SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

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ee.shanghai@sgs.com



# 1 Cover Page

# *TEST REPORT*

| | |
|---|---|
| **Application No.:** | SHEM1210001442RF |
| **Applicant:** | Beijing Landwell Electron Technology Co.,LTD |
| **Manufacturer:** | Beijing Landwell Electron Technology Co.,LTD |
| **Factory:** | Beijing Landwell Electron Technology Co.,LTD |
| **FCC ID:** | Q65LW19990824 |
| **Product Name:** | Acquisition data |
| **Model No.(EUT):** | L-3000 |
| **Add Model No.** | L-9000; L-7000; L-2000; L-2000P; L-2000PF; L-3000E; L-3000EF; L-7000E; L-7000EF; L-9000P; L-9000PF; LW-01; LW-12; LW-24; LW-48; LW-110; LW-120; LW-150; LW-02; i-keybox12; i-keybox24; i-keybox48; i-keybox96; i-keybox120; i-keybox150 |
| **Standards:** | FCC Part15 :2011 |
| **Date of Receipt:** | October 10, 2012 |
| **Date of Test:** | October 12, 2012 to October 17, 2012 |
| **Date of Issue:** | October 20, 2012 |
| **Test Result :** | **Pass*** |

* In the configuration tested, the EUT (Equipment under test) complied with the standards specified above.


**Tony Wu**
**E&E Section Manager**
**SGS-CSTC (Shanghai) Co., Ltd.**

# 2 Version

| Revision Record | | | | |
|---|---|---|---|---|
| **Version** | **Chapter** | **Date** | **Modifier** | **Remark** |
| 00 | | Oct. 20,2012 | Neil Zhang | Original |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| **Authorized for issue by:** | | | | |
| **Engineer** | | Neil Zhang<br>**Print Name** | |  <br>**Date(Oct. 20, 2012)** |
| **Clerk** | | Neil Zhang<br>**Print Name** | |  <br>**Date(Oct. 20, 2012)** |
| **Reviewer** | | Jim Xu<br>**Print Name** | |  <br>**Date(Oct. 20, 2012)** |

# 3 Test Summary

| ELECTROMAGNETIC INTERFERENCE (EMI) | | | | |
|---|---|---|---|---|
| **Test** | **Test Requirement** | **Test Method** | **Class / Severity** | **Result** |
| Conducted Emission (150KHz to 30MHz) | FCC Part15:2011 | ANSI C63.4: 2009 | Class B | PASS |
| Radiated Emission, (30MHz to 1GHz) | FCC Part15:2011 | ANSI C63.4: 2009 | Class B ♀ | PASS |
| Radiated Emission above 1 GHz | FCC Part15:2011 | ANSI C63.4: 2009 | Class B | N/A |
| ♀ If the highest frequency of the internal sources of the EUT is less than 108MHz,the measurement shall only be made up to 1GHz. | | | | |

# 4 Contents

# 5 General Information

## 5.1 Client Information

| | |
|---|---|
| Applicant: | Beijing Landwell Electron Technology Co.,LTD |
| Address of Applicant: | Room 811,Ganglu Mansion,Jia 6 Huguang Street, Wangjing, Chaoyang,Beijing |
| Manufacturer: | Beijing Landwell Electron Technology Co.,LTD |
| Address of Manufacturer: | Room 811,Ganglu Mansion,Jia 6 Huguang Street, Wangjing, Chaoyang,Beijing |
| Factory: | Beijing Landwell Electron Technology Co.,LTD |
| Address of Factory: | Room 811,Ganglu Mansion,Jia 6 Huguang Street, Wangjing, Chaoyang,Beijing |

## 5.2 General Description of E.U.T.

| | |
|---|---|
| Product Name: | Acquisition data |
| Model No.(EUT): | L-3000 |
| Add Model No. | L-9000; L-7000; L-2000; L-2000P; L-2000PF; L-3000E; L-3000EF; L-7000E; L-7000EF; L-9000P; L-9000PF; LW-01; LW-12; LW-24; LW-48; LW-110; LW-120; LW-150; LW-02; i-keybox12; i-keybox24; i-keybox48; i-keybox96; i-keybox120; i-keybox150 |
| Operating frequency: | 4MHz (the Highest working frequency ) |

## 5.3 Details of E.U.T.

| | |
|---|---|
| Battery Power Supply: | 3.6V DC |
| Adapter Supply: | N/A |
| Functions/Modes: | Running the software installed at the PC to keeping the EUT reading the information from the EUT through USB cable. |

## 5.4 Description of Support Units

**Supporting equipments** :

| Description | Manufacturer | Model No. | Serial No. | Data Cable | Power Cable |
|---|---|---|---|---|---|
| Personal Computer | DELL | OPTIPLEX 755 | E191 (reference no.) | N/A | 1.5m |
| 17" LCD | Lenovo | 9227-AE1 | VENCW23 | VGA | 1.5m |
| Universal Programmer | Qian LongSheng | QL-2006 | 201105116086 | COM | 1.5m |
| Keyboard | Lenovo | KB1021 | 0000319 | USB[2)] | N/A |
| Mouse | Lenovo | MO28UOL | 4401282 081 | USB[3)] | N/A |
| Note: For the cable details please refer to below table. | | | | | |

**Cables:**

| # | Type | Length, m | Shield | Metallic hood | Ferrite |
|---|---|---|---|---|---|
| 1 | VGA | 1.8 | Yes | No | Yes |
| 2 | COM | 1.5 | Yes | No | No |
| 3 | USB[1)] | 1.5 | Yes | No | Yes |
| 4 | USB[2)] | 1.8 | Yes | No | No |
| 5 | USB[3)] | 1.8 | Yes | No | No |

**Software:**

| Description | Manufacturer | Software name | Version no. |
|---|---|---|---|
| USB Driver | Microsoft | USB Input Device Driver | 6.1.7601.17514 |
| USB Driver | Microsoft | USB Mass Storage Device Driver | 5.1.2600.0 |
| | | | |

## 5.5 Deviation from Standards

None.

