



**MAY CHEONG TOY PRODUCTS FTY., LTD**

Application  
For  
Certification

FCC ID: PKG16932RC49

Cyklon Twist  
Additional name: Radio Control Vehicle 1:18 R/C Red Bull Racing RB9

Model: 82054(13086/16932)  
Additional models: 82094(13086/16890), 81084

Superregenerative Receiver

Report No.: SZHH01123449-001

Prepared and Checked by:

Approved by:

Sign on file  
Abel Zhou  
Senior Engineer

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Jimmy Wen  
Assistant Supervisor  
Date: February 13, 2017

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TRF No.: FCC 15C\_RX\_b

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## INTERTEK TESTING SERVICES

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### GENERAL INFORMATION

**MAY CHEONG TOY PRODUCTS FTY., LTD**

**Model: 82054(13086/16932)**

**FCC ID: PKG16932RC49**

|                           |                                                                                                    |
|---------------------------|----------------------------------------------------------------------------------------------------|
| Grantee:                  | MAY CHEONG TOY PRODUCTS FTY., LTD                                                                  |
| Grantee Address:          | UNIT 901-2, 9/F., EAST OCEAN CENTRE, 98<br>GRANVILLE ROAD, TSIMSHATSUI EAST,<br>KOWLOON, HONG KONG |
| Contact Person:           | Anson Wang                                                                                         |
| Tel:                      | (769)8775 3128 ext:132                                                                             |
| Manufacturer:             | Dongguan Maisto Industries Limited                                                                 |
| Manufacturer Address:     | Chu Wei Tian, Feng Kang Town, Dongguan City,<br>Guangdong Province, China                          |
| Model:                    | 82054(13086/16932)                                                                                 |
| Type of EUT:              | Superregenerative Receiver                                                                         |
| Description of EUT:       | Cyklon Twist                                                                                       |
| Serial Number:            | N/A                                                                                                |
| FCC ID :                  | PKG16932RC49                                                                                       |
| Date of Sample Submitted: | January 20, 2017                                                                                   |
| Date of Test:             | February 10, 2017                                                                                  |
| Report No.:               | SZHH01123449-001                                                                                   |
| Report Date:              | February 13, 2017                                                                                  |
| Environmental Conidtions: | Temperature: +10 to 40°C<br>Humidity: 10 to 90%                                                    |

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### SUMMARY OF TEST RESULT

**MAY CHEONG TOY PRODUCTS FTY., LTD**

**Model: 82054(13086/16932)**

**FCC ID: PKG16932RC49**

| TEST SPECIFICATION                                           | REFERENCE                     | RESULTS |
|--------------------------------------------------------------|-------------------------------|---------|
| Maximum Peak Output Power                                    | 15.247(b), (c) / RSS-210 A8.4 | N/A     |
| Hopping Channel Carrier Frequencies Separation               | 15.247(e) / RSS-210 A8.1      | N/A     |
| 20dB Bandwidth of the Hopping Channel                        | 15.247(a) / RSS-210 A8.1      | N/A     |
| Number of Hopping Frequencies                                | 15.247(e) / RSS-210 A8.1      | N/A     |
| Average Time of Occupancy of Hopping Frequency               | 15.247(e) / RSS-210 A8.1      | N/A     |
| Antenn Conducted Spurious Emissions                          | 15.247(d) / RSS-210 A8.5      | N/A     |
| Radiated Spurious Emissions                                  | 15.247(d) / RSS-210 A8.5      | N/A     |
| RF Exposure Compliance                                       | 15.247(i) / RSS-Gen 5.5       | N/A     |
| Transmitter Power Line Conducted Emissions                   | 15.207 / RSS-Gen 7.2.2        | N/A     |
| Transmitter Field Strength                                   | 15.227 / RSS-310 3.8          | N/A     |
| Transmitter Field Strength                                   | 15.229 / RSS-210 A2.7         | N/A     |
| Transmitter Field Strength, Bandwidth and Timing Requirement | 15.231(a) / RSS-210 A1.1.1    | N/A     |
| Transmitter Field Strength, Bandwidth and Timing Requirement | 15.231(e) / RSS-210 A1.1.5    | N/A     |
| Transmitter Field Strength and Bandwidth Requirement         | 15.239 / RSS-210 A2.8         | N/A     |
| Transmitter Field Strength and Bandwidth Requirement         | 15.249 / RSS-210 A2.9         | N/A     |
| Transmitter Field Strength and Bandwidth Requirement         | 15.235 / RSS-310 3.9          | N/A     |
| Receiver / Digital Device Radiated Emissions                 | 15.109 / RSS-310 3.1          | Pass    |
| Digital Device Conducted Emissions                           | 15.107 / ICES-003             | N/A     |

