

# EVALUATION DATA

MODEL NAME : OFI1200A12

Tested by : Shintaro Oki

Shintaro Oki

Approved by : \_\_\_\_\_

Tomas Isaksson

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POWERBOX

A Cosel Group Company

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Remark:

Unless specified the test condition shall be

Input voltage / Frequency: 230 [Vac] / 50 [Hz]

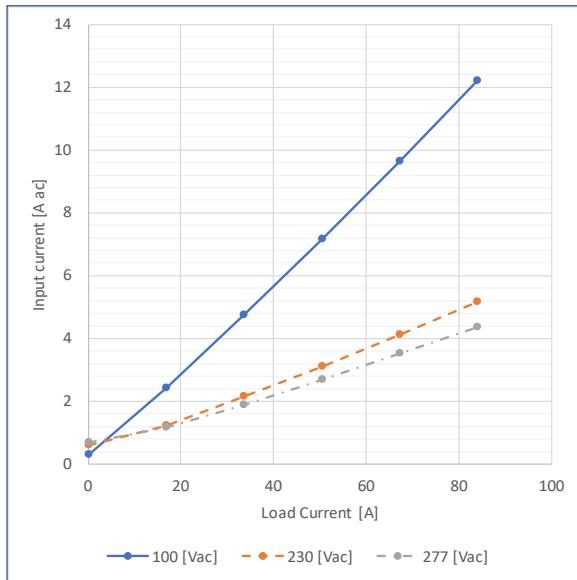
Load current: 84.0 [A]

Baseplate temperature: 25 [°C]

1. Input Current (by Load Current)

Test Circuitry : Figure A

Graph



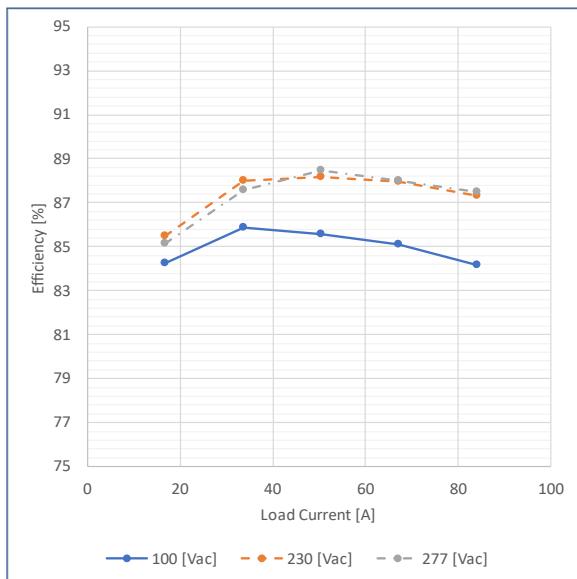
Value

| Load Current [A] | Input Current [Aac] |           |           |
|------------------|---------------------|-----------|-----------|
|                  | Input Voltage       |           |           |
|                  | 100 [Vac]           | 230 [Vac] | 277 [Vac] |
| 0.00             | 0.289               | 0.601     | 0.703     |
| 16.80            | 2.429               | 1.237     | 1.179     |
| 33.60            | 4.753               | 2.144     | 1.895     |
| 50.40            | 7.155               | 3.119     | 2.678     |
| 67.20            | 9.630               | 4.129     | 3.510     |
| 84.00            | 12.211              | 5.162     | 4.355     |

2. Efficiency (by Load Current)

Test Circuitry : Figure A

Graph



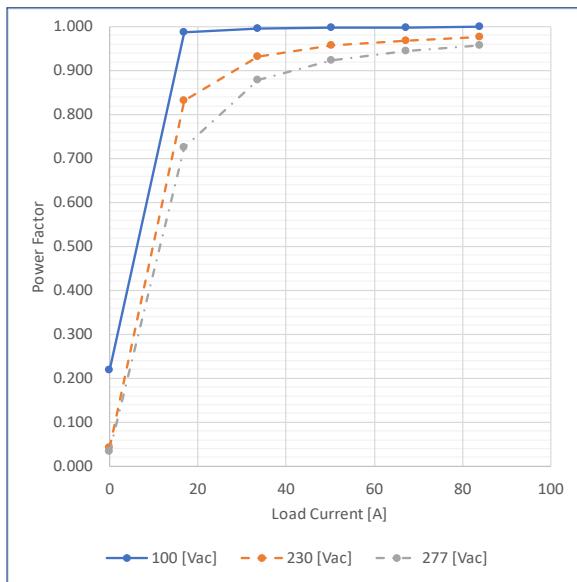
Value

| Load Current [A] | Efficiency [%] |           |           |
|------------------|----------------|-----------|-----------|
|                  | Input Voltage  |           |           |
|                  | 100 [Vac]      | 230 [Vac] | 277 [Vac] |
| 0.00             | -              | -         | -         |
| 16.80            | 84.240         | 85.483    | 85.138    |
| 33.60            | 85.886         | 88.001    | 87.561    |
| 50.40            | 85.550         | 88.159    | 88.474    |
| 67.20            | 85.102         | 87.966    | 87.987    |
| 84.00            | 84.177         | 87.322    | 87.469    |

