



**Flom Test Labs**  
EMI, EMC, RF Testing Experts Since 1963

toll-free: (866) 311-3268  
fax: (480) 926-3598  
<http://www.flomlabs.com>  
[info@flomlabs.com](mailto:info@flomlabs.com)

**Date:** October 14, 2008

Federal Communications Commission  
Via: Electronic Filing

**Attention:** Authorization & Evaluation Division

**Applicant:** Wayne Miller Associates  
**Equipment:** GI-100/1000  
**FCC ID:** WLX-GI100A1000  
**FCC Rules:** 15.219

Gentlemen:

On behalf of the Applicant, enclosed please find Application Form 731, Engineering Test Report and all pertinent documentation, the whole for approval of the referenced equipment as shown.

We trust the same is in order. Should you need any further information, kindly contact the writer who is authorized to act as agent.

Sincerely yours,

Hoosamuddin S. Bandukwala, Lab Director

**List Of Exhibits**  
(FCC Certification (Transmitters) - Revised 9/28/98)

**Applicant:** Wayne Miller Associates

**FCC ID:** WLX-GI100A1000

**By Applicant:**

1. Letter Of Authorization
2. Identification Drawings
  - ☐ Id Label
  - ☐ Location Info
  - ☐ Attestation Statement(S)
  - ☐ Location of Compliance Statement
3. Documentation: 2.1033(B)
  - (3) User Manual(S)
  - (4) Operational Description
  - (5) Block Diagram
  - (5) Schematic Diagram
  - (7) External Photographs
  - Internal Photographs
  - Parts List
  - Active Devices

**By F.T.L. Inc.**

- A. Testimonial & Statement of Certification
- B. Statement of Qualifications



**Flom Test Labs**  
EMI, EMC, RF Testing Experts Since 1963

toll-free: (866) 311-3268  
fax: (480) 926-3598  
<http://www.flomlabs.com>  
[info@flomlabs.com](mailto:info@flomlabs.com)

## Test Report

for

**FCC ID:** WLX-GI100A1000

**Model:** GI-100/1000

to

**Federal Communications Commission**

Rule Part(s) 15.219

**Date Of Report:** October 14, 2008

**On the Behalf of the Applicant:** Wayne Miller Associates  
4 Lenape Drive  
Stanhope, NJ 07874

**Attention of:** Wayne L Miller  
Ph: 973-347-1406  
Fax: 973-347-1621  
E-mail: wlm@wlm.name

Supervised By:

Hoosamuddin S. Bandukwala, Lab Director

## Test Report Revision History

Revision	Date	Revised By	Reason for revision
1.0	October 14, 2008	J Erhard	Original Document
2.0	November 21, 2008	J Erhard	Corrections to report per TCB request
3.0	December 12, 2008	J Erhard	Correct typo

**The applicant has been cautioned as to the following:**

15.21 Information to User.

The users manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) Special Accessories.

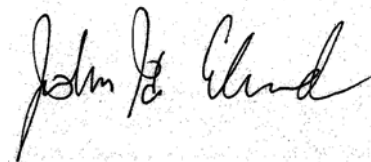
Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

## Testimonial And Statement Of Certification

**This is to certify that:**

1. **That** the application was prepared either by, or under the direct supervision of, the undersigned.
2. **That** the technical data supplied with the application was taken under my direction and supervision.
3. **That** the data was obtained on representative units, randomly selected.
4. **That**, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.



John Erhard

Certifying Engineer:

## Table Of Contents

Rule	Description	Page
	Test Report	1
2.1033(c)	General Information Required	2
	Standard Test Conditions and Engineering Practices	4
	Test Results Summary	5
15.219(a)	Peak Output Power	6
15.219(c)	Out of Band Spurious Emissions	7
15.219(c)	Band Edge Emissions	9
15.207	A/C Powerline Conducted Emissions	11
15.205	Restricted Band Spurious Emissions	12
	Test Equipment Utilized	13

*Required information per ISO 17025-2005, paragraph 5.10.2:*

a) **Test Report**

b) Laboratory: Flom Test Lab, Inc.  
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107  
(Canada: IC 2044A-1) Chandler, AZ 85225

c) Report Number: d08a0009

d) Client: Wayne Miller Associates

e) Identification: GI-100/1000  
FCC ID: WLX-GI100A1000  
Description: AM Transmitter

f) EUT Condition: Not required unless specified in individual tests.

