

1 UNITED STATES PATENT AND TRADEMARK OFFICE

2  
3 BEFORE THE PATENT TRIAL AND APPEAL BOARD  
4

5 MIANYANG BOE OPTOELECTRONICS TECHNOLOGY CO., LTD;

6 WUHAN CHINA STAR OPTOELECTRONICS SEMICONDUCTOR

7 DISPLAY TECHNOLOGY CO., LTD.;

8 TIANMA MICROELECTRONICS CO., LTD.,

9 and VISIONOX TECHNOLOGY, INC.,

10 Petitioner,

11 vs.

12 SAMSUNG DISPLAY CO., LTD.,

13 Patent Owner.  
14

15 Case No. IPR2023-00987

16 U.S. Patent No. 9,818,803

17 -and-

18 Case No. IPR2023-00988

19 U.S. Patent No. 10,854,683

20 -and-

21 Case No. IPR2023-01075

22 U.S. Patent No. 11,594,578

VIDEOTAPED DEPOSITION OF IOANNIS KYMISSIS, Ph.D.

via videoconference

Wednesday, June 12, 2024

9:00 a.m. EST

Job No.: 540558

Pages: 1 - 120

Stenographically Reported By:

Alison C. Webster, CSR-6266, RPR, RMR, CRR, RDR

1  
2  
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4  
5 Videotaped deposition of IOANNIS KYMISSIS, Ph.D.,  
6 produced as a witness at the instance of the Petitioner, and  
7 duly sworn, was taken in the above-styled and numbered cause  
8 on Wednesday, June 12, 2024, from 9:00 a.m. to 11:46 a.m.  
9 Eastern Time, before Alison C. Webster, RPR, CRR, RMR, RDR,  
10 CSR-6266 (Michigan); License No. 14559 (California); License  
11 No. 084.004953 (Illinois); License No. 23001848  
12 (Washington); CSR-12432 (Texas), reported by stenographic  
13 method, via videoconference, pursuant to the Federal Rules  
14 of Civil Procedure and the provisions stated on the record  
15 or attached hereto.  
16  
17  
18  
19  
20  
21  
22

A P P E A R A N C E S

APPEARING ON BEHALF OF SAMSUNG

MATTHEW KUDZIN, ESQUIRE

KEE YOUNG LEE, ESQUIRE

Covington & Burling LLP

850 Tenth Street, NW

Washington, D.C. 20001

202.662.5990

mkudzin@cov.com

kylee@cov.com

APPEARING ON BEHALF OF THE PETITIONER

K. PATRICK HERMAN, ESQUIRE

Orrick, Herrington & Sutcliffe, LLP

51 West 52nd Street

New York, New York 10019

212.506.3596

pherman@orrick.com

ALSO PRESENT:

Michael Safee, tech; John Parkman, videographer

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T A B L E   O F   C O N T E N T S

|                         |      |
|-------------------------|------|
| Witness                 | Page |
| IOANNIS KYMISSIS, Ph.D. |      |
| EXAMINATION             |      |
| BY MR. HERMAN:          | 10   |
| EXAMINATION             |      |
| BY MR. KUDZIN:          | 113  |

E X H I B I T I N D E X

| Exhibit | Page |
|---------|------|
|---------|------|

(Exhibits attached to transcript.)

|                                |    |
|--------------------------------|----|
| PREVIOUSLY MARKED EXHIBIT 2009 | 13 |
|--------------------------------|----|

Case IPR2023-00987

ENTERED INTO THE RECORD:

PREVIOUSLY MARKED EXHIBIT 2009

Case IPR2023-00988

ENTERED INTO THE RECORD:

PREVIOUSLY MARKED EXHIBIT 2009

Case IPR2023-01075

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| PREVIOUSLY MARKED EXHIBIT 2009 | 13 |
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Case IPR2023-00988

ENTERED INTO THE RECORD:

PREVIOUSLY MARKED EXHIBIT 2009

Case IPR2023-01075

|                                |    |
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| PREVIOUSLY MARKED EXHIBIT 2009 | 14 |
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Case IPR2023-01075

Transcript of Ioannis Kymissis, Ph.D.  
Conducted on June 12, 2024

7

|    |                                |           |                   |
|----|--------------------------------|-----------|-------------------|
| 1  | E X H I B I T                  | I N D E X | C O N T I N U E D |
| 2  | PREVIOUSLY MARKED EXHIBIT 1001 |           | 23                |
| 3  | IPR2023-00987                  |           |                   |
| 4  | PREVIOUSLY MARKED EXHIBIT 1001 |           | 58                |
| 5  | IPR2023-00988                  |           |                   |
| 6  | ENTERED INTO THE RECORD:       |           |                   |
| 7  | PREVIOUSLY MARKED EXHIBIT 1001 |           |                   |
| 8  | IPR2023-01075                  |           |                   |
| 9  | PREVIOUSLY MARKED EXHIBIT 1001 |           | 58                |
| 10 | IPR2023-01075                  |           |                   |
| 11 | PREVIOUSLY MARKED EXHIBIT 2018 |           | 62                |
| 12 | IPR2023-00987                  |           |                   |
| 13 | PREVIOUSLY MARKED EXHIBIT 1015 |           | 66                |
| 14 | IPR2023-00987                  |           |                   |
| 15 | PREVIOUSLY MARKED EXHIBIT 1005 |           | 71                |
| 16 | IPR2023-00987                  |           |                   |
| 17 | PREVIOUSLY MARKED EXHIBIT 1004 |           | 75                |
| 18 | IPR2023-00987                  |           |                   |
| 19 | PREVIOUSLY MARKED EXHIBIT 2011 |           | 83                |
| 20 | IPR2023-00987                  |           |                   |
| 21 | PREVIOUSLY MARKED EXHIBIT 1016 |           | 97                |
| 22 | IPR2023-00987                  |           |                   |

Transcript of Ioannis Kymissis, Ph.D.  
Conducted on June 12, 2024

8

1 DEPOSITION OF IOANNIS KYMISSIS, Ph.D.

2 Wednesday, June 12, 2024

3  
4 VIDEO TECHNICIAN: Here begins Media

08:59:23

5 Number 1 in the videotaped deposition of Ioannis

08:59:25

6 Kymissis, Ph.D., in the matter of Mianyang BOE

08:59:31

7 Optoelectronics Technology Limited Company, et al,

08:59:35

8 versus Samsung Display Company Limited, in the United

08:59:38

9 States Patent and Trademark Office before the Patent

08:59:42

10 Trial and Appeal Board, Case Numbers IPR2023-00987,

08:59:45

11 00988, and 01075.

08:59:52

12 Today's date is Wednesday, June 12th, 2024.

08:59:55

13 The time on the video monitor is now 9 a.m. Eastern

08:59:59

14 Time.

09:00:03

15 The remote videographer today is John

09:00:04

16 Parkman, representing Planet Depos. All parties of

09:00:04

17 this video deposition are attending remotely.

09:00:04

18 Would counsel please voice-identify

09:00:04

19 themselves and state whom they represent.

09:00:15

20 MR. HERMAN: This is Patrick Herman from

09:00:15

21 Orrick, Herrington & Sutcliffe here on behalf of

09:00:21

22 Petitioner.

09:00:24

PLANET DEPOS

888.433.3767 | WWW.PLANETDEPOS.COM

1 MR. KUDZIN: This is Matthew Kudzin of 09:00:25  
2 Covington & Burling on behalf of Samsung Display 09:00:29  
3 Company and the witness, and I'm joined by my 09:00:32  
4 colleague Kee Young Lee, also of Covington & Burling. 09:00:34

5 VIDEO TECHNICIAN: The court reporter today 09:00:39  
6 is Alison Webster, representing Planet Depos.

7 The witness will now be sworn.

8 STENOGRAPHER: The attorneys participating  
9 in this deposition and the witness have verified that  
10 he is Ioannis Kymissis, Ph.D. In lieu of an oath  
11 administered in person, the witness will visually  
12 affirm his testimony in this matter is under penalty  
13 of perjury.

14 The parties and their counsel consent to  
15 this arrangement and waive any objections to this  
16 manner of reporting or admissibility of the  
17 transcript.

18 If there are any objections to proceeding  
19 in this manner by any party, please state so now.

20 Hearing no objections, Dr. Kymissis, would  
21 you please raise your right hand.

22 Do you swear or affirm the testimony you

1 are about to give in this matter will be the truth,  
2 the whole truth, and nothing but the truth?

3 DR. KYMISSIS: I do.

4 STENOGRAPHER: Thank you.

5 You may proceed.

6 IOANNIS KYMISSIS, Ph.D.,  
7 was thereupon called as a witness herein, and after  
8 having first been duly sworn to testify to the truth,  
9 the whole truth and nothing but the truth, was  
10 examined and testified as follows:

09:01:25

11 MR. HERMAN: Good morning, Doctor.

09:01:25

12 EXAMINATION

09:01:25

13 BY MR. HERMAN:

09:01:25

14 Q. Have you been deposed before?

09:01:28

15 A. Yes, I have.

09:01:31

16 Q. Approximately how many times?

09:01:36

17 A. This is, I believe, my third time.

09:01:37

18 Q. So despite your prior experience, I'm going to go

09:01:39

19 through a few basic ground rules to make sure we're on

09:01:42

20 the same page to help things go a little more smoothly

09:01:46

21 today.

09:01:50

22 The first is that there's a court reporter

09:01:51

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | here, so it's important that you respond verbally so     | 09:01:52 |
| 2  | that the reporter can record your testimony.             | 09:01:58 |
| 3  | Is that okay?                                            | 09:02:01 |
| 4  | A. Yes, it is.                                           | 09:02:02 |
| 5  | Q. And it's also important that we not talk over each    | 09:02:04 |
| 6  | other so that there's a clear record. So I'll do my      | 09:02:07 |
| 7  | best to wait for you to finish answering before asking   | 09:02:11 |
| 8  | another question, and I also ask that you wait until     | 09:02:13 |
| 9  | I'm done with my question before answering.              | 09:02:16 |
| 10 | And it's also important that we not                      | 09:02:20 |
| 11 | interject with uh-huhs or other unclear statements.      | 09:02:24 |
| 12 | Is that okay?                                            | 09:02:28 |
| 13 | A. Yep. I think that's a good idea. I'll do my best to   | 09:02:31 |
| 14 | wait for you to finish and -- that sounds good.          | 09:02:33 |
| 15 | Q. And you, Doctor, are also entitled to a question from | 09:02:36 |
| 16 | me that you understand. So if anything I ask is          | 09:02:40 |
| 17 | unclear, please ask for clarification. Otherwise,        | 09:02:44 |
| 18 | I'll assume that we're on the same page.                 | 09:02:48 |
| 19 | Is that okay?                                            | 09:02:49 |
| 20 | A. Yes, I appreciate that.                               | 09:02:53 |
| 21 | Q. And next, I ask that you not look at anything during  | 09:02:54 |
| 22 | the deposition besides the documents that I give you.    | 09:02:58 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | And if you do look at anything, I ask that you tell       | 09:03:03 |
| 2  | me.                                                       | 09:03:06 |
| 3  | I understand that you have copies, printed                | 09:03:07 |
| 4  | copies of your declaration with you, and it's okay if     | 09:03:09 |
| 5  | you refer to those when we're discussing your             | 09:03:15 |
| 6  | declaration, but if there's any documents that you are    | 09:03:17 |
| 7  | looking at that we are not talking about during the       | 09:03:20 |
| 8  | questioning, I ask that you tell me.                      | 09:03:22 |
| 9  | Is that okay?                                             | 09:03:24 |
| 10 | A. Okay. That sounds good.                                | 09:03:25 |
| 11 | Q. And those copies of your declaration and the patents   | 09:03:26 |
| 12 | at issue and the prior art in this IPR proceeding, are    | 09:03:29 |
| 13 | any of them annotated or are they clean copies?           | 09:03:34 |
| 14 | A. These are clean copies. They were printed just for     | 09:03:38 |
| 15 | this.                                                     | 09:03:40 |
| 16 | Q. And next I ask that you don't have any side            | 09:03:40 |
| 17 | conversations with anyone or use technology to chat or    | 09:03:46 |
| 18 | communicate with anyone during your deposition.           | 09:03:50 |
| 19 | Is that okay?                                             | 09:03:53 |
| 20 | A. Yes, it is.                                            | 09:03:55 |
| 21 | Q. Now, is there anything that would prevent or interfere | 09:03:56 |
| 22 | with your testimony today?                                | 09:03:59 |

1 A. No, there is not. 09:04:03

2 Q. So I'm going to put three exhibits, to get us started, 09:04:04

3 into the Chat. Let me know when you've got those. 09:04:09

4 And I understand you also have paper 09:04:18

5 copies, but I want you to have electronic versions in 09:04:19

6 case you would like to refer to those. 09:04:22

7 MR. HERMAN: Now, there are three exhibits. 09:04:31

8 Each of them bears the Exhibit Number 2009. Do you 09:04:33

9 see that? 09:04:36

10 MR. KUDZIN: I'm sorry, it may just be a 09:04:40

11 technical issue on my end, but I'm not seeing any 09:04:41

12 documents in the Chat yet. 09:04:44

13 MR. HERMAN: Is anyone else seeing them? 09:04:46

14 STENOGRAPHER: Did you hit the send? 09:04:51

15 MR. HERMAN: Ah... good point. I just 09:04:52

16 needed the key step of actually submitting the 09:04:58

17 documents to the Chat. 09:05:01

18 ENTERED INTO THE RECORD:

19 PREVIOUSLY MARKED EXHIBIT 2009

20 Case IPR2023-00987

21 ENTERED INTO THE RECORD:

22 PREVIOUSLY MARKED EXHIBIT 2009

|    |                                                      |          |
|----|------------------------------------------------------|----------|
| 1  | Case IPR2023-00988                                   |          |
| 2  | ENTERED INTO THE RECORD:                             |          |
| 3  | PREVIOUSLY MARKED EXHIBIT 2009                       |          |
| 4  | Case IPR2023-01075                                   |          |
| 5  | 9:05 a.m.                                            | 09:05:06 |
| 6  | VIDEO TECHNICIAN: I'm sorry to interrupt.            | 09:05:06 |
| 7  | This is the videographer.                            | 09:05:08 |
| 8  | Mr. Kudzin, is there a way that we can move          | 09:05:09 |
| 9  | the Polycom phone closer to the witness? We're able  | 09:05:12 |
| 10 | to hear you clearly, but he's a little muffled.      | 09:05:15 |
| 11 | THE WITNESS: I think it's fixed in the               | 09:05:26 |
| 12 | room but I may be able to move myself. I don't know. | 09:05:26 |
| 13 | MR. KUDZIN: Let me see if I can increase             | 09:05:27 |
| 14 | the sensitivity of the microphone.                   | 09:05:29 |
| 15 | Why don't we try this. I'm going to mute             | 09:05:44 |
| 16 | the Polycom, Dr. Kymissis. Why don't you turn on the | 09:05:48 |
| 17 | microphone on your computer, and hopefully I will be | 09:05:51 |
| 18 | loud enough, because I usually am, that it will be   | 09:05:54 |
| 19 | picked up by your computer.                          | 09:05:56 |
| 20 | THE WITNESS: Yeah.                                   | 09:05:59 |
| 21 | Okay. Can you hear...                                | 09:06:04 |
| 22 | All right, can you hear me now?                      | 09:06:11 |