3. Power Factor (by Load Current)

Test Circuitry : Figure A

Graph



Value

| Load<br>Current [A] | Power Factor  |           |           |
|---------------------|---------------|-----------|-----------|
|                     | Input Voltage |           |           |
|                     | 100 [Vac]     | 230 [Vac] | 277 [Vac] |
| 0.00                | 0.219         | 0.043     | 0.033     |
| 16.80               | 0.988         | 0.831     | 0.726     |
| 33.60               | 0.995         | 0.931     | 0.878     |
| 50.40               | 0.998         | 0.958     | 0.923     |
| 67.20               | 0.998         | 0.969     | 0.945     |
| 84.00               | 0.999         | 0.976     | 0.957     |

4. Leakage Current

Test Circuitry : See table

Test Equipment: Simpson 228

Value

| Standard   | Testing<br>Circuitry | Measuring<br>Method | Leakage Current [mA] |           |           | Note      |  |
|------------|----------------------|---------------------|----------------------|-----------|-----------|-----------|--|
|            |                      |                     | Input Voltage        |           |           |           |  |
|            |                      |                     | 100 [Vac]            | 230 [Vac] | 277 [Vac] |           |  |
| IEC62368-1 | Figure B-1           | Both phases         | 0.25                 | 0.60      | 0.74      | Operation |  |
|            |                      | One of phases       | 0.44                 | 1.20      | 1.45      | Stand by  |  |
|            | Figure B-2           | Both phases         | 0.25                 | 0.60      | 0.74      | Operation |  |
|            |                      | One of phases       | 0.44                 | 1.20      | 1.45      | Stand by  |  |

## 5. Inrush Current

Test Circuitry : Figure A

C1: Input Voltage (200V/div)  
 C4: Input Current (20A/div)

### Waveform



Input Voltage : 100 [Vac]  
 (100ms/div)

- ① Primary Inrush Current : 12.5 [A]
- ② Secondary Inrush Current : 28.3 [A]

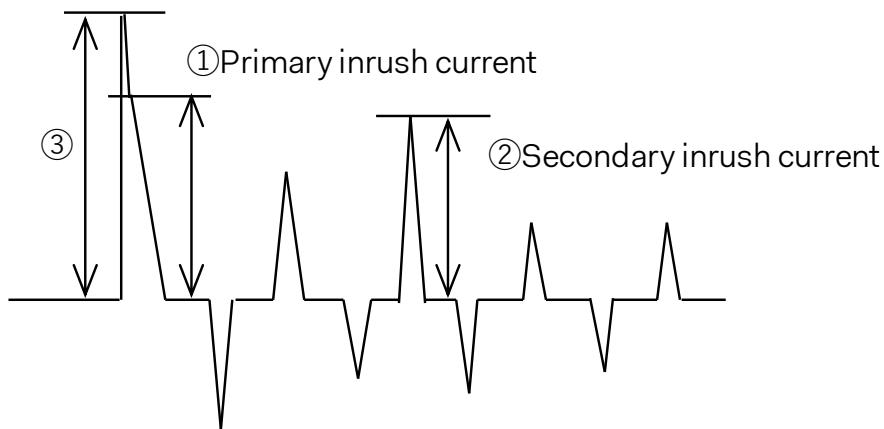


Input Voltage : 277 [Vac]  
 (100ms/div)

- ① Primary Inrush Current : 37.1 [A]
- ② Secondary Inrush Current : 14.0 [A]

### Remark:

A surge current flown into Line-to-Line capacitor (③) would be excluded as primary inrush current (①).

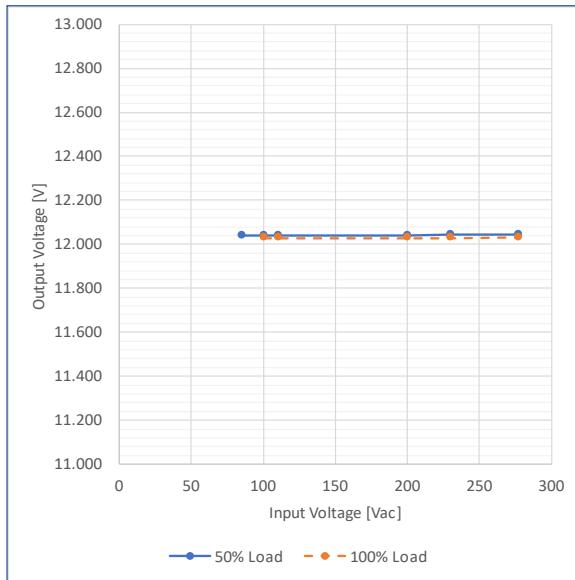


## 6. Line Regulation

Test Circuitry : Figure A

Change input voltage from 85 to 277 [Vac]

