



## Test Report

Prepared for: Revolution Microelectronics

Model: Revolution Ballast

Description: Lighting

Serial Number: N/A

To

FCC Part 15B  
Class B

And

IC ICES-003 Issue 6 (January 2016)

Date of Issue: July 19, 2016

On the behalf of the applicant:

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**Kenneth Lee**  
Project Test Engineer

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All results contained herein relate only to the sample tested.

**Test Report Revision History**

<b>Revision</b>	<b>Date</b>	<b>Revised By</b>	<b>Reason for Revision</b>
1.0	7/15/16	Kenneth Lee	Original Document

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

**FCC**

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 the 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 an 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.

**Industry Canada**

Products subject to Industry Canada ICES-003 must be labeled in English and/or French (based on the intended market and any other applicable provincial or federal regulations) as follows:

*CAN ICES-3 (B)/NMB-3(B)*

**ILAC / A2LA**

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to the joint ISO-ILAC-IAF Communiqué dated January 2009).

The tests results contained within this test report all fall within our scope of accreditation, unless noted below.

Please refer to <http://www.compliancetesting.com/labscope.html> for current scope of accreditation.

Testing Certificate Number: **2152.01**



**FCC Site Reg. #349717**

**IC Site Reg. #2044A-2**

**Non-accredited tests contained in this report:**

**N/A**

## Test and Measurement Data

Subpart 2.1033(b)

All tests and measurement data shown were performed in accordance with FCC Rule Parts: 15.107, 15.109 (Unintentional Radiators).

All tests and measurement data shown are deemed satisfactory evidence of compliance with Industry Canada Interference-Causing Equipment Standard ICES-003.

Name of Test	FCC Section	ICES-003
A/C Powerline Conducted Emissions	15.107	Section 6
Radiated Emissions	15.109	Section 6

## Standard Engineering Practices

Unless otherwise indicated, the procedures contained in ANSI C63.4-2009 were observed during testing.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst case measurement.

## Standard Test Conditions and Engineering Practices

Unless otherwise indicated in the specific measurement results, the ambient temperature was maintained within the range of 10° to 40°C (50° to 104°F) and the relative humidity levels were in the range of 10% to 90%.

Environmental Conditions	
Temperature (°C)	Humidity (%)
26.6	31.4

## EUT Description

**Model:** Revolution Ballast

**Description:** Lighting

**Firmware:** N/A

**Software:** N/A

**Serial Number:** N/A

**Additional Information:** None

## EUT Operation during Tests

The EUT was powered on and set to emit light at 100% intensity.

**Accessories:** None

**Cables:** None

**Modifications:** None

## Test Results Summary

Specification	Test Name	Pass, Fail, N/A	Comments
15.107	A/C Powerline Conducted Emissions	Pass	
15.109	Radiated Emissions	Pass	

### 15.107 A/C Powerline Conducted Emissions

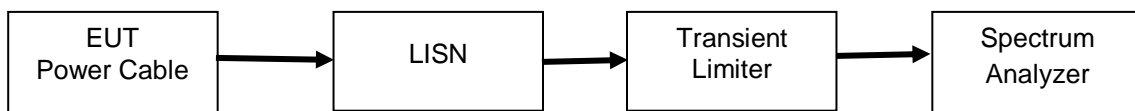
**Engineer:** Kenneth Lee

**Test Date:** 07/14/2016

#### Test Procedure

The EUT power cable was connected to a LISN and the monitored output of the LISN was connected to a transient limiter, which then connected directly to a spectrum analyzer. The conducted emissions from 150 kHz to 30 MHz were measured and compared to the specification limits.

