



L.S. Compliance, Inc.

W66 N220 Commerce Court
Cedarburg, WI 53012
262-375-4400 Fax: 262-375-4248

COMPLIANCE TESTING OF:

900S10 Module (10 mW)

PREPARED FOR:

Xecom

TEST REPORT NUMBER:

304193 TX TCB Rev. 1

TEST DATE(S):

May 4th and 14th, 2004

All results of this report relate only to the items that were tested. This report is not to be reproduced, except in full, without written approval of L. S. Compliance, Inc.

Table of Contents

Section	Description	Page
Index		2
1	L. S. Compliance in Review	3
2	A2LA Certificate of Accreditation	4
3	A2LA Scope of Accreditation	5
4	Validation Letter-U.S. Competent Body for EMC Directive 89/336/EEC	6
5	Signature Page	7
6	Product and General Information	8
7	Introduction	8
8	Product Description	8
9	Test Requirements	9
10	Summary of Test Report	9
11	Radiated Emissions Test	10-17
12	Conducted Emissions Test, AC Power Line	18-22
Appendix		
A	Test Equipment List	23
B	Conducted Emissions Test Report (LSR)	attached

1. L. S. Compliance In Review

L.S. Compliance – Accreditations and Listing's

As an EMC Testing Laboratory, our Accreditation and Assessments are recognized through the following:

A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025 : 1999
with Electrical (EMC) Scope of Accreditation
A2LA Certificate Number: 1255.01

Federal Communications Commission (FCC) – USA

Listing of 3 Meter Semi-Anechoic Chamber based on Title 47 CFR – Part 2.948
FCC Registration Number: 90756

Listing of 3 and 10 meter OATS based on Title 47CFR – Part 2.948
FCC Registration Number: 90757

Industry Canada

On file, 3 Meter Semi-Anechoic Chamber based on RSS-212 – Issue 1
File Number: IC 3088-A

On file, 3 and 10 Meter OATS based on RSS-212 – Issue 1
File Number: IC 3088

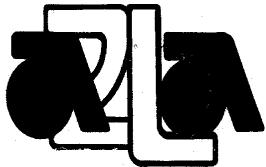
U. S. Conformity Assessment Body (CAB) Validation

Validated by the European Commission as a U. S. Competent Body operating under the U. S. /EU, Mutual Recognition Agreement (MRA) operating under the European Union Electromagnetic Compatibility –Council Directive 89/336/EEC, Article 10.2.
Date of Validation: January 16, 2001

Validated by the European Commission as a U.S. Notified Body operating under the U.S./EU, Mutual Recognition Agreement (MRA) operating under the European Union Telecommunication Equipment – Council Directive 99/5/EC, Annex V.

Date of Validation: November 20, 2002
Notified Body Identification Number: 1243

2. A2LA Certificate of Accreditation



THE AMERICAN
ASSOCIATION
FOR LABORATORY
ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

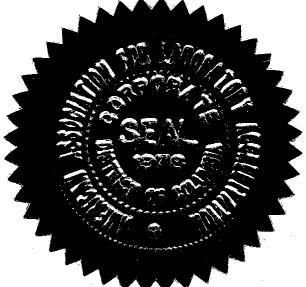
**L.S. COMPLIANCE, INC.
Cedarburg, WI**

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/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration Laboratories" and any additional program requirements in the identified field of testing. Testing and calibration laboratories that comply with this International Standard also operate in accordance with ISO 9001 or ISO 9002 (1994).

Presented this 26th day of March 2003.



A handwritten signature of 'Peter Moyer' is written over a horizontal line. To the left of the signature, the text 'President' is printed. Below the signature, the text 'For the Accreditation Council' is printed, followed by 'Certificate Number 1255.01' and 'Valid to January 31, 2005'.

For tests or types of tests to which this accreditation applies,
please refer to the laboratory's Electrical Scope of Accreditation.

3. A2LA Scope of Accreditation



American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025-1999

L.S. COMPLIANCE, INC.
W66 N220 Commerce Court
Cedarburg, WI 53012
James Blaha Phone: 262 375 4400

ELECTRICAL (EMC)

Valid to: January 31, 2005

Certificate Number: 1255-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests:

<u>Test</u>	<u>Test Method(s)</u>
Emissions	
Conducted	
Continuous/Discontinuous	Code of Federal Regulations (CFR) 47, FCC Method Parts 15, 18 using ANSI C63.4; EN: 55011, 55022, 50081-1, 50081-2; CISPR: 11, 12, 14-1, 22; CNS 13438
Radiated	Code of Federal Regulations (CFR) 47, FCC Method Parts 15, 18 using ANSI C63.4; EN: 55011, 55022, 50081-1, 50081-2; CISPR: 11, 12, 14-1, 22; CNS 13438
Current Harmonics	IEC 61000-3-2; EN 61000-3-2
Voltage Fluctuations & Flicker	IEC 61000-3-3; EN 61000-3-3
Immunity	EN: 50082-1, 50082-2 EN 61000-6-2 CISPR: 14-2, 24
Conducted Immunity	
Fast Transients/Burst	IEC 61000-4-4; EN 61000-4-4
Surge	IEC: 61000-4-5; ENV 50142; EN 61000-4-5
RF Fields	IEC: 61000-4-6; ENV 50141; EN 61000-4-6
Voltage Dips/Interruptions	IEC 61000-4-11; EN 61000-4-11

Roxane M. Robinson

(A2LA Cert. No. 1255-01) 05/13/03
5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8373 • Phone: 301-644 3248 • Fax: 301-662 2974



4. Validation Letter – U.S. Competent Body for EMC Directive 89/336/EEC



UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899

January 16, 2001

Mr. James J. Blaha
L.S. Compliance Inc.
W66 N220 Commerce Court
Cedarburg, WI 53012-2636

Dear Mr. Blaha:

I am pleased to inform you that the European Commission has validated your organization's nomination as a U.S. Conformity Assessment Body (CAB) for the following checked (✓) sectoral annex(es) of the U.S.-EU Mutual Recognition Agreement (MRA).