### Graph



### Value

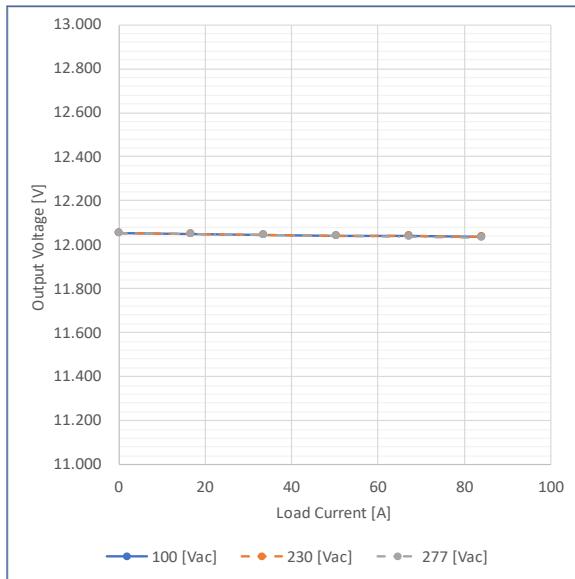
| Input Voltage<br>[Vac] | Output Voltage [V] |           |
|------------------------|--------------------|-----------|
|                        | Load Factor        |           |
|                        | 50% Load           | 100% Load |
| 85.00                  | 12.041             | -         |
| 100.00                 | 12.041             | 12.031    |
| 110.00                 | 12.041             | 12.031    |
| 200.00                 | 12.042             | 12.031    |
| 230.00                 | 12.043             | 12.031    |
| 277.00                 | 12.043             | 12.033    |

## 7. Load Regulation

Test Circuitry : Figure A

Change Load Current from 0 to 84.0 [A]

### Graph



### Value

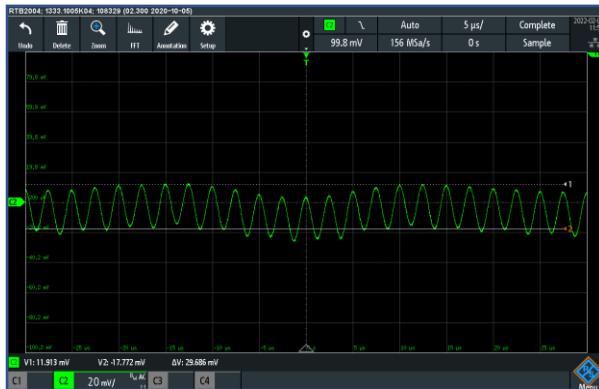
| Load Current<br>[A] | Output Voltage [V] |           |           |
|---------------------|--------------------|-----------|-----------|
|                     | Input Voltage      |           |           |
|                     | 100 [Vac]          | 230 [Vac] | 277 [Vac] |
| 0.00                | 12.052             | 12.052    | 12.051    |
| 16.80               | 12.048             | 12.049    | 12.050    |
| 33.60               | 12.045             | 12.045    | 12.045    |
| 50.40               | 12.042             | 12.042    | 12.041    |
| 67.20               | 12.039             | 12.039    | 12.037    |
| 84.00               | 12.036             | 12.034    | 12.033    |

## 8. Ripple Noise

Test Circuitry : Figure C

C2: Output voltage (20mV/div)  
BW: 20MHz

### Waveform



(5μs/div)



(200ms/div)

## 9. Dynamic Load Response

Test Circuitry : Figure A

Load Current 8.4 [A] <-> 75.6 [A]

C2: Output voltage (50mV/div)  
C4: Output current (50A/div)

### Waveform



(50ms/div)

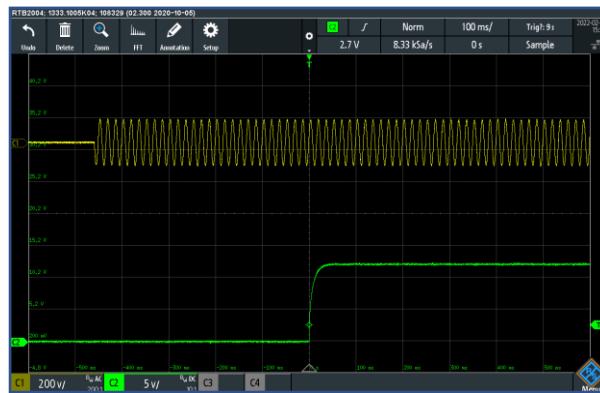
Load changes from 10% to 90% of rated current.

