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Radeon RX 5700 / RX 5700 XT Linux Benchmarks

Radeon and NVIDIA Linux gaming benchmarks by Michael Larabel for a future article of Radeon RX 5700 Navi graphics performance at the end of July.

Automated Executive Summary

TITAN RTX had the most wins, coming in first place for 84% of the tests.

Based on the geometric mean of all complete results, the fastest (TITAN RTX) was 2.461x the speed of the slowest (RX 590).

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

A Total War Saga: THRONES OF BRITANNIA (Resolution: 2560 x 1440 - Graphics Preset: Ultra - Total Frame Time) at 44.934x
Total War: WARHAMMER II (Resolution: 2560 x 1440 - Graphics Preset: Ultra - Scenario: Skaven Battle - Total Frame Time) at 25.526x
HITMAN 2 (Resolution: 3840 x 2160 - Quality Level: Medium - Total Frame Time) at 21.165x
HITMAN 2 (Resolution: 2560 x 1440 - Quality Level: Ultra - Total Frame Time) at 20.033x
HITMAN 2 (Resolution: 2560 x 1440 - Quality Level: Medium - Total Frame Time) at 14.051x
Unigine Heaven (Resolution: 3840 x 2160 - Mode: Fullscreen - Renderer: OpenGL) at 3.709x
Strange Brigade (Resolution: 3840 x 2160 - Graphics Setting: Ultra) at 2.886x

Strange Brigade (Resolution: 2560 x 1440 - Graphics Setting: Ultra) at 2.82x
Rise of the Tomb Raider (Resolution: 2560 x 1440 - Graphics Preset: Very High - Anti Aliasing: Off - Scene: Spine Of The Mountain) at 2.78x
DiRT Rally 2.0 (Resolution: 2560 x 1440 - Graphics Preset: Ultra) at 2.78x.

Test Systems:

RX 590

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASUS PRIME Z390-A (0802 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16384MB, Disk: Samsung SSD 970 EVO 250GB + 2000GB SABRENT, Graphics: Sapphire AMD Radeon RX 470/480/570/570X/580/580X 8GB (1560/2100MHz), Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel I219-V

OS: Ubuntu 19.04, Kernel: 5.2.0-999-generic (x86_64) 20190621, Desktop: GNOME Shell 3.32.1, Display Server: X Server 1.20.4, OpenGL: 4.5 Mesa 19.2.0-devel (git-262787b 2019-06-22 disco-oibaf-ppa) (LLVM 8.0.0), OpenCL: OpenCL 2.1 AMD-APP (2901.0), Vulkan: 1.1.107, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Processor Notes: Scaling Governor: intel_pstate performance
Security Notes: l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling

RX Vega 56

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASUS PRIME Z390-A (0802 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16384MB, Disk: Samsung SSD 970 EVO 250GB + 2000GB SABRENT, Graphics: AMD Radeon RX 64 8GB (1590/800MHz), Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel I219-V

OS: Ubuntu 19.04, Kernel: 5.2.0-999-generic (x86_64) 20190621, Desktop: GNOME Shell 3.32.1, Display Server: X Server 1.20.4, OpenGL: 4.5 Mesa 19.2.0-devel (git-262787b 2019-06-22 disco-oibaf-ppa) (LLVM 8.0.0), OpenCL: OpenCL 2.1 AMD-APP (2901.0), Vulkan: 1.1.107, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Processor Notes: Scaling Governor: intel_pstate performance
Security Notes: l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling

RX Vega 64

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASUS PRIME Z390-A (0802 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16384MB, Disk: Samsung SSD 970 EVO 250GB + 2000GB SABRENT, Graphics: AMD Radeon RX 64 8GB (1630/945MHz), Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel I219-V

OS: Ubuntu 19.04, Kernel: 5.2.0-999-generic (x86_64) 20190621, Desktop: GNOME Shell 3.32.1, Display Server: X Server 1.20.4, OpenGL: 4.5 Mesa 19.2.0-devel (git-262787b 2019-06-22 disco-oibaf-ppa) (LLVM 8.0.0), OpenCL:

OpenCL 2.1 AMD-APP (2901.0), Vulkan: 1.1.107, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Processor Notes: Scaling Governor: intel_pstate performance
Security Notes: l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling

Radeon VII

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASUS PRIME Z390-A (0802 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16384MB, Disk: Samsung SSD 970 EVO 250GB + 2000GB SABRENT, Graphics: AMD Vega 20 16GB (1802/1001MHz), Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel I219-V

OS: Ubuntu 19.04, Kernel: 5.2.0-999-generic (x86_64) 20190621, Desktop: GNOME Shell 3.32.1, Display Server: X Server 1.20.4, OpenGL: 4.5 Mesa 19.2.0-devel (git-262787b 2019-06-22 disco-oibaf-ppa) (LLVM 8.0.0), OpenCL: OpenCL 2.1 AMD-APP (2901.0), Vulkan: 1.1.107, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Processor Notes: Scaling Governor: intel_pstate performance
Security Notes: l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling

RX 5700

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASUS PRIME Z390-A (0802 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16384MB, Disk: Samsung SSD 970 EVO 250GB + 2000GB SABRENT, Graphics: AMD Navi 10 8GB (1750/875MHz), Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel I219-V

OS: Ubuntu 19.04, Kernel: 5.3.0-999-generic (x86_64) 20190726, Desktop: GNOME Shell 3.32.1, Display Server: X Server 1.20.4, OpenGL: 4.5 Mesa 19.2.0-devel (git-de17922b8a) (LLVM 9.0.0), Vulkan: 1.1.107, Compiler: GCC 8.3.0 + LLVM 9.0.0, File-System: ext4, Screen Resolution: 3840x2160

Processor Notes: Scaling Governor: intel_pstate performance
Security Notes: l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling

RX 5700 XT

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASUS PRIME Z390-A (0802 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16384MB, Disk: Samsung SSD 970 EVO 250GB + 2000GB SABRENT, Graphics: AMD Navi 10 8GB (2100/875MHz), Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel I219-V

OS: Ubuntu 19.04, Kernel: 5.3.0-999-generic (x86_64) 20190726, Desktop: GNOME Shell 3.32.1, Display Server: X Server 1.20.4, OpenGL: 4.5 Mesa 19.2.0-devel (git-de17922b8a) (LLVM 9.0.0), Vulkan: 1.1.107, Compiler: GCC 8.3.0 + LLVM 9.0.0, File-System: ext4, Screen Resolution: 3840x2160

Processor Notes: Scaling Governor: intel_pstate performance
Security Notes: l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling

GTX 1070

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASUS PRIME Z390-A (0802 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16384MB, Disk: Samsung SSD 970 EVO 250GB + 2000GB SABRENT, Graphics: NVIDIA GeForce GTX 1070 8GB (1506/4006MHz), Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel I219-V

OS: Ubuntu 19.04, Kernel: 5.1.10-050110-generic (x86_64), Desktop: GNOME Shell 3.32.1, Display Server: X Server 1.20.4, Display Driver: NVIDIA 430.26, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 10.2.120, Vulkan: 1.1.99, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Processor Notes: Scaling Governor: intel_pstate performance
Security Notes: l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling

GTX 1080

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASUS PRIME Z390-A (0802 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16384MB, Disk: Samsung SSD 970 EVO 250GB + 2000GB SABRENT, Graphics: NVIDIA GeForce GTX 1080 8GB (1607/5005MHz), Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel I219-V

OS: Ubuntu 19.04, Kernel: 5.1.10-050110-generic (x86_64), Desktop: GNOME Shell 3.32.1, Display Server: X Server 1.20.4, Display Driver: NVIDIA 430.26, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 10.2.120, Vulkan: 1.1.99, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Processor Notes: Scaling Governor: intel_pstate performance
Security Notes: l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling

GTX 1080 Ti

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASUS PRIME Z390-A (0802 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16384MB, Disk: Samsung SSD 970 EVO 250GB + 2000GB SABRENT, Graphics: NVIDIA GeForce GTX 1080 Ti 11GB (1480/5508MHz), Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel I219-V

OS: Ubuntu 19.04, Kernel: 5.1.10-050110-generic (x86_64), Desktop: GNOME Shell 3.32.1, Display Server: X Server 1.20.4, Display Driver: NVIDIA 430.26, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 10.2.120, Vulkan: 1.1.99, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Processor Notes: Scaling Governor: intel_pstate performance
Security Notes: l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling

RTX 2060

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASUS PRIME Z390-A (0802 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16384MB, Disk: Samsung SSD 970 EVO 250GB + 2000GB SABRENT, Graphics: NVIDIA GeForce RTX 2060 6GB (1365/7000MHz), Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel I219-V

OS: Ubuntu 19.04, Kernel: 5.1.10-050110-generic (x86_64), Desktop: GNOME Shell 3.32.1, Display Server: X Server 1.20.4, Display Driver: NVIDIA 430.26, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 10.2.120, Vulkan: 1.1.99, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Processor Notes: Scaling Governor: intel_pstate performance
Security Notes: l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling

RTX 2070

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASUS PRIME Z390-A (0802 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16384MB, Disk: Samsung SSD 970 EVO 250GB + 2000GB SABRENT, Graphics: ASUS NVIDIA GeForce RTX 2070 8GB (1410/7000MHz), Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel I219-V

OS: Ubuntu 19.04, Kernel: 5.1.10-050110-generic (x86_64), Desktop: GNOME Shell 3.32.1, Display Server: X Server 1.20.4, Display Driver: NVIDIA 430.26, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 10.2.120, Vulkan: 1.1.99, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Processor Notes: Scaling Governor: intel_pstate performance
Security Notes: l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling

RTX 2080

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASUS PRIME Z390-A (0802 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16384MB, Disk: Samsung SSD 970 EVO 250GB + 2000GB SABRENT, Graphics: Zotac NVIDIA GeForce RTX 2080 8GB (1515/7000MHz), Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel I219-V

OS: Ubuntu 19.04, Kernel: 5.1.10-050110-generic (x86_64), Desktop: GNOME Shell 3.32.1, Display Server: X Server 1.20.4, Display Driver: NVIDIA 430.26, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 10.2.120, Vulkan: 1.1.99, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Processor Notes: Scaling Governor: intel_pstate performance
Security Notes: l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling

RTX 2080 Ti

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASUS PRIME Z390-A (0802 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16384MB, Disk: Samsung SSD 970 EVO 250GB + 2000GB SABRENT, Graphics: NVIDIA GeForce RTX 2080 Ti 11GB (1350/7000MHz), Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel I219-V

OS: Ubuntu 19.04, Kernel: 5.1.10-050110-generic (x86_64), Desktop: GNOME Shell 3.32.1, Display Server: X Server 1.20.4, Display Driver: NVIDIA 430.26, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 10.2.120, Vulkan: 1.1.99, Compiler: GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

Processor Notes: Scaling Governor: intel_pstate performance
Security Notes: l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling

TITAN RTX

Processor: Intel Core i9-9900K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: ASUS PRIME Z390-A (0802 BIOS), Chipset: Intel Cannon Lake PCH, Memory: 16384MB, Disk: Samsung SSD 970 EVO 250GB + 2000GB SABRENT, Graphics: NVIDIA TITAN RTX 24GB (1350/7000MHz), Audio: Realtek ALC1220, Monitor: Acer B286HK, Network: Intel I219-V

OS: Ubuntu 19.04, Kernel: 5.1.10-050110-generic (x86_64), Desktop: GNOME Shell 3.32.1, Display Server: X Server 1.20.4, Display Driver: NVIDIA 430.26, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 10.2.120, Vulkan: 1.1.99, Compiler:

Radeon RX 5700 / RX 5700 XT Linux Benchmarks

GCC 8.3.0, File-System: ext4, Screen Resolution: 3840x2160

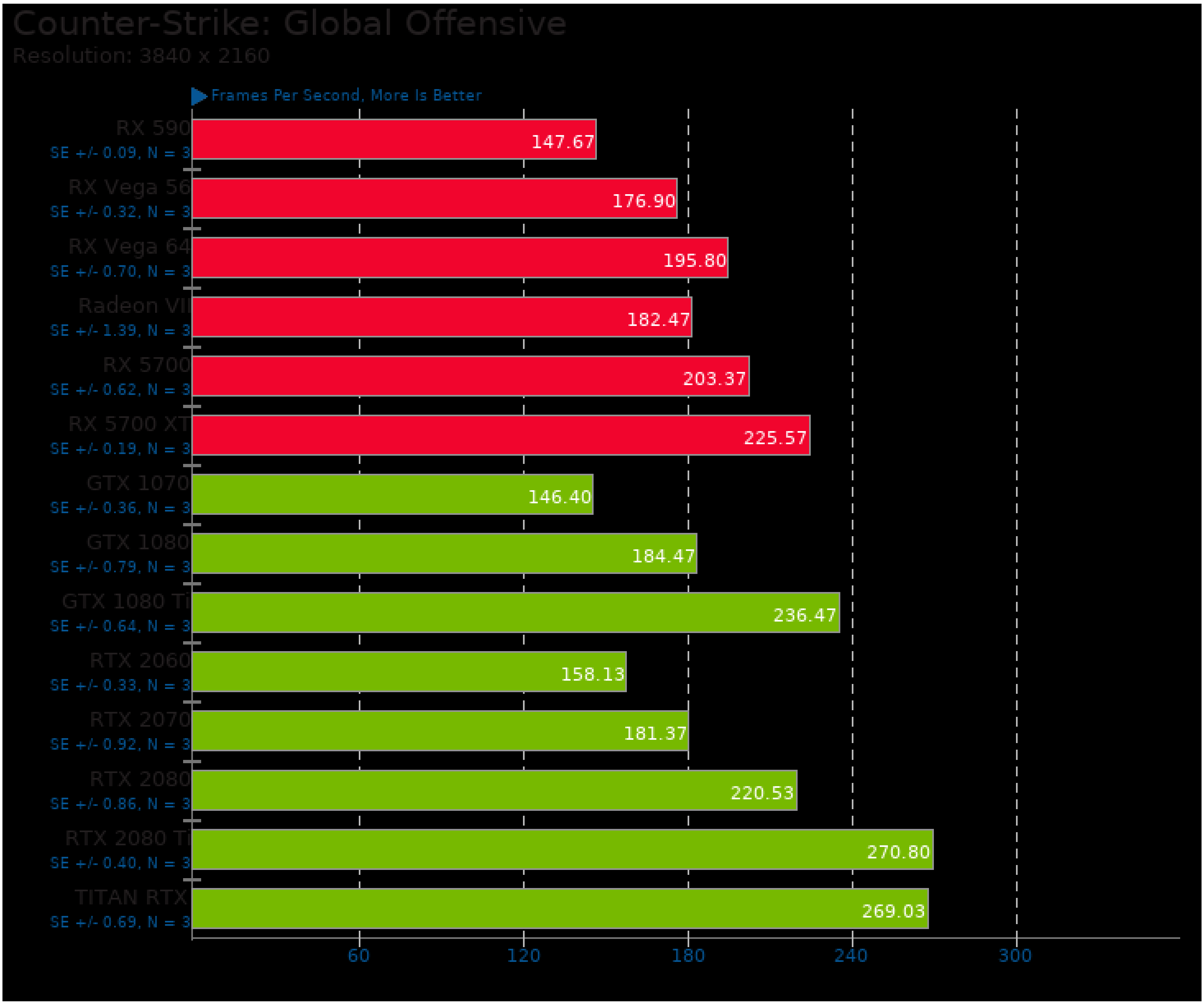
Processor Notes: Scaling Governor: intel_pstate performance
Security Notes: l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling

	RX 590	RX Vega 56	RX Vega 64	Radeon VII	RX 5700	RX 5700 XT	GTX 1070	GTX 1080	GTX 1080 Ti	RTX 2060	RTX 2070	RTX 2080	RTX 2080 Ti	TITAN RTX
Counter-Strike: Global Offensive - 3840 x 2160 (FPS)	147.67	176.90	195.80	182.47	203.37	225.57	146.40	184.47	236.47	158.13	181.37	220.53	270.80	269.03
Normalized	54.53%	65.32%	72.3%	67.38%	75.1%	83.3%	54.06%	68.12%	87.32%	58.39%	66.98%	81.44%	100%	99.35%
Standard	0.1%	0.3%	0.6%	1.3%	0.5%	0.1%	0.4%	0.7%	0.5%	0.4%	0.9%	0.7%	0.3%	0.4%
DiRT Rally 2.0 - 2560 x 1440 - Ultra (FPS)	31.85	41.30	46.85	57.68	41.72	47.79		50.30	65.23	47.82	53.86	66.91	86.20	88.53
Normalized	35.98%	46.65%	52.92%	65.15%	47.13%	53.98%		56.82%	73.68%	54.02%	60.84%	75.58%	97.37%	100%
Standard	0.1%	0.2%	0.3%	0.2%	0%	0.1%		0.4%	0.6%	0.1%	0.3%	0.5%	0.2%	0.2%
HITMAN 2 - 2560 x 1440 - Medium (FPS)	51.28	61.71	70.43	80.91	69.61	78.21	52.78	66.72	78.68	59.65	68.03	80.72	101.14	103.44
Normalized	49.57%	59.66%	68.09%	78.22%	67.3%	75.61%	51.02%	64.5%	76.06%	57.67%	65.77%	78.04%	97.78%	100%
Standard	0.1%	0.3%	0.2%	0.2%	0.1%	0.2%	0.2%	0.8%	0.8%	0.4%	0.4%	0.1%	0.2%	0.2%
HITMAN 2 - 2560 x 1440 - Ultra (FPS)	47.90	57.77	65.76	75.37	64.28	72.69	50.22	62.40	73.33	56.23	63.47	75.30	94.06	96.41
Normalized	49.68%	59.92%	68.21%	78.18%	66.67%	75.4%	52.09%	64.72%	76.06%	58.32%	65.83%	78.1%	97.56%	100%
Standard	0.2%	0.1%	0.3%	0.1%	0.1%	0%	0.1%	0.2%	0.5%	0.2%	0.1%	0.3%	0.1%	0.2%
HITMAN 2 - 3840 x 2160 - Medium (FPS)	26.17	32.43	38.26	45.99	36.33	41.40	26.84	33.66	41.31	30.53	35.33	43.94	59.72	62.08
Normalized	42.16%	52.24%	61.63%	74.08%	58.52%	66.69%	43.23%	54.22%	66.54%	49.18%	56.91%	70.78%	96.2%	100%
Standard	0.4%	0.2%	0.1%	0.1%	0.2%	0.1%	0.3%	0.2%	0.4%	0.2%	0.1%	1.3%	0.1%	0.3%
Rise of the Tomb Raider - 2560 x 1440 - Very High - Off - S.O.T.M (FPS)	71.50	89.17	100.63	122.77			93.33	115.37	148.37	110.10	124.20	150.17	191.17	198.80
Normalized	35.97%	44.85%	50.62%	61.76%			46.95%	58.03%	74.63%	55.38%	62.47%	75.54%	96.16%	100%
Standard Deviation	0.8%	0.7%	0.1%	1.3%			0.3%	0.1%	0.9%	0.6%	0.5%	0.3%	0.5%	0.5%

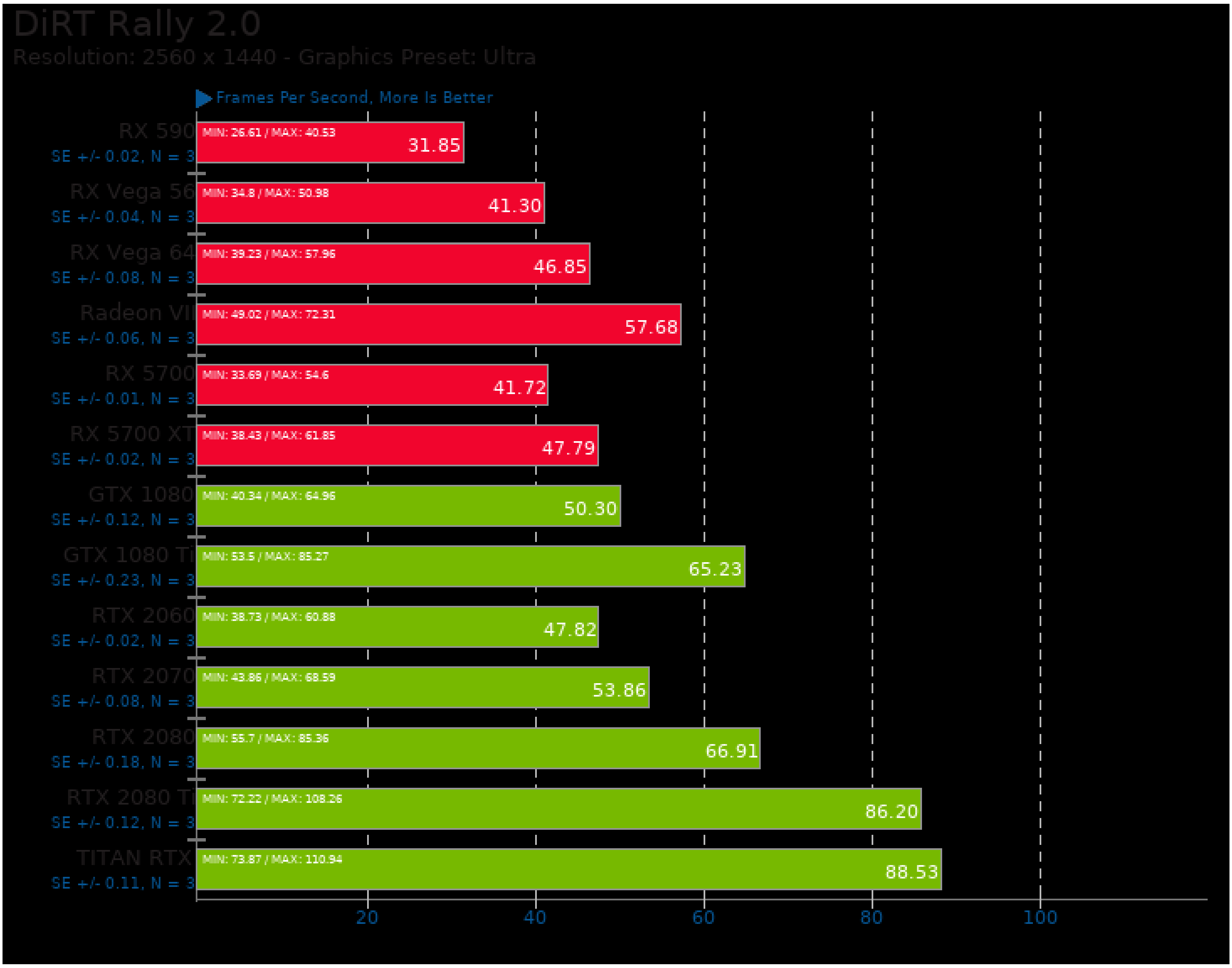
Rise of the Tomb Raider - 2560 x 1440 - Very High - Off - Prophets Tomb (FPS)	55.67	64.60	73.43	87.93			69.63	86.77	105.57	86.20	98.53	118.93	145.07	148.47
Normalized	37.5%	43.51%	49.46%	59.22%			46.9%	58.44%	71.11%	58.06%	66.36%	80.1%	97.71%	100%
Standard	0.1%	0.2%	0.2%	0.2%			0.2%	0.1%	0.8%	0.2%	0.3%	0.1%	0.4%	0.6%
Rise of the Tomb Raider - 2560 x 1440 - Very High - Off - Geothermal	53.83	63.80	72.80	89.23			68.20	84.40	103.83	80.17	92.07	112.13	136.77	139.13
Normalized	38.69%	45.86%	52.33%	64.13%			49.02%	60.66%	74.63%	57.62%	66.18%	80.59%	98.3%	100%
Standard	0.4%	0.3%	0.2%	0.2%			0.3%	0.4%	0.3%	0.3%	0.1%	0.5%	1%	1.5%
Strange Brigade - 2560 x 1440 - Ultra (FPS)	74.60	94.97	107.83	140.50	113.37	124.03	92.23	116.50	152.00	109.30	130.63	153.00	198.33	210.37
Normalized	35.46%	45.14%	51.26%	66.79%	53.89%	58.96%	43.84%	55.38%	72.25%	51.96%	62.1%	72.73%	94.28%	100%
Standard	0.5%	0.3%	0.1%	0.2%	0.3%	0.5%	0.8%	2.9%	0.6%	0.3%	0.3%	0.1%	0.3%	0.3%
Strange Brigade - 3840 x 2160 - Ultra (FPS)	43.40	57.57	65.90	90.20	69.53	75.63	52.27	65.90	88.87	61.87	75.17	88.77	118.30	125.27
Normalized	34.65%	45.96%	52.61%	72%	55.5%	60.37%	41.73%	52.61%	70.94%	49.39%	60.01%	70.86%	94.44%	100%
Standard	0.5%	0.3%	0.4%	0.1%	0.1%	0.3%	0.5%	0.8%	0.1%	0.1%	0.8%	0.3%	0.2%	0.3%
A Total War Saga: THRONES OF BRITANNIA - 2560 x 1440 - Ultra (FPS)	39.93	50.17	57.70	69.00	59.13	66.63	50.97	60.90	79.60	56.90	67.67	80.47	100.67	103.23
Normalized	38.68%	48.6%	55.89%	66.84%	57.28%	64.55%	49.38%	58.99%	77.11%	55.12%	65.55%	77.95%	97.52%	100%
Standard	0.4%	0.2%	0.6%	1%	0.6%	1%	0.1%	0.4%	1.3%	0.7%	0.8%	0.7%	0.1%	1.3%
Total War: WARHAMMER II - 2560 x 1440 - Ultra - Skaven Battle (FPS)	37.57	47.93	56.40	67.53	58.73	65.93	48.37	59.50	75.30	55.27	63.10	75.90	94.20	96.17
Normalized	39.07%	49.84%	58.65%	70.22%	61.07%	68.56%	50.3%	61.87%	78.3%	57.47%	65.61%	78.92%	97.95%	100%
Standard	0.8%	1.2%	1.7%	2.2%	2.7%	1.5%	0.7%	1.1%	1%	0.3%	0.7%	2.1%	2.2%	1.1%
Deviation														

