

Giant Telecom Ltd.

Application
For
Certification

2.4GHz Digital Modulation Cordless Phone with Caller ID

(FCC ID: RAQS245X)

06007831
TL/ Ann Choy
March 17, 2006

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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 Website: www.hk.intertek-etlsemko.com

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MEASUREMENT/TECHNICAL REPORT

Giant Telecom Ltd.- MODEL: 5102 XX, 5101 XX, 5103 XX, 5104 XX, 5105 XX
FCC ID: RAQS245X

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

Equipment Type: DTS - Digital Transmission System

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes No X

If yes, defer until :
date

Company Name agrees to notify the Commission by:
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? Yes No X

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-01-04 Edition] provision.

Report prepared by:

Tommy Leung
Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre,
576 Castle Peak Road,
Kowloon, Hong Kong.
Phone: 852-2173-8538
Fax: 852-2741-1693

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List of attached file

Exhibit type	File Description	filename
Cover Letter	Confidentiality Request	request.pdf
Test Report	Test Report	report.pdf
Test Report	Maximum Output Power Plot	maxop.pdf
Test Report	6 dB Bandwidth Plot	6dB.pdf
Test Report	Maximum Power Density Plot	maxpd.pdf
Test Report	Out Band Antenna Conducted Emission Plot	obantcon.pdf
Test Report	Duty Cycle Calculation and Measurement	dcc.pdf
Test Report	Conducted Emission Test Result	conduct.pdf
Test Setup Photo	Radiated Emission for Base	config photos.doc
Test Setup Photo	Radiated Emission for Handset	config photos.doc
Test Setup Photo	Conducted Emission	config photos.doc
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
Operation Description	Technical Description	descri.pdf

EXHIBIT 1
SUMMARY OF TEST RESULTS

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1.0 Summary of Test

Giant Telecom Ltd. - MODEL: 5102 XX, 5101 XX, 5103 XX, 5104 XX, 5105 XX
FCC ID: RAQS245X

TEST	REFERENCE	RESULTS
Max. Output power	15.247(b)	Pass
6 dB Bandwidth	15.247(a)(2)	Pass
Max. Power Density	15.247(e)	Pass
Out of Band Antenna Conducted Emission	15.247(d)	Pass
Radiated Emission in Restricted Bands	15.247(d)	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

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2.0 **General Description**

2.1 Product Description

The 5102 is a 2.4GHz Digital Modulation Cordless Phone with Caller ID. It operates at frequency range of 2406.240MHz to 2475.360MHz with 9 Channels. The unit is capable of either tone or pulse dialing. The internal power supply's isolation is accomplished through a power transformer having an adequate dielectric rating. The circuit wiring is consistent under the requirement of part 68.

The base unit consists of a keypad with twelve standard keys (0,...9,*,#), ten function keys (LDS, CLEAR/MUTE, CALL RETURN, INFO, REPEAT, DIAL, FLASH, INT, OFF, PROG/OK). A Talk key is provided to control pick and release telephone line in a toggle base.

The base unit has a page 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: 5102 is one of the Model: 5102 XX, and the letter "XX", followed by the model number is represented the packing method. The Model: 5101 XX, 5103 XX, 5104 XX, 5105 XX are the same as the Model: 5102 XX in hardware aspect expect the cosmetic and packaging configuration. The difference in model number serves as marketing strategy.

The circuit description is saved with filename: descri.pdf

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

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2.2 Related Submittal(s) Grants

This is an application for Certification of a DTS - Digital Transmission 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 (2003). 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 emissions testing, the equipment under test (EUT) was setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. 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 (provided by client) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

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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 and a battery (provided with the unit) were used to power the device. Their description are listed below.

- (1) Base Unit: An AC adaptor (120VAC to 7.5VDC 300mA, Model: UD-0803)
- (2) Handset: A "Ni-MH" type rechargeable battery (2.4V 700mAh, Model: 2SN-AAA70H-S-X2F)
- (3) Extra Charger: An AC Adaptor (120VAC to 9VDC 200mA, Model: MA132-090020)

CABLES:

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

OTHERS:

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

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3.4 Measurement Uncertainty

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

3.5 Equipment Modification

Any modifications installed previous to testing by Giant Telecom 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
Assistant Manager
Intertek Testing Services Hong Kong Ltd.
Agent for Giant Telecom Ltd.*



Signature

March 17, 2006 Date

EXHIBIT 4
MEASUREMENT RESULTS

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Company: Giant Telecom Ltd.
Model: 5102

Date of Test: February 8-March 7, 2006

4.0 **Measurement Results**

4.1 Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b)(3):

- ☐ 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> 6dB bandwidth and power was read directly in dBm. External attenuation and cable loss were compensated for using to OFFSET function of the analyzer.