## 10. Rise Time Characteristics by AC ON

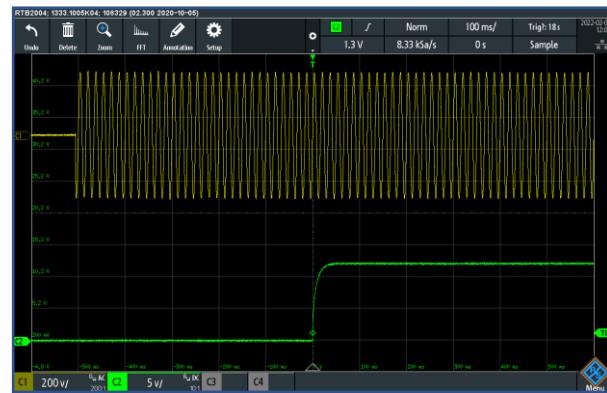
Test Circuitry : Figure A

C1: Input voltage (200V/div)  
C2: Output voltage (5V/div)

### Waveform



Input Voltage 100 [Vac]  
Load Current 84.0 [A]  
(100ms/div)



Input Voltage 277 [Vac]  
Load Current 84.0 [A]  
(100ms/div)

## 11. Rise Time Characteristics with RC Signal

Test Circuitry : Figure D

C1: Input voltage (500V/div)  
C2: Output voltage (5V/div)  
C3: RC signal (10V/div)

### Waveform



Input Voltage 100 [Vac]  
Load Current 84.0 [A]  
(100ms/div)



Input Voltage 277 [Vac]  
Load Current 84.0 [A]  
(100ms/div)

## 12. Fall Time / Hold-up Time

Test Circuitry : Figure A

C1: Input voltage (200V/div)  
C2: Output voltage (5V/div)

### Waveform

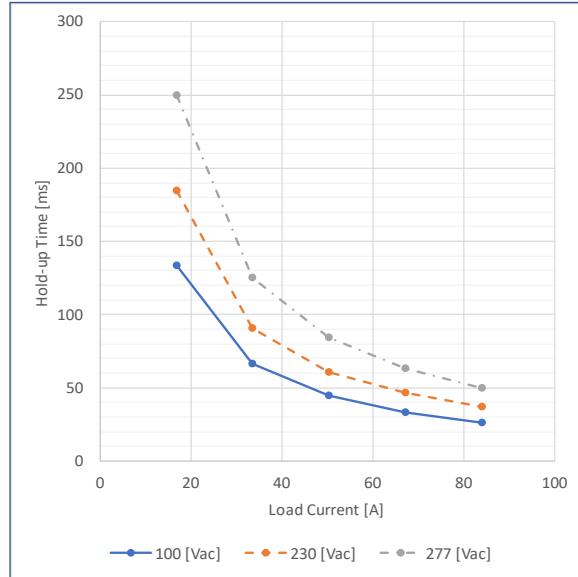


Input Voltage 100 [Vac]  
Load Current 84.0 [A]  
(10ms/div)



Input Voltage 277 [Vac]  
Load Current 84.0 [A]  
(10ms/div)

### Graph



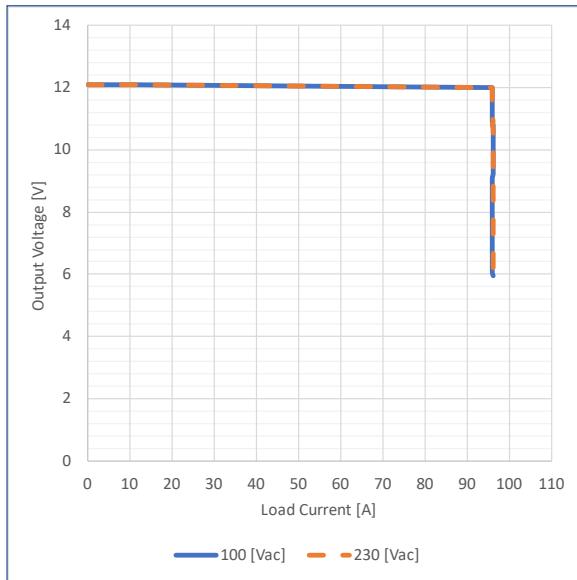
### Value

| Load Current [A] | Hold-up Time [ms] |           |           |
|------------------|-------------------|-----------|-----------|
|                  | Input Voltage     |           |           |
|                  | 100 [Vac]         | 230 [Vac] | 277 [Vac] |
| 0.00             | -                 | -         | -         |
| 16.80            | 133.6             | 184.8     | 249.8     |
| 33.60            | 66.4              | 90.9      | 125.3     |
| 50.40            | 44.7              | 60.9      | 84.1      |
| 67.20            | 33.2              | 46.6      | 63.0      |
| 84.00            | 26.0              | 36.8      | 50.1      |
|                  |                   |           |           |

