



Nemko

Test Report: 5W38277.3

Applicant: Alutron Modules Inc.
420 Industrial Parkway South
Aurora, Ontario L4G 3V7

Apparatus: Central Vacuum Remote Control Receivers
LV9 and LV11

FCC ID: S3PRFR

In Accordance With: FCC Part 15 Subpart B, 15.107 and 15.109
Unintentional Radiators

Tested By: Nemko Canada Inc.
303 River Road
Ottawa, Ontario
K1V 1H2

Authorized By: 
Sim Jagpal, Resource Manager

Date: 18 August 2005

Total Number of Pages: 18

Report Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart B. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

The assessment summary is as follows:

Apparatus Assessed:	Central Vacuum Remote Control Receivers LV9 and LV11
Specification:	FCC Part 15 Subpart B, 15.107 and 15.109
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None
Report Release History:	Original Release

Author: Jason Nixon, Telecom Specialist

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

Nemko Canada Inc. authorizes the applicant to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Nemko Canada Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

TABLE OF CONTENTS

Report Summary.....	2
Section 1 : Equipment Under Test.....	4
1.1 Product Identification	4
1.2 Samples Submitted for Assessment.....	4
1.3 Theory of Operation	4
1.4 Technical Specifications of the EUT	5
Section 2 : Test Conditions.....	6
2.1 Specifications	6
2.2 Deviations From Laboratory Test Procedures	6
2.3 Test Environment	6
2.4 Test Equipment.....	6
Section 3 : Observations	7
3.1 Modifications Performed During Assessment	7
3.2 Record Of Technical Judgements	7
3.3 EUT Parameters Affecting Compliance	7
3.4 Test Deleted.....	7
3.5 Additional observations	7
Section 4 : Results Summary	8
4.1 FCC Part 15 Subpart C : Test Results	9
Appendix A : Test Results.....	10
Appendix B : Setup Photographs	16
Appendix C : Block Diagram of Test Setups.....	18

Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows:

Central Vacuum Remote Control Receivers
LV9 and LV11

1.2 Samples Submitted for Assessment

The following samples of the apparatus have been submitted for type assessment:

Sample No.	Description	Serial No.
1	ALUTRON MODULES LV9 WIRELESS RECEIVER	_____
2	ALUTRON MODULES LV11 WIRELESS RECEIVER	_____
6	CLASS 2 TRANSFORMER (P/N A41W240300-02/1)	_____

The first samples were received on: January 31, 2005

1.3 Theory of Operation

The input from the antenna is amplified by an LNA, passed through a SAW filter for noise rejection then decoded by the Micrel receiver chip. The OOK input is then converted into a digital message and fed to a Microchip microcontroller for decoding. Upon receipt of the appropriate message the output relay, under the control of the microcontroller, is turned ON or OFF.

1.4 Technical Specifications of the EUT

Manufacturer: Alutron Modules Inc.

Receive Frequency: 433.9MHz

Receiver Type: Super Heterodyne

Antenna Data: Internal

Power Source: 120VAC, 60Hz

Section 2 : Test Conditions

2.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart B, 15.107 and 15.109
Unintentional Radiators

2.2 Deviations From Laboratory Test Procedures

No deviations were made from laboratory test procedures.

2.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	15 – 30 °C
Humidity range	:	20 - 75 %
Pressure range	:	86 - 106 kPa
Power supply range	:	+/- 5% of rated voltages

2.4 Test Equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Last Cal.	Next Cal.
LISN	EMCO	4825/2	FA001545	Jan. 13/05	Jan. 13/06
Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	May 28/04	May 28/05
Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	May 28/04	May 28/05
International Power Supply	California Inst.	1001WP	FA000965	NCR	NCR
Transient Limiter	Hewlett-Packard	1194 7A	FA000975	June 10/04	June 10/05
Receiver	Rohde & Schwarz	ESVS-30	FA001437	July 26/04	July 26/05
Biconical (1) Antenna	EMCO	3109	FA000805	April 23/04	April 23/05

Section 3 : Observations

3.1 Modifications Performed During Assessment

No modifications were performed during assessment.

3.2 Record Of Technical Judgements

No technical judgements were made during the assessment.

3.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

3.4 Test Deleted

No Tests were deleted from this assessment.

3.5 Additional observations

The following additional observation was made during this assessment:

3.5.1 Difference between models

The LV11 and LV9 are identical from an RF standpoint since both use the same Micrel receiver chip and associated circuitry. The differences lie in the power supply and output circuits. In the case of the LV9 an AC input of 24 VAC is required and a heavy-duty relay provides the output dry contact. In the LV11 the input voltage is 9VDC and a light duty relay provides the output.

