



NVLAP LAB CODE 200707-0



## FCC PART 15.227

# EMI MEASUREMENT AND TEST REPORT

For

## LIANGCHENG PLASTIC TOYS FACTORY

LAIMEI ROAD, CHENGHAI, SHANTOU, CHINA.

**FCC ID: XBZLC27MHZSB08**

<b>Report Type:</b> Original Report		<b>Product Type:</b> R/C CAR	
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\* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "\*" .

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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *LIANGCHENG PLASTIC TOYS FACTORY*. 's product, model number: 6811,19547,89278,19652,19566,89969,9023,9024,9025,9026,9027,9028,9029,9030 or the "EUT" as referred to in this report is a R/C CAR The EUT is measured approximately 10 cm L x 4 cm W x 8 cm H. rated input voltage: DC 9V battery.

*\* All measurement and test data in this report was gathered from production sample serial number: 0904029 (Assigned by BACL, Shenzhen). The EUT was received on 2009-04-15.*

*\*Note: The series products, model 6811,19547,89278,19652,19566,89969,9023,9024,9025,9026,9027,9028,9029,9030, we select 6811 to test, the all model have same circuit diagram, PCB, only appearance and names have differences, which was explained in the attached Declaration Letter.*

### Objective

This Type approval report is prepared on behalf of *LIANGCHENG PLASTIC TOYS FACTORY* in accordance with Part 2, Subpart J, and Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules, sec 15.203, 15.205, 15.209 and sec 15.227.

### Related Submittal(s)/Grant(s)

No related submittals.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect radiated and conducted emission measurement data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 21, 2007. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



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The current scope of accreditations can be found at  
<http://ts.nist.gov/Standards/scopes/2007070.htm>

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## SYSTEM TEST CONFIGURATION

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### Justification

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

### EUT Exercise Software

N/A.

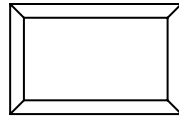
### Special Accessories

The special Accessories were supplied by manufacturer.

### Equipment Modifications

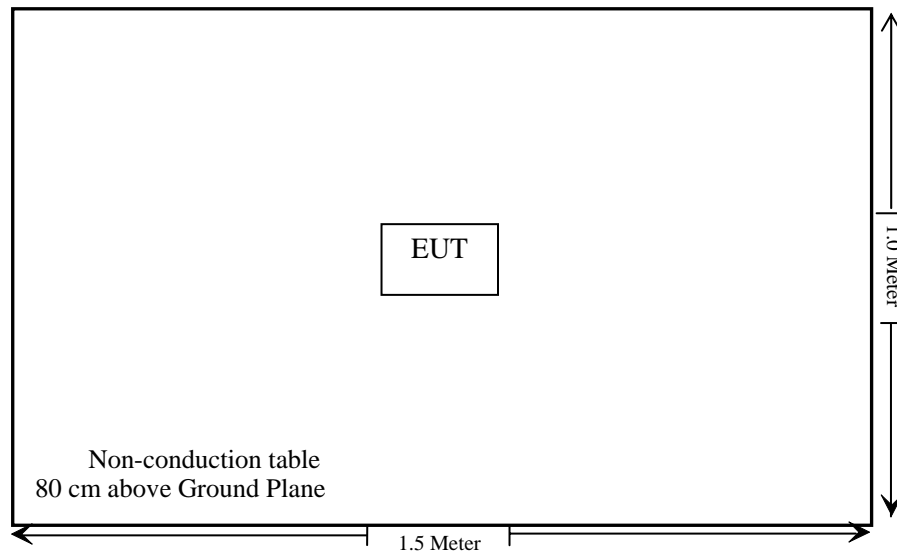
No modifications were made to the unit tested.

