

# HFE1600

## IEC 61000 TEST DATA

| DWG: IA688-58-01                    |                                   |  |
|-------------------------------------|-----------------------------------|--|
| APPD                                | CHK                               | DWG                                    |
| <i>Doron P.</i><br><i>12-May-11</i> | <i>Ani P.</i><br><i>12-May-11</i> | <i>MICHAEL G.</i><br><i>12.05.2011</i> |

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**Test results are typical data.Nevertheless the following results are considered to be actual capability data because all units have nearly the same characteristics.**

## 1. Electrostatic Discharge Immunity Test (IEC61000-4-2)

### (1) Equipment used

NOISEKEN ESS-2000

Discharge resistance: 330 Ohm Capacity: 150pF

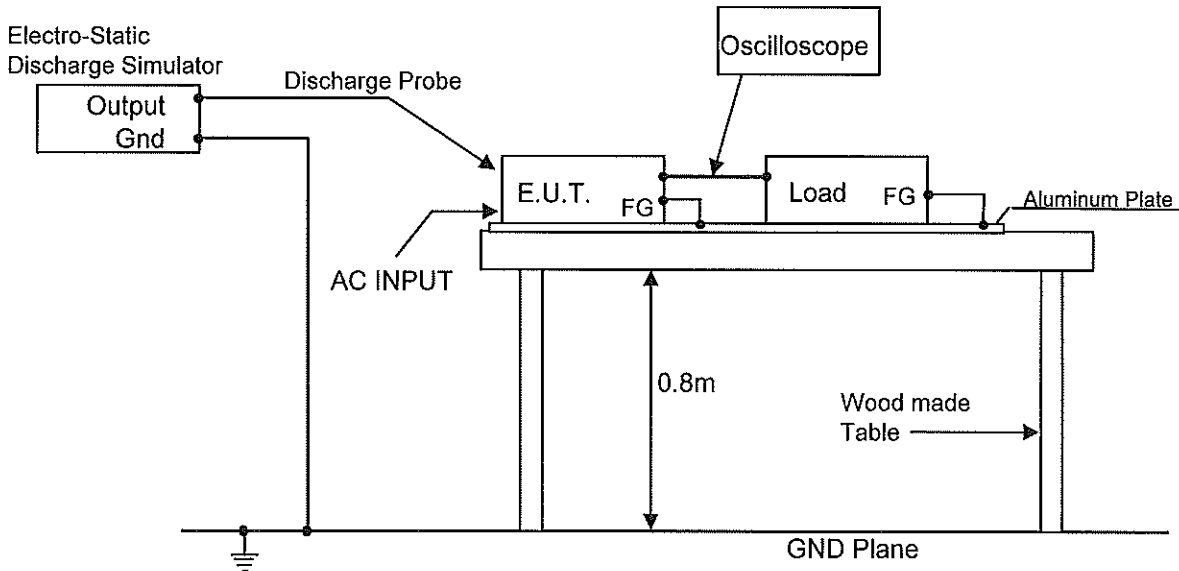
### (2) Test conditions

|                  |          |                     |           |
|------------------|----------|---------------------|-----------|
| Input voltage:   | Rated    | Output voltage:     | Rated     |
| Output current:  | 100%     | Polarity:           | -, +      |
| Number of tests: | 10 times | Discharge interval: | >1 Second |

### (3) Test method and Device test point

Contact discharge: FG, Case screw

Air discharge: Input and Output terminal



### (4) Acceptable conditions

1. Output voltage regulation not to exceed  $\pm 5\%$  of initial (before test) value during test.
2. Output voltage to be within regulation specification after the test.
3. Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

### (5) Test Result

| Contact Discharge (Kv) | HFE1600 | Air Discharge (Kv) | HFE1600 |
|------------------------|---------|--------------------|---------|
| 4                      | PASS    | 8                  | PASS    |

