

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

MERCEDES-BENZ USA, LLC,)
Petitioner,)
VS.) Case IPR2023-01343
DAEDALUS PRIME LLC,) Patent 8,898,494
Patent Owner.)

ORAL AND VIDEOTAPED DEPOSITION OF
MICHAEL C. BROGIOLI, PH.D.
JULY 30, 2024
(REPORTED REMOTELY)

ORAL AND VIDEOTAPED DEPOSITION OF
MICHAEL C. BROGIOLI, PH.D., produced as a
witness at the instance of the Petitioner,
and duly sworn, was taken in the above-styled
and numbered cause on July 30, 2024, from
9:32 a.m. to 1:50 p.m., at 515 Congress
Avenue, Suite 1700, Austin, Texas, before
Donna Wright, CSR in and for the State of
Texas, reported by machine shorthand and
remotely via Zoom, pursuant to the Federal
Rules of Civil Procedure and any stipulations
or agreements stated on the record or
attached hereto.

A P P E A R A N C E S

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ALSO PRESENT:

Peter Zierlein - Videographer

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	Brogioli Declaration	

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1 THE VIDEOGRAPHER: Here begins
2 the deposition of Dr. Michael
3 Brogioli. Today's date, July 30, 2024
4 and the time is 9:32 a.m.

5 Will counsel please identify
6 themselves for the record, after which
7 the court reporter will swear in the
8 witness.

9 MS. TRAC: My name is Helen
10 Trac, counsel for the petitioner in
11 this case, Mercedes-Benz, USA LLC.

12 MR. FAHMI: Tarek Fahmi of
13 Ascenda Law Group on behalf of the
14 patent owner.

15 MICHAEL C. BROGIOLI, PH.D.,
16 having been first duly sworn, testified as
17 follows:

18 EXAMINATION

19 BY MS. TRAC:

20 Q. Okay. Good morning,
21 Dr. Brogioli.

22 A. Good morning.

23 Q. Could you please state your
24 first -- full name for the record?

25 A. Yes, it's Michael Charles

1 Brogioli.

2 Q. Okay. And you understand that
3 you are being deposed today in connection
4 with the declaration you submitted in an IPR
5 proceeding?

6 A. Yes.

7 Q. Okay. And for the record, the
8 IPR proceeding is IPR2023-01343?

9 A. Yes, that's right.

10 Q. Okay. So he already has a copy
11 of all of the exhibits, okay.

12 A. I don't know that it's all of
13 the exhibits. It should be my declaration
14 and the patents of the prior art.

15 Q. Okay. So this IPR proceeding
16 is related to US Patent No. 8,898,494,
17 correct?

18 A. That's right, yes.

19 Q. I'll refer to this patent as
20 the '494 patent. Will you understand that?

21 A. Yes.

22 Q. How many times have you been
23 deposed?

24 A. Maybe around 55 or so.

25 Q. Okay. Well, then just very

1 briefly for the ground rules, first, you are
2 under oath and you have an obligation to
3 answer my questions truthfully as if you were
4 testifying in court.

5 Do you understand that?

6 A. Yes, I do.

7 Q. Okay. Are you taking any drugs
8 or medications that might prevent you from
9 testifying truthfully?

10 A. No.

11 Q. Okay. Is there any other
12 reason you're unable to testify truthfully
13 today?

14 A. No.

15 Q. Okay. So since the court
16 reporter can only record one person at the
17 same time, we will just have to -- we can't
18 speak at the same time.

19 A. Understood.

20 Q. And you need to answer my
21 questions verbally.

22 A. Yes.

23 Q. If you don't answer --
24 understand a question, please let me know and
25 ask for clarification. If you answer a

1 question, the record will reflect that you
2 understood it.

3 A. I understand.

4 Q. Okay. And from time to time
5 counsel may object to a question, but you
6 must still answer the question unless he
7 instructs you not to answer.

8 A. I understand.

9 Q. If you need a break, just ask.
10 But you need to answer the pending question
11 before we take a break.

12 A. Understood.

13 Q. Did you do anything to prepare
14 for this deposition?

15 A. I did, yes.

16 Q. And what did you do?

17 A. Sort of the general procedure I
18 follow, I reviewed my declaration, the
19 patent, the '494 patent. I would have looked
20 at prior art that I discuss in my declaration
21 and probably petitioner's expert declaration,
22 or parts of it. And then met with counsel
23 who is here today.

24 Q. Okay. How many times did you
25 meet with counsel?

1 A. Maybe three or four. But I
2 would answer that in that we were -- it was
3 mixed with talking about the other
4 depositions that will happen this week as
5 well.

6 Q. Okay. And how long were
7 these -- each of these conversations?

8 A. I would say maybe an hour, two
9 hours, depending on the day.

10 Q. Did you meet or speak with
11 anyone else other than counsel for Daedalus?

12 A. No.

13 Q. As we discussed earlier, you
14 are being deposed with respect to the
15 declaration you submitted in this proceeding,
16 correct?

17 A. That's right.

18 Q. How many hours did you spend
19 preparing your declaration?

20 A. I would say that would be
21 reflected in my invoices. I don't recall the
22 number of hours offhand.

23 Q. Do you have an estimate?

24 A. I would say I probably started
25 relatively early on in the engagement putting

1 together a first draft of things. In terms
2 of the total hours from then to when it was
3 submitted, I guess I would have to go back to
4 the invoices on it. I don't really recall.

5 Similar answer that I think
6 there were two or three declarations I was
7 preparing in that same timeframe.

8 Q. Okay. And you drafted the
9 declaration yourself?

10 A. That's right.

11 Q. All of it?

12 A. That's my recollection. There
13 may have been -- it's usually the case
14 someone assists with things like formatting
15 or footnotes, cross references, et cetera.
16 But I remember drafting certainly the first
17 draft of it.

18 Q. Okay. And do you have staff
19 that work with you for expert matters?

20 A. Not on this engagement, no.

21 Q. Okay. So earlier you said that
22 you reviewed exhibits that were submitted
23 with the petition, correct?

24 A. That's right.

25 Q. Did you review all of the

1 exhibits?

2 A. I don't recall. I don't recall
3 from memory all of my -- what's usually
4 called materials considered. I remember
5 primarily focusing on the prior art
6 references, the set of prior art references I
7 talk about in my declaration.

8 Q. Okay. Would those be
9 Exhibit 1005, US Patent No. 7,421,601 to
10 Bose?

11 A. Bose would be part of that,
12 yes.

13 Q. Okay. Did you review
14 Exhibit 1006, US Patent No. 7,263,457 to
15 White?

16 A. Yes.

17 Q. Did you review Exhibit 1007, US
18 Patent No. 8,601,300 to Anderson?

19 A. I think so.

20 Q. Okay. And did you review
21 Exhibit 1008, US Patent No. 2,009,015,0689 to
22 Simeral?

23 A. Yes, I did.

24 Q. Okay. And did you review
25 Exhibit 1009, US Patent No. 8,510,582 to

1 Nafziger?

2 A. That sounds right.

3 Q. Okay. And for all of these
4 references, I'm just going to call them by
5 their -- the name that I used and you will
6 understand what I'm referring to?

7 A. Sure.

8 Q. Okay. Approximately how much
9 time did you spend reviewing each of these
10 references?

11 A. I would say they were all
12 reviewed to some degree as part of my
13 preparation over the last, you know, week and
14 a half or two getting ready for today. I
15 don't have an hour estimate of each of them.

16 Q. Okay. I'm handing you -- oh,
17 no, I'm sorry, the staple is coming apart --
18 what's been marked as Exhibit 2001 in the
19 IPR.

20 (Exhibit 2001 marked)

21 Q. Do you recognize this as a copy
22 of your declaration that was submitted?

23 A. That looks correct with my CV
24 attached.

25 Q. Okay.

1 A. And I'll note I brought a copy
2 as well that's probably identical.

3 Q. Okay. So, actually, you
4 mentioned your CV is attached. That's
5 Appendix A, correct?

6 A. That looks correct. I guess
7 this would be the CV at the time I filed the
8 declaration.

9 Q. Okay. And is this CV complete
10 and accurate?

11 A. It should be at this time. So
12 I try and put a date on the bottom of it and
13 this one says May 1 of 2024, so it should
14 be -- it should have been complete or as
15 complete as it was at that -- you know, on
16 that date.

17 Q. Okay. Is there anything in
18 here that you would like to change?

19 A. In the CV or the --

20 Q. Yes, in the CV.

21 A. Not that I'm aware of.

22 Q. Is there anything in the
23 declaration that you would like to change?

24 A. I'm sure we will find a typo or
25 two today that I may have come across in

1 preparing, but nothing that I -- nothing in
2 terms of my opinions or statements, no.

3 Q. Do you have experience relevant
4 to your opinion that's not captured in the
5 CV?

6 A. Oh, captured in the CV?
7 Nothing that comes immediately to mind, but
8 there may be something in my experience I
9 haven't listed in there.

10 Q. Okay. So keeping the CV, I
11 would like you to turn to Page 8 -- sorry,
12 Paragraph 9 of your declaration.

13 A. Okay.

14 Q. So here you say that you are
15 currently a co-founder, co-inventor and chief
16 technology officer at Native Network -- or
17 Network Native -- sorry. Is that correct?

18 A. That's correct, yes.

19 Q. Okay. If you would turn to
20 Page 8 of your CV, it says that you're
21 interim CTO.

22 Do you see that?

23 A. I see that, yes.

24 Q. Is that a typo?

25 A. No, at one point I believe my

1 title was interim.

2 Q. As of May 1, 2024?

3 A. No, it was probably prior to
4 that.

5 Q. So this is a typo?

6 A. No, I guess early on, maybe in
7 the, I don't know, '17 timeframe, I may have
8 been interim. I still hold that title of
9 CTO, so I guess it would no longer be
10 interim, I guess, depending on how long of a
11 time horizon we're thinking of.

12 Q. Okay. What does Network Native
13 do?

14 A. We develop tools and technology
15 for new ways of building and deploying
16 distributed network computer applications.

17 So at a very high level, you
18 can sit at your computer and write an
19 application that maybe runs in the Cloud,
20 runs on an edge-of-network multiprocessor,
21 multicore high performance Linux machine, for
22 example, and then also has maybe sensors that
23 run on bare metal micro-controllers. And the
24 programming languages and tools push that
25 application out seamlessly across all of

1 these devices and monitor and update and
2 things like that.

3 Q. Okay. Does any of your work at
4 Network Native involve power budgeting on an
5 integrated circuit?

6 A. I would say some of the
7 technology involves things like power
8 monitoring on -- for example, if you have
9 microprocessors with sensors attached
10 deployed in a field or a distributed network
11 and things like that.

12 Q. Okay. So your CV on Page 3
13 shows that you're a lead engineer -- software
14 engineer at Vicarious Visions, correct?

15 A. That's right.

16 Q. And this is in 1999?

17 A. That's right.

18 Q. How long did you work there?

19 A. Up until I left for grad
20 school, so about maybe three-quarters of a
21 year or something like that.

22 Q. Okay. Was that a full-time
23 job?

24 A. And then some, yes.

25 Q. Okay. What does Vicarious

1 Visions do?

2 A. So they are now part of the
3 company Activision who makes games for Xbox
4 and PlayStation and things like that. At the
5 time, we were an early-stage gaming studio
6 making titles for Nintendo consoles,
7 PlayStation and PC.

8 And I was -- I had two roles.
9 One was sort of starting a development team
10 to do Nintendo Gameboy titles; and, two, I
11 was building developer tools and hardware for
12 interfacing consoles to like your developer
13 machine so you could look inside the bits and
14 bytes happening inside the machine and
15 develop software for them and things like
16 that.

17 Q. So you mentioned that you
18 worked on hardware development at Vicarious
19 Visions as well?

20 A. That's right.

21 Q. Okay. Did you -- that's --
22 that hardware experience is not listed in
23 your CV, is it?

24 A. So it's probably in the
25 developing the PC-based audio and graphics

1 development tools suite. So that involved
2 custom PCBs that interfaced with what were
3 then like Windows development machines and
4 things like that.

5 Q. Okay. Did you develop hardware
6 for the Nintendo console?

7 A. For the console itself, no.
8 Peripheral to the console, yes.

9 Q. Okay. So the hardware and
10 software optimizations you mentioned, were
11 any of those power-related optimizations?

12 A. I would say in the sense of the
13 little Gameboy console runs on, if I remember
14 right, AA batteries, and so some of the
15 things we were doing, like full video,
16 would -- if your console was supposed to last
17 for 30 hours on a set of batteries, the video
18 might drain the batteries in 15 minutes or
19 something like that.

20 So there were some tricks and
21 techniques that we developed to extend the
22 battery life of the machine when it was up
23 and running. I guess that would be probably
24 the only power-related area in that body of
25 work.

1 Q. Let's turn to Page 7 -- sorry,
2 Paragraph 7 of your declaration.

3 You mention that from 1999
4 to 2003, you worked in the area of low power
5 computing.

6 Do you see that?

7 A. That's right.

8 Q. Is that referring to your work
9 both at Vicarious Visions and as an
10 instructor at Rice University?

11 A. Actually, neither. That's
12 focusing on the funded research I was doing
13 that I guess ultimately led to my master's
14 thesis and some publications in the industry.

15 Q. Was this research captured in
16 your CV?

17 A. It should be, yes. I would say
18 generally my master's thesis work that's
19 listed on there and there's probably some
20 publications from way back then as well. I
21 can probably find it for you.

22 So if you go to the CV at
23 Page 7, I guess at least those last two
24 publications from 2001 and 2002 cover some of
25 that work.

1 Q. From 2001 and 2002 on Page 7 of
2 your CV? Oh, I see, I see. Before the --
3 okay, okay, I see.

4 So you were doing your master's
5 at Rice University at the same time you were
6 a -- an instructor there?

7 A. Well, in that time at Rice I
8 was a research assistant. So I would have
9 been doing some level of instructing as part
10 of that as well.

11 Q. Okay. Did the work you did as
12 an instructor at Rice University involve low
13 power computing?

14 A. I would say at various points
15 along the way. If you're asking about this
16 sort of up to 2002, 2003 timeframe, I mean,
17 we're going back 20-something years.

18 But probably classes like
19 computer architecture or advanced computer
20 architecture that consider things like power
21 consumption in CPU design would have been
22 part of the curriculum as, you know, standard
23 for that type of curriculum.

24 Q. Okay. Let's turn to
25 Paragraph 14 of your declaration.

1 It says over the past 20 years,
2 you have authored numerous peer-reviewed
3 publications, as well as engineering books in
4 the area of hardware and software design, and
5 then many of these incorporate technologies
6 specific to the subject matter at hand.

