



**CMA Testing
and Certification
Laboratories**
廠商會檢定中心

TEST REPORT

Report No. : AL027228-001 Date : 2009-07-29

Application No. : LL219759(0)

Applicant : Enertec Enterprises Ltd.
Rm. 1017, Chinachem Golden Plaza,
77 Mody Road,
T.S.T. East, Kln.,
Hong Kong.

Sample Description : One(1) submitted sample(s) stated to be R/C Monster Wheels Hi-Rollers
of Model No. 2625, 26251, 2626 and 26261

Radio Frequency : 27.145MHz Transmitter

Rating : 2 x 1.5V AA size batteries

No. of submitted sample : One (1) piece(s)

Date Received : 2009-07-15.

Test Period : 2009-07-16 to 2009-07-23.

Test Requested : FCC Part 15 Certification.

Test Method : 47 CFR Part 15 (10-1-08 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 four models are the same in circuitry and components and construction, and
therefore model 26251 was chosen to be the representative of the test sample.

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 R/C Monster Wheels Hi-Rollers. 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. When it switched "ON" and pressed the control stick once, it will transmit a radio control signal to 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:

- TX-2 and associated circuit act as encoder.
- JT, Q2 and associated circuit act as oscillator.
- Q1 and associated circuit act as RF amplifier.

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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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1.3 List of measuring equipment

| Equipment | Manufacturer | Model No. | Serial No. | Calibration Due Date |
|-------------------|--------------|-----------|------------|----------------------|
| Spectrum Analyzer | R&S | FSP30 | 100628 | 2009 September 23 |
| Bilog Antenna | Schaffner | CBL6112B | 2718 | 2010 August 04 |
| Loop Antenna | EMCO | 6502 | 00056620 | 2009 July 18 |



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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 that tenth harmonics were investigated, and emissions more 20dB below limited were not reported. Thus, those highest emissions were presented in next page (section 2.3).

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 (dB μ V/m) | Antenna and Cable factor (dB) | Average Factor (dB) | Field Strength (dB μ V/m) | Limit at 3m (dB μ V/m) | Margin (dB) |
|-----------------|----------------|------------------------------|-------------------------------|---------------------|-------------------------------|----------------------------|-------------|
| 27.145 | V | 58.8 | 9.1 | -6.1 | 61.8 | 80.0 | -18.2 |
| 54.293 | V | 23.4 | 8.6 | - | 32.0 | 40.0 | -8.0 |
| 81.437 | H | 21.3 | 7.8 | - | 29.1 | 40.0 | -10.9 |
| #108.573 | H | 14.8 | 11.2 | - | 26.0 | 43.5 | -17.5 |
| #135.730 | H | 10.4 | 12.6 | - | 23.0 | 43.5 | -20.5 |
| #162.871 | H | 15.6 | 11.0 | - | 26.6 | 43.5 | -16.9 |
| 190.014 | H | 15.9 | 9.9 | - | 25.8 | 43.5 | -17.7 |
| 217.158 | H | 13.6 | 10.3 | - | 23.9 | 46.0 | -22.1 |
| #244.305 | H | 13.7 | 10.3 | - | 24.0 | 46.0 | -22.0 |
| #271.449 | H | 12.8 | 14.1 | - | 26.9 | 46.0 | -19.1 |



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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 |
| Part List | Partlist.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:

$$\text{The duration of one cycle} = 64.8\text{ms}$$

$$\begin{aligned}\text{Effective period of the cycle} &= (0.42 \times 64)\text{ms} + (1.31 \times 4)\text{ms} \\ &= 32.12\text{ms}\end{aligned}$$

$$\begin{aligned}\text{Duty Cycle} &= 32.12 / 64.8 \\ &= 0.496\end{aligned}$$

Therefore, the average factor is found by $20 \log_{10} 0.496 = -6.1\text{dB}$

5.3 Transmission time

Not Applicable



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6 Appendices

| | | | |
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| A1. | Photos of the set-up of Radiated Emissions | 1 | page |
| 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. | Part List | 1 | page |
| A10. | User Manual | 1 | page |
| A11. | Operation Description | 1 | page |

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

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