

1 UNITED STATES PATENT AND TRADEMARK OFFICE
2 BEFORE THE PATENT TRIAL AND APPEAL BOARD
3

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5 MERCEDES-BENZ USA, LLC

6 Petitioner,

7 v.

8 DAEDALUS PRIME LLC,

9 Patent Owner.
10 -----

11 Case No.: IPR2023-01345

12 U.S. Patent No. 10,705,588
13 -----

14
15 DEPOSITION OF ROBERT W. HORST, PhD

16 CONDUCTED VIRTUALLY

17 Friday, May 10, 2024
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The deposition of ROBERT W. HORST, PhD, was taken
virtually on behalf of DAEDALUS PRIME LLC, beginning at
8:50 a.m., Pacific Time, on May 10, 2024, before LORI
STOKES, RPR, Certified Shorthand Reporter No. 12732.

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May 10, 2024 | 8:50 a.m.

ROBERT W. HORST, PhD,
having been administered an oath, was examined and
testified as follows:

EXAMINATION

BY MR. FAHMI:

Q Good morning, Dr. Horst.

A Good morning.

Q We met last time, but again, just to refresh,
my name is Tarek Fahmi. I'm here representing the
patent owner, Daedalus Prime.

And today's deposition is in connection with
Inter Partes Review Number 2023-01345, and that concerns
U.S. Patent 10,705,588.

Do you understand that?

A Yes.

Q And is it correct that you provided a
declaration in support of the petition in this
proceeding?

A Yes, I did.

Q I know we just spoke a few days ago, but just
to cover a couple of housekeeping items.

If you would please continue to do as you're

1 doing and provide audible answers. Especially since
2 we're doing this over a video conference, the court
3 reporter can't really take down gestures or nods of the
4 head, that type of thing.

5 So audible answers would be appreciated, okay?

6 A Yes.

7 Q And also, as you're doing, if you would be so
8 kind as to wait until I finish asking a question before
9 you begin your answer, I'll try and do likewise and wait
10 until you've finished answering a question before I ask
11 another.

12 That way the court reporter only has to take
13 down what one person is saying at a time. It makes her
14 job easier. It makes the record much more clear.

15 Is that okay?

16 A Yes.

17 Q Great.

18 If you need a break at all during the
19 proceeding today, just let us know. I'm happy to pause
20 and take a break. I would just ask that if there's a
21 question pending at the time, that you please answer the
22 question before we take that break.

23 Is that all right?

24 A Yes.

25 Q Do you have any materials in the room with you

1 this morning?

2 A Yes. I have a copy of my expert declaration
3 and several of the exhibits, including the White,
4 Shakkarwar, and Nussbaum references.

5 Q Are there any notes or annotations or marking
6 on any of those papers?

7 A No.

8 Q Okay. Any other materials in the room?

9 A I have a copy of my CV, and the Finkelstein
10 reference, and the '588 patent itself.

11 Q No markings or annotations on any of those
12 either; is that right?

13 A No.

14 (Reporter clarification.)

15 BY MR. FAHMI:

16 Q Who is present in the room with you this
17 morning?

18 A Mr. Rotz is here in the room.

19 Q Are you in communication with anyone else
20 other than Mr. Rotz?

21 A Mr. Raffetto is joining us by Zoom.

22 Q Okay. But you're not keeping any other
23 communication channels other than this video conference;
24 is that right?

25 A That's right.

1 Q Just a reminder that now that the
2 cross-examination portion has started, you're not to
3 speak about the substance of your testimony with anyone,
4 and that includes counsel. And that applies even when
5 we're on a break.

6 Do you understand that?

7 A Yes.

8 Q Is there any reason why you can't give us your
9 full, honest, and complete testimony in this matter
10 today?

11 A No.

12 Q Did you do any preparation for today's
13 deposition?

14 A Yes. I refreshed my memory on the expert
15 report and the various exhibits in this matter.

16 Q When was that?

17 A Yesterday I met with the attorneys. And
18 before that, I read through materials on my own.

19 Q Well, if during the proceeding you need to
20 refer to any of those materials, I'm happy if you want
21 to use the copies that you have in the room with you. I
22 just ask, if you're reading from any materials as part
23 of an answer, please let us know what you're reading
24 from, all right?

