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Tigerlake Xe Gen12 to Gen9

Tests for a future article

Test Systems:

Gen9 - i7-8565U

Processor: Intel Core i7-8565U @ 4.60GHz (4 Cores / 8 Threads), Motherboard: Dell 0KTW76 (1.0.0 BIOS), Chipset: Intel Cannon Point-LP, Memory: 16GB, Disk: SK hynix PC401 NVMe 256GB, Graphics: Intel UHD 620 3GB (1150MHz), Audio: Realtek ALC3271, Network: Qualcomm Atheros QCA6174 802.11ac

OS: Ubuntu 20.10, Kernel: 5.9.1-050901-generic (x86_64), Desktop: GNOME Shell 3.38.1, Display Server: X Server 1.20.9, Display Driver: modesetting 1.20.9, OpenGL: 4.6 Mesa 20.3.0-devel (git-fdbc45d 2020-10-21 groovy-oibaf-ppa), OpenCL: OpenCL 3.0, Vulkan: 1.2.145, Compiler: GCC 10.2.0, File-System: ext4, Screen Resolution: 1920x1080

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++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/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: intel_pstate powersave - CPU Microcode: 0xd6 - Thermald 2.3
Python Notes: Python 3.8.6
Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + l1tf: Not affected + mds: Mitigation of Clear buffers; SMT vulnerable + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Full generic retpoline IBPB: conditional IBRS_FW STIBP: conditional RSB filling + srbds: Mitigation of Microcode + tsx_async_abort: Not affected

Gen11 - i7-1065G7

Processor: Intel Core i7-1065G7 @ 3.90GHz (4 Cores / 8 Threads), Motherboard: Dell 06CDVY (1.0.9 BIOS), Chipset: Intel Device 34ef, Memory: 16GB, Disk: KBG40ZPZ512G NVMe TOSHIBA 512GB, Graphics: Intel Iris Plus G7 3GB (1100MHz), Audio: Realtek ALC289, Network: Intel Killer Wi-Fi 6 AX1650i 160MHz

OS: Ubuntu 20.10, Kernel: 5.9.1-050901-generic (x86_64), Desktop: GNOME Shell 3.38.1, Display Server: X Server 1.20.9, Display Driver: modesetting 1.20.9, OpenGL: 4.6 Mesa 20.3.0-devel (git-4408131 2020-10-20 groovy-oibaf-ppa), OpenCL: OpenCL 3.0, Vulkan: 1.2.145, Compiler: GCC 10.2.0, File-System: ext4, Screen Resolution: 1920x1200

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++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/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: intel_pstate powersave - CPU Microcode: 0x78 - Thermald 2.3
Python Notes: Python 3.8.6
Security Notes: itlb_multihit: KVM: Mitigation of VMX disabled + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

Gen12 Xe - i7-1165G7

Processor: Intel Core i7-1165G7 @ 4.70GHz (4 Cores / 8 Threads), Motherboard: Dell 0GG9PT (1.0.3 BIOS), Chipset: Intel Tiger Lake-LP, Memory: 16GB, Disk: KIOXIA KBG40ZNS256G NVMe 256GB, Graphics: Intel UHD 3GB (1300MHz), Audio: Realtek ALC289, Network: Intel Wi-Fi 6 AX201

OS: Ubuntu 20.10, Kernel: 5.9.1-050901-generic (x86_64), Desktop: GNOME Shell 3.38.1, Display Server: X Server 1.20.9, Display Driver: modesetting 1.20.9, OpenGL: 4.6 Mesa 20.3.0-devel (git-fdbc45d 2020-10-21 groovy-oibaf-ppa), OpenCL: OpenCL 3.0, Vulkan: 1.2.145, Compiler: GCC 10.2.0, File-System: ext4, Screen Resolution: 1920x1200

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++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-JvwpWM/gcc-10-10.2.0/debian/tmp-gcn/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: intel_pstate powersave - CPU Microcode: 0x60 - Thermald 2.3
Python Notes: Python 3.8.6
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 Enhanced IBRS IBPB: conditional RSB filling + srbds: Not affected + tsx_async_abort: Not affected

	Gen9 - i7-8565U	Gen11 - i7-1065G7	Gen12 Xe - i7-1165G7
cl-mem - Copy (GB/s)	21.6	35.9	48.0
Normalized	45%	74.79%	100%
Standard Deviation	1.9%	0.5%	0.1%

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cl-mem - Read (GB/s)	**22.7**	41.3	**57.1**
Normalized	39.75%	72.33%	100%
Standard Deviation	1.8%	0.7%	2.3%
cl-mem - Write (GB/s)	**24.0**	34.4	**47.9**
Normalized	50.1%	71.82%	100%
Standard Deviation	2.7%	5%	0.8%
cl-mem - Copy (GB/s/Watt)	**1.09**	1.95	**2.02**
Normalized	53.96%	96.53%	100%
cl-mem - Read (GB/s/Watt)	**1.15**	**2.70**	2.45
Normalized	42.59%	100%	90.74%
cl-mem - Write (GB/s/Watt)	**1.21**	**2.31**	2.08
Normalized	52.38%	100%	90.04%
clpeak - Kernel Latency (us)	34.12	**36.89**	**29.53**
Normalized	86.55%	80.05%	100%
Standard Deviation	2.3%	0.7%	0.5%
clpeak - S.P.F (GFLOPS)	**438.06**	1039	**1775**
Normalized	24.68%	58.52%	100%
Standard Deviation	0%	0.1%	0%
clpeak - G.M.B (GBPS)	**26.73**	45.94	**57.02**
Normalized	46.88%	80.57%	100%
Standard Deviation	0.6%	0.1%	0.1%
clpeak - T.B.e (GBPS)	**31.64**	39.48	**52.15**
Normalized	60.67%	75.7%	100%
Standard Deviation	0.1%	6.4%	1%
clpeak - S.P.F (GFLOPS/Watt)	**20.31**	58.93	**80.98**
Normalized	25.08%	72.77%	100%
clpeak - G.M.B (GBPS/Watt)	**0.92**	**2.71**	2.54
Normalized	33.95%	100%	93.73%
clpeak - T.B.e (GBPS/Watt)	**2.60**	**3.45**	3.44
Normalized	75.36%	100%	99.71%
ET: Legacy - Renderer2 - 1920 x 1200 (FPS)	**72.1**	86.4	**122.3**
Normalized	58.95%	70.65%	100%
Standard Deviation	0.1%	8.2%	2.9%
ET: Legacy - Renderer2 - 1920 x 1200 (FPS/Watt)	**3.41**	5.40	**5.59**
Normalized	61%	96.6%	100%
FinanceBench - Monte-Carlo OpenCL (ms)	**2585**	579.523733	**433.370858**
Normalized	16.77%	74.78%	100%
Standard Deviation	8.3%	7.7%	0.9%
FinanceBench - B.S.O (ms)	**25.826923**	6.343	**4.179**
Normalized	16.18%	65.88%	100%
Standard Deviation	0.6%	3.2%	0.5%
GpuTest - GiMark - 1920 x 1200 - Fullscreen (Points)	**1314**	1724	**2017**
Normalized	65.15%	85.47%	100%
Standard Deviation	0.8%	1%	0.1%
GpuTest - Furmark - 1920 x 1200 - Fullscreen (Points)	**672**	1062	**1782**
Normalized	37.71%	59.6%	100%
Standard Deviation	2.2%	2.5%	2.6%
GpuTest - TessMark - 1920 x 1200 - Fullscreen (Points)	**2840**	3602	**5080**
Normalized	55.91%	70.91%	100%
Standard Deviation	1.5%	1.3%	0.9%

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GpuTest - Pixmark Piano - 1920 x 1200 - Fullscreen (Points)	**149**	288	**584**
Normalized	25.51%	49.32%	100%
Standard Deviation		1%	1.9%
GpuTest - Pixmark Volplosion - 1920 x 1200 - Fullscreen (Points)	**390**	761	**1595**
Normalized	24.45%	47.71%	100%
Standard Deviation		1.1%	1.6%
GpuTest - GiMark - 1920 x 1200 - Fullscreen (Points/Watt)	**47.23**	104.65	**111.04**
Normalized	42.53%	94.25%	100%
GpuTest - Furmark - 1920 x 1200 - Fullscreen (Points/Watt)	**25.26**	63.19	**81.15**
Normalized	31.13%	77.87%	100%
GpuTest - TessMark - 1920 x 1200 - Fullscreen (Points/Watt)	**100.32**	214.06	**242.99**
Normalized	41.29%	88.09%	100%
GpuTest - Pixmark Piano - 1920 x 1200 - Fullscreen (Points/Watt)	**6.01**	17.13	**27.39**
Normalized	21.94%	62.54%	100%
GpuTest - Pixmark Volplosion - 1920 x 1200 - Fullscreen (Points/Watt)	**16.06**	45.24	**75.39**
Normalized	21.3%	60.01%	100%
JuliaGPU - GPU (Samples/sec)	**47930813**	85184313	**132508055**
Normalized	36.17%	64.29%	100%
Standard Deviation	0%	3%	2.6%
JuliaGPU - GPU (Samples/sec/Watt)	**1343813**	5650341	**5935646**
Normalized	22.64%	95.19%	100%
LeelaChessZero - OpenCL (Nodes/s)	**389**	579	**1535**
Normalized	25.34%	37.72%	100%
Standard Deviation	2.3%	2.4%	0.9%
LeelaChessZero - OpenCL (Nodes/s/Watt)	**14.05**	37.81	**70.05**
Normalized	20.06%	53.98%	100%
MandelGPU - GPU (Samples/sec)	**10702353**	23689429	**44609195**
Normalized	23.99%	53.1%	100%
Standard Deviation	0%	1.7%	1.2%
MandelGPU - GPU (Samples/sec/Watt)	**468417**	1544709	**1974932**
Normalized	23.72%	78.22%	100%
NCNN - Vulkan GPU - squeezenet (ms)	**28.27**	24.65	**11.51**
Normalized	40.71%	46.69%	100%
Standard Deviation	0.4%	2.2%	0.3%
NCNN - Vulkan GPU - mobilenet (ms)	**25.74**	22.36	**9.74**
Normalized	37.84%	43.56%	100%
Standard Deviation	2.6%	1.6%	1.2%
NCNN - Vulkan GPU-v2-v2 - mobilenet-v2	**8.27**	7.53	**4.62**
Normalized	55.86%	61.35%	100%
Standard Deviation	0.8%	1.3%	2.3%
NCNN - Vulkan GPU-v3-v3 - mobilenet-v3	**9.19**	8.65	**5.47**
Normalized	59.52%	63.24%	100%
Standard Deviation	0.3%	0.2%	1.4%
NCNN - Vulkan GPU - shufflenet-v2 (ms)	**6.75**	5.71	**3.05**
Normalized	45.19%	53.42%	100%
Standard Deviation	0.5%	1%	0.9%

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NCNN - Vulkan GPU - mnasnet (ms)	**8.36**	7.65	**5.14**
Normalized	61.48%	67.19%	100%
Standard Deviation	0.3%	1.1%	9.7%
NCNN - Vulkan GPU - efficientnet-b0 (ms)	16.52	**16.72**	**11.05**
Normalized	66.89%	66.09%	100%
Standard Deviation	0.1%	0.1%	0.4%
NCNN - Vulkan GPU - blazeface (ms)	**1.81**	**1.81**	**0.98**
Normalized	54.14%	54.14%	100%
Standard Deviation	3.9%	1.8%	3.5%
NCNN - Vulkan GPU - googlenet (ms)	**23.72**	18.62	**10.51**
Normalized	44.31%	56.44%	100%
Standard Deviation	0.5%	0.1%	0.5%
NCNN - Vulkan GPU - vgg16 (ms)	**152.79**	96.32	**38.44**
Normalized	25.16%	39.91%	100%
Standard Deviation	0.1%	0.1%	0.1%
NCNN - Vulkan GPU - resnet18 (ms)	**23.89**	17.12	**7.18**
Normalized	30.05%	41.94%	100%
Standard Deviation	0%	0.2%	0.6%
NCNN - Vulkan GPU - alexnet (ms)	**25.77**	16.63	**9.47**
Normalized	36.75%	56.95%	100%
Standard Deviation	0.1%	0.3%	0.1%
NCNN - Vulkan GPU - resnet50 (ms)	**51.46**	35.91	**15.49**
Normalized	30.1%	43.14%	100%
Standard Deviation	0.1%	0.2%	0.2%
NCNN - Vulkan GPU - yolov4-tiny (ms)	**62.81**	38.95	**15.26**
Normalized	24.3%	39.18%	100%
Standard Deviation	0.8%	0.7%	0.2%
oneAPI Level Zero Tests - P.I.C (GFLOPS)	**138.516**	153.147	**439.002**
Normalized	31.55%	34.89%	100%
Standard Deviation	3%	2.4%	0.5%
oneAPI Level Zero Tests - D.T.H.B (GB/s)	**13.462183**	21.943939	**26.690187**
Normalized	50.44%	82.22%	100%
Standard Deviation	1%	0.1%	0.2%
oneAPI Level Zero Tests - D.T.H.B (usec)	**19941**	12233	**10057**
Normalized	50.44%	82.22%	100%
Standard Deviation	1%	0.1%	0.2%
oneAPI Level Zero Tests - H.T.D.B (GB/s)	**13.592119**	21.928612	**26.714162**
Normalized	50.88%	82.09%	100%
Standard Deviation	0.9%	0.2%	0.3%
oneAPI Level Zero Tests - H.T.D.B (usec)	**19750**	12241	**10049**
Normalized	50.88%	82.09%	100%
Standard Deviation	0.9%	0.2%	0.3%
oneAPI Level Zero Tests - P.K.L.L (us)	**31.4224**	28.9568	**22.3130**
Normalized	71.01%	77.06%	100%
Standard Deviation	1.6%	11%	9.6%
oneAPI Level Zero Tests - P.H.P.C (GFLOPS)	**751.623**	1352	**3037**
Normalized	24.75%	44.53%	100%
Standard Deviation	0.1%	2.5%	0.1%
oneAPI Level Zero Tests - P.S.P.C (GB/s)	**418.862**	920.207	**1220**
Normalized	34.35%	75.46%	100%
Standard Deviation	0.7%	0%	0%
oneAPI Level Zero Tests - H.T.D.T.H.I.C	**4.83779**	10.5736	**21.6345**
Normalized	22.36%	48.87%	100%
Standard Deviation	0.6%	2.9%	0.9%
oneAPI Level Zero Tests - P.F.G.M.B (GB/s)	**24.5276**	34.7522	**56.9391**

Normalized	43.08%	61.03%	100%
Standard Deviation	2.1%	0.1%	0.5%
oneAPI Level Zero Tests - P.S.M.C.t.S.M	**10.7883**	13.8085	**15.0859**
Normalized	71.51%	91.53%	100%
Standard Deviation	2.9%	0.3%	0.5%
oneAPI Level Zero Tests - P.I.C (GFLOPS/Watt)	**4.31**	9.15	**20.00**
Normalized	21.55%	45.75%	100%
oneAPI Level Zero Tests - P.H.P.C (GFLOPS/Watt)	**24.17**	73.98	**135.36**
Normalized	17.86%	54.65%	100%
oneAPI Level Zero Tests - P.S.P.C	**13.93**	**59.52**	54.99
Normalized	23.4%	100%	92.39%
oneAPI Level Zero Tests - H.T.D.T.H.I.C (GB/s/Watt)	**0.14**	0.68	**0.94**
Normalized	14.89%	72.34%	100%
oneAPI Level Zero Tests - P.F.G.M.B (GB/s/Watt)	**0.85**	2.24	**2.49**
Normalized	34.14%	89.96%	100%
oneAPI Level Zero Tests - P.S.M.C.t.S.M (GB/s/Watt)	**0.36**	**0.90**	0.67
Normalized	40%	100%	74.44%
PlaidML - No - Inference - VGG16 - OpenCL (FPS)	**8.18**	19.93	**22.18**
Normalized	36.88%	89.86%	100%
Standard Deviation	1.6%	5.9%	0.3%
PlaidML - No - Inference - VGG19 - OpenCL (FPS)	**6.42**	16.03	**17.49**
Normalized	36.71%	91.65%	100%
Standard Deviation	0.2%	2.2%	0.2%
PlaidML - No - Inference - IMDB LSTM - OpenCL (FPS)	**7.84**	20.10	**30.52**
Normalized	25.69%	65.86%	100%
Standard Deviation	0.4%	1%	2.3%
PlaidML - No - Inference - Mobilenet - OpenCL (FPS)	**116.08**	242.83	**299.60**
Normalized	38.74%	81.05%	100%
Standard Deviation	0%	2.4%	0.5%
PlaidML - No - Inference - ResNet 50 - OpenCL (FPS)	**34.52**	75.57	**87.29**
Normalized	39.55%	86.57%	100%
Standard Deviation	1.8%	2.4%	0.1%
PlaidML - No - Inference - DenseNet 201 - OpenCL (FPS)	**5.81**	11.30	**22.44**
Normalized	25.89%	50.36%	100%
Standard Deviation	0.4%	1.2%	0.7%
PlaidML - No - Inference - Inception V3 - OpenCL (FPS)	**15.90**	34.82	**46.37**
Normalized	34.29%	75.09%	100%
Standard Deviation	1.7%	0.4%	0.1%

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PlaidML - No - Inference - NASNer Large - OpenCL (FPS)	**1.84**	3.31	**5.14**
Normalized	35.8%	64.4%	100%
Standard Deviation	0.5%	0.3%	0%
PlaidML - No - Inference - VGG16 - OpenCL (FPS/Watt)	**0.26**	**1.21**	1.07
Normalized	21.49%	100%	88.43%
PlaidML - No - Inference - VGG19 - OpenCL (FPS/Watt)	**0.21**	**0.98**	0.86
Normalized	21.43%	100%	87.76%
PlaidML - No - Inference - IMDB LSTM - OpenCL (FPS/Watt)	**0.24**	1.24	**1.40**
Normalized	17.14%	88.57%	100%
PlaidML - No - Inference - Mobilenet - OpenCL (FPS/Watt)	**3.63**	**15.04**	13.59
Normalized	24.14%	100%	90.36%
PlaidML - No - Inference - ResNet 50 - OpenCL (FPS/Watt)	**1.10**	**4.79**	4.04
Normalized	22.96%	100%	84.34%
PlaidML - No - Inference - DenseNet 201 - OpenCL (FPS/Watt)	**0.22**	0.75	**1.02**
Normalized	21.57%	73.53%	100%
PlaidML - No - Inference - Inception V3 - OpenCL (FPS/Watt)	**0.54**	**2.31**	2.14
Normalized	23.38%	100%	92.64%
PlaidML - No - Inference - NASNer Large - OpenCL (FPS/Watt)	**0.06**	0.22	**0.24**
Normalized	25%	91.67%	100%
RealSR-NCNN - 4x - No (sec)	**202.601**	143.988	**68.311**
Normalized	33.72%	47.44%	100%
Standard Deviation	0.5%	0.4%	1.1%
RealSR-NCNN - 4x - Yes (sec)	**1615**	1120	**538.065**
Normalized	33.32%	48.04%	100%
Standard Deviation	0.3%	0.5%	0.4%
SHOC Scalable HeterOgeneous Computing - OpenCL - Triad (GB/s)	**10.9236**	14.0210	**21.3040**
Normalized	51.27%	65.81%	100%
Standard Deviation	6.8%	7.4%	1.9%
SHOC Scalable HeterOgeneous Computing - OpenCL - FFT SP (GFLOPS)	**38.9719**	140.162	**156.162**
Normalized	24.96%	89.75%	100%
Standard Deviation	0.3%	0.5%	0.8%
SHOC Scalable HeterOgeneous Computing - OpenCL - MD5 Hash (GHash/s)	**0.3691**	0.6778	**1.6775**
Normalized	22%	40.41%	100%
Standard Deviation	0%	0.1%	0%
SHOC Scalable HeterOgeneous Computing - OpenCL - Max SP Flops (GFLOPS)	**1681**	5323	**7821**
Normalized	21.5%	68.06%	100%
Standard Deviation	0.1%	0.1%	0%

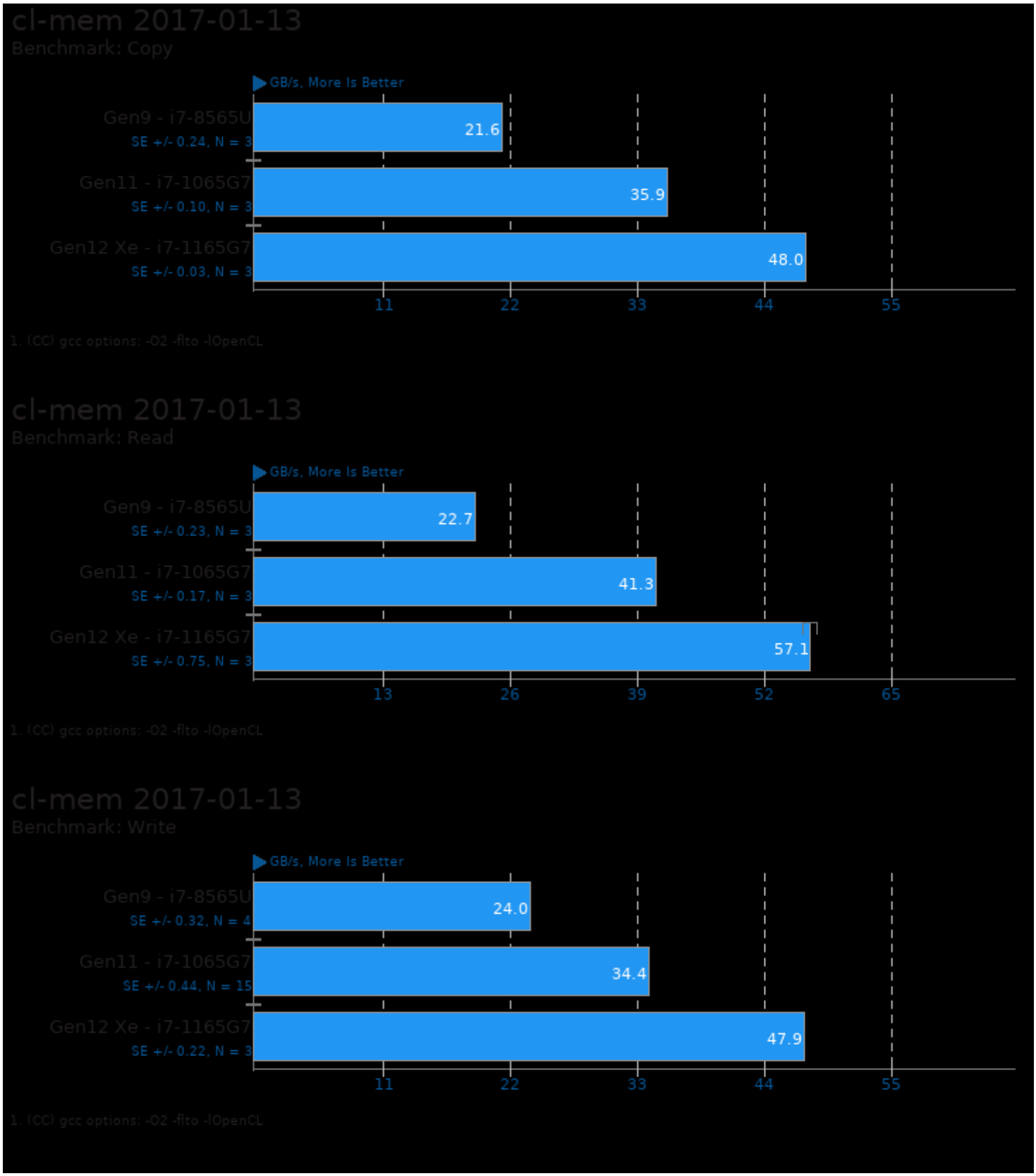
Tigerlake Xe Gen12 to Gen9

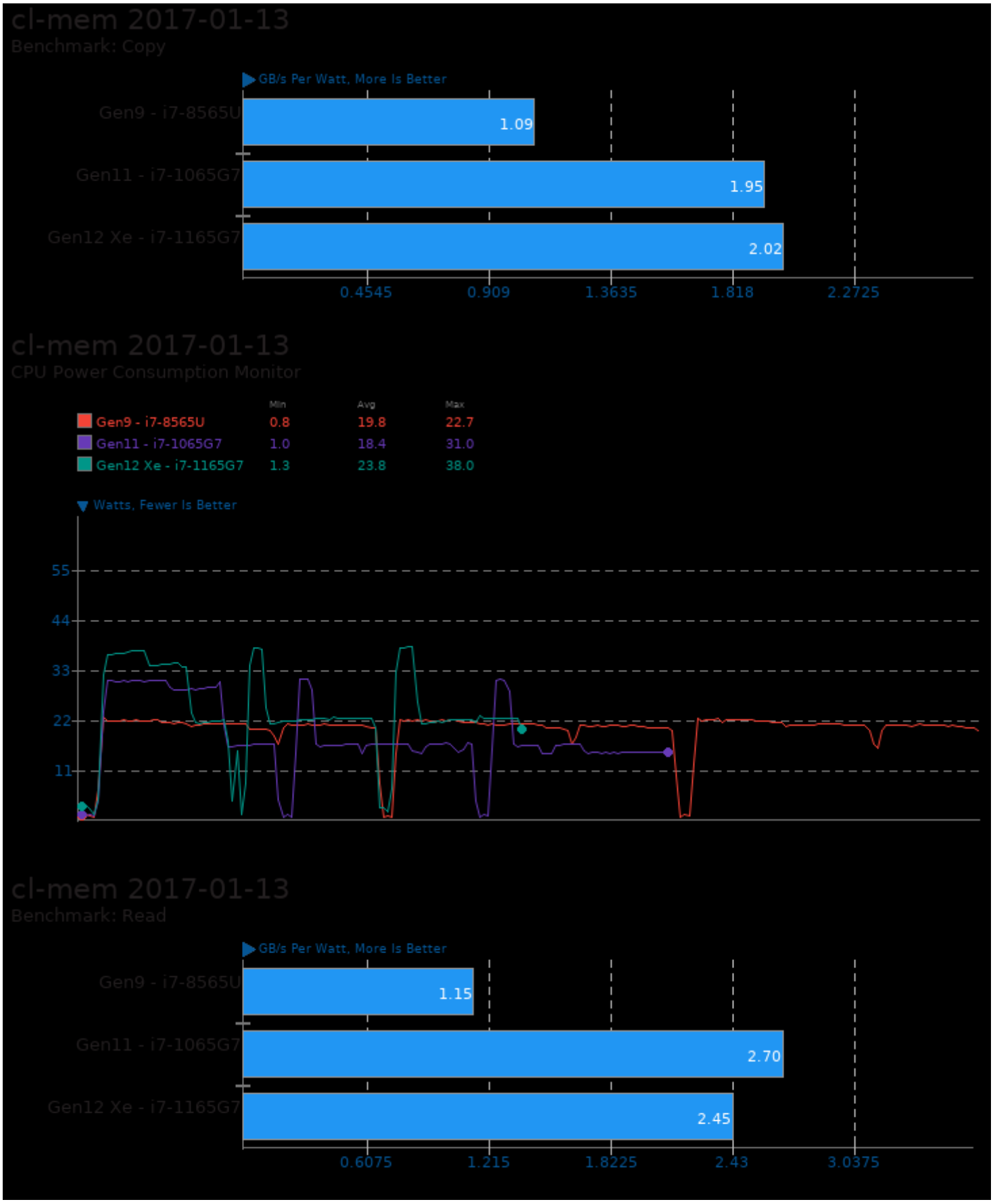
SHOC Scalable HeterOgeneous Computing - OpenCL - Bus Speed Download (GB/s)	**23.3048**	40.1640	**58.4143**
Normalized	39.9%	68.76%	100%
Standard Deviation	8.6%	1%	2.9%
SHOC Scalable HeterOgeneous Computing - OpenCL - Bus Speed Readback (GB/s)	**23.9319**	41.7406	**60.4048**
Normalized	39.62%	69.1%	100%
Standard Deviation	9.3%	3.9%	1%
SHOC Scalable HeterOgeneous Computing - OpenCL - T.R.B (GB/s)	**54.2625**	174.162	**189.757**
Normalized	28.6%	91.78%	100%
Standard Deviation	0%	1.7%	0%
SHOC Scalable HeterOgeneous Computing - OpenCL - Triad (GB/s/Watt)	**0.92**	1.68	**1.92**
Normalized	47.92%	87.5%	100%
SHOC Scalable HeterOgeneous Computing - OpenCL - FFT SP (GFLOPS/Watt)	**2.21**	17.77	**17.81**
Normalized	12.41%	99.78%	100%
SHOC Scalable HeterOgeneous Computing - OpenCL - MD5 Hash (GHash/s/Watt)	**0.02**	0.03	**0.07**
Normalized	28.57%	42.86%	100%
SHOC Scalable HeterOgeneous Computing - OpenCL - Max SP Flops (GFLOPS/Watt)	**72.86**	265.36	**343.74**
Normalized	21.2%	77.2%	100%
SHOC Scalable HeterOgeneous Computing - OpenCL - Bus Speed Download (GB/s/Watt)	**2.65**	6.84	**7.04**
Normalized	37.64%	97.16%	100%
SHOC Scalable HeterOgeneous Computing - OpenCL - Bus Speed Readback (GB/s/Watt)	**2.69**	6.82	**7.39**
Normalized	36.4%	92.29%	100%
SHOC Scalable HeterOgeneous Computing - OpenCL - T.R.B (GB/s/Watt)	**2.59**	**10.35**	8.35
Normalized	25.02%	100%	80.68%
Tesseract - 1920 x 1200 (FPS)	**65.22251**	109.4669	**140.3486**
Normalized	46.47%	78%	100%
Standard Deviation	1.2%	2.3%	1.1%
Tesseract - 1920 x 1200 (FPS/Watt)	**2.61**	5.00	**6.28**
Normalized	41.56%	79.62%	100%
Unigine Heaven - 1920 x 1200 - Fullscreen - OpenGL (FPS)	**10.3701**	16.1363	**28.6453**
Normalized	36.2%	56.33%	100%
Standard Deviation	0.3%	4.5%	0.4%
Unigine Heaven - 1920 x 1200 - Fullscreen - OpenGL (FPS/Watt)	**0.38**	0.81	**1.31**
Normalized	29.01%	61.83%	100%
Unigine Superposition - 1920 x 1200 - Fullscreen - Low - OpenGL (FPS)	**12.2**	17.0	**29.6**
Normalized	41.22%	57.43%	100%
Standard Deviation	0.5%	0.9%	0.8%
Unigine Superposition - 1920 x 1200 - Fullscreen - Medium - OpenGL (FPS)	**5.8**	9.0	**16.4**
Normalized	35.37%	54.88%	100%

Tigerlake Xe Gen12 to Gen9

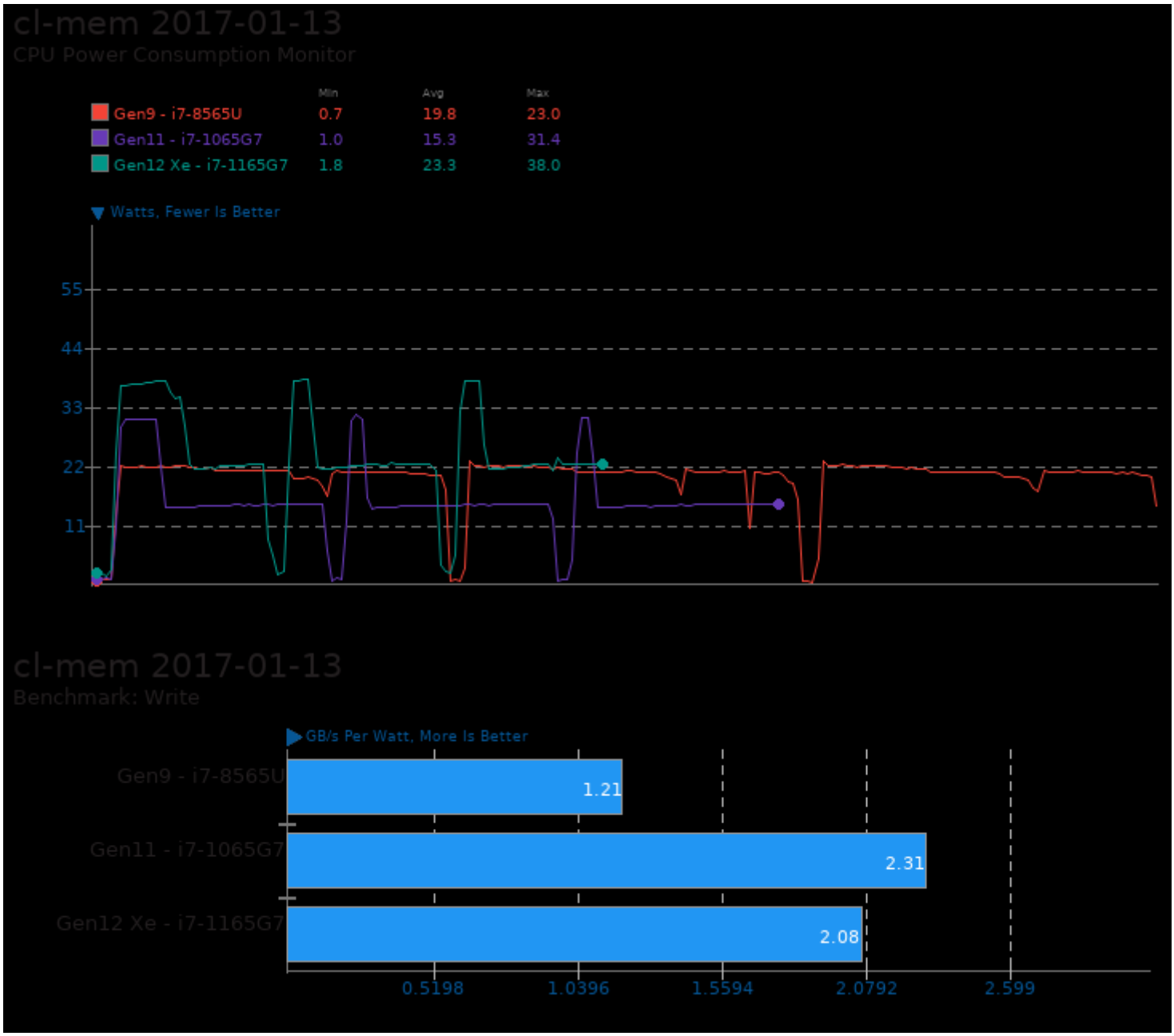
Standard Deviation	1%	0.6%	0%
Unigine Superposition - 1920 x 1200 - Fullscreen - Low - OpenGL (FPS/Watt)	0.48	0.89	1.34
Normalized	35.82%	66.42%	100%
Unigine Superposition - 1920 x 1200 - Fullscreen - Medium - OpenGL (FPS/Watt)	0.23	0.50	0.74
Normalized	31.08%	67.57%	100%
Unigine Valley - 1920 x 1200 - Fullscreen - OpenGL (FPS)	11.4067	17.7436	30.6054
Normalized	37.27%	57.98%	100%
Standard Deviation	1%	1.1%	0.5%
Unigine Valley - 1920 x 1200 - Fullscreen - OpenGL (FPS/Watt)	0.43	1.13	1.40
Normalized	30.71%	80.71%	100%
ViennaCL - O.L.F (GFLOPS)	24.6746	48.9117	73.8162
Normalized	33.43%	66.26%	100%
Standard Deviation	0.3%	1.3%	0.4%
ViennaCL - O.L.F (GFLOPS/Watt)	1.86	5.86	6.64
Normalized	28.01%	88.25%	100%
Waifu2x-NCNN Vulkan - 2x - 3 - No (sec)	10.288	7.062	4.095
Normalized	39.8%	57.99%	100%
Standard Deviation	0.6%	0.9%	0.9%
Waifu2x-NCNN Vulkan - 2x - 3 - Yes (sec)	75.252	53.103	27.216
Normalized	36.17%	51.25%	100%
Standard Deviation	0.1%	3%	0.2%
Xonotic - 1920 x 1200 - Low (FPS)	183.6211229	209.1609960	307.6345501
Normalized	59.69%	67.99%	100%
Standard Deviation	0.1%	2.9%	2.9%
Xonotic - 1920 x 1200 - High (FPS)	111.6753218	144.1207832	183.8028138
Normalized	60.76%	78.41%	100%
Standard Deviation	1.3%	2.8%	2.4%
Xonotic - 1920 x 1200 - Ultra (FPS)	93.2094800	123.2383929	155.3708840
Normalized	59.99%	79.32%	100%
Standard Deviation	1%	2.6%	1.5%
Xonotic - 1920 x 1200 - Ultimate (FPS)	71.6067804	99.2365089	121.9041377
Normalized	58.74%	81.41%	100%
Standard Deviation	1.1%	2.7%	1.5%
Xonotic - 1920 x 1200 - Low (FPS/Watt)	8.37	12.89	14.14
Normalized	59.19%	91.16%	100%
Xonotic - 1920 x 1200 - High (FPS/Watt)	4.25	8.81	8.28
Normalized	48.24%	100%	93.98%
Xonotic - 1920 x 1200 - Ultra (FPS/Watt)	3.44	7.51	7.06
Normalized	45.81%	100%	94.01%
Xonotic - 1920 x 1200 - Ultimate (FPS/Watt)	2.65	6.10	5.56
Normalized	43.44%	100%	91.15%

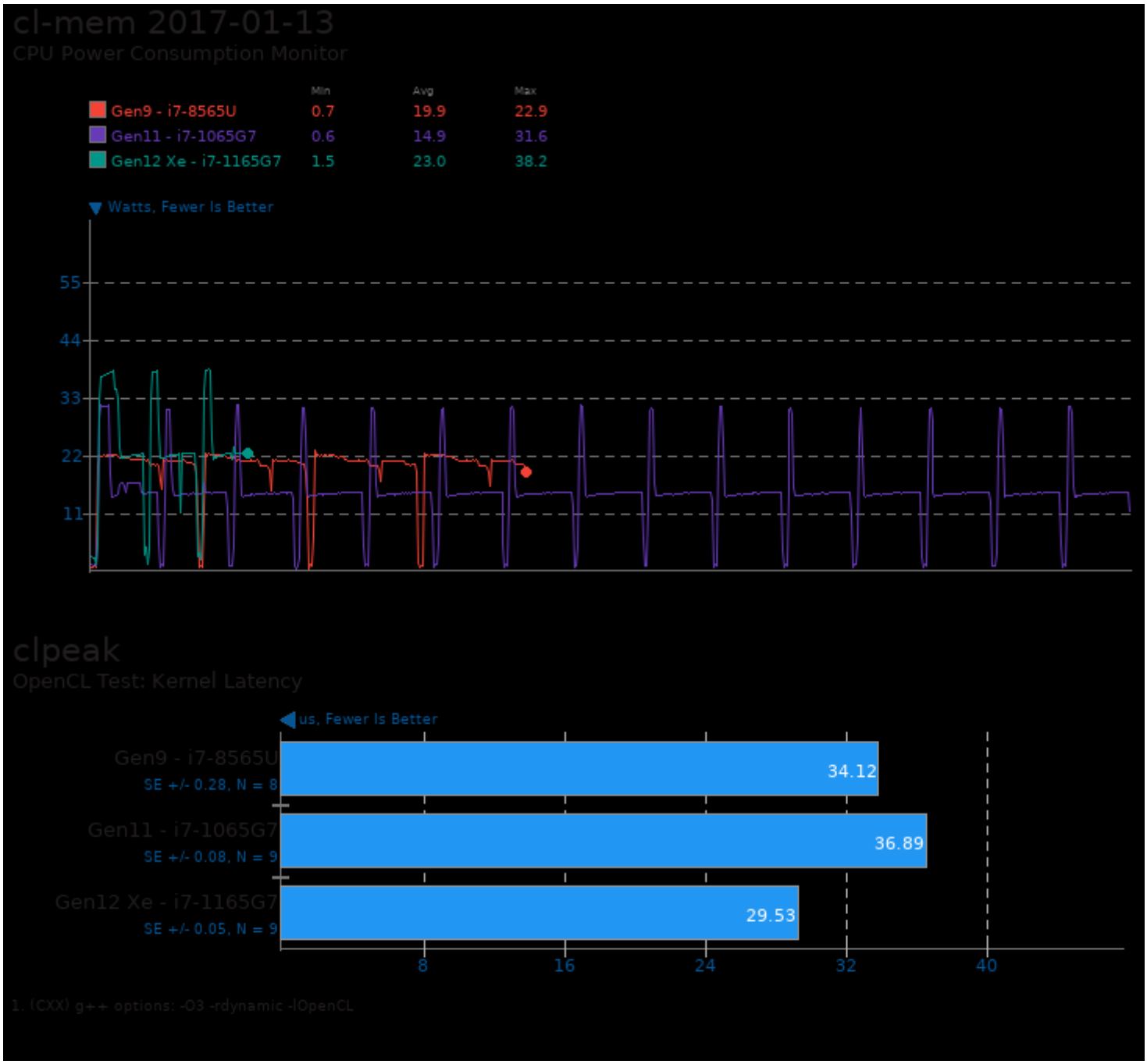
Tigerlake Xe Gen12 to Gen9

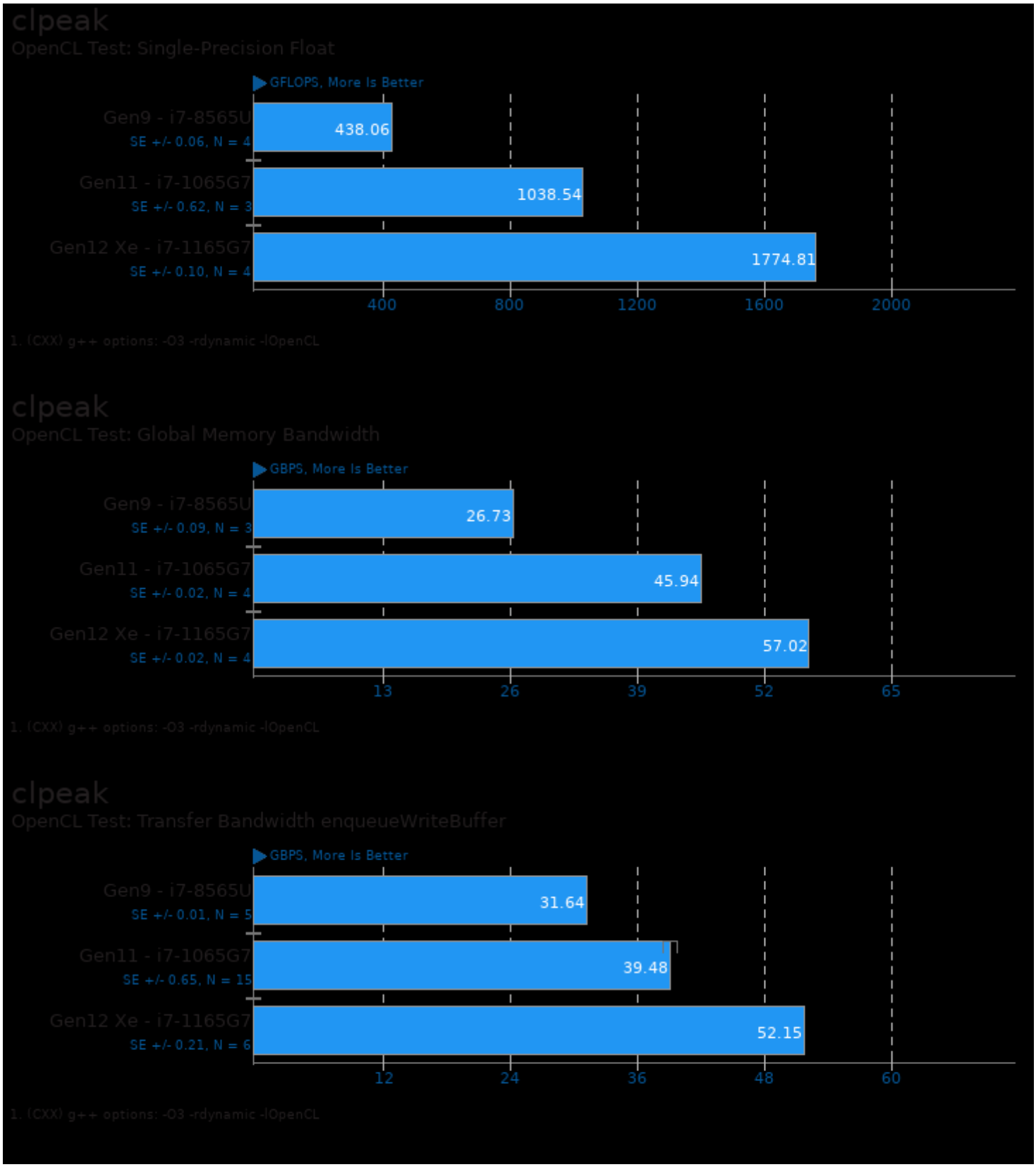



cl-mem 2017-01-13
Benchmark: Copy
GB/s Per Watt, More Is Better
Gen9 - i7-8565U
1.09
Gen11 - i7-1065G7
1.95
Gen12 Xe - i7-1165G7
2.02
0.4545
0.909
1.3635
1.818
2.2725
cl-mem 2017-01-13
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U 0.8 19.8 22.7
Gen11 - i7-1065G7 1.0 18.4 31.0
Gen12 Xe - i7-1165G7 1.3 23.8 38.0
Watts, Fewer Is Better
55
44
33
22
11
cl-mem 2017-01-13
Benchmark: Read
GB/s Per Watt, More Is Better
Gen9 - i7-8565U
1.15
Gen11 - i7-1065G7
2.70
Gen12 Xe - i7-1165G7
2.45
0.6075
1.215
1.8225
2.43
3.0375