|    |                                                        |          |
|----|--------------------------------------------------------|----------|
| 1  | VIDEO TECHNICIAN: Yes, that's much                     | 09:06:13 |
| 2  | clearer. Thank you very much.                          | 09:06:14 |
| 3  | THE WITNESS: I can move to a headset if                | 09:06:16 |
| 4  | necessary, but this way we'll all be on the same       | 09:06:18 |
| 5  | audio.                                                 | 09:06:21 |
| 6  | MR. KUDZIN: And just testing, can you hear             | 09:06:21 |
| 7  | me through his computer mic as well?                   | 09:06:23 |
| 8  | VIDEO TECHNICIAN: Yes, we can. Thank you               | 09:06:25 |
| 9  | very much.                                             | 09:06:27 |
| 10 | THE WITNESS: Okay. Great.                              | 09:06:28 |
| 11 | BY MR. HERMAN:                                         | 09:06:31 |
| 12 | Q. So, Doctor, I'd like to draw your attention to      | 09:06:32 |
| 13 | Exhibit 2009 from IPR2023-00987. Do you see that       | 09:06:36 |
| 14 | exhibit?                                               | 09:06:42 |
| 15 | A. Just a moment. Let me open them all.                | 09:06:43 |
| 16 | Okay. I have that one open.                            | 09:07:07 |
| 17 | Q. So what is that exhibit?                            | 09:07:07 |
| 18 | A. So that is my declaration referring to patent       | 09:07:09 |
| 19 | 9,818,803.                                             | 09:07:15 |
| 20 | Q. All right. So that patent you mentioned, is it okay | 09:07:17 |
| 21 | if I refer to that as the '803 patent?                 | 09:07:19 |
| 22 | A. Yes, it is.                                         | 09:07:24 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | Q. And is it okay today if I refer to this declaration as | 09:07:25 |
| 2  | your '803 patent declaration?                             | 09:07:28 |
| 3  | A. Yes, that would be great.                              | 09:07:31 |
| 4  | Q. Now, I'd like you to look at the exhibit that's been   | 09:07:32 |
| 5  | marked Exhibit 2009 in the IPR ending 988. Can you        | 09:07:38 |
| 6  | find that for me, please?                                 | 09:07:44 |
| 7  | A. Sure, just a moment.                                   | 09:07:48 |
| 8  | Okay. I have that open.                                   | 09:08:07 |
| 9  | Q. And what is that exhibit?                              | 09:08:08 |
| 10 | A. So that's my declaration on U.S. Patent 10,854,683.    | 09:08:10 |
| 11 | Q. All right. And is it okay if I refer to that patent    | 09:08:18 |
| 12 | that you just mentioned as the '683 patent?               | 09:08:22 |
| 13 | A. Yes, it is.                                            | 09:08:25 |
| 14 | Q. And is it also okay if I refer to this declaration as  | 09:08:26 |
| 15 | your '683 patent declaration?                             | 09:08:29 |
| 16 | A. Yes, it is.                                            | 09:08:37 |
| 17 | Q. So I'd like you to find Exhibit 2009 in the IPR ending | 09:08:37 |
| 18 | 1075. Can you find that for me?                           | 09:08:39 |
| 19 | A. I have that open.                                      | 09:08:44 |
| 20 | Q. All right. So what is that exhibit?                    | 09:08:45 |
| 21 | A. So this is my declaration on U.S. Patent 11,594,578.   | 09:08:49 |
| 22 | Q. So is it okay if I refer to that patent as the '578    | 09:08:57 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | patent?                                                   | 09:09:01 |
| 2  | A. Yes, it is.                                            | 09:09:02 |
| 3  | Q. And is it also okay if I refer to that declaration as  | 09:09:03 |
| 4  | your '578 patent declaration?                             | 09:09:07 |
| 5  | A. Yes, it is.                                            | 09:09:11 |
| 6  | Q. All right. So I'd like you to get Exhibit 2009 in the  | 09:09:12 |
| 7  | 987 IPR, that's your '803 patent declaration, handy       | 09:09:19 |
| 8  | and in front of you. Can you do that for me?              | 09:09:24 |
| 9  | A. Okay. I have that open.                                | 09:09:26 |
| 10 | Q. And I'd like you to turn to paragraph 47 of that       | 09:09:30 |
| 11 | declaration.                                              | 09:09:33 |
| 12 | A. I also have it on paper here, so...                    | 09:09:37 |
| 13 | Okay. I'm on paragraph 47.                                | 09:09:54 |
| 14 | Q. So paragraph 47 is a part of your declaration that is  | 09:09:55 |
| 15 | meant to provide some technological background; is        | 09:09:59 |
| 16 | that right?                                               | 09:10:01 |
| 17 | A. That is correct.                                       | 09:10:04 |
| 18 | Q. So in paragraph 47 you explain that, quote, "There are | 09:10:05 |
| 19 | two different ways to operate flat panel displays --      | 09:10:09 |
| 20 | active-matrix driving and passive-matrix driving," end    | 09:10:13 |
| 21 | quote.                                                    | 09:10:18 |
| 22 | Do you see that?                                          | 09:10:19 |

|    |    |                                                        |          |
|----|----|--------------------------------------------------------|----------|
| 1  | A. | Yes, I see that.                                       | 09:10:21 |
| 2  | Q. | Now, when the '803 patent was filed, were both of      | 09:10:22 |
| 3  |    | those different ways of operating a display known?     | 09:10:28 |
| 4  | A. | Yes. Both of those techniques were known at that       | 09:10:31 |
| 5  |    | time.                                                  | 09:10:35 |
| 6  | Q. | Was it also known, when the '803 patent was filed,     | 09:10:35 |
| 7  |    | that an OLED display could employ either active-matrix | 09:10:39 |
| 8  |    | driving or passive-matrix driving?                     | 09:10:47 |
| 9  | A. | Yes, this was known.                                   | 09:10:50 |
| 10 | Q. | Now, before we go on, did I -- did I use that acronym  | 09:10:51 |
| 11 |    | correctly? Is that the way that those ordinary         | 09:10:55 |
| 12 |    | skilled in the art refer to the acronym O-L-E-D? Do    | 09:11:00 |
| 13 |    | they say OLED or do they say out all the letters?      | 09:11:03 |
| 14 | A. | Everyone says OLED. There's not enough time to spell   | 09:11:06 |
| 15 |    | it out.                                                | 09:11:09 |
| 16 | Q. | Okay. So when the term, quote, "OLED display," end     | 09:11:10 |
| 17 |    | quote, is used by itself when the '803 patent was      | 09:11:15 |
| 18 |    | filed, this could be referring to an OLED display that | 09:11:19 |
| 19 |    | employs active-matrix driving or a display that        | 09:11:23 |
| 20 |    | employs passive-matrix driving; is that right?         | 09:11:27 |
| 21 | A. | That is correct. They would, of course, be different   | 09:11:32 |
| 22 |    | displays, but OLED displays could be architected for   | 09:11:34 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | either passive-matrix drive or for active-matrix          | 09:11:39 |
| 2  | drive.                                                    | 09:11:42 |
| 3  | Q. So that term, "OLED display," by itself embraces both  | 09:11:42 |
| 4  | of those possible driving mechanisms. True?               | 09:11:48 |
| 5  | A. That is correct. Either of those driving mechanisms    | 09:11:52 |
| 6  | can be used in an OLED display, although, again, they     | 09:11:54 |
| 7  | are different types of displays with a different          | 09:11:57 |
| 8  | architecture.                                             | 09:11:59 |
| 9  | Q. Now, if you could turn to paragraph 118 for me.        | 09:12:00 |
| 10 | Sorry, actually, paragraph 119, which is on               | 09:12:19 |
| 11 | the next page. And let me know when you're there.         | 09:12:23 |
| 12 | A. Okay, I'm there now.                                   | 09:12:35 |
| 13 | Q. So in paragraph 119 you state that, quote, "There were | 09:12:36 |
| 14 | well-recognized shortcomings with PMOLED displays that    | 09:12:41 |
| 15 | were," quote, "well before the time of the invention      | 09:12:46 |
| 16 | of the" -- sorry, let me start again. Let me strike       | 09:12:53 |
| 17 | that.                                                     | 09:12:57 |
| 18 | So in paragraph 119, you state, "There were               | 09:12:57 |
| 19 | well-recognized shortcomings with PMOLED displays, and    | 09:13:00 |
| 20 | well before the time of the invention of the '803         | 09:13:05 |
| 21 | Patent, the industry was shifting away from PMOLED        | 09:13:08 |
| 22 | displays to AMOLED displays."                             | 09:13:12 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | Do you see that?                                          | 09:13:16 |
| 2  | A. Yes, I do.                                             | 09:13:16 |
| 3  | Q. So the acronym first. PMOLED displays, that's          | 09:13:17 |
| 4  | referring to a passive matrix OLED; is that right?        | 09:13:22 |
| 5  | A. That is correct.                                       | 09:13:26 |
| 6  | Q. And the acronym AMOLED display, that's referring to an | 09:13:28 |
| 7  | active matrix OLED display; is that right?                | 09:13:31 |
| 8  | A. That is correct.                                       | 09:13:36 |
| 9  | Q. And, again, passive matrix versus active matrix refers | 09:13:39 |
| 10 | to how the display is being driven. True?                 | 09:13:43 |
| 11 | A. Yes. It primarily refers to the drive, although,       | 09:13:49 |
| 12 | again, there's a different architecture for passive       | 09:13:51 |
| 13 | matrix and active matrix systems.                         | 09:13:53 |
| 14 | Q. And what you're saying here is that when the '803      | 09:13:55 |
| 15 | patent was filed, a person having ordinary skill in       | 09:13:59 |
| 16 | the art would have known that there were shortcomings     | 09:14:02 |
| 17 | with passive matrix OLED displays; is that true?          | 09:14:07 |
| 18 | A. That is correct.                                       | 09:14:11 |
| 19 | Q. And you say in this paragraph that those shortcomings  | 09:14:15 |
| 20 | were not only known, but, in your words, were             | 09:14:19 |
| 21 | well-recognized. True?                                    | 09:14:21 |
| 22 | A. That is correct.                                       | 09:14:23 |

|    |    |                                                        |          |
|----|----|--------------------------------------------------------|----------|
| 1  | Q. | And you also say that a person having ordinary skill   | 09:14:23 |
| 2  |    | in the art would have known that there was a shift     | 09:14:27 |
| 3  |    | towards active matrix OLED displays as of the '803     | 09:14:30 |
| 4  |    | patent's filing. True?                                 | 09:14:34 |
| 5  | A. | That is correct. There was a -- there were some        | 09:14:37 |
| 6  |    | demonstrations and there was definitely some interest  | 09:14:40 |
| 7  |    | in the industry to move to active matrix.              | 09:14:42 |
| 8  | Q. | And that would have been known by one of ordinary      | 09:14:45 |
| 9  |    | skill in the art as of the filing date of the '803     | 09:14:49 |
| 10 |    | patent?                                                | 09:14:51 |
| 11 | A. | That is correct.                                       | 09:14:52 |
| 12 | Q. | So is it fair to say that as of the '803 patent's      | 09:14:53 |
| 13 |    | filing, if a person having ordinary skill in the art   | 09:14:57 |
| 14 |    | were implementing an OLED display they would have      | 09:15:00 |
| 15 |    | preferred to make it an active matrix display to avoid | 09:15:03 |
| 16 |    | what you characterize as the well-recognized           | 09:15:07 |
| 17 |    | shortcomings of passive matrix displays.               | 09:15:11 |
| 18 | A. | So I disagree with that as a general statement. You    | 09:15:14 |
| 19 |    | know, the details of how one designs a display really  | 09:15:17 |
| 20 |    | depend on what the display is intended to do, and      | 09:15:22 |
| 21 |    | even at that time, and even today, there are passive   | 09:15:25 |
| 22 |    | matrix displays being made.                            | 09:15:28 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | So it really depends on exactly what the                  | 09:15:29 |
| 2  | practitioner is looking to achieve.                       | 09:15:34 |
| 3  | Q. So what you're saying is that there are circumstances, | 09:15:35 |
| 4  | even today, in which a passive matrix display would       | 09:15:38 |
| 5  | be -- would be a viable option; is that right?            | 09:15:42 |
| 6  | A. That is correct.                                       | 09:15:45 |
| 7  | Q. But at the same time there were still well-recognized  | 09:15:46 |
| 8  | shortcomings with passive matrix displays that would      | 09:15:50 |
| 9  | render them less than suitable in other circumstances.    | 09:15:54 |
| 10 | True?                                                     | 09:15:57 |
| 11 | A. That is correct. There are engineering tradeoffs       | 09:15:58 |
| 12 | which need to be made, and sometimes those would          | 09:16:01 |
| 13 | indicate a passive matrix system and sometimes those      | 09:16:03 |
| 14 | would indicate an active matrix system.                   | 09:16:06 |
| 15 | Q. So there are circumstances where one of ordinary skill | 09:16:08 |
| 16 | in the art would have preferred active matrix             | 09:16:13 |
| 17 | displays; is that fair?                                   | 09:16:16 |
| 18 | A. Yes, again, as a -- as a general statement, I would    | 09:16:18 |
| 19 | agree that is true. And, you know, again, it depends      | 09:16:22 |
| 20 | on exactly what you're trying to make and other           | 09:16:25 |
| 21 | details like, again, what capabilities are available      | 09:16:31 |
| 22 | to the practitioner who's looking to make that            | 09:16:34 |

|    |                                                         |          |
|----|---------------------------------------------------------|----------|
| 1  | design.                                                 | 09:16:36 |
| 2  | Q. Okay.                                                | 09:16:38 |
| 3  | MR. HERMAN: So I'm going to put another                 | 09:16:38 |
| 4  | exhibit into the Chat, and I am going to send it, as    | 09:16:39 |
| 5  | I've learned I have to do.                              | 09:16:45 |
| 6  | ENTERED INTO THE RECORD:                                | 09:16:50 |
| 7  | PREVIOUSLY MARKED EXHIBIT 1001                          | 09:16:50 |
| 8  | IPR2023-00987                                           | 09:16:50 |
| 9  | 9:16 a.m.                                               | 09:16:50 |
| 10 | BY MR. HERMAN:                                          | 09:16:50 |
| 11 | Q. Let me know when you've got that.                    | 09:16:54 |
| 12 | A. Okay, I see that exhibit.                            | 09:16:54 |
| 13 | Q. And this is Exhibit 1001 in IPR2023-00987. And this  | 09:16:56 |
| 14 | exhibit is the '803 patent that you've reviewed; is     | 09:17:06 |
| 15 | that right?                                             | 09:17:10 |
| 16 | A. That is correct.                                     | 09:17:14 |
| 17 | Q. And, again, you have a paper copy of this particular | 09:17:14 |
| 18 | patent with you; is that right?                         | 09:17:16 |
| 19 | A. I believe so. Let me just check.                     | 09:17:17 |
| 20 | Yes, I have that here as well.                          | 09:17:26 |
| 21 | Q. So please feel free to review either the electronic  | 09:17:28 |
| 22 | copy or the paper copy, whichever you determine is      | 09:17:31 |

