FCC Part 15

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: NS3LELUX681T

August 28, 2007

This Report Concerns: ☒ Original Report	**Equipment Type:** Wireless Remote Control
Test Engineer:	Rocky Ge
Report Number:	**SE07H-402R**
Test Date:	August 25-27, 2007
Reviewed By:	
Prepared By:	**S&E Technologies Laboratory Ltd** Room 407, Block A Shennan Garden, Hi-Tech Industrial Park, Shenzhen 518057, P.R. China. Tel: 86-755-26636573, 26630631 Fax: 86-755-26630557

Table of Contents

1-Test Result Certification

Applicant:	Lelux Electronics Ltd
	Unit 6, 10/F, TCL TOWER, NO.8, Tai Chung Road, Tsuen Wan, New Territories, Hong Kong
Equipment Under Test:	Wireless Remote Control
Trade Name:	HomeSafe
Model:	681T
Operation Frequency:	433.92MHz
Antenna Designation:	Non-user replaceable (fixed)
Date of Test:	August 23-27, 2007

Applicable Standards	
Standard	**Test Result**
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

We hereby certify that:

The above equipment was tested at Compliance Certification Services (Shenzhen) Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.207, 15.209 and Part 15.231.

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

2- EUT Description

Product	Wireless Remote Control
Trade Name	HomeSafe
Model Number	681T
Model Difference	N/A
Power Supply	Powered by 2x3V CR2032 button battery
Frequency Range	433.92 MHz
Antenna Designation	Non-user replaceable (fixed)

Remark: *This submittal(s) (test report) is intended for FCC ID: NS3LELUX681T filing to comply with Section 15.207, 15.209 and 15.231 of the FCC Part 15, Subpart C Rules.*

3-Test Methodology

The tests documented in this report were performed in accordance with ANSI C63.4 (2003) and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 and 15.231.

3.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

3.3 General Test Procedures

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.

3.4 FCC Part 15.205 Restricted Bands of Operations

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(2)
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

3.5 Description of Test Modes

The EUT has been tested under engineering test mode condition and the EUT staying in continuous transmitting mode.

4- Instrument Calibration

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

5- Facilities and Accreditations

5.1 Facilities

All measurement facilities used to collect the measurement data are located at
No. 6, Jinao Industrial Park, No.35 Jukeng Road, Dashuikeng Village, Guanlan Town, Baoan District, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 Equipment

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3 Laboratory Accreditation and Listing

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200577-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission.

6- Setup of Equipment Under Test

6.1 Setup Configuration of EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

6.2 Support Equipment

Device Type	Brand	Model	FCC ID	Series No.	Data Cable	Power Cord
N/A						

Remark:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

7- FCC Part 15.231 Requirements

7.1 20 db Bandwidth

Limit

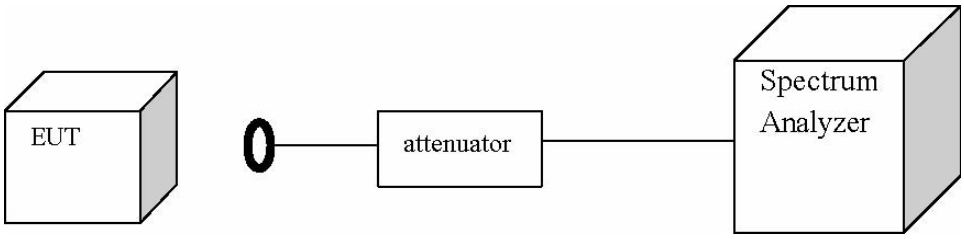
The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Measurement Equipment Used

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	02/06/2008

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration



Test Procedure

The transmitter output is connected to the spectrum analyzer. The spectrum analyzer center frequency is set to the transmitter frequency. The RBW is set to 10 kHz and VBW is set 30kHz.