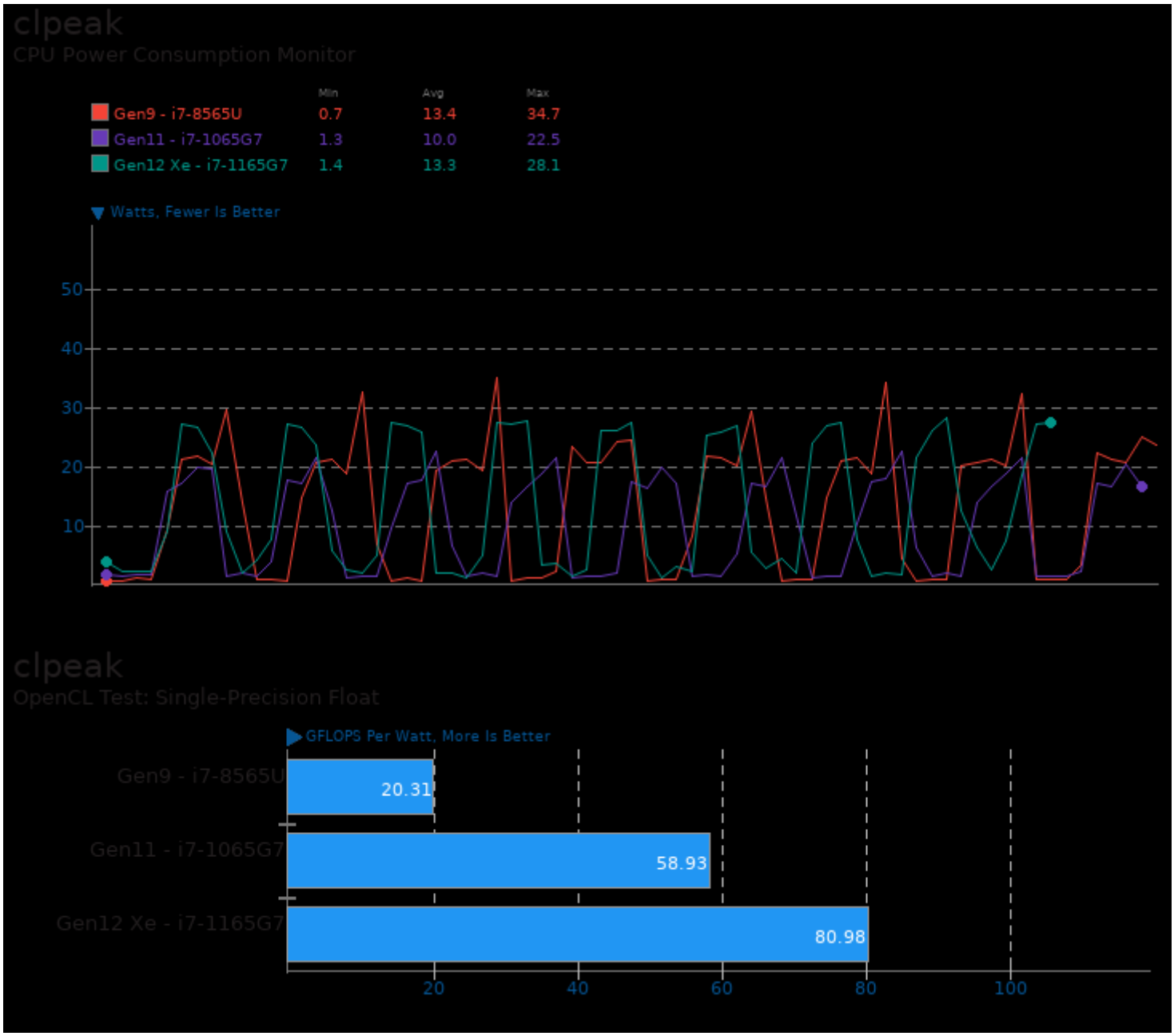
Tigerlake Xe Gen12 to Gen9



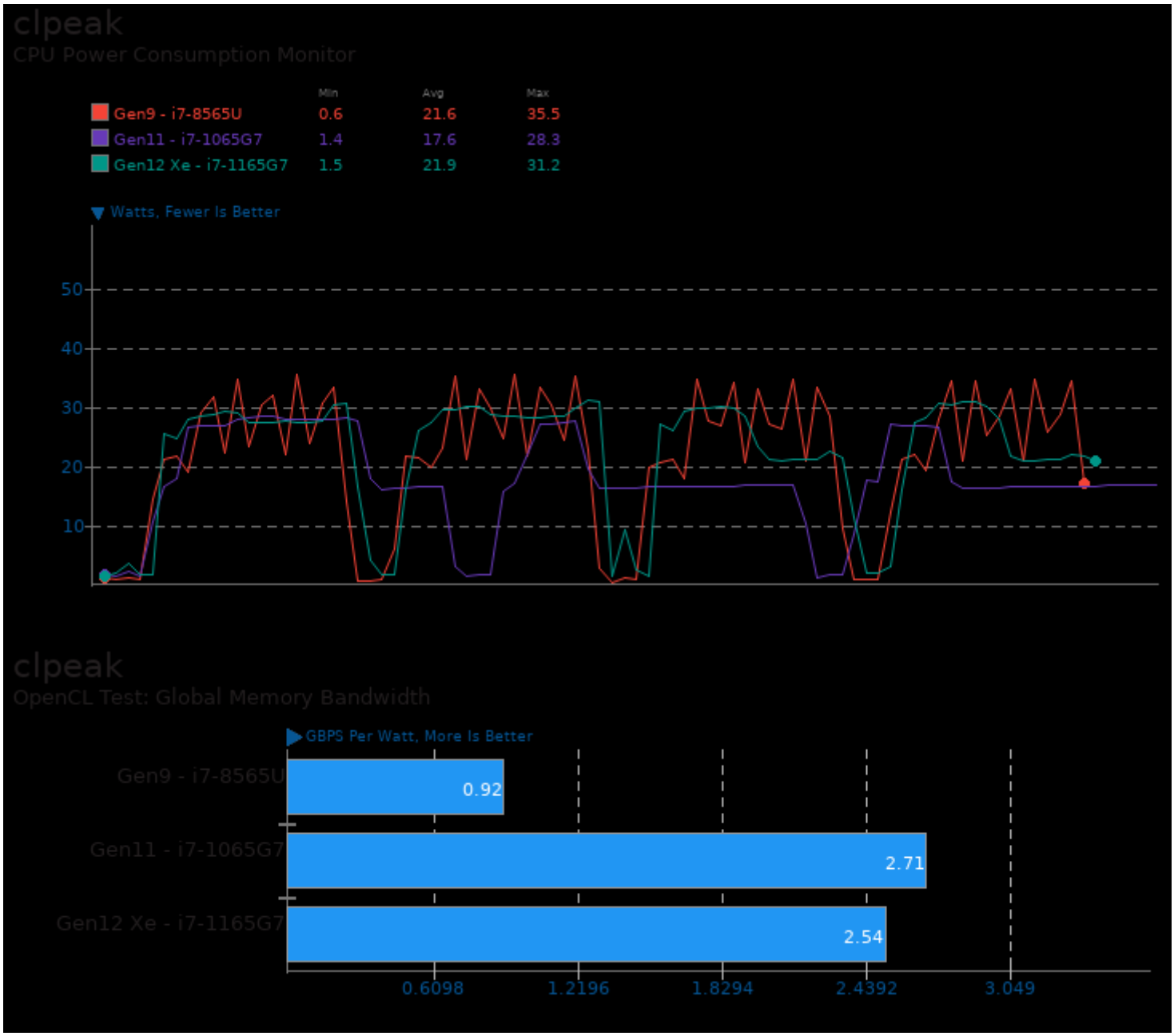

cl-mem 2017-01-13
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U
0.7
19.9
22.9
Gen11 - i7-1065G7
0.6
14.9
31.6
Gen12 Xe - i7-1165G7
1.5
23.0
38.2
Watts, Fewer Is Better
55
44
33
22
11
clpeak
OpenCL Test: Kernel Latency
us, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.28, N = 8
34.12
Gen11 - i7-1065G7
SE +/- 0.08, N = 9
36.89
Gen12 Xe - i7-1165G7
SE +/- 0.05, N = 9
29.53
8
16
24
32
40
1. (CXX) g++ options: -O3 -rdynamic -lOpenCL


clpeak
OpenCL Test: Single-Precision Float
GFLOPS, More Is Better
Gen9 - i7-8565U
SE +/- 0.06, N = 4
438.06
Gen11 - i7-1065G7
SE +/- 0.62, N = 3
1038.54
Gen12 Xe - i7-1165G7
SE +/- 0.10, N = 4
1774.81
400
800
1200
1600
2000
1. (CXX) g++ options: -O3 -rdynamic -lOpenCL
clpeak
OpenCL Test: Global Memory Bandwidth
GBPS, More Is Better
Gen9 - i7-8565U
SE +/- 0.09, N = 3
26.73
Gen11 - i7-1065G7
SE +/- 0.02, N = 4
45.94
Gen12 Xe - i7-1165G7
SE +/- 0.02, N = 4
57.02
13
26
39
52
65
1. (CXX) g++ options: -O3 -rdynamic -lOpenCL
clpeak
OpenCL Test: Transfer Bandwidth enqueueWriteBuffer
GBPS, More Is Better
Gen9 - i7-8565U
SE +/- 0.01, N = 5
31.64
Gen11 - i7-1065G7
SE +/- 0.65, N = 15
39.48
Gen12 Xe - i7-1165G7
SE +/- 0.21, N = 6
52.15
12
24
36
48
60
1. (CXX) g++ options: -O3 -rdynamic -lOpenCL

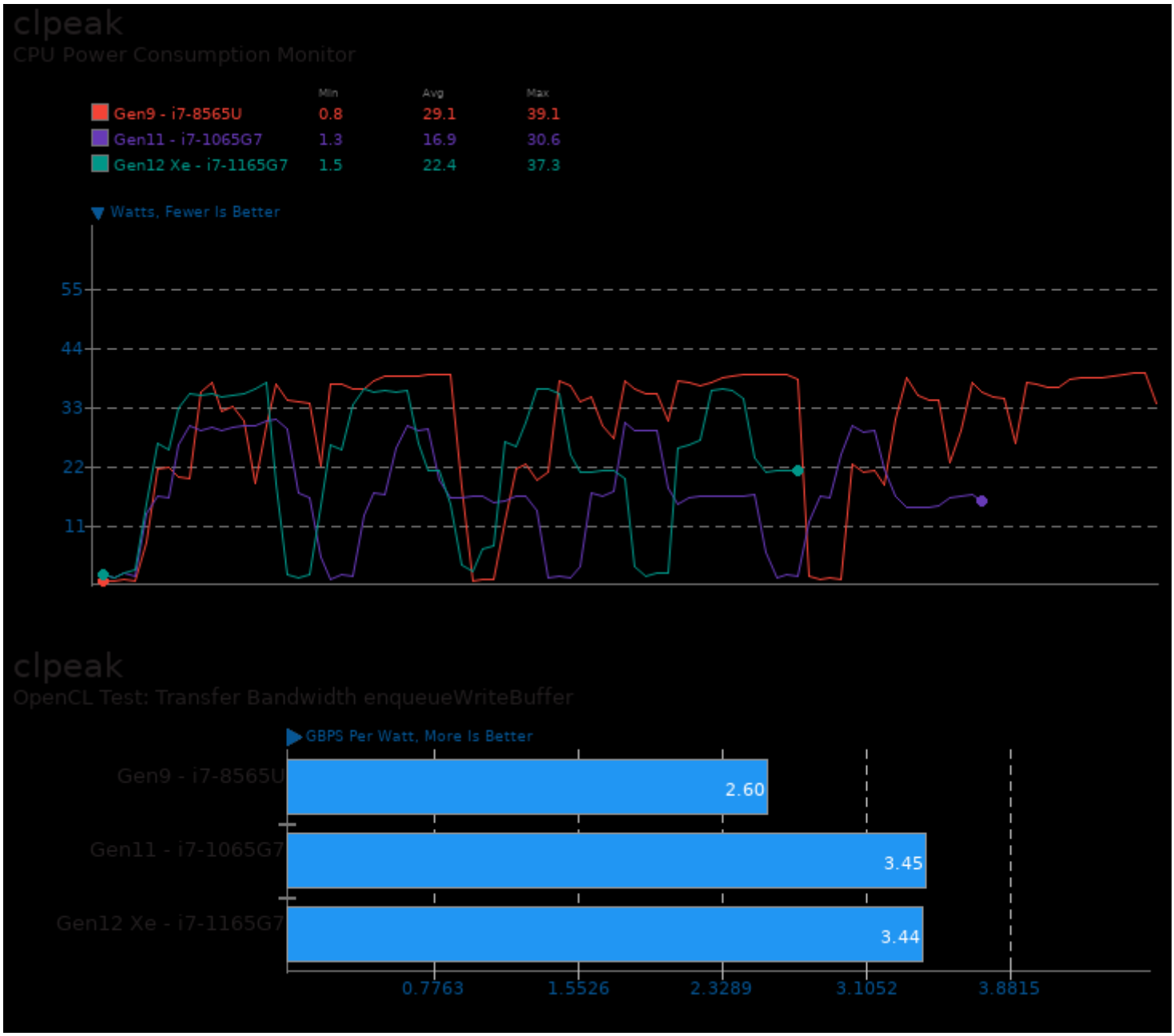
Tigerlake Xe Gen12 to Gen9

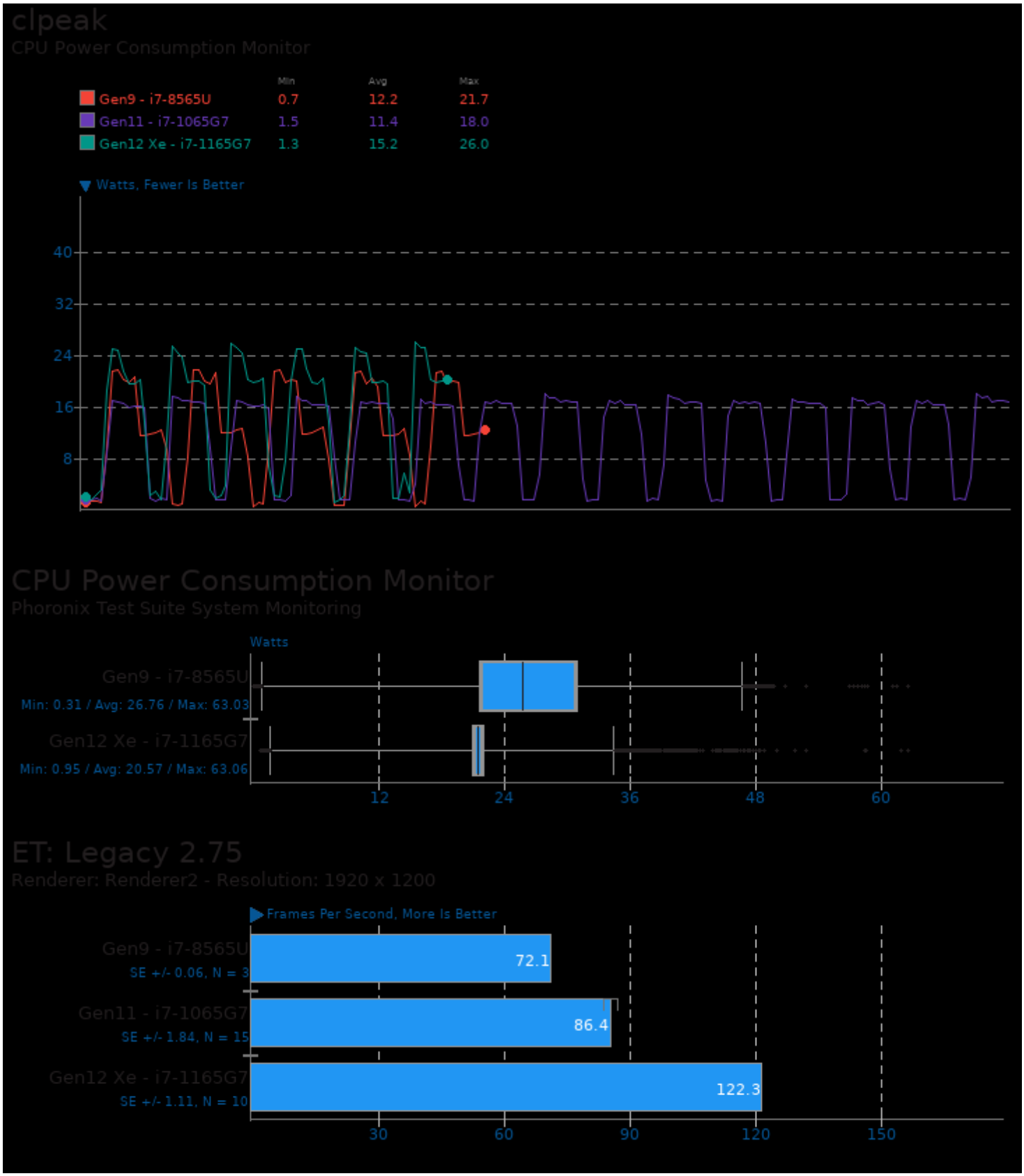


Tigerlake Xe Gen12 to Gen9



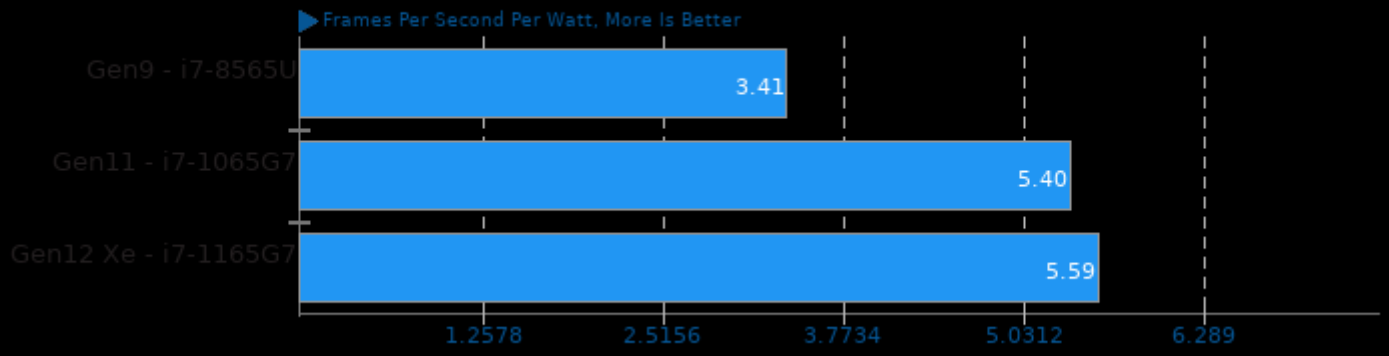
Tigerlake Xe Gen12 to Gen9




clpeak
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U
0.7
12.2
21.7
Gen11 - i7-1065G7
1.5
11.4
18.0
Gen12 Xe - i7-1165G7
1.3
15.2
26.0
Watts, Fewer Is Better
40
32
24
16
8
CPU Power Consumption Monitor
Phoronix Test Suite System Monitoring
Watts
Gen9 - i7-8565U
Min: 0.31 / Avg: 26.76 / Max: 63.03
Gen12 Xe - i7-1165G7
Min: 0.95 / Avg: 20.57 / Max: 63.06
12
24
36
48
60
ET: Legacy 2.75
Renderer: Renderer2 - Resolution: 1920 x 1200
Frames Per Second, More Is Better
Gen9 - i7-8565U
SE +/- 0.06, N = 3
72.1
Gen11 - i7-1065G7
SE +/- 1.84, N = 15
86.4
Gen12 Xe - i7-1165G7
SE +/- 1.11, N = 10
122.3
30
60
90
120
150

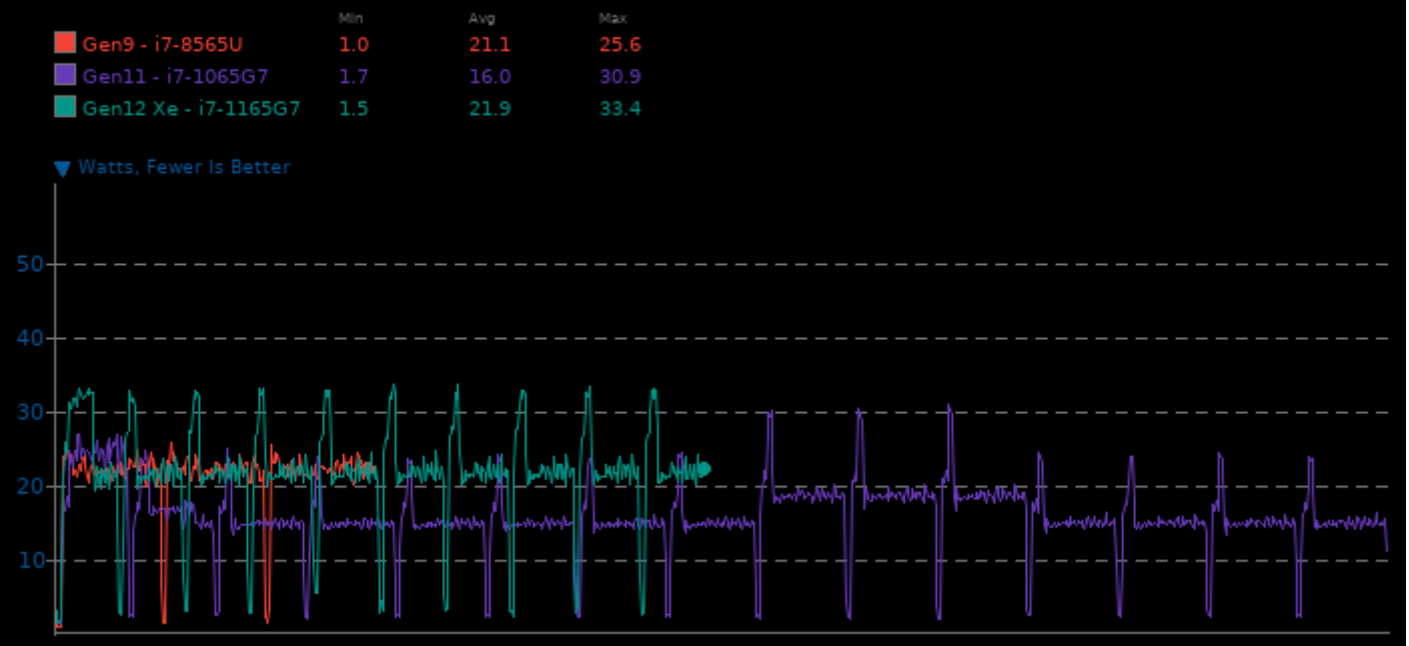
ET: Legacy 2.75

Renderer: Renderer2 - Resolution: 1920 x 1200



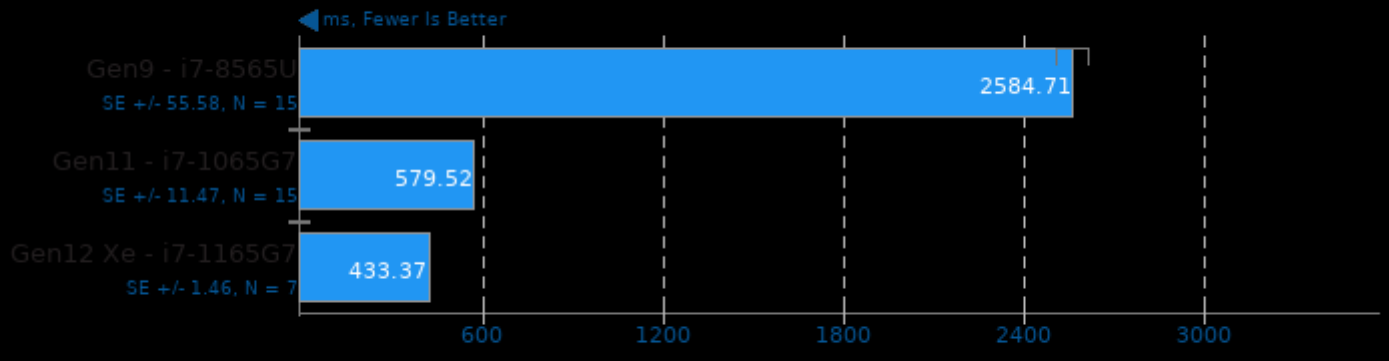
ET: Legacy 2.75

CPU Power Consumption Monitor



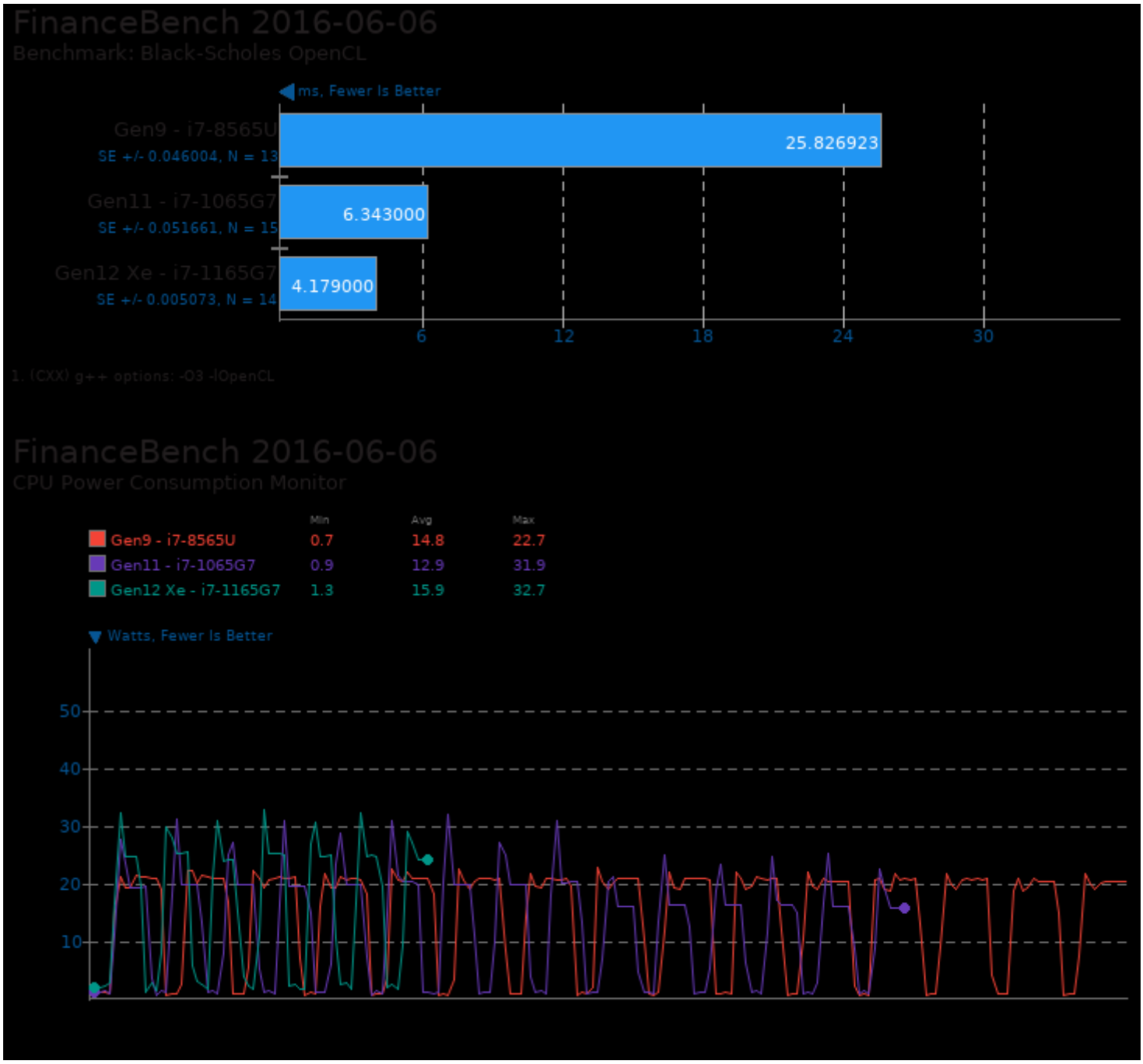
FinanceBench 2016-06-06

Benchmark: Monte-Carlo OpenCL



1. (CXX) g++ options: -O3 -lOpenCL

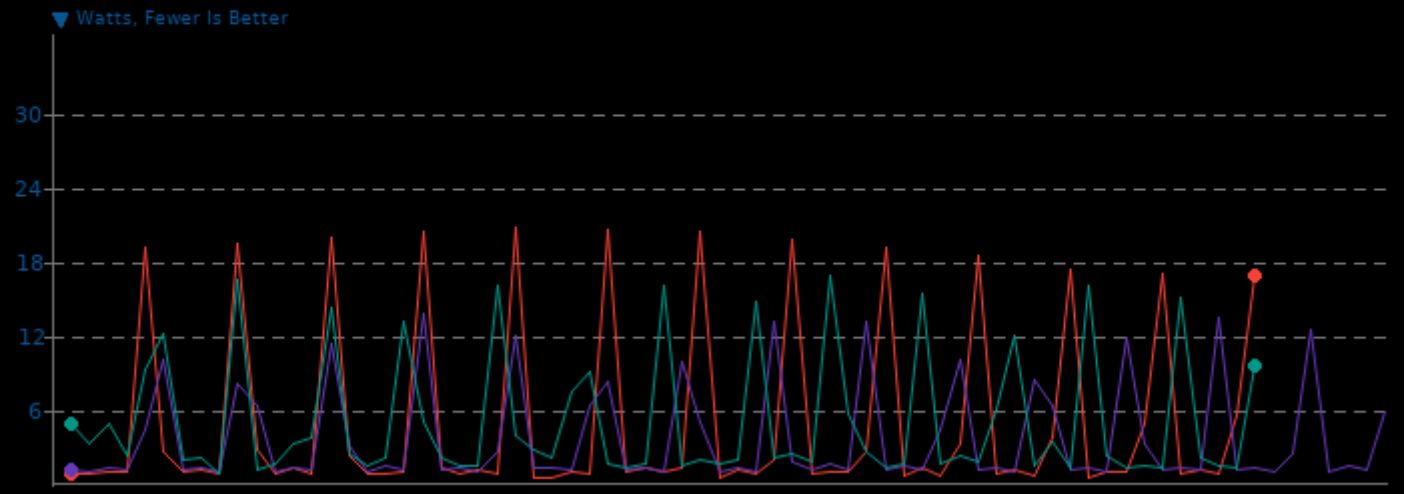
Tigerlake Xe Gen12 to Gen9



FinanceBench 2016-06-06

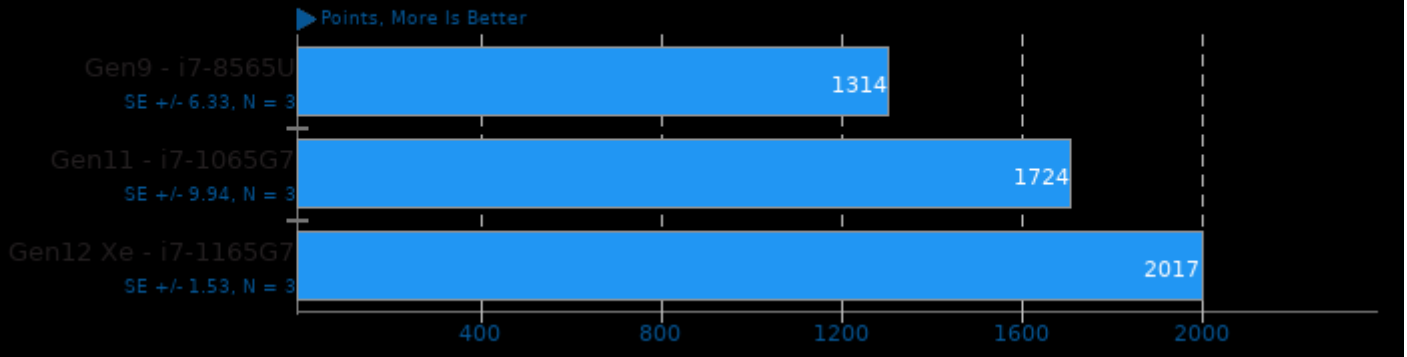
CPU Power Consumption Monitor

	Min	Avg	Max
Gen9 - i7-8565U	0.7	5.0	20.7
Gen11 - i7-1065G7	1.1	3.8	13.9
Gen12 Xe - i7-1165G7	1.0	5.1	16.9



