

EMVA 1288 Report Summary Cover Page

Package includes all associated EMVA Report Summaries valid for the following Phantom camera models

KT-1640, KT-1240

Refer to the report corresponding with your camera configuration:

- Monochrome models, Standard mode: PDF pages 2-3
- Monochrome models, Binned mode: PDF pages 4-5
- Color models, Standard mode: PDF pages 6-9

Each report summary was generated by Vision Research in accordance with the EMVA 1288 4.0 standard.

For more information on EMVA 1288 image measurements visit:
www.phantomhighspeed.com/emva

EMVA 1288 Data Sheet m0450

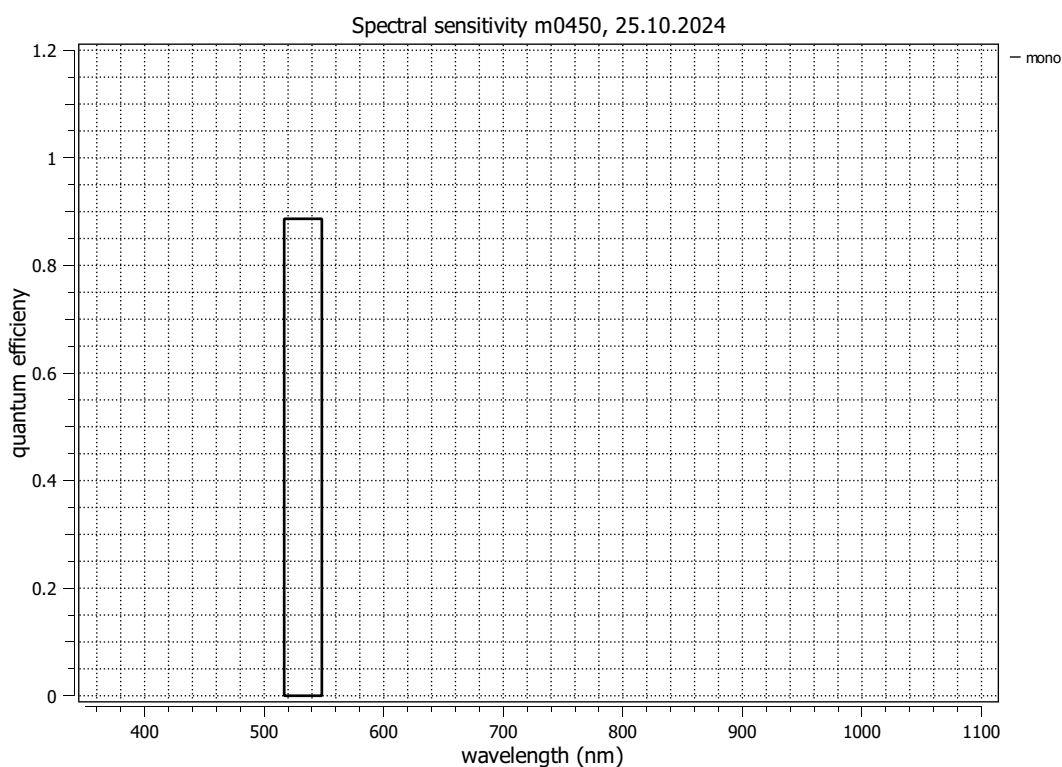
This data sheet describes the specification according to the standard 1288 Release 4.0 Linear issued on 21 June 2021 for "Characterization and Presentation of Specification Data for Image Sensors and Cameras" by the European Machine Vision Association (EMVA), published at <https://www.emva.org/standards-technology/emva-1288/> with proprietary extensions from AEON. The measurements were performed with the AEON ACC2b RGB-IR, Release 9, 31.10.2023, SN 0032(AMETEK), software version 2.0.

Measurements performed by Vision Research.

Type of data presented	Single
Vendor	Vision Research
Model	Phantom KT-1640
Serial number	567
Sensor diagonal	28.30 mm
Lens category	F-Mount
Resolution	2560 × 1664, 12 bit
Offset/Size used	0 × 0/ 2560 × 1664
Pixel size (h×v)	9.27 μm × 9.27 μm
Sensor	Vision Research Proprietary
Sensor type	CMOS
Shutter type	Global
Overlap cap.	Overlapping
Max. frame rate	3766.0 Hz
Interface type	Ethernet

