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NVIDIA Compute Tests

Benchmarks for a future article.

Automated Executive Summary

RTX 3080 had the most wins, coming in first place for 70% of the tests.

Based on the geometric mean of all complete results, the fastest (RTX 3080) was 3.566x the speed of the slowest (GTX 1060).

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

Blender (Blend File: Pabellon Barcelona - Compute: NVIDIA OptiX) at 16.467x
Blender (Blend File: Fishy Cat - Compute: NVIDIA OptiX) at 15.145x
Blender (Blend File: Classroom - Compute: NVIDIA OptiX) at 13.28x
clpeak (OpenCL Test: Integer Compute INT) at 11.885x
clpeak (OpenCL Test: Single-Precision Float) at 6.859x
OctaneBench (Total Score) at 6.64x
Geekbench (Test: GPU NVIDIA CUDA) at 6.187x
RedShift Demo at 6.186x
Blender (Blend File: Barbershop - Compute: NVIDIA OptiX) at 5.959x
LuxCoreRender OpenCL (Scene: DLSC) at 5.37x.

Test Systems:

GTX 1060

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (2311 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA GeForce GTX 1060 6GB (1506/4006MHz), Audio: NVIDIA GP106 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.4.0-54-generic (x86_64), Desktop: GNOME Shell 3.36.4, Display Server: X Server 1.20.8, Display Driver: NVIDIA 455.45.01, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.1.114, Vulkan: 1.2.142, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 3840x2160

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 - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 1280
Python Notes: Python 2.7.18 + Python 3.8.5
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

GTX 1660 SUPER

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (2311 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: eVGA NVIDIA GeForce GTX 1660 SUPER 6GB (1530/7000MHz), Audio: NVIDIA TU116 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.4.0-54-generic (x86_64), Desktop: GNOME Shell 3.36.4, Display Server: X Server 1.20.8, Display Driver: NVIDIA 455.45.01, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.1.114, Vulkan: 1.2.142, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 3840x2160

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 - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 1408
Python Notes: Python 2.7.18 + Python 3.8.5
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

GTX 1660 Ti

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (2311 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: eVGA NVIDIA GeForce GTX 1660 Ti 6GB (1500/6000MHz), Audio: NVIDIA TU116 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.4.0-54-generic (x86_64), Desktop: GNOME Shell 3.36.4, Display Server: X Server 1.20.8, Display Driver: NVIDIA 455.45.01, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.1.114, Vulkan: 1.2.142, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 3840x2160

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 - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 1536
Python Notes: Python 2.7.18 + Python 3.8.5
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 2060

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (2311 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA GeForce RTX 2060 6GB (1365/7000MHz), Audio: NVIDIA TU106 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.4.0-54-generic (x86_64), Desktop: GNOME Shell 3.36.4, Display Server: X Server 1.20.8, Display Driver: NVIDIA 455.45.01, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.1.114, Vulkan: 1.2.142, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 3840x2160

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 - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 1920
Python Notes: Python 2.7.18 + Python 3.8.5
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 2060 SUPER

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (2311 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA GeForce RTX 2060 SUPER 8GB (1470/7000MHz), Audio: NVIDIA TU106 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.4.0-54-generic (x86_64), Desktop: GNOME Shell 3.36.4, Display Server: X Server 1.20.8, Display Driver: NVIDIA 455.45.01, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.1.114, Vulkan: 1.2.142, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 3840x2160

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 - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 2176
Python Notes: Python 2.7.18 + Python 3.8.5
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 2070

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (2311 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: ASUS NVIDIA GeForce RTX 2070 8GB (1410/7000MHz), Audio: NVIDIA TU106 HD Audio, Monitor:

ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.4.0-54-generic (x86_64), Desktop: GNOME Shell 3.36.4, Display Server: X Server 1.20.8, Display Driver: NVIDIA 455.45.01, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.1.114, Vulkan: 1.2.142, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 3840x2160

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 - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 2304
Python Notes: Python 2.7.18 + Python 3.8.5
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 2070 SUPER

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (2311 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA GeForce RTX 2070 SUPER 8GB (1605/7000MHz), Audio: NVIDIA TU104 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.4.0-54-generic (x86_64), Desktop: GNOME Shell 3.36.4, Display Server: X Server 1.20.8, Display Driver: NVIDIA 455.45.01, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.1.114, Vulkan: 1.2.142, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 3840x2160

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 - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 2560
Python Notes: Python 2.7.18 + Python 3.8.5
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 2080

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (2311 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: Zotac NVIDIA GeForce RTX 2080 8GB (1515/7000MHz), Audio: NVIDIA TU104 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.4.0-54-generic (x86_64), Desktop: GNOME Shell 3.36.4, Display Server: X Server 1.20.8, Display Driver: NVIDIA 455.45.01, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.1.114, Vulkan: 1.2.142, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 3840x2160

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 - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 2944
Python Notes: Python 2.7.18 + Python 3.8.5
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 2080 SUPER

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (2311 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA GeForce RTX 2080 SUPER 8GB (1650/7750MHz), Audio: NVIDIA TU104 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.4.0-54-generic (x86_64), Desktop: GNOME Shell 3.36.4, Display Server: X Server 1.20.8, Display Driver: NVIDIA 455.45.01, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.1.114, Vulkan: 1.2.142, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 3840x2160

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 - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 3072
Python Notes: Python 2.7.18 + Python 3.8.5
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 2080 Ti

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (2311 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA GeForce RTX 2080 Ti 11GB (1350/7000MHz), Audio: NVIDIA TU102 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.4.0-54-generic (x86_64), Desktop: GNOME Shell 3.36.4, Display Server: X Server 1.20.8, Display Driver: NVIDIA 455.45.01, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.1.114, Vulkan: 1.2.142, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 3840x2160

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 - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 4352
Python Notes: Python 2.7.18 + Python 3.8.5
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

TITAN RTX

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (2311 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA TITAN RTX 24GB (555/810MHz), Audio: NVIDIA TU102 HD Audio, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.4.0-54-generic (x86_64), Desktop: GNOME Shell 3.36.4, Display Server: X Server 1.20.8, Display Driver: NVIDIA 455.45.01, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.1.114, Vulkan: 1.2.142, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 3840x2160

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 - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 4608
Python Notes: Python 2.7.18 + Python 3.8.5
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 3060 Ti

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (2311 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA GeForce RTX 3060 Ti 8GB (1665/7000MHz), Audio: NVIDIA Device 228b, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.4.0-54-generic (x86_64), Desktop: GNOME Shell 3.36.4, Display Server: X Server 1.20.8, Display Driver: NVIDIA 455.45.01, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.1.114, Vulkan: 1.2.142, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 3840x2160

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 - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 4864
Python Notes: Python 2.7.18 + Python 3.8.5
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

RTX 3080

Processor: AMD Ryzen 9 5950X 16-Core @ 3.40GHz (16 Cores / 32 Threads), Motherboard: ASUS ROG CROSSHAIR VIII HERO (WI-FI) (2311 BIOS), Chipset: AMD Starship/Matisse, Memory: 16GB, Disk: 2000GB Corsair Force MP600 + 2000GB, Graphics: NVIDIA GeForce RTX 3080 10GB (1710/9501MHz), Audio: NVIDIA Device 1aef, Monitor: ASUS MG28U, Network: Realtek RTL8125 2.5GbE + Intel I211 + Intel Wi-Fi 6 AX200

OS: Ubuntu 20.04, Kernel: 5.4.0-54-generic (x86_64), Desktop: GNOME Shell 3.36.4, Display Server: X Server 1.20.8, Display Driver: NVIDIA 455.45.01, OpenGL: 4.6.0, OpenCL: OpenCL 1.2 CUDA 11.1.114, Vulkan: 1.2.142, Compiler: GCC 9.3.0, File-System: ext4, Screen Resolution: 3840x2160

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 - CPU Microcode: 0xa201009
OpenCL Notes: GPU Compute Cores: 8704
Python Notes: Python 2.7.18 + Python 3.8.5
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full AMD retpoline IBPB: conditional IBRS_FW STIBP: always-on RSB filling + srbds: Not affected + tsx_async_abort: Not affected

Phoronix Test Suite

NVIDIA Compute Tests

	GTX 1060	GTX 1660 SUPER	GTX 1660 Ti	RTX 2060	RTX 2060 SUPER	RTX 2070	RTX 2070 SUPER	RTX 2080	RTX 2080 SUPER	RTX 2080 Ti	TITAN RTX	RTX 3060 Ti	RTX 3080
clpeak - S.P.F (GFLOPS)	4095	4543	4448	5480	6758	7203	8537	9118	10190	13338	13605	16013	28089
Normalized	14.58%	16.17%	15.84%	19.51%	24.06%	25.65%	30.39%	32.46%	36.28%	47.49%	48.43%	57.01%	100%
Standard Deviation	6.2%	2.3%	3.9%	7.4%	4.1%	5%	3.9%	2.8%	3.6%	4.7%	3.7%	0.6%	2.7%
OctaneBench - Total Score (Score)	80.907 51	131.85 6678	124.73 7161	192.59 8086	225.40 8822	242.72 5356	258.47 2071	259.16 2993	265.14 9965	349.41 2708	350.66 2499	378.71 3033	537.24 2047
Normalized	15.06%	24.54%	23.22%	35.85%	41.96%	45.18%	48.11%	48.24%	49.35%	65.04%	65.27%	70.49%	100%
Geekbench - GPU NVIDIA CUDA (Score)	33671	66387	67003	83535	90572	99664	110450	121856	128277	167858	155867	136797	208331
Normalized	16.16%	31.87%	32.16%	40.1%	43.48%	47.84%	53.02%	58.49%	61.57%	80.57%	74.82%	65.66%	100%
Standard Deviation	0.5%	1%	0.3%	0.9%	1.3%	1.2%	0.8%	0.9%	2.4%	1.3%	4.2%	1.1%	4.2%
RedShift Demo (sec)	1064	764	833	479	402	373	352	342	325	247	256	240	172
Normalized	16.17%	22.51%	20.65%	35.91%	42.79%	46.11%	48.86%	50.29%	52.92%	69.64%	67.19%	71.67%	100%
Standard Deviation	0.2%	0.1%	0.4%	0.2%	0.1%	0.2%						0.4%	
Blender - Barbershop - NVIDIA OptiX (sec)		2594	2732	1783	1878	1804	1002	974.80	917.27	902.94	1003	581.54	458.51
Normalized		17.68%	16.78%	25.71%	24.42%	25.42%	45.74%	47.04%	49.99%	50.78%	45.72%	78.84%	100%
Standard Deviation		0%	0.6%	0.4%	0.3%	0.2%	0.1%	0.1%	0%	0.3%	0.2%	0.5%	0.3%
LuxCoreRender OpenCL - DLSC (M	1.73	2.60	2.37	3.31	3.96	4.19	4.29	4.20	4.34	5.65	5.46	7.13	9.29
Normalized	18.62%	27.99%	25.51%	35.63%	42.63%	45.1%	46.18%	45.21%	46.72%	60.82%	58.77%	76.75%	100%
Standard Deviation	6.4%	0.3%	0.3%	0.6%	0.3%	0.1%	6.4%	5%	0.7%	0.2%	0.3%	6.7%	5.7%
Geekbench - GPU OpenCL (Score)	36798	64680	64871	80712	87076	93805	105899	114773	124272	152583	151148	132421	197267
Normalized	18.65%	32.79%	32.88%	40.92%	44.14%	47.55%	53.68%	58.18%	63%	77.35%	76.62%	67.13%	100%
Standard Deviation	1%	1.5%	1.1%	1.7%	1.6%	1.2%	0.9%	0.3%	1.4%	0.3%	2%	1.7%	0.6%
LuxCoreRender OpenCL - LuxCore Benchmark (M samples/sec)	1.45	2.20	1.96	2.76	3.26	3.51	3.57	3.48	3.61	4.60	4.42	5.79	7.26
Normalized	19.97%	30.3%	27%	38.02%	44.9%	48.35%	49.17%	47.93%	49.72%	63.36%	60.88%	79.75%	100%
Standard Deviation	6.3%	0.8%	1.5%	0.8%	1.1%	0.5%	5.9%	4.3%	0.4%	0.8%	2%	6.5%	3.5%
Hashcat - SHA-512 (H/s)	465271 429	784514 286	794742 857	103502 8571	110484 2857	121278 5714	139924 2857	153541 4286	170530 0000	222312 8571	211881 6667	140692 8571	230670 0000
Normalized	20.17%	34.01%	34.45%	44.87%	47.9%	52.58%	60.66%	66.56%	73.93%	96.38%	91.85%	60.99%	100%
Standard Deviation	1%	0.2%	0.3%	0.4%	0.4%	0.3%	0.2%	0.4%	0.1%	0.2%	0.5%	0.2%	0.4%
Hashcat - T.R.X (H/s)	142264	237900	236988	306825	324240	359933	423593	458971	524033	650229	625550	434067	692388
Normalized	20.55%	34.36%	34.23%	44.31%	46.83%	51.98%	61.18%	66.29%	75.68%	93.91%	90.35%	62.69%	100%
Standard Deviation	2.9%	2.9%	0.6%	0.9%	2.3%	0.3%	3.1%	0.6%	3.4%	0.6%	1.4%	2.6%	1%

NVIDIA Compute Tests

LeelaChessZero - OpenCL (Nodes/s)	5925	7324	7051	10249	11284	12723	14332	15758	17915	23269	21084	22842	28389
Normalized	20.87%	25.8%	24.84%	36.1%	39.75%	44.82%	50.48%	55.51%	63.11%	81.96%	74.27%	80.46%	100%
Standard Deviation	1.4%	0.5%	1.8%	1.4%	0.5%	0.8%	0.7%	0.5%	0.8%	1%	1.2%	0.4%	0.6%
Hashcat - 7-Zip (H/s)	198242	333847	335700	433342	459973	504100	577947	639915	704180	882560	837420	586918	939290
Normalized	21.11%	35.54%	35.74%	46.14%	48.97%	53.67%	61.53%	68.13%	74.97%	93.96%	89.15%	62.49%	100%
Standard Deviation	1.6%	3.3%	2%	3.5%	1.8%	0.2%	4.1%	2.4%	3.8%	2.3%	2.6%	0.3%	0.9%
IndigoBench - OpenCL GPU - Bedroom (M samples/s)	3.547	4.662	4.360	5.534	6.865	7.394	7.677	7.711	7.884	10.913	10.588	11.394	16.595
Normalized	21.37%	28.09%	26.27%	33.35%	41.37%	44.56%	46.26%	46.47%	47.51%	65.76%	63.8%	68.66%	100%
Standard Deviation	0.1%	0.1%	0%	0.1%	0.2%	0%	0.2%	0.2%	0.1%	0.2%	0.1%	0%	0.3%
Hashcat - MD5 (H/s)	128974 00000	179977 00000	183548 14286	257304 14286	274346 14286	299966 71429	350269 71429	385817 28571	425657 00000	557407 28571	530863 14286	329920 00000	540303 14286
Normalized	23.14%	32.29%	32.93%	46.16%	49.22%	53.81%	62.84%	69.22%	76.36%	100%	95.24%	59.19%	96.93%
Standard Deviation	0.6%	0.7%	0.6%	0.4%	0.4%	1.6%	0.3%	0.7%	0.4%	0.5%	0.7%	0.4%	0.5%
PlaidML - No - Inference - IMDB LSTM - OpenCL (FPS)	226.15	296.82	299.07	389.45	416.15	447.06	498.24	544.72	587.72	747.50	718.51	686.66	975.56
Normalized	23.18%	30.43%	30.66%	39.92%	42.66%	45.83%	51.07%	55.84%	60.24%	76.62%	73.65%	70.39%	100%
Standard Deviation	0.3%	0.2%	0.2%	0.2%	0.2%	0.1%	0.4%	0.2%	0.2%	0.2%	0.6%	0.3%	0.5%
Meta Performance Per Watts - P.P.W (Performance/	2331	3523	3347	4333	4908	5279	5750	6000	6419	8097	7834	6913	10056
Normalized	23.19%	35.04%	33.28%	43.09%	48.8%	52.5%	57.18%	59.67%	63.84%	80.53%	77.91%	68.74%	100%
clpeak - G.M.B (GBPS)	147.51	273.92	222.01	275.12	348.06	368.84	367.04	368.91	405.77	502.73	484.40	389.02	633.34
Normalized	23.29%	43.25%	35.05%	43.44%	54.96%	58.24%	57.95%	58.25%	64.07%	79.38%	76.48%	61.42%	100%
Standard Deviation	0.1%	1.9%	0.7%	2%	0.5%	0.2%	2.1%	0.1%	0.1%	2.3%	1.8%	0.2%	2.4%
IndigoBench - OpenCL GPU - Supercar (M samples/s)	10.282	15.241	14.304	18.252	21.666	23.430	24.490	24.825	25.478	33.190	31.757	33.520	43.589
Normalized	23.59%	34.97%	32.82%	41.87%	49.71%	53.75%	56.18%	56.95%	58.45%	76.14%	72.86%	76.9%	100%
Standard Deviation	0.2%	0.4%	0.1%	0.1%	0.7%	0.1%	0.1%	0%	0.5%	0.7%	0.7%	0.1%	0.9%
Geekbench - GPU Vulkan (Score)	37844	60351	59063	72689	75750	85125	96082	98487	108359	132489	128003	112321	158724
Normalized	23.84%	38.02%	37.21%	45.8%	47.72%	53.63%	60.53%	62.05%	68.27%	83.47%	80.65%	70.76%	100%
Standard Deviation	1.5%	1.2%	2.2%	2%	0.8%	0.9%	2.4%	2%	3%	3.7%	3.6%	3.2%	3.1%
cl-mem - Write (GB/s)	147.4	230.0	207.4	251.2	311.8	328.4	313.9	334.2	344.1	445.4	456.0	383.6	615.3
Normalized	23.96%	37.38%	33.71%	40.83%	50.67%	53.37%	51.02%	54.31%	55.92%	72.39%	74.11%	62.34%	100%
Standard Deviation	0.5%	1.5%	0.3%	0.4%	0.2%	0.2%	1.6%	1.4%	1.7%	1.2%	0.9%	0%	1.4%

NVIDIA Compute Tests

Hashcat - SHA1 (H/s)	**4402442857**	6178314286	6219960000	8158285714	8747071429	9558914286	10984400000	12195000000	13467714286	17840385714	16935833333	11091171429	**18345528571**
Normalized	24%	33.68%	33.9%	44.47%	47.68%	52.1%	59.88%	66.47%	73.41%	97.25%	92.32%	60.46%	100%
Standard Deviation	0.4%	0.4%	2.7%	0.4%	0.4%	0.3%	0.2%	0.2%	0.8%	0.4%	0.4%	0.2%	0.5%
cl-mem - Read (GB/s)	**152.8**	293.5	235.4	297.3	372.2	396.7	394.2	394.1	434.4	540.7	514.5	393.5	**634.1**
Normalized	24.1%	46.29%	37.12%	46.89%	58.7%	62.56%	62.17%	62.15%	68.51%	85.27%	81.14%	62.06%	100%
Standard Deviation	0%	1.4%	0.5%	0.1%	0.2%	0.1%	1.2%	1.2%	1.5%	1.9%	1.1%	0%	2.8%
RealSR-NCNN - 4x - Yes (sec)	**144.628**	120.907	123.848	86.602	80.587	74.806	63.754	60.095	54.783	44.725	45.553	52.468	**35.720**
Normalized	24.7%	29.54%	28.84%	41.25%	44.32%	47.75%	56.03%	59.44%	65.2%	79.87%	78.41%	68.08%	100%
Standard Deviation	0.3%	0.2%	0.2%	0.5%	0.7%	1%	0.5%	0.9%	0.4%	0.6%	0.7%	0.2%	0.8%
NCNN - Vulkan GPU - vgg16 (ms)	**18.54**	13.97	15.09	10.32	9.85	8.96	8.20	7.69	7.44	5.68	6.28	6.02	**4.71**
Normalized	25.4%	33.72%	31.21%	45.64%	47.82%	52.57%	57.44%	61.25%	63.31%	82.92%	75%	78.24%	100%
Standard Deviation	0.4%	1.2%	1.7%	1.7%	1.8%	1.4%	0.9%	2.5%	3.2%	3%	1.8%	1.1%	5.1%
VkFFT (Benchmark Score)	**12788**	18450	17097	20883	24975	26600	27682	28564	30720	37384	36933	32065	**49631**
Normalized	25.77%	37.17%	34.45%	42.08%	50.32%	53.6%	55.78%	57.55%	61.9%	75.32%	74.42%	64.61%	100%
Standard Deviation	0.1%	0.3%	0.2%	0.2%	0.4%	0.1%	0.4%	0.4%	0.3%	0.4%	0.6%	0.1%	0.6%
PlaidML - No - Inference - Mobilenet - OpenCL (FPS)	**778.99**	1075	985.97	1283	1509	1580	1708	1714	1832	2406	2395	1876	**2996**
Normalized	26%	35.89%	32.91%	42.81%	50.38%	52.75%	57.01%	57.22%	61.15%	80.32%	79.95%	62.62%	100%
Standard Deviation	0.5%	0.8%	0.4%	0.7%	0.6%	0.5%	1.1%	0.6%	0.5%	1%	0.8%	0.4%	1%
PlaidML - Yes - Inference - Mobilenet - OpenCL (FPS)	**982.70**	1371	1352	1696	1952	2009	2297	2340	2481	3227	3284	2439	**3725**
Normalized	26.38%	36.8%	36.29%	45.54%	52.4%	53.93%	61.66%	62.81%	66.59%	86.63%	88.16%	65.47%	100%
Standard Deviation	0.3%	0.9%	0.4%	4.7%	1.4%	0.5%	1.4%	0.9%	0.8%	0.8%	1.6%	0.2%	1.4%
MandelGPU - GPU (Samples/sec)	**128084240**	198638056	197542243	247283061	262260551	280144899	316276201	341286782	363715439	**446864473**	443646921	278997773	401282795
Normalized	28.66%	44.45%	44.21%	55.34%	58.69%	62.69%	70.78%	76.37%	81.39%	100%	99.28%	62.43%	89.8%
Standard Deviation	0.8%	0.7%	0.8%	0.4%	2.9%	1.1%	1.2%	2%	1.4%	1.9%	1.8%	0.6%	1.4%
clpeak - D.P.D (GFLOPS)	**150.15**	170.63	173.67	229.29	245.51	267.76	306.51	343.49	373.04	**516.53**	498.14	302.82	514.40
Normalized	29.07%	33.03%	33.62%	44.39%	47.53%	51.84%	59.34%	66.5%	72.22%	100%	96.44%	58.63%	99.59%
Standard Deviation	0.3%	0.3%	0.5%	0.2%	0.3%	0.5%	0.2%	0.5%	0.1%	0.7%	0.9%	0.3%	0.5%
FinanceBench - B.S.O (ms)	13.468	15.361	**15.525067**	12.587	11.492	10.263	8.318	7.715	6.912	6.158	6.372	8.374	**4.921**
Normalized	36.54%	32.04%	31.7%	39.1%	42.82%	47.95%	59.16%	63.78%	71.2%	79.91%	77.23%	58.77%	100%
Standard Deviation	9.4%	1.8%	4.1%	1.1%	5.5%	0.3%	2.2%	2%	4.7%	5.9%	13.6%	1.3%	3.4%
ArrayFire - C.G.O (ms)	**5.023**	2.670	3.228	2.671	2.198	2.094	2.076	2.094	1.917	1.678	1.756	2.094	**1.627**
Normalized	32.39%	60.94%	50.4%	60.91%	74.02%	77.7%	78.37%	77.7%	84.87%	96.96%	92.65%	77.7%	100%
Standard Deviation	0.9%	1.7%	0.3%	1.1%	0.5%	0.3%	1.3%	1.2%	1.8%	0.5%	1.2%	0.4%	1.6%

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PlaidML - No - Inference - DenseNet 201 - OpenCL (FPS)	**78.97**	99.49	93.61	124.27	137.81	148.07	148.55	150.94	159.34	211.01	208.22	177.04	**243.50**
Normalized	32.43%	40.86%	38.44%	51.03%	56.6%	60.81%	61.01%	61.99%	65.44%	86.66%	85.51%	72.71%	100%
Standard Deviation	0%	0.1%	0.2%	0.1%	0.3%	0.2%	0.1%	0.3%	0.2%	0.2%	0.2%	0.2%	0.3%
RealSR-NCNN - 4x - No (sec)	**20.128**	17.214	17.733	12.936	12.377	11.537	10.206	9.611	9.031	7.743	8.009	8.633	**6.576**
Normalized	32.67%	38.2%	37.08%	50.83%	53.13%	57%	64.43%	68.42%	72.82%	84.93%	82.11%	76.17%	100%
Standard Deviation	0.1%	0.3%	0.3%	0.2%	0.3%	0.2%	0.7%	0.8%	0.7%	0.4%	0.8%	0.6%	0.5%
FAHBench (Ns/Day)	**101.2902**	136.0813	129.4973	180.9695	189.0783	205.4939	227.7661	242.5543	257.4767	300.8935	270.6805	234.5598	**306.7671**
Normalized	33.02%	44.36%	42.21%	58.99%	61.64%	66.99%	74.25%	79.07%	83.93%	98.09%	88.24%	76.46%	100%
Standard Deviation	0%	0.1%	0.3%	0.2%	0.3%	0.3%	0.1%	0.1%	0.2%	0.2%	0.7%	0.1%	0.2%
Rodinia - O.P.F (sec)	**12.105**	11.617	11.746	9.004	8.656	7.804	6.980	6.355	5.904	**4.491**	4.805	6.988	4.855
Normalized	37.1%	38.66%	38.23%	49.88%	51.88%	57.55%	64.34%	70.67%	76.07%	100%	93.47%	64.27%	92.5%
Standard Deviation	1.1%	0.2%	0.4%	0.5%	0.5%	0.2%	0.6%	1.8%	0.6%	0.5%	0.5%	0.3%	2.8%
Waifu2x-NCNN Vulkan - 2x - 3 - Yes (sec)	**9.251**	7.060	7.243	5.792	5.553	5.211	4.769	4.582	4.368	3.835	4.124	4.236	**3.519**
Normalized	38.04%	49.84%	48.58%	60.76%	63.37%	67.53%	73.79%	76.8%	80.56%	91.76%	85.33%	83.07%	100%
Standard Deviation	0.9%	0.9%	1%	1.3%	1.4%	1.1%	1.6%	1.3%	1.3%	1.6%	1.6%	2.1%	2.4%
cl-mem - Copy (GB/s)	**137.8**	239.0	197.2	239.0	270.4	284.5	288.2	288.5	298.9	320.8	291.8	298.2	**339.9**
Normalized	40.54%	70.31%	58.02%	70.31%	79.55%	83.7%	84.79%	84.88%	87.94%	94.38%	85.85%	87.73%	100%
Standard Deviation	0.5%	0.8%	0.3%	0.1%	0.4%	0.1%	1%	0.8%	1.1%	0.8%	0.4%	0.1%	1.7%
Blender - Pabellon Barcelona - NVIDIA OptiX (sec)	**973.87**	476.55	489.37	210.22	209.05	198.24	135.34	135.02	130.28	104.80	114.00	86.20	**59.14**
Normalized	6.07%	12.41%	12.08%	28.13%	28.29%	29.83%	43.7%	43.8%	45.39%	56.43%	51.88%	68.61%	100%
Standard Deviation	0%	0.2%	0.1%	0.1%	0.2%	0.1%	0.1%	0.1%	0.1%	0.3%	1%	0.1%	0.2%
Blender - Fishy Cat - NVIDIA OptiX (sec)	**344.25**	165.55	168.18	68.22	63.22	58.17	48.84	45.98	43.57	33.09	35.12	37.24	**22.73**
Normalized	6.6%	13.73%	13.52%	33.32%	35.95%	39.08%	46.54%	49.43%	52.17%	68.69%	64.72%	61.04%	100%
Standard Deviation	0%	0.1%	0.1%	0.1%	0.4%	0.1%	0%	0.1%	0.1%	0.1%	0.6%	0%	0.4%
Blender - Classroom - NVIDIA OptiX (sec)	**548.35**	270.19	281.98	149.31	154.25	147.16	90.51	87.26	82.60	73.91	82.31	55.95	**41.29**
Normalized	7.53%	15.28%	14.64%	27.65%	26.77%	28.06%	45.62%	47.32%	49.99%	55.87%	50.16%	73.8%	100%
Standard Deviation	0%	0.9%	0.9%	0.4%	0.3%	0%	0.1%	0.2%	0.2%	0.3%	0.7%	2.4%	0.3%
clpeak - I.C.I (GIOPS)	**1226**	4308	4444	5248	6754	7134	8495	9509	10455	13254	13266	8291	**14574**
Normalized	8.41%	29.56%	30.49%	36.01%	46.34%	48.95%	58.29%	65.25%	71.74%	90.94%	91.02%	56.89%	100%
Standard Deviation	4.6%	2.6%	4.7%	3.4%	4%	4.4%	4.4%	2.7%	3.6%	4%	4.7%	3%	3.7%

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NCNN - Vulkan GPU - squeezenet	7.70	5.35	6.05	4.75	5.41	4.58	4.18	4.29	4.20	3.87	5.05	3.96	4.07
Normalized	50.26%	72.34%	63.97%	81.47%	71.53%	84.5%	92.58%	90.21%	92.14%	100%	76.63%	97.73%	95.09%
Standard Deviation	1.8%	6%	2.4%	5.2%	2.1%	1.9%	1.1%	5.6%	8.4%	7.7%	3.9%	2.7%	12.2%
NCNN - Vulkan GPU - yolov4-tiny	9.87	8.58	9.30	7.84	8.54	7.27	7.19	7.02	7.07	6.53	7.47	6.56	6.50
Normalized	65.86%	75.76%	69.89%	82.91%	76.11%	89.41%	90.4%	92.59%	91.94%	99.54%	87.01%	99.09%	100%
Standard Deviation	2.3%	3.6%	3.1%	3.7%	2.8%	3.7%	4%	2.8%	3.8%	2.8%	3.3%	1.3%	2.6%
ViennaCL - O.L.F	61.729 4	68.705 3	68.608 7	72.833 8	72.334 3	75.094 0	75.743 3	76.133 5	77.107 7	78.612 0	76.274 0	75.825 6	77.953 6
Normalized	78.52%	87.4%	87.28%	92.65%	92.01%	95.52%	96.35%	96.85%	98.09%	100%	97.03%	96.46%	99.16%
Standard Deviation	2.7%	1.3%	1%	1.5%	1.3%	1%	1.6%	1.9%	1.7%	2%	2.6%	1%	1.7%
Geekbench - GPU Vulkan (Score/Watt)	715.07	1127	1281	1275	1117	1608	1469	1363	1486	1593	1301	1806	1503
Normalized	39.59%	62.38%	70.93%	70.59%	61.82%	89.05%	81.34%	75.45%	82.28%	88.19%	72.05%	100%	83.21%
Geekbench - GPU NVIDIA CUDA (Score/Watt)	592.62	1208	1500	1314	1422	1524	1590	1752	1816	1927	1603	2140	1916
Normalized	27.69%	56.44%	70.08%	61.41%	66.45%	71.2%	74.32%	81.86%	84.85%	90.07%	74.89%	100%	89.54%
Geekbench - GPU OpenCL (Score/Watt)	766.73	1297	1731	1474	1458	1631	1659	1613	1855	1962	1558	2278	1937
Normalized	33.66%	56.93%	75.98%	64.7%	63.98%	71.6%	72.81%	70.81%	81.44%	86.13%	68.37%	100%	85%
IndigoBench - OpenCL GPU - Bedroom (M samples/s/Watt	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.06	0.05	0.05	0.07	0.07
Normalized	71.43%	71.43%	71.43%	71.43%	71.43%	85.71%	71.43%	71.43%	85.71%	71.43%	71.43%	100%	100%
IndigoBench - OpenCL GPU - Supercar (M samples/s/Watt	0.16	0.16	0.18	0.17	0.17	0.18	0.18	0.18	0.18	0.17	0.15	0.23	0.19
Normalized	69.57%	69.57%	78.26%	73.91%	73.91%	78.26%	78.26%	78.26%	78.26%	73.91%	65.22%	100%	82.61%
NCNN - Vulkan GPU - resnet50 (ms)	7.62	5.25	6.03	4.43	4.65	3.93	3.84	3.72	3.52	3.30	3.88	3.72	3.51
Normalized	43.31%	62.86%	54.73%	74.49%	70.97%	83.97%	85.94%	88.71%	93.75%	100%	85.05%	88.71%	94.02%
Standard Deviation	3.3%	2.9%	2%	5.2%	1.3%	3.2%	10.7%	7%	7.4%	8.8%	8.1%	4.1%	7.1%
NCNN - Vulkan GPU - alexnet (ms)	5.45	3.04	3.55	2.56	2.80	2.14	2.00	2.21	1.96	1.72	1.96	1.65	1.82
Normalized	30.28%	54.28%	46.48%	64.45%	58.93%	77.1%	82.5%	74.66%	84.18%	95.93%	84.18%	100%	90.66%
Standard Deviation	2.5%	7.7%	8.6%	10.6%	12.7%	3%	0.6%	13.7%	6.9%	16.5%	11.3%	3.2%	20.2%

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NCNN - Vulkan GPU - resnet18 (ms)	3.26	2.32	2.38	1.98	1.91	1.74	1.66	1.55	1.52	1.30	1.73	1.70	1.31
Normalized	39.88%	56.03%	54.62%	65.66%	68.06%	74.71%	78.31%	83.87%	85.53%	100%	75.14%	76.47%	99.24%
Standard Deviation	10.2%	7.3%	1.7%	8.3%	1.5%		6.3%	7.3%	9.9%	6.4%	16.6%	15.8%	2.9%
NCNN - Vulkan GPU - googlenet (ms)	5.31	3.93	4.33	3.57	4.16	3.43	3.23	3.29	3.12	3.10	3.73	3.44	3.88
Normalized	58.38%	78.88%	71.59%	86.83%	74.52%	90.38%	95.98%	94.22%	99.36%	100%	83.11%	90.12%	79.9%
Standard Deviation	3.1%	6.8%	6.2%	6.2%	2.6%	5.5%	6.1%	5.9%	5.3%	7%	7.6%	0.3%	7.7%
NCNN - Vulkan GPU - blazeface (ms)	0.80	0.64	0.72	0.67	0.72	0.58	0.63	0.61	0.63	0.68	0.81	0.63	0.64
Normalized	72.5%	90.63%	80.56%	86.57%	80.56%	100%	92.06%	95.08%	92.06%	85.29%	71.6%	92.06%	90.63%
Standard Deviation	28.6%	22.1%	0.8%	25.8%	4.3%	1.7%	11%	9.5%	20.2%	29.6%	29.4%	6.6%	10.6%
NCNN - Vulkan GPU - efficientnet-b0 (ms)	3.76	2.88	3.63	2.92	3.35	2.79	2.76	2.66	2.61	2.73	3.33	3.03	3.13
Normalized	69.41%	90.63%	71.9%	89.38%	77.91%	93.55%	94.57%	98.12%	100%	95.6%	78.38%	86.14%	83.39%
Standard Deviation	2.8%	7%	1.8%	7.8%	5.3%	7.6%	7.1%	6.8%	7.7%	8.5%	7.4%	7.1%	11.7%
NCNN - Vulkan GPU - mnasnet (ms)	2.29	1.66	1.81	1.63	1.72	1.56	1.66	1.50	1.52	1.49	1.89	1.77	1.80
Normalized	65.07%	89.76%	82.32%	91.41%	86.63%	95.51%	89.76%	99.33%	98.03%	100%	78.84%	84.18%	82.78%
Standard Deviation	10.2%	14.1%	4.1%	15.9%	2%	11.7%	14%	7.7%	12%	9%	10.9%	11.2%	12.3%
NCNN - Vulkan GPU - shufflenet-v2 (ms)	1.78	1.33	1.56	1.37	1.63	1.26	1.36	1.37	1.32	1.34	1.62	1.36	1.54
Normalized	70.79%	94.74%	80.77%	91.97%	77.3%	100%	92.65%	91.97%	95.45%	94.03%	77.78%	92.65%	81.82%
Standard Deviation	9.7%	8.8%	3.2%	10.5%	22.8%	0.9%	17.2%	14.9%	17.3%	18.5%	15.7%	5.1%	13%
NCNN - Vulkan GPU-v3-v3 - mobilenet-v3 (ms)	2.47	1.82	2.10	1.81	1.89	1.64	1.71	1.75	1.76	1.64	2.11	1.76	1.98
Normalized	66.4%	90.11%	78.1%	90.61%	86.77%	100%	95.91%	93.71%	93.18%	100%	77.73%	93.18%	82.83%
Standard Deviation	9.3%	10.4%	10.8%	12.9%	3.5%	0.6%	11.9%	9.5%	11.4%	8.8%	12.5%	0.7%	11.8%
NCNN - Vulkan GPU-v2-v2 - mobilenet-v2 (ms)	2.11	1.53	1.84	1.56	1.72	1.54	1.38	1.46	1.37	1.51	1.75	1.74	1.73
Normalized	64.93%	89.54%	74.46%	87.82%	79.65%	88.96%	99.28%	93.84%	100%	90.73%	78.29%	78.74%	79.19%
Standard Deviation	7.7%	10%	15.4%	14.5%	7.3%	17.2%	1.8%	8.2%	7.6%	16.1%	16.2%	11.6%	11.2%
NCNN - Vulkan GPU - mobilenet (ms)	5.76	4.67	5.30	4.43	4.95	4.23	4.09	4.16	4.06	4.02	4.66	4.27	4.45
Normalized	69.79%	86.08%	75.85%	90.74%	81.21%	95.04%	98.29%	96.63%	99.01%	100%	86.27%	94.15%	90.34%
Standard Deviation	3.1%	7.2%	2.5%	4.7%	3%	1.9%	10.8%	5.9%	7.8%	6.2%	4.7%	0.4%	5.8%

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VkFFT (Benchmark Score/Watt)	188.54	227.18	241.67	235.12	250.53	286.99	264.03	253.77	281.33	287.99	261.32	328.58	329.04
Normalized	57.3%	69.04%	73.45%	71.46%	76.14%	87.22%	80.24%	77.12%	85.5%	87.52%	79.42%	99.86%	100%
Blender - BMW27 - NVIDIA OptiX (sec)	170.15	78.26	83.09	37.35	33.87	31.96	26.41	29.53	26.39	19.83	21.26	18.06	14.96
Normalized	8.79%	19.12%	18%	40.05%	44.17%	46.81%	56.65%	50.66%	56.69%	75.44%	70.37%	82.83%	100%
Standard Deviation	6.6%	0.1%	12.3%	0%	0.3%	0.1%	0%	33%	0.1%	0.2%	0.4%	0.2%	67.6%
ViennaCL - O.L.F (GFLOPS/Watt)	1.58	2.14	2.34	2.03	1.78	2.31	1.77	1.71	1.74	1.85	1.13	1.94	1.20
Normalized	67.52%	91.45%	100%	86.75%	76.07%	98.72%	75.64%	73.08%	74.36%	79.06%	48.29%	82.91%	51.28%
MandelGPU - GPU (Samples/sec/Watt)	1890714	2676263	3061659	2826824	2790141	3316969	3284889	3349006	3682880	4140168	3502263	3434301	3127589
Normalized	45.67%	64.64%	73.95%	68.28%	67.39%	80.12%	79.34%	80.89%	88.95%	100%	84.59%	82.95%	75.54%
cl-mem - Copy (GB/s/Watt)	2.59	3.48	3.49	3.49	3.39	3.82	3.38	3.42	3.77	3.05	2.58	3.85	2.52
Normalized	67.27%	90.39%	90.65%	90.65%	88.05%	99.22%	87.79%	88.83%	97.92%	79.22%	67.01%	100%	65.45%
cl-mem - Write (GB/s/Watt)	2.74	3.37	3.58	3.63	3.80	4.43	3.66	3.96	4.31	3.91	3.90	4.84	4.53
Normalized	56.61%	69.63%	73.97%	75%	78.51%	91.53%	75.62%	81.82%	89.05%	80.79%	80.58%	100%	93.6%
cl-mem - Read (GB/s/Watt)	2.82	4.27	4.09	4.15	4.41	5.22	4.50	4.55	5.31	5.01	4.27	5.02	4.62
Normalized	53.11%	80.41%	77.02%	78.15%	83.05%	98.31%	84.75%	85.69%	100%	94.35%	80.41%	94.54%	87.01%
LeelaChessZero - OpenCL (Nodes/s/Watt)	55.11	61.33	60.93	67.87	68.81	76.50	77.62	82.87	91.44	94.30	82.37	120.64	103.85
Normalized	45.68%	50.84%	50.51%	56.26%	57.04%	63.41%	64.34%	68.69%	75.8%	78.17%	68.28%	100%	86.08%
PlaidML - No - Inference - IMDB LSTM - OpenCL	3.48	4.78	5.14	5.10	4.99	6.12	6.03	6.18	7.04	7.71	6.56	9.36	8.30
Normalized	37.18%	51.07%	54.91%	54.49%	53.31%	65.38%	64.42%	66.03%	75.21%	82.37%	70.09%	100%	88.68%
PlaidML - No - Inference - DenseNet 201 - OpenCL (FPS/Watt)	1.49	1.74	1.32	1.49	1.37	1.55	1.46	1.64	2.09	1.65	1.53	2.66	1.94
Normalized	56.02%	65.41%	49.62%	56.02%	51.5%	58.27%	54.89%	61.65%	78.57%	62.03%	57.52%	100%	72.93%

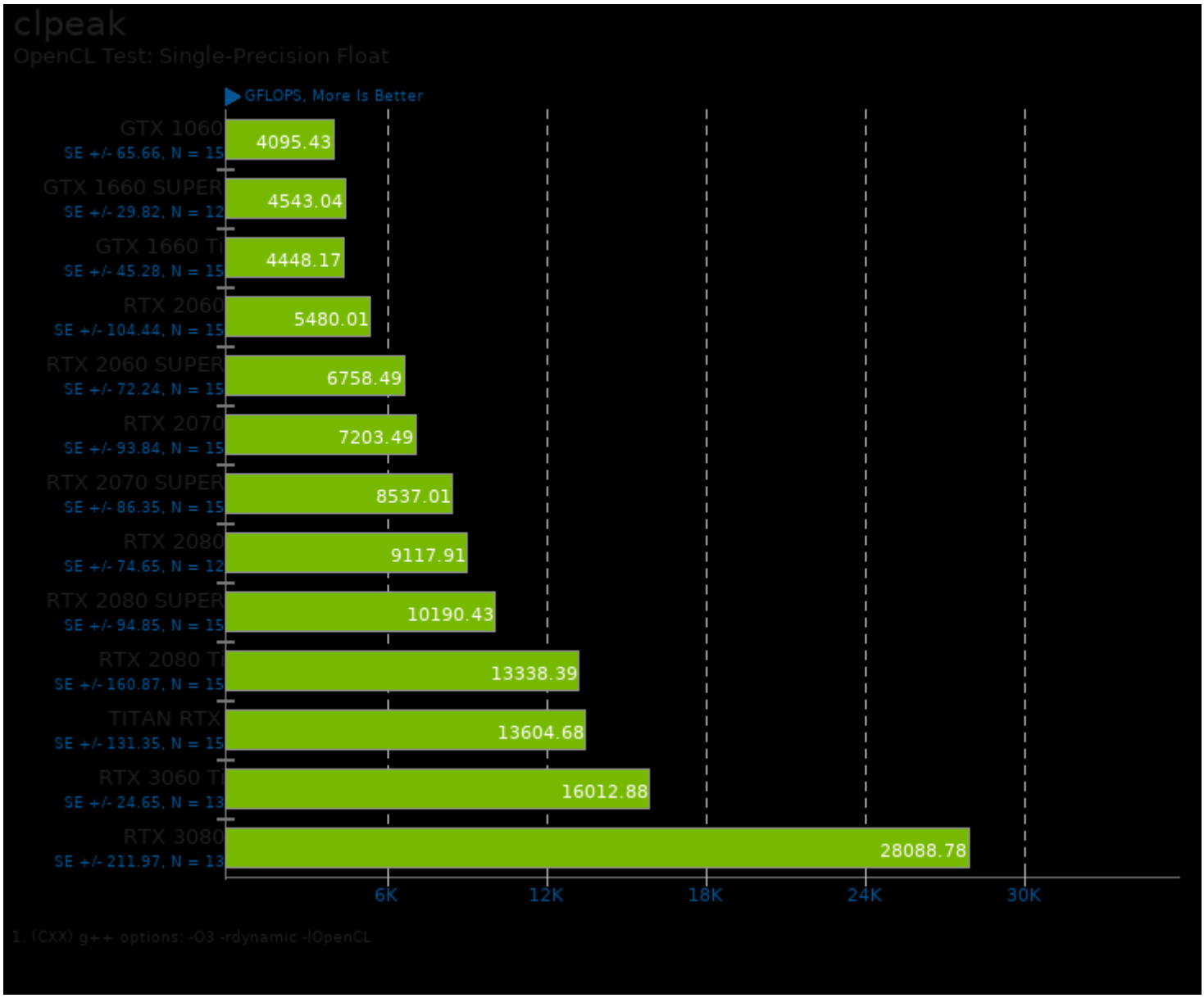
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PlaidML - No - Inference - Mobilenet - OpenCL (FPS/Watt)	14.09	19.70	20.91	21.49	23.51	25.24	25.09	24.69	28.11	29.90	26.40	31.55	29.90
Normalized	44.66%	62.44%	66.28%	68.11%	74.52%	80%	79.52%	78.26%	89.1%	94.77%	83.68%	100%	94.77%
PlaidML - Yes - Inference - Mobilenet - OpenCL (FPS/Watt)	19.85	28.53	33.03	33.14	34.95	41.22	36.78	36.24	43.27	49.67	41.53	45.66	43.22
Normalized	39.96%	57.44%	66.5%	66.72%	70.36%	82.99%	74.05%	72.96%	87.11%	100%	83.61%	91.93%	87.01%
clpeak - I.C.I (GIOPS/Watt)	19.39	96.51	112.27	103.54	99.10	120.15	119.43	127.83	152.30	147.86	118.27	128.32	116.90
Normalized	12.73%	63.37%	73.72%	67.98%	65.07%	78.89%	78.42%	83.93%	100%	97.08%	77.66%	84.25%	76.76%
clpeak - D.P.D (GFLOPS/Watt)	3.07	2.99	3.67	3.44	3.07	3.79	3.58	3.57	4.29	4.14	3.56	4.04	3.52
Normalized	71.56%	69.7%	85.55%	80.19%	71.56%	88.34%	83.45%	83.22%	100%	96.5%	82.98%	94.17%	82.05%
clpeak - S.P.F (GFLOPS/Watt)	101.60	117.45	142.17	131.53	124.64	157.05	144.93	152.55	179.85	158.64	132.66	327.99	309.31
Normalized	30.98%	35.81%	43.35%	40.1%	38%	47.88%	44.19%	46.51%	54.83%	48.37%	40.45%	100%	94.3%
clpeak - G.M.B (GBPS/Watt)	3.39	6.37	5.87	5.51	6.62	8.09	6.50	6.32	7.19	5.98	6.13	7.45	6.21
Normalized	41.9%	78.74%	72.56%	68.11%	81.83%	100%	80.35%	78.12%	88.88%	73.92%	75.77%	92.09%	76.76%
LuxCoreRender OpenCL - Food (M samples/sec/Watt)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02
Normalized	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	100%	100%
LuxCoreRender OpenCL - Food (M	0.63	1.05	0.99	1.17	1.17	1.27	1.78	1.79	1.88	2.11	1.99	2.80	3.54
Normalized	17.8%	29.66%	27.97%	33.05%	33.05%	35.88%	50.28%	50.56%	53.11%	59.6%	56.21%	79.1%	100%
Standard Deviation	7.6%	1.3%	1.9%	1.4%	2%	0.2%	8%	5.9%	1.3%	0.6%	0.7%	7.6%	6.3%
LuxCoreRender OpenCL - R.C.a.P (M samples/sec/Watt)	0.08	0.07	0.07	0.08	0.09	0.10	0.09	0.08	0.08	0.08	0.07	0.15	0.11
Normalized	53.33%	46.67%	46.67%	53.33%	60%	66.67%	60%	53.33%	53.33%	53.33%	46.67%	100%	73.33%
LuxCoreRender OpenCL - R.C.a.P (M samples/sec)	5.34	5.54	4.7641667	7.83	10.45	10.98	9.86	8.95	9.03	12.08	12.13	16.84	20.82
Normalized	25.65%	26.61%	22.88%	37.61%	50.19%	52.74%	47.36%	42.99%	43.37%	58.02%	58.26%	80.88%	100%
Standard Deviation	7%	1%	0.2%	0.8%	0.6%	1%	9.3%	6.9%	1%	0.5%	1.3%	11.8%	8.5%

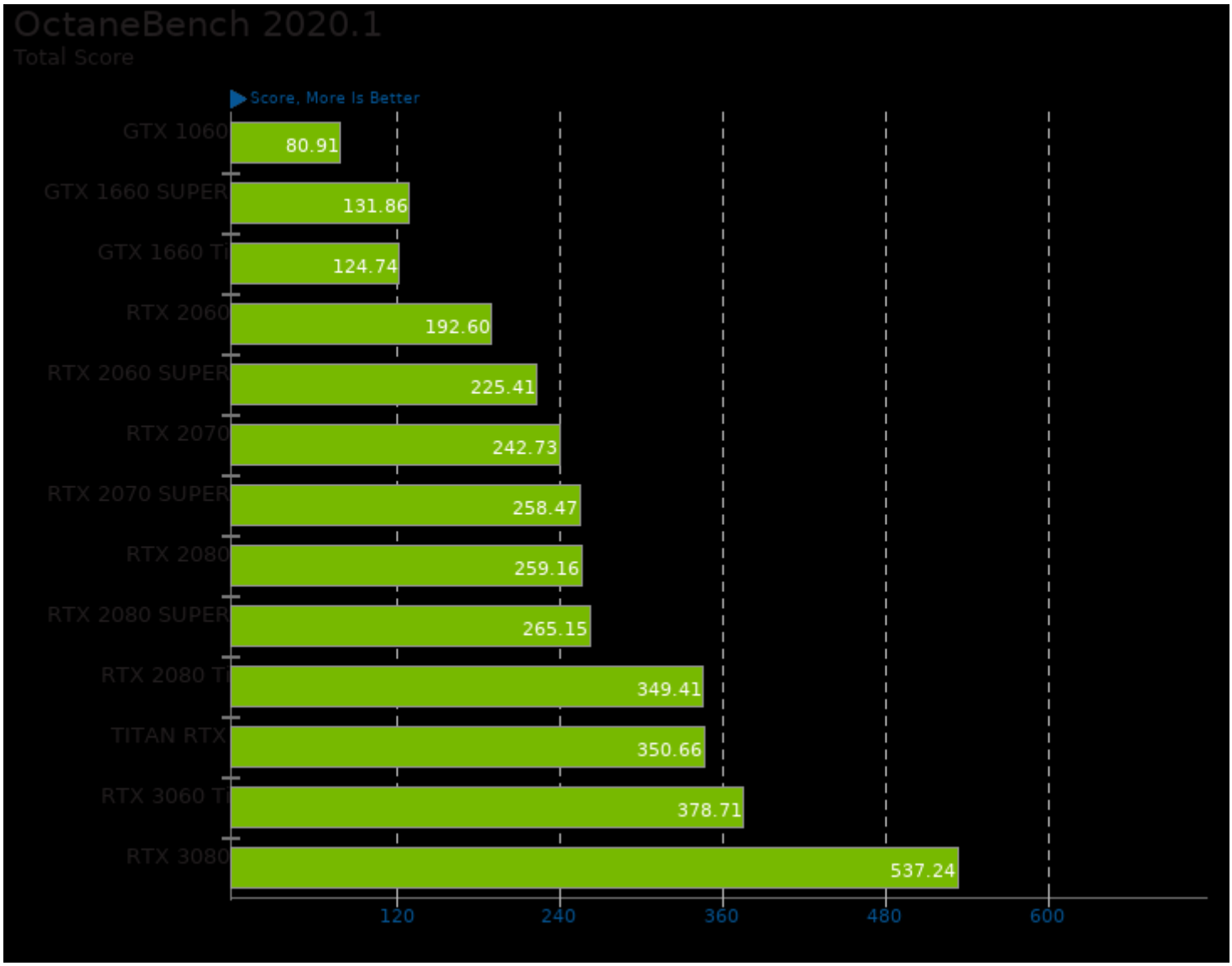
NVIDIA Compute Tests

LuxCoreRender OpenCL - DLSC (M samples/sec/Watt)	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04
Normalized	50%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	100%	100%
LuxCoreRender OpenCL - LuxCore Benchmark (M samples/sec/Watt)	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.02	0.02	0.04	0.03
Normalized	50%	50%	75%	75%	75%	75%	75%	50%	75%	50%	50%	100%	75%
OctaneBench - Total Score (Score/Watt)	1.06	1.21	1.28	1.63	1.57	1.72	1.68	1.59	1.73	1.55	1.50	2.28	1.87
Normalized	46.49%	53.07%	56.14%	71.49%	68.86%	75.44%	73.68%	69.74%	75.88%	67.98%	65.79%	100%	82.02%
FAHBench (Ns/Day/Watt)	1.51	1.63	1.83	1.77	1.73	1.88	1.89	1.80	1.98	1.84	1.66	2.10	1.68
Normalized	71.9%	77.62%	87.14%	84.29%	82.38%	89.52%	90%	85.71%	94.29%	87.62%	79.05%	100%	80%
Hashcat - T.R.X (H/s/Watt)	2915	3799	3964	3870	4691	4925	4727	4418	3900	4941	5054	5390	5092
Normalized	54.09%	70.48%	73.54%	71.8%	87.04%	91.37%	87.7%	81.97%	72.36%	91.67%	93.76%	100%	94.48%
Hashcat - 7-Zip (H/s/Watt)	3825	7099	8358	8032	7182	8840	8524	8699	9973	11015	8111	9708	8222
Normalized	34.72%	64.44%	75.88%	72.91%	65.2%	80.26%	77.38%	78.97%	90.54%	100%	73.63%	88.14%	74.64%
Hashcat - SHA-512 (H/s/Watt)	6439856	103931 52	115250 83	111433 79	106307 48	120614 01	114962 68	122340 42	124077 59	14695989	128484 49	127978 97	124290 64
Normalized	43.82%	70.72%	78.42%	75.83%	72.34%	82.07%	78.23%	83.25%	84.43%	100%	87.43%	87.08%	84.57%
Hashcat - SHA1 (H/s/Watt)	6092571 3	855341 13	948362 99	892075 31	841292 16	971649 67	943857 76	961282 69	102514 996	12161843	104602 759	103115 176	100535 706
Normalized	50.1%	70.33%	77.98%	73.35%	69.17%	79.89%	77.61%	79.04%	84.29%	100%	86.01%	84.79%	82.66%
Hashcat - MD5 (H/s/Watt)	1845879 19	244831 691	286208 946	278488 631	275454 497	313223 917	288952 169	322401 428	311117 906	39635471 9	341784 951	311715 797	311017 484
Normalized	46.57%	61.77%	72.21%	70.26%	69.5%	79.03%	72.9%	81.34%	78.49%	100%	86.23%	78.65%	78.47%

