

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

IPR2023-01335

MERCEDES-BENZ USA, LLC,)
)
Petitioner,)
) U.S. Patent No. 8,775,833
V.)
)
DAEDALUS PRIME LLC,)
)
Patent Owner.)

Remote Videotaped Deposition of
MICHAEL C. BROGIOLI, Ph.D.
Thursday, August 1, 2024
9:49 a.m. to 1:06 p.m.

Job No. 6832320
Pages 1 - 80
Reported by:
Kari Behan, CSR, CCR

August 1, 2024

REMOTE 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 the 1st of August, 2024, from 9:49 a.m. to 1:06 p.m., before Kari Behan, CSR, CCR, in and for the State of Texas, reported by stenographic method.

A P P E A R A N C E S

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THE VIDEOGRAPHER:

Joss Harrington

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I N D E X
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EXAMINATION OF MICHAEL C. BROGIOLI, PH.D.	PAGE
BY MR. LEWIS.....	5
BY MR. FAHMI.....	76
CHANGES AND SIGNATURE.....	78
REPORTER'S CERTIFICATION.....	80

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E X H I B I T S

EXHIBITS	DESCRIPTION	PAGE
Exhibit 1	Notice of Deposition	8
Exhibit 2	U.S. Patent 8,775,833 B2	17
Exhibit 3	Declaration of Michael C. Brogioli, Ph.D.	29
Exhibit 4	Finkelstein Patent Application Publication	34
Exhibit 5	Conroy Patent Application Publication	46
Exhibit 6	Nussbaum Patent Application Publication	49
Exhibit 7	Bose Patent Application Publication	52

** REPORTER'S NOTE **

QUOTATION MARKS ARE USED FOR CLARITY AND DO NOT
NECESSARILY REFLECT A DIRECT QUOTE.

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PROCEEDINGS:

(Thursday, August 1, 2024, at 9:49 a.m.)

THE VIDEOGRAPHER: Here begins the deposition of Michael C. Brogioli, Ph.D. The date is August 1st, 2024. The time on the video is 9:49 a.m.

Will the court reporter please swear in the witness?

MICHAEL C. BROGIOLI, PH.D.,
after having been first duly sworn by the
above-mentioned Certified Court Reporter, was examined
and testified as follows:

EXAMINATION

BY MR. LEWIS:

Q. Good morning, Dr. Brogioli. How are you today?

A. Good. How are you?

Q. I'm doing okay.

Again, my name is Damon Lewis. I represent Mercedes-Benz USA in connection with this matter.

Can you please state your full name and address for the record?

A. Yes. It's Michael Charles Brogioli, and my home address is 3420 Mount Barker Drive, Austin, Texas 78731.

Q. All right. And do you understand that we're here for the purpose of taking your deposition testimony

1 today?

2 A. Yes.

3 Q. Have you ever had your deposition taken before?

4 A. I have.

5 Q. About how many times?

6 A. I think it's 56 or so after yesterday.

7 Q. Okay. Do you know which courts you have been

8 deposed before? ITC? District courts? IPR

9 proceedings?

10 A. Those are my general recollections, yes, those
11 three.

12 Q. Okay. And what were these cases about,
13 generally speaking?

14 A. A mix of things from hardware design to
15 software design, some pertaining to trade secrets,
16 generally in that space, computer architecture,
17 processor design, things like that.

18 Q. Were all of your depositions expert testimony?

19 A. I -- I'm not sure if I recall correctly.
20 Certainly a lot of them. Not all of them are in -- I
21 guess in relation to patents, if that's maybe what
22 you're asking.

23 Q. Okay. I'd like to go over some ground rules
24 like we did yesterday for today's deposition. I will be
25 asking the questions, and you'll be giving me answers.

1 Is that okay?

2 A. Yes.

3 Q. The court reporter here is taking down
4 everything we say, so we should try not to speak over
5 each other. Okay?

6 A. Okay.

7 Q. When I'm asking questions, please let me finish
8 asking before you answer, and I'll try to do the same
9 with your answers. Okay?

10 A. Okay.

11 Q. The court reporter also can't take down a nod
12 of the head or an "uh-uh" or "um," so it's important
13 that you provide verbal answers to my questions.

14 Is that okay?

15 A. Okay.

16 Q. And do you understand that your testimony today
17 will be provided here under oath?

18 A. Yes.

19 Q. And you understand that that means that it's
20 provided under penalty of perjury?

21 A. Yes.

22 Q. And you understand that you should give the
23 answers the same seriousness and truthfulness as -- as
24 if you were answering in front of a judge or a jury in a
25 court of law?

1 A. I understand.

2 Q. Is there any reason why you'd be unable to
3 answer my questions truthfully today?

4 A. No.

5 Q. No medications or illnesses that could affect
6 your testimony?

7 A. No.

8 Q. If you answer a question, I have to assume that
9 you understand it. So if I ask something that you do
10 not understand, can you confirm that you will tell me
11 that you don't understand it, and I'll try to ask you a
12 better question?

13 A. Yes.

14 Q. Okay. Dr. Brogioli, I just handed you an
15 exhibit that is under Tab 1. We'll have it marked
16 later.

17 (Exhibit 1 was marked for identification.)

18 BY MR. LEWIS:

19 Q. Can you tell me what this -- this document is?

20 A. This looks like the notice of deposition that I
21 received regarding today for this matter.

22 Q. And you understand that you're appearing today
23 based on this notice of deposition?

24 A. That's my understanding, yes.

25 Q. What is a core?

1 A. A core can be thought of as -- in the sense of
2 a multicore processor, a component within the overall
3 design that generally performs computation, runs
4 instructions, pertinent instructions of architecture and
5 has different hardware components that go with it.

6 Q. Okay. And what is a memory?

7 A. In -- I guess in the context of the -- the
8 technology we'll talk about today, it's -- can be
9 something like a DRAM or an SRAM, a space where digital
10 information and bits can be stored and, perhaps,
11 randomly accessed, things like that.

12 Q. How big is a memory?

13 A. It depends on, I guess, the design you're
14 talking about, or depending on the types of memory
15 technology, there's certain types of limits as to how
16 big or fast you can make them.

17 Q. Is it fair to say that, generally, a memory can
18 be sized for the -- the job? It can be big, or it can
19 be small?

20 A. I would say there are things like DRAM that we
21 probably all have in our laptops here that can be, these
22 days, gigabytes. You can have SRAMs that are -- have
23 different behavioral characteristics that are sometimes
24 smaller for caches, the megabytes range, things like
25 that.

1 Q. You used the word "megabytes." I'm assuming
2 that bytes, kilobytes, megabytes, those are the units of
3 sizes in -- in -- in memories?

4 A. Those are generally the types of numbers we're
5 talking about: kilobytes, megabytes, gigabytes, et
6 cetera.

7 Q. And a memory could be a byte; it could be a
8 megabyte; it could be a terabyte, et cetera?

9 A. Typically, when we talk about memories, if
10 you're going to buy memory or put a memory in a machine,
11 you know, it's usually kilobytes on up, I would think.
12 And even kilobytes is a little rarer these days,
13 depending on the type of memory you're -- system you're
14 talking about.

15 Q. Okay. Can there be local memory on a chip?

16 A. Different types, yes.

17 Q. What are those types?

18 A. So, I guess, if we're talking on a piece of --
19 like a silicon -- a chip, as you just said, you might
20 have something called a local cache -- or sometimes
21 referred to as L1 or maybe an L2 that now, or these
22 days -- or even in years past may fit on a die.

23 And then in some systems -- sometimes,
24 like, in embedded systems, you have things called
25 scratch-pad memories which are chunks or regions of SRAM

1 that you can manually manage sometimes in software
2 via -- excuse me -- a microprocessor.

3 Q. What kinds of sizes would we expect on a memory
4 that is embedded in -- on a die?

5 A. Caches have varied over time and gotten bigger
6 and bigger. But these days are megabytes. Going back
7 some years may have been, you know, dozens of kilobytes,
8 64k maybe for an L1, L2 being larger and so forth.

9 Q. What's the smallest memory that we could put on
10 a chip?

11 MR. FAHMI: Objection; form.

12 BY MR. LEWIS:

13 Q. Let me ask a better question.

14 What's the smallest memory that we could
15 put on a -- on a die with a CPU?

16 MR. FAHMI: Objection; form.

17 THE WITNESS: I mean, I don't -- I don't
18 know. I suppose you could design whatever kind of
19 memory you wanted. As to whether that would be useful
20 for the CPU on the chip is another question.

21 BY MR. LEWIS:

22 Q. Uh-huh.

23 If it were 64 kilobytes, would we call that
24 a memory?

25 A. Depending on how it was designed, it could be.

1 If it were a data cache, which -- there are examples in
2 the past of data caches of that size. A cache being
3 something that is dynamically updated with short-term
4 data in it for use -- or instructions for use with a
5 CPU.

6 Q. Cache is a memory, correct?

7 A. They are a form of memory, that's right.

8 Q. Okay. I can have a cache that's maybe even a
9 meg- -- a megabyte?

10 A. That's correct.

11 Q. Could I have a cache that is as small as -- as
12 8 kilobytes?

13 A. There are -- I'm going from a long-time-ago
14 memory, but there have probably been designs with L1
15 caches of -- I think you said kilobytes -- 8 kilobytes
16 or something like that.

17 Q. Is it fair to say that the -- the size does not
18 change whether we call it a memory or not; it's what it
19 does instead?

20 MR. FAHMI: Objection; form.

21 THE WITNESS: I'm not sure I would entirely
22 agree with that. At some point, I think it starts to
23 become what we call "registers" that still store bits of
24 information. They are typically not DRAM but built
25 using SRAM, for example. And those are used differently

1 in the machine versus what we call memory. Although,
2 they both do store digital information.

3 BY MR. LEWIS:

4 Q. Would a person of ordinary skill call a
5 register a form of memory?

6 A. I would say yes and no. No in the sense of
7 there are ways that registers are used by
8 microprocessors. There are -- and we'll get into this
9 today -- memory map registers that are used for maybe
10 data coming in from a sensor or something you want to
11 send out to something else. And then there's whole
12 fields of study around things like register allocation
13 and usage and -- and things like that.

14 Memory is typically -- also, registers are
15 something that you access at a given address, like
16 Register 123 in a CPU. Or in a memory map register,
17 this registers at some specific address.

18 Memory is more the random access. I can go
19 to Slot 17 and see what's there. I can update it, read
20 it, write it kind of thing. And, typically, when
21 handling memory, there's things like memory allocation,
22 memory deallocation that are types of things specific to
23 memory versus registers.

24 Q. What is a storage? Does that term have meaning
25 to you?

1 A. It does, but there's a lot of different
2 context. Maybe you could ask a more specific question.

3 Q. Well, let's start general. What is storage,
4 generally?

5 MR. FAHMI: Objection; form.

6 THE WITNESS: I would say, generic --
7 generically or generally, in computing, storage in terms
8 of -- I guess I'll frame it from data storage. There's
9 things like offsite storage where people put tapes or
10 things like that. There's things like cold storage
11 where data is stored a certain way. In some cases,
12 people might refer to storage as putting -- putting data
13 on a hard disk, that kind of thing.

14 BY MR. LEWIS:

15 Q. In terms of -- is there something -- let me
16 strike that.

17 Is there such a thing as on-chip storage?

18 A. It's a -- it's sort of a peculiar phrasing.
19 I've typically heard the phrase of "on-chip memory" or
20 things like that, memory of various kinds or on-device
21 or on-board memory. Storage, I mean, is probably a word
22 used, but I typically -- it's a little bit less of a
23 technical word in that space, in my opinion.

24 Q. Going back to cores, why would we have more
25 than one core on a -- on a chip?

1 A. There is a lot of reasons. You might want --
2 there has been different reasons for different times
3 over different periods in history. But you might have
4 cores of different types for different types of
5 computation, or you might want multiple cores to do more
6 work, more -- you know, more computation versus what one
7 core can do. Or you might have cores of different
8 behavioral characteristics, things like that.

9 Q. Do you understand how memories are implemented
10 on-chip?

11 A. I would say aspects of that, depending on what
12 type of memory we're talking about.

13 Q. Like a cache memory, for instance.

14 A. Yes. I worked in cache at various points in my
15 career.

16 Q. Is it fair to say that these are implemented as
17 an array of some sort of bit storage?

18 A. I would say that's a concept or a phrase that
19 comes up in memory -- maybe memory architecture. And
20 there are things like a -- like a -- let's talk about a
21 simple data cache.

22 If I was teaching someone how they work or
23 how they are designed, there's multiple strips or arrays
24 of digital storage that get architected together to form
25 how the cache works, and then you can -- there's a lot

1 of different ways how you kind of use your secret sauce
2 there.

3 Q. You used the phrase "multiple strips or
4 arrays." Is that synonymous with, like, a bank?

5 A. The word "array" is sometimes used in terms of
6 banks. Although, banks aren't -- weren't part of the
7 context I was talking about. I was talking about like a
8 two-way or four-way set associative cache or something
9 like that.

10 Q. And if I wanted to, say, double the size of
11 this cache in my next implementation, I could simply
12 double the number of arrays to create that larger cache,
13 correct?

14 MR. FAHMI: Objection; form.

15 THE WITNESS: I think if you want to double
16 the storage capacity of a cache, there's different ways
17 you can go about it. I guess, if you're saying I have
18 16 arrays and you want to go to 32, that may be a design
19 choice you would explore. Whether it's feasible in your
20 system is another question.

21 BY MR. LEWIS:

22 Q. Would a person having ordinary skill in the art
23 typically consider that one larger cache, or now are
24 they calling that two caches?

25 A. If I'm referring to -- I guess it depends on

1 how -- if you're doubling the capacity of a memory, it
2 depends how you're doing it as to how they would refer
3 to that. But if I have a single L1 data cache attached
4 to a processor locally and I double it, it's still the
5 L1 data cache.

6 Q. Okay.

7 A. If I doubled the storage size of it, capacity.

8 Q. Dr. Brogioli, I just handed you another
9 document marked Tab 2.

10 (Exhibit 2 was marked for identification.)

11 BY MR. LEWIS:

12 Q. Can you -- can you tell me what that is?

13 A. Yes. This is U.S. Patent 8,775,833 that I
14 discuss in my Declaration, the -- the '833 patent.

15 Q. Okay. You're getting ahead of me, but I'm
16 going to ask the question anyway.

17 Have you seen this document before?

18 A. I have, yes. This is the patent I discuss in
19 my Declaration.

20 Q. Okay. And do you understand that this patent
21 is being challenged in this IPR proceeding?

22 A. Yes, that's my understanding.

23 Q. If I refer to something called the "'833" or
24 the "'833 patent," do you understand that I'm referring
25 to this document?

1 A. I do.

2 Q. And your Declaration, I think you just said,
3 provides opinions about this patent?

4 A. Aspects of this patent, largely addressing, as
5 I recall, some of the arguments Dr. Horst made.

6 Q. Okay. Can you look at Claim 1 of '833?

7 A. Okay.

8 Q. You are providing opinions on Claim 1, correct?

9 A. That's correct.

10 Q. And Claim 1 is one of the challenged claims,
11 correct?

12 A. That's correct, yes.

13 Q. Okay. Take a look at Claim 1. And the
14 question I have for you is: What is a domain?

15 A. Okay. So in the -- what the '833 patent talks
16 about, domains here are -- for the overall processor or
17 the overall package, are portions of the device that
18 have -- one example being a -- a certain voltage and
19 frequency or a certain power associated with them.
20 Whereas, there are perhaps a second domain that has
21 another setting associated with it in the overall
22 package. And then the patent talks about ways to manage
23 that -- just as the claims talk about, ways to manage
24 that power.

25 Q. So what exactly is a domain, then? How would

1 you define that word?

2 MR. FAHMI: Objection.

3 BY MR. LEWIS:

4 Q. And if the -- if the patent helps, I might be
5 able to point you to a -- a place. Bottom of Column 1,
6 does the -- let me strike the question and make it
7 clearer.

8 The bottom of Column 1, around Line 57, do
9 you see where the patentee has defined the term
10 "domain"?

11 MR. FAHMI: Objection; form.

12 THE WITNESS: So it looks like what the
13 specification is describing here is a description of
14 domain, similar to what I was describing earlier,
15 that -- I guess, at Line 57 or 58, the domain is used to
16 mean a collection of hardware logic. It's at the same
17 voltage and frequency point. And then the patent goes
18 on to talk about multiple of these -- these domains.

19 BY MR. LEWIS:

20 Q. The patent specification says -- and I can
21 quote it -- "The term 'domain' is used to mean a
22 collection of hardware and/or logic that operates at the
23 same voltage and frequency point."

24 Did I recite that correctly?

25 A. That's what the sentence says, yes.

1 Q. Do you agree with that, with that definition?

2 A. That's similar to definitions I've heard used
3 elsewhere in the industry and in the literature.

4 Q. Okay. And in your words, what is the
5 overarching goal of the '833 patent?

6 A. There's probably a number of goals or aspects
7 contemplated in the patent, but it's having these
8 various -- various policy budgets and managing power
9 budgets within these domains that the patent
10 contemplates and updating them to manage the -- the
11 power consumption and performance and things like that
12 and doing that in a dynamic manner.

13 Q. "Dynamic," as in the -- something about the
14 domains changes or is changeable?

15 A. That the allocations in these domains can -- is
16 changing over -- or changes over time or adapts.

17 Q. The allocations of what?

18 A. The power budget that's being allocated is --
19 is -- it can change from what's being allocated to each
20 domain over time.