Nr.	Centroid/FWHM	Gain, blacklevel	t_{exp} (ms)
1	532.5/31.5 nm	1 / 0.4%	0.0500

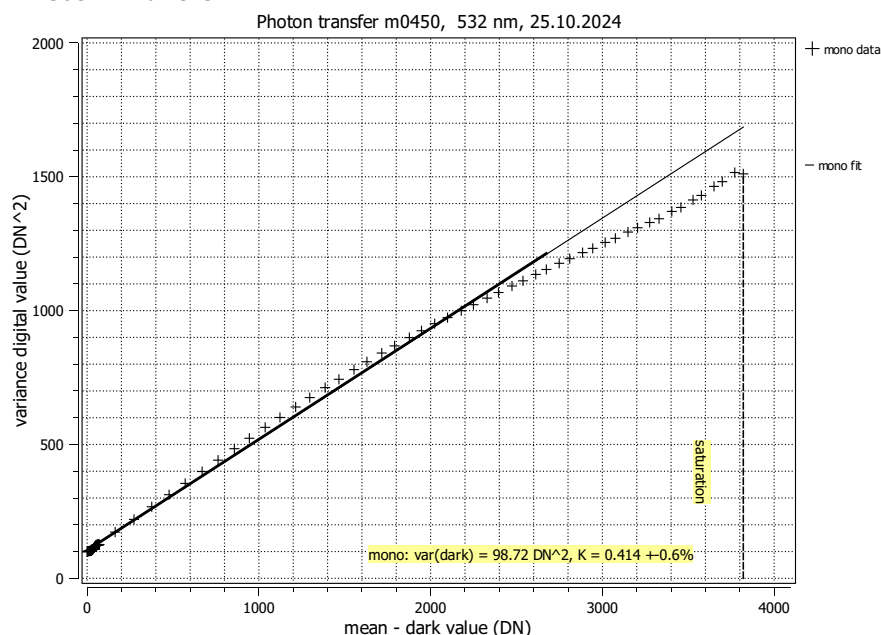
Optional data measured: None



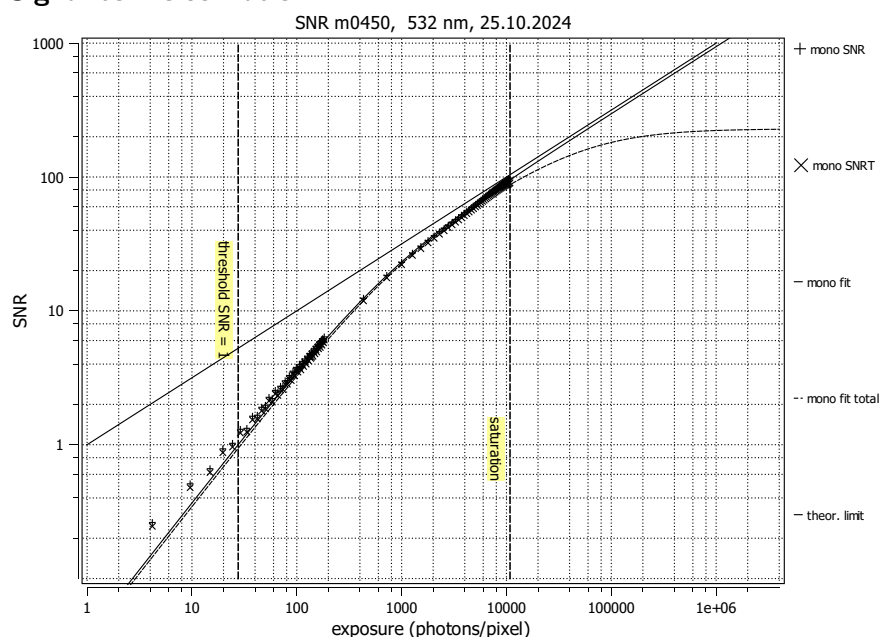
Summary Sheet for Operation Point 1 at a Wavelength of 533 nm

Type of data	Single	Gain, black-level	1 / 0.4%
Exposure control	By irradiance	Environmental temperature	24.9°C
Exposure time	50.000 us	Camera body temperature	37.1°C
Frame rate	1000.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono 12	Wavelength, centr., FWHM	533 nm, 31.5 nm

