Standards Council of Canada
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TM

Test Report:	4R08262.1 Issue 2
Applicant:	eXI Wireless Systems Inc. Suite 100.13551 Commerce Parkway Richmond, BC Canada V6V 2L1
Equipment Under Test:	eLink Master Receiver
Model Number:	R4 Master
In Accordance With:	**FCC 47 CFR Part 15, Subpart B** Verification
Tested By:	Nemko Canada Inc. 303 River Road, R.R. 5 Ottawa, Ontario K1V 1H2
Authorized By:	Daniel Hynes, EMC Specialist
Date:	13 October 2004
Total Number of Pages:	16

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Measurement Uncertainty

Accuracy of Measurement

Measurement uncertainty was calculated using the methods described in CISPR 16-4 *Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC measurements* and Nemko Canada Inc. procedure EMC/MUC/001 *Uncertainty in EMC Measurements.*

Test Specific Measurement Uncertainty

Measurement	Test Specification	Ulab
Conducted disturbance	9kHz – 150kHz	4.0dB
	150kHz – 30MHz	3.6dB
Radiated disturbance	30MHz – 200MHz Horizontal polarization	4.7dB
	200MHz – 1000MHz Horizontal polarization	4.7dB
	30MHz – 200MHz Vertical polarization	4.9dB
	200MHz – 1000MHz Vertical polarization	4.9dB

Lab Environmental Conditions

Lab Conditions

Ambient Temperature: 15°C to 35°C, Relative Humidity: 30% to 60%, Atmospheric Pressure: 86kPa (860mbar) to 106kPa (1 060mbar)

Declaration

Product Name: eLink Master Receiver

Model No: R4 Master

Trademark: eXI WIRELESS SYSTEMS INC.

Serial No: N/A

Name of Applicant: eXI Wireless systems Inc

Name of Manufacturer: eXI Wireless systems Inc

Nemko Canada Inc., Ottawa, Ontario Canada	TEST RESULT	
	PASS	FAIL
In the configuration tested, the EUT complied with the requirements of: FCC 47 CFR Part 15, Subpart B for Class B. Digital Devices.	X	

Note: See Summary of Test Results and Engineering Considerations for full details.

Tested by: _____ 13 October 2004
Signature Date
Phil Taffinder, EMC & Telecom Specialist

Reviewed by: _____ 13 October 2004
Signature Date
Daniel Hynes, EMC Specialist

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Nemko Canada Inc., a testing laboratory, is accredited by the Standards Council of Canada.
The tests included in this report are within the scope of this accreditation.

Summary of Test Results

General

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15, Subpart B for Digital Devices.

These tests were conducted using measurement procedures of ANSI C63.4-2001.

The equipment was tested for conducted emissions from 0.15MHz to 30MHz using a 50 microhenry line impedance stabilization network (L.I.S.N.) as described in ANSI C63.4-2001. Peripheral equipment was also operated through a 50 microhenry L.I.S.N.

Limits For Conducted Disturbance At The Mains Ports: Paragraph No. 15.107 for Class A

Frequency Range MHz	Limits dB(μV)		Result (Pass/Fail)
	Quasi-Peak	Average	
0.15 to 0.50	79	66	N/A
0.50 to 30	73	60	

Limits For Conducted Disturbance At The Mains Ports: Paragraph No. 15.107 for Class B

Frequency Range MHz	Limits dB(μV)		Result (Pass/Fail)
	Quasi-Peak	Average	
0.15 to 0.50	66 to 56	56 to 46	Pass
0.5 to 5	56	46	
5 to 30	60	50	

Notes

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50MHz.

Summary of Test Results, continued

Limits For Radiated Disturbance: Paragraph No. 15.109		
Frequency Range MHz	Limits For Radiated Disturbance At A Measuring Distance Of 10 Meters Class A	
	Quasi-Peak Limits dB (μV/m)	Result (Pass/Fail)
30 - 88	39.1	N/A
88 - 216	43.5	
216 - 960	46.4	
Above 960	49.5	
Frequency Range MHz	Limits For Radiated Disturbance At A Measuring Distance Of 3 Meters Class B	
	Quasi-Peak Limits dB (μV/m)	Result (Pass/Fail)
30 - 88	40.0	Pass
88 - 216	43.5	
216 - 960	46.0	
Above 960	54.0	

Notes

1. The lower limit shall apply at the transition frequency.
2. Additional provisions may be required for cases where interference occurs.