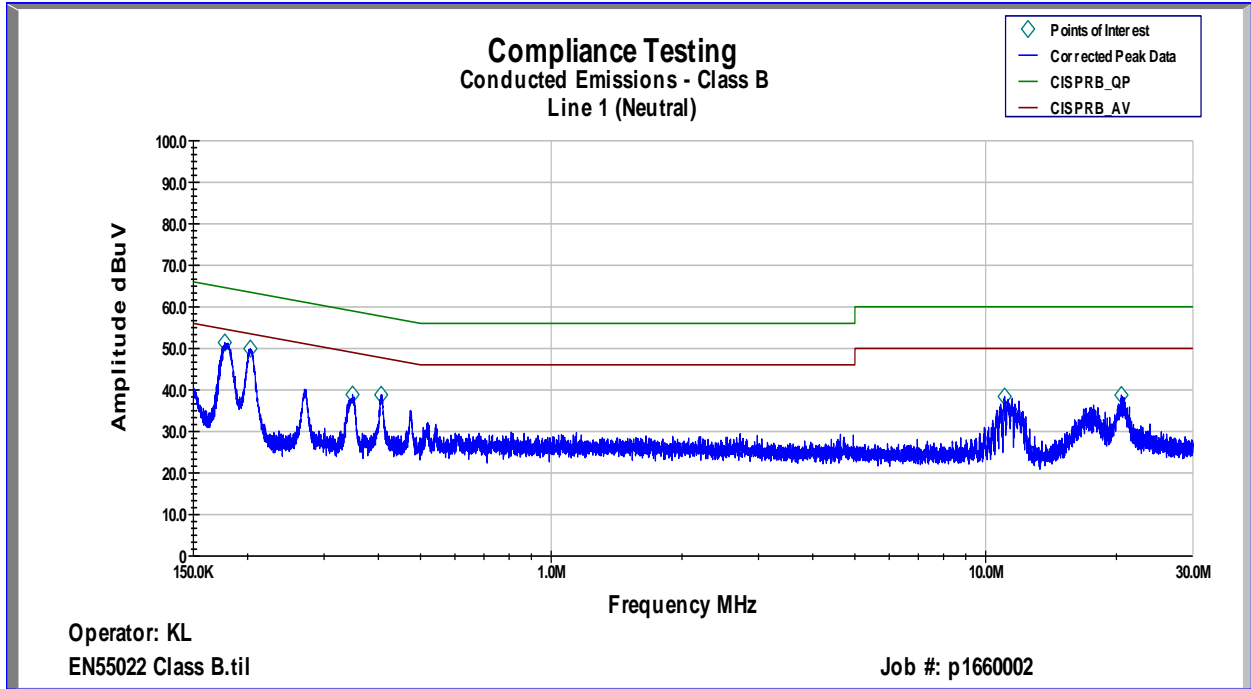
#### Test Setup



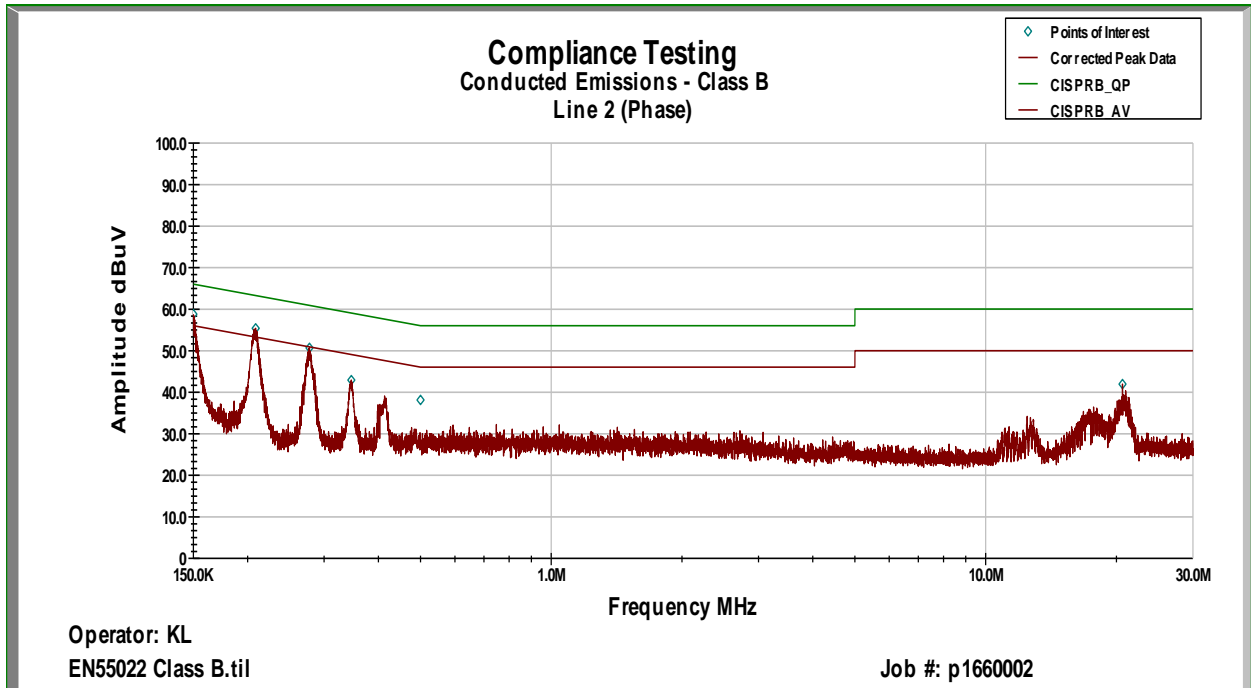


**Conducted Emissions Test Results**

**Line 1 Peak Plot**



**Line 2 Peak Plot**





**Line 1 Neutral Avg Detector**

Frequency	Measured Value (dBuV)	LISN Correction Factor (dB)	Cable Loss (dB)	Transient Limiter (dB)	Final Data (dBuV)	Limit (dBuV)	Avg Margin (dB)
157.82 KHz	32.61	0.22	0.02	10.2	43.048	55.777	-12.728
207.71 KHz	39.18	0.2	0.02	10.1	49.5	54.351	-4.851
344.34 KHz	20.22	0.13	0.027	10.1	30.478	50.447	-19.969
415.78 KHz	23.57	0.1	0.03	10.1	33.8	48.406	-14.606
11.068 MHz	9.45	0	0.163	10.2	19.817	50	-30.183
20.544 MHz	18	0.1	0.22	10.3	28.617	50	-21.383

**Line 2 Phase Avg Detector**

Frequency	Measured Value (dBuV)	LISN Correction Factor (dB)	Cable Loss (dB)	Transient Limiter (dB)	Final Data (dBuV)	Limit (dBuV)	Avg Margin (dB)
