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xps-8940-thermal-validation

Dell XPS (8940) testing with an Intel Core i7-11700K and ASRock Radeon RX 6900 XT OC Formula 16 GB on Ubuntu 20.04.3.

Automated Executive Summary

BIOS 2.4.0 had the most wins, coming in first place for 53% of the tests.

Based on the geometric mean of all complete results, the fastest (BIOS 2.4.0) was 1.003x the speed of the slowest (XPS Performance).

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

Timed LLVM Compilation (Build System: Ninja) at 1.024x
srsRAN (Test: 4G PHY_DL_Test 100 PRB MIMO 64-QAM) at 1.021x
srsRAN (Test: 5G PHY_DL_NR Test 52 PRB SISO 64-QAM) at 1.017x
Y-Cruncher (Calculating 500M Pi Digits) at 1.013x
srsRAN (Test: 5G PHY_DL_NR Test 52 PRB SISO 64-QAM) at 1.013x
srsRAN (Test: 4G PHY_DL_Test 100 PRB SISO 256-QAM) at 1.008x
srsRAN (Test: 4G PHY_DL_Test 100 PRB SISO 64-QAM) at 1.007x
srsRAN (Test: 5G PHY_DL_NR Test 270 PRB SISO 256-QAM) at 1.006x
srsRAN (Test: 4G PHY_DL_Test 100 PRB MIMO 256-QAM) at 1.005x

srsRAN (Test: OFDM_Test) at 1.002x.

Test Systems:

XPS Performance

Processor: Intel Core i7-11700K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: Dell 0K3CM7 (2.3.0 BIOS), Chipset: Intel Comet Lake PCH, Memory: 16GB, Disk: SK hynix BC511 NVMe 256GB + 4001GB Seagate ST4000DM004-2CV1 + 1000GB CT1000MX500SSD1, Graphics: Intel RKL GT1 3GB (1300MHz), Audio: Realtek ALC3861, Monitor: DELL P2415Q, Network: Realtek Device 2600 + Intel Wi-Fi 6 AX201

OS: Ubuntu 20.04, Kernel: 5.14.0-1007-oem (x86_64), Desktop: GNOME Shell 3.36.9, Display Server: X Server 1.20.11, OpenGL: 4.6 Mesa 21.0.3, OpenCL: OpenCL 3.0, Vulkan: 1.2.145, Compiler: GCC 10.3.0, File-System: ext4, Screen Resolution: 3840x2160

Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --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-link-mutex --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-S4I5Pr/gcc-10-10.3.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-S4I5Pr/gcc-10-10.3.0/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-build-config=bootstrap-lto-lean --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 performance - CPU Microcode: 0x40 - Thermald 1.9.1
Python Notes: Python 3.8.10
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

BIOS 2.4.0

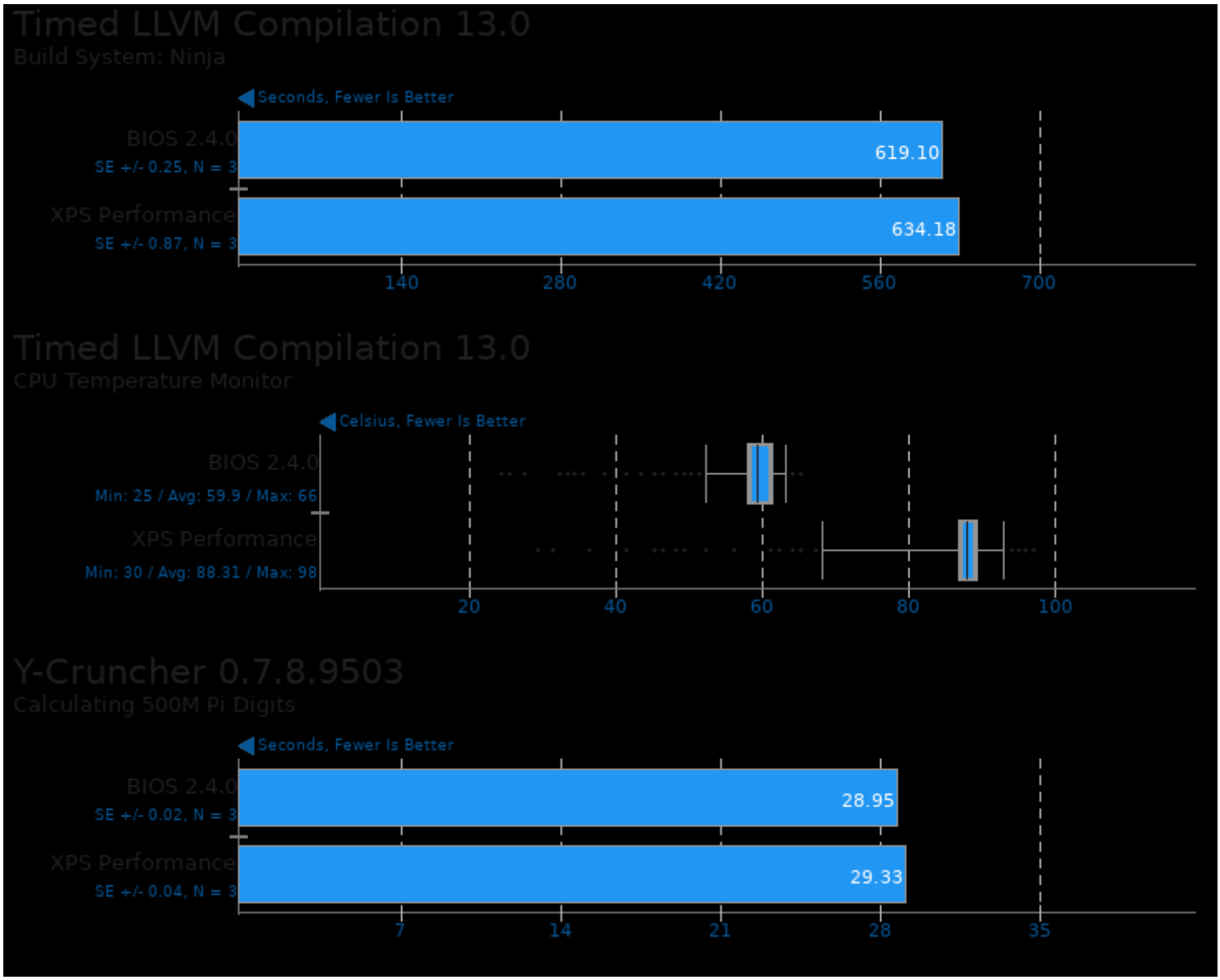
Processor: Intel Core i7-11700K @ 5.00GHz (8 Cores / 16 Threads), Motherboard: Dell 0K3CM7 (2.4.0 BIOS), Chipset: Intel Comet Lake PCH, Memory: 16GB, Disk: SK hynix BC511 NVMe 256GB + 4001GB Seagate ST4000DM004-2CV1 + 1000GB CT1000MX500SSD1, Graphics: AMD SIENNA_CICHLID 16GB (2720/1000MHz), Audio: Realtek ALC3861, Monitor: LG TV SSCR2, Network: Realtek Device 2600 + Intel Wi-Fi 6 AX201

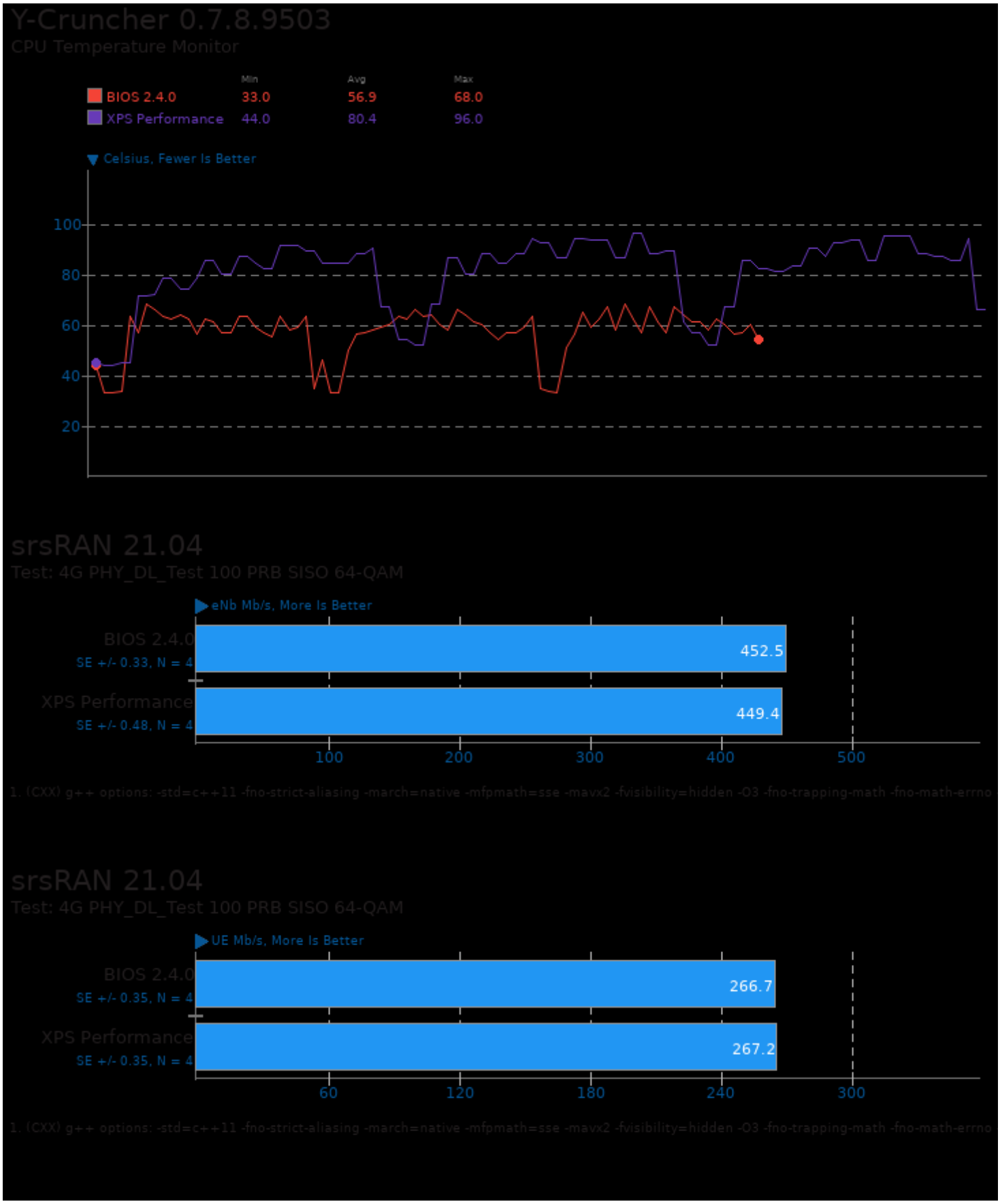
OS: Ubuntu 20.04, Kernel: 5.11.0-46-generic (x86_64), Desktop: GNOME Shell 3.36.9, Display Server: X Server 1.20.13, OpenGL: 4.6 Mesa 21.0.3 (LLVM 12.0.0), OpenCL: OpenCL 3.0 + OpenCL 2.2 AMD-APP (3361.0), Vulkan: 1.2.145, Compiler: GCC 10.3.0, File-System: ext4, Screen Resolution: 3840x2160