The spectrum was investigated from 30MHz up to the frequency shown in the following table based on the highest operating frequency used in the EUT

The highest operational frequency used in the EUT was 433.92MHz.

Highest Frequency Generated or Used in the Device Which the Device Operates or Tunes (MHz)	Upper Frequency of Measurement Range (MHz)
Below 1.075	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5^{th} harmonic of the highest frequency or 40GHz, whichever is lower.

Engineering Considerations

Product Modification
To achieve compliance the following change(s) were made during compliance testing: None
Justification
None
Deviations
The following deviations from, additions to, or exclusions from the test specification have been made: None

Test Report Revision History

Issue #	Details of changes made to test report
#1	Original Report Issued
#2	Report amended to incorporate details of the frequency range tested for radiated emissions.

General Information Regarding the Equipment Under Test (EUT)

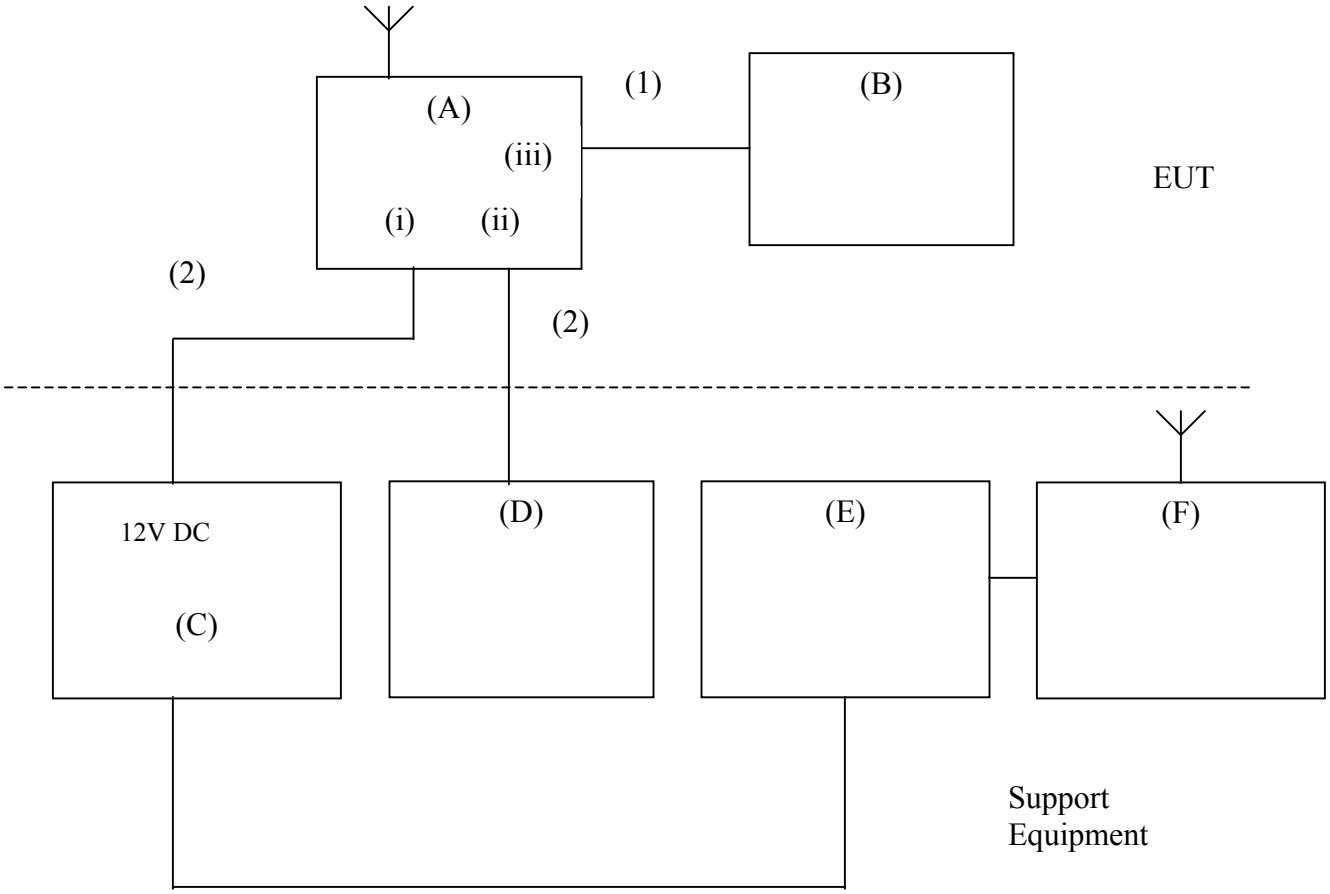
Date Received In Laboratory:	22nd July 04
Nemko Identification Number:	Refer to Nemko Canada receiving report.