150.48 KHz	29	0.3	0.02	10.2	39.515	55.986	-16.471
211.2 KHz	42.88	0.19	0.021	10.1	53.192	54.251	-1.06
280.92 KHz	35.04	0.16	0.024	10.1	45.324	52.259	-6.936
348.58 KHz	28.22	0.13	0.027	10.1	38.476	50.326	-11.85
485.2 KHz	8.53	0.1	0.03	10.1	18.757	46.423	-27.666
20.675 MHz	18.43	0.1	0.22	10.3	29.047	50	-20.953

**Line 1 Neutral QP Detector**

Frequency	Measured Value (dBuV)	LISN Correction Factor (dB)	Cable Loss (dB)	Transient Limiter (dB)	Final Data (dBuV)	Limit (dBuV)	QP Margin (dB)
157.82 KHz	46.64	0.222	0.02	10.2	57.082	65.777	-8.695
207.71 KHz	44.24	0.196	0.02	10.1	54.557	64.351	-9.795
344.34 KHz	25.24	0.128	0.027	10.1	35.495	60.447	-24.952
415.78 KHz	29.34	0.1	0.03	10.1	39.57	58.406	-18.836
11.068 MHz	19.59	0	0.163	10.2	29.953	60	-30.047
20.544 MHz	24.58	0.1	0.22	10.3	35.2	60	-24.8

