
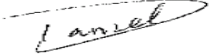


**FCC PART 15.247**  
**EMI MEASUREMENT AND TEST REPORT**

For  
**CCT R & D Limited**

18F., CCT Telecom Building, 11 Wo Shing Street,  
Fo Tan, Shatin, N.T.

**FCC ID: NC8MD751**

|   |   |
|---|---|
| <b>This Report Concerns:</b><br><input checked="checked" type="checkbox"/> Class II Permissive Change   | <b>Equipment Type:</b><br>Digital 2.4/5.8GHz Cordless Telephone<br>System w/ Caller ID – Base |
| <div style="text-align: center;"></div> <b>Test Engineer:</b> <u>Jerry Wang</u>  |   |
| <b>Report No.:</b> <u>R0509081(B)</u>   |   |
| <b>Report Date:</b> <u>2004-09-14</u>   |   |
| <div style="text-align: center;"></div> <b>Reviewed By:</b> <u>Daniel Deng</u>  |   |
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**Note:** This test report is specially limited to the above client company and this particular sample only. It may not be duplicated without prior written consent of Bay Area Compliance Laboratory Corporation. This report **must not** be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

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## GENERAL INFORMATION

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### Product Description for Equipment Under Test (EUT)

The *CCT R & D Limited's*, FCC ID: *NC8MD751*, or the "EUT" as referred to in this report is the base part of a Digital 2.4/5.8GHz Cordless Telephone System w/ Caller ID, which measures approximately 18.5mmL x 16mm W x 7mm H. The EUT is a DSS device, which operates at the frequency range of 5760.7190 – 5838.3117MHz.

*\* The test data gathered are from a production sample, S/N: 602VFR002D, provided by the manufacturer.*

### Objective

This type approval report is prepared on behalf of *CCT R & D Limited* in accordance with Part 2, Subpart J, Part 15, Subparts A, B, and C of the Federal Communication Commissions rules.

This is a Class II Permissive Change report. The differences between the above-mentioned model and the tested model are: Change IC U1 from 'DH24RF17' to 'DH24RF17B' and Change IC U2 from 'SIT8825' to 'GP214D'. The manufacture declares that all design including electronic, electrical, mechanical, and cosmetics designs remain the same except the above-mentioned changes. The RF antenna of the above-mentioned model is identical in, construction, dimensions, and electrical circuits with the tested model. Due to the changes, the Spurious Radiated Emission had been retested. Please refer to BACL's testing report R0407072.

The objective is to determine compliance with FCC 15.247 rules:

- Spurious Emission
- Radiated Emission

### Related Submittal(s)/Grant(s)

The original device was granted on 2004-08-16. For the original testing, please refer to BACL's testing report R0407072.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003.

### Test Facility

The Open Area Test site used by BACL to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA.

Test site at BACL has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm>

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## SYSTEM TEST CONFIGURATION

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### Justification

The EUT was configured for testing according to ANSI C63.4 - 2003.

The EUT was tested in the normal (native) operating mode to represent *worst-case* results during the final qualification test.

### EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the system components.

Once loaded, set the Tx channel to low, mid and high for testing.

### Special Accessories

As shown in following test block diagram, all interface cables used for compliance testing are shielded.

### Schematics / Block Diagram

Please refer to Appendix A.

### Equipment Modifications

No modifications were made to the EUT.

