PEP Testing Laboratory
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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 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	:	Door Entry Alarm & Counting System
MODEL NO.	:	DES-700 & DC-500
APPLICANT	:	Yuan Hsun Electric Co., Ltd.
ADDRESS		No. 57, Chung He Rd., Zuo-Ying Dist., Kaohsiung City 813, Taiwan, R. O. C.

Test Engineer : STEVEN CHEN

Checked by : HADES HUANG

Issued Date : NOV. 23, 2004

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1. General

1.1 General Information :

Applicant : Yuan Hsun Electric Co., Ltd.

Address : No. 57, Chung He Rd., Zuo-Ying Dist., Kaohsiung City 813, Taiwan, R. O. C.

Manufacturer : Yuan Hsun Electric Co., Ltd.

Address : 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

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2. Product Information/ Product Technical Judgement

a. EUT Name: Door Entry Alarm & Counting System

b. Model No.： DES-700 & DC-500

c. CPU Type： N/A

d. CPU Frequency： N/A

e. Crystal/Oscillator(s) ： 4 MHz

f. Chassis Used： ABS

g. Port/Connector(s) ： Input Jack × 1, Output Jack × 1, Power Jack × 1

h. Power Rating： Adapter ----

1) Model No. : SP35-90300
Input : AC 230V 50Hz 50mA
Output : DC 9V 300mA

2) Model No. : 090-0250
Input : AC 120V 60Hz 5W
Output : DC 9V 250mA

3) Model No. : AD-0900300DS
Input : AC 240V 50Hz
Output : DC 9V 300mA

i. Condition of the EUT : ☐ Prototype Sample ☑ Engineering Sample
☐ Production Sample

j. Test Item Receipt Date : NOV. 16, 2004

3. EUT Description and Test Conclusion

The equipment under test (EUT) is Door Entry Alarm & Counting System model DES-700 & DC-500. The EUT that comes with operations of CHIME mode and ALARM mode is infrared sensor equipment used for the application of counting objects passing by. AC-DC adaptor supplies EUT DC 9V from AC mains. For more detail specification about the EUT, please refer to the user's manual.

Test method: According to the major function designed, the EUT configuration was set up for test. The test was carried out on EUT operational conditions of CHIME mode and ALARM mode. Besides original AC-DC adaptor model SP35-90300, two additional models: 090-0250 and AD-0900300DS were respectively used during conducted emission test. The worst-case test result of each test mode was recorded and provided in this report.

Conducted emission test:
The system was setup with the EMI diagnostic software running. The power line conducted EMI tests were run on the line and neutral conductors of the power cord and the results were recorded. The effect of varying the position of the interface cables has been investigated to find the worst-case configuration that produces maximum emission.
At the frequencies where the peak values of the emission exceeded the quasi-peak limit, the emissions were also measured with the quasi-peak detectors. The average detector also measured the emission either (A) quasi-peak values were under quasi-peak limit but exceeded average limit, or (B) peak values were under quasi-peak limit but exceeded average limit.

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 61000-3-2, EN 61000-3-3, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, and EN 61000-4-11.

4. Modification(s):

N/A

5. Test Software Used

N/A

6. Support Equipment Used

N/A

7. EN 55022 Conducted Disturbance Test

Test Standard	Model No.	Result
EN 55022	DES-700 & DC-500	Passed

7.1 Conducted Disturbance Test Limits at Main Ports

Frequency Rang	Limits dB(uV)			
	Class A ITE		Class B ITE	
MHz	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.50	79	66	66-56	56-46
0.50 - 5.0	73	60	56	46
5.0 - 30	73	60	60	50

Remarks: - If the average limit is met when a quasi-peak detector is used, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary.

-The lower limit shall apply at the transition frequency

-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50 MHz.

7.2 Conducted Disturbance Test Setup Photos

< FRONT VIEW >

< REAR VIEW >

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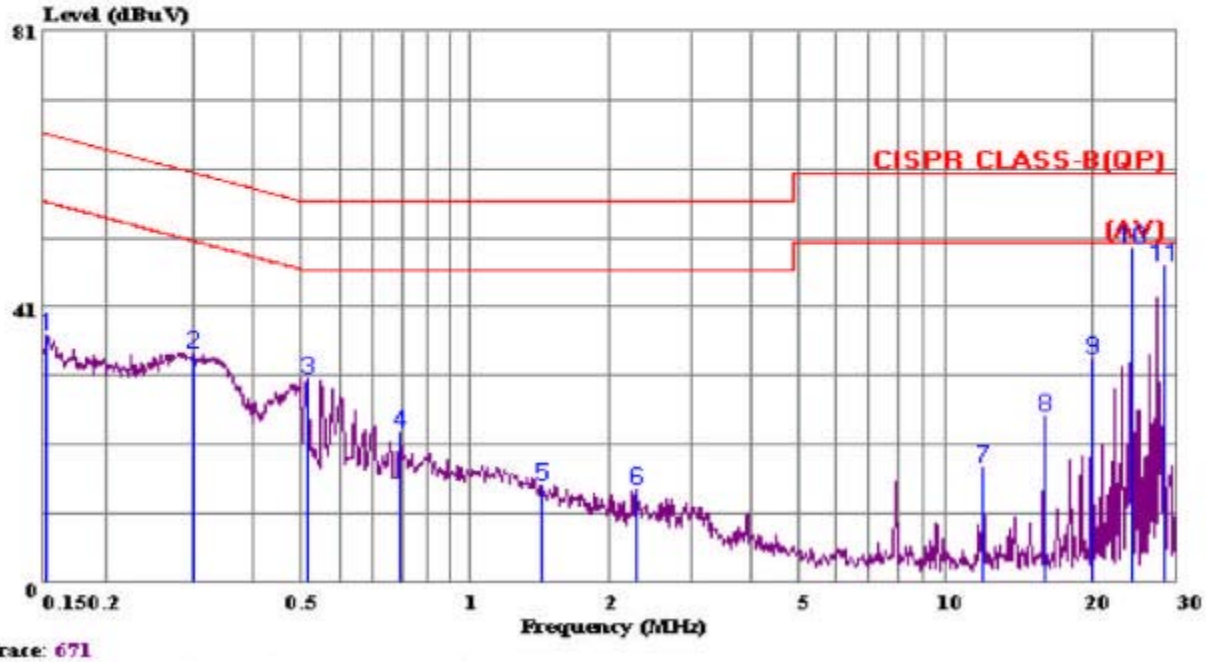
7.3 Conducted Disturbance Test Data at Main Ports (LISN)

Model No.	**: DES-700 & DC-500**
Frequency range	**: 150KHz to 30MHz**
Detector	**: Peak Value**
Temperature	**: 24 ℃**
Humidity	**: 49 %**
Adapter	**: SP35-90300**
Memo	**: CHIME Mode**

Test Data : # **672** < LINE >
674 < NEUTRAL >

※ Note 1. Level = Read Level + Probe (LISN) Factor + Cable Loss
2. Over Limit = Level – Limit Line = Margin

Data#: 672 File#: EN55022-B(QP).EMI Date: 2004-11-16 Time: 17:54:47



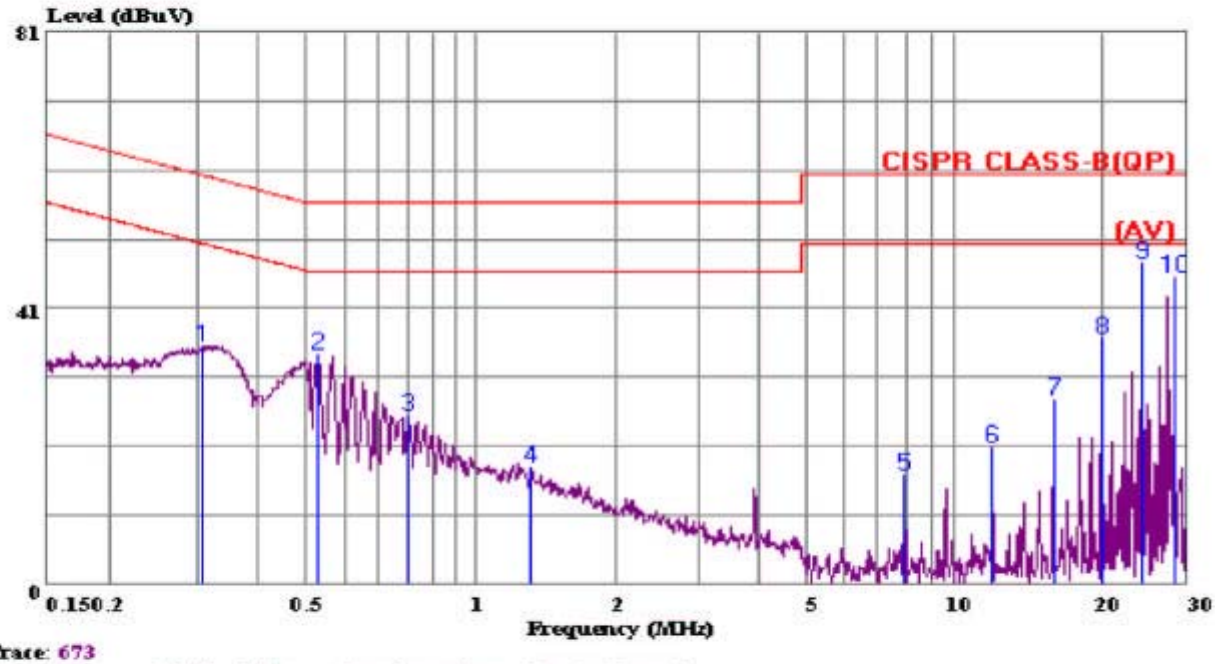
Trace: 671

Site : Shih-Chi : Conduction No.1(Gene)
Condition: CISPR CLASS-B(QP) LISN.L(16A) LINE
eut : E930737
power : AC 230V 50Hz
memo : Peak Value
: Final Test

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.152	36.24	-29.63	65.87	35.94	0.20	0.10	
2	0.302	33.78	-26.41	60.19	33.48	0.20	0.10	
3	0.513	29.90	-26.10	56.00	29.51	0.20	0.19	
4	0.796	22.01	-33.99	56.00	21.71	0.20	0.10	
5	1.535	14.32	-41.68	56.00	13.92	0.20	0.20	
6	2.396	13.78	-42.22	56.00	13.38	0.20	0.20	
7	12.124	16.86	-43.14	60.00	16.07	0.39	0.40	
8	16.140	24.43	-35.57	60.00	23.51	0.52	0.40	
9	20.162	32.90	-27.10	60.00	31.89	0.61	0.40	
10	24.271	48.93	-11.07	60.00	47.76	0.77	0.40	
11	28.302	46.36	-13.64	60.00	45.06	0.80	0.50	

Data#: 674 File#: EN55022-B(QP).EMI Date: 2004-11-16 Time: 17:56:02



Trace: 673

Site : Shih-Chi : Conduction No.1(Gene)
Condition: CISPR CLASS-B(QP) LISN.N(16A) NEUTRAL
eut : E930737
power : AC 230V 50Hz
memo : Peak Value
: Final Test

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.310	34.98	-24.99	59.97	34.68	0.20	0.10	
2	0.529	33.54	-22.46	56.00	33.17	0.20	0.17	
3	0.800	24.67	-31.33	56.00	24.37	0.20	0.10	
4	1.426	17.12	-38.88	56.00	16.72	0.20	0.20	
5	8.062	16.04	-43.96	60.00	15.46	0.28	0.30	
6	12.124	19.98	-40.02	60.00	19.19	0.39	0.40	
7	16.140	27.03	-32.97	60.00	26.11	0.52	0.40	
8	20.162	36.08	-23.92	60.00	35.07	0.61	0.40	
9	24.271	47.10	-12.90	60.00	45.93	0.77	0.40	
10	28.302	45.13	-14.87	60.00	43.83	0.80	0.50	

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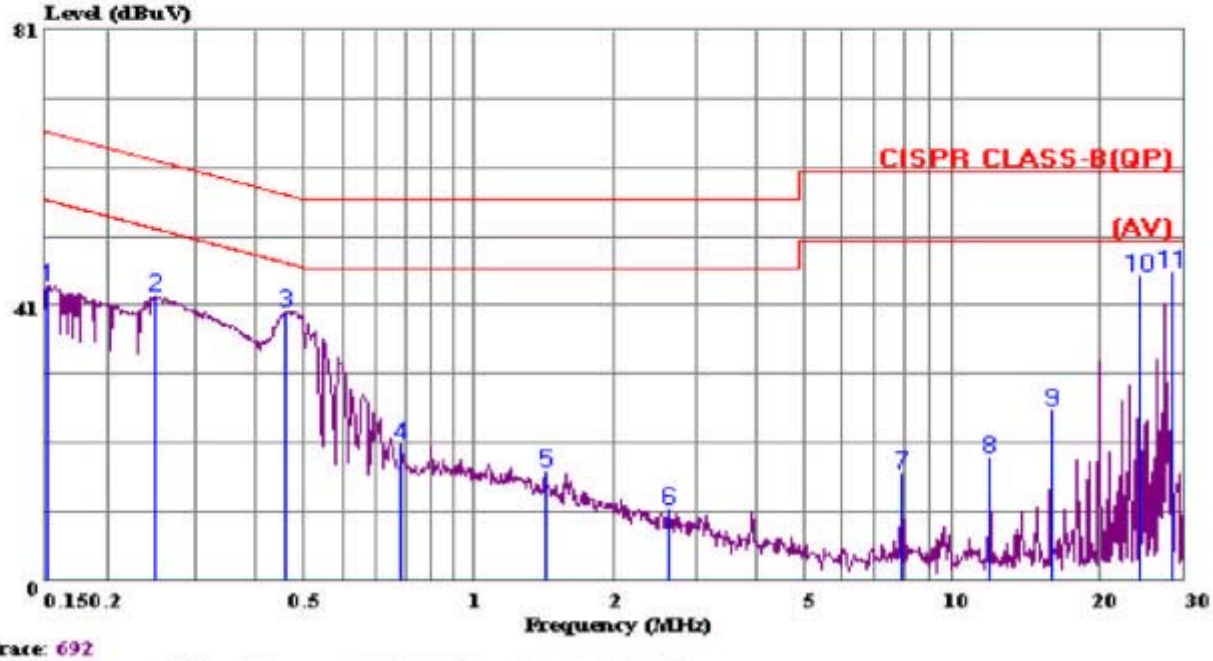
Model No. : **DES-700 & DC-500**
Frequency range : **150KHz to 30MHz**
Detector : **Peak Value**
Temperature : **24 ℃**
Humidity : **49 %**
Adapter : **090-0250**
Memo : **CHIME Mode**

