

# **CUS1200M**

## **IMMUNITY DATA**

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## Terminology used

|              | Definition                       |
|--------------|----------------------------------|
| FG           | ..... Frame GND                  |
| $\perp$      | ..... Earth ( $\perp$ ) terminal |
| L            | ..... Live line                  |
| N            | ..... Neutral line               |
| $\text{///}$ | ..... Earth                      |
| V+           | ..... Output terminal +          |
| V-           | ..... Output terminal -          |
| STBY+        | ..... Standby supply +           |
| STBY-        | ..... Standby supply -           |
| R+           | ..... Remote ON/OFF terminal +   |
| R-           | ..... Remote ON/OFF terminal -   |
| PG           | ..... Power good signal          |
| S+           | ..... Remote sense +             |
| S-           | ..... Remote sense -             |

※ Test results are reference data based on our standard measurement condition.

## 1. Summary of Immunity Test Result

**MODEL: CUS12000M**

### (1) IEC61000 Series Test Result:

| Item                                                                     | Standard                                              | Test level       | Criteria | Result | Notes & Conditions             |
|--------------------------------------------------------------------------|-------------------------------------------------------|------------------|----------|--------|--------------------------------|
| Electrostatic Discharge Immunity Test                                    | IEC61000-4-2                                          | 1,2,3,4          | A        | PASS   |                                |
| Radiated Radio-Frequency<br>Electromagnetic Field Immunity Test          | IEC61000-4-3                                          | 3                | A        | PASS   |                                |
| Electrical Fast Transient / Burst Immunity Test                          | IEC61000-4-4                                          | 1,2,3,4          | A        | PASS   |                                |
| Surge Immunity Test                                                      | IEC61000-4-5                                          | 1,2,3,4          | A        | PASS   | <b>Input a.c. power PORT</b>   |
| Conducted Disturbances Induced<br>by Radio-Frequency Field Immunity Test | IEC61000-4-6                                          | 1,2,3            | A        | PASS   |                                |
| Power Frequency Magnetic Field Immunity Test                             | IEC61000-4-8                                          | 1,2,3,4          | A        | PASS   |                                |
| Voltage Dips Immunity Test, Short Interruptions<br>Immunity Test         | IEC61000-4-11<br>( 100~120VAC )<br>CLASS 3 Industrial | Dip: 20% 5000ms  | A        | PASS   |                                |
|                                                                          |                                                       | Dip: 30% 500ms   | A        | PASS   |                                |
|                                                                          |                                                       | Dip: 60% 200ms   | A/B      | PASS   | <b>A : ≤500W, B : &gt;500W</b> |
|                                                                          |                                                       | Dip: 100% 20ms   | A/B      | PASS   | <b>A : ≤600W, B : &gt;600W</b> |
|                                                                          |                                                       | Dip: 100% 10ms   | A        | PASS   |                                |
|                                                                          |                                                       | Dip: 100% 5000ms | B        | PASS   |                                |
|                                                                          | IEC61000-4-11<br>( 200~240VAC )<br>CLASS 3 Industrial | Dip: 20% 5000ms  | A        | PASS   |                                |
|                                                                          |                                                       | Dip: 30% 500ms   | A        | PASS   |                                |
|                                                                          |                                                       | Dip: 60% 200ms   | A        | PASS   |                                |
|                                                                          |                                                       | Dip: 100% 20ms   | A/B      | PASS   | <b>A : ≤600W, B : &gt;600W</b> |
|                                                                          |                                                       | Dip: 100% 10ms   | A        | PASS   |                                |
|                                                                          |                                                       | Dip: 100% 5000ms | B        | PASS   |                                |

Detail of test condition refer to each test page.

#### Criteria A

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

#### Criteria B

1. Must not have temporary function degradation that requires input restart.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

## 1. Summary of Immunity Test Result

**MODEL: CUS1200M**

### (2) IEC60601-1-2 Series Test Result:

| Item                                                                  | Standard                           | Test level       | Criteria | Result | Notes & Conditions             |
|-----------------------------------------------------------------------|------------------------------------|------------------|----------|--------|--------------------------------|
| Electrostatic Discharge Immunity Test                                 | IEC60601-1-2 Ed.4.1                | 1,2,3,4          | A        | PASS   | <b>ENCLOSURE PORT</b>          |
| Radiated Radio-Frequency Electromagnetic Field Immunity Test          | IEC60601-1-2 Ed.4.1                | 3                | A        | PASS   | <b>ENCLOSURE PORT</b>          |
| Electrical Fast Transient / Burst Immunity Test                       | IEC60601-1-2 Ed.4.1                | 1,2,3            | A        | PASS   |                                |
| Surge Immunity Test                                                   | IEC60601-1-2 Ed.4.1                | 1,2,3            | A        | PASS   | <b>Input a.c. power PORT</b>   |
| Conducted Disturbances Induced by Radio-Frequency Field Immunity Test | IEC60601-1-2 Ed.4.1                | 1,2              | A        | PASS   |                                |
| Power Frequency Magnetic Field Immunity Test                          | IEC60601-1-2 Ed.4.1                | 1,2,3,4          | A        | PASS   | <b>ENCLOSURE PORT</b>          |
| Voltage Dips Immunity Test, Short Interruptions Immunity Test         | IEC60601-1-2. Ed4.1 ( 100~120VAC ) | Dip: 30% 500ms   | A        | PASS   |                                |
|                                                                       |                                    | Dip: 100% 10ms   | A        | PASS   |                                |
|                                                                       |                                    | Dip: 100% 20ms   | A/B      | PASS   | <b>A : ≤600W, B : &gt;600W</b> |
|                                                                       |                                    | Dip: 100% 5000ms | B        | PASS   |                                |
| Voltage Dips Immunity Test, Short Interruptions Immunity Test         | IEC60601-1-2. Ed4.1 ( 200~240VAC ) | Dip: 30% 500ms   | A        | PASS   |                                |
|                                                                       |                                    | Dip: 100% 10ms   | A        | PASS   |                                |
|                                                                       |                                    | Dip: 100% 20ms   | A/B      | PASS   | <b>A : ≤600W, B : &gt;600W</b> |
|                                                                       |                                    | Dip: 100% 5000ms | B        | PASS   |                                |
| Radiated Field In Close Proximity Immunity Test                       | IEC60601-1-2 Ed.4.1                | -                | A        | PASS   |                                |

Detail of test condition refer to each test page.

