

# EMC TEST REPORT

For

BATTERY

Models Number: R6P, R03P, LR6, LR03, CR2032, CR2025,  
CR2016, NI-MH 3/5F 65, MH-NI AA, MH-NI AAA,  
MH-CD AA, MH-CD AAA, PL052030, PL502030,  
PL563759, PL552030, PL063455, PL042717,  
PL953455, PL082835, LR44, LR1130, LR41



Prepared for : SHENZHEN TIANXIANGRUI INDUSTRIAL CO., LTD.  
Address : NO. 515 UNIT A, HUAFENG KE JI YUAN XINHU ROAO',  
BAO'AN DISTRICT, SHENZHEN, CHINA  
Prepared by : Shenzhen Toby Technology Co., Ltd.  
Address : 10/F., A Block, Jiada R & D Bldg., No.5 Songpingshan Road,  
Science & Technology Park, Nanshan District, Shenzhen, China  
Tel : 0086-18925263335

Report Number : **TB-EMC095364**  
Date of Test : Sep. 14-15, 2009  
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**TEST REPORT DECLARATION**

Applicant : SHENZHEN TIANXIANGRUI INDUSTRIAL CO., LTD.  
 Address : NO. 515 UNIT A, HUAFENG KE JI YUAN XINHU ROAO',  
 BAO'AN DISTRICT, SHENZHEN, CHINA  
 Manufacturer : SHENZHEN TIANXIANGRUI INDUSTRIAL CO., LTD.  
 Address : NO. 515 UNIT A, HUAFENG KE JI YUAN XINHU ROAO',  
 BAO'AN DISTRICT, SHENZHEN, CHINA  
 EUT Description : BATTERY  
 Models No. : R6P, R03P, LR6, LR03, CR2032, CR2025, CR2016, NI-MH 3/5F 65,  
 MH-NI AA, MH-NI AAA, MH-CD AA, MH-CD AAA, PL052030,  
 PL502030, PL563759, PL552030, PL063455, PL042717, PL953455,  
 PL082835, LR44, LR1130, LR41

**Test Standards:**

**EN 61000-6-3:2007;**  
**EN 61000-6-1:2007.**

The device described above is tested by Shenzhen Academy of Metrology and Quality Inspection to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and EUT's performance criterion. The test results are contained in this test report. Shenzhen Toby Technology Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests. Also, this report shows that the EUT technically complies with the 89/336/EEC directive and its amendment 2004/108/EC directive requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Toby Technology Co., Ltd.

Tested by: Jacky Wang Date: Sep. 17, 2009  
 (Jacky Wang)

Checked by: Benny Xu Date: Sep. 17, 2009  
 (Benny Xu)

Approved by: Justin Zhang Date: Sep. 18, 2009  
 (Justin Zhang)

## 1. TEST RESULTS SUMMARY

Table 1 Test Results Summary

Test Items	Test Results
Radiated Disturbance	Pass
ESD Immunity	Pass
Radiated Electromagnetic Field Immunity	Pass

## **2. GENERAL INFORMATION**

### **2.1. Report information**

2.1.1. This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that Toby approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that Toby in any way guarantees the later performance of the product/equipment.

2.1.2. The sample/s mentioned in this report is/are supplied by Applicant, Toby therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

2.1.3. Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through Toby, unless the applicant has authorized Toby in writing to do so.

### **2.2. Laboratory Accreditation and Relationship to Customer**

The testing report were performed by the Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory (guangdong EMC compliance testing center), in their facilities located at Bldg. of Metrology & Quality Inspection, Longzhu Road, Nanshan District, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

The Laboratory is listed in the United States of American Federal Communications Commission (FCC), and the registration number is 274801.

The Laboratory is registered to perform emission tests with Industry Canada (IC), and the registration number is IC4174.

Jun. 19, 2009 certificated by TUV Rheinland, Shenzhen (Audit Report:02024086 004). The certificate is valid until the next scheduled inspection or up to 24 months, at the discretion of TUV Rhineland.

### **2.3. Measurement Uncertainty**

Available upon request.

### 3. PRODUCT DESCRIPTION

#### 3.1. EUT Description

Description : BATTERY

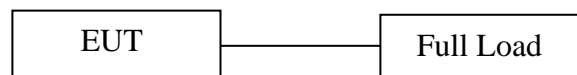
Models No. : R6P, R03P, LR6, LR03, CR2032, CR2025, CR2016, NI-MH 3/5F 65, MH-NI AA, MH-NI AAA, MH-CD AA, MH-CD AAA, PL052030, PL502030, PL563759, PL552030, PL063455, PL042717, PL953455, PL082835, LR44, LR1130, LR41

Applicant : SHENZHEN TIANXIANGRUI INDUSTRIAL CO., LTD.

