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Issuing Laboratory:
Intertek Testing Services Hong Kong Limited

HKAS has accredited this laboratory (Reg. No. HOKLAS 005) under HOKLAS for specific laboratory activities as listed in the HOKLAS directory of accredited laboratories.

TEST REPORT

Report Number: 15081077HKG-001

Application
for
Original Grant of 47 CFR Part 15 Certification

4-Line Office Phones Router

FCC ID: EW780-0068-00

Prepared and Checked by:

Chak Chun Yin, Ray
Assistant Engineer

Approved by:

Chow Chi Ming, Billy
Manager
September 24, 2015

GENERAL INFORMATION

Applicant Name:	VTech Telecommunications Ltd.
Applicant Address:	23/F., Tai Ping Industrial Centre, Block 1, 57 Ting Kok Road, Tai Po, Hong Kong.
FCC Specification Standard:	FCC Part 15, October 1, 2014 Edition
FCC ID:	EW780-0068-00
FCC Model(s):	VNT814
Type of EUT:	Class B Personal Computers and Peripherals
Description of EUT:	4-Line Office Phones Router
Serial Number:	N/A
Sample Receipt Date:	August 24, 2015
Date of Test:	August 31, 2015
Report Date:	September 24, 2015
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

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EXHIBIT 1
TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE

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1.0 Test Results Summary & Statement of Compliance

1.1 Summary of Test Results

Test Items	FCC Part 15 Section	Results	Details see section
Radiated Emission from Class B Personal Computers and Peripherals	15.109	Pass	4.2
AC Power Line Conducted Emission	15.107	Pass	4.3

1.2 Statement of Compliance

The equipment under test is found to be complying with the following standard:

FCC Part 15, October 1, 2014 Edition

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EXHIBIT 2
GENERAL DESCRIPTION

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2.0 General Description

2.1 Product Description

The VNT814 is a 4-Line Office Phones Router. The EUT is powered by an adaptor 100-240VAC to 12VDC 500mA.

2.2 Test Methodology

Both AC power line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2009). Preliminary radiated scans and all radiated measurements were performed in 3m Chamber. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

2.3 Test Facility

The 3m Chamber and conducted measurement facility used to collect the radiated data and conducted data are at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

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EXHIBIT 3
SYSTEM TEST CONFIGURATION

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3.0 **System Test Configuration**

3.1 Justification

For radiated emissions testing, the equipment under test (EUT) was setup normal mode 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 EUT was powered by a 100-240VAC to 12VDC 500mA adaptor.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable. If the EUT attached to peripherals, they were connected and operational to simulate typical use.

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.

For radiated measurement, the spectrum analyzer resolution bandwidth was 100 kHz for frequencies below 1000 MHz.

Radiated emission measurement was performed from the frequency 30MHz to 1GHz.

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3.1 Justification - Cont'd

Detector function for radiated emissions is in peak mode.

For AC line conducted emission test, the EUT along with its peripherals were placed on a 1.0m(W)x1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50ohm coupling impedance for measuring instrument. The LISN housing, measuring instrument case, reference ground plane, and vertical ground plane were bounded together. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were manipulated to find the maximum emission.

All relevant operation modes have been tested, and the worst case data was included in this report.

3.2 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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3.3 Details of EUT and Description of Accessories

Details of EUT:

An AC adaptor (provided with the unit) was used to power the device. Their description are listed below.

(1) An AC adaptor (100-240VAC to 12VDC 500mA, Model: CS6D120050FUF, Brand: CSEC) (Supplied by Client)

Description of Peripherals:

(1) 4 x Lenovo Notebook: Model: T61, S/N: L3-CF468, DoC Product (Supplied by Intertek)
(2) 5 x CAT5 LAN unshielded cable with 1 meter long (Supplied by Client)

3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of 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.

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EXHIBIT 4
TEST RESULTS

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4.0 **Test 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.

4.1 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD + AV

where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflects the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD +AV

Example
Assume a receiver reading of 62.0 dBμV 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. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 62.0 dBμV
AF = 7.4 dB
CF = 1.6 dB
AG = 29 dB
PD = 0 dB
AV = -10 dB
FS = 62 + 7.4 +1.6 -29 +0 + (-10) = 32 dBμV/m

Level in μV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m

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4.2 Radiated Emissions

4.2.1 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
at

60.236 MHz

The worst case radiated emission configuration photographs are attached in the Appendix and saved with filename: config photos.pdf

4.2.2 Radiated Emission Data

The data in tables 1 list the significant emission frequencies, the limit and the margin of compliance.

