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Transcript of Kurt Duane Humphrey

Date: October 2, 2025

Case: Samsung Display Co., Ltd. -v- Pictiva Displays International Ltd. (PTAB)

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WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

1 UNITED STATES PATENT AND TRADEMARK OFFICE
2 BEFORE THE PATENT TRIAL AND APPEAL BOARD
3 - - - - - x
4 SAMSUNG DISPLAY :
5 CO., LTD., :
6 Petitioner, : Case No. IPR2024-01223
7 v. : Patent No. 6,949,389
8 PICTIVA DISPLAYS :
9 INTERNATIONAL LTD., :
10 Patent Owner. :
11 - - - - - X

12
13 Deposition of KURT DUANE HUMPHREY
14 Conducted Virtually
15 Thursday, October 2nd, 2025
16 10:29 a.m. EDT

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20 Job No.: 601803
21 Pages 1 - 72
22 Reported by: Debra A. Whitehead

1 Deposition of KURT DUANE HUMPHREY, conducted
2 virtually.

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5 Pursuant to notice, before Debra Ann Whitehead,
6 E-Notary Public in and for the Commonwealth of
7 Virginia.

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20 ALSO PRESENT:

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C O N T E N T S

EXAMINATION OF KURT DUANE HUMPHREY	PAGE
By Mr. Garr	5
By Ms. Zhong	65

EXHIBITS MARKED IN TODAY'S SESSION
(None Marked)

EXHIBITS MARKED IN PRIOR SESSIONS
(Not attached)

DEPOSITION EXHIBIT	PAGE
Exhibit 1001	31
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1 P R O C E E D I N G S

2 KURT DUANE HUMPHREY,

3 having been duly sworn, testified as follows:

4 EXAMINATION BY COUNSEL FOR PETITIONER

5 BY MR. GARR:

6 Q Good morning, Mr. Humphrey.

7 A Good morning.

8 Q So yesterday we took your deposition in
9 the IPR Number IPR2024-01222. Today the
10 plaintiffs have your deposition for IPR2024-01223.

11 Is that consistent with your
12 understanding?

13 A Yes.

14 Q Is there any reason you can't give full
15 and truthful testimony today?

16 A No.

17 MR. GARR: I'd like to bring two
18 documents into the deposition record, please. One
19 is marked Exhibit 2001.

20 (Exhibit 2001, previously marked, not
21 attached.)

22 MR. GARR: And the other is Exhibit 2018,

1 please.

2 (Exhibit 2018, previously marked, not
3 attached.)

4 MR. GARR: And could we bring Exhibit
5 2001 up on the screen, please.

6 Q Mr. Humphrey, document Exhibit 2001 has
7 been put up on the screen.

8 Do you recognize this document?

9 A Yes.

10 Q You can look through it.

11 And what is it?

12 A It's my declaration, my declaration for
13 IPR2024-01223.

14 MR. GARR: Can we turn to the last page
15 of it, please, the signature page.

16 Q And this is a -- December 2024. Do you
17 recognize that?

18 A Yes.

19 Q And this is the first declaration that
20 you submitted in this case?

21 A That's correct.

22 Q And by "this case," or "this IPR" today,

1 you'll understand that I'm referring to the 1223
2 matter. Right?

3 A Yes.

4 Q Was this declaration accurate and
5 truthful at the time that you submitted it?

6 A Yes, I believe so.

7 Q Do you stand by the testimony in it
8 today?

9 A Yeah. For the time it was written, yes.

10 Q And do you still stand by it today?

11 A Well, I've submitted a second declaration
12 more recently that was dated June 20th of 2025.

13 Q We'll pull that one up in a moment.

14 But is there anything in the initial
15 declaration that you do not stand by?

16 A No, not that I'm aware of.

17 MR. GARR: Okay. Let's pull up Exhibit
18 2018, please.

19 Q Mr. Humphrey, is this the more recent
20 declaration that you just referred to?

21 A Yes.

22 Q And was the testimony in it accurate and

1 truthful at the time you submitted it?

2 A Yes.

3 Q And do you continue to stand by it today?

4 A Yes.

5 Q At the end of the exhibit is a few pages
6 that are labeled Appendix A.

7 MR. GARR: Could we turn to that page,
8 please.

9 Q Or you're welcome to do so in your paper
10 copy.

11 A I didn't print out that portion, so if
12 you'd turn to it, that would be best.

13 Q Great.

14 Do you see Appendix A up on the screen?

15 A I do.

16 Q What is the information in Appendix A?

17 A It's my CV.

18 Q And is that CV accurate?

19 A Yes, up to the date it was included in
20 the report.

21 Q Are there any changes since then that are
22 material to this case?

1 A I was engaged in a separate case which at
2 this point is -- is not active, but it's not
3 listed at the -- at the end of my CV.

4 Q Does that case pertain to Pictiva?

5 A No.

6 Q Does it pertain to Samsung Display?

7 A No.

8 Q What parties does it pertain to?

9 A Corning is one of the main parties. And,
10 frankly, it's been dormant for a couple of months.
11 I'd have to go back and check the other party.

12 Q Understood. This declaration, Exhibit
13 2018, is your most recent declaration in this
14 case. Correct?

15 A Yes.

16 Q And so this will probably be the bulk of
17 my questions will refer to this declaration rather
18 than the other one. So if in general I'm
19 referring to "your declaration," will you
20 understand that I'm referring to this Exhibit
21 2018?

22 A Yes. Yes.

1 Q I noticed that the declaration signature
2 page says it was executed on June 20th, 2025.

3 Is that correct?

4 A That's correct.

5 Q And it says it was executed in Honolulu,
6 Hawaii.

7 Is that correct?

8 A That's correct.

9 Q The declaration that you submitted on the
10 same day in the 1222 case said it was executed in
11 Colorado.

12 Do you have an understanding for why that
13 discrepancy exists?

14 A Well, my home is in Colorado. My oldest
15 son lives in Hawaii. And at the time I was -- my
16 family and I were on extended visit to him in
17 Hawaii when this was executed.

18 Q And is the same true for your declaration
19 in 1222, dated June 20th, 2025; in other words,
20 was that one also executed in Hawaii?

21 A No. No. I was -- I was in Colorado.

22 Q Even though it was on the same day?

1 A Oh, I'm sorry. Maybe I misheard your
2 question.

3 June 20th, 2025, I was in -- I was in
4 Hawaii.

5 Q We spoke during your deposition yesterday
6 about claim constructions for planarization layer
7 and selectively depositing.

8 Do you remember that?

9 A Yes.

10 Q And in this case and in your declaration
11 in this case you likewise provide opinions
12 relating to claim construction.

13 Is that correct?

14 A Yes.

15 Q Or at least you have a section in your
16 declaration starting on Paragraph 19 where you
17 address that topic. Correct?

18 A Yes.

19 Q The first claim construction that you
20 address is for planarization layer. And that's on
21 Page 7, beginning at Paragraph 19.

