



Scope

The Alvium CSI-2 Cameras User Guide provides tables with ROI frame rates to enable estimations for applications that do not use the maximum resolution. These frame rates relate to **GenICam for CSI-2 Access**. **SensorBitDepth** with **GenICam for CSI-2 Access** optimizes the bandwidth usage when pixel formats have a lower bit depth than the sensor ADC output.

Therefore, with 1800 C models supporting **SensorBitDepth**, frame rates are lower with **Video4Linux Access** or **Direct Register Access** than with **GenICam for CSI-2 Access**.

This document shows ROI frame rates with 1800 C models for **Video4Linux Access** or **Direct Register Access**.

Helpful downloads

Download	Link
Alvium CSI-2 Cameras User Guide	www.alliedvision.com/en/support/technical-documentation/alvium-csi-2-documentation
Additional camera documentation	
Accessories for Alvium CSI-2 cameras	www.alliedvision.com/en/products/accessories

Table 1: Helpful downloads



Frame rate values in tables

Calculations for frame rates were done at different times. Therefore, some tables contain numbers rounded to integer values, while others have been rounded to include an additional decimal place. Values are always rounded down. For example, 21.9 is rounded to 21.

Notes on values for ROI frame rate

Achieved values deviating from specified values

Values stated in the model specifications show the maximum available on an ideal system, supporting a bandwidth of 1.051 Gbit/s per lane. Your individual setup may affect available values such as for:

- Minimum and maximum exposure times and increments
- Maximum frame rates, including ROI frame rates
- Image resolution steps.
- **Image resolution steps.** Depending on the available increments, some standard resolutions are not supported. For example, instead of 1,440 × 900 pixels for WXGA+, 1,440 × 904 pixels are available.
- **Minimum resolution.** Depending on the embedded board, minimum resolution may be greater than stated in tables. For example, instead of 16 × 16 pixels, the minimum resolution available may be 256 × 32 pixels.
- We recommend you to set ROI values before you set values for Exposure Time, because interdependencies between controls affect each other. See Value changes by control interdependencies in the Alvium CSI-2 Cameras User Guide.
- **Deviations from stated frame rates** can occur, especially when:
 - The camera is operated in triggered mode
 - Low bandwidth is used
 - Small ROIs are used.

CSI-2LaneCount and CSI-2ClockFrequency

Alvium cameras require higher bandwidths than supported by only one CSI-2 lane, especially with low CSI-2 clock frequencies. We recommend you to do extensive testing to find the best setup for maximum frame rates, regarding:

- CSI-2LaneCount
- CSI-2 ClockFrequency (CSI-2 Clock).

Dropped frames or a viewer issue?

Alvium CSI-2 cameras are designed for a maximum bandwidth that does not exceed board abilities. However, if your setup does not provide sufficient bandwidth, frames are dropped. Even if bandwidth is sufficient, embedded boards may not be able to display all images of an image stream. In this case, only the display is affected but no dropped frames occur.

Frame rates with ROI/Cropping

ROI and Cropping work similarly: While ROI is typically used for **GenICam for CSI-2 Access**, Cropping is typically used for **Video4Linux Access** or **Direct Register Access**. By using a reduced area of the available sensor, the payload is reduced, increasing frame rates. This document uses the term ROI.

The maximum frame rate which can be achieved depends on various values, such as bandwidth, pixel format, exposure time, and ROI. Calculation of maximum frame rates for different ROIs for Alvium CSI-2 cameras does not allow to give a formula. Data is calculated for [Operation for maximum frame rates](#) on page 3.

Operation for maximum frame rates

Values for maximum frame rates and for minimum and maximum exposure time in the specification tables are based on following parameters:

- Factory settings (camera after power up)
- Minimum exposure time
- Full resolution
- **Video4Linux Access** or **Direct Register Access**
- RAW8 (GREY) for monochrome and color models
- Camera operation in freerun mode
- Without bandwidth limitations.

Frame rates with rolling shutter sensors

The following table shows how the shutter type impacts available frame rates. Reducing the area for ROI reduces readout time. The relations in [Table 2](#) apply only if exposure time is shorter than readout time.

Sensor type	Shutter mode	Trigger mode	Frame rates at full resolution ¹	ROI frame rates
All models, except for...	Global shutter (GS)	Freerun	100%	Increased values
	Global shutter (GS)	External trigger	100%	
1800 C-500	Rolling shutter (RS)	Freerun	100%	Increased values
	Rolling shutter (RS)	External trigger	>50%	
1800 C-1240	Rolling shutter (RS)	Freerun	100%	No increase
	Rolling shutter (RS)	External trigger	>99%	
1800 C-2050	Rolling shutter (RS)	Freerun	100%	Increased values
	Rolling shutter (RS)	External trigger	>99%	

¹ Related to the values for maximum frame rates stated in the specification tables for each model.