Judgement -

Passed by 0.5 dB margin

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Mode: 4 LAN Online

Table 1

Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBuV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBuV/m)	Limit at 3m (dBuV/m)	Margin (dB)
V	55.966	44.0	16	11.0	39.0	40.0	-1.0
V	58.720	44.4	16	11.0	39.4	40.0	-0.6
V	60.236	45.5	16	10.0	39.5	40.0	-0.5
V	82.350	47.0	16	7.0	38.0	40.0	-2.0
V	90.360	46.8	16	11.0	41.8	43.5	-1.7
V	98.141	43.4	16	12.0	39.4	43.5	-4.1
V	143.296	41.0	16	14.0	39.0	43.5	-4.5
H	166.060	40.4	16	17.0	41.4	43.5	-2.1
V	249.600	35.1	16	20.0	39.1	46.0	-6.9
H	234.438	32.2	16	19.0	35.2	46.0	-10.8
H	301.769	35.6	16	22.0	41.6	46.0	-4.4
V	346.809	28.1	16	24.0	36.1	46.0	-9.9
V	413.270	31.3	16	25.0	40.3	46.0	-5.7
V	500.939	32.6	16	26.0	42.6	46.0	-3.4
V	607.786	25.1	16	29.0	38.1	46.0	-7.9
V	749.616	27.5	16	30.0	41.5	46.0	-4.5
V	812.544	28.2	16	31.0	43.2	46.0	-2.8
V	937.816	25.4	16	33.0	42.4	46.0	-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.

*

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4.3 AC Power Line Conducted Emission

[ ] Not applicable – EUT is only powered by battery for operation.

[×] EUT connects to AC power line. Emission Data is listed in following pages.

[ ] 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.

4.3.1 AC Power Line Conducted Emission Configuration Photograph

Worst Case Line-Conducted Configuration
at

1.518 MHz

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

4.3.2 AC Power Line Conducted Emission Data

The plot(s) and data in the following pages list the significant emission frequencies, the limit and the margin of compliance

Passed by 13.5 dB margin compare with average limit

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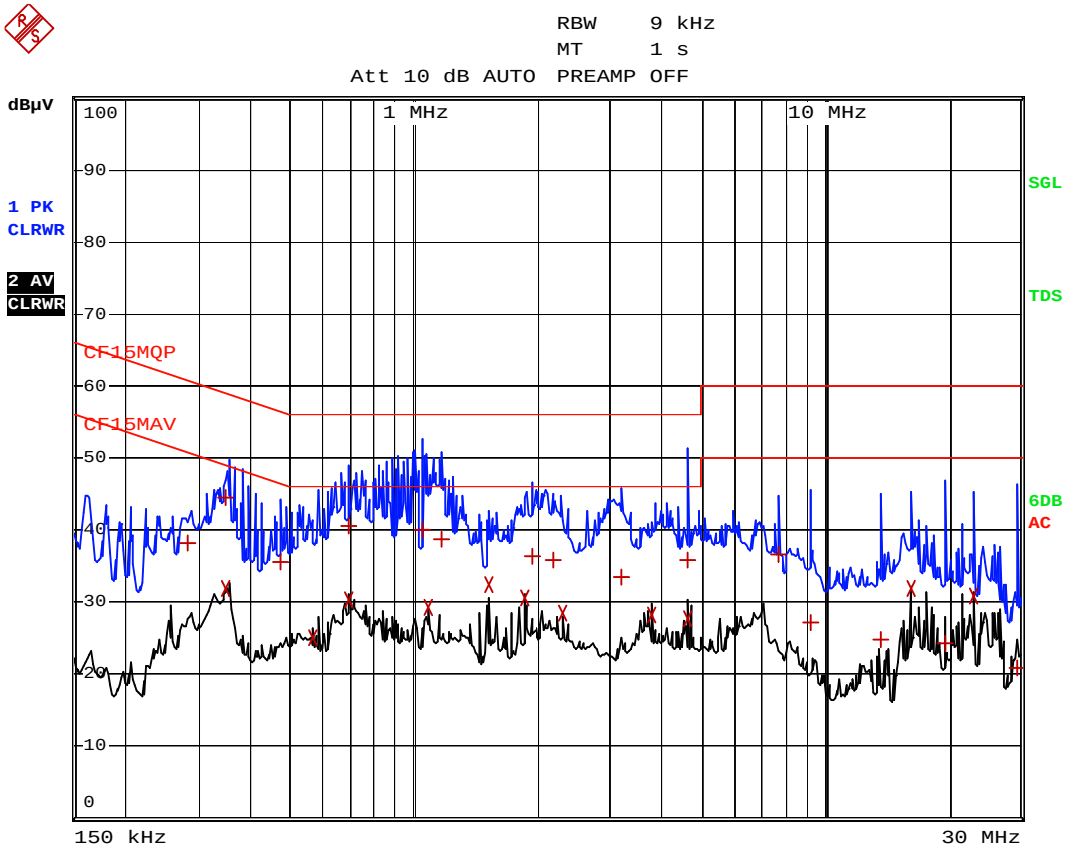
Worst Case: Operational On



