



EMC VERIFICATION SUMMARY

Report No.: SZHH01091828-001

Toy

ITE

Others

Model: BL-48900 Additional Model: BL-48908 Product Description: VILAIN Sample Receipt Date: 13 September 2016	Applicant: DONGGUAN LIYANG TOYS LTD. Floor 3, Building 2, Daxingwei Industry Xianxi, Wusha, Changan Town, Dongguan City, Guangdong Province		
	Test Conducted Date: 13 September 2016 to 1 November 2016		
<input checked="" type="checkbox"/> 1 st TEST <input type="checkbox"/> 2 nd TEST	ALL TESTS WERE CONDUCTED IN ACCORDANCE WITH: *EN 55014-1: 2006 + A1: 2009 + A2: 2011 *EN 55014-2: 1997 + A1: 2001 + A2: 2008		
Test Site and Location:	Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch 6/F., Block D, Huahan Building, Langshan Road, Nanshan District, Shenzhen, China		
Test Result	OK	Not OK	Remark
*EN 55014-1: 2006 + A1: 2009 + A2: 2011	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*EN 55014-2: 1997 + A1: 2001 + A2: 2008	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Remark: When determining the test conclusion, the Measurement Uncertainty of test has been considered.			

Prepared and checked by:

Approved By:

Sign On File
Vanessa Deng
Assistant Engineer
Intertek

Jimmy Wen
Assistant Supervisor
Intertek
Date: 1 November 2016

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TRF No.: EN55014-1/-2_b

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EMC Results Conclusion (with Justification)

RE: EMC Testing Pursuant to EMC Directive 2014/30/EU, Performed On the VILAIN,
Model: BL-48900

We tested the VILAIN, Model: BL-48900, to determine if it was in compliance with the relevant EN standards as marked on the EMC Verification Summary. We found that the unit met the requirement of EN55014-1, EN55014-2 standards when tested as received.

The Model: BL-48908 is the same as the Model: BL-48900 in hardware aspect. The difference in model number serves as marketing strategy.

The production units are required to conform to the initial sample as received when the units are placed on the market.

LABORATORY MEASUREMENTS**Configuration Information**

Equipment Under Test (EUT):	VILAIN
Model:	BL-48900
Serial No.:	N/A
Support Equipment:	N/A
Cables:	USB Cable (Length: 140cm, Unshielded) (Provided by client)
Adaptor:	TP-LINK (Model: T050100-2A3) Input: AC 100V-240V, 50/60Hz, 0.3A; Output: 5V, 1A (Provided by Intertek)
Rated Voltage:	DC 3.7V(1 x 3.7V rechargeable battery) which can be charged by adaptor

Performance Criteria for Immunity

The performance criteria are referred to the test standard: EN 55014-2

Performance criteria A

During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.

Performance criteria B

After the test, the EUT 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 EUT is used as intended. The performance level may be replaced by a permissible loss of performance.

During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.

If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.

Performance criteria C

During and after testing, a temporary loss of function is allowed, provided the function is selfrecoverable, or can be restored by the operation of the controls or cycling of the power to the EUT by the user in accordance with the manufacturer's instructions.

Applicant: DONGGUAN LIYANG TOYS LTD.
Model: BL-48900
Worst Case Operating Mode: Motor

EN 55014-1 Radiated Scan

Used Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Cal. Date	Due Date
SZ185-01	EMI Receiver	R & S	ESCI	23-Jan-16	23-Jan-17
SZ061-12	Biconilog Antenna	ETS	3142E	9-Sep-16	9-Sep-17
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	16-Apr-16	16-Apr-18

