



Compliance Testing, LLC

Previously Flom Test Lab

RF, EMC and Safety Testing Experts Since 1963

toll-free: (866) 311-3268

fax: (480) 926-3598

<http://www.ComplianceTesting.com>

info@ComplianceTesting.com

Date: August 5, 2010

Applicant: Unigen Corporation
45388 Warm Springs Blvd
Fremont, CA 94539

Attention: Mark Morrissey, Director of Business Development
Ph: (214) 597-1848
Fax: (510) 661-2788
E-mail: mmorrissey@unigen.com

Equipment: WiFi 802.11 b/g/n Radio Module

FCC ID: R8KUGWDS82

FCC Rules: 15.247

Enclosed please find your copy of the Engineering Test Report for which you are subject to the restrictions as listed on the attached summary.

This Class II Permissive Change Certification Testing was completed on behalf of:
ECotality North America
430 S. 2nd Ave
Phoenix, AZ 85003
Ph: (602) 716-9576

For any additional information please contact us.

Sincerely,

Compliance Testing, LLC



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Test Report

for

FCC ID: R8KUGWDS82

Model: UGWDS82NSM33

to

Federal Communications Commission

Rule Part(s) 15.247

Date of Report: August 5, 2010

On the Behalf of the Applicant:

Unigen Corporation
45388 Warm Springs Blvd
Fremont, CA 94539

Attention of:

Mark Morrissey, Director of Business Development
Ph: (214) 597-1848
Fax: (510) 661-2788
E-mail: mmorrissey@unigen.com

At the Request of:

ECotality North America
430 S. 2nd Ave
Phoenix, AZ 85003
Ph: (602) 716-9576

By

Compliance Testing, LLC
3356 N. San Marcos Place, Suite 107
Chandler, Arizona 85225-7176
(866) 311-3268 phone, (480) 926-3598 fax



Test Report Revision History

Revision	Date	Revised By	Reason for revision
1.0	August 5, 2010	J. Erhard	Original Document



The Applicant has been cautioned as to the following:

15.21 Information to User

The user's 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 is true and correct.

A handwritten signature in black ink, appearing to read "John Erhard".

Certifying Engineer:

John Erhard: Engineering Manager



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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: 15.247 Operation within bands 902-928, 2400-2483.5, 5725-5850 MHz



Standard Test Conditions and Engineering Practices

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

In accordance with ANSI C63.10-2009 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.

A2LA

“A2LA has accredited Compliance Testing, LLC, in 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 for current scope of accreditation.

Certificate number: 2152.01



TESTING CERT# 2152.01

FCC OATS Reg. #933597

IC O.A.T.S. Number: 2044A-1



List of General Information Required For Certification

In Accordance with FCC Rules and Regulations,
Volume II, Part 2 and Part 15.247

Sub-Part 2.1033(b)

Name and Address of Applicant: Unigen Corporation
45388 Warm Springs Blvd
Fremont, CA 94539

FCC ID: R8KUGWDS82

Model Number: UGWDS82NSM33

Instruction Manual(s):

Please See Attached Exhibits

Type of Emission: DTS

FREQUENCY RANGE, MHz: 2412.0 - 2462.0

Power Rating, Watts: 0.03837

☐ Switchable

☐ Variable

☒ N/A

Maximum Power Rating, W: 1

15.203: Antenna Requirement:

- ☒ The antenna is permanently attached to the EUT
- ☐ The antenna uses a unique coupling
- ☐ The EUT must be professionally installed
- ☐ The antenna requirement does not apply



Subpart 2.1033 (continued)

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

Label Information:

Please See Attached Exhibits

Photographs:

Please See Attached Exhibits

Digital Modulation Description:

☐ Attached Exhibits
☒ N/A

Test and Measurement Data:

Follows



Test Results Summary

Specification	Test Name	Pass, Fail, N/A	Comments
15.247(d), 15.209(a), 15.205	Radiated Spurious Emissions	Pass	
15.247(d), 15.209(a), 15.205	Emissions At Band Edges	Pass	
15.207	A/C Powerline Conducted Emissions	Pass	