25 A Yes.

1 Q Let's turn to your declaration. It's
2 Exhibit 1003.

3 (Deposition Exhibit 1003 was
4 marked for identification.)

5 THE WITNESS: Yes, I have it.

6 THE REMOTE TECHNICIAN: I'll put it on the
7 screen shortly.

8 BY MR. FAHMI:

9 Q Do you recognize this exhibit, Dr. Horst?

10 A Yes. This is my expert report in the '588 IPR
11 [verbatim].

12 Q When is the last time you had a chance to
13 review this?

14 A I reviewed this yesterday.

15 Q Turn, if you would, please, to paragraph 29.
16 I think it's on -- begins on page 10 and carries over
17 into page 11.

18 A Yes, I'm there.

19 Q Here, you're describing the person of ordinary
20 skill in the art; is that right?

21 A That's right.

22 Q And you're giving us a summary of that
23 person's education and work experience, correct?

24 A Correct.

25 Q How did you decide this would characterize a

1 person of ordinary skill in the art for this patent?

2 A This patent is concerned with the topics that
3 I list in the person of ordinary skill in the art. And
4 it says that the person [reading]:

5 Would have had a bachelor's degree
6 in electrical engineering, computer
7 science, computer engineering,
8 material science, physics, applied
9 physics, or a related field.

10 And at least two years' experience
11 in the research, design,
12 development, or testing of
13 electronic circuits or components
14 or software for controlling
15 electronic circuits or components,
16 or the equivalent.

17 With additional education
18 substituting for experience and
19 additional experience substituting
20 for formal education.

21 Q Why would that kind of experience be required
22 in connection with this '588 patent?

23 A The '588 patent is concerned with multi-core
24 architecture, which is an electronic circuit. And this
25 experience requires experience with electronic circuits.

1 Q Would any particular experience regarding
2 multi-core processors be necessary to be a person of
3 ordinary skill in the art?

4 A This definition requires someone with
5 experience that can substitute for formal education.
6 And someone with experience in electronic circuits would
7 have at least some understanding of multi-core
8 integrated circuits.

9 Q So I have a bachelor's degree in engineering
10 physics. I worked as a systems engineer for a number of
11 years in the Navy. I taught classes in the design of
12 digital circuits, including multi-processor controlled
13 circuits. All of this was in the late '80s and early
14 '90s.

15 Would I be a person of ordinary skill in the
16 art?

17 MR. ROTZ: Objection. Legal conclusion.

18 THE WITNESS: I would have to know more about
19 the rest of your background. But the person of ordinary
20 skill needs that skill at the critical filing date of
21 the patent. And in this case, the date is 2011.

22 BY MR. FAHMI:

23 Q So are you saying a person of ordinary skill
24 who had that experience prior to 2011 would not be a
25 person of ordinary skill in the art?

1 A The person that had the relevant experience
2 would have to have had that experience before that date
3 or at that date.

4 Q Are there any differences between unicore
5 processors and multi-core processors?

6 MR. ROTZ: Objection. Vague.

7 MR. FAHMI: Let me see if I can clarify it for
8 you, Dr. Horst.

9 BY MR. FAHMI:

10 Q Are there any differences of particular
11 interest in connection with the '588 patent between
12 unicore processors and multi-core processors?

13 A There are specific claims related to
14 multi-core processors in the '588 patent. We would have
15 to go through the specifics of those claims to answer
16 that question.

17 Q Speaking of claims, looking at your expert
18 report, beginning in paragraph 31, you provide some
19 commentary concerning claim construction.

20 Is that right?

21 A Yes. The claim construction was given to me
22 by the attorneys in this case as the way of
23 interpreting, in particular in this case, the means plus
24 function claim 20.

