

FCC PART 15 B
MEASUREMENT AND TEST REPORT
For
Lelux Electronics Ltd.

Unit 6, 10/F, TCL TOWER, NO.8, Tai Chung Road,
Tsuen Wan, New Territories, Hong Kong

FCC ID: NS3-425R

May 30, 2008

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: Wireless Light Switch
Test Engineer: Joe Du	
Report Number: <u>SE08E-059R</u>	
Test Date: May 19-29, 2008	
Reviewed By: <u></u>	
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of S&E Technologies Laboratory Ltd.

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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: **Lelux Electronics Ltd.**

Address of applicant: Unit 6, 10/F, TCL TOWER, NO.8, Tai Chung Road, Tsuen Wan, New Territories, Hong Kong

Manufacturer: **Lelux Electronics Ltd.**

Address of manufacturer: Unit 6, 10/F, TCL TOWER, NO.8, Tai Chung Road, Tsuen Wan, New Territories, Hong Kong

General Description of E.U.T

EUT Description: Wireless Light Switch

Trade Name: HomeSafe

EUT Model: 425

Supplementary Model: N/A

Test Power Supply: AC 120V/60Hz

Remark:

- *The test data gathered are from the production sample provided by the manufacturer.*

1.2 Test Standards

The following Declaration of Conformity report of EUT is prepared in accordance with

FCC Rules and Regulations Part 15 Subpart B Class B 2007

The objective of the manufacturer is to demonstrate compliance with the above described standards.

1.3 Test Summary

For the EUT described above. The standards used were FCC Part 15 Subpart B for Emissions

Tests Carried Out Under FCC Part 15 Subpart B

Standard	Test Items	Status
FCC Part 15 Subpart B	Conduction Emission, 0.15MHz to 30MHz	✓
FCC Part 15 Subpart B	Radiation Emission, 30MHz to 1000MHz	✓

✓ Indicates that the test is applicable
✗ Indicates that the test is not applicable

1.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

All measurement required was performed at laboratory of Shenzhen Huatongwei International Inspection Co., Ltd at Huatongwei Building, Keji Rd. 12 S., High-Tech Park, Nanshan District, Shenzhen, Guangdong, P.R.China

The fully anechoic chamber test sites and the line conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003 and CISPR 22/EN 55022 requirements.

1.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: August 02, 2007. Valid time is until March 04, 2009.

A2LA-Lab Cert. No. 2243.01

Shenzhen Huatongwei International Inspection Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with 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. Valid time is from Aug 24, 2005 to Sept 30, 2009

FCC-Registration No.: 662850

Shenzhen Huatongwei International Inspection Co., Ltd, EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 662850, Renewal date September 12, 2006.

IC-Registration No.: 5377

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377 on November 28th, 2005.

VCCI

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) and Shielded Room (8m×4m×3m) of Shenzhen Huatongwei International Inspection Co., Ltd has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2484. Date of Registration: December 20, 2006. Valid time is until December 19, 2009.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: December 20, 2006. Valid time is until December 19, 2009.

IECEE CB

Shenzhen Huatongwei International Inspection Co Ltd has been assessed and determined to fully comply with the requirements of ISO/IEC 17025: 2005-05, The Basic Rules, IECEE 01: 2006-10 and Rules of Procedure IECEE 02: 2006-10, and the relevant IECEE CB-Scheme Operational Documents.

It is therefore entitled to operate as a CB Testing Laboratory under the responsibility of Nemko A/S. This certificate remains valid until May 25th 2009 at which time it will be reissued by the IECEE Executive Secretary upon successful completion of the normally scheduled 3-year Reassessment Program administered by the IECEE CB Scheme.