13. Over Current Protection

Test Circuitry : Figure A

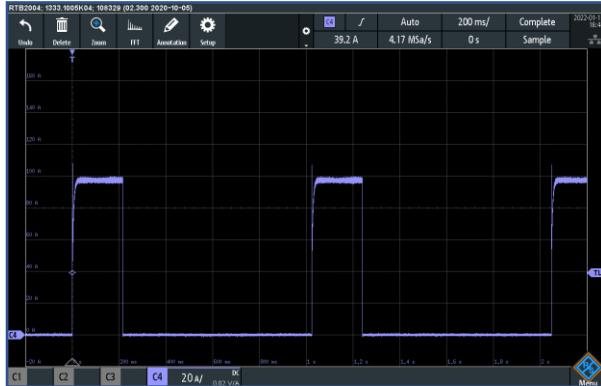
Graph



Value

| Output<br>Voltage [V] | Load Current [A] |           |
|-----------------------|------------------|-----------|
|                       | Input Voltage    |           |
|                       | 100 [Vac]        | 230 [Vac] |
| 12.00                 | 96.078           | 96.083    |
| 11.40                 | 96.091           | 96.091    |
| 10.80                 | 96.101           | 96.095    |
| 9.60                  | 96.132           | 96.315    |
| 8.40                  | 96.043           | 96.309    |
| 7.20                  | 96.049           | 96.306    |
|                       |                  |           |
|                       |                  |           |

Waveform



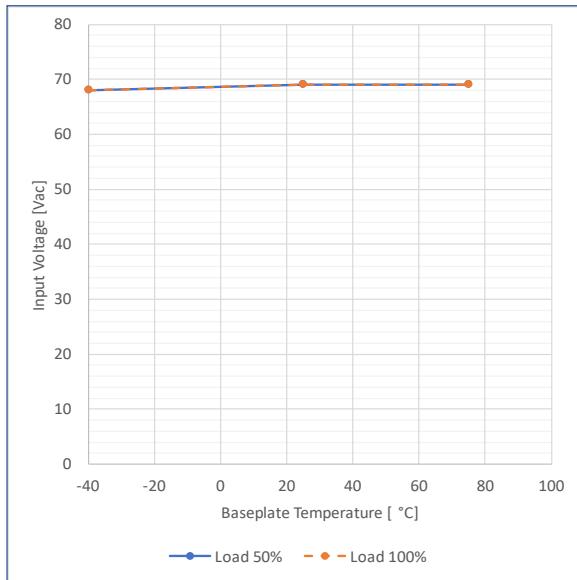
Input Voltage      230 [Vac]  
Output              Short  
(200ms/div)

— C4: Output Current (20A/div)

Intermittent operation occurs when the output voltage is from 6.0V to 0V.

## 14. Minimum Input Voltage for Regulated Output Voltage

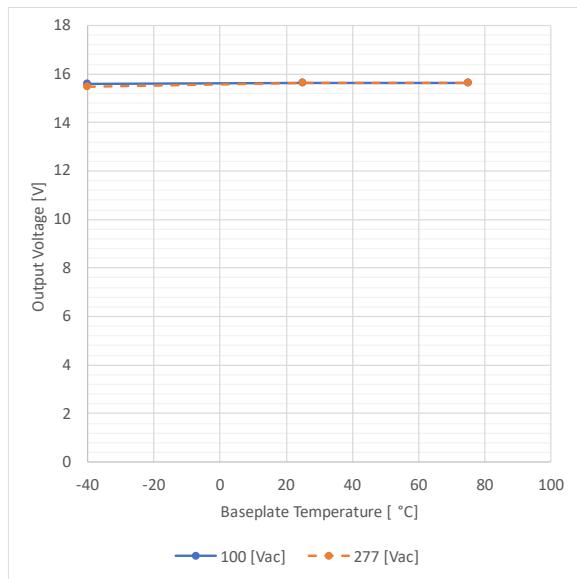
Test Circuitry : Figure A

GraphValue

| Baseplate<br>Temperature<br>[°C] | Input Voltage [Vac] |           |
|----------------------------------|---------------------|-----------|
|                                  | Load Current        |           |
|                                  | Load 50%            | Load 100% |
| -40                              | 68                  | 68        |
| 25                               | 69                  | 69        |
| 75                               | 69                  | 69        |
|                                  |                     |           |
|                                  |                     |           |
|                                  |                     |           |
|                                  |                     |           |
|                                  |                     |           |

## 15. Over Voltage Protection

Test Circuitry : Figure A

GraphValue

| Baseplate<br>Temperature<br>[°C] | Output Voltage [V] |           |
|----------------------------------|--------------------|-----------|
|                                  | Input Voltage      |           |
|                                  | 100 [Vac]          | 277 [Vac] |
| -40                              | 15.580             | 15.460    |
| 25                               | 15.640             | 15.640    |
| 75                               | 15.640             | 15.640    |
|                                  |                    |           |
|                                  |                    |           |
|                                  |                    |           |
|                                  |                    |           |