Photon Transfer



Signal-to-Noise Ratio



Quantum efficiency

η 88.7%

Overall system gain

K 0.4143 DN/e⁻

$1/K$ 2.414 e⁻/DN

Temporal dark noise

σ_d 24.0 e⁻

$\sigma_{y,\text{dark}}$ 9.94 DN

Signal-to-noise ratio

SNR_{max} 97.9

39.8 dB

$1/\text{SNR}_{\text{max}}$ 1.021 %

Absolute sensitivity threshold

$\mu_{e,\text{min}}$ 24.5 e⁻

$\mu_{e,\text{min},\text{area}}$ 0.285 e⁻/μm²

Saturation capacity

$\mu_{e,\text{sat}}$ 9588 e⁻

$\mu_{e,\text{sat},\text{area}}$ 112 e⁻/μm²

Dynamic range

DR 392

51.86 dB

Spatial nonuniformities

DSNU₁₂₈₈ 8.94 e⁻

DSNU_{1288.col} 0.18 e⁻

DSNU_{1288.row} 0.27 e⁻

DSNU_{1288.pix} 8.94 e⁻

PRNU₁₂₈₈ 0.437 %

PRNU_{1288.col} 0.111 %

PRNU_{1288.row} 0.149 %

PRNU_{1288.pix} 0.395 %

Linearity error

LE 1.12%

Dark current

$\mu_{c,\text{mean}}$ 32673 e⁻/s

$\mu_{c,\text{var}}$ 30179 e⁻/s

EMVA 1288 Data Sheet m0447

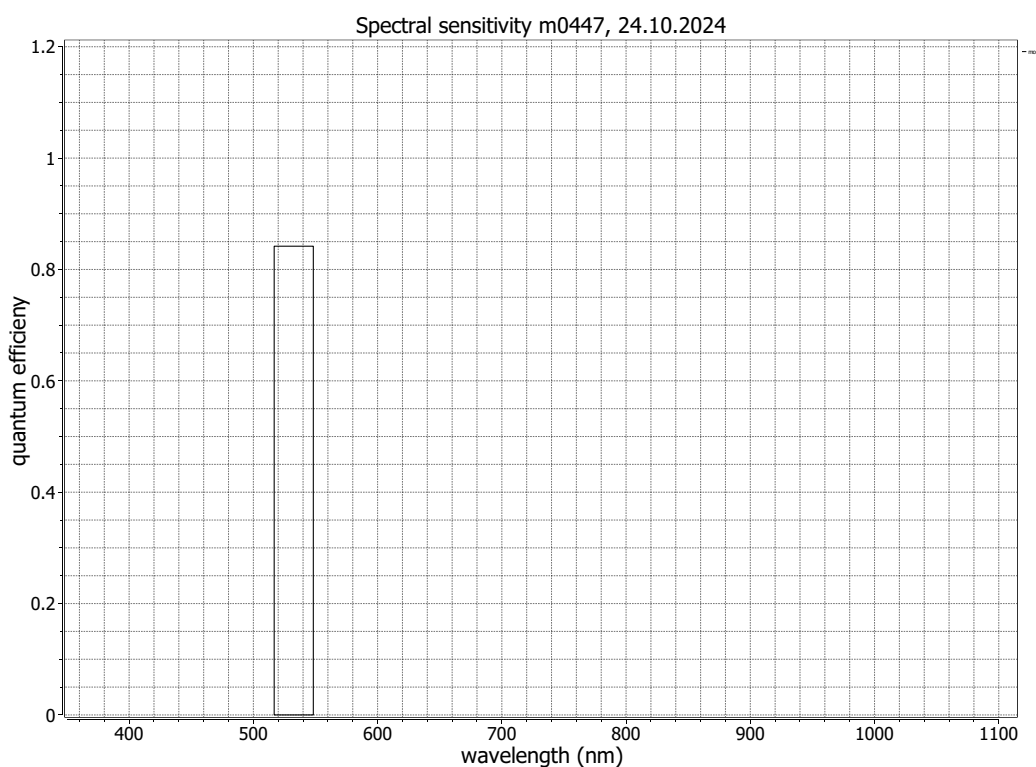
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Measurements performed by Vision Research.

Type of data presented	Single
Vendor	Vision Research
Model	Phantom KT-1640
Serial number	567
Sensor diagonal	28.30 mm
Lens category	F-Mount
Resolution	1280 × 832, 12 bit
Offset/Size used	0 × 0/ 1280 × 832
Pixel size (h×v)	18.54 μm × 18.54 μm
Sensor	Vision Research Proprietary
Sensor type	CMOS
Shutter type	Global
Overlap cap.	Overlapping
Max. frame rate	15037.0 Hz
Interface type	Ethernet

