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UNITED STATES PATENT AND TRADEMARK OFFICE

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MICRON TECHNOLOGY, INC., : U.S. Patent No. 7,378,702

MICRON SEMICONDUCTOR : Case No. IPR-2023-00900

PRODUCTS, INC., and MICRON :

TECHNOLOGY TEXAS, LLC :

Petitioners, :

vs. :

BESANG, INC., :

Patent Owner. :

-----X

REMOTE DEPOSITION OF DR. JACK C. LEE

JUNE 12, 2024

9:04 a.m.

Reported By:

Randi J. Garcia, RPR

DIGITAL EVIDENCE GROUP

1730 M Street, NW, Suite 812

Washington, D.C. 20036

(202) 232-0646

1 Transcript of the deposition of
2 Dr. Jack C. Lee, called for Oral Examination
3 in the above-captioned matter, said
4 Deposition being taken pursuant to Federal
5 Rules of Civil Procedure by and before RANDI
6 J. GARCIA, Registered Professional Reporter,
7 and Notary Public, via Zoom, on Wednesday,
8 June 12, 2024, commencing at approximately
9 9:04 a.m.

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1 A P P E A R A N C E S:

2

3 FOR THE PETITIONERS:

4 By: John Kappos, Esq.

5 Patric Reinbold, Esq.

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19

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1 (Continued)

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3 Also Present:

4 Billy Fahnert, Videographer, Exhibit

5 Technician

6 Kasper Larsen, Micron Technologies

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I N D E X

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WITNESS: DR. JACK C. LEE

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EXAMINATION

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Ph.D.

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1 THE VIDEOGRAPHER: We are on the
2 record. This is the remote video
3 deposition of Dr. Jack C. Lee in the
4 matter of Micron Technologies, Inc.,
5 et al., versus BeSang Inc. filed in the
6 United States Patent and Trademark Office.

7 My name is Billy Fahnert. I am the
8 video technician today. The court
9 reporter is Randi Birnhak. We both
10 represent Digital Evidence Group.

11 Today's date is June 12, 2024. The
12 time is 9:04 a.m. Central Standard Time.

13 All parties have stipulated to the
14 witness being sworn in remotely. Will
15 counsel please identify yourselves for the
16 record, and then the witness will be sworn
17 in.

18 MS. ARMOND: This is Michelle Armond
19 for Patent Owner, BeSang.

20 MR. KAPPOS: This is John Kappos
21 representing the Micron petitioners. I'm
22 with O'Melveny & Myers. With me remotely

1 is Patric Reinbold, also of O'Melveny.

2 And with me in the room is Kasper Larsen,
3 who is with the Micron in-house legal
4 department.

5 J A C K C. L E E, Ph.D., after having been
6 first duly sworn, was examined and testified
7 as follows:

8 THE REPORTER: I can't hear you well.

9 THE VIDEOGRAPHER: Yeah, the
10 microphone sounds a little muffled. Is
11 it --

12 THE WITNESS: Hello?

13 THE VIDEOGRAPHER: Can it get any
14 closer, or is it a stationary microphone?

15 MR. KAPPOS: Is that any better?

16 THE WITNESS: Hello?

17 MS. ARMOND: Can we go off the record
18 for a sec?

19 MR. KAPPOS: Yeah, should we go off
20 the record?

21 THE VIDEOGRAPHER: Okay. Yeah, sure.
22 Going off the record. The time is 9:06.

1 (Thereupon, a brief recess was taken.)

2 THE VIDEOGRAPHER: We are back on the
3 record. The time is 9:11.

4 EXAMINATION

5 BY MS. ARMOND:

6 Q. Good morning, Dr. Lee.

7 A. Good morning.

8 Q. Could you please state your full name
9 for the record.

10 A. Jack Chung-Yeung Lee. C-H-U-N-G-
11 Y-E-U-N-G is my middle name.

12 Q. And you're a professor in the
13 Department of Electrical Engineering or
14 Electrical and Computer Engineering at the
15 University of Texas at Austin?

16 A. I was a professor at the University
17 of Texas at Austin. Since September of 2023, I
18 have been promoted to professor emeritus of the
19 University of Texas at Austin.

20 Q. Do you know if there are any other
21 Jack Lees in the Department of Electrical and
22 Computer Engineering at the University of Texas

1 in Austin?

2 A. No, there isn't.

3 Q. You're the only one?

4 A. I'm the only one.

5 Q. Have you been deposed before?

6 A. Yes.

7 Q. So you understand how a deposition
8 works?

9 A. Yes.

10 Q. Do you understand you're under oath
11 today?

12 A. Yes.

13 Q. If there is something that you don't
14 understand about any of my questions, will you
15 let me know?

16 A. Yes.

17 Q. Is there any reason you would not be
18 able to give truthful and accurate testimony
19 today?

20 A. No.

21 Q. You understand you're being deposed
22 remotely today; correct?

1 A. Yes.

2 Q. And where are you currently located?

3 A. Austin, Texas in counsel's office, in
4 a conference room.

5 Q. Mr. Kappos said that he is in the
6 room with you as well as another O'Melveny
7 attorney Kasper. Is there anybody else in the
8 room besides those two attorneys?

9 MR. KAPP0S: Kasper is not an
10 O'Melveny attorney. He's --

11 MS. ARMOND: Oh, right. I'm sorry.
12 He is at Micron. Okay. So beside -- what
13 is Kasper's name, John?

14 MR. KAPP0S: Kasper Larsen.

15 BY MS. ARMOND:

16 Q. Besides Mr. Lark [sic] and
17 Mr. Kappos, is there anyone else in the
18 conference room with you today?

19 A. No.

20 Q. Do you have anything with you in the
21 conference room today?

22 A. I have some -- counsel had bring in

1 some documents, in case that we need them.

