

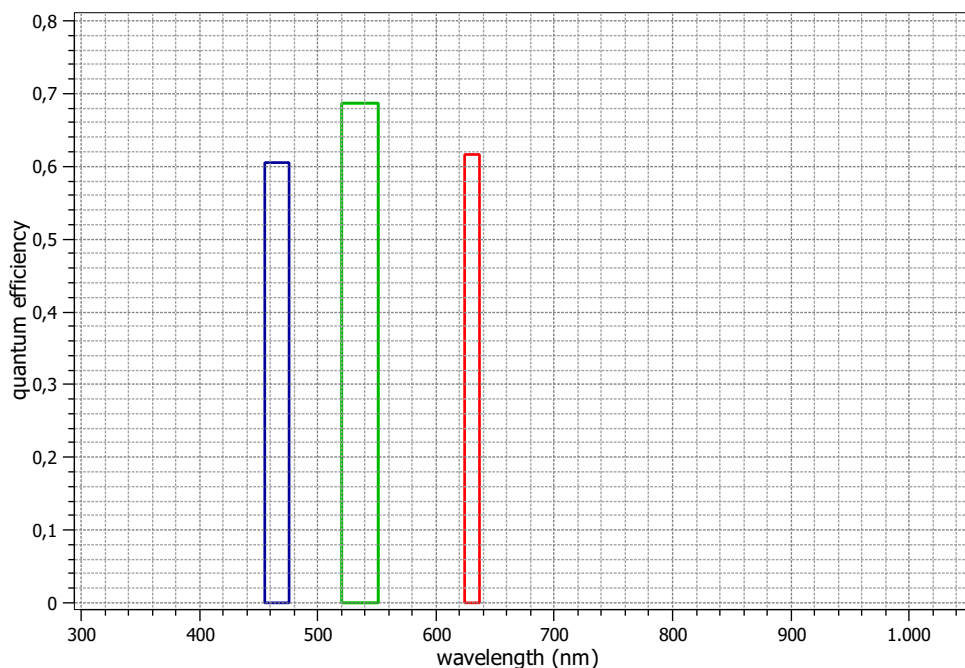
EMVA 1288 Summary Sheet

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 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 26.08.2019. 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.

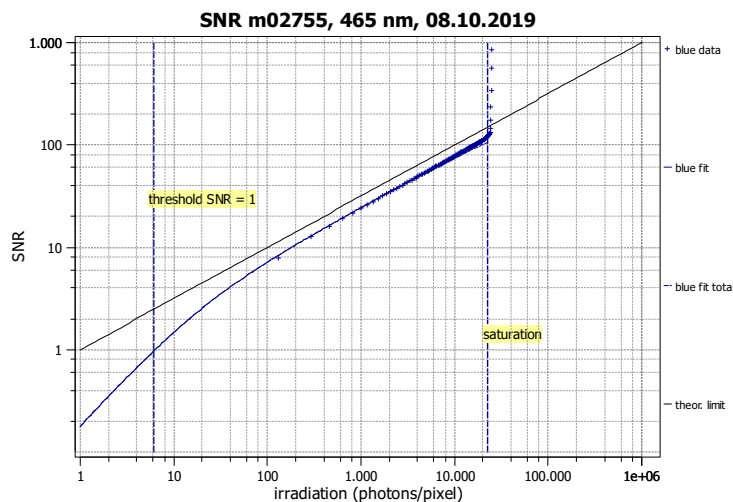
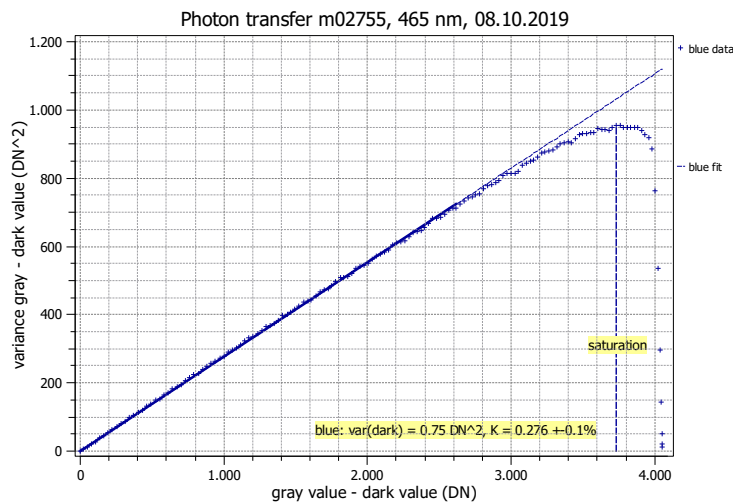
Vendor	Baumer
Model	VCXU-22C.R
Serial number	700003591912
Sensor diagonal	6.39 mm
Lens category	C-Mount
Resolution	1920 × 1080, 12 bit
Pixel size	2.90 μm × 2.90 μm
Sensor	Sony IMX290
Sensor type	CMOS
Shutter type	Rolling shutter
Overlap capabilities	Overlapped
Maximum frame rate	0.0 Hz
Interface type	U3V

