



## 1440p Linux Gaming

1440p Linux gaming benchmarks by Michael Larabel for a future article.

### Test Systems:

#### RTX 2060

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: NVIDIA GeForce RTX 2060 6GB, Audio: NVIDIA TU106 HD Audio, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.8.0-48-generic (x86\_64), Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.67, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.162, Vulkan: 1.2.155, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86\_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch

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--enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin
--enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686
--with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009
Security Notes: itlb_multihit: Not affected + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and
seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW
STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected
```

## RTX 2060 SUPER

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: NVIDIA GeForce RTX 2060 SUPER 8GB, Audio: NVIDIA TU106 HD Audio, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.8.0-48-generic (x86\_64), Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.67, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.162, Vulkan: 1.2.155, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

```
Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie
--enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch
--enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin
--enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686
--with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009
Security Notes: itlb_multihit: Not affected + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and
seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW
STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected
```

## RTX 2070

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: ASUS NVIDIA GeForce RTX 2070 8GB, Audio: NVIDIA TU106 HD Audio, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.8.0-48-generic (x86\_64), Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.67, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.162, Vulkan: 1.2.155, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

```
Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie
--enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch
--enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin
--enable-shared --enable-threads=posix --host=x86_64-linux-gnu --program-prefix=x86_64-linux-gnu- --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686
--with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009
Security Notes: itlb_multihit: Not affected + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and
seccomp + spectre_v1: Mitigation of usercopy/swaps barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW
STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected
```

## RTX 2070 SUPER

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: NVIDIA GeForce RTX 2070 SUPER 8GB, Audio: NVIDIA TU104 HD Audio, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.8.0-48-generic (x86\_64), Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.67, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.162, Vulkan: 1.2.155, Compiler: GCC

## 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86\_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --program-prefix=x86\_64-linux-gnu- --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009

Security Notes: itlb\_multihit: Not affected + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec\_store\_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre\_v1: Mitigation of usercopy/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

## RTX 2080

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: Zotac NVIDIA GeForce RTX 2080 8GB, Audio: NVIDIA TU104 HD Audio, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.8.0-48-generic (x86\_64), Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.67, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.162, Vulkan: 1.2.155, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86\_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --program-prefix=x86\_64-linux-gnu- --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009

Security Notes: itlb\_multihit: Not affected + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec\_store\_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre\_v1: Mitigation of usercopy/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

## RTX 2080 SUPER

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: NVIDIA GeForce RTX 2080 SUPER 8GB, Audio: NVIDIA TU104 HD Audio, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.8.0-48-generic (x86\_64), Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.67, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.162, Vulkan: 1.2.155, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86\_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --program-prefix=x86\_64-linux-gnu- --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009

Security Notes: itlb\_multihit: Not affected + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec\_store\_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre\_v1: Mitigation of usercopy/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

## RTX 2080 Ti

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: NVIDIA GeForce RTX 2080 Ti 11GB, Audio: NVIDIA TU102 HD Audio, Monitor: ASUS VP28U,

Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.8.0-48-generic (x86\_64), Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.67, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.162, Vulkan: 1.2.155, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86\_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --program-prefix=x86\_64-linux-gnu- --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009

Security Notes: itlb\_multihit: Not affected + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec\_store\_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre\_v1: Mitigation of usercopy/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

## TITAN RTX

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: NVIDIA TITAN RTX 24GB, Audio: NVIDIA TU102 HD Audio, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.8.0-48-generic (x86\_64), Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.67, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.162, Vulkan: 1.2.155, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86\_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --program-prefix=x86\_64-linux-gnu- --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009

Security Notes: itlb\_multihit: Not affected + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec\_store\_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre\_v1: Mitigation of usercopy/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

## RTX 3060

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: eVGA NVIDIA GeForce RTX 3060 12GB, Audio: NVIDIA Device 228e, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.8.0-48-generic (x86\_64), Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.67, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.162, Vulkan: 1.2.155, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86\_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --program-prefix=x86\_64-linux-gnu- --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009

Security Notes: itlb\_multihit: Not affected + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec\_store\_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre\_v1: Mitigation of usercopy/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

## RTX 3060 Ti

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: NVIDIA GeForce RTX 3060 Ti 8GB, Audio: NVIDIA Device 228b, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.8.0-48-generic (x86\_64), Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.67, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.162, Vulkan: 1.2.155, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86\_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --program-prefix=x86\_64-linux-gnu- --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v  
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009  
Security Notes: itlb\_multihit: Not affected + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec\_store\_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre\_v1: Mitigation of usercopy/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

## RTX 3070

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: NVIDIA GeForce RTX 3070 8GB, Audio: NVIDIA Device 228b, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.8.0-48-generic (x86\_64), Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.67, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.162, Vulkan: 1.2.155, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86\_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --program-prefix=x86\_64-linux-gnu- --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v  
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009  
Security Notes: itlb\_multihit: Not affected + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec\_store\_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre\_v1: Mitigation of usercopy/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

## RTX 3080

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: NVIDIA GeForce RTX 3080 10GB, Audio: NVIDIA Device 1aef, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.8.0-48-generic (x86\_64), Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.67, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.162, Vulkan: 1.2.155, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009

Security Notes: itlb\_multihit: Not affected + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec\_store\_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre\_v1: Mitigation of usercopy/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected



## RTX 3090

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: NVIDIA GeForce RTX 3090 24GB, Audio: NVIDIA Device 1aef, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.8.0-48-generic (x86\_64), Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, Display Driver: NVIDIA 460.67, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.2.162, Vulkan: 1.2.155, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86\_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --program-prefix=x86\_64-linux-gnu- --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009

Security Notes: itlb\_multihit: Not affected + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec\_store\_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre\_v1: Mitigation of usercopy/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

## Radeon VII

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: AMD Radeon VII 16GB (1801/1000MHz), Audio: AMD Vega 20 HDMI Audio, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.12.0-051200rc6daily20210408-generic (x86\_64) 20210407, Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, OpenGL: 4.6 Mesa 21.1.0-devel (git-d1f96e0 2021-04-08 focal-oibaf-ppa) (LLVM 12.0.0), Vulkan: 1.1.168, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86\_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --program-prefix=x86\_64-linux-gnu- --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009

Security Notes: itlb\_multihit: Not affected + 1tft: Not affected + mds: Not affected + meltdown: Not affected + spec\_store\_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre\_v1: Mitigation of usercopy/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

## RX 5600 XT

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: Sapphire AMD Radeon RX 5600 OEM/5600 XT / 5700/5700 6GB (1780/875MHz), Audio: AMD Navi 10 HDMI Audio, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.12.0-051200rc6daily20210408-generic (x86\_64) 20210407, Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, OpenGL: 4.6 Mesa 21.1.0-devel (git-d1f96e0 2021-04-08 focal-oibaf-ppa) (LLVM 12.0.0), Vulkan: 1.1.168, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86\_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --program-prefix=x86\_64-linux-gnu- --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009

Security Notes: itlb\_multihit: Not affected + 1tft: 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 IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

## RX 5700 XT

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: AMD Radeon RX 5600 OEM/5600 XT / 5700/5700 8GB (2100/875MHz), Audio: AMD Navi 10 HDMI Audio, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.12.0-051200rc6daily20210408-generic (x86\_64) 20210407, Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, OpenGL: 4.6 Mesa 21.1.0-devel (git-d1f96e0 2021-04-08 focal-oibaf-ppa) (LLVM 12.0.0), Vulkan: 1.1.168, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86\_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --program-prefix=x86\_64-linux-gnu- --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009

Security Notes: itlb\_multihit: Not affected + 1tft: 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 IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

## RX 6700 XT

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: AMD NAVY\_FLOUNDER 12GB (2855/1000MHz), Audio: AMD Device ab28, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.12.0-051200rc6daily20210408-generic (x86\_64) 20210407, Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, OpenGL: 4.6 Mesa 21.1.0-devel (git-d1f96e0 2021-04-08 focal-oibaf-ppa) (LLVM 12.0.0), Vulkan: 1.1.168, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86\_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --program-prefix=x86\_64-linux-gnu- --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v

Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009

Security Notes: itlb\_multihit: Not affected + 1tft: 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 IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

## RX 6800

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: AMD Radeon RX 6800 16GB (2475/1000MHz), Audio: AMD Device ab28, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.12.0-051200rc6daily20210408-generic (x86\_64) 20210407, Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, OpenGL: 4.6 Mesa 21.1.0-devel (git-d1f96e0 2021-04-08 focal-oibaf-ppa) (LLVM 12.0.0), Vulkan: 1.1.168, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86\_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --program-prefix=x86\_64-linux-gnu- --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v  
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009

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/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

## RX 6800 XT

Processor: AMD Ryzen 9 5900X 12-Core @ 3.70GHz (12 Cores / 24 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (3402 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 1000GB Sabrent Rocket 4.0 Plus + 2000GB, Graphics: AMD Radeon RX 6800 XT 16GB (2575/1000MHz), Audio: AMD Device ab28, Monitor: ASUS VP28U, Network: Realtek RTL8125 2.5GbE + Intel I211

OS: Ubuntu 20.04, Kernel: 5.12.0-051200rc6daily20210408-generic (x86\_64) 20210407, Desktop: GNOME Shell 3.36.7, Display Server: X Server 1.20.9, OpenGL: 4.6 Mesa 21.1.0-devel (git-d1f96e0 2021-04-08 focal-oibaf-ppa) (LLVM 12.0.0), Vulkan: 1.1.168, Compiler: GCC 9.3.0 + CUDA 11.2, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise

Compiler Notes: --build=x86\_64-linux-gnu --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,gm2 --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-9-HskZEa/gcc-9-9.3.0/debian/tmp-nvptx/usr,hsa --enable-plugin --enable-shared --enable-threads=posix --host=x86\_64-linux-gnu --program-prefix=x86\_64-linux-gnu- --target=x86\_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-default-libstdcxx-abi=new --with-gcc-major-version-only --with-multilib-list=m32,m64,mx32 --with-target-system-zlib=auto --with-tune=generic --without-cuda-driver -v  
Processor Notes: Scaling Governor: acpi-cpufreq performance (Boost: Enabled) - CPU Microcode: 0xa201009

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/swaps barriers and \_\_user pointer sanitization + spectre\_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS\_FW STIBP: always-on RSB filling + srbds: Not affected + tsx\_async\_abort: Not affected

	RTX 2060	RTX 2060 SUPER	RTX 2070	RTX 2070 SUPER	RTX 2080	RTX 2080 SUPER	RTX 2080 Ti	TITAN RTX	RTX 3060	RTX 3060 Ti	RTX 3070	RTX 3080	RTX 3090	Radon VII	RX 5600 XT	RX 5700 XT	RX 6700 XT	RX 6800	RX 6800 XT
<b>Batman</b>	99.8	119.	121.	132.	139.	149.	187.	190.	115.	159.	176.	204.	235.	152.	102.	129.	169.	207.	229.
<b>Arkham Knight - 2560 x 1440 - High</b>	6	93	28	34	54	29	70	11	48	04	45	51	76	23	41	87	59	31	46
<b>Normalized</b>	42.36	50.87	51.44	56.13	59.19	63.32	79.61	80.64	48.98	67.46	74.84	86.74	100%	64.57	43.44	55.09	71.93	87.93	97.33
<b>Standard Deviation</b>	0.6%	0.5%	0.8%	1.4%	1.1%	1.2%	0.3%	0.8%	0.3%	0.8%	0.7%	0.2%	1.9%	1%	0.9%	0.1%	0.6%	0.3%	1.6%



## 1440p Linux Gaming

<b>DiRT Rally</b>	<b>63.3</b>	71.8	71.0	82.0	88.6	94.8	116.	117.	71.4	91.0	107.	130.	<b>158.</b>	95.1	72.1	86.0	106.	130.	156.
<b>2.0 - 2560</b>	<b>127</b>	165	454	172	098	727	858	556	269	427	670	206	<b>289</b>	531	838	832	664	907	243
<b>x 1440 -</b>	<b>10</b>	51	41	14	35	70	991	193	48	12	779	990	<b>703</b>	37	71	24	200	496	571
<b>Ultra</b>																			
<b>Normalized</b>	40%	45.37	44.88	51.81	55.98	59.94	73.83	74.27	45.12	57.52	68.02	82.26	100%	60.11	45.6	54.38	67.39	82.7	98.71
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
<b>Standard</b>	0.3%	0.4%	0.1%	0.7%	0.6%	0.3%	0.6%	0.1%	0.3%	0.3%	0.1%	0.2%	0.2%	0.1%	0%	0.1%	0.4%	0.3%	0%
<b>Deviation</b>																			
<b>F1 2020 -</b>	115	129	130	147	154	165	183	183	129	167	182	189	<b>190</b>	123	<b>110</b>	130	149	170	188
<b>2560 x</b>																			
<b>1440 -</b>																			
<b>Ultra</b>																			
<b>Normalized</b>	60.53	67.89	68.42	77.37	81.05	86.84	96.32	96.32	67.89	87.89	95.79	99.47	100%	64.74	57.89	68.42	78.42	89.47	98.95
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
<b>Standard</b>						0.4%	0.8%	0.3%				1.7%	1.4%						0.9%
<b>Deviation</b>																			
<b>HITMAN 2</b>	<b>68.5</b>	76.0	76.9	85.9	90.7	98.3	115.	114.	78.4	100.	111.	120.	<b>136.</b>	92.5	75.1	87.1	106.	123.	134.
<b>- 2560 x</b>	<b>9</b>	0	2	2	7	6	17	76	7	75	34	27	<b>51</b>	9	4	1	69	65	12
<b>1440 -</b>																			
<b>Ultra</b>																			
<b>Normalized</b>	50.25	55.67	56.35	62.94	66.49	72.05	84.37	84.07	57.48	73.8	81.56	88.1	100%	67.83	55.04	63.81	78.16	90.58	98.25
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
<b>Standard</b>	0.1%	0.2%	0.2%	0.1%	0%	0.1%	0.1%	0.3%	0.1%	0.1%	0.3%	1.7%	0.9%	0.1%	0.2%	0.3%	0.6%	0.6%	0.3%
<b>Deviation</b>																			
<b>Shadow</b>	64.9	78.5	78.9	92.0	95.8	105.	124.	125.	80.9	107.	119.	143.	<b>172.</b>	93.4	<b>40.0</b>	88.5	106	131.	152.
<b>of the</b>						1	5	9		2	2	9	<b>9</b>				6	8	
<b>Tomb</b>																			
<b>Raider -</b>																			
<b>2560 x</b>																			
<b>1440 -</b>																			
<b>Highest -</b>																			
<b>Normalized</b>	37.54	45.4	45.63	53.21	55.41	60.79	72.01	72.82	46.79	62%	68.94	83.23	100%	54.02	23.13	51.19	61.31	76.11	88.37
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
<b>Standard</b>	0.3%	0.1%	0%	0.1%	0.1%	0.1%	0.1%	0%	0.1%	0.1%	0%	0.2%	0.1%	0.1%	8%	0%		0.2%	0%
<b>Deviation</b>																			
<b>Strange</b>	<b>114.</b>	132.	134.	151.	159.	175.	212.	219.	135.	184.	202.	245.	<b>254.</b>						
<b>Brigade -</b>	<b>3</b>	1	3	8	8	2	4	5	6	4	2	4	<b>8</b>						
<b>2560 x</b>																			
<b>1440 -</b>																			
<b>Ultra</b>																			
<b>Normalized</b>	44.86	51.84	52.71	59.58	62.72	68.76	83.36	86.15	53.22	72.37	79.36	96.31	100%						
	%	%	%	%	%	%	%	%	%	%	%	%	%						
<b>Standard</b>	0.6%	0.7%	0.4%	0.3%	0.7%	0.1%	1.2%	0.3%	0.5%	0.6%	0.3%	0.2%	1.3%						
<b>Deviation</b>																			

## 1440p Linux Gaming

Unigine	88.9	102.	103.	121.	127.	141.	172.	171.	97.1	135.	157.	189.	232.	106.	78.1	94.7	147.	182.	215.
