Cherish Enterprise Co. Ltd.

Application
For
Certification

900MHz Direct Sequence Spread Spectrum
Cordless Telephone

(FCC ID: FNXCR-256)

WO# 00067101
SKL/at
June 26, 2000

FCC ID: FNXCR-256

LIST OF EXHIBITS

MEASUREMENT/TECHNICAL REPORT

Cherish Enterprise Co. Ltd. - MODEL: CR-256
FCC ID: FNXCR-256

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

Equipment Type: DSS-Part 15 Spread Spectrum 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:

Wilson Loke
Intertek Testing Service
2/F., Garment Centre,
576 Castle Peak Road,
Kowloon, Hong Kong.
Phone: 852-2173-8575
Fax: 852-2741-1693

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Exhibit type	File Description	filename
Cover Letter	Letter of Agency	letter.pdf
Test Report	Test Report	report.doc
Operation Description	Technical Description	descri.pdf
Test Setup Photo	Radiated Emission for Base	base1.jpg, base2.jpg
Test Setup Photo	Radiated Emission for Handset	handset1.jpg, handset2.jpg
Test Report	Maximum Output Power Plot	bmaxop.pdf, hmaxop.pdf
Test Report	6 dB Bandwidth Plot	b6dB.pdf, h6dB.pdf
Test Report	Maximum Power Density Plot	bpowden.pdf, hpowden.pdf
Test Report	Out Band Antenna Conducted Emission Plot	bobantcon.pdf, hobantcon.pdf
Test Setup Photo	Conducted Emission	conduct1.jpg to conduct3.jpg
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Test Report	Jamming Test Setup	jamset.pdf
External Photo	External Photo	ophoto1.jpg, ophoto2.jpg
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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

EXHIBIT 1
SUMMARY OF TEST RESULTS

1.0 Summary of Test

Cherish Enterprise Co. Ltd. - MODEL: CR-256
FCC ID: FNXCR-256

TEST	REFERENCE	RESULTS
Max. Output power	15.247(b)	Pass
6 dB Bandwidth	15.247(a)(2)	Pass
Max. Power Density	15.247(d)	Pass
Out of Band Antenna Conducted Emission	15.247(c)	Pass
Out of Band Radiated Emission	15.247 (c)	Pass
Radiated Emission in Restricted Bands	15.205	Pass
AC Conducted Emission	15.207	Pass
Radiated Emission from Digital Part	15.109	Pass
Processing Gain Measurements	15.247 (e)	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 CR-256 is a 900MHz DSSS Cordless Telephone. The unit is capable of either tone or pulse dialing. The internal power supply's isolation is accomplished through a power transformer having an adequate dielectric rating. The circuit wiring is consistent under the requirement of part 68.

The handset unit consists of a keypad with twelve standard keys (0,...9,*,#), six function keys (Memo, Mute, Flash, Rdial, Volume Up, Volume Down). A talk key is provided to control pick/release telephone line in a toggle base.

The base unit has an “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.

2.2 Related Submittal(s) Grants

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

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

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

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

(2) Four shielded coaxial cable (50Ω) for processing gain measurement.

OTHERS: (for Processing Gain Measurement)

(1) Two Mini-Circuits 20MHz-2GHz Power Splitter / Combiner with 50Ω input impedance

(2) Two DC-2GHz 20 dB Attentuators

(3) Two DC-2GHz 3dB Attentuators

(4) Marconi Communication Service Monitor, Model:2945

(5) Marconi 9kHz to 2.05GHz Signal Generator, Model: 2023B

3.4 Equipment Modification

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

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

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

Confirmed by:

Wilson Loke
Manager
Intertek Testing Services Hong Kong Ltd.
Agent for Cherish Enterprise Co. Ltd.

