Intertek ETL SEMKO

*September 14, 2004*

*Belco International Co., Ltd.*
*212, Yeokgok-Dong,*
*Wonmi-Ku, Bucheon City,*
*Kyungki-Do, Korea.*
*Tel. : 82-32-349-1903*
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*Dear Ms. Diana Jung:*

*Enclosed you will find your file copy of a Part 15 Class II Permissive Change Application (FCC ID: NYC-GH5877).*

*For your reference, TCB will normally take another 15 to 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,*

*Tommy Leung*
*Supervisor*

*Enclosure*

FCC ID: NYC-GH5877

Intertek ETL SEMKO

# Belco International Co., Ltd.

Application
For
Permissive Change

5.8GHz/2.4GHz 40 Channel Analog Modulation Cordless Phone – Base Unit

**(FCC ID: NYC-GH5877)**

04152201
TL/Ann Choy
September 14, 2004



FCC ID: NYC-GH5877


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

## MEASUREMENT/TECHNICAL REPORT

## Belco International Co., Ltd. - MODEL: PM5800(XXXXX)
## FCC ID: NYC-GH5877

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

Equipment Type : DXT- Cordless Telephone

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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 C for intentional radiator - the new 47 CFR [12-08-03 Edition] Provision.

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Report prepared by:

Tommy Leung
Intertek Testing Services.
2/F., Garment Centre,
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## Table of Contents

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| Exhibit type | File Description | filename |
|---|---|---|
| Test Report | Test Report | report.pdf |
| Operation Description | Technical Description | descri.pdf |
| Cover Page | Purpose of Application | product change.pdf |
| Test Setup Photo | Radiated Emission for Base | config photos.doc |
| Test Setup Photo | Conducted Emission | config photos.doc |
| Test Report | Conducted Emission Test Result | conduct.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 |
| User Manual | FCC Information | fcc information.pdf |

# EXHIBIT 1
# GENERAL DESCRIPTION

## 1.0 General Description

### 1.1 Product Description

The PM5800 is a 5.8GHz/2.4GHz 40 Channel Analog Modulation Cordless Phone. The unit is capable of either tone or pulse dialing. The internal power supply's isolation is accomplished through a power transformer having an adequate dielectric rating. The circuit wiring is consistent under the requirement of part 68.

The handset unit consists of a keypad with twelve standard keys (0,...9,*,#), four function keys (Mem, Flash, Redial, Mute), and one channel switch key. A Talk key is provided to control pick/release telephone line in a toggle base.

The base unit has a page key, which is used to page the handset unit.

The antennas used in base unit and handset are integral, and the tested sample is a prototype.

The model PM5800 is one of the model PM5800(XXXXX). The suffix, (XXXXX), followed by the model number is represented color code in any alpha character from A to Z. The model numbers with different suffix are identical in electrical, mechanical, and physical design. The difference in suffix of model number serves as marketing strategy.

The circuit description is saved with filename: descri.pdf

Connection between the device and the telephone network is accomplished through the use of USOC RJ11C in the 2-wire loop calling central office line.

### 1.2 Purpose of Application

The purpose of this application is to report changes in the original certified product for reason of different cosmetic enclosures. The main modifications are PCB layout of base unit main board and handset main board. In addition, some of capacitors are changed for better acoustic performance. All other design including electronic and electrical are identical. The RF modules of base unit and handset are remained the same, and the function is also the same as the original certified product.

This is a single application for Permissive Change Class II of Base Unit of a cordless telephone system. The FCC ID of the associated handset is NYC-GH5877H, and it was subjected to Permissive Change Class I.

## 1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2001). 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 radiated 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.

# EXHIBIT 2
# SYSTEM TEST CONFIGURATION

## 2.0 System Test Configuration

### 2.1 Justification

For emission testing, the equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). During testing, all cables were manipulated to produce worst case emissions. The handset was powered by a fully charged battery.

For the measurements, the EUT is attached to a plastic stand if necessary and placed on the wooden turntable. If the base unit attaches to peripherals, they are connected and operational (as typical as possible). The handset is remotely located as far from the antenna and the base as possible to ensure full power transmission from the base. Else, the base is wired to transmit full power without modulation.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater. The spurious emissions more than 20 dB below the permissible value are not reported.

### 2.2 EUT Exercising Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

For emissions testing, the units were setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing.

