Unical Enterprises Inc.

Application
For
Permissive Change

5.8GHz/2.4GHz Frequency Hopping Spread Spectrum Cordless Phone with Caller ID, Speakerphone, and Digital Answering Machine - Handset Unit

(FCC ID: LZX35850H)

04139162
TL/Ann Choy
September 1, 2004

- The test results reported in this report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.
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FCC ID: LZX35850H

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MEASUREMENT/TECHNICAL REPORT

Unical Enterprises Inc.- MODEL: 35828, 35828A, 35829
FCC ID: LZX35850H

This report concerns (check one) Original Grant_____ Class II Change_X__

Equipment Type: DSS

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes___ No_X__

If yes, defer until : _____
dae

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 [12-08-03 Edition] provision.

Report prepared by:

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Exhibit type	File Description	filename
Test Report	Test Report	report.pdf
Operation Description	Technical Description	descri.pdf
Cover Page	Purpose of Application	product change.pdf
Test Setup Photo	Radiated Emission for Base	config photos.doc
Test Report	Out Band Antenna Conducted Emission Plot	hobantcon.pdf
Test Report	Duty Cycle Calculation and Measurement	hdcc.pdf
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
Operation Descriptoin	Security Code Information	security code information.pdf

EXHIBIT 1
SUMMARY OF TEST RESULTS

1.0 Summary of Test

Unical Enterprises Inc.- MODEL: 35828, 35282A, 35829
FCC ID: LZX35850H

TEST	REFERENCE	RESULTS
Out of Band Antenna Conducted Emission	15.247(c)	Pass
Radiated Emission in Restricted Bands	15.247(c)	Pass
Radiated Emission from Digital Part	15.109	Pass
Antenna Requirement	15.203	Pass (See Notes)

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

EXHIBIT 2
GENERAL DESCRIPTION

2.0 **General Description**

2.1 Product Description

The 35828 is a 5.8GHz/2.4GHz Frequency Hopping Spread Spectrum Cordless Phone with Caller ID, Speakerphone and Digital Answering Machine. Base Unit and handset operate at frequency of 5760.719MHz to 5838.312MHz and 2401.808MHz to 2479.401MHz respectively, and they consist of 87 physical hopping frequencies and 75 logical hopping frequencies. The unit is capable of either tone or pulse dialing. The internal power supply's isolation is accomplished through a power transformer having an adequate dielectric rating. The circuit wiring is consistent under the requirement of part 68.

The handset unit consists of a keypad with twelve standard keys (0,...9,*,#), eight function keys (Int, Menu, Mute/Del, Redial/Pause, Mem/Back, Flash/Remote, Up, Down). A L1 key and a L2 key are provided to control pick/release telephone line 1 and line 2 in a toggle base.

The base unit has a Int/Format/Prog key, which is used to communicate with handset unit, or change CID number format on screen, or register a new handset to the base unit.

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

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

The model 35828A is the same as the model 35828 in hardware aspect except different packaging. The difference in model 35828A is lack of an additional identical handset and an extra charger in a package. The model 35829 is an identical handset with an extra charger for selling handset standalone. The difference in model number serves as marketing strategy.

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 Purpose of Application

The purpose of application is saved with filename: product change.pdf.

As the RF module and FHSS mechanism of the handset remained uncharged, only the out of band emissions results of handset was included in this report. The FCC ID of the associated base unit is LZX35850B and has been also filed at the same time as this application of permissive change.

2.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (2001). 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 facility used to collect the radiated data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

EXHIBIT 3
SYSTEM TEST CONFIGURATION

3.0 **System Test Configuration**

3.1 Justification

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

For the measurements, the EUT is attached to a plastic stand if necessary and placed on the wooden turntable. The base is remotely located as far from the antenna and the handset as possible to ensure full power transmission from the handset. Else, the handset 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 40GHz.

3.2 EUT Exercising Software

The EUT exercise program used during radiated 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. A 3.6V Ni-MH rechargeable battery (provided with the unit) was used to power the device.

CABLES:

There are no special cables necessary for compliance of this unit.

OTHERS:

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

3.4 Measurement Uncertainty

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

3.5 Equipment Modification

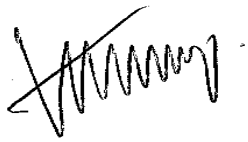
Any modifications installed previous to testing by Unical Enterprises Inc. will be incorporated in each production model sold/leased in the United States.

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

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

Confirmed by:

Tommy Leung
Supervisor
Intertek Testing Services Hong Kong Ltd.
Agent for Unical Enterprises Inc.



_____Signature

September 3, 2004_____Date

EXHIBIT 4
MEASUREMENT RESULTS

Company: Unical Enterprises Inc. Date of Test: July 26-August 10, 2004
Model: 35828

4.0 Measurement Results

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

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

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

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

Plot H6a.1- H6a.2: Low Channel Emissions
Plot H6b.1- H6b.2: Middle Channel Emissions
Plot H6c.1- H6c.2: High Channel Emissions
Plot H6d.1- H6d.2: Modulation Products Emissions*

The plots showed the 2nd harmonic and modulation products at the band edges of 2400.0 MHz and 2483.5 MHz. In addition, all spurious emission and up to the tenth harmonic was measured and they were found to be at least 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 plots are shown the worst-case which has been already considered between enable and disable the hopping function of the EUT.

