

**VTech Telecommunications Ltd.**

Application  
For  
Certification

900MHz / 5.8GHz Analog Modulation Cordless Phone with Caller ID

**(FCC ID: EW780-6529-00)**

HK09090177-1  
MN/cl  
October 09, 2009

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**Intertek Testing Services Hong Kong Ltd.**

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# INTERTEK TESTING SERVICES

## MEASUREMENT/TECHNICAL REPORT

**VTech Telecommunications Ltd. - Model: CS5211, CS521Z-XY**  
**FCC ID: EW780-6529-00**

This report concerns (check one:)      Original Grant       Class II Change

Equipment Type : Base: DXX - Pt 15 Low Pwr Com. Device Tx  
Handset: DXT - Pt 15 Low Pwr Transceiver , Rx Verified

Deferred grant requested per 47 CFR  
0.457(d)(1)(ii)?      Yes       No

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       No

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-01-08  
Edition] Provision.

Report reviewed by:

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# INTERTEK TESTING SERVICES

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**EXHIBIT 1  
GENERAL DESCRIPTION**

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### 1.0 General Description

#### 1.1 Product Description

The CS5211 is a 900MHz / 5.8GHz Analog Modulation Cordless Phone with Caller ID. It operates at frequency range of base unit of 912.750MHz to 917.100MHz and handset unit of 5857.200MHz to 5865.900MHz with 30 channels. The Base Unit is powered by an adaptor 117VAC to 7.5VAC 200mA. The Handset is powered by a "Ni-Cd" type rechargeable battery pack (3.6V, 400mAh). 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: CS521Z-XY is the same as the Model: CS5211 in hardware aspect. Suffix (Z,X,Y) indicates different packaging material and different color of enclosure. The difference in model number serves as marketing strategy.

The circuit description is saved with filename: descri.pdf

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### 1.2 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). Preliminary radiated scans were performed in the Open Area Test Site only to determine worst case modes. All radiated measurements were performed in Open Area Test Sites. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

### 1.3 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 unit as possible to ensure full power transmission from the base unit. Else, the base unit 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.

Measurements of the radiated signal level of the fundamental frequency component of the emission was performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz.

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 7.5VAC 200mA, Model: U075020A12V) (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)

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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 Commercial & Electrical Division, Intertek Testing Services Hong Kong Ltd.

All the items listed under section 2.0 of this report are confirmed by:

*Confirmed by:*

*Nip Ming Fung, Melvin  
Supervisor  
Intertek Testing Services  
Agent for VTech Telecommunications Ltd.*



\_\_\_\_\_  
Signature

\_\_\_\_\_  
October 09, 2009 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 & 1834.200 MHz

The worst case radiated emission configuration photographs are saved with filename: config photos.pdf

### 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 2.4 dB margin

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#### **TEST PERSONNEL:**



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*Tester Signature*

Koo Wai Ip, Engineer  
*Typed/Printed Name*

October 09, 2009  
*Date*

## INTERTEK TESTING SERVICES

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Company: VTech Telecommunications Ltd.

Date of Test: September 08-09, 2009

Model: CS5211

Mode : TX-Channel 0

Table 1, Base unit

### Radiated Emissions Pursuant to FCC Part 15 Section 15.249(a) Requirements

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Calculated at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
V	912.750	67.1	16	33.0	84.1	94.0	-9.9
H	1825.500	57.4	33	27.2	51.6	54.0	-2.4
<b><i>H</i></b>	<b><i>2738.250</i></b>	<b><i>52.8</i></b>	<b><i>33</i></b>	<b><i>30.4</i></b>	<b><i>50.2</i></b>	<b><i>54.0</i></b>	<b><i>-3.8</i></b>
<b><i>H</i></b>	<b><i>3651.000</i></b>	<b><i>49.7</i></b>	<b><i>33</i></b>	<b><i>33.3</i></b>	<b><i>50.0</i></b>	<b><i>54.0</i></b>	<b><i>-4.0</i></b>
<b><i>H</i></b>	<b><i>4563.750</i></b>	<b><i>46.7</i></b>	<b><i>33</i></b>	<b><i>34.9</i></b>	<b><i>48.6</i></b>	<b><i>54.0</i></b>	<b><i>-5.4</i></b>
H	5476.500	45.5	33	35.7	48.2	54.0	-5.8
H	6389.250	43.7	33	36.9	47.6	54.0	-6.4

- 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. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of part 15.205.

Test Engineer: Koo Wai Ip

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## INTERTEK TESTING SERVICES

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Company: VTech Telecommunications Ltd.

