



TEST REPORT

Report Number: 3100969ATL-001

July 27, 2006

Product Designation: EW 40 WIRELESS CONTROL SYSTEM

Standard: CFR, Title 47, Chapter I, Part 15 Subpart B (USA)
ICES-003, Issue 3, 1997 (Canada)

Tested by:
Intertek Testing Services NA Inc.
1950 Evergreen Blvd., Suite 100
Duluth, GA 30096

Client:
Exhausto, Inc.
1200 Northmeadow Pkwy.
Suite 180
Roswell, GA 30076
Contact: Steen Hagensen
Phone: 770.587.3238
Fax: 770.587.4731

Tests performed by:

A handwritten signature in blue ink, appearing to read "Shawn K. McGuinness".

Shawn K. McGuinness
EMC Project Engineer

Report reviewed by:

A handwritten signature in blue ink, appearing to read "David J. Schramm".

David J. Schramm
EMC Department Manager

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1.0 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complies with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

2.0 Test Summary

Section	Test Full Name	Test Date	Result
4.0	System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)		
5.0	Conducted emissions on AC power lines - Power Unit (Conducted Emissions)	07/13/2006	PASS
6.0	Conducted emissions on AC power lines - Repeater (Conducted Emissions)	07/26/2006	PASS
7.0	Radiated emissions (E-field) - Control Unit (Radiated Emissions)	07/26/2006	PASS
8.0	Radiated emissions (E-field) - Power Unit (Radiated Emissions)	07/13/2006	PASS
9.0	Radiated emissions (E-field) - Repeater (Radiated Emissions)	07/26/2006	PASS

3.0 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Wireless Control System – Control Unit and Power Unit	Exhausto	EW 40	Engineering Sample
Wireless Repeater	Exhausto	EW-REPEATER	Engineering Sample

EUT receive date:	July 12, 2006
EUT receive condition:	Production

Description of EUT provided by Client:

The EW40 is a wireless control that can be used to operate and control an Exhausto chimney fan or power venter. It is designed for use with fireplaces and stoves. The use is not restricted to any type of fuel.

The unit allows the user to stop and start and control the speed of a chimney fan from a wireless Control Unit. It can be installed with or without a temperature sensor. For gas-fired appliances, a safety system in the form of a PDS (Proven Draft Switch), must be installed.

Description of EUT exercising:

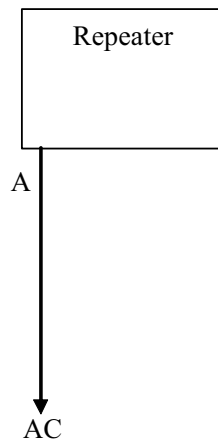
The Control Unit, Repeater, and Power Unit were each tested individually.

4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

Method:

Record the details of EUT cabling, document the support equipment, and show the interconnections in a block diagram.

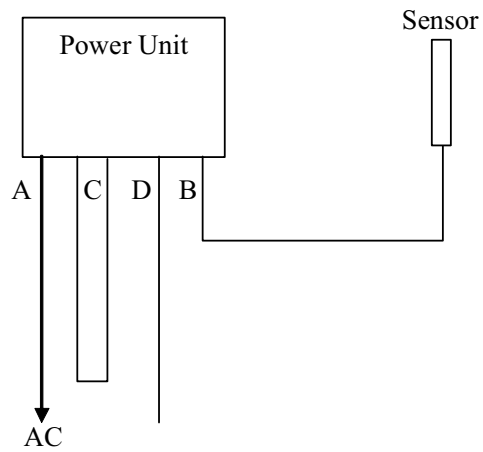
Photos:



Setup Diagram - Repeater

4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

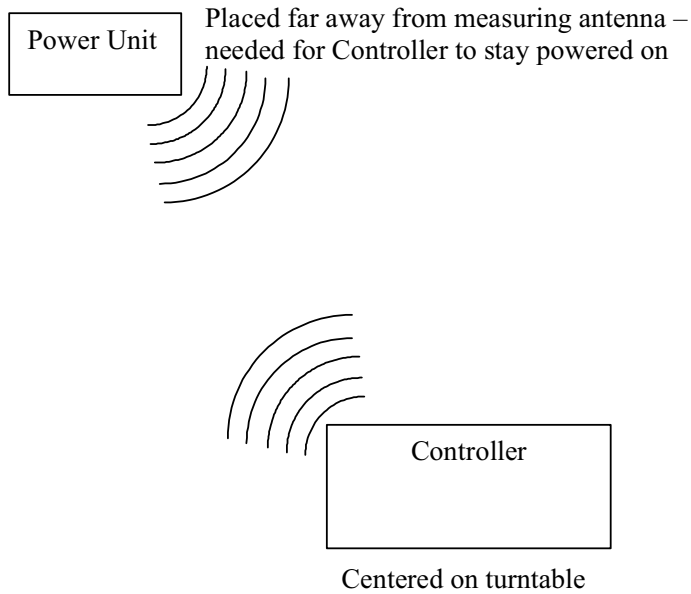
Photos:



Setup Diagram - Power Unit

4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

Photos:



Setup Diagram - Controller

4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

Data:

EUT Cabling						
ID	Description	Length	Shielding	Ferrites	Connection	
					From	To
Control Unit						
NA - No cable connections						
Power Unit						
A	AC Power	1.5m	None	None	EUT	AC Mains
B	Sensor	2m	None	None	EUT	Temperature Sensor
C	Alarm Wire	1m	None	None	EUT Alarm Pin 1	EUT Alarm Pin 2
D	Fan Power	2m	None	None	EUT	Unterminated
Repeater						
A	AC Power	1.5m	None	None	EUT	AC Mains
Support Equipment						
Description		Manufacturer		Model Number		Serial Number
None Required						

5.0 Conducted emissions on AC power lines - Power Unit (Conducted Emissions)

Method:

Equipment setup for conducted disturbance tests shall follow the guidelines of ANSI C63.4:2003.

Measurements in the frequency range of 150kHz to 30 MHz shall be performed with a quasi-peak or average detector instrument that meets the requirements of Section One of CISPR 16. An AMN shall be used to provide a defined impedance at high frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. An AMN defined in CISPR 16 shall be used.