Heaven -	550	201	791	741	579	374	589	907	220	789	441	200	937	084	095	784	322	788	531
2560 x																			
1440 -																			
Fullscreen																			
- OpenGL																			
(FPS)																			
Normalized	38.19	43.87	44.56	52.26	54.77	60.69	74.09	73.8	41.69	58.29	67.59	81.22	100%	45.54	33.53	40.69	63.25	78.47	92.53
%	%	%	%	%	%	%	%	%	%	%	%	%		%	%	%	%	%	%
Standard	0.2%	0%	0.3%	0.1%	0.1%	0.1%	0.2%	0.2%	0.1%	0.1%	0.1%	0.2%	0.1%	0.1%	0.1%	0.1%	0%	0.1%	0.1%
Deviation																			
Unigine	45.2	51.4	51.9	59.3	63.5	69.5	82.9	83.9	49.4	69.4	78.5	94.2	117.	53.8	44.2	52.2	73.7	92.0	107.
Superposi													9						4
tion - 2560																			
x 1440 -																			
Fullscreen																			
- High -																			
OpenGL																			
(FPS)																			
Normalized	38.34	43.6	44.02	50.3	53.86	58.95	70.31	71.16	41.9	58.86	66.58	79.9	100%	45.63	37.49	44.27	62.51	78.03	91.09
%	%	%	%	%	%	%	%	%	%	%	%	%		%	%	%	%	%	%
Standard	0.1%	0%	0.2%	1.9%	0.2%	0.1%	0.2%	0.1%	0.2%	0.1%	0.1%	0.2%	0.1%	0.1%	0%	0.1%	0.1%	0.1%	0.1%
Deviation																			
Unigine	14.3	18.5	18.8	20.8	22	23.2	32.4	31.7	14.6	29.1	34.2	41.2	52.2	21.6	15.4	20	27.9	35.4	42.4
Superposi																			
tion - 2560																			
x 1440 -																			
Fullscreen																			
- Ultra -																			
OpenGL																			
(FPS)																			
Normalized	27.39	35.44	36.02	39.85	42.15	44.44	62.07	60.73	27.97	55.75	65.52	78.93	100%	41.38	29.5	38.31	53.45	67.82	81.23
%	%	%	%	%	%	%	%	%	%	%	%	%		%	%	%	%	%	%
Standard	0%	0%	0%	0.3%		0%	0.2%	0.4%	0.4%	0%	0%	0.3%	0.2%	0%	0.4%		0%	0%	0.1%
Deviation																			
Baseline	118.	144.	146.	158.	165.	181.	226.	235.	141.	190.	209.	279.	342.						
GPU -	86	34	02	63	99	12	11	26	83	41	11	32	90						
Vulkan -																			
2560 x																			
1440 -																			
High																			
Normalized	34.66	42.09	42.58	46.26	48.41	52.82	65.94	68.61	41.36	55.53	60.98	81.46	100%						
%	%	%	%	%	%	%	%	%	%	%	%	%							
Standard	0%	0.1%	0%	0.1%	0.2%	0%	0%	0%	0%	0.1%	0.1%	0.4%	0.1%						
Deviation																			

## 1440p Linux Gaming

Batman: Arkham Knight - 2560 x 1440 - High (FPS/Watt)	0.81	0.88	0.90	0.84	0.83	0.89	0.95	0.87	0.92	1.04	1.04	0.84	0.88	0.99	1.04	0.96	1.22	1.47	1.28
	3		1		6			6	4				3	4	7	8	1	3	5
Normalized	55.19	59.74	61.17	57.03	56.75	60.42	64.49	59.47	62.73	70.6	70.6	57.03	59.95	67.48	71.08	65.72	82.89	100%	87.24
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
DiRT Rally 2.0 - 2560 x 1440 - Ultra (FPS/Watt)	0.44	0.46	0.45	0.46	0.47	0.47	0.50	0.46	0.54	0.52	0.56	0.46	0.50	0.53	0.59	0.53	0.64	0.77	0.67
	2		5		1			2	1		4		9	7	2	1	5	9	6
Normalized	56.74	59.05	58.41	59.05	60.46	60.33	64.18	59.31	69.45	66.75	72.4	59.05	65.34	68.93	75.99	68.16	82.8	100%	86.78
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Shadow of the Raider - 2560 x 1440 - Highest - Off	0.45	0.50	0.51	0.49	0.52	0.51	0.55	0.51	0.56	0.61	0.62	0.51	0.57	0.54	0.42	0.55	0.65	0.79	0.68
	9							5	6		5		6	4	7	4	4		7
Normalized	58.1	63.29	64.56	62.03	65.82	64.56	69.62	65.19	71.65	77.22	79.11	64.56	72.91	68.86	54.05	70.13	82.78	100%	86.96
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Unigine Heaven - 2560 x 1440 - Fullscreen - OpenGL (FPS/Watt)	0.58	0.61	0.62	0.60	0.64	0.60	0.70	0.64	0.61	0.71	0.75	0.63	0.70	0.51	0.58	0.54	0.82	0.93	0.88
	5		5		9			6	7		5		8	9	7	6	3	8	3
Normalized	62.37	65.03	66.63	63.97	69.19	63.97	74.63	68.87	65.78	75.69	80.49	67.16	75.48	55.33	62.58	58.21	87.74	100%	94.14
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%

## 1440p Linux Gaming

Unigine Superposition - 2560 x 1440 - Fullscreen - High - OpenGL (FPS/Watt)	0.32	0.34	0.34	0.33	0.34	0.33	0.37	0.34	0.34	0.39	0.39	0.34	0.37	0.26	0.32	0.31	0.42	0.48	0.45
Normalized	66.94	69.82	70.43	67.76	71.46	67.76	75.98	70.84	70.64	80.08	81.93	69.82	77.21	54.21	65.71	64.07	87.27	100%	92.81
%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Unigine Superposition - 2560 x 1440 - Fullscreen - Ultra - OpenGL (FPS/Watt)	0.10	0.12	0.12	0.12	0.12	0.12	0.15	0.13	0.10	0.16	0.17	0.15	0.16	0.11	0.12	0.12	0.16	0.18	0.17
Normalized	56.45	64.52	67.2	64.52	64.52	64.52	80.65	70.43	58.06	86.02	94.09	80.65	88.17	60.22	65.05	64.52	86.02	100%	95.7
%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
GeeXLab Vulkan Ray-Tracing Demo - 2560 x 1440 (FPS)	17.8	20.6	21.1	24.6	26.9	29.9	39.3	40.6	19.6	27.2	32.3	47.2	54.4						
Normalized	32.72	37.87	38.79	45.22	49.45	54.96	72.24	74.63	36.03	50%	59.38	86.76	100%						
%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Standard Deviation	1.2%	0.3%	0.5%	0.2%	0.4%	0%	0.5%	0.5%	0.3%	0.2%	0.5%	0.6%	0.6%						
Ray Tracing In Vulkan - 2560 x 1440 - Cornell Box (FPS)	26.3	29.5	30.3	34.8	39.1	42.5	58.4	59.6	27.5	38.6	45.9	67.6	79.8						
Normalized	150	697	511	187	976	368	417	141	162	884	028	253	037						
Standard Deviation	0%	2.4%	0.4%	2.3%	0.6%	0.2%	0.3%	0.2%	0.1%	0.2%	0.3%	0.7%	0%						

## 1440p Linux Gaming

Ray	9.80	12.5	12.7	14.0	14.3	14.8	21.8	22.7	11.8	19.5	23.4	33.5	39.9
Tracing In	080	382	434	759	890	112	752	055	465	965	528	875	962
Vulkan - 2560 x 1440 - Cornell Box + Lucy													
Normalized	24.5	31.35	31.86	35.19	35.98	37.03	54.69	56.77	29.62	49%	58.64	83.98	100%
	%	%	%	%	%	%	%	%	%		%	%	
Standard	0.1%	0.1%	0.2%	0.1%	0.2%	0.4%	0.1%	0.2%	0.1%	0.2%	0.2%	0.1%	0%
Deviation													
Ray	11.1	13.7	14.0	15.6	16.3	17.2	24.4	25.2	13.9	19.5	23.0	32.7	39.0
Tracing In	656	560	143	649	852	297	520	046	186	597	296	156	771
Vulkan - 2560 x 1440 - L.I.O.W (FPS)													
Normalized	28.57	35.2	35.86	40.09	41.93	44.09	62.57	64.5	35.62	50.05	58.93	83.72	100%
	%	%	%	%	%	%	%	%	%	%	%	%	
Standard	0%	0%	0.1%	0.3%	0.2%	0%	0.1%	0.1%	0%	0.1%	0%	0.3%	0.1%
Deviation													
Ray	17.1	19.3	19.4	22.7	25.2	27.6	36.8	37.8	14.8	20.9	24.8	35.9	43.5
Tracing In	208	277	848	512	502	902	108	963	656	569	536	135	462
Vulkan - 2560 x 1440 - P.I.O.W (FPS)													
Normalized	39.32	44.38	44.75	52.25	57.98	63.59	84.53	87.03	34.14	48.13	57.07	82.47	100%
	%	%	%	%	%	%	%	%	%	%	%	%	
Standard	0%	0%	2.1%	0.4%	0.5%	0.3%	0.2%	0.2%	0.1%	0.6%	0.1%	0%	0.1%
Deviation													
Ray	16.7	18.9	19.2	22.3	24.7	27.0	36.0	37.1	14.5	20.5	24.3	35.1	42.6
Tracing In	824	495	966	041	259	717	584	446	732	086	425	564	308
Vulkan - 2560 x 1440 - R.T.I.O.W (FPS)													
Normalized	39.37	44.45	45.26	52.32	58%	63.5	84.58	87.13	34.18	48.11	57.1	82.47	100%
	%	%	%	%		%	%	%	%	%	%	%	
Standard	0%	0%	0.1%	0.4%	0.5%	0.4%	0.2%	0.3%	0.4%	0.3%	0.1%	0.1%	0.3%
Deviation													

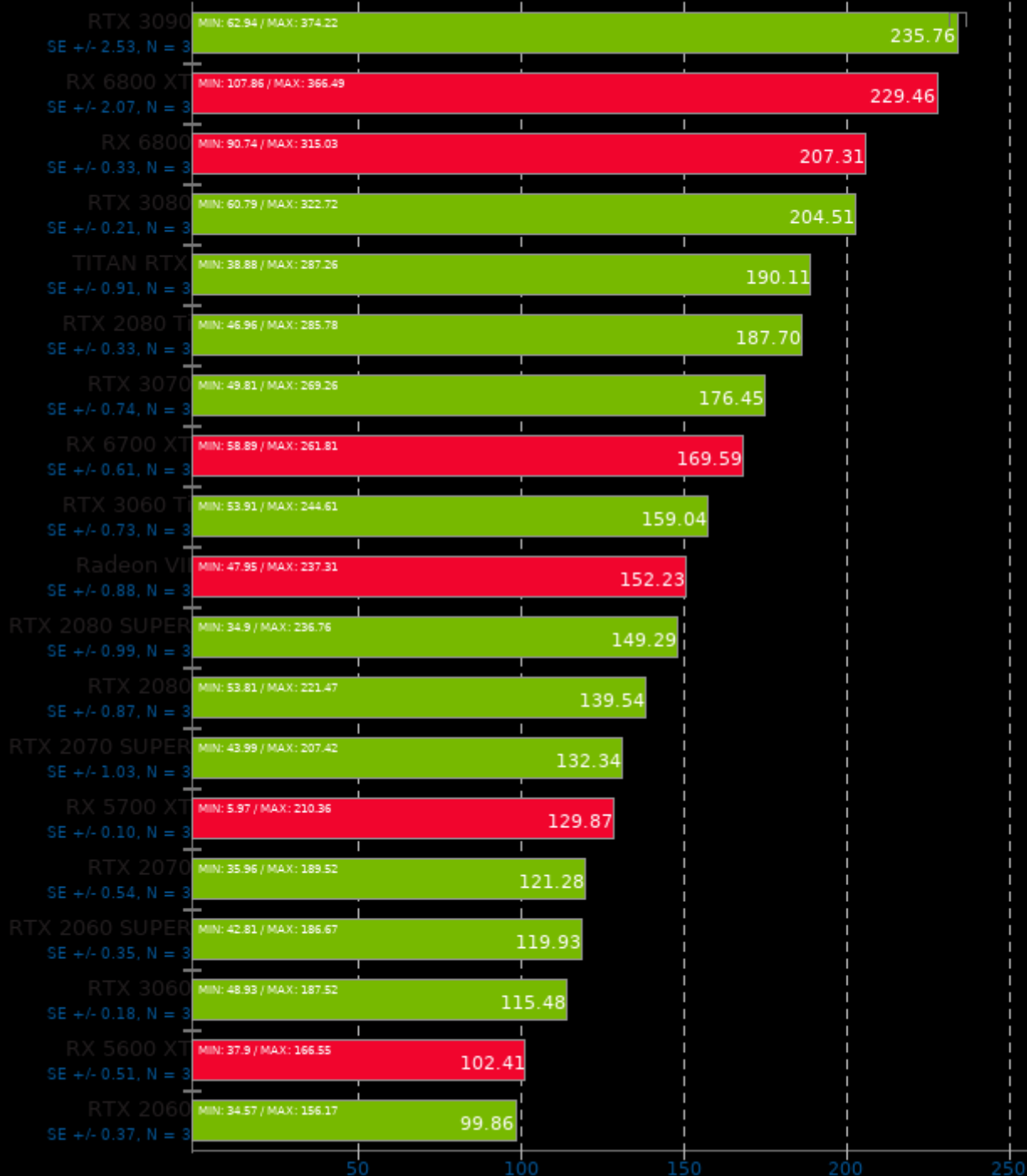


Geometric	60.7	70.9	71.5	81.2	85.8	92.8	113.	113.	68.2	95.9	108.	126.	148.	81.2	58.1	75.9	99.0	120.	138.
