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# GPU Comparison

AMD Ryzen 5 3600 6-Core testing with a Gigabyte X570 AORUS ELITE (F32 BIOS) and MSI NVIDIA GeForce GTX 1080 8GB on Ubuntu 22.04 via the Phoronix Test Suite.

**Automated Executive Summary**

*GeForce RTX 4080 had the most wins, coming in first place for 87% of the tests.*

*Based on the geometric mean of all complete results, the fastest (GeForce RTX 4080) was 2.813x the speed of the slowest (GeForce GTX 1080). RD 6700 XT was 0.572x the speed of GeForce RTX 4080, RX 6700 XT Stock was 0.972x the speed of RD 6700 XT, Vega 64 Stock was 0.696x the speed of RX 6700 XT Stock, v56preupgrade was 0.963x the speed of Vega 64 Stock, GeForce GTX 1080 was 0.954x the speed of v56preupgrade.*

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

*GravityMark (Resolution: 2560 x 1440 - Renderer: OpenGL) at 6.32x*
*GravityMark (Resolution: 2560 x 1440 - Renderer: Vulkan) at 5.217x*
*Unigine Superposition (Resolution: 2560 x 1440 - Mode: Fullscreen - Quality: Ultra - Renderer: OpenGL) at 5.121x*
*Unigine Superposition (Resolution: 2560 x 1440 - Mode: Fullscreen - Quality: High - Renderer: OpenGL) at 3.898x*
*Unigine Superposition (Resolution: 2560 x 1440 - Mode: Fullscreen - Quality: Medium - Renderer: OpenGL) at 3.678x*
*Unigine Superposition (Resolution: 2560 x 1440 - Mode: Fullscreen - Quality: Low - Renderer: OpenGL) at 2.448x*
*Tesseract (Resolution: 2560 x 1440) at 1.704x*

*Xonotic (Resolution: 2560 x 1440 - Effects Quality: Ultimate) at 1.268x*
*Memory Usage Monitor (Phoronix Test Suite System Monitoring) at -1x*
*GPU Voltage Monitor (Phoronix Test Suite System Monitoring) at -1x.*

# Test Systems:

## Vega 64 Stock

Processor: Intel Core i9-7900X @ 4.50GHz (10 Cores / 20 Threads), Motherboard: ASUS PRIME X299-DELUXE (3601 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 32GB, Disk: 1024GB INTEL SSDPEKNW010T8 + 256GB Western Digital WDS256G1X0C-00ENX0 + 4001GB Western Digital WD4004FZWX-0 + 250GB Hitachi HTS54252, Graphics: ASUS AMD Radeon RX 56/64 8GB (1630/945MHz), Audio: Intel 200 PCH HD Audio, Monitor: C27HG7x, Network: Intel I219-V + Intel I211 + Qualcomm Atheros QCA6174 802.11ac

OS: Arch rolling, Kernel: 5.19.13-zen1-1-zen (x86_64), Desktop: Sway 1.7, Display Server: X Server 1.20.13 + Wayland, OpenGL: 4.6 Mesa 22.1.7 (LLVM 14.0.6 DRM 3.47), OpenCL: OpenCL 1.1 Mesa 22.1.7 + OpenCL 2.1 AMD-APP (3486.0), Vulkan: 1.3.211, Compiler: GCC 12.2.0 + Clang 14.0.6 + LLVM 14.0.6, File-System: btrfs, Screen Resolution: 2560x1440

Kernel Notes: Transparent Huge Pages: always
Environment Notes: MAKEFLAGS="-j20 -fuse-ld=mold"
Processor Notes: Scaling Governor: intel_cpufreq performance - CPU Microcode: 0x2006a08
Graphics Notes: BAR1 / Visible vRAM Size: 8176 MB - vBIOS Version: 115-D050PIL-100
Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + mmio_stale_data: Mitigation of Clear buffers; SMT vulnerable + retbleed: Mitigation of IBRS + spec_store_bypass: Mitigation of SSB disabled via prctl + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of IBRS IBPB: conditional RSB filling PBRSB-eIBRS: Not affected + srbds: Not affected + tsx_async_abort: Mitigation of Clear buffers; SMT vulnerable

## RX 6700 XT Stock

Processor: Intel Core i9-7900X @ 4.50GHz (10 Cores / 20 Threads), Motherboard: ASUS PRIME X299-DELUXE (3601 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 32GB, Disk: 1024GB INTEL SSDPEKNW010T8 + 256GB Western Digital WDS256G1X0C-00ENX0 + 4001GB Western Digital WD4004FZWX-0 + 250GB Hitachi HTS54252, Graphics: Sapphire AMD Radeon RX 6700 XT 12GB (2855/1000MHz), Audio: Intel 200 PCH HD Audio, Monitor: C27HG7x, Network: Intel I219-V + Intel I211 + Qualcomm Atheros QCA6174 802.11ac

OS: Arch rolling, Kernel: 5.19.13-zen1-1-zen (x86_64), Desktop: Sway 1.7, Display Server: X Server 1.20.13 + Wayland, OpenGL: 4.6 Mesa 22.1.7 (LLVM 14.0.6 DRM 3.47), OpenCL: OpenCL 1.1 Mesa 22.1.7 + OpenCL 2.1 AMD-APP (3486.0), Vulkan: 1.3.211, Compiler: GCC 12.2.0 + Clang 14.0.6 + LLVM 14.0.6, File-System: btrfs, Screen Resolution: 2560x1440

Kernel Notes: Transparent Huge Pages: always
Environment Notes: MAKEFLAGS="-j20 -fuse-ld=mold"
Processor Notes: Scaling Governor: intel_cpufreq performance - CPU Microcode: 0x2006a08
Graphics Notes: BAR1 / Visible vRAM Size: 12272 MB - vBIOS Version: 113-D5121100-O02
Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + l1tf: Mitigation of PTE Inversion; VMX: conditional cache flushes SMT vulnerable + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Mitigation of PTI + mmio_stale_data: Mitigation of Clear buffers; SMT vulnerable + retbleed: Mitigation of IBRS + spec_store_bypass: Mitigation of SSB disabled via prctl + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of IBRS IBPB: conditional RSB filling PBRSB-eIBRS: Not affected + srbds: Not affected + tsx_async_abort: Mitigation of Clear buffers; SMT vulnerable

## v56preupgrade

Processor: AMD Ryzen 5 3600 6-Core @ 3.60GHz (6 Cores / 12 Threads), Motherboard: ASRock B550 Phantom Gaming 4 (P2.20 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 1000GB CT1000P1SSD8 + 2000GB Seagate ST2000LX001-1RG1 + 480GB KINGSTON SUV400S + 63GB Cruzer + 2 x 0GB Storage + 4 x 0GB Seagate STORAGE DEVICE, Graphics: XFX AMD Radeon RX 56/64 8GB (1590/800MHz), Audio: AMD Vega 10 HDMI Audio, Monitor: 2 x LCD1970GX + ED323QUR A, Network: Realtek RTL8111/8168/8411

OS: Nobara 36, Kernel: 6.0.9-202.fc36.x86_64 (x86_64), Desktop: GNOME Shell 42.3.1, Display Server: X Server 1.20.14 + Wayland, OpenGL: 4.6 Mesa 22.2.3 (LLVM 14.0.5 DRM 3.48), OpenCL: OpenCL 2.1 AMD-APP (3452.0), Vulkan: 1.3.235, Compiler: GCC 12.2.1 20220819 + Clang 14.0.5 + LLVM 14.0.5, File-System: ext4, Screen Resolution: 5120x1440

Kernel Notes: Transparent Huge Pages: madvise
Environment Notes: HIP_ENV_CXX_FLAGS="-D_GNU_SOURCE -isystem /usr/include/c++/12 -isystem /usr/include/c++/12/x86_64-redhat-linux"
Processor Notes: Scaling Governor: acpi-cpufreq schedutil (Boost: Enabled) - CPU Microcode: 0x8701021
Graphics Notes: GLAMOR - BAR1 / Visible vRAM Size: 256 MB - vBIOS Version: 113-VEGA10XLH_HBM_8
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + mmio_stale_data: Not affected + retbleed: Mitigation of untrained return thunk; SMT enabled with STIBP protection + spec_store_bypass: Mitigation of SSB disabled via prctl + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Retpolines IBPB: conditional STIBP: always-on RSB filling PBRSB-eIBRS: Not affected + srbds: Not affected + tsx_async_abort: Not affected

## RD 6700 XT

Processor: AMD Ryzen 5 3600 6-Core @ 3.60GHz (6 Cores / 12 Threads), Motherboard: ASRock B550 Phantom Gaming 4 (P2.20 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 1000GB CT1000P1SSD8 + 2000GB Seagate ST2000LX001-1RG1 + 480GB KINGSTON SUV400S + 63GB Cruzer + 2 x 0GB Storage + 4 x 0GB Seagate STORAGE DEVICE, Graphics: AMD Radeon RX 6700 XT 12GB (2855/1000MHz), Audio: AMD Navi 21/23, Monitor: 2 x LCD1970GX + ED323QUR A, Network: Realtek RTL8111/8168/8411

OS: Nobara 36, Kernel: 6.0.9-202.fc36.x86_64 (x86_64), Desktop: GNOME Shell 42.3.1, Display Server: X Server 1.20.14 + Wayland, OpenGL: 4.6 Mesa 22.2.3 (LLVM 14.0.5 DRM 3.48), OpenCL: OpenCL 2.1 AMD-APP (3452.0), Vulkan: 1.3.235, Compiler: GCC 12.2.1 20221121 + Clang 14.0.5 + LLVM 14.0.5, File-System: ext4, Screen Resolution: 5120x1440

Kernel Notes: Transparent Huge Pages: madvise
Environment Notes: HIP_ENV_CXX_FLAGS="-D_GNU_SOURCE -isystem /usr/include/c++/12 -isystem /usr/include/c++/12/x86_64-redhat-linux"
Processor Notes: Scaling Governor: acpi-cpufreq schedutil (Boost: Enabled) - CPU Microcode: 0x8701021
Graphics Notes: GLAMOR - BAR1 / Visible vRAM Size: 256 MB - vBIOS Version: 113-D5121000_100
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + mmio_stale_data: Not affected + retbleed: Mitigation of untrained return thunk; SMT enabled with STIBP protection + spec_store_bypass: Mitigation of SSB disabled via prctl + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Retpolines IBPB: conditional STIBP: always-on RSB filling PBRSB-eIBRS: Not affected + srbds: Not affected + tsx_async_abort: Not affected

## GeForce RTX 4080

Processor: AMD Ryzen 5 3600 6-Core @ 3.80GHz (6 Cores / 12 Threads), Motherboard: Gigabyte X570 AORUS ELITE (F32 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 525GB Crucial CT525MX3 + 120GB INTEL SSDSC2CW12 + 0GB Seagate STORAGE DEVICE, Graphics: Gigabyte NVIDIA GeForce RTX 4080 16GB, Audio: NVIDIA Device 22bb, Monitor: LG ULTRAGEAR, Network: Intel I211

OS: Ubuntu 22.04, Kernel: 5.15.0-53-generic (x86_64), Desktop: GNOME Shell 42.5, Display Server: X Server 1.21.1.3, Display Driver: NVIDIA 525.53, OpenGL: 4.6.0, Vulkan: 1.3.224, Compiler: GCC 11.3.0 + Clang 14.0.0-1ubuntu1, File-System: btrfs, Screen Resolution: 2560x1440

Kernel Notes: Transparent Huge Pages: madvise
Processor Notes: Scaling Governor: acpi-cpufreq schedutil (Boost: Enabled) - CPU Microcode: 0x8701021
Graphics Notes: BAR1 / Visible vRAM Size: 256 MiB - vBIOS Version: 95.03.0e.40.6e
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + mmio_stale_data: Not affected + retbleed: Mitigation of untrained return thunk; SMT enabled with STIBP protection + 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 Retpolines IBPB: conditional STIBP: always-on RSB filling PBRSB-eIBRS: Not affected + srbds: Not affected + tsx_async_abort: Not affected

## GeForce GTX 1080

Processor: AMD Ryzen 5 3600 6-Core @ 3.80GHz (6 Cores / 12 Threads), Motherboard: Gigabyte X570 AORUS ELITE (F32 BIOS), Chipset: AMD Starship/Matisse, Memory: 32GB, Disk: 525GB Crucial CT525MX3 + 120GB INTEL SSDSC2CW12 + 0GB Seagate STORAGE DEVICE, Graphics: MSI NVIDIA GeForce GTX 1080 8GB, Audio: NVIDIA GP104 HD Audio, Monitor: LG ULTRAGEAR, Network: Intel I211

OS: Ubuntu 22.04, Kernel: 5.15.0-53-generic (x86_64), Desktop: GNOME Shell 42.5, Display Server: X Server 1.21.1.3, Display Driver: NVIDIA 525.53, OpenGL: 4.6.0, Vulkan: 1.3.224, Compiler: GCC 11.3.0 + Clang 14.0.0-1ubuntu1, File-System: btrfs, Screen Resolution: 2560x1440

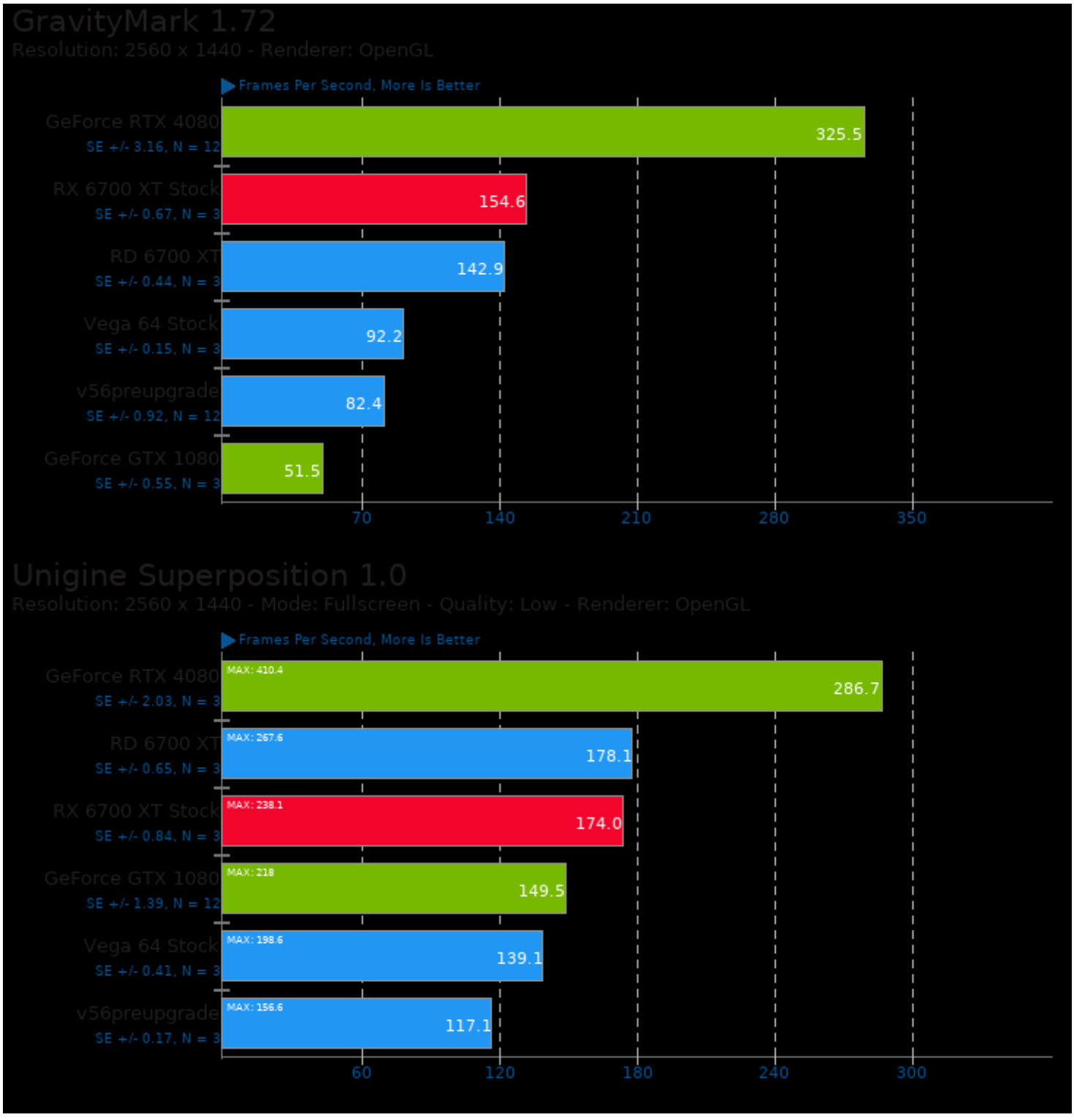
Kernel Notes: Transparent Huge Pages: madvise
Processor Notes: Scaling Governor: acpi-cpufreq schedutil (Boost: Enabled) - CPU Microcode: 0x8701021
Graphics Notes: BAR1 / Visible vRAM Size: 256 MiB - vBIOS Version: 86.04.60.40.27
Security Notes: itlb_multihit: Not affected + l1tf: Not affected + mds: Not affected + meltdown: Not affected + mmio_stale_data: Not affected + retbleed: Mitigation of untrained return thunk; SMT enabled with STIBP protection + 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 Retpolines IBPB: conditional STIBP: always-on RSB filling PBRSB-eIBRS: Not affected + srbds: Not affected + tsx_async_abort: Not affected

| | Vega 64 Stock | RX 6700 XT Stock | v56preupgrade | RD 6700 XT | GeForce RTX 4080 | GeForce GTX 1080 |
|---|---|---|---|---|---|---|
| **GravityMark - 2560 x 1440 - OpenGL (FPS)** | 92.2 | 154.6 | 82.4 | 142.9 | **325.5** | **51.5** |
| **Normalized** | 28.33% | 47.5% | 25.31% | 43.9% | 100% | 15.82% |
| **Standard Deviation** | 0.3% | 0.7% | 3.9% | 0.5% | 3.4% | 1.9% |
| **Unigine Superposition - 2560 x 1440 - Fullscreen - Low - OpenGL (FPS)** | 139.1 | 174.0 | **117.1** | 178.1 | **286.7** | 149.5 |
| **Normalized** | 48.52% | 60.69% | 40.84% | 62.12% | 100% | 52.15% |
| **Standard Deviation** | 0.5% | 0.8% | 0.2% | 0.6% | 1.2% | 3.2% |
| **GravityMark - 2560 x 1440 - Vulkan (FPS)** | 90.5 | 159.6 | 84.3 | 149.6 | **317.2** | **60.8** |
| **Normalized** | 28.53% | 50.32% | 26.58% | 47.16% | 100% | 19.17% |
| **Standard Deviation** | 0.3% | 0.1% | 6.2% | 0.8% | 0.3% | 0.2% |
| **Unigine Superposition - 2560 x 1440 - Fullscreen - Ultra - OpenGL (FPS)** | 18.4 | 28.8 | 15.8 | 26.3 | **67.6** | **13.2** |
| **Normalized** | 27.22% | 42.6% | 23.37% | 38.91% | 100% | 19.53% |
| **Standard Deviation** | 0% | 0% | 0% | 0.2% | 0.1% | 0% |
| **Unigine Superposition - 2560 x 1440 - Fullscreen - High - OpenGL (FPS)** | 44.3 | 78.9 | **37.1** | 69.4 | **144.6** | 47.1 |
| **Normalized** | 30.64% | 54.56% | 25.66% | 47.99% | 100% | 32.57% |
| **Standard Deviation** | 0% | 0% | 0% | 0% | 0% | 0% |

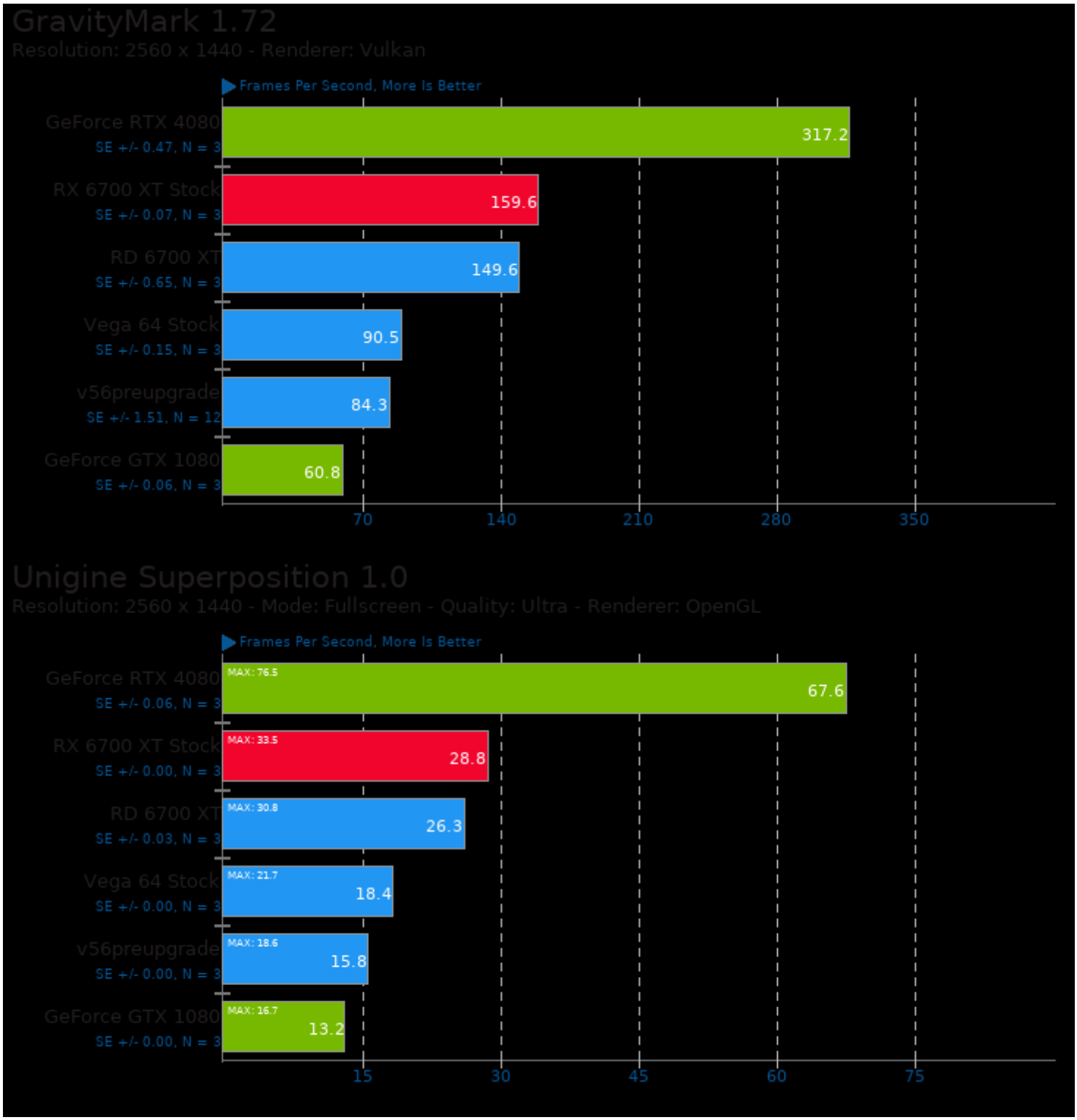
# GPU Comparison

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|---|---|---|---|---|---|---|
| **Unigine Superposition - 2560 x 1440 - Fullscreen - Medium - OpenGL (FPS)** | 64.2 | 110.4 | **53.4** | 96.6 | **196.4** | 69.3 |
| **Normalized** | 32.69% | 56.21% | 27.19% | 49.19% | 100% | 35.29% |
| **Standard Deviation** | 0.1% | 0.1% | 0.1% | 0.1% | 0.3% | 0% |
| **Xonotic - 2560 x 1440 - Ultimate (FPS)** | **213.7100540** | 214.7456920 | 260.0054575 | **270.9008360** | 266.9731373 | 268.8746722 |
| **Normalized** | 78.89% | 79.27% | 95.98% | 100% | 98.55% | 99.25% |
| **Standard Deviation** | 1.1% | 0.6% | 0.1% | 0.8% | 0.1% | 0.4% |
| **Tesseract - 2560 x 1440** | **490.2730** | 499.5453 | 713.2435 | 799.6308 | **835.5144** | 596.1467 |
| **Normalized** | 58.68% | 59.79% | 85.37% | 95.71% | 100% | 71.35% |
| **Standard Deviation** | 1.5% | 2.9% | 2.2% | 2.2% | 1.6% | 2.1% |

