

Giant Electronics Ltd.

Application  
For  
Certification

2.4GHz Frequency Hopping Spread Spectrum Cordless Phone

**(FCC ID: K7G2G4DSSG4NNN)**

WO# 0202654  
WL/Sandy  
March 20, 2002

- 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 Giant Electronics Limited Limited

FCC ID: K7G2G4DSSG4NNN

**Intertek Testing Services Hong Kong Ltd.**

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## LIST OF EXHIBITS

### *INTRODUCTION*

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## INTERTEK TESTING SERVICES

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### MEASUREMENT/TECHNICAL REPORT

**Giant Electronics Ltd. - MODEL: GH4010(XXXXX), GH41(XXXXX)**  
**FCC ID: K7G2G4DSSG4NNN**

This report concerns (check one)      Original Grant ☒      Class II Change ☐

Equipment Type: DSS-Part 15 Spread Spectrum Transmitter

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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.

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Transition Rules Request per 15.37?      Yes ☐      No ☒

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [12-18-01 Edition] provision.

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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.doc
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	Maximum Output Power Plot	bmaxop.pdf, hmaxop.pdf
Test Report	20 dB Bandwidth Plot	b20dB.pdf, h20dB.pdf
Test Report	Minimum Number of Hopping Frequencies	chno.pdf
Test Report	Minimum Hopping Channel Carrier Frequency Separation	bfsepa.pdf, hfsepa.pdf
Test Report	Average Channel Occupancy Time	avetime.pdf
Test Report	Out Band Antenna Conducted Emission Plot	bobantcon.pdf, hobantcon.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	bcircuit.pdf, hcircuit.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual1.pdf, manual2.pdf
User Manual	FCC Information	FCC information.pdf
RF Exposure Info	RF Safety	RF exposure info.doc

**EXHIBIT 1**  
**SUMMARY OF TEST RESULTS**

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## INTERTEK TESTING SERVICES

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### 1.0 Summary of Test

**Giant Electronics Ltd. - MODEL: GH4010(XXXXXX), GH41(XXXXXX)**  
**FCC ID: K7G2G4DSSG4NNN**

TEST	REFERENCE	RESULTS
Max. Output Power	15.247(b)	Pass
20 dB Bandwidth	15.247(a)(1)	Pass
Min. No. of Hopping Frequencies	15.247(a)(1)	Pass
Min. Hopping Channel Carrier Frequency Separation	15.247(a)(1)	Pass
Average Time of Occupancy	15.247(a)(1)	Pass
Out of Band Antenna Conducted Emission	15.247(c)	Pass
Radiated Emission in Restricted Bands	15.247(c)	Pass
AC Conducted Emission	15.207	Pass
Radiated Emission from Digital Part	15.109	Pass
Antenna Requirement	15.203	Pass (See Notes)

Notes: The EUT uses a permanently attached antenna which, in accordance to Section 15.203, is considered sufficient to comply with the provisions of this section.

**EXHIBIT 2**  
**GENERAL DESCRIPTION**



### 2.0 **General Description**

#### 2.1 Product Description1.1 Product Description1.1 Product Description

The GH4010(XXXXXX) is a 2.4GHz Frequency Hopping Spread Spectrum Cordless Phone with Caller ID feature. It operates at frequency range of 2401.056 MHz to 2482.272 MHz with 95 hopping frequencies. 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,\*,#), seven function keys (Mute/Del, Mem, Redial/Pause, Int/Hold, Flash, Up, Down). A Talk key is provided to control pick/release telephone line in a toggle base.

The base unit has a intercom key, which is used to communicate with handset unit.

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

The model GH41(XXXXXX) is the same as the model GH4010(XXXXXX) in hardware aspect. The difference in model number serves as marketing strategy of selling the handset standalone.

The circuit description and frequency hopping algorithm 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.

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### 2.2 Related Submittal(s) Grants1.2 Submittal(s) Grants

### Related Submittal(s) Grants1.2 Related

This is an application for Certification of a DSS-Part 15 Spread Spectrum Transceiver. The device is also subject to Part 68 Registration.

### 2.3 Test Methodology1.3

### Test Methodology1.3

### 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. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

### 2.4 Test Facility1.4

### Test Facility1.4 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 3**  
**SYSTEM TEST CONFIGURATION**

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## INTERTEK TESTING SERVICES

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### 3.0 System Test Configuration2.0

### System Test Configuration2.0 System

#### 3.1 Justification2.1

#### Justification2.1 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 for frequencies below 1000MHz. The resolution is 1MHz or greater for frequencies above 1000MHz. All emissions greater than 20 dBµV/m are recorded.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9kHz to 25GHz.