25 Q Sorry. What do you mean it was given to you?

1 A Well, the attorneys I worked with helped me
2 create the text of the means plus function claim 20
3 to -- because that claim requires structure in order to
4 determine whether it meets the limitations of the claim.

5 Q Did you receive any other assistance in
6 connection with construing any of the claims of the '588
7 patent?

8 A I worked with attorneys in preparation of this
9 report, but the report is my report.

10 Q Did you, in fact, construe any of the claims
11 other than claim 20 in connection with the preparation
12 of your report?

13 A I didn't specifically construe any of the
14 terms and use the plain meaning of those terms, as they
15 would have been understood by one of ordinary skill.

16 Q But I don't see in this section on claim
17 construction that you've provided any of those plain
18 meanings; is that right?

19 A I did not specifically put in the plain
20 meanings. I used them as I understood someone of
21 ordinary skill would have understood those terms.

22 MR. FAHMI: All right. In that case, let's
23 turn to the '588 patent. It's Exhibit 1001.

24 (Deposition Exhibit 1001 was
25 marked for identification.)

1 BY MR. FAHMI:

2 Q And we can go to the claims. They begin in
3 column 8 of the patent.

4 A Yes. I'm there.

5 Q And you recognize this exhibit as the
6 '588 patent; is that right, Dr. Horst?

7 A That's right.

8 Q And you provided testimony concerning the
9 '588 patent as part of your declaration; is that right?

10 A That's right.

11 Q To provide that testimony, you reviewed the
12 '588 patent; is that correct?

13 A Yes.

14 Q And that includes the claims of the patent; is
15 that right?

16 A Yes.

17 Q So let's look at claim 1. As I say, it begins
18 in column 8, at about line 35.

19 And perhaps maybe take a minute, just read
20 through it, refresh your memory, and let me know when
21 you're ready to proceed.

22 A Yes. I'm ready.

23 Q Claim 1 uses the phrase [reading]:

24 A second core operable at a second
25 voltage, independent of the first

1 voltage.

2 Do you see that?

3 A Yes, I see that.

4 Q As part of your analysis, did you construe
5 that portion of the claim?

6 MR. ROTZ: Objection. Legal conclusion.

7 THE WITNESS: My expert report, I have an
8 analysis of that portion of the claim.

9 BY MR. FAHMI:

10 Q What would a person of ordinary skill in the
11 art understand is the plain and ordinary meaning of that
12 phrase?

13 A A core operable at a voltage independent of
14 the first voltage would mean that in the multi-core
15 processor, there's at least two cores that could be
16 operating at different voltages at one point in time.

17 Q So do I understand correctly that the person
18 of ordinary skill in the art would understand, as it's
19 used in this claim 1, "independent" means different?

20 A Independent would mean that they could be
21 different; not that they always had to be different.

22 Q The claim continues and says [reading]:

23 And at a second frequency different
24 from the first frequency.

25 Do you see that?

1 A Yes.

2 Q What would the person of ordinary skill in the
3 art understand is the plain and ordinary meaning of this
4 phrase?

5 A That would mean that in a multi-core
6 processor, there are at least two cores in which one
7 could be operated at a different frequency than the
8 other one.

9 Q So would the person of ordinary skill in the
10 art reading claim 1 understand that the term
11 "independent" means the same thing as "different"?

12 MR. ROTZ: Objection. Legal conclusion.

13 THE WITNESS: In my understanding of that
14 claim, I would say that "independent" and "different"
15 are effectively saying the same thing.

16 BY MR. FAHMI:

17 Q Others of the claims of the '588 patent use
18 those same terms, "independent" and "different."

19 Do you remember that from your analysis?

20 A I'd have to analyze those claims to see
21 exactly what you're referring to.

22 Q Sure. Yeah. Let's do so.

23 So if you take a look, for example, at
24 claim 8. And why don't you give that a read and let me
25 know when you're ready to proceed.

