



**TEST REPORT**

Report No. : AM0016751 Date : 2010-05-05  
 Application No. : LM221418  
 Applicant : Mattel Asia Pacific Sourcing Ltd.  
 1301, South Tower, World Finance Center,  
 Harbour City, Tsim Sha Tsui,  
 Hong Kong.

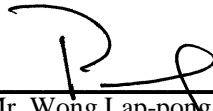
Sample Description : One (1) submitted sample(s) stated to be:

Sample Descriptions	Model
TYCO® R/C Cars Radio Control Made Easy Lightning McQueen	M2314, N7778
TYCO® R/C Cars Radio Control Made Easy Assortment	N8049
Hot Wheels® R/C Monster Jam® Grave Digger®	N4053
TYCO® R/C GT Racer™ Radio Control Vehicle	H9283
Fire Truck 27MHz	K7218
Matchbox® R/C Radio Control Police Vehicle	M2570
Matchbox® R/C Radio Control Dump Truck Construction Vehicle	M2572
RC BM My First Batmobile	M0784
Matchbox® R/C 27MHz Assortment	H9301

Radio Frequency : 27.145MHz Transmitter  
 Rating : 2 x 1.5V AA size batteries  
 No. of submitted sample : Two (2) piece(s)

Date Received : 2010-04-28.  
 Test Period : 2010-04-30 to 2010-05-04.  
 Test Requested : FCC Part 15 Class II Permissive Change.  
 Test Method : 47 CFR Part 15 (10-1-09 Edition)  
 ANSI C63.4 – 2003  
 Test Result : See attached sheet(s) from page 2 to 11.  
 Conclusion : The submitted sample was found to comply with requirement of FCC Part 15 Subpart C.  
 Remark : All ten models are the same in circuitry, components and construction. Therefore, model M2314 was chosen to be the representative of the test samples.

*For and on behalf of*  
**CMA Industrial Development Foundation Limited**

Authorized Signature :   
 Mr. Wong Lap-pong, Andrew  
 Assistant Manager  
 Electrical Division



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### **1 General Information**

#### **1.1 General Description**

The equipment under test (EUT) is a transmitter for TYCO® R/C Cars Radio Control Made Easy Lightning McQueen. It operates at 27.145MHz and the oscillation of radio control is generated by a crystal. The EUT is powered by 2 x 1.5V AA size batteries. There is a steering wheel on the EUT. When the steering wheel is turned to right, left, forward or backward, this transmitter will transmit different radio control signal to the receiver.

The antenna is permanently attached in EUT and the radio output power is unable to adjust.

The brief circuit description is listed as follows:

- U1 and associated circuit act as an encoder.
- X1 and associated circuit act as an oscillator.



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### **1.2 Location of the test site**

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2003. A Semi-Anechoic Chamber Testing Site is set up for investigation and located at:

Ground Floor, Yan Hing Centre,  
9 – 13 Wong Chuk Yeung Street,  
Fo Tan, Shatin,  
New Territories,  
Hong Kong.

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.4 – 2003. A shielded room is located at :

Ground Floor, Yan Hing Centre,  
9 – 13 Wong Chuk Yeung Street,  
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New Territories,  
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### 1.3 List of measuring equipment

Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date
EMI Test Receiver	R&S	ESCI	100152	2010-12-23
Bilog Antenna	Schaffner	CBL6112B	2718	2010-08-04
Loop Antenna	EMCO	6502	00056620	2011-08-24



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### **2 Description of the radiated emission test**

#### **2.1 Test Procedure**

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2003.

The equipment under test (EUT) was placed on a non-conductive turntable with dimensions of 1.5m x 1m and 0.8m high above the ground. 3m from the EUT, a broadband antenna mounting on the mast received the signal strength. The turntable was rotated to maximize the emission level. The antenna was then moving along the mast from 1m up to 4m until no more higher value was found. Both horizontal and vertical polarization of the antenna were placed and investigated.

