



**VTech Telecommunications Ltd.**

Application  
For  
Permissive Change Class II

900MHz/5.8GHz 30 Channel Analog Modulation Cordless Phone with  
Caller ID and Digital Answering Machine - Base Unit

**(FCC ID: EW780-5735-02)**

07219301  
KS/ ac  
November 21, 2007

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**Intertek Testing Services Hong Kong Ltd.**

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# INTERTEK TESTING SERVICES

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# INTERTEK TESTING SERVICES

## MEASUREMENT/TECHNICAL REPORT

VTech Telecommunications Ltd. - Model: CS5121, CS5121-2,  
CS5121-3, CS5121-4

FCC ID: EW780-5735-02

This report concerns (check one:)		Original Grant <input type="checkbox"/>	Class II Change <input checked="" type="checkbox"/>
Equipment Type : <u>DXX - Pt 15 Low Pwr Com. Device TX</u>			
Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?		Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
		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.			
Transition Rules Request per 15.37 ?		Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [05-04-07 Edition] Provision.			
Report prepared by:	Sit Kim Wai, Ken Intertek Testing Services Hong Kong Ltd. 2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. Phone : 852-2173-8534 Fax: 852-2741-1693		

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List of attached file

Exhibit type	File Description	filename
Cover Letter	Confidentiality Request	request.pdf
Test Report	Test Report	report.pdf
Operation Description	Technical Description	descri.pdf
Cover Letter	Purpose of Application	product change.pdf
Test Setup Photo	Radiated & Conducted Emission	config photos.doc
Test Report	Emission Plot	emission.pdf
Test Report	Conducted Emission Test Result	conduct.pdf
External Photo	External Photo	external photos.doc
Internal Photo	Internal Photo	internal photos.doc
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
ID Label/Location	Label Artwork and Location	label.pdf
Operation Description	Security Code Information	security code information.pdf
User Manual	User Manual	manual.pdf

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## **EXHIBIT 1 GENERAL DESCRIPTION**

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### **1.0 General Description**

#### **1.1 Product Description**

The CS5121 is a 900MHz/5.8GHz 30 Channel Analog Modulation Cordless Phone with Caller ID and Digital Answering Machine. Operating frequencies of Base Unit and Handset are from 912.750MHz to 917.100MHz, and from 5857.200MHz to 5865.900MHz respectively. The EUT is powered by an AC adaptor 117VAC to 7.5VDC 250mA. The unit is capable of either tone or pulse dialing. The circuit wiring is consistent under the requirement of part 68.

The antennas used in base unit and handset are integral, and the tested sample is a prototype.

The Model: CS5121-2, CS5121-3 and CS5121-4 are the same as the Model: CS5121 in hardware aspect except number of handset in the packing. The difference in model number serves as marketing strategy.

The circuit description is saved with filename: descri.pdf

Connection between the base unit and the telephone network is accomplished through the use of USOC RJ11C in the 2-wire loop calling central office line.

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### 1.2 Purpose of Application

The purpose of application is saved with filename: product change.pdf

The RF module of the Base Unit is the same as the previous granted Model: ia5823. Enclosure and PCB layout are changed.

This is an Application for Certification of a Base Unit of a cordless telephone system. The FCC ID of the associated Handset is EW780-5735-05 and has been filed at the same time as this application. A verification report has been prepared for the digital portion. The device is also subject to Part 68 Registration.

### 1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). 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. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

### 1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data and conducted data are 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.

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**EXHIBIT 2  
SYSTEM TEST CONFIGURATION**

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### **2.0 System Test Configuration**

#### **2.1 Justification**

For emissions testing, the equipment under test (EUT) was setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables (if any) 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 plastic stand if necessary 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. 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.

Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

#### **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.

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### 2.3 Details of EUT and Description of Peripherals

#### Details of EUT:

An AC adaptor and/or a battery (provided with the unit) were used to power the device. Their description are listed below.

- (1) Base Unit: An AC adaptor (117VAC to 7.5VDC 250mA, Model: U075025D12) (Supplied by Client)
- (2) Handset: A "Ni-Cd" type rechargeable battery (3.6V 400mAh) (Supplied by Client)

#### Description of Peripherals:

- (1) Telecommunication cable with RJ11C connectors (1m, unshielded), terminated (Supplied by Intertek)
- (2) Handset, Model: CS5121, FCC ID: EW780-5735-05 (Supplied by Client)

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### 2.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty test has been considered.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

### 2.5 Equipment Modification

Any modifications installed previous to testing by VTech Telecommunications Ltd. 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:*

*Sit Kim Wai, Ken  
Supervisor  
Intertek Testing Services  
Agent for VTech Telecommunications Ltd.*



\_\_\_\_\_  
Signature

November 21, 2007

\_\_\_\_\_  
Date

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**EXHIBIT 3  
EMISSION RESULTS**

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### 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.

