FCC ID: HSUTRLS-600EC

EMC

TEST REPORT

REPORT NO. : F87082006
MODEL NO. : S-600EC
DATE OF TEST : Aug. 29, 1998

PREPARED FOR: ROYAL INFORMATION ELECTRONICS CO., LTD.

ADDRESS : NO. 3, LANE 11, TZU-CHANG ST., TU-CHENG IND.
DISTRICT TAIPEI HSIEN, TAIWAN,R.O.C.

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION

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12F, NO.1, SEC.4, NAN-KING EAST RD.,
TAIPEI, TAIWAN, R.O.C.

TABLE OF CONTENTS

1.

CERTIFICATION

Issue Date: Sept. 1, 1998

Product	:	SCANNER
Trade Name	:	TRL/RIC
Model No.	:	S-600EC
Applicant	:	ROYAL INFORMATION ELECTRONIC CO., LTD.
Standard	:	FCC Part 15, Subpart B, Class B ANSI C63.4-1992 CISPR 22:1993+A1+A2

We hereby certify that one sample of the designation has been tested in our facility on Aug. 29, 1998. The test record, data evaluation and Equipment Under Test (EUT) configurations represent herein are true and accurate representation of the measurements of the sample's EMC characteristics under the conditions herein specified.

The test results show that the EUT as described in this report is in compliance with the Class B limits of conducted and radiated emission of applicable standards.

TESTED BY: Jackey Chang DATE: 9/4/98
(Jackey Chang)

CHECKED BY: Yemmy Soong , DATE: 9/4/98
(Yemmy Soong)

APPROVED BY: Mike Su , DATE: 9/4/98
(Mike Su)

ADVANCE DATA TECHNOLOGY CORPORATION

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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	SCANNER
Model No.	:	S-600EC
Power Supply Type	:	DC 15V
Power Cord	:	Nonshielded (AC 1.8m)
		Nonshielded (DC 1.8m)
Data Cable	:	Shielded (1.1m)

Note: The EUT is a color scanner designed for high speed, high resolution, quality scanning of A4 sized documents.

The EUT was tested with a SINCHO power adapter, model: SCP57-151200.
Its rating: Input: 230V, 50 Hz
Output: 15 Vdc, 1.2A

This power adapter will be sold together with the EUT.

There is a ferrite core on the cable connecting the EUT and PC.

For more detailed features description, please refer to ATTACHMENT 1 - TECHNICAL DESCRIPTION OF EUT and User's Manual.

2.2 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories are used to form representative test configuration during the tests.

No.	Product	Brand	Model No.	FCC ID.	I/O Cable
1	PERSONAL COMPUTER	HP	D5220B-PK201	FCC Doc Approved	Nonshielded Power (1.8m)
2	MONITOR	HP	D2846	FCC Doc Approved	Shielded Signal (1.5m) Nonshielded Power (1.8m)
3	KEYBOARD	FORWARD	FDA-104GA	F4ZDA-104G	Shielded signal (1.5m)
4	PRINTER	HP	2225C+	DSI6XU2225	Shielded Signal (1.2m) Nonshielded Power (1.8m)
5	MODEM	ACEEX	1414	IFAXDM1414	Shielded signal (1.5m) Nonshielded Power (1.8m)
6	MOUSE	HP	M-S34	DZL21102P	Shielded signal (1.8m)

2.3 TEST METHODOLOGY AND CONFIGURATION

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4:1992. Radiated testing was performed at an antenna to EUT distance of 10m on an open area test site. Please refer to the photos of test configuration in Item 5.