|    |                                                         |          |
|----|---------------------------------------------------------|----------|
| 1  | more suitable.                                          | 09:17:33 |
| 2  | So I'd like you to turn to Claim 1 of the               | 09:17:36 |
| 3  | '803 patent, which is on the second-to-last page of     | 09:17:41 |
| 4  | the document, begins on the second-to-last page and     | 09:17:47 |
| 5  | continues to the final page.                            | 09:17:49 |
| 6  | Do you see that?                                        | 09:17:52 |
| 7  | A. Yes, I'm there now.                                  | 09:17:55 |
| 8  | Q. So the preamble of Claim 1 states that the claim is  | 09:17:56 |
| 9  | directed to, quote, "an organic light-emitting diode    | 09:18:00 |
| 10 | (OLED) display."                                        | 09:18:04 |
| 11 | Do you see that?                                        | 09:18:05 |
| 12 | A. I see that, yes.                                     | 09:18:08 |
| 13 | Q. So that preamble just references OLED displays in    | 09:18:09 |
| 14 | general without specifying whether the display is       | 09:18:13 |
| 15 | either active or passive. Right?                        | 09:18:16 |
| 16 | A. That is correct. The text of the preamble does not   | 09:18:21 |
| 17 | specify the mode of drive of the display.               | 09:18:23 |
| 18 | Q. And the rest of the claim also does not use the word | 09:18:27 |
| 19 | "active." Right?                                        | 09:18:30 |
| 20 | A. That is correct. The rest of the claim speaks about  | 09:18:32 |
| 21 | the pixel arrangement and not the mode of the drive.    | 09:18:36 |
| 22 | Q. And the rest of the claim also does not exclude      | 09:18:41 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | passive displays from the claim scope. True?             | 09:18:43 |
| 2  | A. So the language of the claim does not exclude passive | 09:18:49 |
| 3  | matrix from the claim scope.                             | 09:18:52 |
| 4  | Q. And none of the claims depending on Claim 1 mention   | 09:18:55 |
| 5  | either an active or a passive display either.            | 09:18:58 |
| 6  | Correct?                                                 | 09:19:00 |
| 7  | A. So if we limit ourselves to the claims of the patent, | 09:19:04 |
| 8  | that is correct. All of the discussion of active         | 09:19:07 |
| 9  | matrix is in the specification.                          | 09:19:09 |
| 10 | Q. All right. So let's look at the specification. So     | 09:19:12 |
| 11 | the specification does not actually use the word,        | 09:19:14 |
| 12 | quote, "active." True?                                   | 09:19:18 |
| 13 | A. That may be true. Give me a second to check.          | 09:19:22 |
| 14 | That is correct.                                         | 09:19:45 |
| 15 | Q. And the specification also does not use the word      | 09:19:47 |
| 16 | "passive." Correct?                                      | 09:19:51 |
| 17 | A. So give me a second to check.                         | 09:19:55 |
| 18 | So that word does not appear in the                      | 09:20:18 |
| 19 | specification.                                           | 09:20:20 |
| 20 | Q. And there is also no statement in the specification   | 09:20:21 |
| 21 | that says that the claims -- or the inventions set       | 09:20:24 |
| 22 | forth in this patent are limited to just active-matrix   | 09:20:28 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | driven displays. True?                                    | 09:20:33 |
| 2  | A. So there's no limitation to active matrix displays.    | 09:20:36 |
| 3  | There is discussion, for example, however, in the         | 09:20:41 |
| 4  | specification of the features of an active matrix         | 09:20:44 |
| 5  | display if we go, for example, in the background          | 09:20:47 |
| 6  | discussion of a gate line, data line, which are           | 09:20:51 |
| 7  | features that are in active matrix displays but not       | 09:20:54 |
| 8  | passive matrix displays. But I do agree that the          | 09:20:58 |
| 9  | patent does not limit itself in that way.                 | 09:21:00 |
| 10 | Q. And the specification also does not say anywhere that  | 09:21:04 |
| 11 | the claims exclude displays that use passive-matrix       | 09:21:08 |
| 12 | driving. Correct?                                         | 09:21:11 |
| 13 | A. That is correct. The language of the claims does not   | 09:21:15 |
| 14 | exclude passive matrix display.                           | 09:21:17 |
| 15 | Q. So my question here related to the specification, that | 09:21:20 |
| 16 | there's no statement in the specification saying that     | 09:21:24 |
| 17 | the invention that's described excludes passive matrix    | 09:21:26 |
| 18 | displays. True?                                           | 09:21:31 |
| 19 | MR. KUDZIN: Objection.                                    | 09:21:33 |
| 20 | A. Yeah, so I'm not aware of any statements in the spec.  | 09:21:35 |
| 21 | I would need to read it again a little more               | 09:21:41 |
| 22 | carefully. But I'm -- just speaking now, I'm not          | 09:21:45 |

|    |                                                         |          |
|----|---------------------------------------------------------|----------|
| 1  | aware of any exclusion of passive matrix in the         | 09:21:52 |
| 2  | specification, just discussion of the topic of the      | 09:21:54 |
| 3  | patent.                                                 | 09:21:58 |
| 4  | BY MR. HERMAN:                                          | 09:21:59 |
| 5  | Q. All right. So returning to Claim 1, because that     | 09:21:59 |
| 6  | claim references generically OLED displays, it's broad  | 09:22:02 |
| 7  | enough to embrace an OLED display that employs either   | 09:22:08 |
| 8  | a passive or an active-matrix driving method.           | 09:22:13 |
| 9  | Correct?                                                | 09:22:17 |
| 10 | A. So, again, I agree that the claim language doesn't   | 09:22:19 |
| 11 | state anything about passive versus active-matrix       | 09:22:24 |
| 12 | drive, but it would be based on the limitations that    | 09:22:27 |
| 13 | are in the patent. It would be, you know, obvious to    | 09:22:30 |
| 14 | a person of ordinary skill in the art at the time of    | 09:22:35 |
| 15 | the patent that this particular architecture is         | 09:22:37 |
| 16 | directed towards active matrix displays.                | 09:22:39 |
| 17 | Q. So I'm asking about the scope of the claims, though. | 09:22:44 |
| 18 | The claims are broad enough, the way they are written,  | 09:22:46 |
| 19 | to embrace both active matrix displays and passive      | 09:22:48 |
| 20 | matrix displays. True?                                  | 09:22:51 |
| 21 | A. So the language of the claim does not limit us to an | 09:22:53 |
| 22 | active matrix display. All of my analysis which         | 09:22:57 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | discusses active matrix is based on the understanding     | 09:23:00 |
| 2  | of a person of ordinary skill and the discussion in       | 09:23:03 |
| 3  | the specification.                                        | 09:23:06 |
| 4  | Q. So I think you just agreed. Right? The claims are      | 09:23:07 |
| 5  | broad enough to embrace displays regardless of whether    | 09:23:10 |
| 6  | they're active-matrix driven or passive-matrix driven.    | 09:23:14 |
| 7  | Correct?                                                  | 09:23:17 |
| 8  | A. So, again, I agree that the claim itself does not      | 09:23:18 |
| 9  | limit us to an active matrix display.                     | 09:23:20 |
| 10 | Q. Okay. Now, Claim 1 also does not specify what type of  | 09:23:22 |
| 11 | device employs the claimed OLED display, does it?         | 09:23:27 |
| 12 | A. I'm sorry, could you be more specific? It does limit   | 09:23:32 |
| 13 | it, for example, to an OLED display.                      | 09:23:36 |
| 14 | Q. Sure. So the device that includes that OLED display    | 09:23:39 |
| 15 | could be a mobile device. True?                           | 09:23:43 |
| 16 | A. Ah. Yes. That is correct. It could be a mobile         | 09:23:46 |
| 17 | device, it could be a watch, it could be any of           | 09:23:49 |
| 18 | several types.                                            | 09:23:52 |
| 19 | Q. So it could be a TV, for instance.                     | 09:23:53 |
| 20 | A. Again, the language of the claim does not limit us to  | 09:23:56 |
| 21 | the format of the end use of the OLED display.            | 09:24:00 |
| 22 | Q. So the claim does not exclude an OLED display employed | 09:24:04 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | by a TV. True?                                           | 09:24:07 |
| 2  | A. That's right. The language of the claim does not      | 09:24:10 |
| 3  | limit us to the end use case of the display.             | 09:24:12 |
| 4  | Q. And it doesn't exclude an OLED display used by a      | 09:24:17 |
| 5  | computer monitor. Correct?                               | 09:24:21 |
| 6  | A. That is correct. It doesn't -- the language of the    | 09:24:23 |
| 7  | claim doesn't limit us in the end use application of     | 09:24:26 |
| 8  | the display.                                             | 09:24:29 |
| 9  | Q. And it doesn't even exclude an OLED display used by a | 09:24:30 |
| 10 | jumbotron, for instance, so long as that OLED display    | 09:24:33 |
| 11 | employs the claimed pixel arrangement. True?             | 09:24:36 |
| 12 | A. So, again, the language of the claims doesn't limit   | 09:24:40 |
| 13 | us to the end use of the -- of the display.              | 09:24:44 |
| 14 | Q. So it doesn't exclude a tiled display either.         | 09:24:47 |
| 15 | Correct?                                                 | 09:24:50 |
| 16 | A. So the language of the claims doesn't speak about     | 09:24:52 |
| 17 | tiling or, again, that end use or format of the          | 09:24:56 |
| 18 | display.                                                 | 09:25:01 |
| 19 | Q. All right. So it says nothing; it does not exclude    | 09:25:01 |
| 20 | that from the scope of the claims. Correct?              | 09:25:06 |
| 21 | A. So the -- that's right. The language of the claims    | 09:25:11 |
| 22 | doesn't exclude the end use -- any end use               | 09:25:13 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | application.                                              | 09:25:15 |
| 2  | Q. So Claim 1, for instance, does not say that the claim  | 09:25:20 |
| 3  | is limited to just mobile devices. True?                  | 09:25:22 |
| 4  | A. Claim 1 does not specify the end use of the display    | 09:25:29 |
| 5  | which is being described.                                 | 09:25:33 |
| 6  | Q. And none of the claims that depend on Claim 1 do that  | 09:25:34 |
| 7  | either, none of them limit the end use of the device      | 09:25:38 |
| 8  | that's claimed. True?                                     | 09:25:41 |
| 9  | A. Correct. None of the -- none of the claims have a      | 09:25:43 |
| 10 | statement as to the end use of the display.               | 09:25:44 |
| 11 | Q. And the specification of the '803 patent does not even | 09:25:47 |
| 12 | use the word "mobile." Correct?                           | 09:25:50 |
| 13 | A. I would have to check. Give me one second to check.    | 09:26:00 |
| 14 | So I don't see the word "mobile" anywhere                 | 09:26:12 |
| 15 | in the specification.                                     | 09:26:14 |
| 16 | Q. And the specification also does not say anywhere that  | 09:26:18 |
| 17 | the patent is limited to just small displays for          | 09:26:20 |
| 18 | mobile devices and excludes larger displays for           | 09:26:23 |
| 19 | televisions, does it?                                     | 09:26:25 |
| 20 | MR. KUDZIN: Objection.                                    | 09:26:33 |
| 21 | A. So the specification, again, says a lot of things,     | 09:26:33 |
| 22 | but it does not restrict the end use of the display       | 09:26:36 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | which is being described.                                | 09:26:41 |
| 2  | BY MR. HERMAN:                                           | 09:26:42 |
| 3  | Q. So let's go back to Claim 1. And Claim 1 of the '803  | 09:26:43 |
| 4  | patent also does not say that the claimed OLED display   | 09:26:47 |
| 5  | must be an HD display, does it?                          | 09:26:50 |
| 6  | A. Claim 1 is -- does not say anything about the         | 09:26:55 |
| 7  | resolution of the display, does not require specific     | 09:26:58 |
| 8  | resolution.                                              | 09:27:02 |
| 9  | Q. And you understand what I mean when I use the acronym | 09:27:03 |
| 10 | "HD." Right?                                             | 09:27:06 |
| 11 | A. Yes. HD, I assume, correct me if I'm wrong, in your   | 09:27:08 |
| 12 | normal use, means high definition, which is typically    | 09:27:16 |
| 13 | a display of 1K or higher.                               | 09:27:19 |
| 14 | Q. How about the acronym "SD," what does that refer to?  | 09:27:22 |
| 15 | A. So SD generally refers to standard definition, which  | 09:27:27 |
| 16 | is, roughly speaking, the resolution that was present    | 09:27:31 |
| 17 | on TVs during the analog TV era.                         | 09:27:35 |
| 18 | Q. All right. So Claim 1 is broad enough to embrace both | 09:27:40 |
| 19 | HD and nonHD displays such as an SD display. True?       | 09:27:43 |
| 20 | A. So, again, Claim 1 has no statement about the number  | 09:27:50 |
| 21 | of pixels or the resolution of the display.              | 09:27:54 |
| 22 | Q. The specification of the '803 patent also does not    | 09:27:58 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | include a statement that says that the claims are        | 09:28:01 |
| 2  | limited to only HD displays, does it?                    | 09:28:03 |
| 3  | A. So the specification does not limit the resolution of | 09:28:10 |
| 4  | the displays.                                            | 09:28:12 |
| 5  | Q. All right, so let's go back to Claim 1.               | 09:28:16 |
| 6  | So Claim 1 of the '803 patent also makes no              | 09:28:19 |
| 7  | mention of any particular pixel density; is that true?   | 09:28:22 |
| 8  | A. Claim 1 has no statement about the pixel density that | 09:28:28 |
| 9  | one requires in the display.                             | 09:28:31 |
| 10 | Q. So there's no limitation in the claim that requires,  | 09:28:34 |
| 11 | for instance, more than 400 pixels per inch. True?       | 09:28:37 |
| 12 | A. Claim 1 has no statement about the pixel density      | 09:28:43 |
| 13 | that's required in the display.                          | 09:28:46 |
| 14 | Q. So the claim does not exclude displays with only, for | 09:28:48 |
| 15 | instance, 300, 200, or even 100 or less pixels per       | 09:28:51 |
| 16 | inch. Correct?                                           | 09:28:57 |
| 17 | A. So Claim 1 has no statement about the required pixel  | 09:28:58 |
| 18 | density in the display.                                  | 09:29:03 |
| 19 | Q. And the specification of the '803 patent does not use | 09:29:04 |
| 20 | the word "density." True?                                | 09:29:07 |
| 21 | A. Give me a moment to check.                            | 09:29:11 |
| 22 | No, I do not see the word "density" in the               | 09:29:26 |

|    |                                                           |          |
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| 1  | specification.                                            | 09:29:28 |
| 2  | Q. All right. And the specification does not say that     | 09:29:29 |
| 3  | the claims are limited to just displays providing more    | 09:29:31 |
| 4  | than 400 pixels per inch or some other specific           | 09:29:34 |
| 5  | density. Correct?                                         | 09:29:38 |
| 6  | MR. KUDZIN: Objection.                                    | 09:29:41 |
| 7  | A. So, I'm sorry, could you -- I'm sorry, could you       | 09:29:48 |
| 8  | repeat your question?                                     | 09:29:50 |
| 9  | BY MR. HERMAN:                                            | 09:29:51 |
| 10 | Q. Sure. Is there a statement in the specification that   | 09:29:51 |
| 11 | says that the patent is limited to just displays          | 09:29:53 |
| 12 | providing more than 400 pixels per inch?                  | 09:29:57 |
| 13 | MR. KUDZIN: Objection.                                    | 09:30:02 |
| 14 | A. So there's no specific density requirement stated in   | 09:30:03 |
| 15 | the specification.                                        | 09:30:09 |
| 16 | BY MR. HERMAN:                                            | 09:30:11 |
| 17 | Q. Now, moving back to Claim 1 of the '803 patent, the    | 09:30:11 |
| 18 | claim also does not use the phrase "aperture ratio."      | 09:30:14 |
| 19 | Correct?                                                  | 09:30:18 |
| 20 | A. That is correct, Claim 1 does not require a specific   | 09:30:21 |
| 21 | aperture ratio.                                           | 09:30:24 |
| 22 | Q. So the claim does not exclude displays that have lower | 09:30:25 |