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## INTERTEK TESTING SERVICES

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### 1.0 General Description

#### 1.1 Product Description

The equipment under test (EUT) is a receiver for a Cyklon Twist operating at 49.860MHz. The EUT is powered by three 1.5V size AA batteries.

The model: 82054 and 82094 are package numbers. The model: 82054 include a transmitter and a receiver, the transmitter model number is 13086, receiver model number is 16932, the additional receiver model: 16890, 81084 are same as the model: 16932 in hardware and electrical aspect. Theirs difference in the appearance and model number.

Antenna Type: Integral Antenna

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

#### 1.2 Related Submittal(s) Grants

This is an application for certification of a receiver for the Cyklon Twist, and there has a transmitter which associated with this EUT, has FCC ID: PKG13086RC49M which has been granted.

#### 1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (2014). Radiated Emission measurement was performed in a Semi-anechoic chamber. Preliminary scans were performed in the Semi-anechoic chamber only to determine worst case modes. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

#### 1.4 Test Facility

The Semi-anechoic chamber used to collect the radiated data is EMTEK (Shenzhen) Co., Ltd. and located at Bldg. 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, 518052, China. This test facility and site measurement data have been fully placed on file with the FCC (Registration Number: 406365).

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### 2.0 **System Test Configuration**

#### 2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (2014).

The EUT was powered by three 1.5V size AA batteries during test.

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The unit was operated standalone and placed in the center of the turntable.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the styrene turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

#### 2.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered up, it receives the RF signal continuously.

#### 2.3 Special Accessories

There are no special accessories necessary for compliance of this product.

#### 2.4 Equipment Modification

Any modifications installed previous to testing by MAY CHEONG TOY PRODUCTS FTY., LTD will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd.

#### 2.5 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

#### 2.6 Support Equipment List and Description

N/A.

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### 3.0 Emission Results

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

#### 3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG - AV$$

where      FS = Field Strength in dB $\mu$ V/m  
              RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V  
              CF = Cable Attenuation Factor in dB  
              AF = Antenna Factor in dB  
              AG = Amplifier Gain in dB  
              AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

$$FS = RR + LF$$

where      FS = Field Strength in dB $\mu$ V/m  
              RR = RA - AG - AV in dB $\mu$ V  
              LF = CF + AF in dB

Assume a receiver reading of 52.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 27 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

$$RA = 52.0 \text{ dB}\mu\text{V/m}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$AV = 5.0 \text{ dB}$$

$$FS = RR + LF$$

$$FS = 18 + 9 = 27 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(27 \text{ dB}\mu\text{V/m})/20] = 22.4 \mu\text{V/m}$$

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### 3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission at 50.620 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

### 3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Passed by 3.1 dB

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## INTERTEK TESTING SERVICES

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Applicant: MAY CHEONG TOY PRODUCTS FTY., LTD

Date of Test: February 10, 2017

Model: 82054(13086/16932)

