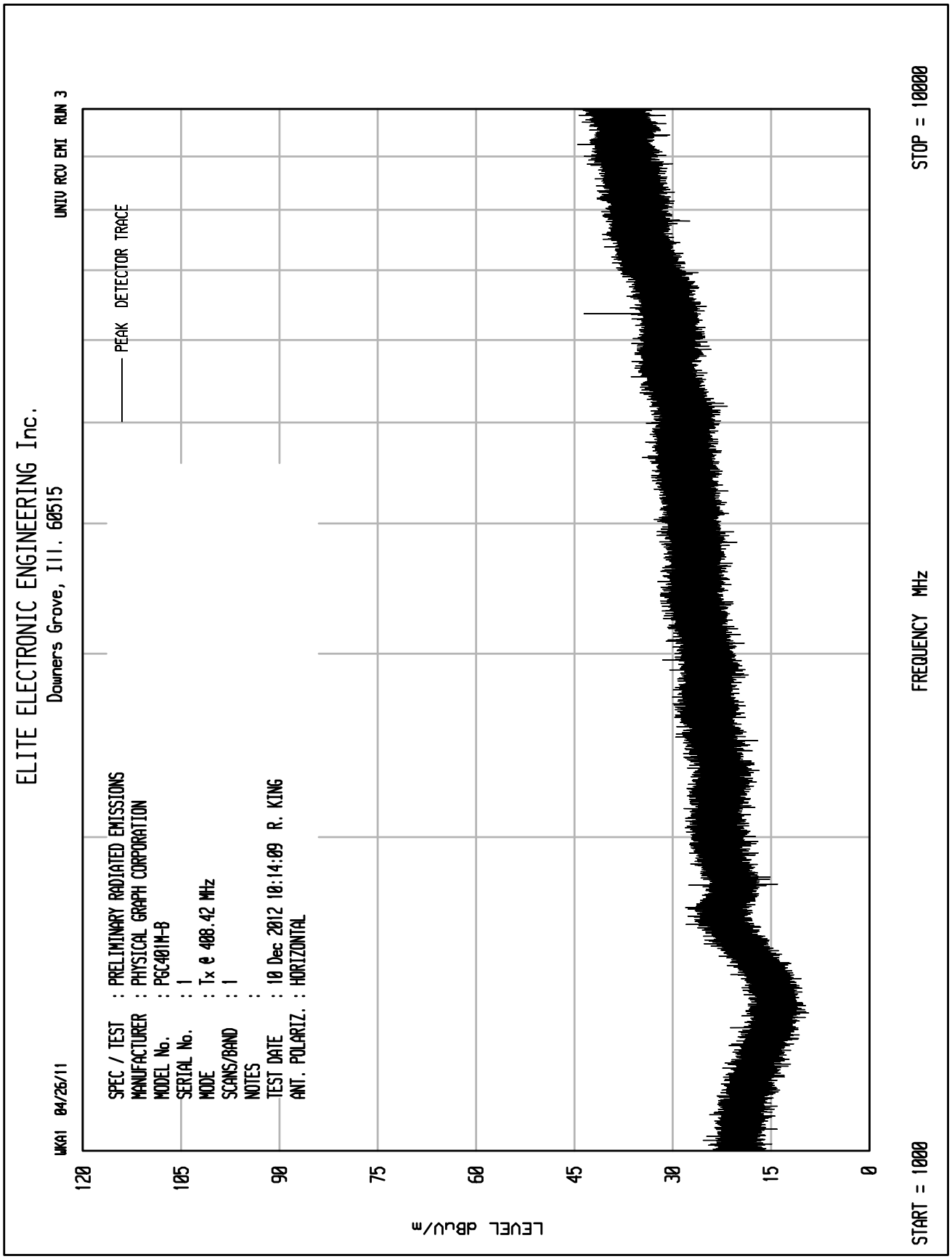
Manufacturer	:	PHYSICAL GRAPH CORP
Model	:	PGC401M-B
Serial Number	:	1
DUT Mode	:	Tx @ 908.42MHz
Line Tested	:	L2
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	
Test Engineer	:	R. King
Limit	:	Class B
Test Date	:	Dec 10, 2012 03:26:13 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