Manufacturer : SHENZHEN TIANXIANGRUI INDUSTRIAL CO., LTD.

**Remark:** All above models are identical in schematic, structure and critical components except for different model number, color and different enclosure, therefore, EMI and EMS testing was performed with R6P only.

#### 3.2. Block Diagram of EUT Configuration



#### 3.3. Operating Condition of EUT

Test mode 1: Discharge

#### 3.4. Test Conditions

Temperature: 23~25°C

Relative Humidity: 54~60 %

#### 3.5. Modifications

No modification was made.

#### 3.6. Performance Criterion

**Criterion A:** The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended.

**Criterion B:** After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended.

**Criterion C:** Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions.

## 4. TEST EQUIPMENT USED

### 4.1. Test Equipment Used to Measure Radiated Disturbance

Table 2 Radiated Disturbance Test Equipment

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB3436	EMI Test Receiver	Rohde & Schwarz	ESI26	Jan.30, 2009	1 Year
SB3440	Bilog Antenna	Chase	CBL6112B	Jan.30, 2009	1 Year

### 4.2. Test Equipment Used to Measure Electrostatic Discharge Immunity

Table 3 ESD Immunity Test Equipment

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB2561	ESD Tester	SCHNAFFN ER	NSG435	Feb.14, 2009	1 Year

### 4.3. Test Equipment Used to Measure Radio Frequency Electromagnetic Fields Immunity

Table 4 Radiated Electromagnetic Field Immunity Test Equipment

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB3433	Signal Generator	Rohde & Schwarz	SMT03	Jan.30, 2009	1 Year
SB3437	Power Meter	Rohde & Schwarz	NRVD	Jan.30, 2009	1Year
SB3437/01	Voltage Probe	Rohde & Schwarz	URV5-Z2	Jan.30, 2009	1Year
SB3437/02	Voltage Probe	Rohde & Schwarz	URV5-Z2	Jan.30, 2009	1Year
SB3173	Power Amplifier	AR	150W1000	Jan.30, 2009	1Year
SB2622	Bilog Antenna	Chase	CBL6111C	Jan.30, 2009	1Year

## 5. RADIATED DISTURBANCE TEST

### 5.1. Test Standard and Limit

#### 5.1.1. Test Standard

EN 61000-6-3:2007

#### 5.1.2. Test Limit

Table 5 Radiated Disturbance Test Limit (Class B)

Frequency	Limit (dB $\mu$ V/m)
	Quasi-peak Level
30MHz~230MHz	40
230MHz~1000MHz	47

\* The lower limit shall apply at the transition frequency.

\* The test distance is 3m.

### 5.2. Test Procedure

The EUT is placed on a turntable, which is 0.8 meter above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set **3 meters** away from the receiving antenna, which is mounted on an antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.

### 5.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

### 5.4. Test Data

Emissions don't show below are too low against the limits, the test curves are shown in the APPENDIX I .

Table 6 Radiated Disturbance Test Data

Model No.: R6P			
Test Mode: 1			
Frequency MHz	Readings dB( $\mu$ V/m)	Polarization	Limits dB ( $\mu$ V/m)
----	----	Horizontal	40
----	----	Vertical	40
----	----	Vertical	47



## 6. ELECTROSTATIC DISCHARGE IMMUNITY TEST

### 6.1. Test Requirements

#### 6.1.1. Test Standard

EN 61000-6-1:2007 (EN 61000-4-2:1995+A1:1998+A2:2001)

#### 6.1.2. Test Level

Table 7 Test Level for ESD

Port	Test Specification
Enclosure Port	± 8kV air discharge ± 4kV contact discharge

#### 6.1.3. Performance criterion: **B**

### 6.2. Test Procedure

#### 6.2.1. Contact Discharge:

The ESD generator is held perpendicular to the surface to which the discharge is applied and the tip of the discharge electrode touch the surface of EUT. Then turn the discharge switch. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

#### 6.2.2. Air Discharge:

Air discharge is used where contact discharge can't be applied. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

#### 6.2.3. Indirect discharge for horizontal coupling plane

At least 10 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT.