Table 2: Frame rates depending on shutter types and trigger modes

ROI frame rates by Alvium 1800 C model

Alvium 1800 C-030 VSWIR

Feature	Specification
Maximum frame rate → at full resolution	132 fps → using 1 to 4 lanes
Exposure time → RAW8 (GREY) at 12-Bit readout	21 μs to 10 s → 1 lane

Table 3: Alvium 1800 C-030 VSWIR → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 1 lane with 1.051 Gbit/s. Increasing the CSI-2 Lane Count value does not increase frame rates.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	656	520	0.341	132.9		
VGA	640	480	0.307	142.9		
HVGA	480	320	0.154	205.1		
QVGA	320	240	0.077	262.7		
HQVGA	240	160	0.038	365.0		
QQVGA	160	120	0.019	454.6		
Max. × half ²	656	264	0.173	241.0		
Max. × min.	656	16	0.010	1133.1		
Min. × max.	16	520	0.008	134.1		
Min. × min.	16	16	256 P	1224.5		

¹ RAW8 (GREY) at 12-Bit readout
² Instead of 656 × 260
 If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 4: Alvium 1800 C-030 VSWIR → ROI frame rates

Alvium 1800 C-040m/c

Feature	Specification
Maximum frame rate → at full resolution	289 fps → using 1 to 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	20 μs to 10 s → 1 lane

Table 5: Alvium 1800 C-040m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 1 lane with 1.051 Gbit/s. Increasing the **CSI-2 Lane Count** value does not increase frame rates.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	728	544	0.396	289		
VGA	640	480	0.307	322		
HVGA	480	320	0.154	450		
QVGA	320	240	0.077	564		
HQVGA	240	160	0.038	750		
QQVGA	160	120	0.019	896		
Max. × half	728	272	0.198	503		
Max. × min.	728	16	0.012	1,663		
Min. × max.	16	544	0.009	293		
Min. × min.	16	16	256 P	1,810		

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout

Table 6: Alvium 1800 C-040m/c → ROI frame rates

Alvium 1800 C-052m/c

Feature	Specification
Maximum frame rate → at full resolution	499 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	21 μs to 10 s → 4 lanes

Table 7: Alvium 1800 C-052m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	816	624	0.509	499.6	414.7	215.4
SVGA	800	600	0.480	510.8	434.7	223.0
VGA	640	480	0.307	622.7		336.9
HVGA	480	320	0.154	851.8		607.2
QVGA	320	240	0.077	1056.6		
HQVGA	240	160	0.038	1371.3		
QQVGA	160	120	0.019	1572.0		
Max. × half	816	312	0.255	822.8	688.3	363.6
Max. × min.	816	16	0.013	2329.6	2021.0	1164.6
Min. × max.	16	624	0.010	525.4		
Min. × min.	16	16	256 P	3021.2		

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout

Table 8: Alvium 1800 C-052m/c → ROI frame rates

Alvium 1800 C-130 VSWIR

Feature	Specification
Maximum frame rate → at full resolution	69 fps → using 1 to 4 lanes
Exposure time → RAW8 (GREY) at 12-Bit readout	21 μs to 10 s → 1 lane

Table 9: Alvium 1800 C-130 VSWIR → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 1 lane with 1.051 Gbit/s. Increasing the CSI-2 Lane Count value does not increase frame rates.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	1296	1032	1.337		69.7	
SXGA	1280	1024	1.311		70.3	
HD 720	1280	720	0.922		97.8	
XGA	1024	768	0.786		92.3	
SVGA	800	600	0.480		116.4	
VGA	640	480	0.307		142.9	
HVGA	480	320	0.154		205.1	
QVGA	320	240	0.077		262.7	
HQVGA	240	160	0.038		365.0	
QQVGA	160	120	0.019		454.6	
Max. × half ²	1296	520	0.674		131.8	
Max. × min.	1296	16	0.021		1054.4	
Min. × max.	16	1032	0.017		70.4	
Min. × min.	16	16	256 P		1224.5	

¹ RAW8 (GREY) at 12-Bit readout

² Instead of 1296 × 516

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 10: Alvium 1800 C-130 VSWIR → ROI frame rates

Alvium 1800 C-158m/c

Feature	Specification
Maximum frame rate → at full resolution	153 fps → using 2 to 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	20 μs to 10 s → 2 lanes

Table 11: Alvium 1800 C-158m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 2 lanes with 2.102 Gbit/s. Increasing the CSI-2 Lane Count value does not increase frame rates.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	1456	1088	1.584	153		81
WXGA+ ²	1440	904	1.302	181		98
SXGA	1280	1024	1.311	163		98
HD 720	1280	720	0.922	222		136
XGA	1024	768	0.786	211		158
SVGA	800	600	0.480	264		250
VGA	640	480	0.307	321		321
QVGA	480	320	0.154	564		564
QQVGA	320	240	0.077	896		
Max. × half	240	160	0.038	281		153
Max. × min.	160	120	0.019	1,431		978
Min. × max.	1456	544	0.792	157		
Min. × min.	1456	16	0.023	1,810		

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout

² Instead of 1440 × 900

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 12: Alvium 1800 C-158m/c → ROI frame rates

Alvium 1800 C-203m/c

Feature	Specification
Maximum frame rate → at full resolution	156 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	15 μs to 10 s → 4 lanes

Table 13: Alvium 1800 C-203m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	1632	1248	2.037	156.2	118.7	60.1
UXGA	1600	1200	1.920	162.0	124.7	63.5
WXGA+ ²	1440	904	1.302	209.8	180.0	91.5
SXGA	1280	1024	1.311	188.3	179.5	91.8
HD 720	1280	720	0.922	257.4	245.6	126.3
XGA	1024	768	0.786	245.2		148.7
SVGA	800	600	0.480	306.6		236.0
VGA	640	480	0.307	373.0		355.9
HVGA	480	320	0.154	523.0		
QVGA	320	240	0.077	658.5		
HQVGA	240	160	0.038	881.7		
QQVGA	160	120	0.019	1072.2		
Max. × half	1632	624	1.018	287.6	220.2	112.5
Max. × min.	1632	16	0.026	1592.3	1317.3	758.1
Min. × max.	16	1248	0.020	161.2		
Min. × min.	16	16	256 P	2319.2		

