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Low End Graphics

Tests for a future article.

Automated Executive Summary

Athlon 3000G had the most wins, coming in first place for 50% of the tests.

Based on the geometric mean of all complete results, the fastest (Athlon 3000G) was 1.897x the speed of the slowest (Celeron G5900). AMD A10-7870K was 0.958x the speed of Athlon 3000G, Core i3 8100 was 0.904x the speed of AMD A10-7870K, Core i3 10100 was 0.965x the speed of Core i3 8100, Pentium Gold G6400 was 0.64x the speed of Core i3 10100, Celeron G5900 was 0.986x the speed of Pentium Gold G6400.

The results with the greatest spread from best to worst included:

OpenArena (Resolution: 1920 x 1080 - Total Frame Time) at 18x
Xonotic (Resolution: 1920 x 1080 - Effects Quality: High) at 2.409x
OpenArena (Resolution: 1920 x 1080) at 2.398x
Xonotic (Resolution: 1920 x 1080 - Effects Quality: Ultra) at 2.295x
Tesseract (Resolution: 1920 x 1080) at 2.287x
SuperTuxKart (Resolution: 1920 x 1080 - Mode: Fullscreen - Graphics Effects: High - Karts: 4 - Scene: Cocoa Temple) at 2.136x
SuperTuxKart (Resolution: 1920 x 1080 - Mode: Fullscreen - Graphics Effects: Ultimate - Karts: 4 - Scene: Candela City)

at 2.108x
SuperTuxKart (Resolution: 1920 x 1080 - Mode: Fullscreen - Graphics Effects: Ultimate - Karts: 4 - Scene: Gran Paradiso Island) at 2.104x
SuperTuxKart (Resolution: 1920 x 1080 - Mode: Fullscreen - Graphics Effects: High - Karts: 4 - Scene: Candela City) at 2.103x
SuperTuxKart (Resolution: 1920 x 1080 - Mode: Fullscreen - Graphics Effects: Ultimate - Karts: 4 - Scene: Cocoa Temple) at 2.101x.

Test Systems:

AMD A10-7870K

Processor: AMD A10-7870K Radeon R7 12 Compute Cores 4C+8G @ 3.90GHz (2 / 4 Threads), Motherboard: ASUS A88XM-E (2001 BIOS), Chipset: AMD 15h, Memory: 16GB, Disk: 525GB SABRENT + 250GB Samsung SSD 850, Graphics: ASUS AMD Radeon R7 1GB, Audio: AMD Kaveri HDMI/DP, Monitor: LG Ultra HD, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 20.04, Kernel: 5.8.0-050800rc6daily20200721-generic (x86_64) 20200720, Desktop: GNOME Shell 3.36.3, Display Server: X Server 1.20.8, Display Driver: modesetting 1.20.8, OpenGL: 4.5 Mesa 20.0.8 (LLVM 10.0.0), Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

Processor Notes: Scaling Governor: acpi-cpufreq ondemand - CPU Microcode: 0x6003106
Graphics Notes: GLAMOR
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline STIBP: disabled RSB filling + srbds: Not affected + tsx_async_abort: Not affected

Core i3 8100

Processor: Intel Core i3-8100 @ 3.60GHz (4 Cores), Motherboard: ASRock Z370M-ITX/ac (P4.10 BIOS), Chipset: Intel 8th Gen Core 4-core Desktop, Memory: 8GB, Disk: 60GB DREVO X1 SSD + 525GB SABRENT, Graphics: Intel 8th Gen Core Gaussian Mixture Model 3GB (1100MHz), Audio: Realtek ALC892, Monitor: VA2431, Network: Intel I219-V + Intel I211 + Intel Dual Band-AC 3168NGW

OS: Ubuntu 20.04, Kernel: 5.8.0-050800rc6daily20200721-generic (x86_64) 20200720, Desktop: GNOME Shell 3.36.3, Display Server: X Server 1.20.8, Display Driver: modesetting 1.20.8, OpenGL: 4.6 Mesa 20.0.8, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xd6
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT disabled + mds: Mitigation of Clear buffers; SMT disabled + meltdown: Mitigation of PTI + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: disabled RSB filling + srbds: Mitigation of Microcode + tsx_async_abort: Not affected

Athlon 3000G

Processor: AMD Athlon 3000G (2 Cores / 4 Threads), Motherboard: MSI B350M GAMING PRO (MS-7A39) v1.0 (2.NR BIOS), Chipset: AMD Raven/Raven2, Memory: 6GB, Disk: 525GB Crucial CT525MX3, Graphics: MSI AMD Picasso 2GB (1100/1600MHz), Audio: AMD Raven/Raven2/Fenghuang, Monitor: VA2431, Network: Realtek

RTL8111/8168/8411

OS: Ubuntu 20.04, Kernel: 5.8.0-050800rc6daily20200721-generic (x86_64) 20200720, Desktop: GNOME Shell 3.36.3, Display Server: X Server 1.20.8, Display Driver: modesetting 1.20.8, OpenGL: 4.6 Mesa 20.0.8 (LLVM 10.0.0), Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

Processor Notes: CPU Microcode: 0x8108109
Graphics Notes: GLAMOR
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional STIBP: disabled RSB filling + srbds: Not affected + tsx_async_abort: Not affected

Celeron G5900

Processor: Intel Celeron G5900 @ 3.40GHz (2 Cores), Motherboard: Gigabyte B460M DS3H (F2 BIOS), Chipset: Intel Device 9b73, Memory: 16GB, Disk: 525GB Crucial CT525MX3, Graphics: Gigabyte Intel UHD 610 3GB (1050MHz), Audio: Realtek ALC887-VD, Monitor: LG Ultra HD, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 20.04, Kernel: 5.8.0-050800rc6daily20200721-generic (x86_64) 20200720, Desktop: GNOME Shell 3.36.3, Display Server: X Server 1.20.8, Display Driver: modesetting 1.20.8, OpenGL: 4.6 Mesa 20.0.8, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xcc
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

Pentium Gold G6400

Processor: Intel Pentium Gold G6400 @ 4.00GHz (2 Cores / 4 Threads), Motherboard: Gigabyte B460M DS3H (F2 BIOS), Chipset: Intel Device 9b73, Memory: 16GB, Disk: 525GB Crucial CT525MX3, Graphics: Gigabyte Intel UHD 610 3GB (1050MHz), Audio: Realtek ALC887-VD, Monitor: LG Ultra HD, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 20.04, Kernel: 5.8.0-050800rc6daily20200721-generic (x86_64) 20200720, Desktop: GNOME Shell 3.36.3, Display Server: X Server 1.20.8, Display Driver: modesetting 1.20.8, OpenGL: 4.6 Mesa 20.0.8, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xcc
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

Core i3 10100

Processor: Intel Core i3-10100 @ 4.30GHz (4 Cores / 8 Threads), Motherboard: Gigabyte B460M DS3H (F2 BIOS), Chipset: Intel Device 9b63, Memory: 16GB, Disk: 525GB Crucial CT525MX3, Graphics: Gigabyte Intel UHD 630 3GB (1100MHz), Audio: Realtek ALC887-VD, Monitor: LG Ultra HD, Network: Realtek RTL8111/8168/8411

OS: Ubuntu 20.04, Kernel: 5.8.0-050800rc6daily20200721-generic (x86_64) 20200720, Desktop: GNOME Shell 3.36.3, Display Server: X Server 1.20.8, Display Driver: modesetting 1.20.8, OpenGL: 4.6 Mesa 20.0.8, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 1920x1080

Processor Notes: Scaling Governor: intel_pstate powersave - CPU Microcode: 0xcc
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

Low End Graphics

	AMD A10-7870K	Core i3 8100	Athlon 3000G	Celeron G5900	Pentium Gold G6400	Core i3 10100
OpenArena - 1920 x 1080 (FPS)	50.3	66.4	**106.7**	**44.5**	46.8	64.9
Normalized	47.14%	62.23%	100%	41.71%	43.86%	60.82%
Standard Deviation	0%	1.2%	0.2%	0.5%	0.1%	0.7%
SuperTuxKart - 1920 x 1080 - Fullscreen - High - 4 - Candela City (FPS)	**100.504550**	81.614921	76.429253	**47.795222**	48.609720	78.631042
Normalized	100%	81.21%	76.05%	47.56%	48.37%	78.24%
Standard Deviation	2.7%	0.6%	0.1%	0.3%	0.4%	0.4%
SuperTuxKart - 1920 x 1080 - Fullscreen - High - 4 - Cocoa Temple (FPS)	**93.457331**	74.260493	70.676961	**43.745285**	44.828121	71.344711
Normalized	100%	79.46%	75.62%	46.81%	47.97%	76.34%
Standard Deviation	1.4%	0.5%	0.6%	2.2%	0.9%	0.6%
SuperTuxKart - 1920 x 1080 - Fullscreen - Ultimate - 4 - Candela City (FPS)	**97.552887**	79.168686	74.980166	**46.272525**	47.038958	76.676036
Normalized	100%	81.15%	76.86%	47.43%	48.22%	78.6%
Standard Deviation	0.4%	0.2%	0.1%	0.6%	0.8%	0.1%
SuperTuxKart - 1920 x 1080 - Fullscreen - Ultimate - 4 - Cocoa Temple (FPS)	**84.642548**	67.230589	66.922175	**40.290754**	40.750388	65.459168
Normalized	100%	79.43%	79.06%	47.6%	48.14%	77.34%
Standard Deviation	0.8%	1.3%	0.7%	2.3%	2.4%	1.4%
SuperTuxKart - 1920 x 1080 - Fullscreen - High - 4 - G.P.I (FPS)	**103.577639**	83.524358	77.834704	**49.546739**	49.839863	81.333811
Normalized	100%	80.64%	75.15%	47.84%	48.12%	78.52%
Standard Deviation	0.4%	0.4%	0.2%	0.3%	0.5%	0.5%
SuperTuxKart - 1920 x 1080 - Fullscreen - Ultimate - 4 - G.P.I (FPS)	**99.044218**	80.311269	76.682360	**47.080050**	47.893515	78.050527
Normalized	100%	81.09%	77.42%	47.53%	48.36%	78.8%
Standard Deviation	1.1%	0.6%	0.6%	1%	0.4%	0.8%
Tesseract - 1920 x 1080	81.27152	64.79874	**89.58638**	**39.17049**	39.34095	61.83535
Normalized	90.72%	72.33%	100%	43.72%	43.91%	69.02%
Standard Deviation	0.7%	0.6%	0.3%	0.4%	1.2%	0.6%
Xonotic - 1920 x 1080 - Low (FPS)	191.2786314	219.9218480	**321.9540818**	**162.1079328**	163.0992732	211.6459592
Normalized	59.41%	68.31%	100%	50.35%	50.66%	65.74%
Standard Deviation	0.2%	0.2%	0.1%	0%	0.1%	0.7%
Xonotic - 1920 x 1080 - High (FPS)	124.5272961	126.6982487	**185.1207280**	**76.8519364**	77.3573342	119.7514484
Normalized	67.27%	68.44%	100%	41.51%	41.79%	64.69%
Standard Deviation	0.4%	0.2%	0.3%	0.1%	0.1%	0.4%
Xonotic - 1920 x 1080 - Ultra (FPS)	107.9732875	100.2551325	**135.2059741**	**58.9120339**	59.3127072	96.0485292
Normalized	79.86%	74.15%	100%	43.57%	43.87%	71.04%
Standard Deviation	0.8%	0.2%	0.4%	0.1%	0.1%	0%