#### 6.2.4. Indirect discharge for vertical coupling plane

At least 10 single discharge shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

### 6.3. Test Data

Table 8 ESD Test Data

Model No.: R6P				
Test Mode: 1				
Location	Voltage	Amount of test points	Discharge Method	Results
Nonconductive Enclosure	$\pm 8\text{kV}$	7	A	Pass
HCP	$\pm 4\text{kV}$	4	C	Pass
VCP	$\pm 4\text{kV}$	5	C	Pass

## 7. RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

### 7.1. Test Requirements

#### 7.1.1. Test Standard

EN 61000-6-1:2007 (EN 61000-4-3:2006)

#### 7.1.2. Test Level

Table 9 Test Level for Radiated Electromagnetic Field Immunity Test

Port	Test Specification
Enclosure Port	80-1000MHz 3 V/m 80 % AM(1kHz)

#### 7.1.3. Performance criterion: A

### 7.2. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on Test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor EUT screen.

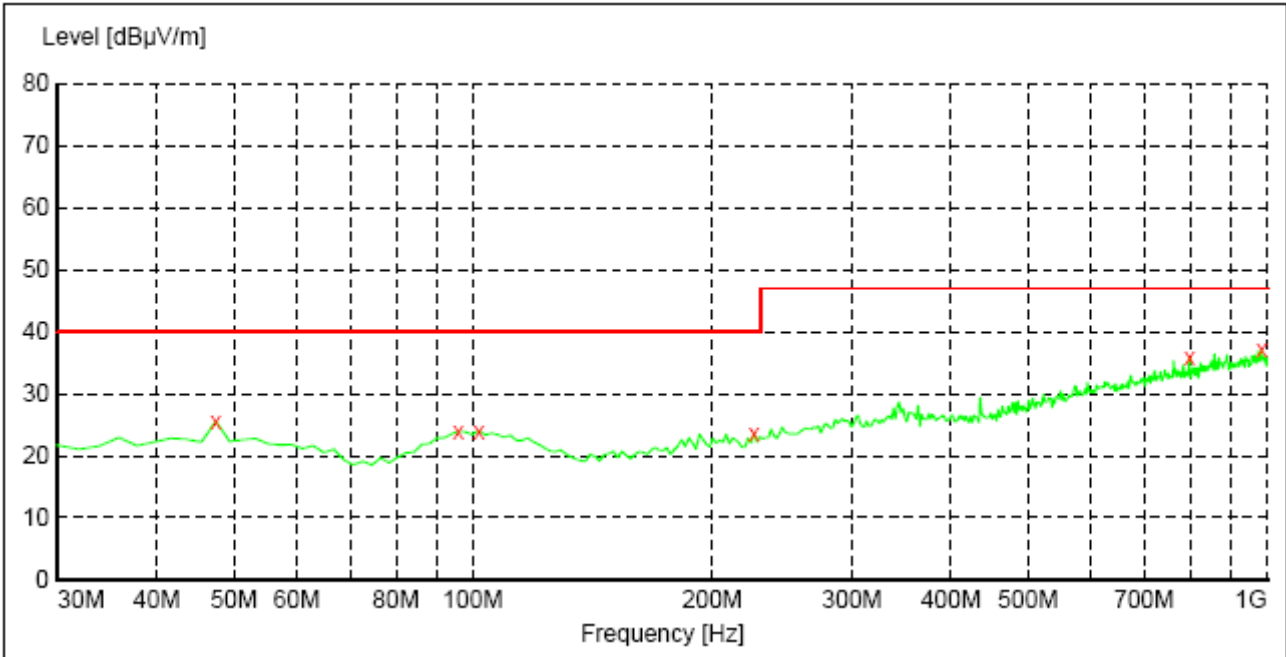
