



TEST REPORT

Report No.: HK11040466-1

First Act Inc.

Application
For
Certification

(Original Grant)

(FCC ID: ZDMVCKRZ)

Transmitter

Prepared and Checked by:

Approved by:

Signed On File
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Date: May 12, 2011

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GENERAL INFORMATION

**FIRST ACT INC.
MODEL: FI901**

FCC ID: ZDMVCKRZ

Grantee:	First Act Inc.
Grantee Address:	745 Boylston Street, Boston, MA 02116, Massachusetts, United States
Contact Person:	Paul Franzosa
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Manufacturer:	First Act Entertainment Ltd.
Manufacturer Address:	Unit 2313, 23/F, BEA Tower, Millennium City 5, 418 Kwun Tong, Kowloon, Hong Kong
Brand Name:	First Act
Model:	FI901
Additional Model:	FI902, FI903, FI904, FI905, FI906, FI916, FI926, FI907, FI917, FI927
Type of EUT:	Transmitter
Description of EUT:	First Act Voice Rockrz Microphone
Serial Number:	N/A
FCC :	ZDMVCKRZ
Date of Sample Submitted:	April 08, 2011
Date of Test:	April 15, 2011
Report No.:	HK11040466-1
Report Date:	May 12, 2011
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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SUMMARY OF TEST RESULT

FIRST ACT INC.

MODEL: FI901

FCC ID: ZDMVCKRZ

TEST SPECIFICATION	REFERENCE	RESULTS
Maximum Peak Output Power	15.247(b), (c) / RSS-210 A8.4	N/A
Hopping Channel Carrier Frequencies Separation	15.247(e) / RSS-210 A8.1	N/A
20dB Bandwidth of the Hopping Channel	15.247(a) / RSS-210 A8.1	N/A
Number of Hopping Frequencies	15.247(e) / RSS-210 A8.1	N/A
Average Time of Occupancy of Hopping Frequency	15.247(e) / RSS-210 A8.1	N/A
Antenn Conducted Spurious Emissions	15.247(d) / RSS-210 A8.5	N/A
Radiated Spurious Emissions	15.247(d) / RSS-210 A8.5	N/A
RF Exposure Compliance	15.247(i) / RSS-Gen 5.5	N/A
Transmitter Power Line Conducted Emissions	15.207 / RSS-Gen 7.2.2	N/A
Transmitter Field Strength	15.225 / RSS-210 A2.6	Pass
Transmitter Field Strength	15.227 / RSS-310 3.8	N/A
Transmitter Field Strength	15.229 / RSS-210 A2.7	N/A
Transmitter Field Strength, Bandwidth and Timing Requirement	15.231(a) / RSS-210 A1.1.1	N/A
Transmitter Field Strength, Bandwidth and Timing Requirement	15.231(e) / RSS-210 A1.1.5	N/A
Transmitter Field Strength and Bandwidth Requirement	15.239 / RSS-210 A2.8	N/A
Transmitter Field Strength and Bandwidth Requirement	15.249 / RSS-210 A2.9	N/A
Transmitter Field Strength and Bandwidth Requirement	15.235 / RSS-310 3.9	N/A
Receiver / Digital Device Radiated Emissions	15.109 / ICES-003	N/A
Digital Device Conducted Emissions	15.107 / ICES-003	N/A

- 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 expected variations in temperature and supply voltage were considered.

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INTERTEK TESTING SERVICES

1.0 General Description

1.1 Product Description

The equipment under test (EUT) is a transmitter for an Inductive toy microphone (RFID tag reader) operating at 13.56MHz which is controlled by a crystal. The EUT is energized by three AAA size batteries. This toy consists of toy microphone (RFID tag reader) and 8 passive type powered tags (Flower ring, Skull ring, Rock Ring, Skull bracelet, Zipper bracelet, Flame ring, Bike Chain bracelet, studded bracelet). The microphone has a power on/off button, FX button, MIC button and a Demo/play switch with a line in Jack. The RFID tag sensor is located on the back of microphone. After switched on the EUT, the user can tap a tag to the target zone (i.e. RFID tag sensor) and sing into the Mic for generate voice effect. Each tag can generate different voice effect while in play. In addition, the user can plug the MP3 player into the line jack input for play music from the speaker of the EUT.

The Model: FI902, FI903, FI904, FI905, FI906, FI916, FI926, FI907, FI917 and FI927 are the same as the Model: FI901 in hardware aspect. The difference in graphic on product and housing colour only.

Antenna Type : Internal, Integral

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

1.2 Related Submittal(s) Grants

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

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). 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 (2003).

The device was powered from DC 4.5V (3 x "AAA" size batteries) during test.

For maximizing emissions, 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 reported in Exhibit 3.0.