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout

² Instead of 1440 × 900

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 14: Alvium 1800 C-203m/c → ROI frame rates

Alvium 1800 C-234m/c

Feature	Specification
Maximum frame rate → at full resolution	31 fps → using 1 to 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	39 μs to 10 s → 1 lane

Table 15: Alvium 1800 C-234m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 1 lane with 1.051 Gbit/s. Increasing the CSI-2 Lane Count value does not increase frame rates.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	1936	1216	2.354		31.6	
Full HD	1920	1080	2.074		35.4	
UXGA	1600	1200	1.920		32.0	
WXGA+ ²	1,440	904	1.302		41.9	
SXGA	1280	1024	1.311		37.2	
HD 720	1280	720	0.922		51.9	
XGA	1024	768	0.786		48.9	
SVGA	800	600	0.480		61.6	
VGA	640	480	0.307		75.6	
HVGA	480	320	0.154		108.5	
QVGA	320	240	0.077		138.6	
HQVGA	240	160	0.038		192.5	
QQVGA	160	120	0.019		238.4	
Max. × half	1936	608	1.177		60.6	
Max. × min.	1936	16	0.031		580.4	
Min. × max.	16	1216	0.019		31.7	
Min. × min.	16	16	256 P		625.8	

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout

² Instead of 1440 × 900

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 16: Alvium 1800 C-234m/c → ROI frame rates

Alvium 1800 C-235m/c

Feature	Specification
Maximum frame rate → at full resolution	121 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	21 μs to 10 s → 4 lanes

Table 17: Alvium 1800 C-235m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	1936	1216	2.354	121.8	103.8	52.8
Full HD	1920	1080	2.074	136.1	117.2	59.8
UXGA	1600	1200	1.920	124.0		64.8
WXGA+ ²	1440	904	1.302	161.9		94.0
SXGA	1280	1024	1.311	144.6		94.0
HD 720	1280	720	0.922	200.1		130.4
XGA	1024	768	0.786	189.8		153.3
SVGA	800	600	0.480		238.9	
VGA	640	480	0.307		293.3	
HVGA	480	320	0.154		420.8	
QVGA	320	240	0.077		539.6	
HQVGA	240	160	0.038		744.9	
QQVGA	160	120	0.019		927.8	
Max. × half	1936	608	1.177	228.6	195.5	100.6
Max. × min.	1936	16	0.031	1555.4	1401.2	845.3
Min. × max.	16	1216	0.019		125.3	
Min. × min.	16	16	256 P		2403.8	

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout

² Instead of 1440 × 900

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 18: Alvium 1800 C-235m/c → ROI frame rates

Alvium 1800 C-240m/c

Feature	Specification
Maximum frame rate → at full resolution	126 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	20 μs to 10 s → 4 lanes

Table 19: Alvium 1800 C-240m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	1936	1216	2.354	126	109	56
Full HD	1920	1080	2.074	140	123	63
UXGA	1600	1200	1.920	128		68
WXGA+ ²	1440	904	1.302	166		99
SXGA	1280	1024	1.311	149		99
HD 720	1280	720	0.922	204		137
XGA	1024	768	0.786	194		160
SVGA	800	600	0.480	243		243
VGA	640	480	0.307		297	
QVGA	320	240	0.077		529	
QQVGA	160	120	0.192		862	
Max. × half	1936	608	1.177	233	203	106
Max. × min.	1936	16	0.031	1,337	1,251	841
Min. × max.	16	1216	0.019		129	
Min. × min.	16	16	256 P		1,858	

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout

² Instead of 1440 × 900

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 20: Alvium 1800 C-240m/c → ROI frame rates

Alvium 1800 C-291m/c

Feature	Specification
Maximum frame rate → at full resolution	116 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	11 μs to 10 s → 4 lanes

Table 21: Alvium 1800 C-291m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	1944	1472	2.862	116.3	85.4	43.1
Full HD	1920	1080	2.074	154.6	115.0	58.6
UXGA	1600	1200	1.920	141.3	125.0	63.7
WXGA+ ²	1440	904	1.302	183.4	180.7	91.9
SXGA	1280	1024	1.311	164.4		92.1
HD 720	1280	720	0.922	225.5		126.8
XGA	1024	768	0.786	214.2		149.3
SVGA	800	600	0.480	268.4		237.3
VGA	640	480	0.307	326.9		
HVGA	480	320	0.154	460.6		
QVGA	320	240	0.077	582.6		
HQVGA	240	160	0.038	782.6		
QQVGA	160	120	0.019	952.0		
Max. × half	1944	736	1.431	217.0	160.5	81.8
Max. × min.	1944	16	0.031	1409.9	1139.9	659.3
Min. × max.	16	1472	0.024	119.7		
Min. × min.	16	16	64 P	2147.6		

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout

² Instead of 1440 × 900

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 22: Alvium 1800 C-291m/c → ROI frame rates

Alvium 1800 C-319m/c

Feature	Specification
Maximum frame rate → at full resolution	54 fps → using 2 to 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	26 μs to 10 s → 2 lanes