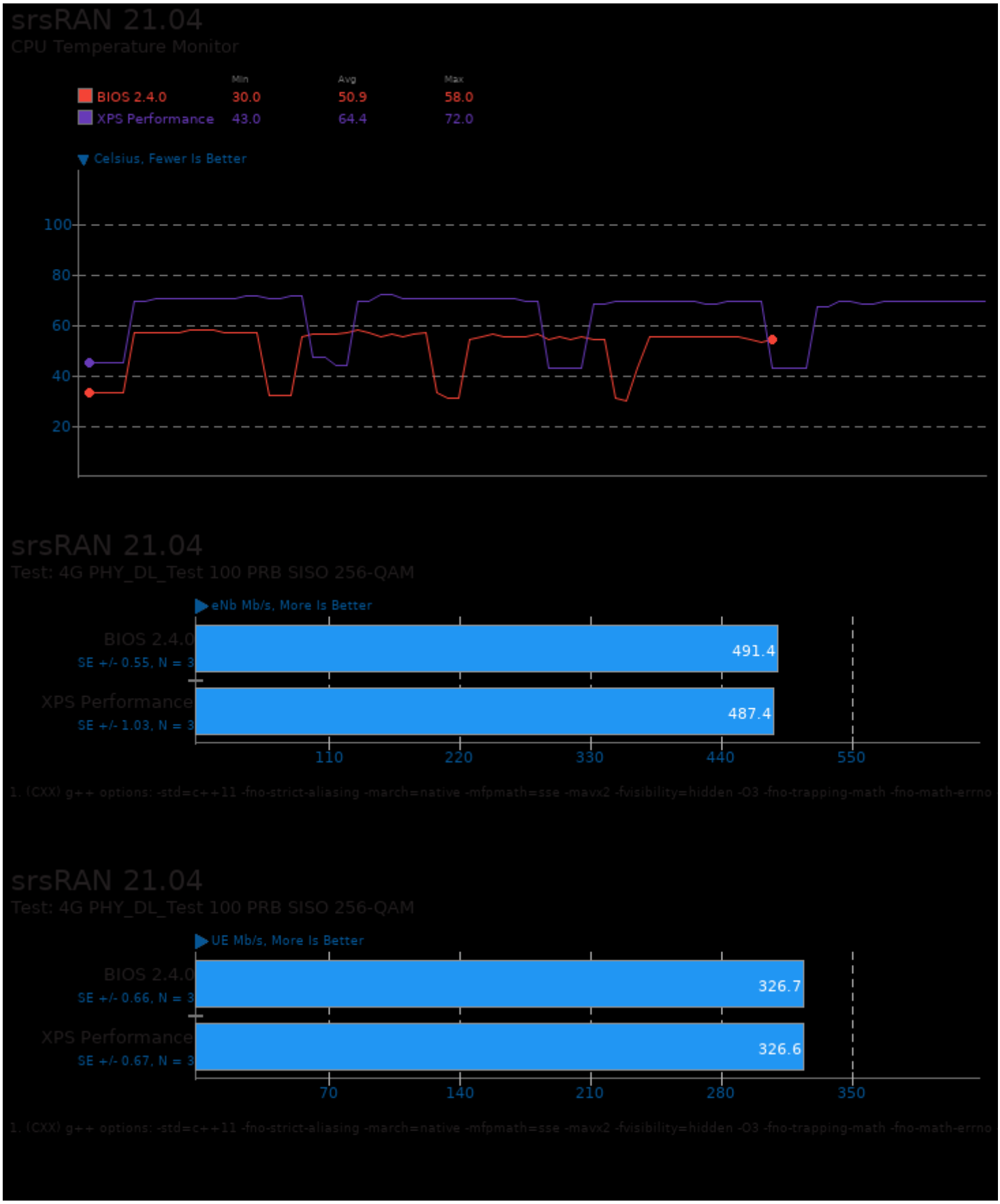
Kernel Notes: Transparent Huge Pages: madvise
Compiler Notes: --build=x86_64-linux-gnu --disable-vtable-verify --disable-werror --enable-bootstrap --enable-checking=release --enable-clocale=gnu --enable-default-pie --enable-gnu-unique-object --enable-languages=c,ada,c++,go,brig,d,fortran,objc,obj-c++,m2 --enable-libphobos-checking=release --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-link-mutex --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc=auto --enable-offload-targets=nvptx-none=/build/gcc-10-S4I5Pr/gcc-10-10.3.0/debian/tmp-nvptx/usr,amdgcn-amdhsa=/build/gcc-10-S4I5Pr/gcc-10-10.3.0/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-build-config=bootstrap-lto-lean --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 performance (EPP: performance) - CPU Microcode: 0x50 - Thermald 1.9.1
Python Notes: Python 3.8.10
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

