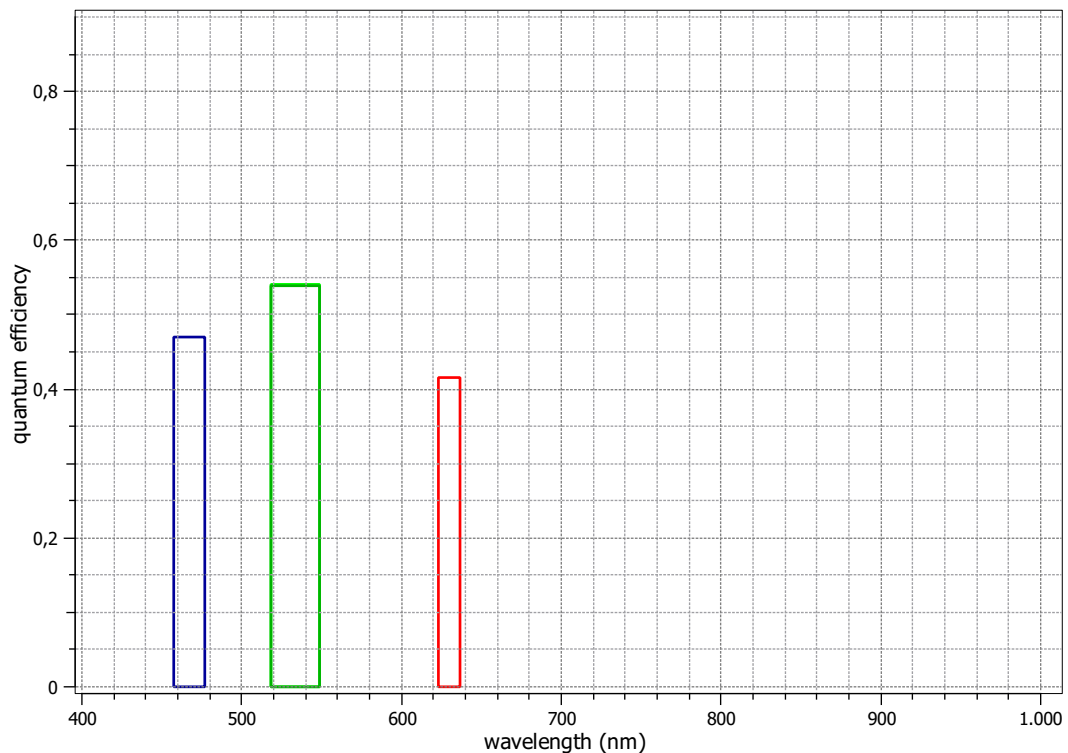


## EMVA 1288 Summary Sheet

This datasheet describes the specification according to the standard 1288 release 3.1 for "Characterization and Presentation of Specification Data for Image Sensors and Cameras" issued on December 30, 2016 by the European Machine Vision Association (EMVA), published at [www.standard1288.org](http://www.standard1288.org) and the *zenodo EMVA 1288 community* with proprietary extensions from AEON. The measurements were performed with the AEON ACC3 Release 7, 21.08.2018, SN 0018(AEON).

Measurements performed by Technical and Application Support Center, Baumer Optronic GmbH.