21 Q. Okay. And what are the primary drivers of the
22 power consumed by the domains according to the patent?

23 MR. FAHMI: Objection; form.

24 THE WITNESS: I'm not sure what you mean by
25 "primary drivers."

1 BY MR. LEWIS:

2 Q. Well, let me ask it this way, then: Is it fair
3 to say, based on the patent and the claim language, that
4 the primary drivers that the '833 was concerned with are
5 frequency and voltage?

6 A. Those are two things that the patent discusses
7 in its adjusting of power allocation to these domains
8 for the overall performance of the device.

9 Q. Is it fair to say that the '833 patent is
10 discussing changing the voltage and/or frequency to
11 adjust the power consumed by the domains?

12 A. So I'm going back to the abstract, and it
13 mentions that when it's -- when the patent's talking
14 about the first and second domains, it's controlling a
15 frequency of domains, based on this -- these allocated
16 portions.

17 Q. Does that complete your answer?

18 A. It does, yes.

19 Q. What were you looking at to -- to come to that
20 answer?

21 A. I was just quoting from the abstract.

22 Q. Okay. Going beyond the abstract, does the
23 patent discuss altering the voltage of domains as -- as
24 well?

25 A. Just going back through the detailed

1 description for it.

2 Q. I may have misspoke in my question, so I'm just
3 going to repeat it, if that's all right.

4 Going back to beyond the abstract, does the
5 patent discuss altering the domains based on voltage as
6 well?

7 A. So I'm going up through to detailed
8 description. I'm going --

9 Q. Before you answer, let me strike that, because
10 I think I keep flubbing the question. Let me try one
11 more time.

12 Does the patent discuss altering the
13 voltage on the domains as well as the frequency? Does
14 that question make -- does that add up?

15 A. I understand the question, yeah.

16 Q. Okay. Thanks.

17 A. So I -- continuing with my early an- -- earlier
18 answer, I'm going through the -- I guess, Columns 1, 2,
19 and 3, and the patent's talking about frequency, and it
20 makes mention of things like power and thermal
21 specifications. Up until this point, I'm not seeing it
22 mentioning -- well, I think your question was the
23 modification of voltage for domains.

24 Continuing to Column 4, it talks about the
25 package power budget and how, in this example, five

1 values are used to represent the policy values.

2 I guess I'll -- I guess I'll stop there.

3 I'm, roughly, at the top of Column 5.

4 Q. Can you continue down Column 5, around Lines 40
5 through 50.

6 A. Okay.

7 (Witness examines document.)

8 Okay. So I see here -- and I actually was
9 just getting to, I guess, around Line 12 of Column 5.

10 Q. Uh-huh.

11 A. "As determined" -- or at Line 10, "As
12 determined in accordance with Equation 1, can be
13 allocated to each of the domains by controlling
14 frequency and/or voltage accordingly."

15 And then at 42 of Column 5, more
16 specifically at Block 130, "A frequency
17 and/or voltage of these domains can be updated based on
18 the allocated portion of the power budget."

19 Q. Okay. And you said that was Column 5 near the
20 top?

21 A. I think I was first reading from Column 5 at
22 10 -- or starting at Line 8.

23 Q. And one of the ideas of the '833 patent is that
24 different domains can receive a different amount of the
25 power budget, correct?

1 A. I would say, generally, yes, when it's managing
2 the budget for this overall package.

3 Q. In fact, the -- each domain can receive a
4 different amount of the budget -- the power budget,
5 correct?

6 A. Right. It's -- if we get into Column 7 or so,
7 it starts to describe how the package budget and the
8 budgets, for example, the IA domain and the GT domain
9 are computed, and it's -- it's using these equations and
10 other information to figure out what the budgets are in
11 these -- these domains.

12 Q. Okay. And then, getting into the claims, for
13 instance, in Claim 1, it's noting that the first and
14 second domain have operated independent voltage and
15 frequency.

16 Do you agree with that?

17 A. That the -- the claim says the first --
18 sorry -- a first domain and a second domain, each of the
19 first and second domains, to operate at an independent
20 voltage and frequency, is talking about these domains --
21 when we look at the equations or the formulas -- and as
22 I talk about in my Declaration, they are related, but
23 each of the values or budgets for the domains can be --
24 can be set or operated independently.

25 Q. Okay. Is it correct to say, then, that each

1 domain could have a different voltage and frequency than
2 the other domain?

3 A. Different or same.

4 Q. But they could have a different voltage and
5 frequency from the other domain, right?

6 A. I would say they could have a different budget.
7 As to whether those always mean a different voltage --
8 settings of voltage and frequency -- or -- sorry -- if
9 you're asking about voltage and frequency for each
10 domain, the domains can operate independently. I
11 don't -- I'm not sure if -- we'd have to talk about,
12 like, explicit mapping or something like that, as to
13 what those numerical values would be.

14 Q. I'm not asking for any kind of mapping. I'm
15 just wanting to confirm that what you're saying is that
16 the frequency and voltage of one domain could be
17 different from the frequency and voltage of the other
18 domain?

19 A. I guess I would say the power budget could be
20 different for the two, and the patent talks about
21 adjusting the frequency or, in some cases, talks about
22 voltage. So those are set independently. They could be
23 different, or they could be the same, I guess.

24 Q. So I keep asking you about frequency and
25 voltage, and the last couple answers you've changed that

1 to power budget. Is -- are we talking about the same
2 thing?

3 A. Well, the -- the formulas I was just
4 discussing, I guess, in Column 7 talk about the
5 budgeting for the different domains. And so those
6 budgets could be -- those are computed independently,
7 and then there's, as the patent talks about, frequencies
8 associated with them or frequencies and voltages.

9 Q. I'm not sure I understood your answer, sir.
10 I'm asking about voltage and frequency.
11 Your answers have been about power budgets. Are power
12 budgets the same as voltage/frequency?

13 A. I guess the frequency -- or frequency and
14 voltage are what are being used to, I guess, achieve the
15 budgeting that comes up. And, to me, the answer, I
16 guess, more concisely, those values could be -- the
17 values are done independently, but they could be
18 different or they could be the same.

19 Q. The values of?

20 A. The vol- -- the frequency or the voltages that
21 are used.

22 Q. Okay. So in summary -- I think this is a
23 yes-or-no question -- is it correct to say, then, that
24 each domain could have a different voltage and frequency
25 in the other domain, or it could have the same voltage

1 and frequency of the other domain, and that's what it
2 means to be independent?

3 MR. FAHMI: Objection; form.

4 THE WITNESS: That they are -- that they
5 operate independently, and these -- these formulas are
6 being used to determine how they operate, and the values
7 that they end up being set at in a given instance could
8 be different, or they could be the same. The same thing
9 I'm saying in my Declaration.

10 BY MR. LEWIS:

11 Q. The values of the voltages and frequencies is
12 different or the same; is that what you're saying?

13 A. Just as I'm saying in 32, that these -- or
14 sorry -- Paragraph 32 of my Declaration, that they're
15 controlled separately from one another. I don't think
16 anything is precluding them from perhaps having the same
17 values at a certain point in time.

18 Q. That's not my question, though.

19 How about this way: True or false, each
20 domain could have a different voltage frequency than the
21 other domain. Is that true or false?

22 A. I think in some instances they could have
23 different frequency or frequency and voltage.

24 Q. I think you're saying true; is that right?

25 A. It sounds like, at times, if I'm understanding

1 your question, they can -- depending on how the
2 budgeting is done, they operate independently, but that
3 doesn't necessarily mean they might not have the same
4 values at a certain point in time or -- or different
5 values, depending on how the -- the system behaviors
6 [sic] at that moment in time.

7 Q. So each domain could have a different voltage
8 than frequency than the other domain, not necessarily
9 saying that it would, but it could; true?

10 A. I think that sounds right.

11 Q. Okay. And sometimes they could be the same,
12 frequency and voltage, as the other domains?

13 A. I think that sounds right as well. I don't
14 recall anything precluding either of those cases.

15 Q. Okay. But you opened your copy of the
16 Declaration, so why don't I give it to you now, and then
17 you can use this as the official exhibit. Okay?

18 A. Okay.

19 Q. And just for the record, which -- what page
20 were you referring to when you looked at your copy of
21 the Declaration?

22 A. It was Page 14 at Paragraph 32.

23 THE COURT REPORTER: Is this going to be
24 Exhibit 3?

25 MR. LEWIS: I'm handing him Exhibit 3 now,

1 yes.

2 THE COURT REPORTER: Thank you.

3 (Exhibit 3 was marked for identification.)

4 THE WITNESS: Thanks.

5 MR. LEWIS: Do you want this?

6 BY MR. LEWIS:

7 Q. Dr. Brogioli, have you seen this document that
8 I have handed you that we marked as Exhibit 3?

9 A. Yes. This is my Declaration I submitted in
10 support of the patent owner's response for the '833
11 patent.

12 Q. Can you confirm that this is the same document
13 that you were referring to in your materials that you
14 brought with you?

15 A. They look to be the same document.

16 Q. There's a slight difference, though, isn't
17 there? The document I handed you also has your CV
18 attached?

19 A. It is an appendix, yes, that's right.

20 Q. Okay. Is there any other difference?

21 A. Not that I saw just now.

22 Q. Okay. Who prepared this document?

23 A. I did.

24 Q. Did you have any assistance preparing this
25 document?

1 A. I would say on -- probably on minor things like
2 formatting or some of the cites -- or cite formatting,
3 things like that, and maybe some explanation on the
4 legal -- legal standards that I cite in the document.
5 But the words and opinions are mine, and I -- I drafted
6 the first and subsequent drafts of it.

7 Q. Okay. Do you know how many drafts you drafted?

8 A. No, I don't.

9 Q. More than one?

10 A. Probably -- probably more than one, yes.

11 Q. More than five?

12 A. I don't know.

13 Q. More than three?

14 A. Maybe. In the sense of dropping maybe sections
15 in piecemeal kind of thing.

16 Q. Okay. And do you understand that the contents
17 of this document were provided under oath -- well, under
18 the penalties of perjury?

19 A. Yes.

20 Q. And if I refer to "your Declaration," you
21 understand that I'm referring to the document that I
22 just handed you, correct?

23 A. Correct.

24 Q. Okay. What documents did you review in
25 assisting you in creating that document?

1 A. It would be largely, if not entirely, the
2 documents cited in here, to the patent, the various
3 prior-art references, Dr. Horst's Declaration, and
4 probably the petitioner's document that, I think,
5 Dr. Horst's Declaration was in support of.

6 I don't recall if maybe I have some cites
7 in here to, like, external literature or definitions,
8 but to the extent there's one or two of those in here,
9 it would have been that as well.

10 Q. Okay.

11 A. And then my experience, you know, in the
12 industry and my career and so forth.

13 Q. Okay. Do you have experience with multicore
14 processors before your engagement in this matter?

15 A. Yes.

16 Q. Do you have experience designing multicore
17 processors before your engagement in this matter?

18 A. Yes.

19 Q. You have a copy of your CV attached to the back
20 end of -- of your Declaration.

21 Would you mind turning to, I think it was,
22 Page 4 of the CV, and march, kind of, forwards in time
23 by going backwards in the document to point which of
24 these experiences -- beginning at the top of Page 4 and
25 going backwards -- where you worked with multicore

1 processors.

2 A. Okay.

3 Q. Okay. Starting at Electric Motor Sports on the
4 top of Page 4.

5 A. So those were multiprocessor systems where we
6 were building operating systems and peripheral hardware
7 and things like that.

8 The next one at the bottom was Digital
9 Microelectronics, circuit design used in my multicore or
10 multi- -- I guess multicore, but not multicore in and of
11 itself.

12 Stratus Computer, I don't recall. We were
13 certainly using multiprocessor systems, but I don't
14 recall the organization of the logic on dies or
15 cross-dies.

16 Vicarious Visions, I don't think I was.
17 They were single core, if I remember.

18 Rice Computer Architecture and Circuit
19 Design, yes, there would have been multicore in there.

20 Intel, as I recall, either multicore or
21 multiprocessor. There was certainly multicore
22 technology, I think, we had there.

23 Fulbright and Jaworski, I guess I would say
24 I was working, at times, on systems that had
25 heterogenous multiple processor systems.

1 Texas Instruments, yes, was multicore.

2 Method Seven, we were using multicore
3 hardware, but I wasn't super involved in the multicore
4 aspects of it, I guess you could say -- well, things
5 were parallel-threaded across multiple cores for
6 high-speed data ingestion and processing and formatting
7 with some synchronization stuff.

8 Freescale, from 2007 to '9, yes, both in
9 the use of the hardware or the software, designing
10 languages for them in design of the silicon. The second
11 Freescale from 2009 to '11, same answer.

12 RISC5, I just -- I had mostly been looking
13 at, I guess, other aspects of RISC5.

14 UT Lecturing Engagement, probably not a
15 focal point, but it may have come up.

16 I'm back to Page 1, Rice University Adjunct
17 role, yes, in a few different flavors from -- well,
18 probably three or four different types of multicore
19 processing at least.

20 The IEEE/ACM role, yes, for a lot of
21 different flavors.

22 And Polymathic Consulting, yes, for
23 different flavors.

24 Q. With respect to Polymathic Consulting, taking
25 out your expert testimony services, did you work on

1 multicore processors?

2 A. In a nonexpert role and in a consulting role,
3 yes.

4 Q. Okay. In any of these roles, did you ever
5 design a multicore processor or a system designed of a
6 multicore processor?

7 A. Yes.

8 Q. Which ones? The ones you mentioned or --

9 A. They would have been a list of those that I
10 mentioned.

11 Q. Okay. I'm also going to hand you another
12 document.

13 (Exhibit 4 was marked for identification.)

14 BY MR. LEWIS:

15 Q. Dr. Brogioli, do you recognize this document I
16 just handed you under Tab 4?

17 A. I do. This is the Finkelstein reference I
18 discuss in my Declaration.

19 Q. Okay. So you've already answered this, but I
20 got to ask it: Have you seen this document before?

21 A. I have, yes.

22 Q. And do you understand that when I refer to
23 "Finkelstein," I'm referring to this document?

24 A. I do.

25 Q. Do you understand that Finkelstein is prior art

1 to the '833 patent?

2 MR. FAHMI: Objection; form.

3 THE WITNESS: I guess I would say that
4 was -- my understanding is that's what Petitioner or
5 Dr. Horst are saying. So I addressed it through that
6 lens.

7 BY MR. LEWIS:

8 Q. Did you treat it as if it were prior art to the
9 '815 patent in your Declaration?

10 A. Yes. In my responding to Dr. Horst's
11 arguments, yes.

12 Q. And am I correct that your Declaration provides
13 opinions about Finkelstein?

14 A. It does, yes.

15 Q. Okay. I'm going to ask you to use both hands.

16 Can you also look at the '833 patent, Claim
17 1?

18 A. Okay.

19 Q. In the fourth limitation of Claim 1, beginning
20 with "First logic," can you -- can you take a look at
21 that and read it to me?

22 A. Yes.

23 (As read): "First logic to dynamically
24 allocate a power budget for the processor between the
25 first and second domains at run time, according to a

1 first sharing value for the first domain and a second
2 sharing policy value for the second domain, the first
3 and second sharing policy values controllable by
4 user-level software."

5 Q. Okay. What does it mean when it says
6 "dynamically allocate a power budget for the processor"?

7 A. That, as the patent describes, it is -- I think
8 we talked about some of the formulas in Column 5 and
9 7 -- over time, these allocations are being performed to
10 allocate the power budget for the overall processor
11 package in the '833.

12 Q. Am I correct that the power budget is being
13 split between the domains in Claim 1?

14 A. I guess I would say it's being -- in the
15 examples where there's a first and second domain here,
16 it's being allocated across the two.

17 Q. Okay. Am I correct that the power budget for
18 the processor is being split between the first and
19 second domains in the '833 patent?

20 A. I don't know that I used the word "split." Or
21 maybe it's the first time I've heard it in regard to
22 this patent. But I would phrase it that the power
23 budget for -- in the context of the '833, the power
24 budget for the package and the processor as a whole is
25 being allocated across these two domains -- or between

1 the two domains.

2 Q. Okay. Going back to the Finkelstein --

3 A. Okay.

4 Q. -- can you look at Paragraph 26? It's on
5 Page 3.

6 A. All right.

7 Q. Do you see where Finkelstein talks about power
8 planes?

9 A. Yes.

10 Q. Let me make an intermediary stop there.

11 Power planes are the same thing as domains,
12 correct?

13 A. I think my recollection is that's generally
14 what Finkelstein is getting at is -- he is using the
15 word "plane" versus "domain."

16 Q. Okay. And Finkelstein discusses that the power
17 planes, which share a common package power/energy
18 budget.

19 Do you see that?

20 A. So I'm in Paragraph 26 of Finkelstein and, I
21 guess, the third line down, he states, "For example, if
22 multiple power planes sharing the same power source,
23 120, are present in System 100, power management may
24 need to be satisfied for both individual constraints per
25 power plane and global constraints per package."

1 Q. What's a package in this context?

2 A. It's the whole -- the cores and other things
3 that may be with them on the chip and, sort of, packaged
4 in the -- what we kind of see in pictures like the black
5 rectangle with the metal things coming out.

6 Q. Is it fair to say that's the package of the
7 entire die plus whatever structural support that it has
8 that attaches it to the motherboard?

9 A. That sounds generally right.

10 Q. Okay. If you read the next sentence -- you
11 finished at "global constraints per package." Keep
12 reading, "By doing so..."

13 A. "By doing so, it is possible to share a common
14 package power" -- sorry -- "package power/energy budget
15 and allow for use of perfect" -- "for example" --
16 sorry -- "unused processor core power for more graphic
17 effects, GFX performance in a GFX-intensive workload
18 when processor resources are not fully utilized."

