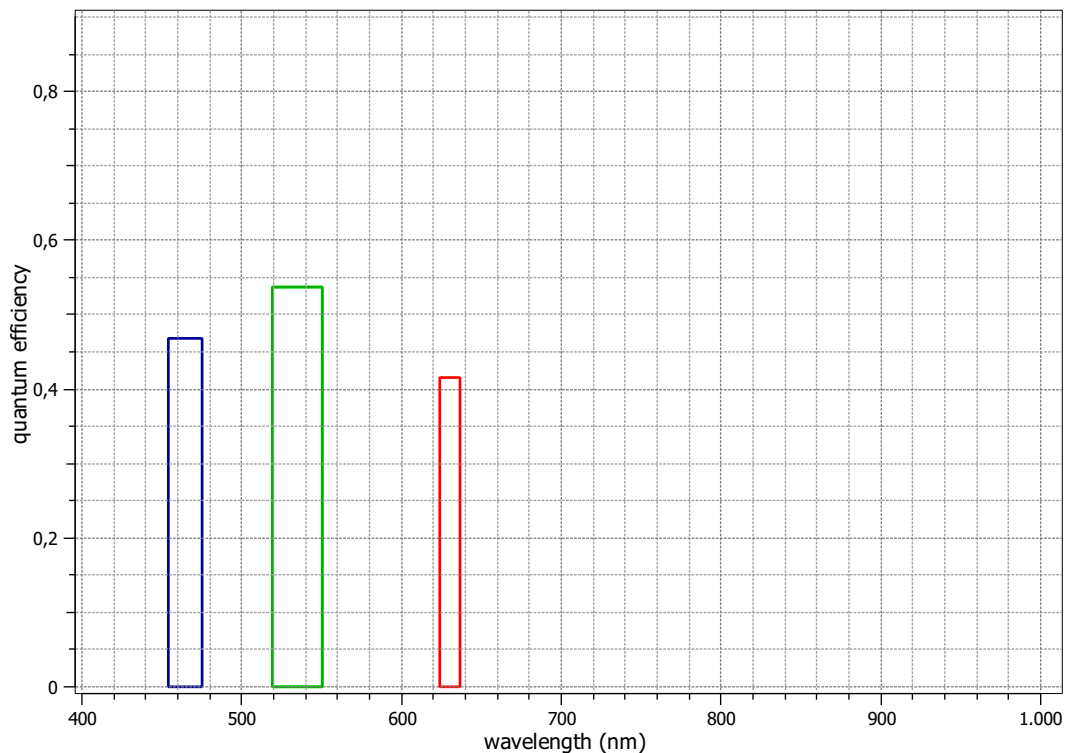


## EMVA 1288 Summary Sheet

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 RGB Release 7, 21.08.2018, SN 0001(Baumer).

