

**Lionda Technology Co., Ltd.**

Application  
For  
Certification

900MHz/2.4GHz 50 Channel Analog Modulation Cordless Phone (Base unit)

**(FCC ID: O63GH9402NB)**

WO# 01073731

TL/Ann Choy

August 7, 2001

- 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.
- This report shall not be reproduced except in full without prior authorization from Intertek Testing Services Limited

FCC ID: O63GH9402NB

**Intertek Testing Services Hong Kong Ltd.**

2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.  
Tel: (852) 2173 8888 Fax: (852) 2741 1693

## LIST OF EXHIBITS

### *INTRODUCTION*

|                   |                           |
|-------------------|---------------------------|
| <i>EXHIBIT 1:</i> | General Description       |
| <i>EXHIBIT 2:</i> | System Test Configuration |
| <i>EXHIBIT 3:</i> | Emission Results          |
| <i>EXHIBIT 4:</i> | Equipment Photographs     |
| <i>EXHIBIT 5:</i> | Product Labelling         |
| <i>EXHIBIT 6:</i> | Technical Specifications  |
| <i>EXHIBIT 7:</i> | Instruction Manual        |
| <i>EXHIBIT 8:</i> | Security Code Information |

# INTERTEK TESTING SERVICES

## MEASUREMENT/TECHNICAL REPORT

**Lionda Technology Co., Ltd. - MODEL: GH9402, GH9404**  
**FCC ID: O63GH9402NB**

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

Equipment Type : Cordless Telephone (example : computer, modem, transmitter, 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 [10-1-99 Edition] Provision.

Report prepared by:

Tommy Leung  
Intertek Testing Services.  
2/F., Garment Centre,  
576 Castle Peak Road,  
Kowloon, Hong Kong.  
Phone :      852-2173-8575  
Fax:      852-2741-1693

---

# INTERTEK TESTING SERVICES

---

## Table of Contents

|     |                                                              |    |
|-----|--------------------------------------------------------------|----|
| 1.0 | <b><u>General Description</u></b> .....                      | 2  |
| 1.1 | Product Description.....                                     | 2  |
| 1.2 | Related Submittal(s) Grants.....                             | 3  |
| 1.3 | Test Methodology.....                                        | 3  |
| 1.4 | Test Facility .....                                          | 3  |
| 2.0 | <b><u>System Test Configuration</u></b> .....                | 5  |
| 2.1 | Justification.....                                           | 5  |
| 2.2 | EUT Exercising Software .....                                | 5  |
| 2.3 | Support Equipment List and Description .....                 | 6  |
| 2.4 | Equipment Modification.....                                  | 7  |
| 3.0 | <b><u>Emission Results</u></b> .....                         | 9  |
| 3.1 | Field Strength Calculation .....                             | 10 |
| 3.2 | Radiated Emission Configuration Photograph - Base Unit ..... | 11 |
| 3.3 | Radiated Emission Data - Base Unit .....                     | 12 |
| 3.4 | Radiated Emission on the bandedge.....                       | 15 |
| 3.5 | Line Conducted Configuration Photograph - Base Unit .....    | 17 |
| 3.6 | Line Conducted Emission Data - Base Unit.....                | 18 |
| 4.0 | <b><u>Equipment Photographs</u></b> .....                    | 20 |
| 5.0 | <b><u>Product Labelling</u></b> .....                        | 22 |
| 6.0 | <b><u>Technical Specifications</u></b> .....                 | 24 |
| 7.0 | <b><u>Instruction Manual</u></b> .....                       | 26 |
| 8.0 | <b><u>Security Code Information</u></b> .....                | 28 |

## INTERTEK TESTING SERVICES

---

### List of attached file

| Exhibit type          | File Description               | filename                   |
|-----------------------|--------------------------------|----------------------------|
| Test Report           | Test Report                    | report.doc                 |
| Operation Description | Technical Description          | descri.pdf                 |
| Test Setup Photo      | Radiated Emission for Base     | config photos.doc          |
| Test Report           | Emission Plot                  | emission.pdf               |
| 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                    | manual1.pdf to manual4.pdf |
| User Manual           | FCC Information                | fcc information.pdf        |

# **INTERTEK TESTING SERVICES**

---

## **EXHIBIT 1 GENERAL DESCRIPTION**

# INTERTEK TESTING SERVICES

---

## 1.0 **General Description**

### 1.1 Product Description

The GH9402, is a 900MHz/2.4GHz 50 Channel Analog Modulation Cordless Phone (Base unit). The transmit frequency of the base unit is from 2400.592MHz to 2405.315MHz, and the handset is from 922.012MHz to 925.161MHz. 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 base unit has a page key, which is used to page the handset unit.

