

Report No.: HKES130100000301 Page: 1 of 31

# **TEST REPORT**

Application No.:	HKES130100000301
Applicant:	01 POWER LIMITED
Product Description:	USB Tray Hub
Model No:	4372
Standards:	EN 55022:2010, EN 55024:2010
Date of Receipt:	2013-01-02, 2013-03-27
Date of Test:	2013-01-04 to 2013-04-10
Date of Issue:	2013-04-15
Test Result :	Pass*

\* In the configuration tested, the EUT complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The protection requirements with respect to electromagnetic compatibility contained in Directive 2004/108/EC are considered.



#### LOKE Sai Kit, Wilson Senior Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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## 2 Test Summary

ELECTROMAGNETIC INTERFERENCE (EMI)						
Test	Test Requirement	Test Method	Class / Severity	Result		
Conducted Emission (150KHz to 30MHz)	EN 55022:2010	EN 55022:2010	Class B	PASS		
Conducted Emission on Telecommunication (150KHz to 30MHz)	EN 55022:2010	EN 55022:2010	Class B	N/A		
Radiated Emission, (30MHz to 1GHz)	EN 55022:2010	EN 55022:2010	Class B	PASS		
Radiated Emission above 1 GHz	EN 55022:2010	CISPR 16-2-3:2006	Class B	N/A		
Electromagnetic Suscep	tibility (EMS)					
Test	Test Requirement	Test Method	Class / Severity	Result		
ESD	EN 55024:2010	EN 61000-4-2:2009	Contact ±4 kV Air ±8 kV	PASS		
Radiated Immunity, (80MHz to 1 GHz)	EN 55024:2010	EN 61000-4-3 :2006 +A1:2008+A2:2010	3V/m 80%, 1kHz, AM	PASS		
Electrical Fast Transients (EFT) on AC and Signal	EN 55024:2010	EN 61000-4-4:2004 +A1:2010	AC ± 1.0kV Signal ± 0.5 kV	N/A		
Surge Immunity on AC	EN 55024:2010	EN 61000-4-5:2006	±1kV D.M.†	N/A		
Surge Immunity on telecommunication	EN 55024:2010	EN 61000-4-5:2006	±1kV C.M.‡	N/A		
Injected Currents (150kHz to 80MHz)	EN 55024:2010	EN 61000-4-6:2009	3Vrms (emf), 80%, 1kHz Amp. Mod.	N/A		
Power Frequency Magnetic Field	EN 55024:2010	EN 61000-4-8:2010	50 Hz 1 A/m	N/A		
Voltage Dips and Interruptions on AC	EN 55024:2010	EN 61000-4-11:2004	$0 \% U_T^*$ for 0.5per 0 % U_T^* for 250per 70 % U_T^* for 25per	N/A		
* U <sub>T</sub> is the nominal su	pply voltage					
† D.M. – Differential	Mode					
EUT In this whole report EUT means Equipment Under Test.						
N/A: Not applicable, please	e refer to section 6.2, 6.	4, 7.4, 7.5, 7.6, 7.7, 7.8 8	7.9 of this report for a	details.		



## 3 Contents

1	COV	ER PAGE	. 1
2	TEST	SUMMARY	. 2
3	CON	TENTS	3
4	GEN	ERAL INFORMATION	. 5
	4.1	Client Information	. 5
	4.2	General Description of E.U.T.	. 5
	4.3	Details of E.U.T.	. 5
	4.4	Description of Support Units	. 5
	4.5	Test Location	. 6
	4.6	Deviation from Standards	. 6
	4.7	Abnormalities from Standard Conditions	. 6
	4.8	Monitoring of EUT for All Immunity Test	. 6
5	EQU	IPMENT USED DURING TEST	7
6	EMIS	SION TEST RESULTS	. 9
	6.1	Conducted Emissions Mains Terminals, 150 kHz to 30MHz	. 9
	6.2	Conducted Emissions at Telecommunication ports, 150 KHz to 30 MHz	15
	6.3	Radiated Emissions, 30MHz to 1GHz	15
	6.4	Radiated Emissions above 1 GHz	18
7	ΙΜΜΙ	JNITY TEST RESULTS	19
	7.1	Performance Criteria Description in Clause 7 of EN 55024	19
	7.2	ESD	20
	7.3	Radiated Immunity	23
	7.4	Electrical Fast Transients (EFT)	26
	7.5	Surge	26
	7.6	Surge immunity on telecommunication port	26
	7.7	Conducted Immunity 0.15 MHz to 80 MHz	26
	7.8	Power Frequency Magnetic Field Immunity	26
	7.9	Voltage Dips and Interruptions	27



