1 UNITED STATES PATENT AND TRADEMARK OFFICE

2 BEFORE THE PATENT TRIAL AND APPEAL BOARD

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4 SAMSUNG ELECTRONICS CO. LTD., :

5 SAMSUNG ELECTRONICS AMERICA, INC., :

6 SAMSUNG SEMICONDUCTOR, INC., AND :

7 SAMSUNG AUSTIN SEMICONDUCTOR LLC, :

8 PETITIONER, : IPR2024-00534

9 v. : (PATENT 9,138,862)

10 CHIEN-MIN SUNG :

11 PATENT OWNER. :

12 ----------x

13

14 HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

15

16 VIDEOTAPED DEPOSITION OF MING-YI TSAI

17 TAICHUNG CITY, TAIWAN

18 WEDNESDAY, FEBRUARY 19, 2025

19 1:30 p.m.

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23 Job No.: 572613

24 Pages: 1 - 91

25 Reported by: Mark McClure, CRR

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3 Videotaped deposition of MING-YI TSAI, held in:
4
5 NATIONAL CHIN-YI UNIVERSITY OF TECHNOLOGY
6 NO. 57, SECTION 2
7 ZHONGSHAN ROAD
8 TAIPING DISTRICT
9 TAICHUNG CITY 411030
10 TAIWAN
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19 PURSUANT TO NOTICE, BEFORE MARK MCCLURE, REGISTERED
20 PROFESSIONAL REPORTER AND CALIFORNIA CERTIFIED SHORTHAND
21 REPORTER NO. 12203.
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25

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TAI LEE, THE LEAD INTERPRETER
10
(APPEARING IN PERSON)
11 JOSEPH TSENG, THE CHECK INTERPRETER
12
13
14
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C O N T E N T S

EXAMINATION OF MING-YI TSAI PAGE
BY MR. HA 7
BY MR. CHAN 69

E X H I B I T S

(Attached to transcript)

TSAI DEPOSITION EXHIBITS PAGE
Exhibit 1044 Dressing characteristics of Oriented Single Diamond on CMP Polyurethane Pad - 14 pages 35
Exhibit 1045 Effect of CMP Conditioner Diamond Shape on Pad Topography and Oxide wafer Performances - 10 pages 35
Exhibit 1046 International Journal of Machine Tools & Manufacture - 8 pages 65

1 E X H I B I T S
2 PREVIOUSLY MARKED
3 (Attached to transcript)


| 4 TSAI DEPOSITION EXHIBITS | PAGE |
|---|---|
| 5 Exhibit 1004 | 11 |
| 6 Exhibit 1005 | 55 |
| 7 Exhibit 2004 | 69 |
| 8 Exhibit 2011 | 13 |


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1 PROCEEDINGS
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3 TAI LEE and JOSEPH TSENG
4 were previously sworn to interpret the
5 Mandarin Chinese language.
6
7 MING-YI TSAI,
8 having been previously sworn, was examined
9 and testified as follows:
10
11 EXAMINATION
12 BY MR. HA:
13 Q. Welcome back, Dr. Tsai.
14 I know you were rubbing your eyes and whatnot.
15 I'm sorry you're feeling tired, but is there
16 any reason why you couldn't continue to provide accurate
17 and truthful testimony?
18 A. No.
19 Q. How much time did you spend overall to prepare
20 for today's deposition?
21 A. (In English) I don't remember.
22 Q. Was it two days?
23 A. More than that.
24 Q. Five days?
25 A. Also more than that.

1 Q. Ten days?
2 A. Are you talking about from the beginning to
3 the present time?
4 Q. Sure.
5 A. Maybe more.
6 Q. Fifteen days?
7 A. It's from time to time. Sometimes I run the
8 preparation. I don't remember exactly how much time.
9 Q. But it's definitely more than 10?
10 A. Yes.
11 Q. Do you think it's less than 20.
12 A. I don't remember exactly how much time.
13 Q. How about between Monday to today, how much
14 time did you spend preparing for today's deposition?
15 A. Maybe several hours.
16 Q. Can you estimate how many hours?
17 A. Starting from Monday till now?
18 Q. Yes.
19 A. I think it was probably around three to four
20 hours, but anyway, on and off, putting together, about
21 three to four hours.
22 Q. Did you spend three to four hours with counsel
23 or by yourself preparing for the deposition?
24 A. Mostly preparing by myself.
25 Q. How much time did you spend preparing with

1 counsel?
2 MR. CHAN: Objection. I caution the witness
3 not to disclose any attorney-client privileged
4 information.
5 To the extent you can answer this question
6 without doing so, you may proceed.
7 THE WITNESS: I don't remember.
8 BY MR. HA:
9 Q. Was it one hour?
10 A. I already don't remember.
11 Q. Was it two hours?
12 A. I don't remember.
13 Q. Ten minutes?
14 A. I don't remember.
15 Q. You can't provide any estimate in the amount
16 of time you spent with counsel?
17 A. I already don't remember it.
18 Q. Was it a short conversation over the phone or
19 in person?
20 A. We discussed by using the phone.
21 Q. And you don't remember how long you talked to
22 counsel over the phone, although it happened yesterday?
23 A. Well, I did ask the counsel about when we're
24 going to start to do our deposition?
25 Q. That's your answer?

1 A. Yes.
2 Q. So you can't estimate the length of time,
3 correct?
4 A. (In English) I don't remember.
5 Q. Which documents did you review to prepare for
6 the deposition?
7 A. I reviewed those papers that we just had
8 earlier, plus my declaration, and also, I reviewed the
9 relevant patents.
10 THE CHECK INTERPRETER: "I reviewed the papers
11 that I previously mentioned, plus my declaration. And
12 also, I reviewed patents."
13 BY MR. HA:
14 Q. And when you say "previously mentioned,"
15 you're talking about the papers we discussed in the
16 earlier '270 deposition, correct?
17 A. Yes, mainly reviewed that paper, plus another
18 paper.
19 Q. What is the other paper?
20 A. Okay, that paper titled "Single Diamond" and
21 something, and that was -- that is shown in my
22 declaration.
23 Q. Did you review any other papers?
24 A. No, I was just scanning through these papers.
25 Q. When you said you reviewed patents, do you

1 mean the '862 patent, the '207 patent and the '802
2 patent?
3 MR. CHAN: Objection. Form.
4 THE WITNESS: I was just generally reviewed
5 '026, and also double-checked the key points of '862.
6 THE CHECK INTERPRETER: Check rendition: "I
7 just generally reviewed '026. I don't remember -- I
8 double-checked the key points of '862."
9 BY MR. HA:
10 Q. When you say '026, you're talking about the
11 prior reference Sung '026?
12 A. It is a patent.
13 Q. Well, Sung '026 is a patent, correct?
14 A. It looks like --
15 MR. CHAN: Objection. Form. It's actually an
16 application.
17 THE WITNESS: (In English) I don't
18 understand.
19 BY MR. HA:
20 Q. Would you review Exhibit 1004.
21 A. Yes.
22 Q. So that's the '026 that you're talking about?
23 A. Yes.
24 Q. And the paper that you're talking about -- and
25 I'm handing you Exhibit 2002 -- is this what you

1 reviewed?
2 A. Yes.
3 Q. Is there any other paper that you reviewed?
4 A. Another paper.
5 Q. What's the title of that paper?
6 A. The title seems like "Diamond and Related
7 Material."
8 Q. Is that an exhibit that's already made of
9 record?
10 A. It talks about ODD.
11 Q. Is the title "Organic Diamond Disk Versus
12 Brazed Diamond Disk for Dressing a Chemical-Mechanical
13 Polishing Pad"?
14 A. Yes.
15 Q. Okay. So in an effort to help you get back to
16 your father quickly, I'm not going to re-ask the same
17 questions that I already asked you in Day 1, but the
18 same ground rules stand.
19 Is that clear?
20 A. Okay.
21 Q. Oh, actually, one quick cleanup question.
22 Did you review the '802 patent in preparation
23 for today's deposition?
24 A. I did not review it in this time period, but I
25 reviewed it before that.

1 Q. Okay. And before that includes some of the
2 greater than 10 days of deposition preparation that you
3 did?
4 A. The answer is yes.
5 Q. I'm going to hand you Exhibit 2011, which is a
6 copy of your declaration from the '862 patent.
7 Do you recognize it?
8 A. Yes.
9 Q. Can you turn to paragraph 12 of your
10 declaration.
11 Are you there, sir?
12 A. Yes.
13 Q. You talk about two different papers in
14 paragraph 12, correct?
15 A. Yes.
16 Q. And the second paper is titled "Dressing
17 Characteristics of Oriented Single Diamond on CMP
18 Polyurethane Pad," right?
19 A. Yes.
20 Q. And this is the paper that you reviewed as
21 part of your preparation for your deposition today,
22 right?
23 A. Yes.
24 Q. Can you turn to Figure 1 of Exhibit 2002,
25 which is that same paper.

1 A. Okay.
2 Q. So let's start with the top of page 93. The
3 first sentence says there: "A typical orbital-type CMP
4 system has two main parts, polishing action and dressing
5 action."
6 Do you see that?
7 A. Yes.
8 Q. And it's referring to Figure 1 in that
9 sentence, correct?
10 A. Yes.
11 Q. So Figure 1 on the bottom is showing a typical
12 CMP system, right?
13 MR. CHAN: Objection. Form.
14 THE WITNESS: Yes.
15 BY MR. HA:
16 Q. And that typical CMP pad system has a
17 polishing section and a dress- -- sorry, polishing
18 action section and a dressing action section, correct?
19 A. Yes.
20 Q. I'm going to hand you a pen. Can you draw for
21 me on Figure 1 the portion that shows the polishing
22 action and another circle that shows the dressing
23 action, and label it for me, please.
24 THE LEAD INTERPRETER: He's writing in
25 Chinese.

1 MR. CHAN: Let the record reflect that he's
2 also writing in English.
3 MR. HA: Yes, agreed.
4 Q. Then let's go to the last paragraph of this
5 paper. I'm sorry, last paragraph on page 93.
6 Do you see the paragraph that starts with "For
7 CMP to continue"?
8 A. Yes.
9 Q. It says: "A diamond pad conditioner is
10 typically employed periodically and continually, either
11 in situ dressing in which conditioning is conducted
12 during wafer polishing, or an ex situ dressing in which
13 conditioning is conducted after wafers have been
14 polished to regenerate the asperity structure of the
15 pad."
16 Do you see that?
17 Actually, Dr. Tsai, you know, you're
18 proficient in reading English.
19 You don't need words that are printed on the
20 paper read back to you, right?
21 A. Yes.
22 Q. So can you read it?
23 A. Yes. I can read this section.
24 Q. Okay. Any words that are written in English
25 you can read proficiently, correct?

