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, 20.01.2014, 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.

<table>
<thead>
<tr>
<th>Vendor</th>
<th>MATRIX VISION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>mvBlueCOUGAR-XD129C</td>
</tr>
<tr>
<td>Serial number</td>
<td>GX201689</td>
</tr>
<tr>
<td>Sensor diagonal</td>
<td>16.00 mm</td>
</tr>
<tr>
<td>Lens category</td>
<td>C-Mount</td>
</tr>
<tr>
<td>Resolution</td>
<td>$3384 \times 2712$, 12 bit</td>
</tr>
<tr>
<td>Pixel size</td>
<td>$3.69 \mu m \times 3.69 \mu m$</td>
</tr>
<tr>
<td>Sensor type</td>
<td>CCD</td>
</tr>
<tr>
<td>Readout type</td>
<td>Progressive</td>
</tr>
<tr>
<td>Transfer type</td>
<td>Interline</td>
</tr>
<tr>
<td>Maximum frame rate</td>
<td>8.6 Hz</td>
</tr>
<tr>
<td>Interface type</td>
<td>GigE Vision</td>
</tr>
</tbody>
</table>

Type of data presented: Single

**Operation point 1, (page 5)**
- Wavelength centroid: 467.3 nm
- Wavelength FWHM: 20.5 nm
- Gain, offset: Gain = -5dB, Offset = 0.2

**Operation point 2, (page 10)**
- Wavelength centroid: 534.2 nm
- Wavelength FWHM: 30.9 nm
- Gain, offset: Gain = -5dB, Offset = 0.2

**Operation point 3, (page 15)**
- Wavelength centroid: 629.5 nm
- Wavelength FWHM: 13.1 nm
- Gain, offset: Gain = -5dB, Offset = 0.2

Optional data measured: None

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

<table>
<thead>
<tr>
<th>Type of data</th>
<th>Single</th>
<th>Gain, offset</th>
<th>Gain = -5dB, Offset = 0.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure time</td>
<td>20.0 ms</td>
<td>Environmental</td>
<td>29.3°C</td>
</tr>
<tr>
<td>Frame rate</td>
<td>0.0 Hz</td>
<td>Camera temper-</td>
<td>27.5°C</td>
</tr>
<tr>
<td>Data transfer mode</td>
<td>BayerRG12</td>
<td>ature</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wavelength,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>centr., FWHM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>467 nm, 20.5 nm</td>
<td></td>
</tr>
</tbody>
</table>

- **Quantum efficiency**
  \[ \eta = 0.447 \]

- **Gain**
  \[ K = 0.320 \]
  \[ 1/K (e/DN) = 3.121 \]

- **Dark noise & DSNU**
  \[ \sigma_d (DN) = 3.68 \]
  \[ \sigma_0 (e) = 11.5 \]
  \[ DSNU_{1288} (DN) = - \]
  \[ DSNU_{1288} (e) = - \]

- **Signal-to-noise ratio & PRNU**
  \[ SNR_{\text{max}} = 108 \]
  \[ SNR_{\text{max}} (dB) = 40.7 \]
  \[ SNR_{\text{max}} (bits) = 6.8 \]
  \[ 1/SNR_{\text{max}} (%) = 0.92 \]
  \[ PRNU_{1288} (%) = - \]

- **Nonlinearity**
  \[ LE (%) = 0.32 \]

- **Sensitivity & saturation**
  \[ \mu_{\text{p, min}} (\text{p}) = 26.8 \]
  \[ \mu_{\text{e, min}} (\text{e}) = 12.0 \]
  \[ \mu_{\text{p, sat}} (\text{p}) = 26242 \]
  \[ \mu_{\text{e, sat}} (\text{e}) = 11742 \]

- **Dynamic range**
  \[ DR = 978 \]
  \[ DR (dB) = 59.8 \]
  \[ DR (bit) = 9.9 \]

- **Dark current**
  \[ \mu_{\text{c, mean}} (\text{DN/s}) = - \]
  \[ \mu_{\text{c, mean}} (\text{e/s}) = - \]
  \[ \mu_{\text{c, var}} (\text{e/s}) = - \]
EMVA 1288 Summary Sheet for Operating Point 2

Type of data: Single  
Exposure time: 20.0 ms  
Frame rate: 0.0 Hz  
Data transfer mode: BayerRG12

Environmental conditions:
- Temperature: 29.3°C  
- Camera temperature: 27.5°C

Wavelength, cent., FWHM: 534 nm, 30.9 nm

Quantum efficiency: $\eta = 0.506$

Gain:
- $K$ (DN/e): 0.319  
- $1/K$ (e/DN): 3.132

Dark noise & DSNU:
- $\sigma_d$ (DN): 3.78  
- $\sigma_0$ (e): 11.8  
- DSNU$_{1288}$ (DN): —  
- DSNU$_{1288}$ (e): —

Signal-to-noise ratio & PRNU:
- $\text{SNR}_{\text{max}}$: 109  
- $\text{SNR}_{\text{max}}$ (dB): 40.7  
- $\text{SNR}_{\text{max}}$ (bits): 6.8  
- $1/\text{SNR}_{\text{max}}$ (%): 0.92  
- PRNU$_{1288}$ (%): —

Nonlinearity:
- LE (%): 0.41

Sensitivity & saturation:
- $\mu_{p,\text{min}}$ (p): 24.4  
- $\mu_{e,\text{min}}$ (e): 12.4  
- $\mu_{p,\text{sat}}$ (p): 23400  
- $\mu_{e,\text{sat}}$ (e): 11833

Dynamic range:
- DR: 958  
- DR (dB): 59.6  
- DR (bit): 9.9

Dark current:
- $\mu_{c,\text{mean}}$ (DN/s): —  
- $\mu_{c,\text{mean}}$ (e/s): —  
- $\mu_{c,\text{var}}$ (e/s): —
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>20.0 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 = -5dB, Offset = 0.2

Environmental temperature
- 29.3°C

Camera temperature
- 27.5°C

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

Quantum efficiency
- \( \eta = 0.340 \)

Gain
- \( K \) (DN/e) = 0.318
- \( 1/K \) (e/DN) = 3.140

Dark noise & DSNU
- \( \sigma_d \) (DN) = 3.74
- \( \sigma_0 \) (e) = 11.7
- DSNU\(_{1288} \) (DN) = —
- DSNU\(_{1288} \) (e) = —

Signal-to-noise ratio & PRNU
- \( \text{SNR}_{\text{max}} \) = 109
- \( \text{SNR}_{\text{max}} \) (dB) = 40.8
- \( \text{SNR}_{\text{max}} \) (bits) = 6.8
- \( 1/\text{SNR}_{\text{max}} \) (%) = 0.91
- PRNU\(_{1288} \) (%) = —

Nonlinearity
- LE (%) = 0.67

Sensitivity & saturation
- \( \mu_{p,\text{min}} \) (p) = 36.1
- \( \mu_{e,\text{min}} \) (e) = 12.3
- \( \mu_{p,\text{sat}} \) (p) = 35225
- \( \mu_{e,\text{sat}} \) (e) = 11983

Dynamic range
- DR = 977
- DR (dB) = 59.8
- DR (bit) = 9.9

Dark current
- \( \mu_{c,\text{mean}} \) (DN/s) = —
- \( \mu_{c,\text{mean}} \) (e/s) = —
- \( \mu_{c,\text{var}} \) (e/s) = —