_____Signature

June 26, 2000 Date

EXHIBIT 4
MEASUREMENT RESULTS

Company: Cherish Enterprise Co. Ltd. Date of Test: June 13, 2000
Model: CR-256

4.0 Measurement Results

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

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

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

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

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

(Base Unit) Maximum Antenna Gain = 2			
Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	904.2	13.1	20.4
Middle Channel:	914.4	13.7	23.4
High Channel:	925.8	14.1	25.7

Cable loss : 1.0 dB External Attenuation : 20.0 dB

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

EUT Transmit Antenna Gain (dBi) + dBm max. Output level = 16.1 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: Cherish Enterprise Co. Ltd. Date of Test: June 13, 2000
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Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b) - Continued:

(Handset Unit) Maximum Antenna Gain = 2 dB			
Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	904.2	15.5	35.5
Middle Channel:	914.4	14.7	29.5
High Channel:	925.8	14.9	30.9

Cable loss : 1.0 dB External Attenuation : 20.0 dB

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

EUT Transmit Antenna Gain (dBi) + dBm max. Output level = 17.5 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

It should be noted that the maximum conducted power for this cordless telephone system is 17.5 dBm which is 56.2 mW. This low energy level ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines as stipulated in Parts 1.1307(b)(1) and 2.1093.

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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)	Minimum 6 dB Bandwidth (kHz)
914.4	1568

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

For electronic filing, the above plots are saved with filename: b6dB.pdf

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

(Handset Unit)	
Frequency (MHz)	Minimum 6 dB Bandwidth (kHz)
925.8	1568

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: h6dB.pdf

Company: Cherish Enterprise Co. Ltd. Date of Test: June 13, 2000
Model: CR-256

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

The spectrum analyzer RES BW was set to 3 kHz. The START and STOP frequencies were set to the band edges of the maximum output passband. Id 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. The specification calls for a 1 second interval at each 3 kHz bandwidth; total SWEEP TIME is calculated as follows:

SWEEP TIME (SEC) = (Fstop, kHz - Fstart, kHz)/3kHz

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated by adding to the SA raw reading.

(Base Unit)	
Frequency (MHz)	Power Density (dBm)
925.8	1.3

Frequency Span = 1500kHz

Sweep Time = Frequency Span/3kHz
= 500 seconds

Cable Loss: 1.0 dB External Attenuation: 20.0 dB

Refer to the following plots for power density data :

Plot B3a: Low Channel 6 dB power density
Plot B3b: Middle Channel 6 dB power density
Plot B3c: High Channel 6 dB power density

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

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Maximum Power Density Reading, FCC Rule 15.247(d) - Continued:

(Handset Unit)	
Frequency (MHz)	Power Density (dBm)
925.8	1.5

Frequency Span = 1500kHz

Sweep Time = Frequency Span/3kHz
= 500 seconds

Cable Loss: 1.0 dB External Attenuation: 20.0 dB

Refer to the following plots for power density data :

Plot H3a: Low Channel 6 dB power density
Plot H3b: Middle Channel 6 dB power density
Plot H3c: High Channel 6 dB power density

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

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4.4 Out of Band Conducted 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 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 and tables for out of band conducted emissions data:

Plot B4d.1 - B4d.2: Modulation Products Emissions (Base)
Plot H4d.1 - H4d.2: Modulation Products Emissions (Handset)

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

Cherish Enterprise Co. Ltd.

CR-256

Table 1 : Base Channel 1

Frequency (MHz)	Emission relative to Fundamental (dB)	Limit (dB)	Margin (dB)
*1808.4	-5.3	-20	+14.7
2712.6	-23.3	-20	-3.3
3616.8	-35.0	-20	-15.0
4521.0	-30.0	-20	-10.0
5425.2	-50.0	-20	-30.0
6329.4	-44.7	-20	-24.7
7233.6	-50.2	-20	-30.2
8137.8	-45.0	-20	-25.0

Remark: 1. '-' sign in margin column shows the value below the limits.

2. For '*' sign, it is subjected to radiated emission test at section 4.5.

Test Engineer: H. Y. Vu Date of Test: June 13, 2000

Cherish Enterprise Co. Ltd.

CR-256

Table 2 : Base Channel 10

Frequency (MHz)	Emission relative to Fundamental (dB)	Limit (dB)	Margin (dB)
*1828.8	-5.6	-20	+14.4
2743.2	-27.0	-20	-7.0
3657.6	-32.4	-20	-12.4
4572.0	-32.9	-20	-12.9
5486.4	-54.0	-20	-34.0
6460.8	-44.8	-20	-24.8
7375.2	-61.3	-20	-41.3
8229.6	-49.7	-20	-29.7

Remark: 1. '-' sign in margin column shows the value below the limits.