8	PHO	TOGRAPHS AND LABEL	. 28
	8.1	Conducted Emissions Mains Terminals Test Setup	. 28
	8.2	Radiated Emissions, 30MHz to 1GHz Test Setup	. 28
	8.3	ESD Test Setup	. 29
	8.4	Radiated Immunity Test Setup	. 29
	8.5	EUT Constructional Details	. 30



## 4 General Information

#### 4.1 Client Information

Applicant:	01 POWER LIMITED
Address of Applicant:	Rm 517, 5/F Kwong Loong Tai Bldg
	1016-1018 Tai Nan West Street, Lai Chi Kok, Kowloon
	Hong Kong

## 4.2 General Description of E.U.T.

Product Description:	USB Tray Hub
Model No:	4372

#### 4.3 Details of E.U.T.

Power Supply:	USB DC5V by host computer
Function:	USB Hub

## 4.4 Description of Support Units

The EUT has been tested with a personal computer system :

escription	Manufacturer	Model No.	Serial No.	Data Cable	Power Cable
Personal Computer	DELL	OPTIPLEX 755	E191 (reference no.)	N/A	1.5m
Personal Computer	DELL	Inspiron 2200	E157 (reference no.)	N/A	1.5m
Monitor	DELL	SP2208WFPt	DT09068168F B	VGA	1.5m
Printer	Hewett Packard	C3990A	JPZT098822	LPT	1.5m
Universal Programmer	Qian LongSheng	QL-2006	201105116086	COM/USB <sup>1)</sup>	1.5m (DC)
Keyboard	Lenovo	KB1021	0000319	USB <sup>2)</sup>	N/A
Ethernet router	Net Screen	NS-5GT-103	006402200400 2202	LAN	1.8m (DC)
USB flash drive 4GB	Toshiba	N/A	1027DA0649J2 JMI	N/A	N/A
Note: For the cable detail please refer to below table.					

#### Cables:

#	Туре	Length, m	Shield	Metallic hood	Ferrite
1	VGA	1.8	Yes	No	Yes
2	LPT	1.8	Yes	No	No
3	COM	1.5	Yes	No	No
4	USB <sup>1)</sup>	1.5	Yes	No	No
5	USB <sup>2)</sup>	1.8	Yes	No	No



The EUT has been tested with the software:

Description	Manufacturer	Software name	Version no.
Read / Write / Erase Program	SGS IECC	RWE Program	Version 1.5

#### 4.5 Test Location

All tests were performed at:

SGS IECC Limited (Member of the SGS Group (SGS SA))

Units 303-305, 3/F., 31 Lok Yip Road, On Lok Tsuen, Fanling, N.T., Hong Kong

Tel: +852 2305 2570 Fax: +852 2756 4480

No tests were sub-contracted.

#### 4.6 Deviation from Standards

All Immunity tests to EN 55024 were performed in accordance with EN 61000-4-x and not IEC 61000-4-x. (x=2,3,4,5,6,8,11).

The EUT was preliminary checked and no significant emission source was found. Besides, the EUT was not affected by the applicable immunity tests. In view of this, the EUT was tested with only the host computer as a simplified test method.

#### 4.7 Abnormalities from Standard Conditions

None

#### 4.8 Monitoring of EUT for All Immunity Test

Audio: N/A

Visual: Monitor the normal operation of the test setup

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## 5 Equipment Used during Test

Conducted Emission				
Equipment	Manufacturer	Model / Serial No.	Calibration Due	
Test Receiver	Rohde & Schwarz	ESHS 30 / 839667/002	2013-11-18	
Impulse Limiter	Rohde & Schwarz	ESH-3-Z2 / 375881052	2015-01-20	
Artificial Mains Network (LISN)	Schwarzbeck	NSLK 8127 / 8127312	2013-08-29	

Radiated Emission				
Equipment	Manufacturer	Model / Serial No.	Calibration Due	
Test Receiver	Rohde & Schwarz	ESCS 30 / 100388	2013-11-18	
Antenna (30-1000 MHz)	Schaffner	CBL6111C / 2791	2014-10-11	
Antenna Mast System	Schwarzbeck	AM9104 / -		
Turntable with Controller	Drehtisch	DT312 / -		

