June 23, 2003

Giant Electronics Ltd.
7/F., Elite Industrial Building,
135-137 Hoi Bun Road, Kwun Tong,
Kowloon, Hong Kong.
Tel. : (852) 2797 3363
Fax. : (852) 2343 6224

Dear Mr. Raymond Lau:

Enclosed you will find your file copy of a Part 15 Certification (FCC ID: K7GH4000).

For your reference, TCB will normally take another 15-20 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: K7GH4000

Giant Electronics Ltd.

Application
For
Certification

2.4GHz Frequency Hopping Spread Spectrum Cordless Phone with Caller ID

(FCC ID: K7GH4000)

WO# 03084241
TL/Ann Choy
June 23, 2003

FCC ID: K7GH4000

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

MEASUREMENT/TECHNICAL REPORT

Giant Electronics Ltd.- MODEL: GH4000(XXXXX), GH4003(XXXXX), GH41(XXXXX)
FCC ID: K7GH4000

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

Equipment Type: DSS-Part 15 Spread Spectrum Transmitter

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 [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

Table of Contents

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	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	bavetime.pdf, havetime.pdf
Test Report	Out Band Antenna Conducted Emission Plot	bobantcon.pdf, hobantcon.pdf
Test Report	Duty Cycle Calculation and Measurement	bdcc.pdf, hdcc.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
RF Exposure Info	RF Safety	RF exposure info.pdf

EXHIBIT 1
SUMMARY OF TEST RESULTS

1.0 Summary of Test

Giant Electronics Ltd.- MODEL: GH4000
FCC ID: K7GH4000

TEST	REFERENCE	RESULTS
Max. Output Power	15.247(b)	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 Description

The GH4000 is a 2.4GHz Frequency Hopping Spread Spectrum Cordless Phone with Caller ID. 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,*,#), nine function keys (Mem, Mute/Del, Redial/Pause, Intcm, Flash, Up, Down, Prog, Cancel). 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: GH4000 is one of the model GH4000(XXXXX). The suffix, (XXXXX), followed by the number represent color difference only. The model numbers with different suffix are identical in electrical, mechanical, and physical design. The model GH41(XXXXX) is an additional handset with a charge for selling handset standalone, and the model GH4003(XXXXX) has one base plus three handsets with two chargers. The models GH41(XXXXX) and GH4003(XXXXX) are the same as the model GH4000(XXXXX) in hardware aspect. The difference in model number serves as marketing strategy.

The circuit description and frequency hopping algorithm is saved with filename: descri.pdf

The hopping engine steps through a sequence, which is taken from a look-up table Flash/ROM. All 95 channels are exercised once after a period of approximately 1 second (95 x 10ms), therefore, usage of channels are equal on average.

The receiver is a single conversion superheterodyne receiver. The channel filtering is realized by a fully integrated low IF band-pass filter at a center frequency of 864kHz (inside the IC). When locked to the transmitter, the receiver is able to predict the next slot channel based on the received RFPI (Radio Fixed Part Identity).

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.

2.2 Related Submittal(s) Grants

This is an application for Certification of a DSS-Part 15 Spread Spectrum Cordless Telephone System. Two transmitters are included in this application. The device is also subject to Part 68 Registration.

2.3 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 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

3.0 **System Test Configuration**

3.1 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. 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.

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 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. (Supplied by ITS)

3.4 Equipment Modification

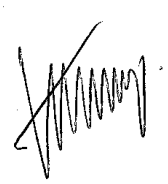
Any modifications installed previous to testing by Giant Electronics Ltd. will be incorporated in each production model sold/leased in the United States.

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

All the items listed under section 3.0 of this report are confirmed by:

Confirmed by:

Tommy Leung
Supervisor
Intertek Testing Services Hong Kong Ltd.
Agent for Giant Electronics Ltd.



Signature

June 23, 2003 Date

EXHIBIT 4
MEASUREMENT RESULTS

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

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 RBW>20dB bandwidth and power was read directly in dBm. External attenuation and cable loss were compensated for using the OFFSET function of the analyser.

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 = -1.0 dBi			
Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2401.107	20.81	120.50
Middle Channel:	2441.724	21.34	136.14
High Channel:	2482.293	22.19	165.58

Cable loss : 0.5 dB External Attenuation : N/A dB

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

EUT Transmit Antenna Gain(dBi) + dBm max. output level = 21.19 dBm (36 dBm or less)

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

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

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

(Handset Unit) Maximum Antenna Gain = -1.0 dBi			
Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2401.065	21.00	125.89
Middle Channel:	2441.754	20.03	100.69
High Channel:	2482.371	19.03	79.98

Cable loss : 0.5 dB External Attenuation : N/A dB

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

EUT Transmit Antenna Gain(dBi) + dBm max. output level = 20.00 dBm (36 dBm or less)

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.pdf.