Table 23: Alvium 1800 C-319m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 2 lanes with 2.102 Gbit/s. Increasing the CSI-2 Lane Count value does not increase frame rates.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	2064	1544	3.187	54		42
QXGA	2048	1536	3.146	54		42
Full HD	1920	1080	2.074	75		63
UXGA	1600	1200	1.920		68	
WXGA+ ²	1440	904	1.302		89	
SXGA	1280	1024	1.311		79	
HD 720	1280	720	0.922		110	
XGA	1024	768	0.786		104	
SVGA	800	600	0.480		131	
VGA	640	480	0.307		160	
QVGA	320	240	0.077		289	
QQVGA	160	120	0.019		484	
Max. × half ³	2064	776	1.602	102		80
Max. × min.	2064	16	0.033	937		790
Min. × max.	16	1544	0.025		54	
Min. × min.	16	16	256 P		1,146	

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout
² Instead of 1440 × 900
³ Instead of 2064 × 772
 If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 24: Alvium 1800 C-319m/c → ROI frame rates

Alvium 1800 C-320 VSWIR

Feature	Specification
Maximum frame rate → at full resolution	87 fps → using 4 lanes
Exposure time → RAW8 (GREY) at 12-Bit readout	28 μs to 10 s → 4 lanes

Table 25: Alvium 1800 C-320 VSWIR → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	2080	1544	3.212	87.6	73.6	37.1
QXGA	2048	1536	3.146	88.0	74.7	37.9
Full HD	1920	1080	2.074	120.2	108.6	55.3
UXGA	1600	1200	1.920	110.2		60.4
WXGA+ ²	1440	904	1.302	140.9		85.8
SXGA	1280	1024	1.311	127.0		86.7
HD 720	1280	720	0.922	170.7		116.8
XGA	1024	768	0.786	162.8		138.1
SVGA	800	600	0.480	199.9		
VGA	640	480	0.307	238.8		
HVGA	480	320	0.154	321.8		
QVGA	320	240	0.077	391.0		
HQVGA	240	160	0.038	496.4		
QQVGA	160	120	0.019	573.8		
Max. × half ³	2080	776	1.614	158.0	133.2	67.7
Max. × min.	2080	16	0.033	773.9	671.7	367.1
Min. × max.	16	1544	0.025	89.6		
Min. × min.	16	16	0.000	967.4		

¹ RAW8 (GREY) at 12-Bit readout
² Instead of 1440 × 900 | ³ Instead of 2080 × 772
 If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 26: Alvium 1800 C-320 VSWIR → ROI frame rates

Alvium 1800 C-500m/c

Feature	Specification
Maximum frame rate → at full resolution	68 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	8 μs to 10 s → 4 lanes

Table 27: Alvium 1800 C-500m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Shutter mode	User mode	Available frame rates
Rolling shutter (RS)	Freerun	Values in Table 29 below are reached.
Rolling shutter (RS)	Triggered	>50% of the values for in Table 29 below are reached.

Table 28: Alvium 1800 C-500m/c → Frame rate behavior for different configurations

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	2592	1944	5.039	68.1	50.8	25.5
WQHD	2560	1440	3.686	91.1	68.9	34.6
QXGA	2048	1536	3.146	85.8	80.8	40.6
Full HD	1920	1080	2.074	120.5		60.9
UXGA	1600	1200	1.920	109.1		66.0
WXGA+ ²	1440	904	1.302	143.2		96.3
SXGA	1280	1024	1.311	127.2		96.2
HD 720	1280	720	0.922	177.7		134.5
XGA	1024	768	0.786	167.7		158.1
SVGA	800	600	0.480	212.1		
VGA	640	480	0.307	261.3		
HVGA	480	320	0.154	378.2		
QVGA	320	240	0.077	488.0		
HQVGA	240	160	0.038	684.2		
QQVGA	160	120	0.019	856.3		
Max. × half ³	2592	976	2.530	132.0	98.8	49.7
Max. × min.	2592	16	0.041	1917.2	1535.3	858.9
Min. × max.	16	1944	0.031	68.6		
Min. × min.	16	16	256 P	2474.6		

¹ RAW8 (GREY) or RGB888 (RGB3) at 10-Bit readout

² Instead of 1440 × 900 | ³ Instead of 2592 × 972

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 29: Alvium 1800 C-500m/c → ROI frame rates

Alvium 1800 C-507m/c and -507m/c Pol

Feature	Specification
Maximum frame rate → at full resolution	34 fps → using 2 to 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	28 μs to 10 s → 2 lanes

Table 30: Alvium 1800 C-507m/c (Pol) → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 2 lanes with 2.102 Gbit/s. Increasing the CSI-2 Lane Count value does not increase frame rates.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	2464	2056	5.066	34		26
QXGA	2048	1536	3.146	46		42
Full HD	1920	1080	2.074	64		63
UXGA	1600	1200	1.920	58		
WXGA+ ²	1440	904	1.302	76		
SXGA	1280	1024	1.311	67		
HD 720	1280	720	0.922	94		
XGA	1024	768	0.786	89		
SVGA	800	600	0.480	111		
VGA	640	480	0.307	136		
QVGA	320	240	0.077	248		
QQVGA	160	120	0.019	416		
Max. × half ³	2464	1032	2.543	66		51
Max. × min.	2464	16	0.039	814		678
Min. × max.	16	2056	0.033	35		
Min. × min.	16	16	256 P	1,001		

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout
² Instead of 1440 × 900
³ Instead of 2464 × 1028
If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 31: Alvium 1800 C-507m/c, -507m/c Pol → ROI frame rates

Alvium 1800 C-508m/c and -508m/c Pol

Feature	Specification
Maximum frame rate → at full resolution	65 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	21 μs to 10 s → 4 lanes