Mean Of	74	79	70	21	52	14	051	228	93	13	634	106	767	51	06	62	08	581	523
All Test																			
Results -																			
Result																			
Composit																			
e - 1440p																			
Linux																			
Gaming																			
(Geometri																			
c Mean)																			
Normalized	40.85	47.71	48.11	54.6	57.71	62.39	75.99	76.11	45.91	64.47	73.02	84.77	100%	54.62	39.06	51.06	66.55	81.05	93.11
	%	%	%	%	%	%	%	%	%	%	%	%		%	%	%	%	%	%

## Batman: Arkham Knight

Resolution: 2560 x 1440 - Quality: High

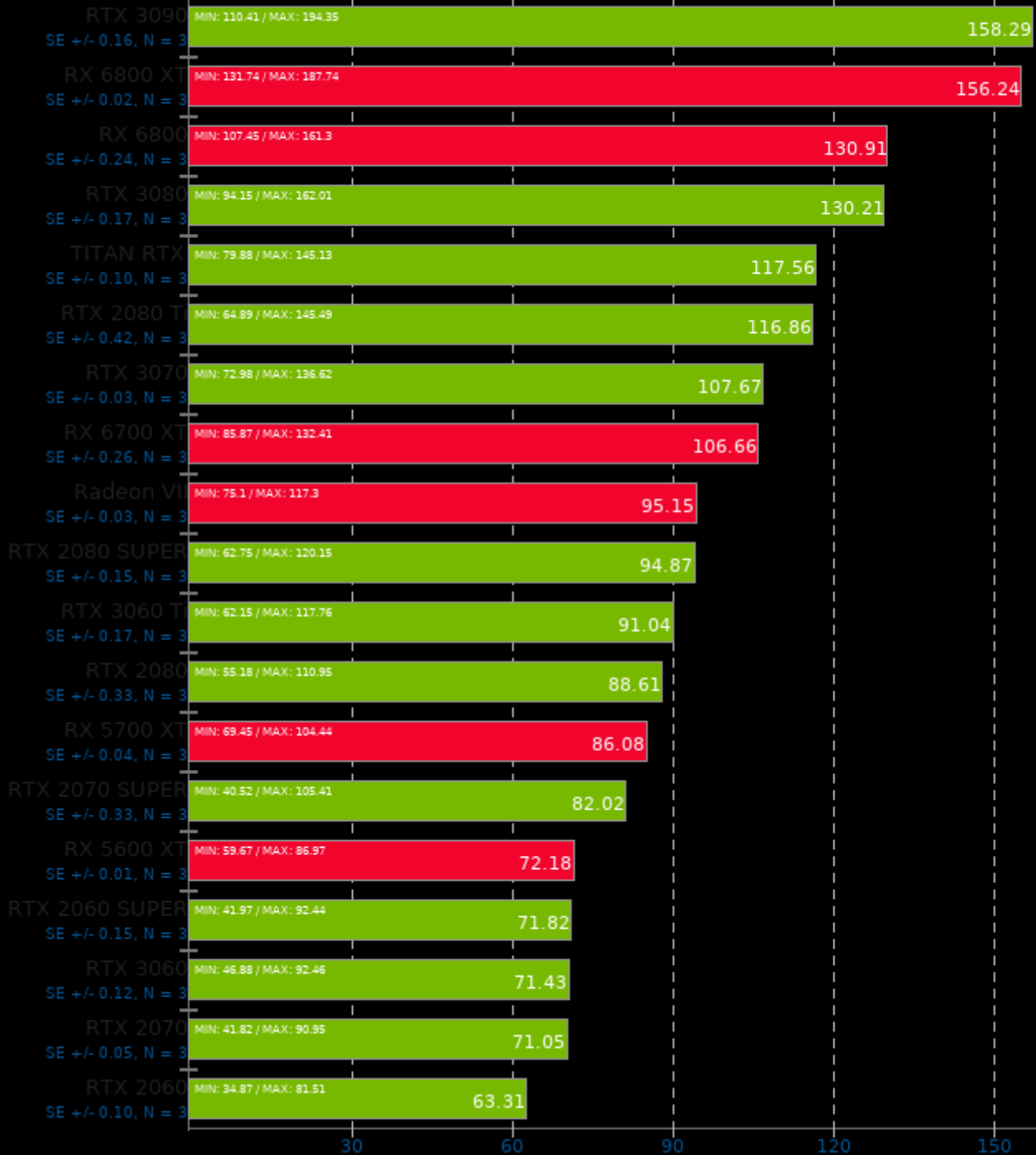
► Frames Per Second, More Is Better



## DiRT Rally 2.0

Resolution: 2560 x 1440 - Graphics Preset: Ultra

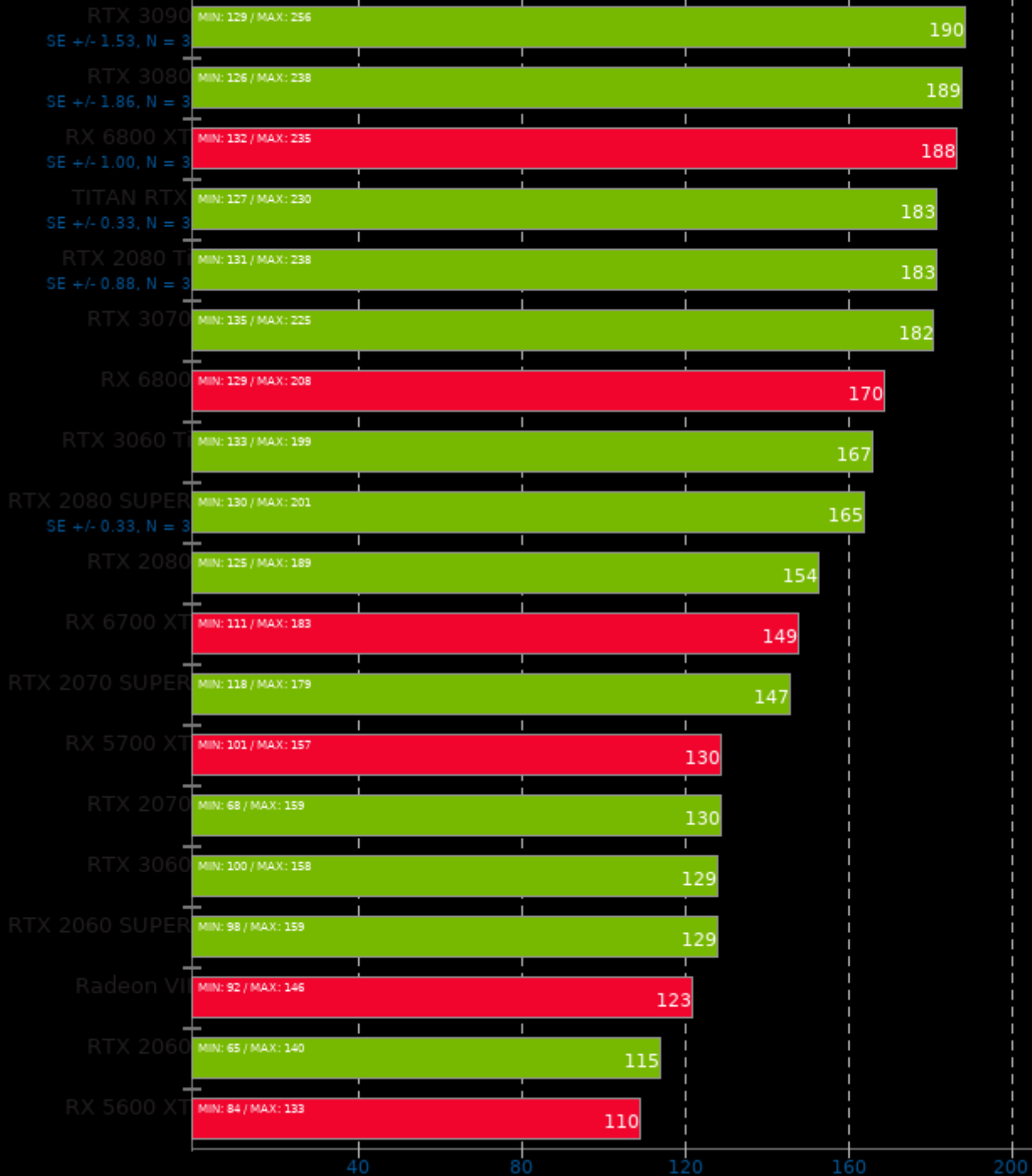