Type of data presented	Single
Operation point 1	
Wavelength centroid	465.1 nm
Wavelength FWHM	20.5 nm
Gain / BlackLevel	1.0 / 39.0
Operation point 2	
Wavelength centroid	535.7 nm
Wavelength FWHM	31.9 nm
Gain / BlackLevel	1.0 / 39.0
Operation point 3	
Wavelength centroid	630.3 nm
Wavelength FWHM	13.2 nm
Gain / BlackLevel	1.0 / 39.0
Optional data measured	
None	



EMVA 1288 Summary Sheet for Operating Point 1

Type of data	Single	Gain / BlackLevel	1.0 / 39.0
Exposure control	By irradiance	Environmental temperature	23.4°C
Exposure time	1.58 ms	Camera body temperature	29.9°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12	Wavelength, centr., FWHM	465 nm, 20.5 nm



Quantum efficiency

η 60.6%

Overall system gain

K 0.276 DN/e⁻

1/ K 3.617 e⁻/DN

Temporal dark noise & DSNU

$\sigma_{y,\text{dark}}$ 0.86 DN

DSNU₁₂₈₈ 0.10 DN

σ_d 2.94 e⁻

DSNU₁₂₈₈ 0.34 e⁻

Signal-to-noise ratio & PRNU

SNR_{max} 116

41.3 dB

6.9 bit

1/SNR_{max} 0.86 %

PRNU₁₂₈₈ 0.40 %

Nonlinearity

LE 0.19%

LE_{min} -0.25%

LE_{max} 0.13%

Sensitivity & saturation

$\mu_{p,\text{min}}$ 6.05 p

0.719 p/ μm^2

$\mu_{p,\text{sat}}$ 22394 p

2663 p/ μm^2

$\mu_{e,\text{min}}$ 3.66 e⁻

0.436 e⁻/ μm^2