EUT Mains Input Voltage and Frequency
Voltage: 12VDC Frequency: N/A
Description & Theory of Operation
The eLink Master Receivers are fixed frequency receivers dedicated to received and decode specifically encoded tamper and location message transmitted from RFID tags. The receivers are networked to host computers on RS485 network.
EUT Clock and Operational Frequencies
Receive Frequency: 433.92 MHz (non specific SRD) -- LO Freq 423.22MHz; LO OSC XTAL: 6.6128125MHz -- Micro clock XTAL Osc: 14.7456 MHz
Exercise/Monitoring method
EUT monitored by receiving ID messages from a Transmitter.
Software Version
FW: R4M Master FW -- PN 720-000045-000

Equipment Configuration

Equipment Configuration List					
Item	Description	Identification: *(M/N #, S/N #, P/N #, Rev.)*			
(A)	eLink Master Receiver	M/N# R4 Master			
(B)	Rx Counter	M/N# eXI Tag ID Display			
(C)	HP PSU	S/N# 2713A-10106			
(D)	RS232 Converter	M/N# IRSFC24XT			
(E)	Tx Counter	N/A			
(F)	HP Signal Generator	S/N# US39270695			
EUT Ports					
Item	Description	Indoor/Outdoor	Type (See Legend)	Qty	
i.	DC Port	Indoor	2	1	
ii.	RS485	Indoor	4	1	
iii.	Auxiliary	Indoor	4	1	
Inter-Connection Cables					
Item	Description	Shielded	Ferrite	Length (m)	
(1)	RS 485 I/O, FT-4 Low Capac	Yes	No	10	
(2)	Twisted Pair	No	No	10	
Legend: 1 = AC Power Input/Output, 2 = DC Power Input/Output, 3 = Telecom, 4 = Non-telecom I/O, 5 = Maintenance, 6 = Fiber Optic					
Notes					
None					

Configuration of the Equipment Under Test (EUT)



Radiated Disturbance

Test Date: 11th August 2004
Engineer's Name: Phil Taffinder

Tested as per: Table Top
Mains Input Voltage: 12VDC | Mains Input Frequency: N/A

Enclosure Investigation Data
Test Distance (meters): 10 | Dome: Almonte

Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor (dB)	Amp. Gain (dB)	Cable Loss (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Amp.
49.8905	BL	H	12.5	8.2	N/A	1.0	21.6	29.5	7.9	Q-Peak	N/A
108.5452	BL	V	10.5	11.9	N/A	1.3	23.7	33.0	9.3	Q-Peak	N/A
114.5399	BL	V	9.6	12.5	N/A	1.3	23.4	33.0	9.6	Q-Peak	N/A
75.0002	BL	V	9.6	6.2	N/A	1.2	17.0	29.5	12.5	Q-Peak	N/A
162.3445	BL	H	8.7	10.1	N/A	1.6	20.4	33.0	12.6	Q-Peak	N/A
174.9968	BL	H	8.9	9.7	N/A	1.6	20.2	33.0	12.8	Q-Peak	N/A

Legend:
Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole
Detector Legend: Q-Peak = 120kHz RBW, Average = 1.0MHz RBW

Notes

Measurements were performed at a distance of 10 meters. The limits have been extrapolated using a factor of 10.5dB.
The spectrum was searched from 30.0 MHz to 2.0GHz and any emissions within 20dBs of the limit were recorded.