3. TEST INSTRUMENTS

3.1 TEST INSTRUMENTS (EMISSION)

RADIATED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
HP Spectrum Analyzer	8590L	3544A01042	April 29, 1999
HP Preamplifier	8447D	2944A08313	Sept. 18, 1998
ROHDE & SCHWARZ TEST RECEIVER	ESVS 30	841977/008	Oct. 5, 1998
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 28, 1998
CHASE BiLOG Antenna	CBL6111A	1647	July 3, 1999
EMCO Turn Table	1016	1722	N/A
EMCO Tower	1051	1825	N/A
Open Field Test Site	Site 4	ADT-R04	June 19, 1999

Note: 1. The measurement uncertainty is less than +/- 3dB, which is calculated as per NAMA's document NIS81.

2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

CONDUCTED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ Test Receiver	ESHS30	828765/002	July 29, 1999
ROHDE & SCHWARZ Artificial Mains Network	ESH2-Z5	828075/003	July 27, 1999
EMCO-L.I.S.N.	3825/2	90031627	July 27, 1999
Shielded Room	Site 5	ADT-C05	N/A

Note: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per NAMA's document NIS81.

2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

LIMITS OF CONDUCTED AND RADIATED EMISSION

LIMIT OF RADIATED EMISSION OF CISPR 22

FREQUENCY (MHz)	Class A (at 10m) dBuV/m	Class B (at 10m) dBuV/m
30 - 230	40	30
230 - 1000	47	37

LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (MHz)	Class A (at 10m)		Class B (at 3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
Above 1000	300	49.5	500	54.0

Note: (1) The lower limit shall apply at the transition frequencies.

(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

LIMIT OF CONDUCTED EMISSION OF CISPR 22

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Note: (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz

(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4. TEST RESULTS (EMISSION)

4.1 RADIO DISTURBANCE

Frequency Range	:	0.15 - 30 MHz (Conducted Emission)
		30 - 1000 MHz (Radiated Emission)
Input Voltage	:	120 Vac, 60 Hz
Temperature	:	27 ℃
Humidity	:	61 %
Atmospheric Pressure	:	998 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -12.0 dB at 4.779 MHz Minimum passing margin of radiated emission: -3.0 dB at 190.09 MHz

4.1.1 EUT OPERATION CONDITION

1. Turn on the power of all equipments.
2. PC runs a test program to enable all functions.
3. Scanner (EUT) scans an image and sends messages to PC.
4. PC then sends these messages to monitor.
5. Repeat steps 3-4.

4.2 TEST DATA OF CONDUCTED EMISSION

EUT: **SCANNER** MODEL: **S-600EC**

6 dB Bandwidth: 10 kHz

TEST PERSONNEL: Jackey Chang

Freq.	L Level		N Level		Limit		Margin [dB (μV)]			
[MHz]	[dB (μV)]		[dB (μV)]		[dB (μV)]		L		N	
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV
0.153	29.90	-	24.40	-	65.82	55.82	-35.9	-	-41.4	-
2.355	31.40	-	31.90	-	56.00	46.00	-24.6	-	-24.1	-
3.948	41.00	-	41.50	-	56.00	46.00	-15.0	-	-14.5	-
4.779	42.00	-	44.00	-	56.00	46.00	-14.0	-	-12.0	-
5.540	45.10	-	46.10	-	60.00	50.00	-14.9	-	-13.9	-
9.497	41.40	-	33.90	-	60.00	50.00	-18.6	-	-26.1	-

Remarks:
1. "*": Undetectable
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
4. The emission level of other frequencies were very low against the limit.