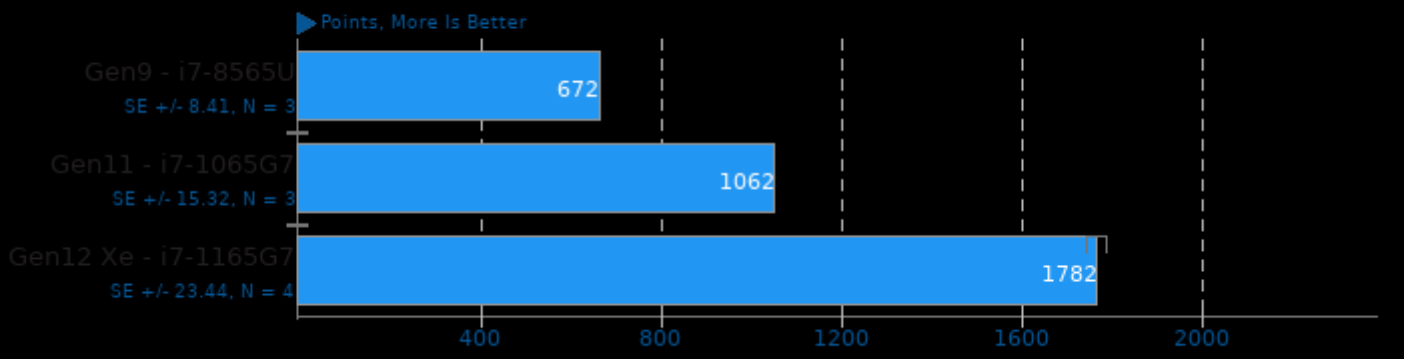
GpuTest 0.7.0

Test: GiMark - Resolution: 1920 x 1200 - Mode: Fullscreen

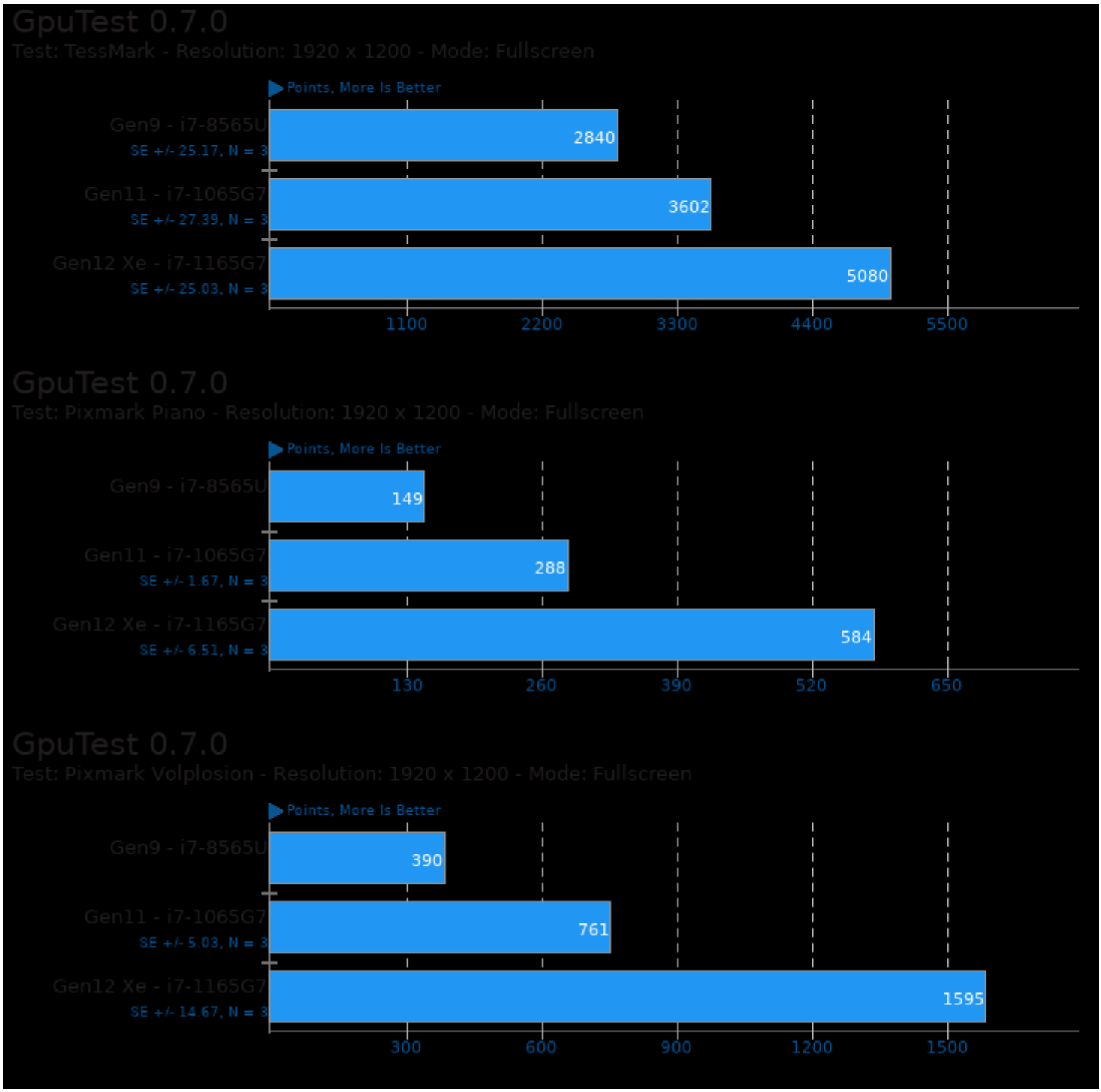


GpuTest 0.7.0

Test: Furmark - Resolution: 1920 x 1200 - Mode: Fullscreen



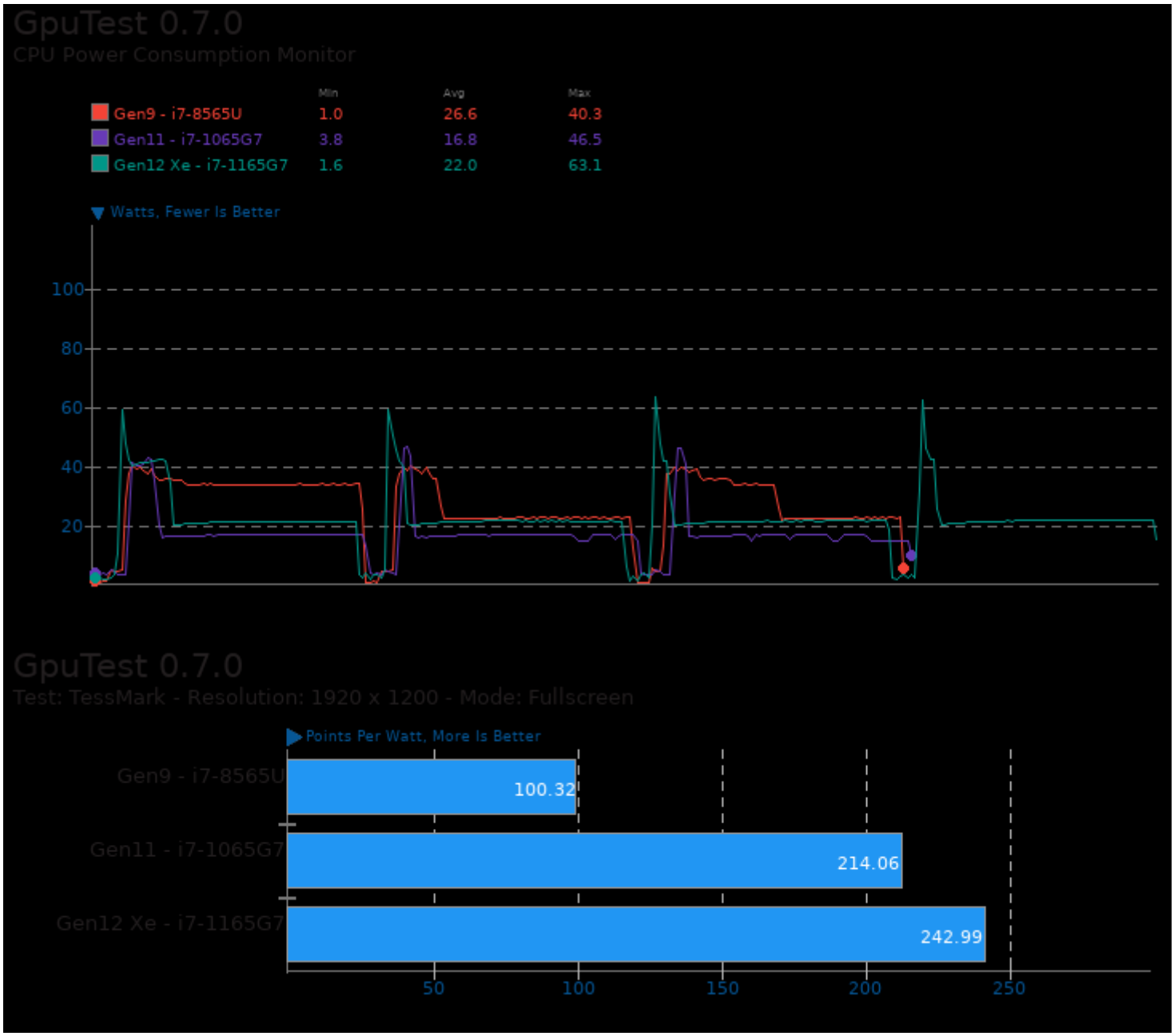
Tigerlake Xe Gen12 to Gen9



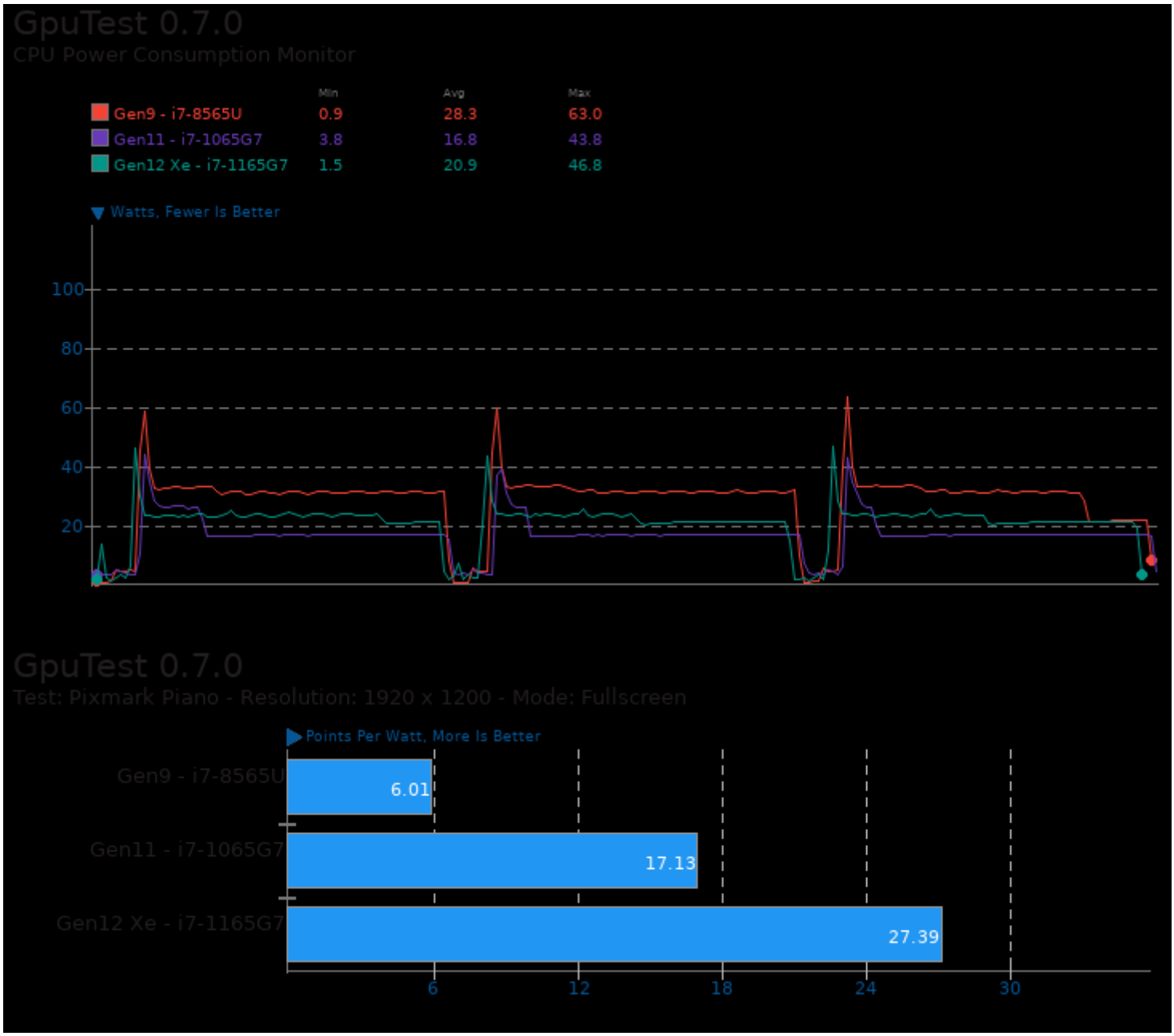
Tigerlake Xe Gen12 to Gen9



Tigerlake Xe Gen12 to Gen9

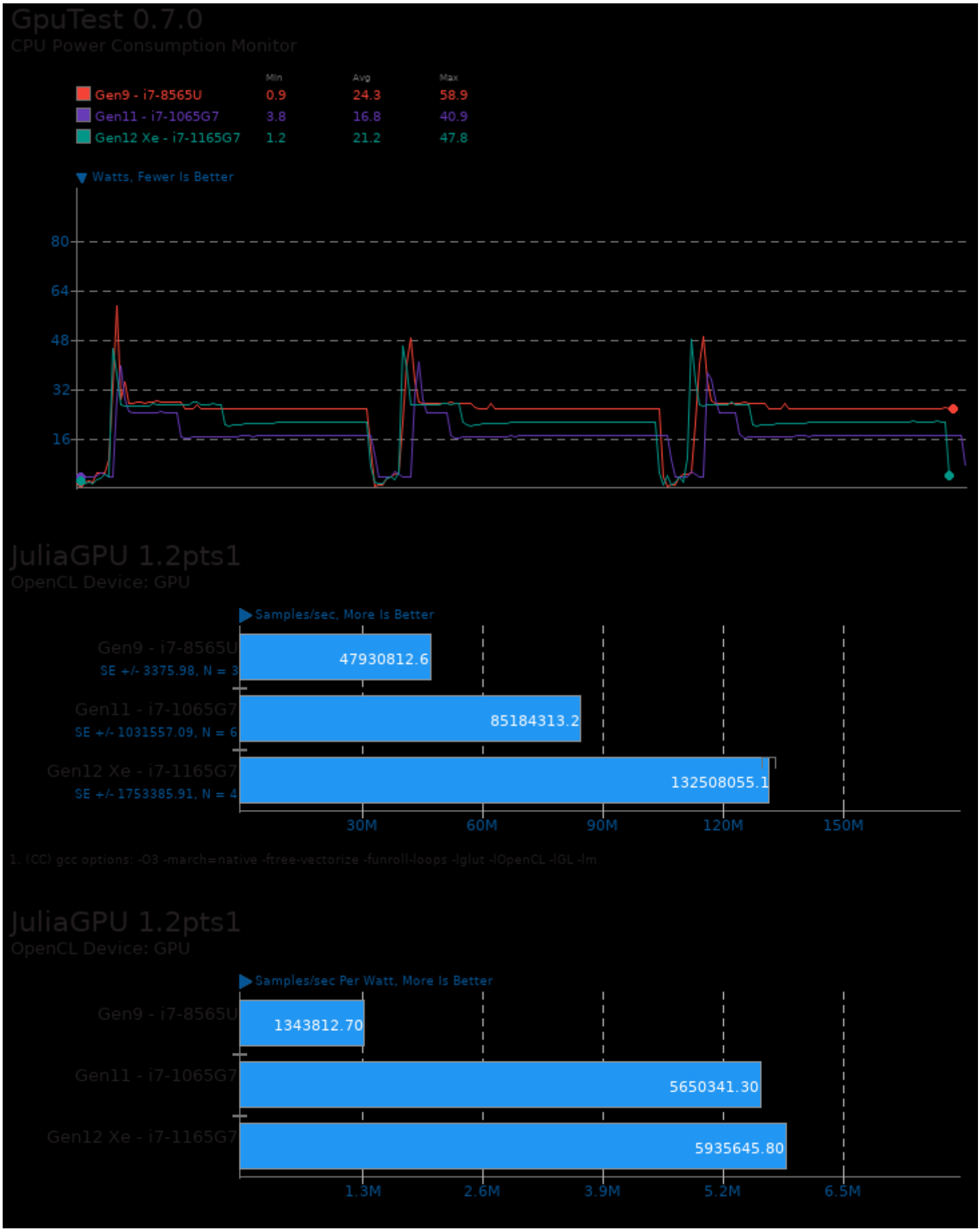


Tigerlake Xe Gen12 to Gen9



Tigerlake Xe Gen12 to Gen9

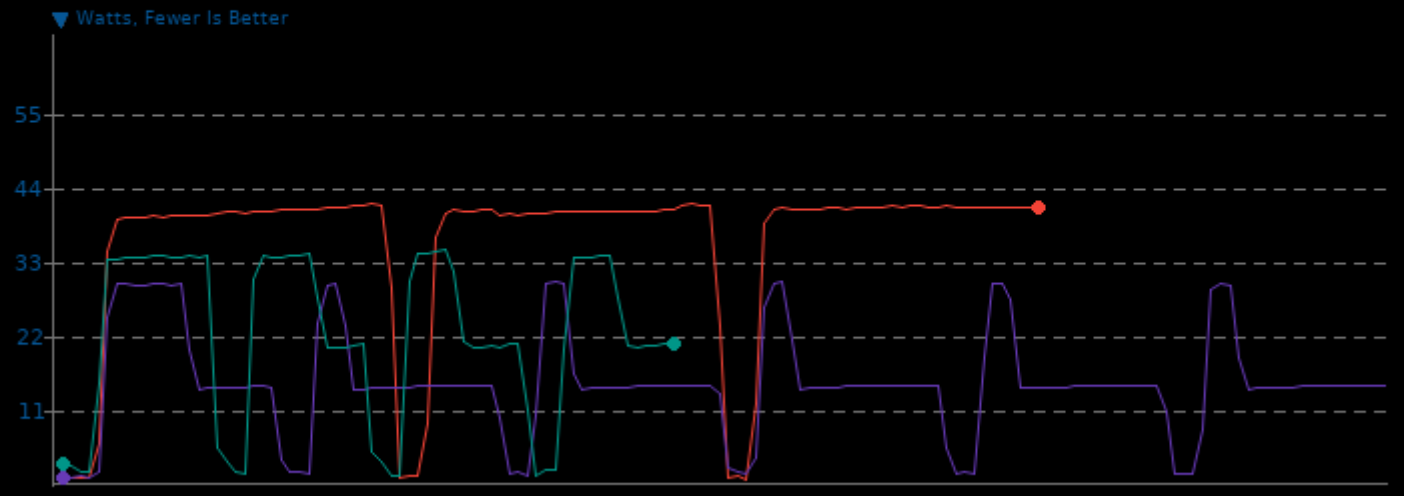



GpuTest 0.7.0
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U 0.9 24.3 58.9
Gen11 - i7-1065G7 3.8 16.8 40.9
Gen12 Xe - i7-1165G7 1.2 21.2 47.8
Watts, Fewer Is Better
80
64
48
32
16
JuliaGPU 1.2pts1
OpenCL Device: GPU
Samples/sec, More Is Better
Gen9 - i7-8565U
SE +/- 3375.98, N = 3
47930812.6
Gen11 - i7-1065G7
SE +/- 1031557.09, N = 6
85184313.2
Gen12 Xe - i7-1165G7
SE +/- 1753385.91, N = 4
132508055.1
30M
60M
90M
120M
150M
1. (CC) gcc options: -O3 -march=native -ftree-vectorize -funroll-loops -lglut -lOpenCL -lGL -lm
JuliaGPU 1.2pts1
OpenCL Device: GPU
Samples/sec Per Watt, More Is Better
Gen9 - i7-8565U
1343812.70
Gen11 - i7-1065G7
5650341.30
Gen12 Xe - i7-1165G7
5935645.80
1.3M
2.6M
3.9M
5.2M
6.5M

JuliaGPU 1.2pts1

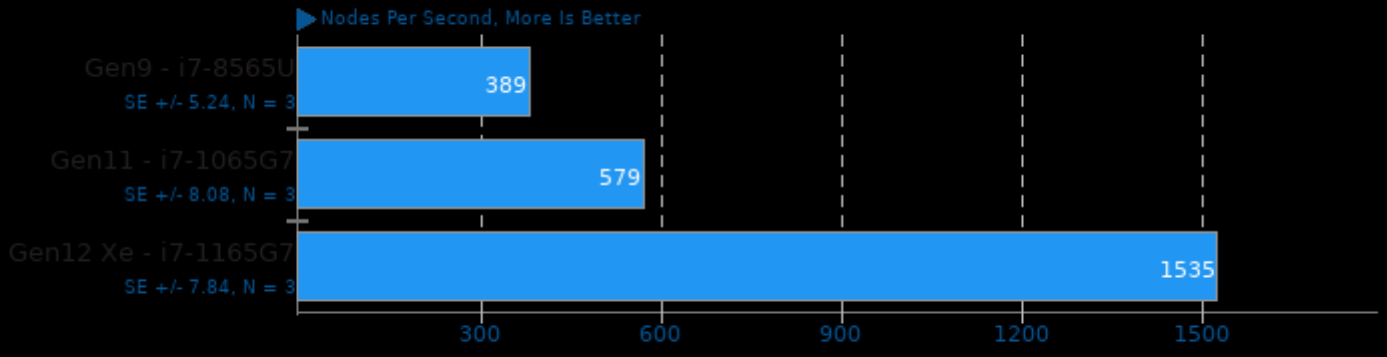
CPU Power Consumption Monitor

	Min	Avg	Max
Gen9 - i7-8565U	1.0	35.7	41.4
Gen11 - i7-1065G7	1.1	15.1	30.0
Gen12 Xe - i7-1165G7	1.5	22.3	34.7



LeelaChessZero 0.26

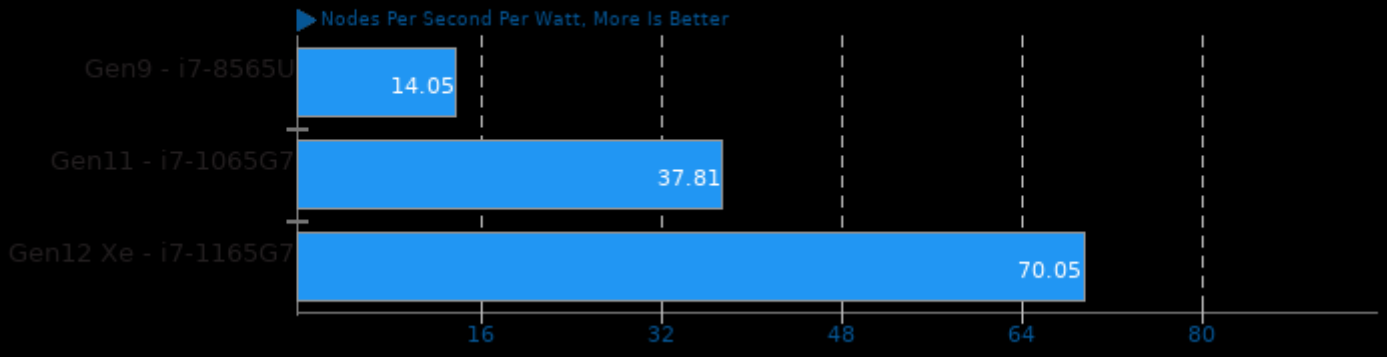
Backend: OpenCL

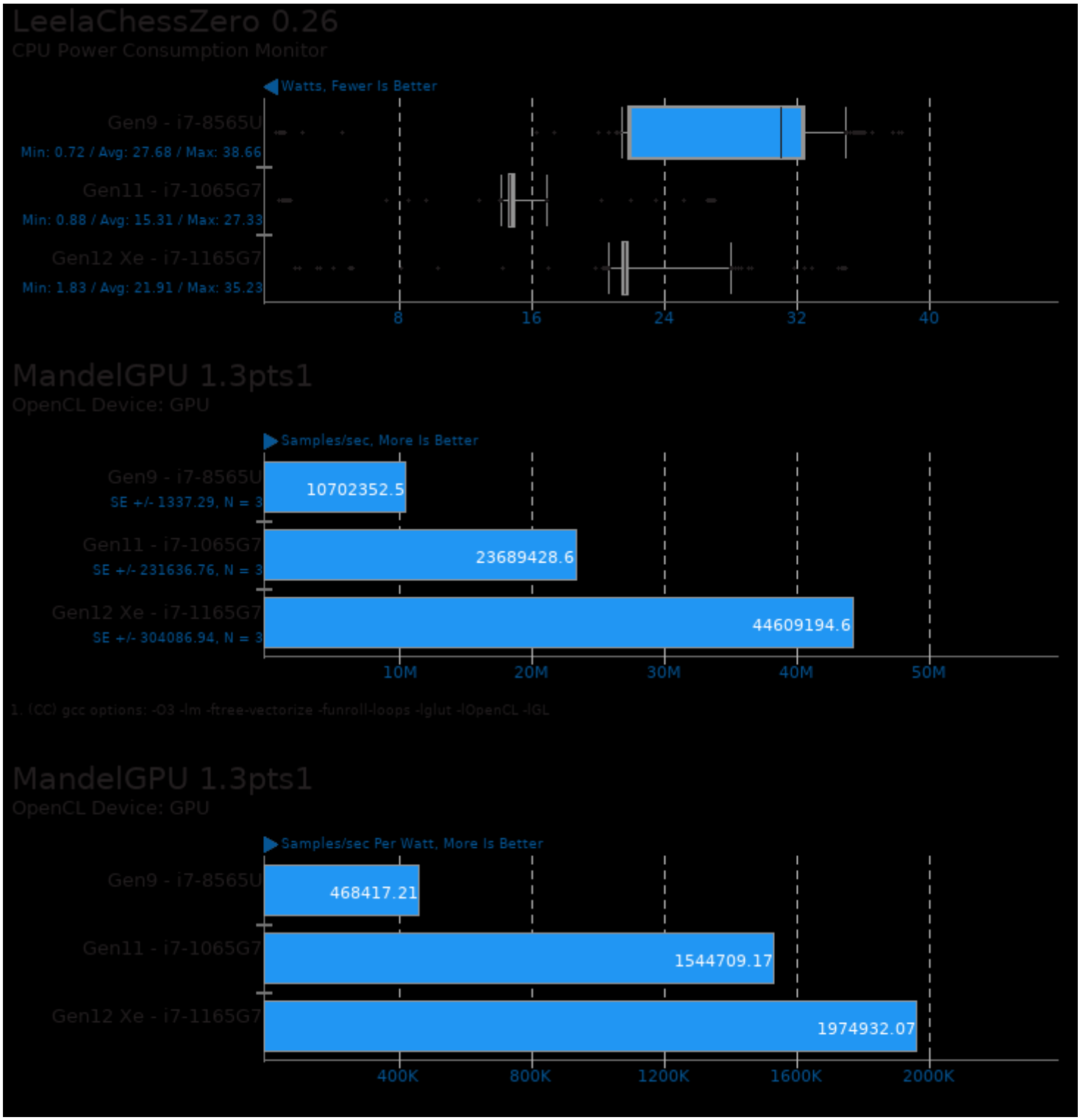


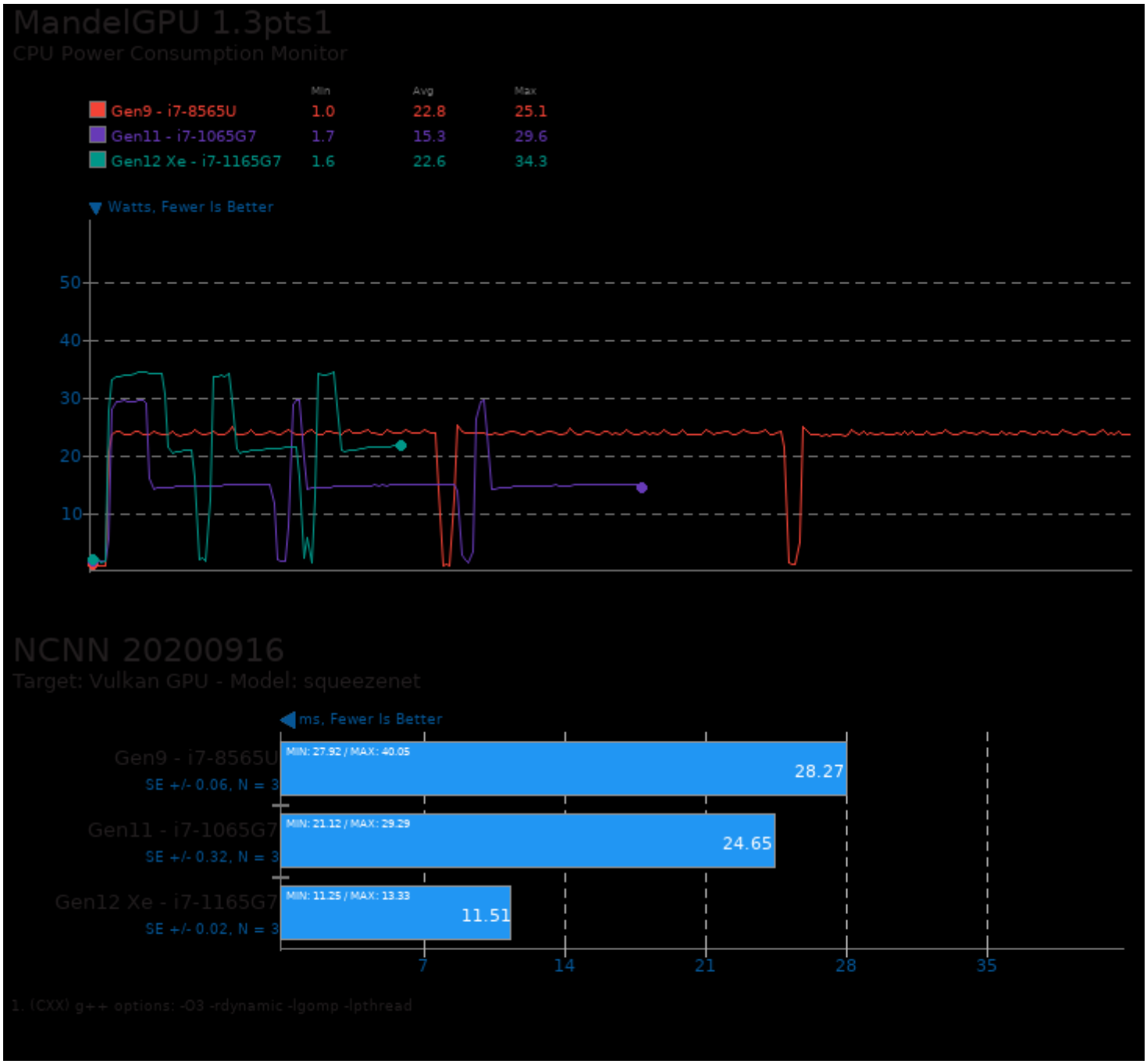
1. (CXX) g++ options: -flto -pthread

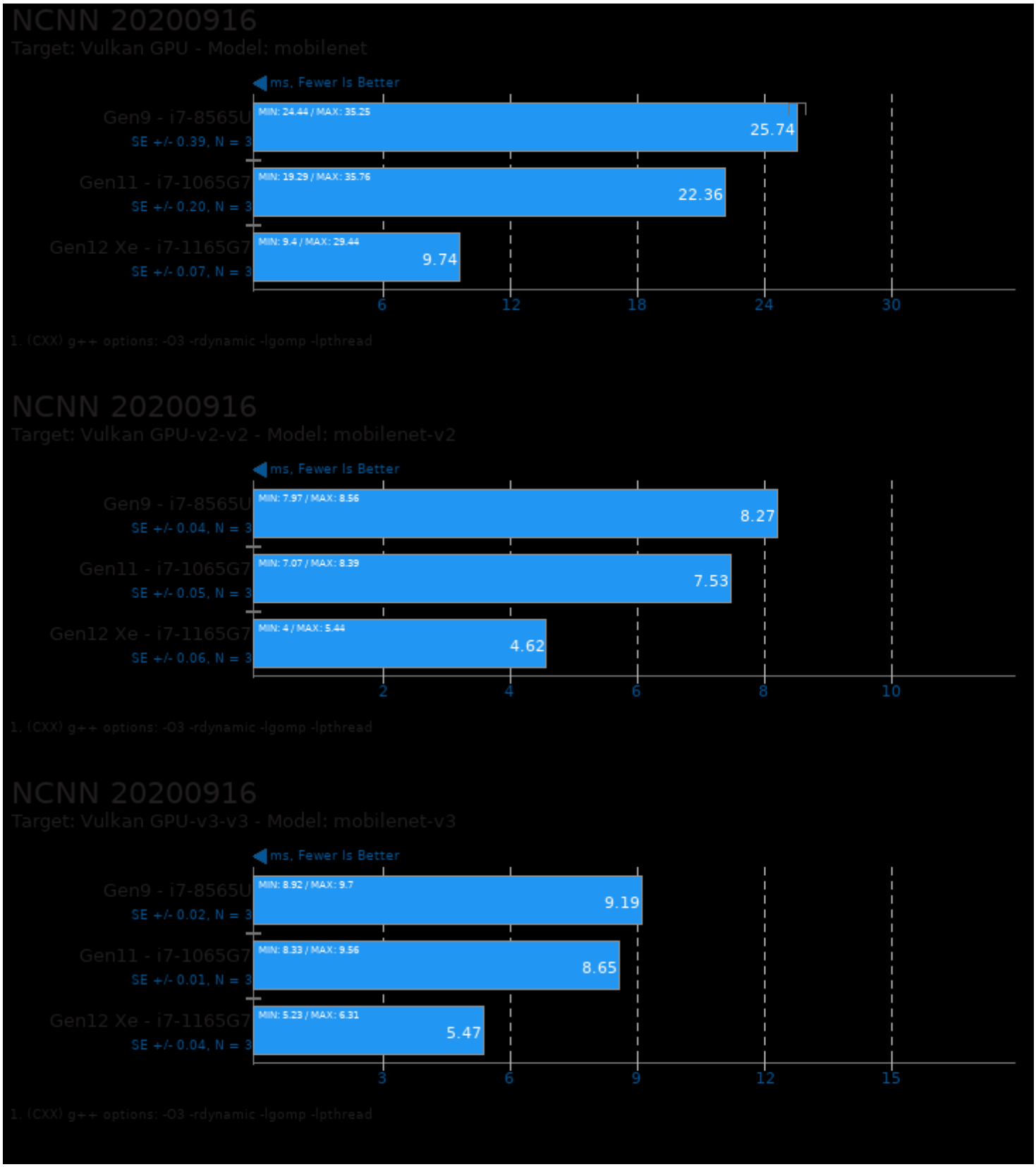
LeelaChessZero 0.26

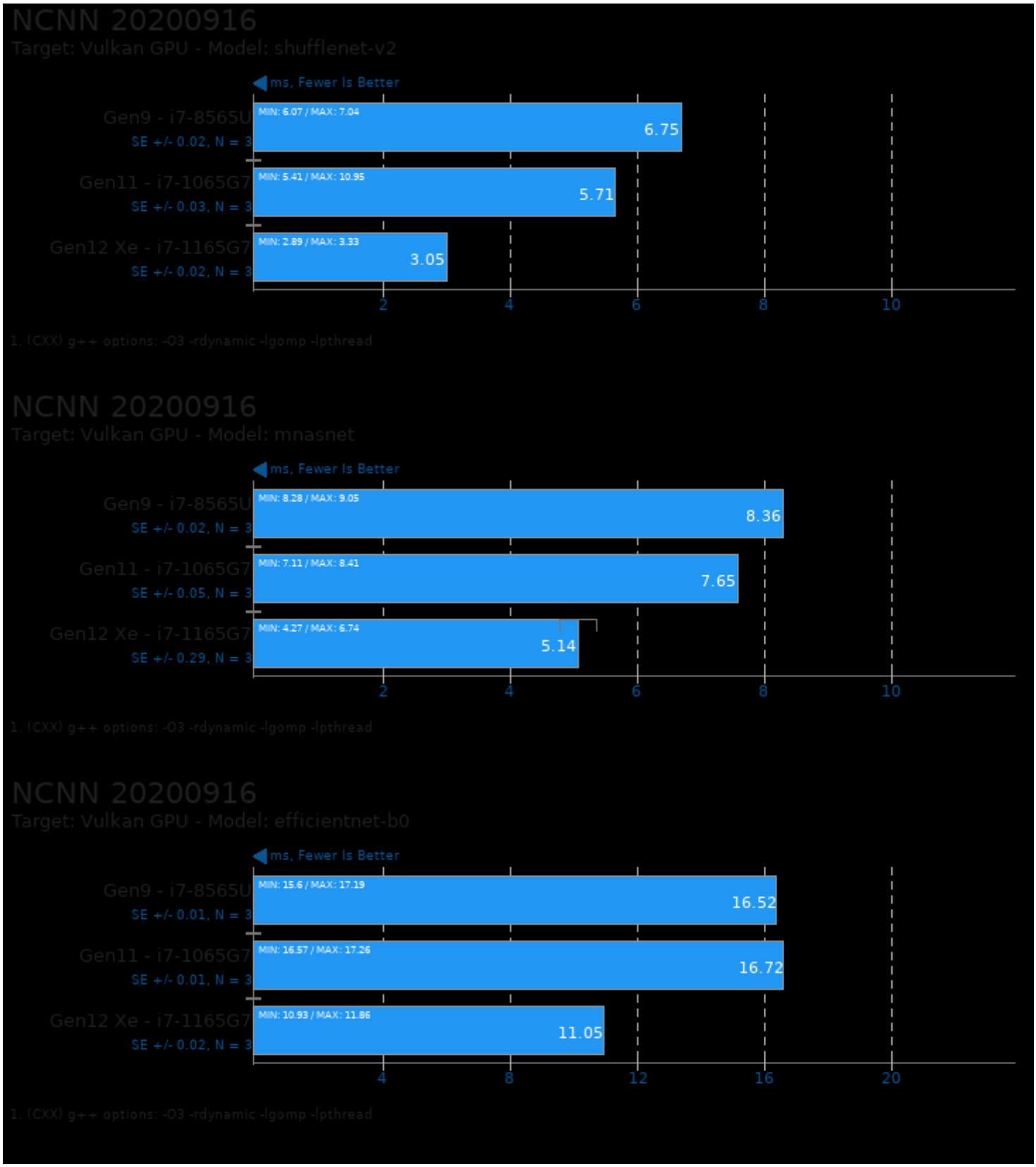
Backend: OpenCL

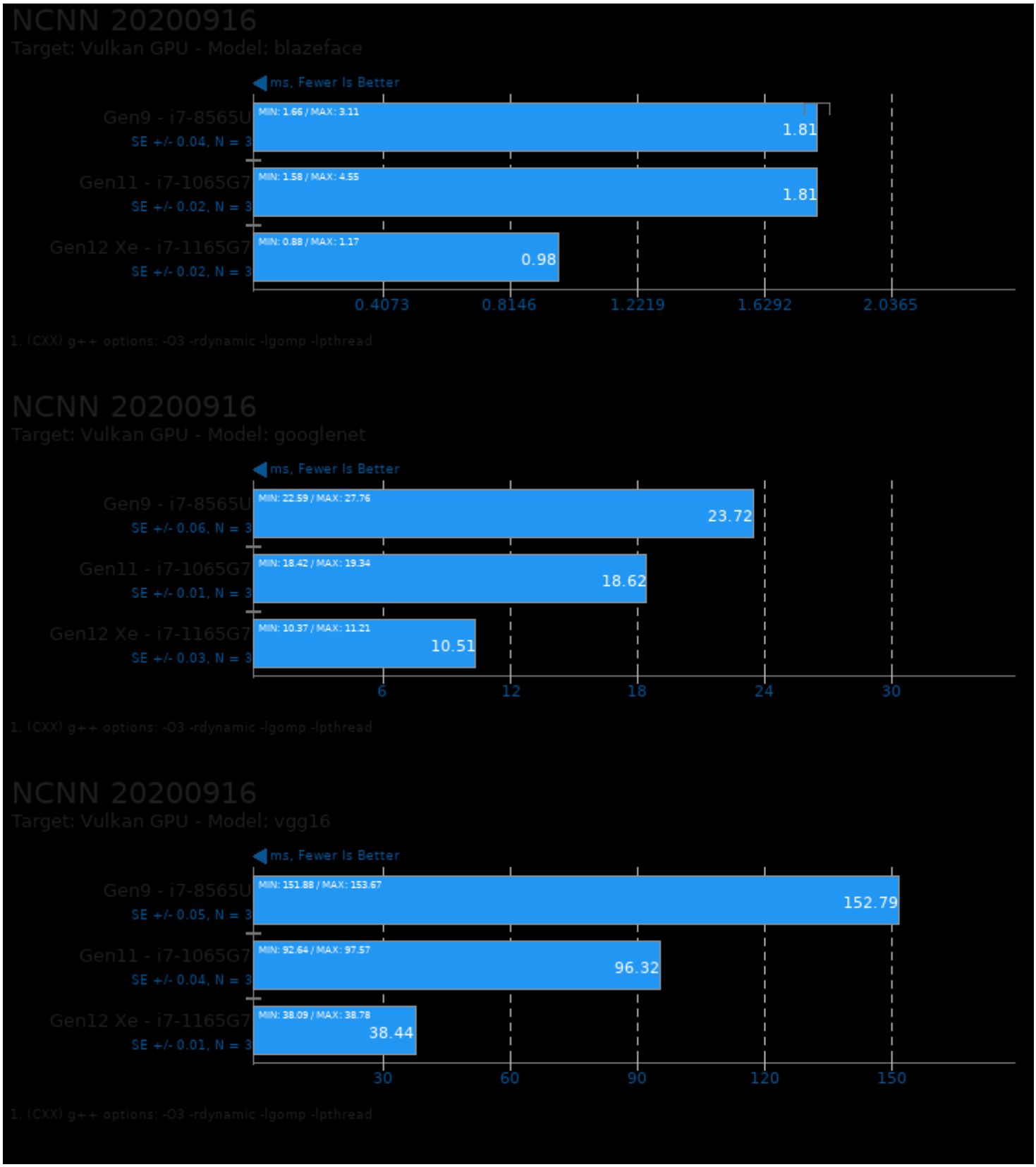


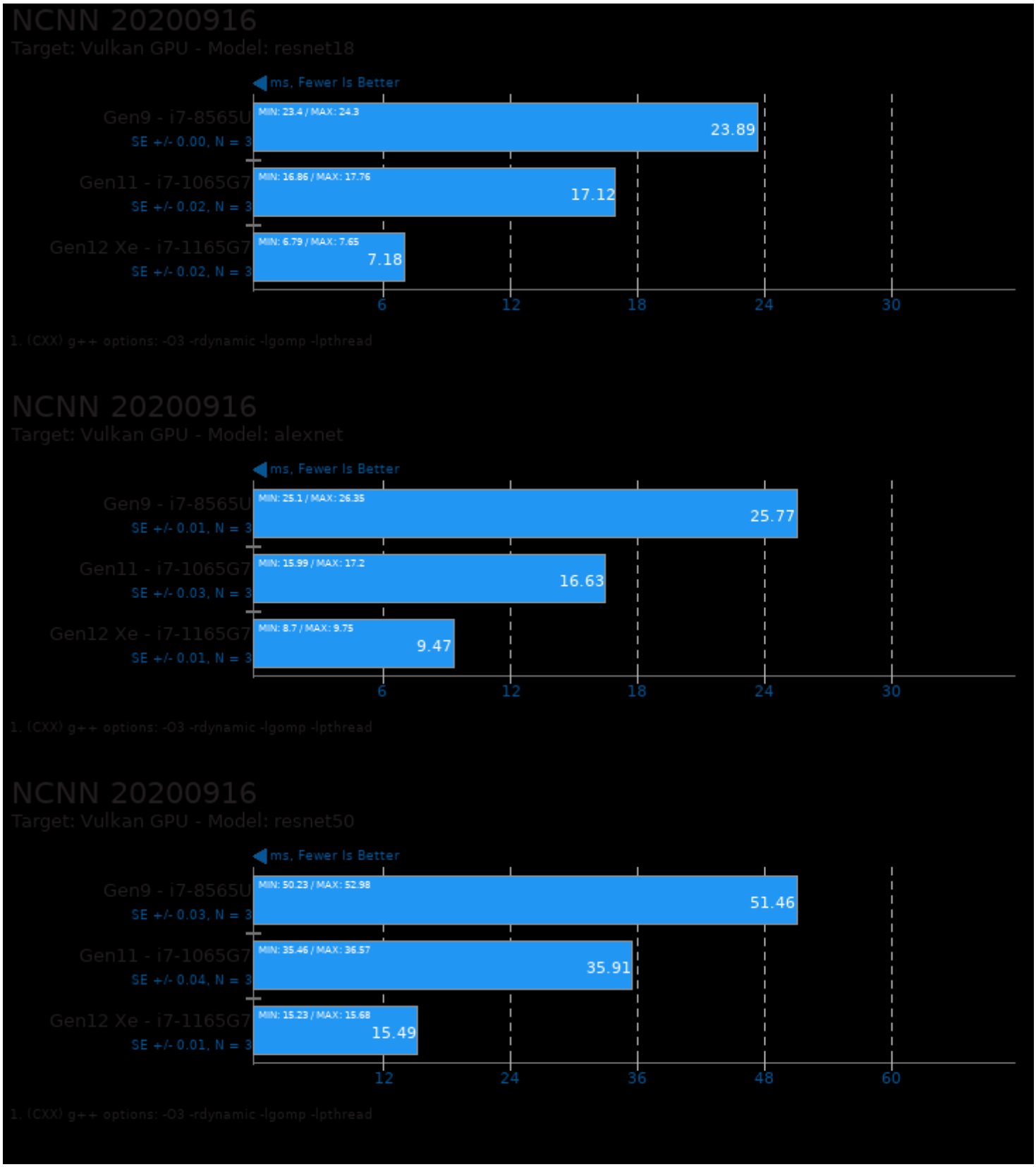

LeelaChessZero 0.26
CPU Power Consumption Monitor
Watts, Fewer Is Better
Gen9 - i7-8565U
Min: 0.72 / Avg: 27.68 / Max: 38.66
Gen11 - i7-1065G7
Min: 0.88 / Avg: 15.31 / Max: 27.33
Gen12 Xe - i7-1165G7
Min: 1.83 / Avg: 21.91 / Max: 35.23
8
16
24
32
40
MandelGPU 1.3pts1
OpenCL Device: GPU
Samples/sec, More Is Better
Gen9 - i7-8565U
SE +/- 1337.29, N = 3
10702352.5
Gen11 - i7-1065G7
SE +/- 231636.76, N = 3
23689428.6
Gen12 Xe - i7-1165G7
SE +/- 304086.94, N = 3
44609194.6
10M
20M
30M
40M
50M
1. (CC) gcc options: -O3 -lm -ftree-vectorize -funroll-loops -lglut -lOpenCL -lGL
MandelGPU 1.3pts1
OpenCL Device: GPU
Samples/sec Per Watt, More Is Better
Gen9 - i7-8565U
468417.21
Gen11 - i7-1065G7
1544709.17
Gen12 Xe - i7-1165G7
1974932.07
400K
800K
1200K
1600K
2000K

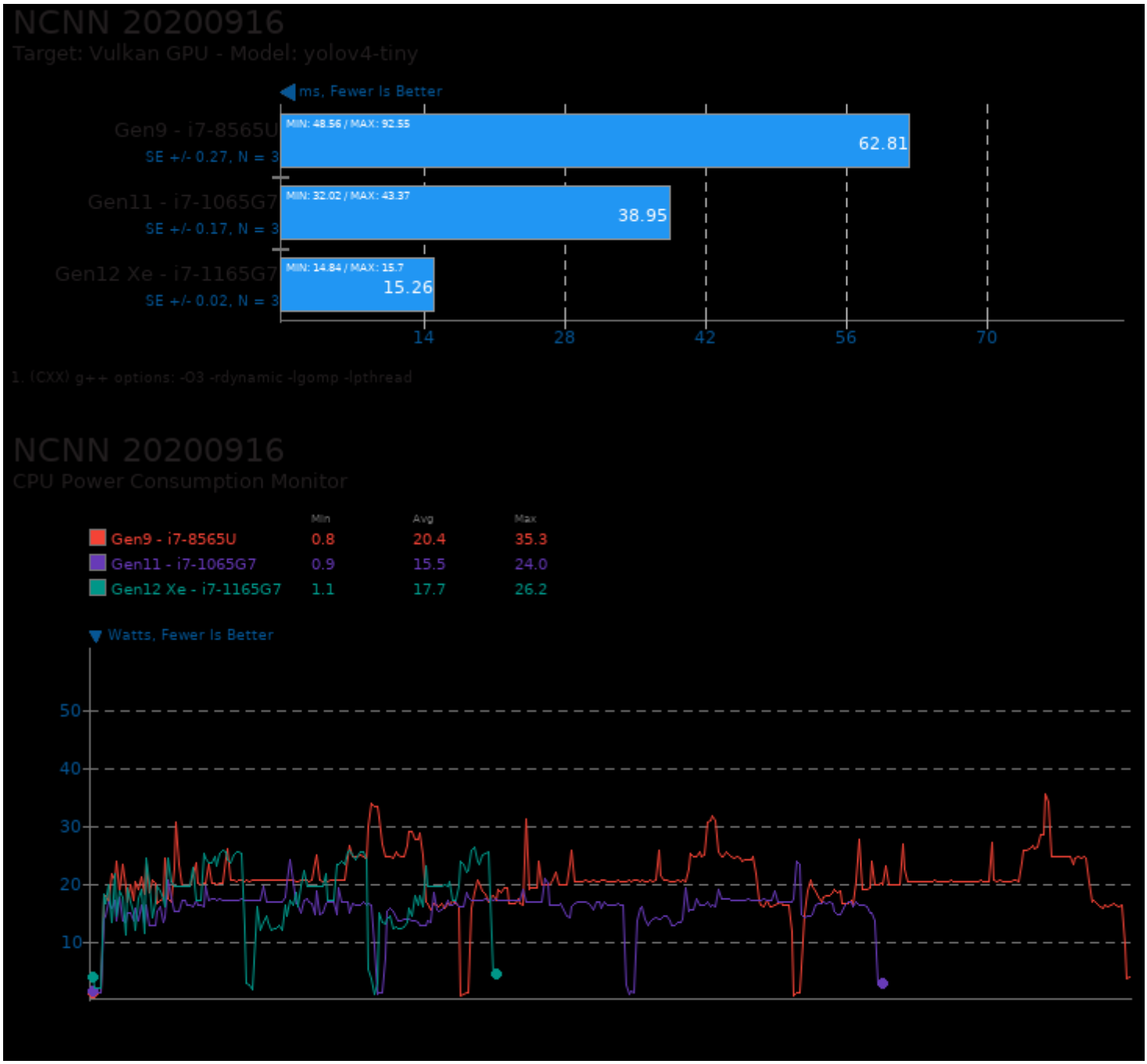

MandelGPU 1.3pts1
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U 1.0 22.8 25.1
Gen11 - i7-1065G7 1.7 15.3 29.6
Gen12 Xe - i7-1165G7 1.6 22.6 34.3
Watts, Fewer Is Better
50
40
30
20
10
NCNN 20200916
Target: Vulkan GPU - Model: squeezenet
ms, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.06, N = 3
MIN: 27.92 / MAX: 40.05
28.27
Gen11 - i7-1065G7
SE +/- 0.32, N = 3
MIN: 21.12 / MAX: 29.29
24.65
Gen12 Xe - i7-1165G7
SE +/- 0.02, N = 3
MIN: 11.25 / MAX: 13.33
11.51
7
14
21
28
35
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread


NCNN 20200916
Target: Vulkan GPU - Model: mobilenet
ms, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.39, N = 3
MIN: 24.44 / MAX: 35.25
25.74
Gen11 - i7-1065G7
SE +/- 0.20, N = 3
MIN: 19.29 / MAX: 35.76
22.36
Gen12 Xe - i7-1165G7
SE +/- 0.07, N = 3
MIN: 9.4 / MAX: 29.44
9.74
6
12
18
24
30
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20200916
Target: Vulkan GPU-v2-v2 - Model: mobilenet-v2
ms, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.04, N = 3
MIN: 7.97 / MAX: 8.56
8.27
Gen11 - i7-1065G7
SE +/- 0.05, N = 3
MIN: 7.07 / MAX: 8.39
7.53
Gen12 Xe - i7-1165G7
SE +/- 0.06, N = 3
MIN: 4 / MAX: 5.44
4.62
2
4
6
8
10
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20200916
Target: Vulkan GPU-v3-v3 - Model: mobilenet-v3
ms, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.02, N = 3
MIN: 8.92 / MAX: 9.7
9.19
Gen11 - i7-1065G7
SE +/- 0.01, N = 3
MIN: 8.33 / MAX: 9.56
8.65
Gen12 Xe - i7-1165G7
SE +/- 0.04, N = 3
MIN: 5.23 / MAX: 6.31
5.47
3
6
9
12
15
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread

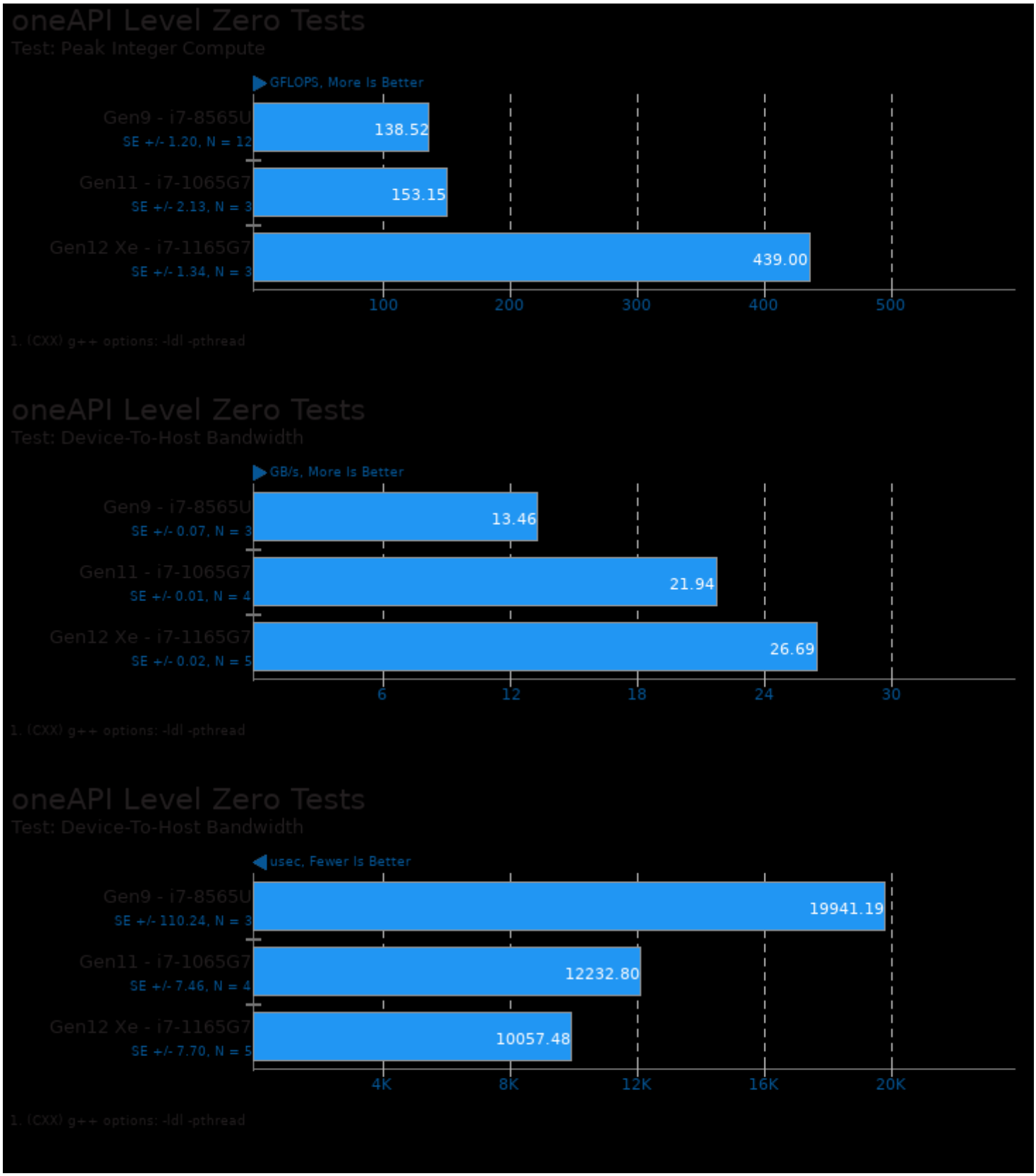

NCNN 20200916
Target: Vulkan GPU - Model: shufflenet-v2
ms, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.02, N = 3
MIN: 6.07 / MAX: 7.04
6.75
Gen11 - i7-1065G7
SE +/- 0.03, N = 3
MIN: 5.41 / MAX: 10.95
5.71
Gen12 Xe - i7-1165G7
SE +/- 0.02, N = 3
MIN: 2.89 / MAX: 3.33
3.05
2
4
6
8
10
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20200916
Target: Vulkan GPU - Model: mnasnet
ms, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.02, N = 3
MIN: 8.28 / MAX: 9.05
8.36
Gen11 - i7-1065G7
SE +/- 0.05, N = 3
MIN: 7.11 / MAX: 8.41
7.65
Gen12 Xe - i7-1165G7
SE +/- 0.29, N = 3
MIN: 4.27 / MAX: 6.74
5.14
2
4
6
8
10
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20200916
Target: Vulkan GPU - Model: efficientnet-b0
ms, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.01, N = 3
MIN: 15.6 / MAX: 17.19
16.52
Gen11 - i7-1065G7
SE +/- 0.01, N = 3
MIN: 16.57 / MAX: 17.26
16.72
Gen12 Xe - i7-1165G7
SE +/- 0.02, N = 3
MIN: 10.93 / MAX: 11.86
11.05
4
8
12
16
20
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread

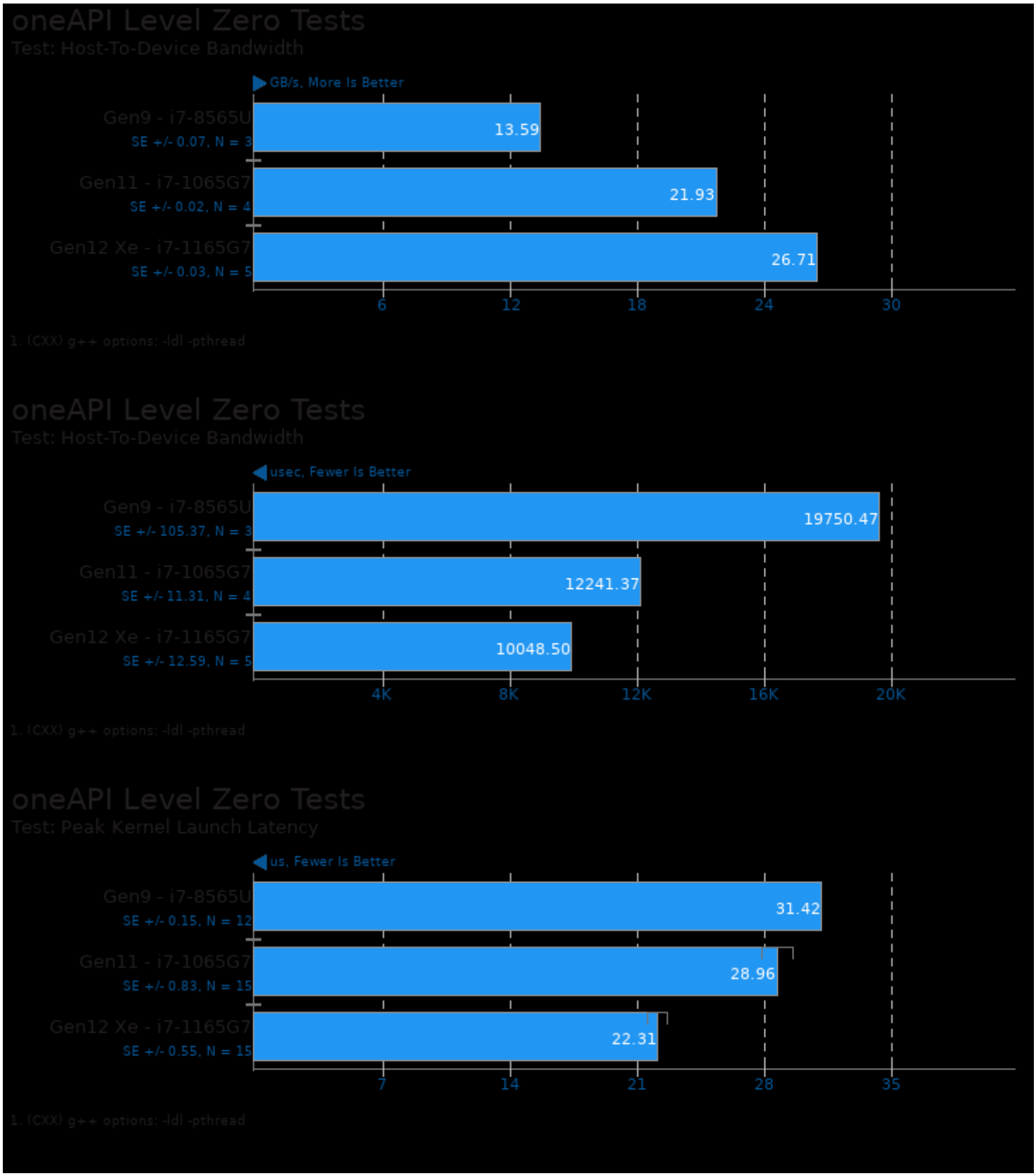

NCNN 20200916
Target: Vulkan GPU - Model: blazeface
ms, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.04, N = 3
MIN: 1.66 / MAX: 3.11
1.81
Gen11 - i7-1065G7
SE +/- 0.02, N = 3
MIN: 1.58 / MAX: 4.55
1.81
Gen12 Xe - i7-1165G7
SE +/- 0.02, N = 3
MIN: 0.88 / MAX: 1.17
0.98
0.4073
0.8146
1.2219
1.6292
2.0365
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20200916
Target: Vulkan GPU - Model: googlenet
ms, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.06, N = 3
MIN: 22.59 / MAX: 27.76
23.72
Gen11 - i7-1065G7
SE +/- 0.01, N = 3
MIN: 18.42 / MAX: 19.34
18.62
Gen12 Xe - i7-1165G7
SE +/- 0.03, N = 3
MIN: 10.37 / MAX: 11.21
10.51
6
12
18
24
30
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20200916
Target: Vulkan GPU - Model: vgg16
ms, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.05, N = 3
MIN: 151.88 / MAX: 153.67
152.79
Gen11 - i7-1065G7
SE +/- 0.04, N = 3
MIN: 92.64 / MAX: 97.57
96.32
Gen12 Xe - i7-1165G7
SE +/- 0.01, N = 3
MIN: 38.09 / MAX: 38.78
38.44
30
60
90
120
150
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread

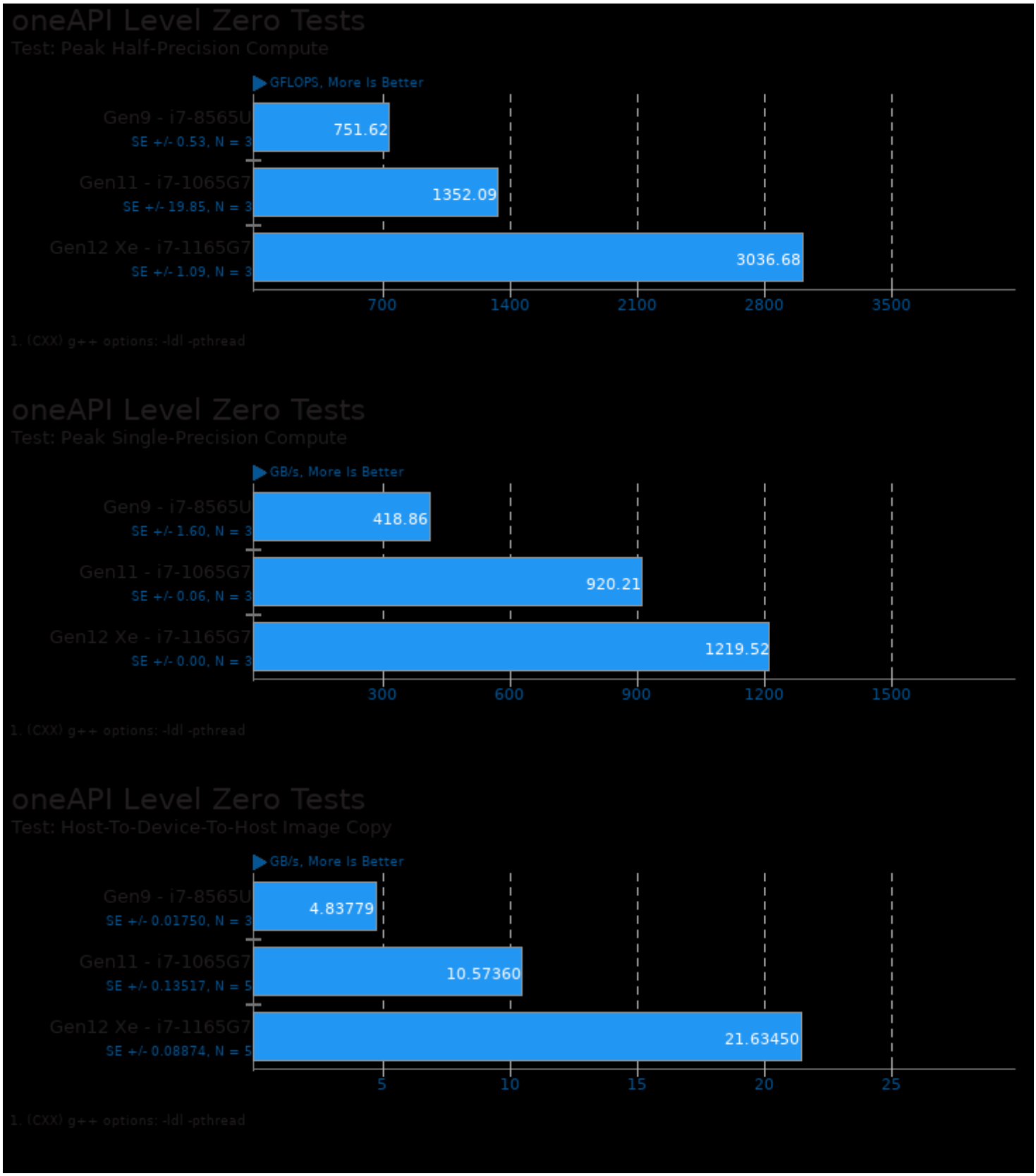

NCNN 20200916
Target: Vulkan GPU - Model: resnet18
ms, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.00, N = 3
MIN: 23.4 / MAX: 24.3
23.89
Gen11 - i7-1065G7
SE +/- 0.02, N = 3
MIN: 16.86 / MAX: 17.76
17.12
Gen12 Xe - i7-1165G7
SE +/- 0.02, N = 3
MIN: 6.79 / MAX: 7.65
7.18
6
12
18
24
30
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20200916
Target: Vulkan GPU - Model: alexnet
ms, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.01, N = 3
MIN: 25.1 / MAX: 26.35
25.77
Gen11 - i7-1065G7
SE +/- 0.03, N = 3
MIN: 15.99 / MAX: 17.2
16.63
Gen12 Xe - i7-1165G7
SE +/- 0.01, N = 3
MIN: 8.7 / MAX: 9.75
9.47
6
12
18
24
30
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread
NCNN 20200916
Target: Vulkan GPU - Model: resnet50
ms, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.03, N = 3
MIN: 50.23 / MAX: 52.98
51.46
Gen11 - i7-1065G7
SE +/- 0.04, N = 3
MIN: 35.46 / MAX: 36.57
35.91
Gen12 Xe - i7-1165G7
SE +/- 0.01, N = 3
MIN: 15.23 / MAX: 15.68
15.49
12
24
36
48
60
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread

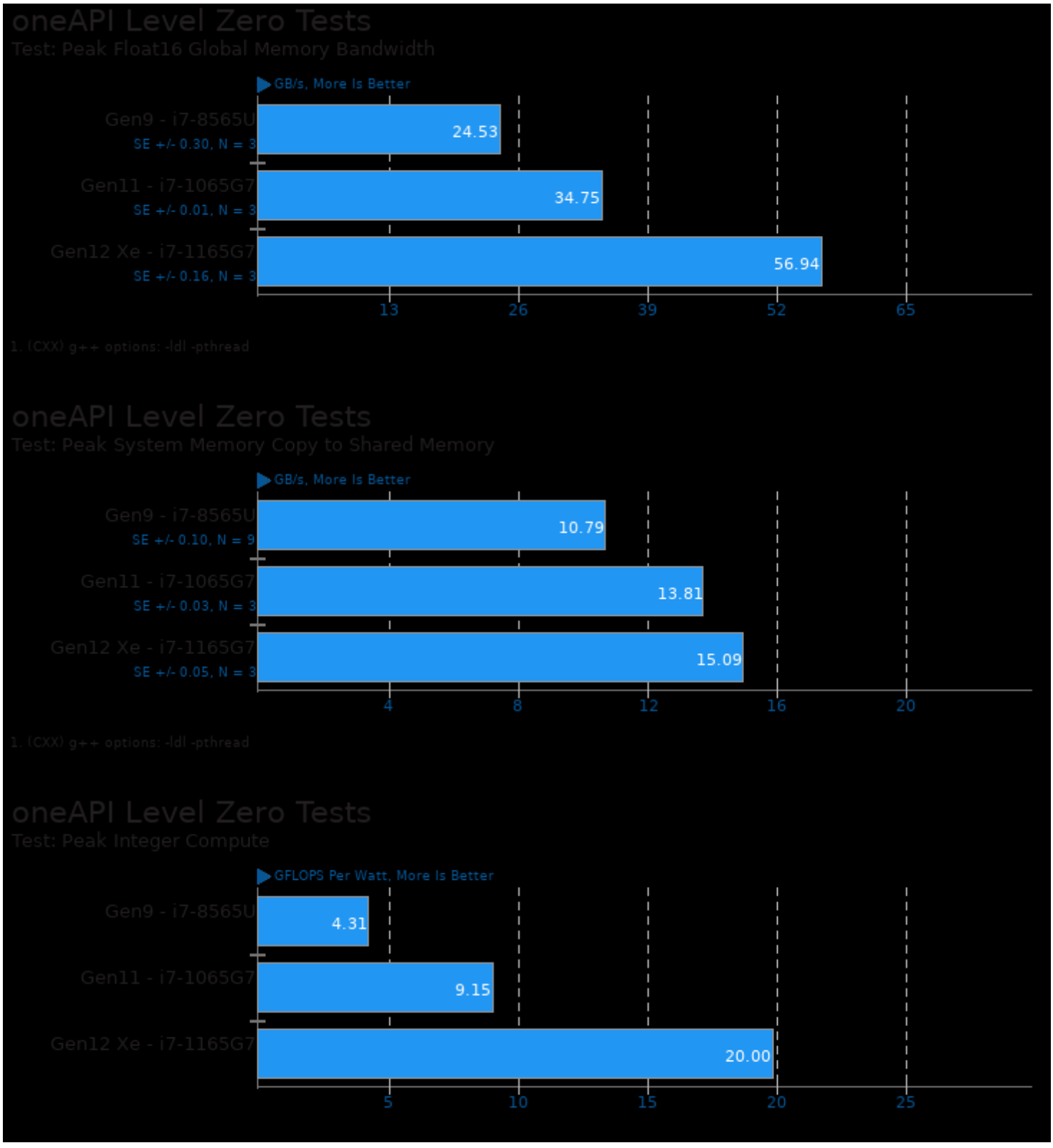

NCNN 20200916
Target: Vulkan GPU - Model: yolov4-tiny
ms, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.27, N = 3
MIN: 48.56 / MAX: 92.55
62.81
Gen11 - i7-1065G7
SE +/- 0.17, N = 3
MIN: 32.02 / MAX: 43.37
38.95
Gen12 Xe - i7-1165G7
SE +/- 0.02, N = 3
MIN: 14.84 / MAX: 15.7
15.26
14
28
42
56
70
1. (CXX) g++ options: -O3 -rdynamic -lgomp -lpthread

NCNN 20200916
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U 0.8 20.4 35.3
Gen11 - i7-1065G7 0.9 15.5 24.0
Gen12 Xe - i7-1165G7 1.1 17.7 26.2
Watts, Fewer Is Better
50
40
30
20
10

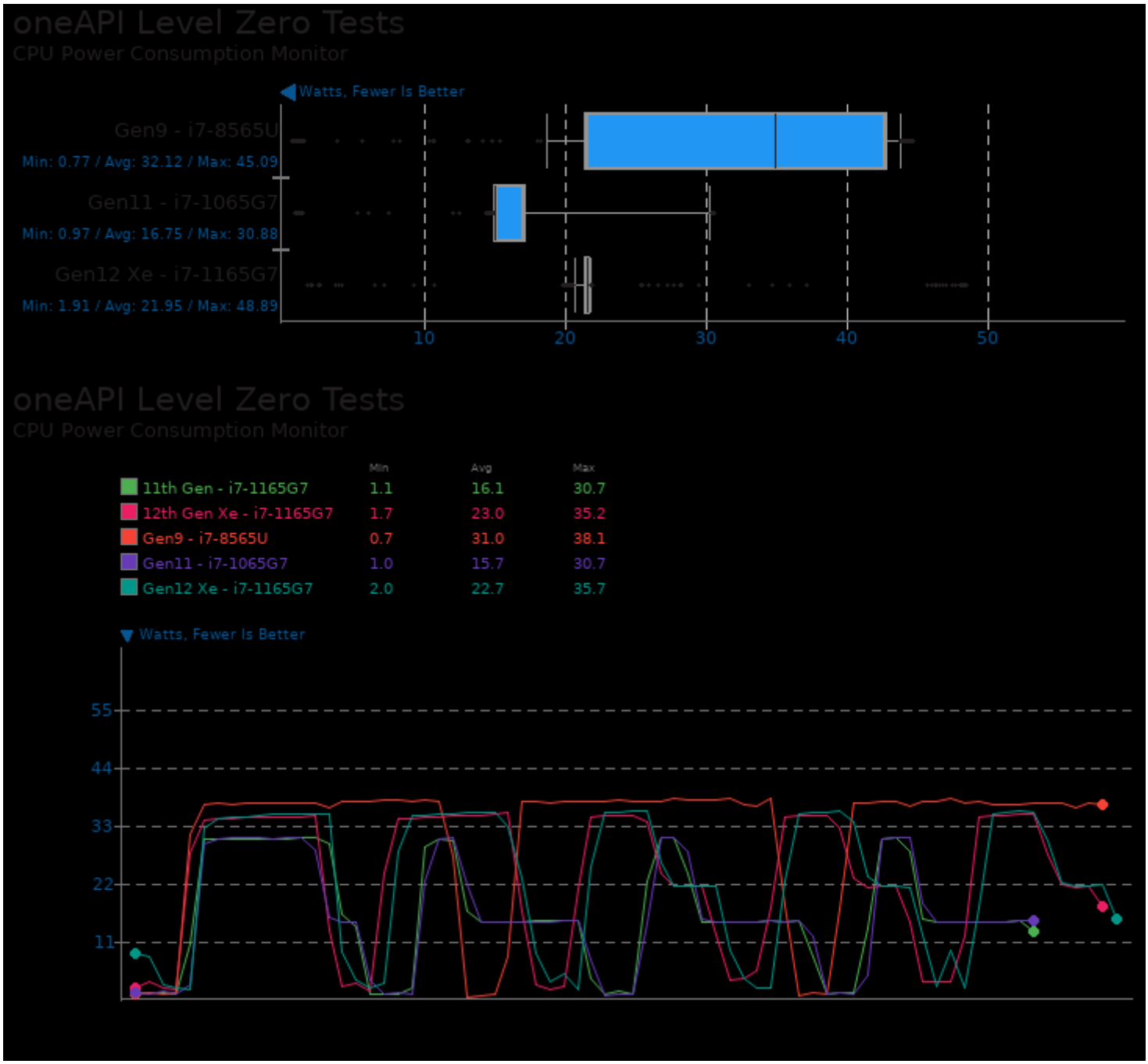

oneAPI Level Zero Tests
Test: Peak Integer Compute
GFLOPS, More Is Better
Gen9 - i7-8565U
SE +/- 1.20, N = 12
138.52
Gen11 - i7-1065G7
SE +/- 2.13, N = 3
153.15
Gen12 Xe - i7-1165G7
SE +/- 1.34, N = 3
439.00
100
200
300
400
500
1. (CXX) g++ options: -ldl -pthread
oneAPI Level Zero Tests
Test: Device-To-Host Bandwidth
GB/s, More Is Better
Gen9 - i7-8565U
SE +/- 0.07, N = 3
13.46
Gen11 - i7-1065G7
SE +/- 0.01, N = 4
21.94
Gen12 Xe - i7-1165G7
SE +/- 0.02, N = 5
26.69
6
12
18
24
30
1. (CXX) g++ options: -ldl -pthread
oneAPI Level Zero Tests
Test: Device-To-Host Bandwidth
usec, Fewer Is Better
Gen9 - i7-8565U
SE +/- 110.24, N = 3
19941.19
Gen11 - i7-1065G7
SE +/- 7.46, N = 4
12232.80
Gen12 Xe - i7-1165G7
SE +/- 7.70, N = 5
10057.48
4K
8K
12K
16K
20K
1. (CXX) g++ options: -ldl -pthread

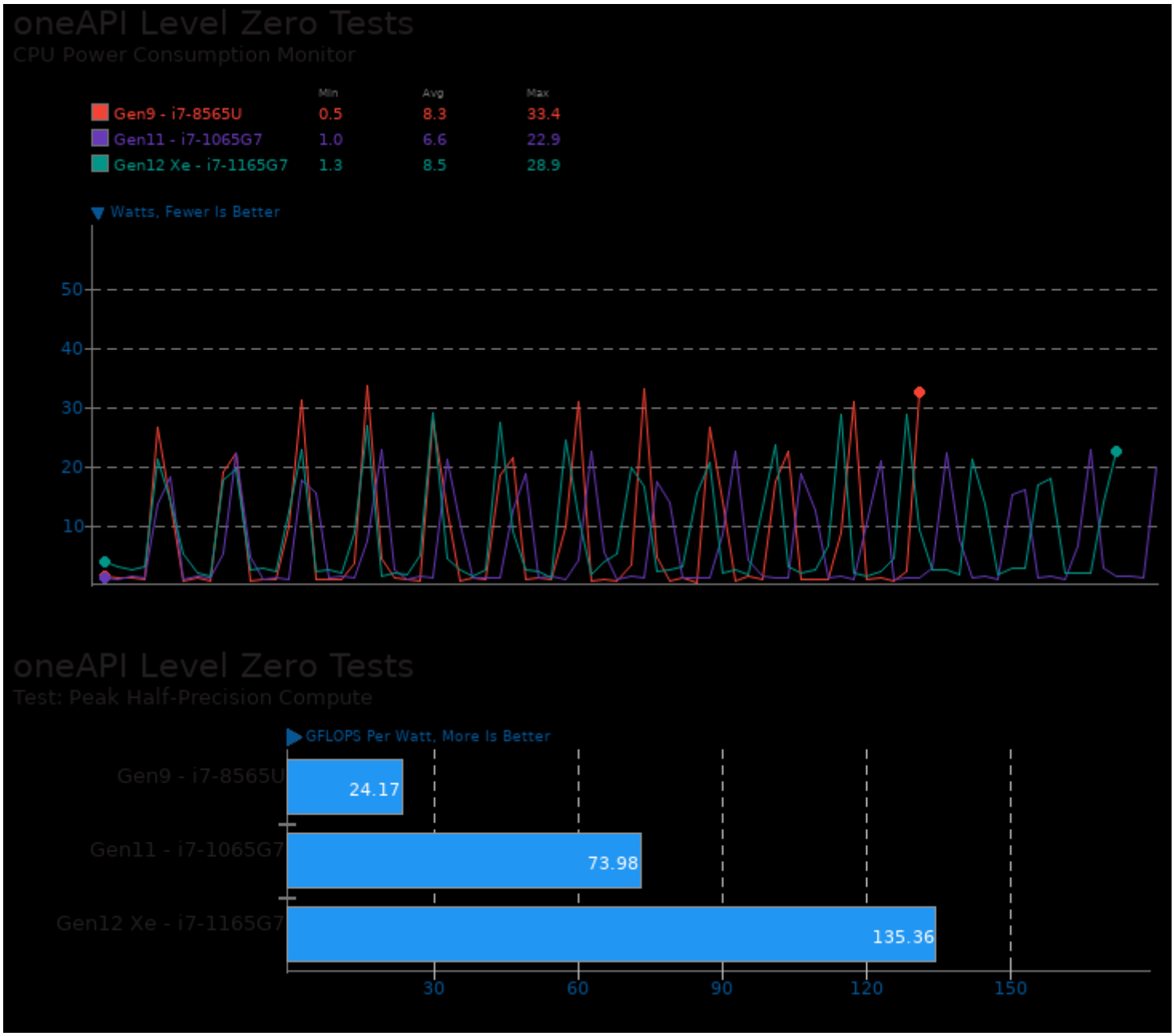

oneAPI Level Zero Tests
Test: Host-To-Device Bandwidth
GB/s, More Is Better
Gen9 - i7-8565U
SE +/- 0.07, N = 3
13.59
Gen11 - i7-1065G7
SE +/- 0.02, N = 4
21.93
Gen12 Xe - i7-1165G7
SE +/- 0.03, N = 5
26.71
6
12
18
24
30
1. (CXX) g++ options: -ldl -pthread
oneAPI Level Zero Tests
Test: Host-To-Device Bandwidth
usec, Fewer Is Better
Gen9 - i7-8565U
SE +/- 105.37, N = 3
19750.47
Gen11 - i7-1065G7
SE +/- 11.31, N = 4
12241.37
Gen12 Xe - i7-1165G7
SE +/- 12.59, N = 5
10048.50
4K
8K
12K
16K
20K
1. (CXX) g++ options: -ldl -pthread
oneAPI Level Zero Tests
Test: Peak Kernel Launch Latency
us, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.15, N = 12
31.42
Gen11 - i7-1065G7
SE +/- 0.83, N = 15
28.96
Gen12 Xe - i7-1165G7
SE +/- 0.55, N = 15
22.31
7
14
21
28
35
1. (CXX) g++ options: -ldl -pthread

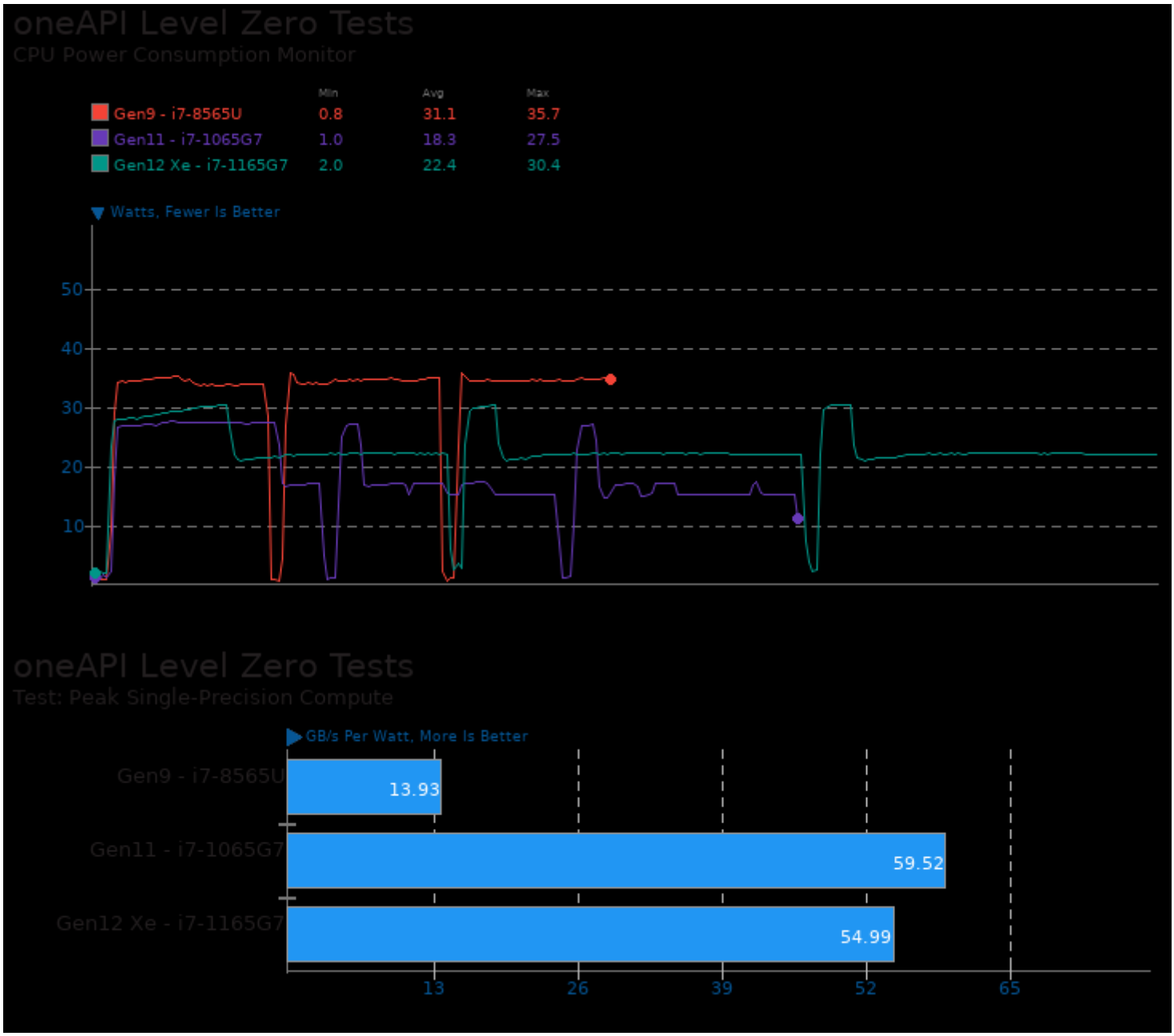

oneAPI Level Zero Tests
Test: Peak Half-Precision Compute
GFLOPS, More Is Better
Gen9 - i7-8565U
SE +/- 0.53, N = 3
751.62
Gen11 - i7-1065G7
SE +/- 19.85, N = 3
1352.09
Gen12 Xe - i7-1165G7
SE +/- 1.09, N = 3
3036.68
700
1400
2100
2800
3500
1. (CXX) g++ options: -ldl -pthread
oneAPI Level Zero Tests
Test: Peak Single-Precision Compute
GB/s, More Is Better
Gen9 - i7-8565U
SE +/- 1.60, N = 3
418.86
Gen11 - i7-1065G7
SE +/- 0.06, N = 3
920.21
Gen12 Xe - i7-1165G7
SE +/- 0.00, N = 3
1219.52
300
600
900
1200
1500
1. (CXX) g++ options: -ldl -pthread
oneAPI Level Zero Tests
Test: Host-To-Device-To-Host Image Copy
GB/s, More Is Better
Gen9 - i7-8565U
SE +/- 0.01750, N = 3
4.83779
Gen11 - i7-1065G7
SE +/- 0.13517, N = 5
10.57360
Gen12 Xe - i7-1165G7
SE +/- 0.08874, N = 5
21.63450
5
10
15
20
25
1. (CXX) g++ options: -ldl -pthread


oneAPI Level Zero Tests
Test: Peak Float16 Global Memory Bandwidth
GB/s, More Is Better
Gen9 - i7-8565U
SE +/- 0.30, N = 3
24.53
Gen11 - i7-1065G7
SE +/- 0.01, N = 3
34.75
Gen12 Xe - i7-1165G7
SE +/- 0.16, N = 3
56.94
13
26
39
52
65
1. (CXX) g++ options: -ldl -pthread
oneAPI Level Zero Tests
Test: Peak System Memory Copy to Shared Memory
GB/s, More Is Better
Gen9 - i7-8565U
SE +/- 0.10, N = 9
10.79
Gen11 - i7-1065G7
SE +/- 0.03, N = 3
13.81
Gen12 Xe - i7-1165G7
SE +/- 0.05, N = 3
15.09
4
8
12
16
20
1. (CXX) g++ options: -ldl -pthread
oneAPI Level Zero Tests
Test: Peak Integer Compute
GFLOPS Per Watt, More Is Better
Gen9 - i7-8565U
4.31
Gen11 - i7-1065G7
9.15
Gen12 Xe - i7-1165G7
20.00
5
10
15
20
25

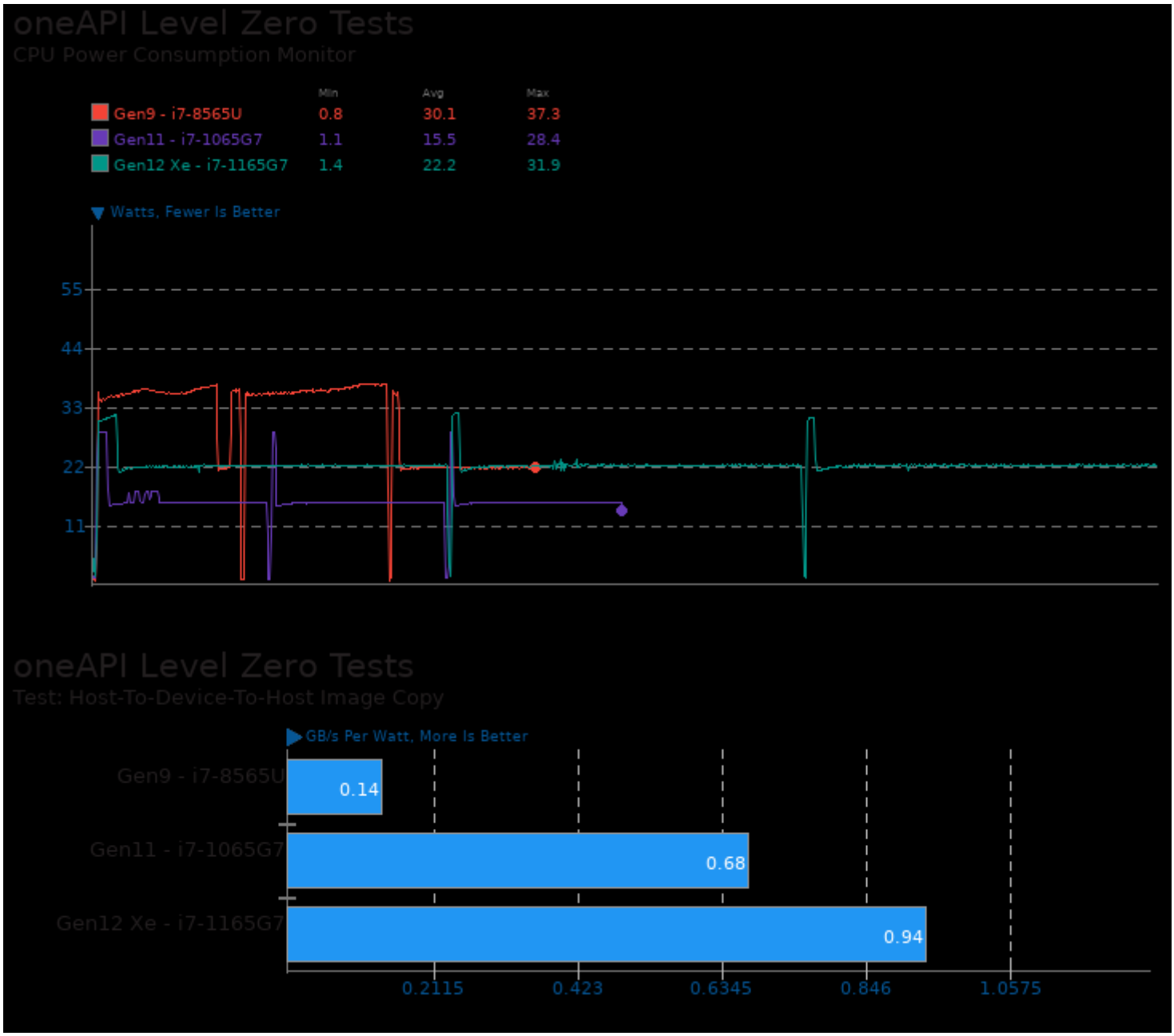
Tigerlake Xe Gen12 to Gen9



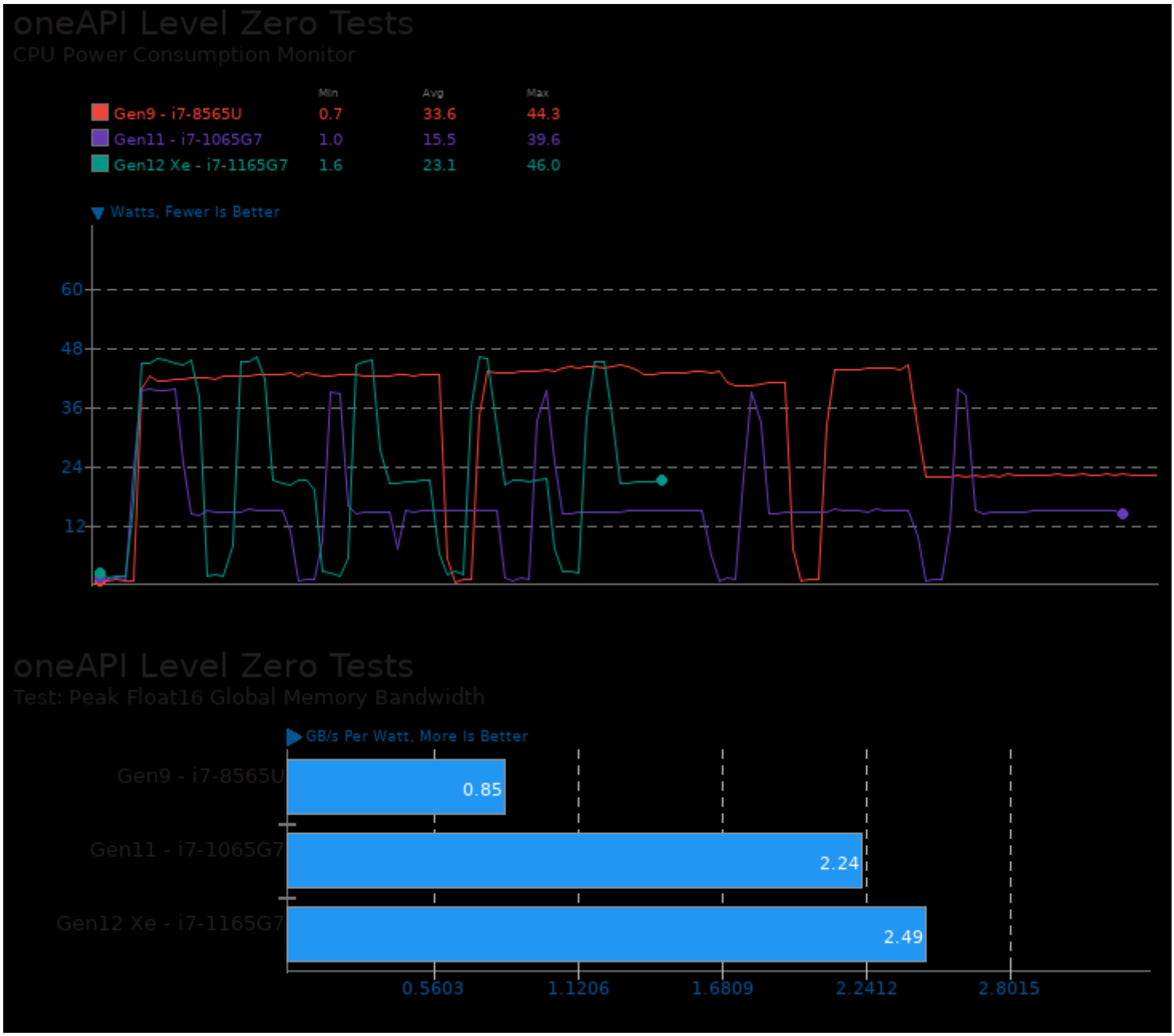

oneAPI Level Zero Tests
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U
0.5
8.3
33.4
Gen11 - i7-1065G7
1.0
6.6
22.9
Gen12 Xe - i7-1165G7
1.3
8.5
28.9
Watts, Fewer Is Better
50
40
30
20
10
oneAPI Level Zero Tests
Test: Peak Half-Precision Compute
GFLOPS Per Watt, More Is Better
Gen9 - i7-8565U
24.17
Gen11 - i7-1065G7
73.98
Gen12 Xe - i7-1165G7
135.36
30
60
90
120
150

