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**Applicant:** New-Ray Toys Co., Ltd. Unit 9, 12/F., Houston Centre, 63 Mody Road, T.S.T. East, Kowloon, Hong Kong. **Description of Samples: B/O & RADIO CONTROL IVECO FIRE** Model name: ENGINE TRUCK Model no.: 87933 Brand name: New-Ray FCC ID: Q4S87933 **Date Samples Received:** 2007-04-20 **Date Tested:** 2007-04-25 **Investigation Requested:** FCC Part 15 Subpart C **Conclusions:** The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and The tests were performed in Regulations Part 15. accordance with the standards described above and on Section 2.2 in this Test Report. **Remarks:** LEE Kam Chuen, EMD For and on behalf of The Hong Kong Standards and Testing Centre Ltd.

 The Hong Kong Standards and Testing Centre Ltd.

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List of Measurement Equipment

## Appendix B

Duty Cycle Correction During 100 msec

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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 1888Fax:852 2664 4353

## 1.2 Applicant Details

#### Applicant

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

## Manufacturer

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





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# 1.3 Equipment Under Test [EUT] Description of Sample Model Name: B/O & RADIO CONTROL IVECO FIRE ENGINE TRUCK Manufacturer: Manufacturer: New-Ray Toys Co., Ltd. Brand Name: New-Ray Model Number: 87933 Rating: 9Vd.c. ("6F22" size battery x 1)

## 1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a New-Ray Toys Co., Ltd., B/O & RADIO CONTROL IVECO FIRE ENGINE TRUCK. The transmitter is a 2 trigger transmitter. The EUT continues to transmit while trigger is being pressed, It is pulse transmitter, Modulation by IC, and type is pulse modulation.

#### 1.4 Date of Order

2007-04-20

## 1.5 Submitted Sample(s):

1 Sample

## 1.6 Test Duration

2007-04-25

## 1.7 Country of Origin

China



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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: 2006 and ANSI C63.4:2003 for FCC Certification.

## 2.2 Test Standards and Results Summary Tables

		MISSION Its Summary				
Test Condition	Test Requirement	Test Method	Class /	Т	est Resu	lt
			Severity	Pass	Failed	N/A
Field Strength of Fundamental Emissions & Spurious Emissions	FCC 47CFR 15.227	ANSI C63.4:2003	N/A	$\boxtimes$		
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.4:2003	N/A	$\boxtimes$		
Conducted Emissions on AC, 0.15MHz to 30MHz	FCC 47CFR 15.207	ANSI C63.4:2003	N/A			

Note: N/A - Not Applicable





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- 3.0 Test Results
- 3.1 Emission
- 3.1.1 Radiated Emissions (30 1000MHz)

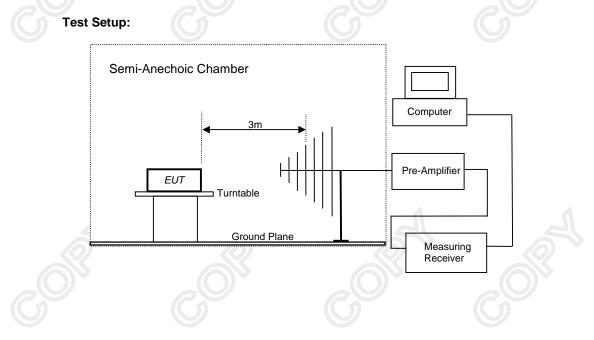
Test Requirement: Test Method: Test Date: Mode of Operation:

FCC 47CFR 15.227 ANSI C63.4:2003 2007-04-25 Tx mode

#### **Test Method:**

The sample was placed 0.8m above the ground plane on a standard radiated emission test site. 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. In the frequency range of 9kHz to 30MHz, The center of the loop antenna shall be 1 meter above the ground and rotated loop axis for maximum reading. The emissions worst-case are shown in Test Results of the following pages.

Semi-anechoic chamber located on the G/F of HKSTC with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.



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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							
Frequency	Measured	Correction	Field	Field	Limit @3m	E-Field	
	Level @3m	Factor	Strength	Strength		Polarity	
MHz	dBµV	dB/m	dBµV/m	μV/m	μV/m		
27.15	43.80	21.2	65.0	1,778.3	100,000	Vertical	

Field Strength of Fundamental Emissions Average							
Frequency		Adjusted by Duty Cycle		Field Strength	Field Strength	Limit @3m	E-Field Polarity
MHz	dBµV	dB	dB/m	dBµV/m	μV/m	μV/m	
27.15	38.7	-5.1	21.2	59.9	988.6	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 includes Antenna Factor and Cable Attenuation. Calculated measurement uncertainty : 30MHz to 1GHz ±5.2dB

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

Frequency Range	Quasi-Peak Limits
[MHz]	[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 quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

#### **Results :**

Radiated Emissions Quasi-Peak									
Frequency	Me	easured	Correction		Field		Field	Limit @3m	E-Field
	Lev	el @3m	Factor	S	trength	S	trength		Polarity
MHz	d	lBμV	dB/m	d	BµV/m	- 1	μV/m	μV/m	
54.29	Ý	1.0	9.0	<	10.0	<	3.2	100	Vertical
81.44	<	1.0	9.5	<	10.5	<	3.3	100	Vertical
108.58	۷	1.0	10.7	<	11.7	<	3.8	150	Vertical
135.73	<	1.0	10.2	<	11.2	<	3.6	200	Vertical
162.87	<	1.0	11.9	<	12.9	<	4.4	200	Vertical
190.02	<	1.0	12.4	<	13.4	<	4.7	200	Vertical
217.16	<	1.0	13.2	<	14.2	<	5.1	200	Vertical
244.31	<	1.0	15.0	<	16.0	<	6.3	200	Vertical
271.45	<	1.0	16.1	<	17.1	<	7.2	200	Vertical

#### Remarks:

Correction Factor includes Antenna Factor and Cable Attenuation. Calculated measurement uncertainty : 30MHz to 1GHz ±5.2dB



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

Test Requirement:	FCC 47CFR 15.207
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: Test Method: Test Date: Mode of Operation:

FCC 47 CFR 15.227 ANSI C63.4:2003 (Section 13.1.7) 2007-04-25 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 20dB Bandwidth of Fundamental Emission: 20dB Bandwidth FCC Limits **Frequency Range** [MHz] [MHz] [KHz] 27.145 86.4 within 26.96-27.28 20dB Bandwidth of Fundamental Emission 10 MARKER A ACTV DET: PEAK 86.4 kHz MEAS DET: PEAK QP AVG -.02 dB MKRA 86.4 kHz .02 dB L06 10 REF 87.0 dBpV dB/ #ATN 0 dB MA SB SC FC CORR START 26.9600 #IF BW 10 STOP P 27.2800 MHz SWP 30.0 msec MHz BW 10 kHz AVG BW 10 kHz



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Appendix A

## List of Measurement Equipment

		Radiated Emission					
EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.			
EM007	SPECTRUM ANALYZER	HEWLETT PACKARD	HP85660B	3144A21192			
EM008	SPECTRUM ANALYZER DISPLAY	HEWLETT PACKARD	HP85662A	3144A20514			
EM009	QUASI PEAK ADAPTOR	HEWLETT PACKARD	HP85650A	3303A01702			
EM010	RF PRESELECTOR	HEWLETT PACKARD	HP85685A	3221A01410			
EM011	ATTENUATOR/SWITCH	HEWLETT PACKARD	HP11713A	2508A10595			
EM012	PRE-AMPLIFIER	HEWLETT PACKARD	HP8449B	3008A00262			
EM020	HORN ANTENNA	ETS-Linggren	3115	4032			
EM022	LOOP ANTENNA	ETS-Linggren	6502	1189-2424			
EM072	SIGNAL GENERATOR	HEWLETT PACKARD	8640B	1948A11892			
EM083	OPEN AREA TEST SITE	HKSTC	N/A	N/A			
EM131	EMC ANALYZER	HEWLETT PACKARD	8595EM	3710A00155			
EM145	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESCS 30	830245/021			
EM195	ANTENNA POSITIONING MAST	ETS-Linggren	2075	2368			
EM196	MULTI-DEVICE CONTROLLER	ETS-Linggren	2090	1662			
EM215	MULTIDEVICE CONTROLER	ETS-Linggren	2090	00024676			
EM216	MINI MAST SYSTEM	ETS-Linggren	2075	00026842			
EM217	ELECTRIC POWERED TURNTABLE	ETS-Linggren	2088	00029144			
EM218	ANECHOIC CHAMBER	ETS-Linggren	FACT-3				
EM219	BICONILOG ANTENNA	ETS-Linggren	3142C	00029071			
EM229	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB40	100248			

## Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.
EM078	VARIAC	SHANGHAI VOLTAGE	TDGC-3/0.5	N/A
EM081	SMALL SCREENED ROOM	MIKO INST HK	N/A	N/A
EM119	LISN	ROHDE & SCHWARZ	ESH3-Z5	0831.5518.52
EM127	ISOLATION TRANSFORMER 220 TO 300V	WING SUN	N/A	N/A
EM233	PULSE LIMITER	ROHDE & SCHWARZ	ESH3-Z2	100314
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072
EM154	SHIELDING ROOM	SIEMENA MATSUSHITA COMPONENTS	N/A	803-740-057-99A
EM197	LISN	ETS-Linggren	4825/2	1193
EM213	DIGITAL POWER METER	VICNOBL	VIP120	00277

#### **Remarks:-**

- **Corrective Maintenance** СМ
- Not Applicable or Not Available N/A
- To Be Determined TBD

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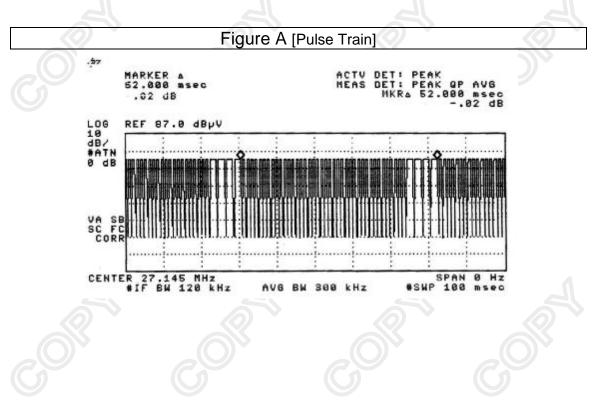
## Appendix B

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

Each function key sends a different series of characters, but each packet period (52msec) never exceeds a series of 4 long (1.65msec) and 40 short (550 $\mu$ sec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered 4x1.65msec+40x550 $\mu$ sec per 52msec=55% duty cycle. Figure A through C show the characteristics of the pulse train for one of these functions.

Remarks:

Duty Cycle Correction = 20Log(0.55) =-5.1dB



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



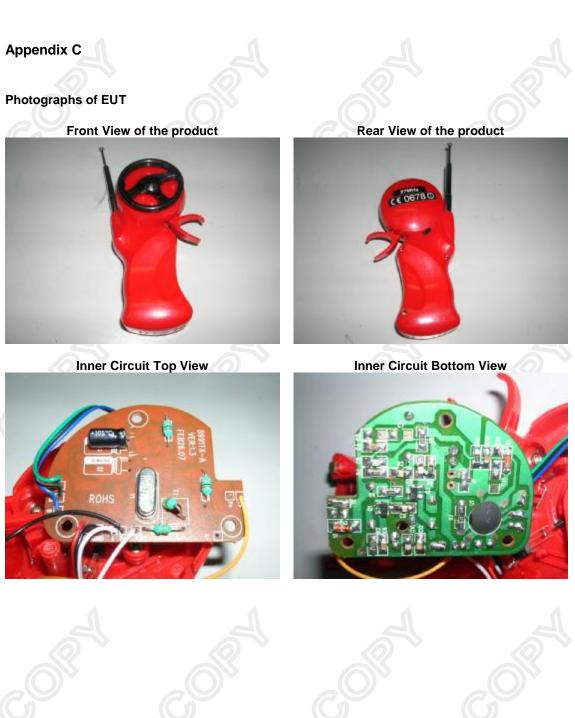
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Figure B [Long Pulse] ho ACTU DET MARKER 1.6500 PEAK ۵ PEAK ..... MKRA 1. 6500 10 d -.10 dB dB REF 87.0 dBpV LOG 10 10 dB/ #ATN 0 dB SC CENTER 27.145 MHz #IF BW 120 kHz SPAN 0 Hz 30.0 msec AVG BW 300 kHz #SWP Figure C [Short Pulse] no MARKER 550.00 ACTV DET: Ausec PEAK QP AVG .00 00 dB 550 .00 dB L06 10 dB/ #ATN 0 dB REF 87.0 dBpV VA S SC F COR 0 Hz SPAN 20.0 CENTER 27.145 MHz #IF BW 128 kHz AVG BW 300 kHz #SWP

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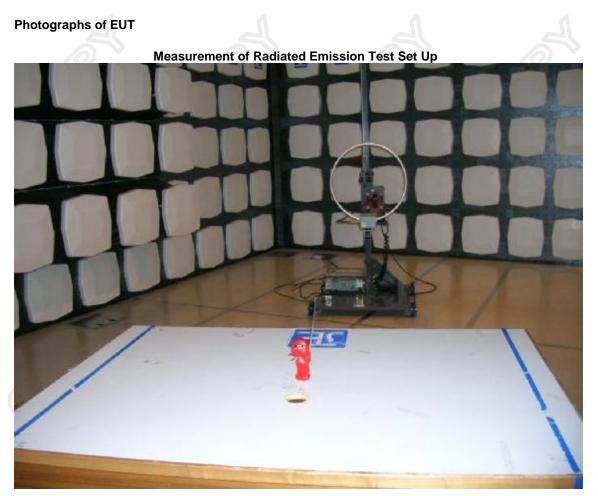
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## \*\*\*\*\* End of Test Report \*\*\*\*\*



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