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass

Radiated Emissions Test Equipment Used

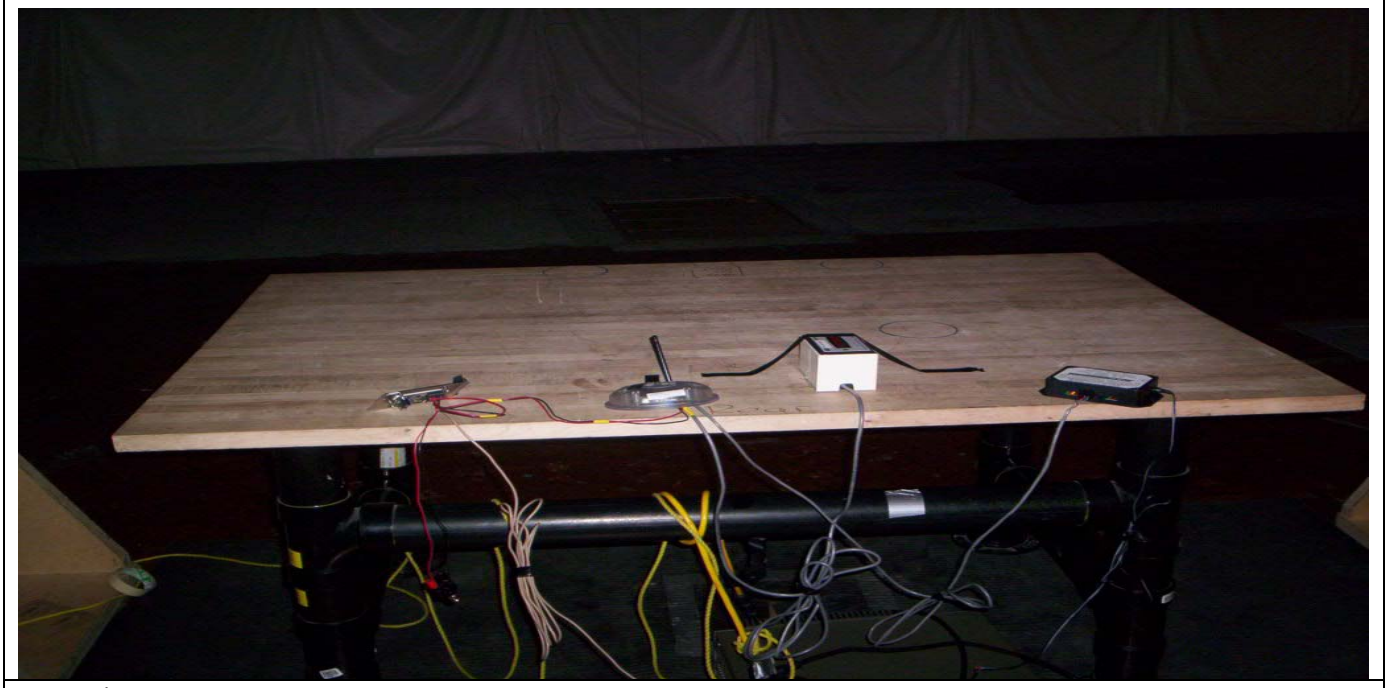
CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	Receiver	Rohde & Schwarz	ESVS-30	FA001445	July 07/04	July 07/05
1 Year	Bilog	Schaffner	CBL6112B	FA001503	July 09/04	July 09/05

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use, OUT = Out For CAL/Repair