|    |                                                         |          |
|----|---------------------------------------------------------|----------|
| 1  | aperture ratios. Correct?                               | 09:30:30 |
| 2  | MR. KUDZIN: Objection.                                  | 09:30:37 |
| 3  | A. So Claim 1 has no statement about the required       | 09:30:39 |
| 4  | aperture ratio of the display.                          | 09:30:40 |
| 5  | BY MR. HERMAN:                                          | 09:30:42 |
| 6  | Q. So it does not require displays with higher aperture | 09:30:42 |
| 7  | ratios or exclude displays with lower aperture ratios.  | 09:30:45 |
| 8  | True?                                                   | 09:30:49 |
| 9  | MR. KUDZIN: Objection.                                  | 09:30:49 |
| 10 | A. So Claim 1 has no statement about the required       | 09:30:50 |
| 11 | aperture ratio for the display.                         | 09:30:52 |
| 12 | BY MR. HERMAN:                                          | 09:30:54 |
| 13 | Q. So as an example of that, nothing about the claims   | 09:30:54 |
| 14 | would exclude a display with an aperture ratio as low   | 09:30:57 |
| 15 | as, for example, 5 percent, so long as that display is  | 09:31:02 |
| 16 | an OLED display and employs the claimed pixel           | 09:31:06 |
| 17 | arrangement. Correct?                                   | 09:31:09 |
| 18 | A. So, again, language of the claims has no statement   | 09:31:12 |
| 19 | about aperture ratio.                                   | 09:31:15 |
| 20 | Q. Okay. Now, Claim 1 of the '803 patent is also        | 09:31:16 |
| 21 | directed to pixel arrangement structure for an OLED     | 09:31:22 |
| 22 | display; is that correct?                               | 09:31:25 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | A. That is correct, it's -- that's the -- I guess that's  | 09:31:28 |
| 2  | the first part of Claim 1.                                | 09:31:32 |
| 3  | Q. All right. So the claim is not directed to a           | 09:31:34 |
| 4  | manufacturing method. True?                               | 09:31:37 |
| 5  | A. Correct. Claim 1 of this patent is a pixel             | 09:31:42 |
| 6  | arrangement for that OLED display.                        | 09:31:44 |
| 7  | Q. So, in fact, the claim is agnostic to the              | 09:31:49 |
| 8  | manufacturing method used so long as the display has      | 09:31:51 |
| 9  | the claimed pixel arrangement. Correct?                   | 09:31:56 |
| 10 | A. So the language of the claim itself speaks to the      | 09:32:00 |
| 11 | pixel arrangement.                                        | 09:32:04 |
| 12 | Q. So the claim is open to displays made by any available | 09:32:05 |
| 13 | manufacturing methods. True?                              | 09:32:09 |
| 14 | A. So the claim is directed to pixel arrangement and has  | 09:32:11 |
| 15 | no statement about the manufacturing technique in         | 09:32:16 |
| 16 | Claim 1.                                                  | 09:32:18 |
| 17 | Q. So the claim does not, for instance, require an OLED   | 09:32:20 |
| 18 | display manufactured using a fine metal mask. True?       | 09:32:23 |
| 19 | A. So the language of the claim does not require the use  | 09:32:28 |
| 20 | of a fine metal mask.                                     | 09:32:31 |
| 21 | Q. Now, if you could turn to paragraph 323 of your '803   | 09:32:32 |
| 22 | patent declaration.                                       | 09:32:37 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | Let me know when you're there.                           | 09:33:01 |
| 2  | A. Okay, I'm here.                                       | 09:33:10 |
| 3  | Q. All right. So the first sentence of paragraph 323     | 09:33:13 |
| 4  | references FMM manufacturing. Do you see that?           | 09:33:16 |
| 5  | A. Yes, I do.                                            | 09:33:20 |
| 6  | Q. Is that referring to manufacturing of an OLED display | 09:33:21 |
| 7  | using a fine metal mask?                                 | 09:33:25 |
| 8  | A. That is correct.                                      | 09:33:30 |
| 9  | Q. So that same sentence, the end of that sentence also  | 09:33:30 |
| 10 | references "alternative methods to pattern organic       | 09:33:33 |
| 11 | materials," and you reference "inkjet printing" and      | 09:33:38 |
| 12 | "laser-induced thermal imaging."                         | 09:33:41 |
| 13 | Do you see that?                                         | 09:33:44 |
| 14 | A. Yes, I do.                                            | 09:33:44 |
| 15 | Q. So Claim 1 is open to the use of any of those         | 09:33:45 |
| 16 | manufacturing methods referenced in this sentence.       | 09:33:50 |
| 17 | True?                                                    | 09:33:52 |
| 18 | MR. KUDZIN: Objection.                                   | 09:33:54 |
| 19 | A. So the language of the claim does not specify a       | 09:33:55 |
| 20 | specific manufacturing method.                           | 09:33:59 |
| 21 | BY MR. HERMAN:                                           | 09:34:01 |
| 22 | Q. All right. So none of those organic OLED displays     | 09:34:01 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | manufactured by any of those methods can fall within     | 09:34:07 |
| 2  | the scope of the claims. True?                           | 09:34:10 |
| 3  | MR. KUDZIN: Objection.                                   | 09:34:11 |
| 4  | A. So, you know, that really depends a little bit, I     | 09:34:15 |
| 5  | mean, on how the display is -- I'll say finally comes    | 09:34:21 |
| 6  | out. But again, the claim does not require any           | 09:34:26 |
| 7  | specific manufacturing method.                           | 09:34:28 |
| 8  | BY MR. HERMAN:                                           | 09:34:30 |
| 9  | Q. So let's turn back to Claim 1 of the '803 patent. Let | 09:34:31 |
| 10 | me know when you've got that in front of you.            | 09:34:40 |
| 11 | A. Okay. I'm here.                                       | 09:34:45 |
| 12 | Q. All right. So Claim 1 of the '803 patent is also not  | 09:34:47 |
| 13 | limited to just the pixel arrangement that's shown in    | 09:34:50 |
| 14 | Figure 5 of the '803 patent. True?                       | 09:34:54 |
| 15 | A. So Claim 1 is limited to the, you know, configuration | 09:35:01 |
| 16 | given by the claim language.                             | 09:35:07 |
| 17 | Q. All right. But it's not limited to just the very      | 09:35:08 |
| 18 | specific arrangement shown in Figure 5. Correct?         | 09:35:10 |
| 19 | A. So it is not limited just to what's in Figure 5.      | 09:35:14 |
| 20 | There are other arrangements which can satisfy the       | 09:35:18 |
| 21 | claim limitations.                                       | 09:35:20 |
| 22 | Q. So, for instance, the arrangement shown in Figures 2, | 09:35:21 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | 3, and 4. Correct?                                        | 09:35:24 |
| 2  | A. That is correct, those are other examples that can     | 09:35:28 |
| 3  | satisfy some of those claim limitations.                  | 09:35:33 |
| 4  | Q. All right. So let's look at Claim 1. In Claim 1,       | 09:35:35 |
| 5  | there's reference to three pixels; a first pixel, a       | 09:35:40 |
| 6  | second pixel, and a third pixel. Do you see that?         | 09:35:45 |
| 7  | A. Yes, I do.                                             | 09:35:49 |
| 8  | MR. KUDZIN: Objection.                                    | 09:35:50 |
| 9  | BY MR. HERMAN:                                            | 09:35:51 |
| 10 | Q. And the claim specifies that the first pixel is at the | 09:35:51 |
| 11 | center of a virtual square. Right?                        | 09:35:55 |
| 12 | A. That is correct.                                       | 09:36:00 |
| 13 | Q. And the claim also specifies that the second and the   | 09:36:01 |
| 14 | third pixels are located at vertex of the virtual         | 09:36:04 |
| 15 | square. Correct?                                          | 09:36:10 |
| 16 | A. That's correct.                                        | 09:36:12 |
| 17 | Q. And I guess I probably -- the claim uses the singular, | 09:36:13 |
| 18 | but to -- I mean, for language purposes, I probably       | 09:36:16 |
| 19 | should have said vertices.                                | 09:36:19 |
| 20 | Now, the claim concludes, at its very end,                | 09:36:24 |
| 21 | by specifying that the first pixel is configured to       | 09:36:34 |
| 22 | emit green light. Do you see that?                        | 09:36:34 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | A. Yes, I do.                                            | 09:36:38 |
| 2  | Q. But the claim says nothing at all about the light --  | 09:36:39 |
| 3  | the color of the light emitted by the second and third   | 09:36:42 |
| 4  | pixels. True?                                            | 09:36:46 |
| 5  | A. Yeah. Claim 1 does not specify the color of the       | 09:36:47 |
| 6  | other two pixels.                                        | 09:36:50 |
| 7  | Q. So the second and the third pixel could be colored    | 09:36:51 |
| 8  | blue and red. Correct?                                   | 09:36:56 |
| 9  | A. That is correct.                                      | 09:36:59 |
| 10 | Q. But they could also be other colors like white, cyan, | 09:37:00 |
| 11 | or yellow. True?                                         | 09:37:05 |
| 12 | MR. KUDZIN: Objection.                                   | 09:37:06 |
| 13 | A. So with the limitation that the -- we have to be      | 09:37:07 |
| 14 | making an organic light-emitting diode display, and      | 09:37:20 |
| 15 | if the cyan and yellow are configured in a way that      | 09:37:24 |
| 16 | gives us a display then it is possible for them to be    | 09:37:30 |
| 17 | other colors.                                            | 09:37:32 |
| 18 | I offer that limitation because it may be                | 09:37:33 |
| 19 | difficult for some configurations of other colors to     | 09:37:35 |
| 20 | make a display, but it depends, again, on what you're    | 09:37:38 |
| 21 | trying to show and what you're structuring.              | 09:37:40 |
| 22 | BY MR. HERMAN:                                           | 09:37:42 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | Q. All right. So the claim does not exclude other        | 09:37:42 |
| 2  | colors. Correct? Besides blue and red?                   | 09:37:46 |
| 3  | A. So, again, the claim language does not exclude other  | 09:37:49 |
| 4  | colors, but you do have to be making a display.          | 09:37:52 |
| 5  | Q. Okay. Now, the claim also says that the second pixel  | 09:37:56 |
| 6  | has a larger area than that of the third pixel. Do       | 09:38:00 |
| 7  | you see that? Kind of at the top of column 9.            | 09:38:03 |
| 8  | Correct?                                                 | 09:38:06 |
| 9  | A. That's correct.                                       | 09:38:12 |
| 10 | Q. But, again, the claim does not say what colors the    | 09:38:12 |
| 11 | second and the third pixel are. True?                    | 09:38:13 |
| 12 | A. That is correct. The claim does not require the       | 09:38:19 |
| 13 | second and third pixel to be a specific color.           | 09:38:22 |
| 14 | Q. So the claim could embrace a display with a larger    | 09:38:24 |
| 15 | blue pixel. Right?                                       | 09:38:27 |
| 16 | A. That is correct.                                      | 09:38:30 |
| 17 | Q. But it also display -- embraces displays with larger  | 09:38:31 |
| 18 | red pixels. Correct?                                     | 09:38:35 |
| 19 | A. That is correct.                                      | 09:38:37 |
| 20 | Q. Or with larger, different-colored pixels like cyan or | 09:38:37 |
| 21 | yellow. True?                                            | 09:38:41 |
| 22 | MR. KUDZIN: Objection.                                   | 09:38:42 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | A. So with the caveat I gave earlier that we do have to   | 09:38:50 |
| 2  | be making a display, it is possible for other colors      | 09:38:50 |
| 3  | to be the largest rather than blue or red.                | 09:38:51 |
| 4  | BY MR. HERMAN:                                            | 09:38:57 |
| 5  | Q. The claim also doesn't say anything at all about the   | 09:38:57 |
| 6  | size of the green first pixel. True?                      | 09:39:00 |
| 7  | A. That is correct. The language of the claim does not    | 09:39:07 |
| 8  | specify any absolute or specific size for the first       | 09:39:08 |
| 9  | pixel.                                                    | 09:39:11 |
| 10 | Q. So Claim 1 does not require the green pixel to be the  | 09:39:12 |
| 11 | smallest of the first, second, and third pixels.          | 09:39:16 |
| 12 | True?                                                     | 09:39:19 |
| 13 | A. So that is correct. Claim 1 only specifies the         | 09:39:22 |
| 14 | relationship between the second and the third pixel.      | 09:39:26 |
| 15 | Q. So Claim 1 is also open to displays in which the green | 09:39:29 |
| 16 | pixel is the largest of the three pixels. True?           | 09:39:33 |
| 17 | A. It would be possible, again with the limitation that   | 09:39:39 |
| 18 | we need to in making a display, that the green pixel      | 09:39:41 |
| 19 | could be the largest pixel.                               | 09:39:45 |
| 20 | Q. And the claim does not require a particularly good     | 09:39:47 |
| 21 | display or a commercially viable display, it just         | 09:39:49 |
| 22 | requires a display. True?                                 | 09:39:52 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | MR. KUDZIN: Objection.                                    | 09:39:56 |
| 2  | A. The language of the claim requires a display. It       | 09:39:57 |
| 3  | does not specify the quality of the display.              | 09:40:00 |
| 4  | BY MR. HERMAN:                                            | 09:40:02 |
| 5  | Q. So while Figure 5 shows a pixel arrangement in which   | 09:40:02 |
| 6  | the blue pixel is largest, the red pixel is of            | 09:40:08 |
| 7  | intermediate size, and the green pixel's the smallest,    | 09:40:11 |
| 8  | the claims do not exclude other arrangements. True?       | 09:40:14 |
| 9  | MR. KUDZIN: Objection.                                    | 09:40:23 |
| 10 | A. So the claim does not require a specific relationship  | 09:40:24 |
| 11 | between the red, the green, and the blue. It              | 09:40:30 |
| 12 | specifies the restrictions that we discussed earlier,     | 09:40:32 |
| 13 | which is that the second pixel has to be larger than      | 09:40:35 |
| 14 | the third pixel and is silent as to the size, say, of     | 09:40:38 |
| 15 | the first pixel, which is required to be the green        | 09:40:42 |
| 16 | pixel.                                                    | 09:40:45 |
| 17 | BY MR. HERMAN:                                            | 09:40:45 |
| 18 | Q. So, for instance, the claims are open to displays with | 09:40:46 |
| 19 | the reverse ordering for what's shown in Figure 5,        | 09:40:50 |
| 20 | where the green pixel is largest, the red is              | 09:40:54 |
| 21 | intermediate size, and the blue pixel is smallest.        | 09:40:56 |
| 22 | True?                                                     | 09:41:00 |

|    |    |                                                        |          |
|----|----|--------------------------------------------------------|----------|
| 1  | A. | Correct. One could envision a configuration with       | 09:41:02 |
| 2  |    | that size order.                                       | 09:41:05 |
| 3  | Q. | All right. And the claims also do not say how much     | 09:41:06 |
| 4  |    | bigger the area of the second pixel must be than that  | 09:41:09 |
| 5  |    | of the third pixel. There's no quantification of that  | 09:41:13 |
| 6  |    | in the claim. True?                                    | 09:41:16 |
| 7  | A. | Yes, the claim language does not specify an exact      | 09:41:19 |
| 8  |    | ratio. That would have to be something which is        | 09:41:22 |
| 9  |    | interpreted by a person of ordinary skill in the art   | 09:41:27 |
| 10 |    | as being larger relative to the other one.             | 09:41:29 |
| 11 | Q. | So the claims are open to both large and small         | 09:41:32 |
| 12 |    | differences in area between the second and the third   | 09:41:37 |
| 13 |    | pixel. True?                                           | 09:41:39 |
| 14 | A. | Again, the claim does not specify a specific ratio of  | 09:41:42 |
| 15 |    | sizes, and, again, we would have to interpret in       | 09:41:46 |
| 16 |    | the -- in the context of a person of ordinary skill    | 09:41:50 |
| 17 |    | in the art whether the second is larger than the       | 09:41:53 |
| 18 |    | third.                                                 | 09:41:56 |
| 19 | Q. | So there's nothing about the language of the claims    | 09:41:56 |
| 20 |    | itself that would exclude a display in which the first | 09:41:59 |
| 21 |    | and the second pixel are equal size and the third      | 09:42:03 |
| 22 |    | pixel is 99 percent of the size of the first and the   | 09:42:07 |