2 Those are exhibits, some of the exhibits, in my
3 declarations.

4 Q. Can you tell me what exhibits you
5 have printed with you in the conference room
6 today?

7 A. Sure. Exhibit 1002, Exhibit 1041,
8 Exhibit 1001, Paper 9, Exhibit 1005,
9 Exhibit 1007, Exhibit 1035, Exhibit 1033,
10 Exhibit 1034.

11 Q. Do you have any other printed
12 documents in the conference room besides the
13 ones you just named?

14 A. No.

15 Q. Are there any notes or markings on
16 the exhibits that you have with you in the
17 conference room today?

18 A. No.

19 MS. ARMOND: I would like to
20 introduce Exhibit 1041 in this IPR.

21 (Thereupon, Exhibit 1041 was marked for
22 identification.)

1 MS. ARMOND: This is titled: The
2 Declaration of Dr. Jack Lee in Support of
3 Petitioners' Reply to Patent Owner's
4 Response.

5 BY MS. ARMOND:

6 Q. Dr. Lee, have you seen this document
7 before?

8 A. Yes.

9 Q. Is this your reply declaration in
10 this IPR?

11 A. Yes. Excuse me. I'm trying to
12 download this document on the computer -- on
13 the laptop, but understand it can be done.

14 Q. So our -- our tech has it up on the
15 screen. And it sounds like you told me you
16 have a printed copy. So you're welcome to look
17 at that as well, or you can download it.

18 So tell me when you have a copy.

19 A. Okay.

20 Q. So, Dr. Lee, I don't have a question
21 pending. So just let me know when you have it,
22 and then I will ask my question.

1 A. Okay. Go ahead. I -- I'm having
2 some trouble navigating on this laptop. So I
3 will try to see if I can answer your questions
4 using the paper document.

5 Q. Okay. That's fine. Okay. So do you
6 have a paper copy of Exhibit 1041 in front of
7 you right now?

8 A. Yes.

9 Q. Is Exhibit 1041 a copy of your reply
10 declaration in this IPR?

11 A. Yes.

12 Q. Can you look at the last page which
13 is numbered page 47 of Exhibit 1041.

14 A. Yes.

15 Q. Do you see at the bottom there's a
16 signature?

17 A. Yes.

18 Q. Is that your signature on the last
19 page of Exhibit 1041?

20 A. Yes.

21 Q. Can you look on page 3 of
22 Exhibit 1041.

1 A. Yes.

2 Q. Okay. Do you see -- there's a list
3 of documents. Do you see Item P?

4 A. Yes.

5 Q. Item P is Exhibit 1051 Dr. Steven A.
6 Przybylski deposition transcript April 5, 2024.
7 Do you see that?

8 A. Yes.

9 Q. Did you review the deposition
10 transcript of Dr. Przybylski on April 5, 2024?

11 A. I don't recall, but I believe so.

12 Q. Is there any reason to think you
13 didn't look at the deposition transcript of
14 Dr. Przybylski in preparing your reply
15 declaration?

16 MR. KAPPOS: Object to form.

17 THE WITNESS: I just have not -- I
18 just cannot recall whether I have or not.

19 BY MS. ARMOND:

20 Q. Okay. Well, let me ask you this:
21 Are you -- strike that.

22 Do you know or did you see where

1 Mr. Kappos questioned Dr. Przybylski about an
2 order from the International Trade Commission
3 that mentioned Dr. Przybylski?

4 A. Can you repeat the question, please.

5 Q. Have you reviewed the section of
6 Dr. Przybylski's deposition transcript where
7 Mr. Kappos questioned Dr. Przybylski about an
8 order from the International Trade Commission?

9 A. I don't recall if I reviewed that or
10 not.

11 MS. ARMOND: Why don't we pull up
12 Exhibit 1051. And it will be on the
13 screen, or feel free to download a copy,
14 Dr. Lee.

15 MR. KAPPOS: So given that we are
16 having technical difficulties, I think we
17 need to pull -- let's go off the record,
18 let me get my IT guy back, and then he can
19 figure out how to download this. If you
20 posted it in a room, then we can refresh.
21 Is that okay?

22 MS. ARMOND: That's fine.

1 MR. KAPPOS: Okay. Let's just
2 take -- take a break, and let me get my IT
3 guy.

4 THE WITNESS: I apologize.

5 THE VIDEOGRAPHER: Going off the
6 record. The time is 9:22.

7 (A brief recess was taken.)

8 THE VIDEOGRAPHER: We are back on the
9 record. The time is 9:25.

10 MS. ARMOND: I'd like to introduce
11 Exhibit 1051.

12 (Thereupon, Exhibit 1051 was marked for
13 identification.)

14 MS. ARMOND: This is a transcript
15 from the deposition of Dr. Steven
16 Przybylski dated April 5, 2024.

17 BY MS. ARMOND:

18 Q. Dr. Lee, have you looked at
19 Exhibit 1051 before?

20 A. As I mentioned, I do not recall.

21 Q. Okay. So do you know one way or
22 another whether Mr. Kappos asked Dr. Przybylski

Page 17

1 about a prior decision from the International
2 Trade Commission?

3 A. No, I do not know. I do not recall.

4 Q. Can you look, Dr. Lee, at page 118 of
5 Exhibit 1051. Let me know when you're there.

6 A. Okay. 118?

7 Q. Yes.

8 A. Okay.

9 Q. Okay. Let me refresh your
10 recollection. Dr. Lee, can you start reading
11 at page 118 around line 18 and then read
12 through page 120 to yourself. And then when
13 you're done, can you let me know.

14 A. Starting on page 118?

15 Q. Yes. Read from the bottom of
16 page 118 around line 20 and then just read
17 through page 120. And when you're done, let me
18 know.

19 MR. KAPPOS: Michelle, are you
20 referring to page numbers at the upper
21 right or at the lower right of the page?
22 Because the page that's on the screen says

1 119 on the lower right.