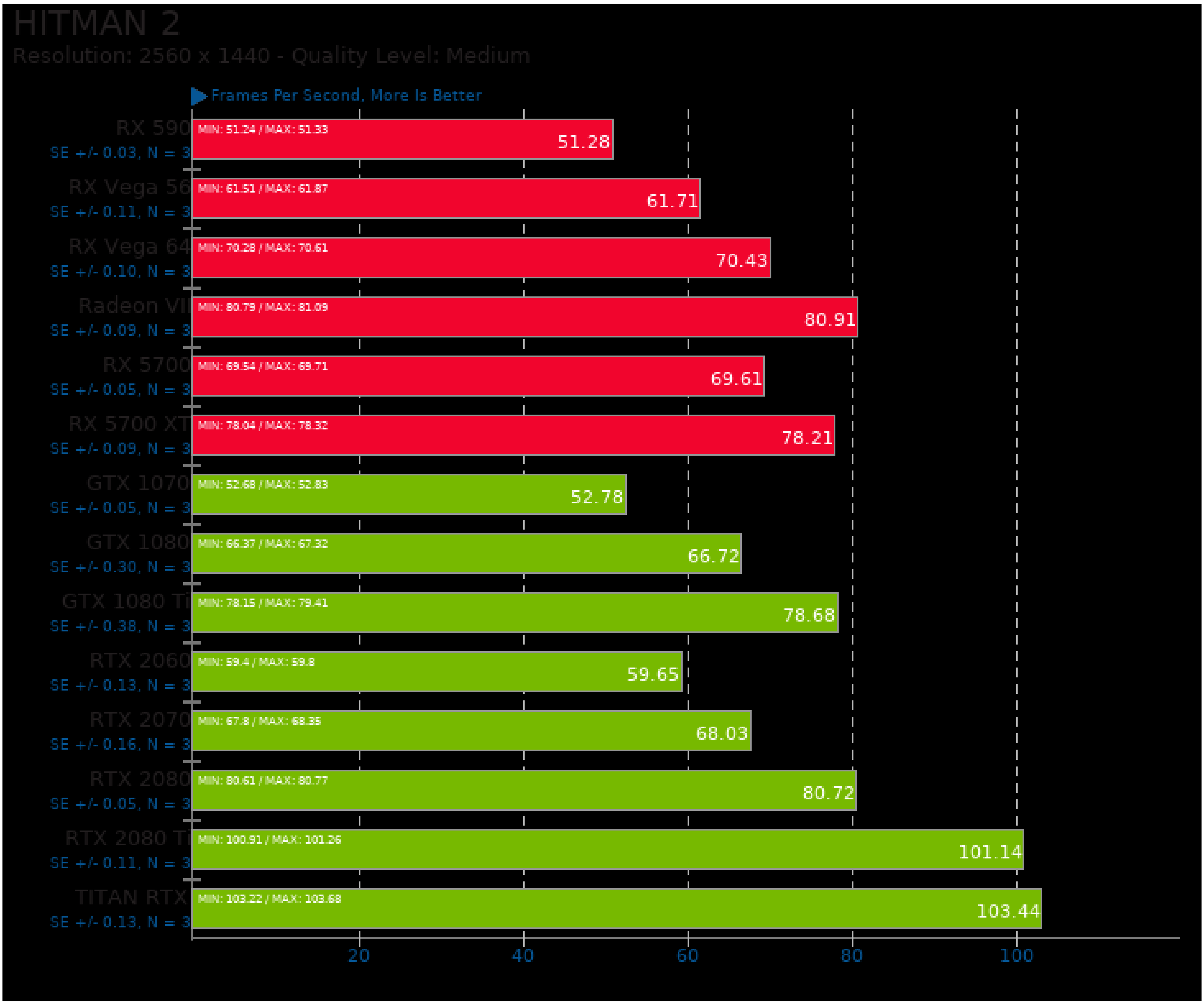
Radeon RX 5700 / RX 5700 XT Linux Benchmarks

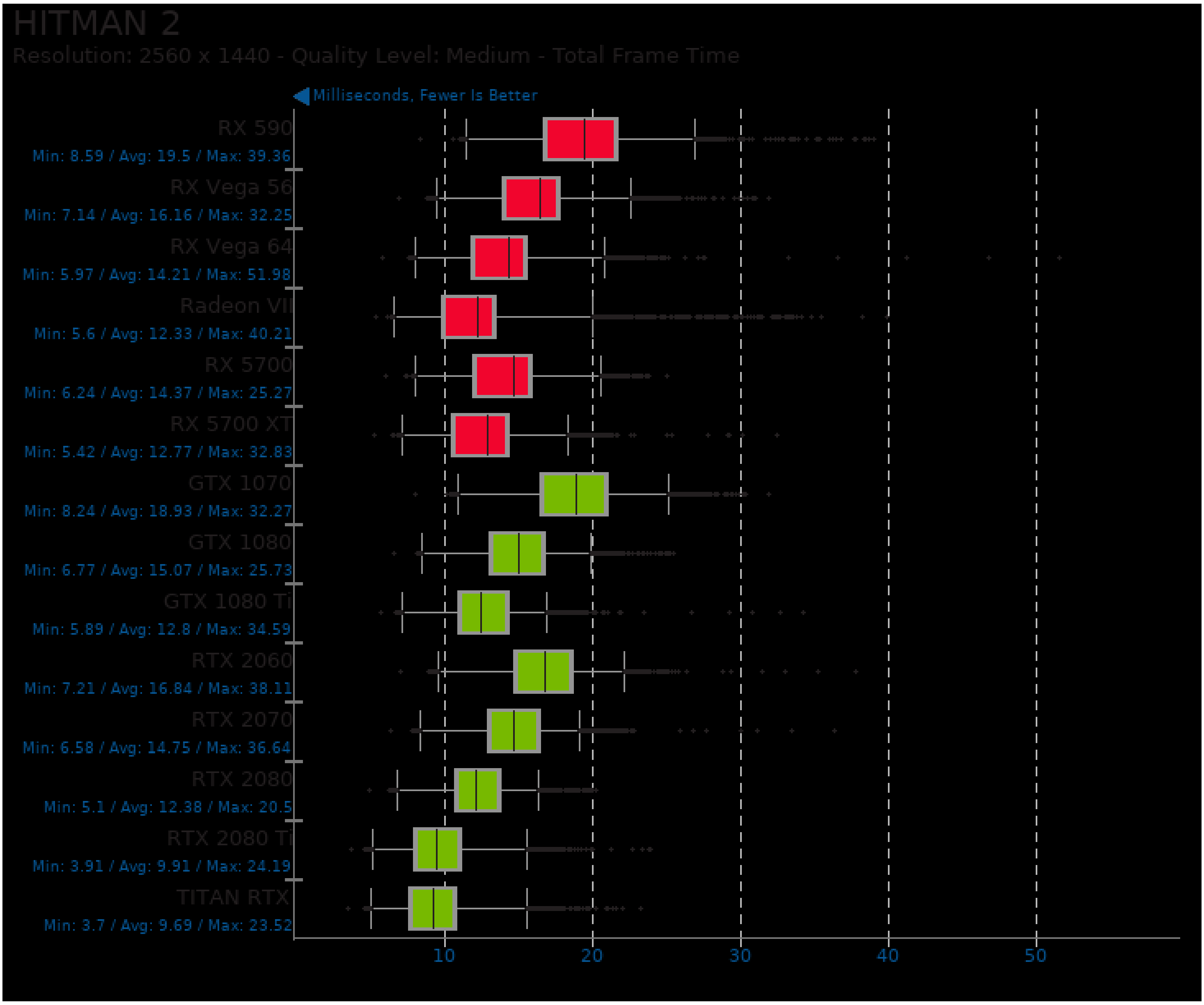
Unigine Heaven - 3840 x 2160 - Fullscreen - OpenGL (FPS)	20.13	25.68	29.86	37.33	33.17	36.88	30.62	35.78	47.56	34.74	42.81	51.50	74.66	70.60
Normalized	26.96%	34.4%	39.99%	50%	44.43%	49.4%	41.01%	47.92%	63.7%	46.53%	57.34%	68.98%	100%	94.56%
Standard Deviation	0%	0%	0.2%	0.2%	0.1%	0%	0.2%	0.1%	0.5%	0.2%	0.2%	0.2%	0.2%	0.2%


Counter-Strike: Global Offensive
Resolution: 3840 x 2160
Frames Per Second, More Is Better
RX 590
SE +/- 0.09, N = 3
147.67
RX Vega 56
SE +/- 0.32, N = 3
176.90
RX Vega 64
SE +/- 0.70, N = 3
195.80
Radeon VII
SE +/- 1.39, N = 3
182.47
RX 5700
SE +/- 0.62, N = 3
203.37
RX 5700 XT
SE +/- 0.19, N = 3
225.57
GTX 1070
SE +/- 0.36, N = 3
146.40
GTX 1080
SE +/- 0.79, N = 3
184.47
GTX 1080 Ti
SE +/- 0.64, N = 3
236.47
RTX 2060
SE +/- 0.33, N = 3
158.13
RTX 2070
SE +/- 0.92, N = 3
181.37
RTX 2080
SE +/- 0.86, N = 3
220.53
RTX 2080 Ti
SE +/- 0.40, N = 3
270.80
TITAN RTX
SE +/- 0.69, N = 3
269.03
60
120
180
240
300

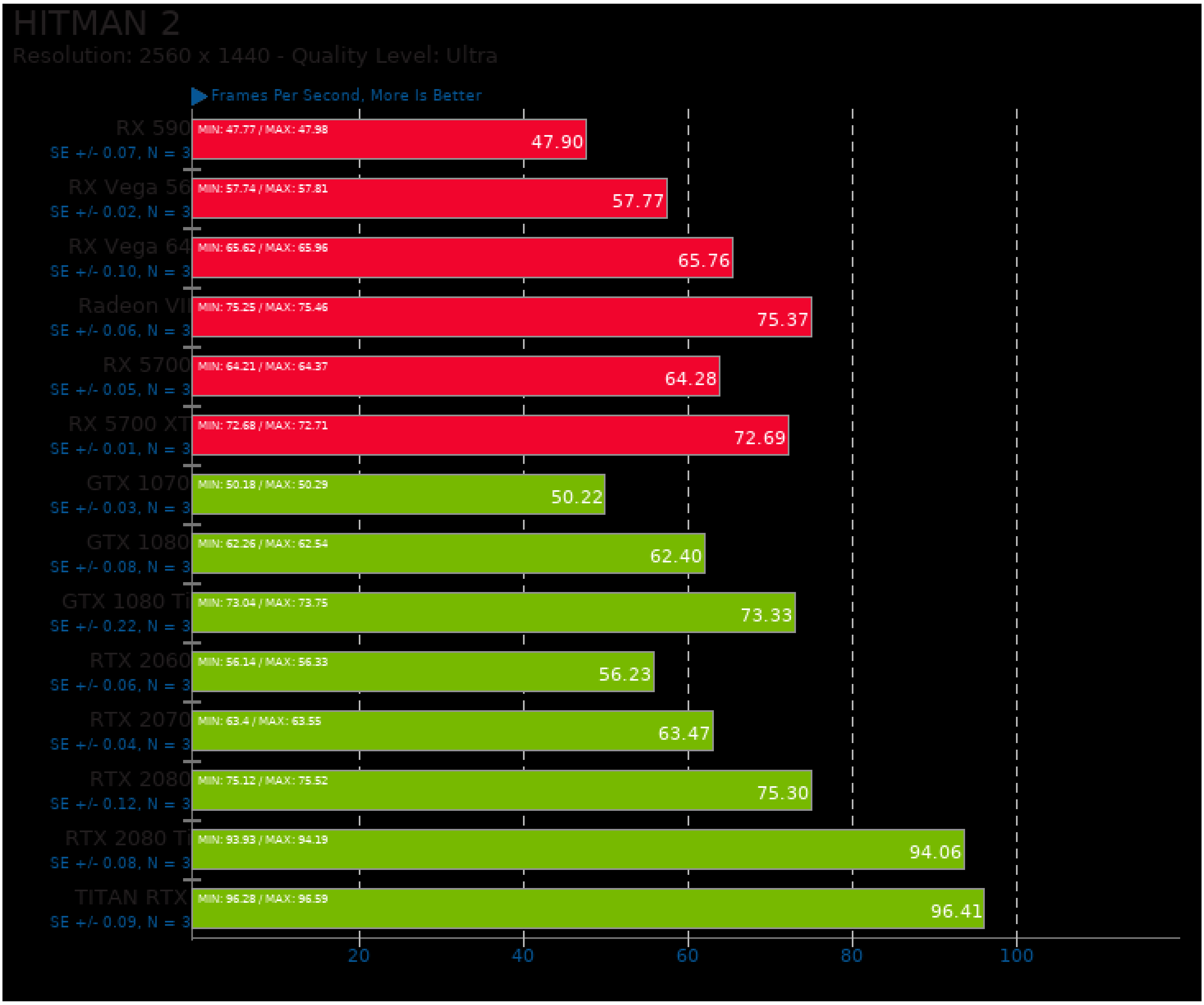
Radeon RX 5700 / RX 5700 XT Linux Benchmarks

