

PopCo Entertainment Ltd.

Application
For
Certification
(FCC ID: WHHHC78806S)

Superregenerative Receiver

Sample Description : Basic Silver Vehicle Set (49MHz)

Model : HC78806S

Additional Model : HC78812S

Supersede Report No. HK08070767-1(R1) dated September 17, 2008

HK08070767-1(R2)

BC/at

September 22, 2008

- The test results reported in this 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.
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- The evaluation data of the report will be kept for 3 years from the date of issuance.

FCC ID : WHHHC78806S

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LIST OF EXHIBITS

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MEASUREMENT/TECHNICAL REPORT

**PopCo Entertainment Ltd. - MODEL: HC78806S
FCC ID: WHHHC78806S**

September 22, 2008

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

Equipment Type: Superregenerative Receiver

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

If no, assumed Part 15, Subpart B for unintentional radiator

Report prepared by: **Chow Chi Ming, Billy**
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List of attached file

Exhibit type	File Description	filename
Test Report	Test Report	report.pdf
Cover Letter	Letter of Agency	letter.pdf
Operation Description	Technical Description	descri.pdf
Test Setup Photo	Radiated Emission	radiated photos.pdf
Test Setup Photo	Conducted Emission	conducted photos.pdf
Test Report	Conducted Emission Test Result	conducted.pdf
Test Report	Stabilization Waveform	superreg.pdf
External Photo	External Photo	external photos.pdf
Internal Photo	Internal Photo	internal photos.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

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EXHIBIT 1

GENERAL DESCRIPTION

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1.0 General Description

1.1 Product Description

The equipment under test (EUT) is a receiver for a RC car operating at 49.860 MHz. The EUT is powered by an internal Super Capacitor 2.7V and a 1.2V Fell Cell. The EUT has an ON/OFF/WARM UP switch and DC jack to charge up the internal Super Capacitor. Fell Cell is charged by hydrogen fuel. It can be controlled to move forward, backward, turning left and right directions, turbo function by the controller.

The Model: HC78812S is the same as the tested Model: HC78806S in hardware and software aspect. The models are difference in colour of enclosure only.

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 receiver. The transmitter for this receiver is authorized by Certification procedure with FCC ID: WHHHC78812S.

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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 measurements were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites 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 emission data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

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EXHIBIT 2

SYSTEM TEST CONFIGURATION

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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 EUT was powered by a fully charged internal Super Capacitor 2.7V and Fell Cell 1.2V during test.

Super Capacitor is charged by a 90 – 125V AC 50/60 Hz to 2.7V DC 1.5A 4.05W adaptor.

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 placed on the turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

All relevant operation modes have been tested, and the worst case data is included in this report.

2.2 EUT Exercising Software

There was no special software to exercise the device.

2.3 Special Accessories

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

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2.4 Equipment Modification

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

No modifications were installed by Intertek Testing Services.

2.5 Measurement Uncertainty

When determining the test conclusion, the measurement uncertainty of test has been considered.

2.6 Support Equipment List and Description

HARDWARE:

(1) An AC power adaptor (SMPS) with : Input: 90 - 125V AC 50/60Hz
Output: 2.7V DC 1.5A 1.5A 4.05W
Model: ZG-150005C
(Provided by Client)

All the items listed under section 2.0 of this report are

Confirmed by:

*Chow Chi Ming, Billy
Manager
Intertek Testing Services
Agent for PopCo Entertainment Ltd.*



Signature

September 22, 2008 _____ Date

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EXHIBIT 3

EMISSION RESULTS

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3.0 Emission Results

Data is included 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.

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

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

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 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 is subtracted, giving a field strength of 32 $\text{dB}\mu\text{V}/\text{m}$. This value in $\text{dB}\mu\text{V}/\text{m}$ was converted to its corresponding level in $\mu\text{V}/\text{m}$.