19 Q. So given that context, would the shared
20 budget -- well, let me ask it this way. Strike that.

21 When Finkelstein refers to sharing a common
22 package power/energy budget, would the shared budget be
23 a budget for a processor?

24 A. So I don't think so. The sentence here in
25 Finkelstein at the third line down of 26 is saying that

1 it need -- the power management may need to be satisfied
2 for the individual constraints per power plane. And
3 then there's a global constraint on the package, but the
4 way that -- you know, based on if we put a power meter
5 at the -- at the plug in the wall, conceptually, and
6 Finkelstein's talking about just the management of power
7 across some of these domains, but not all aspects of the
8 package or things incorporated in the package or
9 processor.

10 Q. But reading into the next line, it says, "Share
11 a common package power/energy budget."

12 Do you see that?

13 A. I see that portion of the sentence, yes.

14 Q. And we established a few minutes ago that the
15 package is the whole chip, correct?

16 A. That's what package refers to, yes.

17 Q. So is it not fair to say, then, that this
18 sentence describes -- describing a common package
19 power/energy budget is talking about an energy budget
20 for the entire package as it's common to the entire
21 package?

22 A. I'm going to continue reading one minute.

23 (Witness examines document.)

24 So I also -- I'm looking at, I guess,
25 roughly, Paragraph 31 and 32 in Finkelstein where

1 it's -- it's -- it's taking its -- the controller budget
2 and, for each of those power planes in Finkelstein,
3 mapping it into a discrete set of these power states,
4 things like P0 for turbo, et cetera, et cetera, and
5 then, sort of, other P-states for budget.

6 And that is something that sounds like the
7 P-states for these processors, where you can have them
8 in an active state or a turbo state or a sleep state.
9 But that, to me, doesn't seem like -- while there is a
10 total power for the package coming out of the wall, for
11 example, that doesn't seem to be what Finkelstein is
12 contemplating in its management of these power planes.

13 Q. Dr. Brogioli, I asked you to look at the next
14 sentence, and you jumped to a paragraph five paragraphs
15 away.

16 Can I get you back to Paragraph 26?

17 A. Yes.

18 Q. And refer to the middle of the paragraph that
19 says, "By doing so, it is possible to share a common
20 package power/energy budget..."

21 And then it continues, "And allow for use
22 of, for example, unused processor core power for more
23 graphics effects performance."

24 Do you see that?

25 A. I do.

1 Q. So am I wrong in saying that the Finkelstein is
2 disclosing a common package power-energy budget? Those
3 are the words on the -- in the paragraph, correct?

4 A. He's saying there's a common package
5 power/energy budget, some number of power or energy
6 coming in from the wall, and then -- just as it's saying
7 in this sentence, and it's talking about taking from --
8 you know, an unused portion from the -- an unused
9 portion of the budget from the processor or, you know,
10 the general-purpose processor, I guess, and perhaps
11 giving that to the graphics processor if you're in a
12 graphics-intensive performance workload.

13 But those aren't the only two things that
14 would, perhaps, be in a package, but it's talking about
15 sharing between those two here.

16 Q. Okay. Am I correct -- strike that.

17 Let me -- should we understand
18 Finkelstein's use of the phrase "processor core power"
19 as describing the power used in one of the CPU cores?

20 A. Without looking at a specific sentence, I think
21 that sounds right. One of the things Finkelstein talks
22 about in these various cores just as it has in Figure 1.

23 Q. Okay. And the graphics effects performance is
24 referring to a graphics core, correct?

25 A. I'm just going back to the figures to make sure

1 I'm right. That sounds like he is probably referring to
2 the graphics or graphics accelerators like in Figure 6.

3 Q. Okay. And in looking at Figure 6 in
4 Paragraph 26, are the processor cores and graphics
5 effects core, or graphics accelerator, 616, are they in
6 different planes?

7 A. So it looks like -- and I'm sticking with your
8 Paragraph 26. So it's saying, third line down, "If
9 multiple power planes sharing the same power source,
10 120," which is the -- from Figure 1, "are present in
11 system, 100," which is the overall system Figure 1, it
12 says, "Power management may need to be satisfied for
13 both individual constraints per power plane and global
14 constraints per package."

15 And so maybe I'm pointing us to the
16 wrong -- I just want to make sure I'm recalling Figure 6
17 correctly. So I'm just skipping ahead to 42, 43, 44 to
18 refresh myself on Figure 6 here.

19 So I've read through 47, Paragraph 47, and
20 I don't see power planes mentioned in the context of
21 Figure 6. Maybe that's my mistake for pointing us to
22 the wrong figure.

23 Q. Okay. Figure 6 does refer to, however,
24 multiple power planes sharing the same power source,
25 correct?

1 A. It does contain that language, yes.

2 Q. And it uses an example of shifting power from
3 the processor core to the graphics if there's a
4 GFX-intensive workload, correct?

5 A. It says about halfway down, "It is possible to
6 share a common package power/energy budget and allow for
7 use of it, for example, unused processor core power for
8 more Graphics Effects performance in a GFX-intensive
9 workload."

10 So power going from the processor core to
11 the GFX --

12 Q. Would you agree --

13 A. -- and continues when -- when processor
14 resources are not fully utilized.

15 Q. Would you agree, then, that this is disclosing
16 shifting power available from the processor cores to the
17 graphics core?

18 A. It looks like it -- where it's saying is -- if
19 there's unused processor core power in the scenario of a
20 graphics-intensive workload, then taking the unused
21 processor core power and effectively giving it to the
22 graphics -- or graphics effects, or graphics processor,
23 to handle the GFX-intensive workload.

24 Q. So it's pushing available power from the
25 processor core, so the graphics, correct?

1 MR. FAHMI: Objection; form.

2 THE WITNESS: It's saying that the
3 processor core has, in this scenario, unused power, and
4 that power is being -- now being -- taking the unused
5 processor core power and putting it to the graphics
6 effects performance in the scenario of a graphics
7 effects-intensive workload.

8 BY MR. LEWIS:

9 Q. In your view as an expert, does that insinuate
10 that the graphics and the processor cores are on
11 different planes?

12 A. So the last sentence of the paragraph states
13 "However, the techniques discussed herein with reference
14 to multiple power planes may also be applied to
15 implementations that may utilize a single power plane."

16 Q. Okay. So that first half of the sentence is
17 describing what happened in the rest of the paragraph
18 preceding it, correct? "The techniques discussed herein
19 with reference to multiple power planes."

20 Is that what it says?

21 A. That's what the first part of that sentence
22 says.

23 Q. And then, it's correct, then, that -- that
24 reference to multiple power planes referring to the
25 previous sentences in that paragraph describing the

1 processor core and the graphics core, correct?

2 A. I guess that, perhaps, sounds right. I don't
3 recall -- I don't know if I talked about the sentence in
4 my Declaration or not. But what it's saying at the end
5 of 26 is: "Techniques discussed herein" with reference
6 to multiple power planes, it mentions there, and it
7 says, "They can also be applied to implementations that
8 utilize a single power plane."

9 And as we were talking about, it's talking
10 about an unused power budget -- or unused power for the
11 core processor and then moving that to a graphics
12 processor in this scenario.

13 Q. Okay.

14 MR. LEWIS: Let's go off the record.

15 THE VIDEOGRAPHER: Going off the record.
16 The time is 11 o'clock.

17 (Brief recess taken.)

18 THE VIDEOGRAPHER: Back on the record. The
19 time is 11:22.

20 BY MR. LEWIS:

21 Q. Welcome back, Dr. Brogioli -- "Brogioli." I'm
22 sorry.

23 "Brogioli," correct?

24 A. That's right.

25 Q. Okay. I just handed you a document marked

1 Tab 5.

2 (Exhibit 5 was marked for identification.)

3 BY MR. LEWIS:

4 Q. Can you tell me what that is?

5 A. This is the Conroy reference I discuss in my
6 deposition.

7 Q. And what is the patent number or the reference
8 number?

9 A. It is 2 -- Patent No. -- or Publication
10 No. 20070049133-A1.

11 Q. Okay. And you have seen this document before,
12 correct?

13 A. That's correct, yes.

14 Q. And if I refer to a reference called "Conroy,"
15 do you understand that I'm referring to that document?

16 A. Yes.

17 Q. Do you understand that Conroy has prior art to
18 the '833 patent?

19 MR. FAHMI: Objection; form.

20 THE WITNESS: I believe petitioner and
21 Dr. Horst said that. So I just assumed that it was
22 based on his statements.

23 BY MR. LEWIS:

24 Q. Okay. So you've treated it in your Declaration
25 as if it were, correct?

1 A. That's fair, yes.

2 Q. And your Declaration does provide opinions
3 about Conroy?

4 A. Yes.

5 Q. Can you turn to Paragraph 50, which is pretty
6 deep into the document, Page 3, but after the large set
7 of figures there.

8 A. Okay.

9 Q. And you see where it says, Figure 1, "A
10 computer system has a number of different throttle
11 settings. For example, the CPU processor of the
12 computer system may be set to run under different core
13 voltages and/or different core frequencies such that the
14 system can be fully functional but at different
15 performance levels to trade power usage and computing
16 performance."

17 Do you see that?

18 A. I do.

19 Q. Okay. I also want you to look at Paragraphs 64
20 and 65, and then also 81. And let me know when
21 you're -- when you're done reviewing them.

22 A. Okay. (Witness examines document.)

23 Okay.

24 Q. All right. In the context of the Conroy
25 patent -- or patent application, what does the term

1 "throttle setting" refer to? For instance, it's
2 mentioned in Paragraph 81. It says, "One embodiment the
3 system includes throttled component and non-throttle
4 components. A throttle component has different throttle
5 settings at which the component is functional, but at
6 different power performance levels, operating setting."

7 A. I see that. And a processor may be throttled
8 to work at different core voltages and core frequencies,
9 and then gives a few other examples.

10 Q. Okay. Is it correct, then, to say that a
11 throttle setting is the voltage and frequency pair, at
12 least with respect to the processors?

13 A. That's what it -- it seems to be mentioning in
14 this paragraph.

15 Q. Okay. Now let's jump to Paragraph 97.

16 Have you reviewed it?

17 A. Yes.

18 Q. Okay. So 97 says, "For example, the
19 microcontroller may store the determined throttle
20 setting in a register and then send a signal to the
21 corresponding component (or the main CPU) to enforce the
22 throttle setting."

23 Would you agree, then, that the Conroy
24 reference is disclosing that the throttle setting is
25 stored in a register?

1 A. That -- so Conroy talks about storing its --
2 the -- I'm jumping around. In Conroy 201, my
3 Declaration, Paragraph 46, Conroy stores its power
4 distribution tables in a memory.

5 What 97 -- Paragraph 97 of Conroy is
6 talking about is, when the microcontroller is doing its
7 computation, it may store a determined throttle setting
8 in that temporary registry at this point in the process.

9 Q. You said you're referring to Paragraph 46 of
10 your Declaration?

11 A. That's correct.

12 Q. I'm going to hand you another exhibit.

13 MR. LEWIS: That was 6, correct?

14 THE WITNESS: 5, I think, Tab 5.

15 MR. LEWIS: Thank you.

16 (Exhibit 6 was marked for identification.)

17 THE WITNESS: Thank you.

18 BY MR. LEWIS:

19 Q. Okay. I just handed you Tab 6.

20 Have you seen this document before?

21 A. Yes. This looks like the Nussbaum reference
22 Dr. Horst talks about and that I talk about in my
23 Declaration.

24 Q. Okay. So have you seen this document before?

25 A. I have, yes.

1 Q. And do you understand that when I refer to
2 "Nussbaum," I'm referring to this document, that exhibit
3 in Tab 6?

4 A. I do.

5 Q. And do you understand that Nussbaum is prior
6 art to the '833 patent?

7 MR. FAHMI: Objection; form.

8 THE WITNESS: My understanding is Dr. Horst
9 and Petitioner are characterizing it as prior art. I
10 treated it as such in my Declaration.

11 BY MR. LEWIS:

12 Q. Okay. And am I correct that your Declaration
13 provides opinions on this document, the Nussbaum
14 application?

15 A. That's right, in response to some of
16 Dr. Horst's argument.

17 Q. Okay. Let's start by going to Paragraph 19 of
18 Nussbaum.

19 A. Okay.

20 Q. Go ahead and review that for a second. I'm
21 going to ask you a question about computational units.

22 A. (Witness examines document.) Okay.

23 Q. So you see where it says, "Computational units
24 such as the CPU," and then, later, the "GPU"?

25 A. Yes.

1 Q. What is a computational unit?

2 A. It looks like here Nussbaum is referring to a
3 CPU. So, for example, maybe a 32-bit processor, like
4 maybe an Intel flavor, and a graphics processing unit
5 being the -- a different style architecture of a
6 processing unit to do graphical workloads, for example,
7 the pieces that do computation.

8 Q. When Nussbaum refers to a computational unit,
9 it could be referring to a CPU, correct?

10 A. I think it's referring to the CPU and talking
11 about, in the first part of 19, "Power to all cores or
12 to one or more cores based on performance states of the
13 cores," and then talks about things like "allow for
14 power to be reallocated from idle computational units,
15 such as the CPU." It's not doing anything computation,
16 or it's sitting there idle kind of thing.

17 Q. So computational unit could be the CPU?

18 A. That sounds like what Nussbaum is referring to
19 in 19.

20 Q. Okay.

21 A. Its -- you know, its definition of CPU versus
22 the GPU here.

23 Q. Further down in that paragraph, it says,
24 "Selectively distributing power among the active cores
25 or other computational units based on frequency

1 sensitivity allows for greater overall system throughput
2 on heterogenous workloads or multi-threaded workloads
3 with heterogenous threads."

4 Do you see that?

5 A. Yes.

6 Q. What is included in Nussbaum's category of
7 other computational units?

8 A. So Nussbaum seems to be talking about a
9 scenario where there are computational units and the
10 notion of trying to get computation through the system
11 effectively, and some of these computational units are
12 more sensitive to frequency than others. And so part of
13 that maybe you've got different workloads on different
14 computational units or different types of threads.

15 And so I think all he is saying here is
16 that's some kind of unit that performs computation CPU
17 or maybe I think the GPU is an example that he talks
18 about. Something that computes how sensitivity that --
19 how sensitive that is to the frequency change.

20 Q. I'm going to hand you another document.

21 (Exhibit 7 was marked for identification.)

22 BY MR. LEWIS:

23 Q. Dr. Brogioli, I just referred you to another
24 document on -- under Tab 7.

25 Can you describe this document for me?

1 A. This is the Bose patent application publication
2 that Dr. Horst talks about and I also discuss in my
3 Declaration.

4 Q. Okay. So you have seen this document before,
5 correct?

6 A. That's correct.

7 Q. And if I refer to a "Bose" document, you
8 understand that I'm referring to that one in your hands,
9 correct?

10 A. Understood.

11 Q. All right. And you understand that Bose is
12 prior art to the '833 patent?

13 MR. FAHMI: Objection; form.

14 THE WITNESS: That Dr. Horst and, I think,
15 Petitioner are saying it's prior art. I treated it as
16 such in my Declaration. I didn't offer an opinion on
17 that, though.

18 BY MR. LEWIS:

19 Q. To be sure, you offered an opinion on Bose, but
20 not to whether it was prior art or not; is that what
21 you're saying?

22 A. That's correct. Thank you.

23 Q. Okay. So just to clean that up, you have
24 provided opinions on this reference, the Bose reference,
25 correct?

1 A. That's correct.

2 Q. If you can turn to Paragraph 56 of Bose.

3 A. Okay.

4 Q. Do you see where it discusses a BUSY bit for
5 components?

6 A. I see that, yes.

7 Q. What is a BUSY bit in this context?

8 A. I'm rereading the prior paragraph.

9 Q. Sure. That's fine.

10 A. (Witness examines document.)

11 So it looks like the -- this Paragraph 55
12 and 56 refer to Figure 5, and this example is giving us
13 six units shown in the figure. And it's in a ring
14 network, and there's a two-bit token counter with each
15 of the six units, I guess, 520, 530, 540, 550, 560, 570.
16 And that token is used to -- depending on the bits in
17 each of the units, we're determining whether the unit's
18 idle.

19 And so, getting to Paragraph 56, under
20 normal operation and no power management, each -- each
21 of these units always has one token. And then each unit
22 also has the busy flag, BUSY Bit B 515, which it says is
23 normally set to one indicating usage. Like, presumably,
24 saying that the unit's busy.

25 And then, it looks like in 57, it says:

1 "On these timing boundaries, a b=0 flag causes a 01
2 state to transition to 00," which is, I think, mentioned
3 earlier as the -- the idle stay or idle counter.

4 Q. You can put that away for a moment.

5 Let's go back to Tab 5, the Conroy.

6 A. Okay.

7 Q. Let's look at Paragraph 69.

8 A. Okay.

9 Q. Paragraph 69 is talking about monitoring power
10 usage in the chip, correct?

11 A. That at certain places, the power -- in the
12 device, the power usage is mo- -- sorry -- the power
13 usage is measured periodically.

14 Q. Then keep reading through 70 and 71 also.
15 This -- this section is talking about the periodic
16 measurements, correct?

17 A. Right. In 69, it's talking about the power
18 usage can be measured periodically, and then it goes
19 into 70 and 71, talking about examples of -- of how the
20 measurements work and how the determinations work, power
21 budget determinations.

22 Q. Okay. Would it be accurate to say that the
23 power budgets calculated for each interval -- actually,
24 let's -- let's scratch that.

