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

EMC TEST REPORT

According to

1) EN 55022: 1998+A1: 2000
2) EN 61000-3-2: 2000
3) EN 61000-3-3: 1995+A1: 2001
4) EN 55024: 1998+A1: 2001
EN 61000-4-2: 1995+A2: 2001 / EN 61000-4-3: 1996+A2: 2001
EN 61000-4-4: 1995+A2: 2001 / EN 61000-4-5: 1995+A1: 2001
EN 61000-4-6: 1996+A1: 2001 / EN 61000-4-8: 1993+A1: 2001
EN 61000-4-11: 1994+A1: 2001

EUT Name : 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

Reviewed by : HADES HUANG

Issued Date: : FEB. 25, 2004

• This report is only for the equipment which described in page 7.

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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 : EN55022

1.2 Place of Measurement

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NVLAP LAB CODE 200097-0
FCC Registration No. : 90868
NEMKO Aut. No. : ELA133
BSMI Aut. No. : SL2-IN-E-11
VCCI Registration No. : C-493/R-477

1.3 Test Standards

Tested for compliance with:

EN 55022:1998 +A1: 2000	- Information Technology Equipment – Radio disturbance characteristics - Limits and methods of measurement
EN 61000-3-2: 2000	- Electromagnetic compatibility (EMC) Part 3-2: Limits – Limits for harmonic current emissions (equipment input Current up to and including 16A per phase
EN 61000-3-3: 1995 +A1: 2001	- Electromagnetic compatibility (EMC) Part 3-2: Limits – Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current up to 16A
EN 55024:1998 +A1: 2001	- Information technology equipment – Immunity characteristics Limits and methods of measurement
EN 61000-4-2: 1995 +A2: 2001	- Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques, Section 2: Electrostatic discharge immunity test Basic EMC Publication
EN 61000-4-3: 1996 +A2: 2001	- Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques, Section 3: Radiated, radio-Frequency, electromagnetic field immunity test
EN 61000-4-4: 1995 +A2: 2001	- Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques, Section 4: Electrical fast transient / Burst immunity test Basic EMC publication
EN 61000-4-5: 1995 +A1: 2001	- Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques, Section 5: Surge immunity test (includes corrigendum: 1995)
EN 61000-4-6: 1996 +A1: 2001	- Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques, Section 6: Immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-8: 1993 +A1: 2001	- Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques, Section 8: Power frequency magnetic field immunity test Basic EMC publication
EN 61000-4-11: 1994 +A1: 2001	- Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques, Section 11: Voltage dips, short interruptions and voltage variations immunity tests

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

2a. Product Technical Judgement

Based on the major electrical and mechanical constrictions of the EUT, We hereby declare that the subject product does fully comply with the following EMC requirements without additional test required :

1) EN 61000-3-2：2000
2) EN 61000-3-3：1995+A1：2001
3) EN 61000-4-4：1995+A2：2001
4) EN 61000-4-5：1995+A1：2001
5) EN 61000-4-6：1996+A1：2001
6) EN 61000-4-11：1994+A1：2001

These test standards will be applicable to both of PEP EMC verification and declaration of conformity for technical reference.

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.

In addition, the test standards EN 61000-4-2, EN 61000-4-3 and 61000-4-8 are applicable for related tests being carried out on the same EUT configuration and operational condition kept during radiated emission test.

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 0.1μF capacitors shown as page 41.
(B) Respectively ground two pins of SACE Y2, Y4 and Y5 in parallel using 45PF capacitors shown as page 41.
(C) Respectively ground two pins of SACE Y1 in parallel using 15PF capacitor shown as page 43.
(D) Respectively arrange parallel connections to SACE C39, C41, C46, C48, C31 and C30 using 0.1μF capacitors shown as page 42.
(E) Respectively ground the 3 rd pin, 27th pin, 43rd pin and 49th pin of SACE U12 in parallel using 0.1μF capacitors shown as page 41.
(F) Respectively ground the 9th pin and 37th pin of SACE U2 in parallel using 0.1μF capacitors shown as page 42.
(G) Respectively ground the 27th pin, 43rd pin and 49th pin of SACE U1 in parallel using 0.1μF capacitors shown as page 42.
(H) Spread ground plane beneath PS2 connector shown as page 43.
(I) Interconnect the ground of the 7th pin of SADV J5 and the ground of C9 shown as page 43.

5. Test Software Used

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

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

5. Personal Computer (PC1)	**CPU :** Intel PⅢ600 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. EN 55022 Conducted Disturbance Test

Test Standard	Model No.	Result
EN 55022:1998	W-8731	N/A

8. EN 55022 Radiated Disturbance Test

Test Standard	Model No.	Result
EN 55022	W-8731	Passed

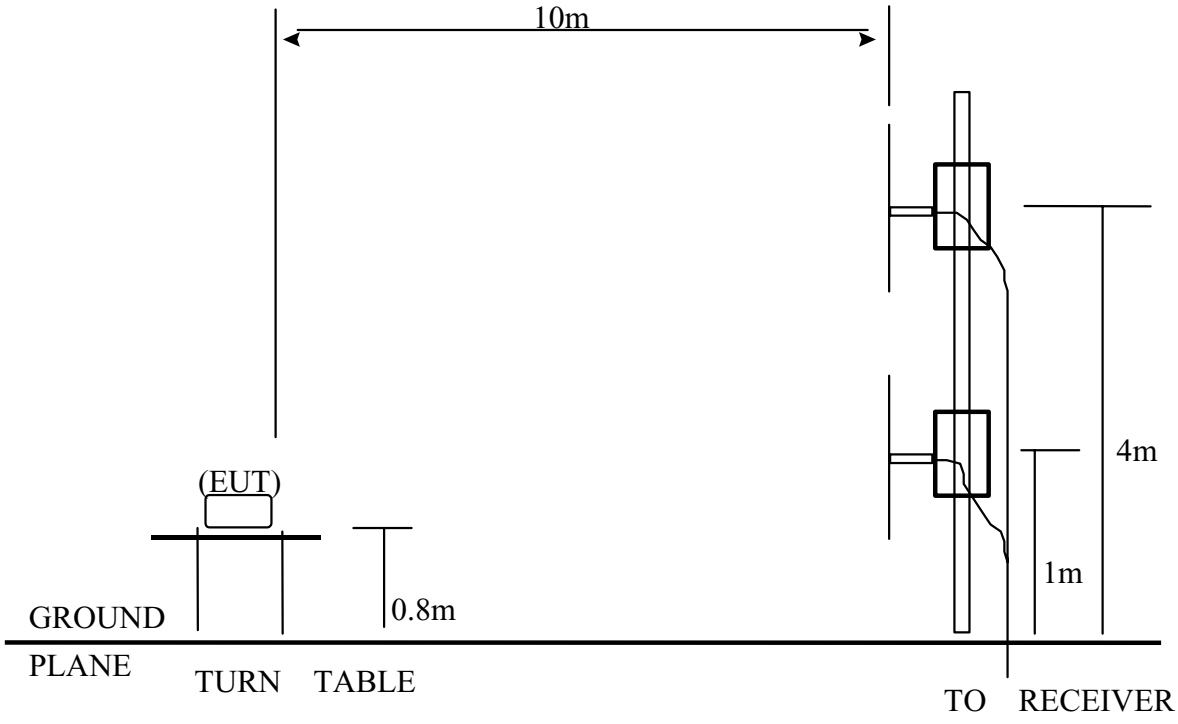
8.1 Radiated Disturbance Test Description

Preliminary measurements were made indoors chamber at 3 meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 to 1000 MHz using logbicon antenna. Above 1GHz, linearly polarized double ridge horn antenna were used.

