

**Tai Nam Industrial Co., Ltd.**

Application  
For  
Certification  
**(FCC ID: SFSBWM0001)**

Transmitter

0716553  
BH/ SL  
October 05, 2007

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**Intertek Testing Services Hong Kong Ltd.**

2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.

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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# 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 photos.doc |
| Test Report           | Bandedge Plot              | be.pdf              |
| External Photo        | External Photo             | external photos.doc |
| Internal Photo        | Internal Photo             | internal photos.doc |
| 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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**INTERTEK TESTING SERVICES**

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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 Body Weight Scale operating at 2402 - 2480 MHz. The EUT is powered by 6V d.c. (4 x 1.5V "AA" batteries). The EUT is 2.4 GHz transceiver with a Bluetooth Module. Frequency hopping sequence is used over the total 79 channels between 2.402 GHz and 2.480 GHz. The channel spacing is 1 MHz. And with a nominal hop rate of 1600 hops/s. If the performance of the channel is poor, it will swap to another channel. It measures the human's weight and the data about the weight is sent to the receiver through the wireless link. Then the receiver will transmit the data to nurse center through the telephone line or Ethernet cable.

Antenna Type : Internal, Integral

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 transmitter portion. The receiver portion, associated with this transmitter, can be exempted from technical requirement of the FCC Part 15 standard.

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### 1.3 Test Methodology

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 from 4 x 1.5V new "AA" battery.

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 equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The unit was operated standalone and placed in the floor-standing configuration.

The frequency range from 9kHz to 25GHz was searched for spurious emissions from the device. Only those emissions reported were detected. All other emissions were at least 20 dB below the applicable limits.

#### 2.2 EUT Exercising Software

The EUT exercise program (RF-test-customer 2.exe) used during radiated testing was designed to exercise the various system components in a manner similar to a typical use.

The parameters of test software setting:

During the test, Channel, modulation and power controlling software provided by the applicant was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the applicant and is going to be fixed on the firmware of the end product.

| Parameter Setting:   |                  |                       |     |
|----------------------|------------------|-----------------------|-----|
| <b>Channel</b>       | "00", "27", "4E" | <b>Hopping</b>        | OFF |
| <b>Power</b>         | "02"             | <b>Tx Modulatjion</b> | ON  |
| <b>Scenario type</b> | "04"             | <b>Packet type</b>    | DH3 |

#### 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 Tai Nam Industrial Co., Ltd. will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Intertek Testing Services Hong Kong Ltd.

### 2.5 Measurement Uncertainty

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

### 2.6 Support Equipment List and Description

This product was tested in a standalone configuration.

All the items listed under section 2.0 of this report are

*Confirmed by:*

*Ho Wai Kin, Ben  
Supervisor  
Intertek Testing Services Hong Kong Ltd.  
Agent for Tai Nam Industrial Co., Ltd.*



\_\_\_\_\_  
Signature

\_\_\_\_\_  
October 05, 2007

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 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:

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

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.

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

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

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

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

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

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

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

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

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### 3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission  
at  
2400.000 MHz

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

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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 0.89 dB

#### **TEST PERSONNEL:**



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*Signature*

Mark Cheung, Compliance Engineer  
*Typed/Printed Name*

October 05, 2007  
*Date*

## INTERTEK TESTING SERVICES

Applicant: Tai Nam Industrial Co., Ltd.  
 Model: BWM 0001

Date of Test: August 09, 2007

Table 1

### Radiated Emissions

| Polarization | Frequency (MHz) | Reading (dB $\mu$ V) | Antenna Factor (dB) | Pre-Amp Gain (dB) | Net at 3m (dB $\mu$ V/m) | Limit at 3m (dB $\mu$ V/m) | Margin (dB) |
|--------------|-----------------|----------------------|---------------------|-------------------|--------------------------|----------------------------|-------------|
| H            | 2402.000        | 93.9                 | 29.4                | 33                | 90.3                     | 94.0                       | -3.7        |
| H            | 4804.000        | 43.9                 | 34.9                | 33                | 45.8                     | 54.0                       | -8.2        |
| H            | 7206.000        | 39.3                 | 37.9                | 33                | 44.2                     | 54.0                       | -9.8        |
| H            | 9608.000        | 36.2                 | 40.4                | 33                | 43.6                     | 54.0                       | -10.4       |
| H            | 12010.000       | 35.7                 | 40.5                | 33                | 43.2                     | 54.0                       | -10.8       |
|              |                 |                      |                     |                   |                          |                            |             |
| H            | 2441.000        | 93.4                 | 29.4                | 33                | 89.8                     | 94.0                       | -4.2        |
| H            | 4882.000        | 44.2                 | 34.9                | 33                | 46.1                     | 54.0                       | -7.9        |
| H            | 7323.000        | 39.7                 | 37.9                | 33                | 44.6                     | 54.0                       | -9.4        |
| H            | 9764.000        | 36.4                 | 40.4                | 33                | 43.8                     | 54.0                       | -10.2       |
| H            | 12205.000       | 35.7                 | 40.5                | 33                | 43.2                     | 54.0                       | -10.8       |
|              |                 |                      |                     |                   |                          |                            |             |
| H            | 2480.000        | 90.7                 | 29.4                | 33                | 87.1                     | 94.0                       | -6.9        |
| H            | 4960.000        | 44.5                 | 34.9                | 33                | 46.4                     | 54.0                       | -7.6        |
| H            | 7440.000        | 39.9                 | 37.9                | 33                | 44.8                     | 54.0                       | -9.2        |
| H            | 9920.000        | 36.8                 | 40.4                | 33                | 44.2                     | 54.0                       | -9.8        |
| H            | 12400.000       | 36.1                 | 40.5                | 33                | 43.6                     | 54.0                       | -10.4       |

- Notes:
1. Peak Detector Data unless otherwise stated.
  2. 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.
  3. Negative value in the margin column shows emission below limit.
  4. Horn antenna is used for the emission over 1000MHz.
  5. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Test Engineer: Mark Cheung

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**EXHIBIT 4**

**EQUIPMENT PHOTOGRAPHS**

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### 4.0 Equipment Photographs

For electronic filing, the photographs of the tested EUT are saved with filename: external photos.doc & internal photos.doc.

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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 of the tested EUT 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 bandedge measurement, the test procedure and calculation of factors such as pulse desensitization.

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### 8.1 Bandedge Plot

For electronic filing, the plot shows the fundamental emission when modulated is saved with filename: be.pdf.

#### Peak Measurement

Bandedge compliance is determined by applying marker-delta method, i.e (Bandedge Plot A).

Resultant field strength= Fundamental emissions (peak value) - delta from the plot A

$$= 90.3\text{dB}\mu\text{V/m} - 37.19\text{dB}$$

$$= 53.11\text{dB}\mu\text{V/m}$$

The resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed 74dB $\mu$ V/m (Peak limit) and 54dB $\mu$ V/m (Average limit).

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### 8.2 Discussion of Pulse Desensitization

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

The pulse desensitivity factor is considered as 0 dB.

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### 8.3 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services in the measurements of transmitters operating under Part 15, Subpart C rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 2003.

The transmitting 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 axes to obtain maximum emission levels. The antenna height and polarization are 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 the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower. For line conducted emissions, the range scanned is 150 kHz to 30 MHz.

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### 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 are made as described in ANSI C63.4 - 2003.

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.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.