In the frequency range of 150 kHz to 30 MHz, a resolution/video bandwidth of 9kHz/30kHz or greater shall be used.

The EUT shall be located so that the distance between the boundary of the EUT and the closest surface of the AMN is 0.8m.

If a flexible mains cord is provided by the manufacturer that is in excess of 1m, the excess cable shall be folded back and forth as far as possible to form a bundle not exceeding 0.4m in length.

The EUT shall be arranged and connected with cables terminated in accordance with the product specification.

Conducted disturbance shall be measured between each current carrying conductor and the reference ground. Each measured values shall be reported.

If EUT is intended for tabletop use, the EUT shall be placed on a table whose top is 0.8m above the ground plane. A vertical, metal reference plane is placed 0.4m from the EUT. The vertical metal reference-plane is at least 2m by 2m. The EUT shall be kept at least 0.8m from any other metal surface or other ground plane not being part of the EUT. The table shall be constructed of non-conductive materials. Its dimensions are at least 1m by 1.5m, but may be extended for larger EUT.

If EUT is floor standing, the floor standing EUT shall be placed on a horizontal metal ground plane and isolated from the ground plane by up to 12 mm of insulating material. The metal ground plane shall extend at least 0.5m beyond the boundaries of the EUT and had minimum dimensions of 2m by 2m.

TEST SITE

The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096.

MEASUREMENT UNCERTAINTY

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes. The values given are the measurement uncertainty values with an expanded uncertainty of k=2.

150 kHz to 30 MHz: +/- 2.8 dB

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Cable TT4	Andrews	Cable TT4	211404	05/11/2006	05/11/2007
Coaxial Cable, 6ft, N(Male) to N(Male)	Mini-Circuits	CBL-6FT-NMNM	TT1	05/11/2006	05/11/2007
EMI Receiver	Hewlett Packard	8546A	211505	02/13/2006	02/13/2007
EMI Receiver, Preselector section	Hewlett Packard	85460A	211506	02/13/2006	02/13/2007
LISN (TT4)	Fischer Custom Comm	FCC-LISN-50-50-M	211406	09/15/2005	09/15/2006
Spectrum Analyzer, 20 Hz to 40 GHz	Rohde & Schwarz	FSEK30	200062	01/12/2006	01/12/2007

Results: The sample tested was found to Comply.

5.0 Conducted emissions on AC power lines - Power Unit (Conducted Emissions)

Photos:



Test Setup - Front

5.0 Conducted emissions on AC power lines - Power Unit (Conducted Emissions)

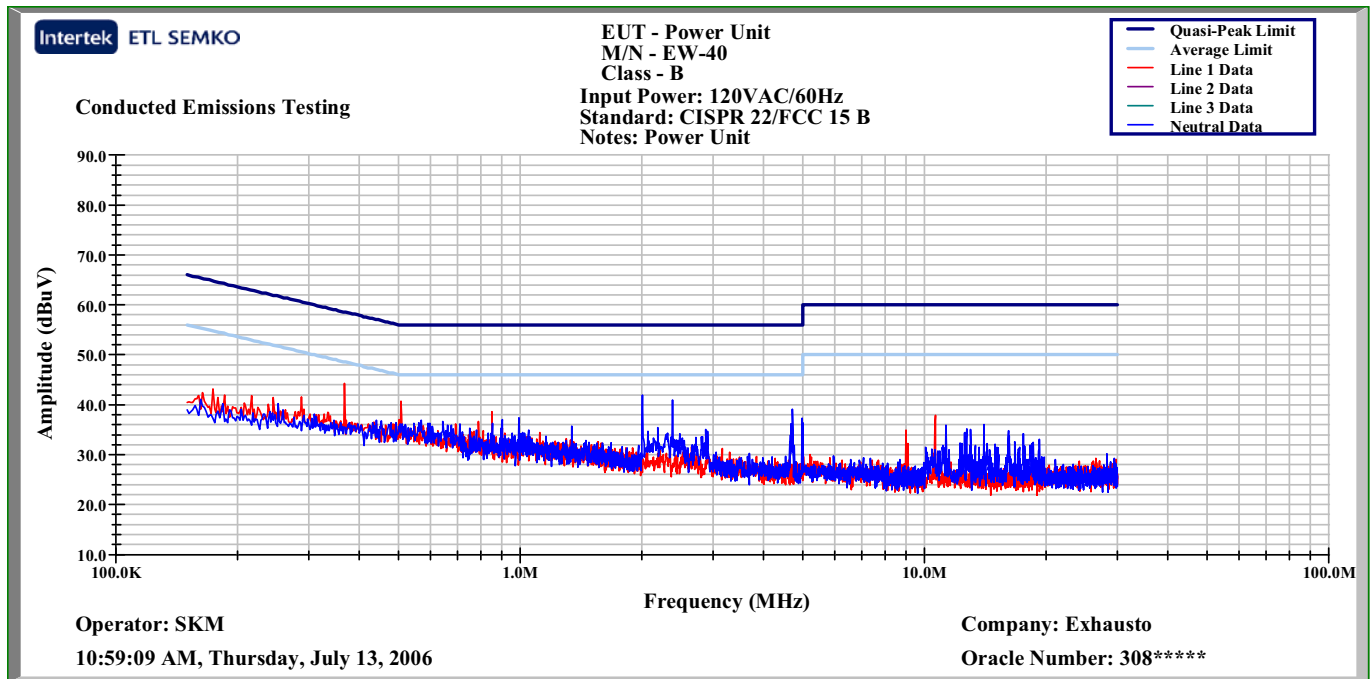
Photos:



Test Setup - Back

5.0 Conducted emissions on AC power lines - Power Unit (Conducted Emissions)

Plots:



Conducted Emissions Plot - Power Unit

5.0 Conducted emissions on AC power lines - Power Unit (Conducted Emissions)

Data:

Frequency Range (MHz): .150to30

Input power: 120VAC/60Hz

Limit: CISPR Class B

Modifications for compliance (y/n): N

A	B	C	D	E	F	G	H	I
LISN Number 1,2	Detector (P,QP, A)	Frequency MHz	Reading dBuV	Cable Loss dB	LISN Ins. Loss dB	Net dBuV	Limit dBuV	Margin dB
1	P	0.368	37.1	0.6	6.1	43.8	48.6	-4.8
1	P	0.501	33.0	0.6	6.0	39.6	46.0	-6.4
1	P	8.965	29.1	0.6	6.1	35.8	50.0	-14.2
1	P	10.620	32.1	0.6	6.1	38.8	50.0	-11.2
2	P	2.001	34.5	0.6	6.0	41.1	46.0	-4.9
2	P	2.360	33.1	0.6	6.0	39.7	46.0	-6.3
2	P	4.720	29.9	0.6	6.0	36.5	46.0	-9.5
2	P	4.966	26.4	0.6	6.0	33.0	46.0	-13.0
Calculations		G=D+E+F		I=G-H				

Note: Peak measurements are compared to the average limit.