1 A Yes, I'm ready.

2 Q Sir, claim 8 has the same language we were
3 just looking at in claim 1 [reading]:

4 A second voltage independent of the
5 first voltage and a second
6 frequency different from the first
7 frequency.

8 Do you see that?

9 A Yes, I see that.

10 Q Are the terms "independent" and "different" as
11 they're used in claim 8 being used in the same way
12 they're being used in claim 1 from the standpoint of the
13 person of ordinary skill in the art?

14 A Yes. And my analysis of claim 1 and claim 8
15 are together because there's very little difference
16 between claims 1 and 8.

17 Q Claims 1 and 8 also use the phrase
18 "independently operable."

19 For example [reading]:

20 Independently operable at a third
21 frequency different from the first
22 frequency.

23 Do you see that?

24 A Yes.

25 Q How would the person of ordinary skill in the

1 art construe that phrase in claims 1 and 8?

2 A It would mean that the third frequency could
3 be different than the other frequencies but would not
4 necessarily have to be different.

5 Q By "different," do you mean not the same?

6 A It says [reading]:

7 Independently operable at a third
8 frequency different from the first
9 frequency.

10 So there has to be a mode of operation where
11 those frequencies are not the same.

12 Q Claims 1 and 8 also use the phrase [reading]:

13 Operable at a fourth frequency
14 different from the first, second,
15 and third frequencies.

16 Do you see that?

17 A Yes, I see that.

18 Q What would the person of ordinary skill in the
19 art understand is the plain and ordinary meaning of that
20 phrase?

21 A That would again mean there's a mode of
22 operation in which that fourth frequency could be
23 different than the other frequencies.

24 Q If you take a look at claim 2. And maybe give
25 that a read and let me know when you're ready.

1 THE REMOTE TECHNICIAN: Counsel, could you
2 tell me which page that is.

3 MR. FAHMI: Yeah, sorry. It's in column 8,
4 beginning at line 50.

5 THE REMOTE TECHNICIAN: Thank you.

6 THE WITNESS: Yes, I see that.

7 BY MR. FAHMI:

8 Q Claim 2 includes the phrase [reading]:
9 Independently operate at the second
10 frequency.

11 Do you see that?

12 A Yes.

13 Q What would the person of ordinary skill in the
14 art understand is the plain and ordinary meaning of that
15 phrase?

16 MR. ROTZ: Objection. Legal conclusion.

17 THE WITNESS: That would mean that the cores
18 are -- could operate at different frequencies. And
19 those frequencies may not be the same.

20 BY MR. FAHMI:

21 Q And if we look at claim 9, which is in
22 column 9, beginning at about line 25.

23 That same phrase, "independently operate at
24 the second frequency," appears.

25 Do you see that?

1 A Yes.

2 Q Would it have the same meaning as you just
3 described as for claim 2?

4 MR. ROTZ: Objection. Legal conclusion.

5 THE WITNESS: Yes. I've analyzed claim 2 and
6 9 together as basically having the same limitations.

7 BY MR. FAHMI:

8 Q Let's go back to claim 4, please. This is
9 back in column 8, beginning at about line 58 or so.

10 A Yes, I've read it.

11 Q Sorry. I said claim 4. I meant claim 5.
12 Claim 5 begins at line 63.

13 Do you see that?

14 A Yes.

15 Q Claim 5 uses the phrase "selectable
16 frequencies."

17 Do you see that?

18 A Yes.

19 Q What would the person of ordinary skill in the
20 art understand is the plain and ordinary meaning of
21 "selectable frequencies" in that claim?

22 MR. ROTZ: Objection. Legal conclusion.

23 THE WITNESS: That claim says [reading]:

24 A mapping of selectable
25 frequencies.

1 So I interpret that to mean that there are a
2 set of possible frequencies that can be selected.

3 BY MR. FAHMI:

4 Q And if we look at claim 12, which begins at
5 the bottom of column 9 and carries over to the top of
6 column 10, it also recites the mapping of selectable
7 frequencies.