ADT CO. Shielded Room 5

25. Aug 98 18:28

CISPR 22 CLASS B

Report No. F87082006

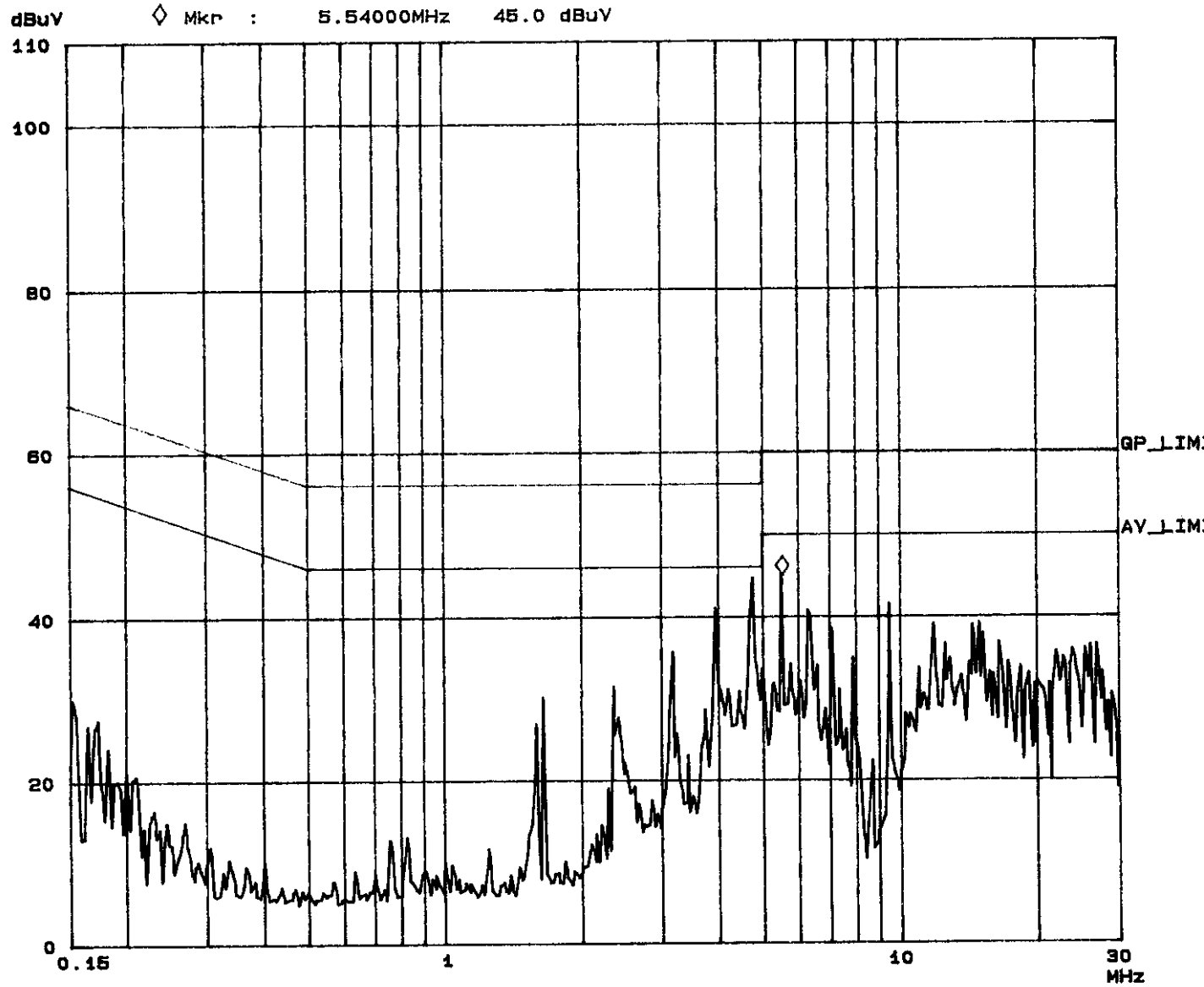
Page 9-1

Tested by Jackey Chang

EUT: S-800EC
Operator: JACKEY
Test Spec: LISN : L
Comment: FULL SYSTEM

Fast Scan Settings (3 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	450k	3k	10k	PK	1ms	10dBLN	OFF	60dB
450k	5M	3k	10k	PK	1ms	10dBLN	OFF	60dB
5M	30M	3k	10k	PK	1ms	10dBLN	OFF	60dB



