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: NC8MD751H

This Report Concerns:	**Equipment Type:**
☒ Class II Permissive Change	Digital 2.4/5.8GHz Cordless Telephone System w/ Caller ID – Handset

Test Engineer:	Kevin Lee
Report No.:	R0508269(H)
Report Date:	2005-09-06
Reviewed By:	Daniel Deng /
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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *CCT R & D Limited's*, FCC ID: *NC8MD751H*, or the "EUT" as referred to in this report is the handset part of a Digital 2.4/5.8GHz Cordless Telephone System w/ Caller ID, which measures approximately 7" L x 2" W x 1.5" H. The EUT is a DSS device, which operates at the frequency range of 2401.8085 – 2479.4012MHz.

** The test data gathered are from a production sample, S/N: 602VFD000W, 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', Delete the external transistor (2SC5754), and delete FL1 (2.4GHz dielectric filter). 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 for DSS:

- 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

SYSTEM TEST CONFIGURATION

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.

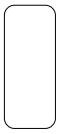
Schematics / Block Diagram

Please refer to Appendix A.

Equipment Modifications

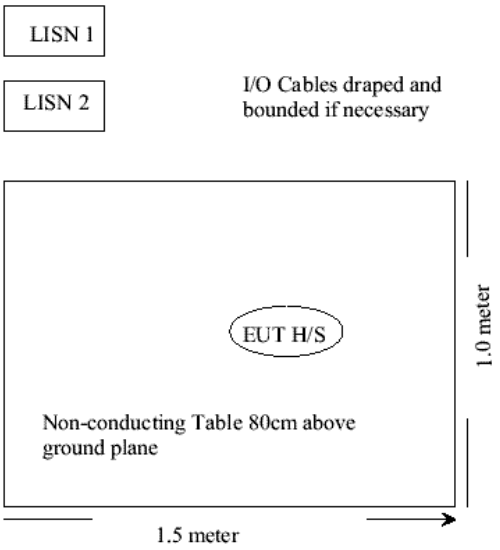
No modifications were made to the EUT.

Configuration of Test System



Handset

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 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) § 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

§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 ±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.

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:

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
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:	29° C
Relative Humidity:	48%
ATM Pressure:	1017 mbar

The testing was performed by Kevin Lee on 2005-09-01.

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:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - 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:

Margin = Corr. Ampl. - 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:

-8.7 dB at **4802.0000 MHz** in the **Horizontal** polarization, Low Channel.

-7.5 dB at **7320.3900 MHz** in the **Vertical** polarization, Middle Channel.

-9.5 dB at **7437.8100 MHz** in the **Horizontal** polarization, High Channel.

-6.5 dB at **770.55 MHz** in the **Vertical** polarization, Unintentional Emission.