8 Would that have the same meaning in claim 12
9 as it does in claim 5?

10 A Yes. Claims 5 and 12, again, I analyzed
11 together with similar limitations.

12 Q Okay.

13 MR. FAHMI: Let's turn to Exhibit 1006,
14 please. This is the Shakkarwar reference. I'm not sure
15 if I'm pronouncing that correctly.

16 (Deposition Exhibit 1006 was
17 marked for identification.)

18 THE WITNESS: Yes, I have it.

19 MR. FAHMI: Just give the technician a chance
20 to get it up on the screen for us.

21 Thank you.

22 BY MR. FAHMI:

23 Q Do you recognize this exhibit, Dr. Horst?

24 A Yes.

25 Q As I understand it, you offered testimony

1 concerning Shakkarwar in your declaration; is that
2 right?

3 A Yes.

4 Q When is the last time you had a chance to
5 review this reference?

6 A I reviewed this yesterday also.

7 MR. FAHMI: If we could have figure 3 up on
8 the screen, please.

9 THE REMOTE TECHNICIAN: Stand by.

10 BY MR. FAHMI:

11 Q You reviewed figure 3 as part of your
12 analysis; is that right, Dr. Horst?

13 A Yes.

14 Q What are we looking at here in figure 3?

15 A Figure 3 is a block diagram of one of the
16 embodiments described in Shakkarwar.

17 Q So we see a system that has a system processor
18 connected to some other components. There's a data
19 controller, graphics controller, a block labeled 320
20 that includes a communication module, and that is
21 connected to some I/O devices.

22 Is that right?

23 A That is part of what's in this diagram, yes.

24 Q And this system, as you say, is one of the
25 embodiments described by Shakkarwar; is that correct?

1 A That's right.

2 Q I'm going to have you turn to column 6.

3 MR. FAHMI: And on the screen, if we could
4 maybe have figure 4, please.

5 And that way Dr. Horst can look at the text in
6 his local copy and the figure is there for reference on
7 the screen if you need it.

8 BY MR. FAHMI:

9 Q Shakkarwar provides a discussion of figure 4
10 beginning at about line 35 in column 6.

11 Do you see that, Dr. Horst?

12 A Yes.

13 Q And we're told beginning at about line 41 that
14 this process that's illustrated in figure 4 begins with
15 bandwidth for a component being monitored for increasing
16 or decreasing communication requirements.

17 Is that right?

18 A It says [reading]:

19 Monitoring of the components' data
20 rate requirements can be
21 accomplished by monitoring
22 application usage, polling specific
23 modules, reading specific
24 registers, and receiving
25 interrupts.

1 Q You're reading from --

2 A That's from column 6, starting at line 45.

3 Q And then in the next paragraph, we're told
4 that [reading]:

5 For example, when an application
6 that's known to use 3D graphics is
7 opened, system software can
8 determine if the bus rate between
9 the data controller and the
10 graphics controller is high enough
11 to support the graphics
12 requirements.

13 Is that right?

14 A Yes. That's the next sentence.

15 Q Uh-huh. And then carrying on in column 7, the
16 paragraph beginning at about line 5, we're told that
17 when a change in processing condition is detected, the
18 bandwidth for that associated data connection can be
19 determined based on the active components.

20 Correct?

21 A There's a lot more in that paragraph than what
22 you -- that's part of it.

23 Q And the paragraph goes on and says that that
24 might entail the use of a look-up table, and the look-up
25 table might include lists of clock speeds or voltage

1 levels required to process information for specific
2 devices or groups of devices, correct?

3 A Yes. That's in that paragraph.

4 Q So do I understand correctly, then, that in
5 Shakkarwar, the bandwidth for data connection is
6 determined according to a device's particular
7 requirements to process information?

8 MR. ROTZ: Objection. Mischaracterizes the
9 document.

10 THE WITNESS: That's a simplification of what
11 it says here. You'd have to use the whole description
12 here to accurately describe how it determines the
13 bandwidths for the data connections.