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

(Base Unit) Antenna Gain = -6 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2406.240	20.56	113.8
Middle Channel: 2445.120	20.01	100.2
High Channel: 2475.360	19.47	88.5

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

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

EUT dBm max. output level = 20.56 dBm (30 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

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Company: Giant Telecom Ltd.
Model: 5102

Date of Test: February 8-March 7, 2006

4.1 Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b)(3) - Continued:

(Handset Unit) Maximum Antenna Gain = -4 dBi		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2406.240	17.69	58.7
Middle Channel: 2445.120	17.34	54.2
High Channel: 2475.360	17.04	50.6

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 dBm max. output level = 17.69 dBm (30 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: maxop.pdf.

For RF safety, the information is saved with filename: RF exposure info.pdf.

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Company: Giant Telecom Ltd.
Model: 5102

Date of Test: February 8-March 7, 2006

4.2 Minimum 6 dB RF Bandwidth, FCC Rule 15.247(a)(2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100kHz. 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 6 dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

Base Unit	
Frequency (MHz)	6 dB Bandwidth (kHz)
2475.360	894

Limit: at least 500kHz

Refer to the following plots for 6 dB bandwidth sharp:

Plot B2A: Low Channel 6 dB RF Bandwidth
Plot B2B: Middle Channel 6 dB RF Bandwidth
Plot B2C: High Channel 6 dB RF Bandwidth

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Company: Giant Telecom Ltd.
Model: 5102

Date of Test: February 8-March 7, 2006

4.2 Minimum 6 dB RF Bandwidth, FCC Rule 15.247(a)(2) - Continued:

(Handset Unit)	
Frequency (MHz)	6 dB Bandwidth (kHz)
2475.360	876

Limit: at least 500kHz

Refer to the following plots for 6 dB bandwidth sharp:

Plot H2A: Low Channel 6 dB RF Bandwidth
Plot H2B: Middle Channel 6 dB RF Bandwidth
Plot H2C: High Channel 6 dB RF Bandwidth

For electronic filing, the above plots are saved with filename: 6dB.pdf

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Company: Giant Telecom Ltd.
Model: 5102

Date of Test: February 8-March 7, 2006

4.3 Maximum Power Density Reading, FCC Rule 15.247(e) :

The spectrum analyzer RES BW was set to 3kHz. In order to look for a peak, the START and STOP frequencies were set to the band edges of the maximum output passband. If there is no clear maximum amplitude in any given portion of the band, it may be necessary to make measurements at a number of bands defined by several START and STOP frequency pairs.

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

Since the spectrum line spacing is less than 3kHz which is provided by the manufacturer, the RES BW was reduced below 3kHz until the individual lines were resolved. It is found that they were resolved when RES BW is 100Hz. The measured data was normalized to 3 kHz bandwidth by adding the following correction factor:

$$10\log(3\text{kHz}/100\text{Hz}) = 14.8\text{dB}$$

Base Unit	
Frequency (MHz)	Power Density (dBm/3kHz)
2406.240	2.04

Frequency Span = 120 kHz

Sweep Time = Frequency Span/ 100 Hz
= 1200 seconds

Cable Loss: 0.5 dB

Peak Power Density (at 2406.240MHz) = -12.76dBm/100Hz + 14.8dB

Limit: 8dBm/3kHz

Refer to the following plots for power density data :

Plot B3A: Low Channel power density
Plot B3B: Middle Channel power density
Plot B3C: High Channel power density

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Company: Giant Telecom Ltd.
Model: 5102