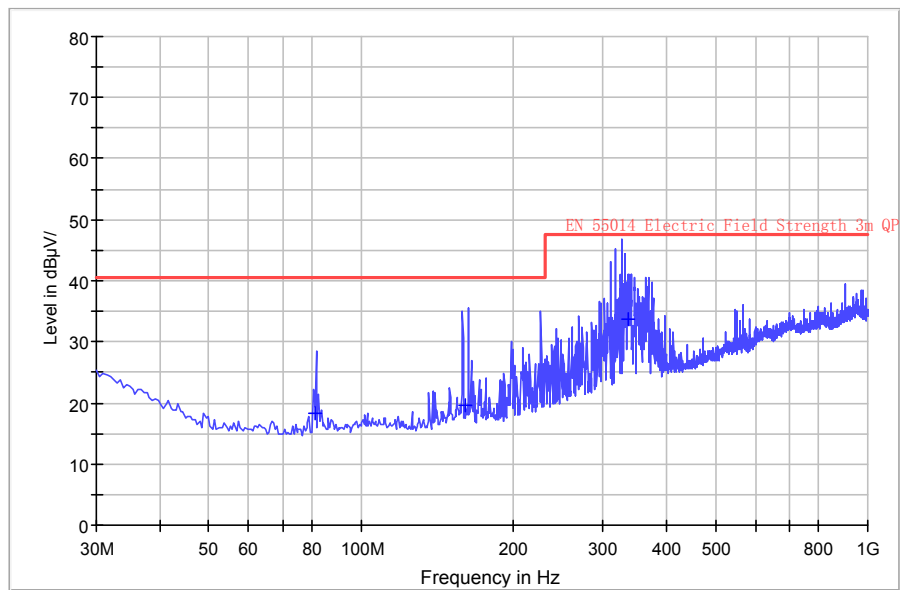
- Notes:
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (–) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4. Only emissions significantly above equipment noise floor are reported.
 5. Uncertainty: $\pm 4.8\text{dB}$ at a level of confidence of 95%.

Applicant: DONGGUAN LIYANG TOYS LTD.

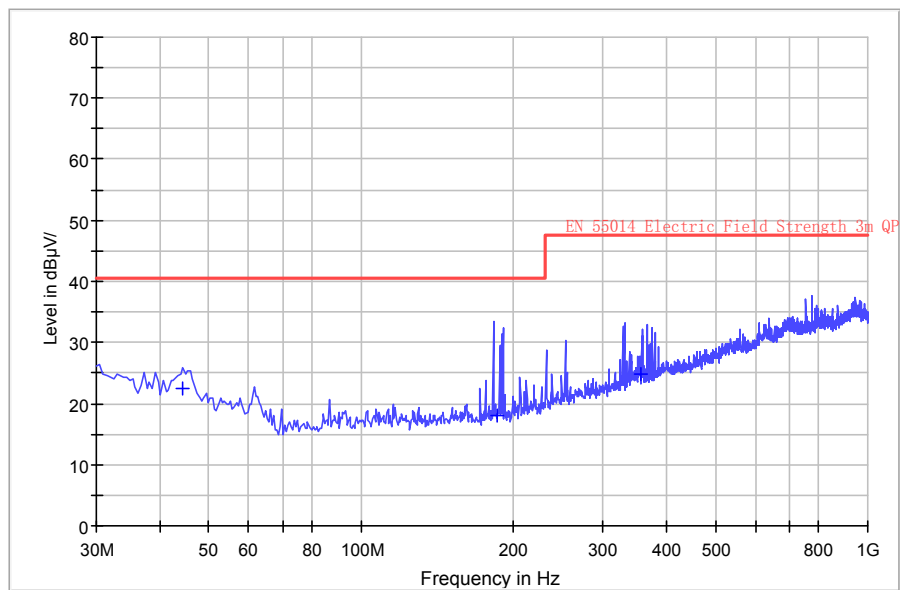
Model: BL-48900

Worst Case Operating Mode: Motor

Graphic Radiated Emissions Pursuant to EN55014-1: Emissions Requirement Horizontal



Vertical



Applicant: DONGGUAN LIYANG TOYS LTD.

Model: BL-48900

Worst Case Operating Mode: Motor

Data Table

**Radiated Emissions
Pursuant to EN55014-1: Emissions Requirement**

Polarization	Frequency (MHz)	Net at 3m (dBµV/m)	Calculated Net at 10m (dBµV/m)	Limit at 10m (dBµV/m)	Margin (dB)
H	80.925	18.2	7.7	30.0	-22.3
H	160.950	19.5	9.0	30.0	-21.0
H	337.005	33.8	23.3	37.0	-13.7
V	44.550	22.5	12.0	30.0	-18.0
V	186.170	18.0	7.5	30.0	-22.5
V	357.375	24.8	14.3	37.0	-22.7

No emissions significantly above equipment noise floor.

