

**FCC PART 15 Subpart C**  
**EMI MEASUREMENT AND TEST REPORT**  
For  
**Meisida Electronic Toys Co., Ltd.**

Anping Indsutry Park (Anhai) Jinjiang Fujian China

**FCC ID: PV5MSD03331991**

November 5, 2003

<b>This Report Concerns:</b> <input checked="checked" type="checkbox"/> Original Report	<b>Equipment Type:</b> 1:24 scale R/C Nascar car
<b>Test Engineer:</b> Chris	
<b>Report No.:</b> RSZ03091103	
<b>Test Date:</b> October 31, 2003	
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## 1 - GENERAL INFORMATION

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### 1.1 Product Description for Equipment Under Test (EUT)

The *Meisida Electronic Toys Co., Ltd.*'s product, model name: *MSD0333*, Serial number: 110304 or the "EUT" as referred to in this report is a 1:24 scale R/C Nascar car. The EUT is a Transmitter, which measures approximately 12.0cmL x 6.0cmW x 10.4cmH, with permanent antenna 36cm.

The EUT power: DC 9V battery, we use a new DC battery to test.

*\* The test data was good for test sample only. It may have deviation for other product samples.*

### 1.2 Objective

This document is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2001.

The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the specification limits defined by FCC Title 47, Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209, and 15.229.

### 1.3 Related Submittal(s)/Grant(s)

No Related Submittals

### 1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4 - 2001, 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. All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### 1.5 Test Facility

The open Area Test site used by Bay Area Compliance Laboratory Corporation to collect radiated electromagnetic disturbance and disturbance voltage measurement data is located in the No. 3 building JingHua Courtyard, Shennanzhong Rd ShenZhen, Guandong 518031, P.R. C, and 230 Commercial Street, Sunnyvale, CA 94085 USA.

Test site at Bay Area Compliance Laboratory Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4 - 2001.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratory Corporation is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (NVLAP). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, CISPR 22:1997 and AS/NZS 3548: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods under NVLAP Lab Code 200167-0.

## 1.6 Test Equipment List

Manufacturer	Description	Model	Serial Number	Cal. Due Date
R/S	Spectrum Analyzer	FSEM	849720/019	08/05/2004
R/S	Receiver	ESCS30	828304/014	09/05/2004
HP	Amplifier	8447D	2944A09795	08/05/2004
ETS	Log Periodic Antenna	3146	9603-4421	09/05/2004
ETS	Biconical Antenna	3110B	3360	08/05/2004
Solar Electronics	LISN	TYPE 8012-50-R-24-BNC	21162	09/05/2004
Solar Electronics	LISN	TYPE 8012-50-R-25-BNC	21163	10/05/2004

**\*Statement of Traceability: Bay Area Compliance Laboratory Corp.** Certifies that all calibration has been performed using suitable standards traceable to the NATIONAL INSTITUTE of STANDARDS and TECHNOLOGY.

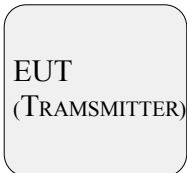
## 2 - SYSTEM TEST CONFIGURATION

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### 2.1 Description of Test Configuration

The EUT was lie, stand, and side for testing.

### 2.2 Configuration of Test System



### 2.3 Test Configuration Photos

lie configuration



Stand Configuration



## Side Configuration



## 2.4 Equipment Modifications

The EUT tested was not modified by BACL.

### 3 - SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 15.203	Antenna requirement	Pass
§ 15.205	Restricted bands of operation	Pass
§ 15.207	Conduct requirement	Pass
§ 15.209	Radiated requirement	Pass
§ 15.229(a) (b) (c)	Radiated requirement	Pass
§ 15.229(d)	Frequency tolerance	Pass

## **4 – ANTENNA REQUIREMENT**

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Require: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The antenna of the EUT is permanent attached to the Controller, so the antenna is fulfilled requirement of section 15.203.

test result passed.



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## **5 - CONDUCTED EMISSIONS TEST DATA**

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The EUT unit is battery powered so AC conducted emissions testing are not applicable.