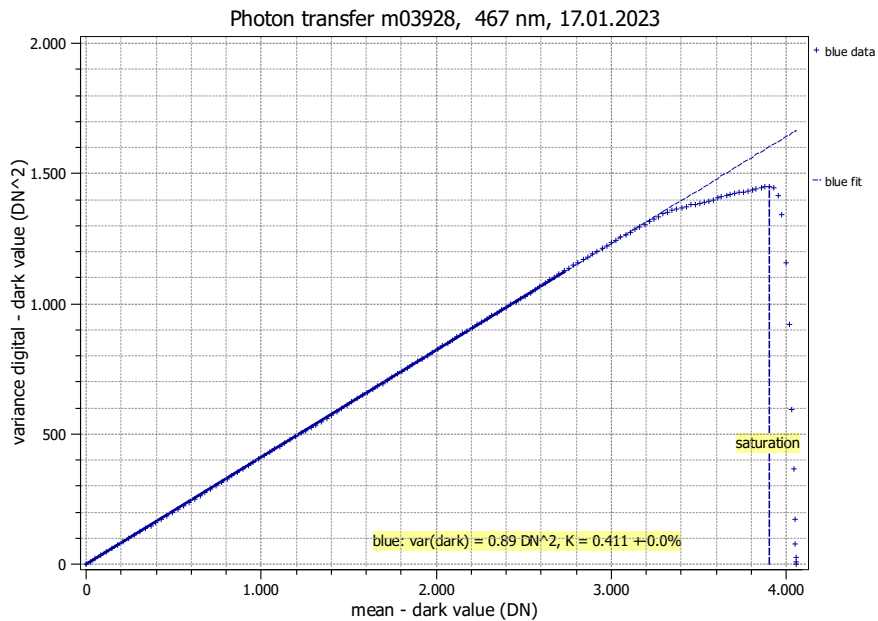
Vendor	Baumer	Type of data presented	Single
Model	VCXG.2-241C	<b>Operation point 1</b>	
Serial number	700009029084	Wavelength centroid	467.2 nm
Sensor diagonal	17.03 mm	Wavelength FWHM	19.5 nm
Lens category	C-Mount	Gain, black-level	1.0 / 39.0
Resolution	4672 × 4100, 12 bit	<b>Operation point 2</b>	
Pixel size (h×v)	2.74 μm × 2.74 μm	Wavelength centroid	533.3 nm
Sensor	Sony IMX540	Wavelength FWHM	30.3 nm
Sensor type	CMOS	Gain, black-level	1.0 / 39.0
Shutter type	Global shutter	<b>Operation point 3</b>	
Overlap cap.	Overlapped	Wavelength centroid	629.9 nm
Max. frame rate	0.0 Hz	Wavelength FWHM	12.9 nm
Interface type	GEV	Gain, black-level	1.0 / 39.0
		<b>Optional data measured</b>	
		None	



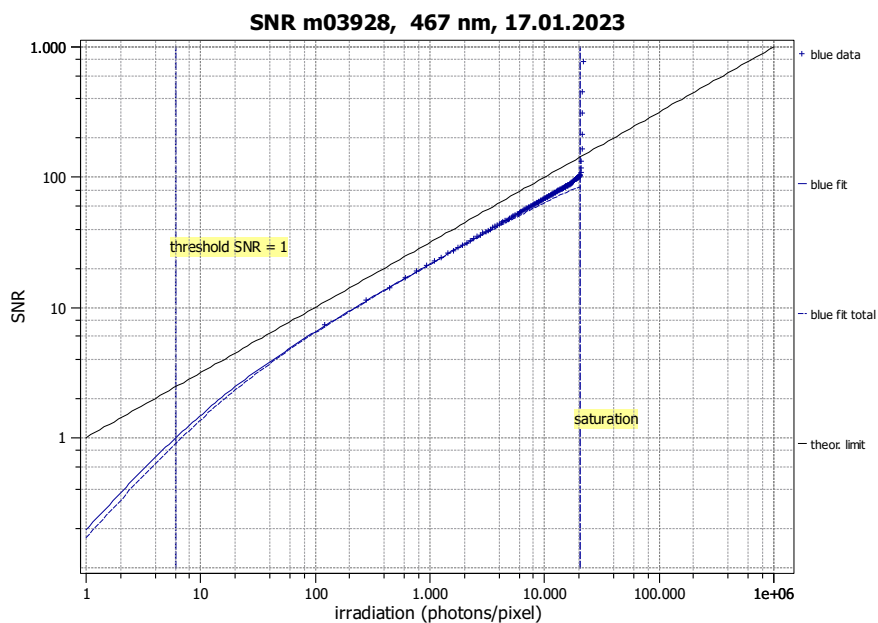
## Summary Sheet for Operation Point 1 at a Wavelength of 467 nm

Type of data	Single	Gain, black-level	1.0 / 39.0
Exposure control	By irradiance	Environmental temperature	22.3°C
Exposure time	820.00 $\mu$ s	Camera body temperature	35.4°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12	Wavelength, centr., FWHM	467 nm, 19.5 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  47.0%

#### Overall system gain

$K$  0.411 DN/e<sup>-</sup>

$1/K$  2.436 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  2.18 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  0.94 DN

