

Hong Kong Standards and Testing Centre

Applicant: 21st Century Toys, Inc.

2456 Verna Court, San Leandro, CA 94577

United States

Description of Samples: Model name: RADIO CONTROL HMMWV

M1045A2 TOW Missile Carrier

Model no.: RC09038

Brand name: 21st Century Toys FCC ID: SM3RC09038D

Date Samples Received: 2004-12-18

Date Tested: 2004-12-30

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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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

21st Century Toys, Inc. 2456 Verna Court, San Leandro, CA 94577 United States

HKSTC Code Number for Applicant

NEM005

Manufacturer

Kin Sun Industrial Ltd. 2-12 Au Pui Wan St., Fo Tan, Shatin, N.T., Hong Kong.



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1.3 Equipment Under Test [EUT] Description of Sample

Model Name: RADIO CONTROL HMMWV M1045A2 TOW Missile Carrier

Manufacturer: Kin Sun Industrial Ltd. Brand Name: 21st Century Toys

Model Number: RC09038

Input Voltage: 12Vd.c ("AA" size battery x 8)

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a 21st Century Toys, Inc., RADIO CONTROL HMMWV M1045A2 TOW Missile Carrier. The transmitter is a 3 button, 1 wheel and 1 trigger transmitter. The EUT continues to transmit while button is being pressed, Modulation by IC. and type is pulse modulation.

1.4 Date of Order

2004-12-18

1.5 Submitted Sample(s):

4 Samples

1.6 Test Duration

2004-12-30

1.7 Country of Origin

China



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1.8 Additional Information of EUT

	Submitted	Not Available
User Manual		
Part List		
Circuit Diagram		
Printed Circuit Board [PCB] Layout		
Block diagram		
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 / Test Result									
			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, 30MHz to 1GHz	FCC 47CFR 15.209	ANSI C63.4:2003	Class B	\boxtimes) 10			
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)

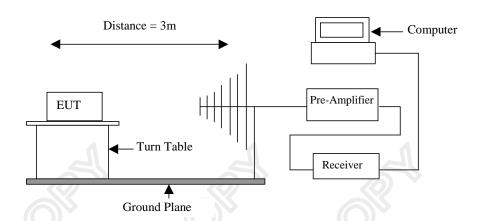
Test Requirement: FCC 47CFR 15.227
Test Method: ANSI C63.4:2003
Test Date: 2004-12-30
Mode of Operation: On mode

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	Spurious 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/m	dBµV/m	dBµV/m	μV/m	μV/m		
27.05	55.40	21.9	77.3	7,328.2	100,000	Vertical	

Field Strength of Fundamental Emissions								
Average								
Frequency	requency 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		
27.05	53.9	-1.5	21.9	75.8	6,166.0	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	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				
54.09	25.8	10.1	35.9	62.4	100	Vertical			
81.14	12.8	9.5	22.3	13.0	100	Horizontal			
108.18	17.3	10.7	28.0	25.1	150	Horizontal			
135.23	25.6	10.2	35.8	61.7	200	Horizontal			
162.27	< 1.0	17.4	< 18.4	< 8.3	200	Vertical			
189.32	< 1.0	17.2	< 18.2	< 8.1	200	Vertical			
216.36	< 1.0	18.8	< 19.8	< 9.8	200	Vertical			
243.41	< 1.0	19.7	< 20.7	< 10.8	200	Vertical			
270.45	< 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: 2004-12-30 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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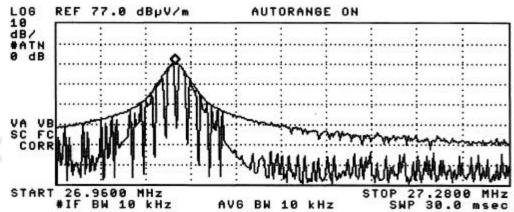
Limits for 20 dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [KHz]	FCC Limits [MHz]
27.045	40.8	within 26.96-27.28

20dB Bandwidth of Fundamental Emission









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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	ATTENNUATOR/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 HEWLETT PACKARD HEWLETT PACKARD	HP9000 HP A1097C HP9133L	6226A60314 3151J39517 2623A02468	15/06/04
EM020	HORN ANTENNA	EMCO	3115	4032	30/07/03
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	30/07/03
EM072	SIGNAL GENERATOR	HEWLETT PACKARD	8640B	1948A11892	N/A
EM083	HKSTC OPEN AREA TEST SITE	HKSTC	N/A	N/A	08/02/03
EM131	PORTABLE SPECTRUM ANALYSER	HEWLETT PACKARD	8595EM	3710A00155	13/01/04
EM145	EMI TEST RECEIVER	R&S	ESCS 30	830245/021	04/10/04
EM219	BICONILOG ANTENNA	EMCO	3142C	00029071	28/10/03
EM195	ANTENNA POSITIONING MAST	EMCO	2075	2368	N/A
EM196	MULTI-DEVICE CONTROLLER	EMCO	2090	1662	N/A

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	17/10/03
EM119	LISN	R&S	ESH3-Z5	0831.5518.52	14/10/04
EM127	ISOLATION TRANSFORMER 220 TO 300	WING SUN	N/A	N/A	СМ
EM142	PULES LIMITER	R&S	ESH3Z2	357.8810.52	04/08/04
EM181	EMI TEST RECEIVER	R&S	ESIB7	100072	06/01/04
EM154	SHIELDING ROOM	SIEMENA MATSUSHITA COMPONENTS	N/A	803-740-057- 99A	17/10/03
EM197	LISN	EMCO	4825/2	1193	05/06/04

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

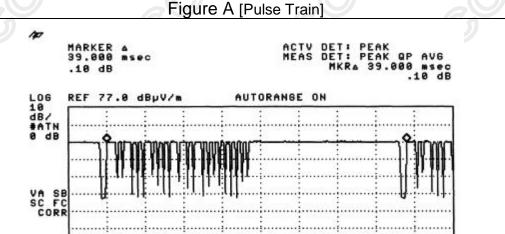
Each function key sends a different series of characters, but each packet period (39msec) never exceeds a series of 8 long (19.625 and 0.9msec) and 15 short (450µsec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered 19.625+7x0.9msec+15x0.45msec) per 39msec=83.7% duty cycle. Figure A through C show the characteristics of the pulse train for one of these functions.

Remarks:

Duty Cycle Correction = 20Log(0.837) =-1.5dB

.0448 BW 10

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



AVG BW 10

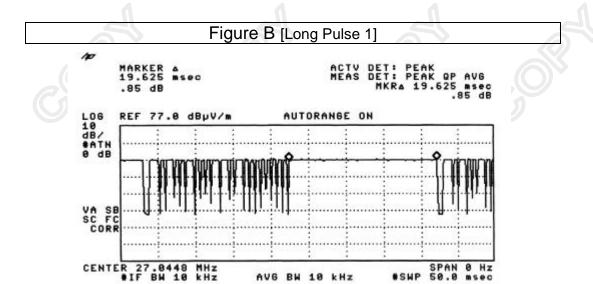
SPAN

0 Hz

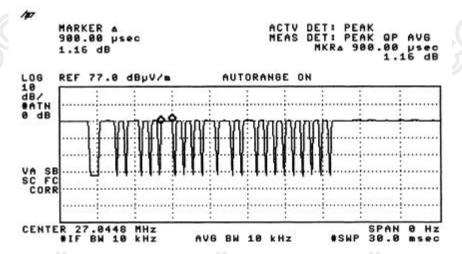


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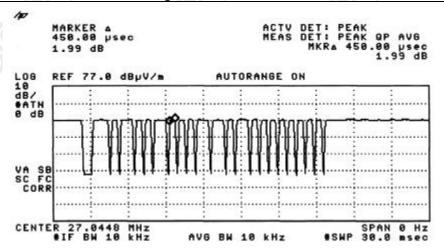




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Figure C [Short Pulse]





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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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Photographs of EUT

Measurement of Radiated Emission Test Set Up

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