22 You see that. Correct?

1 A Yes.

2 Q You set forth a construction in Paragraph
3 19 that you describe as an agreed construction
4 between, as you say, Samsung and Pictiva.

5 Do you see that?

6 A Yes.

7 Q And is that the construction that you
8 applied for purposes of your opinions in this
9 declaration?

10 A No. I used the Samsung and
11 Dr. Subramanian's definition.

12 Q I just want to make sure I'm clear. Are
13 you referring to planarization layer or
14 selectively depositing?

15 A In this case -- in this case I've used
16 the planarization layer definition recited in
17 Paragraph 19.

18 Q You used that construction -- or excuse
19 me, let me start over.

20 You applied that construction for
21 purposes of your opinions in this declaration.

22 Is that right?

1 A Yes.

2 Q Okay.

3 A That's right.

4 Q And you agree with that construction.
5 Correct?

6 A Yes.

7 Q On Paragraph 21 you comment that the
8 construction you believe is consistent with Figure
9 5 from the '389 patent.

10 Do you see that?

11 A Yes.

12 Q In what way does this figure in your
13 opinion support the construction?

14 A It satisfies the -- the nonreproduction
15 of the underlying topography as shown in the
16 figure.

17 Q Could you explain to me what aspect of
18 the figure demonstrates that, in your
19 understanding?

20 A The red box in Figure 5 represents the
21 OLED devices, and the blue figure represents the
22 planarization layer described in the '389 patent.

1 The yellow is the barrier layer. And the
2 planarization layer in blue has largely removed
3 the vertical steps of the underlying red-shaded
4 devices and provided for a smooth and more
5 planarized surface.

6 Q And what do you mean by "more
7 planarized"?

8 A We don't see the sharp steps or vertical
9 side walls in the figure reproduced in the blue
10 and subsequent yellow layers.

11 Q I believe you also address this concept
12 in Paragraph 38. Could you please turn to that.

13 A Thirty-eight?

14 Q Yes. And it's up on the screen.

15 MR. GARR: Actually, why don't we scroll
16 down a little, or up a little, so we can see the
17 figures above it, too.

18 Q Am I correct that you're addressing this
19 top -- the same topic here in Paragraph 38?

20 A Yes.

21 Q You comment that the figure in the '389
22 patent, Figure 5, provides a more rounded topology

1 than the figures above it.

2 Is that correct?

3 A Yes.

4 Q And where do you identify this rounded
5 topology in the Figure 5?

6 A In the shaded blue layer in that figure.

7 Q And in the figure above Paragraph 38 on
8 the right, how does that figure differ in your
9 opinion with respect to the topology?

10 A The figure on the right?

11 Q Yeah.

12 A Well, it's a bit more difficult to
13 visualize, because the -- especially in my printed
14 copy. It's a little better on the screen.

15 But the top green layer, which is the
16 first layer in the encapsulation stack for that
17 figure, is quite conformal and follows the -- the
18 topology of the structure below it.

19 Q In Paragraph 39 you offer the comment
20 that your understanding is consistent with
21 Dr. Subramanian's understanding of planarizing.

22 Do you see that?

1 A Yes.

2 Q And you quote Dr. Subramanian with
3 respect to some discussion of Suzuki.

4 Do you see that?

5 A Yes.

6 Q And why do you believe that this shows
7 that Dr. Subramanian agrees with your
8 understanding?

9 A These particular paragraphs are in the
10 context of the hypothetical proposed by
11 Dr. Subramanian that -- that an additional organic
12 layer be added to the Kijima structure.

13 Q Okay. And so how does the discussion
14 that you include from Dr. Subramanian's testimony
15 in Paragraph 39, in what way is that consistent
16 with your -- or with the agreed construction of
17 planarization layer?

18 A Well, I agree in part with that excerpt
19 from the testimony that the layers are more
20 rounded compared to the sharpness of the topology
21 below it.

22 I would not agree with the -- his

1 characterization of it being a nonconformal
2 coating.

3 Q Why is that?

4 A Because the degree of conformality is
5 fairly large, with the exception of some rounding
6 of the corners. Essentially the figures we're
7 showing here at the top of Page 17 are -- are
8 quite conformal.

9 Q Okay. I believe Dr. Subramanian's
10 testimony relates to Suzuki.

11 Do you see that?

12 A Yes.

13 Q And Suzuki's figure is shown -- the
14 figures at the top of Page 17 are Kijima. Right?

15 A I'm sorry, yes. I believe both of those
16 came from Kijima, with the addition of the
17 added -- the proposed addition of an organic layer
18 as taught by Suzuki.

19 Q Right. So with the understanding that
20 Dr. Subramanian is not talking about the Kijima
21 photos but, rather, the figure in Suzuki, how does
22 that bear on your answer that you provided to me a

1 moment ago?

2 A Well, I guess I would refer back to the
3 figure at the top of Page 15 of my declaration,
4 which is a figure from Suzuki. And the annotation
5 is pointing to the -- the first -- or the first
6 encapsulation layer.

7 Q The purple?

8 A The purple, correct.

9 Q Okay.

10 A And it is also quite conformal. There is
11 some minor rounding of the corners, but it largely
12 follows the topology of the -- of the underlying
13 material.

14 Q So you're seeking to draw a distinction
15 between this figure in Suzuki and Figure 5 in the
16 '389 patent that's shown up on the screen.

17 Is that right?

18 A That's correct.

19 Q And you're doing it by looking at how
20 curvy the figures are drawn?

21 A No. I'm looking primarily at whether the
22 encapsulation layers, again referring to Figure 5

1 in blue and in yellow, do they reproduce the
2 topology, the underlying topology shown in red.

3 Q And you have a --

4 MR. GARR: Let's just go up on the screen
5 to Page 15 so we can look at the figure you're
6 talking about from Suzuki. A little more high --
7 high up. There you go.

8 Q You say, "largely reproduced topology."
9 What's "largely" mean here?

10 A It means that it follows the underlying
11 topology for the most part. The --

12 Q So what does "for the most part" mean?

13 A Well, as a POSITA would know, the --
14 there are degrees of planarity, there are degree
15 of conformality, and it can vary from something
16 that is -- almost has zero conformality, meaning
17 it does not conform at all to the surface on which
18 it's deposited; or that conformality can be
19 practically a hundred percent, where it completely
20 replicates the surface that it's being deposited
21 on.

22 This Figure 1 from the Suzuki reference

1 is closer to a hundred percent conformality than
2 it is zero.

3 Q So with respect to the drawings you have
4 that are taken from Kijima, where would they fall
5 on the spectrum? And I'm looking at the top of
6 Page 17.

7 A They would likewise be closer to a
8 hundred percent conformality than zero.

9 Q How close?

10 A Well, it's difficult to quantify that.
11 But again, they largely are following the -- the
12 surfaces, both horizontal and vertical, of the
13 underlying topology.

14 Q So for Figure 5 of the '389 patent --
15 MR. GARR: Can we turn to that, please.
16 It's on Page 17. There you go.

17 Q It looks like you've got these things
18 that are kind of shaped like the top of a
19 hamburger bun. Is that a fair way to describe it?