2 MS. ARMOND: I'm referring to the
3 transcript pages. So at the top of the
4 page.

5 THE WITNESS: So are you --

6 BY MS. ARMOND:

7 Q. Okay. Do you see on page 118 around
8 line 20 it says: Exhibit 1040 was marked for
9 identification?

10 A. Yes.

11 Q. Start reading there.

12 A. Okay, got it --

13 Q. And then read that page and the next
14 two pages, which are pages -- transcript
15 pages 118 to 120. And then let me know when
16 you're done. You can read those to yourself.

17 A. Up to and including page 120 in the
18 transcript?

19 Q. Correct.

20 A. Yes.

21 Q. So you read pages 118 to 120 of the
22 transcript of Dr. Przybylski?

1 A. Yes.

2 Q. Okay. So did you see on those pages
3 where Mr. Kappos was asking Dr. Przybylski some
4 questions about an International Trade
5 Commission decision?

6 A. Yes.

7 Q. And that International Trade
8 Commission mentioned Dr. Przybylski?

9 A. Yes.

10 Q. If there is an ITC decision that
11 criticizes an expert's opinions, does it
12 undermine that expert's credibility in all of
13 his future cases?

14 MR. KAPPOS: Object to form.

15 THE WITNESS: I don't know, since I'm
16 not a lawyer.

17 BY MS. ARMOND:

18 Q. You're not sure?

19 (Clarification by the reporter.)

20 THE WITNESS: I don't know, since I'm
21 not a lawyer. And I don't know the legal
22 ramifications of -- if a witness is

1 discredited in one case, how that apply to
2 other cases.

3 (Clarification by the reporter.)

4 THE WITNESS: I do not understand --
5 I do not know the law regarding a
6 testifying expert being discredited and
7 how that affect his or her future
8 testimony.

9 Was that the question?

10 BY MS. ARMOND:

11 Q. I'm not asking about the legal
12 significance. I'm asking about what you think.
13 So if --

14 MR. KAPPOS: Object to form.

15 MS. ARMOND: That wasn't a question.
16 I'm -- I'm going to ask a question, John.
17 But thank you.

18 BY MS. ARMOND:

19 Q. Okay. So, Dr. Lee, in your opinion,
20 if there an ITC decision that criticizes an
21 expert's opinion, do you think that undermines
22 the expert's credibility in his or her future

1 cases?

2 MR. KAPPOS: Object to form.

3 THE WITNESS: This is one of the
4 first time, if not the first time, I have
5 read his two pages. So I don't think I
6 can form an opinion regarding this. So I
7 cannot confirm or deny what you just said.

8 BY MS. ARMOND:

9 Q. Well, I'm asking in general.

10 A. In general, I not form -- I do not
11 form any opinion regarding this.

12 Q. So you don't know either way whether
13 a decision criticizing an expert's opinion
14 would impact that expert's credibility in
15 future cases?

16 MR. KAPPOS: Object to form.

17 THE WITNESS: I did not say that I
18 don't know. I just say I have been -- I
19 have not formed any opinion regarding this
20 issue.

21 BY MS. ARMOND:

22 Q. Well, I'm not asking about this

1 particular order and Dr. Przybylski. I'm
2 asking in general, how would you take this into
3 account in your analysis?

4 MR. KAPPOS: Object to form.

5 THE WITNESS: My answer is the same,
6 in general, even for a general cases,
7 general situation, I have not form any
8 opinion regarding the answer to your
9 question.

10 BY MS. ARMOND:

11 Q. So you have no opinion whether an ITC
12 order criticizing an expert's opinion would
13 undermine that expert's credibility in future
14 cases?

15 A. That is correct. I do not have any
16 opinion regarding that.

17 Q. So in your opinion a prior ITC order
18 criticizing an expert's opinion might undermine
19 the expert's credibility or it might not
20 undermine the expert's credibility; right?

21 MR. KAPPOS: Object to form.

22 THE WITNESS: No, I have not form any

1 opinion whether it might or might not.

2 BY MS. ARMOND:

3 Q. So you're telling me you just don't
4 know?

5 A. I am saying that I do -- have not
6 formed any opinion since I have not thought
7 about this issue previously. I need to think
8 more about it and -- in order to arrive at an
9 opinion. But sitting here and looking at this
10 just for a few minutes, I don't -- don't have
11 any opinion regarding this.

12 Q. Do you think Dr. Przybylski's
13 opinions in this case are credible?

14 MR. KAPPOS: Object to form.
15 (Clarification by the reporter.)

16 THE WITNESS: My opinion regarding
17 the patent owner's opinions as well as
18 Dr. Przybylski opinion have been
19 documented on my declarations, my first
20 and second declarations.

21 BY MS. ARMOND:

22 Q. So you can't answer my question in

1 general, whether an ITC order criticizing an
2 expert's opinions undermines that expert's
3 credibility in future cases?

4 MR. KAPPOS: Object to form.

5 THE WITNESS: I believe I answered
6 that question already. But let me answer
7 it again, that sitting here, I do not have
8 an opinion whether a witness who had been
9 discredited at ITC, how that influence his
10 testimony in future cases, or his
11 credibility in future cases.

12 BY MS. ARMOND:

13 Q. So you would not automatically
14 conclude that just because there is an ITC
15 order criticizing an expert's opinion that
16 would automatically undermine that expert's
17 credibility in future cases; correct?

18 MR. KAPPOS: Object to form.

19 THE WITNESS: I have not formed any
20 opinion one way or the other.

21 BY MS. ARMOND:

22 Q. So you would be a little slower to

1 judgment and have to think about it; right?

2 MR. KAPPOS: Object to form.

3 THE WITNESS: I don't know what that
4 means by slow -- "slower in judgment."

5 But as I mentioned, sitting here, I have
6 not formed an opinion regarding this
7 issue.

8 BY MS. ARMOND:

9 Q. So you would have to consider at some
10 length whether an ITC order criticizing an
11 expert's opinion would undermine that expert's
12 credibility in future cases; right?

