

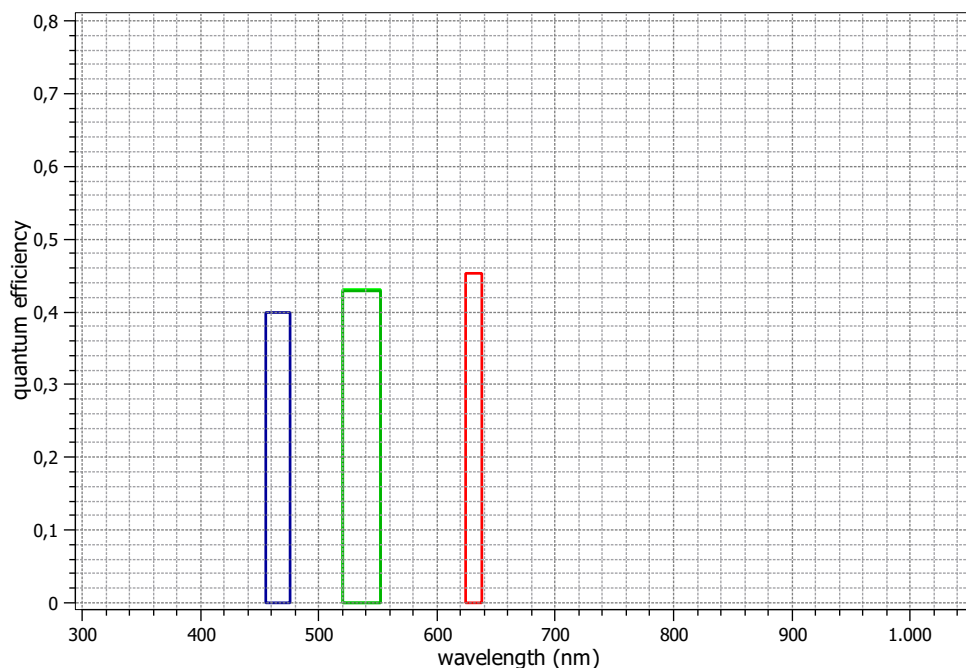
## EMVA 1288 Summary Sheet

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) . 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.

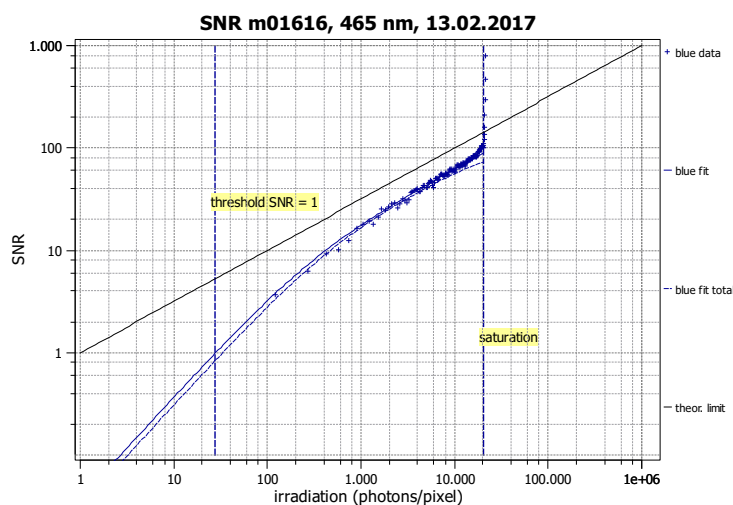
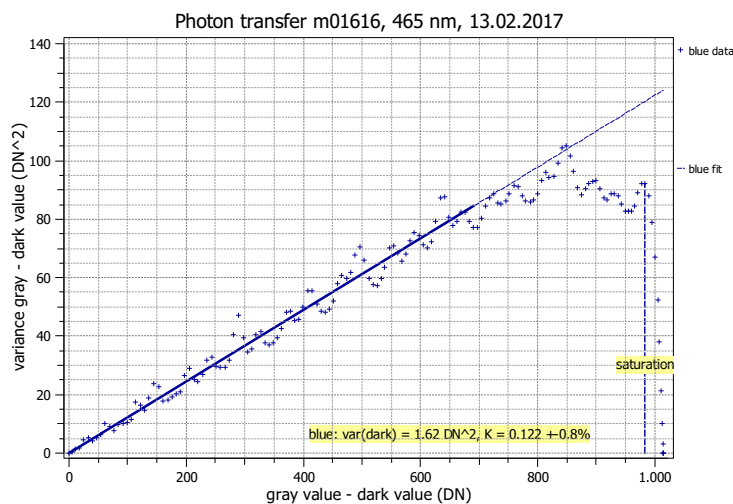
Vendor	Baumer
Model	VCXU-02C
Serial number	700001947837
Sensor diagonal	3.84 mm
Lens category	C-Mount
Resolution	640 × 480, 10 bit
Pixel size	4.80 μm × 4.80 μm
Sensor	OnSemi PYTHON300
Sensor type	CMOS
Shutter type	Global shutter
Overlap capabilities	Overlapped
Maximum frame rate	0.0 Hz
Interface type	U3V

