

## **Energy Meter Reference Design**

### **Introduction**

Reference meter, based on 71M6533 meter IC, with SMPS power supply working with 3 phase system 3x230V, 4 wires, possible missing neutral. Base current considered 5Amps.  
According to IEC62052-11, point 7.5 Electromagnetic compatibility (EMC).

### **EMC Lab:**

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### **Tests:**

1. CISPR 22 – Class B
  - a. Conducted Disturbance
  - b. Radiated Disturbance
2. IEC 61000-4-6 (Conducted Immunity)
  - a. 150KHz to 80MHz; 10V
3. IEC 61000-4-3 (RFI)
  - a. 80MHz TO 1000MHz; 1m cable length exposed to the field
    - i. 10V/m with load (Ib);error limit = 2% variation
    - ii. 30V/m without load; maximum accumulation = x
4. IEC 61000-4-4 (EFT)
  - a. 4kV on voltage and current circuits with load
5. IEC 61000-4-2 (ESD)
  - a. 8kV contact discharge
  - b. 15kV air discharge
6. IEC 61000-4-5 (Surge Immunity)
  - a. 4kV

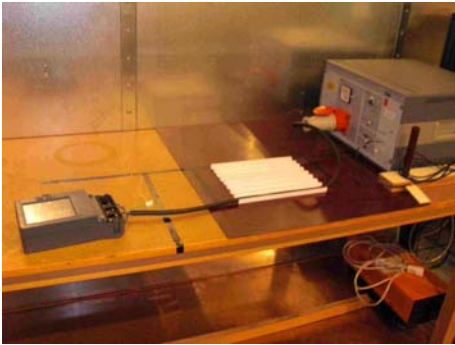
### Extra Lab Equipment:

1. Power Supply and Reference Meter
  - a. Teridian 60659
    - i. BY2083C
    - ii. BY2463-4A

### Test Results:

1. CISPR 22 – Class B
  - a. Passed – Inside Conducted Disturbance limits
    1. Results: 55022.pdf (page 1)
  - b. Passed – Inside Radiated Disturbance limits
    1. Results: 55022.pdf (page 2/3)
2. IEC 61000-4-6
  - a. Passed
    - i. The meter behavior was not perturbed as well as accuracy not disturbed
      1. Test Waveform: 61000-4-6.pdf
3. IEC 61000-4-3
  - a.
    - i. Passed – meter accuracy < 1% from 80Mhz to 1GHz – all faces and polarities
      1. Test Field Monitor: 61000-4-3-10V.pdf
    - ii. Passed – meter increment <1Wh – all faces and polarities
      1. Test Field Monitor: 61000-4-3-30V.pdf
4. IEC 61000-4-4
  - a. Passed – Meter behavior was not perturbed as well as accuracy variation < 1%
    1. Test list: 61000-4-4.pdf
5. IEC 61000-4-2
  - a. Passed – Meter behavior was not perturbed and registers were not modified
  - b. Passed – Meter behavior was not perturbed and registers were not modified
6. IEC 61000-4-5
  - a. Passed – Meter behavior was not perturbed and register were not modified
    1. Pulses list: 61000-4-5.pdf

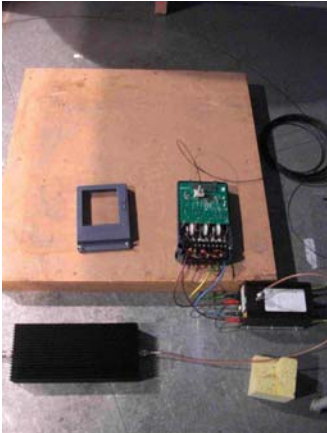
**Test Pictures:**



CISPR 22, conducted disturbances



CISPR 22, radiated disturbances



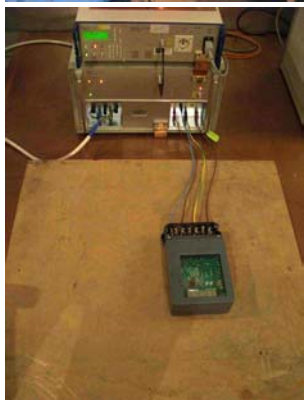
61000-4-6 conducted immunity



61000-4-3 RFI 30V, frontal, vertical polarity



61000-4-3 RFI 10V, left face, vertical polarity, with load



61000-4-4 EFT



61000-4-2 ESD



61000-4-5 Surges

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