

FCC Part 18 COMPLIANCE REPORT

for

Electromagnetic Emissions

of

touch sensor switch

Trade Name : JINGLE WORLD

Model Number : JW-001

Serial Number : N/A

Report Number : 030153-D

FCC ID : Q8JJW70689178

Date : May 13, 2003

Prepared for :

JINGLE WORLD CO., LTD.
2F, No. 176, Sec. 2, Dung Men Rd.,
Tainan, Taiwan, R.O.C.

Prepared by :



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1 VERIFICATION OF COMPLIANCE

Equipment Under Test: touch sensor switch
Trade Name: JINGLE WORLD
Model Number: JW-001
Serial Number: N/A
Applicant: **JINGLE WORLD CO., LTD.**
2F, No. 176, Sec. 2, Dung Men Rd.,
Tainan, Taiwan, R.O.C.
Manufacturer: **JINGLE WORLD CO., LTD.**
2F, No. 176, Sec. 2, Dung Men Rd.,
Tainan, Taiwan, R.O.C.
Type of Test: FCC Part 18
Measurement Procedure: MP5
File Number: 030153-D
FCC ID: Q8JJW70689178
Date of Test: May 8, 2003
Deviation: None
Condition of Test Sample: Normal
Final Result: Pass
Worst Data: See below

Test Item	Freq. (MHz)	Measured Data	Margin (M _{pC})	Remark
Radiated Emission	39.03	28.1 (dB/m)	-11.9 dB (± 2.1422 dB)	
Conducted Emission	0.153	34.0 (dB)	-14.0 dB (± 2.8104 dB)	

- The negative sign in Margin cell means under the specific limit.
- This test result traceable to national or international standards.

The above equipment was tested by C&C Laboratory, Co., Ltd. for compliance with the requirements set forth in the FCC Rules and Regulations Part 18, and the measurement procedure according to MP5. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

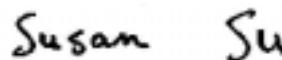
The test results of this report relate only to the tested sample identified in this report.

Approved by:



Jonson Lee / EMC Director

Reviewed by:



Susan Su / Section Manager

2 SYSTEM DESCRIPTION

EUT Test Program:

The EUT was connected with tungsten lamp and power on to test.

3 PRODUCT INFORMATION

Housing Type:	N/A
EUT Power Rating:	120Vac / 60Hz
AC Power during test	110Vac / 60Hz
AC Power Cord Type:	Unshielded, 1.8m (Detachable)

4 SUPPORT EQUIPMENT

Equipment	Type
Tungsten Lamp	Unshielded, 0.2m

5 MEASUREMENT PROCEDURE

5.1 PRELIMINARY LINE CONDUCTED EMISSION TEST

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per PM5 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per MP5.
- 3) All I/O cables were positioned to simulate typical actual usage as per MP5.
- 4) The EUT received AC power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5) All support equipment received power from a second LISN supplying power of 110VAC/60Hz, if any.
- 6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7) Analyzer / Receiver scanned from 450kHz to 30MHz for emissions in each of the test modes.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The following test mode(s) were scanned during the preliminary test:

Mode(s):

1. 120Vac, 60W
2. 120Vac, 100W

- 10) After the preliminary scan, we found the following test mode producing the highest emission level.

Mode: 2.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

5.2 FINAL LINE CONDUCTED EMISSION TEST

- 1) EUT and support equipment was set up on the test bench as per step 10 of the preliminary test.
- 2) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Q.P. mode, then the emission signal was re-checked using an Average detector.
- 3) The test data of the worst case condition(s) was reported on the Summary Data page.

Data Sample:

Freq. MHz	Q.P. Raw dBuV	Average Raw dBuV	Q.P. Limit dBuV	Average Limit dBuV	Q.P. Margin dB	Average Margin dB	Note
x.xx	43.95	---	56	46	-12.05	-2.05	L 1

Freq.	= Emission frequency in MHz
Raw dBuV	= Uncorrected Analyzer/Receiver reading + Insertion loss of LISN, if it > 0.5 dB
Limit dBuV	= Limit stated in standard
Margin dB	= Reading in reference to limit
Note	= Current carrying line of reading
“---”	= The emission level complied with the Average limits, with at least 2dB margin limits, so no further recheck.