#### Signal-to-noise ratio

SNR<sub>max</sub> 98

39.8 dB

6.6 bit

$1/\text{SNR}_{\text{max}}$  1.02 %

#### Absolute sensitivity threshold

$\mu_{p,\text{min}}$  6.06 p

$\mu_{p,\text{min,area}}$  0.807 p/ $\mu\text{m}^2$

$\mu_{e,\text{min}}$  2.85 e<sup>-</sup>

$\mu_{e,\text{min,area}}$  0.379 e<sup>-</sup>/ $\mu\text{m}^2$

#### Saturation capacity

$\mu_{p,\text{sat}}$  20297 p

$\mu_{p,\text{sat,area}}$  2704 p/ $\mu\text{m}^2$

$\mu_{e,\text{sat}}$  9547 e<sup>-</sup>

$\mu_{e,\text{sat,area}}$  1272 e<sup>-</sup>/ $\mu\text{m}^2$

#### Dynamic range

DR 3352

70.5 dB

11.7 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 1.34 e<sup>-</sup>

0.55 DN

PRNU<sub>1288</sub> 0.58 %

#### Linearity error

LE<sub>min</sub> -0.23%

LE<sub>max</sub> 0.51%

#### Dark current

$\mu_{c,\text{mean}}$  0.2  $\pm$  0.0 e<sup>-</sup>/s

0.06 DN/s

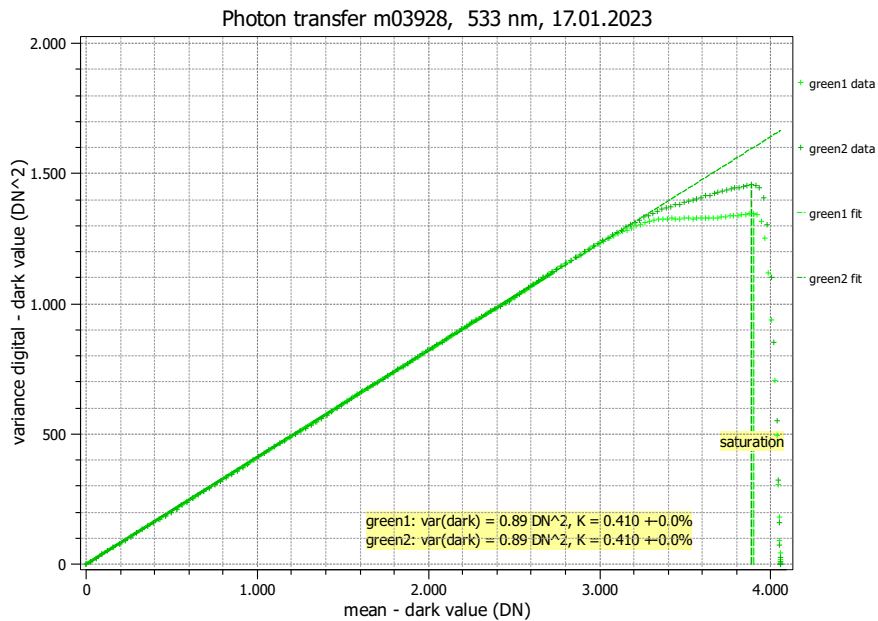
$\mu_{c,\text{var}}$  6.7  $\pm$  0.3 e<sup>-</sup>/s

$T_d$  — °C

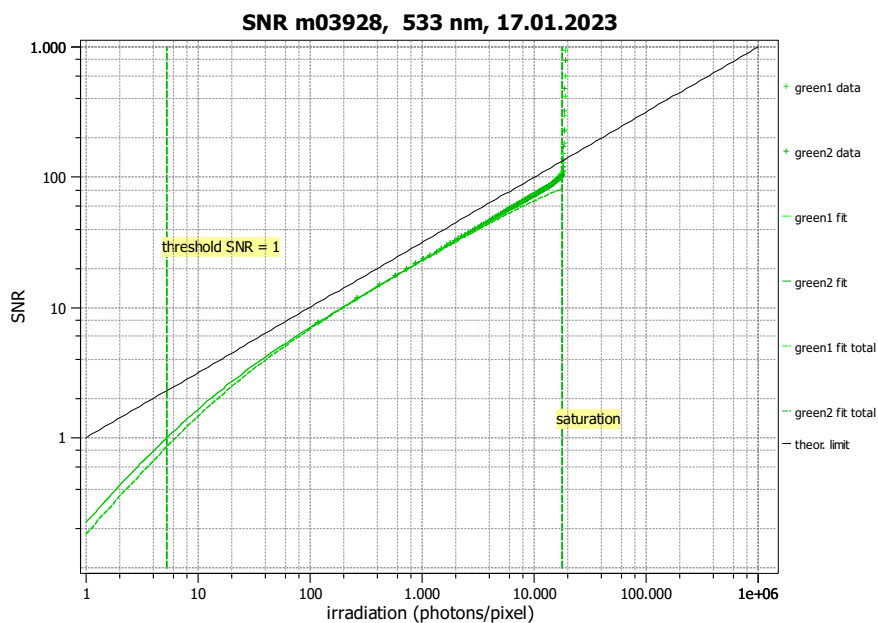
## Summary Sheet for Operation Point 2 at a Wavelength of 533 nm