Table 32: Alvium 1800 C-508m/c (Pol) → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	2464	2056	5.066	65	52	26
QXGA	2048	1536	3.146	86	83	42
Full HD	1920	1080	2.074	120		63
UXGA	1600	1200	1.920	109		68
WXGA+ ²	1440	904	1.302	142		99
SXGA	1280	1024	1.311	127		99
HD 720	1280	720	0.922	175		136
XGA	1024	768	0.786	166		159
SVGA	800	600	0.480	208		208
VGA	640	480	0.307		254	
QVGA	320	240	0.077		447	
QQVGA	160	120	0.019		718	
Max. × half ³	2464	1032	2.543	124	100	51
Max. × min.	2464	16	0.039	1,111	995	648
Min. × max.	16	2056	0.033		66	
Min. × min.	16	16	256 P		1,513	

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout

² Instead of 1440 × 900

³ Instead of 2464 × 1028

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 33: Alvium 1800 C-508m/c, -508m/c Pol → ROI frame rates

Alvium 1800 C-510m/c

Feature	Specification
Maximum frame rate → at full resolution	81 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	8 μs to 10 s → 4 lanes

Table 34: Alvium 1800 C-510m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	2464	2064	5.086	81.5	47.3	23.8
QXGA	2048	1536	3.146	106.7	74.8	37.6
Full HD	1920	1080	2.074	145.5	108.7	54.8
UXGA	1600	1200	1.920	133.3	118.4	60.1
WXGA+ ²	1440	904	1.302	170.1	168.5	85.1
SXGA	1280	1024	1.311	153.5		86.2
HD 720	1280	720	0.922	205.8		115.8
XGA	1024	768	0.786	196.1		137.2
SVGA	800	600	0.480	239.9		214.7
VGA	640	480	0.307	285.3		
HVGA	480	320	0.154	380.5		
QVGA	320	240	0.077	456.0		
HQVGA	240	160	0.038	569.0		
QQVGA	160	120	0.019	649.4		
Max. × half	2464	1032	2.543	150.2	87.8	44.4
Max. × min.	2464	16	0.039	887.8	555.3	295.4
Min. × max.	16	2064	0.033	82.5		
Min. × min.	16	16	256 P	1026.7		

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout

² Instead of 1440 × 900

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 35: Alvium 1800 C-510m/c → ROI frame rates

Alvium 1800 C-511m/c

Feature	Specification
Maximum frame rate → at full resolution	79 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	8 μs to 10 s → 4 lanes

Table 36: Alvium 1800 C-511m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	2464	2064	5.086	79.9	47.3	23.8
QXGA	2048	1536	3.146	104.7	74.8	37.6
Full HD	1920	1080	2.074	142.8	108.7	54.8
UXGA	1600	1200	1.920	130.7	118.4	60.1
WXGA+ ²	1440	904	1.302	167.0		85.1
SXGA	1280	1024	1.311	150.5		86.2
HD 720	1280	720	0.922	201.8		115.8
XGA	1024	768	0.786	192.3		137.2
SVGA	800	600	0.480	235.2		214.7
VGA	640	480	0.307	280.2		
HVGA	480	320	0.154	373.1		
QVGA	320	240	0.077	447.1		
HQVGA	240	160	0.038	557.9		
QQVGA	160	120	0.019	636.8		
Max. × half	2464	1032	2.543	147.3	87.8	44.4
Max. × min.	2464	16	0.039	870.6	555.3	295.4
Min. × max.	16	2064	0.033	80.9		
Min. × min.	16	16	256 P	1006.8		

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout
² Instead of 1440 × 900
If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 37: Alvium 1800 C-511m/c → ROI frame rates

Alvium 1800 C-530 VSWIR

Feature	Specification
Maximum frame rate → at full resolution	58 fps → using 4 lanes
Exposure time → RAW8 (GREY) at 12-Bit readout	30 μs to 10 s → 4 lanes

Table 38: Alvium 1800 C-530 VSWIR → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	2592	2056	5.329	58.8	45.2	22.8
QSXGA	2560	2048	5.243	59.0	46.1	23.2
WQHD	2560	1440	3.686	81.2	63.4	32.0
QXGA	2048	1536	3.146	77.0	74.7	37.9
Full HD	1920	1080	2.074	105.2		55.3
UXGA	1600	1200	1.920	96.4		60.4
WXGA+ ²	1440	904	1.302	123.4		85.8
SXGA	1280	1024	1.311	111.1		86.7
HD 720	1280	720	0.922	149.4		116.8
XGA	1024	768	0.786	142.3		138.1
SVGA	800	600	0.480	174.8		
VGA	640	480	0.307	209.0		
HVGA	480	320	0.154	281.3		
QVGA	320	240	0.077	341.9		
HQVGA	240	160	0.038	433.1		
QQVGA	160	120	0.019	500.6		
Max. × half ³	2592	1028	2.675	108.4	83.6	42.5
Max. × min.	2592	16	0.041	664.9	535.2	293.7
Min. × max.	16	2056	0.033	60.0		
Min. × min.	16	16	0.000	843.9		

¹ RAW8 (GREY) at 12-Bit readout

² Instead of 1440 × 900 | ³ Instead of 2080 × 772

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 39: Alvium 1800 C-530 VSWIR → ROI frame rates

Alvium 1800 C-811m/c

Feature	Specification
Maximum frame rate → at full resolution	59 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	8 μs to 10 s → 4 lanes

