Intertek

Issuing Laboratory:
Intertek Testing Services Hong Kong Limited

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HOKLAS 005
TEST

TEST REPORT

Report No.: 13100283HKG-001

Toy State International Ltd.

Application
For
Certification
(Original Grant)
(FCC ID: V9Q-90420F27)

Transmitter

Prepared and Checked by:

Tse Ying, Cathy
Senior Lead Engineer

Approved by:

Chan Chi Hung, Terry
Supervisor
Date: October 31, 2013

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HOKLAS 005 TEST

GENERAL INFORMATION

Toy State International Ltd.
BRAND NAME: N/A, MODEL: 90421
90422
FCC ID: V9Q-90420F27

Grantee:	Toy State International Ltd.
Grantee Address:	Unit 905, 9/F,West Wing, Tsim Sha Tsui Centre, 66 Mody Road, Tsim Sha Tsui East, Kowloon, Hong Kong.
Contact Person:	Jason Ng
Tel:	0755-3680 6243
Fax:	0755-2870 0487
e-mail:	qa@toystate.cn
Manufacturer:	ShenZhen Nanling Toys Products Co., Ltd.
Manufacturer Address:	132 Busha Road, Nanling Village, Buji Town, 518114 Shenzhen, China
Brand Name:	N/A
Model:	90421
Additional Model:	90422
Asst. No.:	90420
Type of EUT:	Transmitter
Description of EUT:	Engine Power R/C - 2 Asstd: - Baja Bone Shaker™ (90421), - Quicksand™ (90422)
Serial Number:	N/A
FCC ID:	V9Q-90420F27
Date of Sample Submitted:	October 10, 2013
Date of Test:	October 22, 2013 to October 30, 2013
Report No.:	13100283HKG-001
Report Date:	October 31, 2013
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

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HOKLAS 005 TEST

SUMMARY OF TEST RESULT

Toy State International Ltd.
BRAND NAME: N/A, MODEL: 90421
90422
FCC ID: V9Q-90420F27

TEST SPECIFICATION	REFERENCE	RESULTS
Transmitter Field Strength	15.227	Pass

The equipment under test is found to be complying with the following standards:
FCC Part 15, October 1, 2012 Edition

Note: 1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the pervisions 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 excepted variations in temperature and supply voltage were considered.

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1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is a portable transmitter of a RC car operating at 27.145 MHz as dictated by a crystal. The EUT is powered by a 4.5 V DC source (3 x 1.5V AAA batteries). The EUT has two forward or backward control levers to control the left wheels and right wheel of the receiver of the RC Car.

After switching ON the EUT and the receiver of the RC Car, activating the control levers on the EUT can control the receiver moving forward, backward, left or right.

The Model: 90422 is the same as the Model: 90421 in hardware aspect. The difference in model number serves as marketing strategy.

Antenna Type : External, Integral

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

1.2 Related Submittal(s) Grants

This is a single application for certification of a transmitter.

The receiver for this transceiver is exempted from the Part 15 technical rules per 15.101(b).

1.3 Test Methodology

Radiated emission measurement was performed according to the procedures in ANSI C63.4 (2009). 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.

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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 (2009).

The device was powered by 3 X 1.5V AAA batteries.

For maximizing emissions below 30 MHz, the EUT was rotated through 360°, the centre of the loop antenna was placed 1 meter above the ground, and the antenna polarization was changed. For maximizing emission at and above 30 MHz, 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 report 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 transmits 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 Toy State International 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.

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

Assume a receiver reading of 52.0 dBµV 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 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 52.0 dBµV/m
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
AV = 5.0 dB
FS = RR + LF
FS = 18 + 9 = 27 dBµV/m

RR = 18.0 dBµV
LF = 9.0 dB

Level in µV/m = Common Antilogarithm [(27 dBµV/m)/20] = 22.4 µV/m

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3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 54.290 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 3.9 dB

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Applicant: Toy State International Ltd. Date of Test: October 22, 2013
Model: 90421
Worst-Case Operating Mode: Transmitting

Table 1

Radiated Emissions
Pursuant to FCC Part 15 Section 15.227 Requirement

Polari-zation	Frequency (MHz)	Reading (dBμV)	Pre-Amp (dB)	Antenna Factor (dB)	Average Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
V	27.145	72.4	16	15.4	0.0	71.8	80.0	-8.2
V	54.290	41.1	16	11.0	-	36.1	40.0	-3.9
V	81.438	44.0	16	7.0	-	35.0	40.0	-5.0
H	108.584	37.5	16	14.0	-	35.5	43.5	-8.0
H	135.729	36.8	16	14.0	-	34.8	43.5	-8.7
H	162.876	34.3	16	16.0	-	34.3	43.5	-9.2
H	190.025	35.3	16	16.0	-	35.3	43.5	-8.2
H	217.168	34.7	16	17.0	-	35.7	46.0	-10.3
H	244.309	31.1	16	20.0	-	35.1	46.0	-10.9
H	271.459	29.0	16	22.0	-	35.0	46.0	-11.0
H	298.595	28.4	16	22.0	-	34.4	46.0	-11.6

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. Loop antenna is used for the emissions below 30MHz.