2. For '*' sign, it is subjected to radiated emission test at section 4.5.

Test Engineer: H. Y. Vu Date of Test: June 13, 2000

Cherish Enterprise Co. Ltd.

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Table 3 : Base Channel 20

Frequency (MHz)	Emission relative to Fundamental (dB)	Limit (dB)	Margin (dB)
*1851.6	-8.8	-20	+11.2
2777.4	-28.8	-20	-8.8
3703.2	-29.8	-20	-9.8
4629.0	-36.1	-20	-16.1
5554.8	-59.8	-20	-19.8
6480.6	-48.0	-20	-28.0
7406.4	-46.7	-20	-26.7
8332.2	-56.0	-20	-36.0

Remark: 1. '-' sign in margin column shows the value below the limits.

2. For '*' sign, it is subjected to radiated emission test at section 4.5.

Test Engineer: H. Y. Vu Date of Test: June 13, 2000

Cherish Enterprise Co. Ltd.

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Table 4 : Handset Channel 1

Frequency (MHz)	Emission relative to TP (dB)	Limit (dB)	Margin (dB)
1808.4	-27.1	-20	-7.1
2712.6	-32.0	-20	-12.0
3616.8	-36.0	-20	-16.0
4521.0	-41.3	-20	-21.3
5425.2	-40.2	-20	-20.2

Remark: 1. '-' sign in margin column shows the value below the limits.

Test Engineer: H. Y. Vu Date of Test: June 13, 2000

Cherish Enterprise Co. Ltd.

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Table 5 : Handset Channel 10

Frequency (MHz)	Emission relative to TP (dB)	Limit (dB)	Margin (dB)
1828.8	-29.0	-20	-9.0
2743.2	-31.9	-20	-11.9
3657.6	-33.7	-20	-13.7
4572.0	-43.0	-20	-23.0
5486.4	-42.9	-20	-22.9

Remark: 1. '-' sign in margin column shows the value below the limits.

Test Engineer: H. Y. Vu Date of Test: June 13, 2000

Cherish Enterprise Co. Ltd.

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Table 6 : Handset Channel 20

Frequency (MHz)	Emission relative to TP (dB)	Limit (dB)	Margin (dB)
1851.6	-33.8	-20	-13.8
2777.4	-32.8	-20	-12.8
3703.2	-34.1	-20	-14.1
4629.0	-42.9	-20	-22.9
5554.8	-45.0	-20	-25.0

Remark: 1. '-' sign in margin column shows the value below the limits.

Test Engineer: H. Y. Vu Date of Test: June 13, 2000

Company: Cherish Enterprise Co. Ltd. Date of Test: June 13, 2000
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4.5 Out of Band Radiated Emissions (for emissions in 4.4 above that are less than 20dB below carrier), FCC Rule 15.247(c):

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

[ ] Not required
[×] See attached data sheet

4.6 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.205 :

Radiated emission measurements were performed from 30 MHz to 1000 MHz. Analyzer resolution is 100 kHz or greater for 30 MHz to 1000 MHz, 1 MHz for >1000 MHz.

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.

4.7 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

4.8 Radiated Emission Configuration Photograph - Base Unit

Worst Case Radiated Emission

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: base1.jpg and base2.jpg

4.9 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 2.0 dB

****

TEST PERSONNEL:

Tester Signature

H. Y. Vu, Engineer
Typed/Printed Name

June 30, 2000
Date

Company: Cherish Enterprise Co. Ltd. Date of Test: June 13, 2000
Model: CR-256
Mode : TX-Channel 1

Table 7, 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	1808.506	48.4	26.5	34	40.9	54	-13.1
V	*2712.345	46.7	29.1	34	41.8	54	-12.2
V	*3616.848	46.4	32.8	34	45.2	54	-8.8
V	*4521.637	52.0	34.0	34	52.0	54	-2.0
V	*5425.540	50.7	35.2	34	51.9	54	-2.1