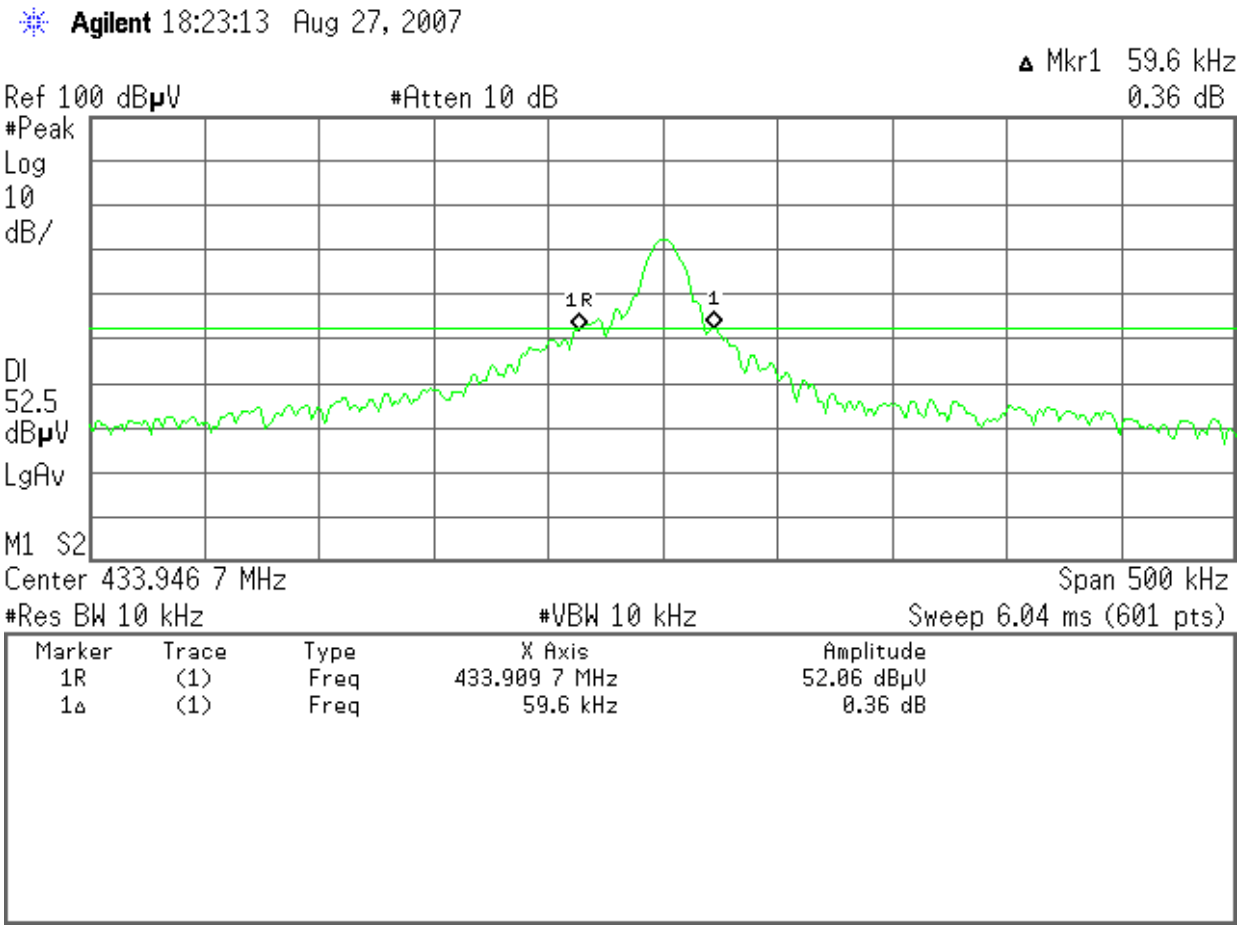
Test Results

No non-compliance noted.