Low End Graphics

Xonotic - 1920 x 1080 - Ultimate (FPS)	77.5531420	73.9956301	**87.2806194**	**42.9801064**	43.3009742	71.7539866
Normalized	88.85%	84.78%	100%	49.24%	49.61%	82.21%
Standard Deviation	0.2%	0%	0.1%	0%	0%	0.2%
SuperTuxKart - 1920 x 1080 - Fullscreen - High - 4 - Candela City (FPS/Watt)		4.82		**4.70**	5.03	**5.93**
Normalized		81.28%		79.26%	84.82%	100%
SuperTuxKart - 1920 x 1080 - Fullscreen - High - 4 - Cocoa Temple (FPS/Watt)		4.36		**4.27**	4.62	**5.32**
Normalized		81.95%		80.26%	86.84%	100%
SuperTuxKart - 1920 x 1080 - Fullscreen - Ultimate - 4 - Candela City (FPS/Watt)		4.66		**4.56**	4.87	**5.75**
Normalized		81.04%		79.3%	84.7%	100%
SuperTuxKart - 1920 x 1080 - Fullscreen - Ultimate - 4 - Cocoa Temple (FPS/Watt)		3.98		**3.96**	4.21	**4.93**
Normalized		80.73%		80.32%	85.4%	100%
SuperTuxKart - 1920 x 1080 - Fullscreen - High - 4 - G.P.I (FPS/Watt)		4.94		**4.89**	5.15	**6.12**
Normalized		80.72%		79.9%	84.15%	100%
SuperTuxKart - 1920 x 1080 - Fullscreen - Ultimate - 4 - G.P.I (FPS/Watt)		4.78		**4.66**	4.98	**5.91**
Normalized		80.88%		78.85%	84.26%	100%
Tesseract - 1920 x 1080 (FPS/Watt)		**3.85**		3.96	4.07	**4.57**
Normalized		84.25%		86.65%	89.06%	100%
Xonotic - 1920 x 1080 - Low (FPS/Watt)		**12.70**		11.91	11.45	**11.20**
Normalized		100%		93.78%	90.16%	88.19%
Xonotic - 1920 x 1080 - High (FPS/Watt)		**5.28**		5.99	**6.39**	5.60
Normalized		82.63%		93.74%	100%	87.64%
Xonotic - 1920 x 1080 - Ultra (FPS/Watt)		**4.24**		4.81	**5.09**	4.77
Normalized		83.3%		94.5%	100%	93.71%
Xonotic - 1920 x 1080 - Ultimate (FPS/Watt)		**3.35**		3.65	3.86	**3.96**
Normalized		84.6%		92.17%	97.47%	100%

Low End Graphics



Low End Graphics



Low End Graphics



Low End Graphics

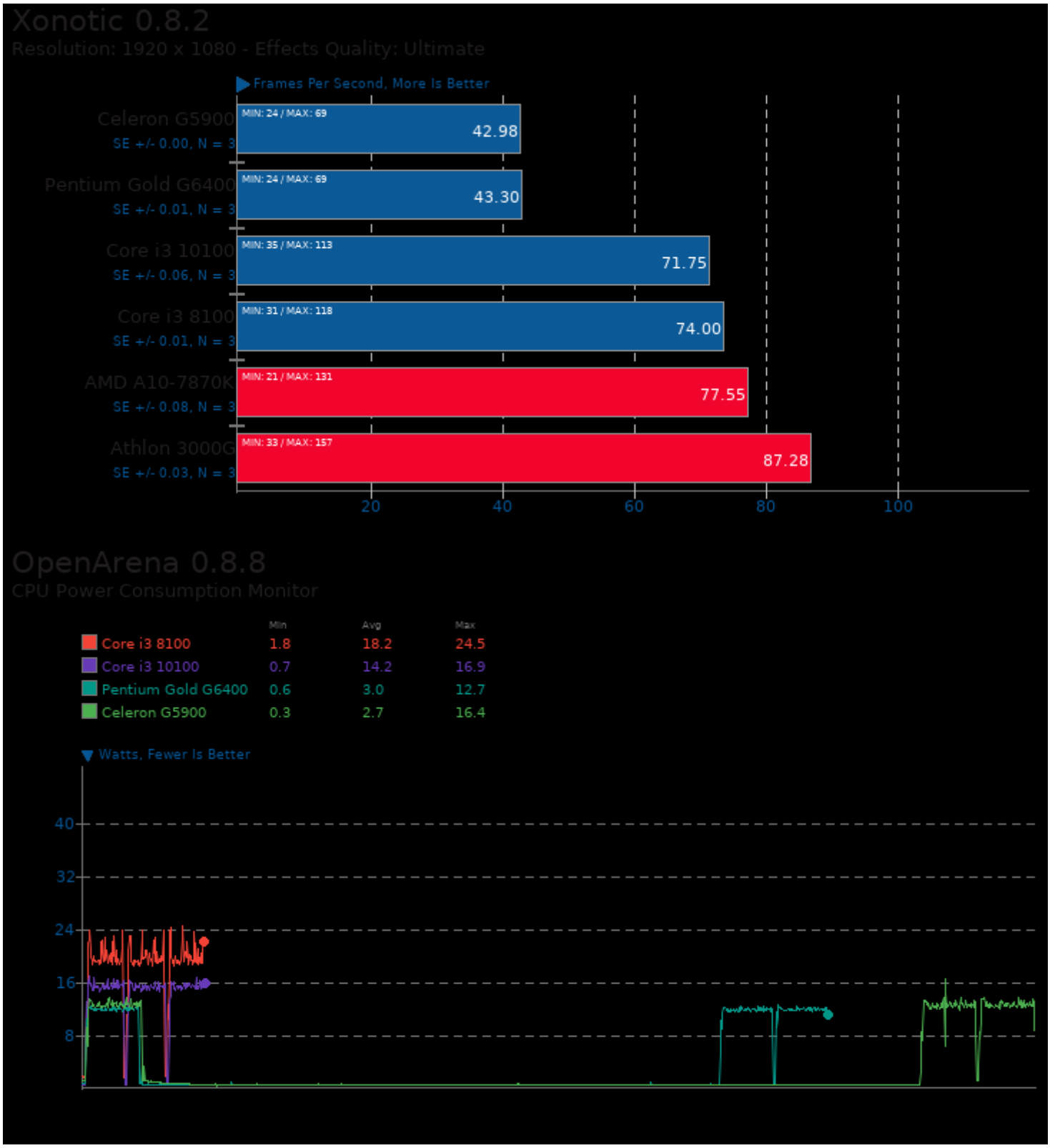



Tesseract 2014-05-12
Resolution: 1920 x 1080
Frames Per Second, More Is Better
Celeron G5900
SE +/- 0.10, N = 3
39.17
Pentium Gold G6400
SE +/- 0.26, N = 3
39.34
Core i3 10100
SE +/- 0.21, N = 3
61.84
Core i3 8100
SE +/- 0.22, N = 3
64.80
AMD A10-7870K
SE +/- 0.35, N = 3
81.27
Athlon 3000G
SE +/- 0.16, N = 3
89.59
20
40
60
80
100
Xonotic 0.8.2
Resolution: 1920 x 1080 - Effects Quality: Low
Frames Per Second, More Is Better
Celeron G5900
SE +/- 0.04, N = 3
MIN: 119 / MAX: 209
162.11
Pentium Gold G6400
SE +/- 0.07, N = 3
MIN: 120 / MAX: 212
163.10
AMD A10-7870K
SE +/- 0.25, N = 3
MIN: 131 / MAX: 323
191.28
Core i3 10100
SE +/- 0.81, N = 3
MIN: 139 / MAX: 308
211.65
Core i3 8100
SE +/- 0.19, N = 3
MIN: 142 / MAX: 327
219.92
Athlon 3000G
SE +/- 0.12, N = 3
MIN: 216 / MAX: 586
321.95
70
140
210
280
350