Date of Test: September 08-09, 2009

Model: CS5211

Mode : TX-Channel 29

Table 2, Base unit

**Radiated Emissions**  
**Pursuant to FCC Part 15 Section 15.249(a) Requirements**

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Calculated at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
V	917.100	66.8	16	33.0	83.8	94.0	-10.2
H	1834.200	57.4	33	27.2	51.6	54.0	-2.4
<b>H</b>	<b>2751.300</b>	<b>53.0</b>	<b>33</b>	<b>30.4</b>	<b>50.4</b>	<b>54.0</b>	<b>-3.6</b>
<b>H</b>	<b>3668.400</b>	<b>49.9</b>	<b>33</b>	<b>33.3</b>	<b>50.2</b>	<b>54.0</b>	<b>-3.8</b>
<b>H</b>	<b>4585.500</b>	<b>46.9</b>	<b>33</b>	<b>34.9</b>	<b>48.8</b>	<b>54.0</b>	<b>-5.2</b>
H	5502.600	44.6	33	36.6	48.2	54.0	-5.8
H	6419.700	43.5	33	36.9	47.4	54.0	-6.6

- 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. Emission (the row indicated by **bold italic**) within the restricted band meets the requirement of part 15.205.

Test Engineer: Koo Wai Ip



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## INTERTEK TESTING SERVICES

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Company: VTech Telecommunications Ltd.  
Model: CS5211  
Mode : Talk

Date of Test: September 08-09, 2009

Table 3, Base unit

**Radiated Emissions**  
**Pursuant to FCC Part 15 Section 15.209, 15.109 Requirements**

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	43.000	40.8	16	10.0	34.8	40.0	-5.2
V	86.000	42.3	16	8.0	34.3	40.0	-5.7
<b>H</b>	<b>129.000</b>	<b>35.8</b>	<b>16</b>	<b>14.0</b>	<b>33.8</b>	<b>43.5</b>	<b>-9.7</b>
<b>H</b>	<b>172.000</b>	<b>31.2</b>	<b>16</b>	<b>18.0</b>	<b>33.2</b>	<b>43.5</b>	<b>-10.3</b>
H	215.000	31.4	16	17.0	32.4	43.5	-11.1
<b>H</b>	<b>258.000</b>	<b>26.6</b>	<b>16</b>	<b>21.0</b>	<b>31.6</b>	<b>46.0</b>	<b>-14.4</b>

- 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. Emission (the row indicated by **bold italic**) within the restricted band meets the requirement of part 15.205.

Test Engineer: Koo Wai Ip

## INTERTEK TESTING SERVICES

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### 3.4 Radiated Emission Configuration Photograph - Handset

Worst Case Radiated Emission

at 11731.800 MHz

The worst case radiated emission configuration photographs are saved with filename: config photos.pdf

### 3.5 Radiated Emission Data - Handset

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement : Passed by 3.2 dB margin

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#### **TEST PERSONNEL:**



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*Tester Signature*

Koo Wai Ip, Engineer  
*Typed/Printed Name*

October 09, 2009  
*Date*

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## INTERTEK TESTING SERVICES

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Company: VTech Telecommunications Ltd.  
Model: CS5211  
Mode : TX-Channel 0

Date of Test: September 08-09, 2009

Table 4, Handset

**Radiated Emissions**  
**Pursuant to FCC Part 15 Section 15.249(a) Requirements**

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Calculated at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	5857.200	85.2	33	36.6	88.8	94.0	-5.2
<b><i>H</i></b>	<b><i>11714.400</i></b>	<b><i>43.1</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>50.6</i></b>	<b><i>54.0</i></b>	<b><i>-3.4</i></b>
H	17571.600	45.7	33	37.5	50.2	54.0	-3.8

- 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. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of part 15.205.

Test Engineer: Koo Wai Ip

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## INTERTEK TESTING SERVICES

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Company: VTech Telecommunications Ltd.

Date of Test: September 08-09, 2009

Model: CS5211

Mode : TX-Channel 29

Table 5, Handset

**Radiated Emissions**  
**Pursuant to FCC Part 15 Section 15.249(a) Requirements**

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Calculated at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	5865.900	85.3	33	36.6	88.9	94.0	-5.1
<b><i>H</i></b>	<b><i>11731.800</i></b>	<b><i>43.3</i></b>	<b><i>33</i></b>	<b><i>40.5</i></b>	<b><i>50.8</i></b>	<b><i>54.0</i></b>	<b><i>-3.2</i></b>
H	17597.700	45.9	33	37.5	50.4	54.0	-3.6

- 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. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of part 15.205.