► Frames Per Second, More Is Better



## F1 2020

Resolution: 2560 x 1440 - Graphics Preset: Ultra

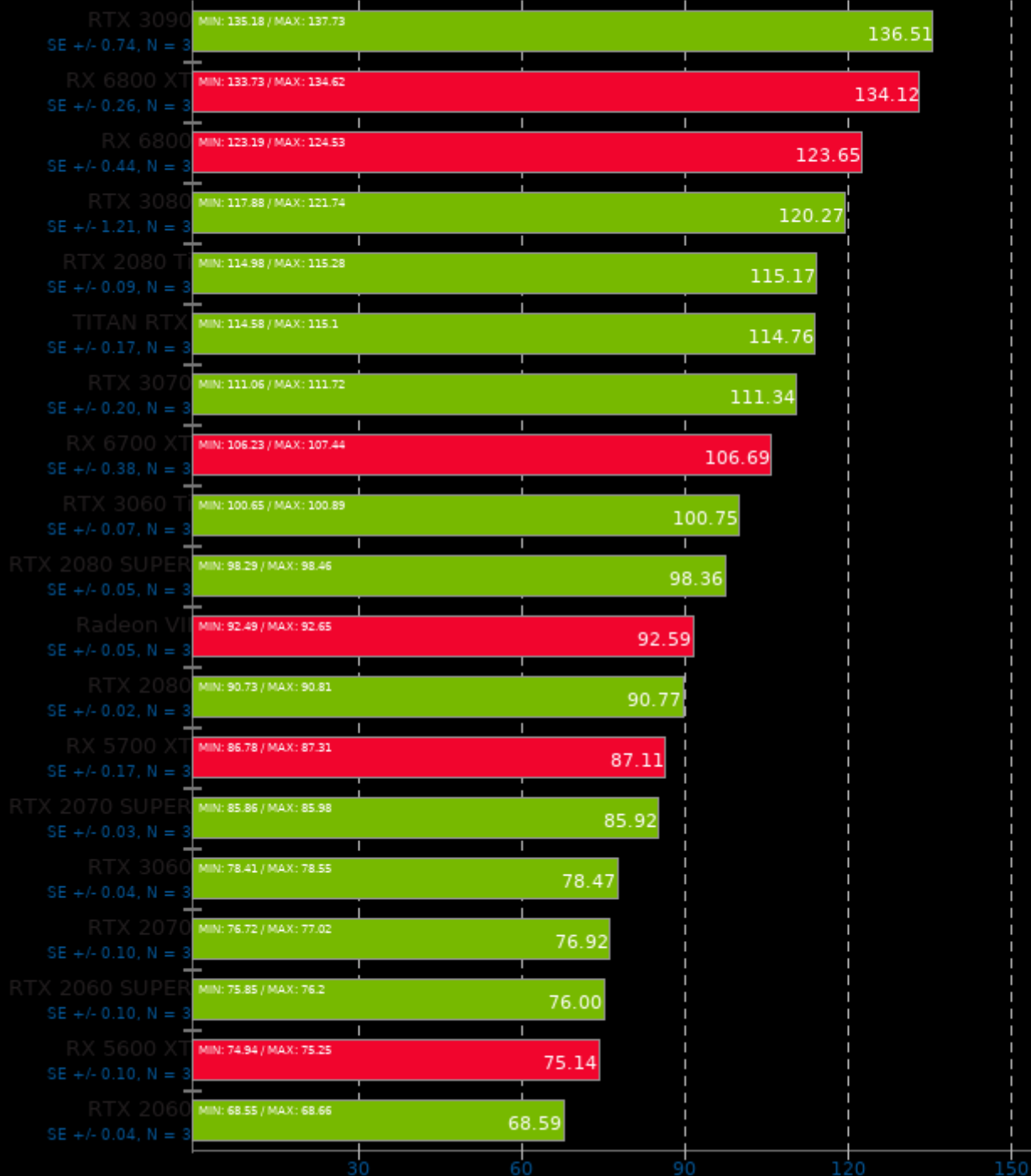
► Frames Per Second, More Is Better



## HITMAN 2

Resolution: 2560 x 1440 - Quality Level: Ultra

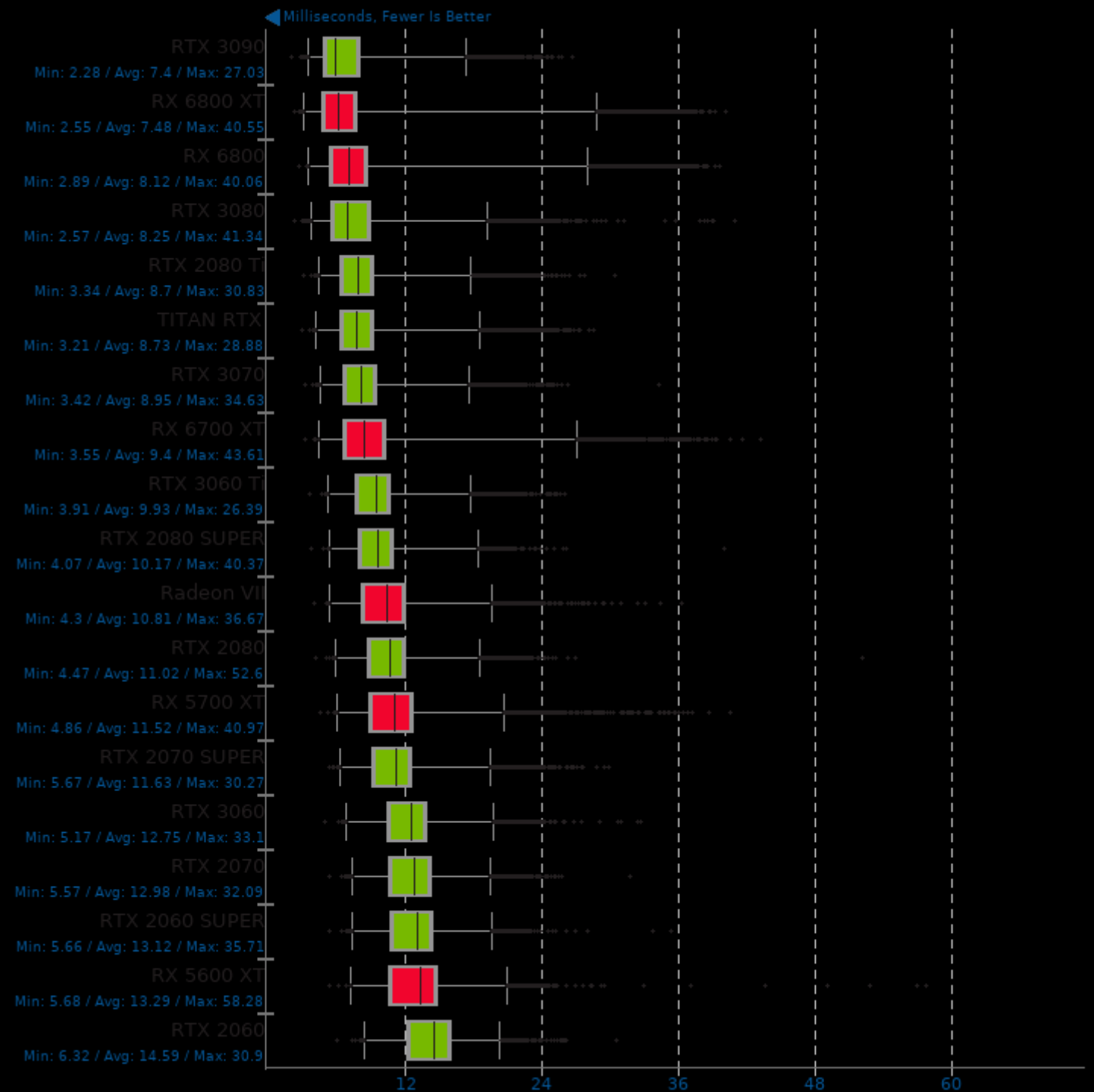
► Frames Per Second, More Is Better





## HITMAN 2

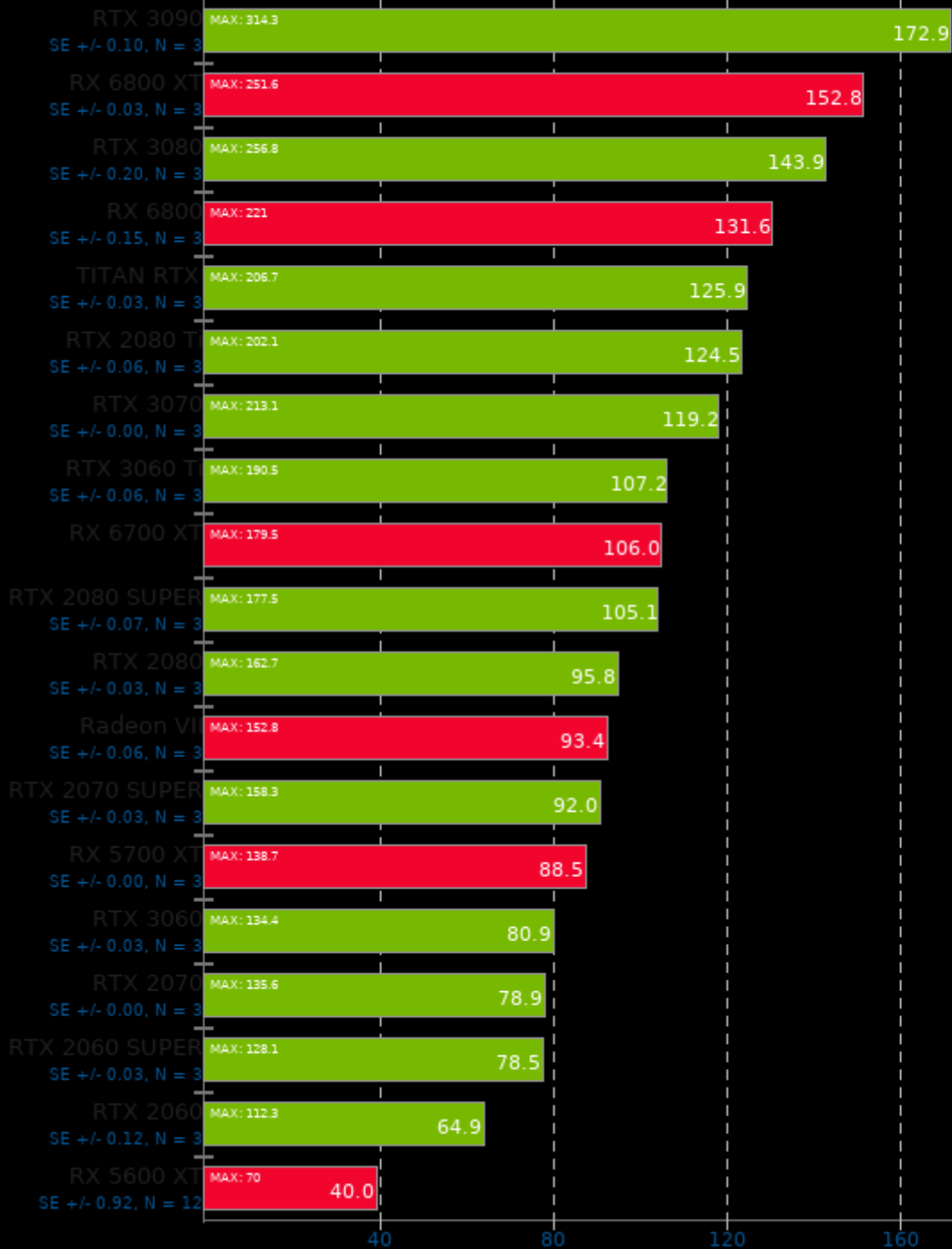
Resolution: 2560 x 1440 - Quality Level: Ultra - Total Frame Time



## Shadow of the Tomb Raider

Resolution: 2560 x 1440 - Graphics Preset: Highest - Anti Aliasing: Off

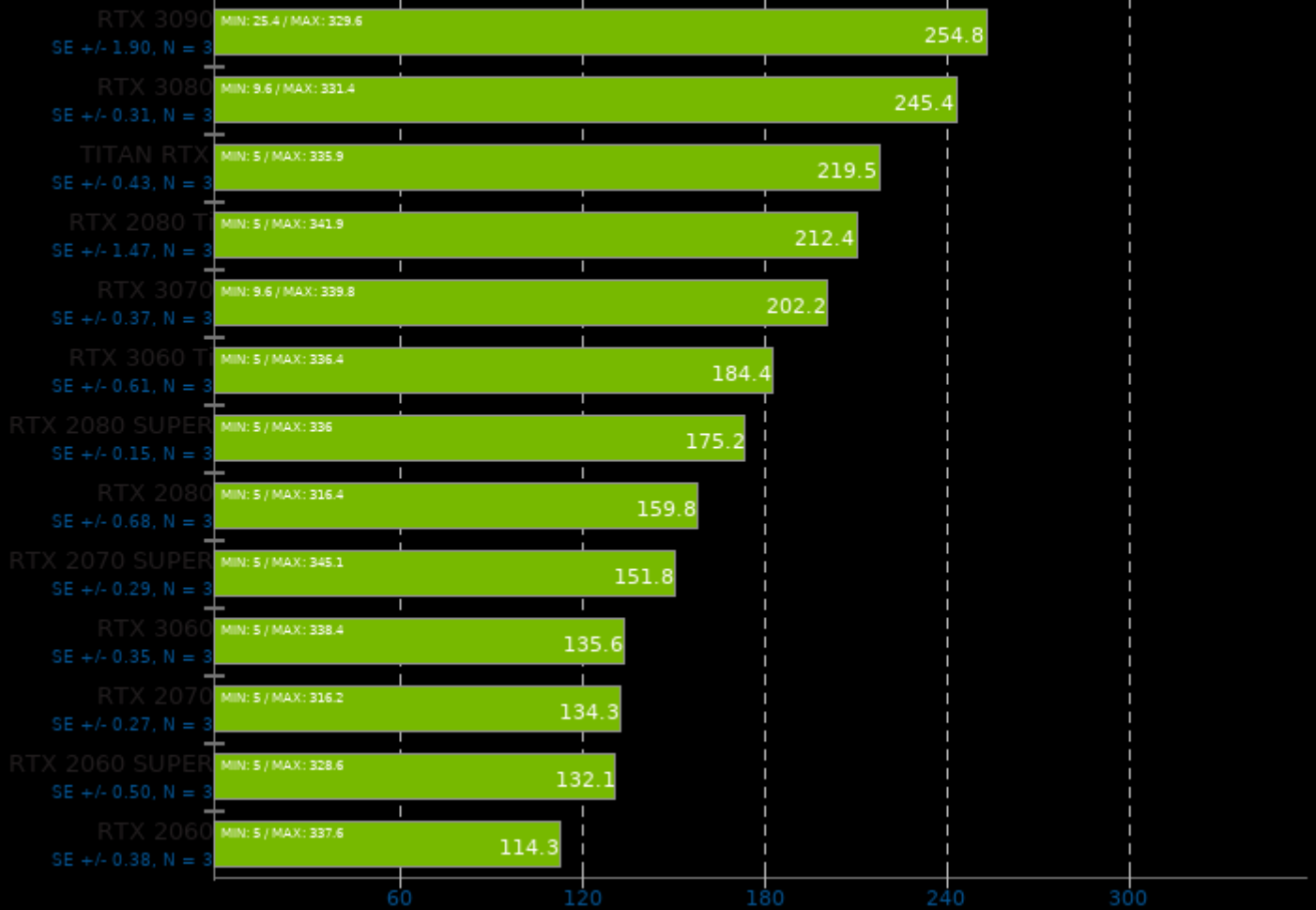
► Frames Per Second, More Is Better



## Strange Brigade

Resolution: 2560 x 1440 - Graphics Setting: Ultra

► Frames Per Second, More Is Better