** The test data was Within the Measurement of Uncertainty*

Radiated Emission Test Data

Indicated			Antenna	Antenna		Correction Factor			FCC 15 Subpart C		
Frequency MHz	Ampl. dBμV/m	Direction Degree	Height Meter	Polar H/V	Antenna dBμV/m	Cable Loss dBμV/m	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB	Comments
Low Channel											
2401.0000	113.1	0	2.0	H	28.1	2.0	35.7	107.5			Peak/Fund
2401.0000	109.3	220	1.6	V	28.1	2.0	35.7	103.8			Peak/Fund
2401.0000	91.2	15	1.8	H	28.1	2.0	35.7	85.6			Ave
2401.0000	86.7	220	1.5	V	28.1	2.0	35.7	81.1			Ave
4802.0000	44.5	145	1.7	H	32.5	3.1	34.8	45.4	54	-8.7	Ave
4802.0000	62.8	130	1.8	H	32.5	3.1	34.8	63.7	74	-10.4	Peak
7203.0000	37.3	85	1.6	V	36.7	4.3	34.7	43.6	54	-10.4	Ave
4802.0000	62.2	95	1.7	V	32.5	3.1	34.8	63.0	74	-11.0	Peak
7203.0000	36.5	225	2.0	H	36.7	4.3	34.7	42.8	54	-11.2	Ave
4802.0000	41.2	90	1.7	V	32.5	3.1	34.8	42.1	54	-12.0	Ave
7203.0000	31.7	235	1.9	H	36.3	4.3	35.7	36.6	74	-37.4	Peak
7203.0000	31.3	90	1.6	V	36.3	4.3	35.7	36.2	74	-37.8	Peak
Middle Channel											
2440.1300	113.2	225	1.8	V	28.1	2.0	35.7	107.6			Peak/Fund
2440.1300	92.9	90	1.8	H	28.1	2.0	35.7	87.3			Peak/Fund
2440.1300	98.5	210	1.7	V	28.1	2.0	35.7	92.9			Ave
2440.1300	79.6	95	1.6	H	28.1	2.0	35.7	74.0			Ave
7320.3900	40.2	245	1.8	V	36.7	4.3	34.7	46.5	54	-7.5	Ave
7320.3900	39.5	90	1.6	H	36.7	4.3	34.7	45.8	54	-8.2	Ave
4880.2600	42.3	95	1.3	V	32.5	3.1	34.8	43.2	54	-10.9	Ave
4880.2600	41.1	215	1.6	H	32.5	3.1	34.8	42.0	54	-12.1	Ave
4880.2600	60.8	90	1.2	V	32.5	3.1	34.8	61.7	74	-12.4	Peak
4880.2600	57.8	200	1.8	H	32.5	3.1	34.8	58.7	74	-15.4	Peak
7320.3900	31.3	255	1.7	V	36.3	4.3	35.7	36.2	74	-37.8	Peak
7320.3900	30.5	90	1.6	H	36.3	4.3	35.7	35.4	74	-38.6	Peak
High Channel											
2479.2700	107.3	240	3.1	H	28.1	2.0	35.7	101.8			Peak/Fund
2479.2700	111.3	15	2.6	V	28.1	2.0	35.7	105.8			Peak/Fund
2479.2700	86.5	225	2.9	H	28.1	2.0	35.7	80.9			Ave
2479.2700	90.5	15	2.4	V	28.1	2.0	35.7	84.9			Ave
7437.8100	38.2	90	1.2	H	36.7	4.3	34.7	44.5	54	-9.5	Ave
7437.8100	37.5	90	1.6	V	36.7	4.3	34.7	43.8	54	-10.2	Ave
4958.5400	42.4	15	2.3	H	32.5	3.1	34.8	43.3	54	-10.8	Ave
4958.5400	60.9	0	2.6	H	32.5	3.1	34.8	61.8	74	-12.2	Peak
4958.5400	38.6	270	1.4	V	32.5	3.1	34.8	39.5	54	-14.6	Ave
4958.5400	53.4	270	1.3	V	32.5	3.1	34.8	54.3	74	-19.7	Peak
7437.8100	31.8	90	1.3	H	36.3	4.3	35.7	36.7	74	-37.3	Peak
7437.8100	30.9	90	1.6	V	36.3	4.3	35.7	35.8	74	-38.2	Peak

FUND: Fundemental
AVG: Average

Unintentional Emission

Indicated			Antenna	Antenna		Correction Factor			FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV/m	Direction Degree	Height Meter	Polar H/V	Antenna dBμV/m	Cable Loss dBμV/m	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
770.55	40.5	145	2.1	V	21.1	5.9	28.0	39.5	46	-6.5
770.55	37.2	325	1.8	H	21.1	5.9	28.0	36.2	46	-9.8
228.68	43.6	120	2.1	V	10.9	3.1	27.6	30.0	46	-16.0
251.82	41.8	325	2.2	H	11.9	3.4	27.4	29.7	46	-16.3
228.68	42.3	325	1.9	H	10.9	3.1	27.6	28.7	46	-17.3
251.82	40.5	115	1.5	V	11.9	3.4	27.4	28.4	46	-17.6