Edwin McAuley Electronics Ltd.

Application
For
Certification
(FCC ID: ML657016A)

Superheterodyne Receiver

WO# 99001972
CKL/at
12 February, 1999

LIST OF EXHIBITS

FCC ID: ML657016A

MEASUREMENT/TECHNICAL REPORT

Edwin McAuley Electronics Ltd. - MODEL: Orbit 57016 (6-station)
FCC ID: ML657016A

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.

_____

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.

_____

Report prepared by:

Wilbur Ng
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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 VAC adaptor. The remote control water system which can drive 6 stations. The receiver receives 6 different remote commands 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 ML657555.

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.

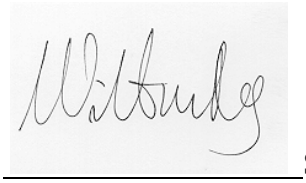
No modifications were installed by Intertek Testing Services.

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 RR = 23.0 dBµV
CF = 1.6 dB LF = 9.0 dB
AG = 29.0 dB
FS = RR + LF
FS = 23 + 9 = 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 314.541 MHz

For electronic filing, the front view and back view of the test configuration is saved with filename: radiated1.jpg and rediated2.jpg respectively.

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 57016 (6-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 to 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.