2.3 Support Equipment List and Description

The FCC ID's for all equipment, plus descriptions of all cables used in the tested system are:

*HARDWARE:*

The unit was operated standalone. An AC adapter (provided with the unit, Model: U090030D1201, 120VAC to 9VDC 300mA) was used to power the device. Its description is listed below.

(1) AC adapter with two meter unshielded power cord permanently affixed.

*CABLES*:

(1) Telecommunication cable with RJ11C connectors (1m, unshielded), terminated

*OTHERS*:

(1) A headset for telephone use with 1.2m unshielded cable permanently affixed. (Supplied by Intertek)

2.4 Measurement Uncertainty

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

2.5 Equipment Modification

Any modifications installed previous to testing by Belco International Co., Ltd. will be incorporated in each production model sold/leased in the United States.

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

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

*Confirmed by:*

*Tommy Leung*
*Supervisor*
*Intertek Testing Services*
*Agent for Belco International Co., Ltd.*

_____Signature

September 14, 2004 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 is 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
CF = 1.6 dB
AG = 29.0 dB
FS = RR + LF
FS = 23 + 9 = 32 dBμV/m

RR = 23.0 dBμV
LF = 9.0 dB

Level in μV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m

3.2 Radiated Emission Configuration Photograph - Base Unit

Worst Case Radiated Emission

at 5803.019 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: config photos.doc

3.3 Radiated Emission Data - Base Unit

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement : Passed by 9.0 dB

**********

***TEST PERSONNEL:***

*Tester Signature*

Jess Tang, Engineer
*Typed/Printed Name*

September 14, 2004
*Date*

Company: Belco International Co., Ltd. Date of Test: August 7-September 8, 2004
Model: PM5800
Mode : TX-Channel 1

Table 1, Base unit
**Radiated Emissions**

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp (dB) | Antenna Factor (dB) | Net at 3m (dBμV/m) | Limit at 3m (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| V | 5803.019 | 83.0 | 34 | 36.0 | 85.0 | 94 | -9.0 |
| H | *1160.604 | 46.6 | 34 | 25.5 | 38.1 | 54 | -15.9 |
| H | *2321.208 | 43.9 | 34 | 29.1 | 39.0 | 54 | -15.0 |
| V | 3481.811 | 41.1 | 34 | 32.8 | 39.9 | 54 | -14.1 |
| V | *4642.415 | 40.2 | 34 | 34.0 | 40.2 | 54 | -13.8 |
| H | 6963.623 | 38.9 | 34 | 36.4 | 41.3 | 54 | -12.7 |
| V | *8124.227 | 37.5 | 34 | 38.1 | 41.6 | 54 | -12.4 |
| V | 9284.830 | 37.4 | 34 | 38.7 | 42.1 | 54 | -11.9 |
| V | 10445.434 | 37.0 | 34 | 39.6 | 42.6 | 54 | -11.4 |
| V | *11606.038 | 35.9 | 34 | 40.6 | 42.5 | 54 | -11.5 |

NOTES: 1. Quasi-peak detector is used for the emission below or equal to 1000MHz.

2. All measurements were made at 3 meters. 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 and average detector are used for the emission over 1000MHz.

5. Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9kHz to 40GHz.

* 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. The radio frequency emissions above 1000MHz also meet corresponding 20 dB permitted peak limit with a peak detector function.

Test Engineer: Jess Tang

Company: Belco International Co., Ltd. Date of Test: August 7-September 8, 2004
Model: PM5800
Mode : TX-Channel 21

Table 2, Base unit
**Radiated Emissions**

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp (dB) | Antenna Factor (dB) | Net at 3m (dBμV/m) | Limit at 3m (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| V | 5809.686 | 82.8 | 34 | 36.0 | 84.8 | 94 | -9.2 |
| H | *1161.937 | 45.8 | 34 | 25.5 | 37.3 | 54 | -16.7 |
| H | *2323.874 | 43.4 | 34 | 29.1 | 38.5 | 54 | -15.5 |
| V | 3485.811 | 40.6 | 34 | 32.8 | 39.4 | 54 | -14.6 |
| V | *4647.749 | 40.3 | 34 | 34.0 | 40.3 | 54 | -13.7 |
| H | 6971.623 | 38.0 | 34 | 36.4 | 40.4 | 54 | -13.6 |
| V | *8133.560 | 37.2 | 34 | 38.1 | 41.3 | 54 | -12.7 |
| V | 9295.497 | 36.9 | 34 | 38.7 | 41.6 | 54 | -12.4 |
| V | 10457.434 | 36.4 | 34 | 39.6 | 42.0 | 54 | -12.0 |
| V | *11619.371 | 35.3 | 34 | 40.6 | 41.9 | 54 | -12.1 |

NOTES: 1. Quasi-peak detector is used for the emission below or equal to 1000 MHz.

