

Technical Note: Prosilica GX Image Height versus Frame Rate

Introduction

The camera frame rate can be increased by reducing the camera's *Height* attribute, resulting in a decreased region of interest (ROI) or "window"; or by increasing the camera's *BinningY* attribute, resulting in a vertically scaled image (less overall height with same field of view). This technical note aims to provide users with performance information which identifies the impact of reducing the region of interest on the camera's maximum frame rate. In addition, because the Prosilica GX camera offers Dual GigE LAG, the impact of using a single Ethernet connection versus dual Ethernet connections with the host is compared.

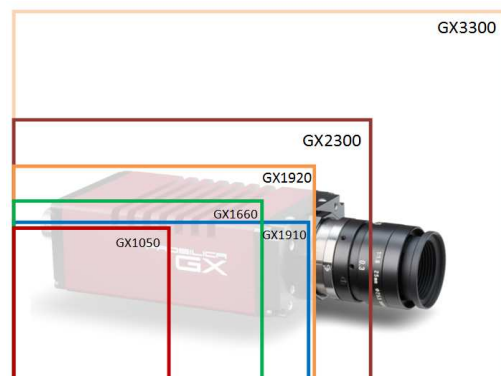
Single port GigE connection with the Prosilica GX

The Prosilica GX cameras can be operated using a single Ethernet connection or a dual port Ethernet connection (Dual GigE LAG). When a Prosilica GX camera is connected to the host computer using a single Ethernet connection, it behaves like a single port GigE Vision camera. The total bandwidth available for the camera is 125 MB or 1 Gb. Connecting a Prosilica GX camera using both Ethernet connections requires link aggregation support from the host Ethernet controller and filter driver. A Dual GigE LAG connection supported by the Prosilica GX camera offers up to 250 MB or 2 Gb of bandwidth.

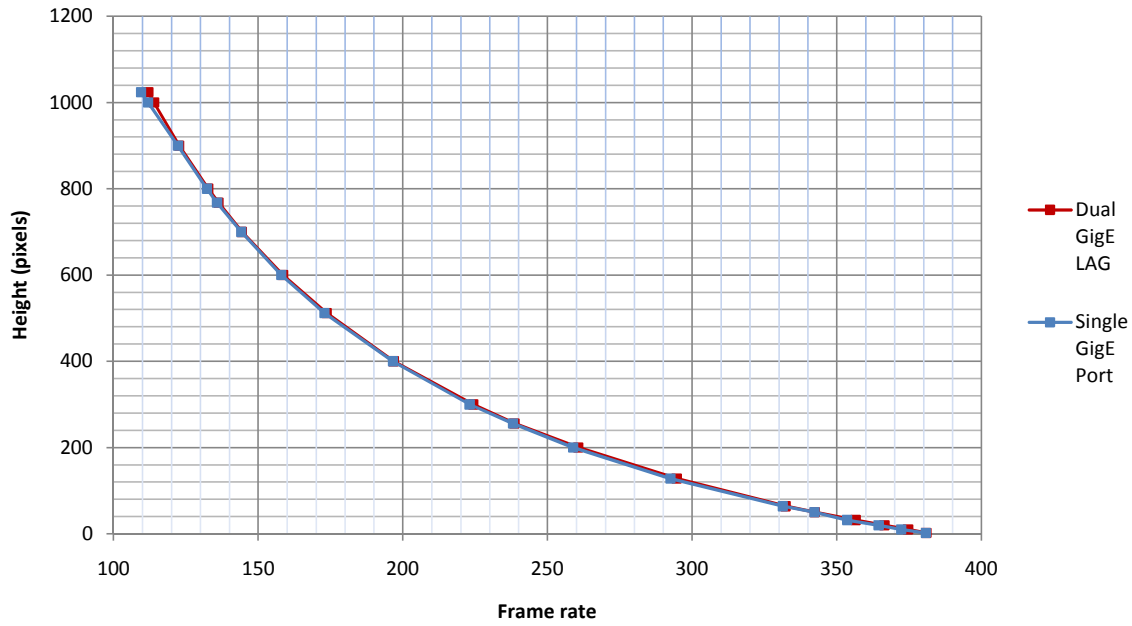
The Prosilica GX camera can be operated near peak frame rates even when using a single port connection. The frame rate tables included in this document provide frame rate performance results for both single GigE port and Dual GigE LAG configurations.

