# Continental Conair Limited

Application
For
Class II Permissive Change

900MHz Cordless Telephone

**(FCC ID: LBBFF915TE)**

WO# 9907813
PKL/at
September 8, 1999


- 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: LBBFF915TE

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# MEASUREMENT/TECHNICAL REPORT

## Continental Conair Limited - MODEL: FF915(XXX)
## FCC ID: LBBFF915TE

This report concerns (check one:) Original Grant_____ Class II Change __X__

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

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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.

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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.

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Report prepared by:

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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 | descri.pdf |
| Operation Description | Modification List | mod.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 | Emission Plot | emission.pdf |
| Test Setup Photo | Conducted Emission | conduct1.jpg to conduct3.jpg |
| Test Report | Conducted Emission Test Result | conduct.pdf |
| External Photo | External Photo | ophoto1.jpg, ophoto2.jpg |
| Internal Photo | Internal Photo | iphoto1.jpg to iphoto10.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 FF915(XXX) is a 900MHz Analog Modulation 40 Channel Cordless Telephone with Caller ID feature. 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,*,#), four function keys (Program, Memory, Flash, Redial), and one channel switch key. A talk key is provided to control pick/release telephone line in a toggle base.

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 Purpose of Application

The purpose of this application is to change the SAW filters of previously certified equipment to matched dielectric band-pass filters for solving the component shortage issue and a buffer amplifier is added to the VCO output to improve the isolation in order to reduce the pulling effect.

The modification list is saved with filename: mod.pdf

## 1.3 Related Submittal(s) Grants

This is an Application for Class II Permissive Change 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.

## 1.4 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.

## 1.5 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 Continental Conair 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:*

*Alfred Lo*
*Senior Supervisor*
*Intertek Testing Services*
*Agent for Continental Conair Limited*

_____Signature

____September 8, 1999_____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 2715.300 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: base1.jpg and base2.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 3.0 dB

**********

***TEST PERSONNEL:***

*Tester Signature*

Tommy W. L. Leung, Engineer
*Typed/Printed Name*

September 7, 1999
*Date*

Company: Continental Conair Limited
Model: FF915(XXX)
Mode : TX-Channel 1

Date of Test: August 17, 1999

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) |
|---|---|---|---|---|---|---|---|
| V | 902.175 | 57.6 | 32.0 | 16 | 73.6 | 94 | -20.4 |
| H | 1804.350 | 49.4 | 26.5 | 34 | 41.9 | 54 | -12.1 |
| H | *2706.525 | 51.0 | 29.1 | 34 | 46.1 | 54 | -7.9 |
| H | *3608.700 | 37.3 | 32.8 | 34 | 36.1 | 54 | -17.9 |

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: Tommy W. L. Leung

Company: Continental Conair Limited
Model: FF915(XXX)
Mode : TX-Channel 40

Date of Test: August 17, 1999

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) |
|---|---|---|---|---|---|---|---|
| V | 905.100 | 60.1 | 32.0 | 16 | 76.1 | 94 | -17.9 |
| H | 1810.200 | 48.9 | 26.5 | 34 | 41.4 | 54 | -12.6 |
| H | *2715.300 | 55.9 | 29.1 | 34 | 51.0 | 54 | -3.0 |
| H | *3620.400 | 35.4 | 32.8 | 34 | 34.2 | 54 | -19.8 |

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: Tommy W. L. Leung

## 3.4 Radiated Emission Configuration Photograph - Handset

Worst Case Radiated Emission

at 1849.750 MHz

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

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 15.1 dB

**********

***TEST PERSONNEL:***

*Tester Signature*

Tommy W. L. Leung, Engineer
*Typed/Printed Name*

September 7, 1999
*Date*

Company: Continental Conair Limited
Model: FF915(XXX)
Mode : TX-Channel 1

Date of Test: August 17, 1999

Table 3, 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 | 924.875 | 54.6 | 33.0 | 16 | 71.6 | 94 | -22.4 |
| H | 1849.750 | 46.4 | 26.5 | 34 | 38.9 | 54 | -15.1 |
| H | *2774.625 | 40.0 | 29.1 | 34 | 35.1 | 54 | -18.9 |

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: Tommy W. L. Leung

Company: Continental Conair Limited
Model: FF915(XXX)
Mode : TX-Channel 40

Date of Test: August 17, 1999

Table 4, 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 | 927.800 | 54.5 | 33.0 | 16 | 71.5 | 94 | -22.5 |
| H | 1855.600 | 44.7 | 26.5 | 34 | 37.2 | 54 | -16.8 |
| H | *2783.400 | 38.5 | 29.1 | 34 | 33.6 | 54 | -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: Tommy W. L. Leung

## 3.6 Radiated Emission on the bandedge

From the following plots, they show that the fundamental emissions are confined in the specified band and they are at least 55 dB below the carrier level at band edge (902 and 928 MHz). It meets 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 photographs are saved with filename: conduct1.jpg to conduct3.jpg

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 by more than 20 dB

***TEST PERSONNEL:***

*Tester Signature*

Tommy W. L. Leung, Engineer
*Typed/Printed Name*

September 7, 1999
*Date*

Company: Continental Conair Limited
Model: FF915(XXX)

Date of Test: August 17, 1999

**Conducted Emissions**

For electronic filing, the conducted emission test result is saved 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 iphoto10.jpg

# EXHIBIT 5
# PRODUCT LABELLING

## 5.0 **Product Labelling**

Please note that the FCC ID label artwork and location are remained the same as the original certification.

# EXHIBIT 6
# TECHNICAL SPECIFICATIONS

## 6.0 **Technical Specifications**

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

# EXHIBIT 7
# INSTRUCTION MANUAL

## 7.0 Instruction Manual

Please note that the required FCC Information to the user are remained the same as the original certification.

# EXHIBIT 8
# SECURITY CODE INFORMATION

## 8.0 Security code information

The telephone has an internal security code with 65,000 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.