- (✓) Electromagnetic Compatibility-Council Directive 89/336/EEC, Article 10(2)
- () Telecommunication Equipment-Council Directive 98/13/EC, Annex III
- () Telecommunication Equipment-Council Directive 98/13/EC, Annex III and IV
Identification Number:
- () Telecommunication Equipment-Council Directive 98/13/EC, Annex V
Identification Number:

This validation is only for the location noted in the address block, unless otherwise indicated below.

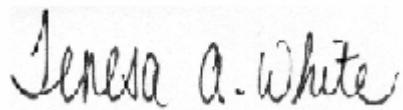
- (✓) Only the facility noted in the address block above has been approved.
- () Additional EMC facilities:
- () Additional R&TTE facilities:

Please note that an organization's validations for various sectors of the MRA are listed on our web site at <http://ts.nist.gov/mra>. You may now participate in the conformity assessment activities for the operational period of the MRA as described in the relevant sectoral annex or annexes of the U.S.-EU MRA document.

NIST will continue to work with you throughout the operational period. All CABs validated for the operational phase of the Agreement must sign and return the enclosed CAB declaration form, which states that each CAB is responsible for notifying NIST of any relevant changes such as accreditation status, liability insurance, and key staff involved with projects under the MRA. Please be sure that you fully understand the terms under which you are obligated to operate as a condition of designation as a CAB. As a designating authority, NIST is responsible for monitoring CAB performance to ensure continued competence under the terms of the MRA.

NIST

5. Signature Page

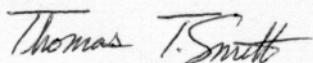


Prepared By:

Sept. 13, 2004

Teresa A. White, Document Coordinator

Date



Tested By:

Sept. 13, 2004

Thomas T. Smith, EMC Engineer

Date



Approved By:

Sept. 13, 2004

Kenneth L. Boston, EMC Lab Manager

Date

PE #31926 Licensed Professional Engineer

Registered in the State of Wisconsin, United States

6. Product and General Information

Manufacturer:	Xecom				
Date(s) of Test:	May 4 th and 14 th , 2004				
Test Engineer(s):	Tom Smith	✓	Abtin Spantman	✓	Ken Boston
Model #:	900 S 10				
Serial #:	Engineering Unit				
Voltage:	3.0 VDC				
Operation Mode:	Normal				

7. Introduction

On May 4th and 14th, 2004 a series of Radiated Emission tests were performed on one sample of the Xecom 900 S 10 Module, here forth referred to as the "*Equipment Under Test*" or "*EUT*". These tests were performed using the procedures outlined in ANSI C63.4-2001 for intentional radiators, and in accordance with the limits set forth in FCC Part 15.247 (Industry Canada RSS-210) for a low power transmitter. These tests were performed by Kenneth L. Boston, EMC Lab Manager and Abtin Spantman, EMC Engineer of L.S. Compliance, Inc.

All Radiated and Conducted Emission tests upon the EUT were performed to measure the emissions in the frequency bands described in Title 47 CFR, FCC Part 15, including 15.35, 15.209, 15.247 and Industry Canada RSS-210 to determine whether these emissions are below the limits expressed within the standards. These tests were performed in accordance with the procedures described in the 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 (ANSI C63.4-2001). Another document used as a reference for the EMI Receiver specification was the Comite International Special Des Perturbations Radioelectriques (CISPR) Number 16-1, 2002.

8. Product Description

The Xecom 900 S 10 Transceiver is a compact frequency hopping spread spectrum 900 MHz transceiver. It is a low power, 10 mW output device with a simple series interface capability. It is based on the Xemics XE1203 transceiver chipset and the T.I. MSP430 microprocessor, and operates with a 1/4 wave monopole antenna.

9. Test Requirements

The above mentioned tests were performed in order to determine the compliance of the EUT with limits contained in various provisions of Title 47 CFR, FCC Part 15, including:

15.207	15.247b	15.247e
15.205	15.247c	15.109
15.247a	15.247d	

10. Summary of Test Report

DECLARATION OF CONFORMITY

The Xecom 900 S 10 Module was found to **MEET** the requirements as described within the specification of Title 47 CFR FCC, Part 15.247, Subpart C; and Industry Canada RSS-210, Section 6.2.2(o) for a Frequency Hopping Spread Spectrum Transmitter.

11. Radiated Emissions Test

Test Setup

The test setup was assembled in accordance with Title 47, CRF FCC Part 15 and ANSI C63.4-2001. The EUT was placed on an 80cm high non-conductive pedestal centered on a flush mounted 2-meter diameter turntable inside the 3 Meter Semi-Anechoic, FCC listed Chamber located at L. S. Compliance, Inc., Cedarburg, Wisconsin. The EUT was operated in one of several test modes and powered via a 3 volt regulated supply. A laptop computer was used to upload a test program that allowed both fixed channel and frequency hopping operations to be examined. The applicable limits apply at a 3 meter distance, and are found on Page 11 of this test report. Measurements above 5 GHz were also performed at a 1.0 meter separation distance, and the calculation can also be found on Page 11 of this test report. The calculations to determine these limits are detailed on Page 11. Please refer to Appendix A for a list of the test equipment. The test sample was operated on one of three (3) standard channels: low (1), medium (27) and high (52) to comply with FCC Part 15.35. The sample was also inspected with the antenna placed in 3 orthogonal positions, due to the presence of a flexible antenna cable (ant.: vertical, flat, 90° flat).

Test Procedure

Radiation measurements were performed on the EUT in the 3 Meter Semi-Anechoic, FCC listed Chamber, located at L. S. Compliance, Inc. in Cedarburg, Wisconsin. The frequency range from 30 MHz to 9,300 MHz was scanned, and levels were manually noted at the various fixed degree settings of azimuth on the turntable and antenna height. The EUT was placed on the non-conductive pedestal in the 3 Meter Semi-Anechoic Chamber, with the antenna mast placed such that the antenna was 3 meters from the EUT. A Biconical Antenna was used to measure emissions from 30 MHz to 300 MHz, and a Log Periodic Antenna was used to measure emissions from 300 MHz to 1000 MHz. A Double Ridged Waveguide Horn Antenna was used from 1 GHz to 9.3 GHz. The maximum radiated emissions were found by raising and lowering the antenna between 1 and 4 meters in height, using both horizontal and vertical antenna polarities.

