# 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 50130-4:1995+A1:1998**
**EN 61000-4-2: 1995+A2: 2001 / EN 61000-4-3: 1996+A2: 2001**
**EN 61000-4-4: 1995+A2: 2001 / EN61000-4-5: 1995+A1: 2001**
**EN 61000-4-6: 1996+A1: 2001 / EN 61000-4-11: 1994+A1: 2001**
**Main Supply Voltage Variations**

EQUIPMENT : Through Beam Photoelectric Beam Sensor

MODEL NO. : IR-3000G

APPLICANT : YUAN HSUN ELECTRIC CO., LTD.

NO. 57, CHUNG HE RD., ZUO-YING DIST., KAOHSIUNG CITY 813, TAIWAN, R. O. C.

Test Engineer : SIMON LIU

Checked by : HADES HUANG

Issued Date : NOV. 07, 2003

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# 1. General

## 1.1 General Information :

Applicant : YUAN HSUN ELECTRIC CO., LTD.

NO. 57, CHUNG HE RD., ZUO-YING DIST., KAOHSIUNG CITY 813, TAIWAN, R. O. C.

Manufacturer : YUAN HSUN ELECTRIC CO., LTD.

NO. 57, CHUNG HE RD., ZUO-YING DIST., KAOHSIUNG CITY 813, TAIWAN, R. O. C.

Measurement Procedure : EN 55022 & EN 50130-4

## 1.2 Place of Measurement

***PEP TESTING LABORATORY***

*12-3Fl, No. 27-1, Lane 169, Kang-Ning St., Hsi-Chih, Taipei Hsien, Taiwan, R. O. C.*
*TEL : 8862-26922097 FAX : 8862-26956236*

NVLAP LAB CODE 200097-0
FCC Registration No. : 90868
Nemko Aut. No. : ELA133
BSMI Aut. No. : SL2-IN-E-11,SL2-A1-E-11
VCCI Registration No. : C-493/R-477

## 1.3 Test standard

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 50130-4:1995+A1: 1998** | - Alarm systems – Part 4. Electromagnetic compatibility Product family standard: Immunity requirements for components of fire, intruder and social alarm systems |
| **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 61000-4-11: 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:** | Through Beam Photoelectric Beam Sensor |
| **b.** | **Model No.：** | IR-3000G |
| **c.** | **CPU Type：** | N/A |
| **d.** | **CPU Frequency：** | N/A |
| **e.** | **Crystal/Oscillator(s) ：** | N/A |
| **f.** | **Chassis Used：** | ABS |
| **g.** | **Port/Connector(s) ：** | N/A |
| **h.** | **Power Rating：** | Direct ----- DC 24V |
| **i.** | **Condition of the EUT :** | ☐ Prototype Sample ☑ Engineering Sample ☐ Production Sample |
| **j.** | **Test Item Receipt Date :** | NOV. 03, 2003 |

# 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 Through Beam Photoelectric Beam Sensor model IR-3000G. The EUT that consists of a transmitter and a receiver is used for the applications at place such as gate or garage door, overhead doors, barrier, door entrance, alarm system or parking lot. The sensing range between EUT transmitter and receiver is 30 meters. DC 10~24V from any power source is required to operate EUT. For more detail specification about EUT, please refer to the user's manual.

Test method: According to the major function designed, the placement of EUT transmitter and receiver was arranged for test and the test was respectively carried out on the following operational condition.

(A) Tx On: a) Connect NA terminal of EUT receiver and Line of AC source;
b) Connect C terminal of EUT receiver and Neutral of AC source via a lamp load;
c) Respectively supply EUT transmitter and receiver DC 24V from DC power source.

(B) Tx Off: a) Connect NC terminal of EUT receiver and Line of AC source;
b) Connect C terminal of EUT receiver and Neutral of AC source via a lamp load;
c) Respectively supply EUT transmitter and receiver DC 24V from DC power source.

The worst-case test result of each test mode 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 following test standards are applicable for related tests being carried out on the same EUT configuration and operational condition kept during radiated emission test and conducted emission test:
EN 61000-4-2, EN 61000-4-3, EN 61000-4-11 and Main Supply Voltage Variations.

# 4. Modification(s):

N/A

# 5. Test Software Used

N/A

# 6. Support Equipment Used

| | |
|---|---|
| **1. DC Power Supply** | **Manufacturer**：ABM<br>**Model Number**：9306D<br>**Power Cord**：Non-Shielded, Detachable, 1m |
| **2. The Overload of Lamp** | |

# 7. EN 55022 Conducted Disturbance Test

| Test Standard | Model No. | Result |
|---|---|---|
| EN 55022 | IR-3000G | N/A |

# 8. EN 55022 Radiated Disturbance Test

| Test Standard | Model No. | Result |
|---|---|---|
| EN 55022 | IR-3000G | Passed |

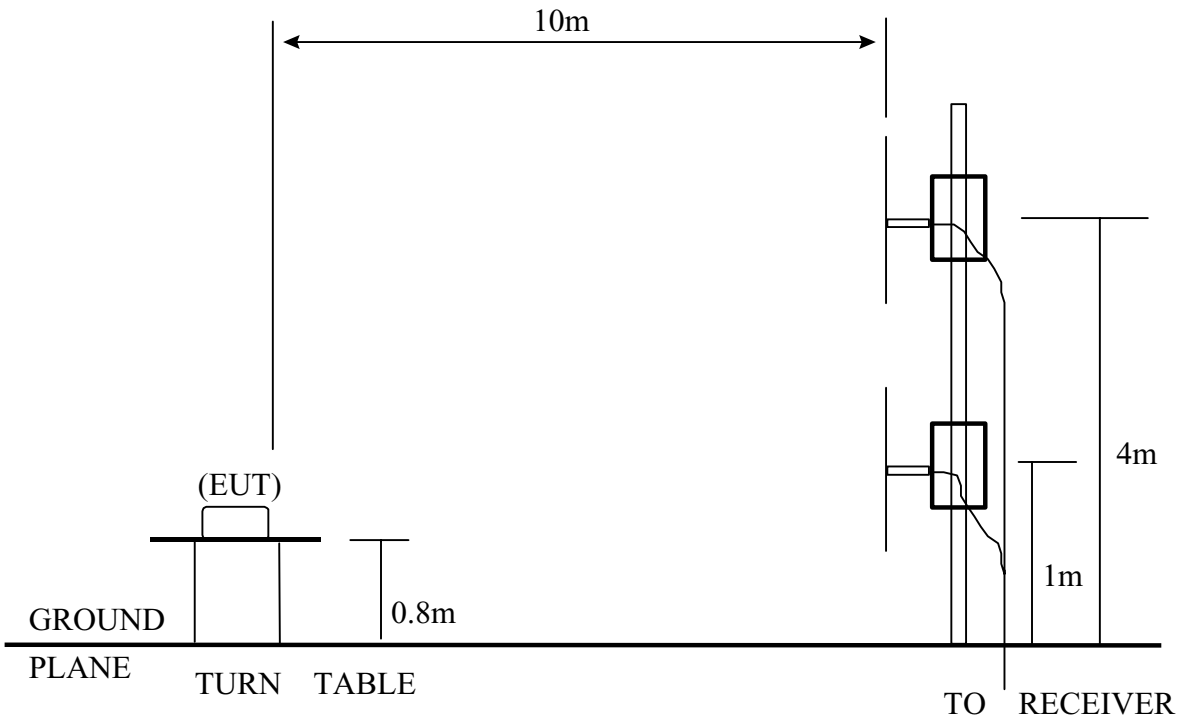
## 8.1 Radiated Disturbance Test Description