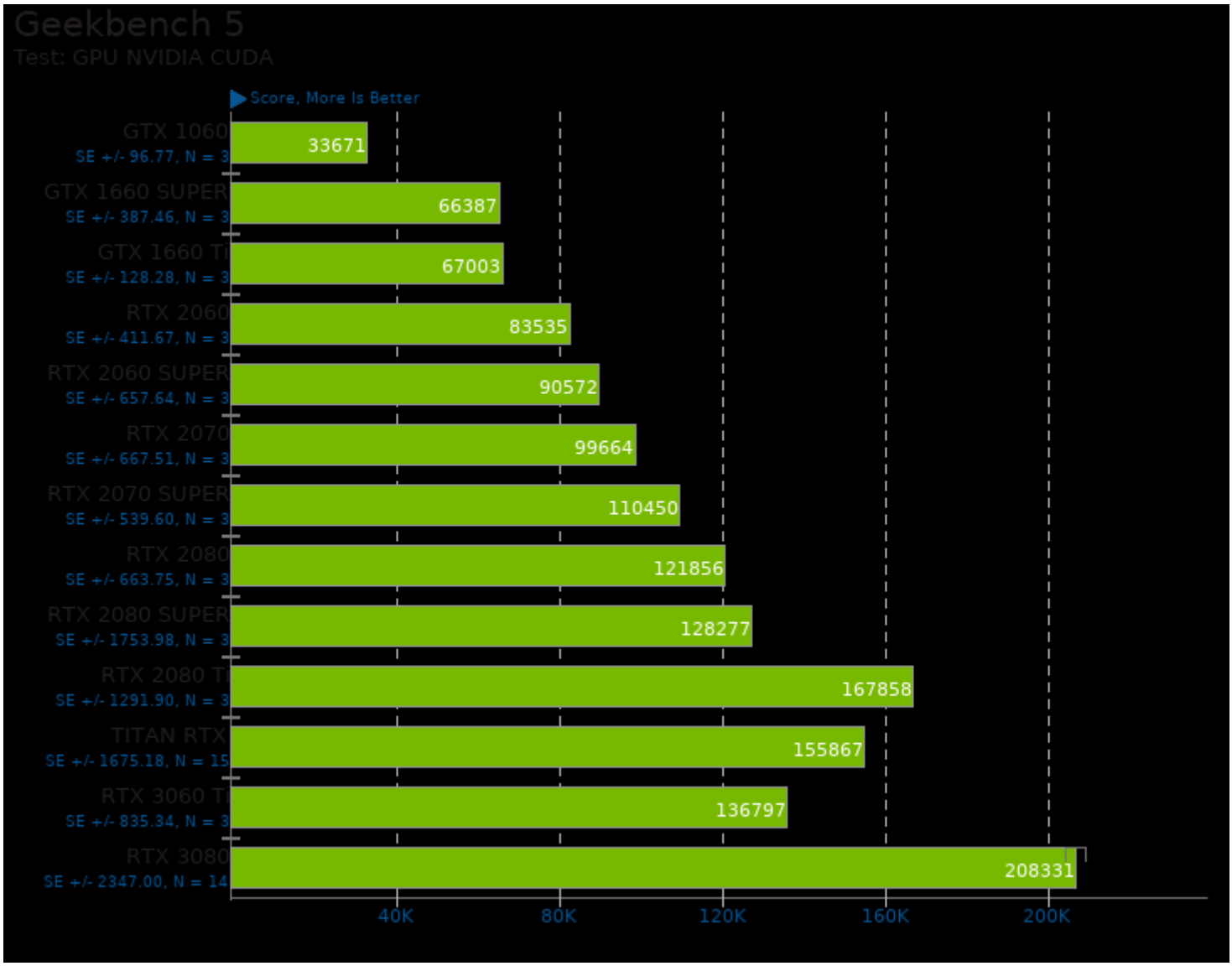
NVIDIA Compute Tests



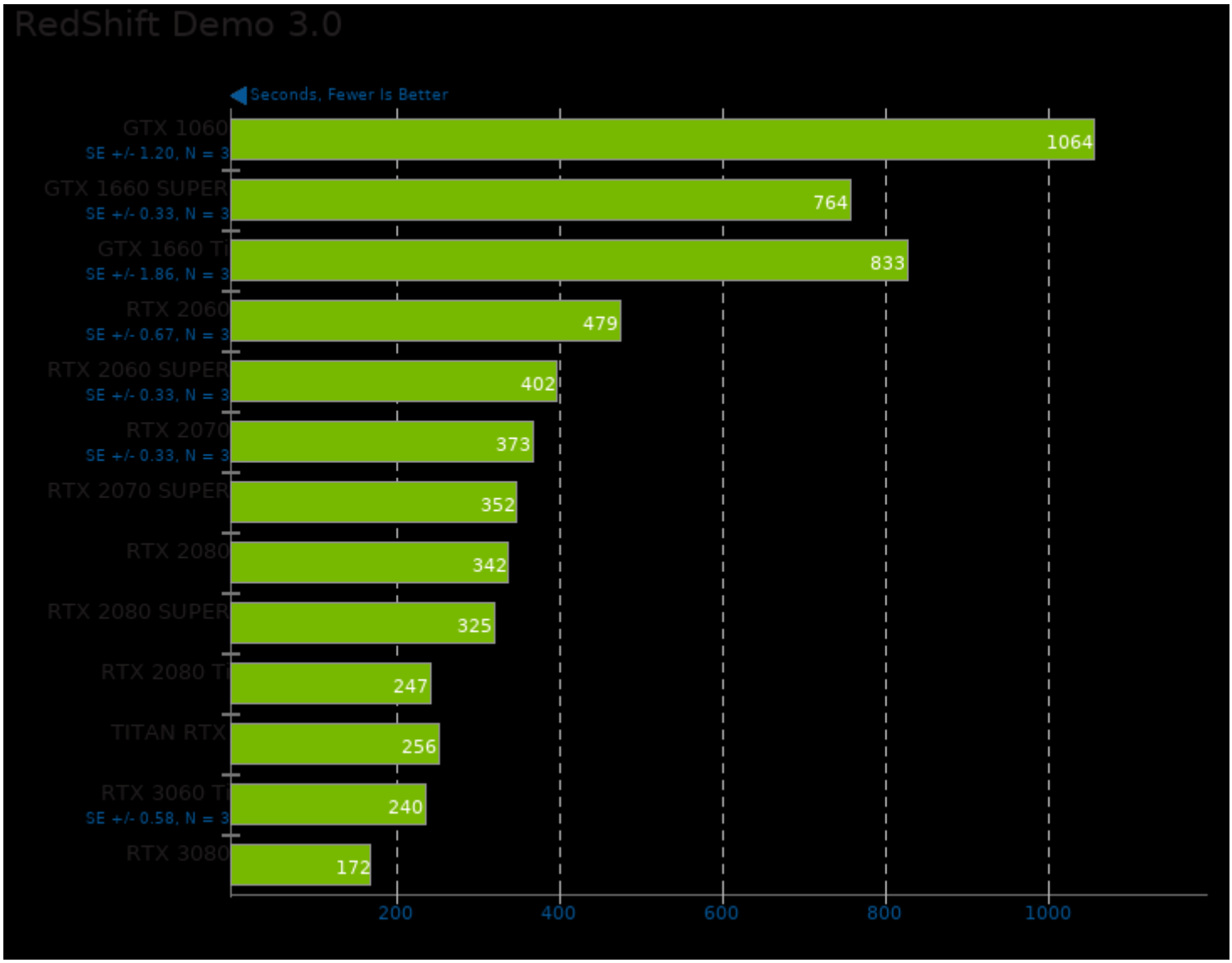
NVIDIA Compute Tests



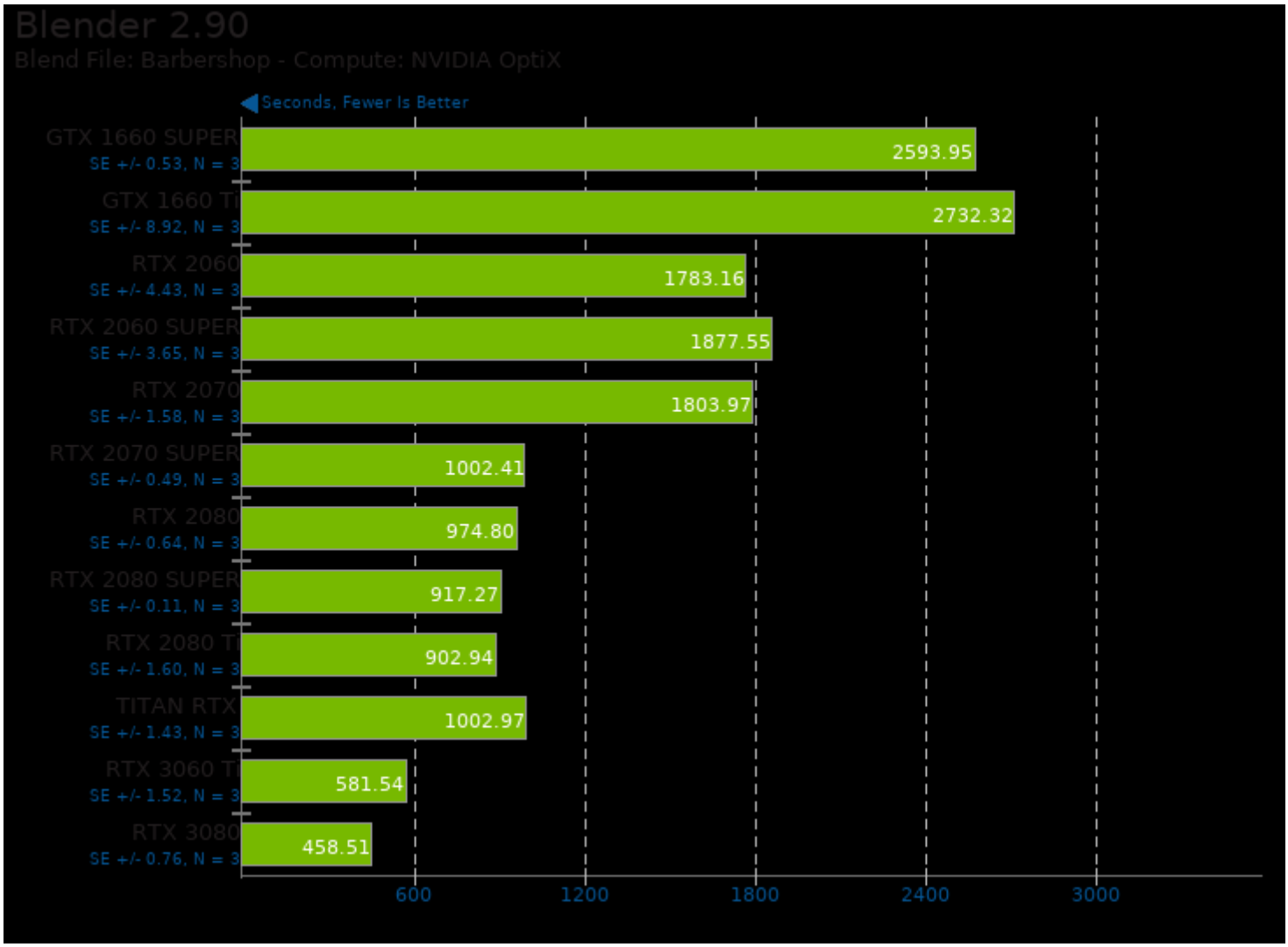
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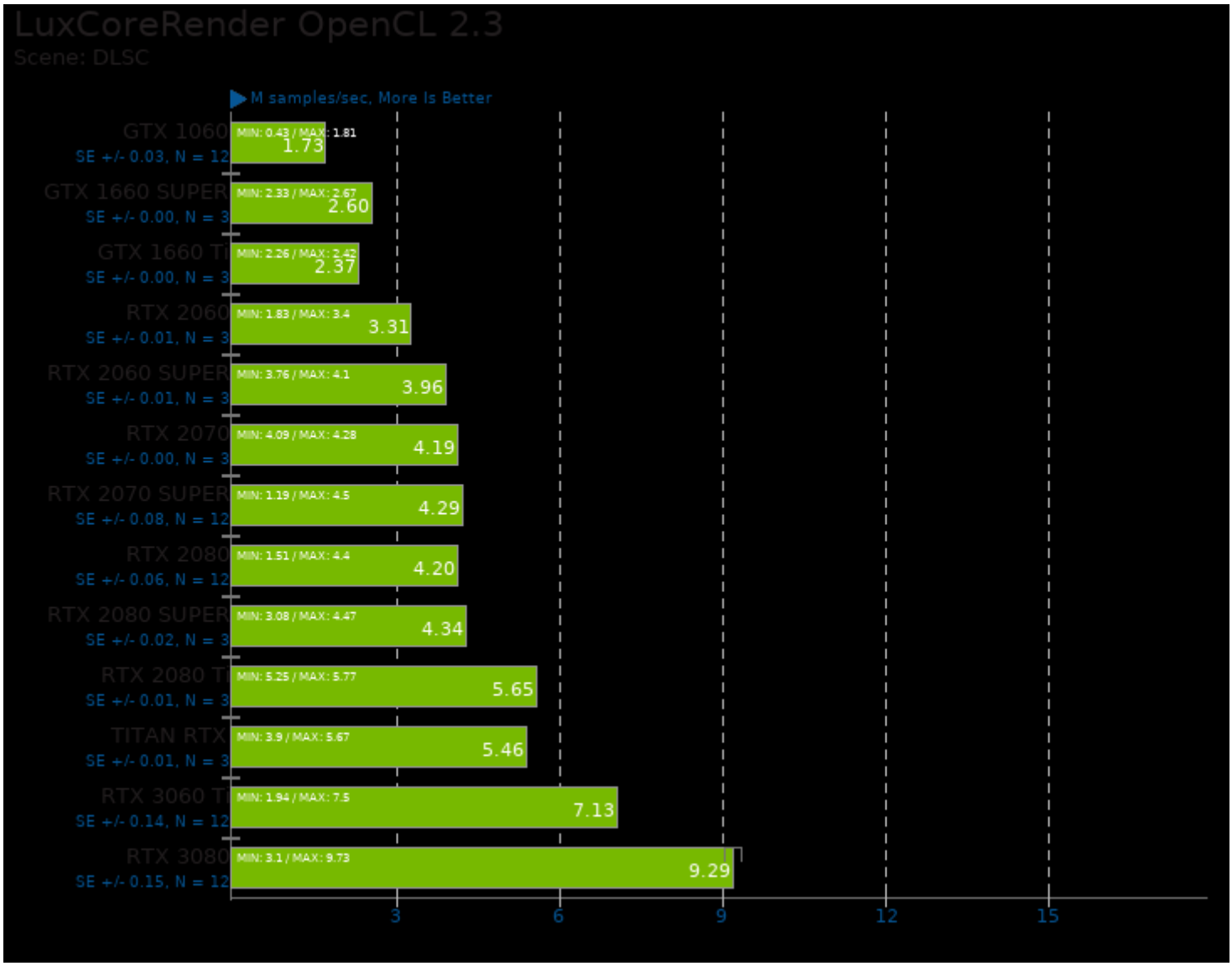
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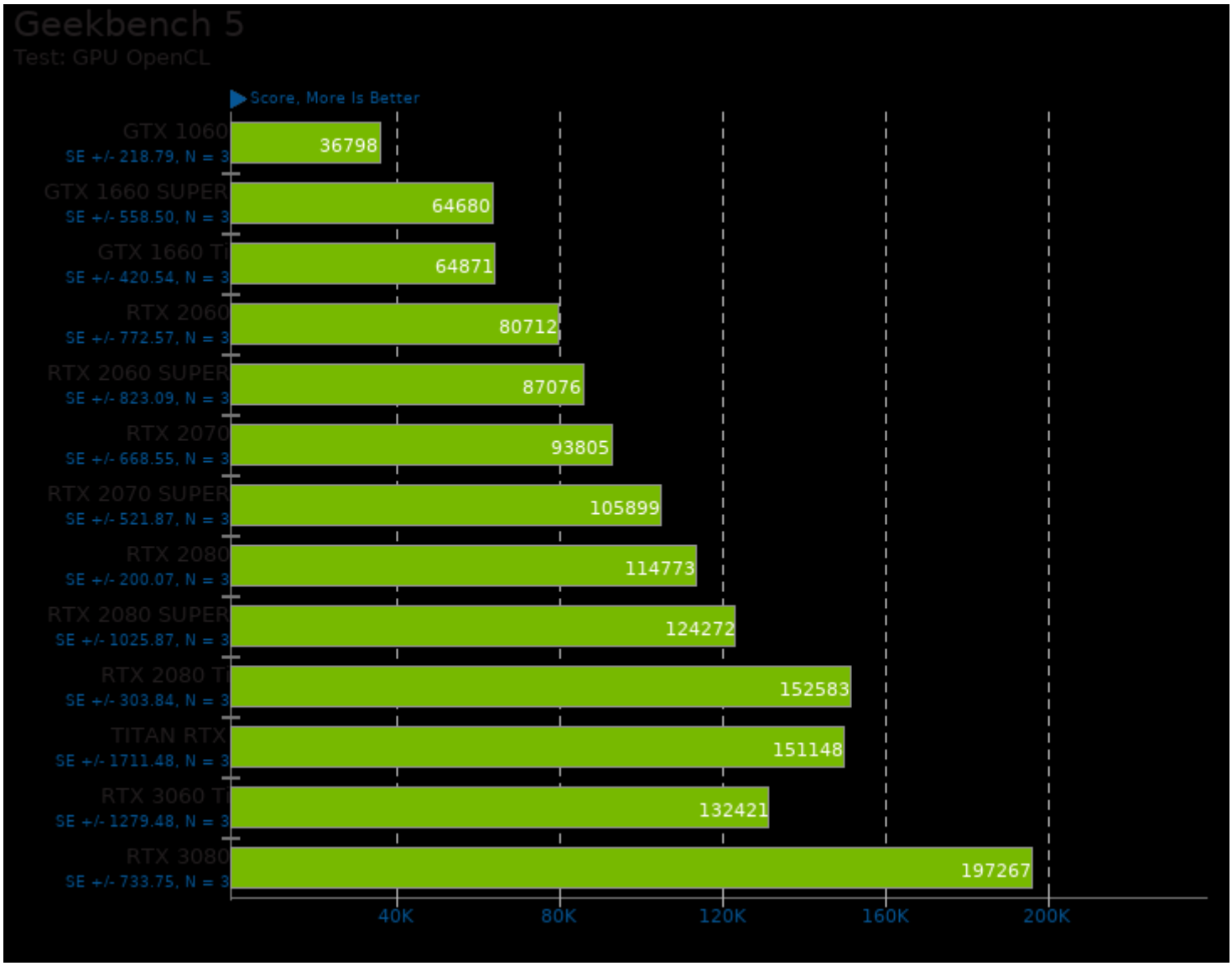
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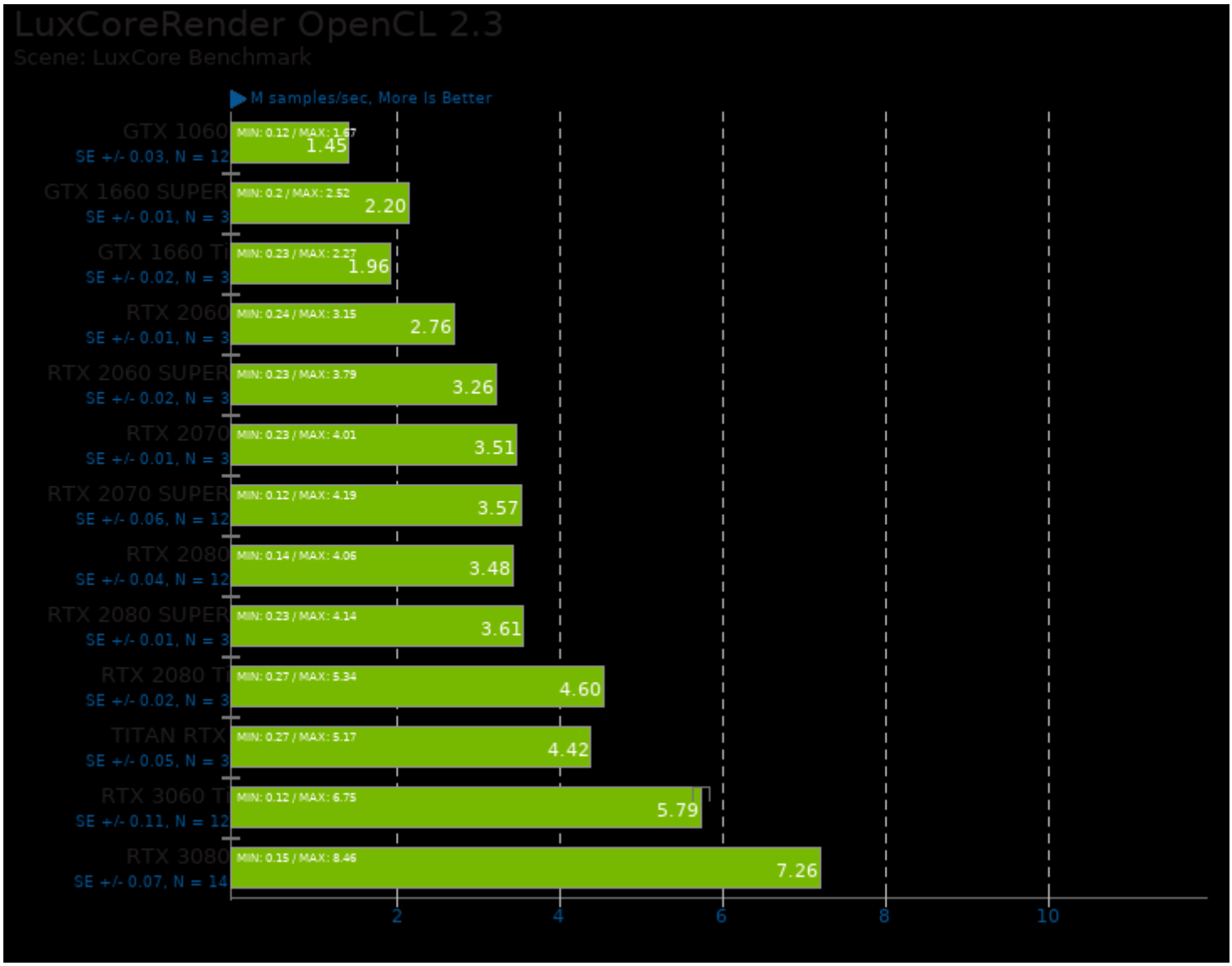
NVIDIA Compute Tests



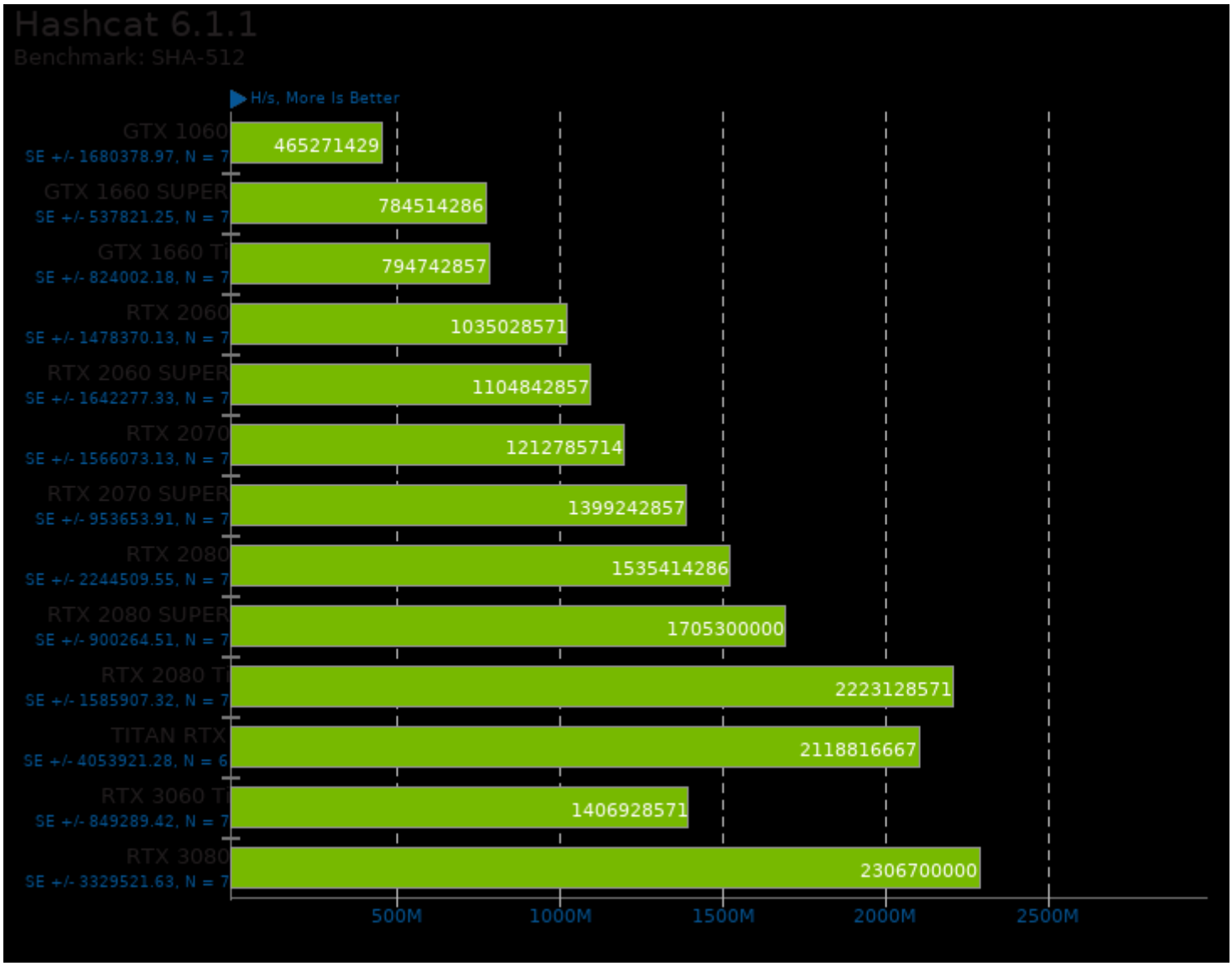
NVIDIA Compute Tests



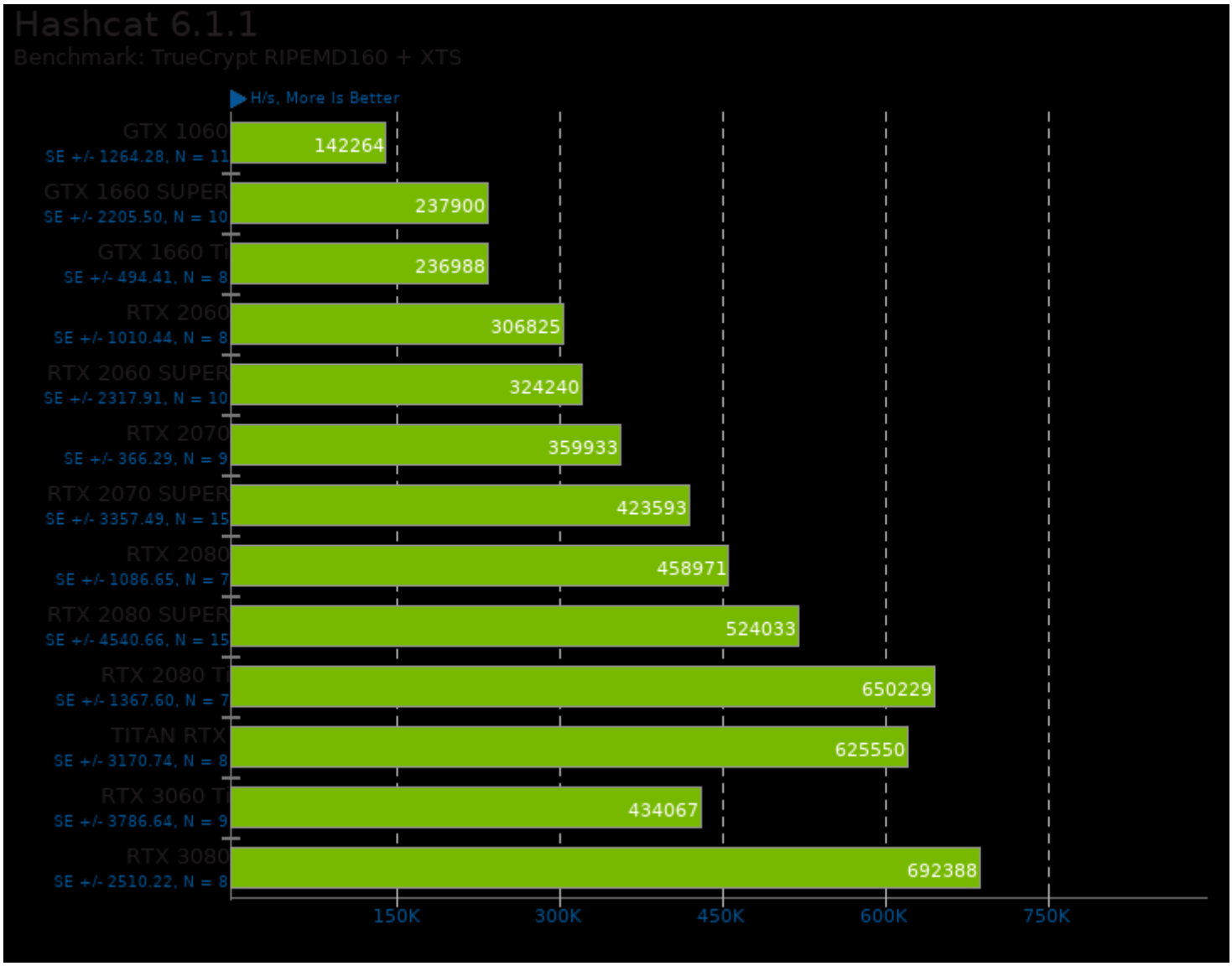
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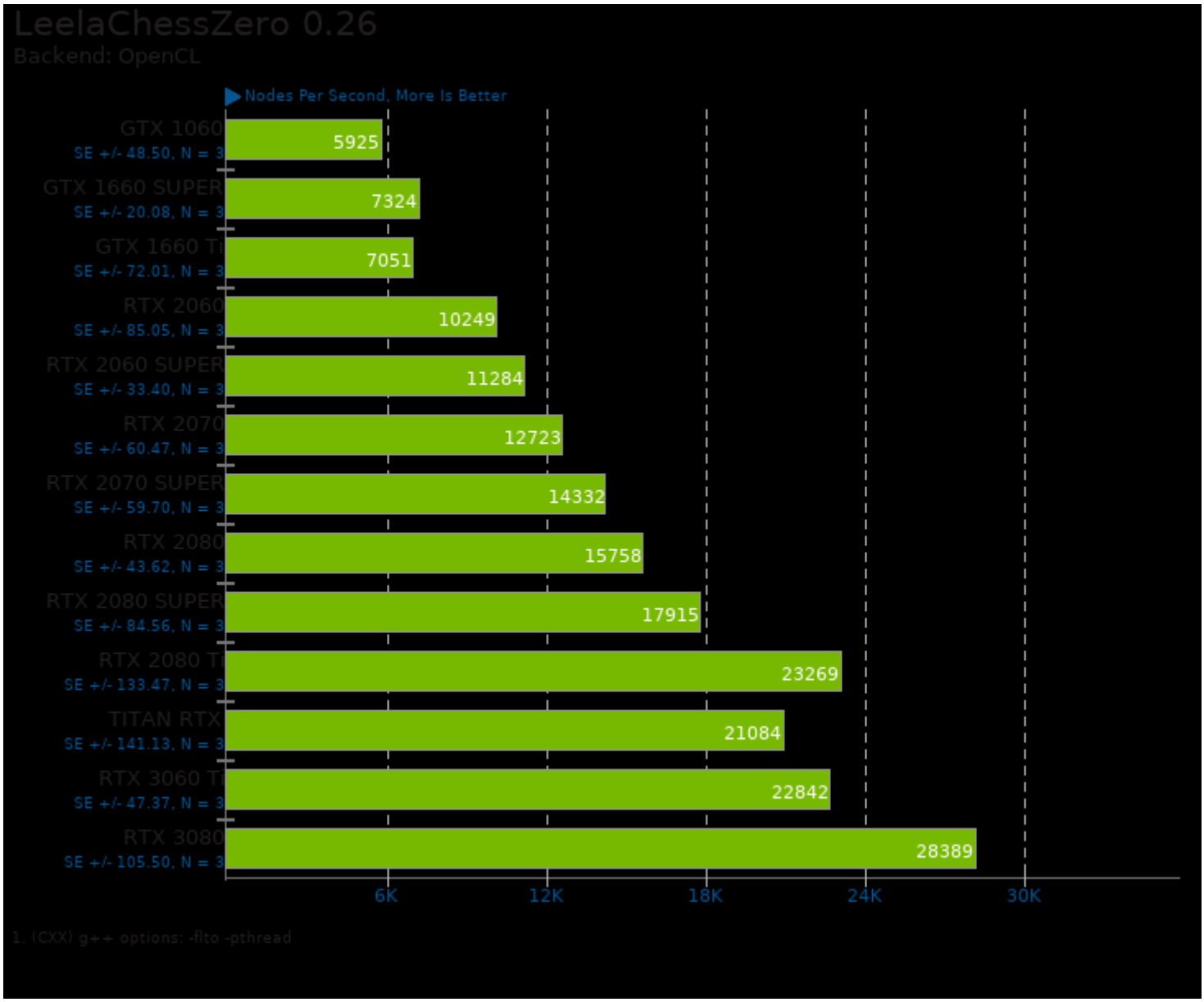
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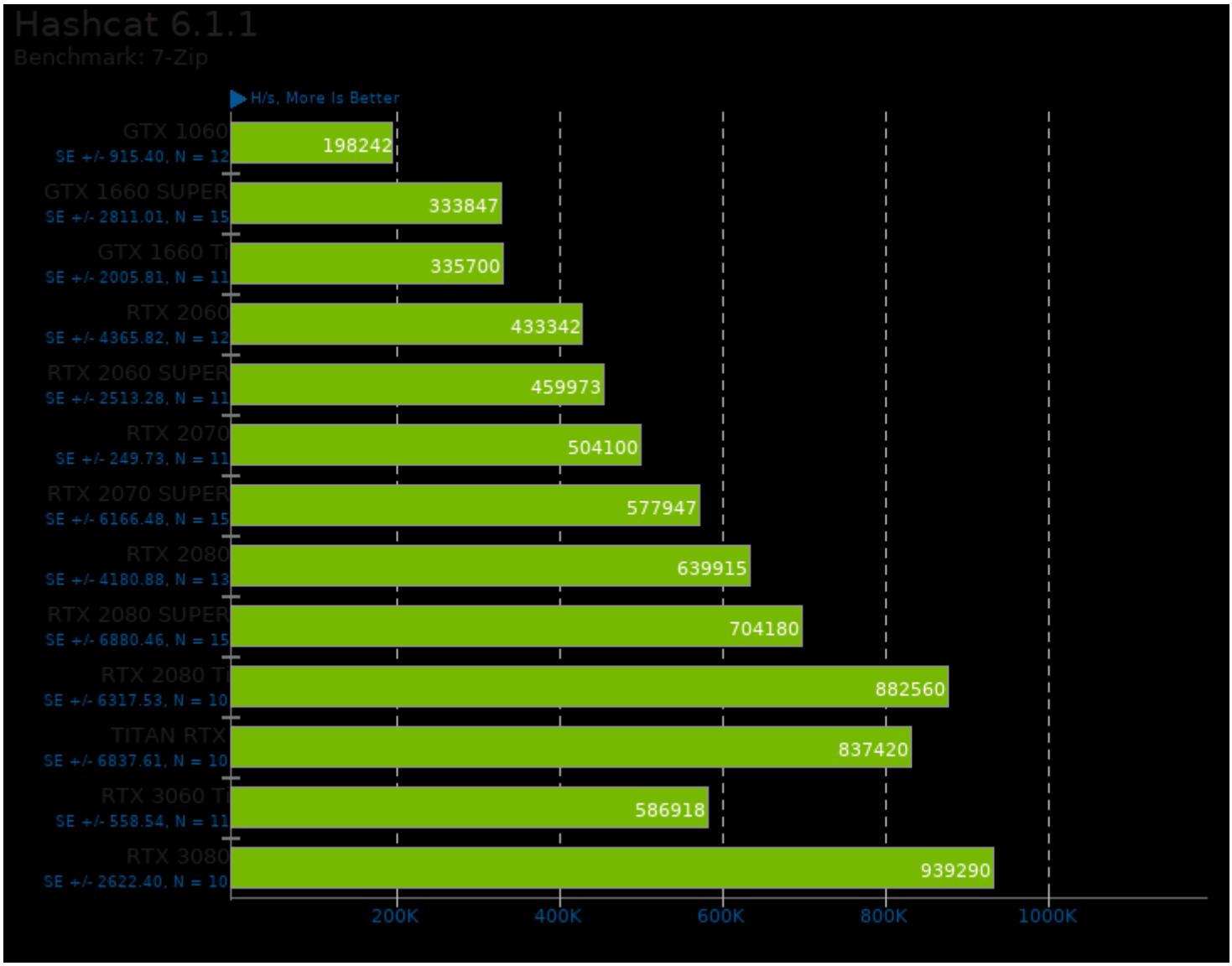
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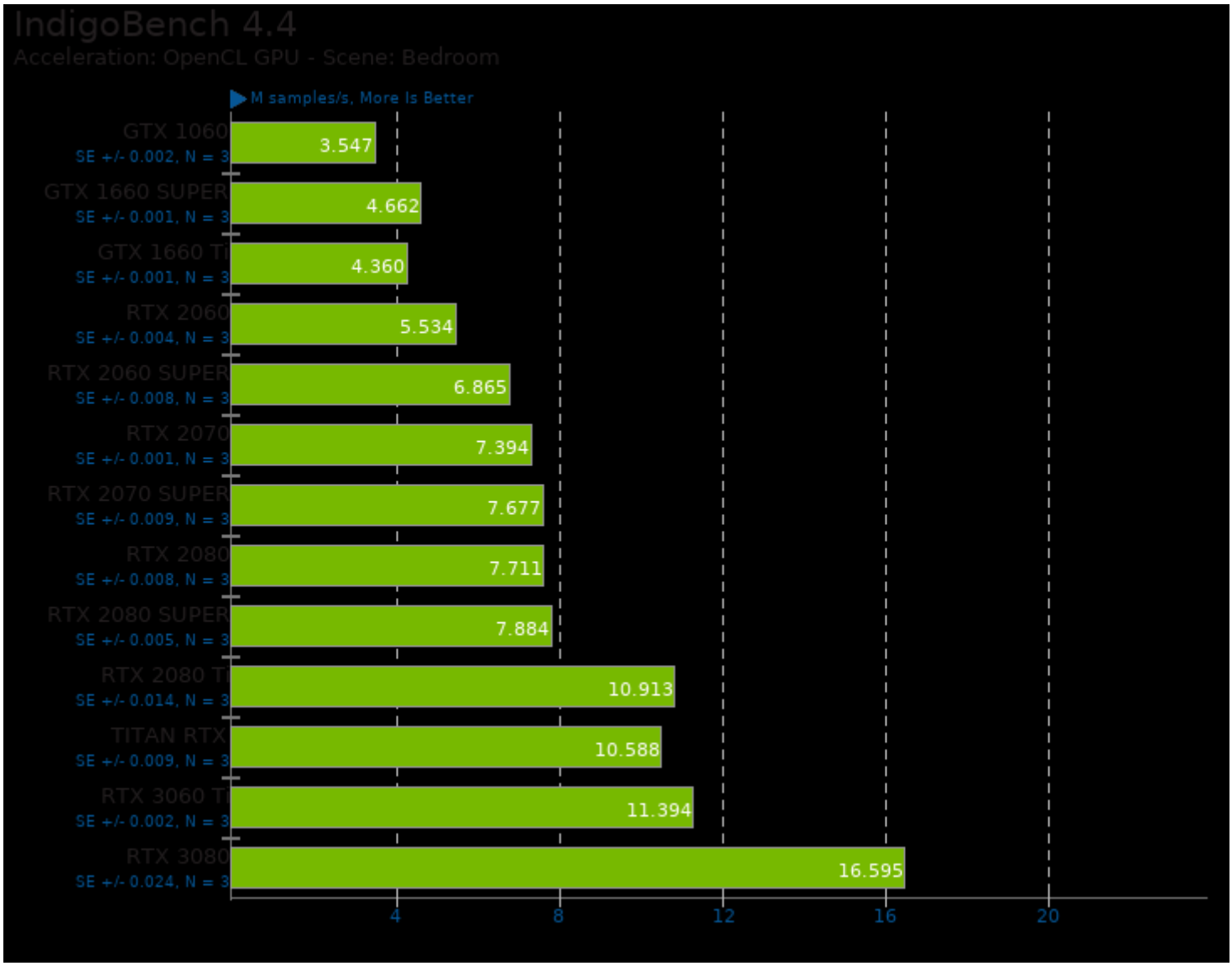
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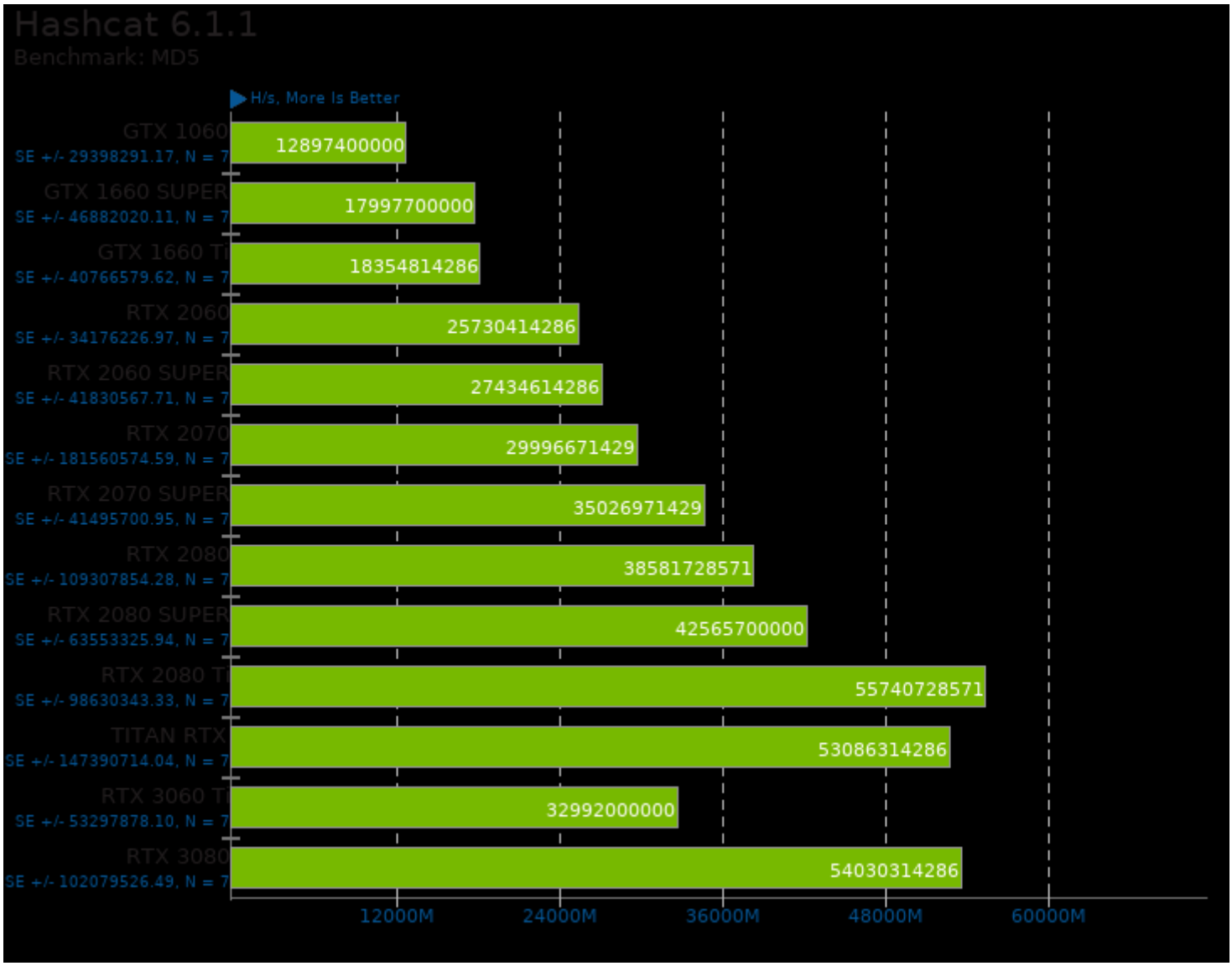
NVIDIA Compute Tests



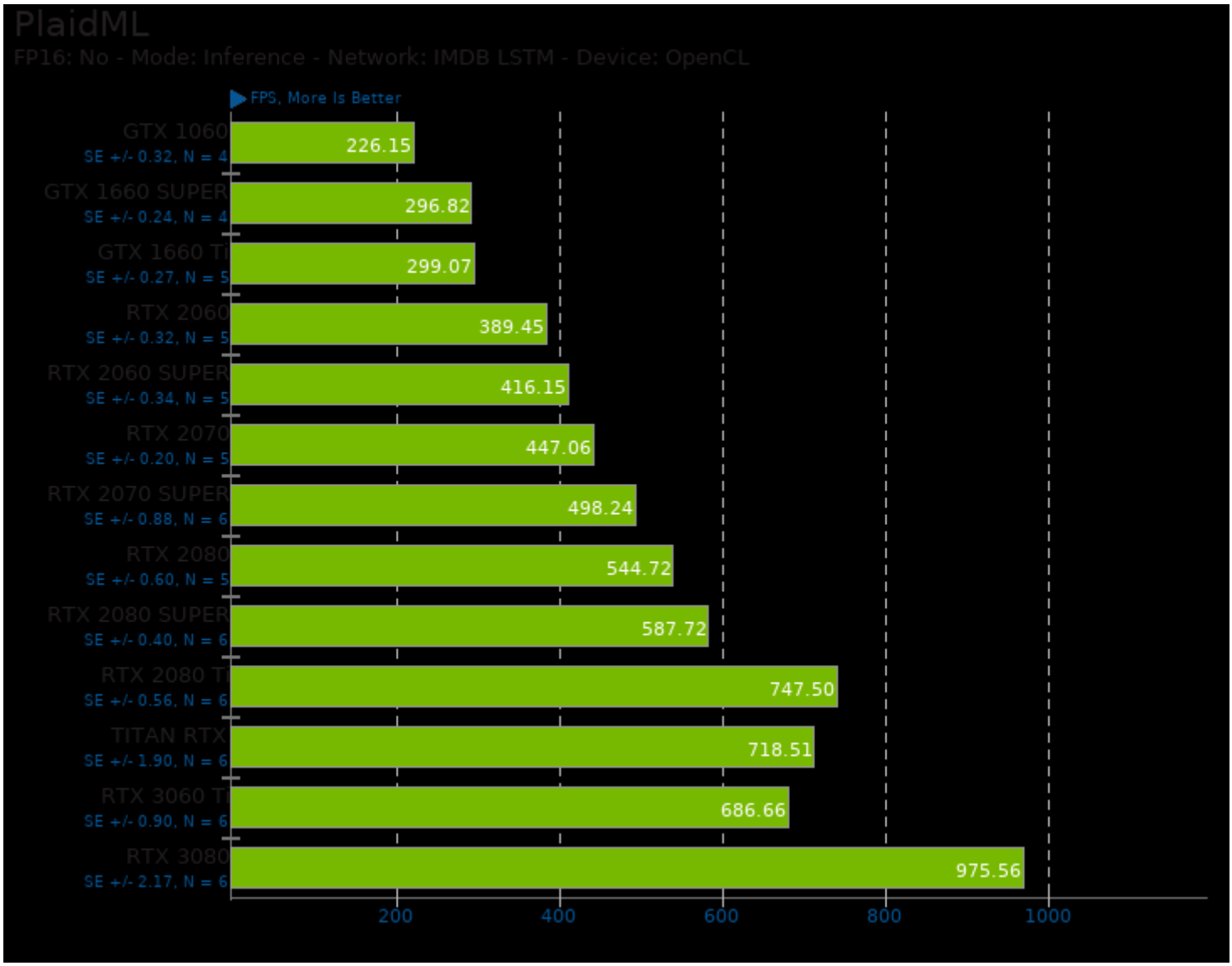
NVIDIA Compute Tests

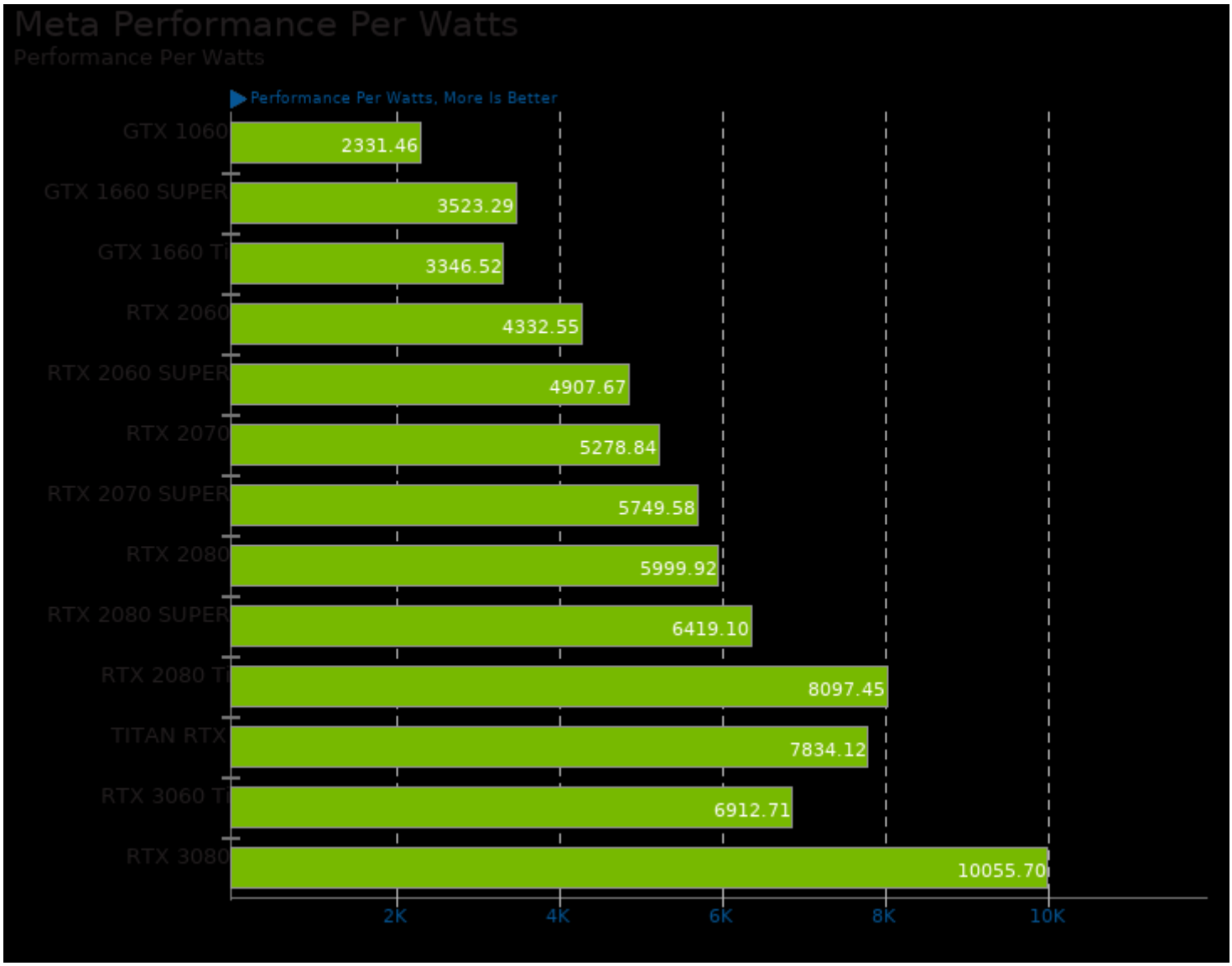


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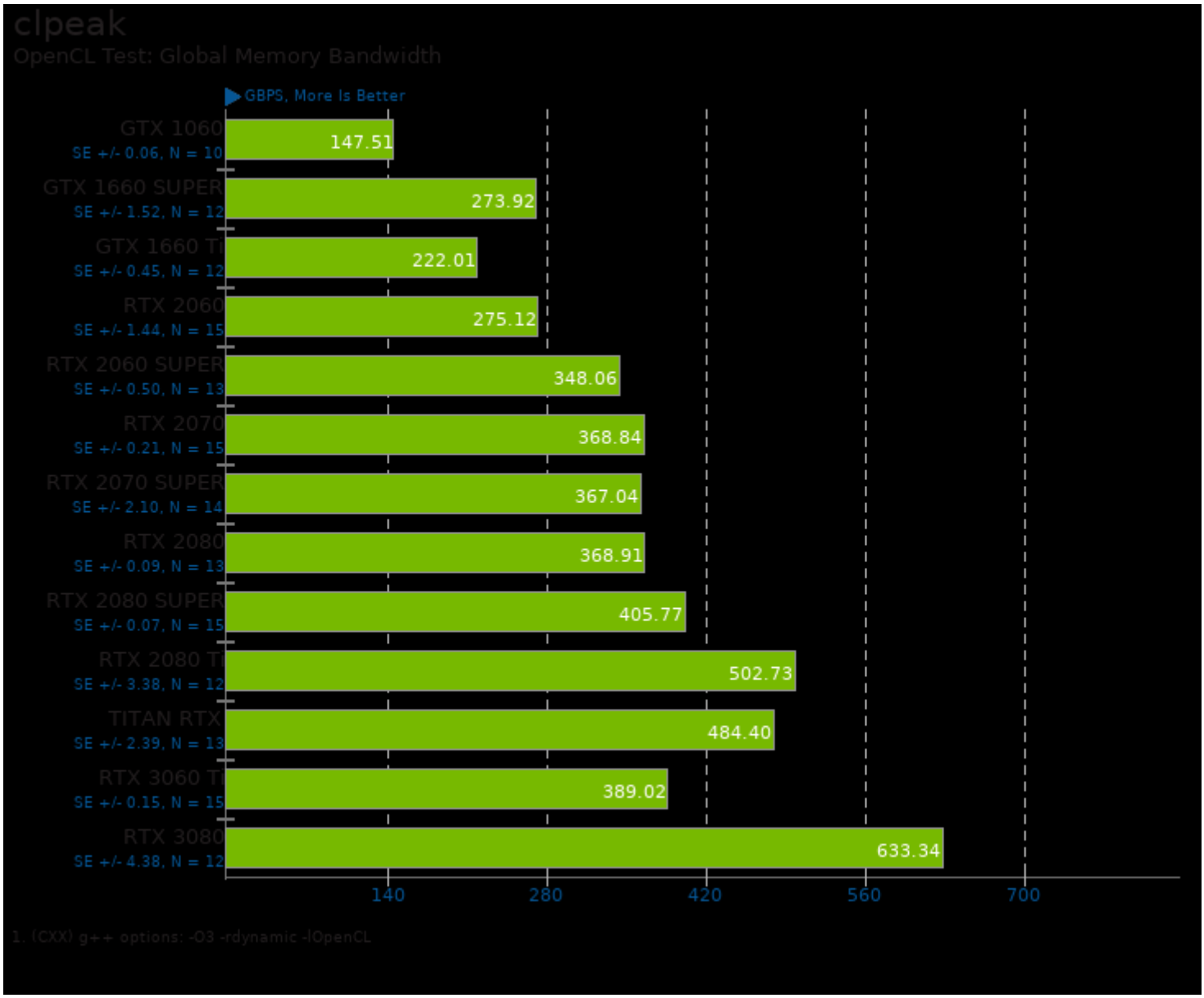