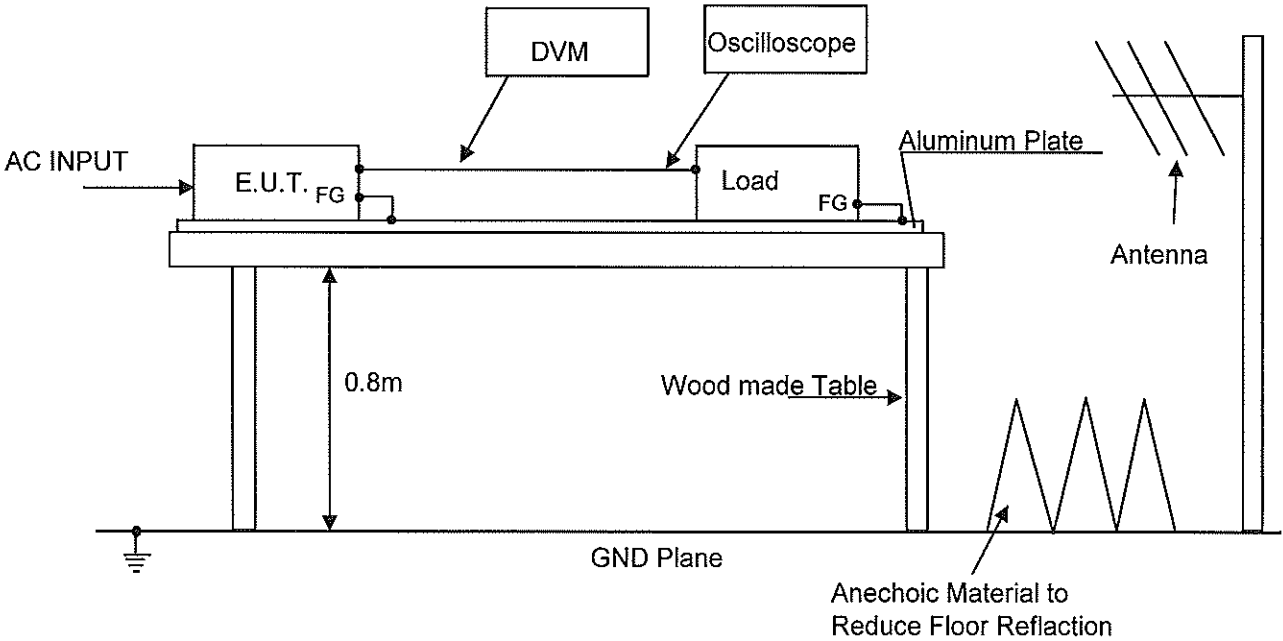
2.Radiated Radio-Frequency Electromagnetic Field Immunity Test (IEC61000-4-3)

(1)Equipment used

Test Laboratory: Hermon Laboratories Ltd.

(2)Test conditions

|                            |                                    |                      |                         |
|----------------------------|------------------------------------|----------------------|-------------------------|
| Input voltage:             | Rated                              | Output voltage:      | Rated                   |
| Output current:            | 100%                               | Amplitude Modulated: | 80%, 1kHz               |
| Electromagnetic Frequency: | 80~1000MHz                         | Ambient temperature: | 25°C                    |
| Distance:                  | 2.4m                               | Wave Angel:          | Horisontal and Vertical |
| Sweep condition:           | 1.0% Step Up, 2.0 second Hold      |                      |                         |
| Test Angle:                | Top/Botton, Both Sides, Front/Back |                      |                         |



(3)Acceptable conditions

1. Output voltage regulation not to exceed  $\pm 5\%$  of initial (before test) value during test.
2. Output voltage to be within regulation specification after the test.
3. Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

(4)Test Result

|                               |         |
|-------------------------------|---------|
| Radiated Field Strength (V/m) | HFE1600 |
| 3                             | PASS    |