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

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

$$RR = 23.0 \text{ dB}\mu\text{V}$$

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

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

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

$$FS = RR + LF$$

$$FS = 23 + 9 = 32 \text{ dB}\mu\text{V}/\text{m}$$

$$\text{Level in } \mu\text{V}/\text{m} = \text{Common Antilogarithm} [(32 \text{ dB}\mu\text{V}/\text{m})/20] = 39.8 \mu\text{V}/\text{m}$$

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3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission

51.148 MHz

For electronic filing, the worst case radiated emission configuration photograph is saved with filename: radiated photos.pdf

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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 1.2 dB

TEST PERSONNEL:



Signature

Terry Chan, Compliance Engineer

Typed/Printed Name

September 22, 2008

Date

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Company: PopCo Entertainment Ltd.

Date of Test: July 28, 2008

Model: HC78806S

Mode: RX

Sample: 2/2

Table 1

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	45.064	44.0	16	10.0	38.0	40.0	-2.0
V	48.057	43.4	16	11.0	38.4	40.0	-1.6
V	50.260	43.6	16	11.0	38.6	40.0	-1.4
V	51.148	43.8	16	11.0	38.8	40.0	-1.2
V	53.360	43.2	16	11.0	38.2	40.0	-1.8
V	101.249	33.0	16	13.0	30.0	43.5	-13.5
V	105.161	33.6	16	13.0	30.6	43.5	-12.9
V	108.258	32.1	16	14.0	30.1	43.5	-13.4
V	151.147	30.8	16	15.0	29.8	43.5	-13.7
V	152.362	31.0	16	15.0	30.0	43.5	-13.5
V	154.457	30.7	16	15.0	29.7	43.5	-13.8

Notes:

1. Negative sign in the column shows value below limit.
2. Peak Detector Data unless otherwise stated.
3. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance 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: Terry Chan

FCC ID: WHHHC78806S

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3.4 Conducted Emission Configuration Photograph

**Worst Case Line-Conducted Configuration
at
1.665 MHz**

For electronic filing, the worst case line-conducted configuration photograph are saved with filename: conducted photos.pdf.

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3.5 Conducted Emission Data

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

Judgement: Passed by 29.2 dB

TEST PERSONNEL:



Signature

Terry Chan, Compliance Engineer

Typed/Printed Name

September 22, 2008

Date

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EXHIBIT 4

EQUIPMENT PHOTOGRAPHS

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4.0 Equipment Photographs

For electronic filing, the photographs are saved with filename:
external photos.pdf and internal photos.pdf

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EXHIBIT 5

PRODUCT LABELLING

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5.0 Product Labelling

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

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EXHIBIT 6

TECHNICAL SPECIFICATIONS

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6.0 Technical Specifications

For electronic filing, the block diagram and schematics are saved with filename: block.pdf and circuit.pdf respectively.

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EXHIBIT 7

INSTRUCTION MANUAL

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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.

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EXHIBIT 8

MISCELLANEOUS INFORMATION

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8.0 Miscellaneous Information

This miscellaneous information includes details of the stabilizing process (including a plot of the stabilized waveform) and the test procedure.

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8.1 Stabilization Waveform

Previous to the testing, the superregenerative receiver was stabilized as outlined in the test procedure. The plot saved on the filename : superreg.pdf shows the fundamental emission when a signal generator was used to stabilize the receiver. Please note that the antenna was placed as close as possible to the EUT for clear demonstration of the waveform and that accurate readings are not possible from this plot.

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8.2 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of superregenerative receivers operating under the Part 15, Subpart B rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 2003. Superregenerative receivers are stabilized prior to measurement by generating a signal well above the receiver threshold whose frequency is tuned until the emissions stabilize into a line spectrum. The signal is usually generated as CW with a Marconi 2022D signal generator and a short whip antenna and is at a level of several hundred to several thousand mV/m. Plots of the stabilized signal will be shown. If a modulated signal is used, it will be noted.

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 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.

The frequency range scanned is from 30 MHz to 1000 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 were 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. 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.