ADT CO. Shielded Room 5

25. Aug 98 18: 47

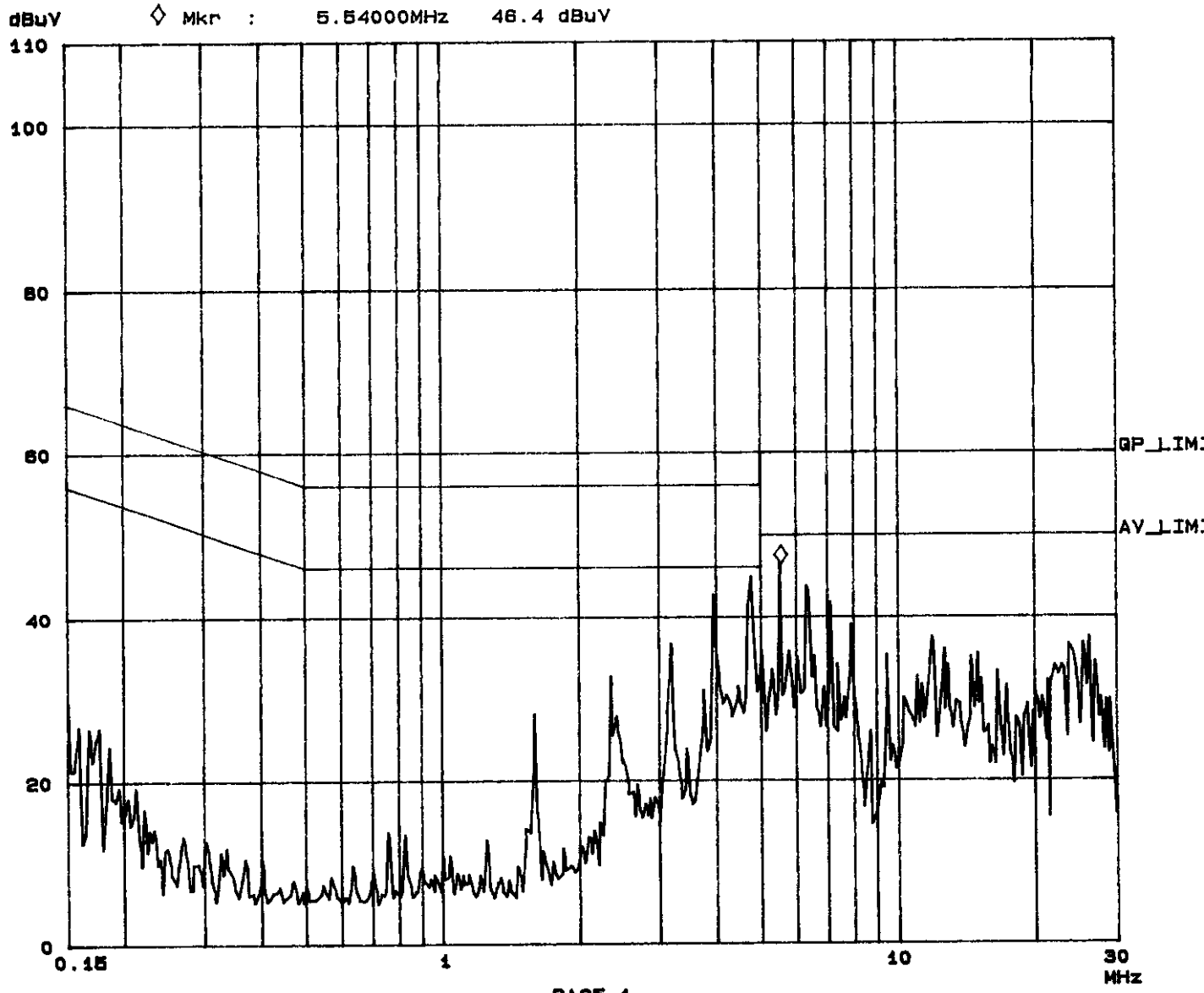
CISPR 22 CLASS B

EUT: S-600EC
Operator: JACKEY
Test Spec: LISN : N
Comment: FULL SYSTEM

Report No. F87082006
Page 9-2
Tested by Jackey Chang

Fast Scan Settings (3 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	450k	3k	10k	PK	1ms	10dBLN	OFF	60dB
450k	5M	3k	10k	PK	1ms	10dBLN	OFF	60dB
5M	30M	3k	10k	PK	1ms	10dBLN	OFF	60dB