20 A Sure.

21 Q And where does that fall on the spectrum
22 of perfect conformality to perfect planarity?

1 A Well, it's closer to zero conformality
2 than it is a hundred percent.

3 Q What would zero look like?

4 A Zero would basically look like a -- the
5 surface of the water in a glass that has a -- has
6 a Lego block submerged in it, to use -- to try to
7 use an analogy.

8 Q So zero conformality would be a perfect
9 plain?

10 A Yes. It would basically totally ignore
11 the structure underneath, as far as its vertical
12 or horizontal dimensions would be irrelevant. It
13 would just completely cover it.

14 Q Figure 5 is pretty far away from that,
15 though. Correct?

16 A Yes. It's not perfectly nonconformal.

17 MS. ZHONG: Object to form.

18 Q And so you believe that --

19 MR. GARR: Scroll up a little bit so we
20 can see the Kijima figures. Okay.

21 Q So you're taking the position that the
22 Kijima figures here at the top of Page 17 are

1 largely conformal, and the '389 figures are less
2 conformal.

3 Is that right?

4 A That's correct.

5 Q And am I correct that Suzuki is somewhere
6 in between these two?

7 MS. ZHONG: Objection. Form.

8 A No. I would say based upon the -- our --
9 referring back to the figure we were just looking
10 at on Page 15.

11 Q Uh-huh.

12 A The degree of conformality between Suzuki
13 and Kijima are roughly the same. The figure from
14 Suzuki on the top of Page 15 shows a slightly more
15 rounding of the upper corners, but that -- not
16 significantly.

17 Again, in both cases the topology being
18 covered by those encapsulation layers conforms to
19 the underlying topology. It's replicated or
20 reproduced largely by -- in the encapsulation
21 layers.

22 Q But you said "slightly more rounding."

1 That's more rounding than is shown in Kijima.

2 Right?

3 A Yes. Kijima shows basically no rounding
4 at all.

5 Q Okay.

6 A In fact, you can use the Kijima figures
7 to represent almost a hundred percent conformity
8 there, they're nearly that.

9 Q And Suzuki has more rounding than that?

10 MS. ZHONG: Objection. Form.

11 A Again, at the top corners of the figures
12 it's showing some degree of rounding. But as we
13 discussed yesterday, you know, the figures are
14 representative. Exactly how accurate they are is
15 somewhat subject to interpretation.

16 Q You also provide a discussion of claim
17 construction for selectively depositing, starting
18 on Paragraph 26.

19 Do you see that?

20 A Yes.

21 Q Okay. And in this section of your
22 declaration that begins on Paragraph 26, you

1 discuss claim construction positions taken by
2 Samsung in a parallel litigation matter.

3 Is that correct? Or in a matter other
4 than this IPR, I should say, just to be clear.

5 A Are you talking about Paragraph 28?

6 Q I guess 26 and 27 talk about Samsung has
7 proposed and Samsung said this during the claim
8 construction hearing.

9 Do you understand what I'm referring to?

10 A In response to your question, I would say
11 that, yes, in Paragraph 27 I do refer to some
12 statements made at the claim construction hearing.
13 And again in Paragraph 28 I refer specifically to
14 Samsung's district court position on the
15 definition of selectively depositing.

16 Q I just want to make sure we're looking at
17 the same document. You just referred to 28 as
18 incorporating stuff having to do with claim
19 construction, having to do with the claim
20 construction hearing?

21 A No. In this -- in that -- in 28 I
22 referred to Samsung's district court position,

1 which I understood to be the other matter that you
2 were referring to previously.

3 MR. GARR: Okay. Could we put 28 on the
4 screen.

5 Q Is this the paragraph that you're
6 referring to as 28?

7 A Yes.

8 Q And is this your understanding refers to
9 a claim construction hearing?

10 A I -- I state in the -- towards the middle
11 of that paragraph, "Thus, Dr. Subramanian" --

12 Q Oh, okay.

13 A -- "understanding of selectively
14 depositing is consistent with Samsung's district
15 court position."

16 Q Okay. Okay. I understand. And you
17 understand, just for clarity, that Dr. Subramanian
18 is an expert in this IPR matter. Right?

19 A Yes.

20 Q So in this overall section under the
21 Subheading B, Selectively Depositing, going from
22 Paragraphs 26 through 29, you are referring to

1 positions taken by Samsung in the district court
2 and Dr. Subramanian in this case. Correct?

3 A Yes.

4 Q And you labeled this in Paragraph 29
5 "Samsung and Dr. Subramanian's Construction."

6 Correct?

7 A Yes.

8 Q And that is a construction that you have
9 applied in Section 7 of this declaration.

10 Correct?

11 A Yes.

12 Q But you disagree with that construction.
13 Is that correct? You think it's wrong?

14 A That's correct. I state in Paragraph 28,
15 immediately after the sentence referring to
16 Samsung district court position, I state, "I
17 disagree with this position, as selective
18 depositions can often leave small quantities of
19 unwanted material, for example, trace residues,
20 scum, et cetera, that require removing using wet
21 chemical cleaning, for example descumming, or
22 brief plasma etching, for example ashing, to

1 remove the residues."

2 MR. GARR: Let's turn to Section 7,
3 please. It begins on Paragraph 49, Page 23.

4 Q This is the section that you were
5 referring to in the paragraph we were just looking
6 at?

7 A Yes.

8 Q And this is the section in which you
9 offer opinions that are based on the Samsung and
10 Dr. Subramanian's construction. Right?

11 A Well, this is Section 8. Correct?

12 Q Paragraph 49?

13 A Oh, 49. I'm sorry. I thought we were
14 looking at Page 49. Okay.

15 Yes, 49 is Section 7. Yes.

16 Q Okay. And this is the section that you
17 were referring to in Paragraph 29 that we were
18 looking at before in which you apply this
19 construction of selectively depositing?

20 A Yes.

21 Q And in this section heading for Roman
22 numeral 7, you refer to it as Dr. Subramanian's

1 construction. Right?

2 A Yes.

3 Q This is the same construction that you
4 referred to as Samsung and Subramanian's
5 construction in Paragraph 29. Right?

6 A Yes.

7 Q And this section header says that "Kijima
8 does not disclose the element," and then it says,
9 "at least under Dr. Subramanian's construction."
10 Right?

11 A Yes.

12 Q What do you mean by "at least"?

13 A By "at least" I basically am just
14 indicating that I am using Dr. Subramanian's
15 construction in this analysis.

16 Q And in this section you're discussing the
17 Kijima reference, at least in part. Correct?

18 A That's correct.

19 Q And Kijima specifies an approach for
20 depositing various layers in its structure.

21 Is that right?

22 A Could you repeat the question, please?

1 Q Kijima provides a methodology for
2 depositing layers. Right? We can actually go to
3 the pictures above Paragraph 53, if that would be
4 helpful.