Final measurements were made outdoors at 10-meter test range using biconical, dipole antenna or horn antenna. The test equipment was placed on a wooden bench situated on a 1.5x1 meter area adjacent to the measurement area. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using Quasi-Peak Adapter. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120kHz.

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non-metallic 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission.

8.2 Radiated Disturbance Test Setup



EUT = Equipment Under Test

8.3 Radiated Disturbance Test Limits

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

Frequency MHz	Field Strength dB(μV/m)
30 to 230	40
230 to 1 000	47
NOTES 1 The lower limit shall apply at the transition frequency. 2 Additional provisions may be required for cases where interference occurs.	

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

Frequency MHz	Field Strength dB(μV/m)
30 to 230	30
230 to 1 000	37
NOTES 1 The lower limit shall apply at the transition frequency. 2 Additional provisions may be required for cases where interference occurs.	

8.4 Radiated Disturbance Test Setup Photos

< FRONT VIEW >

< REAR VIEW >

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8.5 Radiated Disturbance 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	-10.42	40.00	40.33	8.21	0.84	19.80	163.0	4.0
167.729	27.85	-12.15	40.00	34.93	11.25	1.30	19.63	254.0	4.0
206.436	38.25	- 1.75	40.00	47.06	9.15	1.50	19.46	73.0	4.0
309.770	38.65	- 8.35	47.00	41.56	14.46	2.01	19.38	269.0	3.5
516.087	38.77	- 8.23	47.00	35.19	19.68	2.52	18.62	148.0	3.5
618.871	37.55	- 9.45	47.00	32.54	21.74	2.62	19.35	301.0	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	-6.62	40.00	42.57	10.28	0.53	20.00	272.0	1.0
71.883	33.58	-6.42	40.00	44.33	8.21	0.84	19.80	218.0	1.0
169.500	30.85	-9.15	40.00	37.76	11.43	1.30	19.64	307.0	1.0
309.770	39.64	-7.36	47.00	42.55	14.46	2.01	19.38	142.0	1.5
516.087	38.45	-8.55	47.00	34.87	19.68	2.52	18.62	88.0	1.5
618.871	35.67	-11.33	47.00	30.66	21.74	2.62	19.35	159.0	1.5

Note :

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

9. EN 61000-4-2 Electrostatic Discharge Test

Test standard	Model No.	Result
EN 61000-4-2	W-8731	B

The test results shall be classified on the basis of the operating conditions and the functional specifications of the equipment under test , as in the following , unless different specifications are given by product committees or product specifications :
Performance Criterion :
A) normal performance within the specification limits ;
B) temporary degradation or loss of function or performance which is self-recoverable ;
C) temporary degradation or loss of function or performance which requires operator intervention or system reset ;

9.1 Electrostatic Discharge Test Description

This standard relates to equipment, systems, sub-systems and peripherals which may be involved in static electricity discharges owing to environmental and installation conditions. such as low relative humidity, use of low-conductivity (artificial-fibre) carpets, vinyl garments, etc., which may exist in allocations classified in standards relevant to electrical and electronic equipment.

The test set-up shall consist of a wooden able, 0.8 m high standing on the ground reference plane. A horizontal coupling plane(HCP), 1.6 m x 0.8 m, shall be placed on the table. The EUT and cables shall be isolated from the coupling plane by an insulating support 0.5 mm thick .
A ground reference plane shall be provided on floor of the laboratory. It shall be metallic sheet of 0.25 mm minimum thickness. The minimum size of the reference plane is 1 m, the exact size depending on the dimensions of the EUT .

It shall project beyond the EUT or coupling plant by at least 0.5 m on all sides. and shall be connected to the protective grounding system.
In order to minimize the impact of environmental parameters on test results, the tests shall be carried out in climatic and electromagnetic reference conditions.

Climatic conditions

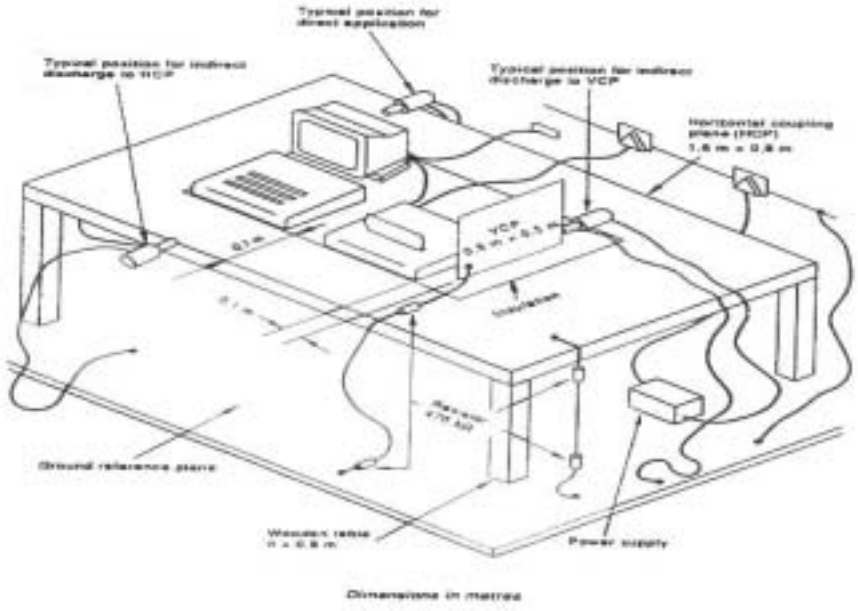
- ambient temperature: 15 ℃ to 35℃;
- relative humidity: 30 % to 60%
- atmospheric pressure: 86 KPa (860 mbar) to 106 KPa (1 060 mbar).

NOTE – Any other values are specified in the product specification.

Electromagnetic conditions

The electromagnetic environment of the laboratory shall not influence the test results.