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## EVALUATION DATA

OFI1200A12

12Vdc / 84.0A

## 16. Conducted Emission

Input Voltage : 230Vac / 50Hz Load : 100 %

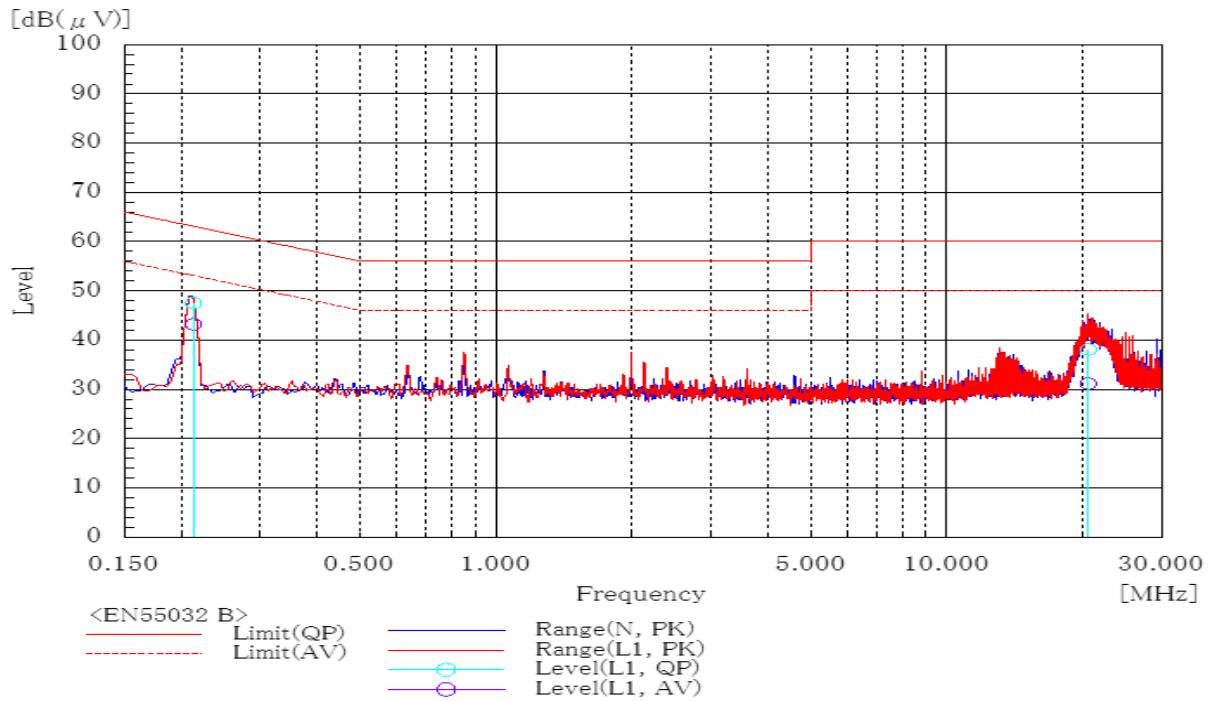


Table Conducted emission test result (230Vrms / 50Hz)

| Frequency<br>MHz | Line | Level  |      | Limit  |      | Margin |      | Pass/Fail | Remark |  |  |
|------------------|------|--------|------|--------|------|--------|------|-----------|--------|--|--|
|                  |      | dB(μV) |      | dB(μV) |      | dB     |      |           |        |  |  |
|                  |      | QP     | AV   | QP     | AV   | QP     | AV   |           |        |  |  |
| 0.213            | L1   | 47.5   | 43.2 | 63.1   | 53.1 | 15.6   | 9.9  | Pass      |        |  |  |
| 20.599           | L1   | 38.1   | 31.2 | 60     | 50   | 21.9   | 18.8 | Pass      |        |  |  |