7 What do you -- what do you mean
8 by "technologies specific to the subject
9 matter at hand"?

10 A. So a number of those papers and
11 books cover things like power, power
12 consumption. They probably talk about
13 flavors of power management, things like
14 multicore, multiple processor systems. They
15 probably cover things about interconnects and
16 bandwidth and subjects like that.

17 Q. Okay. You are currently the
18 managing director of Polymathic Consulting,
19 correct?

20 A. That's correct.

21 Q. And you note that clients turn
22 to Polymathic for research and development?

23 A. Yes.

24 Q. Did any of the technology
25 development you did there relate to power

1 budgeting on an integrated circuit?

2 A. In terms of like product
3 development or technology development, I
4 don't recall specifically. I don't know that
5 in my role I was designing systems to do that
6 in the last, you know, ten or 15 years or so
7 at Polymathic.

8 Q. Okay. So you don't recall
9 doing any --

10 A. Yeah, I would say I don't
11 recall doing like silicon design for these
12 kinds of things is my answer.

13 Q. Your CV shows that you are also
14 a conference chair for the IEEE and ACM
15 Design Automation Conference, correct?

16 A. I have been. I'm not holding
17 that chair position right now, although I'm
18 still on the committee.

19 Q. Okay. I see on Page 1 of your
20 resume, it says that you're the conference
21 chair from 2016 to present?

22 A. Right. It says steering
23 committee and then under that, conference
24 chair. In some of those years I have held a
25 chair position and in some I have not.

1 Q. Okay. Was any of the work
2 there related to power budgeting on an
3 integrated circuit?

4 A. Yes. I would say probably
5 almost every year there are contributions
6 from either academia and/or industry relating
7 to different aspects of, I would say, this
8 general field.

9 Q. Okay. Your CV also lists you
10 as an adjunct professor at Rice University,
11 correct?

12 A. That's right.

13 Q. Was any -- did you do any work
14 there related to power budgeting on an
15 integrated circuit?

16 A. Yes, some of the curriculum
17 for -- in some years, what I was doing was
18 like Ph.D. candidate-facing seminars. So
19 looking at advanced topics or new emerging
20 things or that type of subject matter and we
21 would be looking at, from time to time,
22 power-related issues.

23 And I think during that window,
24 if memory serves correctly, we had jointly
25 published some things in like multiprocessing

1 that were probably somewhat related.

2 Q. Okay. Dr. Brogioli, your CV
3 includes a number of other experiences that
4 we didn't cover, correct?

5 A. That's right.

6 Q. Are any of these other -- at
7 any of these other positions, did you work on
8 power budgeting on an integrated circuit?

9 A. I would would say certainly
10 some of my work at Freescale, we were
11 designing and selling big multiprocessor-type
12 systems. For instance, six cores on a die
13 with multiple dies in the system and it had
14 pretty strict power consumption budgets.

15 So there would be some overlap
16 there and probably other work along the way.

17 Q. Other than Freescale, is there
18 any other experience you would like to
19 highlight?

20 A. I guess I would generally point
21 us to the CV. I don't have a recollection of
22 every role that I have had that might
23 dovetail with the things we will talk about
24 this week.

25 Q. Dr. Brogioli, you don't provide

1 any opinions on the Anderson reference, do
2 you?

3 A. So I recall you asking me about
4 Anderson a moment ago. I don't recall
5 discussing it explicitly in my declaration.

6 Q. Okay. And you also don't
7 provide any opinions on the Nafziger
8 declaration, correct?

9 A. The Nafziger reference?

10 Q. Yes.

11 A. I don't recall discussing it in
12 my declaration, no.

13 Q. Okay. And you don't -- you
14 also don't opine on any motivation to combine
15 any prior art references, correct?

16 A. I need to go back and look. As
17 I recall, I discuss aspects of things like
18 Bose and White and Simeral and respond to
19 Mercedes-Benz's expert declaration.

20 As to whether I talk about
21 reasons why a specific combination wouldn't
22 work, I guess we would have to go back
23 through the declaration.

24 Q. Okay. Well, can you show me
25 where in your declaration you provide an

1 opinion on motivation to combine?

2 A. I'm thumbing back through my
3 table of contents and it looks like in the
4 various sections, six, seven, eight, I'm
5 talking about things like anticipation of
6 obviousness in relation to Mr. Wyatt's
7 declaration. It doesn't look like I'm
8 talking about things like lack of motivation
9 to combine.

10 Q. And in your declaration, you
11 don't provide any opinions specific to the
12 dependent claims, do you?

13 A. If I recall, I talked about the
14 independent claims one and four.

15 Q. Okay.

16 A. At least going from a high
17 level structure, I don't see that I'm
18 addressing explicitly claims that may depend
19 from those.

20 Q. And you don't recall providing
21 any opinions on the dependent claims?

22 A. Not explicitly, no.

23 Q. Okay. So I would now like to
24 give you exhibit -- a copy of what is marked
25 as Exhibit 1001, and that's the '494 patent.

1 A. Okay.

2 Q. So in the abstract, a couple
3 lines down, it says -- well, I'll just read
4 the beginning.

5 "An apparatus method and system
6 is described herein for efficiently balancing
7 performance and power between processing
8 elements based on measured workload. If a
9 workload of a processing element indicates
10 that it is a bottleneck, then its performance
11 may be increased."

12 Do you see that?

13 A. Yes.

14 Q. How does the '494 patent
15 determine if a component is a bottleneck?

16 MR. FAHMI: Objection, form.

17 THE WITNESS: I would say
18 generally, and as I talk about in
19 my -- I think I talk about in my
20 declaration, it's looking at
21 various -- contemplating things like
22 CPUs, GPUs and interconnects and
23 contemplating what's going on with
24 them to deduce if, just as you said,
25 they are a bottleneck in the system or

1 some aspect of them can be adjusted
2 for power performance reasons.

3 Q. (BY MS. TRAC) How does the
4 '494 patent determine if a component is a
5 bottleneck?

6 MR. FAHMI: Objection, form.

7 THE WITNESS: I would have to
8 go back and look at the specification
9 for you. I'm just skipping ahead to
10 Column 2.

11 Q. (BY MS. TRAC) Well, let me --
12 I'll withdraw the question and rephrase it
13 differently.

14 Does determining a bottleneck
15 require determining a component's workload?

16 A. Are you asking in the patent?

17 Q. Does the '494 patent teach
18 that?

19 A. Well, the '494 patent mentions
20 bottlenecks within this system and it
21 mentions things like workload and describes
22 how it contemplates workload as part of its
23 overall invention.

24 Q. Okay. Well, how about outside
25 the context of the '494 patent, how -- what

1 other ways can you determine if a bottleneck
2 exists?

3 MR. FAHMI: Objection, form.

4 THE WITNESS: You would have to
5 be more specific. We would need to
6 define what you are talking about as a
7 bottleneck and there is -- depending
8 on what area of computing or what type
9 of solution or algorithm someone is
10 using, there is different ways to look
11 at these things, I would say.

12 Q. (BY MS. TRAC) So is there a
13 common understanding in the art of what
14 bottleneck means?

15 A. In my opinion, I would say as a
16 general concept. But it depends on sort of
17 what specific technology or part of the
18 system you're looking at as to what someone
19 might consider a bottleneck or
20 non-bottleneck.

21 Q. Is saying that a component is a
22 bottleneck the same as saying it's
23 overutilized?

24 A. I don't know. We would have to
25 look at a specific reference.

1 Just to give a generic example,
2 if I've got a processor that's trying to do
3 addition operations and there's a million of
4 them backlogged and I only have one integer
5 unit, someone might realize if I say four
6 integer units there, I can do more arithmetic
7 operations or something like that.

8 Q. So, in your opinion, generally
9 determining a bottleneck doesn't require
10 determining a component's workload?

11 MR. FAHMI: Objection, form.

12 THE WITNESS: That's not what I
13 said. When you look at the patent, it
14 specifically talks about workloads and
15 things like bottlenecks and things
16 like instructions or instructions
17 executed and things like that.

18 Q. So does determining a
19 bottleneck require comparing the workload to
20 anything?

21 A. Well, the patent talks about
22 workloads and things like constructions
23 processed or aspects of like bussing connects
24 and these threshold comparisons I talk about
25 in my declaration.

1 Q. Okay. So determining a
2 bottleneck requires a threshold comparison?

3 MR. FAHMI: Objection, form.

4 THE WITNESS: I would say
5 that -- those are subjects that the
6 '494 talks about as part of its
7 invention.

8 Q. (BY MS. TRAC) Are there other
9 ways of determining bottlenecks that doesn't
10 require a comparison?

11 A. We have to look at a specific
12 reference. As I recall, the patent itself is
13 talking about threshold comparisons.

14 Q. Okay. Does the term "workload"
15 in the '494 patent mean something different
16 than what it normally means in the art?

17 A. I would need to go back and
18 look at the '494. But in my experience,
19 "workload" is a term that can be used in
20 different contexts depending on a number of
21 different variables generally in the field.

22 Q. Okay. And so you -- you
23 provided opinions on what workload in the
24 '494 patent is, right?

25 A. Certainly within my

1 declaration. I'm trying to see if I've
2 got a -- it's probably in the overview of the
3 '494 starting on Page 10. I'm just going to
4 review Section 4.

5 Q. Okay.

6 A. So I guess roughly the top of
7 Page 12 in my declaration, I mention that in
8 this regard, a component's activity may be
9 taken as being indicative of its workload.

10 And then I cite to passages in
11 the patent, like the workload includes any
12 known method for determining activity of
13 hardware or workload software, a number of
14 instructions executed or to execute, and so
15 forth.

16 And then continuing down, in
17 the case of a communication bus, activity may
18 be measured by the number of cycles or number
19 of work slots occupied on the bus. Things
20 like processing elements, et cetera, can be
21 instrumented to use workload monitors.

22 Q. And does the way the '494
23 patent uses the term "workload," is it
24 different how -- than how "workload" is
25 normally used in the art?

1 MR. FAHMI: Objection, form.

2 THE WITNESS: I don't have an
3 opinion on how "workload" is normally
4 used in the art. That sounds like a
5 vastly broad question.

6 Q. (BY MS. TRAC) Okay. Well,
7 aside from the '494 patent, how would one in
8 the art understand what a workload is?

9 A. They would need to read -- you
10 know, if it was a patent or a technical
11 article or a textbook to get -- you would
12 have to understand the context being talked
13 about and then what that reference or what
14 aspect of a workload that reference is
15 talking about.

16 Q. Okay. In the context of the
17 '494 patent, can a counter be used to measure
18 workload?

19 A. I don't recall if the patent
20 talks about counters or not. I'm skimming
21 through my declaration.

22 Q. Okay.

23 A. Maybe you can --

24 Q. Yes, yes, I'll point you to
25 Column 16, Line 38 to 41.

1 A. Okay. I'm just going to take a
2 second to read this portion.

3 Q. Okay.

4 A. So it looks like this section
5 here is talking about the workload monitor on
6 the bus or a communication bus, it says. And
7 it's looking at a window of time and how many
8 slots on the bus are used or not used.

9 And so in this example, it's
10 stating a counter counts the number of slots
11 or entries that are issued over cycles, so
12 it's looking at occupancy rates on the bus.

13 Q. So a counter can be used to
14 measure a workload, right?

15 A. Here it says the counter is
16 being used to count slots or entries over a
17 time window as part of monitoring what it
18 looks like is saying is the workload monitor
19 for the communication bus.

20 Q. So is it used to measure
21 workload or not?

22 MR. FAHMI: Objection, form.

23 THE WITNESS: It looks like --
24 it looks like it's being used as part
25 of the workload monitor here to

1 monitor -- the counter is being used
2 as part of the monitoring of the
3 bus -- communication bus activity over
4 a period of time.

5 Q. (BY MS. TRAC) Is there a
6 distinction between a component's workload
7 and its performance?

8 MR. FAHMI: Objection, form.

9 THE WITNESS: Is there -- I
10 guess workload and performance aren't
11 necessarily equivalent. Is there a
12 section in the patent itself you're
13 referring to?

14 Q. (BY MS. TRAC) No, I'm just
15 asking generally.

16 A. Can you ask it again?

17 Q. Is there a distinction between
18 a component's workload and its performance?

19 MR. FAHMI: Objection, form.

20 THE WITNESS: I guess you need
21 to be -- we need to look at a more
22 specific example.

23 But I think we have all seen
24 cases where, you know, you have a
25 processor that shows 100 percent

1 utilization on your Windows machine,
2 right, but it's stuck with some bug in
3 the software and it's not doing any
4 meaningful work.

5 So, you know, in that case,
6 maybe your performance is zero, but
7 the workload is 100 percent or
8 something like that.

9 Q. (BY MS. TRAC) Okay. So
10 when -- when you're talking about performance
11 levels, that's not referring to a monitored
12 workload?

13 A. I guess -- well, I'm not sure I
14 understand that question. There's workloads,
15 there's what the patent talks about as
16 workload monitors, and then there's the
17 separate question of what is performance.

18 Q. And how do you understand
19 performance?

20 A. I guess I would go back to the
21 patent to see how it describes the word
22 "performance" in this context.

23 Q. So, for example, the abstract
24 talks about balancing performance and power.

25 A. Right.

1 Q. How is performance being used
2 here?

3 A. So I'm back at Column 15, and
4 roughly starting at Line 8. So it says, "The
5 apparatus and methodology of balancing
6 power/performance above has been in regard to
7 a producer-consumer relationship, e.g., one
8 device producing for another."

9 And so -- so in this context,
10 the CPU and GPU, it may be the GPU is
11 dependent on things being produced by the
12 CPU. And if the CPU can produce more things,
13 then -- in a window of time, then the GPU can
14 do more things on its end. And so that seems
15 to be one aspect of performance the patent
16 contemplates.

17 Q. The number of things that the
18 processor element can do?

19 A. I would say at a very, very
20 high level of abstraction, if these
21 processors like CPUs or GPUs are processing
22 tasks or work units, the performance may be
23 the increased ability to perform more work
24 units per time.

25 Q. Okay. And is that related to a

1 component's workload?

2 A. I would say in the sense that
3 if the GPU is performing more units of work
4 over time, it's doing more things or like the
5 patent talks about executing more
6 instructions or more utilization, then in
7 that context, I think someone would look at
8 it as performance in the sense of more work
9 is getting done per unit of time.

10 Q. Does more work translate to
11 higher workload?

12 A. You would have to be more
13 specific.

14 Q. Okay. Is there a difference
15 between a workload and a workload activity?

16 MR. FAHMI: Objection, form.

17 THE WITNESS: I need to go back
18 to the patent for you on that. I
19 don't recall where it may state
20 workload activity.

21 Q. (BY MS. TRAC) Okay. I'll
22 direct your attention to Column 14, Lines 36
23 to 49.

24 A. Okay.

25 Q. It says, "In flow 825, it's

1 determined if the graphics processor is a
2 performance bottleneck based at least on the
3 graphics workload activity."