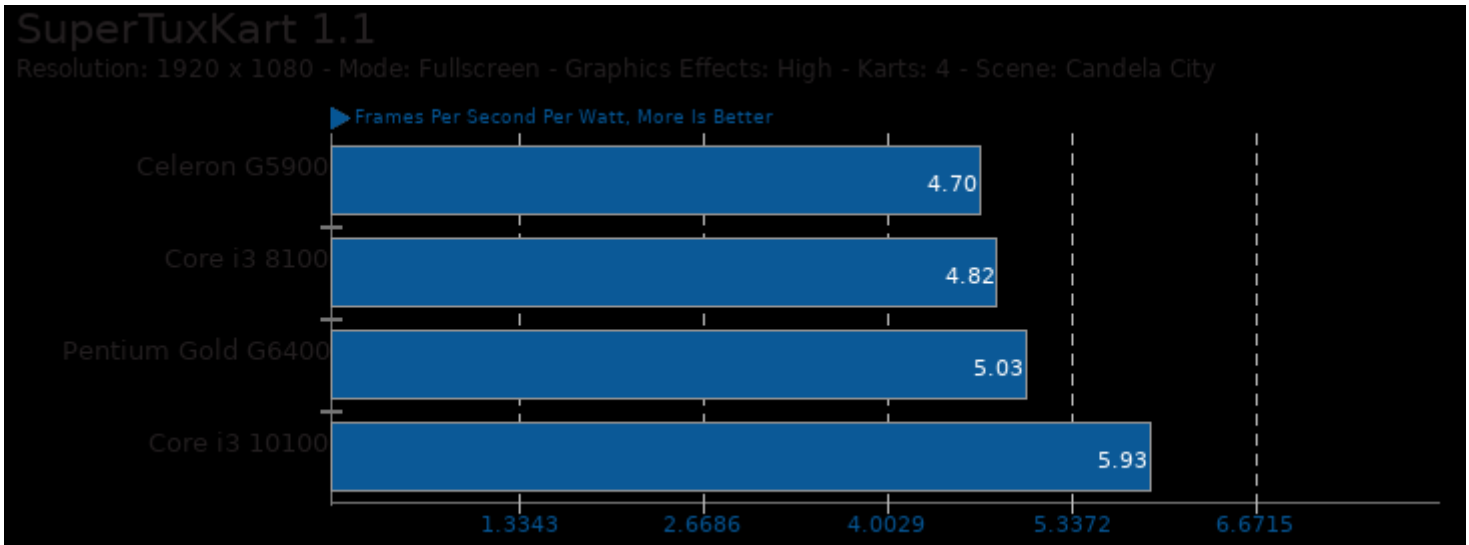
Low End Graphics

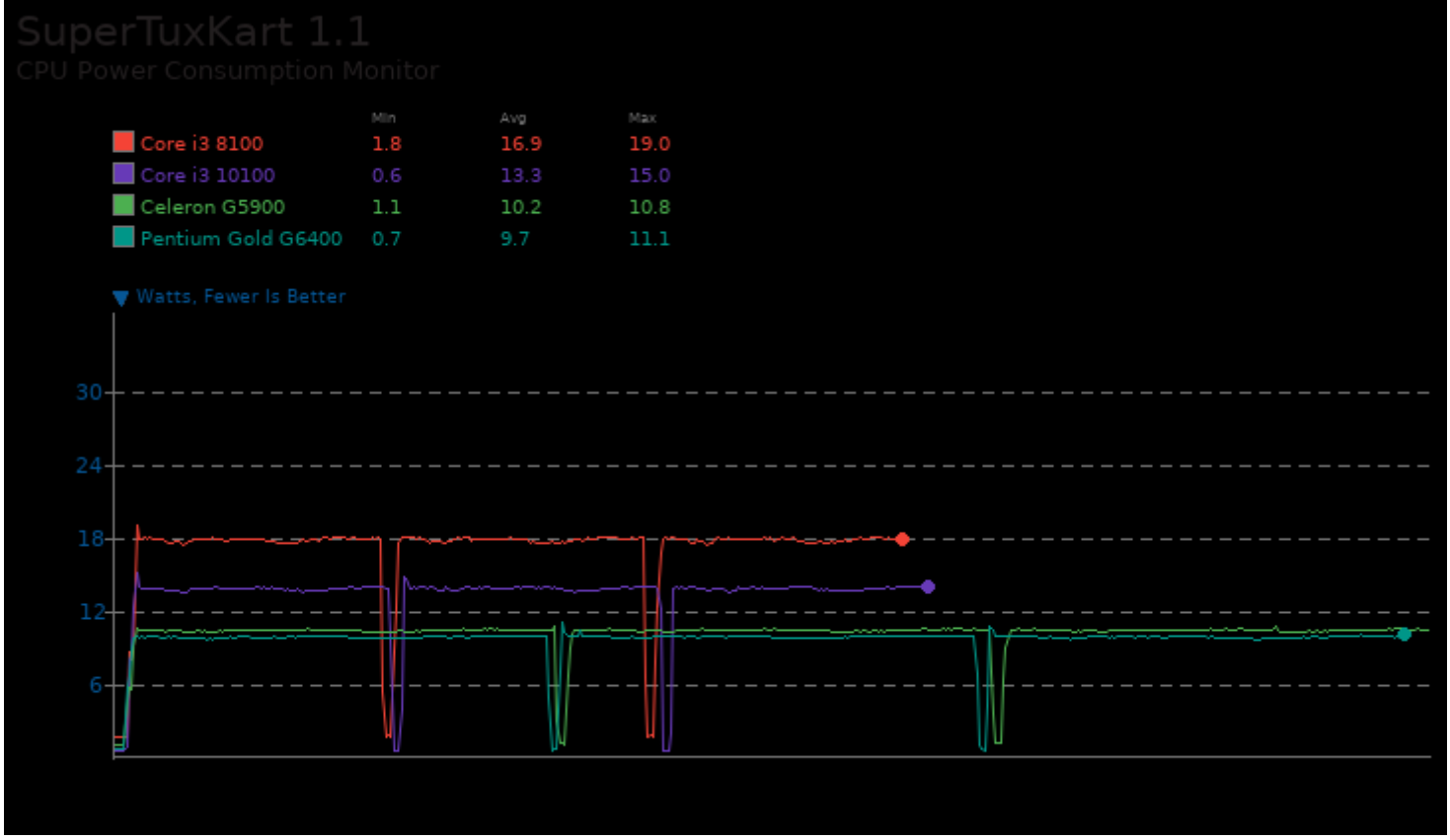


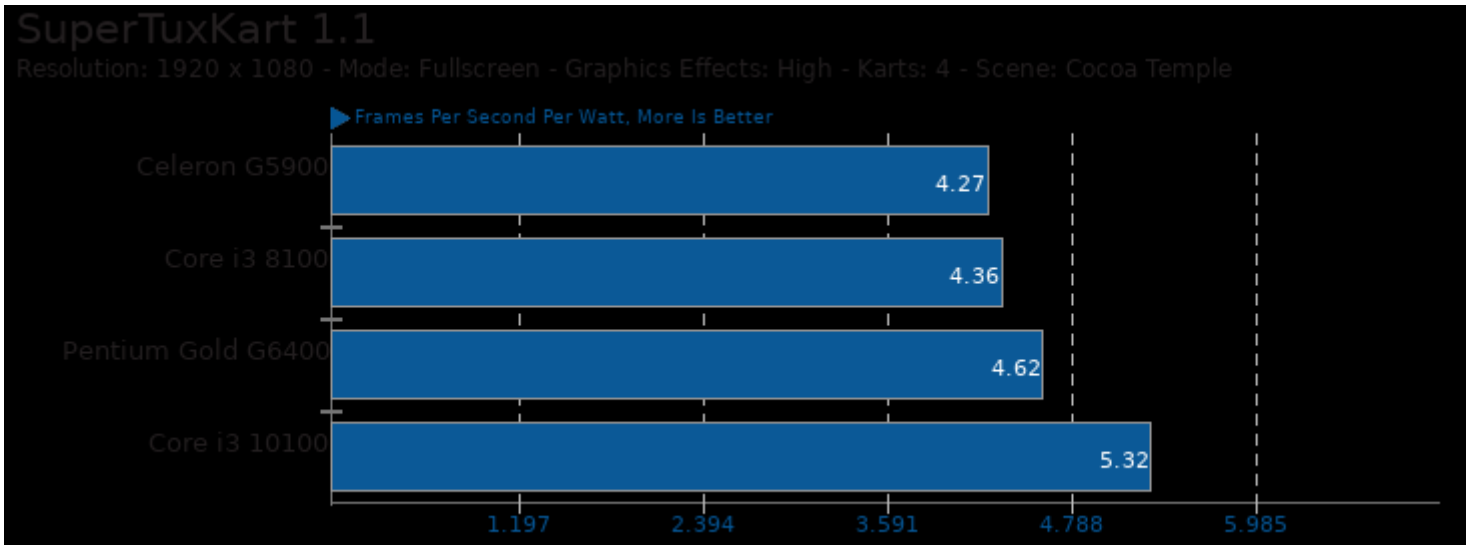
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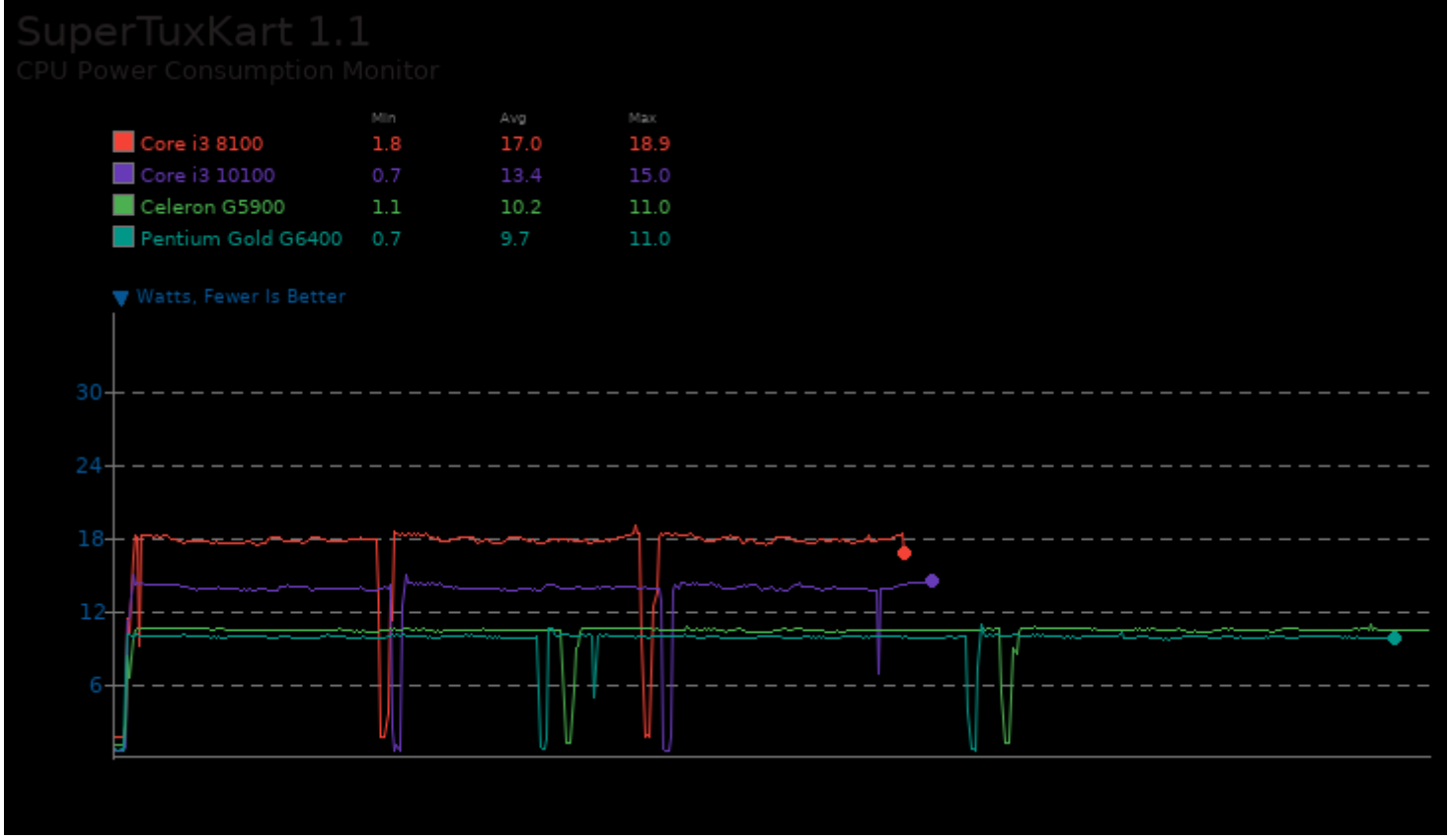


