

## Hong Kong Standards and Testing Centre

Applicant: New-Ray Toys Co., Ltd.

Unit 9, 12/F Houston Centre, 63 Mody Road, Tsimshatsui East, Kowloon, Hong Kong

**Description of Samples:** Model name: R/C Racing Car

Model no.: 89826

Brand name: New-Ray Toys Co., Ltd.

FCC ID: Q4S89826

Date Samples Received: 2005-03-18

**Date Tested:** 2005-03-29

Investigation Requested: FCC Part 15 Subpart C

Conclusions: The submitted product <u>COMPLIED</u> with the

requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on

Section 2.2 in this Test Report.

Remarks: ----

K C Lee, EMC for Chief Executive

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### 香港新界大埔工業村大宏街 10 號



### Hong Kong Standards and Testing Centre

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### 1.0 General Details

#### 1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd. EMC Laboratory 10 Dai Wang Street, Taipo Industrial Estate New Territories, Hong Kong

Telephone: 852 2666 1888 Fax: 852 2664 4353

# 1.2 Applicant Details Applicant

New-Ray Toys Co., Ltd. Unit 9, 12/F Houston Centre, 63 Mody Road, Tsimshatsui East, Kowloon, Hong Kong

### **HKSTC Code Number for Applicant**

**NER001** 

#### Manufacturer

New-Ray Toys Co., Ltd. Unit 9, 12/F Houston Centre, 63 Mody Road, Tsimshatsui East, Kowloon, Hong Kong



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# 1.3 Equipment Under Test [EUT] Description of Sample

Model Name: R/C Racing Car
Manufacturer: New-Ray Toys Co

Manufacturer: New-Ray Toys Co., Ltd. New-Ray Toys Co., Ltd. New-Ray Toys Co., Ltd.

Model Number: 89826

Assortment No.: 80000-89999

Input Voltage: 6Vd.c ("LR44" size battery x 4)

#### 1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a New-Ray Toys Co., Ltd., R/C Racing Car. The transmitter is a joystick transmitter. The EUT continues to transmit while button is being pressed, Modulation by IC. and type is pulse modulation.

#### 1.4 Date of Order

2005-03-18

### 1.5 Submitted Sample(s):

3 samples per model

#### 1.6 Test Duration

2005-03-29

### 1.7 Country of Origin

China



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### 1.8 Additional Information of EUT

	Submitted	Not Available
User Manual		
Part List		5
Circuit Diagram		
Printed Circuit Board [PCB] Layout		
Block diagram	$\boxtimes$	
FCC ID Label	$\boxtimes$	



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### 2.0 Technical Details

### 2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 and ANSI C63.4:2003 for FCC Certification.

### 2.2 Test Standards and Results Summary Tables

EMISSION									
Results Summary									
Test Condition	Test Requirement	Test Method	Class /	Te	est Resul	t			
			Severity	Pass	Failed	N/A			
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.227	ANSI C63.4:2003	N/A						
Radiated Emissions, 30MHz to 1GHz	FCC 47CFR 15.209	ANSI C63.4:2003	Class B						
Conducted Emissions on AC, 0.15MHz to 30MHz	FCC 47CFR 15.207	ANSI C63.4:2003	Class B						

Note: N/A - Not Applicable



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### 3.0 Test Results

#### 3.1 Emission

#### 3.1.1 Radiated Emissions (30 – 1000MHz)

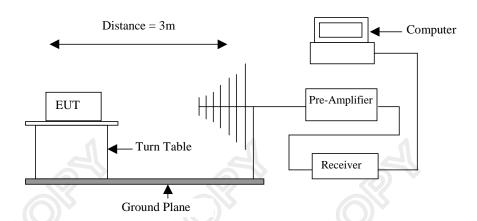
Test Requirement: FCC 47CFR 15.227
Test Method: ANSI C63.4:2003
Test Date: 2005-03-29
Mode of Operation: On mode

#### **Test Method:**

The sample was placed 0.8m above the ground plane on the OATS \*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

\*: OATS [Open Area Test Site] located at HKSTC with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

#### **Test Setup:**





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#### Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.227]:

Frequency Range of	Field Strength of	Field Strength of
Fundamental	Fundamental Emission	Fundamental Emission
	[Peak]	[Average]
[MHz]	[μV/m]	[μV/m]
26.96-27.28	100,000	10,000

#### Results:

Field Strength of Fundamental Emissions								
			Peak Value	<b>;</b>				
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field		
	Level @3m	Factor	Strength	Strength		Polarity		
MHz	dBμV/m	dBμV/m	dBµV/m	μV/m	μV/m			
27.15	37.40	21.9	59.3	922.6	100,000	Vertical		

	Field Strength of Fundamental Emissions									
Average										
Frequency	Measured	Adjusted by	Correction	Field	Field	Limit @3m	E-Field			
	Level @3m	Duty Cycle	Factor	Strength	Strength		Polarity			
MHz	dBμV/m	dB	dBµV/m	dBµV/m	μV/m	μV/m				
27.15	32.1	-5.3	21.9	54.0	501.2	10,000	Vertical			

According to FCC 47CFR15.35, the limit on the radio frequency emissions as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules.

#### Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz ±4.1dB



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### Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasipeak detector and above 1000MHz are based on measurements employing an average detector.

#### Results:

	Radiated Emissions									
	Quasi-Peak									
Frequency	Me	asured	Correction		Field		Field	Limit @3m	E-Field	
	Lev	el @3m	Factor	S	trength	S	trength		Polarity	
MHz	dE	βµV/m	dBμV/m	d	BµV/m	- 1	μV/m	μV/m		
54.29	<	1.0	9.8	<	10.8	<	3.5	100	Vertical	
81.44	<	1.0	9.8	<	10.8	<	3.5	100	Vertical	
108.58	<	1.0	11.5	<	12.5	<	4.2	150	Vertical	
135.73	<	1.0	15.9	<	16.9	<	7.0	200	Vertical	
162.87	<	1.0	17.4	<	18.4	<	8.3	200	Vertical	
190.02	<	1.0	17.2	<	18.2	<	8.1	200	Vertical	
217.16	<	1.0	18.8	<	19.8	<	9.8	200	Vertical	
244.31	<	1.0	19.7	<	20.7	<	10.8	200	Vertical	
271.45	<	1.0	20.6	<	21.6	<	12.0	200	Vertical	

Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz ±4.1dB



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### 3.1.1 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement: FCC 47CFR 15.107
Test Method: ANSI C63.4:2003

Test Date: N/A
Mode of Operation: N/A

Results: N/A

The EUT is operated by a single source of internal battery power [located in the battery compartment], therefore power line conducted emission was deemed unnecessary.



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### 3.2 20dB Bandwidth of Fundamental Emission

Test Requirement: FCC 47 CFR 15.227

Test Method: ANSI C63.4:2003 (Section 13.1.7)

Test Date: 2005-03-29 Mode of Operation: On mode

#### **Test Method:**

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

#### **Test Setup:**

As Test Setup of clause 3.1.1 in this test report.



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#### Limits for 20 dB Bandwidth of Fundamental Emission:

Frequency Range	20dB Bandwidth	FCC Limits
[MHz]	[KHz]	[MHz]
27.145	49.8	within 26.96-27.28

### 20dB Bandwidth of Fundamental Emission

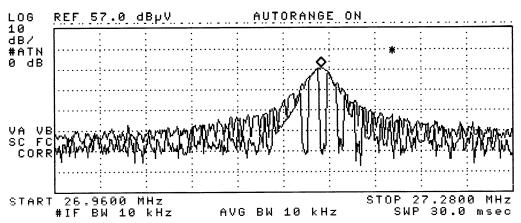
 Ø9:11:24 JAN 16, 1995 23:49:37 NOV 12, 1997

 MARKER
 ACTV DET: PEAK

 27.1464 MHz
 MEAS DET: PEAK QP AVG

37.52 dBµV

MKR 27.1464 MHz 37.52 dBµV





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### Appendix A

### **List of Measurement Equipment**

### **Radiated Emission**

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EM007	SPECTRUM ANALYZER	HEWLETT PACKARD	HP85660B	3144A21192	15/06/04
EM008	SPECTRUM ANALYZER DISPLAY	HEWLETT PACKARD	HP85662A	3144A20514	15/06/04
EM009	QUASI PEAK ADAPTOR	HEWLETT PACKARD	HP85650A	3303A01702	15/06/04
EM010	RF PRESELECTOR	HEWLETT PACKARD	HP85685A	3221A01410	15/06/04
EM011	ATTENUATOR/SWITCH	HEWLETT PACKARD	HP11713A	2508A10595	15/06/04
EM012	PRE-AMPLIFIER	HEWLETT PACKARD	HP8449B	3008A00262	15/06/04
EM013	CONTROLLER (COMPUTER), COLOR MONITOR, KEYBOARD , MOUSE & FLOPPY DRIVE	HEWLETT PACKARD	HP9000 HP A1097C HP9133L	6226A60314 3151J39517 2623A02468	15/06/04
EM020	HORN ANTENNA	ETS-Linggren	3115	4032	30/07/03
EM022	LOOP ANTENNA	ETS-Linggren	6502	1189-2424	19/09/03
EM072	SIGNAL GENERATOR	HEWLETT PACKARD	8640B	1948A11892	N/A
EM083	OPEN AREA TEST SITE	HKSTC	N/A	N/A	08/02/03
EM131	EMC ANALYZER	HEWLETT PACKARD	8595EM	3710A00155	13/01/04
EM145	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESCS 30	830245/021	04/10/04
EM195	ANTENNA POSITIONING MAST	ETS-Linggren	2075	2368	N/A
EM196	MULTI-DEVICE CONTROLLER	ETS-Linggren	2090	1662	N/A
EM215	MULTIDEVICE CONTROLER	ETS-Linggren	2090	00024676	N/A
EM216	MINI MAST SYSTEM	ETS-Linggren	2075	00026842	N/A
EM217	ELECTRIC POWERED TURNTABLE	ETS-Linggren	2088	00029144	N/A
EM218	ANECHOIC CHAMBER	ETS-Linggren	FACT-3		19/03/04
EM219	BICONILOG ANTENNA	ETS-Linggren	3142C	00029071	28/10/03