Type of data presented	Single
<b>Operation point 1</b>	
Wavelength centroid	465.3 nm
Wavelength FWHM	20.7 nm
Gain / BlackLevel	1.0 / 11
<b>Operation point 2</b>	
Wavelength centroid	535.8 nm
Wavelength FWHM	32.0 nm
Gain / BlackLevel	1.0 / 11
<b>Operation point 3</b>	
Wavelength centroid	631.0 nm
Wavelength FWHM	13.4 nm
Gain / BlackLevel	1.0 / 11
<b>Optional data measured</b>	
None	



## EMVA 1288 Summary Sheet for Operating Point 1

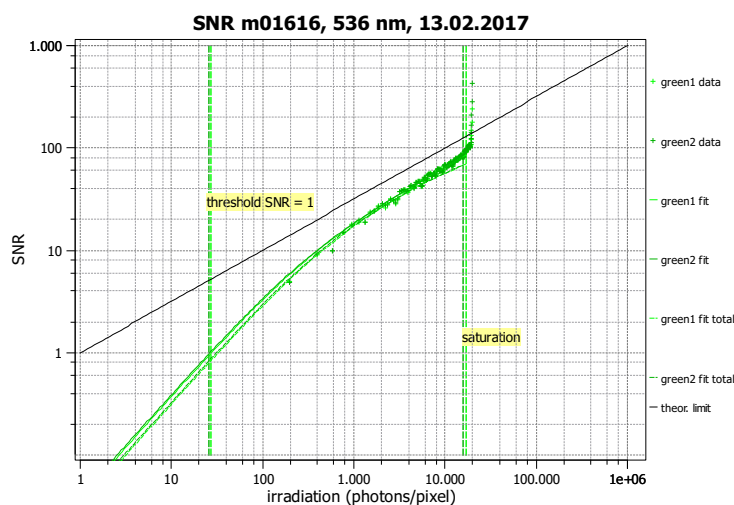
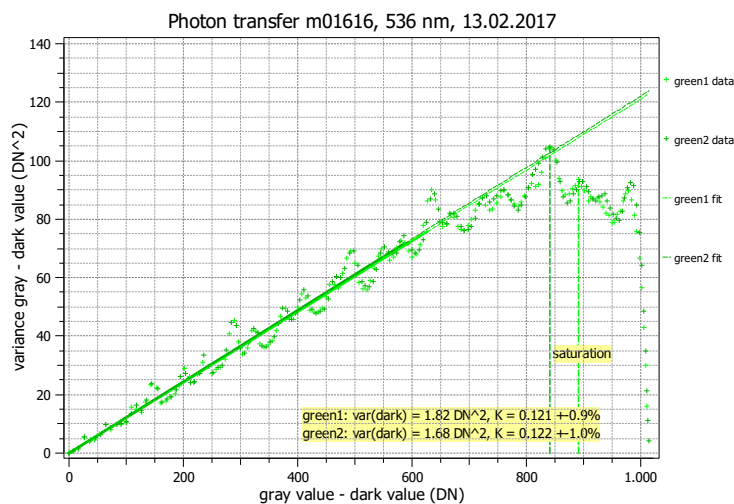
Type of data	Single	Gain / BlackLevel	1.0 / 11
Exposure control	By irradiance	Environmental temperature	24.8°C
Exposure time	420.00 $\mu$ s	Camera body temperature	36.1°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG10	Wavelength, centr., FWHM	465 nm, 20.7 nm