Calculation example:

$$\text{Margin (dB)} = \text{RAW (dBuV)} - \text{Limit (dBuV)}$$

LINE CONDUCTED EMISSION LIMIT

Frequency (MHz)	Maximum Field Strength Limit (dBu V/m/ Q.P.)
450kHz – 30MHz	48

Note: The lower limit shall apply at the transition frequency.

5.3 PRELIMINARY RADIATED EMISSION TEST

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per MP5 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, was placed as per MP5.
- 3) All I/O cables were positioned to simulate typical actual usage as per MP5.
- 4) The EUT received AC power source from the outlet socket under the turntable. All support equipment received 110VAC/60Hz power from another socket under the turntable, if any.
- 5) The antenna was placed at 10 meter away from the EUT as stated in MP5. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- 6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 7) The following test mode(s) were scanned during the preliminary test:

Mode(s):

1. 120Vac, 60W
2. 120Vac, 100W

- 8) After the preliminary scan, we found the following test mode producing the highest emission level.

Model: 2.

Then, the EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for reference of final testing.

5.4 FINAL RADIATED EMISSION TEST

- 1) EUT and support equipment were set up on the turntable as per step 8 of the preliminary test.
- 2) The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 3) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.
- 4) The test data of the worst case condition(s) was reported on the Summary Data page.

Data Sample:

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits	Margin (dB)
xx.xx	14.0	11.2	26.2	30	-3.8

Freq.	= Emission frequency in MHz
Raw Data (dBuV)	= Uncorrected Analyzer / Receiver reading
Corr. Factor (dB/m)	= Antenna factor + Cable loss – Amplifier gain
Emiss. Level	= Raw reading converted to dBuV/m and CF added
Limit dBuV/m	= Limit stated in standard
Margin dB	= Reading in reference to limit
P	= Peak Reading
Q	= Quasi-peak Reading
A	= Average Reading

Calculation example:

$$\text{Margin (dB)} = \text{Emiss. Level (dBuV/m)} - \text{Limits (dBuV/m)}$$

$$\text{Emission Level (dBuV/m)} = \text{Raw Data (dBuV)} + \text{Corr Factor (dB/m)}$$

RADIATED EMISSION LIMIT

Frequency (MHz)	Maximum Field Strength Limit (dBu V/m/ Q.P.)
30-88	40
88-216	43.5
216-960	46
Above 960	53.9

Note: The lower limit shall apply at the transition frequency.

6 SUMMARY DATA

(LINE CONDUCTED TEST)

Model Number: JW-001

Location: Site # 3

Tested by: Lung Tsai

Test Mode: Mode 2

Test Results: Passed

Temperature: 24°C

Humidity: 70%RH

(The chart below shows the highest readings taken from the final data)

FREQ MHz	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.153	34.00	---	48.00	35.00	-14.00	---	L1
5.541	13.40	---	48.00	35.00	-34.60	---	L1
11.203	13.70	---	48.00	35.00	-34.30	---	L1
12.443	13.60	---	48.00	35.00	-34.40	---	L1
27.394	13.70	---	48.00	35.00	-34.30	---	L1
29.961	14.20	---	48.00	35.00	-33.80	---	L1
0.462	20.30	---	48.00	35.00	-27.70	---	L2
2.818	13.60	---	48.00	35.00	-34.40	---	L2
3.813	13.90	---	48.00	35.00	-34.10	---	L2
5.264	13.80	---	48.00	35.00	-34.20	---	L2
10.681	24.10	---	48.00	35.00	-23.90	---	L2
12.307	17.40	---	48.00	35.00	-30.60	---	L2

L1 = Line One (Hot side) / L2 = Line Two (Neutral side)