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### 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 dB $\mu$ V/m  
              RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V  
              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 dB $\mu$ V/m  
              RR = RA - AG in dB $\mu$ V  
              LF = CF + AF in dB

Assume a receiver reading of 52.0 dB $\mu$ V 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 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

RA = 52.0 dB $\mu$ V  
AF = 7.4 dB  
CF = 1.6 dB  
AG = 29.0 dB  
FS = RR + LF  
FS = 23 + 9 = 32 dB $\mu$ V/m

RR = 23.0 dB $\mu$ V  
LF = 9.0 dB

Level in  $\mu$ V/m = Common Antilogarithm [(32 dB $\mu$ V/m)/20] = 39.8  $\mu$ V/m

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### 3.2 Radiated Emission Configuration Photograph - Base Unit

Worst Case Radiated Emission

at 1825.500 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: config photos.doc

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### 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 2.8 dB margin

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#### **TEST PERSONNEL:**



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*Tester Signature*

Jess Tang, Lead Engineer  
*Typed/Printed Name*

November 21, 2007

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*Date*

## INTERTEK TESTING SERVICES

Company: VTech Telecommunications Ltd. Date of Test: September 21-November 9, 2007  
Model: CS5121  
Mode : TX-Channel 00

Table 1, Base unit

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
V	912.750	67.5	16	33.0	84.5	94.0	-9.5
H	1825.500	57.0	33	27.2	51.2	54.0	-2.8
H	*2738.250	52.4	33	30.4	49.8	54.0	-4.2
H	*3651.000	49.4	33	33.3	49.7	54.0	-4.3
H	*4563.750	46.7	33	34.9	48.6	54.0	-5.4
H	5476.500	45.8	33	35.7	48.5	54.0	-5.5
H	6389.250	43.5	33	36.9	47.4	54.0	-6.6
H	*7302.000	42.2	33	37.9	47.1	54.0	-6.9
H	*8214.750	41.0	33	39.0	47.0	54.0	-7.0

- NOTES: 1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated 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 radiated 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 is used for the emission over 1000MHz.
5. Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).
- \* Emission within the restricted band meets the requirement of part 15.205.

Test Engineer: Jess Tang

## INTERTEK TESTING SERVICES

Company: VTech Telecommunications Ltd. Date of Test: September 21-November 9, 2007  
Model: CS5121  
Mode : TX-Channel 29

Table 2, Base unit

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre- Amp (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
V	917.100	67.2	16	33.0	84.2	94.0	-9.8
H	1834.200	56.8	33	27.2	51.0	54.0	-3.0
H	*2751.300	52.1	33	30.4	49.5	54.0	-4.5
H	*3668.400	48.9	33	33.3	49.2	54.0	-4.8
H	*4585.500	46.6	33	34.9	48.5	54.0	-5.5
H	5502.600	44.6	33	36.6	48.2	54.0	-5.8
H	6419.700	43.4	33	36.9	47.3	54.0	-6.7
H	*7336.800	42.3	33	37.9	47.2	54.0	-6.8
H	*8253.900	41.1	33	39.0	47.1	54.0	-6.9
H	*9171.000	39.6	33	40.4	47.0	54.0	-7.0

- NOTES: 1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated 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 radiated 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 is used for the emission over 1000MHz.
5. Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).
- \* Emission within the restricted band meets the requirement of part 15.205.

Test Engineer: Jess Tang

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### 3.4 Radiated Emission on the Bandedge

From the following plots, they show that the fundamental emissions are confined in the specified band (902MHz and 928MHz). In case of the fundamental emissions are within two standard bandwidths from the bandedge, the delta measurement technique is used for determining bandedge compliance. Standard bandwidth is the bandwidth specified by ANSI C63.4 (2003) for frequency being measured.

Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).

Please refer to the following plots for radiated emission on the bandedge:

Plot B1A: Base Unit - Low Channel Emissions

Plot B1B: Base Unit - High Channel Emissions

For electronic filing, the above plots are saved with filename: emission.pdf

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### 3.5 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: config photos.doc

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### 3.6 Line Conducted 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 more than 20 dB margin

#### **TEST PERSONNEL:**



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*Tester Signature*

Jess Tang, Lead Engineer  
*Typed/Printed Name*

November 21, 2007

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*Date*

## **INTERTEK TESTING SERVICES**

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Company: VTech Telecommunications Ltd. Date of Test: September 21-November 9, 2007  
Model: CS5121

### **Conducted Emissions**

For electronic filing, the conducted emission test result is saved with filename:  
conduct.pdf

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**EXHIBIT 4  
EQUIPMENT PHOTOGRAPHS**

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### 4.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.doc & internal photos.doc

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**EXHIBIT 5  
PRODUCT LABELLING**

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### 5.0 **Product Labelling**

For electronic filing, the FCC ID label artwork and location is saved with filename: label.pdf

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**EXHIBIT 6  
TECHNICAL SPECIFICATIONS**

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### 6.0 Technical Specifications

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

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## **EXHIBIT 7 INSTRUCTION MANUAL**

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### 7.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf

The required FCC Information to the User is stated on P.61 of the Instruction Manual.

This manual will be provided to the end-user with each unit sold/leased in the United States.

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**EXHIBIT 8  
SECURITY CODE INFORMATION**

## INTERTEK TESTING SERVICES

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### 8.0 Security Code Information

For electronic filing, a copy of the security code information is saved with filename: security code information.pdf

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**EXHIBIT 9  
CONFIDENTIALITY REQUEST**

## INTERTEK TESTING SERVICES

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### 9.0 Confidentiality Request

For electronic filing, a preliminary copy of the Confidentiality Request is saved with filename: request.pdf