Test Equipment Utilized

A list of the test equipment and antennas utilized for the Radiated Emissions test can be found in Appendix A. This list includes calibration information and equipment descriptions. All equipment is calibrated and used according to the operation manuals supplied by the manufacturers. All calibrations of the antennas used were performed at an N.I.S.T. traceable site. In addition, the Connecting Cables were measured for losses using a calibrated Signal Generator and a HP 8546A EMI Receiver. The resulting correction factors and the cable loss factors from these calibrations were entered into the HP 8546A EMI Receiver database. As a result, the data taken from the HP 8546A EMI Receiver accounts for the antenna correction factor as well as cable loss or other corrections, and can therefore be entered into the database as a corrected meter reading. The HP 8546A EMI Receiver was operated with a bandwidth of 120 kHz for measurements below 1 GHz, and a bandwidth of 1 MHz for measurements above 1 GHz. Both the Peak and Quasi-Peak Detector functions were utilized. From 5 GHz to 9.3 GHz, an HP E4407 Spectrum Analyzer and the EMCO Horn Antenna were used.

Test Results

The EUT was found to **MEET** the Radiated Emissions requirements of Title 47 CFR, FCC Part 15.247 for a FHSS transmitter (Canada RSS-210). The frequencies with significant signals were recorded and plotted as shown in the Data Charts and Graphs.

CALCULATION OF RADIATED EMISSIONS LIMITS

The following table depicts the Class B limits for an unintentional radiator. These limits are obtained from Title 47 CFR, Part 15.209, for radiated emissions measurements. These limits were applied to any signals found in the 15.205 restricted bands.

Frequency (MHz)	3 m Limit μ V/m	3 m Limit (dB μ V/m)	1 m Limit (dB μ V/m)
30-88	100	40.0	-
88-216	150	43.5	-
216-960	200	46.0	-
960-24,000	500	54.0	63.5

Sample conversion from field strength μ V/m to dB μ V/m:

$$\begin{aligned} \text{dB}\mu\text{V/m} &= 20 \log_{10} (100) \\ &= 40 \text{ dB}\mu\text{V/m} \text{ (from 30-88 MHz)} \end{aligned}$$

For measurements made at 1.0 meter, a 9.5 dB correction has been invoked.

960 MHz to 10,000 MHz
500 μ V/m or 54.0 dB/ μ V/m at 3 meters
54.0 + 9.5 = 63.5 dB/ μ V/m at 1.0 meters

DUTY CYCLE CORRECTION FACTOR CALCULATION

Average (Duty Cycle) Factor

Average Factor = $20 * \log_{10}$ (Worst Case EUT On-time over 100 ms time window)
In this particular case, the transmit packet envelope or burst length in a single channel can be used to calculate the duty cycle factor.

The transmit burst length (see page 17 of the Conducted Emissions report) occupies 52 ms of time, within any 100 ms window. Therefore, the duty cycle factor allowance is calculated as:

Average Factor = $20 * \log_{10}$ (52 ms / 100 ms) = -5.7
A duty cycle factor of 5.7 dB would be allowable for this product.

Measurement of Electromagnetic Radiated Emissions
Within the 3 Meter FCC Listed Chamber
Frequency Range Inspected: 30 MHz to 9300 MHz
Test Requirements: 15.205

Manufacturer:	Xecom				
Date(s) of Test:	May 4 th , 2004				
Test Engineer(s):	Tom Smith	Abtin Spantman	✓	Ken Boston	
Model #:	900 S 10				
Serial #:	Engineering Unit				
Voltage:	3.0 VDC				
Operation Mode:	Normal; antenna vertical unless otherwise indicated by (*)				
EUT Power:		Single Phase ___VAC		3 Phase ___VAC	
		Battery	✓	Other: 3 volt bench supply	
EUT Placement:	✓	80cm non-conductive table		10cm Spacers	
EUT Test Location:	✓	3 Meter Semi-Anechoic FCC Listed Chamber		3/10m OATS	
Measurements:		Pre-Compliance		Preliminary	✓ Final
Detectors Used:	✓	Peak	✓	Quasi-Peak	Average

Environmental Conditions in the Lab:

Temperature: 20 – 25°C
 Relative Humidity: 30 – 60 %

Test Equipment Used:

EMI Measurement Instrument: HP8546A and Agilent E4407B
 Log Periodic Antenna: EMCO #93146
 Horn Antenna: EMCO #3115
 Biconical Antenna: EMCO 3110
 Pre-Amp: Advanced Microwave WHA6224
 Standard Gain Horn: EMCO 3160-09

The following table depicts the level of significant radiated emissions found:

Frequency (MHz)	Antenna Polarity	Channel	Height (meters)	Azimuth (0° - 360°)	EMI Meter Reading (dB μ V/m)			15.205 Limit (dB μ V/m)	Margin (dB)
					Value	Corr. Factor	Corr. Reading		
114.7	V	52	1.0	320	26.9	5.7	21.2	43.5	22.3
149.98	V	52	1.0	0	27.3	5.7	21.6	43.5	21.9
2710	V	1	1.0	40	44.9	5.7	39.2	54.0	14.8
3613	V	1	1.0	355	36.9	5.7	31.2	54.0	22.8
4515	H	1	1.45	305	40.8	5.7	35.1	54.0	18.9
5420	V	1	1.0	290	42.9	5.7	37.2	63.5	26.3
2745	V	27	1.12	310	40.6	5.7	34.9	54.0	19.1
5492	V	27	1.0	290	41.7	5.7	36.0	63.5	27.5
2782	V	52	1.1	35	41.5	5.7	35.8	54.0	18.2
4637	V	52	1.0	165	41.4	5.7	35.7	54.0	18.3
5564	V	52	1.0	290	42.5	5.7	36.8	63.5	26.7

Notes: A Quasi-Peak Detector was used in measurements below 1 GHz, and a Peak Detector was used in measurements above 1 GHz.

Unit was tested with the supplied small 1/4 wave stub radiator; Temple Star model 01 C-522 with OdBi gain.