## 3. Electrical Fast Transient / Burst Immunity Test (IEC61000-4-4)

### (1) Equipment used

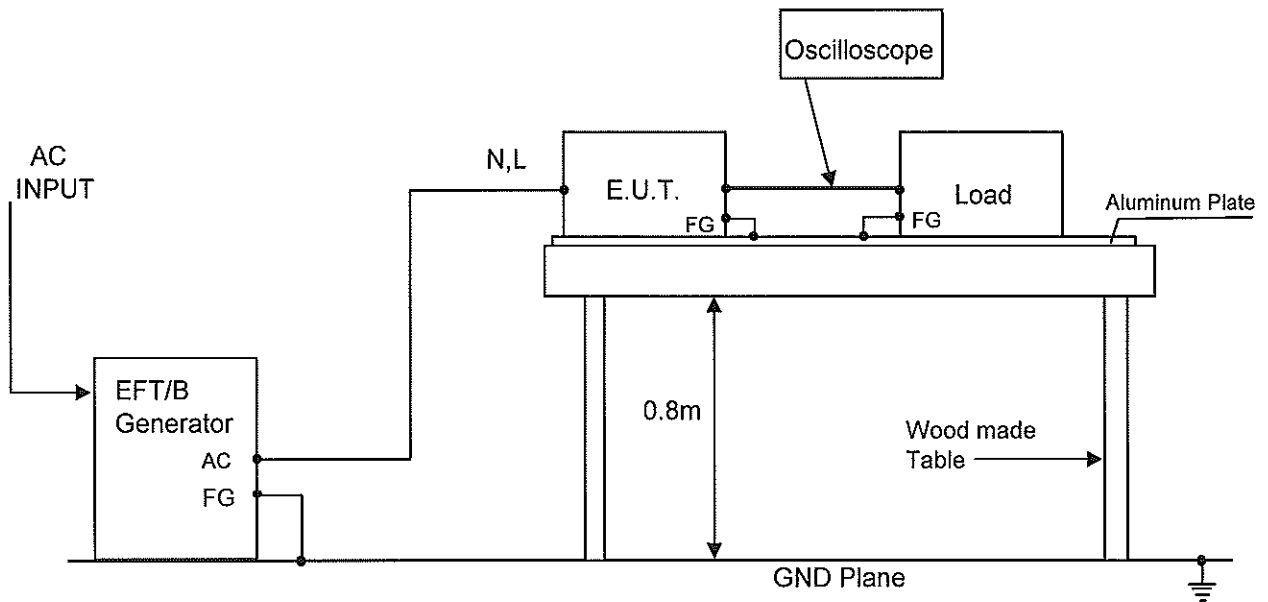
EFT/B Generator: SCHAFFNER NSG2025

### (2) Test conditions

|                  |         |                      |          |
|------------------|---------|----------------------|----------|
| Input voltage:   | Rated   | Output voltage:      | Rated    |
| Output current:  | 100%    | Test time:           | 1 minute |
| Polarity:        | -, +    | Ambient temperature: | 25°C     |
| Number of tests: | 3 times |                      |          |

### (3) Test method and Device test point: Neutral (N), Line (L), Ground (FG)

Apply pulses from EFT/B Generator to N,L,FG separately, as well as, all at the same time.



### (4) Acceptable conditions

1. Output voltage regulation not to exceed  $\pm 5\%$  of initial (before test) value during test.
2. Output voltage to be within regulation specification after the test.
3. Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

### (5) Test Result

| Test Voltage (kV) | Repetition Rate (kHz) | HFE1600 |
|-------------------|-----------------------|---------|
| 2                 | 5                     | PASS    |

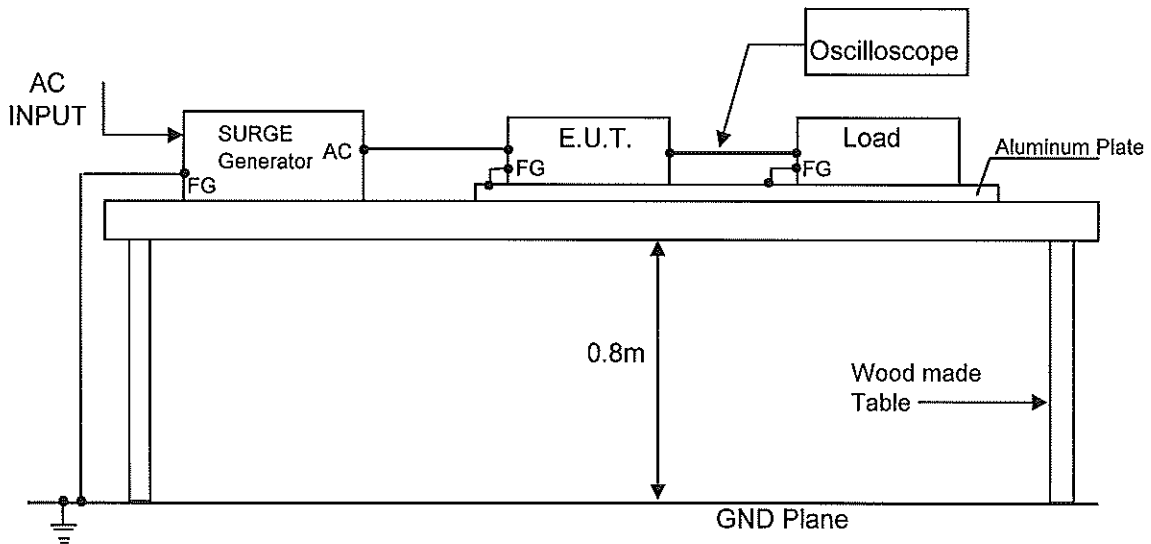
4.Surge Immunity Test (IEC61000-4-5)

