# Edwin McAuley Electronics Ltd.

Application
For
Certification
**(FCC ID: ML657592A)**

Superheterodyne Receiver

WO# 99001973
CKL/at
12 February, 1999


- The test results reported in this test report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.
- This report shall not be reproduced except in full without prior authorization from Intertek Testing Services Hong Kong Limited


FCC ID: ML657592A

# LIST OF EXHIBITS

*INTRODUCTION*

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## MEASUREMENT/TECHNICAL REPORT

# Edwin McAuley Electronics Ltd. - MODEL: Orbit 57592 (12-station)
# FCC ID: ML657592A

This report concerns (check one:) Original Grant_X_ Class II Change_____

Equipment Type: Superheterodyne Receiver (example: computer, printer, modem, etc.)

_____

_____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.

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Transition Rules Request per 15.37? Yes___ No_X_

If no, assumed Part 15, Subpart B for unintentional radiator - the new 47 CFR [10-1-96 Edition] provision.

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Report prepared by:

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List of attached file

| Exhibit type | File Description | filename |
|---|---|---|
| Cover Letter | Letter of Agency | letter.pdf |
| Test Report | Test Report | report.doc |
| Operation Description | Technical Description | descri.pdf |
| Test Setup Photo | Radiated Emission | radiated1.jpg, radiated2.jpg |
| Test Setup Photo | Conducted Emission | conduct1.jpg, conduct2.jpg conduct3.jpg |
| Test Report | Conducted Emission Test Result | conducted.pdf |
| External Photo | External Photo | ophoto1.jpg, ophoto2.jpg |
| Internal Photo | Internal Photo | iphoto1.jpg to iphoto5.jpg |
| 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

The equipment under test (EUT) is a superheterodyne receiver of the water timer with remote control operating at 315 MHz. The EUT is power by 24 V AC adaptor. The remote control water system which can drive 12 stations. The receiver receives 6 different remote command which are sent by remote transmitter to control the programmable timing controller with dual program for watering gardens.

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

### 1.2 Related Submittal(s) Grants

This is an application for Certification of a receiver. The FCC ID for the transmitter associated with this receiver is ML657556.

## 1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992). 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. 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).

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 unit was operated standalone and placed in the center of the turntable.

The device was powered from 24V AC Adaptor

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 a turnable , 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 received continuously.

### 2.3 Support Equipment List and Description

This product was tested in standalone configuration.

2.4 Equipment Modification

Any modifications installed previous to testing by Edwin McAuley Electronics Ltd. will be incorporated in each production model sold/leased in the United States.

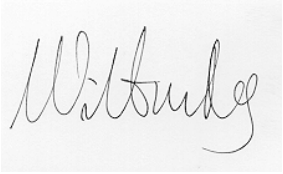
No modifications were installed by Intertek Testing Services.

2.5 Special Accessories

There are no special accessories necessary for compliance of this product.

*Confirmed by:*

*Wilbur Ng*
*Assistant Manager - EMC*
*Intertek Testing Services*
*Hong Kong Ltd.*
*Agent for* Edwin McAuley Electronics Ltd.


_____Signature

February 23, 1999 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 Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG

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

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 dBμV/m
RR = RA - AG in dBμV
LF = CF + AF in dB

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV/m
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
FS = RR + LF
FS = 23 + 9 = 32 dBμV/m

RR = 23.0 dBμV
LF = 9.0 dB

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 314.541 MHz

For electronic filing, the front view and back view of the test configuration is saved with filename: radiated.jpg.

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 3.2 dB

*All readings are peak unless stated otherwise

***TEST PERSONNEL:***

*Signature*

Billy C. M. Chow, Compliance Engineer
*Typed/Printed Name*

February 23, 1999
Date

Company: Edwin McAuley Electronics Ltd. Date of Test: 10 February, 1999
Model: Orbit 57592 (12-station)

**Table 1**

**FCC Class B Radiated Emissions**

| Polarity | Frequency (MHz) | Reading (dBµV) | Antenna Factor (dB) | Pre-Amp Gain (dB) | Net at 3m (dBµV/m) | Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 314.541 | 35.8 | 23 | 16 | 42.8 | 46 | -3.2 |
| H | 629.091 | 22.8 | 29 | 16 | 35.8 | 46 | -10.2 |
| H | 943.742 | 19.2 | 33 | 16 | 36.2 | 46 | -9.8 |

NOTES:
1. Negative sign in the column shows value below limit.
2. Peak Detector Data.
3. 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.

Test Engineer: Billy C. M. Chow

3.4 Conducted Emission Configuration Photograph

Worst Case Conducted Emission

at 0.4500 MHz

For electronic filing, the front view, rear view and side view of the test configuration are saved with filename: conduct1.jpg, conduct2.jpg and conduct3.jpg respectively.

3.5 Conducted Emission Data

For electronic filing, the graph and data table of conducted emission is saved with filename: conducted.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 24.0 dB

*All readings are peak unless stated otherwise

***TEST PERSONNEL:***

*Signature*

Billy C. M. Chow, Compliance Engineer
*Typed/Printed Name*

February 23, 1999
Date

# EXHIBIT 4

# EQUIPMENT PHOTOGRAPHS

## 4.0 Equipment Photographs

For electronic filing, photographs of the tested EUT are saved with filename: ophoto1.jpg, ophoto2.jpg for external photo, and iphoto1.jpg, iphoto4.jpg for internal photo.

# EXHIBIT 5

# PRODUCT LABELLING

## 5.0 Product Labelling

For electronics filing, the FCC ID label and 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 Superheterodyne Receiver are saved with filename: circuit.pdf and block.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.