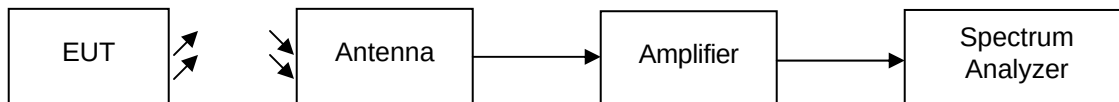
Name of Test: Radiated Spurious Emissions
Specification: 15.247(d), 15.209(a), 15.205
Test Equipment Utilized: i00028, i00103, i00331

Engineer: J. Erhard
Test Date: 8/5/2010

Test Procedure

The EUT was tested in a semi-anechoic chamber set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Spurious Emissions. The antenna and cable correction factors were summed with the amplifier gain and input into the spectrum analyzer as an offset to ensure accurate readings. The spectrum for each tuned frequency was examined to the 10th harmonic.

Test Setup



Radiated Spurious Emissions

Tuned Freq (MHz)	Emission Freq (MHz)	Peak Monitored Level (dBuV/m)	Peak Limit (dBuV/m)	Average Monitored Level (dBuV/m)	Average Limit (dBuV/m)	Result
2412	4824	50.56	74.0	42.67	54.0	Pass
2412	7236	55.84	74.0	48.71	54.0	Pass
2437	4874	48.5	74.0	42.66	54.0	Pass
2437	7311	57.28	74.0	49.97	54.0	Pass
2462	4924	40.51	74.0	36.97	54.0	Pass
2462	7686	48.72	74.0	41.66	54.0	Pass

No other emissions were detectable. All emissions were greater than -20 dBc.



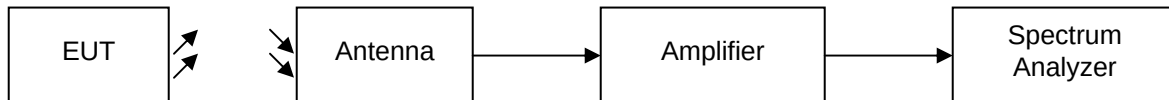
Name of Test: Emissions At Band Edges
Specification: 15.247(d), 15.209(a), 15.205
Test Equipment Utilized: i00028, i00103, i00331

Engineer: J. Erhard
Test Date: 8/5/2010

Test Procedure

The EUT was tested in a semi-anechoic chamber set 3m from the receiving transducer. A spectrum analyzer was used to verify that the EUT met the requirements for band edge with both peak and average measurements. The cable and transducer correction factors were input into the analyzer as a reference level offset to ensure accurate readings were obtained.