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( $\mu$ V/m) |
|---|---|
| 30 to 230 | 40 |
| 230 to 1 000 | 47 |
| NOTES<br>1 The lower limit shall apply at the transition frequency.<br>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( $\mu$ V/m) |
|---|---|
| 30 to 230 | 30 |
| 230 to 1 000 | 37 |
| NOTES<br>1 The lower limit shall apply at the transition frequency.<br>2 Additional provisions may be required for cases where interference occurs. | |

# 8.4 Radiated Disturbance Test Setup Photos

**TX ON MODE**

**< FRONT VIEW >**


**< REAR VIEW >**

**TX OFF MODE**

**< FRONT VIEW >**


**< REAR VIEW >**

# 8.5 Radiated Disturbance Test Data

**Model No. : IR-3000G**
**Frequency range : 30MHz to 1GHz Detector : Quasi-Peak Value**
**Frequency range : above 1GHz Detector : Quasi-Peak/Average Value**
**Temperature : 26° C Humidity : 56 %**
**Memo : TX ON MODE**

**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) |
|---|---|---|---|---|---|---|---|---|---|
| 38.422 | 19.66 | -10.34 | 30.00 | 24.48 | 14.53 | 0.61 | 19.96 | 117.0 | 4.0 |
| 229.564 | 17.61 | -12.39 | 30.00 | 26.26 | 9.37 | 1.52 | 19.54 | 141.0 | 4.0 |
| 242.429 | 22.84 | -14.16 | 37.00 | 30.27 | 10.48 | 1.57 | 19.48 | 93.0 | 4.0 |
| 586.915 | 25.44 | -11.56 | 37.00 | 21.42 | 20.24 | 2.59 | 18.81 | 85.0 | 3.5 |
| 747.354 | 27.96 | - 9.04 | 37.00 | 20.01 | 24.34 | 2.80 | 19.19 | 217.0 | 3.5 |
| 803.355 | 28.40 | - 8.60 | 37.00 | 21.56 | 22.68 | 3.19 | 19.03 | 259.0 | 3.5 |

Note :

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

**Model No. : IR-3000G**
**Frequency range : 30MHz to 1GHz Detector : Quasi-Peak Value**
**Frequency range : above 1GHz Detector : Quasi-Peak/Average Value**
**Temperature : 26 ° C Humidity : 56 %**
**Memo : TX ON MODE**

**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) |
|---|---|---|---|---|---|---|---|---|---|
| 46.366 | 22.38 | - 7.62 | 30.00 | 30.62 | 11.19 | 0.57 | 20.00 | 221.0 | 1.0 |
| 119.935 | 20.17 | - 9.83 | 30.00 | 33.02 | 6.15 | 0.90 | 19.90 | 239.0 | 1.0 |
| 174.246 | 18.87 | -11.13 | 30.00 | 25.83 | 11.34 | 1.30 | 19.60 | 104.0 | 1.0 |
| 442.184 | 25.85 | -11.15 | 37.00 | 26.72 | 16.56 | 2.28 | 19.71 | 172.0 | 1.5 |
| 586.958 | 26.07 | -10.93 | 37.00 | 22.05 | 20.24 | 2.59 | 18.81 | 302.0 | 1.5 |
| 708.835 | 27.72 | - 9.28 | 37.00 | 22.72 | 21.56 | 2.72 | 19.28 | 159.0 | 1.5 |

Note :

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

**Model No. : IR-3000G**
**Frequency range : 30MHz to 1GHz Detector : Quasi-Peak Value**
**Frequency range : above 1GHz Detector : Quasi-Peak/Average Value**
**Temperature : 26° C Humidity : 56 %**
**Memo : TX OFF MODE**

**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) |
|---|---|---|---|---|---|---|---|---|---|
| 38.433 | 20.99 | - 9.01 | 30.00 | 25.81 | 14.53 | 0.61 | 19.96 | 115.0 | 4.0 |
| 119.941 | 19.69 | -10.31 | 30.00 | 32.54 | 6.15 | 0.90 | 19.90 | 206.0 | 4.0 |
| 229.565 | 16.86 | -13.14 | 30.00 | 25.51 | 9.37 | 1.52 | 19.54 | 137.0 | 4.0 |
| 499.593 | 25.52 | -11.48 | 37.00 | 23.09 | 18.83 | 2.50 | 18.90 | 169.0 | 3.5 |
| 586.922 | 26.05 | -10.95 | 37.00 | 22.03 | 20.24 | 2.59 | 18.81 | 88.0 | 3.5 |
| 747.341 | 25.38 | -11.62 | 37.00 | 17.43 | 24.34 | 2.80 | 19.19 | 307.0 | 3.5 |

Note :

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

**Model No. : IR-3000G**
**Frequency range : 30MHz to 1GHz Detector : Quasi-Peak Value**
**Frequency range : above 1GHz Detector : Quasi-Peak/Average Value**
**Temperature : 26 ° C Humidity : 56 %**
**Memo : TX OFF MODE**

**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) |
|---|---|---|---|---|---|---|---|---|---|
| 38.386 | 19.84 | -10.16 | 30.00 | 24.60 | 14.59 | 0.61 | 19.96 | 189.0 | 1.0 |
| 46.430 | 20.64 | - 9.36 | 30.00 | 28.95 | 11.12 | 0.57 | 20.00 | 217.0 | 1.0 |
| 119.908 | 21.76 | - 8.24 | 30.00 | 34.61 | 6.15 | 0.90 | 19.90 | 234.0 | 1.0 |
| 393.872 | 25.43 | -11.57 | 37.00 | 26.37 | 16.53 | 2.09 | 19.56 | 93.0 | 1.5 |
| 442.172 | 26.14 | -10.86 | 37.00 | 27.01 | 16.56 | 2.28 | 19.71 | 169.0 | 1.5 |
| 839.720 | 27.98 | - 9.02 | 37.00 | 21.33 | 22.73 | 3.12 | 19.20 | 175.0 | 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 | IR-3000G | Passed |

**Criteria for Compliance:**

There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the application of the discharges is permissible, providing that there is no residual change in the EUT or any change in outputs.