Electrostatic Discharge (ESD)				
Equipment Manufacturer Model / Serial No. Calibration De				
Electrostatic Discharge Tester	Schaffner	NSG435 / 005540	2013-05-21	



Radiated Immunity				
Equipment	Manufacturer	Model / Serial No.	Calibration Due	
RF Amplifier 80 - 1000MHz, 175Watts	Milmega	80RF1000-175 / 1048909	Cal-in-use	
RF Amplifier 0.8 – 2.7GHz, 55Watts	Milmega	AS0827-55 / 1052118	Cal-in-use	
E-Field Probe	Dare	CTR1001S + RSS1006A / 10/00037SNO20 + 11/00014SNO18	2013-08-29	
Antenna	Schwarzbeck	VULP9118E / 9118E908	Cal-in-use	
Antenna	Schwarzbeck	STLP9149 / 9149-179	Cal-in-use	
Signal Generator	Rohde & Schwarz	SMT03 / 832939/017	2013-05-01	
Dual Directional Coupler 80 - 1000MHz, 200Watts	Amplifier Research	DC6080A / 0339242	2015-02-06	
RF Power head with USB interface, 9kHz - 6GHz	Dare	RPR1006A / 06D00705SNO-95	2014-02-13	
RF Power head with USB interface, 9kHz - 6GHz	Dare	RPR1006A / 06D00705SNO-96	2014-02-13	



#### **Emission Test Results** 6

#### 6.1 Conducted Emissions Mains Terminals, 150 kHz to 30MHz

Test Requirement:	EN 55022
Test Method:	EN 55022
Test Date:	2013-01-04
Power Supply:	AC 230V
Frequency Range:	150 KHz to 30 MHz
Detector:	Peak for pre-scan (9 kHz Resolution Bandwidth)
	Quasi-Peak if maximised peak within 6 dB of Quasi-Peak limit
Class:	Class B

Class:

I imit.

Frequency range	Class B Limits				
MHz	dB (µV)				
	Quasi-peak	Average			
0.15 to 0.50	66 to 56	56 to 46			
0.50 to 5	56	46			
5 to 30	60 50				
NOTE 1 The limit decreases linearly with the logarithm of the frequency in the					
range 0.15 MHz to 0.50 MI	ЛНz.				

#### 6.1.1 E.U.T. Operation

**Operating Environment:** 

Humidity: 46% RH Temperature: 22°C

EUT Operation: Test the EUT under data transfer operation.



## 6.1.2 Test Setup and Procedure



- 1. The mains terminal disturbance voltage test was conducted in a shielded room.
- 2. The EUT was connected via the host computer to AC power source through a LISN (Line Impedance Stabilization Network) which provides a 50Ω/50µH + 5Ω linear impedance. For Load terminal voltage measurement, a voltage probe was used on the load terminals. Measurement at control terminals were carried out by means of an impedance stabilization network (ISN). The ISN was bounded to ground.
- 3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
- 4. The EUT kept a distance of at least 0.8m from any other earthed conducting surface. The Artificial Mains Network was situated at a distance of 0.8m from the EUT. The mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m.

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#### 6.1.3 Measurement Data

Live Line:

Quasi-peak measurement:





#### Live Line:

#### Average measurement:





#### Neutral Line:

Quasi-peak measurement:





#### Neutral Line:

Average measurement:





## 6.2 Conducted Emissions at Telecommunication ports, 150 KHz to 30 MHz

Remark:	
Test Date:	Not Applicable
Test Method:	EN 55022
Test Requirement:	EN 55022

The product does not have telecommunication ports and this test is not applicable.

#### 6.3 Radiated Emissions, 30MHz to 1GHz

Test Requirement:	EN 55022
Test Method:	EN 55022
Test Voltage:	USB DC 5V
Test Date:	2013-04-10
Frequency Range:	30MHz to 1GHz
Measurement Distance:	3m
Detector:	Peak for pre-scan
	Quasi-Peak if maximised peak within 6dB of limit
	(120 kHz resolution bandwidth)
Class / Limit:	Class B

#### For 3M

Frequency range MHz	Quasi-peak limits dB (µV/m)
30 to 230	40
230 to 1 000	47
At transitional frequencies the lower limit applies.	

#### 6.3.1 E.U.T. Operation

Operating Environment: Temperature: 24 °C Humidity: 66 %RH EUT Operation: Test the EUT under data transfer operation.



