

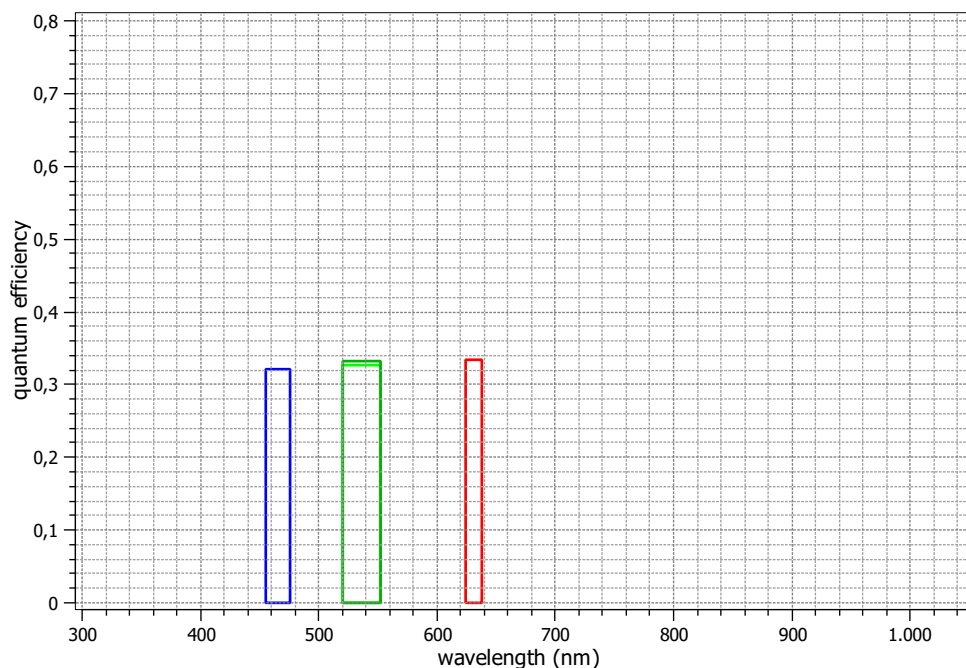
## EMVA 1288 Summary Sheet

This datasheet describes the specification according to the standard 1288 for "Characterization and Presentation of Specification Data for Image Sensors and Cameras of the European Machine Vision Association (EMVA)" (see [www.standard1288.org](http://www.standard1288.org) or the *Zenodo EMVA 1288 community*) release 3.0 with proprietary extensions from AEON. The measurements were performed with the AEON ACC3 RGB Release 3, 15.08.2015, SN 0001(Baumer), recalibrated 28.08.2017. The performance parameters and estimated accuracy of the measurements are described in the technical report for the instrument, its calibration in the corresponding specification and calibration report.

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

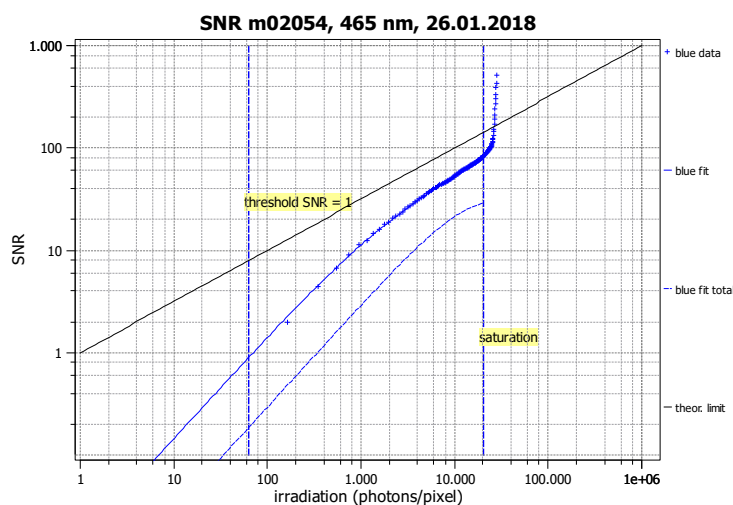
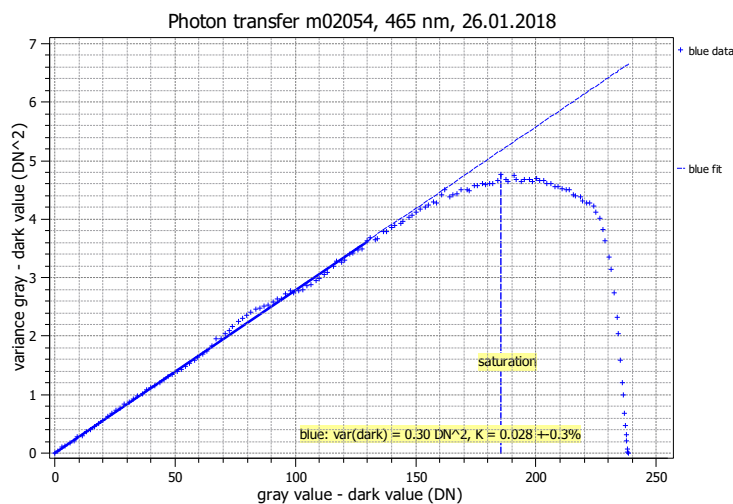
Vendor	Baumer
Model	VQXT-120C.HS
Serial number	700002954629
Sensor diagonal	28.15 mm
Lens category	M58 mount
Resolution	4096 × 3068, 8 bit
Pixel size	5.50 μm × 5.50 μm
Sensor	CMOSIS CMV12000
Sensor type	CMOS
Shutter type	Global shutter
Overlap capabilities	Overlapped
Maximum frame rate	0.0 Hz
Interface type	GEV