# 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 plane 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

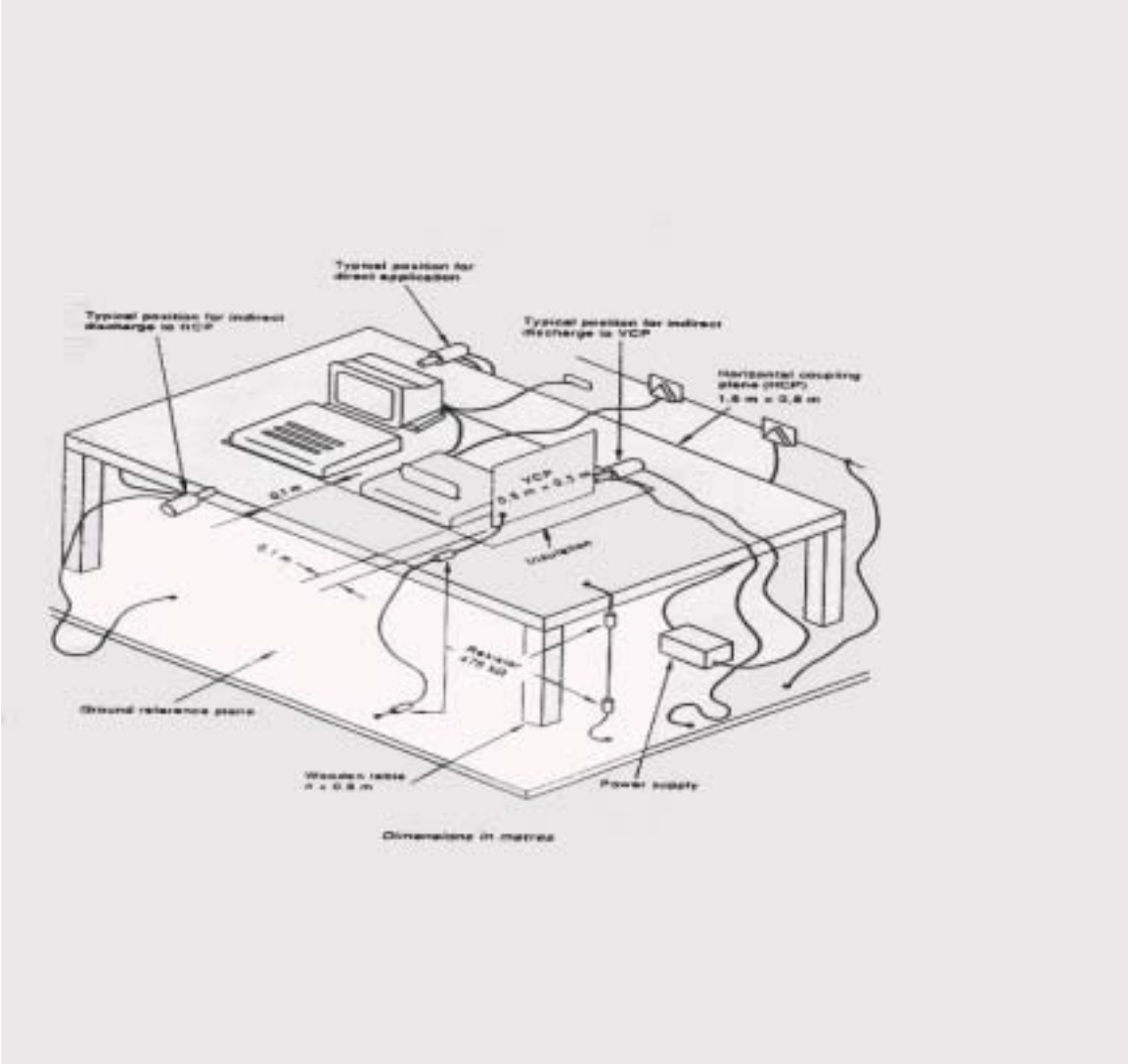
- ambient temperature: 15 ℃ to 35℃;
- relative humidity: 30 % to 60%
- atmospheric pressure: 86 KPa (860 mbar) to 106 KPa (1 060 mbar).

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



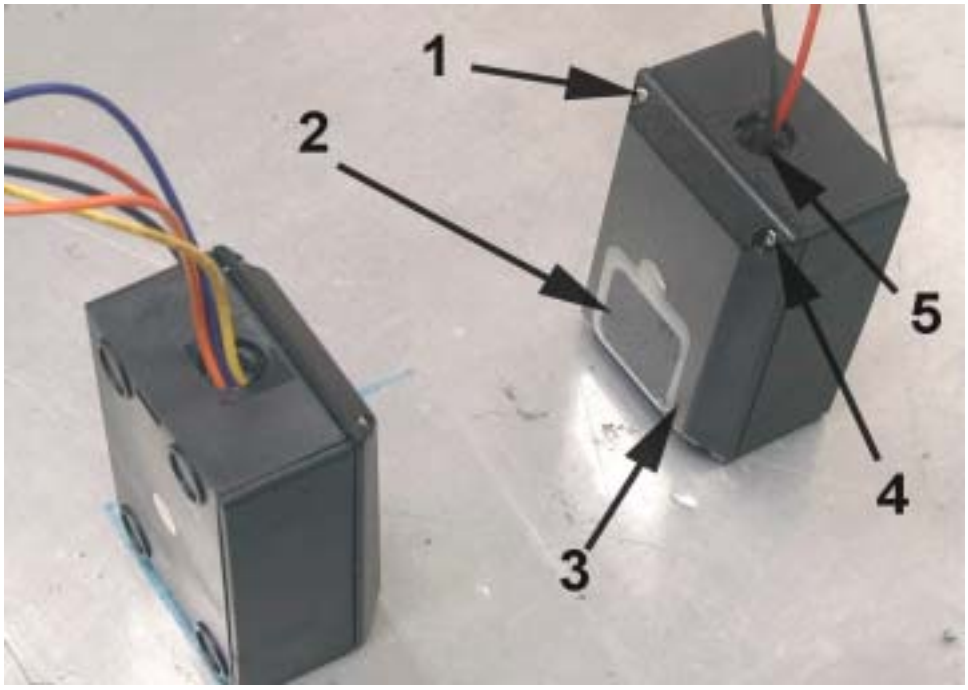

- Example of test set-up for table-top equipment, laboratory tests

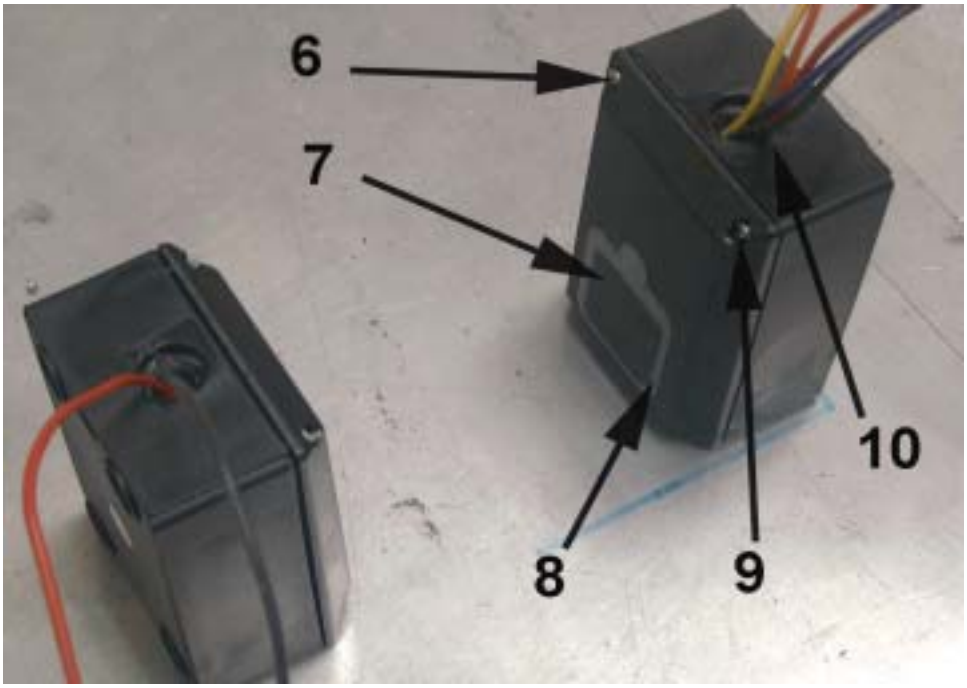
# 9.3 Electrostatic Discharge Test Limits

| | | |
|---|---|---|
| Test voltages[1]: | | |
| Air discharges | (kV) | 2; 4 & 8 |
| Contact discharges | (kV) | 2; 4 & 6 |
| Polarity | | + & - |
| Number of discharges per point for each voltage and polarity | | 10 |
| Interval between discharges | (s) | =1 |