## Configuration of Test Setup



EUT

## Block Diagram of Test Setup



## SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna requirement	Compliant
§15.205	Restricted Band of operation	Compliant
§15.207	Conducted Emissions	N/A *
§15.209, §15.227(a), §15.227(b)	Field Strength	Compliant
§15.227	Duty Cycle	/

**Note:** N/A\* - EUT is powered in battery only.

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## §15.203 - ANTENNA REQUIREMENT

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### Standard Applicable

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

This product has a solder antenna on PCB, fulfill the requirement of this section, please refer to the EUT photos.

Test Result: Compliant



## §15.209, §15.227(a), §15.227 (b) – FIELD STRENGTH

### Standard Applicable

According to §15.227 (a), the field strength if any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters.

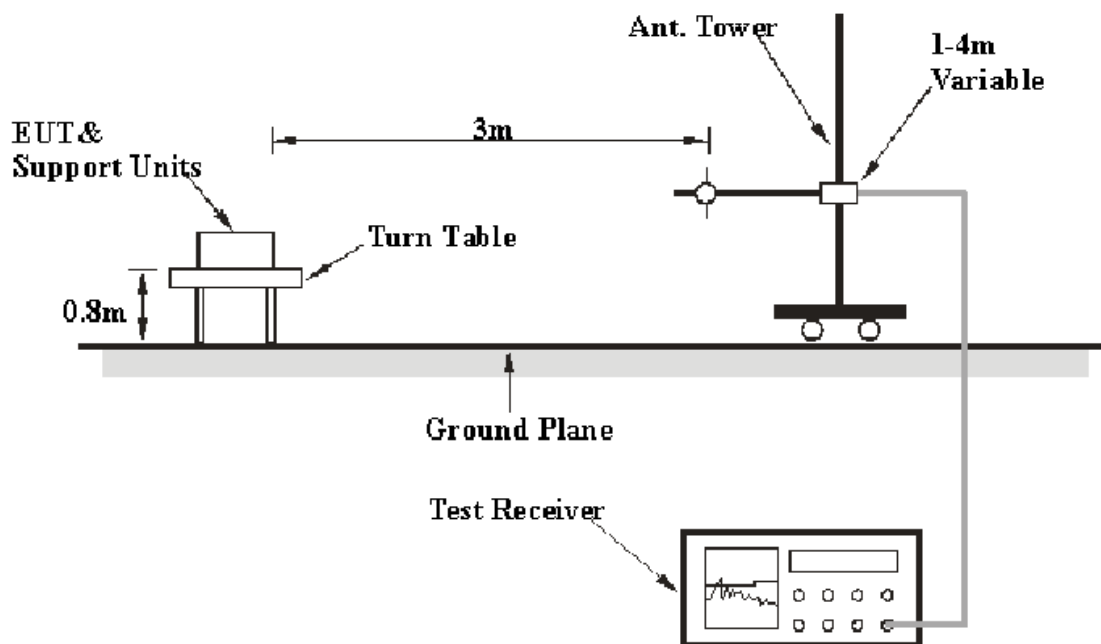
(b), the field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in §15.209.

### 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.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (ShenZhen) is  $\pm 4.0$  dB.

### EUT Setup



The radiated emission tests were performed in the chamber B test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part 15 Subpart C section 15.227 limits.

## EMI Test Receiver Setup

According to FCC Rules, 47 CFR 15.33, the EUT emissions were investigated from 27 MHz to 1000 MHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

<i><b>Frequency</b></i>	<i><b>RB/W</b></i>	<i><b>VB/W</b></i>	<i><b>IF B/W</b></i>
9 kHz-30 MHz	10 kHz	30 kHz	9 kHz
30 MHz-1 GHz	100 kHz	300 kHz	120 kHz

## Test Equipment List and Details

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
HP	Amplifier	8447E	1937A01046	2008-11-15	2009-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-11-07	2009-11-06
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2009-04-12	2010-04-11
EM Test	Loop Antenna	MS100	303298	2009-03-07	2010-03-07
ETS	Passive Loop Antenna	6512	00029604	2009-03-04	2010-03-04

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (ShenZhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

## Corrected Amplitude & Margin Calculation

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

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

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

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

## Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.227, with the worst margin reading of:

**15.5 dB at 54.084750 MHz in the Vertical polarization.**

**Test Data****Environmental Conditions**

<b>Temperature:</b>	22° C
<b>Relative Humidity:</b>	58%
<b>ATM Pressure:</b>	1016mbar

Testing was performed by Alvin Huang on 2009-04-23.