## 5.6 Abnormalities from Standard Conditions

None.

## 5.7 Modification/Retest Record

None.

## 5.8 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab

No.588 West Jindu Road, Songjiang District, Shanghai, China. 201612.

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

No tests were sub-contracted.

## 5.9 Test Facility

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2014-07-26.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2015-02-22.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A. Expiry Date: 2014-09-20.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: **R-3868** and **C-4336** respectively. Date of Registration: 2012-05-29. Date of Expiry: 2015-05-28.

# 6 Equipment Used during Test

**Conducted Emission**

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Date | Cal.Due date |
|---|---|---|---|---|---|---|
| 1 | EMI test receiver | Rohde & Schwarz | ESCS30 | 100086 | 2012-04-13 | 2013-04-12 |
| 2 | Line impedance stabilization network | SCHWARZBECK | NSLK8127 | 8127-490 | 2012-03-15 | 2013-03-14 |
| 3 | Line impedance stabilization network | ETS | 3816/2 | 00034161 | 2012-03-15 | 2013-03-14 |

**Radiated Emission**

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Date | Cal.Due date |
|---|---|---|---|---|---|---|
| 1 | EMI test receiver | Rohde & Schwarz | ESU40 | 100109 | 2012-06-02 | 2013-06-01 |
| 2 | Antenna | SCHWARZBECK | VULB9168 | 9168-313 | 2012-03-15 | 2013-03-14 |
| 3 | CONTROLLER | INNCO | CO200 | 474 | / | / |
| 4 | Antenna | SCHWARZBECK | BBHA9120D | 9120D-679 | 2012-03-15 | 2013-03-14 |
| 5 | Antenna | SCHWARZBECK | BBHA9170 | 9170-373 | 2012-03-15 | 2013-03-14 |
| 6 | Low nosie amplifier | LNA6900 | TESEQ | 71033 | 2012-03-15 | 2013-03-14 |

**General Equipment**

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Date | Cal.Due date |
|---|---|---|---|---|---|---|
| 1 | Digital pressure meter | YONGZHI | DYM3-01 | 101012 | 2012-01-16 | 2013-01-14 |
| 2 | Digital Multimeter | FLUKE | 17B | 10560713 | 2012-08-24 | 2013-08-22 |
| 3 | Temperature& humidity recorder | ShangHai weather meter work | ZJ 1-2B | 0804081<br>0802150<br>0805126 | 2012-07-25 | 2013-07-23 |

# 7 Electromagnetic Interference Test Results

## 7.1 Conducted Emissions on Mains Terminals, 150 kHz to 30 MHz

Test Requirement: FCC Part15 :2011

Test Method: ANSI C63.4: 2009

Test Date: October 13, 2012

Test Voltage: AC 120V 60Hz

Frequency Range: 150 KHz to 30 MHz

Class / Severity: Class B

Detector: Peak for pre-scan (9 kHz Resolution Bandwidth from 150 KHz to 30 MHz)

Limit:

| Frequency range MHz | Class B Limits dB (μV) | |
|---|---|---|
| | 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 |
| Note1: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.<br>Note2: The lower limit is applicable at the transition frequency. | | |

### 7.1.1 E.U.T. Operation

Operating Environment:

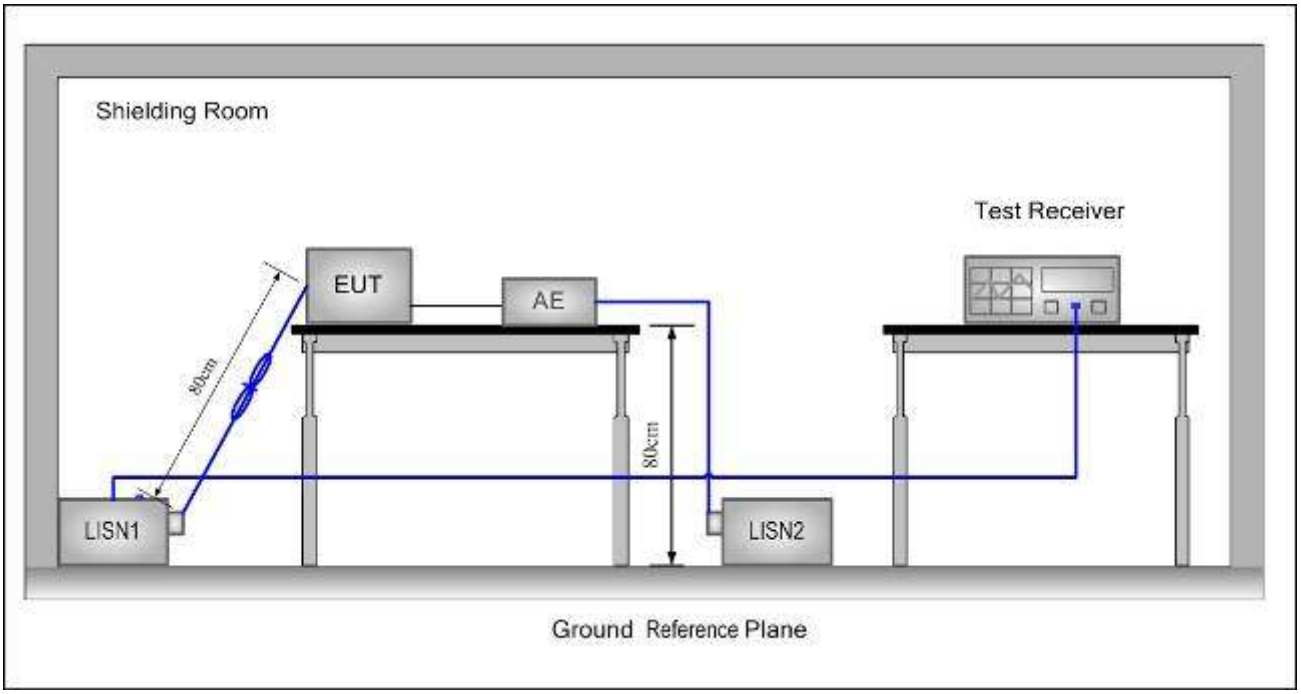
Temperature: 24.0 °C Humidity: 55% RH Atmospheric Pressure: 100.1 kPa

Test mode: Reading card mode

Pre-scan was performed with peak detected on all ports, Quasi-peak & average measurements were performed at the frequencies at which maximum peak emission level were detected.
Please see the attached Quasi-peak and Average test results.

Level = Read Level + LISN/ISN Factor + Cable Loss.

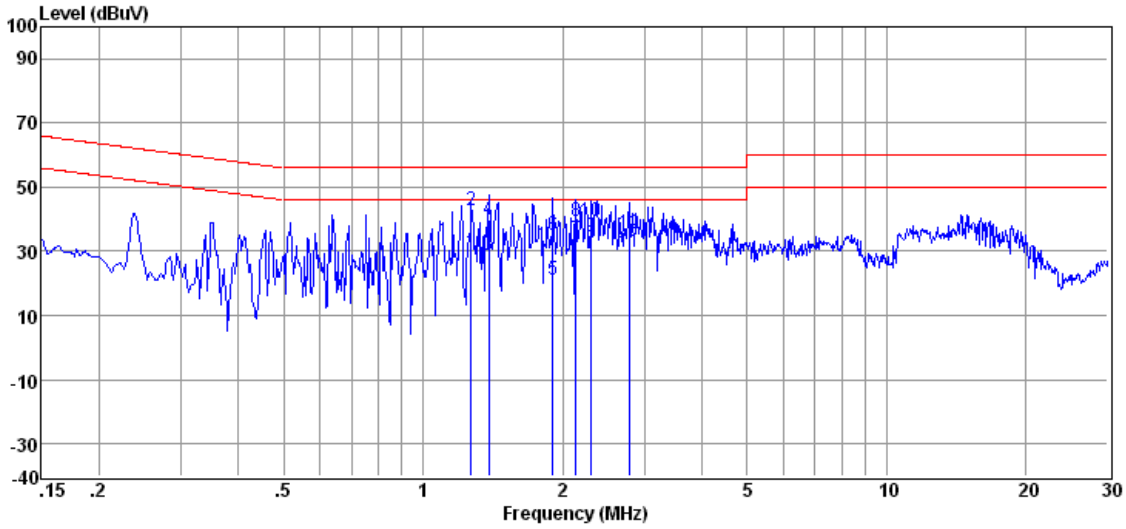
### 7.1.2 Test Setup and Procedure




1. The mains terminal disturbance voltage was measured with the EUT in a shielded room.
2. The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50µH + 5Ω linear impedance. The power cables of all other units of the EUT was connected to a second LISN, which was bonded to the ground reference plane in the same way as the LISN for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance was between the closest points of the LISN and the EUT. The mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m. All other units of the EUT and associated equipment was at least 0,8 m from the LISN.