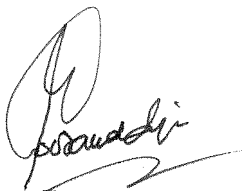
g) Report Date: October 14, 2008  
EUT Received:

h, j, k): As indicated in individual tests.

i) Sampling method: No sampling procedure used.

l) Uncertainty: In accordance with FTL internal quality manual.

m) Supervised by:



Hoosamuddin S. Bandukwala, Lab Director

n) Results: The results presented in this report relate only to the item tested.

o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.



**List Of General Information Required For Certification**

In Accordance with FCC Rules and Regulations,  
Volume II, Part 2 and to

15.219

**Sub-Part 2.1033**

(c)(1):

**Name and Address of Applicant:** Wayne Miller Associates

(c)(2): **FCC ID:** WLX-GI100A1000

**Model Number:** GI-100/1000

(c)(3): **Instruction Manual(s):**

Please See Attached Exhibits

(c)(4): **Type of Emission:** AM

(c)(5): **FREQUENCY RANGE, MHz:** 0.520 to 1.700

(c)(6): **Power Rating, W:** 1.285 mW  
\_\_\_\_\_ Switchable \_\_\_\_\_ Variable   X   N/A

(c)(7): **Maximum Power Rating, W:** 100 mW

**15.203: Antenna Requirement:**

\_\_\_\_\_ The antenna is permanently attached to the EUT  
\_\_\_\_\_ The antenna uses a unique coupling  
\_\_\_\_\_ The EUT must be professionally installed  
  X   The antenna requirement does not apply

**Subpart 2.1033 (continued)****(c)(8): Circuit Diagram/Circuit Description:**

Including description of circuitry & devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation and limiting power.

Please See Attached Exhibits

**(c)(9): Label Information:**

Please See Attached Exhibits

**(c)(10): Photographs:**

Please See Attached Exhibits

**(c)(11): Digital Modulation Description:**

☐ Attached Exhibits

☒ N/A

**(c)(12): Test And Measurement Data:**

Follows

Sub-part  
2.1033(b):

### Test And Measurement Data

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2 and the following individual Parts: 51.219 operation within the band 510 – 1705 kHz

### Standard Test Conditions and Engineering Practices

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.4-2003 and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Measurement results, unless otherwise noted, are worst-case measurements. All user controls, input signals, and antenna position were adjusted to maximize emissions. The general requirements of 15.31, 15.33, and 15.35 have been adhered to during testing.

### A2LA

“A2LA has accredited Flom Test Labs, Inc. Chandler, AZ for technical competence in the field of Electrical testing. The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO 17025:2005 ‘General Requirements for the Competence of Testing and Calibration Laboratories’ and any additional program requirements in the identified field of testing.”

Please refer to [www.a2la.org](http://www.a2la.org) for current scope of accreditation.

Certificate number: 2152.01



**FCC OATS Reg. #933597**

**IC Reg. # 2044A-1**

### Test Results Summary

Specification	Test Name	Pass, Fail, N/A	Comments
15.219(a)	Output Power	Pass	
15.219(c)	Out of Band Emissions	Pass	
15.219(c)	Band Edge Emissions	Pass	
15.207	A/C Powerline Conducted Emissions	Pass	
15.205	Restricted Band Spurious Emissions	Pass	

All tests were performed with a 2.5 kHz audio tone set to produce maximum modulation input into the UUT.