NOTES

1. There is no frame rate increase with reduced width
2. ROIs are taken center image for maximum speed advantage. A CCD has "fast readout rows" before and after an ROI. This is how the sensor frame rate increases with less height. On a quad-tap GX CCD, the top half and bottom half of the sensor are read out together. Read out starts from the outside of the sensor and moves to the inside, i.e. top row of top half of sensor read out with bottom row of bottom half. As these rows are clocked together, if either row is not a "fast readout row" (outside the ROI), the combination is read out slowly. Therefore the ROI must be centered for maximum speed advantage.
3. BinningY is horizontal row summing on CCD before readout. The frame rate for an ROI at the same effective height as binning will be slower because the CCD still needs to read out the "fast readout rows" in ROI mode.
4. Single GigE port frame rate data was generated using StreamBytesPerSecond equals 120 MB and an 8 bit pixel format such as Mono8 or Bayer8



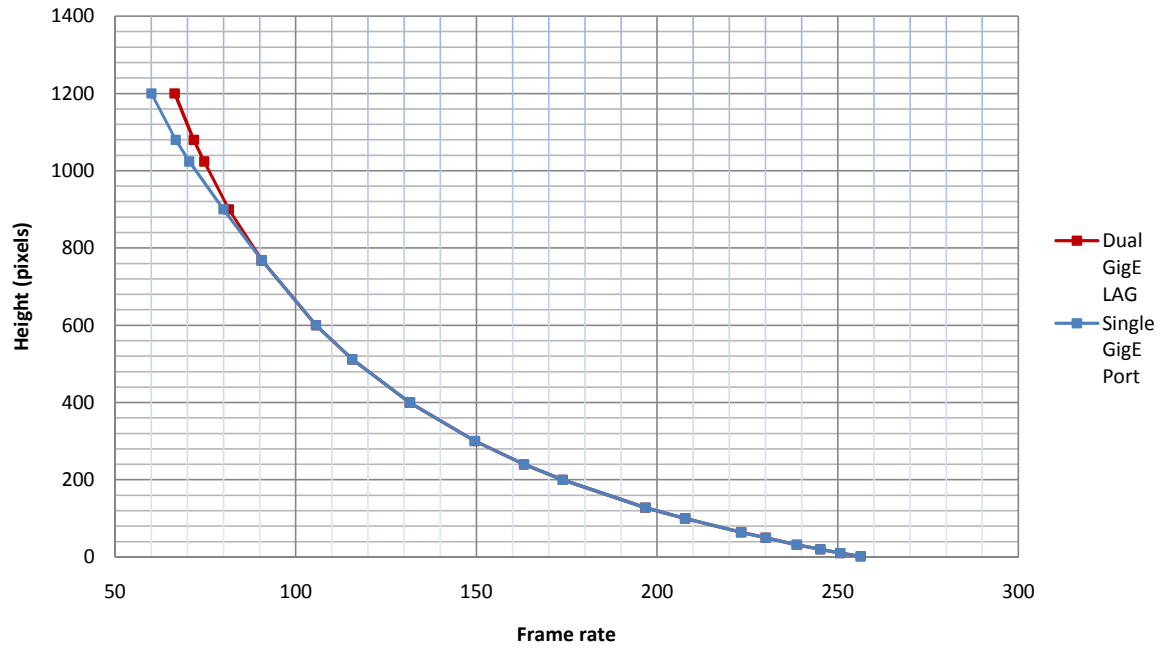
Prosilica GX1050 Image Height Versus Frame Rate