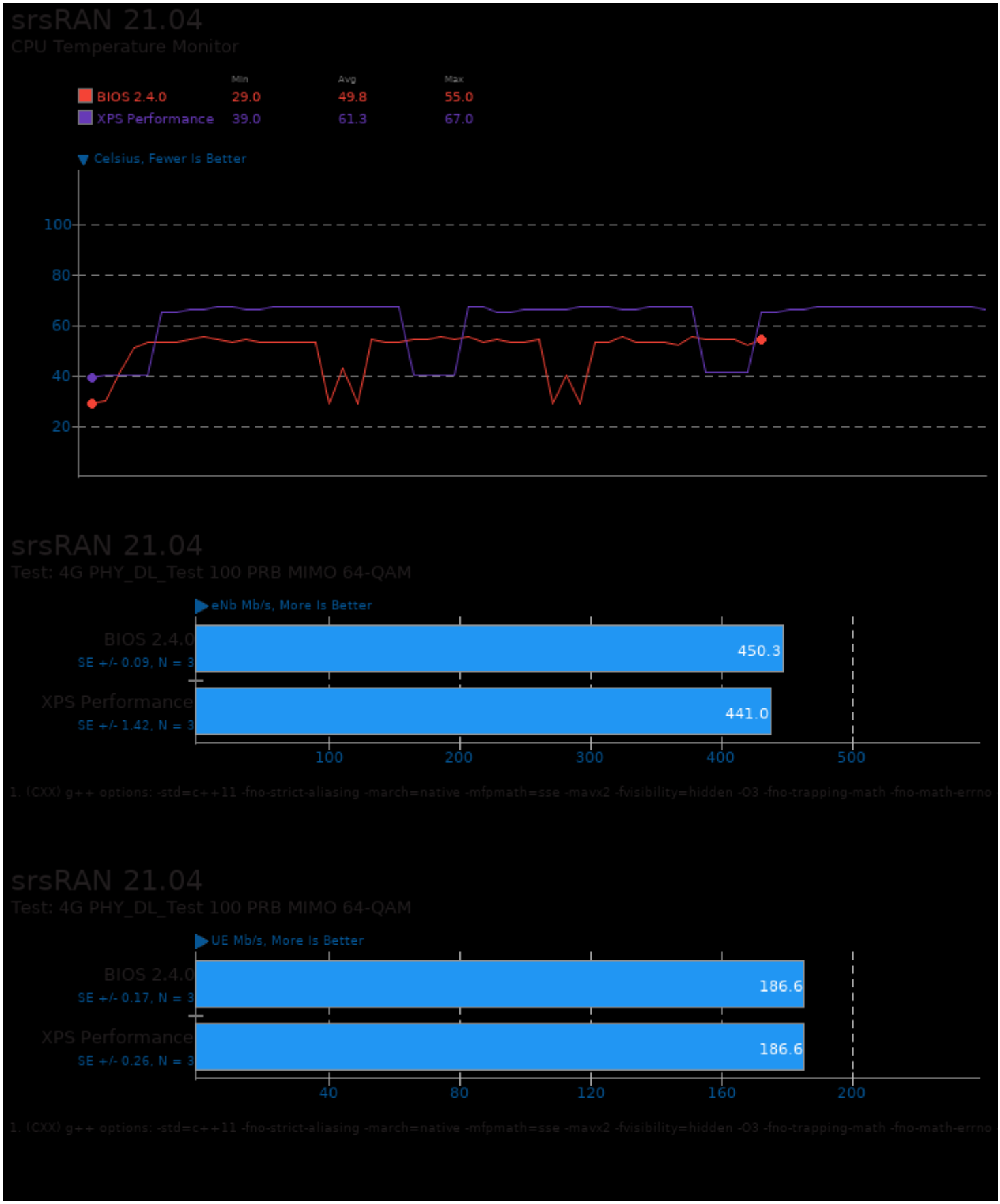
xps-8940-thermal-validation

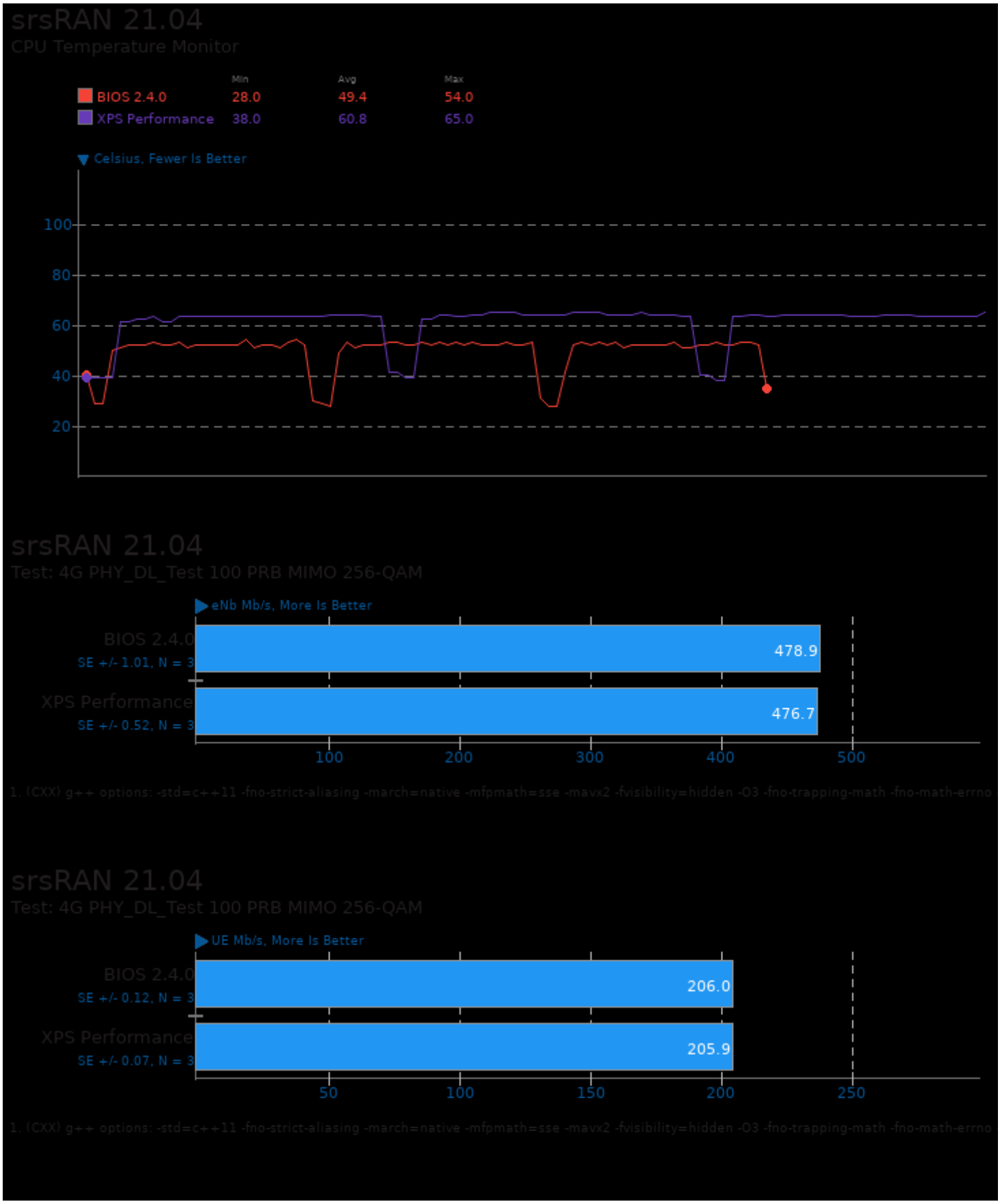
	XPS Performance	BIOS 2.4.0
Timed LLVM Compilation - Ninja (sec)	634.180	619.103
Normalized	97.62%	100%
Standard Deviation	0.2%	0.1%
Y-Cruncher - C.5.P.D (sec)	29.326	28.946
Normalized	98.7%	100%
Standard Deviation	0.3%	0.1%
srsRAN - 4.P.1.P.S.6.Q (eNb Mb/s)	449.4	452.5
Normalized	99.31%	100%
Standard Deviation	0.2%	0.1%
srsRAN - 4.P.1.P.S.6.Q (UE Mb/s)	267.2	266.7
Normalized	100%	99.81%
Standard Deviation	0.3%	0.3%
srsRAN - 4.P.1.P.S.2.Q (eNb Mb/s)	487.4	491.4
Normalized	99.19%	100%
Standard Deviation	0.4%	0.2%
srsRAN - 4.P.1.P.S.2.Q (UE Mb/s)	326.6	326.7
Normalized	99.97%	100%
Standard Deviation	0.4%	0.3%
srsRAN - 4.P.1.P.M.6.Q (eNb Mb/s)	441.0	450.3
Normalized	97.93%	100%
Standard Deviation	0.6%	0%
srsRAN - 4.P.1.P.M.6.Q (UE Mb/s)	186.6	186.6
Standard Deviation	0.2%	0.2%
srsRAN - 4.P.1.P.M.2.Q (eNb Mb/s)	476.7	478.9
Normalized	99.54%	100%
Standard Deviation	0.2%	0.4%
srsRAN - 4.P.1.P.M.2.Q (UE Mb/s)	205.9	206.0
Normalized	99.95%	100%
Standard Deviation	0.1%	0.1%
srsRAN - 5.P.T.5.P.S.6.Q (eNb Mb/s)	172.3	170.1
Normalized	100%	98.72%
Standard Deviation	0.7%	2.5%
srsRAN - 5.P.T.5.P.S.6.Q (UE Mb/s)	110.8	108.9
Normalized	100%	98.29%
Standard Deviation	0.9%	0.7%
srsRAN - 5.P.T.2.P.S.2.Q (eNb Mb/s)	200.7	199.6
Normalized	100%	99.45%
Standard Deviation	0.3%	0.2%
srsRAN - 5.P.T.2.P.S.2.Q (UE Mb/s)	152.1	152.1
Standard Deviation	0.4%	0.5%
srsRAN - OFDM_Test (Samples / Second)	179633333	179233333
Normalized	100%	99.78%
Standard Deviation	1.4%	0.2%

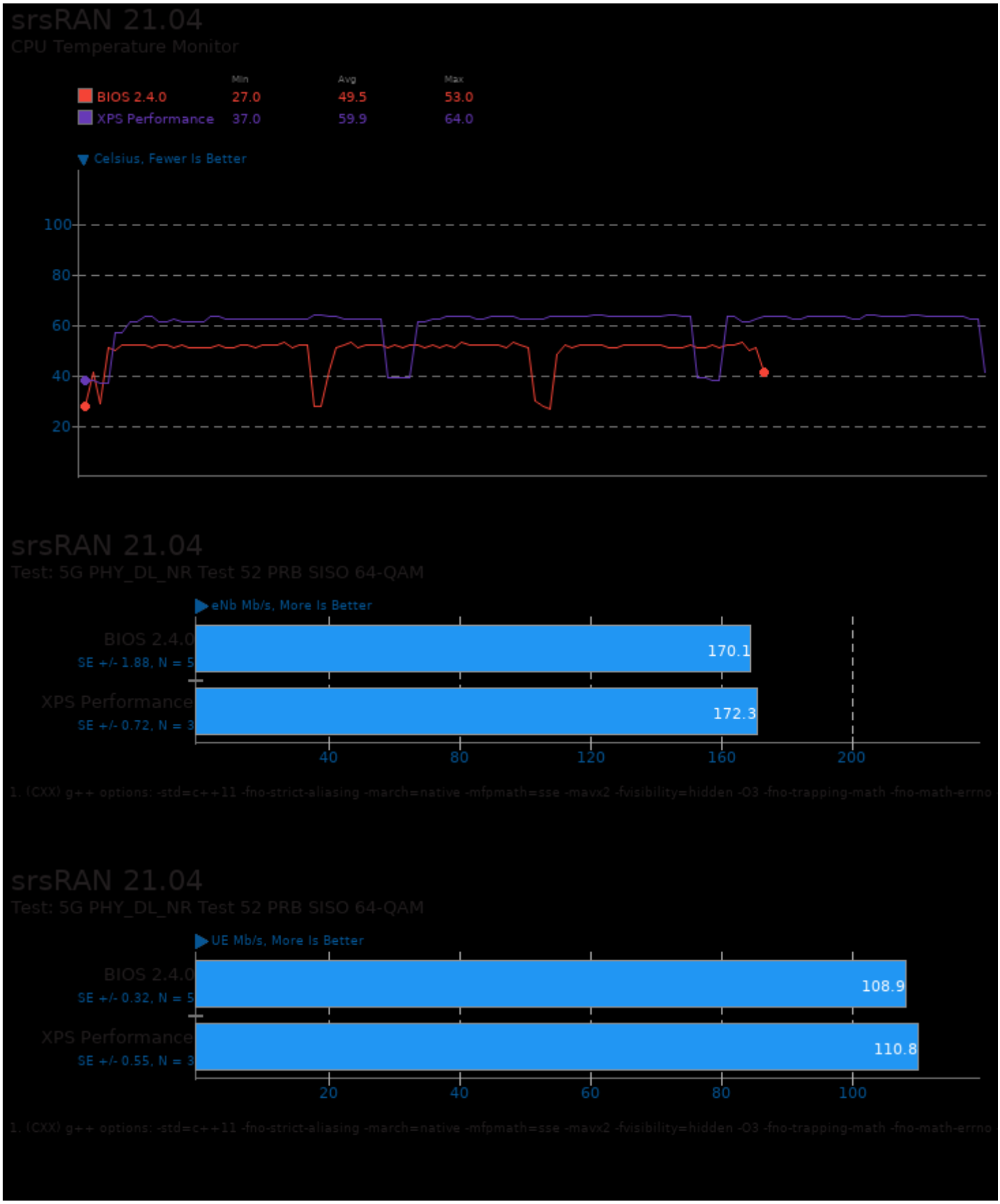

Timed LLVM Compilation 13.0
Build System: Ninja
Seconds, Fewer Is Better
BIOS 2.4.0
SE +/- 0.25, N = 3
619.10
XPS Performance
SE +/- 0.87, N = 3
634.18
140
280
420
560
700
Timed LLVM Compilation 13.0
CPU Temperature Monitor
Celsius, Fewer Is Better
BIOS 2.4.0
Min: 25 / Avg: 59.9 / Max: 66
XPS Performance
Min: 30 / Avg: 88.31 / Max: 98
20
40
60
80
100
Y-Cruncher 0.7.8.9503
Calculating 500M Pi Digits
Seconds, Fewer Is Better
BIOS 2.4.0
SE +/- 0.02, N = 3
28.95
XPS Performance
SE +/- 0.04, N = 3
29.33
7
14
21
28
35