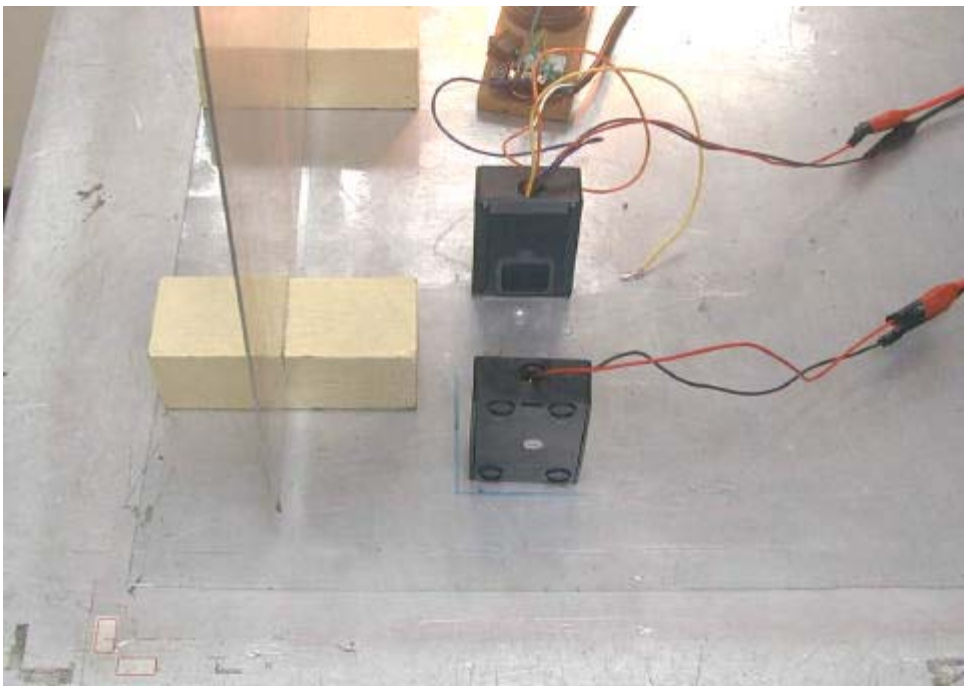
[1]The test voltages specified are the open-circuit voltages.
The test voltages for the lower severity levels are included because all the lower severity levels must also be satisfied.

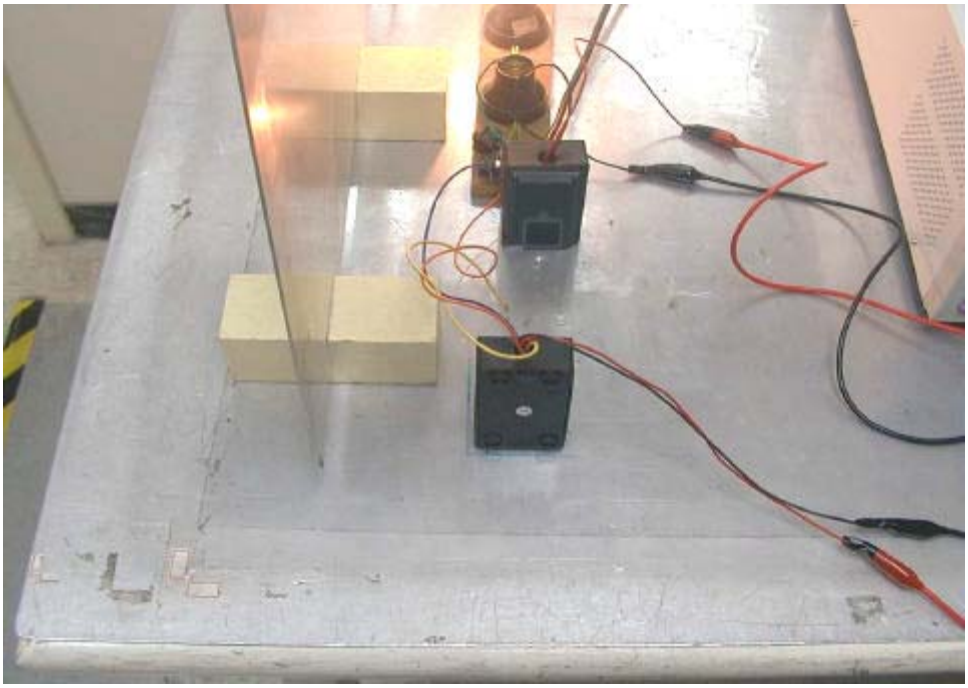
## 9.4 Direct Discharge Test Drawing



# Indirect Discharge Test Drawing





# 9.5 Electrostatic Discharge Test Data(Direct Discharge)

Model No. : IR-3000G

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

Temperature : 27 ℃ Relative Humidity : 42 %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.

# Electrostatic Discharge Test Data(Indirect Discharge)

Model No. : IR-3000G

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

Temperature : 27 ℃ Relative Humidity : 42 %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 | | 8 KV | | 15 KV | |
| | + | - | + | - | + | - | + | - | + | - | + | - | + | - | + | - |
| 1 | P | P | P | P | P | P | / | / | / | / | / | / | / | / | / | / |
| 2 | P | P | P | P | P | P | / | / | / | / | / | / | / | / | / | / |
| 3 | P | P | P | P | P | P | / | / | / | / | / | / | / | / | / | / |
| 4 | P | P | P | P | P | P | / | / | / | / | / | / | / | / | / | / |
| 5 | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / |
| 6 | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / |
| 7 | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / |
| 8 | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / |
| 9 | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / |
| 10 | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / | / |

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

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

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

| Test standard | Model No. | Result |
|---|---|---|
| EN 61000-4-3 | IR-3000G | Passed |

Field Strength : 10 V/M ,

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

Start : 80 MHz , Stop : 1000 MHz . DC Power : 24 Vdc

Pulse modulation: 1 Hz ON ( YES ) . OFF (____)

Start : 80 MHz , Stop : 1000 MHz . DC Power : 24 Vdc

**Criteria for Compliance:**

There shall be no damage, malfunction or change of status due to the conditioning. Flickering of an indicator during the conditioning is permissible, providing that there is no residual change in the EUT or any change in outputs.

