

Issuing Laboratory:
Intertek Testing Services Hong Kong Limited

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TEST REPORT

Report Number: 14110371HKG-002

Application
for
Original Grant of 47 CFR Part 15 Certification

IP Camera

FCC ID: EW780-9479-00

Prepared and Checked by:

A handwritten signature in blue ink, appearing to be 'Wong Kwok Yeung'.

Wong Kwok Yeung, Kenneth
Lead Engineer

Approved by:

A handwritten signature in blue ink, appearing to be 'Chan Chi Hung'.

Chan Chi Hung, Terry
Supervisor
January 27, 2015

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Intertek Testing Services Hong Kong Ltd.

2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

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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, 2012 Edition
FCC ID:	EW780-9479-00
FCC Model(s):	VC931, VC931-XY
Type of EUT:	Class B Personal Computers and Peripherals
Description of EUT:	IP Camera
Serial Number:	N/A
Sample Receipt Date:	November 11, 2014
Date of Test:	November 20, 2014
Report Date:	January 27, 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
Antenna Requirement	15.203	Pass	2.1
Radiated Emission from Class B Personal Computers and Peripherals	15.109	Pass	4.2
AC Power Line Conducted Emission	15.107	Pass	4.3

Note: 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.

1.2 Statement of Compliance

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

FCC Part 15, October 1, 2012 Edition

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EXHIBIT 2
GENERAL DESCRIPTION

2.0 General Description

2.1 Product Description

The VC931 is a IP Camera. It operates at frequency range of 2412.000MHz to 2462.000MHz. The EUT is powered by an adaptor 100-240Vac 400mA to 5Vdc 2000mA.

The Model(s): VC931-XY is the same as the Model: VC931 in electronics/electrical designs including software & firmware, PCB layout and construction design/physical design/enclosure. The only differences between these models are color, cosmetic details and model number to be sold for marketing purpose. Suffix (X) can be 0-9, a-z, A-Z or blank, color code of camera cosmetic or number of camera and Suffix (Y) can be 0-9, a-z, A-Z or blank and packaging.

The antennas used in base unit is integral, and the test sample is a prototype.

The circuit description is saved with filename: descri.pdf.

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 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.

2.3 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data and conducted data are respectively of Intertek Testing Services Hong Kong Ltd., which is located at World-Wide Industrial Centre 43-47 Shan Mei Street, Fo Tan ShaTin, New Territories, 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

3.0 **System Test Configuration**

3.1 Justification

For radiated emissions testing, the equipment under test (EUT) was setup to 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 400mA to 5Vdc 2000mA 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.

For radiated measurement, the spectrum analyzer resolution bandwidth was 1MHz for frequencies above 1000 MHz.

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

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.

There was no special software to exercise the device.

3.3 Details of EUT and Description of Accessories

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) An AC adaptor (100-240VAC to 5V 2000mA, Model: S012WU0500200, Brand: Ten Pao) (Supplied by Client)
- (2) A NoteBook : HP ProBook 430 G1 with serial : 2CE425OH44
- (3) A external harddisk : Buffalo HD-PCFU3 with serial : 80097434500448

Description of Peripherals:

- (1) 3m LAN cable (Supplied by Intertek)

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

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 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
- 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 reflect 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 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. 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 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$\begin{aligned} RA &= 62.0 \text{ dB}\mu\text{V} \\ AF &= 7.4 \text{ dB} \\ CF &= 1.6 \text{ dB} \\ AG &= 29 \text{ dB} \\ PD &= 0 \text{ dB} \\ AV &= -10 \text{ dB} \\ FS &= 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 \text{ dB}\mu\text{V/m} \end{aligned}$$

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

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4.2 Radiated Emissions

4.2.1 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
at

50.006 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 table 1 list the significant emission frequencies, the limit and the margin of compliance.

Judgement -

Passed by 2.0 dB margin

Mode: LAN mode

Table 1

Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
V	50.006	54.0	16	0.0	38.0	40.0	-2.0
V	56.586	51.0	16	0.0	35.0	40.0	-5.0
V	58.746	50.0	16	0.0	34.0	40.0	-6.0
V	60.138	39.0	16	10.0	33.0	40.0	-7.0
V	98.365	38.6	16	12.0	34.6	43.5	-8.9
V	239.505	32.0	16	19.0	35.0	46.0	-11.0
V	250.730	34.5	16	20.0	38.5	46.0	-7.5
V	299.069	24.1	16	22.0	30.1	46.0	-15.9
V	335.813	26.4	16	24.0	34.4	46.0	-11.6
V	360.006	35.2	16	24.0	43.2	46.0	-2.8
V	384.425	30.5	16	24.0	38.5	46.0	-7.5
V	408.669	29.5	16	24.0	37.5	46.0	-8.5
V	480.031	24.4	16	26.0	34.4	46.0	-11.6
V	500.544	23.3	16	26.0	33.3	46.0	-12.7
V	601.347	20.0	16	29.0	33.0	46.0	-13.0
V	681.781	22.0	16	29.0	35.0	46.0	-11.0

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.

