



iQ-Luminance

User Manual

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- I INTRODUCTION 3
- II PRECONDITIONS 3
 - 2.1 Camera Calibration 3
 - 2.2 System Requirements 3
- III GRAPHICAL USER INTERFACE 4
 - 3.1 Control Area 5
 - 3.2 Image Area / Toolbox 7
 - 3.3 Result Area 11
- IV TRADEMARK AND COPYRIGHT 12





I INTRODUCTION

The iQ-Luminance software calculates luminance values from the image data taken with a calibrated camera. The obligatory camera calibration provides the knowledge, how the raw RGB data from the camera are mapped to the luminance considering various exposure settings. Rectangular, elliptical, circular or polygonal Regions Of Interest (ROI) can be drawn on the image in order to evaluate the selected area. The corresponding luminance is displayed as a grayscale or false color image.

II PRECONDITIONS

2.1 Camera Calibration

The obligatory camera calibration provides the knowledge, how the raw RGB data from the camera are mapped to the luminance considering various exposure settings. This camera- and lens-specific calibration is performed in our iQ-Lab.

IMPORTANT:

**THE CALIBRATION IS AN INDISPENSABLE PROCEDURE IN ORDER TO USE THE CAMERA WITH IQ-LUMINANCE.
PLEASE NOTE THAT THE CALIBRATION PROCEDURE CHANGED AND YOU MIGHT NOT BE ABLE TO USE OLD
(BEFORE 08/16 OR V2.2.2) CALIBRATION FILES WITH THE CURRENT VERSION.**

The camera calibration requires two measurements:

- Opto-electronical conversion function (OECF)
- Spectral response (SR)
- **Optional:** Shading correction (since v2.2.0)

2.2 System Requirements

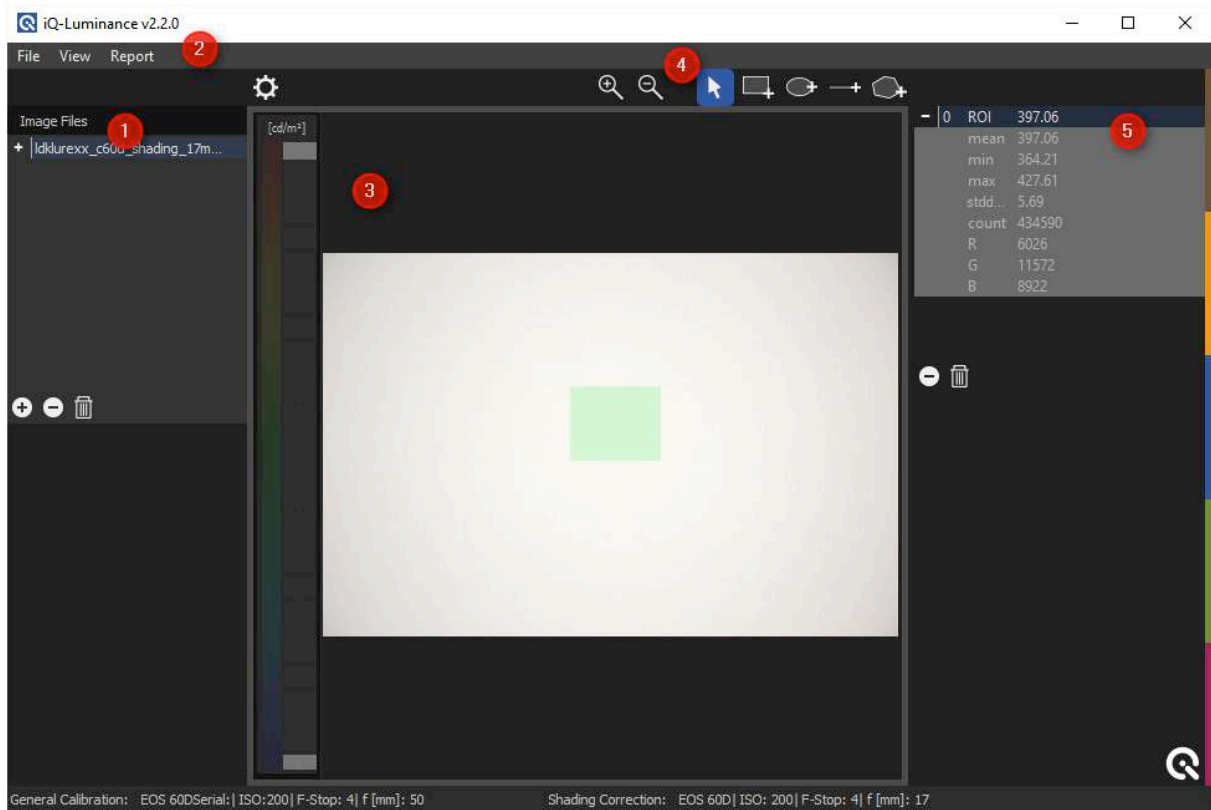
Operating System	Windows 7 64bit (or newer)
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III GRAPHICAL USER INTERFACE

