Breakout Session:
Family Grouping
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Overview: Why are you here?

- What are DLC's family grouping rules? How have they evolved?
- What is the Scaled Performance Table and how do I develop a robust Scaled Performance Methodology?
- What is worst case?
- Goal: Develop an understanding of the DLC's family grouping rules and expectations on worst-case performance

Family Grouping Definition

- A family MUST:
  - Contain a single LED package/module/array or standardized set of LED packages/modules/arrays.
  - Overall physical fixture housing and assembly of the products in the family group is both:
    - Of identical material, construction, and shape, and differs only in overall physical dimensions for different models within the product grouping. If the family group differs in overall dimension for different models within the group, each dimensional change will be grouped in a Sub-group.
    - In all other ways, thermally relatable to other fixtures in the family. That is, products can reliably be identified as to which are operating hotter or cooler.
  - Must demonstrate scalability or modularity using identical LED packages/modules/arrays, electronics, optics, heat sinking, and any other applicable features.
- A family MAY:
  - Contain multiple driver variations as well as different LED drive currents achieved by an adjustable driver.
  - Contain variations in fixture mounting systems if mounting systems do not change thermal management characteristics.

Family Grouping Definition

Revisions to Family Grouping

- Previous version of policy did not allow for driver variations
- Broadly, policy restrictions on allowable variations help control for variations that make it more difficult to identify and justify worst case
- DLC understood previous policy may have promoted suboptimal product efficiency due to indirect restrictions on driver loading conditions

Revisions to Family Grouping

- Revision to policy allows for driver variations with the following provisions for identifying worst case:
  - In-house electrical testing must be provided to demonstrate which products (including which driver(s), at which loading condition(s)) result in worst-case product performance for applicable metrics (efficacy, THD, PF)
  - Testing should include input voltage, current, wattage, output voltage, current, wattage, THDi, PF for each loading condition of each driver
  - Spec sheet-level information on driver performance will not be sufficient for worst-case analysis/identification

Revisions to Family Grouping

Quick Links

- Family Grouping Definition
- Family Grouping Testing Requirements
- Family Grouping Testing Guidance
- General Application Instructions
- Application Review Time Frames
- Application Fees
- Completing the Product Family Appli
- Forms

Driver Characteristics

- For each unique driver used within a family group, manufacturers must provide electrical testing for each driver group to demonstrate which driver variation will result in the overall worst case metrics identified under the Independent Test Reports for Family Groups and Sub-groups.
- In general, this testing should include the input voltage, current, and wattage, the output voltage, current, and wattage, and the THDi and PF, for each loading condition of each driver within the family group. This information should be factored into the scaled performance methodology and identification of "worst case" efficacy and power quality.
- In house testing is allowed.

Scaled Performance Table: Overview

- Located on the second tab of the Application Form

- Provides performance overview of the products submitted

- Documents additional details for each product in the application (driver, base type, dimming, controls, etc.)

- Used by review staff to calculate application fees

Scaled Performance Table: Importance

- Understanding product family
  - Expected performance
  - Worst-case models
- Fee calculation
  - Independent test reports for worst-case models
  - Multiple Primary Use designations
  - Premium classification fees
- Performance information used as rated data on QPL

Completing the Scaled Performance Table

- Read the provided instructions
- Complete every applicable column in the table
  - Everything is asked for a reason
- Make sure that every model you wish to submit is included in the Scaled Performance table
  - Models not included in the table will not be included in the review
- The more information you provide, the better
- Please contact us with any questions you have about the Scaled Performance Table

Scaled Performance Methodology

- Identify key variations and how they affect product performance
- Determine the worst-case models
- Conduct preliminary testing to understand product performance
- Develop methodology that can be applied to non-tested members in the product family
- Be able to explain/support your scaling methodology

Draft Rated Data Policy out for comment!

Worst Case

- What is "worst case"?
  - Worst-performing conditions for a given metric
- Importance
  - Most DLC metrics are minimum requirements; need to ensure worst case meets requirements to determine if better-performing products also meet them without additional test data

Worst Case: Single Product Applications

- Key variables that affect Single Product Applications
  - CCT
  - Input voltage
- DLC has expectations on worst case performance, but *expectations are NOT rules*!
- Understand your products; justify worst case

Worst Case: Family Grouping Applications

- What does DLC evaluate in terms of "worst case"?
    - Light output
    - Efficacy
    - Thermals (LED and driver)
    - Driver variations
    - Power quality
    - Minimum CRI

Worst Case: Light Output

- Product variables that affect light output
  - Number of LEDs (fewer is worse)
  - Drive current (lower is worse)
  - CCT (lower is worse)
  - Optical efficiencies (dependent on optical design)
  - Color Rendering Index (CRI) (higher is worse)
  - Thermal conditions (hotter is worse)

Worst Case: Efficacy

- Product variables that affect efficacy
  - CCT (lower is worse)
  - Thermal conditions (hotter is worse)
  - Optical efficiencies (depends on optical efficiency)
  - Drive current (high is worse)
  - Loading conditions (lower is worse)
  - CRI (higher is worse)

Worst Case: Thermals

- Product variables that affect thermals
  - Number of LEDs (higher is worse)
  - Housing size (smaller is worse)
  - Drive current (higher is worse)
  - CCT (lower is worse)
  - CRI (higher is worse)
  - Optical efficiencies (depends on optical efficiency)
  - Proximity of other heat sources (closer is worse)

Worst Case: Family Grouping Applications

- What does DLC evaluate as "representative" performance?
  - CCT
  - Zonal lumen distribution

Overview

- Understand the Family Grouping definition
- The Scaled Performance Table and Scaled Performance Methodology are crucial to Family Grouping applications
- Understand your product's performance and be able to justify worst case!
- Ask questions before submitting

Thank You!

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