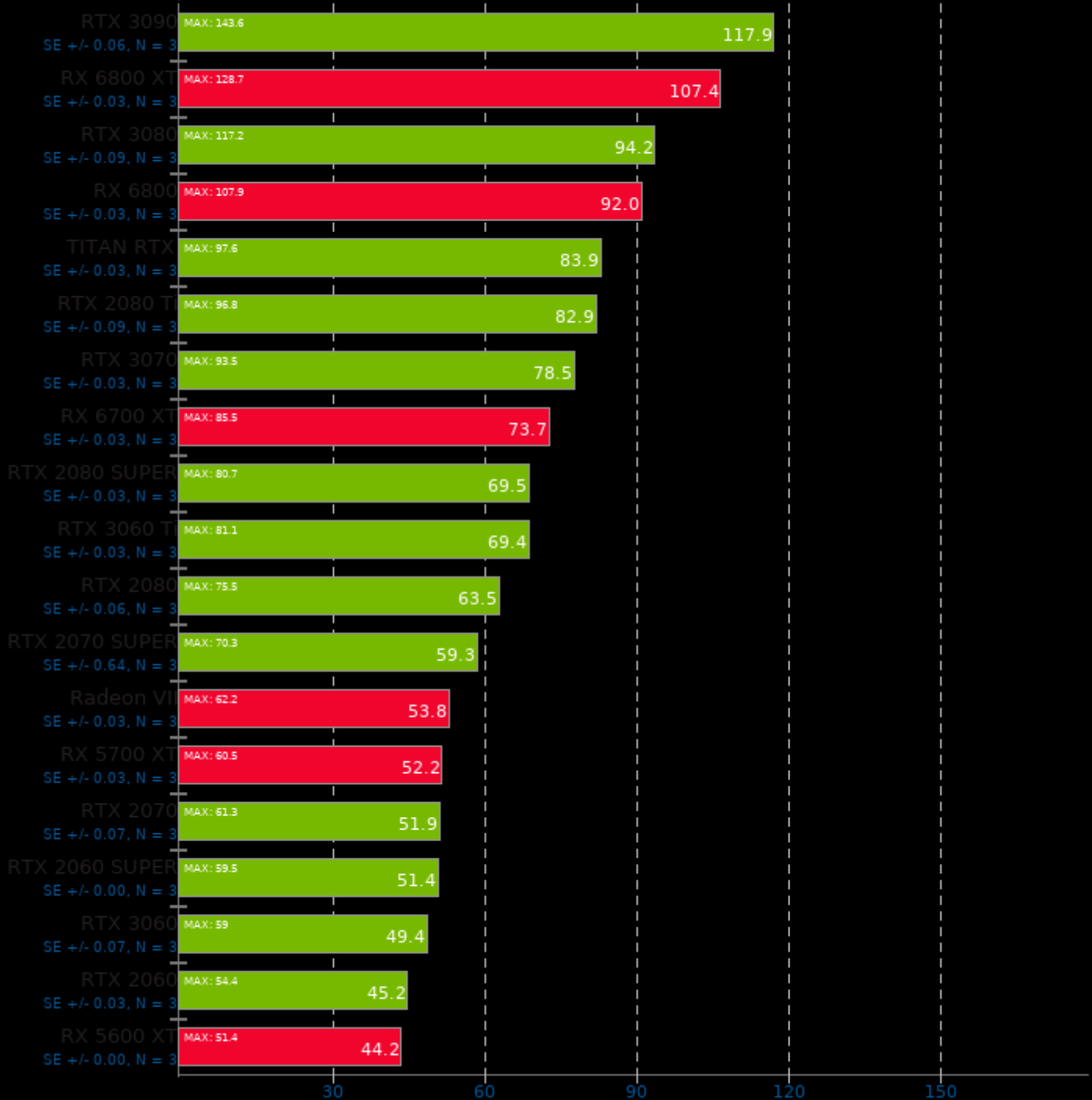




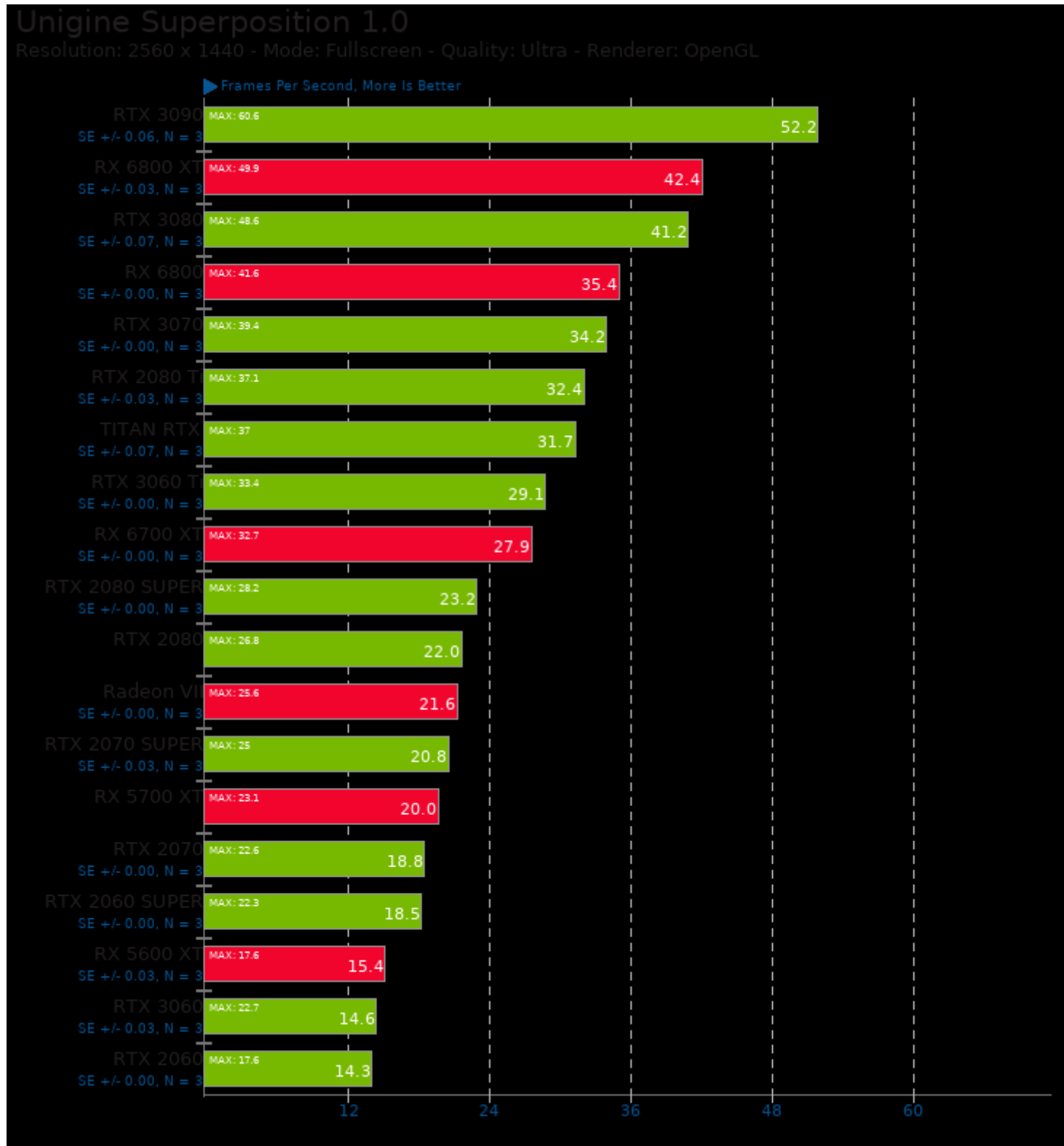
## Unigine Superposition 1.0

Resolution: 2560 x 1440 - Mode: Fullscreen - Quality: High - Renderer: OpenGL

► Frames Per Second, More Is Better



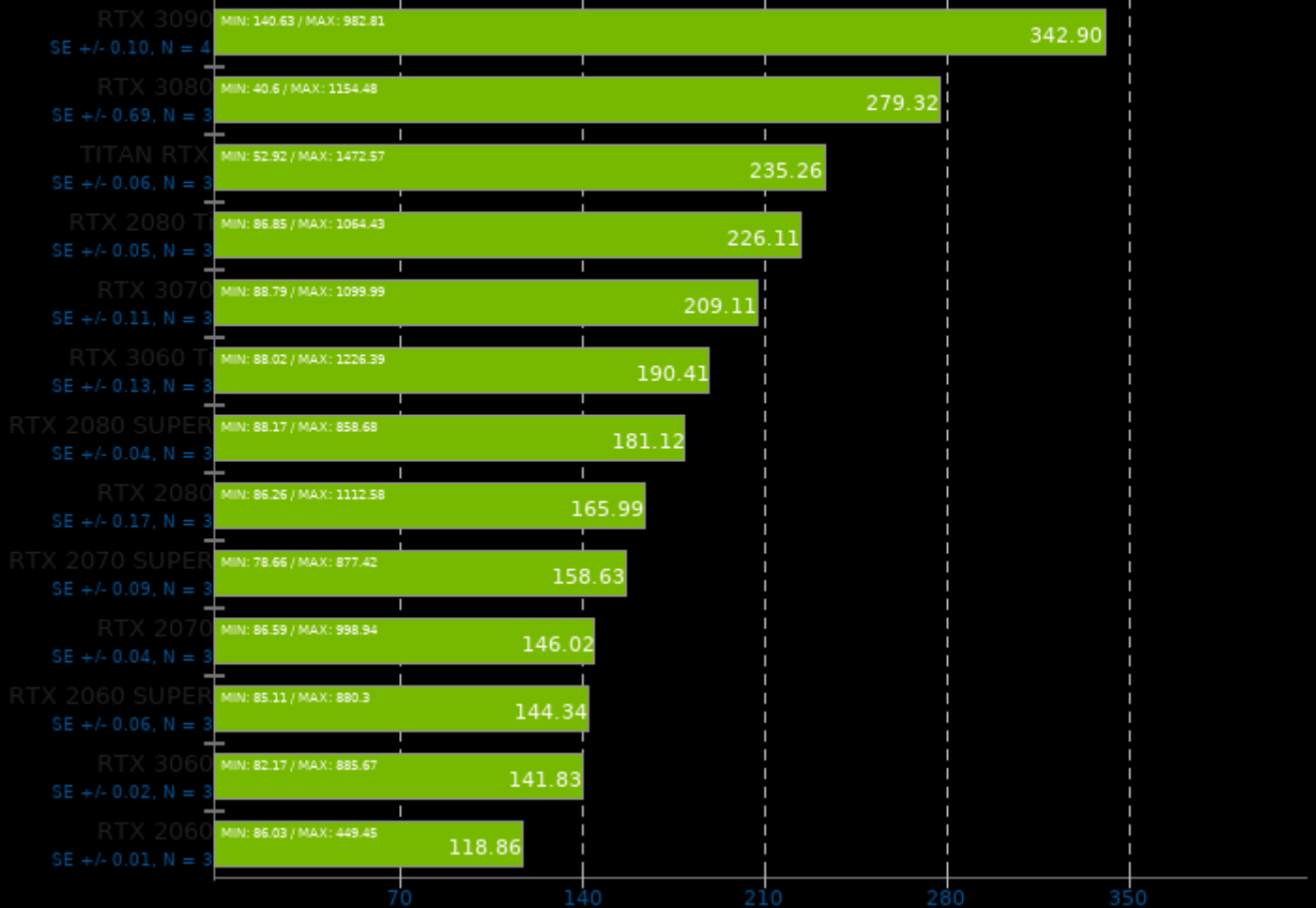




## Basemark GPU 1.2

Renderer: Vulkan - Resolution: 2560 x 1440 - Graphics Preset: High

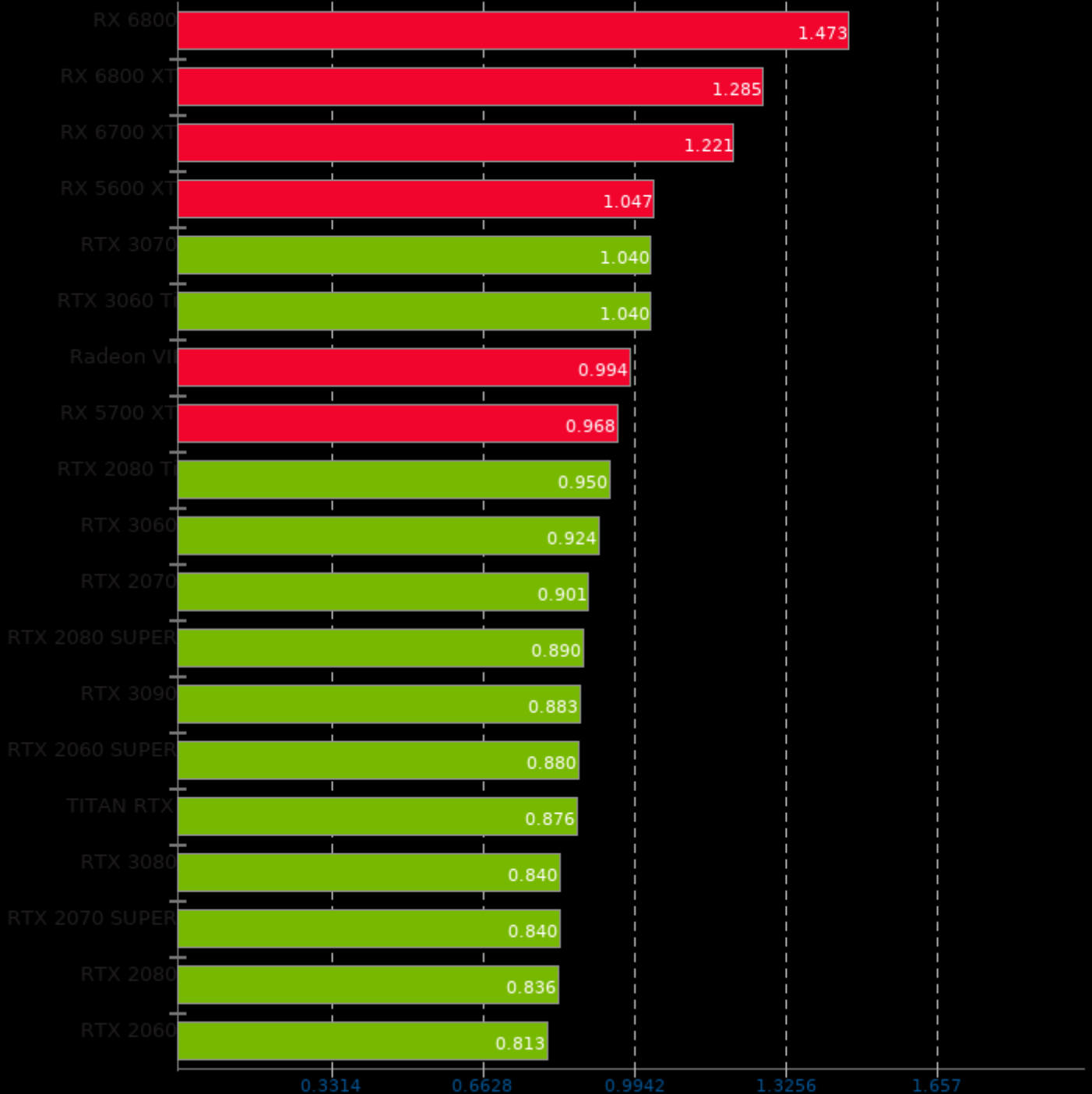
► FPS, More Is Better

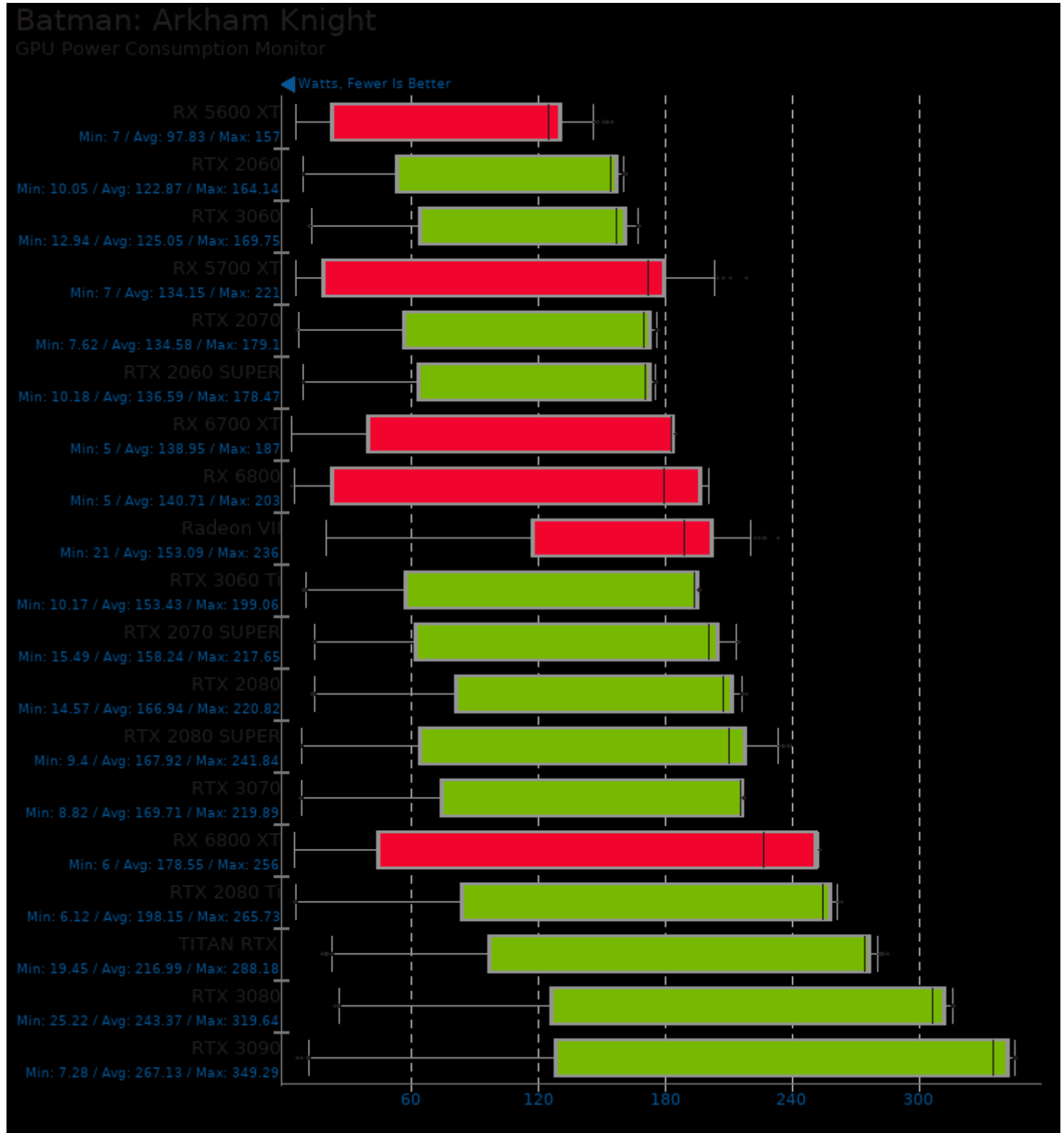


## Batman: Arkham Knight

Resolution: 2560 x 1440 - Quality: High

► Frames Per Second Per Watt, More Is Better

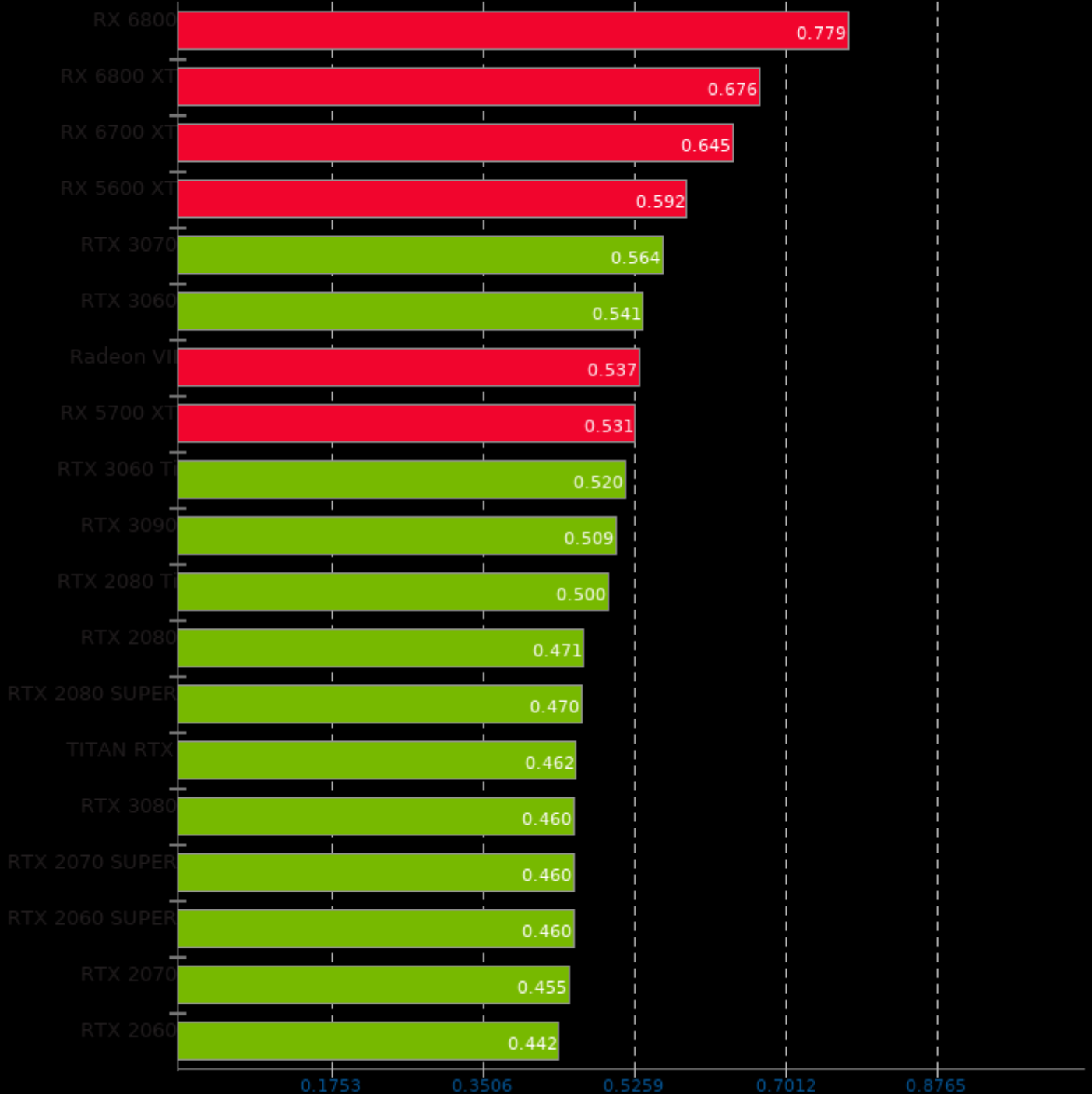




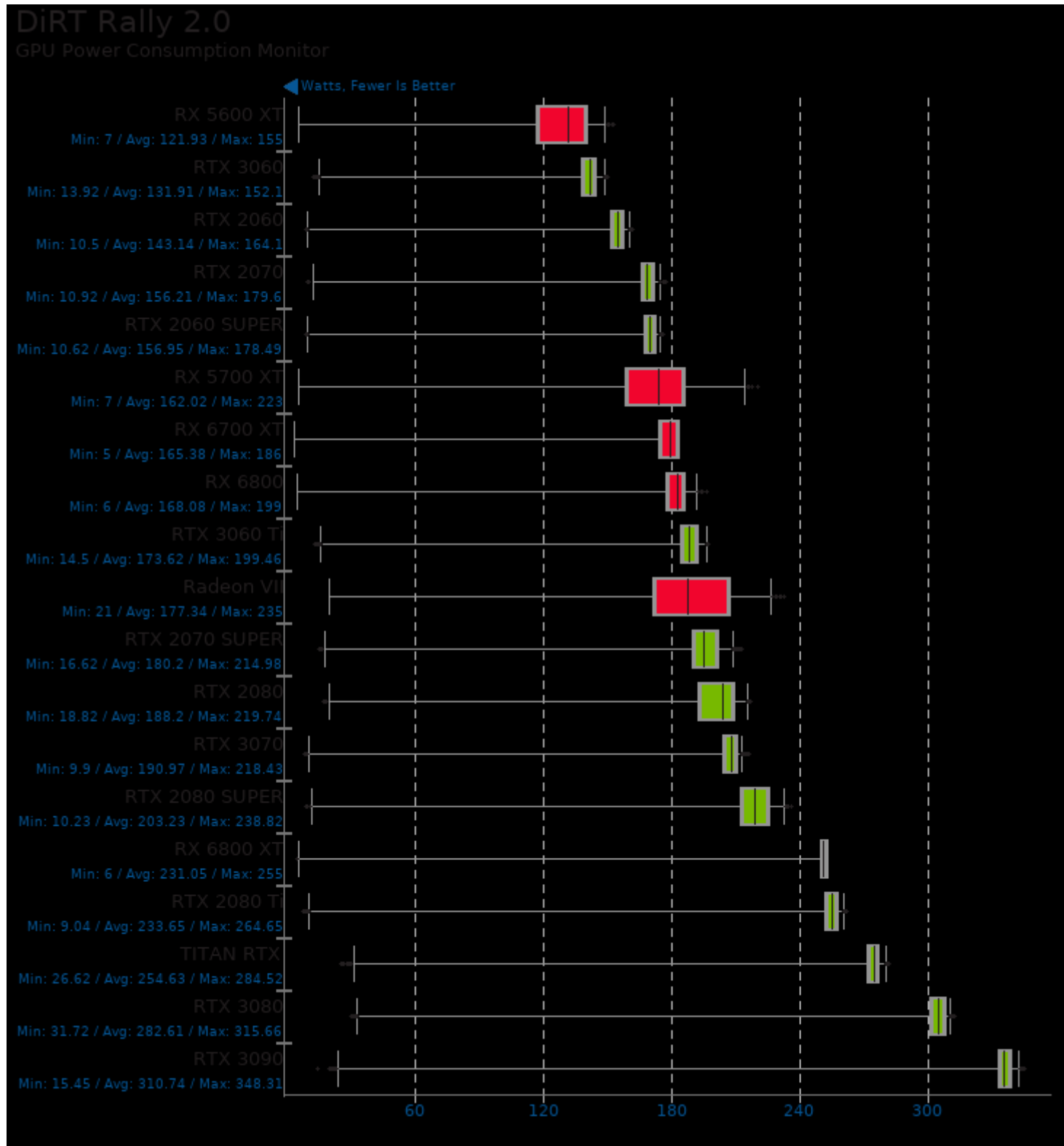
## DiRT Rally 2.0

Resolution: 2560 x 1440 - Graphics Preset: Ultra