**Line 2 Phase QP Detector**

Frequency	Measured Value (dBuV)	LISN Correction Factor (dB)	Cable Loss (dB)	Transient Limiter (dB)	Final Data (dBuV)	Limit (dBuV)	QP Margin (dB)
150.48 KHz	33.5	0.3	0.02	10.2	44.015	65.986	-21.971
211.2 KHz	47.82	0.19	0.021	10.1	58.135	64.251	-6.116
280.92 KHz	40.01	0.16	0.024	10.1	50.294	62.259	-11.966
348.58 KHz	35.63	0.13	0.027	10.1	45.883	60.326	-14.443
485.2 KHz	15.13	0.1	0.03	10.1	25.36	56.423	-31.063
20.675 MHz	25.69	0.1	0.22	10.3	36.31	60	-23.69

## 15.109 Radiated Emissions

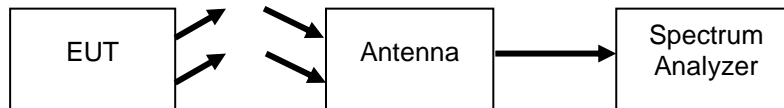
**Engineer:** Kenneth Lee

**Test Date:** 06/21/2016

### Test Procedure

The EUT was tested in a semi-anechoic chamber with the turntable set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Emissions. The EUT was tested by rotating it 360 degrees with the antennas in both the vertical and horizontal orientation while raised from 1 to 4 meters to ensure the signal levels were maximized. All emissions from 30 MHz to 1 GHz were examined.

