

Issuing Laboratory:

Intertek Testing Services Hong Kong Limited

Hong Kong Accreditation Service (HKAS) has accredited this laboratory under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific laboratory activities as listed in the HOKLAS directory of accredited laboratories. The results shown in this report were determined by this laboratory in accordance with its terms of accreditation.



TEST REPORT

Report No.: 13050290HKG-001

Auxo International Limited

Application
For
Certification

(Original Grant)

(FCC ID: SFF-KM13001)

Transmitter

Prepared and Checked by:

A handwritten signature in black ink.

Lee Shui Tim, Tim
Assistant Engineer

Approved by:

A handwritten signature in black ink.

Chan Chi Hung, Terry
Assistant Supervisor
Date: May 21, 2013

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**GENERAL INFORMATION**

Auxo International Limited.
BRAND NAME: AUXO, MODEL: AU00530

FCC ID: SFF-KM13001

Grantee:	Auxo International Limited.
Grantee Address:	Rm 1425, Block A, Hoi Luen Ind.Ctr., 55 Hoi Yuen Rd., Kwun Tong, Kwun Tong, HK
Contact Person:	Edward Chan
Tel:	27636293
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e-mail:	edward@auxo.com.hk
Manufacturer:	Shantou Hengdi Industry First Workshop
Manufacturer Address:	Building A, Xiongye Industrial Park, West of Ningchuanbei Road and South of Huancui Road, Guangyi Street, Chenghai District, Shantou City, Guangdong Province, China
Brand Name:	AUXO
Model:	AU00530
Type of EUT:	Transmitter
Description of EUT:	JK R/C 13IN BIG WHEEL VEHICLE
Serial Number:	N/A
FCC ID:	SFF-KM13001
Date of Sample Submitted:	May 07, 2013
Date of Test:	May 07, 2013 to May 13, 2013
Report No.:	13050290HKG-001
Report Date:	May 21, 2013
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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SUMMARY OF TEST RESULT

Auxo International Limited.
BRAND NAME: AUXO, MODEL: AU00530

FCC ID: SFF-KM13001

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, 2011 Edition

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 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 transmitter of a RC Car system, which is operating at 27.145MHz as dictated by a crystal. The EUT is powered by 1 x 9.0V Alkaline battery. The EUT has a control key only.

After switching ON the EUT and its corresponding receiver (i.e. car), activating the control key on the EUT can control the receiver moving forward and backward.

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.

1.3 Test Methodology

Radiated emission measurements 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 EUT was powered by 1 X 9.0V Alkaline battery during test.

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 Auxo International Limited. 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.

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2.6 Support Equipment List and Description

N/A.

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 $\text{dB}\mu\text{V}/\text{m}$

RA = Receiver Amplitude (including preamplifier) in $\text{dB}\mu\text{V}$

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 $\text{dB}\mu\text{V}/\text{m}$

RR = $RA - AG - AV$ in $\text{dB}\mu\text{V}$

LF = $CF + AF$ in dB

Assume a receiver reading of 52.0 $\text{dB}\mu\text{V}$ 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 $\text{dB}\mu\text{V}/\text{m}$. This value in $\text{dB}\mu\text{V}/\text{m}$ was converted to its corresponding level in $\mu\text{V}/\text{m}$.

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

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

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

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

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

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

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

$$FS = RR + LF$$

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

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

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3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission 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 11.2 dB

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Applicant: Auxo International Limited.

Date of Test: May 9, 2013

Model: AU00530

Mode: Transmitting

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp (dB)	Antenna Factor (dB)	Average Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	27.145	37.1	16	15.4	0.0	36.5	80.0	-43.5
V	54.290	33.8	16	11.0	-	28.8	40.0	-11.2
V	81.435	37.3	16	7.0	-	28.3	40.0	-11.7
H	108.580	30.6	16	14.0	-	28.6	43.5	-14.9
H	135.725	30.9	16	14.0	-	28.9	43.5	-14.6
H	162.870	29.1	16	16.0	-	29.1	43.5	-14.4
H	190.015	28.2	16	16.0	-	28.2	43.5	-15.3

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 30 MHz.
5. Horn antenna is used for the emissions 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.

8.0 Miscellaneous Information

This miscellaneous information includes details of the test procedure.

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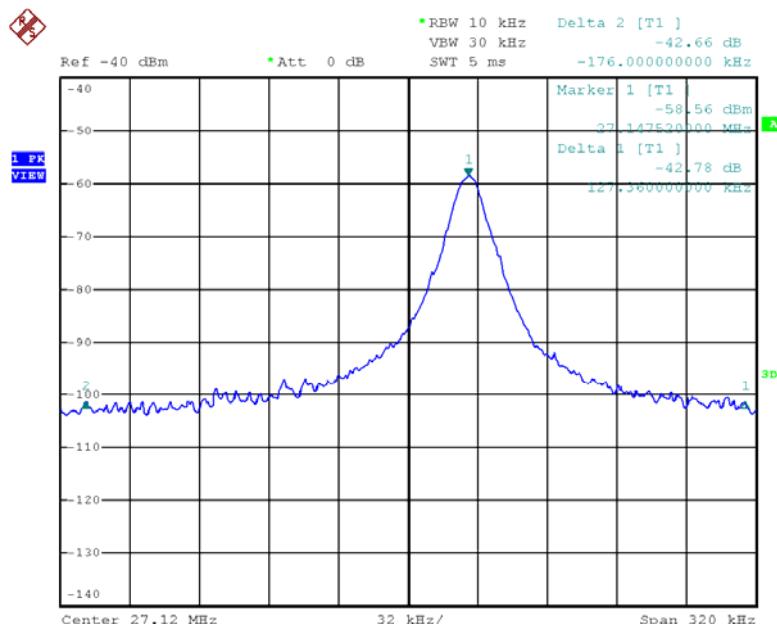
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8.1 Measured Bandwidth

The plot which shows the fundamental emission is confined in the specified band. And it also shows that the emission is at least 42.7 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 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.



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.

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8.4 Emissions Test Procedures

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

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 2009.

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 axes to obtain maximum emission levels. The antenna height and polarization are varied during the testing to search for maximum signal levels.

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. For line conducted emissions, the range scanned is 150 kHz to 30 MHz.

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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 are made as described in ANSI C63.4 - 2009.

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. 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 8.2). 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 restricted 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, but those 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	Log Periodic Antenna	Biconical Antenna
Registration No.	EW-2666	EW-0446	EW-2512
Manufacturer	R&S	EMCO	EMCO
Model No.	ESCI7	3146	3104C
Calibration Date	May 21, 2012	Oct 31, 2011	Nov 15, 2011
Calibration Due Date	May 21, 2013	Apr 30, 2013	May 15, 2013

Equipment	Spectrum Analyzer
Registration No.	EW-2188
Manufacturer	AGILENTTECH
Model No.	E4407B
Calibration Date	Nov 05, 2012
Calibration Due Date	Nov 05, 2013

Equipment	Active H-field Loop Antenna
Registration No.	EW-0191
Manufacturer	EMCO
Model No.	6502
Calibration Date	Jan 30, 2013
Calibration Due Date	Jul 30, 2014

2) Bandwidth Measurement

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