9.2 Electrostatic Discharge Test Setup



- Example of test set-up for table-top equipment, laboratory tests

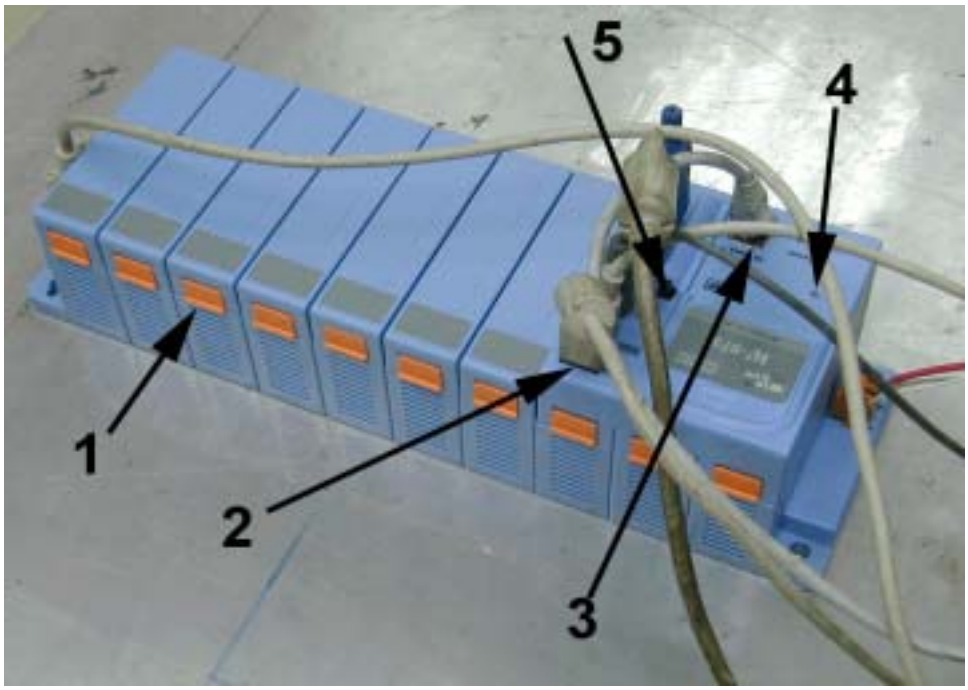
9.3 Electrostatic Discharge Test Limits

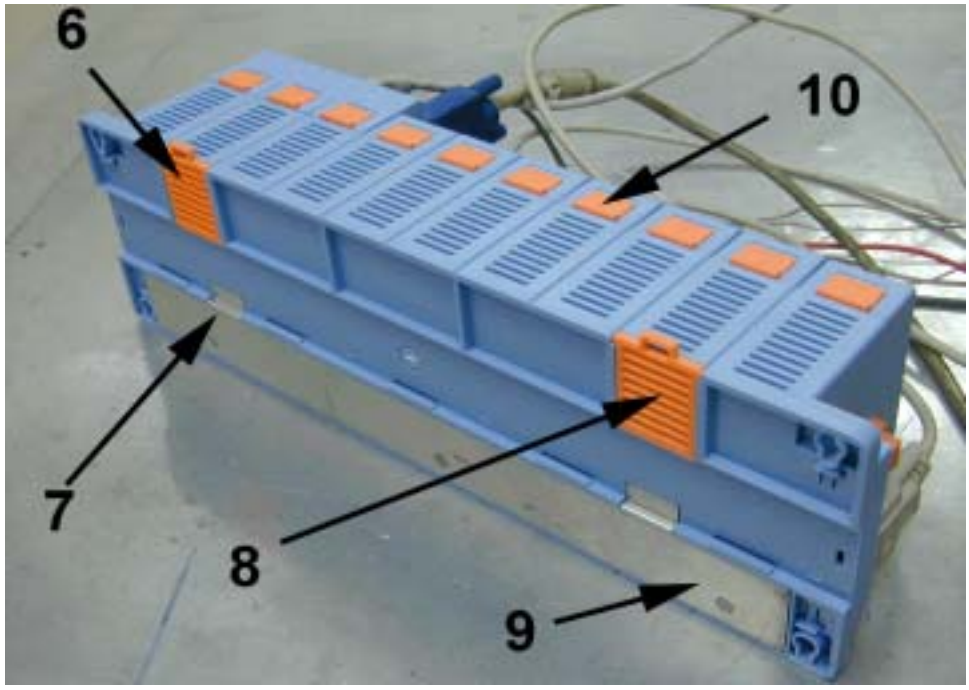
Test levels

Contact discharge		Air discharge	
Level	Test voltage kv	Level	Test voltage
1	2	1	2
2	4	2	4
3	6	3	8
4	8	4	15
x[1)]	Special	x[1)]	Special

[1)] "x" is an open level . The level has to be specified in the dedicated equipment specification .
If higher voltages than those shown are specified , special test equipment may be needed .

9.4 Direct Discharge Test Drawing





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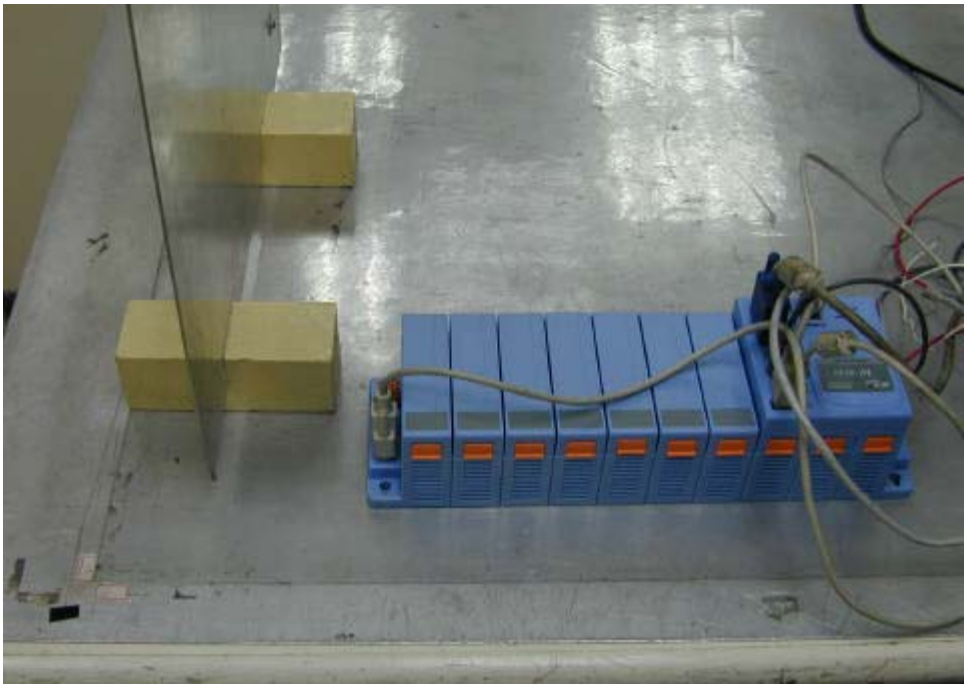
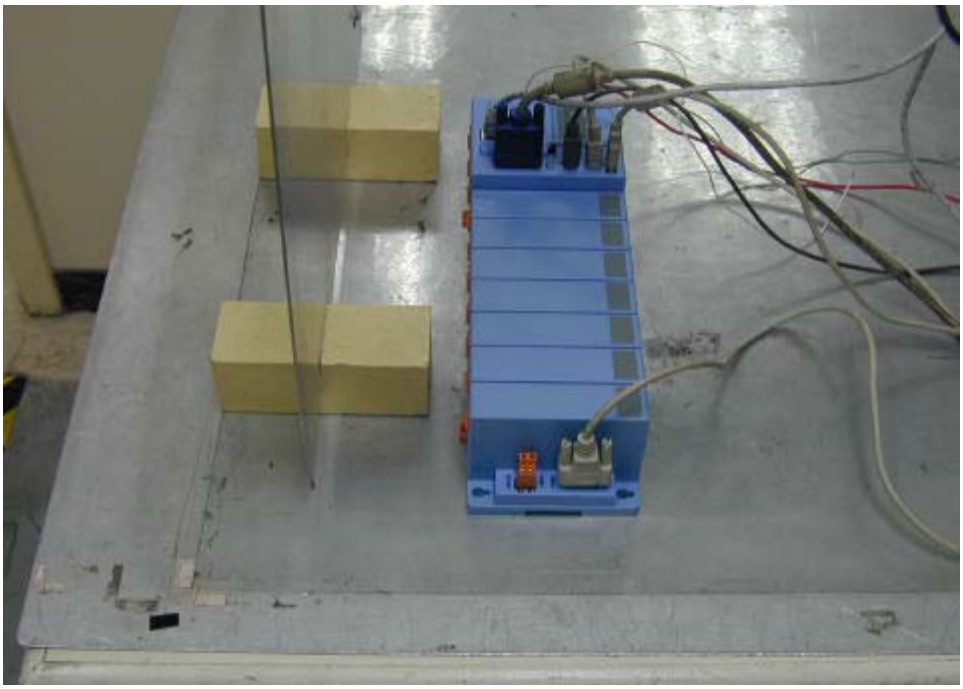
Indirect Discharge Test Drawing





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9.5 Electrostatic Discharge Test Data (Direct Discharge)

Model No. : W-8731

Test Item : **Direct Discharge** Instrument : NoiseKen ESS-100L

Temperature : 25 ℃ Relative Humidity : 45 %RH

Storage Capacitor : 150 pf Discharge Resistor : 330 Ohm

Discharge Rate : < 1 / Sec

	Contact Discharge								**Air Discharge**							
	2 KV		4 KV		6 KV		8 KV		2 KV		4 KV		6 KV		8 KV	
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
1	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P
2	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P
3	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P
4	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P
5	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P
6	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P
7	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P
8	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P
9	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P
10	/	/	/	/	/	/	/	/	P	P	P	P	P	P	P	P

1. " P " - - - - means the EUT function is correct during the test .