**Name of Test:**  
**Specification:**  
**Test Equipment Utilized**

Output Power  
 15.219(a)  
 i00331

**Engineer: J Erhard**  
**Test Date: 10/14/08**

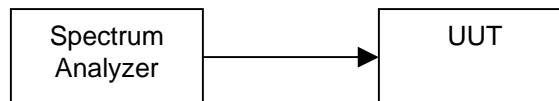
### Test Procedure

The UUT was connected directly to a spectrum analyzer with the RBW set to a greater value than the bandwidth of the emission. The peak readings were taken and the result was then compared to the limit. The input power was varied +/- 15% and no variation in the output power was observed. By applying Ohm's law and Watt's law the maximum input power to the final stage amplifier is 92.5 mW. The resulting transformer and antenna matching circuitry result in the signal being significantly lower than the input power.

### Spectrum Analyzer Settings

RBW = 100kHz  
 VBW = 300KHz

### Test Setup



### Transmitter Peak Output Power

Tuned Frequency kHz	Recorded Measurement dBm	Recorded Measurement Watts	Specification Limit Watts	Result
520	-23.95	0.004 mW	100 mW	Pass
1110	-14.70	0.033 mW	100 mW	Pass
1700	1.09	1.285 mW	100 mW	Pass

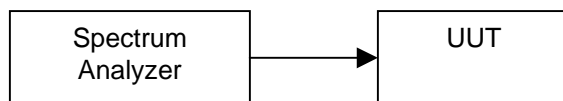
**Name of Test:** Out of Band Spurious Emissions  
**Specification:** 15.219(c)  
**Test Equipment Utilized** i00331

**Engineer:** J Erhard  
**Test Date:** 10/14/08

### Test Procedure

The UUT was connected directly to a spectrum analyzer to verify that the UUT met the requirements for spurious emissions. The out of band spurious emissions of the 10<sup>th</sup> harmonic of the fundamental was observed. Only the highest out of band emission is recorded in the test table. The UUT was tested to verify that intermediate and improper switch positions did not cause out of band operation. The input power was varied +/- 15% and no variation in the frequency or spurious emissions were observed.