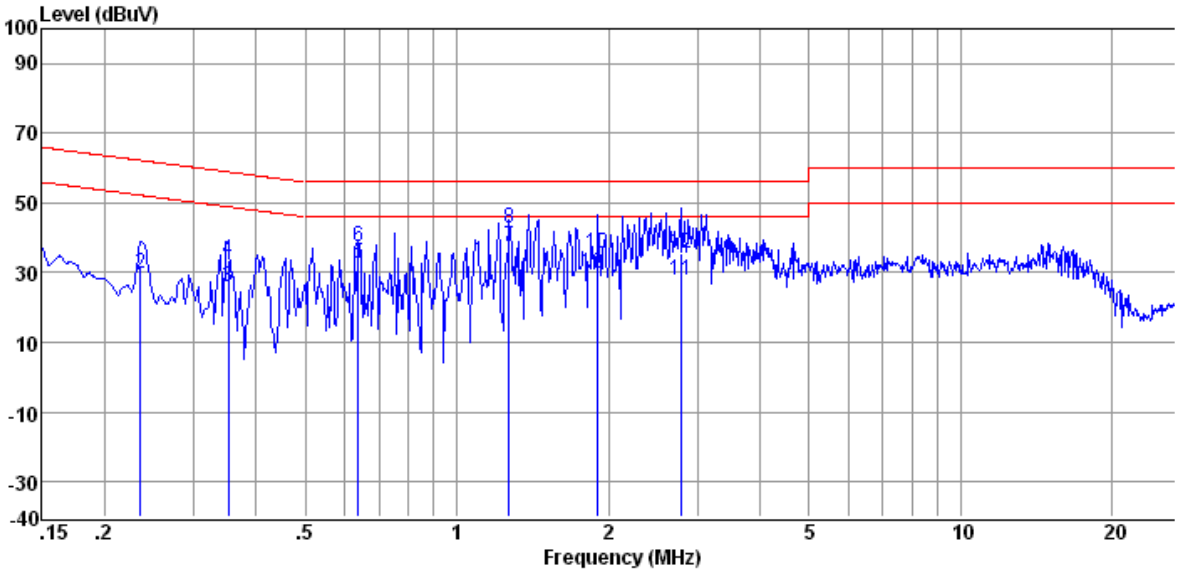
### 7.1.3 Measurement Data

Live Line:




| Freq (MHz) | Read Level (dBμV) | LISN Factor (dB) | Cable Loss (dB) | Level (dBμV) | Limit Line (dBμV) | Over Limit (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1.269 | 29.44 | 0.23 | 0.10 | 29.77 | 46.00 | -16.23 | Average |
| 1.269 | 42.44 | 0.23 | 0.10 | 42.77 | 56.00 | -13.23 | QP |
| 1.388 | 28.24 | 0.24 | 0.10 | 28.58 | 46.00 | -17.42 | Average |
| 1.388 | 39.31 | 0.24 | 0.10 | 39.65 | 56.00 | -16.35 | QP |
| 1.908 | 20.85 | 0.29 | 0.10 | 21.24 | 46.00 | -24.76 | Average |
| 1.908 | 34.51 | 0.29 | 0.10 | 34.90 | 56.00 | -21.10 | QP |
| 2.133 | 33.37 | 0.30 | 0.10 | 33.77 | 46.00 | -12.23 | Average |
| 2.133 | 39.19 | 0.30 | 0.10 | 39.59 | 56.00 | -16.41 | QP |
| 2.309 | 34.06 | 0.30 | 0.11 | 34.47 | 46.00 | -11.53 | Average |
| 2.309 | 39.10 | 0.30 | 0.11 | 39.51 | 56.00 | -16.49 | QP |
| 2.779 | 29.33 | 0.30 | 0.13 | 29.76 | 46.00 | -16.24 | Average |
| 2.779 | 35.30 | 0.30 | 0.13 | 35.73 | 56.00 | -20.27 | QP |

Neutral Line:




| Freq (MHz) | Read Level (dBµV) | LISN Factor (dB) | Cable Loss (dB) | Level (dBµV) | Limit Line (dBµV) | Over Limit (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 0.235 | 25.68 | 0.11 | 0.10 | 25.89 | 52.26 | -26.37 | Average |
| 0.235 | 29.65 | 0.11 | 0.10 | 29.86 | 62.26 | -32.40 | QP |
| 0.352 | 25.52 | 0.15 | 0.10 | 25.77 | 48.91 | -23.14 | Average |
| 0.352 | 33.25 | 0.15 | 0.10 | 33.50 | 58.91 | -25.41 | QP |
| 0.637 | 32.13 | 0.20 | 0.10 | 32.43 | 46.00 | -13.57 | Average |
| 0.637 | 37.11 | 0.20 | 0.10 | 37.41 | 56.00 | -18.59 | QP |
| 1.269 | 37.13 | 0.23 | 0.10 | 37.46 | 46.00 | -8.54 | Average |
| 1.269 | 42.45 | 0.23 | 0.10 | 42.78 | 56.00 | -13.22 | QP |
| 1.908 | 29.46 | 0.29 | 0.10 | 29.85 | 46.00 | -16.15 | Average |
| 1.908 | 35.22 | 0.29 | 0.10 | 35.61 | 56.00 | -20.39 | QP |
| 2.779 | 27.20 | 0.30 | 0.13 | 27.63 | 46.00 | -18.37 | Average |
| 2.779 | 35.11 | 0.30 | 0.13 | 35.54 | 56.00 | -20.46 | QP |

## 7.2 Radiated Emissions, 30MHz to 1GHz

Test Requirement: FCC Part15 :2011

Test Method: ANSI C63.4: 2009

Test Date: October 15,2012

Test Voltage: AC 120V 60Hz

Frequency Range: 30 MHz to 1 GHz

Measurement Distance: 3m

Class: Class B

Detector: Peak for pre-scan (120 kHz resolution bandwidth)

Limit:

For 3m

| Frequency range MHz | Quasi-peak limits dB (μV/m) |
|---|---|
| 30 to 88 | 40 |
| 88 to 216 | 43.5 |
| 216 to 960 | 46 |
| Above 960 | 54 |
| Note: At transitional frequencies the lower limit applies. | |

### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 23.0 °C Humidity: 59 % RH Atmospheric Pressure: 100.8 kPa