1 A. It depends. Basically, I am okay.
2 Q. Okay. So as much as you can, whenever the
3 words are written in English, let's just have you read
4 it directly without the translation happening.
5 A. Okay.
6 Q. And if you ever need translation, just let us
7 know, but just to speed things up, let's try to do that
8 moving forward.
9 Is that fair?
10 A. Okay.
11 Q. So can you explain to me, using this figure,
12 how dressing is carried out based on what you said here
13 on the bottom of page 93?
14 A. Just based on this figure, only on this
15 figure, I can tell you that there is a dresser that
16 rotates and there is a pad that also rotates, and
17 generally, the dresser can also horizontally slide back
18 and forth, and it can also scan like a fan, moving like
19 a fan, so that's what this figure is.
20 Q. Got it.
21 I don't see any horizontal arrows on Figure 1,
22 but if I understood you correctly, you're saying that
23 the dresser moves parallel to the CMP pad surface, is
24 that right?
25 A. That is, it has a moving action. It can be

1 either horizontally or move like a fan.
2 Q. When you say "fan," you mean about a central
3 axis?
4 A. Yes.
5 Q. And are the dresser -- is the dresser and the
6 CMP pad touching each other?
7 A. They must touch to each other in order to do
8 the conditioning.
9 MR. CHAN: Let the record reflect that the
10 witness was swiping his arm left and right. And you can
11 also clarify what the arm action --
12 MR. HA: That sounded very clear to me, so
13 great. Okay.
14 Q. In order for the CMP pad dresser and the CMP
15 pad to become -- come into contact with each other, how
16 do you achieve that in this typical CMP pad system?
17 A. The dresser itself has a weight. Therefore,
18 based on that, it can do this kind of a move.
19 Q. Got it.
20 So the weight is then acted upon by gravity to
21 bring down the dresser onto the CMP pad, is that right?
22 MR. CHAN: Objection. Form. Argumentative.
23 THE WITNESS: Traditionally, they use its own
24 weight to make the contact, but if there's a design,
25 that design will hold this dresser there. Then how this

1 dresser is contacting the pad, that I don't know, but
2 traditionally, they usually rely on its own weight.
3 BY MR. HA:
4 Q. Got it.
5 So in this typical orbital type CMP system,
6 the diamond dresser comes into contact with the CMP pad
7 using, typically, its own weight and gravity?
8 MR. CHAN: Objection to form. Misstates
9 testimony.
10 THE WITNESS: There are many ways to do so.
11 This is one of them. There are other ways to do that.
12 And for me, I often use this way.
13 BY MR. HA:
14 Q. Okay. Is this often used throughout the
15 industry?
16 MR. CHAN: Objection. Form.
17 THE WITNESS: Because in the industry, there
18 are many equipments with them. Therefore, as to what
19 way they are using, I'm not so clear about it.
20 BY MR. HA:
21 Q. Okay. Let's go back to paragraph 12 of your
22 declaration, please. The first paper you talk about
23 there is called "Novel Diamond Conditioner Dressing
24 Characteristics of the CMP Polishing Pad," right?
25 A. (In English) Yes.

1 Q. And this is Exhibit 2003 that I'm handing you.
2 Exhibit 2003 is a copy of that paper you just
3 read at paragraph 12, correct?
4 A. (In English) Yes.
5 Q. Now, I don't see a figure in Exhibit 2003, but
6 if you go to page 724, I see a section that says
7 "Experimental Apparatus."
8 Do you see that?
9 A. (In English) Okay.
10 Q. Okay. So under that "Experimental Apparatus"
11 section, you state, "The dressing experiments were
12 performed using a commercially modified polishing
13 machine with a variable speed and a polishing plate with
14 a diameter of 200 millimeters on which a polishing pad
15 was mounted," correct?
16 A. (In English) Yes.
17 Q. The commercially modified polishing machine --
18 is that similar to what we just saw in Figure 1 of
19 Exhibit 2002?
20 MR. CHAN: Objection. Form. Argumentative.
21 THE WITNESS: This equipment was designed by
22 myself.
23 BY MR. HA:
24 Q. So what you see in Figure 1 of Exhibit 2002,
25 it's not representative of the commercially modified

1 polishing machine?
2 A. That particular paper was only stating the
3 behavior of a single diamond, and it did not talk about
4 the polishing action.
5 Q. Okay.
6 A. That figure was just an illustration. Whereas
7 here, in this section, in order to polish wafers, we had
8 designed by ourself a dressing -- polishing machine.
9 Q. Let's continue reading. It says -- we're back
10 in Exhibit 2003.
11 Are you with me, in the experimental section?
12 The next sentence says: "The diamond pad
13 conditioner was attached to a holder which was connected
14 to a head that rotated at 120 rpm."
15 Correct?
16 A. (In English) Okay.
17 Q. So the diamond pad conditioner is rotating
18 like this, and I'm making swirly movements on the table
19 like this, right? The CMP pad dresser is rotating like
20 this at 120 rpm, correct?
21 A. Yes.
22 Q. The next sentence says: "A polyurethane pad
23 was mounted on the table disk that rotated at 110 rpm,"
24 correct?
25 A. Yes.

1 Q. So that means you have -- if you could just
2 look at me real quirk, Doctor.
3 So that means that a polyurethane pad was on a
4 table disk and that CMP pad also rotated, and I'm again
5 doing a swirly motion, at 110 rpm, is that right?
6 MR. CHAN: Object to form.
7 BY MR. HA:
8 Q. In this system, is the table disk on which the
9 polyurethane pad was mounted -- is it moving up and
10 down, or is it stationary vertically?
11 MR. CHAN: Objection. Form.
12 THE WITNESS: (In English) Repeat again,
13 please.
14 BY MR. HA:
15 Q. Sure.
16 So the polyurethane pad was mounted on the
17 table disk, correct?
18 A. Uh-huh.
19 Q. And the table disk -- is it moving up and down
20 or staying stationary and only rotating?
21 MR. CHAN: Objection. Form.
22 THE WITNESS: Generally, the way of using that
23 is this pad, this table disk where the pad is mounted is
24 stationary, sitting there and rotate, where the diamond
25 disk is on top of it and it rotates and also move

1 around, move back and forth.
2 BY MR. HA:
3 Q. Got it. Okay.
4 Let's continue reading. It says: "The
5 applied load was about 60 N."
6 Do you see that?
7 A. Yes.
8 Q. What does "N" stand for?
9 A. Newton.
10 Q. So 60 newtons is the applied load, correct?
11 A. Yes.
12 Q. How do you apply the load? Can you explain
13 what the "applied load" means?
14 A. Based on my recollection, it uses its own
15 weight. If the weight is not enough, we will add more
16 load, more weight.
17 Q. So you're adding weight to the CMP pad dresser
18 such that it presses down onto the CMP pad with 60
19 newtons of applied load?
20 MR. CHAN: Objection. Form. Argumentative.
21 THE WITNESS: Generally, we will apply a load
22 to it.
23 BY MR. HA:
24 Q. So when you applied the load, the CMP pad
25 dresser presses down onto the CMP pad, right?

1 MR. CHAN: Objection. Form. Argumentative.
2 THE WITNESS: In principle, for my own
3 experiments, that's the way I usually do it, but I do
4 not know about other people.
5 BY MR. HA:
6 Q. So in your experiments discussed here in
7 Exhibit 2003, the CMP pad dresser presses down onto the
8 CMP pad when you apply the load, correct?
9 MR. CHAN: Objection. Form. Argumentative.
10 THE WITNESS: Well, I still stress that this
11 was the way that I did when I did this paper, but I
12 don't know about how other people does it.
13 BY MR. HA:
14 Q. Well, how about Dr. Sung, because he's one of
15 the named co-authors on this paper, did Dr. Sung utilize
16 such a system?
17 MR. CHAN: Objection. Form.
18 THE WITNESS: I don't know about that, but for
19 this experiment, I completed it entirely in my own lab.
20 BY MR. HA:
21 Q. And you shared those results with Dr. Sung,
22 correct?
23 MR. CHAN: Objection. Form. Argumentative.
24 THE WITNESS: I shared my experimental data to
25 Kinik.

1 BY MR. HA:
2 Q. Okay. And Dr. Sung was the general manager at
3 Kinik, correct?
4 A. (In English) I'm not sure.
5 Q. Then let me re-ask.
6 Dr. Sung was a supervisor at Kinik, correct?
7 A. Well, I know he was a supervisor at the time
8 at Kinik. I wasn't sure whether he was the general
9 manager or not, but anyway, he was in a very high level
10 position. Everyone called him Dr. Sung.
11 Q. Okay. And Dr. Sung is listed as a co-author
12 on Exhibit 2003, correct?
13 A. Yes.
14 Q. And people at Kinik did not -- actually,
15 strike that.
16 Let's move on to the next exhibit, which is
17 Exhibit 1014. Exhibit 1014 -- and I actually believe
18 you talk about this paper in paragraph 11 of your
19 declaration as well. I'm sorry, 10 of your declaration.
20 A. Yes.
21 Q. Can you -- on Exhibit 1014, can you please
22 turn to page 5. It's got the section Experimental
23 Apparatus again.
24 And let's just start reading there again.
25 "The dressing experiments were conducted using a

1 polishing pad mounted on a commercially modified
2 polishing machine (Figure 4) that had a variable speed
3 control."
4 Do you see that?
5 A. Yes.
6 Q. And on the previous page, there's Figure 4.
7 If you can turn to Figure 4.
8 Is it the commercially modified polishing
9 machine you were talking about?
10 A. This is one of the machine sets.
11 Q. It's one example of a commercially modified
12 polishing machine that you talk about in this paper,
13 correct?
14 A. Yes.
15 Q. Now, Figure 4 shows two parts: Part A, which
16 is the dressing system; and part B, which is a polishing
17 system.
18 Do you see that?
19 A. Yes.
20 Q. So I'm a little confused.
21 Are Figures 4A and 4B on the same machine but
22 just pictured differently, or are they on two separate
23 machines?
24 A. They are located on the same machine but just
25 pictured separately.

