



**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](mailto:info@ComplianceTesting.com)

**Date:** April 11, 2011

**Attention:** Authorization & Evaluation Division

**Applicant:** Blackboard, Inc.  
Tim Mattson, Senior Engineer  
Ph: (623) 476-1141  
Fax: (602) 861-9617  
email: [tim.mattson@blackboard.com](mailto:tim.mattson@blackboard.com)

**Equipment:** AC3100  
**Description:** Contactless Card Reader

**FCC ID:** TMEDR4100X007  
**Model:** DR4100 Series Module

**FCC Rules:** 15.225

Attached is a copy of your Test Report per the testing standards requested.  
This report may not be reproduced, except in full, without written permission from Compliance Testing, LLC.  
Please retain a copy of this report for your archival purposes.

The attached report indicates that the sample submitted for testing complied with relevant requirements of the pertinent standards we tested to.

If you are seeking an FCC Grant or other Certification requiring approval from a regulatory authority via a Certification Body (TCB or FCB), you may submit this report along with your application for review.

Our invoice for services has been directed to your Accounts Payable Department, with a copy attached for your reference.

Should anything need clarification, do not hesitate to call or FAX.

It has been a pleasure to work with you and we do thank you for your order.

Sincerely,

Compliance Testing



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## Test Report

for

**FCC ID: TMEDR4100X007**

**Model: AC3100**

to

**Federal Communications Commission**

**Rule Part(s) 15.225**

**Date of Report: April 11, 2011**

**On the Behalf of the Applicant:** Blackboard, Inc.  
22601 North 19th Ave, Suite 113  
Phoenix, AZ 85027

**Attention of:** Tim Mattson, Senior Engineer  
Ph: (623) 476-1141  
Fax: (602) 861-9617  
email: [tim.mattson@blackboard.com](mailto:tim.mattson@blackboard.com)

**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	April 11, 2011	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 that reads "John Erhard".

Certifying Engineer:

John Erhard: Engineering Manager



## Table of Contents

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### 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.

Environmental Conditions	
Temperature	Humidity
24.4	23.3

### 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](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
15.225(a)	Fundamental Field Strength	Pass	
15.225(b)(c)(d)	Out of Band Spurious Emissions	Pass	
12.209	Radiated Emissions	Pass	
12.207	Conducted Powerline Emissions	Pass	





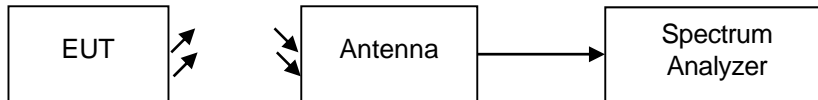
Name of Test: Field Strength  
Specification: 15.225(a)(b)(c)(d)  
Test Equipment Utilized: i00379, i00326

Engineer: J. Erhard  
Test Date: 4/11/2011

### Test Procedure

The EUT was tested on an anechoic chamber at a distance of 1 meter from the receiving loop antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Fundamental Field Strength. The antenna correction and distance correction factors were summed with the quasi-peak measurement to ensure accurate readings were obtained. The following table indicates the highest emission in each of the indicated bands.

### Test Setup



### Field Strength

Frequency Band (MHz)	Measured Frequency (MHz)	Monitored Level (dBuV/m)	Distance CF (dB)	Antenna CF (dB)	Corrected Measurement (dBuV/m)	Limit (dBuV/m)	Result
13.110-13.410	13.346	38.29	59.1	17.8	-38.61	40.51	Pass
13.410-13.553	13.552	50.86	59.1	17.8	-26.04	50.47	Pass
13.553-13.567	13.559	61.62	59.1	17.8	-15.28	84.00	Pass
13.567-13.710	13.568	45.14	59.1	17.8	-31.76	50.47	Pass
13.710-14.010	13.772	34.94	59.1	17.8	-41.96	40.51	Pass

\* Note. Cable correction factors are not included in this measurement as the low loss of the high quality TWINAX cable at low frequencies is practically non-existent.