(1)Equipment used

Surge Generator: SCHAFFNER-NSG651  
 Coupling impedance: Common - 12 OHm  
 Normal - 2 OHm  
 Coupling capacitance: Common - 9 uF  
 Normal - 18 uF  
 Coupling network: SCHAFFNER-CDN110

(2)Test method and devise test point

Input voltage: Rated                      Output voltage: Rated  
 Output current: 100%                      Number of tests: 5 times  
 Polarity: -,+                                  Mode: Common, Normal  
 Phase: 0,90 DEG.                              Ambient temperature: 25°C



(3)Acceptable conditions

- 1.Output voltage regulation not to exceed  $\pm 5\%$  of initial (before test) value during test.
- 2.Output voltage to be within regulation specification after the test.
- 3.Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

(4)Test Result

| Test Voltage (kV)<br>Common | HFE1600 | Test Voltage (kV)<br>Normal | HFE1600 |
|-----------------------------|---------|-----------------------------|---------|
| 2.0                         | PASS    | 2.0                         | PASS    |
| 4.0                         | PASS    |                             |         |

**5. Conducted Disturbances Induced by Radio-Frequency Field Immunity Test (IEC61000-4-6)**

(1) Equipment used

|                                    |                         |
|------------------------------------|-------------------------|
| RF Signal Generator 10kHz-1050MHz: | Fluke,6061A             |
| RF Amplifier 10kHz-220MHz,150W:    | Amplifier Research,150L |
| Coupling/Decoupling Network:       | HL CDN 801-M3           |

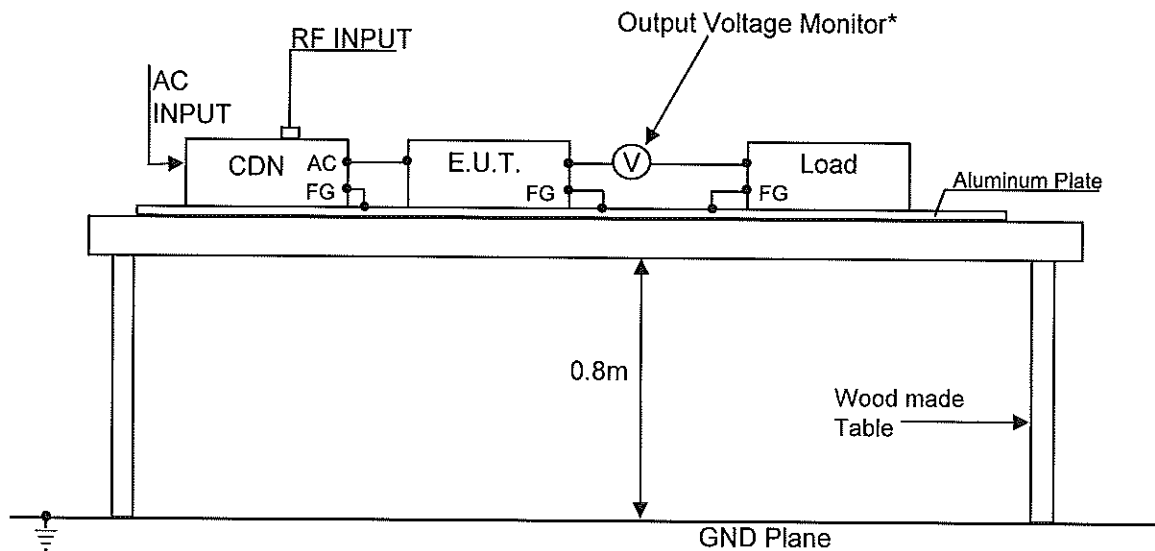
(2) Test Condition:

|                 |       |                            |              |
|-----------------|-------|----------------------------|--------------|
| Input voltage:  | Rated | Output voltage:            | Rated        |
| Output current: | 100%  | Electromagnetic Frequency: | 150kHz~80MHz |

