

FCC PART 15 Subpart C
EMI MEASUREMENT AND TEST REPORT
For
GOLD LIGHT TOYS FACTORY

Gangxia Road, Pumei, Cheng Hai City, Guang Dong Province

FCC ID: QW949MHZ

February 28, 2003

This Report Concerns: ☒ Original Report	Equipment Type: Mini R/C Car
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Report No.: RSZ03021402	
Test Date: February 14, 2003	
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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

The *GOLD LIGHT TOYS FACTORY*'s product, model name: 7774 or the "EUT" as referred to in this report is a Mini R/C Car. The EUT was composed of two parts, one is a Receiver, and the other is a Transmitter.

** 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: 1992.

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 15.209, 15.227, and 15.235.

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 - 2000, 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 St. Ste. 2, 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 C63.4-2000.

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	08/05/2003
R/S	Receiver	ESCS30	828304/014	09/05/2003
HP	Amplifier	8447D	2944A09795	08/05/2003
ETS	Log Periodic Antenna	3146	9603-4421	09/05/2003
ETS	Biconical Antenna	3110B	3360	08/05/2003
Solar Electronics	LISN	TYPE 8012-50-R-24-BNC	21162	09/05/2003
Solar Electronics	LISN	TYPE 8012-50-R-25-BNC	21163	10/05/2003

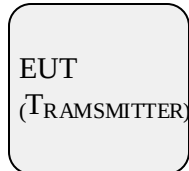
***Statement of Traceability: Bay Area Compliance Laboratory Corp.** Certifies that all calibration has been performed using suitable standards traceable to the NATIONAL INSTITUTE of STANDARDS and TECHNOLOGY.

2 - SYSTEM TEST CONFIGURATION

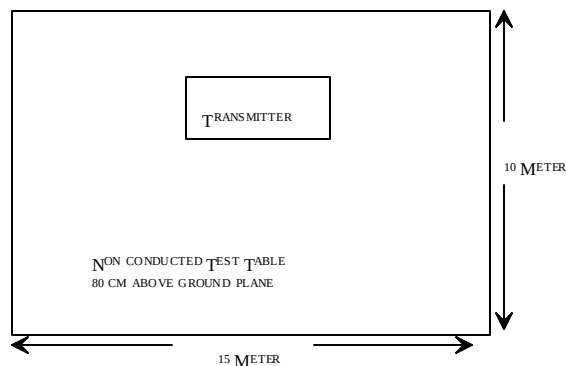
2.1 Description of Test Configuration

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

2.2 Configuration of Test System



2.3 Test Setup Block Diagram



2.4 Equipment Modifications

No modification(s) to the EUT were made by BACL to comply with the applicable limits.

3 - CONDUCTED EMISSIONS TEST DATA

The EUT did not have AC power source, therefore conducted emissions test was not needed.

4 - RADIATED EMISSION DATA

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.

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 ± 4.0 dB.

4.2 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 - 1992. The specification used was the FCC 15 Subpart C limits for transmitter and FCC Subpart C limits for receiver.

The EUT was placed center of the test table.

4.3 Spectrum Analyzer Setup

According to FCC Rules, 47 CFR, Section 15.33, the system was tested 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.....	1MHz

4.4 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.

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 -7dBμV means the emission is 7dBμV below the maximum limit for applicable limits. The equation for margin calculation is as follows:

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

4.6 Summary of Test Results

According to the data in section 4.7, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.209, 15.227, and 15.235 after tested to 10th harmonics as required by FCC and had the worst margin of:

-4.2 dBmV at 81.439 MHz in the Vertical polarization, 30 – 1000MHz, 3 meters, 27MHZ
-4.3 dBmV at 149.583 MHz in the Vertical polarization, 30 – 1000MHz, 3 meters, 49MHZ