Nr.	Centroid/FWHM	Gain, blacklevel	t_{exp} (ms)
1	532.5/31.5 nm	1 / 0.4%	0.0500

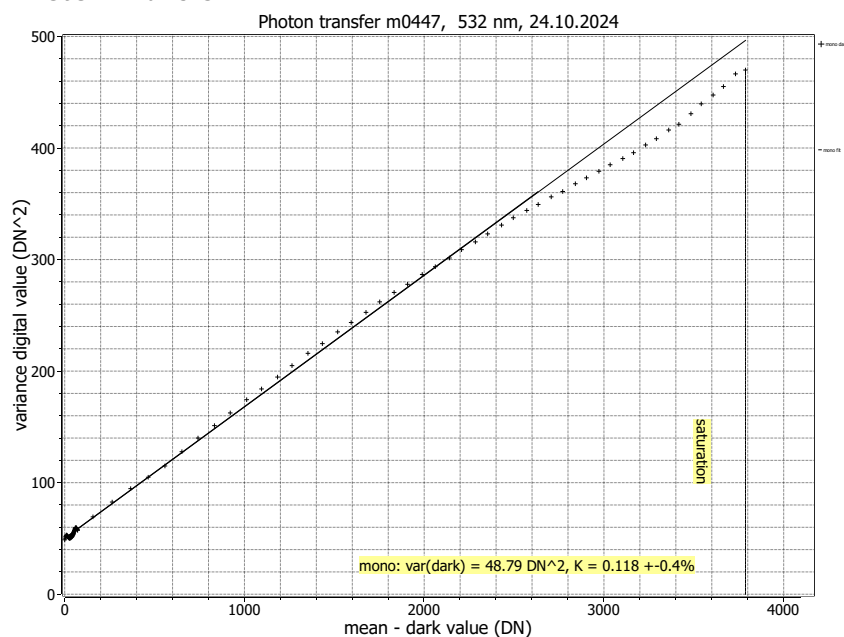
Optional data measured: None



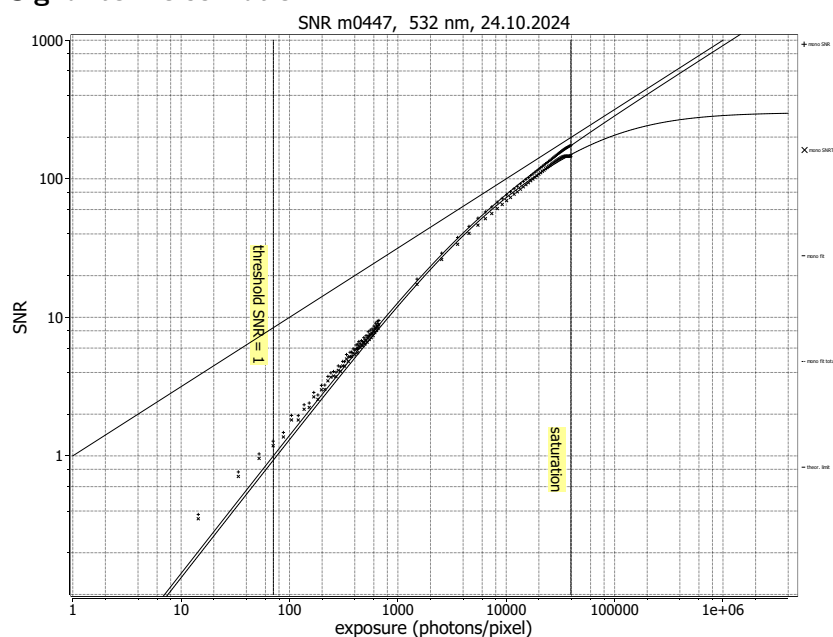
Summary Sheet for Operation Point 1 at a Wavelength of 533 nm

Type of data	Single	Gain, black-level	1 / 0.4%
Exposure control	By irradiance	Environmental temperature	26.3°C
Exposure time	50.000 us	Camera body temperature	38.4°C
Frame rate	1000.0 Hz	Internal temperature(s)	—
Data transfer mode	Mono 12 (Binning)	Wavelength, centr., FWHM	533 nm, 31.5 nm