#### Criteria A

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

#### Criteria B

1. Must not have temporary function degradation that requires input restart.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

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

**MODEL: CUS1200M**

### (1) Equipment Used

Electro Static Discharge Simulator : ESS-S3011A (NOISEKEN)

Discharge Resistance : 330Ω Capacity : 150pF

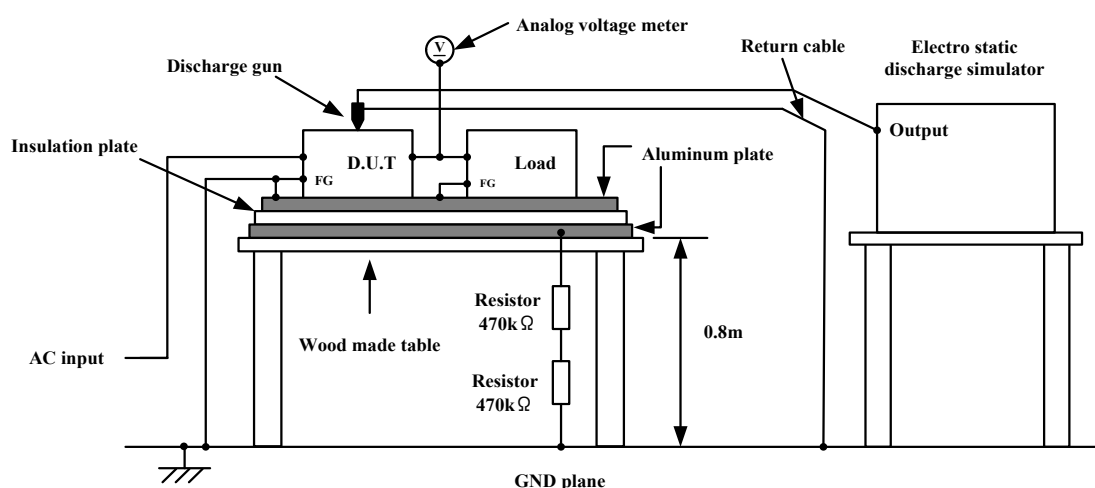
### (2) Test Conditions

|                       |               |                      |              |
|-----------------------|---------------|----------------------|--------------|
| • Input Voltage       | : 100, 240VAC | • Output Voltage     | : Rated      |
| • Output Current      | : 0%, 100%    | • Polarity           | : +, -       |
| • Test Times          | : 10 times    | • Discharge Interval | : > 1 second |
| • Ambient Temperature | : 25°C        |                      |              |

### (3) Test Method and Device Test Point

Contact Discharge : ⚡, Mounting screw

Air Discharge : ⚡, Mounting screw, Input and output terminal



### (4) Acceptable Conditions

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

### (5) Test Result

| Contact Discharge (kV) | CUS1200M-24/36/48 | Air Discharge(kV) | CUS1200M-24/36/48 |
|------------------------|-------------------|-------------------|-------------------|
| 2                      | PASS              | 2                 | PASS              |
| 4                      | PASS              | 4                 | PASS              |
| 6                      | PASS              | 8                 | PASS              |
| 8                      | PASS              | 15                | PASS              |

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

#### MODEL: CUS1200M

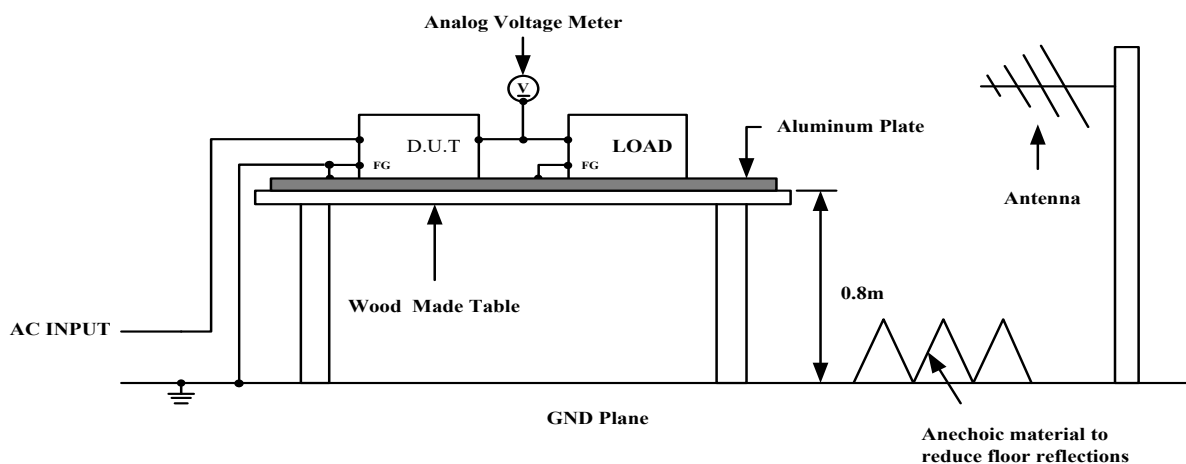
##### (1) Equipment Used

|                      |                                                                          |
|----------------------|--------------------------------------------------------------------------|
| Signal Generator     | : MG3692B (Anritsu)                                                      |
| LOG.Periodic Antenna | : VULP9118E (Schwarzbeck)                                                |
| Horn Antenna         | : STLP 9149 (Schwarzbeck)                                                |
| Power Amplifier      | : 80RF 1000-175 (AMETEK)<br>: AS0102-65 (AMETEK)<br>: AS1860-50 (AMETEK) |

##### (2) Test Conditions

|                             |                                      |                       |             |
|-----------------------------|--------------------------------------|-----------------------|-------------|
| • Input Voltage             | : 100, 240VAC                        | • Output Voltage      | : Rated     |
| • Output Current            | : 0%, 100%                           | • Amplitude Modulated | : 80%, 1kHz |
| • Wave Angle                | : Horizontal and Vertical            | • Ambient Temperature | : 25°C      |
| • Sweep Condition           | : 1.0% Step Up, 0.5 Seconds Hold     | • Distance            | : 3.0m      |
| • Test Angle                | : Top/Bottom, Both Sides, Front/Back |                       |             |
| • Electromagnetic Frequency | : 80~1000MHz, 1.4~6.0GHz             |                       |             |

##### (3) Test Method



##### (4) Acceptable Conditions

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

##### (5) Test Result

| Radiation Field Strength (V/m) | Electromagnetic Frequency | CUS1200M-24/36/48 |
|--------------------------------|---------------------------|-------------------|
| 3                              | 1.4~6.0GHz                | PASS              |
| 10                             | 80~1000MHz                | PASS              |

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

**MODEL: CUS1200M**

##### (1) Equipment Used

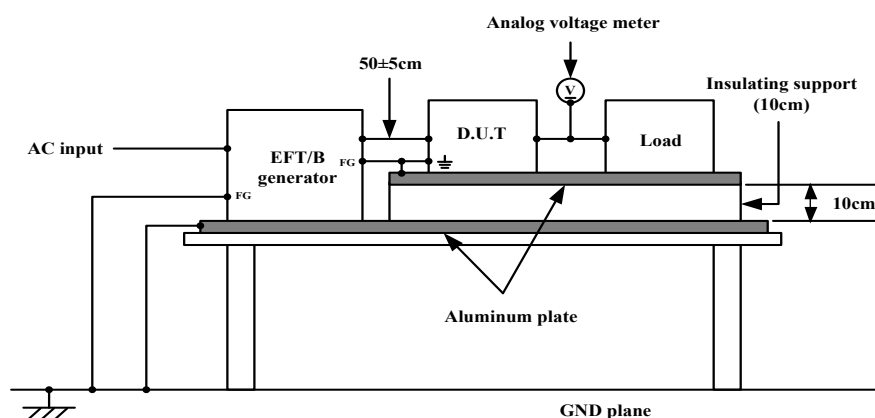
EFT/B Generator : FNS-AX3 (NOISEKEN)  
Coupling Clamp : 15-00012A (NOISEKEN)