# 10.1 Radio-Frequency Electromagnetic Field Test Description

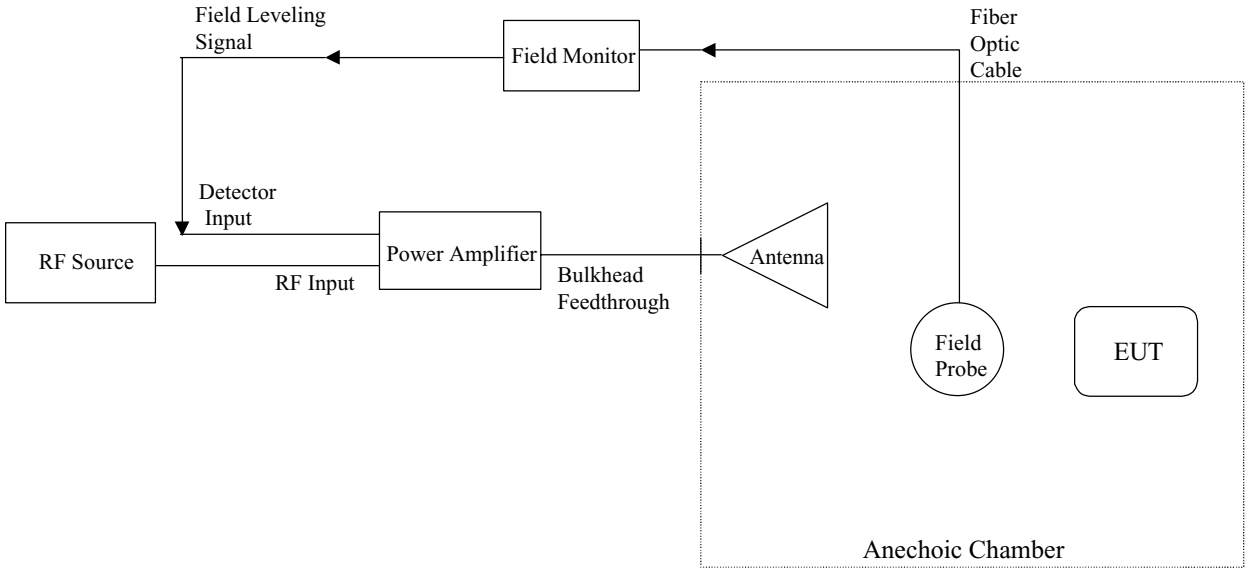
Most electronic equipment is, in some manner, affected by electromagnetic radiation.
This radiation is frequently generated by such sources as the small hand-held radio transceivers that are used by operating, maintenance and security personnel, fixed-station radio and television transmitters, vehicle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

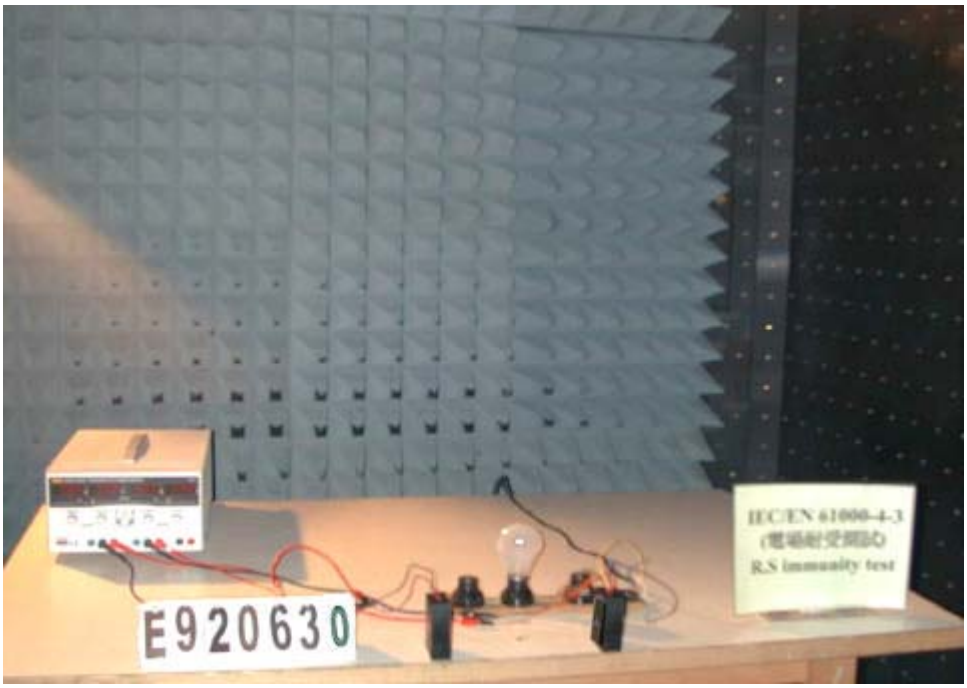
| | | |
|---|---|---|
| Frequency range | (MHz) | 80 to 1000 |
| Field strength[1)] | (V/m) | 10 |
| Modulation:<br>Amplitude modulation<br>Pulse modulation | | <br>80%, 1 kHz, sinusoidal<br>1 Hz (0.5 s ON: 0.5 s OFF) |

[1)] The field strength quoted is the RMS value for the continuous wave, before modulation.

# 10.4 Radio-Frequency Electromagnetic Field Test Setup Photo

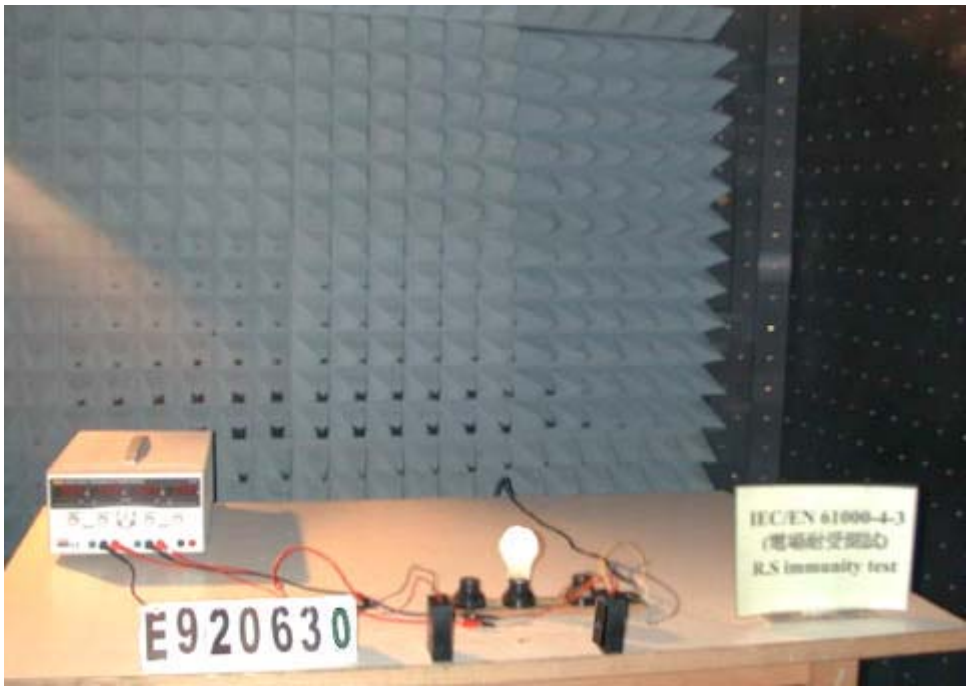
**TX ON MODE**

**< FRONT VIEW >**



**TX OFF MODE**

**< FRONT VIEW >**



# 11. EN 50130-4 Clause 7 Mains Supply Voltage Variations Test

| Test standard | Model No. | Result |
|---|---|---|
| EN 50130-4 Clause 7 | IR-3000G | Passed |

**Criteria for Compliance:**

There shall be no damage, malfunction or change of status due to the different supply voltage conditions. The EUT shall meet the acceptance criteria for the functional test, during the conditioning.

# 11.1 EN 50130-4 Clause 7 Mains Supply Voltage Variations Tests Description

To demonstrate the ability of the equipment to function correctly over the anticipated range of mains supply voltage conditions.