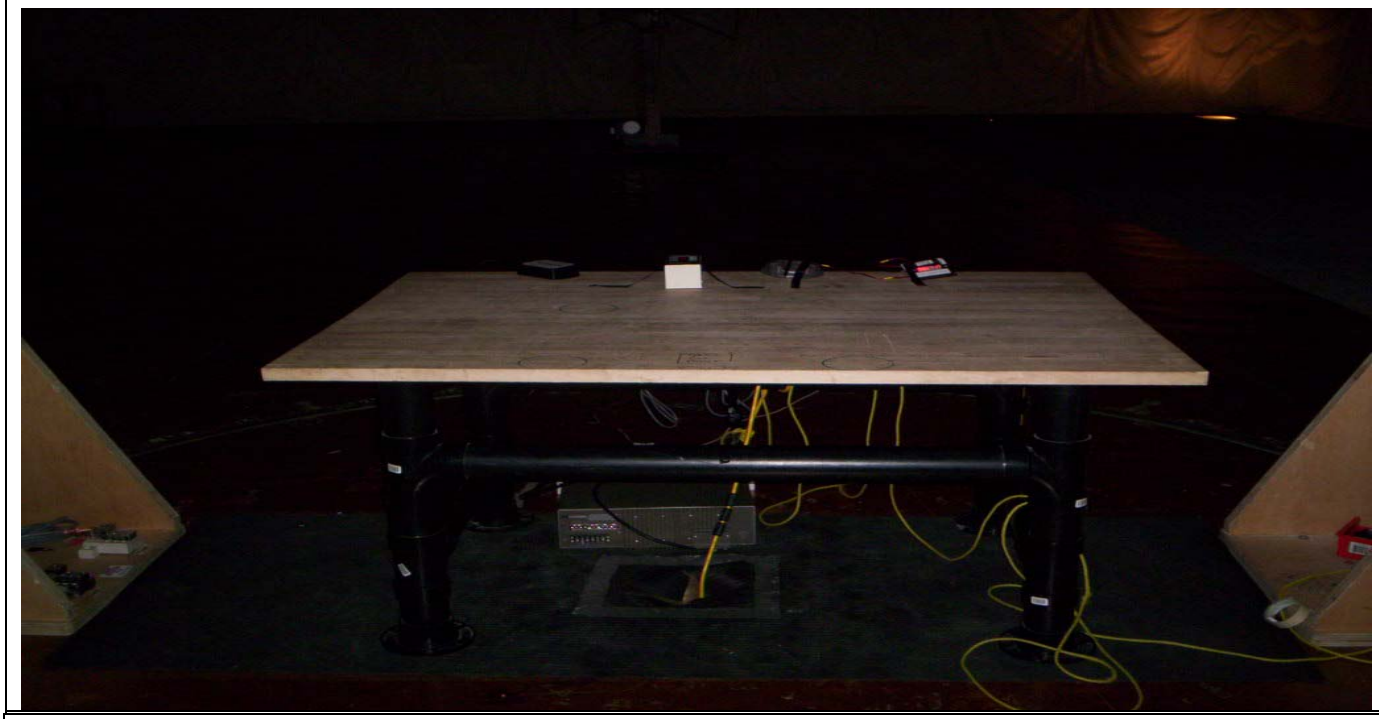
Radiated Disturbance, continued

Enclosure Port, Radiated Electromagnetic Field Emissions Setup Photos

Front View



Rear View



Conducted Disturbance at Mains Port

Test Date: 12ht August 04

Engineer's Name: Phil Taffinder

Tested as per: Table Top

Mains Input Voltage: 120VAC | Mains Input Frequency: 60Hz

Spectrum plots for each frequency band can be found at the back of this section. *All plots were generated with a peak detector.

Port Investigation Data

Port under test: AC Mains

Results: Refer to Plots of this section and tables.