Test Setup



Band Edge Emissions Summary

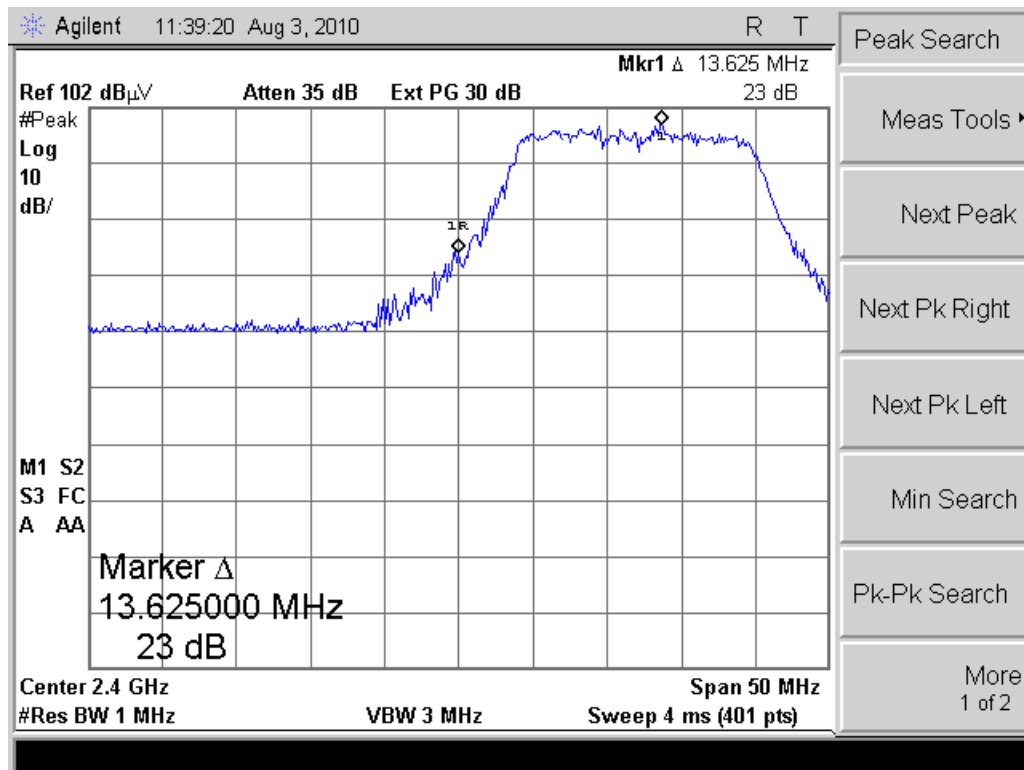
Tuned Freq (MHz)	Emission Freq (MHz)	Monitored Level (dBc)	Detector	Limit	Result
2412	2400	-23	Peak	-20 dBc	Pass
2462	2483.5	-36.29	Peak	-20 dBc	Pass

Restricted Band Emissions Summary

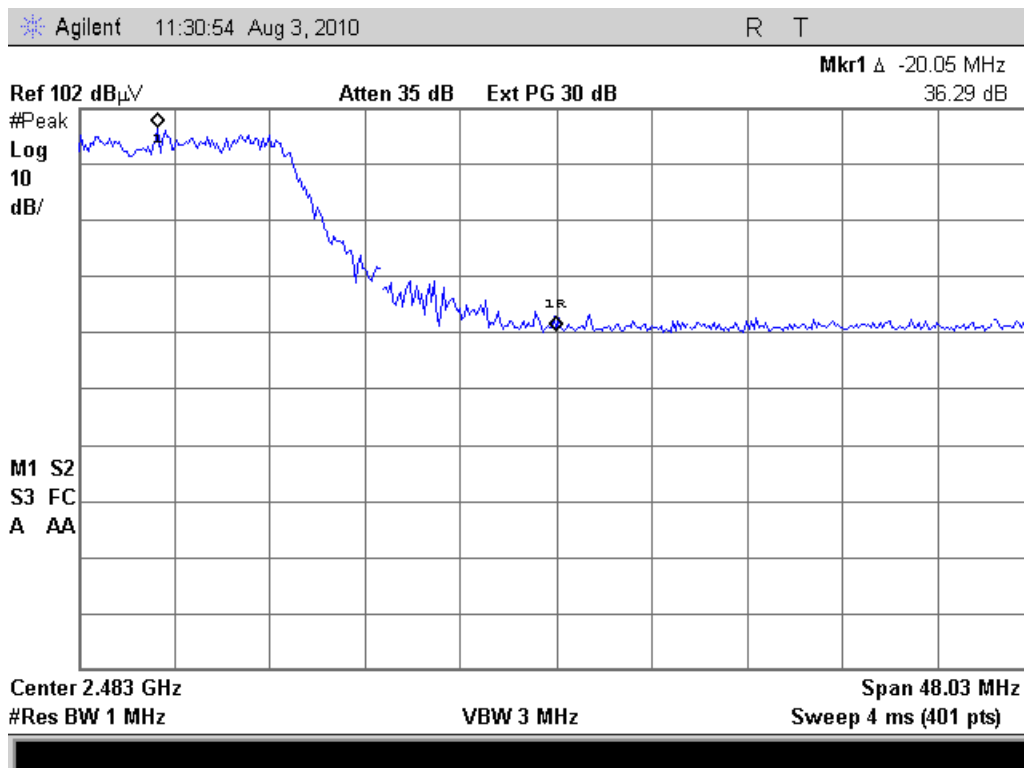
Tuned Freq (MHz)	Emission Freq (MHz)	Monitored Level (dBuV/m)	Detector	Limit (dBuV/m)	Result
2412	2389.2	56.06	Peak	74	Pass
2412	2389.2	31.55	Average	54	Pass
2462	2483.5	59.62	Peak	74	Pass
2462	2484.75	53.39	Average	54	Pass