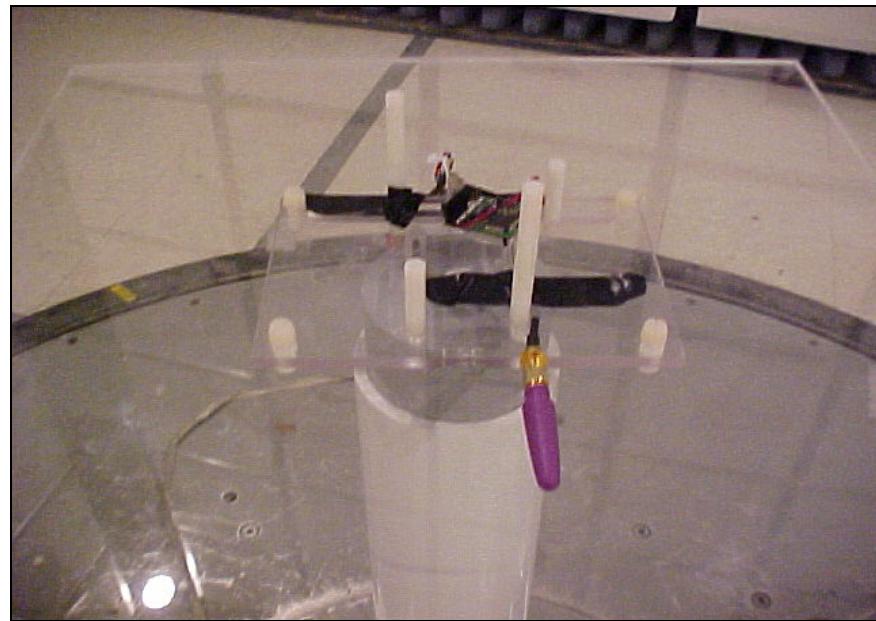
(*) ant. = flat position

Photo(s) Taken During Radiated Emission Testing

Setup for the Radiated Emissions Test, 1.0 meter range shown (ant. = vertical)



Setup for the Radiated Emissions Test, 2nd antenna position (ant. = flat)

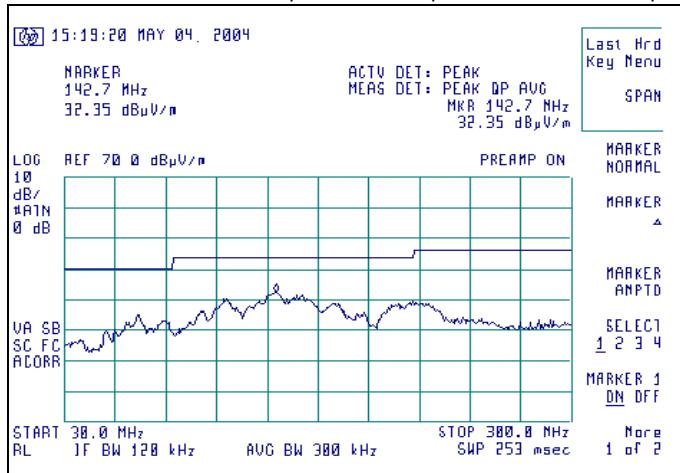


Setup for the Radiated Emissions Test, 3rd antenna position (ant. = 90° flat)

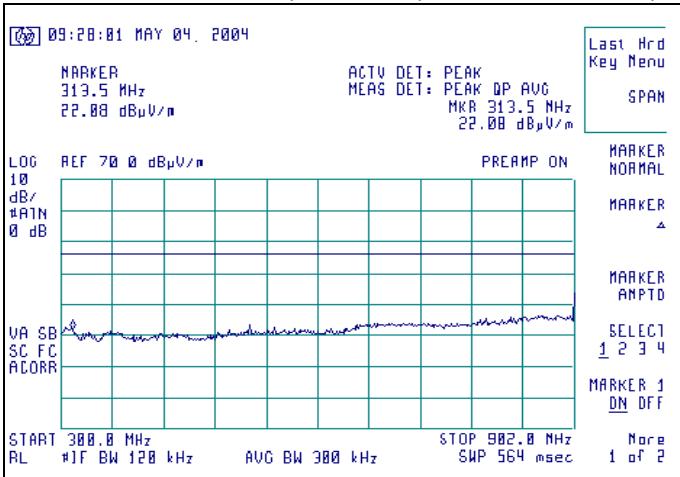


Graphs made during Radiated Emission Testing; EUT antenna = vertical

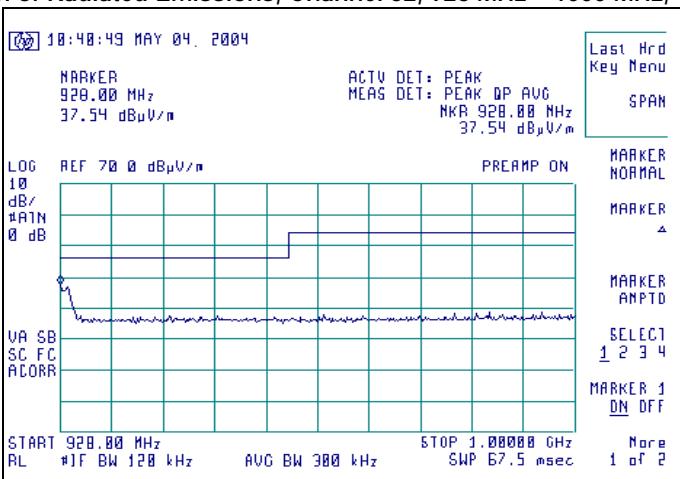
Signature Scan of Radiated Emissions, Channel 27, 30 MHz – 300 MHz, Vertical Polarity



Signature Scan of Radiated Emissions, Channel 1, 300 MHz – 902 MHz, Vertical Polarity