$\mu_{e,\text{sat}}$ 13567 e⁻

1613 e⁻/ μm^2

Dynamic range

DR 3704

71.4 dB

11.9 bit

Dark current

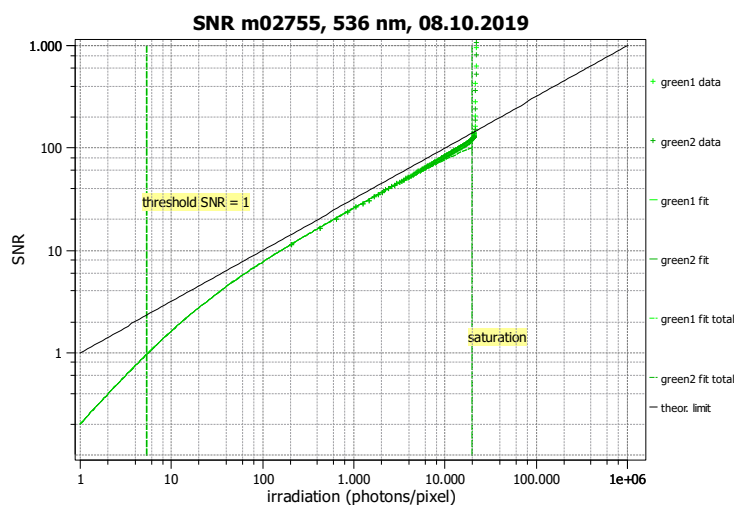
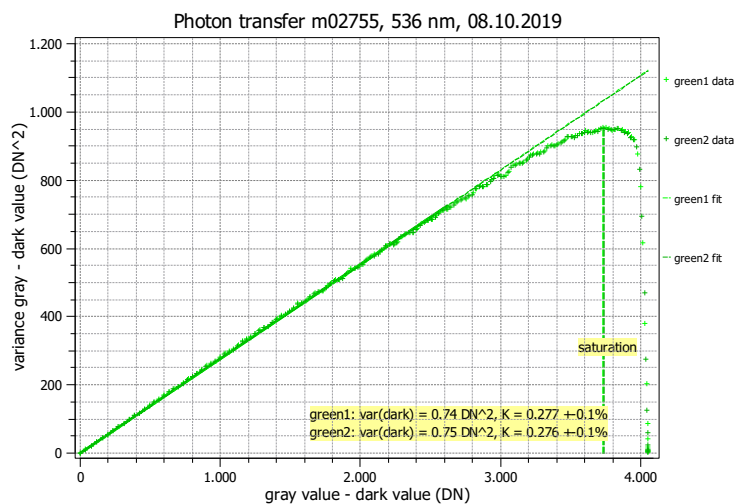
$\mu_{c,\text{mean}}$ 0.0 DN/s

$\mu_{c,\text{mean}}$ 0.1 e⁻/s

$\mu_{c,\text{var}}$ 0.5 e⁻/s

EMVA 1288 Summary Sheet for Operating Point 2

Type of data	Single	Gain / BlackLevel	1.0 / 39.0
Exposure control	By irradiance	Environmental temperature	23.4°C
Exposure time	1.58 ms	Camera body temperature	29.9°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12	Wavelength, centr., FWHM	536 nm, 31.9 nm



Quantum efficiency

η 68.7%

Overall system gain

K 0.277 DN/e⁻
 $1/K$ 3.612 e⁻/DN

Temporal dark noise & DSNU

$\sigma_{y,\text{dark}}$ 0.86 DN
 DSNU_{1288} 0.10 DN
 σ_d 2.94 e⁻
 DSNU_{1288} 0.35 e⁻

Signal-to-noise ratio & PRNU

SNR_{max} 116
 41.3 dB
 6.9 bit
 $1/\text{SNR}_{\text{max}}$ 0.86 %
 PRNU_{1288} 0.49 %

Nonlinearity

LE 0.11%
 LE_{min} -0.15%
 LE_{max} 0.06%

Sensitivity & saturation

$\mu_{p,\text{min}}$ 5.32 p
 0.633 p/ μm^2
 $\mu_{p,\text{sat}}$ 19639 p
 2335 p/ μm^2
 $\mu_{e,\text{min}}$ 3.66 e⁻
 0.435 e⁻/ μm^2
 $\mu_{e,\text{sat}}$ 13494 e⁻
 1604 e⁻/ μm^2