****NOTE: “---” denotes the emission level was or more than 2dB below the Average limit,
so no re-check anymore.**

SUMMARY DATA

(RADIATED EMISSION TEST)

Model Number: JW-001

Location: Site # 2

Tested by: Vic Wang

Polar: Vertical--3m

Test Mode: Mode 2

Test Results: Passed

Detector Function: Quasi-Peak

Temperature: 23°C

Humidity: 65%RH

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits	Margin (dB)
39.03	11.3	16.8	28.1	40.0	-11.9
83.53	9.4	10.0	19.4	40.0	-20.6
133.30	8.8	14.0	22.8	43.5	-20.7
161.90	13.2	11.2	24.4	43.5	-19.1
185.00	11.9	11.9	23.8	43.5	-19.7
215.90	14.1	12.6	26.7	43.5	-16.8

SUMMARY DATA

(RADIATED EMISSION TEST)

Model Number: JW-001

Location: Site # 2

Tested by: Vic Wang

Polar: Horizontal--3m

Test Mode: Mode 1

Test Results: Passed

Detector Function: Quasi-Peak

Temperature: 23°C

Humidity: 65%RH

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits	Margin (dB)
47.40	7.5	13.7	21.2	40.0	-18.8
81.21	10.1	9.5	19.6	40.0	-20.4
125.20	13.2	14.7	27.9	43.5	-15.6
142.00	10.3	13.1	23.4	43.5	-20.1
169.20	10.6	11.5	22.1	43.5	-21.4
215.60	8.5	12.6	21.1	43.5	-22.4

7 TEST FACILITY

- Location:** No. 81-1, 210 Lane, Pa-de 2nd Road, Lu-Chu Hsiang, Taoyuan, Taiwan, R. O. C.
- Description:** There are four 3/10m open area test sites and three line conducted labs for final test. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents MP5 and CISPR 16 requirements.
- Site Filing:** A site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.
- Registration also was made with Voluntary Control Council for Interference (VCCI).
- Site Accreditation:** Accredited by NEMKO (Authorization #: ELA 124) for EMC & A2LA (Certificate #: 824.01) for Emission
- Accredited by NVLAP (Certificate #: 200600-0)
- Also accredited by BSMI for the product category of Information Technology Equipment.
- Instrument Tolerance:** All measuring equipment is in accord with MP5 and CISPR 22 requirements that meet industry regulatory agency and accreditation agency requirement.
- Ground Plane:** Two conductive reference ground planes were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna. It has no holes or gaps having longitudinal dimensions larger than one-tenth of a wavelength at the highest frequency of measurement up to 1GHz.

Site # 3 & # 4 Line Conducted Test Site: At Shielding Room

8 TEST EQUIPMENT LIST

Instrumentation: The following list contains equipment used at C & C Laboratory, Co., Ltd. for testing. The equipment conforms to the CISPR 16-1 / ANSI C63.2-1988 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 9kHz to 1.0 GHz or above.
Equipment used during the tests:

Open Area Test Site: # 2

Open Area Test Site # 2					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
Spectrum Analyzer	ADVANTEST	R3261C	81720301	08/28/2002	08/27/2003
EMI Test Receiver	R&S	ESVS10	834468/006	04/15/2003	04/14/2004
Pre-Amplifier	HP	8447D	2944A08780	07/15/2002	07/14/2003
Bilog Antenna	SCHWAZBECK	VULB9163	147	05/21/2002	05/20/2003
Turn Table	Chance Most	CM-T003-1	T807-6	N.C.R	N.C.R
Antenna Tower	Chance Most	CM-A003-1	A807-6	N.C.R	N.C.R
Controller	Chance Most	N/A	N/A	N.C.R	N.C.R
RF Switch	ANRITSU	MP59B	M76890	N.C.R	N.C.R
Site NSA	C&C Lab.	N/A	N/A	08/31/2002	08/30/2003