5 What is shown in these two figures,
6 Kijima 3 and 11, that are reproduced with
7 annotations on your declaration just above
8 Paragraph 53?

9 A The last part of Paragraph 52 just above
10 those figures describes Dr. Subramanian's
11 interpretation of Kijima. In 52, regarding
12 selective deposition of the insulating sealing
13 layer, Dr. Subramanian relies on the Kijima's use
14 of shadow mask 24.

15 And then at the end of that same
16 paragraph, To illustrate this, Dr. Subramanian
17 annotated Kijima's Figures 3 and 11, which I've
18 reproduced below.

19 And those are the figures that we're
20 looking at now.

21 Q Okay. So these figures depict a shadow
22 mask approach?

1 A Yes, that would be a -- a reasonable
2 interpretation. Yes.

3 Q Okay. And what is the purpose of shadow
4 masks in connection with deposition techniques?

5 A Well, it's almost in the name. The
6 shadow mask, the mask creates -- or blocks the
7 deposition of material over certain areas in --
8 similar to the shadow blocking, like from the sun.
9 It's created wherever the sunlight is blocked.

10 Q And what is the reason you would want to
11 use it when conducting -- when depositing
12 something?

13 A To reduce the amount of material
14 deposited in a -- in that -- in the shadow of the
15 mask.

16 Q And shadow masks are discussed in the
17 specification for the '389 patent. Correct?

18 A Yes, I believe so.

19 Q And they're discussed as an exemplary
20 technique for conducting selective deposition.

21 Is that right?

22 Do you have the '389 patent in paper

1 format?

2 A I do not.

3 Q Okay. If you'd like --

4 A Give me a moment to pull that up.

5 Q -- we can pull that into the deposition
6 record.

7 MR. GARR: It will be Exhibit 1001.

8 (Exhibit 1001, previously marked, not
9 attached.)

10 Q Okay. Let's just look at the first page
11 for a second.

12 You recognize this document,
13 Mr. Humphrey. Right?

14 A Yes.

15 Q This is the -- what we've been referring
16 to, I think both parties, as the '389 patent in
17 this case. Right?

18 A Yes.

19 Q Okay.

20 MR. GARR: Could we turn to Column 7,
21 please. Actually, yeah, that would be great if we
22 could do it where we -- just scroll down a little

1 so we can get a little bit of Column 6. Okay.

2 Q Do you see the bottom of Column 6, the
3 last two lines, "The manner of selectively
4 depositing the organic layer and the barrier layer
5 may be accomplished in a variety of" -- moving to
6 Column 7 -- "ways"?

7 A Yes.

8 Q Okay. And then the next sentence
9 indicates that a shadow mask can be used?

10 A Yes.

11 Q And in this case the shadow masking is
12 being provided as a way of accomplishing selective
13 deposition. Right?

14 A Yes.

15 Q So it's one of the examples selective
16 deposition approach is provided in the '389
17 patent?

18 A Yes.

19 Q And it's the approach provided in Kijima.
20 Correct?

21 A Yes, the Kijima is using masks in that
22 manner.

1 Q It's using shadow masks. Right?

2 A I would have to do a search of Kijima to
3 make sure it actually uses the term "shadow
4 masks," but that's the logical interpretation of
5 the figure.

6 Q Okay. And in Kijima's figures -- could
7 we go back to your declaration we were just
8 looking at, please. Wonderful. We have Kijima's
9 figures just above your Paragraph 53.

10 On the left side, the pink is the mask
11 and the white is the mask opening.

12 Is that right?

13 A Yes, that's correct.

14 Q And the mask opening corresponds to the
15 intended deposition area?

16 MS. ZHONG: Objection. Form.

17 A Could we blow that up or zoom in on that
18 figure a little bit? I can't make out the text.
19 Thank you.

20 Yes, I believe that's correct.

21 Q And you have pointed to -- well, never
22 mind. Strike that. Let's zoom out a little and

1 look at the text of your Paragraph 54, please.
2 Actually, let's keep going down to the next page.

3 So you have pointed to the Fujimori
4 reference here in Paragraph 54 as evidence that
5 you don't believe the shadow mask in Kijima would
6 be sufficiently precise to achieve selective
7 deposition.

8 Is that right?

9 A Under Dr. Subramanian's definition, no.

10 Q Okay. And Kijima is proposing an
11 improved masking technique, correct, that improves
12 precision?

13 MS. ZHONG: Objection. Form.

14 A Can you point me to what you're referring
15 to as far as Kijima claiming greater precision in
16 the coating?

17 Q I'm referring to what you have here in
18 your testimony in Paragraph 54. I'm sure there
19 are further disclosures, but I'm looking at sort
20 of what you've quoted here, including the line
21 that says, "not conventionally possible."

22 MS. ZHONG: Objection. Form.

1 Counsel, are you referring to Kijima or
2 Fujimori? Maybe that's the confusion.

3 MR. GARR: Oh, my goodness. Sorry. I
4 was trying to -- yeah, let me start this over.

5 Q You've pointed to Fujimori in this
6 Paragraph 54. Right?

7 A Yes.

8 Q And you've noted that it enables finer
9 pattern processing. Right?

10 A That is -- well, as I state in this
11 paragraph, "According to Fujimori, his invention,
12 or this effect, reproduces the proportion of area
13 where the deposited material or other material
14 wraps around; in other words, the portion
15 deposited from the mask opening that bleeds to the
16 shadow portion of the mask, achieving fine pattern
17 processing not conventionally possible."

18 Q So Fujimori is proposing what it
19 characterizes as an improved masking technique.

20 Correct?

21 A Yes.

22 Q I'm paraphrasing, but in concept.

1 A Yes. In general, yes.

2 Q And the idea is that it would improve
3 precision over other masking techniques?

4 MS. ZHONG: Objection. Form.

5 A I don't know that he uses that term
6 "precision," but I think the excerpt that I just
7 read is the case he's making, that it minimizes
8 the amount of bleed or -- or encroachment of
9 deposition beyond the edge of the mask.

10 Q And reducing bleed would make it more
11 accurate or precise in terms of the resulting area
12 in which deposition material is deposited?

13 MS. ZHONG: Objection. Form.

14 A I would again refer to my -- my
15 discussion here in Paragraph 54 of Fujimori. And
16 in looking at the last couple of sentences of that
17 paragraph, I state: As such, a skilled artisan
18 would understand that without the use of the
19 magnetic mask, Fujimori discloses that it's not
20 possible to avoid having material bleed under the
21 shadow mask. Fujimori further discloses that,
22 quote, this is a major problem that can cause a

1 short in the elements and crosstalk due to
2 increased leakage, close quote.

3 And I continue on from the Fujimori
4 reference. And he explains the object of his
5 invention is, quote, to provide a method to
6 achieve adequate adhesion between the mask and the
7 substrate, which is necessary to achieve fine
8 pattern processing with the mask, which has
9 heretofore been impossible.