1.6 Test Equipment List and Details

Table 1: Test Equipment for Conducted Emission Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESCI	100106	2007/10	1 year
ARTIFICIAL MAINS	ROHDE & SCHWARZ	ESH2-Z5	100028	2007/10	1 year
PULSE LIMITER	ROHDE & SCHWARZ	ESHSZ2	100044	2007/10	1 year
EMI TEST SOFTWARE	ROHDE & SCHWARZ	ES-K1 V1.71	N/A	2007/10	1 year

Table 2: Test Equipment for Radiated Emission Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
ULTRA-BROADBAND ANTENNA	ROHDE & SCHWARZ	HL562	100015	2007/10	1 year
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESI 26	100009	2007/10	1 year
RF TEST PANEL	ROHDE & SCHWARZ	TS / RSP	335015/ 0017	N/A	N/A
TURNTABLE	ETS	2088	2149	N/A	N/A
ANTENNA MAST	ETS	2075	2346	N/A	N/A
EMI TEST SOFTWARE	ROHDE & SCHWARZ	ES-K1 V1.71	N/A	2007/10	1 year

2 - SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

2.2 EUT Exercise Software

The EUT was operated in the normal operating mode. No software used to control the receiver.

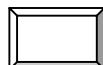
2.3 Special Accessories

Not available for this EUT intended for grant.

2.4 Equipment Modifications

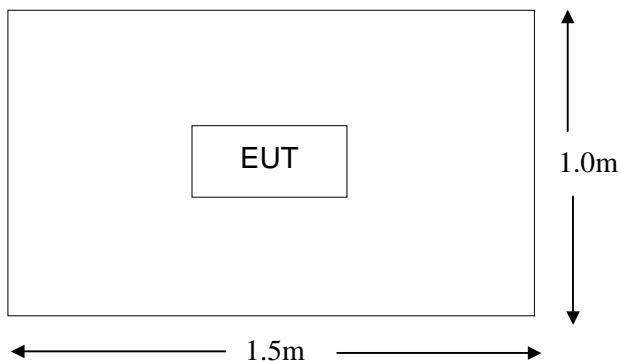
The EUT tested was not modified by S&E Technologies.

2.5 Configuration of Test System



EUT

2.6 Test Setup Diagram



3 - DISTURBANCE VOLTAGE AT THE MAINS TERMINALS

3.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is +2.4 dB.

3.2 Limit of Disturbance Voltage at The Mains Terminals (Class B)

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150~0.500	66~56	56~46
0.500~5.000	56	46
5.000~30.00	60	50

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

3.3 EUT Setup

The setup of EUT is according with ANSI C63.4-2003 measurement procedure. The specification used was the FCC Rules and Regulations Part 15 Subpart B Class B limits.

The EUT was placed center and the back edge of the test table.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.

3.4 Instrument Setup

The test receiver was set with the following configurations:

Test Receiver Setting:

Frequency Range.....150 KHz to 30 MHz
 Detector.....Peak & Quasi-Peak & Average
 Sweep Speed.....Auto
 IF Band Width.....9 KHz

3.5 Test Procedure

During the conducted emission test, the EUT power cord was connected to the auxiliary outlet of the first Artificial Mains.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance using all installation combination.

All data was recorded in the peak detection mode. Quasi-peak and Average readings were only performed when an emission was found to be marginal (within $-10 \text{ dB}\mu\text{V}$ of specification limits). Quasi-peak readings are distinguished with a "QP". Average readings are distinguished with a "Av".

3.6 Summary of Test Results

According to the data in section 3.6, the EUT complied with the FCC Part 15 B Conducted margin, with the *worst* margin reading of:

3.7 Disturbance Voltage Test Data

Temperature (°C)	22~23
Humidity (%RH)	50~54
Barometric Pressure (mbar)	950~1000
EUT	Wireless Light Switch
M/N	425
Operating Mode	On

Test data see following pages

Remark: (1) When PK reading is less than relevant limit 20dB, the QP reading and AV reading will not be recorded.