The iQ-Luminance software is divided into three operation areas:



1. Control area

- Manage images for measurement in a file list.

2. Menu Bar

- File → Open/Close image files
- View → Switch between three different image views
- Report → Edit Report / Export Report
- Scale → Switch between logarithmic or linear scale / reset scale / clone scale

View and **Report** is visible if an image is loaded.

Scale is visible if an image is loaded and a luminance view is active.

3. Image

- Displays the current image.
- Displays a color coded luminance image with color bar.
- ROIs can be drawn directly on the image.

4. Image Toolbox

- Contains measurement (Rectangle ROI, Ellipse ROI, Line, Polygon ROI)
- and display tools (zoom in / out)

5. Results Area

- Displays and manages measurements of selected areas.

Image area and **Results area** are visible if an image is loaded.





3.1 Control Area

Manage images

The iQ-Luminance software only supports the usage of RAW image files.

IMPORTANT:

Previous versions also allowed the usage of JPG files, but due to bad results current version should only be used with RAW images.

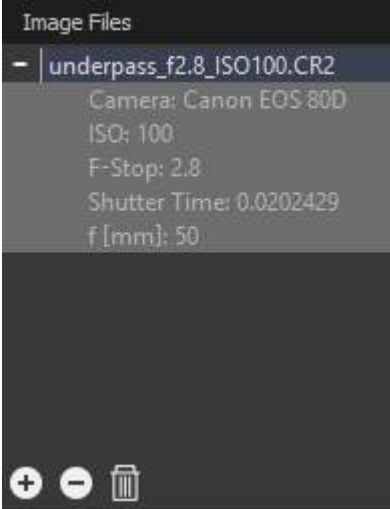


Image Files

- underpass_f2.8_ISO100.CR2
 - Camera: Canon EOS 80D
 - ISO: 100
 - F-Stop: 2.8
 - Shutter Time: 0.0202429
 - f [mm]: 50