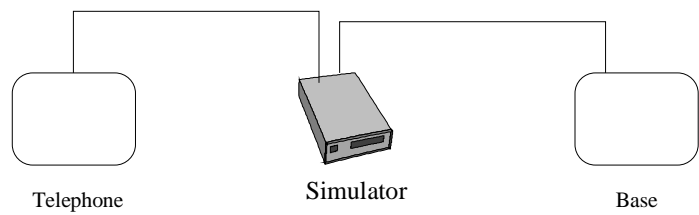
### Local Support Equipment List and Details

| Manufacturer     | Description | Model     | Serial Number | FCC ID |
|------------------|-------------|-----------|---------------|--------|
| TELTONE CORP.    | SIMULATOR   | TLS-3B-01 | 80071         | DOC    |
| Southern Telecom | Telephone   | None      | None          | None   |

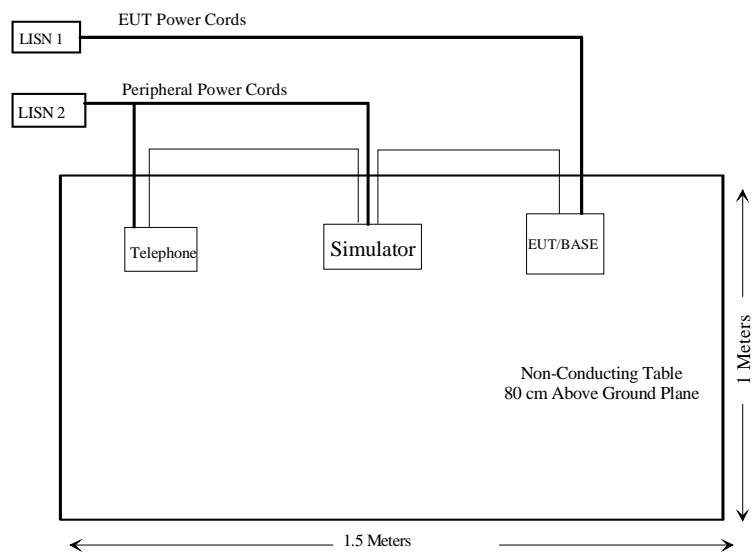
### External I/O Cabling List and Details

| Cable Description             | Length (M) | Port/From           | To                               |
|-------------------------------|------------|---------------------|----------------------------------|
| None-Shielded Telephone Cable | 1.5        | RJ11 Port/EUT       | Telephone Simulator<br>RJ11 Port |
| None-Shielded Telephone Cable | 1.5        | RJ11 Port/Simulator | Telephone<br>RJ11Port/telephone  |

Configuration of Test System



Test Setup Block Diagram



**SUMMARY OF TEST RESULTS FOR FCC PART 15**

| FCC RULES                   | DESCRIPTION OF TEST   | RESULT     |
|-----------------------------|---|------------|
| §15.203                     | Antenna Requirement   | N/A        |
| § 15.205                    | Restricted Bands  | N/A        |
| §15.209                     | Radiated Emission   | Compliant* |
| §15.247 (a) (1)             | Hopping Channel Separation  | N/A        |
| §15.247 (a) (1)             | Channel Bandwidth   | N/A        |
| §15.247 (a) (1) (iii)       | Number of Hopping Frequencies Used  | N/A        |
| §15.247 (a) (1) (iii)       | Dwell Time of Each Frequency within a 35.2<br>Second Period of time (0.4 x Number of Channel) | N/A        |
| §15.247 (b) (1)             | Maximum Peak Output Power   | N/A        |
| § 15.247 (b)(4)<br>§ 2.1093 | RF Safety Requirements  | N/A        |
| § 15.247 (d)                | 100 kHz Bandwidth of Frequency Band Edge  | N/A        |
| § 2.1051                    | Spurious Emission at Antenna Port   | N/A        |

*\*Test data was within the measurement of uncertainty.*

## §15.205 & §15.209 - RADIATED EMISSION

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is  $\pm 4.0$  dB.

### Test Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup in accordance with ANSI C63.4 - 2003. The specification used was the FCC 15 Subpart C limits.

External I/O cables were draped along the edge of the test table and bundle when necessary.

The EUT was connected with 120Vac/60Hz power source.