4 A. Okay. I'll just read the
5 paragraph and look at the figure.

6 So it looks like this paragraph
7 is talking about the GPU and if the workload
8 activity here is greater than -- the graphics
9 workload activity is greater than the
10 graphics activity threshold.

11 If that activity is greater
12 than the threshold, then it's assuming, okay,
13 the GPU is a bottleneck and if the GPU's
14 activity is below that threshold, i.e.,
15 perhaps it could be doing more than the CPU's
16 bottleneck.

17 Q. So is the -- is the workload
18 activity the same as a workload? Is it using
19 those terms interchangeably?

20 A. It seems to me that in this
21 section of Column 14, it's using the phrase
22 "workload activity" or "graphics workload
23 activity," and that may be because it's
24 talking about the activity threshold.

25 I don't know that it's

1 necessarily drawing a distinction in this
2 paragraph between workload or workload
3 activity.

4 Q. So it's referring to the same
5 thing?

6 MR. FAHMI: Objection, form.

7 THE WITNESS: It looks like the
8 workload activity here is talking
9 about what the GPU is running or
10 trying to run at that moment in -- or
11 that window in time, I guess.

12 In the bottom portion it says,
13 "For example, workloads may be
14 directly compared."

15 So it seems to be using a few
16 different phrases here.

17 Q. (BY MS. TRAC) Okay. So the
18 '494 patent also talks about throughput.

19 A. Okay.

20 Q. Is throughput a workload?

21 MR. FAHMI: Objection, form.

22 THE WITNESS: I'm trying to
23 find where it talks about throughput.

24 Q. (BY MS. TRAC) Okay. So if you
25 go to Column 7, 51 through 56.

1 A. So here it's talking about -- I
2 guess on Line 51, probably where you wanted
3 me to start with, "Instead, in this scenario,
4 a device that is determined to be a
5 bottleneck for performance, such as
6 throughput performance as viewed from the
7 perspective of an application ..."

8 So here the term "throughput"
9 may be referred to as like units of work
10 being completed or how quickly the data moves
11 through a portion of the system kind of
12 thing.

13 Q. Okay. And is that a workload
14 in the '494 patent?

15 A. It looks like in this section
16 it is not using the phrase "workload," but
17 rather using the phrase "throughput" on
18 how the ability for things to move through
19 portions of the system at a certain rate
20 provide for performance.

21 Q. Okay. So, in your opinion,
22 throughput here is not a workload?

23 MR. FAHMI: Objection, form.

24 THE WITNESS: So at Line 4,
25 it's talking about, "Additionally,

1 such allocation, in one scenario, is
2 based on actually workload of devices,
3 instead of assumptions of workload or
4 power consumption."

5 And then continues to discuss
6 things related to throughput or, at
7 Line 52, "... A device that is
8 determined to be a bottleneck for
9 performance, such as throughput
10 performance as viewed from the
11 perspective of an application ..."

12 So it's talking about the
13 interrelationship here between
14 throughput -- throughput and devices
15 being bottlenecks and then overall
16 performance. It talks about -- it
17 talks about workload earlier in the
18 paragraph.

19 Q. (BY MS. TRAC) So my question
20 was is throughput a workload or are they two
21 different concepts?

22 MR. FAHMI: Objection, form.

23 THE WITNESS: It looks like in
24 this paragraph the patent is talking
25 about throughput performance as

1 another example of what the patent
2 contemplates in looking at these
3 thresholds and balancing performance
4 of the device.

5 It doesn't seem to me that they
6 are necessarily separate things in the
7 patent.

8 Q. (BY MS. TRAC) So it sounds
9 like the patent is using those two terms,
10 "throughput" and "workload," interchangeably?

11 MR. FAHMI: Objection, form.

12 THE WITNESS: No, it's talking
13 about throughput here because it's a
14 more appropriate term in terms of the
15 aspect of the system behavior that the
16 patent is looking at in this
17 description.

18 Q. (BY MS. TRAC) Okay. What
19 about the term "load," is "load" and
20 "workload" referring to the same thing?

21 MR. FAHMI: Objection, form.

22 THE WITNESS: You would have
23 to -- it depends on the -- well, in
24 computing, it depends on the context
25 you're talking about. They can be --

1 they can be very different things at
2 times, too.

3 Q. (BY MS. TRAC) Is workload a
4 type of performance metric?

5 A. I don't recall in the patent
6 the phrase "performance metrics." Maybe you
7 can point me to where that's used.

8 Q. I'm just asking about
9 workloads.

10 MR. FAHMI: Objection, form.

11 THE WITNESS: I don't know. I
12 mean, I don't know the universe of
13 ways that people use, in the very
14 broad field of computing, the phrase
15 "workload" and "performance metrics."

16 Q. (BY MS. TRAC) Okay.
17 Dr. Brogioli, in Paragraph 38 of your
18 declaration, you define workload as an amount
19 of activity over a quantum or period of time.

20 Do you see that?

21 A. Yes, that's what we were
22 talking about earlier.

23 Q. Is activity level a workload
24 under the '494 patent?

25 A. I would say in the sense that

1 we are talking about activity of a device
2 over window of time or period of time, that
3 sounds like workload.

4 Q. I'll just refer to this amount
5 of activity over a quantum or period of time
6 as your definition of workload. And so if I
7 say your definition, you will understand what
8 I mean?

9 A. Okay.

10 Q. Okay. When you say "over
11 quantum of time," are you distinguishing
12 between quantum and period of time?

13 A. I don't recall breaking down an
14 explicit difference between the two.
15 Generally, and this is what the patent talks
16 about, is something happening or a number of
17 times something is able to happen over a
18 period of time or a window of time.

19 Q. Okay. So that quantum of time,
20 you just mean the window of time?

21 A. That would be fair, yes.

22 Q. Is that the same thing as a
23 period of time?

24 A. I suppose so. You could
25 probably use the two interchangeably. You

1 know, depending on the scale or granularity,
2 you're looking at some portion of the system.
3 It can be a window or a set -- set period you
4 want to look at kind of thing.

5 Q. So what did you rely on to form
6 your definition of "workload"?

7 A. The definition is based on the
8 description in the patent and the
9 specification and what this definition of a
10 person skilled in the art that would use it
11 would understand.

12 Q. Did you look at any other
13 materials in construing workload?

14 A. No. I believe it was just the
15 understanding of a person with skill in the
16 patent itself.

17 To put it another way, if I was
18 referring to like a technical dictionary or
19 something, I would have cited that here.

20 Q. Okay. So you didn't refer to
21 any technical dictionaries?

22 A. Not that I see listed here or
23 that I necessarily recall.

24 (Discussion off the record)

25 MS. TRAC: So we have almost

1 been going for an hour. Should we
2 take a short break?

3 MR. FAHMI: Sure, yeah.
4 Whatever you like.

5 THE VIDEOGRAPHER: Going off
6 the record. The time is 10:30.

7 (Recess from 10:30 a.m. to
8 10:42 a.m.)

9 THE VIDEOGRAPHER: Back on the
10 record. This marks the beginning of
11 Media Unit No. 2. The time is 10:42.

12 Q. (BY MS. TRAC) All right. The
13 definition you provide for "workload" that we
14 talked about earlier, that applies to both
15 processing cores and communication buses,
16 right?

17 A. Those -- yes, CPUs, GPUs and
18 the bus are -- communication bus are things
19 that the patent talks about in relation to
20 this.

21 Q. Okay. Under your definition,
22 does the amount of data passing over a bus
23 constitute a workload?

24 A. The patent talks about the
25 communication bus and activity over the bus

1 that we were talking about before the break.
2 And so I think data would be fair. As an
3 example of that, data moving over a bus or
4 whatever communication goes over the bus.

5 Q. That would be a workload, data
6 over a bus?

7 A. In the context of the patent
8 looking at the amount of activity over that
9 unit of time, if it's looking at the bus, it
10 would be looking at data or whatever payloads
11 are going over the bus.

12 Q. Under your definition, does the
13 amount of time when a component is active
14 count as a workload?

15 A. Well, I guess it's looking at
16 the amount of -- for instance, a component
17 and its amount of activity over that window
18 of time, we might -- if you say the --
19 something being active, we need to maybe
20 parse out what "active" means in that
21 context.

22 Q. Well, what does "active" mean
23 to you?

24 A. I would say in this area of --
25 "active" means, like, for example, when it

1 comes to CPU cores, we have different states
2 that you can put -- or at the time of the
3 patent, there's different states you can put
4 them in. Some are running instructions, some
5 are in different power conservation states
6 that do different things, but they may not
7 execute instructions, for example.

8 Q. Okay. So the amount of time a
9 core is active during a period of time,
10 that's not necessarily a workload then?

11 A. I guess to answer it a little
12 differently, if you had a core that's got
13 some power going to the voltage rail, but
14 it's not doing anything or is stuck in a halt
15 scenario, I don't think it would be
16 performing any activity over a unit of -- or
17 a period of time like I'm talking about in
18 Paragraph 38.

19 Q. Okay. What about a cache miss
20 rate, could that be a workload under your
21 definition?

22 A. I don't think I talked about
23 that in my declaration.

24 Q. Right. I'm just saying that --
25 does it -- is it a workload under your

1 definition?

2 A. I don't know. I don't think I
3 have an opinion one way or the other. Cache
4 miss rate is something in and of itself
5 relating to every time somebody asks the
6 cache for data, does it have it or doesn't it
7 have it.

8 Q. Is that an activity?

9 A. I'm saying a cache miss rate is
10 just a statistic, just a number or statistic
11 related to activities or, I guess,
12 summarizing the ratio at which various
13 activities happen.

14 Q. What about instructions per
15 second, would that be a workload according to
16 your definition?

17 A. In the sense of my definition
18 of "workload" is the amount of activity over
19 a period of time and IPS or instructions per
20 second is a metric we use to describe the
21 number of instructions that get executed by a
22 processor in a -- in this case, a second of
23 time, millions or billions of instructions.

24 So that may be something that
25 falls under "workload" that I talk about in

1 Paragraph 38.

2 Q. Okay. What about instructions
3 per cycle, would that be a workload?

4 A. I don't recall talking about
5 instructions per cycle. But if we have a
6 processor that can issue -- or I guess
7 execute, I'll say, multiple instructions per
8 clock cycle and the clock cycle is some unit
9 of time, a billionth of a second, then that
10 sounds like an amount of activity over a
11 period of time at some very fine grain level.

12 Q. Okay. So instructions per
13 cycle could be a workload under your
14 definition?

15 A. Perhaps. I don't think I
16 talked about that in my declaration. But it
17 sounds like if we're getting 1.5 instructions
18 per cycle and a cycle is, you know, a
19 billionth of a second, that sounds like
20 something that may fit that definition.

21 Q. Okay. Would revolutions per
22 minute be a workload under your definition?

23 A. I don't know. I don't talk
24 about that in my declaration.

25 Q. So you don't know if

1 revolutions per minute would be a workload
2 under your own definition?

3 A. I guess if the activity you're
4 monitoring is revolutions, like in a
5 combustion engine, for example, and you --
6 that's the activity or the amount of activity
7 you're looking at over a period of time, in
8 your example, the period of time is per
9 minute, then that may fit into the definition
10 of "workload."

11 Q. Okay. What about a number of
12 disk accesses per unit of time, would that be
13 a workload under your definition?

14 A. I guess I would say -- and
15 similar to the rotations per minute, I don't
16 think these are things that the patent
17 discusses. So I'm answering you sort of
18 generally, are these things that would fit
19 within the definition and amount of activity
20 over a period of time.

21 It sounds like disk access is
22 another thing I don't recall the patent
23 talking about. But if the activity you're
24 monitoring in this generic example is disk
25 reads and you're looking at them or the

1 number of completed reads over a window of
2 time, like a minute, that sounds like some
3 kind of activity over a period of time. I
4 don't know that the patent is talking about
5 that.

6 Q. Is workload indicative of how
7 busy a component is?

8 MR. FAHMI: Objection, form.

9 THE WITNESS: I don't know what
10 you mean by "busy."

11 Q. (BY MS. TRAC) Is a workload
12 indicative of how active a component is?

13 MR. FAHMI: Objection, form.

14 THE WITNESS: Again, I'm not
15 sure what you mean by the word
16 "active" either.

17 Q. (BY MS. TRAC) Well, you've
18 used the term "active" today, right?

19 A. I have, I have. And as we were
20 talking about a moment ago, there's
21 conditions where, for instance, a CPU may be
22 asleep, but still consuming power, but not
23 executing anything.

24 The other example I gave this
25 morning about a CPU that maybe is running

1 at -- what would show up in Windows at
2 100 percent, but it's not performing any
3 useful work because something has gone wrong.

4 We need to define "active" in
5 your question's context, I guess.

6 Q. Would an activity level be a
7 workload under your definition?

8 MR. FAHMI: Objection, form.

9 THE WITNESS: So my definition
10 is the amount of activity over this
11 period of time. I would have to look
12 at the universe of ways different
13 references use activity level.
14 There's a lot of different contexts in
15 computing there.

16 Q. (BY MS. TRAC) Okay. Can a
17 frequency be a workload under your
18 definition?

19 MR. FAHMI: Objection, form.

20 THE WITNESS: I don't think so,
21 no. I think I talk about that in
22 relation to perhaps the White
23 reference.

24 Q. (BY MS. TRAC) Okay. What
25 about bandwidth, can bandwidth be a workload

1 under your definition?

2 MR. FAHMI: Objection, form.

3 THE WITNESS: I don't think I
4 talked about that in my declaration.

5 Bandwidth is usually -- for
6 instance, in a bus, it's the knowledge
7 -- if you have a 32-bit bus that runs
8 at X megahertz, it's number of bits
9 times megahertz that the hardware can
10 support or something like that.

11 Q. (BY MS. TRAC) So would that be
12 a workload under your definition?

13 A. In the definition I'm using
14 where it's just sort of a raw number that's
15 sort of peak performance capability of a
16 piece of silicon implementing a bus, I don't
17 know that that fits into the definition of
18 "workload" I'm using.

19 With that being said, there are
20 probably references out there that use the
21 word "bandwidth" different -- in formal ways
22 or in different context.

23 Q. Okay. What about activity of
24 hardware, is that a workload?

25 A. I think you probably need to

1 define it more specifically.

2 Q. So sitting here today, you
3 can't -- you don't know whether activity of
4 hardware is a workload or not?

5 MR. FAHMI: Objection, form.

6 THE WITNESS: I don't know what
7 the phrase, quote, "activity of
8 hardware" means in your context.

9 Q. (BY MS. TRAC) Okay.

10 A. I mean, if I have a transistor
11 and I start switching it really fast, in and
12 of itself, that doesn't really mean anything.

