FCC PART 15 CLASS B
EMI MEASUREMENT AND TEST REPORT

For

EXI Wireless Systems Inc.

100-13551 Commerce Parkway
Richmond, BC, V6V 2L1, Canada

FCC ID: HE7PCR

2005-04-01

This Report Concerns:	**Equipment Type:**
☒ Original Report	433.92 MHz Receiver with PCMCIA Interface

Test Engineer:	Jerry Wang / Jerry
Report No.:	R0503171
Test Date:	2005-03-21
Reviewed By:	Hang Tan/ HANG
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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *EXI Wireless Systems Inc.* product, model: eLink PCMCIA Card, or the "EUT" as referred to this report is a 433.92 MHz Receiver with PCMCIA Interface which measures approximately 23.6cm L x 5.5cmW x 0.5cmH with weight 1.25LB.

**The test data gathered are from production sample, serial number: 0001, provided by the manufacturer.*

Objective

This Class B report is prepared on behalf of *EXI Wireless Systems Inc.* in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective is to determine compliance with U.S.A. FCC Class B and Canada ICES-003 issue 4 limits for conducted and radiated margin requirements for Information Technology Equipment.

Related Submittal(s)/Grant(s)

No Related Submittals.

Test Methodology

All measurements contained in this report were conducted with 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.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp

Test Facility

The Open Area Test site used by Bay Area Compliance Laboratory Corporation to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA.

Test site at Bay Area Compliance Laboratory Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules and Article 8 of the VCCI regulations. The facility also complies with the test methods and procedures set forth in ANSI C63.4-2003.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations is attached hereinafter and can also be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm

SYSTEM TEST CONFIGURATION

Justification

The EUT was tested in accordance with ANSI C63.4-2003.

EUT Exercise Software

The EUT exercising software program was designed to exercise the various installed components in accordance with ANSI C63.4-2003.

Special Accessories

The unit was tested with the normally supplied cabling and accessories provided by the supporting equipment and no special accessories were used.

Schematics / Block Diagram

Please refer to Exhibit C.

Equipment Modifications

No modifications were made to the EUT.

Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
Cradle	Notebook	None	370120326420	DOC
HIPRO	Power Adaptor	HP-OD042D03	02 07000005	DOC

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
Cradle	Notebook	None	370120326420	DOC
Microsoft	USB Mouse	IntelliMouse Explorer	55249-OEM-9926345-4	DOC

Printed Circuit Boards in EUT

Manufacturer/Description	Rev.	# of Layers	Crystals (MHz)
EXI Wireless System	N/A	4	433.92; 14.7456;7.3728

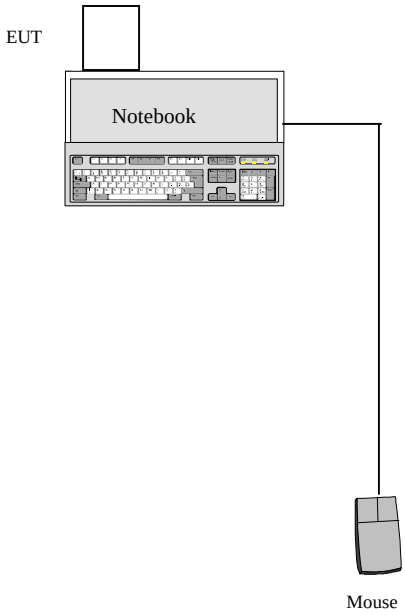
Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number	FCC ID
HIPRO	Power Adaptor	HP-OD042D03	02 07000005	DOC

Interface Ports and Cabling

Cable Description	Length (M)	Port/From	To
Shielded Cable	0	68pin PCMCIA Port / Host	EUT
Shielded Cable	2	Mouse Port / Host	Mouse

Configuration of Test System



SUMMARY OF TEST REPORT

RULE	DESCRIPTION	RESULTS
15.107	Conducted Emissions	Compliant
15.109	Radiated Emissions	Compliant
15.19	Labelling Requirements	Compliant
15.21, 15.105	Information to the User	Compliant
15.27	Special Accessories	Compliant

§15.107 - CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are receiver, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is ±2.4 dB.