Type of data	Single	Gain, black-level	1.0 / 39.0
Exposure control	By irradiance	Environmental temperature	22.5 °C
Exposure time	1.60 ms	Camera body temperature	36.0 °C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12	Wavelength, centr., FWHM	533 nm, 30.3 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  54.0%

#### Overall system gain

$K$  0.410 DN/e<sup>-</sup>

$1/K$  2.436 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  2.18 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  0.94 DN

#### Signal-to-noise ratio

SNR<sub>max</sub> 98

39.8 dB

6.6 bit

$1/\text{SNR}_{\text{max}}$  1.02 %

#### Absolute sensitivity threshold

$\mu_{p,\text{min}}$  5.27 p

$\mu_{p,\text{min,area}}$  0.702 p/μm<sup>2</sup>

$\mu_{e,\text{min}}$  2.85 e<sup>-</sup>

$\mu_{e,\text{min,area}}$  0.379 e<sup>-</sup>/μm<sup>2</sup>

#### Saturation capacity

$\mu_{p,\text{sat}}$  17714 p

$\mu_{p,\text{sat,area}}$  2359 p/μm<sup>2</sup>

$\mu_{e,\text{sat}}$  9572 e<sup>-</sup>

$\mu_{e,\text{sat,area}}$  1275 e<sup>-</sup>/μm<sup>2</sup>

#### Dynamic range

DR 3361

70.5 dB

11.7 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 1.66 e<sup>-</sup>

0.68 DN

PRNU<sub>1288</sub> 0.68 %

#### Linearity error

LE<sub>min</sub> -0.38%

LE<sub>max</sub> 0.55%

#### Dark current

$\mu_{c,\text{mean}}$  0.2 ± 0.0 e<sup>-</sup>/s

0.09 DN/s

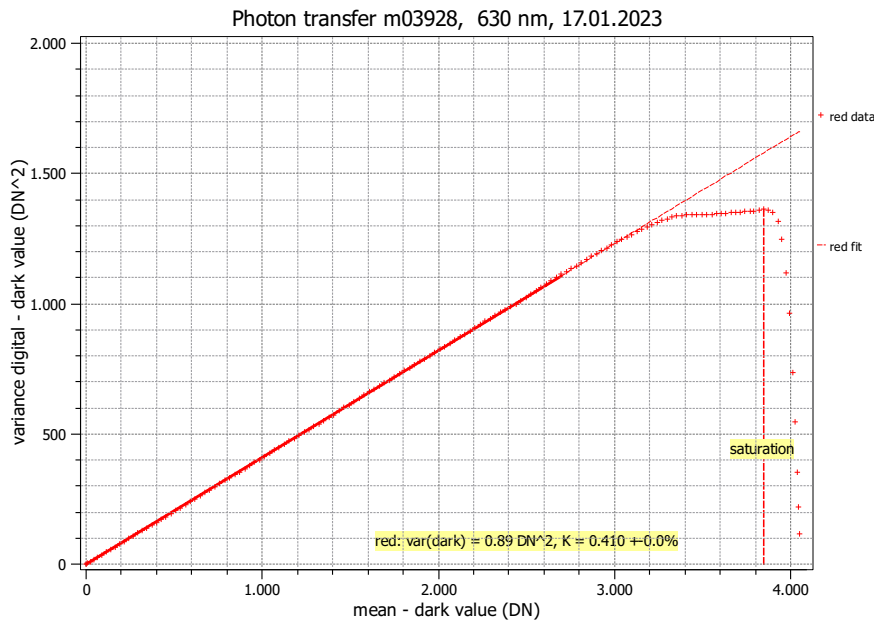
$\mu_{c,\text{var}}$  7.0 ± 0.4 e<sup>-</sup>/s