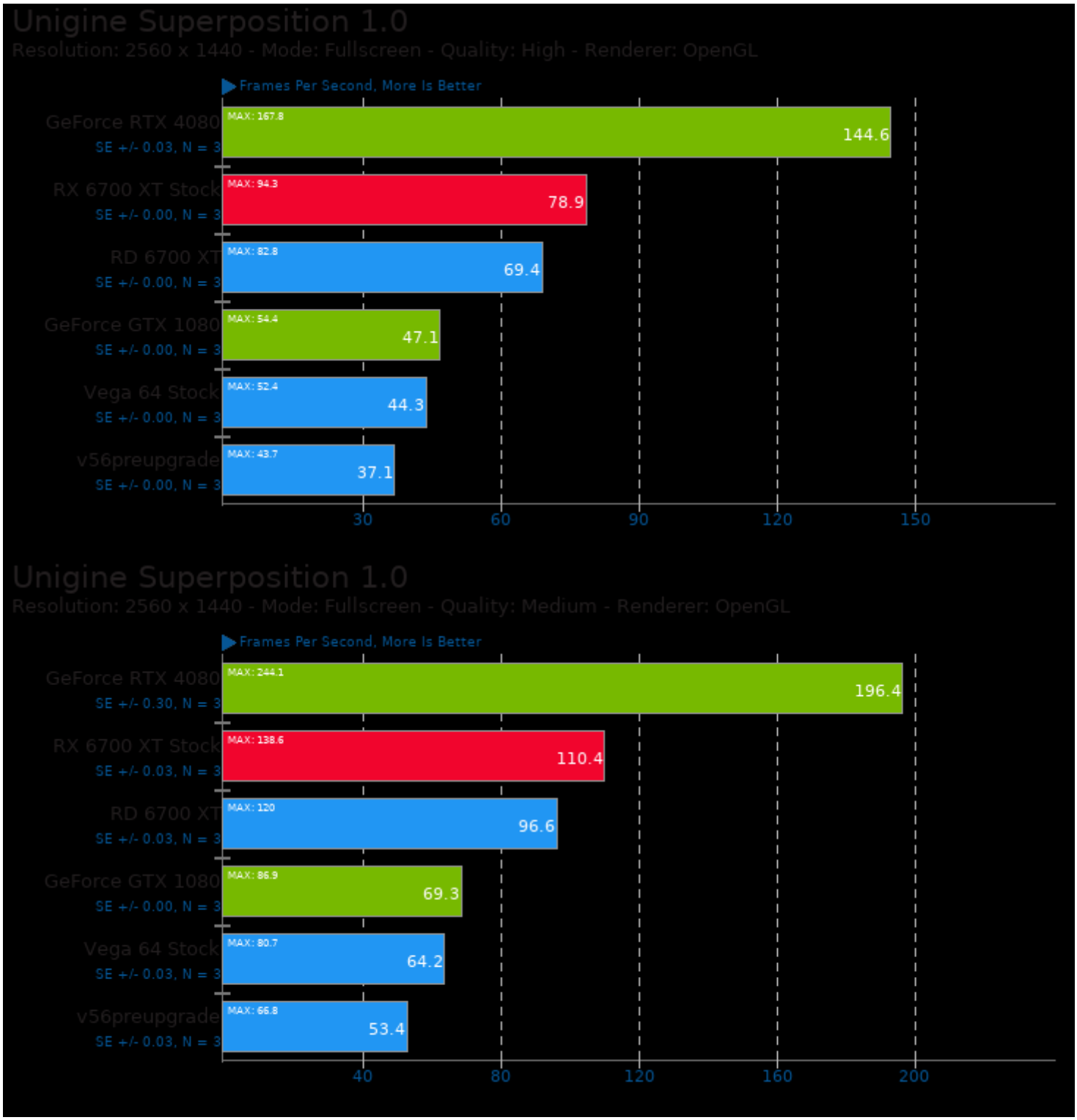
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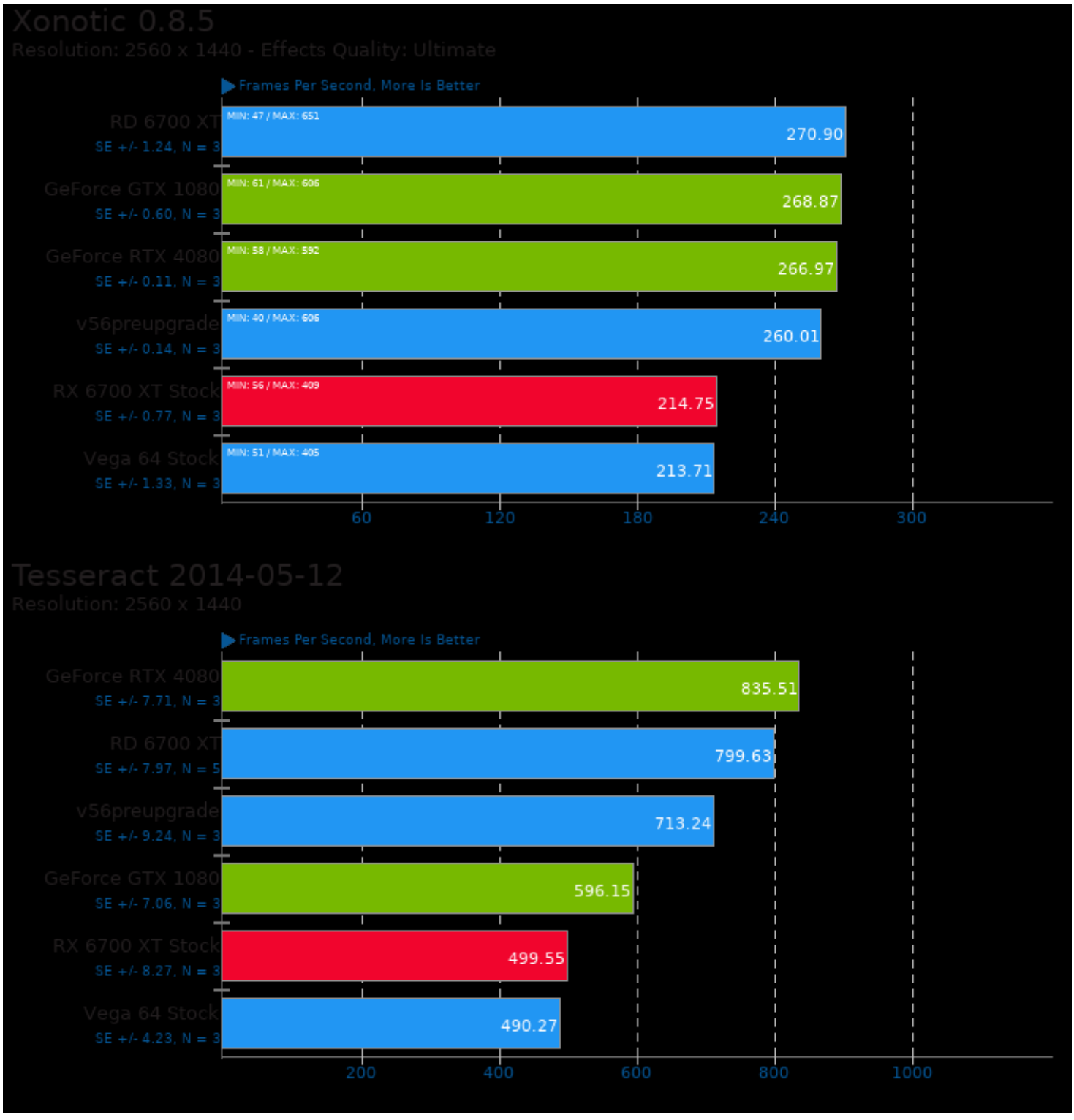
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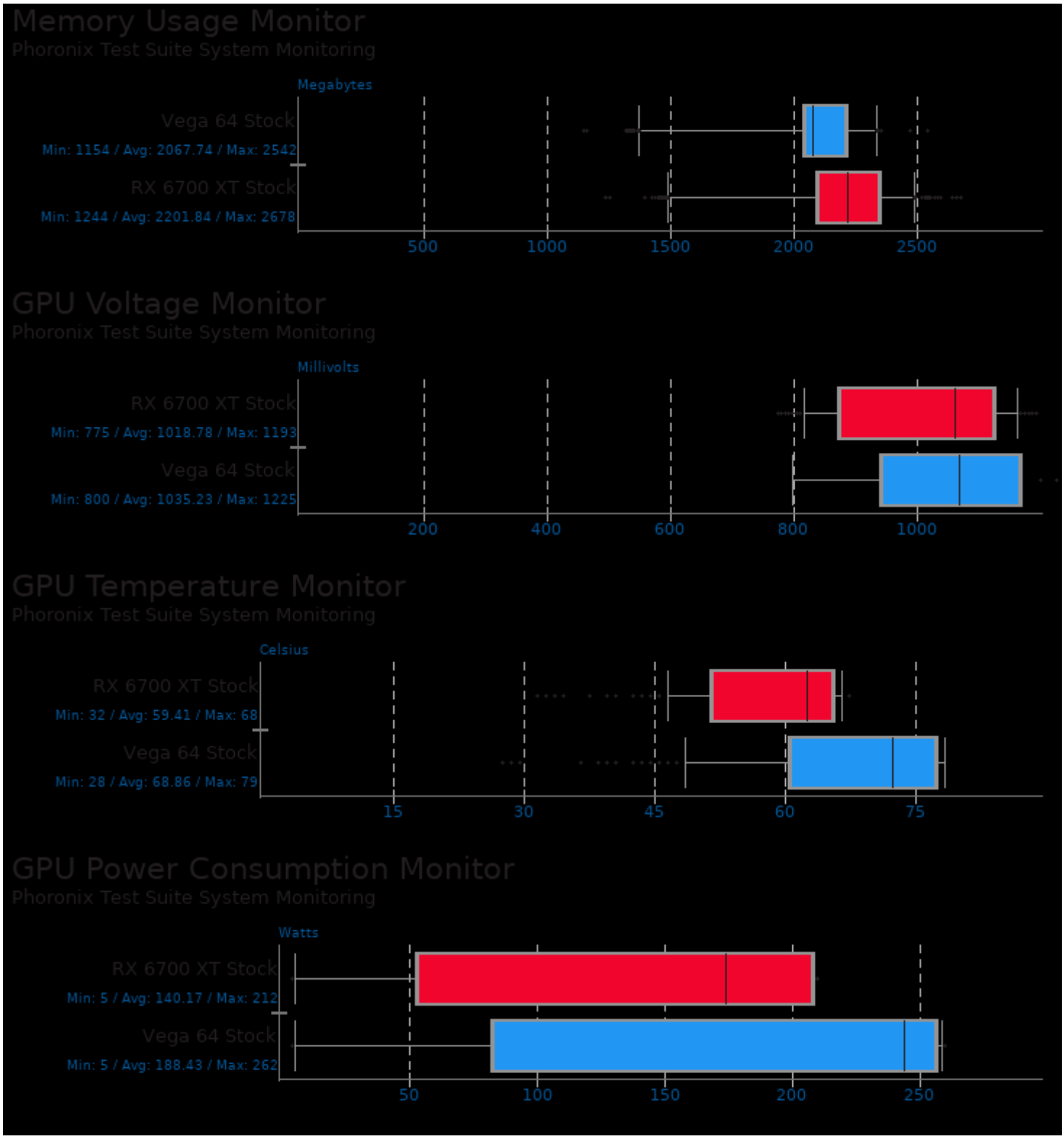
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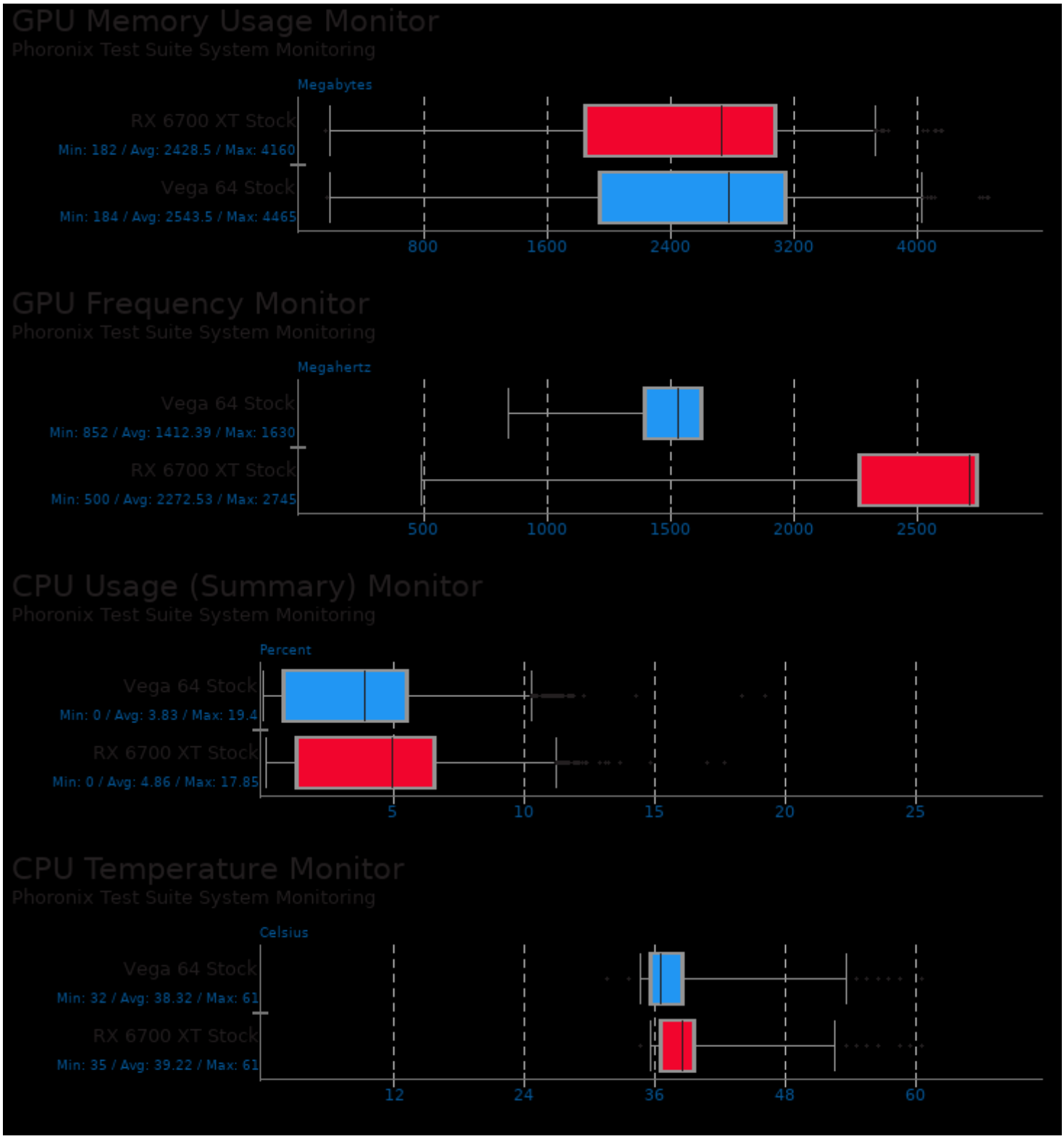
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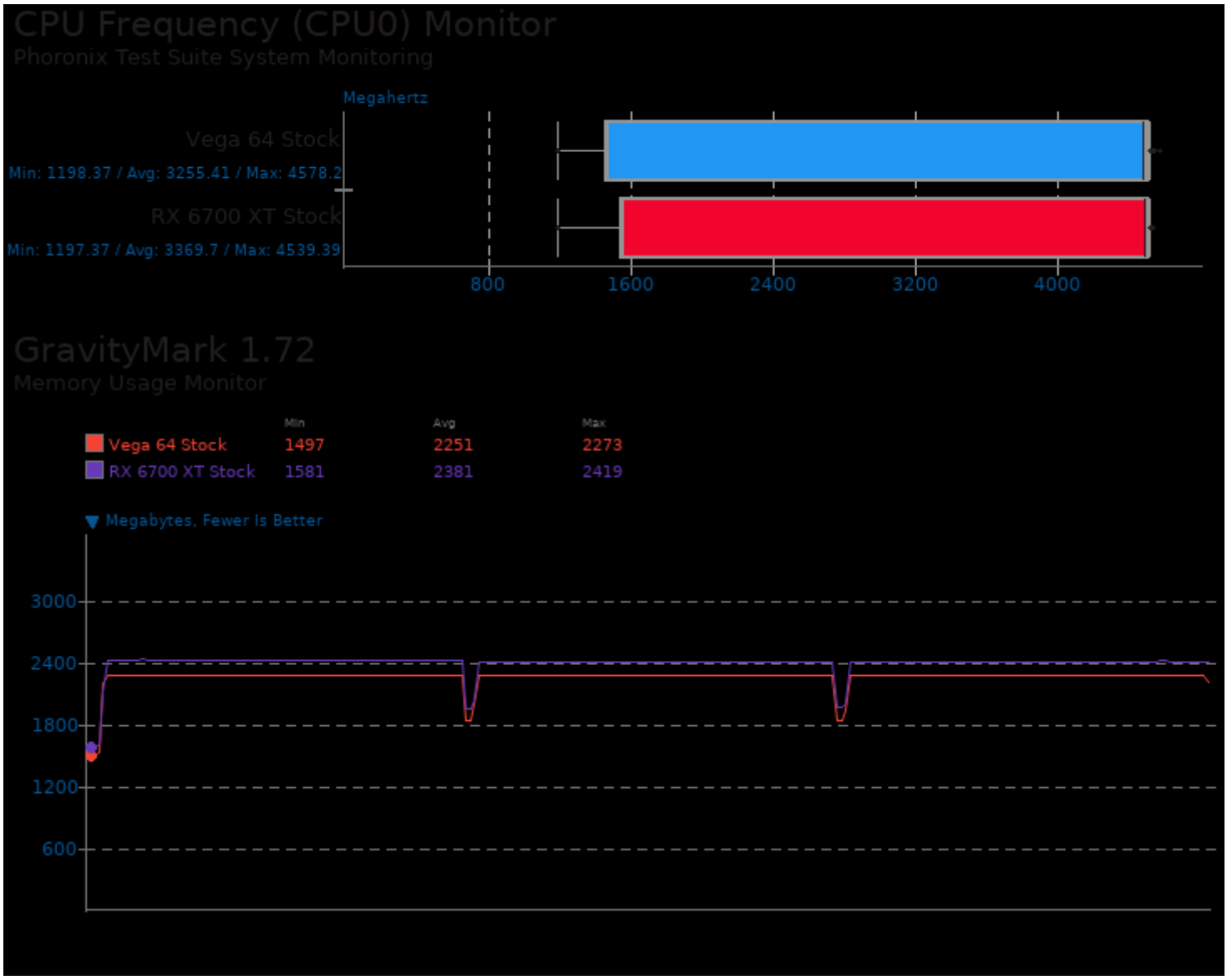
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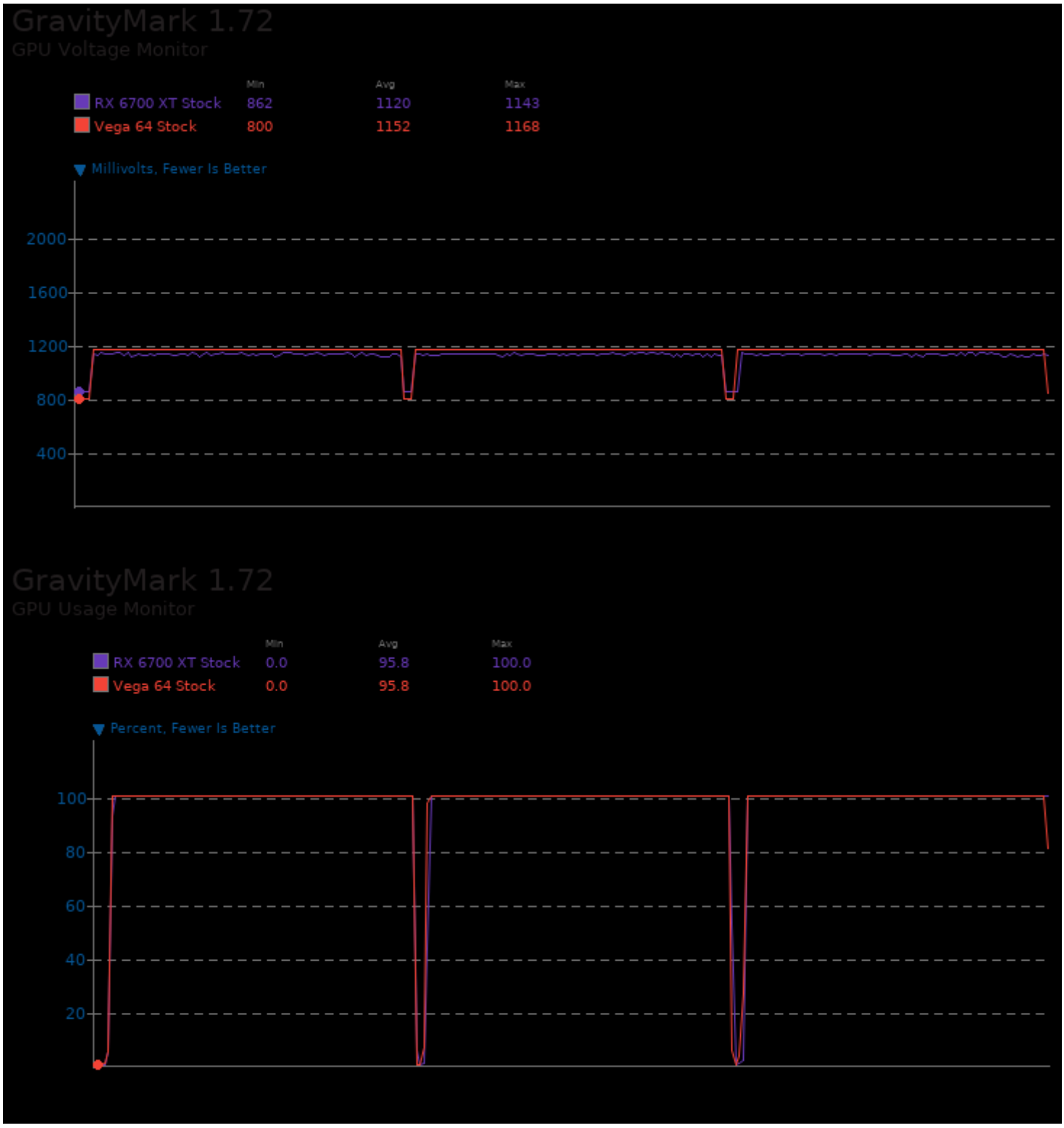
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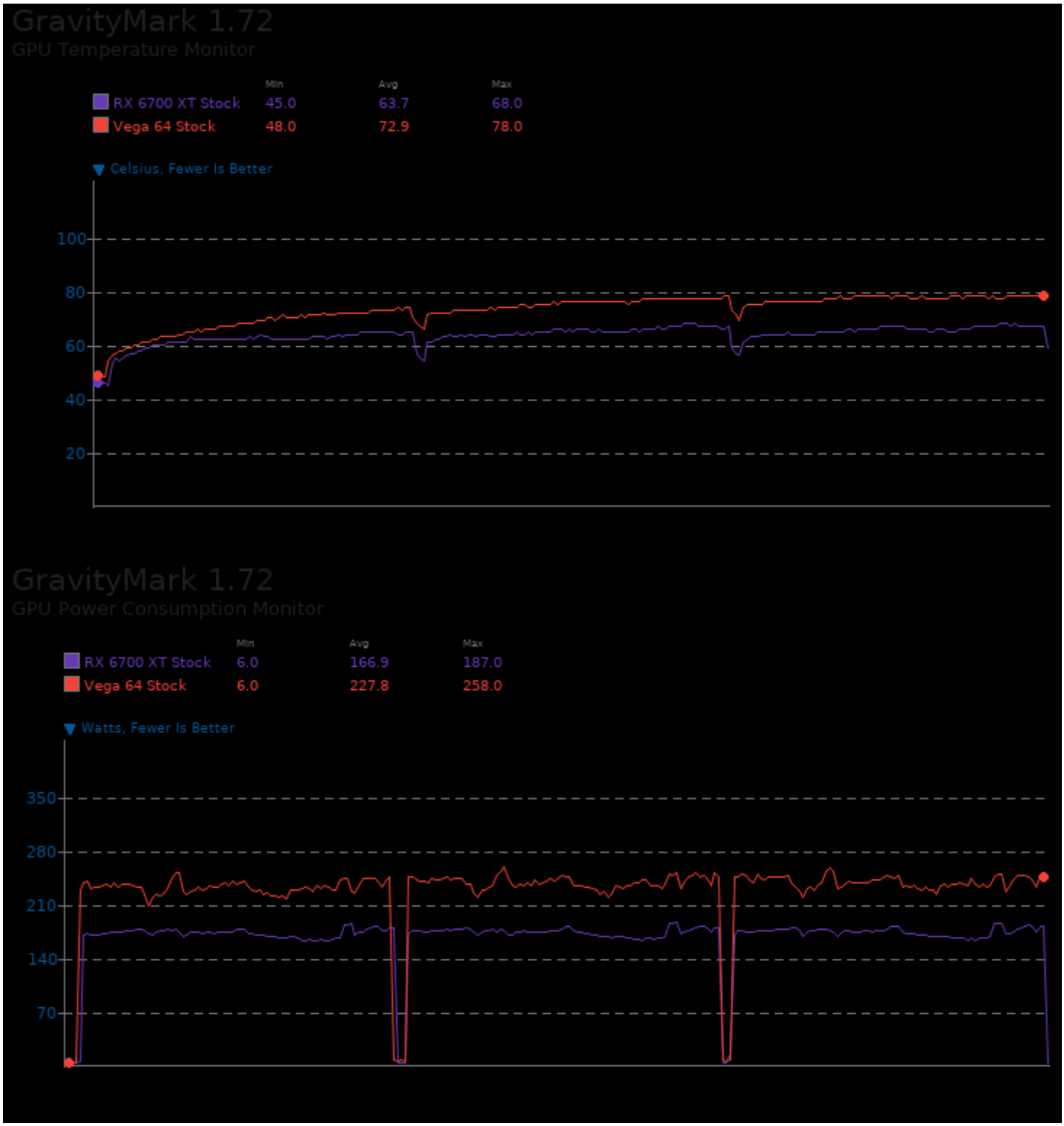