Table 40: Alvium 1800 C-811m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	2848	2848	8.111	59.2	30.4	15.2
QSXGA	2560	2048	5.243	80.4	46.1	23.1
WQHD	2560	1440	3.686	110.4	63.5	31.9
QXGA	2048	1536	3.146	104.7	74.8	37.6
Full HD	1920	1080	2.074	142.8	108.7	54.8
UXGA	1600	1200	1.920	130.7	118.4	60.1
WXGA+ ²	1440	904	1.302	167.0		85.1
SXGA	1280	1024	1.311	150.5		86.2
HD 720	1280	720	0.922	201.8		115.8
XGA	1024	768	0.786	192.3		137.2
SVGA	800	600	0.480	235.2		214.7
VGA	640	480	0.307	280.2		
HVGA	480	320	0.154	373.1		
QVGA	320	240	0.077	447.1		
HQVGA	240	160	0.038	557.9		
QQVGA	160	120	0.019	636.8		
Max. × half	2848	1424	4.056	111.2	57.4	29.0
Max. × min.	2848	16	0.046	850.0	481.1	255.8
Min. × max.	16	2848	0.046	59.8		
Min. × min.	16	16	256 P	1006.8		

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout

² Instead of 1440 × 900

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 41: Alvium 1800 C-811m/c → ROI frame rates

Alvium 1800 C-812 UV

Feature	Specification
Maximum frame rate → at full resolution	58 fps → using 4 lanes
Exposure time → RAW8 (GREY) at 12-Bit readout	8 μs to 10 s → 4 lanes

Table 42: Alvium 1800 C-812 UV → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	2848	2848	8.111	58.8	30.2	15.1
QSXGA	2560	2048	5.243	79.7	45.7	22.9
WQHD	2560	1440	3.686	109.0	62.7	31.5
QXGA	2048	1536	3.146	103.5	73.9	37.2
Full HD	1920	1080	2.074	139.7	106.3	53.6
UXGA	1600	1200	1.920	128.9	116.7	59.3
WXGA+ ²	1440	904	1.302	162.8		82.9
SXGA	1280	1024	1.311	148.0		84.8
HD 720	1280	720	0.922	197.3		113.3
XGA	1024	768	0.786	188.3		134.3
SVGA	800	600	0.480	226.9		207.1
VGA	640	480	0.307	271.8		
HVGA	480	320	0.154	358.2		
QVGA	320	240	0.077	426.0		
HQVGA	240	160	0.038	525.4		
QQVGA	160	120	0.019	579.4		
Max. × half	2848	1424	4.056	109.8	56.7	28.6
Max. × min.	2848	16	0.046	776.8	435.5	230.3
Min. × max.	16	2848	0.046	59.4		
Min. × min.	16	16	256 P	905.6		

¹ RAW8 (GREY) at 12-Bit readout

² Instead of 1440 × 900

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 43: Alvium 1800 C-812 UV → ROI frame rates

Alvium 1800 C-895m/c

Feature	Specification
Maximum frame rate → at full resolution	31 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	29 μs to 10 s → 4 lanes

Table 44: Alvium 1800 C-895m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	4112	2176	8.948	31.5	28.3	14.3
UHD 4K	3840	2160	8.294	31.8	30.6	15.4
QSXGA	2560	2048	5.243	33.6		24.3
WQHD	2560	1440	3.686	47.2		34.1
QXGA	2048	1536	3.146	44.5		40.2
Full HD	1920	1080	2.074	62.3		60.0
UXGA	1600	1200	1.920	56.5		
WXGA+ ²	1440	904	1.302	74.1		
SXGA	1280	1024	1.311	65.9		
HD 720	1280	720	0.922	91.8		
XGA	1024	768	0.786	86.6		
SVGA	800	600	0.480	109.2		
VGA	640	480	0.307	134.4		
HVGA	480	320	0.154	193.3		
QVGA	320	240	0.077	247.8		
HQVGA	240	160	0.038	345.2		
QQVGA	160	120	0.019	428.4		
Max. × half	4112	1088	4.474	60.9	54.8	27.8
Max. × min.	4112	16	0.066	740.8	693.4	419.7
Min. × max.	16	2176	0.035	32.0		
Min. × min.	16	16	256 P	1147.1		

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout

² Instead of 1440 × 900

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 45: Alvium 1800 C-895m/c → ROI frame rates

Alvium 1800 C-1236m/c

Feature	Specification
Maximum frame rate → at full resolution	22 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	29 μs to 10 s → 4 lanes

Table 46: Alvium 1800 C-1236m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 2 lanes with 2.102 Gbit/s. Increasing the CSI-2 Lane Count value does not increase frame rates.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	4112	3008	12.369	22		11
UHD 4K	3840	2160	8.294	31		16
QSXGA	2560	2048	5.243	33		25
WQHD	2560	1440	3.686	46		36
QXGA	2048	1536	3.146	44		42
Full HD	1920	1080	2.074		61	
UXGA	1600	1200	1.920		55	
WXGA+ ²	1440	904	1.302		72	
SXGA	1280	1024	1.311		65	
HD 720	1280	720	0.922		90	
XGA	1024	768	0.786		85	
SVGA	800	600	0.480		106	
VGA	640	480	0.307		130	
QVGA	320	240	0.077		235	
QQVGA	160	120	0.019		392	
Max. × half	4112	1504	6.184	44	42	21
Max. × min.	4112	16	0.066	640	621	397
Min. × max.	16	3008	0.048		23	
Min. × min.	16	16	256 P	923		

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout
² Instead of 1440 × 900
If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 47: Alvium 1800 C-1236m/c → ROI frame rates

Alvium 1800 C-1240m/c

Feature	Specification
Maximum frame rate → at full resolution	41 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	10 μs to 10 s → 4 lanes

Table 48: Alvium 1800 C-1240m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s. .