13 MR. KAPPOS: Object to form.

14 THE WITNESS: I'm not sure what you
15 mean by "at some length." But as I
16 answered before, sitting here, I have not
17 formed any opinion regarding whether a
18 witness testimony has been discredited in
19 one case how it undermine -- whether that
20 undermines his future testimony in future
21 cases.

22

1 BY MS. ARMOND:

2 Q. And is that because it is not a
3 black-and-white question; it would depend?

4 MR. KAPPOS: Object to form.

5 THE WITNESS: I just don't have any
6 opinion at this point.

7 MS. ARMOND: Let's mark an exhibit.
8 Billy, can you pull up tab 1, please. I'd
9 like to mark this exhibit as Exhibit 2051.
10 (Thereupon, Exhibit 2051 was marked for
11 identification.)

12 MS. ARMOND: It is titled:
13 Declaration of Jack C. Lee, Ph.D. under
14 37 CFR 1.68 in Support of Petition for
15 Inter Partes Review.

16 And this was submitted as
17 Exhibit 1003 in an IPR captioned: Western
18 Digital Technologies versus Longitude
19 Licensing LTD Challenging U.S. Patent
20 Number 9,379,233.

21 BY MS. ARMOND:

22 Q. Dr. Lee, do you recognize Exhibit

1 2051?

2 A. It has been quite a while that I
3 reviewed this.

4 (Clarification by the reporter.)

5 THE WITNESS: It has been quite a
6 while that I reviewed this.

7 BY MS. ARMOND:

8 Q. Dr. Lee, is this your declaration
9 from the Western Digital versus Longitude
10 Licensing IPR?

11 A. Apparently it is.

12 Q. Can you look at the last page of this
13 document.

14 A. Yes. Let me get there.

15 Q. Let me know when you are at page 107
16 of Exhibit 2051.

17 A. Yes.

18 Q. Is that your signature on page 107 of
19 Exhibit 2051, which is your declaration from
20 the Western Digital versus Longitude Licensing
21 IPR?

22 A. Yes.

1 Q. You can put that aside.

2 A. Yes.

3 Q. Let's go back to Exhibit 1041, which
4 is your reply declaration in this IPR?

5 A. Yes.

6 Q. Did you prepare Exhibit 1041?

7 A. Yes.

8 Q. How much time did you spend preparing
9 Exhibit 1041?

10 A. I don't recall how much time.

11 Q. Can you go to the last page of
12 Exhibit 1041.

13 A. Okay.

14 Q. Is that your signature on --

15 A. Yes.

16 Q. Let me -- let me ask the actual
17 question.

18 Is that your signature on the last
19 page of Exhibit 1041?

20 A. Yes.

21 Q. Did you sign this declaration,
22 Exhibit 1041, on May 3rd, 2024?

1 A. Yes.

2 Q. So how much time did you spend
3 preparing Exhibit 1041?

4 MR. KAPPOS: Object to form.

5 THE WITNESS: I have not calculated
6 how much time I have.

7 BY MS. ARMOND:

8 Q. Okay. But you signed it a little
9 over a month ago; correct?

10 A. Yes.

11 Q. But you don't remember how much time
12 you spent preparing it?

13 A. No.

14 Q. Have you sent Micron a bill for the
15 time that you spent preparing it?

16 A. Yes. Every month at the beginning of
17 the month I send an invoice for the previous
18 month.

19 Q. So on June 1st, you sent Micron an
20 invoice for your May time on this case?

21 MR. KAPPOS: Object to form.

22 THE WITNESS: As I mentioned, yes, I

1 send an invoice around the beginning of
2 the month for the previous month --

3 BY MS. ARMOND:

4 Q. Okay. So you -- so you just sent
5 them an invoice for your May time on this case,
6 yes?

7 MR. KAPPAS: Object to form.

8 THE WITNESS: At the beginning of the
9 month I send the invoice.

10 BY MS. ARMOND:

11 Q. Okay. So it is June 12. So on
12 June 1st you sent them an invoice,
13 approximately, for your May time on this case;
14 correct?

15 A. That is correct.

16 Q. So how much was the bill that you
17 sent them last week?

18 A. I don't recall.

19 Q. You don't remember how much time you
20 spent?

21 A. I do not.

22 Q. Can you give me an approximate amount

1 of time that you spent preparing Exhibit 1041?

2 A. I just don't recall. I can look it
3 up but I don't recall at this point.

4 Q. Can you look it up for me?

5 A. Sure.

6 Was there a question?

7 Q. Yeah. I asked approximately how much
8 time you spent preparing your reply
9 declaration, Exhibit 1041?

10 MR. KAPPOS: Object to form.

11 THE WITNESS: And I said, I don't
12 recall. I can look it up. You said, Oh,
13 you can look it up. But it is no -- I
14 cannot look it up until I -- during the
15 break and I go to my computer.

16 BY MS. ARMOND:

17 Q. Well, what were you just doing?
18 Because I asked you if you could look it up,
19 and you said yes.

20 A. Yes, but not right now.

21 Q. Oh, okay. All right. Well --

22 A. Sorry. Yeah.

1 Q. You can look it up for me on the
2 break.

3 A. Sure.

4 Q. Can you look it up for me on the
5 break?

6 A. I hope so. Because I'm not sure -- I
7 will try.

8 Q. Okay. Is there any reason you
9 couldn't look it up for me on the break on your
10 computer?

11 MR. KAPPOS: Object to form.

12 THE WITNESS: At this point I will
13 try my best to look it up.

14 BY MS. ARMOND:

15 Q. Okay. Let's -- okay. Can we turn to
16 paragraph 57 of your reply declaration,
17 Exhibit 1041. Let me know when you're there.