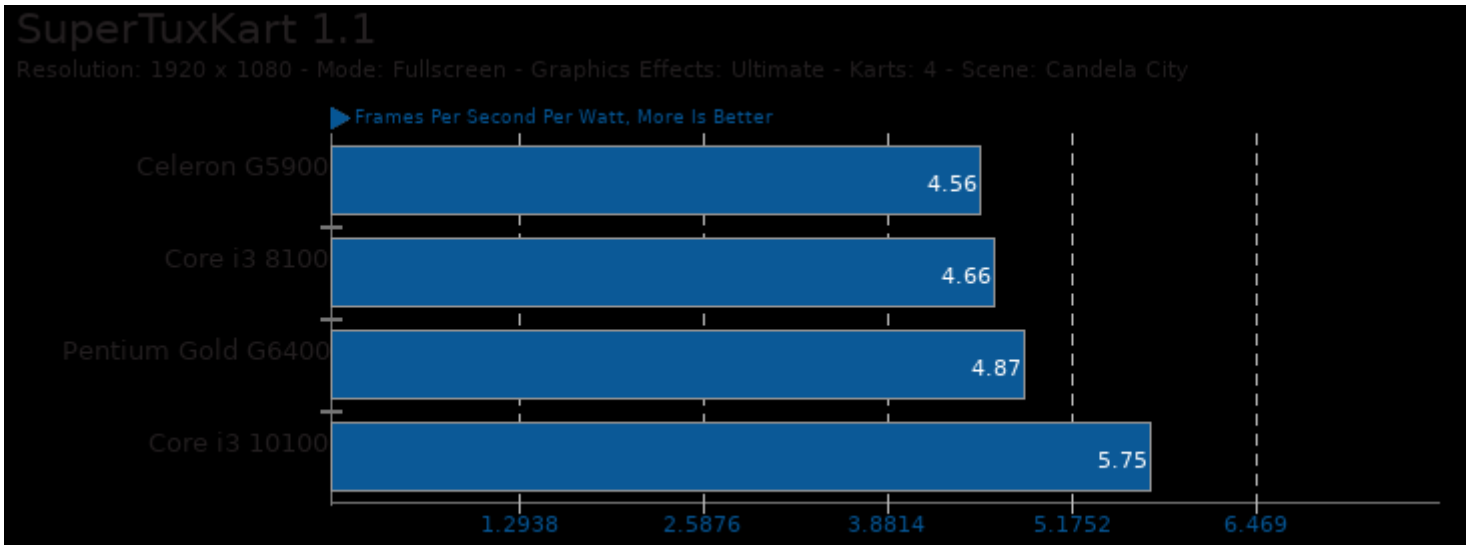
Low End Graphics

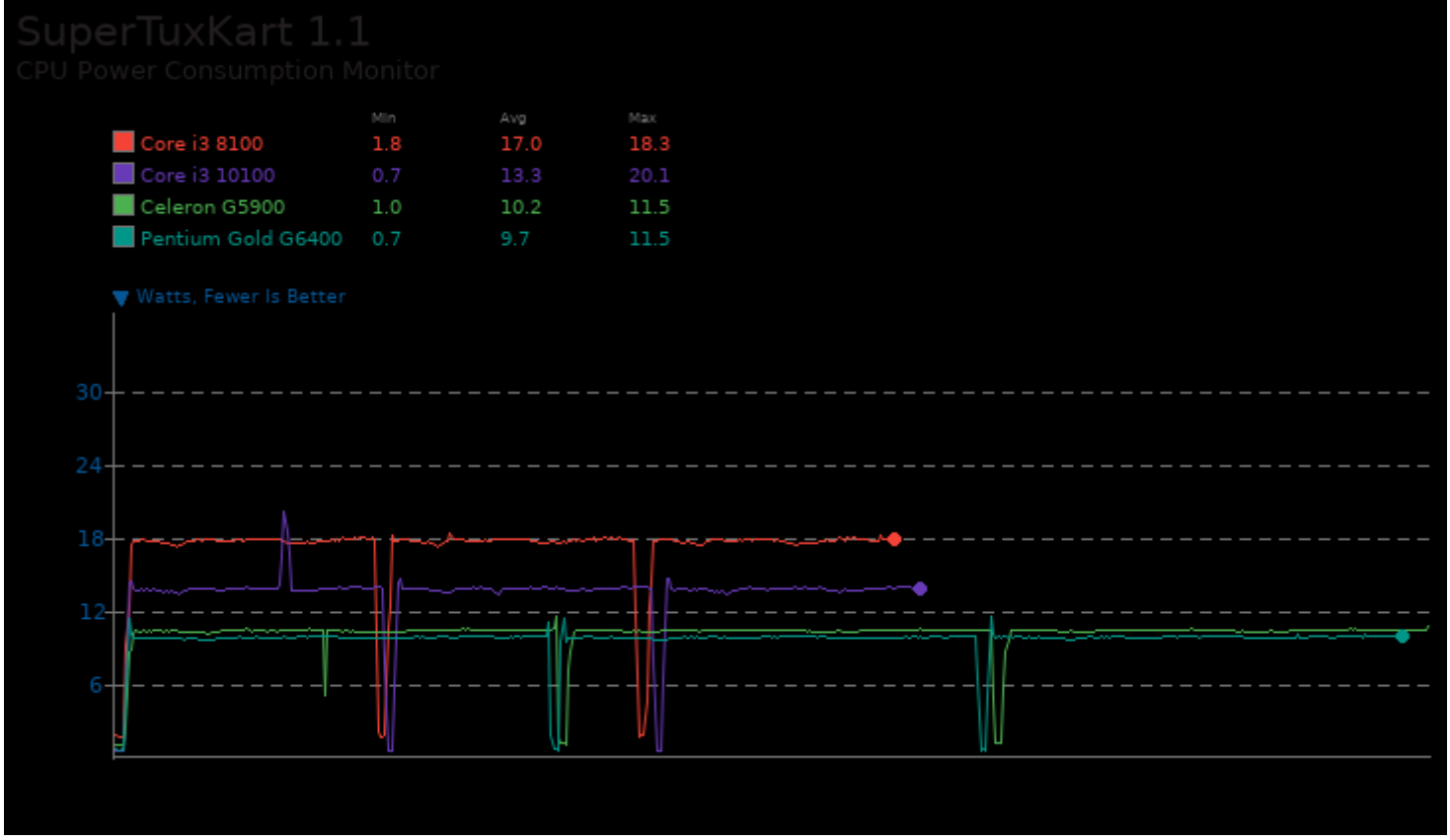




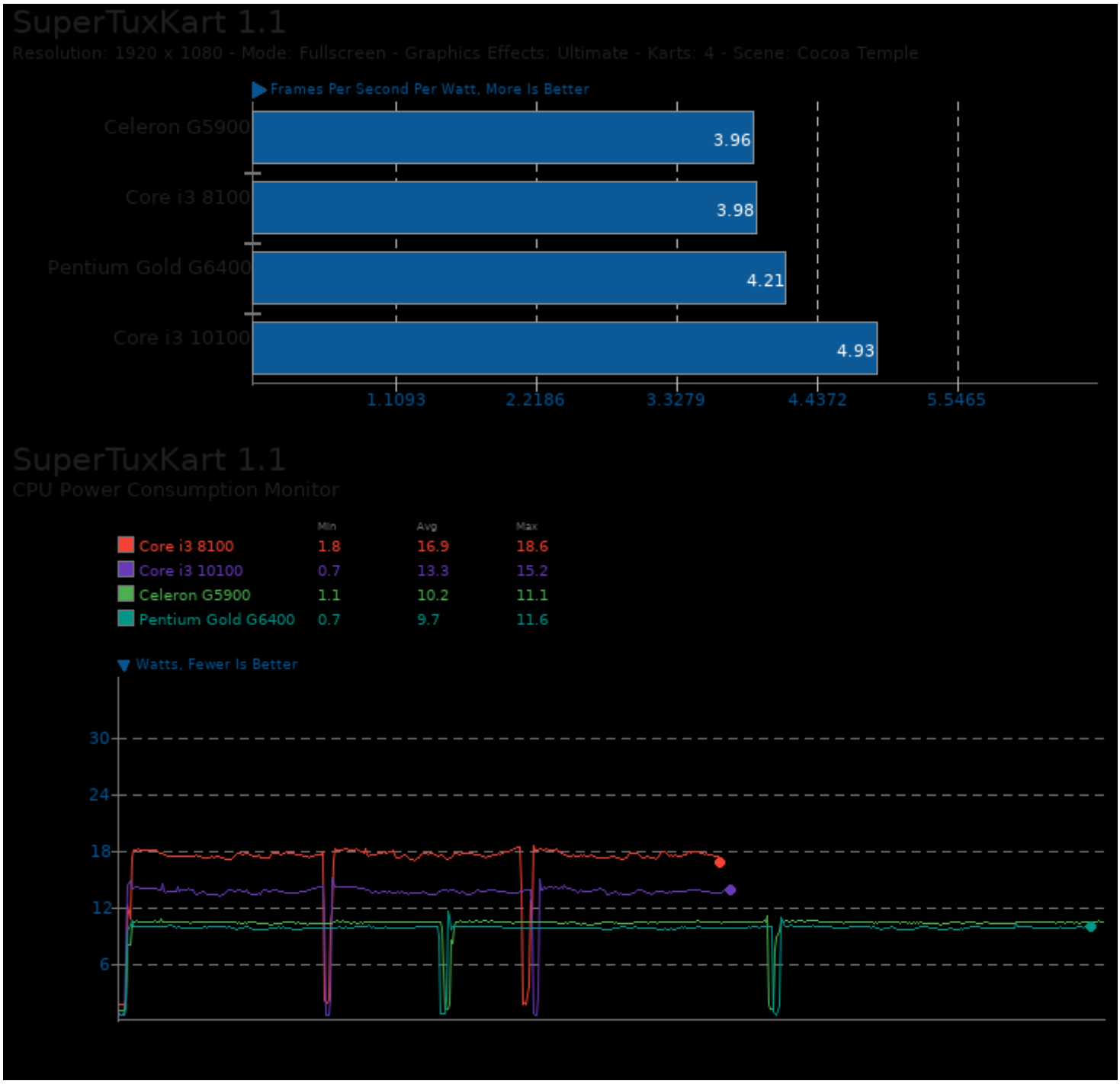

SuperTuxKart 1.1
Resolution: 1920 x 1080 - Mode: Fullscreen - Graphics Effects: High - Karts: 4 - Scene: Cocoa Temple
Frames Per Second Per Watt, More Is Better
Celeron G5900
4.27
Core i3 8100
4.36
Pentium Gold G6400
4.62
Core i3 10100
5.32
1.197
2.394
3.591
4.788
5.985