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: H.Y.Vu

Company: Cherish Enterprise Co. Ltd. Date of Test: June 13, 2000
Model: CR-256
Mode : TX-Channel 10

Table 8, 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	1829.836	49.0	26.5	34	41.5	54	-12.5
V	*2744.045	46.8	29.1	34	41.9	54	-12.1
V	*3657.883	50.1	32.8	34	48.9	54	-5.1
V	*4572.120	51.9	34.0	34	51.9	54	-2.1
H	*7315.176	43.9	35.2	34	45.1	54	-8.9

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: H. Y. Vu

Company: Cherish Enterprise Co. Ltd. Date of Test: June 13, 2000
Model: CR-256
Mode : TX-Channel 20

Table 9, 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	1848.329	49.1	26.5	34	41.6	54	-12.4
V	*2777.798	47.4	29.1	34	42.5	54	-11.5
V	*3703.449	53.1	32.8	34	51.9	54	-2.1
V	*4629.723	51.6	34.0	34	51.6	54	-2.4
H	*7407.873	43.4	35.2	34	44.6	54	-9.4

NOTES: 1. Peak Detector data

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

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

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

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

Test Engineer: H. Y. Vu

4.10 Radiated Emission Configuration Photograph - Handset

Worst Case Radiated Emission

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: handset1.jpg and handset2.jpg

4.11 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 10.1 dB

****

TEST PERSONNEL:

Tester Signature

H. Y. Vu, Engineer
Typed/Printed Name

June 30, 2000
Date

Company: Cherish Enterprise Co. Ltd. Date of Test: June 13, 2000
Model: CR-256
Mode : TX-Channel 1

Table 10, 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	1808.006	46.2	26.5	34	38.7	54	-15.3
H	*2713.005	45.8	29.1	34	40.9	54	-13.1
H	*4521.618	45.1	32.8	34	43.9	54	-10.1
H	*5426.153	42.8	34.0	34	42.8	54	-11.2

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: H.Y.Vu

Company: Cherish Enterprise Co. Ltd. Date of Test: June 13, 2000
Model: CR-256
Mode : TX-Channel 10

Table 11, 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	1828.816	46.1	26.5	34	38.6	54	-15.4
H	*2743.135	46.4	29.1	34	41.5	54	-12.5
H	*3657.469	44.0	32.8	34	42.8	54	-11.2
H	*4571.782	43.2	34.0	34	43.2	54	-10.8

NOTES: 1. Peak Detector data

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

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

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

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

Test Engineer: H. Y. Vu

Company: Cherish Enterprise Co. Ltd. Date of Test: June 13, 2000
Model: CR-256
Mode : TX-Channel 20

Table 12, 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	1850.281	47.3	26.5	34	39.8	54	-14.2
H	*2777.384	46.8	29.1	34	41.9	54	-12.1
H	*3703.628	44.4	32.8	34	43.2	54	-10.8
H	*4629.864	43.8	34.0	34	43.8	54	-10.2

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: H. Y. Vu

Company: Cherish Enterprise Co. Ltd. Date of Test: June 13, 2000
Model: CR-256

4.12 AC Line Conducted Emission, FCC Rule 15.207:

[ ] Not required; battery operation only

[×] Test data attached

4.13 Line Conducted Configuration Photograph - Base Unit

Worst Case Line-Conducted Configuration

For electronic filing, the worst case line conducted configuration photographs are saved with filename: conduct1.jpg to conduct3.jpg

4.14 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 by more than 20 dB margin

TEST PERSONNEL:

Tester Signature

H. Y. Vu, Engineer
Typed/Printed Name

June 30, 2000
Date

Company: Cherish Enterprise Co. Ltd. Date of Test: June 13, 2000
Model: CR-256

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

[ ] Not required - Not digital part

[×] Test results are attached

[ ] Included in the separated DOC report.