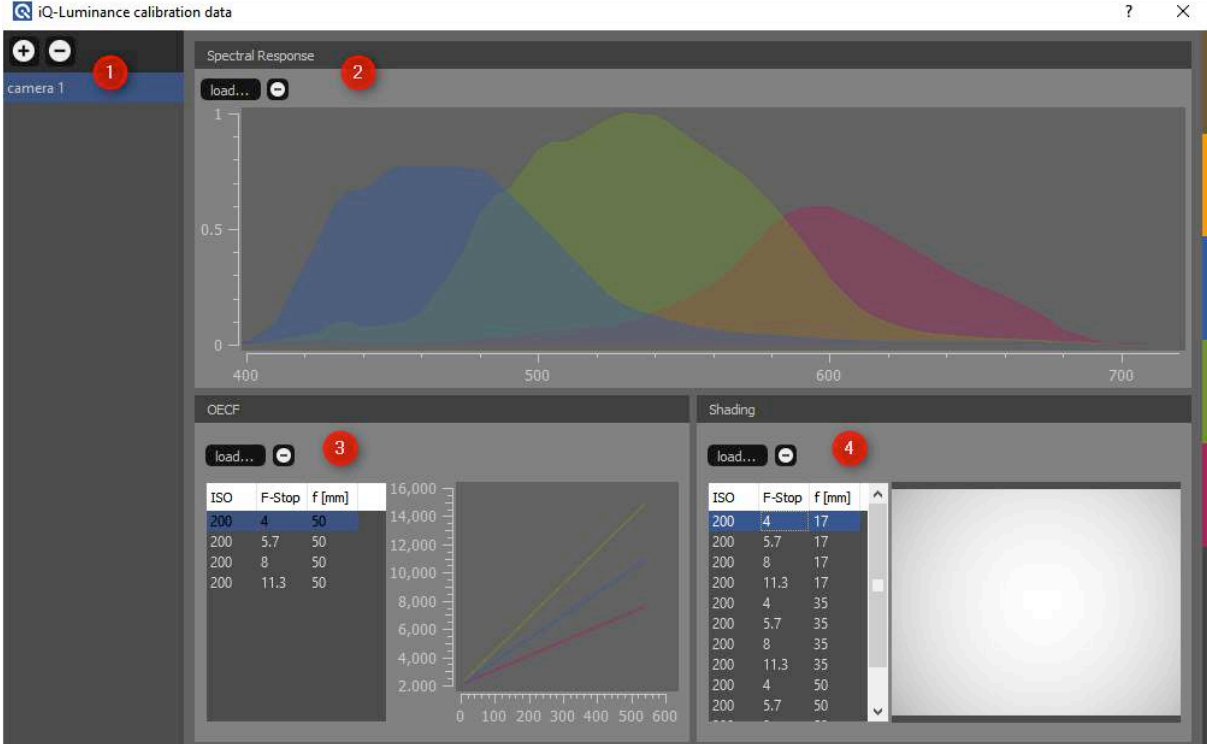
Controls: +, -, trash icon

- + Add image files to a list
- Remove selected image files from the list
- trash icon Clear list
- +/- Show/Hide additional meta-information of the image

Load calibration data

The camera- and lens-specific calibration is performed in our iQ-Lab. The software is delivered with calibration text files that can be loaded in the calibration data screen:

File → Calibration Data...



iQ-Luminance calibration data

camera 1

Spectral Response

load... -

OECF

ISO	F-Stop	f [mm]
200	4	50
200	5.7	50
200	8	50
200	11.3	50

Shading

ISO	F-Stop	f [mm]
200	4	17
200	5.7	17
200	8	17
200	11.3	17
200	4	35
200	5.7	35
200	8	35
200	11.3	35
200	4	50
200	5.7	50





1. Add (+) or remove (-) a set of calibration data (e.g. for one camera lens combination)
You can rename your sets using a double click.
Select a set of calibration data by clicking on the specific entry.
The currently active set that is displayed on the right side and that is used by the software is highlighted with a blue background color.
2. Spectral response (SR)
Load or remove (-) the spectral response calibration file (usually *_camspecs_*.txt)
3. Opto-electronical conversion function (OECF)
Load or remove one or more OECF calibration files (usually *_oecf20_*.txt)
4. Shading data (**optional**)
Load one or more shading correction calibration files (usually *_shading_*.txt)

If you select more than one oecf and/or shading calibration file, the software will select the suited calibration files based on the exposure of the loaded image (ISO, F-Stop, f [mm]).

Your calibration data will be saved and available after loading the *.txt files.





3.2 Image Area / Toolbox

After loading and selecting an image, it is displayed in the **image area**. Furthermore the **toolbox** (above image) and the **result area** (right beside the image) are displayed.

The toolbox contains tools to select ROIs for the measurement as well as some options for displaying the image.



Select A ROI

iQ-Luminance offers four different shapes when selecting a region of interest:



Rectangular ROI



Elliptical ROI



Arbitrary line

After choosing one of the above tools the ROI is created by dragging a rectangle on the image while pressing and holding the mouse button down.



Polygonal ROI

The polygon is created by clicking into the image. Each click sets a point of the polygon. You can set 3 ... n points.



After setting the points you have to confirm



or cancel the polygon.

Please note: While you are in Polygon Mode most of the GUI will be disabled until you confirm or cancel.

Multiple ROIs may be created, which are managed in the result area. The ROIs can be moved and re-shaped afterwards.

Zoom in / out



Zoom in: You can zoom to a specific area by pressing and holding the mouse button while dragging a rectangle on the image.



Zoom out: Displays the entire image.