Height	¹ Width	² Region Y	Frame Rate using:	
			⁴ Single GigE Port	Dual GigE LAG
1024	1024	0	109.5	112.1
1000	1024	12	112.0	114.0
900	1024	62	122.3	122.7
800	1024	112	132.3	132.8
768	1024	128	135.8	136.3
700	1024	162	144.2	144.4
600	1024	212	158.0	158.6
512	1024	256	172.9	173.7
400	1024	312	196.6	196.9
300	1024	362	223.1	224.4
256	1024	384	238.1	238.6
200	1024	412	258.9	260.7
128	1024	448	292.5	294.7
64	1024	480	331.4	332.4
50	1024	487	342.3	342.4
32	1024	496	353.6	356.6
20	1024	502	364.5	366.5
10	1024	507	372.3	374.7
2	1024	511	380.8	381.0

³ BinningY:	2	512	1024	0	196.6	197.0
	3	340	1024	0	262.2	263.6
	4	256	1024	0	313.3	315.4
	5	204	1024	0	354.5	358.4
	6	170	1024	0	385.7	392.9
	7	146	1024	0	418.6	421.2
	8	128	1024	0	442.1	444.6

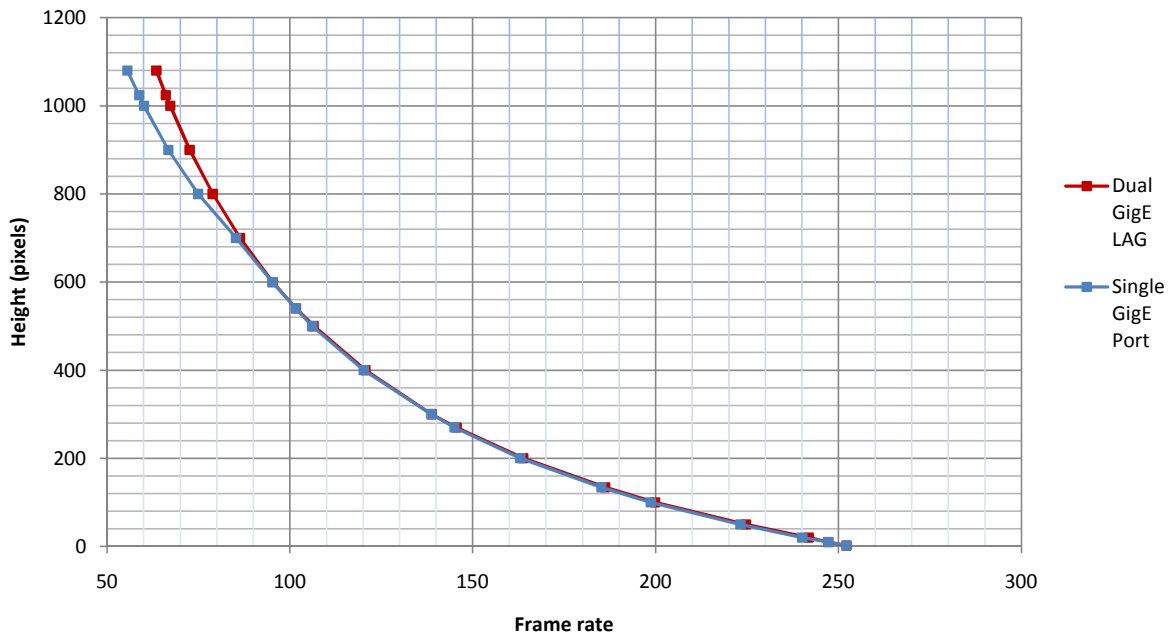
Prosilica GX1660 Image Height Versus Frame Rate



Height	¹ Width	² Region Y	Frame Rate using:	
			⁴ Single GigE Port	Dual GigE LAG
1200	1600	0	60.1	66.5
1080	1600	60	66.8	71.8
1024	1600	88	70.5	74.7
900	1600	150	80.0	81.5
768	1600	216	90.6	90.6
600	1600	300	105.6	105.6
512	1600	344	115.6	115.6
400	1600	400	131.6	131.6
300	1600	450	149.6	149.6
240	1600	480	163.2	163.2
200	1600	500	173.9	173.9
128	1600	536	196.8	196.8
100	1600	550	207.8	207.8
64	1600	568	223.3	223.3
50	1600	575	230.1	230.1
32	1600	584	238.7	238.7
20	1600	590	245.2	245.2
10	1600	595	250.7	250.7
2	1600	599	256.4	256.4