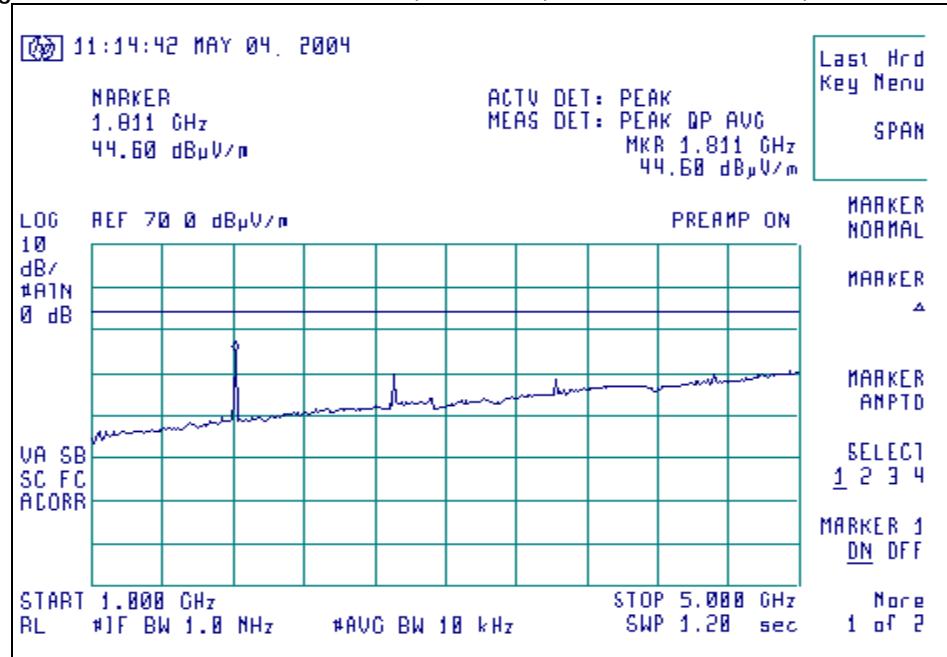


Signature Scan of Radiated Emissions, Channel 52, 928 MHz – 1000 MHz, Vertical Polarity

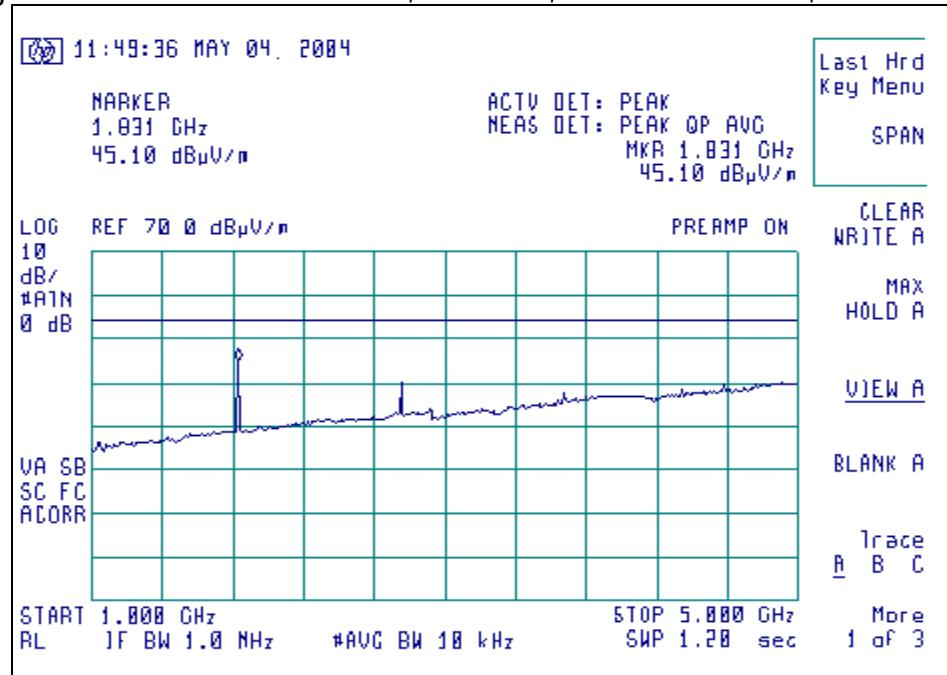


Graphs made during Radiated Emission Testing (continued)

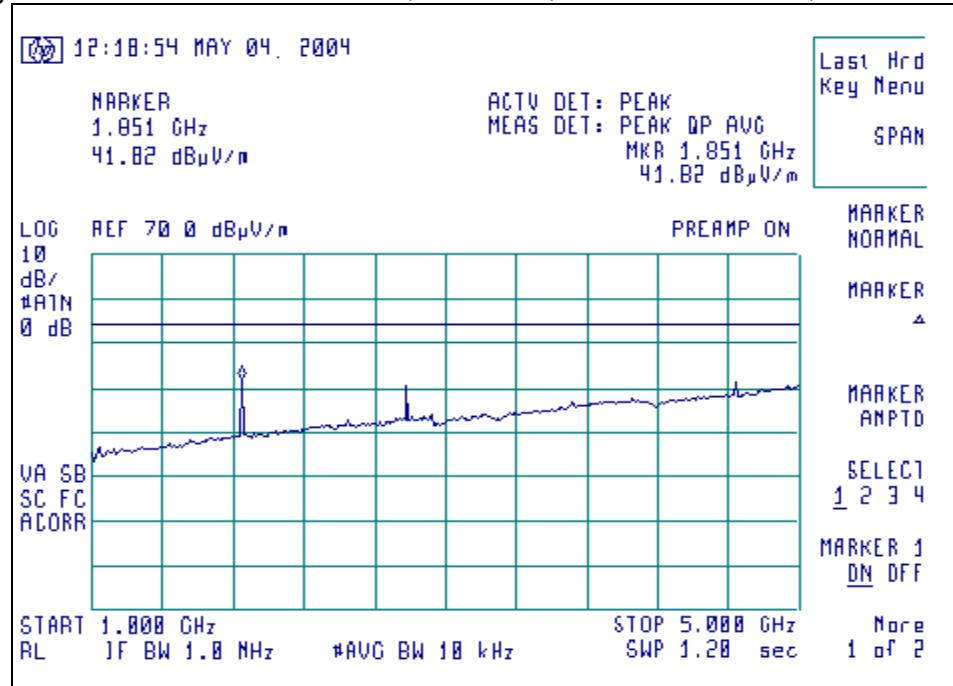
Signature Scan of Radiated Emissions, Channel 1, 1000 MHz – 6000 MHz, Vertical Polarity