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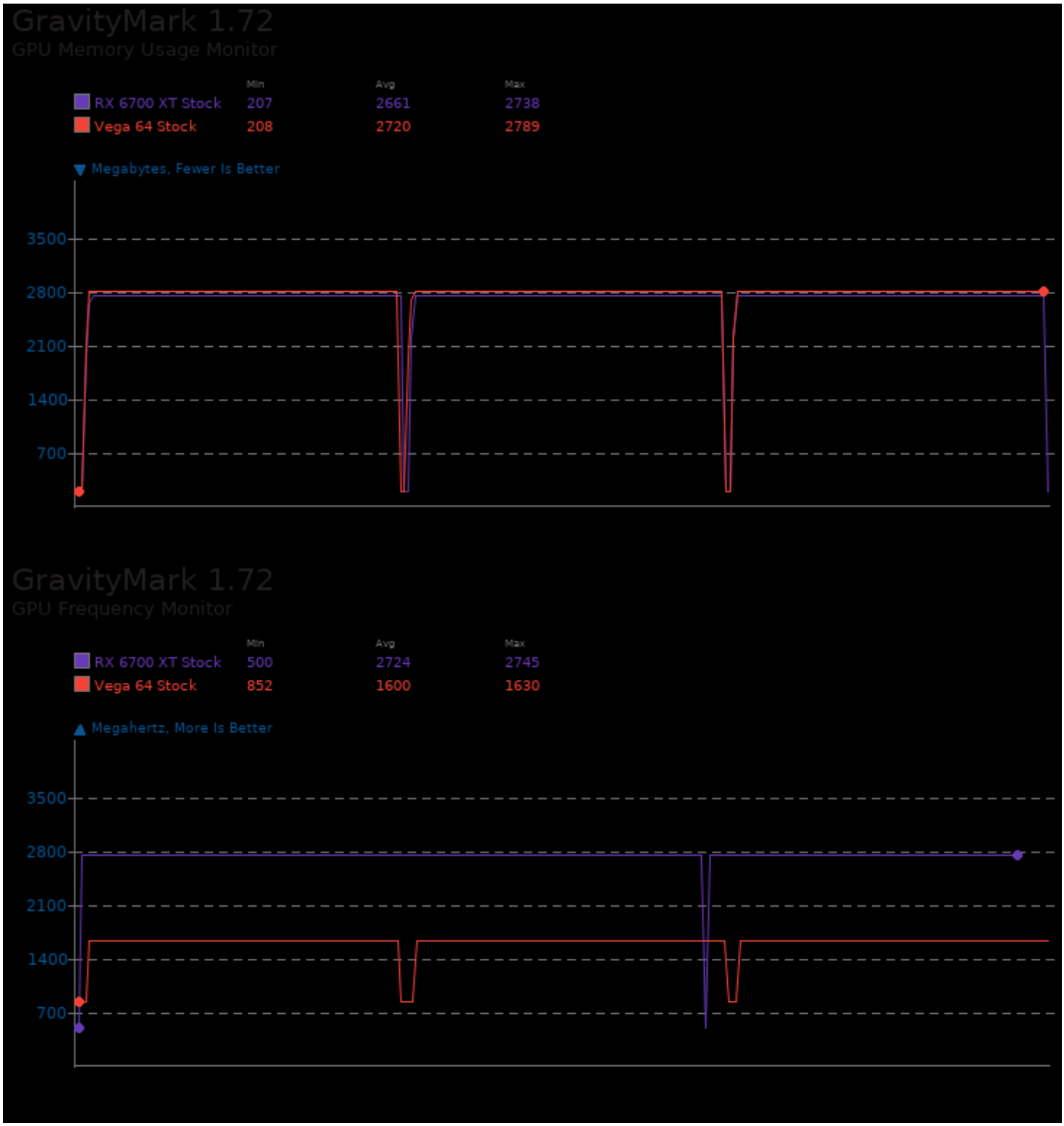
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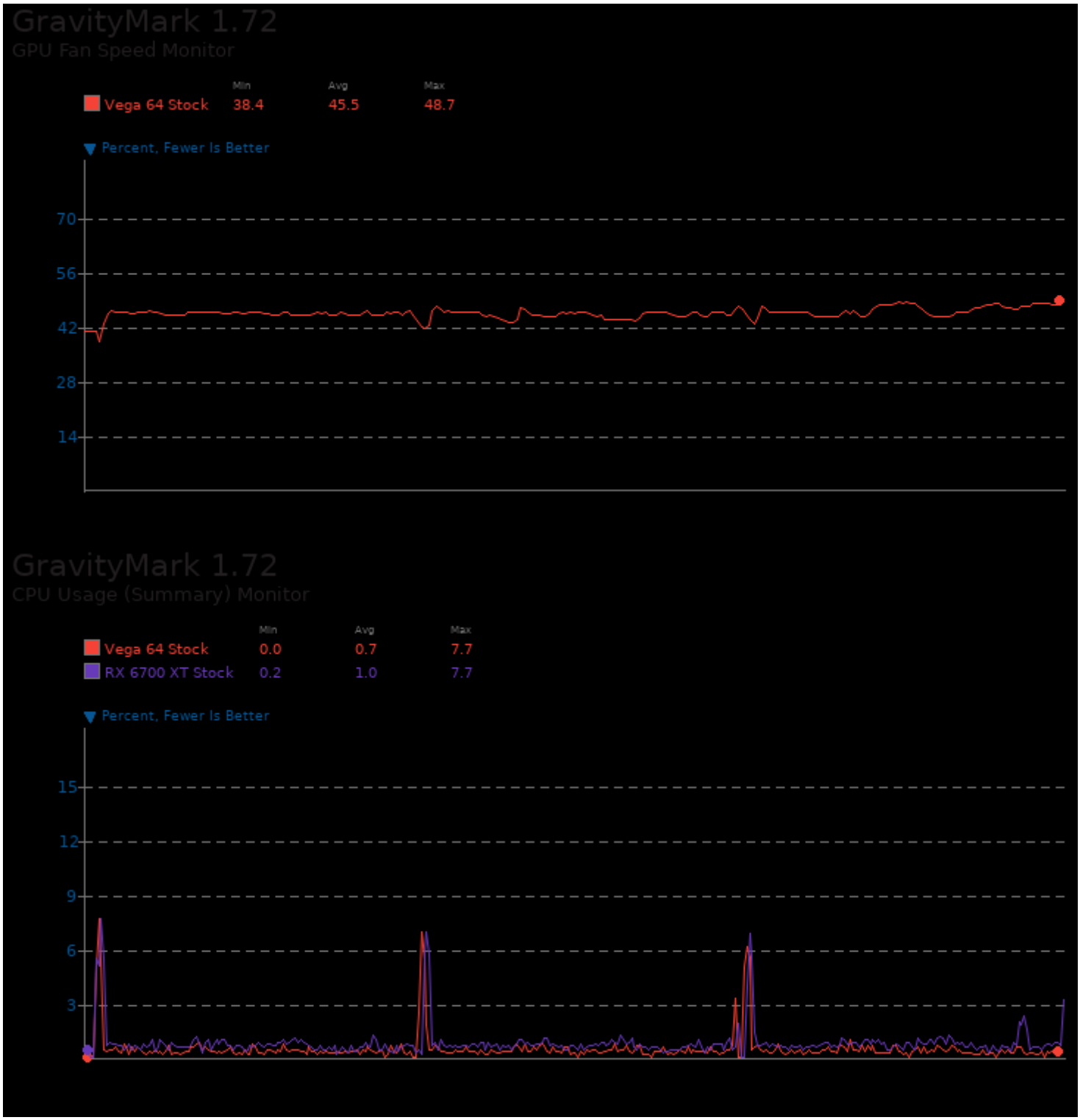
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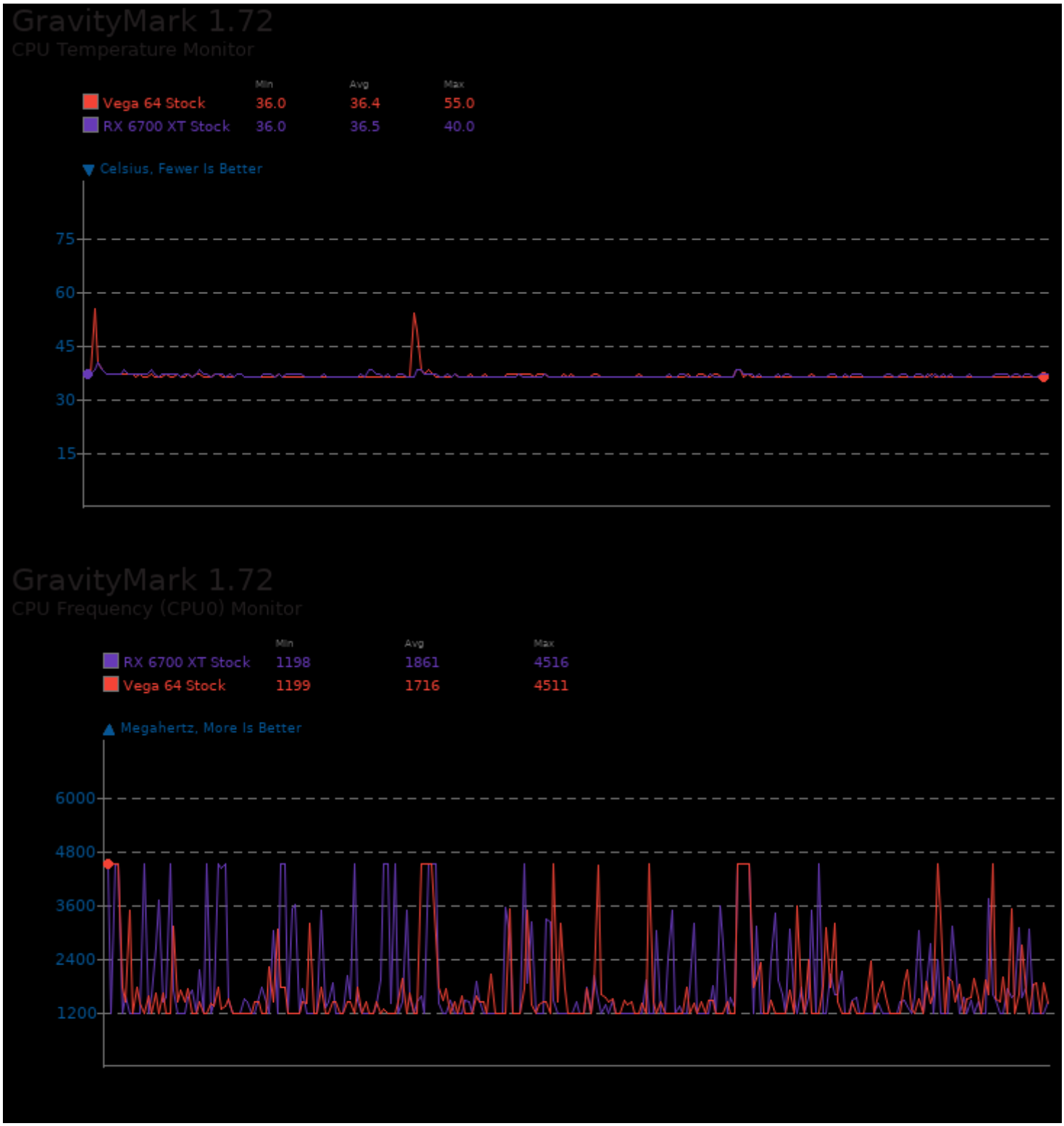
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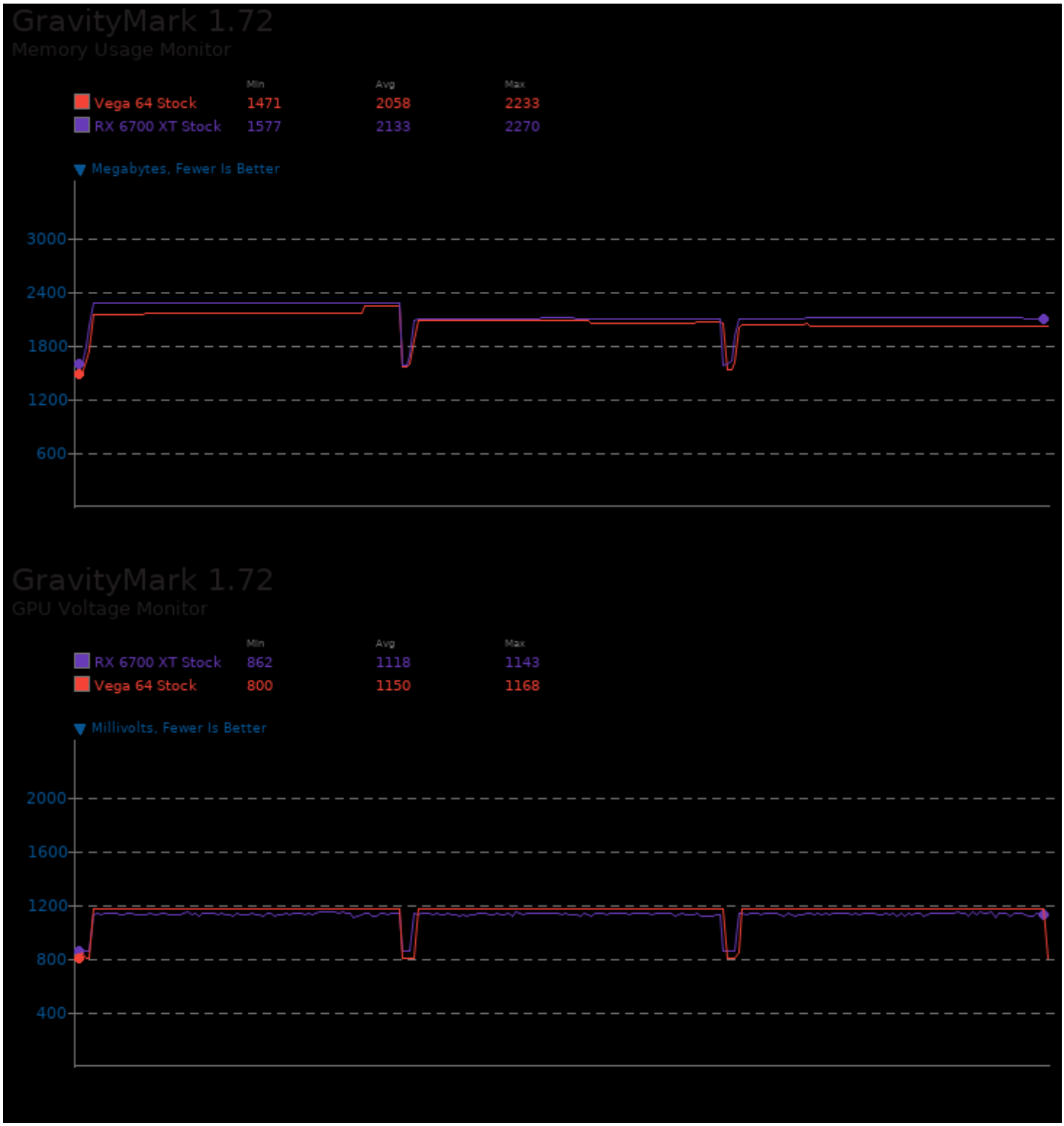
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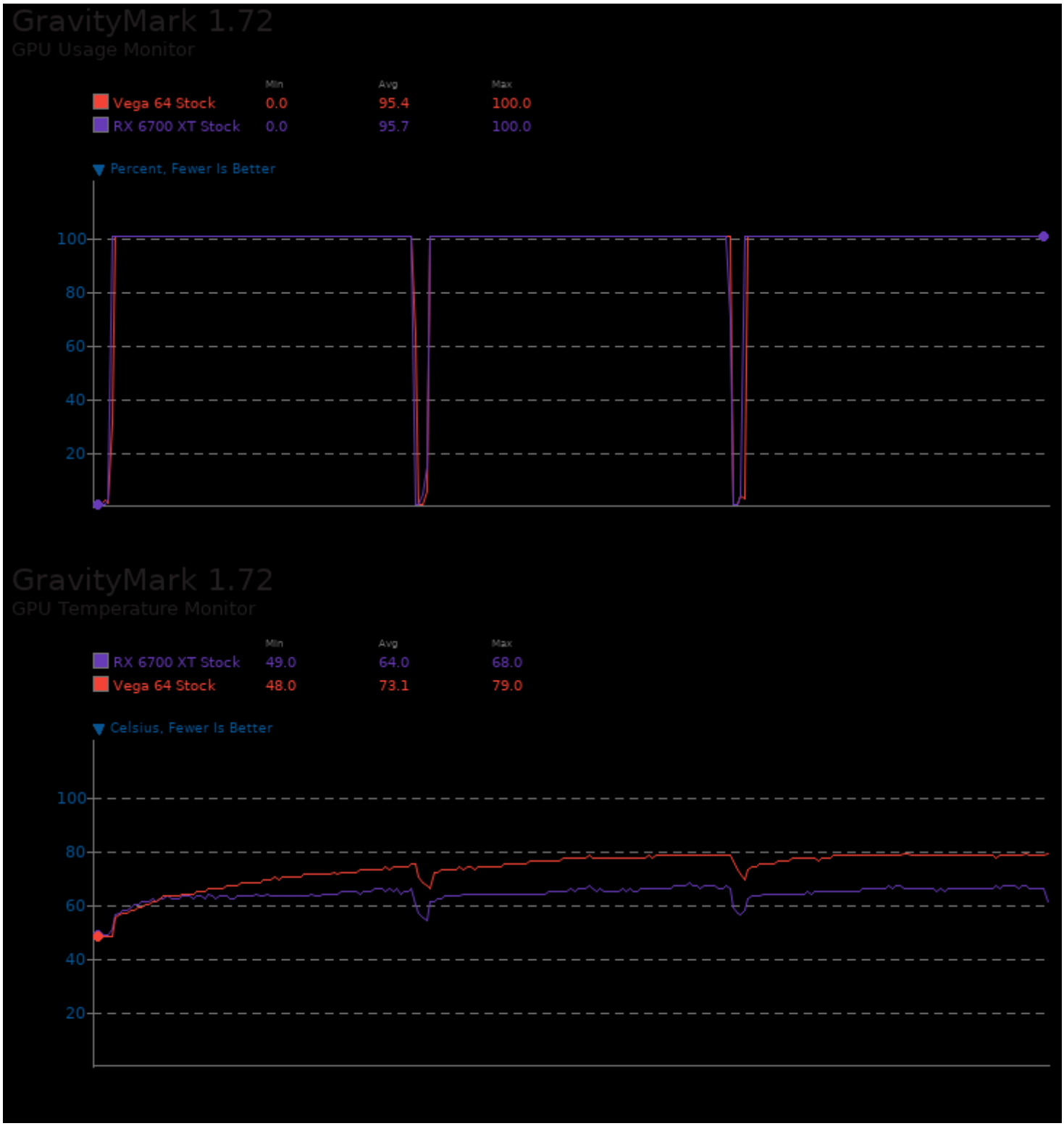
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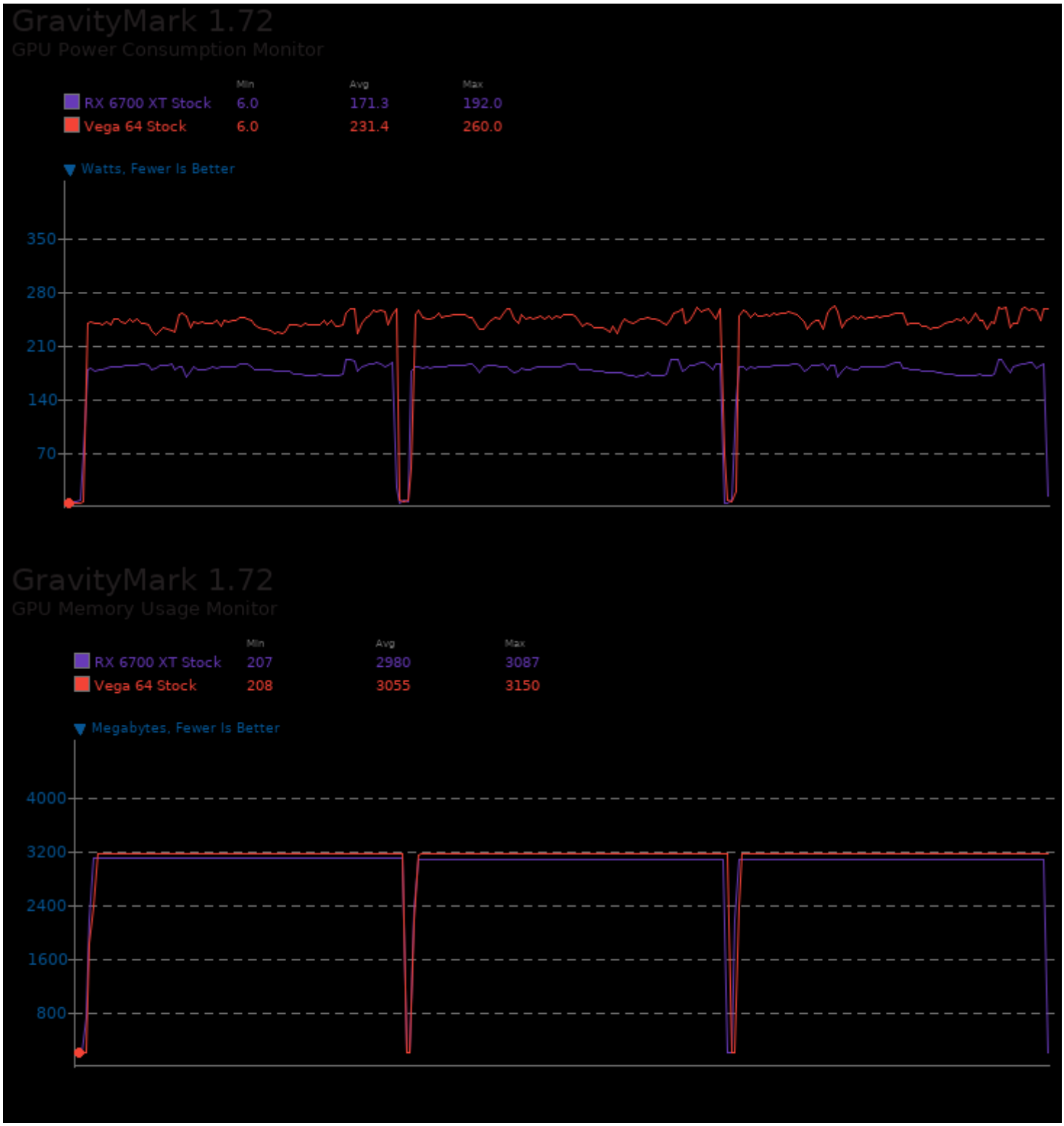