EUT Setup

The measurement was performed in the shielded room, using the same setup per ANSI C63.4-2003 measurement procedure. The specification used was FCC 15 Class B limits.

The spacing between the peripherals was 10 cm.

The external I/O cables were draped along the test table and bundled as required.

The EUT was connected to 120Vac/60Hz power source.

Receiver Setup

The receiver was set to investigate the frequency from 150 kHz to 30MHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Rohde & Schwarz	Artificial-Mains Networks	ESH2-Z5	871884/039	2004-08-15
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2004-05-06
Fluke	Calibrated Voltmeter	189	18485-38	2004-07-18

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, EUT was connected to the mains outlet of the first LISN-1.

Maximizing procedure were performed on the six (6) highest emissions of the EUT.

All data was recorded in the peak detection mode, quasi-peak and average. Average readings are distinguished with an “Ave”. Quasi-peak readings are distinguished with an “Qp”.

Environmental Conditions

Temperature:	10.6° C
Relative Humidity:	86%
ATM Pressure:	1021.7 mbar

The testing was performed by Jerry Wang on 2005-03-21.

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Conducted limits for a Class B device, with the worst margin reading of:

-20.2 dB at **0.62** MHz on the **Neutral** conductor.

Conducted Emissions Test Data

LINE CONDUCTED EMISSIONS				FCC PART 15 CLASS B	
Frequency MHz	Amplitude dBμV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBμV	Margin dB
0.62	25.8	Ave	Neutral	46.00	-20.2
0.15	43.8	QP	Neutral	66.00	-22.2
0.48	23.8	Ave	Neutral	46.34	-22.5
0.15	42.6	QP	Line	66.00	-23.4
0.61	22.0	Ave	Line	46.00	-24.0
0.48	21.2	Ave	Line	46.34	-25.1
0.62	27.3	QP	Neutral	56.00	-28.7
0.48	26.0	QP	Neutral	56.34	-30.3
0.61	23.6	QP	Line	56.00	-32.4
0.48	23.0	QP	Line	56.34	-33.3
0.15	15.5	Ave	Neutral	56.00	-40.5
0.15	14.5	Ave	Line	56.00	-41.5

Plots of Conducted Emission

The plots of conducted emission are presented hereinafter as reference.