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

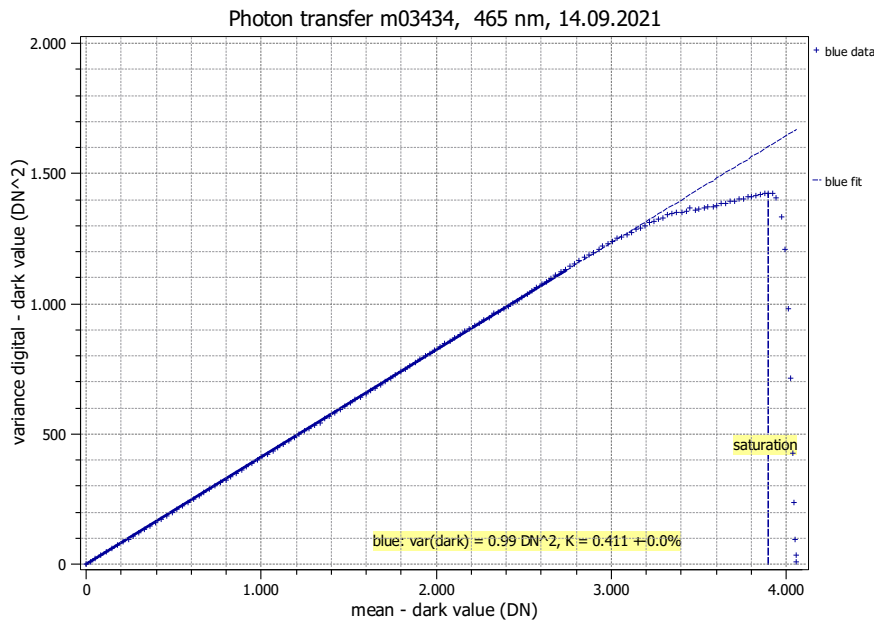
Vendor	Baumer	Type of data presented	Single
Model	VCXG-204C	<b>Operation point 1</b>	
Serial number	700006993025	Wavelength centroid	464.6 nm
Sensor diagonal	17.39 mm	Wavelength FWHM	20.6 nm
Lens category	C-Mount	Gain, black-level	1.0 / 39.0
Resolution	4480 × 4496, 12 bit	<b>Operation point 2</b>	
Pixel size (h×v)	2.74 μm × 2.74 μm	Wavelength centroid	534.9 nm
Sensor	Sony IMX541	Wavelength FWHM	31.8 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	630.5 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	



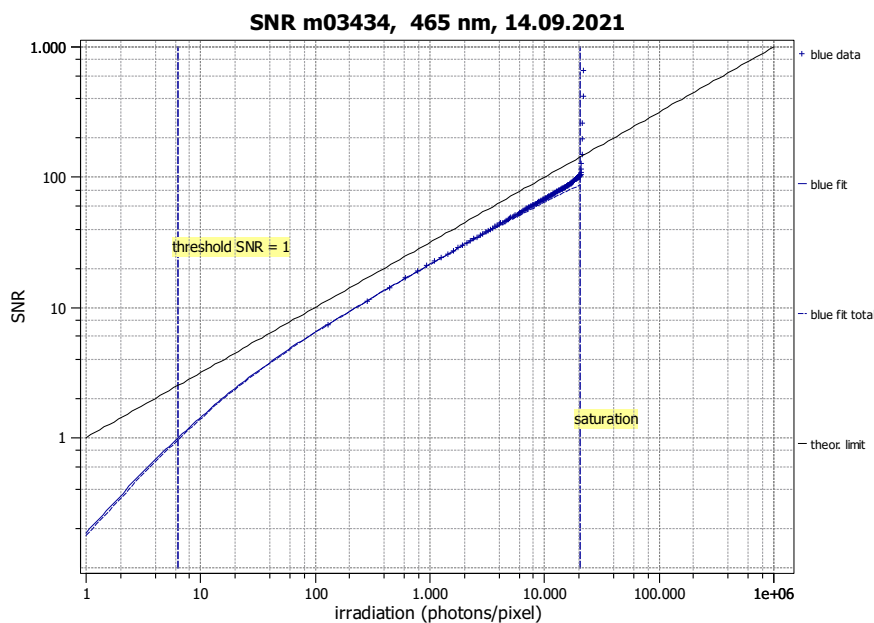
## Summary Sheet for Operation Point 1 at a Wavelength of 465 nm

Type of data	Single	Gain, black-level	1.0 / 39.0
Exposure control	By irradiance	Environmental temperature	23.8°C
Exposure time	815.00 $\mu$ s	Camera body temperature	26.5°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12	Wavelength, centr., FWHM	465 nm, 20.6 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  46.7%

#### Overall system gain

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

$1/K$  2.431 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  2.31 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  0.99 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