14 BY MR. FAHMI:

15 Q So what did I leave out? What specifically is
16 required in order to determine the bandwidth for that
17 data connection?

18 MR. ROTZ: Objection. Vague.

19 THE WITNESS: The sentence that you read
20 earlier [reading]:

21 The look-up table may include a
22 list of clock speeds and/or voltage
23 levels required to process
24 information for specific devices
25 and/or groups of devices.

1 This is only describing part of the flowchart
2 in figure 4.

3 BY MR. FAHMI:

4 Q Is there anything else in Shakkarwar that
5 tells us how this process determines what the bandwidth
6 for a data connection is done?

7 MR. ROTZ: Objection. Vague.

8 THE WITNESS: There's quite a bit more
9 information in column 7 that talks about all the steps
10 in figure 4.

11 BY MR. FAHMI:

12 Q Right. But all the steps in figure 4 are not
13 concerned with how the bandwidth determination is done,
14 are they?

15 A The other steps of figure 4 have to do with
16 other parts of the algorithm.

17 Q Is it just the paragraph beginning in line 5
18 in column 7 that describes how the bandwidth
19 determination is done?

20 A There may be other information, other parts of
21 the specification. I'd have to read through it all to
22 see if there's other information that's presented as
23 well as that paragraph.

24 Q So if we looked at figure 4, which is on the
25 screen, which step is involved with the determination of

1 the bandwidth requirements?

2 A Step 401 is monitoring the processing
3 conditions. And then step 402 is detecting changes in
4 the processing conditions. So those are the steps
5 primarily concerned with that.

6 Q And if we look back in column 6, with respect
7 to the paragraph beginning at about line 8, this isn't
8 referring to figure 4 specifically, but we're told that
9 if a graphics engine is not being used, that is, no
10 application is using it [reading]:

11 The data rate and/or the power
12 level of the bus between the
13 graphics controller and frame
14 buffer can be reduced.

15 And then at the end of that paragraph
16 [reading]:

17 If the 3D graphics are not being
18 produced [sic], the data rate
19 between the data controller and the
20 graphics controller can also be
21 reduced.

22 Do you see that?

23 A Yes.

24 Q So does that help us understand what we were
25 discussing, that the bandwidth for data connection can

1 be determined based on processing requirements, for
2 example, as exemplified by the software that's running
3 on the system?

4 A This paragraph in column 6 gives one example
5 of how to determine the required data rates. And one of
6 ordinary skill would know that this example could be
7 extended to other -- other parts of the system, and
8 other parts could similarly determine the data rates.

9 Q So in general, then, what Shakkarwar is
10 describing is that the bandwidth for a data connection
11 can be determined by assessing the processing
12 requirements for the device.

13 Is that fair?

14 MR. ROTZ: Objection. Mischaracterizes the
15 document.

16 THE WITNESS: It's saying that that's one way
17 that it can determine the processing requirements. I
18 don't know that it says that's the only way.

19 MR. FAHMI: Okay. Let's take a look at
20 Exhibit 1007, please. It's the Nussbaum reference.

21 (Deposition Exhibit 1007 was
22 marked for identification.)

23 THE WITNESS: Yes, I have it.

24 BY MR. FAHMI:

25 Q Do you recognize this exhibit, Dr. Horst?

1 A Yes.

2 Q I understand you provided testimony concerning
3 Nussbaum as part of your declaration; is that right?

4 A That's right.

5 Q When is the last time you had a chance to
6 review Nussbaum?

7 A I reviewed this yesterday.

8 Q Let's turn to paragraph 21, please.

9 A Yes, I'm there.

10 Q So here Nussbaum describes a thermal design
11 point; is that right?

12 A Yes.

13 Q The thermal design point, we're told
14 [reading]:

15 Represents the power that can be
16 consumed by the entire system on a
17 chip.

18 Is that right?

19 A Yes.

20 Q And we're provided a table, it's
21 table number 1, that gives us an example of how such a
22 power limit might be divided up amongst components on a
23 chip.

