*October 16, 2002*

*Tandy Electronics (China) Limited*
*6/F. & 7/F., M.C. Packaging Building,*
*9th District, Lian Tang Industrial Estate,*
*ShenZhen, GuangDong, China.*

*Dear Mr. Tan Hui:*

*Enclosed you will find your file copy of a Part 15 report (FCC ID: AAO4005029T).*

*For your reference, TCB will normally take another 15-20 days for reviewing the report. Approval will then be granted when no query is sorted.*

*Please contact me if you have any questions regarding the enclosed material.*

*Sincerely,*

*Alfred Lo*
*Senior Technical Supervisor*

*Enclosure*

*FCC ID: AAO4005029T*

**Intertek Testing Services Hong Kong Ltd.**
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2745 8306

# Tandy Electronics (China) Limited

Application
For
Certification
**(FCC ID: AAO4005029T)**

Transmitter

WO# 0213169
LC/sa
October 16, 2002

FCC ID: AAO4005029T

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**Intertek Testing Services Hong Kong Ltd.**
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2713 8888 Fax: (852) 2745 8306

# LIST OF EXHIBITS

*INTRODUCTION*

| | |
|---|---|
| *EXHIBIT 1*: | General Description |
| *EXHIBIT 2*: | System Test Configuration |
| *EXHIBIT 3*: | Emission Results |
| *EXHIBIT 4*: | Equipment Photographs |
| *EXHIBIT 5*: | Product Labelling |
| *EXHIBIT 6*: | Technical Specifications |
| *EXHIBIT 7*: | Instruction Manual |
| *EXHIBIT 8*: | Miscellaneous Information |

# MEASUREMENT/TECHNICAL REPORT

## Tandy Electronics (China) Limited - MODEL: 40-5029
## FCC ID: AAO4005029T

This report concerns (check one:) Original Grant__X__ Class II Change _____

Equipment Type: Low Power Transmitter (example: computer, printer, modem, etc.)

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Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes___ No_X__

If yes, defer until: _____
date

Company Name agrees to notify the Commission by: _____
date

of the intended date of announcement of the product so that the grant can be issued on that date.

---

Transition Rules Request per 15.37? Yes___ No_X__

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [12-18-01 Edition] provision.

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Report prepared by:

Alfred Lo
Intertek Testing Services
Hong Kong Ltd.
2/F., Garment Centre,
576, Castle Peak Road,
Kowloon, Hong Kong
Phone: 852-2173-8545
Fax: 852-2371-0914

## Table of Contents

1.0 **General Description** ..... 3
1.1 Product Description ..... 3
1.2 Related Submittal(s) Grants ..... 3
1.3 Test Methodology ..... 4
1.4 Test Facility ..... 4

2.0 **System Test Configuration** ..... 6
2.1 Justification ..... 6
2.2 EUT Exercising Software ..... 6
2.3 Special Accessories ..... 6
2.4 Equipment Modification ..... 7
2.5 Support Equipment List and Description ..... 7

3.0 **Emission Results** ..... 9
3.1 Field Strength Calculation ..... 10
3.1 Field Strength Calculation (cont'd) ..... 11
3.2 Radiated Emission Configuration Photograph ..... 12
3.3 Radiated Emission Data ..... 13
3.4 Conducted emission Configuration Photograph ..... 16
3.5 Conducted Emission Data ..... 18

4.0 **Equipment Photographs** ..... 20

5.0 **Product Labelling** ..... 22

6.0 **Technical Specifications** ..... 24

7.0 **Instruction Manual** ..... 26

8.0 **Miscellaneous Information** ..... 28
8.1 Measured Bandwidth ..... 29
8.2 Discussion of Pulse Desensitization ..... 30
8.3 Calculation of Average Factor ..... 31
8.4 Emissions Test Procedures ..... 32
8.4 Emissions Test Procedures (cont'd) ..... 33

List of attached file

| Exhibit type | File Description | filename |
|---|---|---|
| Test Report | Test Report | report.pdf |
| Operation Description | Technical Description | descri.pdf |
| Test Setup Photo | Radiated Emission | radiated.pdf |
| Test Setup Photo | Conduct Emission | conducted.pdf |
| Test Report | Conducted Emission Test Result | conduct.pdf |
| Test Report | Bandwidth Plot | bw.pdf |
| External Photo | External Photo | ophoto.pdf |
| Internal Photo | Internal Photo | Iphoto.pdf |
| Block Diagram | Block Diagram | block.pdf |
| Schematics | Circuit Diagram | circuit.pdf |
| ID Label/Location | Label Artwork and Location | Label.pdf |
| User Manual | User Manual | manual.pdf |