#### **Line Conducted**

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL
EM078	VARIAC	SHANGHAI VOLTAGE	TDGC-3/0.5	N/A	CM
EM081	SMALL SCREENED ROOM	MIKO INST HK	N/A	N/A	27/01/05
EM119	LISN	ROHDE & SCHWARZ	ESH3-Z5	0831.5518.52	14/10/04
EM127	ISOLATION TRANSFORMER 220 TO 300V	WING SUN	N/A	N/A	СМ
EM142	PULSE LIMITER	ROHDE & SCHWARZ	ESH3Z2	357.8810.52	04/08/04
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	06/01/04
EM154	SHIELDING ROOM	SIEMENA MATSUSHITA COMPONENTS	N/A	803-740-057- 99A	27/01/05
EM197	LISN	ETS-Linggren	4825/2	1193	05/06/04
EM213	DIGITAL POWER METER	VICNOBL	VIP120	00277	14/09/04

#### Remarks:-

CM Corrective Maintenance N/A Not Applicable or Not Available

TBD To Be Determined



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### Appendix B

### **Duty Cycle Correction During 100msec**

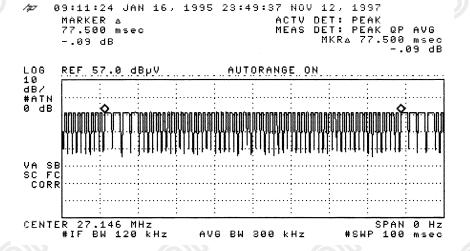
Each function key sends a different series of characters, but each packet period (77.5msec) never exceeds a series of 4 long (1.8msec) and 58 short (600µsec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered 4x1.8msec+58x600µsec per 77.5msec=54.2% duty cycle. Figure A through C show the characteristics of the pulse train for one of these functions.

#### Remarks:

Duty Cycle Correction = 20Log(0.542) =-5.3dB

The following figures [Figure A to Figure C] show the characteristics of the pulse train for one of these functions.

### Figure A [Pulse Train]



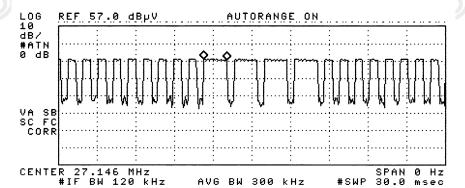


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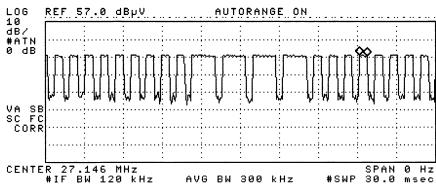
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### Figure B [Long Pulse]

Ø9:11:24 JAN 16, 1995 23:49:37 NOV 12, 1997
MARKER △ ACTV DET: PEAK
1.8000 msec MEAS DET: PEAK QP AVG
-.38 dB MKR△ 1.8000 msec
-.38 dB



### Figure C [Short Pulse]





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### Appendix C

### **Photographs of EUT**

Front View of the product



Rear View of the product



**Inner Circuit Top View** 



**Inner Circuit Bottom View** 





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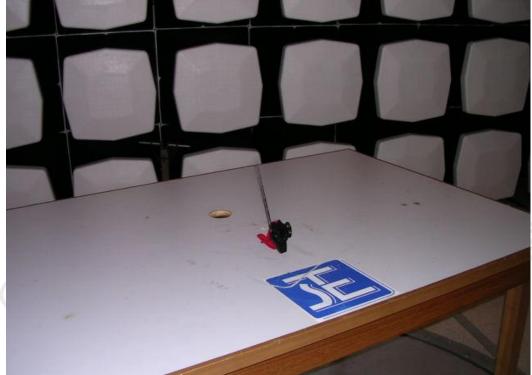
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Measurement of Radiated Emission Test Set Up

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### Photographs of EUT



\*\*\*\*\* End of Test Report \*\*\*\*\*