Conductor	Frequency (MHz)	Detector	Emission Level (dBuV)	LISN Loss (dB)	Cable Loss (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
Phase	10.7608	Quasi-Peak	52.2	0.2	0.2	52.6	60.0	7.4
		Average	31.2	0.2	0.2	31.6	50.0	18.4
	10.3519	Quasi-Peak	50.2	0.2	0.2	50.6	60.0	9.4
		Average	30.6	0.2	0.2	31	50.0	19.0
	11.1606	Quasi-Peak	48.6	0.2	0	48.8	60.0	11.2
		Average	44.2	0.2	0	44.4	50.0	5.6
Neutral	10.7608	Quasi-Peak	50.7	0.2	0.2	51.1	60.0	8.9
		Average	30.6	0.2	0.2	31	50.0	19.0
	10.3519	Quasi-Peak	51.8	0.2	0.2	52.2	60.0	7.8
		Average	32.8	0.2	0.2	33.2	50.0	16.8
	11.1606	Quasi-Peak	47.2	0.2	0	47.4	60.0	12.6
		Average	44.2	0.2	0	44.4	50.0	5.6

Notes

It was noted that the EUT was DC powered. Tests were performed with a laboratory PSU to demonstrate that there would be no issues when powered from a PSU connected to the mains power supply.

Deviations

Refer to Engineering Considerations.

Test Result

Final Test Result: Pass

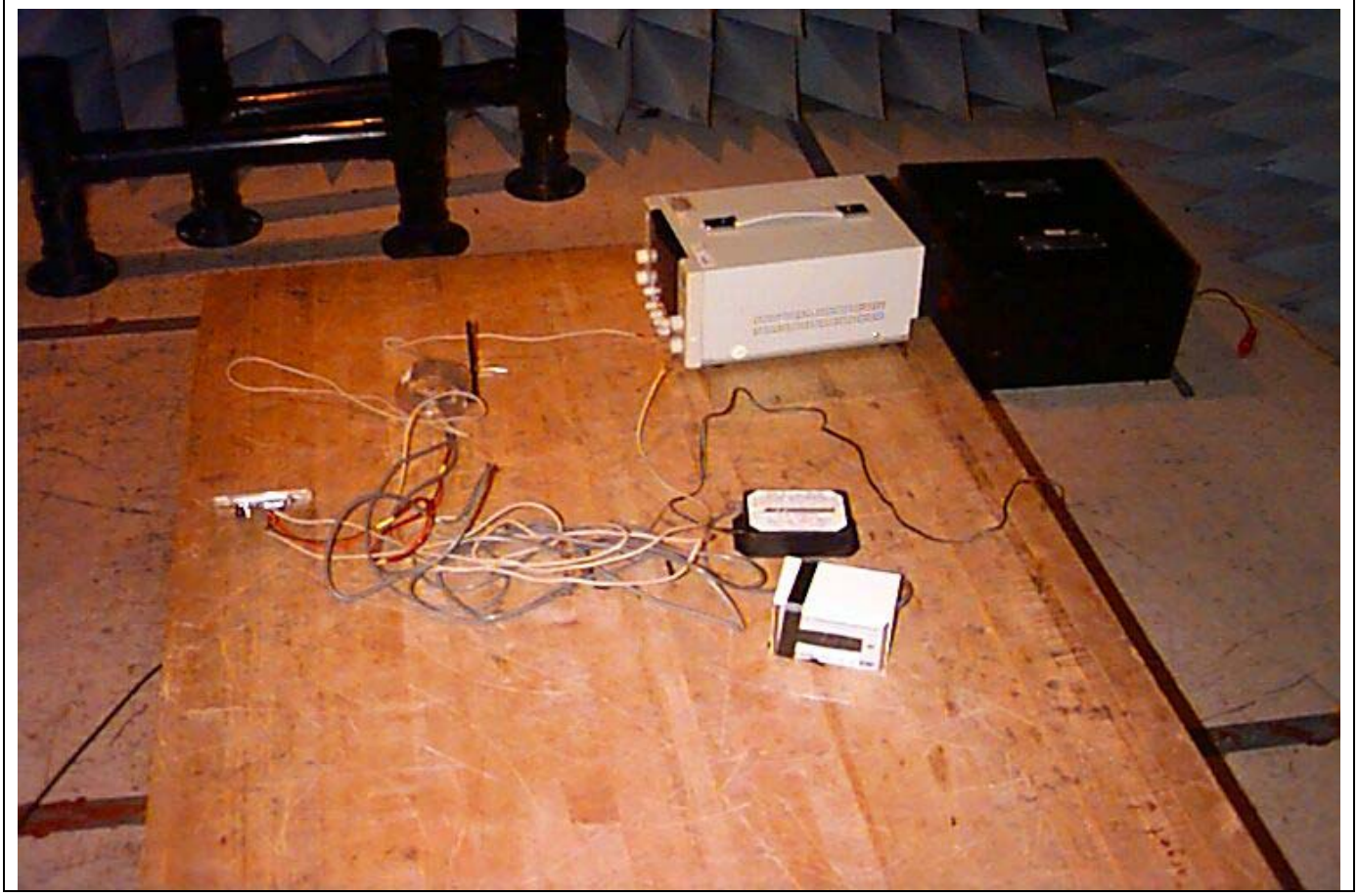
Conducted Disturbance at Mains Test Equipment Used