Shutter mode	User mode	Available frame rates
Rolling shutter (RS)	Freerun	Values in Table 50 below are reached.
Rolling shutter (RS)	Triggered	>99% of the values for in Table 50 below are reached.
Global reset shutter (GRS)	Freerun	>99% of the values for in Table 50 below are reached.
Global reset shutter (GRS)	Triggered	

Table 49: Alvium 1800 C-1240m/c → Frame rate behavior for different configurations

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	4024	3036	12.217	41.2	20.9	10.5
UHD 4K	3840	2160	8.294			
QSXGA	2560	2048	5.243			
WQHD	2560	1440	3.686			
QXGA	2048	1536	3.146			
Full HD	1920	1080	2.074			
UXGA	1600	1200	1.920			
WXGA+ ²	1440	904	1.302			
SXGA	1280	1024	1.311			
...			
Max. × half ³	4024	1520	6.116			
Max. × min.	4024	16	0.064			
Min. × max.	16	3036	0.049			
Min. × min.	16	16	256 P			

¹ RAW8 (GREY) or RGB888 (RGB3) at 10-Bit readout

² Instead of 1440 × 900 | ³ Instead of 4024 × 1518

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 50: Alvium 1800 C-1240m/c → ROI frame rates

Alvium 1800 C-1242m/c

Feature	Specification
Maximum frame rate → at full resolution	39 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	11 μs to 10 s → 4 lanes

Table 51: Alvium 1800 C-1242m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	4128	3008	12.417	39.8	20.0	10.0
UHD 4K	3840	2160	8.294	55.8	29.4	14.8
QSXGA	2560	2048	5.243	59.0	46.4	23.3
WQHD	2560	1440	3.686	81.4	64.1	32.2
QXGA	2048	1536	3.146	77.0	75.5	38.0
Full HD	1920	1080	2.074	105.5		55.5
UXGA	1600	1200	1.920	96.4		60.8
WXGA+ ²	1440	904	1.302	123.6		86.4
SXGA	1280	1024	1.311	111.1		87.4
HD 720	1280	720	0.922	149.9		118.0
XGA	1024	768	0.786	142.5		139.6
SVGA	800	600	0.480	175.2		
VGA	640	480	0.307	209.1		
HVGA	480	320	0.154	281.7		
QVGA	320	240	0.077	340.4		
HQVGA	240	160	0.038	430.0		
QQVGA	160	120	0.019	495.1		
Max. × half	4128	1504	6.209	75.4	38.2	19.2
Max. × min.	4128	16	0.066	645.3	363.2	193.8
Min. × max.	16	3008	0.048	41.4		
Min. × min.	16	16	256 P	817.0		

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout

² Instead of 1440 × 900

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 52: Alvium 1800 C-1242m/c → ROI frame rates

Alvium 1800 C-1620m/c

Feature	Specification
Maximum frame rate → at full resolution	30 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	13 μs to 10 s → 4 lanes

Table 53: Alvium 1800 C-1620m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	5328	3040	16.148	30.8	15.5	7.8
UHD 4K	3840	2160	8.294	44.6	29.6	14.9
QSXGA	2560	2048	5.243	47.1	46.8	23.5
WQHD	2560	1440	3.686	65.2	64.9	32.7
QXGA	2048	1536	3.146	61.7		38.4
Full HD	1920	1080	2.074	84.9		56.4
UXGA	1600	1200	1.920	77.4		61.8
WXGA+ ²	1440	904	1.302	99.7		88.0
SXGA	1280	1024	1.311	89.4		88.9
HD 720	1280	720	0.922	121.4		120.8
XGA	1024	768	0.786	115.3		
SVGA	800	600	0.480	142.2		
VGA	640	480	0.307	171.0		
HVGA	480	320	0.154	232.7		
QVGA	320	240	0.077	284.0		
HQVGA	240	160	0.038	364.4		
QQVGA	160	120	0.019	424.3		
Max. × half	5312	1520	8.074	58.7	29.7	15.0
Max. × min.	5312	16	0.085	557.8	318.5	171.6
Min. × max.	16	3040	0.049	32.6		
Min. × min.	16	16	256 P	741.9		

¹ RAW8 (GREY) or GB888 (RGB3) at 12-Bit readout

² Instead of 1440 × 900

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 54: Alvium 1800 C-1620m/c → ROI frame rates

Alvium 1800 C-2040m/c

Feature	Specification
Maximum frame rate → at full resolution	24 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	12 μs to 10 s → 4 lanes

Table 55: Alvium 1800 C-2040m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	4512	4512	20.358	24.8	12.5	6.2
HXGA	4096	3072	12.583	37.2	19.9	10.0
UHD 4K	3840	2160	8.294	52.0	29.6	14.9
QSXGA	2560	2048	5.243	54.9	46.8	23.5
WQHD	2560	1440	3.686	76.0	64.8	32.6
QXGA	2048	1536	3.146	71.9		38.4
Full HD	1920	1080	2.074	98.8		56.4
UXGA	1600	1200	1.920	90.2		61.7
WXGA+ ²	1440	904	1.302	116.1		87.9
SXGA	1280	1024	1.311	104.1		88.7
HD 720	1280	720	0.922	141.3		120.5
XGA	1024	768	0.786		134.2	
SVGA	800	600	0.480		165.5	
VGA	640	480	0.307		198.9	
HVGA	480	320	0.154		270.2	
QVGA	320	240	0.077		329.3	
HQVGA	240	160	0.038		421.4	
QQVGA	160	120	0.019		489.9	
Max. × half	4512	2256	10.179	47.9	24.2	12.1
Max. × min.	4512	16	0.072	648.1	370.6	199.2
Min. × max.	16	4512	0.072		25.9	
Min. × min.	16	16	256 P		848.8	

