

VTech Telecommunications Ltd.

Application
For
Certification

1.9GHz Digital Modulation Cordless Phone with Bluetooth, Digital Answering
Machine, and Speakerphone - Base Unit Bluetooth Portion

(FCC ID: EW780-6761-00)

HK09030793-1
KS/ ac
April 16, 2009

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MEASUREMENT/TECHNICAL REPORT

VTech Telecommunications Ltd. - Model: LS6245
FCC ID: EW780-6761-00

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

Equipment Type : DXX - Low Power Transmitter (example: computer, printer, modem, etc.)

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 [10-01-07
Edition] Provision.

Report prepared by:

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**EXHIBIT 1
GENERAL DESCRIPTION**

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1.0 General Description

1.1 Product Description

The Model: LS6245 is a 1.9GHz Digital Modulation Cordless Phone with Bluetooth, Digital Answering Machine, and Speakerphone. Only base unit offers Bluetooth as a feature and it operates at frequency range of 2402MHz-2480MHz with 79 channels. It is powered by 100-120VAC to 6VDC 400mA adaptor. With Bluetooth and 1.9GHz wireless communications enable, the base unit allows a user uses a cordless handset to dial out or receive Bluetooth-equipped cellular phone calls via the cellular network or uses a corresponding Bluetooth-equipped headset instead of a corded headset, but only one cellular phone or headset can be on a call at a time.

Antenna Type : Integral, Internal

The circuit description is saved with filename: descri.pdf

1.2 Related Submittal(s) Grants

This is an Application for Certification of a DXX - Part 15 Low Power Com. Device Tx. One transmitter is included in this application. On the other hand, a 1.9GHz transmitter, a composite device subject to an additional equipment authorization, has the same as this FCC ID: EW780-6761-00 and is in the process of being filed.

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1.3 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 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 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 were manipulated to produce worst case emissions. The EUT was powered by an AC adaptor 100-120VAC to 6VDC 400mA.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable. The signal was maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization were varied during the search for maximum signal level. The antenna height was varied from 1 to 4 meters. Radiated emissions were taken at three meters unless the signal level was too low for measurement at that distance. If necessary, a pre-amplifier was used and/or the test was 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 was 100 kHz or greater for frequencies below 1000 MHz. The resolution was 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value were not reported.

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

Determination of pulse desensitization was made according to *Hewlett Packard Application Note 150-2, Spectrum Analysis... Pulsed RF*. The effective period (τ_{eff}) was 625 μ s for Bluetooth. With the resolution bandwidth 1MHz and spectrum analyzer IF bandwidth 3 dB, the pulse desensitization factor was 0 dB.

2.2 EUT Exercising Software

The EUT exercise program (if any) 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:

AC adaptor (provided with the unit) were used to power the device. Its description is listed below.

- (1) Base Unit: AC adaptor (100-120VAC to 6VDC 400mA, Model: S005IU0600040) (Supplied by Client)

Description of Peripherals:

- (1) Handset, Model: LS6245, FCC ID: EW780-6948-00 (Supplied by Client)
- (2) Nokia Mobile Phone, Model: 5300, FCC ID: PPIRM-146 (Supplied by Intertek)
- (3) Handset Battery: "Ni-MH" type rechargeable battery pack (2.4V 750mAh) (Supplied by Client)
- (4) 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.

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:

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



Signature

April 16, 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 μ V/m
 RA = Receiver Amplitude (including preamplifier) in dB μ 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 μ V/m
 RR = RA - AG in dB μ V
 LF = CF + AF in dB

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

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

RR = 23.0 dB μ V
LF = 9.0 dB

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

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3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
at

2441.000 MHz

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

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3.3 Radiated Emission Data

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

Judgement

Passed by 19.2 dB margin compare with the peak limit

TEST PERSONNEL:



Tester Signature

Jess Tang, Lead Engineer
Typed/Printed Name

April 16, 2009
Date

INTERTEK TESTING SERVICES

Company: VTech Telecommunications Ltd.

Date of Test: March 16-April 1, 2009

Model: LS6245

Mode : TX-Channel 0

Table 1

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

Polarization	Frequency	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (dB)	Calculated at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
V	2402.000	98.2	33	29.4	43.9	50.7	94.0	-43.3
V	*4804.000	48.7	33	34.9	43.9	6.7	54.0	-47.3
H	7206.000	45.5	33	37.9	43.9	6.5	54.0	-47.5
H	9608.000	41.2	33	40.4	43.9	4.7	54.0	-49.3
H	*12010.000	40.7	33	40.5	43.9	4.3	54.0	-49.7
H	14412.000	41.0	33	40.0	43.9	4.1	54.0	-49.9

Polarization	Frequency	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
V	2402.000	98.2	33	29.4	94.6	114.0	-19.4
V	*4804.000	48.7	33	34.9	50.6	74.0	-23.4
H	7206.000	45.5	33	37.9	50.4	74.0	-23.6
H	9608.000	41.2	33	40.4	48.6	74.0	-25.4
H	*12010.000	40.7	33	40.5	48.2	74.0	-25.8
H	14412.000	41.0	33	40.0	48.0	74.0	-26.0

- 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

Test Report Number: HK09030793-1

FCC ID: EW780-6761-00

INTERTEK TESTING SERVICES

Company: VTech Telecommunications Ltd.