Company: Cherish Enterprise Co. Ltd. Date of Test: June 13, 2000
Model: CR-256

Table 13, 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	163.210	31.4	13.1	16	28.5	43.5	-15.0
H	182.409	29.9	16.2	16	30.1	43.5	-13.4
H	220.813	36.6	11.8	16	32.4	46.0	-13.6
H	249.611	37.7	11.4	16	33.1	46.0	-12.9
H	297.617	33.5	13.3	16	30.8	46.0	-15.2
H	316.816	36.3	14.3	16	34.6	46.0	-11.4
H	345.615	35.0	14.6	16	33.6	46.0	-12.4
H	384.013	33.2	15.4	16	32.6	46.0	-13.4

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: H. Y. Vu

Company: Cherish Enterprise Co. Ltd. Date of Test: June 13, 2000
Model: CR-256

Table 13, Base Unit (Cont'd….)

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	403.223	35.5	15.9	16	35.4	46.0	-10.6
H	422.422	40.6	15.9	16	40.5	46.0	-5.5
H	432.622	35.1	16.3	16	35.4	46.0	-10.6
H	480.027	39.4	17.3	16	40.7	46.0	-5.3
H	499.226	38.5	17.3	16	39.8	46.0	-6.2
H	518.425	35.4	18.0	16	37.4	46.0	-8.6
H	537.624	32.6	18.2	16	34.8	46.0	-11.2

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: H. Y. Vu

Company: Cherish Enterprise Co. Ltd. Date of Test: June 13, 2000
Model: CR-256

Table14, 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	76.811	40.2	6.3	16	30.5	40.0	-9.5
H	134.404	35.3	12.3	16	31.6	43.5	-11.9
H	177.631	32.2	14.7	16	30.9	43.5	-12.6
H	201.612	34.0	11.8	16	29.8	43.5	-13.7
H	216.016	34.1	11.8	16	29.9	46.0	-16.1
H	244.817	35.2	11.4	16	30.6	46.0	-15.4
H	264.019	39.2	12.4	16	35.6	46.0	-10.4
H	268.818	36.5	12.4	16	32.9	46.0	-13.1
H	273.621	40.4	12.4	16	36.8	46.0	-9.2

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: H. Y. Vu

Company: Cherish Enterprise Co. Ltd. Date of Test: June 13, 2000
Model: CR-256

Table 14, Handset (Cont'd….)

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	283.220	38.6	13.3	16	35.9	46.0	-10.1
H	331.223	37.3	14.6	16	35.9	46.0	-10.1
H	340.826	35.3	14.6	16	33.9	46.0	-12.1
H	384.023	36.5	14.9	16	35.4	46.0	-10.6
H	403.225	35.0	15.9	16	34.9	46.0	-11.1
H	422.430	35.0	15.9	16	34.9	46.0	-11.1
H	441.625	35.6	16.3	16	35.9	46.0	-10.1
H	460.231	32.6	16.8	16	33.4	46.0	-12.6
H	480.021	33.3	17.3	16	34.6	46.0	-11.4

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: H. Y. Vu

Company: Cherish Enterprise Co. Ltd. Date of Test: May 20, 1999
Model: CR-256

4.16 Processing Gain Measurements, FCC Ref: 15.247(e)

The processing gain shall be determined from the ratio in dB of the signal to noise ratio with the system spreading code turned OFF, to the signal to noise ratio with the system spreading code turned ON, as measured at the demodulated output of the receiver. The processing gain shall be at least 10 dB for a direct sequence spread spectrum system.

X	Refer to attached test procedure and data sheets.
	Refer to circuit analysis and processing gain calculations provided by manufacturer

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

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

Duty cycle = Maximum ON time in 100 msec/100

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

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

Processing Gain Measurement
Test Condition

Test condition

A. Bit Error Rate

The Bit Error Rate was recommended to be 10^{-3} by Rockwell Telecommunications, which is the manufacturer of the chipset, it is to ensure a satisfactory communication between Handset and Base unit.

B. Jamming Margin Method (Refer to the Rockwell's test procedure)

The Processing Gain was measured using the CW jamming margin method. Figure 1 & 2 shows the Test setup for the Handset and Base unit. The test consists of stepping a signal generator in 50 kHz increments across the passband of the system. At each point, the generator level required to produce the recommended Bit Error Rate (BER) (set at BER=10^{-3}) is recorded. This level is the jamming level. The output power of the transmitting unit is measured at the same point. The Jammer to Signal (J/S) ratio is then calculated. Discard the worst 20% of the J/S data points. The lowest remaining J/S ratio is used to calculate the processing gain.