18 A. What page is that? Paragraph 51?

19 Q. 57.

20 A. 57.

21 Q. Yes.

22 A. Okay.

1 Q. Okay. So you're at paragraph 57 of
2 your declaration?

3 A. Yes.

4 Q. Okay. Do you see in paragraph 57 of
5 your reply declaration, Exhibit 1041, you have
6 a picture and a discussion of Figure 12B of the
7 Lee reference, which is Exhibit 1007?

8 A. Yes.

9 Q. Do you see right under Figure 12B you
10 have a sentence that says that you testified
11 about whether layers d, b, and e are conductors
12 or insulators?

13 A. Yes.

14 Q. Okay. As you sit here today, is it
15 your testimony that layers d, b, and e are
16 insulators?

17 A. As I sit here today, I still remain
18 that the Lee patent does not explicitly
19 describe the material of these layers d, b, and
20 e. So a person of ordinary skill in the art
21 and myself would not know whether these layers
22 d, b, and e are conductors or insulators.

1 Q. So your opinion, as you sit here
2 today, is you don't know what layers d, b, and
3 e in Lee's Figure 12B are; correct?

4 MR. KAPPOS: Object to form.

5 THE WITNESS: What I'm saying is that
6 Lee does not explicitly describe the
7 material of these layers. And, therefore,
8 one of ordinary skill in the art would not
9 know whether layers d, b, and e are
10 conductors or insulators.

11 BY MS. ARMOND:

12 Q. You don't know whether layers d, b,
13 and e are conductors or insulators in Lee's
14 Figure 12B; correct?

15 A. Since Lee does not explicitly
16 describe the material of these layers, a person
17 of ordinary skill in the art and myself would
18 not know whether these layers d, b, and e are
19 conductors or insulators.

20 MS. ARMOND: We've been going for
21 about an hour. Do you want to take a
22 break?

1 MR. KAPPAS: Sure.

2 MS. ARMOND: Okay. And then if you
3 can look up how much time you spent,
4 approximately, on your reply,
5 Exhibit 1041, that would be great. And we
6 can talk about it after the break. Let's
7 go off the record.

8 THE VIDEOGRAPHER: Okay. Going off
9 the record. The time is 9:58.

10 (Thereupon, a brief recess was taken.)

11 THE VIDEOGRAPHER: We are back on
12 record. The time is 10:16.

13 BY MS. ARMOND:

14 Q. So, Dr. Lee, did you look up about
15 how much time you spent preparing your reply
16 declaration, Exhibit 1041?

17 A. Yes.

18 Q. Approximately how much time did you
19 spend preparing Exhibit 1041?

20 A. I would say that it is between 50 to
21 75 hours around that, more than 50 hours.

22 Q. And that 50 to 75 hours was just for

1 the Exhibit 1041, reply declaration; correct?

2 MR. KAPPOS: Object to form.

3 THE WITNESS: Well, it is hard to
4 estimate because I already submit the
5 invoices. And, you know, since the
6 decision, the Institution decision came
7 out late last year, we already started
8 looking at how to respond to that. And
9 when the patent owners respond, we also
10 start looking and discuss about the
11 issues.

12 And specifically, you know, these are
13 all aiming toward drafting and give my
14 opinion on the declaration -- on my second
15 declaration. So it is hard -- it is not
16 that easy to separate where, you know --
17 how much time is discussions of -- of the
18 relevant issues and how much is directly
19 aiming at drafting the Exhibit 1041.

20 You see what I'm saying?

21 BY MS. ARMOND:

22 Q. Uh-huh.

1 Which invoices did you look at to
2 determine that you spent 50 to 75 hours?

3 MR. KAPPOS: Object to form.

4 THE WITNESS: I look at the past
5 number of months, say, from January to
6 May. And, again, if your question is how
7 much time devoted into drafting of 1041,
8 or versus how much time devoting to
9 preparing which involving discussions of
10 the issues is two different questions of
11 course. But overall I can estimate about
12 more than 50 hours.

13 BY MS. ARMOND:

14 Q. Did you start drafting your reply
15 declaration, Exhibit 1041, before
16 Dr. Przybylski provided his declaration in this
17 case?

18 A. I don't recall.

19 Q. So you don't remember if you started
20 drafting your reply declaration before
21 Dr. Przybylski drafted his declaration?

22 MR. KAPPOS: Object to form.

1 THE WITNESS: Again, I don't recall
2 exactly when we started to draft the reply
3 declaration. But for sure we are -- we
4 have discussed the Institution decisions
5 and the patent owners and the witness
6 response throughout early months of this
7 year.

8 BY MS. ARMOND:

9 Q. In preparing your reply declaration,
10 Exhibit 1041, did you do any of your own
11 research on thermal budgets or bonding?

12 A. Not sure what you mean by "your own."
13 Can you clarify that?

14 Q. Dr. Lee, did you go out and look for
15 any information yourself about thermal budgets
16 or bonding?

17 A. Thermal budget is well known in
18 the -- in the art how it is defined, and to
19 describe the effect of thermal effects, and
20 that is common knowledge. However, in order to
21 support the equations that I put in, I did
22 search for some documents to -- to support

1 that.

2 Q. So your testimony is that you
3 personally searched for some of the documents
4 that you cite in your reply declaration,
5 Exhibit 1041; correct?

6 MR. KAPPOS: Object to form.

7 THE WITNESS: Yes. There are many
8 documents I searched myself.

9 BY MS. ARMOND:

10 Q. What documents are those?

11 A. For example, including thermal
12 budget.

13 Q. I can ask you a more specific
14 question. Can you look at Exhibit 1041,
15 page 8, as your counsel has labeled it at the
16 bottom of the page.