13 Q. Okay. What about workload of
14 software, is that a workload under your
15 definition?

16 MR. FAHMI: I'm sorry, could
17 you read that back, please?

18 Q. (BY MS. TRAC) What about
19 workload of software?

20 A. So the patent in a few places,
21 even as we talked about this morning,
22 mentions applications. I'm not sure that the
23 phrase "workload of software" appears in the
24 patent. So we need to be a little bit more
25 specific.

1 Q. Okay. What about number of
2 instructions executed or to execute, is that
3 a workload under your definition?

4 MR. FAHMI: Objection, form.

5 THE WITNESS: I don't know. We
6 would need to be -- you would need to
7 ask a more specific question.
8 Something like number of instructions
9 to execute could just be a bucket of
10 things that need to run, but we have
11 no notion of where they are running or
12 how they are running, and so forth.

13 Q. (BY MS. TRAC) Okay. What
14 about a metric for determining the use of a
15 processing ARM?

16 MR. FAHMI: Objection, form.

17 THE WITNESS: I don't recall
18 discussing that phrase in my
19 declaration.

20 Q. (BY MS. TRAC) So a metric for
21 determining use, is that a workload in
22 your -- under your definition?

23 MR. FAHMI: Objection, form.

24 THE WITNESS: I guess you need
25 to be more specific. That sounds like

1 a fairly broad term that, one, I don't
2 talk about, but can see encompassing a
3 number of different things.

4 Q. (BY MS. TRAC) So in -- okay.
5 How would a POSITA understand an activity of
6 hardware?

7 A. I guess you would have to give
8 me a frame of reference of the question is
9 being posed to them.

10 Q. Well, I guess, you know, in the
11 context of, you know, power management
12 between cores in the context of the '494
13 patent, for example, that technology area.

14 A. I think they would understand
15 hardware and aspects of hardware just as the
16 '494 talks about them and as the '494 talks
17 about workloads and thresholds and things
18 like that and the concept of having CPUs and
19 CPUs and then perhaps being dependent on each
20 other. It would be just as the patent
21 describes.

22 Q. Okay. Can you provide any
23 examples of activity hardware?

24 MR. FAHMI: Objection, form.

25 A. I guess, again, giving you a

1 generic example, if you have got a transistor
2 and that transistor's hardware and I start
3 switching the transistor on and off, I
4 think -- versus just leaving it static and
5 not switching it on and off, I think a person
6 of skill would understand generically, okay,
7 one scenario the transistor is not switching
8 and one scenario it is, maybe in the latter
9 scenario it's active.

10 Q. Okay. Is a bus -- we might
11 have talked about this. Bus data rate was a
12 workload, right?

13 A. I would say a person skilled
14 reading the patent, it talks about buses or
15 communication buses, and those buses have a
16 speed, you know, clock speed associated with
17 them and things like that.

18 And I think we talked about
19 earlier the amount of activity, an example
20 being how much data might be going over the
21 bus for that window of time that a person of
22 skill would understand those concepts.

23 Q. Okay. So is a bus -- the data
24 rate of a bus, is that a workload?

25 MR. FAHMI: Objection, form.

1 THE WITNESS: I guess I would
2 ask what do you mean by data rate of a
3 bus? The scenario I just described,
4 which we talked about earlier, is the
5 workload that the patent talks about.

6 Q. (BY MS. TRAC) So this scenario
7 described earlier, what was the workload that
8 the patent talks about?

9 A. The passages of the patent we
10 were talking about this morning where we were
11 looking at things going over the
12 communication bus in the patent versus
13 another -- the other example that I think
14 wouldn't be workload is if I go to the store
15 at the time of this patent and there is a
16 PCI -- 32-bit PCI peripheral that supports
17 33 megahertz, if it's sitting in a box not
18 doing nothing, there is certainly nothing
19 moving over the bus, right.

20 Q. Okay. What about processing
21 burden? Is processing burden a workload?

22 MR. FAHMI: Objection, form.

23 THE WITNESS: I don't -- I'm
24 not sure I know what you mean by
25 "processing burden." Is that

1 something used in the patent?

2 Q. (BY MS. TRAC) No. Just, you
3 know, in the art, how would one in the art
4 understand a processing burden?

5 A. I'm not sure. I would have to
6 go back and look at the reference.

7 Q. Is instructions of a software
8 application a workload?

9 MR. FAHMI: Objection, form.

10 THE WITNESS: We need to look
11 at a reference. I mean, an
12 application is made up of software
13 instructions that ultimately run on
14 some piece of hardware to perform a
15 job or something. But I need a more
16 specific question.

17 Q. (BY MS. TRAC) Okay. What
18 about a process load? Is that a workload?

19 MR. FAHMI: Objection, form.

20 THE WITNESS: I'm not sure I
21 recall the term "process load" being
22 used in the patent or something in my
23 declaration.

24 Q. (BY MS. TRAC) So you don't
25 know what "process load" means?

1 MR. FAHMI: Objection, form.

2 THE WITNESS: Not in this
3 context. It seems like a term that
4 could be used in a lot of different
5 fields of study.

6 Q. (BY MS. TRAC) Do you know what
7 "process workload" means?

8 A. I guess we would need to look
9 at its use in a specific example.

10 Q. Okay. What about power
11 consumption, is that a workload?

12 MR. FAHMI: Objection, form.

13 THE WITNESS: I think I talk
14 about this in my declaration that at
15 least in certain aspects of the prior
16 art references, that's not a workload.

17 Q. (BY MS. TRAC) Okay. Is power
18 consumption a metric for determining use of a
19 processing element?

20 MR. FAHMI: Objection, form.

21 THE WITNESS: I don't recall
22 talking about, in the context of the
23 patent or the prior art references in
24 this matter, the power consumption of
25 a piece of hardware is a workload.

1 Q. (BY MS. TRAC) But is power
2 consumption a metric of use for a processing
3 element?

4 MR. FAHMI: Objection, form.

5 THE WITNESS: I would say
6 generally, not necessarily, I can have
7 a piece of hardware that's consuming
8 power, as I was talking about earlier
9 this morning, that's not necessarily
10 doing anything.

11 Q. (BY MS. TRAC) Okay. What
12 about temperature, is that a workload?

13 MR. FAHMI: Objection, form.

14 THE WITNESS: It doesn't sound
15 like that falls within my definition
16 of workload. Some piece of silicon
17 can have a temperature associated with
18 it that isn't necessarily doing
19 anything.

20 Q. (BY MS. TRAC) Well, can
21 temperature be a metric for determining use
22 of a processing element?

23 MR. FAHMI: Objection, form.

24 THE WITNESS: I don't recall
25 talking about that in my declaration.

1 Q. (BY MS. TRAC) But do you know
2 the answer?

3 MR. FAHMI: Objection, form.

4 THE WITNESS: In the context of
5 these -- this patent and the prior art
6 references, I don't recall that being
7 the case.

8 Q. (BY MS. TRAC) So temperature
9 cannot be -- is not a metric for determining
10 use of a processing element?

11 MR. FAHMI: Objection, form.

12 THE WITNESS: Not in the
13 context of the subject matter I talk
14 about in my declaration, I don't
15 recall, no.

16 Q. (BY MS. TRAC) Okay. Well,
17 higher temperature reflects higher usage,
18 right?

19 A. I would say generically,
20 outside the scope of the patent, if I have a
21 piece of silicon and I crank up things like
22 voltage and frequency or frequency and burn
23 more power, that can result in more heat.
24 That's just a general concept.

25 Q. Okay. And in higher usage,

1 does that lead to high temperatures,
2 generally?

3 A. I mean, not necessarily. I
4 would just say just in electronics in
5 general, the more power someone is consuming,
6 the more heat it turns into is a sort of
7 generic concept.

8 Q. If you increase the workload of
9 the component, would you expect the
10 temperature to decrease?

11 A. It depends on how you design
12 the component or what your workload is here.

13 Q. Okay. So as a processor goes
14 from 50 percent active to 75 percent active,
15 you would expect the temperature to go down?

16 MR. FAHMI: Objection, form.

17 THE WITNESS: I mean, possibly.
18 You know, in this timeframe or when we
19 shifted to multicore processing, the
20 idea was we're consuming too much
21 power and too much heat, but we need
22 so run more things on our laptops like
23 you have there.

24 And so rather than one big
25 processor, we move to all of these

1 smaller processors with lower
2 frequency rates and lower power to do
3 more things. And I think your
4 question was about temperature, but
5 things run cooler now.

6 Q. (BY MS. TRAC) So the '494
7 patent, it talks about workload monitors,
8 correct?

9 A. That's correct.

10 Q. And the workload monitors, they
11 measure workload?

12 A. I'm trying to find where the
13 workload monitor is discussed in the
14 specification.

15 Q. It might not be called a
16 workload monitor, but in the specification
17 sometimes it uses different terms.

18 A. So it looks like at least in
19 Column 12, talking about Figure 6, there's a
20 workload monitor 606, it looks like for the
21 GPU cores. It's starting at Line 20 of
22 Column 12.

23 Q. Okay. And is that a workload
24 monitor that measures workload?

25 A. So it looks like it's saying

1 that 606 is a workload monitor. And then if
2 I skip down to 39, it says, for example,
3 assume the activity threshold is 95 percent
4 activity, then at workload monitor 606
5 detects 96 percent to 100 percent active
6 cycles, then it's determined the activity
7 threshold is exceeded.

8 So it looks like that monitor,
9 606, is looking at that definition of
10 workload I provided in my declaration. It's
11 this activity over this period of time.

12 Q. Okay. And activity threshold
13 here, is that referring to the workload
14 threshold?

15 A. It looks like the activity
16 threshold is whatever activity the workload
17 monitor is monitoring. So whatever those
18 activities are over that period of time.

19 Q. Okay. Let's turn to Column 10,
20 starting on Line 65. It says, "However, if a
21 workload module 520 determines GPU's
22 frequency is below a threshold, i.e., not
23 working/consume at maximum capacity, then any
24 CPU frequency is increased to cause more
25 production such that GPU core's workload

1 increases accordingly."

2 Do you see that?

3 A. Yes.

4 Q. In this example, is the '494
5 patent disclosing a workload monitor
6 determining the frequency of a GPU?

7 A. So this section looks like it's
8 referring back to Figure 5 and there's a
9 workload module 520 here. And it's -- it
10 knows that the GPU is running at a frequency
11 or operating below a threshold and. Then
12 it's saying, well, the CPU -- if we increase
13 the limit on the CPU, the CPU will start
14 producing more or increase its production and
15 then that will allow the GPU workload to
16 increase.

17 So it looks like it's talking
18 about here a workload module and knowing that
19 the GPUs clock rate is below some limit.

20 Q. Okay. So the -- so the
21 workload module determines the GPU's
22 frequency, correct?

23 A. Here, it's stating that the
24 workload module 520 is determining that the
25 GPU is running at a frequency below some

1 threshold and then it's making its other
2 deductions or changes within the system.

3 Q. And to determine that the
4 frequency is below the threshold, that module
5 has to compare the GPU's frequency with the
6 threshold, right?

7 A. I mean, in the sense that here
8 the workload module 520, just as the language
9 states, determines the GPU is below some
10 threshold or the GPU's frequency is below a
11 threshold. And then it makes adjustments to
12 the CPU's cap.

13 Q. Right. But I'm just -- I'm
14 just asking about that determination. That
15 requires comparing the frequency to a
16 threshold, correct?

17 MR. FAHMI: Objection, form.

18 THE WITNESS: In this example,
19 the workload module, as part of
20 adjusting the system, is looking at
21 the GPUs -- what frequency the GPU is
22 currently at.

23 Q. (BY MS. TRAC) And is it
24 comparing that frequency to a threshold?

25 A. As part of this process, it's

1 looking at the GPU frequency and seeing it's
2 below a threshold and then making the
3 adjustments to everything else. Here, a
4 threshold being not working or consuming at
5 maximum capacity.

6 Q. Yeah. And so when you're
7 saying it's seeing if it's below a threshold,
8 does that involve a comparison?

9 A. I guess in the sense that it's
10 saying GPU frequency is below a threshold,
11 i.e., it's less than whatever some threshold
12 is in terms of working or consuming at max
13 capacity and then CPU frequency caps or
14 limits get increased.

15 Q. So this threshold represents
16 the maximum capacity of the GPU, correct?

17 A. I'm just rereading the
18 paragraph. So I'm going back up this
19 paragraph, Column 10 at 54.

20 So it's saying here -- assume
21 that we have a collection of CPU cores and
22 GPU cores. And then in 56, the GPU cores are
23 operating at maximum, i.e., fully occupied,
24 then the GPU core is at a performance
25 bottleneck. It's working as fast as it can

1 under the current limits.

2 And then it continues on to say
3 here, roughly around 65, if the workload
4 monitor determines that that frequency of the
5 GPUs is below a threshold, they are not
6 running at maximum capacity. Then in this
7 example, the CPU limit is increased so then
8 more things can go to the GPU and increase
9 accordingly.

10 Q. So the threshold is a maximum
11 capacity, right, threshold?

12 A. Here in this paragraph, the
13 example of threshold they are using in this
14 context is, i.e., not working/consume at
15 maximum capacity.

16 Q. Does the term "threshold" in
17 the '494 patent mean something different than
18 it normally means?

19 MR. FAHMI: Objection, form.

20 THE WITNESS: I would say the
21 term "threshold" in the '494 means the
22 way it's described in the '494. In
23 the field of processor design, shift
24 design, et cetera, a threshold can
25 have different meanings in different

1 contexts.

2 Q. (BY MS. TRAC) So the '494
3 patent uses the term differently from how
4 it's used elsewhere in the art?

5 MR. FAHMI: Objection, form.

6 THE WITNESS: I would say that
7 the patent uses the term "threshold"
8 just as a person of skill understands
9 it in this context. But there are
10 probably other references in areas of
11 computing that may use it differently.

12 Q. (BY MS. TRAC) So generally, it
13 uses it consistently about how the word
14 "threshold" normally means in the art,
15 correct?

16 A. In the sense of how a person of
17 skill would understand it, when talking about
18 CPUs, GPUs, buses, power management, et
19 cetera, I didn't -- I don't recall Mr. Wyatt
20 or myself offering a different construction
21 of it.

22 Q. In your opinion, is a limit a
23 threshold?

24 A. I don't know that I'm offering
25 an opinion on that.

1 Q. Well, you said the threshold
2 is -- you know, is used according to how a
3 person of ordinary skill would understand it.

4 A. Right.

5 Q. So a person of ordinary skill,
6 would they consider a limit to be a
7 threshold?

8 A. Possibly.

9 Q. But not always?

10 A. There are probably cases of
11 both, depending on the given reference or how
12 it's used.

13 Q. Okay. What about a boundary?
14 Is a boundary a threshold?

15 MR. FAHMI: Objection, form.

16 THE WITNESS: I don't recall
17 discussing the phrase "boundary" in my
18 declaration or that being something in
19 the -- in Mr. Wyatt's prior art
20 references that I don't recall
21 boundary being something discussed.