### 6.3.2 Test Setup and Procedure



- 1. The radiated emissions test was conducted in a semi-anechoic chamber.
- 2. Bilog antenna was used for the frequency range from 30MHz to 1GHz
- 3. The EUT was operated with power supply via the host PC. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
- 4. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT.
- 5. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.

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Report No.: HKES130100000301 Page: 17 of 31

#### 6.3.3 Measurement Data

Quasi-peak measurement :



Fraguanay	Antonno	Correction	Receiver	Emission	Limit	Over
	Polorization	Factor	QP Reading	Level	(dBµV/m)	Limit
	Polalization	(dB/m)	(dBµV)	(dBµV/m)		(dB)
42.313	V	14.6	17.8	32.4	40.0	-7.6
60.000	V	10.0	24.3	34.3	40.0	-5.7
120.000	Н	11.5	19.9	31.4	40.0	-8.6
191.998	Н	9.3	26.2	35.5	40.0	-4.5
574.875	Н	19.5	9.9	29.4	47.0	-17.6
958.063	Н	22.5	14.0	36.5	47.0	-10.5

1. All readings are Quasi-Peak values.

2. Correction Factor = Antenna Factor + Cable Loss.

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## 6.4 Radiated Emissions above 1 GHz

Test Requirement:	EN 55022
Test Method:	CISPR16-2-3
Test Date:	Not Applicable

#### **Remark:**

The product is not operated at frequency over 108MHz and this test is not applicable.



## 7 Immunity Test Results

## 7.1 Performance Criteria Description in Clause 7 of EN 55024

Criterion A:	The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criterion B:	After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criterion C:	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.



## 7.2 ESD

Test Requirement:	EN 55024	
Test Method:	EN 61000-4-2	
Test Voltage:	USB DC 5V	
Criterion Required:	В	
Test Date:	2013-01-07	
Discharge Impedance:	330 $\Omega$ / 150 pF	
Discharge Voltage:	Air Discharge:	2, 4, 8 kV
	VCP, HCP:	4 kV
	Contact Discharge:	4 kV
Polarity:	Positive & Negative	
Number of Discharge:	Minimum 10 times at each te	est point
Discharge Mode:	Single Discharge	
Discharge Period:	1 second minimum	

## 7.2.1 E.U.T. Operation

Operating Environment:Temperature:21°CHumidity:42%RHAtmospheric Pressure:1016mbarEUT Operation:Test the EUT under data transfer operation.

## 7.2.2 Test Setup and Procedure





1. Contact discharges to the conductive surfaces and to coupling planes:

The EUT was exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points (a minimum of 50 discharges at each point). One of the test points was subjected to at least 50 indirect discharges (contact) to the centre of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges.

If no direct contact test points were available, then at least 200 indirect discharges were applied in the indirect mode. Tests were performed at a maximum repetition rate of one discharge per second.

Air discharge at slots and apertures, and insulating surfaces:

On those parts of the EUT where it was not possible to perform contact discharge testing, the equipment was investigated to identify user accessible points where breakdown may occur. This investigation was restricted to those areas normally handled by the user. A minimum of 10 single air discharges were applied to the selected test point for each such area.

The application of electrostatic discharges to the contacts of open connectors was not required by this standard.

- 2. The EUT was put on a 0.8m high wooden table for table-top equipment or 0.1m high for floor standing equipment standing on the ground reference plane (GRP).
- 3. A horizontal coupling plane(HCP) 1.6m by 0.8m in size was placed on the table, and the EUT with its cables were isolated from the HCP by an insulating support thick than 0.5mm. The VCP 0.5m by 0.5m in size while HCP were constructed from the same material type and thickness as that of the GRP, and connected to the GRP via a 470kΩ resistor at each end. The distance between EUT and any of the other metallic surface excepted the GRP, HCP and VCP was greater than 1m.
- 4. During the contact discharges, the tip of the discharge electrode was touched the EUT before the discharge switch is operated. During the air discharges, the round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT.
- 5. After each discharge, the ESD generator was removed from the EUT, the generator was then retriggered for a new single discharge. For ungrounded product, a discharge cable with two resistances was used after each discharge to remove remnant electrostatic voltage. 10 times of each polarity single discharge were applied to HCP and VCP.

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#### 7.2.3 Test Results

#### • Direct Application Test Results

Observations: Test Point:

- 1. All insulated enclosure & seams.
- 2. All accessible metal parts of the enclosure with discharge resistor used.