³ BinningY:	2	600	1600	0	118.7	121.0
	3	400	1600	0	165.4	165.4
	4	300	1600	0	202.7	202.7
	5	240	1600	0	234.1	234.1
	6	200	1600	0	260.8	260.8
	7	170	1600	0	283.9	283.9
	8	150	1600	0	303.1	303.1

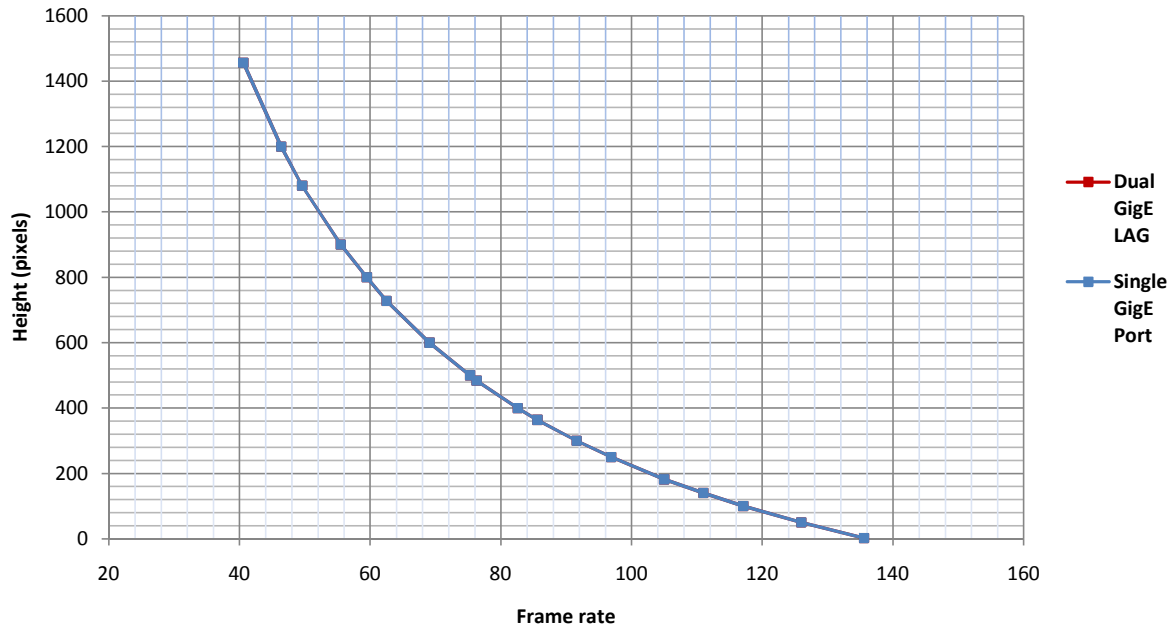
Prosilica GX1910 Image Height Versus Frame Rate



Height	¹ Width	² Region Y	Frame Rate using:	
			⁴ Single GigE Port	Dual GigE LAG
1080	1920	0	55.6	63.5
1024	1920	28	58.8	66.1
1000	1920	40	60.1	67.3
900	1920	90	66.8	72.6
800	1920	140	74.9	78.9
700	1920	190	85.3	86.4
600	1920	240	95.2	95.3
540	1920	270	101.6	101.7
500	1920	290	106.1	106.5
400	1920	340	120.2	120.7
300	1920	390	138.7	138.8
270	1920	405	145.0	145.6
200	1920	440	163.0	163.8
134	1920	473	185.2	186.2
100	1920	490	198.7	199.9
50	1920	515	223.2	224.7
20	1920	530	240.1	241.9
10	1920	535	247.2	247.2
2	1920	539	252.2	252.2