The rear of unit shall be flushed with the rear of the table.

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 First Act Entertainment 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

Cassette Player (EW-1738b) (Provided by Intertek)

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

Assume a receiver reading of 52.0 dB μ 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 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$\begin{aligned} RA &= 52.0 \text{ dB}\mu\text{V/m} \\ AF &= 7.4 \text{ dB} & RR &= 18.0 \text{ dB}\mu\text{V} \\ CF &= 1.6 \text{ dB} & LF &= 9.0 \text{ dB} \\ AG &= 29.0 \text{ dB} \\ AV &= 5.0 \text{ dB} \\ FS &= RR + LF \\ FS &= 18 + 9 = 27 \text{ dB}\mu\text{V/m} \end{aligned}$$

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

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3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission at 94.947 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 2.7 dB

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Company: First Act Inc.
Model: FI901
Mode: Transmitting

Date of Test: April 15, 2011

Table 1

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dB μ V/m)	Distance Factor (-dB)	Calculated at 30m (dB μ V/m)	Limit at 30m (dB μ V/m)	Margin (dB)
V	13.563	66.8	10.8	0.0	77.6	40.0	37.6	84.0	-46.4
V	27.124	23.8	9.5	0.0	33.3	40.0	-6.7	29.5	-36.2

Table 2

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	40.688	41.1	16	10.0	35.1	40.0	-4.9
V	54.257	42.2	16	11.0	37.2	40.0	-2.8
V	67.816	42.4	16	8.0	34.4	40.0	-5.6
H	81.380	42.3	16	7.0	33.3	40.0	-6.7
H	94.947	45.8	16	11.0	40.8	43.5	-2.7
H	108.514	34.2	16	14.0	32.2	43.5	-11.3
H	122.078	34.3	16	14.0	32.3	43.5	-11.2
H	135.642	35.3	16	14.0	33.3	43.5	-10.2
H	149.206	37.0	16	14.0	35.0	43.5	-8.5

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

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3.4 Frequency Stability

Data Table
Frequency tolerance of Transmitter
(Temperature Variation: -20°C to +50°C)

Operating Frequency			13.563774 MHz	
Test Voltage (V)	Temperature (°C)	Measured Frequency (MHz)	Frequency Error (%)	Limit (%)
4.5	+50	13.563783	+0.000066	±0.01
	+40	13.563773	-0.000007	±0.01
	+30	13.563773	-0.000007	±0.01
	+20	13.563774	0	±0.01
	+10	13.563745	-0.00021	±0.01
	0	13.563703	-0.00052	±0.01
	-10	13.563653	-0.0009	±0.01
	-20	13.563606	-0.0012	±0.01

We found that the EUT met the requirement of FCC Part 15 Section 15.225 (e).

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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**

The miscellaneous information includes details of the test procedure and measured bandwidth.

8.1 **Measured Bandwidth**

The plot saved in be.pdf which shows the fundamental emission is confined in the specified band. The emission of the fundamental is 37.6 dB μ V/m and it is below the limit of 50.5 dB μ V/m in the range of (13.410 – 13.553 MHz) and (13.567 – 13.710 MHz) and the limit of 40.5 dB μ V/m in the frequency range of (13.110 – 14.410 MHz) and (13.710 – 14.010 MHz). In the frequency range from 13.110 – 14.010 MHz, we cannot find any emission higher than the fundamental emission. Therefore they meet the requirement of Section 15.225(a), (b), (c), & (d).

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8.2 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 - 2003.

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.

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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8.2 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 - 2003.

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.

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.

9.0 Equipment List

Radiated Emissions Test

Equipment	Active H-field Loop Antenna	EMI Test Receiver	Log Periodic Antenna	Biconical Antenna
Registration No.	EW-0191	EW-2250	EW-0446	EW-0954
Manufacturer	EMCO	ROHDESCHWARZ	EMCO	EMCO
Model No.	6502	ESCI	3146	3104C
Calibration Date	Dec 25, 2009	Jan 25, 2011	Apr 26, 2010	Apr 14, 2010
Calibration Due Date	Jun 25, 2011	Jan 25, 2012	Oct 26, 2011	Oct 14, 2011

Equipment	14m Double Shield RF Cable (20MHz - 6GHz)	14m Double Shield RF Cable (9kHz - 6GHz)	Spectrum Analyzer
Registration No.	EW-2528	EW-2375	EW-2188
Manufacturer	RADIALL	RADIALL	AGILENTTECH
Model No.	nm / br5d / sma 14m	n m/br56/bnc m 14m	E4407B
Calibration Date	Dec 14, 2010	Sep 11, 2010	Dec 27, 2010
Calibration Due Date	Dec 14, 2011	Sep 12, 2011	Dec 31, 2011