CAL Cycle	Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
1 Year	LISN (peripheral)	Tegam	95300-50	FA000986	Jan. 27/04	Jan. 27/05
1 Year	LISN (peripheral)	Tegam	95300-50	FA000987	Jan. 27/04	Jan. 27/05
1 Year	Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	May 28/04	May 28/05
1 Year	Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	May 28/04	May 28/05
1 Year	Transient Limiter	Hewlett-Packard	1194 7A	FA000975	June 10/04	June 10/05

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use

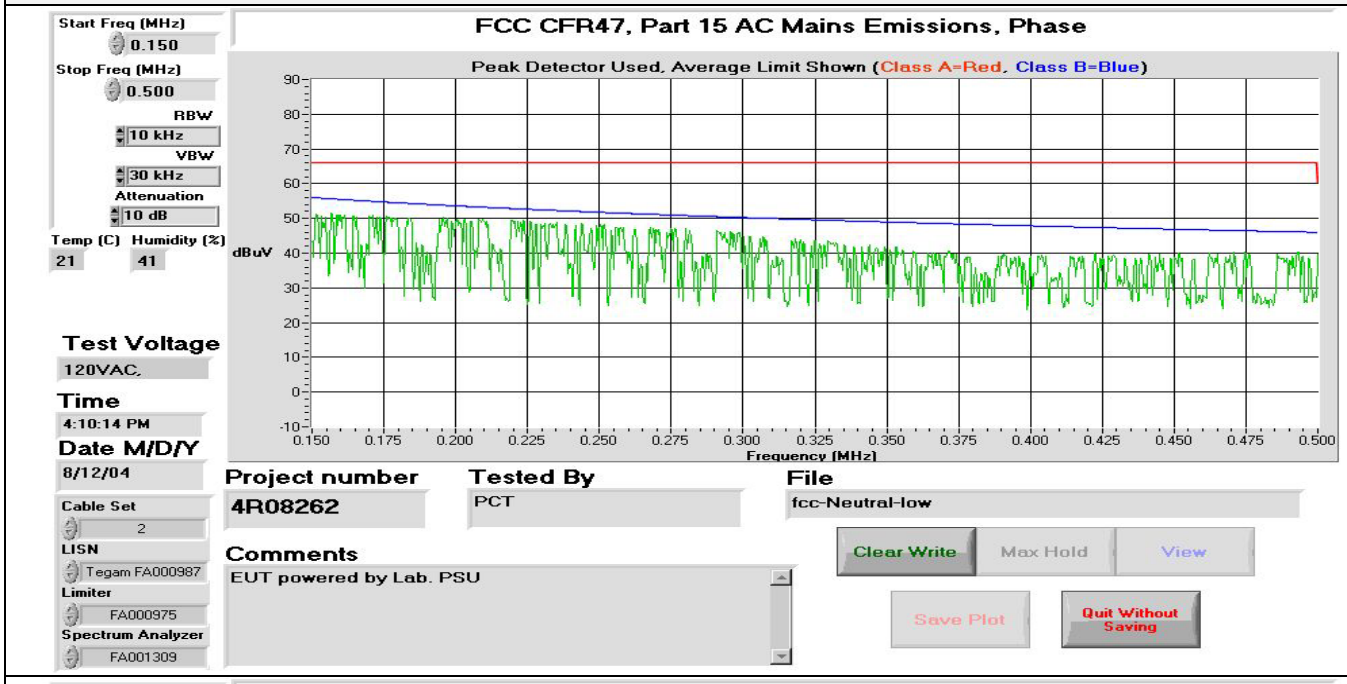
Conducted Disturbance at Mains, continued