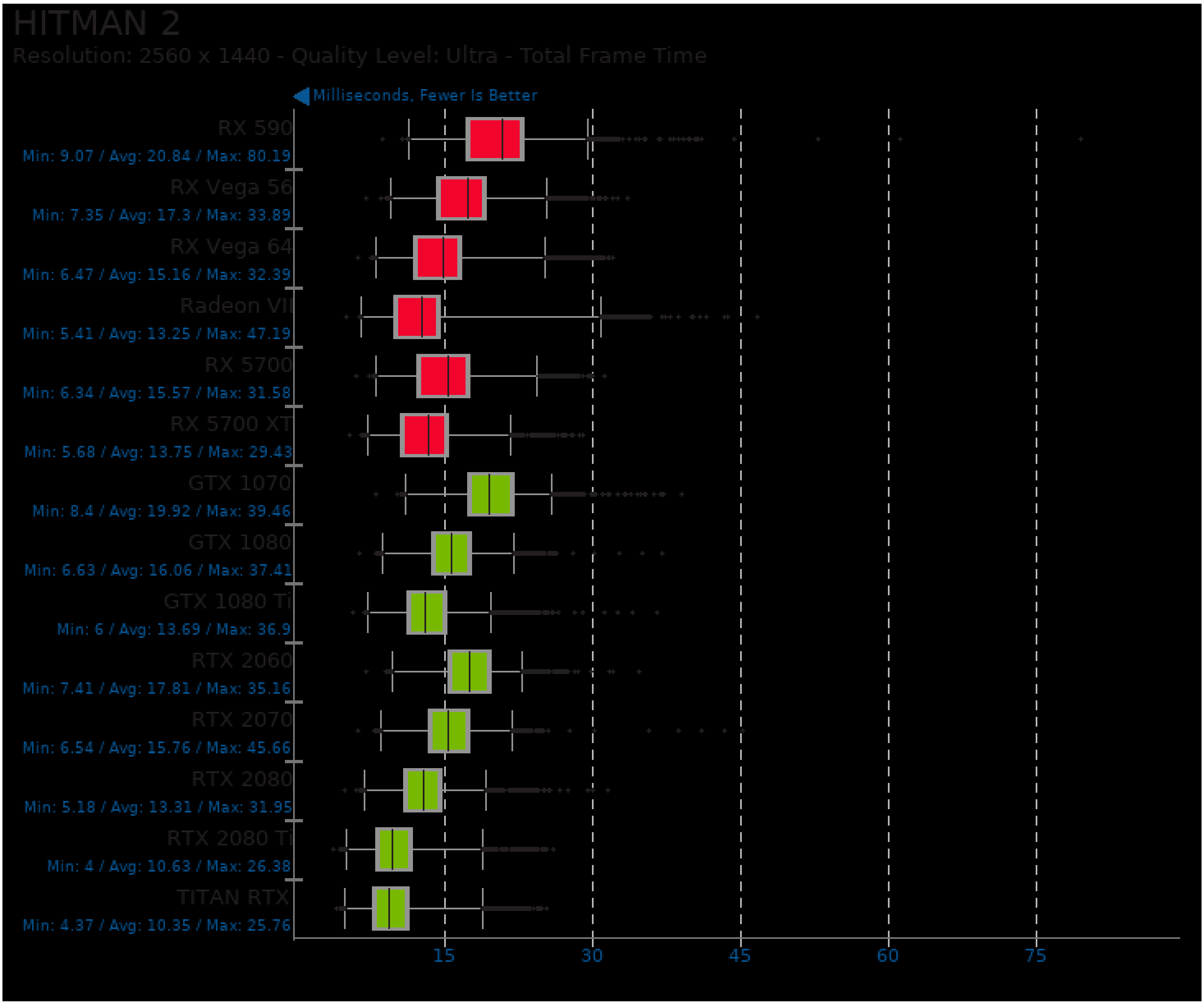


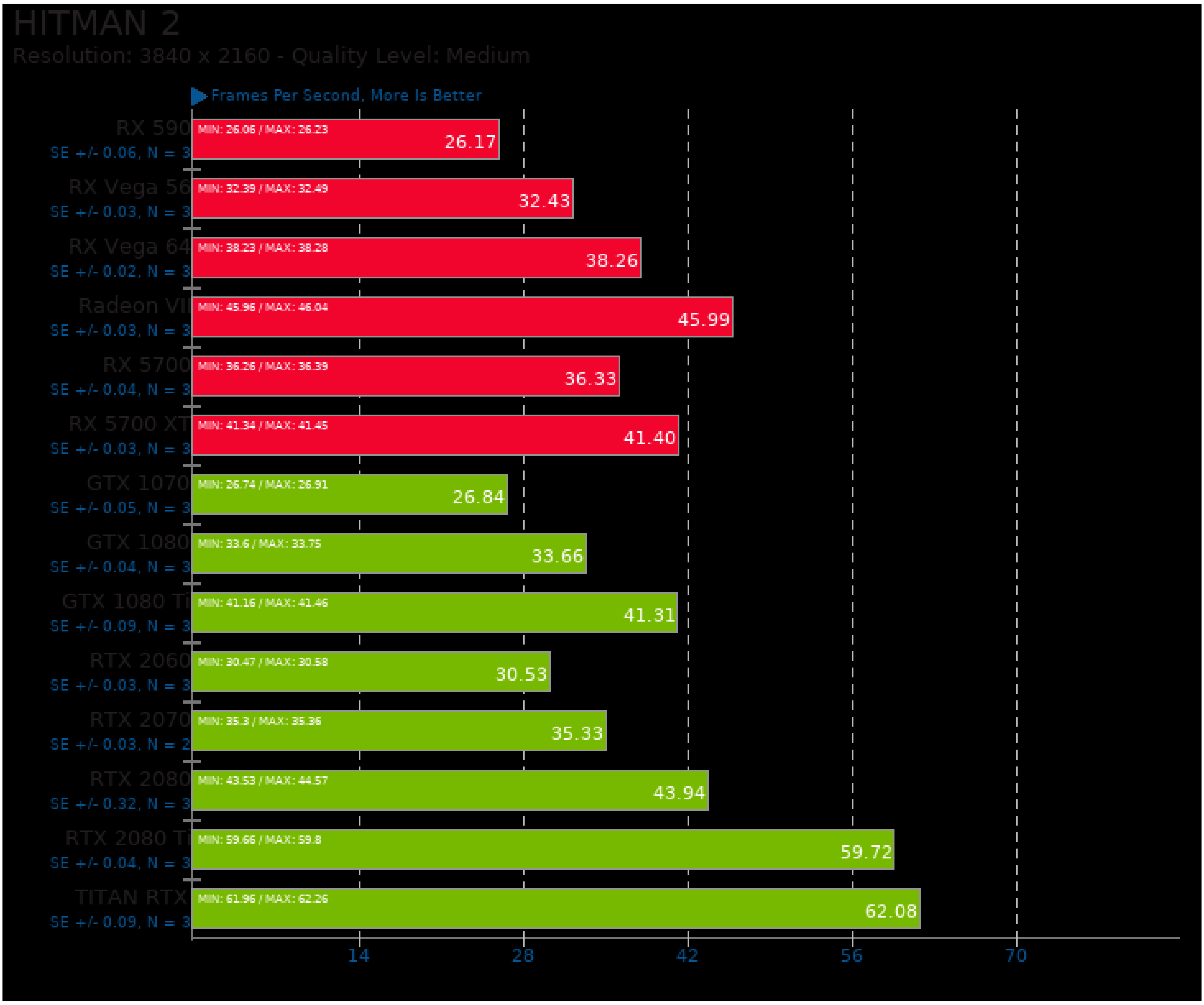

HITMAN 2
Resolution: 2560 x 1440 - Quality Level: Medium
Frames Per Second, More Is Better
RX 590
SE +/- 0.03, N = 3
MIN: 51.24 / MAX: 51.33
51.28
RX Vega 56
SE +/- 0.11, N = 3
MIN: 61.51 / MAX: 61.87
61.71
RX Vega 64
SE +/- 0.10, N = 3
MIN: 70.28 / MAX: 70.61
70.43
Radeon VII
SE +/- 0.09, N = 3
MIN: 80.79 / MAX: 81.09
80.91
RX 5700
SE +/- 0.05, N = 3
MIN: 69.54 / MAX: 69.71
69.61
RX 5700 XT
SE +/- 0.09, N = 3
MIN: 78.04 / MAX: 78.32
78.21
GTX 1070
SE +/- 0.05, N = 3
MIN: 52.68 / MAX: 52.83
52.78
GTX 1080
SE +/- 0.30, N = 3
MIN: 66.37 / MAX: 67.32
66.72
GTX 1080 Ti
SE +/- 0.38, N = 3
MIN: 78.15 / MAX: 79.41
78.68
RTX 2060
SE +/- 0.13, N = 3
MIN: 59.4 / MAX: 59.8
59.65
RTX 2070
SE +/- 0.16, N = 3
MIN: 67.8 / MAX: 68.35
68.03
RTX 2080
SE +/- 0.05, N = 3
MIN: 80.61 / MAX: 80.77
80.72
RTX 2080 Ti
SE +/- 0.11, N = 3
MIN: 100.91 / MAX: 101.26
101.14
TITAN RTX
SE +/- 0.13, N = 3
MIN: 103.22 / MAX: 103.68
103.44
20
40
60
80
100

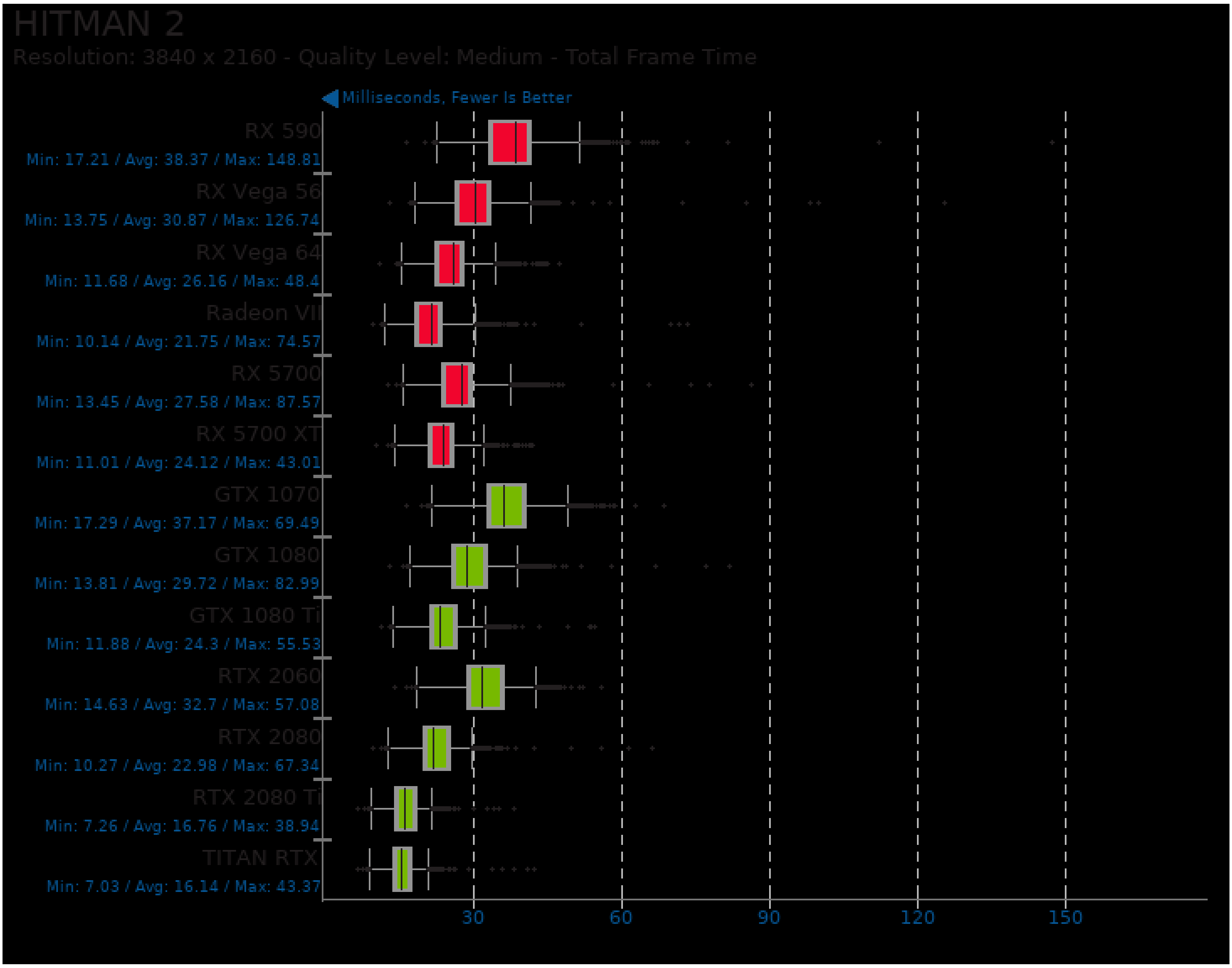


HITMAN 2
Resolution: 2560 x 1440 - Quality Level: Medium - Total Frame Time
Milliseconds, Fewer Is Better
RX 590
Min: 8.59 / Avg: 19.5 / Max: 39.36
RX Vega 56
Min: 7.14 / Avg: 16.16 / Max: 32.25
RX Vega 64
Min: 5.97 / Avg: 14.21 / Max: 51.98
Radeon VII
Min: 5.6 / Avg: 12.33 / Max: 40.21
RX 5700
Min: 6.24 / Avg: 14.37 / Max: 25.27
RX 5700 XT
Min: 5.42 / Avg: 12.77 / Max: 32.83
GTX 1070
Min: 8.24 / Avg: 18.93 / Max: 32.27
GTX 1080
Min: 6.77 / Avg: 15.07 / Max: 25.73
GTX 1080 Ti
Min: 5.89 / Avg: 12.8 / Max: 34.59
RTX 2060
Min: 7.21 / Avg: 16.84 / Max: 38.11
RTX 2070
Min: 6.58 / Avg: 14.75 / Max: 36.64
RTX 2080
Min: 5.1 / Avg: 12.38 / Max: 20.5
RTX 2080 Ti
Min: 3.91 / Avg: 9.91 / Max: 24.19
TITAN RTX
Min: 3.7 / Avg: 9.69 / Max: 23.52
10
20
30
40
50