#### 3.2 EUT Exercising Software2.2

#### EUT Exercising Software2.2 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.

### 3.3 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:*

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

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3.4 Equipment Modification2.4  
Modification

Equipment Modification2.4

Equipment

Any modifications installed previous to testing by Giant Electronics 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 Hong Kong Ltd.  
Agent for Giant Electronics Ltd.*



\_\_\_\_\_  
Signature

\_\_\_\_\_  
March 20, 2002 Date

**EXHIBIT 4**  
**MEASUREMENT RESULTS**

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## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

### 4.0 Measurement Results

#### 4.1 Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b) :

☐ The antenna power of the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.

☒ The antenna port of the EUT was connected to the input of a spectrum analyzer. The analyzer was set for maximum RES BW and power was read directly in dBm. External attenuation and cable loss were compensated by adding to SA raw reading.

For antennas with gains of 6 dBi or less, maximum allowed transmitter output is 1 watt (+30 dBm).

For antennas with gains greater than 6 dBi, transmitter output level must be decreased by an amount equal to (GAIN - 6) dBm.

(Base Unit) Antenna Gain = 3 dB		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2401.079	24.07	255.3
Middle Channel: 2441.679	23.81	240.4
High Channel: 2482.543	23.48	222.8

Cable loss : 0.5 dB External Attenuation : 0 dB

Cable loss, external attenuation: ☒ included in OFFSET function  
☐ added to SA raw reading

Please refer to the attached plots for details:

Plot B1a: Low Channel Output Power  
Plot B1b: Middle Channel Output Power  
Plot B1c: High Channel Output Power



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## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b) - Continued:

(Handset Unit) Maximum Antenna Gain = 3 dB		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2400.864	20.91	123.3
Middle Channel: 2441.507	20.54	113.2
High Channel: 2482.114	20.35	108.4

Cable loss : 0.5 dB External Attenuation : 0 dB

Cable loss, external attenuation: [ x ] included in OFFSET function  
[ ] added to SA raw reading

Please refer to the attached plots for details:

Plot H1a: Low Channel Output Power  
Plot H1b: Middle Channel Output Power  
Plot H1c: High Channel output Power

For electronic filing, the above plots are saved with filename: bmaxop.pdf, hmaxop.pdf

For RF Safety, the information is saved with filename: RF exposure info.doc

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

### 4.2 Maximum 20 dB RF Bandwidth, FCC Rule 15.247(a)(1):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was chosen so that the display was a result of the hopping channel modulation. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 20 dB lower than PEAK level. The 20 dB bandwidth was determined from where the channel output spectrum intersected the display line.

(Base Unit)	
Frequency (MHz)	20 dB Bandwidth (kHz)
2401.071	693

Refer to the following plots for 20 dB bandwidth sharp:

Plot B2a: Low Channel 20 dB RF Bandwidth

Plot B2b: Middle Channel 20 dB RF Bandwidth

Plot B2c: High Channel 20 dB RF Bandwidth

For electronic filing, the above plots are saved with filename: b20dB.pdf

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## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

Maximum 20 dB RF Bandwidth, FCC Rule 15.247(a)(1) - Continued:

(Handset Unit)	
Frequency (MHz)	20 dB Bandwidth (kHz)
2482.307	679

Refer to the following plots for 20 dB bandwidth sharp:

Plot H2a: Low Channel 20 dB RF Bandwidth

Plot H2b: Middle Channel 20 dB RF Bandwidth

Plot H2c: High Channel 20 dB RF Bandwidth

For electronic filing, the above plots are saved with filename: h20dB.pdf

## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

### 4.3 Minimum Number of Hopping Frequencies, FCC Rule 15.247(a)(1) :

The RF passband of the EUT was divided into 5 approximately equal bands. With the analyzer set to MAX HOLD readings were taken for 2-3 minutes in each band. The channel peaks so recorded were added together, and the total number compared to the minimum number of channels required in the regulation.

No. of hopping channels	95
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Minimum Requirements: at least 75 channels for 2400-2483.5 and 5725-5850 MHz systems.

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

## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

### 4.4 Minimum Hopping Channel Carrier Frequency Separation, FCC Ref: 15.247(a)(1) :

Using the DELTA MARKER function of the analyzer, the frequency separation between two adjacent channels was measured and compared against the limit.