24 Is that correct?

25 A Yes. Table 1 shows example assuming a 40-watt

1 limit and shows how that power might be divided among
2 the various cores and GPU, memory controller, and I/O
3 bridge.

4 Q In paragraph 22, at the top of the next
5 column, those individual allocated powers are said to be
6 limits that define the highest nominal operation
7 point -- and I guess that's in terms of frequency and
8 voltage -- of the associated component.

9 Is that correct?

10 MR. ROTZ: Objection. Mischaracterizes the
11 document.

12 THE WITNESS: It says [reading]:

13 The power budget is a limit that
14 defines the highest nominal
15 operational point of frequency and
16 voltage of the core and the 5-watt
17 power budget does the same for the
18 GPU.

19 BY MR. FAHMI:

20 Q If we look back at table 1, we see that each
21 of the cores was allocated 8 watts, and the GPU was
22 allocated 5 watts.

23 Is that right?

24 A Yes. In this example, that's what they're
25 showing.

1 Q And those are the power budgets that
2 paragraph 22 is talking about; is that right?

3 A That's right.

4 Q So the idea is, if I have it right, the total
5 power budget for the system on the chip is 40 watts, and
6 then the table is specifying an example of how that
7 40 watts can be divided up against the different
8 power-consuming components of the system on the chip; is
9 that right?

10 A Yes. Table 1 is one example of a way of
11 dividing up the power among the units.

12 Q Table 2 in paragraph 23 is a different
13 example, correct?

14 A Yes. That shows dividing up the power
15 differently among the same units.

16 Q So those allocated power budgets, if I
17 understand paragraph 22 correctly, are defining the
18 highest nominal operational point of the component; is
19 that correct?

20 A The highest possible of each component is not
21 part of those tables. There is just a -- there are two
22 different examples of a different allocation to the
23 different cores. But it doesn't say that that's the
24 maximum for each core.

25 Q The tables are just providing sort of a not to

1 exceed power budget for the components of the cores, the
2 GPU, according to these allocations.

3 Would that be right?

4 MR. ROTZ: Objection. Mischaracterizes the
5 document.

6 THE WITNESS: The table is allocating maximums
7 to each of those components.

8 BY MR. FAHMI:

9 Q So looking at paragraph 24, and I think this
10 is speaking to the allocation that's given in table 2,
11 the reason that these allocations are different than,
12 for example, what we saw in table 1, is that some
13 available headroom in the overall power budget has been
14 given to Core0 and Core1 because others of the
15 components don't need, for example, the 8 watts for
16 Cores 2 and 3 that they had in table 1.

17 Is that right?

18 A In paragraph 23, it talks about how power can
19 be reallocated from idle or less active components to
20 busy components.

21 So I view the allocation as generally a method
22 of reallocating from less busy to busy components.

23 Q I see. So you're making decisions about where
24 to allocate the power on the basis of what the different
25 system components need at a particular time.

1 Is that right?

2 MR. ROTZ: Objection. Mischaracterizes the
3 document.

4 THE WITNESS: In that paragraph, it's talking
5 about reallocating from busy to not busy. And there's
6 also more description in paragraph 24 about -- about
7 allocating the headroom to other components.

8 BY MR. FAHMI:

9 Q At the end of paragraph 24, we're told that
10 this decision about allocating headroom is made on the
11 basis of what's best for the overall system on a chip
12 performance.

13 Is that right?

14 A Yes. That's what it says.

15 Q Do those power budget allocations then define
16 the operating points in terms of frequency and voltage
17 for each of the components?

18 A Given a power allocation for a component, that
19 then is used to determine the frequency and the voltage
20 for that component.

21 Q In the next paragraph, paragraph 25, there's a
22 discussion of boost sensitivity.

23 Do you see that?

24 A Yes.

25 Q What is the -- what does Nussbaum mean by

1 boost sensitivity?

2 A It means that some components can -- can
3 benefit from being allocated more power to boost their
4 performance. And some components are more sensitive to
5 that than others.