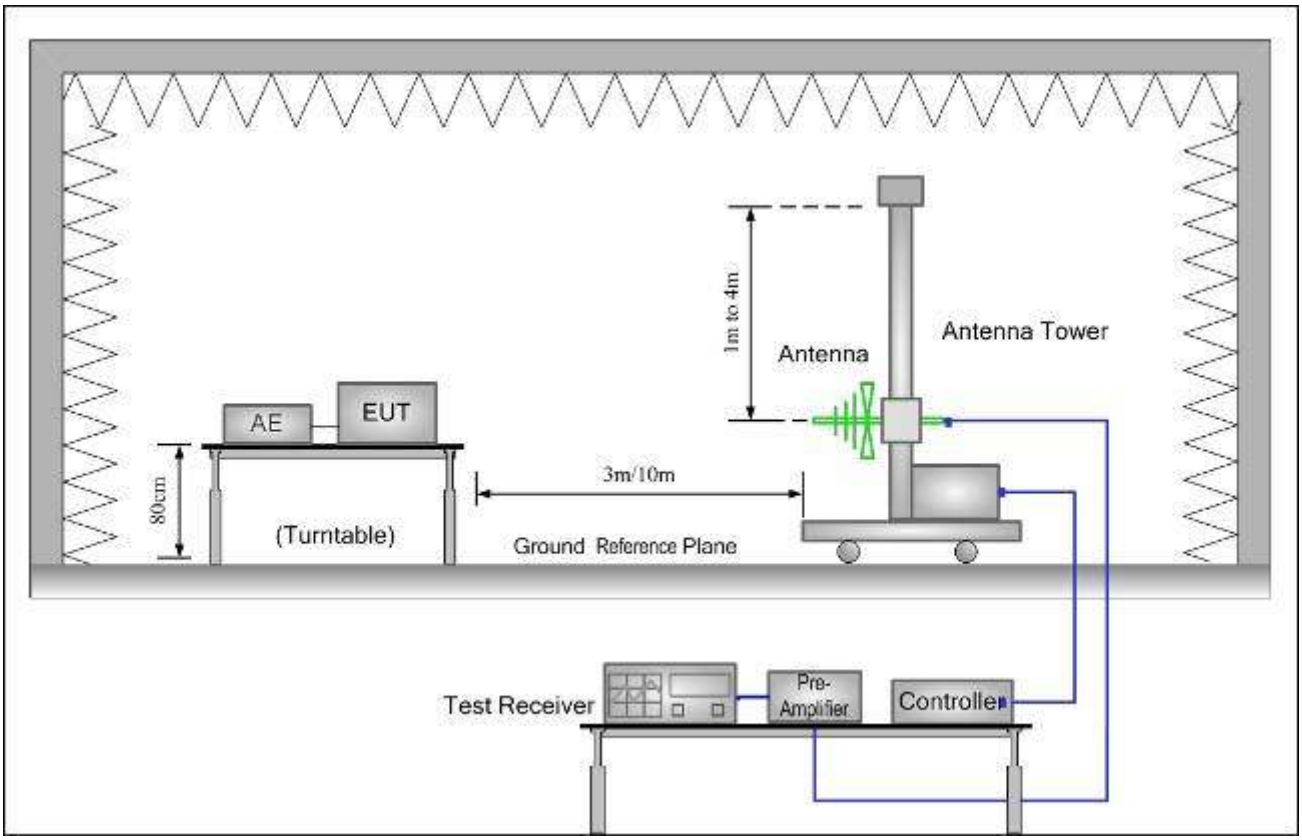
Test mode: Reading Card mode

Pre-scan was performed with peak detected on all ports, Quasi-peak measurements was performed at the frequencies at which maximum peak emission level were detected.

Please see the attached Quasi-peak test results.

For radiated emission: Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor.

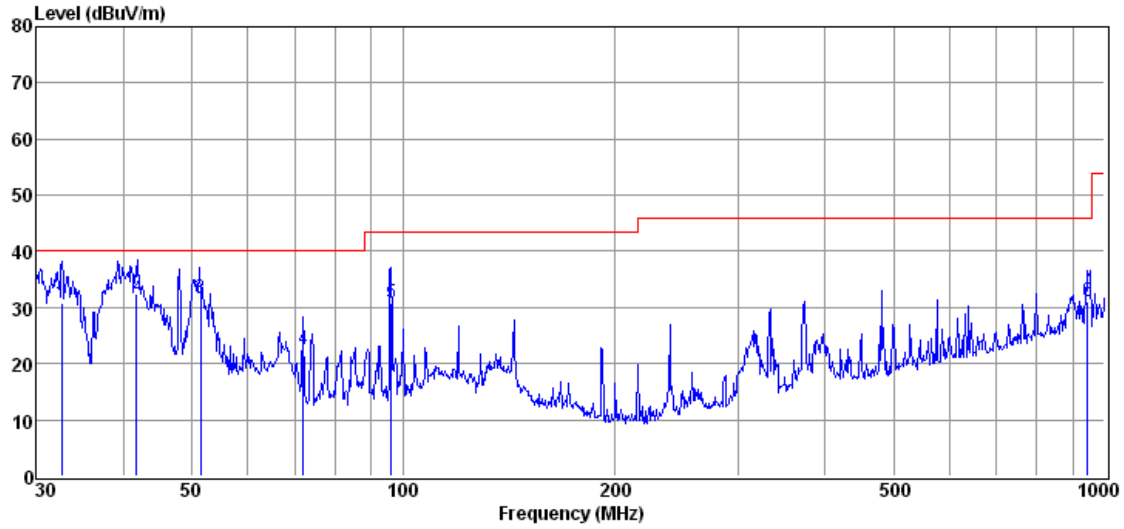
### 7.2.2 Test Setup and Procedure




1. The radiated emissions test was conducted in a semi-anechoic chamber.
2. The EUT was connected to AC power source through a mains power outlet which was bonded to the ground reference plane; The mains cables shall drape to the ground reference plane.
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
4. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum signature data plots of the EUT.
5. The frequencies of maximum emission were determined in the final radiated emissions measurement, the physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

