

**PEP Testing Laboratory**

12-3Fl, No. 27-1, Lane 169, Kang-Ning St., Hsi-Chih,

Taipei Hsien, Taiwan, R. O. C.

TEL: 886-2-26922097 FAX: 886-2-26956236

FCC REGISTRATION NO. : 90868

REPORT NO. : E930080

# FCC TEST REPORT

According to

## FCC Part 15 Class A

EQUIPMENT : Embedded Controller

MODEL NO. : W-8731, W-8031, W-8331, W-8037, W-8039, W-8337,  
W-8339, W-8737, W-8739

APPLICANT : ICP DAS CO., LTD.

NO. 111, KUANGFU N. RD., HUKOU SHIANG, HSINCHU,  
TAIWAN 303, R. O. C.

TEST ENGINEER : SIMON LIU

CHECKED BY : HADES HUALNG

ISSUED DATE : FEB. 25, 2004

- The test result refers exclusively to the test presented test model / sample.
- Without the written authorization of the test lab., the Test Report may not be copied.

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## 1. General

### 1.1 General Information:

APPLICANT : ICP DAS CO., LTD.

NO. 111, KUANGFU N. RD., HUKOU SHIANG,  
HSINCHU, TAIWAN 303, R. O. C.

MANUFACTURER : ICP DAS CO., LTD.

NO. 111, KUANGFU N. RD., HUKOU SHIANG,  
HSINCHU, TAIWAN 303, R. O. C.

MEASUREMENT PROCEDURE : ANSI C63.4(1992)

### 1.2 Place of Measurement

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### 2. Product Information

- a. **EUT Name:** Embedded Controller
- b. **Model No. :** W-8731
- c. **CPU Type :** Intel SA-1110
- d. **CPU Frequency :** 206MHz
- e. **Crystal/Oscillator(s) :** 3.6MHz
- f. **Chassis Used :** ABS+BC
- g. **Port/Connector(s) :** RJ45 Port × 1, D-SUB Port × 1, PS2 Port × 2,  
USB Port × 1, RS232 Port × 1
- h. **Power Rating :** DC10V~DC30V
- i. **Condition of the EUT :**  Prototype Sample  Engineering Sample  
 Production Sample
- j. **Test Item Receipt Date :** FEB. 18, 2004

### **3. EUT Description and Test Conclusion**

The equipment under test (EUT) is Embedded Controller model W-8731, W-8031, W-8037, W-8039, W-8331, W-8337, W-8339, W-8737 and W-8739. These models have identical electrical design and construction except that they are different in amount of slot and embedded operating system. After verifying these models, we took the worst-case model: W-8731 for test. The EUT contains one VGA port, two PS2 ports, one USB port, one RJ-45 port, one COM port and seven slots. DC 10V-30V from any DC power source is required to operate EUT. For more detail specifications about the EUT, please refer to the user's manual.

Test method: According to the major function designed, the EUT configuration was set up by the following steps for test:

- (A) Install keyboard and mouse to EUT PS 2 ports.
- (B) Install monitor to EUT VGA port.
- (C) Install USB keyboard to EUT USB port.
- (D) Install modem to EUT COM port.
- (E) Connect EUT RJ-45 port to remote PC off test table.

All corresponding peripherals to EUT I/O ports were set to proceed with test. The test was carried out on EUT operational condition and the worst-case test result was recorded and provided in this report.

Conducted emission test:

N/A

Radiated emission test:

The maximum readings were found by varying the height of antenna and then rotating the turntable. Both polarization of antenna, horizontal and vertical, are measured. The effect of varying the position of the interface cables has been investigated to find the configuration that produces maximum emission.

The highest emissions were also analyzed in details by operating the spectrum analyzer in fixed tuned quasi-peak mode to determine the precise amplitude of the emissions.

## **4. Modification(s):**

The applicant has been notified and agrees to incorporate the following modification(s) into all production units, please refer to the attached pages in this report.