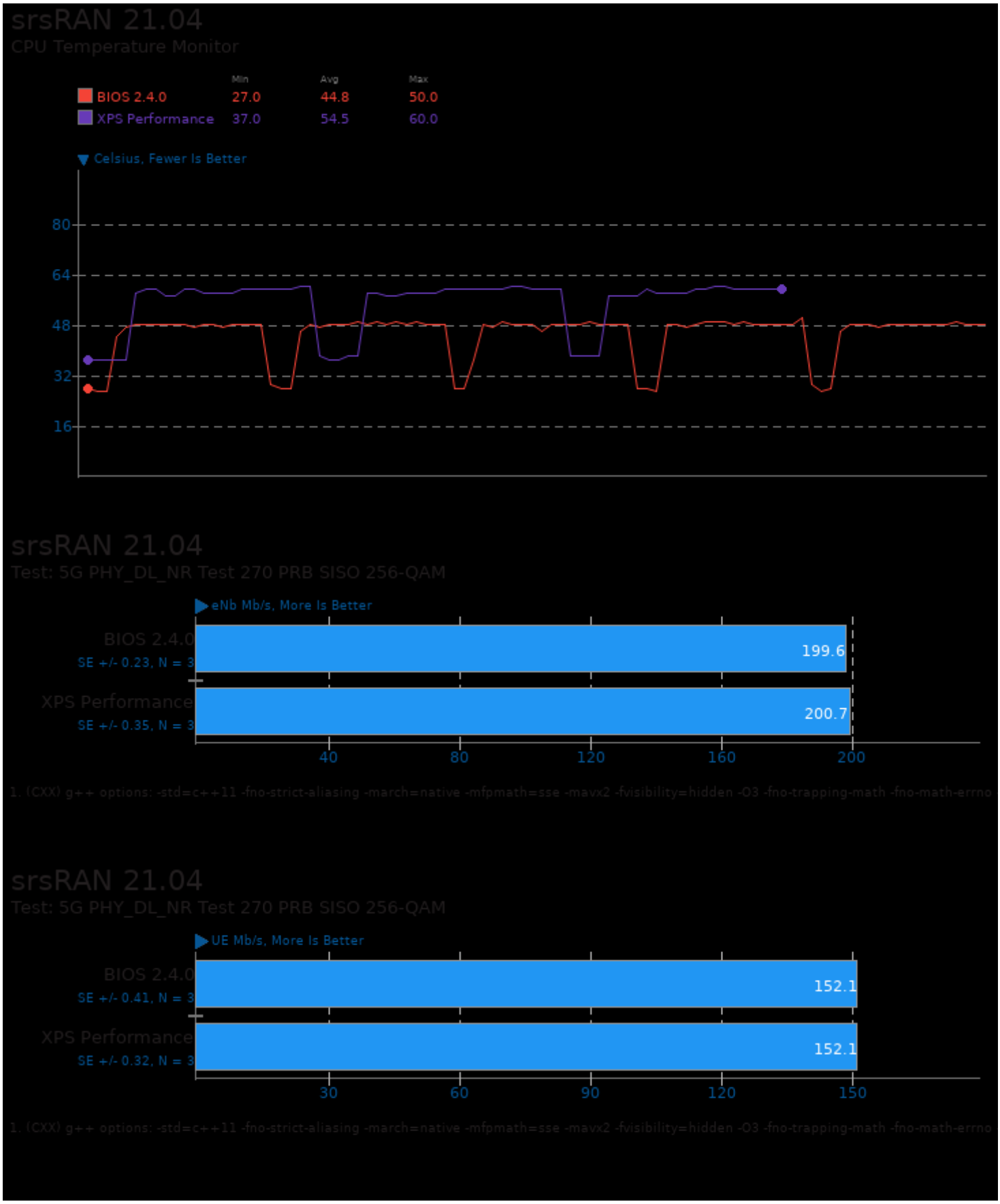

Y-Cruncher 0.7.8.9503
CPU Temperature Monitor
Min
Avg
Max
BIOS 2.4.0
33.0
56.9
68.0
XPS Performance
44.0
80.4
96.0
Celsius, Fewer Is Better
100
80
60
40
20
srsRAN 21.04
Test: 4G PHY_DL_Test 100 PRB SISO 64-QAM
eNb Mb/s, More Is Better
BIOS 2.4.0
SE +/- 0.33, N = 4
452.5
XPS Performance
SE +/- 0.48, N = 4
449.4
100
200
300
400
500
1. (CXX) g++ options: -std=c++11 -fno-strict-aliasing -march=native -mfpmath=sse -mavx2 -fvisibility=hidden -O3 -fno-trapping-math -fno-math-errno
srsRAN 21.04
Test: 4G PHY_DL_Test 100 PRB SISO 64-QAM
UE Mb/s, More Is Better
BIOS 2.4.0
SE +/- 0.35, N = 4
266.7
XPS Performance
SE +/- 0.35, N = 4
267.2
60
120
180
240
300
1. (CXX) g++ options: -std=c++11 -fno-strict-aliasing -march=native -mfpmath=sse -mavx2 -fvisibility=hidden -O3 -fno-trapping-math -fno-math-errno

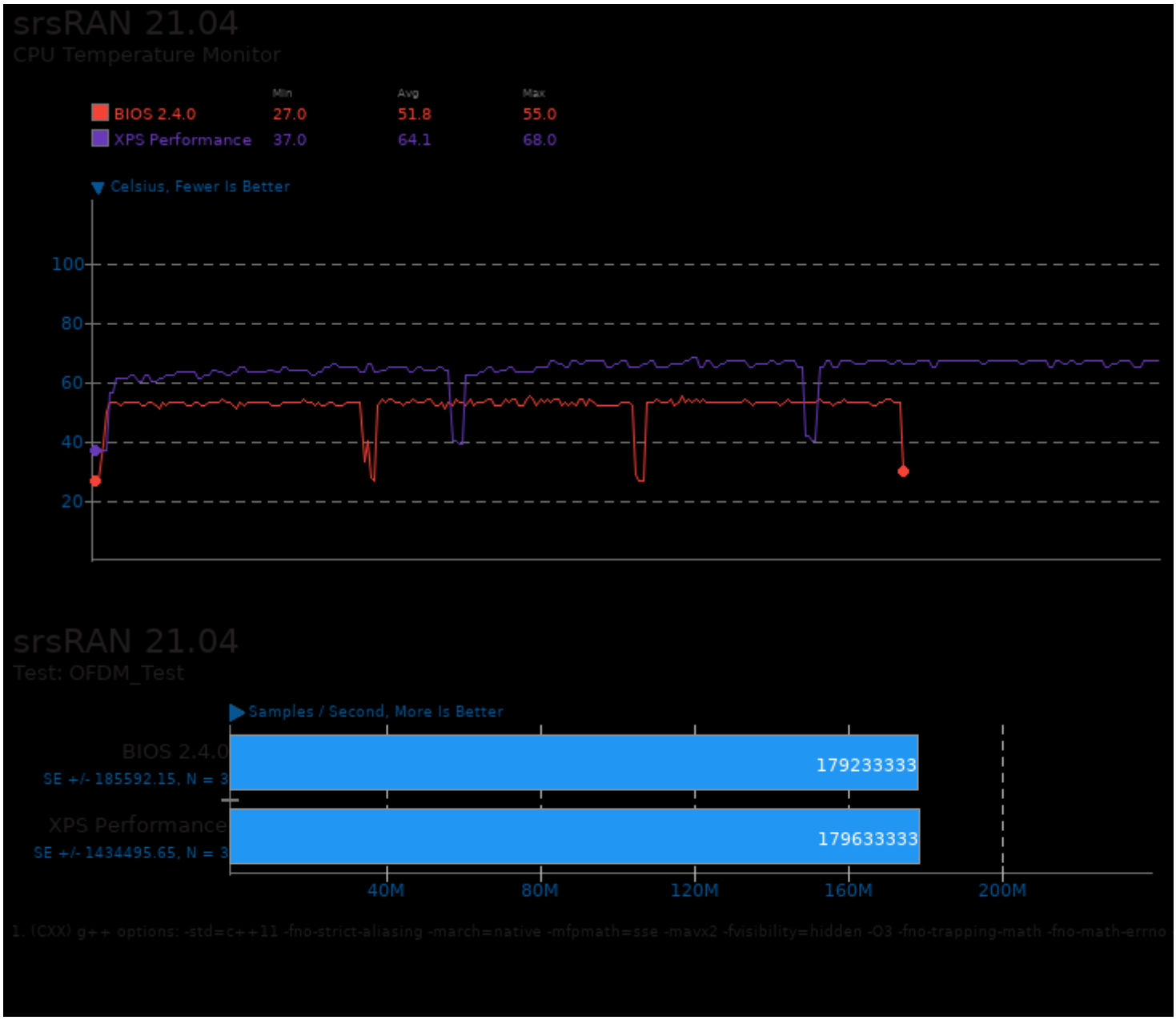

srsRAN 21.04
CPU Temperature Monitor
Min
Avg
Max
BIOS 2.4.0
30.0
50.9
58.0
XPS Performance
43.0
64.4
72.0
Celsius, Fewer Is Better
100
80
60
40
20
srsRAN 21.04
Test: 4G PHY_DL_Test 100 PRB SISO 256-QAM
eNb Mb/s, More Is Better
BIOS 2.4.0
SE +/- 0.55, N = 3
491.4
XPS Performance
SE +/- 1.03, N = 3
487.4
110
220
330
440
550
1. (CXX) g++ options: -std=c++11 -fno-strict-aliasing -march=native -mfpmath=sse -mavx2 -fvisibility=hidden -O3 -fno-trapping-math -fno-math-errno
srsRAN 21.04
Test: 4G PHY_DL_Test 100 PRB SISO 256-QAM
UE Mb/s, More Is Better
BIOS 2.4.0
SE +/- 0.66, N = 3
326.7
XPS Performance
SE +/- 0.67, N = 3
326.6
70
140
210
280
350
1. (CXX) g++ options: -std=c++11 -fno-strict-aliasing -march=native -mfpmath=sse -mavx2 -fvisibility=hidden -O3 -fno-trapping-math -fno-math-errno