³ BinningY:	2	540	1920	0	116.3	116.4
	3	360	1920	0	160.8	160.8
	4	270	1920	0	198.5	198.5
	5	216	1920	0	230.6	230.6
	6	180	1920	0	258.2	258.2
	7	154	1920	0	282.3	282.4
	8	134	1920	0	302.3	302.3

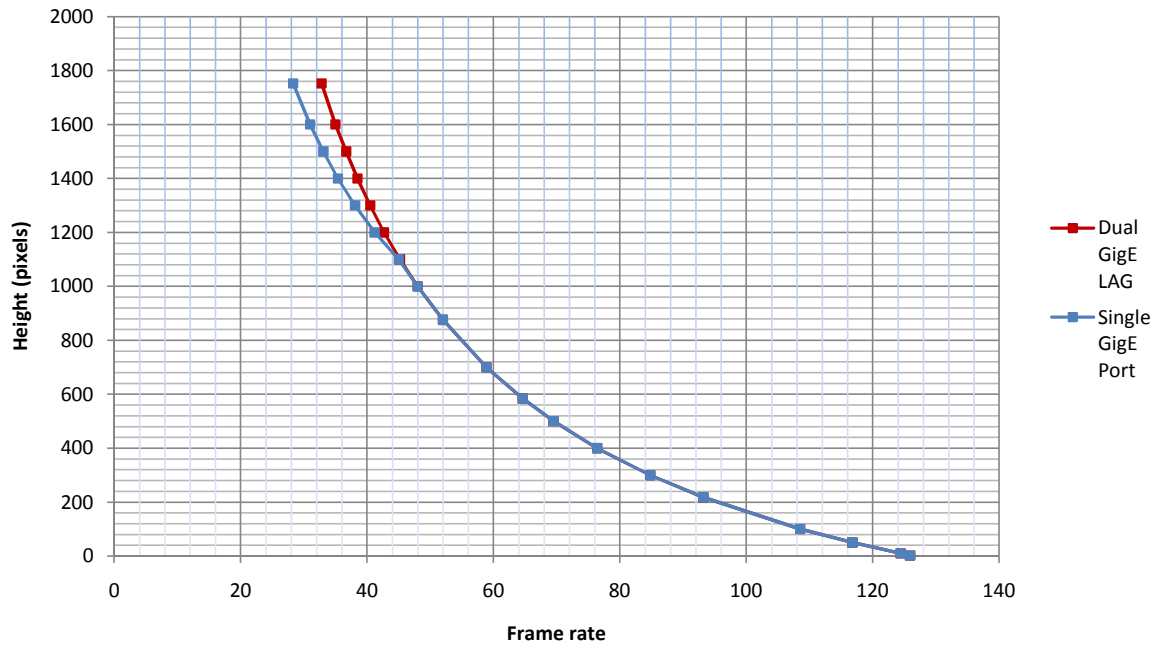
Prosilica GX1920 Image Height Versus Frame Rate



Height	¹ Width	² Region Y	Frame Rate using:	
			⁴ Single GigE Port	Dual GigE LAG
1456	1936	0	40.6	40.6
1200	1936	128	46.4	46.4
1080	1936	188	49.6	49.6
900	1936	278	55.5	55.5
800	1936	328	59.5	59.5
728	1936	364	62.5	62.5
600	1936	428	69.1	69.1
500	1936	478	75.3	75.3
484	1936	486	76.3	76.3
400	1936	528	82.6	82.6
364	1936	546	85.6	85.6
300	1936	578	91.6	91.6
250	1936	603	96.9	96.9
182	1936	637	105.0	105.0
140	1936	658	111.0	111.0
100	1936	678	117.1	117.1
50	1936	703	126.0	126.0
2	1936	727	135.6	135.6

³ BinningY:	2	728	1920	0	70.2	70.2
	3	484	1920	0	92.8	92.8
	4	364	1920	0	109.5	109.5
	5	290	1920	0	123.5	123.5
	6	242	1920	0	134.5	134.5
	7	208	1920	0	143.5	143.5
	8	182	1920	0	151.1	151.1