Test Data : # **693** < LINE >
695 < NEUTRAL >

※ Note 1. Level = Read Level + Probe (LISN) Factor + Cable Loss
2. Over Limit = Level – Limit Line = Margin

Data#: 693 File#: EN55022-B(QP).EMI Date: 2004-11-16 Time: 18:15:43



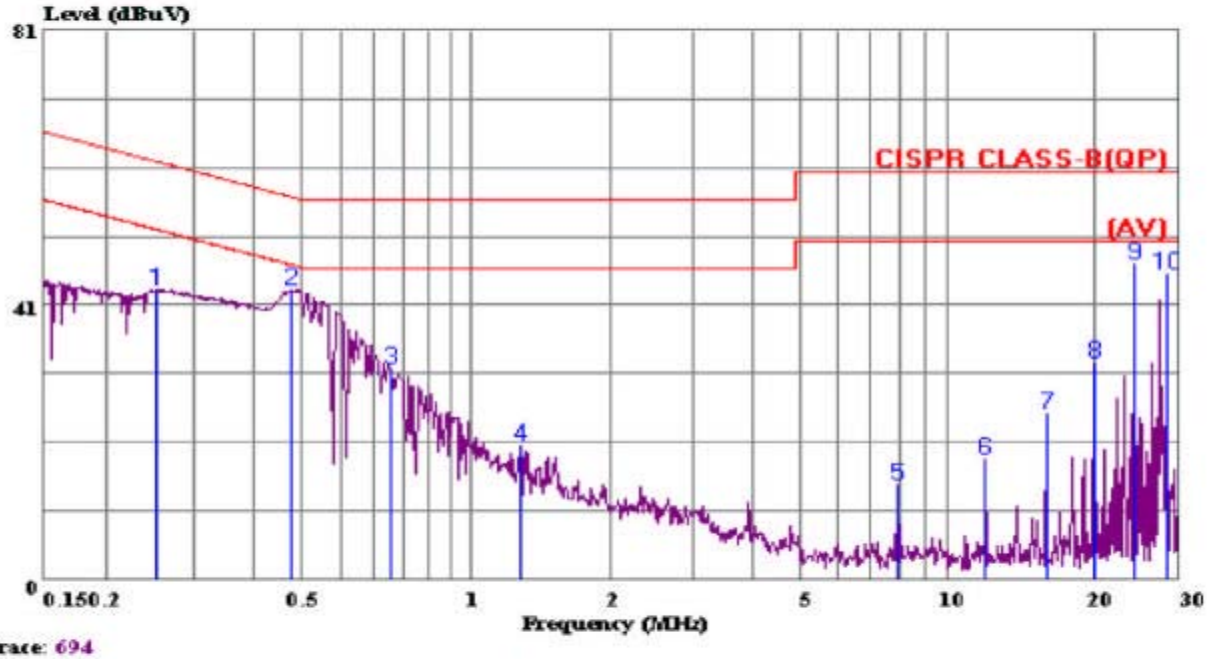
Trace: 692

Site : Shih-Chi : Conduction No.1(Gene)
Condition: CISPR CLASS-B(QP) LISN.L(16A) LINE
eut : E930737
power : AC 120V 60Hz
memo : Peak Value
: Final Test

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.152	43.33	-22.54	65.87	43.03	0.20	0.10	
2	0.251	41.68	-20.05	61.73	41.28	0.20	0.20	
3	0.461	39.57	-17.10	56.67	39.24	0.20	0.13	
4	0.783	20.10	-35.90	56.00	19.80	0.20	0.10	
5	1.535	16.01	-39.99	56.00	15.61	0.20	0.20	
6	2.721	10.40	-45.60	56.00	10.00	0.20	0.20	
7	8.062	15.68	-44.32	60.00	15.10	0.28	0.30	
8	12.124	18.02	-41.98	60.00	17.23	0.39	0.40	
9	16.140	24.95	-35.05	60.00	24.03	0.52	0.40	
10	24.271	44.79	-15.21	60.00	43.62	0.77	0.40	
11	28.302	45.34	-14.66	60.00	44.04	0.80	0.50	

Data#: 695 File#: EN55022-B(QP).EMI Date: 2004-11-16 Time: 18:17:08



Trace: 694

Site : Shih-Chi : Conduction No.1(Gene)
Condition: CISPR CLASS-B(QP) LISN.N(16A) NEUTRAL
eut : E930737
power : AC 120V 60Hz
memo : Peak Value
: Final Test

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.253	42.78	-18.86	61.64	42.38	0.20	0.20	
2	0.474	42.67	-13.78	56.45	42.32	0.20	0.15	
3	0.755	31.21	-24.79	56.00	30.91	0.20	0.10	
4	1.381	19.71	-36.29	56.00	19.31	0.20	0.20	
5	8.062	14.00	-46.00	60.00	13.42	0.28	0.30	
6	12.124	17.74	-42.26	60.00	16.95	0.39	0.40	
7	16.140	24.52	-35.48	60.00	23.60	0.52	0.40	
8	20.162	32.06	-27.94	60.00	31.05	0.61	0.40	
9	24.271	46.56	-13.44	60.00	45.39	0.77	0.40	
10	28.302	45.05	-14.95	60.00	43.75	0.80	0.50	

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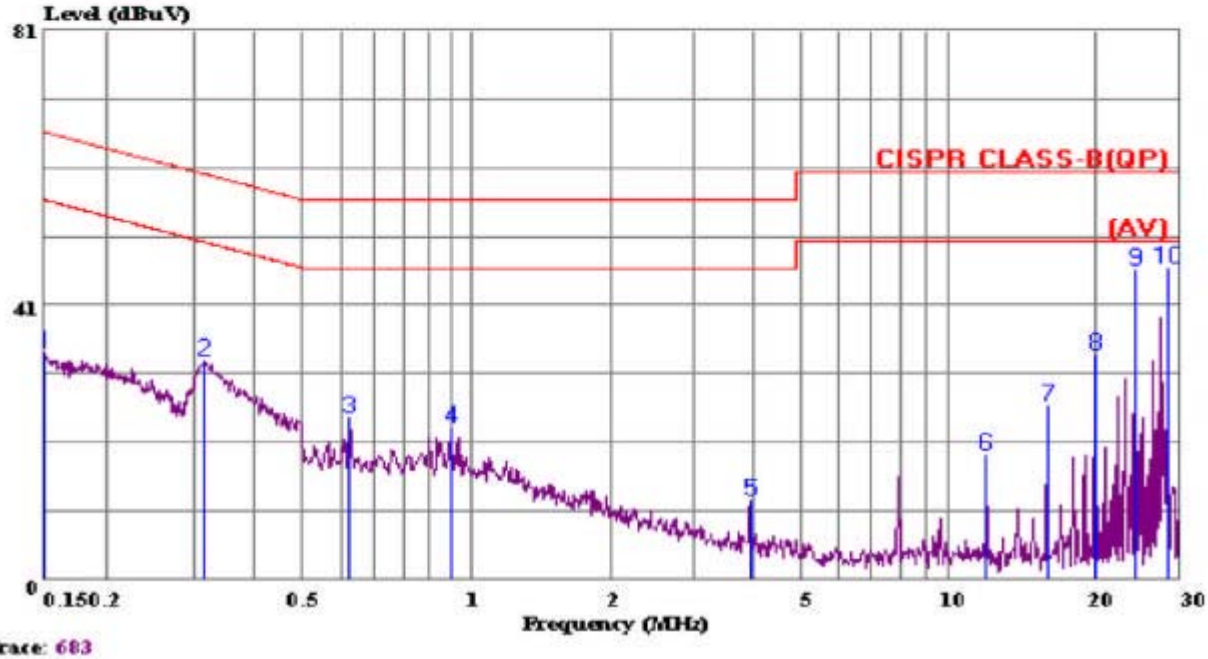
Model No. : **DES-700 & DC-500**
Frequency range : **150KHz to 30MHz**
Detector : **Peak Value**
Temperature : **24 ℃**
Humidity : **49 %**
Adapter : **AD-0900300DS**
Memo : **CHIME Mode**

Test Data : # **684** < LINE >
682 < NEUTRAL >

※ Note 1. Level = Read Level + Probe (LISN) Factor + Cable Loss
2. Over Limit = Level – Limit Line = Margin

Data#: 684 File#: EN55022-B(QP).EMI Date: 2004-11-16 Time: 18:04:03



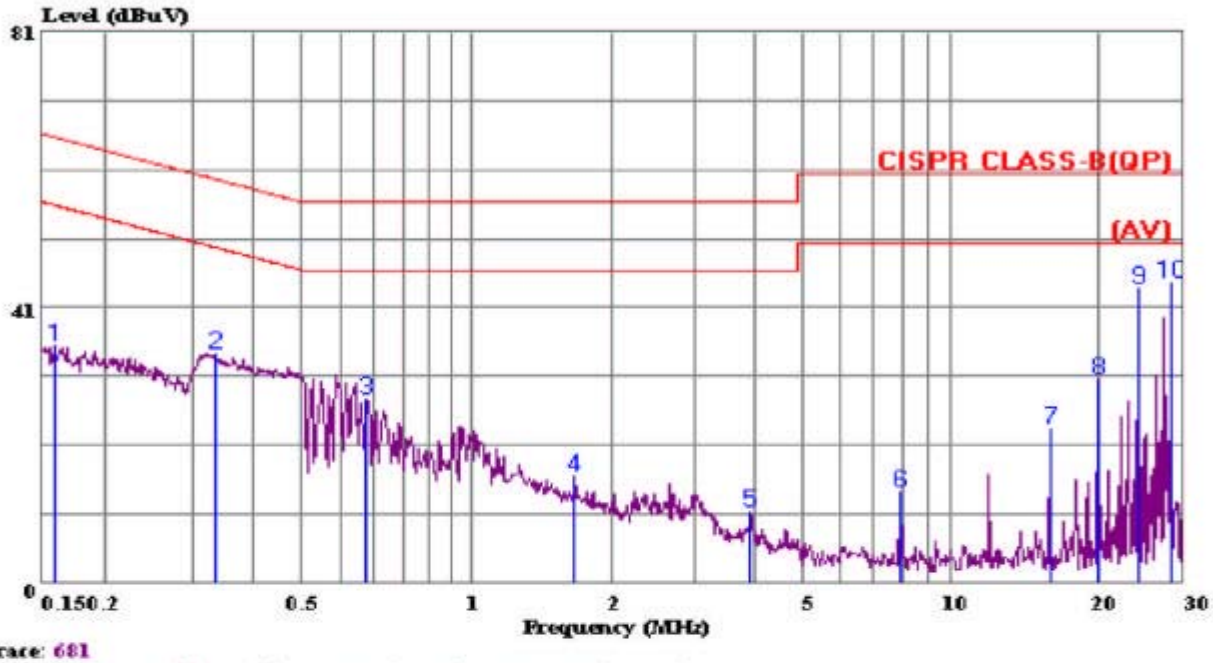
Trace: 683

Site : Shih-Chi : Conduction No.1(Gene)
Condition: CISPR CLASS-B(QP) LISN.L(16A) LINE
eut : E930737
power : AC 240V 50Hz
memo : Peak Value
: Final Test

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.150	33.35	-32.65	66.00	33.05	0.20	0.10	
2	0.317	32.26	-27.54	59.80	31.96	0.20	0.10	
3	0.621	23.77	-32.23	56.00	23.47	0.20	0.10	
4	1.000	22.46	-33.54	56.00	22.06	0.20	0.20	
5	4.027	11.61	-44.39	56.00	11.11	0.20	0.30	
6	12.124	18.30	-41.70	60.00	17.51	0.39	0.40	
7	16.140	25.47	-34.53	60.00	24.55	0.52	0.40	
8	20.162	33.04	-26.96	60.00	32.03	0.61	0.40	
9	24.271	45.61	-14.39	60.00	44.44	0.77	0.40	
10	28.302	45.76	-14.24	60.00	44.46	0.80	0.50	

Data#: 682 File#: EN55022-B(QP).EMI Date: 2004-11-16 Time: 18:03:05



Trace: 681

Site : Shih-Chi : Conduction No.1(Gene)
Condition: CISPR CLASS-B(QP) LISN.N(16A) NEUTRAL
eut : E930737
power : AC 240V 50Hz
memo : Peak Value
: Final Test

Page: 1

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.158	34.77	-30.79	65.56	34.47	0.20	0.10	
2	0.334	33.65	-25.70	59.35	33.35	0.20	0.10	
3	0.675	27.14	-28.86	56.00	26.84	0.20	0.10	
4	1.772	15.73	-40.27	56.00	15.33	0.20	0.20	
5	4.006	10.45	-45.55	56.00	9.95	0.20	0.30	
6	8.062	13.29	-46.71	60.00	12.71	0.28	0.30	
7	16.140	22.78	-37.22	60.00	21.86	0.52	0.40	
8	20.162	30.02	-29.98	60.00	29.01	0.61	0.40	
9	24.271	43.17	-16.83	60.00	42.00	0.77	0.40	
10	28.302	44.12	-15.88	60.00	42.82	0.80	0.50	

