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). The measurements were performed with an AEON ACC3 RGB Release 3, 20.01.2104, SN 0005(). The performance parameters and estimated accuracy of the measurements are described in the technical report for the instrument, its calibration in the corresponding calibration report.

Vendor: MATRIX VISION
Model: mvBlueFOX3-2024C
Serial number: FF000003
Sensor diagonal: 13.39 mm
Lens category: C-Mount
Resolution: 1936 × 1214, 12 bit
Pixel size: 5.86 μm × 5.86 μm
Sensor type: CMOS
Shutter type: Global
Overlap capabilities: Overlapping
Maximum frame rate: 49.8 Hz
Interface type: USB3 Vision

Type of data presented: Single

**Operation point 1, (page 5)**
- Wavelength centroid: 467.3 nm
- Wavelength FWHM: 20.5 nm
- Gain, offset: Gain = 0 dB, Offset = 0.08

**Operation point 2, (page 17)**
- Wavelength centroid: 534.2 nm
- Wavelength FWHM: 30.9 nm
- Gain, offset: Gain = 0 dB, Offset = 0.08

**Operation point 3, (page 29)**
- Wavelength centroid: 629.5 nm
- Wavelength FWHM: 13.1 nm
- Gain, offset: Gain = 0 dB, Offset = 0.08

Optional data measured: None

![Spectral sensitivity graph](image-url)
EMVA 1288 Summary Sheet for Operating Point 1

<table>
<thead>
<tr>
<th>Type of data</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure time</td>
<td>1.0 ms</td>
</tr>
<tr>
<td>Frame rate</td>
<td>0.0 Hz</td>
</tr>
<tr>
<td>Data transfer mode</td>
<td>BayerRG12</td>
</tr>
<tr>
<td>Gain, offset</td>
<td>Gain = 0dB, Offset = 0.08</td>
</tr>
<tr>
<td>Environmental temperature</td>
<td>23.1°C</td>
</tr>
<tr>
<td>Camera temperature</td>
<td>34.4°C</td>
</tr>
<tr>
<td>Wavelength, cent., FWHM</td>
<td>467 nm, 20.5 nm</td>
</tr>
</tbody>
</table>

**Photon transfer**

\[ \eta = 0.522 \]

\[ K (\text{DN/e}) = 0.126 \]

\[ 1/K (\text{e/DN}) = 7.915 \]

**Dark noise & DSNU**

\[ \sigma_d (\text{DN}) = 0.82 \]

\[ \sigma_0 (\text{e}) = 6.0 \]

\[ \text{DSNU}_{1288} (\text{DN}) = 0.20 \]

\[ \text{DSNU}_{1288} (\text{e}) = 1.60 \]

**Signal-to-noise ratio & PRNU**

\[ \text{SNR}_{\text{max}} = 179 \]

\[ \text{SNR}_{\text{max}} (\text{dB}) = 45.0 \]

\[ \text{SNR}_{\text{max}} (\text{bits}) = 7.5 \]

\[ 1/\text{SNR}_{\text{max}} (%) = 0.56 \]

\[ \text{PRNU}_{1288} (%) = 0.481 \]

**Nonlinearity**

\[ \text{LE} (%) = 0.42 \]

**Sensitivity & saturation**

\[ \mu_{p,\text{min}} (\text{p}) = 13.4 \]

\[ \mu_{e,\text{min}} (\text{e}) = 7.0 \]

\[ \mu_{p,\text{sat}} (\text{p}) = 61018 \]

\[ \mu_{e,\text{sat}} (\text{e}) = 31873 \]

**Dynamic range**

\[ \text{DR} = 4570 \]

\[ \text{DR (dB)} = 73.2 \]

\[ \text{DR (bit)} = 12.2 \]

**Dark current**

\[ \mu_{c,\text{mean}} (\text{DN/s}) = 2.62 \]

\[ \mu_{c,\text{mean}} (\text{e/s}) = 20.71 \]

\[ \mu_{c,\text{var}} (\text{e/s}) = 20.74 \]
EMVA 1288 Summary Sheet for Operating Point 2

Type of data: Single
Exposure time: 1.0 ms
Frame rate: 0.0 Hz
Data transfer mode: BayerRG12