Test Data

Frequency (MHz)	20 dB Bandwidth (kHz)	Limit (MHz)	Result
433.946	59.60	1.0850	PASS

Test Plot


Agilent 18:23:13 Aug 27, 2007
Mkr1 59.6 kHz
Ref 100 dBµV
#Atten 10 dB
0.36 dB
#Peak
Log
10
dB/
1R
1
Dl
52.5
dBµV
LgAv
M1 S2
Center 433.946 7 MHz
Span 500 kHz
#Res BW 10 kHz
#VBW 10 kHz
Sweep 6.04 ms (601 pts)
Marker Trace Type X Axis Amplitude
1R (1) Freq 433.909 7 MHz 52.06 dBµV
1Δ (1) Freq 59.6 kHz 0.36 dB

7.2 Limit of transmission

Time Limit

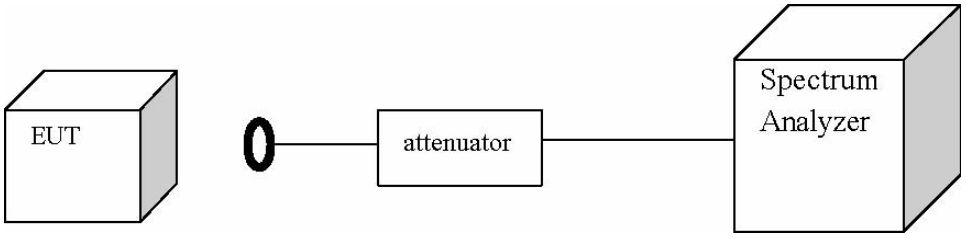
According to 15.231 (a)(1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

Measurement Equipment Used

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	02/06/2007

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration



Test Procedure

The transmitter output is connected to the spectrum analyzer. The spectrum analyzer center frequency is set to the transmitter frequency. The RBW and VBW are set to 1MHz.

Test Results

No non-compliance noted

Test Data

Frequency (MHz)	Transmission time (ms)	Limit (Second)	Result
433.946	535	5.00	PASS

7.3 Duty Cycle

Limit

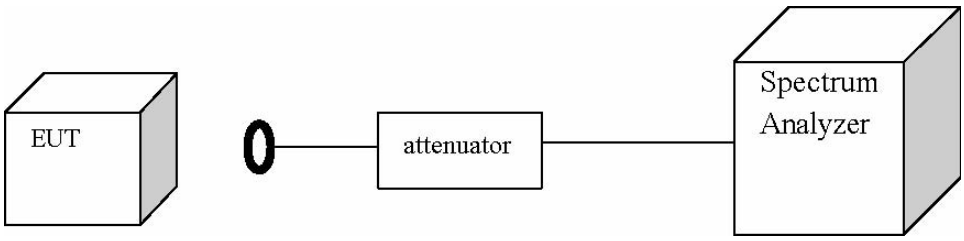
Nil (No dedicated limit specified in the Rules)