[ ] 25 kHz [ x ] 20 dB bandwidth of hopping channel

Channel Separation	864 kHz
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Plot B4a: Channel 0

Plot B4b: Channel 1

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

## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

### 4.4 Minimum Hopping Channel Carrier Frequency Separation, FCC Ref: 15.247(a)(1) - Continued:

Using the DELTA MARKER function of the analyzer, the frequency separation between two adjacent channels was measured and compared against the limit.

[ ] 25 kHz [ x ] 20 dB bandwidth of hopping channel

Channel Separation	836 kHz
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Plot H4a: Channel 0  
Plot H4b: Channel 1

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

## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXXX)

Date of Test: March 6-20, 2002

### 4.5 Average Channel Occupancy Time, FCC Ref: 15.247(a)(1)

The spectrum analyzer center frequency was set to one of the known hopping channels. The SWEEP was set to 50ms, the SPAN was set to ZERO SPAN, and the TRIGGER was set to VIDEO. The time duration of the transmission so captured was measured with the MARKER DELTA function.

The SWEEP was then set to the time required by the regulation (20 seconds for 902-928 MHz devices, 30 seconds for all other bands). The analyzer was set to SINGLE SWEEP, the total ON time was added and compared against the limit (0.4 seconds).

Average 0.4 seconds maximum occupancy in 30 seconds, 2400-2483.5/5725-5850 Hz.

[ x ] Refer to attached spectrum analyzer plots 5a-5b

Average Occupancy Time = $857\mu\text{s} \times 31$	26.6 ms
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For electronic filing, the above plots are saved with filename: avetime.pdf

## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

### 4.6 Out of Band Radiated Emissions, FCC Rule 15.247(c):

In any 100 kHz bandwidth outside the EUT passband, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission, or else shall meet the general limits for radiated emissions at frequencies outside the passband, whichever results in lower attenuation.

All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

Refer to the following plots for out of band conducted emissions data:

Plot B6a.1 - B6a.2: Low Channel Emissions  
Plot B6b.1 - B6b.2: Middle Channel Emissions  
Plot B6c.1 - B6c.2: High Channel Emissions  
Plot B6d.1 - B6d.2: Modulation Products Emissions  
Plot H6a.1 - H6a.2: Low Channel Emissions  
Plot H6b.1 - H6b.2: Middle Channel Emissions  
Plot H6c.1 - H6c.2: High Channel Emissions  
Plot H6d.1 - H6d.2: Modulation Products Emissions

The plots showed the 2<sup>nd</sup> harmonic and modulation products at the band edges of 2400 MHz and 2483.5 MHz. In addition, all spurious emission and up to the tenth harmonic was measured and they were found to be at least 40 dB below the highest level of the desired power in the passband.

Furthermore, delta measurement technique for measuring bandedge emissions was incorporated in the test of the edge at 2483.5MHz.

For electronic filing, the above plots are saved with filenames: bobantcon.pdf, hobantcon.pdf



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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXXX)

Date of Test: March 6-20, 2002

### 4.7 Out of Band Radiated Emissions (for emissions in 4.6 above that are less than 26 dB below carrier), FCC Rule 15.247(c):

For out of band emissions that are close to or that exceed the 20dB attenuation requirement described in the specification, radiated measurements were performed at a 3m separation distance to determine whether these emissions complied with the general radiated emission requirement.

☒ Not required

☐ See attached data sheet

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

### 4.8 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.35(b), (c):

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. All measurements were performed with peak detection unless otherwise specified.

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

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## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

### 4.9 Field Strength Calculation3.1 Strength Calculation

### Field Strength Calculation3.1 Field

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  $\text{dB}\mu\text{V/m}$   
               $RA$  = Receiver Amplitude (including preamplifier) in  $\text{dB}\mu\text{V}$   
               $CF$  = Cable Attenuation Factor in  $\text{dB}$   
               $AF$  = Antenna Factor in  $\text{dB}$   
               $AG$  = Amplifier Gain in  $\text{dB}$

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

Assume a receiver reading of  $52.0 \text{ dB}\mu\text{V}$  is obtained. The antenna factor of  $7.4 \text{ dB}$  and cable factor of  $1.6 \text{ dB}$  is added. The amplifier gain of  $29 \text{ dB}$  is subtracted, giving a field strength of  $32 \text{ dB}\mu\text{V/m}$ . This value in  $\text{dB}\mu\text{V/m}$  was converted to its corresponding level in  $\mu\text{V/m}$ .