22 Q. (BY MS. TRAC) Is a boundary a
23 threshold?

24 MR. FAHMI: Objection, form.

25 THE WITNESS: I don't know. We

1 have to look at a specific example, I
2 suppose.

3 Q. (BY MS. TRAC) Does one of
4 ordinary skill understand what "boundary"
5 means?

6 A. Probably in a given context,
7 yes. I don't recall that being a word or a
8 phrase in the patent.

9 Q. And "threshold" is being used
10 to define ranges?

11 MR. FAHMI: Objection, form.

12 THE WITNESS: I don't recall
13 the patent's use of threshold being
14 something defining ranges.

15 As I talk about in my
16 declaration, it's -- it's this value,
17 scalar value, that's used in the
18 patent.

19 Q. (BY MS. TRAC) Does the patent
20 use the term "scalar value"?

21 A. I don't recall if it uses the
22 word "scalar," but that's the type of value
23 that it's talking about.

24 Q. Okay. And by scalar, are you
25 distinguishing it from vector?

1 A. That would be one example, a
2 scalar being something like an integer -- a
3 single integer value or Boolean or things
4 like that.

5 Q. So a threshold can't be
6 multiple values then, correct?

7 MR. FAHMI: Objection, form.

8 THE WITNESS: I don't see that
9 the patent was talking about, for
10 instance, something like a vector.

11 Q. (BY MS. TRAC) In the '494
12 patent, it wouldn't cover a system where the
13 threshold is multiple values?

14 MR. FAHMI: Objection, form.

15 THE WITNESS: I don't recall
16 discussing that one way or the other
17 in my declaration.

18 Q. (BY MS. TRAC) So the '494
19 could cover a system where the threshold
20 is -- is multiple values?

21 MR. FAHMI: Objection, form.

22 THE WITNESS: I haven't
23 performed an analysis as to the types
24 of systems or, for example, if this
25 were a litigation in accused products

1 that were or were not covered by the
2 patent claims.

3 Q. (BY MS. TRAC) Okay. Well, in
4 your declaration you say that the threshold
5 is a -- is a singular value, correct?

6 If you want to look at
7 Paragraph 44 and 45 is where you talk about
8 this.

9 A. I'm looking at 44. Yeah, this
10 is what -- yes, this is what I was getting at
11 a moment ago. The third line down, "A POSITA
12 would understand the threshold value as a
13 singular scale or value against which a
14 comparison is made."

15 Q. And later, in Paragraph 45, you
16 say that a threshold is a fixed value as
17 well?

18 A. In the context of what Bose is
19 doing, yes, that Bose is -- well, there are a
20 lot of differences in what Bose is
21 contemplating.

22 But part of that is a dynamic
23 set of information and tables and structures
24 that are being algorithmically used and
25 updated and manipulated over time.

1 Q. But you said the '494 patent
2 uses -- contemplates threshold as a fixed
3 value, correct?

4 A. The threshold contemplated by
5 the '494, which is a fixed value over time.

6 Q. Okay. Are you using "singular
7 value" and "fixed value" interchangeably
8 here?

9 A. I would say there are two
10 concepts, one being the patent talks about a
11 singular value. So, i.e., let's use an
12 example as an integer -- as a scalar and that
13 it's -- that threshold is fixed over time.

14 So, for example, where the
15 patent talked about 95 percent being -- if
16 something was 96 to 100 percent, that being
17 over a threshold of 95 percent.

18 Q. Does the '494 patent use the
19 term "singular value"?

20 A. I don't recall if that explicit
21 phrase is used in the patent specification.
22 But it is, just as we saw, talking about in
23 that example I just mentioned of 95 percent
24 and 96 percent, 97, 98 being above that, that
25 the singular value in that example is the

1 95 percent.

2 Q. Okay. What do you mean by
3 "fixed value over time"?

4 A. That the patent isn't
5 discussing -- well, I don't discuss in my
6 declaration either the type of system that
7 Bose contemplates where -- and this is one
8 difference. There is multiple of them.

9 But Bose is updating these
10 various tables and structures continuously
11 over time as, if I recall, the loop versus
12 the patent, which talks about this threshold
13 that's being used.

14 Q. So the threshold in the '494
15 patent, does it have to be fixed for all
16 time?

17 MR. FAHMI: Objection, form.

18 THE WITNESS: I don't -- I
19 don't believe I offer an opinion on
20 that one way or another. Just that
21 the way the patent -- the '494 patent
22 describes the threshold, it is the
23 singular value that's being used.

24 Q. (BY MS. TRAC) Right. But you
25 also say it's fixed over time and I'm trying

1 to understand what you mean by "fixed over
2 time."

3 A. In that at a given point in
4 time, in the different embodiments
5 descriptions in the patent, it's talking
6 about a threshold value.

7 It's not contemplating, for
8 example, reading a bunch of tables from
9 memory and dynamically updating things as the
10 algorithm is running.

11 Q. So is the threshold fixed for
12 all time?

13 MR. FAHMI: Objection, form.

14 THE WITNESS: What do you mean
15 by "all time"?

16 Q. (BY MS. TRAC) Well, is it your
17 opinion that the threshold can never change?

18 A. I don't see that the patent
19 talks about changing or dynamically changing
20 that threshold value as the patent describes
21 its embodiments using the threshold.

22 Q. Does it have to be fixed when I
23 the hardware is manufactured?

24 A. I don't offer an opinion on
25 that as to whether it's burned into silicon

1 fuses or something like that or established
2 another way.

3 Q. Okay. But it can be fixed when
4 the hardware is manufactured. That's one way
5 it could keep a threshold fixed?

6 A. I don't have an opinion on that
7 as to -- I don't recall the patent talking
8 one way or another about how the threshold
9 value is stored in the system or something
10 like that.

11 Q. Does it have to be stored in a
12 read-only memory?

13 A. I don't have an opinion on
14 that.

15 Q. So if it's fixed over time, it
16 can be stored in anywhere?

17 A. I don't know that the patent
18 says it can be stored anywhere either.

19 Q. Well, I don't think the patent
20 says it's fixed over time, but that's --
21 that's your words.

22 MR. FAHMI: Objection, form.

23 Q. (BY MS. TRAC) Okay. In your
24 opinion, would the '494 patent cover systems
25 with a threshold as dynamically varying?

1 MR. FAHMI: Objection, form.

2 THE WITNESS: That's what -- it
3 sounds like I talk about in my
4 declaration, at least in part with
5 respect to Bose, that the patent is
6 not talking about this dynamic -- a
7 system that Bose contemplates with
8 power-performance trade-off tables and
9 prediction tables and semantics of
10 control for updating all of these
11 things during run time.

12 Q. (BY MS. TRAC) So the '494
13 patent wouldn't cover a system where the
14 threshold is dynamically varying?

15 MR. FAHMI: Objection, form.

16 THE WITNESS: Oh, I don't offer
17 an opinion on that in my declaration,
18 I don't recall.

19 Q. (BY MS. TRAC) So it could
20 cover a system where the threshold is
21 dynamically varying?

22 MR. FAHMI: Objection, form.

23 THE WITNESS: I guess I would
24 have -- you would have to explain what
25 you mean by "dynamic."

1 The patent talks about a
2 singular value for the threshold and
3 that threshold value being used. I
4 don't have opinions or I wasn't asked
5 to look at whether there is other
6 characteristics of the threshold.

7 It may be encompassed by the
8 patent or if you're asking about
9 whether a given system uses a
10 threshold identical to the patent or
11 something.

12 Q. (BY MS. TRAC) Well, you're the
13 one -- your declaration uses the term
14 "dynamically changing," right?

15 A. In the context of Bose, yes.

16 Q. Okay. But -- so then the '494
17 patent could cover a system where the
18 threshold is dynamically changing?

19 MR. FAHMI: Objection, form.

20 THE WITNESS: In the context of
21 Bose talks about a dynamically
22 changing data of this kind, which is
23 apparently derived algorithmically
24 from historical information and
25 current data samples.

1 Q. (BY MS. TRAC) Okay. So the
2 '494 patent, that doesn't cover a threshold
3 where the threshold is algorithmically
4 derived?

5 MR. FAHMI: Objection, form.

6 THE WITNESS: Not in the manner
7 that Bose is contemplating. I'm
8 responding to Mr. Wyatt's statements
9 about -- for example, the Bose prior
10 art references, I haven't performed an
11 exhaustive analysis of systems that
12 may be covered by the '494. That was
13 my role.

14 Q. (BY MS. TRAC) Can you show me
15 where the '494 patent says that a threshold
16 can't be dynamically updated?

17 A. I don't recall seeing a passage
18 in the patent saying that this threshold is
19 dynamically updating at each duration cycle
20 or something like that.

21 Q. Does it say that it can't be
22 updated?

23 A. Are you asking me to prove a
24 negative?

25 Q. No.

1 A. Okay.

2 Q. I'm just -- I'm just asking --

3 A. I'll look through the spec for
4 you then.

5 Q. That's okay. If you don't
6 remember, it's okay.

7 But sitting here today, you
8 can't -- you don't know if the '494 patent
9 says that the threshold can't be dynamically
10 updated, right?

11 MR. FAHMI: Objection, form.

12 THE WITNESS: I would say my
13 opinions relate to -- it sounds like
14 in this subject that the patent isn't
15 describing what is in the Bose
16 reference or the Bose reference is
17 describing something different from
18 the patent.

19 Q. (BY MS. TRAC) Okay. A POSITA
20 would understand that 95 percent is a
21 positive -- a possible threshold, correct?

22 MR. FAHMI: Objection, form.

23 THE WITNESS: I forget where we
24 were a moment ago in the patent, but
25 95 percent, as I recall, is one -- one

1 example that the patent uses as -- I
2 think it was a threshold and that
3 embodiment.

4 Q. (BY MS. TRAC) Okay. So it's a
5 possible threshold?

6 A. I'm looking through that
7 section. So it says at Line 39 of Column 12,
8 for example, assume the activity threshold is
9 95 percent activity. And then if the
10 workload monitor 606 detects 96 to 100 active
11 cycles, then it's determined the activity
12 threshold is exceeded. So here it's saying
13 95 percent as the -- the activity threshold.

14 Q. But the activity threshold
15 could be higher or lower, correct?

16 A. Depending on where in the
17 system you're looking, or perhaps you wanted
18 to use 85 percent or something, that may be
19 another example of an activity threshold.

20 Q. Okay. And the '494 patent, it
21 says that any threshold level can be
22 utilized, correct?

23 A. Where are you referring to?

24 Q. Well, does the '494 patent
25 place any limits on what can be a threshold

1 value?

2 MR. FAHMI: Objection, form.

3 THE WITNESS: I would say it
4 characterizes it in the way I describe
5 in my declaration.

6 To answer another way, I don't
7 recall the patent saying, "But the
8 activity threshold can never be 47,"
9 or something like that.

10 Q. (BY MS. TRAC) Okay. So it can
11 be 47?

12 MR. FAHMI: Objection, form.

13 THE WITNESS: I don't know. I
14 don't recall the patent specification
15 saying, you know, it can't be an
16 integer value of a specific number or
17 something like that.

18 Q. (BY MS. TRAC) Does the '494
19 patent cover how the threshold is determined?

20 A. I would say the patent
21 discusses -- at least I talk about in my
22 declaration how the threshold is used.

23 Perhaps you can go back through
24 the specification if you're asking does it
25 say how -- where it comes from or something

1 like that. I don't -- I don't recall from
2 memory what the patent says or doesn't say
3 there.

4 Q. Okay. Dr. Brogioli, is it your
5 opinion that a workload threshold must be
6 stored in a register?

7 MR. FAHMI: Objection, form.

8 THE WITNESS: I'm going to look
9 through my declaration.

10 Q. (BY MS. TRAC) Okay. If you
11 want to look at Paragraph 47, this is where
12 you talk about registers.

13 A. That's where I just was.

14 Right, so in 47 I'm talking
15 about in the context of the Bose reference.
16 And I guess at the top of Page 29, that if a
17 threshold value were contemplated in Bose,
18 and it's not, it would be -- again, we are
19 talking about the scalar value or the
20 singular value of the patent.

21 It would be much more
22 simplistic and efficient to just stick it in
23 a local register, like a 32-bit register to
24 hold a 32-bit integer, for example.

25 Q. Sure. But is it your opinion

1 that the workload threshold has to be stored
2 in the register to be covered by the '494
3 patent?

4 MR. FAHMI: Objection, form.

5 THE WITNESS: I would say that
6 that would be one example the '494
7 contemplates. I don't know that it's
8 necessarily -- that would be one
9 example of the type of solution the
10 patent lends itself toward and that if
11 Bose were contemplating a solution
12 like that, Bose would also discuss
13 as -- because that's, you know, what a
14 person of skill would understand
15 registers can be used for.

16 Bose's solution of multiple
17 tables being input and output of this
18 power management control unit and its
19 algorithmic nature point us in a very
20 different direction, which is why Bose
21 doesn't talk about using a register,
22 for example.

23 Q. (BY MS. TRAC) Does the '494
24 patent cover a system where the workload
25 threshold is stored in a table?

1 MR. FAHMI: Objection, form.

2 THE WITNESS: The patent
3 doesn't talk about using tables for
4 this threshold activity.

5 Q. (BY MS. TRAC) Okay. So it --
6 the workload threshold can't be stored in a
7 table to be covered in the '494 patent?

8 MR. FAHMI: Objection, form.

9 THE WITNESS: I would say that
10 the patent talks about threshold
11 that's the singular value. I don't
12 offer an opinion as to the universe of
13 places in a given system that, you
14 know, may be percolated to elsewhere
15 in the system or how it would be
16 stored.

17 But that's -- Bose's notion of
18 tables are tables stored in various
19 portions of memory in the system and
20 then moved around and updated with
21 semantics and control and then
22 restored elsewhere in the system.

23 Q. (BY MS. TRAC) So could the
24 '494 patent cover a system where the workload
25 threshold is stored in a table?

1 MR. FAHMI: Objection, form.

2 THE WITNESS: I don't know. We
3 would have to go look at the specific
4 system you're referring to and how the
5 threshold value is used and what the
6 tables were used for.

7 But at least in the context of
8 what Mr. Wyatt points to in Bose,
9 that's not what the patent is talking
10 about.

11 Q. (BY MS. TRAC) Okay. Could the
12 '494 patent cover a system where the workload
13 threshold is stored with other types of
14 information?

15 MR. FAHMI: Objection, form.

16 THE WITNESS: I don't know.
17 The workload threshold in the patent
18 is used just as the patent describes.

19 If -- you know, if you've got a
20 threshold that's stored in some
21 nonvolatile memory or something in a
22 certain way, I don't recall analyzing
23 the universe of limitations as to
24 how -- what the patent covers or
25 doesn't cover in a given system.