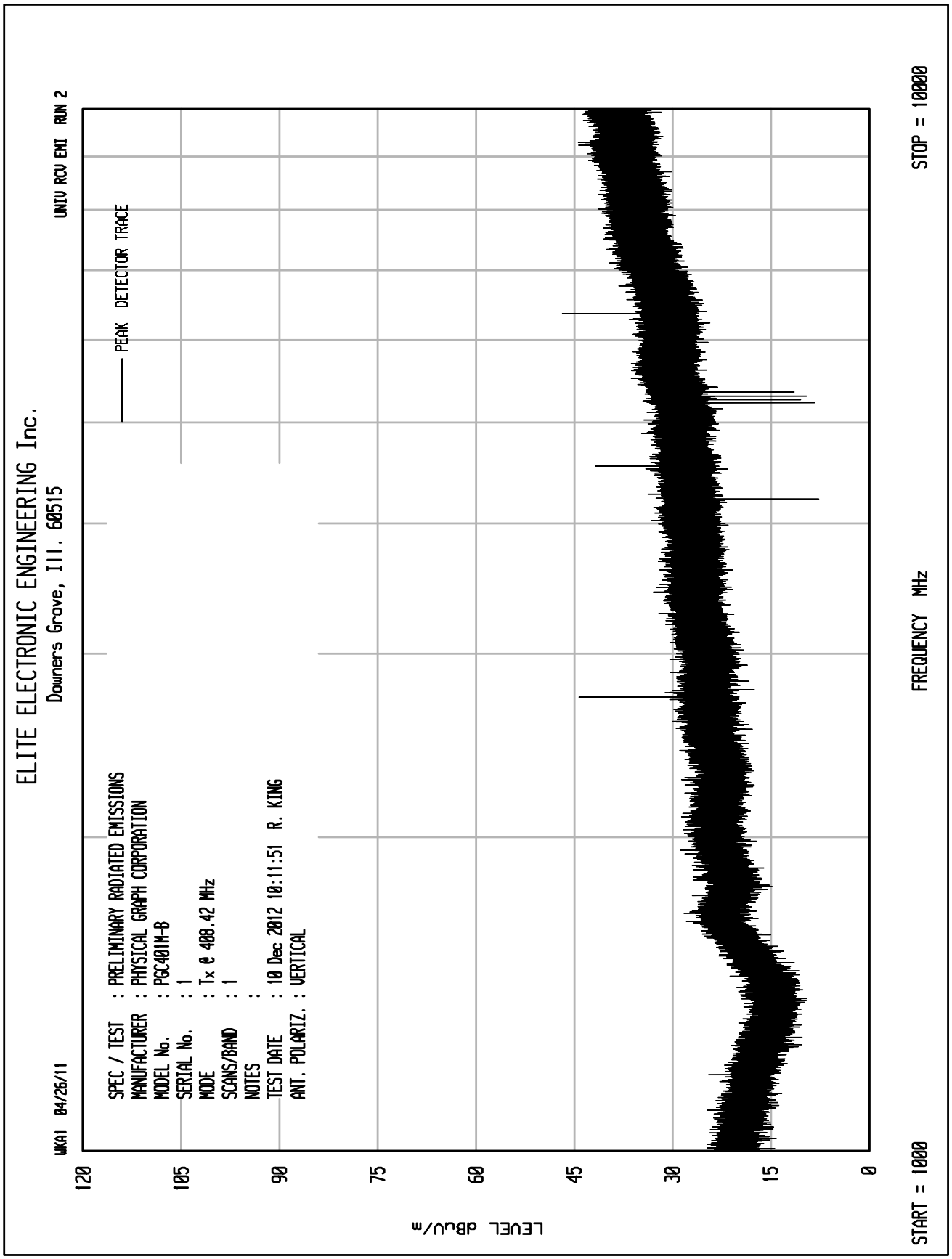
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.258	46.6	61.5		38.6	51.5	
0.284	54.6	60.7		47.6	50.7	
0.541	44.5	56.0		37.5	46.0	
0.568	46.6	56.0		36.7	46.0	
0.599	44.1	56.0		37.1	46.0	
0.631	43.8	56.0		36.2	46.0	
0.970	44.8	56.0		35.7	46.0	
1.619	46.2	56.0		35.3	46.0	
1.646	47.1	56.0		36.0	46.0	
1.651	47.2	56.0		35.3	46.0	
1.655	46.9	56.0		36.3	46.0	
1.673	47.5	56.0		36.7	46.0	
1.678	48.2	56.0		36.5	46.0	
1.682	47.5	56.0		37.0	46.0	
1.705	48.0	56.0		37.0	46.0	
1.709	48.0	56.0		36.8	46.0	
1.718	45.8	56.0		36.9	46.0	
1.736	47.7	56.0		37.4	46.0	
1.763	47.5	56.0		35.4	46.0	
1.772	46.3	56.0		36.6	46.0	
1.795	47.9	56.0		36.2	46.0	
1.804	46.0	56.0		36.3	46.0	
1.822	47.8	56.0		37.1	46.0	
1.826	47.9	56.0		35.7	46.0	
1.835	46.3	56.0		36.4	46.0	
1.853	47.7	56.0		36.9	46.0	
1.858	47.2	56.0		36.9	46.0	
1.880	47.5	56.0		36.4	46.0	
1.889	46.4	56.0		36.4	46.0	
1.894	46.7	56.0		35.8	46.0	
1.907	47.1	56.0		36.8	46.0	
1.912	47.2	56.0		35.9	46.0	
1.930	46.9	56.0		35.8	46.0	
1.939	46.4	56.0		36.1	46.0	

Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
1.966	46.9	56.0		35.5	46.0	
1.989	47.1	56.0		34.7	46.0	
2.021	47.3	56.0		33.9	46.0	
2.025	46.8	56.0		36.0	46.0	
2.052	47.3	56.0		36.4	46.0	
2.079	47.3	56.0		35.7	46.0	
2.106	47.1	56.0		35.9	46.0	
2.111	47.0	56.0		36.1	46.0	
2.138	46.7	56.0		36.0	46.0	
2.241	46.4	56.0		34.8	46.0	
2.273	46.4	56.0		35.2	46.0	
2.304	46.4	56.0		34.1	46.0	
3.284	44.9	56.0		34.4	46.0	
5.315	31.6	60.0		21.2	50.0	
11.039	30.5	60.0		20.1	50.0	
26.488	33.2	60.0		26.4	50.0	

Checked BY Richard E. King :

Richard E. King


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 3
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : PHYSICAL GRAPH CORPORATION
MODEL No. : PGC401M-B
SERIAL No. : 1
MODE : Tx @ 408.42 MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 10 Dec 2012 10:14:09 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 2
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : PHYSICAL GRAPH CORPORATION
MODEL No. : PGC401M-B
SERIAL No. : 1
MODE : Tx @ 408.42 MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 10 Dec 2012 10:11:51 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 : Physical Graph Corporation
Model No. : PGC401M-B
Test Specification : FCC Part 15, Subpart C, Section 15.249, Radiated Emissions
Date : December 10, 2012
Mode : Transmit @ 908.42 MHz
Notes : Quasi-Peak Detector <1 GHz; Peak Detector >1GHz
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain