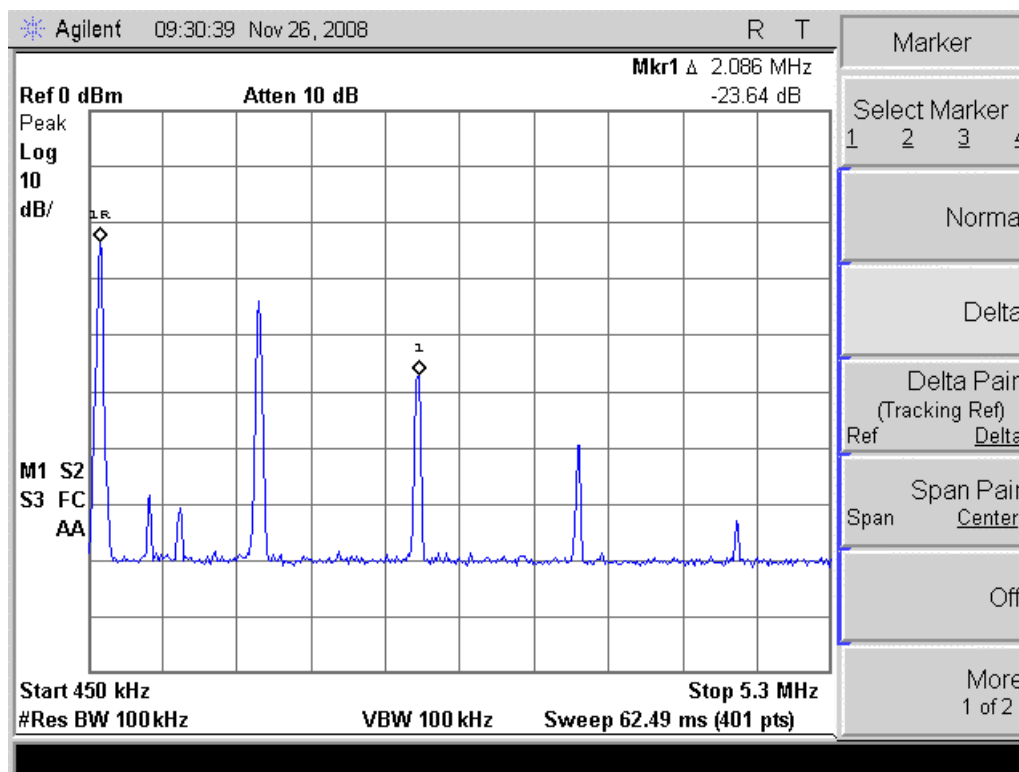
### Test Setup



### Conducted Spurious Emissions Summary Test Table

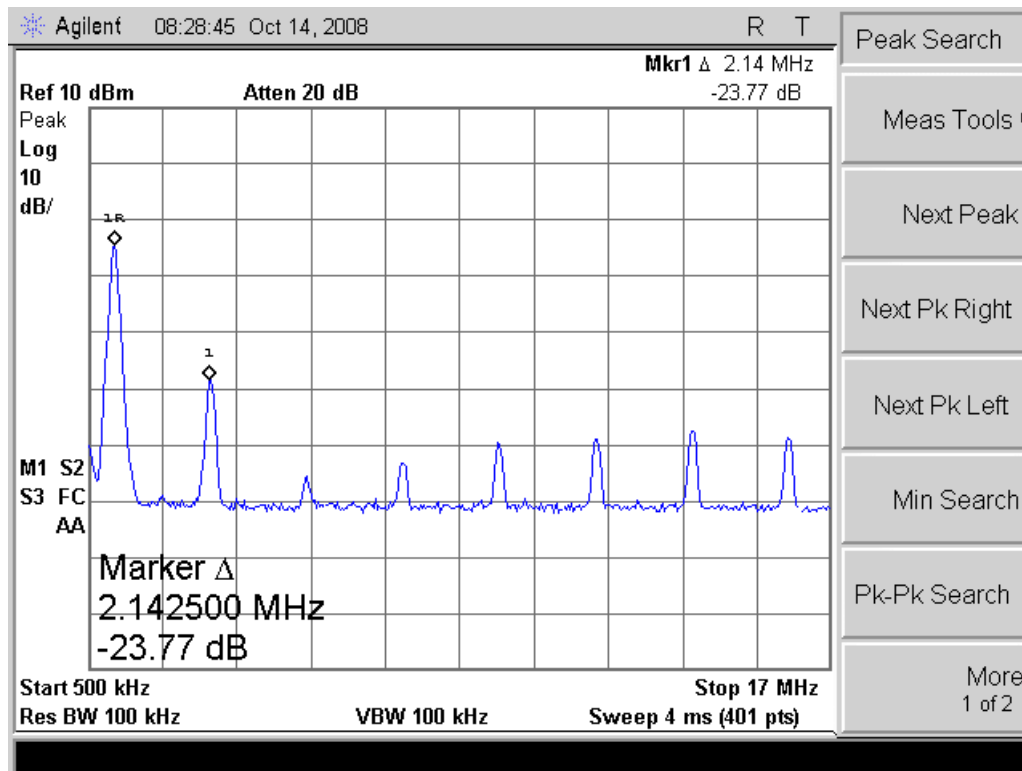
Tuned Frequency kHz	Recorded Measurement	Specification Limit	Result
520	-23.6 dBc	-20 dBc	Pass
1110	-23.77 dBc	-20 dBc	Pass
1700	-44.53 dBc	-20 dBc	Pass