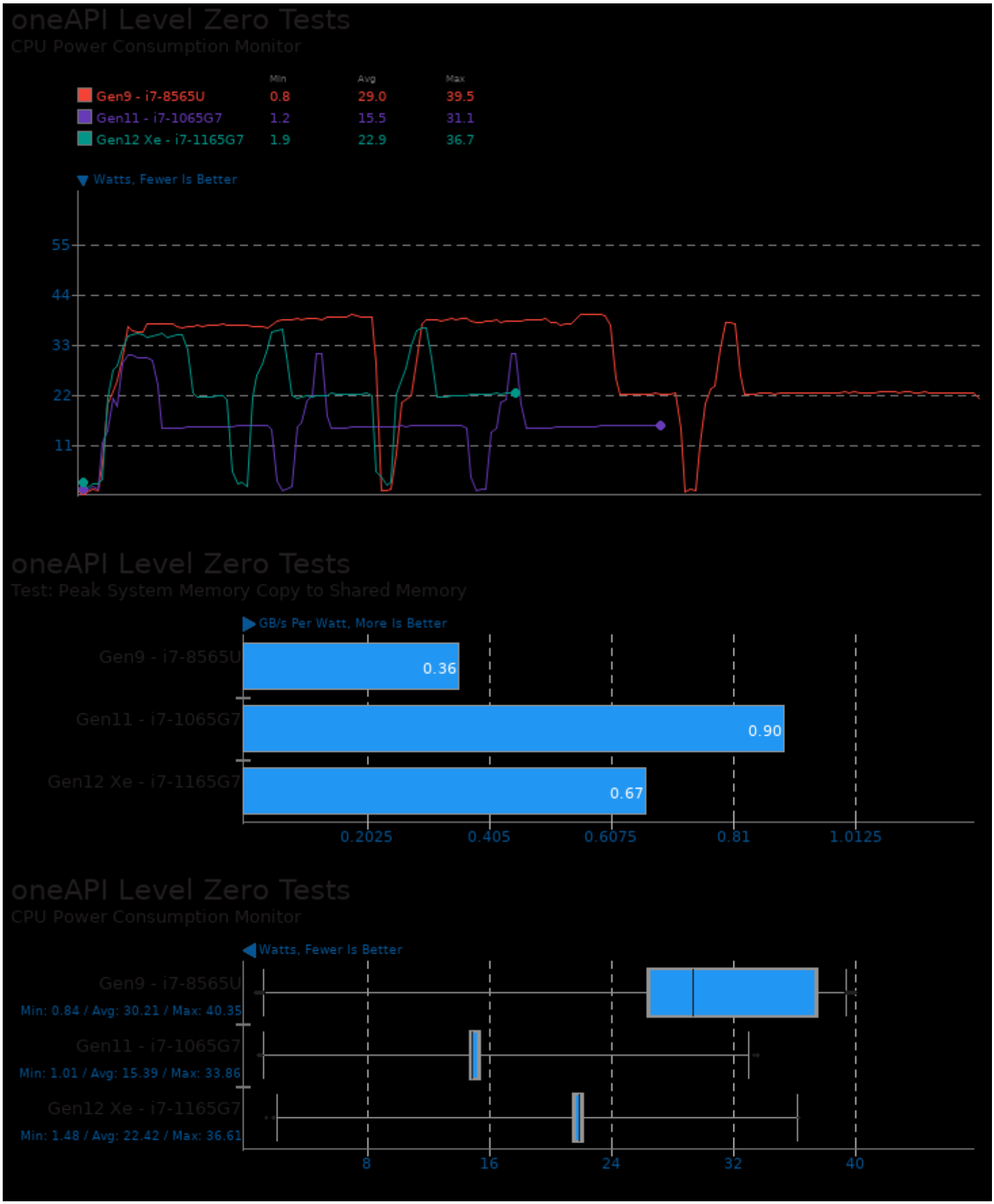

oneAPI Level Zero Tests
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U
0.8
31.1
35.7
Gen11 - i7-1065G7
1.0
18.3
27.5
Gen12 Xe - i7-1165G7
2.0
22.4
30.4
Watts, Fewer Is Better
50
40
30
20
10
oneAPI Level Zero Tests
Test: Peak Single-Precision Compute
GB/s Per Watt, More Is Better
Gen9 - i7-8565U
13.93
Gen11 - i7-1065G7
59.52
Gen12 Xe - i7-1165G7
54.99
13
26
39
52
65

Tigerlake Xe Gen12 to Gen9

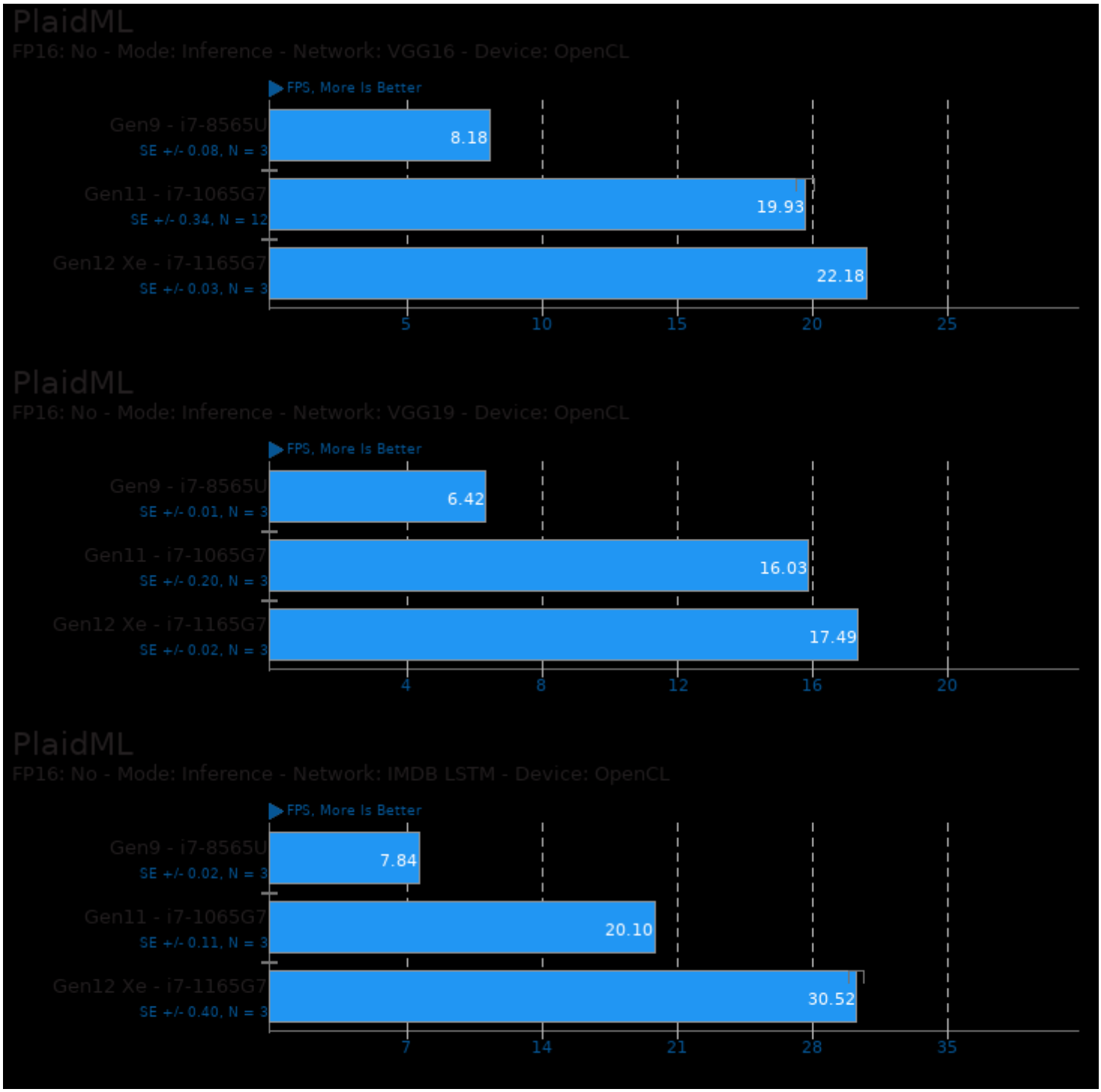


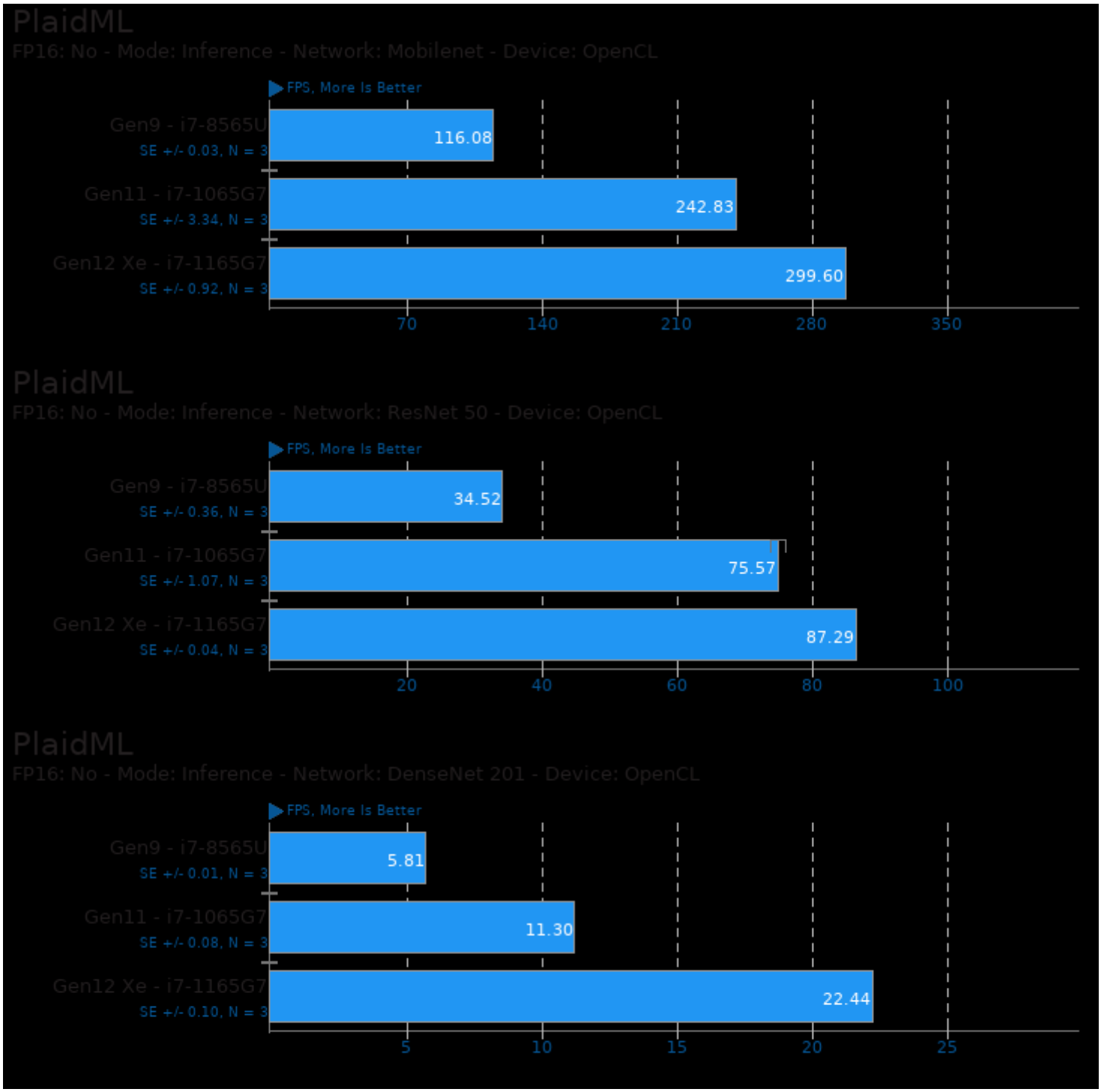
Tigerlake Xe Gen12 to Gen9

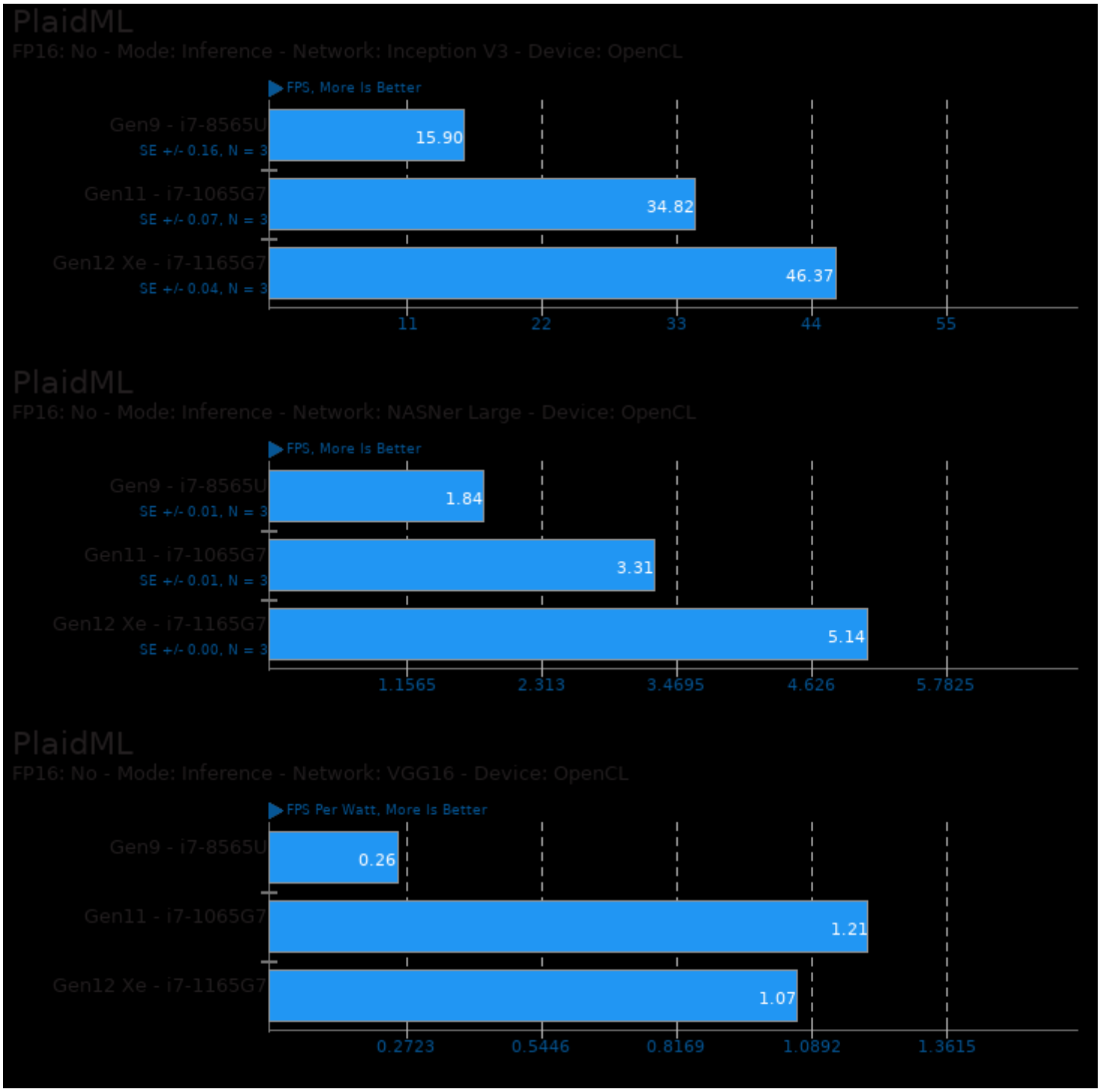



oneAPI Level Zero Tests
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U
0.8
29.0
39.5
Gen11 - i7-1065G7
1.2
15.5
31.1
Gen12 Xe - i7-1165G7
1.9
22.9
36.7
Watts, Fewer Is Better
55
44
33
22
11
oneAPI Level Zero Tests
Test: Peak System Memory Copy to Shared Memory
GB/s Per Watt, More Is Better
Gen9 - i7-8565U
0.36
Gen11 - i7-1065G7
0.90
Gen12 Xe - i7-1165G7
0.67
0.2025
0.405
0.6075
0.81
1.0125
oneAPI Level Zero Tests
CPU Power Consumption Monitor
Watts, Fewer Is Better
Gen9 - i7-8565U
Min: 0.84 / Avg: 30.21 / Max: 40.35
Gen11 - i7-1065G7
Min: 1.01 / Avg: 15.39 / Max: 33.86
Gen12 Xe - i7-1165G7
Min: 1.48 / Avg: 22.42 / Max: 36.61
8
16
24
32
40

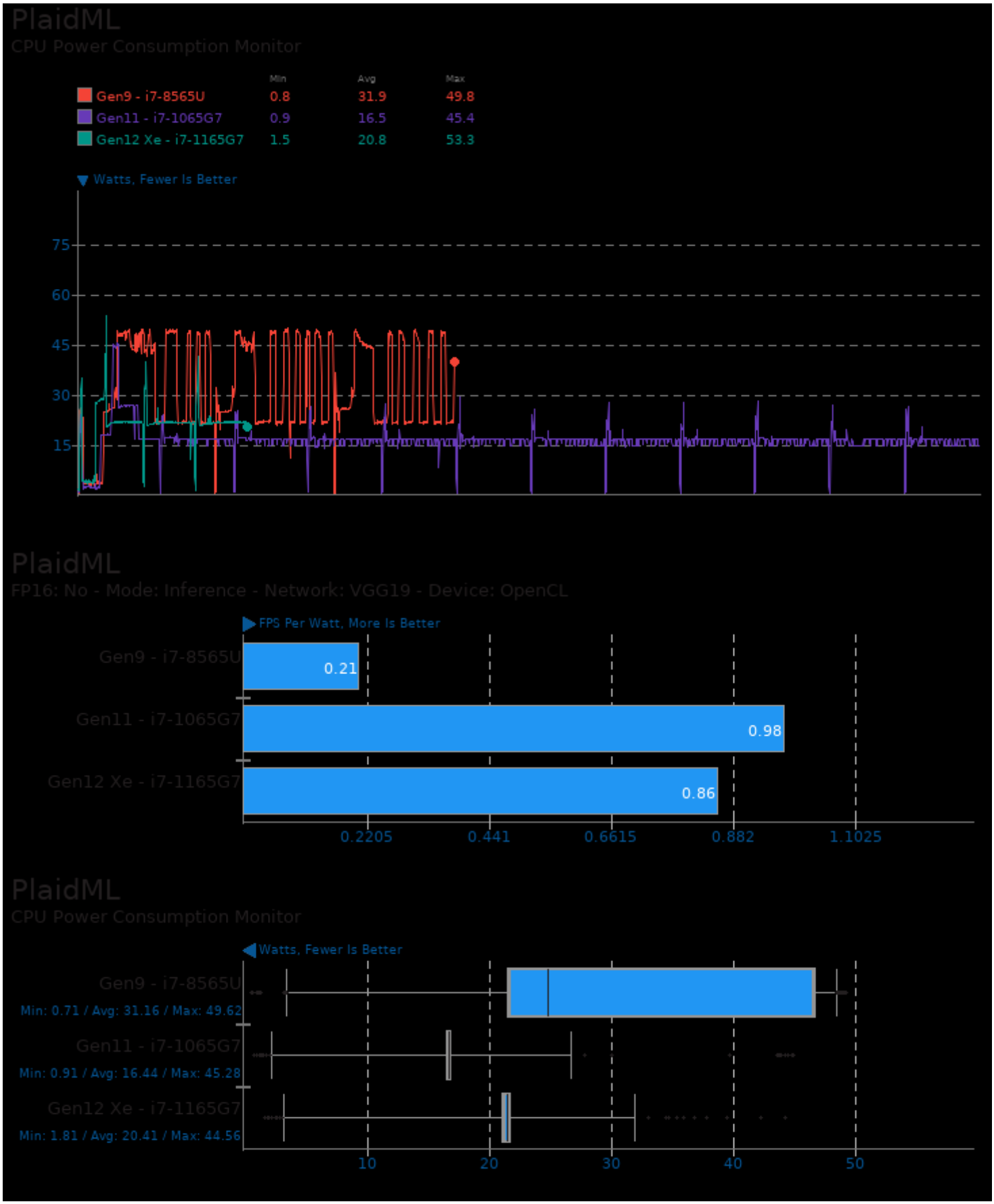
Tigerlake Xe Gen12 to Gen9



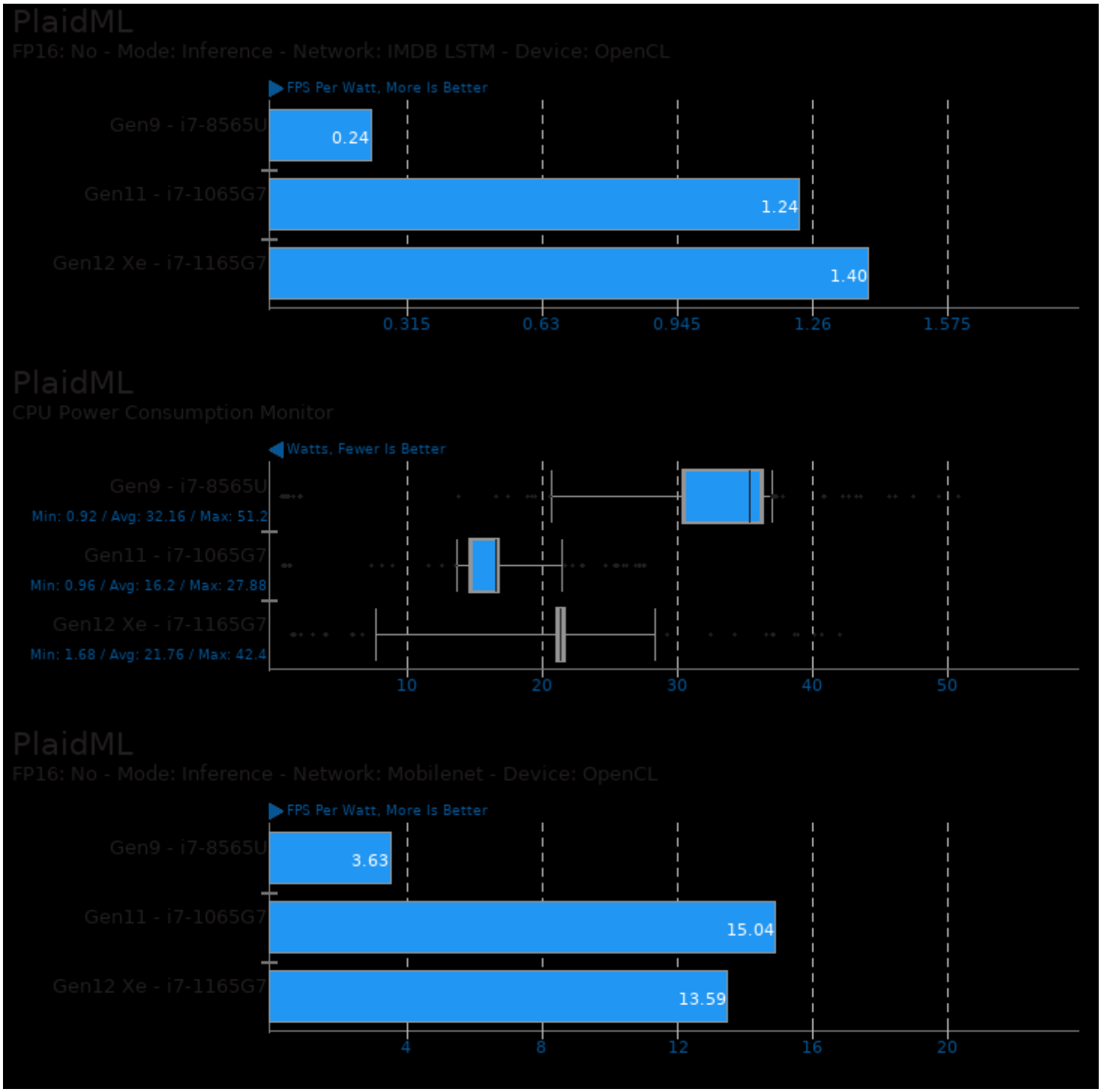

PlaidML
FP16: No - Mode: Inference - Network: Mobilenet - Device: OpenCL
FPS, More Is Better
Gen9 - i7-8565U
SE +/- 0.03, N = 3
116.08
Gen11 - i7-1065G7
SE +/- 3.34, N = 3
242.83
Gen12 Xe - i7-1165G7
SE +/- 0.92, N = 3
299.60
70
140
210
280
350
PlaidML
FP16: No - Mode: Inference - Network: ResNet 50 - Device: OpenCL
FPS, More Is Better
Gen9 - i7-8565U
SE +/- 0.36, N = 3
34.52
Gen11 - i7-1065G7
SE +/- 1.07, N = 3
75.57
Gen12 Xe - i7-1165G7
SE +/- 0.04, N = 3
87.29
20
40
60
80
100
PlaidML
FP16: No - Mode: Inference - Network: DenseNet 201 - Device: OpenCL
FPS, More Is Better
Gen9 - i7-8565U
SE +/- 0.01, N = 3
5.81
Gen11 - i7-1065G7
SE +/- 0.08, N = 3
11.30
Gen12 Xe - i7-1165G7
SE +/- 0.10, N = 3
22.44
5
10
15
20
25

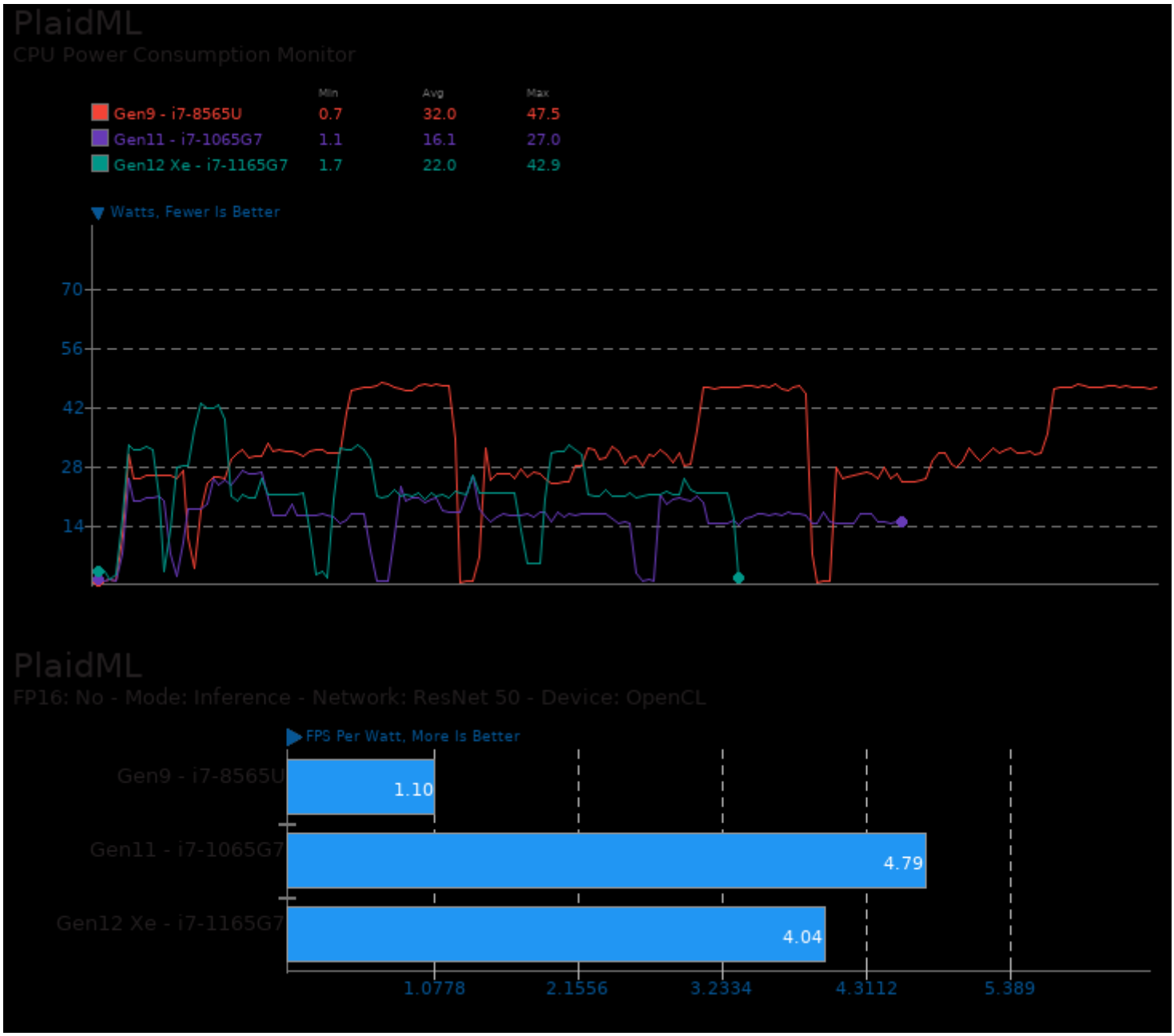

PlaidML
FP16: No - Mode: Inference - Network: Inception V3 - Device: OpenCL
FPS, More Is Better
Gen9 - i7-8565U
SE +/- 0.16, N = 3
15.90
Gen11 - i7-1065G7
SE +/- 0.07, N = 3
34.82
Gen12 Xe - i7-1165G7
SE +/- 0.04, N = 3
46.37
11
22
33
44
55
PlaidML
FP16: No - Mode: Inference - Network: NASNer Large - Device: OpenCL
FPS, More Is Better
Gen9 - i7-8565U
SE +/- 0.01, N = 3
1.84
Gen11 - i7-1065G7
SE +/- 0.01, N = 3
3.31
Gen12 Xe - i7-1165G7
SE +/- 0.00, N = 3
5.14
1.1565
2.313
3.4695
4.626
5.7825
PlaidML
FP16: No - Mode: Inference - Network: VGG16 - Device: OpenCL
FPS Per Watt, More Is Better
Gen9 - i7-8565U
0.26
Gen11 - i7-1065G7
1.21
Gen12 Xe - i7-1165G7
1.07
0.2723
0.5446
0.8169
1.0892
1.3615

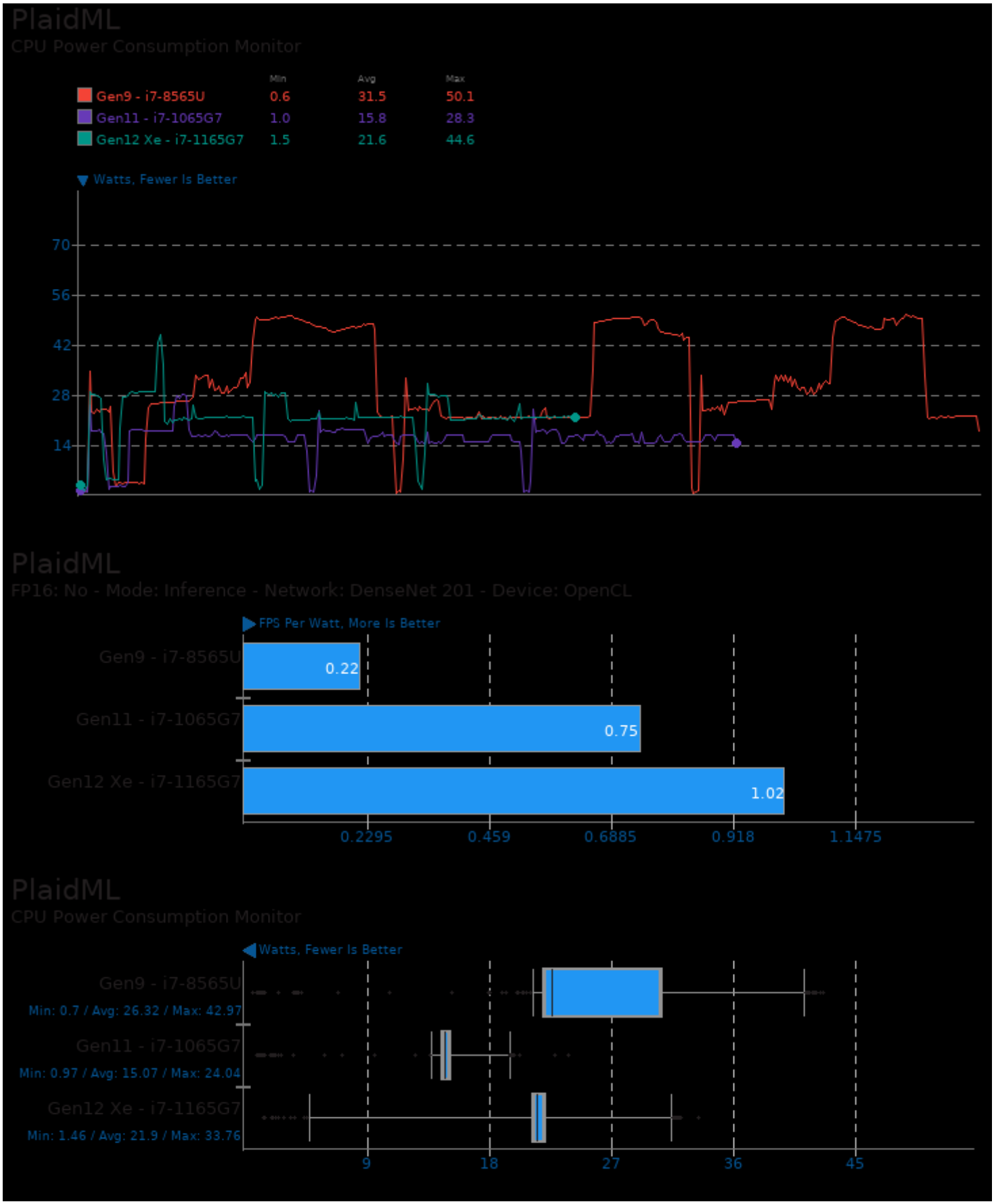
Tigerlake Xe Gen12 to Gen9



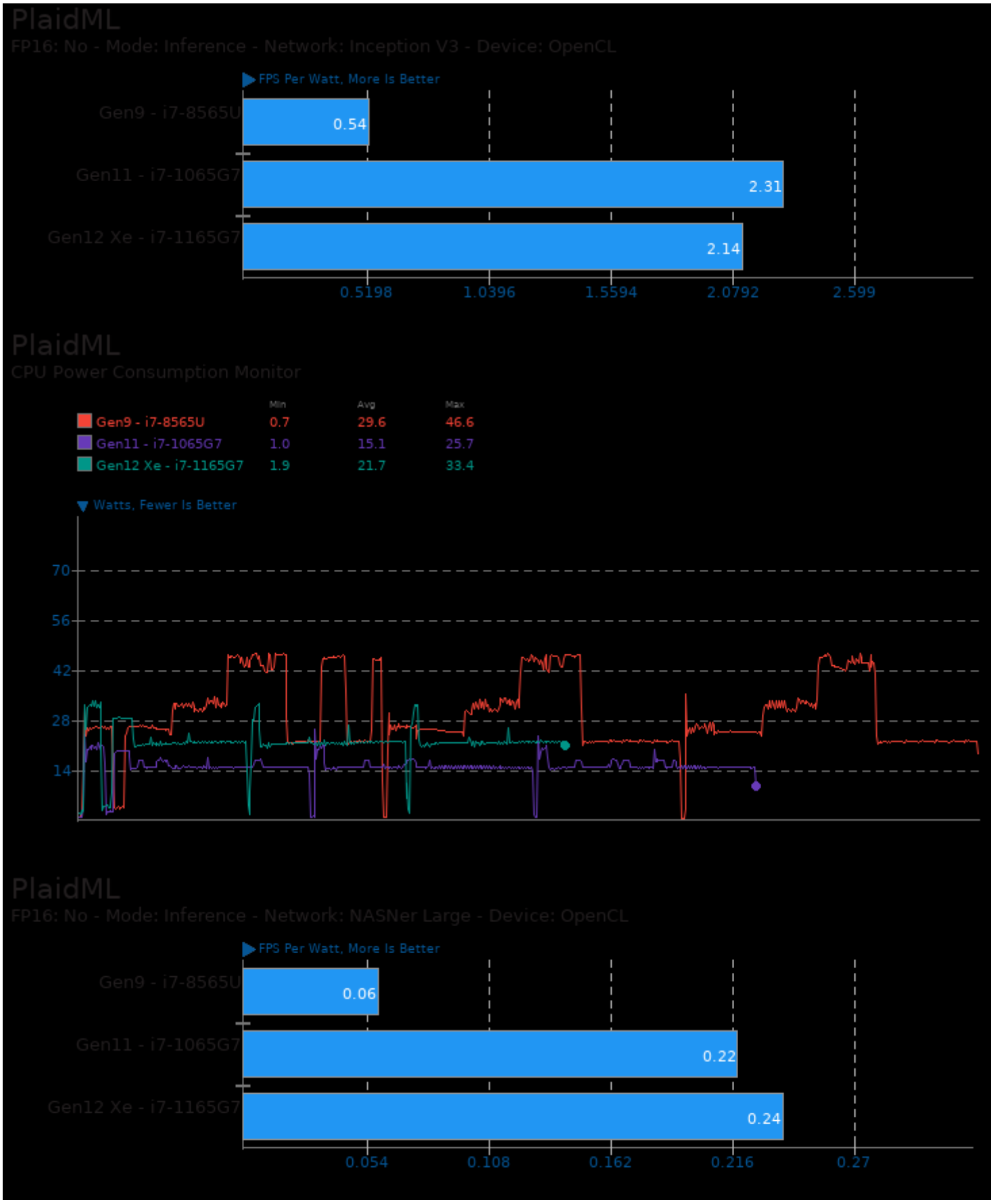
Tigerlake Xe Gen12 to Gen9

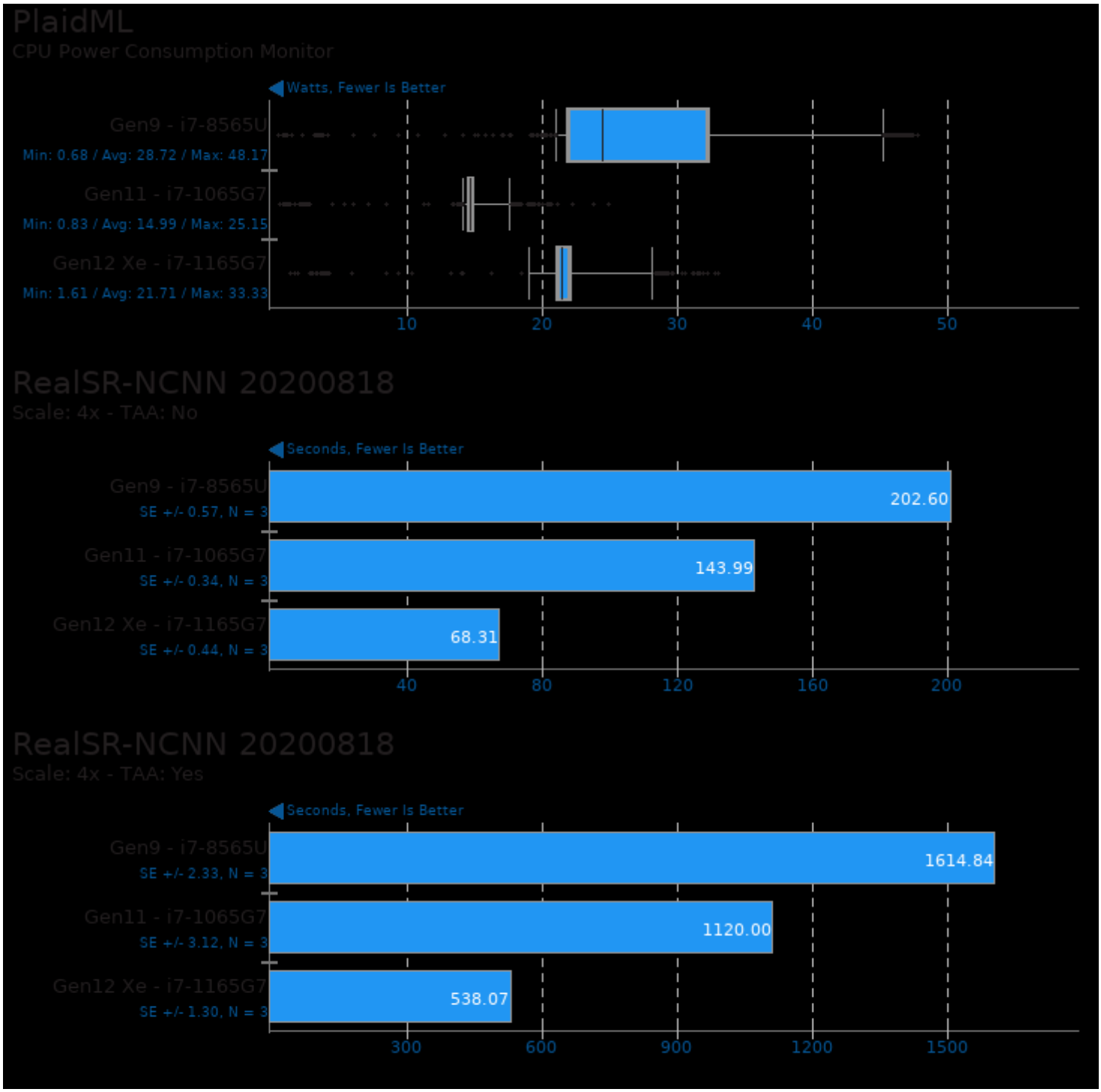



PlaidML
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U 0.7 32.0 47.5
Gen11 - i7-1065G7 1.1 16.1 27.0
Gen12 Xe - i7-1165G7 1.7 22.0 42.9
Watts, Fewer Is Better
70
56
42
28
14
PlaidML
FP16: No - Mode: Inference - Network: ResNet 50 - Device: OpenCL
FPS Per Watt, More Is Better
Gen9 - i7-8565U
1.10
Gen11 - i7-1065G7
4.79
Gen12 Xe - i7-1165G7
4.04
1.0778
2.1556
3.2334
4.3112
5.389