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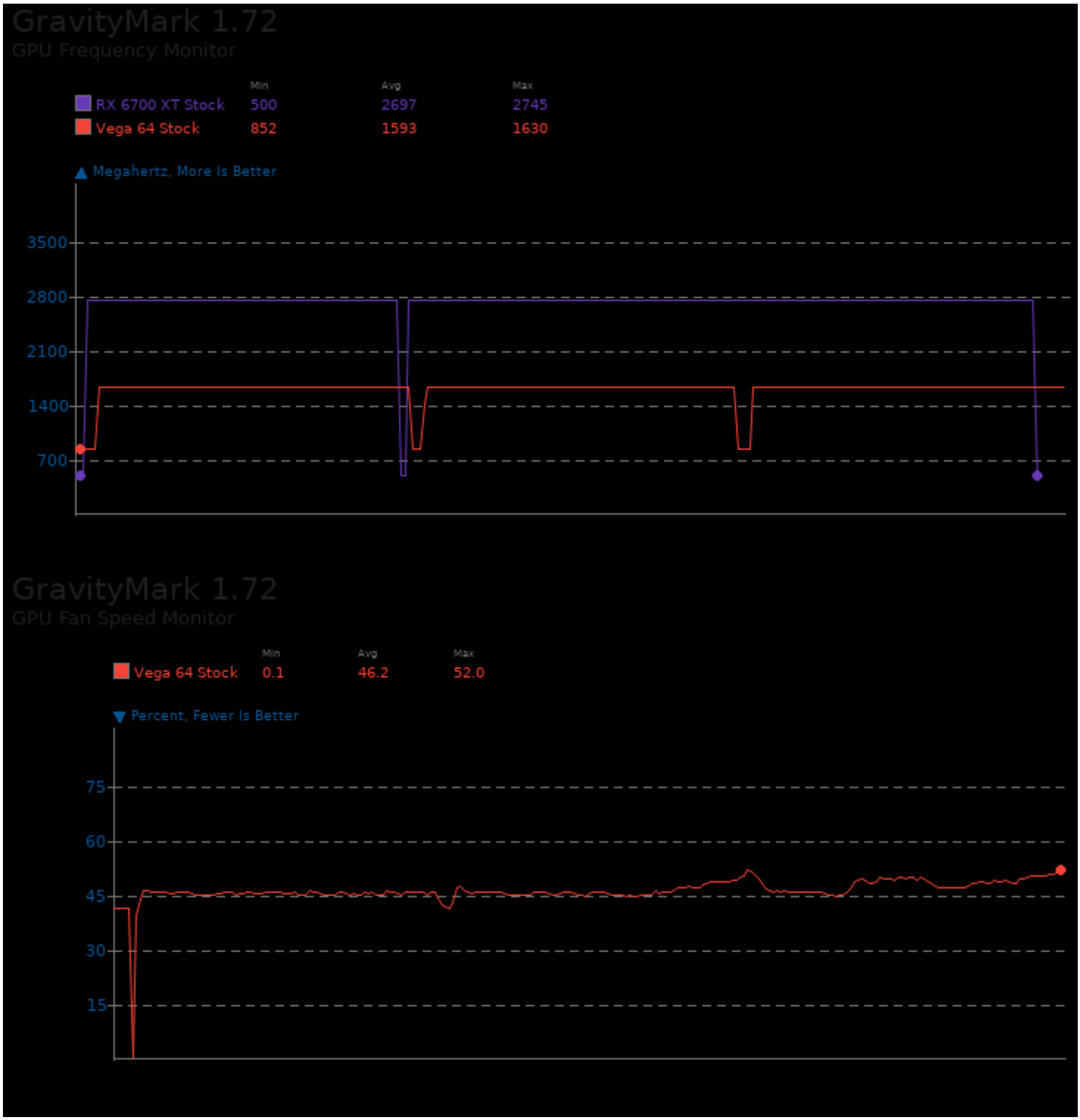
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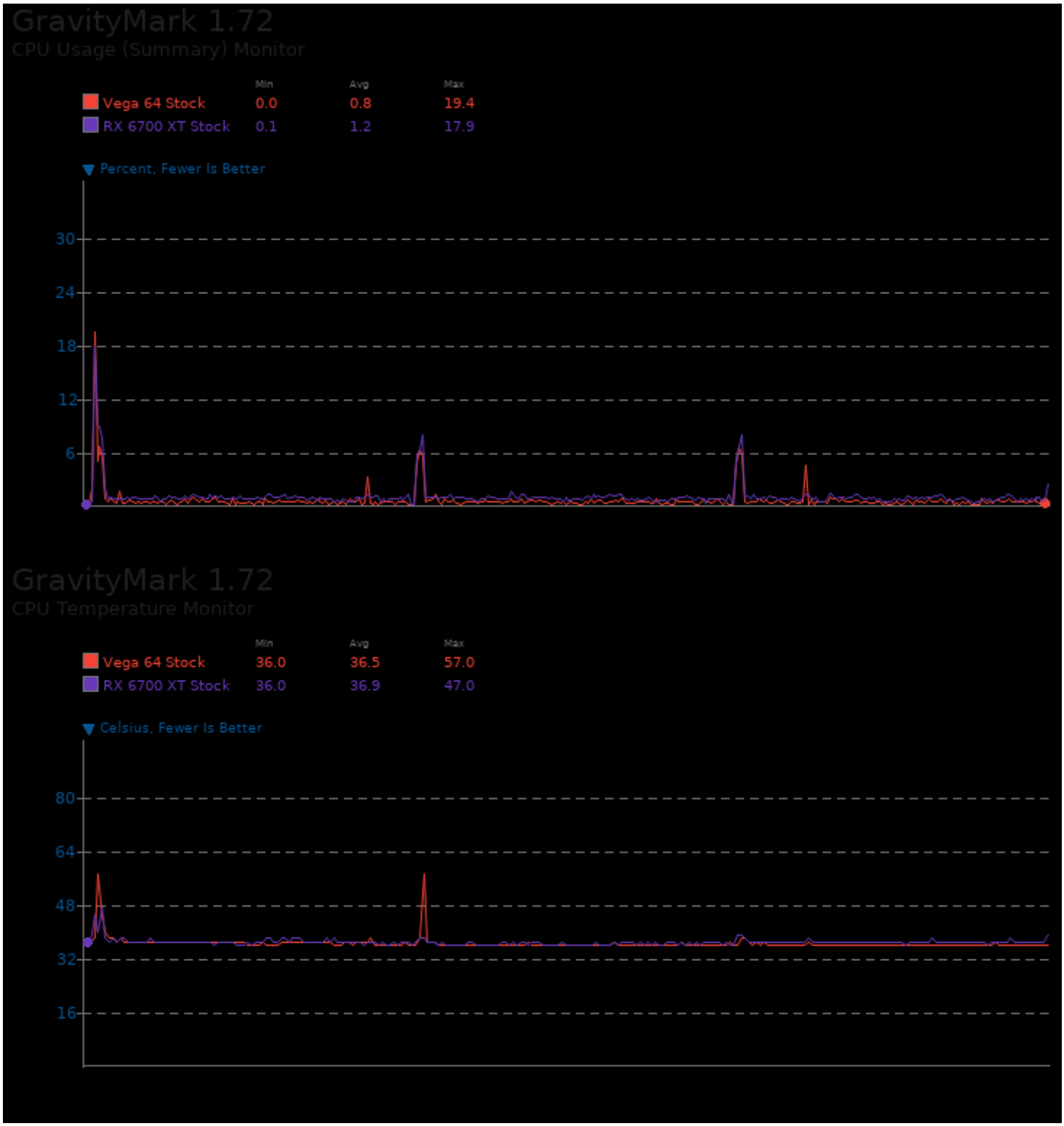
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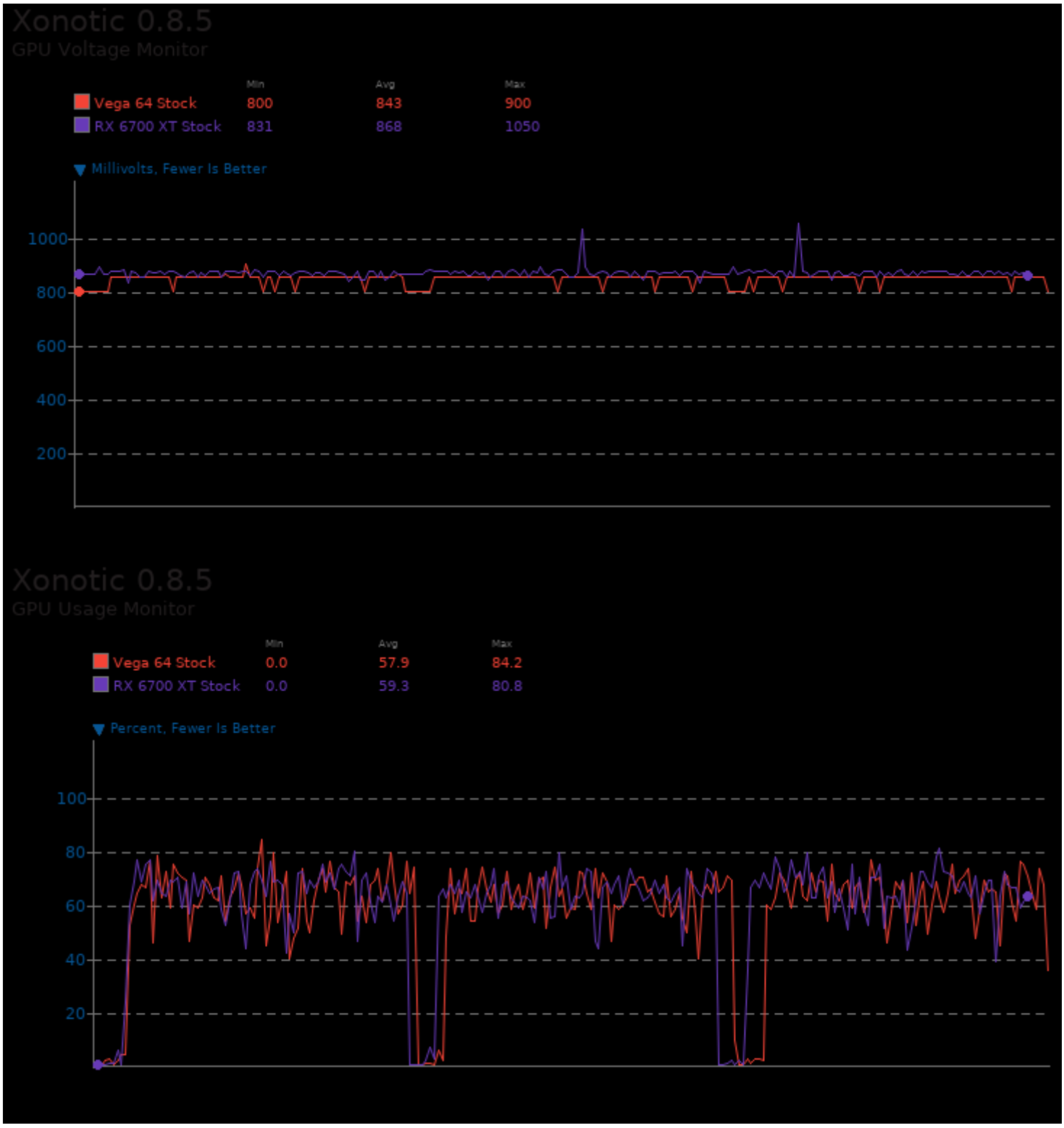
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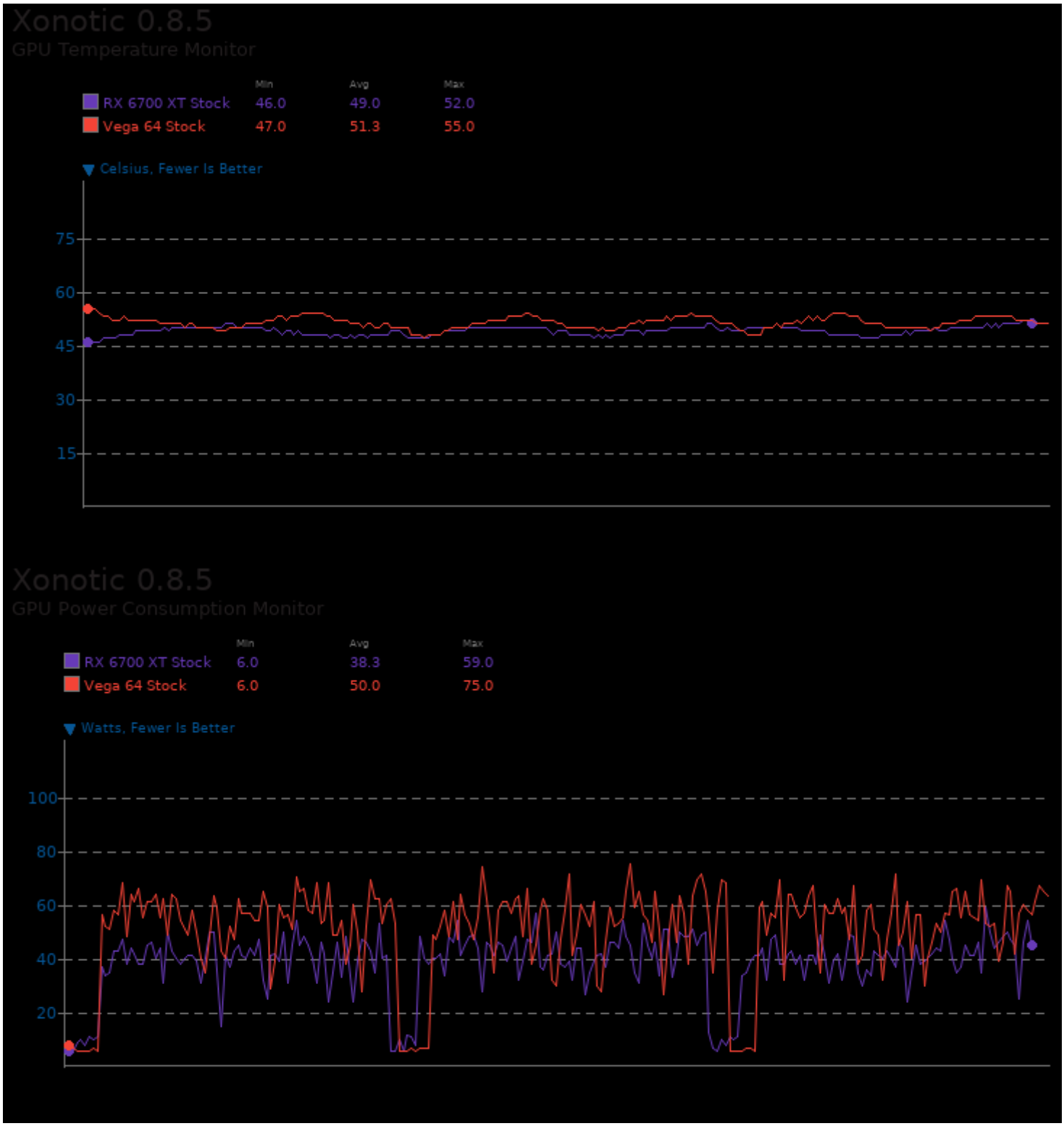
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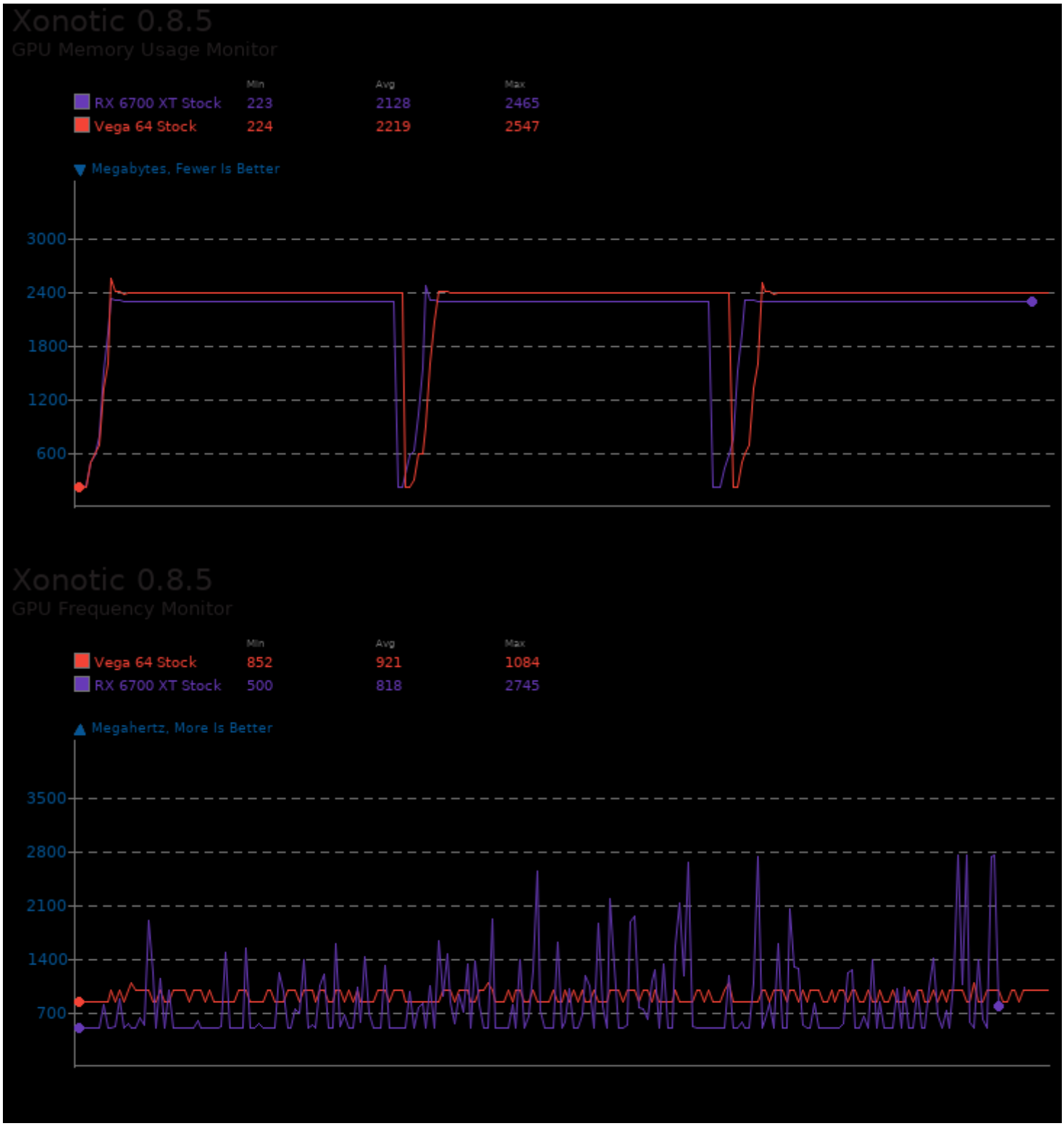
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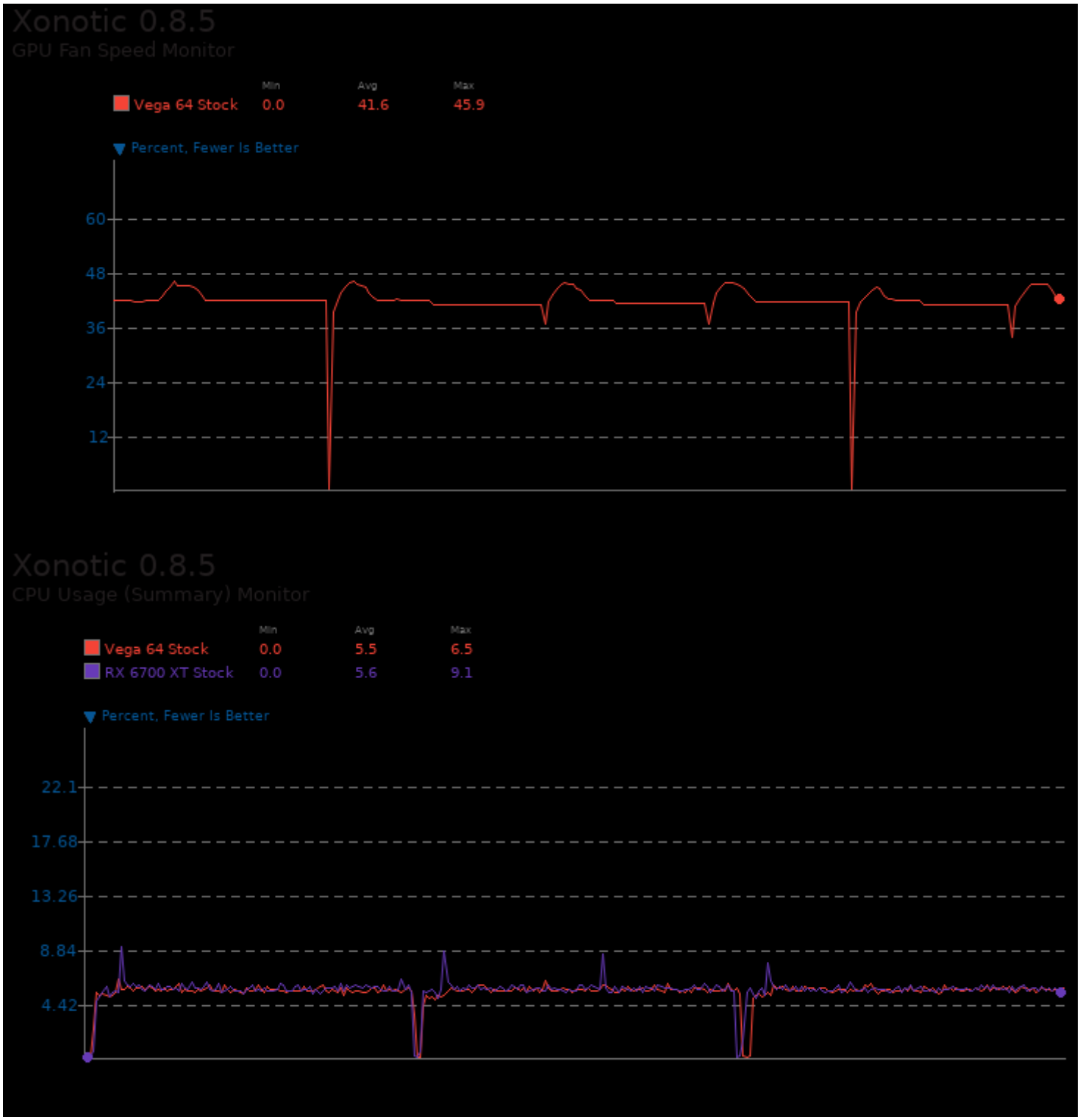
# GPU Comparison