25 I want you to look at Figure 5 first before

1 I ask that question.

2 First of all, what is Figure 5?

3 I think you just passed it. Did you pass
4 it?

5 A. Yeah. I'm just trying to look at the
6 description of it for you.

7 So in Paragraph 99 of Conroy, it states:
8 "Figure 5 illustrates an example of dynamically
9 throttling components of a data processing system to
10 control power usage according to one embodiment of the
11 invention."

12 And going back to the actual figure, we see
13 there's a -- on that X axis, there's a window advancing
14 with time for computing an average -- or the average.

15 Q. Okay. Now I'm going to ask you to use both
16 your hands. If you look at your -- don't lose that
17 page, because you're going to refer back to Conroy as
18 well, but I want you to look at your Declaration,
19 Paragraph 53.

20 A. Okay.

21 Q. 53 is discussing Conroy, correct?

22 A. That's right, yes.

23 Q. And in Paragraph 53, you -- you note a series
24 of mathematical designations -- I'll call it that -- all
25 relating to T. T is for time, correct --

1 A. T --

2 Q. -- generally speaking?

3 A. -- in this scenario is talking about time.

4 That's right.

5 Q. And you say T is the current time in
6 Paragraph 53?

7 A. The symbol "T" here is the current time, that's
8 right.

9 Q. Going -- moving ahead to Paragraph 54. You can
10 go ahead and review that, if you'd like.

11 But you say, "It would make no sense to
12 calculate the budget for current time interval."

13 You see that?

14 A. Let me look at the paragraph quickly.

15 Q. Sure.

16 A. (Witness examines document.)

17 Okay. Your question again?

18 Q. You say that it would make no sense to
19 calculate a budget for a current time interval?

20 MR. FAHMI: Objection; form.

21 THE WITNESS: I guess I'll point us roughly
22 to the fifth line down of Paragraph 5- -- my
23 Paragraph 54: "It would make no sense for the time (T
24 plus delta) to be a current time, as the petition
25 alleges, because by the time that time window is,"

1 quote, "current, the power allocated for that time
2 period must already be determined and allocated."

3 BY MR. LEWIS:

4 Q. Is T plus delta the current time or the next
5 time?

6 A. Just as I talk about in this paragraph, the T
7 plus delta is the next time interval.

8 Q. Does Conroy calculate the budget for a current
9 time interval?

10 A. In Conroy's Paragraph 69 to 71 -- I think we
11 may have looked at already -- it's calculating what the
12 budget is going to be for the next time interval at T
13 plus delta, and as I talk about in Paragraph 54, looking
14 at -- backwards in time or prior -- prior date.

15 Q. So Con- -- Conroy calculates the budget to be
16 allocated for the next time interval by looking at the
17 current and previous time intervals, correct?

18 A. It looks like that's what I'm saying in
19 portions of 54. For example -- and I'm the third line
20 down -- if N is 5, Conroy looks at power usage for T
21 plus delta, the next time winner -- window, and if
22 looking at T minus 4 delta up through T minus delta and
23 T. T in this scenario being the current time.

24 Q. So if we're using your example, if we're
25 calculating the power budget for N equals 5, we look at

1 T minus 4 delta, T minus 3 delta, T minus 2 delta, and T
2 minus delta, and T.

3 How about for the next time period after
4 the current one? So we've advanced in time --

5 A. Uh-huh.

6 Q. -- and we're going to calculate a budget for
7 the next time period.

8 Isn't this process iterative? Like we're
9 going to be calculating using an overlap of time deltas
10 that we had already incorporated into the calculation
11 for the last N time deltas, correct?

12 MR. FAHMI: Objection; form.

13 THE WITNESS: That -- where -- in this
14 scenario, in the example I describe in 54, you're
15 looking at a shifting -- effectively a shifting time
16 window, and so at the next time interval, you're still
17 using the formula to calculate T plus delta for the next
18 time window using T minus 4 delta through T that I
19 mentioned here, but the window keeps shifting.

20 BY MR. LEWIS:

21 Q. Uh-huh.

22 A. I think --

23 Q. I just did that thing I can't -- I told you not
24 to do, right?

25 That's -- we're shifting a time window of

1 many time deltas, correct? If -- if N equals 5, we've
2 got 5, kind of, shutters, if I can -- let me find a way
3 that we can talk the same language here.

4 The delta and the multiple claimed on the
5 delta is talking about a uniform unit of time, correct,
6 a uniform slice of time?

7 A. I think that -- that looks right based on
8 Figure 5.

9 Q. And as we are progressing forward in time, the
10 process for determining the power budget for the next
11 unit of time, the delta, is iterative. It's based on
12 some number of the past time windows also, correct?

13 A. In a -- at a given point in time, when I'm
14 connect -- when I'm determining the budget for the next
15 time window, I'm using a trailing set of -- in the N
16 equals 5 case, five prior windows.

17 And then when I advance to the next time
18 window and compute the next time, T plus delta in the
19 future, you're computing over the prior five time
20 windows of that. And there may be overlap, depending on
21 how you have your numbers configured, in what comprises
22 those various aggregate windows of five.

23 Q. If N is greater than 1, there's going to be
24 overlap, correct?

25 A. That sounds right. Of -- like, if N is 2,

1 there would be a one-window overlap.

2 Q. Right.

3 And that process, then, is iterative,
4 correct?

5 A. Well, I guess it happens at various time
6 intervals, and for a given time when the process runs,
7 it looks over whatever the number of prior time windows
8 is. You might want to say it -- it iterates over them
9 by looking at them, if you wanted to use the word
10 "iterative."

11 Q. Okay. Can we go back to Nussbaum, which is
12 Tab 6?

13 A. Okay.

14 Q. I want you to find Table 3, which is Column --
15 I'm sorry, Page 4 -- left column on Page 4.

16 A. Okay.

17 Q. What is Table 3 describing?

18 A. It is talking about different performance
19 states. I think this table in Paragraph 33 of Nuss- --
20 Nussbaum is talking about four examples. So there's P0
21 through P4, and it's talking about the OS, or other
22 software, can utilize these.

23 And so there's -- in Table 3, there's --
24 the performance states, there's a boost, P0 to P3.
25 There's an idle, and then a deep C-state where things

1 are basically off through a power control mechanism that
2 -- that's used. So it's showing different core
3 performance states.

4 Q. Okay. There are four columns in this table,
5 right; there's "Core Performance States," "Operational
6 point (F,V)."

7 What does "F,V" mean here?

8 A. I think, it looks like, based on that
9 information in that table -- or in that column, rather,
10 it's talking about frequency -- sorry --
11 frequency/voltage value.

12 And we see, for instance, when we get to
13 idle, for F, it shows clocks off, so the oscillator is
14 off, low voltage. And then in the deep C-states, what
15 is F is clocks are off, and V is power's off.

16 Q. So the F and V values for the four P-states
17 correspond to a power setting; is that correct?

18 A. It looks like Nuss- -- one second.

19 (Witness examines document.)

20 Nussbaum refers to those as, it looks like,
21 various operational points. Yeah, the -- so the very
22 last sentence of Paragraph 33.

23 Q. The next column of this table is "Power
24 (dynamic and static) consumed in this point."

25 You see that?

1 A. Yes.

2 Q. And for each of the rows, which there are five
3 P-states -- an idle stat and a deep C-state -- there is
4 a core power row in that table -- a core power value in
5 that row, correct?

6 A. That looks right. That -- and that's sort of
7 the -- the naming convention Nussbaum seems to use.

8 Q. So for P-boost, the power consumed in this
9 point is a value of Core_Boost_PWR. For P0, it's
10 Core_PWR0; for P1, it's Core_PWR1; for P2, it's
11 Core_PWR2; for P3, it's Core_PWR3; for idle, it's
12 Core_Idle_PWR. And for deep C-state, it's
13 Core_DeepCstate_PWR.

14 Is that correct?

15 A. That's correct.

16 Q. And the remark is that for a P-boost setting,
17 it's "Boost point power budget of the core has been
18 exceeded," and then for the -- it looks like the four
19 P-states, it says, "Core power budget."

20 Do you agree with that?

21 A. That -- I agree. That looks like what it's
22 saying.

23 Q. And for the deep C-state, it says that the core
24 is either power gated, or deep voltage is applied?

25 A. That's correct.

1 Q. What is deep voltage?

2 A. I think what this table is getting at for the
3 deep C-state is you're in a nonoperational state, so
4 it's not performing any functions. There's no clock,
5 and power's off.

6 And, here, it looks like it's either the
7 power has been gated to it, or there's a very, very
8 deep -- perhaps extremely low voltage applied to maybe
9 maintain some kind of -- something internal, but there's
10 no functionality going on, no computation, et cetera.

11 Q. Okay.

12 A. Switching -- there's no switching, et cetera.

13 Q. So for the deep C-state, there might be some,
14 maybe, tiny modicum of voltage that's still being
15 applied, correct? That's what you just testified to,
16 extremely low voltage applied?

17 A. I think that seems to be what it's -- the
18 remarks that Table 3 are getting at, that there's --
19 there may be some extremely low voltage applied.

20 Q. Okay. So that would imply that there's
21 possibly an extremely low power, but there's -- there's
22 a power applied to the deep C-state, correct?

23 A. That -- I would say in the deep C-state, there
24 may be a voltage applied, and there may be a -- in
25 Column 3 a resultant core deep C-state power associated

1 with that, but the clocking -- from a system's
2 standpoint, the clocks and power are off. There's no
3 computation happening; it's -- the device is asleep.

4 Q. Okay. If we go to Paragraph 47 of Nussbaum,
5 which is near the bottom of the right column on Page 5,
6 do you see where it says, "The power headroom made
7 available is provided to the bounded computational
8 unit"?

9 A. Ahh, okay. Yeah, it's about halfway down.
10 In the -- sorry.

11 In 607, the performance of the subset is
12 limited, and the power headroom made available through
13 throttling is provided in 609 to the computational units
14 executing the CPU-bounded and/or GPU-bounded
15 application.

16 Q. So that would be either the CPU or the GPU,
17 correct, the computational unit referred to there?

18 A. It looks like it's referring to, in this case,
19 the CPU or the GPU here.

20 Q. Okay. And feel free to also refer to Figure 6
21 here, since that is what this paragraph refers to.

22 But the CPU or GPU is selected, according
23 to Nussbaum, based on the determination of Step 601 of
24 whether the application is CPU-bounded or GPU-bounded,
25 correct?

1 A. So what's going on in this Figure 6 -- it's
2 discussed in 47 -- is that the Block 601 that, I think,
3 you just mentioned is identifying that an application
4 may be CPU-bounded or GPU-bounded. But that's really
5 just the identification process that I describe in my
6 Paragraph 70.

7 Q. But the power that's provided to either the CPU
8 or the GPU is based on that Step 610, correct -- I'm
9 sorry. Let me say it again.

10 But the power that's provided to either the
11 CPU or GPU is based on that Step 601, correct?

12 A. Well, the 601 is just identifying the
13 boundedness of CPU-bounded or GPU-bounded, and then at
14 that point, there is no allocation of power budget. And
15 then boost sensitivity of computational units is looked
16 at.

17 Q. Okay.

18 A. And then the process continues on.

19 Q. Okay. So maybe not just 601, but maybe 601
20 through 609, the performance of those five steps
21 determines whether the GPU or CPU will be selected for
22 additional power headroom to be provided, correct?

23 A. The process and flow described in Figure 6 is
24 being used to identify those two throttles based on the
25 subset of cores being less sensitive in terms of

1 performance or reduction performance capability. So
2 it's talking about the throttling here.

3 Q. Figure 6 does not mention cores, though, does
4 it? It refers to computational units, correct?

5 A. You're asking about the figure itself?

6 Q. Yes.

7 A. It mentions -- so it's identifying CPU-bounded
8 or GPU-bounded applications, and it mentions
9 computational units.

10 Q. So is it correct to say, then, that the power
11 headroom is provided to the computational units based on
12 the identification of the application being CPU-bounded
13 or GPU-bounded?

14 A. Well, the way Nussbaum describes Figure 6 is
15 that 601 is the identification of the CPU-boundedness or
16 GPU-boundedness. And then, subsequent to that, it --
17 it's talking about the throttling to see if -- if the
18 throttling will free up performance capabilities for --
19 to be used elsewhere in the system.

20 And then that's -- what it gets at is, in
21 605, identify subset to throttle; 607, limit performance
22 of subset of computational units and so forth.

23 Q. I'm not sure if you have said "yes" or "no" to
24 my question of whether -- whether it was correct to say
25 this. Let me ask it one more time.

1 Is it correct to say, then, that the power
2 headroom is provided to the computational units based on
3 the identification of the application being CPU-bounded
4 or GPU-bounded?

5 A. I would say that there's an identification of
6 CPU-bounded or GPU-bounded, and then, from there,
7 intermediate steps occur that result in the throttling.

8 And then halfway through 47, it states:
9 The performance of the subset is limited in 607, and the
10 power headroom made available through that throttling is
11 provided in 609 to those -- those specific computational
12 units.

13 Q. So is it correct?

14 MR. FAHMI: Objection; form.

15 THE WITNESS: It doesn't -- the way you're
16 phrasing, it doesn't sound correct -- it doesn't sound
17 like it's correctly characterizing the process of
18 Nussbaum.

19 BY MR. LEWIS:

20 Q. Where does it mis- -- where have I
21 mischaracterized it?

22 A. If I'm hearing you correctly, 601 is
23 identifying whether the application in Nussbaum is
24 bounded by CPU or GPU, and then there's a sensitivity
25 determination step that occurs, frequency sensitivity.

1 And then, from there, Nussbaum identifies
2 which things to potentially throttle, limits that
3 subset, and then there's the headroom that's provided to
4 other computational units.

5 So it's not just -- that whole process is
6 comprised of the blocks in Figure 6; it's not all in
7 601. And it -- and it involves a throttling down and
8 then a reallocation portion.

9 Q. But the identification of CPU-bounded or
10 GPU-bounded is a step that's required in providing the
11 power headroom to either the computational unit, right?

12 A. It looks like that's a step that Nussbaum says
13 is -- is part of his Figure 6 flow, yes.

14 Q. And if the Nussbaum disclosure does not
15 identify a CPU-bounded or GPU-bounded application, then
16 it doesn't provide additional power headroom, correct,
17 to one of the computational units, correct?

18 A. I don't recall. It looks like that scenario is
19 something at least outside the scope of Nussbaum's
20 Figure 6.

21 Q. Is there any disclosure anywhere in Nussbaum
22 that says that it would provide additional power
23 headroom outside of that process that starts with
24 identifying whether it's CPU-bounded or GPU-bounded?

25 A. I don't recall that I addressed that in my

1 Declaration. I don't recall what Nussbaum says about
2 that.

3 Q. Okay. Can you -- can you point me to any
4 instance where it might have said that?

5 A. And your -- your question one more time.

6 Q. What I'm getting at is that the only way that
7 Nussbaum is addressing adding additional power headroom
8 to provide to one of the computational units is to first
9 identify whether it's CPU-bounded or GPU-bounded
10 applications, correct?

11 A. (Witness examines document.)

12 So I -- I note in 17 Nussbaum says: "There
13 are several methods which have been proposed to
14 opportunistically raise the performance level; i.e. --
15 e.g., raise the frequency of CPU cores on multicore
16 processors, when the processor integrated circuit is
17 running below its thermal design point."

18 I noticed it does -- doesn't mention
19 headroom there.

20 And it continues to talk about, same
21 paragraph but halfway down, "Such approaches allow the
22 operating frequency of the CPU cores to be raised
23 together when there is estimated power, current, or
24 thermal headroom in order to improve performance under a
25 given TDP."

1 It's not saying anything about -- I don't
2 see that necessarily talking about boundedness that we
3 talked about in Figure 6 a minute ago.

4 Q. Okay. So where the Nussbaum patent does talk
5 about boundedness, is there a -- let me strike that.
6 Let me ask you a different question.

7 Looking at what Nussbaum does disclose in
8 Figure 6 and Paragraph 47, the first step in the process
9 for providing additional power headroom to a
10 computational unit is identifying whether the
11 application is CPU-bounded or GPU-bounded, correct?

12 A. (Witness examines document.)

13 So it's looking -- the first step is
14 looking to see whether the application itself is
15 CPU-bounded or a GPU-bounded application, and then going
16 and looking at the -- the stored boost or performance
17 sensitivity information respective to those.

18 Q. Does that complete your answer?

19 A. That's my answer.

20 Q. Okay. So, then, isn't it fair to say that the
21 CPU-bounded or GPU-bounded determination is used to
22 allocate power budget in the Nussbaum disclosure?

23 A. So in the context of Figure 6, that first step,
24 601, is the identifying of, for this application, is it
25 -- is it a CPU-bounded scenario or a GPU -bounded

1 scenario, that determination step in 601.

2 Q. Okay.

3 MR. LEWIS: Let's go off the record.

4 THE VIDEOGRAPHER: Going off the record.

5 The time is 12:24.

6 (Brief recess taken.)

7 THE VIDEOGRAPHER: Back on the record. The
8 time is 12:56.

9 BY MR. LEWIS:

10 Q. All right. Welcome back, Dr. Brogioli.

11 A. Thank you.

12 Q. Can you refer to the Nussbaum reference? And
13 let's go to Paragraph 40 on Page 5.

14 A. Okay.

15 Q. Do you see where it discloses boosting cores
16 based on how high their boost sensitivities are?

17 A. I see it discusses boost sensitivity, yes.

18 Q. What's the boost sensitivity?

19 A. (Witness examines document.)

20 So it looks like these -- this is
21 describing in Figure 5 identifying cores that, you know,
22 if their performance is to be boosted, there's a -- it
23 looks like it's ranking the -- prioritizing the cores in
24 terms of the benefit of boosting, and it's doing that in
25 decreasing order in 519. So it looks like that's the

1 boost sensitivity performance potential that's being
2 identified.