Gain, offset
Gain = 0 dB, Offset = 0.08
Environmental temperature
23.1°C
Camera temperature
34.4°C
Wavelength, centr., FWHM
534 nm, 30.9 nm

Quantum efficiency
$\eta = 0.586$

Gain
$K$ (DN/e) = 0.126
$1/K$ (e/DN) = 7.948

Dark noise & DSNU
$\sigma_d$ (DN) = 0.82
$\sigma_0$ (e) = 6.1
$DSNU_{1288}$ (DN) = 0.20
$DSNU_{1288}$ (e) = 1.57

Signal-to-noise ratio & PRNU
$SNR_{max}$ = 179
$SNR_{max}$ (dB) = 45.0
$SNR_{max}$ (bits) = 7.5
$1/SNR_{max}$ (%) = 0.56
$PRNU_{1288}$ (%) = 0.474

Nonlinearity
LE (%) = 0.26

Sensitivity & saturation
$\mu_{p,\text{min}}$ (p) = 11.9
$\mu_{e,\text{min}}$ (e) = 7.0
$\mu_{p,\text{sat}}$ (p) = 54444
$\mu_{e,\text{sat}}$ (e) = 31915

Dynamic range
$DR$ = 4560
$DR$ (dB) = 73.2
$DR$ (bit) = 12.2

Dark current
$\mu_{c,\text{mean}}$ (DN/s) = 2.19
$\mu_{c,\text{mean}}$ (e/s) = 17.39
$\mu_{c,\text{var}}$ (e/s) = -34.29
### EMVA 1288 Summary Sheet for Operating Point 3

<table>
<thead>
<tr>
<th>Type of data</th>
<th>Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure time</td>
<td>1.0 ms</td>
</tr>
<tr>
<td>Frame rate</td>
<td>0.0 Hz</td>
</tr>
<tr>
<td>Data transfer mode</td>
<td>BayerRG12</td>
</tr>
</tbody>
</table>

**Gain, offset**
- Gain = 0dB, Offset = 0.08

**Environmental temperature**
- Camera temp: 34.4°C
- Environmental temp: 23.1°C

**Wavelength, centr., FWHM**
- 630 nm, 13.1 nm

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**Photon transfer m0195, 630nm, 20.01.2015**

<table>
<thead>
<tr>
<th>gray value - dark value (DN)</th>
<th>variance gray - dark value (DN^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-100</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>400</td>
<td>500</td>
</tr>
<tr>
<td>600</td>
<td></td>
</tr>
</tbody>
</table>

- red: var(dark) = 0.68 DN^2, K = 0.126 ± 0.6%

**SNR m0195, 630nm, 20.01.2015**

<table>
<thead>
<tr>
<th>irradiation (photons/pixel)</th>
<th>SNR max (dB)</th>
<th>SNR max (bits)</th>
<th>1/SNR max (%)</th>
<th>PRNU1288 (%)</th>
<th>LE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>45.0</td>
<td>7.5</td>
<td>0.56</td>
<td>0.470</td>
<td>0.55</td>
</tr>
</tbody>
</table>

- SNR max (dB) = 45.0
- SNR max (bits) = 7.5
- 1/SNR max (%) = 0.56
- PRNU1288 (%) = 0.470
- LE (%) = 0.55

**Nonlinearity**
- LE (%) = 0.55

**Sensitivity & saturation**
- \( \mu_{p,\text{min}} \) (p) = 16.1
- \( \mu_{e,\text{min}} \) (e) = 7.1
- \( \mu_{p,\text{sat}} \) (p) = 72786
- \( \mu_{e,\text{sat}} \) (e) = 31969

**Dynamic range**
- DR = 4534
- DR (dB) = 73.1
- DR (bit) = 12.1

**Dark current**
- \( \mu_{c,\text{mean}} \) (DN/s) = 1.85
- \( \mu_{c,\text{mean}} \) (e/s) = 14.67
- \( \mu_{c,\text{var}} \) (e/s) = -91.08

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**Quantum efficiency**
- \( \eta \) = 0.439

**Gain**
- \( K \) (DN/e) = 0.126
- \( 1/K \) (e/DN) = 7.945

**Dark noise & DSNU**
- \( \sigma_d \) (DN) = 0.82
- \( \sigma_0 \) (e) = 6.1
- DSNU1288 (DN) = 0.20
- DSNU1288 (e) = 1.57