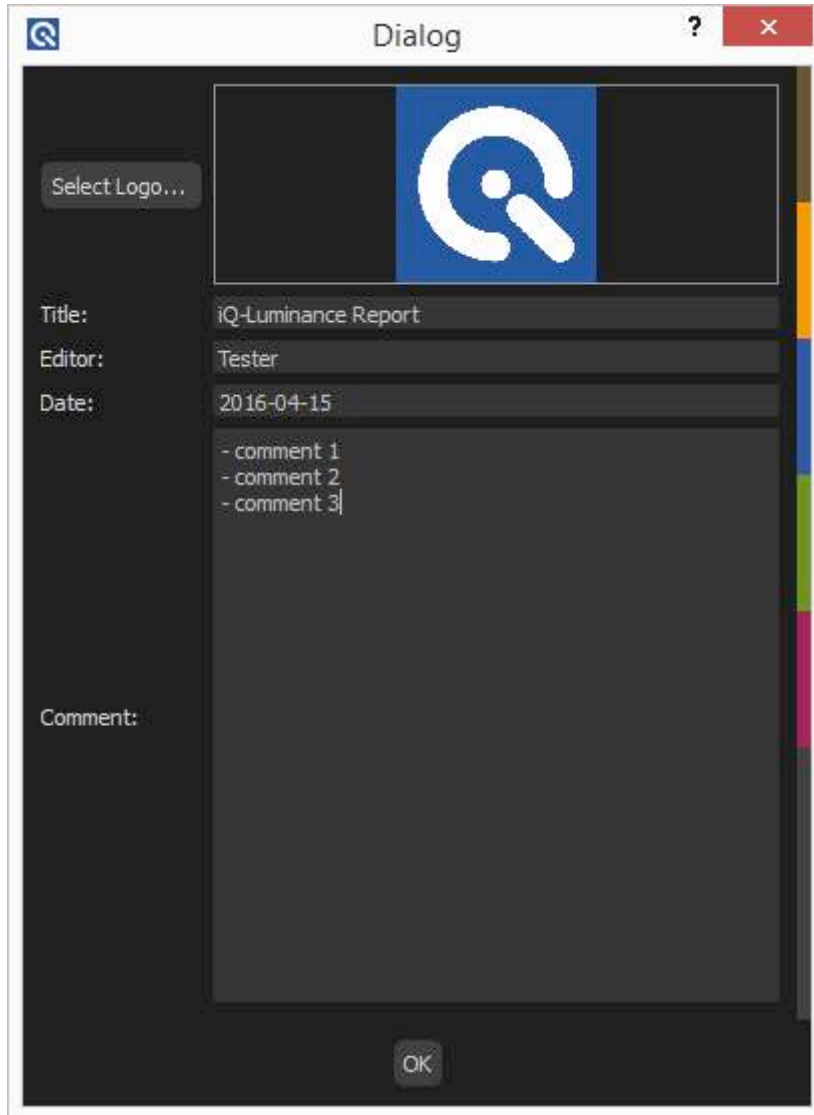




Configure PDF Report

You can add your own logo, title, editor and date to the PDF Export.
You can open the relevant dialog in the menu bar:

Report → Configure...





Change the display mode

The iQ-Luminance software offers three different display modes found in the menu bar:

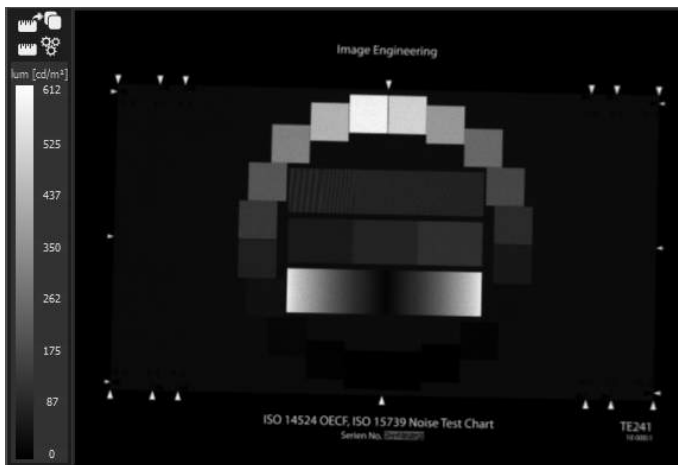
View → Original RGB

View → Luminance (B/W)