2. All measurements were made at 3 meters. 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 and average detector are used for the emission over 1000MHz.

5. Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9kHz to 40GHz.

* 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. The radio frequency emissions above 1000MHz also meet corresponding 20 dB permitted peak limit with a peak detector function.

Test Engineer: Jess Tang

Company: Belco International Co., Ltd. Date of Test: August 7-September 8, 2004
Model: PM5800
Mode : TX-Channel 40

Table 3, Base unit
**Radiated Emissions**

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp (dB) | Antenna Factor (dB) | Net at 3m (dBμV/m) | Limit at 3m (dBμV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| V | 5816.019 | 82.5 | 34 | 36.0 | 84.5 | 94 | -9.5 |
| H | *1163.204 | 47.4 | 34 | 25.5 | 38.9 | 54 | -15.1 |
| H | *2326.408 | 44.0 | 34 | 29.1 | 39.1 | 54 | -14.9 |
| V | 3489.611 | 41.2 | 34 | 32.8 | 40.0 | 54 | -14.0 |
| V | *4652.815 | 40.4 | 34 | 34.0 | 40.4 | 54 | -13.6 |
| H | 6979.223 | 38.9 | 34 | 36.4 | 41.3 | 54 | -12.7 |
| V | *8142.427 | 37.3 | 34 | 38.1 | 41.4 | 54 | -12.6 |
| V | *9305.630 | 37.9 | 34 | 38.7 | 42.6 | 54 | -11.4 |
| V | 10468.834 | 37.5 | 34 | 39.6 | 43.1 | 54 | -10.9 |
| V | *11632.038 | 36.2 | 34 | 40.6 | 42.8 | 54 | -11.2 |

NOTES: 1. Quasi-peak detector is used for the emission below or equal to 1000 MHz.

2. All measurements were made at 3 meters. 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 and average detector are used for the emission over 1000MHz.

5. Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9kHz to 40GHz.

* 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. The radio frequency emissions above 1000MHz also meet corresponding 20 dB permitted peak limit with a peak detector function.

Test Engineer: Jess Tang

3.4 Radiated Emission on the bandedge

From the following plots, they show that the fundamental emissions are confined in the specified band and they are at least 50dB below the carrier level at band edge (5725MHz and 5875MHz). It meets the requirement of section 15.249(d).

## Emission Plot

For electronic filing, the emission plots are saved with filename: emission.pdf

3.5 Line Conducted Configuration Photograph - Base Unit

Worst Case Line-Conducted Configuration

For electronic filing, the worst case line conducted configuration photographs are saved with filename: config photos.doc

3.6 Line Conducted Emission Data

The data on the following pages list the significant emission frequencies, the limit, and the margin of compliance.

Judgement : Passed by more than 20 dB margin

***TEST PERSONNEL:***

*Tester Signature*

Jess Tang, Engineer
*Typed/Printed Name*

September 14, 2004
*Date*

Company: Belco International Co., Ltd. Date of Test: August 7-September 8, 2004
Model: PM5800

**Conducted Emissions**

For electronic filing, the conducted emission test result is saved with filename: conduct.pdf

# EXHIBIT 4
# EQUIPMENT PHOTOGRAPHS

## 4.0 **Equipment Photographs**

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

# EXHIBIT 5
# PRODUCT LABELLING

## 5.0 **Product Labelling**

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

# EXHIBIT 6
# TECHNICAL SPECIFICATIONS

## 6.0 **Technical Specifications**

For electronic filing, the block diagram and circuit diagram 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

Please note that the required FCC Information to the User is saved with filename: fcc information.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

# EXHIBIT 8
# SECURITY CODE INFORMATION

8.0 Security code information

The telephone has an internal security code with 65,000 possible combinations. Each time the HANDSET is placed on the BASE UNIT, the code is randomly set to a new combination.

If you experience difficulty with placing or receiving calls, a lost security code may be the cause of the problem. When this occurs, the handset can no longer communicate with the base. Reset by placing the handset on the base for 5-10 seconds. If that does not work, unplug the AC adapter from the wall outlet. Disconnect the handset battery for 5-10 seconds and then reconnect. Place the handset back on the base and then replug the AC adapter.