Measurement Equipment Used

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	02/06/2007

Remark: *Each piece of equipment is scheduled for calibration once a year.*

Test Configuration



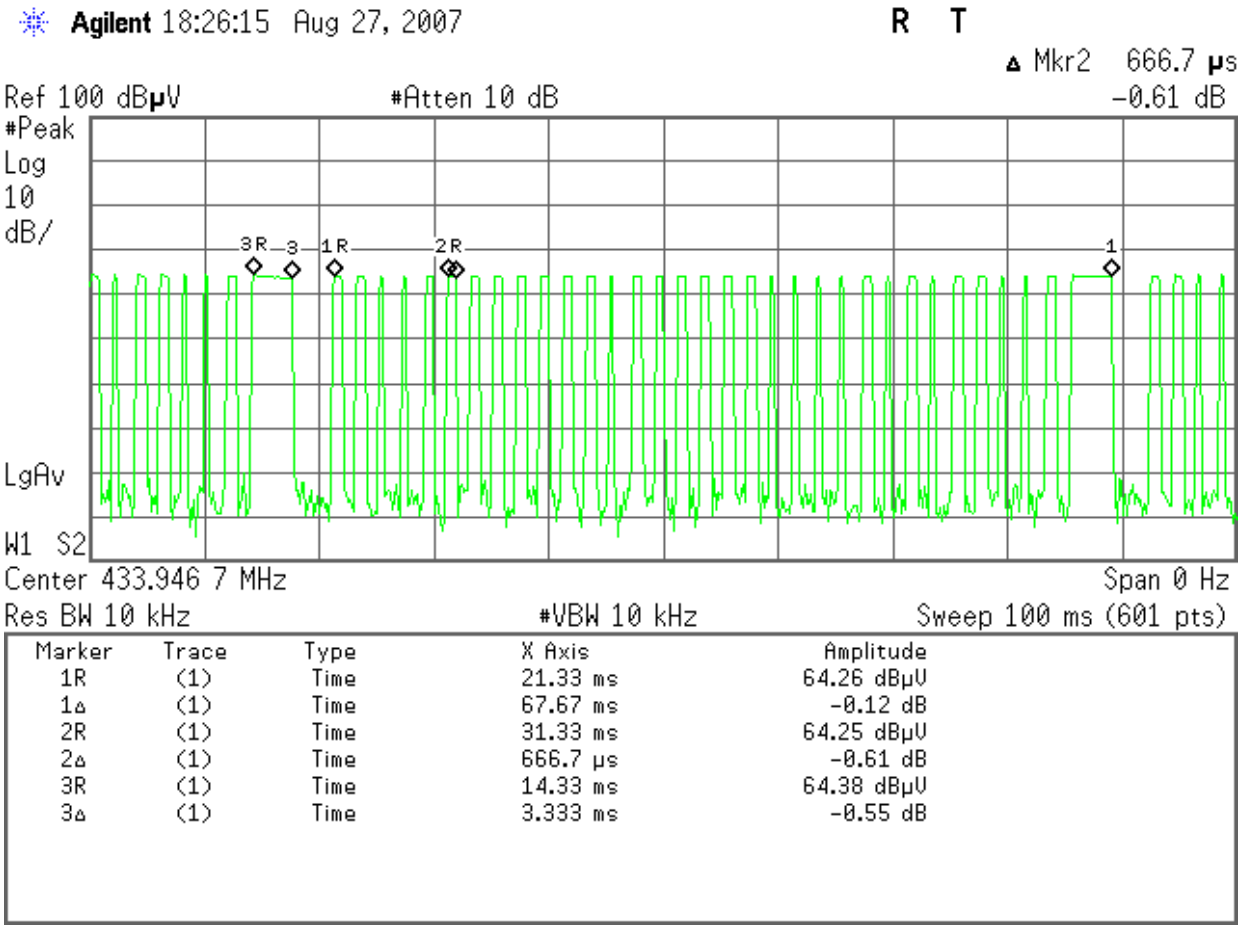
Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span = 0Hz, Adjust Sweep = 30s
5. Repeat above procedures until all frequency measured were complete.

Test Results

No non-compliance noted

Test Plot



Marker	Trace	Type	X Axis	Amplitude
1R	(1)	Time	21.33 ms	64.26 dBµV
1Δ	(1)	Time	67.67 ms	-0.12 dB
2R	(1)	Time	31.33 ms	64.25 dBµV
2Δ	(1)	Time	666.7 µs	-0.61 dB
3R	(1)	Time	14.33 ms	64.38 dBµV
3Δ	(1)	Time	3.333 ms	-0.55 dB

7.4 Radiated Emissions

Limit

1. Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

2. In the above emission table, the tighter limit applies at the band edges.

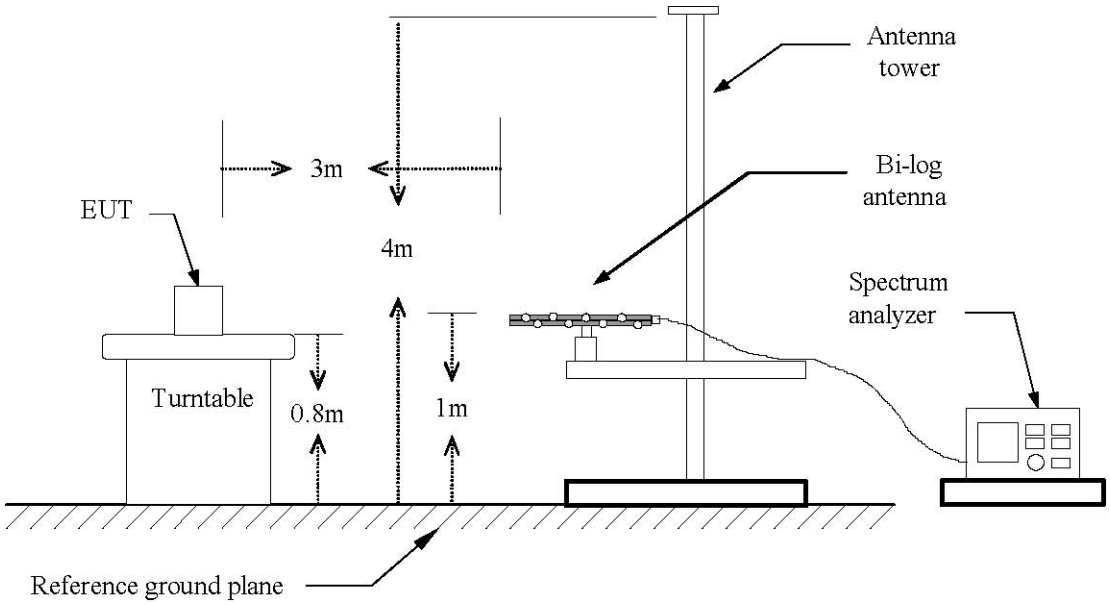
Frequency (Hz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Measurement Equipment Used