Band Edge 2400 MHz

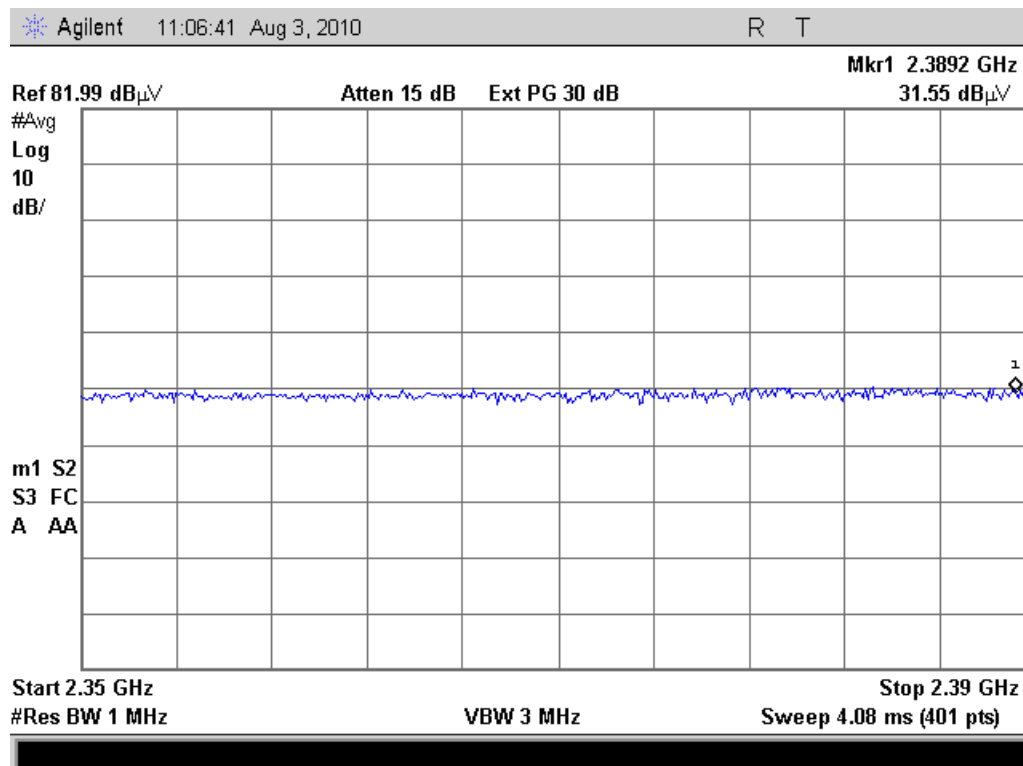
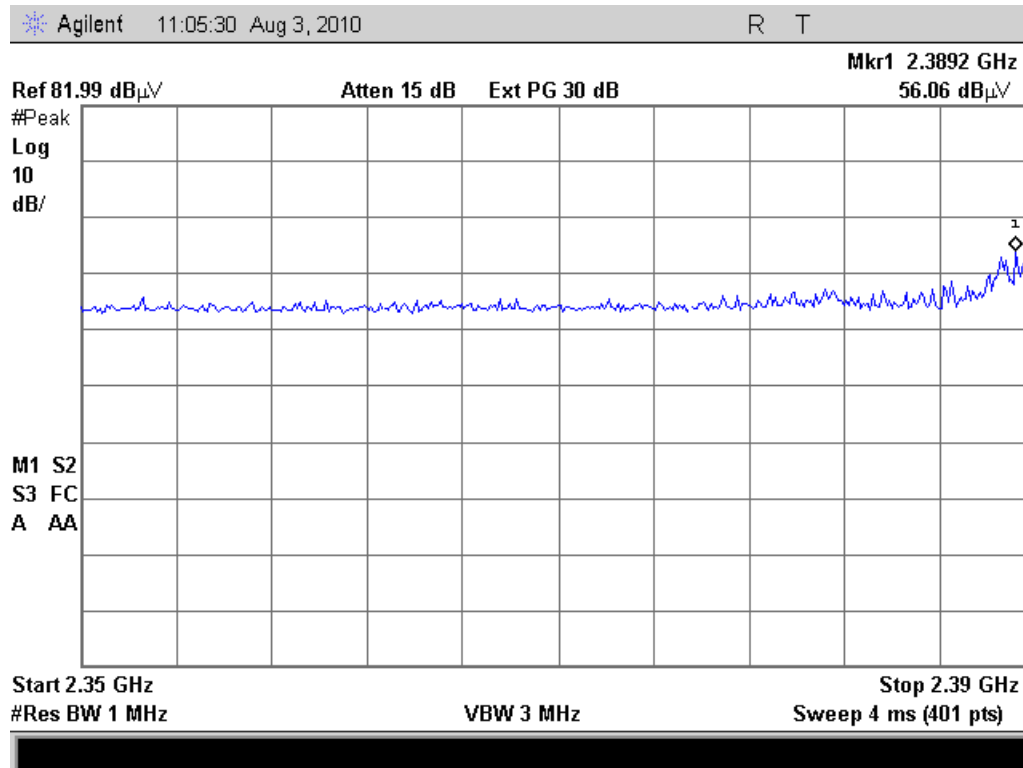