# EXHIBIT 1

# GENERAL DESCRIPTION

## 1.0 General Description

### 1.1 Product Description

This Equipment Under Test (EUT) is a 900MHz wireless audio transmitter for its associated wireless headphone. The main function of the EUT is use to transmit the modulated signal to it's associated receiver. It is powered by the client provided adaptor (model DV-1225S, 12VDC, 250mA). It consists the power input DC jack hole and two female RCA connectors (L & R) at the back and the green LED will be lighted when both inputs were plugged. Moreover, it can be found that the STEREO/MONO and CHANNEL buttons for control the transmitter's operational mode and transmitted frequencies band respectively. Furthermore, this transmitter can be operated in 3 difference channels and those channel frequencies are shows in the block diagram. The bare wire type antenna was equipped inside the plastic case and its photo was shown on the following pages.

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

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992). Radiated Emission measurement was performed in Open Area Test Sites and Conducted Emission was performed in shield room. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. For each scan, the procedure for maximizing emissions in Appendices D and E were followed. 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.

# EXHIBIT 2

# SYSTEM TEST CONFIGURATION

## 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 (1992).

The EUT was powered by AC/DC adaptor model number DV1225S (120VAC to 12VDC, 250mA).

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. The step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was placed on turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

For simplicity of testing, the unit was operated to transmit continuously.

### 2.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered up, it transmits the typical 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 Tandy Electronics (China) Limited will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Intertek Testing Services.

2.5 Support Equipment List and Description

1. Walkman with FM/AM radio (SONY WM-FX193)

2. 1.8 meters cable

(Provided by ITS)

All the items listed under section 2.0 of this report are:

*Confirmed by:*

*Alfred Lo*
*Senior Technical Supervisor - Home Entertainment Electronics*
*Intertek Testing Services Hong Kong Ltd.*
*Agent for Tandy Electronics (China) Limited*

_____Signature

October 16, 2002 Date

# EXHIBIT 3

# EMISSION RESULTS

## 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 reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD + AV

where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD + AV

3.1 Field Strength Calculation (cont'd)

Example

Assume a receiver reading of 62.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 62.0 dBμV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0 dB

AV = -10 dB

FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 dBμV/m

Level in mV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m

3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
at
911.446 and 914.275 MHz (respectively)

For electronic filing, the front view and back view of the test configuration photographs are saved with filename: radiated.pdf.

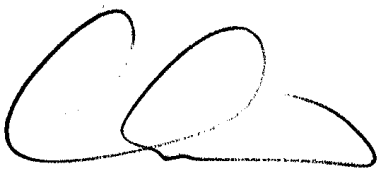
3.3 Radiated Emission Data

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.

Judgement: Passed by 5.4 dB margin

The radiated emission test was observed up to 40 GHz.

***TEST PERSONNEL:***



*Signature*

Lawrence H. C. Chow, Compliance Engineer
*Typed/Printed Name*

October 16, 2002
Date

Company: Tandy Electronics (China) Limited Date of Test: 16 September, 2002
Model: 40-5029
Worst Case Operating Mode: Transmitting Mode (Ch.1)

**Table 1, Ch.1**
**Radiated Emissions**

| Polarization | Frequency (MHz) | Reading (dBμV) | Antenna Factor (dB) | Pre-Amp Gain (dB) | Net at 3m (dBμV/m) | Limit at 3m (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| V | 911.446 | 82.0 | 22.6 | 16 | 88.6 | 94.0 | -5.4 |
| V | 915.646 | 81.9 | 22.6 | 16 | 88.5 | 94.0 | -5.5 |
| V | 907.246 | 28.8 | 22.6 | 16 | 35.4 | 46.0 | -10.6 |
| V | 919.853 | 30.4 | 22.6 | 16 | 37.0 | 46.0 | -9.0 |
| H | 1822.902 | 46.3 | 26.5 | 34 | 38.8 | 54.0 | -15.2 |
| H | 1831.817 | 46.0 | 26.5 | 34 | 38.5 | 54.0 | -15.5 |
| *V | 2734.210 | 44.3 | 29.1 | 34 | 39.4 | 54.0 | -14.6 |
| *V | 2746.806 | 44.0 | 29.4 | 34 | 39.4 | 54.0 | -14.6 |
| *V | 3645.596 | 38.6 | 32.8 | 34 | 37.4 | 54.0 | -16.6 |
| *V | 3662.408 | 36.6 | 32.8 | 34 | 35.4 | 54.0 | -18.6 |
| *V | 4557.004 | 35.2 | 34.0 | 34 | 35.2 | 54.0 | -18.8 |
| *V | 4578.011 | 34.8 | 34.0 | 34 | 34.8 | 54.0 | -19.2 |

NOTES:

1. Peak Detector is used below 1000MHz 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 and average detector are used for the emission over 1000MHz.