8. EN 55022 Radiated Disturbance Test

Test Standard	Model No.	Result
EN 55022	DES-700 & DC-500	Passed

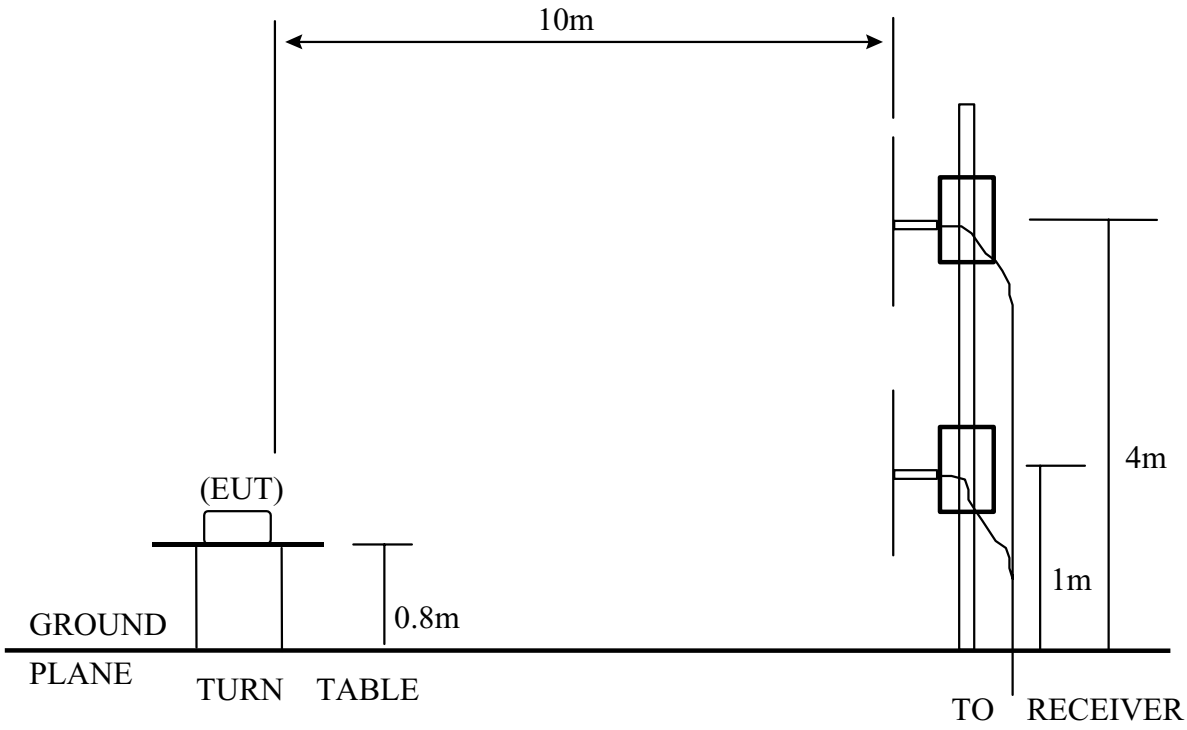
8.1 Radiated Disturbance Test Description

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(μ V/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(μ V/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.	

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8.4 Radiated Disturbance Test Setup Photos

< FRONT VIEW >

< REAR VIEW >

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8.5 Radiated Disturbance Test Data

Model No. : **DES-700 & DC-500**
Frequency range : **30MHz to 1GHz** **Detector** : **Quasi-Peak Value**
Temperature : **24° C** **Humidity** : **49 %**
Memo : **CHIME 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)
31.229	24.76	-5.24	30.00	33.09	10.60	0.52	19.45	140.0	4.0
34.117	23.41	-6.59	30.00	31.51	10.88	0.58	19.56	202.0	4.0
39.329	21.35	-8.65	30.00	29.02	11.33	0.60	19.60	195.0	3.9
47.129	18.49	-11.51	30.00	26.46	10.89	0.68	19.54	172.0	4.0
50.811	17.05	-12.95	30.00	25.15	10.66	0.80	19.56	177.0	4.0
111.400	18.82	-11.18	30.00	25.55	11.55	1.06	19.34	206.0	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. : DES-700 & DC-500
Frequency range : 30MHz to 1GHz Detector : Quasi-Peak Value
Temperature : 24° C Humidity : 49 %
Memo : CHIME 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)
34.622	27.64	-2.36	30.00	35.71	10.92	0.59	19.58	119.0	1.0
40.306	24.17	-5.83	30.00	31.80	11.36	0.60	19.59	184.0	1.0
44.333	25.89	-4.11	30.00	33.73	11.07	0.60	19.51	203.0	1.0
52.239	23.28	-6.72	30.00	31.38	10.57	0.80	19.47	149.0	1.3
134.889	17.05	-12.95	30.00	21.28	13.97	1.10	19.30	165.0	1.0
160.783	20.40	-9.60	30.00	21.90	16.69	1.30	19.49	250.0	1.5

Note :

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

9. EN 61000-3-2 Harmonic Current Test

Test standard	Model No.	Result
EN 61000-3-2	DES-700 & DC-500	Passed

9.1 Harmonic Current Test Description

The equipment under test is supplied in series with shunt(s) Rm or current transformer(s) from a source having the same nominal voltage and frequency as the rated supply voltage and frequency of the equipment under test. Whether the equipment operates with automatic , mixed or manual control , the measurements shall be made under normal load , or conditions for adequate heat discharge , and under normal operating conditions.
User's operation controls or automatic programmers shall be set to produce the maximum harmonic component , for each successive harmonic component in turn.

For the purpose of harmonic current limitation , equipment is classified as follows :
Class A :
- Balanced three-phase equipment;
- Household appliances excluding equipment identified as Class D;
- Tools excluding portable tools;
- Dimmers for incandescent lamps;
- Audio equipment.

Equipment not specified in one of the three other classes shall be considered as Class A equipment.
NOTE 1 Equipment that can be shown to have a significant effect on the supply system may be reclassified in a future edition of the standard. Factors to be taken into account include :
- number in use;
- duration of use;
- simultaneity of use;
- power consumption;
- harmonic spectrum, including phase.

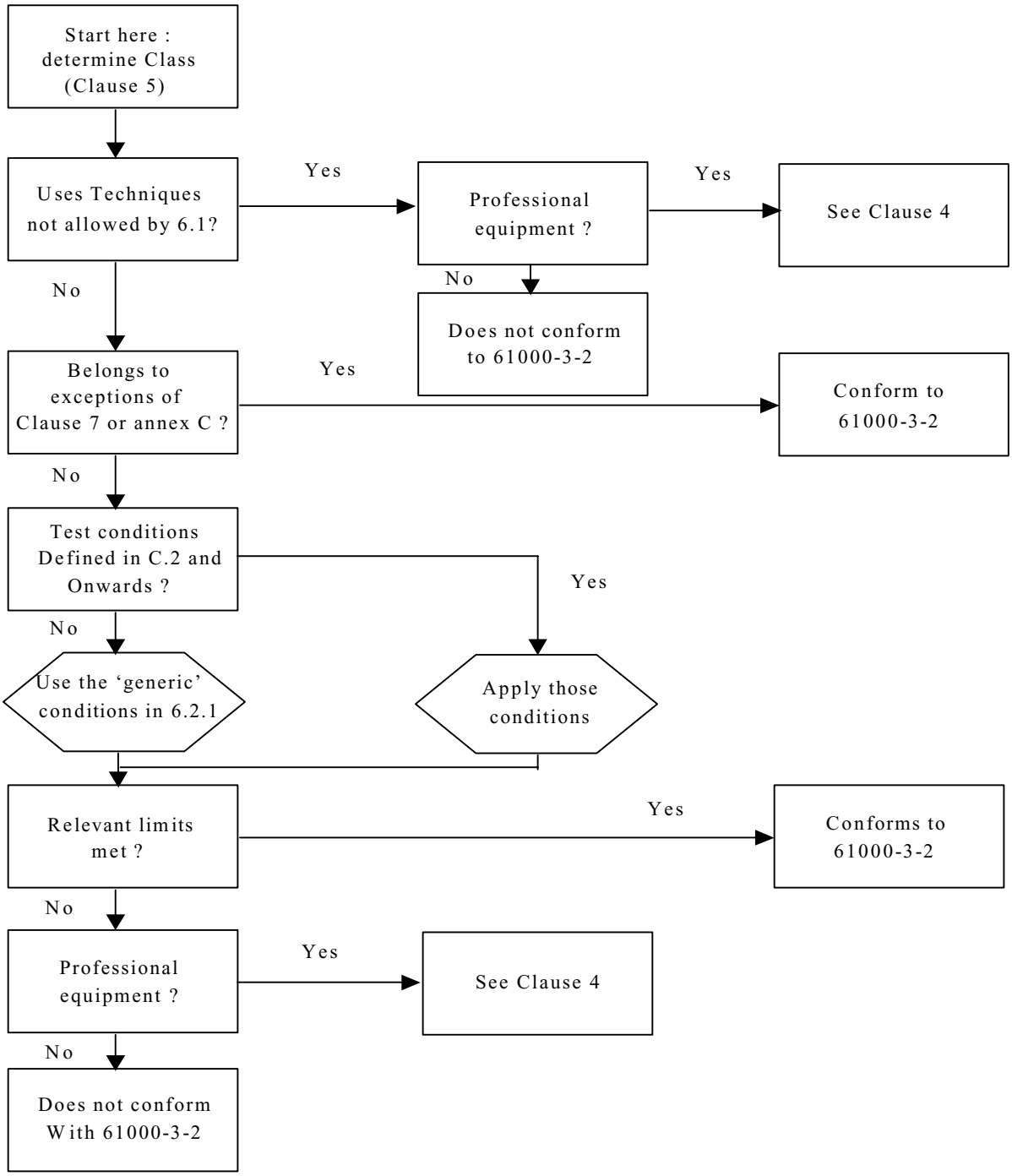
Class B : Portable tools .
- Portable tools;
- Arc welding equipment which is not professional equipment.

Class C :
- Lighting equipment.

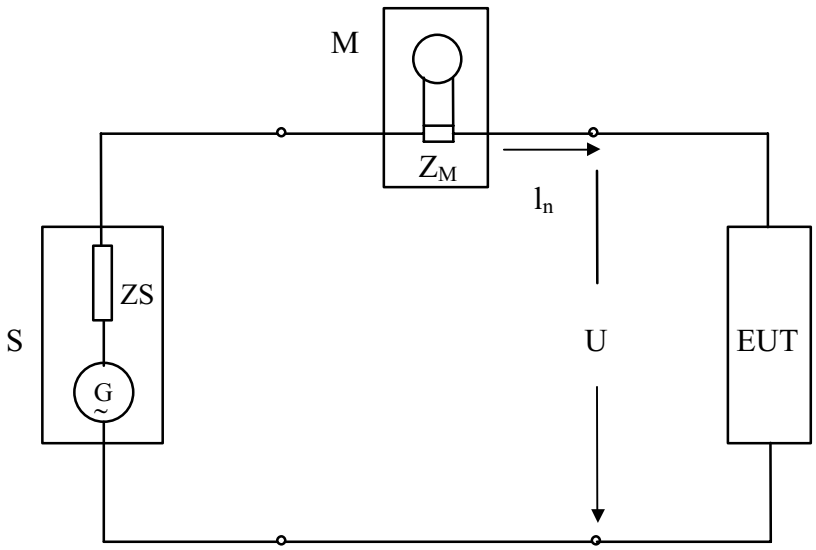
Class D :
Equipment having a specified power according to 6.2.2 less than or equal to 600W, of the following types:
- Personal computers and personal computer monitors;
- Television receivers.

NOTE 2 Class D limits are reserved for equipment that, by virtue of the factors listed in note 1, can be shown to have a pronounced effect on the public electricity supply system.

9.2 Flow-chart for determining Conformity



9.3 Harmonic Current Test Setup



S	power supply source	Z_M	input impedance of measurement equipment
M	measurement equipment	Z_S	internal impedance of the supply source
EUT	equipment under test	I_n	harmonic component of order n of the line current
U	test voltage	G	open-loop voltage of the supply source

9.4 Harmonic Current Test Limits

Table 1 Limits for Class A equipment

Harmonic order n	Maximum permissible harmonic current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15<=n<=39	$0.15\frac{15}{n}$
Even harmonics	
2	1.08
4	0.43
6	0.30
8<=n<=40	$0.23\frac{8}{n}$

Note :

1. For Class A equipment, the harmonics of the input current shall not exceed the absolute values given in table 1.
2. For Class B equipment, the harmonics of the input current shall not exceed the values given in table 1 multiplied by a factor of 1,5.

Table 2 Limits for Class C equipment

Harmonic order n	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %
2	2
3	30·λ*
5	10
7	7
9	5
11<=n<=39 (odd harmonics only)	3
* λ is the circuit power factor	

Note :
The harmonic current limits of lighting equipment shall not exceed the relative limits given in table 2.

Table 3 Limits for Class D equipment

Harmonic n	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
13<=n<=39 (odd harmonics only)	$\frac{3.85}{n}$	See table 1

Note :
The harmonics of the input current shall not exceed the values that can be derived from table 3.