$T_d$  — °C

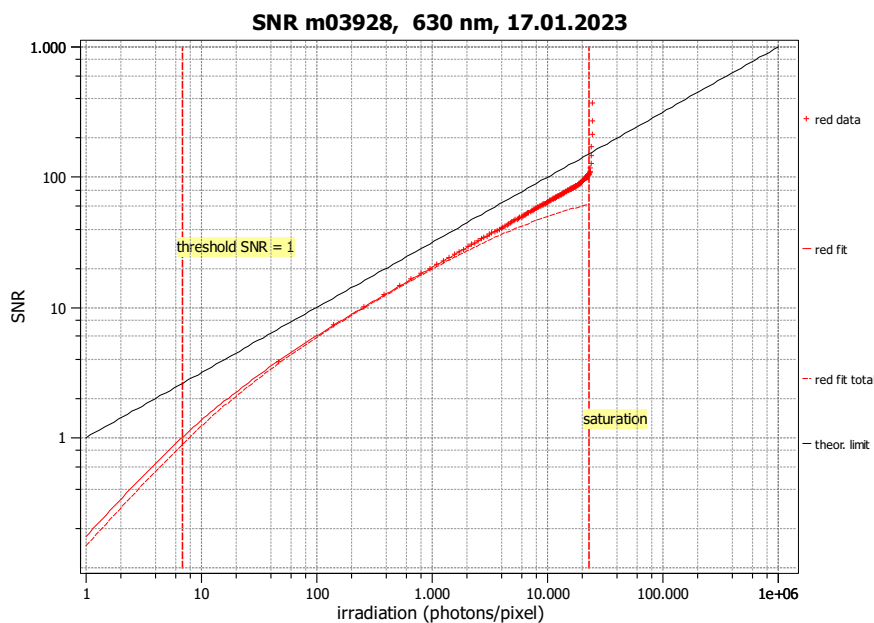
## Summary Sheet for Operation Point 3 at a Wavelength of 630 nm

Type of data	Single	Gain, black-level	1.0 / 39.0
Exposure control	By irradiance	Environmental temperature	23.1 °C
Exposure time	1.60 ms	Camera body temperature	36.4 °C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12	Wavelength, centr., FWHM	630 nm, 12.9 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  41.6%

#### Overall system gain

$K$  0.410 DN/e<sup>-</sup>

$1/K$  2.437 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  2.19 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  0.94 DN

#### Signal-to-noise ratio

SNR<sub>max</sub> 97

39.8 dB

6.6 bit

$1/\text{SNR}_{\text{max}}$  1.03 %

#### Absolute sensitivity threshold

$\mu_{p,\text{min}}$  6.86 p

$\mu_{p,\text{min,area}}$  0.914 p/μm<sup>2</sup>

$\mu_{e,\text{min}}$  2.86 e<sup>-</sup>

$\mu_{e,\text{min,area}}$  0.380 e<sup>-</sup>/μm<sup>2</sup>

#### Saturation capacity

$\mu_{p,\text{sat}}$  22766 p

$\mu_{p,\text{sat,area}}$  3032 p/μm<sup>2</sup>

$\mu_{e,\text{sat}}$  9471 e<sup>-</sup>

$\mu_{e,\text{sat,area}}$  1262 e<sup>-</sup>/μm<sup>2</sup>

#### Dynamic range

DR 3316

70.4 dB

11.7 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 1.49 e<sup>-</sup>

0.61 DN

PRNU<sub>1288</sub> 1.26 %

#### Linearity error

LE<sub>min</sub> -0.52%

LE<sub>max</sub> 0.18%

#### Dark current

$\mu_{c,\text{mean}}$  0.1 ± 0.0 e<sup>-</sup>/s

0.06 DN/s

$\mu_{c,\text{var}}$  6.8 ± 0.4 e<sup>-</sup>/s

$T_d$  — °C