Sweep Condition: 1.0% Step Up, 2.0 Seconds Hold

Ambient temperature:25°C

(3) Test Method:



\*Used Analog Voltage Meter

(4) Acceptable conditions

1. Output voltage regulation not to exceed  $\pm 5\%$  of initial (before test) value during test.
2. Output voltage to be within regulation specification after the test.
3. Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

(5) Test Result

|                   |         |
|-------------------|---------|
| Voltage Level (V) | HFE1600 |
| 3                 | PASS    |

**6.Power Frequency Magnetic Field Immunity Test (IEC61000-4-8)**

(1)Equipment used

AC High Current Generator for  
Magnetic Field immunity tests:

HL, MFG-130A

(2)Test Condition:

Input voltage: Rated

Output voltage: Rated

Output current: 100%

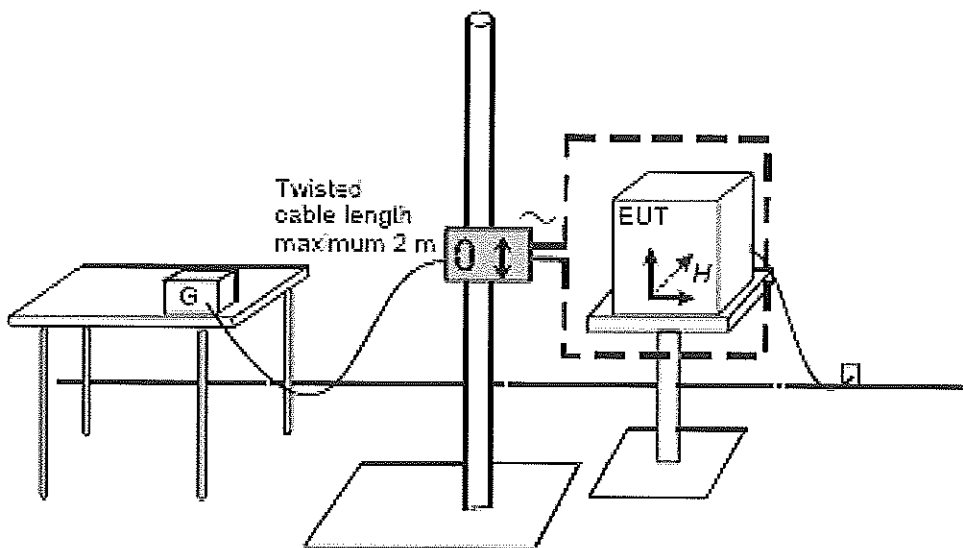
Frequency: 50Hz

Magnetic Field Strength: 30A/m

Ambient temperature:25°C

Duration Time: 10min.

(3)Test Method:



(4)Acceptable conditions

- 1.Output voltage regulation not to exceed  $\pm 5\%$  of initial (before test) value during test.
- 2.Output voltage to be within regulation specification after the test.
- 3.Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

(5)Test Result

| EUT positions | Result |
|---------------|--------|
| X             | PASS   |
| Y             | PASS   |
| Z             | PASS   |