4.3 TEST DATA OF RADIATED EMISSION

EUT: **SCANNER** MODEL: **S-600EC**

ANTENNA: CHASE BILOG CBL6111A POLARITY: Horizontal

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz MEASURED DISTANCE: 10 M

TEST PERSONNEL: Jacky Chang

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
83.86	9.9	10.9	20.8	30.0	-9.2
111.29	13.1	6.0	19.1	30.0	-10.9
130.06	14.3	6.9	21.2	30.0	-8.8
156.31	12.5	10.9	23.4	30.0	-6.6
193.85	11.6	11.6	23.2	30.0	-6.8
206.35	12.0	11.0	23.0	30.0	-7.0
223.85	13.2	12.7	25.9	30.0	-4.1
260.88	16.1	16.1	32.2	37.0	-4.8

REMARKS :
1. Emission level (dBuV/m) = Correction Factor(dB/m) +Meter Reading (dBuV).
2. Correction Factor(dB/m) = Ant. Factor(dB/m)+Cable loss(dB)
3. The other emission levels were very low against the limit.

FCC ID: HSUTRLS-600EC

TEST DATA OF RADIATED EMISSION

EUT: **SCANNER** MODEL: **S-600EC**

ANTENNA: CHASE BILOG CBL6111A POLARITY: Vertical

DETECTOR FUNCTION: Quasi-peak 6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz MEASURED DISTANCE: 10 M

TEST PERSONNEL: Jackey Chang

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
83.80	8.1	16.4	24.5	30.0	-5.5
85.04	8.5	14.4	22.9	30.0	-7.1
112.56	12.0	11.0	23.0	30.0	-7.0
130.06	14.4	10.4	24.8	30.0	-5.2
156.31	13.3	12.9	26.2	30.0	-3.8
190.09	11.8	15.2	27.0	30.0	-3.0
204.87	12.3	10.5	22.8	30.0	-7.2
225.65	13.1	13.1	26.2	30.0	-3.8
270.95	14.6	17.2	31.8	37.0	-5.2

REMARKS :
1. Emission level (dBuV/m) = Correction Factor(dB/m) +Meter Reading (dBuV).
2. Correction Factor(dB/m) = Ant. Factor(dB/m)+Cable loss(dB)
3. The other emission levels were very low against the limit.

6. ATTACHMENT I -TECHNICAL DESCRIPTION OF EUT

SPECIFICATIONS:

*Scanner Type	Desktop flatbed scanner
*Scan Method	Single - pass color CCD
*Light Source	Cold Cathode Lamp
*Optical resolution	600 x 1200 dpi
*Software interpolation resolution	25 ~ 4800 dpi
*Maximum scan area	8.5" x 11.7" (216mm x 297mm)
*Interface	Printer Port (EPP)
*Scan Speed	Prescan : 18 sec
	Color Scan : 285 sec (A4/600dpi)
	Gray Scan : 130 sec (A4/600dpi)
*Scan Mode	Color Picture : 30 bits / pixel
	Gray Scale : 8 bits / pixel
	Line Art : 1 bits / pixel
	Dither : 1 bits / pixel
*Power Supply	15 Vdc
*Power Consumption	Maximum rating: 15 watts
*Software supported	TWAIN compliant application software
*Dimensions	Width : 292mm
	Length: 484mm
	Height: 100mm
	Weight: 3 kg (net)
*Temperature	Operating: 0℃ to 40℃
*Relative Humidity	Operating: 20% to 80%
	Storage: Up to 85%