Fig. Conducted emission test environment

## 17. Figure of Test Circuitry

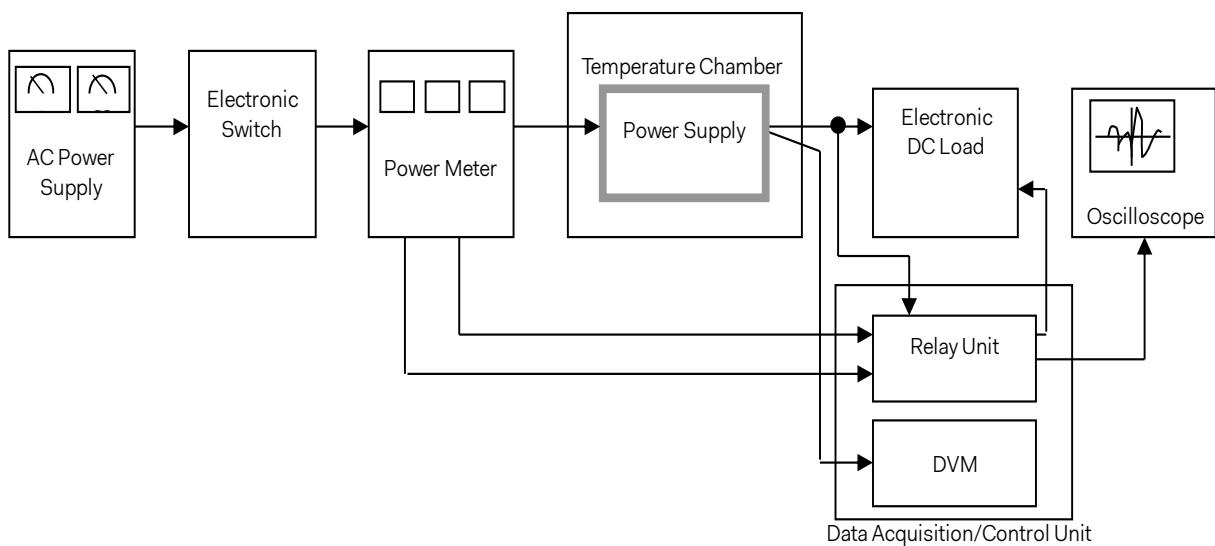


Figure A

Test circuitry for general performance measurement

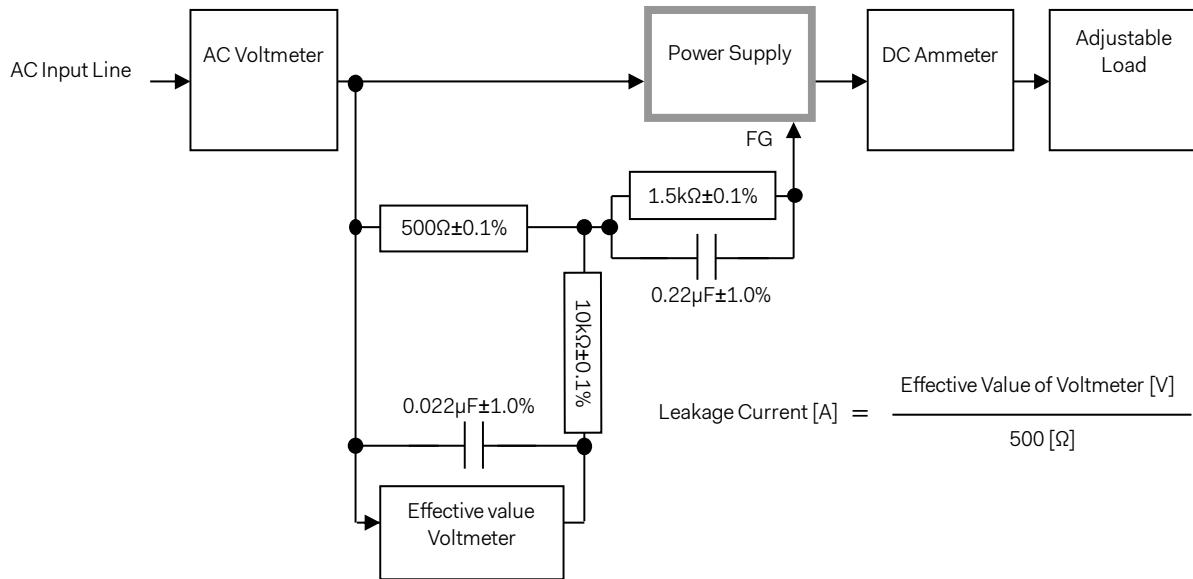


Figure B-1 Leakage current measurement (IEC62368-1, refer to IEC60990 Fig.4)