### Test Setup



### Settings

RBW = 120 KHz

VBW = 300 KHz

Detector – Quasi Peak

### Sample Calculations

Corrected Value = Measured Value + Correction factor

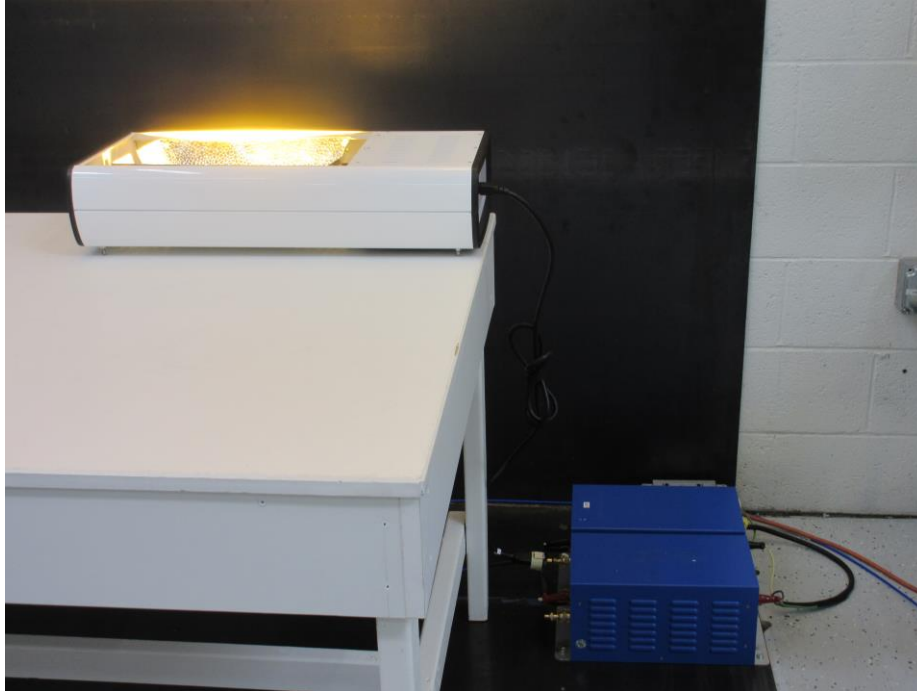
Correction factor = ACF + Cable loss

### Radiated Emissions

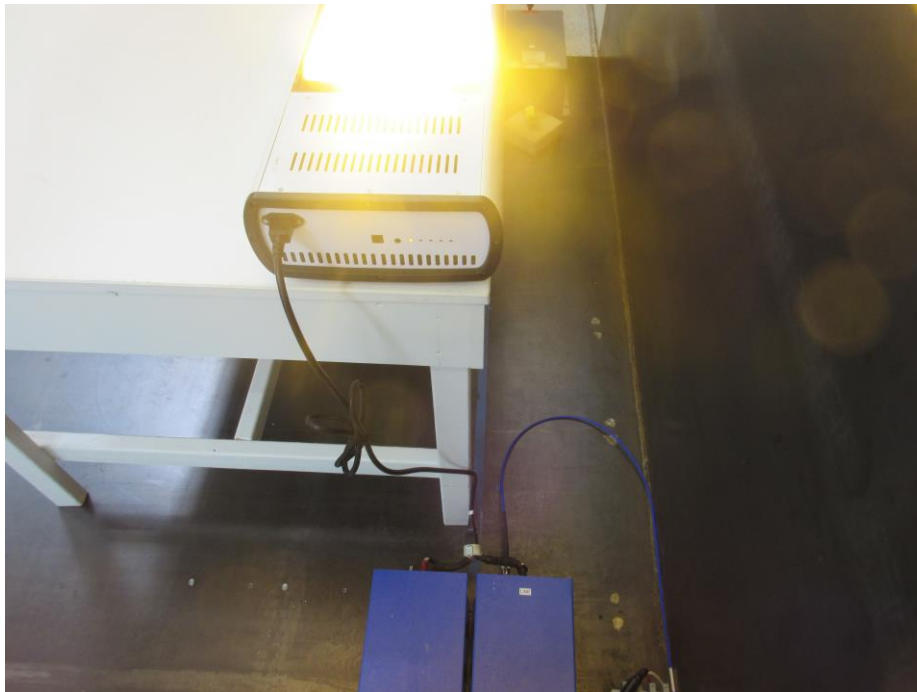
Emission Frequency (MHz)	Measured Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Antenna Polarity (V/H)	Turntable Position (deg)	Detector (QP,PK,Avg)
149.0845	41.672	43.5	-1.828	110	V	333	QP
80.9974	37.997	40	-2.003	109	V	0	QP
131.2369	41.462	43.5	-2.038	267	H	277	QP
80.954	36.514	40	-3.486	116	V	194	QP
155.7539	39.338	43.5	-4.162	250	H	307	QP
76.6527	34.86	40	-5.14	126	V	196	QP