### 520 kHz

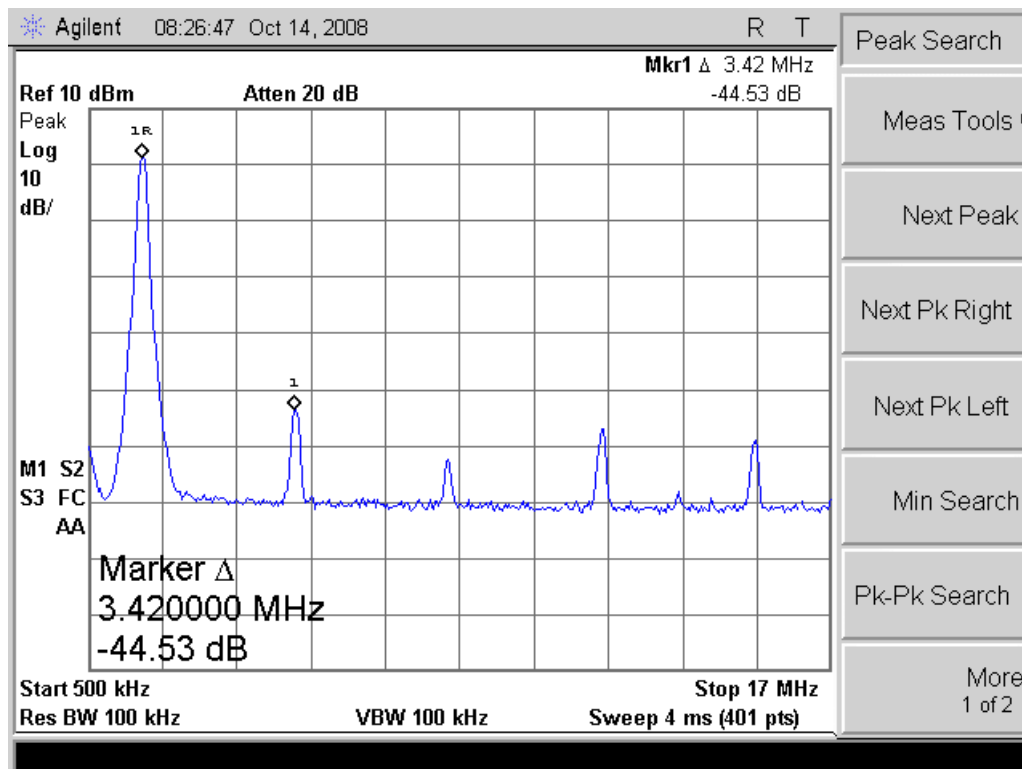


The marker 1 is on the first out of band spurious. The spurious emissions prior to marker 1 are in band.

# 1110 kHz



# 1700 kHz



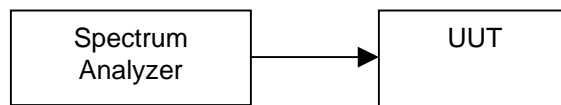
**Name of Test:** Band Edge Emissions  
**Specification:** 15.219(c)  
**Test Equipment Utilized** i00331

**Engineer:** J Erhard  
**Test Date:** 10/14/08

### Test Procedure

The UUT was connected directly to a spectrum analyzer to verify that the UUT met the requirements for spurious emissions. The out of band spurious emissions o the 10<sup>th</sup> harmonic of the fundamental was observed. Only the highest out of band emission is recorded in the test table. The UUT was tested to verify that intermediate and improper switch positions did not cause out of band operation. The input power was varied +/- 15% and no variation in the band edge was observed.

