EMC Requirement for LED Lighting and Accessories & EMC Facilities in SIRIM

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EMC Definition

- The ability of an equipment to function satisfactorily in its intended environment and does not cause any degradation to other equipment in that environment. (IEV 161-01-07)

- The capability of electrical and electronic systems, equipment, and devices to operate in their intended electromagnetic environment within a defined margin of safety and at design levels or performance without suffering or causing unacceptable degradation as a results of electromagnetic interference (ANSI C64.14)
Mechanisms of EMC
Product classification

- Electrical & Electronic Product
  - Commercial / Consumer Product
    - Product Specification
    - Generic Specification
  - Telecommunication Product
    - Fixed Line
    - Wireless
  - Automotive
    - Component (ESA)
    - Vehicle
RFEMCT SECTION:

Samm Accreditation  
(MS ISO/IEC 17025) / (ISO/IEC17025)  
NO. 299
EMC TEST FOR LIGHTING PRODUCT

- **EMC TEST**
  - **EMISSION**
    1) EN 55015 / CISPR 15
    2) IEC 61000-3-2
    3) IEC 61000-3-3
  - **EMF TEST**
    1) EN 62493
  - **IMMUNITY**
    1) EN 61547:
      - IEC 61000-4-2
      - IEC 61000-4-3
      - IEC 61000-4-4
      - IEC 61000-4-5
      - IEC 61000-4-6
      - IEC 61000-4-8
      - IEC 61000-4-11
REQUIREMENT FOR TRAFFIC CONTROL

EMC TEST

MS 2478

EN 50293

EMISSION

1) EN 55022
   Re & Ce
2) EN 55014-1
   Discontinuous Interference
3) IEC 61000-3-2
4) IEC 61000-3-3

EMF TEST

EN 62493

IMMUNITY

- IEC 61000-4-2
- IEC 61000-4-3
- IEC 61000-4-4
- IEC 61000-4-5
- IEC 61000-4-6
- IEC 61000-4-8
- IEC 61000-4-11
EXAMPLE OF PRODUCT TESTING:

- Energy Saving Bulbs
- Lighting Ballasts
- Lighting Converters
- Fluorescent Tube Starting Devices
- Dimmer switches
- Light Fittings with active components (such as fluorescent fittings)
- Etc..
IEC 62493

- Title: Assessment of lighting equipment related to human exposure to electromagnetic fields
  It simulates the EMF effect measurement of a person near the lighting equipment. The induced current density for frequency range is 20kHz-10MHz using “Van der Hoofden” test-head.
EN 55015 or CISPR 15

• Title: Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment

• Test requirement:

• 1) Insertion Loss

  Applicable to fluorescent lamp luminaries with switch type starter circuits. Measurement are made over the frequency range 150kHz to 1.605MHz using dummy lamps fitted in place of the fluorescent tubes.
EN 55015 or CISPR 15

• 2) Mains Terminal Disturbance Voltage

These tests are applicable to all other luminaries in the 9kHz-30MHz frequency range. Conducted Emission back down the mains lead is measured preferably with a LISN (Line Impedance Stabilization Network).
EN 55015 or CISPR 15

3) Radiated Disturbance Test

a) Frequency range 9kHz to 30MHz

These measurements are performed in a two metre diameter triple loop antenna. The measurements are performed in each of three separate axis (XYZ).
EN 55015 or CISPR 15

b) Frequency range 30MHz to 300MHz
These measurements are performed in 3m Semi Anechoic Chamber.
EN 55015 or CISPR 15

c) Conducted RF Emission Test (30-300MHz)
Alternative test for Radiated Emission using CDN method.
IEC 61000-3-2 and IEC 61000-3-3

- IEC 61000-3-2: Limits for harmonic current emission (Equipment input current ≤16Amp per phase)
- IEC 61000-3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection.
EN 61547

• Title: Equipment for general lighting purposes – EMC immunity requirements

• Test requirement:
  1) IEC 61000-4-2 (ESD) test level:
     - Air Discharge ±8kV
     - Contact Discharge ±4kV
2) IEC 61000-4-3 (Radiated Immunity)
   - Frequency Range: 80MHz to 1000MHz
   - Test Level: 3V/m
   - 1kHz, 80% AM, sine wave
EN 61547

3) IEC 61000-4-4 (Electrical fast transient/burst)
   a) Signal/control lines and d.c ports
      - Test Level: ± 0.5kV
      - Rise time/hold time: 5/50ns
      - Repetition frequency : 5kHz
   
   b) a.c ports
      - Test Level: ± 1kV
      - Rise time/hold time: 5/50ns
      - Repetition frequency : 5kHz
EN 61547

- **4) IEC 61000-4-5 (Surge)**
  - a.c voltage pulses: 5 positive polarity at 90°
  - 5 negative polarity at 270°

1. Self ballasted/semi luminaires
   
   Test Level:
   - Line to line: ± 0.5kV
   - Line to ground: ± 1.0kV

2. Luminaires and independent auxiliaries:
   a) ≤ 25W: Line to line: ± 0.5kV
   - Line to ground: ± 1.0kV
   b) > 25W: Line to line: ± 1.0kV
   - Line to ground: ± 2.0kV
EN 61547

- 5) IEC 61000-4-6 (Conducted Immunity)

  - Frequency Range: 0.15MHz to 80MHz
  - Test Level: 3V r.m.s
  - 1kHz, 80% AM, sine wave
  - Source Impedance: 150Ω
EN 61547

6) IEC 61000-4-8 (Power Frequency Magnetic Field)
   - Field frequency : 50/60Hz
   - Test Level: 3 A/m
EN 61547

7) IEC 61000-4-11

(Voltage Dips, short interruption and voltage variations)

a) Voltage Dips: 
   - Test Voltage Level: 70% - 0%
   - Number of periods: 10 - 0.5

b) Voltage short interruption
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Thank you..