► Frames Per Second Per Watt, More Is Better





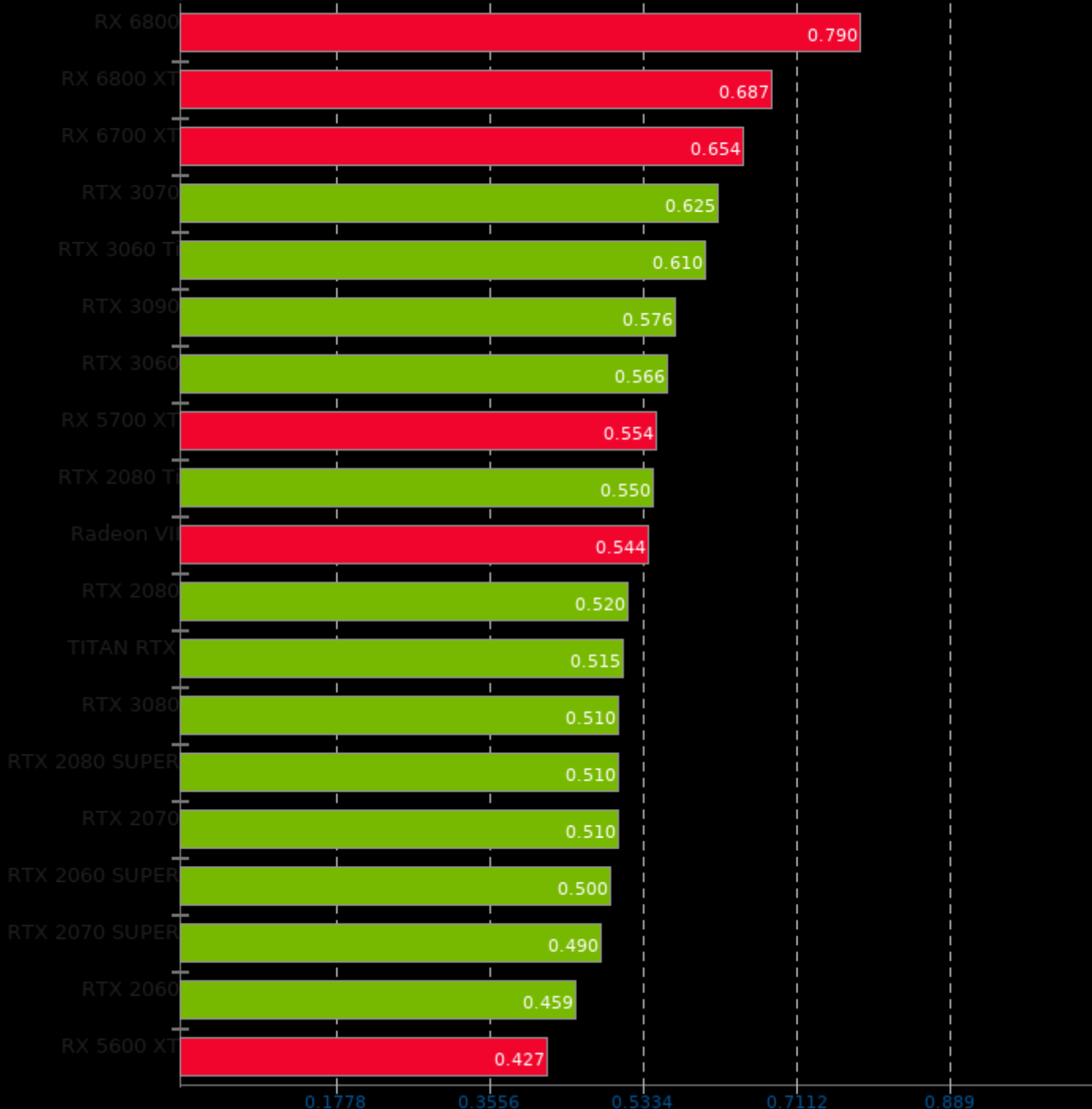




## Shadow of the Tomb Raider

Resolution: 2560 x 1440 - Graphics Preset: Highest - Anti Aliasing: Off

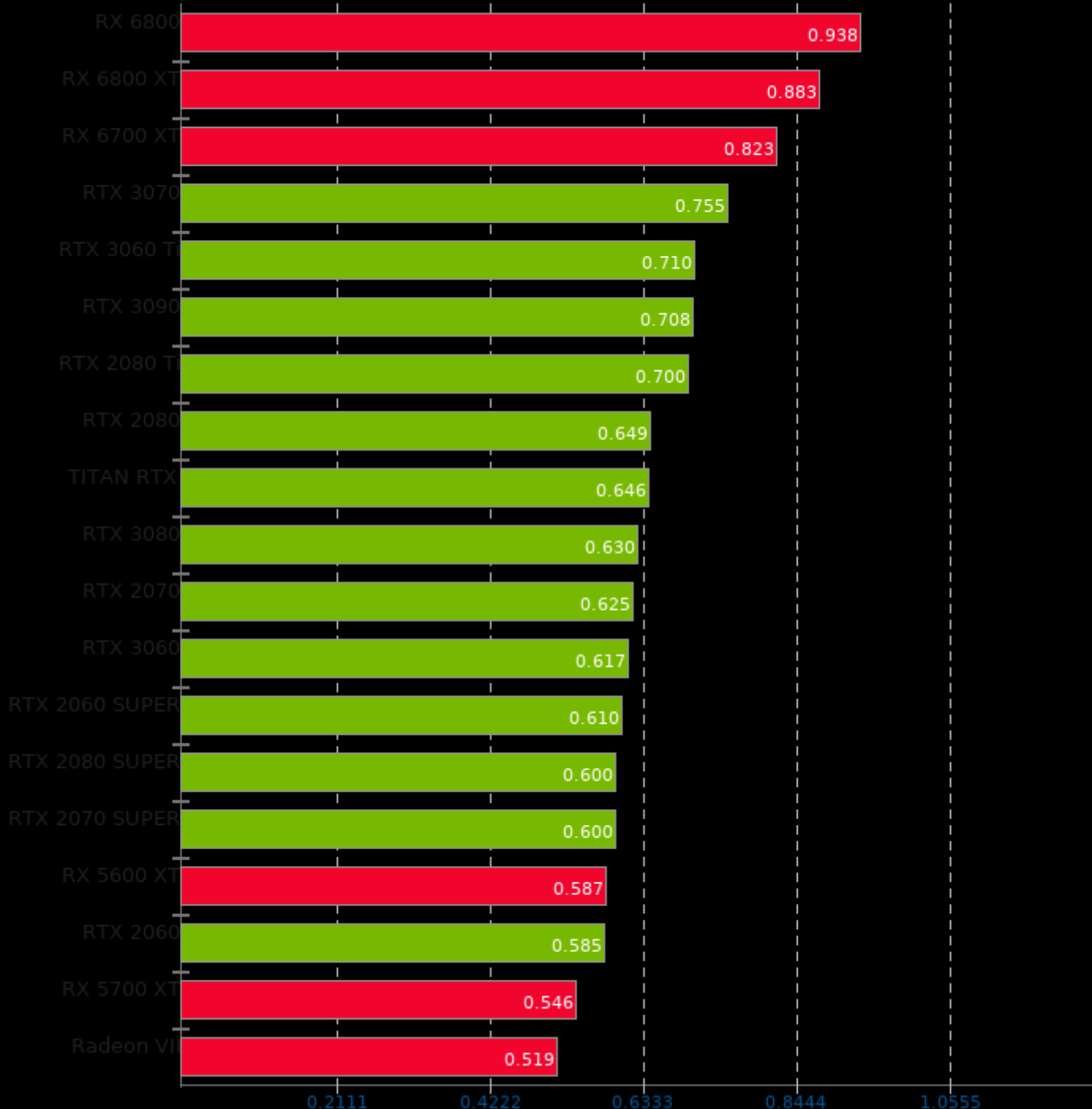
► Frames Per Second Per Watt, More Is Better

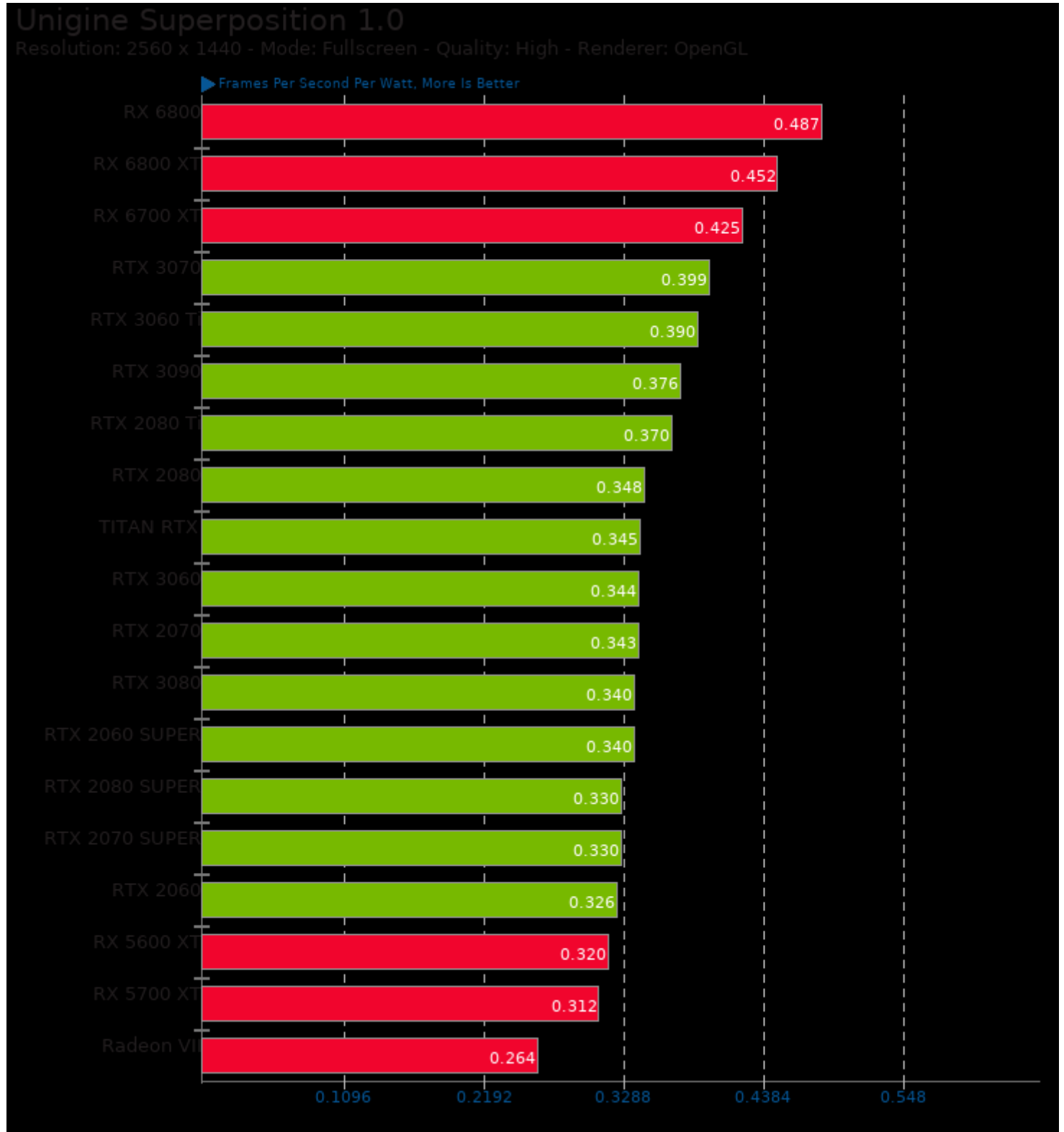


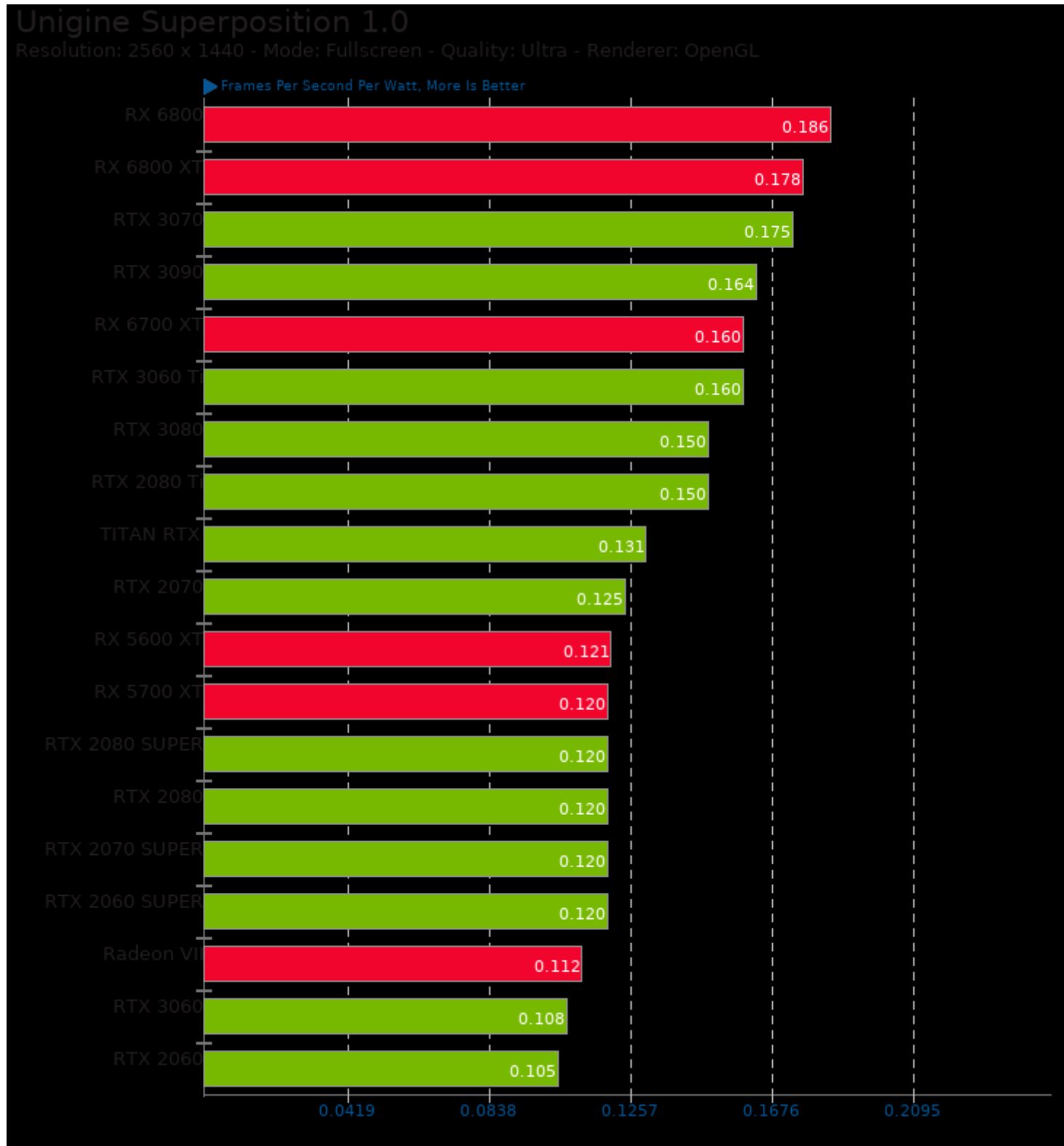
## Unigine Heaven 4.0

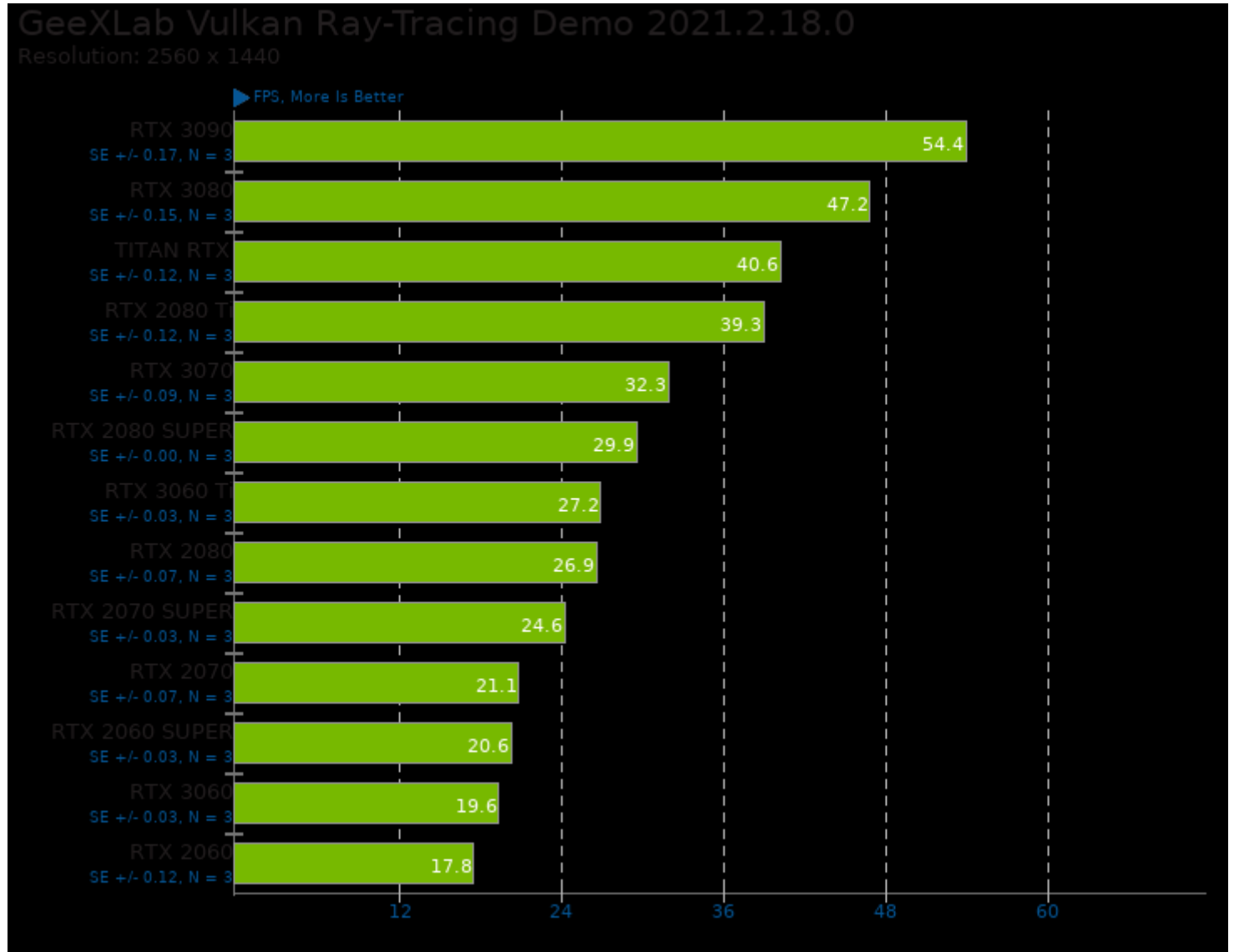
Resolution: 2560 x 1440 - Mode: Fullscreen - Renderer: OpenGL

► Frames Per Second Per Watt, More Is Better



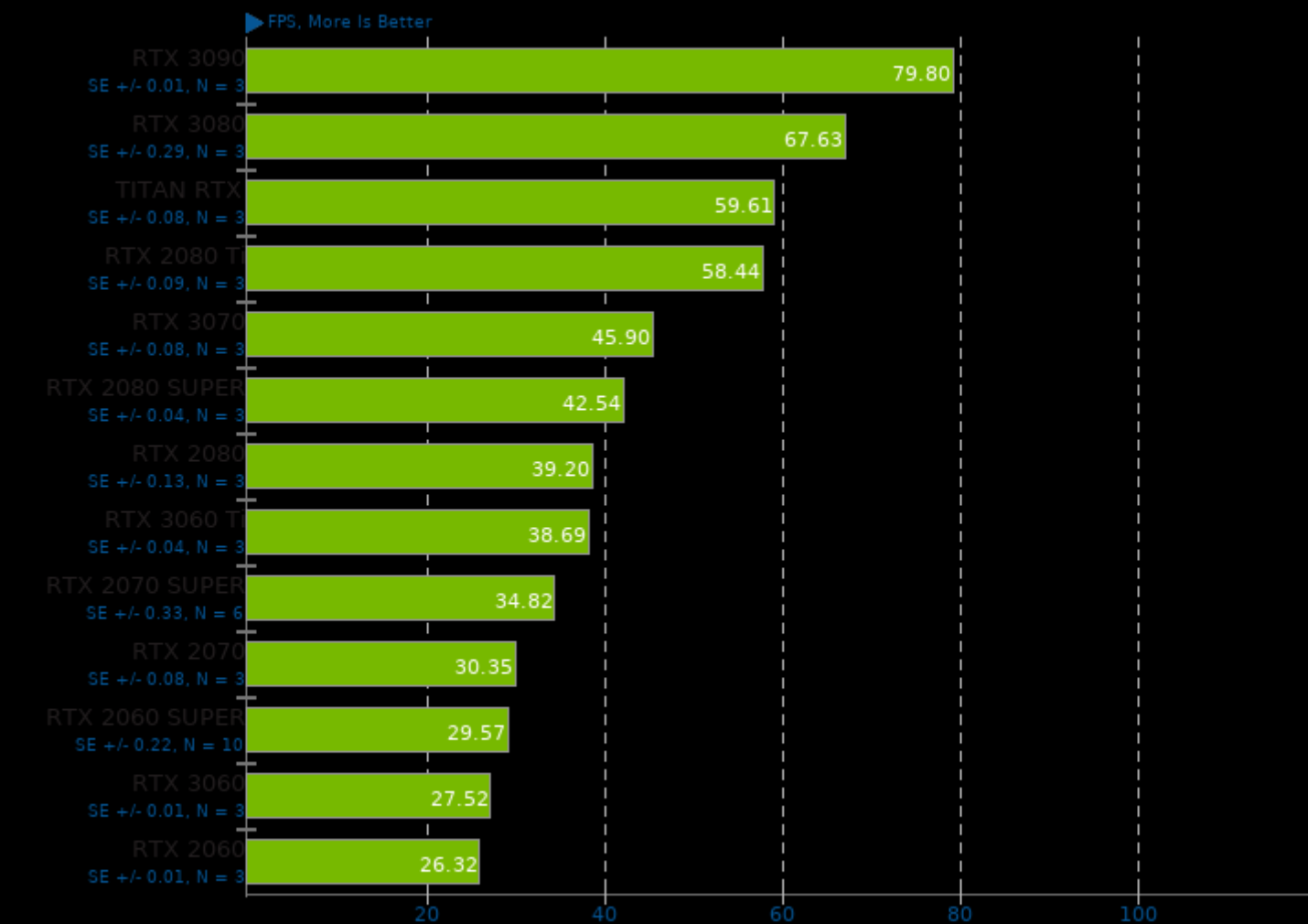






## Ray Tracing In Vulkan r6

Resolution: 2560 x 1440 - Scene: Cornell Box



1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread



## Ray Tracing In Vulkan r6

Resolution: 2560 x 1440 - Scene: Cornell Box + Lucy

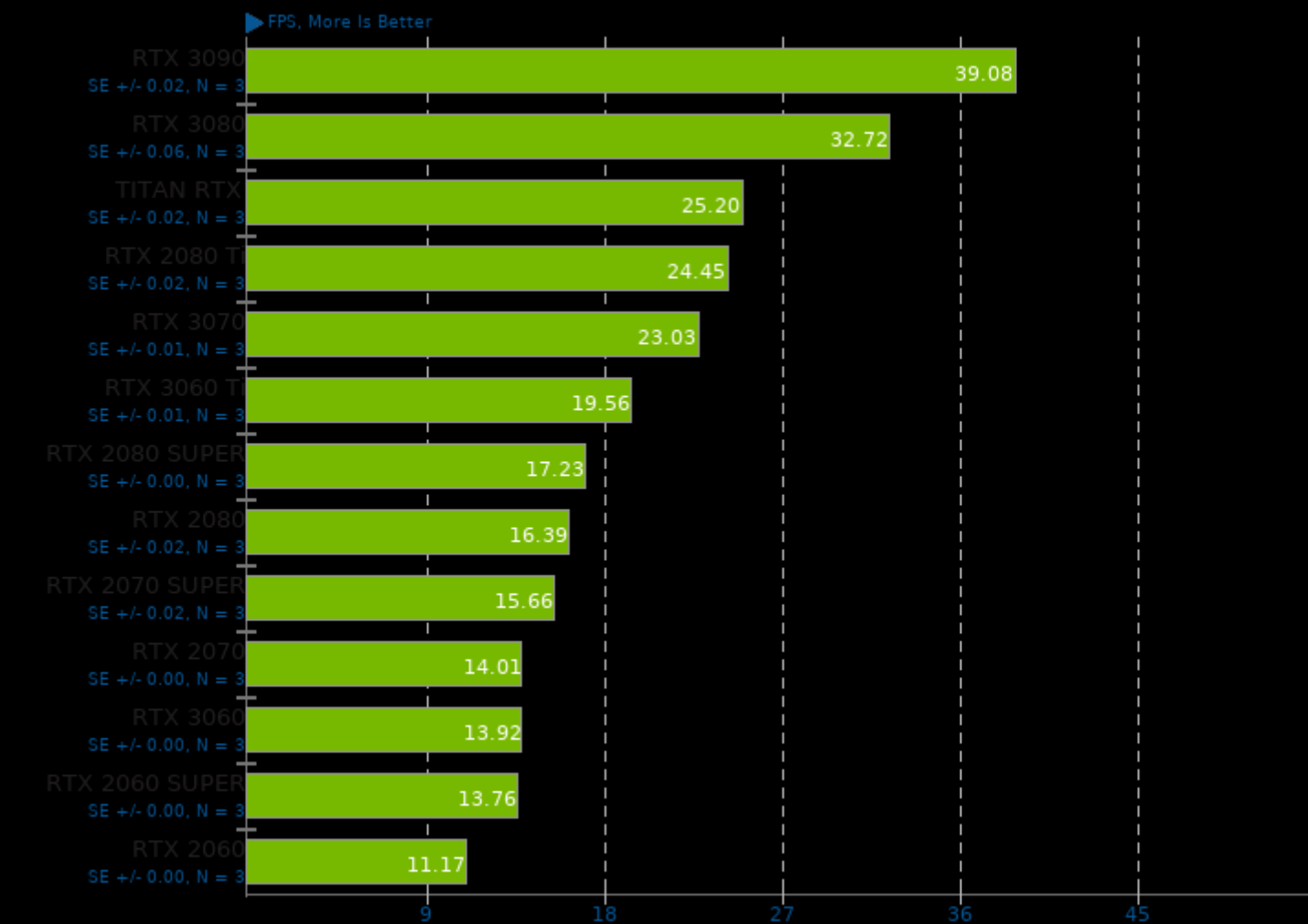
► FPS, More Is Better



1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

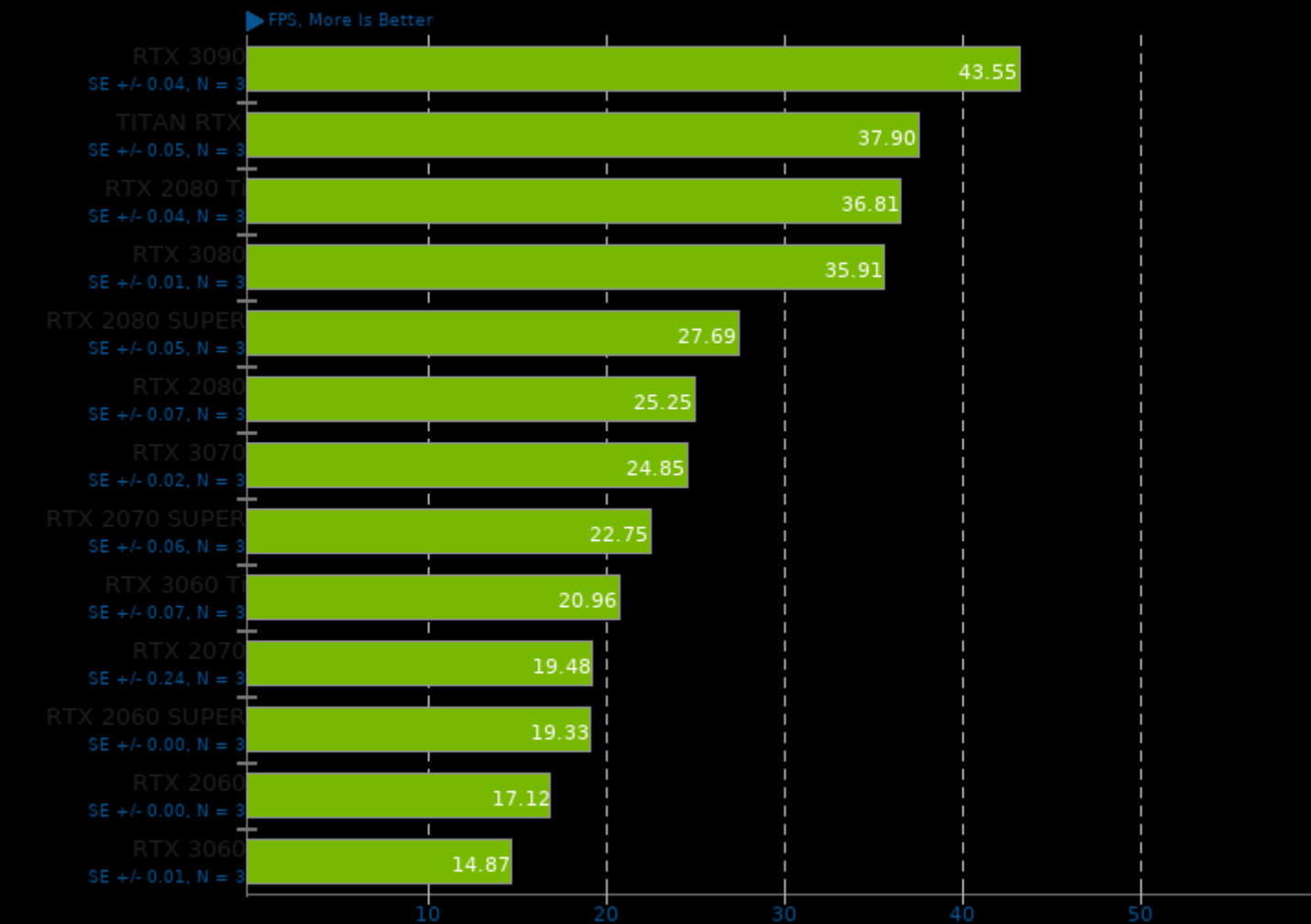
## Ray Tracing In Vulkan r6

Resolution: 2560 x 1440 - Scene: Lucy In One Weekend



## Ray Tracing In Vulkan r6

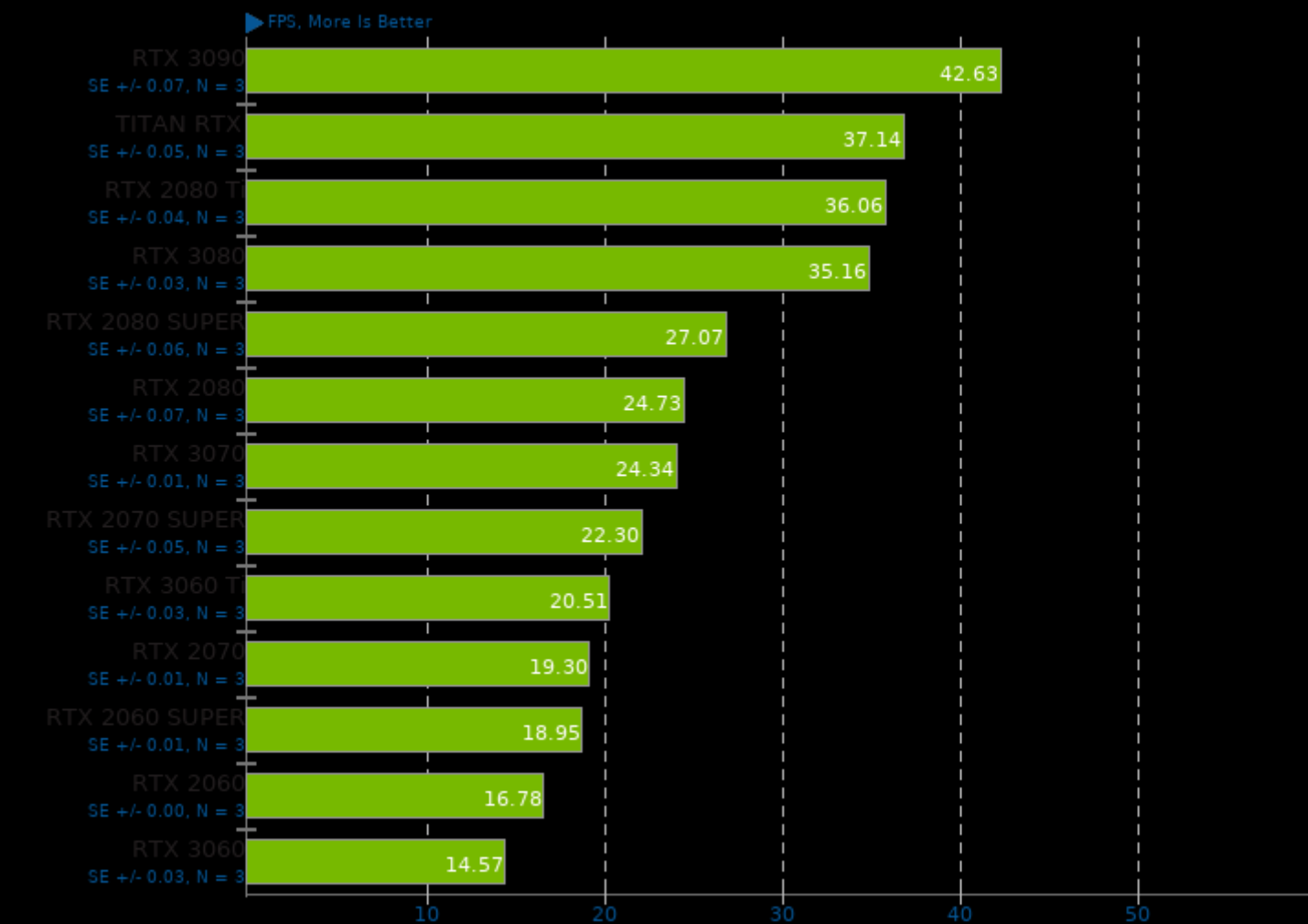
Resolution: 2560 x 1440 - Scene: Planets In One Weekend



1. (CXX) g++ options: -O3 -lbacktrace -lstdc++ -fs -lm -ldl -lpthread

## Ray Tracing In Vulkan r6

Resolution: 2560 x 1440 - Scene: Ray Tracing In One Weekend

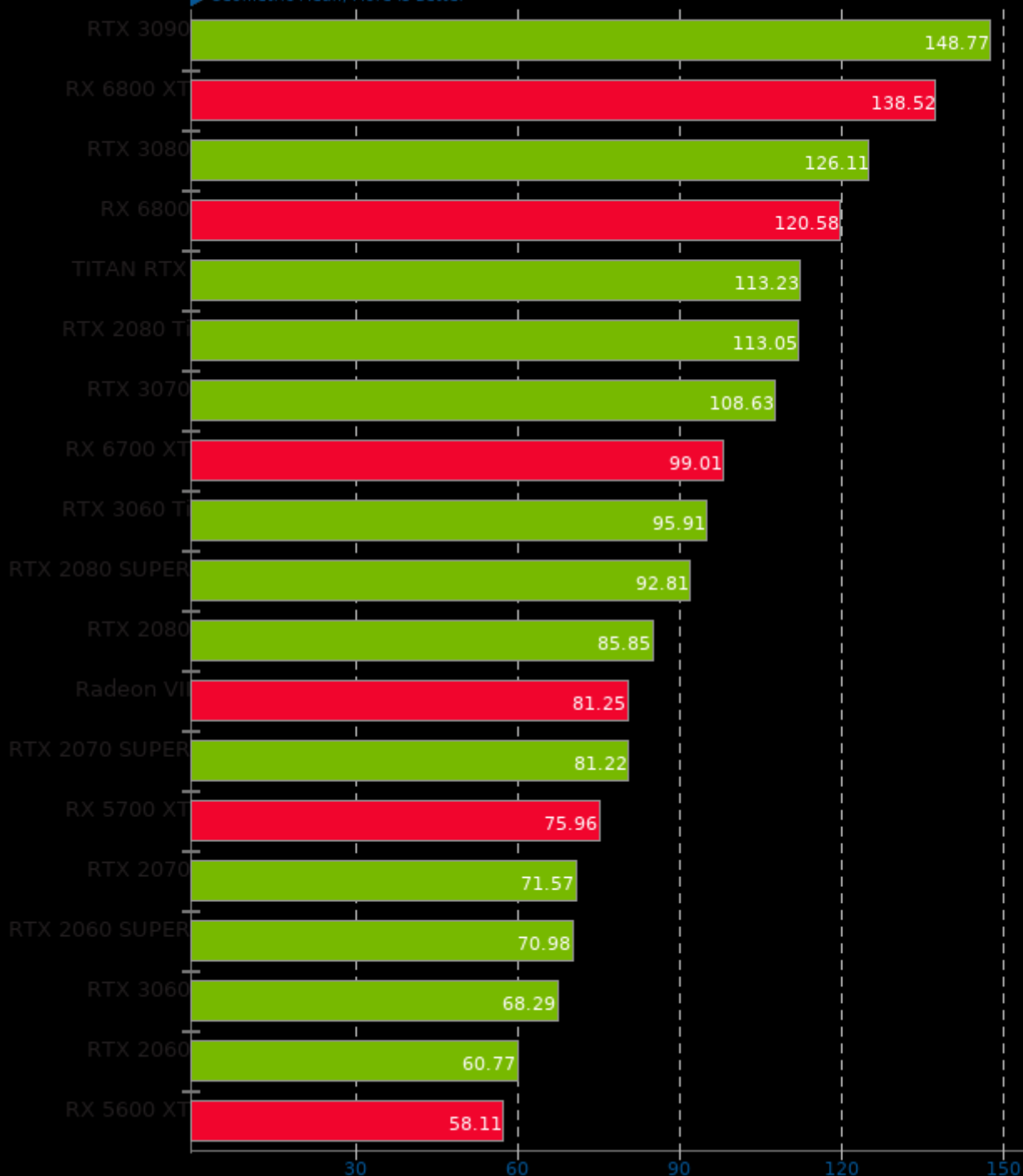


1. (CXX) g++ options: -O3 -lbacktrace -lstdc++fs -lm -ldl -lpthread