17 A. Yes.

18 Q. This is part of your paragraph 5
19 where you list materials and information that
20 you reviewed.

21 Do you see that?

22 A. Yes.

1 Q. So do you see on, I guess,
2 paragraph 5I you mentioned Exhibit 1033?

3 A. Yes.

4 Q. Did you locate this Exhibit 1033
5 yourself, or was it provided by counsel?

6 A. I looked it up myself.

7 Q. How about Exhibit 1034, did you
8 locate that exhibit yourself?

9 A. Yes, I believe I -- I believe I did.

10 Q. How about Exhibit 1035, did you
11 locate that exhibit yourself?

12 A. Yes, I believe I did.

13 Q. Okay. And then look at Exhibit 1047
14 that you list in paragraph 5. Did you locate
15 that exhibit yourself?

16 A. I believe I did. But I'm not
17 100 percent sure.

18 Q. So could Exhibit 1047 have been
19 provided by counsel?

20 MR. KAPPOS: Object to form.

21 THE WITNESS: I believe I located,
22 but I'm not 100 percent sure.

1 BY MS. ARMOND:

2 Q. What about the next one,
3 Exhibit 1048, did you locate that exhibit, or
4 did counsel locate that exhibit?

5 A. Please remind me what that is.

6 Q. It's described as an article by
7 Lucovsky, I'm looking at Exhibit 1041,
8 paragraph 5N. It is an article from the
9 Japanese Journal of Applied Physics. Does that
10 help you?

11 A. Oh, you mean N, not M?

12 Q. Yeah, N, N.

13 A. N as in Nancy. Exhibit 1049;
14 correct?

15 Q. Correct.

16 A. Sorry. Yes, I did.

17 Q. So you located Exhibit 1049 yourself?

18 A. Yes.

19 Q. What about Exhibit 1050, did you
20 locate that exhibit yourself?

21 A. I believe I did. That I'm not --
22 yes, I believe I did. I'm not 100 percent

1 sure. More than 90 percent sure.

2 Q. Okay. What about, go to the next
3 page you list Exhibit 1059, which is a Ph.D.
4 dissertation to Thompson. Did you locate
5 exhibit --

6 A. I don't --

7 Q. Did you see Exhibit 1059?

8 A. Yes.

9 Q. Did you locate Exhibit 1059 yourself?

10 A. I don't recall exactly. But I
11 believe -- I believe one of -- one of the --
12 Exhibit 1059 and 1060, one of them, I located.
13 I remember. I don't know which one. And the
14 other one, I don't recall exactly who located
15 that one.

16 Q. Who located Exhibit 1059 or 1060
17 first, you or counsel?

18 MR. KAPPOS: Object to form.

19 THE WITNESS: I do not recall. If I
20 recall correctly, the first one was
21 located either by counsel or myself, and
22 then the second one I -- I located by

1 looking for the name of the authors.

2 That's -- that's my recollection. But I'm
3 not 100 percent sure the sequence of
4 events.

5 BY MS. ARMOND:

6 Q. Okay. And then go back up a page in
7 your declaration, Exhibit 1041. Number M as in
8 Mary lists Exhibit 1048. You recall that's a
9 patent to Thompson?

10 A. This is by Keith Thompson?

11 Q. Yes.

12 A. Yes.

13 Q. Okay. So there's a patent by
14 Thompson. There's a dissertation by Thompson.
15 And there is a publication by Thompson. Does
16 that sound right?

17 A. On the list, yes.

18 Q. So did you find one of the Thompson
19 references first, or did counsel? And I'm
20 referring to Exhibit 1048, 1059, and 1060.

21 A. I don't recall the sequence. But one
22 of us found the first one, and then I believe I

1 found the second one for sure. I think I found
2 maybe both first and second. The third I do
3 not recall. But regardless, I think -- I'm
4 pretty sure that I found at least one or two or
5 even three of them. But I believe that I
6 probably found one or two. I don't -- I just
7 don't recall.

8 Q. Let's change topics.

9 A. Yes, please.

10 Q. It is your opinion that one of skill
11 would understand the phrase "aspect ratio" in
12 the semiconductor field would refer to height
13 divided by width; correct?

14 A. As I stated on page 16 of my reply
15 declaration, near the bottom, that the correct
16 meaning of aspect ratio in the semiconductor
17 field is defined as the height over width. And
18 I gave several prior art supporting --
19 supporting that statement, Exhibit 1057,
20 Exhibit 1061, Exhibit 1062.

21 Q. Okay. Thank you.

22 So your opinion is that in the

1 semiconductor field "aspect ratio" means height
2 over width; right?

3 A. It is not just my opinion. It is an
4 opinion of a person of ordinary skill in the
5 art in the semiconductor field.

6 Q. Yes. And that opinion is, is that
7 one of ordinary skill would understand the
8 phrase "aspect ratio" in the semiconductor
9 field refers to height divided by width; right?

10 A. That is what I said on the -- in my
11 reply declarations.

12 MS. ARMOND: Okay. I'd like to
13 introduce Exhibit 1001 in this IPR.
14 (Thereupon, Exhibit 1001 was marked for
15 identification.)

16 MS. ARMOND: That is the '702 patent.
17 Let me know when you have that, Dr. Lee.

18 And also, Billy, when you have it up
19 on the screen.

20 THE WITNESS: Yes.

21 BY MS. ARMOND:

22 Q. Okay. So, Dr. Lee, do you recognize

1 Exhibit 1001 as the '702 patent in this IPR?

2 A. Yes.

3 Q. Can you go to column 9 of

4 Exhibit 1001.

5 A. Yes.

6 Q. Do you see in column 9, line 19 and
7 20 of the '702 patent, it says: One drawback
8 of the structure in Figure 20 is its high
9 aspect ratio which may cause toppling during
10 processing.

11 Do you see that?

12 A. Yes. Yes.

13 Q. Toppling here means falling over;
14 correct?

15 (Clarification by the reporter.)

16 MS. ARMOND: Falling over.

17 THE WITNESS: In the worst-case, yes,
18 it means that a high -- the aspect ratio
19 is very high. It can fall over. And --
20 but it also, even before completely
21 falling over, is spotted tilting --
22 (Clarification by the reporter.)