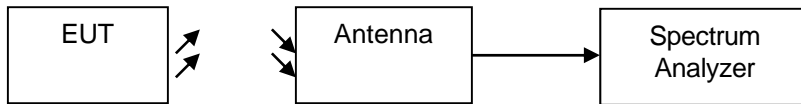
**Name of Test:** Radiated Emissions  
**Specification:** 15.209  
**Test Equipment Utilized:** i00379, i00267

**Engineer:** J. Erhard  
**Test Date:** 4/11/2011

**Test Procedure**

The EUT was tested on an Open Area Test Site (OATS) at a distance of 3 meters from the receiving antenna. A spectrum analyzer was used to verify that the UUT met the requirements for Radiated Emissions. The spectrum for each tuned frequency was examined beyond the 10<sup>th</sup> harmonic. The antenna and cable correction factors were input into the analyzer providing a summed final result.

**Test Setup**



**Radiated Emissions**

Emission Frequency (MHz)	Measured Value (dBuV/m)	Limit (dBuV/m)	Margin (dB)
42.375	20.58	40	-19.42
150.018	37.1	43.5	-6.4
256.135	15.26	46	-30.74
402.525	18.59	46	-27.41
553.250	22.02	46	-23.98
761.575	24.01	46	-21.99



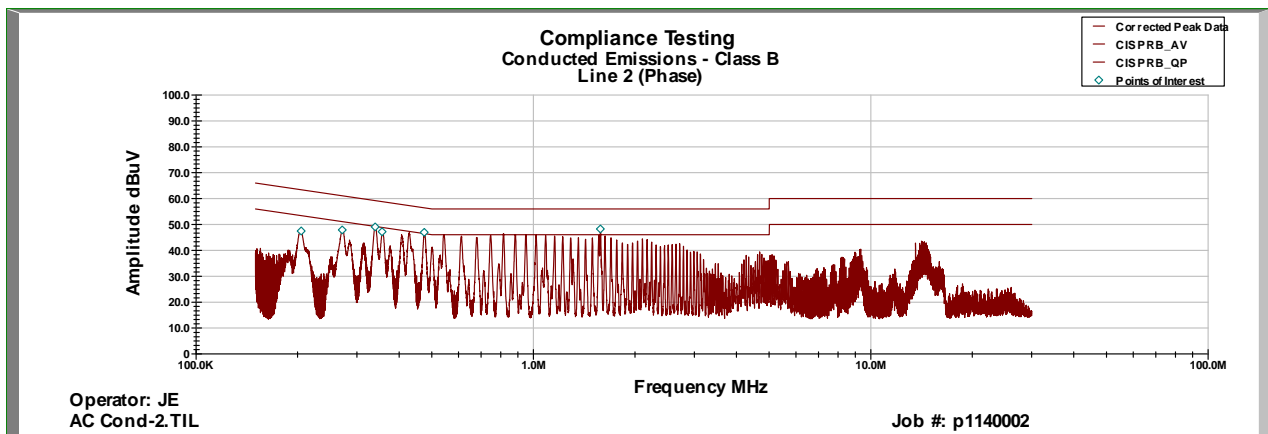
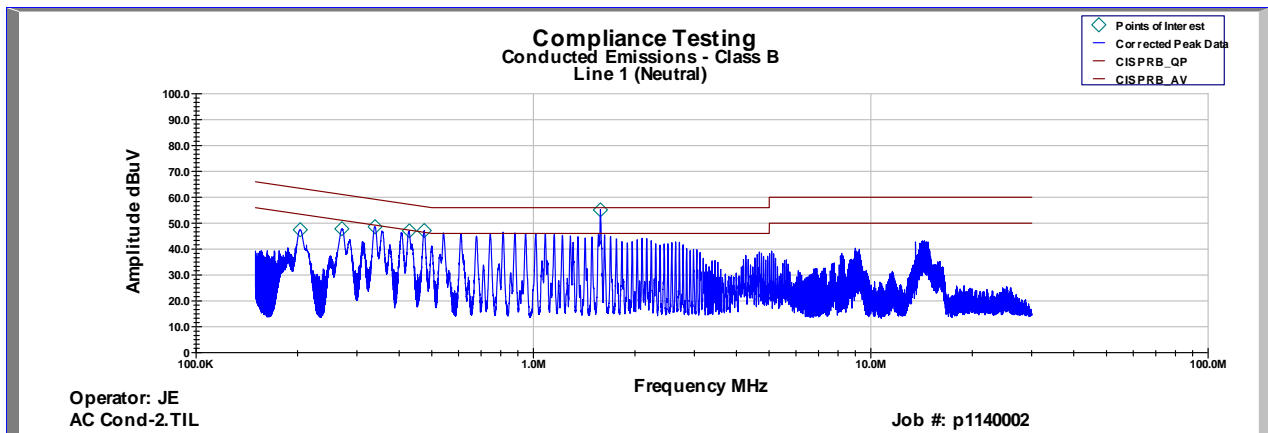
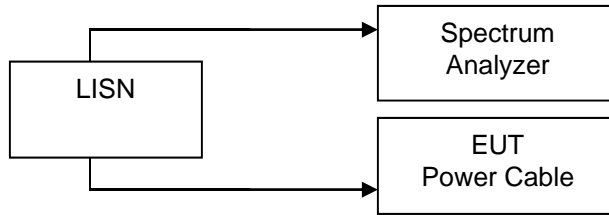
Name of Test: Powerline Conducted Emissions  
Specification: 15.207  
Test Equipment Utilized: i00033, i00270