10 So I interpret your use, Mr. Garr, of
11 "precision" to be in reference to achieving fine
12 pattern processing by using the Fujimori magnetic
13 mask approach.

14 Q So it provides more accuracy in terms of
15 where the deposition material is deposited?

16 A I think that adequately paraphrases what
17 Fujimori is arguing.

18 Q In another place Fujimori refers to
19 favorable pattern accuracy. That's a quote. I
20 can pull it up, if you want.

21 A No, that's fine.

22 Q That's consistent with what you just

1 said. Correct?

2 A I believe so.

3 Q Does Fujimori provide any indication as
4 to what degree of fine pattern processing was
5 conventionally possible using existing techniques?
6 Actually, let me start this over.

7 So I'm looking at your testimony in
8 Paragraph 54 here. After the "not conventionally
9 possible" wording, you have a sentence that says,
10 "Without the use of a magnetic mask, as in
11 Fujimori, Fujimori discloses that it was not
12 possible to avoid having material bleed under the
13 shadow mask."

14 Right?

15 A Correct.

16 Q And it goes on to say this is a major
17 problem, at least in some situations. Right?

18 A Yes, that there's an excerpt from
19 Fujimori indicating that that material bleed under
20 the shadow mask is a major problem.

21 Q And whether this is a problem and the
22 degree to which it does is a function of the how

1 fine of a pattern you're trying to achieve.

2 Is that right?

3 A If I understand your question correctly,
4 it's not just a function of how fine a pattern;
5 it's a function of avoiding even residual
6 deposition underneath the edge of the mask.

7 Q And that idea of avoiding residual
8 deposition material is essentially a problem of
9 accuracy or the lack thereof when you're
10 conducting deposition. Right?

11 MS. ZHONG: Objection. Form.

12 A No, I'm not sure what -- what you're
13 referring to in terms of accuracy.

14 Q Well, Fujimori's saying that its
15 technology allows you to have finer pattern
16 processing.

17 Is that right? A pattern that's more
18 fine than --

19 A Yes.

20 Q -- what was previously possible?

21 A Yes.

22 Q So it works better down to smaller sizes

1 than conventional techniques.

2 MS. ZHONG: Objection. Form.

3 A I'm not sure that that's a correct
4 interpretation.

5 The edge of the mask to some degree is
6 independent of the -- of the size. Ideally, yes,
7 you want the deposited material to not leak or
8 seep beyond that edge. That -- that would be a
9 perfect deposition, which I would use Fujimori's
10 words in saying that that's not conventionally
11 possible, to prevent some material from leaking
12 under that edge.

13 In terms of accuracy, if you'd like to
14 use that term, I would say the resulting deposited
15 material edge should be ideally in perfect
16 alignment with the edge of the mask. But that's
17 ideally speaking, and that's a situation that
18 doesn't exist in the practical world.

19 Q In Paragraph 55 you note the fact that
20 Fujimori refers to a pattern pitch of 2
21 millimeters as a suitable example?

22 A Yes.

1 Q And how does that bear upon your opinions
2 with respect to Kijima?

3 A Fujimori -- well, again, I would -- I
4 would just refer to Paragraph 55 as you stated.
5 And I state in Paragraph 55 Fujimori discloses,
6 quote, a pattern pitch of 2 millimeters is a
7 suitable example for the mask, unquote. And
8 also -- well, further down, This is consistent
9 with the patterning disclosed in Kijima, which
10 likewise discloses creating a pattern with a pixel
11 size -- a pixel, quote, size of 2 millimeter by 2
12 millimeter using a deposition mask 22 as depicted
13 in Figure 3, unquote.

14 Q You have something after that that says,
15 "Thus, a person of ordinary skill would understand
16 from Fujimori that Kijima's shadow mask suffers
17 from the same bleed effect."

18 Right?

19 A Yes, the Fujimori disclosure would
20 indicate that unless you're using his proposed
21 solution, that you would expect the same situation
22 from similarly sized or dimension masks.

1 Q Why does the size or dimension of the
2 masks bear upon your conclusion?

3 A Only that there is a common basis for
4 expecting bleed underneath the mask edges, because
5 the dimensions that are discussed in both Fujimori
6 and Kijima are very similar.

7 Q Does Fujimori provide any examples of
8 sizes at which this bleed becomes a problem?

9 A We would need to refer to Fujimori
10 specifically to answer that question.

11 Q You don't remember offhand?

12 A I'd need to review Fujimori.

13 Q Okay. Do you have it?

14 A No.

15 Q It's Exhibit 1014.

16 MR. GARR: Let's bring it in, please.

17 (Exhibit 1014, previously marked, not
18 attached.)

19 MR. GARR: Let's go to Paragraph 8,
20 please. Problem To Be Solved By The Invention.
21 Keep going down, please. Up there. There we go.
22 Zoom in so we can get the thing on the left,

1 Problem To Be Solved By The Invention.

2 Q Okay. Please take a look at that to
3 refresh your recollection, Mr. Humphrey.

4 A Is there a specific paragraph?

5 Q Paragraph 8 on the left.

6 A Oh, thank you.

7 MR. GARR: If you could zoom in more,
8 actually, on just 8.

9 A It's fine for me.

10 Q Okay. Let me know when you've taken a
11 look at Paragraph 8.

12 A Okay.

13 Q So this is I believe indicating that the
14 bleed-through problem, or the bleed-through effect
15 becomes a problem the finer the pattern is.

16 Is that right?

17 A Well, it doesn't specifically refer to a
18 fine metal mask, but that's -- at least in this
19 particular paragraph. But final metal masks are
20 used for more -- to achieve finer patterning.

21 Q There's a sentence that begins with the
22 word, "Therefore, with conventional methods."

1 Do you see that?

2 A Yes.

3 Q Okay. So, "the finer the pattern is,"
4 what does that mean?

5 A I think that means the smaller the, in
6 this case, pixel sizes or pixel pitches are, would
7 refer to a finer pattern.

8 Q Okay. So the smaller the pattern is, or
9 the smaller the pixels are, the more the position
10 of the deposited material wrapping around the
11 shadow of the mask -- that's referring to the
12 potential unwanted bleed-through. Correct?

13 A Yes.

14 Q -- the more that problem or issue cannot
15 be ignored. Right?

16 A Yes, that's in the context of depositing
17 over pixels. Yes.

18 Q So this problem becomes more difficult to
19 ignore the finer the pattern is. That's what's
20 being said here. Right?

21 A Yes, but this is in the context of
22 depositing material over individual pixels, I

1 believe, not over the entire array, or pixel
2 array.

3 Q You're pointing to this discussion as
4 supporting your opinions that the Kijima shadow
5 mask would not be sufficiently precise. Correct?

6 A Yes, that is correct, for the reasons
7 stated here by Fujimori, as well as the need for
8 accuracy and not having thin-film encapsulation
9 material bleed into electrical contact areas or
10 scribe line areas.