### 7.3. Test Data

Table 10 Radiated Electromagnetic Field Immunity Test Data

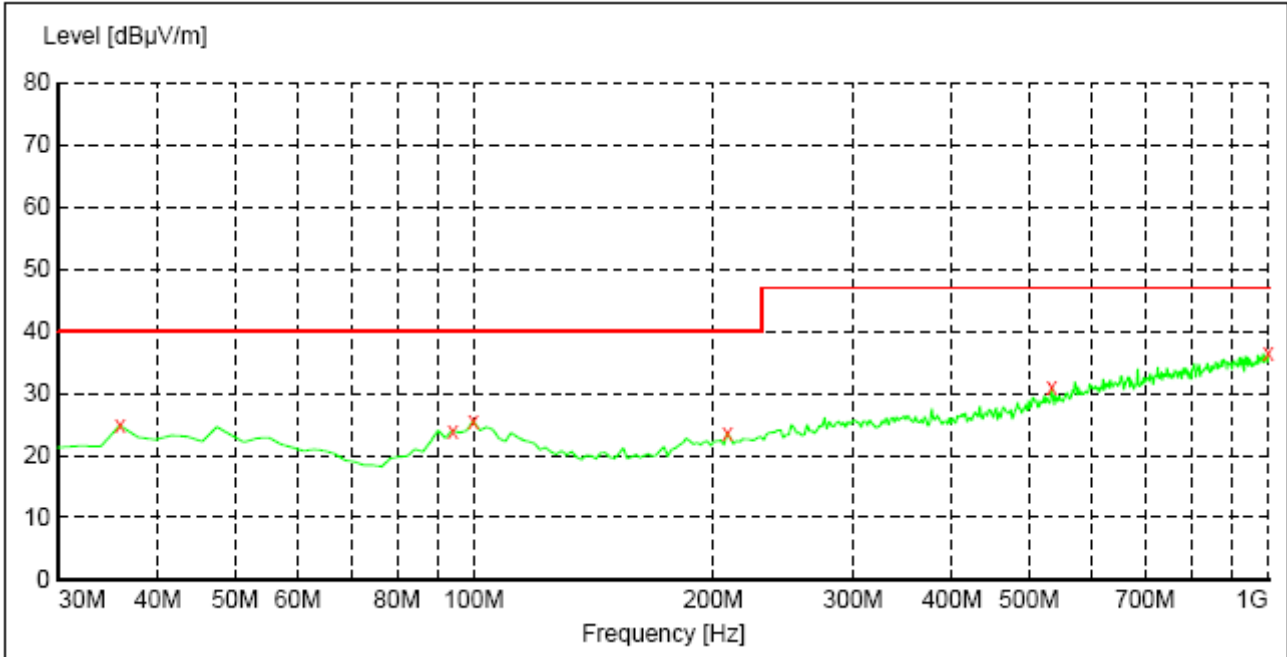
Model No.: R6P		
Test Mode: 1		
Frequency Rang (MHz)	80-1000 MHz	
Field Strength (V/m)	3V/m	
Steps (%)	1%	
	Horizontal	Vertical
Front	Pass	Pass
Rear	Pass	Pass
Left	Pass	Pass
Right	Pass	Pass

## APPENDIX I TEST CURVES

**Radiated Disturbance**  
**EN 55022B**  
**EUT: BATTERY M/N: R6P**  
**Operating Condition: Discharge**  
**Test Site: SMQ EMC Lab. SAC**  
**Test Specification: Horizontal**  
**Comment:**



**Radiated Disturbance**  
**EN 55022B**  
**EUT: BATTERY M/N: R6P**  
**Operating Condition: Discharge**  
**Test Site: SMQ EMC Lab. SAC**  
**Test Specification: Vertical**  
**Comment:**

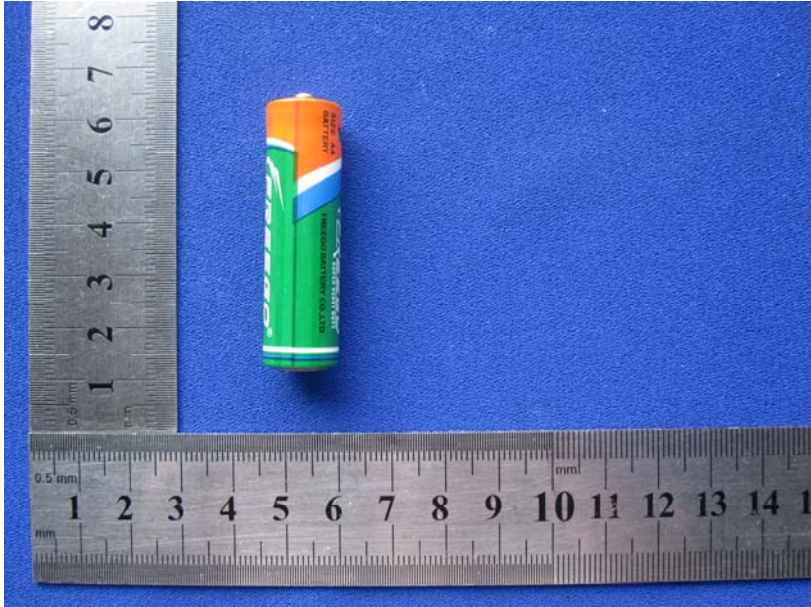


**APPENDIX II TEST PICTURES**

**Photo 1 Appearance of EUT**



**Photo 2 Appearance of EUT**





**Photo 3 Radiated Disturbance Test**



**Photo 4 ESD Immunity Test**