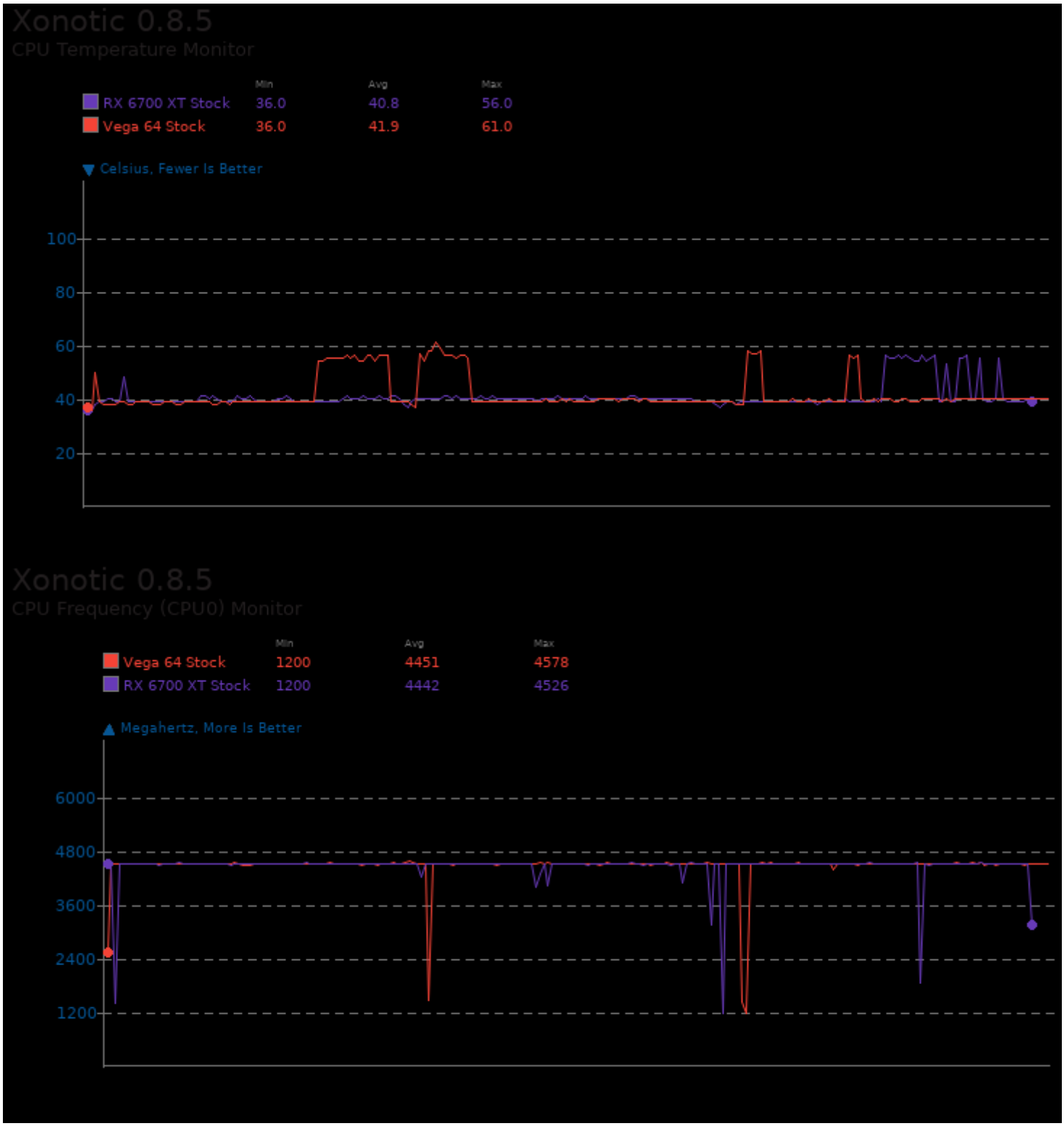
# GPU Comparison



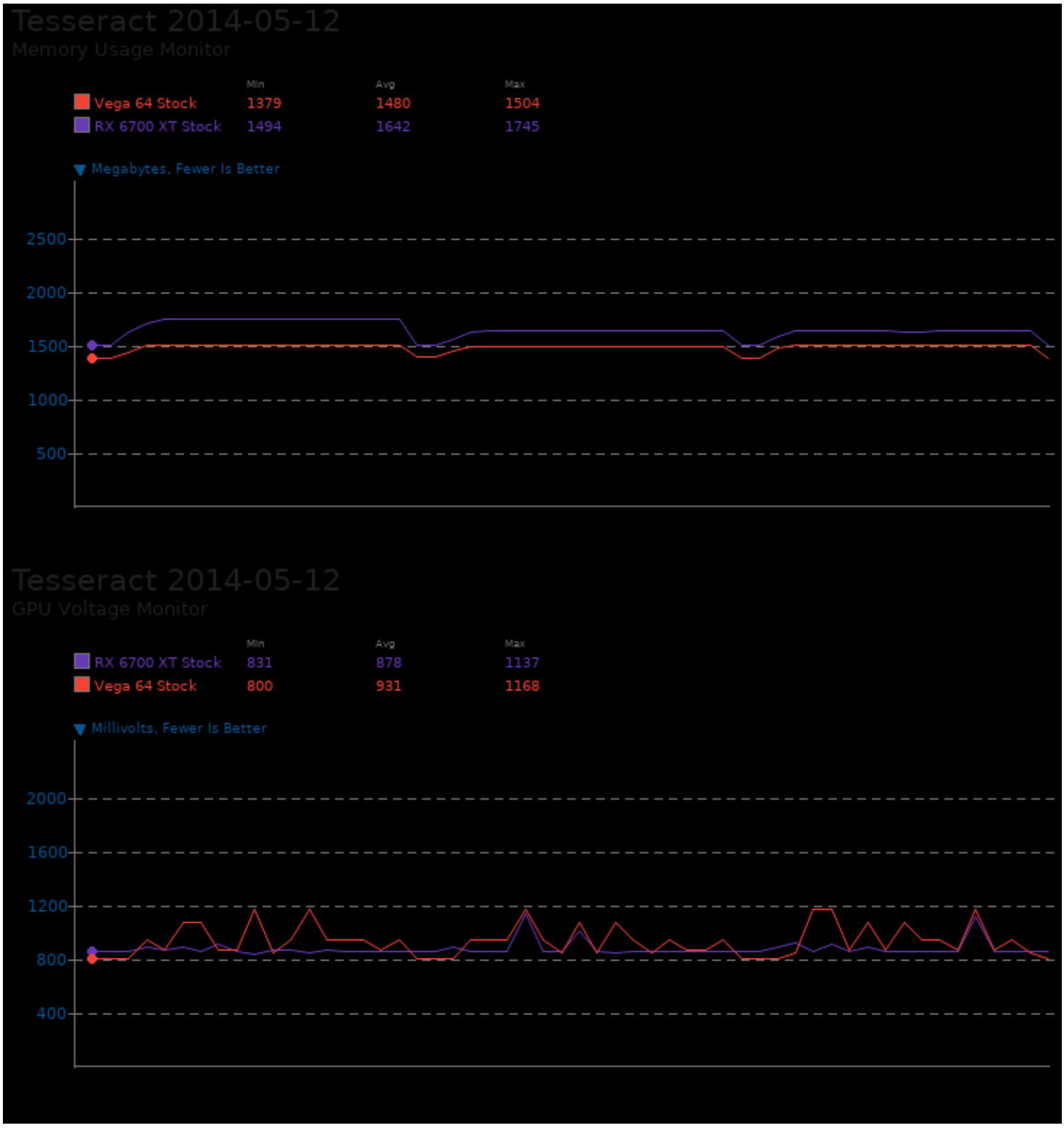
# GPU Comparison



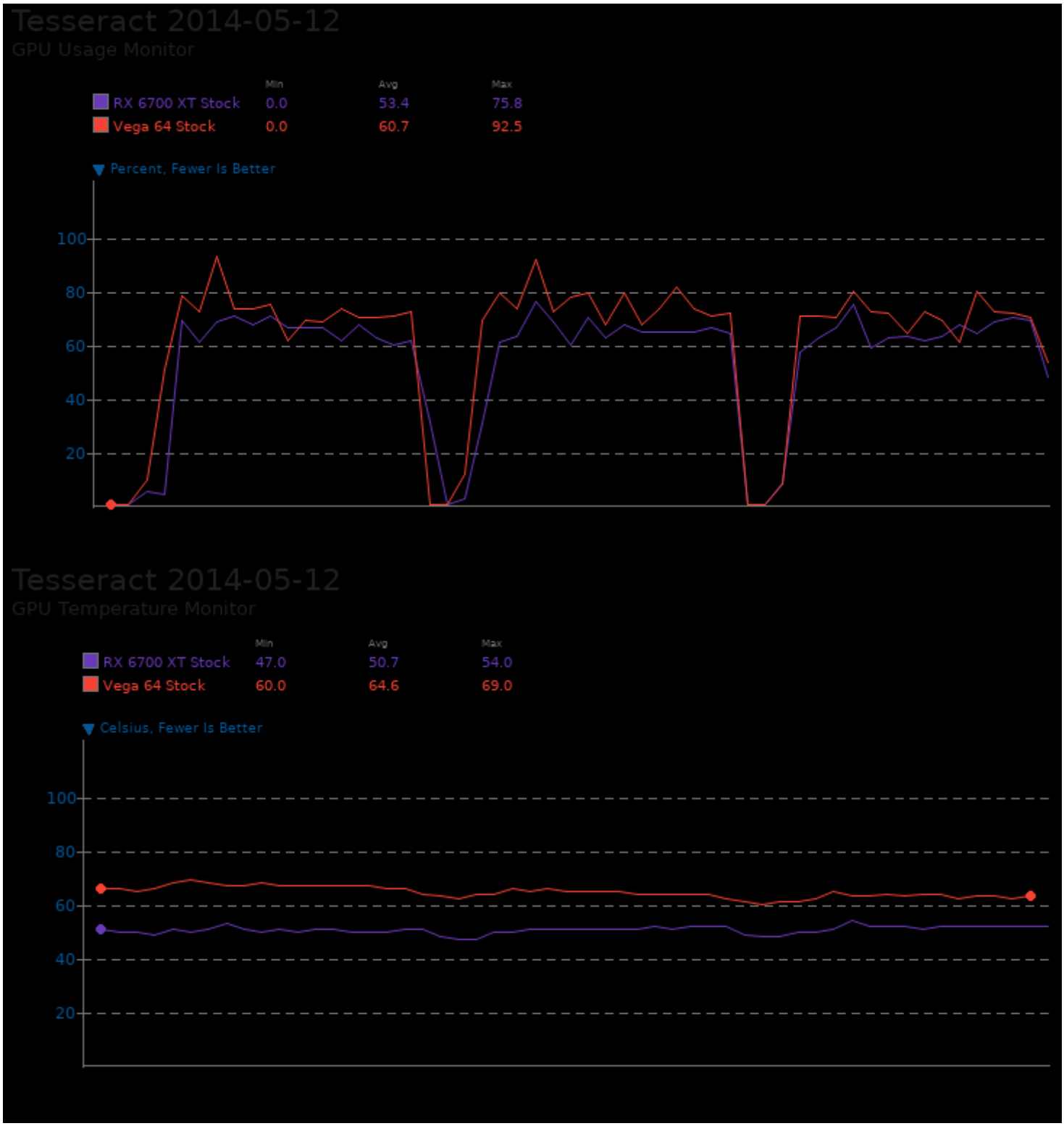
# GPU Comparison



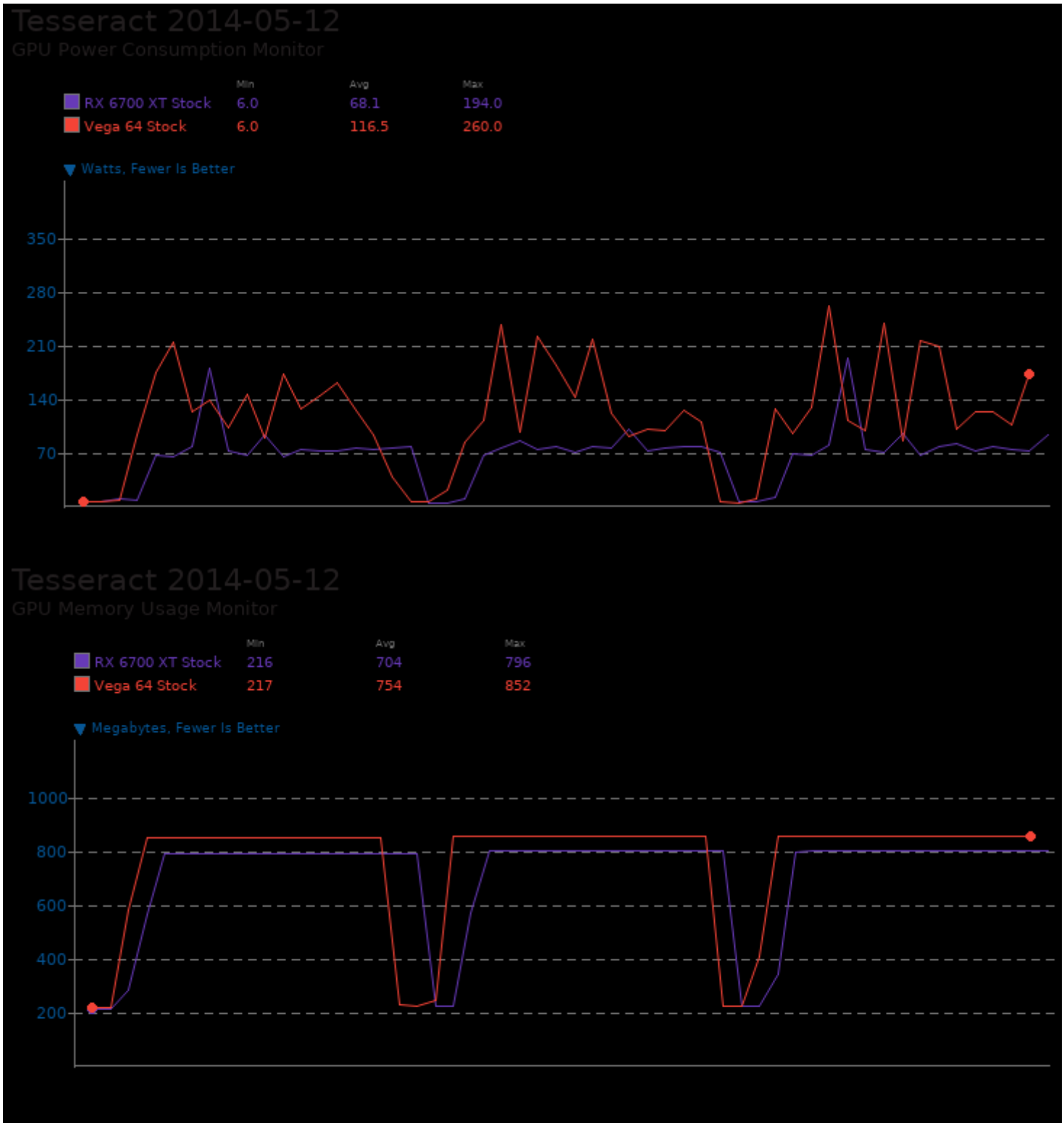
# GPU Comparison



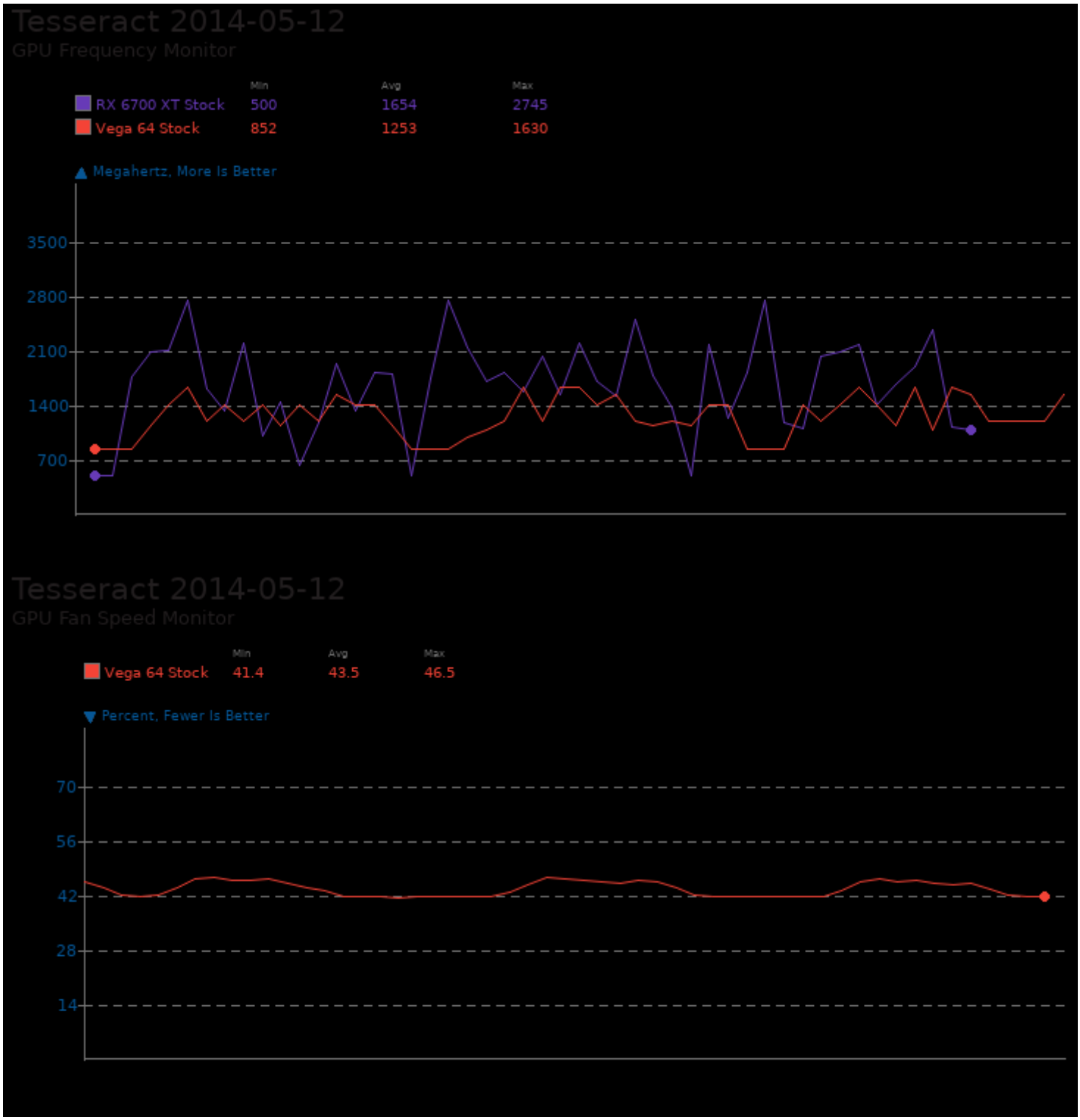
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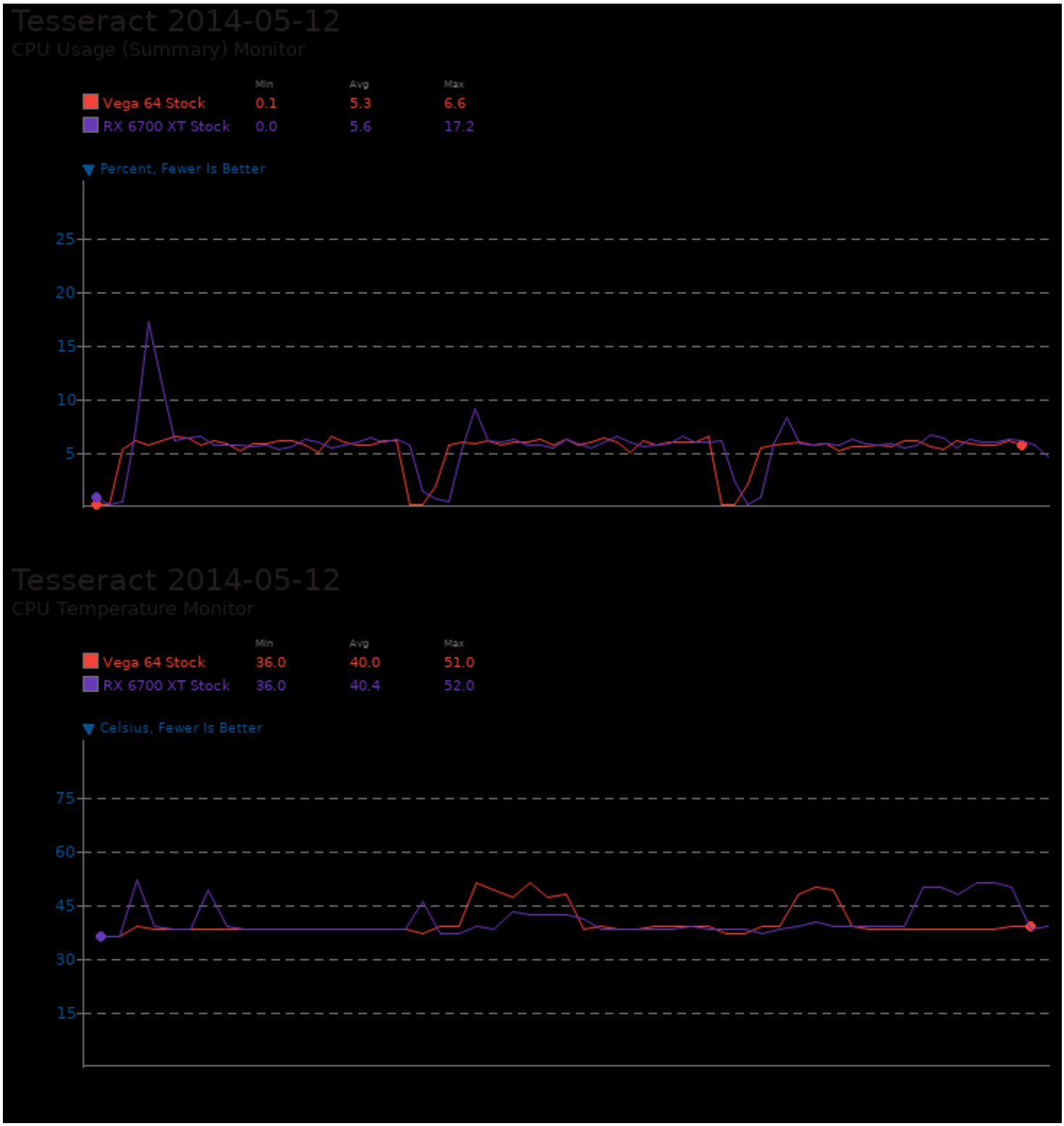
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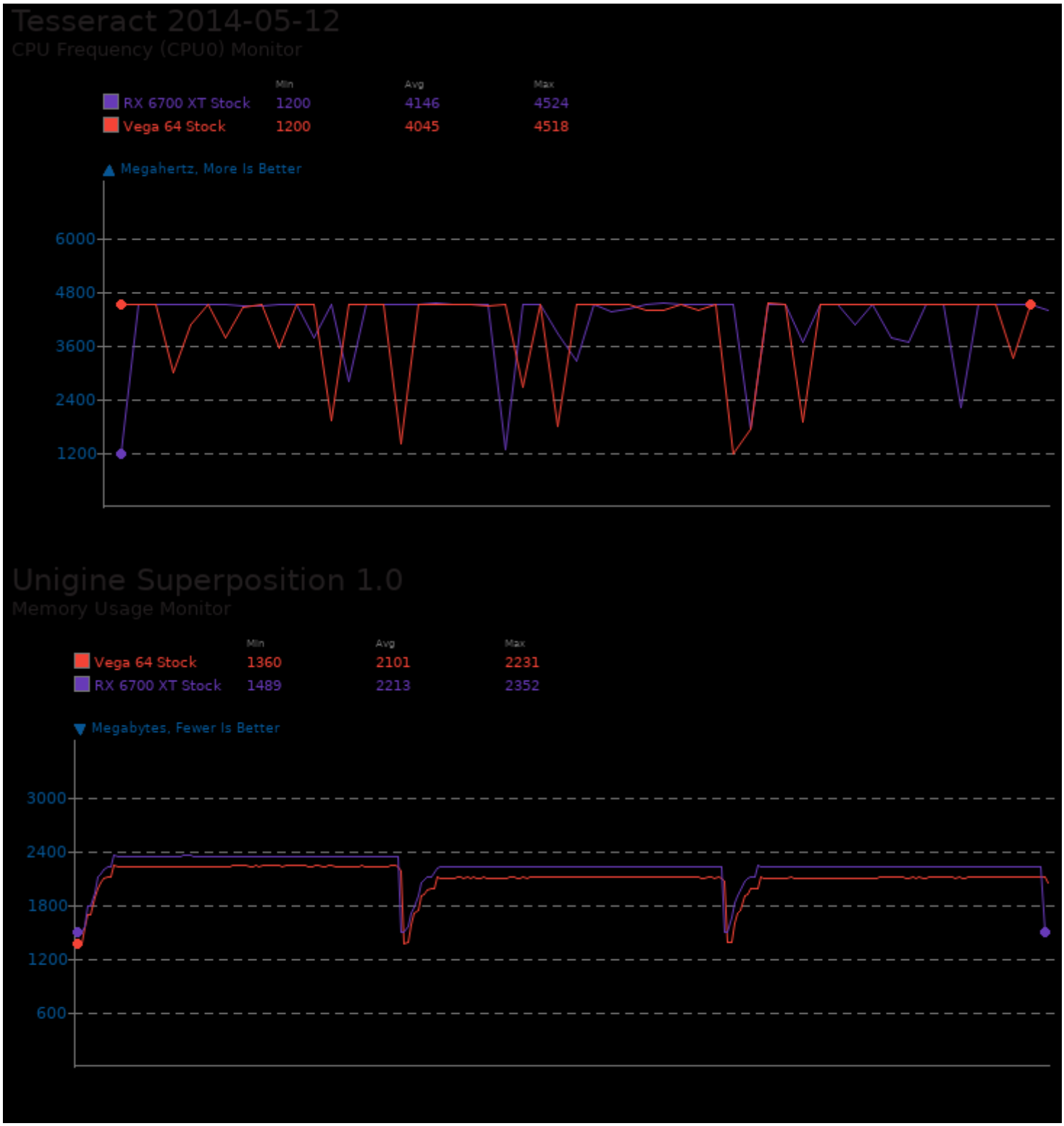
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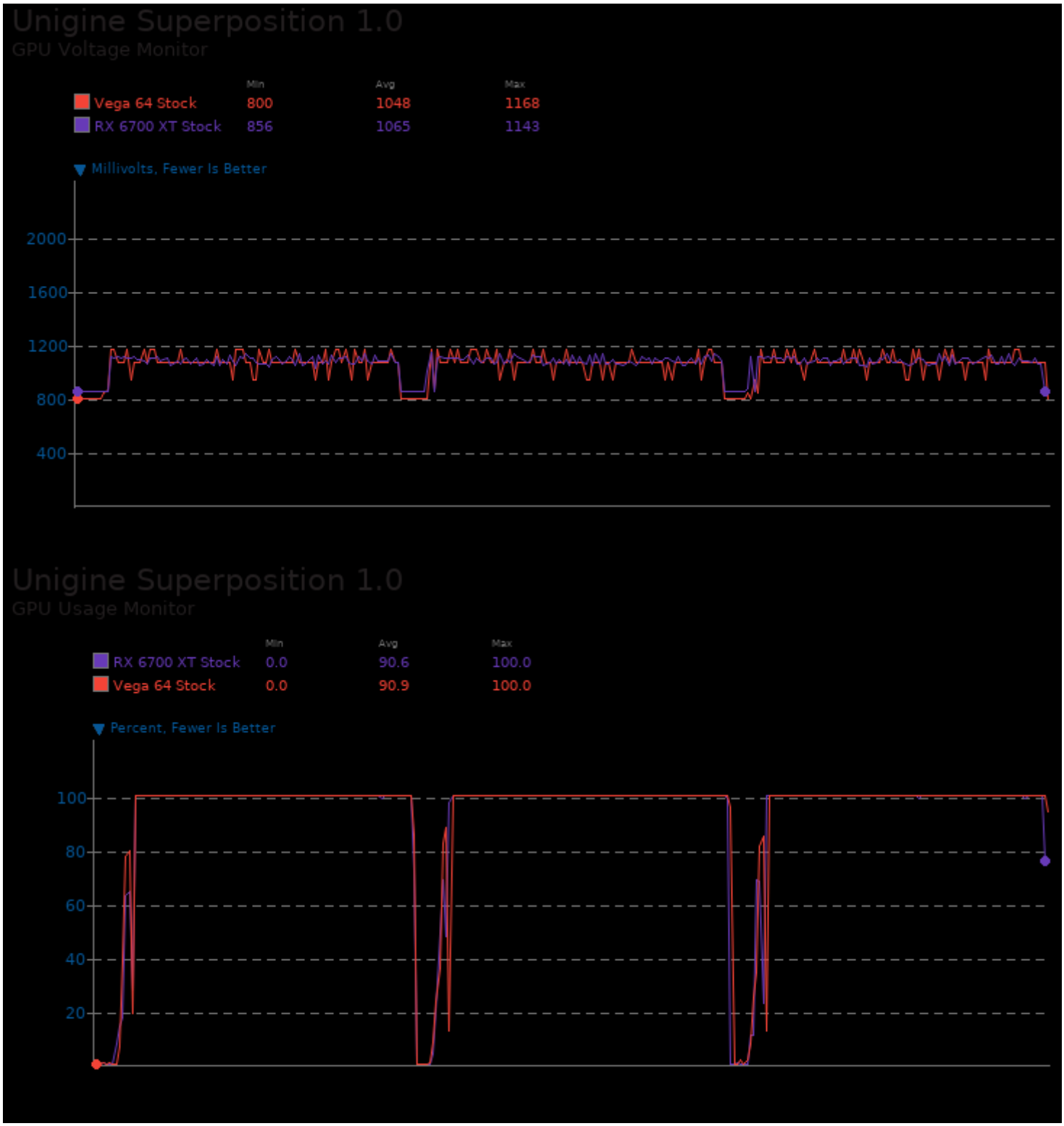
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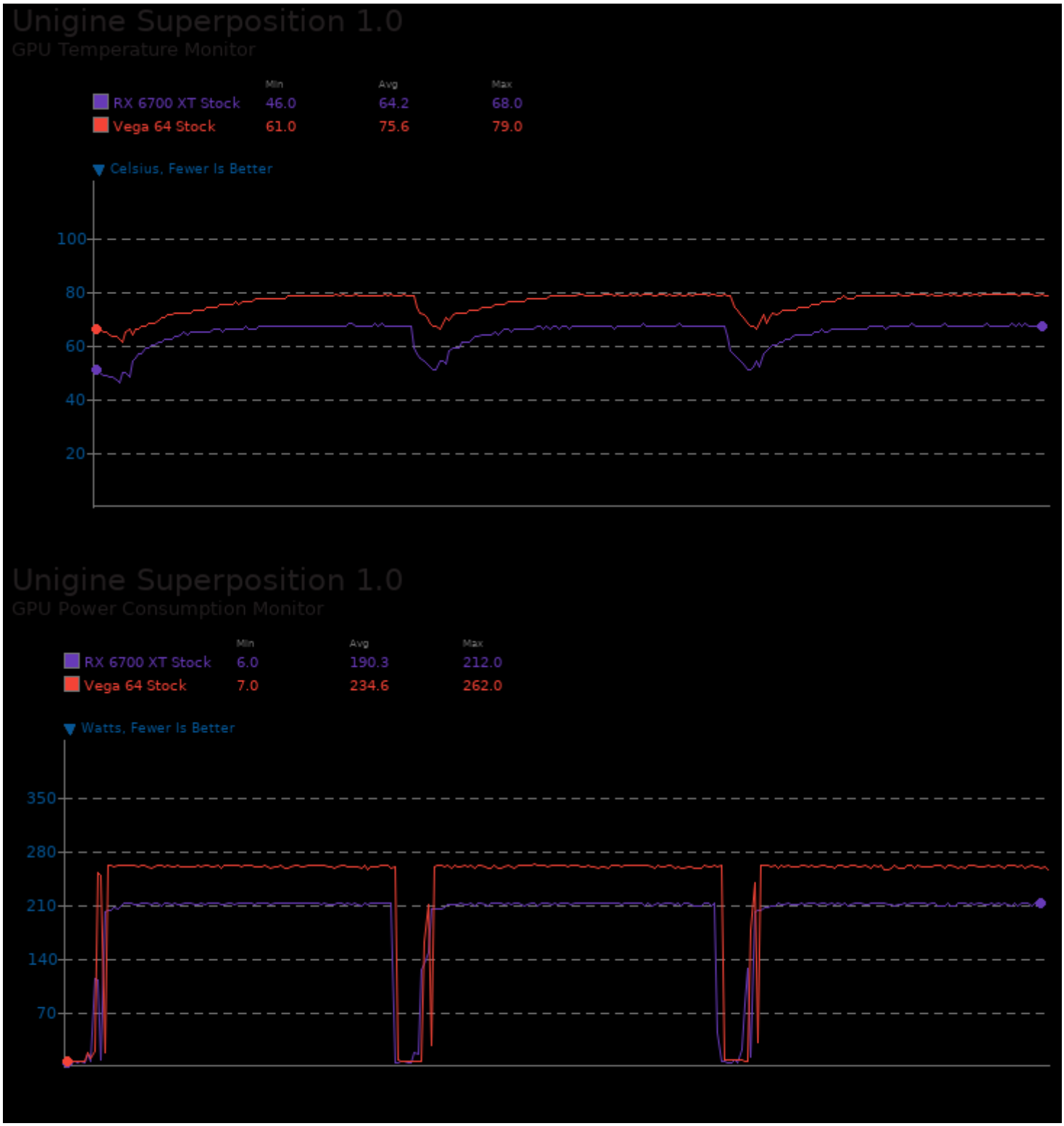
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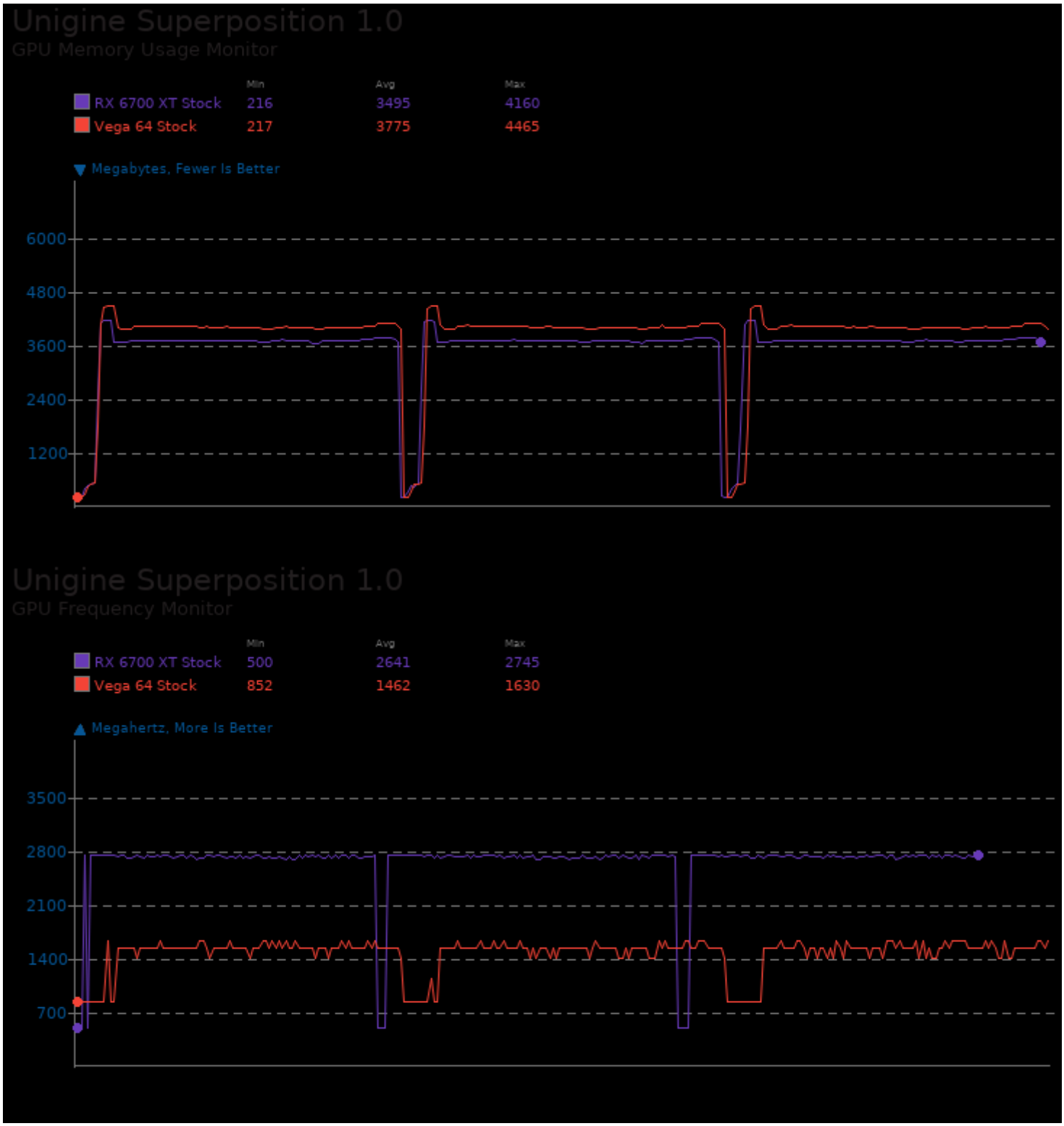
# GPU Comparison