Section 4 : Results Summary

This section contains the following:

FCC Part 15 Subpart B : Test Results

The column headed 'Required' indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

- N No : not applicable / not relevant.
- Y Yes : Mandatory i.e. the apparatus shall conform to these tests.
- N/T Not Tested, mandatory but not assessed. (See section 3.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

4.1 FCC Part 15 Subpart C : Test Results

Part 15	Test Description	Required	Result
15.107(a) 15.109(a)	Conducted Emissions for Class B Radiated Emissions for Class B	Y Y	Pass Pass

Notes:

Appendix A : Test Results

Criteria: Clause 15.107(a) Conducted Emissions

Frequency of Conducted limit (dBmV)		
Emission (MHz)	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

Test Conditions:

Sample Number:	1, 2	Temperature:	22°C
Date:	February 14, 2005	Humidity:	30%
Modification State:	0	Tester:	David Duchesne
		Laboratory:	Wireless

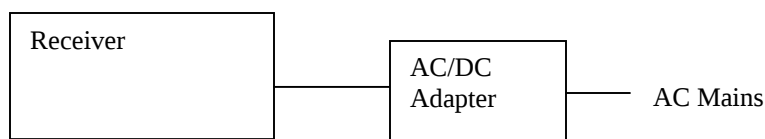
Test Results: See Attached Plots and Table.