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

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)
2482.295	674

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

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

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

(Handset Unit)	
Frequency (MHz)	20 dB Bandwidth (kHz)
2440.635	669

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

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

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.

Base Unit and Handset	
No. of hopping channels	95

Minimum Requirements: at least 15 non-overlapping channels for 2400-2483.5MHz.

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

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

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: 674kHz

Base Unit	
Channel Separation	844 kHz

Plot B4: Channel 47 and Channel 48

Requirement: The frequency separation is more than 20dB bandwidth of hopping channel.

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

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

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: 669kHz

Handset	
Channel Separation	849 kHz

Plot H4: Channel 47 and Channel 48

Requirement: The frequency separation is more than 20dB bandwidth of hopping channel.

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

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

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 10ms, 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, if the 20dB bandwidth is less than 250kHz, 10 seconds for 902-928 MHz if the 20dB bandwidth is or greater than 250kHz, "0.4 seconds x Number of hopping channels employed" seconds for 2400-2483.5 MHz, 30 seconds for 5725-5850 MHz). 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 38 seconds (0.4sec. x 95) for 2400-2483.5MHz

Base Unit	
Average Occupancy Time = 771.4µs x 4 x 40	123.4 ms

Refer to attached spectrum analyzer plots B5a and B5b

Hanset Unit	
Average Occupancy Time = 800.0µs x 40	32 ms

Refer to attached spectrum analyzer plots H5a and H5b

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

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

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 2nd 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 26 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.

*These 2 plots are shown the worst-case which has been already considered between enable and disable the hopping function of the EUT.

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

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

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, all emissions more than 26dB below fundamental
[ ] See attached data sheet

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

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.

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

4.9 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

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

where FS = Field Strength in 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
PD = Pulse Desensitization in dB
AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

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

Example
Assume a receiver reading of 62.0 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. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 62.0 dBµV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0 dB
AV = -10 dB
FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 dBµV/m

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

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

4.10 Radiated Emission Configuration Photograph - Base Unit

Worst Case Radiated Emission
at
4883.328MHz

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

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

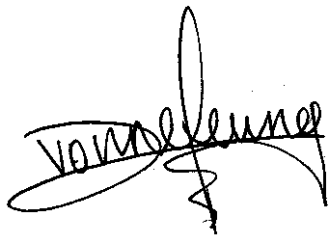
4.11 Radiated Emission Data - Base Unit

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

Judgement : Passed by 11.2dB

****

TEST PERSONNEL:



Tester Signature

Yvonne Leung, Engineer
Typed/Printed Name

June 23, 2003
Date

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000
Mode : TX-Channel 0

Table 1, Base Unit

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Average Factor (-dB)	Net 3m at (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	*4802.112	52.4	34.0	34	10.2	42.2	54	-11.8
V	*12005.280	42.8	40.2	34	10.2	38.8	54	-15.2
V	*19208.448	38.4	45.3	34	10.2	39.5	54	-14.5

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 limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Test Engineer: Yvonne Leung

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000
Mode : TX-Channel 47

Table 2, Base unit

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Average Factor (-dB)	Net 3m at (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	*4883.328	53.0	34.0	34	10.2	42.8	54	-11.2
V	*7324.992	47.7	37.0	34	10.2	40.5	54	-13.5
V	*12208.320	42.1	40.2	34	10.2	38.1	54	-15.9
V	*19533.312	38.0	45.3	34	10.2	39.1	54	-14.9

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 limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Test Engineer: Yvonne Leung

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000
Mode : TX-Channel 94

Table 3, Base unit

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Average Factor (-dB)	Net 3m at (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
H	**2482.272	122.3	29.1	34	10.2	107.2	--	--
V	*4964.544	52.3	34.0	34	10.2	42.1	54	-11.9
V	*7446.816	48.7	37.0	34	10.2	41.5	54	-12.5
V	*12411.360	42.4	40.2	34	10.2	38.4	54	-15.6
V	*19858.176	38.0	45.3	34	10.2	39.1	54	-14.9

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 limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

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

Test Engineer: Yvonne Leung

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

4.12 Radiated Emission Configuration Photograph - Handset

Worst Case Radiated Emission
at
12005.280MHz

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

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

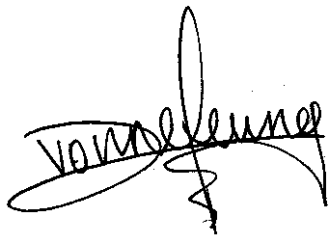
4.13 Radiated Emission Data - Handset

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

Judgement : Passed by 14.8dB

****

TEST PERSONNEL:



Tester Signature

Yvonne Leung, Engineer
Typed/Printed Name

June 23, 2003
Date

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000
Mode : TX-Channel 0

Table 4, Handset

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Average Factor (-dB)	Net at 3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
V	*4802.112	60.0	34	34.0	21.9	38.1	54	-15.9
V	*12005.280	67.3	34	40.2	21.9	39.2	54	-14.8
V	*19208.448	59.8	34	45.3	21.9	26.6	54	-27.4

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 limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Test Engineer: Yvonne Leung

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000
Mode : TX-Channel 47

Table 5, Handset

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Average Factor (-dB)	Net at 3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
V	*4883.328	61.0	34	34.0	21.9	39.1	54	-14.9
V	*7324.992	63.6	34	37.0	21.9	38.7	54	-15.3
V	*12208.320	54.7	34	40.2	21.9	26.6	54	-27.4
V	*19533.312	59.6	34	45.3	21.9	26.4	54	-27.6

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.

* Emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

Test Engineer: Yvonne Leung

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000
Mode : TX-Channel 94

Table 6, Handset

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Average Factor (-dB)	Net at 3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
H	**2482.272	115.3	34	34.0	21.9	93.4	--	--
V	*4964.544	60.8	34	34.0	21.9	38.9	54	-15.1
V	*7446.816	63.7	34	37.0	21.9	38.8	54	-15.2
V	*12411.360	54.8	34	40.2	21.9	26.7	54	-27.3
V	*19858.176	59.6	34	45.3	21.9	26.4	54	-27.6

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.

* Emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

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

Test Engineer: Yvonne Leung

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

4.14 AC Line Conducted Emission, FCC Rule 15.207:

[ ] Not required; battery operation only

[×] Test data attached

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

4.15 Line Conducted Configuration Photograph - Base

Worst Case Line-Conducted Configuration

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

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

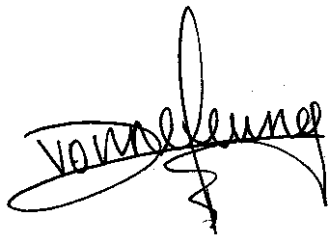
4.16 Line Conducted Emission Data

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

Judgement : Passed by more than 20dB margin

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

TEST PERSONNEL:



Tester Signature

Yvonne Leung, Engineer
Typed/Printed Name

June 23, 2003
Date

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.

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

Table 7, Base

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
H	207.361	33.0	11.8	16	28.8	43.5	-14.7
H	217.727	35.0	11.8	16	30.8	46.0	-15.2
H	248.838	40.6	11.4	16	36.0	46.0	-10.0
H	259.200	39.6	12.4	16	36.0	46.0	-10.0
H	269.573	42.0	12.4	16	38.4	46.0	-7.6
H	290.307	39.4	13.3	16	36.7	46.0	-9.3
H	300.680	38.8	14.3	16	37.1	46.0	-8.9
H	321.409	36.1	14.3	16	34.4	46.0	-11.6

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.

Test Engineer: Yvonne Leung

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

Table 8, Handset

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
V	35.689	21.0	16	11.2	25.8	40	-14.2
V	38.642	20.8	16	11.2	25.6	40	-14.4
V	43.729	24.2	16	11.7	28.5	40	-11.5
V	45.648	24.2	16	11.9	28.3	40	-11.7
V	48.546	23.1	16	11.9	27.2	40	-12.8
V	52.841	23.1	16	11.7	27.4	40	-12.6

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.

Test Engineer: Yvonne Leung

Company: Giant Electronics Ltd. Date of Test: May 29, 2003 to June 14, 2003
Model: GH4000

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:

Base Unit:

Duty cycle = Maximum ON time is 0.7714 x 4msec/10msec for four handsets operation

Duty cycle correction, dB = 20* log (DC)
= 20* log (0.31)
= -10.2dB

Handset:

Duty cycle = Maximum ON time is 0.800msec/10msec

Duty cycle correction, dB = 20* log (DC)
= 20* log (0.08)
= -21.9dB

X	See attached spectrum analyzer chart (s) for transmitter timing Base Unit: Plot B7, Handset: Plot H7
	See transmitter timing diagram provided by manufacturer
	Not applicable, duty cycle was not used.

For electronic filing, the above plots are saved with filenames: bdcc.pdf, hdcc.pdf.

EXHIBIT 5
EQUIPMENT PHOTOGRAPHS

5.0 **Equipment Photographs**

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

EXHIBIT 6
PRODUCT LABELLING

6.0 **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**

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

EXHIBIT 8
INSTRUCTION MANUAL

8.0 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 9
SECURITY CODE INFORMATION

9.0 Security code information

The GH4000 has at least 2^{64} discrete digital codes, and the code is randomly generated during registration and send through the charging terminals to the base and the base confirms over the air.