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9.5 Harmonic Current Test Setup Photo

< FRONT VIEW >

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9.6 Harmonic Current Test Data

Model	:	DES-700 & DC-500
Line Voltage	:	230 Vrms
RMS Current	:	0.015 A
Real Power	:	2.509 W
Fundamental Amp	:	37.2 mArms
Line Frequency	:	50 Hz
Device Class	:	A

Harm. Order	Indicated Values	Max. Permits Harm. Current Ampere	Harm. Order	Indicated Values	Max. Permits Harm. Current Ampere
- - -	- - -	- - -	2	0.000	1.08
3	0.004	2.30	4	0.000	0.43
5	0.003	1.14	6	0.000	0.30
7	0.001	0.77	8	0.000	0.23
9	0.000	0.40	10	0.000	0.18
11	0.000	0.33	12	0.000	0.15
13	0.000	0.21	14	0.000	0.13
15	0.000	0.15	16	0.000	0.12
17	0.000	0.13	18	0.000	0.10
19	0.000	0.12	20	0.000	0.09
21	0.000	0.11	22	0.000	0.08
23	0.000	0.10	24	0.000	0.08
25	0.000	0.09	26	0.000	0.07
27	0.000	0.08	28	0.000	0.07
29	0.000	0.08	30	0.000	0.06
31	0.000	0.07	32	0.000	0.06
33	0.000	0.07	34	0.000	0.05
35	0.000	0.06	36	0.000	0.05
37	0.000	0.06	38	0.000	0.05
39	0.000	0.06	40	0.000	0.05

10. EN 61000-3-3 Voltage Fluctuations Test

Test standard	Model No.	Result
EN 61000-3-3	DES-700 & DC-500	Passed

10.1 Voltage Fluctuations Test Description

EN 61000-3-3 standards define the measurement requirements, ac power source requirements, line impedance requirements, and voltage fluctuation and flicker limits for assessing electronic and electrical equipment's propensity to cause voltage disturbances on the ac mains. Compliance with these standards ensures that voltage fluctuations do not interfere with other equipment connected to the ac mains or cause incandescent lights to visibly flicker in a way that causes an annoyance or health risk to a human observer.

When automatic controls cycle on and off, they cause frequent changes of toehold to the supply. When the fluctuating load is in a branch circuit with other loads, these changes cause rms voltage fluctuations that affect all of the loads in the branch. In particular, variations in voltage amplitude cause changes in the light output of any filament lamps in the branch circuit. Because the output of a filament lamp is proportional to the square of the applied voltage, changes in light intensities can be significant even for small changes in voltage.

10.2 Voltage Fluctuations Test Limits

The limits shall be applicable to voltage fluctuations and flicker at the supply terminals of the equipment under test.

The following limits apply:

- the value of P_{st} shall not be greater than 1.0;
- the value of P_{it} shall not be greater than 0.65;
- the value of *d(t)* during a voltage change shall not exceed 3.3% for more than 500 ms;
- the relative steady-state voltage change, $d_{c,}$ shall not exceed 3.3%;
- the maximum relative voltage change $d_{max,}$ shall not exceed
  a) 4% without additional conditions;
  b) 6% for equipment which is:
     - switched manually, or
     - switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

NOTE The cycling frequency will be frequency will be further limited by the P_{st} and P_{it} limit. For example: a d_{max} of 6% producing a rectangular voltage change characteristic twice per hour will give a P_{it} of about 0.65.

  c) 7% for equipment which is
     - attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or
     - switched on automatically, or is intended to be switched on manually, no mote than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

10.3 Voltage Fluctuations Test Setup Photo

< FRONT VIEW >

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10.4 Voltage Fluctuations Test Data

Model No : DES-700 & DC-500

RMS Voltage	: 230 V	RMS Current	: 0.015 A
Real Power	: 2.491 W	Peak Current	: 0.028 A
Apparent Power	: 3.514 VA	Frequency	: 50.0 Hz

	Indicated Values	Limit	Pass(P) or Fail (F)
Pst	0.072	< 1.0	P
Plt	0.072	< 0.65	P
Dc	0.00%	< 3.3%	P
Dmax	0.00%	< 4%	P
D(t)	0.00%	< 3.3%	P

Pst : Short-term flicker indicator

Plt : Long-term flicker indicator

Dc : Relative steady state voltage change

Dmax : Maximum relative voltage change

D (t) : Voltage change

11. EN 61000-4-2 Electrostatic Discharge Test

Test standard	Model No.	Result
EN 61000-4-2	DES-700 & DC-500	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.

11.1 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-fiber) 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

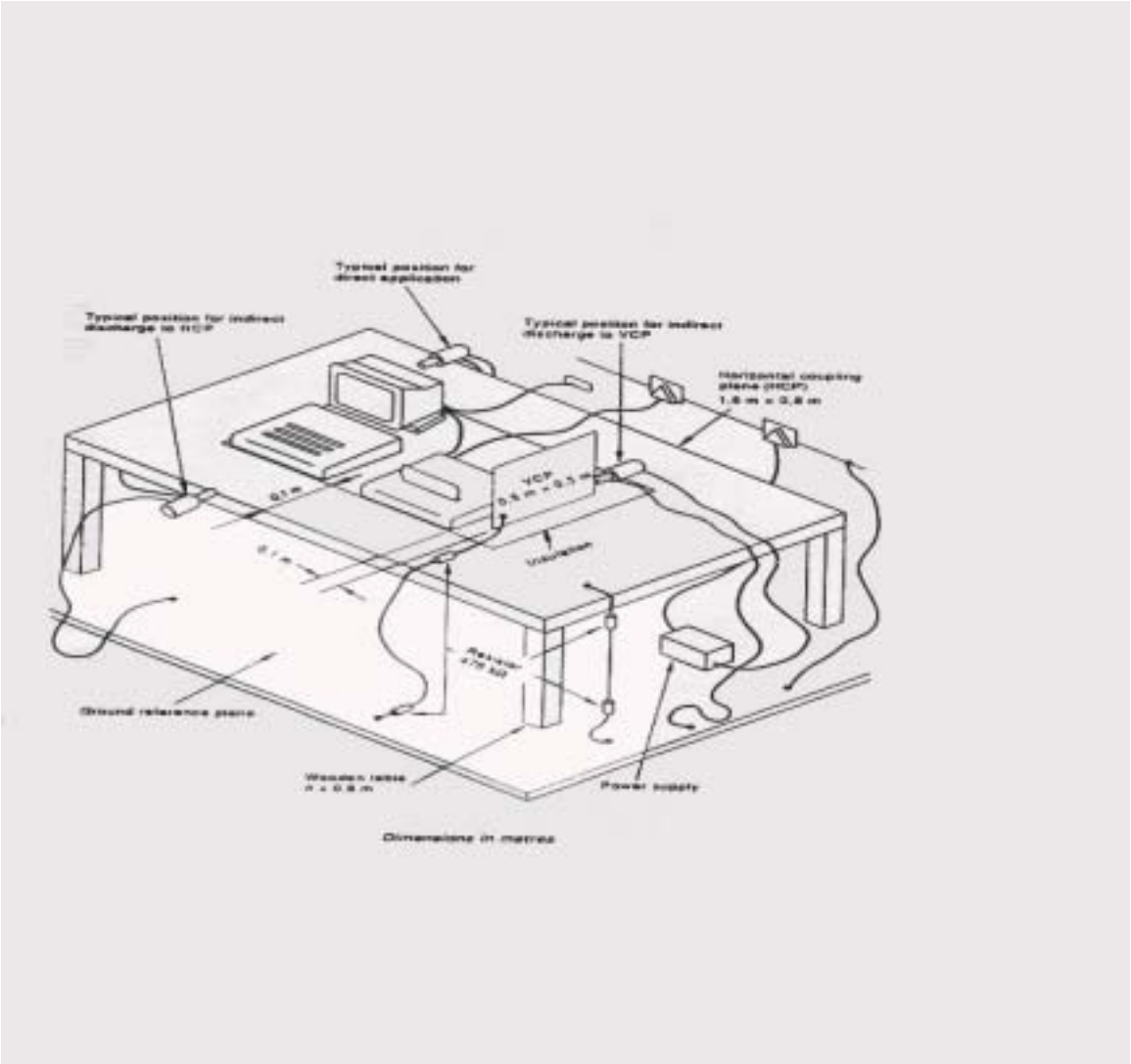
- ambient temperature: 15 ℃ to 35℃;
- relative humidity: 30 % to 60%
- atmospheric pressure: 86 KPa (860 mbar) to 106 KPa (1060 mbar).

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

Electromagnetic conditions

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

11.2 Electrostatic Discharge Test Setup



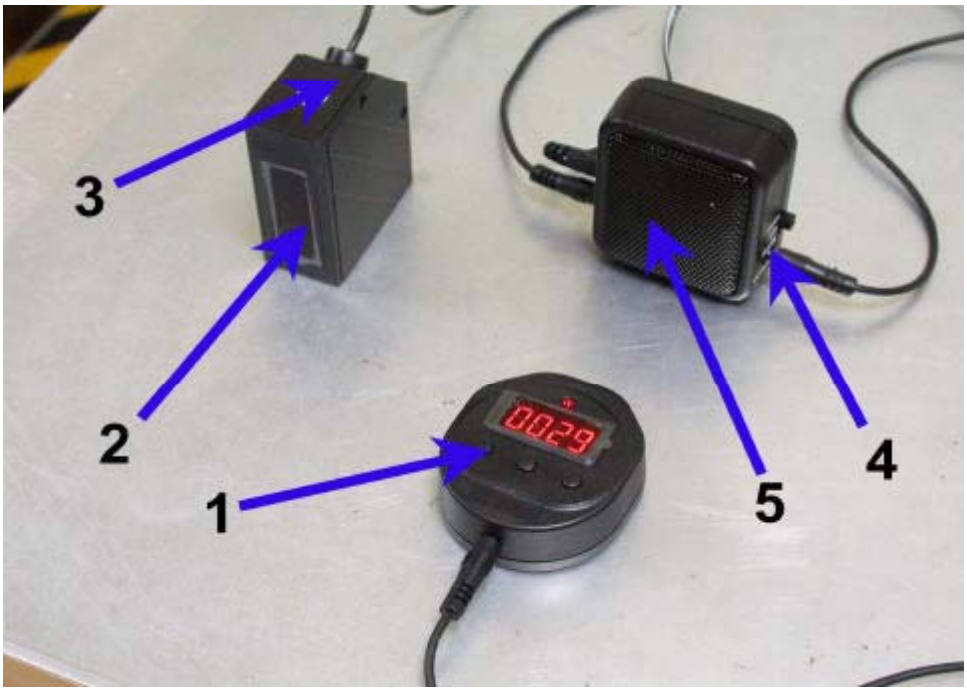
- Example of test set-up for table-top equipment, laboratory tests

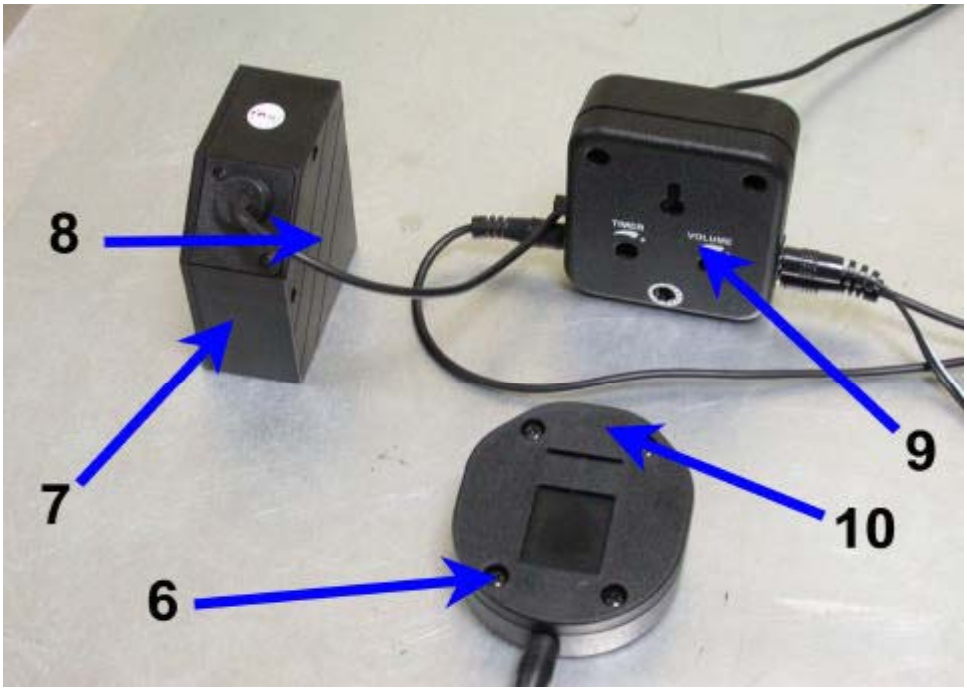
11.3 Electrostatic Discharge Test Limits

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.

