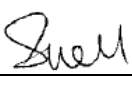


FCC PART 15.249
EMI MEASUREMENT AND TEST REPORT
For
CCT R&D LIMITED

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

FCC ID: NC8CT4250H

This Report Concerns: ☒ Original Report	Equipment Type: 2.4GHz/900 MHz Dual Band Cordless Phone – Handset
Test Engineer: Snell Leong/ 	
Report No.: R0507113(H)	
Report Date: 2005-07-29	
Reviewed By: Daniel Deng/ 	
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Note: The test report is specially limited to the above 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 certification, approval, or endorsement by NVLAP, NIST or any agency of the US Government.

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The CCT R&D LIMITED's product, FCC ID: NC8CT4250H, or the "EUT" as referred to in this report is a 2.4GHz/900 MHz Dual Band Cordless Phone, handset portion. The Handset operates at frequency 2402.48-2409.00 MHz and measures approximately 115mmL x 185mmW x 60mmH.

** The test data gathered are from production sample, serial number: CT4250001, provided by the manufacturer.*

Objective

This document is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2003.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.203 and 15.205, 15.207, 15.249, and 15.209 rules.

Related Submittal(s)/Grant(s)

No Related Submittals

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4 - 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp.

Test Facility

The Open Area Test site used by Bay Area Compliance Laboratory Corporation 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 Bay Area Compliance Laboratory Corporation 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>

SYSTEM TEST CONFIGURATION

Justification

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

Schematics and Block Diagram

Please refer to Appendix A.

Equipment Modifications

No modifications were made to the EUT.

Configuration of Test System

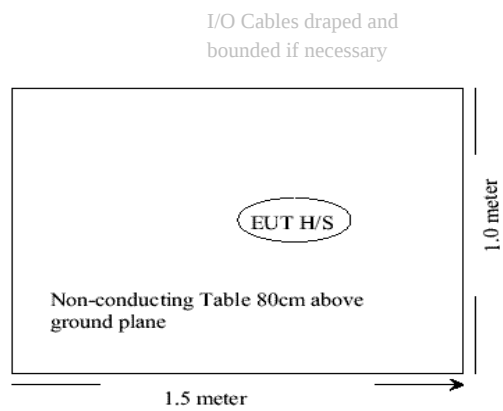
Radiated Setup for Handset



Handset

Test Setup Block Diagram

Radiated Setup for Handset



SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Compliant
§15.205	Restricted Band	Compliant
§15.207(a)	Conducted Emission	N/A
§15.209 (a), §15.249 (a)	Radiated Emission	Compliant
15.249 (d)	Band Edge Testing	Compliant

§15.203 - ANTENNA REQUIREMENT

Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna Connected Construction

The antenna connector is designed with permanent attachment and no consideration of replacement.

Antenna gain is 0 dBi, single port wire antenna.

§15.205, §15.209 (a), §15.249 (a) - RADIATED EMISSION DATA

Applicable Standard

According to §15.249 (a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of (millivolts/ meter)	Field strength of fundamental harmonics (microvolts/ meter)
902-928 MHz.....	50	500
2400-2483.5 MHz.....	50	500
5725-5875 MHz.....	50	500
24.0-24.25 GHz.....	250	2500

According to §15.249 (d), emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

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 ± 4.0 dB.

EUT 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.

The spacing between the peripherals was 10 centimeters.

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

Spectrum Analyzer Setup

According to FCC Rules, 47 CFR 15.33 (a) (1), the system was tested to 25GHz.

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

<u>Frequency Range</u>	<u>RBW</u>	<u>Video B/W</u>
Below 30MHz	10kHz	10kHz
30 – 1000MHz	100kHz	100kHz
Above 1000MHz	1MHz	1MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Amplifier, Pre (.1 ~1300MHz)	8447D	2944A10198	8/20/2004
Agilent	Analyzer, Spectrum	E4446A	US44300386	11/10/2004
HP	Pre, Amplifier (1 ~ 26.5 GHz)	8449B	3147A00400	05/10/2005
Sunol Science	30Mhz ~ 2 GHz Antenna	JB1	A03105-3	02/11/2005
Sunol Sciences	Antenna, Horn, Std	DRH-118	A052704	6/2/2004

* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Environmental Conditions

Temperature:	26°C
Relative Humidity:	78%
ATM Pressure:	1023mbar

*Testing was performed by Snell Leong on 2005-07-26.

Test Procedure

For the radiated emissions test, the power cord of the EUT was connected to the AC floor outlet.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant 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 applicable limits. The equation for margin calculation is as follows:

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

Summary of Test Results

According to the recorded data in following table, the EUT measured test data within the measurement uncertainty of ± 4.0 , and had the worst margin of:

- 14.0 dB at 2402.48.00 MHz in the Vertical polarization at Low Channel
- 13.0 dB at 2405.66 MHz in the Vertical polarization at Mid Channel
- 12.5 dB at 2409.00 MHz in the Vertical polarization at High Channel
- 8.6 dB at 471.30 MHz in the Horizontal polarization at Unintentional Emission