# GPU Comparison



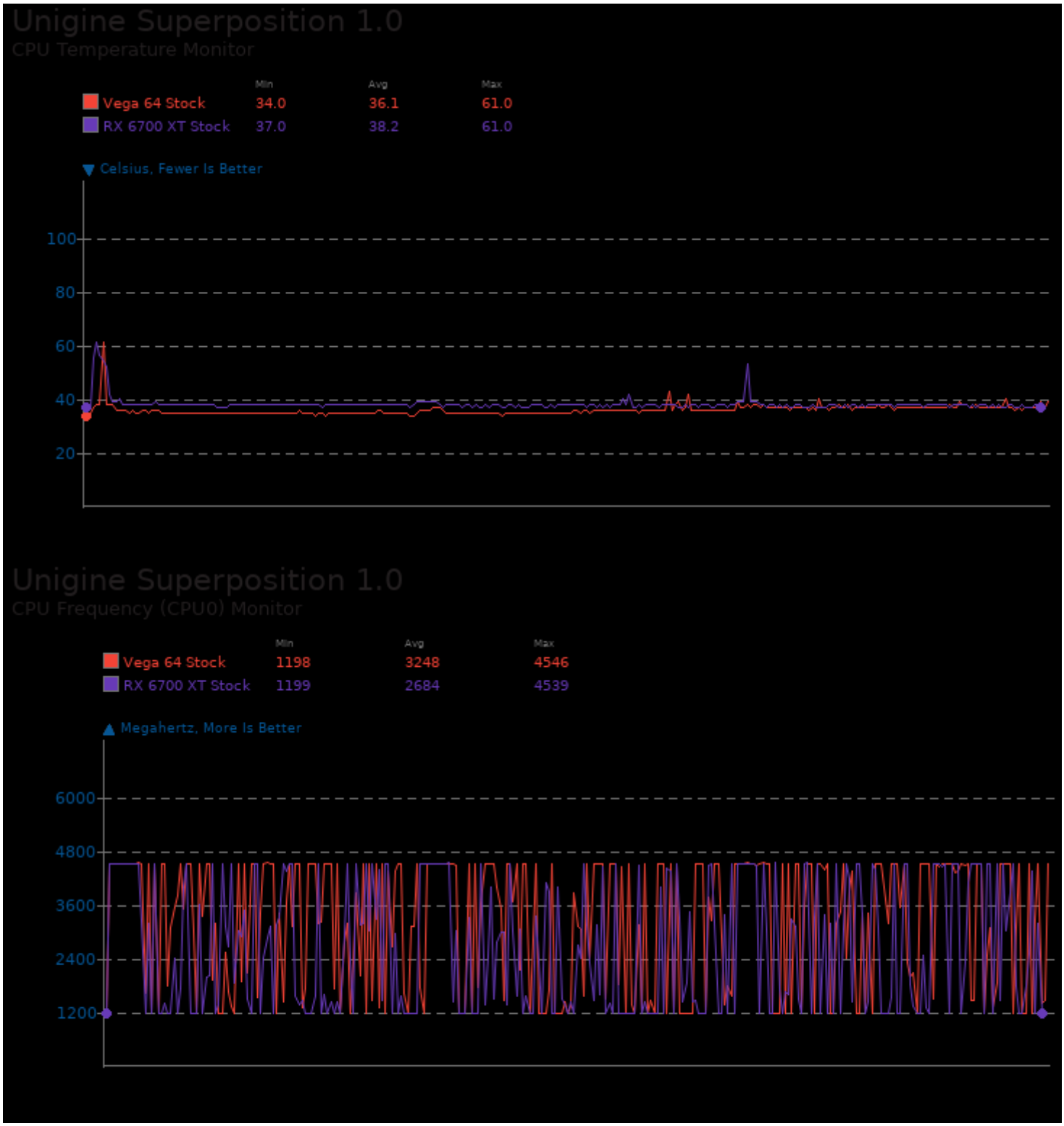
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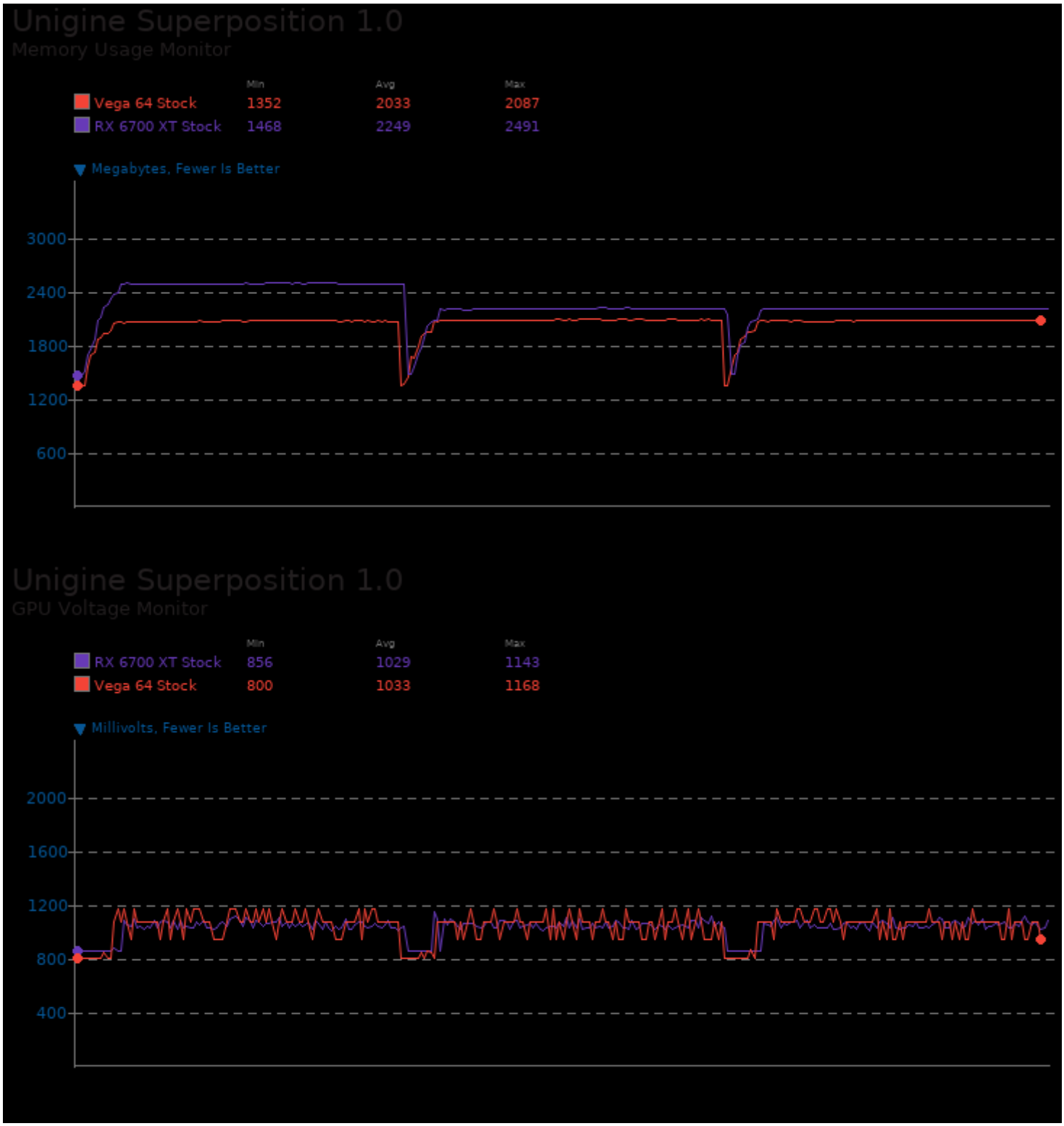
# GPU Comparison



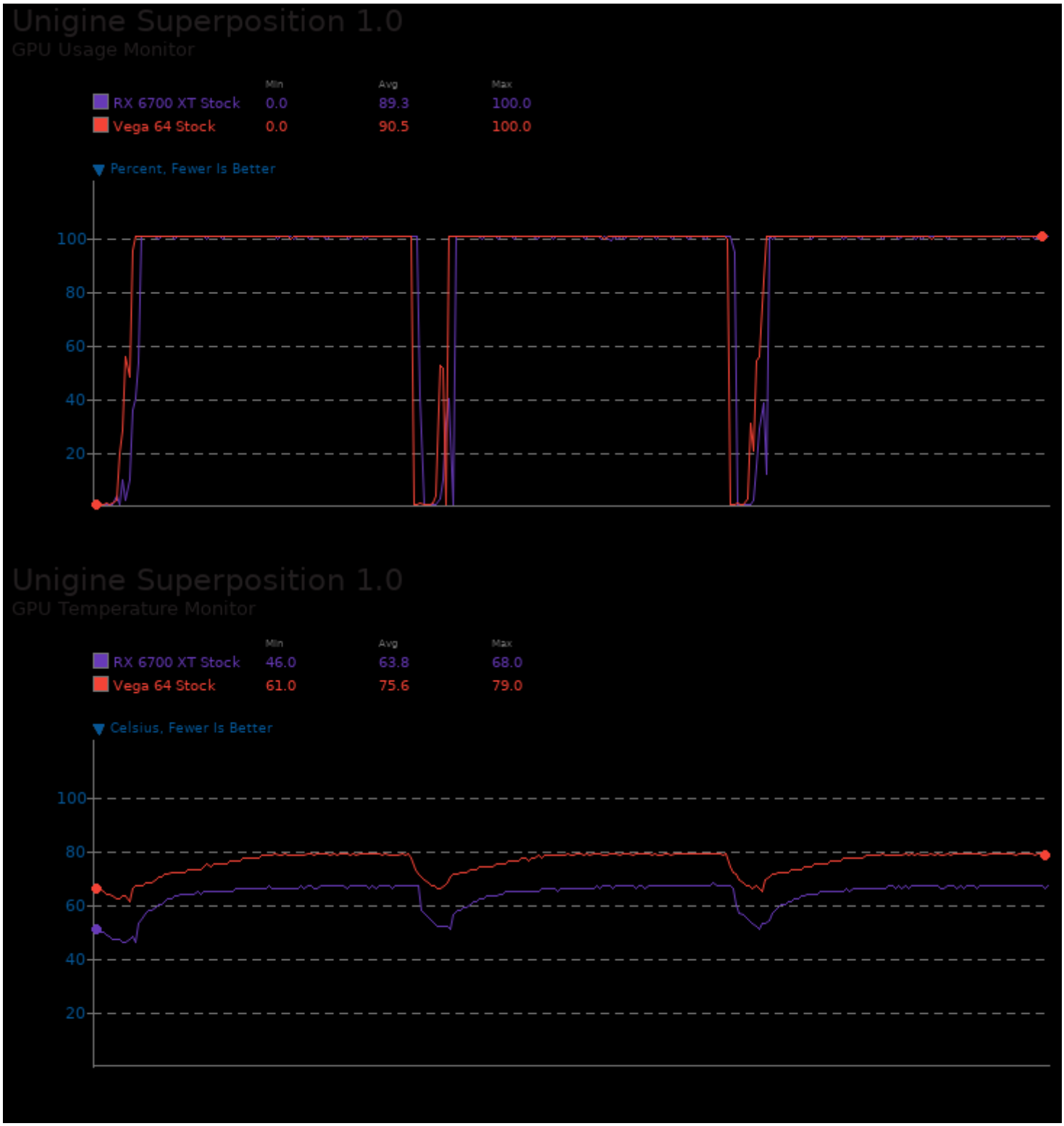
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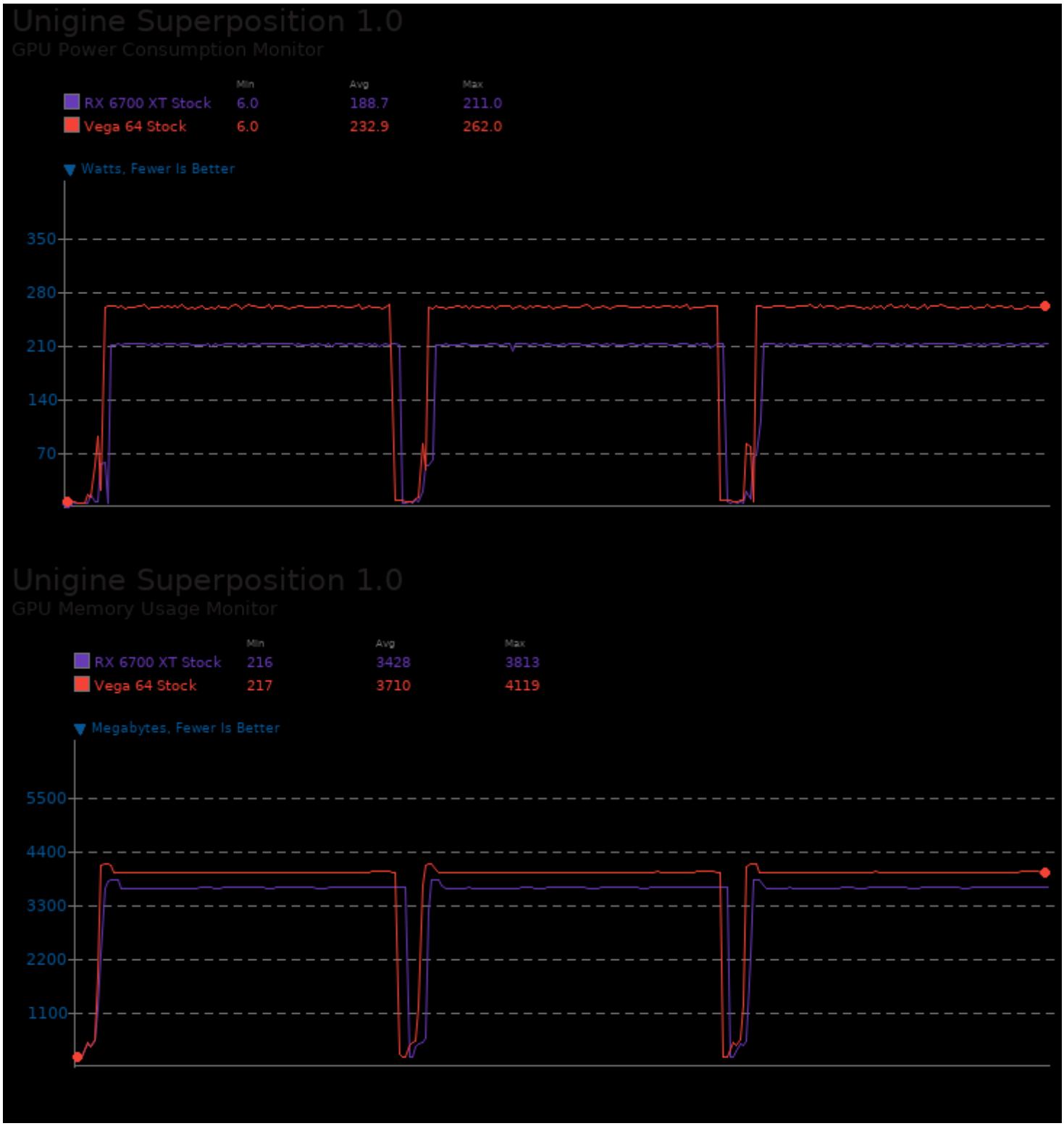
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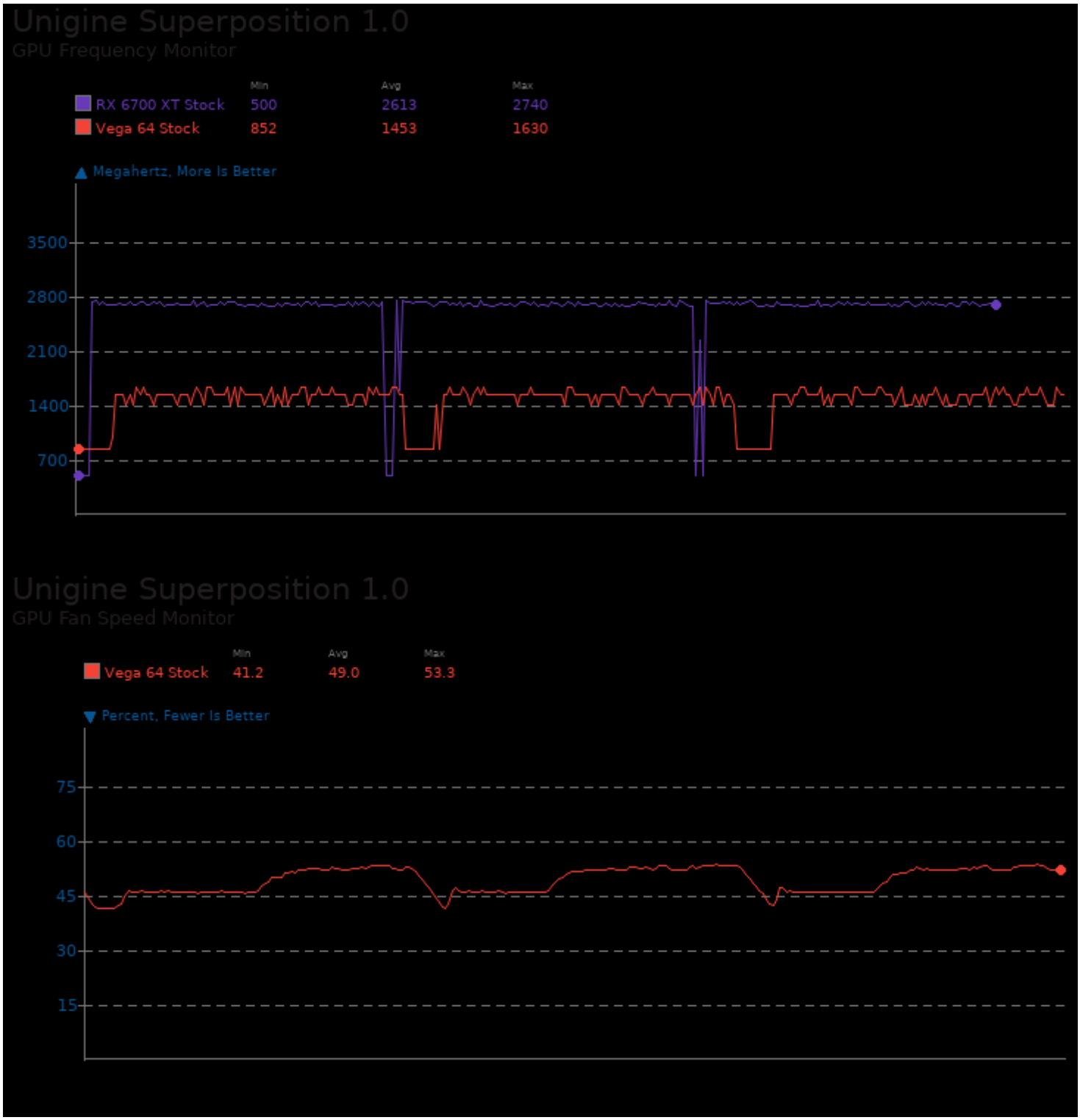
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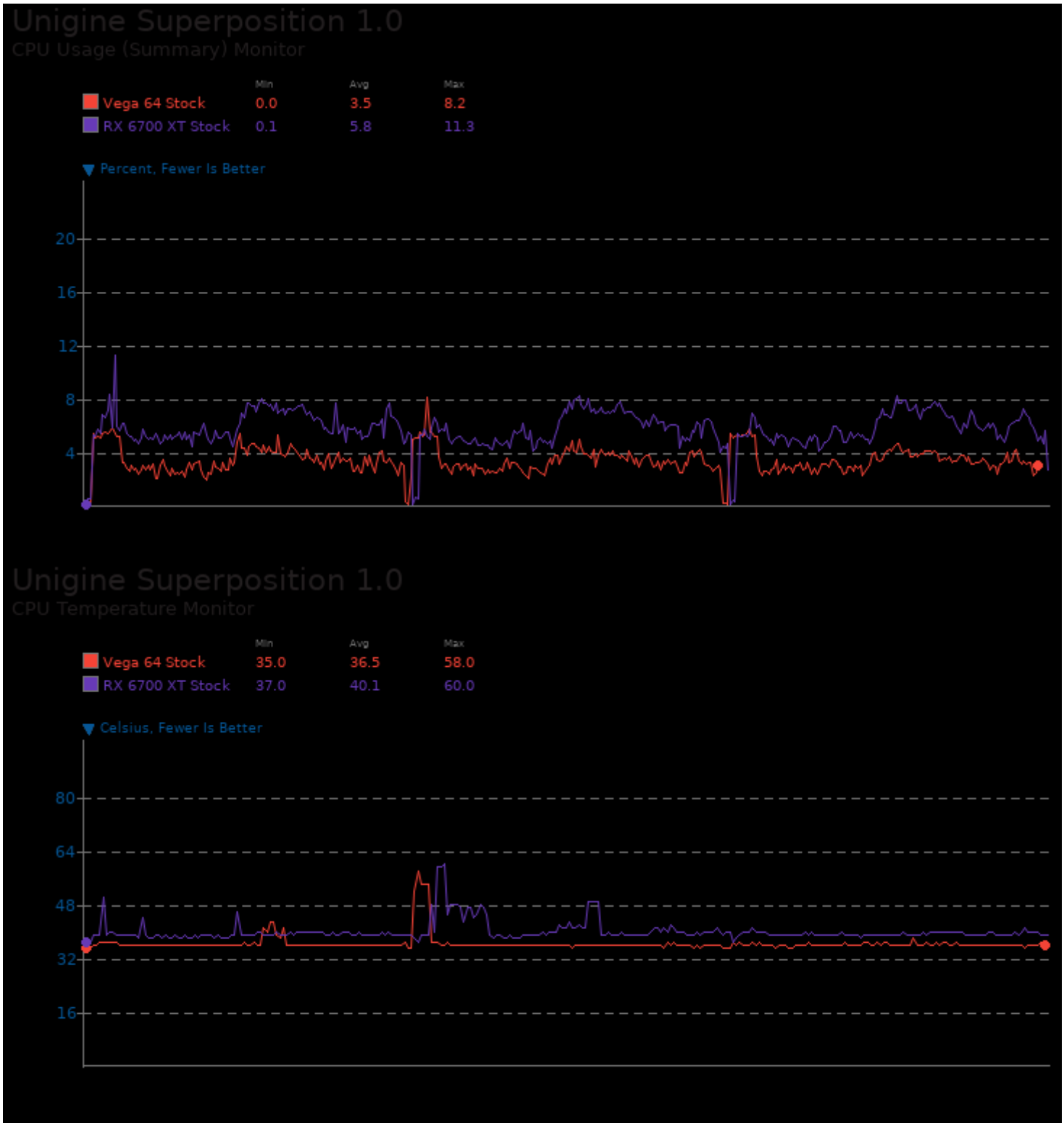
# GPU Comparison