1 THE WITNESS: Spotted tilting during
2 the processing. And that is already not
3 desirable. It might make the chip
4 unfunctional -- nonfunction.

5 BY MS. ARMOND:

6 Q. So the '702 patent here is observing
7 that the structure of Figure 20 has a risk of
8 toppling during processing; right?

9 A. As is stated there, if the structure
10 in Figure 20 has a high aspect ratio, it might
11 cause toppling during the process.

12 Q. Is that a yes?

13 MR. KAPPOS: Object to form.

14 THE WITNESS: Your question is that
15 '702 patent said that the structure may
16 topple during the processing. And I'm
17 just forming what it says here, and the
18 answer is, yes, under certain condition it
19 might cause toppling during the
20 processing.

21 BY MS. ARMOND:

22 Q. Can a structure that is wider than it

1 is tall topple -- strike that. Let me ask that
2 again.

3 If you have a structure that is wider
4 than it is tall, it can't topple or fall over;
5 right?

6 MR. KAPPOS: Object to form.

7 THE WITNESS: It really depends on
8 the situations. The reason why a
9 structure can be distorted or topple
10 during the processing is because of the
11 stress created during the processing. So
12 if the stress is high enough, that even
13 for -- when you mentioned if the structure
14 is wider than its height, even that might
15 get -- might get distorted. But it really
16 depends on the particular processing.

17 Having said that, in general, the
18 higher the aspect ratio of the structure,
19 the higher chance that the structure will
20 topple during processing.

21 (Clarification by the reporter.)

22 THE WITNESS: Having said that, in

1 general, the higher the aspect ratio of
2 the structure, the more chance for the
3 structure to topple during processing.

4 BY MS. ARMOND:

5 Q. And a structure with a lower aspect
6 ratio would have lower risk or even no risk of
7 toppling during processing; correct?

8 MR. KAPPOS: Object to form.

9 THE WITNESS: In general, the lower
10 the aspect ratio of the structure, the
11 less chance for the structure to be
12 distorted during the deposition.

13 Again, it really depends on the
14 particular process, particular materials
15 surrounding the structure. So I would say
16 that when you say "no chance," I
17 wouldn't -- I wouldn't conclude that just
18 because it's low aspect ratio it has no
19 chance of toppling during processing.

20 BY MS. ARMOND:

21 Q. But would you agree that a structure
22 with a lower aspect ratio would have a lower

1 risk of toppling during processing?

2 A. In general, the lower the aspect
3 ratio of the structure, the lower the chance
4 for the structure to topple during the
5 processing. And conversely, the higher the
6 aspect ratio of the structure, the higher
7 chance for the structure to topple during
8 processing.

9 Q. So when the '702 patent is talking
10 about the risk of toppling in column 7, that is
11 due to its high aspect ratio; correct?

12 A. You mean in column 9? I didn't hear
13 you. Sorry.

14 Q. Yes. Let me ask the question again.
15 So when the '702 patent talks about
16 the risk of toppling at column 9, lines 19 to
17 20, that risk of toppling is due to the high
18 aspect ratio; correct?

19 MR. KAPPOS: Object to form.

20 THE WITNESS: As I mentioned, that
21 the toppling of a structure during the
22 processing not only due to high aspect

1 ratio but also due to the processing
2 itself and the materials surrounding the
3 structure, all that play -- all --
4 (Clarification by the reporter.)

5 THE WITNESS: -- and the surrounding
6 material that surround the structure and
7 the -- and the heating cycle, and maybe
8 various parameters of the processing can
9 affect whether the structure would topple
10 or not during processing.

11 BY MS. ARMOND:

12 Q. Column 9, lines 19 to 20 of the '702
13 patent says: One drawback of the structure in
14 Figure 20 is its high aspect ratio which may
15 cause toppling during processing.

16 Do you see that?

17 A. Yes.

18 Q. When you read that, do you understand
19 that the '702 patent is stating that the risk
20 of toppling is due to the high aspect ratio?

21 MR. KAPPAS: Object to form.

22 THE WITNESS: When I read that, as a

1 person of ordinary skill in the art
2 reading this would understand that one
3 possible cause of the structure to topple
4 during the process is the structure's
5 aspect ratio being high.

6 BY MS. ARMOND:

7 Q. So let's turn to Figure 20 of the
8 '702 patent. Tell me when you are there.

9 A. Yes, I'm there.

10 Q. Have you seen Figure 20 of the '702
11 patent before?

12 A. Yes.

13 Q. In Figure 20, is the memory cell
14 depicted as being much taller than it is wide;
15 right?

16 A. Well, first of all, one of ordinary
17 skill in the art would understand that drawings
18 in patents --

19 THE REPORTER: Doctor, can you move a
20 little closer to the microphone, please.

21 THE WITNESS: I am as close as I can
22 be. The microphone is in the ceiling.

1 And -- can you hear me okay?

2 THE REPORTER: It's very fuzzy.

3 BY MS. ARMOND:

4 Q. Let me ask the question again, and we
5 will try again.

6 In Figure 20 of the '702 patent, is
7 the memory cell structure shown as being much
8 taller than it is wide?

9 A. A person of ordinary skill in the art
10 would understand that the drawing in patents
11 and --

12 (Clarification by the reporter.)

13 THE WITNESS: -- the drawing, the
14 figures in patents and the journal papers
15 and in conference papers are not drawn to
16 scale unless specified.

17 So your question is that in Figure
18 20, that the structure is taller than its
19 width, you're assuming that the drawing is
20 drawn to scale, which is not true, which
21 is -- in general is not correct.

