

FCC PART 15 C

MEASUREMENT AND TEST REPORT

For

YINRUN PLASTIC CRAFTS CO.,LTD

Yinrun Ind, Garden, Laimei, Zone,Chenghai,Shantou City, Guangdong, China

FCC ID: R6U6006-27M

February 18, 2006

This Report Concerns: ☒ Original Report	Equipment Type: R/C Spinning Car
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of S&E Technologies Laboratory Ltd.

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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: **YINRUN PLASTIC CRAFTS CO., LTD**

Address of applicant: Yinrun Ind, Garden, Laimei, Zone,Chenghai,Shantou City,
Guangdong, China

Tel: 86-754-5509841 Fax: 86-754-5509840

Manufacturer: **YINRUN PLASTIC CRAFTS CO., LTD**

Address of manufacturer: Yinrun Ind, Garden, Laimei, Zone,Chenghai,Shantou City,
Guangdong, China

Tel: 86-754-5509841 Fax: 86-754-5509840

General Description of E.U.T

The **YINRUN PLASTIC CRAFTS CO., LTD.**'s product, model number: **6006** or the "EUT" as referred to in this report is a transmitter of **R/C Spinning Car**. The EUT is measured approximately 85mm L x 45mm W x 88mm H.

The technical data has been listed following:

Items	Description
EUT Description:	R/C Spinning Car
Trade Name:	N/A
Model No.:	6006
Rated Voltage	DC 9V for Transmitter
Frequency range	27.146MHz
Number of channels	1
Channel Separation	None
Product Class:	Low Power Communication Device Transmitter
Measurement Procedure	ANSI C63.4-2003

** The test data gathered are from the production sample provided by the manufacturer.*

1.2 Test Standards

The following Declaration of Conformity report of EUT is prepared in accordance with

FCC Rules and Regulations Part 15 Subpart C Section 15.227

The objective of the manufacturer is to demonstrate compliance with the described above standards.

1.3 Test Summary

For the EUT described above. The standards used were FCC Part 15 Subpart C Section 15.227 for Emissions

Tests Carried Out Under FCC Part 15 Subpart C

Standard	Test Items	Status	Application
Part 15 Subpart C Section 15.227	Disturbance Voltage at The Mains Terminals	x	N/A, without AC power supply
	Radiation Emission	√	
	Emissions within Band Edges	√	

√ Indicates that the test is applicable
 x Indicates that the test is not applicable

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

The maximum emission levels emanating from the device are compared to the Part 15 Subpart C Section 15.227 limits for radiation emissions and the measurement results contained in this test report show that EUT is to be technically compliant with FCC requirements.

All measurement required was performed at laboratory of Shenzhen Huatongwei International Inspection Co., Ltd at Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China

1.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC – Registration No.: 662850

Shenzhen Huatongwei International Inspection Co., Ltd, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 662850, November 17, 2003.

1.6 Test Equipment List and Details

Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100038	2005/11	1 year
EMI Test Receiver	ROHDE & SCHWARZ	ESPI	100123	2005/03	1 year
Artificial Mains	ROHDE & SCHWARZ	ESH2-Z5	100028	2005/11	1 year
Pulse Limiter	ROHDE & SCHWARZ	ESHSZ2	100044	2005/11	1 year
Ultra-Broadband Antenna	ROHDE & SCHWARZ	HL562	100015	2005/11	1 year
Loop Antenna	ROHDE & SCHWARZ	HFH2-Z2	100020	2005/11	1 year
Horn Antenna	ROHDE & SCHWARZ	HF906	100039	2005/11	1 year
EMI Test Receiver	ROHDE & SCHWARZ	ESI 26	100009	2005/11	1 year
RF Test Panel	ROHDE & SCHWARZ	TS / RSP	335015/ 0017	N/A	N/A
Turntable	ETS	2088	2149	N/A	N/A
Antenna Mast	ETS	2075	2346	N/A	N/A

2 - SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

2.2 EUT Exercise Software

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software offered by manufacture, can let the EUT being normal operation.

2.3 Special Accessories

There are no special accessories necessary for compliance of this product supplied by **YINRUN PLASTIC CRAFTS CO., LTD** and its respective support equipment manufacturers.