Date of Test: February 8-March 7, 2006

4.3 Maximum Power Density Reading, FCC Rule 15.247(e) – Continued:

Handset Unit	
Frequency (MHz)	Power Density (dBm/3kHz)
2406.240	2.04

Frequency Span = 120 kHz

Sweep Time = Frequency Span/100 Hz
= 1200 seconds

Cable Loss: 0.5 dB

Peak Power Density (at 2406.240MHz) = -12.76dBm/100Hz + 14.8dB
= 2.04dBm/3kHz

Limit: 8dBm/3kHz

Refer to the following plots for power density data :

Plot H3A: Low Channel power density
Plot H3B: Middle Channel power density
Plot H3C: High Channel power density

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

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Company: Giant Telecom Ltd.
Model: 5102

Date of Test: February 8-March 7, 2006

4.4 Out of Band Conducted Emissions, FCC Rule 15.247(d):

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 20dB 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 B4A1 - B4A2: Low Channel Emissions
Plot B4B1 - B4B2: Middle Channel Emissions
Plot B4C1 - B4C2: High Channel Emissions
Plot B4D1 - B4D2: Modulation Products Emissions*
Plot H4A1 - H4A2: Low Channel Emissions
Plot H4B1 - H4B2: Middle Channel Emissions
Plot H4C1 - H4C2: High Channel Emissions
Plot H4D1 - H4D2: Modulation Products Emissions*

The plots showed the 2nd harmonic and modulation products at the band edges of 2400MHz and 2483.5MHz. In addition, all spurious emission and up to the tenth harmonic was measured and they were found to be at least 20 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 the electronic filing, the above plots are saved with filename: obantcon.pdf

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Company: Giant Telecom Ltd.
Model: 5102

Date of Test: February 8-March 7, 2006

4.5 Out of Band Radiated Emissions (for emissions in 4.4 above that are less than 20dB below carrier), FCC Rule 15.247(d):

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, since all emissions are more than 20dB below fundamental
- ☐ See attached data sheet

4.6 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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Company: Giant Telecom Ltd.
Model: 5102

Date of Test: February 8-March 7, 2006

4.7 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 dB μ V/m

RA = Receiver Amplitude (including preamplifier) in dB μ V

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 dB μ 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. 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 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

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

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

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

$$PD = 0 \text{ dB}$$

$$AV = -10 \text{ dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 \text{ dB}\mu\text{V/m}$$

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

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Company: Giant Telecom Ltd.
Model: 5102

Date of Test: February 8-March 7, 2006

4.8 Radiated Emission Configuration Photograph - Base Unit

Worst Case Radiated Emission
at
4890.240 MHz

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

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Company: Giant Telecom Ltd.
Model: 5102

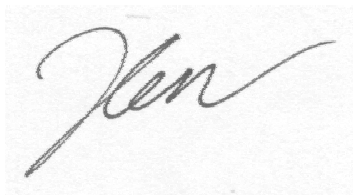
Date of Test: February 8-March 7, 2006

4.9 Radiated Emission Data

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

Judgement : Passed by 4.2 dB margin compare with the average limit

TEST PERSONNEL:



Tester Signature

Kenneth C. C. Lam, Senior Lead Engineer
Typed/Printed Name

March 17, 2006
Date

INTERTEK TESTING SERVICES

Company: Giant Telecom Ltd.
Model: 5102
Mode : TX-Channel 0

Date of Test: February 8-March 7, 2006

Table 1 (Base Unit)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Average Factor (-dB)	Calculated at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	*4812.480	65.4	34	34.9	66.3	17.6	48.7	54	-5.3
V	*12031.200	54.5	34	40.5	61.0	17.6	43.4	54	-10.6
V	*19249.920	50.4	34	37.7	54.1	17.6	36.5	54	-17.5

- NOTES:
1. Peak detector is used for the emission measurement.
 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 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: Kenneth C. C. Lam

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Company: Giant Telecom Ltd.
Model: 5102
Mode : TX-Channel 05

Date of Test: February 8-March 7, 2006

Table 2 (Base Unit)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Average Factor (-dB)	Calculated at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	*4890.240	66.5	34	34.9	67.4	17.6	49.8	54	-4.2
V	*7335.360	49.9	34	37.9	53.8	17.6	36.2	54	-17.8
V	*12225.600	55.3	34	40.5	61.8	17.6	44.2	54	-9.8
V	*19560.960	51.5	34	37.8	55.3	17.6	37.7	54	-16.3

- NOTES: 1. Peak detector is used for the emission measurement.
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 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: Kenneth C. C. Lam

INTERTEK TESTING SERVICES

Company: Giant Telecom Ltd.
Model: 5102
Mode : TX-Channel 09

Date of Test: February 8-March 7, 2006

Table 3 (Base Unit)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (-dB)	Calculated at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
V	**2475.360	112.9	34	29.4	108.3	17.6	90.7	---	---
V	*4950.720	66.1	34	34.9	67.0	17.6	49.4	54	-4.6
V	*7426.080	50.7	34	37.9	54.6	17.6	37.0	54	-17.0
V	*12376.800	54.1	34	40.5	60.6	17.6	43.0	54	-11.0
V	*19802.880	52.6	34	37.8	56.4	17.6	38.8	54	-15.2
V	*22278.240	51.9	34	38.2	56.1	17.6	38.5	54	-15.5

- NOTES:
1. Peak detector is used for the emission measurement.
 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 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: Kenneth C. C. Lam

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Company: Giant Telecom Ltd.
Model: 5102

Date of Test: February 8-March 7, 2006

4.10 Radiated Emission Configuration Photograph - Handset

Worst Case Radiated Emission
at
4950.720 MHz

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

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Company: Giant Telecom Ltd.
Model: 5102

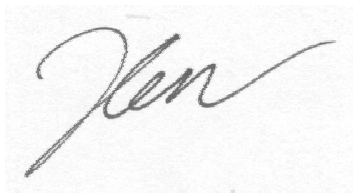
Date of Test: February 8-March 7, 2006

4.11 Radiated Emission Data

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

Judgement : Passed by 8.0 dB margin compare with the peak limit

TEST PERSONNEL:



Tester Signature

Kenneth C. C. Lam, Senior Lead Engineer
Typed/Printed Name

March 17, 2006
Date

INTERTEK TESTING SERVICES

Company: Giant Telecom Ltd.
Model: 5102
Mode : TX-Channel 0

Date of Test: February 8-March 7, 2006

Table 4, Handset

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Average Factor (-dB)	Calculated at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
H	*4812.480	61.9	34	34.9	62.8	27.9	34.9	54	-19.1
V	*12031.200	55.6	34	40.5	62.1	27.9	34.2	54	-19.8
H	*19249.920	50.4	34	37.7	54.1	27.9	26.2	54	-27.8

- NOTES: 1. Peak detector is used for the emission measurement.
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 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: Kenneth C. C. Lam

INTERTEK TESTING SERVICES

Company: Giant Telecom Ltd.
Model: 5102
Mode : TX-Channel 05

Date of Test: February 8-March 7, 2006

Table 5, Handset

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (-dB)	Calculated at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
H	*4890.240	62.9	34	34.9	63.8	27.9	35.9	54	-18.1
V	*7335.360	47.0	34	37.9	50.9	27.9	23.0	54	-31.0
H	*12225.600	55.9	34	40.5	62.4	27.9	34.5	54	-19.5
V	*19560.960	51.2	34	37.8	55.0	27.9	27.1	54	-26.9

- NOTES: 1. Peak detector is used for the emission measurement.
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 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: Kenneth C. C. Lam

INTERTEK TESTING SERVICES

Company: Giant Telecom Ltd.
Model: 5102
Mode : TX-Channel 09

Date of Test: February 8-March 7, 2006

Table 6, Handset

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (-dB)	Calculated at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
V	**2475.360	110.2	34	29.4	105.6	27.9	77.7	---	---
H	*4950.720	65.1	34	34.9	66.0	27.9	38.1	54	-15.9
V	*7426.080	50.2	34	37.9	54.1	27.9	26.2	54	-27.8
H	*12376.800	55.8	34	40.5	62.3	27.9	34.4	54	-19.6
V	*19802.880	52.3	34	37.8	56.1	27.9	28.2	54	-25.8
V	*22278.240	51.6	34	38.2	55.8	27.9	27.9	54	-26.1

- NOTES:
1. Peak detector is used for the emission measurement.
 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 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, and this is the worst-case of 8.0dB margin at 4950.720MHz.

Test Engineer: Kenneth C. C. Lam

INTERTEK TESTING SERVICES

Company: Giant Telecom Ltd.
Model: 5102

Date of Test: February 8-March 7, 2006

4.12 AC Line Conducted Emission, FCC Rule 15.207:

☐ Not required; battery operation only

☒ Test data attached

INTERTEK TESTING SERVICES

Company: Giant Telecom Ltd.
Model: 5102

Date of Test: February 8-March 7, 2006

4.13 Line Conducted Configuration Photograph

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

Company: Giant Telecom Ltd.
Model: 5102

Date of Test: February 8-March 7, 2006

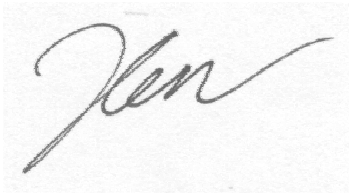
4.14 Line Conducted Emission Data

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 conducted emission test result is saved with filename: conduct.pdf

TEST PERSONNEL:



Tester Signature

Kenneth C. C. Lam, Senior Lead Engineer
Typed/Printed Name

March 17, 2006
Date

INTERTEK TESTING SERVICES

Company: Giant Telecom Ltd.
Model: 5102

Date of Test: February 8-March 7, 2006

4.15 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.

INTERTEK TESTING SERVICES

Company: Giant Telecom Ltd.
Model: 5102
Mode: Talk

Date of Test: February 8-March 7, 2006

Table 7, Base Unit

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	41.471	30.7	16	10.0	24.7	40.0	-15.3
V	55.295	31.1	16	11.0	26.1	40.0	-13.9
V	69.119	36.8	16	7.0	27.8	40.0	-12.2
V	82.943	38.1	16	7.0	29.1	40.0	-10.9
V	96.767	33.6	16	12.0	29.6	43.5	-13.9
V	110.591	31.4	16	14.0	29.4	43.5	-14.1

- NOTES: 1. Quasi-peak detector is used for the emission below or equal to 1000 MHz.
2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.

Test Engineer: Kenneth C. C. Lam

INTERTEK TESTING SERVICES

Company: Giant Telecom Ltd.
Model: 5102
Mode: Talk

Date of Test: February 8-March 7, 2006

Table 8, Handset

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	41.471	30.0	16	10.0	24.0	40.0	-16.0
V	55.295	30.6	16	11.0	25.6	40.0	-14.4
V	69.119	36.1	16	7.0	27.1	40.0	-12.9
V	82.943	37.3	16	7.0	28.3	40.0	-11.7
V	96.767	33.0	16	12.0	29.0	43.5	-14.5
V	110.591	30.7	16	14.0	28.7	43.5	-14.8

- 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.

Test Engineer: Kenneth C. C. Lam

INTERTEK TESTING SERVICES

Company: Giant Telecom Ltd.
Model: 5102

Date of Test: February 8-March 7, 2006

4.16 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 (DC) = Maximum ON time in 10ms/10ms
= (0.4 x 3)ms+0.11ms/10ms for 3 handsets operation

Duty cycle correction, dB = $20 \times \log(\text{DC})$
= $20 \times \log(0.131)$
= -17.6 dB

Handset:

Duty cycle (DC) = Maximum ON time in 10ms/10ms
= 0.4ms/10ms

Duty cycle correction, dB = $20 \times \log(\text{DC})$
= $20 \times \log(0.04)$
= -27.9 dB

X	See attached spectrum analyzer chart (s) for transmitter timing Base Unit: Plot B5A, B5B, Handset: Plot H5
	See transmitter timing diagram provided by manufacturer
	Not applicable, duty cycle was not used.

For electronic filing, the above plots are saved with filename: dcc.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**

Each base and handset has a unique 40 bit ID (2^{40} combinations), to distinguish between different bases. And it is random assigned in factory. There is a registration procedure to register more handsets to a base. To prevent unauthorized registration a key is first to be pressed on the base. Afterwards a changeable 4 digit PIN code needs to be entered on the handset. The default PIN is 0000.

EXHIBIT 10
CONFIDENTIALITY REQUEST

10.0 **Confidentiality Request**

For electronic filing, the confidentiality request is saved with filename: request.pdf