6.0 Conducted emissions on AC power lines - Repeater (Conducted Emissions)

Method:

Conducted emissions measurements were taken using the methods and test equipment described in the previous section.

Results: The sample tested was found to Comply.

Photos:



Test Setup - Front

6.0 Conducted emissions on AC power lines - Repeater (Conducted Emissions)

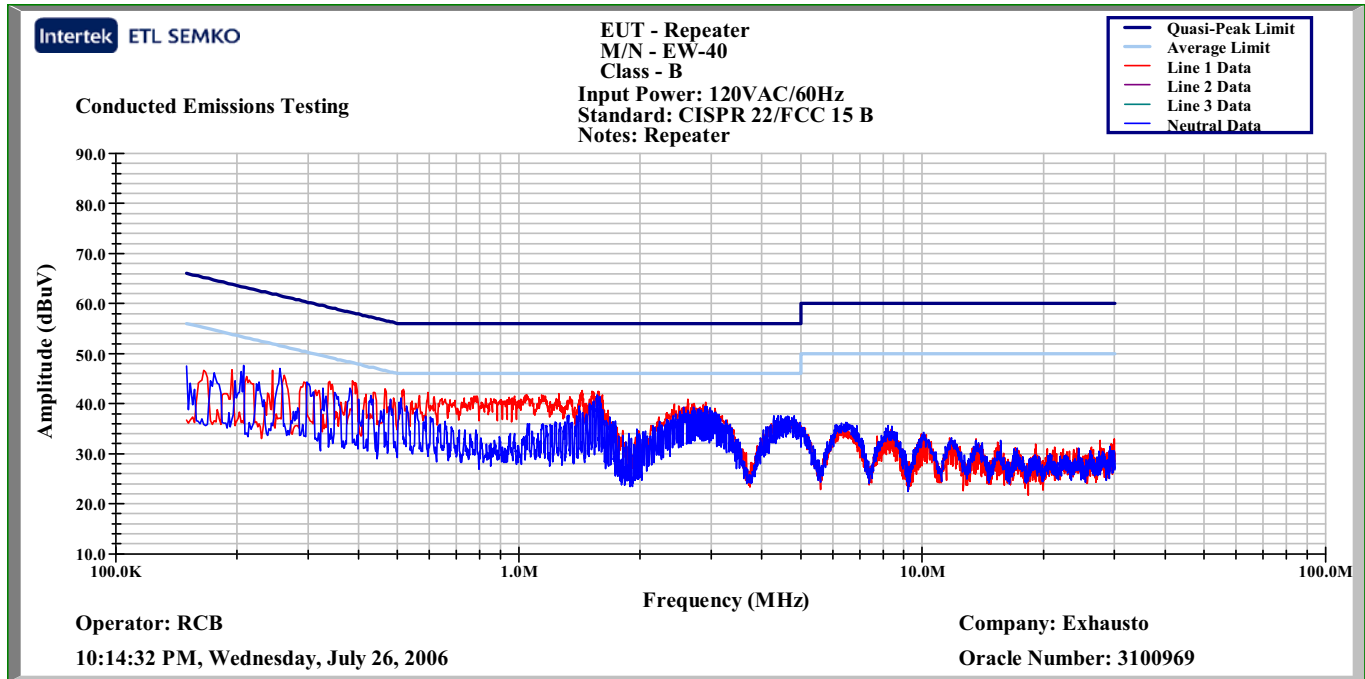
Photos:



Test Setup - Back

6.0 Conducted emissions on AC power lines - Repeater (Conducted Emissions)

Plots:



Conducted Emissions Plot

6.0 Conducted emissions on AC power lines - Repeater (Conducted Emissions)**Data:****Frequency Range (MHz):** .150-30**Input power:** 120/60**Limit:** CISPR Class B**Modifications for compliance (y/n):** No

A	B	C	D	E	F	G	H	I
LISN Number 1,2	Detector (P,QP, A)	Frequency MHz	Reading dBuV	Cable Loss dB	LISN Ins. Loss dB	Net dBuV	Limit dBuV	Margin dB
1	P	0.260	37.8	0.6	6.1	44.4	51.4	-7.0
1	P	0.390	36.8	0.6	6.1	43.4	48.1	-4.7
1	P	0.428	34.9	0.6	6.0	41.5	47.3	-5.8
1	P	0.511	35.0	0.6	6.0	41.5	46.0	-4.5
1	P	1.413	34.2	0.6	6.0	40.8	46.0	-5.2
1	P	1.573	34.2	0.6	6.0	40.8	46.0	-5.2
2	P	0.258	36.3	0.6	6.1	43.0	51.6	-8.7
2	P	0.292	34.3	0.6	6.1	41.0	50.5	-9.5
2	P	0.381	33.8	0.6	6.1	40.5	48.3	-7.8
2	P	0.422	32.6	0.6	6.0	39.2	47.4	-8.2
2	P	1.421	32.2	0.6	6.0	38.8	46.0	-7.2
2	P	1.588	34.4	0.6	6.0	40.9	46.0	-5.1
Calculations		G=D+E+F		I=G-H				

Note: Peak measurements are compared to the average limit.