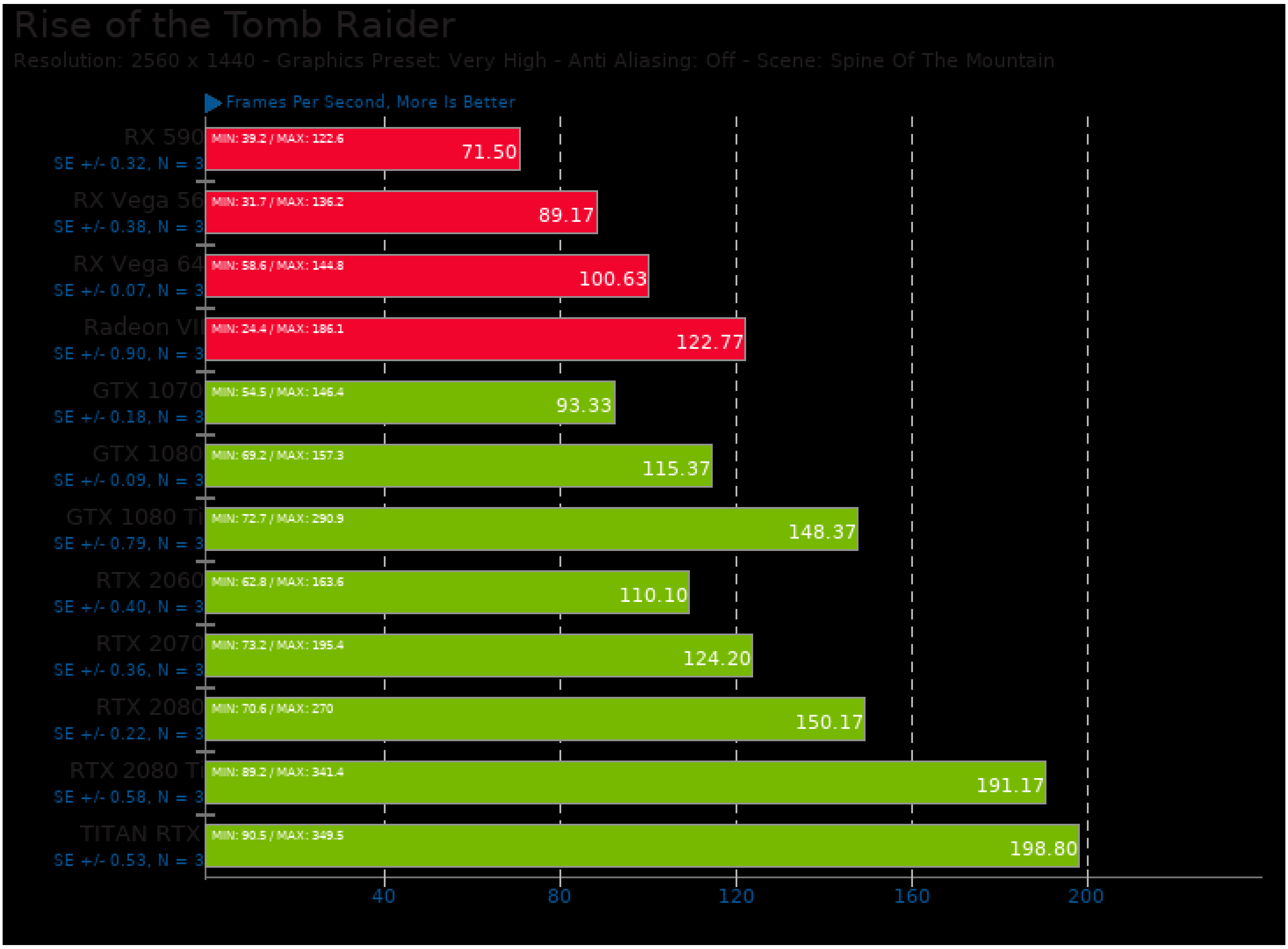

HITMAN 2
Resolution: 2560 x 1440 - Quality Level: Ultra
Frames Per Second, More Is Better
RX 590
SE +/- 0.07, N = 3
MIN: 47.77 / MAX: 47.98
47.90
RX Vega 56
SE +/- 0.02, N = 3
MIN: 57.74 / MAX: 57.81
57.77
RX Vega 64
SE +/- 0.10, N = 3
MIN: 65.62 / MAX: 65.96
65.76
Radeon VII
SE +/- 0.06, N = 3
MIN: 75.25 / MAX: 75.46
75.37
RX 5700
SE +/- 0.05, N = 3
MIN: 64.21 / MAX: 64.37
64.28
RX 5700 XT
SE +/- 0.01, N = 3
MIN: 72.68 / MAX: 72.71
72.69
GTX 1070
SE +/- 0.03, N = 3
MIN: 50.18 / MAX: 50.29
50.22
GTX 1080
SE +/- 0.08, N = 3
MIN: 62.26 / MAX: 62.54
62.40
GTX 1080 Ti
SE +/- 0.22, N = 3
MIN: 73.04 / MAX: 73.75
73.33
RTX 2060
SE +/- 0.06, N = 3
MIN: 56.14 / MAX: 56.33
56.23
RTX 2070
SE +/- 0.04, N = 3
MIN: 63.4 / MAX: 63.55
63.47
RTX 2080
SE +/- 0.12, N = 3
MIN: 75.12 / MAX: 75.52
75.30
RTX 2080 Ti
SE +/- 0.08, N = 3
MIN: 93.93 / MAX: 94.19
94.06
TITAN RTX
SE +/- 0.09, N = 3
MIN: 96.28 / MAX: 96.59
96.41
20
40
60
80
100

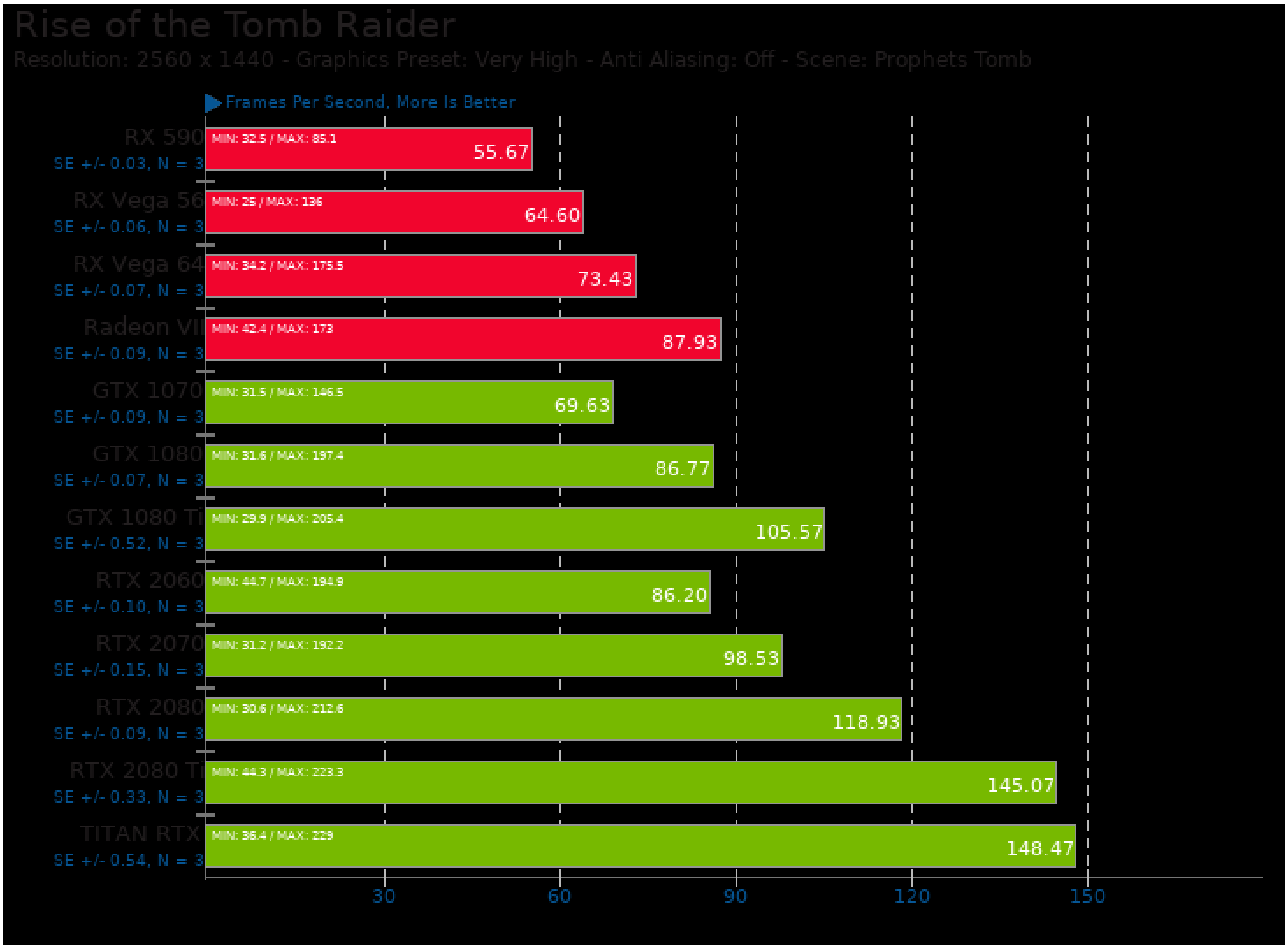

HITMAN 2
Resolution: 2560 x 1440 - Quality Level: Ultra - Total Frame Time
Milliseconds, Fewer Is Better
RX 590
Min: 9.07 / Avg: 20.84 / Max: 80.19
RX Vega 56
Min: 7.35 / Avg: 17.3 / Max: 33.89
RX Vega 64
Min: 6.47 / Avg: 15.16 / Max: 32.39
Radeon VII
Min: 5.41 / Avg: 13.25 / Max: 47.19
RX 5700
Min: 6.34 / Avg: 15.57 / Max: 31.58
RX 5700 XT
Min: 5.68 / Avg: 13.75 / Max: 29.43
GTX 1070
Min: 8.4 / Avg: 19.92 / Max: 39.46
GTX 1080
Min: 6.63 / Avg: 16.06 / Max: 37.41
GTX 1080 Ti
Min: 6 / Avg: 13.69 / Max: 36.9
RTX 2060
Min: 7.41 / Avg: 17.81 / Max: 35.16
RTX 2070
Min: 6.54 / Avg: 15.76 / Max: 45.66
RTX 2080
Min: 5.18 / Avg: 13.31 / Max: 31.95
RTX 2080 Ti
Min: 4 / Avg: 10.63 / Max: 26.38
TITAN RTX
Min: 4.37 / Avg: 10.35 / Max: 25.76
15
30
45
60
75


HITMAN 2
Resolution: 3840 x 2160 - Quality Level: Medium
Frames Per Second, More Is Better
RX 590
SE +/- 0.06, N = 3
MIN: 26.06 / MAX: 26.23
26.17
RX Vega 56
SE +/- 0.03, N = 3
MIN: 32.39 / MAX: 32.49
32.43
RX Vega 64
SE +/- 0.02, N = 3
MIN: 38.23 / MAX: 38.28
38.26
Radeon VII
SE +/- 0.03, N = 3
MIN: 45.96 / MAX: 46.04
45.99
RX 5700
SE +/- 0.04, N = 3
MIN: 36.26 / MAX: 36.39
36.33
RX 5700 XT
SE +/- 0.03, N = 3
MIN: 41.34 / MAX: 41.45
41.40
GTX 1070
SE +/- 0.05, N = 3
MIN: 26.74 / MAX: 26.91
26.84
GTX 1080
SE +/- 0.04, N = 3
MIN: 33.6 / MAX: 33.75
33.66
GTX 1080 Ti
SE +/- 0.09, N = 3
MIN: 41.16 / MAX: 41.46
41.31
RTX 2060
SE +/- 0.03, N = 3
MIN: 30.47 / MAX: 30.58
30.53
RTX 2070
SE +/- 0.03, N = 2
MIN: 35.3 / MAX: 35.36
35.33
RTX 2080
SE +/- 0.32, N = 3
MIN: 43.53 / MAX: 44.57
43.94
RTX 2080 Ti
SE +/- 0.04, N = 3
MIN: 59.66 / MAX: 59.8
59.72
TITAN RTX
SE +/- 0.09, N = 3
MIN: 61.96 / MAX: 62.26
62.08
14
28
42
56
70