1 second pixel. True? 09:42:11

2 A. So, you know, there I would have to -- I would have 09:42:14

3 to disagree just without knowing more details because 09:42:19

4 this question of whether 99 percent is larger or not 09:42:22

5 depends on the assessment based on the technology 09:42:26

6 being used of a person of ordinary skill in the art. 09:42:31

7 You know, the -- you know, whether or not 09:42:34

8 it's larger will be affected by what technology is 09:42:39

9 being used and how much variation one naturally 09:42:45

10 expects within that technology. 09:42:48

11 Q. How about 95 percent of the size of the first and the 09:42:53

12 second pixel; the third pixel is 95 percent of the 09:42:56

13 size of the first and second pixel. 09:42:58

14 Would that fall within the scope of the 09:43:00

15 claims, in your view? 09:43:01

16 A. So, again, I'd need more details on exactly how we're 09:43:03

17 making this display and how you're defining the size 09:43:06

18 and what the variation is so that we can assess 09:43:09

19 whether or not it's a -- it's a consistent and 09:43:12

20 meaningful difference. 09:43:15

21 Q. All right. So as long as there's some meaningful 09:43:16

22 difference in the size of the second and third pixel, 09:43:19

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | in your view, the claim is satisfied. True?              | 09:43:21 |
| 2  | A. Again, the language of the claim is satisfied --      | 09:43:26 |
| 3  | if to a person of ordinary skill in the art the          | 09:43:28 |
| 4  | second pixel is larger than that of the third pixel,     | 09:43:30 |
| 5  | then it is satisfied.                                    | 09:43:33 |
| 6  | Q. And the difference in area of those -- the second and | 09:43:34 |
| 7  | third pixel can be very small as long as it's            | 09:43:37 |
| 8  | meaningful. True?                                        | 09:43:41 |
| 9  | MR. KUDZIN: Objection.                                   | 09:43:42 |
| 10 | A. So, yeah, I mean, I -- again, I would have to really  | 09:43:42 |
| 11 | understand more about how the display is being made,     | 09:43:45 |
| 12 | and we can have a -- I haven't offered an opinion on     | 09:43:50 |
| 13 | the exact analysis of what that -- what that ratio       | 09:43:52 |
| 14 | could be for different technologies, but it would        | 09:43:58 |
| 15 | depend on the technology being used, you know, how       | 09:44:03 |
| 16 | much variation one might see within that technology.     | 09:44:05 |
| 17 | As an example, if we were using a printing               | 09:44:08 |
| 18 | technique in which there is a 3 percent variation in     | 09:44:11 |
| 19 | the area naturally, you know, it would not be real       | 09:44:14 |
| 20 | reasonable to assume a 99 percent difference is going    | 09:44:18 |
| 21 | to consistently give us something that satisfies that    | 09:44:22 |
| 22 | claim.                                                   | 09:44:26 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | BY MR. HERMAN:                                           | 09:44:26 |
| 2  | Q. So my next question is, apart from the figures, the   | 09:44:28 |
| 3  | specification does not include any numerical examples    | 09:44:32 |
| 4  | of the relative sizing of the first, second, and third   | 09:44:36 |
| 5  | pixels. Correct?                                         | 09:44:39 |
| 6  | A. That is correct. The specification does not require   | 09:44:42 |
| 7  | any particular ratio of pixel sizes.                     | 09:44:45 |
| 8  | Q. And it doesn't provide any numerical examples of      | 09:44:48 |
| 9  | relative sizes that can be used. Correct?                | 09:44:52 |
| 10 | A. That is correct. The specification does not offer an  | 09:44:56 |
| 11 | example of a size ratio within the text of the           | 09:44:59 |
| 12 | specification.                                           | 09:45:03 |
| 13 | Q. And the specification also doesn't say anything about | 09:45:03 |
| 14 | what types of OLED material should be used; is that      | 09:45:06 |
| 15 | correct?                                                 | 09:45:11 |
| 16 | A. That is correct. The specification does not specify   | 09:45:12 |
| 17 | the formulation of the OLED.                             | 09:45:15 |
| 18 | Q. Right. And the specification also does not provide an | 09:45:18 |
| 19 | example of how the pixels should be sized relative to    | 09:45:20 |
| 20 | each other numerically to achieve a proper color         | 09:45:24 |
| 21 | balance. Correct?                                        | 09:45:27 |
| 22 | MR. KUDZIN: Objection.                                   | 09:45:31 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | A. Yeah, so the figures give some examples of sizes, you | 09:45:32 |
| 2  | know, layout configuration ratio, but the text does      | 09:45:39 |
| 3  | not give a ratio to achieve color balance under any,     | 09:45:43 |
| 4  | you know, particular drive conditions.                   | 09:45:49 |
| 5  | BY MR. HERMAN:                                           | 09:45:51 |
| 6  | Q. Is that something one of ordinary skill in the art    | 09:45:52 |
| 7  | would have known as of the '803 patent's filing, how     | 09:45:54 |
| 8  | to relatively size pixels to achieve a proper color      | 09:45:58 |
| 9  | balance?                                                 | 09:46:02 |
| 10 | MR. KUDZIN: Objection.                                   | 09:46:02 |
| 11 | A. So that's a pretty complicated question because the   | 09:46:03 |
| 12 | answer to that depends on a number of factors,           | 09:46:08 |
| 13 | factors relating to lifetime --                          | 09:46:14 |
| 14 | Sorry, I didn't mean to trigger my --                    | 09:46:17 |
| 15 | MR. HERMAN: You liked the answer to your                 | 09:46:20 |
| 16 | own question and gave yourself a thumbs up.              | 09:46:21 |
| 17 | THE WITNESS: Apple's operating system's                  | 09:46:26 |
| 18 | giving us gestures. I guess I should speak and not       | 09:46:29 |
| 19 | use hand gestures anywhere for the text.                 | 09:46:32 |
| 20 | A. It depends on the materials that are available, the   | 09:46:35 |
| 21 | desired color point, the target lifetime of the          | 09:46:39 |
| 22 | display, the target lifetime -- the target luminance     | 09:46:42 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | for the display, the use case. There are a number of      | 09:46:45 |
| 2  | factors, and it's not always obvious how that sizing      | 09:46:48 |
| 3  | should be done. Those are engineering choices which       | 09:46:52 |
| 4  | need to be designed for each display individually.        | 09:46:55 |
| 5  | BY MR. HERMAN:                                            | 09:46:59 |
| 6  | Q. Now, those engineering choices that you just           | 09:46:59 |
| 7  | discussed, the target lifetime, the type of device        | 09:47:02 |
| 8  | we're talking about, the materials that you're using,     | 09:47:04 |
| 9  | none of that is discussed in the '803 patent.             | 09:47:07 |
| 10 | Correct?                                                  | 09:47:10 |
| 11 | A. The '803 patent does not require any specific color    | 09:47:11 |
| 12 | point or lifetime, for example.                           | 09:47:15 |
| 13 | Q. So reviewing the '803 patent, if one of ordinary skill | 09:47:17 |
| 14 | in the art needed to make those decisions they would      | 09:47:22 |
| 15 | need to rely on their own knowledge and expertise and     | 09:47:23 |
| 16 | not instruction within the four corners of the '803       | 09:47:26 |
| 17 | patent. True?                                             | 09:47:30 |
| 18 | A. So the '803 patent is -- discusses the pixel           | 09:47:32 |
| 19 | arrangement, which is -- which is in the                  | 09:47:36 |
| 20 | specification and the claims. It does not offer a         | 09:47:38 |
| 21 | recipe for how to make the entire display.                | 09:47:41 |
| 22 | Q. So one of ordinary skill in the art would need to      | 09:47:44 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | apply their own knowledge and experience to engage in     | 09:47:46 |
| 2  | that exercise, how to make the display. True?             | 09:47:50 |
| 3  | MR. KUDZIN: Objection.                                    | 09:47:55 |
| 4  | A. Yeah, I guess that's a general question. So, yeah, I   | 09:47:56 |
| 5  | mean, more engineering work would need to be done,        | 09:47:59 |
| 6  | and whether somebody of ordinary skill would be the       | 09:48:01 |
| 7  | right person or whether you would need to hire, say,      | 09:48:04 |
| 8  | an expert is not something I've offered an opinion        | 09:48:06 |
| 9  | on.                                                       | 09:48:10 |
| 10 | BY MR. HERMAN:                                            | 09:48:10 |
| 11 | Q. All right. So let's move back to Claim 1 of the '803   | 09:48:11 |
| 12 | patent. And to summarize, the -- Claim 1 is not           | 09:48:13 |
| 13 | limited to just active matrix OLED displays. Correct?     | 09:48:18 |
| 14 | A. So Claim 1 makes no statement about the mode of drive  | 09:48:22 |
| 15 | for the display.                                          | 09:48:27 |
| 16 | Q. And Claim 1 is not limited to just high definition     | 09:48:28 |
| 17 | displays for mobile devices. True?                        | 09:48:31 |
| 18 | A. Claim 1 makes no statement about the number of pixels  | 09:48:35 |
| 19 | that are required to be in the display.                   | 09:48:38 |
| 20 | Q. So the claim is also not limited to displays with high | 09:48:40 |
| 21 | pixel densities that have high aperture ratios. True?     | 09:48:43 |
| 22 | A. So Claim 1 makes no statement about the pixel pitch    | 09:48:48 |

|    |                                                         |          |
|----|---------------------------------------------------------|----------|
| 1  | or the aperture ratio required for satisfaction of      | 09:48:52 |
| 2  | the claim.                                              | 09:48:56 |
| 3  | Q. And the claim is also not limited to just the pixel  | 09:48:56 |
| 4  | arrangement in Figure 5. Correct?                       | 09:49:00 |
| 5  | A. Claim 1 is -- it's limited by the -- excuse me, the  | 09:49:04 |
| 6  | text of the claim, and Figure 5 is one example, and     | 09:49:08 |
| 7  | there are others that could also be imagined.           | 09:49:11 |
| 8  | Q. So instead, the claim embraces all types of OLED     | 09:49:13 |
| 9  | displays that include the claimed pixel arrangement,    | 09:49:17 |
| 10 | including both active and passive-matrix driven         | 09:49:20 |
| 11 | displays. Correct?                                      | 09:49:24 |
| 12 | MR. KUDZIN: Objection.                                  | 09:49:25 |
| 13 | A. So, again, the claim itself is silent as to the mode | 09:49:26 |
| 14 | of pixel drive.                                         | 09:49:29 |
| 15 | BY MR. HERMAN:                                          | 09:49:31 |
| 16 | Q. And the claim can embrace displays for nonmobile     | 09:49:31 |
| 17 | devices. True?                                          | 09:49:34 |
| 18 | A. Again, the claim is silent as to the end use of the  | 09:49:36 |
| 19 | display which is being described.                       | 09:49:38 |
| 20 | Q. And the claim can embrace lower definition displays  | 09:49:41 |
| 21 | with lower pixel densities and low aperture ratios.     | 09:49:44 |
| 22 | True?                                                   | 09:49:50 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | MR. KUDZIN: Same objection.                              | 09:49:50 |
| 2  | A. Yeah, the claim has no statement as to the -- I guess | 09:49:51 |
| 3  | two different things. One is the aperture, and           | 09:50:00 |
| 4  | there's no statement as to the pixel density.            | 09:50:00 |
| 5  | BY MR. HERMAN:                                           | 09:50:04 |
| 6  | Q. And the -- and it also embraces pixel arrangements    | 09:50:04 |
| 7  | that are different from those in the '803 patent's       | 09:50:08 |
| 8  | figures. Correct?                                        | 09:50:12 |
| 9  | A. Correct. The claim -- the patent is limited by the    | 09:50:14 |
| 10 | claim language and not by the figures. The figures       | 09:50:17 |
| 11 | are examples.                                            | 09:50:20 |
| 12 | Q. Okay. Now, if you could go back to your '803 patent   | 09:50:21 |
| 13 | declaration for me, and in particular, paragraph 310.    | 09:50:26 |
| 14 | A. Okay, I'm there.                                      | 09:50:53 |
| 15 | Q. So paragraph 310 is the beginning of a section        | 09:50:54 |
| 16 | identifying what you call objective indicia of           | 09:50:57 |
| 17 | nonobviousness. Correct?                                 | 09:51:01 |
| 18 | A. That is correct.                                      | 09:51:05 |
| 19 | Q. Now, in this section of your declaration you discuss  | 09:51:06 |
| 20 | certain commercial products. Correct?                    | 09:51:09 |
| 21 | A. Yes, I do.                                            | 09:51:14 |
| 22 | Q. So, for instance, if you flip down to paragraph 337,  | 09:51:15 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | you reference a product that is referred to as the        | 09:51:22 |
| 2  | Samsung Galaxy S4.                                        | 09:51:25 |
| 3  | A. Yes, I discuss the Samsung Galaxy S4 in that section.  | 09:51:44 |
| 4  | Q. And in paragraph 338, you reference the iPhone X; is   | 09:51:44 |
| 5  | that right?                                               | 09:51:49 |
| 6  | A. Yes, I discuss the iPhone X, or 10, in 338.            | 09:51:58 |
| 7  | Q. In paragraph 339, you reference the iPhone XS Max, the | 09:52:02 |
| 8  | iPhone X again, the iPhone 14 Pro Max, the iPhone 13      | 09:52:08 |
| 9  | Pro Max, and the iPhone 12 Max. Do you see that?          | 09:52:13 |
| 10 | MR. KUDZIN: Objection.                                    | 09:52:18 |
| 11 | A. Yes, in 339, I discuss industry praise for those       | 09:52:20 |
| 12 | products.                                                 | 09:52:26 |
| 13 | BY MR. HERMAN:                                            | 09:52:27 |
| 14 | Q. All right. So in the paragraphs that we just looked    | 09:52:28 |
| 15 | at, 337, 338, and 339, all of the commercial products     | 09:52:30 |
| 16 | that you reference are mobile devices. True?              | 09:52:34 |
| 17 | A. That is correct. All of those products are mobile      | 09:52:40 |
| 18 | devices.                                                  | 09:52:42 |
| 19 | Q. And they all employ OLED displays that are             | 09:52:43 |
| 20 | active-matrix driven. Correct?                            | 09:52:47 |
| 21 | A. That's correct. Each of those is an active matrix      | 09:52:53 |
| 22 | display using the diamond pixel patent configuration.     | 09:52:55 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | Q. And all of the displays of those devices are high      | 09:52:59 |
| 2  | definition. Correct?                                      | 09:53:02 |
| 3  | A. That's correct. Each of those products has a high      | 09:53:06 |
| 4  | definition scale display.                                 | 09:53:08 |
| 5  | Q. And they all have displays with pixel densities on the | 09:53:10 |
| 6  | order of 400 pixels per inch. Correct?                    | 09:53:14 |
| 7  | MR. KUDZIN: Objection.                                    | 09:53:18 |
| 8  | A. That's correct. They all have pixel densities that     | 09:53:20 |
| 9  | exceeds 400 pixels per inch.                              | 09:53:24 |
| 10 | BY MR. HERMAN:                                            | 09:53:27 |
| 11 | Q. And in your view, they all use pixel arrangements that | 09:53:27 |
| 12 | are analogous to what's shown in Figure 5 of the '803     | 09:53:30 |
| 13 | patent. True?                                             | 09:53:34 |
| 14 | MR. KUDZIN: Objection.                                    | 09:53:36 |
| 15 | A. So all of those use the teachings of the '803 patent   | 09:53:38 |
| 16 | and -- yeah, Figure 5 is generally in the design --       | 09:53:43 |
| 17 | same design as those, although the details are, I'm       | 09:53:51 |
| 18 | sure, different.                                          | 09:53:54 |
| 19 | BY MR. HERMAN:                                            | 09:53:55 |
| 20 | Q. Now, in your '803 patent declaration you did not       | 09:53:55 |
| 21 | separately discuss any devices that employed the same     | 09:53:59 |
| 22 | pixel arrangement as Figure 5 of the '803 patent, but     | 09:54:02 |