### 7.2.3 Measurement Data

Vertical:

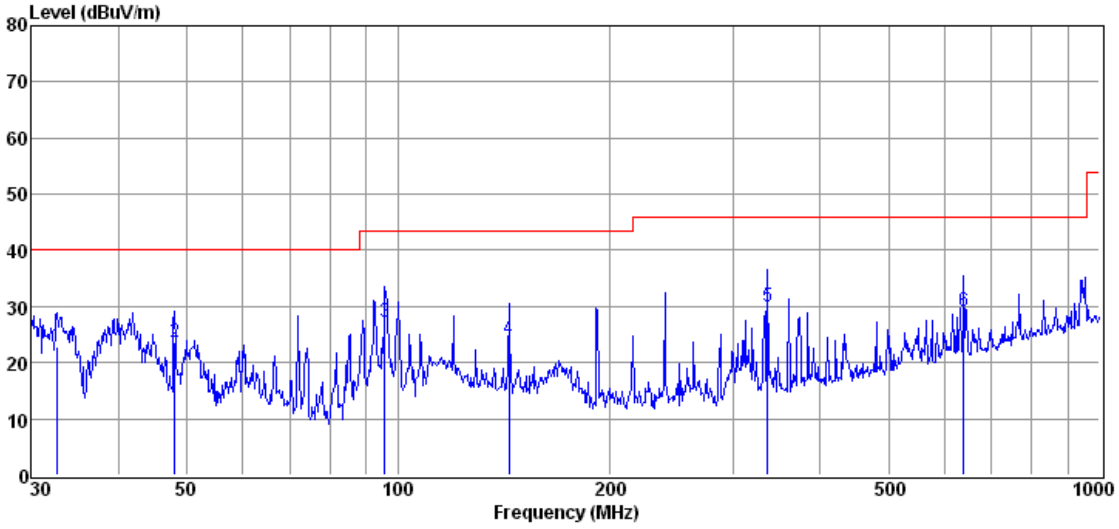



| Item | Freq. | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Result Level | Limit Line | Over Limit | Detector |
|---|---|---|---|---|---|---|---|---|---|
| (Mark) | (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 1 | 32.60 | 42.85 | 12.26 | 24.70 | 0.46 | 30.87 | 40.00 | -9.13 | QP |
| 2 | 41.73 | 43.29 | 13.23 | 24.70 | 0.57 | 32.39 | 40.00 | -7.61 | QP |
| 3 | 51.43 | 42.86 | 12.71 | 24.70 | 0.66 | 31.53 | 40.00 | -8.47 | QP |
| 4 | 72.08 | 36.03 | 10.38 | 24.70 | 0.81 | 22.52 | 40.00 | -17.48 | QP |
| 5 | 96.12 | 45.66 | 8.93 | 24.70 | 1.01 | 30.90 | 43.50 | -12.60 | QP |
| 6 | 945.53 | 27.31 | 23.81 | 23.80 | 3.79 | 31.11 | 46.00 | -14.89 | QP |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - Preamp Factor

2. If Peak Result comply with QP limit,QP Result is deemed to comply with QP limit

Horizontal:




| Item | Freq. | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Result Level | Limit Line | Over Limit | Detector |
|---|---|---|---|---|---|---|---|---|---|
| (Mark) | (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 1 | 32.56 | 34.85 | 12.25 | 24.70 | 0.46 | 22.86 | 40.00 | -17.14 | QP |
| 2 | 48.02 | 34.86 | 12.92 | 24.70 | 0.63 | 23.71 | 40.00 | -16.29 | QP |
| 3 | 95.71 | 42.13 | 8.90 | 24.70 | 1.00 | 27.33 | 43.50 | -16.17 | QP |
| 4 | 143.76 | 35.24 | 12.33 | 24.70 | 1.25 | 24.12 | 43.50 | -19.38 | QP |
| 5 | 336.21 | 38.98 | 13.32 | 24.50 | 2.08 | 29.88 | 46.00 | -16.12 | QP |
| 6 | 640.34 | 30.47 | 19.82 | 24.17 | 3.00 | 29.12 | 46.00 | -16.88 | QP |