##### (2) Test Conditions

|                   |                     |                       |                 |
|-------------------|---------------------|-----------------------|-----------------|
| • Input Voltage   | : 100, 240VAC       | • Output Voltage      | : Rated         |
| • Output Current  | : 0%, 100%          | • Test Time           | : 1 minute      |
| • Polarity        | : +, -              | • Ambient Temperature | : 25°C          |
| • Number of Tests | : 1 time            | • Pulse Frequency     | : 5kHz / 100kHz |
| • Burst Time      | : 15msec / 0.75msec | • Number of Pulse     | : 75pcs         |
| • Burst Cycle     | : 300msec           |                       |                 |

##### (3) Test Method and Device Test Point

Apply to (N, L,  $\frac{\Delta}{\square}$ ), (N, L), (N), (L), ( $\frac{\Delta}{\square}$ ), (V+, V-), (STBY+, STBY-), (R+, R-), (S+, S-), (PG)



##### (4) Acceptable Conditions

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

##### (5) Test Result

| Test terminal     | Test Voltage (kV) | Repetition Rate (kHz) | CUS1200M-24/36/48 |
|-------------------|-------------------|-----------------------|-------------------|
| Input/Output Port | 0.5               | 5 / 100               | PASS              |
|                   | 1                 | 5 / 100               | PASS              |
|                   | 2                 | 5 / 100               | PASS              |
|                   | 4                 | 5 / 100               | PASS              |
| Signal Port       | 0.25              | 5 / 100               | PASS              |
|                   | 0.5               | 5 / 100               | PASS              |
|                   | 1                 | 5 / 100               | PASS              |
|                   | 2                 | 5 / 100               | PASS              |

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

**MODEL: CUS1200M**

### (1) Equipment Used

Surge Generator : LSS-F03A1 (NOISEKEN)

Coupling Impedance : Common 12Ω  
Normal 2Ω

Coupling Capacitance : Common 9μF  
Normal 18μF

### (2) Test Conditions

• Input Voltage : 100, 240VAC

• Output Voltage : Rated

• Output Current : 0, 100%

• Number of Tests : 5 times

• Polarity : +, -

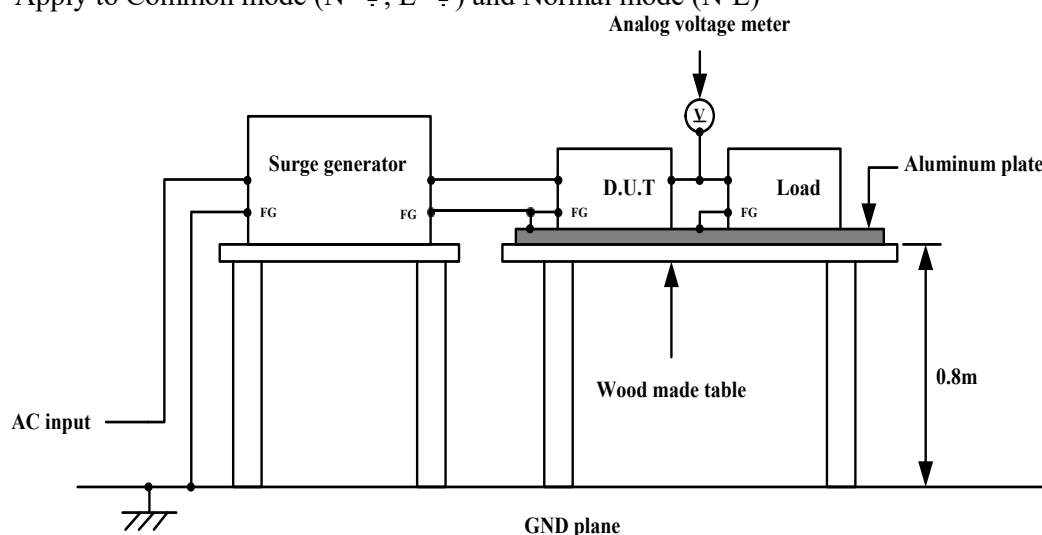
• Mode : Common, Normal

• Phase : 0, 90, 180, 270 deg

• Ambient Temperature : 25°C

### (3) Test Method and Device Test Points

Apply to Common mode (N-  $\frac{\Delta}{\Delta}$ , L-  $\frac{\Delta}{\Delta}$ ) and Normal mode (N-L)



### (4) Acceptable Conditions

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

### (5) Test Result

| Common            |                   | Normal            |                   |
|-------------------|-------------------|-------------------|-------------------|
| Test Voltage (kV) | CUS1200M-24/36/48 | Test Voltage (kV) | CUS1200M-24/36/48 |
| 0.5               | PASS              | 0.5               | PASS              |
| 1                 | PASS              | 1                 | PASS              |
| 2                 | PASS              | 2                 | PASS              |
| 4                 | PASS              |                   |                   |

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

**MODEL: CUS1200M**

### (1) Equipment Used

Compact RF Generator : CIT-10-75 (FRANKONIA)

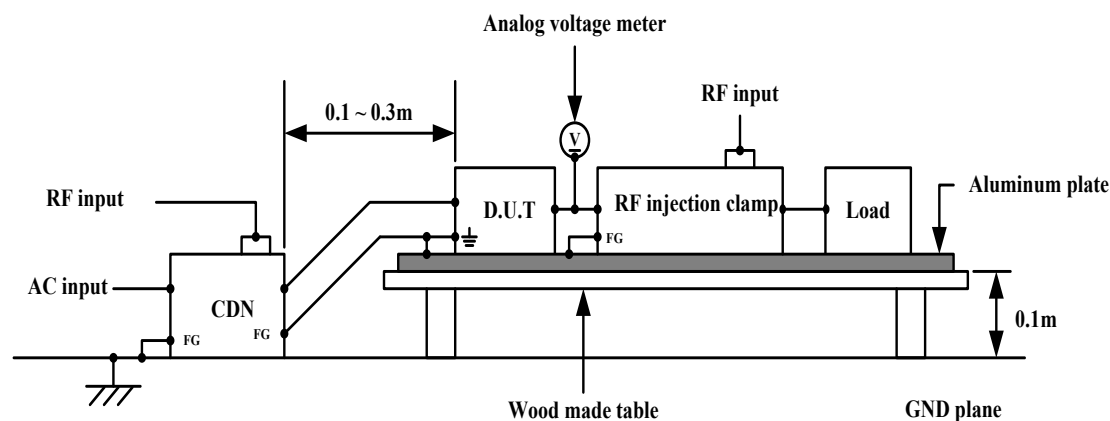
Coupling-Decoupling Network : CDN-M1 (FRANKONIA)  
: CDN-M2+3-32A (FRANKONIA)