NVIDIA Compute Tests

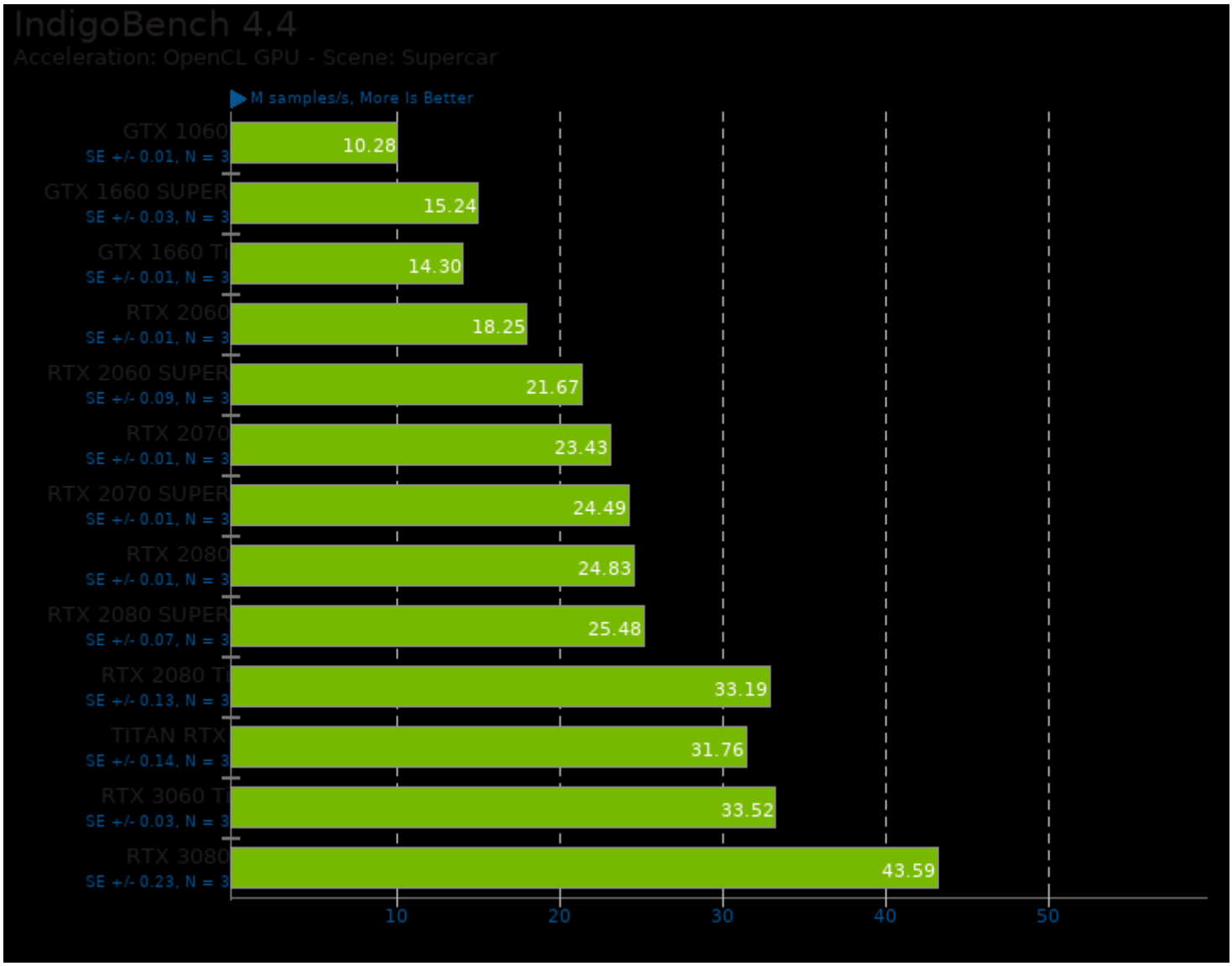



Meta Performance Per Watts
Performance Per Watts
Performance Per Watts, More Is Better
GTX 1060
2331.46
GTX 1660 SUPER
3523.29
GTX 1660 Ti
3346.52
RTX 2060
4332.55
RTX 2060 SUPER
4907.67
RTX 2070
5278.84
RTX 2070 SUPER
5749.58
RTX 2080
5999.92
RTX 2080 SUPER
6419.10
RTX 2080 Ti
8097.45
TITAN RTX
7834.12
RTX 3060 Ti
6912.71
RTX 3080
10055.70
2K
4K
6K
8K
10K

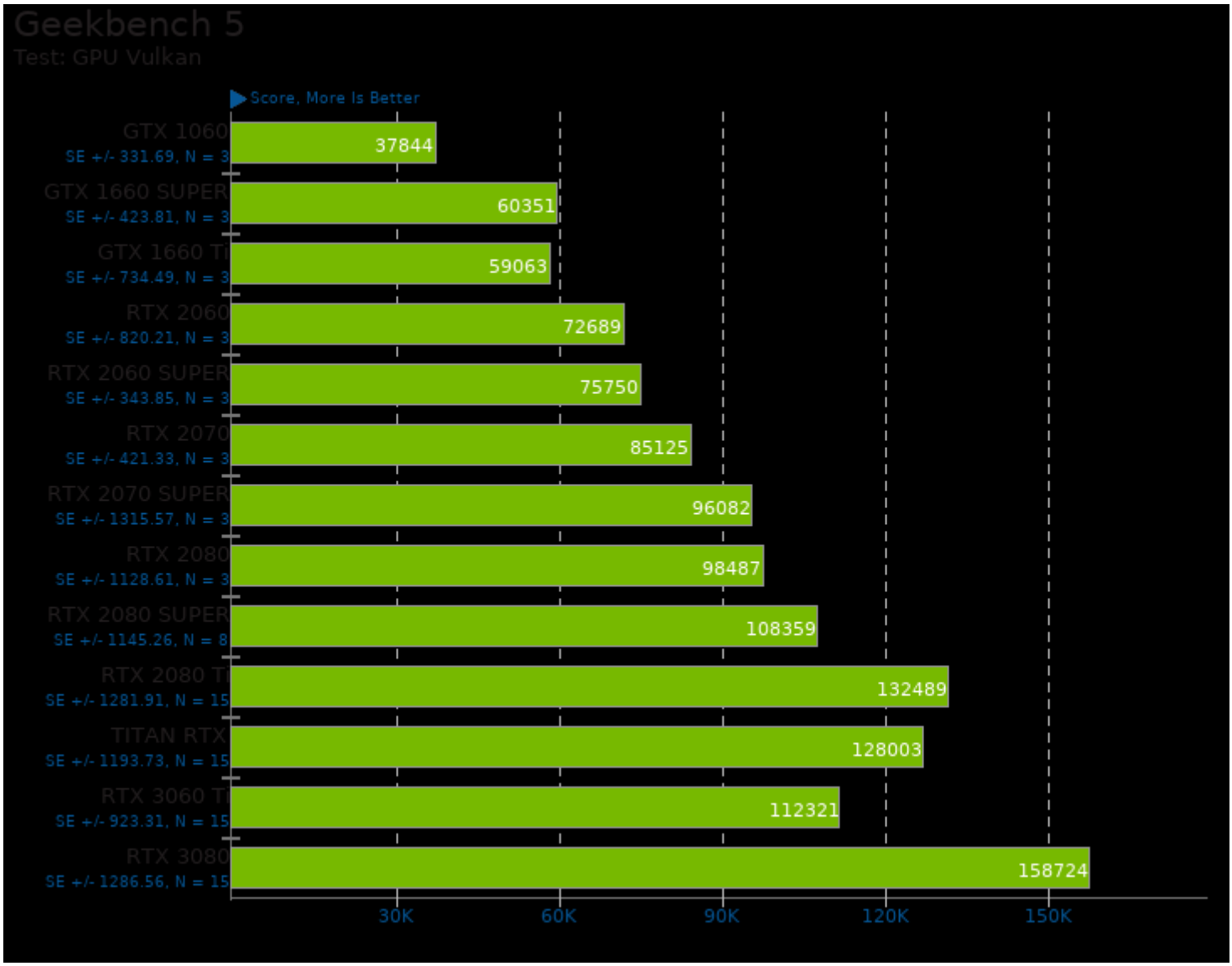
NVIDIA Compute Tests



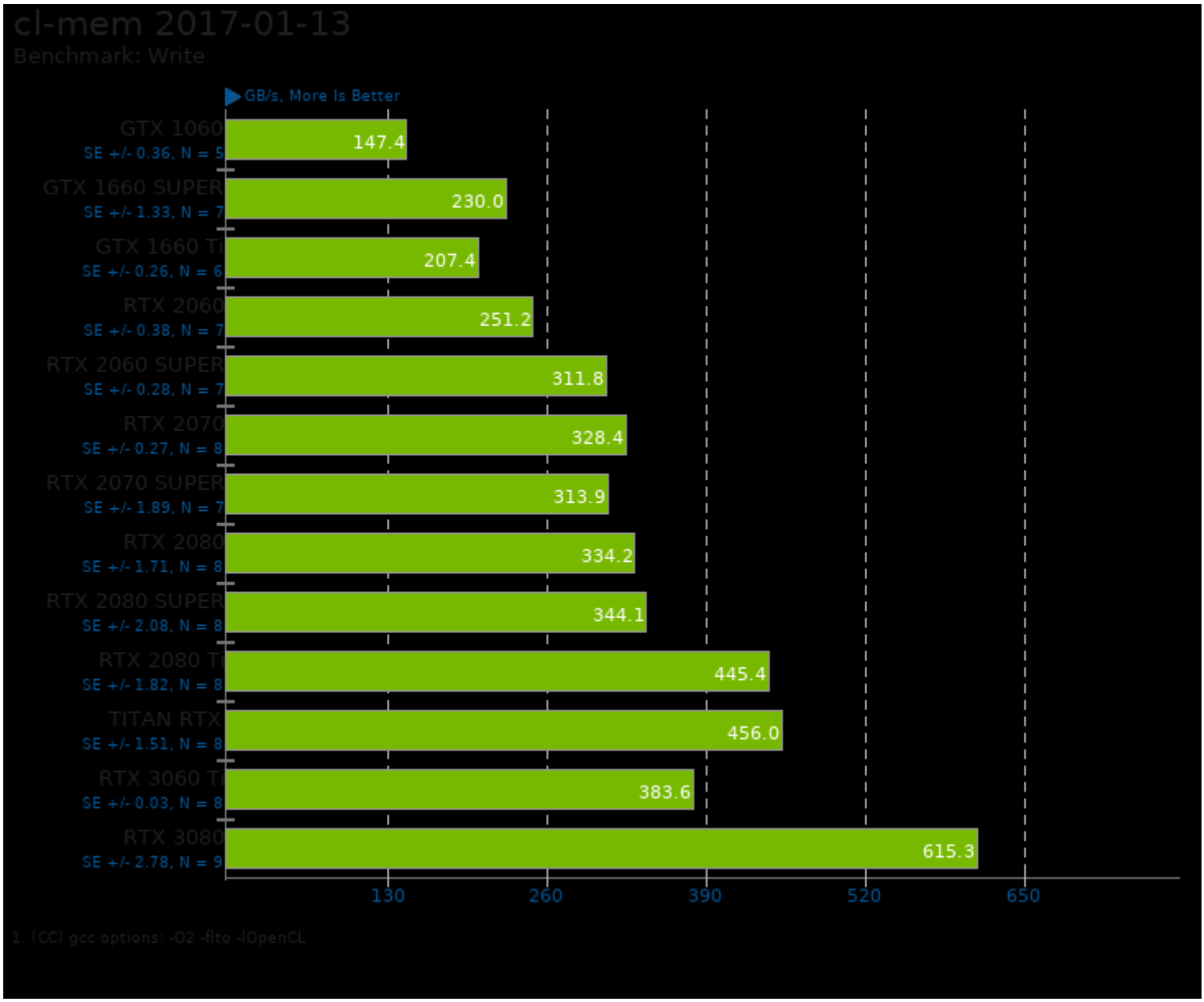
NVIDIA Compute Tests



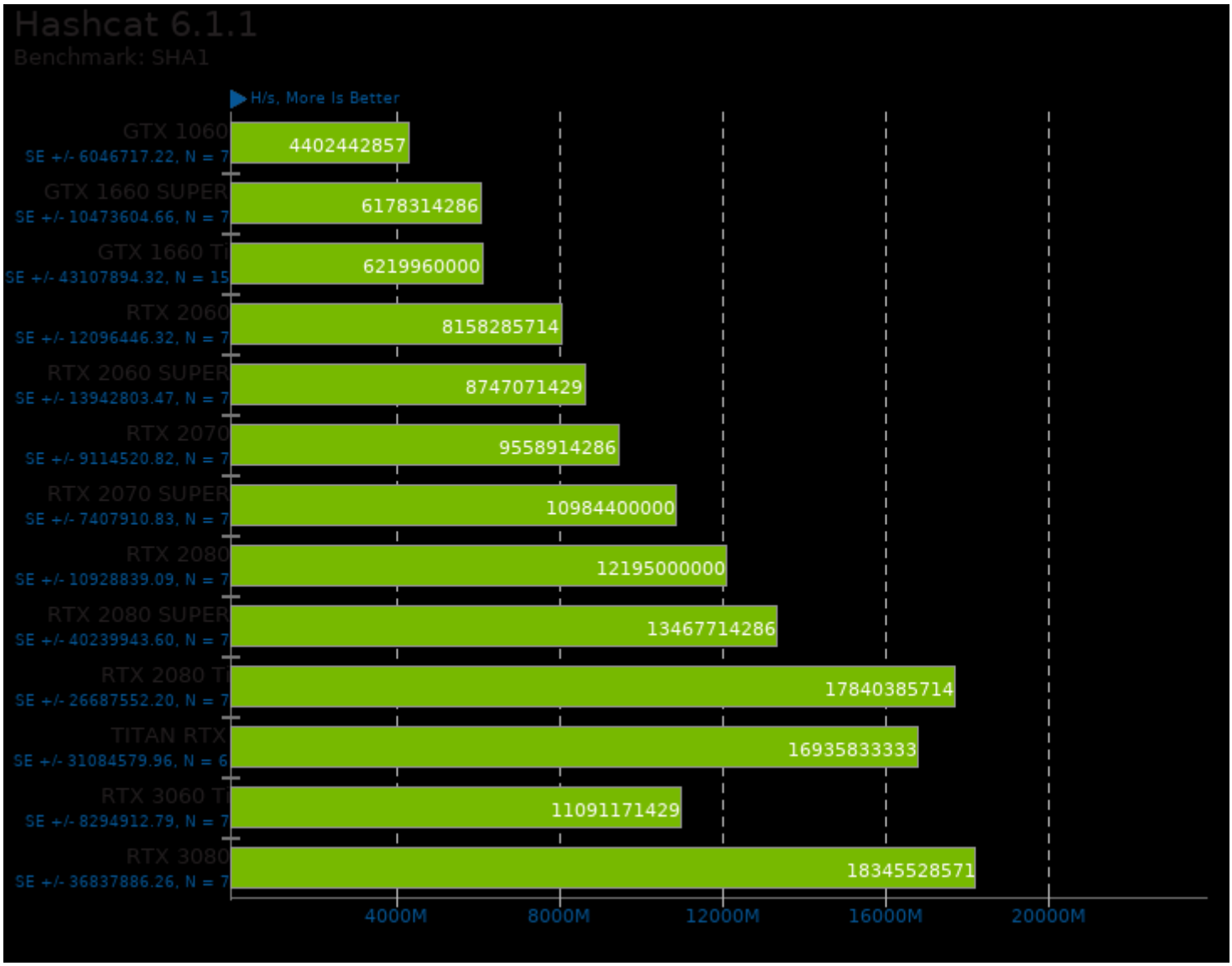
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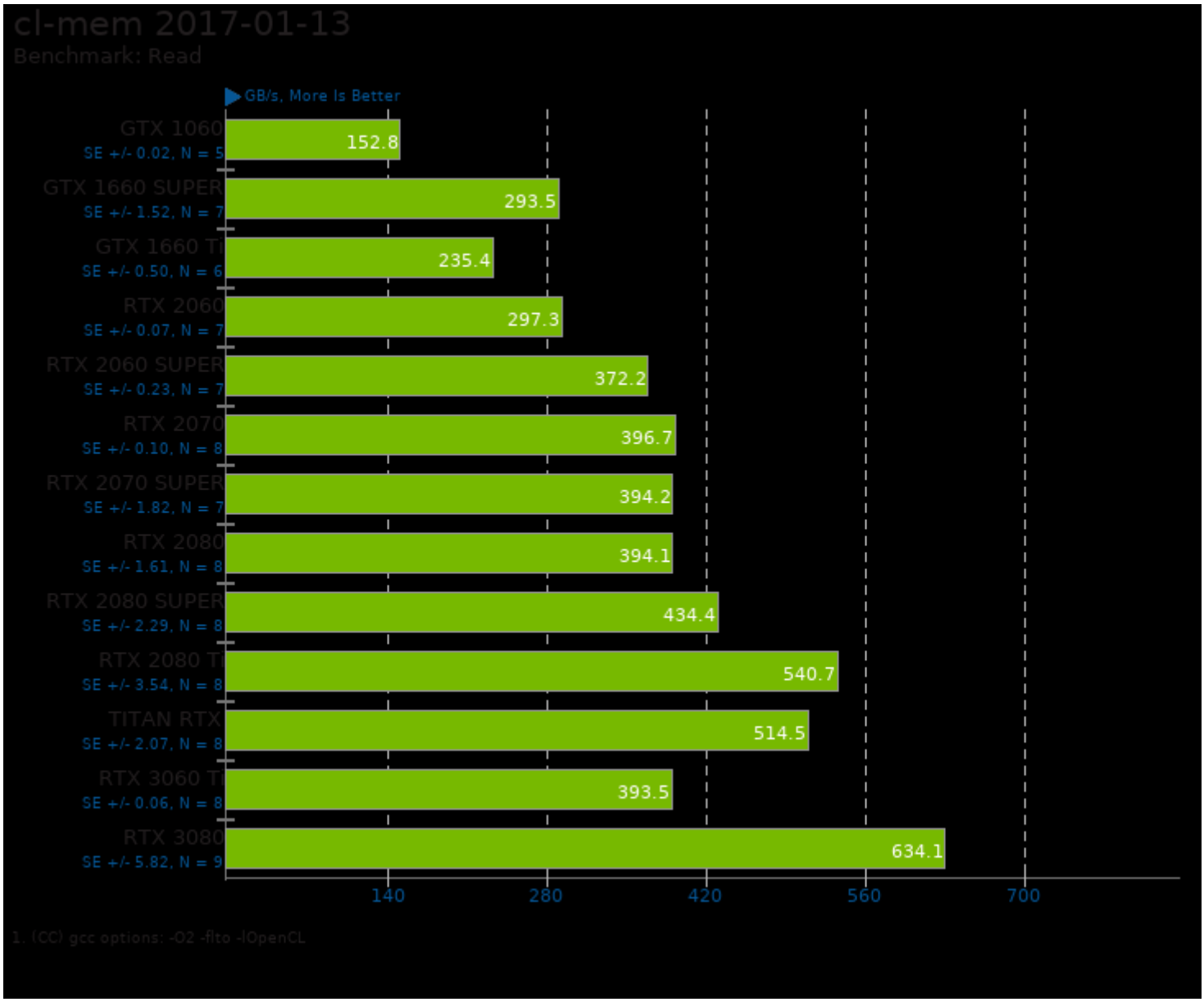
NVIDIA Compute Tests



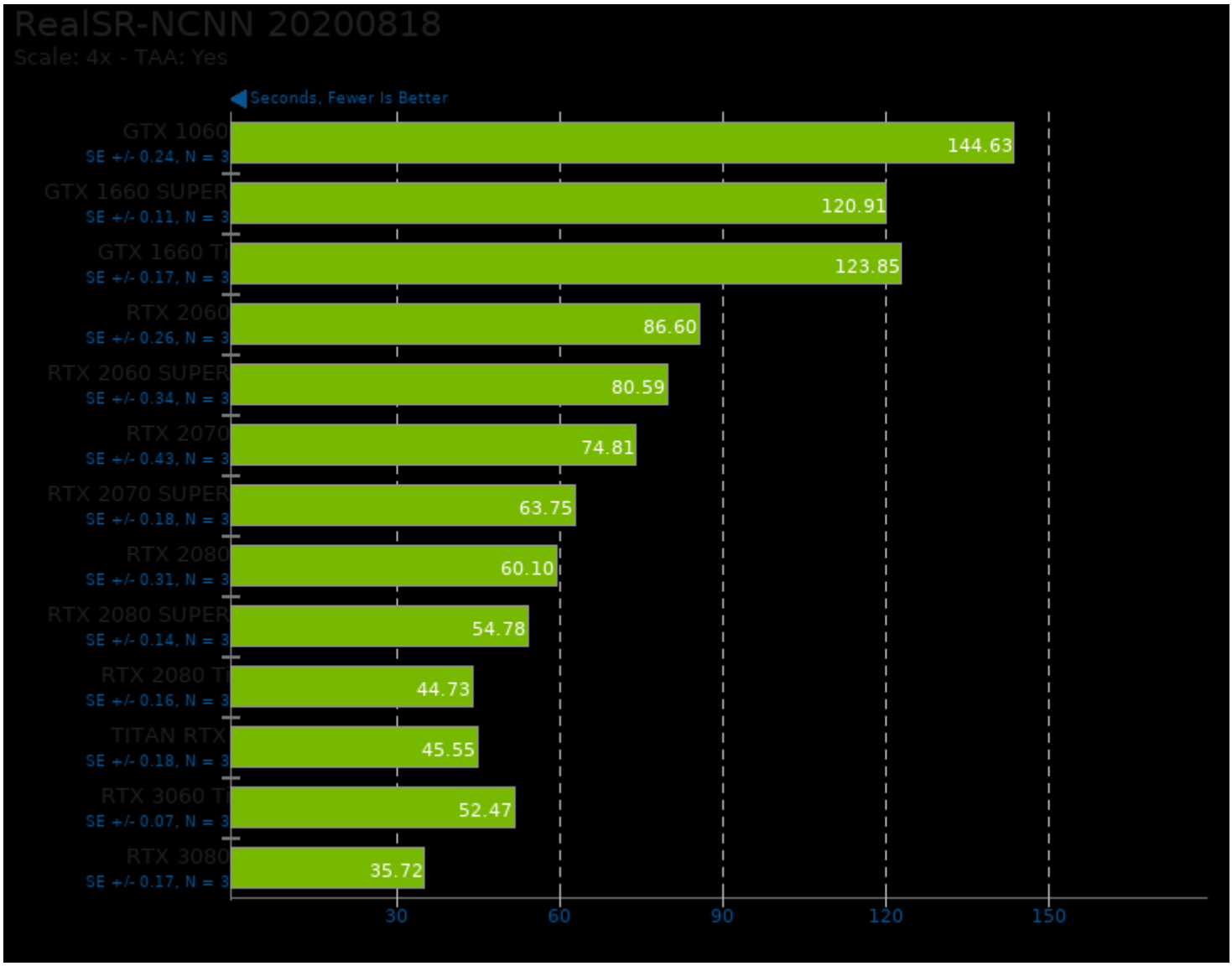
NVIDIA Compute Tests



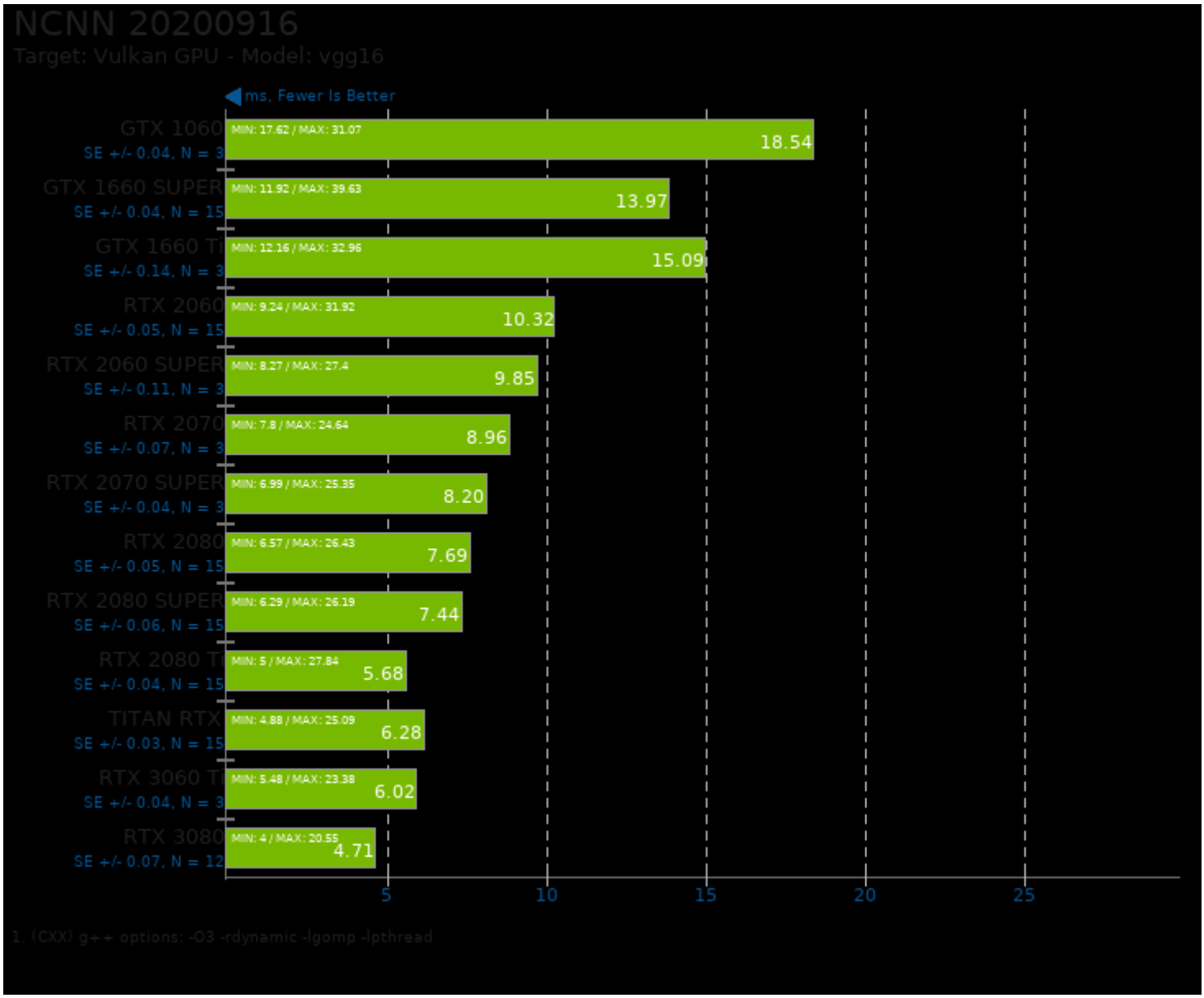
NVIDIA Compute Tests



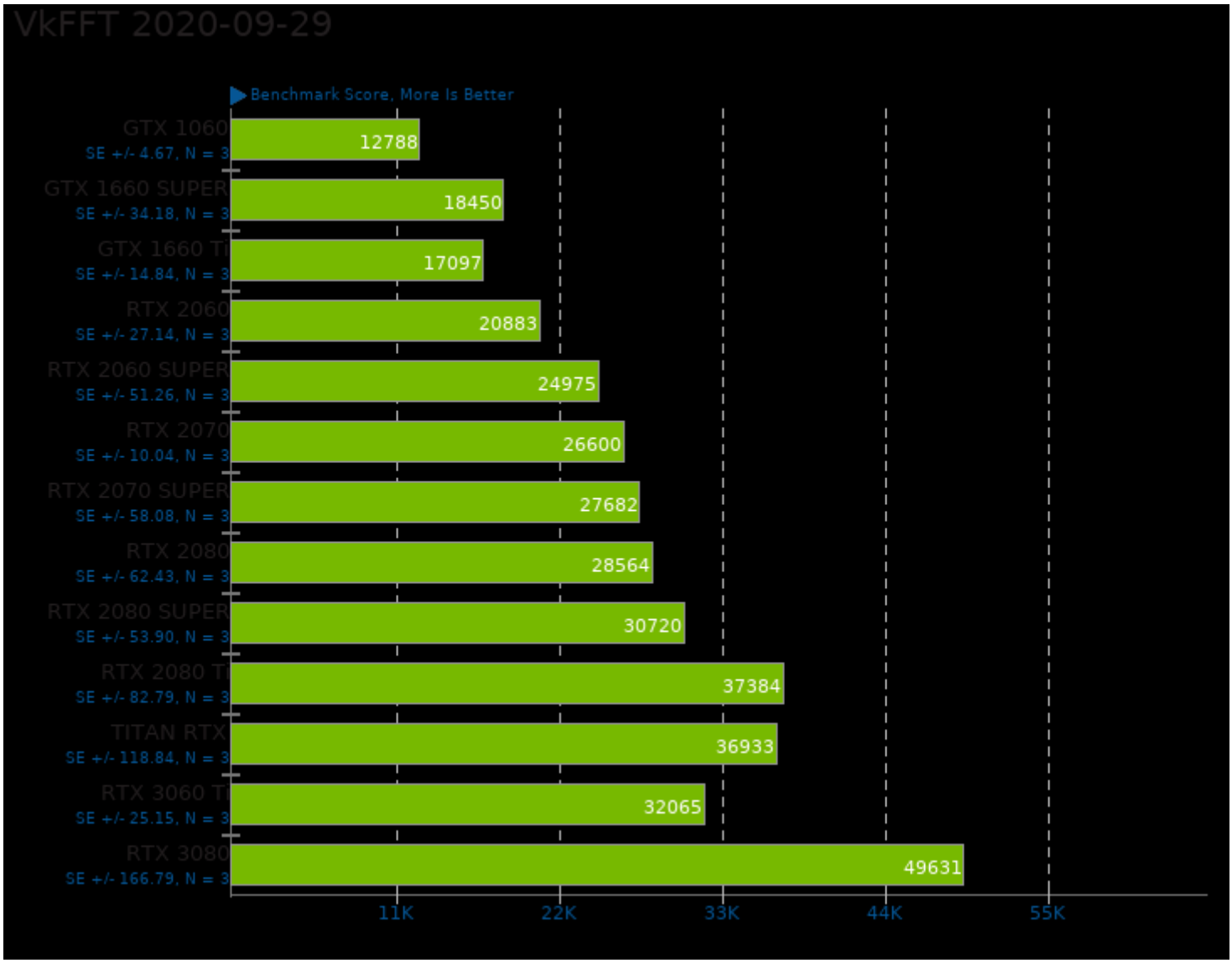
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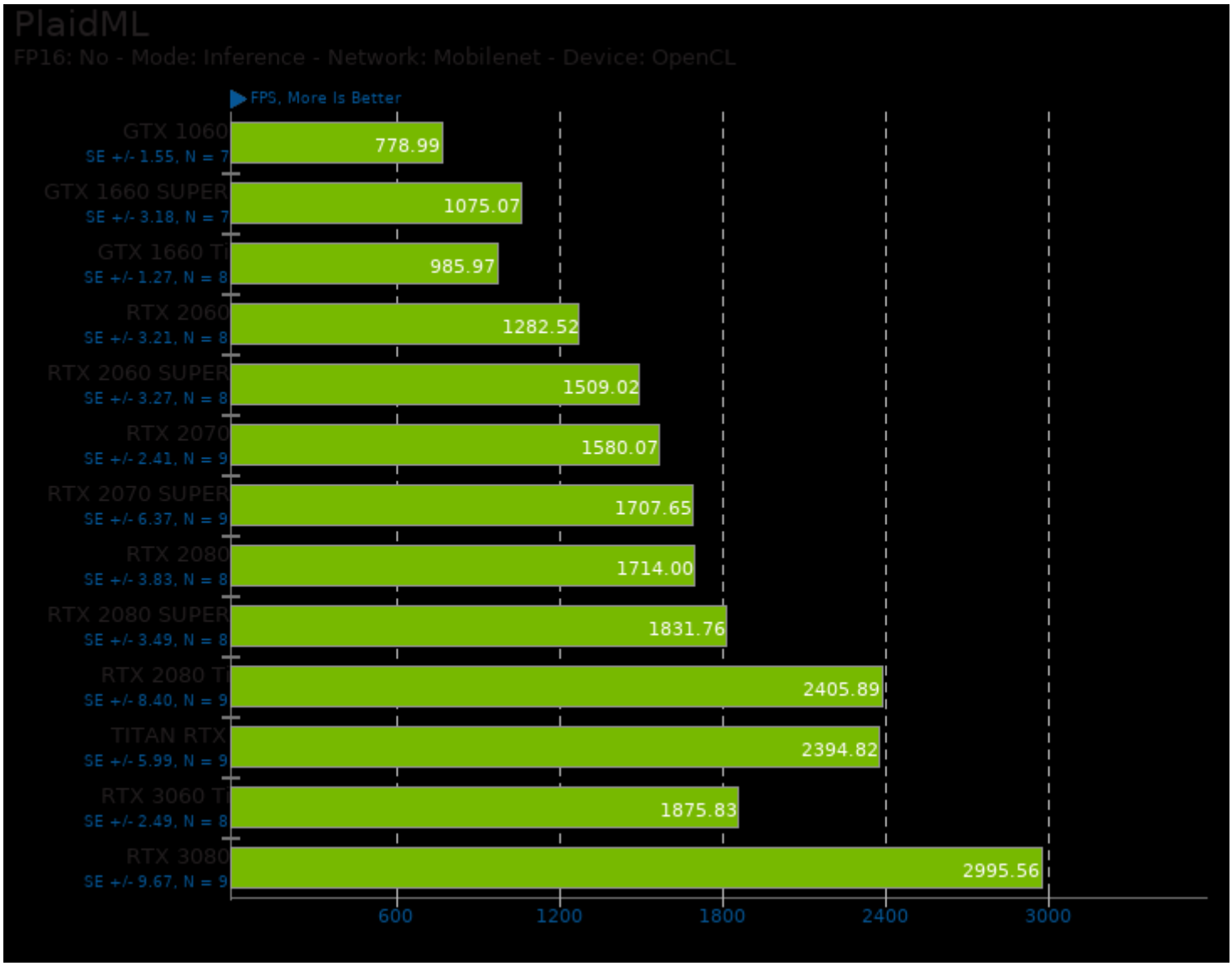
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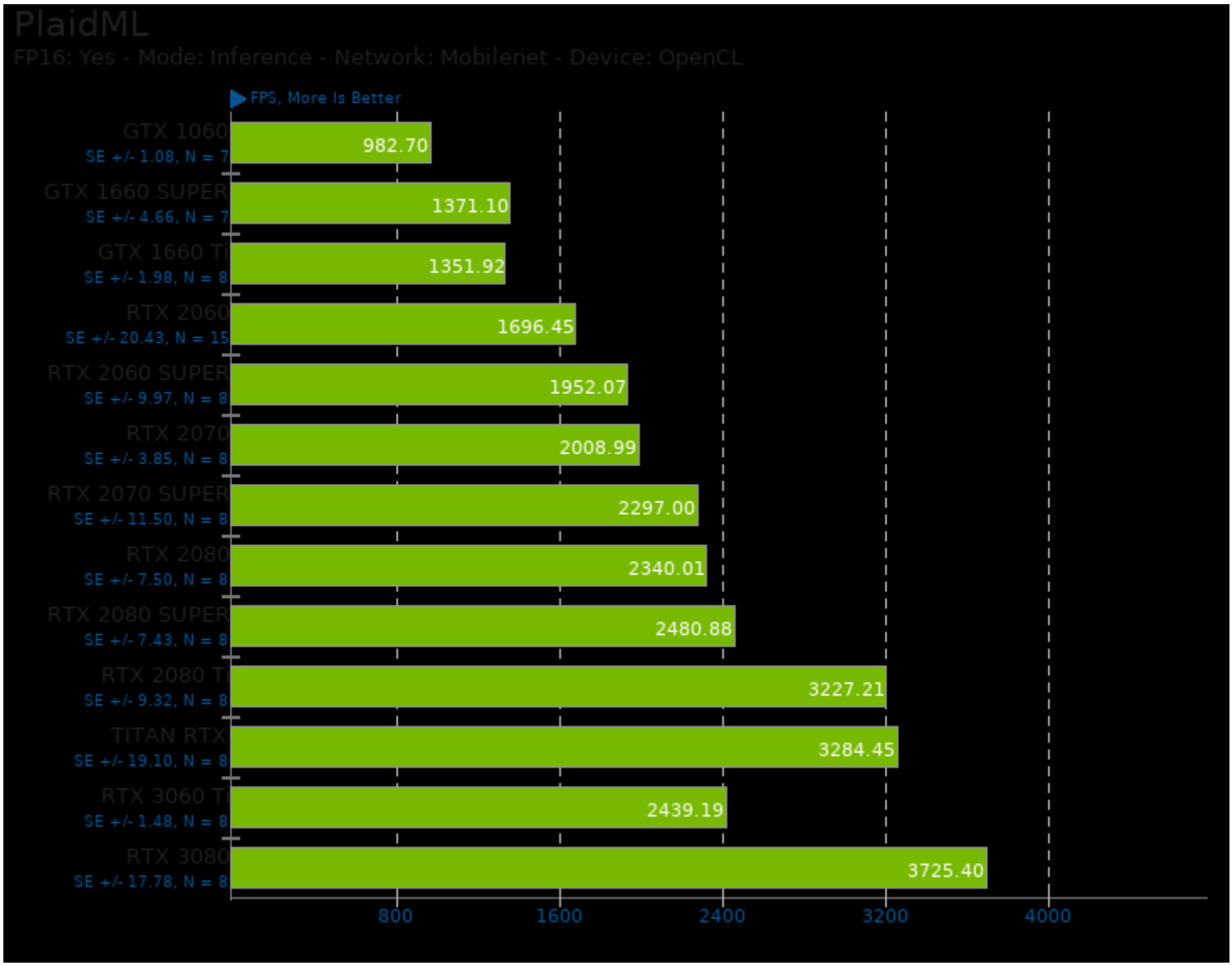
NVIDIA Compute Tests