Subject the specimen to each of the power supply conditions, indicated in table 1, until temperature stability is reached:

| **Table 1** | |
|---|---|
| **Supply voltage max (Umax)** | **Unom + 10%** |
| **Supply voltage min (Umin)** | **Unom – 15%** |
| Unom = Nominal mains voltage. Where provision is made to Adapt the equipment to suit a number of nominal supply voltages (e.g. by transformer tap changing), the above conditioning severity shall be applied for each nominal voltage, with the equipment suitably adapted. For equipment which is claimed to be suitable for a range of nominal mains voltages(e.g.220/240 V) without adaptation, Umax = (Maximum Unom ) + 10%,and Umin = (Minimum Unom) – 15%. In any case the range of Unom must include the European nominal mains voltage of 230 V. | |

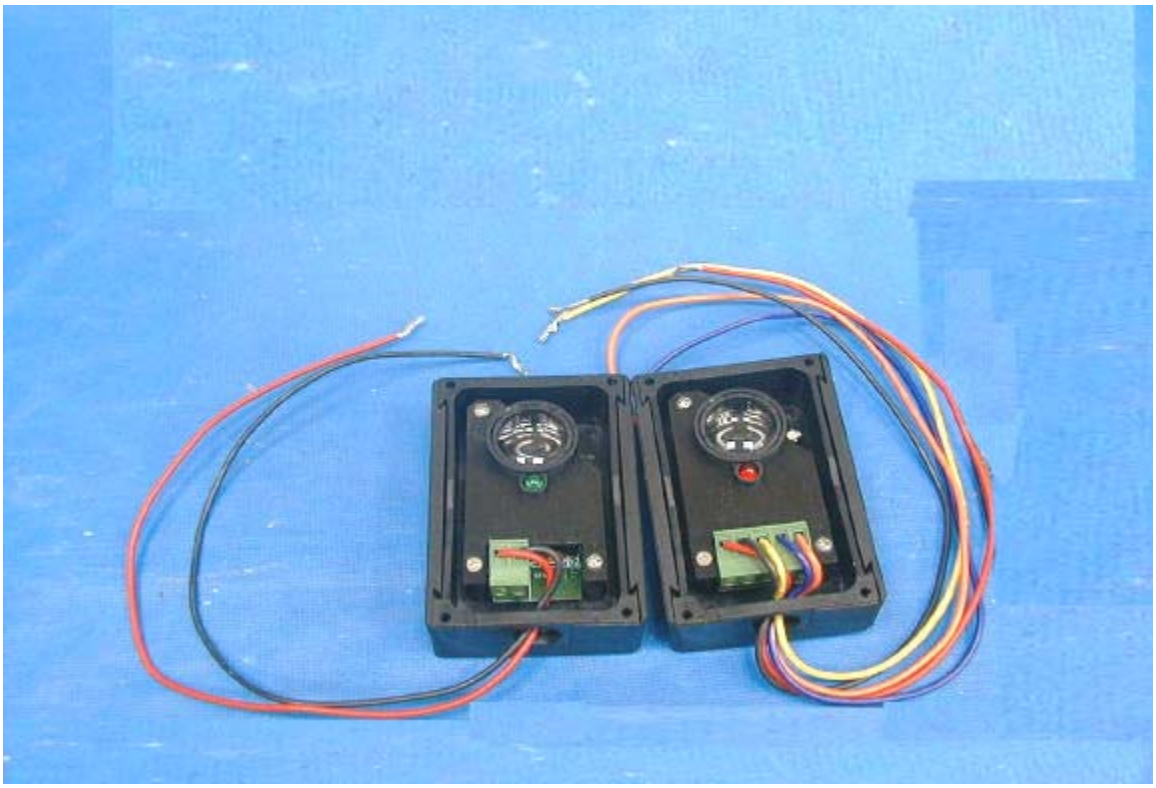
# 12. The List of Test Instruments

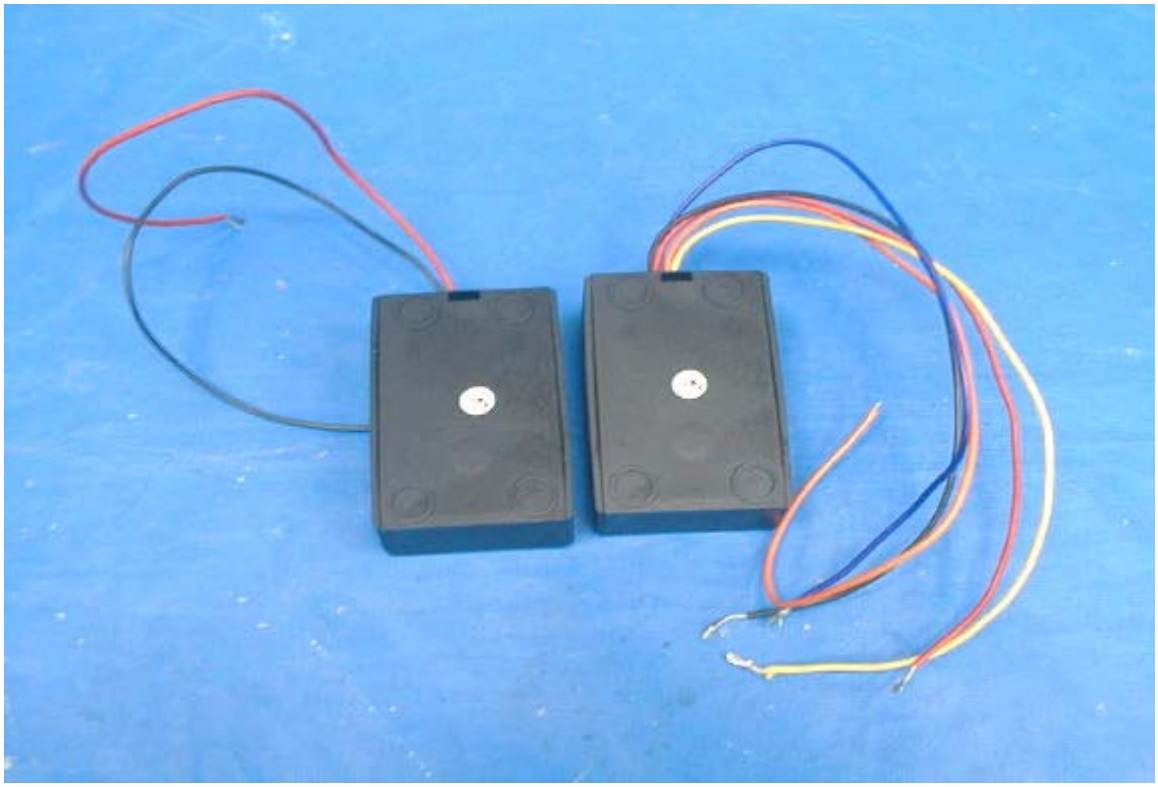
| Test Mode | Instrument | Model No. | Serial No. | Next Cal. Date | Cal. Interval |
|---|---|---|---|---|---|
| **Conduction ( No.1)** | R & S Receiver | ESHS10 | 830223/008 | May 22, 2004 | 1Year |
| | Rolf Heine LISN | NNB-4/63TL | 98008 | May 01, 2004 | 1Year |
| | R & S LISN | ESH3-Z5 | 844982/039 | 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 22, 2004 | 1Year |
| | Schaffner Pre-amplifier | CPA9232 | 1028 | May 20, 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. 29, 2004 | 2Year |
| | RF Cable | No. 1 | N/A | May 11, 2004 | 1Year |
| | EMCO Antenna | 3142B (26MHz~2GHz) | 9904-1370 | Aug. 24, 2004 | 1Year |