### Spectrum Analyzer Setup

According to FCC Rules, 47 CFR §15.33 (a) (1), the system was tested to 40GHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

| <i><b>Frequency Range</b></i> | <i><b>RBW</b></i> | <i><b>Video B/W</b></i> |
|-------------------------------|-------------------|-------------------------|
| Below 30MHz                   | 10kHz             | 10kHz                   |
| 30 – 1000MHz                  | 100kHz            | 100kHz                  |
| Above 1000MHz                 | 1MHz              | 1MHz                    |

### Test Equipment List and Details

| <b>Manufacturer</b> | <b>Description</b>        | <b>Model</b> | <b>Serial Number</b> | <b>Cal. Date</b> |
|---------------------|---------------------------|--------------|----------------------|------------------|
| Sunol Science       | Antenna                   | JB1          | A013105-3            | 2005-02-11       |
| HP                  | Amplifier, Pre            | 8447E        | 1937A01057           | 2005-08-04       |
| HP                  | Analyzer, Spectrum        | 8565EC       | 3946A00131           | 2005-08-06       |
| HP                  | Amplifier, Pre, microwave | 8449B        | 3147A00400           | 2005-06-14       |
| A.R.A.              | Antenna, Horn, DRG        | DRG-118/A    | 1132                 | 2004-09-30       |

\* **Statement of Traceability: BACL Corp.** certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 27° C     |
| Relative Humidity: | 47%       |
| ATM Pressure:      | 1015 mbar |

*The testing was performed by Jerry Wang on 2005-09-13.*



## Test Procedure

For the radiated emissions test, both the laptop and all peripheral power cords were connected to the AC floor outlet since the power supply used in the laptop did not provide an accessory power outlet.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations.

All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limits), and are distinguished with a "Qp" in the data table.

## Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Class B Limit}$$

## Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.207, and 15.247, and had the worst margin of:

**-3.10 dB at 17281.32 MHz in the Horizontal polarization, Low Channel.\***

**-3.90 dB at 17397.45 MHz in the Vertical polarization, Middle Channel.\***

**-3.46 dB at 17514.93 MHz in the Horizontal polarization, High Channel.\***

**-5.24 dB at 147.45 MHz in the Vertical polarization, Unintentional Emission.**

*\*Test data was within the measurement of uncertainty.*

**Radiated Emission Test Data**

| Indicated      |        |           | Antenna | Antenna |         | Correction Factor |       |             | FCC 15 Subpart C |        |           |
|----------------|--------|-----------|---------|---------|---------|-------------------|-------|-------------|------------------|--------|-----------|
| Frequency      | Ampl.  | Direction | Height  | Polar   | Antenna | Cable Loss        | Amp.  | Corr. Ampl. | Limit            | Margin | Comments  |
| MHz            | dBμV/m | Degree    | Meter   | H/V     | dBμV/m  | dBμV/m            | dB    | dBμV/m      | dBμV/m           | dB     |           |
| Low Channel    |        |           |         |         |         |                   |       |             |                  |        |           |
| 5760.44        | 103.67 | 30        | 1.5     | H       | 34.1    | 5.40              | 35.09 | 108.08      |                  |        | Fund/Peak |
| 5760.44        | 104.67 | 30        | 1.5     | V       | 34.1    | 5.40              | 35.09 | 109.08      |                  |        | Fund/Peak |
| 5760.44        | 100.70 | 100       | 1.2     | V       | 34.1    | 5.40              | 35.09 | 105.11      |                  |        | Ave       |
| 5760.44        | 97.70  | 100       | 1.2     | H       | 34.1    | 5.40              | 35.09 | 102.11      |                  |        | Ave       |
| 17281.32       | 30.40  | 200       | 2.3     | H       | 44.3    | 9.70              | 33.50 | 50.90       | 54               | -3.10* | Ave       |
| 17281.32       | 29.50  | 200       | 1.5     | V       | 44.3    | 9.70              | 33.50 | 50.00       | 54               | -4.00  | Ave       |
| 11520.88       | 34.50  | 270       | 2.4     | V       | 39.1    | 7.78              | 34.83 | 46.55       | 54               | -7.45  | Ave       |
| 11520.88       | 33.30  | 180       | 2.2     | H       | 39.1    | 7.78              | 34.83 | 45.35       | 54               | -8.65  | Ave       |
| 17281.32       | 43.20  | 300       | 1.2     | V       | 44.3    | 9.70              | 33.50 | 63.70       | 74               | -10.30 | Peak      |
| 17281.32       | 42.60  | 200       | 2.3     | H       | 44.3    | 9.70              | 33.50 | 63.10       | 74               | -10.90 | Peak      |
| 11520.88       | 49.80  | 180       | 2.2     | H       | 39.1    | 7.78              | 34.83 | 61.85       | 74               | -12.15 | Peak      |
| 11520.88       | 47.80  | 300       | 1.5     | V       | 39.1    | 7.78              | 34.83 | 59.85       | 74               | -14.15 | Peak      |
| Middle Channel |        |           |         |         |         |                   |       |             |                  |        |           |
| 5799.15        | 100.33 | 200       | 1.2     | V       | 34.1    | 5.40              | 35.09 | 104.74      |                  |        | Fund/Peak |
| 5799.15        | 100.90 | 180       | 1.2     | H       | 34.1    | 5.40              | 35.09 | 105.31      |                  |        | Fund/Peak |
| 5799.15        | 97.84  | 180       | 1.2     | V       | 34.1    | 5.40              | 35.09 | 102.25      |                  |        | Ave       |
| 5799.15        | 99.70  | 200       | 1.5     | H       | 34.1    | 5.40              | 35.09 | 104.11      |                  |        | Ave       |
| 17397.45       | 29.60  | 270       | 1.6     | V       | 44.3    | 9.70              | 33.50 | 50.10       | 54               | -3.90* | Ave       |
| 17397.45       | 29.30  | 180       | 1.5     | H       | 44.3    | 9.70              | 33.50 | 49.80       | 54               | -4.20  | Ave       |
| 11598.30       | 35.40  | 300       | 1.5     | V       | 39.1    | 7.78              | 34.83 | 47.45       | 54               | -6.55  | Ave       |
| 11598.30       | 34.70  | 180       | 1.5     | H       | 39.1    | 7.78              | 34.83 | 46.75       | 54               | -7.25  | Ave       |
| 17397.45       | 42.30  | 270       | 1.2     | V       | 44.3    | 9.70              | 33.50 | 62.80       | 74               | -11.20 | Peak      |
| 17397.45       | 41.60  | 180       | 1.5     | H       | 44.3    | 9.70              | 33.50 | 62.10       | 74               | -11.90 | Peak      |
| 11598.30       | 48.20  | 270       | 1.6     | V       | 39.1    | 7.78              | 34.83 | 60.25       | 74               | -13.75 | Peak      |
| 11598.30       | 47.30  | 180       | 1.5     | H       | 39.1    | 7.78              | 34.83 | 59.35       | 74               | -14.65 | Peak      |
| High Channel   |        |           |         |         |         |                   |       |             |                  |        |           |
| 5838.31        | 100.98 | 180       | 1.2     | V       | 34.1    | 5.40              | 35.09 | 105.39      |                  |        | Fund/Peak |
| 5838.31        | 98.80  | 180       | 1.2     | H       | 34.1    | 5.40              | 35.09 | 103.21      |                  |        | Fund/Peak |
| 5838.31        | 100.12 | 180       | 1.2     | V       | 34.1    | 5.40              | 35.09 | 104.53      |                  |        | Ave       |
| 5838.31        | 96.90  | 200       | 1.5     | H       | 34.1    | 5.40              | 35.09 | 101.31      |                  |        | Ave       |
| 17514.93       | 29.50  | 180       | 1.5     | H       | 44.1    | 9.86              | 32.92 | 50.55       | 54               | -3.46* | Ave       |
| 17514.93       | 29.10  | 200       | 1.2     | V       | 44.1    | 9.86              | 32.92 | 50.15       | 54               | -3.86* | Ave       |
| 11676.62       | 35.20  | 270       | 1.2     | V       | 39.1    | 7.78              | 34.83 | 47.25       | 54               | -6.75  | Ave       |
| 11676.62       | 34.20  | 200       | 1.5     | H       | 39.1    | 7.78              | 34.83 | 46.25       | 54               | -7.75  | Ave       |
| 17514.93       | 43.20  | 180       | 1.5     | H       | 44.1    | 9.86              | 32.92 | 64.25       | 74               | -9.76  | Peak      |
| 17514.93       | 42.30  | 300       | 1.2     | V       | 44.1    | 9.86              | 32.92 | 63.35       | 74               | -10.66 | Peak      |
| 11676.62       | 48.20  | 270       | 1.2     | V       | 39.1    | 7.78              | 34.83 | 60.25       | 74               | -13.75 | Peak      |
| 11676.62       | 47.30  | 180       | 1.5     | H       | 39.1    | 7.78              | 34.83 | 59.35       | 74               | -14.65 | Peak      |