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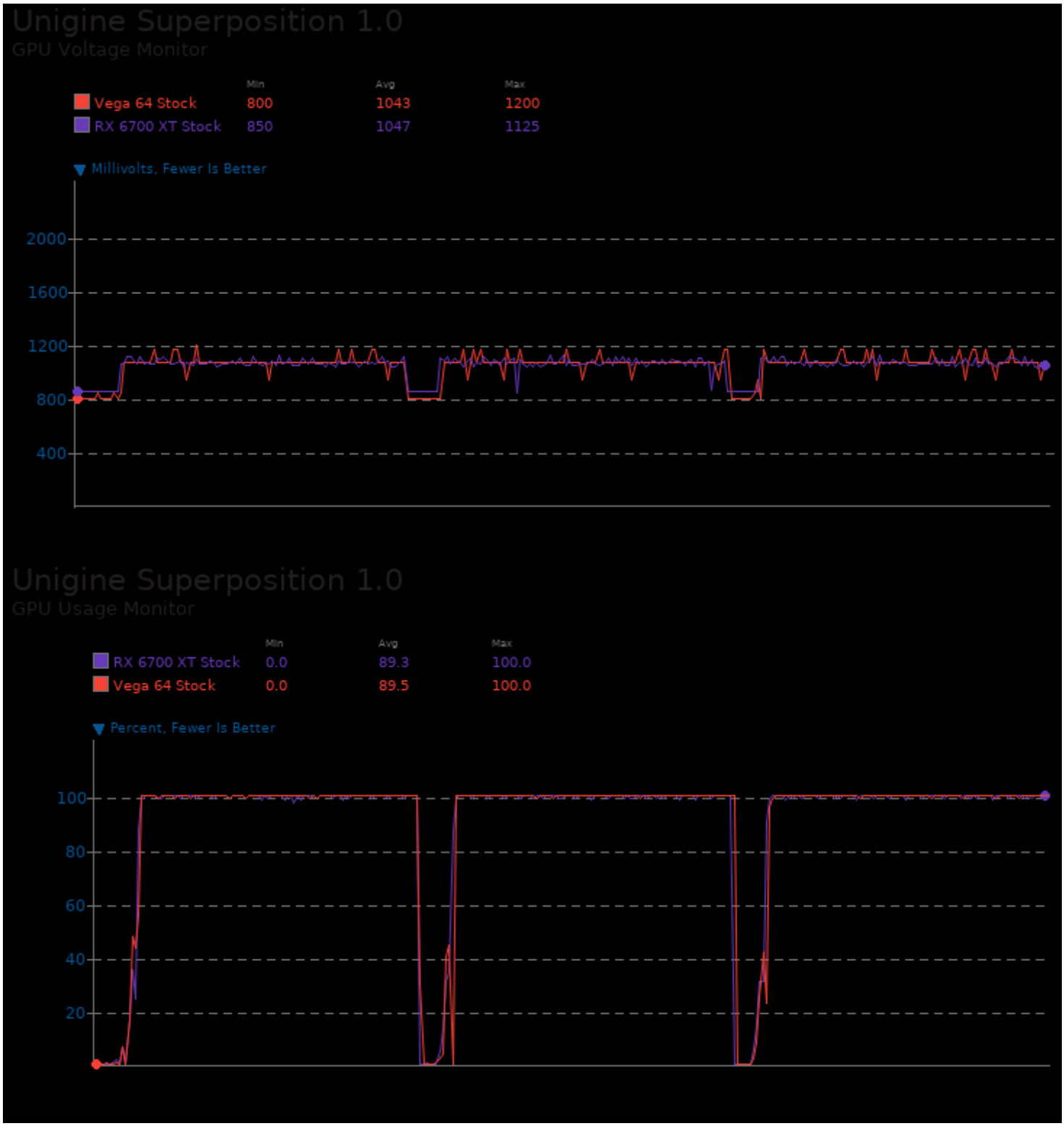
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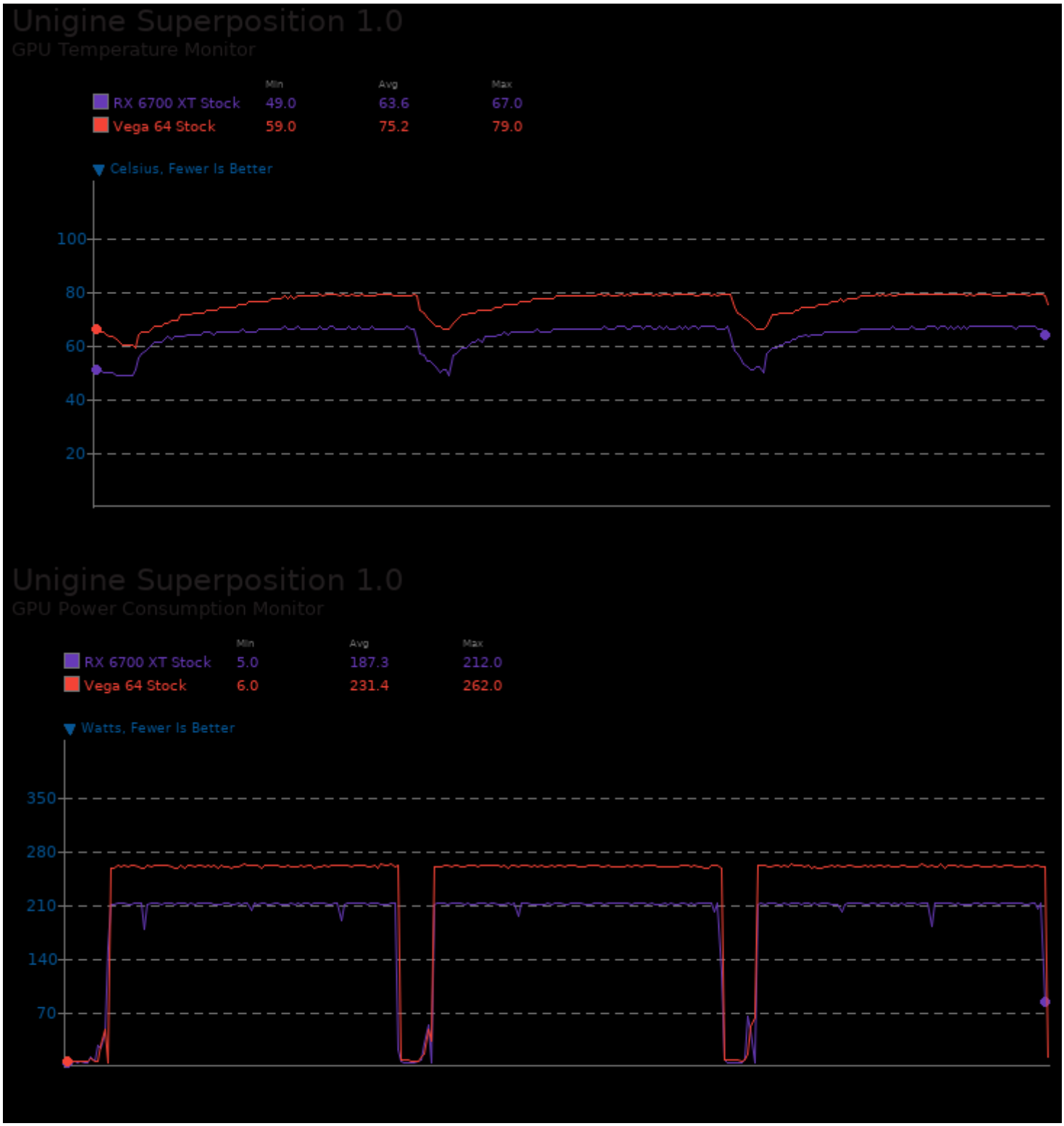
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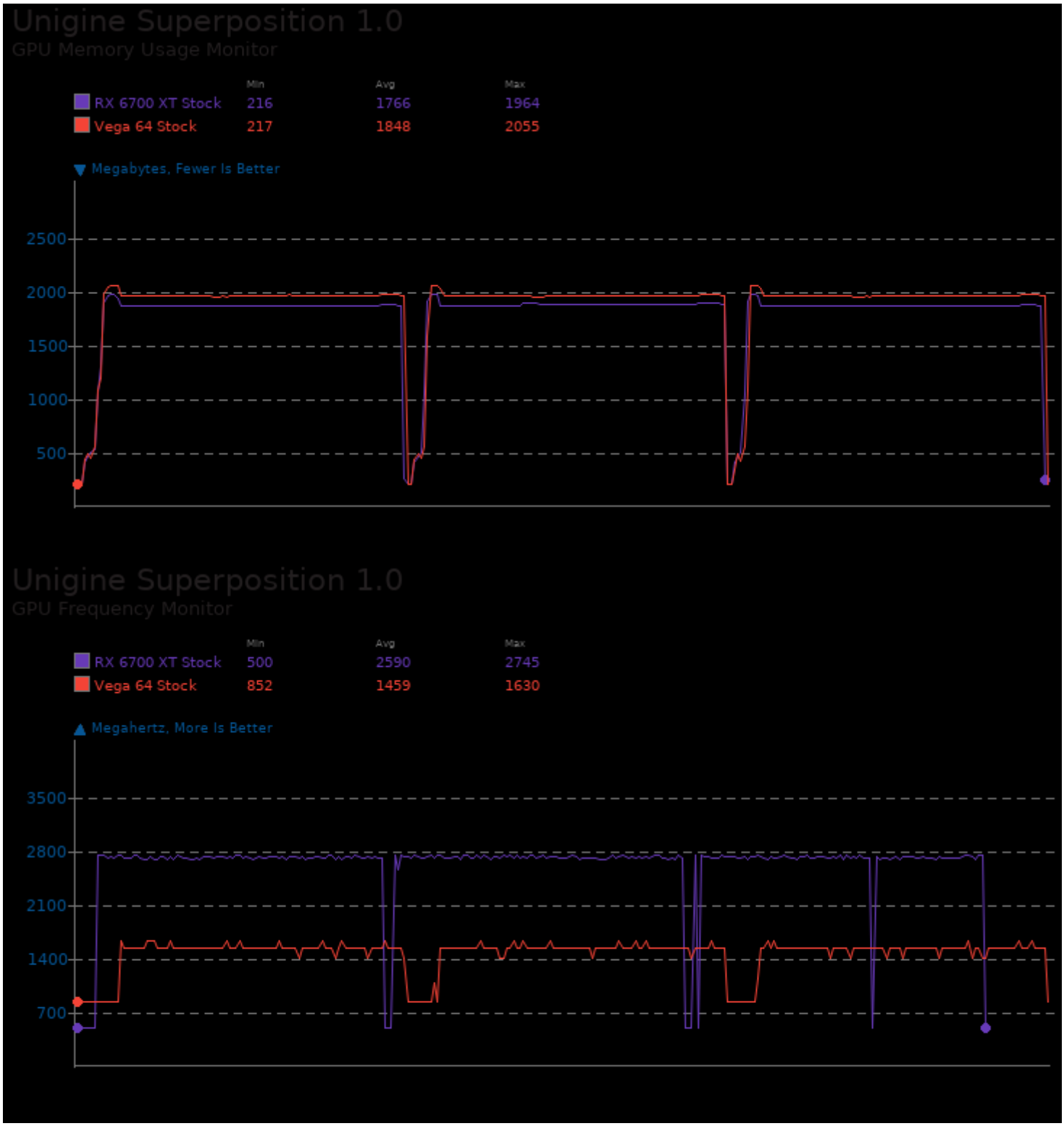
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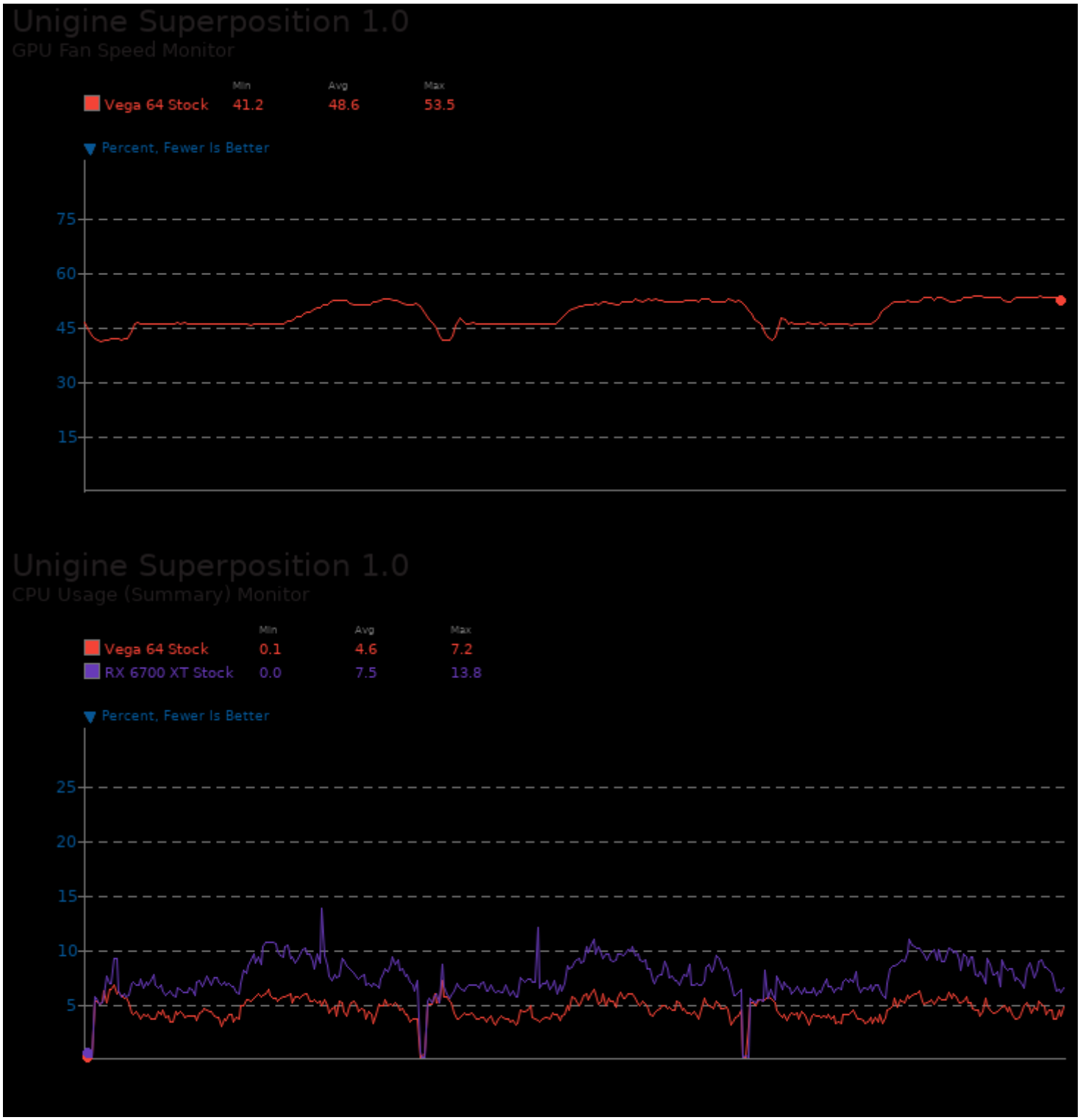
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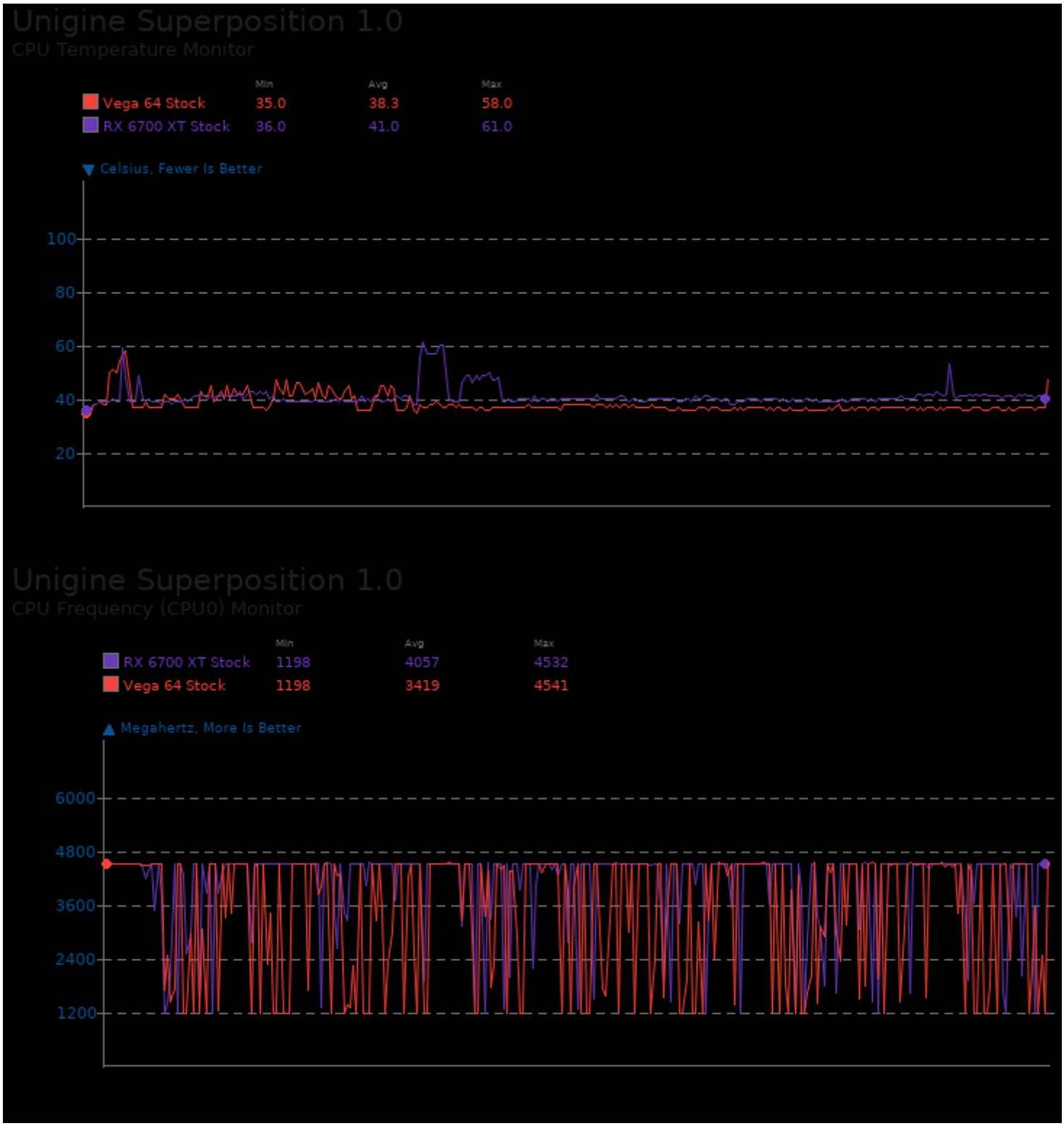
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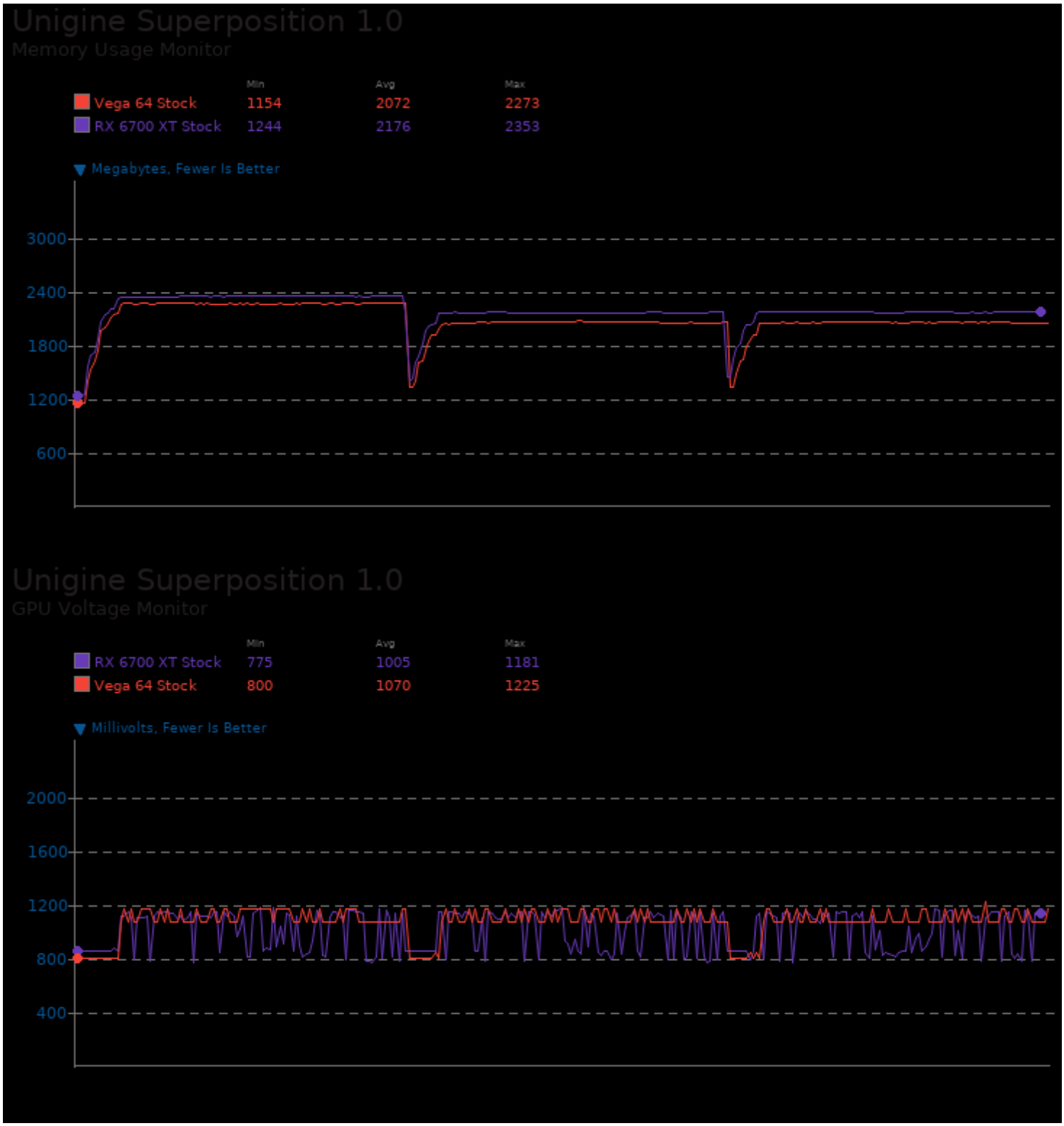
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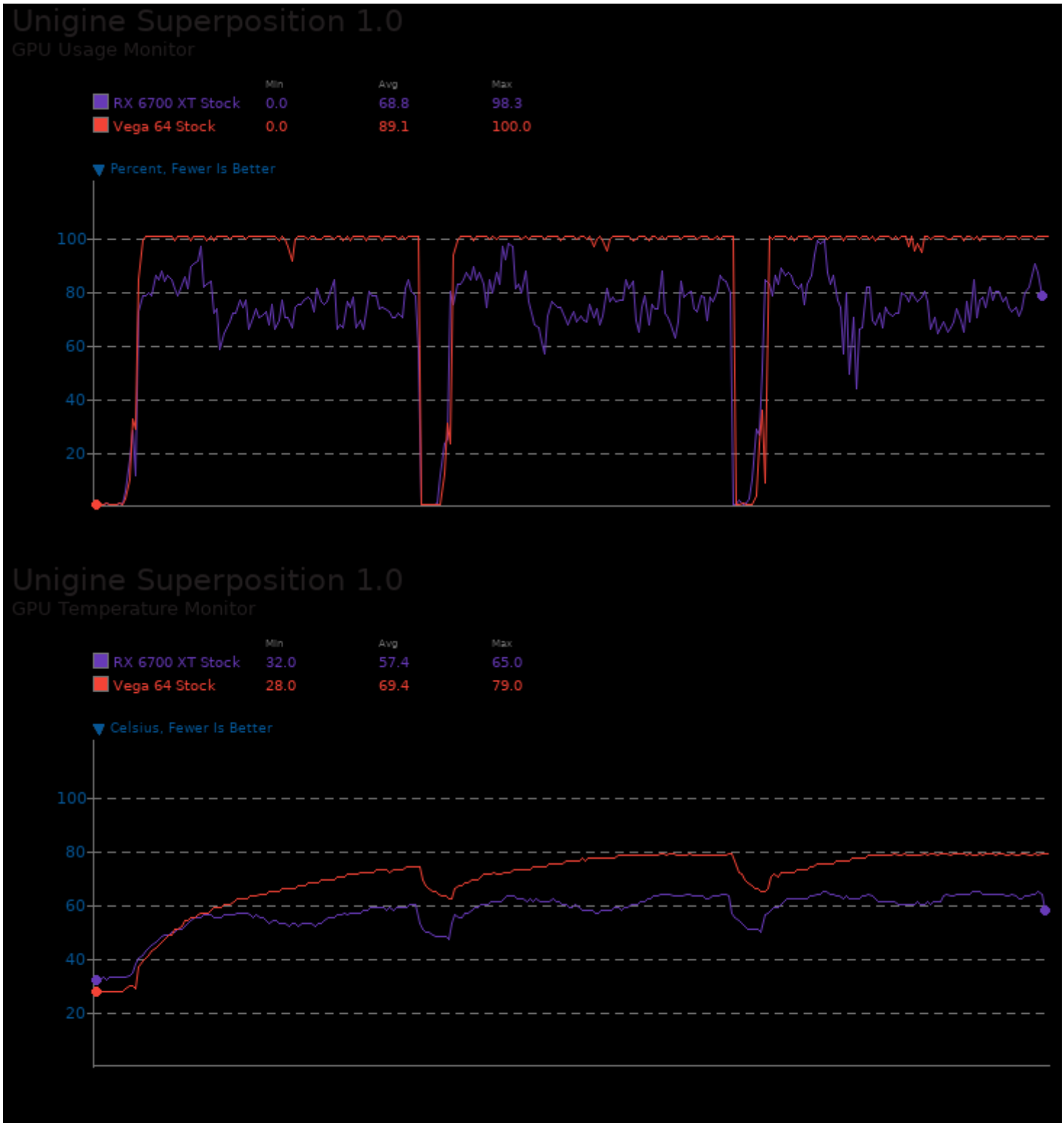
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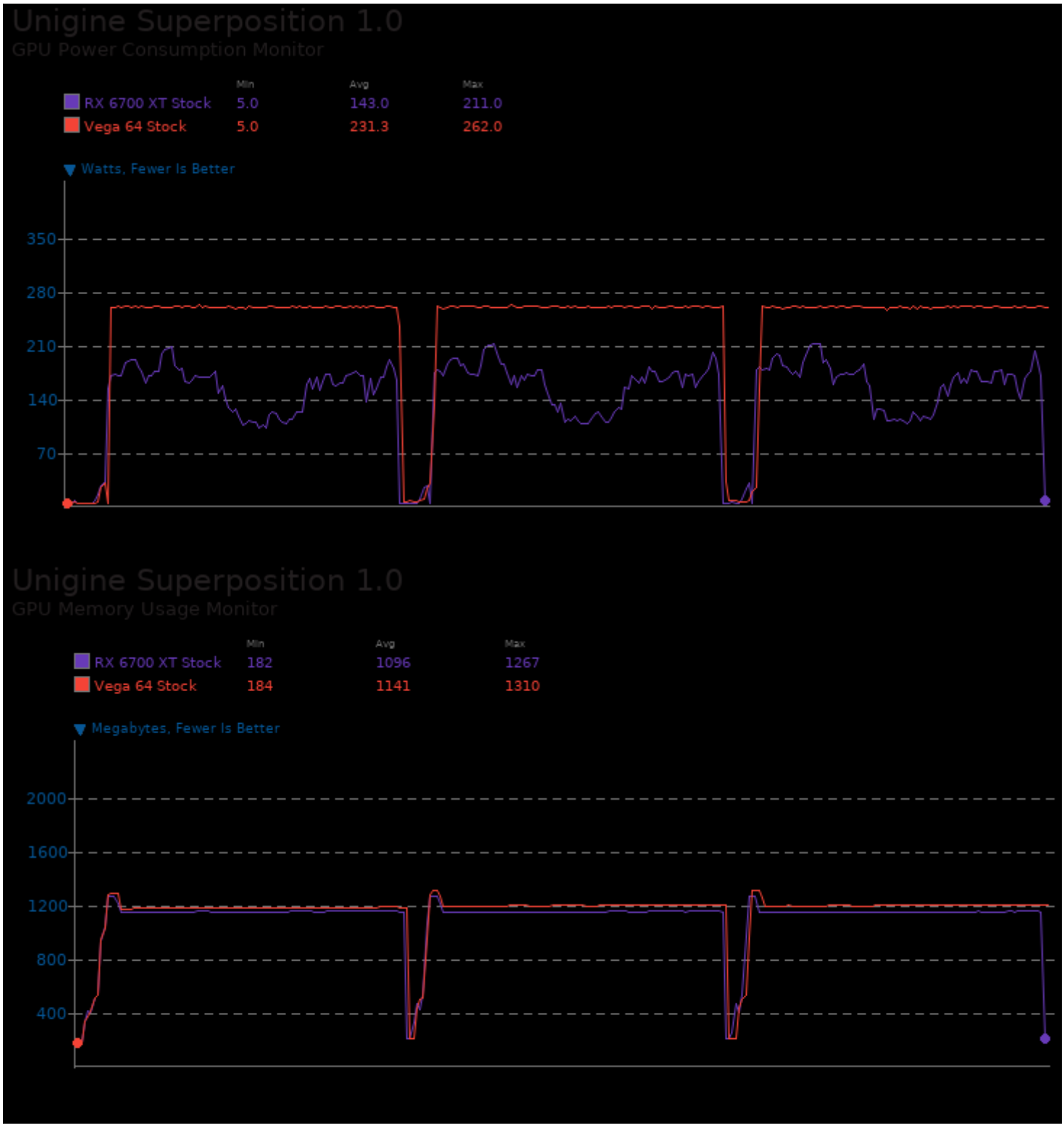
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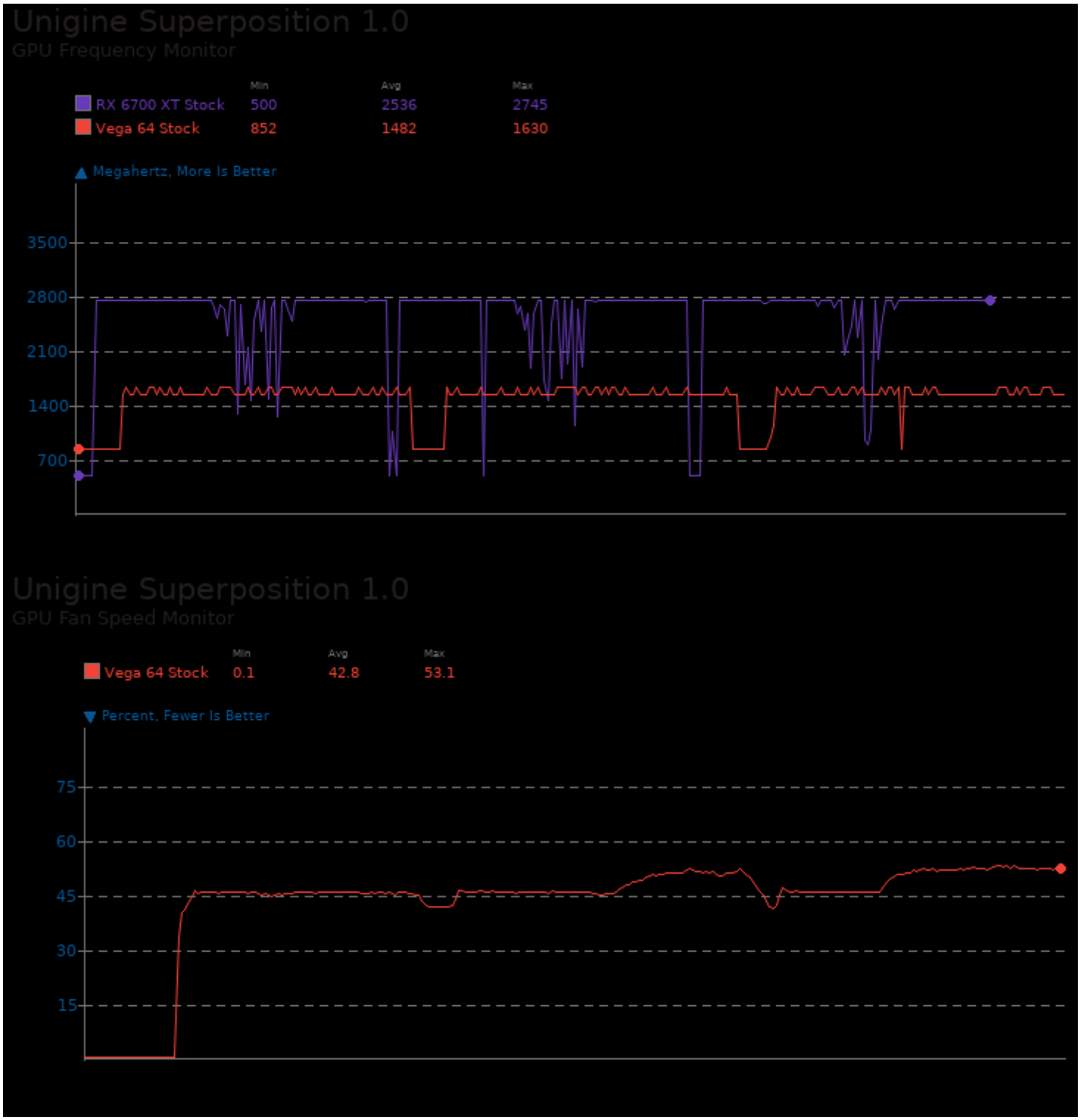
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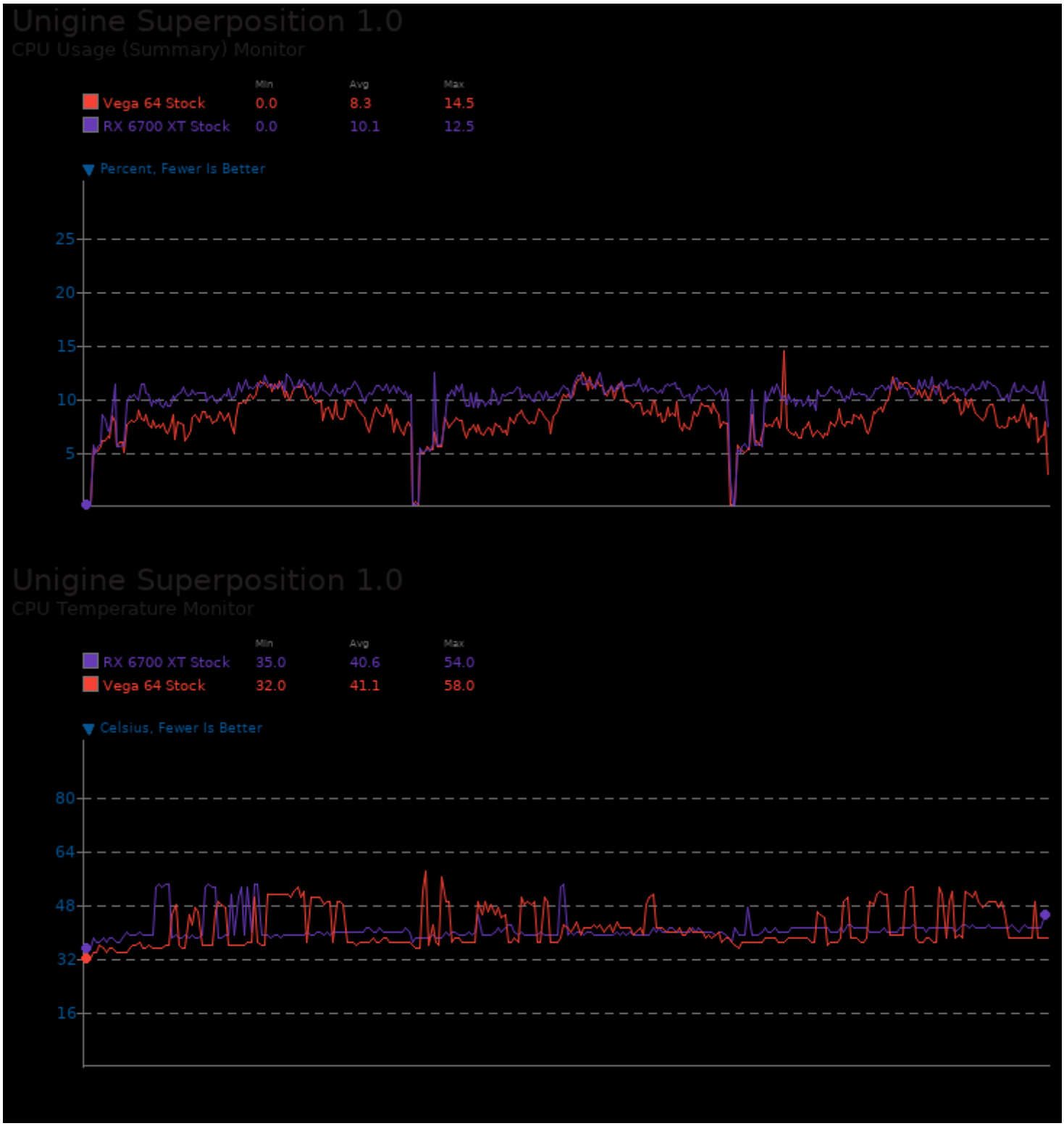
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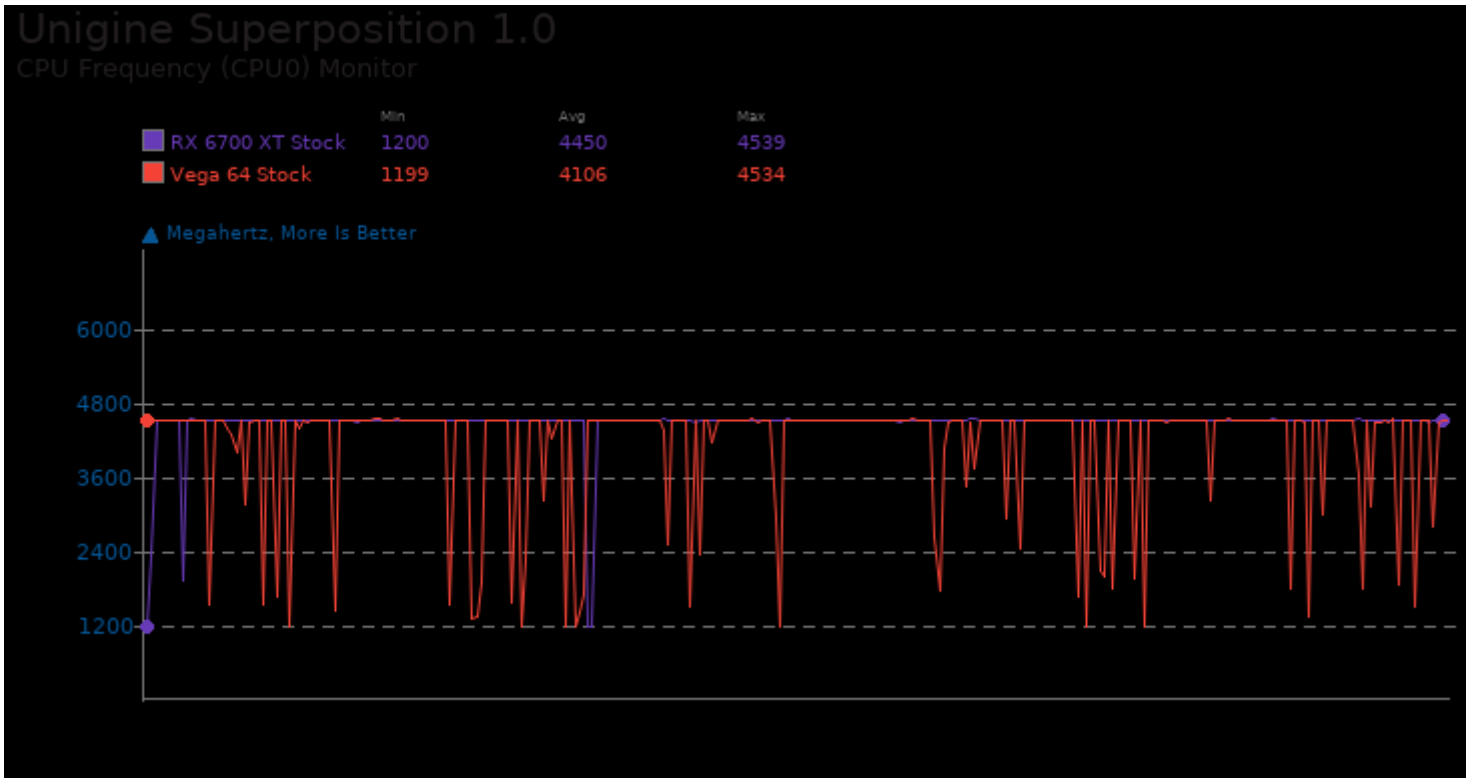
# GPU Comparison