3 Q. Is it fair to say that the cores with the
4 highest boost sensitivity will be boosted?

5 A. (Witness examines document.)

6 It looks like what it's talking about in 40
7 is identifying cores with the low boost sensitivity or
8 those that are below predetermined threshold, for
9 example, and -- and removing those from the list of
10 candidates to boost.

11 Q. Uh-huh.

12 A. And then -- the last sentence of 40, when the
13 now TPD SoC margin is greater than zero, those Ps that
14 are, of course, still on the list get transitioned to
15 the P-boost. So it looks at sensitivity, creates a
16 list -- a prioritized list -- or it says decreasing
17 order, maybe remove some from the bottom and then boosts
18 the remainder.

19 Q. Okay. And is the result of that that the cores
20 with the highest sensitivity, the ones that are left on
21 the list, those are the ones to get boosted, correct?

22 A. That looks like what this paragraph is
23 describing.

24 Q. And would increasing the boost sensitivity of a
25 core therefore cause it to be more likely to be boosted?

1 A. I guess what this paragraph -- Figure 5 of
2 Nussbaum in 517 and 519 seem to be talking about is: If
3 I take a core and increase its -- sort of, in this
4 contrived example, if I keep increasing its
5 sensitivity or if its sensitivity were to increase, it
6 would end up higher on the list, therefore with a lower
7 chance of removal and -- and a higher chance of being
8 boosted.

9 Q. Okay. Let's go down to Tab 7, Bose.

10 A. Okay.

11 Q. I want you to follow me to Figure 13.

12 A. Okay.

13 Q. Do you see where in Step 1316, it attempts to
14 read tokens from bus token storage?

15 A. I see that Block, yes.

16 Q. All right. And if there's at least one token
17 available, the token count is increased in Step 1317,
18 correct?

19 A. Yes. Where it says: "Increase token count of
20 ith resource and increase performance commensurately."

21 Q. That's ith, as in i-t-h, like the nth -- or the
22 fifth, but the ith?

23 A. That's right.

24 Q. And if no spare tokens are available, the
25 process enters a loop back to Step 1314, correct?

1 A. I would say --

2 Q. 1316?

3 A. -- it will go from Block 1316 up and return to
4 1314.

5 Q. Okay. And then from 1314, it would go back to
6 1316, if the ith resource is below the expected
7 performance level?

8 A. That looks right, yes.

9 Q. So the process in Figure 13 will increment the
10 token count in 1317 or it will continue looping until
11 the token count has increased, correct?

12 A. Well, no. If it -- if I'm in Block 1316 and
13 there are no spare tokens available, then I return to
14 Block 1314. And if the ith resource is not below its
15 expected performance level, there wouldn't be a loop,
16 and it would break out and return to Block 1315.

17 Q. But if there are tokens available, it'll --
18 it'll increment them, correct?

19 A. If I'm in Block 1316 and I'm able to get at
20 least one token, then I move to 1317 and increase the
21 token count of that ith -- I-T-H -- resource.

22 Q. Okay. So if -- if I gave you the following
23 assumption that the ith resource is performing below the
24 expected performance level, okay, that's the -- that's
25 the dilemma, that's the precondition, it's going to loop

1 in that 1314, 1316, 1314, 1316 over and over again until
2 there are tokens available, at which point it will
3 increase the token count?

4 A. It looks like if it's able to get the token as
5 part of the reading tokens from bus token storage in
6 1316, it will then go to that 1317 and increase the
7 token count of that ith resource.

8 Q. Okay.

9 MR. LEWIS: We have no more questions.

10 EXAMINATION

11 BY MR. FAHMI:

12 Q. Dr. Brogioli, would you turn to the Conroy
13 reference, please? I think that was what Mr. Lewis had
14 marked as Tab No. 5.

15 Do you recall Mr. Lewis asking you in
16 Conroy about the term "throttle settings"?

17 A. Yes.

18 Q. Would you turn to Paragraph 51 of Conroy,
19 please?

20 A. Okay.

21 Q. Does Paragraph 51 provide a description of a
22 throttle setting?

23 A. It does. It states, "Typically, different
24 throttle settings" -- sorry -- "Typically, different
25 throttle settings correspond to different performance

1 levels. Further, different settings have different
2 power requirements."

3 MR. FAHMI: I have no other questions.

4 MR. LEWIS: Petitioner is also done.

5 THE VIDEOGRAPHER: This concludes the
6 deposition of Michael C. Brogioli, Ph.D.

7 Going off the record. The time is 1:06.

8 (Deposition concluded at 1:06 p.m.)
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1	1	CHANGES AND SIGNATURE	
2	2	MICHAEL C. BROGIOLI, PH.D.	
3	3	THURSDAY, AUGUST 1, 2024	
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5		PAGE/LINE	CHANGE REASON
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THURSDAY, AUGUST 1, 2024

I, Kari J. Behan, CSR, CCR, and in and for the
State of Texas, do hereby certify that the facts as
stated by me in the caption hereto are true;

That there came before me the aforementioned named
person, who was by me duly sworn to testify the truth
concerning the matters in controversy in this cause;

And that the examination was reduced to writing by
computer transcription under my supervision; that the
deposition is a true record of the testimony given by
the witness.

I further certify that I am neither attorney or
counsel for, nor related to or employed by, any of the
parties to the action in which this deposition is taken,
and further that I am not a relative or employee of any
attorney or counsel employed by the parties hereto, or
financially interested in the action.

Given under my hand and seal of office on this 13th
day of August, 2024.

Kari J. Behan

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3 August 13, 2024

4 RE: Mercedes-Benz USA LLC v. Daedalus Prime LLC
5 8/1/2024, Michael C. Brogioli , PhD (#6832320)

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

0	1315 75:16	21 78:21	42 23:15 42:17
0 55:1	1316 74:13	2150 3:10	43 42:17
00 55:2	75:2,3,6,12,19	22 78:22	44 42:17
01 55:1	76:1,1,6	23 78:23	46 4:17 49:3,9
1	1317 74:17	24 78:24	47 42:19,19
1 1:11,23 2:2	75:10,20 76:6	25 78:25	65:4 66:2 68:8
4:12 5:2 8:15	13th 3:5 80:19	26 37:4,20	71:8
8:17 18:6,8,10	14 28:22 78:14	38:25 40:16	49 4:18
18:13 19:5,8	15 78:15	42:4,8 45:5	5
22:18 23:12	16 16:18 78:16	29 4:14	5 4:5,17 23:3,4
24:13 33:16	17 4:13 13:19	3	23:9,15,19,21
35:17,19 36:13	70:12 78:17	3 4:14 22:19	36:8 46:1,2
41:22 42:10,11	18 78:18	28:24,25 29:3	49:14,14 54:12
47:9 60:23	19 50:17 51:11	29:8 37:5 47:6	55:5,25 56:2,8
78:1,3 80:10	51:19 78:19	59:1 61:14,17	57:22 58:20,25
10 23:11,22	1:06 1:12 2:8	61:23 64:18,25	60:1,2,8,16
78:10	77:7,8	78:3	65:5 72:13,21
100 37:23	1st 2:7 3:10 5:5	30 81:16	74:1 76:14
42:11	2	31 39:25	50 23:5 47:5
11 33:11 45:16	2 4:13 17:9,10	32 16:18 27:13	51 76:18,21
78:11	22:18 46:9	27:14 28:22	515 54:22
11:22 45:19	59:1 60:25	39:25 51:3	517 74:2
12 23:9 78:12	78:2	33 61:19 62:22	519 72:25 74:2
120 37:23	20 78:20	336-4000 80:24	52 4:20
42:10	20004 3:6	34 4:15	520 54:15
123 13:16	2007 33:8	3420 5:22	53 56:19,21,23
12:24 72:5	20070049133	4	57:6
12:56 72:8	46:10	4 4:15 22:24	530 54:15
13 74:11 75:9	2009 33:11	31:22,24 32:4	54 57:9,23
78:13 81:3	201 49:2	34:13,16 58:22	58:13,19 59:14
130 23:16	2024 1:11 2:2,8	59:1,18 61:15	540 54:15
1314 74:25	5:2,5 78:3	61:15 78:4	55 54:11
75:4,5,14 76:1	80:10,19 81:3	40 23:4 72:13	550 54:15
76:1	20807 80:21	73:6,12	555 3:5

56 6:6 54:2,12 54:19 560 54:15 57 19:8,15 54:25 570 54:15 571 80:24 58 19:15 6	69 55:7,9,17 58:10 7 7 4:20 24:6 26:4 36:9 52:21,24 74:9 78:7 7-31-2026 80:23 70 55:14,19 66:6 71 55:14,19 58:10 76 4:6 78 4:7 78731 5:23 8 8 4:12 12:12,15 23:22 78:8 8,775,833 1:4 4:13 17:13 80:4 8/1/2024 81:5 80 1:23 4:8 800 80:24 81 47:20 48:2 815 35:9 833 17:14,23,24 18:6,15 20:5 21:4,9 23:23 29:10 35:1,16 36:11,19,23 46:18 50:6 53:12	8564 80:22 9 9 33:8 78:9 95131 3:11 97 48:15,18 49:5,5 99 56:7 9:49 1:12 2:8 5:2,5 a a.m. 1:12 2:8 5:2,5 a1 46:10 able 19:5 75:19 76:4 above 2:7 5:10 79:4 81:6 abstract 21:12 21:21,22 22:4 accelerator 42:5 accelerators 42:2 access 13:15,18 accessed 9:11 accordance 23:12 accuracy 81:9 accurate 55:22 achieve 26:14 acknowledged 79:15 acknowledg... 81:12	acm 33:20 action 80:17,18 active 40:8 51:24 actual 56:12 actually 23:8 55:23 adapts 20:16 add 22:14 adding 70:7 additional 66:22 69:16,22 70:7 71:9 address 5:20,22 13:15,17 addressed 35:5 69:25 addressing 18:4 70:7 adjunct 33:16 adjust 21:11 adjusting 21:7 25:21 advance 60:17 advanced 59:4 advancing 56:13 affect 8:5 affix 79:2 aforemention... 80:12 aggregate 60:22 ago 12:13 39:14 71:3

agree 12:22 20:1 24:16 43:12,15 48:23 63:20,21 ahead 17:15 42:17 50:20 57:9,10 ahh 65:9 alleges 57:25 allocate 35:24 36:6,10 71:22 allocated 20:18 20:19 21:15 23:13,18 36:16 36:25 58:1,2 58:16 allocation 13:12,21 21:7 66:14 allocations 20:15,17 36:9 allotted 81:19 allow 38:15 40:21 43:6 51:13 70:21 allows 52:1 altering 21:23 22:5,12 amount 23:24 24:4 answer 7:8 8:3 8:8 21:17,20 22:9,18 26:9 26:15 33:11 71:18,19	answered 34:19 answering 7:24 answers 6:25 7:9,13,23 25:25 26:11 anyway 17:16 appeal 1:1 80:1 appeared 79:14 appearing 8:22 appendix 29:19 applicable 81:8 application 4:15,17,18,20 47:25 50:14 53:1 65:15,24 66:3 67:12 68:3,23 69:15 71:11,14,15,24 applications 67:8 70:10 applied 44:14 45:7 63:24 64:8,15,16,19 64:22,24 approaches 70:21 architected 15:24 architecture 6:16 9:4 15:19 32:18 51:5 argument 50:16	arguments 18:5 35:11 array 15:17 16:5 arrays 15:23 16:4,12,18 art 16:22 31:3 34:25 35:8 46:17 50:6,9 53:12,15,20 ascenda 3:10 ascendalaw.c... 3:11 81:2 asked 40:13 asking 6:22,25 7:7,8 25:9,14 25:24 26:10 67:5 76:15 asleep 65:3 aspects 15:11 18:4 20:6 33:4 33:13 39:7 assistance 29:24 assisting 30:25 associated 18:19,21 26:8 64:25 associative 16:8 assume 8:8 assumed 46:21 assuming 10:1 assumption 75:23	attached 17:3 29:18 31:19 81:11 attaches 38:8 attempts 74:13 attorney 80:16 80:18 81:13 august 1:11 2:2 2:7 5:2,5 78:3 80:10,19 81:3 austin 5:22 available 43:16 43:24 65:7,12 68:10 74:17,24 75:13,17 76:2 81:6 average 56:14 56:14 axis 56:13
b			
b 4:10 54:22 55:1 b2 4:13 back 11:6 14:24 21:12,25 22:4 31:19 33:16 37:2 40:16 41:25 45:18,21 55:5 56:12,17 61:11 72:7,10 74:25 75:5 backwards 31:23,25 58:14			

bank 16:4 banks 16:6,6 barker 5:22 based 8:23 21:3 21:15 22:5 23:17 39:4 46:22 51:12,25 60:7,11 62:8 65:23 66:8,11 66:24 67:11 68:2 72:16 basically 62:1 beginning 31:24 35:19 begins 5:3 behan 1:25 2:8 80:11,22 behavioral 9:23 15:8 behaviors 28:5 believe 46:20 benefit 72:24 benz 1:3 5:18 80:3 81:4 better 8:12 11:13 beyond 21:22 22:4 big 9:12,16,18 bigger 11:5,6 bit 14:22 15:17 51:3 54:4,7,14 54:22 bits 9:10 12:23 54:16	black 38:4 block 23:16 66:2 74:15 75:3,12,14,16 75:19 blocks 69:6 board 1:1 14:21 80:1 boost 61:24 63:8,9,16,17 66:15 71:16 72:16,17,18 73:1,4,7,10,15 73:24 boosted 72:22 73:4,21,25 74:8 boosting 72:15 72:24 boosts 73:17 bose 4:20 53:1 53:7,11,19,24 54:2 74:9 bottom 19:5,8 32:8 65:5 73:17 boundaries 55:1 bounded 65:7 65:14,14,24,24 66:4,4,13,13 67:7,8,12,13 68:3,4,6,6,24 69:9,10,15,15 69:24,24 70:9	70:9 71:11,11 71:15,15,21,21 71:25,25 boundedness 66:13 67:15,16 71:2,5 bracha 3:4 break 75:16 brief 45:17 72:6 brogioli 1:10 2:5 4:3,14 5:4 5:8,14,21 8:14 17:8 29:7 34:15 40:13 45:21,21,23 52:23 72:10 76:12 77:6 78:2 79:1,6,14 80:9 81:5 brought 29:14 budget 20:18 22:25 23:18,25 24:2,4,4,7 25:6 25:19 26:1 35:24 36:6,10 36:12,17,23,24 37:18 38:14,20 38:22,22,23 39:11,19,19 40:1,5,20 41:2 41:5,9 43:6 45:10 55:21 57:12,19 58:8 58:12,15,25	59:6 60:10,14 63:17,19 66:14 71:22 budgeting 26:5 26:15 28:2 budgets 20:8,9 24:8,10,23 26:6,11,12 55:23 building 32:6 built 12:24 bus 74:14 76:5 busy 54:4,7,22 54:22,24 buy 10:10 byte 10:7 bytes 10:2
			c
			c 1:10 2:4 3:1 4:3,14 5:4,8 61:25 62:14 63:3,12,23 64:3,13,22,23 64:25 77:6 78:2 79:1,6,14 80:9 81:5 cache 10:20 12:1,2,6,8,11 15:13,14,21,25 16:8,11,12,16 16:23 17:3,5 caches 9:24 11:5 12:2,15 16:24

calculate 57:12 57:19 58:8 59:6,17 calculated 55:23 calculates 58:15 calculating 58:11,25 59:9 calculation 59:10 california 3:11 call 11:23 12:18,23 13:1 13:4 56:24 called 10:20,24 17:23 46:14 calling 16:24 candidates 73:10 capabilities 67:18 capability 67:1 capacity 16:16 17:1,7 caption 80:12 career 15:15 31:12 case 60:16 65:18 cases 6:12 14:11 25:21 28:14 category 52:6	cause 2:7 73:25 80:13 causes 55:1 ccr 1:25 2:9 80:11,22 certain 9:15 14:11 18:18,19 27:17 28:4 55:11 certainly 6:20 32:13,21 certification 4:8 80:8 certified 5:10 certify 80:11,16 cetera 10:6,8 40:4,4 64:10 64:12 challenged 17:21 18:10 chance 74:7,7 change 12:18 20:19 52:19 78:5 changeable 20:14 changed 25:25 changes 4:7 20:14,16 78:1 79:3 81:10 changing 20:16 21:10 characteristics 9:23 15:8	characterizing 50:9 68:17 charles 5:21 cheryl 3:4 cheryl.milevs... 3:7 chip 10:15,19 11:10,20 14:17 14:19,25 15:10 38:3 39:15 55:10 choice 16:19 chunks 10:25 circuit 32:9,18 70:16 cite 30:2,4 cited 31:2 cites 30:2 31:6 claim 18:6,8,10 18:13 21:3 24:13,17 35:16 35:19 36:13 claimed 60:4 claims 18:10,23 24:12 clarity 4:23 clean 53:23 clearer 19:7 clock 64:4 clocking 65:1 clocks 62:13,15 65:2 cold 14:10 collection 19:16,22	column 19:5,8 22:24 23:3,4,9 23:15,19,21 24:6 26:4 36:8 61:14,15 62:9 62:23 64:25 65:5 columns 22:18 62:4 come 21:19 33:15 comes 15:19 26:15 coming 13:10 38:5 40:10 41:6 commensurat... 74:20 commission 79:24 common 37:17 38:13,21 39:11 39:18,20 40:19 41:2,4 43:6 complete 21:17 71:18 completed 81:16 component 9:2 48:3,4,5,21 components 9:5 48:4 54:5 56:9 comprised 69:6
--	--	--	--

comprises 60:21 computation 9:3 15:5,6 49:7 51:7,15 52:10 52:16 64:10 65:3 computational 50:21,23 51:1 51:8,14,17,25 52:7,9,11,14 65:7,13,17 66:15 67:4,9 67:11,22 68:2 68:11 69:4,11 69:17 70:8 71:10 compute 60:18 computed 24:9 26:6 computer 6:16 32:12,18 47:10 47:12 80:14 computes 52:18 computing 14:7 47:15 56:14 60:19 con 58:15 concept 15:18 conceptually 39:5 concerned 21:4 concerning 80:13	concisely 26:16 concluded 77:8 concludes 77:5 configured 60:21 confirm 8:10 25:15 29:12 connect 60:14 connection 5:18 conroy 4:17 46:5,14,17 47:3,24 48:23 49:1,2,3,5 55:5 56:7,17,21 58:8,15,20 76:12,16,18 conroy's 58:10 consider 16:23 consideration 79:16 constraint 39:3 constraints 37:24,25 38:11 39:2 42:13,14 consulting 33:22,24 34:2 consumed 20:22 21:11 62:24 63:8 consumption 20:11 contain 43:1 contemplated 20:7	contemplates 20:10 contemplating 40:12 contents 30:16 context 9:7 14:2 16:7 36:23 38:1,19 42:20 47:24 54:7 71:23 continue 23:4 39:22 75:10 continues 40:21 43:13 66:18 70:20 continuing 22:17,24 contrived 74:4 control 56:10 62:1 controllable 36:3 controlled 27:15 controller 40:1 controlling 21:14 23:13 controversy 80:13 convention 63:7 copies 81:14 copy 28:15,20 31:19	core 8:25 9:1 14:25 15:7 32:17 38:16 40:22 41:18,24 42:5 43:3,7,10 43:17,19,21,25 44:3,5 45:1,1 45:11 47:12,13 48:8,8 62:2,5 63:4,4,9,10,10 63:11,11,12,13 63:17,19,23 64:25 73:25 74:3 cores 14:24 15:4,5,7 33:5 38:2 41:19,22 42:4 43:16 44:10 51:11,12 51:13,24 66:25 67:3 70:15,22 72:15,21,23 73:3,7,19 correct 12:6,10 16:13 18:8,9 18:11,12 23:25 24:5,25 26:23 30:22,23 35:12 36:12,17 37:12 39:15 41:3,16 41:24 42:25 43:4,25 44:18 44:23 45:1,23 46:12,13,25 48:10 49:11,13
---	---	--	--