7.0 Radiated emissions (E-field) - Control Unit (Radiated Emissions)

Method:

Measurements in the frequency range of 30 MHz to 1000 MHz shall be performed with a quasi-peak detector instrument that meets the requirements of Section One of CISPR 16. The measuring antenna shall correlate to a balanced dipole.

Measurements of the radiated field are made with the antenna located at a distance of 3 or 10 meters from the EUT. The limit applied to the measurement shall be appropriate for the test distance. The test distance shall be indicated in the results section.

The EUT shall be arranged and connected with cables terminated in accordance with the product specification.

Exploratory tests should be carried out while varying the cable positions to determine the maximum or near-maximum emission level. During manipulation, cables shall not be placed under or on top of the system test components unless such placement is required by the inherent equipment design.

The antenna shall be adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.

The antenna-to-EUT azimuth shall be varied during the measurement to find the maximum field-strength readings.

The antenna-to-EUT polarization (horizontal and vertical) shall be varied during the measurements to find the maximum field-strength readings.

If the EUT is intended for tabletop use, it shall be placed on a table whose top is 0.8m above the ground plane. The table shall be constructed of non-conductive materials. Its dimensions are at least 1m by 1.5m, but may be extended for larger EUT.

If EUT is floor standing, the EUT was placed on a horizontal metal ground plane and isolated from the ground plane by up to 12 mm of insulating material.

Equipment setup for radiated disturbance tests shall follow the guidelines of ANSI C63.4:2003.

TEST SITE

The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096.

MEASUREMENT UNCERTAINTY

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes. The values given are the measurement uncertainty values with an expanded uncertainty of k=2.

30 MHz to 1000 MHz at 3 meters: +/- 3.9 dB

30 MHz to 1000 MHz at 10 meters: +/- 3.6 dB

1 GHz to 18 GHz at 3 meters: +/- 4.2 dB

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Antenna, BiLog (20MHz to 2GHz)	Chase	CBL6112A	211518	12/08/2005	12/08/2006
Antenna, Horn, 1-18 GHz	EMCO	3115	213061	03/28/2006	03/28/2007
Cable E01 (Formerly PE7000N-N2 or N2)	Pasternack	RG214/U	E01	05/11/2006	05/11/2007
Cable E05 (Formerly HS 1500 N-N)	Huber-Suhner	Sucoflex 104PEA	E05	05/11/2006	05/11/2007
Cable E06 (Formerly HS 1500 N-SMA)	Huber-Suhner	Sucoflex 104PEA	E06 211268	05/11/2006	05/11/2007
Cable E11 (Formerly HS 7000 N-SMA)	Huber-Suhner	Sucoflex 104PEA	E11 211266	05/11/2006	05/11/2007
Cable, 18 GHz, N, 394 inches	Megaphase	G919-NKNK-394	MP3	05/11/2006	05/11/2007
EMI Receiver	Hewlett Packard	8546A	211505	02/13/2006	02/13/2007
EMI Receiver, Preselector section	Hewlett Packard	85460A	211506	02/13/2006	02/13/2007
Preamplifier, 10 MHz to 2000 MHz, 27 dB gain	Mini-Circuits	ZKL-2	200074	01/24/2006	01/24/2007
Spectrum Analyzer, 20 Hz to 40 GHz	Rohde & Schwarz	FSEK30	200062	01/12/2006	01/12/2007

Results: The sample tested was found to Comply.

7.0 Radiated emissions (E-field) - Control Unit (Radiated Emissions)

Photos:



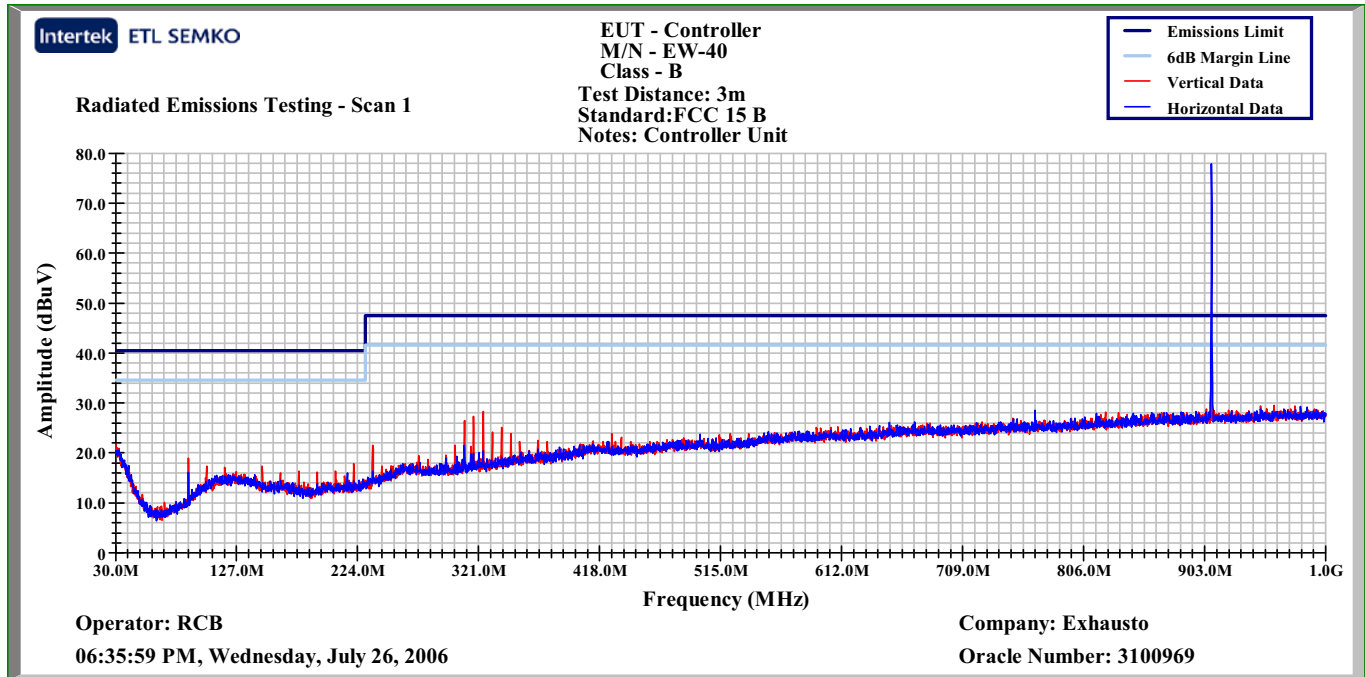
Test Setup - Front

7.0 Radiated emissions (E-field) - Control Unit (Radiated Emissions)**Photos:**

Test Setup - Back

7.0 Radiated emissions (E-field) - Control Unit (Radiated Emissions)

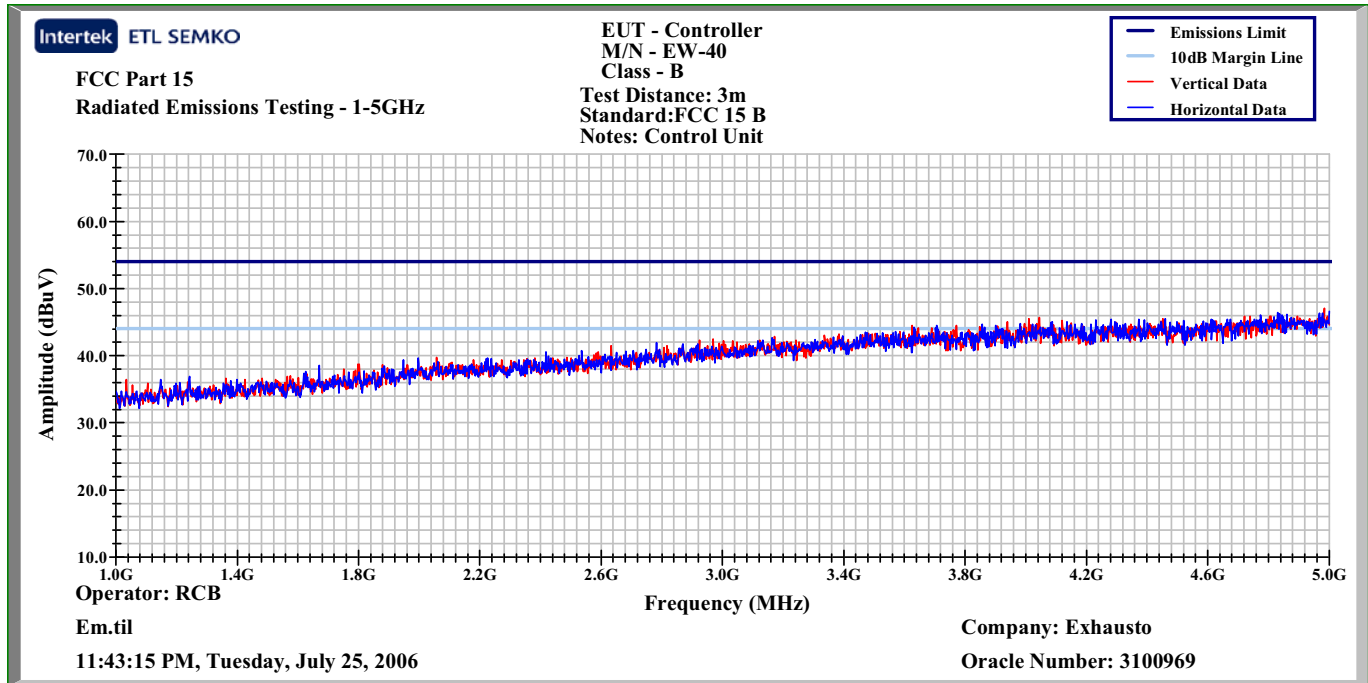
Plots:



Radiated Peak Plot (30MHz-1GHz) - Controller Unit

7.0 Radiated emissions (E-field) - Control Unit (Radiated Emissions)

Plots:



Radiated Peak Plot (1GHz-5GHz) - Controller Unit

7.0 Radiated emissions (E-field) - Control Unit (Radiated Emissions)**Data:****Date:** 07-26-2006**Limit:** FCC15 Class B-3m**Frequency Range (MHz):** 30to5000MHz**Test Distance (m):** 3**Input power:** 120/60**Modifications for compliance (y/n):** No

A	B	C	D	E	F	G	H	I
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Net dB(uV/m)	3m Limit dB(uV/m)	Margin dB
V	217.510	43.0	10.6	2.6	28.0	28.2	46.0	-17.8
V	237.040	35.1	11.7	2.6	28.0	21.4	46.0	-24.6
V	310.520	37.8	13.8	3.2	28.0	26.8	46.0	-19.2
V	318.220	37.7	13.8	3.2	28.0	26.7	46.0	-19.3
V	325.070	38.3	13.9	3.2	28.0	27.4	46.0	-18.6
V	340.000	37.0	14.7	3.2	28.0	26.9	46.0	-19.1
Calculations		$G=C+D+E-F$		$I=G-H$				