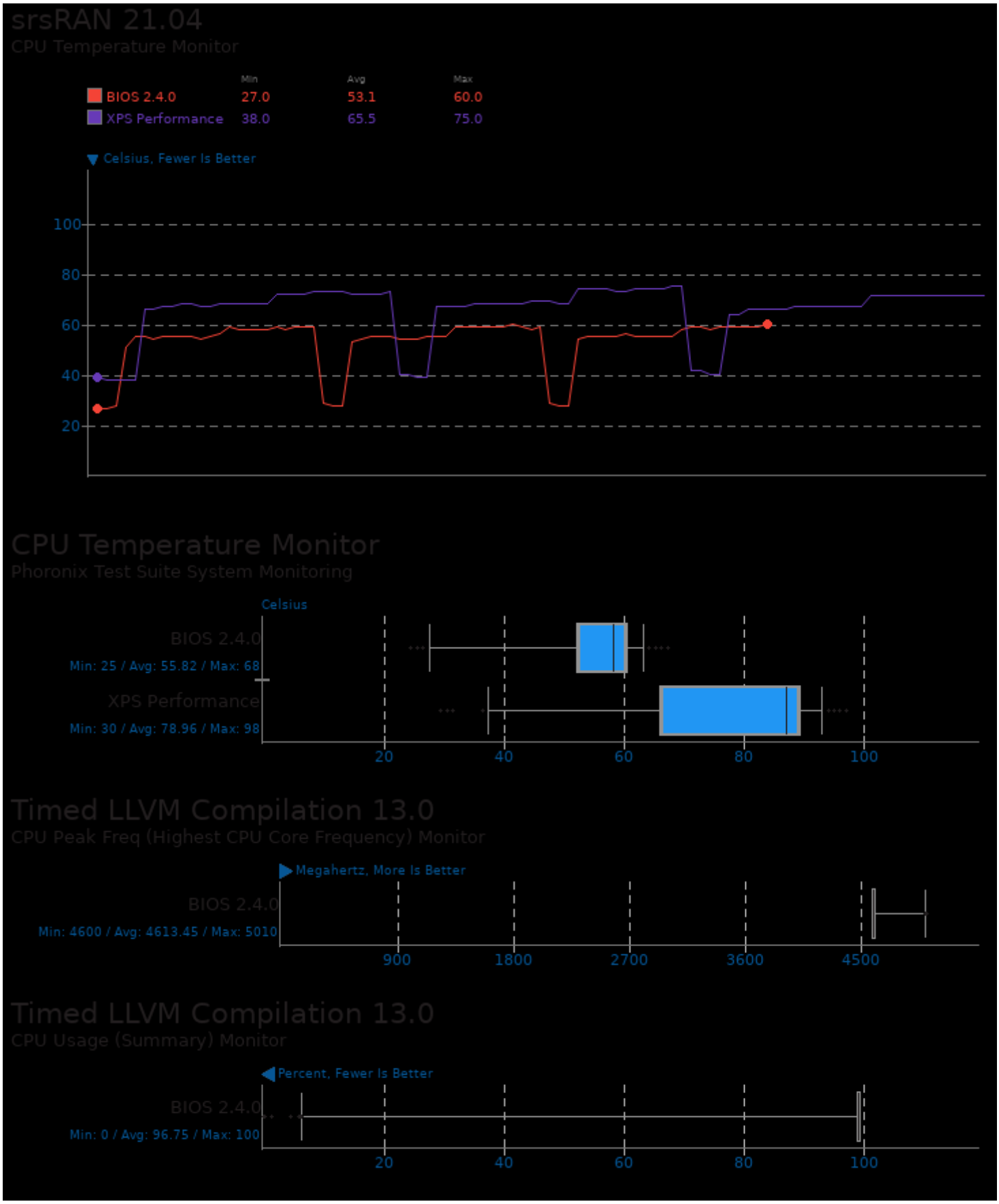

srsRAN 21.04
CPU Temperature Monitor
Min
Avg
Max
BIOS 2.4.0
29.0
49.8
55.0
XPS Performance
39.0
61.3
67.0
Celsius, Fewer Is Better
100
80
60
40
20
srsRAN 21.04
Test: 4G PHY_DL_Test 100 PRB MIMO 64-QAM
eNb Mb/s, More Is Better
BIOS 2.4.0
SE +/- 0.09, N = 3
450.3
XPS Performance
SE +/- 1.42, N = 3
441.0
100
200
300
400
500
1. (CXX) g++ options: -std=c++11 -fno-strict-aliasing -march=native -mfpmath=sse -mavx2 -fvisibility=hidden -O3 -fno-trapping-math -fno-math-errno
srsRAN 21.04
Test: 4G PHY_DL_Test 100 PRB MIMO 64-QAM
UE Mb/s, More Is Better
BIOS 2.4.0
SE +/- 0.17, N = 3
186.6
XPS Performance
SE +/- 0.26, N = 3
186.6
40
80
120
160
200
1. (CXX) g++ options: -std=c++11 -fno-strict-aliasing -march=native -mfpmath=sse -mavx2 -fvisibility=hidden -O3 -fno-trapping-math -fno-math-errno

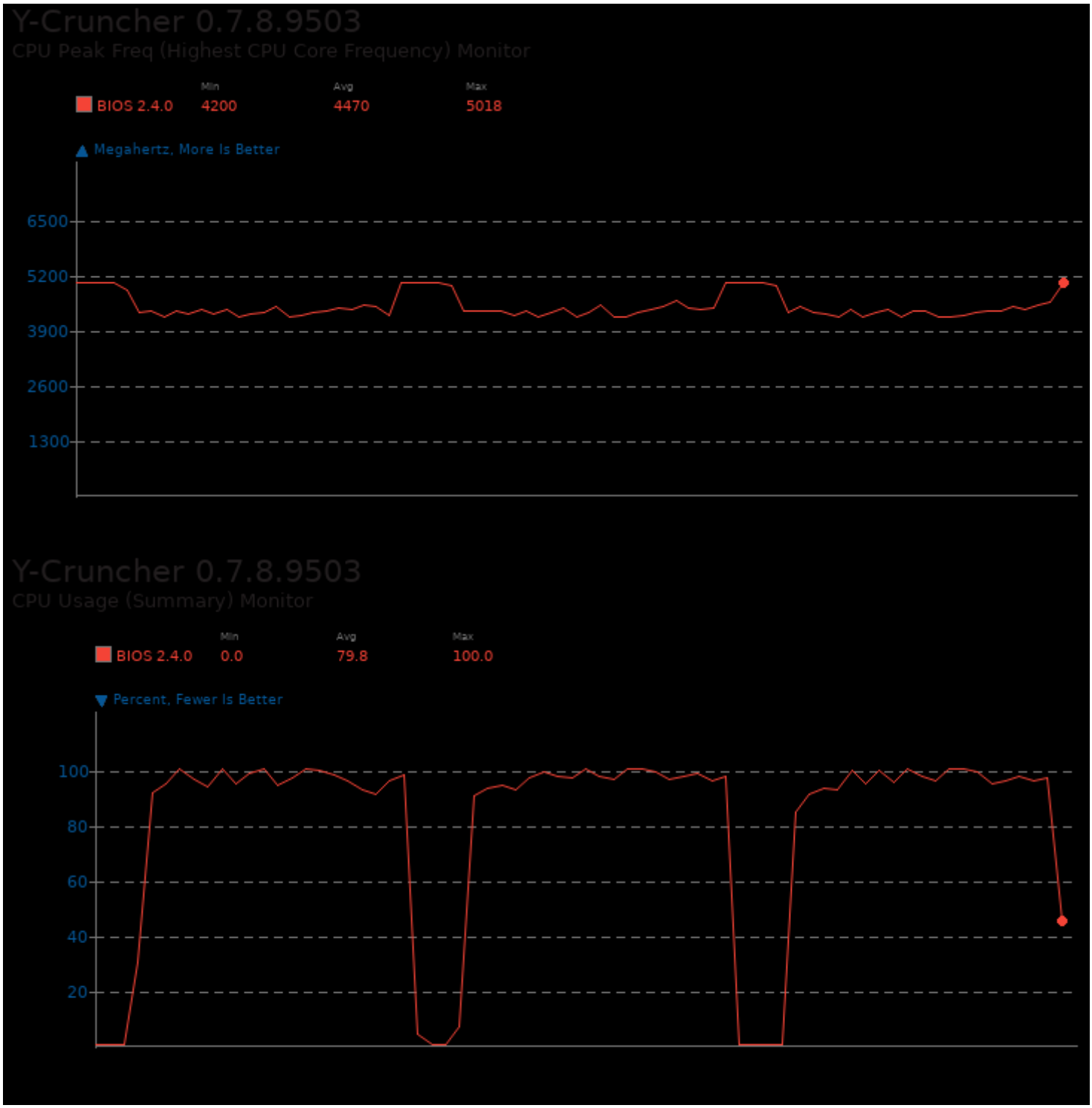

srsRAN 21.04
CPU Temperature Monitor
Min
Avg
Max
BIOS 2.4.0 28.0 49.4 54.0
XPS Performance 38.0 60.8 65.0
Celsius, Fewer Is Better
100
80
60
40
20
srsRAN 21.04
Test: 4G PHY_DL_Test 100 PRB MIMO 256-QAM
eNb Mb/s, More Is Better
BIOS 2.4.0
SE +/- 1.01, N = 3
478.9
XPS Performance
SE +/- 0.52, N = 3
476.7
100
200
300
400
500
1. (CXX) g++ options: -std=c++11 -fno-strict-aliasing -march=native -mfpmath=sse -mavx2 -fvisibility=hidden -O3 -fno-trapping-math -fno-math-errno
srsRAN 21.04
Test: 4G PHY_DL_Test 100 PRB MIMO 256-QAM
UE Mb/s, More Is Better
BIOS 2.4.0
SE +/- 0.12, N = 3
206.0
XPS Performance
SE +/- 0.07, N = 3
205.9
50
100
150
200
250
1. (CXX) g++ options: -std=c++11 -fno-strict-aliasing -march=native -mfpmath=sse -mavx2 -fvisibility=hidden -O3 -fno-trapping-math -fno-math-errno

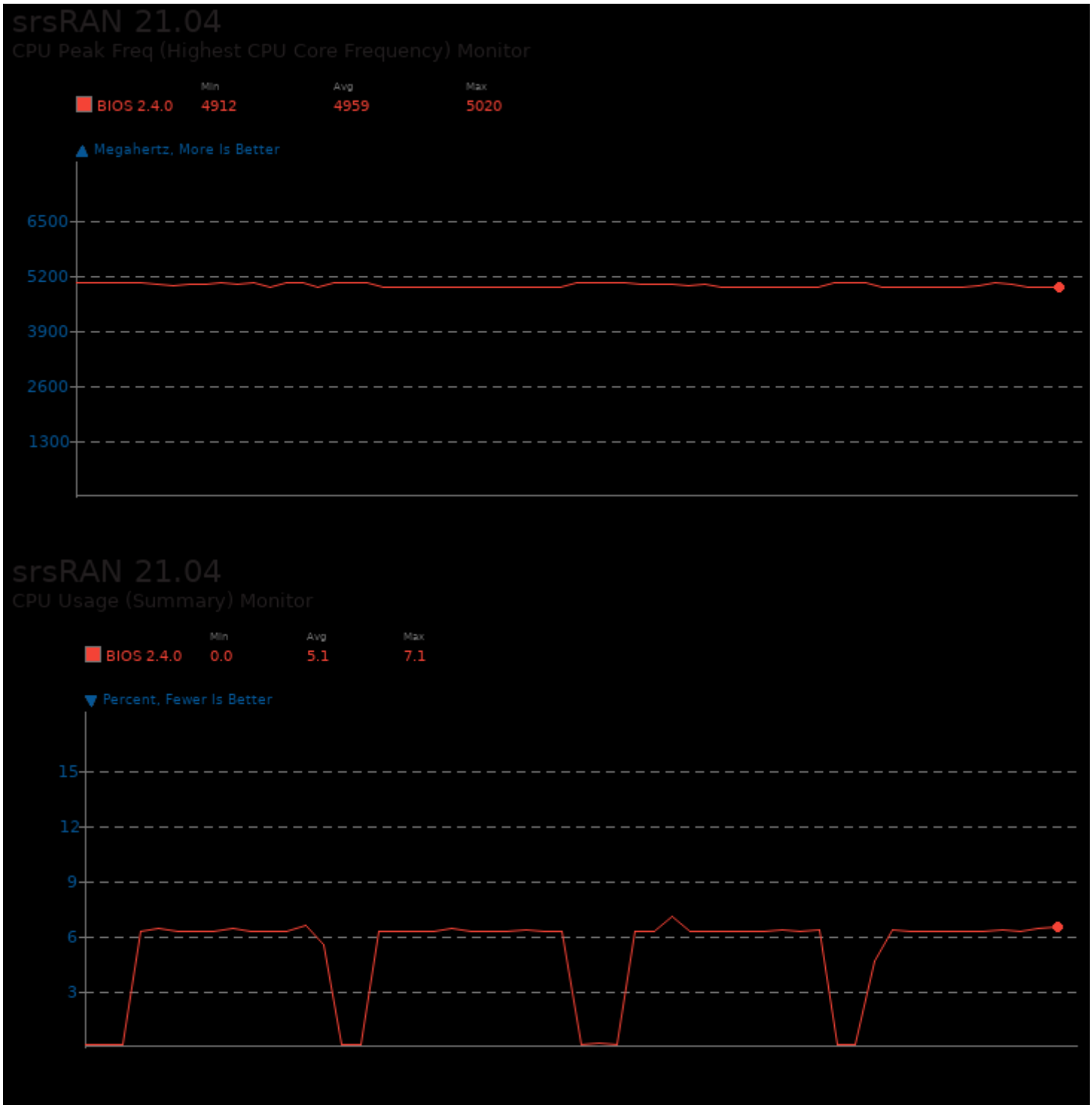

srsRAN 21.04
CPU Temperature Monitor
Min
Avg
Max
BIOS 2.4.0
27.0
49.5
53.0
XPS Performance
37.0
59.9
64.0
Celsius, Fewer Is Better
100
80
60
40
20
srsRAN 21.04
Test: 5G PHY_DL_NR Test 52 PRB SISO 64-QAM
eNb Mb/s, More Is Better
BIOS 2.4.0
SE +/- 1.88, N = 5
170.1
XPS Performance
SE +/- 0.72, N = 3
172.3
40
80
120
160
200
1. (CXX) g++ options: -std=c++11 -fno-strict-aliasing -march=native -mfpmath=sse -mavx2 -fvisibility=hidden -O3 -fno-trapping-math -fno-math-errno
srsRAN 21.04
Test: 5G PHY_DL_NR Test 52 PRB SISO 64-QAM
UE Mb/s, More Is Better
BIOS 2.4.0
SE +/- 0.32, N = 5
108.9
XPS Performance
SE +/- 0.55, N = 3
110.8
20
40
60
80
100
1. (CXX) g++ options: -std=c++11 -fno-strict-aliasing -march=native -mfpmath=sse -mavx2 -fvisibility=hidden -O3 -fno-trapping-math -fno-math-errno