1 Q. Got it.
2 So 4A is the dressing system, correct?
3 A. Yes.
4 Q. So it must have a pad conditioner somewhere,
5 is that right?
6 A. Yes.
7 Q. Can you annotate on Figure 4A for me where the
8 CMP pad dresser is? Can you label it for me?
9 And where is the CMP pad?
10 MR. CHAN: Let the record reflect that
11 Dr. Tsai drew a circle in the left-hand lower corner,
12 which reads "CMP pad."
13 THE WITNESS: All of this area is CMP pad.
14 BY MR. HA:
15 Q. When you say "this," you're talking about the
16 white region on the bottom, correct? The circular white
17 region, correct?
18 A. (In English) Yes.
19 Q. And we're going to submit that into evidence
20 as a separate exhibit so I don't think we need to worry
21 too much about trying to make the record clear.
22 So let's go back to the experimental section.
23 The next sentence says: "The diamond pad
24 conditioner was attached via a connecting holder to a
25 rotating head spinning at 40 rpms," correct?

1 A. (In English) Yes.
2 Q. So the part that you drew or annotated as CMP
3 pad dresser is rotating at 40 rpms, right?
4 A. (In English) Yes.
5 Q. And a polyurethane pad was mounted on a table
6 disk that rotated at a speed of 50 rpms, do you see
7 that?
8 A. Yes.
9 Q. So the white CMP pad on the bottom is rotating
10 at 50 rpms, correct?
11 A. Yes.
12 Q. "The oscillation speed of the conditioner was
13 fixed at about 5 millimeters per second."
14 Can you explain what that sentence means to
15 me, please?
16 A. That is a diamond disk. Pad rotates and the
17 disk moves.
18 Q. Moves parallel to the surface of the CMP pad
19 dresser, back and forth?
20 A. Yes, parallel.
21 Q. Okay, great.
22 And then the next sentence says: "The applied
23 load was fixed at 3 kilograms."
24 Can you explain that sentence for me, please?
25 A. They apply a load on top of a diamond disk.

1 The total weight, including the weight of the diamond
2 disk, is about 3 kilo.
3 Q. So you have sort of the head with the diamond
4 disk that's pressing down onto the CMP pad with a load
5 of about 3 kilograms?
6 MR. CHAN: Objection. Form. Argumentative.
7 THE WITNESS: That is the condition of my
8 experiments, but I do not know about other people's
9 condition.
10 BY MR. HA:
11 Q. Okay. Can you go to figure -- well, actually,
12 before you do that.
13 When you applied the load onto the CMP pad,
14 there's friction that gets generated between the CMP pad
15 dresser and the CMP pad, correct?
16 MR. CHAN: Objection. Form. Argumentative.
17 THE WITNESS: The friction force is a way of
18 doing a measurement.
19 BY MR. HA:
20 Q. Is there friction that gets generated when the
21 CMP pad is getting dressed by the CMP pad conditioner?
22 MR. CHAN: Objection. Form.
23 THE WITNESS: Usually, we don't just say
24 friction, we don't mention just like that. We would
25 say we would change its torque force or friction force.

1 BY MR. HA:
2 Q. So, then, let me rephrase.
3 Is there friction force that gets generated
4 when a CMP pad is dressed by a CMP pad dresser?
5 MR. CHAN: Objection. Form.
6 THE WITNESS: Well, from the viewpoint of
7 doing research, we can measure the change of torque
8 force, and through that change of the torque force, we
9 can measure the friction force.
10 BY MR. HA:
11 Q. And that's why you measured the friction force
12 using the friction force measurement setup shown in
13 Figure 6, correct?
14 MR. CHAN: Objection. Form. Misstates
15 testimony.
16 THE WITNESS: For my experiment, yes, I was
17 using this mode.
18 BY MR. HA:
19 Q. Okay. And in Figure 6, it shows a downward
20 force on the diamond disk pressing against the CMP pad,
21 correct?
22 MR. CHAN: Objection. Form. Argumentative.
23 THE WITNESS: Figure 6 is an illustration to
24 illustrate the entire action.
25 BY MR. HA:

1 Q. Okay. So using Figure 6 -- actually, let me
2 step back.
3 Are you aware of something called Newton's
4 third law of motion?
5 A. Are you referring to that applied force equals
6 to the anti-applied force, or F equals to MA?
7 Q. I think the applied force to the anti-applied
8 force -- I'm not really sure.
9 A. Force equals to anti-force.
10 Q. Well, let me give you my understanding of
11 Newton's third law of motion, and maybe you can correct
12 me if I'm wrong about that.
13 MR. CHAN: Try not to inject your own
14 testimony.
15 Let the record reflect that Dr. Tsai did not
16 say anything about force or anti-force.
17 MR. HA: Okay. Let's clean up the record. I
18 appreciate that. This is handy, that my opposing
19 counsel here knows how to speak Chinese. So let me ask
20 the question.
21 Q. Please let me know if my understanding of
22 Newton's third law of motion is accurate.
23 My understanding of Newton's third law of
24 motion is that whenever a first object exerts a force on
25 a second object, that second object exerts an equal and

1 opposite force on the first object.
2 Is that correct?
3 MR. CHAN: Objection. Form.
4 THE WITNESS: From theoretical viewpoint, it
5 is okay, but in practical situation, it may not be so.
6 BY MR. HA:
7 Q. Okay. Looking at Figure 6, I see one force
8 that's acting on the diamond disk, which is then acting
9 on the CMP pad.
10 Do you agree?
11 A. Well, this is an illustration. It illustrates
12 that we will apply a force on the top of it, and then
13 this force will then apply to the pad.
14 THE CHECK INTERPRETER: Check rendition:
15 "This is an illustration which illustrates that we will
16 apply a force, and, of course, the force will allow the
17 dresser to touch the pad."
18 BY MR. HA:
19 Q. And based on Newton's third law of motion,
20 will there be an equal and opposite force that is acting
21 against the force that's shown here on Figure 6?
22 MR. CHAN: Objection. Form.
23 THE WITNESS: Just like I said, in theory,
24 it's okay, but in reality, there are many factors to be
25 considered. Therefore, it may not be that the equal and

1 opposite force acting back.
2 BY MR. HA:
3 Q. I mean, Figure 6 is just the schematic,
4 correct?
5 A. That's right.
6 Q. So based on the theoretical physics of
7 Newton's third law of motion, can you draw for me where
8 the equal and opposite force will be exerted in Figure
9 6?
10 A. I think it is a little bit difficult to do so
11 because they are all rotating, and also sliding around.
12 So it's difficult to indicate the force.
13 Q. Okay. Then let's remove all rotation and
14 sliding forces.
15 Purely based on the vertical downward force
16 that's shown, can you draw for me the equal and opposite
17 force that would be present in Figure 6 based on
18 Newton's third law of motion?
19 MR. CHAN: Objection. Form. Relevance.
20 Beyond the scope.
21 THE WITNESS: Well, if it's in the classroom,
22 we can assume perfect condition, there's no issue, no
23 problem at all. But in reality, here, this is a very
24 complicated situation. A lot of movements around. So
25 it's difficult to draw.

1 BY MR. HA:
2 Q. Sure.
3 Then let's assume a perfect classroom
4 condition.
5 Assuming a perfect classroom condition,
6 without any rotation or sliding forces, can you draw for
7 me the equal and opposite force that would be exerted
8 against the downward force that you see in Figure 6?
9 MR. CHAN: Objection. Form. Relevance.
10 Beyond the scope.
11 THE WITNESS: Just like I said, if we have a
12 very perfect condition and in the -- in the academic
13 type of a study, perfect condition is there, then, of
14 course, I can draw something like this. There is one
15 object on the left, apply a force, another object on the
16 right, and if you apply a force from the left, the
17 opposite force will be generated from the right to the
18 object. And that would be the situation, under the
19 perfect condition.
20 But I need to stress that in real situation,
21 it's not so.
22 BY MR. HA:
23 Q. May I get a copy of your annotation, please?
24 MR. CHAN: Can we actually mark this?
25 MR. HA: I will. Let me finish this line of

1 questioning.
2 I want to make the record clear that Dr. Tsai
3 drew two boxes with arrows pointing left and right with
4 F on the left and right side of that, and he drew that
5 in black.
6 On this same exhibit, I'm going to draw in
7 red -- this is counsel's annotation -- that shows an
8 upward arrow against a downward force on Figure 6.
9 Q. Assuming perfect classroom condition, is that
10 red arrow an accurate illustration of the equal and
11 opposite force that would be exerted?
12 MR. CHAN: I want to make clear for the record
13 that the red arrow is drawn right below the gray box,
14 whatever that represents.
15 Objection. Form. Relevance.
16 THE WITNESS: Well, actually, to my
17 understanding and my knowledge, the force would be not
18 like this on here, because based on CMP technology, the
19 loading would be much bigger in polishing the wafers,
20 and in addition, this bottom disk is in reality a very
21 stably fixed there. It may not be having any opposite
22 force generated like this.
23 BY MR. HA:
24 Q. I'm going to hand you a green-colored pen.
25 Can you correct any inaccuracies on that

1 annotation of mine, please.
2 MR. CHAN: Objection. Form. Relevance.
3 THE WITNESS: I still want to stress that in
4 terms of CMP, it's dressing force is rather very, very
5 small. It would not create any situation like this.
6 BY MR. HA:
7 Q. Okay. I'd like to move those two papers that
8 you marked up into evidence, if you give me the copies
9 back.
10 THE CHECK INTERPRETER: Check rendition: "I'd
11 like to mention that in terms of the entirety of the
12 CMP, the force exerted by the dresser is actually very
13 small and it would not result in such a situation."
14 MR. CHAN: Both of you are good.
15 MR. HA: Some recordkeeping. What was
16 previously Exhibit 1014, Dr. Tsai marked up, and I'm
17 going to enter this into evidence as Exhibit 1044.
18 (Tsai Deposition Exhibit 1044 was marked for
19 identification and is attached to the transcript.)
20 MR. HA: And also, Dr. Tsai marked up
21 previously marked Exhibit 2002, and so I'm going to move
22 that into evidence as Exhibit 1045.
23 (Tsai Deposition Exhibit 1045 was marked for
24 identification and is attached to the transcript.)
25 MR. HA: Let's take a break.