### (2) Test Conditions

- Input Voltage : 100, 240VAC      • Output Voltage : Rated
- Output Current : 100%      • Ambient Temperature : 25°C
- Electromagnetic Frequency : 150kHz~80MHz      • Sweep Condition : 1.0% Step Up, 0.5 Seconds Hold

### (3) Test Method

Apply to (N, L,  $\oplus$ ), (N, L), (N), (L), ( $\oplus$ ), (V+, V-), (STBY+, STBY-), (R+, R-), (S+, S-), (PG)



### (4) Acceptable Conditions

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

### (5) Test Result

| Test terminal            | Voltage Level (V) | CUS1200M-24/36/48 |
|--------------------------|-------------------|-------------------|
| Input/Output/Signal Port | 1                 | PASS              |
|                          | 3                 | PASS              |
|                          | 10                | PASS              |

## 7. Power Frequency Magnetic Field Immunity Test (IEC61000-4-8)

**MODEL: CUS1200M**

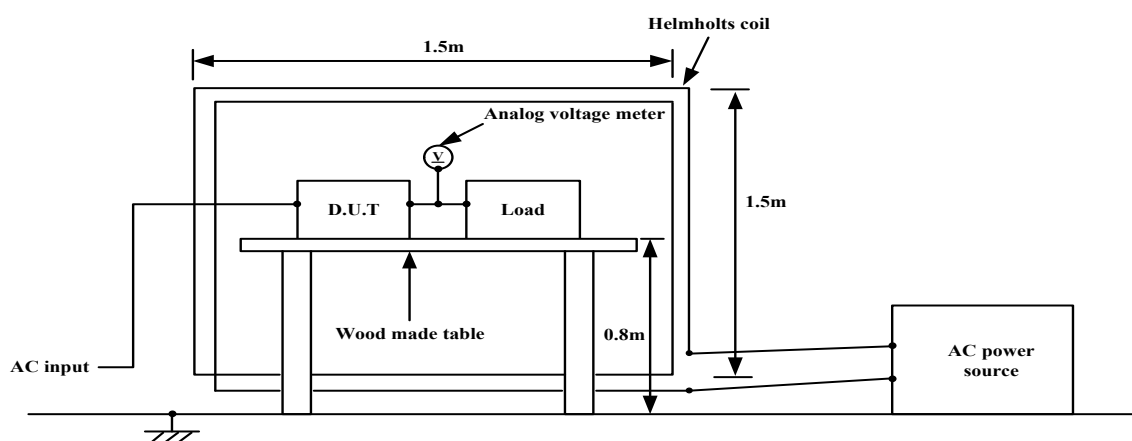
### (1) Equipment Used

PFM Test System : PFM61008TM (PRECIMA)

### (2) Test Conditions

- Input Voltage : 100, 240VAC
- Output Voltage : Rated
- Output Current : 100%
- Magnetic Frequency : 50Hz, 60Hz
- Ambient Temperature : 25°C
- Direction : X, Y, Z
- Test Time : More than 10 seconds (each direction)

### (3) Test Method and Device Test Point



### (4) Acceptable Conditions

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

### (5) Test Result

| Magnetic Field Strength (A/m) | CUS1200M-24/36/48 |
|-------------------------------|-------------------|
| 1                             | PASS              |
| 3                             | PASS              |
| 10                            | PASS              |
| 30                            | PASS              |

## 8. Voltage Dips, Short Interruptions Immunity Test (IEC61000-4-11)

**MODEL: CUS1200M**

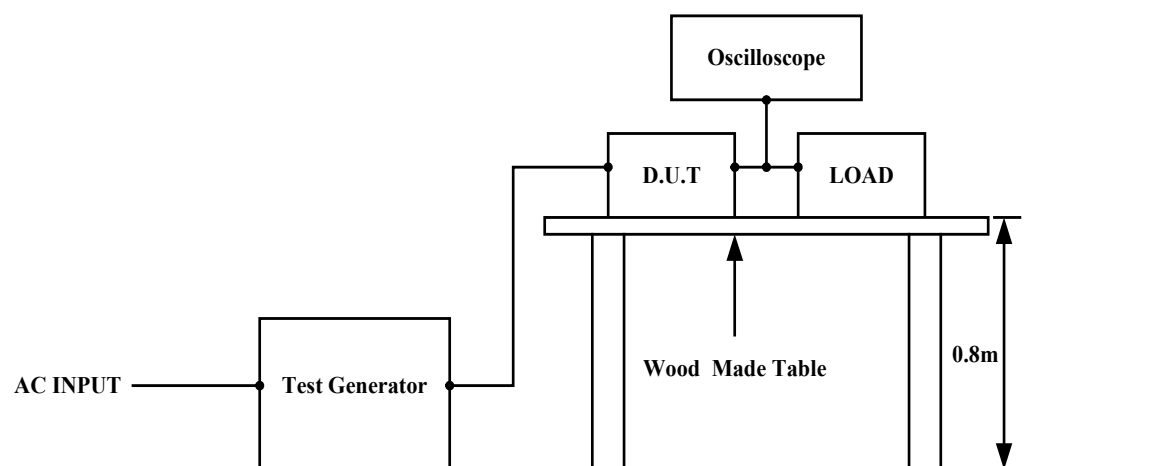
### (1) Equipment Used

Test Generator : PCR4000LA (KIKUSUI)

### (2) Test Conditions

|                       |                        |                       |           |
|-----------------------|------------------------|-----------------------|-----------|
| • Input Voltage       | : 100, 240VAC          | • Output Voltage      | : Rated   |
| • Output Current      | : 100%                 | • STBY Output Current | : 100%    |
| • Ambient Temperature | : 25°C                 | • Number of Tests     | : 3 times |
| • Test interval       | : More than 10 seconds |                       |           |

### (3) Test Method and Device Test Point



### (4) Acceptable Conditions

Criteria A

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

Criteria B

1. Must not have temporary function degradation that requires input restart.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