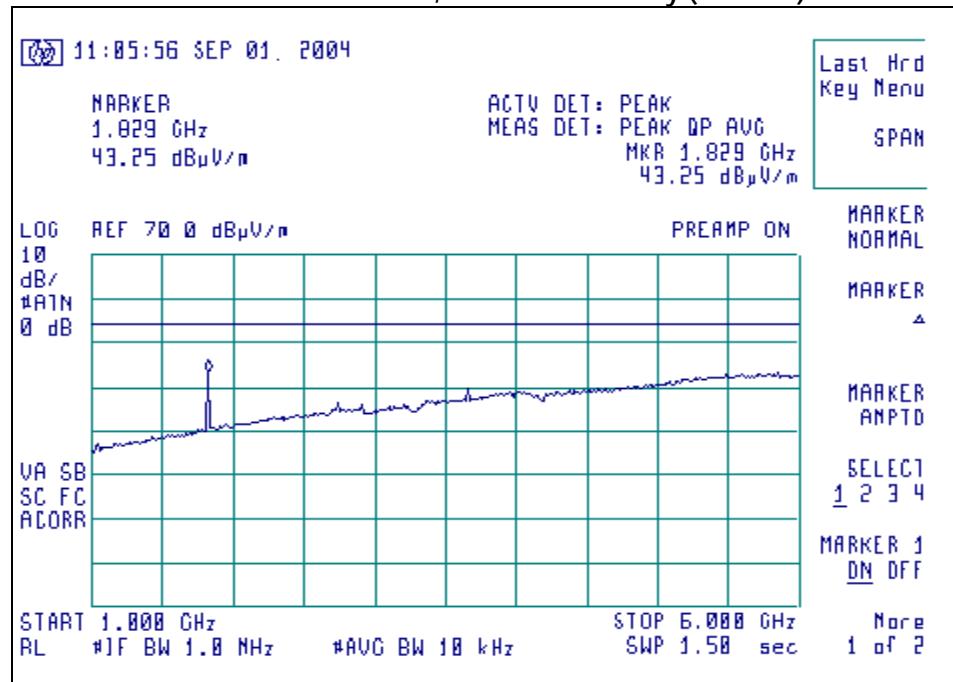
Signature Scan of Radiated Emissions, Channel 27, 1000 MHz – 6000 MHz, Vertical Polarity



Signature Scan of Radiated Emissions, Channel 52, 1000 MHz – 6000 MHz, Vertical Polarity

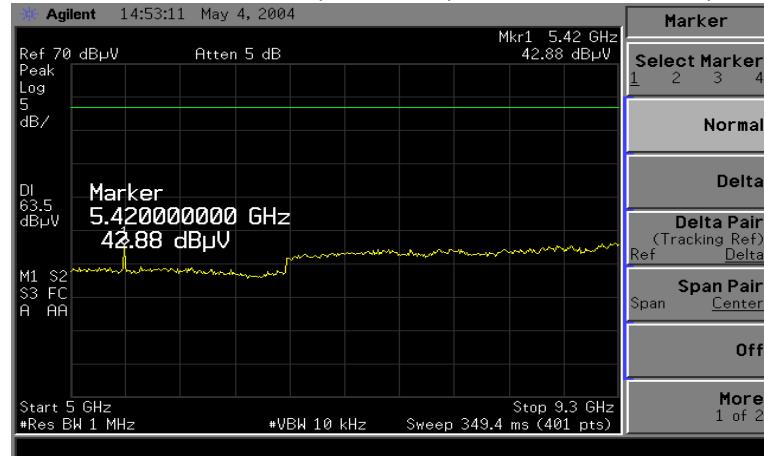


Signature Scan of Radiated Emissions, Channel 27,
1000 MHz – 6000 MHz, Horizontal Polarity (ant.=flat)



Graphs made during Radiated Emission Testing (continued)

Signature Scan of Radiated Emissions, Channel 1, 5000 MHz – 9300 MHz, Vertical Polarity



Signature Scan of Radiated Emissions, Channel 27, 5000 MHz – 9300 MHz, Vertical Polarity



Signature Scan of Radiated Emissions, Channel 52, 5000 MHz – 9300 MHz, Vertical Polarity



12. Conducted Emissions Test, AC Power Line

Test Setup

The Conducted Emissions test was performed at L.S. Compliance, Inc. in Cedarburg, Wisconsin. The test area and setup are in accordance with ANSI C63.4-2001 and with Title 47 CFR, FCC Part 15, Subpart B (Industry Canada RSS-210). The EUT was placed on a non-conductive wooden table, with a height of 80 cm above the reference ground plane. The EUT's power supply was plugged into a 50Ω (ohm), 50/250 μ H Line Impedance Stabilization Network (LISN). The AC power supply of 120V was fed into the 3 Meter Semi-Anechoic Chamber via an appropriate broadband EMI Filter, and then to the LISN line input. Final readings were then taken and recorded. After the EUT was setup and connected to the LISN, the RF Sampling Port of the LISN was cabled to a 10 dB Attenuator-Limiter, and then to the HP 8546A EMI Receiver. The EMCO LISN used has the ability to terminate the unused port with a 50Ω (ohm) load when switched to either L1 (line) or L2 (neutral).

Test Procedure

The appropriate frequency range and bandwidths were selected on the EMI Receiver, and measurements were made. The bandwidth used for these measurements is 9 kHz, as specified in CISPR 16-1 (2002), Section 1, Table 1, for Quasi-Peak and Average detectors in the frequency range of 150 kHz to 30MHz. Final readings were then taken and recorded.

Test Equipment Utilized

A list of the test equipment and accessories utilized for the Conducted Emissions test is found in Appendix A. This list includes calibration information and equipment descriptions. All equipment is calibrated and used according to the operation manuals supplied by the manufacturers. Calibrations of the LISN and Limiter are traceable to N.I.S.T. All cables are calibrated and checked periodically for conformance. The emissions are measured on the HP 8546A EMI Receiver, which has automatic correction for all factors stored in memory and allows direct readings to be taken.

Test Results

The EUT was found to **MEET** the Conducted Emission requirements of FCC Part 15, Conducted Emissions for an Intentional Radiator. See the Data Charts and Graphs for more details of the test results.