Conducted Emission Test Site: # 3

Conducted Emission Test Site # 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
EMI Test Receiver	R&S	ESCS30	847793/012	12/21/2002	12/20/2003
LISN	R&S	ESH2-Z5	843285/010	12/16/2002	12/15/2003
LISN	EMCO	3825/2	9003-1628	07/26/2002	07/25/2003

The calibrations of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

9 BLOCK DIAGRAM OF TEST SETUP

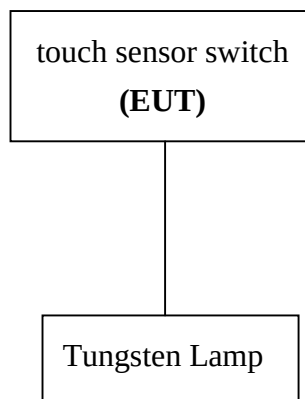
SYSTEM DIAGRAM OF CONNECTIONS BETWEEN EUT AND SIMULATORS

EUT: touch sensor switch

Trade Name: JINGLE WORLD

Model Number: JW-001

Power Cord: Unshielded, 1.8m to Power Supply



10 APPENDIX 1 PHOTOGRAPHS

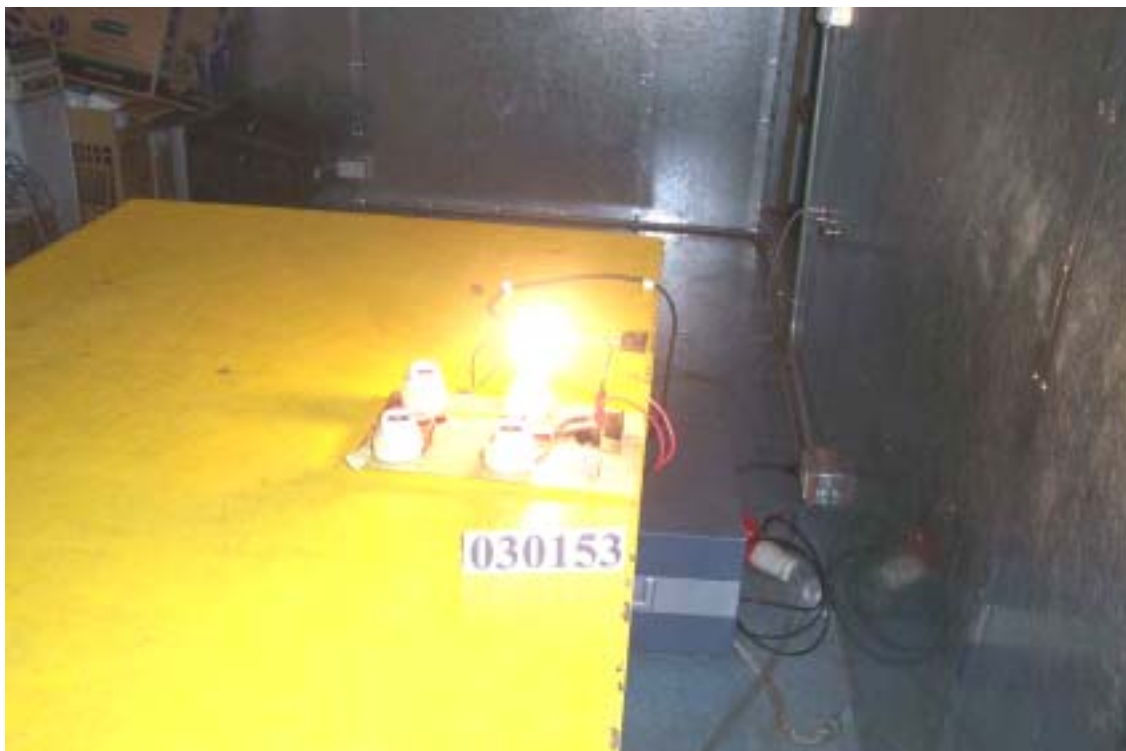
(TEST SETUP OF LINE CONDUCTED EMISSION TEST)