### Test Setup

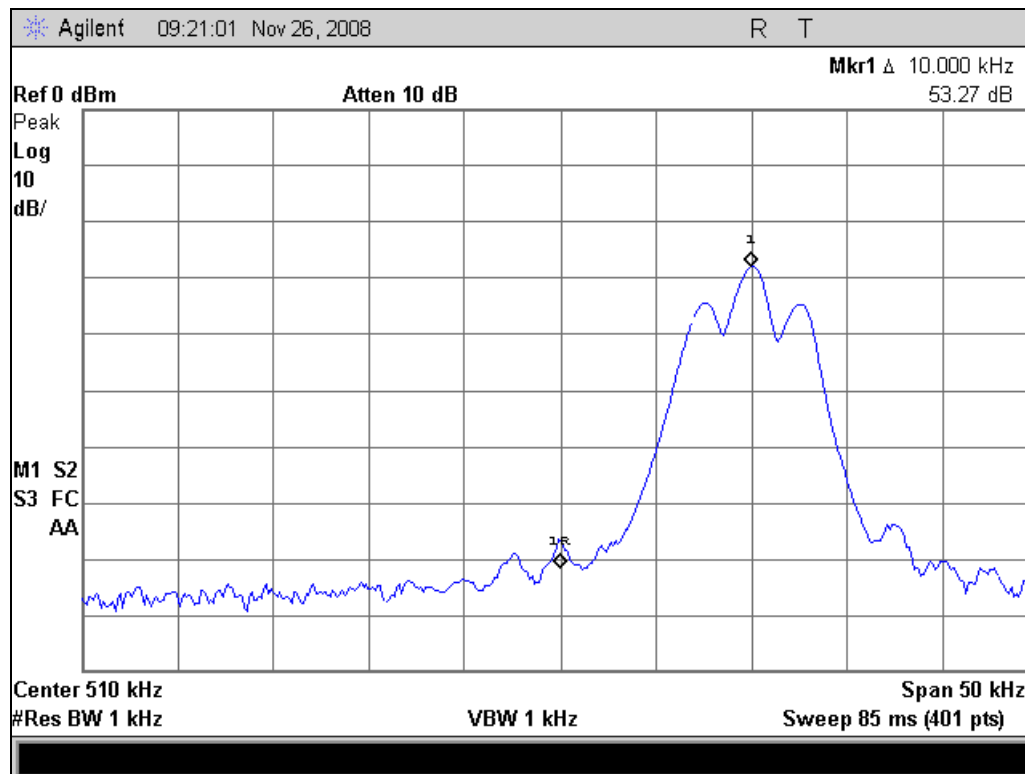


### Conducted Spurious Emissions Summary Test Table

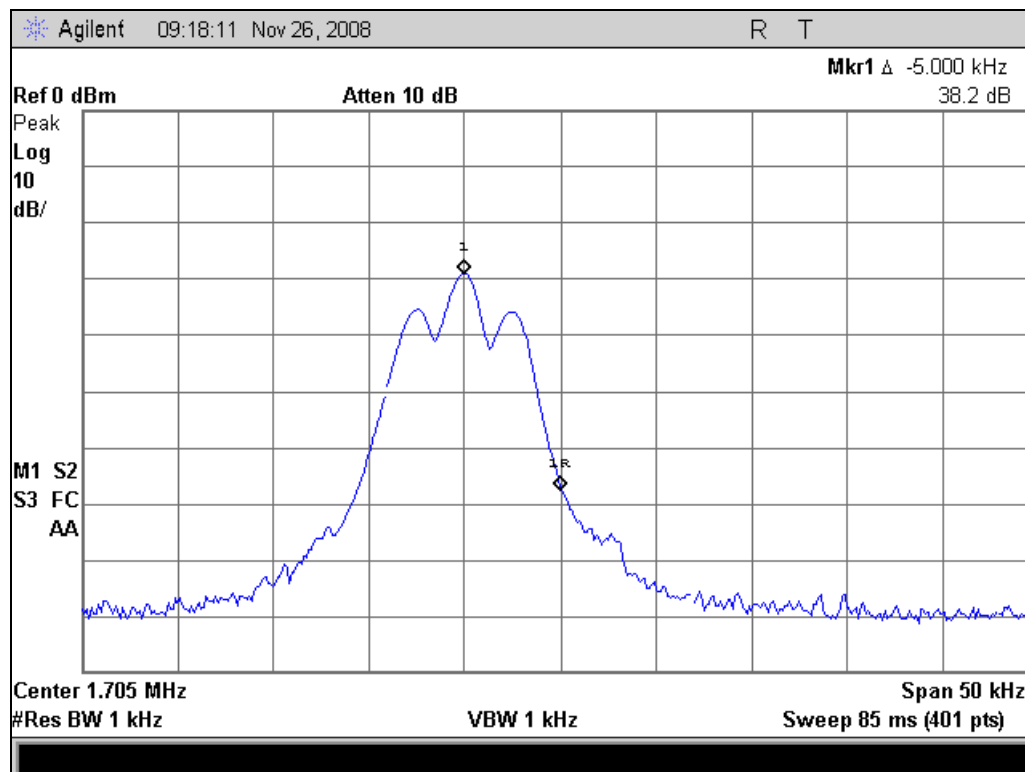
Tuned Frequency kHz	Recorded Measurement	Specification Limit	Result
520	-53.27 dBc	-20 dBc	Pass
1700	-38.20 dBc	-20 dBc	Pass