**Measurement of Electromagnetic Conducted Emission
In the Shielded Room**

Test Requirements: 15.207

Frequency Range inspected: 150 KHz to 30 MHz

Manufacturer:	Xecom				
Date(s) of Test:	May 14, 2004				
Test Engineer:	Tom Smith	✓	Abtin Spantman		Ken Boston
Model #:	900 S 10				
Serial #:	Engineering Unit				
Voltage:	3.0 VDC; 115VAC to supply				
Operation Mode:	Normal				
Distance (meters):	3 Meter Separation				
Test Location:	✓	Shielded Room			Chamber
EUT Placed On:	✓	40cm from Vertical Ground Plane			10cm Spacers
	✓	80cm above Ground Plane			Other:
Measurements:		Pre-Compliance		Preliminary	✓ Final
Detectors Used:		Peak	✓	Quasi-Peak	✓ Average

Environmental Conditions in the Lab:

Temperature: 20 – 25° C

Atmospheric Pressure: 86 kPa – 106 kPa

Relative Humidity: 30 – 60%

Test Equipment Utilized:

EMI Receiver: HP 8546A

LISN: EMCO 3816/2NM

Transient Limiter: HP 119474A

Note: No emissions within 20 dB of the limits were found.

Calculation of Conducted Emissions Limits

The following table describes the 15.207 limits for an intentional radiator. These limits are obtained from Title 47 CFR, Part 15.207 for Conducted Emissions.

Frequency (MHz)	Quasi-Peak Limit (dB μ V)	Average Limit (dB μ V)
0.15 – 0.5	66 – 56 *	56 - 46
0.5 – 5.0	56	46
5.0 – 30.0	60	50

* Decreases with the logarithm of the frequency.

Sample calculation for the limits in the 0.15 to 0.5 MHz:

$$\text{Limit} = -19.12 (\log_{10} (F[\text{MHz}] / 0.15 [\text{MHz}])) + 66.0 \text{ dB}\mu\text{V}$$

For a frequency of 200 kHz for example:

$$\text{Quasi-Peak Limit (F=200kHz)} = -19.12 (\log_{10} (0.2[\text{MHz}] / 0.15 [\text{MHz}])) + 66.0 \text{ dB}\mu\text{V}$$

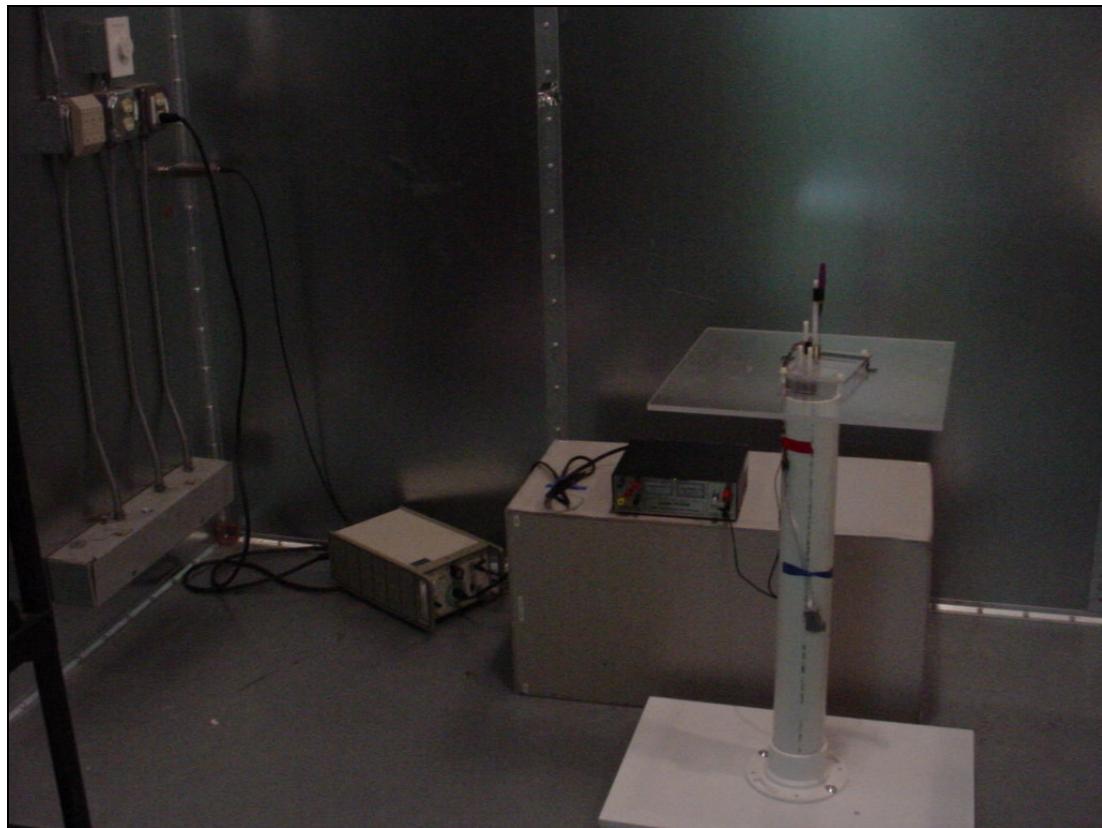
$$\text{Quasi-Peak Limit (F=200kHz)} = 63.6 \text{ dB}\mu\text{V}$$

$$\text{Average Limit (F=200kHz)} = -19.12 (\log_{10} (0.2[\text{MHz}] / 0.15 [\text{MHz}])) + 56.0 \text{ dB}\mu\text{V}$$