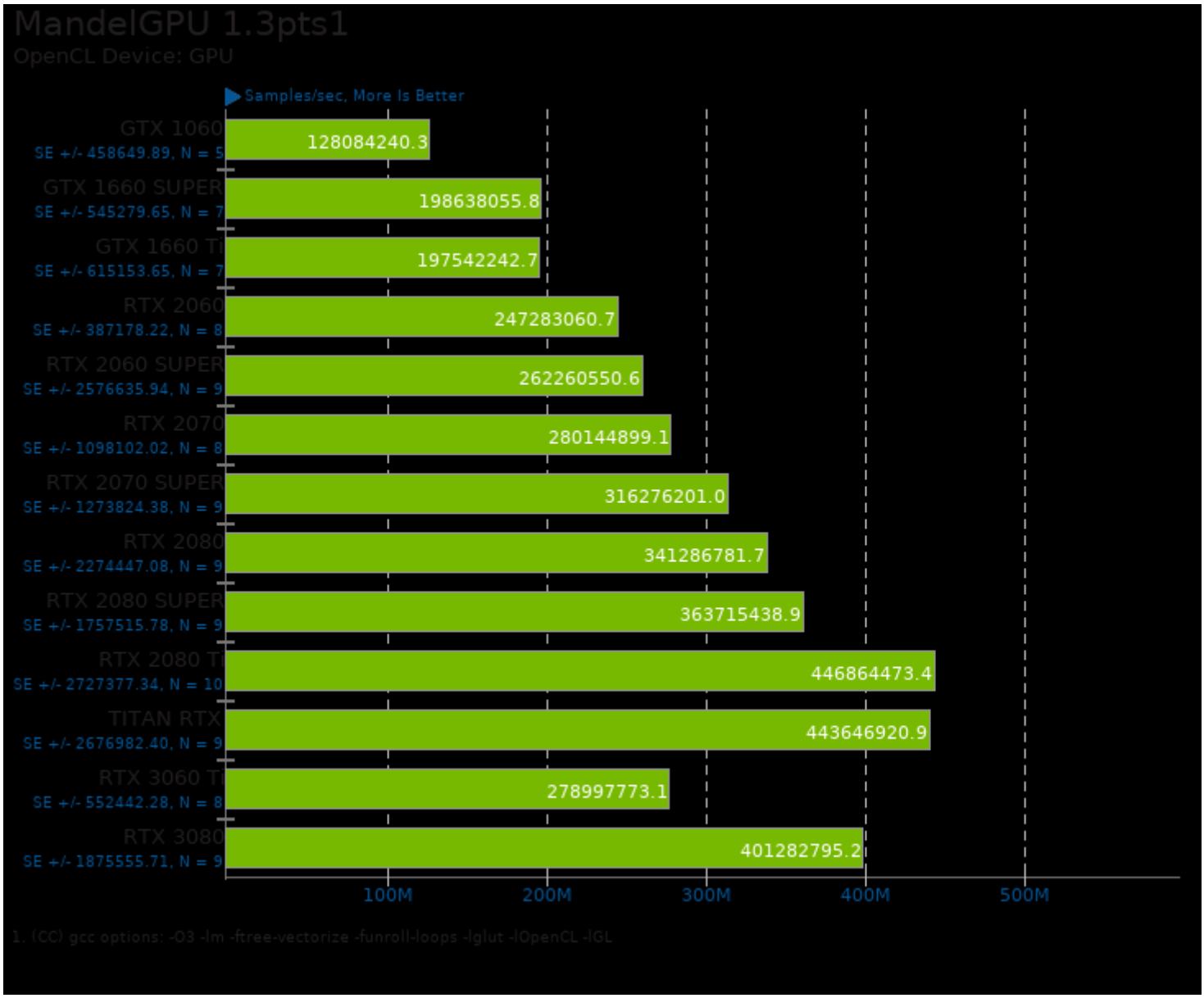
NVIDIA Compute Tests



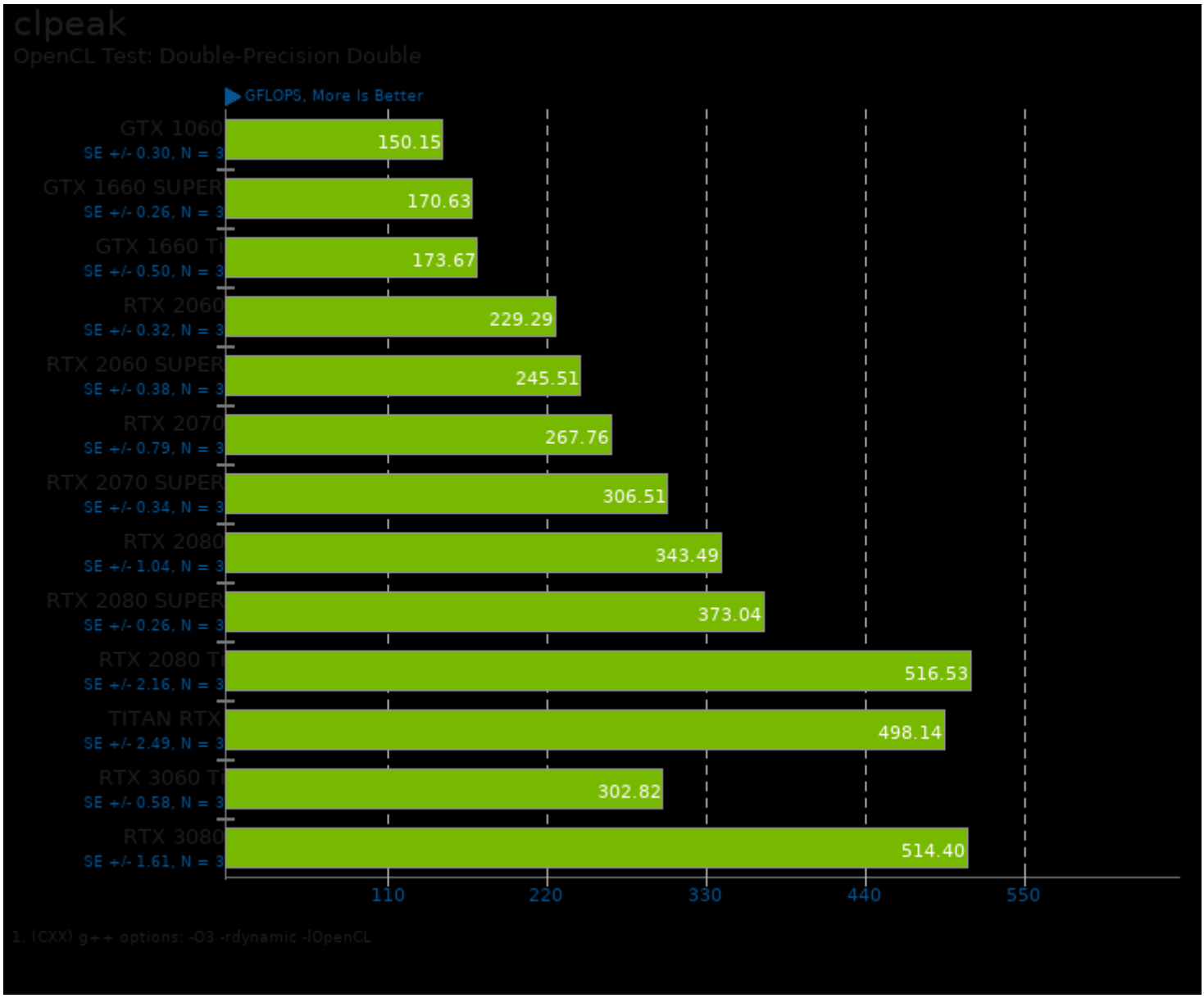
NVIDIA Compute Tests



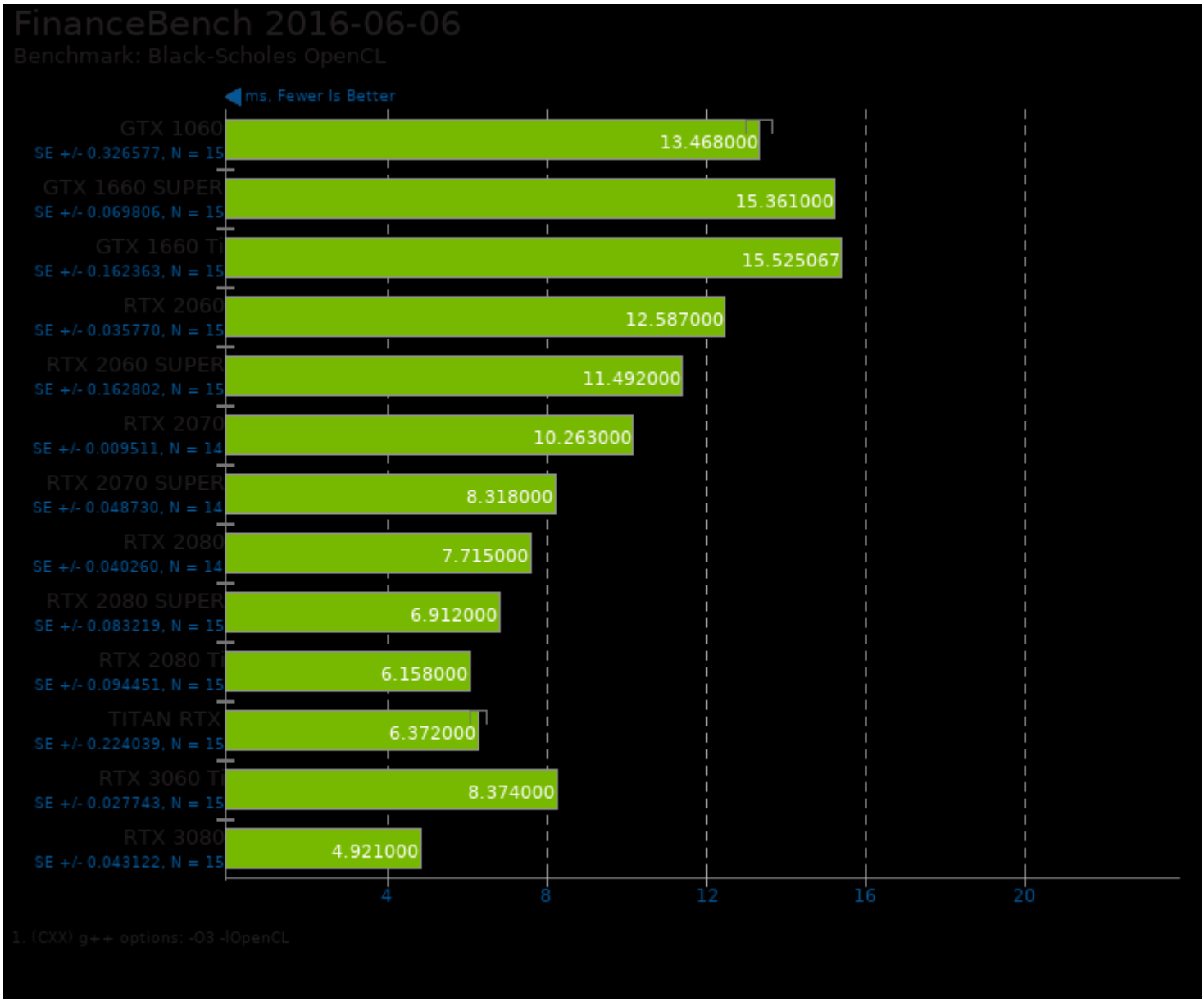
NVIDIA Compute Tests



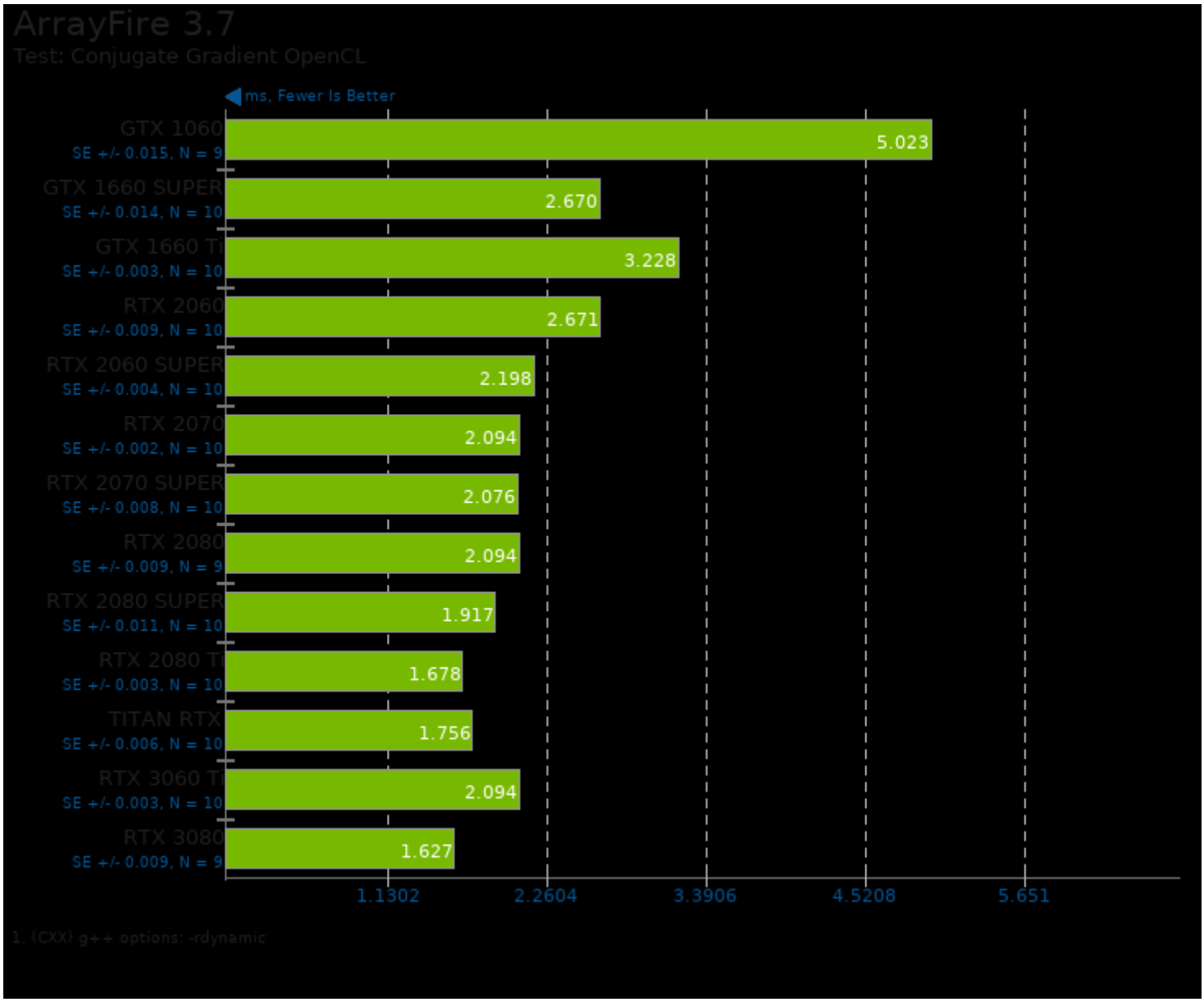
NVIDIA Compute Tests



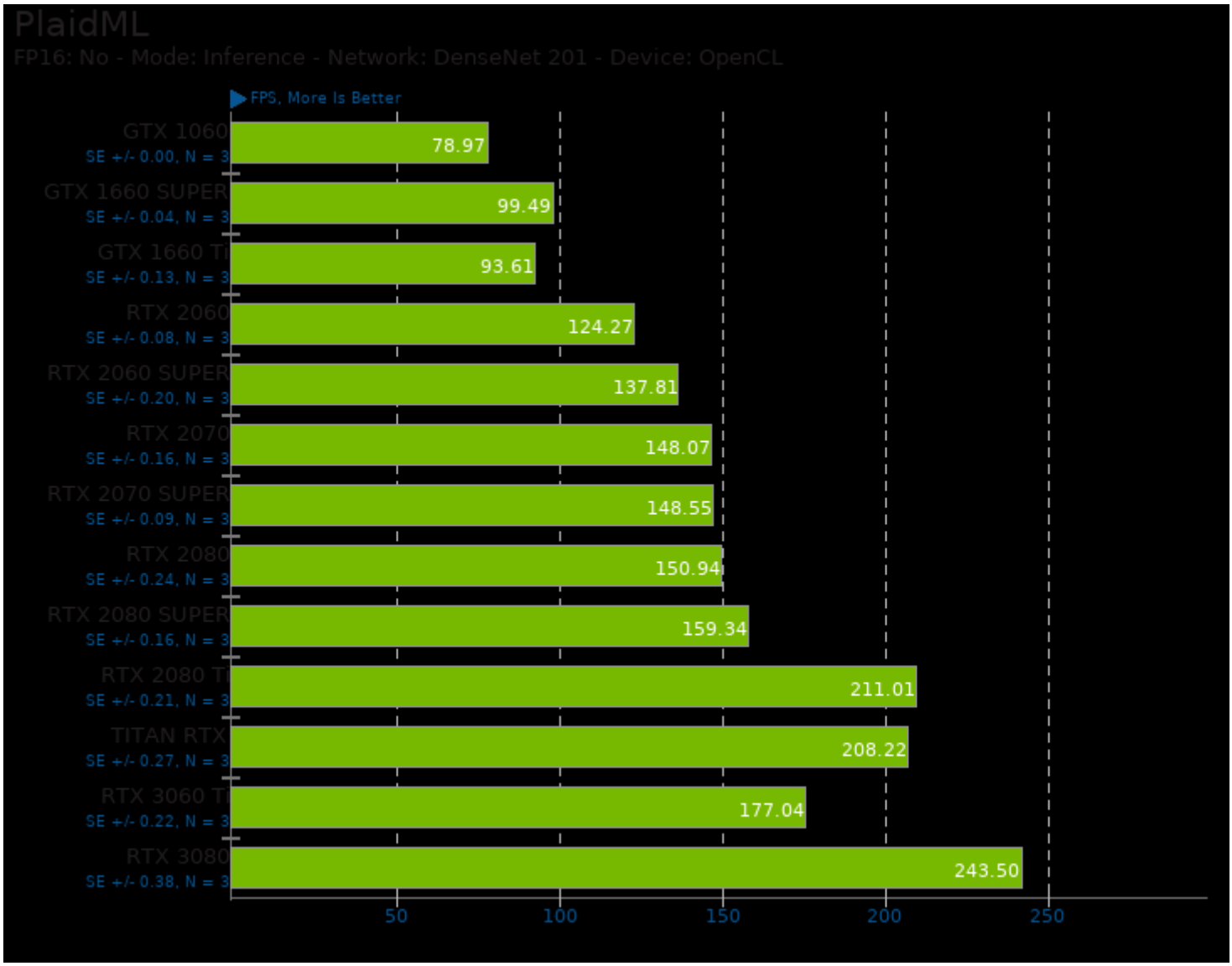
NVIDIA Compute Tests



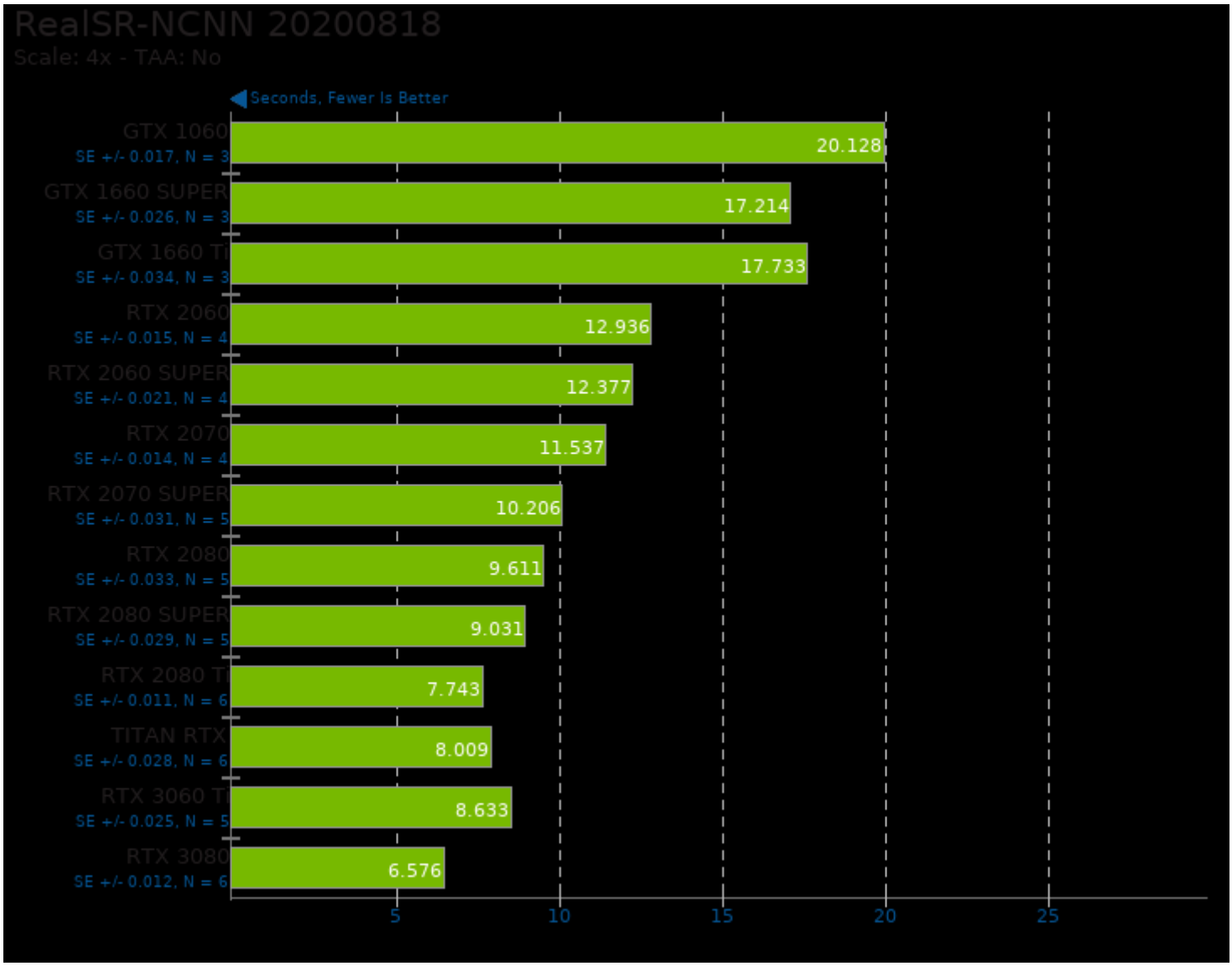
NVIDIA Compute Tests



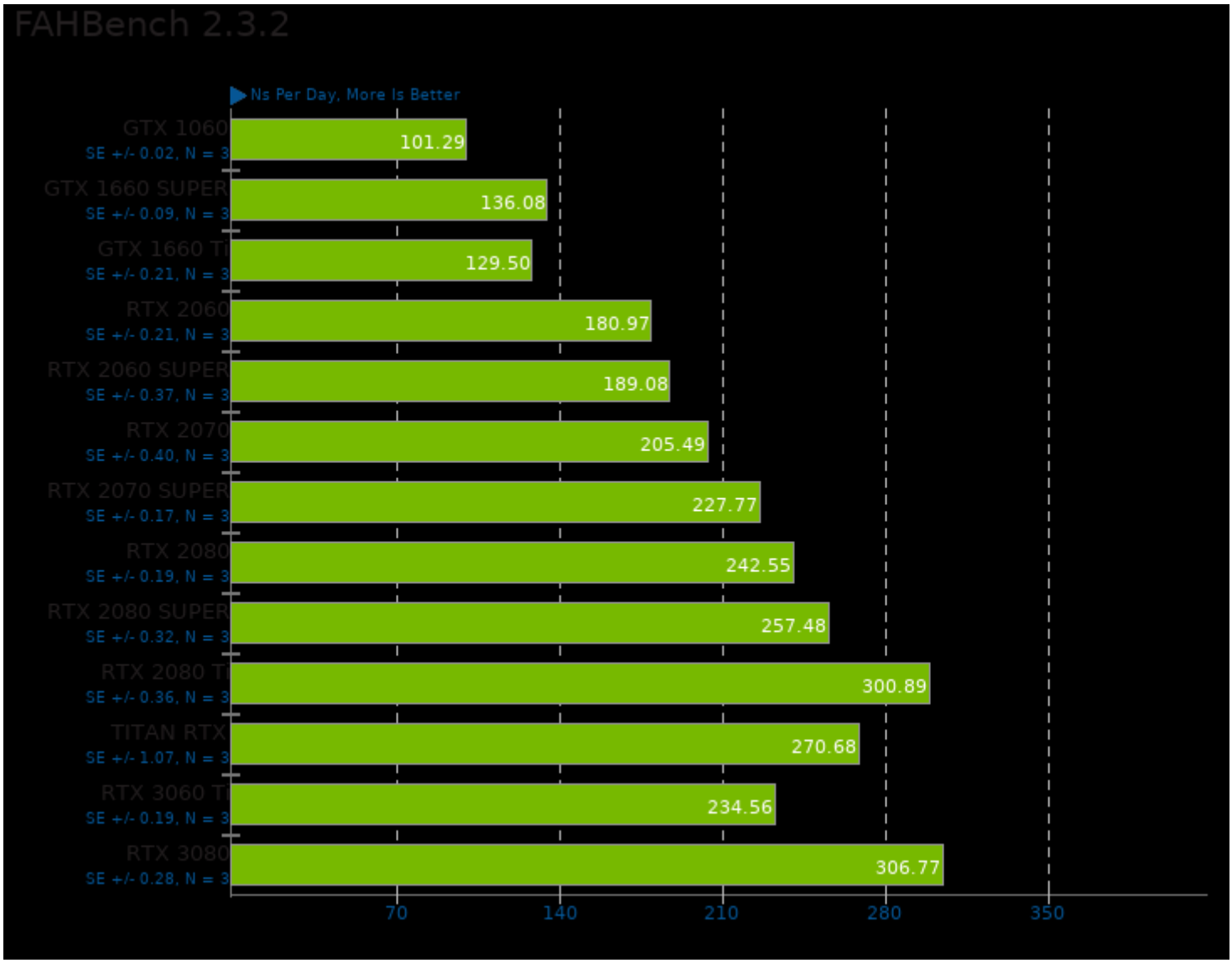
NVIDIA Compute Tests



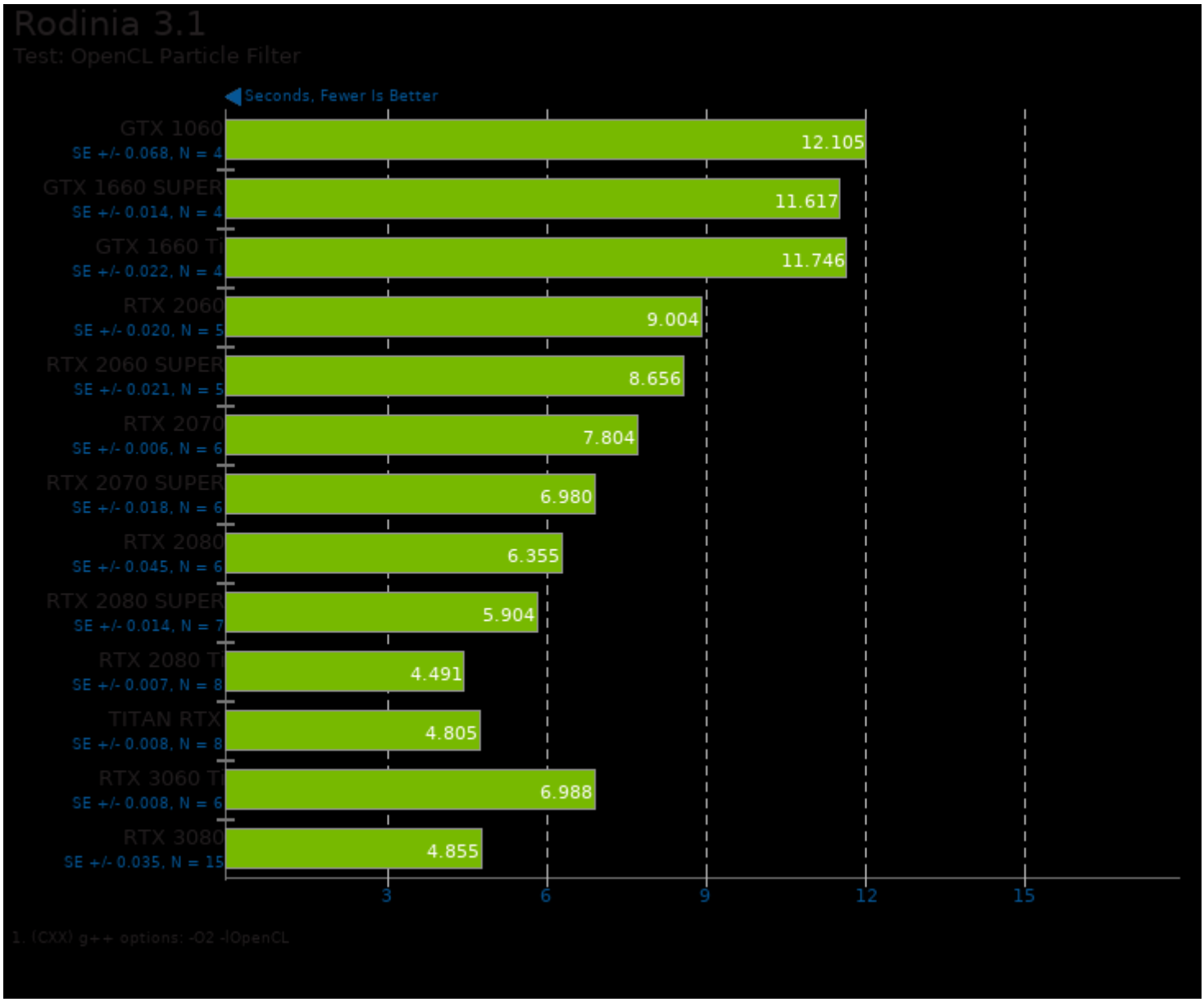
NVIDIA Compute Tests

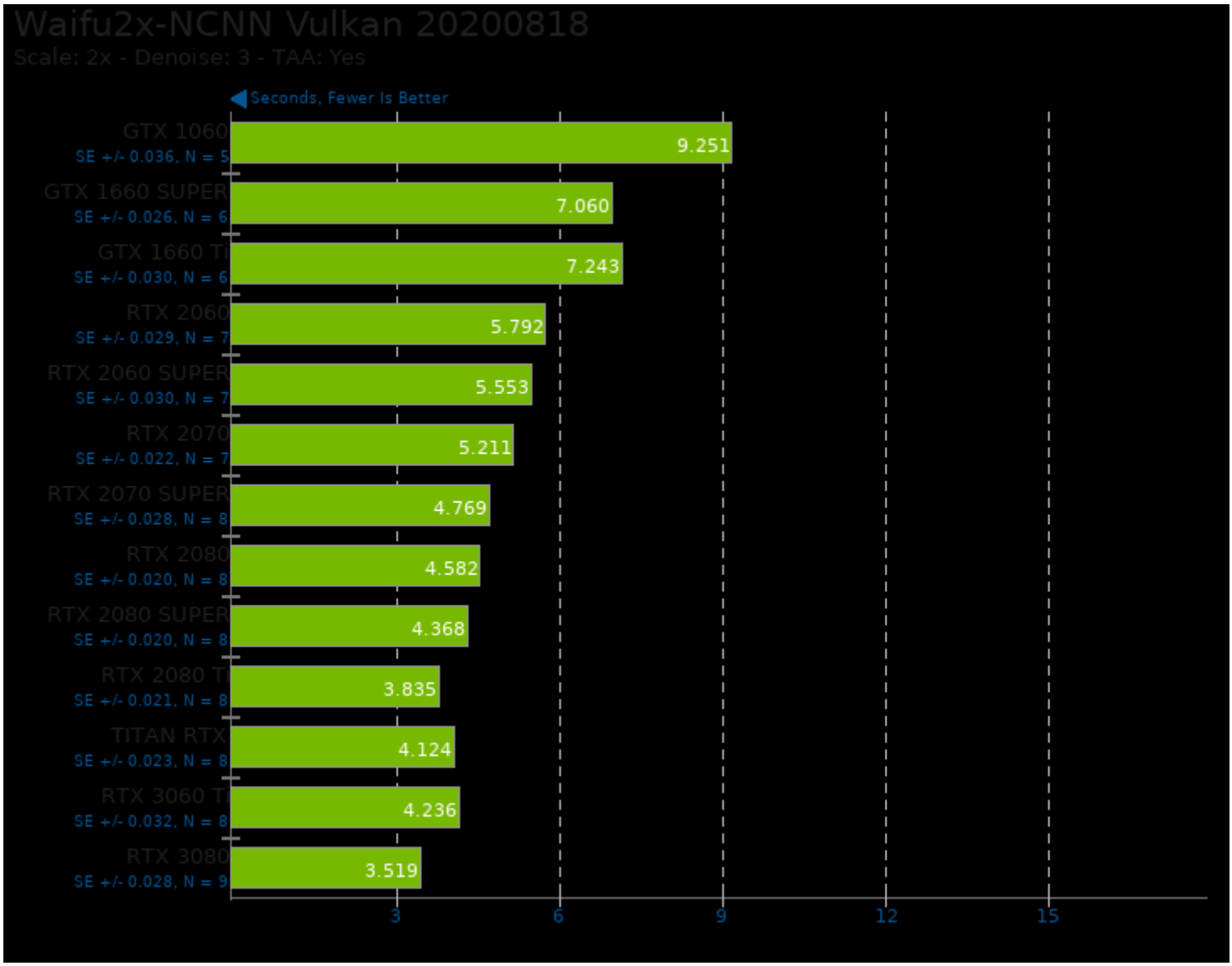


NVIDIA Compute Tests

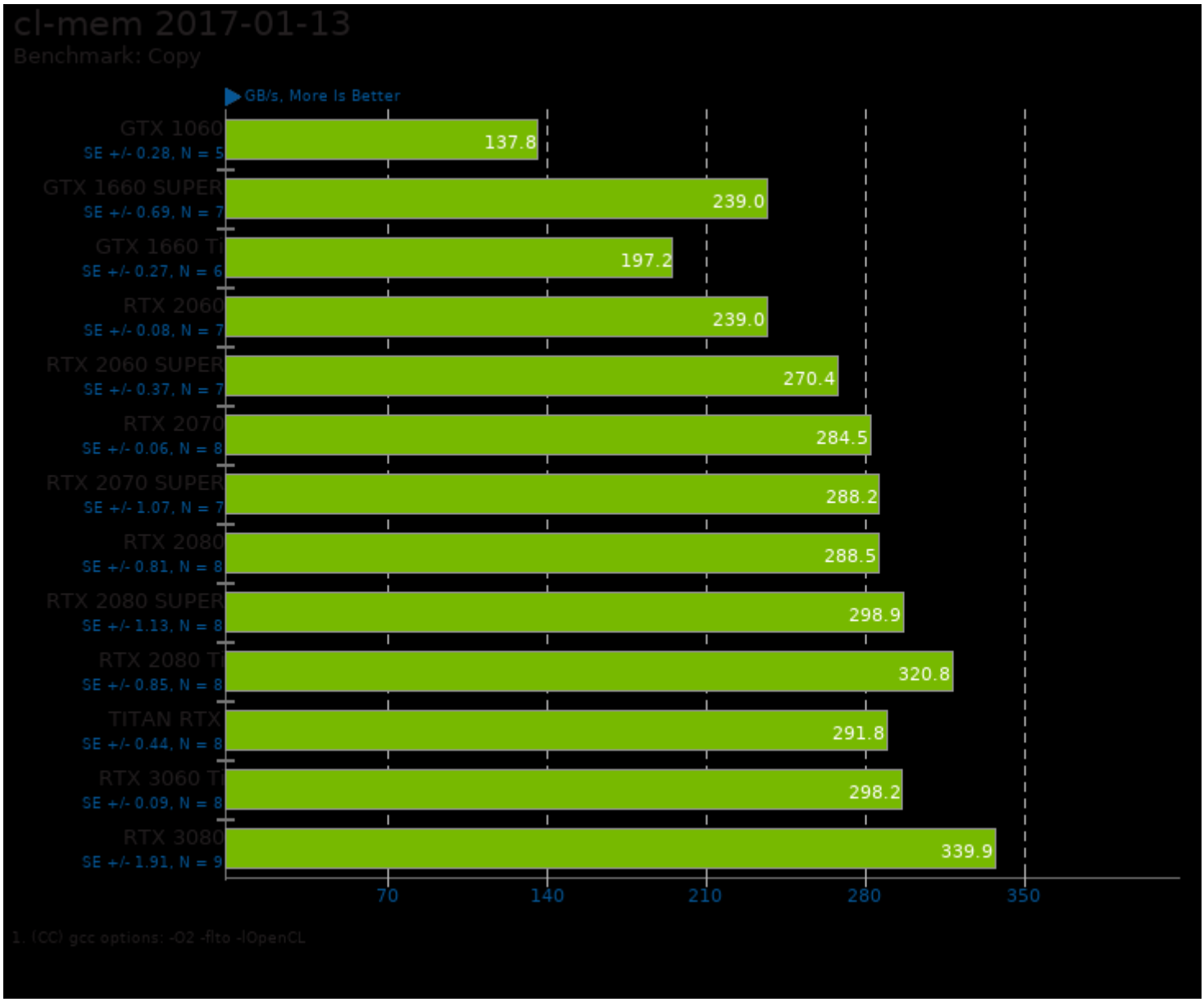


NVIDIA Compute Tests

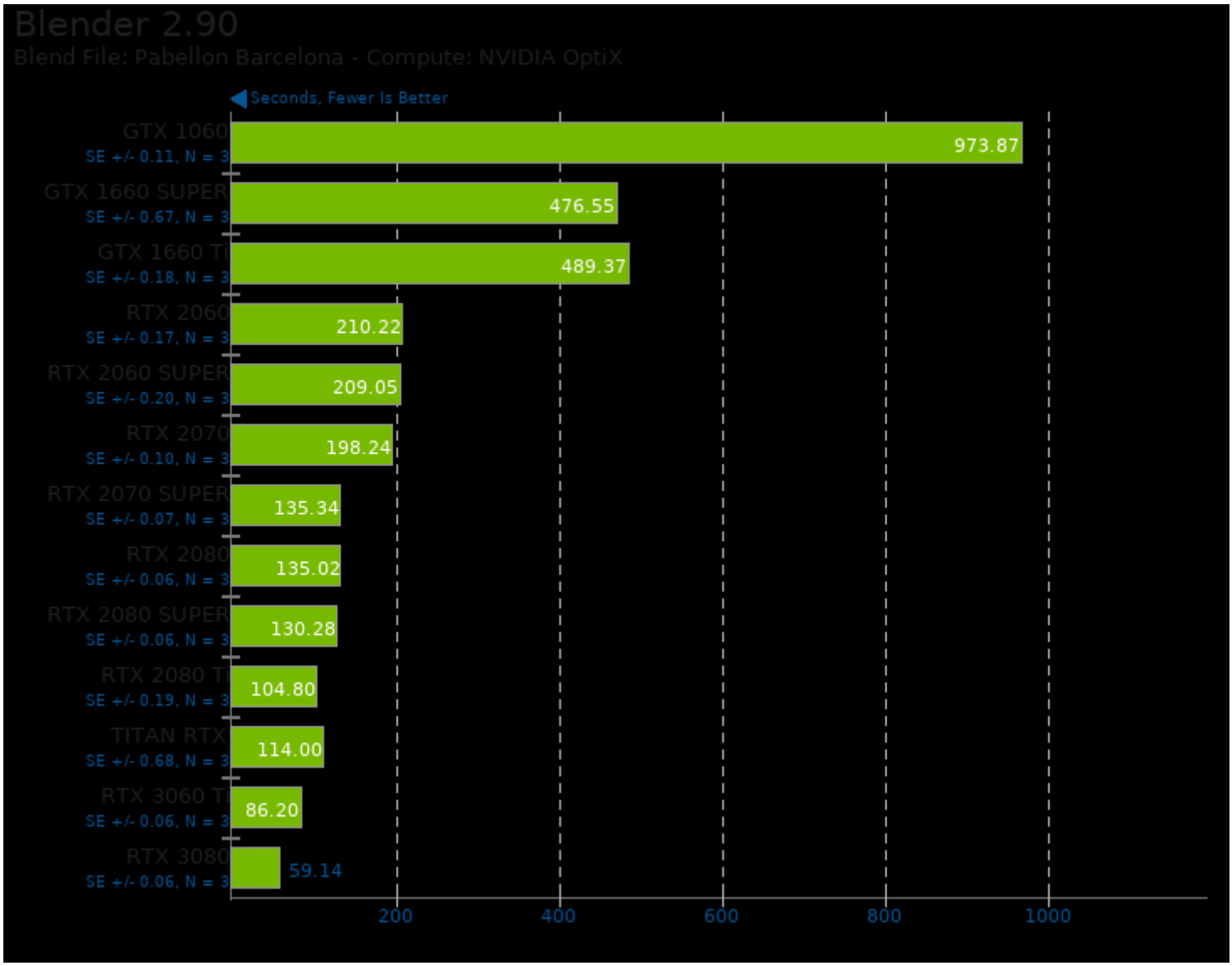



Waifu2x-NCNN Vulkan 20200818
Scale: 2x - Denoise: 3 - TAA: Yes
Seconds, Fewer Is Better
GTX 1060
SE +/- 0.036, N = 5
9.251
GTX 1660 SUPER
SE +/- 0.026, N = 6
7.060
GTX 1660 Ti
SE +/- 0.030, N = 6
7.243
RTX 2060
SE +/- 0.029, N = 7
5.792
RTX 2060 SUPER
SE +/- 0.030, N = 7
5.553
RTX 2070
SE +/- 0.022, N = 7
5.211
RTX 2070 SUPER
SE +/- 0.028, N = 8
4.769
RTX 2080
SE +/- 0.020, N = 8
4.582
RTX 2080 SUPER
SE +/- 0.020, N = 8
4.368
RTX 2080 Ti
SE +/- 0.021, N = 8
3.835
TITAN RTX
SE +/- 0.023, N = 8
4.124
RTX 3060 Ti
SE +/- 0.032, N = 8
4.236
RTX 3080
SE +/- 0.028, N = 9
3.519
3
6
9
12
15