Band Edge 2483.5 MHz



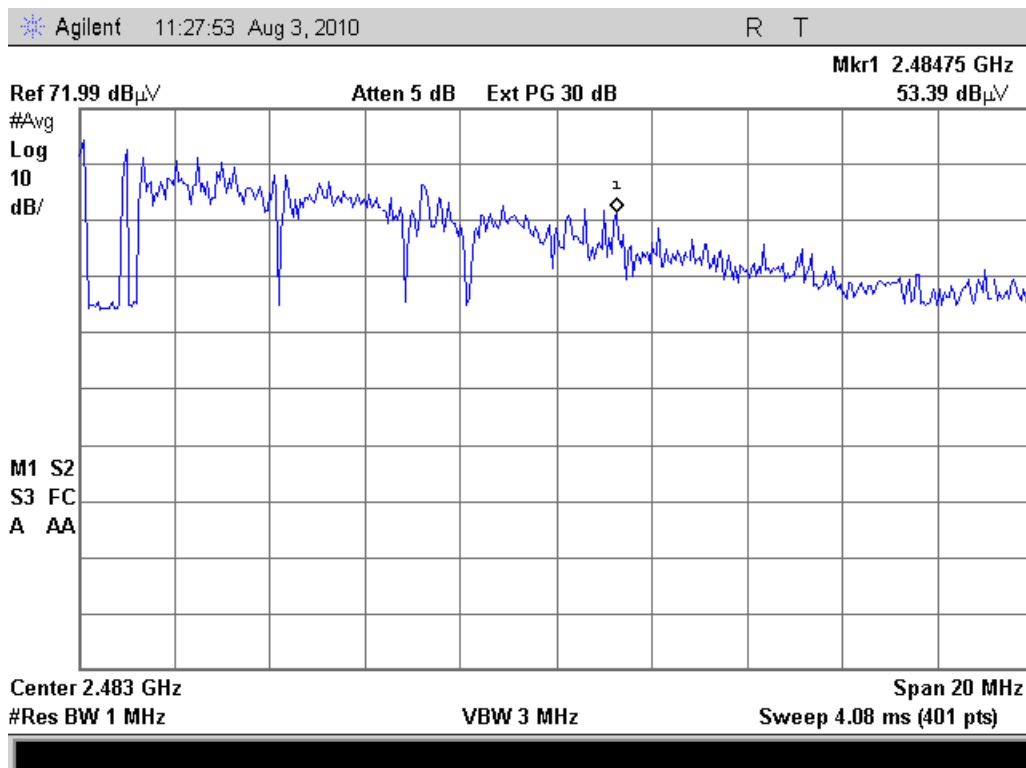
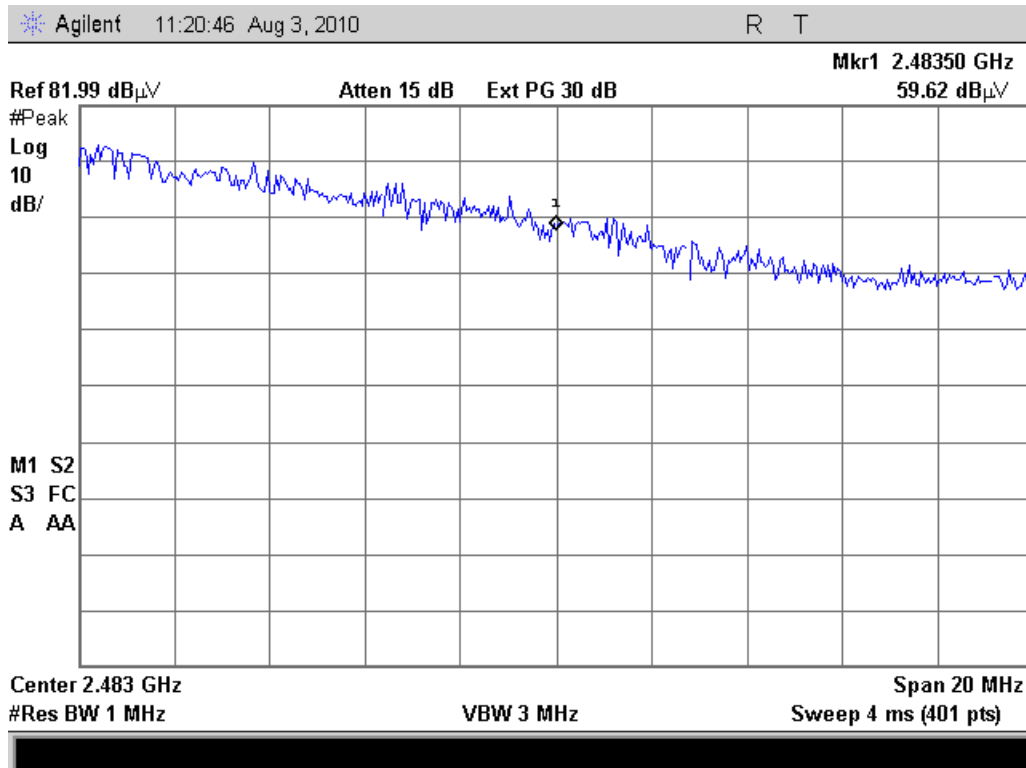


Restricted Band 2390 MHz





Restricted Band 2483.5 MHz





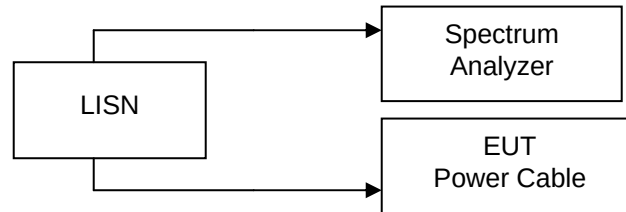
Name of Test: A/C Powerline Conducted Emissions
Specification: 15.207
Test Equipment Utilized: i00270, i00033