- (A) Respectively ground the 9th pin and 37th pin of SACE U21 in parallel using 0.1 $\mu$ F capacitors shown as page 22.
- (B) Respectively ground two pins of SACE Y2, Y4 and Y5 in parallel using 45PF capacitors shown as page 22.
- (C) Respectively ground two pins of SACE Y1 in parallel using 15PF capacitor shown as page 24.
- (D) Respectively arrange parallel connections to SACE C39, C41, C46, C48, C31 and C30 using 0.1 $\mu$ F capacitors shown as page 23.
- (E) Respectively ground the 3 rd pin, 27th pin, 43rd pin and 49th pin of SACE U12 in parallel using 0.1 $\mu$ F capacitors shown as page 22.
- (F) Respectively ground the 9th pin and 37th pin of SACE U2 in parallel using 0.1 $\mu$ F capacitors shown as page 23.
- (G) Respectively ground the 27th pin, 43rd pin and 49th pin of SACE U1 in parallel using 0.1 $\mu$ F capacitors shown as page 23.
- (H) Spread ground plane beneath PS2 connector shown as page 24.
- (I) Interconnect the ground of the 7th pin of SADV J5 and the ground of C9 shown as page 24.

## **5. Test Software Used**

- (A) PING.EXE was the command executed to deliver signals between two PCs during the test.

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### 6. Support Equipment Used

#### 1. Keyboard (KBS1 PS/2) × 2

**FCC ID :** E5XKB5121WTH0110

**Manufacturer :** BTC

**Model Number :** 5121W

**Power Supply :** +5Vdc from PS2 of PC

**Power Cord :** N/A

**Data Cable :** 1 > Shielded , Non-detachable,1.6m

2 > Back Shell : Metal

#### 2. Monitor (MON1 15") × 2

**FCC ID :** Declaration of Conformity(DoC)

**Manufacturer :** SAMSUNG

**Model Number :** 550S

**Power Supply :** Switching

**Power Cord :** Non-Shielded, Detachable, 1.8m

**Data Cable :** 1 > Shielded , Non-detachable,1.2m

2 > Back Shell : Metal

#### 3. Modem (MOD1)

**FCC ID :** IFAXDM1414

**Manufacturer :** ACEEX

**Model Number :** 1414

**Power Supply :** Linear, 9Vac O/P

**Power Cable :** Non-Shielded , Detachable,1.7m

**Data Cable :** 1 > Shielded , Detachable,1m

2 > Back Shell : Metal

#### 4. Mouse (MOUS/1 PS/2) × 2

**FCC ID :** DZL211106

**Manufacturer :** LOGITECH

**Model Number :** M-S43

**Power Supply :** +5Vdc from PS2 of PC

**Power Cord :** N/A

**Data Cable :** 1 > Shielded , Non-detachable,1.8m

2 > Back Shell : Metal

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## 5. Personal Computer (PC1)

**CPU** : Intel P III 600 MHz

**FCC ID** : Declaration of Conformity(DoC)

**Manufacturer** : ASUS INC.

**Model Number** : P2-99

**Power Supply** : Switching

**Power Cord** : Non-Shielded, Detachable, 1.8m

**Data Cable** : N/A

## 6. Keyboard (KBU1 USB)

**FCC ID** : E5XKB7932MUF0310

**Manufacturer** : BTC

**Model Number** : 7932M

**Power Supply** : +5Vdc from USB of PC

**Power Cord** : N/A

**Data Cable** : 1 > Shielded , Non-detachable,1.6m

2 > Back Shell : Metal

## 7. DC Power Supply

**Manufacturer** : AMB

**Model Number** : 9306D

## 8. HUB

**Manufacturer** : N/A

**Model Number** : N/A

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## 7. Conducted Disturbance Test

### 7.1 Conducted Disturbance Emission Limit

Frequency	Maximum RF Line Voltage dB(uV)
	Class A
MHz	QUASI- PEAK
0.15 – 0.5	79
0.5 – 30.0	73

Remarks : In the above table, the tighter limit applies at the band edges.