Type of data presented	Single
<b>Operation point 1</b>	
Wavelength centroid	465.2 nm
Wavelength FWHM	20.8 nm
Gain / BlackLevel	1.0 / 20.0
<b>Operation point 2</b>	
Wavelength centroid	535.8 nm
Wavelength FWHM	31.9 nm
Gain / BlackLevel	1.0 / 20.0
<b>Operation point 3</b>	
Wavelength centroid	630.8 nm
Wavelength FWHM	13.3 nm
Gain / BlackLevel	1.0 / 20.0
<b>Optional data measured</b>	
None	



## EMVA 1288 Summary Sheet for Operating Point 1

Type of data	Single	Gain / BlackLevel	1.0 / 20.0
Exposure control	By irradiance	Environmental temperature	26.1°C
Exposure time	406.00 $\mu$ s	Camera body temperature	42.0°C
Frame rate	40.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerGB8	Wavelength, centr., FWHM	465 nm, 20.8 nm



### Quantum efficiency

$\eta$  32.1%

### Overall system gain

$K$  0.028 DN/e<sup>-</sup>  
 $1/K$  35.837 e<sup>-</sup>/DN

### Temporal dark noise & DSNU

$\sigma_{y,\text{dark}}$  0.55 DN  
 $\text{DSNU}_{1288}$  2.98 DN  
 $\sigma_d$  16.65 e<sup>-</sup>  
 $\text{DSNU}_{1288}$  106.82 e<sup>-</sup>

### Signal-to-noise ratio & PRNU

$\text{SNR}_{\text{max}}$  81  
 38.2 dB  
 6.3 bit  
 $1/\text{SNR}_{\text{max}}$  1.24 %  
 $\text{PRNU}_{1288}$  2.72 %

### Nonlinearity

LE 0.61%  
 $\text{LE}_{\text{min}}$  -0.48%  
 $\text{LE}_{\text{max}}$  0.74%

### Sensitivity & saturation

$\mu_{p,\text{min}}$  62.6 p  
 2.07 p/ $\mu\text{m}^2$   
 $\mu_{p,\text{sat}}$  20349 p  
 673 p/ $\mu\text{m}^2$   
 $\mu_{e,\text{min}}$  20.1 e<sup>-</sup>  
 0.66 e<sup>-</sup>/ $\mu\text{m}^2$   
 $\mu_{e,\text{sat}}$  6533 e<sup>-</sup>  
 216 e<sup>-</sup>/ $\mu\text{m}^2$