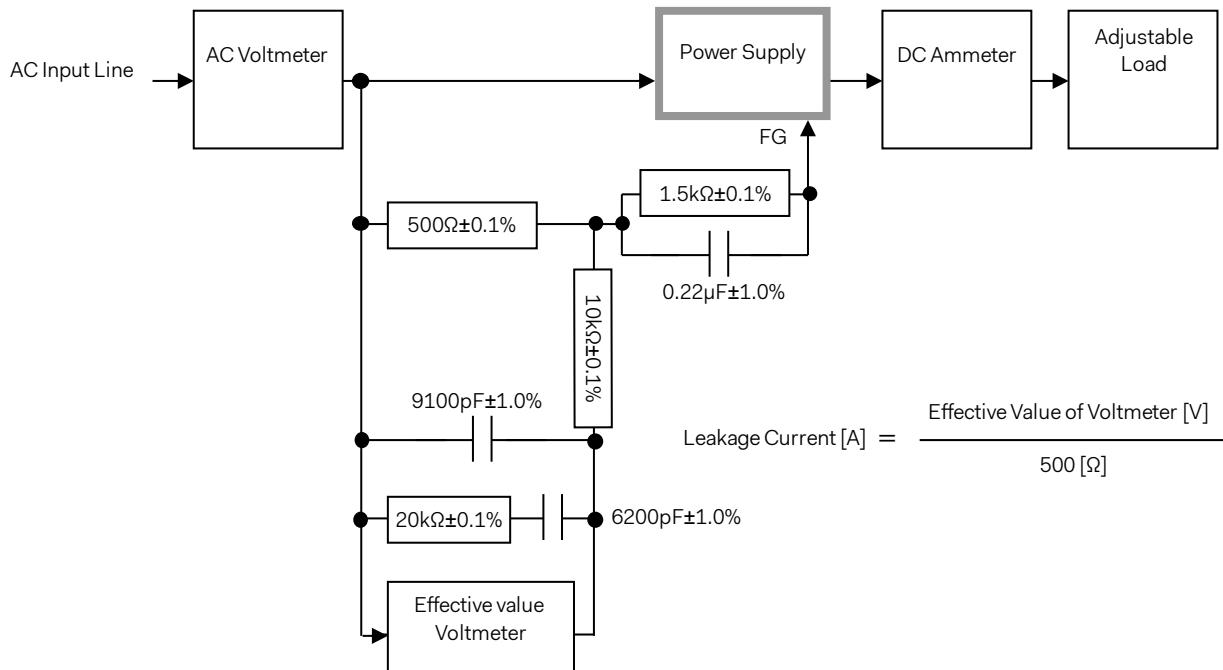


Figure B-2 Leakage current measurement (IEC62368-1, refer to IEC60990 Fig.5)

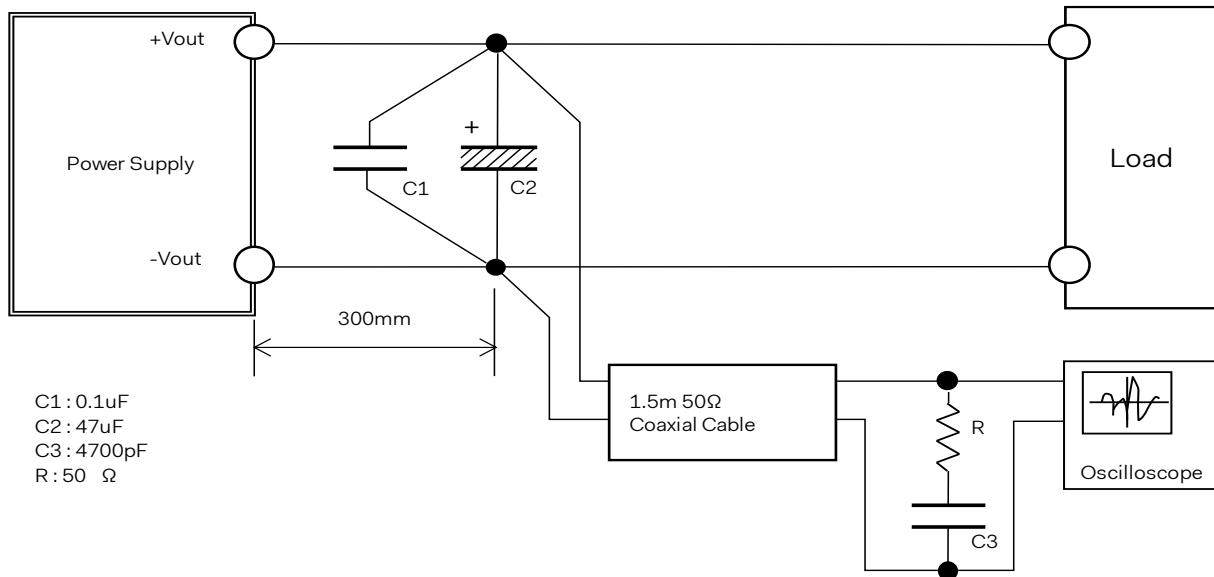


Figure C Ripple voltage measurement (JEITA RC-9131D)

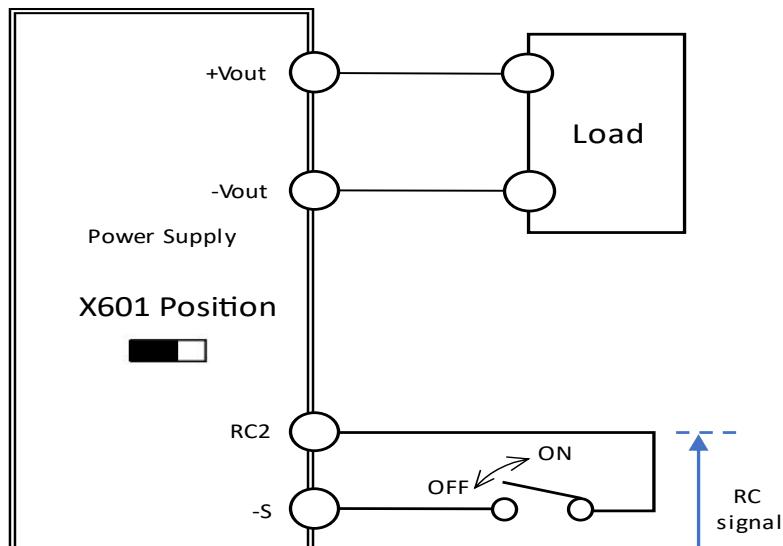


Figure D Turn on by RC measurement