$$RA = 52.0 \text{ dB}\mu\text{V/m}$$

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

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

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

$$FS = RR + LF$$

$$FS = 23 + 9 = 32 \text{ dB}\mu\text{V/m}$$

$$RR = 23.0 \text{ dB}\mu\text{V}$$

$$LF = 9.0 \text{ dB}$$

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

## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

### 4.10 Radiated Emission Configuration Photograph - Base Unit

Worst Case Radiated Emission  
at  
4964.544 MHz

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

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

4.11 Radiated Emission Data 3.3  
Emission Data - Base Unit

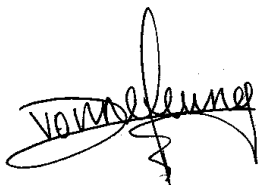
Radiated Emission Data 3.3      Radiated

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

Judgement : Passed by 7.2 dB

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### ***TEST PERSONNEL:***



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*Tester Signature*

Yvonne Leung, Engineer  
*Typed/Printed Name*

March 20, 2002  
*Date*

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## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)  
Mode : TX-Channel 0

Date of Test: March 6-20, 2002

Table 1, Base Unit

### Radiated Emissions

Polarity	Frequency (M H z)	Reading (dB $\mu$ V )	Antenna Factor (dB )	Pre-A m p Gain (dB )	Net at 3m (dB $\mu$ V /m )	Lim it (dB $\mu$ V /m )	M argin (dB )
V	*4802.112	44.6	34.0	34	44.6	54.0	-9.4

- 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

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## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)  
Mode : TX-Channel 47

Date of Test: March 6-20, 2002

Table 2, Base unit

### Radiated Emissions

Polarity	Frequency (M H z)	Reading (dB $\mu$ V )	Antenna Factor (dB )	Pre-Amp Gain (dB )	Net at 3m (dB $\mu$ V /m )	Lim it (dB $\mu$ V /m )	M argin (dB )
V	*4883.328	44.0	34.0	34	44.0	54.0	-10.0
H	*7324.992	33.6	37.0	34	36.6	54.0	-17.4

- 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

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## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)  
Mode : TX-Channel 94

Date of Test: March 6-20, 2002

Table 3, Base unit

### Radiated Emissions

Polarity	Frequency (M H z)	Reading (dB $\mu$ V )	Antenna Factor (dB )	Pre-Amp Gain (dB )	Net at 3m (dB $\mu$ V /m )	Lim it (dB $\mu$ V /m )	M argin (dB )
V	**2482.272	97.9	29.1	34	93.0	—	—
V	*4964.544	46.8	34.0	34	46.8	54.0	-7.2
H	*7446.816	35.0	37.0	34	38.0	54.0	-16.0

- 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.
- \*\* Fundamental emission was measured for determining band-edge compliance of using delta measurement technique.

Test Engineer: Yvonne Leung



## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

### 4.12 Radiated Emission Configuration Photograph - Handset

Worst Case Radiated Emission  
at  
4964.544 MHz

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

## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

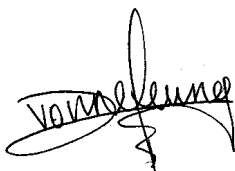
4.13 Radiated Emission Data 3.5 Radiated Emission Data 3.5 Radiated Emission Data -  
Handset

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

Judgement : Passed by 12.2 dB

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### ***TEST PERSONNEL:***



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*Tester Signature*

Yvonne Leung, Engineer  
*Typed/Printed Name*

March 20, 2002  
*Date*

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## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)  
Mode : TX-Channel 0

Date of Test: March 6-20, 2002

Table 4, Handset

### Radiated Emissions

Polarity	Frequency (M H z)	Reading (dB $\mu$ V )	Antenna Factor (dB )	Pre-Amp Gain (dB )	Net at 3m (dB $\mu$ V /m )	Lim it (dB $\mu$ V /m )	M argin (dB )
H	*4802.112	41.2	34.0	34	41.2	54.0	-12.8

- 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

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## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXXX)  
Mode : TX-Channel 47

Date of Test: March 6-20, 2002

Table 5, Handset

### Radiated Emissions

Polarity	Frequency (M H z)	Reading (dB $\mu$ V )	Antenna Factor (dB )	Pre-Amp Gain (dB )	Net at 3m (dB $\mu$ V /m )	Lim it (dB $\mu$ V /m )	M argin (dB )
H	*4883.328	41.8	34.0	34	41.8	54.0	-12.2
H	*7324.992	34.2	37.0	34	37.2	54.0	-16.8

- 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

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## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)  
Mode : TX-Channel 94

Date of Test: March 6-20, 2002

Table 6, Handset

### Radiated Emissions

Polarity	Frequency (M H z)	Reading (dB $\mu$ V )	Antenna Factor (dB )	Pre-Amp Gain (dB )	Net at 3m (dB $\mu$ V /m )	Lim it (dB $\mu$ V /m )	M argin (dB )
H	**2482.272	97.5	29.1	34	92.6	—	—
V	*4964.544	41.7	34.0	34	41.7	54.0	-12.3
H	*7446.816	33.9	37.0	34	36.9	54.0	-17.1

- 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.
- \*\* Fundamental emission was measured for determining band-edge compliance of using delta measurement technique.