11.4 Direct Discharge Test Drawing





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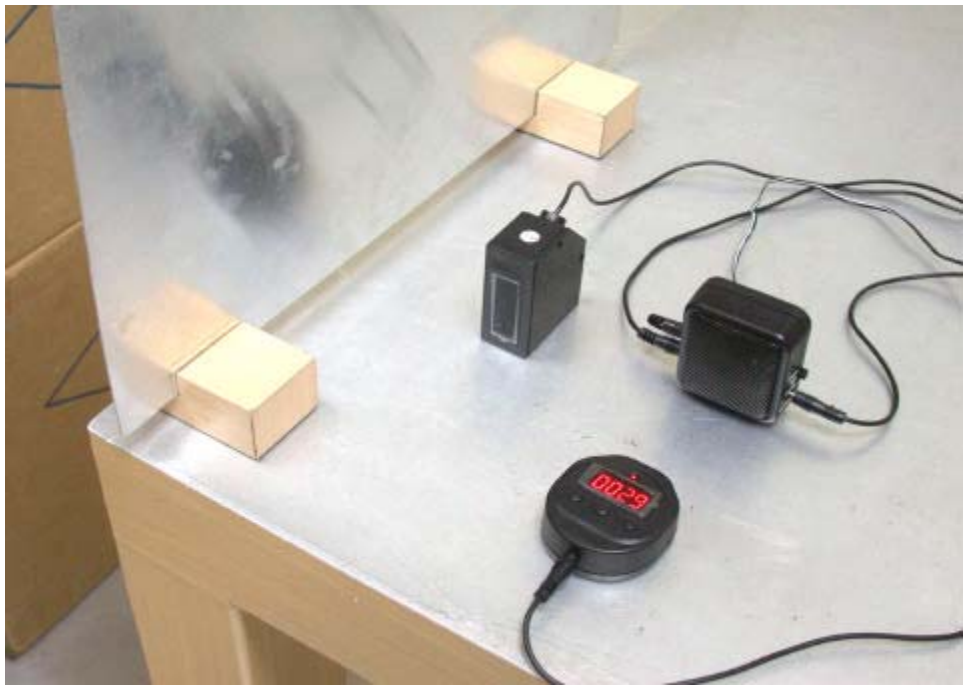
Indirect Discharge Test Drawing



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11.5 Electrostatic Discharge Test Data(Direct Discharge)

Model No. : DES-700 & DC-500

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

Temperature : 22 ℃ Relative Humidity : 58 %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	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	/	/	/	/	/	/	/	/	P	P	P	P	/	/	P	P
6	/	/	/	/	/	/	/	/	P	P	P	P	/	/	P	P
7	/	/	/	/	/	/	/	/	P	P	P	P	/	/	P	P
8	/	/	/	/	/	/	/	/	P	P	P	P	/	/	P	P
9	/	/	/	/	/	/	/	/	P	P	P	P	/	/	P	P
10	/	/	/	/	/	/	/	/	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. : DES-700 & DC-500

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

Temperature : 22 ℃ Relative Humidity : 58 %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	/	/	/	/	/	/	/	/	/	/
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.

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

Test standard	Model No.	Result
EN 61000-4-3	DES-700 & DC-500	Passed

Field Strength : 10 V/M ,

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

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

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

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.

12.1 Radio-Frequency Electromagnetic Field Test Description

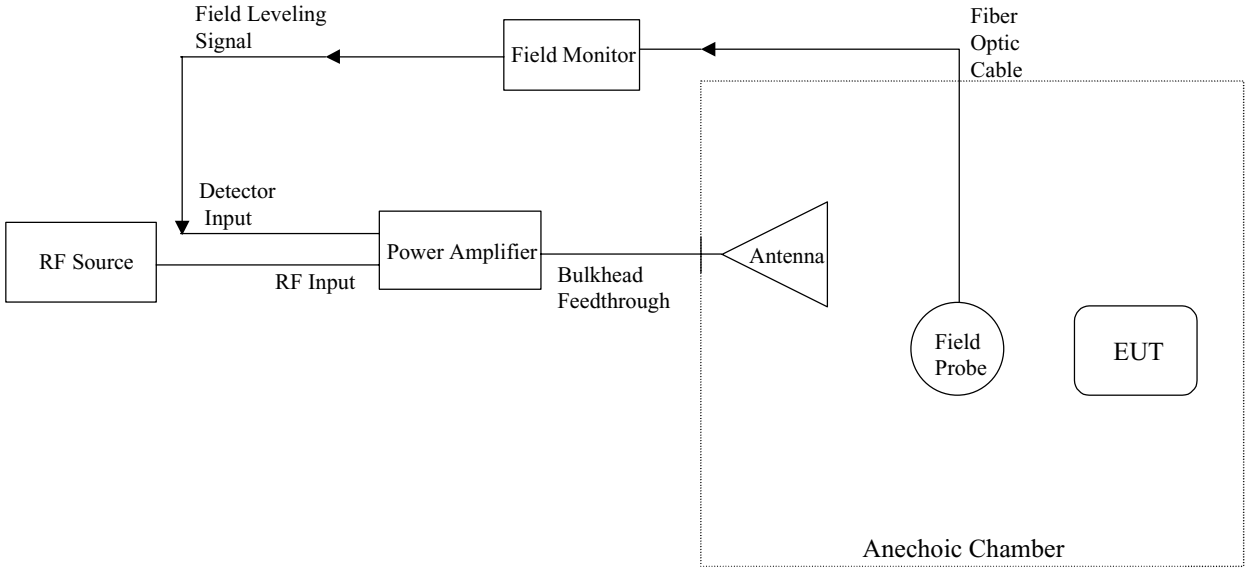
Most electronic equipment is, in some manner, affected by electromagnetic radiation.
This radiation is frequently generated by such sources as the small hand-held radio transceivers that are used by operating, maintenance and security personnel, fixed-station radio and television transmitters, vehicle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

12.2 Radio-Frequency Electromagnetic Field Test Block Diagram



12.3 Radio-Frequency Electromagnetic Field Test Limits

Frequency range	(MHz)	80 to 1000
Field strength[1)]	(V/m)	10
Modulation: Amplitude modulation Pulse modulation		 80%, 1 kHz, sinusoidal 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.

12.4 Radio-Frequency Electromagnetic Field Test Setup Photo

< FRONT VIEW >

13. EN 61000-4-4 Fast Transient Burst Test

Test standard	Model No.	Result
EN 61000-4-4	DES-700 & DC-500	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 bursts is permissible, providing that there is no residual change in the EUT or any change in outputs.

13.1 Fast Transient Bursts Test Description

The repetitive fast transient test is a test with bursts consisting of a number of fast transients, coupled into power supply, control and signal ports of electrical and electronic equipment. Significant for the test are the short rise time, the repetition rate and the low energy of the transients.

The test shall be carried out on the basis of a test plan including verification of the performances of the EUT as defined in the technical specification.

Climatic conditions

The tests shall be carried out in standard climatic conditions in accordance with IEC 68-1:

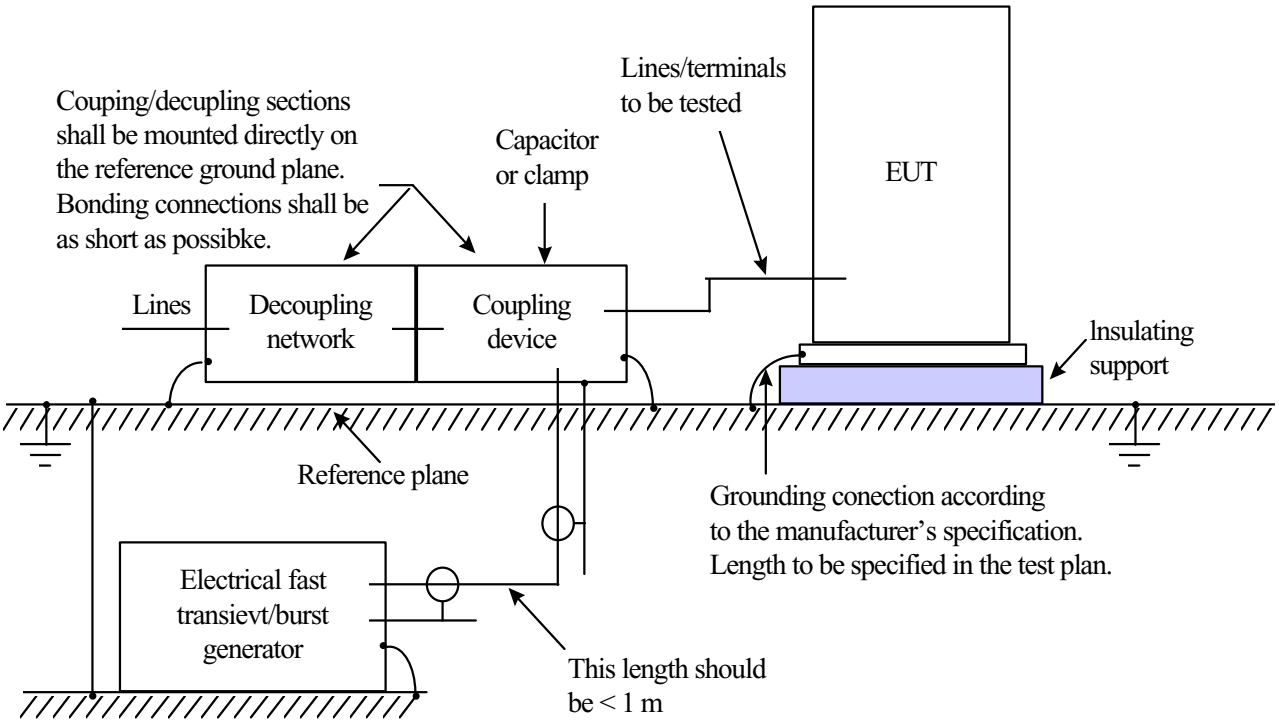
- ambient temperature: 15℃ to 35℃
- relative humidity: 25% to 75%
- atmospheric pressure: 86kPa (860 mbar) to 106Kpa (1060 mbar)

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

Electromagnetic conditions

The electromagnetic conditions of the laboratory shall be such to guarantee the correct operation of the EUT in order not to influence the test results.

13.2 Fast Transient Burst Test Setup



Block-diagram for electrical fast transient/burst immunity test

13.3 Fast Transient Burst Test Limits

Test voltages:[1)]	0.5; 1 & 2
a. c. mains supply lines (kV)	
other supply/signal lines (kV)	0.25; 0.5 & 1
Polarity	+ & -
Number of applications for each voltage and polarity	1
Duration per application (min)	$1^{+0.2}_{-0}$

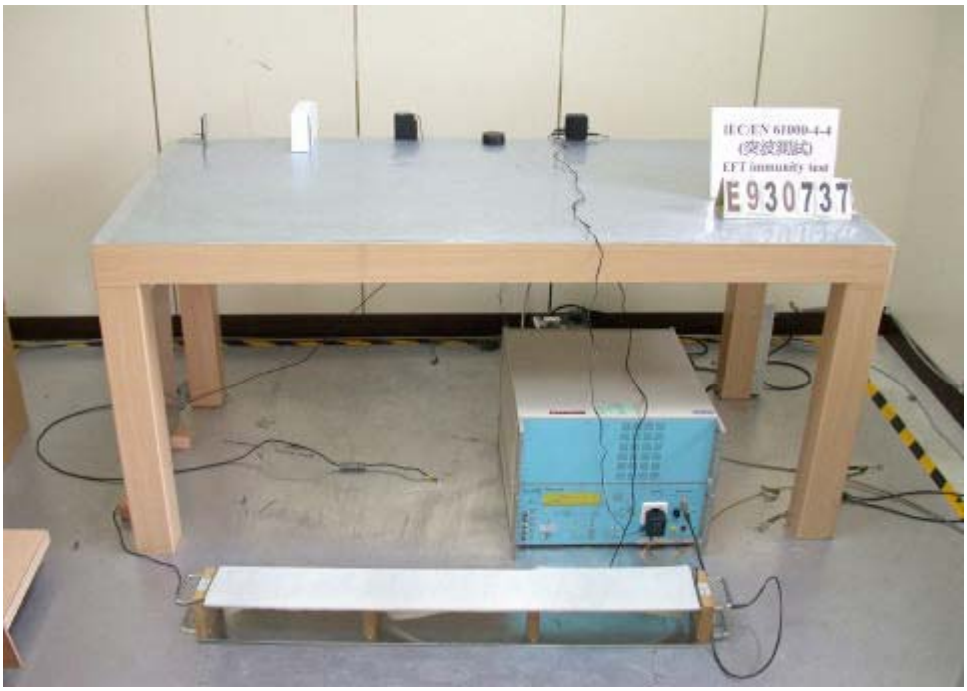
[1)] The test voltages specified are the open-circuit voltages. The test voltages for the lower severity levels are included because all the lower severity levels must also be satisfied.

13.4 Fast Transient Burst Test Setup Photo

< FRONT VIEW >

(Clamp1)

< FRONT VIEW >



(Clamp2)

< FRONT VIEW >

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13.5 Fast Transient Burst Test Data

MODEL NO. : DES-700 & DC-500

REGULATION : **According to EN 61000-4-4 (1995+A2: 2001) Spec .**

TEST RESULT

Temperature : 22 degree .	Last : 1 min .
Relative Humidity : 58 % RH .	Rest : 60 second .
Pulse : 5 / 50 ns .	AC Power : N/A Vac .
Burst : 15 ms / 300 ms .	DC Power : 12 Vdc .

Voltage \ Polarity \ Test Point \ Mode \ Result		**0.5 KV**		**1 KV**		**2KV**	
		+	-	+	-	+	-
Power Line	**L**	P	P	P	P	P	P
	N	P	P	P	P	P	P
	G	/	/	/	/	/	/
Signal Lines[4] Clamp Test		**0.25 KV**		**0.5 KV**		**1 KV**	
		+	-	+	-	+	-
		P	P	P	P	P	P

Note : 1. " P " mean the EUT function is correct during the test .
2. " F " - - - - Fail
3. " / " - - - - no test
4. Applicable only to cables which according to the manufacturer's specification supports communication on cable lengths greater than 3m.

14. EN 61000-4-5 Surge Immunity Test

Test standard	Model No.	Result
EN 61000-4-5	DES-700 & DC-500	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 surge is permissible, providing that there is no residual change in the EUT or any change in outputs.