The antenna used in base unit is intergal, and the tested sample is a prototype.

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.

The model: GH9404 is the same as the model GH9402 in hardware aspect except the cosmetics design. The difference in model number and trade name serves as marketing strategy.

## INTERTEK TESTING SERVICES

---

### 1.2 Related Submittal(s) Grants

This is a single application for Certification of a Base unit of a cordless telephone system. The FCC ID of the associated handset is O63GH9402NH and has been filed at the same time as this application. This specific report details the emission characteristics of each transmitter. The device is also subject to Part 68 Registration.

### 1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992). 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.



**INTERTEK TESTING SERVICES**

---

**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 cardboard box 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. Detector function is in peak mode. 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. All emissions greater than 20 dB $\mu$ V/m are recorded.

Radiated emission measurement were performed from 30 MHz to tenth harmonics.

#### 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.

## INTERTEK TESTING SERVICES

---

### 2.3 Support Equipment List and Description

The FCC ID's for all equipment, plus descriptions of all cables used in the tested system (included inserted cards, which have grants) are:

#### *HARDWARE:*

The unit was operated standalone. An AC adapter (provided with the unit) 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:*

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

## INTERTEK TESTING SERVICES

---

### 2.4 Equipment Modification

Any modifications installed previous to testing by Lionda Technology 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  
Assistant Supervisor  
Intertek Testing Services  
Agent for Lionda Technology Co., Ltd.*



\_\_\_\_\_  
Signature

\_\_\_\_\_  
August 13, 2001 Date

**INTERTEK TESTING SERVICES**

---

**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.

---

## INTERTEK TESTING SERVICES

---

### 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 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

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 dB $\mu$ V/m  
                    RR = RA - AG in dB $\mu$ V  
                    LF = CF + AF in dB

Assume a receiver reading of 52.0 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, giving a field strength of 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

|                               |                      |
|-------------------------------|----------------------|
| RA = 52.0 dB $\mu$ V/m        |                      |
| AF = 7.4 dB                   | RR = 23.0 dB $\mu$ V |
| CF = 1.6 dB                   | LF = 9.0 dB          |
| AG = 29.0 dB                  |                      |
| FS = RR + LF                  |                      |
| FS = 23 + 9 = 32 dB $\mu$ V/m |                      |

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

### 3.2 Radiated Emission Configuration Photograph - Base Unit

Worst Case Radiated Emission

at 801.772 MHz

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



## INTERTEK TESTING SERVICES

---

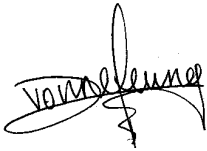
### 3.3 Radiated Emission Data - Base Unit

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

Judgement : Passed by 3.7 dB

\*\*\*\*\*

#### **TEST PERSONNEL:**



---

*Tester Signature*

Yvonne Leung, Engineer  
*Typed/Printed Name*

August 11, 2001  
*Date*

---

## INTERTEK TESTING SERVICES

---

Company: Lionda Technology Co., Ltd.  
Model: GH9402  
Mode : TX-Channel 1

Date of Test: July 29, 2001

Table 1, Base unit

### Radiated Emissions

| Polarity | Frequency<br>(M Hz) | Reading<br>(dB $\mu$ V ) | Antenna<br>Factor<br>(dB ) | Pre-Am p<br>Gain<br>(dB ) | Net<br>at 3m<br>(dB $\mu$ V /m ) | L i m i t<br>(dB $\mu$ V /m ) | M a r g i n<br>(dB ) |
|----------|---------------------|--------------------------|----------------------------|---------------------------|----------------------------------|-------------------------------|----------------------|
| V        | 2400.592            | 94.1                     | 29.1                       | 34                        | 89.2                             | 94                            | -4.8                 |
| V        | 800.197             | 36.9                     | 21.3                       | 16                        | 42.2                             | 46                            | -3.8                 |
| H        | *1600.395           | 45.9                     | 26.5                       | 34                        | 38.4                             | 54                            | -15.6                |
| V        | 3200.789            | 48.8                     | 31.4                       | 34                        | 46.2                             | 54                            | -7.8                 |
| H        | *4000.987           | 39.2                     | 34.2                       | 34                        | 39.4                             | 54                            | -14.6                |
| V        | *4801.184           | 48.6                     | 34.0                       | 34                        | 48.6                             | 54                            | -5.4                 |
| H        | 5601.381            | 46.9                     | 36.0                       | 34                        | 48.9                             | 54                            | -5.1                 |
| H        | 6401.579            | 35.6                     | 36.5                       | 34                        | 38.1                             | 54                            | -15.9                |