(2) Where QP reading is less than relevant AV limit, the AV reading will not be measured

3.8 Test Result

Pass

Conducted Emission Test Data

EUT: Wireless Light Switch
 Operating Condition: ON
 Test Site: Shielded Room
 Operator: Andy
 Test Specification: AC 120V/60Hz
 Comment: Live / Neutral Line
 Start of Test: 05/29/2008

Frequency Mhz	Peak Raw dBuV	Q.P. RAW dBuV	Average RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	Average Margin dB	Note
0.165	24.50	---	---	65.00	55.00	---	-30.50	L1
0.213	21.40	---	---	63.00	53.00	---	-31.60	L1
0.400	22.70	---	---	58.00	48.00	---	-25.30	L1
1.279	22.90	---	---	56.00	46.00	---	-23.10	L1
2.165	25.10	---	---	56.00	46.00	---	-20.90	L1
0.155	21.80	---	---	66.00	56.00	---	-34.20	L2
0.403	22.10	---	---	58.00	48.00	---	-25.90	L2
1.269	23.80	---	---	56.00	46.00	---	-22.20	L2
1.817	25.10	---	---	56.00	46.00	---	-22.90	L2
2.579	23.30	---	---	56.00	46.00	---	-22.70	L2

Note:

L1 = Line One (Hot side)

L2 = Line Two (Neutral side)

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

4 - RADIATED DISTURBANCES

4.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is +4.0 dB.

4.2 Limit of Radiated Disturbances

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB μ V/m)
30 ~ 88	3	40
88~216	3	43.5
216 ~ 960	3	46
960 ~ 1000	3	54

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

4.3 EUT Setup

The radiated emission tests were performed in the in the 3-meter anechoic chamber, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Rules and Regulations Part 15 Subpart B Class B Limit.

The EUT was placed on the center of the test table.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.

4.4 Test Receiver Setup

According to FCC Part 15 rule, the frequency was investigated from 30 to 1000 MHz. During the radiated emission test, the test receiver was set with the following configurations:

Test Receiver Setting:

Detector.....Peak & Quasi-Peak
 IF Band Width.....120 KHz
 Frequency Range.....30MHz to 1000MHz
 Turntable Rotated.....0 to 360 degrees

Antenna Position:

Height.....1m to 4m
 Polarity.....Horizontal and Vertical

4.5 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within $-10 \text{ dB}\mu\text{V}$ of specification limits), and are distinguished with a "Qp" in the data table.

4.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of $7 \text{ dB}\mu\text{V}$ means the emission is $7 \text{ dB}\mu\text{V}$ below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Class B Limit} - \text{Corr. Ampl.}$$

4.7 Radiated Emissions Test Result

Ambient condition for test:

Temperature (°C)	22~23
Humidity (%RH)	50~54
Barometric Pressure (mbar)	950~1000
EUT	Wireless Light Switch
M/N	425
Operating Mode	On

Test data see following pages

4.8 Test Result

Pass

Radiated Emission Test Data

EUT: Wireless Light Switch
 Operating Condition: On
 Test Site: 3m CHAMBER
 Operator: Shine
 Test Specification: AC 120V/60Hz
 Comment: Polarization: Vertical / Horizontal
 Start of Test: 05/29/2008

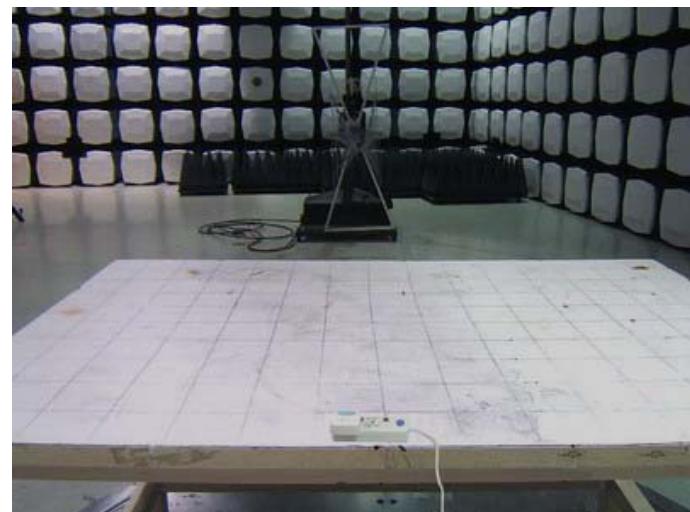
Frequency (MHz)	Ant.Pol H/V	Detector Mode (PK/AV)	Reading (dBuV)	Ant/CL/Amp.CF (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
30.00	V	Peak	3.20	21.20	24.40	40.00	-15.60
30.00	H	Peak	2.70	21.20	23.90	40.00	-16.10
72.77	V	Peak	4.80	10.90	15.70	40.00	-24.30
86.37	H	Peak	4.40	11.70	16.10	40.00	-23.90
99.980	V	Peak	4.20	14.80	19.00	43.50	-24.50
103.870	H	Peak	4.50	14.40	18.90	43.50	-24.60
175.790	V	Peak	4.50	11.30	15.80	43.50	-27.70
199.120	H	Peak	5.40	10.70	16.10	43.50	-27.40
Others				-			