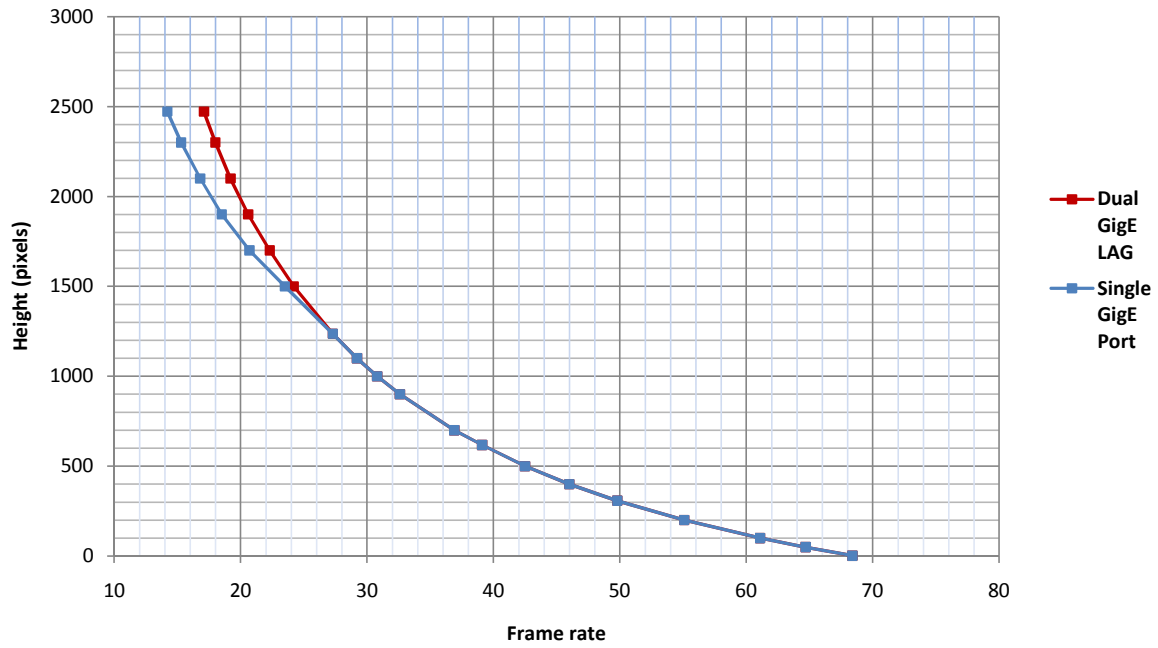
Prosilica GX2300 Image Height Versus Frame Rate



Height	¹ Width	² Region Y	Frame Rate using:	
			⁴ Single GigE Port	Dual GigE LAG
1752	2336	0	28.3	32.8
1600	2336	76	31.0	35.0
1500	2336	126	33.1	36.7
1400	2336	176	35.4	38.5
1300	2336	226	38.1	40.5
1200	2336	276	41.2	42.7
1100	2336	326	45.0	45.2
1000	2336	376	48.0	48.0
876	2336	438	52.0	52.0
700	2336	526	58.9	58.9
584	2336	584	64.6	64.6
500	2336	626	69.5	69.5
400	2336	676	76.4	76.4
300	2336	726	84.8	84.8
218	2336	767	93.2	93.2
100	2336	826	108.5	108.5
50	2336	851	116.8	116.8
10	2336	871	124.4	124.4
2	2336	875	125.9	125.9

³ BinningY:	2	876	2336	0	56.5	59.3
	3	584	2336	0	81.2	81.2
	4	438	2336	0	99.5	99.5
	5	350	2336	0	115.0	115.0
	6	292	2336	0	128.0	128.0
	7	250	2336	0	139.4	139.4
	8	218	2336	0	148.2	148.2