Test Engineer: Koo Wai Ip

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## INTERTEK TESTING SERVICES

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Company: VTech Telecommunications Ltd.  
Model: CS5211  
Mode : Talk

Date of Test: September 08-09, 2009

Table 6, Handset

**Radiated Emissions**  
**Pursuant to FCC Part 15 Section 15.209, 15.109 Requirements**

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	43.000	41.6	16	10.0	35.6	40.0	-4.4
V	86.000	42.2	16	8.0	34.2	40.0	-5.8
<b>H</b>	<b>129.000</b>	<b>35.6</b>	<b>16</b>	<b>14.0</b>	<b>33.6</b>	<b>43.5</b>	<b>-9.9</b>
<b>H</b>	<b>172.000</b>	<b>31.2</b>	<b>16</b>	<b>18.0</b>	<b>33.2</b>	<b>43.5</b>	<b>-10.3</b>
H	215.000	31.6	16	17.0	32.6	43.5	-10.9
<b>H</b>	<b>258.000</b>	<b>27.4</b>	<b>16</b>	<b>21.0</b>	<b>32.4</b>	<b>46.0</b>	<b>-13.6</b>

- 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. Emission (the row indicated by **bold italic**) within the restricted band meets the requirement of part 15.205.

Test Engineer: Koo Wai Ip

## INTERTEK TESTING SERVICES

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### 3.6 Radiated Emission on the Bandedge - Base Unit and Handset, FCC Rule 15.249(d)

From the following plots, they show that the fundamental emissions are confined in the specified band (902MHz to 928MHz / 5725MHz to 5875MHz). 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).

Radiated emission on bandedge plots are saved with filename: emission.pdf

Bandedge compliance is determined by applying marker-delta method, i.e.

Resultant field strength = Fundamental emissions - delta from the plot

Resultant field strength for the lowest and/or highest channel(s), with corresponding peak and average values are calculated as follows:

Handset: Lowest channel (peak) = 88.8BμV/m - 41.63dB = 47.17dBμV/m

Handset: Lowest channel (average) = 88.8dBμV/m – 41.63dB = 47.17dBμV/m

Therefore, the resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed 74dBμV/m and 54dBμV/m for peak and average limits respectively.

Pursuant to FCC Part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

## INTERTEK TESTING SERVICES

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### 3.7 Line Conducted Configuration Photograph - Base Unit

Worst Case Line-Conducted Configuration

at 11.999 MHz

The worst case line conducted configuration photographs are saved with filename: config photos.pdf

Remarks:

- [ ] EUT connects to AC power line. Emission Data is listed in following pages.
- [ x ] Base Unit connects to AC power line and has transmission. Handset connects to AC power line but has no transmission. Emission Data of Base Unit is listed in following pages.

### 3.8 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 : Base Unit: Passed by 17.6 dB margin compared with average limit

#### **TEST PERSONNEL:**



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Tester Signature

Koo Wai Ip, Engineer  
Typed/Printed Name

09 Oct 2009  
Date

## **INTERTEK TESTING SERVICES**

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Company: VTech Telecommunications Ltd.  
Model: CS5211

Date of Test: September 08-09, 2009

### **Conducted Emissions Pursuant to FCC Part 15 Section 15.207, 15.107 Requirements**

The conducted emission test result is saved with filename: conduct.pdf



**INTERTEK TESTING SERVICES**

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**EXHIBIT 4  
EQUIPMENT LIST**

## INTERTEK TESTING SERVICES

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### 4.0 Equipment List

#### 1) Radiated Emissions Test

Equipment	EMI Test Receiver	Spectrum Analyzer	
Registration No.	EW-0014	EW-2188	EW-1792
Manufacturer	R&S	AGILENTTECH	R&S
Model No.	ESVS30	E4407B	FSP40
Calibration Date	Jun. 01, 2009	Dec. 18, 2008	Feb. 02, 2009
Calibration Due Date	Jun. 01, 2010	Dec. 18, 2009	Feb. 02, 2010

Equipment	Log Periodic Antenna	Digital Multimeter
Registration No.	EW-0446	EW-1237
Manufacturer	EMCO	FLUKE
Model No.	3146	179
Calibration Date	Oct. 02, 2008	Sep. 01, 2008
Calibration Due Date	Apr. 02, 2010	Oct. 01, 2009

Equipment	Double Ridged Guide Antenna	Broad-Band Horn Antenna with frequency range 14G - 40GHz	Biconical Antenna
Registration No.	EW-1015	EW-1679	EW-0954
Manufacturer	EMCO	SCHWARZBECK	EMCO
Model No.	3115	BBHA9170	3104C
Calibration Date	Jul. 28, 2008	Feb. 10, 2009	Sep. 30, 2008
Calibration Due Date	Jan. 28, 2010	Feb. 10, 2010	Mar. 30, 2010

#### 2) Conducted Emissions Test

Equipment	EMI Test Receiver	LISN	Pulse Limiter
Registration No.	EW-0017	EW-0090	EW-0700
Manufacturer	R&S	R&S	R&S
Model No.	ESHS30	ESH3-Z5	ESH3-Z2
Calibration Date	Jun. 01, 2009	Jan. 20, 2009	Jun. 08, 2009
Calibration Due Date	Jun. 01, 2010	Jan. 20, 2010	Dec. 08, 2010



**INTERTEK TESTING SERVICES**

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**APPENDIX  
EXHIBITS FOR APPLICATION OF CERTIFICATION**