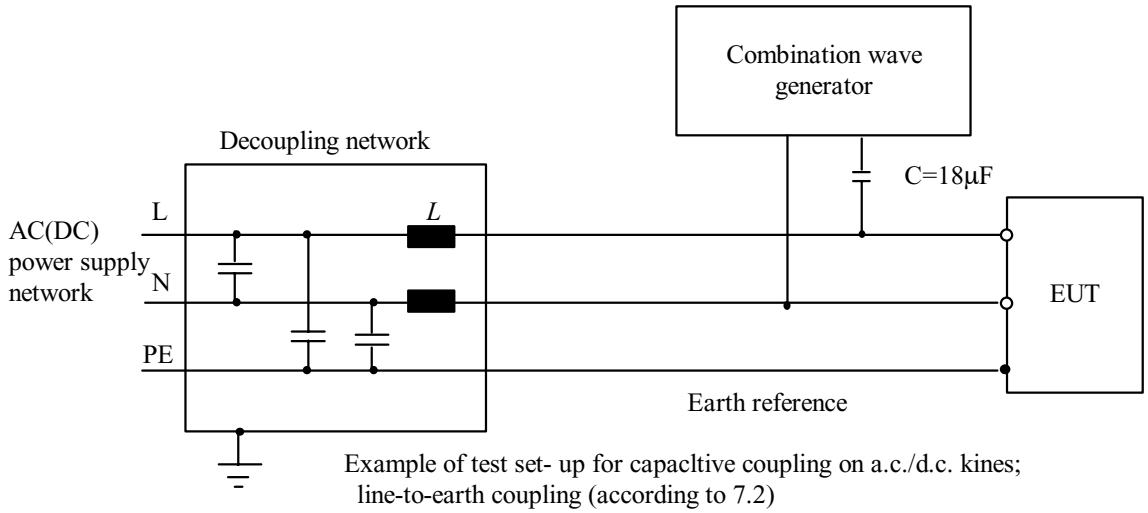
14.1 Surge Immunity Test Description

The task of the described laboratory test is to find the reaction of the EUT under specified operational conditions caused by surge voltages from switching and lightning effects at certain threat levels.

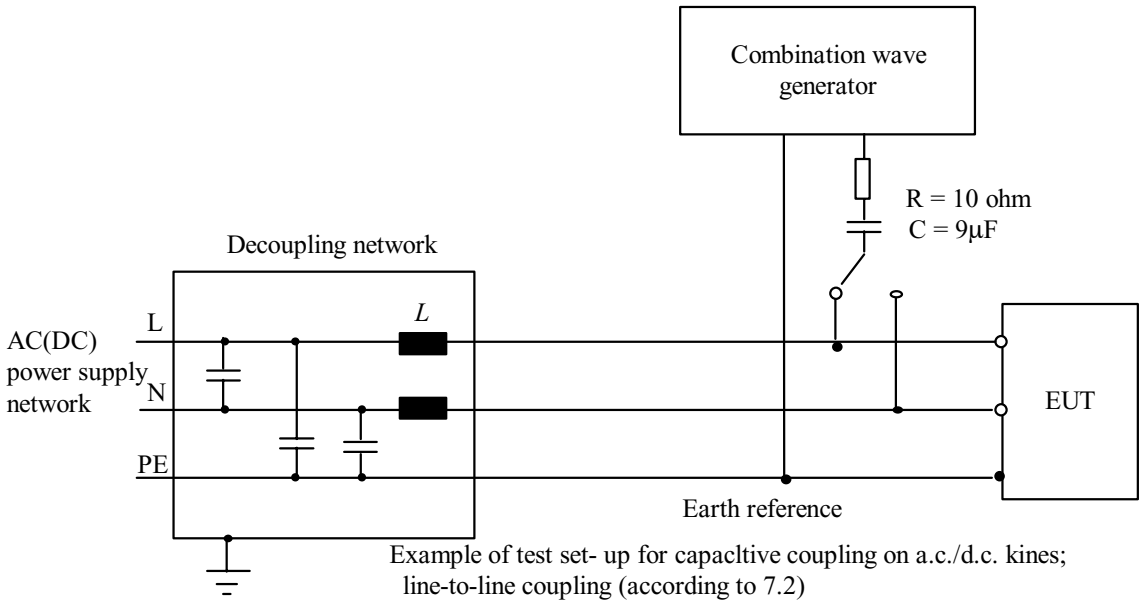
The following equipment is part of the test set-up :
- equipment under test (EUT);
- auxiliary equipment (AE);
- cables (of specified type and length);
- coupling device (capacitive or arrestors);
- test generator (combination wave generator, 1.2/50 μs generator);
- decoupling network/protection devices;
- additional resistors, 10 ohm and 40 ohm

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines and to provide sufficient decoupling impedance to the surge wave so that the specified wave may be developed on the lines under test .

14.2 Surge Immunity Test Setup



Example of test set- up for capacltive coupling on a.c./d.c. kines; line-to-earth coupling (according to 7.2)



Example of test set- up for capacltive coupling on a.c./d.c. kines; line-to-line coupling (according to 7.2)

14.3 Surge Immunity Test Limits

Test voltages[1] :	
a. c. mains supply lines:	
- line-to-line (kV)	0.5 & 1
- line-to-ground[2] (kV)	0.5; 1& 2
other supply/signal lines:	
- line-to-ground[3] (kV)	0.5 & 1
Polarity	+ & -
Minimum number of surges at each polarity, voltage, coupling mode and line:	
- a. c. mains supply lines	20[4]
- other supply/signal lines	5

[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.

[2] via a 10 O series resistor.

[3] via a 10 O series resistor.

[4] 5 at each zero-crossing point and at the maximum and minimum points on he mains voltage wave.

14.4 Surge Immunity Test Setup Photo

< FRONT VIEW >

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14.5 Surge Immunity Test Data

MODEL NO : DES-700 & DC-500

TEST SETUP : According to EN 61000-4-5 (1995+A1: 2001)

Temperature : 22 ℃ Relative Humidity 58 %RH
Waveform : 1,2 x 50 μs Test rate : 15 sec
Times 20 times / each condition AC power 230 VAC

\Phase \Voltage\Mode\Polarity\Result			0	45	90	135	180	215	270	315
a.c. mains supply 0.5KV	Line Neutral	+	P	P	P	P	P	P	P	P
		-	P	P	P	P	P	P	P	P
a.c. mains supply 1KV	Line Neutral	+	P	P	P	P	P	P	P	P
		-	P	P	P	P	P	P	P	P
a.c. mains supply 0.5KV 1KV 2KV	Line Ground	+	/	/	/	/	/	/	/	/
		-	/	/	/	/	/	/	/	/
	Neutral Ground	+	/	/	/	/	/	/	/	/
		-	/	/	/	/	/	/	/	/
Signal line 0.5KV 1KV	Line Ground	+	/	/	/	/	/	/	/	/
		-	/	/	/	/	/	/	/	/
	Neutral Ground	+	/	/	/	/	/	/	/	/
		-	/	/	/	/	/	/	/	/

Note : 1. " P " means the EUT function is correct during the test
2. " / " no test

15. EN 61000-4-6 Immunity To Conducted Disturbances, Induced By Radio-Frequency Fields

Test standard	Model No.	Result
EN 61000-4-6	DES-700 & DC-500	Passed

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.

For components of CCTV systems, where the status is monitored by observing The TV picture, then deterioration of the picture is allowed at Uo =140dBuV.

15.1 Immunity To Conducted Disturbances, Induced By Radio-Frequency Fields Test Description

The EUT shall be placed on an insulating support, 0.1 m above the ground reference plane. For table-top equipment, the ground reference plane may be placed on a table (see figure) .

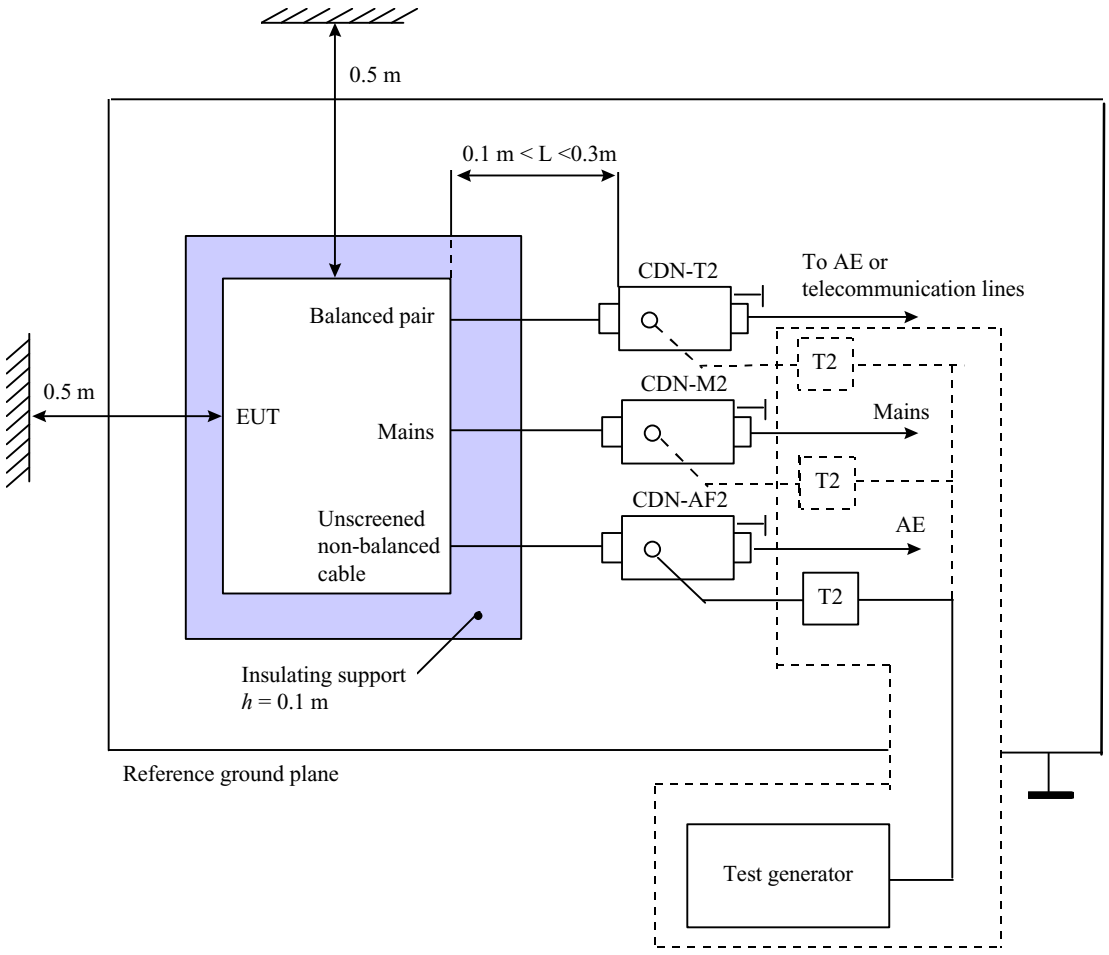
On all cables to be tested, coupling and decoupling devices shall be inserted. The coupling and decoupling devices shall be placed on the ground reference plane, making direct contact with it at about 0.1 m to 0.3 m from the EUT. The cables between the coupling and decoupling devices and the EUT shall be as short as possible and shall not be bundled nor wrapped. height above the ground reference plane shall be between 30 mm and 50 mm.

If the EUT is provided with other earth terminals, they shall, when allowed, be connected to the ground reference plane through the coupling and decoupling network CDN-M1, (i.e. the AE port of the CDN-M1 is then connected to the ground reference).

If the EUT is provided with a keyboard or hand-held accessory, then the artificial hand shall be placed on this keyboard or wrapped around the accessory and connected to the ground reference plane.

Auxiliary equipment (AE) required for the defined operation of the EUT according to the specifications of the product committee, e.g. communication equipment, modem, printer, sensor, etc., as well as auxiliary equipment necessary for ensuring any data transfer and assessment of the functions, shall be connected to the EUT through coupling and decoupling devices. However, as far as possible the number of cables to be tested should be limited by restricting attention to the representative functions.

15.2 Immunity To Conducted Disturbances, Induced By Radio-Frequency Fields Test Setup



NOTE - The EUT clearance from any metallic obstacles shall be at least 0.5 m .
All non-excited input ports of the CDNs shall be terminated by 50 ohm loads .

Example of test set-up with a single-unit system
for class II safety equipment (see IEC 536)

15.3 Immunity To Conducted Disturbances, Induced By Radio-Frequency Fields Test Limits

No tests are required for induced disturbances caused by electromagnetic fields coming from intentional RF transmitters in the frequency range 9 kHz to 150 kHz,
The open-circuit test levels (e.m.f.) of the unmodulated disturbing signal, expressed in r.m.s., are given in table 5. The test levels are set at the EUT port of the coupling and decoupling devices. For testing of equipment, this signal is 80% amplitude modulated with a 1 kHz sine wave to simulate actual threats. The pulse modulation is 1 Hz.

Frequency range	(MHz)	0.15 to 100
Voltage level (emf)[1] Uo	(dBμV)	140
	(V)	(10)
Modulation: Amplitude modulation Pulse modulation		 80%, 1 kHz, sinusoidal 1 Hz (0.5 s ON: 0.5 s OFF)

[1] The voltage level quoted is the open-circuit RMS value for the continuous wave, before modulation.

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15.4 Immunity To Conducted Disturbances, Induced By Radio-Frequency Fields Test Setup Photo

< FRONT VIEW >

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15.5 Immunity To Conducted Disturbances, Induced By Radio-Frequency Fields Test Data

MODEL NO. : DES-700 & DC-500

REGULATION : EN 61000-4-6 (1996+A1: 2001)

TEST RESULT

Temperature : 22 degree , Relative Humidity : 58 % RH
Start : 0.15 MHz , Stop : 100 MHz , Power : AC 230V
Modulation : AM 80 % , 1kHz. ON (YES) , OFF ( )
Output impedance : 50 ohm , Source impedance : 150 ohm
Start: 0.15MHz , Stop : 100 MHz ,
Pulse modulation: 1Hz ON (YES) , OFF ( )

Test Ports	Frequency(MHz) Range	Uo=140dBuV 10V
Input / Output a. c. power	0.15 - - - - - 100	PASS

16. EN 61000-4-11 Main Supply Voltage Dips and Short Interruptions Immunity Tests

16.1 Main Supply Voltage Dips and short Interruptions Immunity Tests Description

Electrical and electronic equipment may be affected by voltage dips, short interruptions or voltage variations of power supply.
Voltage dips and short interruptions are caused by faults in the network, in installations or by a sudden large change of load. In certain cases, two or more consecutive dips or interruptions may occur. Voltage variations are caused by the continuously varying loads connected to the network. Before starting the test of a given equipment, a test plan shall be prepared.