PlaidML
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U
0.6
31.5
50.1
Gen11 - i7-1065G7
1.0
15.8
28.3
Gen12 Xe - i7-1165G7
1.5
21.6
44.6
Watts, Fewer Is Better
70
56
42
28
14
PlaidML
FP16: No - Mode: Inference - Network: DenseNet 201 - Device: OpenCL
FPS Per Watt, More Is Better
Gen9 - i7-8565U
0.22
Gen11 - i7-1065G7
0.75
Gen12 Xe - i7-1165G7
1.02
0.2295
0.459
0.6885
0.918
1.1475
PlaidML
CPU Power Consumption Monitor
Watts, Fewer Is Better
Gen9 - i7-8565U
Min: 0.7 / Avg: 26.32 / Max: 42.97
Gen11 - i7-1065G7
Min: 0.97 / Avg: 15.07 / Max: 24.04
Gen12 Xe - i7-1165G7
Min: 1.46 / Avg: 21.9 / Max: 33.76
9
18
27
36
45

Tigerlake Xe Gen12 to Gen9

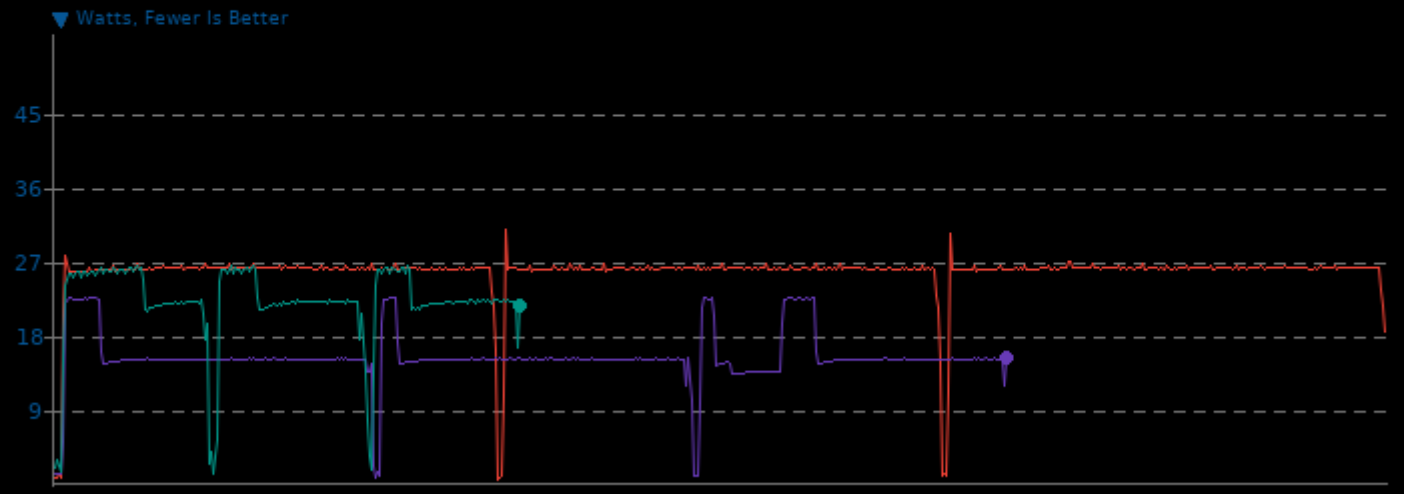



PlaidML
CPU Power Consumption Monitor
Watts, Fewer Is Better
Gen9 - i7-8565U
Min: 0.68 / Avg: 28.72 / Max: 48.17
Gen11 - i7-1065G7
Min: 0.83 / Avg: 14.99 / Max: 25.15
Gen12 Xe - i7-1165G7
Min: 1.61 / Avg: 21.71 / Max: 33.33
10
20
30
40
50
RealSR-NCNN 20200818
Scale: 4x - TAA: No
Seconds, Fewer Is Better
Gen9 - i7-8565U
SE +/- 0.57, N = 3
202.60
Gen11 - i7-1065G7
SE +/- 0.34, N = 3
143.99
Gen12 Xe - i7-1165G7
SE +/- 0.44, N = 3
68.31
40
80
120
160
200
RealSR-NCNN 20200818
Scale: 4x - TAA: Yes
Seconds, Fewer Is Better
Gen9 - i7-8565U
SE +/- 2.33, N = 3
1614.84
Gen11 - i7-1065G7
SE +/- 3.12, N = 3
1120.00
Gen12 Xe - i7-1165G7
SE +/- 1.30, N = 3
538.07
300
600
900
1200
1500

RealSR-NCNN 20200818

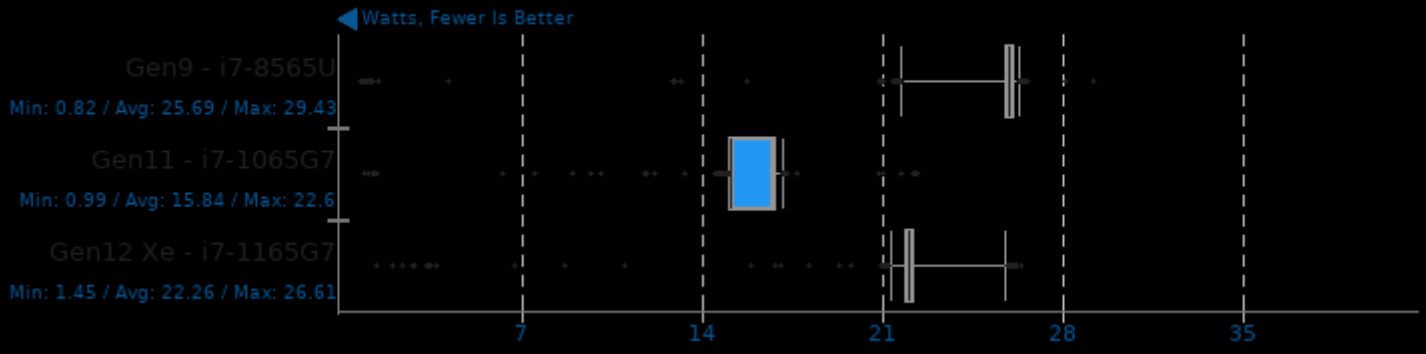
CPU Power Consumption Monitor

	Min	Avg	Max
Gen9 - i7-8565U	0.7	25.7	30.7
Gen11 - i7-1065G7	1.0	15.5	22.7
Gen12 Xe - i7-1165G7	1.5	22.1	26.6



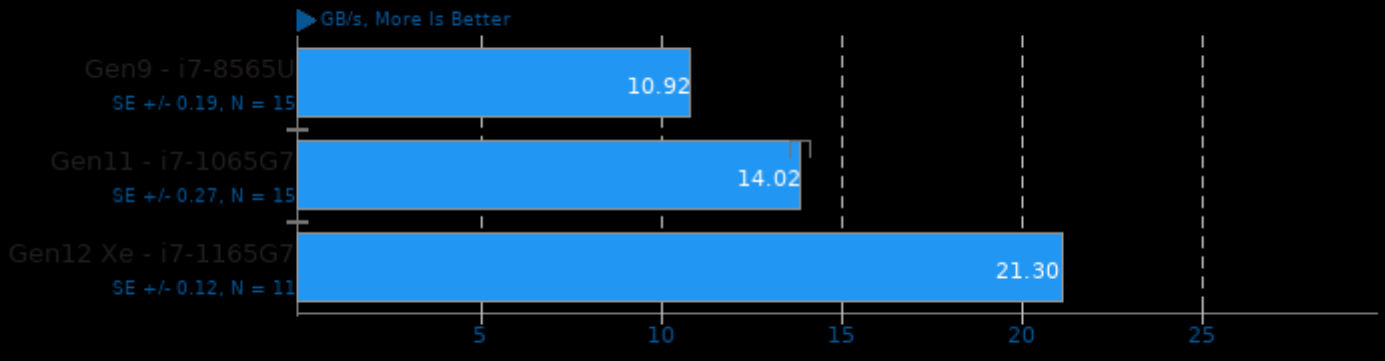
RealSR-NCNN 20200818

CPU Power Consumption Monitor

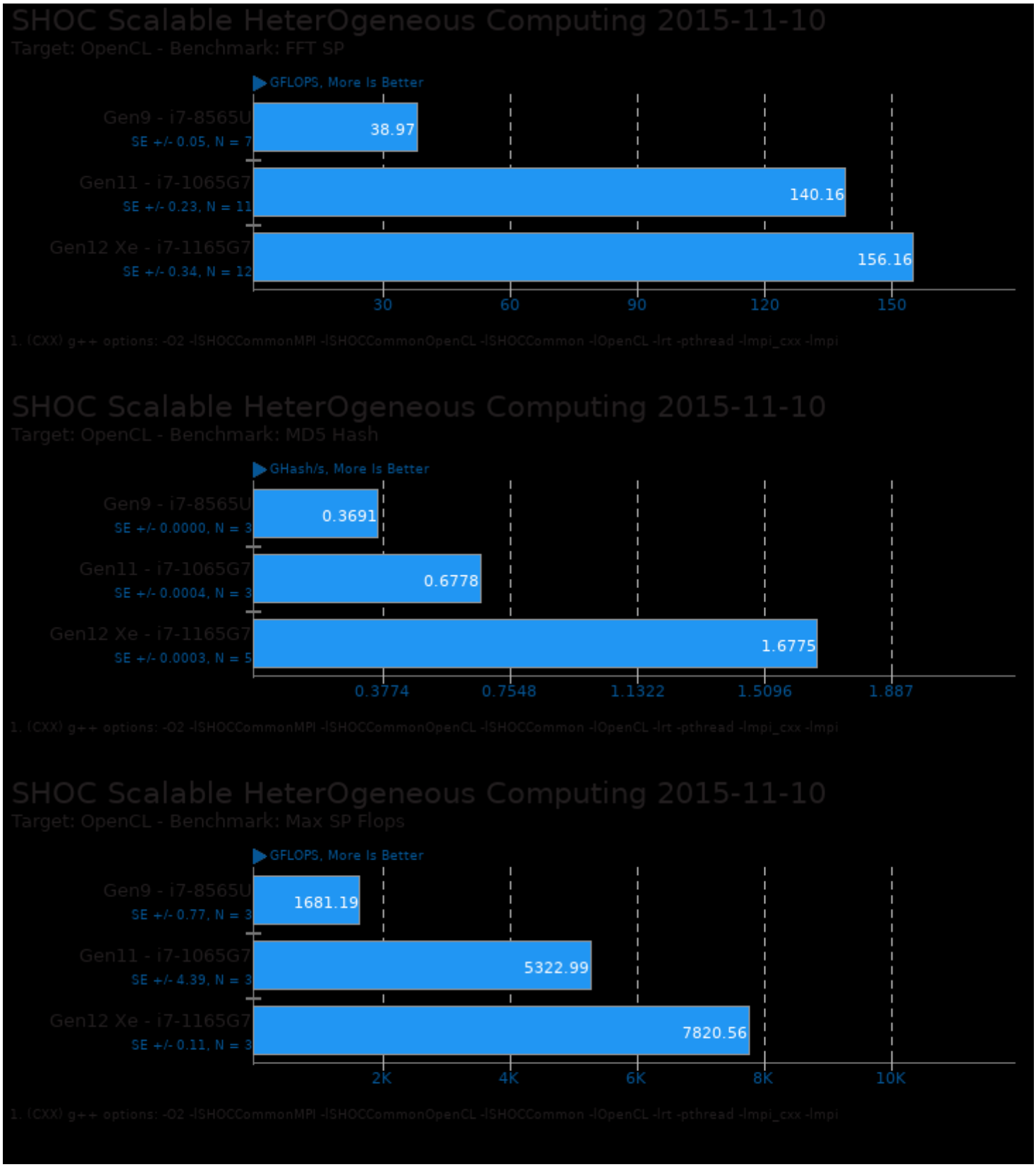


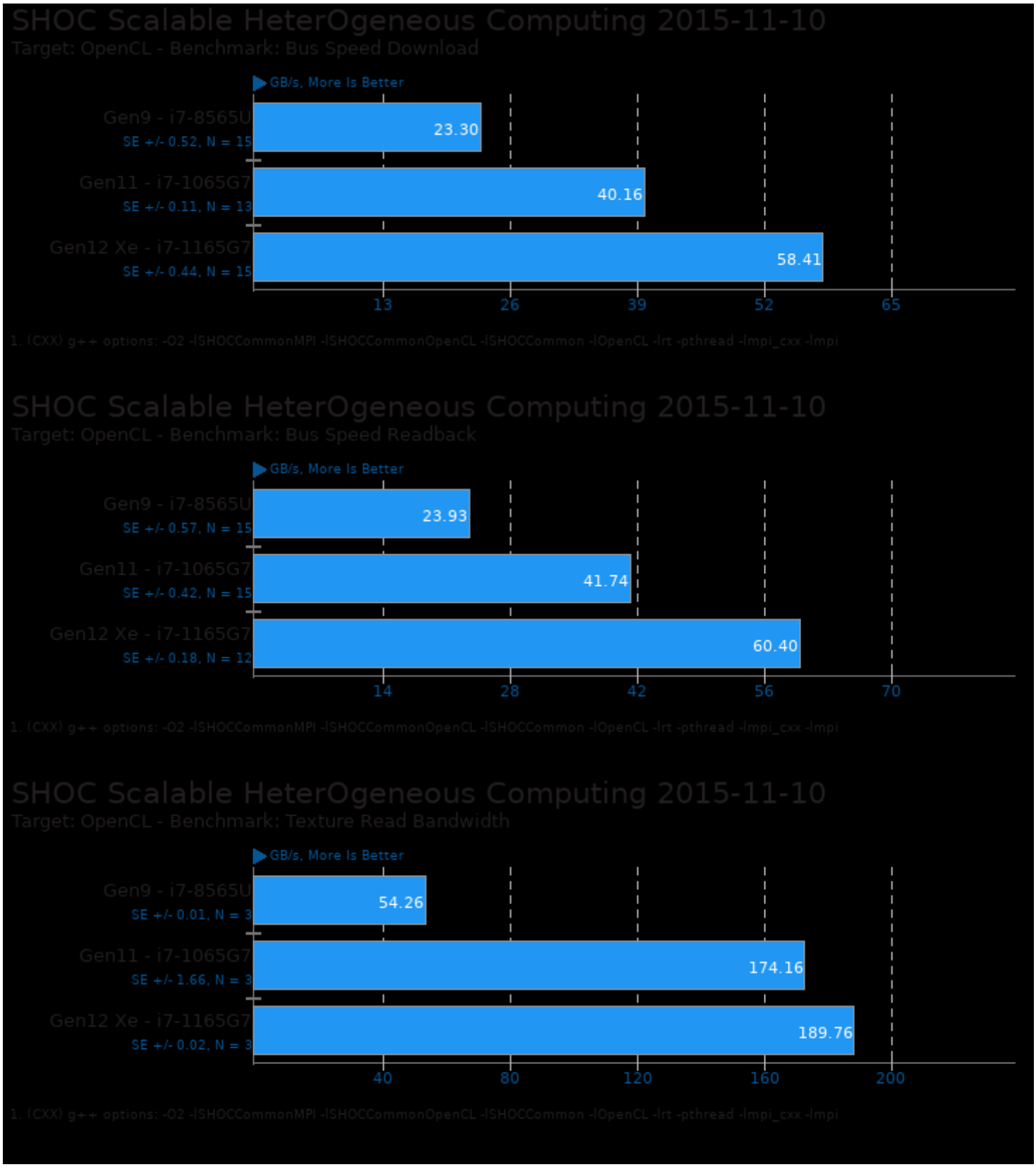
SHOC Scalable HeterOgeneous Computing 2015-11-10

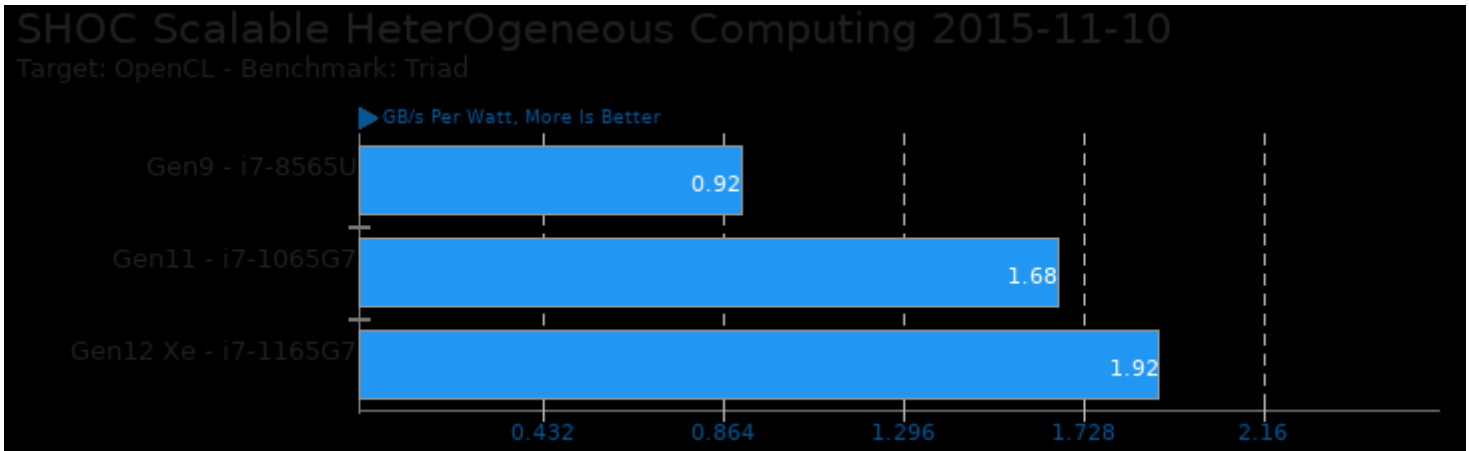
Target: OpenCL - Benchmark: Triad

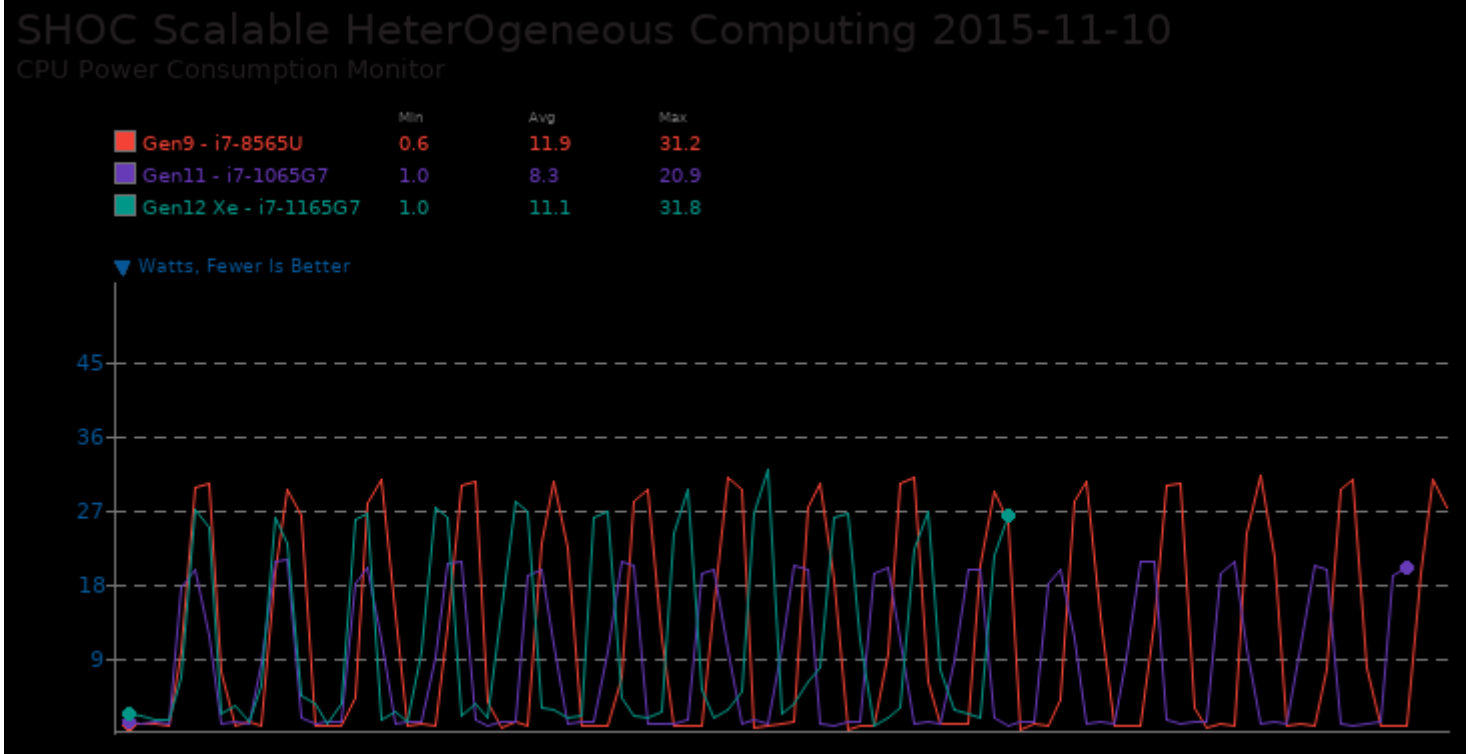


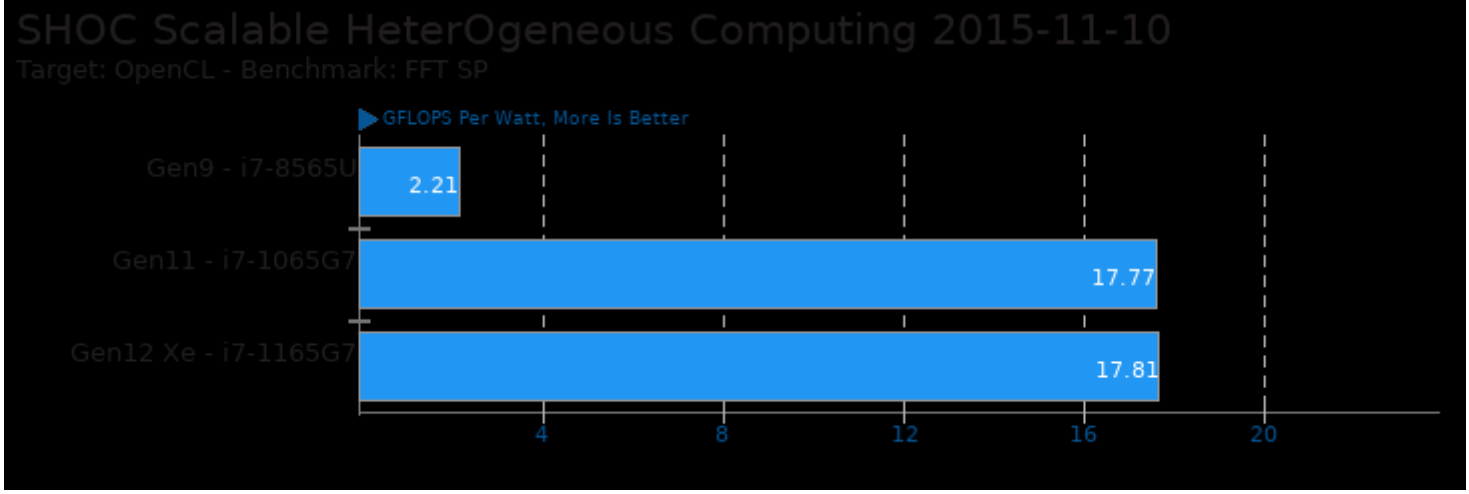
1. (CXX) g++ options: -O2 -lSHOCCommonMPI -lSHOCCommonOpenCL -lSHOCCommon -lOpenCL -lrt -pthread -lmpi_cxx -lmpi


SHOC Scalable HeterOgeneous Computing 2015-11-10
Target: OpenCL - Benchmark: FFT SP
GFLOPS, More Is Better
Gen9 - i7-8565U
SE +/- 0.05, N = 7
38.97
Gen11 - i7-1065G7
SE +/- 0.23, N = 11
140.16
Gen12 Xe - i7-1165G7
SE +/- 0.34, N = 12
156.16
30
60
90
120
150
1. (CXX) g++ options: -O2 -lSHOCCommonMPI -lSHOCCommonOpenCL -lSHOCCommon -lOpenCL -lrt -pthread -lmpi_cxx -lmpi
SHOC Scalable HeterOgeneous Computing 2015-11-10
Target: OpenCL - Benchmark: MD5 Hash
GHash/s, More Is Better
Gen9 - i7-8565U
SE +/- 0.0000, N = 3
0.3691
Gen11 - i7-1065G7
SE +/- 0.0004, N = 3
0.6778
Gen12 Xe - i7-1165G7
SE +/- 0.0003, N = 5
1.6775
0.3774
0.7548
1.1322
1.5096
1.887
1. (CXX) g++ options: -O2 -lSHOCCommonMPI -lSHOCCommonOpenCL -lSHOCCommon -lOpenCL -lrt -pthread -lmpi_cxx -lmpi
SHOC Scalable HeterOgeneous Computing 2015-11-10
Target: OpenCL - Benchmark: Max SP Flops
GFLOPS, More Is Better
Gen9 - i7-8565U
SE +/- 0.77, N = 3
1681.19
Gen11 - i7-1065G7
SE +/- 4.39, N = 3
5322.99
Gen12 Xe - i7-1165G7
SE +/- 0.11, N = 3
7820.56
2K
4K
6K
8K
10K
1. (CXX) g++ options: -O2 -lSHOCCommonMPI -lSHOCCommonOpenCL -lSHOCCommon -lOpenCL -lrt -pthread -lmpi_cxx -lmpi

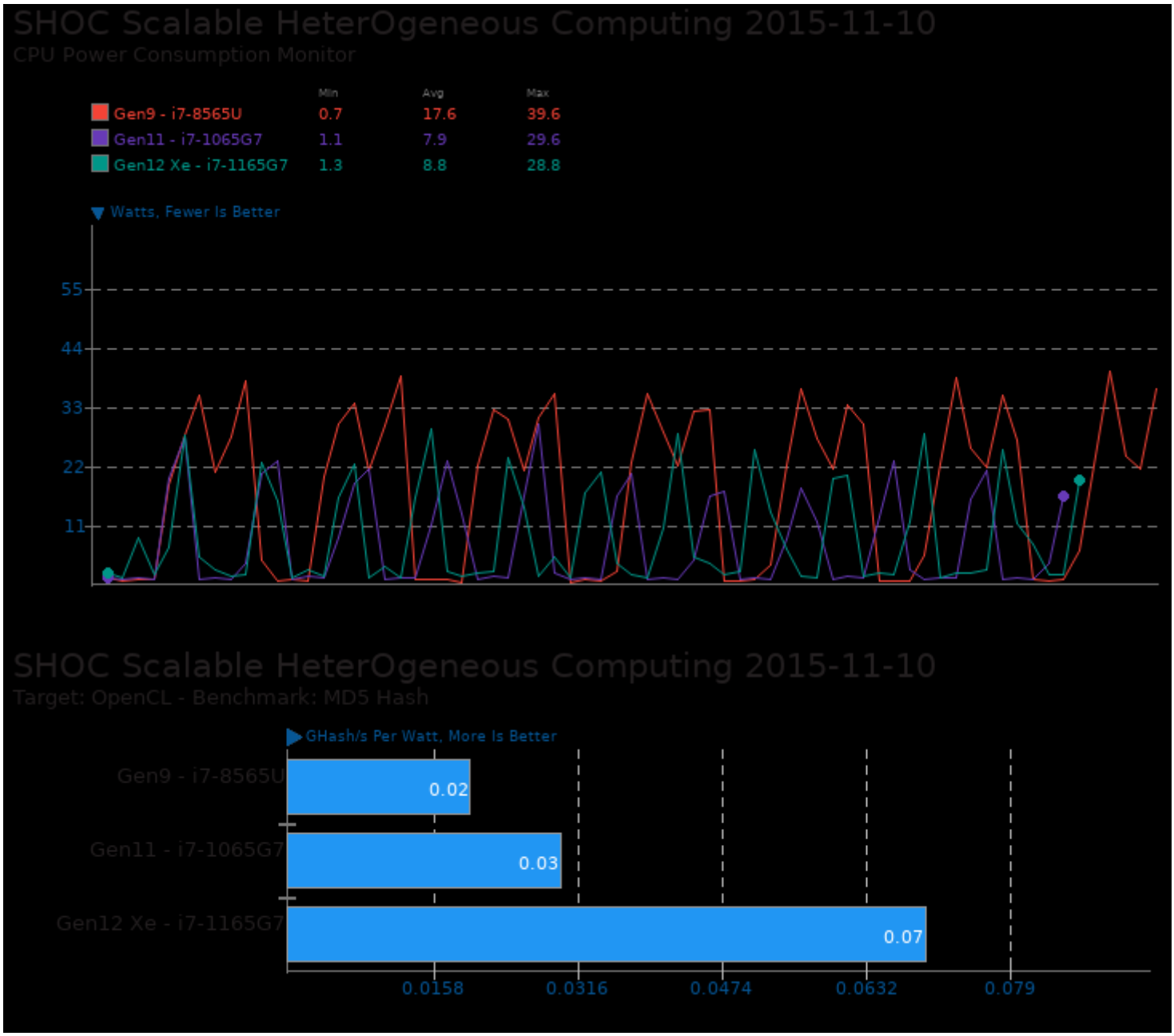

SHOC Scalable HeterOgeneous Computing 2015-11-10
Target: OpenCL - Benchmark: Bus Speed Download
GB/s, More Is Better
Gen9 - i7-8565U
SE +/- 0.52, N = 15
23.30
Gen11 - i7-1065G7
SE +/- 0.11, N = 13
40.16
Gen12 Xe - i7-1165G7
SE +/- 0.44, N = 15
58.41
13
26
39
52
65
1. (CXX) g++ options: -O2 -lSHOCCommonMPI -lSHOCCommonOpenCL -lSHOCCommon -lOpenCL -lrt -pthread -lmpi_cxx -lmpi
SHOC Scalable HeterOgeneous Computing 2015-11-10
Target: OpenCL - Benchmark: Bus Speed Readback
GB/s, More Is Better
Gen9 - i7-8565U
SE +/- 0.57, N = 15
23.93
Gen11 - i7-1065G7
SE +/- 0.42, N = 15
41.74
Gen12 Xe - i7-1165G7
SE +/- 0.18, N = 12
60.40
14
28
42
56
70
1. (CXX) g++ options: -O2 -lSHOCCommonMPI -lSHOCCommonOpenCL -lSHOCCommon -lOpenCL -lrt -pthread -lmpi_cxx -lmpi
SHOC Scalable HeterOgeneous Computing 2015-11-10
Target: OpenCL - Benchmark: Texture Read Bandwidth
GB/s, More Is Better
Gen9 - i7-8565U
SE +/- 0.01, N = 3
54.26
Gen11 - i7-1065G7
SE +/- 1.66, N = 3
174.16
Gen12 Xe - i7-1165G7
SE +/- 0.02, N = 3
189.76
40
80
120
160
200
1. (CXX) g++ options: -O2 -lSHOCCommonMPI -lSHOCCommonOpenCL -lSHOCCommon -lOpenCL -lrt -pthread -lmpi_cxx -lmpi

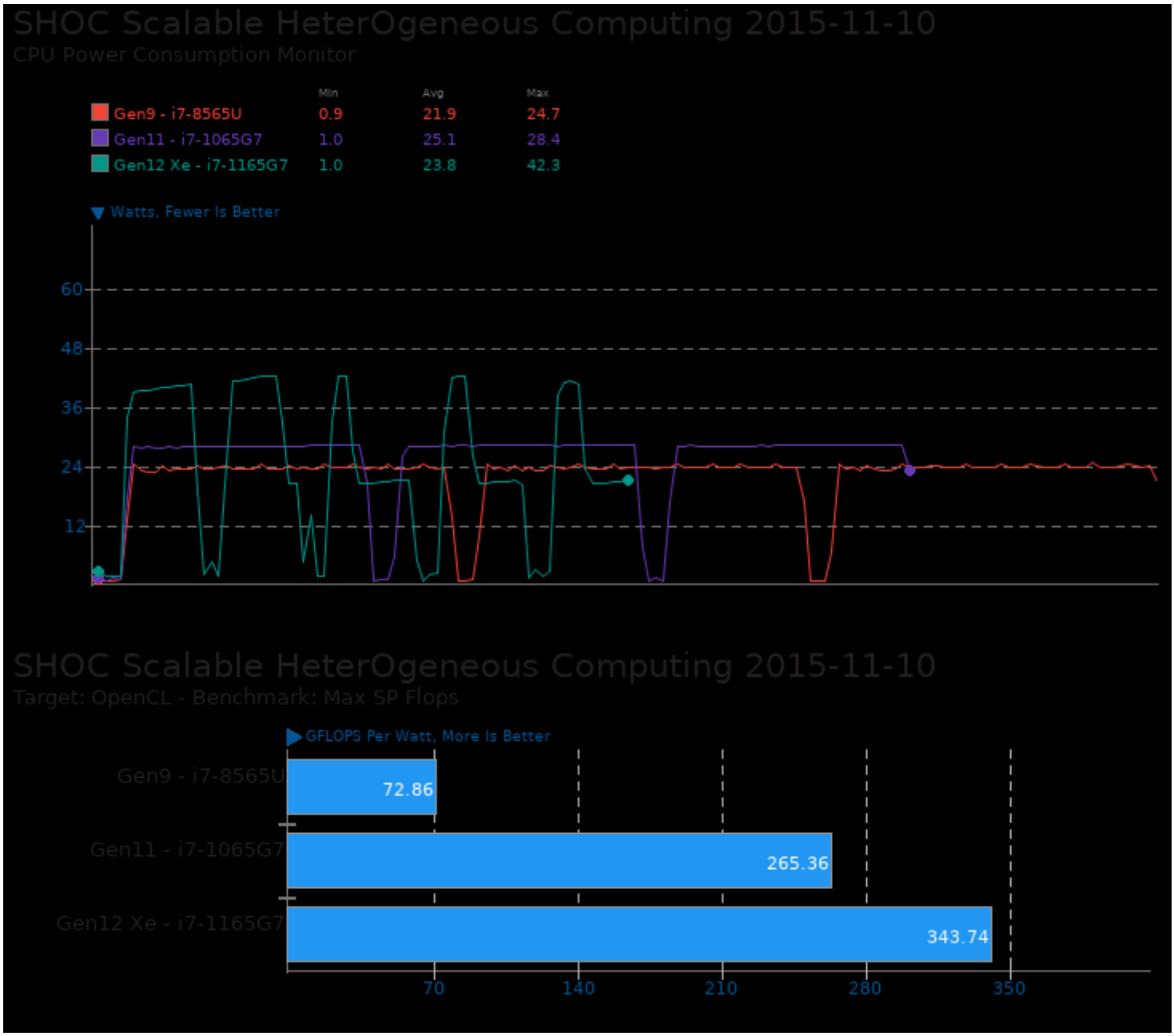

SHOC Scalable HeterOgeneous Computing 2015-11-10
Target: OpenCL - Benchmark: Triad
GB/s Per Watt, More Is Better
Gen9 - i7-8565U
0.92
Gen11 - i7-1065G7
1.68
Gen12 Xe - i7-1165G7
1.92
0.432
0.864
1.296
1.728
2.16

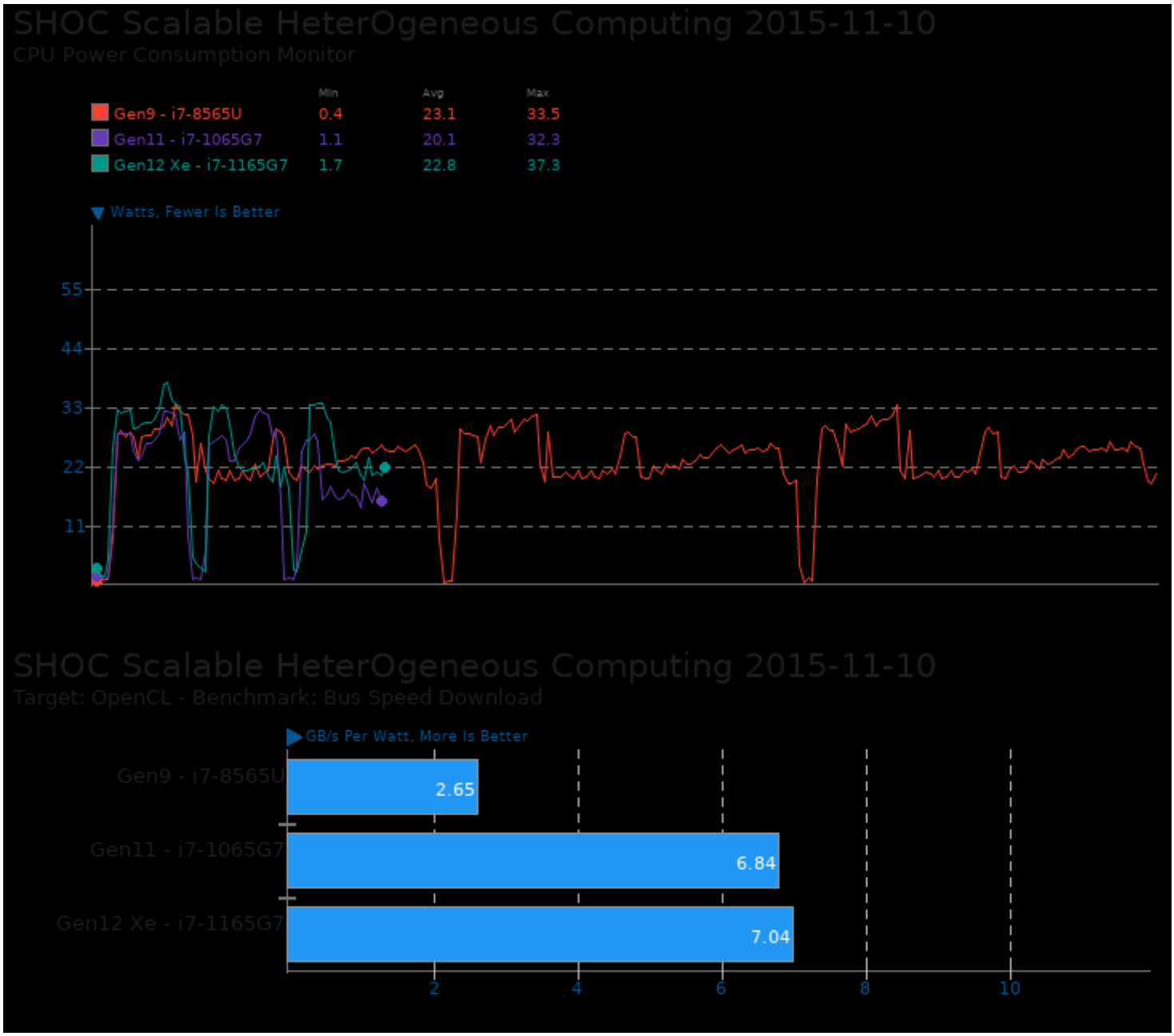

SHOC Scalable HeterOgeneous Computing 2015-11-10
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U 0.6 11.9 31.2
Gen11 - i7-1065G7 1.0 8.3 20.9
Gen12 Xe - i7-1165G7 1.0 11.1 31.8
Watts, Fewer Is Better
45
36
27
18
9


SHOC Scalable HeterOgeneous Computing 2015-11-10
Target: OpenCL - Benchmark: FFT SP
GFLOPS Per Watt, More Is Better
Gen9 - i7-8565U
2.21
Gen11 - i7-1065G7
17.77
Gen12 Xe - i7-1165G7
17.81
4
8
12
16
20

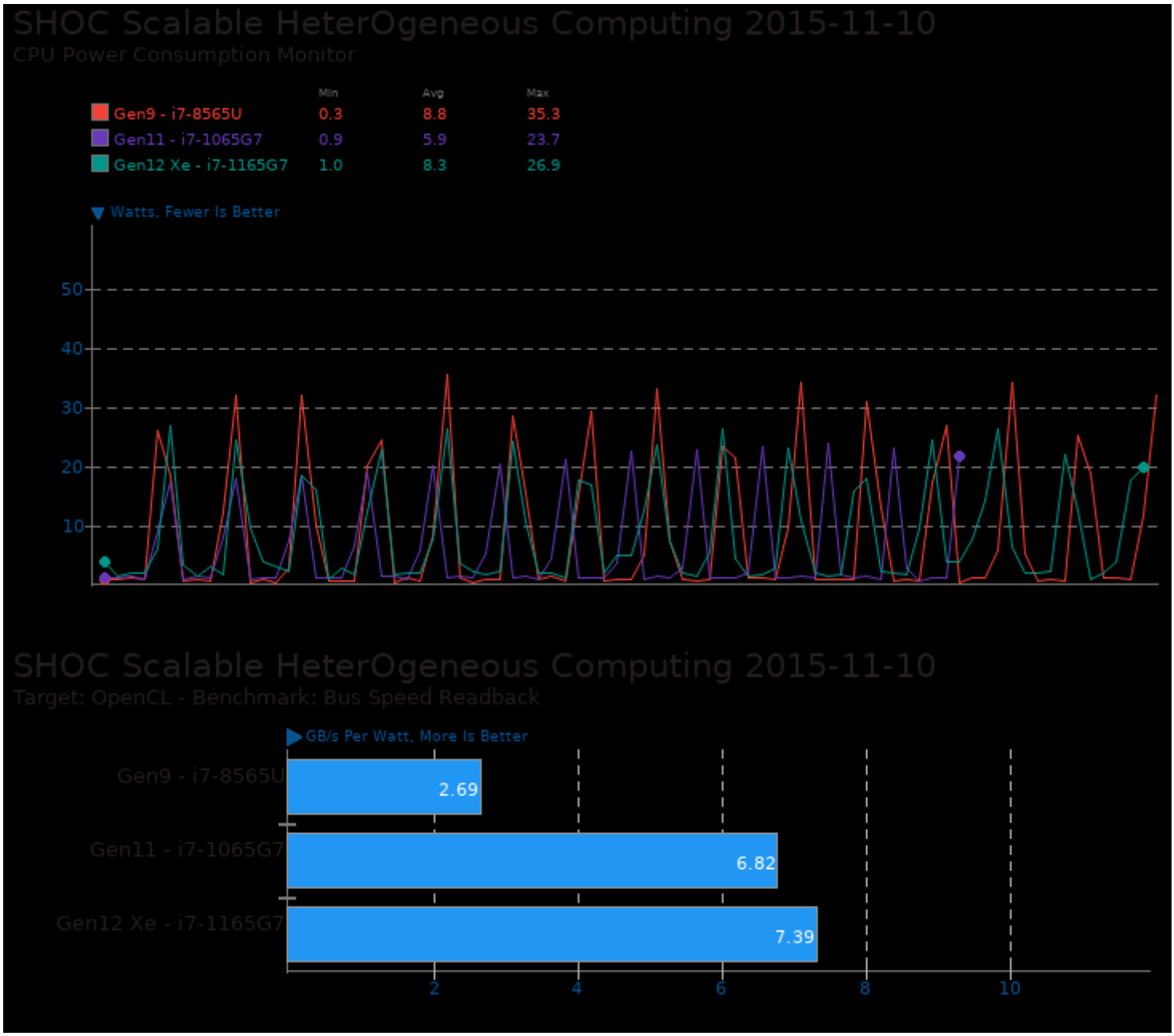
Tigerlake Xe Gen12 to Gen9



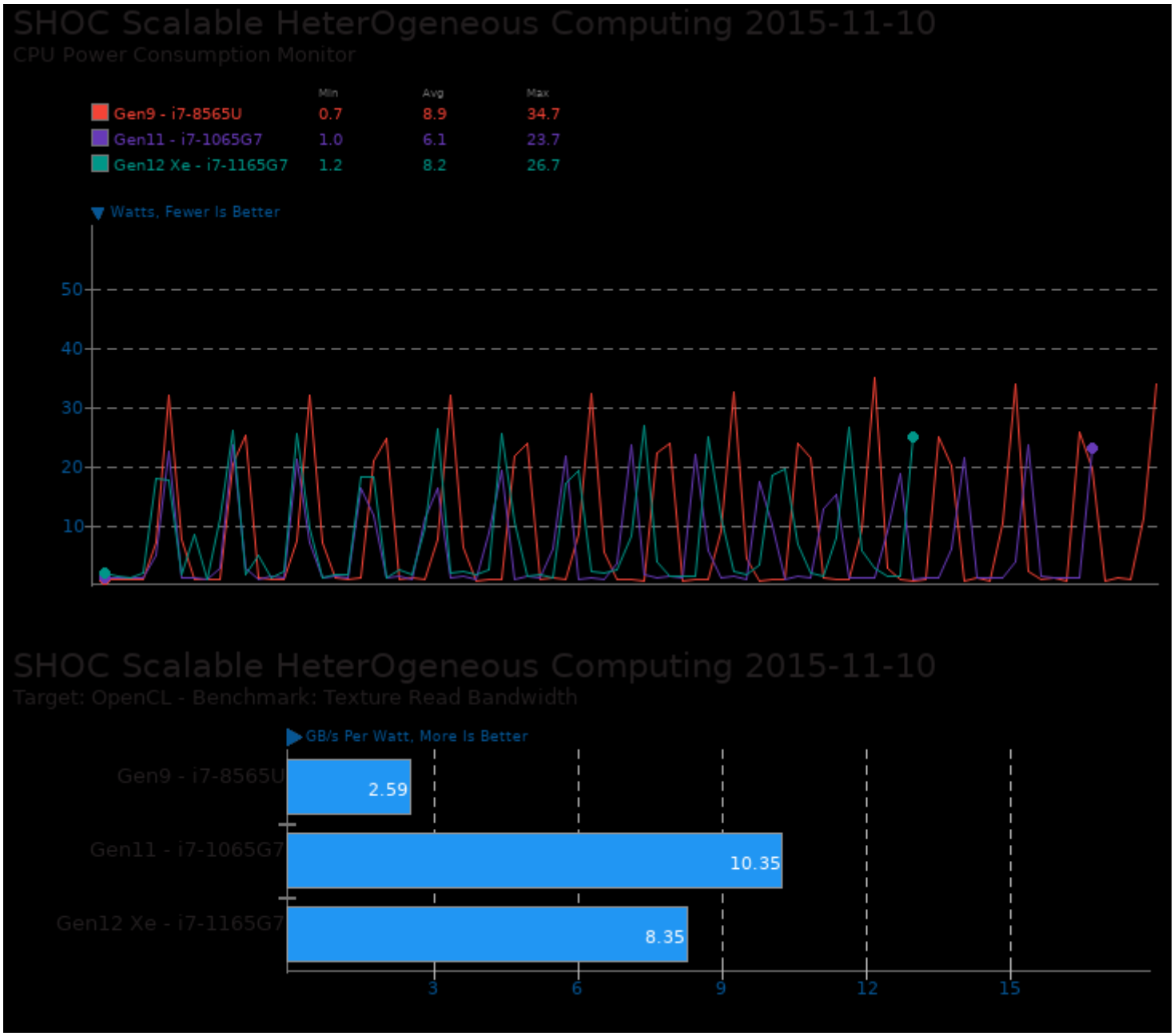

SHOC Scalable HeterOgeneous Computing 2015-11-10
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U
0.9
21.9
24.7
Gen11 - i7-1065G7
1.0
25.1
28.4
Gen12 Xe - i7-1165G7
1.0
23.8
42.3
Watts, Fewer Is Better
60
48
36
24
12
SHOC Scalable HeterOgeneous Computing 2015-11-10
Target: OpenCL - Benchmark: Max SP Flops
GFLOPS Per Watt, More Is Better
Gen9 - i7-8565U
72.86
Gen11 - i7-1065G7
265.36
Gen12 Xe - i7-1165G7
343.74
70
140
210
280
350