**7.Voltage Dips,Short Interruptions Immunity Test (IEC61000-4-11)**

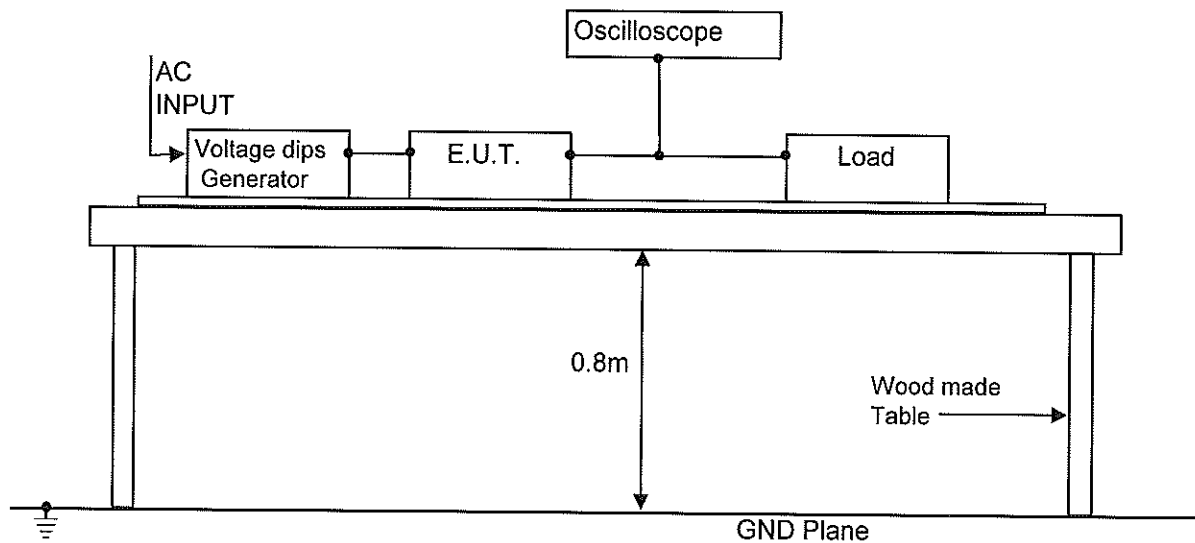
(1)Equipment used

Voltage Dips Generator: CI, 5001ix  
 Oscilloscope: Yokogawa, DL1740EL

(2)Test Condition:

Input voltage: Rated                      Output voltage: Rated  
 Output current: 100%                      Frequency: 50Hz  
 Repetition: 0.1Hz                      Ambient temperature:25°C  
 Number of pulse: 3

(3)Test Method:



(4)Acceptable conditions

- 1.Output voltage regulation not to exceed  $\pm 5\%$  of initial (before test) value during test.
- 2.Output voltage to be within regulation specification after the test.
- 3.Along with 1 and 2, no discharge of fire or smoke, as well as no output failure.

(5)Test Result

| Dip rate     | Continue time    | Result |
|--------------|------------------|--------|
| 30% vol.dip  | 500ms            | PASS   |
| 60% vol.dip  | 200ms            | PASS   |
| >95% vol.dip | 20ms;<br>5,000ms | PASS   |

8.Input Current Harmonics Test (IEC61000-3-2)

Model:

(1)Equipment used

AC Power Analyzer:  
PACS-1(California Instruments)