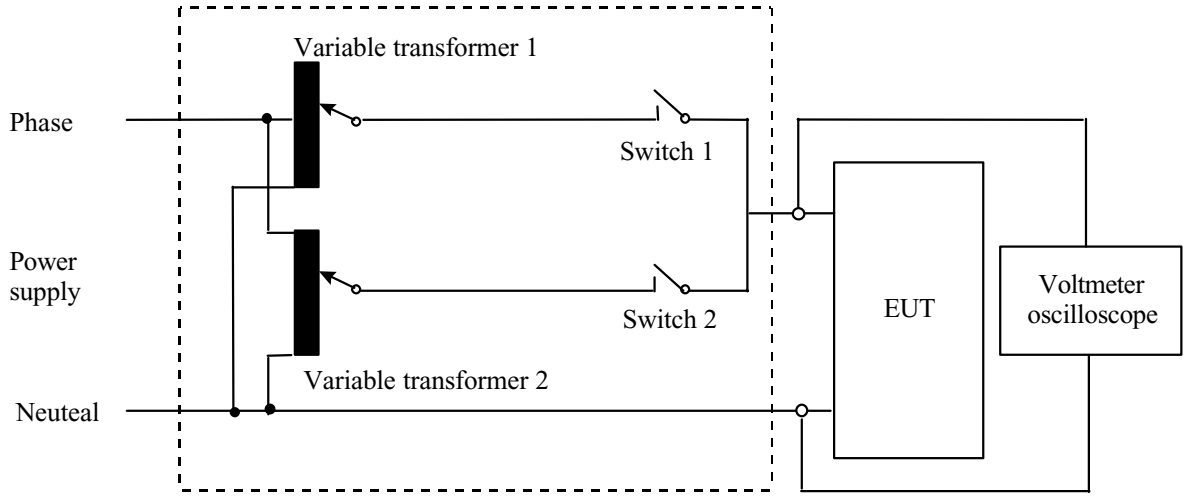
It is recommended that the test plan shall comprise the following items :

- the type designation of the EUT;
- information on possible connections (plugs, terminals, etc.) and cables, and peripherals;
- input power port of equipment to be tested;
- representative operational modes of the EUT for the test;
- performance criteria used and defined in the technical specifications;
- operational mode(s) of equipment;
- description of the test set-up.

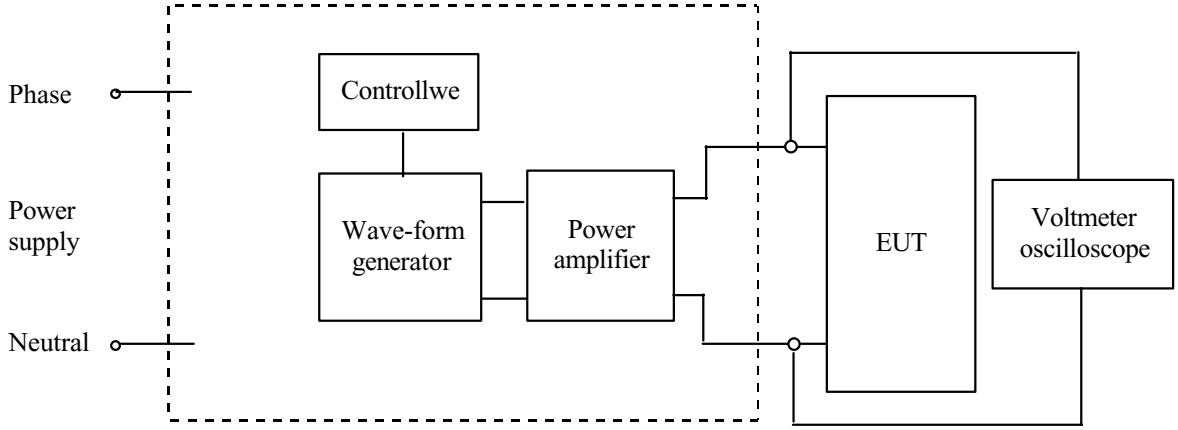
If the actual operating signal sources are not available to the EUT, they may be simulated.

For each test any degradation of performance shall be recorded.
The monitoring equipment should be capable of displaying the status of the operational mode of the EUT during and after the tests. After each group of tests a full functional check shall be performed.

16.2 Main Supply Voltage Dips and short Interruptions Immunity Tests Setup



Schematic of test lnstrumentation for voltage dlps and
short interrupions using variable transformers and seitches



Schematic of test instrumentation for voltage dips,
short interruptions and variations using power amplifier

16.3 Main Supply Voltage Dips and short Interruptions Immunity Tests Limits

Voltage reduction	(%)	60	100
Duration of reduction (No.) of periods) (i. e. cycles of the voltage wave)		0.5; 1; 5 & 10 & 10	0.5; 1 & 5
Number of reductions at each duration		3	3
Interval between reductions	(s)	= 10	= 10

16.4 Main Supply Voltage Dips and short Interruptions Test Setup Photo

< FRONT VIEW >

16.5 Main Supply Voltage Dips and short Interruptions Immunity Tests Data

MODEL NO. : DES-700 & DC-500

REGULAR : EN 61000-4-11 (1996+A1: 2001)

TEST RESULT : Test Voltage **230Vac**

	Test Level $\%U_T$	Duration Periods	Result
Dips and Short Interruptions	30%	0.5;1;5&10	PASS
	60%	0.5;1;5&10	PASS
	100%	0.5;1&5	PASS

Note : 0.5 Period = 10ms
1 Period = 20ms
5 Period = 100ms
10 Period = 200ms

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, which could be interpreted by associated equipment as a change.

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

Test standard	Model No.	Result
EN 50130-4 Clause 7	DES-700 & DC-500	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.

17.1 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.	

17.2 Clause 7 Mains Supply Voltage Variations Test Setup Photo

Unom + 10% , -15 %

< FRONT VIEW >

18. 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, 2005	1Year
	Rolf Heine LISN	NNB-4/63TL	98008	May 01, 2005	1Year
	R & S LISN	ESH3-Z5	844982/039	Aug. 07, 2005	1Year
	Spectrum Analyzer	R3261A	91720076	Jun. 09, 2005	1Year
	RF Cable	Rg400	N/A	May 12, 2005	1Year
	Schaffner ISN	T411	N/A	Jun. 30, 2005	1Year
Radiation (OP No.3)	R & S Receiver	ESBI	845658/003	Sep. 07, 2005	1Year
	Schaffner Pre-Amp.	CPA-9232	1012	Aug. 21, 2005	1Year
	SCHWARZBECK Antenna	9161	9161-4051	May 06, 2005	1Year
	COM-Power Horn Ant.	AH-118 (1GHz~18GHz)	10095	May 21, 2005	1Year
	RF Cable	No.2	N/A	Feb. 19, 2005	1Year
	SCHWARZBECK Precision Dipole Ant.	VHAP (30MHz~1GHz)	970+971 953+954	Jun. 27, 2006	3Year
	R & S Signal Generator	SMY01	829846/038	Feb. 16, 2005	2Year

	Test item	Instrument	Model No.	Serial No.	Next Cal. Date	Cal. Interval
EMS (NO.2)	-4-2 -4-4 -4-5 -4-11	(EMC-PARTNER) Transient Tester	TRA-2000/N6	456	Aug. 13, 2005	1Year
		(EMC-PARTNER) ESD Test System	TRA1Z03B	399	Aug. 13, 2005	1Year
		(EMC-PARTNER) EFT/B Clamp	TAR1Z03B	CNEFT 1000-268	Aug. 13, 2005	1Year
		(EMC-PARTNER) Magnetic Field Loop antenna	MF-1000	MF 1000-169	Aug. 13, 2005	1Year
	-4-6	CONDUCTED IMMUNITY	CIT-10 /102C3117	102C3117	Jul. 24, 2006	2Years
	-3-2 -3-3	(EMC-PARTNER) Harmonic/ Flicker	HAR-1000	66	Jul. 22, 2006	2Years
	4-3	Comtest G-Strip	G-320	CC112-0008	Oct. 01, 2006	2Year

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19. EUT Photographs

MODEL NO. : DES-700 & DC-500

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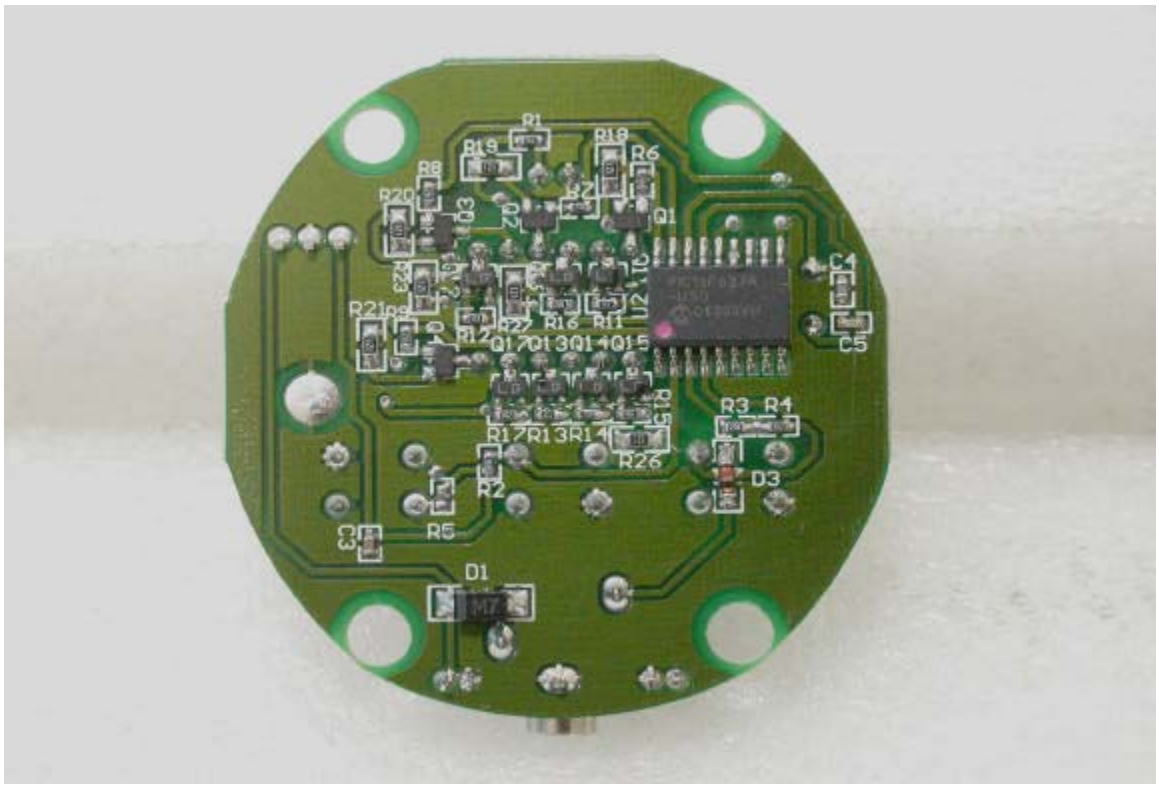