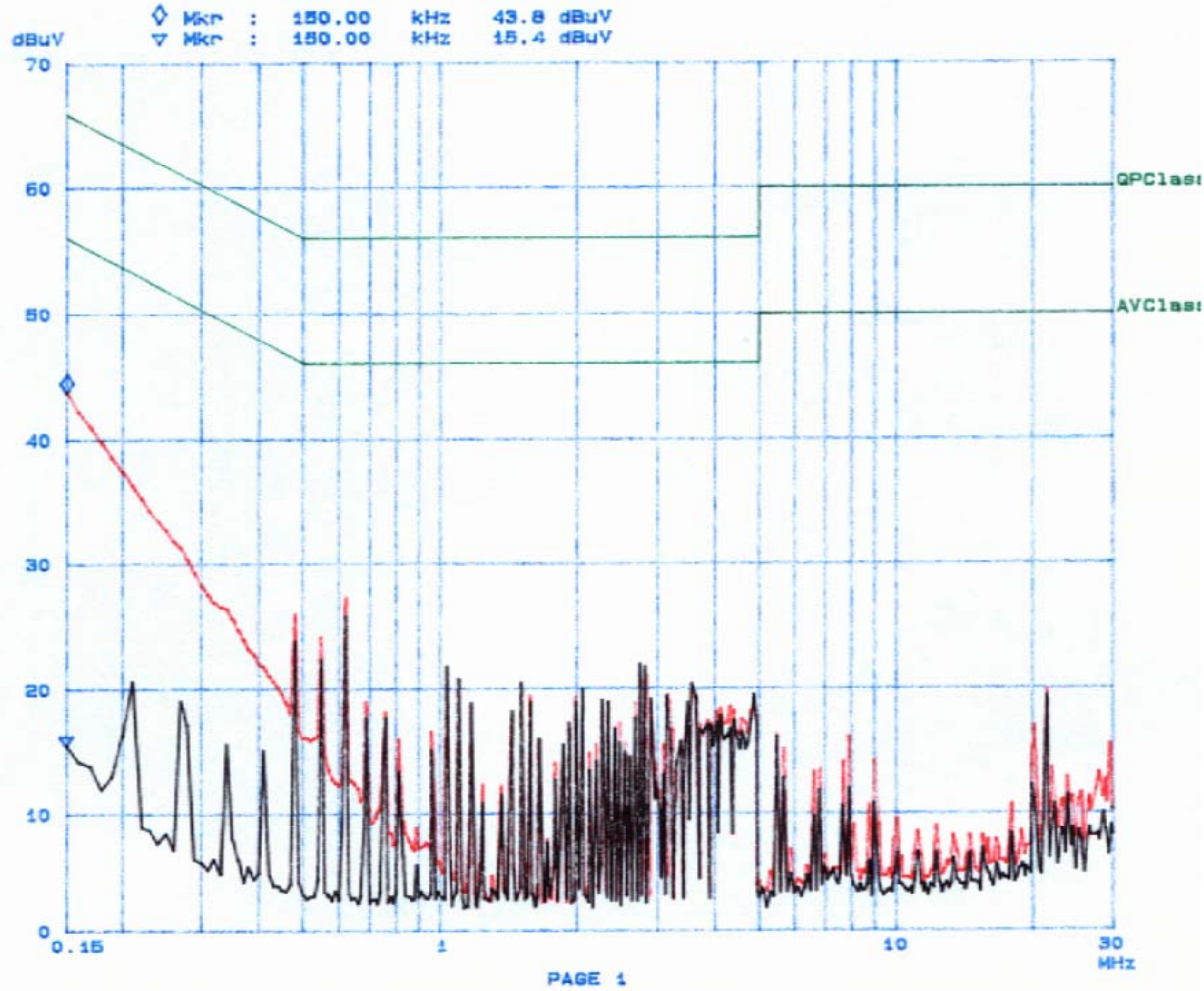
Temp 2005-3-21

Bay Area Compliance Laboratory Corp
21. Mar 05 17:27
FCC B

EUT: eLink PCMCIA Card
Manuf: EXI Wireless System
Op Cond: Normal
Operator: Jerry
Comment: N

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	10k	9k	QP+AV	20ms	15dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	15dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	15dBLN	OFF