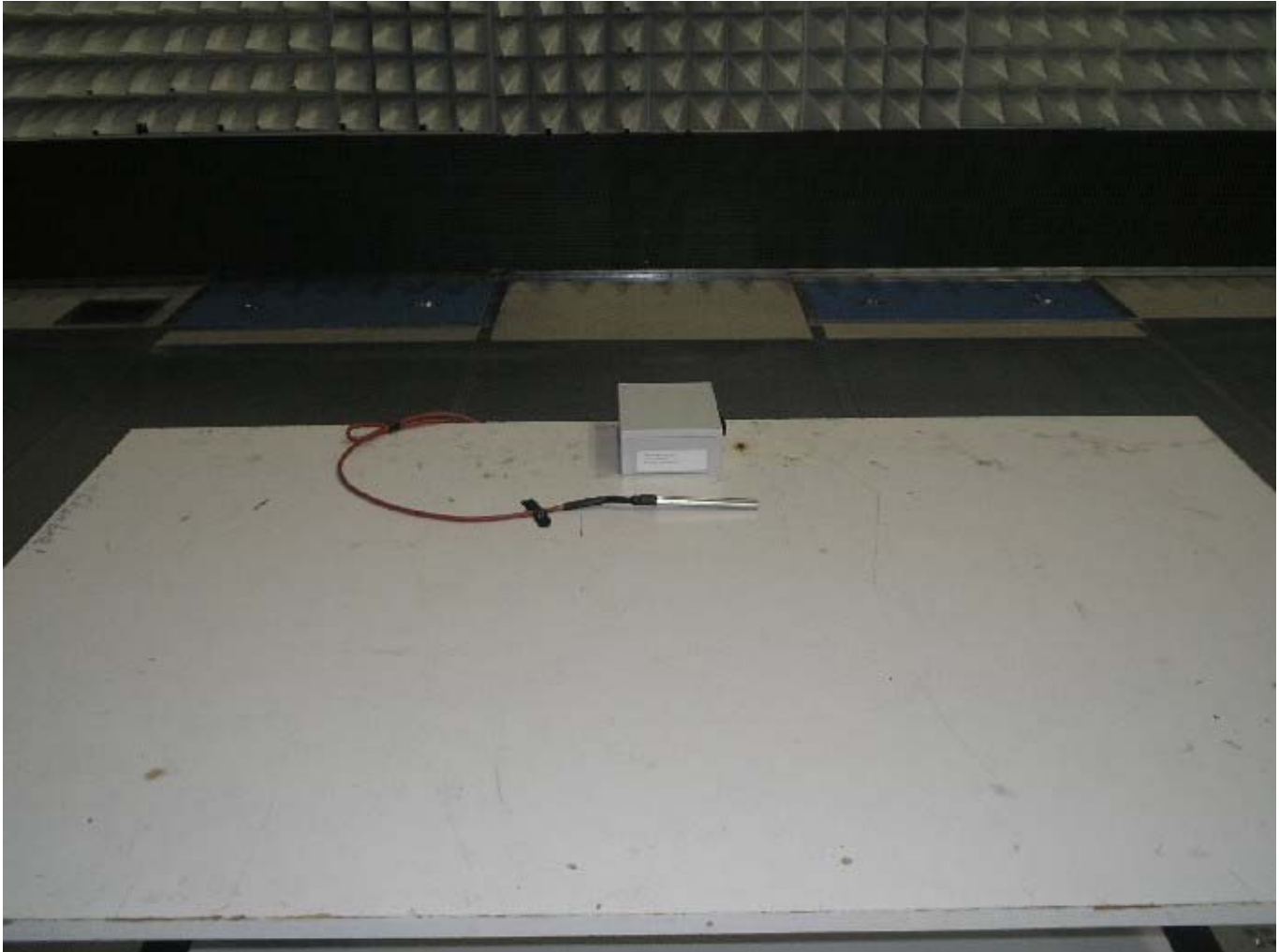
The emission on the plot at 908MHz is the intentional transmit frequency.

8.0 Radiated emissions (E-field) - Power Unit (Radiated Emissions)

Method:

Radiated emissions measurements were taken using the methods and test equipment described in the previous section.

Results: The sample tested was found to Comply.

Photos:

Test Setup - Front

8.0 Radiated emissions (E-field) - Power Unit (Radiated Emissions)

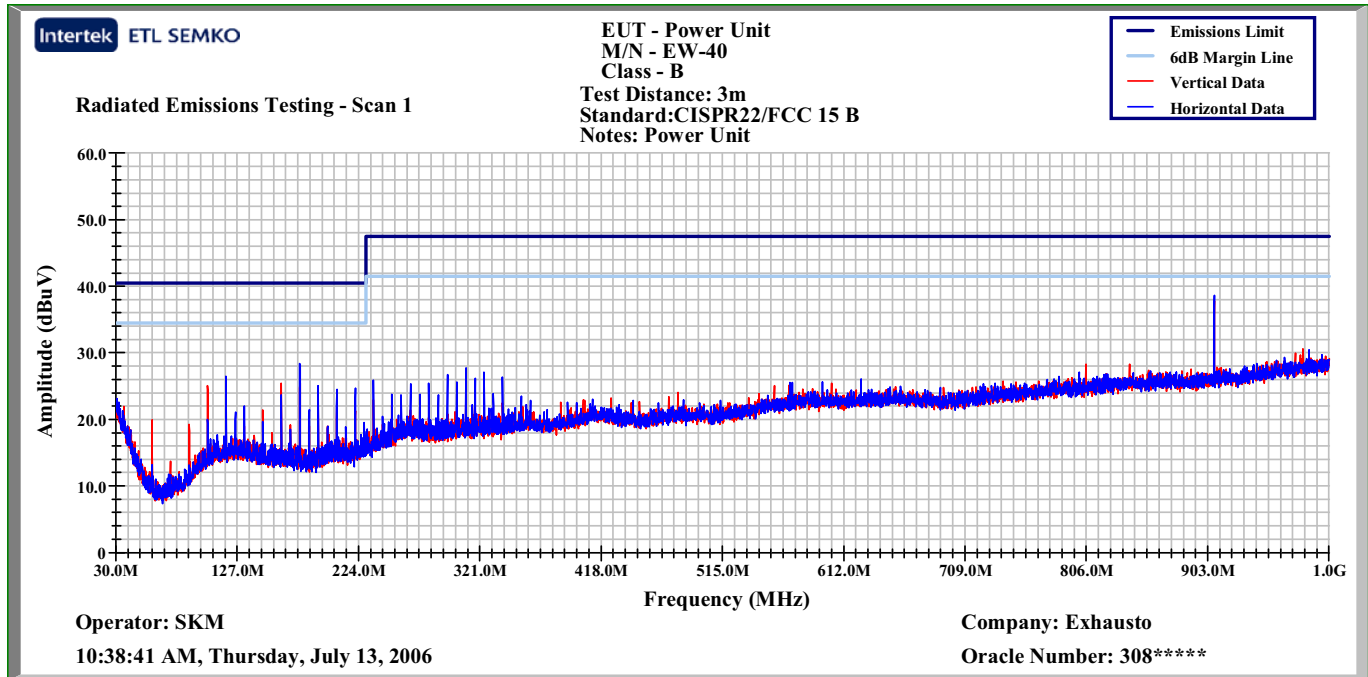
Photos:



Test Setup - Back

8.0 Radiated emissions (E-field) - Power Unit (Radiated Emissions)

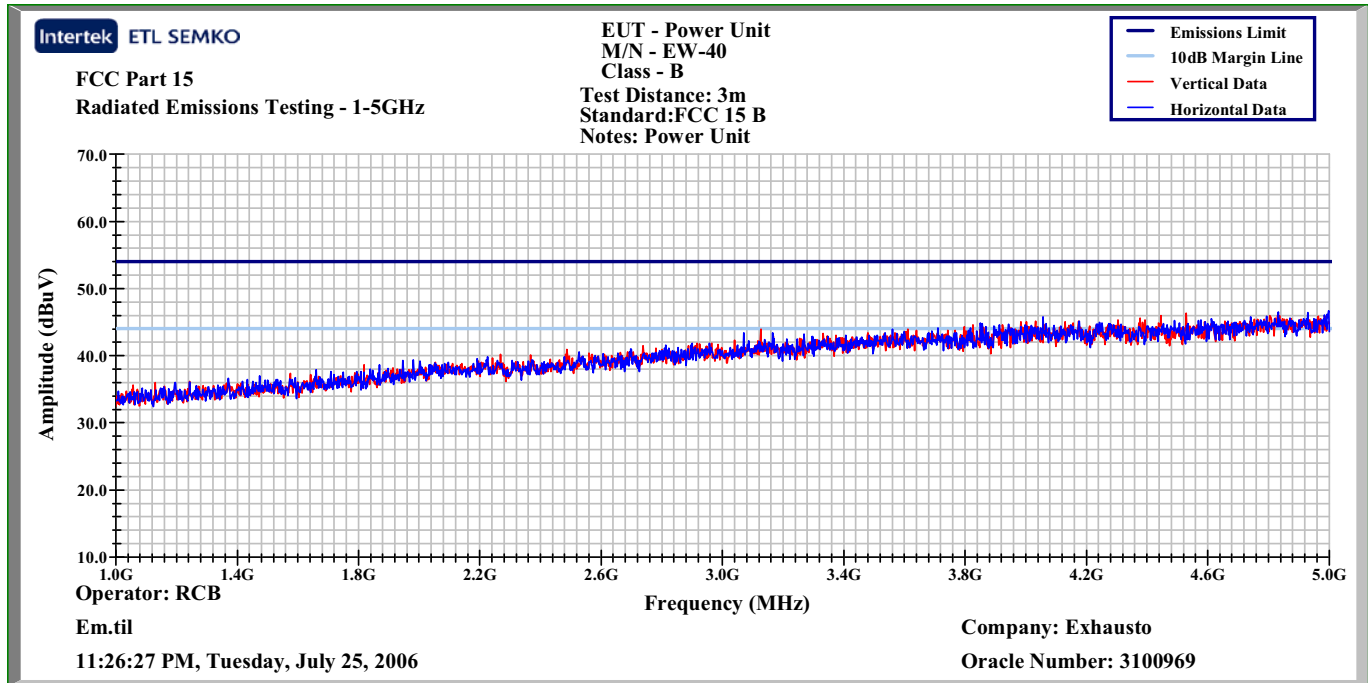
Plots:



Radiated Peak Plot (30MHz-1GHz) - Power Unit

8.0 Radiated emissions (E-field) - Power Unit (Radiated Emissions)

Plots:



Radiated Peak Plot (1GHz-5GHz) - Power Unit

8.0 Radiated emissions (E-field) - Power Unit (Radiated Emissions)**Data:****Date:** 7-13-2006**Limit:** CISPR Class B-3m**Frequency Range (MHz):** 30to5000MHz**Test Distance (m):** 3**Input power:** 120VAC/60Hz**Modifications for compliance (y/n):** N

A	B	C	D	E	F	G	H	I
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Net dB(uV/m)	3m Limit dB(uV/m)	Margin dB
V	103.278	39.5	12.8	1.8	28.0	26.1	40.5	-14.4
H	118.050	40.7	12.7	1.8	28.0	27.2	40.5	-13.3
V	162.285	41.4	10.9	1.8	28.0	26.1	40.5	-14.4
H	177.050	44.1	10.0	1.8	28.0	27.9	40.5	-12.6
H	191.810	41.3	9.8	1.8	28.0	24.9	40.5	-15.6
H	908.278	43.2	21.7	5.7	27.6	42.9	47.5	-4.6
Calculations		$G=C+D+E-F$		$I=G-H$				

9.0 Radiated emissions (E-field) - Repeater (Radiated Emissions)

Method:

Radiated emissions measurements were taken using the methods and test equipment described in the previous section.

Results: The sample tested was found to Comply.

Photos:

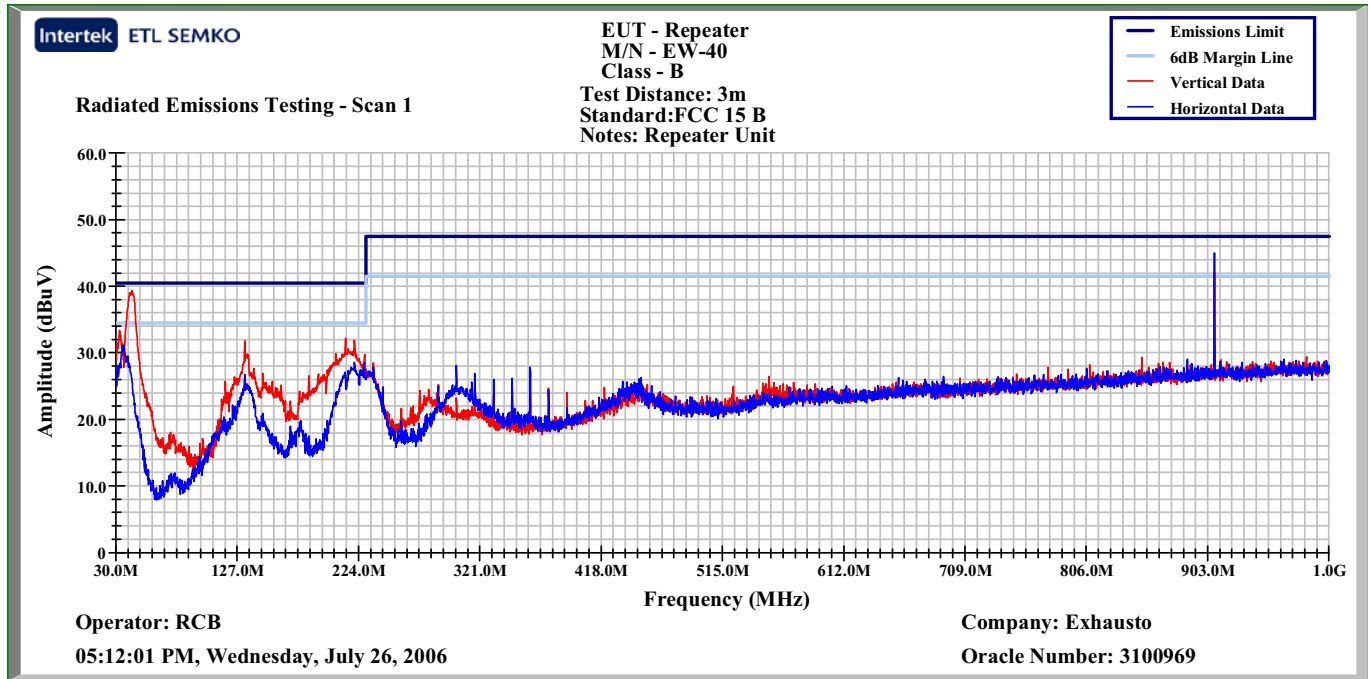
Test Setup - Front

9.0 Radiated emissions (E-field) - Repeater (Radiated Emissions)**Photos:**

Test Setup - Back

9.0 Radiated emissions (E-field) - Repeater (Radiated Emissions)

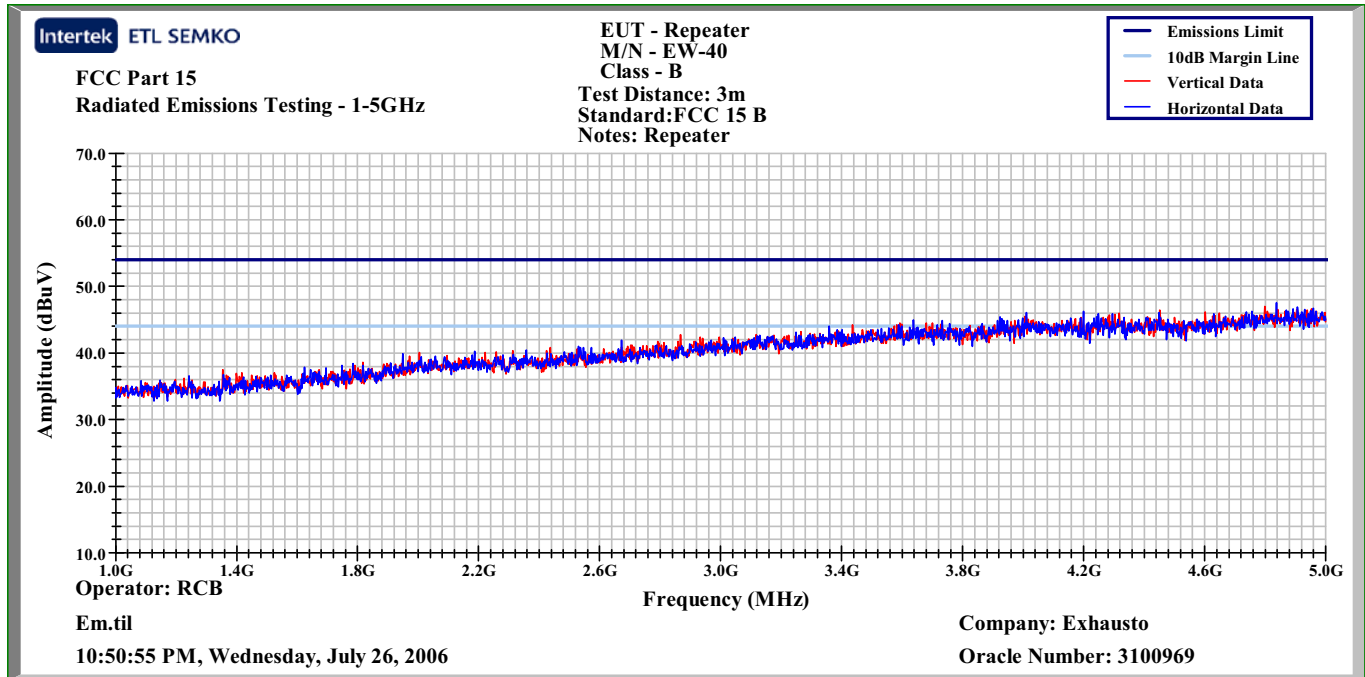
Plots:



Radiated Peak Plot (30MHz-1GHz) - Repeater

9.0 Radiated emissions (E-field) - Repeater (Radiated Emissions)

Plots:



Radiated Peak Plot (1GHz-5GHz) - Repeater

9.0 Radiated emissions (E-field) - Repeater (Radiated Emissions)

Data:

Date: 07-26-2006

Limit: FCC15 Class B-3m

Frequency Range (MHz): 30to5000MHz

Test Distance (m): 3

Input power: 120/60

Modifications for compliance (y/n): No

A	B	C	D	E	F	G	H	I
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Net dB(uV/m)	3m Limit dB(uV/m)	Margin dB
V	40.950	50.1	12.7	1.6	28.1	36.4	40.0	-3.7
V	44.210	50.1	10.5	1.6	28.1	34.2	40.0	-5.8
V	139.750	42.0	13.2	1.8	28.0	29.0	43.5	-14.5
V	213.925	44.5	10.6	2.6	28.0	29.7	43.5	-13.8
V	229.375	41.7	11.0	2.6	28.0	27.3	46.0	-18.7
V	340.000	36.4	14.7	3.2	28.0	26.3	46.0	-19.7
Calculations		$G=C+D+E-F$		$I=G-H$				

The emission on the plot at 908MHz is the intentional transmit frequency.