Applicant: DONGGUAN LIYANG TOYS LTD.
Model: BL-48900
Worst Case Operating Mode: Charge Mode

EN55014-1 RFI Voltage Test

Used Test Equipment

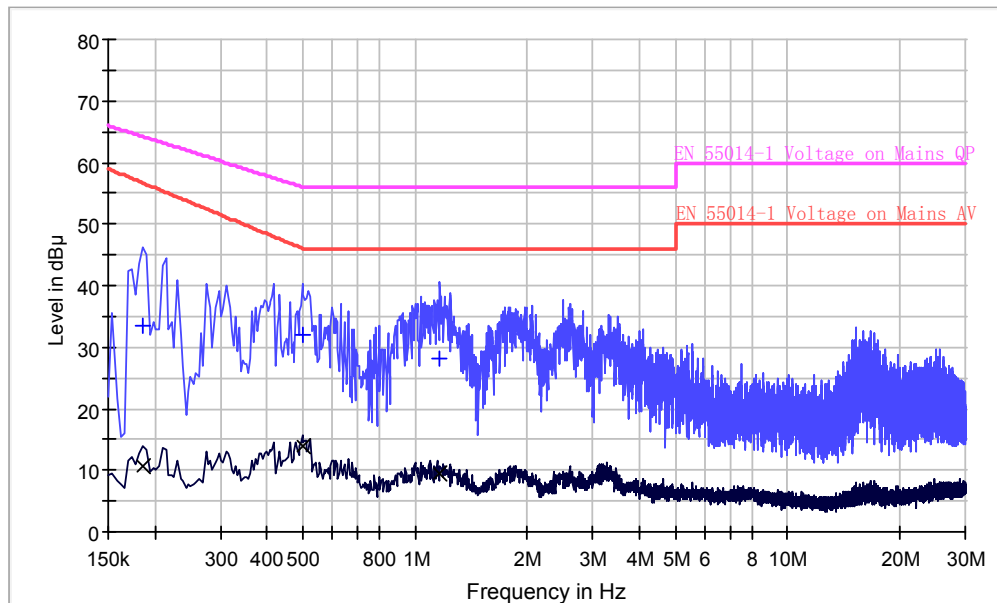
Equipment No.	Equipment	Manufacturer	Model No.	Cal. Date	Due Date
SZ187-01	LISN	R & S	ENV216	9-Nov-15	9-Nov-16
SZ187-02	LISN	R & S	ENV216	9-Nov-15	9-Nov-16
SZ185-02	EMI Test Receiver	R&S	ESCI	9-Nov-15	9-Nov-16
SZ188-03	Shielding Room	ETS	RFD-100	17-Aug-16	17-Aug-17

- Notes:
1. Peak and average detector quick scan are showed on the graph and final quasi-peak and average detector data are measured, the worst-case is recorded in the following graph and table.
 2. Frequency range scanned: 150kHz to 30MHz.
 3. Only emissions significantly above equipment noise floor are reported.
 4. Uncertainty: $\pm 3.6\text{dB}$ at a level of confidence of 95%.

