



TEST REPORT

Report No.: HK11080909-1

Spin Master Toys Far East Ltd.

Application
For
Certification
(Original Grant)
(FCC ID: PQN43004RX49SHU)

Superregenerative Receiver

Prepared and Checked by:

Approved by:

Signed On File
Wong Cheuk Ho, Herbert
Engineer

Chan Chi Hung, Terry
Assistant Supervisor
Date: September 02, 2011

INTERTEK TESTING SERVICES

GENERAL INFORMATION

Spin Master Toys Far East Ltd.
BRAND NAME: Spin Master Ltd.,
MODEL: 43004
FCC ID: PQN43004RX49SHU

Grantee:	Spin Master Toys Far East Ltd.
Grantee Address:	1113, 11 th Floor, Chinachem Golden Plaza, 77 Mody Road, Tsim Sha Tsui East, Kowloon, Hong Kong
Contact Person:	Andy Wong
Tel:	86-0769-81080068
Fax:	86-0769-81080061
e-mail:	andyw@spinmaster.com
Manufacturer:	N/A
Manufacturer Address:	N/A
Brand Name:	Spin Master Ltd.
Model:	43004
Additional Model:	1021500, 6014908, 1021980, 1022538, 6017233, 1022540, 1022579, 6014908, 1022580, 1023412, 1023413
Type of EUT:	Superregenerative Receiver
Description of EUT:	ARH Cars RC (1:24)
Serial Number:	N/A
FCC ID:	PQN43004RX49SHU
Date of Sample Submitted:	August 17, 2011
Date of Test:	August 22, 2011
Report No.:	HK11080909-1
Report Date:	September 02, 2011
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

INTERTEK TESTING SERVICES

SUMMARY OF TEST RESULT

Spin Master Toys Far East Ltd.
BRAND NAME: Spin Master Ltd.,
MODEL: 43004
FCC ID: PQN43004RX49SHU

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
Antenna 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 5.6	N/A
Transmitter Power Line Conducted Emissions	15.207 / RSS-Gen 7.2.4	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 Radiated Emissions	15.109 / RSS-310 3.1	Pass
Digital Device Conducted Emissions	15.107 / ICES-003	N/A

- Note: 1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.
2. Pursuant to FCC part 15 Section 15.215(c), the 20 dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

INTERTEK TESTING SERVICES

Table of Contents

1.0	<u>General Description</u>	1
1.1	Product Description	1
1.2	Related Submittal(s) Grants	1
1.3	Test Methodology	1
1.4	Test Facility	1
2.0	<u>System Test Configuration</u>	2
2.1	Justification.....	2
2.2	EUT Exercising Software	2
2.3	Special Accessories.....	2
2.4	Equipment Modification.....	2
2.5	Measurement Uncertainty	2
2.6	Support Equipment List and Description.....	2
3.0	<u>Emission Results</u>	3
3.1	Field Strength Calculation	3
3.2	Radiated Emission Configuration Photograph	4
3.3	Radiated Emission Data	4
4.0	<u>Equipment Photographs</u>	6
5.0	<u>Product Labelling</u>	6
6.0	<u>Technical Specifications</u>	6
7.0	<u>Instruction Manual</u>	6
8.0	<u>Miscellaneous Information</u>	6
8.1	Stabilization Waveform	6
8.2	Emissions Test Procedures	7
9.0	<u>Equipment List</u>	8

INTERTEK TESTING SERVICES

1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is the receiver of a RC Car which is operating at 49.860MHz. The EUT is powered by three "AA" size batteries. When both the EUT and its associated transmitter are turned ON, the EUT can be controlled motoring forward, backward, left and right by the transmitter.

The Model: 1021500, 6014908, 1021980, 1022538, 6017233, 1022540, 1022579, 6014908, 1022580, 1023412, 1023413 are the same as the Model: 43004 in hardware aspect. The difference in model number and outer casing only.

Antenna used : Internal, Integral

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

1.2 Related Submittal(s) Grants

The transmitter for this receiver (with FCC ID: PQN43004TX49MHZ) has been authorized by Certification procedure.

1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). All radiated measurements were performed in an Open Area Test Site. Preliminary scans were performed in the Open Area Test Site 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 open area test site and conducted measurement facility used to collect the radiated data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been placed on file with the FCC.

INTERTEK TESTING SERVICES

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 (2003).

The device was powered by 3 x new “AA” size batteries.

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 wooden 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 Spin Master Toys Far East Ltd. will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Intertek Testing Services Hong Kong 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.

INTERTEK TESTING SERVICES

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 μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ 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 μ V/m
- RR = RA - AG - AV in dB μ V
- LF = CF + AF in dB

Assume a receiver reading of 52.0 dB μ 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 μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

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

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

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

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

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

$$FS = RR + LF$$

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

$$RR = 18.0 \text{ dB}\mu\text{V}$$

$$LF = 9.0 \text{ dB}$$

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

INTERTEK TESTING SERVICES

3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 50.748 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 5.6 dB

INTERTEK TESTING SERVICES

Applicant: Spin Master Toys Far East Ltd.
Model: 43004
Worst-Case Operating Mode: Receiving
Sample: 1/3

Date of Test: August 25, 2011

Table 1

**Radiated Emissions
Pursuant to FCC Part 15 Section 15.109 Requirement**

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	48.348	37.7	16	11.0	32.7	40.0	-7.3
V	49.277	39.1	16	11.0	34.1	40.0	-5.9
V	50.748	39.4	16	11.0	34.4	40.0	-5.6
V	51.829	38.1	16	11.0	33.1	40.0	-6.9
V	53.107	37.7	16	11.0	32.7	40.0	-7.3
V	99.348	36.1	16	12.0	32.1	43.5	-11.4
V	101.429	36.1	16	13.0	33.1	43.5	-10.4
V	103.743	35.7	16	13.0	32.7	43.5	-10.8
V	151.277	33.4	16	15.0	32.4	43.5	-11.1
V	154.748	32.8	16	15.0	31.8	43.5	-11.7

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.
4. Horn antenna is used for the emission over 1000MHz.

INTERTEK TESTING SERVICES

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**

This miscellaneous information includes details of the stabilizing process (including a plot of the stabilized waveform) and the test procedure.

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.

INTERTEK TESTING SERVICES

8.2 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong 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 - 2003. 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 Marconi 2022D 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 wooden turntable which is four feet in diameter and approximately one meter in height above the groundplane. 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 antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

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.

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

INTERTEK TESTING SERVICES

8.2 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 were made as described in ANSI C63.4 - 2003.

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. Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Measurements are normally conducted at a measurement distance of three meters. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

9.0 Equipment List

1) Radiated Emissions Test

Equipment	Biconical Antenna	Log Periodic Antenna	Signal Generator
Registration No.	EW-0954	EW-0446	EW-0423
Manufacturer	EMCO	EMCO	IFR
Model No.	3104C	3146	2023B
Calibration Date	Apr. 14, 2010	Apr. 26, 2010	Apr. 28, 2011
Calibration Due Date	Oct. 14, 2011	Oct. 26, 2011	Apr. 28, 2012

Equipment	Spectrum Analyzer 40GHz	EMI Test Receiver
Registration No.	EW-2253	EW-2500
Manufacturer	R&S	R&S
Model No.	FSP40	ESCI
Calibration Date	Nov. 23, 2010	Jan. 25, 2011
Calibration Due Date	Nov. 23, 2011	Jan. 25, 2012