Freq (MHz)	Ant Pol	Meter Reading (dBuV)	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)
908.420	H	70.7	2.0	20.7	0.0	93.4	47021.9	50000.0	-0.5
908.420	V	68.9	2.0	20.7	0.0	91.6	38001.4	50000.0	-2.4
1816.840	H	46.4	2.9	28.2	-40.6	36.9	70.2	5000.0	-37.0
1816.840	V	45.8	2.9	28.2	-40.6	36.4	66.1	5000.0	-37.6
2725.260	H	49.7	3.7	31.5	-40.3	44.5	168.2	5000.0	-29.5
2725.260	V	53.9	3.7	31.5	-40.3	48.7	271.5	5000.0	-25.3
3633.680	H	45.7	4.3	33.4	-40.1	43.3	145.8	5000.0	-30.7
3633.680	V	45.0	4.3	33.4	-40.1	42.6	134.5	5000.0	-31.4
4542.100	H	44.7	4.7	34.2	-40.0	43.6	152.1	5000.0	-30.3
4542.100	V	44.7	4.7	34.2	-40.0	43.6	152.1	5000.0	-30.3
5450.520	H	45.3	5.2	36.4	-40.1	46.7	217.5	5000.0	-27.2
5450.520	V	44.8	5.2	36.4	-40.1	46.2	204.6	5000.0	-27.8
6358.940	H	47.9	5.6	37.6	-39.9	51.3	365.9	5000.0	-22.7
6358.940	V	50.8	5.6	37.6	-39.9	54.2	510.3	5000.0	-19.8
7267.360	H	45.0	6.1	38.8	-39.8	50.2	323.1	5000.0	-23.8
7267.360	V	44.1	6.1	38.8	-39.8	49.3	293.0	5000.0	-24.6
8175.780	H	46.6	6.5	39.2	-39.5	52.8	436.2	5000.0	-21.2
8175.780	V	44.4	6.5	39.2	-39.5	50.6	337.0	5000.0	-23.4
9084.200	H	45.3	6.5	40.1	-39.0	52.9	440.2	5000.0	-21.1
9084.200	V	46.8	6.5	40.1	-39.0	54.4	522.6	5000.0	-19.6