50:12 51:9 53:5,6,9,22,25 54:1 55:10,16 56:21,25 58:17 59:11 60:1,5 60:12,24 61:4 62:17 63:5,14 63:15,25 64:15 64:22 65:17,25 66:8,11,22 67:4,10,24 68:1,13,16 69:16,17 70:10 71:11 73:21 74:18,25 75:11 75:18 79:3 correctly 6:19 19:24 42:17 68:17,22 correspond 62:17 76:25 corresponding 48:21 counsel 80:16 80:18 81:14 count 74:17,19 75:10,11,21 76:3,7 counter 54:14 55:3 county 79:11 couple 25:25 course 73:14 court 5:6,10 7:3,11,25	28:23 29:2 courts 6:7,8 cpu 11:15,20 12:5 13:16 41:19 47:11 48:21 50:24 51:3,9,10,15,17 51:21 52:16 65:14,16,19,22 65:24 66:4,7 66:11,13,21 67:7,12,15 68:3,6,24 69:9 69:15,24 70:9 70:15,22 71:11 71:15,21,25 create 16:12 creates 73:15 creating 30:25 cross 32:15 cs 81:15 csr 1:25 2:9 80:11,22,22 current 57:5,7 57:12,19,24 58:1,4,8,17,23 59:4 70:23 cv 29:17 31:19 31:22	damon 3:3 5:17 damon.lewis 3:6 data 12:1,2,4 13:10 14:8,11 14:12 15:21 17:3,5 33:6 56:9 date 5:4 58:14 80:23 day 79:14,19 80:19 days 9:22 10:12 10:22 11:6 81:16 deallocation 13:22 declaration 4:14 17:14,19 18:2 24:22 27:9,14 28:16 28:21 29:9 30:20 31:3,5 31:20 34:18 35:9,12 45:4 46:24 47:2 49:3,10,23 50:10,12 53:3 53:16 56:18 70:1 decreasing 72:25 73:16 deep 47:6 61:25 62:14 63:3,12 63:23,24 64:1	64:3,8,13,22,23 64:25 deepcstate 63:13 define 19:1 defined 19:9 definition 20:1 51:21 definitions 20:2 31:7 delta 57:24 58:4,7,13,21,22 58:22 59:1,1,1 59:2,17,18 60:4,5,11,18 deltas 59:9,11 60:1 depending 9:14 10:13 11:25 15:11 28:1,5 54:16 60:20 depends 9:13 16:25 17:2 deponent 81:13 deposed 6:8 deposing 81:13 deposition 1:9 2:4 4:12 5:4,25 6:3,24 8:20,23 46:6 77:6,8 79:2 80:9,15 80:17 depositions 6:18
	d		
	d 4:1 d.c. 3:6 daedalus 1:6 80:6 81:4		

describe 24:7 52:25 59:14 66:5 described 66:23 describes 36:7 39:18 67:14 describing 19:13,14 39:18 41:19 44:17,25 61:17 72:21 73:23 description 4:11 19:13 22:1,8 56:6 76:21 design 6:14,15 6:17 9:3,13 11:18 16:18 32:9,19 33:10 34:5 70:17 designations 56:24 designed 11:25 15:23 34:5 designing 31:16 33:9 designs 12:14 detailed 21:25 22:7 determination 65:23 68:25 71:21 72:1 determinations 55:20,21	determine 27:6 determined 23:11,12 48:19 49:7 58:2 determines 66:21 determining 54:17 60:10,14 device 14:20 18:17 21:8 55:12 65:3 die 10:22 11:4 11:15 38:7 dies 32:14,15 difference 29:16,20 different 9:5,23 10:16 14:1 15:2,2,3,4,4,7 16:1,16 23:24 23:24 24:4 25:1,3,4,6,7,17 25:20,23 26:5 26:18,24 27:8 27:12,20,23 28:4,7 33:17 33:18,21,23 42:6 44:11 47:10,12,13,14 48:4,6,8 51:5 52:13,13,14 61:18 62:2 71:6 76:23,24 76:25 77:1,1	differently 12:25 digital 9:9 13:2 15:24 32:8 dilemma 75:25 direct 4:24 disclose 71:7 discloses 72:15 disclosing 41:2 43:15 48:24 disclosure 69:14,21 71:22 discrete 40:3 discuss 17:14 17:18 21:23 22:5,12 34:18 46:5 53:2 discussed 44:13 44:18 45:5 66:2 discusses 21:6 37:16 54:4 72:17 discussing 21:10 26:4 56:21 disk 14:13 distributing 51:24 distribution 49:4 district 6:8 document 8:19 17:9,17,25 23:7 29:7,12	29:15,17,22,25 30:4,17,21,25 31:4,23 34:12 34:15,20,23 39:23 45:25 46:11,15 47:6 47:22 49:20,24 50:2,13,22 52:20,24,25 53:4,7 54:10 57:16 62:19 70:11 71:12 72:19 73:5 documents 30:24 31:2 doing 5:16 17:2 20:12 38:12,13 40:19 49:6 51:15 72:24 domain 18:14 18:20,25 19:10 19:14,15,21 20:20 24:3,8,8 24:14,18,18 25:1,2,5,10,16 25:18 26:24,25 27:1,20,21 28:7,8 36:1,2 36:15 37:15 domains 18:16 19:18 20:9,14 20:15,22 21:7 21:11,14,15,23 22:5,13,23 23:13,17,24
---	--	--	---

24:11,19,20,23 25:10 26:5 28:12 35:25 36:13,19,25 37:1,11 39:7 double 16:10 16:12,15 17:4 doubled 17:7 doubling 17:1 dozens 11:7 dr 5:14 8:14 17:8 18:5 29:7 31:3,5 34:15 35:5,10 40:13 45:21 46:21 49:22 50:8,16 52:23 53:2,14 72:10 76:12 drafted 30:5,7 drafts 30:6,7 dram 9:9,20 12:24 drive 5:22 drivers 20:21 20:25 21:4 dropping 30:14 duly 2:6 5:9 80:13 dynamic 20:12 20:13 62:24 dynamically 12:3 35:23 36:6 56:8	e e 3:1,1 4:1,10 e.g. 70:15 earlier 19:14 22:17 55:3 early 22:17 effectively 43:21 52:11 59:15 effects 38:17 40:23 41:23 42:5 43:8,22 44:6,7 either 28:14 32:20 63:24 64:6 65:16 66:7,10 69:11 electric 32:3 embedded 10:24 11:4 embodiment 48:2 56:10 employed 80:16,18 employee 80:17 energy 37:17 38:14,22 39:11 39:19,19 40:20 41:2,5,5 43:6 enforce 48:21 engagement 31:14,17 33:14 enters 74:25 entire 38:7 39:20,20	entirely 12:21 31:1 equals 58:25 60:1,16 equation 23:12 equations 24:9 24:21 errata 81:11,13 81:16 esq 3:3,4,9 esquire 81:1 established 39:14 estimated 70:23 et 10:5,8 40:4,4 64:10,12 exactly 18:25 examination 4:3 5:12 76:10 80:14 examined 5:10 examines 23:7 39:23 47:22 50:22 54:10 57:16 62:19 70:11 71:12 72:19 73:5 example 12:25 18:18 22:25 24:8 37:21 38:15 40:11,22 43:2,7 47:11 48:18 51:3,6 52:17 54:12	56:8 58:19,24 59:14 73:9 74:4 examples 12:1 36:15 48:9 55:19 61:20 exceeded 63:18 except 79:3 excuse 11:2 executed 79:16 executing 65:14 exhibit 4:12,13 4:14,15,17,18 4:20 8:15,17 17:10 28:17,24 28:25 29:3,8 34:13 46:2 49:12,16 50:2 52:21 exhibits 4:11 expect 11:3 expected 75:6 75:15,24 experience 31:11,13,16 experiences 31:24 expert 6:18 33:25 44:9 expiration 80:23 expires 79:24 explanation 30:3
		entirely 12:21 31:1 equals 58:25 60:1,16 equation 23:12 equations 24:9 24:21 errata 81:11,13 81:16 esq 3:3,4,9 esquire 81:1 established 39:14 estimated 70:23 et 10:5,8 40:4,4 64:10,12 exactly 18:25 examination 4:3 5:12 76:10 80:14 examined 5:10 examines 23:7 39:23 47:22 50:22 54:10 57:16 62:19 70:11 71:12 72:19 73:5 example 12:25 18:18 22:25 24:8 37:21 38:15 40:11,22 43:2,7 47:11 48:18 51:3,6 52:17 54:12	56:8 58:19,24 59:14 73:9 74:4 examples 12:1 36:15 48:9 55:19 61:20 exceeded 63:18 except 79:3 excuse 11:2 executed 79:16 executing 65:14 exhibit 4:12,13 4:14,15,17,18 4:20 8:15,17 17:10 28:17,24 28:25 29:3,8 34:13 46:2 49:12,16 50:2 52:21 exhibits 4:11 expect 11:3 expected 75:6 75:15,24 experience 31:11,13,16 experiences 31:24 expert 6:18 33:25 44:9 expiration 80:23 expires 79:24 explanation 30:3

explicit 25:12 explore 16:19 expressed 79:16 extent 31:8 external 31:7 extremely 64:8 64:16,19,21	fifth 57:22 74:22 figure 24:10 41:22 42:2,3 42:10,11,16,18 42:21,22,23 47:9 54:12,13 55:25 56:2,8 56:12 60:8 65:20 66:1,23 67:3,5,14 69:6 69:13,20 71:3 71:8,23 72:21 74:1,11 75:9 figures 41:25 47:7 financially 80:18 find 60:2 61:14 fine 54:9 finish 7:7 finished 38:11 finkelstein 4:15 34:17,23,25 35:13 37:2,7 37:14,16,20 38:21,25 39:25 40:2,11 41:1 41:21 finkelstein's 39:6 41:18 firm 80:24 first 5:9 21:14 23:21 24:13,17 24:18,19 30:6	35:20,23,25 36:1,1,2,15,18 36:21 44:16,21 51:11 55:25 56:2 70:8 71:8 71:13,23 fit 10:22 five 22:25 30:11 40:14 60:16,19,22 63:2 66:20 flag 54:22 55:1 flavor 51:4 flavors 33:17 33:21,23 flow 66:23 69:13 flubbing 22:10 focal 33:15 follow 74:11 following 75:22 follows 5:11 foregoing 79:2 79:15 form 11:11,16 12:7,20 13:5 14:5 15:24 16:14 19:11 20:23 27:3 35:2 44:1 46:19 50:7 53:13 57:20 59:12 68:14 formatting 30:2,2 33:6	formula 59:17 formulas 24:21 26:3 27:5 36:8 forth 11:8 31:12 67:22 forward 60:9 forwards 31:22 four 16:8 33:18 61:20 62:4,16 63:18 fourth 35:19 frame 14:8 free 65:20 67:18 freescall 33:8 33:11 frequencies 26:7,8 27:11 47:13 48:8 frequency 18:19 19:17,23 21:5,10,15 22:13,19 23:14 23:16 24:15,20 25:1,5,8,9,16 25:17,21,24 26:10,12,13,13 26:20,24 27:1 27:20,23,23 28:8,12 48:11 51:25 52:12,19 62:10,11 68:25 70:15,22 front 7:24
f			
f 62:6,7,13,15 62:16 fact 24:3 facts 80:11 fahmi 3:9 4:6 11:11,16 12:20 14:5 16:14 19:2,11 20:23 27:3 35:2 44:1 46:19 50:7 53:13 57:20 59:12 68:14 76:11 77:3 81:1 fails 81:18 fair 9:17 12:17 15:16 21:2,9 38:6 39:17 47:1 71:20 73:3 false 27:19,21 fast 9:16 feasible 16:19 feel 65:20 fields 13:12			

fulbright 32:23 full 5:19 fully 38:18 43:14 47:14 functional 47:14 48:5 functionality 64:10 functions 64:4 further 51:23 77:1 80:16,17 future 60:19	given 13:15 27:7 38:19 60:13 61:6 70:25 79:18 80:15,19 gives 48:9 giving 6:25 41:11 43:21 54:12 global 37:25 38:11 39:3 42:13 go 6:23 9:5 13:18 16:17,18 45:14 50:20 55:5 57:10 61:11 65:4 72:3,13 74:9 75:3,5 76:6 goal 20:5 goals 20:6 goes 19:17 55:18 going 10:10 11:6 12:13 14:24 17:16 21:12,22,25 22:3,4,7,8,18 28:23 31:23,25 34:11 35:15 37:2 39:22 41:25 43:10 45:15 49:12 50:17,21 52:20 56:12,15,17	57:9 58:12 59:6,9 60:23 64:10 66:1 71:15 72:4 75:25 77:7 good 5:14,15 gotten 11:5 gpu 50:24 51:22 52:17 65:14,16,19,22 65:24 66:4,8 66:11,13,21 67:8,13,16 68:4,6,24 69:10,15,24 70:9 71:11,15 71:21,25 graphic 38:16 graphical 51:6 graphics 40:23 41:11,12,23,24 42:2,2,4,5 43:3 43:8,17,20,22 43:22,22,25 44:5,6,10 45:1 45:11 51:4 greater 52:1 60:23 73:13 ground 6:23 group 3:10 gt 24:8 guess 6:21 9:7 9:13 10:18 14:8 16:17,25 19:15 22:18	23:2,2,9 25:19 25:23 26:4,13 26:14,16 32:10 32:23 33:4,13 35:3 36:14 37:21 39:24 41:10 45:2 54:15 57:21 61:5 74:1
g	g		h
gated 63:24 64:7 general 6:10 14:3 41:10 generally 6:13 6:16 9:3,17 10:4 14:4,7 24:1 37:13 38:9 57:2 generic 14:6 generically 14:7 getting 17:15 23:9 24:12 37:14 54:19 64:2,18 70:6 gfx 38:17,17 43:4,8,11,23 gigabytes 9:22 10:5 give 7:22 28:16			h 4:10 74:21 75:21 half 44:16 halfway 43:5 65:9 68:8 70:21 hand 34:11 49:12 52:20 79:18 80:19 handed 8:14 17:8 29:8,17 30:22 34:16 45:25 49:19 handing 28:25 handle 43:23 handling 13:21 hands 35:15 53:8 56:16 happened 44:17 happening 65:3 happens 61:5 hard 14:13 hardware 6:14 9:5 19:16,22