Note:

1. Measuring frequencies from 30 MHz to the 5 GHz.
2. The radiated emissions of measurement within this frequency range shown “-” in the table above means the reading of emissions are attenuated more than 20dB below the 15.209 limit or the field strength is too small to be measured.

Appendix 1 Photographs of Test Setup

Radiated Emission Test



Conducted Emission Test



Appendix 2 Photographs of Constructional Details

EUT - External View



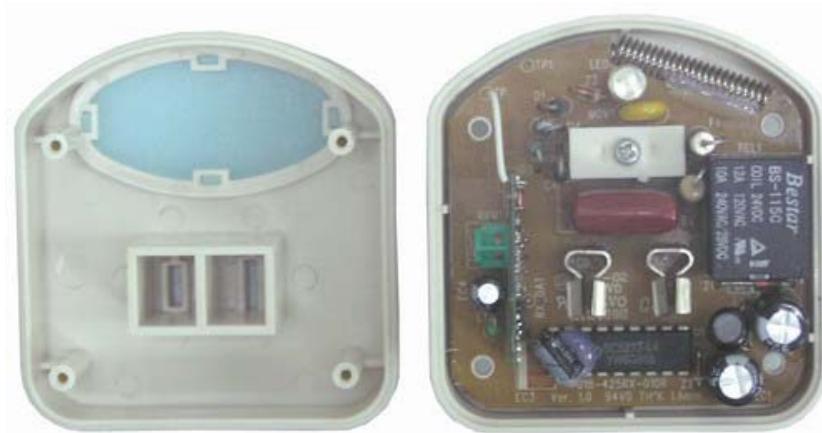
EUT - Top View



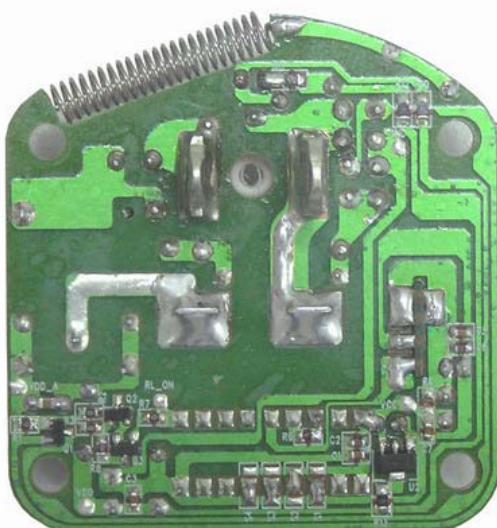
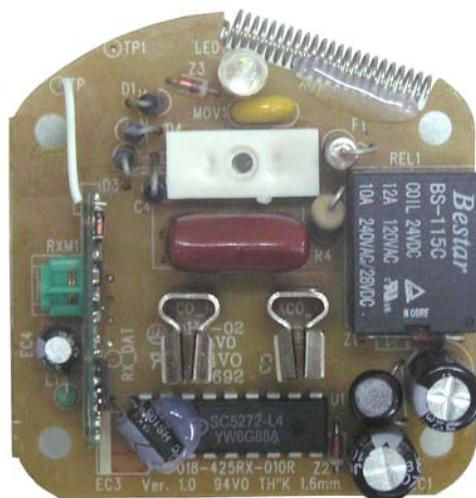
EUT - Bottom View



EUT - Internal View



EUT - PCB View



Appendix 3 FCC ID Label**FCC ID: NS3-425R**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

**Proposed Label Location on EUT
EUT Bottom View/proposed FCC Mark Location**