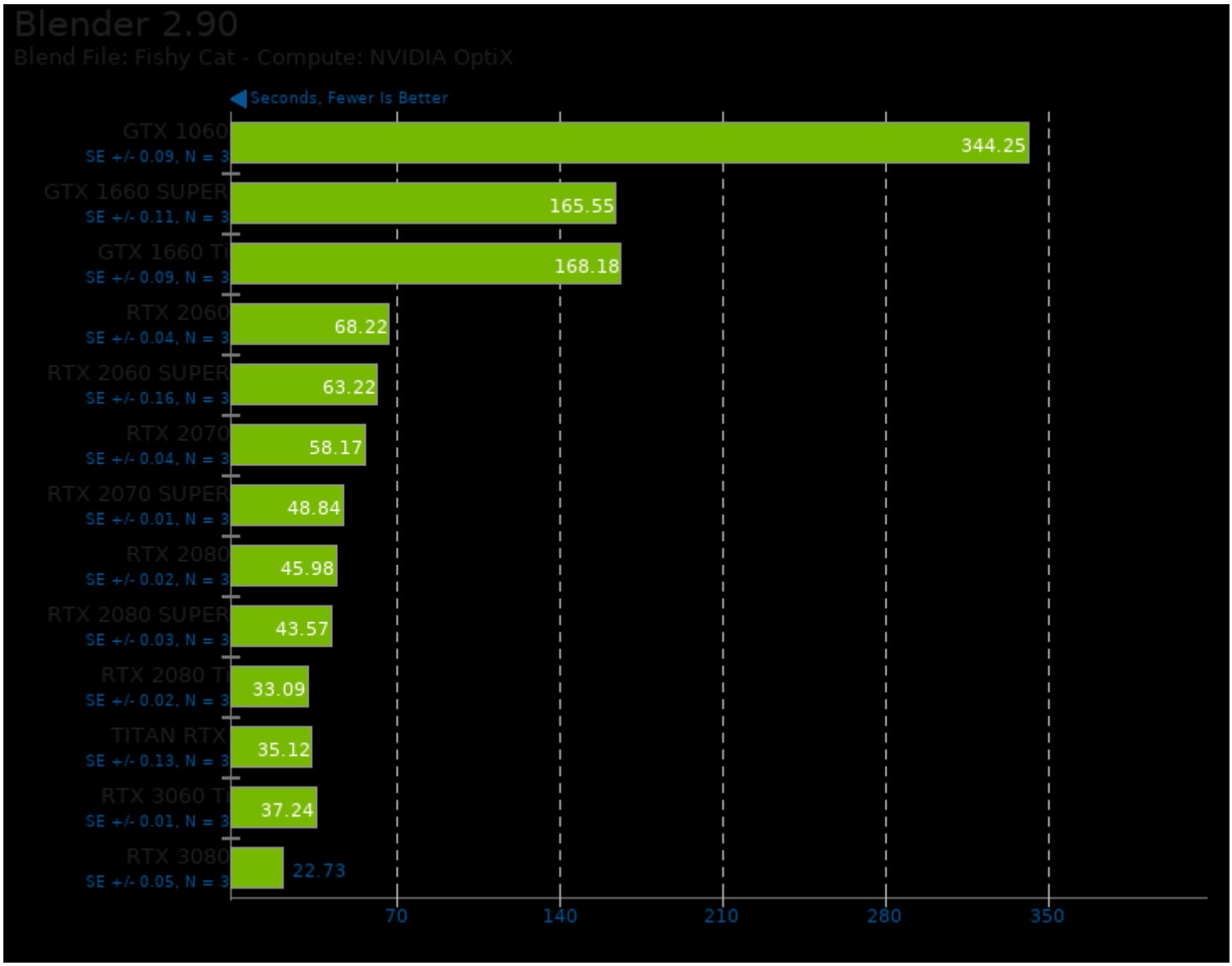
NVIDIA Compute Tests



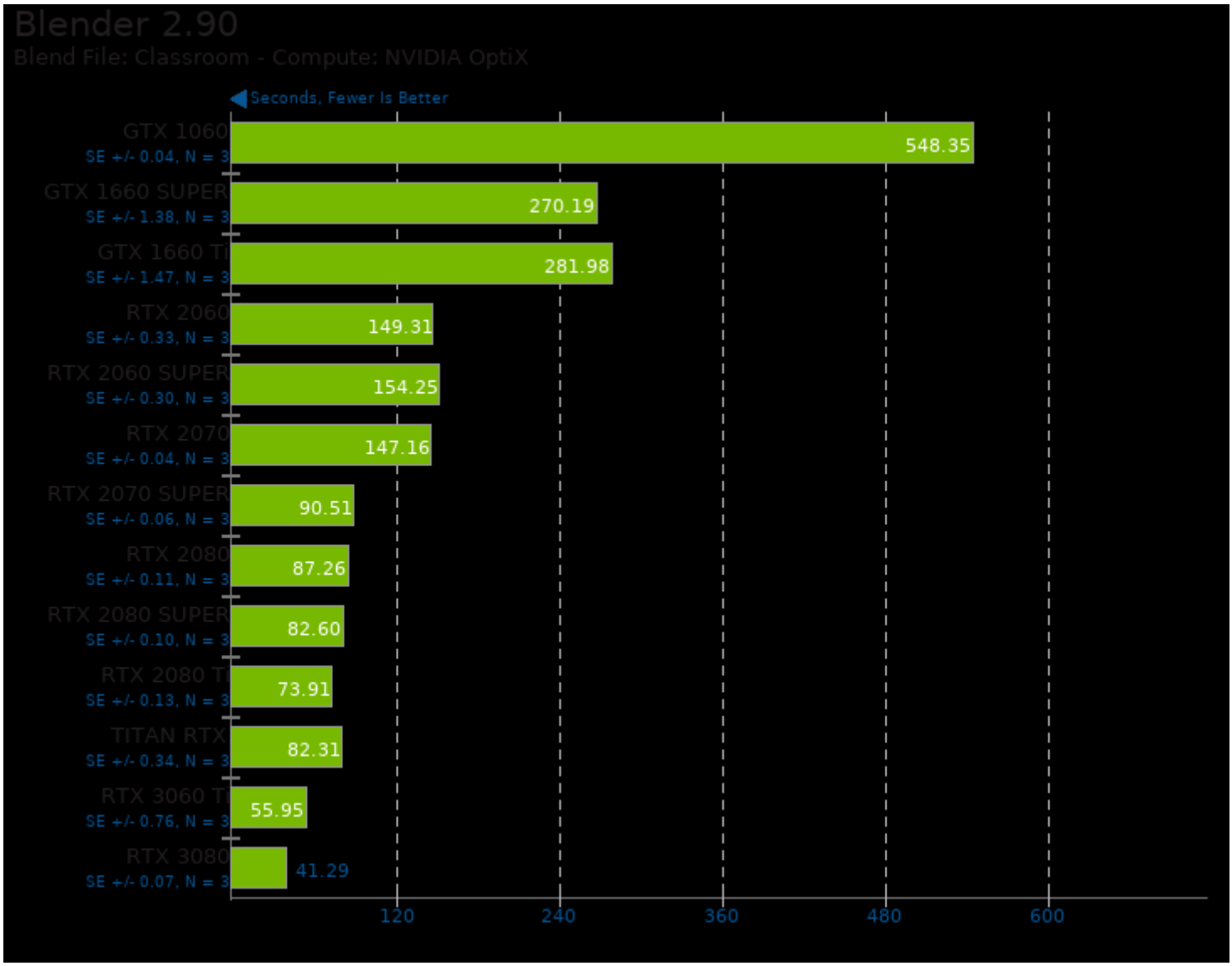
NVIDIA Compute Tests



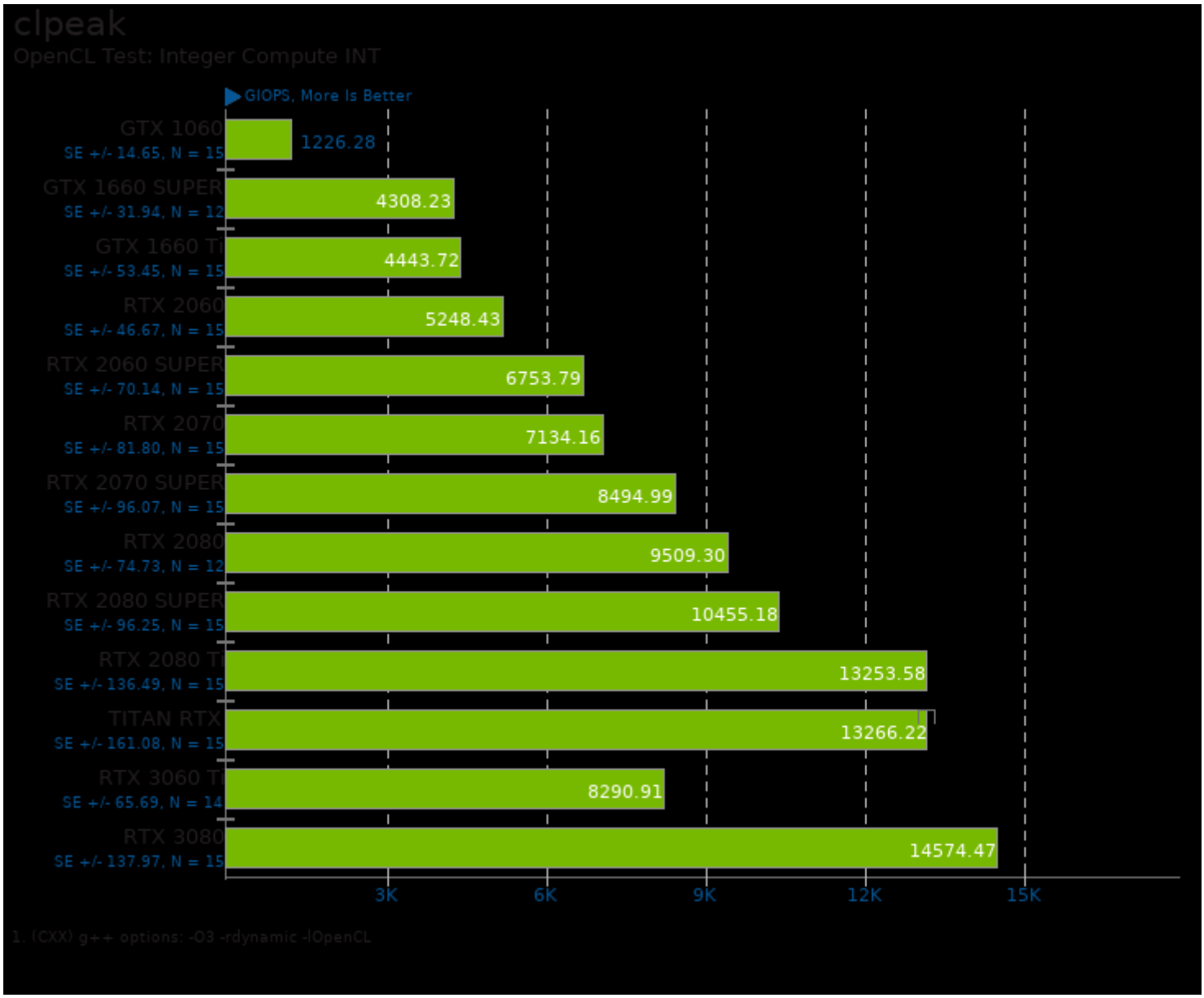
NVIDIA Compute Tests



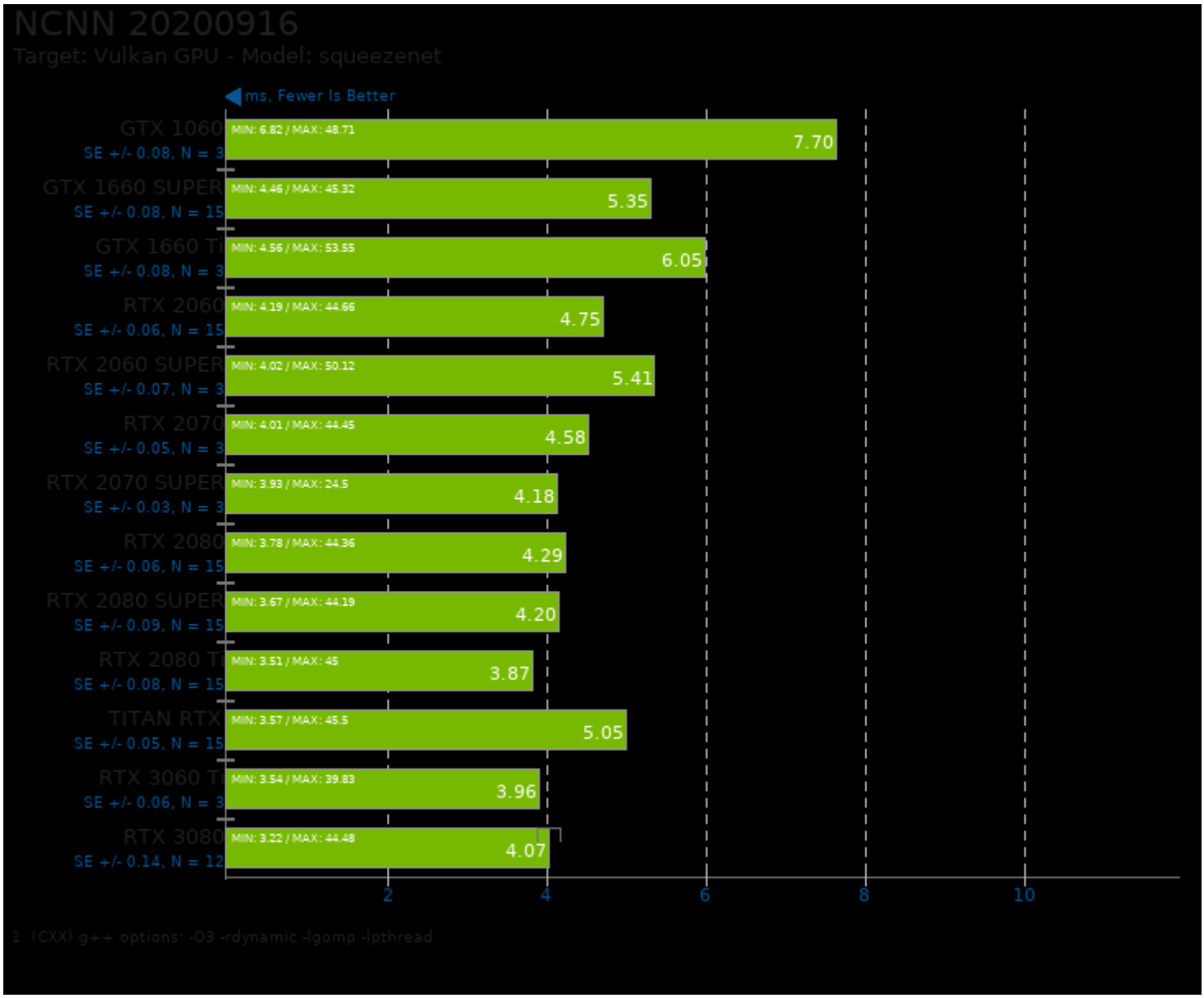
NVIDIA Compute Tests



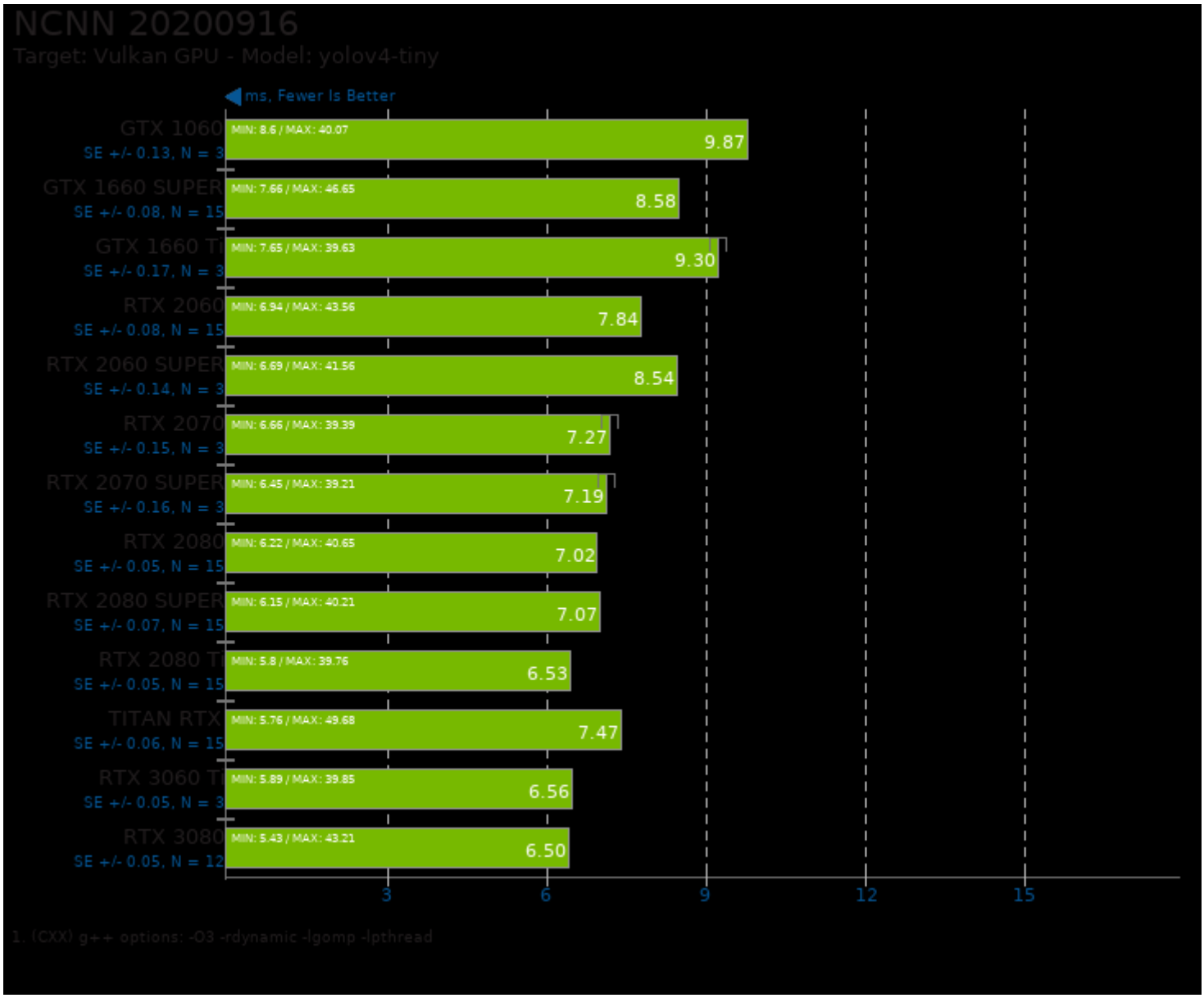
NVIDIA Compute Tests

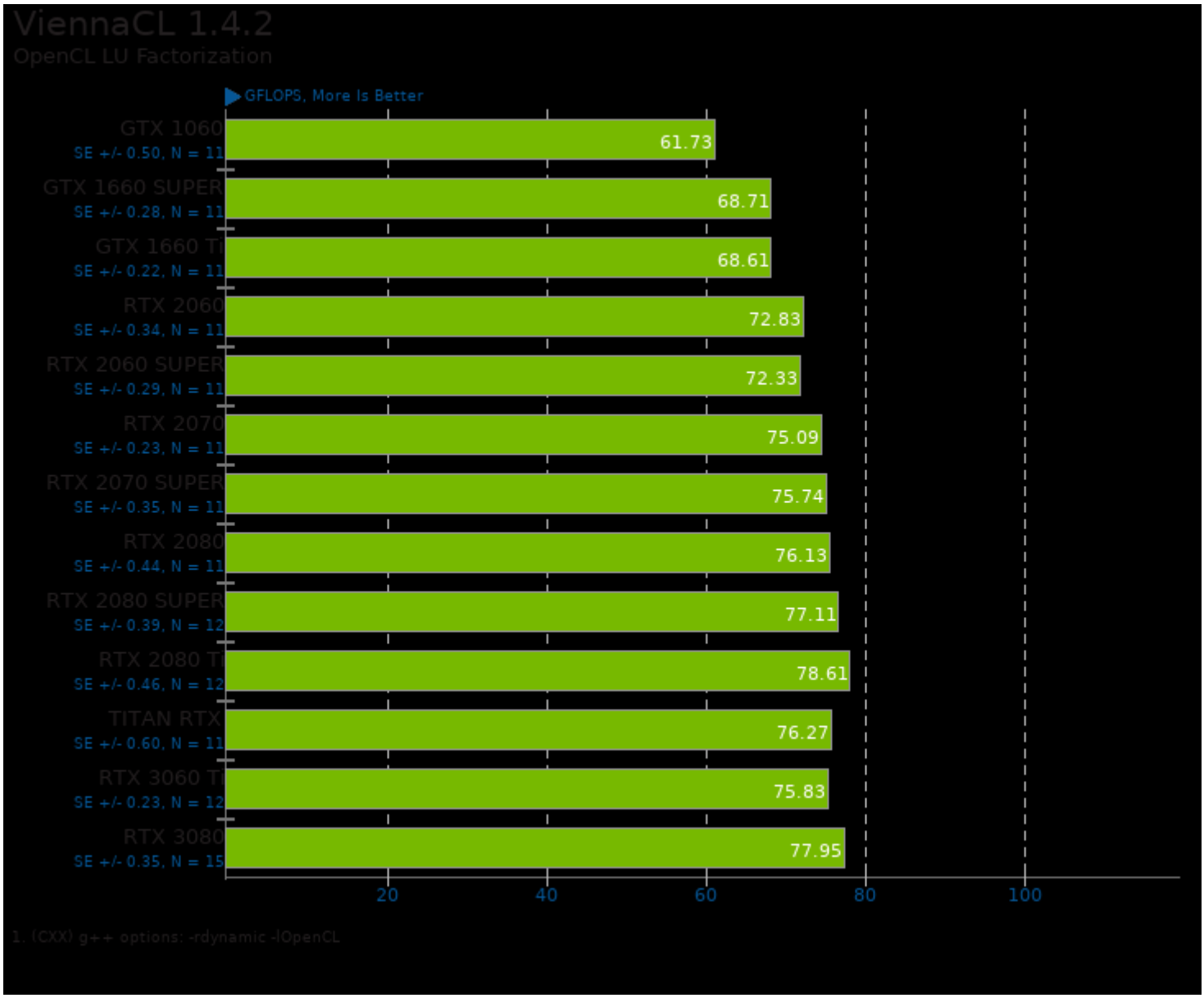


NVIDIA Compute Tests

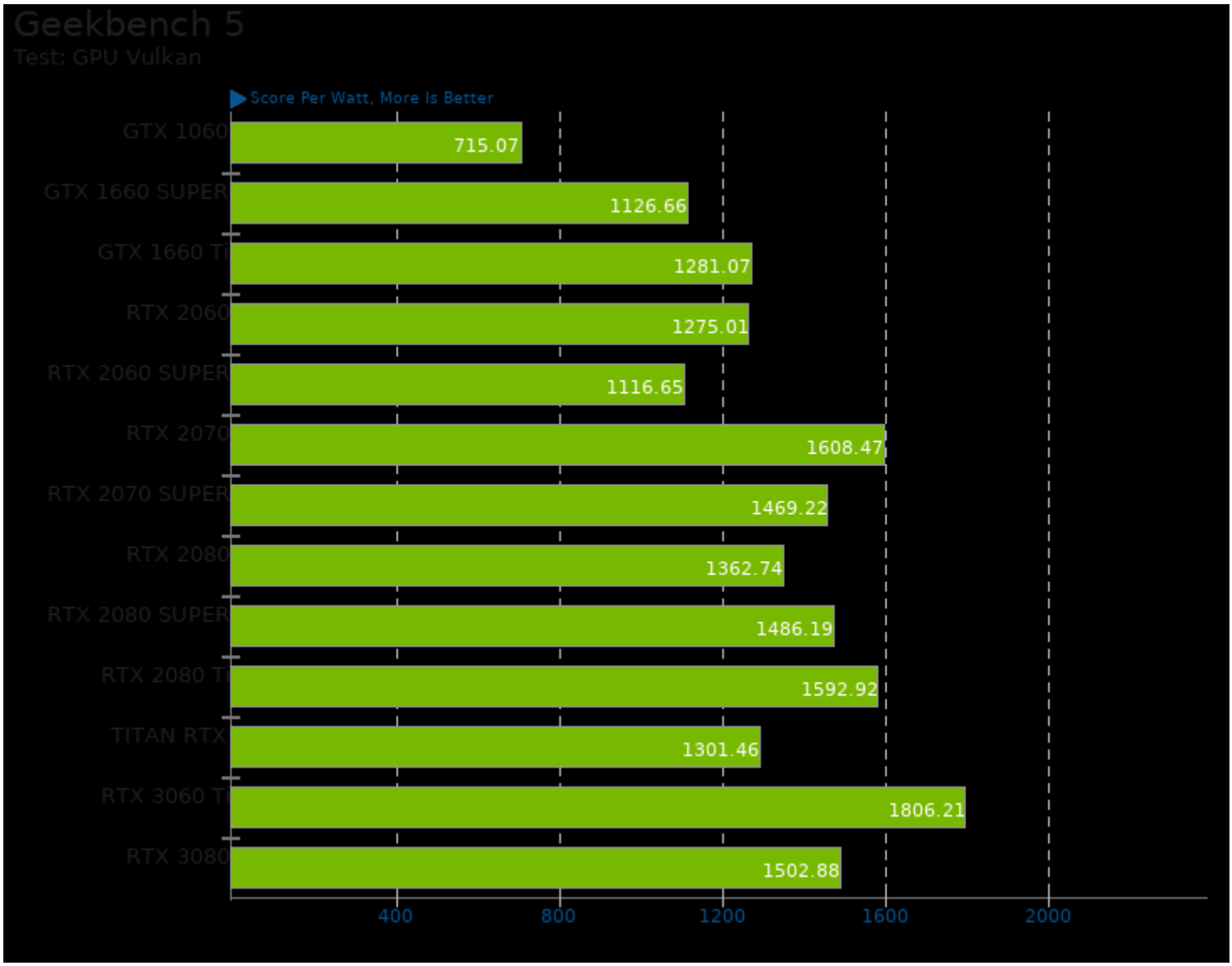


NVIDIA Compute Tests

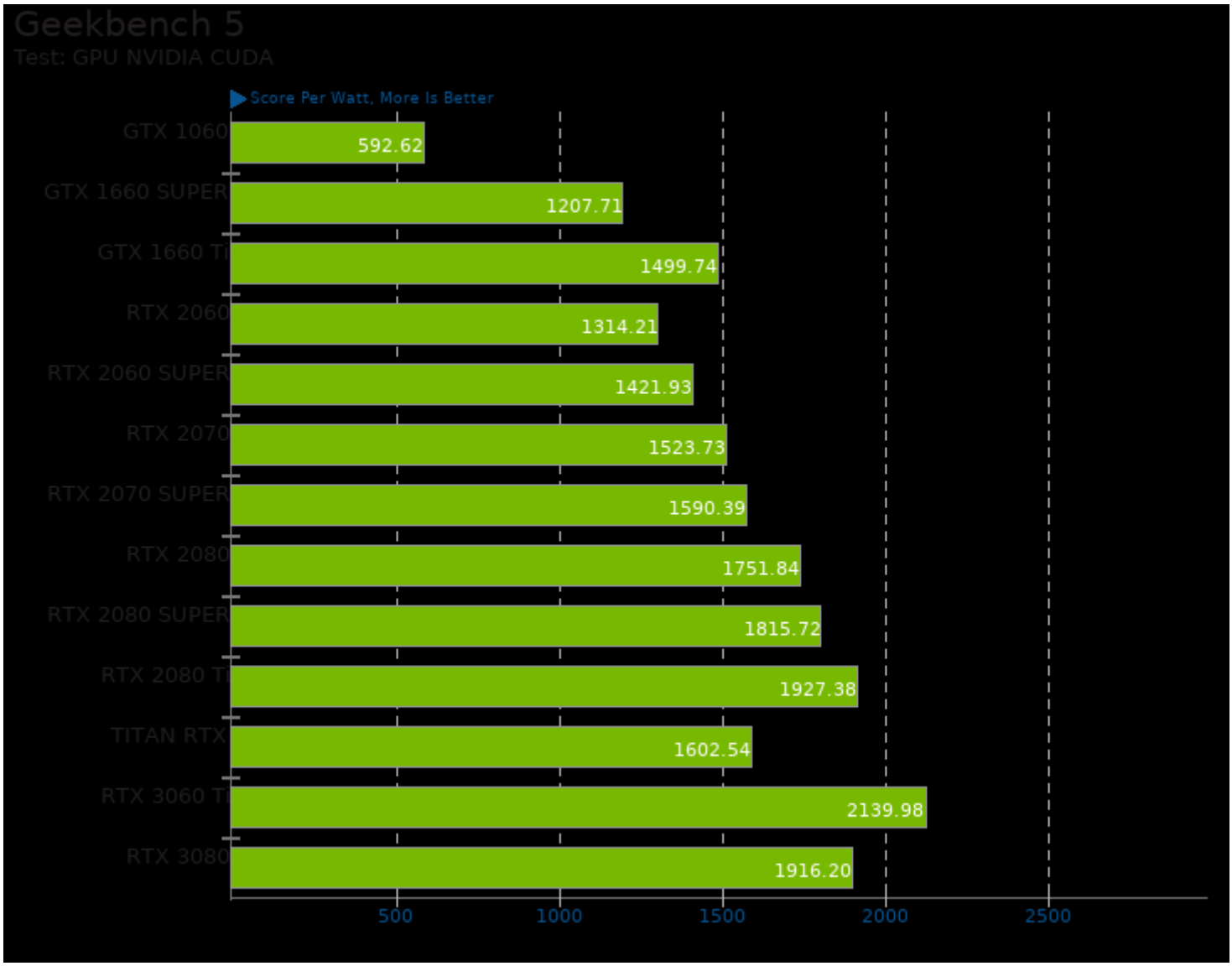



ViennaCL 1.4.2
OpenCL LU Factorization
GFLOPS, More Is Better
GTX 1060
SE +/- 0.50, N = 11
61.73
GTX 1660 SUPER
SE +/- 0.28, N = 11
68.71
GTX 1660 Ti
SE +/- 0.22, N = 11
68.61
RTX 2060
SE +/- 0.34, N = 11
72.83
RTX 2060 SUPER
SE +/- 0.29, N = 11
72.33
RTX 2070
SE +/- 0.23, N = 11
75.09
RTX 2070 SUPER
SE +/- 0.35, N = 11
75.74
RTX 2080
SE +/- 0.44, N = 11
76.13
RTX 2080 SUPER
SE +/- 0.39, N = 12
77.11
RTX 2080 Ti
SE +/- 0.46, N = 12
78.61
TITAN RTX
SE +/- 0.60, N = 11
76.27
RTX 3060 Ti
SE +/- 0.23, N = 12
75.83
RTX 3080
SE +/- 0.35, N = 15
77.95
20
40
60
80
100
1. (CXX) g++ options: -rdynamic -lOpenCL