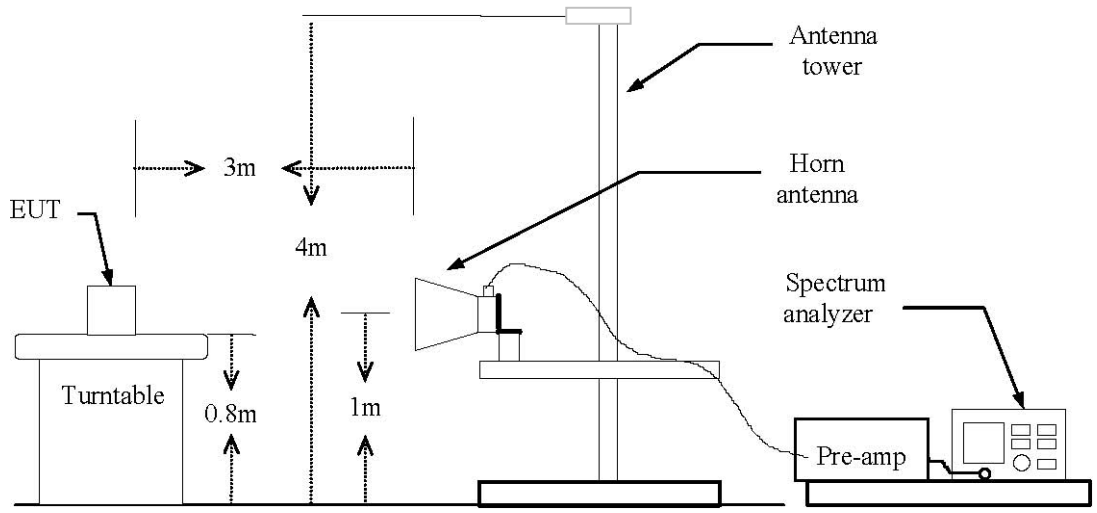
	RF CHAMBER II			
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	02/06/2008
EMI Test Receiver	R&S	ESCI	1166.595K03	01/13/2008
Pre-Amplifier	MITEQ	N/A	AFS42-00102650-42-10P-42	02/14/2008
Bilog Antenna	EMCO	3142C	920250	06/09/2008
Turn Table	EMCO	2081-1.21	N/A	N.C.R
Antenna Tower	CT	N/A	N/A	N.C.R
Controller	CT	N/A	N/A	N.C.R
RF Comm. Test set	HP	8920B	US36142090	N.C.R
Site NSA	C&C	N/A	N/A	09/06/2007
Horn Antenna	TRC	N/A	N/A	03/04/2008

Remark: *Each piece of equipment is scheduled for calibration once a year.*

Test Configuration Below 1 GHz



Above 1 GHz



Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

Below 1GHz:

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

7. Repeat above procedures until the measurements for all frequencies are complete.

Test Results

Operation Mode: TX Test Date: August 27, 2007

Temperature: 24 °C Humidity: 73 % RH Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK /QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV /m)	Lim it 3m (dBuV/m)	Safe Margin (dB)
433.95	H	Peak	56.41	15.29	71.70	80.83	-9.13
867.88	H	Peak	19.90	25.57	45.47	60.83	-15.36
-							
433.95	V	Peak	48.57	15.29	63.86	80.83	-16.97
867.88	V	Peak	18.22	25.57	43.79	60.83	-17.04
-							

Remark:

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.