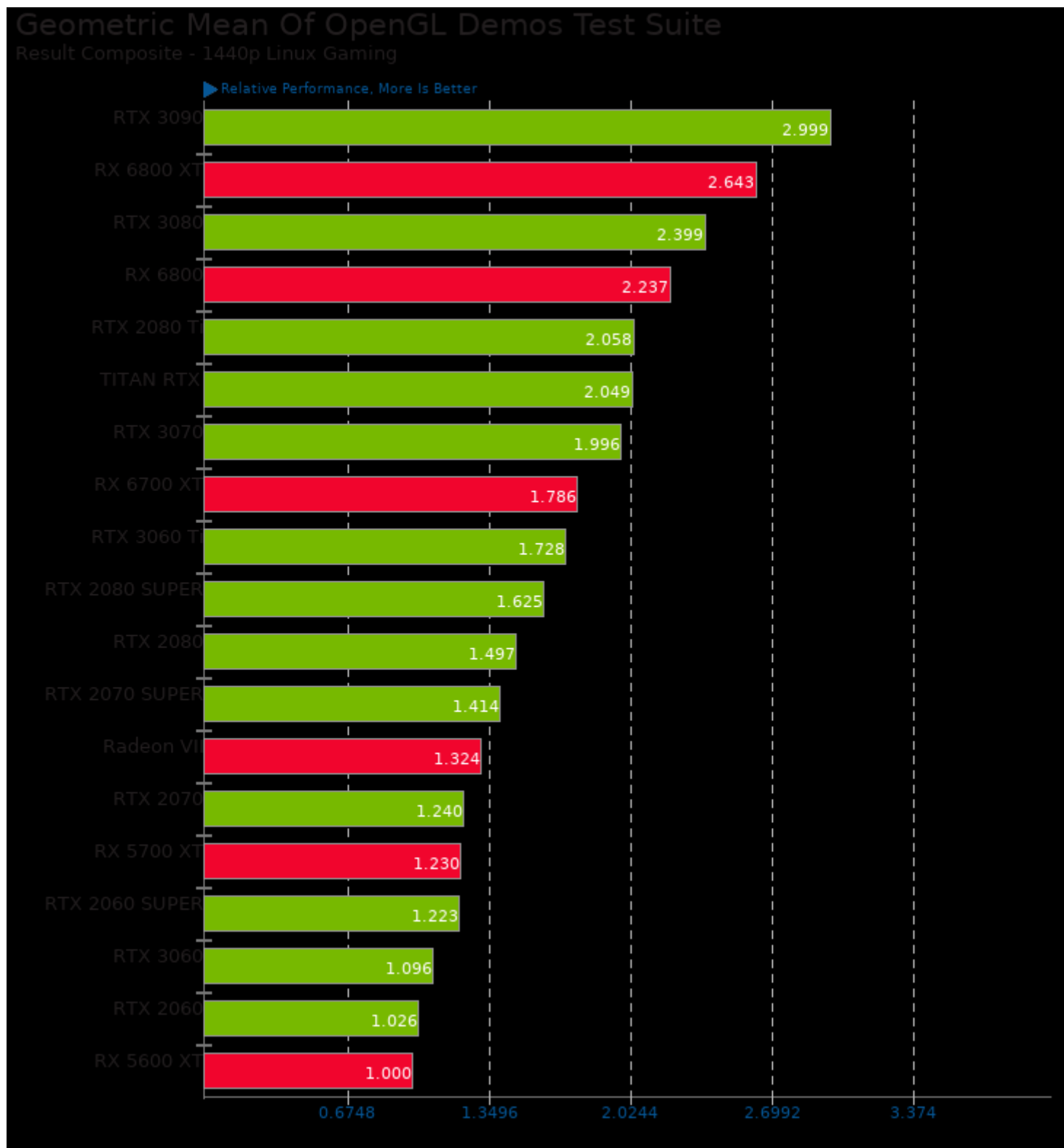
## Geometric Mean Of All Test Results

Result Composite - 1440p Linux Gaming

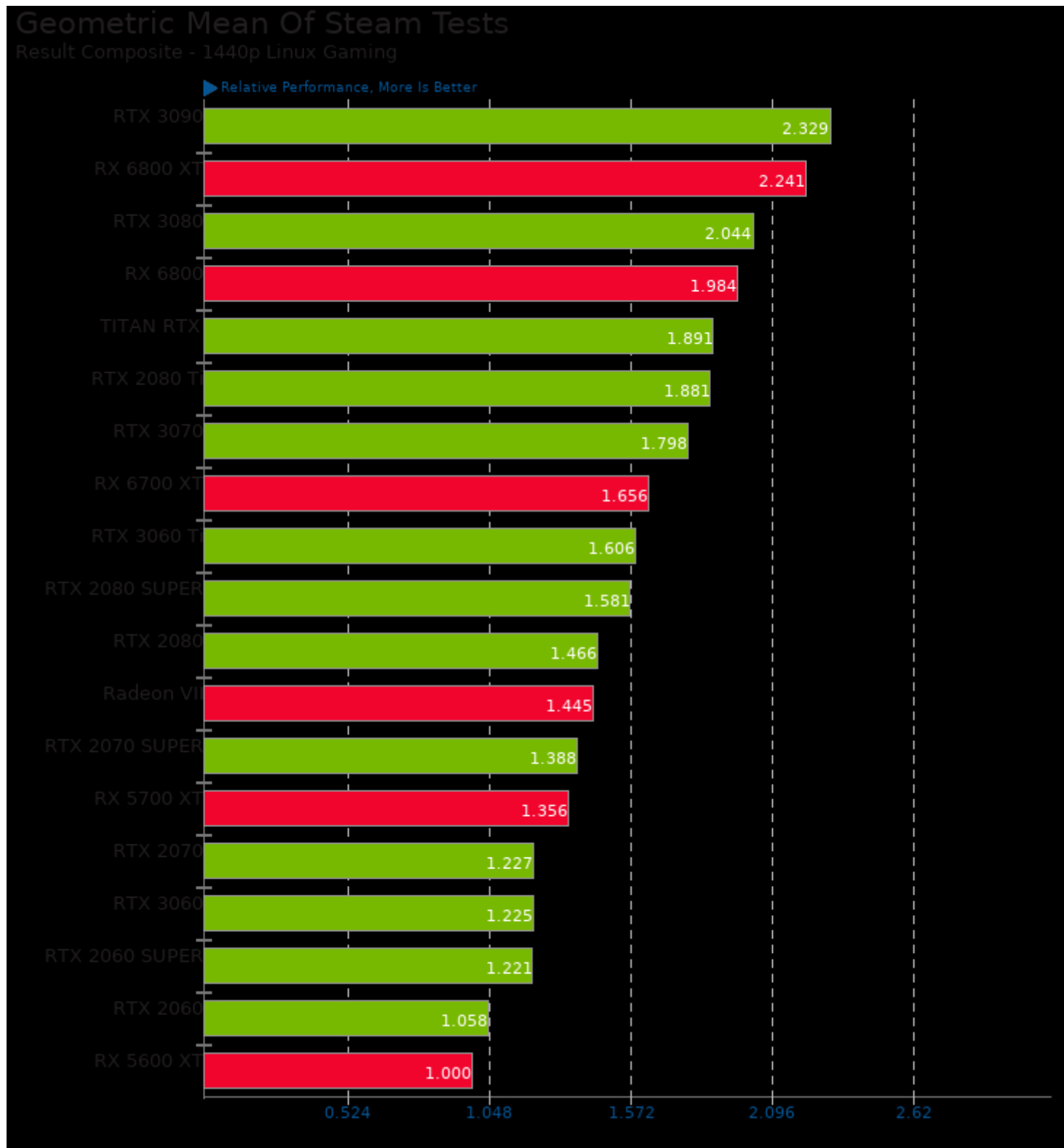
▶ Geometric Mean, More Is Better



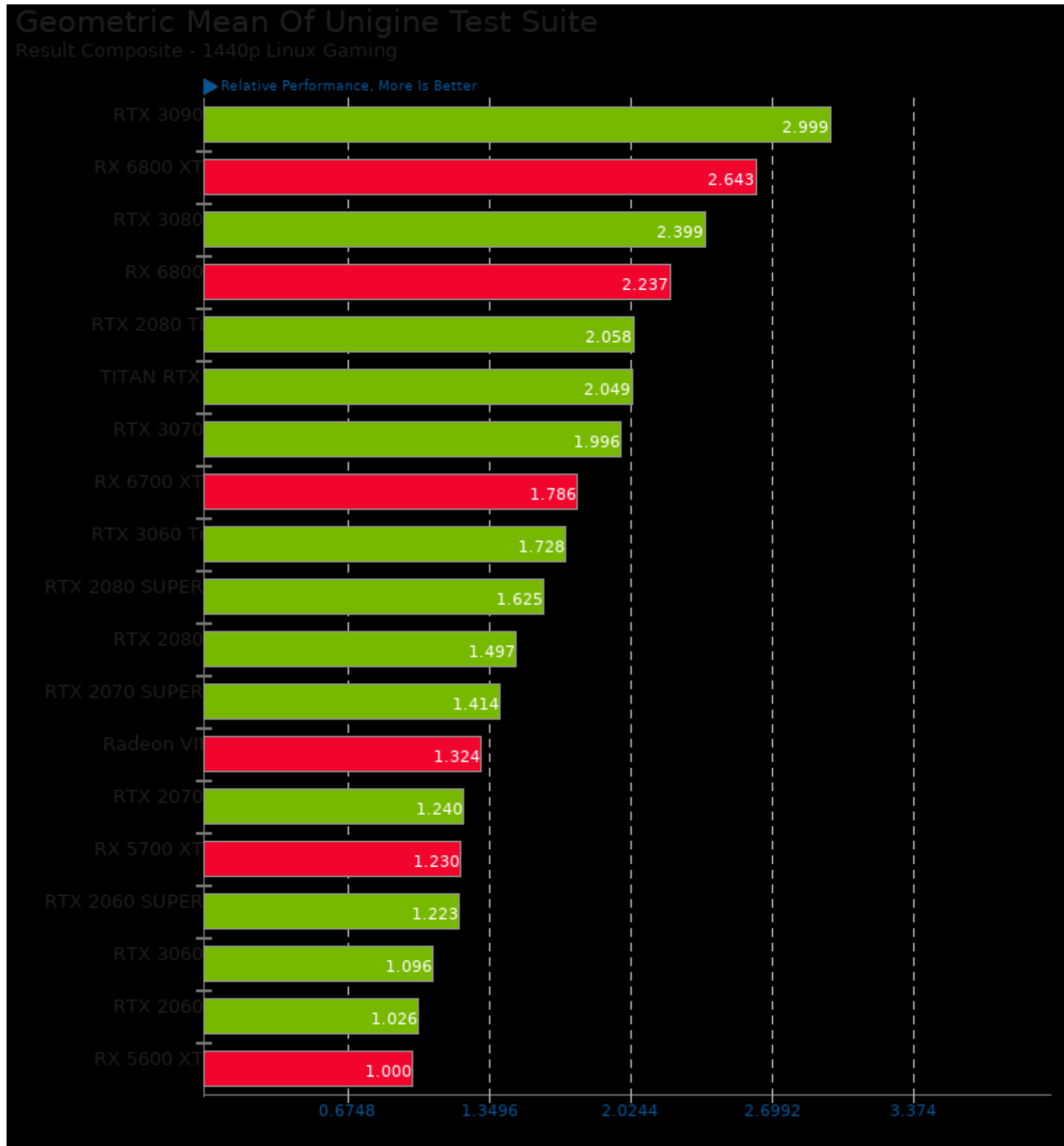
These geometric means are based upon test groupings / test suites for this result file.



Geometric mean based upon tests: pts/unigine-heaven and pts/unigine-super



Geometric mean based upon tests: pts/batman-knight, pts/dirt-rally2, pts/f12020, pts/hitman2, pts/shadowofthetombraider and pts/strange-brigade



Geometric mean based upon tests: pts/unigine-heaven and pts/unigine-super

This file was automatically generated via the Phoronix Test Suite benchmarking software on Sunday, 1 September 2024 05:49.