Engineer: Bandele Adepoju, NCE
Test Date: 10/23/2010

Test Procedure

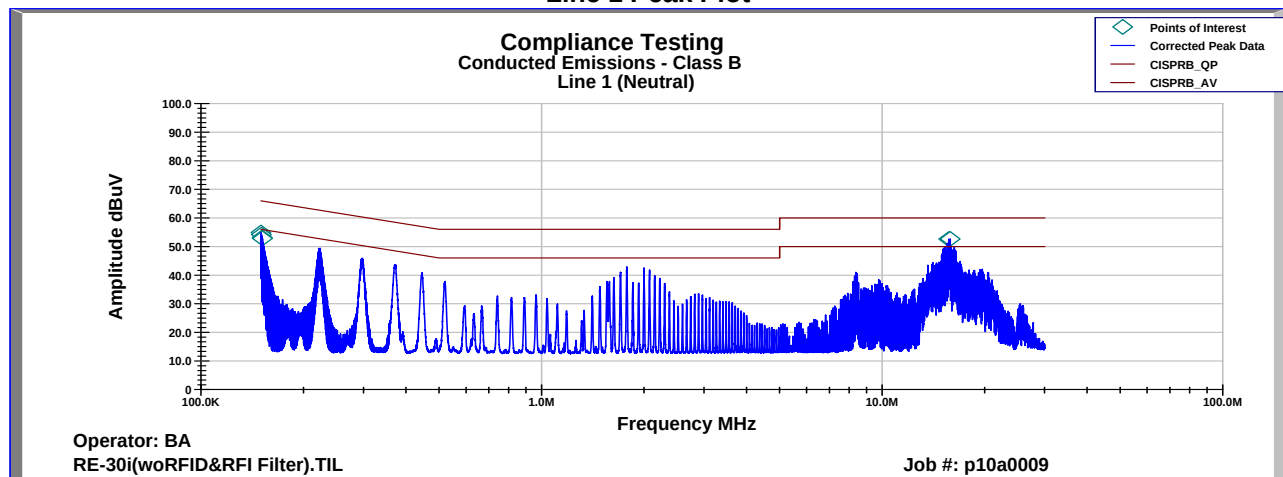
The EUT power cable connected to a LISN and the monitored output of the LISN was connected directly to a spectrum analyzer. The conducted emissions from 150 kHz to 30 MHz were monitored and compared to the specification limits. The average measurements were the worst-case and are recorded in the tables below.