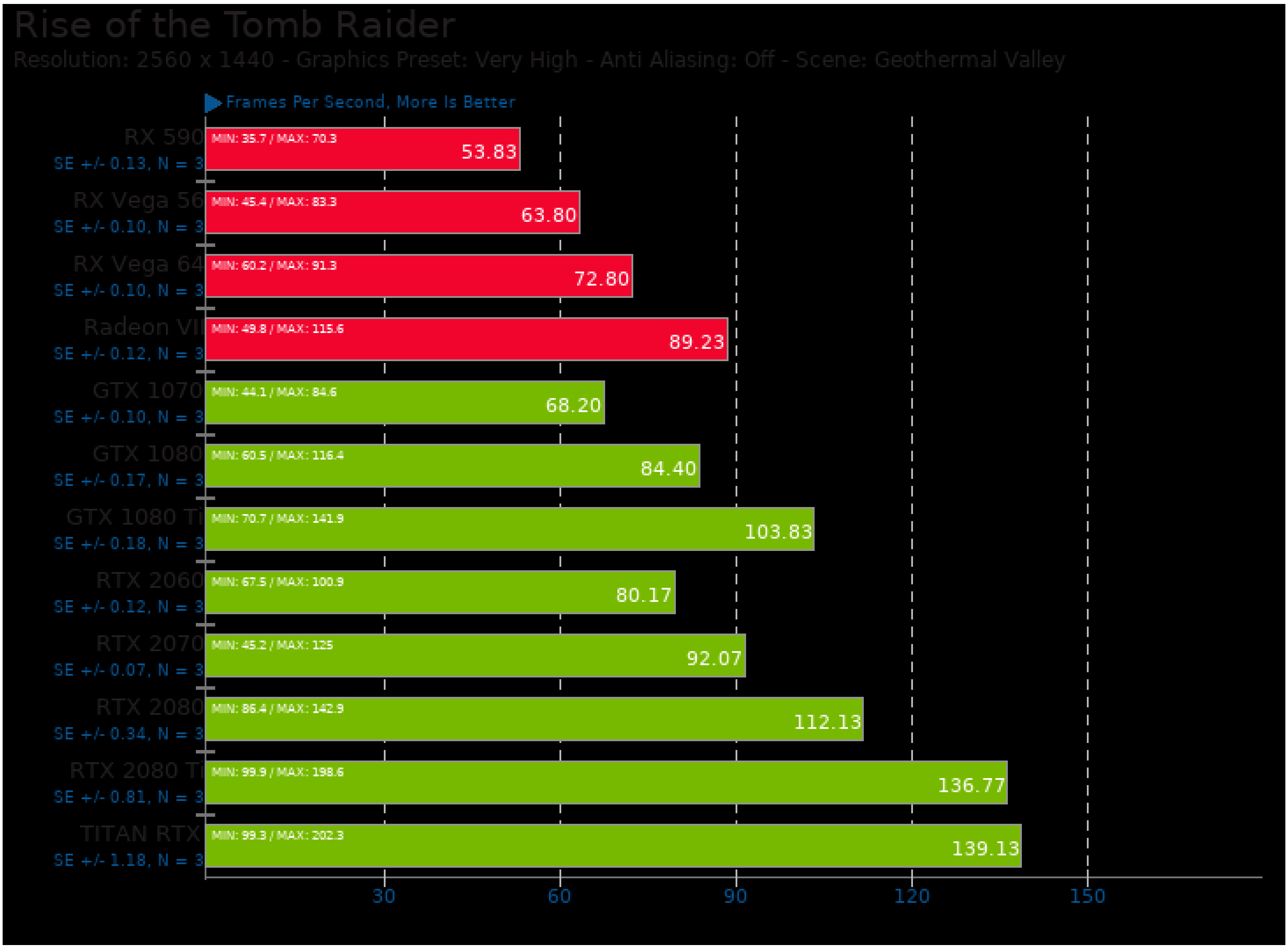

HITMAN 2
Resolution: 3840 x 2160 - Quality Level: Medium - Total Frame Time
Milliseconds, Fewer Is Better
RX 590
Min: 17.21 / Avg: 38.37 / Max: 148.81
RX Vega 56
Min: 13.75 / Avg: 30.87 / Max: 126.74
RX Vega 64
Min: 11.68 / Avg: 26.16 / Max: 48.4
Radeon VII
Min: 10.14 / Avg: 21.75 / Max: 74.57
RX 5700
Min: 13.45 / Avg: 27.58 / Max: 87.57
RX 5700 XT
Min: 11.01 / Avg: 24.12 / Max: 43.01
GTX 1070
Min: 17.29 / Avg: 37.17 / Max: 69.49
GTX 1080
Min: 13.81 / Avg: 29.72 / Max: 82.99
GTX 1080 Ti
Min: 11.88 / Avg: 24.3 / Max: 55.53
RTX 2060
Min: 14.63 / Avg: 32.7 / Max: 57.08
RTX 2080
Min: 10.27 / Avg: 22.98 / Max: 67.34
RTX 2080 Ti
Min: 7.26 / Avg: 16.76 / Max: 38.94
TITAN RTX
Min: 7.03 / Avg: 16.14 / Max: 43.37
30
60
90
120
150

Radeon RX 5700 / RX 5700 XT Linux Benchmarks

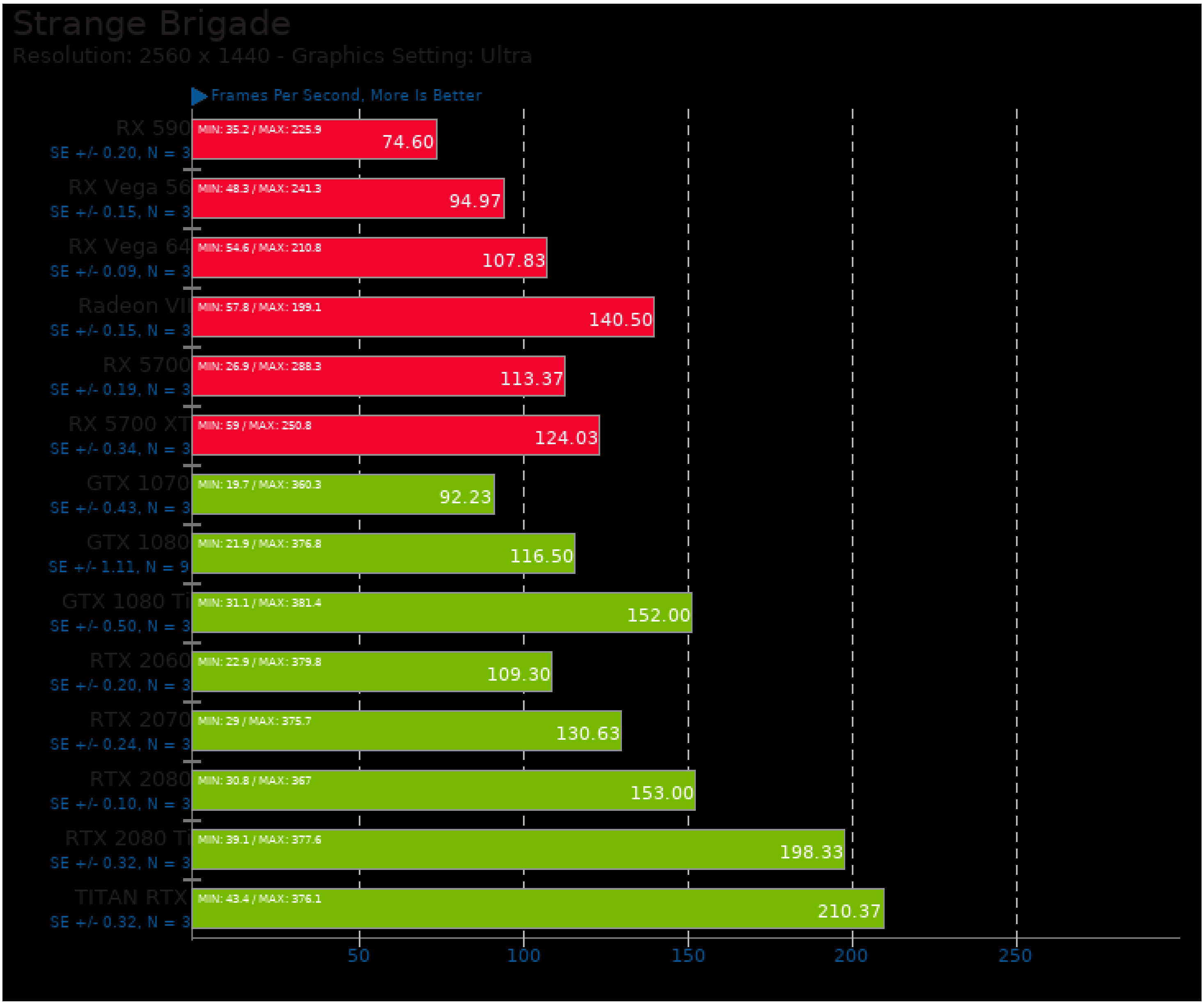


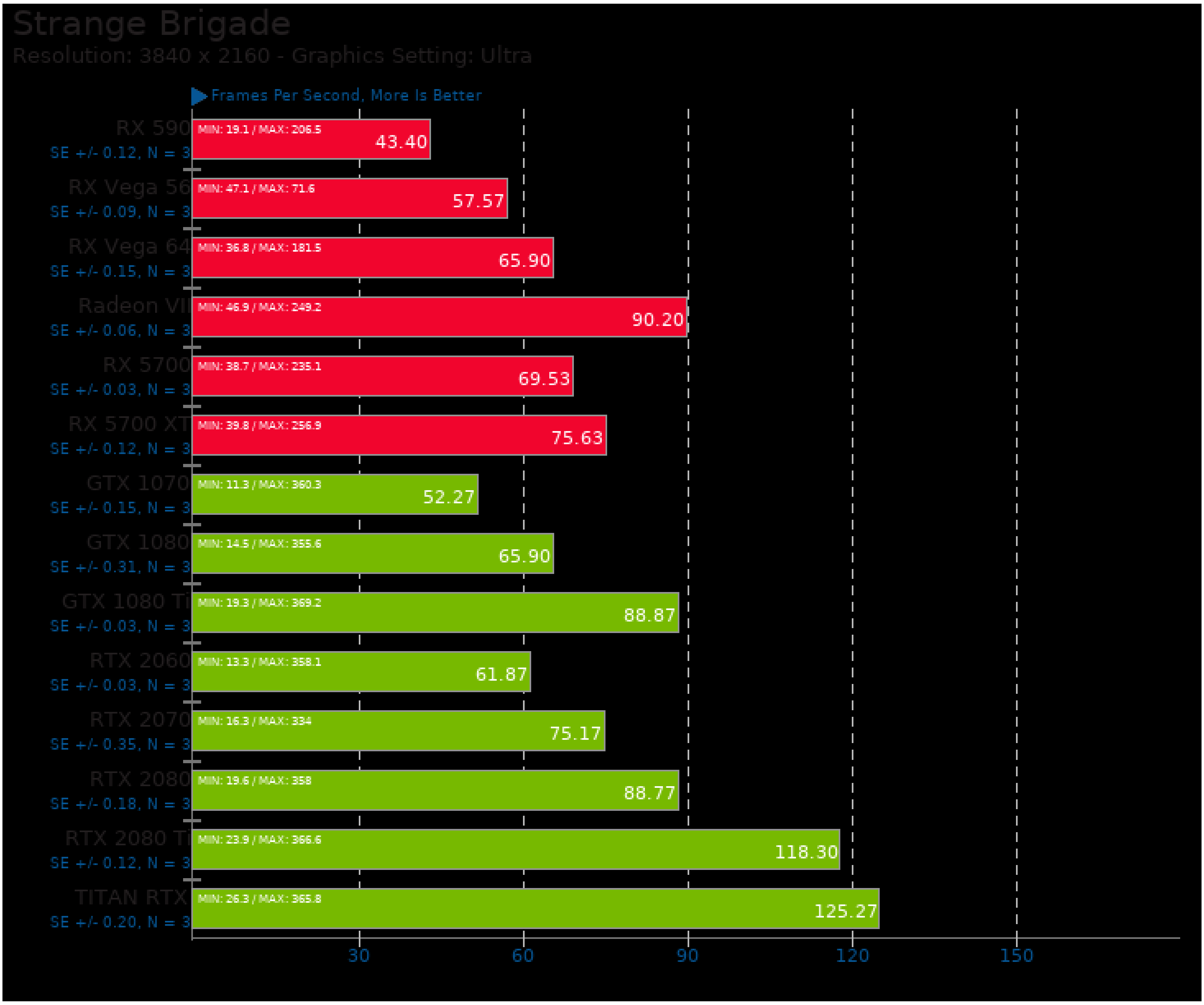

Rise of the Tomb Raider
Resolution: 2560 x 1440 - Graphics Preset: Very High - Anti Aliasing: Off - Scene: Prophets Tomb
Frames Per Second, More Is Better
RX 590
SE +/- 0.03, N = 3
MIN: 32.5 / MAX: 85.1
55.67
RX Vega 56
SE +/- 0.06, N = 3
MIN: 25 / MAX: 136
64.60
RX Vega 64
SE +/- 0.07, N = 3
MIN: 34.2 / MAX: 175.5
73.43
Radeon VII
SE +/- 0.09, N = 3
MIN: 42.4 / MAX: 173
87.93
GTX 1070
SE +/- 0.09, N = 3
MIN: 31.5 / MAX: 146.5
69.63
GTX 1080
SE +/- 0.07, N = 3
MIN: 31.6 / MAX: 197.4
86.77
GTX 1080 Ti
SE +/- 0.52, N = 3
MIN: 29.9 / MAX: 205.4
105.57
RTX 2060
SE +/- 0.10, N = 3
MIN: 44.7 / MAX: 194.9
86.20
RTX 2070
SE +/- 0.15, N = 3
MIN: 31.2 / MAX: 192.2
98.53
RTX 2080
SE +/- 0.09, N = 3
MIN: 30.6 / MAX: 212.6
118.93
RTX 2080 Ti
SE +/- 0.33, N = 3
MIN: 44.3 / MAX: 223.3
145.07
TITAN RTX
SE +/- 0.54, N = 3
MIN: 36.4 / MAX: 229
148.47
30
60
90
120
150