4.7 Radiated Emissions Test Result Data

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC SUBPART C	
Frequency MHz	Ampl. dBmV/m	Angle Degree	Height Meter	Polar H/ V	Antenna dBmV/m	Cable dB	Amp. dB	Corr. Ampl. dBmV/m	Limit dBmV/m	Margin dB
27MHZ										
81.439	42.73	45	1.1	v	9.6	8.5	25	35.8	40	-4.2
54.292	39.97	45	1.1	v	10.5	8.1	25	33.6	40	-6.4
81.439	38.26	181	1.9	h	9.6	8.5	25	31.4	40	-8.6
54.292	37.41	181	2.0	h	10.5	8.1	25	31.0	40	-9.0
135.726	37.51	181	1.8	h	12.9	9.1	25	34.5	43.5	-9.0
135.726	37.42	45	1.0	v	12.9	9.1	25	34.4	43.5	-9.1
27.146	65.10	0	1.1	v	15.3	7.8	25	63.2	80	-16.8
27.146	57.50	180	1.6	h	15.3	7.8	25	55.6	80	-24.4
49MHZ										
149.583	41.62	45	1.0	v	13.4	9.2	25	39.2	43.5	-4.3
99.273	44.27	45	1.1	v	10.4	8.7	25	38.4	43.5	-5.1
199.451	37.41	45	2.0	v	14.4	9.8	25	36.6	43.5	-6.9
149.583	37.63	300	1.8	h	13.4	9.2	25	35.2	43.5	-8.3
99.273	40.27	181	1.8	h	10.4	8.7	25	34.4	43.5	-9.1
199.451	34.56	180	1.9	h	14.4	9.8	25	33.8	43.5	-9.7
49.861	70.74	45	1.1	v	11.3	8.1	25	65.1	80	-14.9
49.861	58.67	181	1.9	h	11.3	8.1	25	53.1	80	-26.9

5 – 10K BAND EDGES TESTING

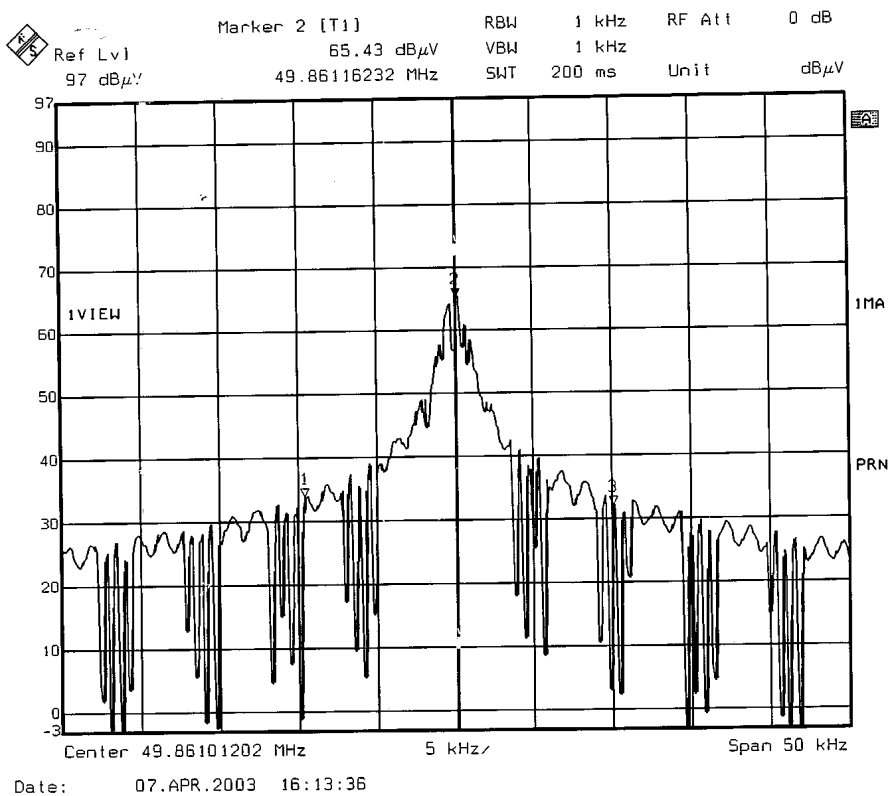
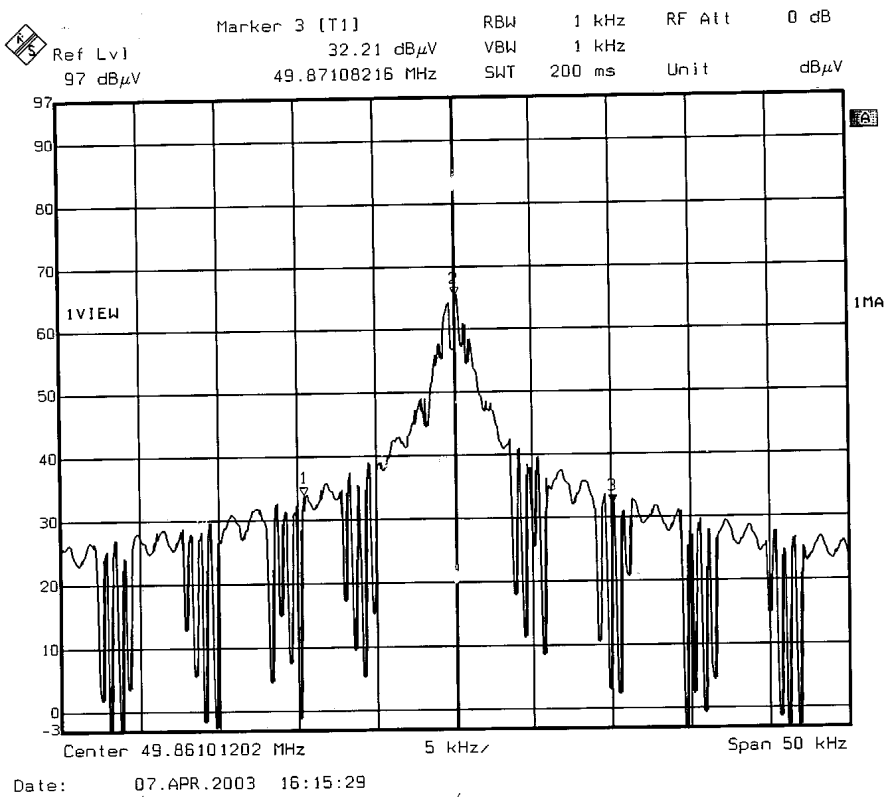
Requirements: Only for 49.86MHz EUT, FCC 15.235 (b), The field strength of any emissions appearing between the band edges and up to 10 kHz above and below the 26 dB below the level of the unmodulated carrier or to the general limits in FCC 15.209, whichever permits the higher emission levels. The field strength of any emissions removed by more than 10 kHz from the band edges shall not exceed the general radiated emission limits in FCC 15.209.