Photon Transfer



Signal-to-Noise Ratio



Quantum efficiency

η 84.2%

Overall system gain

K 0.1179 DN/e⁻

$1/K$ 8.484 e⁻/DN

Temporal dark noise

σ_d 59.2 e⁻

$\sigma_{y,\text{dark}}$ 6.99 DN

Signal-to-noise ratio

SNR_{max} 182.3

45.2 dB

$1/\text{SNR}_{\text{max}}$ 0.549 %

Absolute sensitivity threshold

$\mu_{e,\text{min}}$ 59.8 e⁻

$\mu_{e,\text{min},\text{area}}$ 0.174 e⁻/μm²

Saturation capacity

$\mu_{e,\text{sat}}$ 33225 e⁻

$\mu_{e,\text{sat},\text{area}}$ 97 e⁻/μm²

Dynamic range

DR 556

54.90 dB

Spatial nonuniformities

DSNU₁₂₈₈ 23.2 e⁻

DSNU_{1288.col} 0.3 e⁻

DSNU_{1288.row} 0.6 e⁻

DSNU_{1288.pix} 23.2 e⁻

PRNU₁₂₈₈ 0.332 %

PRNU_{1288.col} 0.092 %

PRNU_{1288.row} 0.167 %

PRNU_{1288.pix} 0.272 %

Linearity error

LE 0.94%

Dark current

$\mu_{c,\text{mean}}$ 130191 e⁻/s

$\mu_{c,\text{var}}$ 121470 e⁻/s

EMVA 1288 Data Sheet m0438

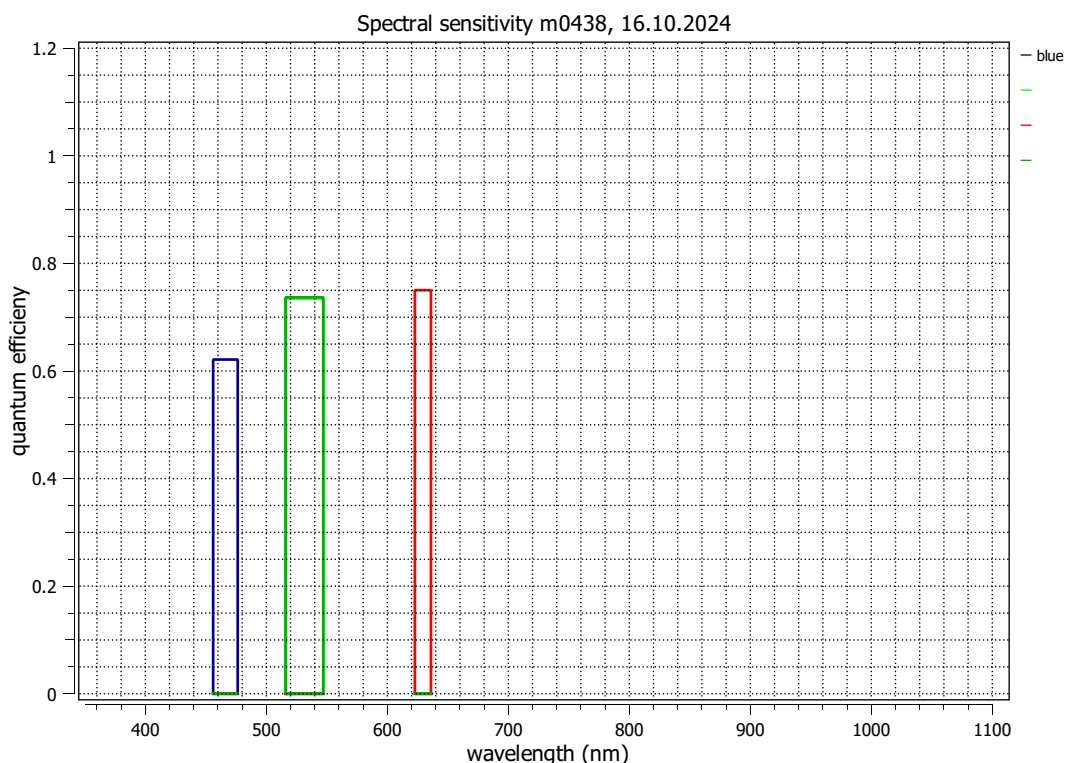
This data sheet describes the specification according to the standard 1288 Release 4.0 Linear issued on 21 June 2021 for "Characterization and Presentation of Specification Data for Image Sensors and Cameras" by the European Machine Vision Association (EMVA), published at <https://www.emva.org/standards-technology/emva-1288/> with proprietary extensions from AEON. The measurements were performed with the AEON ACC2b RGB-IR, Release 9, 31.10.2023, SN 0032(AMETEK), software version 2.0.

Measurements performed by Vision Research.

Type of data presented	Single
Vendor	Vision Research
Model	Phantom KT-1640
Serial number	570
Sensor diagonal	28.30 mm
Lens category	F-Mount
Resolution	2560 × 1664, 12 bit
Offset/Size used	0 × 0/ 2560 × 1664
Pixel size (h×v)	9.27 μm × 9.27 μm
Sensor	Vision Research Proprietary
Sensor type	CMOS
Shutter type	Global
Overlap cap.	Overlapping
Max. frame rate	3766.0 Hz
Interface type	Ethernet

Nr.	Centroid/FWHM	Gain, blacklevel	t_{exp} (ms)
1	466.2/20.3 nm	1 / 0.4%	0.0500
2	531.5/31.2 nm	1 / 0.4%	0.0500
3	629.4/13.3 nm	1 / 0.4%	0.0500

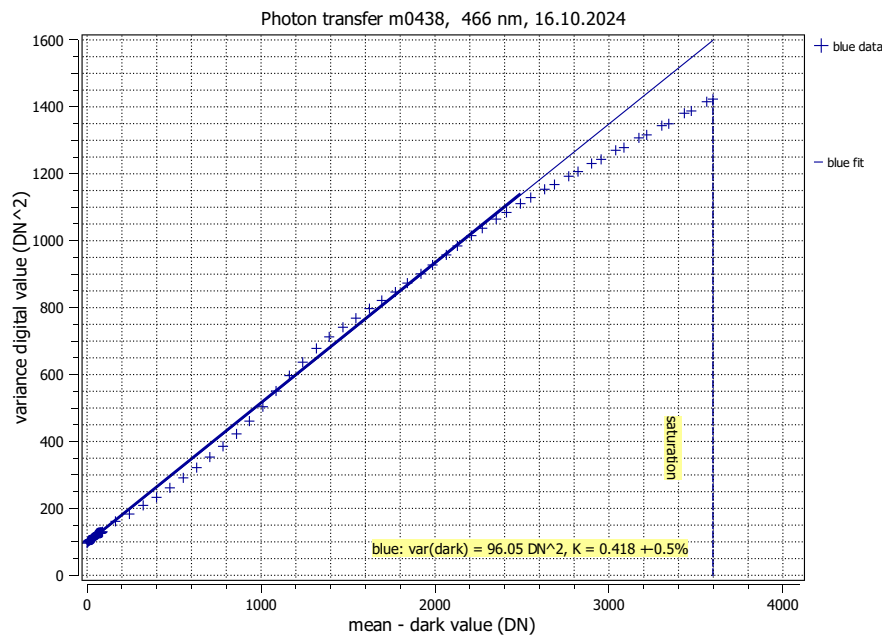
Optional data measured: None



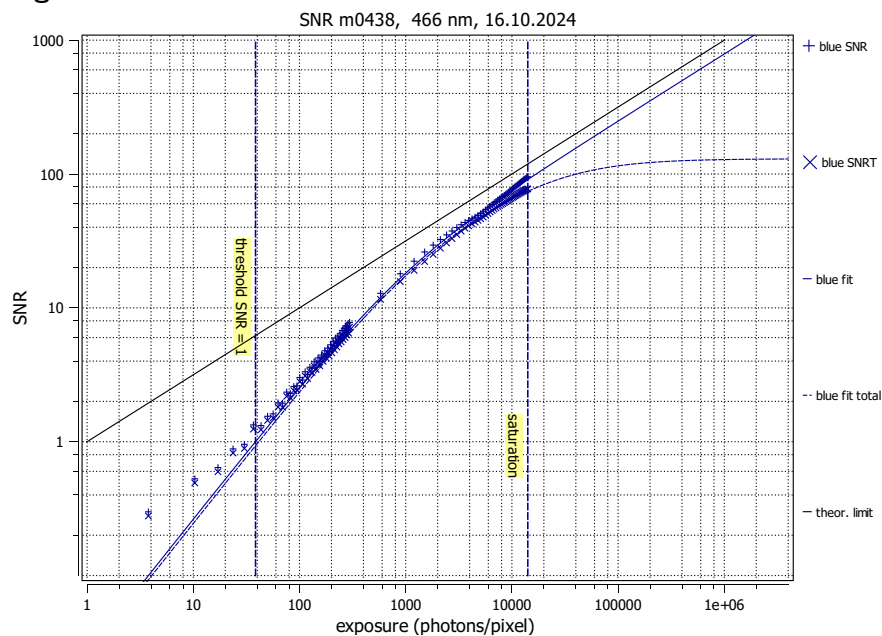
Summary Sheet for Operation Point 1 at a Wavelength of 466 nm

Type of data	Single	Gain, black-level	1 / 0.4%
Exposure control	By irradiance	Environmental temperature	27.2°C
Exposure time	50.000 us	Camera body temperature	26.0°C
Frame rate	1000.0 Hz	Internal temperature(s)	—
Data transfer mode	Color 12	Wavelength, centr., FWHM	466 nm, 20.3 nm