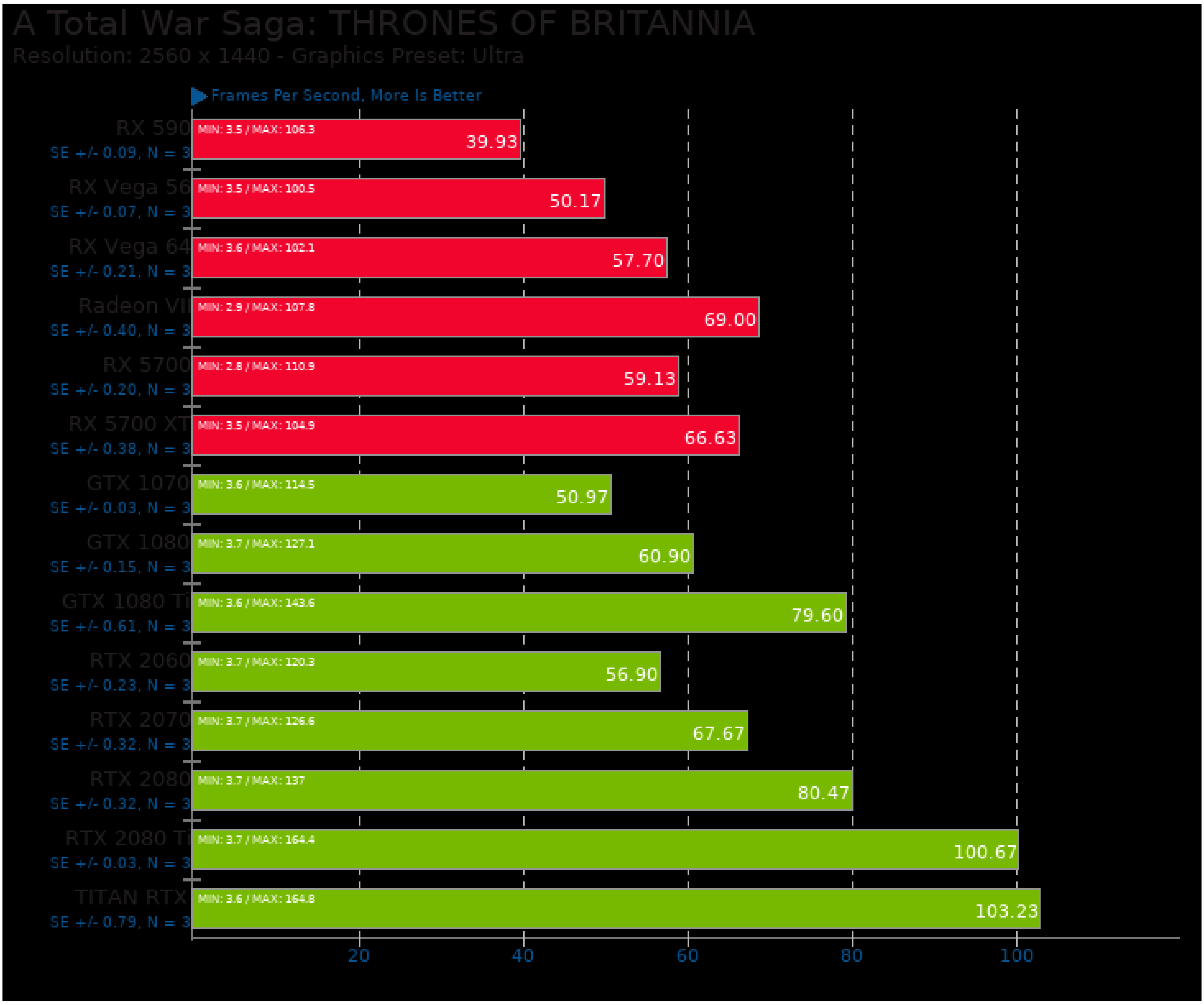
Radeon RX 5700 / RX 5700 XT Linux Benchmarks

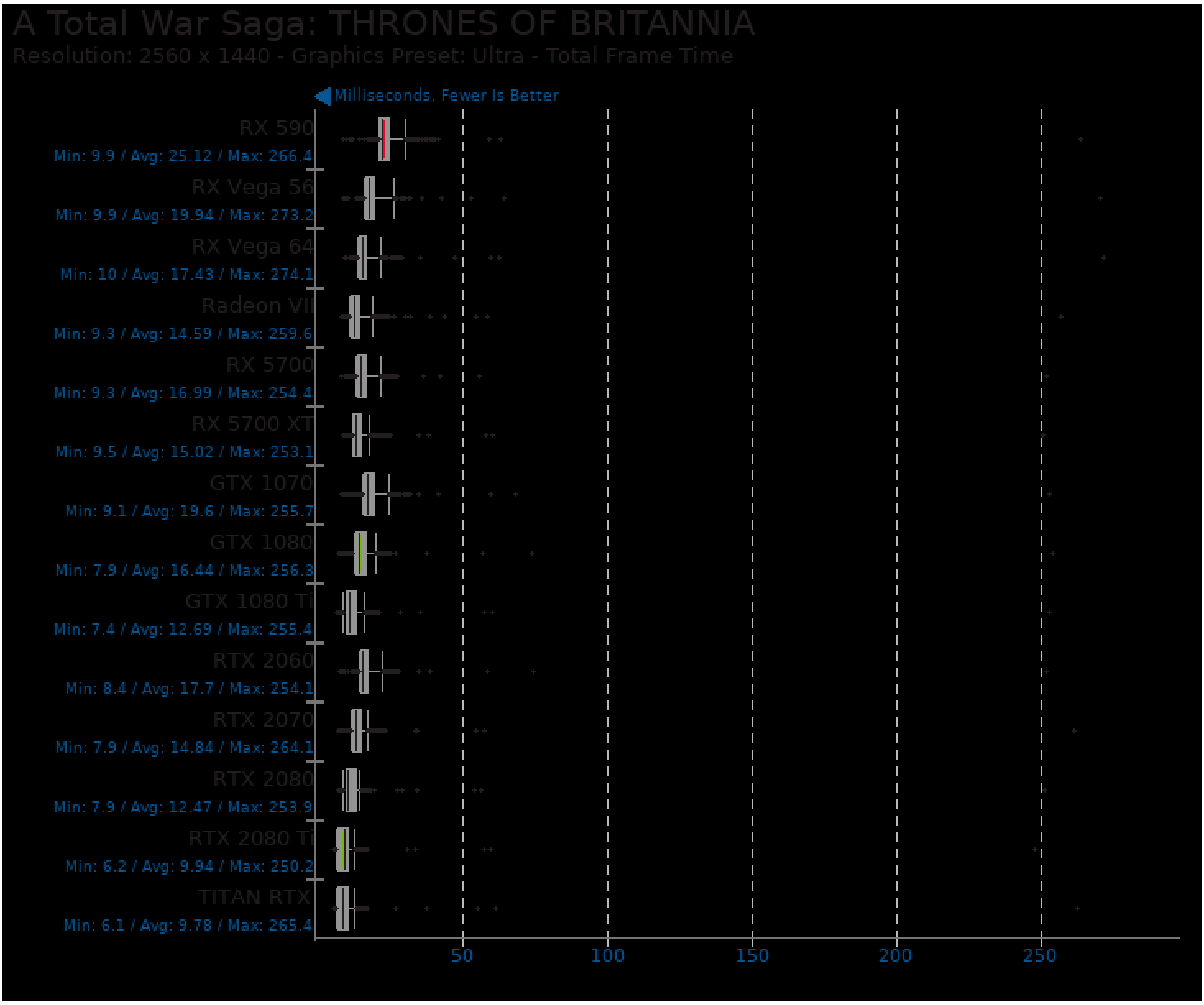


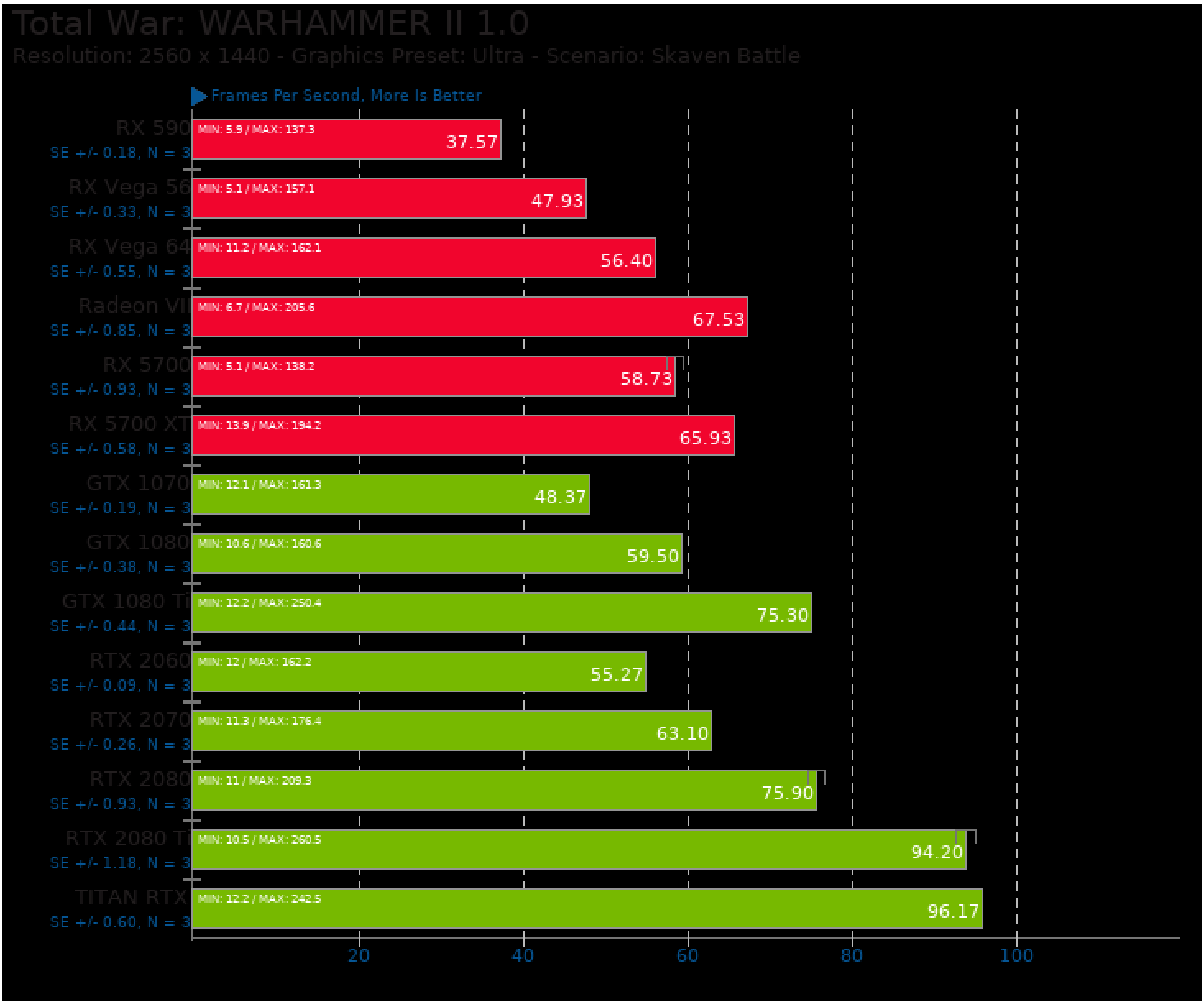
Radeon RX 5700 / RX 5700 XT Linux Benchmarks




Strange Brigade
Resolution: 3840 x 2160 - Graphics Setting: Ultra
Frames Per Second, More Is Better
RX 590
SE +/- 0.12, N = 3
MIN: 19.1 / MAX: 206.5
43.40
RX Vega 56
SE +/- 0.09, N = 3
MIN: 47.1 / MAX: 71.6
57.57
RX Vega 64
SE +/- 0.15, N = 3
MIN: 36.8 / MAX: 181.5
65.90
Radeon VII
SE +/- 0.06, N = 3
MIN: 46.9 / MAX: 249.2
90.20
RX 5700
SE +/- 0.03, N = 3
MIN: 38.7 / MAX: 235.1
69.53
RX 5700 XT
SE +/- 0.12, N = 3
MIN: 39.8 / MAX: 256.9
75.63
GTX 1070
SE +/- 0.15, N = 3
MIN: 11.3 / MAX: 360.3
52.27
GTX 1080
SE +/- 0.31, N = 3
MIN: 14.5 / MAX: 355.6
65.90
GTX 1080 Ti
SE +/- 0.03, N = 3
MIN: 19.3 / MAX: 369.2
88.87
RTX 2060
SE +/- 0.03, N = 3
MIN: 13.3 / MAX: 358.1
61.87
RTX 2070
SE +/- 0.35, N = 3
MIN: 16.3 / MAX: 334
75.17
RTX 2080
SE +/- 0.18, N = 3
MIN: 19.6 / MAX: 358
88.77
RTX 2080 Ti
SE +/- 0.12, N = 3
MIN: 23.9 / MAX: 366.6
118.30
TITAN RTX
SE +/- 0.20, N = 3
MIN: 26.3 / MAX: 365.8
125.27
30
60
90
120
150