<b>Quantum efficiency</b>	
$\eta$	39.8%
<b>Overall system gain</b>	
$K$	0.122 DN/e <sup>-</sup>
1/ $K$	8.175 e <sup>-</sup> /DN
<b>Temporal dark noise &amp; DSNU</b>	
$\sigma_{y,\text{dark}}$	1.27 DN
DSNU <sub>1288</sub>	0.87 DN
$\sigma_d$	10.14 e <sup>-</sup>
DSNU <sub>1288</sub>	7.07 e <sup>-</sup>
<b>Signal-to-noise ratio &amp; PRNU</b>	
SNR <sub>max</sub>	90
	39.1 dB
	6.5 bit
1/SNR <sub>max</sub>	1.11 %
PRNU <sub>1288</sub>	0.77 %
<b>Nonlinearity</b>	
LE	0.37%
LE <sub>min</sub>	-0.45%
LE <sub>max</sub>	0.30%
<b>Sensitivity &amp; saturation</b>	
$\mu_{p,\text{min}}$	27.4 p
	1.19 p/ $\mu\text{m}^2$
$\mu_{p,\text{sat}}$	20260 p
	879 p/ $\mu\text{m}^2$
$\mu_{e,\text{min}}$	10.9 e <sup>-</sup>
	0.47 e <sup>-</sup> / $\mu\text{m}^2$
$\mu_{e,\text{sat}}$	8070 e <sup>-</sup>
	350 e <sup>-</sup> / $\mu\text{m}^2$
<b>Dynamic range</b>	
DR	739
	57.4 dB
	9.5 bit
<b>Dark current</b>	
$\mu_{c,\text{mean}}$	36.2 DN/s
$\mu_{c,\text{mean}}$	296.1 e <sup>-</sup> /s
$\mu_{c,\text{var}}$	226.9 e <sup>-</sup> /s

## EMVA 1288 Summary Sheet for Operating Point 2

Type of data	Single	Gain / BlackLevel	1.0 / 11
Exposure control	By irradiance	Environmental temperature	24.8°C
Exposure time	420.00 $\mu$ s	Camera body temperature	36.1°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG10	Wavelength, centr., FWHM	536 nm, 32.0 nm



### Quantum efficiency

$\eta$  43.0%

### Overall system gain

$K$  0.121 DN/e<sup>-</sup>  
 $1/K$  8.263 e<sup>-</sup>/DN

### Temporal dark noise & DSNU

$\sigma_{y,\text{dark}}$  1.35 DN  
 DSNU<sub>1288</sub> 0.90 DN  
 $\sigma_d$  10.87 e<sup>-</sup>  
 DSNU<sub>1288</sub> 7.41 e<sup>-</sup>

### Signal-to-noise ratio & PRNU

SNR<sub>max</sub> 86  
 38.6 dB  
 6.4 bit  
 $1/\text{SNR}_{\text{max}}$  1.17 %  
 PRNU<sub>1288</sub> 0.84 %

### Nonlinearity

LE 0.31%  
 LE<sub>min</sub> -0.23%  
 LE<sub>max</sub> 0.38%

### Sensitivity & saturation

$\mu_{p,\text{min}}$  27.1 p  
 1.17 p/ $\mu\text{m}^2$   
 $\mu_{p,\text{sat}}$  17008 p  
 738 p/ $\mu\text{m}^2$   
 $\mu_{e,\text{min}}$  11.6 e<sup>-</sup>  
 0.51 e<sup>-</sup>/ $\mu\text{m}^2$   
 $\mu_{e,\text{sat}}$  7318 e<sup>-</sup>  
 318 e<sup>-</sup>/ $\mu\text{m}^2$