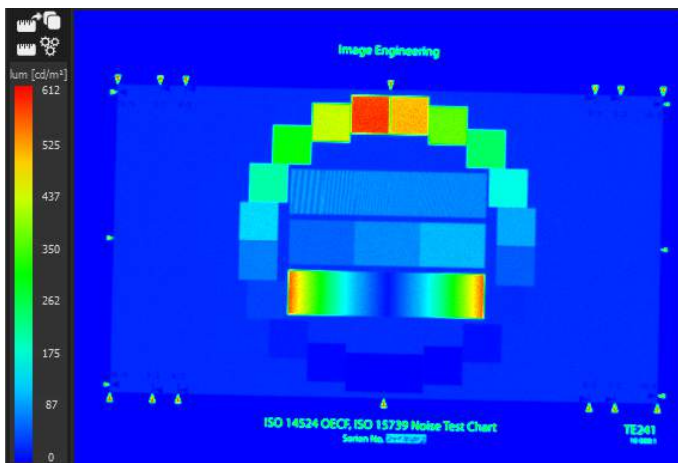
View → Luminance (Color)

Luminance (B/W) and **Luminance (color)** means that the measured luminance values in the image are displayed using grayscale or false colors with corresponding luminance values in candela per square meter.

A color bar on the left side beside the image indicates the correlation between color/gray values in the image and luminance values.



Luminance grayscale display



Luminance false color display





Scaling the luminance value range

It is possible to change the correlation between color and luminance values.

Denotation of false colors / grayscale values:

Red (false color) / white (grayscale) means a high luminance value.

Blue (false color) / black (grayscale) means a low luminance value.

When loading an image the maximum and minimum luminance values in the image are calculated and used as limits for this scaling.

The scaling can be changed by entering new values in the fields for the minimum and maximum value.



Changing the limits for luminance scale.

You can apply the scaling of the current image to all opened images in the menu bar:

Scale → Apply Range To All Open Images

Scale → Reset Range resets the limits of the current image to maximum and minimum luminance values of the image.

Logarithmic Scaling

You can switch to logarithmic scaling in the menu bar:

Scale → Logarithmic Scale

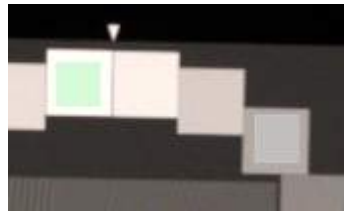




3.3 Result Area

Every ROI created in the image appears in the results list along with the measured luminance value.

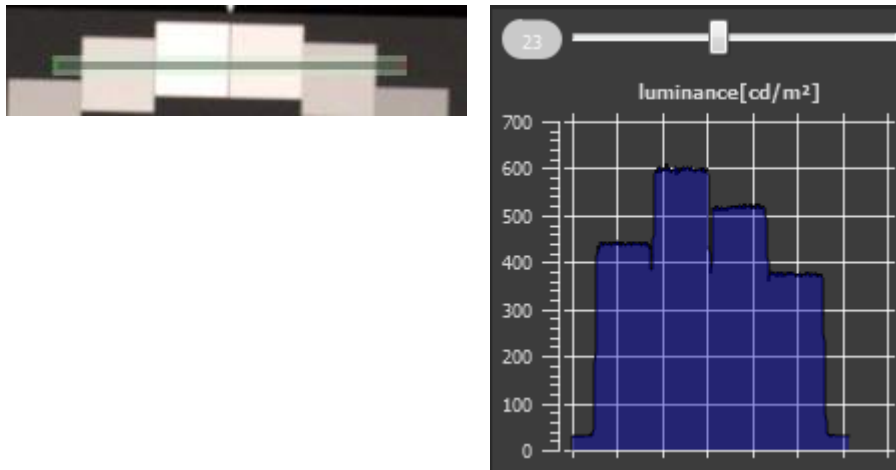
ID	Type	Luminance[cd/m ²]
+ 0	roi	579.78
+ 1	roi	248.87



The currently selected ROI is highlighted in both the image and the result list. Toggling the selection in the list activates the corresponding ROI in the image.

Profile Plot

The line selection is used to evaluate a luminance distribution along a line with variable width. The luminance values along this line are plotted in a chart:



The slider above the plot changes the width of the line.





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(www.cybercom.net/~dcoffin/dcraw/)

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