**A/C Conducted Emissions Test Setup Photos**

**Front**

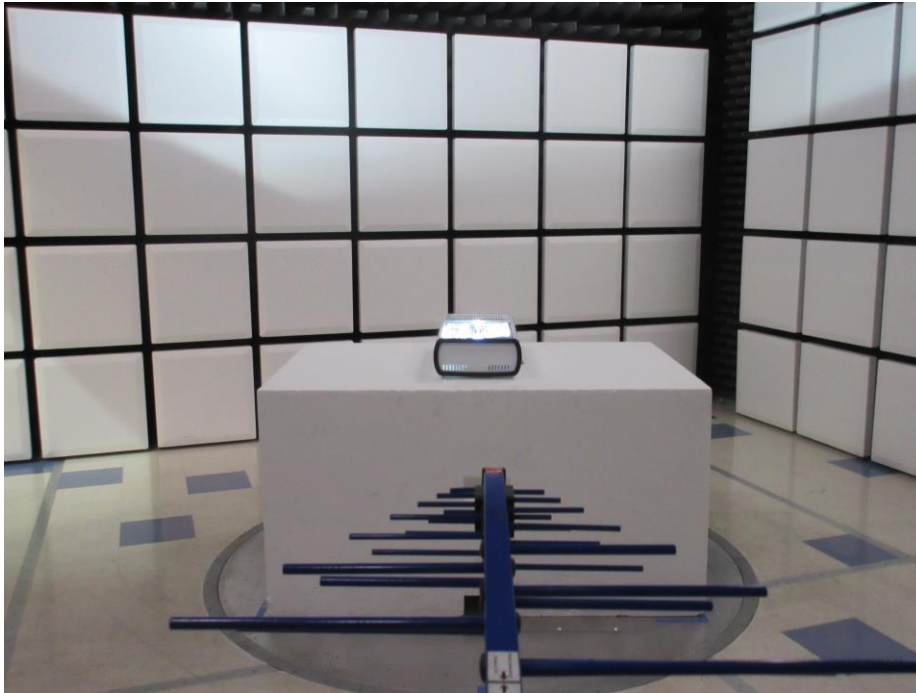


**Side**

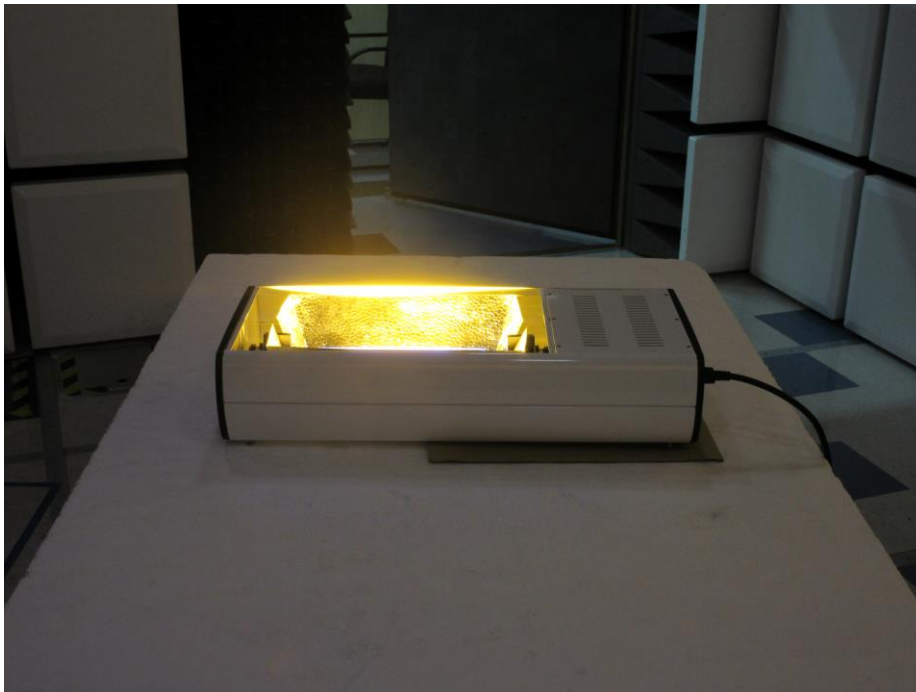


**Radiated Emissions Test Setup Photos**

**Front**



**Side**



**Test Equipment Utilized**

Description	Manufacturer	Model #	CT Asset #	Last Cal Date	Cal Due Date
EMI Receiver	HP	8546A	i00033	3/29/16	3/29/17
Transient Limiter	Com-Power	LIT-153	i00123	Verified on: 07/14/16	
Humidity / Temp Meter	Newport	IBTHX-W-5	i00282	5/26/16	5/26/17
Bi-Log Antenna	Schaffner	CBL 6111D	i00349	10/19/15	10/19/17
AC Power Source	Behlman	BL 6000	i00362	Verified on: 07/14/16	
EMI Analyzer	Agilent	E7405A	i00379	2/11/16	2/11/17
3 Meter Semi-Anechoic Chamber	Panashield	3 Meter Semi-Anechoic Chamber	i00428	7/27/14	7/27/16
LISN	COM-Power	LI-125A	i00446	4/29/16	4/29/18
LISN	COM-Power	LI-125A	i00448	4/29/16	4/29/18

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