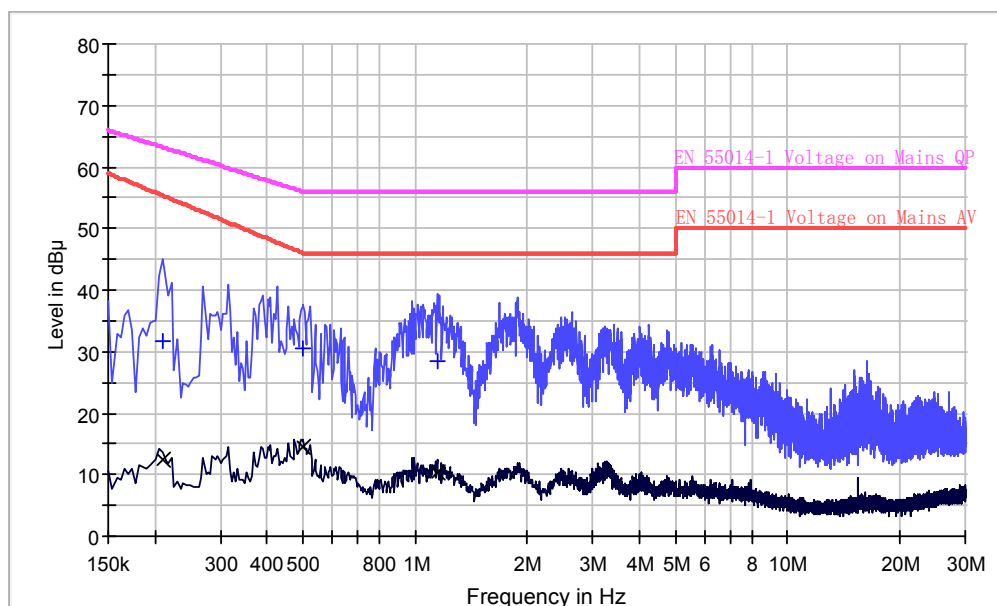
Applicant: DONGGUAN LIYANG TOYS LTD.
Model: BL-48900
Worst Case Operating Mode: Charge Mode
Phase: Live / Neutral

Graphic RFI Voltage Test Pursuant to EN 55014-1: Emissions Requirement

Live Line



Neutral Line



Applicant: DONGGUAN LIYANG TOYS LTD.
 Model: BL-48900
 Worst Case Operating Mode: Charge Mode
 Phase: Live / Neutral

Data Table

**RFI Voltage Test
 Pursuant to EN 55014-1: Emissions Requirement**

Live Line

Frequency (MHz)	Quasi-Peak		Average	
	Disturbance level dB(μV)	Permitted limit dB(μV)	Disturbance level dB(μV)	Permitted limit dB(μV)
0.186000	33.5	64.2	10.7	56.7
0.498000	32.1	56.0	13.9	46.0
1.166000	28.2	56.0	9.4	46.0

No emissions significantly above equipment noise floor.

Neutral Line

Frequency (MHz)	Quasi-Peak		Average	
	Disturbance level dB(μV)	Permitted limit dB(μV)	Disturbance level dB(μV)	Permitted limit dB(μV)
0.210000	31.7	63.2	12.3	55.4
0.498000	30.7	56.0	14.4	46.0
1.146000	28.6	56.0	10.3	46.0

No emissions significantly above equipment noise floor.

Applicant: DONGGUAN LIYANG TOYS LTD.
Model: BL-48900

EN61000-4-2
Electrostatic Discharge

Test Summary (Pursuant to EN55014-2)

Basic Standard:	IEC 61000-4-2: 1995 + A1: 1998 + A2: 2000
Port:	Enclosure
Required Performance Criterion:	B
Limit:	±8.0kV (Air Discharge)
	±4.0kV (Contact Discharge)
	±4.0kV (Indirect Contact Discharge)
Time Between Each Discharge:	1 second
Temperature:	24.1°C
Relative Humidity:	51.0%
Test Mode:	Motor, Charge Mode
Test Setup:	Table-Top
Test of Post-Installation:	N/A

Used Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Cal. Date	Due Date
SZ189-03	ESD Simulator	Teseq	NSG 435	6-Nov-15	6-Nov-16

Applicant: DONGGUAN LIYANG TOYS LTD.
Model: BL-48900

Test Results

EN61000-4-2 Electrostatic Discharge

Discharge Type	No. of Discharge	Applied Voltage	Result (Pursuant to EN55014-2, Criterion B)
Contact Discharge	20	±4kV	OK
Air Discharge	20	±8kV	OK
Indirect HCP Discharge	20	±4kV	OK
Indirect VCP Discharge	20	±4kV	OK

Additional Information

No observable change

Applicant: DONGGUAN LIYANG TOYS LTD.
 Model: BL-48900

**EN61000-4-4
 Electrical Fast Transient / Burst**

Test Summary (Pursuant to EN55014-2)