32:6 33:3,9 harrington 3:14 head 7:12 headroom 65:6 65:12 66:22 67:11 68:2,10 69:3,11,16,23 70:7,19,24 71:9 heard 14:19 20:2 36:21 hearing 68:22 helps 19:4 hereto 80:12,18 heterogenous 32:25 52:2,3 high 33:6 72:16 higher 74:6,7 highest 73:4,20 history 15:3 hogan 3:5 hoganlovells.... 3:6,7 home 5:22 horst 18:5 35:5 46:21 49:22 50:8 53:2,14 horst's 31:3,5 35:10 50:16 huh 11:22 23:10 59:5,21 73:11	i i.e. 70:14 ia 24:8 ideas 23:23 identification 8:17 17:10 29:3 34:13 46:2 49:16 52:21 66:5 67:12,15 68:3 68:5 69:9 identified 73:2 identifies 69:1 identify 66:24 67:21 69:15 70:9 identifying 66:3,12 67:7 68:23 69:24 71:10,24 72:21 73:7 idle 51:14,16 54:18 55:3,3 61:25 62:13 63:3,11,12 ieee 33:20 illnesses 8:5 illustrates 56:8 implementati... 16:11 implementati... 44:15 45:7 implemented 15:9,16	imply 64:20 important 7:12 improve 70:24 included 52:6 includes 48:3 incorporated 39:8 59:10 increase 74:3,5 74:19,20 75:20 76:3,6 increased 74:17 75:11 increasing 73:24 74:4 increment 75:9 75:18 independent 24:14,19 27:2 independently 24:24 25:10,22 26:6,17 27:5 28:2 indicating 54:23 individual 37:24 39:2 42:13 industry 20:3 31:12 information 9:10 12:24 13:2 24:10 62:9 71:17 ingestion 33:6	insinuate 44:9 instance 2:5 15:13 24:13 27:7 48:1 62:12 70:4 instances 27:22 instructions 9:4,4 12:4 instrument 79:15 instruments 33:1 integrated 70:16 intel 32:20 51:4 intensive 38:17 41:12 43:4,8 43:20,23 44:7 interested 80:18 intermediary 37:10 intermediate 68:7 internal 64:9 interval 55:23 57:12,19 58:7 58:9,12,16 59:16 intervals 58:17 61:6 invention 56:11 involved 33:3 involves 69:7
---	--	---	---

ipr 6:8 17:21 ipr2023-01335 1:2 80:2 it'll 75:17,18 itc 6:8 iterates 61:8 iterative 59:8 60:11 61:3,10 ith 74:20,21,22 75:6,14,21,23 76:7	kind 11:18 13:20 14:13 16:1 25:14 30:15 31:22 38:4 51:16 52:16 60:2 64:9 kinds 11:3 14:20 know 6:7 10:11 11:7,18 15:6 30:7,12 31:11 36:20 39:4 41:8,9 45:3 47:20 51:21 72:21 known 79:14	legal 30:4,4 80:23 81:23 lens 35:6 level 36:4 70:14 75:7,15,24 levels 47:15 48:6 77:1 lewis 3:3 4:5 5:13,17 8:18 11:12,21 13:3 14:14 16:21 17:11 19:3,19 21:1 27:10 28:25 29:5,6 34:14 35:7 44:8 45:14,20 46:3,23 49:13 49:15,18 50:11 52:22 53:18 58:3 59:20 68:19 72:3,9 76:9,13,15 77:4 likely 73:25 limit 67:21 limitation 35:19 limited 65:12 68:9 limits 9:15 69:2 line 19:8,15 23:9,11,22 37:21 38:25 39:10 42:8 57:22 58:19	78:5 lines 23:4 list 34:9 73:9 73:14,16,16,21 74:6 literature 20:3 31:7 little 10:12 14:22 llc 1:3,6 80:3,6 81:4,4 llp 3:5 local 10:15,20 locally 17:4 logic 19:16,22 32:14 35:20,23 long 12:13 look 18:6,13 24:21 29:15 35:16,20 37:4 40:13 47:19 55:7,25 56:5 56:16,18 57:14 58:25 looked 28:20 58:11 66:15 looking 21:19 33:12 39:24 41:20 42:3 58:13,16,22 59:15 61:9 71:7,13,14,16 looks 8:20 19:12 42:7 43:18 49:21
j	30:7,12 31:11 36:20 39:4 41:8,9 45:3 47:20 51:21 72:21 known 79:14		
j 80:11 jaworski 32:23 job 1:22 9:18 jose 3:11 joss 3:14 judge 7:24 jump 48:15 jumped 40:14 jumping 49:2 jury 7:24	l l1 10:21 11:8 12:14 17:3,5 l2 10:21 11:8 language 21:3 43:1 60:3 languages 33:10 laptops 9:21 large 47:6 largely 18:4 31:1 larger 11:8 16:12,23 law 3:10 7:25 lecturing 33:14 left 61:15 73:20		
k			
kari 1:25 2:8 80:11,22 keep 22:10 25:24 38:11 55:14 74:4 keeps 59:19 kilobytes 10:2 10:5,11,12 11:7,23 12:12 12:15,15			

51:2 54:11,25 58:18,20 60:7 61:7 62:8,18 62:20 63:6,18 63:21 64:6 65:18 69:12,18 72:20,23,25 73:6,15,22 75:8 76:4 loop 74:25 75:15,25 looping 75:10 lose 56:16 lot 6:20 14:1 15:1,25 33:20 lovells 3:5 low 62:14 64:8 64:16,19,21 73:7 lower 74:6	management 37:23 39:1,6 40:12 42:12 54:20 managing 20:8 24:1 manner 20:12 manually 11:1 map 13:9,16 mapping 25:12 25:14 40:3 march 31:22 margin 73:13 marked 8:15 8:17 17:9,10 29:3,8 34:13 45:25 46:2 49:16 52:21 76:14 marks 4:23 materials 29:13 mathematical 56:24 matter 5:18 8:21 31:14,17 matters 80:13 mean 11:17 14:21 19:16,21 20:24 25:7 28:3 36:5 62:7 meaning 13:24 means 7:19 27:2 measured 55:13,18	measurements 55:16,20 mechanism 62:1 medications 8:5 meg 12:9 megabyte 10:8 12:9 megabytes 9:24 10:1,2,5 11:6 memories 10:3 10:9,25 15:9 memory 9:6,12 9:14,17 10:7 10:10,10,13,15 11:3,9,14,19,24 12:6,7,14,18 13:1,5,9,14,16 13:18,21,21,22 13:23 14:19,20 14:21 15:12,13 15:19,19 17:1 49:4 mention 22:20 67:3 70:18 mentioned 5:10 34:8,10 42:20 48:2 55:2 59:19 66:3 mentioning 22:22 48:13 mentions 21:13 45:6 67:7,8	mercedes 1:3 5:18 80:3 81:4 metal 38:5 meter 39:4 method 2:10 33:2 methods 70:13 michael 1:10 2:4 4:3,14 5:4 5:8,21 77:6 78:2 79:1,6,14 80:9 81:5 microcontroll... 48:19 49:6 microelectro... 32:9 microprocessor 11:2 microprocess... 13:8 midatlantic 81:15 middle 40:18 milevsky 3:4 mind 31:21 mine 30:5 minor 30:1 minus 58:22,22 59:1,1,1,2,18 minute 39:22 71:3 minutes 39:14 mis 68:20 mischaracteri... 68:21
m			
m 3:3 machine 10:10 13:1 made 18:5 65:6 65:12 68:10 main 48:21 maintain 64:9 make 9:16 19:6 22:14 37:10 41:25 42:16 57:11,18,23 makes 22:20 manage 11:1 18:22,23 20:10			

misspoke 22:2 mistake 42:21 mix 6:14 mo 55:12 modicum 64:14 modification 22:23 moment 28:6 55:4 monitoring 55:9 morning 5:14 motherboard 38:8 motor 32:3 mount 5:22 move 75:20 moving 45:11 57:9 multi 32:10 52:2 multicore 9:2 31:13,16,25 32:9,10,10,19 32:20,21 33:1 33:2,3,18 34:1 34:5,6 70:15 multiple 15:5 15:23 16:3 19:18 32:25 33:5 37:22 42:9,24 44:14 44:19,24 45:6 60:4	multiprocessor 32:5,13,21	nth 74:21 number 16:12 20:6 41:5 46:7 46:8 47:10 60:12 61:7 numbered 2:7 numbers 10:4 60:21 numerical 25:13 nuss 61:19 62:18 nussbaum 4:18 49:21 50:2,5 50:13,18 51:2 51:8,18 52:8 61:11,20 62:20 63:7 65:4,23 67:14 68:18,23 69:1,12,14,21 70:1,7,12 71:4 71:7,22 72:12 74:2 nussbaum's 52:6 69:19 nw 3:5	46:19 50:7 53:13 57:20 59:12 68:14 occur 68:7 occurs 68:25 offer 53:16 offered 53:19 office 1:1 79:18 80:1,19 official 28:17 offsite 14:9 okay 5:16 6:7 6:12,23 7:1,5,6 7:9,10,14,15 8:14 9:6 10:15 12:8 17:6,15 17:20 18:6,7 18:13,15 20:4 20:21 21:22 22:16 23:6,8 23:19 24:12,25 26:22 28:11,15 28:17,18 29:20 29:22 30:7,16 30:24 31:10,13 32:2,3 34:4,11 34:19 35:15,18 36:5,17 37:2,3 37:16 38:10 41:16,23 42:3 42:23 44:16 45:13,25 46:11 46:24 47:8,19 47:22,23 48:10 48:15,18 49:19
	n	o	
	n 3:1,10 4:1 58:20,25 59:11 60:1,15,23,25 name 5:17,19 79:15 named 80:12 naming 63:7 near 23:19 65:5 necessarily 4:24 28:3,8 71:2 need 37:24 39:1 39:1 42:12 neither 80:16 network 54:14 nod 7:11 non 48:3 nonexpert 34:2 nonoperational 64:3 normal 54:20 normally 54:23 notary 79:22 note 4:23 56:23 70:12 81:10 noted 79:4 notice 4:12 8:20,23 noticed 70:18 noting 24:13 notion 52:10	o'clock 45:16 oath 7:17 30:17 79:14 objection 11:11 11:16 12:20 14:5 16:14 19:2,11 20:23 27:3 35:2 44:1	

49:24 50:12,17 50:19,22 51:20 53:4,23 54:3 55:6,8,22 56:15,20 57:17 61:11,13,16 62:4 64:11,20 65:4,9,20 66:17,19 70:3 71:4,20 72:2 72:14 73:19 74:9,10,12 75:5,22,24 76:8,20 ones 34:8,8 73:20,21 opened 28:15 operate 24:19 25:10 27:5,6 28:2 operated 24:14 24:24 operates 19:22 operating 32:6 48:6 70:22 operation 54:20 operational 62:5,21 opinion 14:23 53:16,19 opinions 18:3,8 30:5 35:13 47:2 50:13 53:24	opportunistic... 70:14 order 70:24 72:25 73:17 ordinary 13:4 16:22 organization 32:14 os 61:21 oscillator 62:13 outside 69:19 69:23 overall 9:2 18:16,17,21 21:8 24:2 36:10 42:11 52:1 overarching 20:5 overlap 59:9 60:20,24 61:1 owner 1:7 80:7 owner's 29:10	p4 61:21 package 18:17 18:22 22:25 24:2,7 36:11 36:24 37:17,25 38:1,6,11,14,14 38:22 39:3,8,8 39:11,15,16,18 39:20,21 40:10 40:20 41:2,4 41:14 42:14 43:6 packaged 38:3 pad 10:25 page 4:3,11 28:19,22 31:22 31:24 32:4 33:16 37:5 47:6 56:17 61:15,15 65:5 72:13 78:5 pages 1:23 pair 48:11 paragraph 27:14 28:22 37:4,20 39:25 40:14,16,18 41:3 42:4,8,19 44:12,17,25 47:5 48:2,14 48:15 49:3,5,9 50:17 51:23 54:2,8,11,19 55:7,9 56:7,19 56:23 57:6,9	57:14,22,23 58:6,10,13 61:19 62:22 65:4,21 66:6 70:21 71:8 72:13 73:22 74:1 76:18,21 paragraphs 40:14 47:19 parallel 33:5 part 16:6 44:21 51:11 52:12 69:13 76:5 parties 80:17 80:18 pass 56:3 passed 56:3 past 10:22 12:2 60:12 patent 1:1,1,4,7 4:13,15,17,18 4:20 17:13,14 17:18,20,24 18:3,4,15,22 19:4,17,20 20:5,7,9,22 21:3,6,9,23 22:5,12 23:23 25:20 26:7 29:10,11 31:2 35:1,9,16 36:7 36:19,22 46:7 46:9,18 47:25 47:25 50:6 53:1,12 71:4
	p p 3:1,1 40:5,7 62:16 63:3,8 63:16,19 73:15 p.m. 1:12 2:8 77:8 p0 40:4 61:20 61:24 63:9 p1 63:10 p2 63:10 p3 61:24 63:11		

80:1,1,4,7 patent's 21:13 22:19 patentee 19:9 patents 6:21 pc 3:10 peculiar 14:18 penalties 30:18 penalty 7:20 people 14:9,12 perfect 38:15 performance 20:11 21:8 38:17 40:23 41:12,23 43:8 44:6 47:15,16 48:6 51:12 61:18,24 62:3 62:5 65:11 66:20 67:1,1 67:18,21 68:9 70:14,24 71:16 72:22 73:1 74:20 75:7,15 75:24 76:25 performed 36:9 performing 64:4 75:23 performs 9:3 52:16 period 58:2 59:3,7 periodic 55:15 periodically 55:13,18	periods 15:3 peripheral 32:6 perjury 7:20 30:18 person 13:4 16:22 79:15 80:13 personally 79:14 pertaining 6:15 pertinent 9:4 petition 57:24 petitioner 1:4 2:6 3:2 35:4 46:20 50:9 53:15 77:4 80:4 petitioner's 31:4 ph.d. 1:10 2:5 4:3,14 5:4,8 77:6 78:2 79:1 79:6,14 80:9 phd 81:5 phrase 14:19 15:18 16:3 36:22 41:18 phrasing 14:18 68:16 pictures 38:4 piece 10:18 piecemeal 30:15 pieces 51:7	place 19:5 places 55:11 plane 37:15,25 39:2 42:13 44:15 45:8 planes 37:8,11 37:17,22 40:2 40:12 42:6,9 42:20,24 44:11 44:14,19,24 45:6 please 5:6,19 7:7 76:13,19 plug 39:5 plus 38:7 57:24 58:4,7,13,21 59:17 60:18 point 12:22 19:5,17,23 22:21 27:17 28:4 31:23 33:15 49:8 57:21 60:13 62:6,24 63:9 63:17 66:14 70:3,17 76:2 pointing 42:15 42:21 points 15:14 62:21 policy 20:8 23:1 36:2,3 polymathic 33:22,24	portion 23:18 39:13 41:8,9 69:8 portions 18:17 21:16 58:19 possible 38:13 40:19 43:5 possibly 64:21 potential 73:1 potentially 69:2 power 18:19,24 20:8,11,18,22 21:7,11 22:20 22:25 23:18,25 24:4 25:19 26:1,11,11 35:24 36:6,10 36:12,17,22,23 37:7,11,16,17 37:22,22,23,25 38:14,14,16,22 39:1,2,4,6,11 39:19 40:2,3 40:10,12,20,22 41:2,5,5,18,19 42:9,9,12,13,20 42:24,24 43:2 43:6,7,10,16,19 43:21,24 44:3 44:4,5,14,15,19 44:24 45:6,8 45:10,10 47:15 48:6 49:3 51:11,14,24
---	---	--	--

54:20 55:9,11 55:12,12,17,20 55:23 56:10 58:1,20,25 60:10 62:1,17 62:23 63:4,4,8 63:17,19,24 64:7,21,22,25 65:2,6,12 66:7 66:10,14,22 67:10 68:1,10 69:11,16,22 70:7,23 71:9 71:22 77:2 power's 62:15 64:5 preceding 44:18 precluding 27:16 28:14 precondition 75:25 predetermined 73:8 prepared 29:22 preparing 29:24 present 37:23 42:10 presumably 54:23 pretty 47:5 previous 44:25 58:17	primary 20:21 20:25 21:4 prime 1:6 80:6 81:4 prior 31:3 34:25 35:8 46:17 50:5,9 53:12,15,20 54:8 58:14,14 60:16,19 61:7 prioritized 73:16 prioritizing 72:23 probably 9:21 12:14 14:21 20:6 30:1,10 30:10 31:4 33:14,18 42:1 proceeding 17:21 proceedings 5:1 6:9 process 49:8 59:8 60:10 61:3,6 66:5,18 66:23 68:17 69:5,23 71:8 74:25 75:9 processing 33:6 33:19 51:4,6 56:9 processor 6:17 9:2 17:4 18:16 32:25 34:5,6	35:24 36:6,10 36:18,24 38:16 38:18,23 39:9 40:22 41:9,10 41:11,18 42:4 43:3,7,10,13,16 43:19,21,22,25 44:3,5,10 45:1 45:11,12 47:11 48:7 51:3 70:16 processors 31:14,17 32:1 34:1 40:7 48:12 70:16 produced 2:5 progressing 60:9 proposed 70:13 proved 79:14 provide 7:13 47:2 69:16,22 70:8 76:21 provided 7:17 7:20 30:17 53:24 65:7,13 66:7,10,22 67:11 68:2,11 69:3 provides 18:3 35:12 50:13 providing 18:8 69:10 71:9 ps 73:13	public 79:22 publication 4:16,17,19,20 46:9 53:1 purpose 5:25 41:10 purposes 79:16 pushing 43:24 put 10:10 11:9 11:15 14:9 39:4 55:4 putting 14:12 14:12 44:5 pwr 63:9,12,13 pwr0 63:10 pwr1 63:10 pwr2 63:11 pwr3 63:11 q question 8:8,12 11:13,20 14:2 16:20 17:16 18:14 19:6 22:2,10,14,15 22:22 26:23 27:18 28:1 50:21 56:1 57:17 67:24 70:5 71:6 questions 6:25 7:7,13 8:3 76:9 77:3 quickly 57:14 quotation 4:23
--	--	---	--