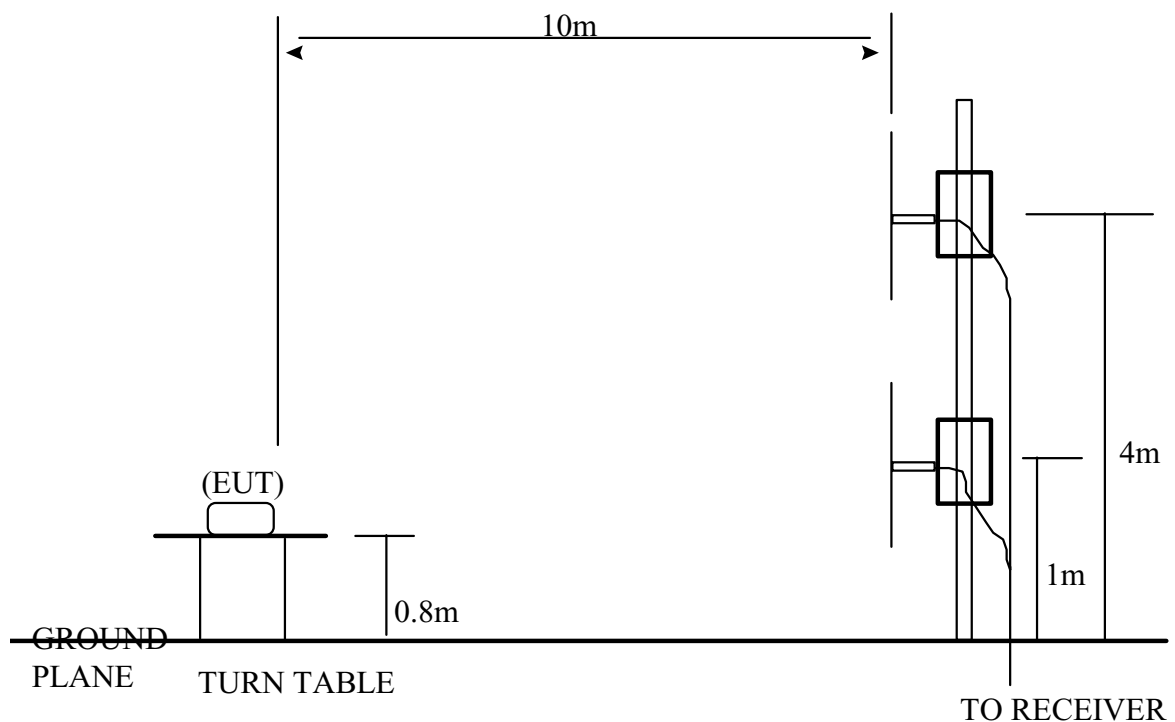
## 8. Radiated Disturbance Test

### 8.1 Setup of the Test Facilities

The equipment under test was setup on the non-conductive table in the open field site.

The table was placed on a remote turntable constructed of a wooden material. The top of the table is located 1m above the ground plane. The turntable was rotated to obtain the maximum level of radiated emissions from the system containing the EUT for each emissions level investigated.

### 8.2 Open Test Site Setup Diagram



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## 8.3 Radiated Disturbance Emission Limit

Limits for radiated disturbance of Class A ITE at  
a measuring distance of 10 m

Frequency MHz	Field Strength dB( $\mu$ V/m)
30 – 88	39.0
88 – 216	43.5
216 – 960	46.4
960 above	49.5

NOTES

- 1 The lower limit shall apply at the transition frequency.
- 2 Additional provisions may be required for cases where interference occurs.

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## **9. Conducted Test Configuration Photo**

N/A

## **10. Conducted Emissions Test Data**

N/A

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## 11. Radiated Test Configuration Photos

< FRONT VIEW >



< REAR VIEW >



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## 12. Radiated Emissions Test Data

**Model No. : W-8731**  
**Frequency range : 30MHz to 1GHz**      **Detector : Quasi-Peak Value**  
**Frequency range : above 1GHz**      **Detector : Quasi-Peak/Average Value**  
**Temperature : 26° C**      **Humidity : 54 %**