- NOTES:
1. Peak Detector data
  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.
- \* 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: Yvonne Leung

---

## INTERTEK TESTING SERVICES

---

Company: Lionda Technology Co., Ltd.  
Model: GH9402  
Mode : TX-Channel 50

Date of Test: July 29, 2001

Table 2, Base unit

### Radiated Emissions

| Polarity | Frequency<br>(M Hz) | Reading<br>(dB $\mu$ V ) | Antenna<br>Factor<br>(dB ) | Pre-Am p<br>Gain<br>(dB ) | Net<br>at 3m<br>(dB $\mu$ V /m ) | L i m i t<br>(dB $\mu$ V /m ) | M a r g i n<br>(dB ) |
|----------|---------------------|--------------------------|----------------------------|---------------------------|----------------------------------|-------------------------------|----------------------|
| V        | 2405.315            | 94.4                     | 29.1                       | 34                        | 89.5                             | 94                            | -4.5                 |
| V        | 801.772             | 37.0                     | 21.3                       | 16                        | 42.3                             | 46                            | -3.7                 |
| H        | *1603.543           | 45.7                     | 26.5                       | 34                        | 38.2                             | 54                            | -15.8                |
| V        | 3207.087            | 48.9                     | 31.4                       | 34                        | 46.3                             | 54                            | -7.7                 |
| H        | *4008.858           | 39.2                     | 34.2                       | 34                        | 39.4                             | 54                            | -14.6                |
| V        | *4810.630           | 48.6                     | 34.0                       | 34                        | 48.6                             | 54                            | -5.4                 |
| H        | 5612.402            | 46.9                     | 36.0                       | 34                        | 48.9                             | 54                            | -5.1                 |
| H        | 6414.173            | 35.6                     | 36.5                       | 34                        | 38.1                             | 54                            | -15.9                |

- NOTES:
1. Peak Detector data
  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.
- \* 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: Yvonne Leung

### 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 50 dB below the carrier level at band edge (2400.0 and 2483.5 MHz). It meets the requirement of section 15.249(c).

### **Emission Plot**

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

## **INTERTEK TESTING SERVICES**

---

### 3.5 Line Conducted Configuration Photograph - Base Unit

Worst Case Line-Conducted Configuration

at 20.645MHz

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

## INTERTEK TESTING SERVICES

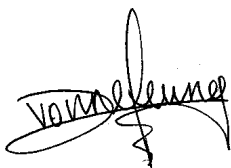
---

### 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 15.1 dB

#### **TEST PERSONNEL:**



---

*Tester Signature*

Yvonne Leung, Engineer  
*Typed/Printed Name*

August 13, 2001  
*Date*

## **INTERTEK TESTING SERVICES**

---

Company: Lionda Technology Co., Ltd.  
Model: GH9402

Date of Test: July 29, 2001

### **Conducted Emissions**

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



## **INTERTEK TESTING SERVICES**

---

### **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

## **INTERTEK TESTING SERVICES**

---

### **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.

# **INTERTEK TESTING SERVICES**

---

## **EXHIBIT 7 INSTRUCTION MANUAL**

## INTERTEK TESTING SERVICES

---

### 7.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual1.pdf to manual4.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.



**INTERTEK TESTING SERVICES**

---

**EXHIBIT 8  
SECURITY CODE INFORMATION**

### 8.0 Security code information

The telephone has an internal security code with 65,536 possible combinations. Each time you pick up the HANDSET, the code is randomly set to a new combination.

Communication between HANDSET and BASE UNIT may not be possible in any of the following situation:

1. After a power failure.
2. After relocation the BASE UNIT by disconnecting the AC adaptor.
3. After replacing the HANDSET battery.

To reset, place the HANDSET on the BASE UNIT for 2 to 5 seconds.