Basic Standard:	IEC 61000-4-4: 2004
Port:	AC Power Lines
Required Performance Criterion:	B
Limit:	±1.0kV
Temperature:	25.0°C
Relative Humidity:	55.0%
Test Duration:	1 minute
Test Mode:	Charge Mode
Test Setup:	Table-Top
Generator Drive:	Internal
Sequence of Application:	Multiple

Used Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Cal. Date	Due Date
SZ063-01	Compact Immunity Tester	Haefely	ECOMPACT 4	23-Jan-16	23-Jan-17



Applicant: DONGGUAN LIYANG TOYS LTD.
Model: BL-48900

Test Results

EN61000-4-4 Electrical Fast Transient / Burst

Port	Level	Polarity	Result (Pursuant to EN55014-2, Criterion B)
AC Power Lines	1kV	+	OK
	1kV	-	OK
DC Power Lines	0.5kV	+	N/A
	0.5kV	-	N/A
Signal Lines	0.5kV	+	N/A
	0.5kV	-	N/A
Control Lines	0.5kV	+	N/A
	0.5kV	-	N/A

- Additional Information
- No observable change

Applicant: DONGGUAN LIYANG TOYS LTD.
 Model: BL-48900

EN61000-4-5 Surge Immunity

Test Summary (Pursuant to EN55014-2)

Basic Standard:	IEC 61000-4-5: 2005		
Port:	AC Power Lines		
	Phase and Neutral	Phase and Earth	Neutral and Earth
Limit:	5 Positive and 5 Negative Surges		
	±1kV	±2kV	±2kV
Generator Impedance:	2ohm	12ohm	12ohm
Required Performance Criterion:	B		
Repetition Rate:	1 minute		
Temperature:	25.0°C		
Relative Humidity:	55.0%		
Test Mode:	Charge Mode		
Test Setup:	Table-Top		
Surge Generator Trigger:	Internal		
Installation Condition:	Class 3: Electrical environment where cables run in parallel.		
Phase Angle:	90°, 270°		

Used Test Equipment

Equip No.	Equipment	Manufacturer	Model No.	Cal. Date	Due Date
SZ063-01	Compact Immunity Tester	Haefely	ECOMPACT 4	23-Jan-16	23-Jan-17



Applicant: DONGGUAN LIYANG TOYS LTD.
Model: BL-48900

Test Results
EN61000-4-5
Surge Immunity

Level	Result (Pursuant to EN55014-2, Criterion B)
Between Phase and Neutral: ±1kV	OK
Between Phase and Earth: ±2kV	N/A
Between Neutral and Earth: ±2kV	N/A

- Additional Information
- No observable change

Applicant: DONGGUAN LIYANG TOYS LTD.
 Model: BL-48900

EN61000-4-6
Injected Current (0.15MHz to 230MHz)

Test Summary (Pursuant to EN55014-2)

Basic Standard:	IEC 61000-4-6: 2003 + A1: 2004 + A2: 2006
Port:	AC Power Lines
Required Performance Criterion:	A
Limit:	3.0V (rms)
Test Modulation:	1kHz, 80% AM
Frequency:	0.15MHz to 230MHz
Dwell Time:	1s
Frequency Step:	1%
Temperature:	25.0°C
Relative Humidity:	55.0%
Coupling Factor of CDN:	-1.0dB ~ -1.7dB
Test Mode:	Charge Mode
Test Setup:	Table-Top
Equipment Under Test (EUT):	Single Unit

Used Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Cal. Date	Due Date
SZ180-02	Signal Generator	Aeroflex	2023A	7-Feb-2016	7-Feb-2017
SZ181-03	Amplifier	AR-WORLDWIDE	75A250	7-Feb-2016	7-Feb-2017
SZ181-03-01	Attenuator	AR-WORLDWIDE	6dB/50FH-006-100	7-Feb-2016	7-Feb-2017
SZ184-01	Coupling-Decoupling Network	LUTHI	CDN L-801 M2/M3	7-Feb-2016	7-Feb-2017



Applicant: DONGGUAN LIYANG TOYS LTD.
Model: BL-48900

Test Results

EN61000-4-6 Injected Current (0.15MHz to 230MHz)