Prosilica GX3300 Image Height Versus Frame Rate

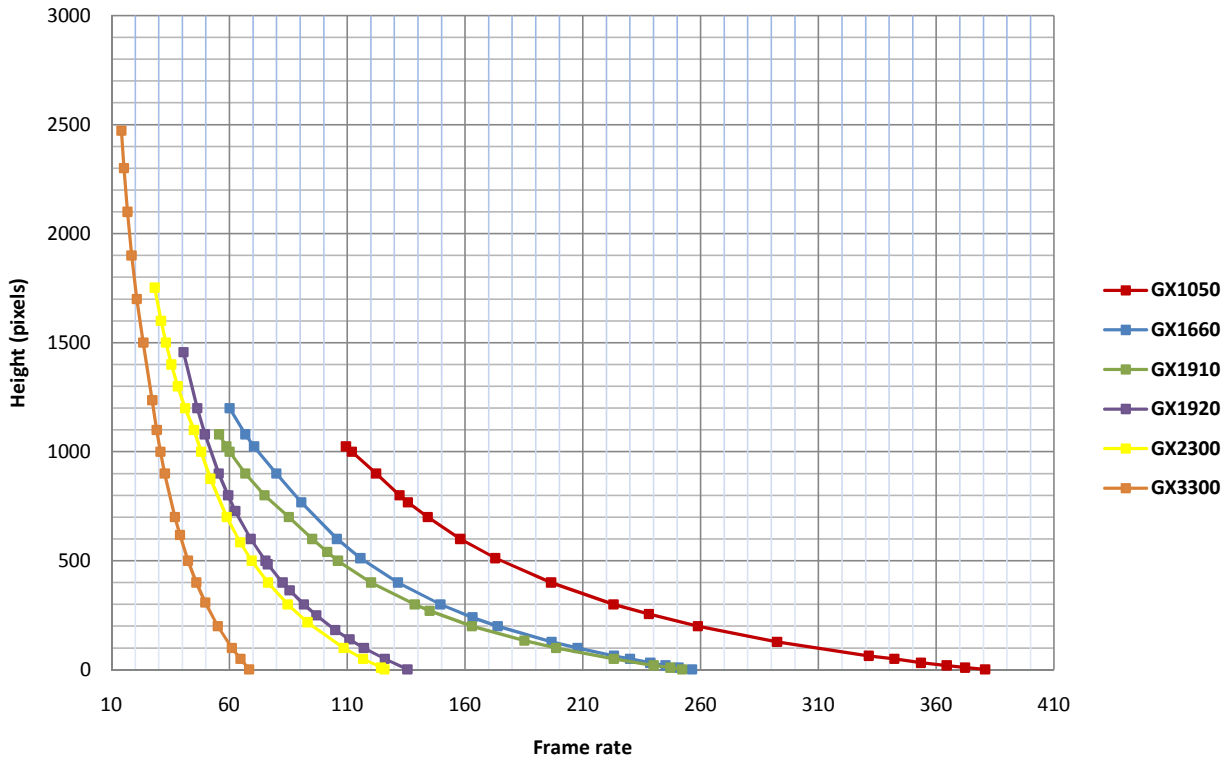


Height	¹ Width	² Region Y	Frame Rate using:	
			⁴ Single GigE Port	Dual GigE LAG
2472	3296	0	14.2	17.1
2300	3296	86	15.3	18.0
2100	3296	186	16.8	19.2
1900	3296	286	18.5	20.6
1700	3296	386	20.7	22.3
1500	3296	486	23.5	24.2
1236	3296	618	27.3	27.3
1100	3296	686	29.2	29.2
1000	3296	736	30.8	30.8
900	3296	786	32.6	32.6
700	3296	886	36.9	36.9
618	3296	927	39.1	39.1
500	3296	986	42.5	42.5
400	3296	1036	46.0	46.0
308	3296	1082	49.8	49.8
200	3296	1136	55.1	55.1
100	3296	1186	61.1	61.1
50	3296	1211	64.7	64.7
2	3296	1235	68.4	68.4