1 Q. (BY MS. TRAC) So you don't
2 have an opinion about how the workload
3 threshold should be stored?

4 A. I would say the workload and
5 the threshold of the patent is not used,
6 stored or computed on in the manner that's
7 described in Bose.

8 As to whether, you know, the
9 patent -- as to the universe of ways that
10 information or data might be stored offline
11 in a system or battery-backed up memory or
12 fuses or something, I haven't offered
13 opinions on that.

14 Q. How are you doing? Would you
15 like to take a break?

16 A. Sure.

17 Q. Okay.

18 THE VIDEOGRAPHER: Going off
19 the record. The time is 11:36.

20 (Recess from 11:36 a.m. to
21 11:50 a.m.)

22 THE VIDEOGRAPHER: Back on the
23 record. This marks the beginning of
24 Media Unit No. 3. The time is 11:50.

25 Q. (BY MS. TRAC) Dr. Brogioli,

1 earlier during the deposition you kept
2 referring to a Bose reference. I'm handing
3 you what's been marked as Exhibit 1005.

4 Do you recognize this as the
5 Bose reference?

6 A. Yes, I do.

7 Q. So turning to page --
8 Figure 2 -- sorry, Figure 1, there's an
9 interconnect 108 there.

10 Do you see that?

11 A. Yes.

12 Q. Would you agree that the
13 interconnect 108 is a bus?

14 A. I'm just going to go see how
15 Bose describes it.

16 So I'm on Column 6 of Bose,
17 roughly at 56 of 58, and it says L2/L3 cache
18 hierarchy, 106 and interconnect 108. Let's
19 see what else it says.

20 Yeah, so I think it's referring
21 to it as an interconnect here. A bus could
22 be a flavor of that, depending on how it's
23 designed.

24 Q. Okay. And the interconnect in
25 Bose has a local PMCU 116; is that correct?

1 A. It looks like that's what Bose
2 refers to as a local component 116 and global
3 components 110 with a PMCU are preferably
4 hierarchical and function as a cooperative
5 management system.

6 I'm in Column 6 at Line 9.

7 Q. Okay. So you see that this
8 box 116 is connected to interconnect 108,
9 correct?

10 A. It looks like it's visualized
11 as within the box 108, the interconnect.
12 Actually, it's either part of it or connected
13 to it.

14 Q. And so is that the local PMCU
15 for the interconnect?

16 A. It looks like it -- block 116
17 would be the local PMCU or it sounds like
18 that portion in the interconnect.

19 Q. And so Column 6, Line 55, it
20 says the local PMCUs monitor activities in
21 each core, cache hierarchy 106 and
22 interconnect 108.

23 Do you see that?

24 A. Yes.

25 Q. So the local PMCU for the

1 interconnect monitors the activity of that
2 interconnect, correct?

3 A. That -- those local PMCU's, such
4 as, I think, 116 you asked about, carry out
5 power-reducing optimizations as commanded by
6 the global PMCU 110.

7 Q. So here it says it monitors
8 activities, correct?

9 A. Monitors activities, yes,
10 that's some of the language used in this
11 paragraph.

12 Q. Okay. And then later on it
13 says the local PMCU's monitor performance
14 statistics.

15 Do you see that?

16 A. Yes.

17 Q. Is the performance statistics
18 here referring to the activities?

19 A. It looks like what it's
20 describing in that sentence at 60 are
21 performance statistics that the local PMCU's
22 are looking at.

23 Q. Are performance statistics a
24 type of workload?

25 MR. FAHMI: Objection, form.

1 THE WITNESS: I don't know. I
2 know I provided the definition of
3 "workload" we discussed this morning.
4 It looks like some of these are
5 performance statistics, at least the
6 first few, related to statistics
7 around the operation of a CPU core,
8 for example.

9 Q. (BY MS. TRAC) And some of
10 the -- these performance statistics, the
11 local PMCU measures using performance
12 counters, correct? And I can direct your
13 attention to Column 7, Line 50.

14 A. Okay. Give me one second to
15 read the paragraph.

16 So it looks like the local PMCU
17 units 240 have and supply the performance
18 statistics, such as performance events, and
19 here it's talking about a thread, and that
20 these come from performance counters 223 due
21 through a various connection.

22 Q. Okay. The local PMCU also
23 monitor the activity of cores, correct?

24 A. I would point us back to
25 Column 6 that we were just talking about at

1 the bottom where it says the local PMCs
2 monitor activities in the cores. And then at
3 Line 60, the local PMCs monitor performance
4 statistics, such as cache, missed rates,
5 branch prediction -- I'm sorry, branch
6 misprediction rates, et cetera.

7 Q. So here Bose is referring to
8 monitoring activity as monitoring performance
9 statistics?

10 A. It -- well, it sounds like Bose
11 is talking about various performance
12 counters. For example, in general silicon
13 you have things that count activities in the
14 hardware and you use that in different ways,
15 perhaps.

16 And what Bose talks about at
17 the bottom of Column 6 is the local PMCs
18 monitor performance statistics, such as
19 things like cache miss rates.

20 Q. So is Bose -- when Bose refers
21 to monitoring activity, is it referring to
22 monitoring these performance statistics?

23 A. It says that at -- Column 6,
24 the local PMCs monitor performance
25 statistics, like cache miss rates, and that

1 just as a note, these devices perform
2 simultaneous multithreading and the PMCU
3 monitor this information on a per-thread
4 basis.

5 And then those local PMCUs are
6 also reporting this information up to the
7 global PMCU periodically, at the top of
8 Column 7, and then the global PMCU is
9 consuming the various performance tables and
10 doing algorithmic things.

11 Q. The global PMCUs, do they use
12 these monitored performance statistics to
13 assign power budgets to the components?

14 A. So if I continue down to Line 4
15 of Column 7, it says to better assign power
16 to each core element, 112 through 106 and
17 108, the global PMCU uses things like this
18 phase prediction technique and this other
19 information in the various tables that get
20 consumed, updated and then moved back -- or
21 updated, I should say.

22 And it can use that information
23 in conjunction with information provided by
24 the local PMCUs. And then that's being used
25 to guide the various PMCUs and make changes

1 to the system.

2 Q. Okay. And the information
3 provided by the local PMCU, that includes
4 the monitored performance statistics,
5 correct?

6 A. It sounds like part of what the
7 PMC -- the local PMCU is reporting are --
8 would be these monitored performance
9 statistics discussed in Column 6.

10 Q. And the global PMCU uses these
11 monitored performance statistics to assign
12 power, right?

13 A. I would say those performance
14 statistics, sounds like the global PMCU will
15 algorithmically use in conjunction with its
16 phase prediction technique and tables to
17 execute whatever logic it's executing in
18 those data structures.

19 Q. The global PMCU assigns power
20 to components using power modes, correct?

21 A. I think it says in Column 7,
22 Line 11, the optimizations -- this is in
23 context of the global PMCU, the optimizations
24 can be packaged into different power modes
25 based on their power-performance trade-off

1 characteristics.

2 And then it looks like that's
3 what it's starting to talk about there.

4 Q. So does the global PMCU assign
5 power to components using a power mode?

6 A. It seems to me, at least in
7 part, what that is referring to in Column 7
8 that the global PMCU consumes all of this
9 information and chooses appropriate power
10 optimizations for each core element and that
11 these optimizations can be packaged into
12 different modes as a way of organizing them.

13 Q. Does the '494 patent cover
14 systems that assign power using power modes?

15 MR. FAHMI: Objection, form.

16 THE WITNESS: I don't recall
17 that language in the '494. Maybe you
18 can point to where it's used.

19 Q. (BY MS. TRAC) No, I'm just
20 asking your opinion.

21 A. It seems to be a different
22 solution than what Bose is talking about here
23 in terms of how Bose is consuming -- it has
24 local PMCUs, global PMCUs, so the
25 heterogenous distributed architecture and the

1 use of these tables and algorithms to perform
2 its logic versus what the patent
3 contemplates.

4 Q. Does the global PMCU use the
5 monitored performance statistics to determine
6 if the performance is high or low?

7 MR. FAHMI: Objection, form.

8 THE WITNESS: I don't recall
9 Bose talking about the performance
10 being high or low or something like
11 that.

12 Q. (BY MS. TRAC) Well, an
13 objective of Bose is to maximize performance,
14 correct?

15 A. Bose is talking about
16 performance and balance within the system, I
17 suppose, and the global PMCUs are selecting
18 power modes and then controlling different
19 components within the system.

20 Q. So if you go down to Column 7,
21 Line 24, it says, "When the main objective of
22 the system is performance, the global PMCU
23 will choose the power modes and assign power
24 for each core element, 106 and 108, such that
25 all elements run at the highest possible

1 performance within the budget."

2 Do you see that?

3 A. Yes.

4 Q. So here Bose states that a
5 system objective might be performance,
6 correct?

7 A. That's one example, yes.

8 Q. And in that case, the global
9 PMCU chooses power modes to get the highest
10 performance?

11 MR. FAHMI: Objection, form.

12 THE WITNESS: That it's
13 choosing the power modes such that
14 core -- all elements can run at the
15 highest possible performance within a
16 budget.

17 Q. (BY MS. TRAC) And does that --
18 is the global -- sorry, strike that.

19 And is that performance related
20 to the performance statistics that are
21 monitored by the local PMCU?

22 A. Well, it's just as Bose
23 describes, talking back to Column 6, that the
24 local PMCU monitors performance statistics,
25 like cache miss rates and branch prediction

1 miss rates.

2 And then it -- the local PMCU
3 monitors back on a thread basis and it can
4 monitor some other things and then the local
5 PMCU's transmit data sets up to the global
6 PMCU.

7 It can then utilize these other
8 phase prediction techniques and tables, and
9 then that information is, it sounds like,
10 being used to control components within the
11 system, according to that passage we just
12 discussed at Line 24, Column 7.

13 Q. So the global PMCU, as you
14 testified, has the monitored performance
15 statistics of the components, correct?

16 MR. FAHMI: Objection, form.

17 THE WITNESS: It sounds like
18 those performance statistics are
19 something that is monitored at the
20 local PMCU.

21 Q. (BY MS. TRAC) But then they
22 are transmitted to the global PMCU?

23 A. That those statistics are
24 measured based -- I guess on a per-thread
25 basis here and other information can be

1 collected.

2 And then the local PMCU's work
3 in conjunction with the global PMCU that's
4 taking in various data to make its decisions.

5 Q. The global PMCU can also
6 predict the performance of a power mode,
7 correct?

8 A. Let me look at the actual
9 patent.

10 So I'm in Column 7, roughly
11 at 46, and this relates to our previous
12 question that although not depicted, local
13 PMCU's and to/from -- sorry, to/from
14 connections will be referred generally with
15 defined numeral 240. The global PMCU 210 is
16 one communication point among the local PMCU's
17 240 and the OS.

18 And the global PMCU stores
19 history information periodically supplied
20 from units of all local PMCU's. And then that
21 puts that in this phase history table.

22 So then it states that those
23 local PMCU's supply performance statistics,
24 such as the performance events of these
25 threads, which sounds like what is mentioned

1 at the bottom of Column 6.

2 And then it looks like the
3 global PMCU has this phase prediction table
4 that, as I recall, is described for some
5 types of prediction of performance in the
6 system.

7 Q. Okay. So the global PMCU has
8 both the monitored performance statistics as
9 well as the predicted performance, correct?

10 A. It looks like PMCU has access
11 to -- I'm at Line 41, Column 7, a global PMCU
12 controller, a phase prediction table, a
13 decision history table, which is looking
14 backwards in time, the power-performance
15 trade-off table, a phase history table, and
16 then various control registers and power --
17 total power budget registers.

18 It looks like in some form, the
19 local PMCUs are looking at statistics locally
20 on a per-thread basis and then some variant
21 of that information is consumed and
22 integrated by the local PMCU with all of its
23 other data. Although I don't see that -- it
24 states that, for example, cache miss rate per
25 thread is reported verbatim from the local

1 PMCU to the global PMCU.

2 Q. In Paragraph 42 of your
3 declaration, you say that otherwise, if the
4 actual power being used exceeds the system
5 power budget, a power mode is selected given
6 consideration to the total system power
7 budget, real-time statistics reported by the
8 local PMCUs and power versus performance
9 trade-off in the various power modes.

10 Do you see that?

11 A. Yes.

12 Q. Here, when you're referring to
13 real-time statistics, are you referring to
14 the monitored performance statistics
15 discussed earlier?

16 A. So here I'm citing to Column 9
17 at 14. And here, I guess around 20, it talks
18 about real-time statistics, as an example,
19 stored in the phase history table of
20 Figure 2.

21 And I think somewhere back at
22 the bottom of Column 6 and into 7, we were
23 just talking -- that we were just talking
24 about mentions real-time as well.

25 Q. So do you know what these

1 real-time statistics are referring to?

2 A. I'm going back to -- and we
3 just talked about this. I'm going back to
4 Column 7 at Line 50, and it says the global
5 PMCU stores history information periodically
6 supplied from units of all the local PMCUs in
7 real time in the phase history tables.

8 So the global PMCUs phase
9 history table is incorporating real-time
10 updates from the local PMCUs. So to whenever
11 the locals are setting up in real time, it in
12 some form is being integrated or rolled into
13 this phase history table.

14 Q. And doesn't it say then that
15 these local PMCU units supply performance
16 statistics?

17 A. The -- right, local -- sorry.
18 At Line 53, the local PMCU units supply
19 performance statistics, such as the
20 performance events of each thread from
21 performance counters through the
22 connection ...

23 Q. So Bose selects power modes
24 based on power and performance trade-offs,
25 correct?

1 A. They -- it talks about power
2 and performance. As we talked about earlier,
3 in Column 7, roughly Line 24, one objective
4 can be performance and the global PMCU will
5 choose power modes and assign one.

6 Q. And does it -- does the global
7 PMCU predict the performance of a power mode?

8 A. The global PMCU takes into
9 account things like power budget,
10 performance, information, the phase
11 prediction table or phase prediction
12 information stored in its own table, and
13 historical information like the decision
14 history table, and makes decisions concerning
15 how to allocate the power budget.

16 Q. And does that decision also
17 involve predicting the performance of the
18 power mode?

19 A. I would say that decision and
20 logic performed by the global PMCU takes into
21 account the phase prediction table of both to
22 make its decision at that point in time about
23 allocation of the power budget.

24 Q. So Bose doesn't use predicted
25 performance to assign power modes?

1 MR. FAHMI: Objection, form.

2 THE WITNESS: I would say it --
3 the -- sorry, the global PMcus of Bose
4 uses, as part of its process, a phase
5 prediction table to make a decision as
6 to how to allocate budget at that
7 point in time.