Radiated Emissions Test Result Data, 3Meter

Low Channel

Frequency	Reading	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Correction Factor	FCC	FCC	
MHz	dBuV/m	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB	Comments
2402.4800	85.2	180	1.2	v	28.7	2.0	35.8	80.0	94	-14.0	Fund/Ave
7207.4400	29.9	180	2.0	v	36.7	4.3	34.7	36.2	54	-17.8	Ave
7207.4400	29.7	90	2.0	h	36.7	4.3	34.7	36.0	54	-18.0	Ave
2402.4800	80.1	0	1.2	h	28.7	2.0	35.8	74.9	94	-19.1	Fund/Ave
4804.9600	29.6	270	2.4	v	32.5	3.1	34.8	30.4	54	-23.6	Ave
4804.9600	29.6	180	2.3	h	32.5	3.1	34.8	30.4	54	-23.6	Ave
7207.4400	40.2	180	2.0	h	36.7	4.3	34.7	46.5	74	-27.5	Peak
7207.4400	38.9	90	2.0	v	36.7	4.3	34.7	45.2	74	-28.8	Peak
4804.9600	41.6	270	2.4	v	32.5	3.1	34.8	42.4	74	-31.6	Peak
4804.9600	40.8	180	2.3	h	32.5	3.1	34.8	41.6	74	-32.4	Peak
2402.4800	86.5	90	1.0	v	28.7	2.0	35.8	81.3	114	-32.7	Fund/Peak
2402.4800	82.1	0	1.2	h	28.7	2.0	35.8	76.9	114	-37.1	Fund/Peak

Mid Channel

Frequency	Reading	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Correction Factor	FCC	FCC	
MHz	dBuV/m	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB	Comments
2405.6600	86.2	180	1.2	v	28.7	2.0	35.8	81.0	94	-13.0	Fund/Ave
7216.9800	30.1	270	2.4	v	36.7	4.3	34.7	36.4	54	-17.6	Ave
7216.9800	29.8	180	2.1	h	36.7	4.3	34.7	36.1	54	-17.9	Ave
2405.6600	80.5	0	1.2	h	28.7	2.0	35.8	75.3	94	-18.7	Fund/Ave
4811.3200	29.5	270	2.4	v	32.5	3.1	34.8	30.3	54	-23.7	Ave
4811.3200	29.3	180	2.2	h	32.5	3.1	34.8	30.1	54	-23.9	Ave
7216.9800	40.3	180	2.3	h	36.7	4.3	34.7	46.6	74	-27.4	Peak
7216.9800	39.1	270	2.4	v	36.7	4.3	34.7	45.4	74	-28.6	Peak
4811.3200	41.8	270	2.4	v	32.5	3.1	34.8	42.6	74	-31.4	Peak
2405.6600	87.6	90	1.0	v	28.7	2.0	35.8	82.4	114	-31.6	Fund/Peak
4811.3200	40.6	180	2.2	h	32.5	3.1	34.8	41.4	74	-32.6	Peak
2405.6600	81.6	0	1.2	h	28.7	2.0	35.8	76.4	114	-37.6	Fund/Peak

High Channel

Frequency	Reading	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Correction Factor	FCC	FCC	
MHz	dBuV/m	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB	Comments
2409.0000	86.7	180	1.2	v	28.7	2.0	35.8	81.5	94	-12.5	Fund/Ave
7227.0000	30.2	270	2.4	v	36.7	4.3	34.7	36.5	54	-17.5	Ave
7227.0000	29.9	90	2.1	h	36.7	4.3	34.7	36.2	54	-17.8	Ave
2409.0000	81.3	0	1.2	h	28.7	2.0	35.8	76.1	94	-17.9	Fund/Ave
4818.0000	30.1	270	2.4	v	32.5	3.1	34.8	30.9	54	-23.1	Ave
4818.0000	29.7	90	2.1	h	32.5	3.1	34.8	30.5	54	-23.5	Ave
7227.0000	40.8	90	2.1	h	36.7	4.3	34.7	47.1	74	-26.9	Peak
7227.0000	40.3	270	2.4	v	36.7	4.3	34.7	46.6	74	-27.4	Peak
4818.0000	41.5	270	2.4	v	32.5	3.1	34.8	42.3	74	-31.7	Peak
2409.0000	87.4	90	1.0	v	28.7	2.0	35.8	82.2	114	-31.8	Fund/Peak
4818.0000	40.5	90	2.1	h	32.5	3.1	34.8	41.3	74	-32.7	Peak
2409.0000	82.6	0	1.2	h	28.7	2.0	35.8	77.4	114	-36.6	Fund/Peak

Unintentional Emission

Frequency	Reading	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Correction Factor	FCC	FCC
MHz	dBuV/m	Degree	Meter	H/V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB
471.30	43.6	280	2.8	H	17.7	4.7	28.6	37.4	46	-8.6
797.87	36.7	75	1.8	V	20.5	6.2	28.1	35.3	46	-10.7
471.30	41.5	250	1.0	V	17.7	4.7	28.6	35.3	46	-10.7
797.87	35.6	270	3.2	H	20.5	6.2	28.1	34.2	46	-11.8
462.05	40.1	270	2.1	H	17.2	4.7	28.5	33.5	46	-12.5
462.05	38.6	330	1.2	V	17.2	4.7	28.5	32.0	46	-14.0

§15.249 (d) – BAND-EDGE TESTING

Standard Applicable

Requirements: FCC 15.249 (c), the emission power at the START and STOP frequencies shall be at least 50 dB below the level of the fundamental or to the general radiated emission limits in FCC 15.209, whichever is the lesser attenuation.

Test Procedure

With the EUT's antenna attached, the EUT's radiated emission power was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	11/10/2004

* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Environmental Conditions

Temperature:	26°C
Relative Humidity:	78%
ATM Pressure:	1023mbar

**Testing was performed by Snell Leong on 2005-07-26.*

Test Results

Refer to the attached plots.