### 520 kHz Band Edge



### 1700 kHz Band Edge

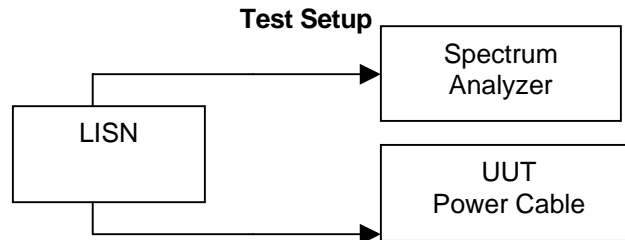


Name of Test: A/C Powerline Conducted Emissions  
Specification: 15.207  
Test Equipment Utilized: i00033, i00270

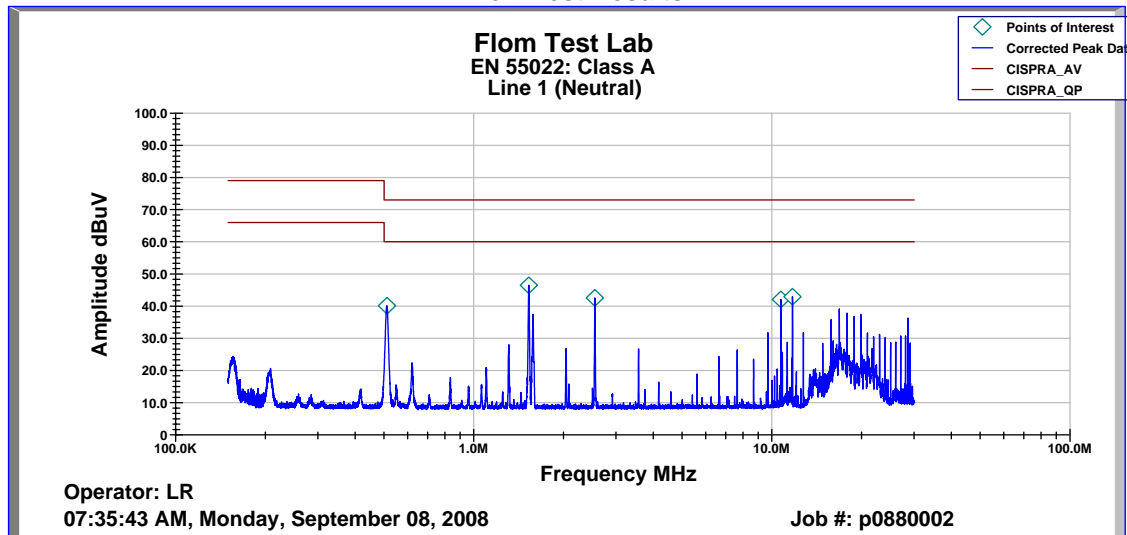
Engineer: J. Erhard  
Test Date: 9/8/08

### Test Procedure

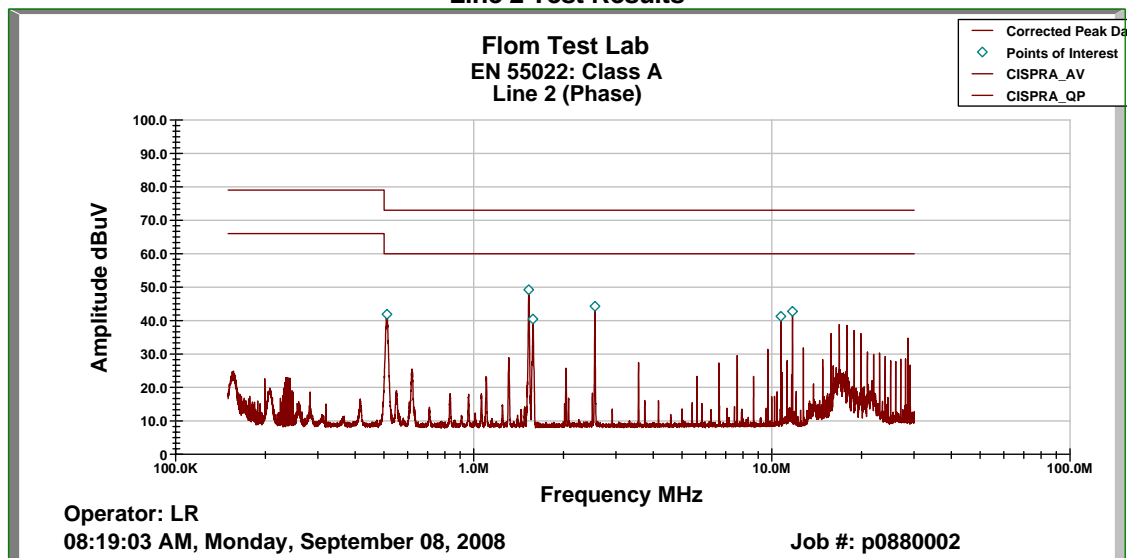
The UUT power cable connected to a LISN and the monitored output of the LISN was connected directly to a spectrum analyzer. The conducted emissions from 150 kHz to 30 MHz were monitored and compared to the specification limits.



### Line 1 Test Results



### Line 2 Test Results



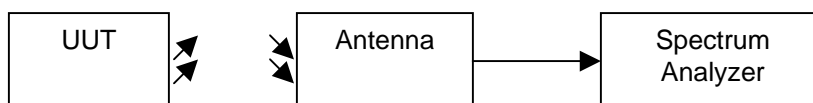
**Name of Test:** Restricted Band Spurious Emissions  
**Specification:** 15.205  
**Test Equipment Utilized** i00033, i00326

**Engineer:** J. Erhard  
**Test Date:** 11/24/2008

### Test Procedure

The UUT was tested in an Open Area Test Site (OATS) set 1m from the receiving antenna. A spectrum analyzer was used to verify that the UUT met the requirements for Restricted Band Spurious Emissions. The UUT was tested by rotating it 360° with the loop antenna in the X, Y, and Z-axis to ensure the TX signal levels were maximized. All emissions from 9 kHz to the 10<sup>th</sup> harmonic of the highest fundamental frequency were examined.