For below 30MHz, a loop antenna with its vertical plane is placed 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1 m above the ground.

The device was rotated through three orthogonal axes to determine which attitude and configuration produce the highest emission during measurement.

#### **2.2 Test Result**

Peak Detector data was measured unless otherwise stated.

“#” means emissions appearing within the restricted bands shall follow the requirement of section 15.205.

The frequencies from fundamental up to the tenth harmonics were investigated, and emissions more 20dB below limit were not reported. Thus, those highest emissions were presented in next page (section 2.3)

It was found that the EUT meets the FCC requirement.



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### 2.3 Radiated Emission Measurement Data

#### Radiated emission

pursuant to

the requirement of FCC Part 15 subpart C

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dB $\mu$ V)	Antenna Factor and Cable Loss (dB/m)	Average Factor (dB)	Field Strength at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
27.145	V	48.4	9.9	-5.8	52.5	80.0	-27.5
54.292	H	7.8	8.6	-	16.4	40.0	-23.6
81.439	H	9.5	7.8	-	17.3	40.0	-22.7
#108.586	H	9.9	11.2	-	21.1	43.5	-22.4
#135.731	H	9.2	12.6	-	21.8	43.5	-21.7
#162.872	H	9.0	11.0	-	20.0	43.5	-23.5
190.019	H	8.5	9.9	-	18.4	43.5	-25.1
217.166	H	10.2	10.3	-	20.5	46.0	-25.5
#244.305	H	12.5	10.3	-	22.8	46.0	-23.2
#271.456	H	9.4	14.1	-	23.5	46.0	-22.5



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### **3 Description of the Line-conducted Test**

#### **3.1 Test Procedure**

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.4 – 2003. The EUT was setup as described in the procedures, and both lines were measured.

#### **3.2 Test Result**

No measurement is required as the EUT is a battery-operated product.

#### **3.3 Graph and Table of Conducted Emission Measurement Data**

Not Applicable





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### **4 Photograph**

#### **4.1 Photographs of the Test Setup for Radiated Emission and Conducted Emission**

For electronic filing, the photos are saved with filename TSup1.jpg to TSup2.jpg.

#### **4.2 Photographs of the External and Internal Configurations of the EUT**

For electronic filing, the photos are saved with filename ExPho1.jpg to ExPho2.jpg and InPho1.jpg to InPho2.jpg.



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### 5 Supplementary document

The following document were submitted by applicant, and for electronic filing, the document are saved with the following filenames:

Document	Filename
ID Label/Location	LabelSmp.jpg
Block Diagram	BlkDia.pdf
Schematic Diagram	Schem.pdf
Users Manual	UserMan.pdf
Operational Description	OpDes.pdf

#### 5.1 Bandwidth

The plot on saved in TestRpt2.pdf shows the fundamental emission is confined in the specified band. It also shows that the band edge met the 15.209 requirement at 26.9599 and 27.2801 MHz.

#### 5.2 Duty cycle

The duty cycle is simply the on-time divided by the period:

$$\begin{aligned} \text{The duration of one cycle} &= 31.70\text{ms} \\ \text{Effective period of the cycle} &= 0.96\text{ms} \times 8 + 0.48\text{ms} \times 18 \\ &= 16.32\text{ms} \\ \text{Duty Cycle} &= 16.32\text{ms} / 31.70\text{ms} \\ &= 0.51 \end{aligned}$$

Therefore, the average factor is found by  $20 \log_{10} 0.51 = -5.8\text{dB}$

#### 5.3 Transmission time

Not Applicable



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### 6 Appendices

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A2.	Photos of External Configurations	1	page
A3.	Photos of Internal Configurations	1	page
A4.	ID Label/Location	1	page
A5.	Bandwidth Plot	1	page
A6.	Average Factor	2	pages
A7.	Block Diagram	1	page
A8.	Schematics Diagram	1	page
A9.	User Manual	2	pages
A10.	Operation Description	1	page

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