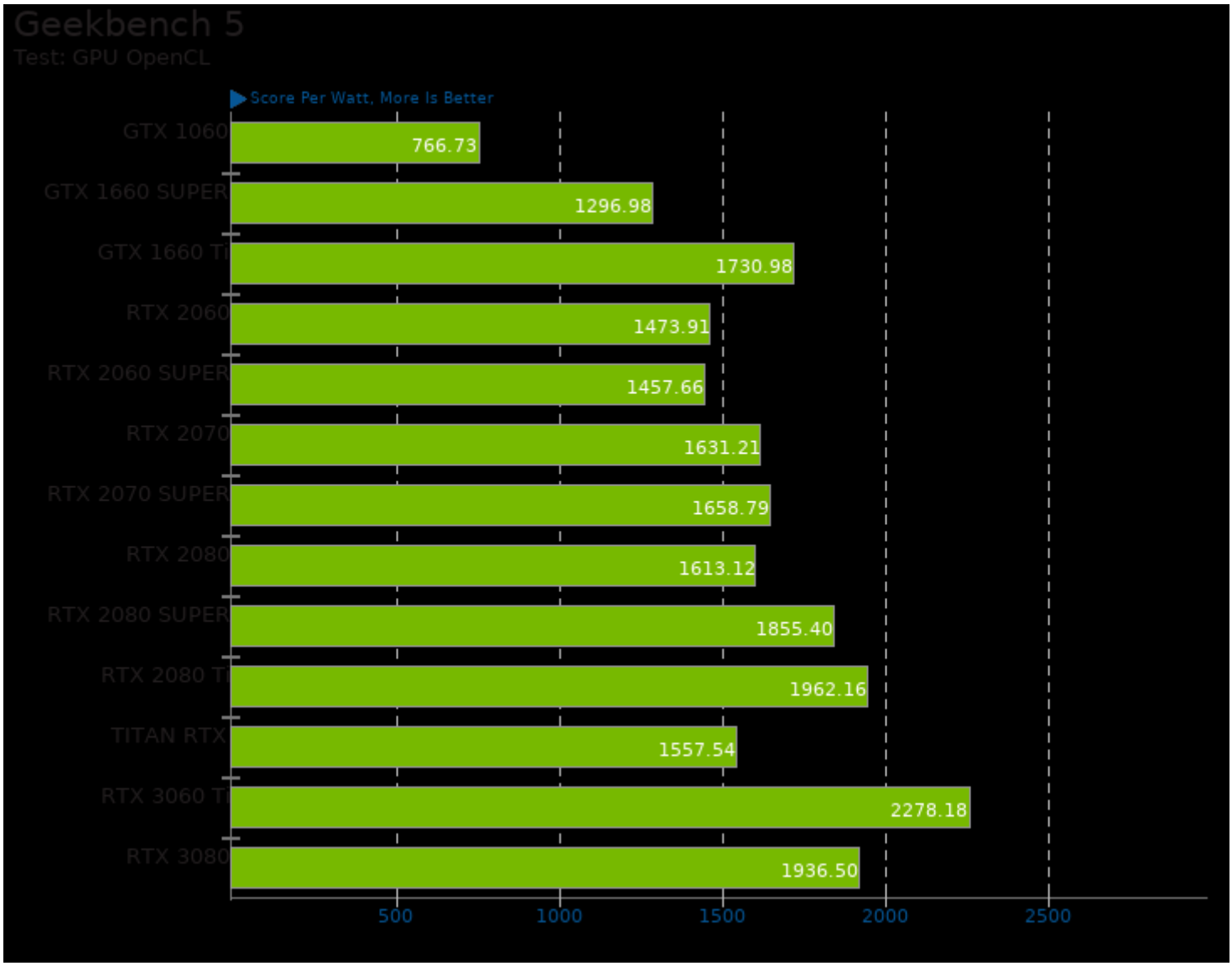
NVIDIA Compute Tests



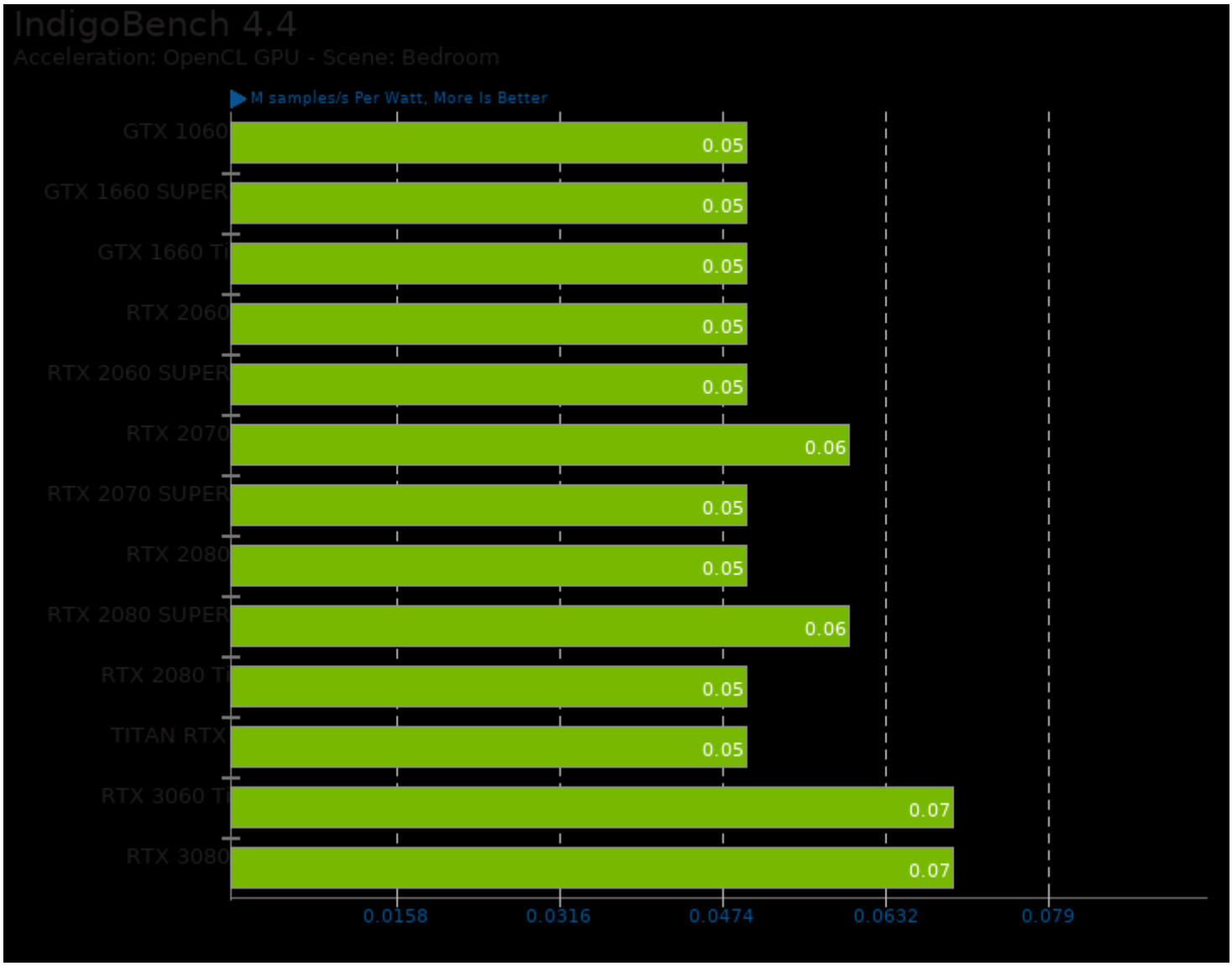
NVIDIA Compute Tests



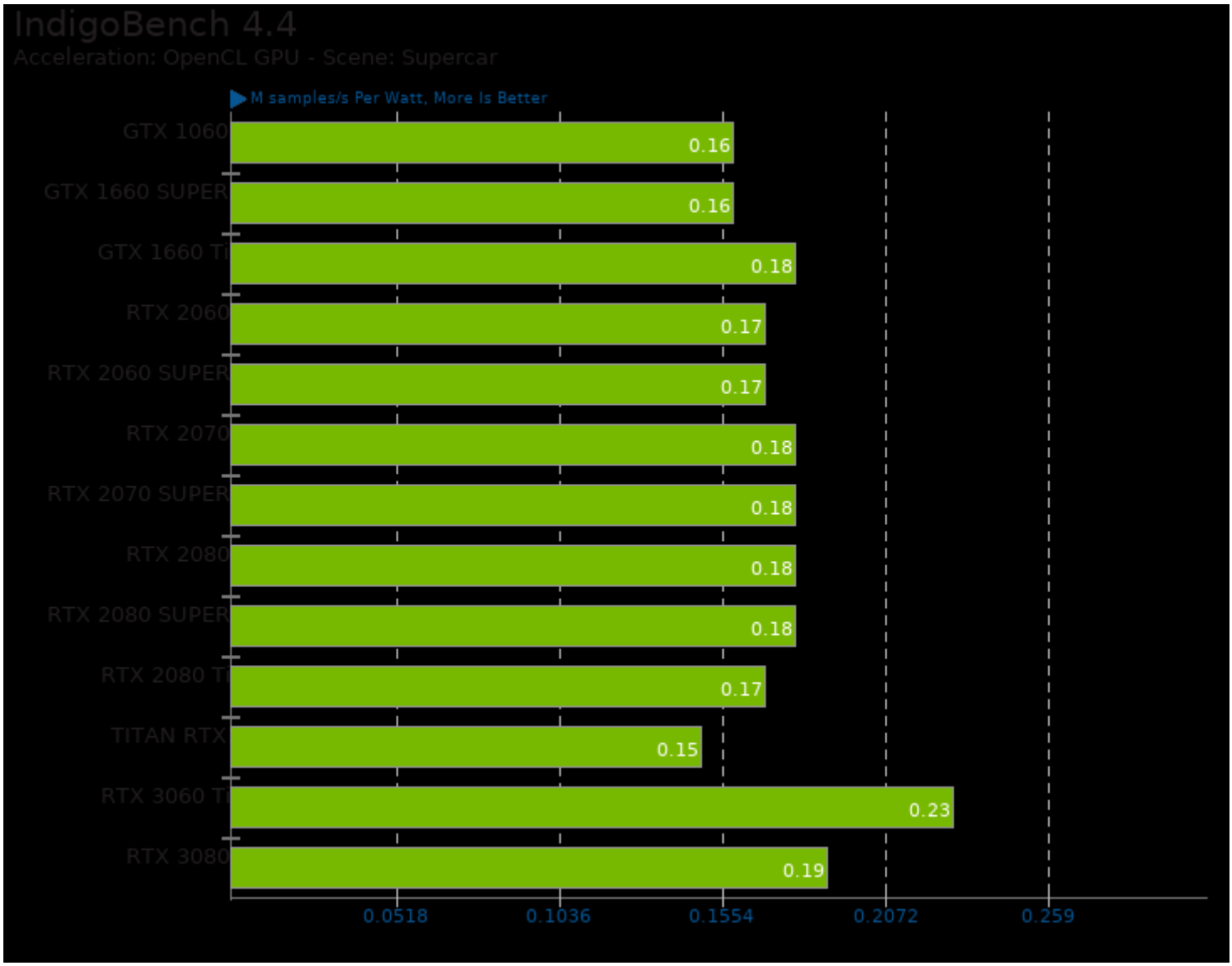
NVIDIA Compute Tests



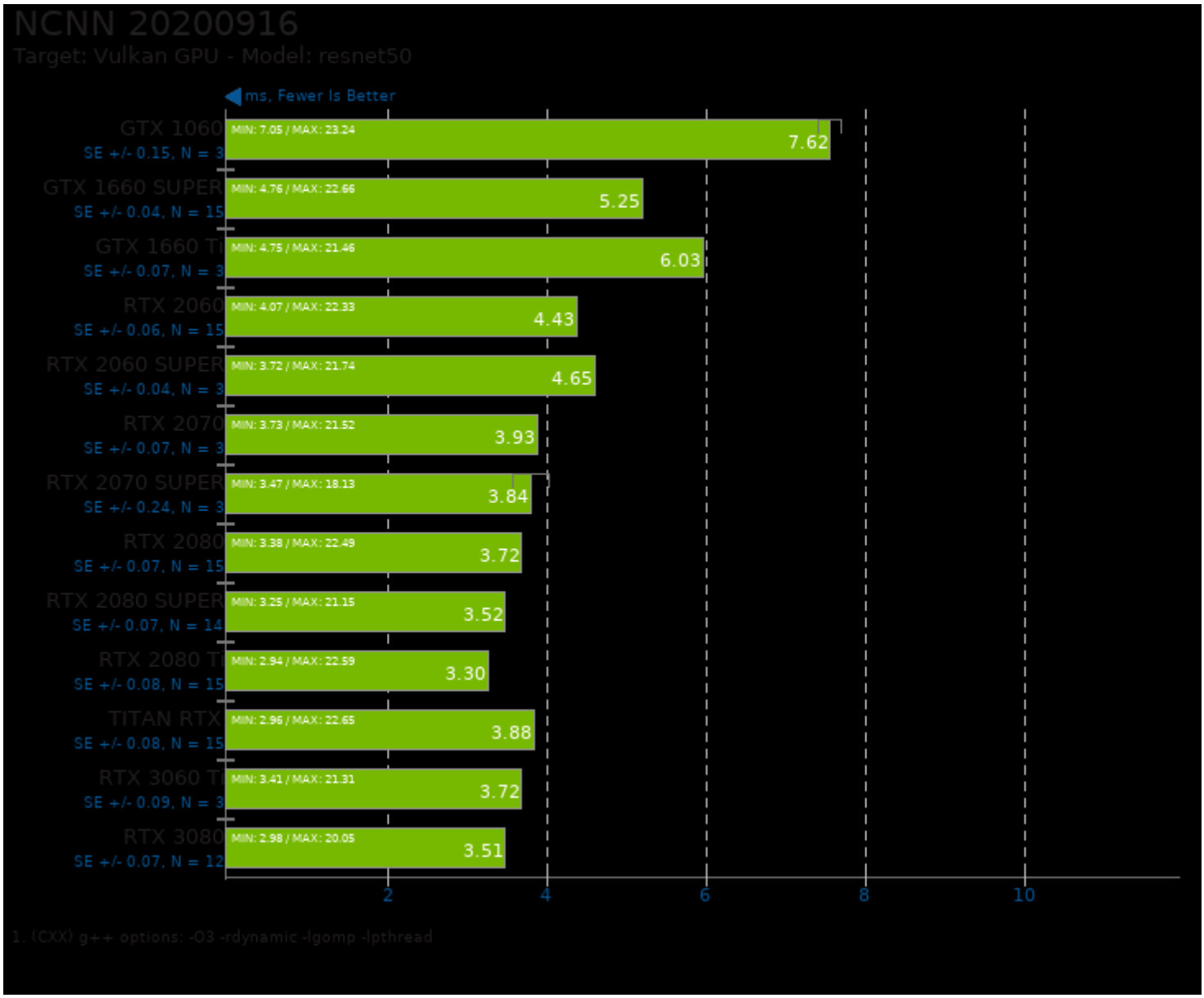
NVIDIA Compute Tests



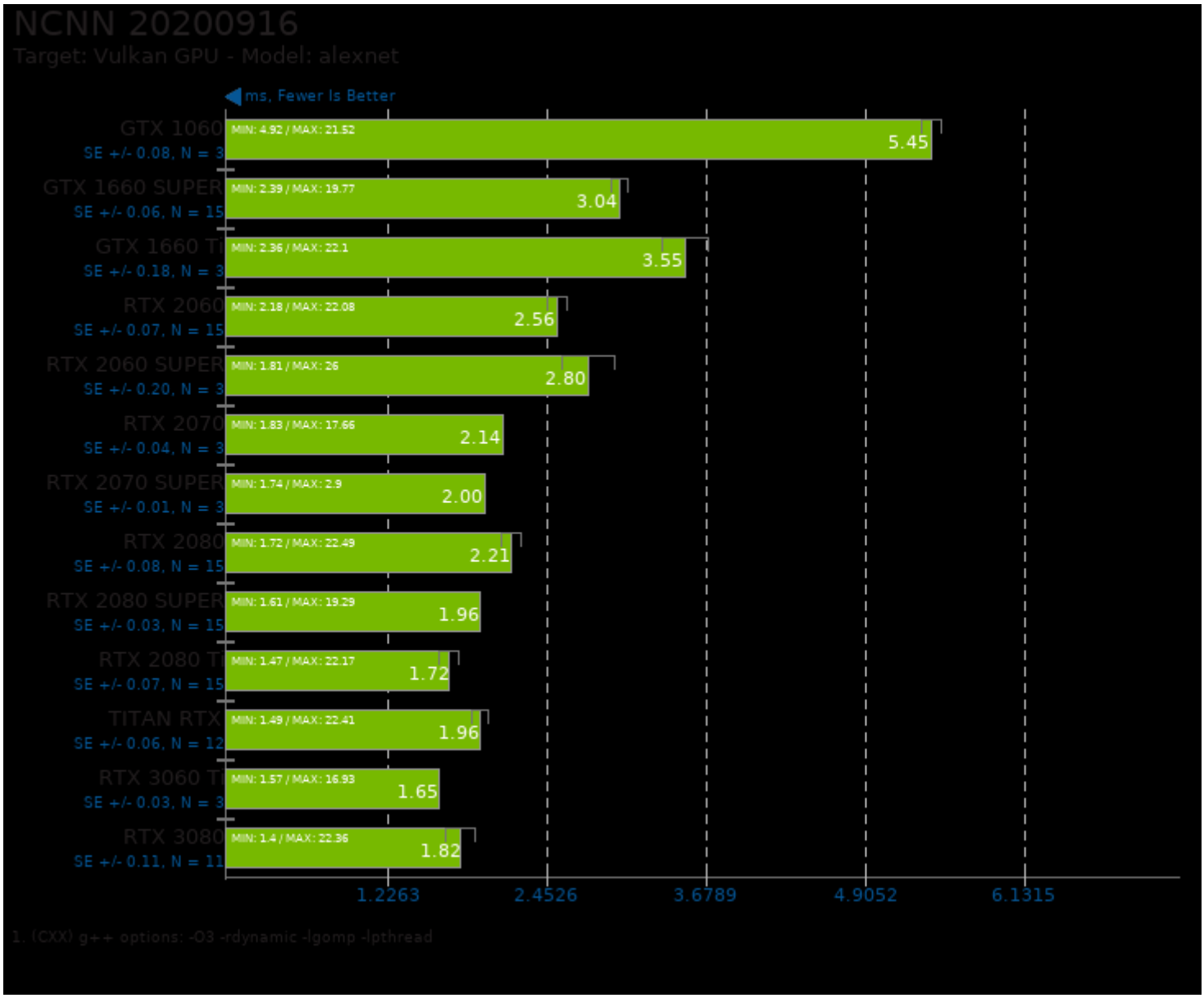
NVIDIA Compute Tests



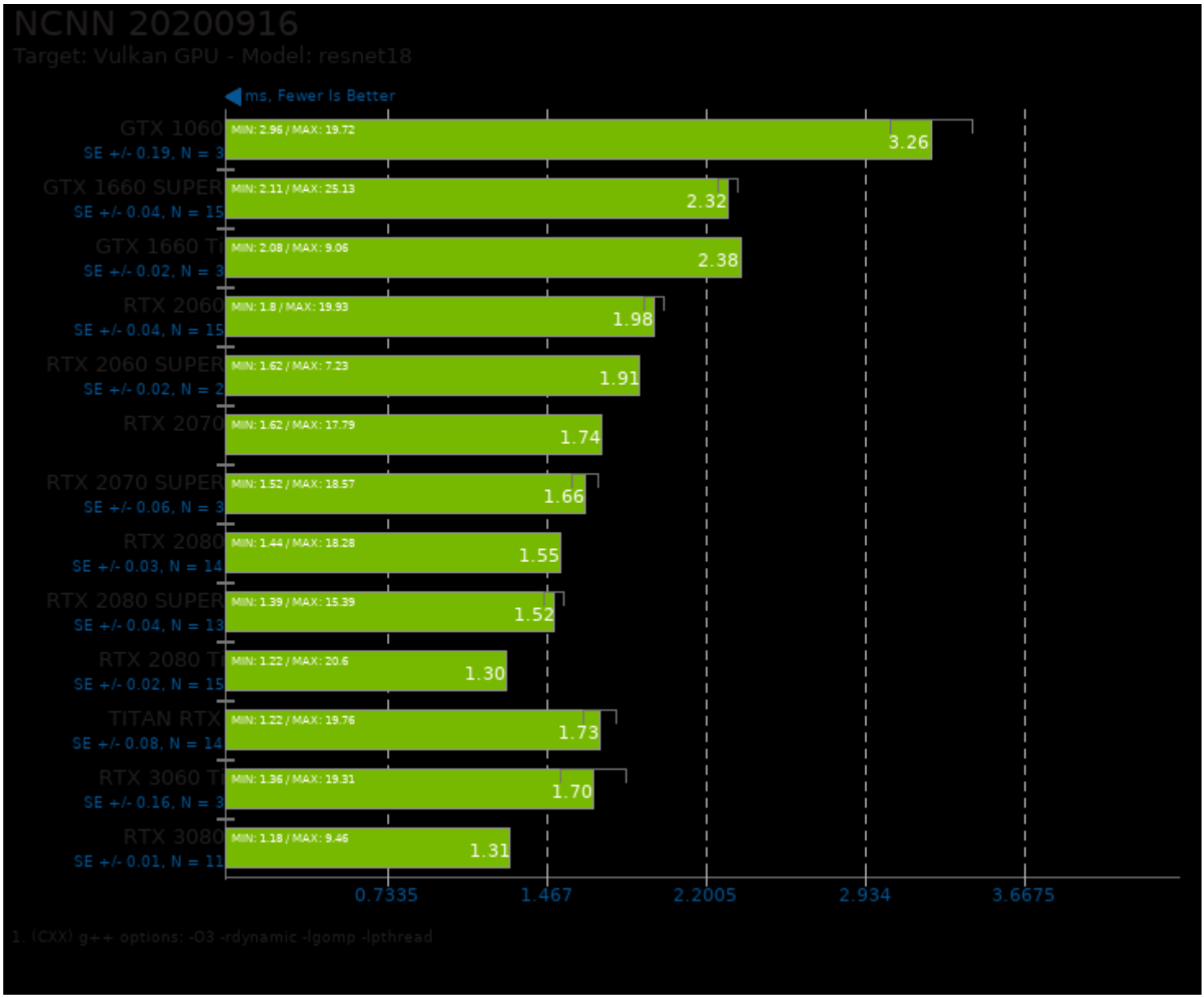
NVIDIA Compute Tests



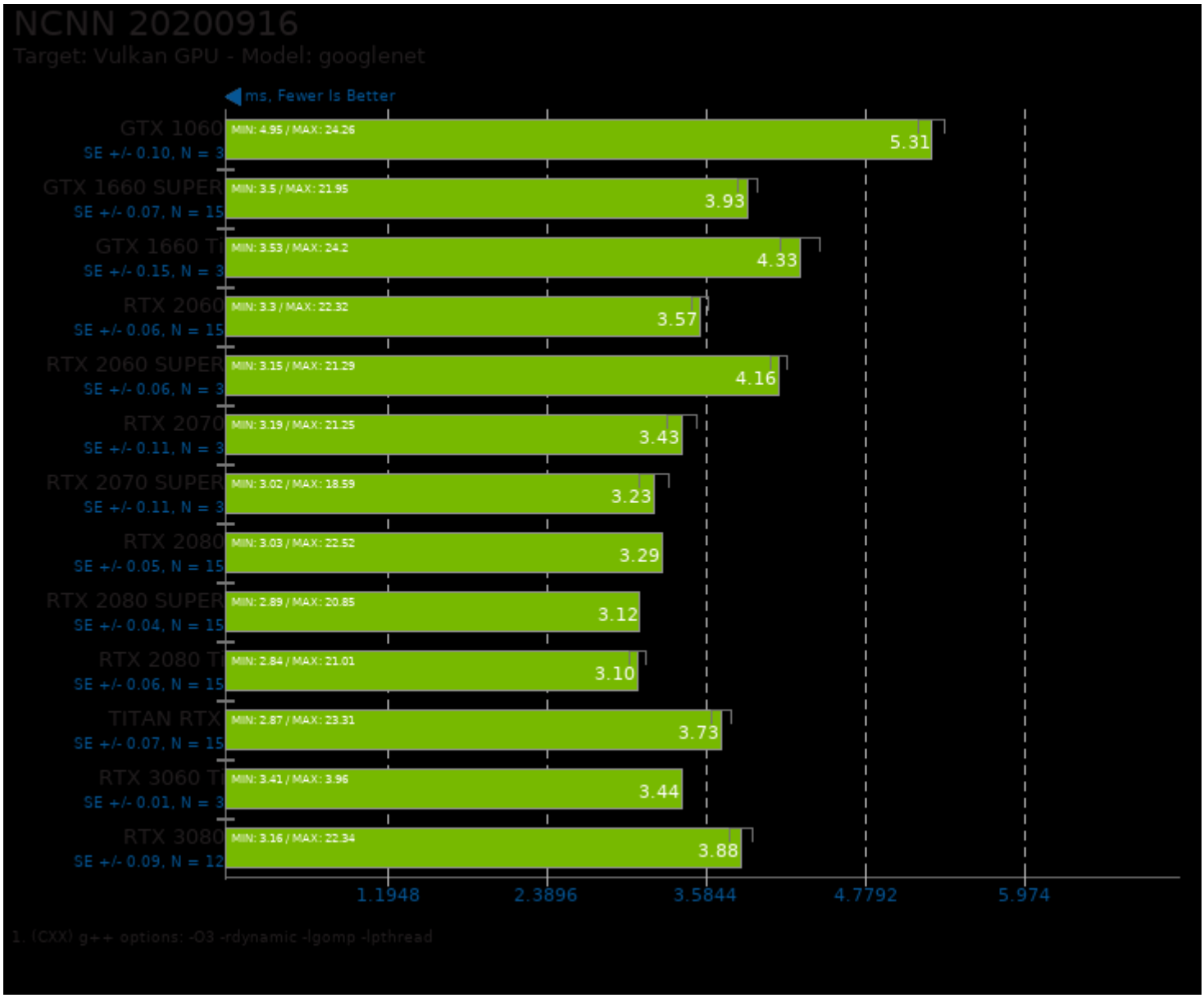
NVIDIA Compute Tests



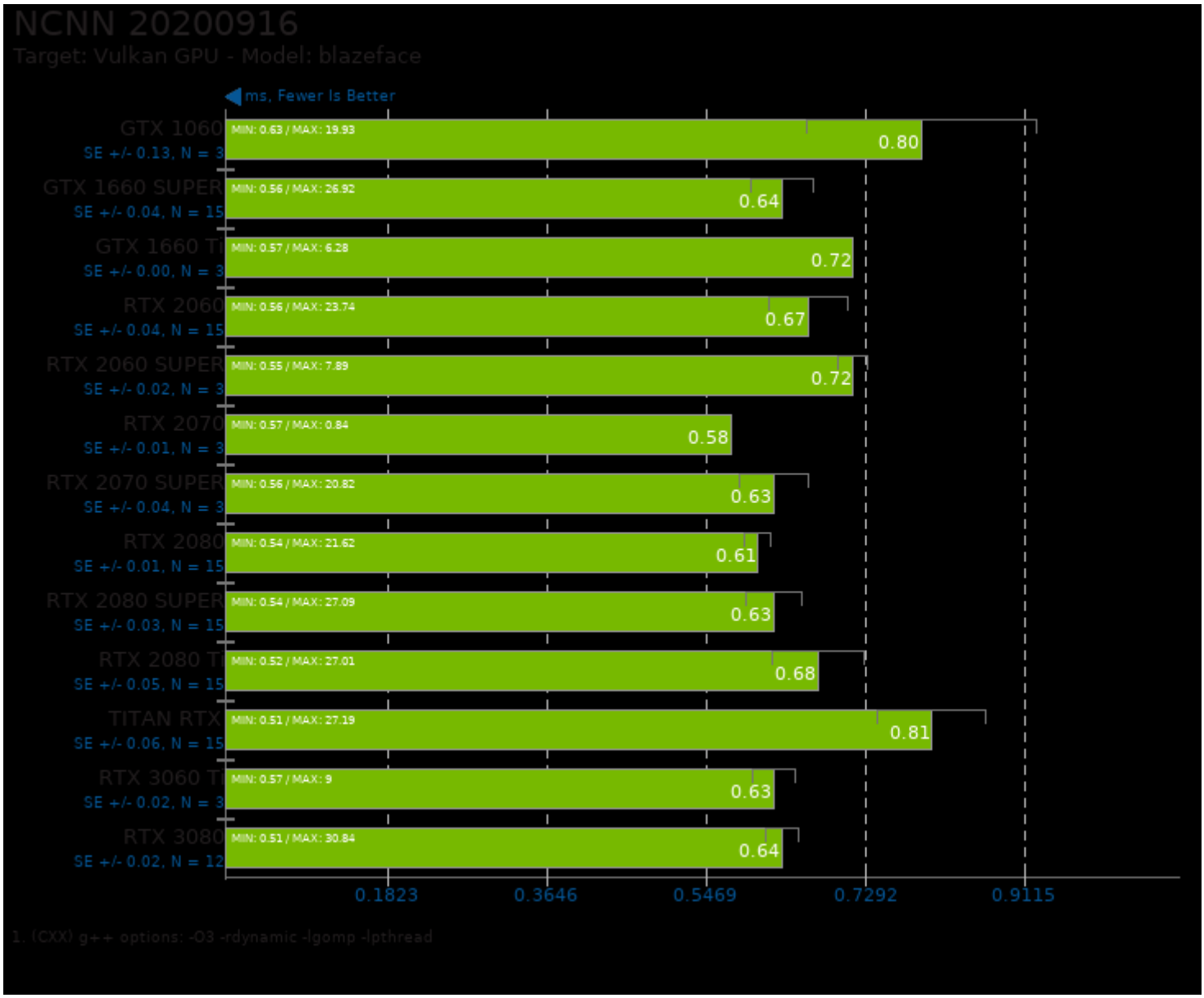
NVIDIA Compute Tests



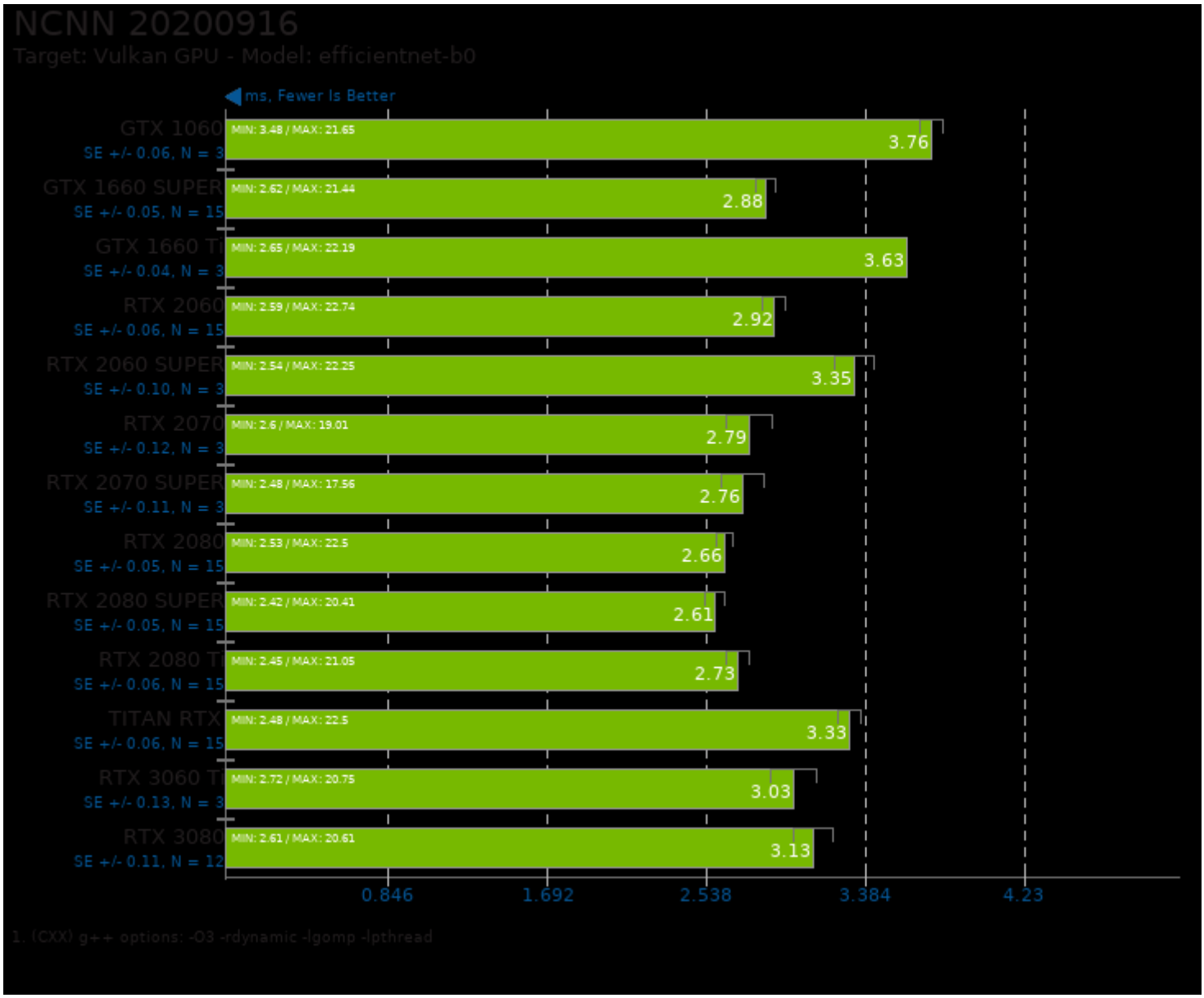
NVIDIA Compute Tests



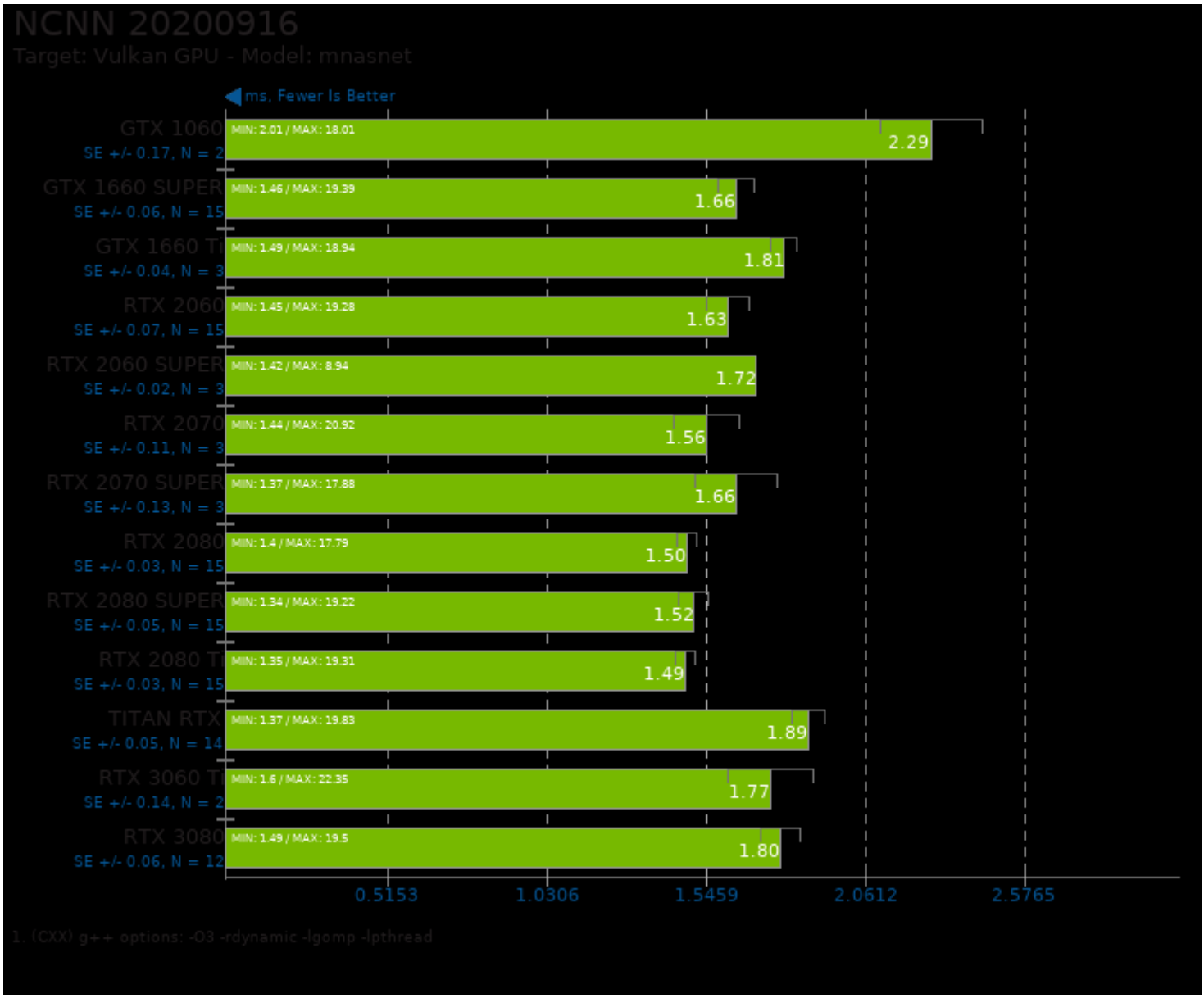
NVIDIA Compute Tests



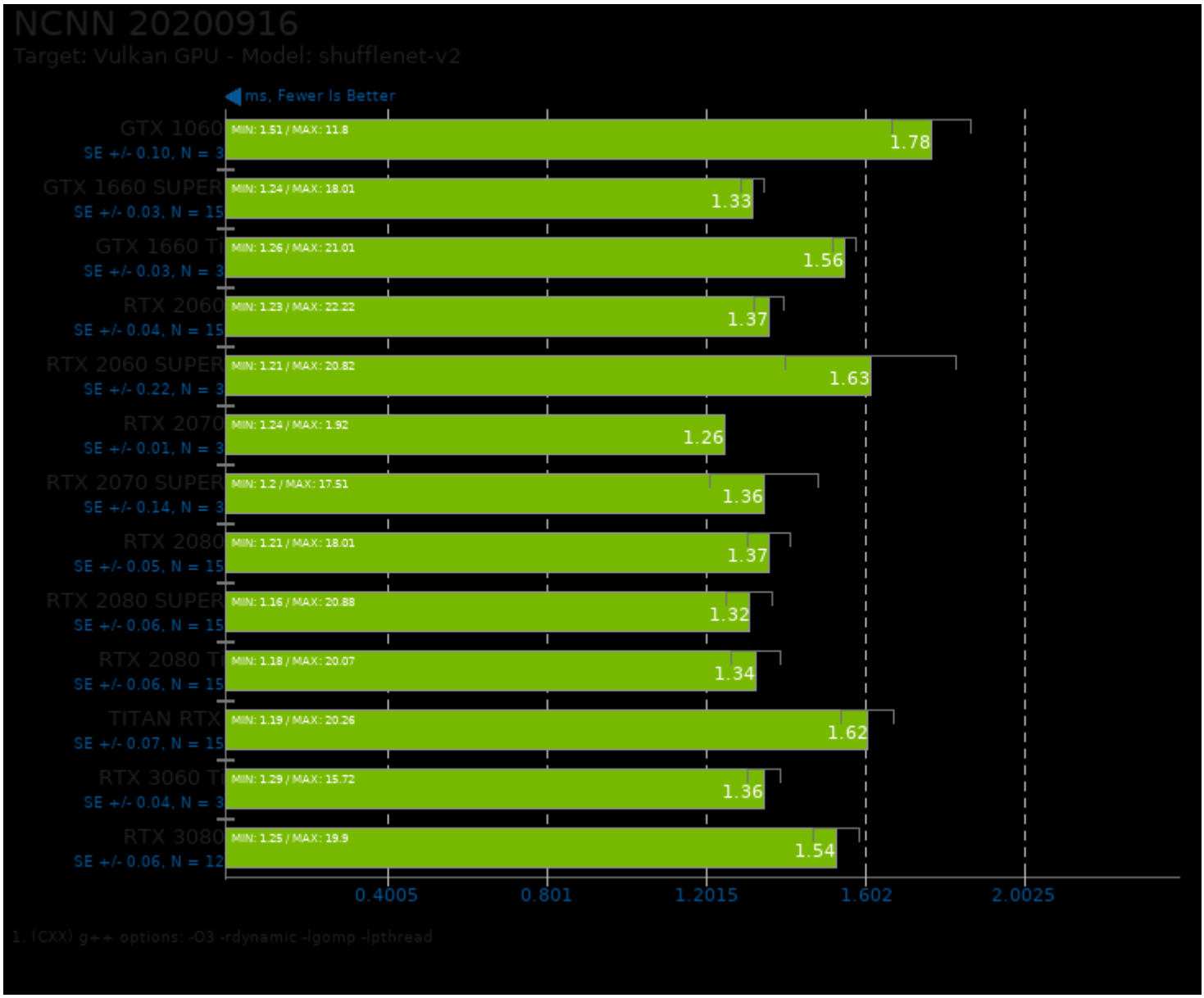
NVIDIA Compute Tests



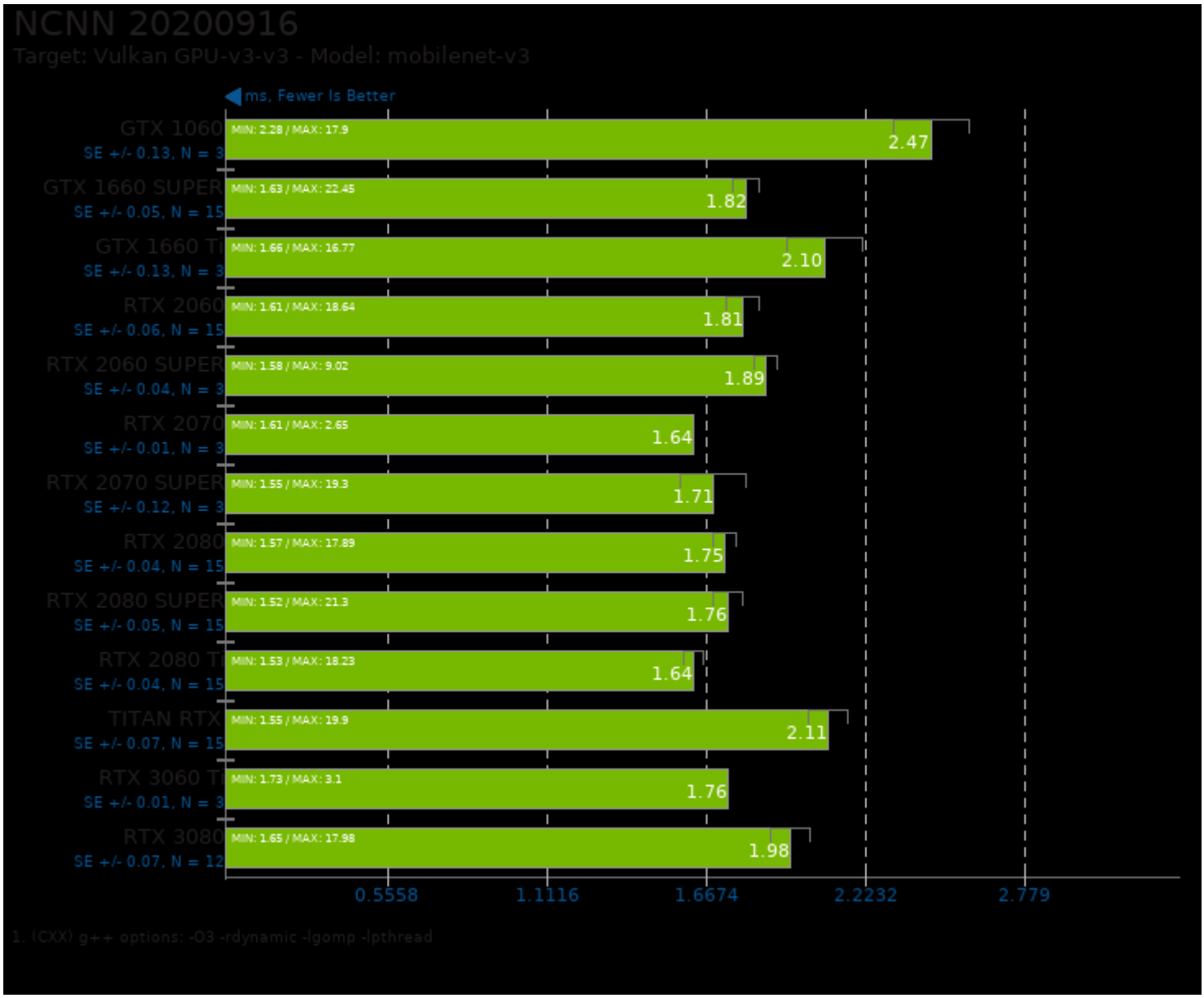
NVIDIA Compute Tests



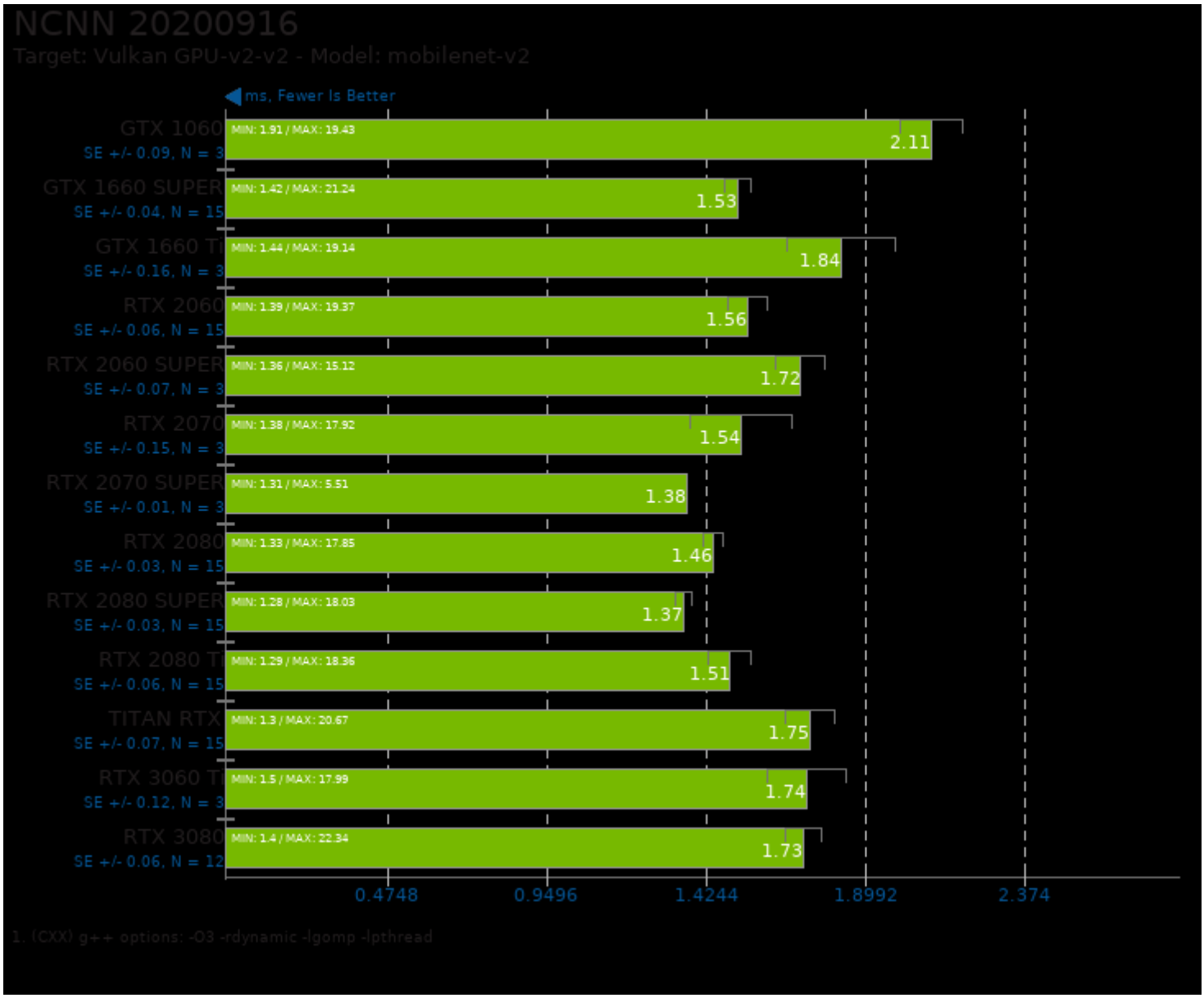
NVIDIA Compute Tests



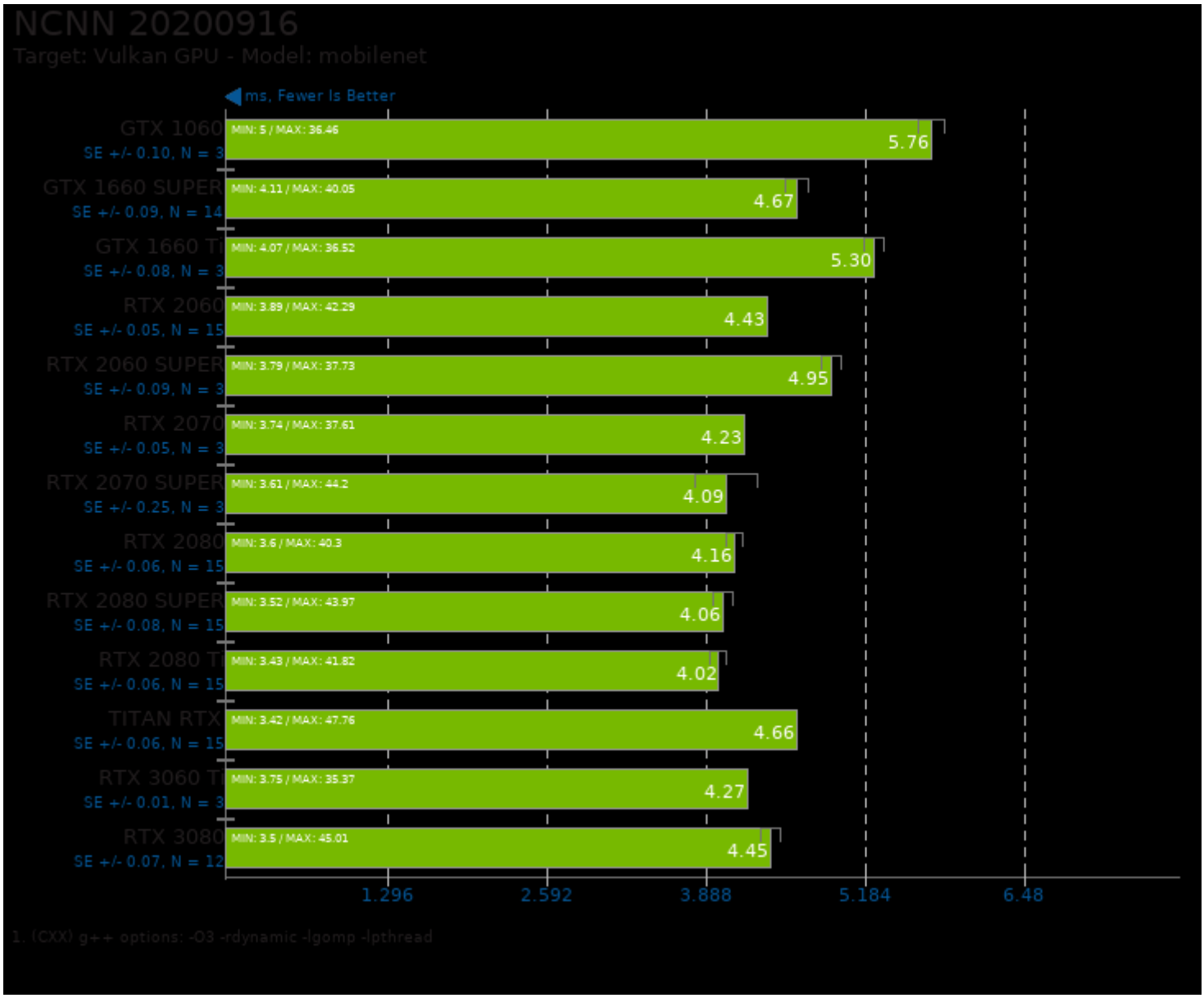
NVIDIA Compute Tests



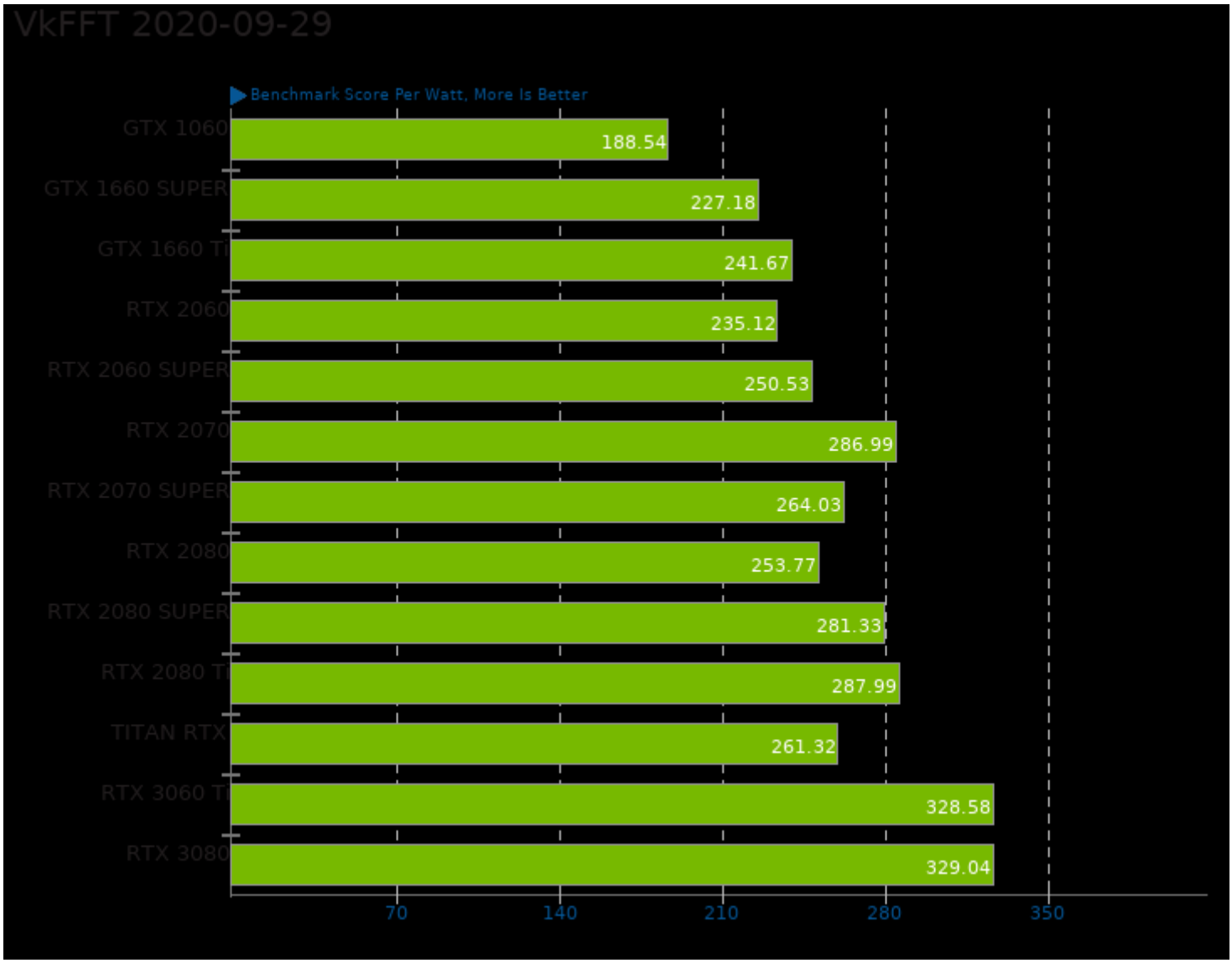
NVIDIA Compute Tests



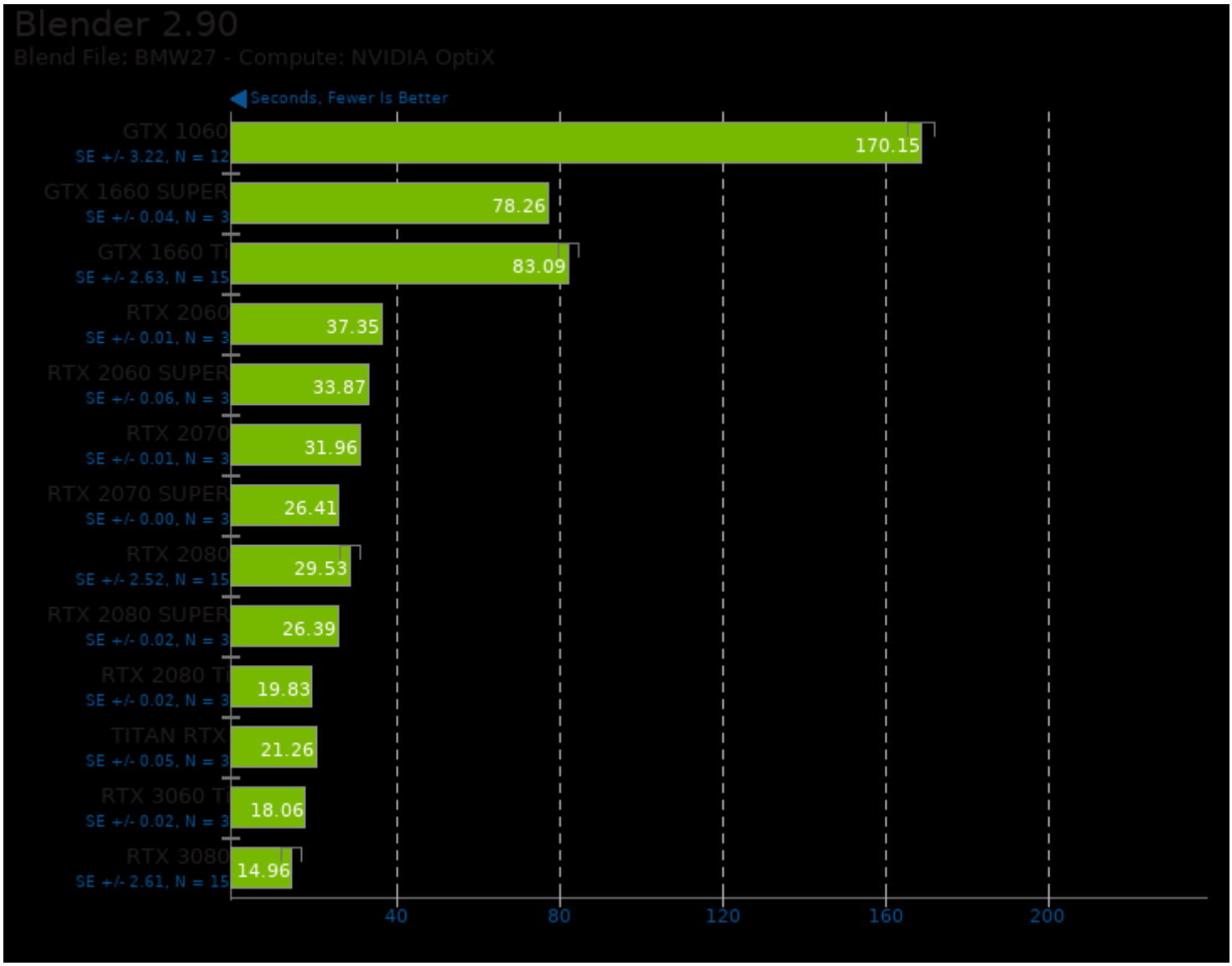
NVIDIA Compute Tests



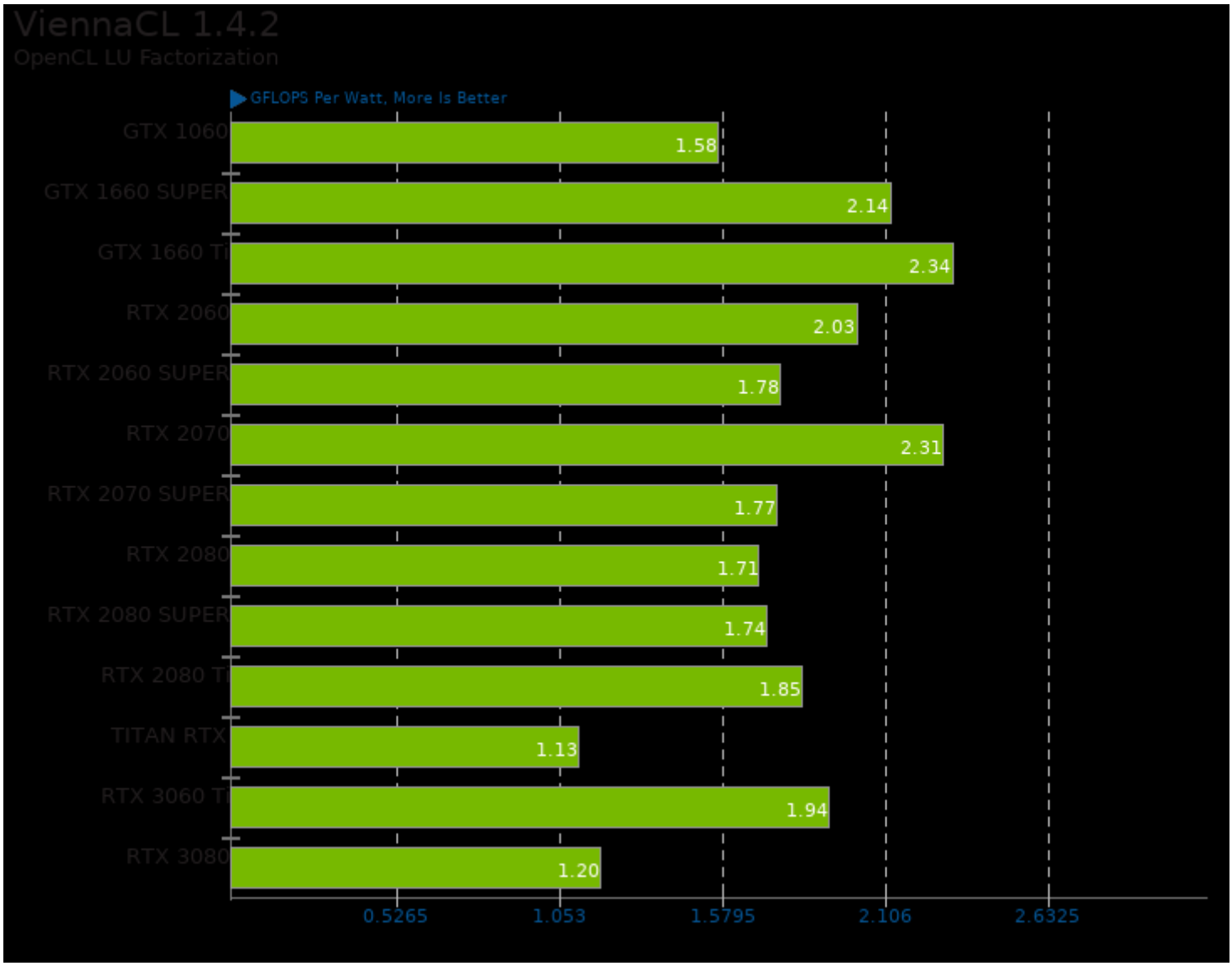
NVIDIA Compute Tests



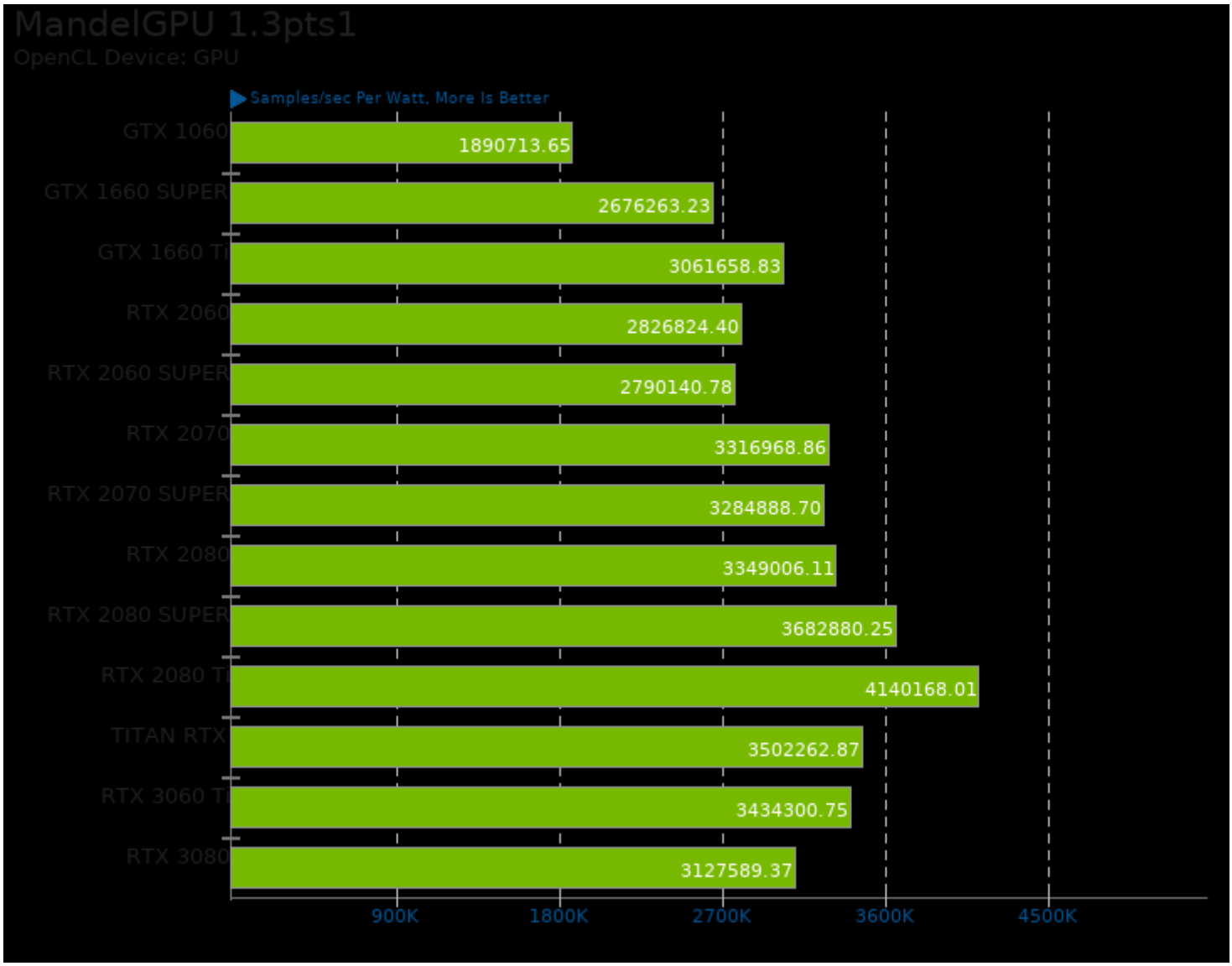
NVIDIA Compute Tests



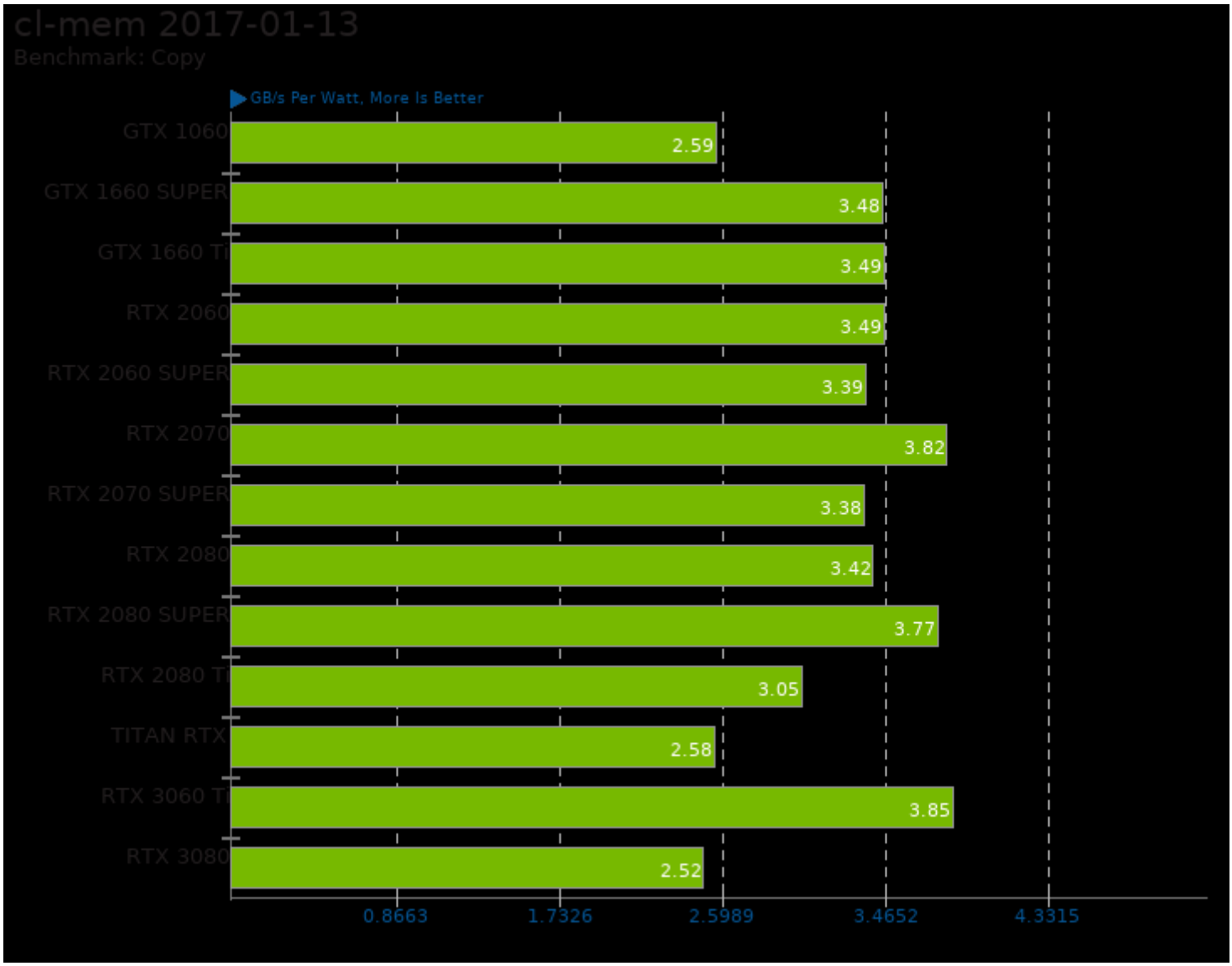
NVIDIA Compute Tests



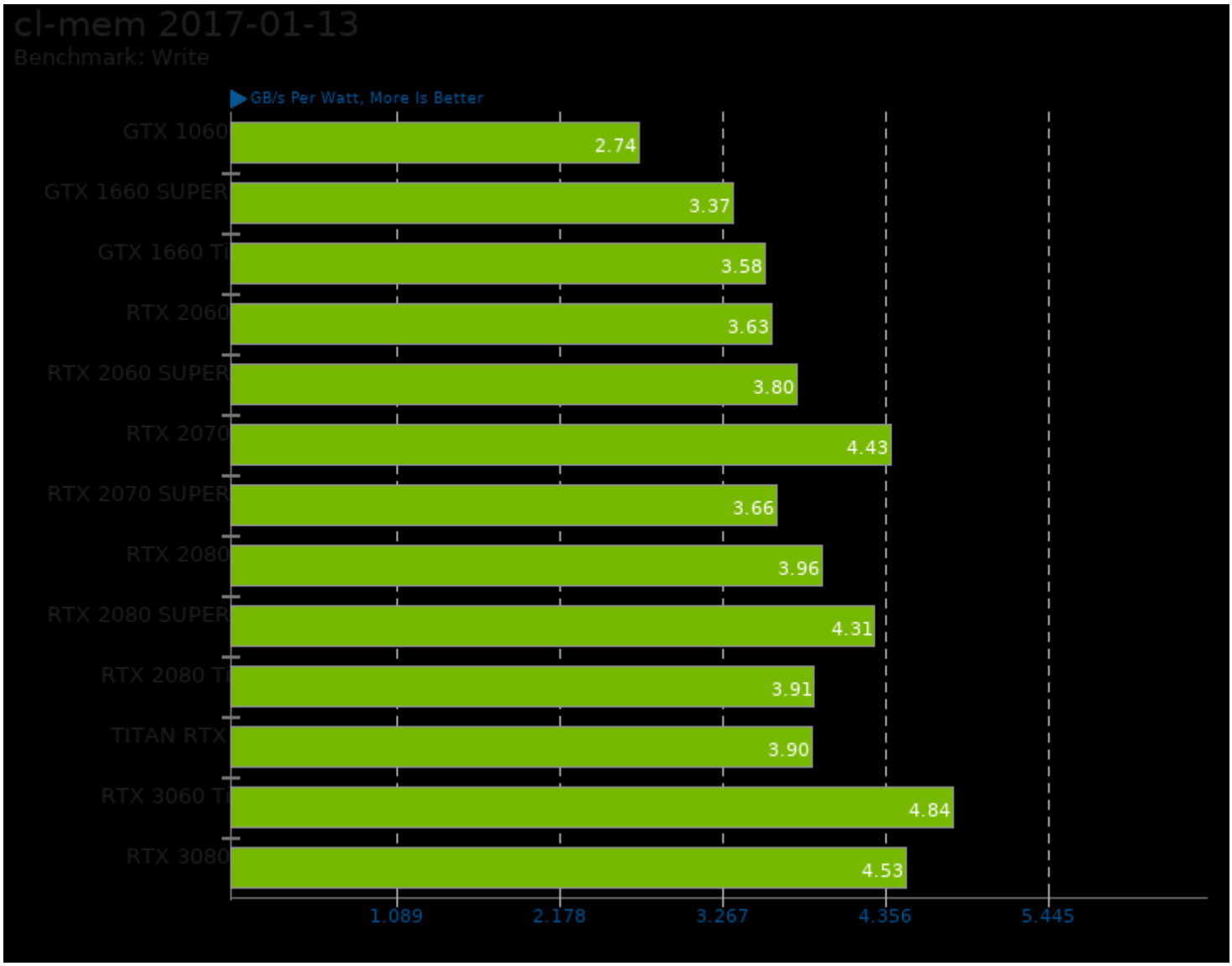
NVIDIA Compute Tests



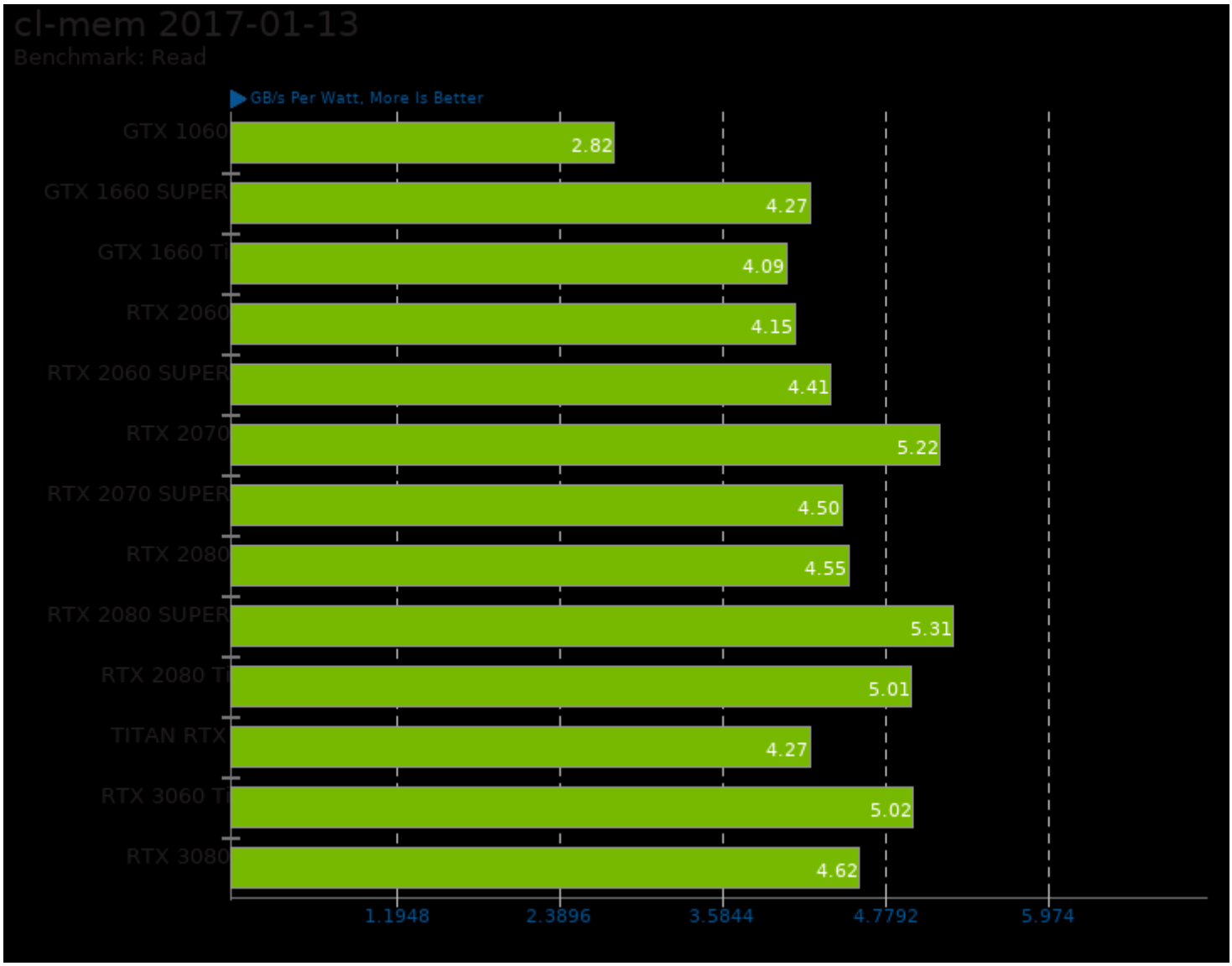
NVIDIA Compute Tests



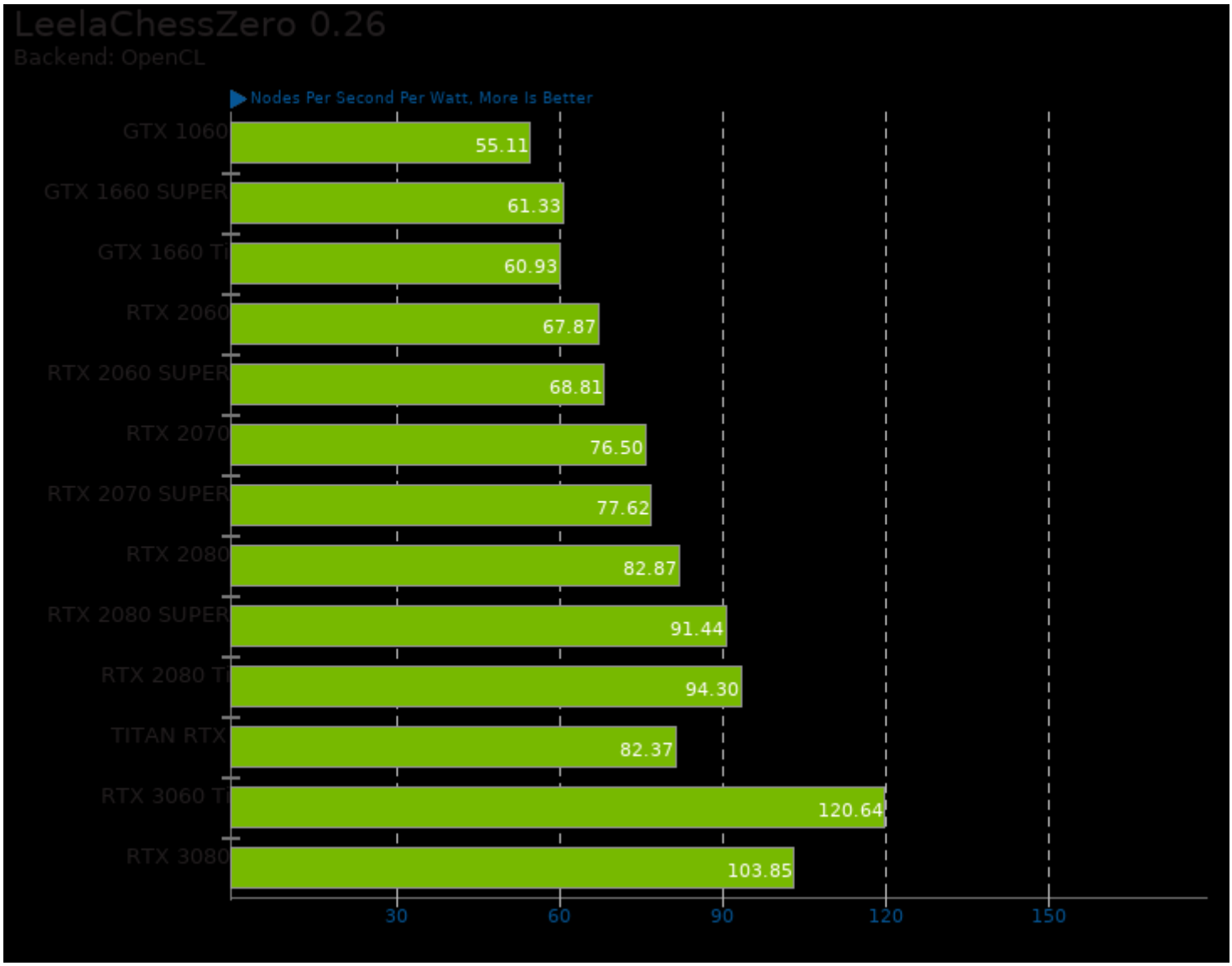
NVIDIA Compute Tests



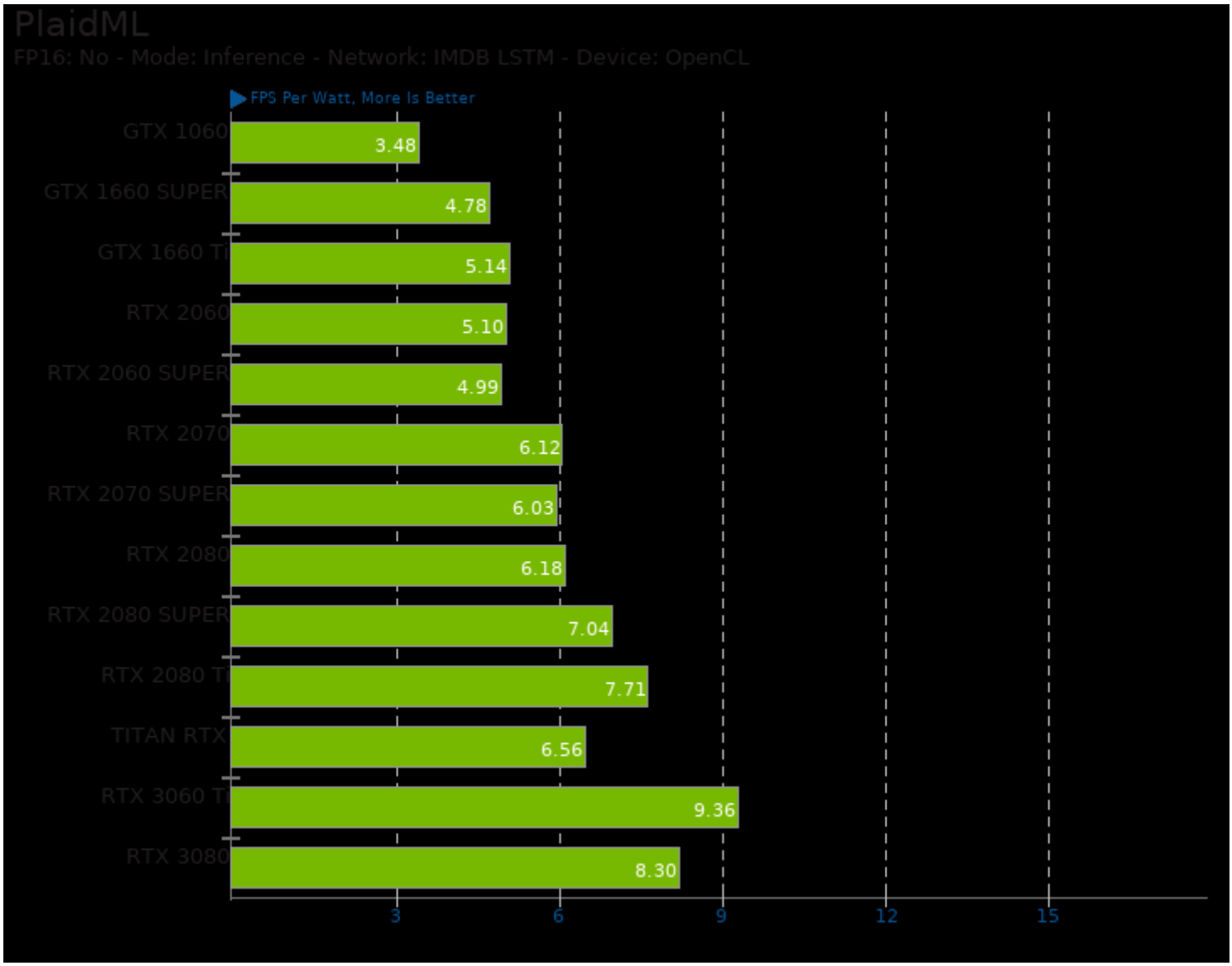
NVIDIA Compute Tests

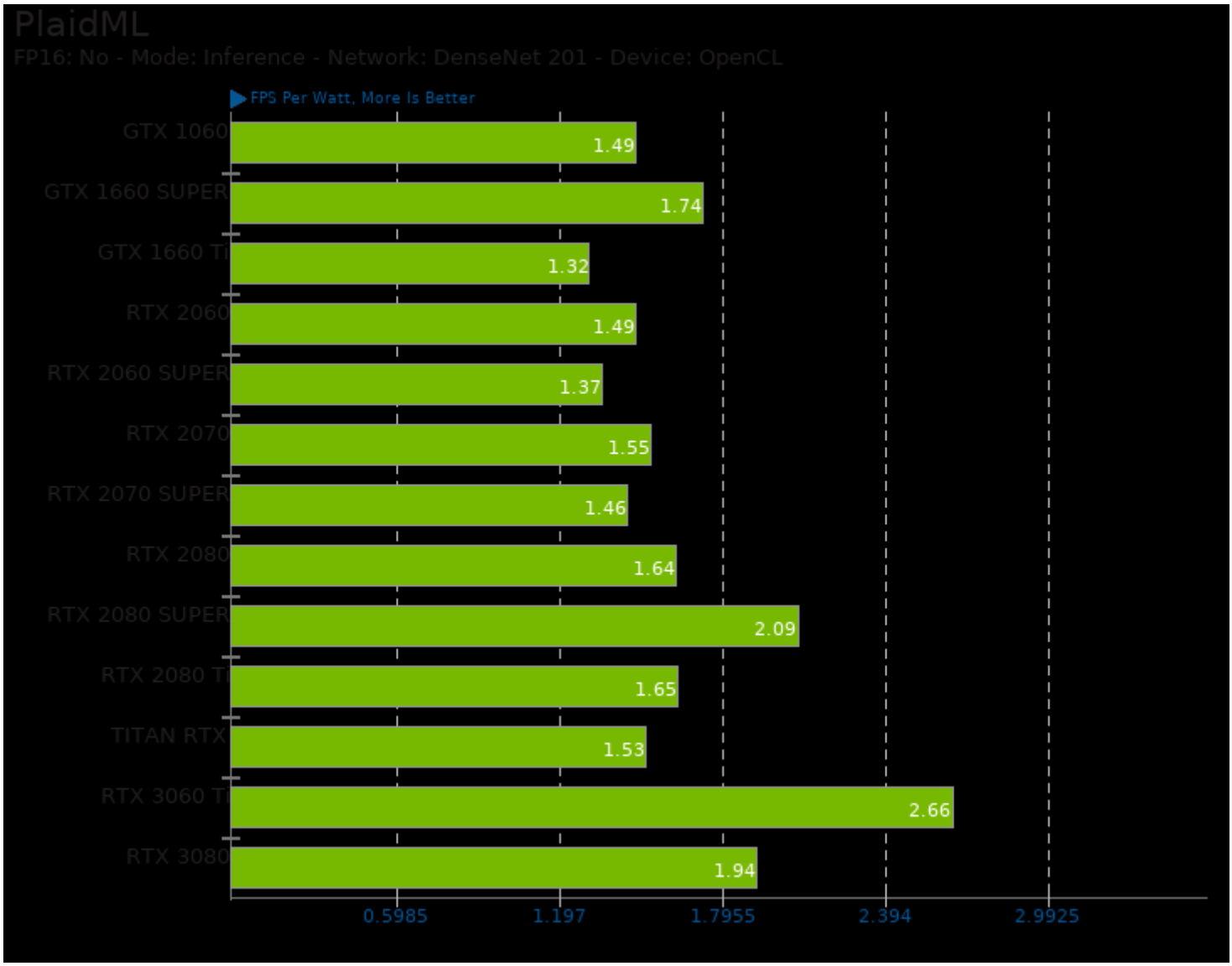


NVIDIA Compute Tests

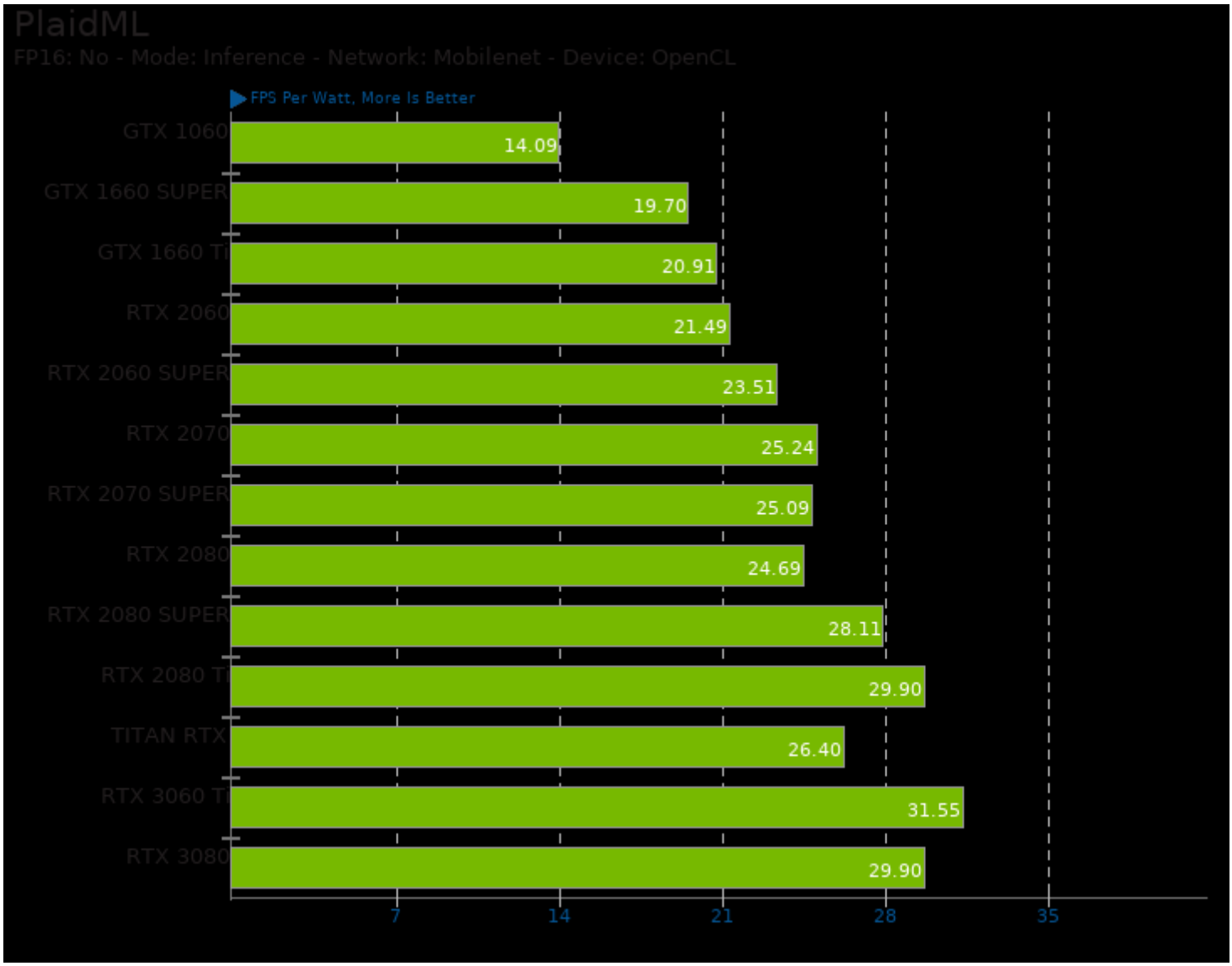


NVIDIA Compute Tests

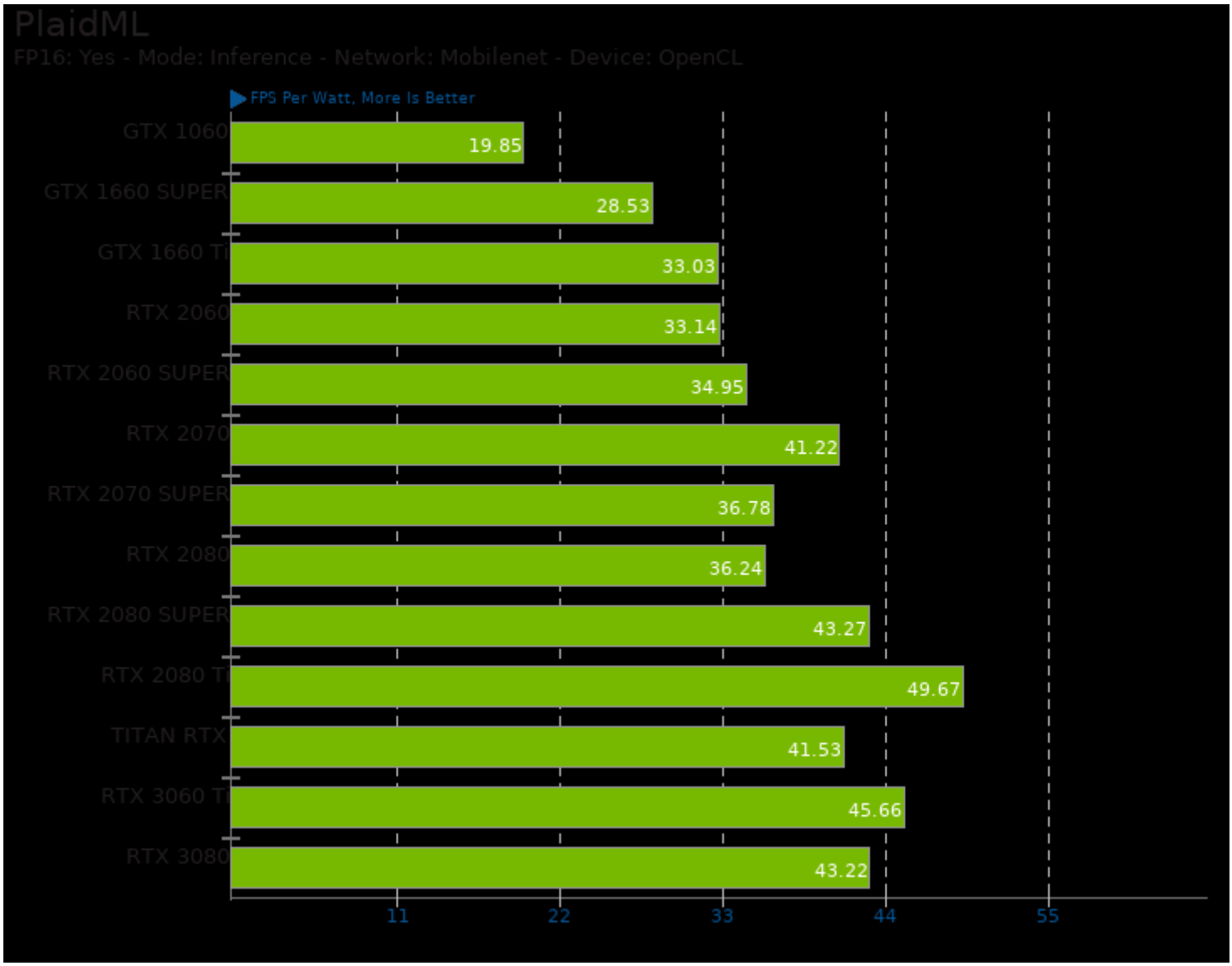



PlaidML
FP16: No - Mode: Inference - Network: DenseNet 201 - Device: OpenCL
FPS Per Watt, More Is Better
GTX 1060
1.49
GTX 1660 SUPER
1.74
GTX 1660 Ti
1.32
RTX 2060
1.49
RTX 2060 SUPER
1.37
RTX 2070
1.55
RTX 2070 SUPER
1.46
RTX 2080
1.64
RTX 2080 SUPER
2.09
RTX 2080 Ti
1.65
TITAN RTX
1.53
RTX 3060 Ti
2.66
RTX 3080
1.94
0.5985
1.197
1.7955
2.394
2.9925