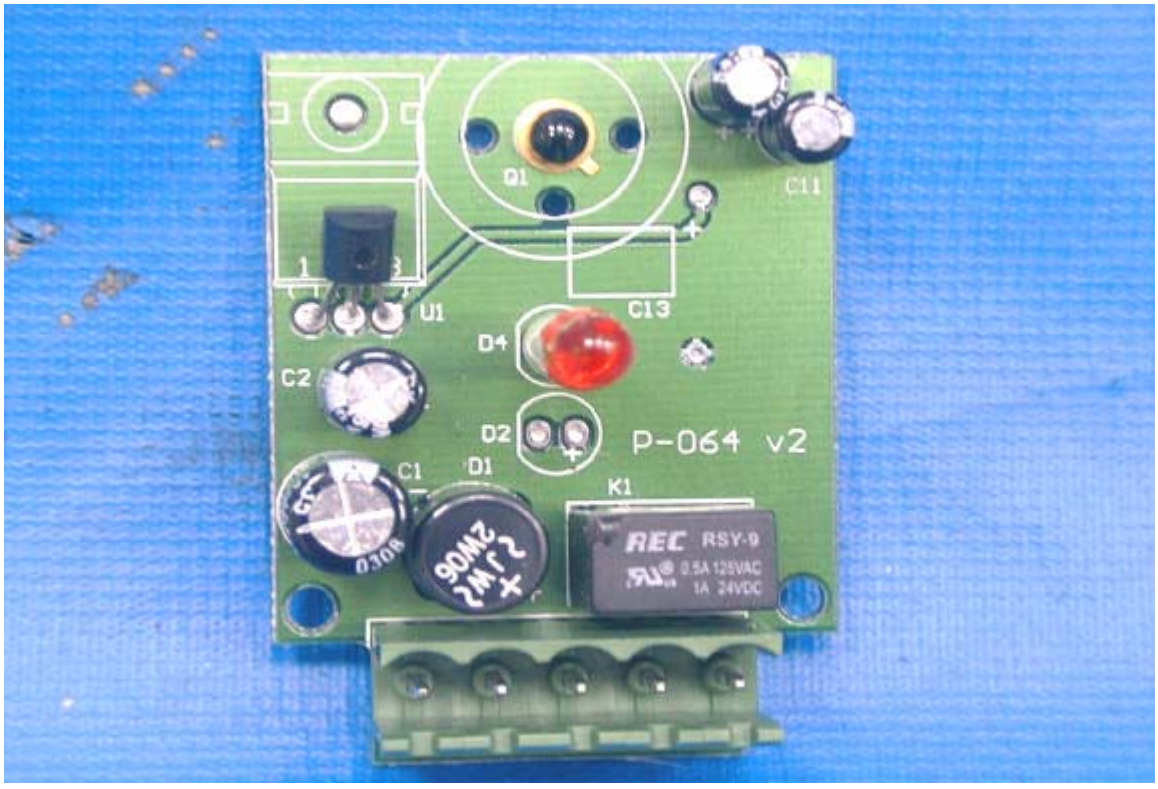
| Test Mode | Test item | Instrument | Model No. | Serial No. | Next Cal. Date | Cal. Interval |
|---|---|---|---|---|---|---|
| EMS (NO.1) | 4-2 | ESD Test System | ESS-100L (A)TC-815D | 4099C01970 | July 14, 2004 | 1Year |
| | 4-3 | Comtest G-Strip | G-320 | CC112-0008 | Oct. 01, 2005 | 2Year |
| | 4-3 | 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 |