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - Preamp Factor

2. If Peak Result comply with QP limit,QP Result is deemed to comply with QP limit

# 8 Photographs (Test Setup For the EUT)

## 8.1 Conducted Emissions on Mains Terminals Test Setup

## 8.2 Radiated Emission Test Setup

# 9 EUT Constructional Details

## 9.1 Exterior of EUT

USB Cable

Top View

Rear View

Left View

Right View

Front View

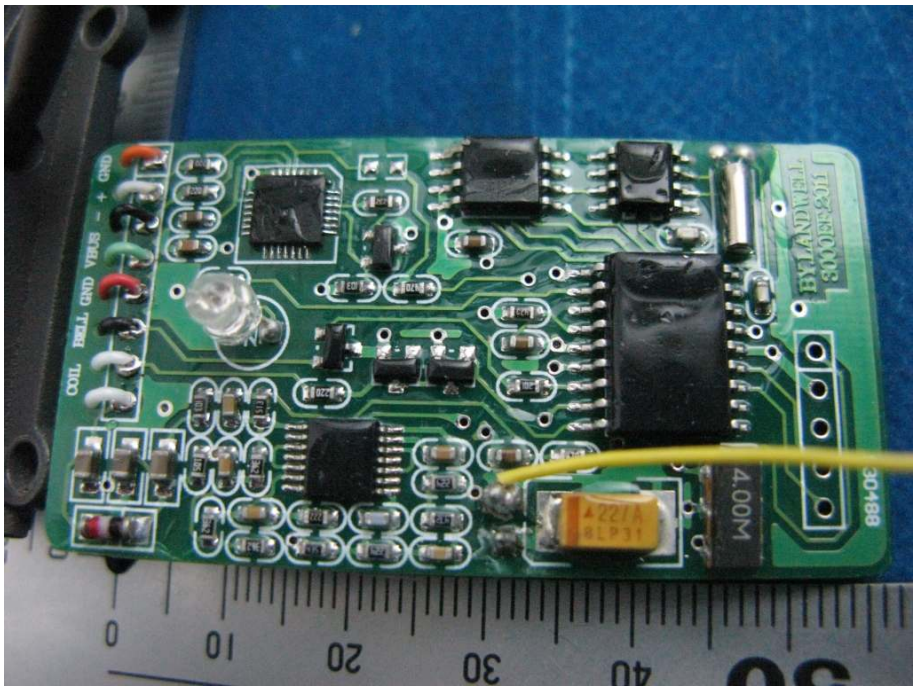