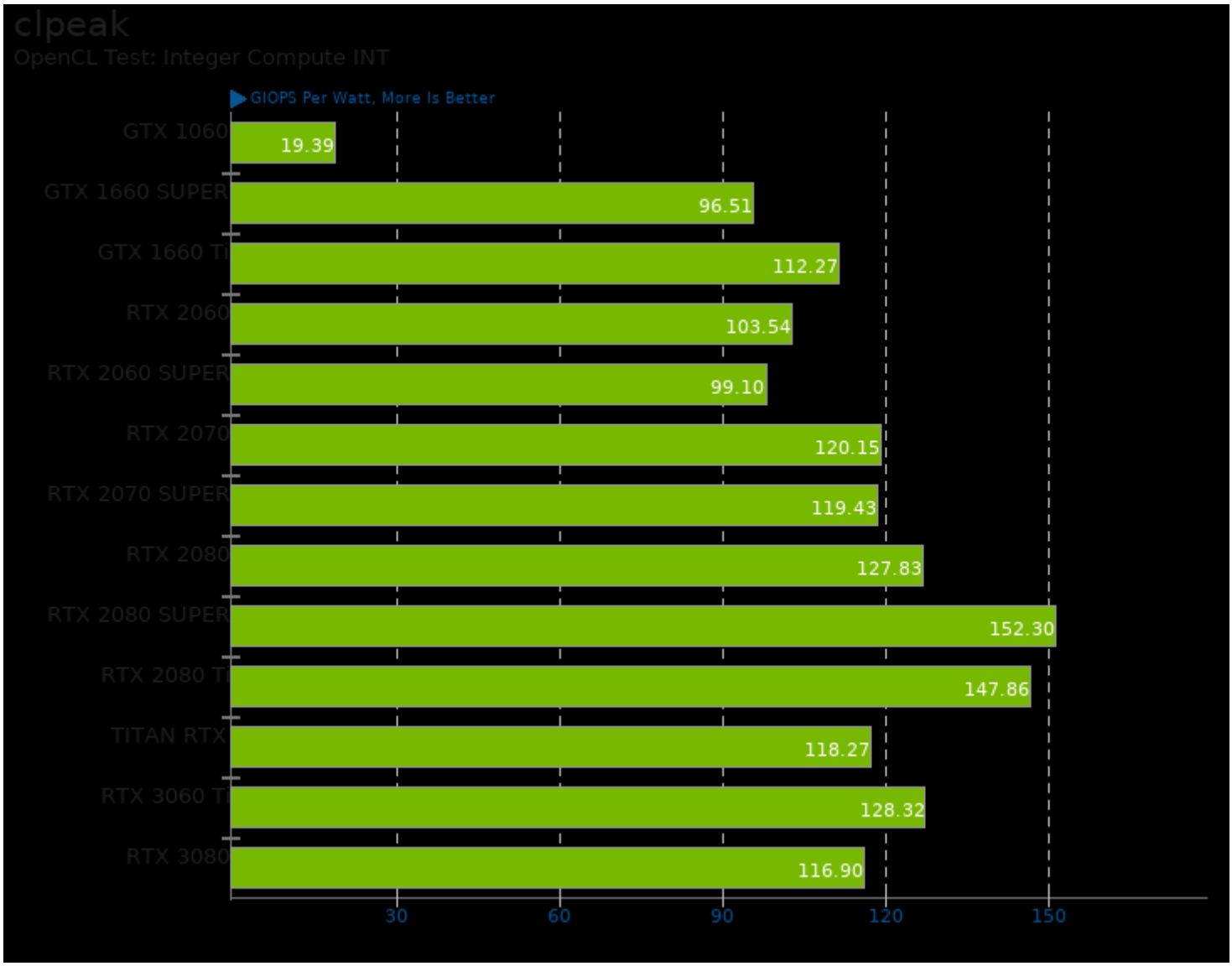
NVIDIA Compute Tests



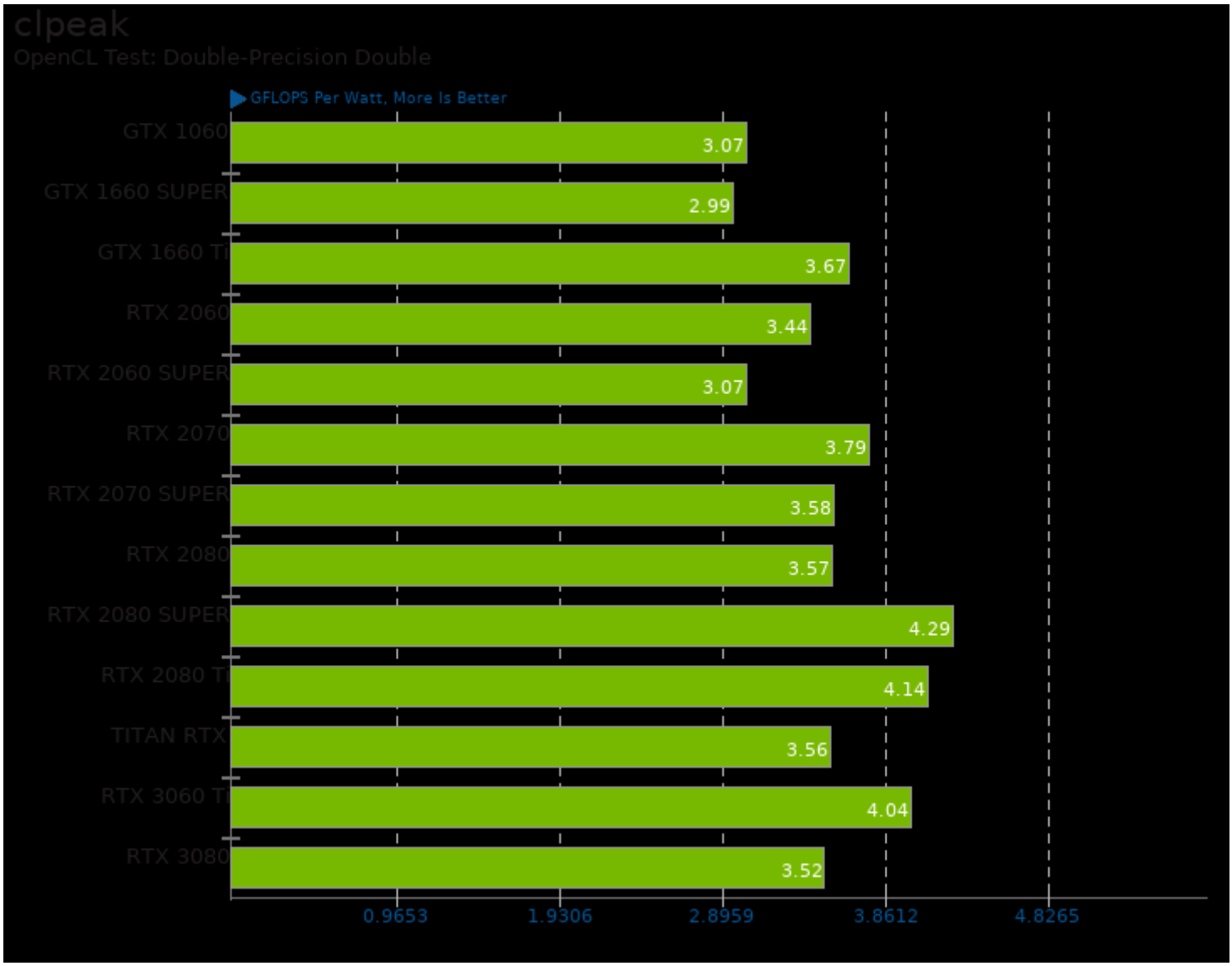
NVIDIA Compute Tests



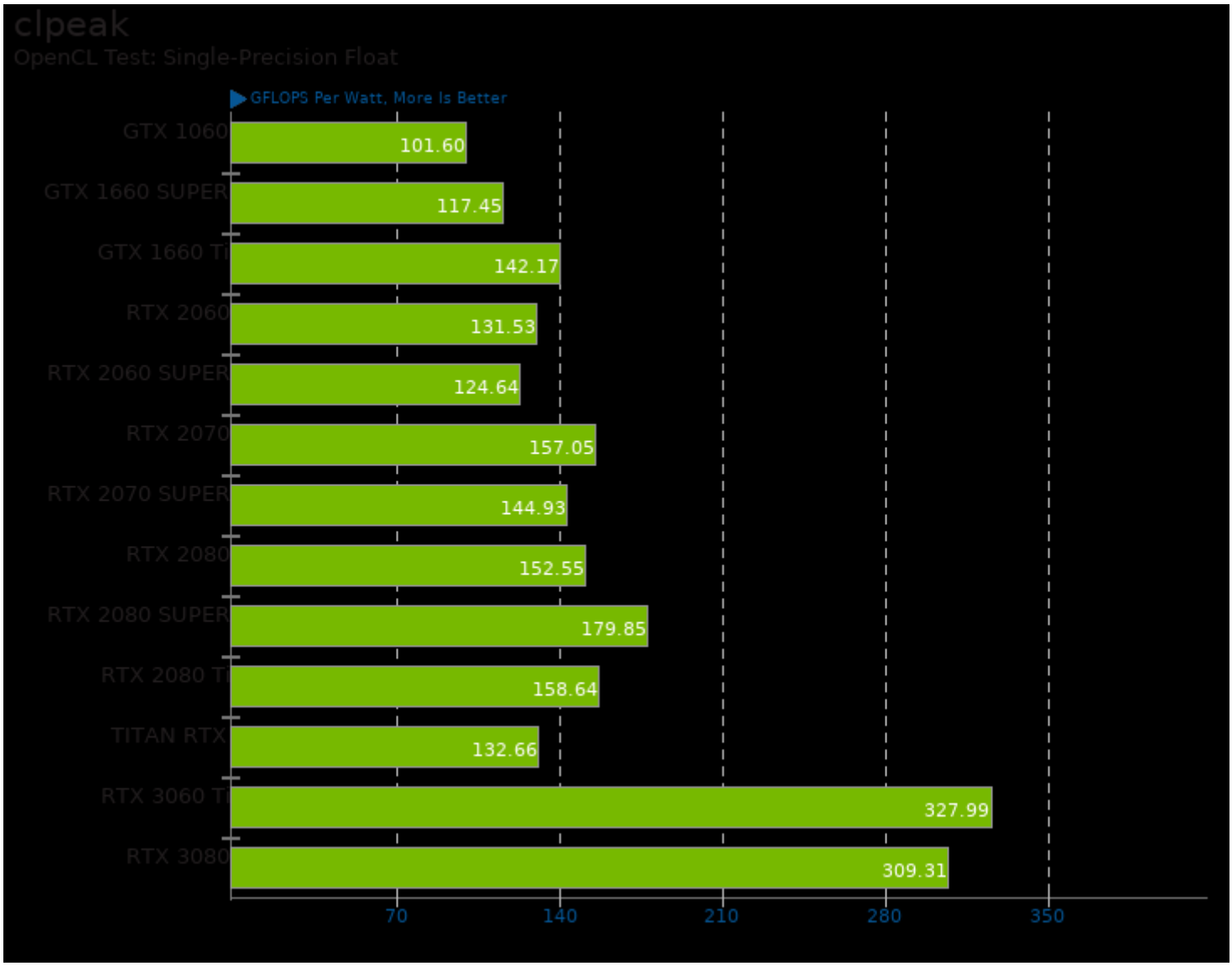
NVIDIA Compute Tests



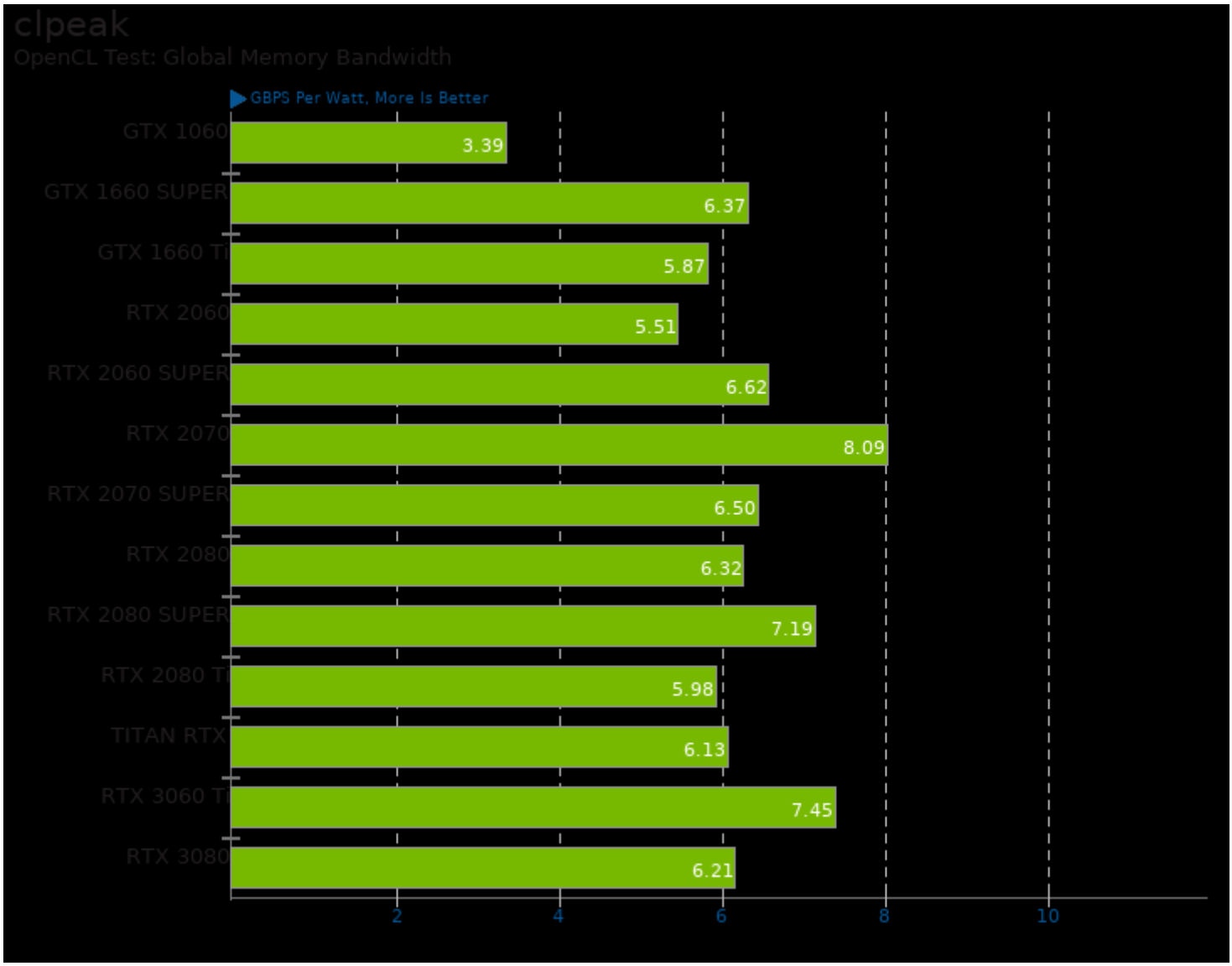
NVIDIA Compute Tests



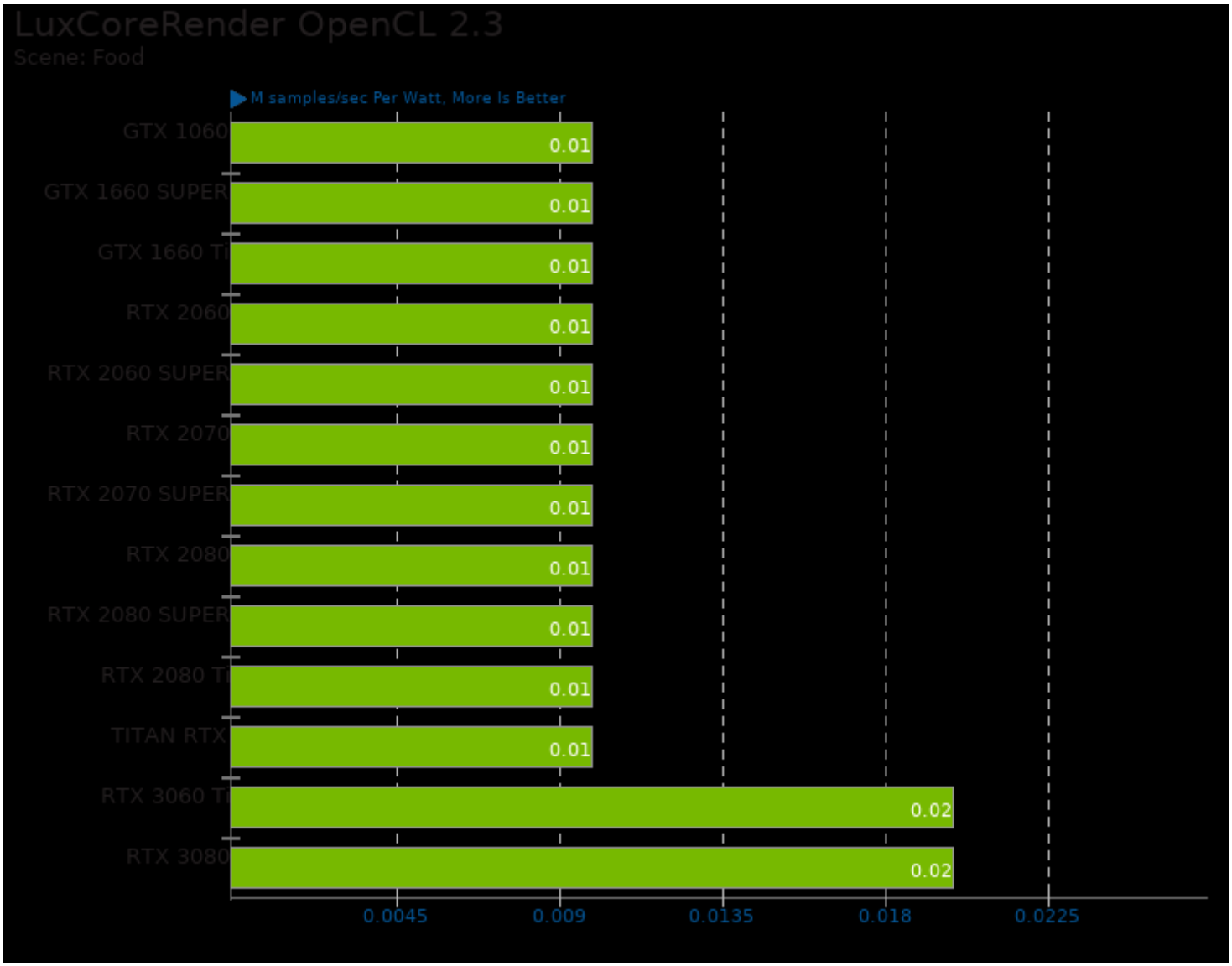
NVIDIA Compute Tests



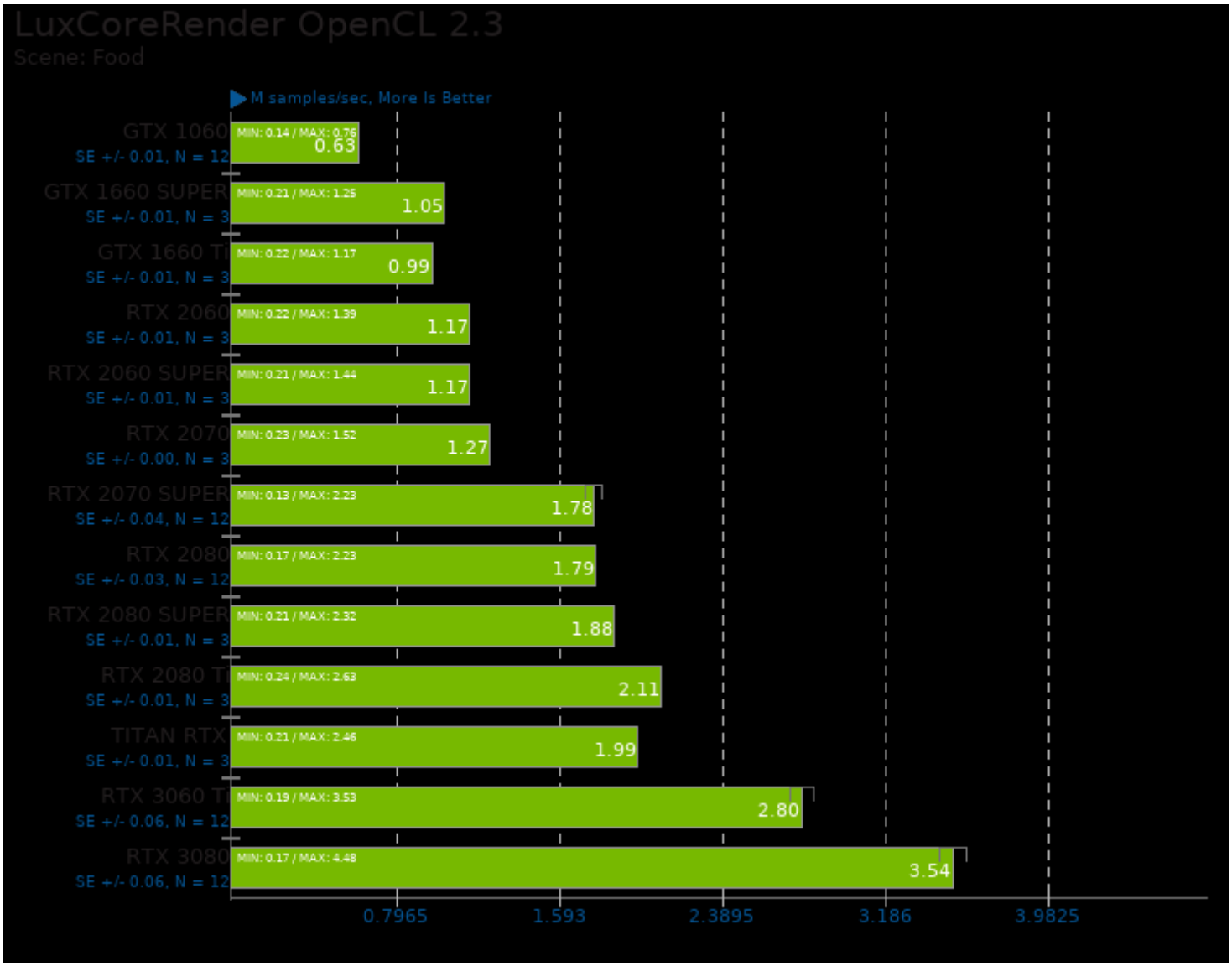
NVIDIA Compute Tests



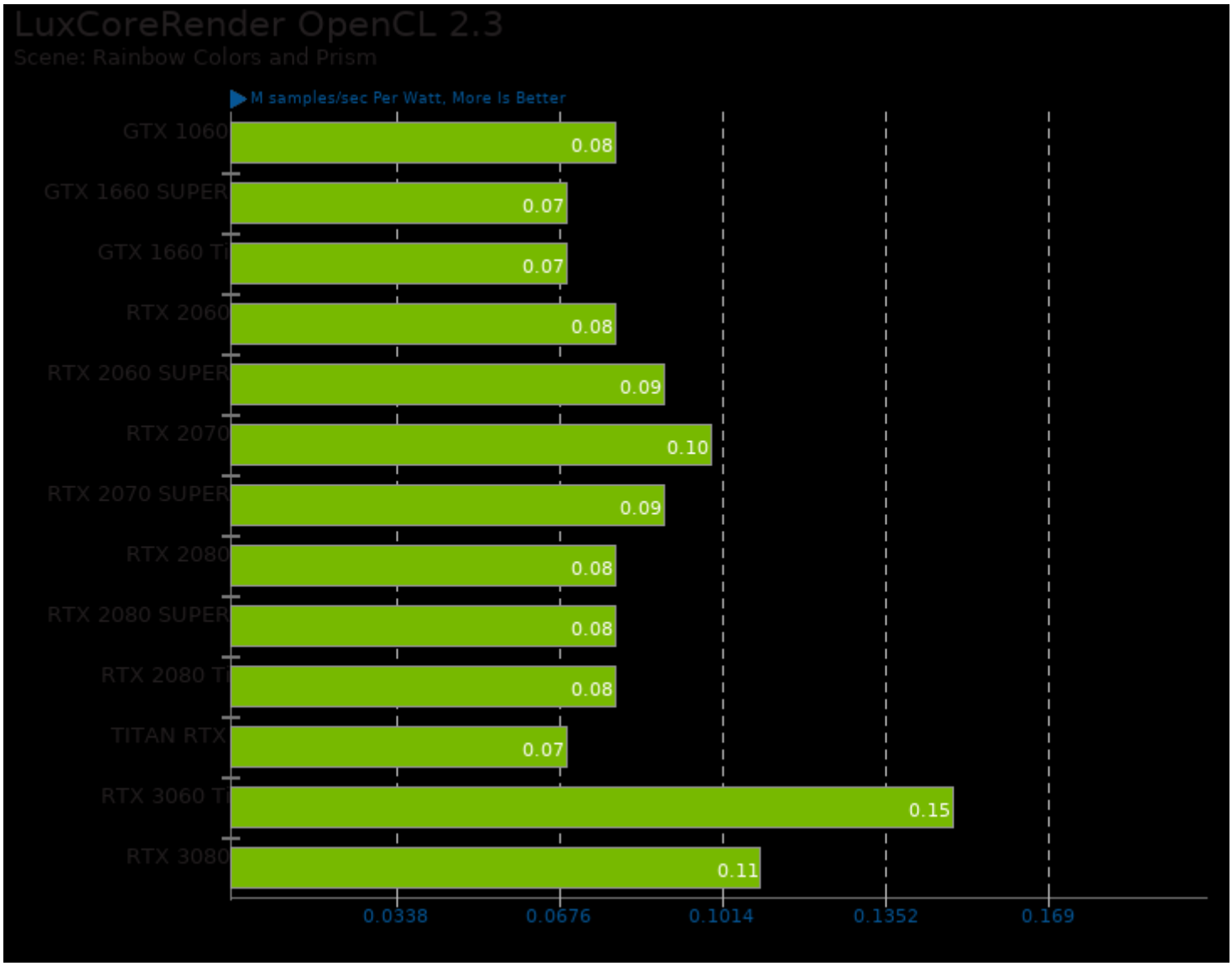
NVIDIA Compute Tests



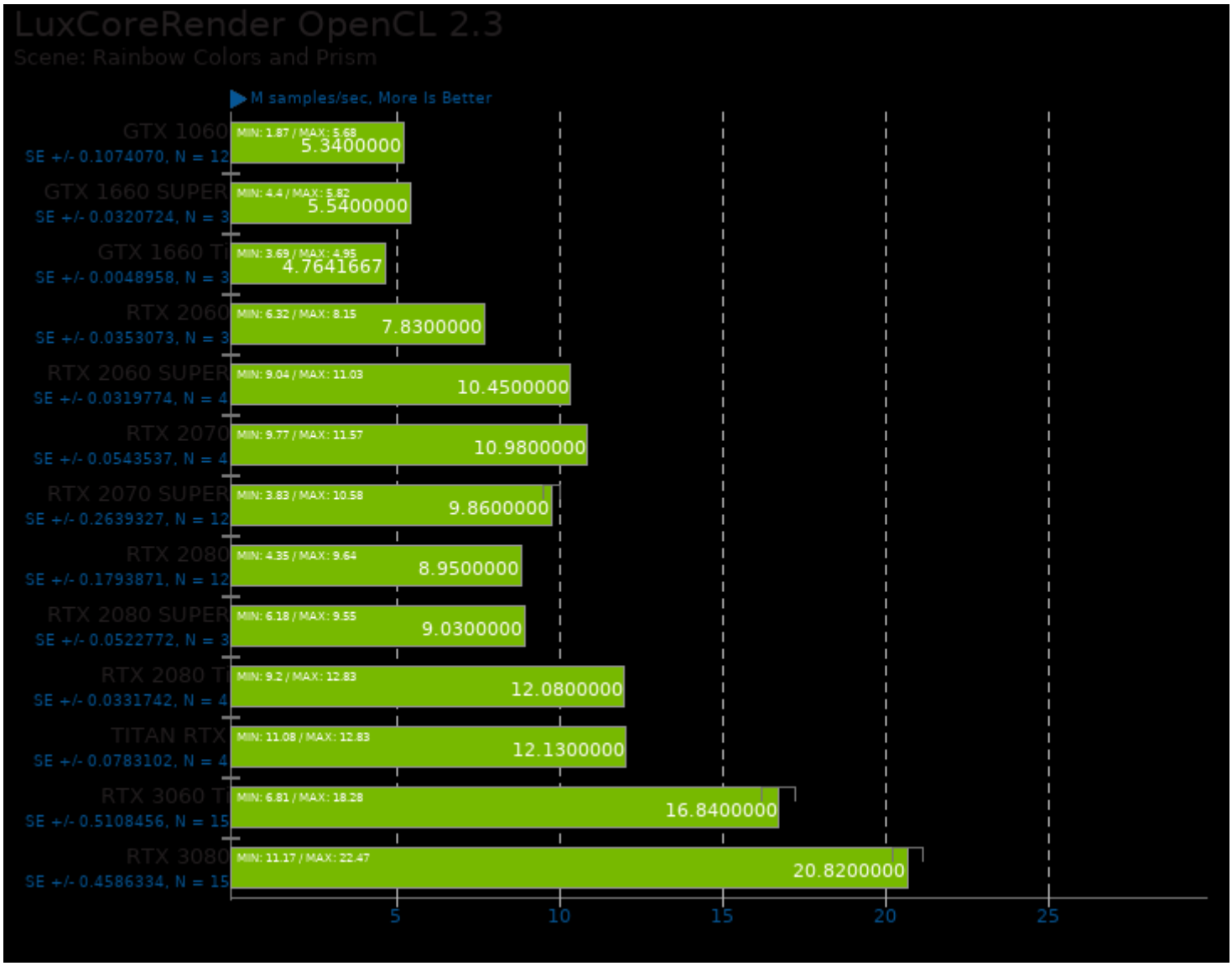
NVIDIA Compute Tests



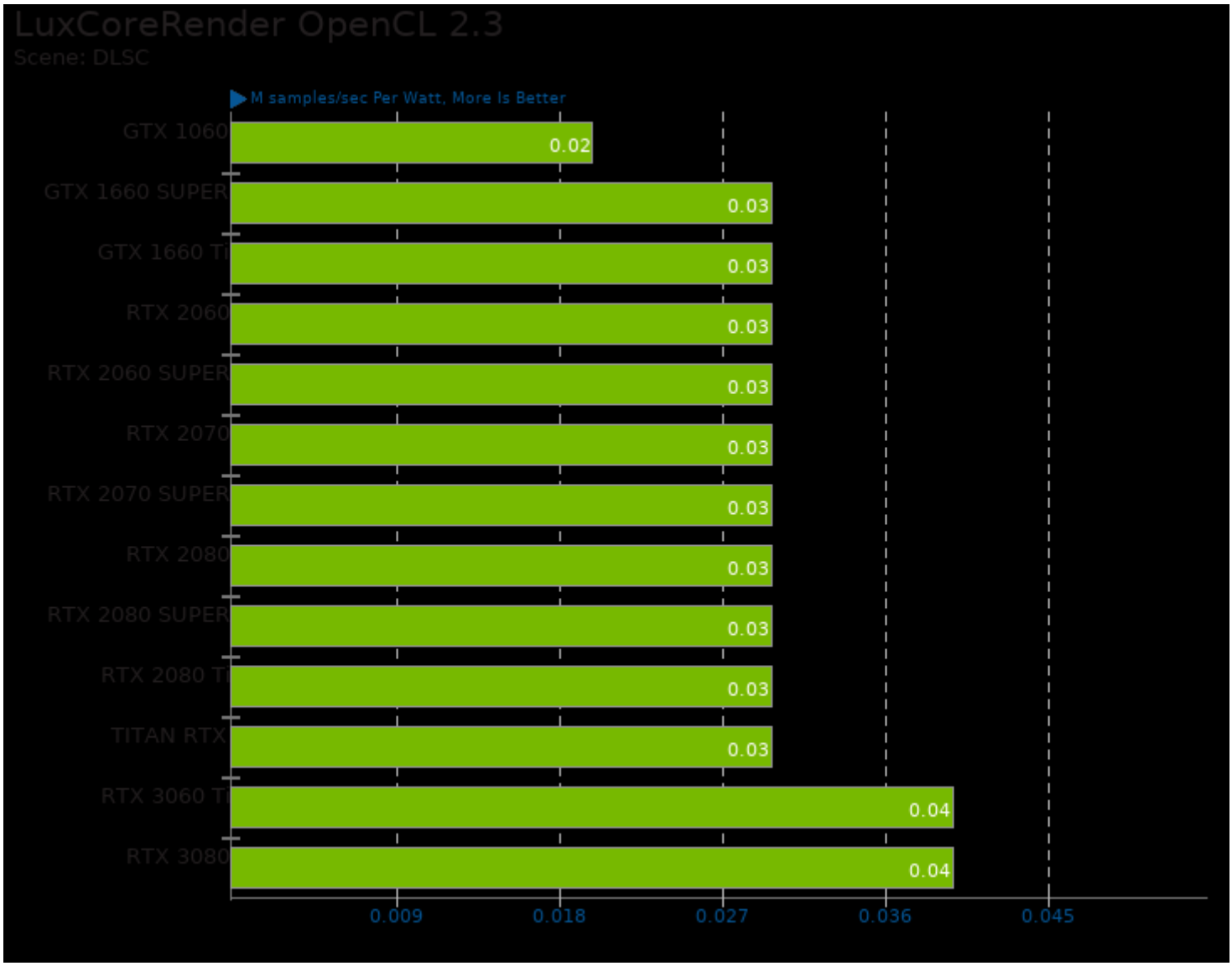
NVIDIA Compute Tests



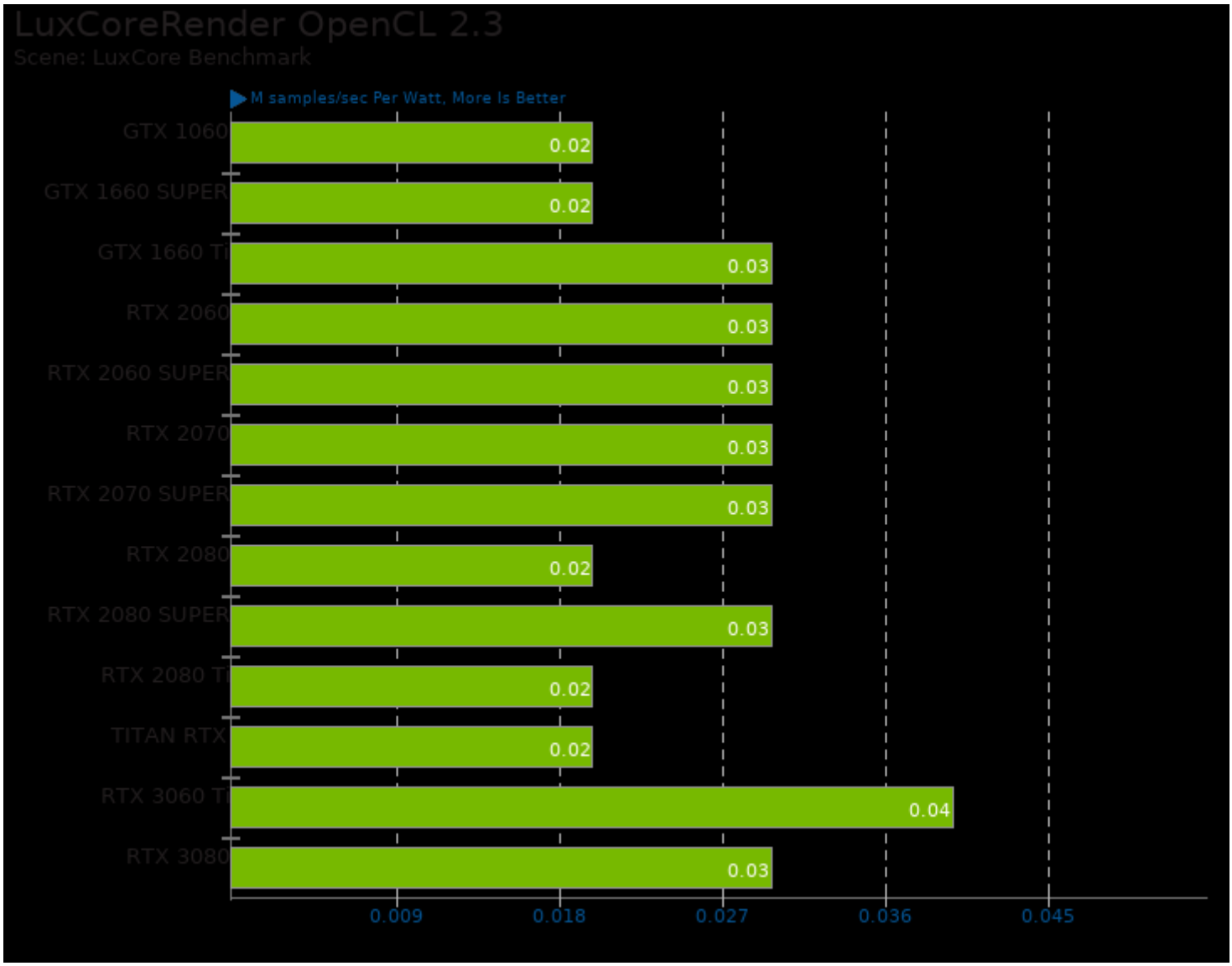
NVIDIA Compute Tests



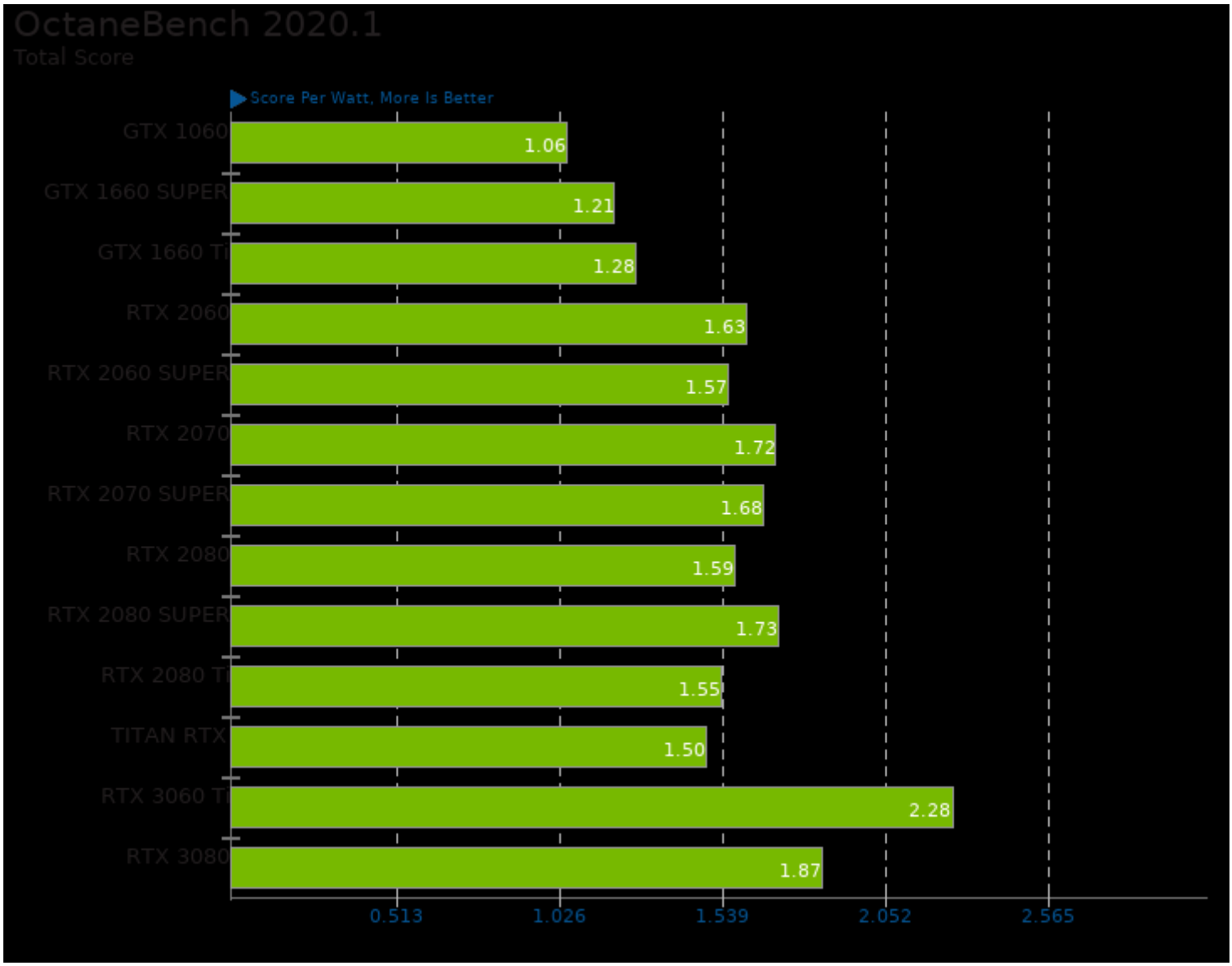
NVIDIA Compute Tests

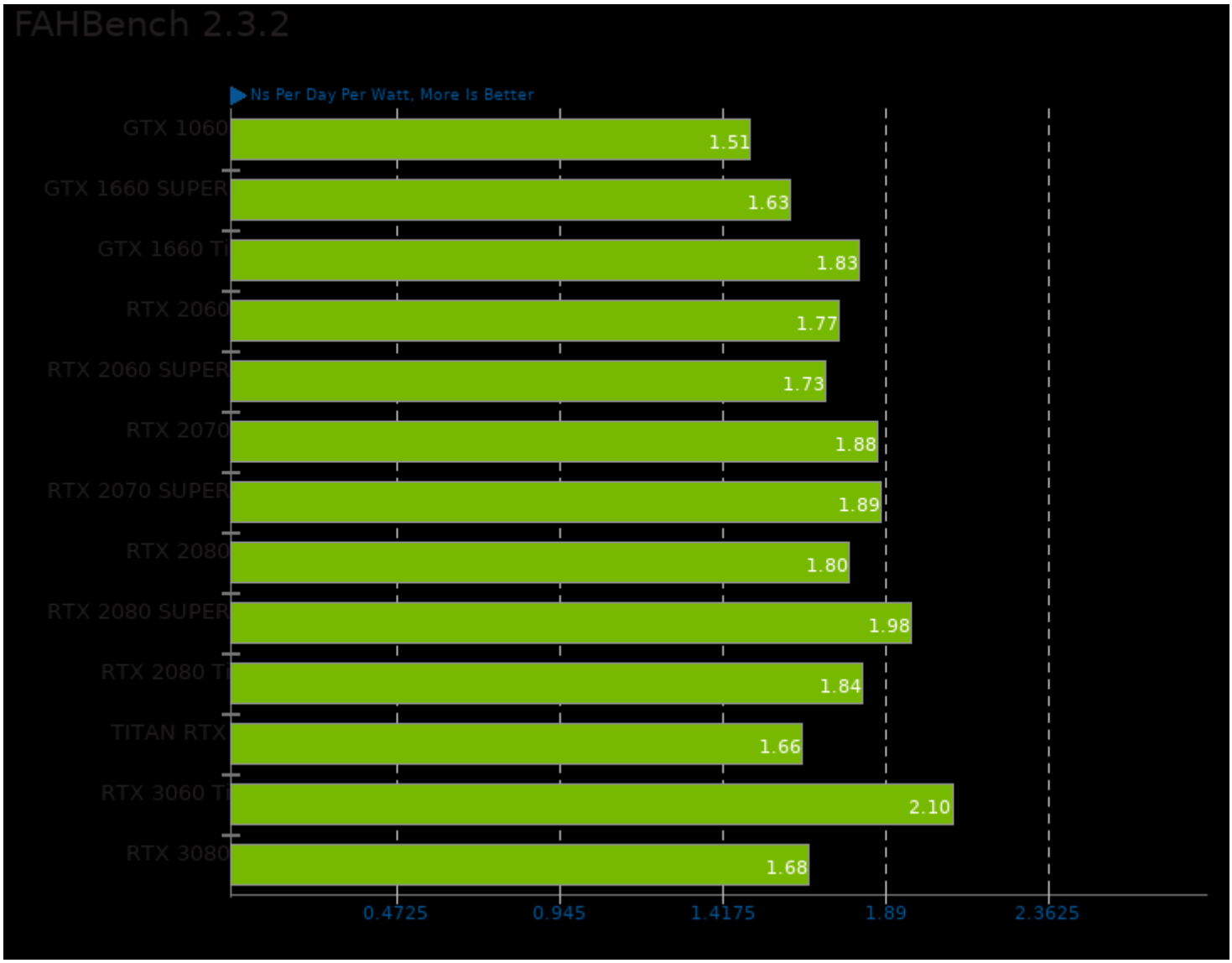


NVIDIA Compute Tests

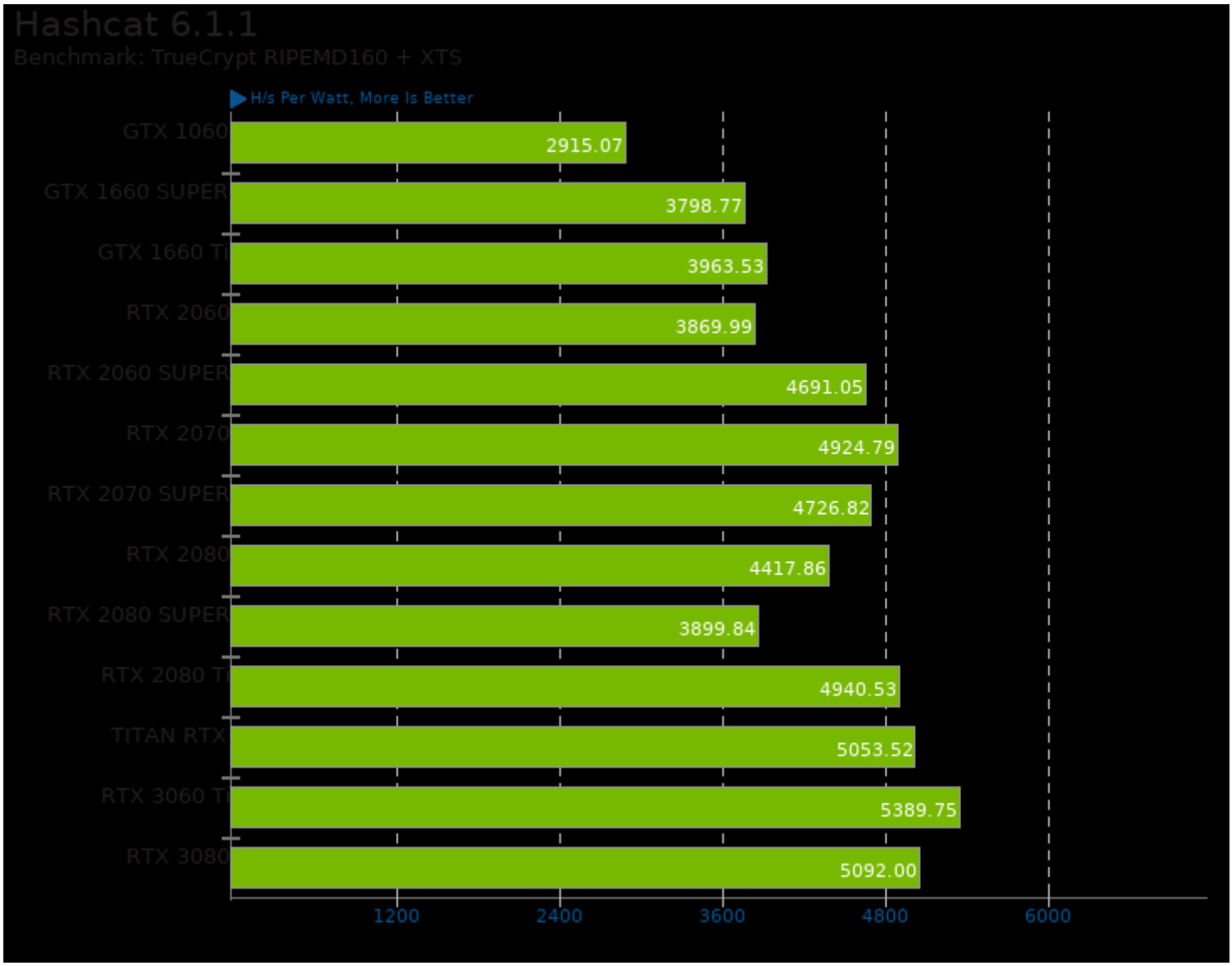


NVIDIA Compute Tests

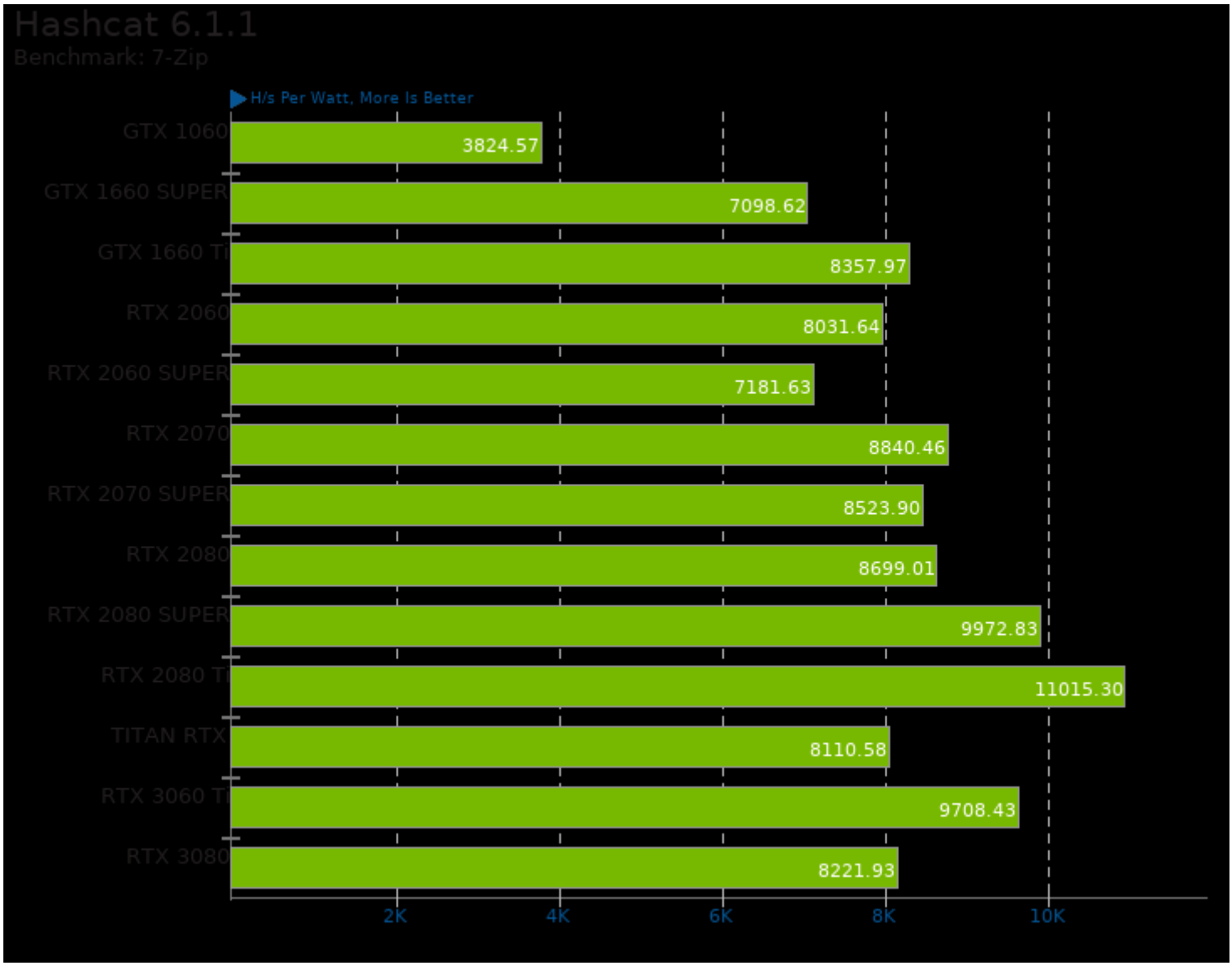



FAHBench 2.3.2
Ns Per Day Per Watt, More Is Better
GTX 1060
1.51
GTX 1660 SUPER
1.63
GTX 1660 Ti
1.83
RTX 2060
1.77
RTX 2060 SUPER
1.73
RTX 2070
1.88
RTX 2070 SUPER
1.89
RTX 2080
1.80
RTX 2080 SUPER
1.98
RTX 2080 Ti
1.84
TITAN RTX
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0.945
1.4175
1.89
2.3625