2.4 Equipment Modifications

The EUT tested was not modified by S&E.

2.5 Basic Test Setup Block Diagram

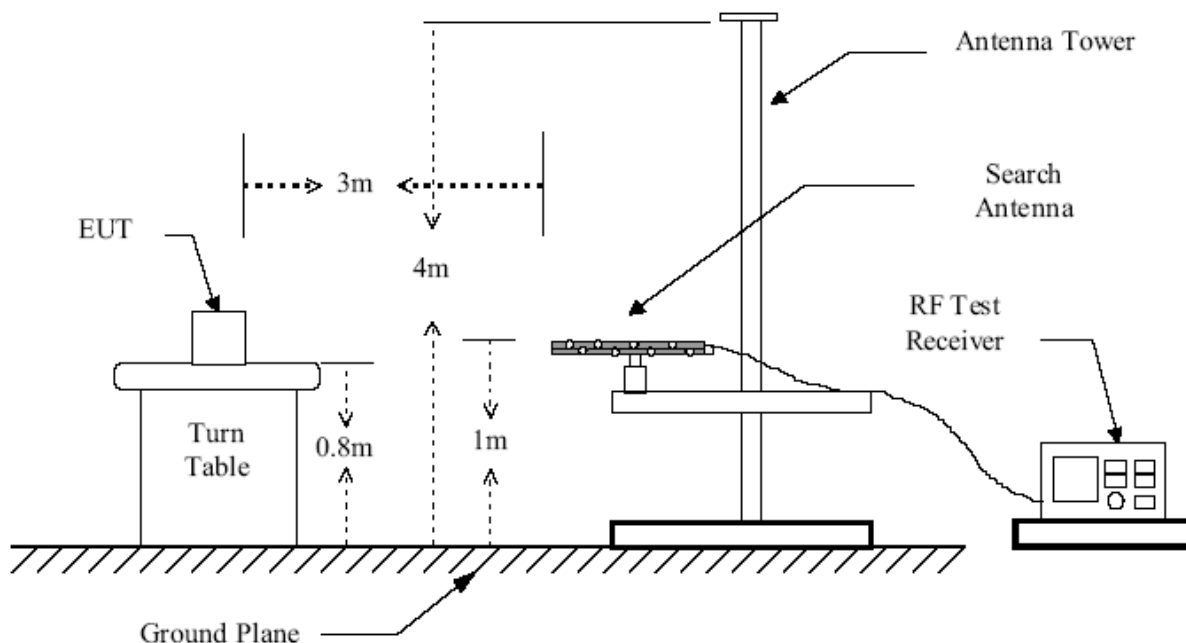


Figure 1 : Frequencies measured below 1 GHz configuration

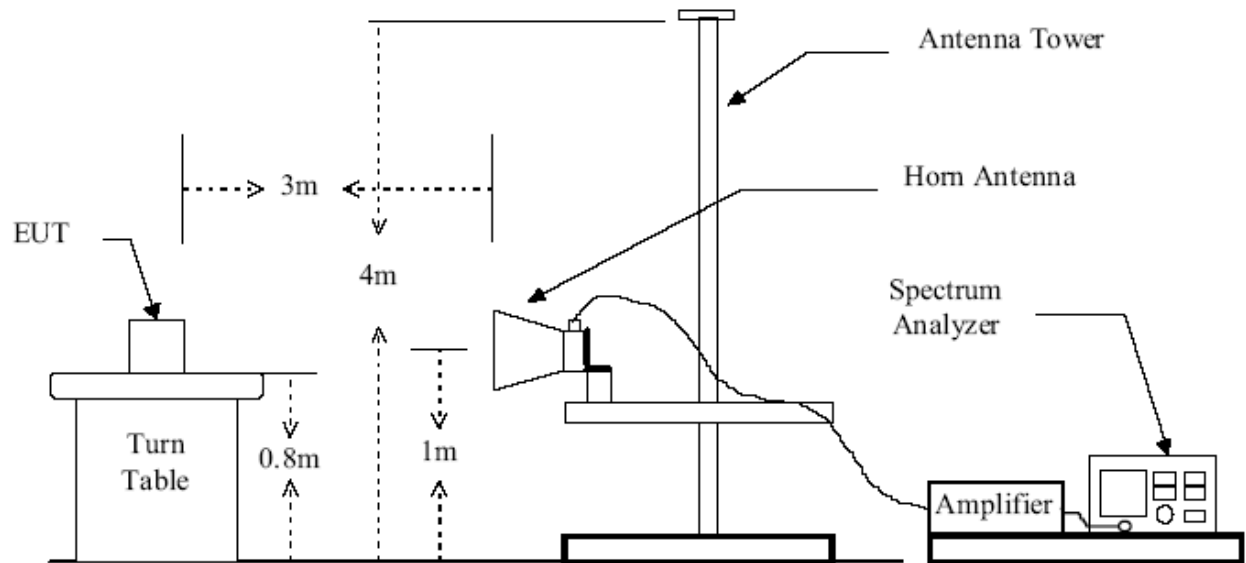


Figure 2 : Frequencies measured above 1 GHz configuration

3 – DISTURBANCE VOLTAGE AT THE MAINS TERMINALS

3.1 Measurement Uncertainty

All test results complied with Section 15.207 requirements. Measurement Uncertainty is 2.4 dB.

3.2 Applicable Standard

Section 15.207: For a Low-power Radio-frequency Device is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150~0.500	66~56	56~46
0.500~5.000	56	46
5.000~30.00	60	50

3.3 Test Description

The EUT is excused from investigation of Disturbance Voltage at The Mains Terminals, for it is powered by a DC 9V battery. According to the Section 15.207(d), measurement to demonstrate compliance with the limits of Disturbance Voltage at The Mains Terminals are not required to the devices which only employed battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

4- RADIATED EMISSIONS

4.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ± 4.0 dB.

4.2 Limit of Radiated Emissions

Limit of Field Strength Of Fundamental Emissions (Fcc 47cfr 15.227):

Frequency Range (MHz)	Field Strength of Fundamental Emission (Peak) ($\mu\text{V/m}$)	Field Strength of Fundamental Emission (Average) ($\mu\text{V/m}$)
26.96-27.28	100,000	10,000

Limits of Spurious Emissions (Fcc 47 Cfr 15.209 Class B):

Frequency (MHz)	Distance (Meters)	Field Strengths Limits ($\text{dB}\mu\text{V/m}$)
30 ~ 88	3	40
88~216	3	43.5
216 ~ 960	3	46
960 ~ 1000	3	54

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(2) The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