Port	Frequency (MHz)	Level	Result (Pursuant to EN55014-2, Criterion A)
AC Power Lines	0.15 to 230	3V (rms)	N/A
DC Power Lines	0.15 to 230	1V (rms)	N/A
Signal Lines	0.15 to 230	1V (rms)	N/A
Control Lines	0.15 to 230	1V (rms)	OK

- Additional Information
- No observable change

Applicant: DONGGUAN LIYANG TOYS LTD.
 Model: BL-48900

EN61000-4-11 Voltage Dips and Interruptions

Test Summary (Pursuant to EN55014-2)

Basic Standard	EN 61000-4-11: 2004			
Port:	A.C. Power Lines			
Limit:	Test level in %UT	Duration (Periods)		Required Performance Criterion
		50Hz	60Hz	
	0	0.5	0.5	C
	40	10	12	C
	70	25	30	C
No. of dips/interruptions:	3			
Test Mode:	Charge Mode			
Test Setup:	Test generator causes the interference of the EUT AC mains			

U_T is the rated voltage for the equipment.

Used Test Equipment

Equip No.	Equipment	Manufacturer	Model No.	Cal. Date	Due Date
SZ063-01	Compact Immunity Tester	Haefely	ECOMPACT 4	23-Jan-16	23-Jan-17

Applicant: DONGGUAN LIYANG TOYS LTD.
Model: BL-48900

Test Results

EN61000-4-11 Voltage Dips and Interruptions

Test condition			Result (Pursuant to EN55014-2, Criterion C)
Test Level in %UT	Duration (Periods)		
	50Hz	60Hz	
0	0.5	0.5	OK
40	10	12	OK
70	25	30	OK

Additional Information

No observable change

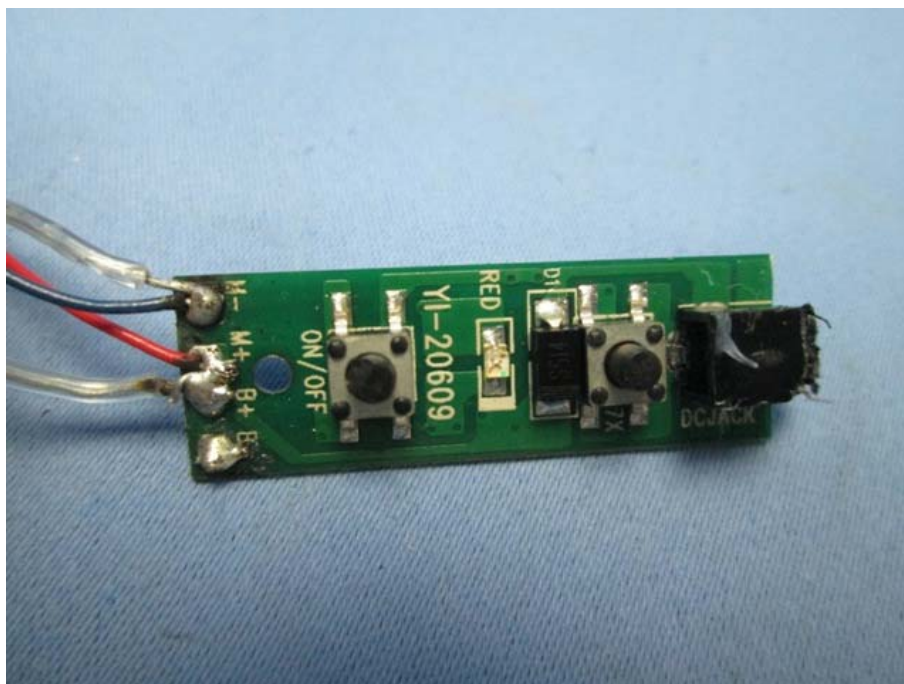
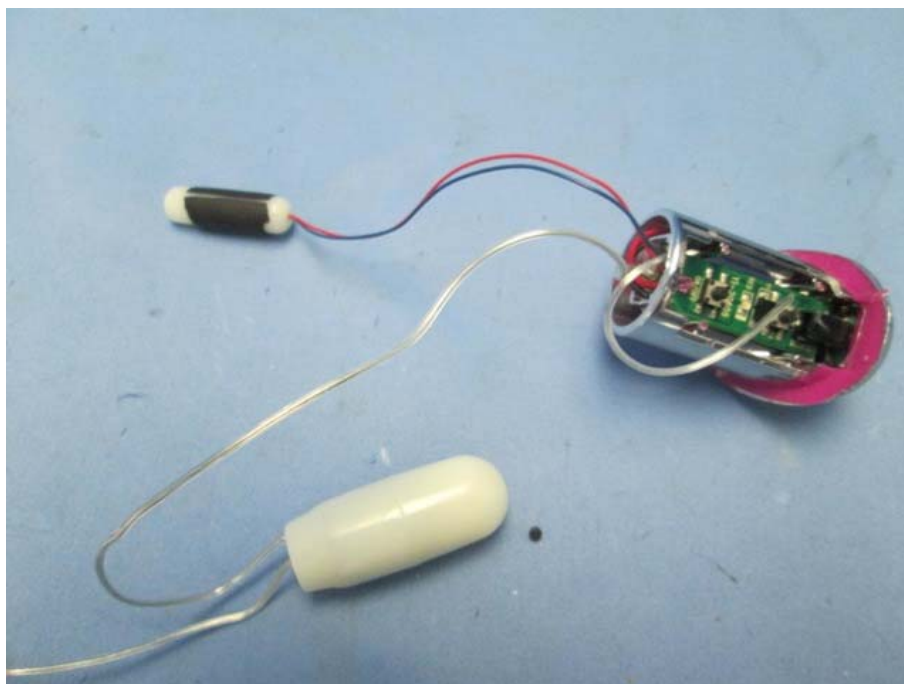
Applicant: DONGGUAN LIYANG TOYS LTD.
Model: BL-48900

External Photo



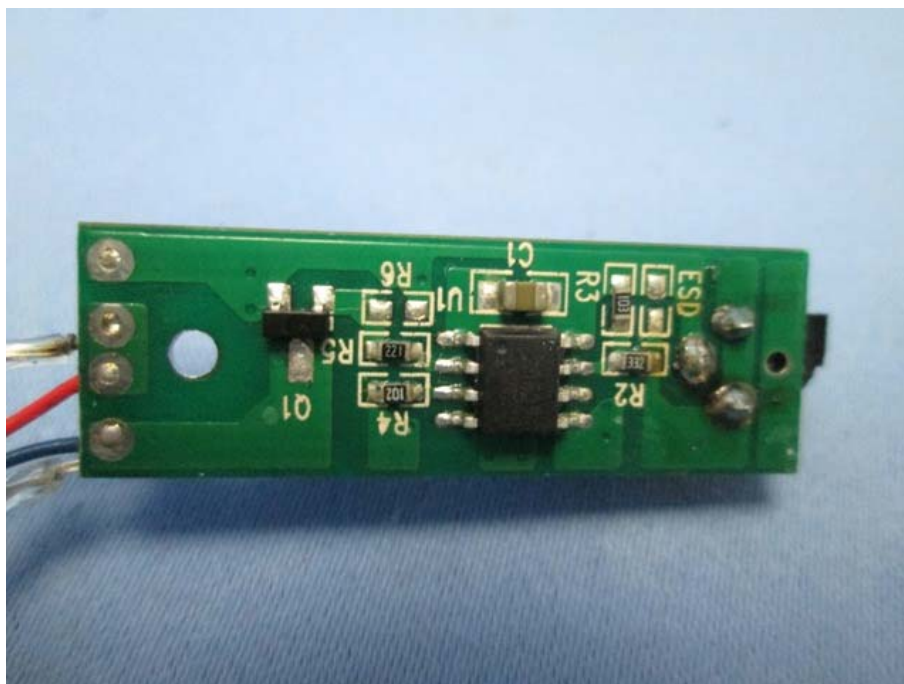
Applicant: DONGGUAN LIYANG TOYS LTD.
Model: BL-48900

Internal Photo



Applicant: DONGGUAN LIYANG TOYS LTD.
Model: BL-48900

Internal Photo



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