CCT Telecom (HK) Limited

Application
For
Permissive Change

46/49 MHz 10 Channels Analog Modulation Cordless Phone with Caller ID

(FCC ID: NC82-9638)

WO# 0211241
TL/Ann Choy
September 12, 2002

FCC ID: NC82-9638

LIST OF EXHIBITS

MEASUREMENT/TECHNICAL REPORT

CCT Telecom (HK) Limited - MODEL: FS29639XXX-A
FCC ID: NC82-9638

This report concerns (check one:) Original Grant___ Class II Change X___

Equipment Type: Cordless Telephone (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 [12-18-01 Edition] provision.

Report prepared by:

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Fax: 852-2741-1693

List of attached file

Exhibit type	File Description	filename
Test Report	Test Report	report.doc
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	Conducted Emission Test Result	conduct.pdf
Test Report	Base Bandwidth Plot	bsbw.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

Table of Contents

EXHIBIT 1
GENERAL DESCRIPTION

1.0 General Description

1.1 Product Description1.1 Product Description

The FS29639XXX-A is a 46/49 MHz 10 Channel Analog Modulation Cordless Phone with Caller ID. 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, *, #) and six function keys (Mem/Prog, INT/Exit, Recall, Volume up/down/Redial, Mute, Pause/Register), and one channel switch key. A Phone key is provided to control pick/release telephone line in a toggle base.

The base unit consists of a keypad with twelve standard keys (0, ...9, *, #) and ten function keys (volume +-/Set Time, CID down/up, Hold, Pause, Recall, Intercom/Exit, Mem/Prog, M1, Clear/Register, Select). An alternative key, Speakerphone, is provided to control pick/release telephone line or to answer intercom call from handset.

Both handset unit and base unit have a intercom key, which are also used to page each other.

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

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 Purpose of Application

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

1.3 Test Methodology1.3 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.

1.4 Test Facility1.4 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**2.0 **System Test Configuration**

2.1 Justification2.1 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 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. The spurious emissions more than 20 dB below the permissible value are not reported.

Only base unit has been modified except its RF module; therefore, all data is derived from base unit.

2.2 EUT Exercising Software2.2 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. AC adapters (provided with the unit) were used to power the device. Theirs description is listed below.

(1) AC adapter for Base Unit (120VAC to 9VDC 300mA) with two meter unshielded power cord permanently affixed.

(2) AC Adapter for Charger (120VAC to 9VDC 200mA) 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 Measurement Uncertainty

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

2.5 Equipment Modification2.4 Equipment Modification

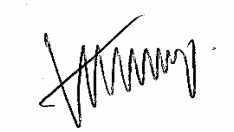
Any modifications installed previous to testing by CCT Telecom (HK) Limited will be incorporated in each production model sold/leased in the United States.

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:

Tommy Leung
Assistant Supervisor
Intertek Testing Services
Agent for CCT Telecom (HK) Limited



_____Signature

September 13, 2002 Date

EXHIBIT 3
EMISSION RESULTS

3.0 **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 Calculation3.1 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 mV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m

3.2 Radiated Emission Configuration Photograph - Base Unit

Worst Case Radiated Emission

at 46.730 MHz

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

3.3 Radiated Emission Data 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 0.9 dB

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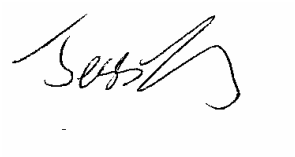
TEST PERSONNEL:



Tester Signature

Jess Tang, Engineer
Typed/Printed Name

September 12, 2002
Date

Company: CCT Telecom (HK) Limited Date of Test: August 16, 2002
Model: FS29639XXX-A
Mode : TX Channel 5

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)	Magin (dB)
V	46.730	83.2	11.9	16	79.1	80.0	-0.9
V	93.460	44.7	9.4	16	38.1	43.5	-5.4
H	140.190	38.2	11.7	16	33.9	43.5	-9.6
H	186.920	32.1	16.7	16	32.8	43.5	-10.7
H	233.650	40.0	11.4	16	35.4	46.0	-10.6
H	*280.380	35.9	13.3	16	33.2	46.0	-12.8

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.

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

5. Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9kHz to 500MHz.

* 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: Jess Tang

3.4 Line Conducted Configuration Photograph - Base3.6 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: config photos.doc

3.5 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

TEST PERSONNEL:

Tester Signature

Jess Tang, Engineer
Typed/Printed Name

September 12, 2002
Date

Company: CCT Telecom (HK) Limited. Date of Test: August 16, 2002
Model: FS29639XXX-A

Conducted Emissions

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

EXHIBIT 4
FREQUENCY DEVIATION

4.0 **Frequency Deviation**4.0 **Frequency Deviation**

Two stability tests were performed -- Frequency stability versus input voltage and frequency stability versus temperature. For both measurements, a 1 GHz frequency counter with temperature controlled time base is used.

The counter is coupled to the transmitter by coiling a pickup wire over the transmitter antenna or directly attaching it to the antenna, assuming a 50Ω antenna is used.