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## 6 - RADIATED EMISSION DATA

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### 6.1 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.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is  $\pm 4.0$  dB.

### 6.2 EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup in accordance with the ANSI C63.4 - 2001. The specification used was the FCC 15 Subpart C limits for transmitter.

The test modes were lie, stand, and side. Stand is the worst mode, and the worst mode test data was included in the test report.

The EUT was placed center of the test table.

### 6.3 Spectrum Analyzer Setup

According to FCC Rules, 47 CFR, Section 15.33, the system was tested from 30 MHz to 1000 MHz.

The spectrum analyzer was set with the following configurations during the radiated emission test:

Start Frequency .....	30 MHz
Stop Frequency .....	1000 MHz
Sweep Speed .....	Auto
IF Bandwidth.....	100 KHz
Video Bandwidth .....	1 MHz
Quasi-Peak Adapter Bandwidth.....	120 KHz
Quasi-Peak Adapter Mode .....	Normal
Resolution Bandwidth.....	100 KHz

### 6.4 Test Procedure

For the radiated emissions test, since the EUT does not have AC power source, there was no connection to AC outlets.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "Qp" in the data table.

## 6.5 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 $\mu$ V means the emission is 7dB $\mu$ V below the maximum limit for applicable limits. The equation for margin calculation is as follows:

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

## 6.6 Summary of Test Results

According to the data in section 5.7, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.207, 15.209 and 15.229 after tested to 10<sup>th</sup> harmonics as required by FCC and had the worst margin of:

**-1.2 dB $\mu$ V at 40.68 MHz in the Horizontal polarization, 30 – 1000MHz, 3 meters**

## 6.7 Radiated Emissions Test Result Data

Date of Test	:	October 31, 2003	Temperature	:	25□
EUT	:	1:24 scale R/C Nascar car	Humidity	:	70□
M/N	:	MSD0333	Operating Mode	:	Transmitting
S/N	:	110304	Test Engineer:	:	Chris

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart C		
Frequency MHz	Ampl. dB $\mu$ V/m	Direction Degree	Height Meter	Polar H/V	Antenna dB $\mu$ V/m	Cable Loss dB $\mu$ V/m	Amp. dB	Corr. Ampl. dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Mode
40.68	71.3	45	1.1	h	12.1	0.4	25	58.8	60	-1.2	Fund(QP)
81.36	52.1	180	1.1	h	9.6	0.6	25	37.3	40	-2.7	QP
81.36	50.7	180	1.1	v	9.6	0.6	25	35.9	40	-4.1	QP
122.04	50.32	45	1.1	h	12.1	1.2	25	38.6	43.5	-4.9	QP
162.72	48.8	60	1.1	h	13.2	0.8	25	37.8	43.5	-5.7	QP
40.68	66.4	180	1.1	v	12.1	0.4	25	53.9	60	-6.1	Fund(QP)
122.04	48.65	45	1.1	v	12.1	1.2	25	37.0	43.5	-6.6	QP
162.72	46.6	180	1.1	v	13.2	0.8	25	35.6	43.5	-7.9	QP
203.4	43.9	45	1.1	h	10.1	1.2	25	30.2	40	-9.8	QP
203.4	45.8	270	1.0	v	10.1	1.2	25	32.1	43.5	-11.4	QP

## 6.8 Test Result: Pass

## 7 – BAND EDGES TESTING

Requirements: The field strength of any emissions appearing outside of this band shall not exceed the general radiated emission limits in § 15.209.