LV9

EVG

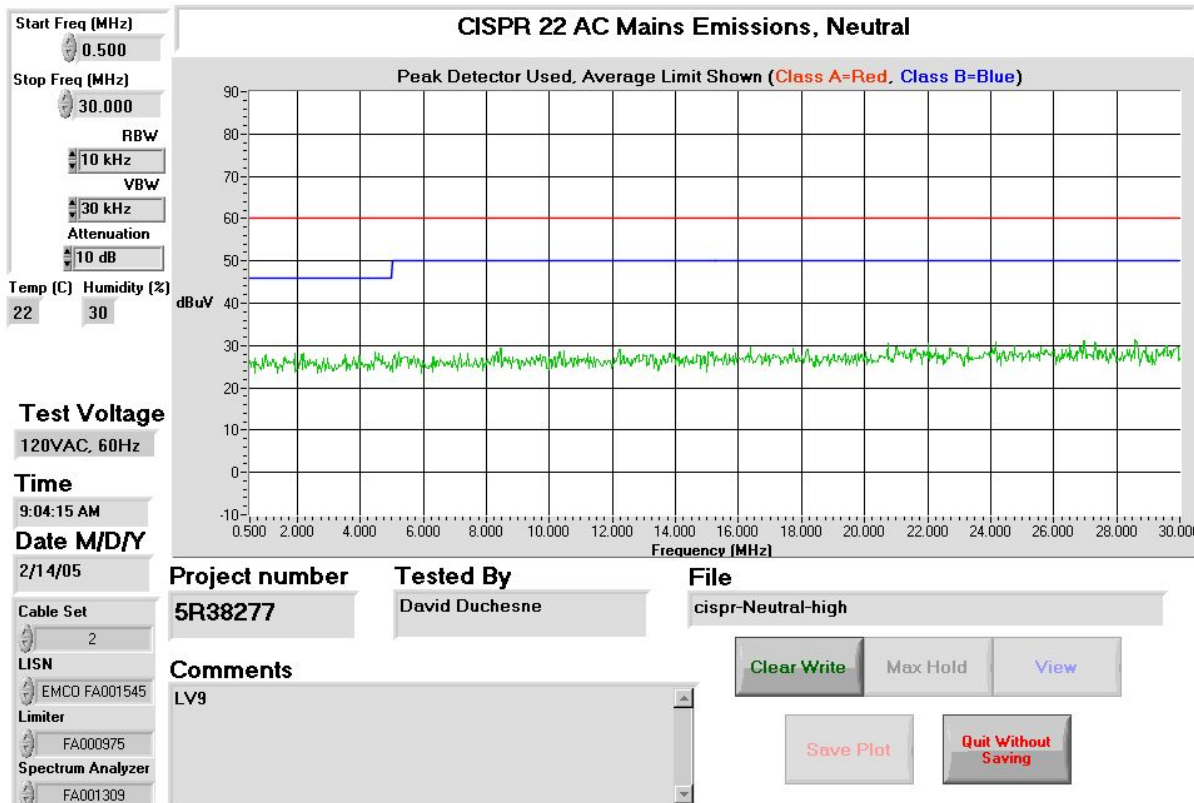
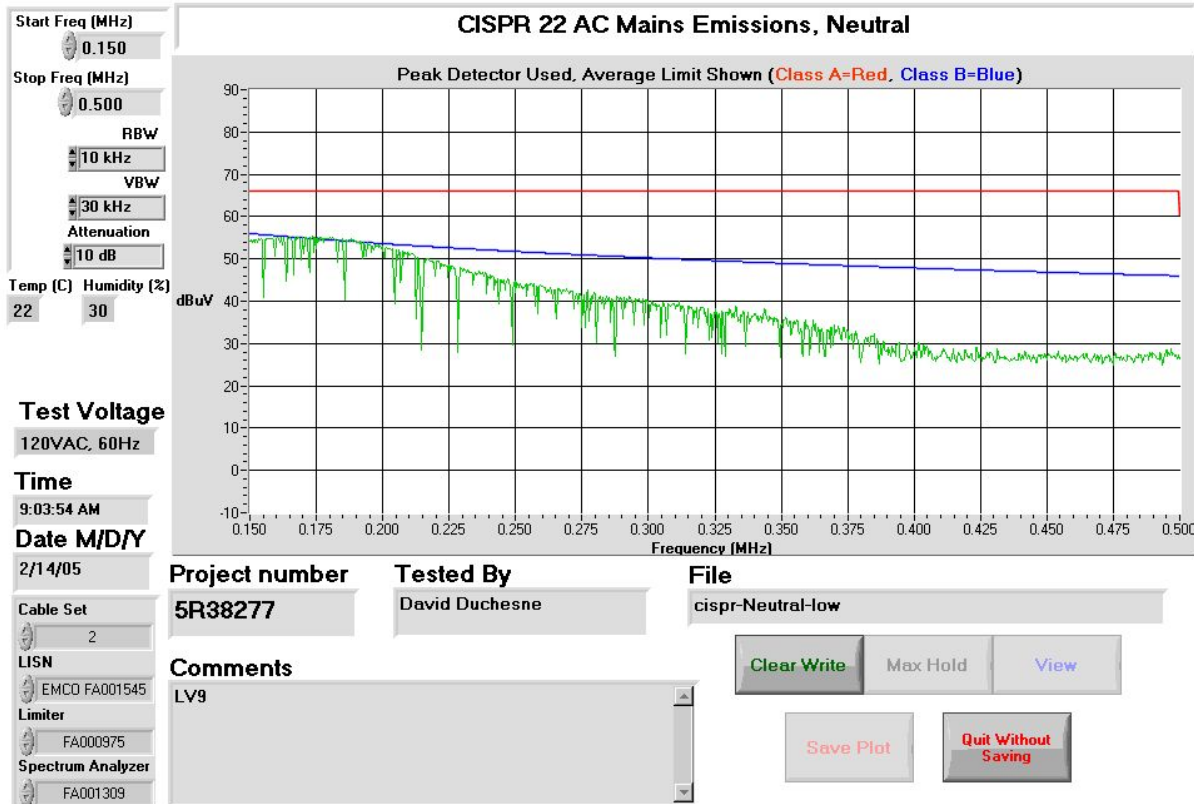
Conductor		Frequency (MHz)	Detector	Emission Level (dBuV)	LISN Loss (dB)	Cable Loss (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	Phase	0.1650	Quasi Peak	43.5	0.00	0.00	43.50	65.2	21.7
			Average	15.8	0.00	0.00	15.80	55.2	39.4
2	Phase	0.1730	Quasi Peak	43.4	0.00	0.00	43.40	64.8	21.4
			Average	13.0	0.00	0.00	13.00	54.8	41.8
3	Phase	0.1990	Quasi Peak	42.0	0.00	0.20	42.20	63.7	21.5
			Average	12.0	0.00	0.20	12.20	53.7	41.5
4	Neutral	0.1650	Quasi Peak	42.5	0.00	0.00	42.50	65.2	22.7
			Average	15.0	0.00	0.00	15.00	55.2	40.2
5	Neutral	0.1730	Quasi Peak	43.4	0.00	0.00	43.40	64.8	21.4
			Average	13.1	0.00	0.00	13.10	54.8	41.7
6	Neutral	0.1990	Quasi Peak	41.0	0.00	0.20	41.20	63.7	22.5
			Average	10.0	0.00	0.20	10.20	53.7	43.5