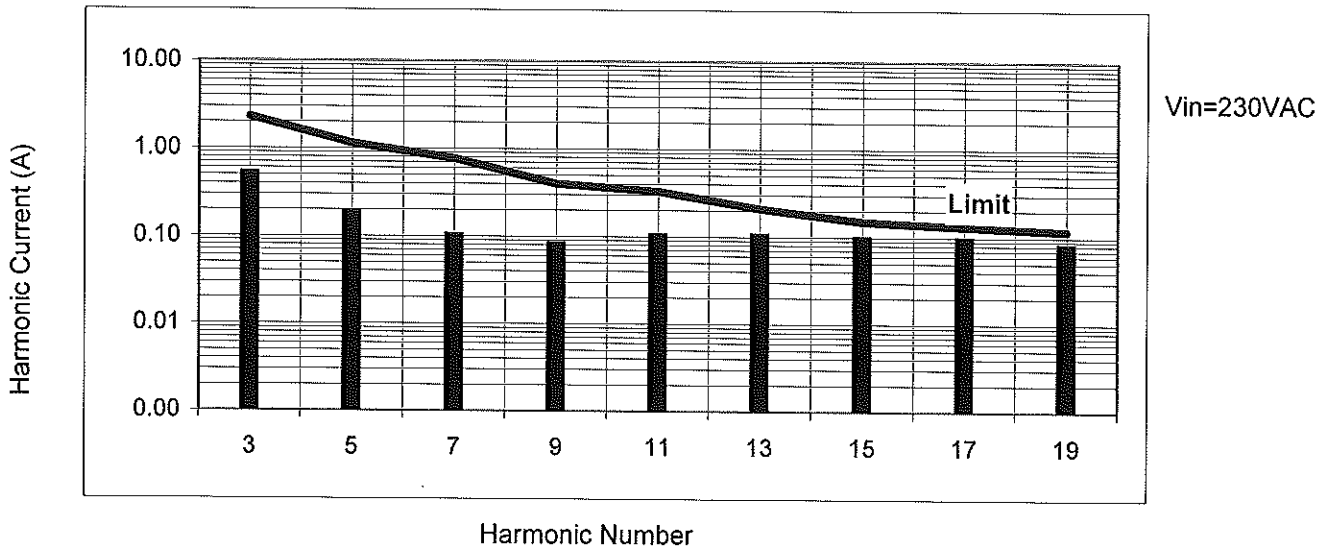
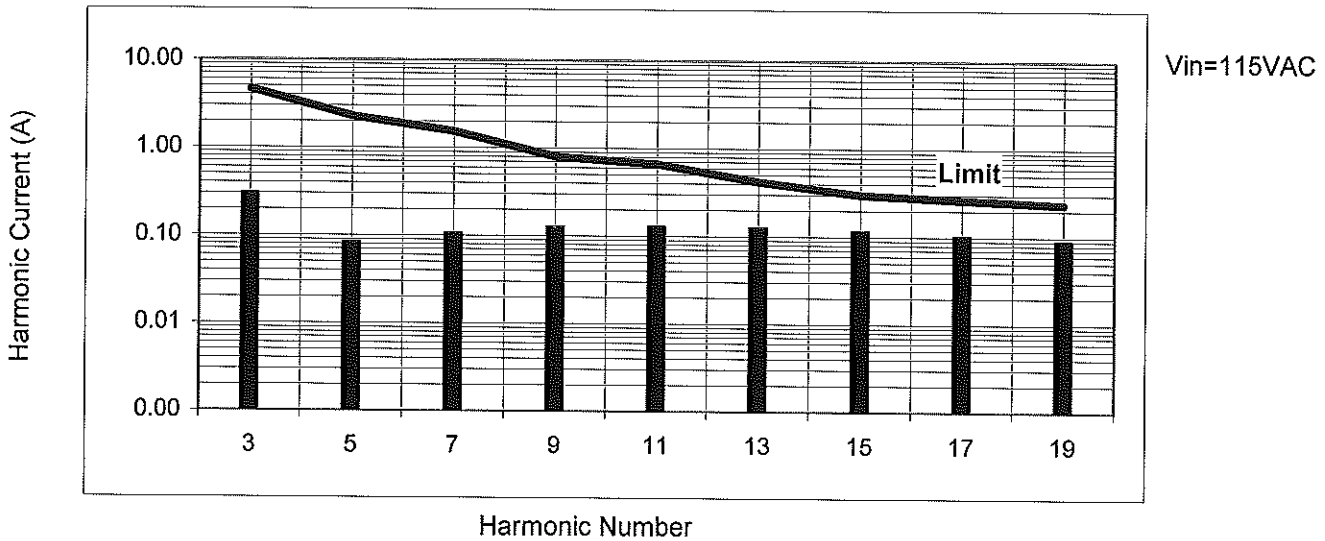
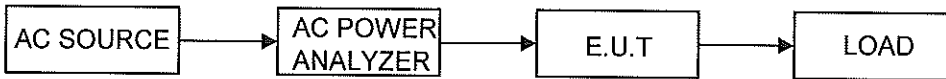
AC Source:  
5001 IX (California Instruments)

(2)Test conditions:

Input voltage: 115VAC;230VAC

Output current: 100%

(3)Test Method:



| Vin     | HARMONICS |      |      |     |      |      |      |       |       |
|---------|-----------|------|------|-----|------|------|------|-------|-------|
|         | 3         | 5    | 7    | 9   | 11   | 13   | 15   | 17    | 19    |
| 115 VAC | 4.6       | 2.28 | 1.54 | 0.8 | 0.66 | 0.42 | 0.3  | 0.264 | 0.236 |
| 230 VAC | 2.3       | 1.14 | 0.77 | 0.4 | 0.33 | 0.21 | 0.15 | 0.132 | 0.118 |

Input Current Harmonics EN61000-3-2 Limit

Input Current Harmonics-Measurment