

FCC PART 15.249

EMI MEASUREMENT AND TEST REPORT

For

VTech Telecommunications Ltd.

23/F Tai Ping Industrial Center Block 1
57 Ting Kok Road, Tai Po NT, Hong Kong

FCC ID: EW780-5587-01

This Report Concerns: <input checked="" type="checkbox"/> Class II Permissive Change	Equipment Type: Transceiver, Cordless Telephone Handset
Test Engineer: Snell Leong 	
Report No.: R0501315-Handset	
Report Date: 2005-02-22	
Reviewed By: Daniel Deng 	
Prepared By: Bay Area Compliance Laboratory Corporation 230 Commercial Street Sunnyvale, CA 94085 Tel (408) 732-9162 Fax (408) 732-9164	

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *VTech Telecommunications Ltd.*'s product, FCC ID: EW780-5587-01, Model: 5851 & 5829 or the "EUT" as referred to in this report is the handset of a cordless phone. The EUT operates at frequency 5863.80 – 5872.50 MHz. The EUT measures approximately 190mmL x 50mmW x 26mmH.

** The test data gathered are from production sample, serial number: HS001, 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 15.205, 15.207, and 15.249, 15.203, 15.209 rules.

This is the C2PC application of the device. The difference between the original device and the current one is as follows:

Original configuration	New configuration
"Package" version RF Combo IC	"Diebond" version RF Combo IC
Separate handset antennas – Wire F (900MHz RX) & Dipole (5.8GHz TX)	Single Dual band Antenna
Not used	Duplexer (discrete version) for 900MHz and 5.8GHz operation
--	Minor PCB layout to accommodate the above changes

For the changes made to the device, radiated emission testing was performed.

Related Submittal(s)/Grant(s)

This is a C2PC application. The original application was granted on 2004-12-14.

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. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

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/hdocs/210/214/scopes/2001670.htm>

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

The final qualification test was performed with the EUT operating at normal mode

Equipment Modifications

No modifications were made to the EUT.

SUMMARY OF TEST RESULTS

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

§15.209(a) - RADIATED EMISSION DATA

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 BAEL 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 as required.

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>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</i>
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, microwave	8449B	3147A00400	2004-03-14
A.R.A.	Antenna, Horn, DRG	DRG-118/A	1132	2004-09-30
Agilent	Analyzer, Spectrum	E4446	US44300386	2004-11-10

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

Environmental Conditions

Temperature:	22 °C
Relative Humidity:	38%
ATM Pressure:	1015mbar

Testing was performed by Snell Leong on 2005-02-05.

Test Procedure

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 μ V 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 μ V means the emission is 7dB μ V 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 complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.207, and 15.249 after tested to 10th harmonics as required by FCC and had the worst margin of:

- 3.7 dB at 5863.8000 MHz in the Vertical polarization at Low Channel
- 0.2 dB at 11745.0000 MHz in the Vertical polarization at High Channel

Radiated Emissions Test Result Data, 3M

INDICATED			TABL E Angle Degree	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE Corr. Ampl. dB μ V/m	FCC 15 Subpart C	
Frequency MHz	Ampl. dB μ V/m	Comments		Height Meter	Polar H/ V	Antenna dB	Cable dB	Amp. dB		Limit dB μ V/m	Margin dB
30MHz – 40GHz, Low Channel											
5863.8000	87.3	Fund/Peak	45	2.5	v	34.1	3.4	34.5	90.3	94	-3.7
11727.6000	37.6	Ave	0	3.0	v	39.1	5.4	32.2	49.9	54	-4.1
11727.6000	36.2	Ave	90	1.5	h	39.1	5.4	32.2	48.5	54	-5.5
5863.8000	81.1	Fund/Peak	90	1.0	h	34.1	3.4	34.5	84.1	94	-9.9
11727.6000	41.3	Peak	0	3.0	v	39.1	5.4	32.2	53.6	74	-20.4
11727.6000	39.7	Peak	90	1.5	h	39.1	5.4	32.2	52.0	74	-22.0
30MHz – 40GHz, High Channel											
11745.0000	41.5	Ave	0	3.0	v	39.1	5.4	32.2	53.8	54	-0.2
11745.0000	37.5	Ave	90	1.5	h	39.1	5.4	32.2	49.8	54	-4.2
5872.5000	83.6	Fund/Peak	45	2.5	v	34.1	3.4	34.5	86.6	94	-7.4
5872.5000	80.5	Fund/Peak	90	1.0	h	34.1	3.4	34.5	83.5	94	-10.5
11745.0000	43.3	Peak	0	3.0	v	39.1	5.4	32.2	55.7	74	-18.3
11745.0000	38.6	Peak	90	1.5	h	39.1	5.4	32.2	50.9	74	-23.1