### (5) Test Result

| Phenomenon          | Test Level | Dip rate | Continue Time | Input Voltage Range | Criteria                       | CUS1200M-24/36/48 |
|---------------------|------------|----------|---------------|---------------------|--------------------------------|-------------------|
| Voltage dips        | 80%        | 20%      | 5000ms        | 100 ~ 120VAC        | A                              | PASS              |
|                     |            |          |               | 200 ~ 240VAC        | A                              | PASS              |
|                     | 70%        | 30%      | 500ms         | 100 ~ 120VAC        | A                              | PASS              |
|                     |            |          |               | 200 ~ 240VAC        | A                              | PASS              |
|                     | 40%        | 60%      | 200ms         | 100 ~ 120VAC        | A : $\leq 500W$ , B : $> 500W$ | PASS              |
|                     |            |          |               | 200 ~ 240VAC        | A                              | PASS              |
|                     | 0%         | 100%     | 20ms          | 100 ~ 120VAC        | A : $\leq 600W$ , B : $> 600W$ | PASS              |
|                     |            |          |               | 200 ~ 240VAC        | A : $\leq 600W$ , B : $> 600W$ | PASS              |
| Short Interruptions | 0%         | 100%     | 10ms          | 100 ~ 120VAC        | A                              | PASS              |
|                     |            |          |               | 200 ~ 240VAC        | A                              | PASS              |
|                     |            |          |               | 100 ~ 120VAC        | B                              | PASS              |
|                     |            |          |               | 200 ~ 240VAC        | B                              | PASS              |

## 9. Electrostatic Discharge Immunity Test (IEC60601-1-2 Ed.4.1)

**MODEL: CUS1200M**

### (1) Equipment Used

Electro Static Discharge Simulator : ESS-S3011A (NOISEKEN)

Discharge Resistance : 330Ω Capacity : 150pF

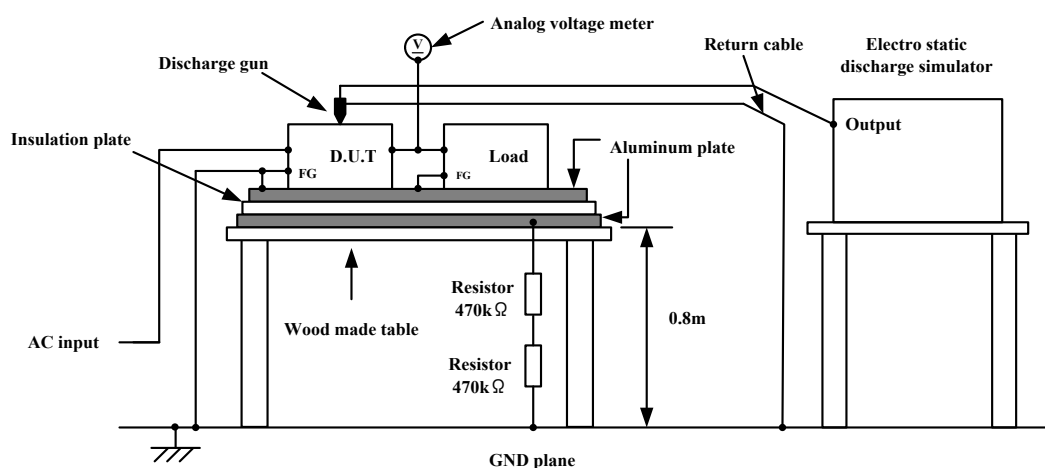
### (2) Test Conditions

• Input Voltage : 100, 240VAC • Output Voltage : Rated  
 • Output Current : 0%, 100% • Polarity : +, -  
 • Test Times : 10 times • Discharge Interval : > 1 second  
 • Ambient Temperature : 25°C

### (3) Test Method and Device Test Point (IEC61000-4-2, ENCLOSURE PORT)

Contact Discharge : ⚡, Mounting screw

Air Discharge : ⚡, Mounting screw, Input and output terminal



### (4) Acceptable Conditions

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

### (5) Test Result

| Contact Discharge (kV) | CUS1200M-24/36/48 | Air Discharge(kV) | CUS1200M-24/36/48 |
|------------------------|-------------------|-------------------|-------------------|
| 2                      | PASS              | 2                 | PASS              |
| 4                      | PASS              | 4                 | PASS              |
| 6                      | PASS              | 8                 | PASS              |
| 8                      | PASS              | 15                | PASS              |

## 10. Radiated Radio-Frequency Electromagnetic Field Immunity Test (IEC60601-1-2 Ed.4.1)

**MODEL: CUS1200M**

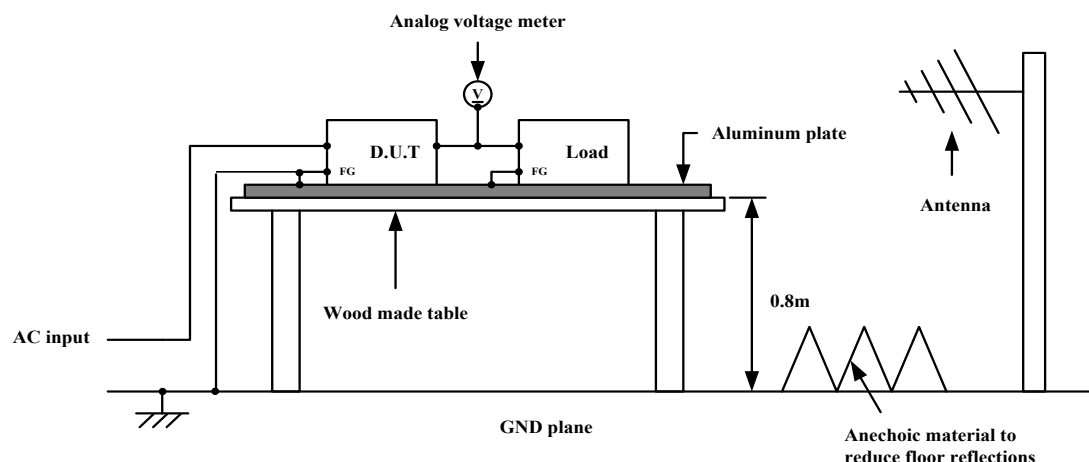
### (1) Equipment Used

|                                     |                            |
|-------------------------------------|----------------------------|
| Signal Generator                    | : MG3692B (Anritsu)        |
| Logarithmic Periodic Antenna        | : VULP9118E (Schwarzbeck)  |
| Horn Antenna                        | : STLP 9149 (Schwarzbeck)  |
| Stacked Double LOG.Periodic Antenna | : 9128D (SCHWARZBECK)      |
|                                     | : 9149 (SCHWARZBECK)       |
| Power Amplifier                     | : 80RF 1000-175 (AMETEK)   |
|                                     | : AS0102-65 (AMETEK)       |
|                                     | : AS1860-50 (AMETEK)       |
|                                     | : BBA 100 (R&S)            |
|                                     | : NTWPA-1060300E (RFLIGHT) |

### (2) Test Conditions

|                           |                                                   |                       |                                               |
|---------------------------|---------------------------------------------------|-----------------------|-----------------------------------------------|
| • Input Voltage           | : 100, 240VAC                                     | • Output Voltage      | : Rated                                       |
| • Output Current          | : 0%, 100%                                        | • Distance(AM)        | : 3.0m                                        |
| • Wave Angle              | : Horizontal and Vertical                         | • Distance(FM,PM)     | : 0.3m                                        |
| • Test Angle              | : Top/Bottom, Both Sides, Front/Back              | • Ambient Temperature | : 25°C                                        |
| • Amplitude Modulated(AM) | : 80%, 1kHz, 1.0% step up,<br>0.5 seconds hold.   | • Pulse Modulated(PM) | : 18Hz, 217Hz, 50% duty,<br>0.5 seconds hold. |
| • Frequency Modulated(FM) | : 5kHz deviation, 1kHz sine,<br>0.5 seconds hold. |                       |                                               |