2. " / " - - - - no test.

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Electrostatic Discharge Test Data (Indirect Discharge)

Model No. : W-8731

Test Item : **Indirect Discharge** Instrument : NoiseKen ESS-100L

Temperature : 25 ℃ Relative Humidity : 45 %RH

Storage Capacitor : 150 pf Discharge Resistor : 330 Ohm

Discharge Rate : < 1 / Sec

	Contact Discharge								**Air Discharge**							
	2 KV		4 KV		6 KV		8 KV		2 KV		4 KV		6 KV		8 KV	
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
1	P	P	P	P	/	/	/	/	/	/	/	/	/	/	/	/
2	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
3	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
4	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
5	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
6	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
7	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
8	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
9	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
10	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/

1. " P " - - - - means the EUT function is correct during the test .

2. " / " - - - - no test.

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10. EN 61000-4-3 Radio-Frequency Electromagnetic Field Test

Test Standard	Model No.	Result
EN 61000-4-3	W-8731	A

Field Strength : 3 V/M , Level 2 .

Modulation : AM 80 % , 1KHz . ON (YES) . OFF ( )

Start : 80 MHz , Stop : 1000 MHz . AC Power : 230 Vac

DC Power : N/A Vdc

The test results shall be classified on the basis of the operating conditions and the functional specifications of the equipment under test , as in the following , unless different specifications are given by product committees or product specifications :

Performance Criterion :

A) normal performance within the specification limits ;

B) temporary degradation or loss of function or performance which is self-recoverable ;

C) temporary degradation or loss of function or performance which requires operator intervention or system reset ;

10.1 Radio-Frequency Electromagnetic Field Test Description

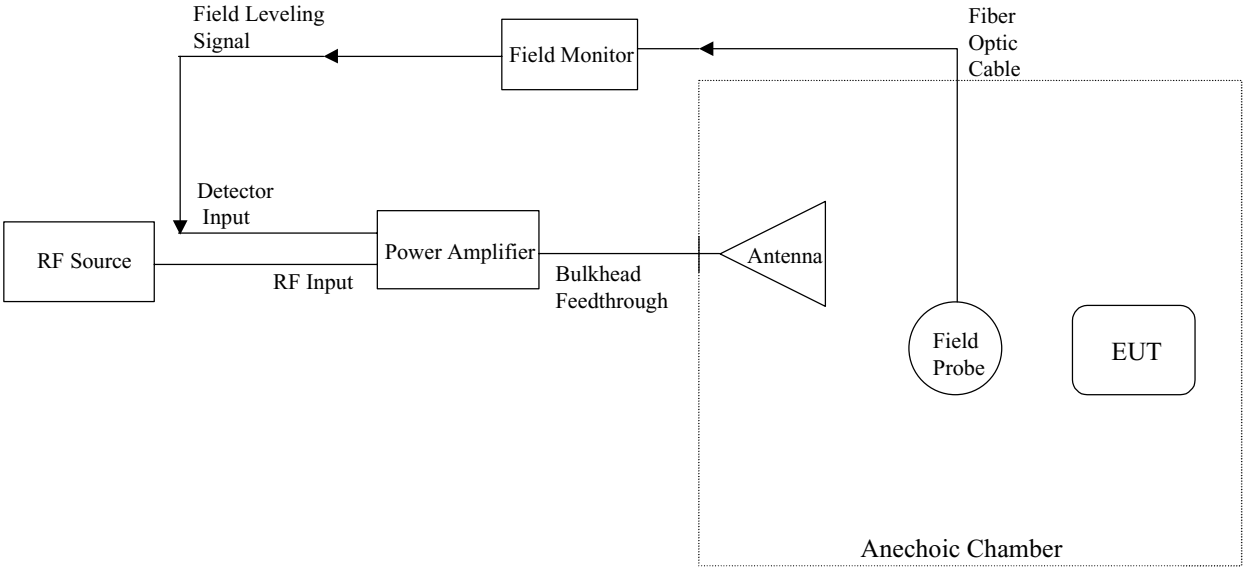
Most electronic equipment is, in some manner, affected by electromagnetic radiation.
This radiation is frequently generated by such sources as the small hand-held radio transceivers that are used by operating, maintenance and security personnel, fixed-station radio and television transmitters, vehicle radio transmitters, and various industrial electromagnetic sources.

In addition to electromagnetic energy deliberately generated, there is also spurious radiation caused by devices such as welders, thyristors, fluorescent lights, switches operating inductive loads, etc. For the most part, this interference manifests itself as conducted electrical interference and, as such, is dealt with in other parts of this standard. Methods employed to prevent effects from electromagnetic fields will normally also reduce the effects from these sources.
The electromagnetic environment is determined by the strength of the electromagnetic field (field strength in volts per metre). The field strength is not easily measured without sophisticated instrumentation nor is it easily calculated by classical equations and formulae because of the effect of surrounding structures or the proximity of other equipment that will distort and/or reflect the electromagnetic waves.

All testing of equipment shall be performed in a configuration as close as possible to the installed case. Wiring shall be consistent with the manufacturer’s recommended procedures, and the equipment shall be in its housing with all covers and access panels in place, unless otherwise stated.

If the equipment is designed to be mounted in a panel, rack or cabinet, it shall be tested in this configuration.

10.2 Radio-Frequency Electromagnetic Field Test Block Diagram



10.3 Radio-Frequency Electromagnetic Field Test Limits

Table 1 - Test levels

Level	Test field strength V/m
1	1
2	3
3	10
x	Special
NOTE – x is an open test level. This level nay be given in the Product specification.	

Table 1 gives details of the field strength of the unmodulated signal. For testing of equipment, this signal is 80 % amplitude modulate with a 1 KHz sinewave to simulate actual threats.

10.4 Radio-Frequency Electromagnetic Field Test Setup Photo

< FRONT VIEW >

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11. EN 61000-4-8 Power Frequency Magnetic Field Immunity Test

Test standard	Model No.	Result
EN 61000-4-8	W-8731	A

(A) Test instruments :

- HAEFELY&TRENCH magnetic field tester MAG100.1
- HAEFELY&TRENCH coil with clamp 1m x 1m
- HAEFELY&TRENCH support with castors height 2m

(B) Laboratory reference conditions :

- Temperature : **25**℃
- relative humidity : **45** %
- atmospheric pressure : 95 kPa
- electromagnetic : 10 dB below the select test level

(C) Test level : level 1 , 1 A/m

The test results shall be classified on the basis of the operating conditions and the functional specifications of the equipment under test , as in the following , unless different specifications are given by product committees or product specifications :
Performance Criterion :
A) normal performance within the specification limits ;
B) temporary degradation or loss of function or performance which is self-recoverable ;
C) temporary degradation or loss of function or performance which requires operator intervention or system reset ;

11.1 Power Frequency Magnetic Field Immunity Test Description

The magnetic fields to which equipment is subjected may influence the reliable operation of equipment and systems.