11 Q Okay. And Fujimori is saying that this
12 problem becomes more critical the finer the
13 pattern size is. Correct?

14 A Well, the tolerances, I would say, even
15 though he doesn't use this terminology, the
16 tolerances are tighter for fine metal mask use,
17 which is what he is referring to here, I believe;
18 as opposed to the masks that are used for
19 deposition in thin-film encapsulation.

20 Q And it provides an example, pointing to
21 another patent application, of pitch size that is
22 much smaller than what would be possible using

1 conventional methods. Correct?

2 A Can you point me to that part of the
3 Fujimori disclosure?

4 Q It's right here in Paragraph 8.

5 A Oh, okay.

6 Where he refers to the example,
7 "according to patent application JP H2-66873, a
8 pattern pitch of less than 300 microns is a much
9 smaller pixel size than the range where pattern
10 processing using a mask is possible."

11 Okay.

12 Yes, he's referring to another reference,
13 indicating that smaller pattern pitches are not
14 achievable, apparently, are not -- I'm sorry, you
15 may have broken up. I didn't hear that.

16 Q I didn't say anything.

17 A Okay.

18 Q He's providing an example size at which
19 this bleed-through effect becomes a significant
20 problem. Correct?

21 A I would say it's not exactly clear from
22 this single reference. But he's indicating that

1 the use of a mask, whether it's related to the
2 actual fabrication of the mask itself, that
3 process not being accurate enough to allow for
4 these smaller pixel sizes and pitches, or whether
5 it's the deposition itself or a combination of the
6 two.

7 In the early part of this paragraph
8 Fujimori is pointing to the fact that the
9 production of the mask itself becomes -- of the
10 shadow mask becomes --

11 (Discussion off the record; technical
12 difficulty.)

13 A -- impossible.

14 I'll just read exactly from Fujimori
15 Paragraph 8 where he says, "However, the mask must
16 be made thin to accommodate a fine pattern. Since
17 sufficient strength cannot be obtained, the
18 adhesion between the substrate and the mask
19 deteriorates due to warping and other factors."

20 So he's pointing to the fact that as we
21 get to finer and finer patterns, just the actual
22 production of a viable mask becomes unachievable.

1 Q Right. And as a result you have
2 bleed-through?

3 MS. ZHONG: Objection. Form.

4 A Well, certainly the accuracy of the
5 deposition is -- is compromised.

6 Q Okay. And as a result it says, It makes
7 it difficult to pattern the element with adequate
8 accuracy. Right?

9 A Yes, he states in the very next sentence,
10 "Therefore, with conventional methods the finer
11 the pattern is, the more the position of the
12 deposited material wrapping around the shadow mask
13 cannot be ignored, making it difficult to pattern
14 the element with adequate accuracy."

15 MR. GARR: Let's go to Paragraph 29.
16 Thank you.

17 Q This is the paragraph that you cited to
18 in the part of your declaration we were looking at
19 a little bit before.

20 Do you recognize this paragraph?

21 A Twenty-nine. Let me read through it,
22 please.

1 Yes, I recognize the paragraph.

2 Q And this paragraph, like the one we were
3 just looking at, is referring to this problem of
4 material -- what I think we have called
5 bleed-through. Right?

6 A Yes, it's referring to -- to
7 bleed-through. Yes.

8 Q And it says that, "As a result of this
9 issue, achieving fine pattern processing not
10 conventionally possible."

11 I feel like that sentence might be
12 missing a verb.

13 But do you have an understanding of what
14 it's saying? You quoted it, so I assume you do.

15 A Yes, that's the portion of Fujimori I
16 quoted in Paragraph 54.

17 Q Okay. And so the clause, "achieving fine
18 pattern processing not conventionally possible,"
19 what do you take that to be indicating?

20 A I think it's just referring to the
21 previous part of that same sentence, that his
22 objective is to reduce the portion of area where

1 the deposited material or other material wraps
2 around; in other words, the portion deposited from
3 the mask opening that bleeds to the shadow portion
4 of the mask.

5 Q Okay. And achieving fine pattern
6 processing not conventionally possible, what does
7 that mean?

8 A It means that he's reduced his invention
9 is -- his proposed solution is to reduce the
10 amount of material that is bleeding beyond the
11 edge of the mask.

12 Q Yes, that's the first clause. Then there
13 is a clause afterwards that say, "Achieving fine
14 pattern processing not conventionally possible."
15 You quoted it. How does that add to what he's
16 saying in the previous clause?

17 MS. ZHONG: Objection. Form.

18 A I think he is just stating that his
19 invention that reduces the amount of material
20 that's bleeding into the shadow portion of the
21 mask allows for finer pattern processing.

22 Q What's "finer pattern processing"?

1 A Smaller pixel sizes, smaller pixel
2 pitches.

3 Q And how small does Fujimori say that this
4 improved technology can allow for?

5 MS. ZHONG: Objection. Form.

6 MR. GARR: We can go back to Paragraph 8.

7 Q Here is the paragraph where Fujimori
8 points to this other Japanese patent document and
9 cites to it as support for the idea that a pattern
10 pitch of less than 300 micrometers is a much
11 smaller pixel size than the range where pattern
12 processing using a mask is possible.

13 Do you see that?

14 A I do.

15 Q What do you take from that?

16 MS. ZHONG: Objection. Form.

17 A My interpretation of this one sentence
18 referring to a Japanese patent application is
19 implying that shadow masking is not a viable
20 technique at that time, according to this patent
21 application, for pattern pitches less than 300
22 microns.

1 Q Are there --

2 MS. ZHONG: Sorry.

3 MR. GARR: I suggest we wrap up when I'm
4 done with this line.

5 MS. ZHONG: Yeah, we've been going on for
6 about an hour and 40 minutes now, so ...

7 MR. GARR: Yeah, just a few more minutes
8 and I'll wrap up.

9 Q Are there any other numerical examples in
10 Fujimori of pitches at which conventional masking
11 techniques are not suitable?

12 A I don't know. I'd need to review the
13 Fujimori patent again.

14 Q Okay.

15 MR. GARR: We can break now.

16 MS. ZHONG: Let's go off the record.

17 (A recess was taken.)

18 BY MR. GARR:

19 Q Mr. Humphrey, I'd like to look at
20 Paragraph 36 of Fujimori.

21 Okay. Kind of the bottom half of the
22 sentence -- or of the paragraph where it says,

1 "The present invention is particularly effective
2 for fine patterning"?

3 Do you see that?

4 A Yes.

5 Q And then it goes on to say, "500
6 micrometers is an example of a more favorable
7 pattern pitch."

8 Right?

9 A Yes.

10 Q What does "pitch" mean in this context?

11 A It's the distance from one pixel edge to
12 the next pixel edge.

13 Q So it provides an example. In this case,
14 for example, if the opening is 300 micrometers,
15 the remaining width of the mask is 200
16 micrometers. Is that consistent with your
17 understanding?

18 A (No verbal response.)

19 Q Could you explain how those numbers
20 relate to the pitch measurement?

21 A Well, it's basically the pixel dimension
22 itself, as well as the length or spacing between

1 them. So you should add the two together, the
2 pixel size and the space, to obtain the pitch.