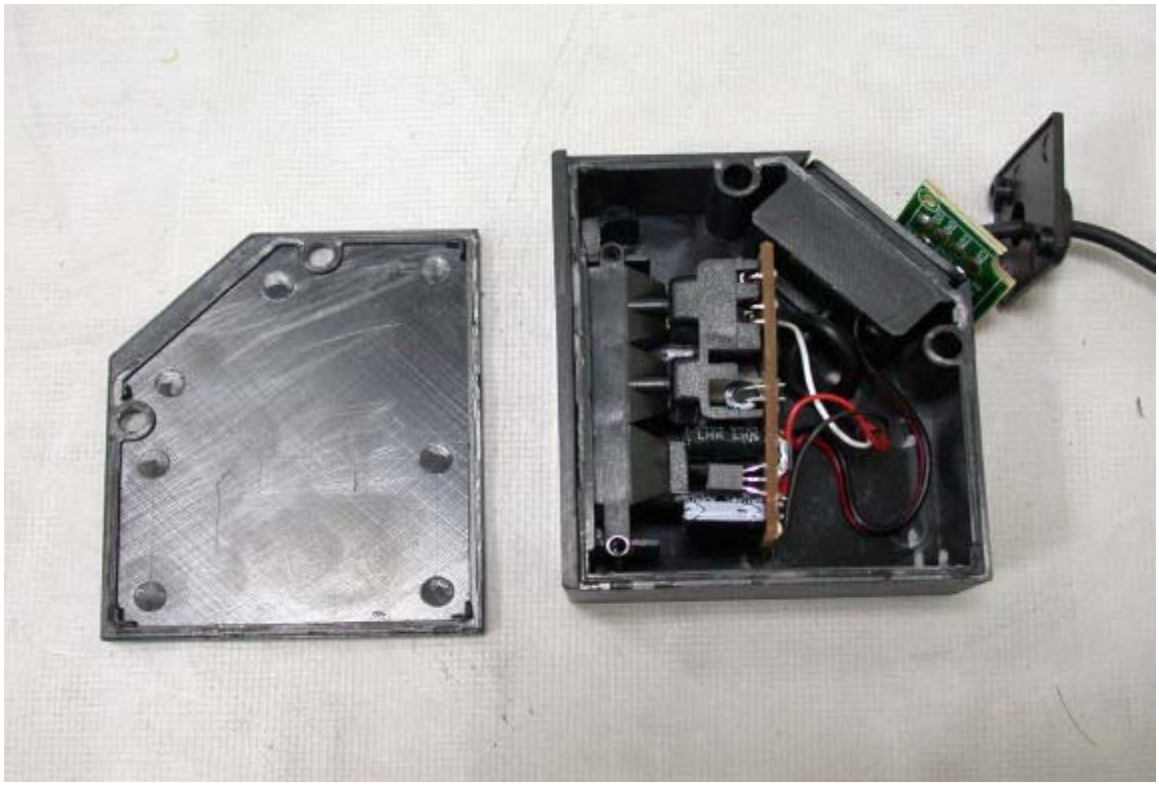

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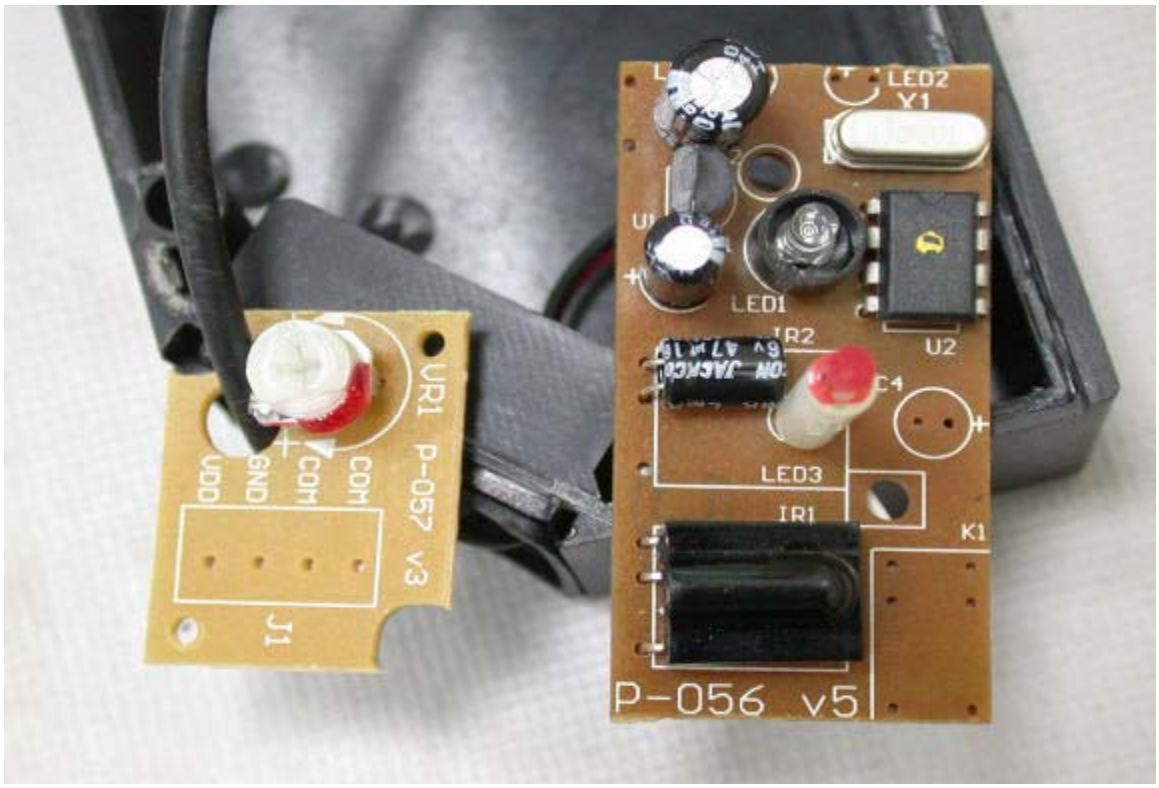
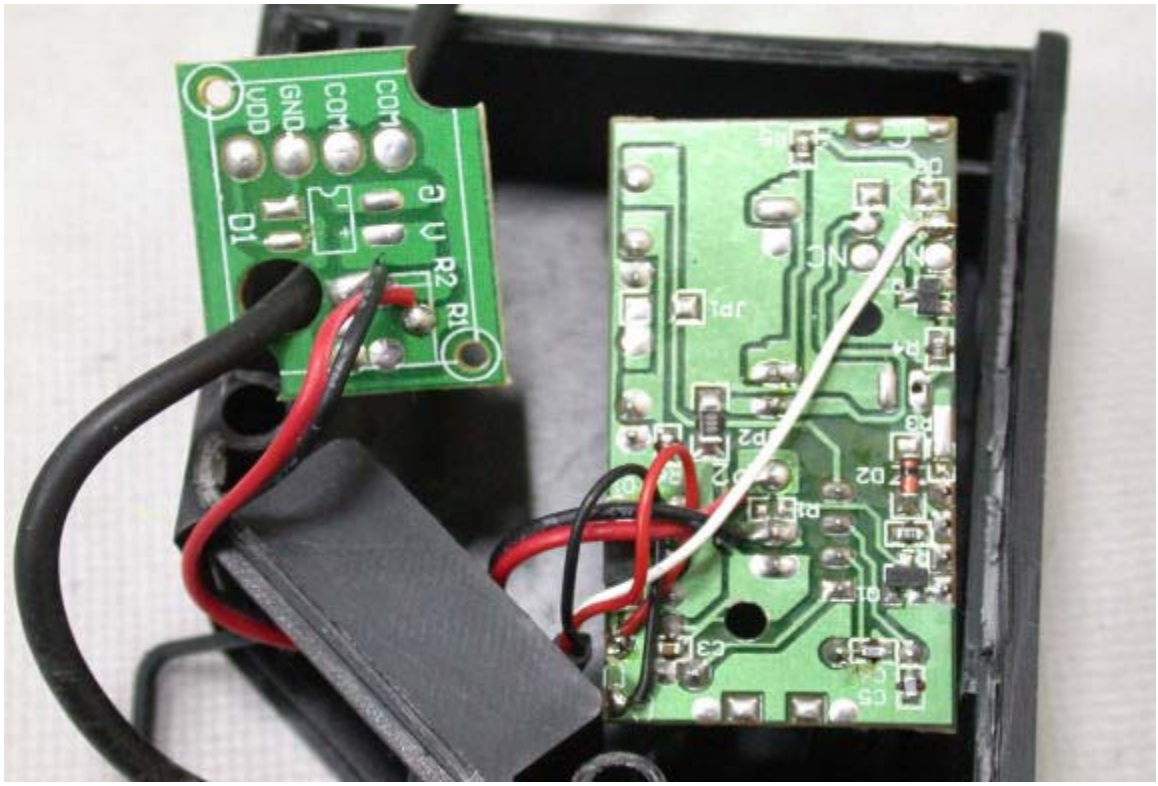
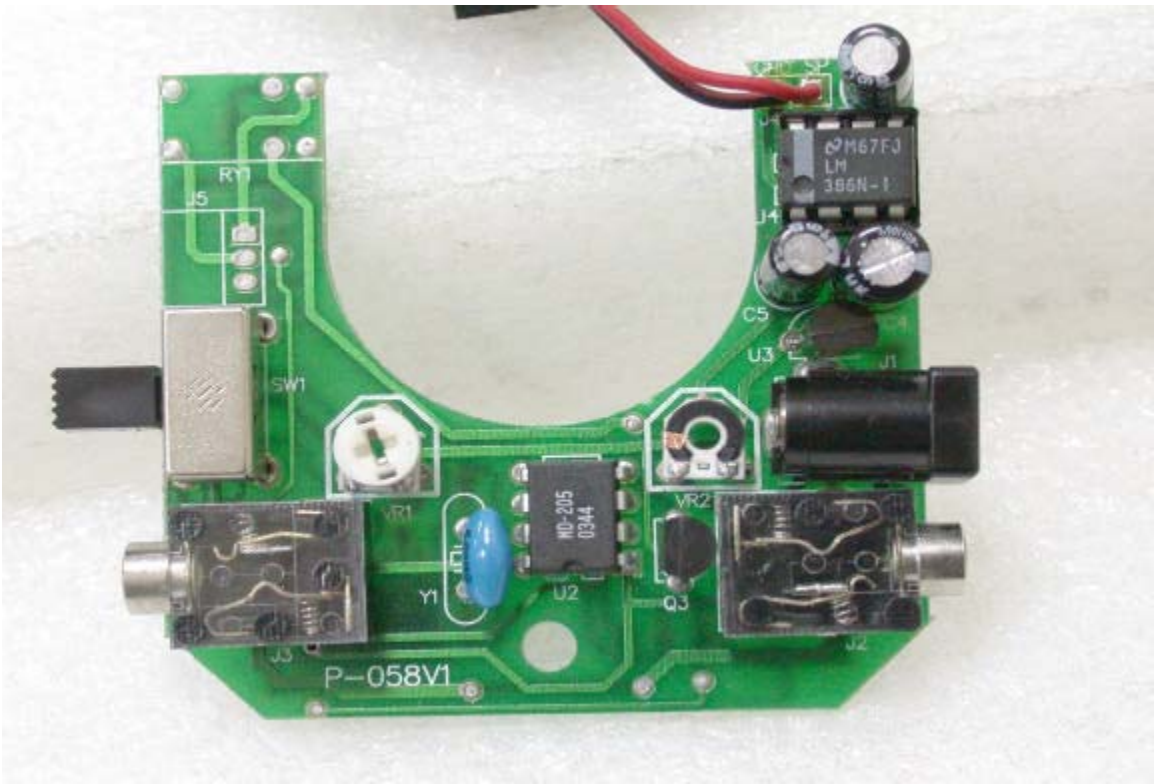
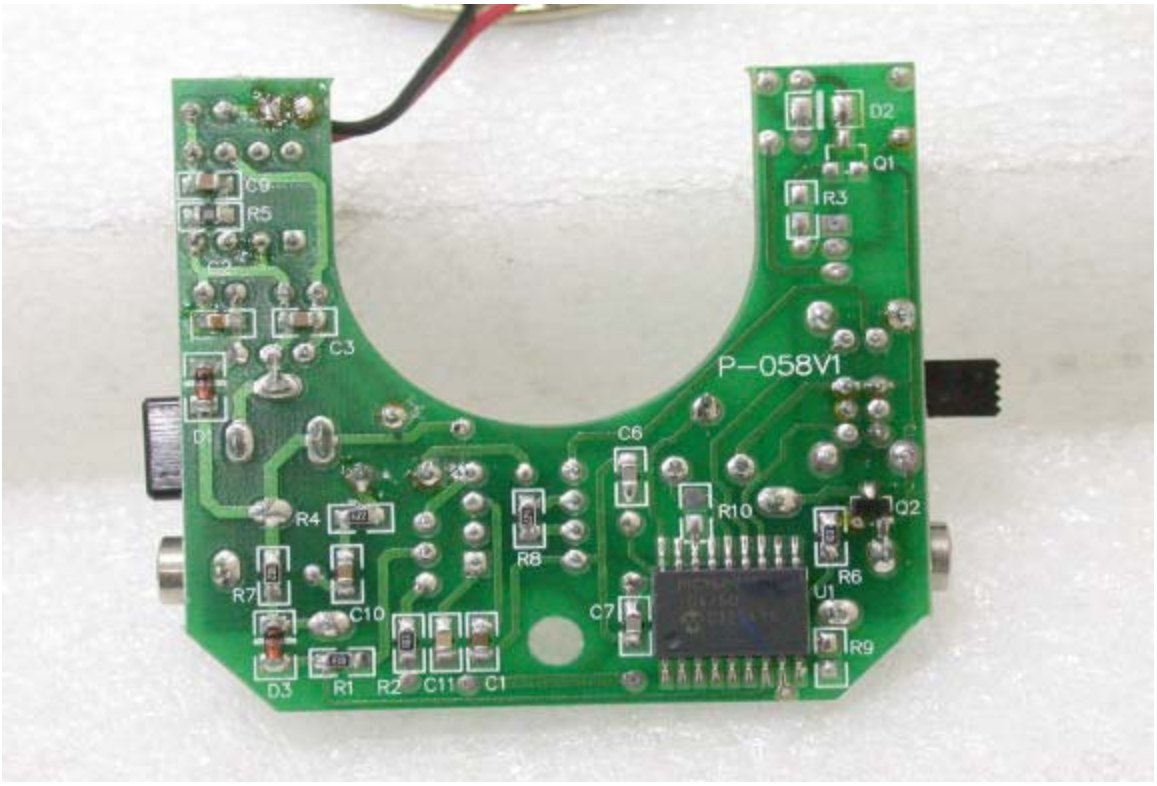





M67FJ
LM
386N-1
RY1
J5
J4
C5
U3
J1
SW1
VR1
VR2
Y1
U2
Q3
J3
J2
P-058V1


P-058V1
D2
Q1
R3
C9
R5
C3
D1
C6
R10
Q2
R4
R8
R6
R7
C10
U1
C7
R9
D3
R1
R2
C11
C1

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VERIFICATION

of conformity with European EMC Directive

No. E930737

Document holder: **Yuan Hsun Electric Co., Ltd.**

Type of equipment: **Door Entry Alarm & Counting System**

Type designation: **DES-700 & DC-500**

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

M. Y. Tsui

Date: NOV. 23, 2004

M. Y. Tsui / President

Declaration of Conformity

The following

Applicant : Yuan Hsun Electric Co., Ltd.

Equipment : Door Entry Alarm & Counting System

Model No. : DES-700 & DC-500

Report No. : E930737

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. 23, 2004
Place and Date

Signature of responsible Person