\*Test data was within the measurement of uncertainty.

Note:

FUND: Fundamental

AVG: Average

## Unintentional Emission

| Frequency<br>MHz | Indicated       |                     | Antenna<br>Height<br>Meter | Antenna      |                   | Correction Factor           |            |                          | FCC 15 Subpart C |              |
|------------------|-----------------|---------------------|----------------------------|--------------|-------------------|-----------------------------|------------|--------------------------|------------------|--------------|
|                  | Ampl.<br>dBμV/m | Direction<br>Degree |                            | Polar<br>H/V | Antenna<br>dBμV/m | Cable<br>Loss<br>dBμV/<br>m | Amp.<br>dB | Corr.<br>Ampl.<br>dBμV/m | Limit<br>dBμV/m  | Margin<br>dB |
| 147.45           | 52.5            | 200                 | 1.2                        | V            | 12.55             | 1.65                        | 28.44      | 38.26                    | 43.5             | -5.24        |
| 224.98           | 54.3            | 300                 | 1.5                        | V            | 11.80             | 2.17                        | 28.12      | 40.15                    | 46.0             | -5.85        |
| 221.18           | 54.3            | 200                 | 1.2                        | V            | 11.80             | 2.17                        | 28.12      | 40.15                    | 46.0             | -5.85        |
| 147.50           | 51.8            | 180                 | 1.5                        | H            | 12.55             | 1.65                        | 28.44      | 37.56                    | 43.5             | -5.94        |
| 221.18           | 53.8            | 180                 | 1.2                        | H            | 11.80             | 2.17                        | 28.12      | 39.65                    | 46.0             | -6.35        |
| 294.50           | 51.2            | 200                 | 1.5                        | V            | 13.70             | 2.30                        | 27.84      | 39.36                    | 46.0             | -6.64        |
| 294.50           | 50.3            | 120                 | 1.5                        | H            | 13.70             | 2.30                        | 27.84      | 38.46                    | 46.0             | -7.54        |
| 250.00           | 50.2            | 200                 | 1.2                        | V            | 13.30             | 2.17                        | 28.00      | 37.67                    | 46.0             | -8.33        |
| 48.00            | 47.4            | 200                 | 1.5                        | H            | 11.05             | 1.10                        | 28.90      | 30.65                    | 40.0             | -9.35        |
| 224.98           | 50.1            | 180                 | 1.5                        | H            | 11.80             | 2.17                        | 28.12      | 35.95                    | 46.0             | -10.05       |
| 240.00           | 45.3            | 200                 | 1.5                        | H            | 13.80             | 2.17                        | 28.04      | 33.23                    | 46.0             | -12.77       |
| 60.00            | 42.3            | 180                 | 1.2                        | V            | 9.40              | 1.33                        | 28.70      | 24.33                    | 40.0             | -15.67       |