quote 4:24 19:21 58:1 quoting 21:21	receipt 81:17 receive 23:24 24:3 received 8:21 recess 45:17 72:6 recite 19:24 recognize 34:15 recollection 37:13 recollections 6:10 record 5:20 28:19 45:14,15 45:18 72:3,4,7 77:7 80:15 rectangle 38:5 reduced 80:14 reduction 67:1 refer 14:12 17:2,23 30:20 34:22 40:18 42:23 46:14 48:1 50:1 53:7 54:12 56:17 65:20 72:12 reference 34:17 44:13,19,24 45:5 46:5,7,14 48:24 49:21 53:24,24 72:12 76:13 referenced 81:6	references 31:3 referred 10:21 52:23 65:17 referring 16:25 17:24 28:20 29:13 30:21 34:23 41:24 42:1 44:24 46:15 49:9 50:2 51:2,9,10 51:18 53:8 65:18 refers 38:21 39:16 51:8 62:20 65:21 67:4 reflect 4:24 refresh 42:18 regard 36:21 regarding 8:21 regions 10:25 register 13:5,12 13:16,16 48:20 48:25 registers 12:23 13:7,9,14,17,23 registration 80:24 registry 49:8 related 24:22 80:16 relating 56:25 relation 6:21 relative 80:17	remainder 73:18 remark 63:16 remarks 64:18 remember 32:17 remote 1:9 2:4 80:9 remotely 3:2,8 removal 74:7 remove 73:17 removing 73:9 repeat 22:3 reported 1:24 2:9 reporter 5:6,10 7:3,11 28:23 29:2 reporter's 4:8 4:23 80:8 represent 5:17 23:1 required 69:10 requirements 77:2 rereading 54:8 resource 74:20 75:6,14,21,23 76:7 resources 38:18 43:14 respect 33:24 48:12 respective 71:17
---	---	---	---

respondent 3:8 responding 35:10 response 29:10 50:15 rest 44:17 result 68:7 73:19 resultant 64:25 return 75:3,13 75:16 81:13,16 review 30:24 50:20 57:10 81:7 reviewed 48:16 reviewing 47:21 rice 32:18 33:16 right 5:24 12:7 22:3 24:6 25:5 27:24 28:10,13 29:19 37:6 38:9 41:21 42:1 45:2,24 47:24 50:15 53:11 55:17 56:22 57:4,8 59:24 60:7,25 61:2 62:5 63:6 65:5 69:11 72:10 74:16,23 75:8 ring 54:13	risc5 33:12,13 role 33:17,20 34:2,2 roles 34:4 roughly 23:3 39:25 57:21 row 63:4,5 rows 63:2 rules 6:23 run 35:25 47:12 running 70:17 runs 9:3 61:6 s s 3:1 4:10 san 3:11 satisfied 37:24 39:1 42:12 sauce 16:1 saw 29:21 saying 16:17 25:15 27:9,12 27:13,24 28:9 35:5 38:25 41:1,4,6 42:8 43:18 44:2 45:4 52:15 53:15,21 54:24 58:18 63:22 71:1 says 19:20,25 24:17 36:5 39:10 40:19 42:12 43:5 44:20,22 45:7	47:9 48:2,18 50:23 51:23 54:22,25 63:19 63:23 65:6 69:12,22 70:1 70:12 73:16 74:19 scenario 43:19 44:3,6 45:12 52:9 57:3 58:23 59:14 69:18 71:25 72:1 scope 69:19 scratch 10:25 55:24 seal 79:18 80:19 second 18:20 21:14 24:14,18 24:19 33:10 35:25 36:1,2,3 36:15,19 50:20 62:18 secret 16:1 secrets 6:15 section 55:15 sections 30:14 see 13:19 19:9 23:8 37:7,19 38:4 39:12,13 40:24 42:20 47:9,17 48:7 50:23 52:4 54:4,6 56:12	57:13 62:12,25 65:6 67:17 71:2,14 72:15 72:17 74:13,15 seeing 22:21 seem 40:9,11 74:2 seems 48:13 52:8 63:7 64:17 seen 17:17 29:7 34:20 46:11 49:20,24 53:4 selected 65:22 66:21 selectively 51:24 send 13:11 48:20 sense 9:1 13:6 30:14 57:11,18 57:23 sensitive 52:12 52:19 66:25 sensitivities 72:16 sensitivity 52:1 52:18 66:15 68:24,25 71:17 72:17,18 73:1 73:4,7,15,20,24 74:5,5 sensor 13:10 sent 81:14
--	---	---	--

sentence 19:25 38:10,24 39:13 39:18 40:14 41:7,20 44:12 44:16,21 45:3 62:22 73:12 sentences 44:25 separately 27:15 series 56:23 seriousness 7:23 services 33:25 set 16:8 24:24 25:22 27:7 40:3 47:6,12 54:23 60:15 setting 18:21 48:1,6,11,20,22 48:24 49:7 62:17 63:16 76:22 settings 25:8 47:11 48:5 76:16,24,25 77:1 seven 33:2 several 70:13 share 37:17 38:13 39:10 40:19 43:6 shared 38:19 38:22 sharing 36:1,2 36:3 37:22	38:21 41:15 42:9,24 sheet 81:11 shifting 43:2,16 59:15,15,19,25 short 12:3 showing 62:2 shown 54:13 shows 62:13 shutters 60:2 sic 28:6 sign 81:12 signal 48:20 signature 4:7 78:1 79:2 80:21 signed 81:19 silicon 10:19 33:10 similar 19:14 20:2 simple 15:21 simply 16:11 single 17:3 32:17 44:15 45:8 sir 26:9 sitting 51:16 six 54:13,15 size 12:2,17 16:10 17:7 sized 9:18 sizes 10:3 11:3 skill 13:4 16:22	skipping 42:17 sleep 40:8 slice 60:6 slight 29:16 slot 13:19 small 9:19 12:11 smaller 9:24 smallest 11:9 11:14 soc 73:13 software 6:15 11:1 33:9 36:4 61:22 solutions 80:23 81:23 sorry 24:18 25:8 27:14 38:14,16 45:22 55:12 61:15 62:10 65:10 66:9 76:24 sort 14:18 15:17 38:3 40:5 63:6 74:3 sound 68:16,16 sounds 27:25 28:10,13 38:9 40:6 41:21 42:1 45:2 51:18 60:25 source 37:22 42:9,24 space 6:16 9:9 14:23	spare 74:24 75:13 speak 7:4 speaking 6:13 57:2 specific 13:17 13:22 14:2 41:20 68:11 specifically 23:16 specification 19:13,20 specifications 22:21 speed 33:6 split 36:13,18 36:20 sports 32:3 sram 9:9 10:25 12:25 srams 9:22 standards 30:4 standpoint 65:2 start 14:3 50:17 starting 23:22 32:3 starts 12:22 24:7 69:23 stat 63:3 state 2:9 5:19 40:8,8,8 55:2 61:25 63:3,12 63:23 64:3,3
--	--	---	--

64:13,22,23,25 79:12,22 80:11 stated 80:12 statements 46:22 states 1:1 37:21 40:3,5,7 44:12 51:12 56:7 61:19,24 62:3 62:5,14,16 63:3,19 68:8 76:23 80:1 static 62:24 stay 55:3 stenographic 2:10 step 65:23 66:8 66:11 68:25 69:10,12 71:8 71:13,23 72:1 74:13,17,25 steps 66:20 68:7 sticking 42:7 stop 23:2 37:10 storage 13:24 14:3,7,8,9,10 14:12,17,21 15:17,24 16:16 17:7 74:14 76:5 store 12:23 13:2 48:19 49:7	stored 9:10 14:11 48:25 71:16 stores 49:3 storing 49:1 stratus 32:12 street 3:5,10 strike 14:16 19:6 22:9 38:20 41:16 71:5 strips 15:23 16:3 structural 38:7 study 13:12 stuff 33:7 style 51:5 styled 2:7 submitted 29:9 subscribed 79:15 subsequent 30:6 67:16 subset 65:11 66:25 67:21,22 68:9 69:3 summary 26:22 super 33:3 supervision 80:14 support 29:10 31:5 38:7 suppose 11:18 sure 6:19 12:21 20:24 25:11	26:9 41:25 42:16 53:19 54:9 57:15 67:23 swear 5:6 switching 64:12,12 sworn 2:6 5:9 80:13 symbol 57:7 synchronizati... 33:7 synonymous 16:4 system 10:13 16:20 28:5 34:5 37:23 42:11,11 47:10 47:12,14 48:3 52:1,10 56:9 67:19 system's 65:1 systems 10:23 10:24 32:5,6 32:13,24,25 t t 4:10 56:25,25 57:1,5,7,23 58:4,6,12,20,22 58:22,23,23 59:1,1,1,1,2,17 59:18,18 60:18 74:21 75:21 tab 8:15 17:9 34:16 46:1	49:14,19 50:3 52:24 55:5 61:12 74:9 76:14 table 61:14,17 61:19,23 62:4 62:9,23 63:4 64:2,18 tables 49:4 take 7:11 18:13 35:20 74:3 taken 2:6 6:3 45:17 72:6 80:17 talk 9:8 10:9 15:20 18:23 19:18 24:22 25:11 26:4 49:22 58:6,13 60:3 70:20 71:4 talked 36:8 45:3 71:3 talking 9:14 10:5,14,18 15:12 16:7,7 21:13 22:19 24:20 26:1 39:6,19 41:7 41:14 45:9,9 49:6 51:10 52:8 55:9,15 55:17,19 57:3 60:5 61:18,20 61:21 62:10
---	--	--	---

67:2,17 71:2 73:6 74:2 talks 18:15,22 22:24 25:20,21 26:7 37:7 41:21 49:1,22 51:13 52:17 53:2 tapes 14:9 tarek 3:9 81:1 tarek.fahmi 3:11 81:2 tdp 70:25 teaching 15:22 technical 14:23 techniques 44:13,18 45:5 technology 9:8 9:15 32:22 telephone 80:24 tell 8:10,19 17:12 46:4 temporary 49:8 terabyte 10:8 term 12:3 13:24 19:9,21 47:25 76:16 terms 14:7,15 16:5 66:25 72:24 testified 5:11 64:15 testify 80:13	testimony 5:25 6:18 7:16 8:6 33:25 80:15 81:9,17 texas 2:9 5:22 33:1 80:11,22 thank 29:2 49:15,17 53:22 72:11 thanks 22:16 29:4 thermal 22:20 70:17,24 thing 13:20 14:13,17 26:2 27:8 30:15 37:11 51:16 59:23 things 6:14,17 9:11,20,24 10:24 13:12,13 13:21,22 14:9 14:10,10,20 15:8,20 20:11 21:6 22:20 30:1,3 32:7 33:4 38:2,5 39:8 40:4 41:13,21 51:13 61:25 69:2 think 6:6 10:11 12:15,22 16:15 18:2 22:10,22 23:21 26:22 27:15,22,24	28:10,13 31:4 31:21 32:16,22 36:7 37:13 38:24 41:20 49:14 51:10 52:15,17 53:14 55:2 56:3 58:10 59:22 60:7 61:19 62:8 64:2,17 66:2 76:13 third 37:21 38:25 42:8 58:19 thought 9:1 threaded 33:5 52:2 threads 52:3,14 three 6:11 30:13 33:18 threshold 73:8 throttle 47:10 48:1,3,4,4,11 48:19,22,24 49:7 67:21 69:2 76:16,22 76:24,25 throttled 48:3,7 throttles 66:24 throttling 56:9 65:13 67:2,17 67:18 68:7,10 69:7 throughput 52:1	thursday 1:11 5:2 78:3 80:10 time 5:5 11:5 12:13 20:16,20 22:11 27:17 28:4,6 31:22 35:25 36:9,21 45:16,19 56:14 56:25 57:3,5,7 57:12,19,23,24 57:25,25 58:1 58:4,5,7,9,12 58:14,16,17,21 58:23 59:3,4,7 59:9,11,15,16 59:18,25 60:1 60:5,6,9,11,12 60:13,15,17,18 60:19 61:5,6,7 67:25 70:5 72:5,8 77:7 81:18 timeframe 81:8 times 6:5 15:2 27:25 32:24 timing 55:1 tiny 64:14 today 5:14 6:1 7:16 8:3,21,22 9:8 13:9 today's 6:24 together 15:24 70:23 token 54:14,16 54:21 74:14,16
--	--	---	---

74:17,19 75:10 75:11,20,21 76:3,4,5,7 tokens 74:14,24 75:13,17 76:2 76:5 told 59:23 top 23:3,20 31:24 32:4 total 40:10 tpd 73:13 trade 6:15 47:15 trademark 1:1 80:1 trailing 60:15 transcript 81:6 81:19 transcription 80:14 transition 55:2 transitioned 73:14 treat 35:8 treated 46:24 50:10 53:15 trial 1:1 80:1 true 27:19,21 27:24 28:9 79:3 80:12,15 truth 80:13 truthfully 8:3 truthfulness 7:23	try 7:4,8 8:11 22:10 trying 52:10 56:5 turbo 40:4,8 turn 47:5 54:2 76:12,18 turning 31:21 two 16:8,24 21:6 25:20 31:8 36:16,25 37:1 41:13,15 54:14 66:24 type 10:13 15:12 types 9:14,15 10:4,16,17 13:22 15:4,4 33:18 52:14 typically 10:9 12:24 13:14,20 14:19,22 16:23 76:23,24	70:24 79:14,18 80:14,19 understand 5:24 7:16,19 7:22 8:1,9,10 8:11,22 15:9 17:20,24 22:15 30:16,21 34:22 34:25 41:17 46:15,17 50:1 50:5 53:8,11 understanding 8:24 17:22 27:25 35:4 50:8 understood 26:9 53:10 uniform 60:5,6 unit 51:1,4,6,8 51:17 52:16 54:21 60:5,11 65:8,17 69:11 71:10 unit's 54:17,24 united 1:1 80:1 units 10:2 50:21,23 51:14 51:25 52:7,9 52:11,14 54:13 54:15,17,21 65:13 66:15 67:4,9,11,22 68:2,12 69:4 69:17 70:8	university 33:16 unused 38:16 40:22 41:8,8 43:7,19,20 44:3,4 45:10 45:10 update 13:19 updated 12:3 23:17 updating 20:10 usa 1:3 5:18 80:3 81:4 usage 13:13 47:15 54:23 55:10,12,13,18 56:10 58:20 use 12:4,4 16:1 28:17 33:9 35:15 38:15 40:21 41:18 43:7 56:15 61:9 63:7 used 4:23 10:1 12:25 13:7,9 14:22 16:3,5 19:15,21 20:2 23:1 26:14,21 27:6 32:9 36:20 41:19 54:16 62:2 66:24 67:19 71:21 81:19 useful 11:19
	u		
	u.s. 1:4 4:13 17:13 80:4 uh 7:12,12 11:22 23:10 59:5,21 73:11 um 7:12 unable 8:2 under 7:17,20 8:15 30:17,17 34:16 47:12 52:24 54:19		

user 36:4 uses 43:2 using 12:25 24:9 32:13 33:2 37:14 58:24 59:9,17 59:18 60:15 usually 10:11 ut 33:14 utilize 44:15 45:8 61:22 utilized 38:18 43:14	veritext.com 81:15 versus 13:1,23 15:6 37:15 51:21 vicarious 32:16 video 5:5 videographer 3:13 5:3 45:15 45:18 72:4,7 77:5 videotaped 1:9 2:4 80:9 view 44:9 visions 32:16 vol 26:20 voltage 18:18 19:17,23 21:5 21:10,23 22:5 22:13,23 23:14 23:17 24:14,20 25:1,4,7,8,9,16 25:17,22,25 26:10,12,14,24 26:25 27:20,23 28:7,12 48:11 62:11,14 63:24 64:1,8,14,16,19 64:24 voltages 26:8 26:20 27:11 47:13 48:8	w wall 39:5 40:10 41:6 want 13:10 15:1,5 16:15 16:18 29:5 42:16 47:19 55:25 56:18 61:8,14 74:11 wanted 11:19 16:10 61:9 wanting 25:15 washington 3:6 way 14:11 16:8 16:8 21:2 27:19 38:20 39:4 60:2 67:14 68:15 70:6 ways 13:7 16:1 16:16 18:22,23 we've 59:4 60:1 welcome 45:21 72:10 window 56:13 57:25 58:21 59:16,18,19,25 60:15,18 61:1 windows 60:12 60:16,20,22 61:7 winner 58:21 witness 2:5 5:7 11:17 12:21 14:6 16:15	19:12 20:24 23:7 27:4 29:4 35:3 39:23 44:2 46:20 47:22 49:14,17 50:8,22 53:14 54:10 57:16,21 59:13 62:19 68:15 70:11 71:12 72:19 73:5 80:15 81:8,10,12,18 word 10:1 14:21,23 16:5 19:1 36:20 37:15 61:9 words 20:4 30:5 41:3 work 15:6,22 33:25 48:8 55:20,20 worked 15:14 31:25 working 32:24 workload 38:17 41:12 43:4,9,20,23 44:7 workloads 51:6 52:2,2,13 works 15:25 write 13:20 writing 80:14 wrong 41:1 42:16,22
v			
v 1:5 62:6,7,15 62:16 80:5 81:4 value 36:1,2 62:11 63:4,9 values 23:1,1 24:23 25:13 26:16,17,19 27:6,11,17 28:4,5 36:3 62:16 varied 11:5 various 14:20 15:14 20:8,8 31:2 41:22 60:22 61:5 62:21 verbal 7:13 verify 81:9 veritext 80:23 81:14,23			

x	
x	4:1,10 56:13
y	
yeah	22:15 56:5 62:21 65:9
years	10:22 11:7
yesterday	6:6 6:24
z	
zero	73:13

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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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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