

**Giant Telecom Limited**

Application  
For  
Certification

2.4GHz 40 Channel Analog Modulation Cordless Phone with Caller ID

**(FCC ID: RAQOL2430)**

WO# 03105621  
TL/Ann Choy  
July 31, 2003

- 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: RAQOL2430

## **INTERTEK TESTING SERVICES**

---

### **LIST OF EXHIBITS**

#### *INTRODUCTION*

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

# INTERTEK TESTING SERVICES

---

## MEASUREMENT/TECHNICAL REPORT

**Giant Telecom Limited - MODEL: OL2430**  
**FCC ID: RAQOL2430**

This report concerns (check one):      Original Grant       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

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

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [08-20-02 Edition] Provision.

---

Report prepared by:

Tommy Leung  
Intertek Testing Services.  
2/F., Garment Centre,  
576 Castle Peak Road,  
Kowloon, Hong Kong.  
Phone : 852-2173-8538  
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	Measurement Uncertainty	7
2.5	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 Configuration Photograph - Handset	15
3.5	Radiated Emission Data - Handset	16
3.6	Radiated Emission on the bandedge	19
3.7	Line Conducted Configuration Photograph - Base Unit	21
3.8	Line Conducted Emission Data - Base Unit	22
4.0	<b><u>Equipment Photographs</u></b>	25
5.0	<b><u>Product Labelling</u></b>	27
6.0	<b><u>Technical Specifications</u></b>	29
7.0	<b><u>Instruction Manual</u></b>	31
8.0	<b><u>Security Code Information</u></b>	33

## INTERTEK TESTING SERVICES

---

### 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 for Base	config photos.doc
Test Setup Photo	Radiated Emission for Handset	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	manual.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 OL2430 is a 2.4GHz 40 Channel Analog Modulation Cordless Phone with Caller ID. 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,\*,#), six function keys (Memo, Del, Calls, Redial, Mute, Flash), 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 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.

## INTERTEK TESTING SERVICES

---

### 1.2 Related Submittal(s) Grants

This is an Application for Certification of a cordless telephone system. Two transmitters are included in this Application. This specific report details the emission characteristics of each transmitter. The receivers are subject to the verification authorization process, in accordance with 15.101(b). A verification report has been prepared for the receiver sections of each device. 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**

## INTERTEK TESTING SERVICES

---

### 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.

## **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 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 Giant Telecom Limited 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 Giant Telecom Limited*



Signature

August 4, 2003

Date

**INTERTEK TESTING SERVICES**

---

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

## INTERTEK TESTING SERVICES

---

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

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

## **INTERTEK TESTING SERVICES**

---

### **3.2 Radiated Emission Configuration Photograph - Base Unit**

Worst Case Radiated Emission

at 4809.800 MHz

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

## INTERTEK TESTING SERVICES

---

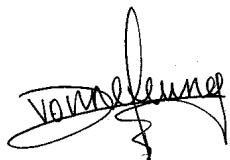
### 3.3 Radiated Emission Data - Base Unit

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

Judgement : Passed by 7.4 dB

\*\*\*\*\*

#### **TEST PERSONNEL:**



---

*Tester Signature*

Yvonne Leung, Engineer

*Typed/Printed Name*

---

August 2, 2003

*Date*

## INTERTEK TESTING SERVICES

---

Company: Giant Telecom Limited  
Model: OL2430  
Mode : TX-Channel 0

Date of Test: June 30-July 18, 2003

Table 1, Base unit

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre- Amp (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	2401.000	90.9	34	29.1	86.0	94	-8.0
V	800.333	30.1	16	21.3	35.4	46	-10.6
H	*1600.667	50.0	34	26.5	42.5	54	-11.5
H	3201.333	46.6	34	31.4	44.0	54	-10.0
H	*4001.667	44.6	34	34.2	44.8	54	-9.2
H	*4802.000	45.3	34	34.0	45.3	54	-8.7

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 25GHz.

\* 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: Yvonne Leung

## INTERTEK TESTING SERVICES

---

Company: Giant Telecom Limited  
Model: OL2430  
Mode : TX-Channel 39

Date of Test: June 30-July 18, 2003

Table 2, Base unit

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre- Amp (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	2404.900	90.4	34	29.1	85.5	94	-8.5
V	801.633	30.7	16	21.3	36.0	46	-10.0
H	*1603.267	50.5	34	26.5	43.0	54	-11.0
H	3206.533	46.7	34	31.4	44.1	54	-9.9
H	*4008.167	45.1	34	34.2	45.3	54	-8.7
H	*4809.800	46.6	34	34.0	46.6	54	-7.4

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 25GHz.