Above 1 GHz

Operation Mode: TX Test Date: August 27, 2007

Temperature: 24 °C Humidity: 73 % RH Polarity: Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual FS		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
N/A									
N/A									

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
   a. Spectrum Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
   b. Spectrum AV Setting 1GH z- 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.

7.5 Powerline Conducted Emission

Limit

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Measurement Equipment Used

Conducted Emission Test Site G				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	ADVANTEST	R3132	120901472	06/09/2008
EMI Test Receiver	SCHAFFNER	SCR3501	401	02/26/2008
LISN	EMCO	3825/2	1371	02/26/2008
LISN	EMCO	3825/2	8901-1459	02/26/2008

Remark: *Each piece of equipment is scheduled for calibration once a year.*

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

Test Procedure

Not applicable (Since the EUT is powered by battery)

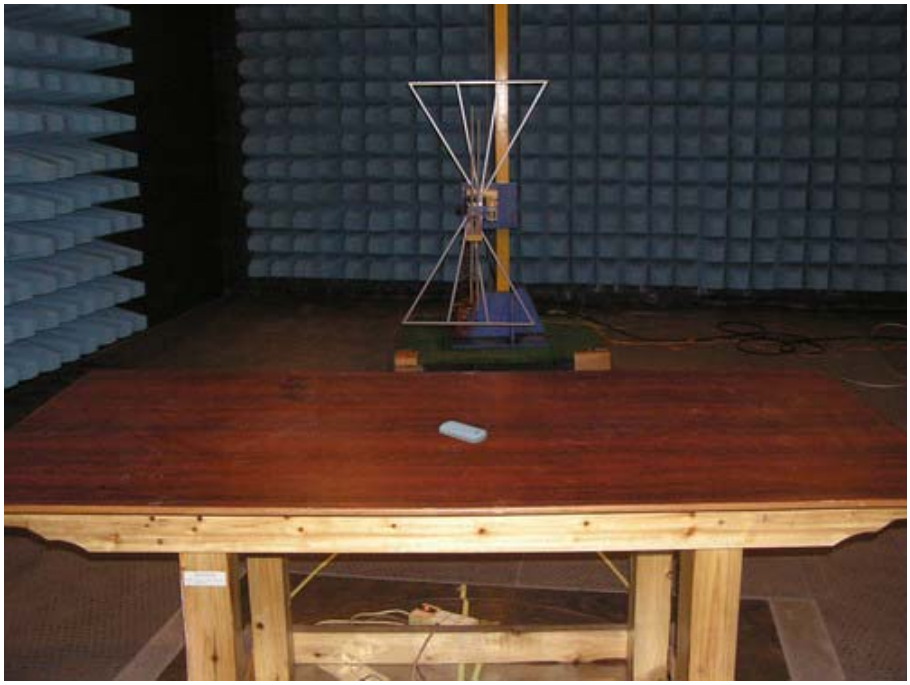
Test Results

Not applicable (Since the EUT is powered by battery)

Appendix 1

Photographs of Test Setup

Radiated Emission Set up Photos



Appendix 2
Photographs of Constructional Details

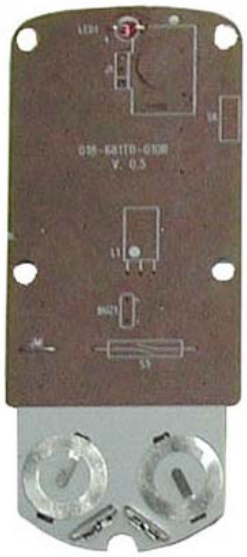
EUT – Front View

EUT – Rear View

EUT – Inside View

EUT – PCB View (1)

EUT – PCB View (2)



Appendix 3

FCC ID Label

FCC ID: NS3LELUX681T

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