### (3) Test Method (IEC61000-4-3, ENCLOSURE PORT)



### (4) Acceptable Conditions

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

### (5) Test Result

| Modulation | Radiation Field Strength (V/m) | Electromagnetic Frequency     | CUS1200M-24/36/48 |
|------------|--------------------------------|-------------------------------|-------------------|
| AM         | 10                             | 80MHz ~2.7GHz                 | PASS              |
| PM         | 27                             | 385MHz                        | PASS              |
| (18Hz)     | 28                             | 810,870,930MHz                | PASS              |
| PM         | 9                              | 710,745,780,5240,5500,5785MHz | PASS              |
| (217Hz)    | 28                             | 1720,1845,1970,2450MHz        | PASS              |
| FM         | 28                             | 450MHz                        | PASS              |

## 11. Electrical Fast Transient / Burst Immunity Test (IEC60601-1-2 Ed.4.1)

### MODEL: CUS1200M

#### (1) Equipment Used

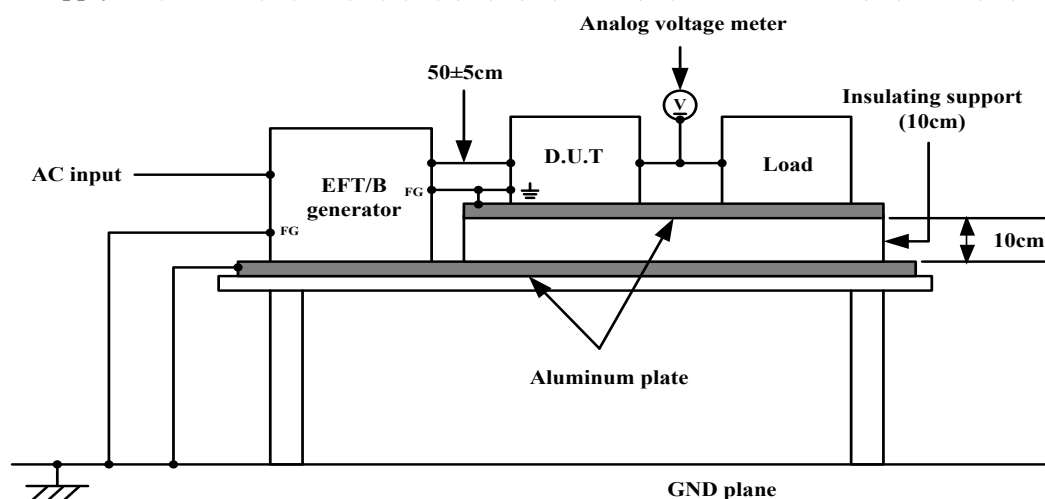
EFT/B Generator : FNS-AX3 (NOISEKEN)  
Coupling Clamp : 15-00012A (NOISEKEN)

#### (2) Test Conditions

|                   |                     |                       |                 |
|-------------------|---------------------|-----------------------|-----------------|
| • Input Voltage   | : 100, 240VAC       | • Output Voltage      | : Rated         |
| • Output Current  | : 0%, 100%          | • Test Time           | : 1 minute      |
| • Polarity        | : +, -              | • Ambient Temperature | : 25°C          |
| • Number of Tests | : 1 time            | • Pulse Frequency     | : 5kHz / 100kHz |
| • Burst Time      | : 15msec / 0.75msec | • Number of Pulse     | : 75pcs         |
| • Burst Cycle     | : 300msec           |                       |                 |

#### (3) Test Method and Device Test Point

Apply to (N, L,  $\frac{\Delta}{\square}$ ), (N, L), (N), (L), ( $\frac{\Delta}{\square}$ ), (V+, V-), (STBY+, STBY-), (R+, R-), (S+, S-), (PG)



#### (4) Acceptable Conditions

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

#### (5) Test Result

| Test terminal     | Test Voltage (kV) | Repetition Rate (kHz) | CUS1200M-24/36/48 |
|-------------------|-------------------|-----------------------|-------------------|
| Input/Output Port | 0.5               | 5 / 100               | PASS              |
|                   | 1                 | 5 / 100               | PASS              |
|                   | 2                 | 5 / 100               | PASS              |
| Signal Port       | 0.25              | 5 / 100               | PASS              |
|                   | 0.5               | 5 / 100               | PASS              |
|                   | 1                 | 5 / 100               | PASS              |

## 12. Surge Immunity Test (IEC60601-1-2 Ed.4.1)

### MODEL: CUS1200M

#### (1) Equipment Used

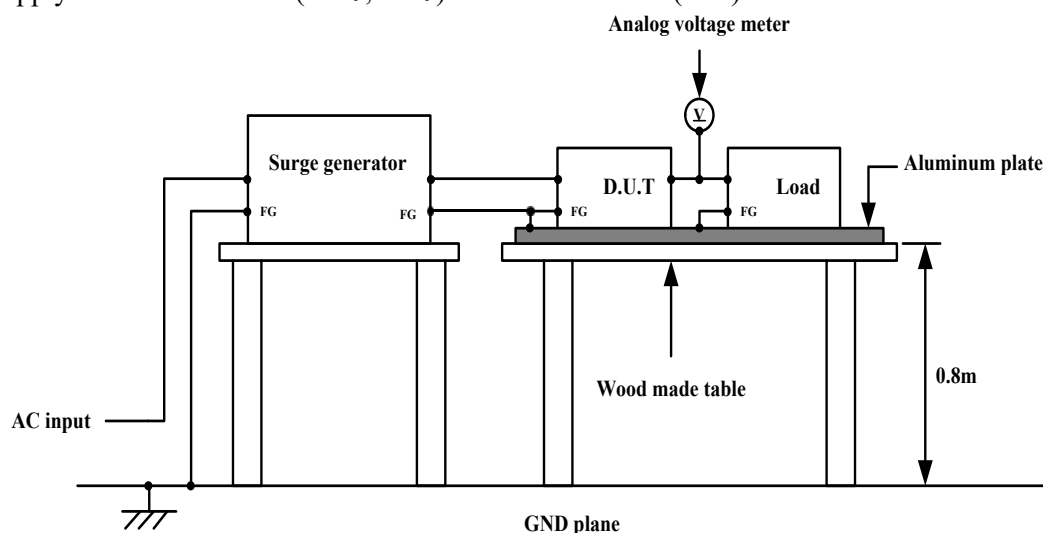
|                    |                        |     |                      |          |      |
|--------------------|------------------------|-----|----------------------|----------|------|
| Surge Generator    | : LSS-F03A1 (NOISEKEN) |     |                      |          |      |
| Coupling Impedance | : Common               | 12Ω | Coupling Capacitance | : Common | 9μF  |
|                    | Normal                 | 2Ω  |                      | Normal   | 18μF |