|    |                                                         |          |
|----|---------------------------------------------------------|----------|
| 1  | are TV-sized and employ passive-matrix driving and are  | 09:54:07 |
| 2  | only standard definition and have pixel densities       | 09:54:11 |
| 3  | below, for instance, 200 pixels per inch. Correct?      | 09:54:15 |
| 4  | MR. KUDZIN: Objection.                                  | 09:54:20 |
| 5  | A. I'm sorry, could you repeat that question?           | 09:54:22 |
| 6  | BY MR. HERMAN:                                          | 09:54:24 |
| 7  | Q. Sure. In this section of your declaration discussing | 09:54:24 |
| 8  | the objective indicia, do you discuss any products,     | 09:54:29 |
| 9  | commercial products that are TV-sized?                  | 09:54:34 |
| 10 | A. No, none of these are TV-sized products.             | 09:54:38 |
| 11 | Q. And you also don't discuss any commercial products   | 09:54:42 |
| 12 | that are passive-matrix driven. Correct?                | 09:54:44 |
| 13 | A. Correct, none of these products are driven using a   | 09:54:48 |
| 14 | passive matrix architecture.                            | 09:54:50 |
| 15 | Q. And none of the products that you discuss are only   | 09:54:52 |
| 16 | standard definition. True?                              | 09:54:55 |
| 17 | A. That's correct. These all offer high definition      | 09:54:59 |
| 18 | displays.                                               | 09:55:01 |
| 19 | Q. And none of the products that you discuss have pixel | 09:55:02 |
| 20 | density below, for instance, 200 pixels per inch.       | 09:55:05 |
| 21 | True?                                                   | 09:55:09 |
| 22 | MR. KUDZIN: Objection.                                  | 09:55:10 |

|    |                |                                                        |          |
|----|----------------|--------------------------------------------------------|----------|
| 1  | A.             | All of the examples that I give in this section have   | 09:55:12 |
| 2  |                | pixel density higher than 200 pixels per inch.         | 09:55:15 |
| 3  | BY MR. HERMAN: |                                                        | 09:55:19 |
| 4  | Q.             | So you cite no evidence regarding a device that is     | 09:55:19 |
| 5  |                | TV-sized, is passive-matrix driven, is only SD, and    | 09:55:24 |
| 6  |                | has less than 200 pixels per inch anywhere in this     | 09:55:27 |
| 7  |                | section relating to objective indicia. Correct?        | 09:55:31 |
| 8  |                | MR. KUDZIN: Objection.                                 | 09:55:34 |
| 9  | A.             | Yeah, in my objective indicia section, I do not offer  | 09:55:37 |
| 10 |                | an example of a display of that type.                  | 09:55:40 |
| 11 | BY MR. HERMAN: |                                                        | 09:55:44 |
| 12 | Q.             | So you have no pictures of a pixel arrangement from    | 09:55:45 |
| 13 |                | such a device. Correct?                                | 09:55:48 |
| 14 | A.             | That's correct, I have no -- I don't discuss it and I  | 09:55:50 |
| 15 |                | don't have any pictures of such a device.              | 09:55:52 |
| 16 | Q.             | You don't point to any claim charts comparing the      | 09:55:54 |
| 17 |                | pixel arrangement of such a device to the claims of    | 09:55:57 |
| 18 |                | the '803 patent. True?                                 | 09:56:00 |
| 19 | A.             | Not having seen such a device, I have not generated    | 09:56:03 |
| 20 |                | any claim charts or other documentation about that     | 09:56:07 |
| 21 |                | device.                                                | 09:56:10 |
| 22 | Q.             | And you don't cite to any discussions of such a device | 09:56:11 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | from the website DisplayMate. Correct?                   | 09:56:15 |
| 2  | A. No, I do not have any discussion and I'm not aware of | 09:56:19 |
| 3  | any such display, certainly not on the DisplayMate       | 09:56:22 |
| 4  | website.                                                 | 09:56:28 |
| 5  | Q. And you don't cite any press releases or web articles | 09:56:28 |
| 6  | discussing such a device. Correct?                       | 09:56:32 |
| 7  | A. Correct.                                              | 09:56:35 |
| 8  | MR. KUDZIN: Objection.                                   | 09:56:35 |
| 9  | A. I do not cite any press releases or articles about    | 09:56:36 |
| 10 | any TV-sized displays that are passive matrix and        | 09:56:40 |
| 11 | have the other limitations you described.                | 09:56:44 |
| 12 | BY MR. HERMAN:                                           | 09:56:46 |
| 13 | Q. So this section of your declaration includes no       | 09:56:47 |
| 14 | evidence showing that such a product would be subject    | 09:56:49 |
| 15 | to the same praise as the Samsung Galaxy S4, the         | 09:56:52 |
| 16 | iPhone X, or the other devices that you do discuss.      | 09:56:56 |
| 17 | Correct?                                                 | 09:56:59 |
| 18 | MR. KUDZIN: Objection.                                   | 09:57:02 |
| 19 | A. So I do not have a discussion of any devices that     | 09:57:03 |
| 20 | don't exist in my Objective Indicia section, so...       | 09:57:07 |
| 21 | BY MR. HERMAN:                                           | 09:57:14 |
| 22 | Q. And you also don't cite any market need that would    | 09:57:14 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | have been satisfied by such a device. True?              | 09:57:16 |
| 2  | MR. KUDZIN: Objection.                                   | 09:57:21 |
| 3  | A. So, again, the market need section that I have in     | 09:57:22 |
| 4  | Objective Indicia is -- you know, cites the market       | 09:57:30 |
| 5  | needs in the market areas that I discuss, which are      | 09:57:34 |
| 6  | in the mobile display area.                              | 09:57:38 |
| 7  | BY MR. HERMAN:                                           | 09:57:39 |
| 8  | Q. But not for the TV area or the SD display area or the | 09:57:41 |
| 9  | passive matrix display area. Correct?                    | 09:57:48 |
| 10 | MR. KUDZIN: Objection.                                   | 09:57:51 |
| 11 | A. Yeah, I've offered no opinions on the market needs in | 09:57:51 |
| 12 | passive matrix or SD displays.                           | 09:57:54 |
| 13 | BY MR. HERMAN:                                           | 09:57:58 |
| 14 | Q. And you also, in your section relating to objective   | 09:57:58 |
| 15 | indicia, you don't point to any praised device where     | 09:58:01 |
| 16 | the green pixels are larger than both the red and the    | 09:58:04 |
| 17 | blue pixels, do you?                                     | 09:58:07 |
| 18 | A. So the industry praise is limited to devices we spoke | 09:58:12 |
| 19 | about earlier, and those have the green pixel as the     | 09:58:17 |
| 20 | smallest pixel.                                          | 09:58:21 |
| 21 | Q. Okay.                                                 | 09:58:23 |
| 22 | MR. HERMAN: I'm going to put two more                    | 09:58:33 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | exhibits into the Chat and then we'll quickly talk        | 09:58:35 |
| 2  | about these and then take a break. Let me know when       | 09:58:40 |
| 3  | you've got those.                                         | 09:58:43 |
| 4  | ENTERED INTO THE RECORD:                                  | 09:58:44 |
| 5  | PREVIOUSLY MARKED EXHIBIT 1001                            |          |
| 6  | IPR2023-00988                                             |          |
| 7  | ENTERED INTO THE RECORD:                                  |          |
| 8  | PREVIOUSLY MARKED EXHIBIT 1001                            |          |
| 9  | IPR2023-01075                                             |          |
| 10 | 9:58 a.m.                                                 | 09:58:59 |
| 11 | A. I have the '578 patent and the '683 patent.            | 09:58:59 |
| 12 | BY MR. HERMAN:                                            | 09:59:05 |
| 13 | Q. Okay. So one of the exhibits is Exhibit 1001 from      | 09:59:05 |
| 14 | IPR2023-988, and that's the '683 patent. Correct?         | 09:59:10 |
| 15 | A. That is correct.                                       | 09:59:16 |
| 16 | Q. And the other exhibit is Exhibit 1001 from the 1075    | 09:59:17 |
| 17 | IPR, and that's the '578 patent. Correct?                 | 09:59:22 |
| 18 | A. Yes, I have those two. I think the numbers are         | 09:59:28 |
| 19 | different, but that's okay. I have the '578 patent        | 09:59:31 |
| 20 | and the '683 patent.                                      | 09:59:35 |
| 21 | Q. Now, if you could direct your attention and maybe look | 09:59:37 |
| 22 | at Claim 1 of both the '683 and the '578 patent           | 09:59:40 |

|    |                                                         |          |
|----|---------------------------------------------------------|----------|
| 1  | that -- if you could have them side-by-side.            | 09:59:45 |
| 2  | A. Actually, I'll do that side-by-side. I can do that.  | 09:59:51 |
| 3  | I have a second monitor I have not been                 | 10:00:02 |
| 4  | using, so...                                            | 10:00:04 |
| 5  | Okay, I have them both open.                            | 10:00:38 |
| 6  | Q. So neither Claim 1 of the '683 patent nor Claim 1 of | 10:00:39 |
| 7  | the '578 patent mention or require an active matrix     | 10:00:45 |
| 8  | display. Correct?                                       | 10:00:49 |
| 9  | MR. KUDZIN: Objection.                                  | 10:00:52 |
| 10 | A. So neither of these in Claim 1 specify the need for  | 10:00:54 |
| 11 | an active matrix display.                               | 10:01:03 |
| 12 | BY MR. HERMAN:                                          | 10:01:05 |
| 13 | Q. So they're similar to Claim 1 of the '803 patent in  | 10:01:05 |
| 14 | that respect. Correct?                                  | 10:01:07 |
| 15 | MR. KUDZIN: Objection.                                  | 10:01:08 |
| 16 | A. Yeah, insofar as they do not require a particular    | 10:01:09 |
| 17 | mode of drive, both of those are similar to the '803    | 10:01:13 |
| 18 | patent.                                                 | 10:01:16 |
| 19 | BY MR. HERMAN:                                          | 10:01:17 |
| 20 | Q. All right. And also like the '803 patent, neither    | 10:01:17 |
| 21 | Claim 1 of the '683 patent nor Claim 1 of the '578      | 10:01:20 |
| 22 | patent mention or require only an HD display or use of  | 10:01:26 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | a display with a pixel density exceeding 400 pixels       | 10:01:31 |
| 2  | per inch. Correct?                                        | 10:01:35 |
| 3  | MR. KUDZIN: Objection.                                    | 10:01:37 |
| 4  | A. So the language of the claims in both -- of Claim 1    | 10:01:39 |
| 5  | in '683 and '578 is silent as to the resolution and       | 10:01:44 |
| 6  | the pixel density of the display that's being             | 10:01:48 |
| 7  | specified.                                                | 10:01:50 |
| 8  | BY MR. HERMAN:                                            | 10:01:50 |
| 9  | Q. And Claim 1 of the '683 patent and Claim 1 of the '578 | 10:01:55 |
| 10 | patent are also silent as to the type of device that      | 10:01:58 |
| 11 | uses the claimed display. Correct?                        | 10:02:01 |
| 12 | MR. KUDZIN: Objection.                                    | 10:02:03 |
| 13 | A. So they're both OLED displays, that is specified in    | 10:02:05 |
| 14 | the claim, but the end use is not specified as part       | 10:02:08 |
| 15 | of the language of the claim in either '683 or in         | 10:02:14 |
| 16 | '578.                                                     | 10:02:17 |
| 17 | BY MR. HERMAN:                                            | 10:02:17 |
| 18 | Q. So neither patent is limited to just mobile devices.   | 10:02:18 |
| 19 | True?                                                     | 10:02:22 |
| 20 | MR. KUDZIN: Objection.                                    | 10:02:23 |
| 21 | A. Both patents are silent as to the end use of the       | 10:02:24 |
| 22 | display that's being specified.                           | 10:02:28 |

1 BY MR. HERMAN:

10:02:29

2 Q. All right. And Claim 1 of the '683 patent and Claim 1  
3 of the '578 patent also do not require the use of any  
4 particular manufacturing method to produce the claimed  
5 display. Correct?

10:02:30

10:02:33

10:02:36

10:02:41

6 MR. KUDZIN: Objection.

10:02:44

7 A. So the language of the claims does not require a  
8 particular manufacturing method. Both Claim 1's  
9 claims -- Claim 1's, I guess, are -- speak about a  
10 pixel arrangement structure and not a method of  
11 manufacture as the text of the claim language.

10:02:46

10:02:50

10:02:53

10:02:57

10:02:59

12 BY MR. HERMAN:

10:03:05

13 Q. Now, Claim 1 of the '683 patent and Claim 1 of the  
14 '578 patent do not mention a virtual square. Correct?

10:03:05

10:03:09

15 MR. KUDZIN: Objection.

10:03:17

16 A. That's correct. Those two claims do not explicitly  
17 mention the virtual square, although the virtual  
18 square can be formed following the claim limitations,  
19 but neither one uses the language virtual square or  
20 specifies it as part of the claim.