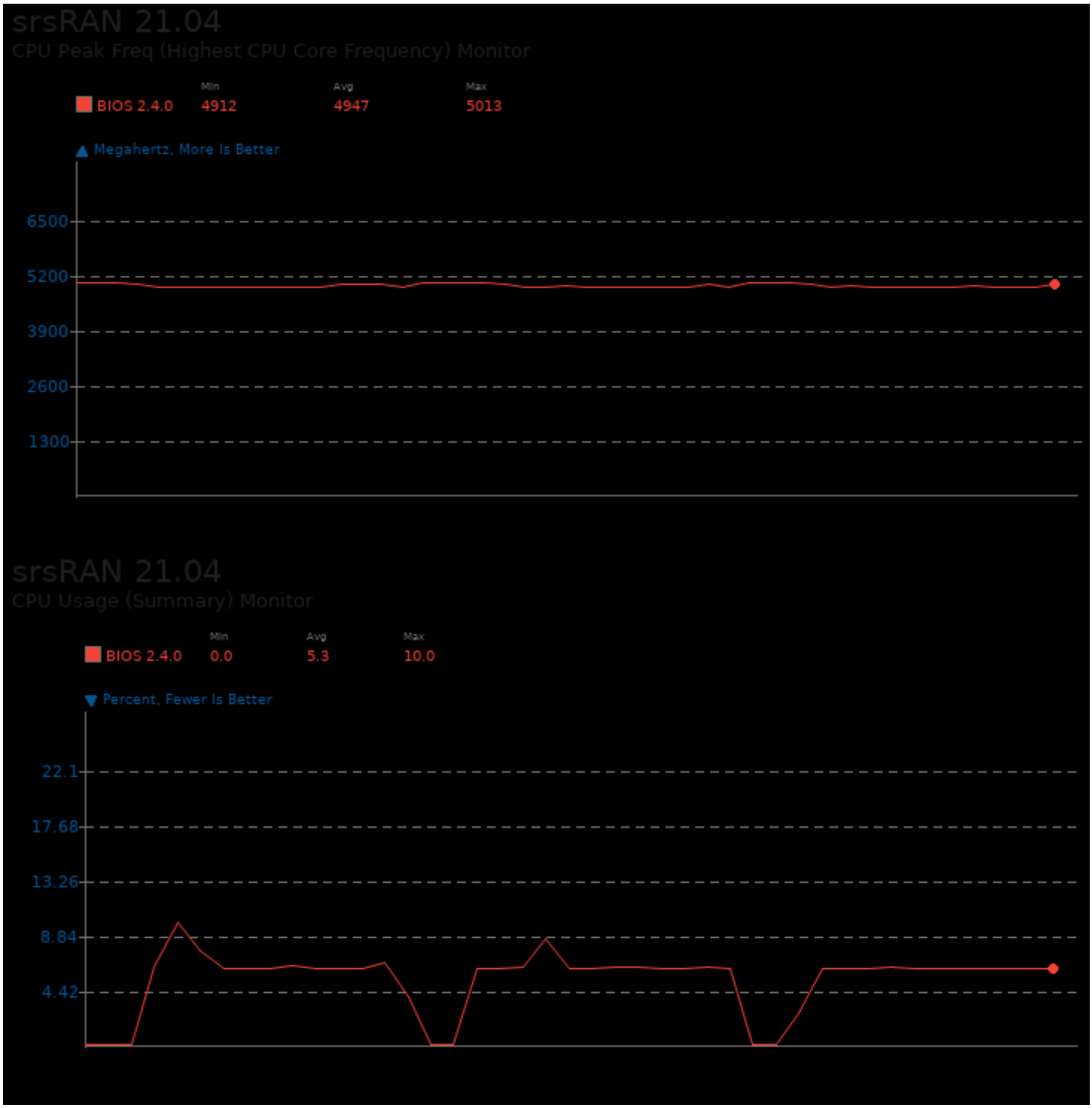

srsRAN 21.04
CPU Temperature Monitor
Min
Avg
Max
BIOS 2.4.0
27.0
44.8
50.0
XPS Performance
37.0
54.5
60.0
Celsius, Fewer Is Better
80
64
48
32
16
srsRAN 21.04
Test: 5G PHY_DL_NR Test 270 PRB SISO 256-QAM
eNb Mb/s, More Is Better
BIOS 2.4.0
SE +/- 0.23, N = 3
199.6
XPS Performance
SE +/- 0.35, N = 3
200.7
40
80
120
160
200
1. (CXX) g++ options: -std=c++11 -fno-strict-aliasing -march=native -mfpmath=sse -mavx2 -fvisibility=hidden -O3 -fno-trapping-math -fno-math-errno
srsRAN 21.04
Test: 5G PHY_DL_NR Test 270 PRB SISO 256-QAM
UE Mb/s, More Is Better
BIOS 2.4.0
SE +/- 0.41, N = 3
152.1
XPS Performance
SE +/- 0.32, N = 3
152.1
30
60
90
120
150
1. (CXX) g++ options: -std=c++11 -fno-strict-aliasing -march=native -mfpmath=sse -mavx2 -fvisibility=hidden -O3 -fno-trapping-math -fno-math-errno

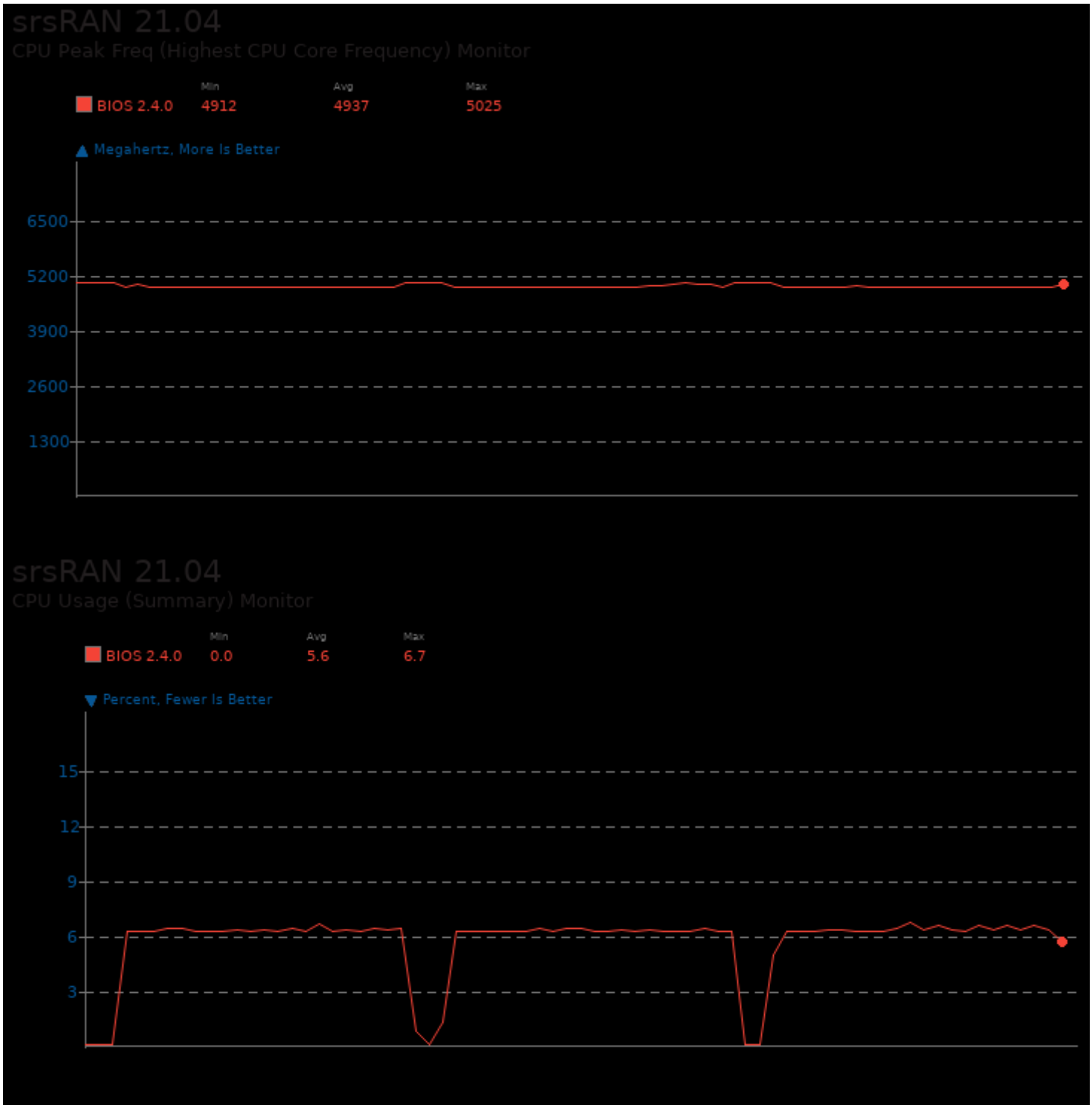

srsRAN 21.04
CPU Temperature Monitor
Min
Avg
Max
BIOS 2.4.0
27.0
51.8
55.0
XPS Performance
37.0
64.1
68.0
Celsius, Fewer Is Better
100
80
60
40
20
srsRAN 21.04
Test: OFDM_Test
Samples / Second, More Is Better
BIOS 2.4.0
SE +/- 185592.15, N = 3
179233333
XPS Performance
SE +/- 1434495.65, N = 3
179633333
40M
80M
120M
160M
200M
1. (CXX) g++ options: -std=c++11 -fno-strict-aliasing -march=native -mfpmath=sse -mavx2 -fvisibility=hidden -O3 -fno-trapping-math -fno-math-errno