LINE CONDUCTED EMISSION TEST

Front View



Back View



11 APPENDIX 2 PHOTOGRAPHS

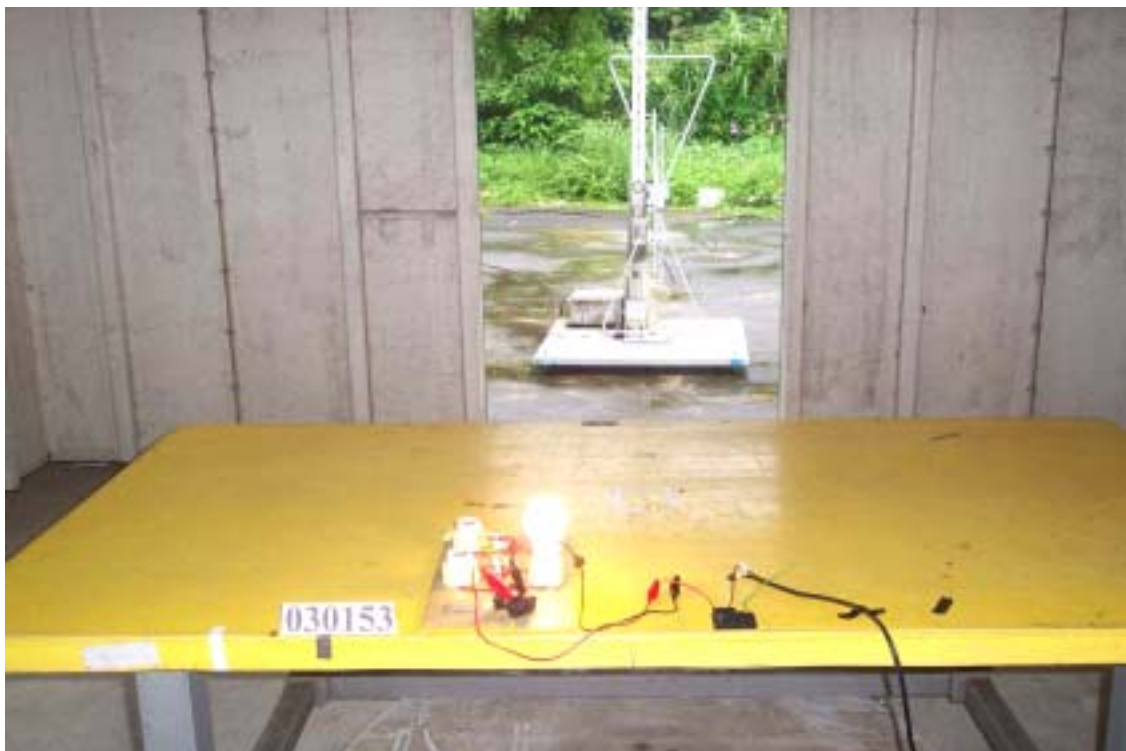
(TEST SETUP OF RADIATED EMISSION TEST)