Engineer: J. Erhard  
Test Date: 4/11/2011

### 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





## 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)
1.5793 MHz	32.86	0.00	0.225	10.000	43.082	46.000	-2.918
474.58 KHz	36.09	0.10	0.152	10.000	46.340	46.726	-0.386
428.04 KHz	35.85	0.10	0.147	10.000	46.097	48.056	-1.959
339.52 KHz	38.27	0.13	0.124	10.000	48.525	50.585	-2.060
271.44 KHz	36.21	0.16	0.104	10.000	46.479	52.530	-6.052
203.5 KHz	36.40	0.20	0.024	10.000	46.619	54.471	-7.852

## 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)
1.581 MHz	33.20	0.00	0.226	10.000	43.426	46.000	-2.574
476.53 KHz	35.96	0.10	0.153	10.000	46.213	46.671	-0.457
357.66 KHz	36.03	0.12	0.132	10.000	46.287	50.067	-3.780
339.7 KHz	38.58	0.13	0.124	10.000	48.837	50.580	-1.743
271.49 KHz	36.19	0.16	0.106	10.000	46.464	52.529	-6.065
203.43 KHz	36.31	0.20	0.028	10.000	46.536	54.473	-7.937

## 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)
1.5793 MHz	32.86	0.00	0.225	10.000	43.082	46.000	-2.918
474.58 KHz	36.09	0.10	0.152	10.000	46.340	46.726	-0.386
428.04 KHz	35.85	0.10	0.147	10.000	46.097	48.056	-1.959
339.52 KHz	38.27	0.13	0.124	10.000	48.525	50.585	-2.060
271.44 KHz	36.21	0.16	0.104	10.000	46.479	52.530	-6.052
203.5 KHz	36.40	0.20	0.024	10.000	46.619	54.471	-7.852

## 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)
1.581 MHz	36.43	0.00	0.226	10.000	46.656	56.000	-9.344
476.53 KHz	36.25	0.10	0.153	10.000	46.503	56.671	-10.167
357.66 KHz	36.39	0.12	0.132	10.000	46.643	60.067	-13.424
339.7 KHz	38.92	0.13	0.124	10.000	49.174	60.580	-11.406
271.49 KHz	37.15	0.16	0.106	10.000	47.420	62.529	-15.108
203.43 KHz	37.02	0.20	0.028	10.000	47.246	64.473	-17.227



### Test Equipment Utilized

Description	MFG	Model Number	CT Asset Number	Last Cal Date	Cal Due Date
Spectrum Analyzer	HP	8546A	i00033	10/3/2010	10/3//2011
Bilog Antenna	Schaffner	CBL6111C	i00267	11/21/2009	11/21/2011
LISN	FCC	FCC-LISN-50-32-2-01	i00270	9/30/2010	9/30/2012
Active Loop Antenna	EMCO	6507	i00326	4/1/09	4/1/11*
Spectrum Analyzer	Agilent	E7405A	i00379	11/22/2010	11/22/2011

\*30 day extension granted QM

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