SuperTuxKart 1.1
CPU Power Consumption Monitor
Min
Avg
Max
Core i3 8100 1.8 17.0 18.9
Core i3 10100 0.7 13.4 15.0
Celeron G5900 1.1 10.2 11.0
Pentium Gold G6400 0.7 9.7 11.0
Watts, Fewer Is Better
30
24
18
12
6

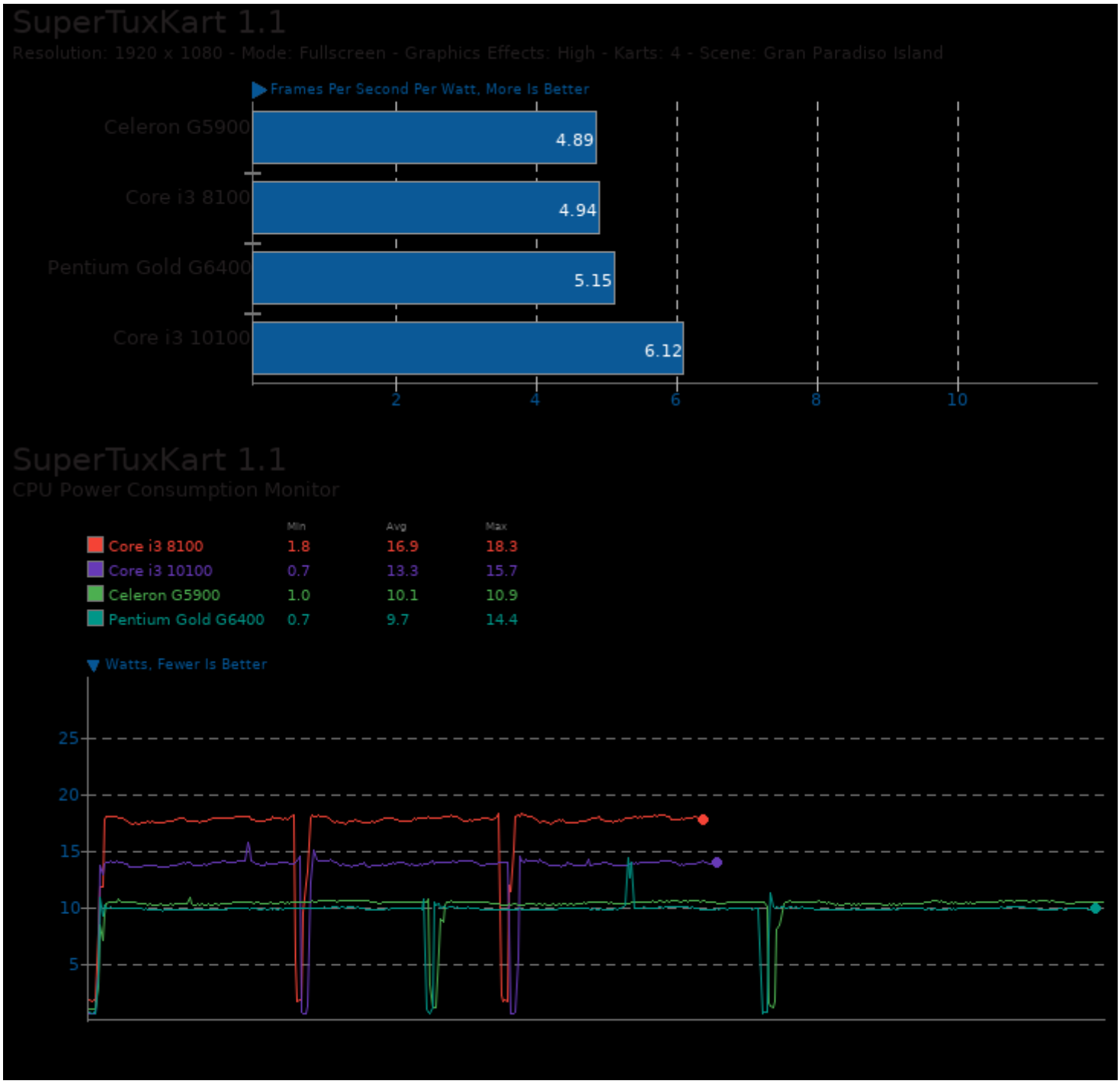

SuperTuxKart 1.1
Resolution: 1920 x 1080 - Mode: Fullscreen - Graphics Effects: Ultimate - Karts: 4 - Scene: Candela City
Frames Per Second Per Watt, More Is Better
Celeron G5900
4.56
Core i3 8100
4.66
Pentium Gold G6400
4.87
Core i3 10100
5.75
1.2938
2.5876
3.8814
5.1752
6.469

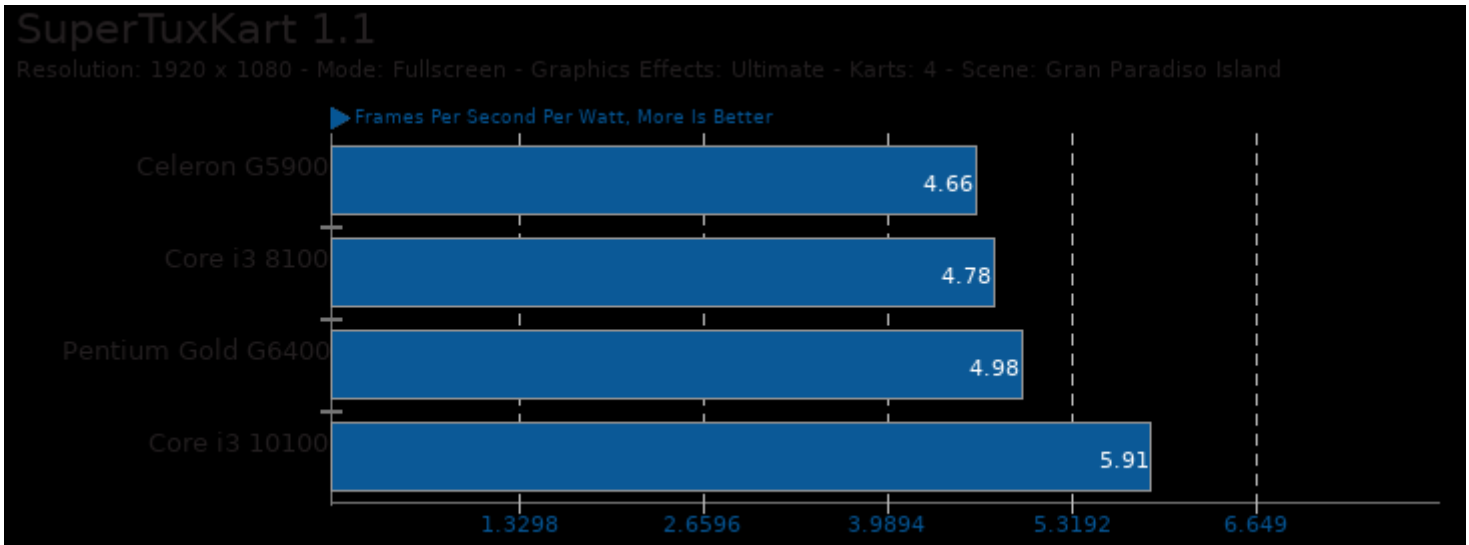

SuperTuxKart 1.1
CPU Power Consumption Monitor
Min
Avg
Max
Core i3 8100 1.8 17.0 18.3
Core i3 10100 0.7 13.3 20.1
Celeron G5900 1.0 10.2 11.5
Pentium Gold G6400 0.7 9.7 11.5
Watts, Fewer Is Better
30
24
18
12
6