$\mu_{p,\text{min}}$  6.35 p

$\mu_{p,\text{min,area}}$  0.846 p/ $\mu\text{m}^2$

$\mu_{e,\text{min}}$  2.97 e<sup>-</sup>

$\mu_{e,\text{min,area}}$  0.395 e<sup>-</sup>/ $\mu\text{m}^2$

#### Saturation capacity

$\mu_{p,\text{sat}}$  20374 p

$\mu_{p,\text{sat,area}}$  2714 p/ $\mu\text{m}^2$

$\mu_{e,\text{sat}}$  9520 e<sup>-</sup>

$\mu_{e,\text{sat,area}}$  1268 e<sup>-</sup>/ $\mu\text{m}^2$

#### Dynamic range

DR 3208

70.1 dB

11.6 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 0.81 e<sup>-</sup>

0.33 DN

PRNU<sub>1288</sub> 0.52 %

#### Linearity error

LE<sub>min</sub> -0.27%

LE<sub>max</sub> 0.51%

#### Dark current

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

0.04 DN/s

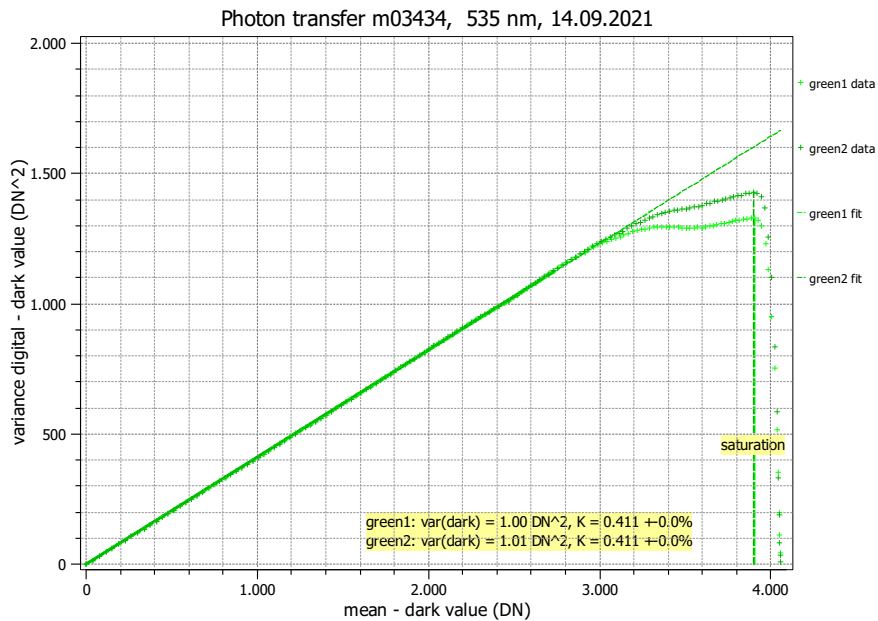
$\mu_{c,\text{var}}$  6.0 ± 0.5 e<sup>-</sup>/s

$T_d$  — °C

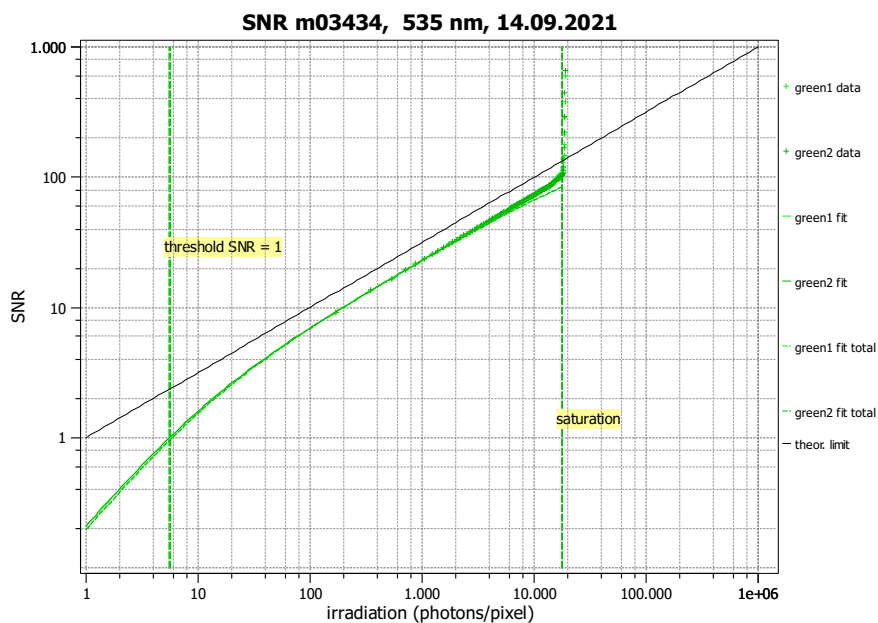
## Summary Sheet for Operation Point 2 at a Wavelength of 535 nm