The following tests are intended to demonstrate the immunity of equipment when subjected to power frequency magnetic fields related to the specific location and installation condition of the equipment (e.g. proximity of equipment to the disturbance source).
The power frequency magnetic field is generated by power frequency current in conductors or, more seldom, from other devices (e.q. leakage of transformers) in the proximity of equipment.

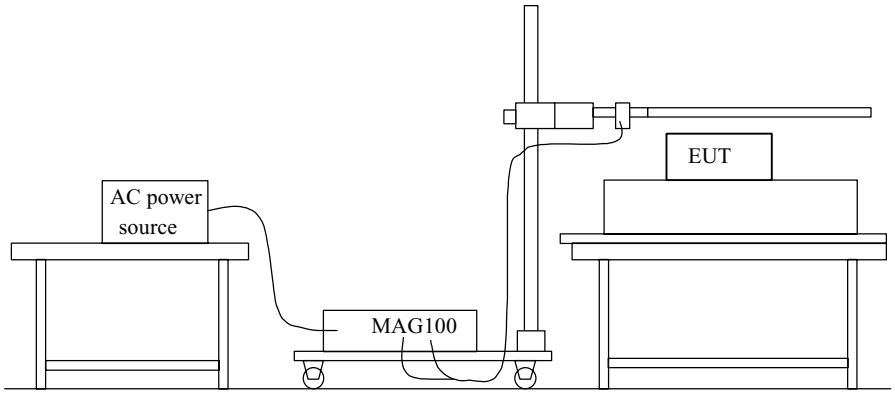
As for the influence of nearby conductors, one should differentiate between:
- the current under normal operating conditions, which produces a steady magnetic field, with a comparatively small magnitude;
- the current under fault conditions which can produce comparatively high magnetic fields but of short duration, until the protection devices operate (a few milliseconds with fuses, a few seconds for protection relays).
The test with a steady magnetic field may apply to all types of equipment intended for public or industrial low voltage distribution networks or for electrical plants.

The test with short duration magnetic field related to fault conditions, requires test levels that differ from those for steady state conditions; the highest values apply mainly to equipment to be installed in exposed places of electrical plants.

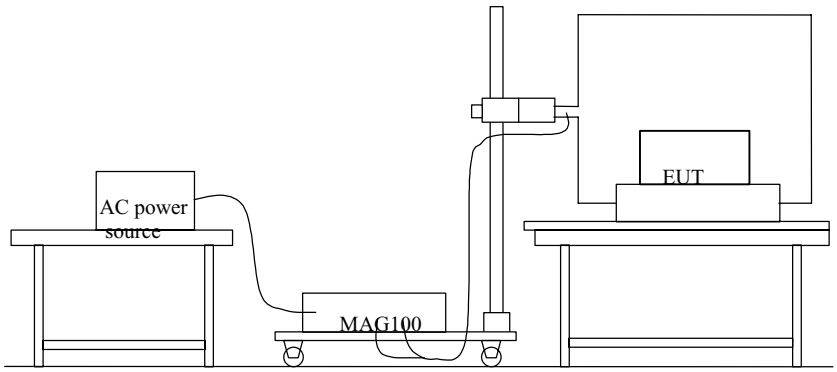
The test field waveform is that of power frequency.

In many cases (household areas, sub-stations and power plant under normal conditions), the magnetic field produced by harmonics is negligible. However, in very special cases like heavy industrial areas (large power convectors, etc.) they occur, and eill be considered in a future revision of this standard.

11.2 Power Frequency Magnetic Field Immunity Test Setup



• Vertical magnetic field drawing



• Horizontal magnetic field drawing

11.3 Power Frequency Magnetic Field Immunity Test Limits

Table 1-Test levels for continuous field

Level	Magnetic field strength A/m
1	1
2	3
3	10
4	30
5	100
x[1)]	special

NOTES
1 – "x" is an open level. This level can be given in the product specification.

Table 2 – Test levels for short duration: 1 s to 3 s

Level	Magnetic field strength A/m
1	n.a.[2)]
2	n.a.[2)]
3	n.a.[2)]
4	300
5	1000
x[1)]	special

NOTES
1 – "x" is an open level. This level, as well the duration of the test, can be given in the product specification.
2 – "n.a." = not applicable

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11.4 Power Frequency Magnetic Field Immunity Test Setup Photos

< VERTICAL VIEW >

< HORIZONTAL VIEW >

12. Labelling Requirement, WARNING

1. The vertical size is 5mm.
2. The mark will be placed in a visible spot on the outside of the equipment, but in cases where that is impractical, it may be included on the packaging and/or documentation.

ITE is subdivided into two categories denoted class A ITE and class B ITE.

Class A ITE

Class A ITE is a category of all other ITE which satisfies the Class A ITE limits but not the Class B ITE limits. Such equipment should not be restricted in its sale but the following warning shall be included in the instructions for use :

> **Warning**
> This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Class B ITE

Class B ITE is a category of apparatus which satisfies the class B ITE disturbance limits.
Class B ITE is intended primarily for use in the domestic environment and may include:

- equipment with no fixed place of use; for example, portable equipment powered by built-in batteries;
- telecommunication terminal equipment powered by a telecommunication network;
- personal computers and auxiliary connected equipment.

13. The List of Test Instruments

Test Mode	Instrument	Model No.	Serial No.	Next Cal. Date	Cal. Interval
Conduction (No.1)	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
Radiation (OP No.1)	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

Test Mode	Test item	Instrument	Model No.	Serial No.	Next Cal. Date	Cal. Interval
EMS (NO.1)	4-2	ESD Test System	ESS-100L (A)TC-815D	4099C01970	July 14, 2004	1Year
	4-3	Comtest G-Strip	G-320	CC112-0008	Oct. 01, 2005	2Year
	4-4	KeyTek EFT Noise Generator	CE-40	9508266	Jan. 27, 2005	2Year
	4-5	HAEFELY Surge Tester	PSURGE 4	083665-17	Dec. 18, 2004	2Year
	4-8	HAEFELY Magnetic Field	MAG 100.1	083858-04	Dec. 26, 2004	2Year
	4-11	HAEFELY Line Interference Tester	PLINE 1610	083732-01	Dec. 19, 2004	2Year
	4-3 4-6	HP Signal Generator	8648A	3619U00426	Sep. 14, 2004	1Year
	3-2 3-3	HP Harmonic/ Flicker Test System	6842A	3531A-00141	Dec. 19, 2004	2Year