Test Mode: Receive

Table 1

### Radiated Emissions

| Polarization | Frequency (MHz) | Reading (dB $\mu$ V) | Pre-amp (dB) | Antenna Factor (dB) | Net at 3m (dB $\mu$ V/m) | Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|--------------|-----------------|----------------------|--------------|---------------------|--------------------------|----------------------------|-------------|
| V            | 49.110          | 37.0                 | 20           | 13.5                | 30.5                     | 40.0                       | -9.5        |
| V            | 49.360          | 37.3                 | 20           | 13.5                | 30.8                     | 40.0                       | -9.2        |
| V            | 49.610          | 38.0                 | 20           | 13.5                | 31.5                     | 40.0                       | -8.5        |
| V            | 50.110          | 42.7                 | 20           | 13.5                | 36.2                     | 40.0                       | -3.8        |
| V            | 50.360          | 43.1                 | 20           | 13.5                | 36.6                     | 40.0                       | -3.4        |
| V            | 50.620          | 43.4                 | 20           | 13.5                | 36.9                     | 40.0                       | -3.1        |

NOTES: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative sign in the column shows value below limit.

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### 4.0 **Equipment Photographs**

For electronic filing, the photographs are saved with filename: external photos.pdf and internal photos.pdf.

### 5.0 **Product Labelling**

For electronics filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

### 6.0 **Technical Specifications**

For electronic filing, the block diagram and schematic of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.

### 7.0 **Instruction Manual**

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

### 8.0 **Miscellaneous Information**

The miscellaneous information includes details of the test procedure.

This miscellaneous information includes details of the stabilizing process (including a plot of the stabilized waveform), the test procedure and calculation of the factors such as pulse desensitization and averaging factor.

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### 8.1 Stabilization Waveform

Previous to the testing, the superregenerative receiver was stabilized as outlined in the test procedure. For the electronic filing, the plot saved with filename: superreg.pdf show the fundamental emission when a signal generator was used to stabilize the receiver. Please note that the antenna was placed as close as possible to the EUT for clear demonstration of the waveform and that accurate readings are not possible from this plot.

### 8.2 Discussion of Pulse Desensitization

This device is a superregenerative receiver. No desensitization of the measurement equipment is required as the received signals are continuously.

### 8.3 Calculation of Average Factor

This device is a superregenerative receiver. It is not necessary to apply average factor to the measurement result.

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### 8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Shenzhen Ltd. in the measurements of superregenerative receivers operating under the Part 15, Subpart B rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 2014. Superregenerative receivers are stabilized prior to measurement by generating a signal well above the receiver threshold whose frequency is tuned until the emissions stabilize into a line spectrum. The signal is usually generated as CW with a R&S SML03 signal generator and a short whip antenna and is at a level of several hundred to several thousand mV/m. Plots of the stabilized signal will be shown. If a modulated signal is used, it will be noted.

The equipment under test (EUT) is placed on a styrene turntable which is four feet in diameter and approximately 0.8 meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axes to obtain maximum emission levels. The antenna height and polarization are varied during the testing to search for maximum signal levels.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from 30 MHz to 1000 MHz.

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### 8.4 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements are made as described in ANSI C63.4 - 2014.

The IF bandwidth used for measurement of radiated signal strength was 10 kHz for emission below 30 MHz and 120 kHz for emission from 30 MHz to 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.2).

Receiver measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the restricted bands, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, but those measurements taken at a closer distance are so marked.

### 9.0 Equipment List

| Equipment No. | Equipment         | Manufacturer    | Model No.     | Serial No.       | Cal. Date   | Due Date    |
|---------------|-------------------|-----------------|---------------|------------------|-------------|-------------|
| EE089         | EMI Test Receiver | Rohde & Schwarz | ESU           | 1302.600<br>5.26 | May-17-2016 | May-17-2017 |
| EE043         | Bilog Antenna     | Schwarzbeck     | VULB916<br>3  | 142              | May-17-2016 | May-17-2017 |
| EE035         | signal generator  | HP              | 8648A         | 3426A00<br>94    | May-28-2016 | May-28-2017 |
| EE312         | Cable             | A.H             | SAC-<br>40G-1 | 414              | May-17-2016 | May-17-2017 |
| EE313         | Cable             | A.H             | SAC-<br>40G-1 | 413              | May-17-2016 | May-17-2017 |