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout

² Instead of 1440 × 900

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 56: Alvium 1800 C-2040m/c → ROI frame rates

Alvium 1800 C-2050m/c

Feature	Specification
Maximum frame rate → at full resolution	25 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	15 μs to 10 s → 4 lanes

Table 57: Alvium 1800 C-2050m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Shutter mode	User mode	Available frame rates
Rolling shutter (RS)	Freerun	Values in Table 59 below are reached.
Rolling shutter (RS)	Triggered	>99% of the values for in Table 59 below are reached.
Global reset shutter (GRS)	Freerun	>99% of the values for in Table 59 below are reached.
Global reset shutter (GRS)	Triggered	

Table 58: Alvium 1800 C-2050m/c → Frame rate behavior for different configurations

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	5376	3672	19.741	25.1	12.6	6.3
HXGA	4096	3072	12.583	29.9	15.1	7
UHD 4K	3840	2160	8.294	41.8	21.1	10.7
QSXGA	2560				22.3	11.2
WQHD	2560					
QXGA	2048					
Full HD	1920	1080	2.074			
UXGA	1600					
WXGA+ ²	1440	904	1.302			
SXGA	1280	1024	1.311		24.6	12.4
...			
QVGA	320	240	0.077			
HQVGA	240	160	0.038			
QQVGA	160	120	0.019			
Max. × half ³	5376	1840	9.892			
Max. × min.	5376	16	0.086			
Min. × max.	16	3672	0.059	25.1	12.7	6
Min. × min.	16	16	256 P	48.4	24.6	12.4

¹ RAW8 (GREY) or RGB888 (RGB3) at 10-Bit readout

² Instead of 1440 × 900 | ³ Instead of 5376 × 1836

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 59: Alvium 1800 C-2050m/c → ROI frame rates

Alvium 1800 C-2460m/c

Feature	Specification
Maximum frame rate → at full resolution	20 fps → using 4 lanes
Exposure time → RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout	13 μs to 10 s → 4 lanes

Table 60: Alvium 1800 C-2460m/c → Maximum frame rate at full resolution and exposure time range

Values were calculated as defined in [Frame rates with ROI/Cropping](#) on page 2 and in [Operation for maximum frame rates](#) on page 3.

Frame rates at maximum bandwidth calculates for 1.051 Gbit/s per lane. To reach the maximum frame rate available for typical operation, the bandwidth for image traffic is at 4 lanes with 4.204 Gbit/s.

Image format	Width [pixels]	Height [pixels]	ROI area [MP]	Frame rate [fps] ¹		
				4-lane	2-lane	1-lane
				4.204 Gbit/s	2.102 Gbit/s	1.051 Gbit/s
Full resolution	5328	4608	24.551	20	11	5
HSXGA	5120	4096	20.972	24	12	6
HXGA	4096	3072	12.583	31	21	10
UHD 4K	3840	2160	8.294	44	31	15
QSXGA	2560	2048	5.243	46	46	25
WQHD	2560	1440	3.686	64	64	34
QXGA	2048	1536	3.146	61	61	40
Full HD	1920	1080	2.074	83	83	59
UXGA	1600	1200	1.920		76	65
WXGA+ ²	1440	900	1.302		98	92
SXGA	1280	1024	1.311			88
HD 720	1280	720	0.922			119
XGA	1024	768	0.786			113
SVGA	800	600	0.480			139
VGA	640	480	0.307			166
QVGA	320	240	0.077			272
QQVGA	160	120	0.019			399
Max. × half	5328	2304	12.276	41	21	10
Max. × min.	5328	16	0.085	531	323	179
Min. × max.	16	4608	0.074			21
Min. × min.	16	16	256 P			669

¹ RAW8 (GREY) or RGB888 (RGB3) at 12-Bit readout

² Instead of 1440 × 900

If resolutions were not available due to increments, frame rates relate to the next available resolution.

Table 61: Alvium 1800 C-2460m/c → ROI frame rates

Contact us

Website, email

General

www.alliedvision.com/en/contact

info@alliedvision.com

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Offices

**Europe, Middle East, and Africa
(Headquarters)**

Allied Vision Technologies GmbH
Taschenweg 2a
07646 Stadtroda, Germany
T// +49 36428 677-0 (Reception)
T// +49 36428 677-230 (Sales)
F// +49 36428 677-28

Asia-Pacific**China**

Allied Vision Technologies
(Shanghai) Co., Ltd.
2-2109 Hongwell Int. Plaza
1602# ZhongShanXi Road
Shanghai 200235, China
T// +86 21 64861133

Singapore

Allied Vision Technologies Asia Pte. Ltd
82 Playfair Rd, #07-01 D'Lithium
Singapore 368001
T// +65 6634 9027

North, Central, and South America**Canada**

Allied Vision Technologies Canada Inc.
300 – 4621 Canada Way
Burnaby, BC V5G 4X8, Canada
T// +1 604 875 8855

USA

Allied Vision Technologies, Inc.
102 Pickering Way- Suite 502
Exton, PA 19341, USA
Toll-free// +1-877-USA-1394
T// +1 978 225 2030

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Table 62: Document history