1 (A recess was taken from 2:44 p.m. to 3:01
2 p.m.)
3 BY MR. HA:
4 Q. Let's switch gears a little bit. I'm just
5 going to read back one of the testimony you provided to
6 me on Monday.
7 "QUESTION: So you don't understand the Legal
8 Understanding section in your declarations, correct?
9 "ANSWER: For those, indeed, I don't have much
10 understanding."
11 So I just wanted to make clear what
12 subsections are in your Legal Understanding section of
13 the '862 declaration. Can you flip to page 3 of your
14 declaration, please.
15 So on page 3, right above paragraph 13, I see
16 the section Relevant Legal Principles, correct?
17 A. Uh-huh.
18 Q. Right below paragraph 13, I see Patent Claims.
19 And then right below paragraph 14, I see
20 Anticipation.
21 And right below paragraph 16, I see
22 Obviousness.
23 And then after paragraph 25, your Relevant
24 Legal Principles section ends, is that correct?
25 A. Yes.

1 Q. So your testimony from Monday is still
2 accurate, correct, that you do not have much
3 understanding on the relevant legal principles of patent
4 claims, anticipation and obviousness, correct?
5 MR. CHAN: Objection. Form. Misstates
6 testimony.
7 THE WITNESS: That's right, I may not have a
8 good understanding to them.
9 BY MR. HA:
10 Q. Okay. I also want to explore what your legal
11 understanding is on legal principles that are not in
12 paragraphs 13 through 25 of your declaration.
13 Do you have an understanding of the legal
14 principles regarding enablement?
15 A. My understanding to it is that it can be
16 enabled.
17 Q. What do you mean by "it"?
18 A. I think it represents the thing that the
19 patent indicates.
20 Q. Are you talking about the invention?
21 A. (In English) Maybe, yes.
22 Q. Do you know what requirements must be met
23 before an invention in a patent can become enabling or
24 not?
25 A. I don't understand.

1 Q. Which part of my question do you not
2 understand?
3 A. (In English) I'm not sure.
4 (In Chinese) So are you asking that the
5 content that this person wrote in patent can be
6 replicated or repeated by the other person? Is that
7 what you mean?
8 THE CHECK INTERPRETER: Check rendition: "I'm
9 not sure, but it perhaps means that what is indicated
10 about the invention will allow another person to
11 reproduce it, right?"
12 I don't think the question is addressing
13 counsel. He was asking -- he was thinking about his
14 answer.
15 THE LEAD INTERPRETER: No, I know that he's
16 trying to get you to clarify it.
17 MR. HA: So he wants clarification to my
18 question. Okay. Let me try.
19 Q. U.S. law has a concept called enablement,
20 which has certain requirements.
21 Do you know what those requirements are to
22 meet the enablement requirement?
23 A. I don't know.
24 Q. Do you know if the enablement requirement
25 changes depending on whether a document is used for

1 prior art purposes versus a document for which you are
2 claiming an earlier priority date?
3 A. I don't know.
4 Q. Do you know whether the law on enablement
5 applies to the claim as a whole or to individual
6 limitations of the claim.
7 A. (In English) I don't know.
8 Q. Well, let's explore one of the legal
9 principles you stated in paragraph 14 of your
10 declaration.
11 You state here, "I understand that independent
12 claims are read separately, whereas dependent claims are
13 based on limitations of another independent and/or
14 dependent claim."
15 Do you see that?
16 And, Tai, this is written text so I don't
17 think we need the translation.
18 THE LEAD INTERPRETER: He said he wants it to
19 be translated.
20 MR. HA: Oh, he did. Okay. My apologies.
21 THE WITNESS: (In English) Yes.
22 BY MR. HA:
23 Q. And so you see that.
24 Next sentence says: "To determine the scope
25 of a dependent claim, it must be read together with the

1 claim or claims upon which it depends."
2 Do you see that?
3 THE LEAD INTERPRETER: He wants me to
4 translate this.
5 THE WITNESS: (In English) Okay.
6 BY MR. HA:
7 Q. So let me take an example based on your
8 understanding here.
9 If you have an independent Claim 1 and a
10 dependent Claim 2 which depends on Claim 1, you have to
11 read both Claims 1 and 2 together to determine the scope
12 of Claim 2, correct?
13 A. (In English) Yes.
14 Q. So you have a copy of Exhibit 1004 in front of
15 you, because it's the document you said you reviewed
16 yesterday in preparation for today's deposition,
17 correct?
18 A. Uh-huh.
19 Q. Exhibit 1004 -- I'm going to call it Sung
20 '026.
21 Is that okay?
22 A. Okay.
23 Q. And you reviewed this document yesterday as
24 part of today's deposition, correct?
25 A. Yes.

1 Q. And Sung '026, as counsel noted earlier, is a
2 publication of a patent application, correct?
3 A. Yes.
4 Q. Are you able to locate Claim 1 of Sung '026?
5 A. (In English) Yes.
6 Q. Is Claim 1 an independent claim or a dependent
7 claim?
8 A. I'm not sure.
9 Q. How about Claim 3?
10 It says, "The method of Claim 1," and then
11 "wherein a majority of the plurality of superabrasive
12 particles protrudes to a predetermined height above the
13 solidified organic material layer."
14 Correct?
15 It looks like you are having a conversation
16 with the interpreter.
17 THE LEAD INTERPRETER: He's saying that here
18 it says -- Claim 3 says "The method of Claim 1," so he's
19 asking himself, is this depending on Claim 1, or what?
20 And I'm asking him, are you going to ask
21 counsel or are you talking to yourself?
22 A. According to what it says in here, it needs
23 Claim 1.
24 BY MR. HA:
25 Q. So is Claim 3 an independent claim or a

1 dependent claim?
2 A. If it is such, then it is a dependent claim.
3 Q. So, then, is Claim 1 an independent claim or a
4 dependent claim?
5 A. In such a case, then Claim 1 is also a
6 dependent claim because it's also related with Claim 3.
7 Q. So Claim 3 -- in order for you to look at the
8 full aspect of Claim 3 -- sorry, full scope of Claim 3,
9 you have to look at both Claim 1 and Claim 3 together,
10 correct?
11 A. (In English) Yes.
12 Q. How about Claim 7? Do you see Claim 7?
13 A. Yes.
14 Q. In order for you to understand the full scope
15 of Claim 7, you have to look at everything in Claims 1,
16 3 and 7 because Claim 7 depends on Claim 3, correct?
17 A. Yes.
18 Q. So you combine the aspects described in Claim
19 1 with the aspects described in Claim 3 and the aspects
20 described in Claim 7 to understand the full scope of
21 Claim 7, correct?
22 A. (In English) Yes.
23 Q. Okay. Let's turn to paragraph 67 of your
24 declaration.
25 In paragraph 67 -- your opinion in this

1 section, starting with paragraph 67, I should say, is
2 that Sung '026 does not disclose Claim Limitation 1C,
3 correct?
4 MR. CHAN: Objection. Form.
5 THE WITNESS: Here, it says this is focusing
6 on Claim 1, or aiming at Claim 1.
7 BY MR. HA:
8 Q. Well, it says "It is my understanding" --
9 strike that.
10 Let's go to paragraph 68. You state here:
11 "In my opinion, viewed from the perspective of a person
12 of ordinary skill in the art, these various portions of
13 Sung '026 are separate and distinct aspects or
14 embodiments of the invention that individually do not
15 disclose what claim Limitation 1C recites, as I will
16 elaborate below."
17 Correct?
18 THE LEAD INTERPRETER: He wants me to
19 translate.
20 For the record, this is your own declaration
21 that you wrote, but you need a translation of your own
22 declaration, correct?
23 And it's okay if you need the translation. I
24 just want to make that clear.
25 THE LEAD INTERPRETER: He needs the

1 translation so he can have a clear understanding of some
2 legal terms in here.
3 MR. HA: Sure.
4 THE WITNESS: Okay.
5 BY MR. HA:
6 Q. So just to make clear, you required the
7 translation -- you required the aid of the translation
8 to fully understand paragraph 68, correct?
9 MR. CHAN: Objection. Misstates testimony.
10 THE WITNESS: Well, that's because it covers
11 some patent terminologies. So through translation, I
12 can have a more accurate understanding.
13 BY MR. HA:
14 Q. Did you or your counsel ever hire a translator
15 to translate paragraph 68 or any other parts of your
16 declaration before you submitted it to the Board?
17 MR. CHAN: Objection. Form.
18 THE WITNESS: Well, we went through the online
19 translation to do some translation. Also, I have a
20 person physically help me to translate about the
21 professional portion or contents that they intend to
22 discuss.
23 BY MR. HA:
24 Q. Understood. Thank you for that clarification.
25 Let's continue. Paragraph 69.

1 You state, "It is also my opinion that it
2 would not have been obvious to a person of ordinary
3 skill in the art circa 2011 to combine these distinct
4 aspects or embodiments involving the separate parameters
5 of predetermined tip profile, permitted variation from
6 the tip profile, and particle protrusion height range?"
7 Do you see that?
8 A. Yes.
9 Q. And you still stand by this opinion, correct?
10 A. Yes.
11 Q. And just to be clear, the different aspects
12 are the predetermined tip profile, the permitted
13 variation from the tip profile, and the particle
14 protrusion height range, correct?
15 A. Yes.
16 Q. Okay. So let's go back to Claim 7.
17 Claim 7 recites: "Wherein the superabrasive
18 particles protrude to a predetermined height that is
19 along a designated profile."
20 Correct?
21 A. Yes.
22 Q. So that is talking about protrusion of the
23 particles to some predetermined height that's along this
24 designated profile, correct?
25 A. Yes.