22

1 BY MS. ARMOND:

2 Q. So is it your opinion that the memory
3 cell shown in Figure 20 of the '702 patent is
4 not taller than it is wide?

5 A. I am saying that one cannot conclude
6 whether the structure is taller than its width.

7 Q. So are you not sure, looking at
8 Figure 20, whether the memory cell is taller
9 than it is wide?

10 A. I am saying that patent drawings
11 should not be presumed to be drawn to scale
12 without an explicit statement. And, therefore,
13 one should not assume that -- even though the
14 drawing shown one way or the other, one cannot
15 assume that, for example, in Figure 20, that
16 the structure has a taller dimension compared
17 to its width.

18 So the answer to your question is
19 that not only I, but a person of ordinary skill
20 in the art looking at the figure would not be
21 able to say that and assume that the drawing to
22 be drawn to scale, and, therefore, cannot

1 conclude one way or the other in terms of the
2 width with respect to the height.

3 Q. Is it your opinion then that
4 Figure 20 is unclear whether it is taller than
5 it is wide to you and a person of ordinary
6 skill in the art?

7 A. If you just look at the figure
8 itself, since figures are not drawn to scale,
9 one cannot presume that the relative dimensions
10 of height versus width. However, the passage
11 that we just read, in column 9, line 19 to 20,
12 that says: One drawback of the structure in
13 Figure 20 is its high aspect ratio which may
14 cause toppling during processing. That seems
15 to suggest that the height of the structure is
16 taller than the width.

17 However, '702 patent didn't say what
18 does it mean by high, the word "high." So --
19 but reading this, a person of ordinary skill in
20 the art would assume that high aspect ratio
21 probably means that it is higher than its
22 width.

1 Q. So reading column 9 of the '702
2 patent, would you conclude that Figure 20 has a
3 high aspect ratio and is at a risk of toppling?

4 MR. KAPPOS: Object to form.

5 THE WITNESS: As I mentioned
6 previously, looking at the pat- -- the
7 figure itself, one cannot assume that it
8 is drawn to scale, so, therefore, cannot
9 assume that the height is greater than its
10 width.

11 However, together with reading
12 column 9, line 19 to 20, regarding this
13 high aspect ratio which may cause toppling
14 during processing, one can safely assume
15 that its height is greater than its width,
16 but still it's not definitive.

17 MS. ARMOND: No further questions.

18 MR. KAPPOS: Can we take a break?

19 MS. ARMOND: Sure.

20 THE VIDEOGRAPHER: Going off the
21 record. The time is 10:53.

22 (Thereupon, a brief recess was taken.)

1 THE VIDEOGRAPHER: We are back on the
2 record. The time is 11:05.

3 FURTHER EXAMINATION

4 BY MR. KAPPOS:

5 Q. Professor Lee, I do have a couple of
6 questions for you.

7 Do you recall before the break you
8 were asked about Figure 20 in the '702 patent,
9 which is in Exhibit 1001?

10 A. Yes.

11 Q. And I think counsel's questions asked
12 about memory cell singular. Is there more than
13 one memory cell shown in Figure 20?

14 A. Yes.

15 Q. How many are there?

16 A. I would say four.

17 Q. And how are you coming up with a
18 number four? Can you explain how you're
19 counting them?

20 A. Well, there are four transistors.
21 And so, for example, you have the top n+, p,
22 p -- n+, a, p, that is one transistor. The

1 next one is n+, p, n+, okay. And then the next
2 one is p+, n+ -- p, n+, p, and then the next
3 one is p, n, p+. So it's basically four
4 transistors in the high -- in this -- in this
5 structure.

6 Q. So the record may be unclear on this,
7 so I'm going to go through this again.
8 Starting at the top, is the first transistor
9 formed or indicated by the p+, n, p?

10 A. Yes.

11 Q. Okay. So that is one. And then the
12 second transistor -- I'm going down from
13 there -- the second would be, n+, p, n+?

14 MS. ARMOND: Objection. Leading.

15 THE WITNESS: Yes. It is -- the next
16 one is n+, p, n+.

17 BY MR. KAPPOS:

18 Q. Okay. And we are going downward;
19 correctly? Right?

20 A. Yes, we are going downward.

21 Q. Okay. And then the third one, is
22 that the p, n+, p?

1 A. Yes.

2 MS. ARMOND: Objection. Leading.

3 THE WITNESS: p, n+, p.

4 BY MR. KAPPOS:

5 Q. Okay. And then the fourth and last
6 one is p, n, p+?

7 A. Yes.

8 MS. ARMOND: Objection.

9 THE WITNESS: p, n -- sorry.

10 BY MR. KAPPOS:

11 Q. So let me just ask you, that the last
12 two seem to overlap. It looks like the p is
13 included in the third and the fourth?

14 A. Right. The thing is that, as
15 described in Figure 20, in column 9, if you
16 read column 9, okay, that -- starting from
17 line 10 it says that: Figure 20 shows a
18 cross-sectional beam of an embodiment of the
19 present invention --

20 (Clarification by the reporter.)

21 THE WITNESS: Beam of an embodiment
22 of the present invention having negative

1 differential resistance based on -- based
2 vertically SRAM, S-R-A-M, cell, including
3 the vertical connections of two thyristor,
4 T-H-Y-R-I-S-T-O-R, slash, MOSFET pairs in
5 the stackable add-on layer.

6 So this is not an ordinary EPROM or
7 E-squared PROM or nonvolatile memory, but
8 is an SRAM.

9 (Clarification by the reporter.)

10 THE WITNESS: Nonvolatile memory. So
11 that is why the thyristor is basically a
12 four regions. Therefore, a thyristor is
13 unlike a simple transistor.

14 MR. KAPPOS: Okay. No further
15 questions.

16 MS. ARMOND: No further questions.

17 THE VIDEOGRAPHER: Okay. We are
18 going off the record. This deposition is
19 concluded at 11:11 a.m.

20 (Time Noted: 11:11 a.m.)

21

22

1 CERTIFICATE

2
3 I, the undersigned authority, hereby
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4 Date of deposition: June 12, 2024

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11 Page No. Line No. Change

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