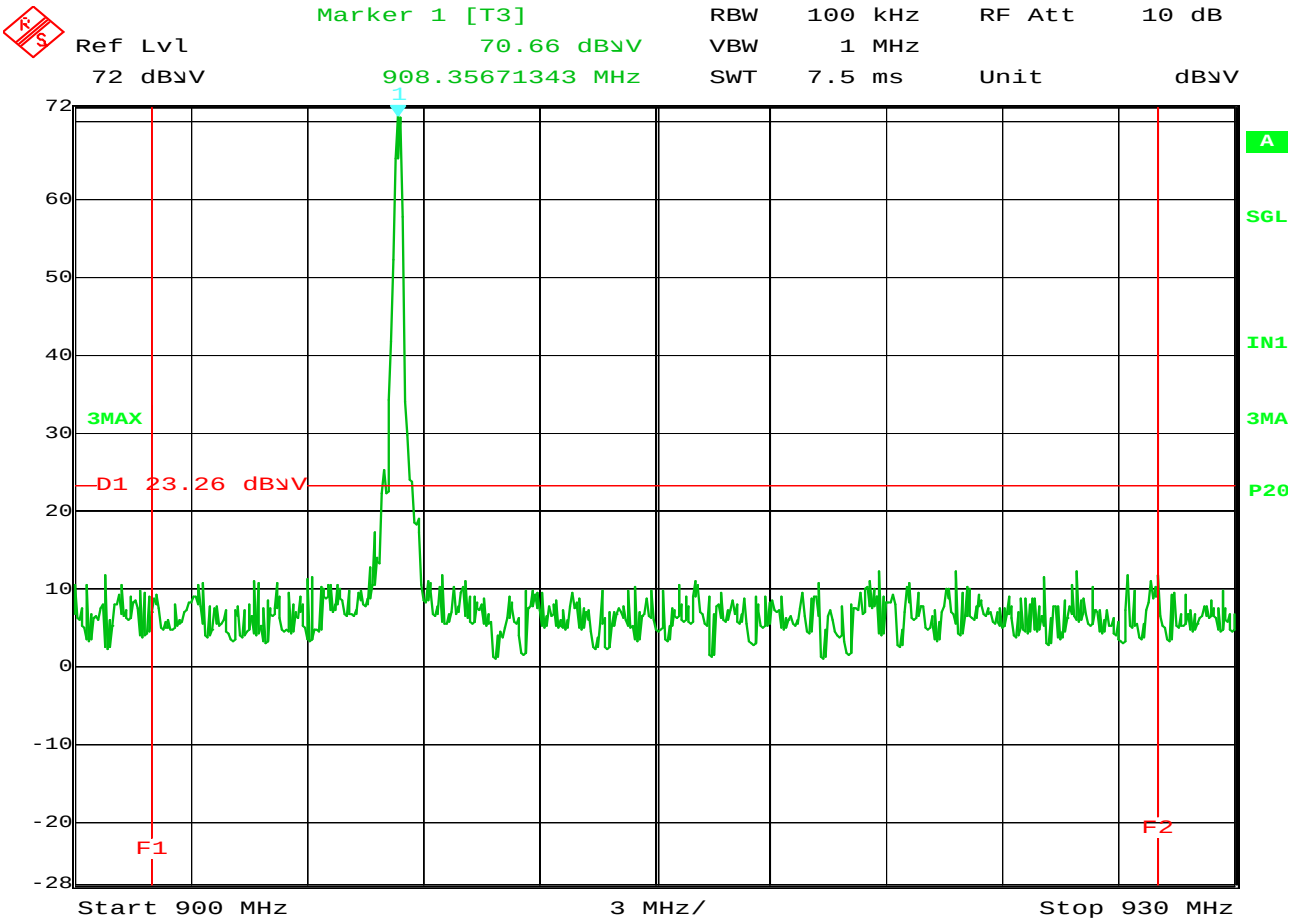
Checked By: Richard E. King

DATA PAGE

Manufacturer : Physical Graph Corporation
Model No. : PGC401M-B
Test Specification : FCC Part 15, Subpart C, Section 15.249, Radiated Emissions
Date : December 10, 2012
Mode : Transmit @ 908.42 MHz
Test Distance : 3 meters
Notes : Peak readings converted to average readings using the duty cycle correction factor.
: Total = Meter Reading + Cable Loss + Antenna Factor + Preamp Gain + Duty Cycle Factor

Freq. MHz	Ant Pol	Meter Reading (dBuV)	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Average Total dBuV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
1816.84	H	46.4	2.9	28.2	-40.6	-1.2	35.7	61.2	500.0	-18.2
1816.84	V	45.8	2.9	28.2	-40.6	-1.2	35.2	57.5	500.0	-18.8
2725.26	H	49.7	3.7	31.5	-40.3	-1.2	43.3	146.5	500.0	-10.7
2725.26	V	53.9	3.7	31.5	-40.3	-1.2	47.5	236.5	500.0	-6.5
3633.68	H	45.7	4.3	33.4	-40.1	-1.2	42.1	127.0	500.0	-11.9
3633.68	V	45.0	4.3	33.4	-40.1	-1.2	41.4	117.2	500.0	-12.6
4542.10	H	44.7	4.7	34.2	-40.0	-1.2	42.4	132.5	500.0	-11.5
4542.10	V	44.7	4.7	34.2	-40.0	-1.2	42.4	132.5	500.0	-11.5
5450.52	H	45.3	5.2	36.4	-40.1	-1.2	45.5	189.4	500.0	-8.4
5450.52	V	44.8	5.2	36.4	-40.1	-1.2	45.0	178.2	500.0	-9.0
6358.94	H	47.9	5.6	37.6	-39.9	-1.2	50.1	318.7	500.0	-3.9
6358.94	V	50.8	5.6	37.6	-39.9	-1.2	53.0	444.5	500.0	-1.0
7267.36	H	45.0	6.1	38.8	-39.8	-1.2	49.0	281.4	500.0	-5.0
7267.36	V	44.1	6.1	38.8	-39.8	-1.2	48.1	255.2	500.0	-5.8
8175.78	H	46.6	6.5	39.2	-39.5	-1.2	51.6	379.9	500.0	-2.4
8175.78	V	44.4	6.5	39.2	-39.5	-1.2	49.4	293.5	500.0	-4.6
9084.20	H	45.3	6.5	40.1	-39.0	-1.2	51.7	383.4	500.0	-2.3
9084.20	V	46.8	6.5	40.1	-39.0	-1.2	53.2	455.2	500.0	-0.8

Checked By: Richard E. King



15C Occupied Bandwidth

MANUFACTURER	: Physical Graph Corp
MODEL NUMBER	: PGC401M-b
SERIAL NUMBER	: 1
TEST MODE	: Tx @ 908.42MHz
TEST DATE	: December 10, 2012
TEST PARAMETER	: 93.4 dBuV/m – 46 dBuV/m = 47.4 dB
NOTES	: General Limit (23.26 dBuV = 70.66 dBuV – 47.4 dB)
NOTES	: Display Line equals the general limit.
NOTES	: F1 = 902MHz; F2=928MHz