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

0.398 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

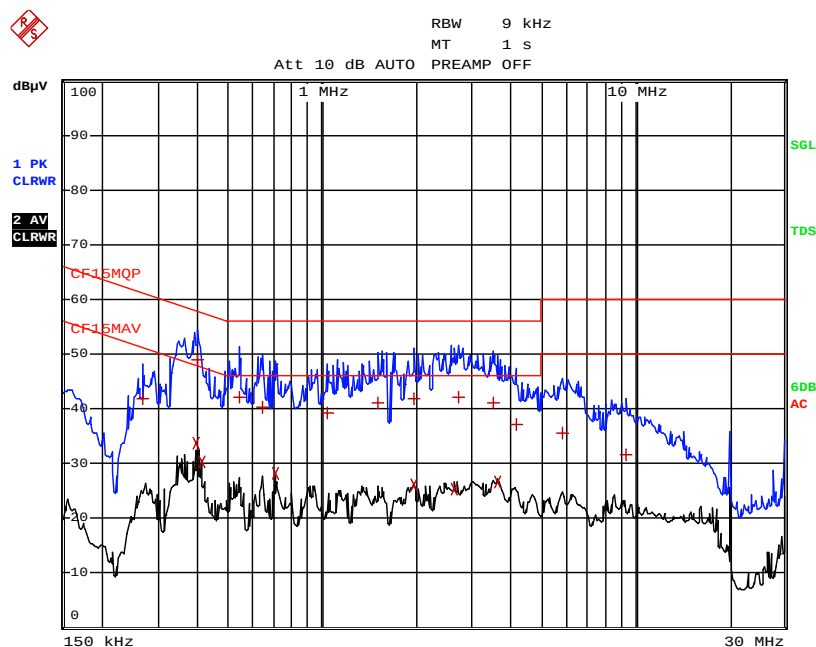
Passed by 9.0 dB margin compare with peak limit

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Worst Case: Live



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Worst Case: Live

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	CF15MQP			
Trace2:	CF15MAV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBμV		DELTA LIMIT dB
1 Quasi Peak	267 kHz	41.84	L1	-19.36
2 CISPR Average	393 kHz	33.82	N	-14.17
1 Quasi Peak	397.5 kHz	48.90	L1	-9.00
2 CISPR Average	411 kHz	30.39	N	-17.23
1 Quasi Peak	541.5 kHz	42.13	L1	-13.87
1 Quasi Peak	640.5 kHz	40.38	L1	-15.61
2 CISPR Average	708 kHz	28.20	N	-17.79
1 Quasi Peak	1.0365 MHz	39.21	N	-16.78
1 Quasi Peak	1.5045 MHz	41.03	L1	-14.96
1 Quasi Peak	1.959 MHz	41.93	N	-14.06
2 CISPR Average	1.968 MHz	26.15	N	-19.84
2 CISPR Average	2.634 MHz	25.32	N	-20.67
1 Quasi Peak	2.7285 MHz	42.21	N	-13.79
1 Quasi Peak	3.5385 MHz	41.17	N	-14.82
2 CISPR Average	3.624 MHz	26.72	N	-19.27
1 Quasi Peak	4.1865 MHz	37.17	L1	-18.82
1 Quasi Peak	5.8425 MHz	35.54	L1	-24.46
1 Quasi Peak	9.321 MHz	31.61	L1	-28.38

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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	Biconical Antenna
Registration No.	EW-2500	EW-2188	EW-0571
Manufacturer	R&S	AGILENTTECH	EMCO
Model No.	ESCI	E4407B	3104C
Calibration Date	Nov. 6, 2014	Apr. 16, 2014	Nov. 01, 2013
Calibration Due Date	Nov. 6, 2015	Apr. 16, 2015	May 01, 2015

Equipment	Log Periodic Antenna	Double Ridged Guide Antenna (1GHz - 18GHz)
Registration No.	EW-0446	EW-1133
Manufacturer	EMCO	EMCO
Model No.	3146	3115
Calibration Date	Nov. 10, 2014	Apr. 30, 2014
Calibration Due Date	May. 10, 2016	Oct. 30, 2015

2) Conducted Emissions Test

Equipment	EMI Test Receiver	Artificial Mains Network	Artificial Mains Network
Registration No.	EW-2500	EW-2501	EW-2874
Manufacturer	R&S	R&S	R&S
Model No.	ESCI	ENV-216	ENV-216
Calibration Date	Nov. 6, 2014	Dec. 25, 2013	Dec. 8, 2014
Calibration Due Date	Nov. 6, 2015	Nov. 30, 2014	Dec. 8, 2015

END OF TEST REPORT