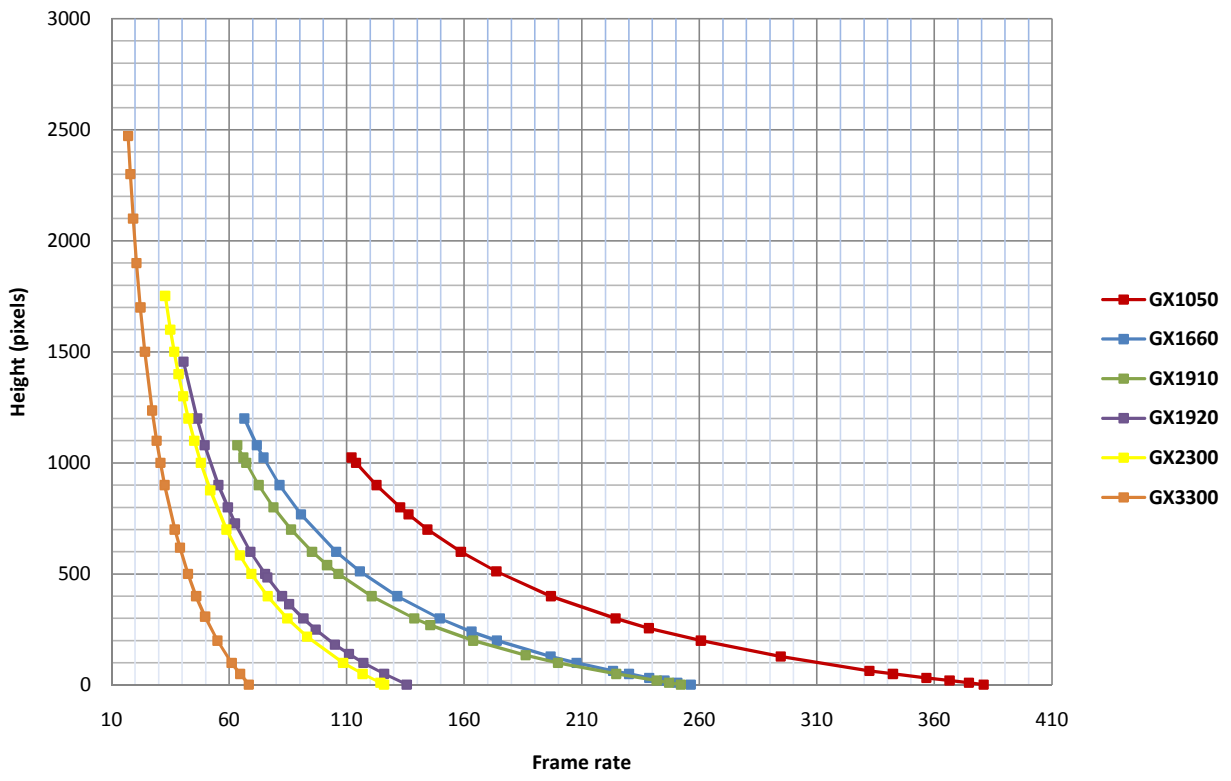
³ BinningY:	2	1236	3296	0	28.4	31.2
	3	824	3296	0	42.6	43.1
	4	618	3296	0	53.2	53.2
	5	494	3296	0	61.9	61.9
	6	412	3296	0	69.4	69.4
	7	352	3296	0	75.7	75.7
	8	308	3296	0	81.4	81.4

Prosilica GX Family Frame Rate Comparison

Single GigE Port Operation



Dual GigE LAG Operation



We invite comments or suggestions on this document at any time.
Please write to: info@alliedvisiontec.com

Disclaimer

Due to continual product development, technical specifications may be subject to change without notice. All trademarks are acknowledged as property of their respective owners. We are convinced that this information is correct. We acknowledge that it may not be fully comprehensive. Nevertheless we cannot be held responsible for any damage in equipment or subsequent loss of data or whatsoever in consequence of following the application note. Copyright © 2011

This document was prepared by the staff of Allied Vision Technologies Canada ("AVT") and is the property of AVT, which also owns the copyright therein. All rights conferred by the law of copyright and by virtue of international copyright conventions are reserved to AVT. This document must not be copied, or reproduced in any material form, either wholly or in part, and its contents and any method or technique available there from must not be disclosed to any other person whatsoever without the prior written consent of AVT.