3 Q And in this case, the opening is the
4 pixel size?

5 A Yes.

6 Q So pitch is pixel size plus mask width,
7 is I think what you said. Right?

8 A Yes, the space between either the pixels
9 or the pitch. If you're referring to the mask
10 pitch, then it would be the whole dimension plus
11 the space between the holes in the mask.

12 Q Yeah, let's go back to your declaration,
13 please. I wanted to ask about your opinions about
14 heat in Kijima. Let me just find where that is.
15 One second, please.

16 MR. GARR: Okay. Let's go to Paragraph
17 84, please, of your declaration.

18 A Did you say 86?

19 Q Paragraph 84, yeah.

20 Here you are referencing Kijima and its
21 discussion about the effect of radiant heat.

22 Do you recall that?

1 A Yes.

2 Q This is discussing the effect of radiant
3 heat during deposition of the insulating sealing
4 film. Right?

5 A Yes.

6 Q What is that radiant heat? Can you
7 explain to me where that heat comes from and why
8 it can be concerning?

9 A Well, in vacuum depositions, generally
10 you are heating the source material in order to
11 evaporate it. And then you have heat of
12 condensation of material that's being released as
13 the material is deposited on the substrate.

14 So you have radiant heat from -- from the
15 heating source, as well as heat of condensation.

16 Q Okay. But the heat that's being
17 discussed in Kijima is radiant heat, in
18 particular. Right?

19 A Oh, yes, correct.

20 Q And in what sense is that heat radiant?
21 I think you get into radiant in your declaration.
22 I'm trying to understand the sort of mechanism of

1 the heat and how it impacts the device.

2 A As far as the insulating layer goes ...

3 Q Yeah, why don't we go to Paragraph 109 of
4 your declaration.

5 Are you there?

6 A I am.

7 Q So your understanding of Kijima is that
8 when it discusses radiant heat, that pertains to
9 heat that's transferred via radiation from the
10 evaporator to the substrate or the device. Right?

11 A Yes.

12 Q Okay. And once that heat reaches the
13 OLED, you say, Heat conduction pathway to remove
14 that heat becomes important. Right?

15 A Yes.

16 Q So what's the mechanism through which
17 the -- you understand the insulating sealing film
18 to provide some protection against this radiant
19 heat?

20 MS. ZHONG: Objection. Form.

21 A Well, I think that question is answered
22 in the last part of Paragraph 109. But once the

1 heat reaches the OLED, heat conduction pathway to
2 remove that heat becomes important. For example,
3 it would be beneficial to have the heat conducted
4 away through the gold stripes to other parts of
5 the substrate.

6 Q Does that mean that conductive -- what is
7 this thing called? Conductive sealing film?
8 Element 7. Sorry. I've -- I want to get my
9 terminology.

10 What is 7? Conductive sealing film.
11 Okay.

12 A Conductive sealing film, yes.

13 Q So is the conductive sealing film
14 essentially acting as a heat sink or an insulator?

15 A No.

16 Q If that question is not clear, I can try
17 to rephrase. I am trying to understand the
18 mechanism through which this conductive sealing
19 film provides a measure of protection from heat.

20 A Yes, as I allude to in the next
21 paragraph, that's why Fujimori emphasizes the need
22 for, quote, a material with good thermal

1 conductivity, which gold is. I added that here.

2 Q Okay.

3 A But, yes, gold is a very good thermal
4 conductor. And so heat will -- will be conducted
5 and be dissipated through the material quite
6 easily.

7 It's also highly reflective, as I state
8 here in that same paragraph. So it would be
9 effective at reflecting radiant heat as well.

10 Q You fault Dr. Subramanian in Paragraph
11 110 for not providing analysis on, as you say,
12 "how the ability of heat conduction changes when
13 an uncovered gold film is modified to one covered
14 with polymers."

15 Why would the heat conduction properties
16 of the gold layer change based on what's on top of
17 it?

18 A Well, if the heat is coming from the
19 deposition of the insulating layer, then any
20 material that's deposited on top of the gold layer
21 will have some affect on the -- the heat that's
22 being transferred during the growth of that film.

1 I mean, the most obvious difference I
2 think would be in terms of reflectivity.

3 If you have an uncovered gold film, it's
4 highly reflective and will reflect heat much
5 better than once that reflective surface has now
6 been coated with a -- a thin layer of insulating
7 material.

8 Q That's sort of addressing its reflective
9 properties, but I'm asking about its conductive
10 properties.

11 You sort of said how the ability of heat
12 conduction changes. And that's what I'm trying to
13 understand. It would still conduct heat the same
14 way if it's covered with something, wouldn't it?

15 A No, not if the source of the heat is
16 coming from the other side of what's covering it.

17 Q Okay. So in this sense, in this case,
18 the source of the heat is coming from when the
19 insulating sealing film is being deposited.

20 Right? That's Layer 8?

21 A Yes, I think I address that in Paragraph
22 111. Kijima emphasizes the importance of gold --

1 of gold film's ability to protect the OLED organic
2 layer from the radiant heat that reaches the OLED.
3 So I think that answers your question.

4 Q How is the radiant heat reaching the
5 OLED?

6 A From the insulating sealing layer
7 deposition.

8 Q Right. And so in the unmodified Kijima,
9 that insulating film deposition is going right on
10 top of the gold layer. Right?

11 A Correct.

12 Q And you've explained that that gold layer
13 is going to take the heat and conduct it away from
14 the -- from the OLED. Right?

15 A Yes, presumably.

16 Q And are -- the modification that's been
17 proposed is to add an organic layer on top of the
18 gold film. Right?

19 A Correct.

20 Q And do organic -- how do organic
21 materials compare with gold in terms of heat
22 conductivity properties?

1 A Typically organic materials are not as
2 good a thermal conductor as -- as metals, and
3 particularly gold.

4 Q They're going to act as an insulator,
5 then. Right?

6 A Correct.

7 Q So in the modification, we have an
8 insulating layer on top of the gold. Right?

9 A I'm sorry, could you repeat that
10 question, please?

11 Q Under the proposed modification, you have
12 an organic layer on top of the gold. Right?

13 A Correct.

14 Q And that organic layer is relatively
15 insulating. Right?

16 A The material that is being proposed to be
17 added is likely to be a poor thermal conductor.

18 Q And wouldn't that reduce the amount of
19 heat that reaches the gold film during deposition
20 of the next layer, the insulating sealing film?

21 A Well, again interpreting Kijima's
22 results, it would appear that this radiant heat

1 which is being -- that is being -- impinging upon
2 the surface, the gold surface, to the extent it
3 can be reflected away and minimize the actual heat
4 transfer that's going on, the masking of that
5 highly reflective gold surface would allow for
6 more radiant heat to be absorbed and retained in
7 the substrate.