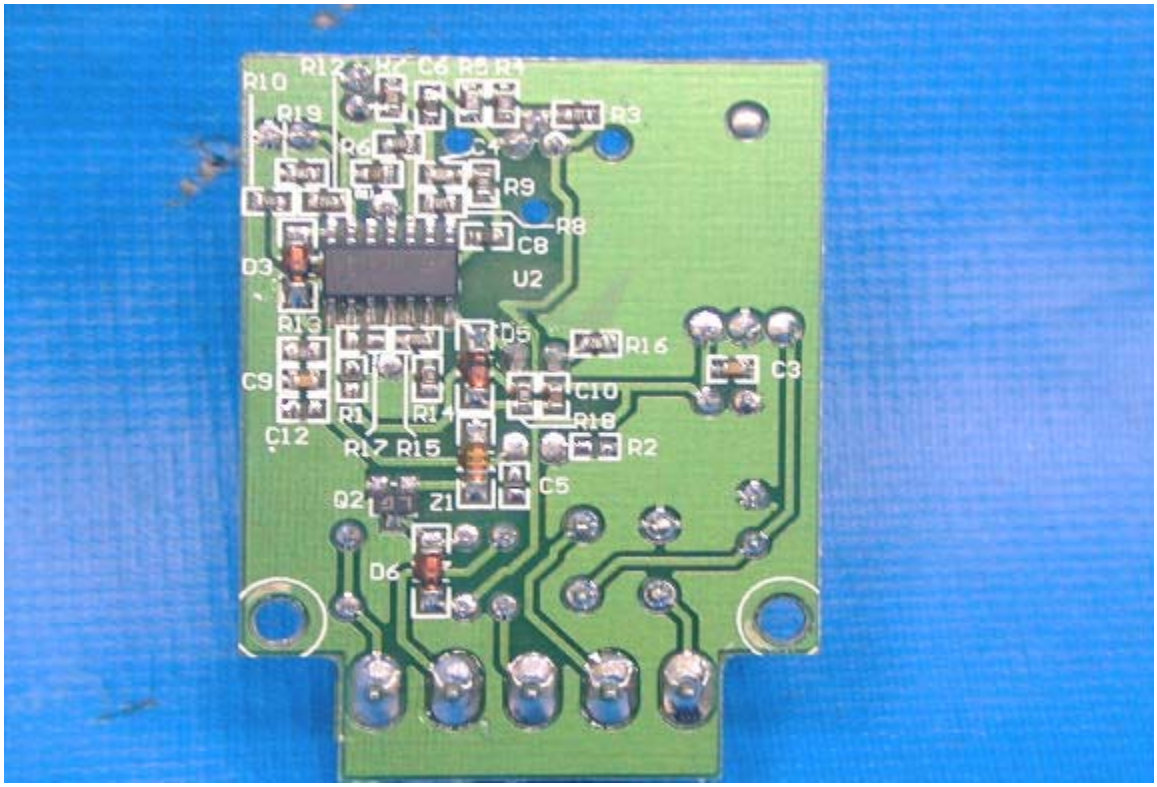
# 13. EUT Photographs

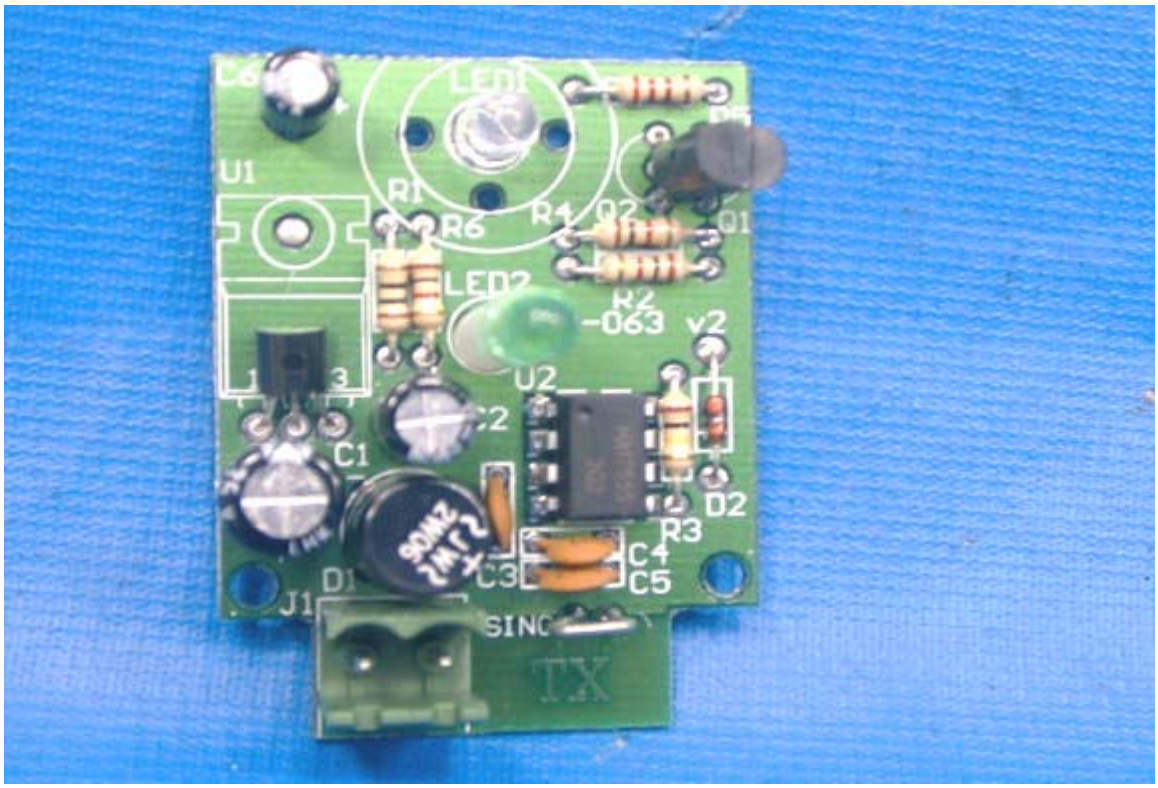
**MODEL NO. : IR-3000G**

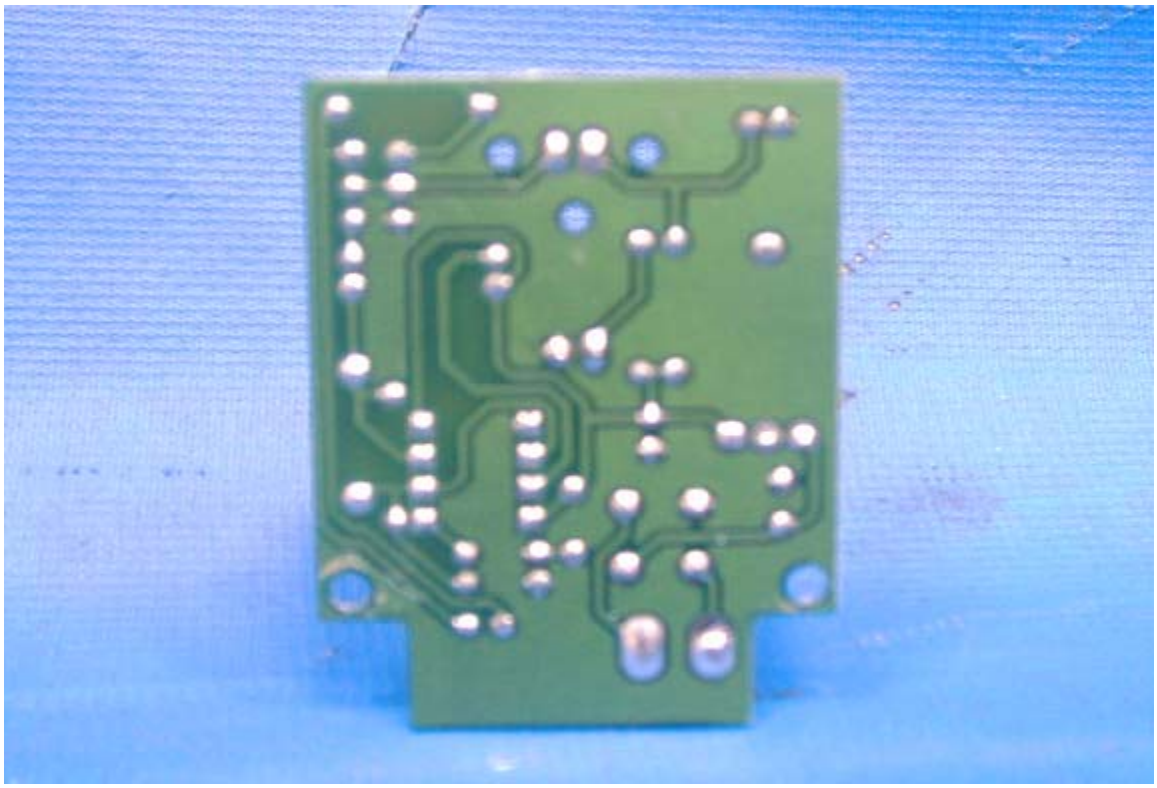






Q1
C11
U1
C13
D4
C2
D2
P-064 v2
C1
D1
K1
REC RSY-9


R10
R19
R3
R9
R8
C8
U2
D3
R13
D5
R16
C3
C9
C10
R1
R14
R18
R2
C12
R17
R15
C5
Q2
Z1
D6


U1
R1
R6
R4
Q2
Q1
LED2
R2
-063
v2
U2
C2
C1
D2
R3
C4
C5
C3
J1
TX



# VERIFICATION

## of conformity with European EMC Directive

### No. E920630

*Document holder*: **YUAN HSUN ELECTRIC CO., LTD.**

*Type of equipment:* **Through Beam Photoelectric Beam Sensor**

*Type designation*: **IR-3000G**

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:*

*Standard(s):*

EN 55022 : 1998 + A1: 2000 — Class B
EN 61000-3-2:2000
EN 61000-3-3:1995 + A1: 2001

*Performance Criterion*

EN 50130-4 :1995 + A1:1998

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 61000-4-11: 1994 + A1: 2001
Main Supply Voltage Variations

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**


Date: NOV. 07, 2003

M. Y. Tsui / President

# Declaration of Conformity

The following

**Applicant** : **YUAN HSUN ELECTRIC CO., LTD.**

**Equipment** : **Through Beam Photoelectric Beam Sensor**

**Model No.** : **IR-3000G**

**Report No.** : **E920630**

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 B
2) EN 61000-3-2 : 2000
3) EN 61000-3-3 : 1995+A1: 2001
4) EN 50130-4:1995 +A1:1998
   - 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 61000-4-11 : 1994+A1: 2001
   - Main Supply Voltage Variations

The following manufacturer is responsible for this declaration:

YUAN HSUN ELECTRIC CO., LTD.

NO. 57, CHUNG HE RD., ZUO-YING DIST., KAOHSIUNG CITY 813,
TAIWAN, R. O. C.

TAIWAN / NOV. 07, 2003

Place and Date

Signature of responsible Person