4.3 Test Equipment Used

Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
Ultra-Broadband Antenna	ROHDE & SCHWARZ	HL562	100015	2005/11	1 year
EMI Test Receiver	ROHDE & SCHWARZ	ESI 26	100009	2005/11	1 year
RF Test Panel	ROHDE & SCHWARZ	TS / RSP	335015/0017	N/A	N/A
Turntable	ETS	2088	2149	N/A	N/A
Antenna Mast	ETS	2075	2346	N/A	N/A

4.4 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

- 1). Configure the EUT according to ANSI C63.4-2003.
- 2). The EUT was placed on the top of the turntable 0.8 meter above ground.
- 3). The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 4). Power on the EUT and all the supporting units.
- 5). The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 6). The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
- 7). For each suspected emission, the antenna tower was scanned (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 8). Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode. Then all data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within -10 dB μ V of specification limits), and are distinguished with a "QP" in the data plots.

4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB μ V means the emission is 7dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

4.6 Radiated Emissions Test Result

Temperature (°C)	22~23
Humidity (%RH)	50~54
Barometric Pressure (mbar)	950~1000
EUT	R/C Spinning Car
M/N	6006
Operating Mode	Continuous Transmitting

Test plots see following pages

Test Result of Field Strength of Fundamental Emissions:

Frequency (MHz)	Maximum Test Result (dB(μ V/m))		FCC Limit (dB(μ V/m))		Margin (dB(μ V/m))
	Peak	Average*	Peak	Average	
27.1462	83.50	77.37	100	80	2.63