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14. EUT Photos

MODEL NO. : W-8731

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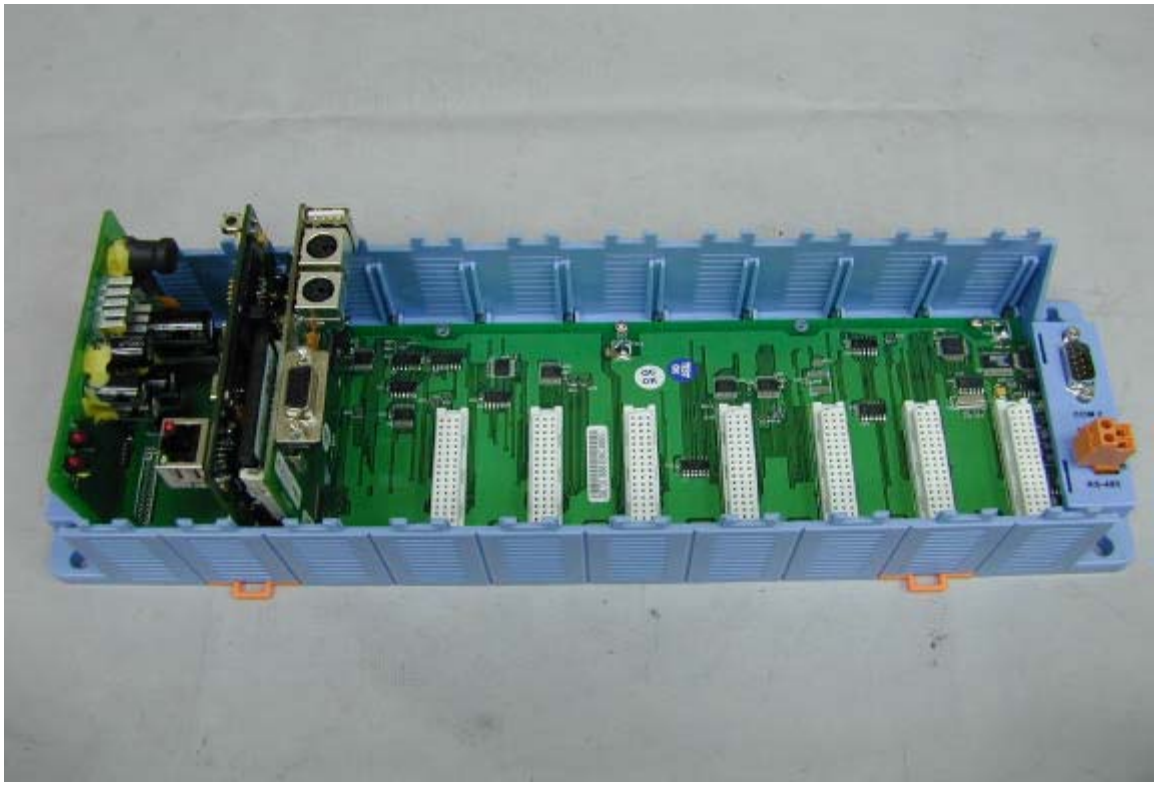

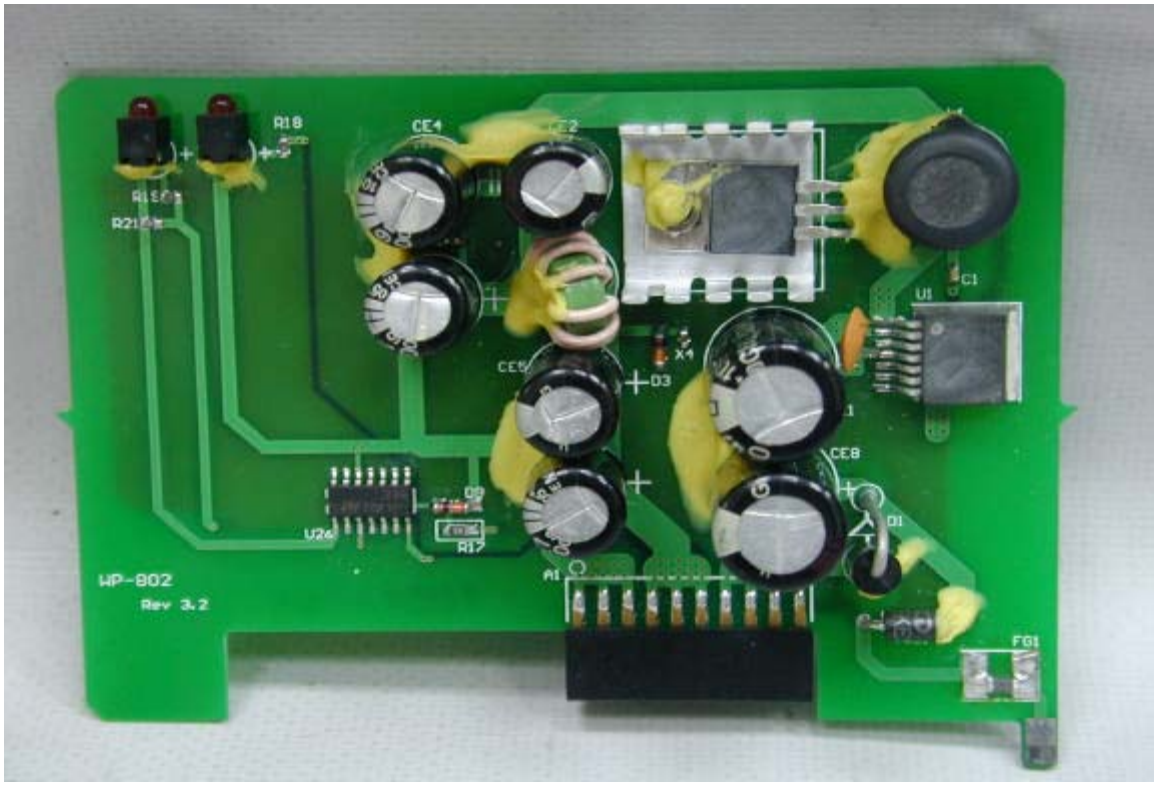

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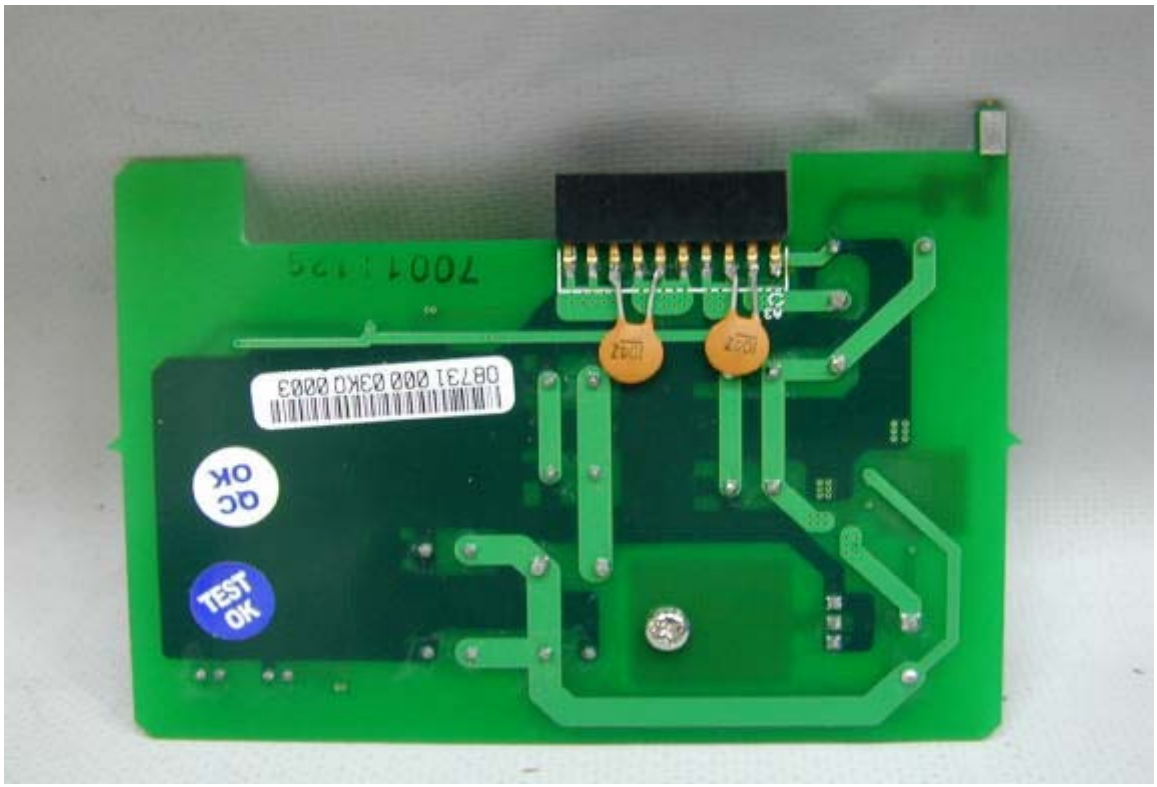