Date of Test: March 16-April 1, 2009

Model: LS6245

Mode : TX-Channel 39

Table 2

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

Polarization	Frequency	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (dB)	Calculated at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
V	2441.000	98.4	33	29.4	43.9	50.9	94.0	-43.1
V	*4882.000	48.5	33	34.9	43.9	6.5	54.0	-47.5
H	*7323.000	45.3	33	37.9	43.9	6.3	54.0	-47.7
H	9764.000	40.8	33	40.4	43.9	4.3	54.0	-49.7
H	*12205.000	40.5	33	40.5	43.9	4.1	54.0	-49.9
H	14646.000	42.7	33	38.4	43.9	4.2	54.0	-49.8

Polarization	Frequency	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
V	2441.000	98.4	33	29.4	94.8	114.0	-19.2
V	*4882.000	48.5	33	34.9	50.4	74.0	-23.6
H	*7323.000	45.3	33	37.9	50.2	74.0	-23.8
H	9764.000	40.8	33	40.4	48.2	74.0	-25.8
H	*12205.000	40.5	33	40.5	48.0	74.0	-26.0
H	14646.000	42.7	33	38.4	48.1	74.0	-25.9

- 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

Test Report Number: HK09030793-1

FCC ID: EW780-6761-00

INTERTEK TESTING SERVICES

Company: VTech Telecommunications Ltd.

Date of Test: March 16-April 1, 2009

Model: LS6245

Mode : TX-Channel 78

Table 3

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

Polarization	Frequency	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (dB)	Calculated at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
V	2480.000	98.1	33	29.4	43.9	50.6	94.0	-43.4
V	*4960.000	48.5	33	34.9	43.9	6.5	54.0	-47.5
H	*7440.000	45.4	33	37.9	43.9	6.4	54.0	-47.6
H	9920.000	41.5	33	40.4	43.9	5.0	54.0	-49.0
H	*12400.000	40.8	33	40.5	43.9	4.4	54.0	-49.6
H	14880.000	42.8	33	38.4	43.9	4.3	54.0	-49.7

Polarization	Frequency	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
V	2480.000	98.1	33	29.4	94.5	114.0	-19.5
V	*4960.000	48.5	33	34.9	50.4	74.0	-23.6
H	*7440.000	45.4	33	37.9	50.3	74.0	-23.7
H	9920.000	41.5	33	40.4	48.9	74.0	-25.1
H	*12400.000	40.8	33	40.5	48.3	74.0	-25.7
H	14880.000	42.8	33	38.4	48.2	74.0	-25.8

- 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. 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

Test Report Number: HK09030793-1

FCC ID: EW780-6761-00

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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 (2400MHz and 2483.5MHz). 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

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.

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3.5 Line Conducted Configuration Photograph

Worst Case Line-Conducted Configuration
at

0.969 MHz

For electronic filing, the worst case line conducted configuration photographs are saved with filename: config photos.pdf

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3.6 Line Conducted Emission Data

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

Judgement

Passed by 13.65 dB margin compare with the quasi-peak limit

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

TEST PERSONNEL:



Tester Signature

Jess Tang, Lead Engineer

Typed/Printed Name

April 16, 2009

Date

INTERTEK TESTING SERVICES

Company: VTech Telecommunications Ltd.
Model: LS6245

Date of Test: March 16-April 1, 2009

3.7 Transmitter Duty Cycle Calculation, FCC Rule 15.35(b, c)

Based on the Bluetooth Specification Version 2.1 + EDR, transmitter ON time is independent of the packet type (DH1, DH3 and DH5) and packet length (single-slot and multi-slot). The maximum transmitter ON time for the Bluetooth is 625 μ s.

Each TX and RX time slot is 625 μ s in length. A TDD scheme is used where master and slave alternately transmit. For one period for a pseudo-random hopping through all 79 RF channels, it takes: $79 \times (0.625 \times 2)\text{ms} = 98.75\text{ms}$.

Therefore,

$$\begin{aligned}\text{Average Factor (AF) of Bluetooth in dB} &= 20 \log_{10} (0.625/98.75) \text{ dB} \\ &= 20 \log_{10} (0.00633) \text{ dB} \\ &= -43.9\text{dB}\end{aligned}$$