10:03:18

10:03:22

10:03:28

10:03:31

10:03:35

21 MR. HERMAN: Okay. So now is probably a

10:03:38

22 good time to take a break. Five minutes, ten minutes,

10:03:41

|    |                                                        |          |
|----|--------------------------------------------------------|----------|
| 1  | Doctor?                                                | 10:03:44 |
| 2  | THE WITNESS: Sure.                                     | 10:03:45 |
| 3  | MR. HERMAN: Which would you prefer?                    | 10:03:46 |
| 4  | THE WITNESS: I don't know. Yeah, let's do              | 10:03:48 |
| 5  | ten minutes -- no, five minutes is fine. I'm okay.     | 10:03:51 |
| 6  | MR. HERMAN: Okay. All right. Sounds                    | 10:03:54 |
| 7  | good.                                                  | 10:03:56 |
| 8  | VIDEO TECHNICIAN: We are going off the                 | 10:03:56 |
| 9  | record. The time is 10:03 a.m.                         | 10:03:57 |
| 10 | (Off the record at 10:03 a.m.)                         | 10:12:34 |
| 11 | (Back on the record at 10:12 a.m.)                     | 10:12:34 |
| 12 | VIDEO TECHNICIAN: We're back on the                    | 10:12:39 |
| 13 | record. The time is now 10:12 a.m.                     | 10:12:40 |
| 14 | BY MR. HERMAN:                                         | 10:12:44 |
| 15 | Q. Okay, Doctor, I'm going to put another exhibit into | 10:12:46 |
| 16 | the Chat.                                              | 10:12:49 |
| 17 | A. Okay.                                               | 10:12:49 |
| 18 | Q. This is Exhibit 2018 from IPR2023-00987.            | 10:12:50 |
| 19 | ENTERED INTO THE RECORD:                               |          |
| 20 | PREVIOUSLY MARKED EXHIBIT 2018                         |          |
| 21 | IPR2023-00987                                          |          |
| 22 | 10:12 a.m.                                             |          |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | BY MR. HERMAN:                                            |          |
| 2  | Q. Let me know when you have that.                        | 10:13:09 |
| 3  | A. It's downloading now.                                  | 10:13:10 |
| 4  | Okay. So this is the Chao reference?                      | 10:13:17 |
| 5  | Q. Yes. So Exhibit 2018 is a patent publication naming    | 10:13:21 |
| 6  | Chao as one of the inventors. Correct?                    | 10:13:26 |
| 7  | A. Yes, that is correct.                                  | 10:13:29 |
| 8  | Q. And this is one of the references that you reviewed in | 10:13:30 |
| 9  | arriving at your opinions. Correct?                       | 10:13:33 |
| 10 | A. That is correct. This is one of the references.        | 10:13:39 |
| 11 | Q. And Chao predates the '803 patent. True?               | 10:13:40 |
| 12 | A. Yes, Chao was filed in 2006, and that predates the     | 10:13:50 |
| 13 | priority date of the '803 patent, which is 2017.          | 10:13:51 |
| 14 | Q. Okay. Now, can you turn to paragraph 6 for me?         | 10:13:55 |
| 15 | A. Paragraph... oh, paragraph 6, not page 6.              | 10:14:15 |
| 16 | Q. Paragraph 6, yep. Uh-huh.                              | 10:14:20 |
| 17 | A. Yep, I'm there now.                                    | 10:14:22 |
| 18 | Q. So that paragraph begins by referring to "conventional | 10:14:23 |
| 19 | organic electroluminescent devices." Do you see that?     | 10:14:27 |
| 20 | A. Yes, I do.                                             | 10:14:33 |
| 21 | Q. So that's referring to an OLED. Correct?               | 10:14:34 |
| 22 | A. Yes. Generally, an organic electroluminescent device   | 10:14:39 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | would be an organic light-emitting device, so that is     | 10:14:45 |
| 2  | correct.                                                  | 10:14:49 |
| 3  | Q. Now, about a third of the way down that paragraph      | 10:14:49 |
| 4  | there's a sentence that begins, "Generally, an organic    | 10:14:51 |
| 5  | electroluminescent panel."                                | 10:14:55 |
| 6  | Do you see that?                                          | 10:14:56 |
| 7  | A. Yes, I do.                                             | 10:14:56 |
| 8  | Q. So that sentence goes on to explain that OLED displays | 10:14:57 |
| 9  | are constituted of red light (R), green light (G), and    | 10:15:01 |
| 10 | blue light (B) sub-pixels. Do you see that?               | 10:15:06 |
| 11 | MR. KUDZIN: Objection.                                    | 10:15:10 |
| 12 | A. Yes, I see that sentence.                              | 10:15:10 |
| 13 | BY MR. HERMAN:                                            | 10:15:15 |
| 14 | Q. And about two sentences later there's another sentence | 10:15:15 |
| 15 | that begins "generally." Do you see that?                 | 10:15:16 |
| 16 | A. Are we speaking about the sentence that starts with,   | 10:15:22 |
| 17 | "Generally, the arrangement of the RGB sub-pixels"?       | 10:15:25 |
| 18 | Q. That's the one, yes.                                   | 10:15:31 |
| 19 | A. Yes, I do.                                             | 10:15:32 |
| 20 | Q. All right. So that sentence says, "The arrangement of  | 10:15:33 |
| 21 | the RGB sub-pixels of the organic electroluminescent      | 10:15:35 |
| 22 | panel continues using the arrangement of the RGB          | 10:15:40 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | sub-pixels of the liquid crystal display panel."         | 10:15:44 |
| 2  | Do you see that?                                         | 10:15:47 |
| 3  | A. Yes, I do.                                            | 10:15:48 |
| 4  | Q. So this is an example of a statement in the prior art | 10:15:51 |
| 5  | expressing that OLED displays can and do use the same    | 10:15:54 |
| 6  | pixel arrangement as existing LCD displays. Correct?     | 10:15:58 |
| 7  | MR. KUDZIN: Objection.                                   | 10:16:08 |
| 8  | A. That's correct. That is what it says.                 | 10:16:08 |
| 9  | BY MR. HERMAN:                                           | 10:16:09 |
| 10 | Q. And this is information that one of ordinary skill in | 10:16:09 |
| 11 | the art would have had as of the filing date of the      | 10:16:13 |
| 12 | '803 patent. True?                                       | 10:16:16 |
| 13 | A. Yes, the RGB pixel arrangement would be known to a    | 10:16:18 |
| 14 | person of ordinary skill in the art at the time of       | 10:16:22 |
| 15 | the '803 patent.                                         | 10:16:25 |
| 16 | Q. And also statements like this in Chao that pixel      | 10:16:26 |
| 17 | arrangements for existing LCD displays can be used       | 10:16:31 |
| 18 | with an OLED display. Correct?                           | 10:16:35 |
| 19 | MR. KUDZIN: Objection.                                   | 10:16:39 |
| 20 | A. Yeah, so in 2006 OLED displays were not extremely     | 10:16:39 |
| 21 | efficient, and there were other complications, but       | 10:16:47 |
| 22 | knowing that such a configuration could be used, it      | 10:16:51 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | would certainly be known to somebody. Whether or not      | 10:16:54 |
| 2  | one could is a perhaps more complicated matter.           | 10:16:59 |
| 3  | BY MR. HERMAN:                                            | 10:17:02 |
| 4  | Q. Okay.                                                  | 10:17:07 |
| 5  | MR. HERMAN: So I'm going to put another                   | 10:17:08 |
| 6  | exhibit in the Chat. And this is Exhibit 1015 in the      | 10:17:09 |
| 7  | 987 IPR.                                                  | 10:17:18 |
| 8  | ENTERED INTO THE RECORD:                                  | 10:17:19 |
| 9  | PREVIOUSLY MARKED EXHIBIT 1015                            | 10:17:19 |
| 10 | IPR2023-00987                                             | 10:17:19 |
| 11 | 10:17 a.m.                                                | 10:17:26 |
| 12 | BY MR. HERMAN:                                            | 10:17:26 |
| 13 | Q. A patent to Cok.                                       | 10:17:27 |
| 14 | A. This is the Cok patent.                                | 10:17:28 |
| 15 | Q. Do you have that?                                      | 10:17:29 |
| 16 | A. I have it in front of me.                              | 10:17:30 |
| 17 | Q. This is another of the references you reviewed in      | 10:17:31 |
| 18 | arriving at your opinions. Correct?                       | 10:17:34 |
| 19 | A. That's correct.                                        | 10:17:38 |
| 20 | Q. And this particular reference is actually cited on the | 10:17:39 |
| 21 | face of the '803 patent, isn't it?                        | 10:17:41 |
| 22 | A. I believe it is. Let me check quickly.                 | 10:17:46 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | Yes, it is cited on the cover page. Sorry,                | 10:18:19 |
| 2  | there are two Cok patents. I wanted to double-check.      | 10:18:38 |
| 3  | Q. Now, if you look at the abstract of the Cok patent,    | 10:18:42 |
| 4  | the abstract explains that Cok is directed to an OLED     | 10:18:45 |
| 5  | display device for displaying a color image. Do you       | 10:18:50 |
| 6  | see that?                                                 | 10:18:54 |
| 7  | A. Yes, I do.                                             | 10:18:55 |
| 8  | Q. And if you flip through the figures, the Cok patent    | 10:18:56 |
| 9  | depicts various different OLED display pixel              | 10:19:02 |
| 10 | arrangements in, for instance, Figures 1, 3, 4, 5, 6,     | 10:19:06 |
| 11 | and 7. Correct?                                           | 10:19:12 |
| 12 | A. That's correct.                                        | 10:19:16 |
| 13 | Q. And all of the depicted pixel arrangements that I just | 10:19:16 |
| 14 | mentioned have differently sized red, green, and blue     | 10:19:20 |
| 15 | sub-pixels. True?                                         | 10:19:24 |
| 16 | MR. KUDZIN: Objection.                                    | 10:19:31 |
| 17 | A. Yeah, so the drawings have different size red, green,  | 10:19:31 |
| 18 | and blue sub-pixels. Whether these were implemented       | 10:19:35 |
| 19 | or are implementable in an OLED display I think is a      | 10:19:38 |
| 20 | separate conversation.                                    | 10:19:43 |
| 21 | BY MR. HERMAN:                                            | 10:19:44 |
| 22 | Q. Now, if you turn to column 2, and in particular,       | 10:19:44 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | line -- the paragraph starting at line 61. Can you        | 10:19:49 |
| 2  | turn to that for me?                                      | 10:19:54 |
| 3  | A. Okay. At "Detailed Description of the Invention"?      | 10:19:55 |
| 4  | Q. So that paragraph begins by stating that, "The present | 10:20:00 |
| 5  | invention is useful for both top-emitting OLED display    | 10:20:03 |
| 6  | devices and bottom-emitting OLED display devices."        | 10:20:07 |
| 7  | I left out some text, but those words are                 | 10:20:14 |
| 8  | there. Correct?                                           | 10:20:17 |
| 9  | A. Correct. That is what that paragraph says.             | 10:20:18 |
| 10 | Q. And it goes on to explain that it is also useful for   | 10:20:20 |
| 11 | passive matrix or active matrix devices. Correct?         | 10:20:23 |
| 12 | A. That is what the patent says.                          | 10:20:26 |
| 13 | Q. So this reference is expressing that various different | 10:20:27 |
| 14 | pixel arrangements, including those with differently      | 10:20:34 |
| 15 | sized red, green, and blue sub-pixels, are useful for     | 10:20:36 |
| 16 | both active and passive matrix displays. Correct?         | 10:20:39 |
| 17 | MR. KUDZIN: Objection.                                    | 10:20:42 |
| 18 | A. So that is a statement of -- that the patent is        | 10:20:48 |
| 19 | making.                                                   | 10:20:50 |
| 20 | BY MR. HERMAN:                                            | 10:20:51 |
| 21 | Q. All right. So the reference does not say that the      | 10:20:52 |
| 22 | pixel arrangements it depicts are suitable only for       | 10:20:54 |

|    |                                                         |          |
|----|---------------------------------------------------------|----------|
| 1  | active matrix displays or only for passive matrix       | 10:20:57 |
| 2  | displays, does it?                                      | 10:21:00 |
| 3  | MR. KUDZIN: Objection.                                  | 10:21:01 |
| 4  | A. So that paragraph says that pixel arrangements are   | 10:21:04 |
| 5  | useful in different displays. Again, the details of     | 10:21:10 |
| 6  | what will or will not be useful for a passive versus    | 10:21:14 |
| 7  | active matrix depends on details of the system          | 10:21:17 |
| 8  | design.                                                 | 10:21:22 |
| 9  | BY MR. HERMAN:                                          | 10:21:23 |
| 10 | Q. And the reference also does not say that passive     | 10:21:24 |
| 11 | matrix displays are incapable of employing pixels with  | 10:21:26 |
| 12 | differently sized red, green, and blue sub-pixels.      | 10:21:30 |
| 13 | True?                                                   | 10:21:34 |
| 14 | MR. KUDZIN: Objection.                                  | 10:21:35 |
| 15 | A. So I would have to read it in more detail to see if  | 10:21:39 |
| 16 | that statement is in there.                             | 10:21:41 |
| 17 | BY MR. HERMAN:                                          | 10:21:47 |
| 18 | Q. You don't know one way or the other, sitting here    | 10:21:47 |
| 19 | today, whether that statement is part of this           | 10:21:47 |
| 20 | reference?                                              | 10:21:47 |
| 21 | A. I'm sorry, I would have to review it in more detail. | 10:21:51 |
| 22 | It's been a little while since I read it more           | 10:21:53 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | carefully.                                                | 10:21:55 |
| 2  | Q. Now, if you would look at Figure 1 for me of the Cok   | 10:21:56 |
| 3  | reference.                                                | 10:22:02 |
| 4  | A. Okay.                                                  | 10:22:06 |
| 5  | Q. Figure 1 is one of the examples that Cok provides of   | 10:22:06 |
| 6  | its pixel arrangements. Correct?                          | 10:22:09 |
| 7  | A. Yes, Figure 1 is one of the examples.                  | 10:22:12 |
| 8  | Q. All right. And, again, Cok says that this pixel        | 10:22:14 |
| 9  | arrangement is usable with an OLED display that can be    | 10:22:19 |
| 10 | either an active-matrix driven display or a               | 10:22:22 |
| 11 | passive-matrix driven display. Correct?                   | 10:22:26 |
| 12 | A. I'm sorry, if you could point me to where he says      | 10:22:30 |
| 13 | that explicitly.                                          | 10:22:33 |
| 14 | Q. Sure. We just read that in column 2.                   | 10:22:35 |
| 15 | A. Ah, okay. So the statement in column 2 says that       | 10:22:37 |
| 16 | generally the present invention is useful for passive     | 10:22:41 |
| 17 | or active matrix devices. I'm sorry, it just doesn't      | 10:22:44 |
| 18 | speak specifically about Figure 1.                        | 10:22:48 |
| 19 | Q. So is it your understanding that Figure 1 is meant for | 10:22:53 |
| 20 | use with an OLED display, first of all?                   | 10:22:56 |
| 21 | A. Yes, Cok contends for Figure 1 to be applied to an     | 10:22:59 |
| 22 | OLED display.                                             | 10:23:02 |

|    |    |                                                        |          |
|----|----|--------------------------------------------------------|----------|
| 1  | Q. | Okay. Now, I'm going to put another exhibit in the     | 10:23:03 |
| 2  |    | Chat here.                                             | 10:23:08 |
| 3  | A. | Okay.                                                  | 10:23:09 |
| 4  |    | MR. HERMAN: And this is Exhibit 1005 of                | 10:23:18 |
| 5  |    | the 987 IPR, and it's one of the prior art references, | 10:23:21 |
| 6  |    | a prior art reference to Phan. Let me know when        | 10:23:23 |
| 7  |    | you've got that.                                       | 10:23:28 |
| 8  |    | ENTERED INTO THE RECORD:                               | 10:23:29 |
| 9  |    | PREVIOUSLY MARKED EXHIBIT 1005                         | 10:23:29 |
| 10 |    | IPR2023-00987                                          | 10:23:29 |
| 11 |    | 10:23 a.m.                                             | 10:23:30 |
| 12 | A. | I don't see it yet. If you --                          | 10:23:30 |
| 13 |    | BY MR. HERMAN:                                         | 10:23:31 |
| 14 | Q. | That's because I failed to press the magic button.     | 10:23:32 |
| 15 |    | But I have now done so, so it should be appearing.     | 10:23:34 |
| 16 | A. | Okay. That one I think I have on paper.                | 10:23:38 |
| 17 |    | So I have the Phan 986 [sic] reference in              | 10:23:51 |
| 18 |    | front of me.                                           | 10:23:54 |
| 19 | Q. | So the Phan reference is one of the references that    | 10:23:54 |
| 20 |    | you reviewed in arriving at your opinions; is that     | 10:23:57 |
| 21 |    | right?                                                 | 10:23:59 |
| 22 | A. | That is correct.                                       | 10:23:59 |

