



TEST REPORT

Report No. : AE006552-2 Date : 2004 May 13

Applicant : Lung Cheong Toys Limited
Lung Cheong Building, 1 Lok Yip Road,
On Lok Tsuen, Fanling, N. T., Hong Kong.

Sample Description : One(1) submitted sample stated to be R/C Spymobile (controller)
of Model No. D389.
Rating : 1 x 9 V battery
No. of sample(s) : Two(2) pieces ***

Date Received : 2004 April 28.

Test Period : 2004 April 28 – 2004 May 03.

Test Requested : FCC Part 15 Certification

Test Method : FCC Rules and Regulations Part 15 – Dec 2003
ANSI C63.4 – 2001

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.

For and on behalf of
CMA Testing and Certification Laboratories

Authorized Signature : _____

Danny Chui
EMC Engineer - EL. Division

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FCC ID : P73-0389-TX

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1 General Information

1.1 General Description

The R/C Spymobile controller contains a transmitter operating at 49.860 MHz and a receiver operating at 27.145 MHz. The transmitter is controlled by a crystal. The receiver is controlled by a crystal. The controller is powered by a 9V battery. There are two joysticks, one push button, a headphone jack and a volume control. There are two joysticks, one push button and a headphone jack. It will transmit signals to the Spymobile vehicle when the forward/backward joystick is moved. The controller can also receive audio signal through receiver circuit from the Spymobile vehicle. If the controller has been idle for 10 minutes, it will activate a "Bi-Bi" sound followed by automatic power off. The red LED indicator will also turn off.

Referring to the circuit design, the circuit description is listed as follows:

- U4 and associated circuit act as the encoder
- Y2, Q3, Q5, C11, L7, C45, C8, T1 and associated circuit act as the oscillator for the transmitter and as 3 times frequency multiplier
- Q7, Q8, C13 and associated circuit act as automatic power control
- U3 and associated circuit act as power control
- Q1, C1, C3, C7, C10, L6 and associated circuit act as RF amplifier
- L1, L2, L4, L5, the antenna coil, C4, C5, C43 and associated circuit act as the antenna matching network
- Q3 and associated circuit act as the audio amplifier
- L7, C41, D1 and associated circuit modulate the carrier signal
- Y1, C25, U2, C24, L8, C26 and associated circuit act as the oscillator for the receiver
- Q4, C36, C37, C38, L9, T2 and associated circuit act as the frequency modulation amplifier
- U1 and associated circuit act as the audio signal amplifier

The brief circuit description is saved with filename: OpDes.pdf

1.2 Related Submittal Grants

This is a single application for certification of a transmitter operating at 49.860 MHz.



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1.3 Location of the test site

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2001. An Open Area Testing Site is set up for investigation and located at :

Top of the Roof, 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 – 2001. A double shielded room is located at :

Roof Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
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New Territories,
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1.4 List of measuring equipment

Equipment	Manufacturer	Model No.	Serial No.	Calibration Certification No.
EMI Test Receiver	R&S	ESCS30	100001	S21141
Broadband Antenna	Schaffner	CBL6113B	2718	AC1753
Signal Generator	IFR	2023B	202302/938	Nil
LISN	R&S	ESH3-Z5	100038	S21142
Pulse Limiter	R&S	ESH3-Z2	100001	20-73194
Biconical Antenna	R&S	HK116	837414/004	4000.7752.02



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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 – 2001.

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.

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.

* Emissions appearing within the restricted bands shall follow the requirement of section 15.205.

It was found that the EUT meet 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 (dBμV/m)	Antenna and Cable factor (dB)	Averaging factor (-dB)	Field Strength (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
49.886	V	52.2	11.1	7.6	55.7	80.0	-24.3
99.774	H	12.1	10.0	--	22.1	43.5	-21.4
149.659	H	10.6	12.4	--	23.0	43.5	-20.5
199.545	H	13.8	10.5	--	24.3	43.5	-19.2
*249.431	H	14.4	10.1	--	24.5	46.0	-21.5
299.317	H	10.9	14.2	--	25.1	46.0	-20.9
349.203	H	10.6	15.6	--	26.2	46.0	-19.8
399.089	H	11.2	15.6	--	26.8	46.0	-19.2
448.975	H	9.7	18.7	--	28.4	46.0	-17.6
498.861	H	11.4	18.7	--	30.1	46.0	-15.9



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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 – 2001. 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 Conduction 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 InPho4.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.pdf
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 to TestRpt3.pdf shows the fundamental emission is confined in the specified band. The field strength of any emission appearing between the band edges and up to 10 kHz above and below the band edges (49.81 and 49.91 MHz) is at least 26 dB below the carrier level. It meets the requirement of Section 15.235(b).

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

The duration of one cycle = 74.30 ms.

Effective period of the cycle = $(420 \mu\text{s} \times 3) + (460 \mu\text{s} \times 65)$
= 31.16 ms.

Duty Cycle = $31.16 \text{ ms.} / 74.30 \text{ ms.}$
= 0.419 ms.

Therefore, the average factor is found by $20 \log_{10} 0.419 = -7.6 \text{ dB}$



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6 Appendices

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

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