6 Q So the boost sensitivity could be determined
7 for the different components in the system on the chip;
8 is that correct?

9 A In paragraph 26, it goes on to talk about how
10 the high-level -- about profiling performance
11 sensitivity to core frequency changes.

12 Q So is it right that Nussbaum is describing a
13 process by which you would determine that boost
14 sensitivity for the different components?

15 A Yes. That -- Nussbaum is talking about using
16 the profiling to determine the boost sensitivity.

17 Q And if I understand it correctly, those
18 results get tabulated in a boost sensitivity table; is
19 that right?

20 THE REMOTE TECHNICIAN: Counsel, I believe we
21 lost the witness on video.

22 MR. FAHMI: Shoot. Let's give them a chance.
23 (Short technical discussion off
24 the stenographic record.)

25 ///

1 BY MR. FAHMI:

2 Q Dr. Horst, before we had the technical issue,
3 we were discussing Nussbaum, and we were in the portion
4 of Nussbaum that talked about boost sensitivity. And I
5 think I'd posed a question. Let me see if I can
6 remember.

7 The question pertained to the boost
8 sensitivity table. And my understanding from Nussbaum
9 is that the results of the training that is done get
10 tabulated in a boost sensitivity table.

11 Is that correct?

12 A Yes. I was answering based on paragraph 27 in
13 Nussbaum, where it says [reading]:

14 The nominal power value and the
15 values are stored in the boost
16 sensitivity table.

17 Q And is it correct that the power budget
18 allocation that we were talking about a few minutes ago
19 uses the information in that boost sensitivity table in
20 order to determine how the power allocation of the total
21 power budget is done?

22 A The boost sensitivity table is part of the
23 determination of how to assign power to the various
24 units.

25 Q Is there anything other than the boost

1 sensitivity table that's used?

2 MR. ROTZ: Objection. Vague.

3 THE WITNESS: Previously, we talked about how
4 the idleness of the various units is used to determine
5 how to allocate power.

6 So that plus the boost sensitivity are used to
7 allocate power.

8 MR. FAHMI: I see. Okay, thanks.

9 I don't have any other questions at this time,
10 Dr. Horst. Thank you very much.

11 THE WITNESS: Thank you.

12 THE STENOGRAPHER: Same orders as last time?

13 MR. FAHMI: It is, but I'm not sure if
14 Mr. Rotz has any redirect.

15 MR. ROTZ: No redirect.

16 MR. FAHMI: So, yes. We're concluded.

17 And Lori, same request, please, for a same-day
18 ASCII, 48-hour on the transcript, please.

19 THE STENOGRAPHER: Mr. Rotz, would you like
20 the same?

21 MR. ROTZ: Yeah. I think the same should work
22 for us as well.

23 THE STENOGRAPHER: Great.

24

25

CERTIFICATE OF CERTIFIED SHORTHAND REPORTER

I, Lori Stokes, Certified Shorthand Reporter in and for the State of California, do hereby certify:

That ROBERT W. HORST, PhD, the witness whose deposition is hereinbefore set forth, was duly sworn by me before the commencement of such deposition, and that such deposition was taken before me and is a true record of the testimony given by such witness.

I further certify that the adverse party, Mercedes-Benz, was represented by counsel at the deposition.

I further certify that the deposition of ROBERT W. HORST, PhD, occurred virtually on Friday, May 10, 2024, commencing at 8:50 to 9:57 a.m. PT.

I further certify the inspection, reading and signing of said deposition was waived on the record by agreement of all parties.

I further certify that I am not related to any of the parties to this action by blood or marriage, I am not employed by or an attorney to any of the parties to this action, and that I am in no way interested, financially or otherwise, in the outcome of this matter.

1 IN WITNESS WHEREOF, I have hereunto set my hand
2 this 11th day of May, 2024.

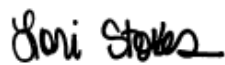
3 My license expires on October 1, 2024.

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