### 7.1 Spectrum Analyzer Setup

The spectrum analyzer was set with the following configurations during the band edges testing:

Start Frequency ..... 40.58 MHz  
Stop Frequency ..... 40.78 MHz  
Sweep Speed ..... 500 ms  
Video Bandwidth ..... 10 KHz  
Resolution Bandwidth ..... 10 KHz

### 7.2 Test Data

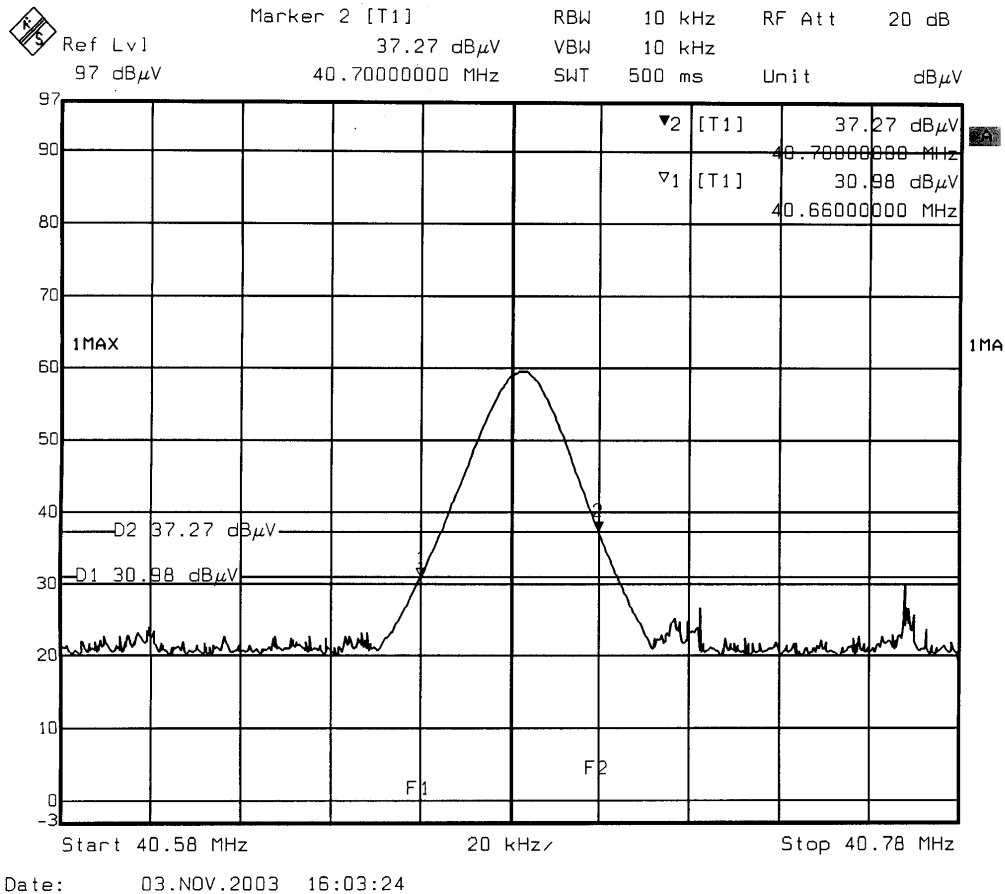
According to the data, the EUT complied with the FCC Title 47, Part 15, Subpart C, section , 15.235(b)

Date of Test	:	October 31, 2003	Temperature	:	25□
EUT	:	1:24 scale R/C Nascar car	Humidity	:	70□
M/N	:	MSD0333	Operating Mode	:	Transmitting
S/N	:	110304	Test Engineer:		Chris

Frequency	Field Strength Level	Limit
MHz	dBμV	dBμV
40.66	30.98	40
40.70	37.27	40

### 7.3 Test Result

PASS



## 8 – FREQUENCY STABILITY TESTING

Requirements: The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency over a temperature variation of 20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

### 8.1 Test Data

Temperature	Fundmental	2 min (MHz)	tolerance	5 min (MHz)	tolerance	10 min(MHz)	tolerance
-20□	40.68	40.6815	0.0037%	40.6810	0.0024%	40.6816	0.0039%
0□	40.68	40.6807	0.0017%	40.6814	0.0034%	40.6810	0.0024%
+20□	40.68	40.6816	0.0039%	40.6810	0.0024%	40.6811	0.0027%
+40□	40.68	40.6821	0.0051%	40.6809	0.0022%	40.6817	0.0042%
+50□	40.68	40.6813	0.0032%	40.6822	0.0054%	40.6820	0.0049%

### 8.2 Test Result

PASS