1 Q. That's one aspect that's described in Claim 7,
2 correct?
3 A. Yes.
4 Q. Is that one of the predetermined tip profile,
5 the permitted variation from the tip profile or the
6 particle protrusion height range that you talk about at
7 paragraph 69?
8 THE CHECK INTERPRETER: I think the witness is
9 asking the interpreter a question about that legal
10 claim.
11 THE WITNESS: I think that the
12 predetermined -- predetermined height and the designated
13 profile are different things. I believe they are
14 different.
15 BY MR. HA:
16 Q. So Claim 7 combined those two different
17 aspects together in a single claim, correct?
18 A. I believe so.
19 Q. Can you also turn to paragraph 105 of Sung
20 '026. Sorry, not your declaration, Sung '026, paragraph
21 105.
22 Second sentence on paragraph 105, and I will
23 read it to you so you don't have to read it, because I
24 think you're having a hard time with the small text.
25 "Numerous modifications and alternative

1 arrangements may be devised by those skilled in the art
2 without departing from the spirit and scope of the
3 present invention."
4 A. For paragraph 105, where did you start to
5 read?
6 Q. Second sentence. It starts with the word
7 "Numerous."
8 A. Okay.
9 Q. I'll read it again. It says: "Numerous
10 modifications and alternative arrangements may be
11 devised by those skilled in the art without departing
12 from the spirit and scope of the present invention."
13 Do you see that?
14 A. Yes. Yes, I see that.
15 Q. Were you aware of this statement in paragraph
16 105 before rendering your opinion in paragraph 69 of
17 your declaration?
18 A. I was not quite clear about it.
19 Q. When you say "clear," what do you mean? You
20 knew it, or you did not know it?
21 A. What I mean was I am not so clear about the
22 meaning of those English texts.
23 Can I have a translation of this?
24 Q. Absolutely. Any time you need a translation,
25 just ask your interpreter, but just let us know what's

1 being discussed.
2 A. Okay.
3 Q. Were you aware of that statement in paragraph
4 105 before rendering your opinion in paragraph 69 of
5 your declaration?
6 A. (In English) I don't know.
7 Q. You did not know?
8 A. Yeah, no.
9 Q. Now that you know the statement exists, would
10 you like to change your opinion stated in paragraph 69?
11 A. Well, to my understanding of this '026 patent,
12 it hopes to allow all tips maintain equal height.
13 And secondly, it hopes to control the quantity
14 of the protrusion.
15 Again, secondly, it hopes to control the
16 height of the protrusion. So I think that from the
17 first aspect where it says "predetermined tip profile,"
18 that means that we need to know whether the tips will
19 face upward or the face will face upward. We must know
20 that.
21 From the second aspect, that is the permitted
22 variation from the profile. That means that if you want
23 to maintain the equal height of all tips, then you need
24 to control the variation from the profile in order to
25 maintain equal heights.

1 THE CHECK INTERPRETER: The witness also said
2 at the end that "all the shapes of the tips should be
3 the same."
4 THE LEAD INTERPRETER: Yeah.
5 THE WITNESS: And third aspect is to try to
6 control the protrusion height. Therefore, that you can
7 control the penetration depth.
8 So this patent tried to indicate that in order
9 to have a perfect equal diamond height and to control
10 the penetration depth, as well as the direction of the
11 penetration to be controlled, we need to have these
12 aspects.
13 So my research is to learn when the tips are
14 facing up or the orientation of the particles are facing
15 up or the face is facing up or even the lines facing up,
16 what will be the effect to the pad individually.
17 Therefore, knowing that, I can clearly to know how to do
18 the designing.
19 BY MR. HA:
20 Q. So just to be clear, you said "this patent" in
21 a couple of places.
22 Are you talking about the '862 patent or the
23 Sung '026 patent publication?
24 A. I am referring to '026.
25 Q. So '026 is focused on combining these three

1 different aspects together?
2 A. If I remember right, it intends to make a
3 diamond disk that has all the protrusion with identical
4 heights and with the same orientation.
5 Q. So Sung '026 intends to make a diamond disk
6 that has all the protrusions with identical heights and
7 with the same orientation, which combines the three
8 different aspects you described in paragraph 69, is that
9 correct?
10 A. In addition, it also intends to control the
11 depths of penetrating into the pad. For example, if I
12 want to penetrate 10 micron into the pad, then the
13 protrusion height should be at least 10 micron.
14 Q. Got it.
15 So Sung '026 intends to combine, and I will
16 read this, "The first aspect, which is directed to the
17 predetermined tip profile where you need to know where
18 the tip or the face must face upwards, a second aspect
19 regarding the permitted variation from the tip profile
20 where you're trying to control the variation to maintain
21 equal heights with equal shapes, and the third aspect of
22 particle protrusion height range where you're trying to
23 control the protrusion to control the penetration
24 depth," is that correct?
25 MR. CHAN: Objection. Form. Misstates

1 testimony.
2 THE WITNESS: So first one is that you need to
3 have the same orientation, same shape so you can have
4 the consistency; and No. 2, you would like to have the
5 same height; and No. 3, you would like to control the
6 penetration depths.
7 BY MR. HA:
8 Q. Right.
9 So Sung '026 is trying to combine all three of
10 those together, correct?
11 A. That's correct, because if you can have a very
12 good control of those, then -- and that time period back
13 then, then you can make a very perfect diamond disk.
14 Q. Great.
15 And just to be clear, it's not the '862
16 patent, it's the Sung '026 that's trying to combine all
17 of these three together, correct?
18 MR. CHAN: Objection. Form.
19 THE WITNESS: Well, that's right, for '026, to
20 achieve that, I personally think that they should
21 achieve those conditions. But I don't know how other
22 people do it. But for me, if I want to achieve a very
23 perfect diamond disk, that is the way I would do.
24 BY MR. HA:
25 Q. Okay. Let's switch gears again. Let's go to

1 Exhibit 2003.
2 Is that -- yes. So you have Exhibit 2003 in
3 front of you.
4 Can you please turn to Figure 2.
5 Are you there?
6 A. Yes.
7 Q. Figure 2A is showing a conventional diamond
8 dresser, correct?
9 A. Yes.
10 Q. You drew a red box and provided an SEM
11 micrograph showing diamond microgrits in Figure 2B, is
12 that correct?
13 A. Yes.
14 Q. Why did you draw that red box?
15 A. If we need to submit a paper to be published,
16 we need clearly to tell them what we are talking about.
17 Q. And the SEM that you took -- sorry.
18 Withdrawn.
19 And the SEM image shown in Figure 2B, is that
20 exactly representative of where that red box was drawn?
21 A. This one?
22 Q. No, that one.
23 A. (In English) Oh, my God.
24 (In Chinese) No, I was just trying to
25 illustrate what is in here is not exactly what it is in

1 this red box.
2 MR. CHAN: I want to interject and say that
3 when the witness said "Oh, my God," that is in response
4 to the translator having a different publication than
5 Exhibit 2003.
6 MR. HA: Thanks for that clarification. I
7 agree with that characterization.
8 Q. So on Exhibit 2003, I drew three rectangles on
9 the diamond dresser.
10 If you drew your red box instead in any one of
11 those other locations, it would still be pretty
12 representative, correct?
13 Sorry, in blue.
14 MR. CHAN: Objection. Form. It's beyond the
15 scope.
16 THE WITNESS: The intention of showing this is
17 to tell people that all the diamonds located in this
18 ring, outer ring, would look like this.
19 BY MR. HA:
20 Q. Can I have that back, please.
21 So, then, let me make sure I understand. I'm
22 going to draw another green rectangle in the middle of
23 the diamond dresser.
24 If you annotated it that way, would it be
25 accurate?

1 A. Well, based on the paper I published, that's
2 not right.
3 Q. Okay. So, then, I'm going to draw a big X on
4 that green rectangle because that's wrong.
5 I'll show this to counsel, as well as
6 Dr. Tsai.
7 So the green rectangle with the X should not
8 be there because it does not have diamond grits, is that
9 correct?
10 A. To our research, we have many different types
11 of diamond disks, and to us, there's no diamond at this
12 center part of it, that's correct.
13 Q. How do you know there's no diamond in the
14 center part?
15 A. Because the heights between outer ring and the
16 center portion are different.
17 Q. Then how about in Figure 3, do you see the
18 shiny circular region in the middle?
19 A. Yes.
20 Q. Are there any diamond particles in the center
21 portion?
22 A. No.
23 Q. And a POSITA would have known that that
24 circular region does not have diamond particles because
25 it appears smooth to the naked eye, correct?

1 MR. CHAN: Objection. Form.
2 THE WITNESS: A person with CMP experiences
3 can tell. It may not be so for any other people.
4 BY MR. HA:
5 Q. I'm going to hand you Exhibit 1005.
6 Can you please turn to Figure 1.
7 Figure 1 is showing an ODD diamond disk on the
8 left, is that right?
9 A. Yes.
10 Q. Are there diamond particles in the central
11 ring, or region, of that ODD disk?
12 A. Based on my profession, there's no diamond at
13 the center part of it.
14 Q. And a POSITA reading that paper would also
15 conclude the same, correct?
16 MR. CHAN: Objection. Form.
17 THE WITNESS: If this POSITA is the POSITA
18 that made the qualification that I did, then I think
19 this person can determine that. But otherwise, I cannot
20 be sure.
21 THE CHECK INTERPRETER: Check rendition: "Of
22 course, if the POSITA is the person designed to find it,
23 according to my definition, that person probably can,
24 but I'm not entirely sure."
25 BY MR. HA:

1 Q. Can you turn to Figure 3 of that paper.
2 Are there diamond particles in the central
3 region on the disk shown in Figure 3?
4 A. It's the same. According to my personal
5 profession, I can tell that there is no diamond in
6 there.
7 Q. And would a POSITA reading this paper know
8 that there are no diamond particles in the center?
9 A. If a person is the person that I define as a
10 POSITA, then I believe this person is capable. Other
11 than that, I'm not sure.
12 Q. Why would the person, as you defined it, know
13 that there are no diamond particles in the central
14 region?
15 A. I said, my definition is that this person
16 possesses the experiences of designing and manufacturing
17 diamond disks, so I believe that he's capable to
18 identify to tell.
19 Q. What specific features shown in Figure 3
20 allows the POSITA, as you defined it, to know that there
21 are no diamond particles in the central region?
22 A. Firstly, the shape.
23 Secondly, when they see this image, they know
24 that is a diamond.
25 Q. Let's break that down.

1 What about the shape allows a POSITA, as you
2 defined it, to know that there are no diamond particles
3 in the central region?
4 A. Well, a typical diamond disk currently is in a
5 cylinder shape. Therefore, that once they see this
6 cylinder shape, they know that it's a diamond disk. But
7 we need to look at this issue combined with the entirety
8 of this paper. Only look at the figure, I don't think
9 it's sufficient.
10 Q. So by only looking at the figure, a POSITA
11 would not have been able to determine that there are no
12 diamond particles in the center? That's your testimony?
13 MR. CHAN: Objection. Form.
14 THE WITNESS: What I mean is that if you only
15 look at this figure, you cannot even tell where there
16 are diamonds at outer area, at the ring.
17 BY MR. HA:
18 Q. You provided a zoomed-in image in this figure
19 of diamond particles in the ring, correct?
20 MR. CHAN: Objection. Form.
21 THE WITNESS: Well, this paper was authored by
22 Dr. Sung, so I'm not so clear about that. But looking
23 at this picture, this diamond picture, like I said,
24 diamond has either six or eight faces kind of structure.
25 So it has that feature on this image. So as I look at

1 it, I can tell directly that it's a diamond.
2 BY MR. HA:
3 Q. Thank you for that clarification. I misspoke.
4 So a POSITA looking at Figure 3 of Exhibit
5 1005 would have known that the central region of the
6 diamond disk has no diamond particles, correct?
7 MR. CHAN: Objection. Form.
8 THE WITNESS: Are you talking about all the
9 images here?
10 BY MR. HA:
11 Q. Yes, the entirety of Figure 3.
12 A. If a POSITA meets my definition as a POSITA,
13 that means that this person has the diamond disk
14 practical experiences in designing and in manufacturing
15 CMP, then this POSITA should be able to tell.
16 Q. Okay. Now, with that definition, your
17 definition of a POSITA, what features in Figure 3
18 allowed that POSITA to know there are no diamonds in the
19 middle of the disk?
20 A. Because there is a red box in there indicating
21 that there are diamond particles there, then, also, the
22 center region has a different color on the outer region,
23 and -- but again, I cannot be very sure that the center
24 region does not have any diamond particles because if
25 the diamond particle sizes are very, very small, then,

1 probably, if you zoom in, you will still find the
2 diamond particles there.
3 Q. Okay. Let's break that into parts.
4 Let's change the definition of a POSITA to
5 somebody who has experience in fabrication and
6 processing of integrated circuits.
7 Would that POSITA, looking at Figure 3,
8 recognize that the middle does -- middle of the disk
9 does not have diamond particles?
10 MR. CHAN: Objection. Form. Beyond the
11 scope. And it's argumentative.
12 THE WITNESS: I am not sure.
13 BY MR. HA:
14 Q. Why are you not sure?
15 A. I am not those people, so I am not sure.
16 Q. Understood.
17 So you do not know if somebody trained in the
18 field of fabrication and processing of integrated
19 circuits would be able to look at the red box in Figure
20 3 that shows diamond particles in there and conclude the
21 same way as your definition of a POSITA?
22 MR. CHAN: Objection. Form.
23 THE WITNESS: So even for that, I don't think
24 I can be sure about that because if a person cannot tell
25 that is a shape of the diamond, then he doesn't know

1 there's diamond there.
2 BY MR. HA:
3 Q. What about the legend that says "The
4 bonding" -- Figure 3: "The bonding conditions of
5 diamond in the epoxy matrix," would that allow a POSITA
6 that has training in the field of integrated circuits
7 and fabrication and processing be able to determine the
8 particles that are shown in the red box are diamond
9 particles?
10 MR. CHAN: Objection. Form. Argumentative.
11 And calls for speculation.
12 THE WITNESS: I still think that this person
13 should have CMP-related knowledge.
14 BY MR. HA:
15 Q. Okay. So the person with training in
16 integrated circuits, fabrication and processing would
17 not be able to look at Figure 3 that has the legend "The
18 bonding conditions of diamond in the epoxy matrix" and
19 conclude that this is a diamond disk, correct?
20 MR. CHAN: Objection. Form.
21 THE WITNESS: My personal understanding or
22 recognition is that if this person has CMP experiences,
23 then this person should be able to identify that.
24 THE CHECK INTERPRETER: Check rendition: "I
25 personally feel that if that person has CMP operational

1 experience, that person should be able to determine
2 that."
3 BY MR. HA:
4 Q. Got it.
5 So as long as the person who is trained in the
6 fabrication and processing of integrated circuits has
7 CMP experience, that would be sufficient to determine
8 that what is being shown in Figure 3 is a diamond disk,
9 correct?
10 MR. CHAN: Objection. Form. Argumentative.
11 THE WITNESS: I still stress that if this
12 person has the CMP operational experiences, then this
13 person can make that determination.
14 BY MR. HA:
15 Q. Okay. Next question: For that same person
16 who has CMP operational experience, can that person look
17 at Figure 3 and the legend and determine that the middle
18 portion of the diamond disk does not have diamond
19 particles?
20 MR. CHAN: Objection. Form.
21 THE WITNESS: I think that if a person has
22 the -- has the experience of writing papers, and
23 usually, writing papers, we need to point the key points
24 in the paper, so for that experience, then this person
25 can determine that the outer ring has the diamonds and

1 the inner part of it does not have.
2 So if the person does not have the experience
3 in writing the paper, without that training, I'm not
4 sure if this person can make that determination.
5 THE CHECK INTERPRETER: Check rendition: "I
6 think that person should be able to determine that there
7 are diamonds on the outer ring, but a paper typically is
8 written so that the key points are highlighted. For
9 example, I think you can see that the key points in this
10 figure are the outer ring, and that suggests that in the
11 central region there are no diamonds.
12 "So if that person is trained to write papers,
13 that person should be able to -- but I'm not sure -- if
14 the person hasn't been trained to write papers, I don't
15 know that person will be able to determine that there is
16 no diamonds in the region, in the central region."
17 THE WITNESS: We are writing papers. When we
18 write the paper, we intend to inform people about the
19 critical or key points of our research, and therefore,
20 the center region is not a key point. And so when we
21 study this whole thing, if that's not a key point, we
22 don't care what is in there.
23 BY MR. HA:
24 Q. And it's not a key point because there's no
25 diamond particles in there, correct?

1 MR. CHAN: Objection. Form. Argumentative.
2 THE WITNESS: In terms of writing the paper,
3 that is an area we don't need to pay attention or care
4 about it.
5 BY MR. HA:
6 Q. Because the center region of the diamond disk
7 does not have diamond particles in there, correct?
8 MR. CHAN: Objection. Form. Argumentative.
9 THE WITNESS: If you look at the other
10 figure --
11 MR. HA: I'll note that Dr. Tsai was pointing
12 to Exhibit 2003, Figure 3A.
13 THE WITNESS: If you look at that figure it's
14 so clear there's no diamond particles on it. But look
15 back to this Figure 3 --
16 MR. HA: I'll note that this is for Exhibit
17 1005, Figure 3.
18 THE WITNESS: -- because the central region is
19 pretty vague. Therefore, we really cannot determine
20 what is on there.
21 BY MR. HA:
22 Q. Okay. I mean, I think you changed your
23 testimony about four or five times, whether there are
24 particles in there or not. So I'm just going to ask one
25 last time.

1 Are there particles in the center of the CMP
2 pad dresser shown in Figure 3 or no?
3 MR. CHAN: Objection. Form. Argumentative.
4 For the clarification of the record, this is
5 Figure 3 of Exhibit 1005, not 1003, which also has
6 another Figure 3?
7 MR. HA: Correct.
8 Let me re-ask that question.
9 I think you've changed your testimony about
10 four or five times on my question, so I'm going to ask
11 one last time.
12 In Figure 3 of Exhibit 1005, are there diamond
13 particles in the central region of the diamond disk, or
14 not?
15 MR. CHAN: Objection to form. Argumentative.
16 THE WITNESS: Well, first of all, from the
17 viewpoint of us, in writing papers, if the heading or
18 legend of Figure 3 is as such, that represents that this
19 study is studying the outer ring part of it.
20 Regarding the central region of it, we don't
21 even care about it.
22 If you keep asking me, are there diamond
23 particles on there, I really do not know because it is
24 not highlighted.
25 If it is highlighted, then I would know. I

1 did not change my testimonies from time to time. That
2 was only because you used a different way to ask me
3 about that. That was the reason why I answered like
4 that.
5 For this figure, the author did not identify
6 or label any information on the center part of it, so I
7 really do not know what that is. If you want me to
8 guess, I would guess that there are no diamonds on that.
9 That's all.
10 BY MR. HA:
11 Q. Thank you for that answer.
12 MR. HA: I'm going to just move Exhibit 2003,
13 which was marked up by myself, into evidence as Exhibit
14 1046.
15 (Tsai Deposition Exhibit 1046 was marked for
16 identification and is attached to the transcript.)
17 MR. HA: Dr. Tsai, you seem a little tired.
18 Do you want to take a break?
19 THE WITNESS: Yes.
20 MR. CHAN: Off the record?
21 MR. HA: Off the record.
22 (A recess was taken from 4:27 p.m. to 4:47
23 p.m.)
24 BY MR. HA:
25 Q. Welcome back.

1 I'm going to hand you a copy of the petition
2 that was filed in this proceeding.
3 Have you seen this petition before?
4 A. No.
5 Q. You have never seen the petition prior to
6 submitting your declaration in this proceeding,
7 Dr. Tsai?
8 A. (In English) No.
9 Q. Can you turn to page 6 of the petition.
10 Do you see a little table there in the middle
11 or the bottom of page 6?
12 A. Yes.
13 Q. It's under the section called "Statutory
14 Grounds of Unpatentability," correct?
15 A. (In English) Yes.
16 Q. And in the table on the left-hand column, it
17 says "Ground 1 through 6," correct?
18 A. (In English) Yes.
19 Q. Okay. And Ground 1, Claims 1 through 6, 9
20 through 12 and 20 are challenged based on Sung '026.
21 Do you see that?
22 A. Yes.
23 Q. Now, can you turn to your declaration, please.
24 Did you provide any opinion regarding how
25 petitioner applied Sung '026 specifically to the added

1 limitations of Claims 2 to 6, 9 through 12 and 20 of the
2 petition?
3 A. No.
4 Q. Go back to the petition, please, and the
5 table.
6 A. Okay.
7 Q. And do you see that Grounds 2 to 6 rely on one
8 additional prior art reference in combination with Sung
9 '026?
10 A. Yes.
11 Q. Have you seen Sung ICPT before?
12 A. No.
13 Q. How about Nishioka?
14 A. No.
15 Q. How about Lin?
16 A. No.
17 Q. How about Kim?
18 A. No.
19 Q. How about Koyama?
20 A. No.
21 Q. Okay. So you provided no opinion regarding
22 any of the references directed to Sung ICPT, Nishioka,
23 Lin, Kim or Koyama, correct?
24 A. Correct.
25 Q. Okay.

1 MR. HA: So this more or less wraps up my set
2 of questions, with a small reservation of rights that I
3 have to make based on an email that counsel sent to the
4 Board yesterday. That email alleged that some of my
5 questions on Monday's deposition was unduly prejudicial
6 to Dr. Tsai and patent owner because it went beyond the
7 scope of the allowed deposition in the '270 patent.
8 But in the interest of allowing Dr. Tsai to go
9 back to his father as quickly as possible, I'm going
10 to -- I'm not going to re-ask the same set of questions
11 that I asked in IPR2024-00533, and we'll simply
12 cross-reference them in this proceeding, as well as the
13 IPR2024-00535 so that we can all save time and get back
14 to our work, and especially so that Dr. Tsai can go back
15 to his ailing father.
16 So I'll stop there.
17 MR. CHAN: Object to that statement. To the
18 extent that counsel for petitioner has any questions
19 that are specific to the 534 IPR, this is probably a
20 good time to ask those questions instead of
21 cross-referencing as this is specific to this IPR and
22 this IPR only, but I appreciate the thoughts of allowing
23 Dr. Tsai to spend more time with his father, but that
24 being said, my understanding -- and he's available now,
25 should you have additional questions that are specific

1 to this IPR.
2 MR. HA: Yeah, and I will make further
3 observation that this objection from counsel is
4 especially surprising given that the patent owner never
5 deposed petitioner's expert, Dr. Shanfield, specifically
6 with respect to any of these ongoing IPR proceedings,
7 but instead relied on Dr. Shanfield's deposition
8 testimony in the companion litigation case in each of
9 its patent owner response, and those are Exhibits 2004
10 in IPR2024-00535, and Exhibit 2002 and Exhibit 2003 in
11 IPR2024-00533.
12 MR. CHAN: Do you want to continue on, or --
13 MR. HA: I am done. Yeah, I will pass the
14 witness.
15
16 EXAMINATION
17 BY MR. CHAN:
18 Q. Dr. Tsai, I have a couple of follow-up
19 questions with you.
20 Earlier today, you were asked about one of
21 your papers, and I believe this is Exhibit 2002, Figure
22 1.
23 Do you have that exhibit in front of you?
24 THE CHECK INTERPRETER: Is it this one?
25 It doesn't have a number.

1 MR. CHAN: At the very bottom of the page
2 there's an exhibit number, 2002. The document of the
3 characteristics of oriented single diamond.
4 Q. If you go to Figure 1, counsel asked about the
5 load, specifically the load being 60 N, or 60 newton?
6 Do you remember that testimony?
7 A. Yes.
8 Q. For CMP polishing, do you need a load to
9 polish a sanding pad using a dresser?
10 A. There are several ways to do it. Of course,
11 the frequently used way is to use a load. But then,
12 again, the second way is to use its own weight to press
13 down, but for that, you need to hold it so that it can
14 move horizontally or to oscillate horizontally.
15 Q. So when you have a holder, do you need a load?
16 A. When there's a holder, then the holder can
17 have a force to move horizontally.
18 Q. Can you apply the load that doesn't place the
19 CMP dresser in contact with the CMP pad?
20 A. I'm not quite sure because, for that, I think
21 I need to do the experiments.
22 Q. Have you conducted an experiment without a
23 load -- let me ask a better question.
24 Have you conducted a CMP polishing experiment
25 without using a load?

1 A. The first way is that if you add a load or a
2 weight and press it down, and to allow these two objects
3 to rotate to each other, then it will also reach the
4 outcome of dressing.
5 And second way is to use its own weight, and
6 that takes a holder to hold it. There's another force
7 to push this holder so that it can do the dressing.
8 Q. If you were to rest a CMP dresser on the pad
9 without pressing against each other, can you still
10 perform CMP polishing?
11 A. I'm not quite sure because I have not done
12 such an experiment.
13 Q. So you would need an experiment, you would
14 need -- strike that.
15 You would need to conduct an experiment to
16 know whether you can polish a CMP pad by resting the
17 dresser on the pad, is that correct?
18 THE CHECK INTERPRETER: Counsel, you asked
19 "polishing," but it was translated as "dressing."
20 Is that what you were asking?
21 MR. CHAN: I'll withdraw my question. Let me
22 just re-ask the question. It's probably better that
23 way.
24 Q. If you were to rest the CMP dresser on a CMP
25 pad without pressing them against each other, can you

1 still perform dressing?
2 A. That's the second way I described. You need a
3 holder to hold it. Then you should have a force to move
4 it, and then the own weight of it, plus the tips of the
5 diamond together can then do the dressing.
6 Q. Okay. Have you conducted an experiment where
7 you press the CMP pad upwards against the CMP dresser?
8 A. I did not do such an experiment before, but I
9 did an experiment where CMP dresser is at the bottom and
10 CMP pad is at the top.
11 Q. Did manufacturers press the CMP pad upward
12 against the CMP dresser?
13 A. The first way is the ordinary way where you
14 have the pad at the bottom, the diamond tips at the top
15 and presses down to the pad.
16 The second way was the one I did the
17 experiment in the past where the pad is at the top and
18 the diamond tips at the bottom, and then the pad goes
19 down, touches the diamond tips.
20 Q. Now, I recall you talked about using a holder.
21 What are the benefits of using a holder?
22 A. The benefit of having a holder is so that it
23 can have a force to push it move horizontally.
24 Q. And what would that do in terms of
25 performance?

1 A. To have the performance of doing the
2 conditioning or dressing.
3 Q. I understand.
4 So is it to give you a smoother surface, or is
5 it -- strike that.
6 I'm trying to understand in terms of
7 performance, is it that it helps to reduce the cut
8 rate -- excuse me, improve the longevity of the pad, or
9 is it that it smoothes the surface quicker?
10 A. Is that the speed of dressing can be quicker.
11 Q. Now, earlier, counsel for petitioner drew an
12 up arrow with respect to Figure 1. It's a red arrow.
13 Do you have Figure 1 in front of you?
14 MR. HA: I'll help you out. It's Figure 6,
15 actually, of Exhibit 1044.
16 MR. CHAN: Yeah, 1044.
17 Q. Do you see that up arrow?
18 A. Yeah.
19 Q. Is it your understanding that that force
20 represented by that up arrow has any relevance to CMP
21 dressing?
22 A. Well, in theory, force is equal to the
23 reaction forces, but in reality, this CMP is kept
24 moving. It's in a movement condition, so there would
25 not be any phenomenon with that.

1 Q. Just to be clear, does it have any relevance
2 to pressing the CMP pad against the CMP dresser?
3 A. Well, based on my knowledge, experience and
4 theoretical understanding, this is not possible to have
5 such a force in existence.
6 Q. Why not?
7 A. Well, first of all, the pressing force from
8 the diamond disk is not too big, and secondly, when the
9 diamond disk is doing such an action, the forces will be
10 absorbed by the vibration and the temperature. And in
11 addition, CMP is to perform the last polishing step to
12 the angstrom level. Therefore, it's not possible to
13 generate such a force.
14 Q. Now, counsel for petitioner asked you about
15 the -- strike that.
16 Counsel for petitioner asked you some
17 questions in relation to paragraph 69 of your
18 declaration. This is in relation to the so-called
19 parameters of predetermined tip profile, permitted
20 variation from the tip profile, and particle protrusion
21 height range.
22 Do you remember those questions?
23 A. Yes.
24 Q. And I recall you testifying that the '026
25 relates to same orientation, same height, and

1 penetration depth control, is that correct?
2 MR. HA: Objection. Mischaracterizes the
3 record.
4 THE WITNESS: The answer is correct.
5 BY MR. CHAN:
6 Q. When you say "same height," how do you have
7 diamonds with the same height?
8 A. Well, actually, we had reached at that time
9 the same orientations, same tip shapes. However, to
10 reach the same height in the process, which is quite
11 difficult, but if we cut them in very flat, then there's
12 a chance to reach that.
13 Q. And how do you cut the diamond tips?
14 A. It's possible that we can use two ways. One
15 is to discharge the electricity to cut it. The second
16 way is to use a laser to cut them. But the cost would
17 be high for these.
18 Q. And when you use any of these methods, is it
19 always accurate? For example, if you were to cut the
20 diamonds until the tips have 10 microns, would you
21 always be able to obtain those heights?
22 MR. HA: Objection. Hypothetical. Beyond the
23 scope.
24 THE WITNESS: The height you're saying is the
25 height from the substrate up?

1 BY MR. CHAN:
2 Q. Yes.
3 A. My personal understanding and knowledge is
4 that, if I want to do so, I can use the line-cutting
5 approach, to use line cutting to cut it all the way
6 across. Then, of course, there is some tolerance, but
7 there are chances that I can cut them into equal height.
8 The second way of doing that is that I take a
9 diamond plate, put it on a substrate, and then I can try
10 to -- and then I try to level it into very flat. After
11 that, I can try to sculpture the shape of the diamond to
12 make them into the diamond particles. So, then, I can
13 have a chance to get equal height.
14 Q. So going back to '026, where we talked about
15 same heights, did '026 tell you how to achieve the same
16 heights?
17 MR. HA: Objection. Argumentative.
18 THE WITNESS: The objective of this
19 application, to my understanding, is that it intends to
20 reach a diamond disk that has the particles with the
21 same orientations and same height.
22
23 BY MR. CHAN:
24 Q. Why?
25 A. Because, at that time, we hoped that we would

1 like to reduce the impact caused by the mechanical
2 forces. We were scared that if we have too much
3 mechanical forces, it tends to cause the dropping off,
4 or falling off, of diamond particles. That will damage
5 the wafers.
6 Q. '026 mentions something about stress.
7 Is that what you're referring to, or are you
8 referring to something different when you mentioned
9 mechanical forces?
10 MR. HA: Objection. Foundation.
11 THE WITNESS: I meant that is the mechanical
12 stress generated when the diamond particle penetrates
13 into the pad.
14 THE CHECK INTERPRETER: Check rendition: "I
15 meant that it's the mechanical force that is created
16 when diamond particles penetrate the pad."
17 THE WITNESS: Okay. I was referring to the
18 down force that is the mechanical stress, because the
19 particle touches the pad. That's a matter of
20 definition.
21 BY MR. CHAN:
22 Q. Thank you. That's not my intent, to get you
23 to define something.
24 So using the mechanical stress -- strike that.
25 Since we're talking about the same height,

1 would you still be able to minimize mechanical stress
2 when you have different heights of diamonds?
3 A. Well, that is rather difficult because you
4 have some higher diamonds and lower diamonds. It
5 varies. Then when they contact the pad, the stress
6 that's been taken by the diamond particles would be
7 different, so it's hard to control.
8 Q. Just to make sure I understand, so diamonds
9 with different heights would increase or decrease
10 stress?
11 A. For the working diamond particles, if they had
12 different heights, then different heights tend to
13 receive different mechanical stresses, so the stresses
14 being taken are different. Obviously, the particles
15 having the highest height should endure the maximum
16 stress. Therefore, each one of them is different.
17 Q. So do you want all diamonds to have the same
18 height, or do you only want some diamonds with the same
19 heights?
20 A. Back at that time when we did the research, of
21 course, we expected it to reach the same heights for
22 every particles. However, in order to reach that, we
23 need to use the method I just mentioned about. Somehow
24 the cost would be very high. Therefore, currently, it's
25 quite possible the particles are having different

1 heights.
2 Back at that time we were using a large
3 quantity of diamonds, and then as a result their heights
4 were all different. But today, right now, the quantity
5 of diamond used are much less, much fewer, and so when
6 you do the leveling, then you tend to reduce the
7 difference of the heights.
8 Q. So back in the relevant time frame -- this is
9 in relation to the '026, which was final in or about
10 2005 -- were manufacturers trying to achieve or
11 manufacture a diamond disk with only some diamonds with
12 the same height or all diamonds with the same height?
13 A. Well, back at that time, we actually are
14 concerned about the whole diamond particles, at that
15 time.
16 Q. Were you aware of any manufacturers who were
17 trying to control the diamond heights with only some
18 diamonds, but not all?
19 MR. HA: Objection. This is way beyond the
20 scope of my cross, and I have given a lot of latitude,
21 but this just feels like we are wasting time now.
22 THE WITNESS: To my knowledge, no.
23 BY MR. CHAN:
24 Q. Counsel for petitioner asked you about Figure
25 3 of Exhibit 2003 earlier.