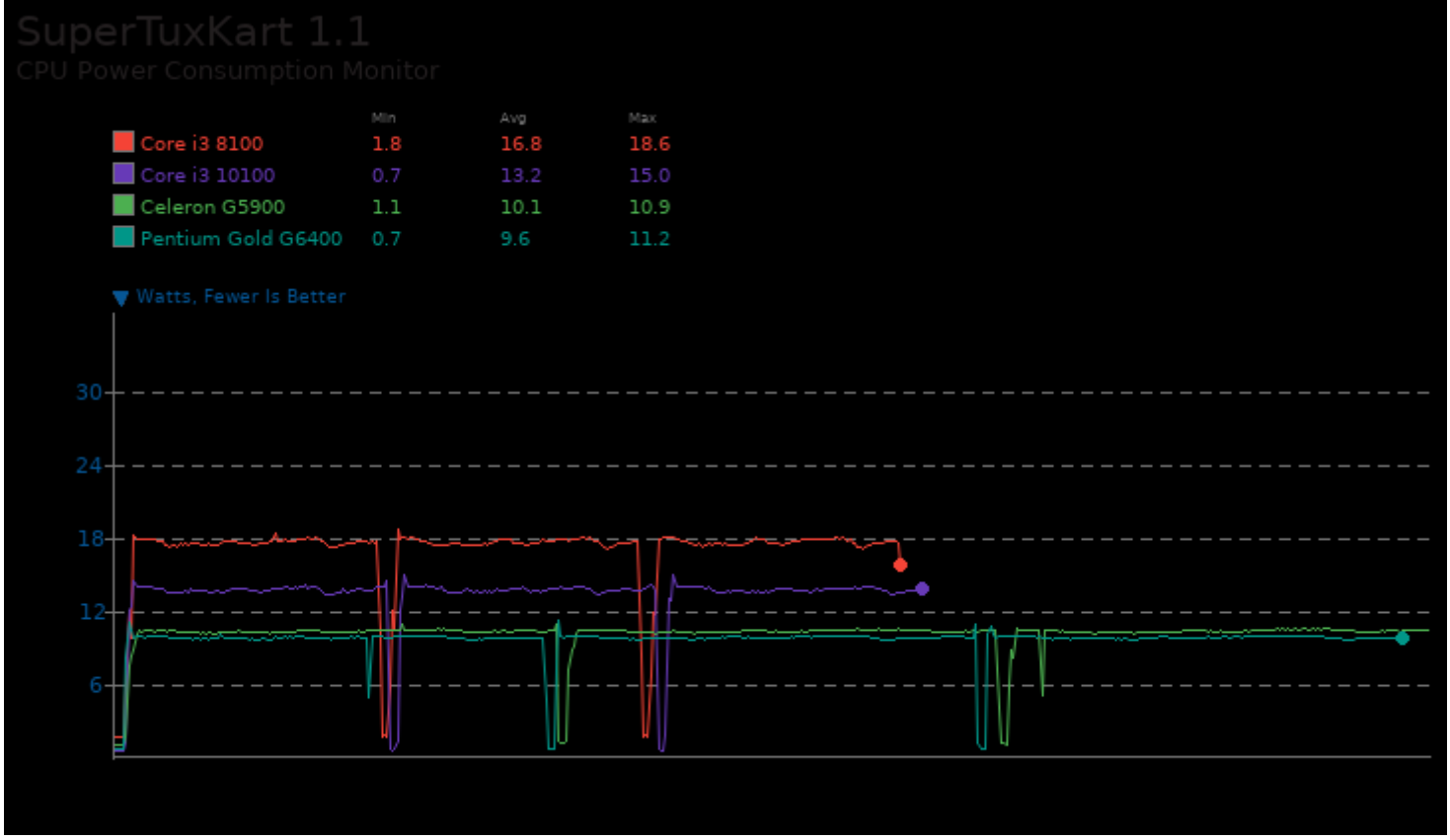
Low End Graphics

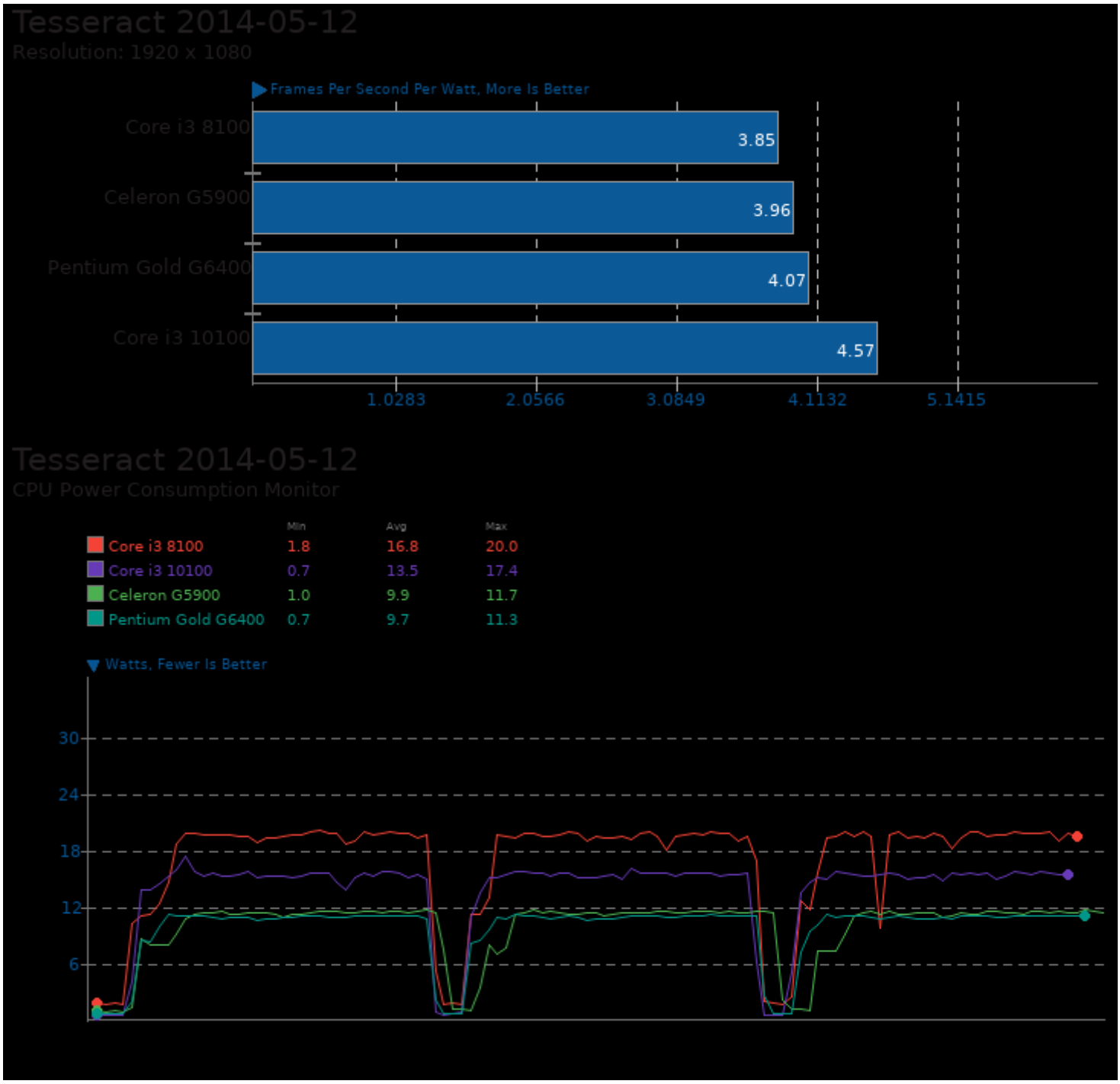


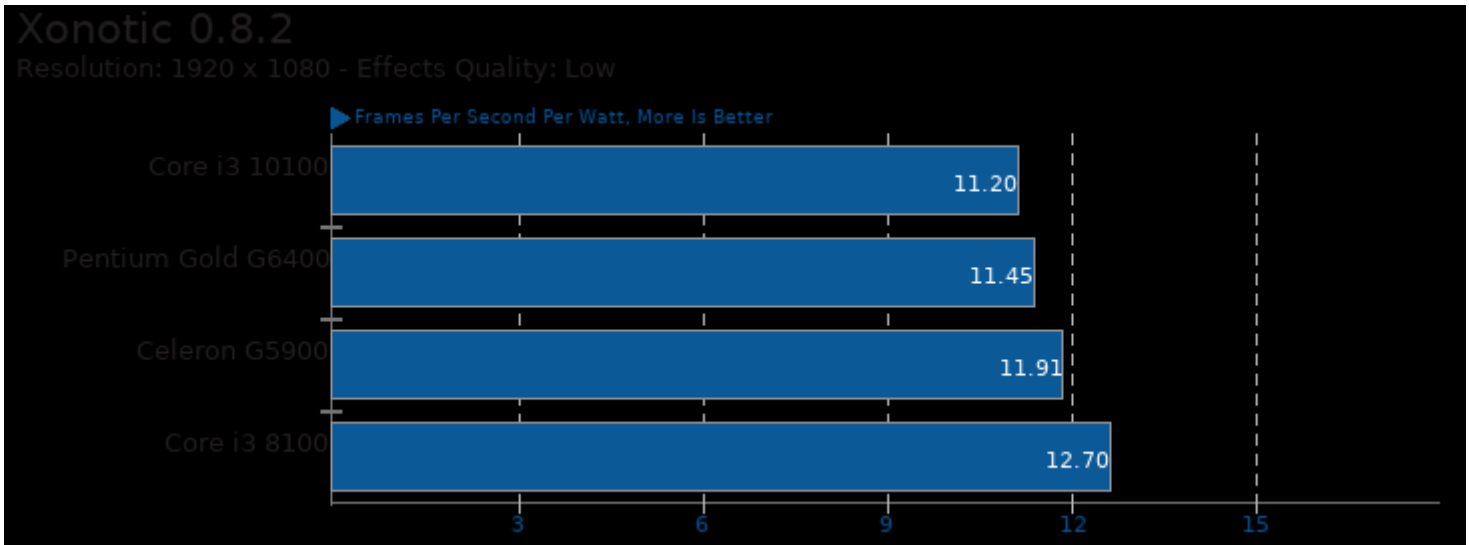
Low End Graphics




SuperTuxKart 1.1
Resolution: 1920 x 1080 - Mode: Fullscreen - Graphics Effects: Ultimate - Karts: 4 - Scene: Gran Paradiso Island
Frames Per Second Per Watt, More Is Better
Celeron G5900
4.66
Core i3 8100
4.78
Pentium Gold G6400
4.98
Core i3 10100
5.91
1.3298
2.6596
3.9894
5.3192
6.649

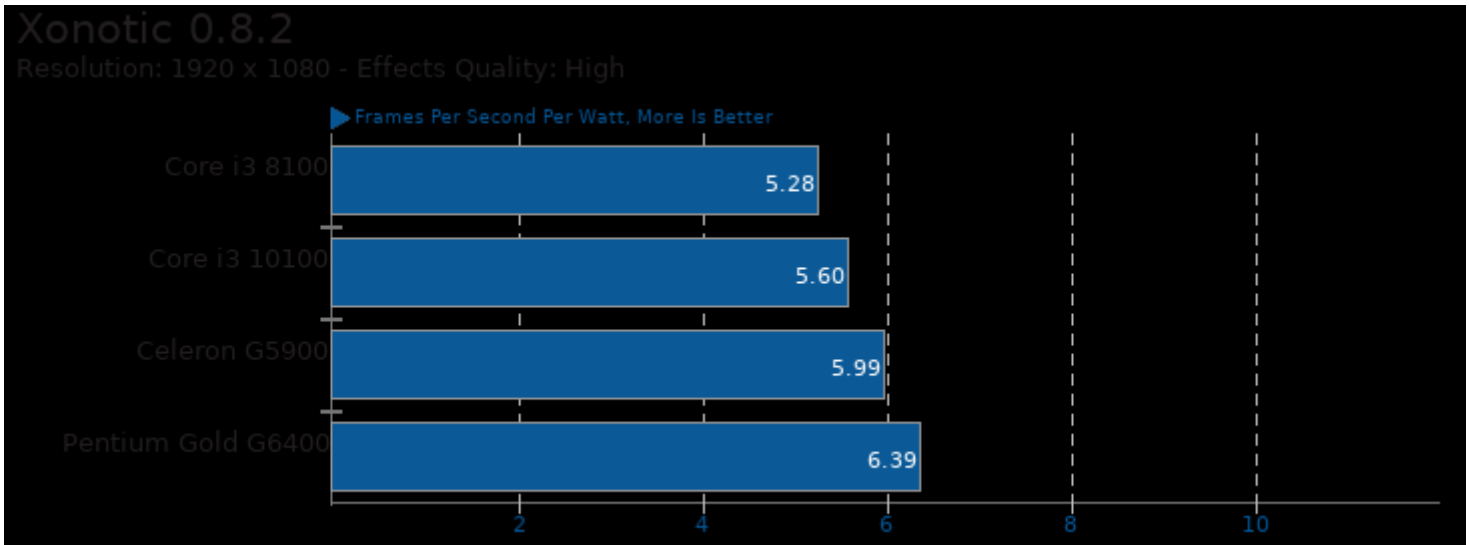

SuperTuxKart 1.1
CPU Power Consumption Monitor
Min
Avg
Max
Core i3 8100 1.8 16.8 18.6
Core i3 10100 0.7 13.2 15.0
Celeron G5900 1.1 10.1 10.9
Pentium Gold G6400 0.7 9.6 11.2
Watts, Fewer Is Better
30
24
18
12
6