Test Mode: Transmitting

**Fundamental Measurement:**

Indicated		Table Angle Deg.	Antenna		Correction Factor			Corrected Amplitude (dBμV/m)	FCC PART 15.227		
Freq. (MHz)	Reading (dBμV)		Height (m)	Detector PK/AV	Antenna Factor (dB/m)	Cable Loss (dB)	Amplifier Gain (dB)		Limit (dBμV/m)	Margin (dB)	Remarks
27.145	79.72	153	2.3	PK	19.7	0.43	28.69	71.16	100	28.84	Fundamental

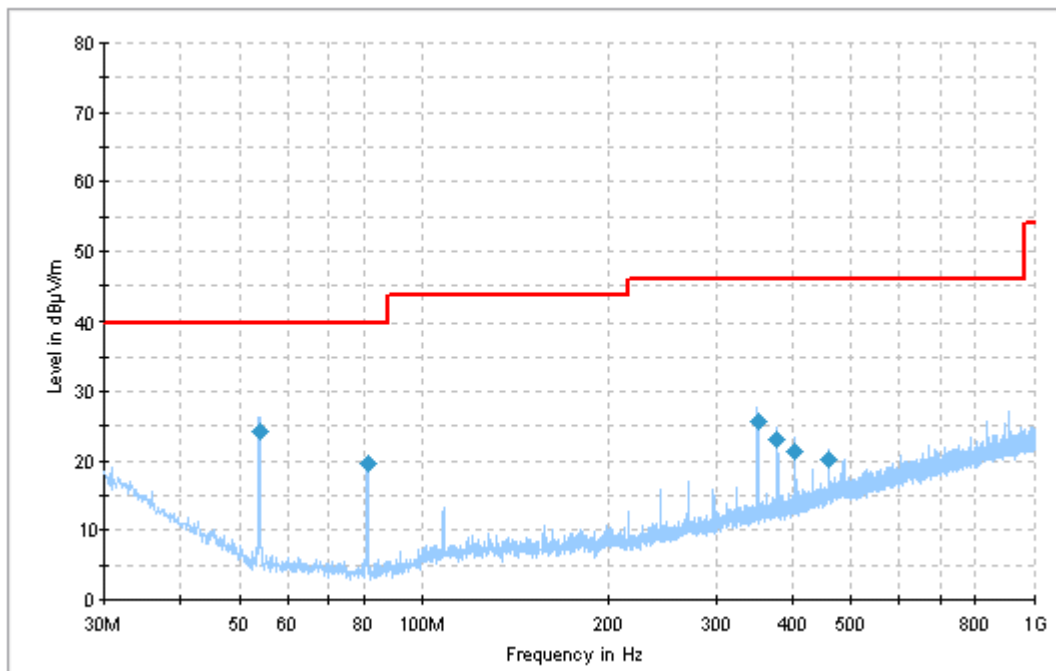
Field Strength of Fundamental Emission (Average)					
Freq. (MHz)	Peak Measurement @3m (dBμV/m)	Duty Cycle Correction (dB)	Corrected Amp. (dBμV/m)	Part 15.227 Limit (dBμV/m)	Result
27.145	71.16	-5.55	65.61	80	compliant

Note:\* The above data is the worst case in the all polarity direction.

According to CFR47 Part 15.35, the limit on the radio frequency emissions as measured using instrumentation with peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

\* Adjusted by Duty Cycle = - 5.55 dB

\* The above data is the worst case in the all polarity direction.