1 Do you remember that figure?
2 No, this is -- is that Exhibit 2003?
3 Yeah, correct.
4 Now, there are blue boxes around the north,
5 east, south, west of that disk in Figure 2A.
6 Do you see those boxes drawn by counsel for
7 petitioners?
8 A. Yes.
9 Q. And then you also see there's a red box drawn
10 on the disk?
11 A. Yes.
12 Q. So I want to understand what that red box
13 represents.
14 Does that represent -- strike that.
15 Does that red box represent the distribution
16 of diamond only in that portion of the disk, or does it
17 represent all portions of the entire disk?
18 A. That only represents that portion of the
19 diamond distribution, not covering the entire disk.
20 Q. So what was the intent when you drew that red
21 box?
22 A. Well, the intention was to allow the reader to
23 clearly see and know the diamond -- diamond situation of
24 the disk.
25 Well, the intention to draw the red box is to

1 show to the reader that that's containing diamonds on
2 there, and that means the whole thing has diamonds.
3 THE CHECK INTERPRETER: By "whole thing,"
4 actually, the witness is just pointing to the outer
5 ring.
6 BY MR. CHAN:
7 Q. Let me ask you a question.
8 If I want to know the diamond distribution of
9 the entire disk, can I just rely on that red box, or do
10 I have to measure the entire disk?
11 A. You need to measure the entire disk.
12 Q. Why?
13 A. Okay. This is just a general illustration.
14 If you want to know the actual entire distribution, you
15 really need to do the measurement.
16 Q. Does your testimony about the red box also
17 apply to those blue boxes drawn by counsel for
18 petitioner?
19 A. Well, the intention of drawing the red box and
20 blue boxes is only to illustrate that there are diamonds
21 on there, and if you really want to know the actual
22 distribution or profile or the heights, then you need to
23 actually do the measurement.
24 Q. Why aren't the diamonds represented by the red
25 box representative of the entire disk?

1 A. Because in this red box, there are only a
2 handful of diamonds in there. They cannot represent the
3 entire diamonds on the entire disk. On the entire disk,
4 they have about more than 10,000 diamonds. Therefore,
5 this small box cannot represent all.
6 Q. I understand.
7 But with the distribution, for example, in
8 terms of spacing, would the heights of those diamonds
9 represented by that red box be representative of other
10 diamonds in other portions of the disk?
11 A. No.
12 Q. Why not?
13 A. Because the diamond distribution or the
14 spacing in every location is affected by the
15 temperature, by the joint agency, et cetera. They are
16 all different. Therefore, a small red box cannot
17 represent the entire diamonds in terms of their
18 distribution, their spacing and shape. If you want to
19 use the small box to do that, then it's not so stringent
20 in our research.
21 THE CHECK INTERPRETER: I think "joint agency"
22 should be "bonding agent."
23 THE LEAD INTERPRETER: Yes, "bonding agent."
24 BY MR. CHAN:
25 Q. Does your testimony also apply to Figure 3 in

1 the context of that red box?
2 MR. HA: Objection. Vague.
3 THE WITNESS: Yes.
4 BY MR. CHAN:
5 Q. Now, I see Figure 3 is in reference to a
6 dresser called ADD. The Figure 3 that you're already
7 looking at.
8 Are you familiar with ADD?
9 A. Yes.
10 Q. Did you come up with ADD?
11 A. What do you mean by "come up with ADD"?
12 Q. Did you design or develop ADD?
13 A. Yes.
14 Q. Was this ever sold?
15 A. No.
16 Q. Okay. Let me direct your attention to Exhibit
17 1005, Figure 1.
18 Do you recall counsel for petitioner went over
19 this figure with you as well?
20 Again I see a red box.
21 Do you see that?
22 A. Yes.
23 Q. Counsel for petitioner went through this red
24 box with you.
25 Remember?

1 A. Yes.
2 Q. He asked a number of questions in relation to
3 Exhibit 2003, Figure 3. Strike that.
4 We went through some questions in relation to
5 Figure 3 of Exhibit 2003.
6 Does your testimony about Figure 2 or Figure 3
7 of Exhibit 2003 also apply to this figure?
8 MR. HA: Objection. Vague. Form.
9 THE WITNESS: Yes.
10 BY MR. CHAN:
11 Q. So let's be clear. The box that you see in
12 Figure 3 of Exhibit 1005 is not representative of the
13 diamonds in other portions of that disk.
14 Am I correct?
15 MR. HA: Objection. Objection. Objection.
16 Leading. Hypothetical.
17 THE WITNESS: The answer is yes.
18 BY MR. CHAN:
19 Q. Do you know if the disk, as reflected in
20 Figure 3 of 2005, was ever sold?
21 A. (In English) I'm not sure. This I'm not
22 sure.
23 Q. So this was for research purpose?
24 A. For me, it was only for the research purposes,
25 but I did not see that this was sold, so I'm not sure.

1 I never saw such a product.
2 Q. Counsel for petitioner asked you what
3 experience would be required to identify whether Figure
4 3 is a diamond disk or which portion of the disk has
5 diamonds.
6 Do you remember those questions?
7 A. Yes.
8 MR. HA: Objection. Mischaracterizes the
9 record. Compound.
10 BY MR. CHAN:
11 Q. Now, you testified, and I will quote you, a
12 phrase called "CMP operating experience."
13 Do you remember that phrase?
14 A. I do.
15 Q. Is CMP operating experience the same or
16 different than your definition of a POSITA for the '862
17 patents?
18 A. We are doing researches. When we say we
19 should have the operational experiences, that represents
20 that, in this field, we should also have the capability
21 of designing, manufacturing and knowledges. So, in
22 effect, if we use it, you push the button, that's also
23 operational experience, but that's not enough
24 capability. You need to understand how to use diamond
25 disk. You should have the diamond knowledges, and then

1 you can have the clear capability to make that
2 determination.
3 THE CHECK INTERPRETER: "Well, as long as you
4 can operate, you know how to operate, it just means that
5 you have knowledge, you know things about the design,
6 manufacturer and also the knowledge. And this is how it
7 is defined when research is performed.
8 "But if we're talking about operating
9 experience like an operator working in a fab, the worker
10 only has to touch buttons in order to operate, then that
11 operator may not necessarily have that kind of
12 capability."
13 And the rest remains unchanged.
14 BY MR. CHAN:
15 Q. Counsel for petitioner again mentioned a
16 phrase called "IC, or integrated circuit, fabrication
17 and processing."
18 Are you familiar with that phrase?
19 A. Yes.
20 Q. Do you know that that means?
21 A. Yes, yes.
22 Q. Do you know what that phrase means,
23 "integrated circuit, fabrication and processing"?
24 A. Yes, I know the terms "integrated circuit,
25 fabrication and processing."

1 Q. Strike that. Let me ask you a better
2 question.
3 Did counsel for petitioner give you a
4 definition of the phrase "IC, or integrated circuit,
5 fabrication and processes"?
6 A. No.
7 Q. Going back to POSITA, I understand that you
8 previously changed or at least revised the definition of
9 a POSITA in a different IPR.
10 Would that revision also apply to your
11 definition of a POSITA for the '862 patent, and
12 specifically one that also includes a master degree in
13 mechanical engineering or material science?
14 MR. HA: Objection. Mischaracterizes the
15 record.
16 THE WITNESS: Yes.
17 BY MR. CHAN:
18 Q. Why?
19 A. Diamond dresser is a very professional
20 specialized process. In order to do it, a person should
21 have an understanding about the diamond disk design,
22 manufacturing and understanding of the material science,
23 plus possessing CMP practical processing experiences in
24 order to do so.
25 MR. CHAN: No further question. I will

1 reserve my time and I'll pass the witness.
2 MR. HA: We're done.
3 Thank you.
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5 (Off the record at 5:54 p.m.)
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1 ACKNOWLEDGMENT OF DEPONENT
2 I, MING-YI TSAI, do hereby acknowledge that I
3 have read and examined the foregoing testimony, and the
4 same is a true, correct and complete transcription of
5 the testimony given by me and any corrections appear on
6 the attached Errata sheet signed by me.
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11 (DATE) (SIGNATURE)
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1 CERTIFICATE OF SHORTHAND REPORTER
2
3 I, Mark McClure, Certified Reporter within and
4 for the State of California, do hereby certify:
5
6 That MING YI TSAI, the witness whose
7 deposition is hereinbefore set forth, was duly sworn by
8 me before the commencement of such deposition and that
9 such deposition was taken before me and is a true record
10 of the testimony given by such witness.
11
12 I further certify that the adverse party,
13 Chien Min Sung, was represented by counsel at the deposition.
14
15 I further certify that the deposition of
16 MING YI TSAI occurred at National Chin Yi University of
17 Technology, No. 57, Section 2, Zhongshan Road, Taiping
18 District, Taichung City 411030, Taiwan, on Monday,
19 February 19, 2025, commencing at 1:30 p.m. to 5:54 p.m.
20 p.m., Taipei Standard Time.
21
22 I further certify that I am not related to any
23 of the parties to this action by blood or marriage, I am
24 not employed by or an attorney to any of the parties to
25 this action, and that I am in no way interested,

1 financially or otherwise, in the outcome of this matter.
2
3 IN WITNESS WHEREOF, I have hereunto set my
4 hand this 2nd day of March, 2025.
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