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

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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.

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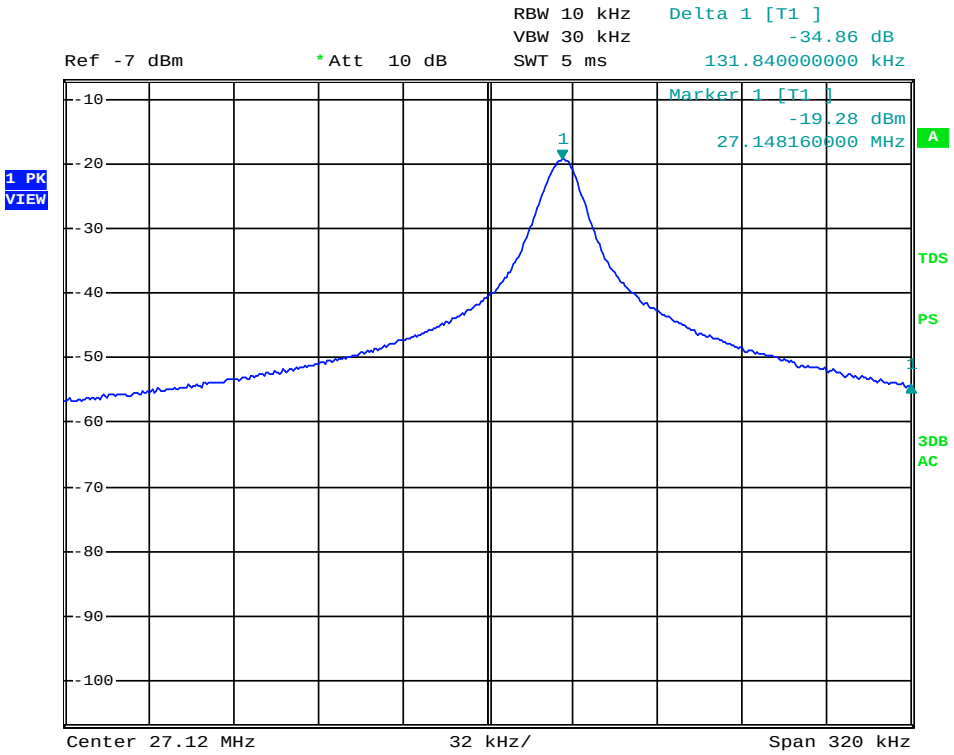
8.0 Miscellaneous Information

The miscellaneous information includes details of the test procedure and measured bandwidth / calculation of factor such as pulse desensitization and averaging factor.

8.1 Measured Bandwidth

The plot shows the fundamental emission is confined in the specified band. And it also shows that the emission is at least 34.86 dB below the carrier level at the band edge (26.96 and 27.28 MHz). It meets the requirement of Section 15.227(b).

Pursuant to FCC Part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designed (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.



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8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. Since the transmitter transmits the RF signal continuously.

8.3 Calculation of Average Factor

The average factor is not applicable for this device as the transmitted signal is a continuously signal.

8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of transmitter operating under the Part 15, Subpart C rules.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one 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 axis to obtain maximum emission levels. 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. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

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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 were made as described in ANSI C63.4 (2009).

The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 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 8.1). Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

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9.0 **Equipment List**

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Spectrum Analyzer	Biconical Antenna
Registration No.	EW-2500	EW-2188	EW-0954
Manufacturer	R&S	AGILENTTECH	EMCO
Model No.	ESCI	E4407B	3104C
Calibration Date	Mar. 22, 2013	Nov. 05, 2012	Apr. 30, 2013
Calibration Due Date	Feb. 28, 2014	Nov. 05, 2013	Oct. 30, 2014

Equipment	Active Loop H-field (9kHz to 30MHz)	Log Periodic Antenna
Registration No.	EW-0191	EW-0447
Manufacturer	EMCO	EMCO
Model No.	6502	3146
Calibration Date	Jan. 30, 2013	Aug. 19, 2013
Calibration Due Date	Jul. 30, 2014	Feb. 19, 2015

2) Bandedge Measurement

Equipment	Spectrum Analyzer
Registration No.	EW-2329
Manufacturer	R&S
Model No.	FSP3
Calibration Date	Jan. 30, 2013
Calibration Due Date	Jan. 30, 2014

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