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

Company: Unical Enterprises Inc. Date of Test: July 26-August 10, 2004
Model: 35828

4.2 Out of Band Radiated Emissions (for emissions in 4.1 above that are less than 20 dB below carrier), FCC Rule 15.247(c):

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

[×] Not required, all emissions more than 20 dB below fundamental
[ ] See attached data sheet

Company: Unical Enterprises Inc. Date of Test: July 26-August 10, 2004
Model: 35828

4.3 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.

4.4 Field Strength Calculation

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

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

where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor in -dB

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

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

Example
Assume a receiver reading of 62.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

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

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

Company: Unical Enterprises Inc. Date of Test: July 26-August 10, 2004
Model: 35828

4.5 Radiated Emission Configuration Photograph - Handset Unit

Worst Case Radiated Emission
at
4880.318 MHz

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

Company: Unical Enterprises Inc. Date of Test: July 26-August 10, 2004
Model: 35828

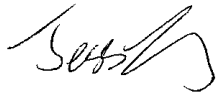
4.6 Radiated Emission Data - Handset Unit

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

Judgement : Passed by 11.0 dB compare with the peak limit

****

TEST PERSONNEL:



Tester Signature

Jess Tang, Engineer
Typed/Printed Name

September 1, 2004
Date

Company: Unical Enterprises Inc. Date of Test: July 26-August 10, 2004
Model: 35828
Mode : TX-Channel 1

Table 1, Handset Unit

Radiated Emissions

Polari-zation	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	*4803.616	62.6	34	34.0	62.6	40.1	22.5	54	-31.5
V	*12009.004	46.3	34	40.2	52.5	40.1	12.4	54	-41.6
V	*19214.464	39.5	34	45.3	50.8	40.1	10.7	54	-43.3

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 is 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: Jess Tang

Company: Unical Enterprises Inc. Date of Test: July 26-August 10, 2004
Model: 35828
Mode : TX-Channel 44

Table 2, Handset unit

Radiated Emissions

Polari-zation	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	*4880.318	63.0	34	34.0	63.0	40.1	22.9	54	-31.1
H	*7320.477	55.3	34	37.0	58.3	40.1	18.2	54	-35.8
V	*12200.795	46.3	34	40.2	52.5	40.1	12.4	54	-41.6
V	*19521.272	38.7	34	45.3	50.0	40.1	9.9	54	-44.1

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 is 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 11.0dB margin at 4880.318MHz.

Test Engineer: Jess Tang

Company: Unical Enterprises Inc. Date of Test: July 26-August 10, 2004
Model: 35828
Mode : TX-Channel 88

Table 3, Handset unit

Radiated Emissions

Polari-zation	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	**2479.401	120.4	34	29.1	115.5	40.1	75.4	---	---
V	*4958.802	62.0	34	34.0	62.0	40.1	21.9	54	-32.1
V	*7438.203	54.1	34	37.0	57.1	40.1	17.0	54	-37.0
V	*12397.005	41.8	34	40.2	48.0	40.1	7.9	54	-46.1
V	*19835.208	38.1	34	45.3	49.4	40.1	9.3	54	-44.7

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 is 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: Jess Tang

Company: Unical Enterprises Inc. Date of Test: July 26-August 10, 2004
Model: 35828

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

[ ] Not required - No digital part

[×] Test results are attached

[ ] Included in the separated DOC report.

Company: Unical Enterprises Inc. Date of Test: July 26-August 10, 2004
Model: 35828

Table 4, Handset

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	34.590	29.4	16	11.6	25.0	40	-15.0
V	41.475	29.1	16	11.7	24.8	40	-15.2
V	48.420	28.8	16	11.9	24.7	40	-15.3
V	49.154	29.1	16	11.9	25.0	40	-15.0
V	62.230	30.4	16	9.9	24.3	40	-15.7
V	76.075	33.8	16	6.3	24.1	40	-15.9

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

Test Engineer: Jess Tang

Company: Unical Enterprises Inc. Date of Test: July 26-August 10, 2004
Model: 35828

4.8 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 100ms/100ms
= 0.980ms/100ms

Duty cycle correction, dB = 20* log (DC)
= 20* log (0.0098)
= -40.1dB

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

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

EXHIBIT 5
EQUIPMENT PHOTOGRAPHS

5.0 **Equipment Photographs**

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

EXHIBIT 6
PRODUCT LABELLING

6.0 **Product Labelling**

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

EXHIBIT 7
TECHNICAL SPECIFICATIONS

7.0 **Technical Specifications**

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

EXHIBIT 8
INSTRUCTION MANUAL

8.0 **Instruction Manual**

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

Please note that the required FCC Information to the User is saved with filename: fcc information.pdf.

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

EXHIBIT 9
SECURITY CODE INFORMATION

9.0 Security code information

For electronic filing, a security code information is saved with filename: security code informatoin.pdf.