\* 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: Yvonne Leung

## **INTERTEK TESTING SERVICES**

---

### **3.4 Radiated Emission Configuration Photograph - Handset**

Worst Case Radiated Emission

at 825.800 MHz

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

## INTERTEK TESTING SERVICES

---

### 3.5 Radiated Emission Data - Handset

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

Judgement : Passed by 7.9 dB

\*\*\*\*\*

#### **TEST PERSONNEL:**



---

*Tester Signature*

Yvonne Leung, Engineer

*Typed/Printed Name*

August 2, 2003

*Date*

## INTERTEK TESTING SERVICES

---

Company: Giant Telecom Limited  
Model: OL2430  
Mode : TX-Channel 0

Date of Test: June 30-July 18, 2003

Table 3, Handset

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre- Amp (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	2473.500	88.5	34	29.1	83.6	94	-10.4
V	824.500	32.0	16	21.3	37.3	46	-8.7
H	1649.000	46.6	34	26.5	39.1	54	-14.9
H	3298.000	44.0	34	31.4	41.4	54	-12.6
H	*4122.500	42.0	34	34.2	42.2	54	-11.8
H	*4947.000	43.5	34	34.0	43.5	54	-10.5

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 25GHz.

\* 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: Yvonne Leung

## INTERTEK TESTING SERVICES

---

Company: Giant Telecom Limited  
Model: OL2430  
Mode : TX-Channel 39

Date of Test: June 30-July 18, 2003

Table 4, Handset

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	2477.400	88.2	34	29.1	83.3	94	-10.7
V	825.800	32.3	16	21.8	38.1	46	-7.9
H	1651.600	47.1	34	26.5	39.6	54	-14.4
H	3303.200	44.7	34	31.4	42.1	54	-11.9
H	*4129.000	42.6	34	34.2	42.8	54	-11.2
H	*4954.800	44.1	34	34.0	44.1	54	-9.9

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 25GHz.

\* 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: Yvonne Leung

## **INTERTEK TESTING SERVICES**

---

### **3.6 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(d).

## **INTERTEK TESTING SERVICES**

---

### **Emission Plot**

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

## **INTERTEK TESTING SERVICES**

---

### **3.7 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

## INTERTEK TESTING SERVICES

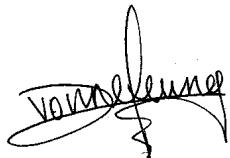
---

### 3.8 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 20dB margin

#### **TEST PERSONNEL:**



---

*Tester Signature*

Yvonne Leung, Engineer

*Typed/Printed Name*

August 2, 2003

*Date*

## **INTERTEK TESTING SERVICES**

---

Company: Giant Telecom Limited  
Model: OL2430

Date of Test: June 30-July 18, 2003

### **Conducted Emissions**

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

**INTERTEK TESTING SERVICES**

---

**EXHIBIT 4**  
**EQUIPMENT PHOTOGRAPHS**

## **INTERTEK TESTING SERVICES**

---

### **4.0 Equipment Photographs**

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

**INTERTEK TESTING SERVICES**

---

**EXHIBIT 5**  
**PRODUCT LABELLING**

## INTERTEK TESTING SERVICES

---

### 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**

## **INTERTEK TESTING SERVICES**

---

### **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: 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.

**INTERTEK TESTING SERVICES**

---

**EXHIBIT 8**  
**SECURITY CODE INFORMATION**

## INTERTEK TESTING SERVICES

---

### 8.0 Security code information

The telephone has an internal security code with 65,536 possible combinations. Each time the HANDSET is placed on the BASE UNIT, the code is randomly set to a new combination.

To renew the security code, place the handset onto the charge cradle, then the charge LED on Base station will be turned on. When a beep sound is given out by handset and the charge LED on base station flash 3 times, the security code is successfully renewed.

When Handset is out of battery, the security code stored in the handset will be lost. When the electricity supply to base station is cut for more than 30 seconds, the security code stored in base station will be lost.

When the security code is lost in either handset or base station, place the handset onto the charge cradle. When a beep sound is given out by handset and the charge LED on base station flash 3 times, the security code will be recovered.