Type of data	Single	Gain, black-level	1.0 / 39.0
Exposure control	By irradiance	Environmental temperature	24.6°C
Exposure time	1.60 ms	Camera body temperature	28.6°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12	Wavelength, centr., FWHM	535 nm, 31.8 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  53.8%

#### Overall system gain

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

$1/K$  2.434 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  2.33 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  1.00 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

$\mu_{p,\text{min}}$  5.55 p

$\mu_{p,\text{min,area}}$  0.739 p/μm<sup>2</sup>

$\mu_{e,\text{min}}$  2.99 e<sup>-</sup>

$\mu_{e,\text{min,area}}$  0.398 e<sup>-</sup>/μm<sup>2</sup>

#### Saturation capacity

$\mu_{p,\text{sat}}$  17809 p

$\mu_{p,\text{sat,area}}$  2372 p/μm<sup>2</sup>

$\mu_{e,\text{sat}}$  9581 e<sup>-</sup>

$\mu_{e,\text{sat,area}}$  1276 e<sup>-</sup>/μm<sup>2</sup>

#### Dynamic range

DR 3209

70.1 dB

11.6 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 0.88 e<sup>-</sup>

0.36 DN

PRNU<sub>1288</sub> 0.62 %

#### Linearity error

LE<sub>min</sub> -0.40%

LE<sub>max</sub> 0.95%

#### Dark current

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

0.06 DN/s

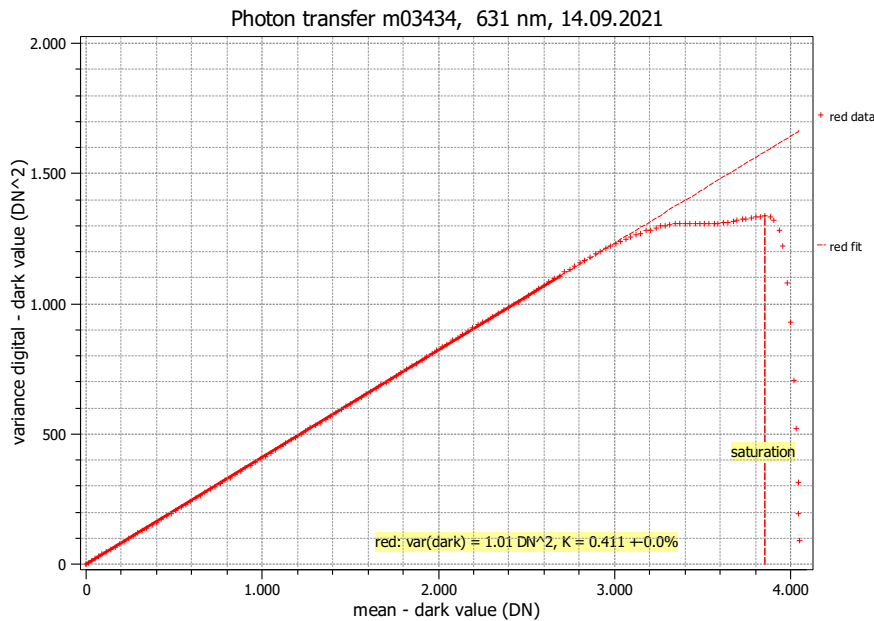
$\mu_{c,\text{var}}$  6.1 ± 0.5 e<sup>-</sup>/s

$T_d$  — °C

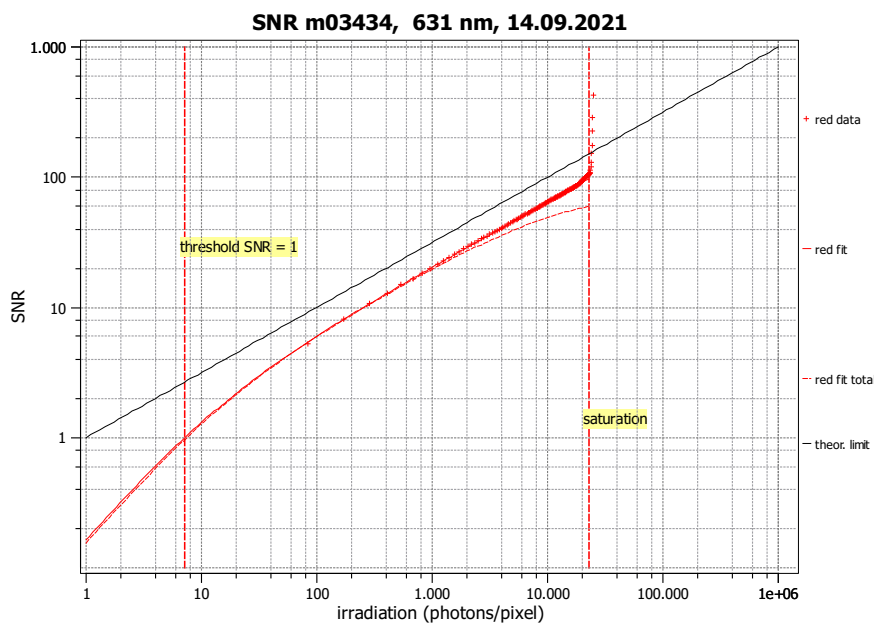
## Summary Sheet for Operation Point 3 at a Wavelength of 631 nm

Type of data	Single	Gain, black-level	1.0 / 39.0
Exposure control	By irradiance	Environmental temperature	26.0°C
Exposure time	1.60 ms	Camera body temperature	29.9°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12	Wavelength, centr., FWHM	631 nm, 12.9 nm

### Photon Transfer



### Signal-to-Noise Ratio



#### Quantum efficiency

$\eta$  41.6%

#### Overall system gain

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

$1/K$  2.434 e<sup>-</sup>/DN

#### Temporal dark noise

$\sigma_d$  2.34 e<sup>-</sup>

$\sigma_{y,\text{dark}}$  1.01 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

$\mu_{p,\text{min}}$  7.21 p

$\mu_{p,\text{min,area}}$  0.960 p/μm<sup>2</sup>

$\mu_{e,\text{min}}$  3.00 e<sup>-</sup>

$\mu_{e,\text{min,area}}$  0.399 e<sup>-</sup>/μm<sup>2</sup>

#### Saturation capacity

$\mu_{p,\text{sat}}$  22829 p

$\mu_{p,\text{sat,area}}$  3041 p/μm<sup>2</sup>

$\mu_{e,\text{sat}}$  9499 e<sup>-</sup>

$\mu_{e,\text{sat,area}}$  1265 e<sup>-</sup>/μm<sup>2</sup>

#### Dynamic range

DR 3168

70.0 dB

11.6 bit

#### Spatial nonuniformities

DSNU<sub>1288</sub> 0.84 e<sup>-</sup>

0.35 DN

PRNU<sub>1288</sub> 1.32 %

#### Linearity error

LE<sub>min</sub> -0.68%

LE<sub>max</sub> 0.16%

#### Dark current

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

0.04 DN/s

$\mu_{c,\text{var}}$  6.0 ± 0.5 e<sup>-</sup>/s

$T_d$  — °C