#### (2) Test Conditions

|                  |                       |                       |                  |
|------------------|-----------------------|-----------------------|------------------|
| • Input Voltage  | : 100, 240VAC         | • Output Voltage      | : Rated          |
| • Output Current | : 0, 100%             | • Number of Tests     | : 5 times        |
| • Polarity       | : +, -                | • Mode                | : Common, Normal |
| • Phase          | : 0, 90, 180, 270 deg | • Ambient Temperature | : 25°C           |

#### (3) Test Method and Device Test Points

Apply to Common mode (N-  $\pm$ , L-  $\pm$ ) and Normal mode (N-L)



#### (4) Acceptable Conditions

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

#### (5) Test Result

| Common            |                   | Normal            |                   |
|-------------------|-------------------|-------------------|-------------------|
| Test Voltage (kV) | CUS1200M-24/36/48 | Test Voltage (kV) | CUS1200M-24/36/48 |
| 0.5               | PASS              | 0.5               | PASS              |
| 1                 | PASS              | 1                 | PASS              |
| 2                 | PASS              |                   |                   |

### 13. Conducted Disturbances Induced by Radio-Frequency Field Immunity Test (IEC60601-1-2 Ed.4.1)

#### MODEL: CUS1200M

#### (1) Equipment Used

Compact RF Generator : CIT-10-75 (FRANKONIA)

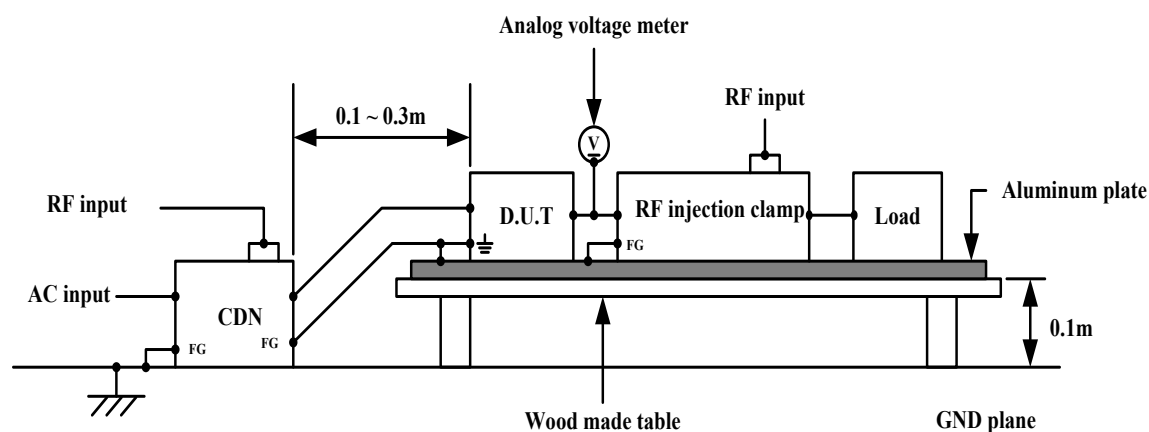
Coupling-Decoupling Network : CDN-M1 (FRANKONIA)  
: CDN-M2+3-32A (FRANKONIA)

#### (2) Test Conditions

- Input Voltage : 100, 240VAC • Output Voltage : Rated
- Output Current : 100% • Ambient Temperature : 25°C
- Electromagnetic Frequency : 150kHz~80MHz • Sweep Condition : 1.0% Step Up, 0.5 Seconds Hold

#### (3) Test Method

Apply to (N, L,  $\oplus$ ), (N, L), (N), (L), ( $\oplus$ ), (V+, V-), (STBY+, STBY-), (R+, R-), (S+, S-), (PG)



#### (4) Acceptable Conditions

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

#### (5) Test Result

| Test terminal            | Voltage Level (V) | CUS1200M-24/36/48 |
|--------------------------|-------------------|-------------------|
| Input/Output/Signal Port | 1                 | PASS              |
|                          | 3                 | PASS              |

# 14. Power Frequency Magnetic Field Immunity Test (IEC60601-1-2 Ed.4.1)

**MODEL: CUS1200M**

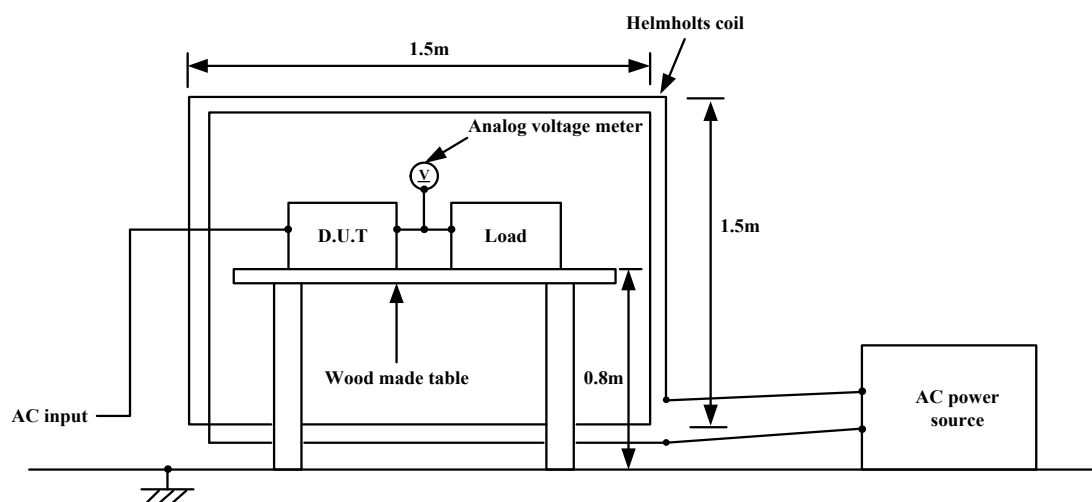
## (1) Equipment Used

PFM Test System : PFM61008TM (PRECIMA)

## (2) Test Conditions

- Input Voltage : 100, 240VAC
- Output Voltage : Rated
- Output Current : 100%
- Ambient Temperature : 25°C
- Magnetic Frequency : 50Hz, 60Hz
- Direction : X, Y, Z
- Test Time : More than 10 seconds (each direction)

## (3) Test Method (IEC61000-4-8, ENCLOSURE PORT)



## (4) Acceptable Conditions

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

## (5) Test Result

| Magnetic Field Strength (A/m) | CUS1200M-24/36/48 |
|-------------------------------|-------------------|
| 1                             | PASS              |
| 3                             | PASS              |
| 10                            | PASS              |
| 30                            | PASS              |