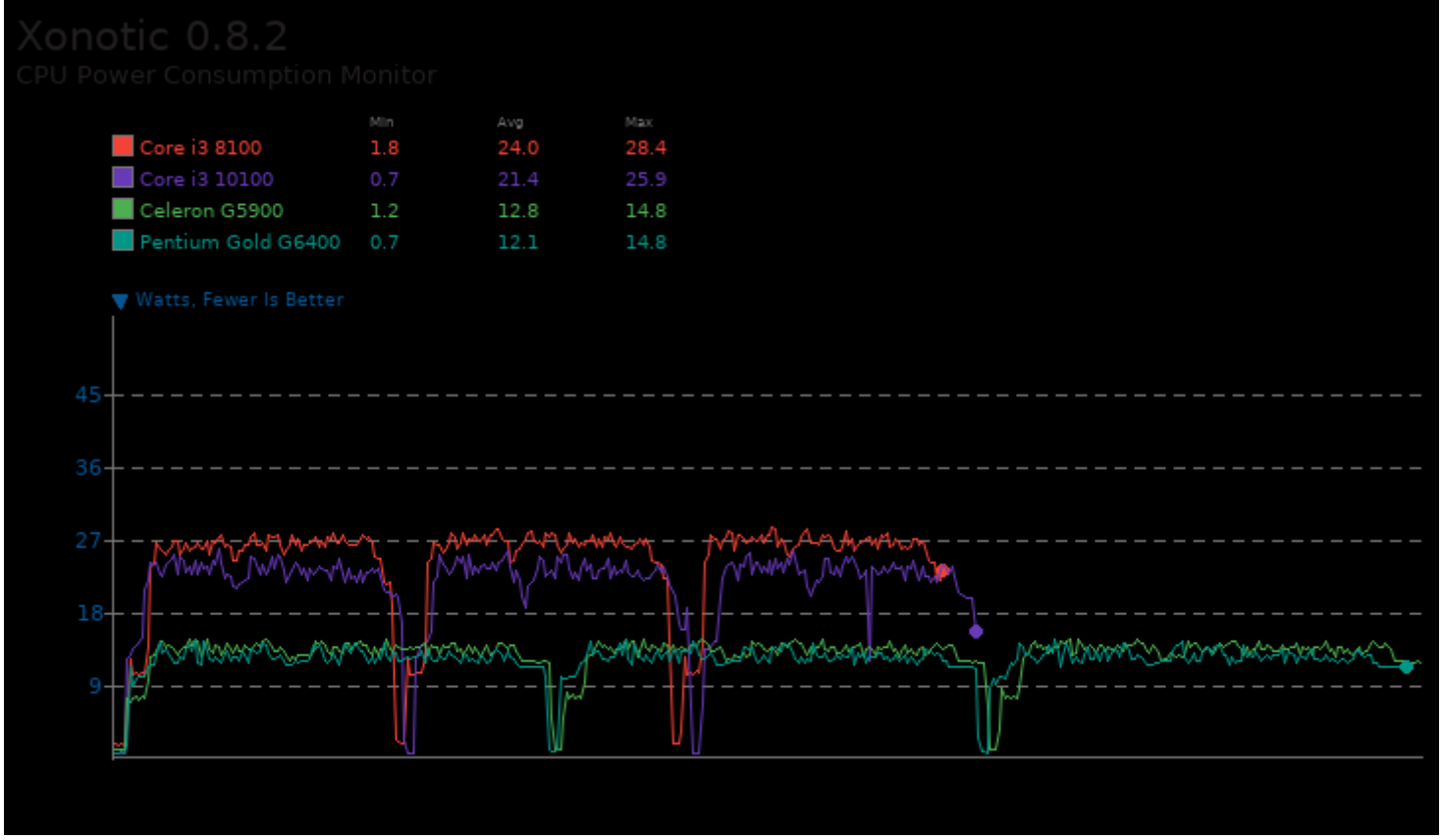

Tesseract 2014-05-12
Resolution: 1920 x 1080
Frames Per Second Per Watt, More Is Better
Core i3 8100
3.85
Celeron G5900
3.96
Pentium Gold G6400
4.07
Core i3 10100
4.57
1.0283
2.0566
3.0849
4.1132
5.1415
Tesseract 2014-05-12
CPU Power Consumption Monitor
Min
Avg
Max
Core i3 8100 1.8 16.8 20.0
Core i3 10100 0.7 13.5 17.4
Celeron G5900 1.0 9.9 11.7
Pentium Gold G6400 0.7 9.7 11.3
Watts, Fewer Is Better
30
24
18
12
6

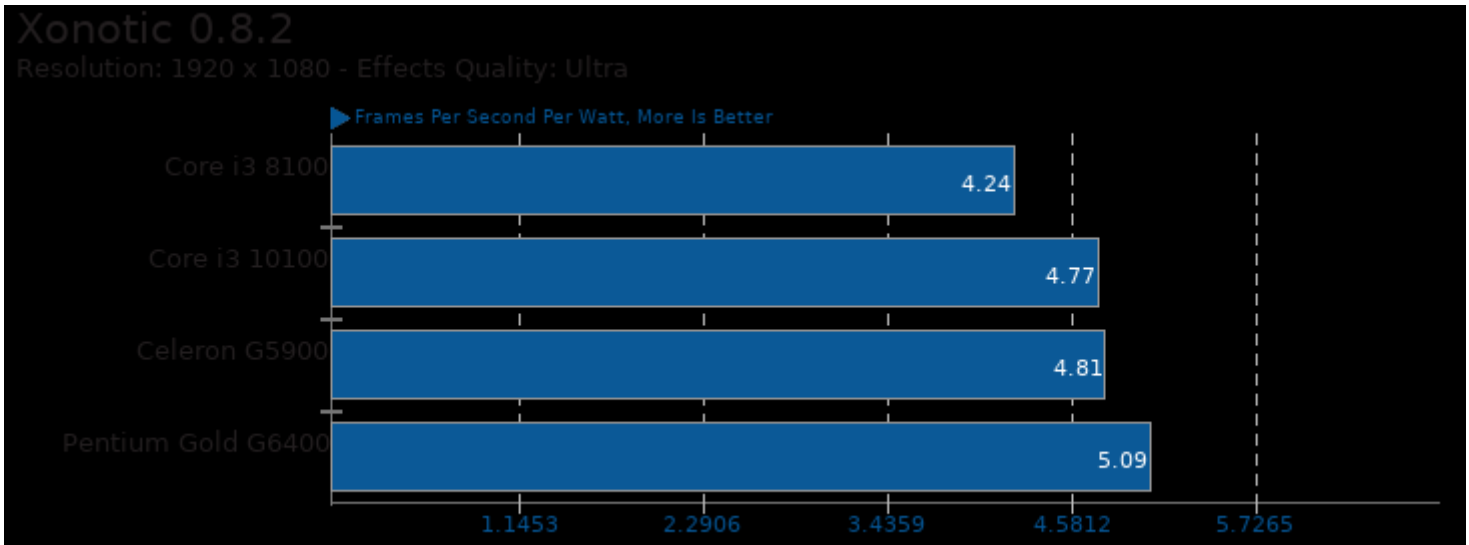

Xonotic 0.8.2
Resolution: 1920 x 1080 - Effects Quality: Low
Frames Per Second Per Watt, More Is Better
Core i3 10100
11.20
Pentium Gold G6400
11.45
Celeron G5900
11.91
Core i3 8100
12.70
3
6
9
12
15


Xonotic 0.8.2
CPU Power Consumption Monitor
Min
Avg
Max
Core i3 10100 0.7 18.9 25.3
Core i3 8100 1.8 17.3 26.8
Pentium Gold G6400 0.7 14.2 17.1
Celeron G5900 1.0 13.6 16.1
Watts, Fewer Is Better
40
32
24
16
8