# GPU Comparison

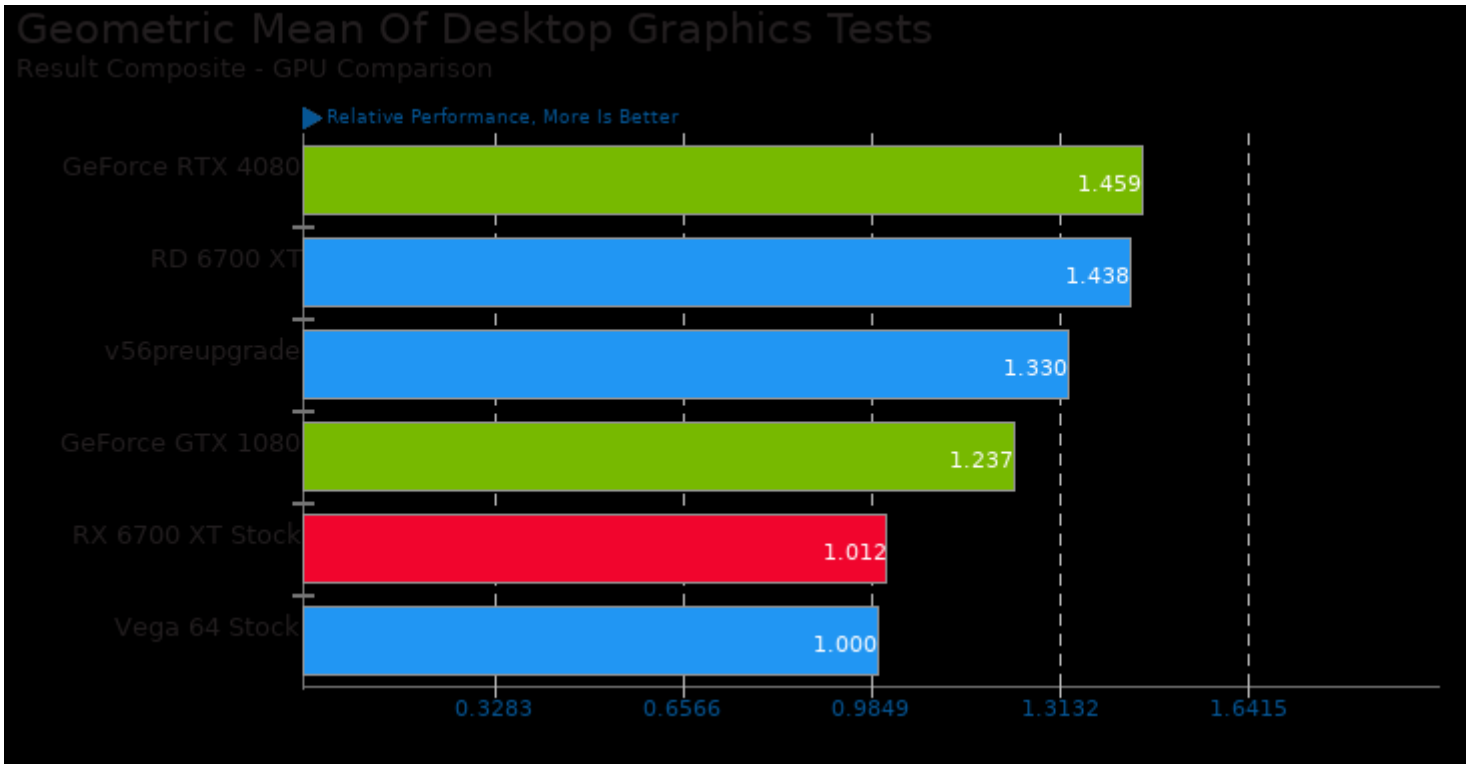


# GPU Comparison



# GPU Comparison

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




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

*This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 08:48.*