RADIATED EMISSION TEST

Front View



Back View

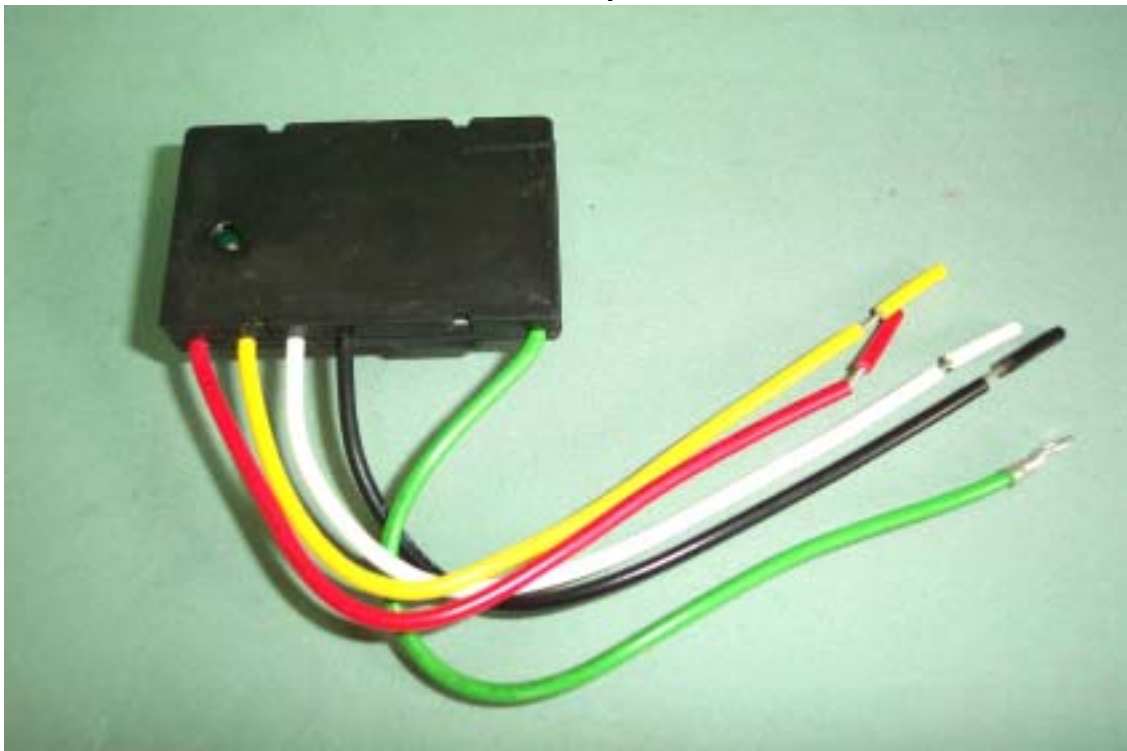


12 APPENDIX 3 PHOTOGRAPHS OF EUT

Front View of EUT



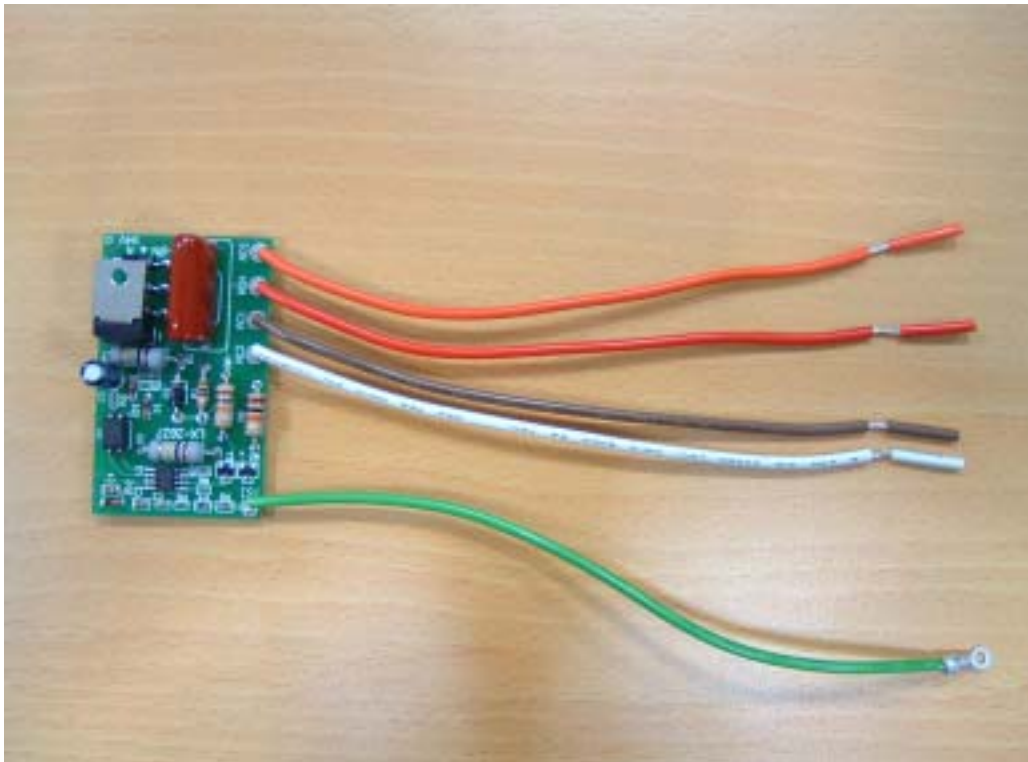
Back View of EUT



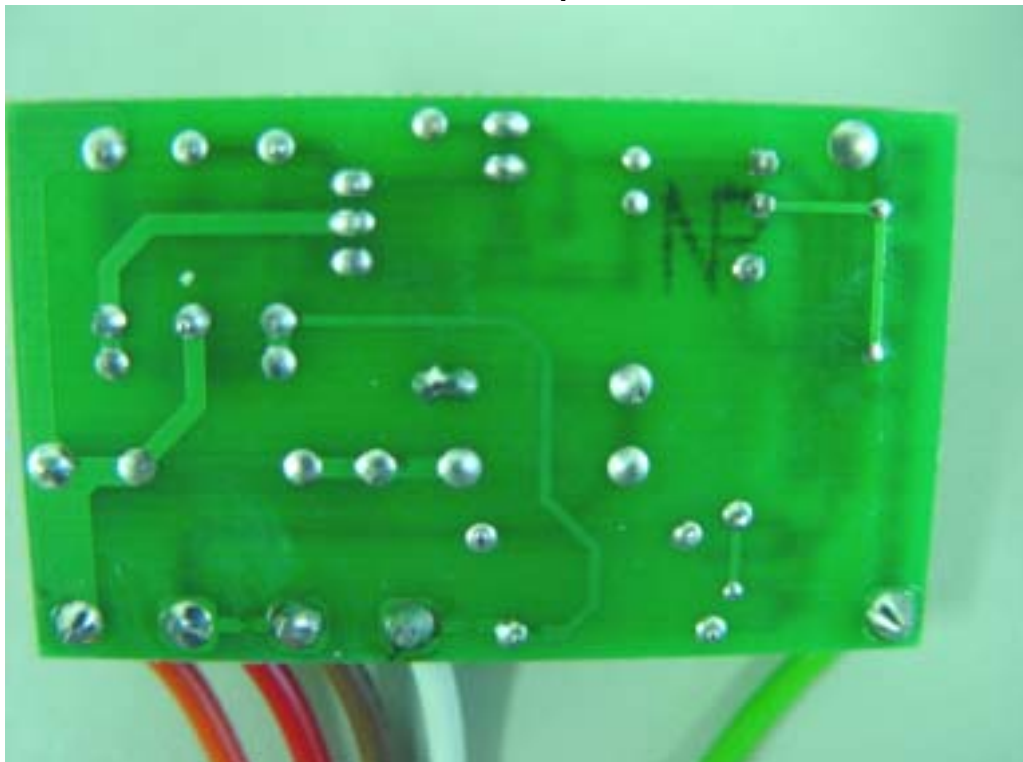
Cable



Front View of PCB



Back View of PCB



13 APPENDIX 4 LABELING REQUIREMENTS

§18.209 Identification of authorized equipment.

Devices authorized under the Declaration of Conformity procedure shall be labeled with the logo shown below. The label shall not be a stick-on, paper label. It shall be permanently affixed to the product and shall be readily visible to the purchaser at the time of purchase as described in § 2.925(d) of this chapter. *Permanently affixed* means that the label is etched, engraved, stamped, silkscreened, indelibly printed, or otherwise permanently marked on a permanently attached part of the equipment or on a nameplate of metal, plastic, or other material fastened to the equipment by welding, riveting, or a permanent adhesive. The label must be designed to last the expected lifetime of the equipment in the environment in which the equipment may be operated and must not be readily detachable. The logo follows:

