

Hong Kong Standards and Testing Centre

No. : HM153010

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: SM3RC09038A

Date Samples Received: 2004-12-02

Date Tested: 2004-12-07

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

2004-12-02

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2004-12-07

1.7 Country of Origin

China



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1.8 Additional Information of EUT

| | Submitted | NUL 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 / | Te | est 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 | | ЛO | | |
| Conducted Emissions on AC, 0.15MHz to 30MHz | FCC 47CFR 15.207 | ANSI C63.4:2003 | Class B | | | \boxtimes | | |

Note: N/A - Not Applicable



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3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions (30 - 1000MHz)

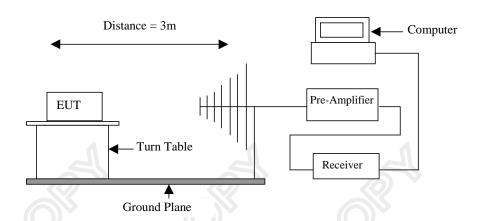
Test Requirement: FCC 47CFR 15.227
Test Method: ANSI C63.4:2003
Test Date: 2004-12-07
Mode of Operation: On mode

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: 90657.

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 | | | | | | | | |
| 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 | 27.15 40.70 21.9 62.6 1,349.0 100,000 Vertical | | | | | | | | |
| | | | | | | | | | |

| Field Strength of Fundamental Emissions | | | | | | | | | |
|---|---|------|--------|--------|---------|--------|----------|--|--|
| | Average | | | | | | | | |
| Frequency | 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 | 40.0 | -0.7 | 21.9 | 61.9 | 1,244.5 | 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 | | | | |
| 54.10 | 24.5 | 10.1 | 34.6 | 53.7 | 100 | Vertical | | | |
| 81.15 | 12.8 | 9.5 | 22.3 | 13.0 | 100 | Horizontal | | | |
| 108.20 | 15.7 | 10.7 | 26.4 | 20.9 | 150 | Vertical | | | |
| 135.25 | 24.7 | 10.2 | 34.9 | 55.6 | 200 | Horizontal | | | |
| 162.30 | < 1.0 | 17.4 | < 18.4 | < 8.3 | 200 | Vertical | | | |
| 189.35 | < 1.0 | 17.2 | < 18.2 | < 8.1 | 200 | Vertical | | | |
| 216.40 | < 1.0 | 18.8 | < 19.8 | < 9.8 | 200 | Vertical | | | |
| 243.45 | < 1.0 | 19.7 | < 20.7 | < 10.8 | 200 | Vertical | | | |
| 270.50 | < 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: 2004-12-07 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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START

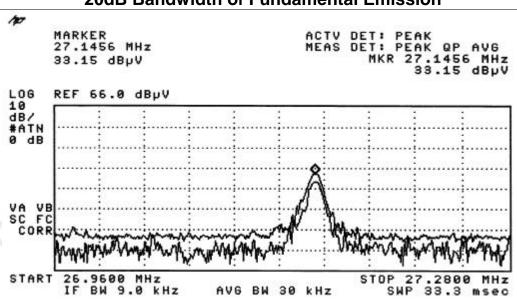
9600

BW 9.0 kHz

Limits for 20 dB Bandwidth of Fundamental Emission:

| Frequency Range | 20dB Bandwidth | FCC Limits |
|-----------------|----------------|--------------------|
| [MHz] | [KHz] | [MHz] |
| 27.145 | 28 | within 26.96-27.28 |

20dB Bandwidth of Fundamental Emission



AV6 BW 30 kHz

STOP



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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 | 15/06/04 |
| EM022 | LOOP ANTENNA | EMCO | 6502 | 1189-2424 | 04/08/00 |
| EM072 | SIGNAL GENERATOR | HEWLETT PACKARD | 8640B | 1948A11892 | N/A |
| EM083 | HKSTC OPEN AREA TEST SITE | HKSTC | N/A | N/A | 08/11/02 |
| EM131 | PORTABLE SPECTRUM ANALYSER | HEWLETT PACKARD | 8595EM | 3710A00155 | 13/01/04 |
| EM145 | EMI TEST RECEIVER | R&S | ESCS 30 | 830245/021 | 02/08/03 |
| EM194 | BICONILOG ANTENNA | EMCO | 3142B | 1795 | 21/10/03 |
| EM195 | ANTENNA POSITIONING MAST | EMCO | 2075 | 2368 | N/A |
| EM196 | MULTI-DEVICE CONTROLLER | EMCO | 2090 | 1662 | N/A |

Conducted Emission

| 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 | 01/10/02 |
| EM127 | ISOLATION TRANSFORMER 220 TO 300 | WING SUN | N/A | N/A | СМ |
| EM142 | PULES LIMITER | R&S | ESH3Z2 | 357.8810.52 | 07/07/03 |
| 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 | 08/04/03 |

Remarks:

CM Corrective Maintenance
N/A Not Applicable or Not Available

TBD To Be Determined



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Appendix B

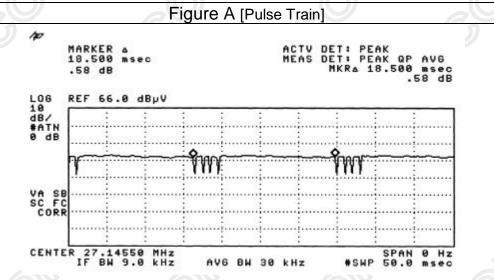
Duty Cycle Correction During 100msec

Each function key sends a different series of characters, but each packet period (18.5msec) never exceeds a series of 4 long (13.95msec) and short (1.5 and 0.75msec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered 13.95msec+1.5msec+(0.75msecx2) per 18.5msec=91.6% duty cycle. Figure A through C show the characteristics of the pulse train for one of these functions.

Remarks:

Duty Cycle Correction = 20Log(0.916) =-0.7dB

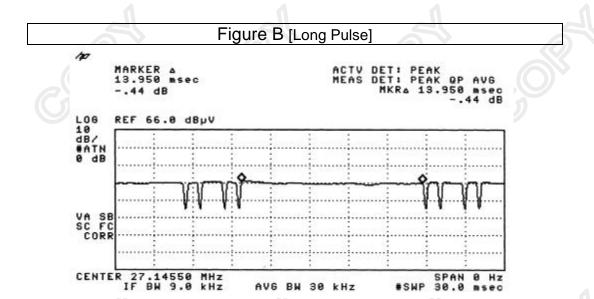
The following figures [Figure A to Figure C] show the characteristics of the pulse train for one of these functions.

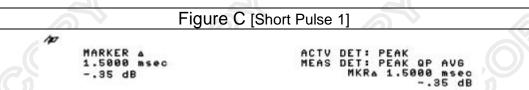


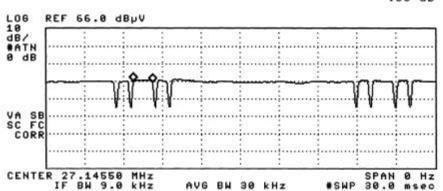


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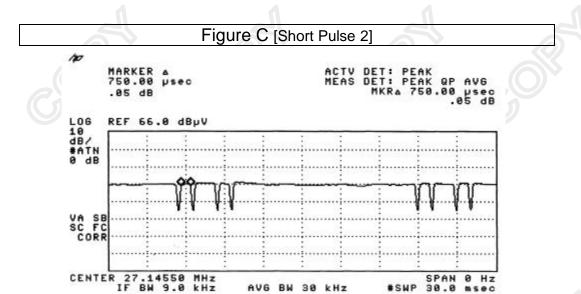






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Appendix C

Photographs of EUT

Front View of the product



Rear View of the product



Inner Circuit Top View



Inner Circuit Bottom View

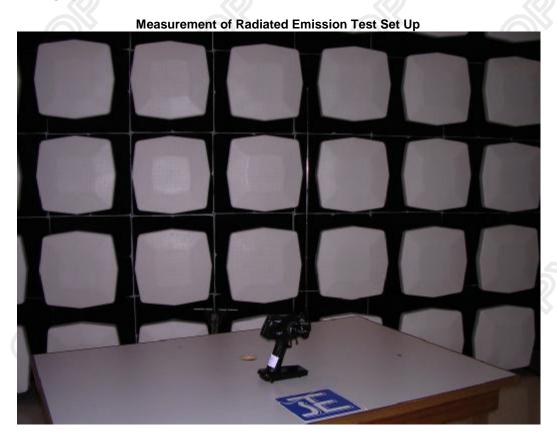




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Photographs of EUT



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