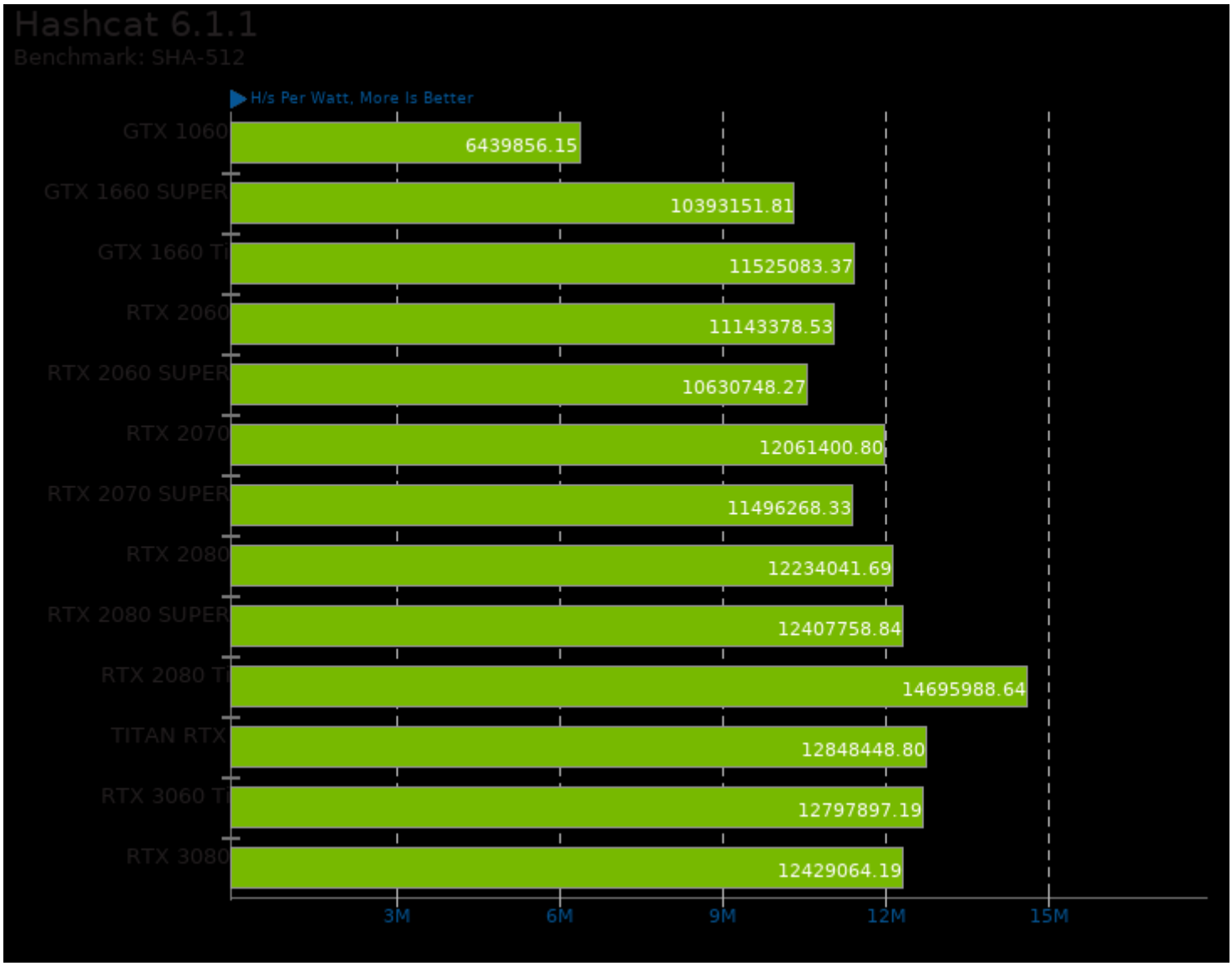
NVIDIA Compute Tests



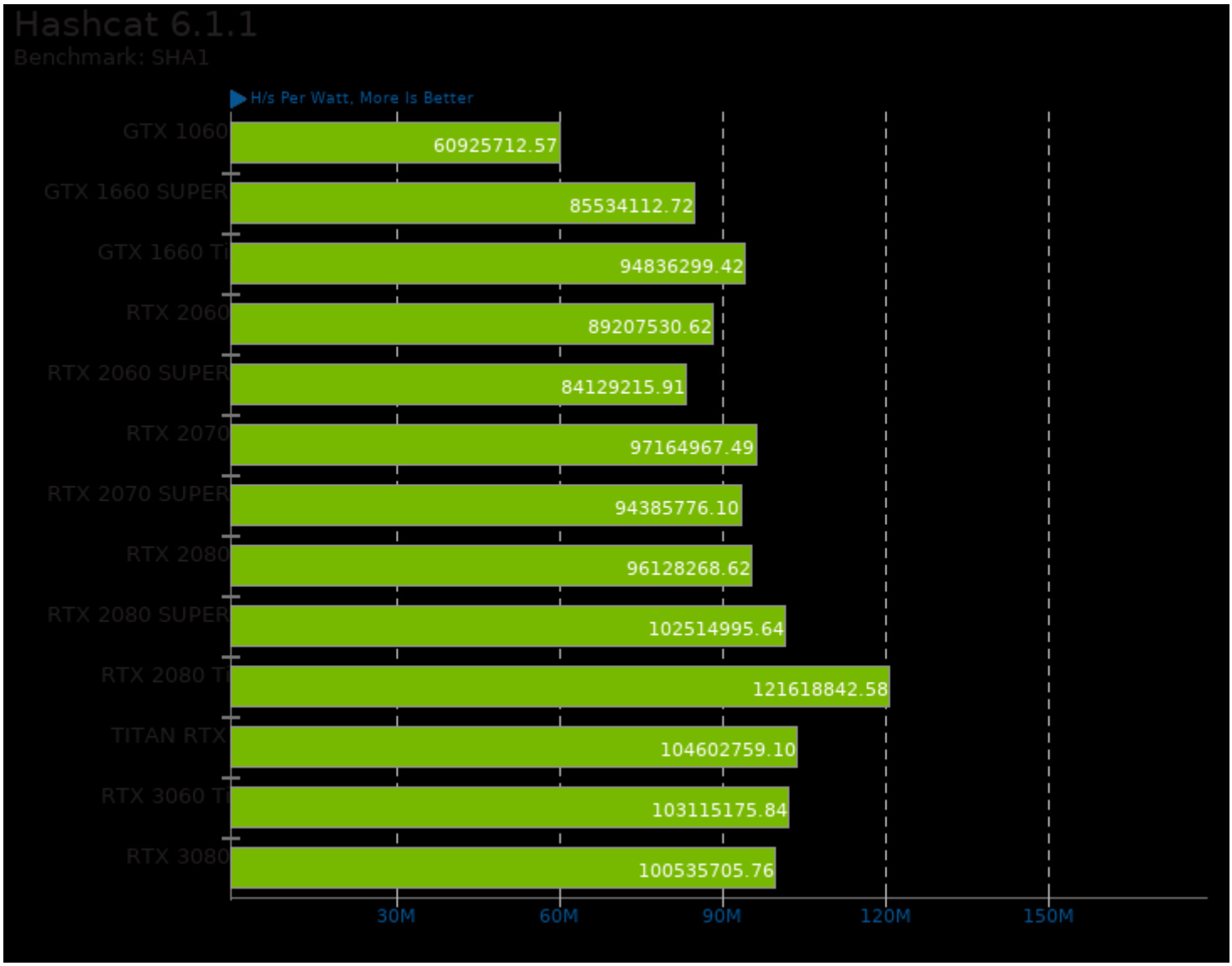
NVIDIA Compute Tests



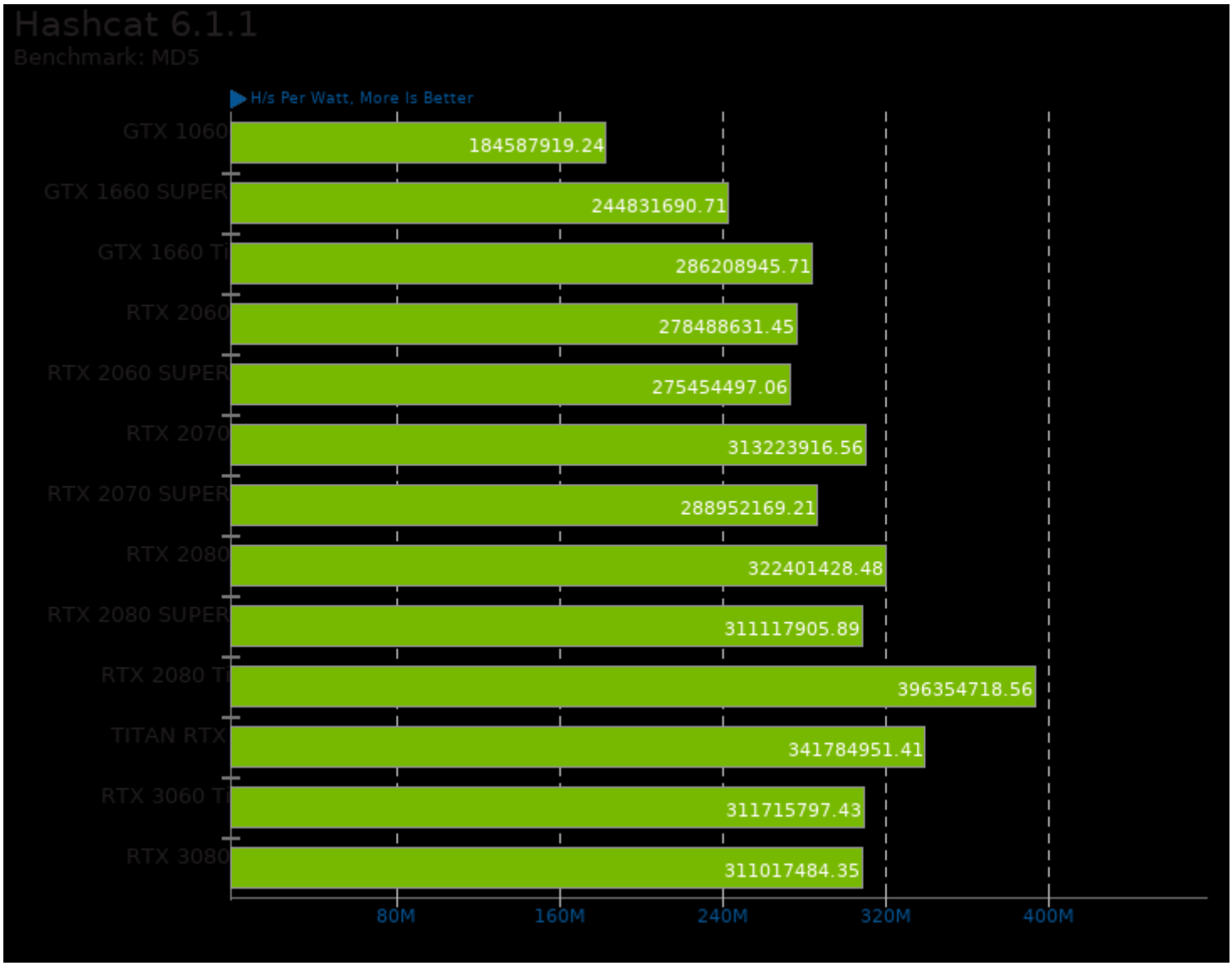
NVIDIA Compute Tests



NVIDIA Compute Tests

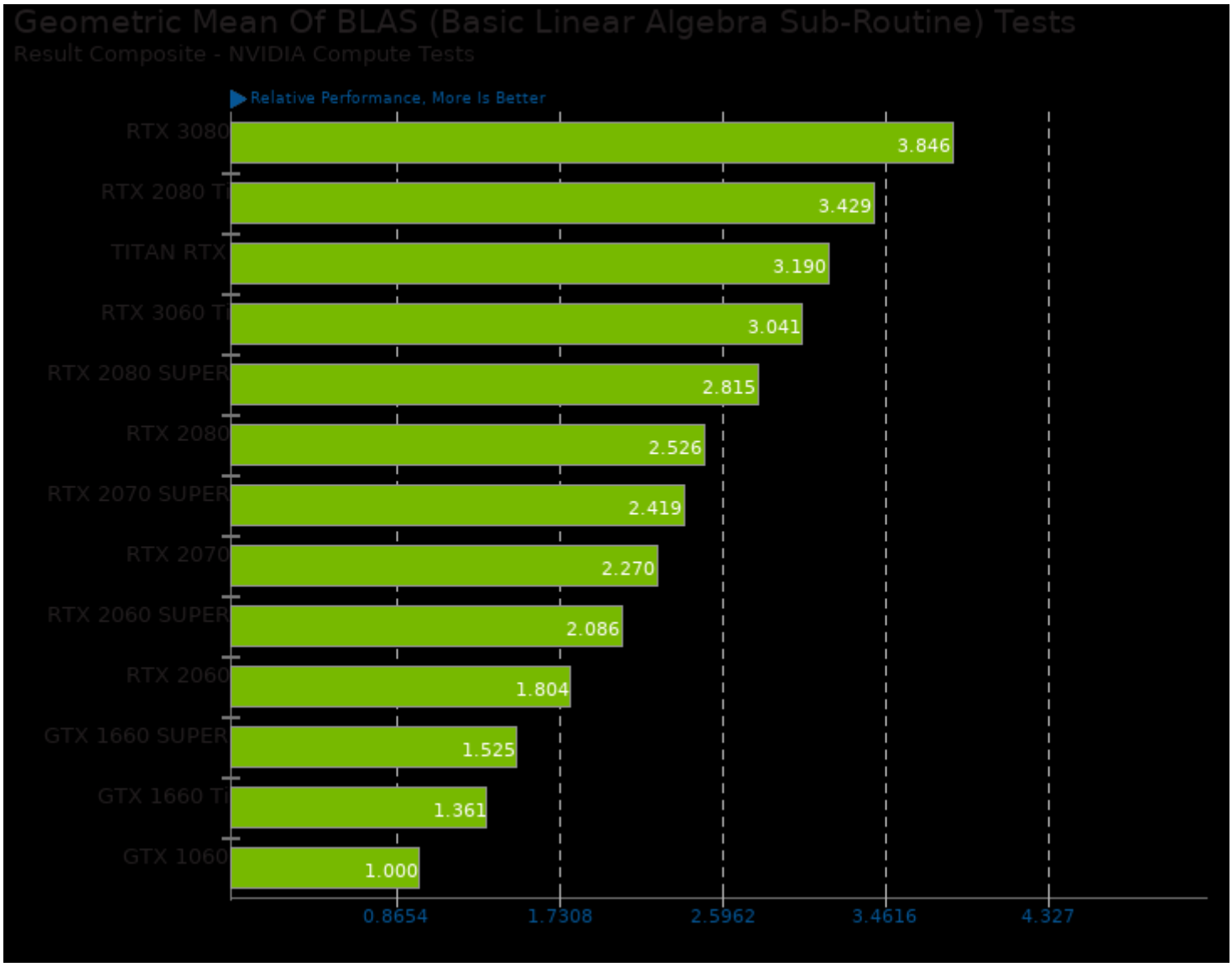


NVIDIA Compute Tests



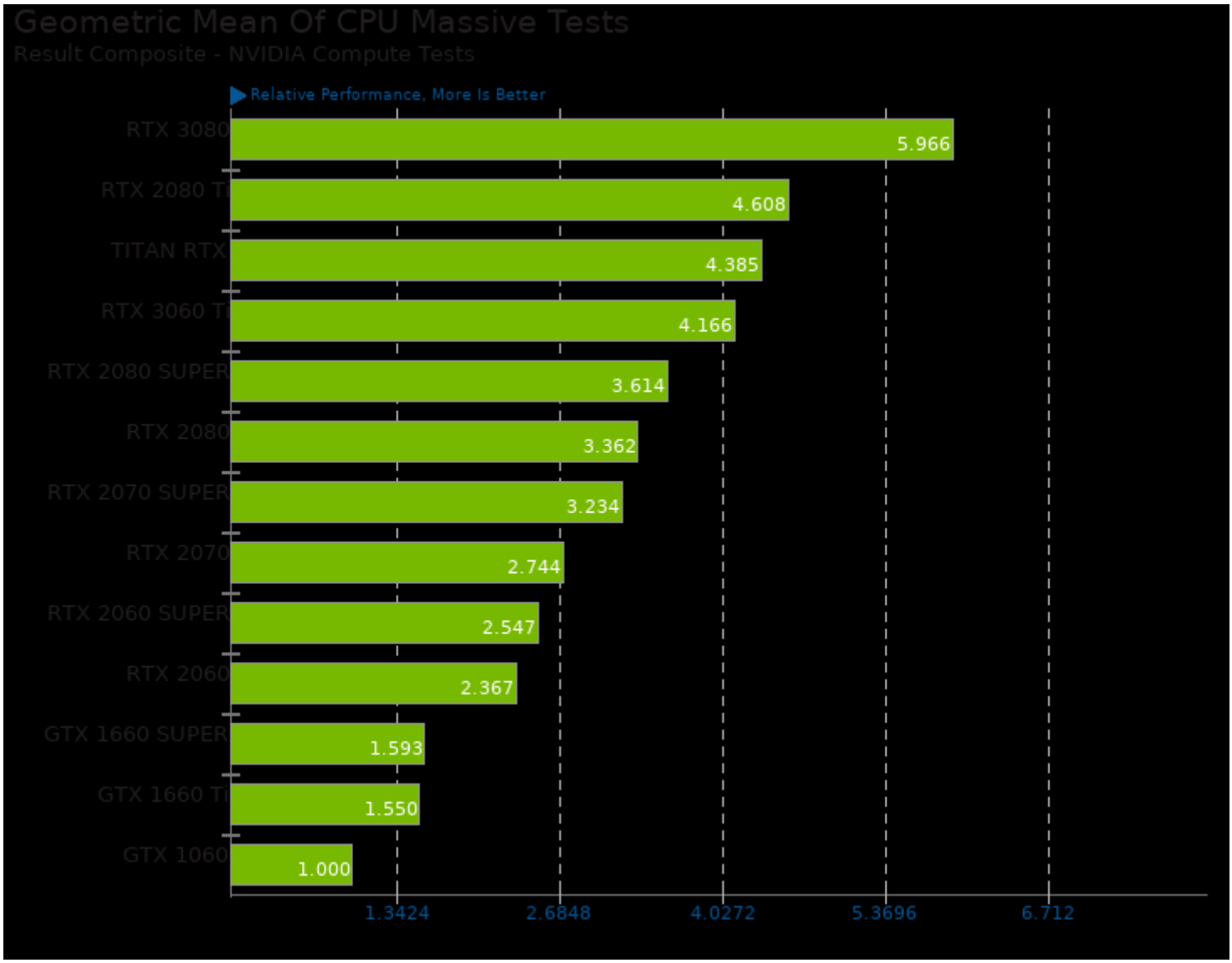
NVIDIA Compute Tests

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

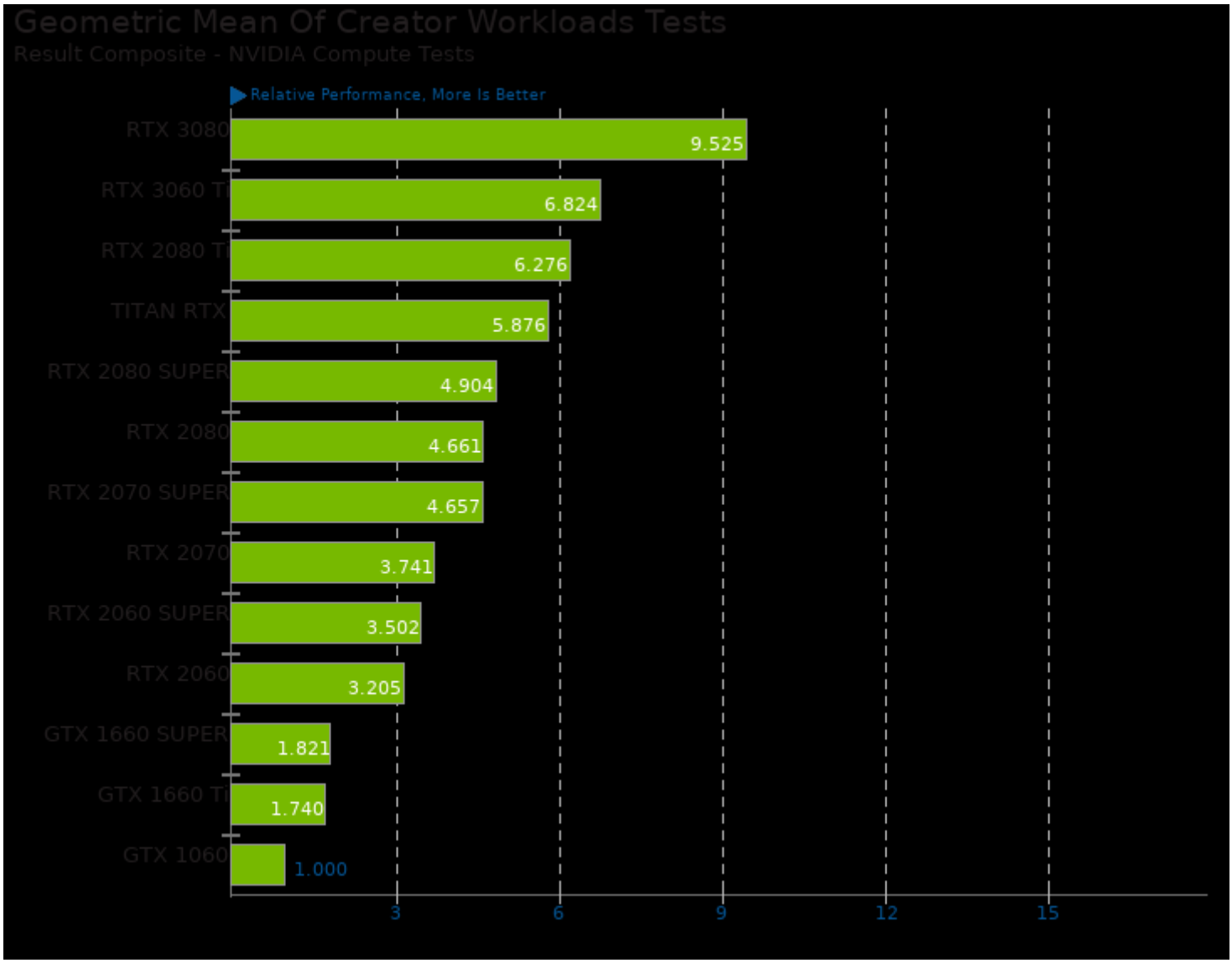


Geometric mean based upon tests: pts/lczero and pts/arrayfire

NVIDIA Compute Tests

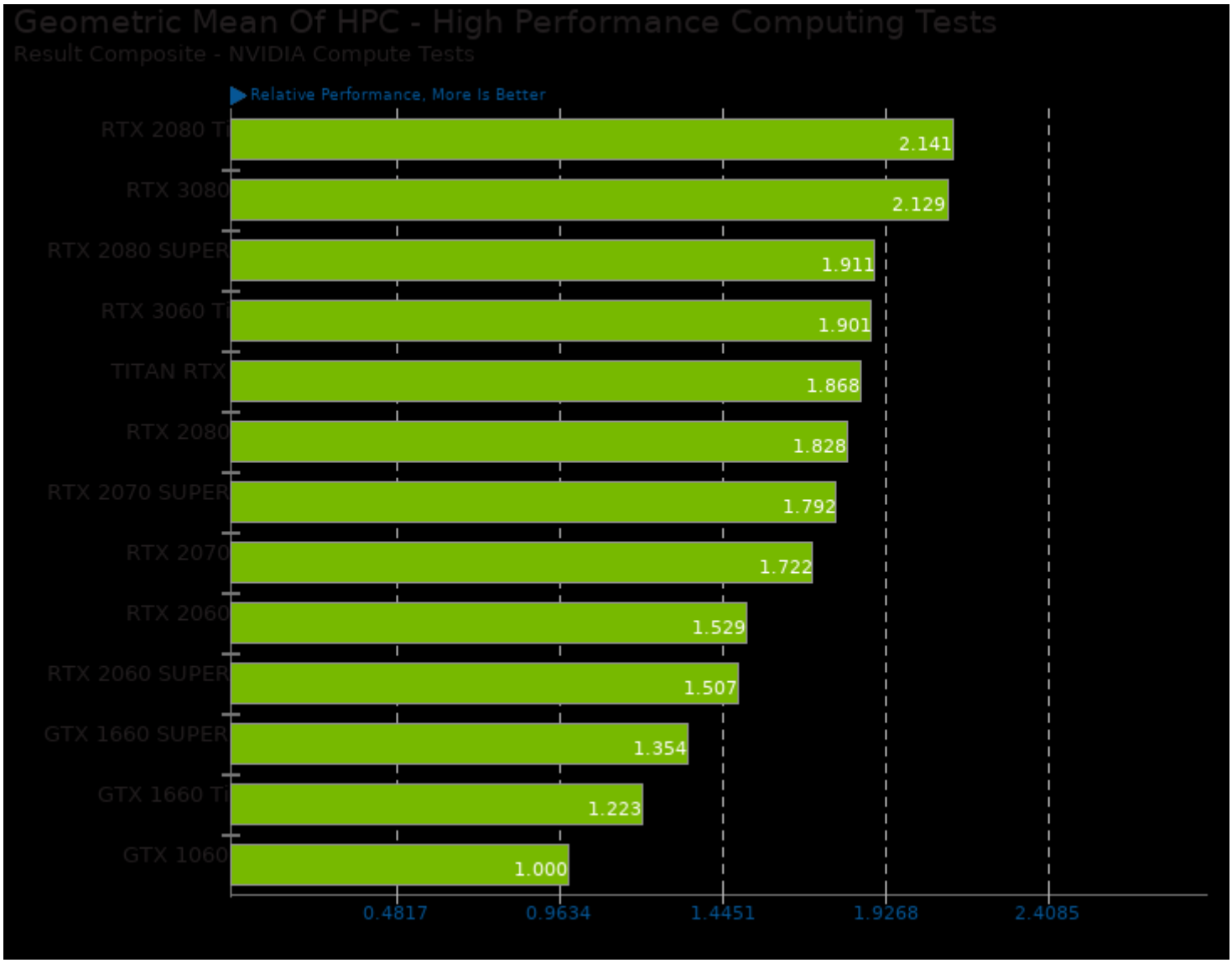


Geometric mean based upon tests: pts/geekbench, pts/lczero, pts/plaidml, pts/rodinia and pts/blender



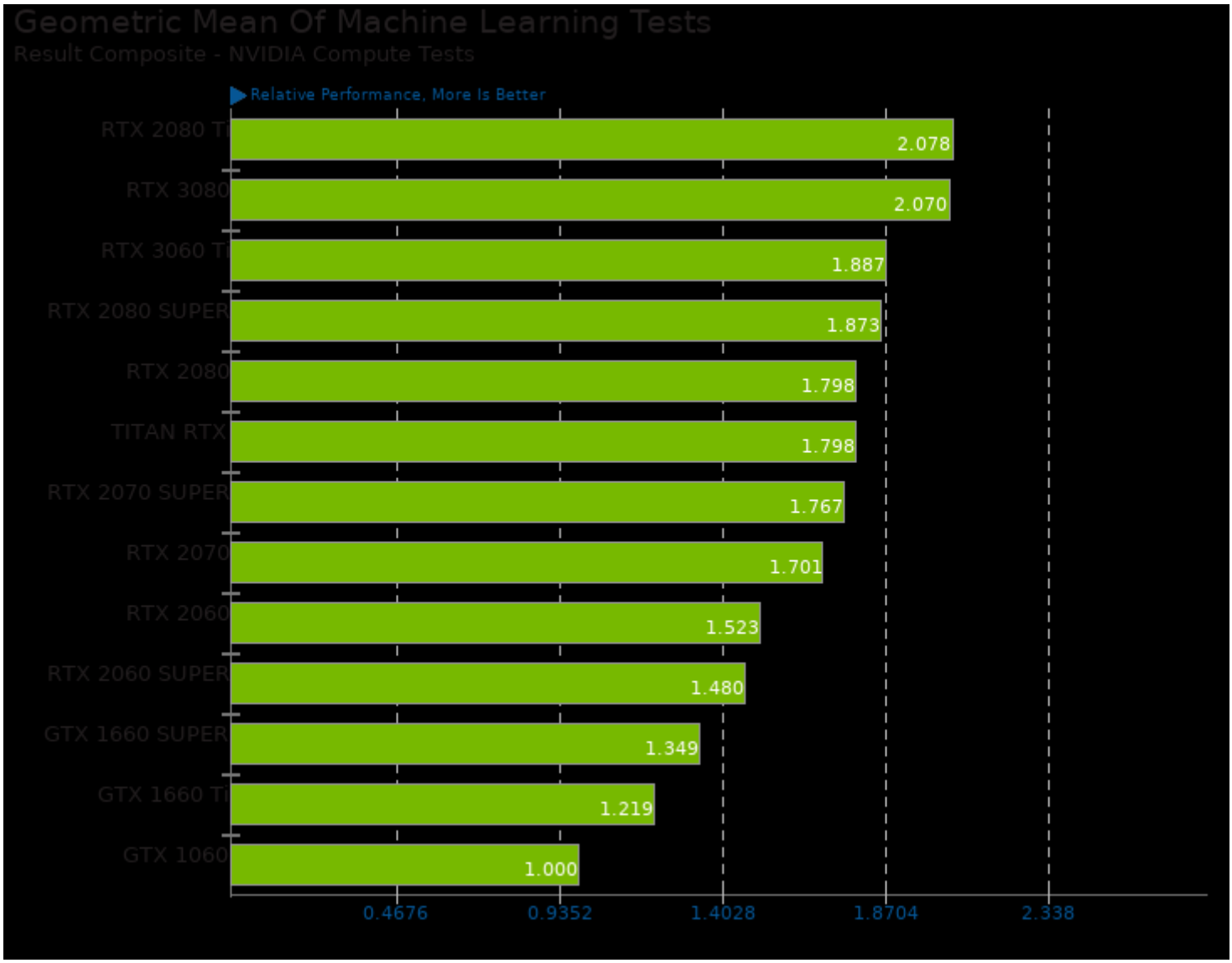
Geometric mean based upon tests: pts/blender and pts/indigobench

NVIDIA Compute Tests



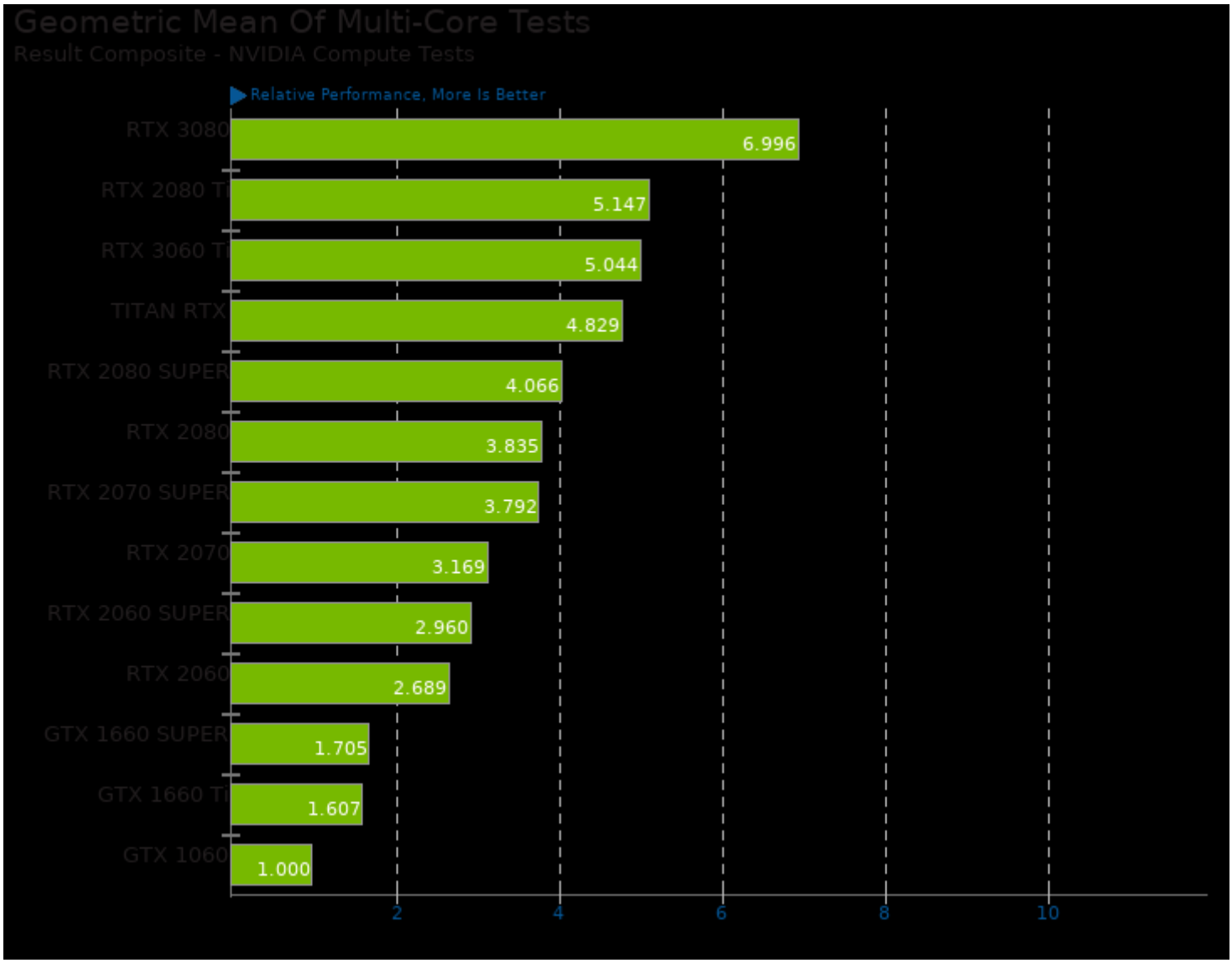
Geometric mean based upon tests: pts/rodinia, pts/arrayfire, pts/ncnn, pts/plaidml and pts/lczero

NVIDIA Compute Tests



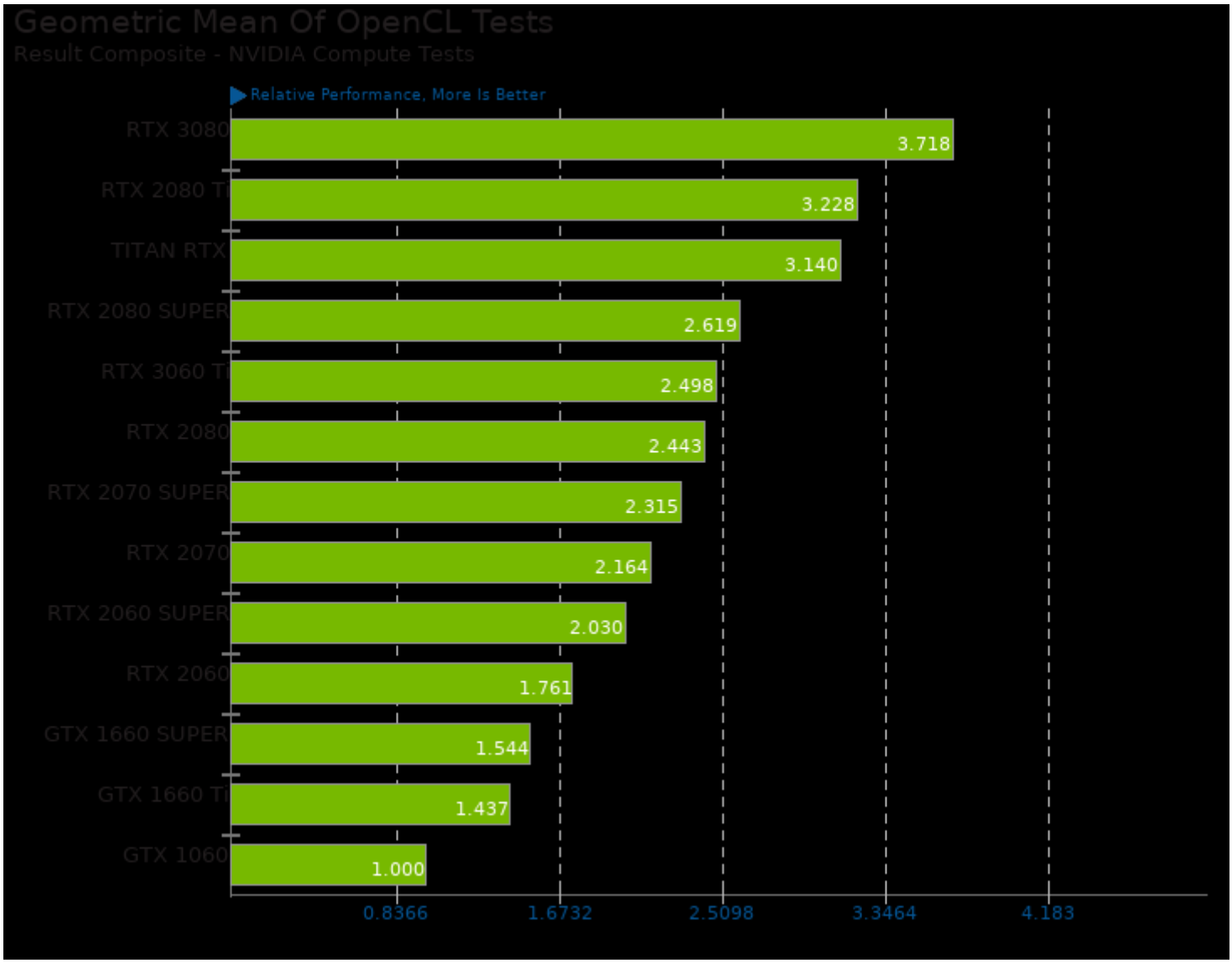
Geometric mean based upon tests: pts/ncnn, pts/plaidml and pts/lczero

NVIDIA Compute Tests

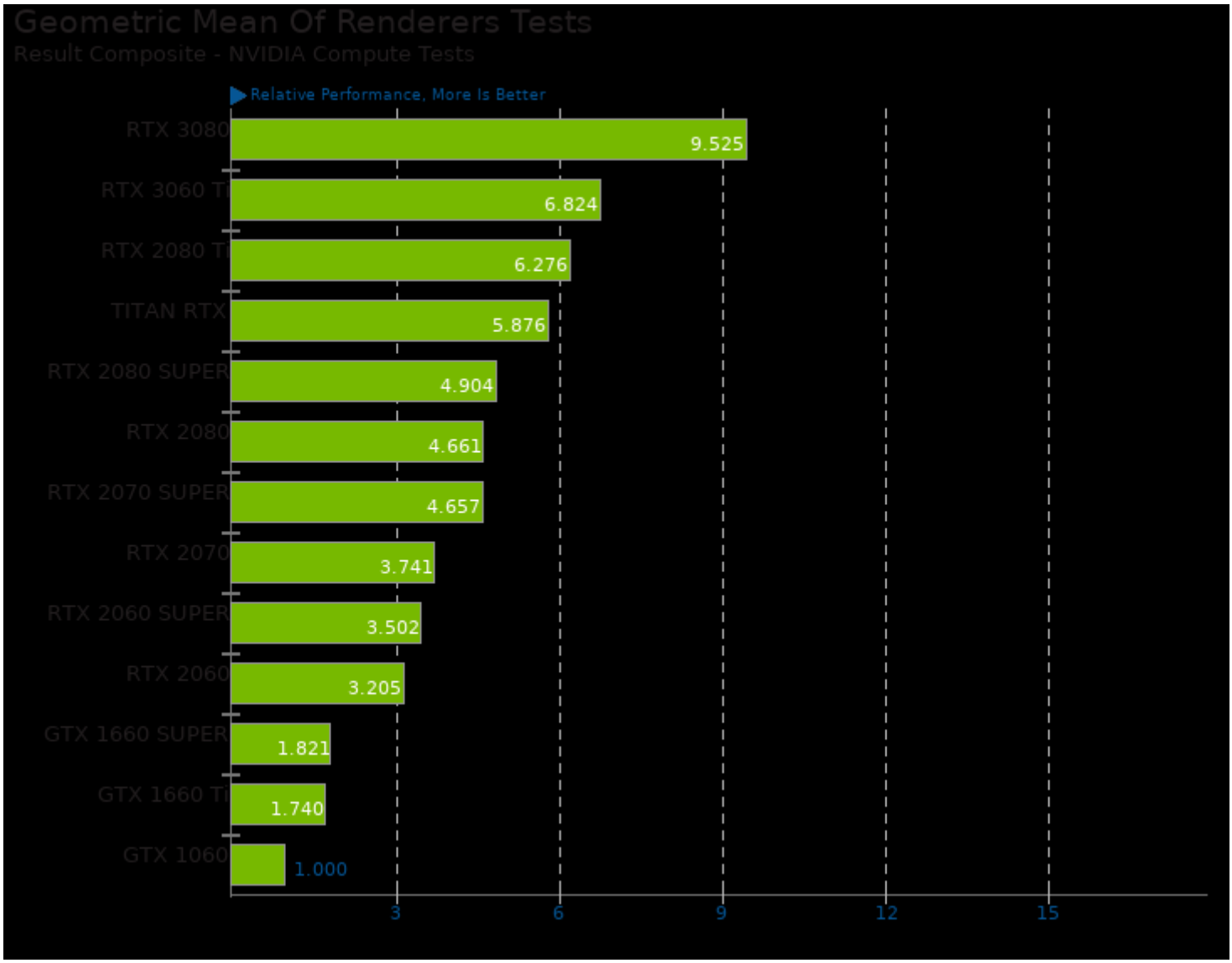


Geometric mean based upon tests: pts/blender, pts/arrayfire, pts/rodinia and pts/indigobench

NVIDIA Compute Tests

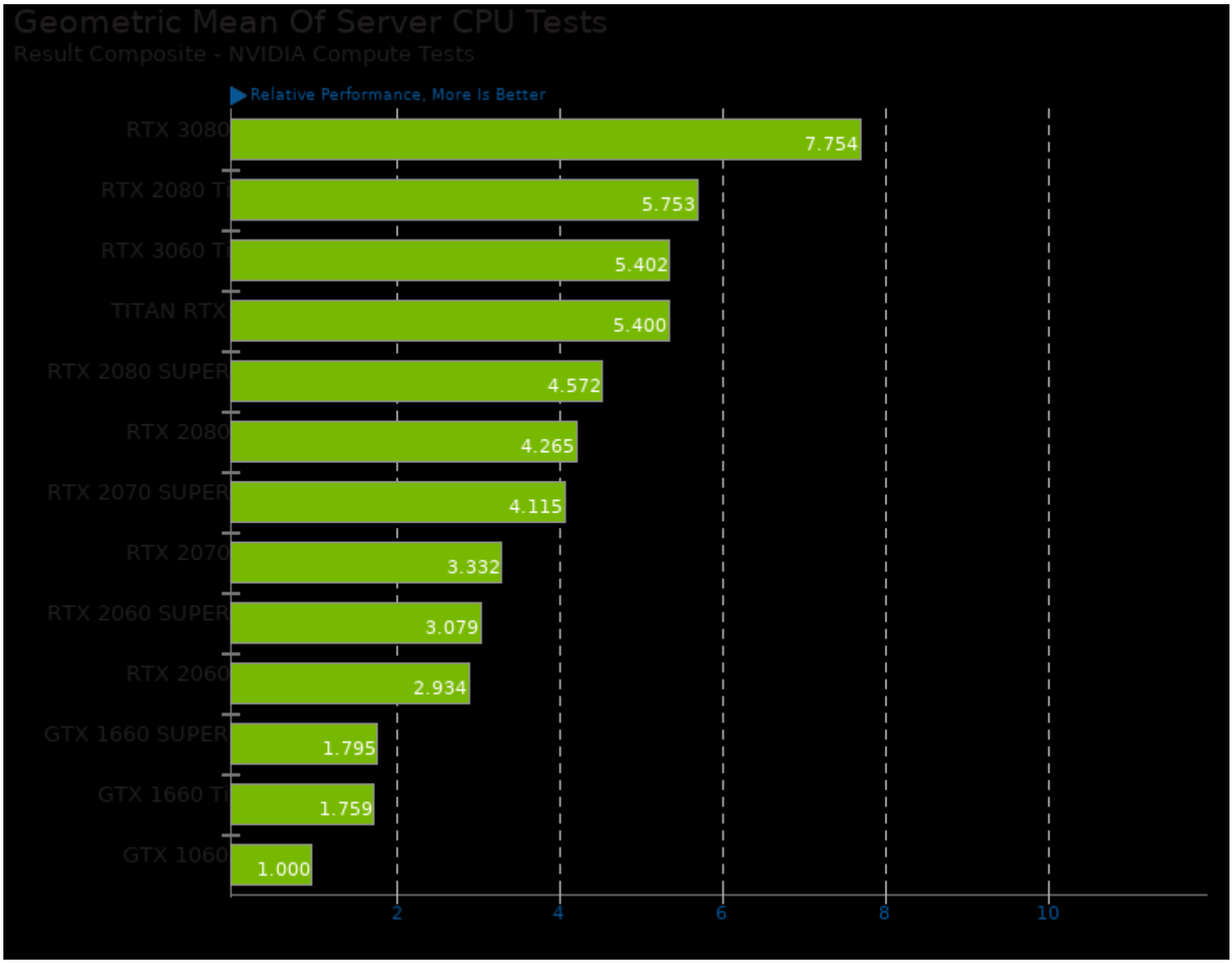


Geometric mean based upon tests: pts/mandelgpu, pts/cl-mem, pts/clpeak, pts/rodinia and pts/viennacl



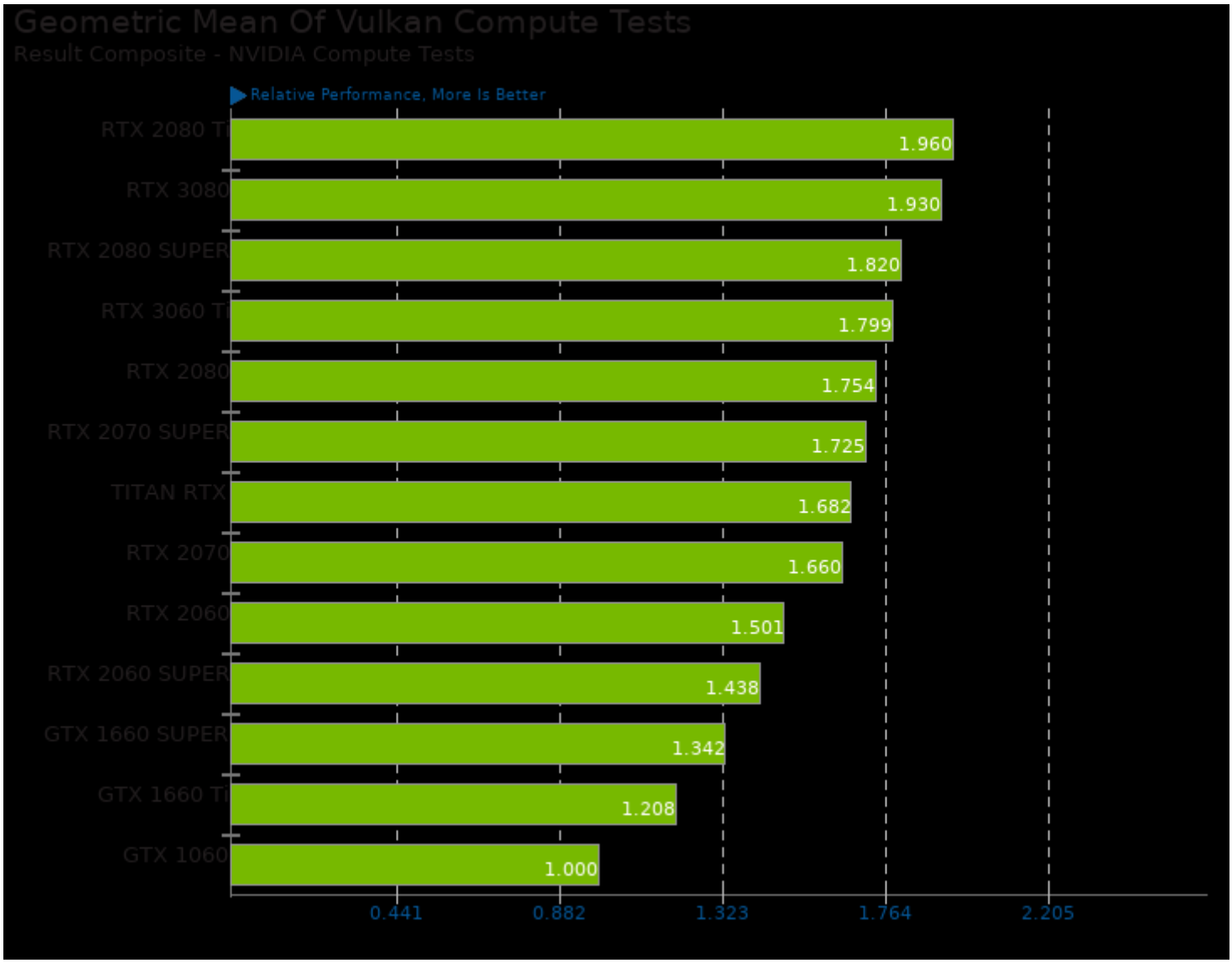
Geometric mean based upon tests: pts/blender and pts/indigobench

NVIDIA Compute Tests



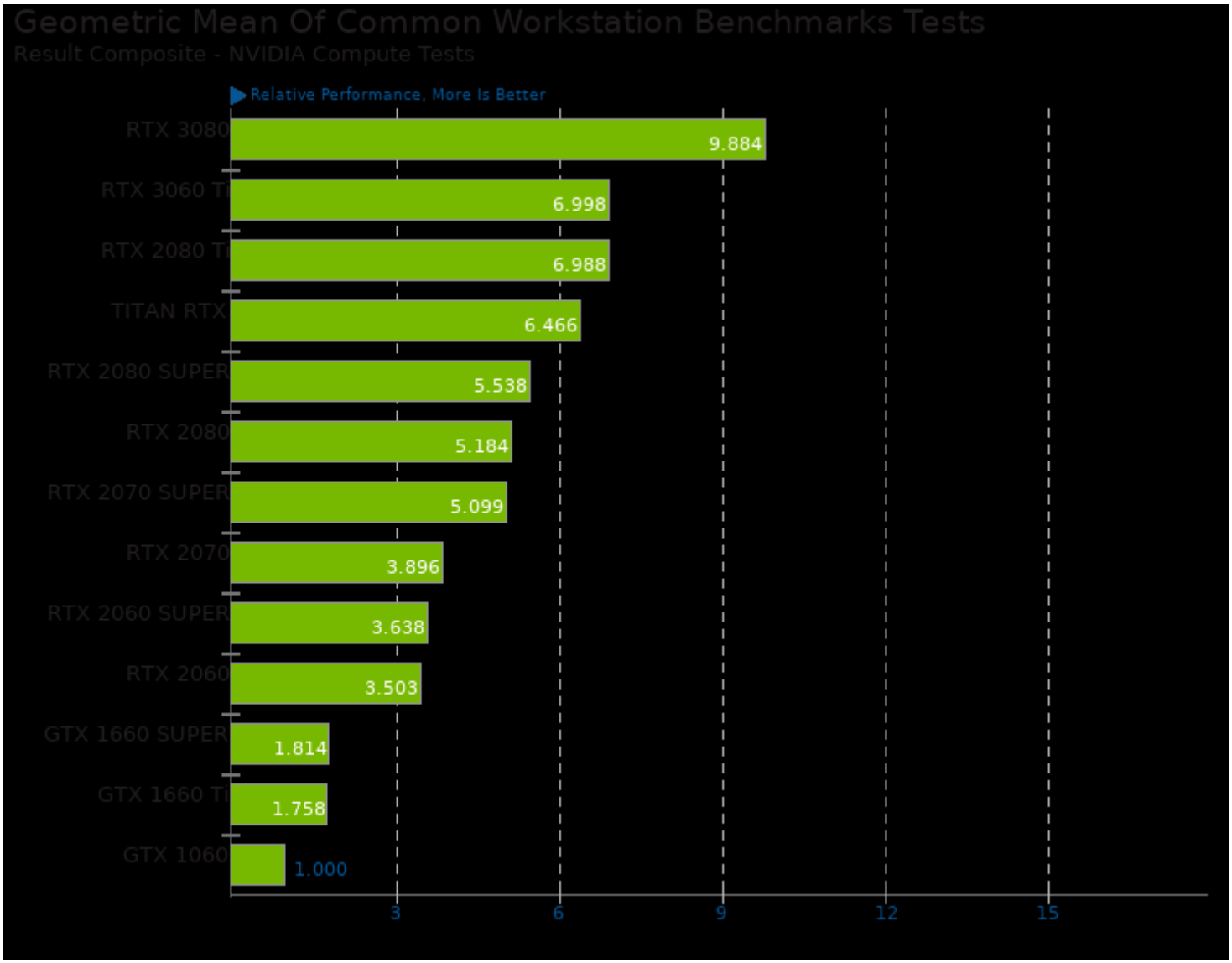
Geometric mean based upon tests: pts/rodinia, pts/blender and pts/geekbench

NVIDIA Compute Tests



Geometric mean based upon tests: pts/vkfft, pts/ncnn, pts/realsr-ncnn and pts/waifu2x-ncnn

NVIDIA Compute Tests



Geometric mean based upon tests: pts/blender and pts/rodinia

This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 09:25.