Front View Remove USB Cover


Back View

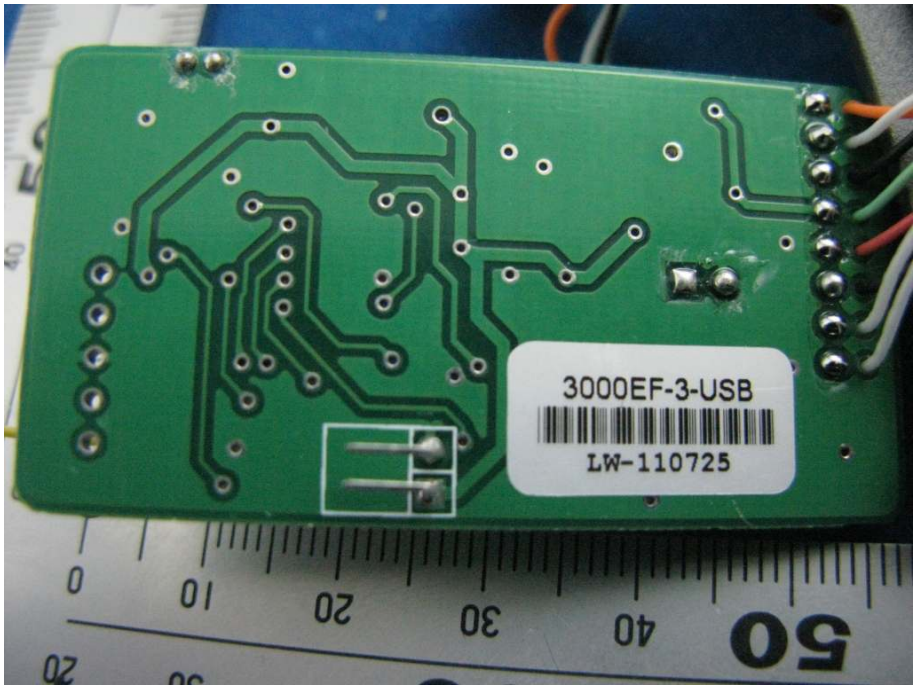
## 9.2 Interior of EUT


EUT Interior Photo Front View

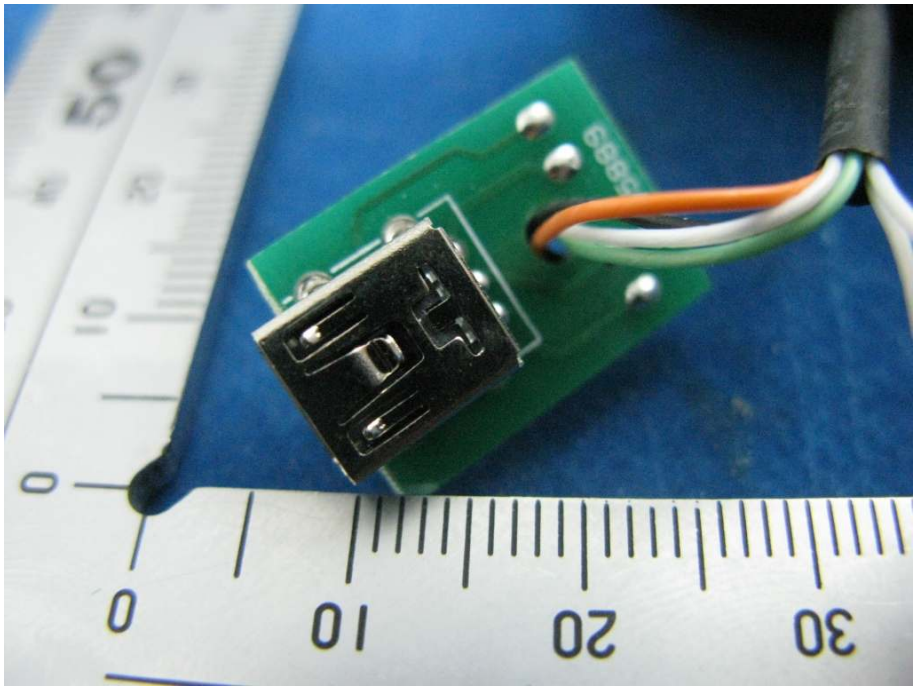
EUT Interior Photo Rear View



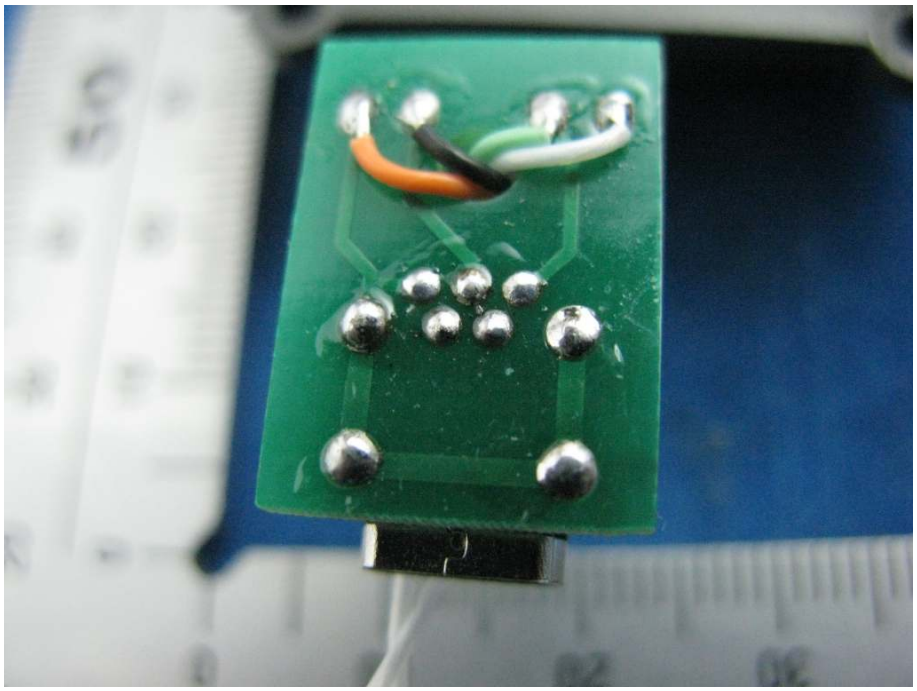

PCB Front View




PCB Rear View

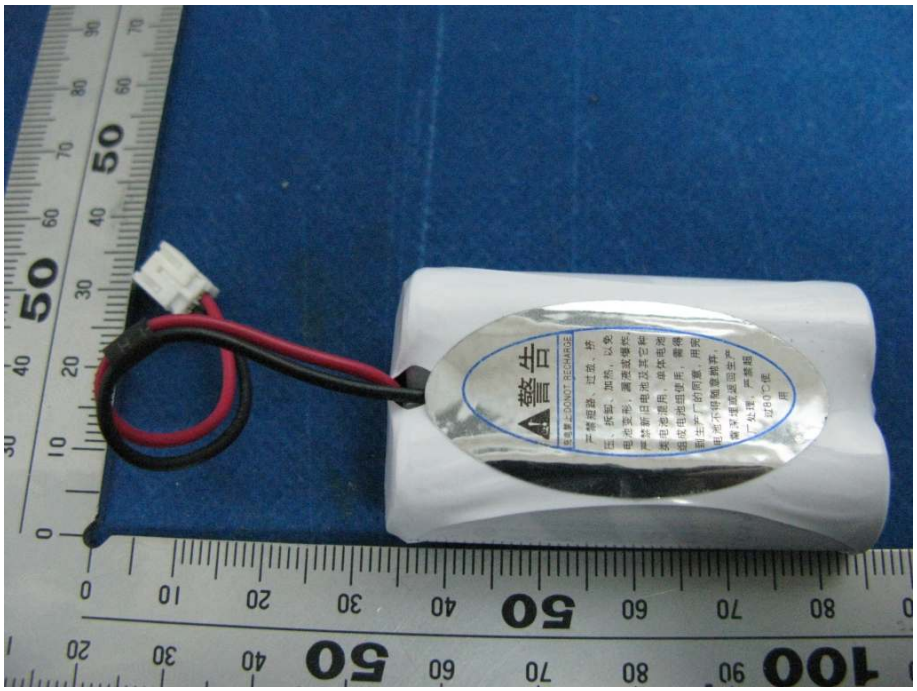



USB Connection Front View



USB Connection Rear View


Battery Front View



Battery Rear View

**--End of the Report--**