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Jerry 2005-3-21

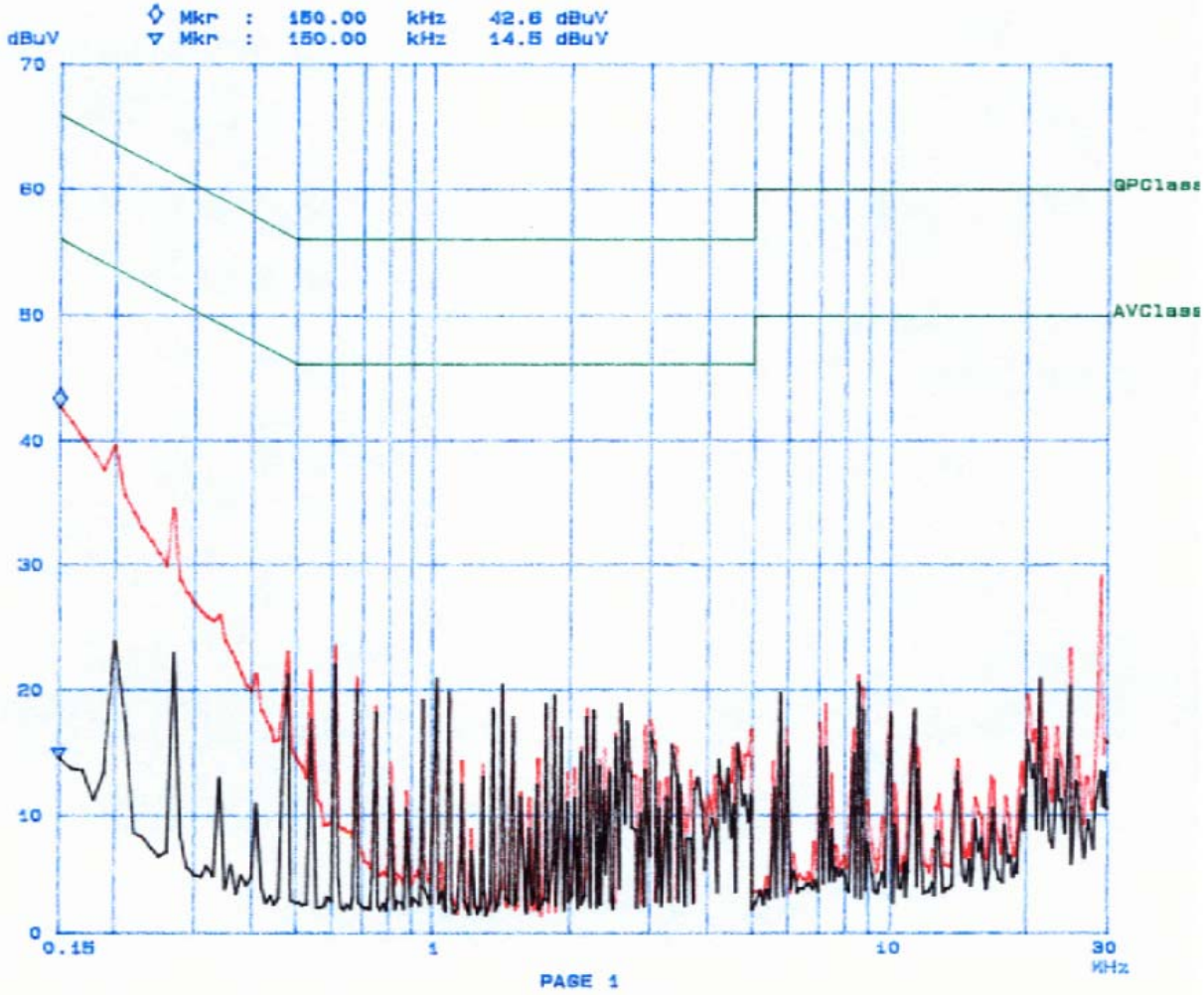
Bay Area Compliance Laboratory Corp
FCC B

21. Mar 05 17:04

EUT: eLink PCMCIA Card
Manuf: EXI Wireless System
Op Cond: Normal
Operator: Jerry
Comment: L

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	10k	9k	QP+AV	20ms	15dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	15dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	15dBLN	OFF



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§15.109 - RADIATED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are receiver, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMI Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is ±4.0 dB.

EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup in accordance with the ANSI C63.4-2003. The specification used was the FCC Class B limits.

The spacing between the peripherals was 10 cm.

The external I/O cables were draped along the test table and bundled as required.

The EUT connected to 120Vac/60Hz power source.

Receiver Setup

The system was tested to 1000 MHz.

During the radiated emission test, the receiver was set with the following configurations:

Frequency Range	***RBW***	***Video B/W***
Below 30MHz	10kHz	10kHz
30 – 1000MHz	100kHz	100kHz
Above 1000MHz	1MHz	1MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal Date
Agilent	Amplifier, Pre	8447D	2944A10198	2004-08-24
EMCO	Antenna, Bionical	3110B	9309-1165	2004-10-01
EMCO	Antenna, Log-Periodic	EM-6950	788	2004-04-15
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.595 0K03	100044	2004-09-29
Sunol Sciences	System Controller	SC99V	122303-1	N/R

*** Statement of Traceability: BACL Corp.** certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

For the radiated emissions test, the EUT all support equipment were connected to the AC floor outlet.