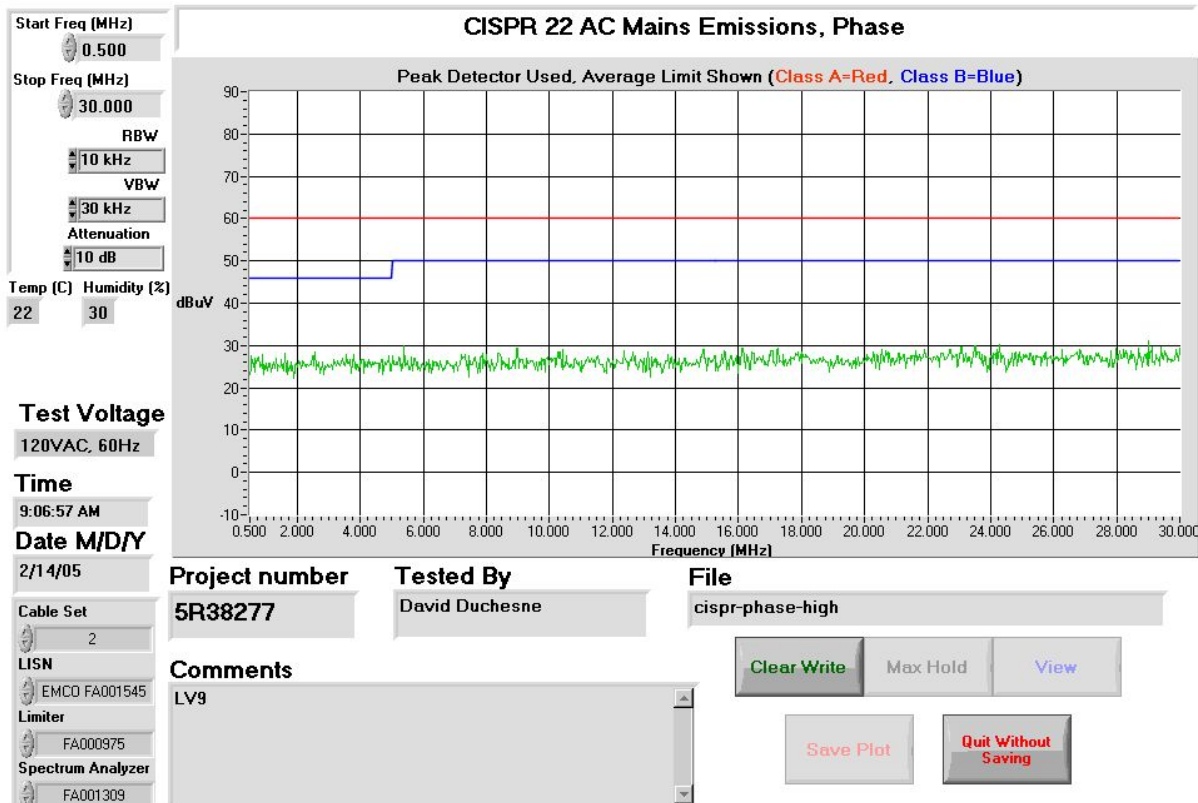
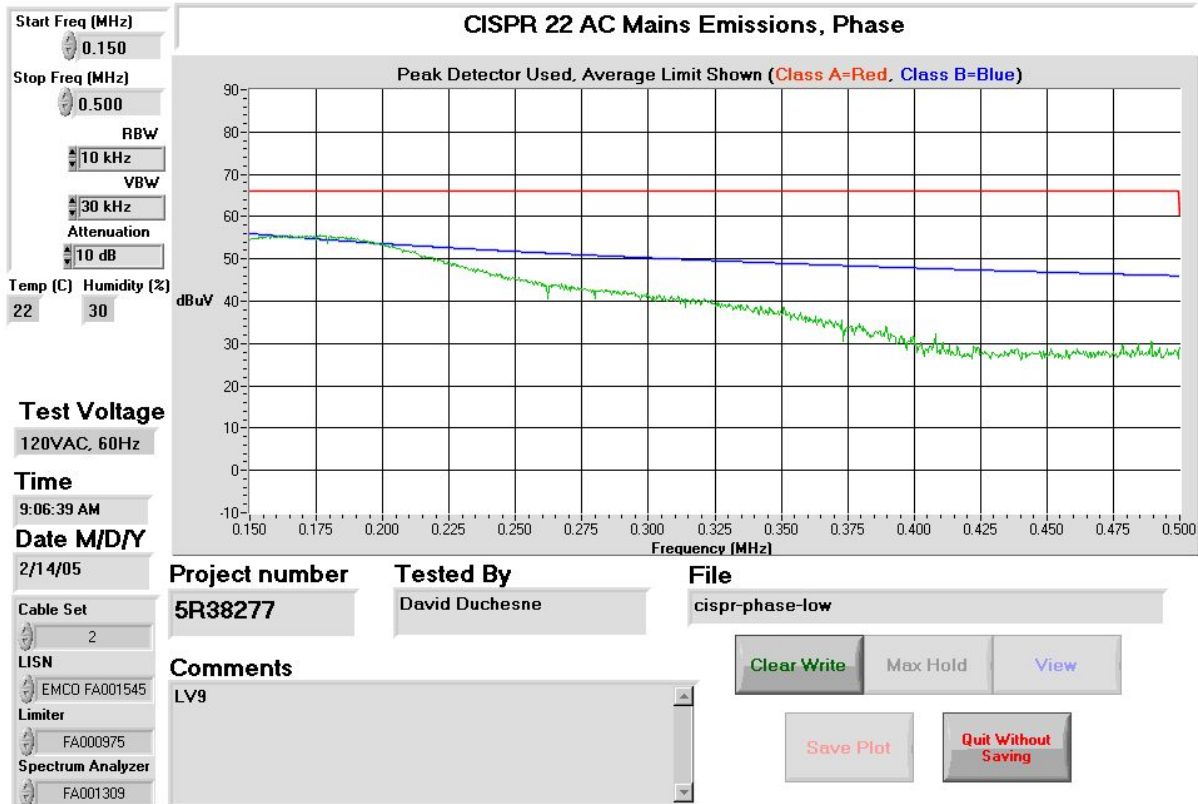
Block Diagram of Test Setup:

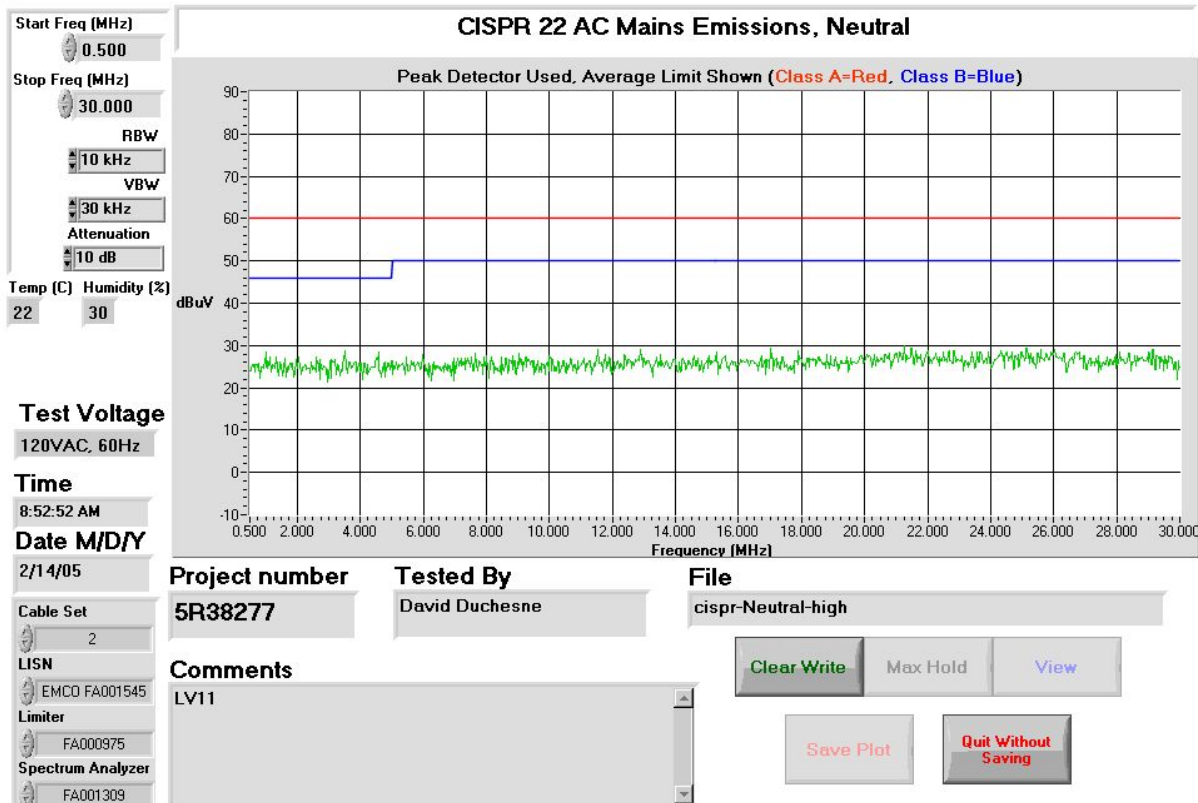
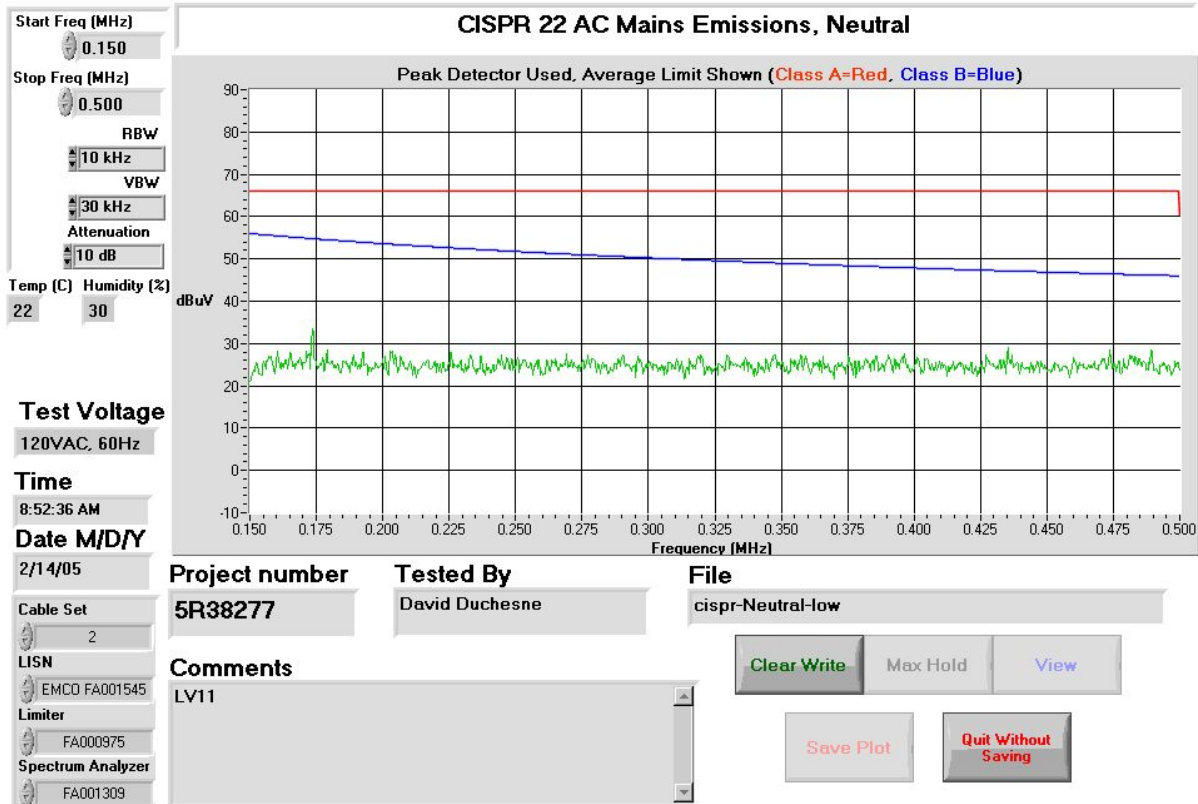