$$\text{Average Limit (F = 200 kHz)} = 53.6 \text{ dB}\mu\text{V}$$

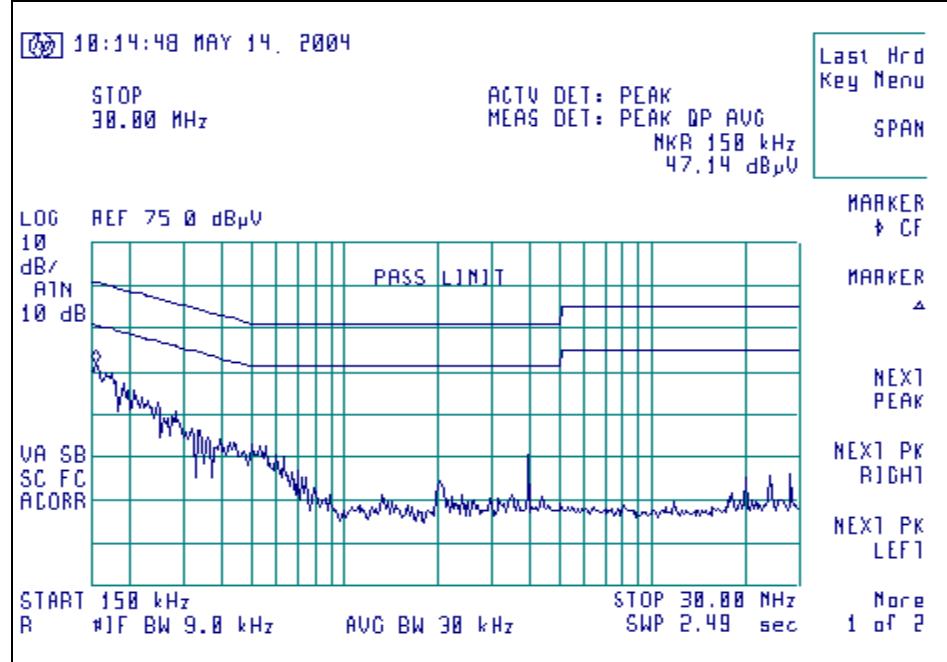
Photo(s) Taken During Conducted Emission Testing

Setup for the Conducted Emissions Test

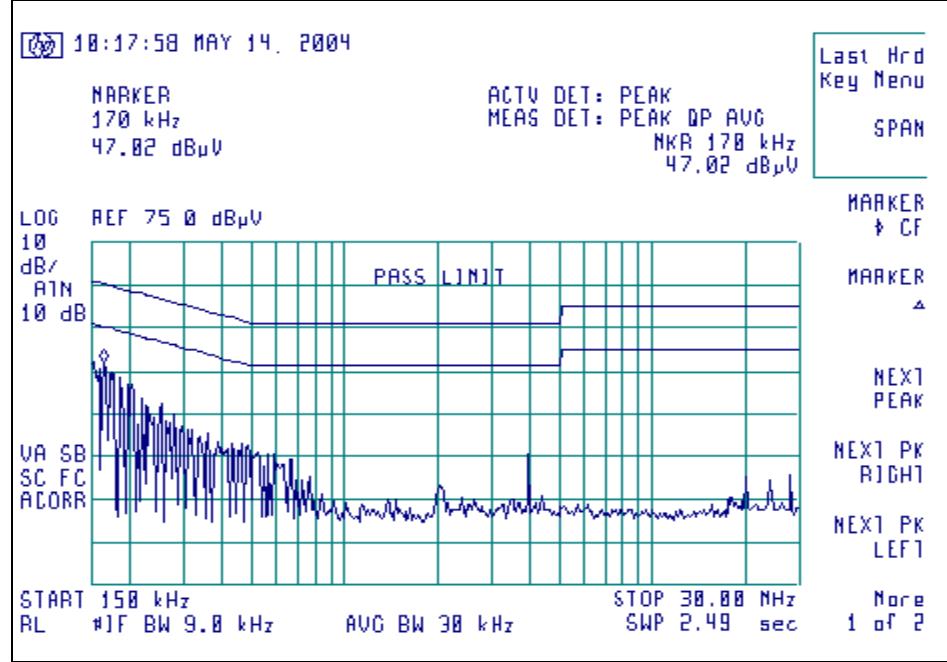


Graphs made during Conducted Emission Testing

Signature Scan of Conducted Emissions, L1, Channel 27



Signature Scan of Conducted Emissions, L2, Channel 27



Appendix A

Test Equipment List

Asset #	Manufacturer	Model #	Serial #	Description	Date	Due
AA960008	EMCO	3816/2NM	9701-1057	Line Impedance Stabilization Network	9/03/03	9/03/04
AA960031	HP	119474A	3107A01708	Transient Limiter	Note 1	Note 1
AA960077	EMCO	93110B	9702-2918	Biconical Antenna	9/02/03	9/02/04
AA960078	EMCO	93146	9701-4855	Log-Periodic Antenna	9/02/03	9/02/04
AA960081	EMCO	3115	6907	Double Ridge Horn Antenna	11/14/03	11/14/04
CC00221C	Agilent	E4407B	US39160256	Spectrum Analyzer	11/04/03	11/04/04
EE960004	EMCO	2090	9607-1164	Device Controller	N/A	N/A
EE960013	HP	8546A	3617A00320	Receiver RF Section	9/04/03	9/04/04
EE960014	HP	85460A	3448A00296	Receiver Pre-Selector	9/04/03	9/04/04
N/A	LSC	Cable	0011	3 Meter 1/2" Armored Cable	6/07/03	6/07/04
N/A	LSC	Cable	0038	1 Meter RG 214 Cable	6/07/03	6/07/04
N/A	LSC	Cable	0050	10 Meter RG 214 Cable	6/07/03	6/07/04
N/A	Pasternack	Attenuator	N/A	10 dB Attenuator	Note 1	Note 1

Note 1 - Equipment calibrated within a traceable system.

Table of Expanded Uncertainty Values, (K=2) for Specified Measurements

Measurement Type	Particular Configuration	Uncertainty Values
Radiated Emissions	3 – Meter chamber, Biconical Antenna	4.24 dB
Radiated Emissions	3-Meter Chamber, Log Periodic Antenna	4.8 dB
Radiated Emissions	10-Meter OATS, Biconical Antenna	4.18 dB
Radiated Emissions	10-Meter OATS, Log Periodic Antenna	3.92 dB
Conducted Emissions	Shielded Room/EMCO LISN	1.60 dB
Radiated Immunity	3 Volts/Meter in 3-Meter Chamber	1.128 Volts/Meter
Conducted Immunity	3 Volts level	1.0 V