8 Q. (BY MS. TRAC) Okay. So I
9 would like to turn to Page 32 of your
10 declaration. There you have a heading that
11 says, "The claimed invention does not
12 resemble the hierarchical and distributed
13 control system described in Bose."

14 Do you see that?

15 A. Yes.

16 Q. What do you mean by
17 hierarchical control system?

18 A. The power allocation system in
19 Bose uses a global PMCU and a number of local
20 PMcus and they are -- they have different
21 design characteristics. For example, the
22 locals transmit information up. They can
23 receive certain information coming down.
24 They look at certain statistics that we just
25 discussed in Columns 6 and 7.

1 The global PMCU is in a
2 different place in the system, consumes
3 different sets of information, like all of
4 the different history tables, phase
5 prediction tables, and so on and so forth,
6 and the global PMCU also issues things like
7 command.

8 So they are distributed
9 throughout the system. They are sending data
10 sets over interconnects performing different
11 functions and consuming or looking at
12 different data structures and using different
13 algorithms.

14 Q. Is it your opinion that the
15 '494 patent doesn't cover systems with
16 hierarchical power management?

17 MR. FAHMI: Objection, form.

18 THE WITNESS: If we look at
19 going back to the patent, and I talk
20 about this in Paragraph 52, it's
21 talking about a single power control
22 module that's able to balance and
23 allocate power/frequency between
24 devices of the integrated circuit.

25 And so it's using a different

1 architecture in addition to not using
2 the types of tables that Bose talks
3 about.

4 Q. (BY MS. TRAC) So would the
5 '494 patent cover systems like Bose where
6 power assignment is done using tables?

7 MR. FAHMI: Objection, form.

8 THE WITNESS: The patent
9 performs its allocation based on
10 determined workload and the
11 workload -- based on determined
12 workloads, whereas Bose is different
13 and using data sets in all of these
14 data structures that are transmitted
15 and consumed by at least the global
16 PMCU.

17 You're looking at different --
18 algorithmically different process than
19 what the patent talks about.

20 Q. Can you show me where the '494
21 patent says power management can't be
22 hierarchical? Do you remember?

23 A. I don't recall offhand. I know
24 that the -- just as I say in my declaration
25 at 52, the patent is talking about the single

1 power control module and how it's operating.

2 Q. Where in the claims does the
3 single power control module requirement
4 appear?

5 A. I don't know that I discuss
6 that in Independent Claim 1 or Independent
7 Claim 4, but I talk about my declaration.

8 Q. So you don't know if it appears
9 in the claim language?

10 A. Not without revisiting the
11 language, correct. I don't necessarily see
12 it explicitly called out one way or the other
13 in Independent Claim 1.

14 We can go to Claim 4. I guess
15 I would give the same answer for Claim 4, but
16 certainly discussed in specification as to
17 how I describe it in Paragraph 52.

18 Q. Okay. So staying with
19 Paragraph 51, you say that a POSITA would
20 understand that control power allocation in
21 Bose is distributed in heterogenous.

22 Do you see that?

23 A. Yes.

24 Q. What do you mean by
25 "heterogenous" here?

1 A. One example is if the local
2 monitors can like make local decisions and do
3 things that, for example, the upper layers
4 can't and consume different data sets.

5 And the upper layers, like the
6 global PMCU, do different things and consume
7 different types of information. So they
8 are -- they are heterogenous in that the
9 local and global PMCUs are different and they
10 are distributed because just like the figures
11 show, there are different physical locations
12 in the system with different interconnects
13 and things like that.

14 Q. Is it your opinion that the
15 '494 patent doesn't cover systems with
16 heterogenous power management?

17 MR. FAHMI: Objection, form.

18 THE WITNESS: I haven't offered
19 an opinion on that. But one example I
20 point to is the local control
21 discussed in at least portions of the
22 patent.

23 Q. (BY MS. TRAC) Okay. So is it
24 your opinion that the '494 patent doesn't
25 cover systems with local control?

1 MR. FAHMI: Objection, form.

2 THE WITNESS: I don't think I
3 have offered an opinion on that in my
4 declaration.

5 Q. (BY MS. TRAC) If a local
6 monitor decides to shut off power to a
7 component, that's a local decision, correct?

8 MR. FAHMI: Objection, form.

9 THE WITNESS: Are you asking in
10 the context -- what context are you
11 asking in?

12 Q. (BY MS. TRAC) I'm just asking
13 what your -- what you mean by "local
14 decisions."

15 A. I guess I would answer you sort
16 of in the abstract that if I have ten
17 decision-makers in some system, then
18 decision-maker 7 says, "I'm going to turn off
19 whatever it is I'm connected to," and it
20 doesn't contemplate anybody else's decision,
21 so that might be a flavor of a local
22 decision.

23 Q. And the '494 patent doesn't
24 cover systems where local decisions are made,
25 correct?

1 MR. FAHMI: Objection, form.

2 THE WITNESS: I don't recall
3 discussing that context of like local
4 decisions with regard to the '494
5 patent.

6 Q. (BY MS. TRAC) So what's the
7 significance of Bose making local decisions
8 if it doesn't -- if the '494 patent doesn't
9 say anything about local decisions?

10 MR. FAHMI: Objection, form.

11 THE WITNESS: Well, the '494
12 patent talks about how it manages
13 power in the way that it describes,
14 whereas Bose -- there's a number of
15 differences there that it's not
16 looking at workloads and it's using
17 the distributed and heterogenous
18 solution of local PMCUs, global PMCUs,
19 its control and semantics that are
20 used and these tables that are read
21 and dynamically updated as part of
22 decision-making logic and distributed
23 system.

24 Q. (BY MS. TRAC) Can you show
25 me where in the claims does it say the power

1 management system can't make local decisions?

2 A. With Claims 1 and 4 that I --
3 my declaration discusses, at least in part, I
4 don't see, say, the word "local" or "global"
5 in there, respectively.

6 Q. And is there a difference
7 between a component deciding power allocation
8 versus a component deciding how to meet an
9 assigned power allocation?

10 MR. FAHMI: Objection, form.

11 THE WITNESS: Can I hear your
12 question again?

13 Q. (BY MS. TRAC) Sure.

14 Is there a decision between
15 deciding a power allocation versus deciding
16 how to meet an assigned power allocation?

17 MR. FAHMI: Objection, form.

18 THE WITNESS: I don't -- I
19 haven't offered an opinion on that. I
20 haven't thought about that.

21 Q. (BY MS. TRAC) So Bose
22 discloses that the power budget is set by the
23 global PMCU, correct?

24 Do you recall?

25 A. I'm trying to remember your

1 question. Sorry, go ahead.

2 Q. Do you recall if the -- if the
3 local PMCU receive a power budget from the
4 global PMCU?

5 Q. As I recall, the local PMCU
6 can do self-monitoring of things like power
7 and performance and can use those statistics
8 in Paragraph 51 of my declaration to decide
9 which microarchitectural techniques would be
10 employed.

11 And at the same time, the
12 global PMCU is performing analysis with its
13 stored tables and data sets and issuing
14 commands onto the local PMCU.

15 Q. So do you know if the power
16 budget for components is set by the global
17 PMCU?

18 MR. FAHMI: Objection, form.

19 THE WITNESS: So if we go to my
20 declaration, Paragraph 53, I'm talking
21 about Bose and differences between
22 that reference and the '494.

23 At the top of Page 34, I state
24 that Bose states that with regard to
25 the power performance budget for the

1 chips, quote, "Monitored power and
2 performance levels received from the
3 lower level resources may be
4 translated by the intermediate layers
5 of the control hierarchy to a set of
6 power modes that are then transmitted
7 downwards."

8 So I think your question was
9 about the global PMCU of Bose. But
10 here I'm just describing how the
11 locals -- the local PMCUs of Bose work
12 in conjunction.

13 Q. (BY MS. TRAC) Okay. Let
14 me -- let's turn to Bose Column 11, Line 3.
15 Here it says, "Based on the power budget and
16 power mode received through connections 523
17 and 524, the local PMCU controller performs
18 local optimizations to fit actual core power
19 usage to that specified by the power budget."

20 Do you see that?

21 A. Yes.

22 Q. Here, is the power budget
23 referring to what's sent -- set by the global
24 PMCU?

25 A. So going back to Figure 5, it

1 looks like lines 523, 524 that are inbound to
2 the local PMCU controller 512 are coming from
3 power budget register 510 and power mode
4 register 511, they look like are coming
5 inbound from the global PMCU over 502 and
6 503.

7 Q. Okay. The power budget here is
8 set by the global PMCU, correct?

9 A. To the extent there is a power
10 budget value in the power budget register 510
11 that is inbound to the local PMCU controller,
12 in addition to all of the other things in
13 this figure, it seems to be that value is
14 coming from the global PMCU.

15 Q. Okay. And the power mode,
16 that's also referring to the power mode set
17 by the global PMCU, correct?

18 MR. FAHMI: Objection, form.

19 THE WITNESS: You're asking
20 about the power mode register?

21 Q. (BY MS. TRAC) Correct.

22 A. I would say it looks to be --
23 it looks to be another value that's coming
24 into a local PMCU, whereas at link 503 it's
25 inbound from the global PMCU in that it's

1 stored in block 511 as the power mode
2 register.

3 Q. Do you want to take a break?

4 A. Sure.

5 THE VIDEOGRAPHER: Going off
6 the record. The time is 12:35.

7 (Lunch recess from 12:35 p.m.
8 to 1:16 p.m.)

9 THE VIDEOGRAPHER: Back on the
10 record. This marks the beginning of
11 Media Unit No. 4. The time is 1:16.

12 Q. (BY MS. TRAC) Good afternoon,
13 Dr. Brogioli.

14 A. Thanks.

15 Q. I'm handing you what's been
16 marked as Exhibit 1008. This is the Simeral
17 reference.

18 So in Paragraphs 61 to 63 of
19 your declaration, you provide an overview of
20 Simeral, correct?

21 A. That looks correct, yes.

22 Q. Okay. Is it your opinion that
23 Simeral does not disclose a bus workload?

24 A. Going back through this section
25 of my declaration, I guess back through about

1 Page 50, I don't know that I discuss -- we're
2 in Simeral. I don't know that I discuss bus
3 workload with Simeral in my declaration.

4 Q. Okay. So is it your opinion
5 that Simeral doesn't disclose the bus
6 workload?

7 A. I don't know that I'm offering
8 an opinion on that one way or the other in my
9 declaration.

10 Q. So is it your opinion that
11 Simeral does not disclose a bus workload
12 threshold?

13 A. I don't think I would analyze
14 Simeral, with regard to your last question, a
15 threshold one way or the other. I think I
16 only addressed certain of Mr. Wyatt's
17 statements from his declaration.

18 Q. So do you have an opinion on
19 whether Simeral discloses monitoring of bus
20 workload?

21 A. I don't think I was asked to
22 offer an opinion on that one way or the
23 other.

24 Q. Okay. Just so the record is
25 clear, you don't have an opinion on whether

1 Simeral discloses a bus workload, correct?

2 A. I don't think that's addressed
3 in my declaration.

4 Q. And you don't have an opinion
5 on whether Simeral discloses a bus workload
6 threshold?

7 A. That sounds -- same answer, I
8 don't think I was asked to address that.

9 Q. Okay. And you don't have an
10 opinion on whether Simeral discloses
11 comparing monitored bus workload to a bus
12 workload threshold?

13 A. Sounds like that was something
14 that I was also not asked to address in my
15 declaration.

16 Q. Okay. So at the bottom of 62,
17 Paragraph 62, you say, "GPIS port K can
18 monitor activity associated with bus 130."

19 A. I see that.

20 Q. Do you have an opinion on
21 whether GPIS port K is a bus workload
22 monitor?

23 A. It looks like the way Simeral
24 is describing the GPIS ports -- sorry -- the
25 GPIS as in that Paragraph 19, halfway down,

1 that there is an interface that includes what
2 he's referring to as general purpose
3 interface signal ports. It doesn't sound
4 like -- it sounds like Simeral is just here
5 referring to those as ports or some type of
6 IO signaling to a device.

7 Q. Yeah, I'm asking about GPIS
8 port K, which you talk about in Paragraph 62
9 of your declaration. And you state that GPIS
10 port K can monitor activity associated with
11 the bus.

12 Do you see that?

13 A. I see it.

14 Q. Do you have an opinion on
15 whether GPIS port K is a bus workload
16 monitor?

17 A. It looks like Simeral is just
18 saying that that's a port that has some
19 monitoring of what's going on in the bus.

20 Q. All right. But that's not my
21 question. My question is do you have an
22 opinion on whether this GPIS port K is a bus
23 workload monitor?

24 A. That sounds like something I
25 haven't offered an opinion on in my

1 declaration.

2 Q. Okay. So Paragraph 63, you
3 say, "According to Simeral, data path
4 controller 100 can manage power for a
5 competing device by first monitoring the
6 activity level of the bus."

7 Do you see that?

8 A. Yes.

9 Q. Do you have an opinion on
10 whether the activity level of the bus here is
11 a bus workload?

12 A. I don't think I've addressed
13 that. What this is saying is that Simeral
14 has, as it states, managed power for a
15 computing device by first monitoring activity
16 level of the bus. It's talking about data
17 transfer rates and then shutting down
18 portions of the bus.

19 Q. Right. And I'm asking, do you
20 have an opinion on whether the activity level
21 of the bus in Simeral is a bus workload?

22 A. I don't recall offering an
23 opinion on that one way or the other.

24 Q. Okay.

25 A. Unless there is somewhere you

1 want to refer me to.

2 Q. No, I'm just asking you what
3 you're providing opinions on and what you're
4 not providing opinions on.

5 Okay. So in Paragraph 63, you
6 continue on Page 43, there's a line that
7 starts with, "In particular ..."

8 Do you see that?

9 A. Yes.

10 Q. "In particular, power
11 management controller 106 monitors activity
12 level of the component, such as the data
13 being exchanged between the data component,
14 and the data controller 100 compares the
15 monitor activity level to a threshold
16 activity level."

17 Do you see that?

18 A. Yes.

19 Q. Okay. I want to ask about the
20 phrase "threshold activity level" here.

21 A. Okay.

22 Q. Do you provide an opinion
23 whether -- do you have an opinion on whether
24 the threshold activity level on Simeral is a
25 workload threshold?

1 A. I don't think I have offered
2 opinions on that one way or the other for
3 Simeral.

4 Q. Okay. And this -- so here,
5 when it says that Simeral compares the
6 monitored activity level to a threshold
7 activity level, you -- do you have an opinion
8 on whether Simeral discloses comparing a
9 monitored bus workload with a bus workload
10 threshold?

11 A. I don't think I have offered
12 opinions on that one way or the other for
13 Simeral.

14 Q. Okay. So just to clarify, you
15 didn't provide any opinions on whether
16 Simeral discloses a bus workload, correct?