Test Setup

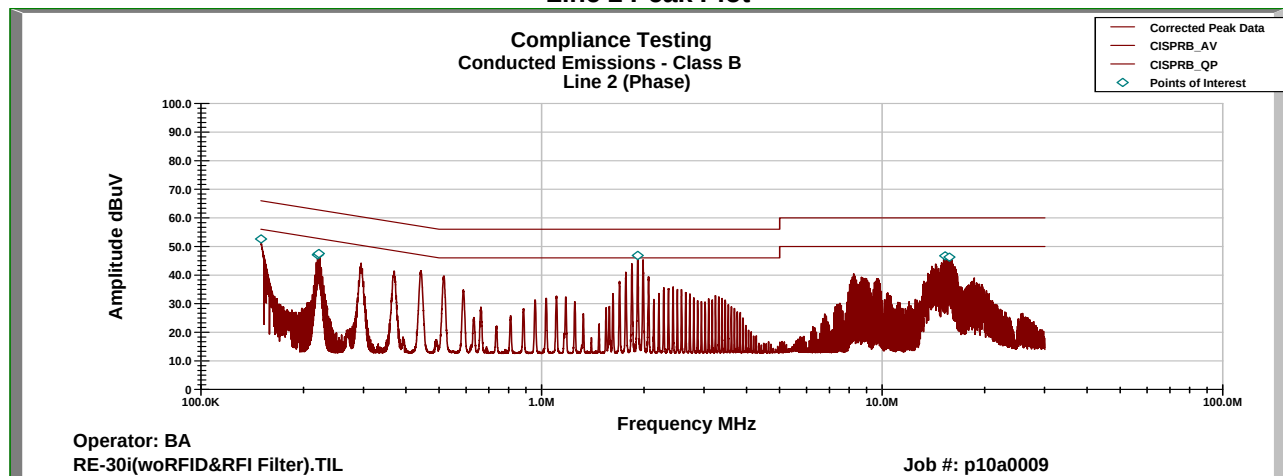


Conducted Emissions Test Results

Line 1 Peak Plot



Line 2 Peak Plot



**Line 1 Neutral AVG Detector**

Frequency	Measured Data (dBuV)	LISN Corr Fact (dB)	Cable Loss (dB)	Attenuator (dB)	L1 Final Data (dBuV)	CISPR/FCC Limit (dBuV)	AVG Margin (dB)
15.846 MHz	29.45	0.00	0.758	10	40.204	50.000	-9.796
15.696 MHz	34.99	0.00	0.761	10	45.751	50.000	-4.249
150.080 KHz	26.67	0.30	0.043	10	37.013	55.998	-18.985
150.020 KHz	27.32	0.30	0.043	10	37.660	56.000	-18.340
150.010 KHz	26.12	0.30	0.043	10	36.460	56.000	-19.540
150.000 KHz	27.01	0.30	0.043	10	37.350	56.000	-18.650

Line 2 Phase AVG Detector

Frequency	Measured Data (dBuV)	LISN Corr Fact (dB)	Cable Loss (dB)	Attenuator (dB)	L2 Final Data (dBuV)	CISPR/FCC Limit (dBuV)	AVG Margin (dB)
15.736 MHz	19.13	0.00	0.752	10	29.878	50.000	-20.122
15.290 MHz	32.27	0.00	0.745	10	43.015	50.000	-6.985
1.913 MHz	34.58	0.00	0.248	10	44.828	46.000	-1.172
221.880 KHz	28.42	0.19	0.056	10	38.665	53.946	-15.282
221.490 KHz	28.47	0.19	0.055	10	38.711	53.957	-15.247
150.010 KHz	22.19	0.30	0.043	10	32.530	56.000	-23.470

Line 1 Neutral QP Detector

Frequency	Measured Data (dBuV)	LISN Corr Fact (dB)	Cable Loss (dB)	Attenuator (dB)	L1 Final Data (dBuV)	CISPR/FCC Limit (dBuV)	QP Margin (dB)
15.846 MHz	38.18	0.00	0.758	10	48.938	60.000	-11.062
15.696 MHz	38.02	0.00	0.761	10	48.781	60.000	-11.219
150.080 KHz	42.19	0.30	0.043	10	52.533	65.998	-13.834
150.020 KHz	42.95	0.30	0.043	10	53.293	66.000	-13.836
150.010 KHz	41.82	0.30	0.043	10	52.163	66.000	-13.836
150.000 KHz	42.31	0.30	0.043	10	52.653	66.000	-13.347

Line 2 Phase QP Detector

Frequency	Measured Data (dBuV)	LISN Corr Fact (dB)	Cable Loss (dB)	Attenuator (dB)	L2 Final Data (dBuV)	CISPR/FCC Limit (dBuV)	QP Margin (dB)
15.736 MHz	27.03	0.00	0.752	10	37.782	60.000	-22.218
15.290 MHz	34.70	0.00	0.745	10	45.445	60.000	-14.555
1.913 MHz	36.68	0.00	0.248	10	46.928	56.000	-9.072
221.880 KHz	35.71	0.19	0.056	10	45.955	63.946	-17.992
221.490 KHz	35.86	0.19	0.055	10	46.104	63.957	-17.853
150.010 KHz	38.52	0.30	0.043	10	48.863	66.000	-17.136



Test Equipment Utilized

Description	MFG	Model Number	CT Asset Number	Last Cal Date	Cal Due Date
Horn Antenna	EMCO	3115	i00103	11/5/2008	11/5/2010
LISN	FCC	FCC-LISN-50-32-2-01	i00270	09/30/2010	09/30/2012
Spectrum Analyzer	Agilent	E4407B	i00331	11/3/2009	11/3/2010
EMI Receiver	HP	8546A	i00033	11/04/2009	11/04/2010
RF Amplifier	HP	8449A	i00028	9/17/2009	9/17/2010

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