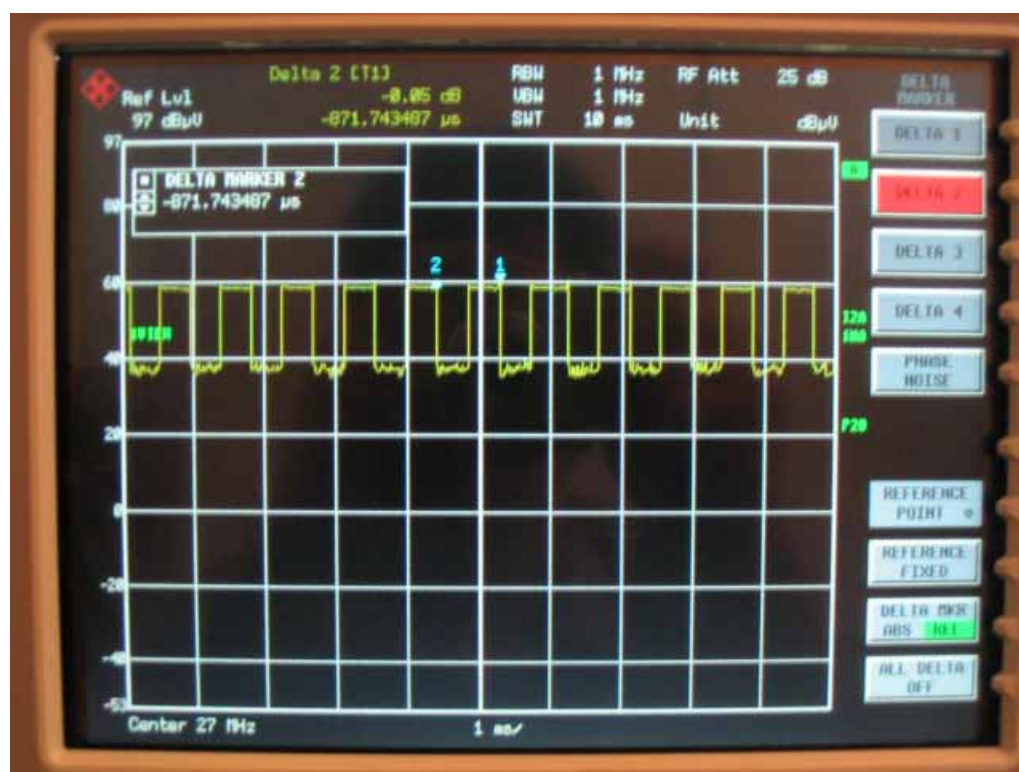
Remark : 1) The above peak value is the maximum value of the measurement in 3 orthogonal planes

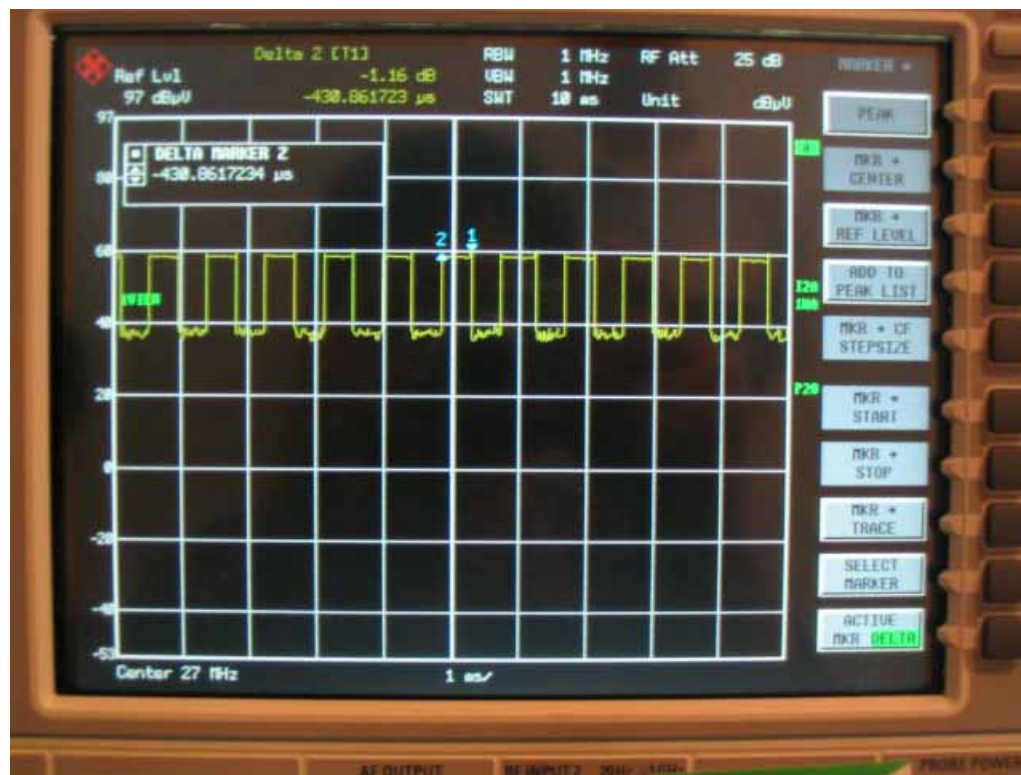
2)* Calculation for radiation(average) from the below time domain plot:

Measured duty cycle(average) = $0.431 / 0.872 = 0.494$

Radiation(average) = $83.50 + 20 \cdot \log(0.494) = 77.37 \text{ dB}(\mu \text{ V/m})$

Result: The field strength of any emission within the operation band did not exceed 80dB(μ V/m) for average value or 100 dB(μ V/m) for peak value.





Test Result of Spurious Emissions:

27.146 MHz Tx in operation							
Maximum Frequency (MHz)	Spurious Emission Position and Level					Limit	Margin
	Polarity	m	Deg°	Transd	dBµV/m	dBµV/m	dBµV/m
27.1462	V	1.22	85.0	12.5	83.50		---
54.2925	V	1.22	85.0	10.4	32.90	40	7.10
81.4386	V	1.22	88.0	10.3	37.55	40	2.45
108.5850	V	2.45	260.0	9.5	27.40	43.5	16.10
135.7315	V	2.45	261.0	9.4	29.20	43.5	14.30
162.8772	V	1.22	85.0	10.1	26.50	43.5	17.00
190.0234	V	1.22	84.0	12.2	25.90	43.5	17.60
217.1695	V	1.22	84.0	14.2	27.45	46	18.55
244.3158	V	1.22	262.0	13.9	26.80	46	19.20
271.4624	V	1.22	352.0	15.4	27.05	46	18.95
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Remark: --- Means that The emission level of the rest measuring harmonic up to 5GHz are so low below applicable limit in operation mode, so the result were not recorded.							

5- EMISSIONS WITHIN BAND EDGES

5.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ± 4.0 dB.

5.2 Limit of Emissions within Band Edges

According to the section 15.227 of FCC Part 15 Subpart C, The field strength of any emission within this band shall not exceed 10,000 microvolts/ meter at 3 meter. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

5.3 Test Equipment Used

Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
Ultra-Broadband Antenna	ROHDE & SCHWARZ	HL562	100015	2005/11	1 year
EMI Test Receiver	ROHDE & SCHWARZ	ESI 26	100009	2005/11	1 year
RF Test Panel	ROHDE & SCHWARZ	TS / RSP	335015/0017	N/A	N/A
Turntable	ETS	2088	2149	N/A	N/A
Antenna Mast	ETS	2075	2346	N/A	N/A

5.4 Test Procedure

Positioned the loop antenna with its plane vertical at the specified distance of 3 meters between its center and the EUT. The center of the loop antenna is set with 1m above the grounded plane. Then rotated about its vertical axis for finding out the maximum emission level of the EUT. (Details refer to the relevant sections of the standard ANSI C63.4-2003 'Methods of Measurement of Radio Noise Emissions from Low –Voltage Electrical and Electronic Equipment in the Range of 9KHz to 40GHz'.)

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

5.5 Emissions within Band Edges Test Result

Temperature (°C)	22~23
Humidity (%RH)	50~54
Barometric Pressure (mbar)	950~1000
EUT	R/C Spinning Car
M/N	6006
Operating Mode	Continuous Transmitting

Test plots see following:

