Greatsino Limited

Application
For
Certification

900MHz Cordless Telephone

(FCC ID: NQL9850)

WO# 9807849
CKL/at
October 12, 1998

FCC ID: NQL9850

LIST OF EXHIBITS

MEASUREMENT/TECHNICAL REPORT

Greatsino Limited - MODEL: 9930 Series
FCC ID: NQL9850

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

Equipment Type: Low Power Transmitter (example: computer, modem, transmitter, etc.)

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

If yes, defer until : _____ date

Company Name agrees to notify the Commission by: _____ date

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

Transition Rules Request per 15.37? Yes _____ No X

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-1-96 Edition] provision.

Report prepared by:

C. K. Lam
Intertek Testing Services.
2/F., Garment Centre,
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Table of Contents

List of attached file

Exhibit type	File Description	filename
Cover Letter	Letter of Agency	letter.pdf
Test Report	Test Report	report.doc
Operation Description	Technical Description	descrip.pdf
Test Setup Photo	Radiated Emission for Base	base.jpg
Test Setup Photo	Radiated Emission for Handset	handset.jpg
Test Report	Emission Plot	emission.pdf
Test Setup Photo	Conducted Emission	conduct1.jpg, conduct2.jpg
Test Report	Conducted Emission Test Result	conduct.pdf
External Photo	External Photo	ophoto1.jpg, ophoto2.jpg
Internal Photo	Internal Photo	iphoto1.jpg to iphoto19.jpg
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf, RFcircuit.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf

EXHIBIT 1
GENERAL DESCRIPTION

1.0 **General Description**

1.1 Product Description

The equipment under test (EUT) is a 900 MHz cordless phone with answering machine and Caller ID/Call waiting with model number 9930 Series. 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 answering machine and Caller ID/Call waiting portion is also verified.

The handset unit consists of a keypad with twelve standard keys (0,...9,*,#), five function keys (memo, ans.cont, flash, tone and re/pa), and one channel switch key. A talk key is provided to control pick/release telephone line in a toggle base. Also the handset consists of a Caller ID system.

The base unit has a page key, which is used to page the handset unit.

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.

1.2 Related Submittal(s) Grants

This is an Application for Certification of a cordless telephone system. Two transmitters are included in this Application. This specific report details the emission characteristics of each transmitter. The receivers are subject to the verification authorization process, in accordance with 15.101(b). A verification report has been prepared for the receiver sections of each device. The device is also subject to Part 68 Registration.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992). All measurements were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. For each scan, the procedure for maximizing emissions in Appendices D and E were followed. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

EXHIBIT 2
SYSTEM TEST CONFIGURATION

2.0 **System Test Configuration**

2.1 Justification

For emission testing, the equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). During testing, all cables were manipulated to produce worst case emissions. The handset was powered by a fully charged battery.

For the measurements, the EUT is attached to a cardboard box and placed on the wooden turntable. If the base unit attaches to peripherals, they are connected and operational (as typical as possible). The handset is remotely located as far from the antenna and the base as possible to ensure full power transmission from the base. Else, the base is wired to transmit full power without modulation.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Detector function is in peak mode. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater. All emissions greater than 20 dBµV/m are recorded.

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

2.2 EUT Exercising Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

For emissions testing, the units were setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing.

2.3 Support Equipment List and Description

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

HARDWARE:

The unit was operated standalone. An AC adapter (provided with the unit) was used to power the device. Its description is listed below.

(1) AC adapter with two meter unshielded power cord permanently affixed.

CABLES:

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

OTHERS:

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

2.4 Equipment Modification

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

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

All the items listed under section 2.0 of this report are confirmed by:

Confirmed by:

C. K. Lam
Assistant Manager
Intertek Testing Services
Agent for Greatsino Limited

Signature

October 12, 98 Date

EXHIBIT 3
EMISSION RESULTS

3.0 **Emission Results**

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG

where FS = Field Strength in 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

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 dBµV/m
RR = RA - AG in dBµV
LF = CF + AF in dB

Assume a receiver reading of 52.0 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, giving a field strength of 32 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 52.0 dBµV/m
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
FS = RR + LF
FS = 23 + 9 = 32 dBµV/m

RR = 23.0 dBµV
LF = 9.0 dB

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

3.2 Radiated Emission Configuration Photograph - Base Unit

Worst Case Radiated Emission

at 327.664 MHz

For electronic filing, the worst case radiated emission configuration photograph is saved with filename: base.jpg

3.3 Radiated Emission Data - Base Unit

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

Judgement : Passed by 4.1 dB

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TEST PERSONNEL:

Tester Signature

Kenneth H. M. Lam, Engineer
Typed/Printed Name

October 12, 98
Date

Company: Greatsino Limited
Model: 9930 Series
Mode : TX-Channel 1

Date of Test: September 30, 1998

Table 1, Base unit

Radiated Emissions

Polarity	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
H	81.916	40.4	7.0	16	31.4	40.0	-8.6
V	163.832	34.5	17.0	16	35.5	43.5	-8.0
V	245.748	20.8	20.0	16	24.8	46.0	-21.2
H	327.664	33.9	24.0	16	41.9	46.0	-4.1
H	409.580	24.9	24.0	16	32.9	46.0	-13.1
V	902.125	59.8	32.0	16	75.8	94.0	-18.2
V	1804.250	43.1	26.5	34	35.6	54.0	-18.4
H	*2706.375	38.6	29.1	34	33.7	54.0	-20.3
H	*3608.506	33.0	32.8	34	31.8	54.0	-22.2

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: Kenneth H. M. Lam

Company: Greatsino Limited
Model: 9930 Series
Mode : TX-Channel 40

Date of Test: September 30, 1998

Table 2, Base unit

Radiated Emissions

Polarity	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
H	81.916	39.2	7.0	16	30.2	40.0	-9.8
V	163.832	33.8	17.0	16	34.8	43.5	-8.7
V	245.748	20.2	20.0	16	24.2	46.0	-21.8
H	327.664	32.1	24.0	16	40.1	46.0	-5.9
H	409.580	25.6	24.0	16	33.6	46.0	-12.4
V	903.305	60.4	32.0	16	76.4	94.0	-17.6
V	1806.610	42.1	26.5	34	34.6	54.0	-19.4
H	*2709.915	37.6	29.1	34	32.7	54.0	-21.3
H	*3613.220	34.8	32.8	34	33.6	54.0	-20.4

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: Kenneth H. M. Lam

Company: Greatsino Limited
Model: 9930 Series
Mode : Stand by

Date of Test: September 30, 1998

Table 3, Base unit

Radiated Emissions

Polarity	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
H	81.916	41.8	7.0	16	32.8	40.0	-7.2
V	163.832	34.6	17.0	16	35.6	43.5	-7.9
V	245.748	20.7	20.0	16	24.7	46.0	-21.3
H	327.664	32.8	24.0	16	40.8	46.0	-5.2
H	409.580	24.8	24.0	16	32.8	46.0	-13.2

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: Kenneth H. M. Lam

Company: Greatsino Limited
Model: 9930 Series
Mode : Charging

Date of Test: September 30, 1998

Table 4, Base unit

Radiated Emissions

Polarity	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
H	81.916	40.4	7.0	16	31.4	40.0	-8.6
V	163.832	33.1	17.0	16	34.1	43.5	-9.4
V	245.748	21.6	20.0	16	25.6	46.0	-20.4
H	327.664	30.6	24.0	16	38.6	46.0	-7.4
H	409.580	22.8	24.0	16	30.8	46.0	-15.2

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: Kenneth H. M. Lam

3.4 Radiated Emission Configuration Photograph - Handset

Worst Case Radiated Emission

at 2778.691 MHz

For electronic filing, the worst case radiated emission configuration photograph is saved with filename: handset.pdf

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 4.5 dB

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TEST PERSONNEL:

Tester Signature

Kenneth H. M. Lam, Engineer
Typed/Printed Name

October 12, 98
Date

Company: Greatsino Limited
Model: 9930 Series
Mode : TX-Channel 1

Date of Test: September 30, 1998

Table 5, Handset

Radiated Emissions

Polarity	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
H	926.120	51.7	33.0	16	68.7	94	-25.3
H	1852.240	43.1	26.5	34	35.6	54	-18.4
H	*2778.360	54.4	29.1	34	49.5	54	-4.5
H	*3704.480	36.0	32.8	34	34.8	54	-19.2
H	4630.604	32.7	34.0	34	32.7	54	-21.3

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.

* 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: Kenneth H. M. Lam

Company: Greatsino Limited
Model: 9930 Series
Mode : TX-Channel 40

Date of Test: September 30, 1998

Table 6, Handset

Radiated Emissions

Polarity	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
V	927.308	49.9	33.0	16	66.9	94	-27.1
H	1854.617	42.3	26.5	34	34.8	54	-19.2
H	*2781.925	53.0	29.1	34	48.1	54	-5.9
H	*3709.236	36.8	32.8	34	35.6	54	-18.4
H	4636.547	32.1	34.0	34	32.1	54	-21.9

NOTES: 1. Peak Detector data

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna and average detector are used for the emission over 1000MHz.

* Emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000 MHz.

Test Engineer: Kenneth H. M. Lam

Company: Greatsino Limited
Model: 9930 Series
Mode : Stand-by

Date of Test: September 30, 1998

Table 7, Handset

Radiated Emissions

Polarity	Frequency (MHz)	Reading (dBµV)	Antenna Factor (dB)	Pre-Amp Gain (dB)	Net at 3m (dBµV/m)	Limit (dBµV/m)	Margin (dB)
H	35.110	28.4	10	16	22.4	40	-17.6
H	46.807	28.5	11	16	23.5	40	-16.5
H	58.504	28.4	11	16	23.4	40	-16.6
H	70.201	31.9	7	16	22.9	40	-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.

Test Engineer: Kenneth H. M. Lam

3.6 Radiated Emission on the bandedge

Form the following plot, it shows that the fundamental emission is confined in the specified band. And there are shows that the emissions are at least 48 dB below the carrier level at band edge (902 and 928 MHz). It meet the requirement of section 15.249(c).

Emission Plot

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

3.7 Line Conducted Configuration Photograph - Base Unit

Worst Case Line-Conducted Configuration

For electronic filing, the worst case line conducted configuration photograph are saved with filename: conduct1.pdf and conduct2.pdf

3.8 Line Conducted Emission Configuration Data

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

Judgement : Passed

* All readings are peak unless stated otherwise.

TEST PERSONNEL:

Tester Signature

Kenneth H. M. Lam, Engineer
Typed/Printed Name

October 12, 98
Date

Company: Greatsino Limited
Model: 9930 Series

Date of Test: September 30, 1998

Conducted Emissions

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

EXHIBIT 4
EQUIPMENT PHOTOGRAPHS

4.0 **Equipment Photographs**

For electronic filing, the photographs are saved with filename: ophoto1.jpg to ophoto2.jpg & iphoto1.jpg to iphoto19.jpg

EXHIBIT 5
PRODUCT LABELLING

5.0 **Product Labelling**

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

EXHIBIT 6
TECHNICAL SPECIFICATIONS

6.0 **Technical Specifications**

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

EXHIBIT 7
INSTRUCTION MANUAL

7.0 Instruction Manual

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

Please note that the required FCC Information to the User can be found on Page 52 and 53 of this manual.

This manual will be provided to the end-user with each unit sold/leased in the United States.

EXHIBIT 8
SECURITY CODE INFORMATION

8.0 Security code information

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

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

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

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