

**September 19, 2003**

**Honwell Products Limited  
Rm. 705, International Trade Centre,  
11-19 Sha Tsui Road, Tsuen Wan, N.T.**

**Dear Mr. Jimmy Chan:**

**Enclosed you will find your file copy of a Part 15 report (FCC ID: RCK 268603).**

**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: RCK 268603**

## **Honwell Products Limited**

Application  
For  
Certification  
**(FCC ID: RCK 268603)**

Transmitter

WO# 0313368  
LC/sa  
September 19, 2003

FCC ID: RCK 268603

- 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
- 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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Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: [www.hk.intertek-etlsemko.com](http://www.hk.intertek-etlsemko.com)

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## INTERTEK TESTING SERVICES

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### LIST OF EXHIBITS

#### *INTRODUCTION*

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**INTERTEK TESTING SERVICES**

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**MEASUREMENT/TECHNICAL REPORT**

**Honwell Products Limited - MODEL: 2686  
FCC ID: RCK 268603**

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

Equipment Type:  Low Power Transmitter  (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 C for intentional radiator - the new 47 CFR [08-20-02 Edition] provision.

Report prepared by:

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# INTERTEK TESTING SERVICES

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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    |
| Test Report           | Bandwidth Plot             | bw.pdf       |
| Schematics            | Circuit Diagram            | circuit.pdf  |
| ID Label/Location     | Label Artwork and Location | label.pdf    |
| User Manual           | User Manual                | manual.pdf   |

# **INTERTEK TESTING SERVICES**

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## **EXHIBIT 1**

### **GENERAL DESCRIPTION**

## INTERTEK TESTING SERVICES

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### 1.0 **General Description**

#### 1.1 Product Description.

This Equipment Under Test (EUT) is a low power wireless cellular phone hand-free which is operates at 88.6 MHz. The main function of the EUT is use to transmit the modulated signal which collected from the speaker of the cellular phone. The modulated signal can be received by common FM broadcast radio. It is powered by one "AAA" size battery. The power indicator (red LED) on the EUT's body will be lighted while the On/Off switch was push downward. On the other hand, there have a microphone at the back of that plastic case which provided path for collection of audio tone from the cellular phone. The 9.5cm extendable telescopic type antenna is equipped at the side of plastic case for transmission, 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.

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### 1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992) and was performed in Open Area Test Sites. 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 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.

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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 ANSIC 63.4 (1992).

The EUT was powered by one 1.5 volts new "AAA" size battery. The unit was operated standalone and placed in the center of the table / with those peripheral, placed flush with rear of tabletop.

For simplifying of test, the unit was operated in transmitting 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.

For simplicity of testing, the unit was operated to transmit continuously and the worst case transmission was suggested by the applicant. Moreover, the antenna was extended to maximum length during testing.

#### 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

Earphone with 1.2 meters length.

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### 2.4 Equipment Modification.

Any modifications installed previous to testing by Intertek Testing Services Hong Kong Ltd. will be incorporated in each production model sold/leased in the United States.

### 2.5 Measurement Uncertainty

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

### 2.6 Support Equipment List and Description

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 Honwell Products Limited*



\_\_\_\_\_  
Signature

\_\_\_\_\_  
September 19, 2003 Date

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**EXHIBIT 3**  
**EMISSION RESULTS**

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### 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.

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### 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 dB $\mu$ V/m

RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V

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:

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

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### 3.1 Field Strength Calculation (cont'd)

#### Example

Assume a receiver reading of 62.0 dB $\mu$ V 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 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

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

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

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

$$PD = 0 \text{ dB}$$

$$AV = -10 \text{ dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 \text{ dB}\mu\text{V/m}$$

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

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3.2 Radiated Emission Configuration Photograph  
Worst Case Radiated Emission  
at  
106.143 MHz

For electronic filing, the front view and back view of the test configuration photographs are saved with filename: radiated.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 0.9 dB margin

#### **TEST PERSONNEL:**



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*Signature*

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

September 19, 2003  
Date

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## INTERTEK TESTING SERVICES

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Company: Honwell Products Limited

Date of Test: August 22, 2003

Model: 2686

Worst Case Operating Mode: Transmitting Mode

**Table 1**  
**Radiated Emissions**

| Polarization | Frequency<br>(MHz) | Reading<br>(dB $\mu$ V) | Antenna<br>Factor<br>(dB) | Pre-Amp<br>Gain<br>(dB) | Net<br>at 3m<br>(dB $\mu$ V/m) | Limit<br>at 3m<br>(dB $\mu$ V/m) | Margin<br>(dB) |
|--------------|--------------------|-------------------------|---------------------------|-------------------------|--------------------------------|----------------------------------|----------------|
| V            | 35.381             | 34.8                    | 11.2                      | 16                      | 30.0                           | 40.0                             | -10.0          |
| H            | 53.072             | 35.8                    | 11.7                      | 16                      | 31.5                           | 40.0                             | -8.5           |
| H            | 70.763             | 46.9                    | 7.1                       | 16                      | 38.0                           | 40.0                             | -2.0           |
| H            | 88.453             | 52.5                    | 8.0                       | 16                      | 44.5                           | 48.0                             | -3.5           |
| H            | 106.143            | 46.4                    | 12.2                      | 16                      | 42.6                           | 43.5                             | -0.9           |
| H            | *123.835           | 31.2                    | 12.8                      | 16                      | 28.0                           | 43.5                             | -15.5          |
| H            | 141.523            | 31.3                    | 11.7                      | 16                      | 27.0                           | 43.5                             | -16.5          |
| H            | 176.905            | 27.1                    | 15.5                      | 16                      | 26.6                           | 43.5                             | -16.9          |
| H            | 212.287            | 26.2                    | 11.8                      | 16                      | 22.0                           | 43.5                             | -21.5          |

- 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 the tenth harmonic of the highest fundamental frequency.
- \* 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

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**EXHIBIT 4**

**EQUIPMENT PHOTOGRAPHS**

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### 4.0 Equipment Photographs

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

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**EXHIBIT 5**

**PRODUCT LABELLING**

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### 5.0 **Product Labelling**

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

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**EXHIBIT 6**

**TECHNICAL SPECIFICATIONS**

## INTERTEK TESTING SERVICES

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### 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.

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**EXHIBIT 7**  
**INSTRUCTION MANUAL**

## INTERTEK TESTING SERVICES

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

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**EXHIBIT 8**

**MISCELLANEOUS INFORMATION**

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### 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).

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### 8.1 Measured Bandwidth

The plot on saved in bw.pdf shows the fundamental emission which are with applying modulation (1kHz audio tone with 100dB SPL). From the plot, it shows the fundamental emissions are within the 200kHz bandwidth and wholly inside 88MHz and 108MHz. (As the plotting shown that the start and stop frequencies of it are 88.4563Mhz and 88.6563MHz respectively). The unit meets the FCC bandwidth requirements.

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### 8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. Since the transmitter transmits the RF signal continuously.

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### 8.3 Calculation of Average Factor

The average factor is not applicable for this device as the transmitted signal is a continuously signal.

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### 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 ground plane. 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.

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### 8.4 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

For battery powered device, a new, fully charged battery is used.

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.