## 15. Voltage Dips, Voltage Interruptions Immunity Test (IEC60601-1-2 Ed.4.1)

**MODEL: CUS1200M**

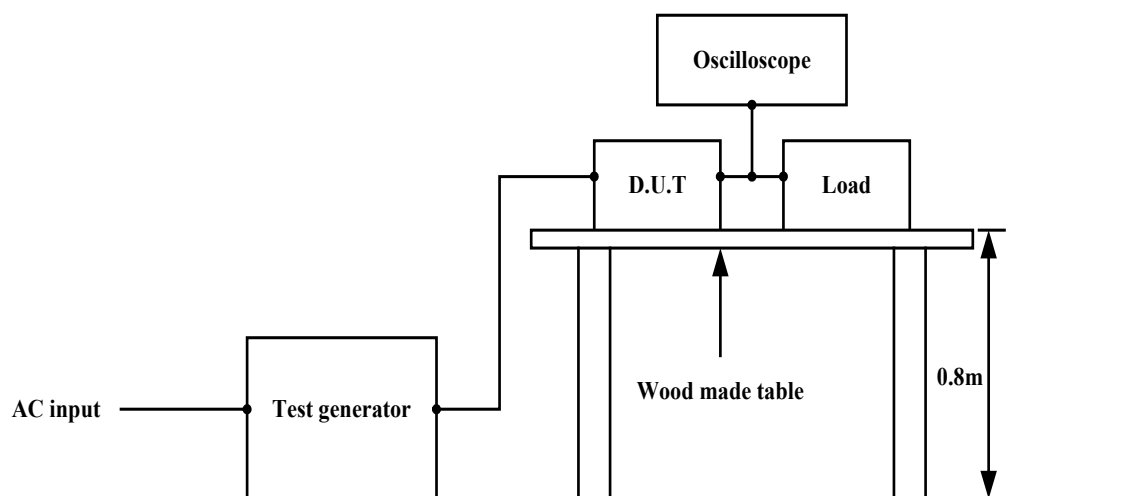
### (1) Equipment Used

Test generator : PCR4000LA (KIKUSUI)

### (2) Test Conditions

|                       |                        |                       |           |
|-----------------------|------------------------|-----------------------|-----------|
| • Input Voltage       | : 100, 240VAC          | • Output Voltage      | : Rated   |
| • Output Current      | : 100%                 | • STBY Output Current | : 100%    |
| • Ambient Temperature | : 25°C                 | • Number of Tests     | : 3 times |
| • Test Interval       | : More than 10 seconds |                       |           |

### (3) Test Method (IEC61000-4-11, Input a.c. power PORT)



### (4) Acceptable Conditions

Criteria A

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

Criteria B

1. Must not have temporary function degradation that requires input restart.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

### (5) Test Result

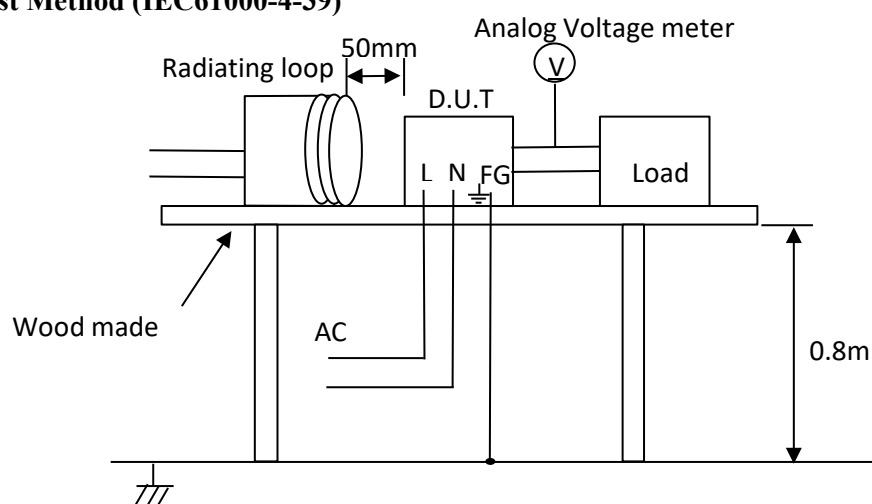
| Phenomenon            | Test Level | Continue Time | Phase Angles                    | Input Voltage Range | Criteria             | CUS1200M-24/36/48 |
|-----------------------|------------|---------------|---------------------------------|---------------------|----------------------|-------------------|
| Voltage dips          | 70%        | 500ms         | 0 deg                           | 100VAC              | A                    | PASS              |
|                       |            |               |                                 | 240VAC              | A                    | PASS              |
|                       | 0%         | 10ms          | 0,45,90,135,180,225,270,315 deg | 100VAC              | A                    | PASS              |
|                       |            |               |                                 | 240VAC              | A                    | PASS              |
|                       | 0%         | 20ms          | 0 deg                           | 100VAC              | A : ≤600W, B : >600W | PASS              |
|                       |            |               |                                 | 240VAC              | A : ≤600W, B : >600W | PASS              |
| Voltage interruptions | 0%         | 5000ms        | 0 deg                           | 100VAC              | B                    | PASS              |
|                       |            |               |                                 | 240VAC              | B                    | PASS              |

**16. Radiated Field In Close Proximity Immunity Test (IEC60601-1-2 Ed.4.1)****MODEL: CUS1200M****(1) Equipment Used**

|                        |                                                      |
|------------------------|------------------------------------------------------|
| Signal generator       | : SMC100A (R&S)                                      |
| Power amplifier system | : BBA150-AB200 (R&S)<br>: NFCN9734 (SCHWARZBECK)     |
| Loop sensor            | : FESP5134-40 (SCHWARZBECK)                          |
| Radiating loop         | : FESP5132 (SCHWARZBECK)<br>: FESP5139 (SCHWARZBECK) |

**(2) Test Conditions**

|                |                                      |                     |         |
|----------------|--------------------------------------|---------------------|---------|
| Input Voltage  | : 100, 240VAC                        | Output Voltage      | : Rated |
| Output Current | : Full load                          | Distance            | : 50mm  |
| Test Angle     | : Top/Bottom, Both Sides, Front/Back | Ambient Temperature | : 25°C  |
| Test Time      | : 2sec for each coil position        |                     |         |

**(3) Test Method (IEC61000-4-39)****(4) Acceptable Conditions**

1. The regulation of output voltage must not exceed 5% of initial value during test.
2. The output voltage must be within the regulation of specification after the test.
3. Smoke and fire are not allowed.

**(5) Test Result**

| Test Frequency | Immunity test level (A/m) | Modulation                      | CUS1200M-24/36/48 |
|----------------|---------------------------|---------------------------------|-------------------|
| 30kHz          | 8                         | Continuous waves                | PASS              |
| 134.2kHz       | 65                        | Pulse Modulation<br>50%, 2.1kHz | PASS              |
| 13.56MHz       | 7.5                       | Pulse Modulation<br>50%, 50kHz  | PASS              |