**Antenna polarization : HORIZONTAL ; Test distance : 10m ;**

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (°angle)	Antenna High(m)
71.883	29.58	- 9.42	39.00	40.33	8.21	0.84	19.80	112.0	4.0
167.729	27.85	-15.65	43.50	34.93	11.25	1.30	19.63	193.0	4.0
206.436	38.25	- 5.25	43.50	47.06	9.15	1.50	19.46	287.0	4.0
309.770	38.65	- 7.75	46.40	41.56	14.46	2.01	19.38	58.0	3.5
516.087	38.77	- 7.63	46.40	35.19	19.68	2.52	18.62	256.0	3.5
618.871	37.55	- 8.85	46.40	32.54	21.74	2.62	19.35	147.0	3.5

Note :

1. Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

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**Model No. : W-8731**  
**Frequency range : 30MHz to 1GHz**      **Detector : Quasi-Peak Value**  
**Frequency range : above 1GHz**      **Detector : Quasi-Peak/Average Value**  
**Temperature : 26° C**      **Humidity : 54 %**

**Antenna polarization : VERTICAL ; Test distance : 10m ;**

Freq. (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Azimuth (°angle)	Antenna High(m)
48.736	33.38	- 5.62	39.00	42.57	10.28	0.53	20.00	236.0	1.0
71.883	33.58	- 5.42	39.00	44.33	8.21	0.84	19.80	179.0	1.0
169.500	30.85	-12.65	43.50	37.76	11.43	1.30	19.64	283.0	1.0
309.770	39.64	- 6.76	46.40	42.55	14.46	2.01	19.38	317.0	3.5
516.087	38.45	- 7.95	46.40	34.87	19.68	2.52	18.62	158.0	1.5
618.871	35.67	-10.73	46.40	30.66	21.74	2.62	19.35	63.0	1.5

Note :

1. Level = Read Level + Antenna Factor + Cable Loss – Preamp Factor
2. Over Limit = Level – Limit Line

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## 13. List of Test Equipment

Test Mode	Instrument	Model No.	Serial No.	Next Cal. Date	Cal. Interval
<b>Conduction (No.1)</b>	R & S Receiver	ESHS10	830223/008	May 22, 2004	1Year
	Rolf Heine LISN	NNB-4/63TL	98008	May 01, 2004	1Year
	R & S LISN	ESH3-Z5	844982/039	Aug. 06, 2004	1Year
	Spectrum Analyzer	R3261A	91720076	June 08, 2004	1Year
	RF Cable	Rg400	N/A	May 12, 2004	1Year
	Schaffner ISN	T411	N/A	June 29, 2004	1Year
<b>Radiation (OP No.1)</b>	R & S Receiver	ESVS30	863342/012	May 20, 2004	1Year
	Schaffner Pre-amplifier	CPA9232	1028	May 12, 2004	1Year
	COM-Power Horn Ant.	AH-118 (1GHz~18GHz)	10095	May 21, 2004	2Year
	Schwarzbeck Precision Dipole Ant	VHAP (30MHz~1GHz)	970 + 971 953 + 954	June 26, 2006	3Year
	R &S Signal Generator	SMY01	841104/037	Apr. 28, 2004	1Year
	RF Cable	No. 1	N/A	May 11, 2004	1Year
	EMCO Antenna	3142B (26MHz~2GHz)	9904-1370	Aug. 24, 2004	1Year

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### 14. Labelling Requirement

A warning label with the following statement shall be permanently attached and conspicuously located on the equipment :

This device complies with Part 15 of the FCC Rules . Operation is subject to the following two conditions : (1) This device may not cause harmful interference , and (2) this devices must accept any interference received , including interference that may cause undesired operation .

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# 15. Information to The User

The following FCC statement should be declared in a conspicuous location in the user's manual .

### Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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# 16. EUT Photographs

Model No. : W-8731



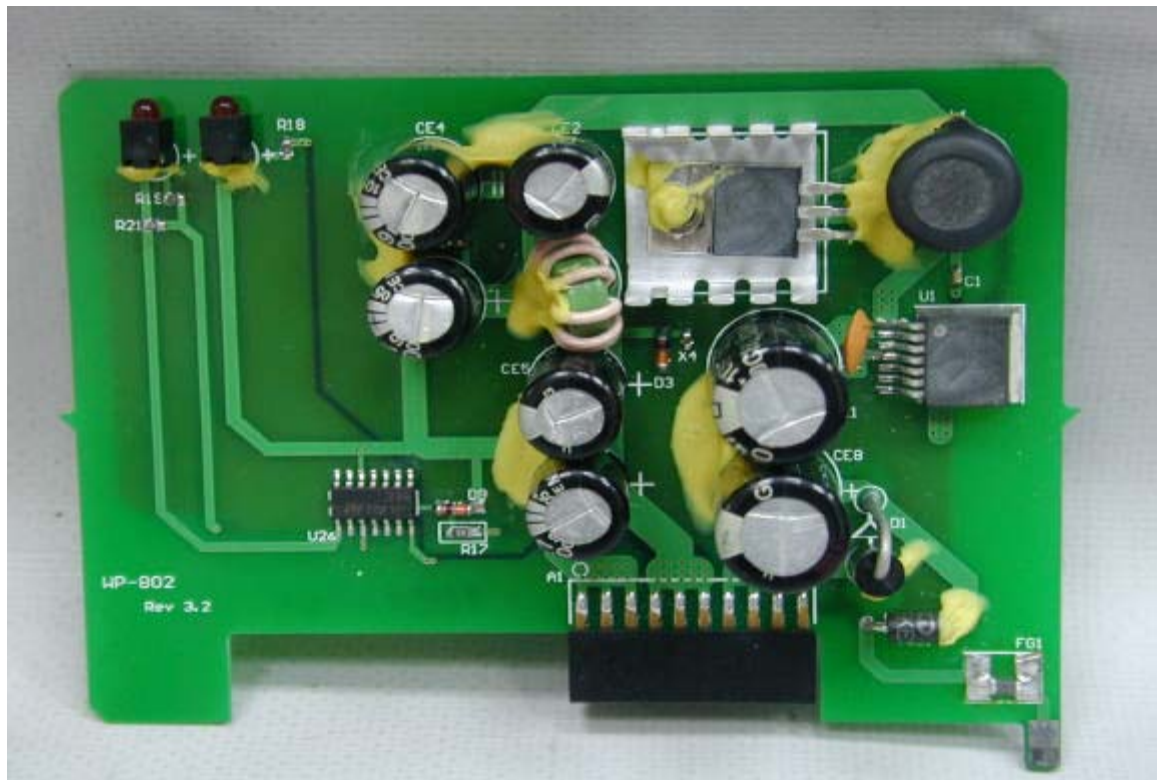
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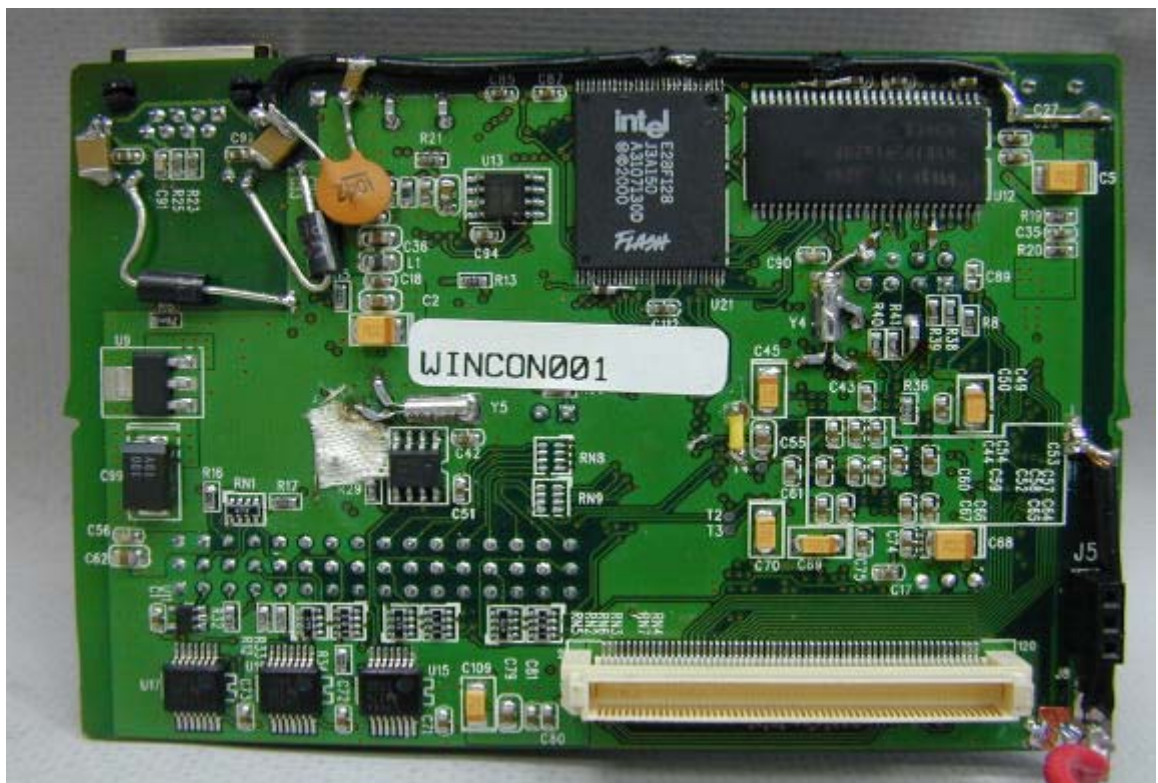
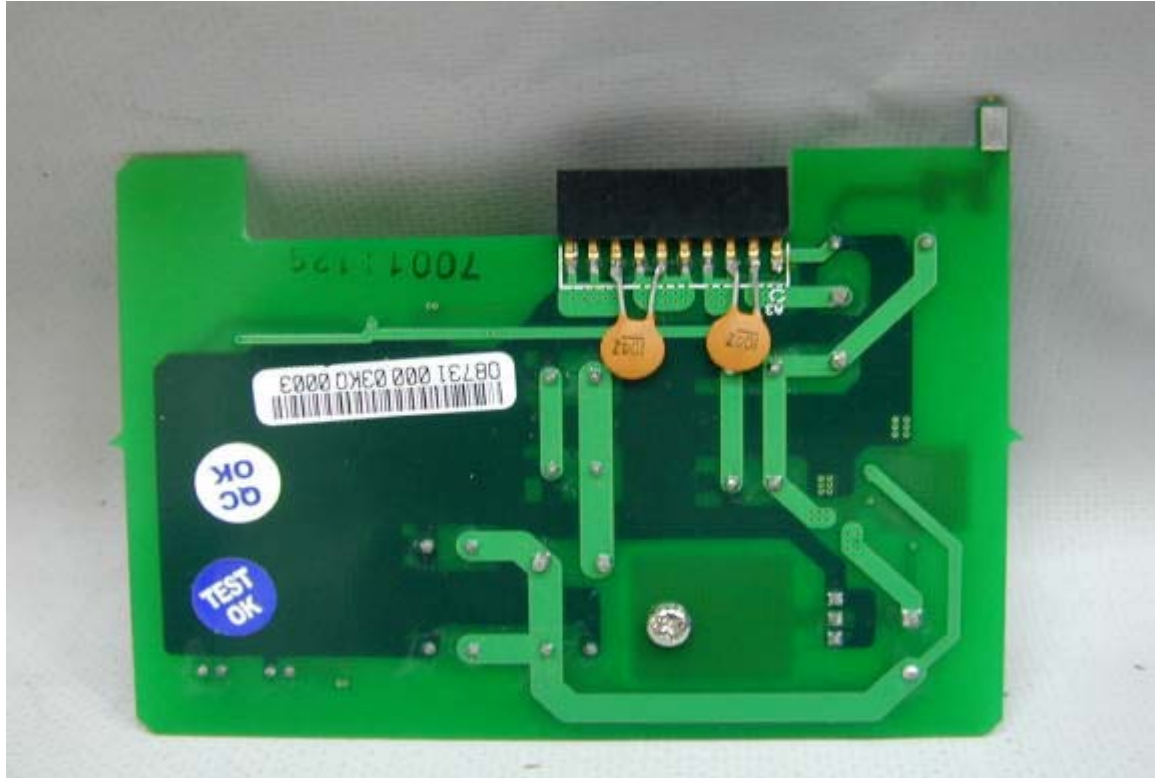
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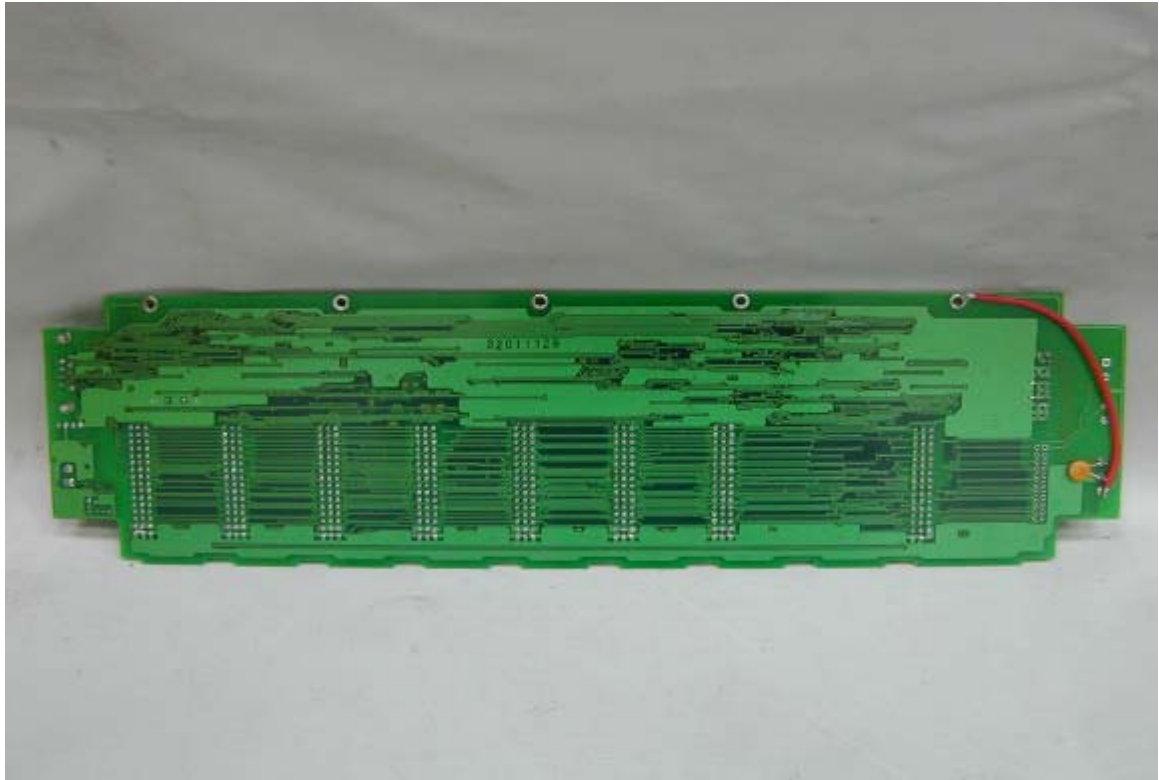
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REPORT NO. : E930080

MODEL NO. : W-8031



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FCC REGISTRATION NO. : 90868

REPORT NO. : E930080

**MODEL NO. : W-8331**



# VERIFICATION

**WE HEREBY VERIFY THAT:**

The Equipment Under Test (EUT) listed below has completed RFI testing by PEP Testing Laboratory and the interference emissions can pass **FCC Class A** limitations .

The test report shall not be reproduced except in full, without the written approval of the laboratory.

The estimate uncertainty of the test result is about  $\pm 3$ dB. The test result is only effect for the sample as below.

**APPLICANT** : ICP DAS CO., LTD.

**EQUIPMENT** : Embedded Controller

**MODEL NO.** : W-8731, W-8031, W-8331, W-8037, W-8039, W-8337,  
W-8339, W-8737, W-8739

**REPORT NO.** : E930080



*M. Y. Tsui*

M. Y. TSUI / Manager



Date : FEB. 25, 2004