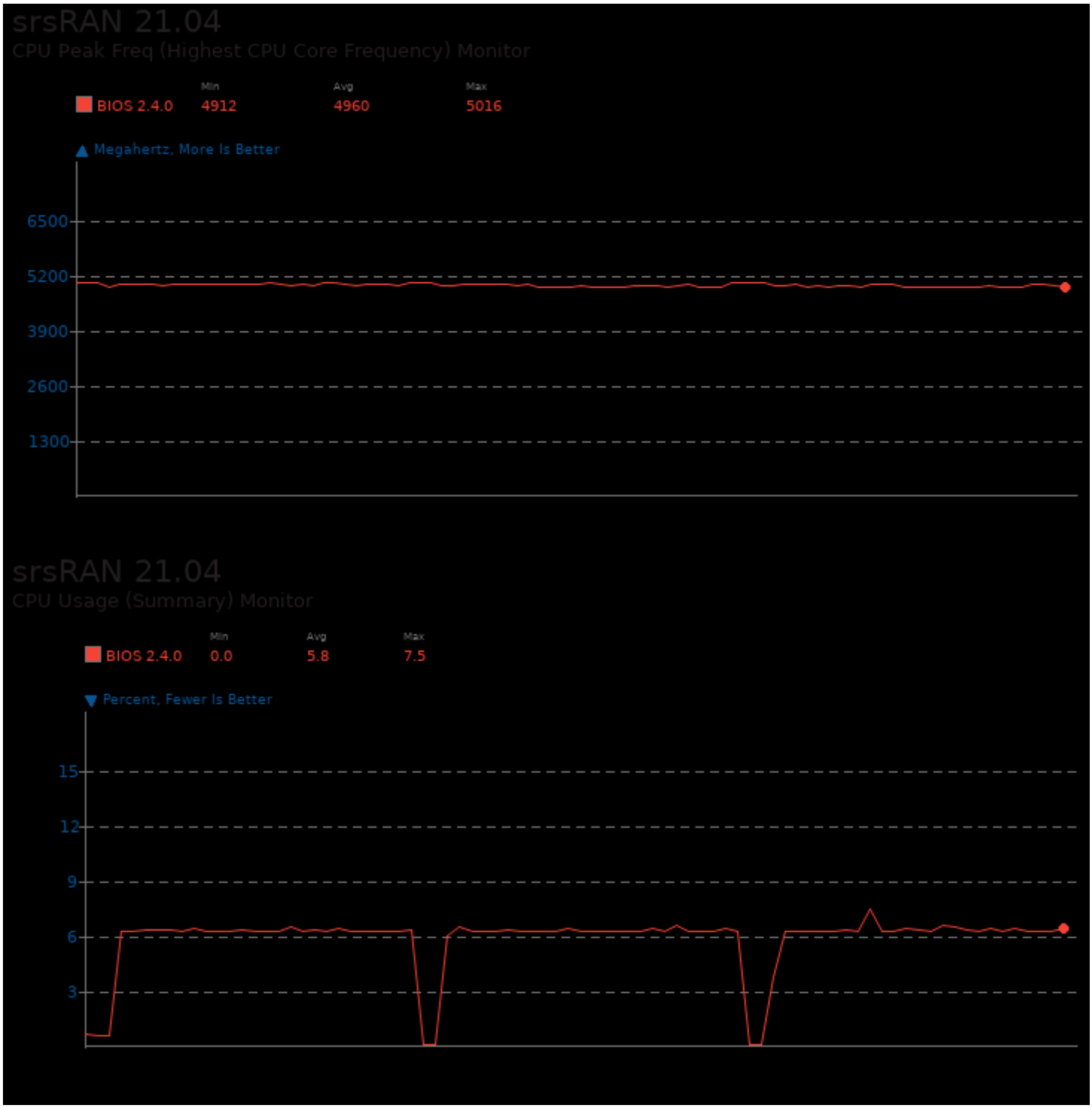

srsRAN 21.04
CPU Temperature Monitor
Min
Avg
Max
BIOS 2.4.0
27.0
53.1
60.0
XPS Performance
38.0
65.5
75.0
Celsius, Fewer Is Better
100
80
60
40
20
CPU Temperature Monitor
Phoronix Test Suite System Monitoring
Celsius
BIOS 2.4.0
Min: 25 / Avg: 55.82 / Max: 68
XPS Performance
Min: 30 / Avg: 78.96 / Max: 98
20
40
60
80
100
Timed LLVM Compilation 13.0
CPU Peak Freq (Highest CPU Core Frequency) Monitor
Megahertz, More Is Better
BIOS 2.4.0
Min: 4600 / Avg: 4613.45 / Max: 5010
900
1800
2700
3600
4500
Timed LLVM Compilation 13.0
CPU Usage (Summary) Monitor
Percent, Fewer Is Better
BIOS 2.4.0
Min: 0 / Avg: 96.75 / Max: 100
20
40
60
80
100

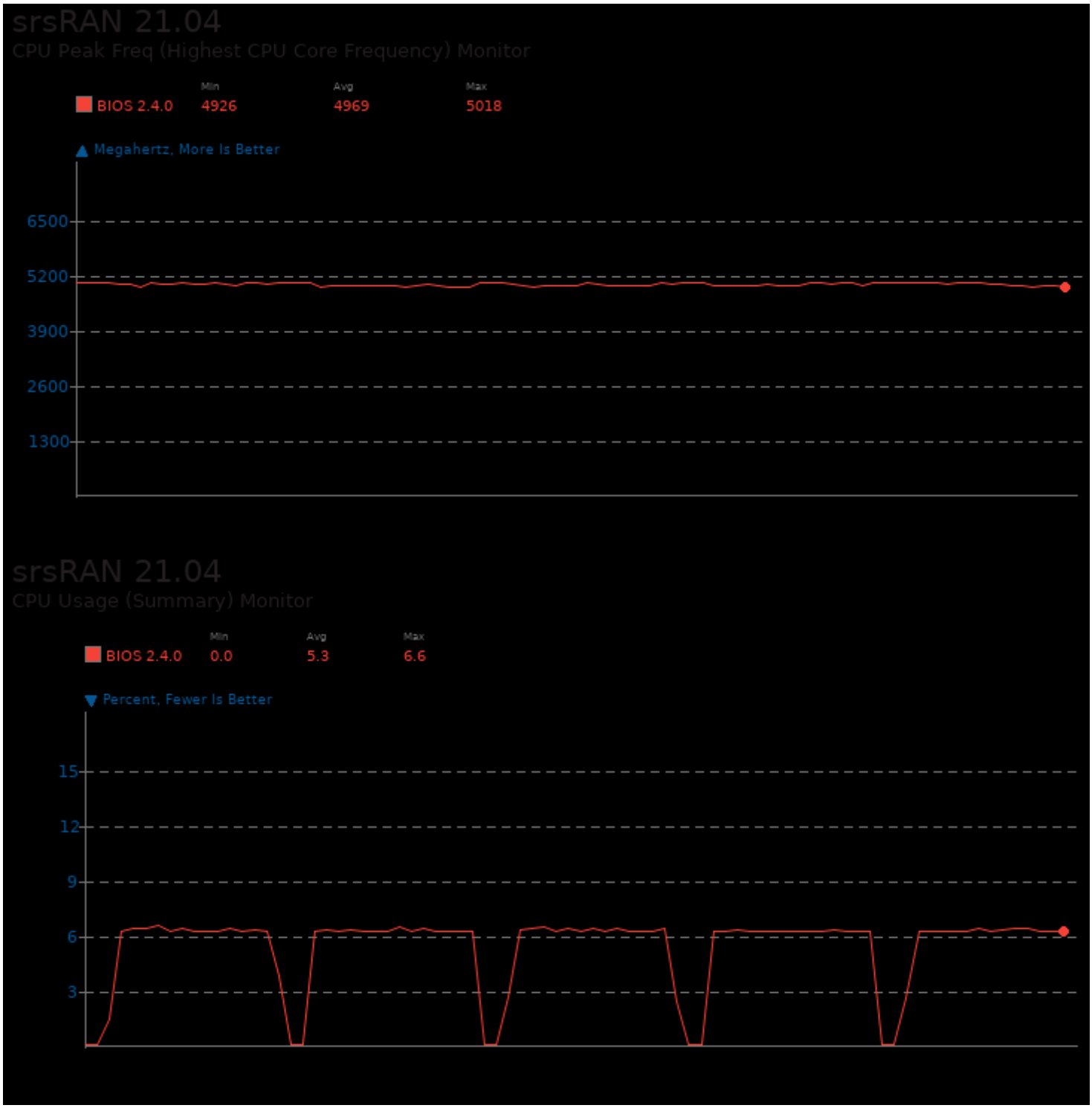

Y-Cruncher 0.7.8.9503
CPU Peak Freq (Highest CPU Core Frequency) Monitor
Min
Avg
Max
BIOS 2.4.0
4200
4470
5018
Megahertz, More Is Better
6500
5200
3900
2600
1300
Y-Cruncher 0.7.8.9503
CPU Usage (Summary) Monitor
Min
Avg
Max
BIOS 2.4.0
0.0
79.8
100.0
Percent, Fewer Is Better
100
80
60
40
20