Test Engineer: Yvonne Leung

## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

### 4.14 AC Line Conducted Emission, FCC Rule 15.207:

☐ Not required; battery operation only

☒ Test data attached

## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

4.15 Line Conducted Configuration Photograph - Base3.6 Line Conducted Configuration  
Photograph - Base3.6 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

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

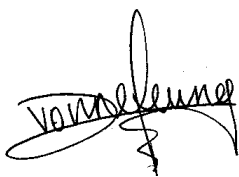
### 4.16 Line Conducted Emission Data

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

For electronic filing, the worst case line conducted emission data are saved with filename: conduct.pdf

### **TEST PERSONNEL:**



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*Tester Signature*

Yvonne Leung, Engineer  
*Typed/Printed Name*

March 20, 2002  
*Date*



## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

### 4.17 Radiated Emissions from Digital Section of Transceiver (Transmitter), FCC Ref: 15.109

☐ Not required - No digital part

☒ Test results are attached

☐ Included in the separated DOC report.

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## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

Table 7, Base

### Radiated Emissions

Polarity	Frequency (M H z)	Reading (dB $\mu$ V )	Antenna Factor (dB )	Pre-Amp Gain (dB )	Net at 3m (dB $\mu$ V /m )	Lim it (dB $\mu$ V /m )	M argin (dB )
V	52.223	31.5	11.7	16	27.2	40.0	-12.8
V	56.243	30.8	11.0	16	25.8	40.0	-14.2
V	58.253	31.4	11.0	16	26.4	40.0	-13.6
V	62.273	32.6	9.9	16	26.5	40.0	-13.5
V	64.283	33.5	9.9	16	27.4	40.0	-12.6

- 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.

Test Engineer: Yvonne Leung

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## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

Table 8, Handset

### Radiated Emissions

Polarity	Frequency (M H z)	Reading (dB $\mu$ V )	Antenna Factor (dB )	Pre-Amp Gain (dB )	Net at 3m (dB $\mu$ V /m )	Lim it (dB $\mu$ V /m )	M argin (dB )
H	52.223	29.8	11.7	16	25.5	40.0	-14.5
H	56.243	30.2	11.0	16	25.2	40.0	-14.8
H	58.253	30.4	11.0	16	25.4	40.0	-14.6
H	62.273	31.5	9.9	16	25.4	40.0	-14.6
H	64.283	31.8	9.9	16	25.7	40.0	-14.3

- 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.

Test Engineer: Yvonne Leung

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## INTERTEK TESTING SERVICES

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Company: Giant Electronics Ltd.  
Model: GH4010(XXXXX)

Date of Test: March 6-20, 2002

### 4.18 Transmitter Duty Cycle Calculation and Measurements, FCC Rule 15.35(b), (c)

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SWEP function on the analyzer was set to ZERO SPAN. The transmitter ON time was determined from the resultant time-amplitude display:

Duty cycle = Maximum ON time in 100 msec/100

Duty cycle correction, dB =  $20 * \log (DC)$

	See attached spectrum analyzer chart (s) for transmitter timing
	See transmitter timing diagram provided by manufacturer
X	Not applicable, duty cycle was not used.

**EXHIBIT 5**  
**EQUIPMENT PHOTOGRAPHS**

5.0 **Equipment Photographs**6.0  
**Photographs**

**Equipment Photographs**6.0 **Equipment**

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

**EXHIBIT 6**  
**PRODUCT LABELLING**

6.0 **Product Labelling**7.0 **Product Labelling**7.0 **Product Labelling**

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



**EXHIBIT 7**  
**TECHNICAL SPECIFICATIONS**

7.0 **Technical Specifications**8.0

**Technical Specifications**8.0

**Technical**

For electronic filing, the block diagram and circuit diagram are saved with filename:  
block.pdf , bcircuit.pdf and hcircuit.pdf respectively.

**EXHIBIT 8**  
**INSTRUCTION MANUAL**

### 8.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual1.pdf and manual2.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 9**  
**SECURITY CODE INFORMATION**

### 9.0 Security code information

The GH4010(XXXXXX) has at least  $2^{64}$  discrete digital codes, and the code is automatically generated during registration and send through the charging terminals to the base and the base confirms over the air.