*October 9, 2002*

*International Smc (H.K.) Ltd.*
*Suite 1210, Ocean Centre,*
*5 Canton Road,*
*T.S.T., Kowloon, Hong Kong.*

*Dear Dora Lee:*

*Enclosed you will find your file copy of a Part 15 report (FCC ID: QNISMM-106-R).*

*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: QNISMM-106-R*

**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

# International SMC (H.K.) Ltd.

Application
For
Certification
**(FCC ID: QNISMM-106-R)**

Superheterodyne Receiver

WO# 0212967
TC/sa
October 9, 2002

FCC ID: QNISMM-106-R


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- For Terms And Conditions of the services, it can be provided upon request.
- The evaluation data of the report will be kept for 3 years from the date of issuance.



**Intertek Testing Services Hong Kong Ltd.**
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# LIST OF EXHIBITS

*INTRODUCTION*

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# MEASUREMENT/TECHNICAL REPORT

## International SMC (H.K.) Limited - MODEL: Singing Machine SMM106
## FCC ID: QNISMM-106-R

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

Equipment Type: Superheterodyne Receiver (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.

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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 [12-18-01 Edition] provision.

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Report prepared by:

Alfred Lo
Intertek Testing Services
Hong Kong Ltd.
2/F., Garment Centre,
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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 |
| 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

## 6.0 General Description

1.1 Product Description

This Equipment Under Test (EUT) is an audio receiver for it corresponding wireless microphone. The main function of the EUT is used to receive the modulated signal that can be transmitting by its corresponding wireless microphone. It is powered by one new "AA" size battery. The power indicator (red LED) on the top of the EUT's body will be lighted while the power switch was on. On the other hand, there have a hole on the plastic case which provided for insertion of screwdriver for the channel tuning, the tuning range from 116 to 120MHz. The 40cm bare wire type antenna was equipped at the top of 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.

The Certification procedure of transmitter for this receiver (with FCC ID QNISMM-106) is being Processed as the same time of this application.

.1 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992). Radiated measurement was 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 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 is powered by a new 'AA' size battery.

The unit was operated standalone and placed in the center of the table.

For simplifying of test, the unit was operated receiving continuously.

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.

### .1 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered up, it received the RF Signal continuously.

### 2.3 Special Accessories

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

.2 Equipment Modification

Any modifications installed previous to testing by International SMC (H.K.) 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

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

1. Resistive load 47k ohm (Provided by ITS)

*Confirmed by:*

*Alfred Lo*
*Senior Technical Supervisor - Home Entertainment Electronics*
*Intertek Testing Services Hong Kong Ltd.*
*Agent for International SMC (H.K.) Limited*

_____Signature

October 9, 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
120.368 MHz

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

.1 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 9.2 dB margin

The radiated emissions test was observed up to 1000MHz.

***TEST PERSONNEL:***

*Signature*

Terry C. H. Chan, Compliance Engineer
*Typed/Printed Name*

October 9, 2002
Date

Company: International SMC (H.K.) Ltd. Date of Test: September 16, 2002
Model: Singing Machine SMM106
Worst case operating mode: Receiving

**Table 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) |
|---|---|---|---|---|---|---|---|
| H | 116.729 | 36.8 | 12.8 | 16 | 33.6 | 43.5 | -9.9 |
| H | 120.368 | 37.5 | 12.8 | 16 | 34.3 | 43.5 | -9.2 |
| H | 233.460 | 34.1 | 11.4 | 16 | 29.5 | 46.0 | -16.5 |
| H | 240.717 | 34.2 | 11.4 | 16 | 29.6 | 46.0 | -16.4 |
| H | 350.197 | 34.2 | 14.9 | 16 | 33.1 | 46.0 | -12.9 |
| H | 361.107 | 33.9 | 14.9 | 16 | 32.8 | 46.0 | -13.2 |
| H | 466.927 | 32.9 | 16.8 | 16 | 33.7 | 46.0 | -12.3 |
| H | 481.476 | 31.6 | 17.3 | 16 | 32.9 | 46.0 | -13.1 |
| H | 583.655 | 32.3 | 18.6 | 16 | 34.9 | 46.0 | -11.1 |
| H | 604.830 | 31.8 | 18.9 | 16 | 34.7 | 46.0 | -11.3 |
| H | 700.384 | 29.5 | 21.3 | 16 | 34.8 | 46.0 | -11.2 |
| H | 722.197 | 29.8 | 21.3 | 16 | 35.1 | 46.0 | -10.9 |

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.

The corresponding limit as per 15.109 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000 MHz.

Test Engineer: Terry C. H. Chan

# 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.

# EXHIBIT 8

# MISCELLANEOUS INFORMATION

## 7.0 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 Discussion of Pulse Desensitization

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

This device is a superheterodyne receiver. The emission are continuous, and no desensitization of the measurement equipment occurs.

## 8.2 Calculation of Average Factor

This device is a superheterodyne receiver. No desensitization of the measurement equipment is required as the transmitted signals are continuously.

It is not necessary to apply average factor to the measurement results.

8.3 Emissions Test Procedures

This device is a superheterodyne receiver. It is not necessary to apply average factor to the measurement result.

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of Superheterodyne 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 - 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 8.2.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to 2GHz.

8.3 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 8.1). 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.