17 A. I'm just getting back through
18 this part of my declaration.

19 If I'm recalling this portion
20 of my declaration, I don't -- I don't believe
21 I'm offering an opinion on that in Simeral
22 one way or the other.

23 Q. Okay. So I had actually -- I
24 would like to direct your attention to
25 Paragraph 21 of Simeral.

1 A. Okay.

2 Q. So in that, maybe a couple --
3 three or four lines down, it says, "Further,
4 consider the amount of data passing over the
5 bus at a given instance represents an
6 activity level."

7 Do you see that?

8 A. Yes.

9 Q. You don't have an opinion one
10 way or another if that activity level being
11 referenced there is a bus workload, do you?

12 A. I don't recall addressing these
13 aspects of Simeral.

14 Q. Then a few more lines down it
15 says, "So if the data rate is below some
16 threshold, i.e. low amounts of data are
17 passing over the bus, then data path
18 controller can either decrease the bus width
19 or shut down one or more bus controllers."

20 Do you see that?

21 A. I do.

22 Q. So you don't have an opinion
23 one way or another that whether this
24 threshold that the data rate is being
25 compared against, whether that's a bus

1 workload threshold, correct?

2 A. I don't address this portion of
3 Simeral one way or the other in my
4 declaration, as I recall.

5 Q. Let's turn to Simeral
6 Paragraph 24. At the very, very bottom it
7 says, "In the second mode of operation, power
8 management controller compares that monitored
9 activity level to a threshold activity
10 level."

11 Do you see that?

12 A. Yes.

13 Q. You don't have any opinion on
14 whether Simeral discloses comparing a
15 monitored workload to a threshold -- workload
16 threshold, do you?

17 A. I don't offer an opinion on
18 Simeral's, quote, "Monitored activity level
19 to a threshold activity level" passage. I
20 don't recall addressing that in my
21 declaration.

22 Q. Okay. In Simeral Paragraph 26,
23 it says, "In various embodiments, performance
24 profiles 110 include activity level
25 thresholds as, for example, upper limits,

1 lower limits and/or one or more ranges."

2 Do you see that?

3 A. I do.

4 Q. Do you have an opinion on
5 whether the ranges of activity levels are
6 based on a workload threshold?

7 A. I haven't offered an opinion on
8 that in my declaration for Simeral.

9 Q. Do you have an opinion on
10 whether -- determining whether the activity
11 level of a bus falls in a particular range,
12 whether a comparison has to be made?

13 MR. FAHMI: Objection, form.

14 THE WITNESS: I don't recall
15 addressing Simeral's discussion of
16 what sounds like ranges in my
17 declaration.

18 Q. (BY MS. TRAC) And then a
19 little further down it says, "Depending on
20 the monitored activity level of the bus,
21 power management controller in the first mode
22 can adjust the width of the bus to the
23 appropriate activity level."

24 Do you see that?

25 A. Yes.

1 Q. I want to ask about the
2 monitored activity level of the bus, that
3 phrase.

4 A. Okay.

5 Q. And you're not offering an
6 opinion on whether the monitored activity
7 level of a bus is a bus workload, correct?

8 A. I don't think I offer opinions
9 on that aspect of Simeral in my declaration.

10 Q. And, sorry, going back to the
11 first sentence where it talks about activity
12 level thresholds, again, you're not offering
13 an opinion as to whether activity level
14 thresholds are bus workload thresholds,
15 correct?

16 A. I don't recall offering
17 opinions on that aspect for Simeral, no.

18 Q. So in Simeral, the GPIS ports
19 can also measure other activity on other
20 components, right?

21 A. It looks like -- I'm going to
22 go back to my -- sorry, were you going to say
23 something? I'll stop.

24 Q. I can -- I can direct your
25 attention to Simeral Paragraph 19, and maybe

1 three-fourths of the way down, it says, "In
2 addition, GPIS ports 104a, 104b, and 104c are
3 power-monitoring ports."

4 Do you see that?

5 A. Yeah. So here it's saying GPIS
6 ports, or general purpose interface signal
7 ports, are power-monitoring ports that can be
8 configured to monitor and quantify activity
9 levels of a processor or peripheral device
10 for power management purposes.

11 Q. Okay. So the -- Seminal
12 discloses that GPIS ports can monitor the
13 activity level of a processor, correct?

14 A. That's part of what the
15 language here says.

16 Q. Okay. And Seminal also
17 discloses that GPIS ports monitor the
18 activity level of other peripheral devices,
19 correct?

20 A. Or a peripheral device, that's
21 right.

22 Q. Okay. And you don't offer any
23 opinion on whether the activity of a level of
24 a processor being monitored is a core
25 workload, correct?

1 A. I don't -- I don't think I
2 offered opinions on this aspect of Simeral in
3 my declaration.

4 Q. And do you offer an opinion on
5 whether monitoring activity levels of a
6 peripheral device is monitoring a workload?

7 A. I don't believe I offer
8 opinions on that aspect of Simeral in my
9 declaration.

10 Q. All right. I'm handing you
11 what's been marked as Exhibit 1006. It's the
12 White reference.

13 A. Okay.

14 Q. So would you agree that if you
15 look at Figure 1, there's a common bridge
16 logic?

17 Do you see that?

18 A. Yes.

19 Q. Is it your opinion that the
20 common bridge logic is not a bus?

21 A. I'm skimming my declaration
22 part. I don't think I offer opinions on the
23 common bridge logic of White. And I think
24 your question is whether it's a bus or not.

25 That was my answer.

1 Q. Do you offer any opinions on
2 the common bridge logic?

3 A. I -- it's mentioned in my
4 declaration. I don't recall analyzing what
5 that block 110 is or isn't. I note that it's
6 not called a bus, that bridges sometimes --
7 well, bridges do certain things and buses do
8 certain things.

9 But I don't think I address
10 that in my declaration.

11 Q. So the common bridge logic in
12 White can operate at different voltages and
13 frequencies than the core, correct?

14 A. I'm going back to Paragraph 60
15 of my declaration and where I'm stating,
16 "Thereafter, the power management logic
17 adjusts the operating conditions for the
18 common bridge logic to be compatible with the
19 new operating voltage and/or frequency of the
20 core."

21 So it looks like the common
22 bridge logic 110 is being adjusted to be
23 compatible with the new operating point for
24 the cores.

25 Q. And that can be a different

1 voltage and frequency than what the cores are
2 at?

3 A. I don't see that this paragraph
4 I'm referring to -- sorry, I guess I would
5 point to Column 20, starting at 19 in White.

6 It talks about the set point of
7 the common bridge logic -- I guess a set
8 point, the cores being the same or different
9 or something like that.

10 Q. So the bus in White can have
11 different voltage and frequency than the
12 cores, correct?

13 A. It looks like a way of saying
14 if there is a power management adjustment to
15 the cores, that the power management logic
16 can also adjust the operating system --
17 sorry, can adjust the operating conditions of
18 the common bridge logic.

19 Q. Okay. And by "operating
20 conditions," you're referring to voltage and
21 frequency, correct?

22 A. In this paragraph of Column 20,
23 starting at 19, it seems to be mentioning
24 frequency and operating voltage.

25 Q. The power management logic in

1 White also monitors the operating voltage of
2 cores, correct?

3 A. The -- it sounds like, yes, the
4 power management logic can determine a new
5 operating voltage and then set the operating
6 voltage for the core.

7 Q. Okay. And then it can -- it
8 also monitors the operating characteristic of
9 the interconnect -- sorry, the common bridge
10 logic? I'll just restate it.

11 The power management logic in
12 White also monitors the operating
13 characteristics of the common bridge logic,
14 right?

15 A. I don't know that this says
16 that. White's power management logic is
17 looking at the cores in an operating voltage
18 or frequency.

19 And in some cases, White states
20 that the power management logic can adjust
21 the operating conditions of the common bridge
22 logic to be compatible or to be operating at
23 the frequency of the core.

24 Q. I would like to direct your
25 attention to White Column 9, starting on

1 Line 36 to the bottom of 54. And if you
2 could just read that passage to yourself.

3 A. Okay.

4 Q. So here it talks about -- White
5 talks about determining whether the common
6 bridge logic is a bottleneck, correct?

7 A. Roughly around 42 where it
8 says, "The common bridge logic may be more of
9 a bottleneck to overall performance."

10 Q. Okay. You don't have an
11 opinion on whether -- how White would
12 determine whether the common bridge logic was
13 a performance bottleneck, do you?

14 A. I see that that seems to be
15 what White is talking about in this passage,
16 but I don't recall in my declaration
17 analyzing how White says that.

18 Q. Okay. And you don't have an
19 opinion one way or another what it means for
20 the bus in White to be a bottleneck, correct?

21 MR. FAHMI: Objection, form.

22 THE WITNESS: So I didn't -- I
23 didn't use the word "bus." White uses
24 the word "common bridge logic."

25 Q. (BY MS. TRAC) Okay.

1 A. I don't recall addressing in my
2 declaration what White says about how it may
3 go determining in this scenario if the common
4 bridge logic is the bottleneck in the system.

5 Q. Okay. And you don't have an
6 opinion on whether determining whether
7 bottleneck exists requires measuring or
8 monitoring a workload, correct?

9 A. I don't think I have addressed
10 or offered opinions on that aspect of White
11 in my declaration.

12 Q. Okay. And you don't offer an
13 opinion on whether determining if the common
14 bridge logic is -- bottleneck requires any
15 comparison to a threshold, correct?

16 A. Well, I discuss how White
17 operates differently from the patent in a
18 number of regards.

19 Q. Right. But --

20 A. I don't recall addressing the
21 common bridge logic bottleneck scenario in my
22 declaration.

23 Q. Okay. So you have no -- you're
24 not offering any opinions on what happens or
25 doesn't happen to determine whether the

1 common bridge logic is a bottleneck?

2 A. I don't think I have offered
3 opinions on how that aspect of White works or
4 doesn't work.

5 Q. Okay. Well, that's -- that's
6 all I have.

7 MR. FAHMI: We have no
8 questions for Dr. Brogioli.

9 THE VIDEOGRAPHER: We're
10 adjourned for the day.

11 Going off the record. The time
12 is 1:48.

13 THE REPORTER: Okay. I'll have
14 rough drafts out this afternoon.
15 Would anybody like it expedited?

16 MS. TRAC: How fast? Yes.

17 THE REPORTER: When do you need
18 the final?

19 MS. TRAC: This week, Friday.

20 THE REPORTER: Okay. How about
21 you, Mr. Fahmi? Is that how I say
22 your name?

23 MR. FAHMI: Yeah, pretty close.

24 We don't require an expedited
25 transcript because we will get one

1 when you - -

2 THE REPORTER: You would like a
3 rough draft, though, right?

4 MR. FAHMI: Yes, rough ASCII
5 would be great.

6 (Proceedings concluded at
7 p.m.)

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CHANGES AND SIGNATURE

WITNESS NAME: MICHAEL C. BROGIOLI, PH.D.

DATE OF DEPOSITION: JULY 30, 2024

PAGE	LINE	CHANGE	REASON
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1 I, MICHAEL C. BROGIOLI, PH.D., have
 2 read the foregoing deposition and hereby
 3 affix my signature that same is true and
 4 correct, except as noted above.

5 _____
 MICHAEL C. BROGIOLI, PH.D.

6
 7 THE STATE OF _____)
 8 COUNTY OF _____)

9 Before me, _____, on this
 10 day personally appeared MICHAEL C. BROGIOLI,
 11 PH.D., known to me (or proved to me under
 12 oath or through _____) (description
 13 of identity card or other document) to be the
 14 person whose name is subscribed to the
 15 foregoing instrument and acknowledged to me
 16 that he executed the same for the purposes
 17 and consideration therein expressed.

18 Given under my hand and seal of office,
 19 this ____ day of _____, _____.
 20

21 _____
 NOTARY PUBLIC IN AND FOR
 22 THE STATE OF _____

23 My commission expires: _____
 24 ____ No Changes Made ____ Amendment Sheet(s)
 Attached
 25

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA

MERCEDES-BENZ USA, LLC,)
Petitioner,)
VS.) Case IPR2023-01343
DAEDALUS PRIME LLC,) Patent 8,898,494
Patent Owner.)

REPORTER'S CERTIFICATION OF THE ORAL
DEPOSITION OF MICHAEL C. BROGIOLI, PH.D.
JULY 30, 2024
(REPORTED REMOTELY)

I, Donna Wright, a Certified Shorthand
Reporter and Notary Public in and for the
State of Texas, hereby certify to the
following:

That the witness, MICHAEL C. BROGIOLI,
PH.D., was duly sworn by the officer and that
the transcript of the oral deposition is a
true record of the testimony given by the
witness;

That the original deposition was
delivered to Mr. Tarek Fahmi;

That a copy of this certificate was
served on all parties and/or the witness
shown herein on _____;

I further certify that pursuant to FRCP
Rule 30(3) that the signature of the deponent:

1 __X__ was requested by the deponent or
2 a party before the completion of the
3 deposition and that the signature is to be
4 before any notary public and returned within
5 30 days from date of receipt of the
6 transcript. If returned, the attached
7 Changes and Signature Page contains any
8 changes and the reasons therefore:

9 ____ was not requested by the deponent
10 or a party before the completion of the
11 deposition.

12 I further certify that I am neither
13 counsel for, related to, nor employed by any
14 of the parties or attorneys in the action in
15 which this proceeding was taken, and further
16 that I am not financially or otherwise
17 interested in the outcome of the action.

18 Certified to by me on this, the 2nd
19 day of August, 2024.

20
21



22 DONNA WRIGHT, Texas CSR 1971
23 Expiration Date: 11/30/24
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25

1 Tarek Fahmi, Esq.

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3 August 2, 2024

4 RE: Mercedes-Benz USA LLC v. Daedalus Prime LLC

5 7/30/2024, Michael C. Brogioli , PhD (#6832302)

6 The above-referenced transcript is available for
7 review.

8 Within the applicable timeframe, the witness should
9 read the testimony to verify its accuracy. If there are
10 any changes, the witness should note those with the
11 reason, on the attached Errata Sheet.

12 The witness should sign the Acknowledgment of
13 Deponent and Errata and return to the deposing attorney.
14 Copies should be sent to all counsel, and to Veritext at
15 cs-midatlantic@veritext.com.

16 Return completed errata within 30 days from
17 receipt of testimony.

18 If the witness fails to do so within the time
19 allotted, the transcript may be used as if signed.

20
21
22 Yours,

23 Veritext Legal Solutions
24
25

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Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

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THE ABOVE RULES ARE CURRENT AS OF APRIL 1, 2019. PLEASE REFER TO THE APPLICABLE FEDERAL RULES OF CIVIL PROCEDURE FOR UP-TO-DATE INFORMATION.

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COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

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