### Dynamic range

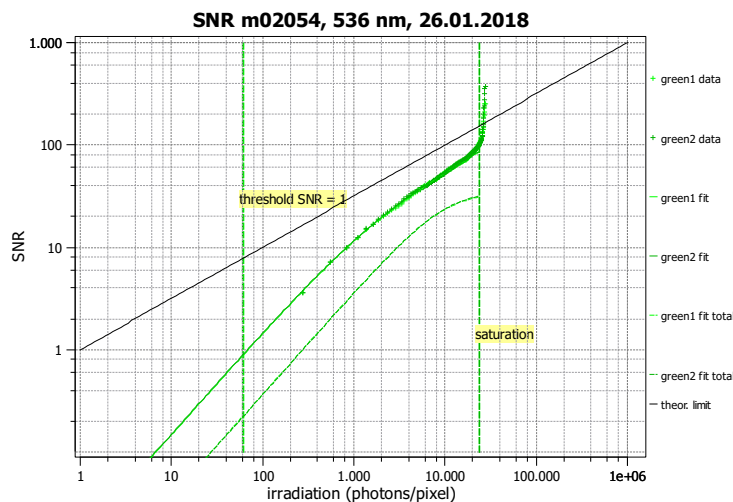
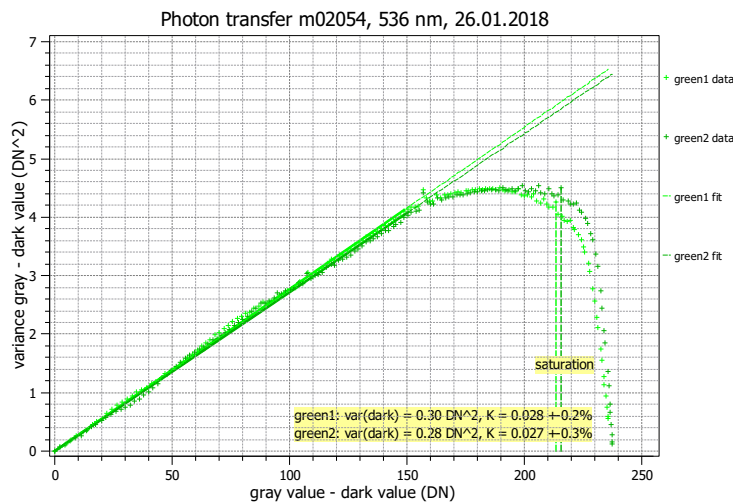
DR 325  
 50.2 dB  
 8.3 bit

### Dark current

$\mu_{c,\text{mean}}$  22.9 DN/s  
 $\mu_{c,\text{mean}}$  819.4 e<sup>-</sup>/s  
 $\mu_{c,\text{var}}$  509.7 e<sup>-</sup>/s

## EMVA 1288 Summary Sheet for Operating Point 2

Type of data	Single	Gain / BlackLevel	1.0 / 20.0
Exposure control	By irradiance	Environmental temperature	26.1°C
Exposure time	406.00 $\mu$ s	Camera body temperature	42.0°C
Frame rate	40.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerGB8	Wavelength, centr., FWHM	536 nm, 31.9 nm



### Quantum efficiency

$\eta$  32.7%

### Overall system gain

$K$  0.028 DN/e<sup>-</sup>  
 $1/K$  36.079 e<sup>-</sup>/DN

### Temporal dark noise & DSNU

$\sigma_{y,\text{dark}}$  0.54 DN  
 $\text{DSNU}_{1288}$  2.40 DN  
 $\sigma_d$  16.65 e<sup>-</sup>  
 $\text{DSNU}_{1288}$  86.61 e<sup>-</sup>

### Signal-to-noise ratio & PRNU

$\text{SNR}_{\text{max}}$  88  
 38.9 dB  
 6.5 bit  
 $1/\text{SNR}_{\text{max}}$  1.14 %  
 $\text{PRNU}_{1288}$  2.78 %

### Nonlinearity

LE 0.59%  
 $\text{LE}_{\text{min}}$  -0.84%  
 $\text{LE}_{\text{max}}$  0.34%

### Sensitivity & saturation

$\mu_{p,\text{min}}$  61.5 p  
 2.03 p/ $\mu\text{m}^2$   
 $\mu_{p,\text{sat}}$  23623 p  
 781 p/ $\mu\text{m}^2$   
 $\mu_{e,\text{min}}$  20.1 e<sup>-</sup>  
 0.67 e<sup>-</sup>/ $\mu\text{m}^2$   
 $\mu_{e,\text{sat}}$  7735 e<sup>-</sup>  
 256 e<sup>-</sup>/ $\mu\text{m}^2$