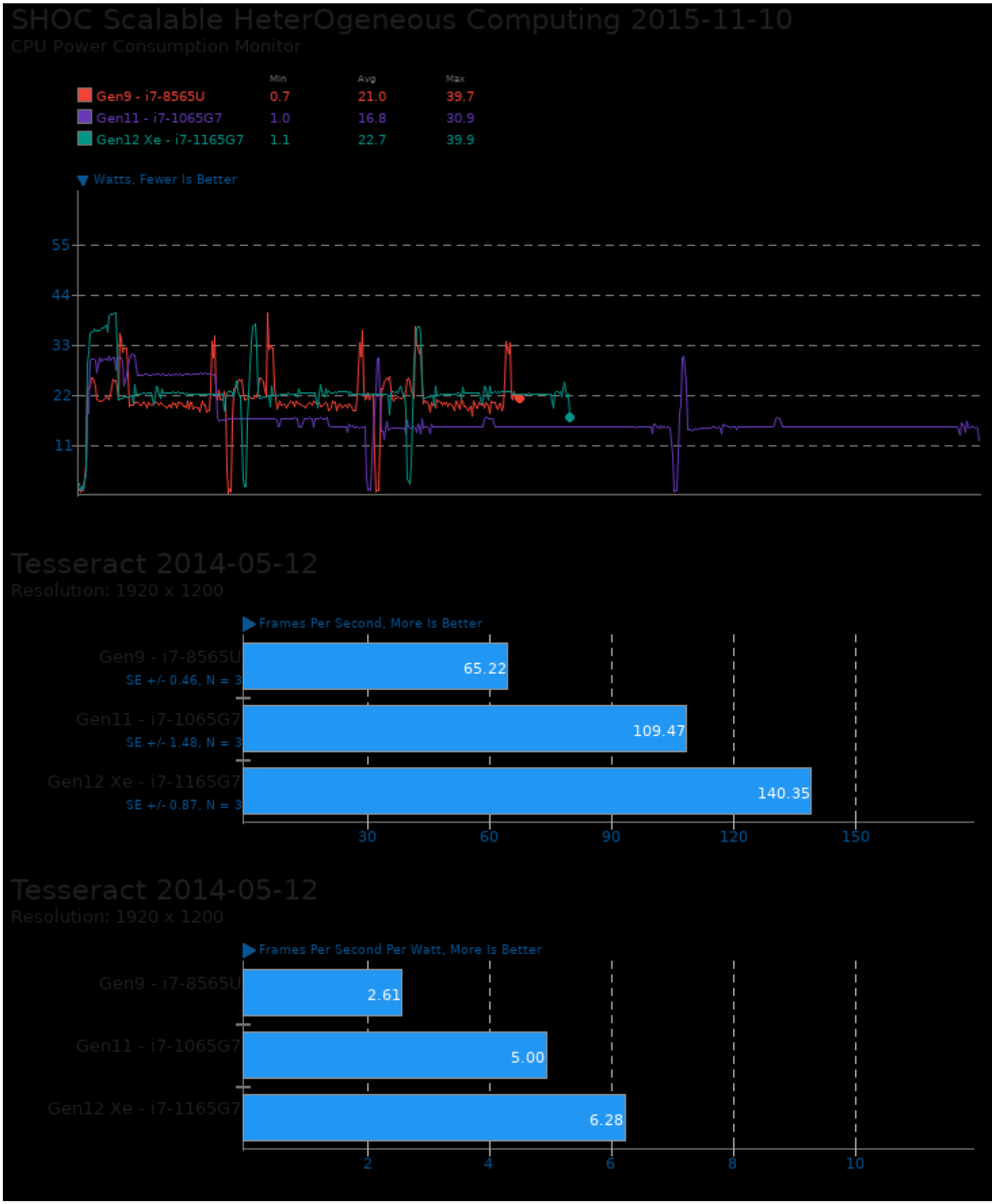

SHOC Scalable HeterOgeneous Computing 2015-11-10
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U
0.4
23.1
33.5
Gen11 - i7-1065G7
1.1
20.1
32.3
Gen12 Xe - i7-1165G7
1.7
22.8
37.3
Watts, Fewer Is Better
55
44
33
22
11
SHOC Scalable HeterOgeneous Computing 2015-11-10
Target: OpenCL - Benchmark: Bus Speed Download
GB/s Per Watt, More Is Better
Gen9 - i7-8565U
2.65
Gen11 - i7-1065G7
6.84
Gen12 Xe - i7-1165G7
7.04
2
4
6
8
10

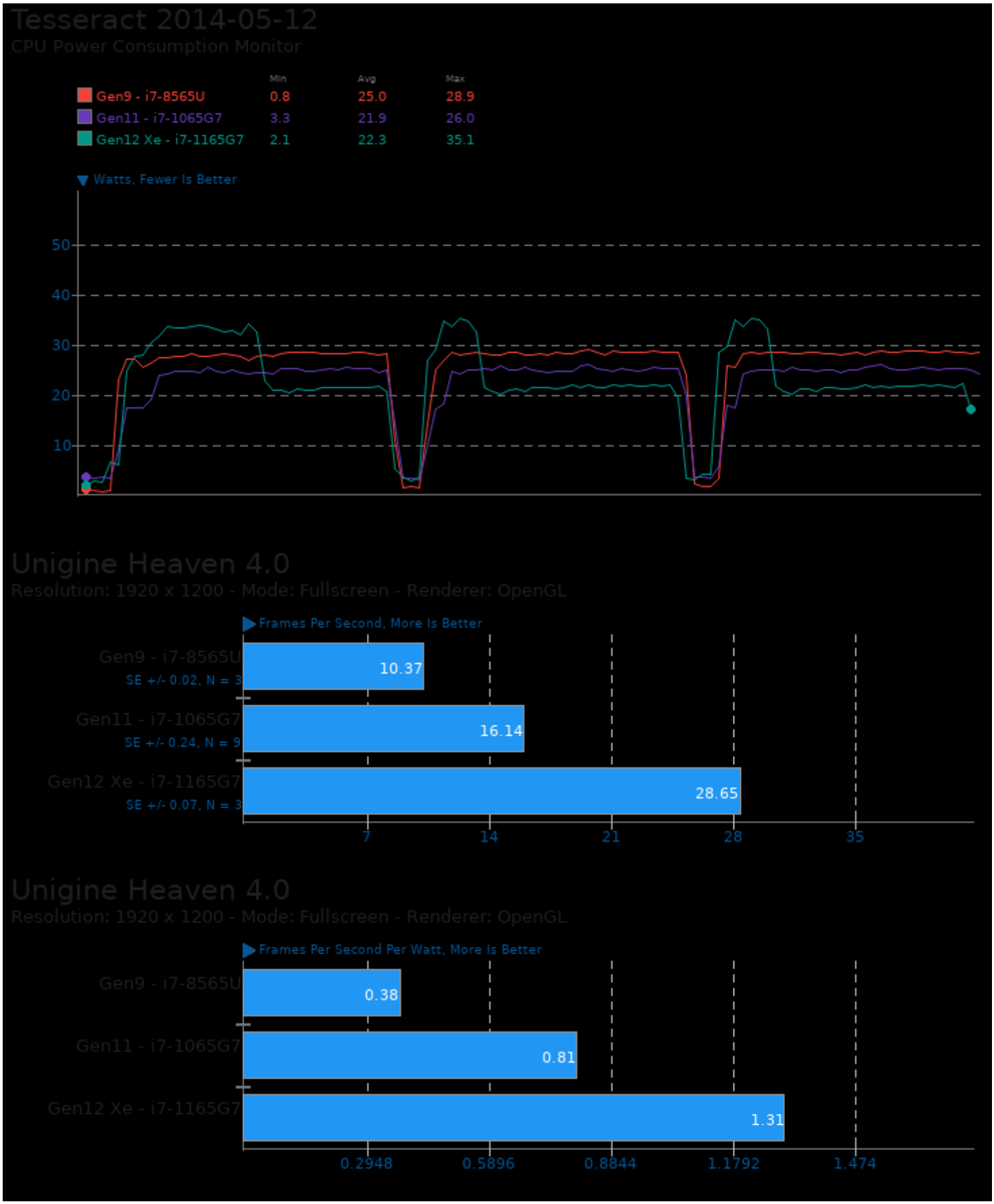
Tigerlake Xe Gen12 to Gen9

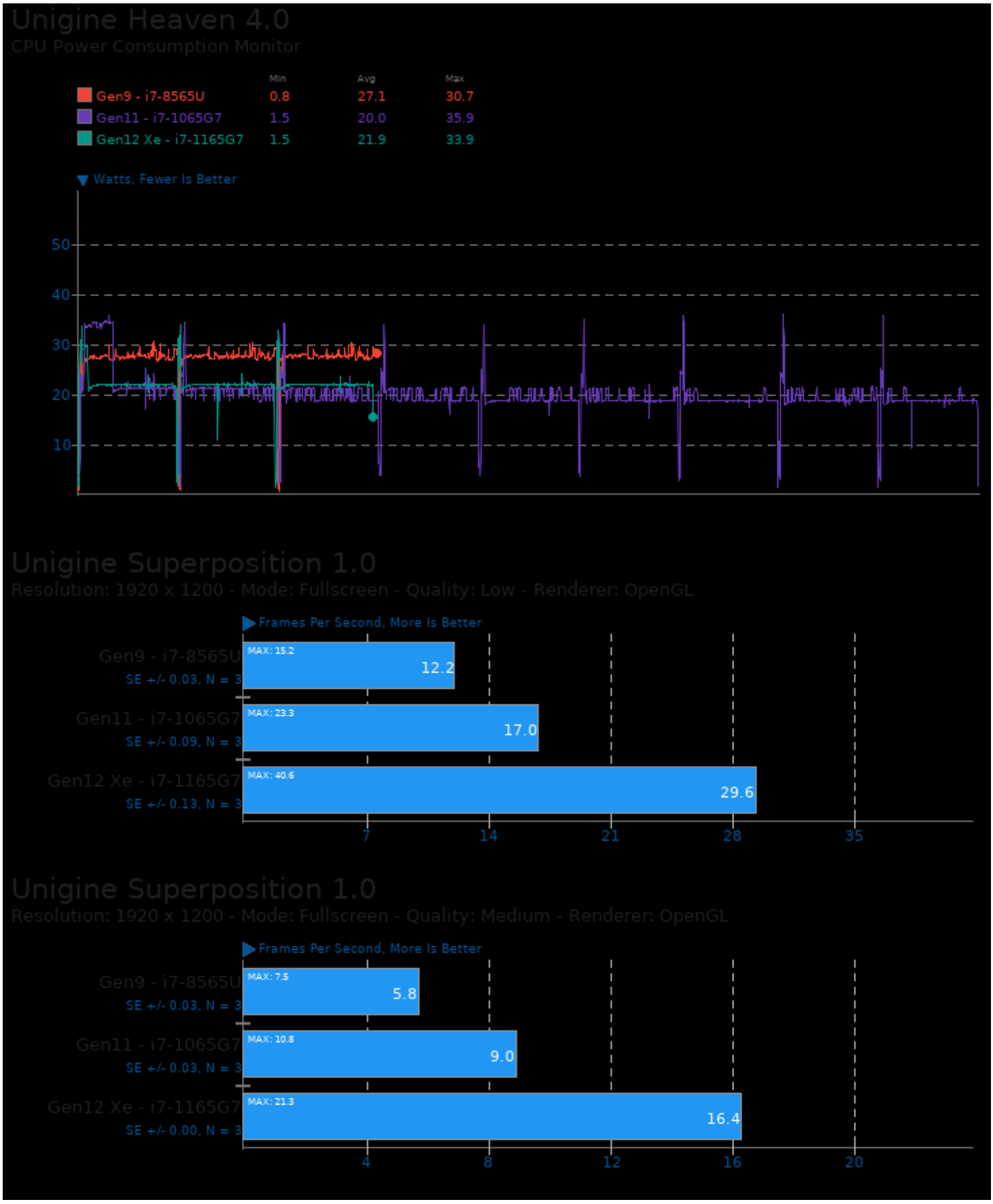


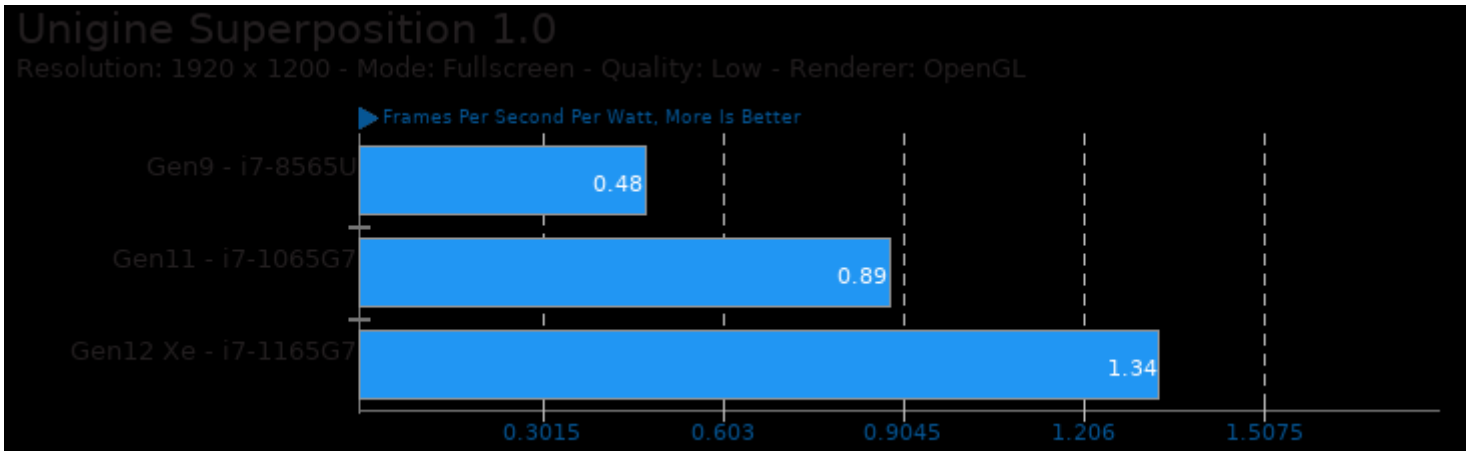
Tigerlake Xe Gen12 to Gen9



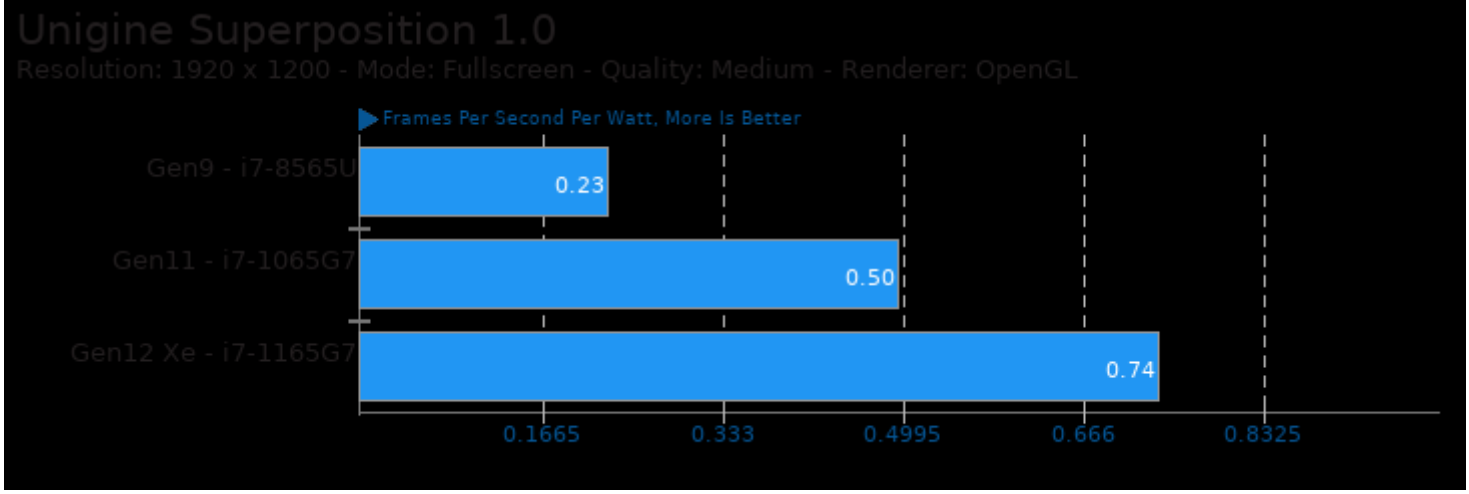

SHOC Scalable HeterOgeneous Computing 2015-11-10
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U 0.7 21.0 39.7
Gen11 - i7-1065G7 1.0 16.8 30.9
Gen12 Xe - i7-1165G7 1.1 22.7 39.9
Watts, Fewer Is Better
55
44
33
22
11
Tesseract 2014-05-12
Resolution: 1920 x 1200
Frames Per Second, More Is Better
Gen9 - i7-8565U
SE +/- 0.46, N = 3
65.22
Gen11 - i7-1065G7
SE +/- 1.48, N = 3
109.47
Gen12 Xe - i7-1165G7
SE +/- 0.87, N = 3
140.35
30
60
90
120
150
Tesseract 2014-05-12
Resolution: 1920 x 1200
Frames Per Second Per Watt, More Is Better
Gen9 - i7-8565U
2.61
Gen11 - i7-1065G7
5.00
Gen12 Xe - i7-1165G7
6.28
2
4
6
8
10


Tesseract 2014-05-12
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U
0.8
25.0
28.9
Gen11 - i7-1065G7
3.3
21.9
26.0
Gen12 Xe - i7-1165G7
2.1
22.3
35.1
Watts, Fewer Is Better
50
40
30
20
10
Unigine Heaven 4.0
Resolution: 1920 x 1200 - Mode: Fullscreen - Renderer: OpenGL
Frames Per Second, More Is Better
Gen9 - i7-8565U
SE +/- 0.02, N = 3
10.37
Gen11 - i7-1065G7
SE +/- 0.24, N = 9
16.14
Gen12 Xe - i7-1165G7
SE +/- 0.07, N = 3
28.65
7
14
21
28
35
Unigine Heaven 4.0
Resolution: 1920 x 1200 - Mode: Fullscreen - Renderer: OpenGL
Frames Per Second Per Watt, More Is Better
Gen9 - i7-8565U
0.38
Gen11 - i7-1065G7
0.81
Gen12 Xe - i7-1165G7
1.31
0.2948
0.5896
0.8844
1.1792
1.474

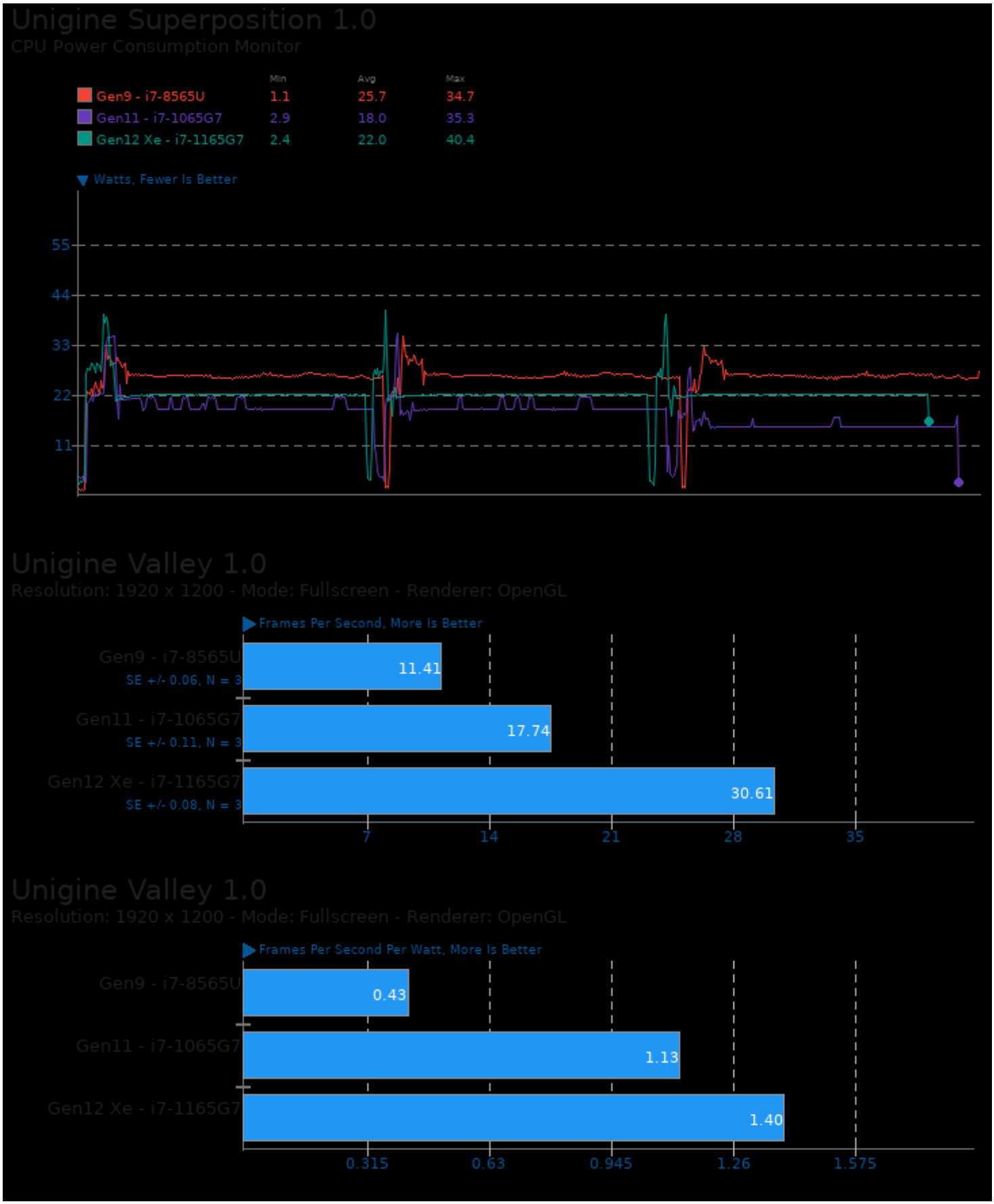

Unigine Heaven 4.0
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U 0.8 27.1 30.7
Gen11 - i7-1065G7 1.5 20.0 35.9
Gen12 Xe - i7-1165G7 1.5 21.9 33.9
Watts, Fewer Is Better
50
40
30
20
10
Unigine Superposition 1.0
Resolution: 1920 x 1200 - Mode: Fullscreen - Quality: Low - Renderer: OpenGL
Frames Per Second, More Is Better
Gen9 - i7-8565U
SE +/- 0.03, N = 3
MAX: 15.2
12.2
Gen11 - i7-1065G7
SE +/- 0.09, N = 3
MAX: 23.3
17.0
Gen12 Xe - i7-1165G7
SE +/- 0.13, N = 3
MAX: 40.6
29.6
7
14
21
28
35
Unigine Superposition 1.0
Resolution: 1920 x 1200 - Mode: Fullscreen - Quality: Medium - Renderer: OpenGL
Frames Per Second, More Is Better
Gen9 - i7-8565U
SE +/- 0.03, N = 3
MAX: 7.5
5.8
Gen11 - i7-1065G7
SE +/- 0.03, N = 3
MAX: 10.8
9.0
Gen12 Xe - i7-1165G7
SE +/- 0.00, N = 3
MAX: 21.3
16.4
4
8
12
16
20


Unigine Superposition 1.0
Resolution: 1920 x 1200 - Mode: Fullscreen - Quality: Low - Renderer: OpenGL
Frames Per Second Per Watt, More Is Better
Gen9 - i7-8565U
0.48
Gen11 - i7-1065G7
0.89
Gen12 Xe - i7-1165G7
1.34
0.3015
0.603
0.9045
1.206
1.5075


Unigine Superposition 1.0
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U
1.1
25.6
31.3
Gen11 - i7-1065G7
2.3
19.0
34.8
Gen12 Xe - i7-1165G7
1.7
22.1
38.8
Watts, Fewer Is Better
55
44
33
22
11


Unigine Superposition 1.0
Resolution: 1920 x 1200 - Mode: Fullscreen - Quality: Medium - Renderer: OpenGL
Frames Per Second Per Watt, More Is Better
Gen9 - i7-8565U
0.23
Gen11 - i7-1065G7
0.50
Gen12 Xe - i7-1165G7
0.74
0.1665
0.333
0.4995
0.666
0.8325

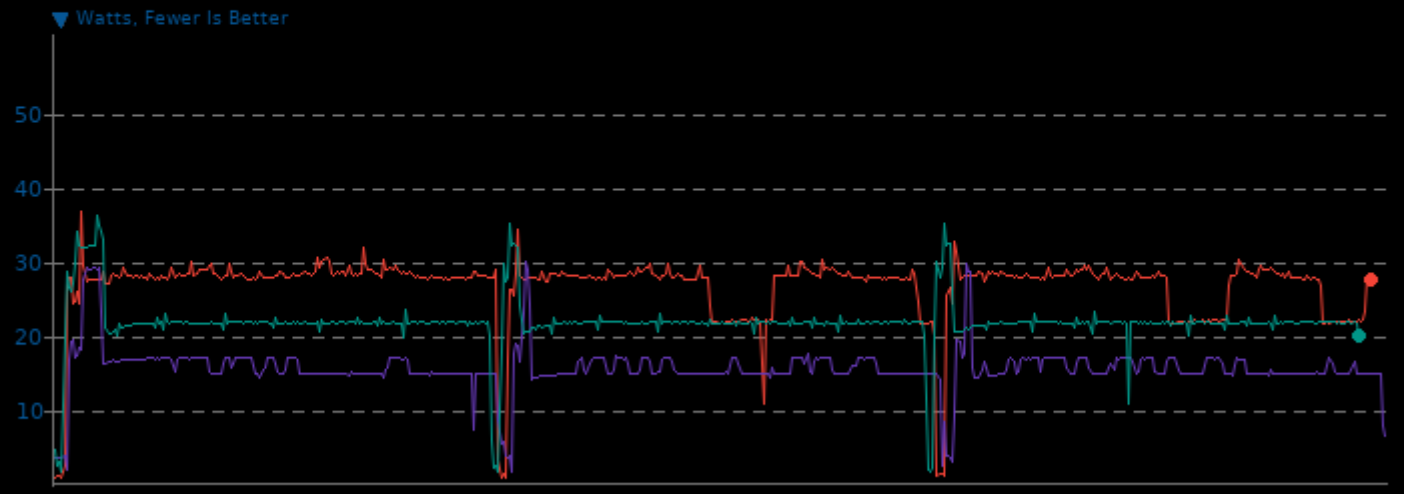
Tigerlake Xe Gen12 to Gen9



Unigine Valley 1.0

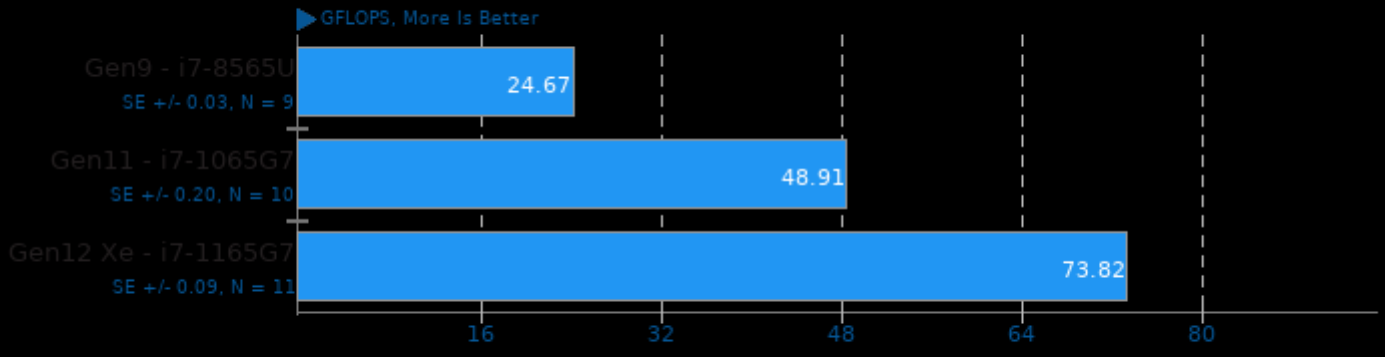
CPU Power Consumption Monitor

	Min	Avg	Max
Gen9 - i7-8565U	1.0	26.7	36.6
Gen11 - i7-1065G7	1.9	15.7	29.9
Gen12 Xe - i7-1165G7	1.8	21.9	36.2



ViennaCL 1.4.2

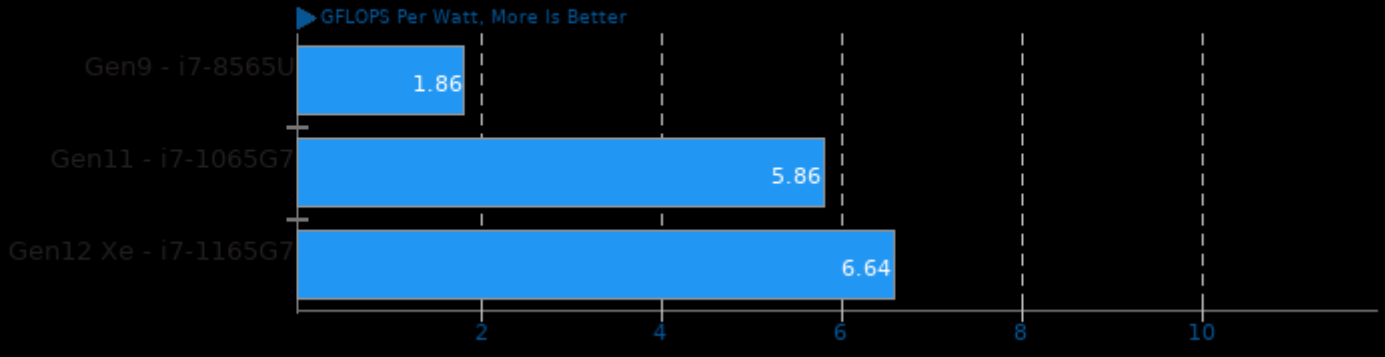
OpenCL LU Factorization



1. (CXX) g++ options: -rdynamic -lOpenCL

ViennaCL 1.4.2

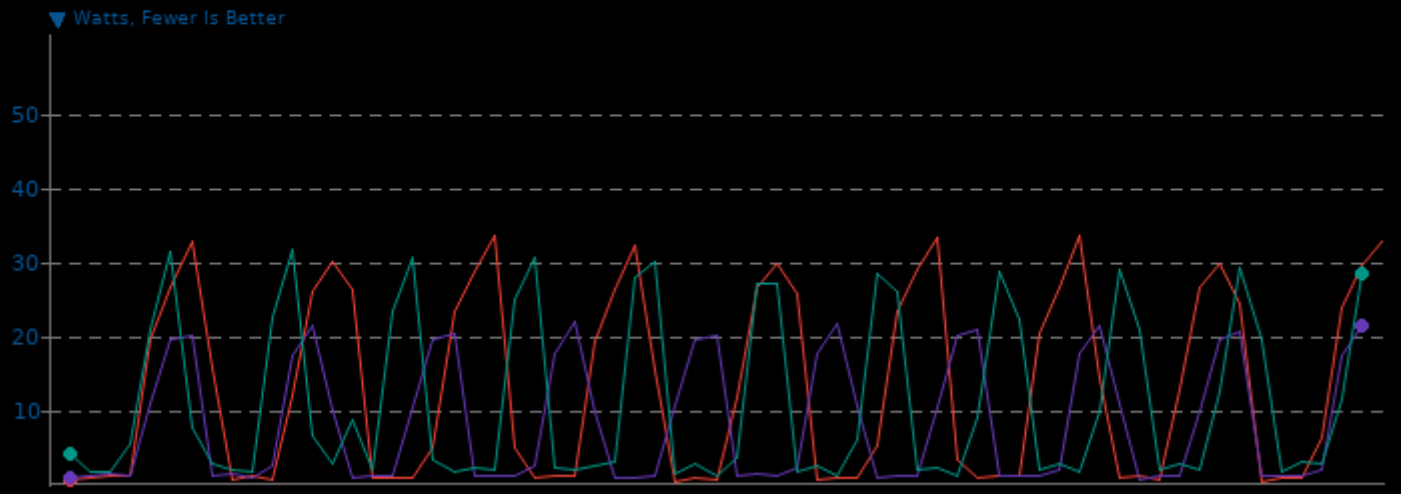
OpenCL LU Factorization



ViennaCL 1.4.2

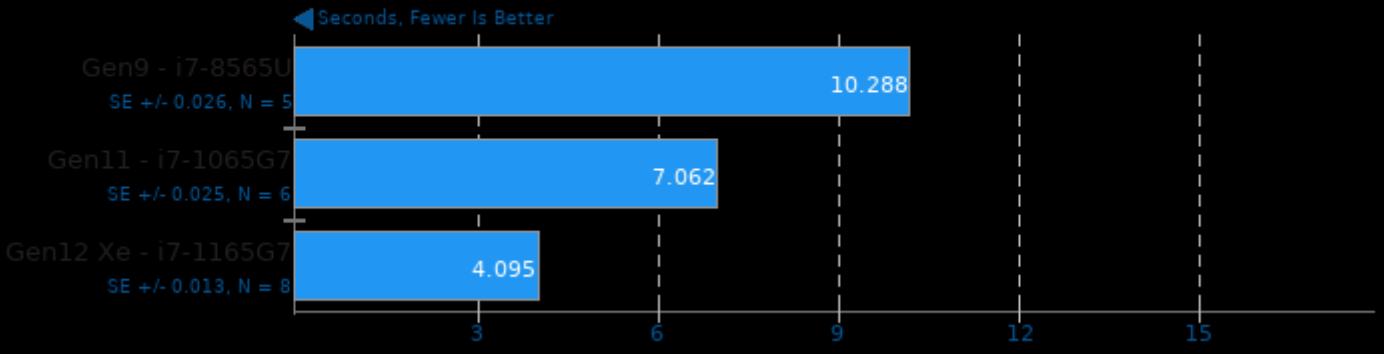
CPU Power Consumption Monitor

	Min	Avg	Max
Gen9 - i7-8565U	0.7	13.3	33.6
Gen11 - i7-1065G7	0.9	8.3	22.0
Gen12 Xe - i7-1165G7	1.3	11.1	31.7