5. The radiated emission test was observed up to 40GHz.

* Emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000 MHz.

Test Engineer: Lawrence H. C. Chow

Company: Tandy Electronics (China) Limited Date of Test: 16 September, 2002
Model: 40-5029
Worst Case Operating Mode: Transmitting Mode (Ch.3)

**Table 2, Ch.3**
**Radiated Emissions**

| Polarization | Frequency (MHz) | Reading (dBμV) | Antenna Factor (dB) | Pre-Amp Gain (dB) | Net at 3m (dBμV/m) | Limit at 3m (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| V | 914.275 | 82.0 | 22.6 | 16 | 88.6 | 94.0 | -5.4 |
| V | 918.409 | 81.7 | 22.6 | 16 | 88.3 | 94.0 | -5.7 |
| V | 910.294 | 29.3 | 22.6 | 16 | 35.9 | 46.0 | -10.1 |
| V | 922.735 | 31.0 | 22.6 | 16 | 37.6 | 46.0 | -8.4 |
| H | 1828.546 | 46.9 | 26.5 | 34 | 39.4 | 54.0 | -14.6 |
| H | 1836.804 | 46.5 | 26.5 | 34 | 39.0 | 54.0 | -15.0 |
| *V | 2742.868 | 43.9 | 29.1 | 34 | 39.0 | 54.0 | -15.0 |
| *V | 2755.254 | 44.6 | 29.1 | 34 | 39.7 | 54.0 | -14.3 |
| *V | 3657.184 | 39.3 | 32.8 | 34 | 38.1 | 54.0 | -15.9 |
| *V | 3673.604 | 36.8 | 32.8 | 34 | 35.6 | 54.0 | -18.4 |
| *V | 4571.369 | 36.7 | 34.0 | 34 | 36.7 | 54.0 | -17.3 |
| *V | 4591.945 | 35.7 | 34.0 | 34 | 35.7 | 54.0 | -18.3 |

NOTES:

1. Peak Detector is used below 1000MHz 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 and average detector are used for the emission over 1000MHz.
5. The radiated emission test was observed up to 40GHz.

* Emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000 MHz.

Test Engineer: Lawrence H. C. Chow

3.4 Conducted Emission Configuration Photograph

Worst Case Conducted Emission
at
0.45 MHz

For electronic filing, the front view, rear view and side view of the test configuration photographs are saved with filename: conducted.pdf.

Company: Tandy Electronics (China) Limited
Model: 40-5029

Date of Test: 16 September, 2002

**Conducted Emissions**
**Section 15.107 Requirements**

For Electronic filing, the conducted emission test result is saved with filename: conduct.pdf

3.5 Conducted Emission Data

For electronic filing, the graph and data table of conducted emission are saved with filename: conduct.pdf. The data table lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgement: Passed by 20 dB margin

* Peak Detector Data Unless otherwise stated.

***TEST PERSONNEL:***

*Signature*

Lawrence H. C. Chow, Compliance Engineer
*Typed/Printed Name*

October 16, 2002
Date

# EXHIBIT 4

# EQUIPMENT PHOTOGRAPHS

## 4.0 Equipment Photographs

For electronic filing, photographs of the tested EUT are saved with filename: ophoto.pdf for external photo, and iphoto.pdf for internal photo.

# EXHIBIT 5

# PRODUCT LABELLING

## 5.0 Product Labelling

For electronics filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

# EXHIBIT 6

# TECHNICAL SPECIFICATIONS

## 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.

# EXHIBIT 7

# INSTRUCTION MANUAL

## 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. Moreover, it was said that the declaration which mention in following pages will also be committed at the time.

# EXHIBIT 8

# MISCELLANEOUS INFORMATION

## 8.0 Miscellaneous Information

The miscellaneous information includes details of the measured bandwidth, the test procedure and calculation of factor such as pulse desensitization and averaging factor (calculation and timing diagram).

8.1 Measured Bandwidth

The plot on saved in bw1.jpg to bw4.jpg shows the fundamental emissions which are without applying modulation. From the plot, it shows the emission is within the band edge 902MHz and 928MHz.

8.2 Discussion of Pulse Desensitization

The determination of pulse desensitivity was made in accordance with Hewlett Packard Application Note 150-2, *Spectrum Analysis ... Pulsed RF.*

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 continuously signal.

## 8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of Low Power Transmitter operating under the Part 15, Subpart C rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 1992.

The equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the groundplane. 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 axis to obtain maximum emission levels. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

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 450 kHz to 30 MHz.

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 were made as described in ANSI C63.4 - 1992.

The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 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.

Measurements are normally conducted at a measurement distance of three meters. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.