### Dynamic range

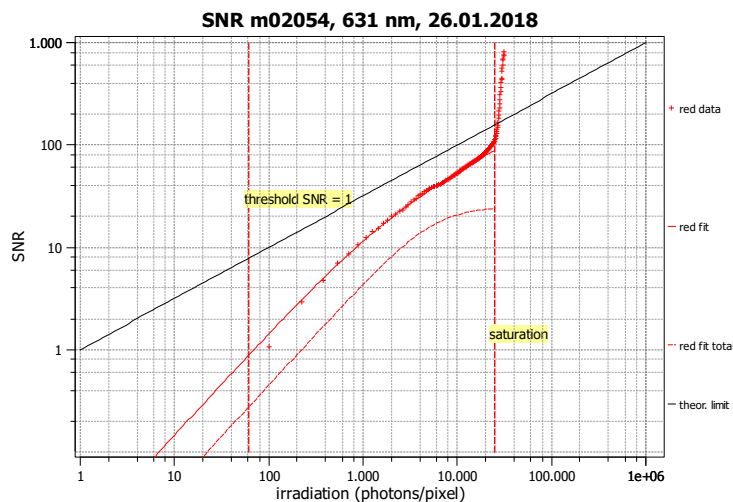
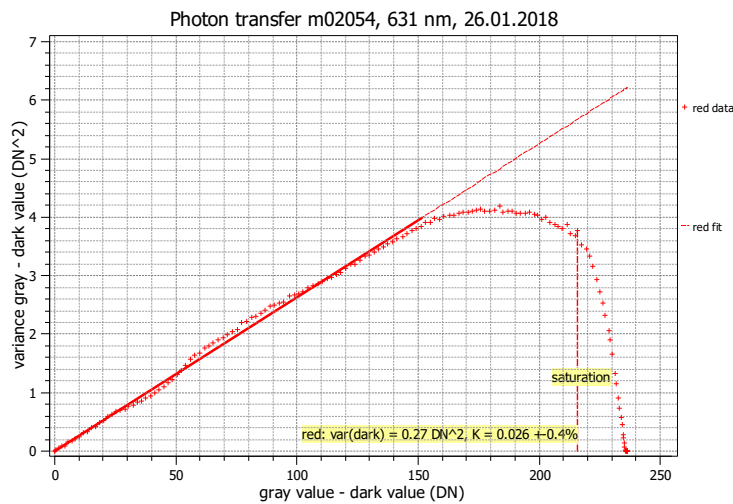
DR 384  
 51.7 dB  
 8.6 bit

### Dark current

$\mu_{c,\text{mean}}$  22.8 DN/s  
 $\mu_{c,\text{mean}}$  821.6 e<sup>-</sup>/s  
 $\mu_{c,\text{var}}$  515.0 e<sup>-</sup>/s

## EMVA 1288 Summary Sheet for Operating Point 3

Type of data	Single	Gain / BlackLevel	1.0 / 20.0
Exposure control	By irradiance	Environmental temperature	26.1°C
Exposure time	406.00 $\mu$ s	Camera body temperature	42.0°C
Frame rate	40.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerGB8	Wavelength, centr., FWHM	631 nm, 13.3 nm



### Quantum efficiency

$\eta$  33.4%

### Overall system gain

$K$  0.026 DN/e<sup>-</sup>  
 $1/K$  38.042 e<sup>-</sup>/DN

### Temporal dark noise & DSNU

$\sigma_{y,\text{dark}}$  0.52 DN  
 $\text{DSNU}_{1288}$  1.85 DN  
 $\sigma_d$  16.65 e<sup>-</sup>  
 $\text{DSNU}_{1288}$  70.56 e<sup>-</sup>

### Signal-to-noise ratio & PRNU

$\text{SNR}_{\text{max}}$  91  
 39.2 dB  
 6.5 bit  
 $1/\text{SNR}_{\text{max}}$  1.10 %  
 $\text{PRNU}_{1288}$  3.92 %

### Nonlinearity

LE 0.78%  
 $\text{LE}_{\text{min}}$  -0.95%  
 $\text{LE}_{\text{max}}$  0.60%

### Sensitivity & saturation

$\mu_{p,\text{min}}$  61.2 p  
 2.02 p/ $\mu\text{m}^2$   
 $\mu_{p,\text{sat}}$  24715 p  
 817 p/ $\mu\text{m}^2$   
 $\mu_{e,\text{min}}$  20.5 e<sup>-</sup>  
 0.68 e<sup>-</sup>/ $\mu\text{m}^2$   
 $\mu_{e,\text{sat}}$  8265 e<sup>-</sup>  
 273 e<sup>-</sup>/ $\mu\text{m}^2$

### Dynamic range

DR 404  
 52.1 dB  
 8.7 bit

### Dark current

$\mu_{c,\text{mean}}$  22.9 DN/s  
 $\mu_{c,\text{mean}}$  871.7 e<sup>-</sup>/s  
 $\mu_{c,\text{var}}$  510.1 e<sup>-</sup>/s