### Test Setup



#### Settings

RBW = 9 KHz

VBW = 30KHz

Detector – Quasi Peak

Sample Calculations

Corrected Value = Measured Value + Correction factor

Correction factor = ACF + Cable loss + Distance Correction factor

### Radiated Emissions

Tuned Freq (kHz)	Emission Freq (kHz)	Measured Value (dBuV/m)	Correction Factor (dB)	Corrected Value (dBuV/m)	Limit (dBuV/m)	Margin dB
520	2080	35.0	-13.6	21.4	29.5	-8.1
520	3640	31.7	-13.5	18.2	29.5	-11.3
520	4160	31.3	-13.4	17.9	29.5	-11.6
1110	2220	32.7	-13.6	19.1	29.5	-10.4
1110	3330	29.8	-13.5	16.3	29.5	-13.2
1110	7770	26.1	-13.0	13.1	29.5	-16.4
1700	8499.95	35.4	-12.9	22.5	29.5	-7.0
1700	11899.89	31.3	-12.6	18.7	29.5	-10.8
1700	15299.88	39.6	-12.3	27.3	29.5	-2.2

Only detectable harmonics were reported. All other measurements were greater than -20 dB below the limit.

### Test Equipment Utilize

Description	MFG	Model Number	FTL Asset Number	Last Cal Date	Cal Due Date
Power Supply	Kenwood	PR18-3A	i00008	N/A	N/A
Spectrum Analyzer	HP	85462A	i00033	10/1//07	10/1//08
LISN	FCC	FCC-LISN-50-32-2-01	i00270	10/22/07	10/22/09
Loop Antenna	EMCO	6507	i00326	1/19/07	1/19/09
Spectrum Analyzer	Agilent	E4407B	i00331	10/23/07	10/23/08

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

END OF TEST REPORT