Direct Application			Test	Results
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge
2, 4, 8	+/-	1	N/A	A
4	+/-	2	В	N/A

#### Indirect Application Test Results

Observations: Test Point: 1. All sides.

Indirect Application			Test Results	
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling	Vertical Coupling
4	+/-	1	А	А

#### Remarks:

A: No degradation in the performance of the EUT was observed.

B: During discharge were applied to the metallic connector shell, USB connection with PC was interrupted and could be self-recovered after the test.

N/A: Not Applicable (not required by Standard).

The EUT does meet the Electrostatic Discharge requirements of Standard.



## 7.3 Radiated Immunity

EN 55024
EN 61000-4-3
USB DC 5V
A
2013-01-07
80MHz to 1GHz
Horizontal & Vertical
3 V/m on enclosure
80 %, 1 kHz Amplitude Modulation

## 7.3.1 E.U.T. Operation

<b>Operating Environ</b>	ment:	
Temperature: 19	°C	Humidity: 51 %RH
EUT Operation:	Test the E	EUT at data transfer operation.

## 7.3.2 Test Setup and Procedure





- For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items.
- 2. If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length.
- 3. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area).
- 4. The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary. Here the frequency range was swept incrementally, the step size was not exceed 1 % of the preceding frequency value.
- 5. The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0.5 s.
- 6. The test normally was performed with the generating antenna facing each side of the EUT.
- 7. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.
- 8. The EUT was performed in a configuration to actual installation conditions, a video camera and/or a audio monitor were used to monitor the performance of the EUT.

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## 7.3.3 Test Results

Frequency	Level	Modulation	Antenna Polarization	EUT Face	Result / Observations
80 MHz-1 GHz 3 V/m		V	Front	А	
		Н		А	
		V		А	
	2 \//m	1 kHz, 80 % Amp. Mod, 1 % increment	Н	Rear	А
	3 0/11		V	Left	А
			Н		А
			V		А
			Н	Right	А

#### Remarks:

Front: the front of the EUT faces to transmitting antenna

A: No degradation in the performance of the E.U.T. was observed.

N/A: Not applicable



## 7.4 Electrical Fast Transients (EFT)

Test Requirement:	EN 55024
Test Method:	EN 61000-4-4
Test Date:	Not Applicable

#### Remark:

The EUT is not connected AC mains and is less than 3m. Hence, this test is not applicable.

## 7.5 Surge

Test Requirement:	EN 55024
Test Method:	EN 61000-4-5
Test Date:	Not Applicable

#### Remark:

The EUT is not connected AC mains and is not connected to outdoor cables. Hence, this test is not applicable.

#### 7.6 Surge immunity on telecommunication port

Test Requirement:	EN 55024
Test Method:	EN 61000-4-5
Test Date:	Not Applicable

#### Remark:

The product does not have telecommunication ports and this test is not applicable.

#### 7.7 Conducted Immunity 0.15 MHz to 80 MHz

Test Requirement:	EN 55024
Test Method:	EN 61000-4-6
Test Date:	Not Applicable

#### Remark:

The EUT is not connected AC mains and is less than 3m. Hence, this test is not applicable.

#### 7.8 Power Frequency Magnetic Field Immunity

Test Requirement:	EN 55024
Test Method:	EN 61000-4-8
Test Date:	Not Applicable

#### Remark:

The product does not have parts which is susceptible to magnetic fields. Hence, this test is not applicable.

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## 7.9 Voltage Dips and Interruptions

Test Requirement:	EN 55024
Test Method:	EN 61000-4-11
Test Date:	Not Applicable

#### Remark:

The EUT is not connected to AC mains and this test is not applicable.



## 8 Photographs and label

8.1 Conducted Emissions Mains Terminals Test Setup



8.2 Radiated Emissions, 30MHz to 1GHz Test Setup



![](_page_28_Picture_0.jpeg)

Report No.: HKES130100000301 Page: 29 of 31

### 8.3 ESD Test Setup

![](_page_28_Picture_3.jpeg)

8.4 Radiated Immunity Test Setup

![](_page_28_Picture_5.jpeg)

![](_page_29_Picture_0.jpeg)

Report No.: HKES130100000301 Page: 30 of 31

#### 8.5 EUT Constructional Details

![](_page_29_Picture_3.jpeg)

![](_page_29_Picture_4.jpeg)

![](_page_30_Picture_0.jpeg)

Report No.: HKES130100000301 Page: 31 of 31

![](_page_30_Picture_2.jpeg)

--End of Report--