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Worst Case: Operational On

EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

TRACE		FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	285 kHz	38.10	N	-22.56
1	Quasi Peak	352.5 kHz	44.48	N	-14.42
2	CISPR Average	352.5 kHz	32.01	L1	-16.88
1	Quasi Peak	474 kHz	35.60	N	-20.84
2	CISPR Average	564 kHz	25.16	L1	-20.83
1	Quasi Peak	694.5 kHz	40.59	L1	-15.41
2	CISPR Average	694.5 kHz	30.39	L1	-15.60
1	Quasi Peak	1.0455 MHz	40.01	L1	-15.98
2	CISPR Average	1.0815 MHz	29.23	L1	-16.76
1	Quasi Peak	1.167 MHz	38.71	L1	-17.28
2	CISPR Average	1.518 MHz	32.49	L1	-13.50
2	CISPR Average	1.86 MHz	30.61	L1	-15.38
1	Quasi Peak	1.9545 MHz	36.35	L1	-19.64
1	Quasi Peak	2.1795 MHz	35.72	L1	-20.27
2	CISPR Average	2.31 MHz	28.58	L1	-17.41
1	Quasi Peak	3.2145 MHz	33.46	L1	-22.53
2	CISPR Average	3.8085 MHz	28.24	L1	-17.75
1	Quasi Peak	4.65 MHz	35.73	N	-20.26
2	CISPR Average	4.65 MHz	27.80	L1	-18.19
1	Quasi Peak	7.71 MHz	36.54	L1	-23.45

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Worst Case: Operational On

EDIT PEAK LIST (Final Measurement Results)

Trace1:	CF15MQP
Trace2:	CF15MAV
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Quasi Peak	9.204 MHz	27.26 L1	-32.73
1 Quasi Peak	13.7355 MHz	24.81 L1	-35.18
2 CISPR Average	16.2285 MHz	31.79 L1	-18.20
1 Quasi Peak	19.68 MHz	24.18 L1	-35.81
2 CISPR Average	23.1315 MHz	30.78 L1	-19.21
1 Quasi Peak	29.373 MHz	20.90 L1	-39.09

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EXHIBIT 5
EQUIPMENT LIST

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5.0 **Equipment List**

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Spectrum Analyzer
Registration No.	EW-3095	EW-2466
Manufacturer	R&S	R&S
Model No.	ESCI	FSP30
Calibration Date	Oct. 16, 2014	Sep. 02, 2014
Calibration Due Date	Oct. 16, 2015	Sep. 02, 2015

Equipment	Double Ridged Guide Antenna	Biconical Antenna
Registration No.	EW-1133	EW-0954
Manufacturer	EMCO	EMCO
Model No.	3115	3104C
Calibration Date	Apr. 30, 2014	Nov. 14, 2014
Calibration Due Date	Oct. 30, 2015	May 14, 2016

2) Conducted Emissions Test

Equipment	EMI Test Receiver	LISN
Registration No.	EW-2251	EW-2501
Manufacturer	R&S	R&S
Model No.	ESCI	ENV-216
Calibration Date	Dec. 04, 2014	Jan. 15, 2015
Calibration Due Date	Dec. 04, 2015	Jan. 15, 2016

END OF TEST REPORT

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