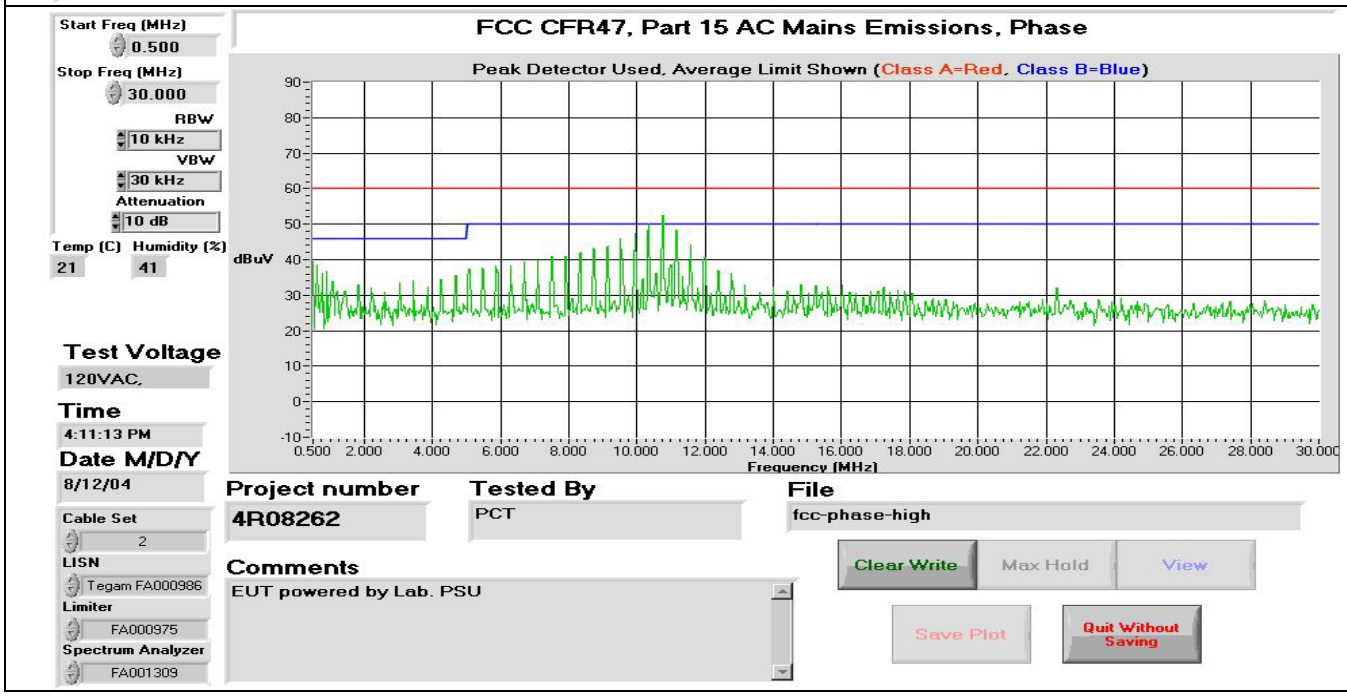
Conducted Disturbance at Mains Setup Photos



Conducted Disturbance at Mains, continued

Conducted Disturbance at Mains Plots





Conducted Disturbance at Mains, continued

Conducted Disturbance at Mains Plots, continued