Photon Transfer



Signal-to-Noise Ratio



Quantum efficiency

η 62.1%

Overall system gain

K 0.4181 DN/e⁻

$1/K$ 2.392 e⁻/DN

Temporal dark noise

σ_d 23.4 e⁻

$\sigma_{y,\text{dark}}$ 9.80 DN

Signal-to-noise ratio

SNR_{max} 93.7

39.4 dB

$1/\text{SNR}_{\text{max}}$ 1.068 %

Absolute sensitivity threshold

$\mu_{e,\text{min}}$ 23.9 e⁻

$\mu_{e,\text{min},\text{area}}$ 0.279 e⁻/μm²

Saturation capacity

$\mu_{e,\text{sat}}$ 8772 e⁻

$\mu_{e,\text{sat},\text{area}}$ 102 e⁻/μm²

Dynamic range

DR 366

51.28 dB

Spatial nonuniformities

DSNU₁₂₈₈ 9.32 e⁻

DSNU_{1288.col} 0.37 e⁻

DSNU_{1288.row} 0.88 e⁻

DSNU_{1288.pix} 9.27 e⁻

PRNU₁₂₈₈ 0.770 %

PRNU_{1288.col} 0.242 %

PRNU_{1288.row} 0.286 %

PRNU_{1288.pix} 0.672 %

Linearity error

LE 0.54%

Dark current

$\mu_{c,\text{mean}}$ 33747 e⁻/s

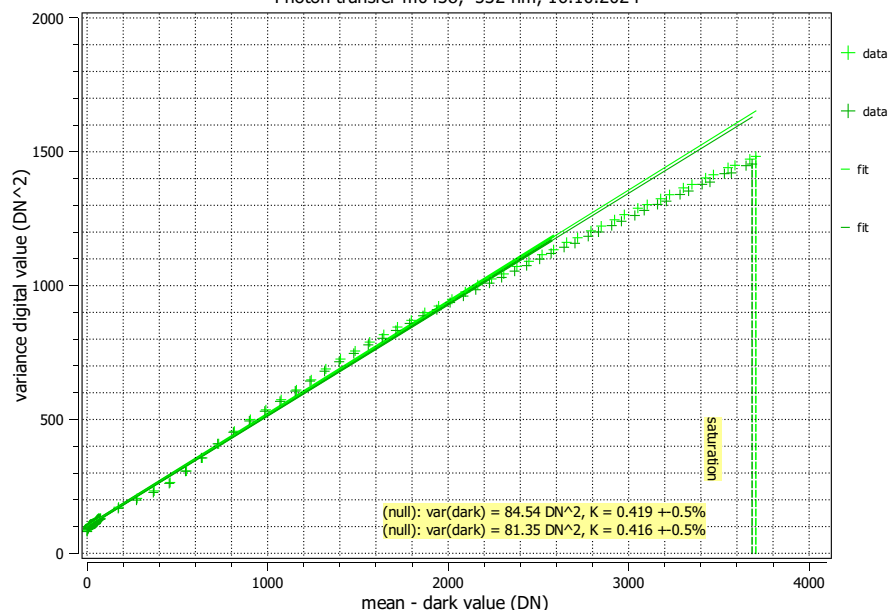
$\mu_{c,\text{var}}$ 35981 e⁻/s

Summary Sheet for Operation Point 2 at a Wavelength of 532 nm

Type of data	Single	Gain, black-level	1 / 0.4%
Exposure control	By irradiance	Environmental temperature	27.1°C
Exposure time	50.000 us	Camera body temperature	26.0°C
Frame rate	1000.0 Hz	Internal temperature(s)	—
Data transfer mode	Color 12	Wavelength, centr., FWHM	532 nm, 31.2 nm