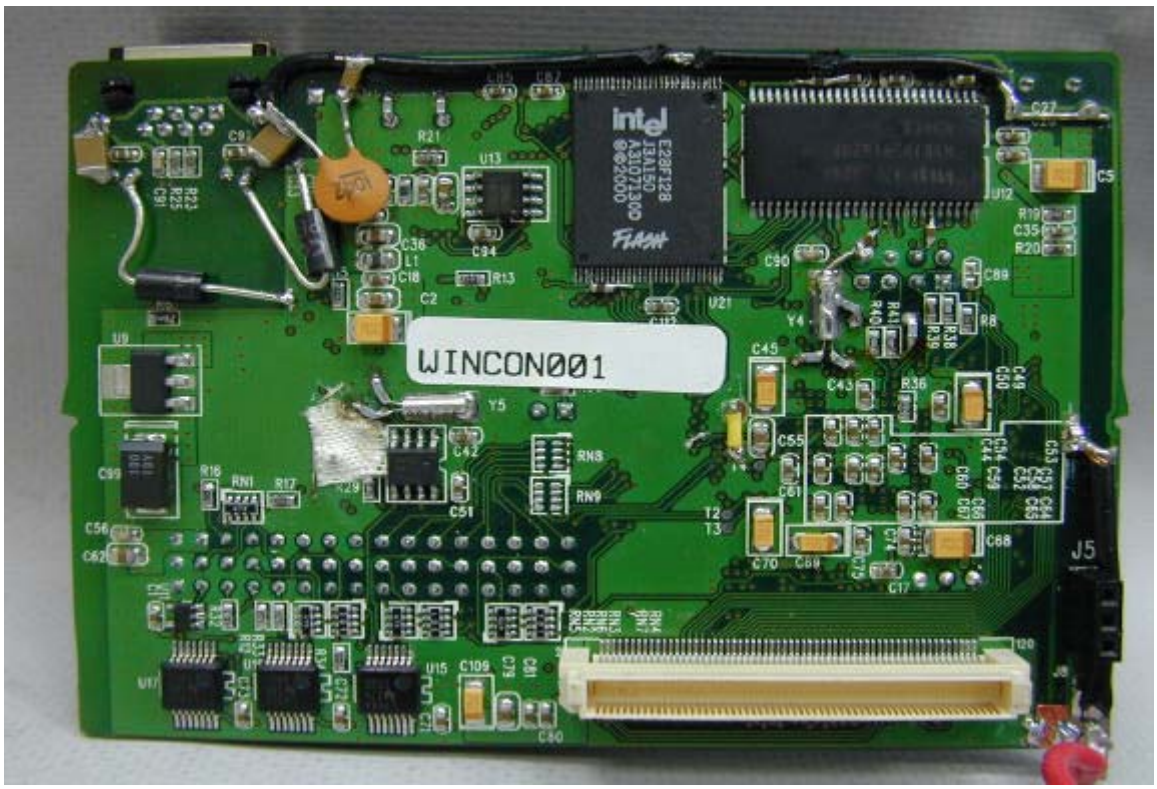

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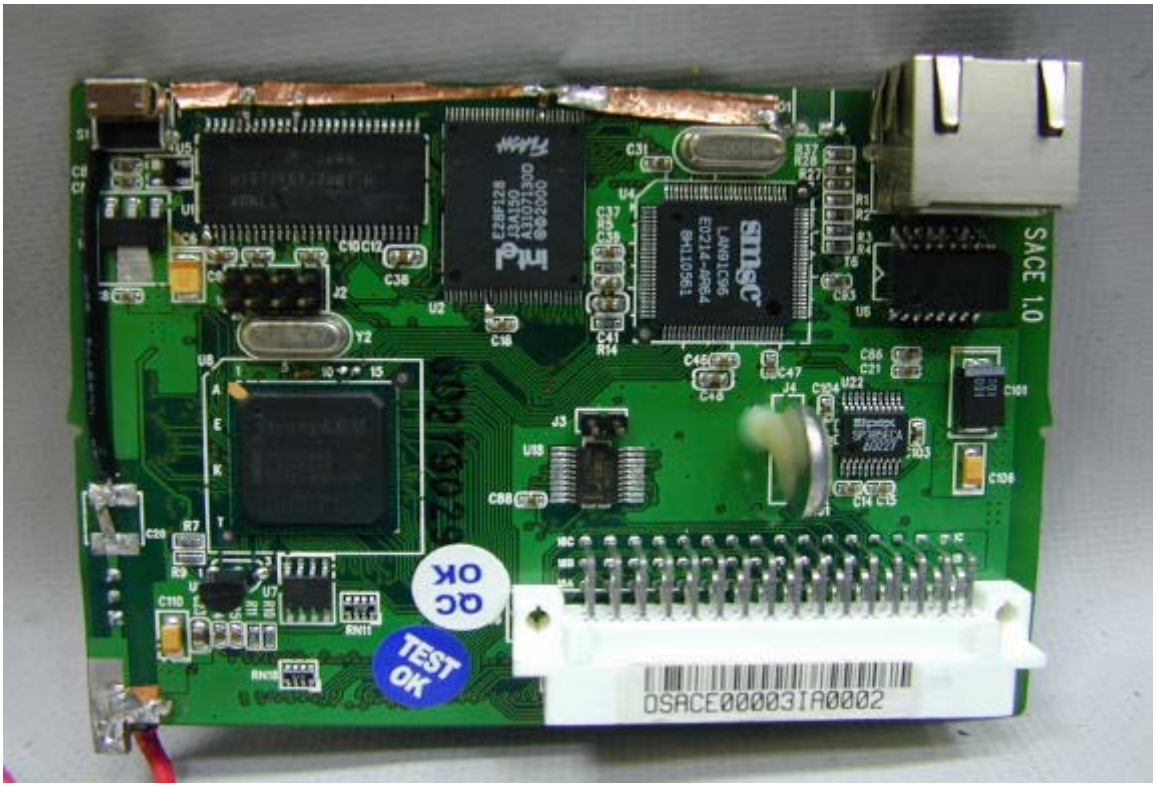