### Dynamic range

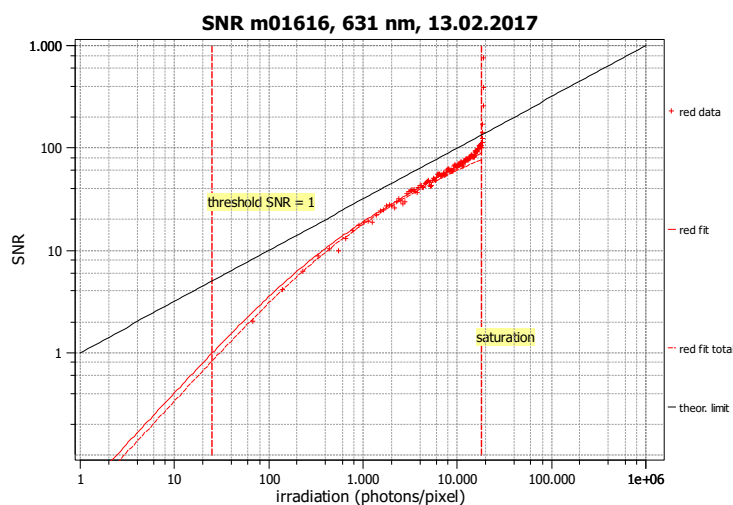
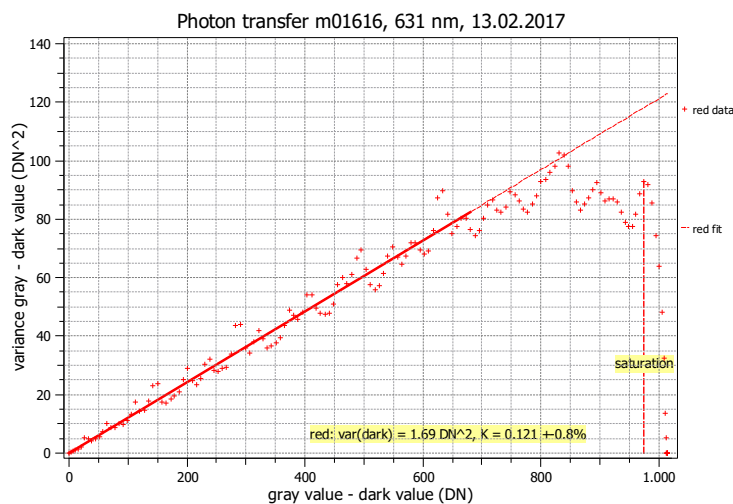
DR 629  
 56.0 dB  
 9.3 bit

### Dark current

$\mu_{c,\text{mean}}$  35.8 DN/s  
 $\mu_{c,\text{mean}}$  296.0 e<sup>-</sup>/s  
 $\mu_{c,\text{var}}$  224.8 e<sup>-</sup>/s

## EMVA 1288 Summary Sheet for Operating Point 3

Type of data	Single	Gain / BlackLevel	1.0 / 11
Exposure control	By irradiance	Environmental temperature	24.8°C
Exposure time	420.00 $\mu$ s	Camera body temperature	36.1°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG10	Wavelength, centr., FWHM	631 nm, 13.4 nm



### Quantum efficiency

$\eta$  45.4%

### Overall system gain

$K$  0.121 DN/e<sup>-</sup>  
 $1/K$  8.250 e<sup>-</sup>/DN

### Temporal dark noise & DSNU

$\sigma_{y,\text{dark}}$  1.30 DN  
 DSNU<sub>1288</sub> 0.90 DN  
 $\sigma_d$  10.47 e<sup>-</sup>  
 DSNU<sub>1288</sub> 7.46 e<sup>-</sup>

### Signal-to-noise ratio & PRNU

SNR<sub>max</sub> 90  
 39.1 dB  
 6.5 bit  
 $1/\text{SNR}_{\text{max}}$  1.11 %  
 PRNU<sub>1288</sub> 0.68 %

### Nonlinearity

LE 0.54%  
 LE<sub>min</sub> -0.79%  
 LE<sub>max</sub> 0.30%

### Sensitivity & saturation

$\mu_{p,\text{min}}$  24.8 p  
 1.08 p/ $\mu\text{m}^2$   
 $\mu_{p,\text{sat}}$  17892 p  
 777 p/ $\mu\text{m}^2$   
 $\mu_{e,\text{min}}$  11.3 e<sup>-</sup>  
 0.49 e<sup>-</sup>/ $\mu\text{m}^2$   
 $\mu_{e,\text{sat}}$  8115 e<sup>-</sup>  
 352 e<sup>-</sup>/ $\mu\text{m}^2$

### Dynamic range

DR 721  
 57.2 dB  
 9.5 bit

### Dark current

$\mu_{c,\text{mean}}$  35.9 DN/s  
 $\mu_{c,\text{mean}}$  296.0 e<sup>-</sup>/s  
 $\mu_{c,\text{var}}$  228.1 e<sup>-</sup>/s