**Spurious Emission:**

Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Polarity	Turntable Position (deg)	Correction Factor (dB)	Limit (dBμV/m)	Margin (dB)
54.084750	24.5	177.0	V	158.0	-21.1	40.0	15.5
351.216350	25.8	112.0	V	132.0	-13.1	46.0	20.2
81.054200	19.5	178.0	H	3.0	-3.6	40.0	20.5
378.218275	23.2	114.0	V	141.0	-12.9	46.0	22.8
405.124825	21.3	132.0	V	225.0	-12.3	46.0	24.7
458.766600	20.3	109.0	V	227.0	-11.2	46.0	25.7

Note:\* The above data is the worst case in the all polarity direction.

**CFR47 §15.227- DUTY CYCLE****Limit**

Nil (No dedicated limit specified in the Rules).

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2008-05-09	2009-05-09

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

**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=150ms.
5. Repeat above procedures until all frequency measured were complete.

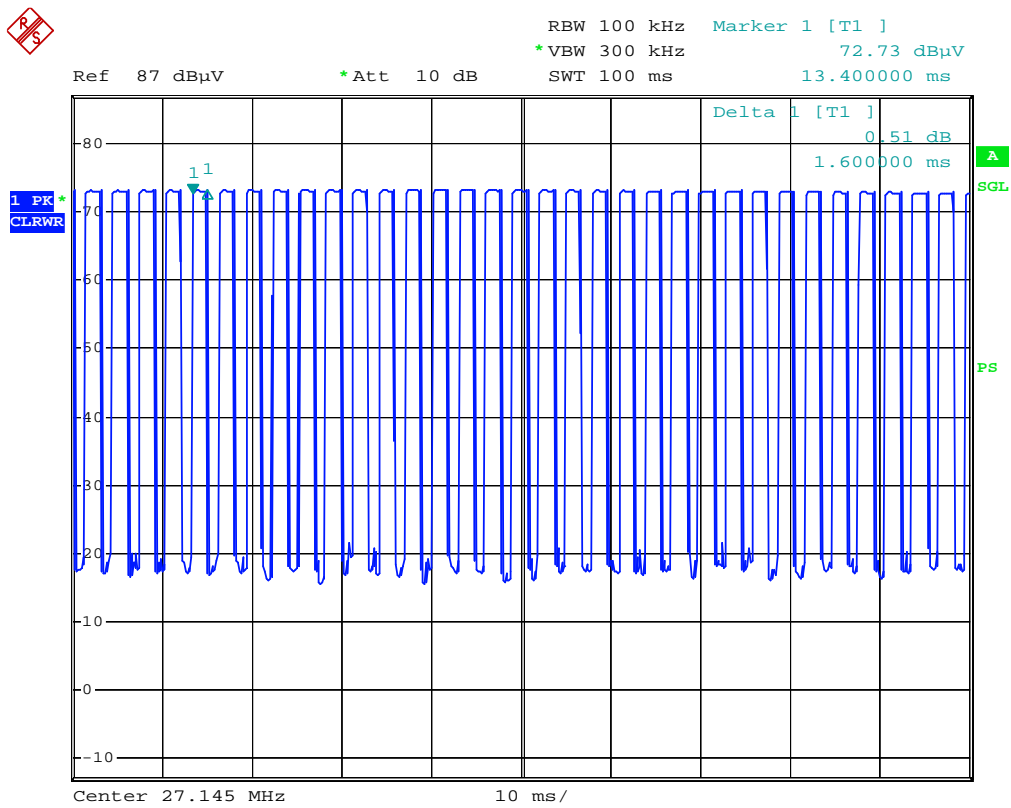
**Test Data**

Duty cycle=1.6ms \*33/ 100ms \*100% = 52.8%

Duty cycle factor = 20 lg (0.528) = -5.55 dB.

This factor will be applied to correct the final reading for the peak measurement.

Duty cycle:



\*\*\*\*END OF REPORT\*\*\*\*