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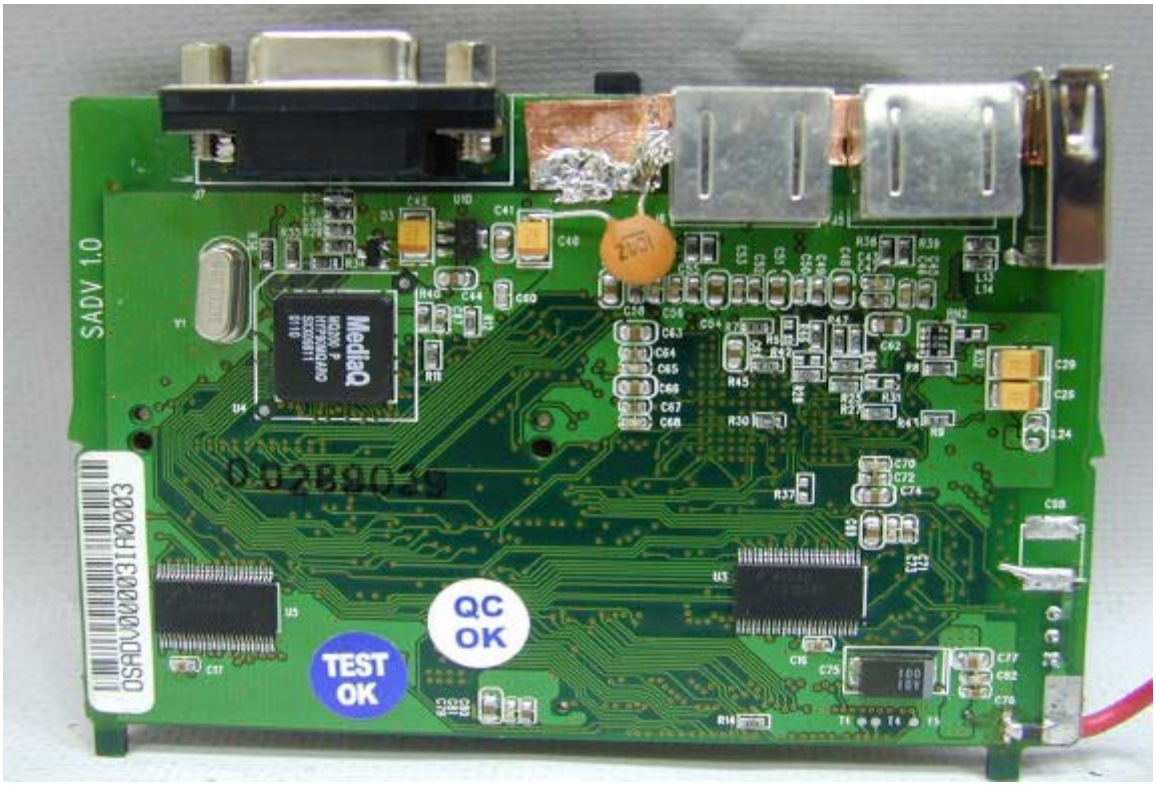

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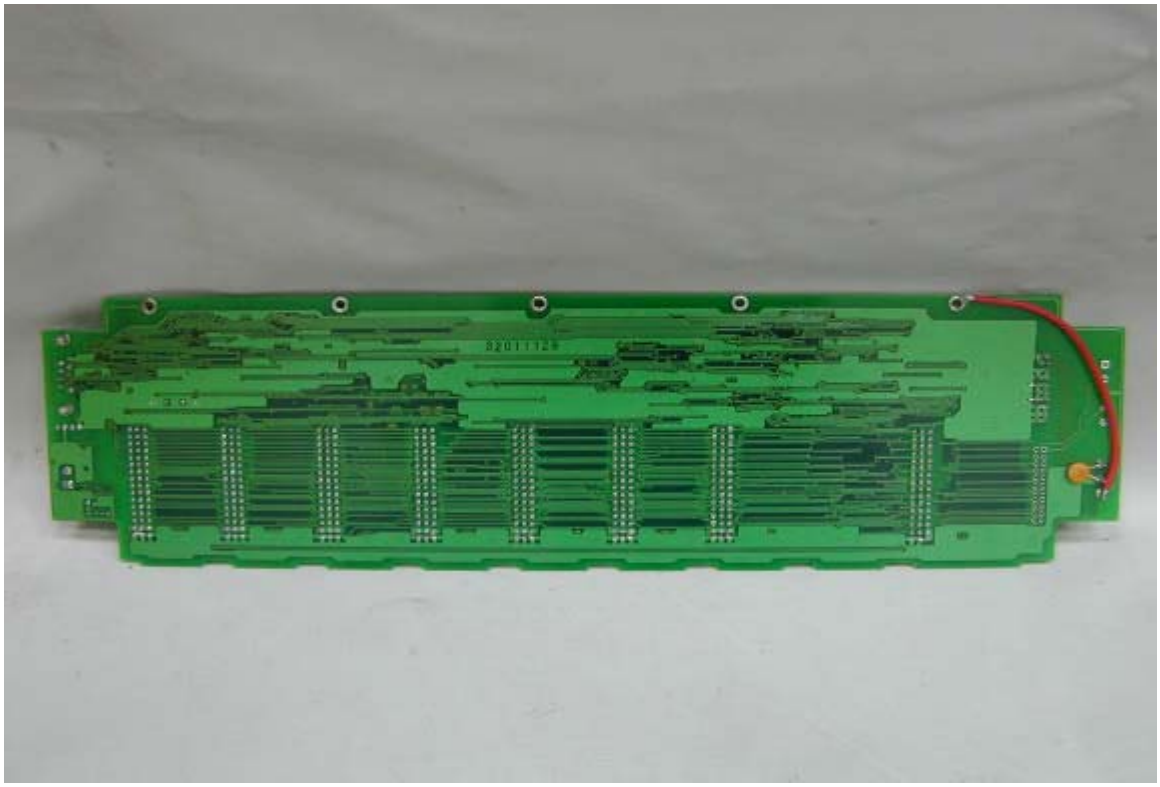

MODEL NO.： W-8031

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MODEL NO.： W-8331

VERIFICATION

of conformity with European EMC Directive

No. E930080

Document holder:	**ICP DAS CO., LTD.**
Type of equipment:	**Embedded Controller**
Type designation:	**W-8731, W-8031, W-8331, W-8037, W-8039, W-8337, W-8339, W-8737, W-8739**

A sample of the equipment has been tested for CE-marking according to the EMC Directive, 89/336/EEC. & 92/31/EEC & 93/68/EEC *Standard(s) used for showing compliance with the essential requirements of the directive:*

EMC Standard(s):

EN 55022: 1998 + A1: 2000		Class A
EN 61000-3-2: 2000		
EN 61000-3-3:1995 + A1: 2001		
		Performance Criterion
EN 55024: 1998 + A1: 2001	EN 61000-4-2: 1995 + A2: 2001	B
	EN 61000-4-3: 1996 + A2: 2001	A
	EN 61000-4-4: 1995 + A2: 2001	
	EN 61000-4-5: 1995 + A1: 2001	
	EN 61000-4-6: 1996 + A1: 2001	
	EN 61000-4-8: 1993 + A1: 2001	A
	EN 61000-4-11: 1994 + A1: 2001	

The referred test report(s) show that the product fulfills the requirements in the EMC Directive for CE marking. On this basis, together with the manufacturer's own documented production control, the manufacturer (or his European authorized representative) can in his EC Declaration of Conformity verify compliance with the EMC Directive.

Signed for and on behalf of
PEP Testing Laboratory

PEP Testing Laboratory

M. Y. Tsui

Date: FEB. 25, 2004

M. Y. Tsui / President

Declaration of Conformity

The following

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**

is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility(89/336/EEC) and the amendments in the Council Directive 92/31/EEC, 93/68/EEC.
For the evaluation of above mentioned Directives, the following standards were applied:

1) EN 55022: 1998+A1 : 2000 Class A
2) EN 61000-3-2 : 2000
3) EN 61000-3-3 : 1995+A1: 2001
4) EN 55024 : 1998+A1 : 2001
   EN 61000-4-2 : 1995+A2: 2001
   EN 61000-4-3 : 1996+A2: 2001
   EN 61000-4-4 : 1995+A2: 2001
   EN 61000-4-5 : 1995+A1: 2001
   EN 61000-4-6 : 1996+A1: 2001
   EN 61000-4-8 : 1993+A1: 2001
   EN 61000-4-11 : 1994+A1: 2001

The following manufacturer is responsible for this declaration:

ICP DAS CO., LTD.
NO. 111, KUANGFU N. RD.,
HUKOU SHIANG, HSINCHU,
TAIWAN 303, R. O. C.

Taiwan / Feb. 25, 2004
Place and Date

Signature of responsible Person