8 I think the analogy that might serve to
9 illustrate is just in commercial buildings we see
10 highly reflective window glass used in order to
11 minimize the -- the heat that's being absorbed
12 from -- from the sunlight. The highly reflective
13 windows are much better at reducing the heat
14 buildup than a normal nonreflective window.

15 Q You provide opinions that this
16 modification would lead to a triple layer device.

17 Right?

18 A Yes.

19 Q And in contrast, the '389 patent and
20 Suzuki are double layer, entail double-layer
21 protections, double-layer encapsulation. Right?

22 A That's certainly true for '389, but, yes.

1 Q Would the heat -- the concern about
2 radiant heat that's discussed in Kijima, would
3 that be a similar problem in the '389 patent's
4 encapsulation method?

5 A Certainly not to the degree of Kijima.

6 Q Why not?

7 A The '389 patent is -- does not suggest
8 using a gold layer planarization layer.

9 Q Right. The '389 patent has no
10 insulating -- or, sorry, conductive sealing film
11 whatsoever. Right?

12 A Well, I think it may -- well, let's go
13 back to look at '389.

14 Q Sure.

15 A There are -- there are some alternatives
16 that are disclosed in the '389 patent.

17 Q Should we look at Figure 5? Or you tell
18 me where you'd like to look.

19 A Actually, let me go ahead and call that,
20 load that here on my screen to make it searchable.

21 Q Sure.

22 A Could you repeat your question?

1 Q I forgot it.

2 MR. GARR: Could we read it back.

3 (Pending question read.)

4 Q Is there a place you want to look at the
5 '389 patent in order to address those issues?

6 A No.

7 Q Okay. And the '389 patent has no
8 conductive sealing film. Right?

9 A Well, the barrier layer is allowed to be
10 metal. So that could be conductive. However, the
11 planarizing layer is an organic material of some
12 kind; therefore the conductivity would be
13 relatively low.

14 Q Okay. And could the concern of radiant
15 heat during deposition that's discussed in Kijima
16 be present in the encapsulation methods of the
17 '389 patent?

18 A There's no disclosure of such an effect
19 being observed in -- by the inventors in the '389.

20 MR. GARR: I think that's all the
21 questions I have, subject to redirect.

22 MS. ZHONG: Okay. Can I have about ten

1 to 15 minutes to look through my notes?

2 MR. GARR: Sure.

3 (A recess was taken.)

4 EXAMINATION BY COUNSEL FOR PATENT OWNER

5 BY MS. ZHONG:

6 Q Mr. Humphrey, do you recall discussing
7 with counsel the definition of selectively
8 depositing you applied in Section 7 of your
9 declaration?

10 A Yes.

11 Q Can we please go to Paragraph 50 of your
12 declaration. Let me know when you are there.

13 Are you there?

14 A I'm there.

15 Q Okay. Do you see that in Paragraph 50
16 you mention blanket deposition of the organic
17 layer followed by patterned etching of the organic
18 material?

19 Do you see that phrase there?

20 A I do.

21 Q So if the definition of selectively
22 depositing is depositing a material in desired

1 areas as the District Court has construed, is
2 blanket deposition selective deposition process?

3 A No.

4 Q Do you recall discussion with counsel of
5 the reference for Fujimori?

6 A Yes.

7 Q Does --

8 MS. ZHONG: Can we pull up Fujimori,
9 Paragraph 8, again.

10 Q And do you recall discussing with counsel
11 the statement in Fujimori that, With conventional
12 methods, the finer the pattern is, the more the
13 position of the deposited material wrapping around
14 the shadow of the mask cannot be ignored?

15 Do you recall that discussion?

16 A Yes.

17 Q Does Fujimori mention that the fact
18 bled-through does not occur with less finer shadow
19 masks?

20 A No, I don't believe so.

21 Q So the fact that the finer the pattern
22 is, the more -- the more the bled-through problem

1 cannot be ignored, does that mean that the
2 bled-through problem should be ignored or can be
3 ignored with less fine metal masks?

4 A No, absolutely not.

5 Q And do you see any evidence by
6 Dr. Subramanian that the bled-through problem does
7 not occur with conventional shadow masks, and no
8 cleanup would be needed?

9 A In my Paragraph 56 from my declaration, I
10 write, "I note that Dr. Subramanian does not
11 modify Kijima's shadow mask with Fujimori's
12 magnetic mask for Grounds I through III." And
13 then skipping to the next sentence. "Therefore,
14 because Fujimori itself indicates that Kijima's
15 unmodified shadow mask (with 2 millimeter by 2
16 millimeter patterning) is unable to selectively
17 deposit material, as Dr. Subramanian understands
18 that term, Dr. Subramanian has not established
19 that Kijima discloses selecting depositing
20 material, as required by Elements 34[b] and
21 34[c]."

22 Does that answer your question?

1 Q That is fine.

2 Now, do you recall discussing with
3 counsel that planarity can mean different degrees
4 of planarity and different degrees of
5 conformalness?

6 Do you recall that discussion?

7 A Yes.

8 Q And can you please take a look at the
9 figure of Suzuki that you have reproduced on Page
10 15 of your declaration.

11 A Yes.

12 Q And in Suzuki, the organic layer is a
13 purple layer. Correct?

14 A Is a polymer layer. Is that what you
15 said?

16 Q That's the layer that's shown in the
17 purple color.

18 Is that correct?

19 A That's correct.

20 Q And would a POSITA, given the underlying
21 topology, consider that the purple layer to be a
22 planarization layer or --

1 A No.

2 Q Okay. And would they consider it to be a
3 layer of material that planarizes, given the
4 underlying topology?

5 A No.

6 MS. ZHONG: That's all the questions I
7 have. And I will pass the witness again.

8 MR. GARR: Nothing further. Thank you.

9 (Off the record at 1:18 p.m. EDT.)

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ACKNOWLEDGMENT OF DEPONENT

I, KURT D. HUMPHREY, do hereby
acknowledge that I have read and examined the
foregoing testimony, and the same is a true,
correct and complete transcription of the
testimony given by me, and any corrections appear
on the attached Errata sheet signed by me.

(DATE)

(SIGNATURE)

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C E R T I F I C A T E

I, Debra Ann Whitehead, E-Notary Public in and for
the Commonwealth of Virginia, do hereby certify:

That KURT D. HUMPHREY, the witness whose
deposition is hereinbefore set forth, was duly sworn
by me before the commencement of such deposition and
that such deposition was taken virtually and is a
true record of the testimony given by such witness.

I further certify that the adverse party,
PICTIVA DISPLAYS INTERNATIONAL, INC., was
represented by counsel at the deposition.

I further certify that the deposition of
KURT D. HUMPHREY occurred virtually, on Thursday,
October 2nd, from 10:29 a.m. to 1:18 p.m. EDT.

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

7

8 IN WITNESS WHEREOF, I have hereunto set my
9 hand this 5th day of October, 2025.

10

11 My commission expires:

12 October 31, 2027

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17 E-NOTARY PUBLIC IN AND FOR THE

18 COMMONWEALTH OF VIRGINIA

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