Low End Graphics

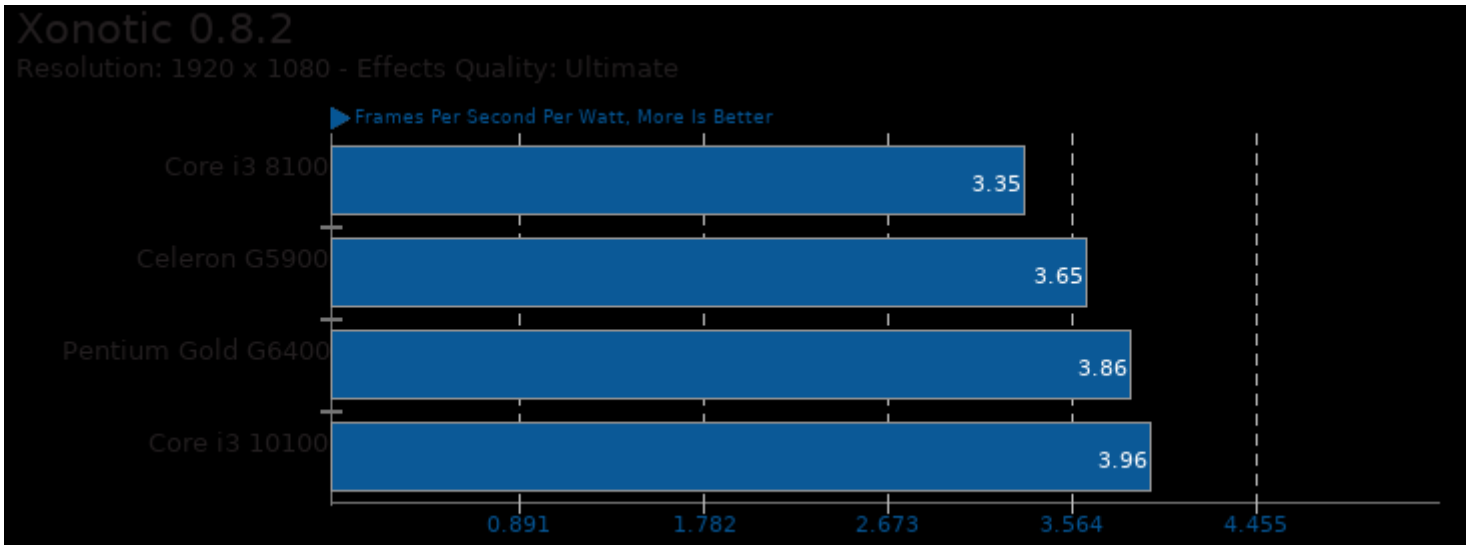


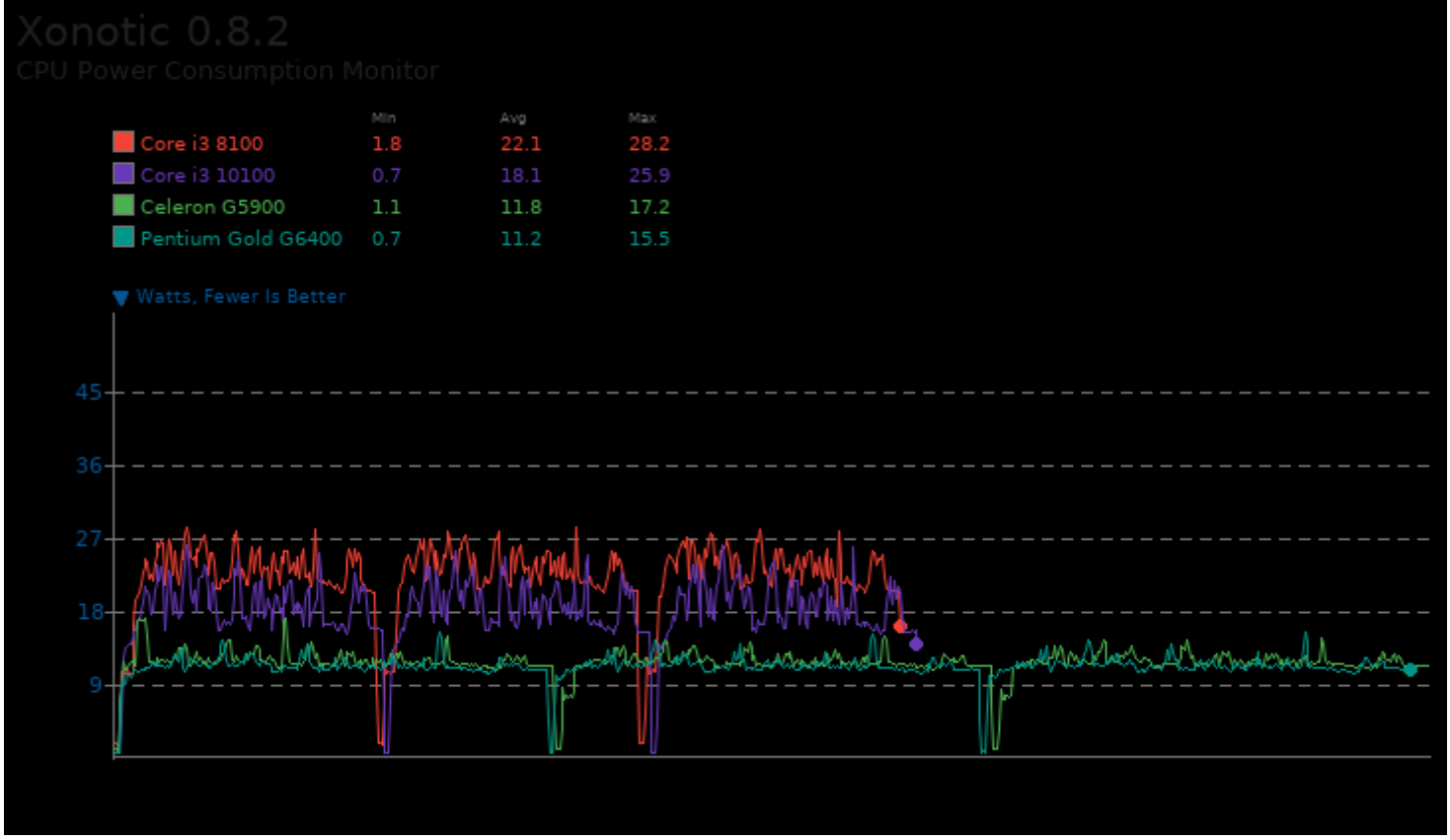



Xonotic 0.8.2
Resolution: 1920 x 1080 - Effects Quality: Ultra
Frames Per Second Per Watt, More Is Better
Core i3 8100
4.24
Core i3 10100
4.77
Celeron G5900
4.81
Pentium Gold G6400
5.09
1.1453
2.2906
3.4359
4.5812
5.7265

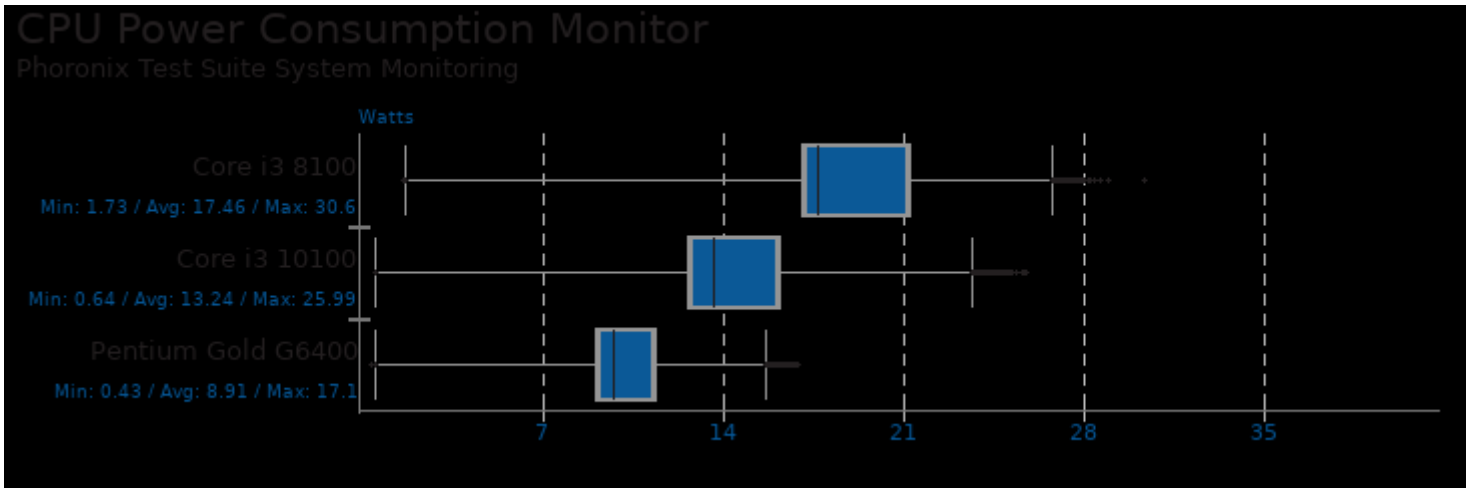

Xonotic 0.8.2
CPU Power Consumption Monitor
Min
Avg
Max
Core i3 8100 1.8 23.6 28.7
Core i3 10100 0.7 20.1 26.0
Celeron G5900 1.2 12.3 14.5
Pentium Gold G6400 0.7 11.7 14.4
Watts, Fewer Is Better
45
36
27
18
9

Low End Graphics



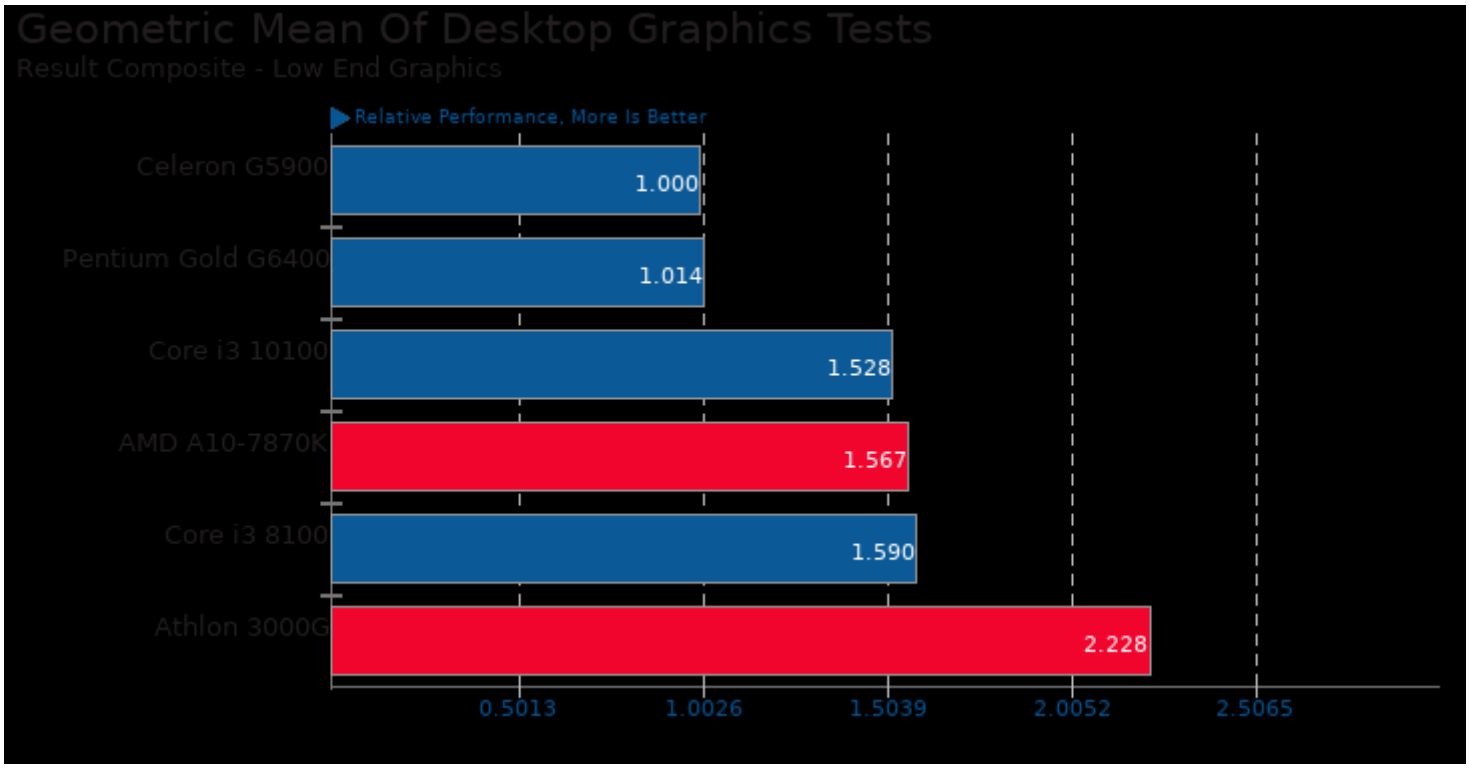


Low End Graphics



Low End Graphics

These geometric means are based upon test groupings / test suites for this result file.



Geometric mean based upon tests: pts/xonotic, pts/openarena and pts/tesseract

This file was automatically generated via the Phoronix Test Suite benchmarking software on Friday, 29 March 2024 08:20.