The frequency stability is measured at room temperature by varying the supply voltage (AC or DC, as required) from 85% through 115% of normal operating voltage. This test is not applicable if the unit uses battery power. For battery powered equipment, the batteries are new and fully charged.

Stability versus temperature testing is carried out with the aid of a Tabai Espec Corp, Model PR-3F(W) environmental chamber. The following procedure is followed during testing:

1. Cool the device to -20°C and allow it to stabilize for 30 minutes. Record the frequency.

2. Heat the oven to +50°C and allow it to stabilize for 30 minutes. Record the frequency of operation.

3. Compare the measurements and a room temperature measurement against the assigned frequency tolerance.

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency.

4.1.1 Measurement Data - Base Unit

Channel Frequency

Channel	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance %
1	46.61000	46.61009	0.00019
2	46.63000	46.63007	0.00015
3	46.67000	46.67009	0.00019
4	46.71000	46.71007	0.00015
5	46.73000	46.73005	0.00011
6	46.77000	46.77005	0.00011
7	46.83000	46.83004	0.00009
8	46.87000	46.87006	0.00013
9	46.93000	46.93005	0.00011
10	46.97000	46.97006	0.00013

4.1.2 Measurement Data - Base Unit - Channel 5

Frequency Stability

Frequency Stability versus Source Voltage

	Voltage (Vac)	Assigned Frequency (kHz)	Measured Frequency (kHz)	Frequency deviation (kHz)	Tolerance % (x 10^{-3})
Nominal	120	46730.00	46730.05	0.05	0.11
85 %	102	46730.00	46730.03	0.03	0.06
115 %	138	46730.00	46730.08	0.08	0.17

Frequency Stability versus Temperature

Temperature (°C)	Assigned Frequency (kHz)	Measured Frequency (kHz)	Frequency deviation (kHz)	Tolerance (%) (x 10^{-3})
-20	46730.00	46730.19	0.19	0.42
25	46730.00	46730.05	0.05	0.11
50	46730.00	46729.63	-0.37	-0.79

Test Results: From the two sets of tables for Base Unit, the largest deviation from nominal frequency was -370Hz, which was -0.00079% compared to the standard test frequency. The required minimum standard is ±0.01% in §15.233(g).

EXHIBIT 5
OPERATING BANDWIDTH

5.0 Operating Bandwidth5.0 Operating Bandwidth

For measurements of bandwidth, the following procedure was followed by the test engineer:

(1) Set up the equipment such that the antenna is located close enough to give a full scale deflection of the unmodulated carrier.

(2) Plot the unmodulated carrier. Any residual guard tones should be left in place, as these will be present at all times in actual operation.

(3) Plot the bandwidth with all alerting tones active. These include ringing and "call" signals from the base, and any intercom functions available in the handset.

(4) Determine the worst case bandwidth using the following procedure:

(a) Disable all internal modulations, if possible.

(b) Apply a 2500 Hz signal to the audio input.

(c) Vary the input signal level and observe on the spectrum analyzer the waveform. Vary until a maximum deflection is observed. Record the input signal level. Record and plot the bandwidth deflection (100% modulation) measured at -6 dBC.

(d) **FOR A DEVICE WITH MODULATION LIMITING:**

Apply a 2500 Hz signal with the input level 16 dB greater than the level which produces 50% modulation. Plot and record the bandwidth.

(e) **FOR A DEVICE WITHOUT MODULATION LIMITING:**

Apply a 2500 Hz signal with the input level set for 85% modulation. If not possible, maximize the modulation percentage. Plot and record bandwidth.

(5) Complete the tables on the following pages.

5.1 Base Unit - Channel 5

Operating Bandwidth

kHz from Carrier	Amplitude Down from Carrier (dB)	Limit (kHz)
-8.63	26.00	-10
8.38	26.00	10
-20.00	54.98	N/A
20.00	61.08	N/A

Test Result: From the above table for Base Unit - Channel 5, the modulated signal from base unit closest to band edge was 1.37kHz above the lower band edge 46.720MHz according to §15.233(d).

Bandwidth Plot - Base Unit

For electronic filing, the bandwidth plot is saved with flename: bsbw.pdf

EXHIBIT 6
EQUIPMENT PHOTOGRAPHS

6.0 **Equipment Photographs**6.0 **Equipment Photographs**

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

EXHIBIT 7
PRODUCT LABELLING

7.0 **Product Labelling**7.0 **Product Labelling**

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

EXHIBIT 8
TECHNICAL SPECIFICATIONS

8.0 **Technical Specifications**8.0 **Technical Specifications**

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

EXHIBIT 9
INSTRUCTION MANUAL

9.0 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 10
SECURITY CODE INFORMATION

10.0 Security code information

Factory pre-program the I.D. into EEPROM before soldering on base using sequential I.D. increment, the I.D. will be 16bit (total of 65,536) as usual. Set the same I.D. on handset via test mode (after soldering), in order to match the I.D. on the base to make it a paired unit before packing.