Maximizing procedure was performed on the six (6) highest emissions in the described configurations.

All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limits), and are distinguished with a "**Qp**" in the data table.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBμV means the emission is 7dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Class B Limit

Summary of Test Results

According to the data in following tables, the EUT complied with the CISPR 22 Class B standards, and had the worst margin of:

-5.7 dB at **47.93 MHz** in the **Vertical** polarization, 30 to 1000 MHz

Radiated Emissions Test Data, 3 meters

Environmental Conditions

Temperature:	10.6° C
Relative Humidity:	86%
ATM Pressure:	1021.5mbar

**Testing was performed by Jerry Wang on 2005-03-21.*

Radiated Emissions Test Data, 3 meters

Frequency	Reading	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifer	Correction Factor	FCC Limit	FCC Margin
MHz	dBuV/m	Degree	Meter	H / V	dB	dB	dB	dBuV/m	dBuV/m	dB
47.93	50.1	200	1.2	V	11.3	1.5	28.6	34.3	40	-5.7
412.50	46.3	200	1.2	V	15.8	4.4	28.1	38.4	46	-7.6
309.70	47.7	200	1.5	H	13.9	3.6	27.4	37.8	46	-8.2
398.16	45.9	270	1.5	H	15.2	4.3	28.1	37.3	46	-8.7
516.16	42.3	200	1.2	V	18.5	5.0	28.5	37.3	46	-8.7
383.41	45.3	270	1.5	H	15.2	4.3	28.0	36.8	46	-9.2
73.82	47.6	200	1.2	V	9.6	1.8	28.4	30.6	40	-9.4
301.34	46.3	200	1.5	H	13.9	3.6	27.4	36.4	46	-9.6
390.78	44.3	200	1.5	H	15.2	4.3	28.1	35.7	46	-10.3
412.93	43.6	300	1.5	H	15.8	4.4	28.1	35.7	46	-10.3
47.93	45.4	270	1.5	H	11.3	1.5	28.6	29.6	40	-10.4
597.24	38.9	300	2.0	H	19.5	5.4	28.6	35.2	46	-10.8
575.08	39.8	270	2.0	H	18.9	5.2	28.7	35.2	46	-10.8
398.15	43.7	270	1.2	V	15.2	4.3	28.1	35.1	46	-10.9
516.17	39.9	180	1.5	H	18.5	5.0	28.5	34.9	46	-11.1
309.70	44.7	200	1.2	V	13.9	3.6	27.4	34.8	46	-11.2
597.24	37.6	180	1.2	V	19.5	5.4	28.6	33.9	46	-12.1
383.40	42.3	200	1.2	V	15.2	4.3	28.0	33.8	46	-12.2
368.65	42.3	200	1.2	V	14.9	4.1	27.8	33.5	46	-12.5
516.17	38.5	200	1.2	V	18.5	5.0	28.5	33.5	46	-12.5
427.64	40.8	270	2.0	H	15.8	4.7	28.1	33.2	46	-12.8
361.31	41.2	200	1.5	H	14.9	4.1	27.8	32.4	46	-13.6
361.30	41.0	180	1.2	V	14.9	4.1	27.8	32.2	46	-13.8
405.52	39.6	300	1.5	H	15.8	4.6	28.1	31.9	46	-14.1
405.53	39.5	180	1.2	V	15.8	4.6	28.1	31.8	46	-14.2
258.07	43.7	200	1.5	H	11.7	3.4	27.4	31.4	46	-14.6
73.82	42.3	200	2.0	H	9.6	1.8	28.4	25.3	40	-14.7
287.57	42.3	200	1.5	H	12.6	3.6	27.4	31.1	46	-14.9
117.86	42.3	200	1.2	V	11.9	2.2	28.2	28.2	43.5	-15.3
427.63	38.2	270	1.2	V	15.8	4.7	28.1	30.6	46	-15.4
420.36	37.9	200	1.2	V	15.8	4.7	28.1	30.3	46	-15.7