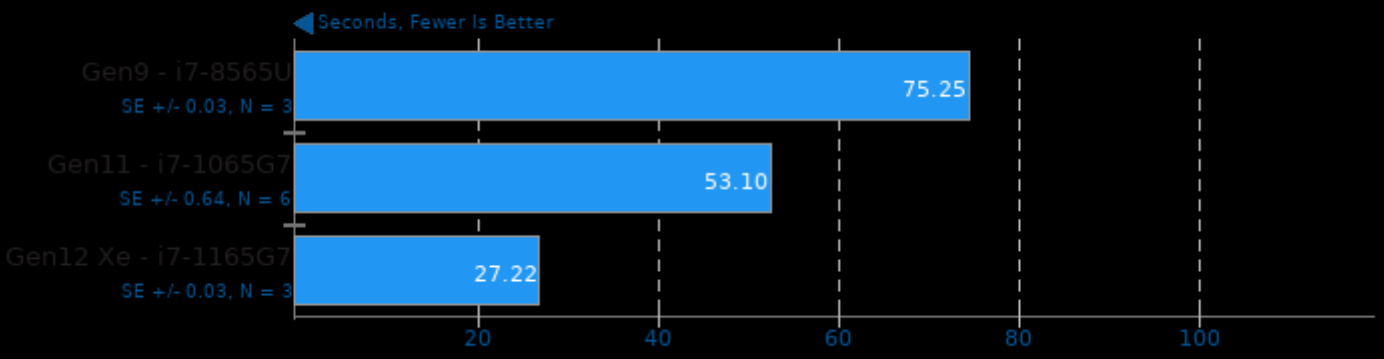
Waifu2x-NCNN Vulkan 20200818

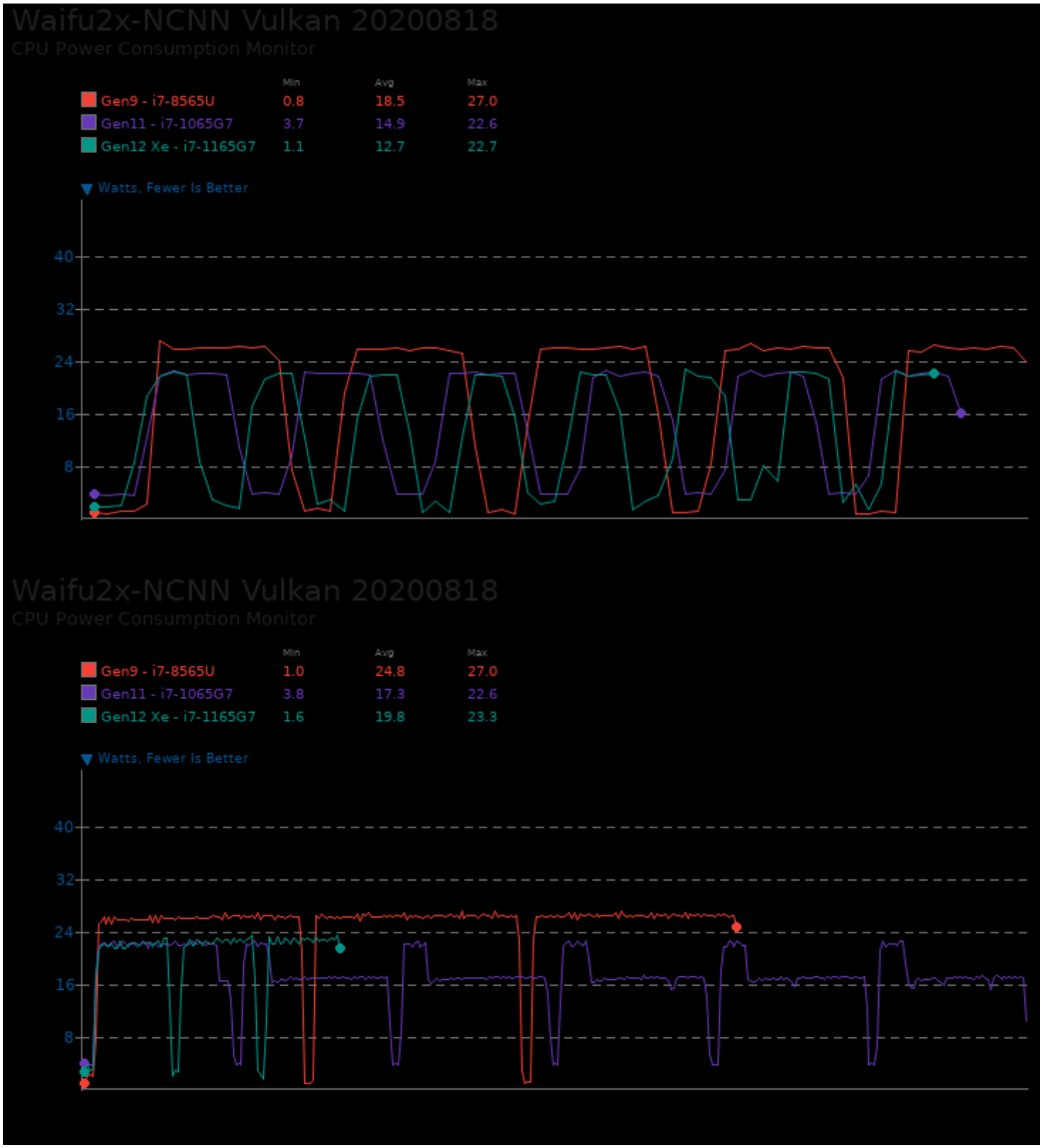
Scale: 2x - Denoise: 3 - TAA: No



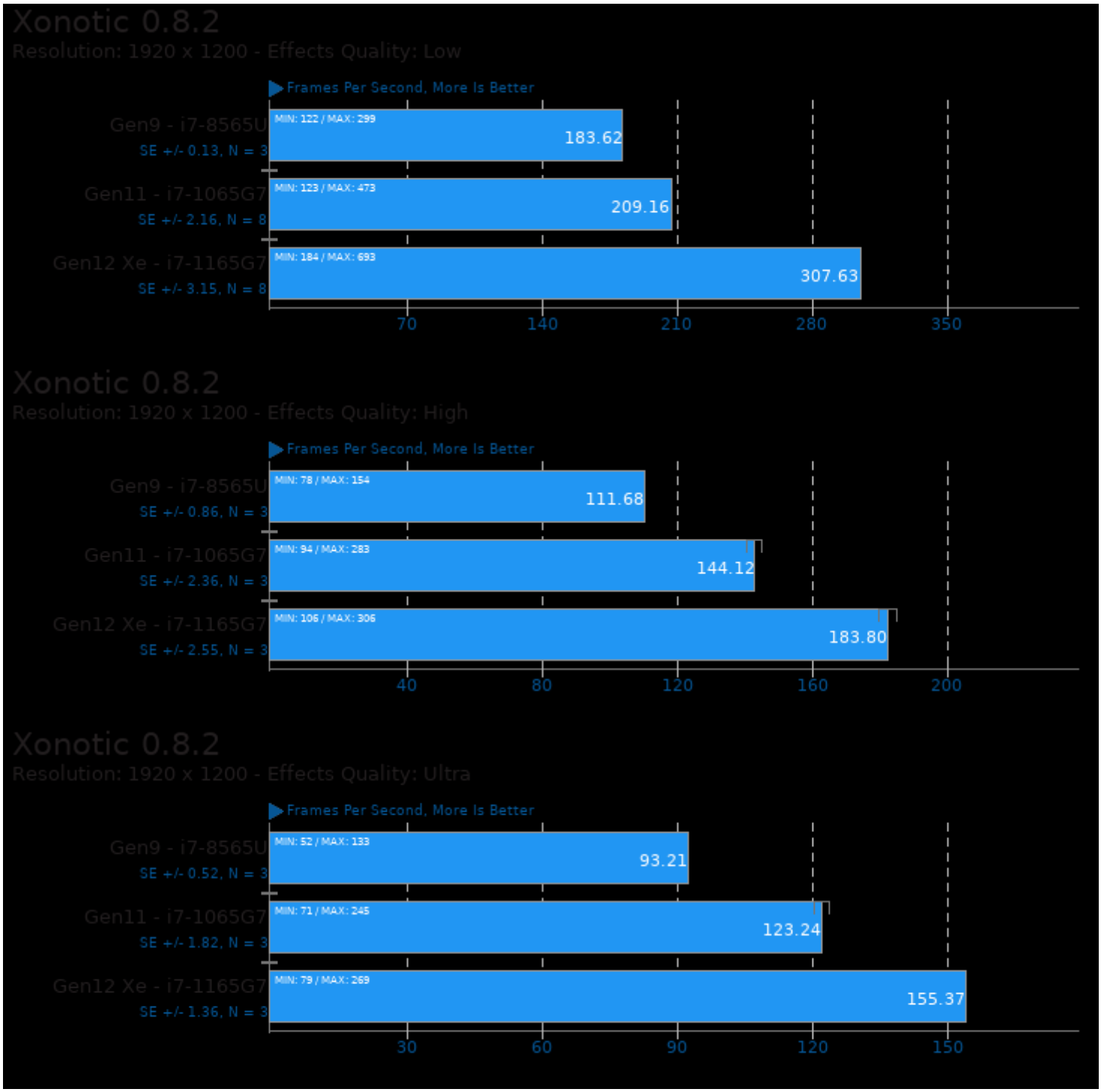
Waifu2x-NCNN Vulkan 20200818

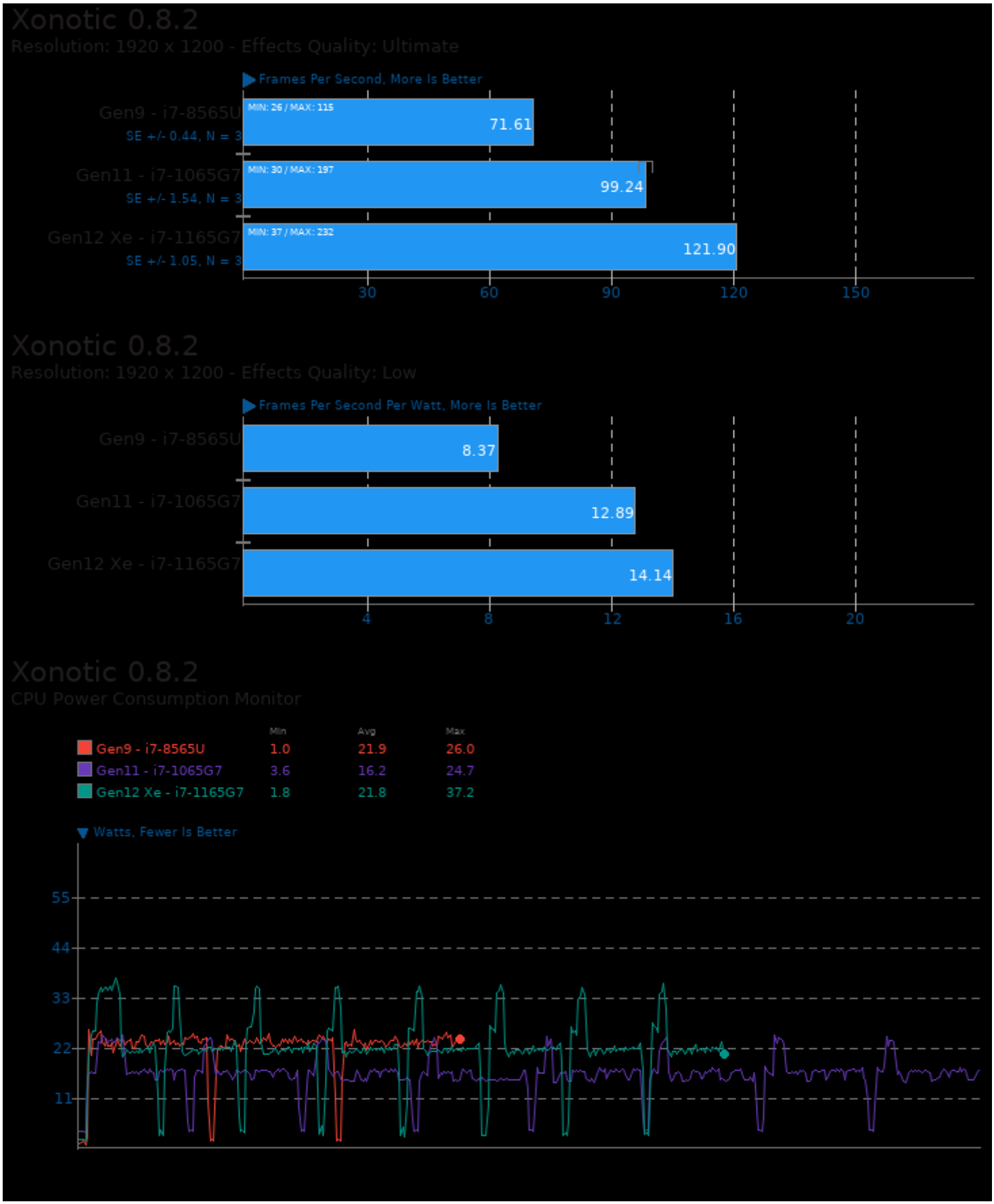
Scale: 2x - Denoise: 3 - TAA: Yes

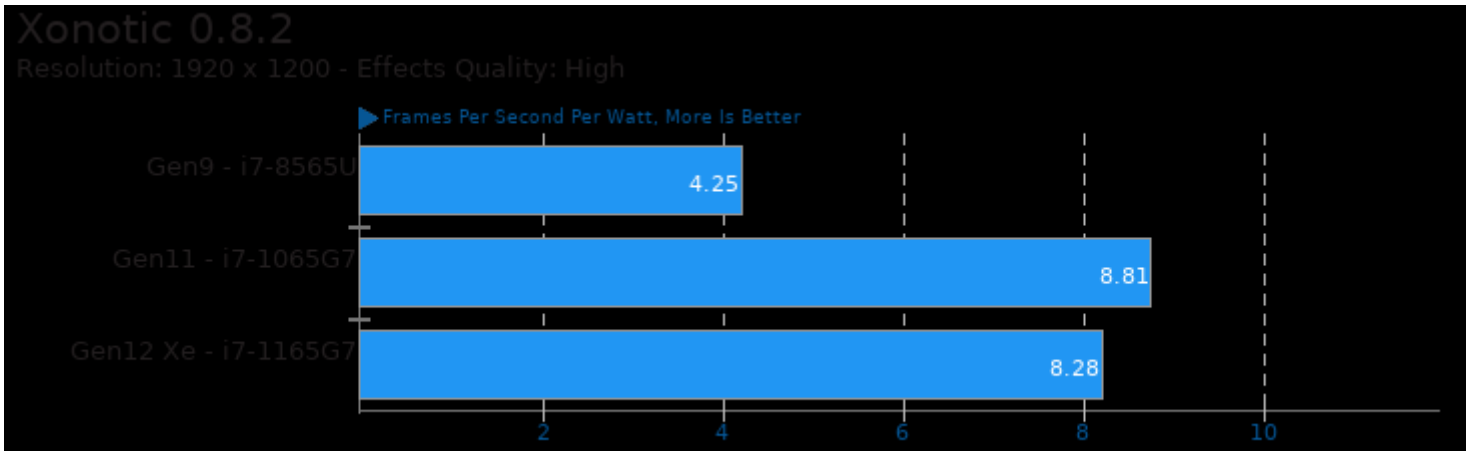



Waifu2x-NCNN Vulkan 20200818
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U 0.8 18.5 27.0
Gen11 - i7-1065G7 3.7 14.9 22.6
Gen12 Xe - i7-1165G7 1.1 12.7 22.7
Watts, Fewer Is Better
40
32
24
16
8
Waifu2x-NCNN Vulkan 20200818
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U 1.0 24.8 27.0
Gen11 - i7-1065G7 3.8 17.3 22.6
Gen12 Xe - i7-1165G7 1.6 19.8 23.3
Watts, Fewer Is Better
40
32
24
16
8

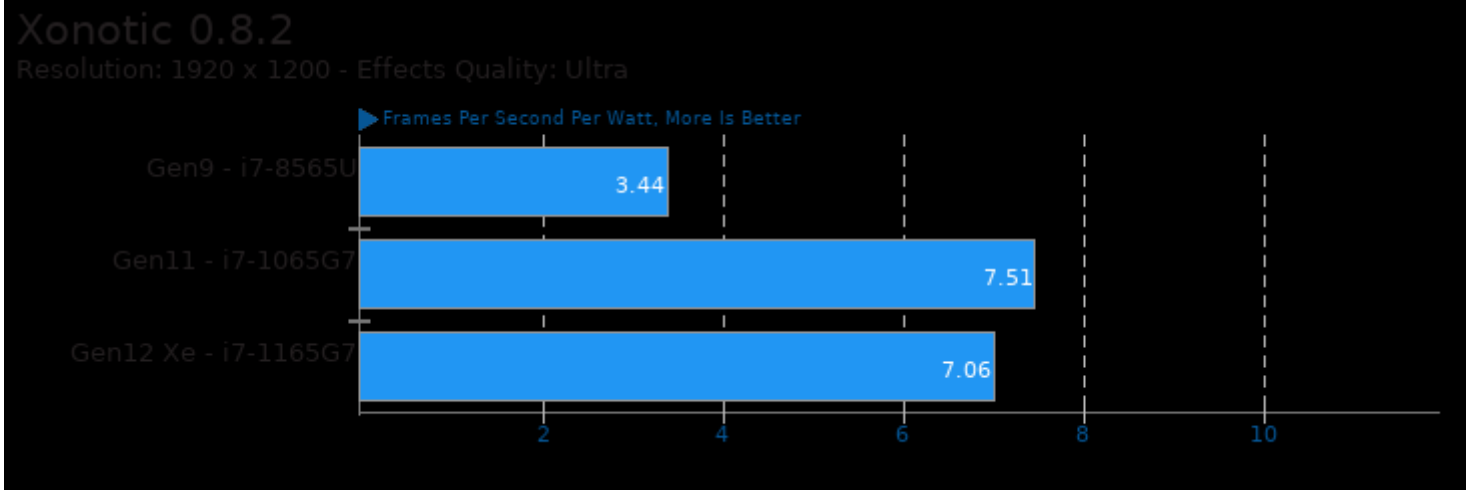
Tigerlake Xe Gen12 to Gen9



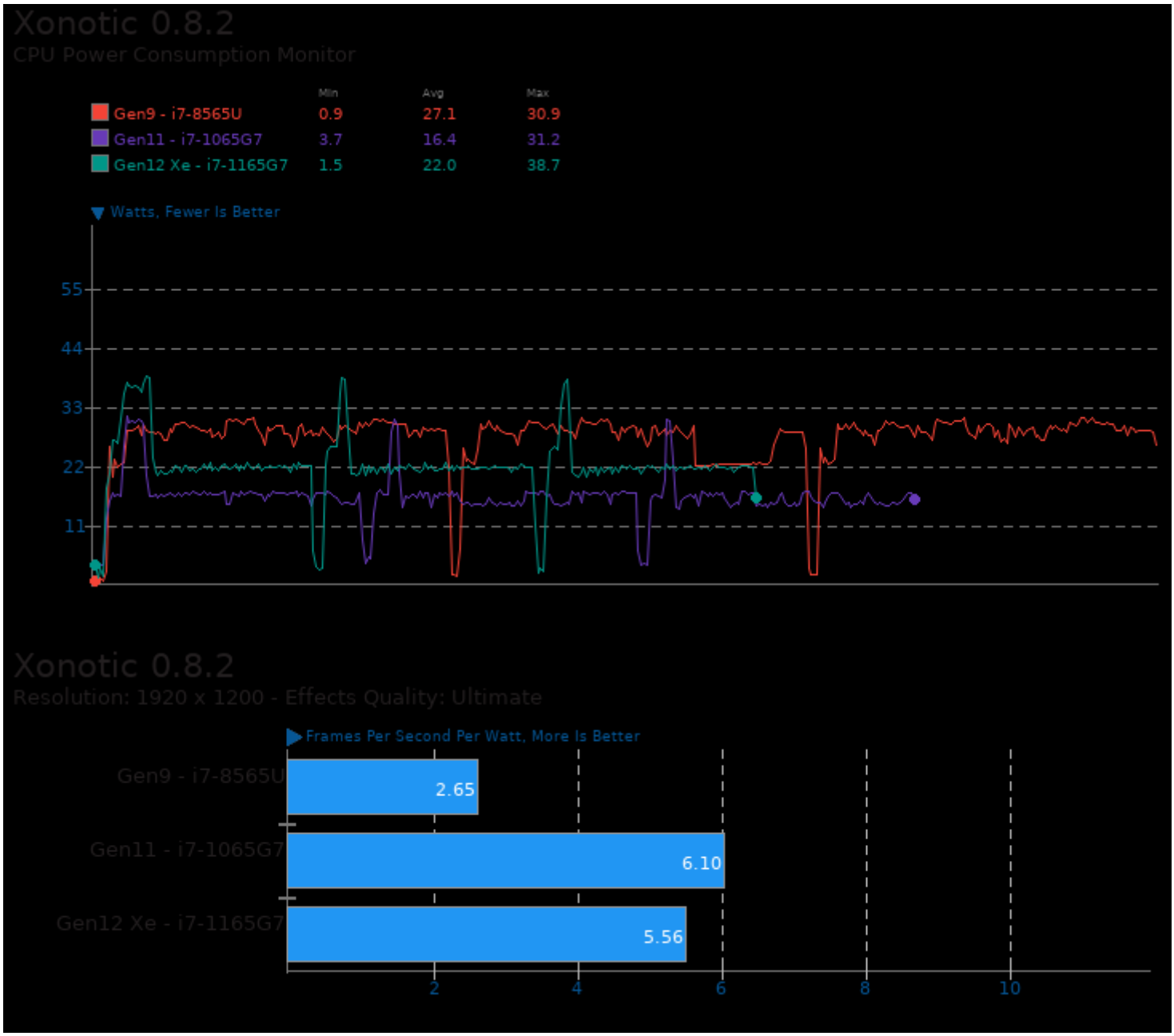

Xonotic 0.8.2
Resolution: 1920 x 1200 - Effects Quality: Ultimate
Frames Per Second, More Is Better
Gen9 - i7-8565U
SE +/- 0.44, N = 3
MIN: 26 / MAX: 115
71.61
Gen11 - i7-1065G7
SE +/- 1.54, N = 3
MIN: 30 / MAX: 197
99.24
Gen12 Xe - i7-1165G7
SE +/- 1.05, N = 3
MIN: 37 / MAX: 232
121.90
30
60
90
120
150
Xonotic 0.8.2
Resolution: 1920 x 1200 - Effects Quality: Low
Frames Per Second Per Watt, More Is Better
Gen9 - i7-8565U
8.37
Gen11 - i7-1065G7
12.89
Gen12 Xe - i7-1165G7
14.14
4
8
12
16
20
Xonotic 0.8.2
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U 1.0 21.9 26.0
Gen11 - i7-1065G7 3.6 16.2 24.7
Gen12 Xe - i7-1165G7 1.8 21.8 37.2
Watts, Fewer Is Better
55
44
33
22
11


Xonotic 0.8.2
Resolution: 1920 x 1200 - Effects Quality: High
Frames Per Second Per Watt, More Is Better
Gen9 - i7-8565U
4.25
Gen11 - i7-1065G7
8.81
Gen12 Xe - i7-1165G7
8.28
2
4
6
8
10

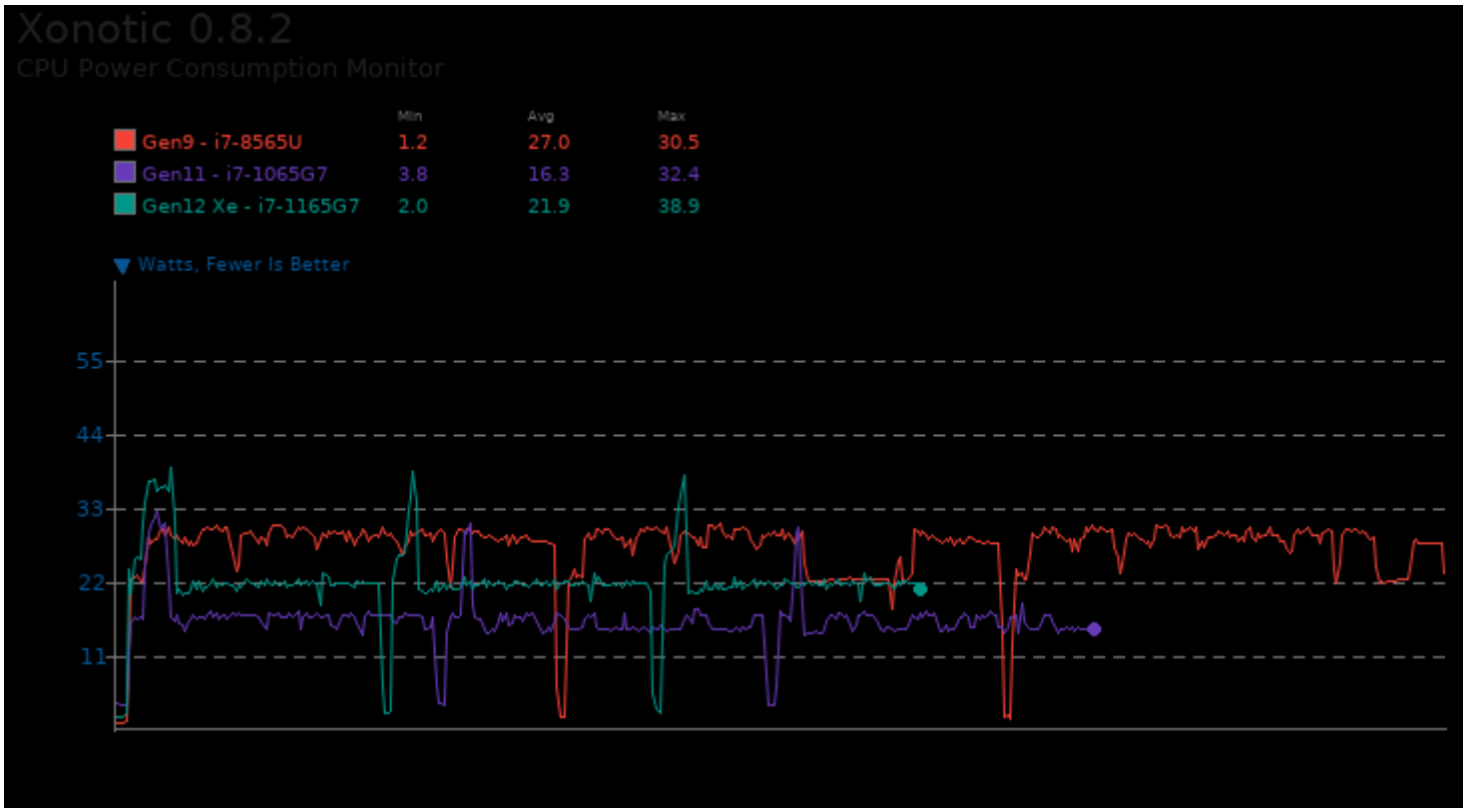

Xonotic 0.8.2
CPU Power Consumption Monitor
Min
Avg
Max
Gen9 - i7-8565U 1.0 26.2 30.3
Gen11 - i7-1065G7 3.8 16.4 29.9
Gen12 Xe - i7-1165G7 2.2 22.2 37.0
Watts, Fewer Is Better
55
44
33
22
11


Xonotic 0.8.2
Resolution: 1920 x 1200 - Effects Quality: Ultra
Frames Per Second Per Watt, More Is Better
Gen9 - i7-8565U
3.44
Gen11 - i7-1065G7
7.51
Gen12 Xe - i7-1165G7
7.06
2
4
6
8
10

Tigerlake Xe Gen12 to Gen9

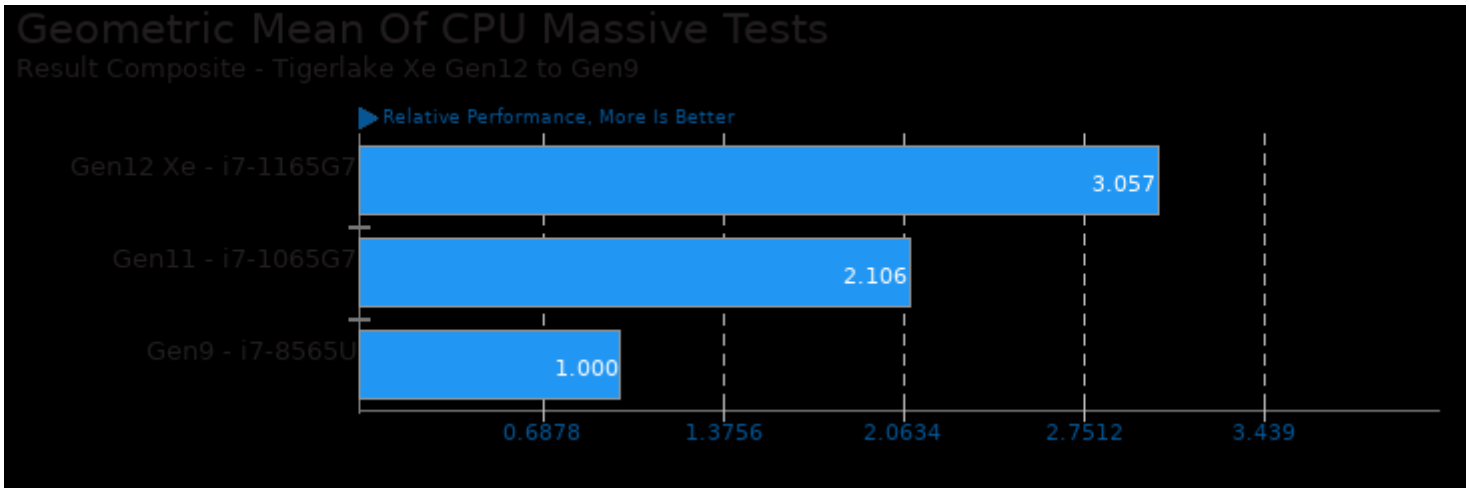


Tigerlake Xe Gen12 to Gen9

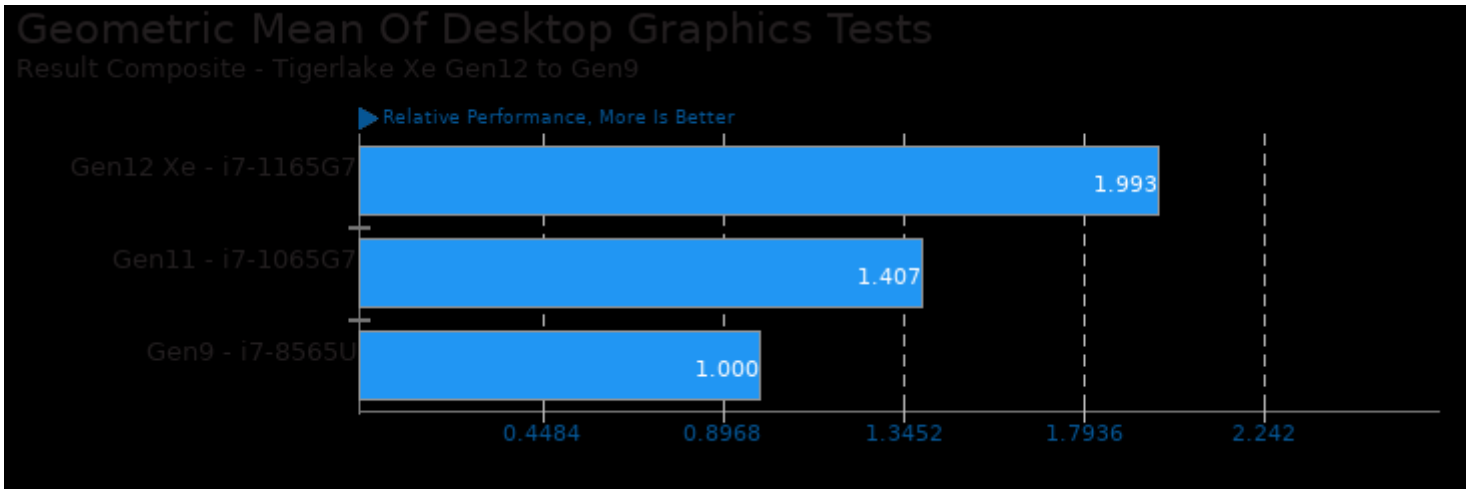


Tigerlake Xe Gen12 to Gen9

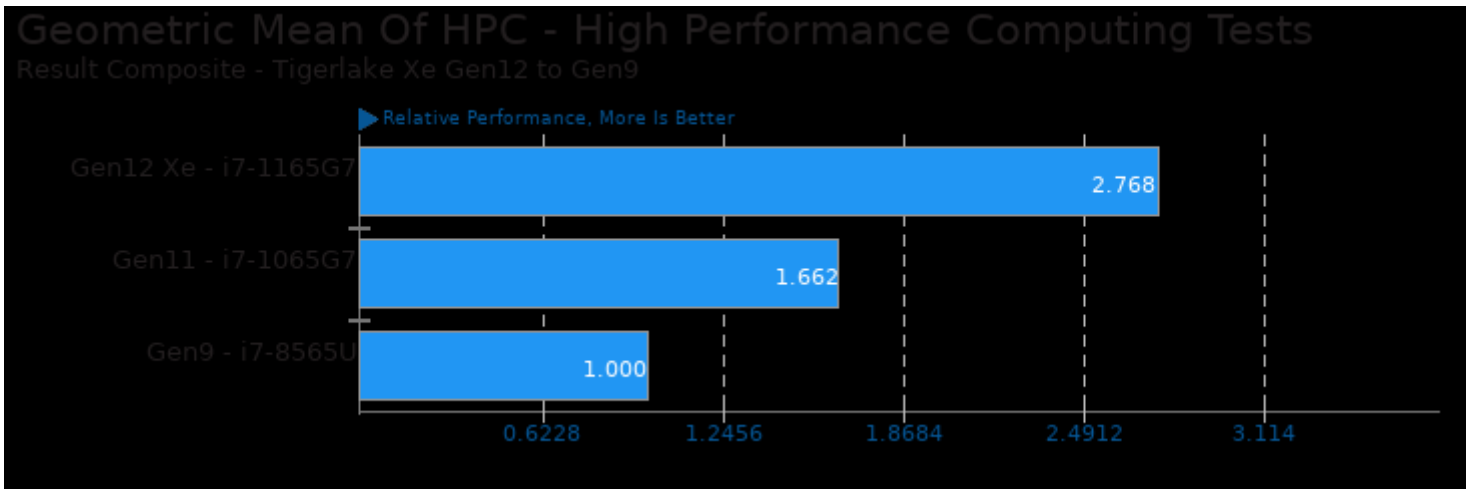
These geometric means are based upon test groupings / test suites for this result file.



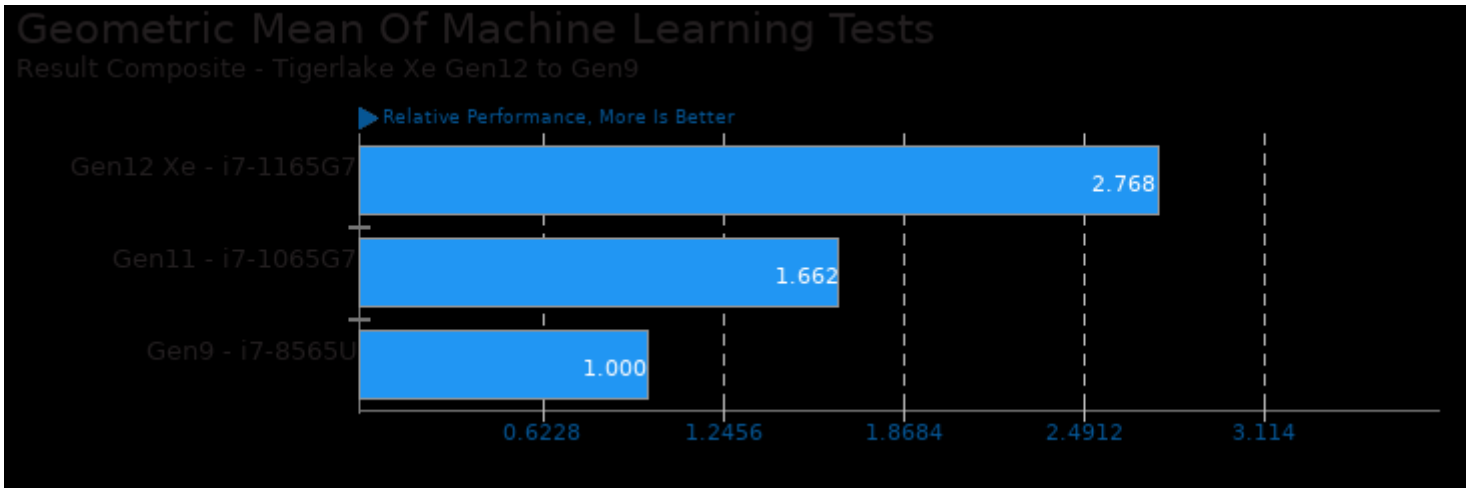
Geometric mean based upon tests: pts/lczero and pts/plaidml



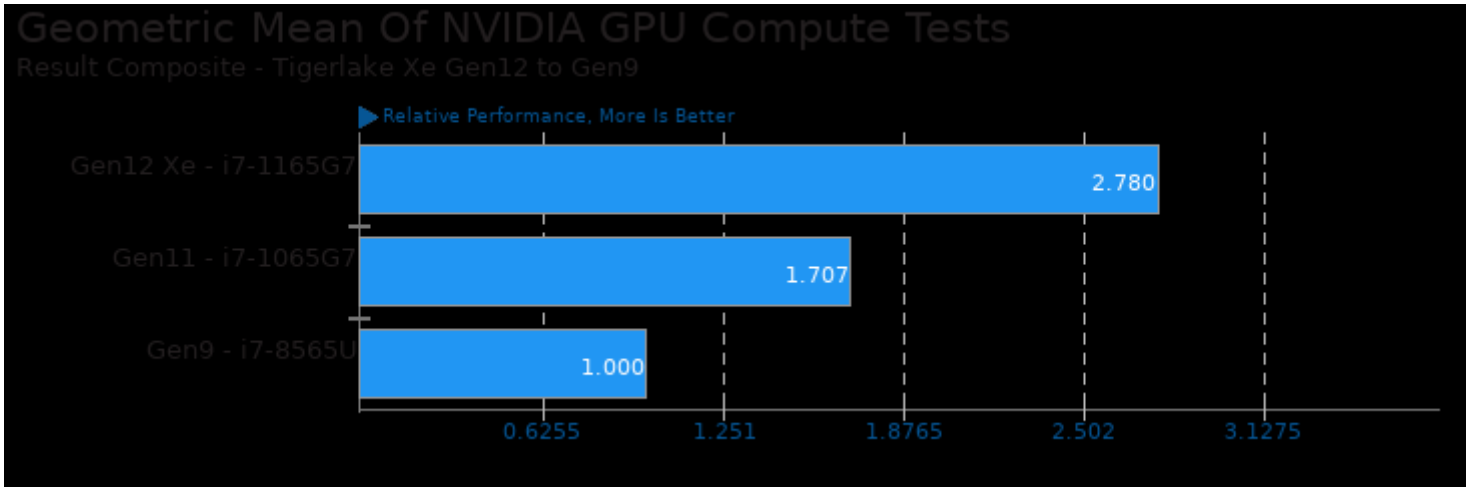
Geometric mean based upon tests: pts/xonotic, pts/tesseract, pts/unigine-valley and pts/unigine-heaven



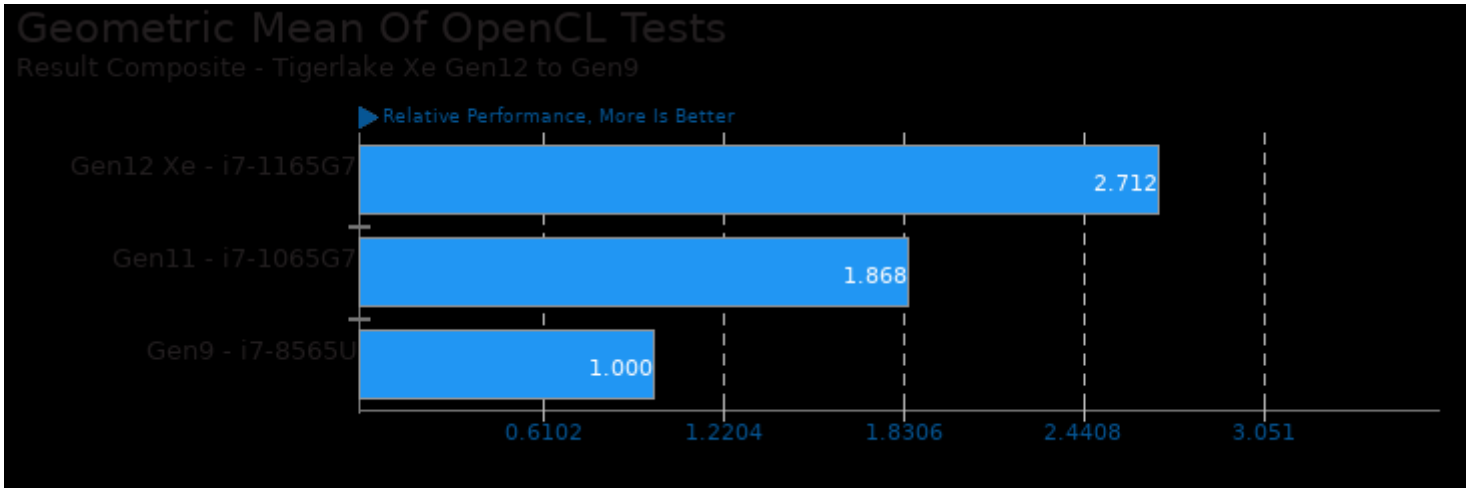
Geometric mean based upon tests: pts/ncnn, pts/shoc, pts/plaidml and pts/lczero



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

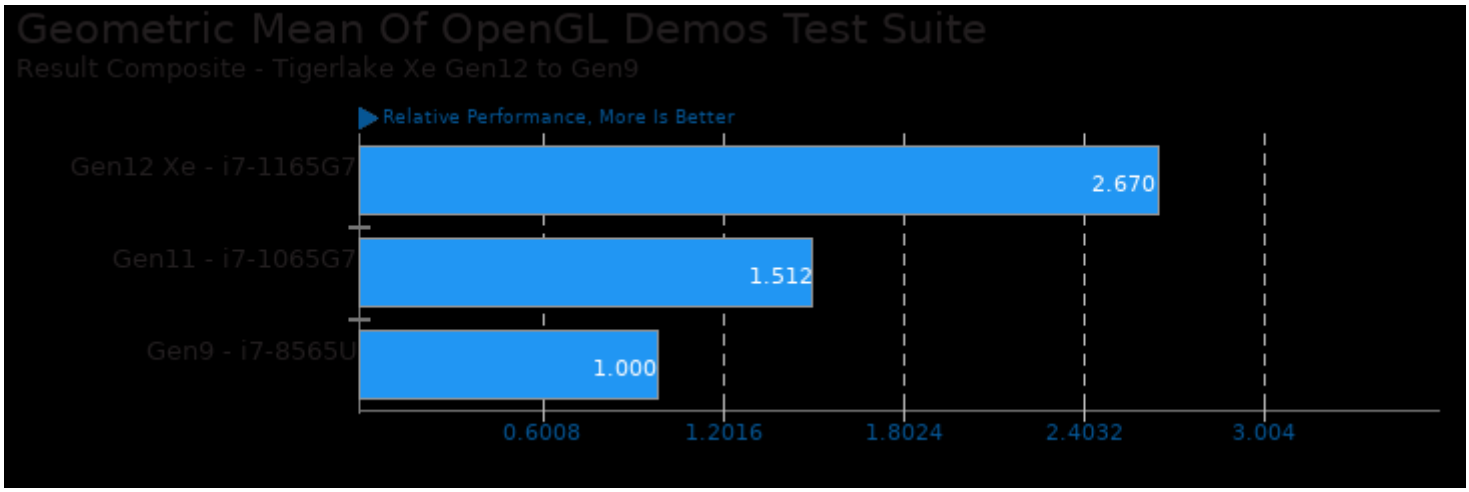


Geometric mean based upon tests: pts/clpeak, pts/financebench, pts/plaidml, pts/lczero, pts/cl-mem, pts/mandelgpu, pts/viennacl, pts/shoc, pts/ncnn, pts/realsr-ncnn and pts/waifu2x-ncnn

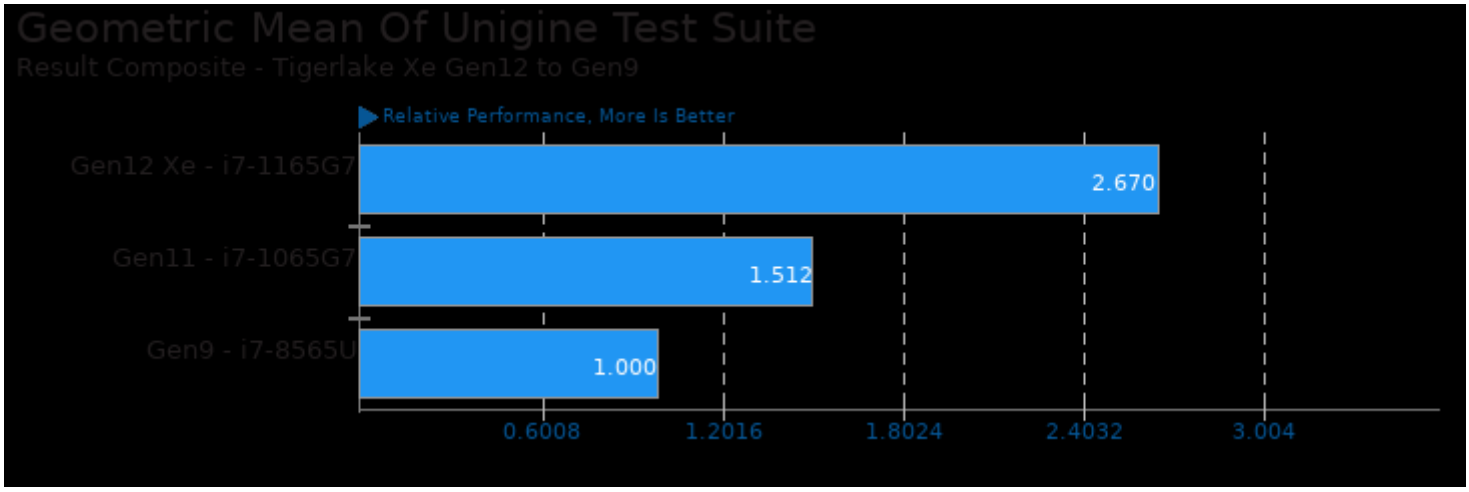


Geometric mean based upon tests: pts/juliagpu, pts/mandelgpu, pts/shoc, pts/cl-mem, pts/clpeak and pts/viennacl

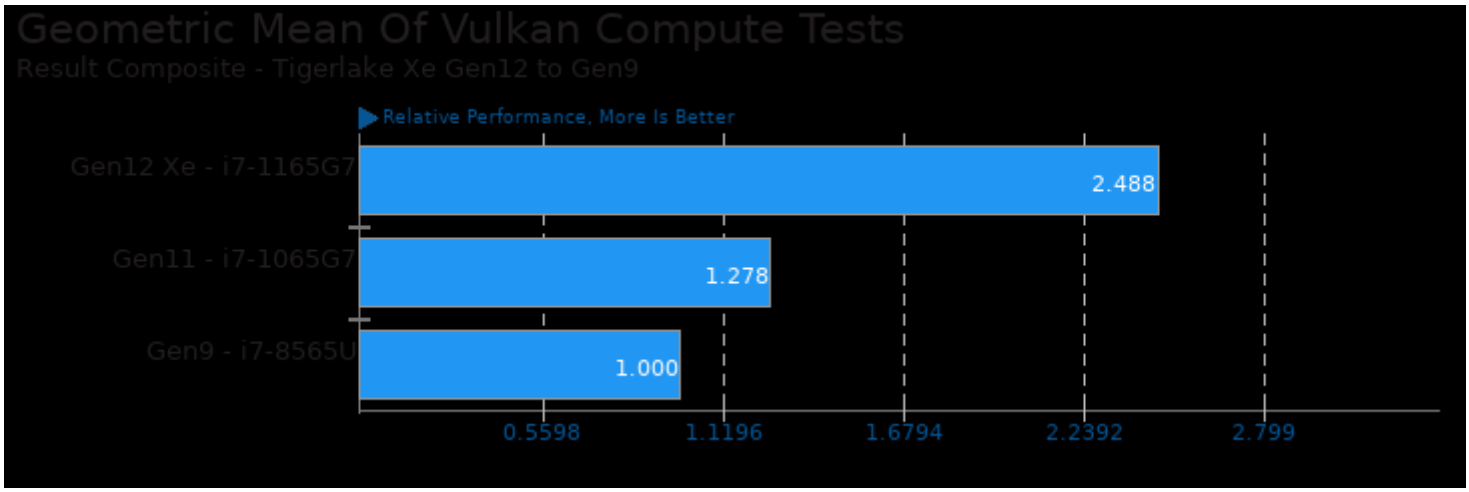
Tigerlake Xe Gen12 to Gen9



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



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



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

This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 12:15.