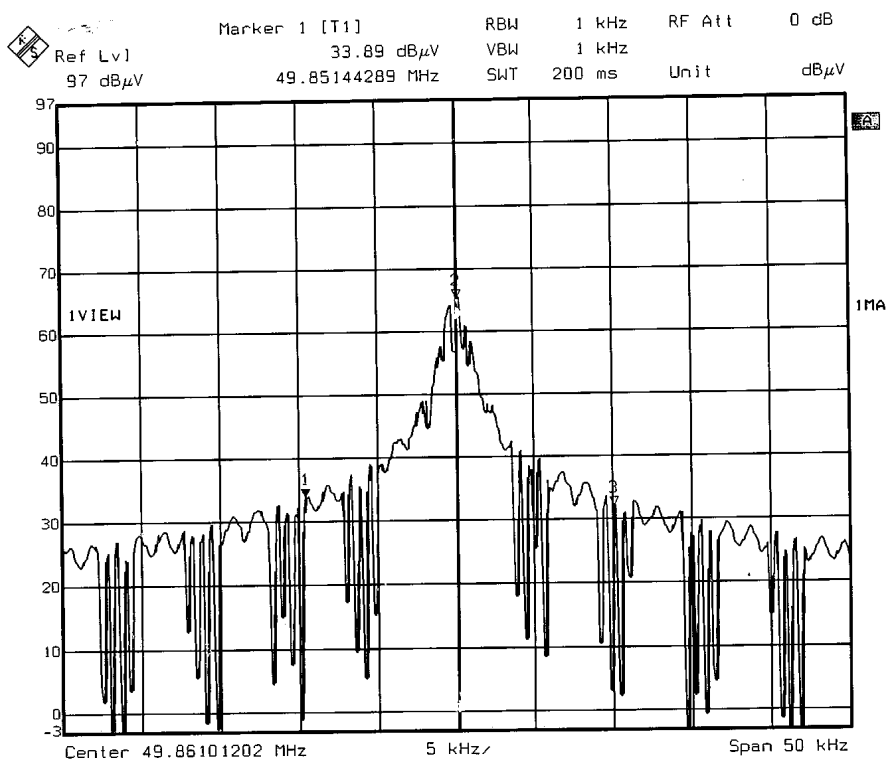
5.1 Test Results

From the point 1 and 3 of the plot, we can see the emission level is lower than the general radiated emission limits in FCC 15.209.

Refer to the attached plots.

Test Results: Pass





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