Dynamic range

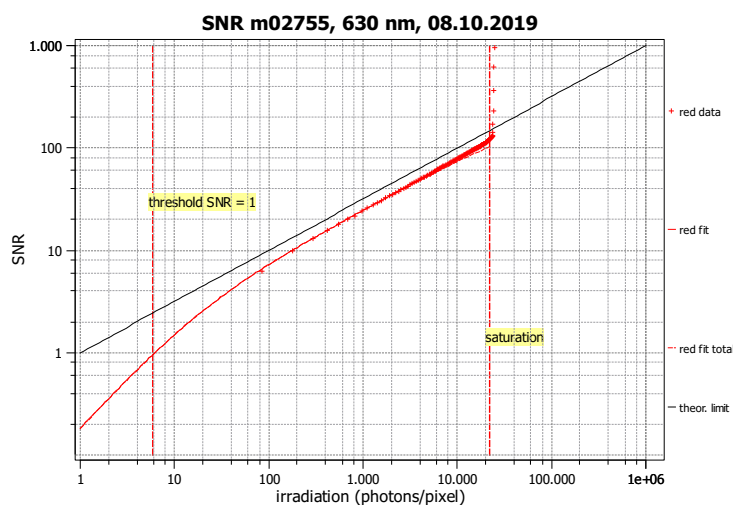
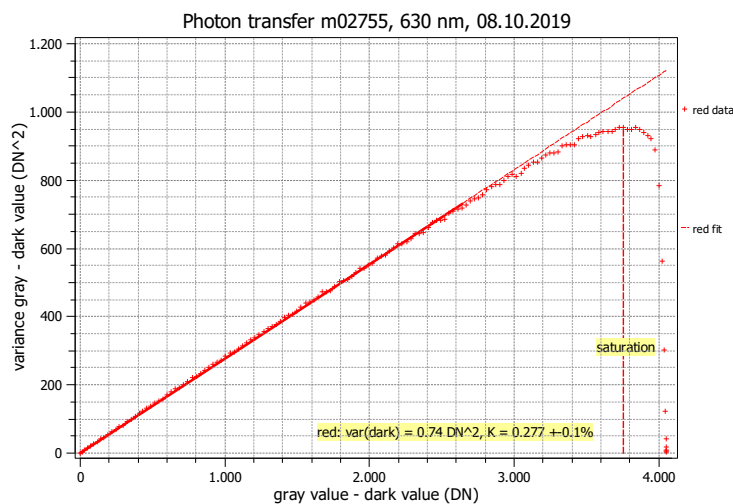
DR 3690
 71.3 dB
 11.8 bit

Dark current

$\mu_{c,\text{mean}}$ 0.0 DN/s
 $\mu_{c,\text{mean}}$ 0.1 e⁻/s
 $\mu_{c,\text{var}}$ 0.5 e⁻/s

EMVA 1288 Summary Sheet for Operating Point 3

Type of data	Single	Gain / BlackLevel	1.0 / 39.0
Exposure control	By irradiance	Environmental temperature	23.4°C
Exposure time	1.58 ms	Camera body temperature	29.9°C
Frame rate	10.0 Hz	Internal temperature(s)	—
Data transfer mode	BayerRG12	Wavelength, centr., FWHM	630 nm, 13.2 nm



Quantum efficiency

η 61.7%

Overall system gain

K 0.277 DN/e⁻
 $1/K$ 3.611 e⁻/DN

Temporal dark noise & DSNU

$\sigma_{y,\text{dark}}$ 0.86 DN
 DSNU_{1288} 0.10 DN
 σ_d 2.94 e⁻
 DSNU_{1288} 0.35 e⁻

Signal-to-noise ratio & PRNU

SNR_{max} 117
 41.4 dB
 6.9 bit
 $1/\text{SNR}_{\text{max}}$ 0.85 %
 PRNU_{1288} 0.47 %

Nonlinearity

LE 0.26%
 LE_{min} -0.35%
 LE_{max} 0.17%

Sensitivity & saturation

$\mu_{p,\text{min}}$ 5.93 p
 0.705 p/ μm^2
 $\mu_{p,\text{sat}}$ 22227 p
 2643 p/ μm^2
 $\mu_{e,\text{min}}$ 3.66 e⁻
 0.435 e⁻/ μm^2
 $\mu_{e,\text{sat}}$ 13709 e⁻
 1630 e⁻/ μm^2

Dynamic range

DR 3750
 71.5 dB
 11.9 bit

Dark current

$\mu_{c,\text{mean}}$ 0.0 DN/s
 $\mu_{c,\text{mean}}$ 0.1 e⁻/s
 $\mu_{c,\text{var}}$ 0.5 e⁻/s