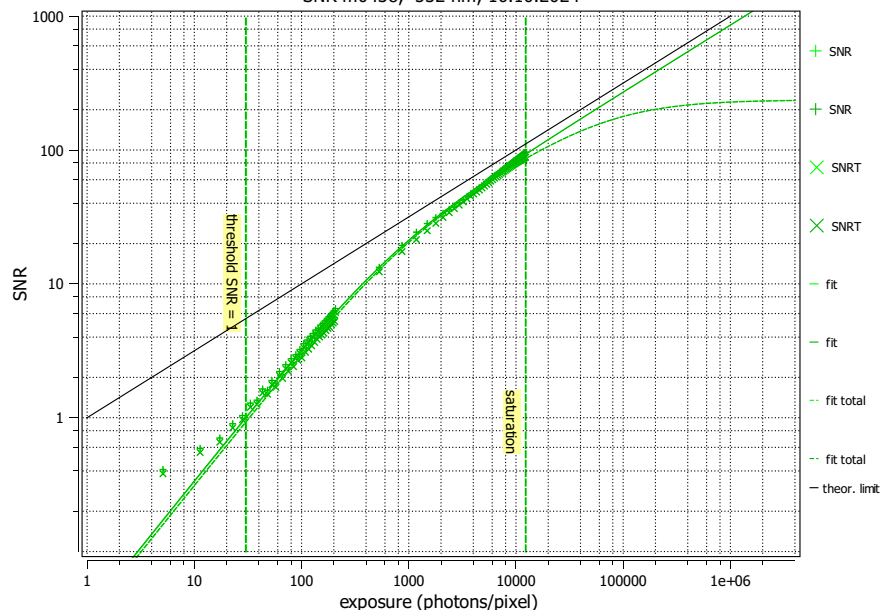
Photon Transfer

Photon transfer m0438, 532 nm, 16.10.2024



Signal-to-Noise Ratio

SNR m0438, 532 nm, 16.10.2024



Quantum efficiency

η 73.5%

Overall system gain

K 0.4192 DN/e⁻

$1/K$ 2.386 e⁻/DN

Temporal dark noise

σ_d 21.9 e⁻

$\sigma_{y, \text{dark}}$ 9.19 DN

Signal-to-noise ratio

SNR_{max} 95.1

39.6 dB

$1/\text{SNR}_{\text{max}}$ 1.051 %

Absolute sensitivity threshold

$\mu_{e, \text{min}}$ 22.4 e⁻

$\mu_{e, \text{min, area}}$ 0.261 e⁻/μm²

Saturation capacity

$\mu_{e, \text{sat}}$ 9050 e⁻

$\mu_{e, \text{sat, area}}$ 105 e⁻/μm²

Dynamic range

DR 403

52.11 dB

Spatial nonuniformities

DSNU_{1288} 8.91 e⁻

$\text{DSNU}_{1288, \text{col}}$ 0.32 e⁻

$\text{DSNU}_{1288, \text{row}}$ 0.65 e⁻

$\text{DSNU}_{1288, \text{pix}}$ 8.87 e⁻

PRNU_{1288} 0.421 %

$\text{PRNU}_{1288, \text{col}}$ 0.034 %

$\text{PRNU}_{1288, \text{row}}$ 0.056 %

$\text{PRNU}_{1288, \text{pix}}$ 0.416 %

Linearity error

LE 0.52%

Dark current

$\mu_{c, \text{mean}}$ 33762 e⁻/s

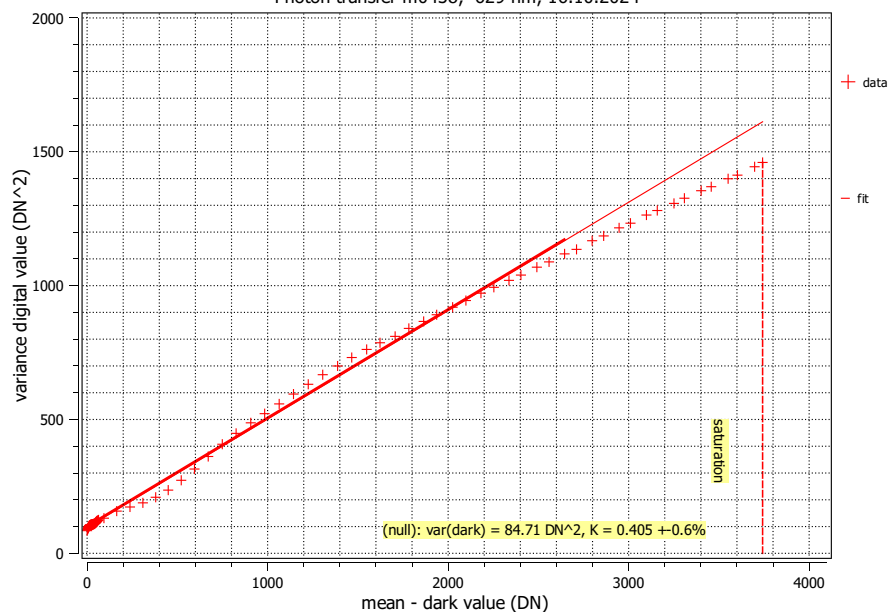
$\mu_{c, \text{var}}$ 38643 e⁻/s

Summary Sheet for Operation Point 3 at a Wavelength of 629 nm

Type of data	Single	Gain, black-level	1 / 0.4%
Exposure control	By irradiance	Environmental temperature	26.6°C
Exposure time	50.000 us	Camera body temperature	25.8°C
Frame rate	1000.0 Hz	Internal temperature(s)	—
Data transfer mode	Color 12	Wavelength, centr., FWHM	629 nm, 13.3 nm

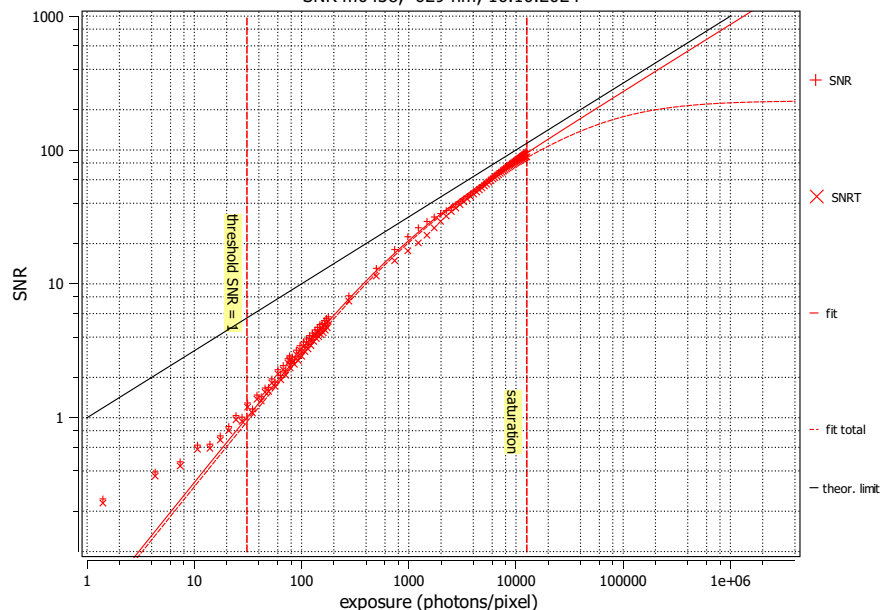
Photon Transfer

Photon transfer m0438, 629 nm, 16.10.2024



Signal-to-Noise Ratio

SNR m0438, 629 nm, 16.10.2024



Quantum efficiency

η 75.0%

Overall system gain

K 0.4050 DN/e⁻

$1/K$ 2.469 e⁻/DN

Temporal dark noise

σ_d 22.7 e⁻

$\sigma_{y,\text{dark}}$ 9.20 DN

Signal-to-noise ratio

SNR_{max} 97.3

39.8 dB

$1/\text{SNR}_{\text{max}}$ 1.027 %

Absolute sensitivity threshold

$\mu_{e,\text{min}}$ 23.2 e⁻

$\mu_{e,\text{min},\text{area}}$ 0.270 e⁻/μm²

Saturation capacity

$\mu_{e,\text{sat}}$ 9475 e⁻

$\mu_{e,\text{sat},\text{area}}$ 110 e⁻/μm²

Dynamic range

DR 408

52.21 dB

Spatial nonuniformities

DSNU₁₂₈₈ 9.08 e⁻

DSNU_{1288.col} 0.35 e⁻

DSNU_{1288.row} 0.72 e⁻

DSNU_{1288.pix} 9.04 e⁻

PRNU₁₂₈₈ 0.429 %

PRNU_{1288.col} 0.028 %

PRNU_{1288.row} 0.070 %

PRNU_{1288.pix} 0.422 %

Linearity error

LE 0.74%

Dark current

$\mu_{c,\text{mean}}$ 33576 e⁻/s

$\mu_{c,\text{var}}$ 35182 e⁻/s