The maximum implementation loss a system can claim in calculating processing gain is 2 dB. The equation to calculate the processing gain (Gp) is the following:

$Gp = (S/N)_o + Mj + Lsys$

Where Lsys = System losses,
Mj = jamming margin (J/S) in dB,
$(S/N)_o$ = signal to noise ratio required for a DBPSK system with BER of 10^{-3} = 8.0 dB

Therefore, the Processing gain

Gp = 8.0 dB + Mj + 2 dB

Jamming Test Setup

(For electronic filing, the setup is saved with filename: jamset.pdf)

Processing Gain Measurement
Result

Mode: TX-Channel 10

Table 15, Base

Processing Gain Measurement

Jammer Frequency (MHz)	J (dBm)	S (dBm)	Mj (J/S)	Processing Gain (dB)
914.00	-23.3	-26.0	2.7	12.7
914.05	-23.6	-26.0	2.4	12.4
914.10	-24.0	-26.0	2.0	12.0
914.20	-21.2	-26.0	4.8	14.8
914.25	-22.7	-26.0	3.3	13.3
914.30	-24.0	-26.0	2.0	12.0
914.35	-20.0	-26.0	6.0	16.0
914.40	-15.1	-26.0	10.9	20.9
914.45	-14.5	-26.0	11.5	21.5
914.50	-21.2	-26.0	4.8	14.8
914.55	-24.4	-26.0	1.6	11.6
914.60	-21.0	-26.0	5.0	15.0
914.65	-23.2	-26.0	2.8	12.8
914.75	-24.1	-26.0	1.9	11.9
914.80	-23.2	-26.0	2.8	12.8
914.85	-24.5	-26.0	1.5	11.5

Processing Gain : **11.5 dB**

Note:

1. $GP = (S/N_O) + Mj + L_{SYS} = 8.0dB + Mj + 2dB$
2. S = Signal Level
3. J = Output level of Signal Generator
4. Worst 20 % of Jamming Margin data (not shown) have been discarded (Section 15.247(e))

Mode: TX-Channel 10

Table 16, Handset

Processing Gain Measurement

Jammer Frequency (MHz)	J (dBm)	S (dBm)	Mj (J/S)	Processing Gain (dB)
914.00	-25.4	-26.9	1.5	11.5
914.05	-25.2	-26.9	1.7	11.7
914.10	-25.8	-26.9	1.1	11.1
914.15	-26.5	-26.9	0.4	10.4
914.20	-23.3	-26.9	3.6	13.6
914.25	-24.0	-26.9	2.9	12.9
914.30	-25.8	-26.9	1.1	11.1
914.35	-21.1	-26.9	5.8	15.8
914.40	-16.3	-26.9	10.6	20.6
914.45	-16.3	-26.9	10.6	20.6
914.50	-22.8	-26.9	4.1	14.1
914.55	-25.9	-26.9	1.0	11.0
914.60	-22.4	-26.9	4.5	14.5
914.65	-24.8	-26.9	2.1	12.1
914.75	-26.1	-26.9	0.8	10.8
914.80	-25.3	-26.9	1.6	11.6

Processing Gain : **10.4 dB**

Note:
1. $GP = (S/N_O) + Mj + L_{SYS} = 8.0dB + Mj + 2dB$
2. S = Signal Level
3. J = Output level of Signal Generator
4. Worst 20 % of Jamming Margin data (not shown) have been discarded (Section 15.247(e))

EXHIBIT 5
EQUIPMENT PHOTOGRAPHS

5.0 **Equipment Photographs**

For electronic filing, the photographs are saved with filename: ophoto1.jpg to ophoto2.jpg & iphoto1.jpg to iphoto7.jpg

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 can be found at the page 9 & 10 of this manual.

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 telephone has an internal security code with at least 256 possible combinations. Each time the HANDSET is placed on the base cradle, the code is randomly set to a new combination.