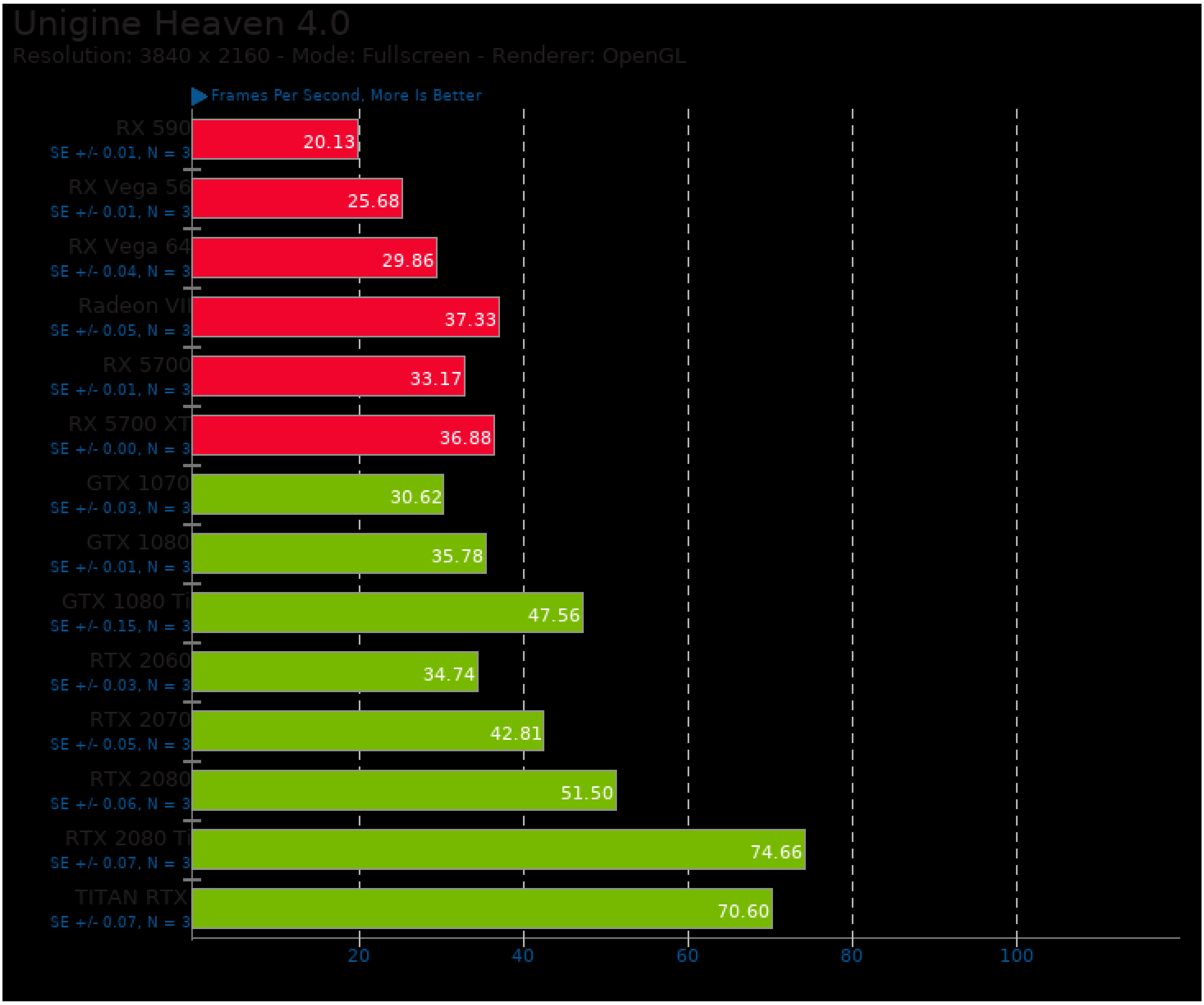

A Total War Saga: THRONES OF BRITANNIA
Resolution: 2560 x 1440 - Graphics Preset: Ultra
Frames Per Second, More Is Better
RX 590
SE +/- 0.09, N = 3
MIN: 3.5 / MAX: 106.3
39.93
RX Vega 56
SE +/- 0.07, N = 3
MIN: 3.5 / MAX: 100.5
50.17
RX Vega 64
SE +/- 0.21, N = 3
MIN: 3.6 / MAX: 102.1
57.70
Radeon VII
SE +/- 0.40, N = 3
MIN: 2.9 / MAX: 107.8
69.00
RX 5700
SE +/- 0.20, N = 3
MIN: 2.8 / MAX: 110.9
59.13
RX 5700 XT
SE +/- 0.38, N = 3
MIN: 3.5 / MAX: 104.9
66.63
GTX 1070
SE +/- 0.03, N = 3
MIN: 3.6 / MAX: 114.5
50.97
GTX 1080
SE +/- 0.15, N = 3
MIN: 3.7 / MAX: 127.1
60.90
GTX 1080 Ti
SE +/- 0.61, N = 3
MIN: 3.6 / MAX: 143.6
79.60
RTX 2060
SE +/- 0.23, N = 3
MIN: 3.7 / MAX: 120.3
56.90
RTX 2070
SE +/- 0.32, N = 3
MIN: 3.7 / MAX: 126.6
67.67
RTX 2080
SE +/- 0.32, N = 3
MIN: 3.7 / MAX: 137
80.47
RTX 2080 Ti
SE +/- 0.03, N = 3
MIN: 3.7 / MAX: 164.4
100.67
TITAN RTX
SE +/- 0.79, N = 3
MIN: 3.6 / MAX: 164.8
103.23
20
40
60
80
100


A Total War Saga: THRONES OF BRITANNIA
Resolution: 2560 x 1440 - Graphics Preset: Ultra - Total Frame Time
Milliseconds, Fewer Is Better
RX 590
Min: 9.9 / Avg: 25.12 / Max: 266.4
RX Vega 56
Min: 9.9 / Avg: 19.94 / Max: 273.2
RX Vega 64
Min: 10 / Avg: 17.43 / Max: 274.1
Radeon VII
Min: 9.3 / Avg: 14.59 / Max: 259.6
RX 5700
Min: 9.3 / Avg: 16.99 / Max: 254.4
RX 5700 XT
Min: 9.5 / Avg: 15.02 / Max: 253.1
GTX 1070
Min: 9.1 / Avg: 19.6 / Max: 255.7
GTX 1080
Min: 7.9 / Avg: 16.44 / Max: 256.3
GTX 1080 Ti
Min: 7.4 / Avg: 12.69 / Max: 255.4
RTX 2060
Min: 8.4 / Avg: 17.7 / Max: 254.1
RTX 2070
Min: 7.9 / Avg: 14.84 / Max: 264.1
RTX 2080
Min: 7.9 / Avg: 12.47 / Max: 253.9
RTX 2080 Ti
Min: 6.2 / Avg: 9.94 / Max: 250.2
TITAN RTX
Min: 6.1 / Avg: 9.78 / Max: 265.4
50
100
150
200
250

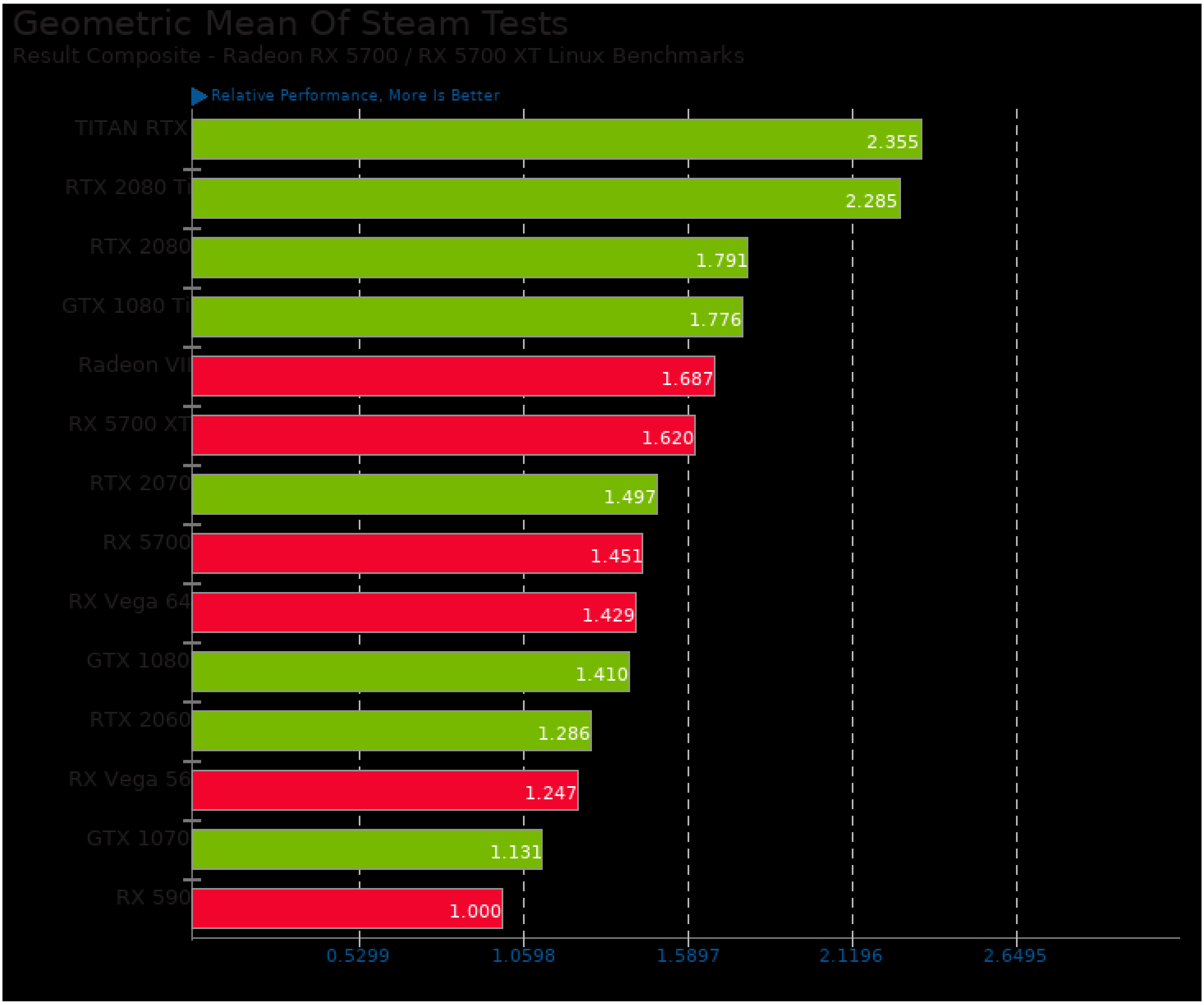

Total War: WARHAMMER II 1.0
Resolution: 2560 x 1440 - Graphics Preset: Ultra - Scenario: Skaven Battle
Frames Per Second, More Is Better
RX 590
SE +/- 0.18, N = 3
MIN: 5.9 / MAX: 137.3
37.57
RX Vega 56
SE +/- 0.33, N = 3
MIN: 5.1 / MAX: 157.1
47.93
RX Vega 64
SE +/- 0.55, N = 3
MIN: 11.2 / MAX: 162.1
56.40
Radeon VII
SE +/- 0.85, N = 3
MIN: 6.7 / MAX: 205.6
67.53
RX 5700
SE +/- 0.93, N = 3
MIN: 5.1 / MAX: 138.2
58.73
RX 5700 XT
SE +/- 0.58, N = 3
MIN: 13.9 / MAX: 194.2
65.93
GTX 1070
SE +/- 0.19, N = 3
MIN: 12.1 / MAX: 161.3
48.37
GTX 1080
SE +/- 0.38, N = 3
MIN: 10.6 / MAX: 160.6
59.50
GTX 1080 Ti
SE +/- 0.44, N = 3
MIN: 12.2 / MAX: 250.4
75.30
RTX 2060
SE +/- 0.09, N = 3
MIN: 12 / MAX: 162.2
55.27
RTX 2070
SE +/- 0.26, N = 3
MIN: 11.3 / MAX: 176.4
63.10
RTX 2080
SE +/- 0.93, N = 3
MIN: 11 / MAX: 209.3
75.90
RTX 2080 Ti
SE +/- 1.18, N = 3
MIN: 10.5 / MAX: 260.5
94.20
TITAN RTX
SE +/- 0.60, N = 3
MIN: 12.2 / MAX: 242.5
96.17
20
40
60
80
100

Radeon RX 5700 / RX 5700 XT Linux Benchmarks

Radeon RX 5700 / RX 5700 XT Linux Benchmarks



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



Geometric mean based upon tests: pts/csgo, pts/dirt-rally2, pts/hitman2, pts/riseofthetombraider, pts/strange-brigade, pts/thronesofbritannia and pts/tww2

This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 05:50.