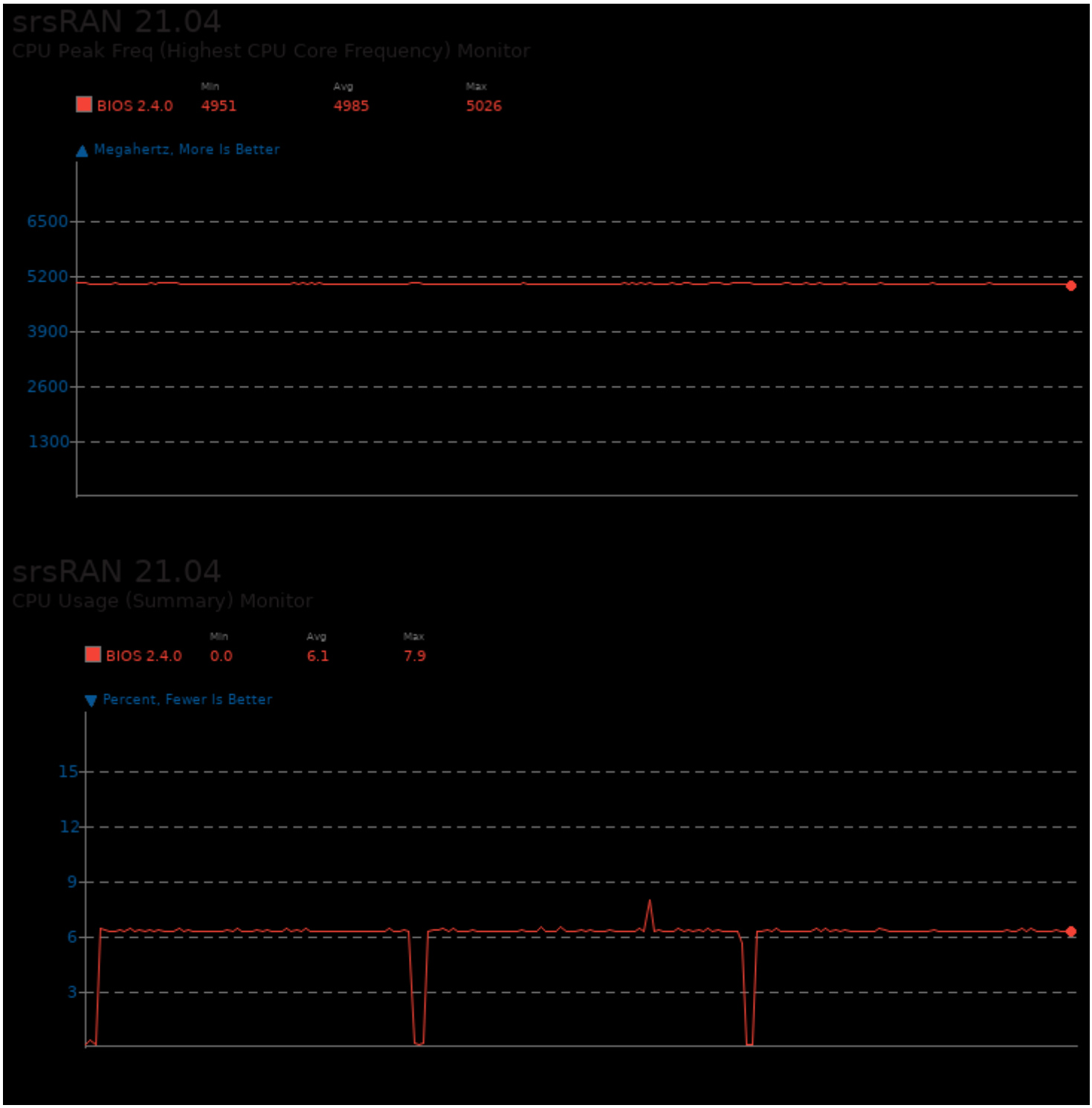

srsRAN 21.04
CPU Peak Freq (Highest CPU Core Frequency) Monitor
Min
Avg
Max
BIOS 2.4.0
4912
4959
5020
Megahertz, More Is Better
6500
5200
3900
2600
1300
srsRAN 21.04
CPU Usage (Summary) Monitor
Min
Avg
Max
BIOS 2.4.0
0.0
5.1
7.1
Percent, Fewer Is Better
15
12
9
6
3

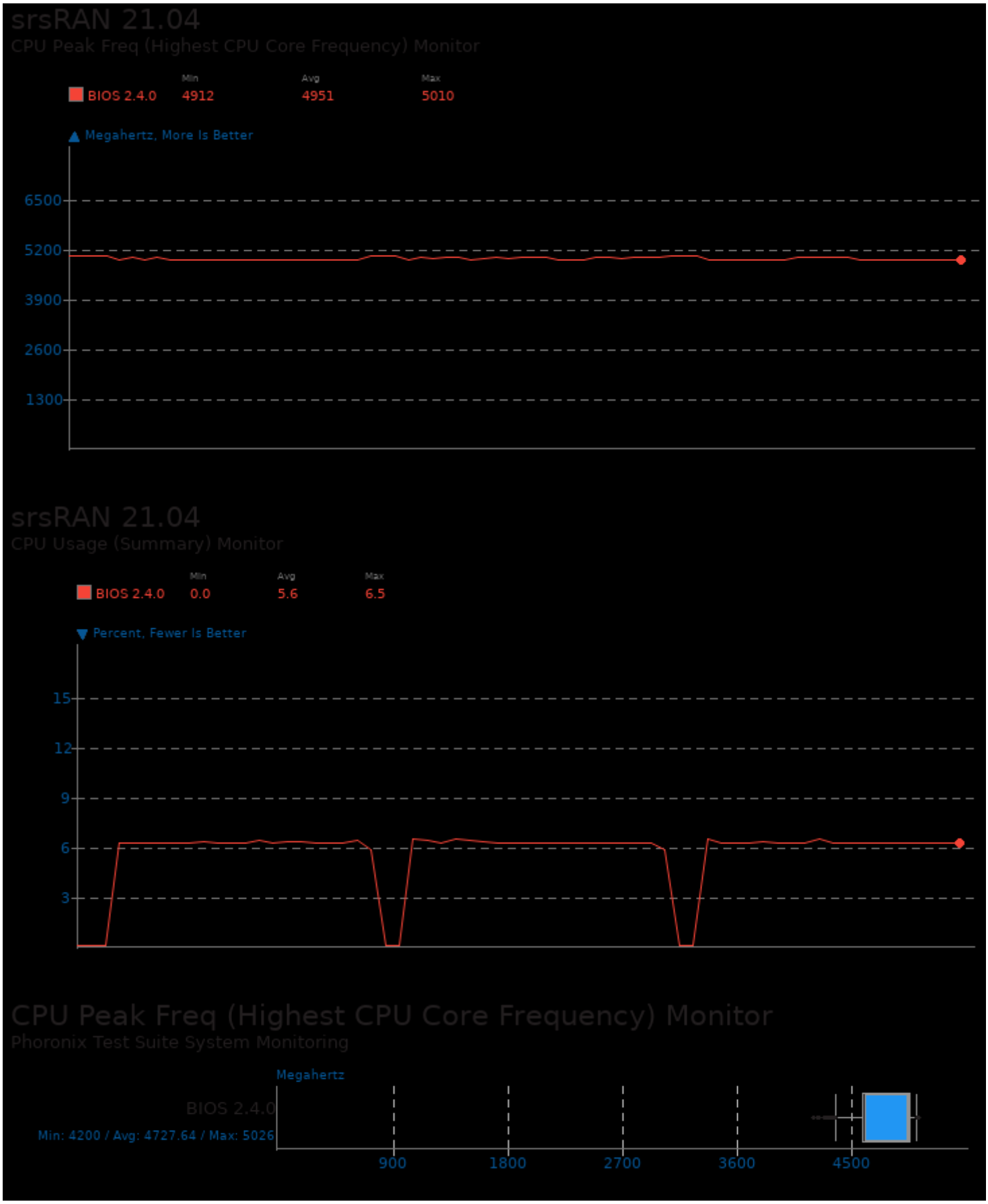

srsRAN 21.04
CPU Peak Freq (Highest CPU Core Frequency) Monitor
Min
Avg
Max
BIOS 2.4.0
4912
4947
5013
Megahertz, More Is Better
6500
5200
3900
2600
1300
srsRAN 21.04
CPU Usage (Summary) Monitor
Min
Avg
Max
BIOS 2.4.0
0.0
5.3
10.0
Percent, Fewer Is Better
22.1
17.68
13.26
8.84
4.42

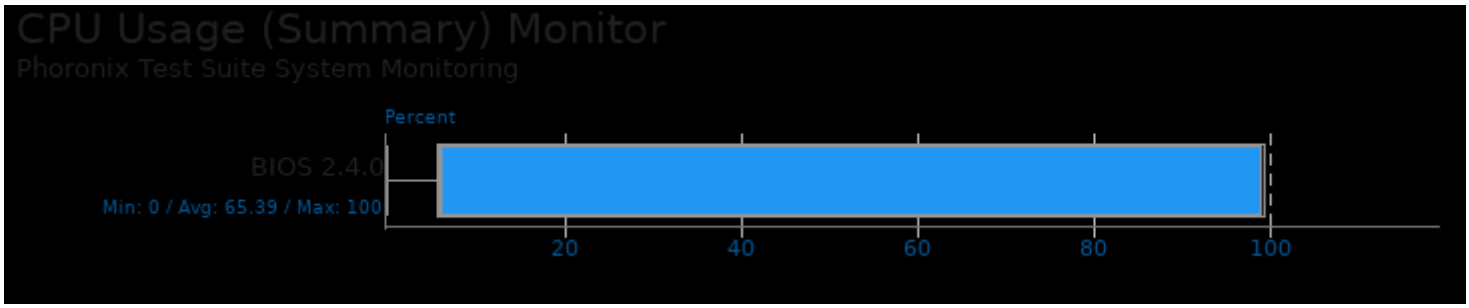

srsRAN 21.04
CPU Peak Freq (Highest CPU Core Frequency) Monitor
Min
Avg
Max
BIOS 2.4.0
4912
4937
5025
Megahertz, More Is Better
6500
5200
3900
2600
1300
srsRAN 21.04
CPU Usage (Summary) Monitor
Min
Avg
Max
BIOS 2.4.0
0.0
5.6
6.7
Percent, Fewer Is Better
15
12
9
6
3


srsRAN 21.04
CPU Peak Freq (Highest CPU Core Frequency) Monitor
Min
Avg
Max
BIOS 2.4.0
4912
4960
5016
Megahertz, More Is Better
6500
5200
3900
2600
1300
srsRAN 21.04
CPU Usage (Summary) Monitor
Min
Avg
Max
BIOS 2.4.0
0.0
5.8
7.5
Percent, Fewer Is Better
15
12
9
6
3


srsRAN 21.04
CPU Peak Freq (Highest CPU Core Frequency) Monitor
Min
Avg
Max
BIOS 2.4.0
4926
4969
5018
Megahertz, More Is Better
6500
5200
3900
2600
1300
srsRAN 21.04
CPU Usage (Summary) Monitor
Min
Avg
Max
BIOS 2.4.0
0.0
5.3
6.6
Percent, Fewer Is Better
15
12
9
6
3


srsRAN 21.04
CPU Peak Freq (Highest CPU Core Frequency) Monitor
Min
Avg
Max
BIOS 2.4.0
4951
4985
5026
Megahertz, More Is Better
6500
5200
3900
2600
1300
srsRAN 21.04
CPU Usage (Summary) Monitor
Min
Avg
Max
BIOS 2.4.0
0.0
6.1
7.9
Percent, Fewer Is Better
15
12
9
6
3


srsRAN 21.04
CPU Peak Freq (Highest CPU Core Frequency) Monitor
Min
Avg
Max
BIOS 2.4.0
4912
4951
5010
Megahertz, More Is Better
6500
5200
3900
2600
1300
srsRAN 21.04
CPU Usage (Summary) Monitor
Min
Avg
Max
BIOS 2.4.0
0.0
5.6
6.5
Percent, Fewer Is Better
15
12
9
6
3
CPU Peak Freq (Highest CPU Core Frequency) Monitor
Phoronix Test Suite System Monitoring
Megahertz
BIOS 2.4.0
Min: 4200 / Avg: 4727.64 / Max: 5026
900
1800
2700
3600
4500



This file was automatically generated via the Phoronix Test Suite benchmarking software on Thursday, 28 March 2024 05:13.