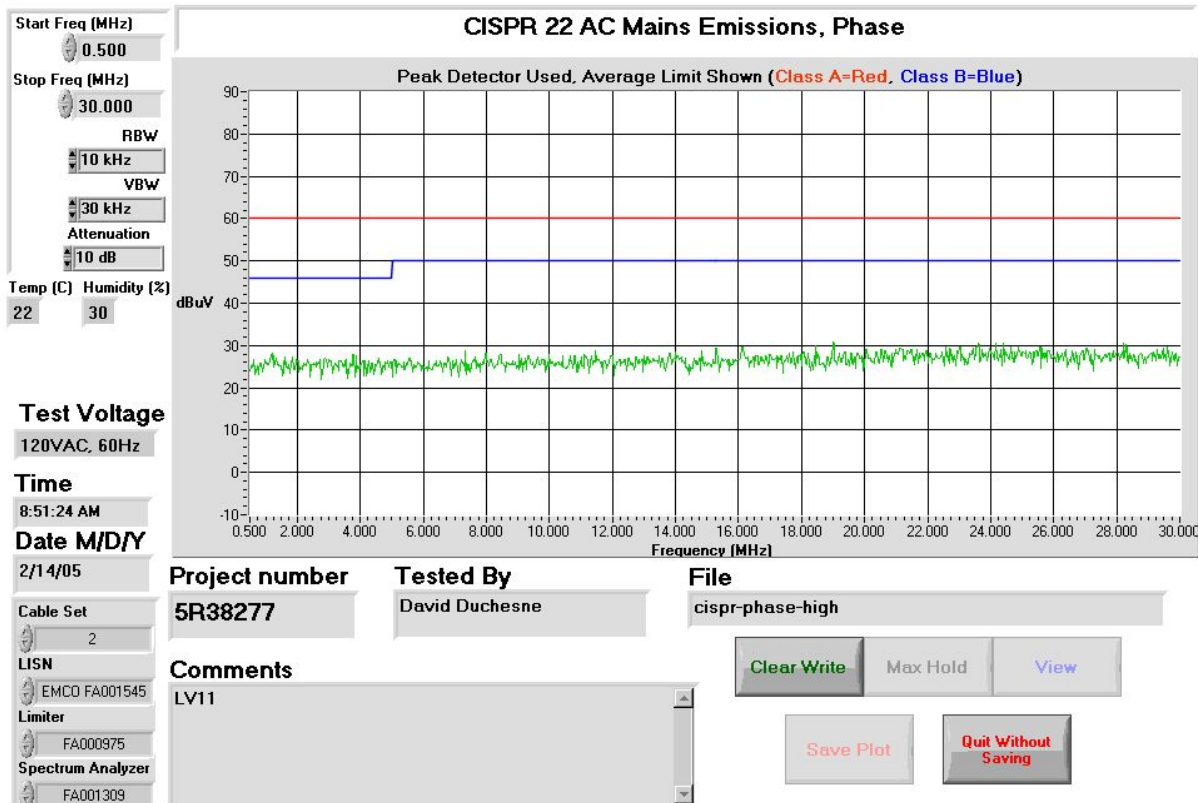
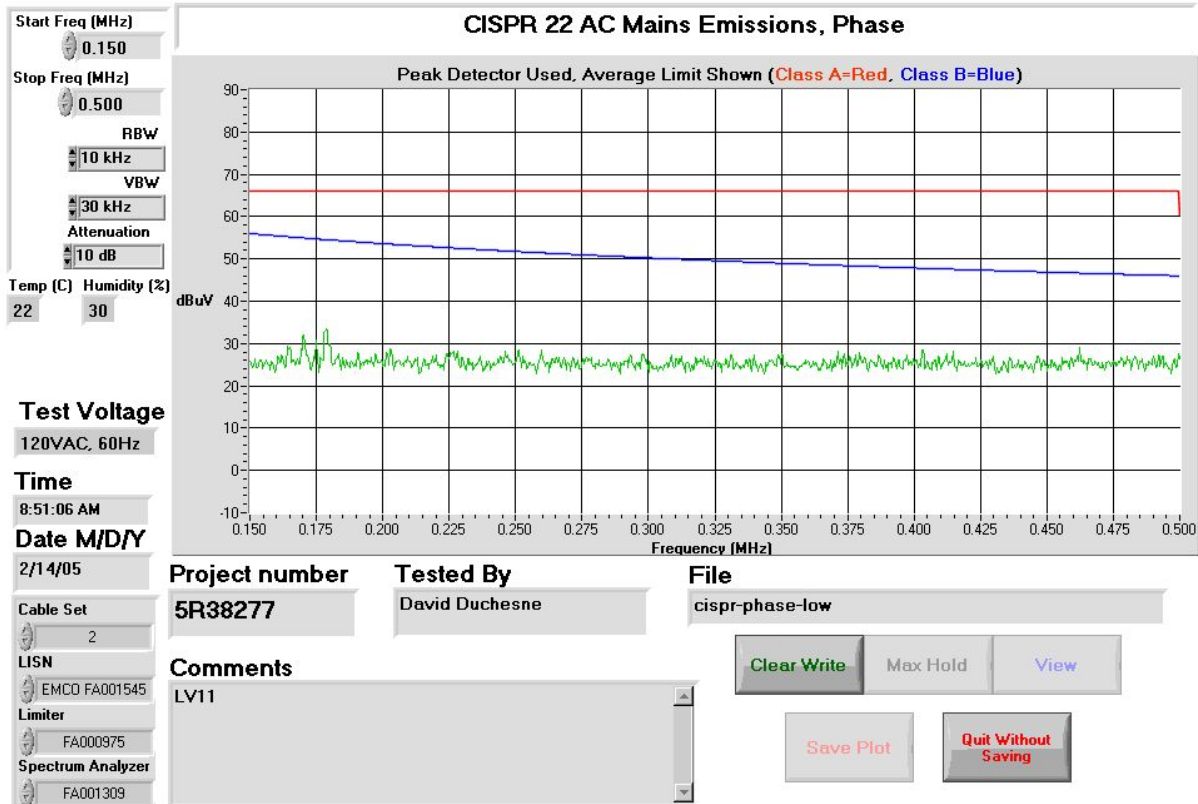
Additional Observations:

Measurements plots were performed using a peak detector and compared to the average limits.









Criteria: Clause 15.109(a) Radiated Emissions

Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of Emission (MHz)	Field Strength (microvoltsmeter)
30 - 88	100
88 - 216	150
216 - 960	200
Above 960	500

Test Conditions:

Sample Number:	1, 2	Temperature:	10°C
Date:	February 23, 2005	Humidity:	60%
Modification State:	0	Tester:	David Duchesne
		Laboratory:	OATS

Test Results:

No emissions within 20dB below the limit were detected.

Additional Observations:

The Spectrum was searched from 30MHz to the 5GHz.

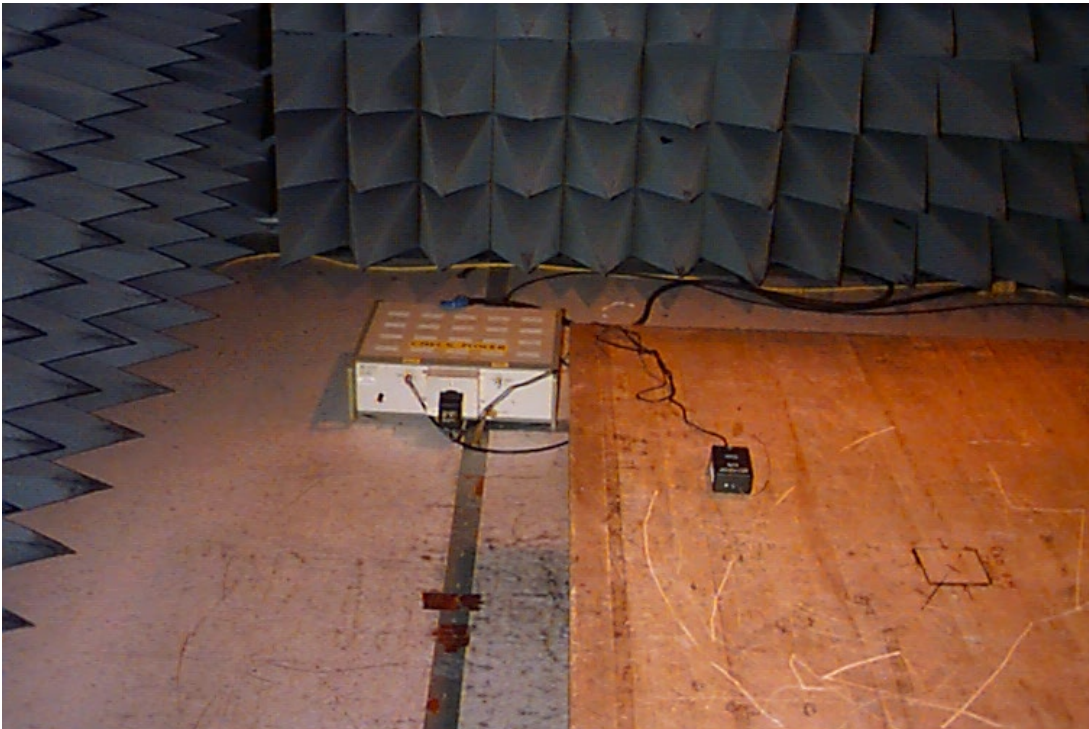
The EUT was measured on three orthogonal axis.

Measurement equipment setup was 120kHz Quasi-peak detector for measurements below 1GHz and 1MHz RBW/VBW peak detector above 1GHz.

All Measurements were performed at 3 meters.

Appendix B : Setup Photographs

Conducted Emissions Setup:

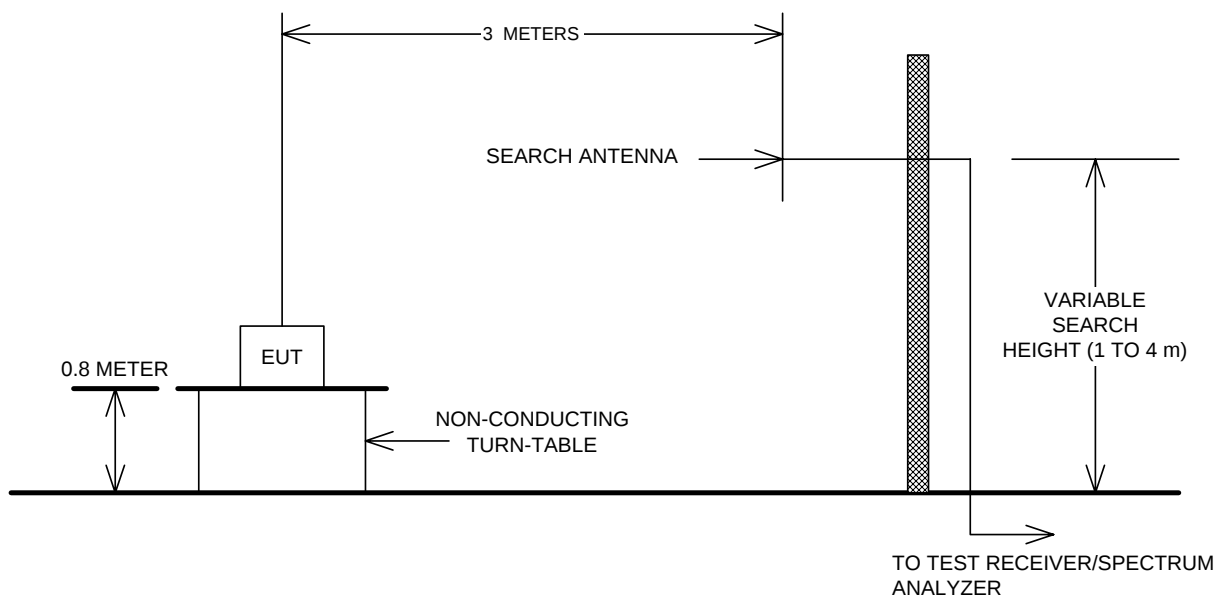


Spurious Emissions Setup:



Appendix C : Block Diagram of Test Setups

Test Site For Radiated Emissions



Conducted Emissions