|    |                                                         |          |
|----|---------------------------------------------------------|----------|
| 1  | Q. And I'd like you to turn to Figure 11b.              | 10:24:06 |
| 2  | A. Okay, I'm at 11b.                                    | 10:24:14 |
| 3  | Q. Figure 11b shows one of Phan's pixel arrangements.   | 10:24:16 |
| 4  | Correct?                                                | 10:24:20 |
| 5  | A. Correct. Phan shows a large number of pixels,        | 10:24:23 |
| 6  | sub-pixel, and display arrangements, and that is one    | 10:24:26 |
| 7  | of them.                                                | 10:24:29 |
| 8  | Q. Okay. Now, I'd like you to put Figure 11b next to    | 10:24:30 |
| 9  | Figure 1 of the Cok patent.                             | 10:24:33 |
| 10 | MR. KUDZIN: Objection.                                  | 10:24:36 |
| 11 | A. Okay.                                                | 10:24:38 |
| 12 | BY MR. HERMAN:                                          | 10:24:43 |
| 13 | Q. Now, besides being rotated 180 degrees, Figure 1 and | 10:24:44 |
| 14 | Figure 11b have the same basic shape, don't they?       | 10:24:49 |
| 15 | MR. KUDZIN: Objection.                                  | 10:24:54 |
| 16 | A. So they have some similarities, but they also have   | 10:24:58 |
| 17 | some differences. For example, Phan explicitly calls    | 10:25:01 |
| 18 | out a number of features such as the barrier ribs and   | 10:25:04 |
| 19 | black mask, which are not discussed in Cok.             | 10:25:09 |
| 20 | BY MR. HERMAN:                                          | 10:25:12 |
| 21 | Q. So both the pixel arrangement shown in Figure 11b    | 10:25:12 |
| 22 | and -- of Phan and Figure 1 of Cok are both generally   | 10:25:18 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | square. Correct?                                         | 10:25:21 |
| 2  | MR. KUDZIN: Objection.                                   | 10:25:25 |
| 3  | A. From the figure, they are generally square, that's    | 10:25:26 |
| 4  | correct.                                                 | 10:25:31 |
| 5  | BY MR. HERMAN:                                           | 10:25:31 |
| 6  | Q. And both include one blue sub-pixel that is largest,  | 10:25:32 |
| 7  | one red pixel that is smallest, and two intermediately   | 10:25:35 |
| 8  | sized green pixels that are generally rectangular.       | 10:25:39 |
| 9  | Correct?                                                 | 10:25:43 |
| 10 | A. That is correct, they both have that configuration    | 10:25:46 |
| 11 | with the larger blue, intermediate green, and a          | 10:25:49 |
| 12 | smaller red.                                             | 10:25:53 |
| 13 | Q. And Exhibit 1015 to Cok states that the pixel         | 10:25:56 |
| 14 | arrangement showed in Figure 1 is suitable for use       | 10:25:59 |
| 15 | with an OLED display, doesn't it?                        | 10:26:04 |
| 16 | MR. KUDZIN: Objection.                                   | 10:26:08 |
| 17 | A. Yes, so Figure 1 is -- yeah, Cok says that it's       | 10:26:09 |
| 18 | specific to an OLED display.                             | 10:26:13 |
| 19 | BY MR. HERMAN:                                           | 10:26:19 |
| 20 | Q. And that's something one of ordinary skill in the art | 10:26:20 |
| 21 | would have been aware of, Cok's statement to that        | 10:26:22 |
| 22 | effect as of the filing date of the '803 patent?         | 10:26:25 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | MR. KUDZIN: Objection.                                   | 10:26:36 |
| 2  | A. I'm sorry, could you be more specific about which     | 10:26:36 |
| 3  | aspect of it?                                            | 10:26:36 |
| 4  | BY MR. HERMAN:                                           | 10:26:36 |
| 5  | Q. That the pixel arrangement shown in Figure 1 was      | 10:26:36 |
| 6  | suitable for use with an OLED display. One of            | 10:26:38 |
| 7  | ordinary skill in the art would have been aware of       | 10:26:41 |
| 8  | that as of the filing date of the '803 patent.           | 10:26:42 |
| 9  | A. So one might be aware that Cok has asserted this, but | 10:26:48 |
| 10 | I would disagree that a person of ordinary skill         | 10:26:53 |
| 11 | would assume that to be a useful layout for an OLED      | 10:26:56 |
| 12 | display at the time of the -- of the filing of the       | 10:27:00 |
| 13 | disputed patent.                                         | 10:27:02 |
| 14 | Q. But Cok says it is. Correct?                          | 10:27:03 |
| 15 | A. Cok says it is, but that's a declaratory statement in | 10:27:06 |
| 16 | the patent, and whether it's actually suitable           | 10:27:10 |
| 17 | depends on the details of the display one's intending    | 10:27:18 |
| 18 | to make.                                                 | 10:27:18 |
| 19 | MR. HERMAN: Now I'm going to put                         | 10:27:24 |
| 20 | Exhibit 1004 in the 987 IPR into the Chat. That's        | 10:27:36 |
| 21 | Matthies.                                                | 10:27:41 |
| 22 | ENTERED INTO THE RECORD:                                 | 10:27:43 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | PREVIOUSLY MARKED EXHIBIT 1004                           | 10:27:43 |
| 2  | IPR2023-00987                                            | 10:27:43 |
| 3  | 10:27 a.m.                                               | 10:27:43 |
| 4  | BY MR. HERMAN:                                           | 10:27:43 |
| 5  | Q. Let me know when you have that.                       | 10:27:44 |
| 6  | A. I have the Matthies '855 patent in front of me.       | 10:27:44 |
| 7  | Q. And this is one of the prior art references that you  | 10:27:47 |
| 8  | reviewed in arriving at your opinions; is that           | 10:27:49 |
| 9  | correct?                                                 | 10:27:51 |
| 10 | A. That's correct, I've reviewed this patent.            | 10:27:52 |
| 11 | Q. Now, I just want you to have a copy of that because I | 10:27:56 |
| 12 | am going to now go to portions of your declaration       | 10:27:58 |
| 13 | discussing this particular prior art reference.          | 10:28:01 |
| 14 | A. Okay.                                                 | 10:28:03 |
| 15 | Q. But if you could get your '803 patent declaration.    | 10:28:03 |
| 16 | A. Okay. If you could point me to the section we'll      | 10:28:06 |
| 17 | discuss first, I'm --                                    | 10:28:08 |
| 18 | Q. Sure. And I'd like you to turn to paragraph 71 and    | 10:28:09 |
| 19 | 72.                                                      | 10:28:14 |
| 20 | A. Okay.                                                 | 10:28:19 |
| 21 | Okay, I have that open.                                  | 10:28:28 |
| 22 | Q. So paragraph 71 and 72 discuss and depict color pixel | 10:28:30 |

|    |                                                         |          |
|----|---------------------------------------------------------|----------|
| 1  | structures in Matthies. That's what you say in          | 10:28:34 |
| 2  | paragraph 71 and paragraph 72; is that right?           | 10:28:37 |
| 3  | A. That's right. In this section I'm summarizing what   | 10:28:43 |
| 4  | Matthies is saying, so I show those two figures.        | 10:28:45 |
| 5  | Q. So in paragraph 71, you reproduce Figure 8a from     | 10:28:48 |
| 6  | Matthies and you state that it shows a "color pixel     | 10:28:52 |
| 7  | structure with a single red sub-pixel, a single blue    | 10:28:56 |
| 8  | sub-pixel, and a single green sub-pixel placed          | 10:29:01 |
| 9  | side-by-side." Right?                                   | 10:29:04 |
| 10 | A. That is correct. Figure 8a shows one of the          | 10:29:08 |
| 11 | configurations Matthies discusses which has red,        | 10:29:10 |
| 12 | green, blue in that side-by-side format and it also     | 10:29:13 |
| 13 | shows other features that Matthies discusses in this    | 10:29:18 |
| 14 | patent.                                                 | 10:29:22 |
| 15 | Q. Now, putting aside what, in your view, Matthies does | 10:29:22 |
| 16 | in its example, this particular pixel arrangement       | 10:29:28 |
| 17 | could be driven by either passive matrix circuitry or   | 10:29:32 |
| 18 | active matrix circuitry. Correct?                       | 10:29:36 |
| 19 | MR. KUDZIN: Objection.                                  | 10:29:41 |
| 20 | A. I'm sorry, I'm not exactly sure what you're asking.  | 10:29:41 |
| 21 | Are we speaking about this with or without the other    | 10:29:45 |
| 22 | features that Matthies discusses?                       | 10:29:48 |

|    |                                                         |          |
|----|---------------------------------------------------------|----------|
| 1  | BY MR. HERMAN:                                          | 10:29:50 |
| 2  | Q. Without.                                             | 10:29:51 |
| 3  | A. So I guess that -- I guess it really depends. We     | 10:29:52 |
| 4  | would need to drop out a few things, but specifically   | 10:29:59 |
| 5  | to the question could we have red, then green, then     | 10:30:03 |
| 6  | blue, such an architecture can be driven as a passive   | 10:30:06 |
| 7  | or active matrix, but the Matthies architecture is      | 10:30:11 |
| 8  | pretty specific and has other features which would      | 10:30:14 |
| 9  | make it quite challenging to implement in an active     | 10:30:19 |
| 10 | matrix architecture.                                    | 10:30:21 |
| 11 | And I'm happy to discuss my opinions on                 | 10:30:23 |
| 12 | that.                                                   | 10:30:24 |
| 13 | Q. But there's nothing about the arrangement of red,    | 10:30:25 |
| 14 | green, and blue sitting next to one another, like       | 10:30:27 |
| 15 | shown in Figure 8a, that necessitates either active or  | 10:30:30 |
| 16 | passive-matrix driving. True?                           | 10:30:34 |
| 17 | MR. KUDZIN: Objection.                                  | 10:30:37 |
| 18 | A. Yeah, so 8A contains other features which complicate | 10:30:38 |
| 19 | me agreeing with that statement. So I'll just limit     | 10:30:43 |
| 20 | myself to saying, red, green, and blue together can     | 10:30:47 |
| 21 | be driven as a passive or an active matrix, but         | 10:30:50 |
| 22 | Figure 8a of Matthies incorporates many other           | 10:30:53 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | features, including row and column drive vias, which      | 10:30:56 |
| 2  | would make it challenging to argue that that Figure       | 10:31:03 |
| 3  | 8a shows us an active matrix device.                      | 10:31:06 |
| 4  | BY MR. HERMAN:                                            | 10:31:09 |
| 5  | Q. Now, Yamada is another prior art reference that you    | 10:31:09 |
| 6  | reviewed. Correct?                                        | 10:31:16 |
| 7  | A. Yes.                                                   | 10:31:18 |
| 8  | Q. And in your view, Yamada discusses OLED displays that  | 10:31:19 |
| 9  | are active-matrix driven. Correct?                        | 10:31:23 |
| 10 | A. Correct. Just give me a moment to pull up Yamada and   | 10:31:29 |
| 11 | make sure I'm on the right page.                          | 10:31:31 |
| 12 | So I'm on the Yamada '025 patent. Okay.                   | 10:31:41 |
| 13 | Q. And that relates to active matrix displays?            | 10:31:48 |
| 14 | A. Yes. So the Yamada patent relates to organic           | 10:31:54 |
| 15 | light-emitting diode displays which are color, and it     | 10:32:02 |
| 16 | discusses an active matrix architecture as the            | 10:32:06 |
| 17 | preferred embodiment.                                     | 10:32:08 |
| 18 | Q. And just for the record, Yamada is Exhibit 1008 in the | 10:32:09 |
| 19 | 987 IPR. True?                                            | 10:32:14 |
| 20 | A. Yes, that is correct.                                  | 10:32:16 |
| 21 | Q. Now, if you look at paragraph 149 of your '803         | 10:32:23 |
| 22 | declaration.                                              | 10:32:23 |

|    |    |                                                        |          |
|----|----|--------------------------------------------------------|----------|
| 1  | A. | Okay, I'm there.                                       | 10:32:50 |
| 2  | Q. | And paragraph 149 has a demonstrative that you         | 10:32:51 |
| 3  |    | prepared showing pixel layouts from Yamada; is that    | 10:32:57 |
| 4  |    | right?                                                 | 10:33:03 |
| 5  | A. | That is correct.                                       | 10:33:03 |
| 6  | Q. | And the one in the middle, you identify as "stripes."  | 10:33:04 |
| 7  |    | Correct?                                               | 10:33:07 |
| 8  | A. | That is correct.                                       | 10:33:07 |
| 9  | Q. | All right. So that's an example of an active matrix    | 10:33:09 |
| 10 |    | display that uses red, green, and blue sub-pixels      | 10:33:12 |
| 11 |    | arranged in stripes. True?                             | 10:33:16 |
| 12 | A. | So that would be an example of what Yamada meant by    | 10:33:23 |
| 13 |    | that stripe arrangement as one option for making the   | 10:33:27 |
| 14 |    | active matrix display.                                 | 10:33:31 |
| 15 | Q. | All right. So as of the filing of the '803 patent,     | 10:33:33 |
| 16 |    | one of ordinary skill in the art would have known that | 10:33:37 |
| 17 |    | pixels arranged in a stripe format could be            | 10:33:38 |
| 18 |    | active-matrix driven. Correct?                         | 10:33:47 |
| 19 | A. | Yes. Yeah, at the time of the filing of the patent,    | 10:33:48 |
| 20 |    | it would be known to a person of ordinary skill that   | 10:33:50 |
| 21 |    | a stripe arrangement could be used.                    | 10:33:53 |
| 22 | Q. | All right, now if you go back to paragraph 72 of your  | 10:33:55 |

|    |                                                        |          |
|----|--------------------------------------------------------|----------|
| 1  | declaration.                                           | 10:33:59 |
| 2  | A. Okay.                                               | 10:34:12 |
| 3  | Q. Paragraph 72 reproduces Figure 8b from Matthies; is | 10:34:12 |
| 4  | that right?                                            | 10:34:16 |
| 5  | A. That's correct.                                     | 10:34:20 |
| 6  | Q. And that pixel arrangement in Figure 8b has four    | 10:34:20 |
| 7  | sub-pixel elements; is that right?                     | 10:34:25 |
| 8  | A. That's correct.                                     | 10:34:28 |
| 9  | Q. And those four sub-pixels are each square. Correct? | 10:34:28 |
| 10 | A. That's correct.                                     | 10:34:34 |
| 11 | Q. And they're arranged in a square; is that right?    | 10:34:34 |
| 12 | A. That is correct.                                    | 10:34:44 |
| 13 | Q. And there's equal space between each of the four    | 10:34:44 |
| 14 | sub-pixels. True?                                      | 10:34:44 |
| 15 | A. There is. That's correct.                           | 10:34:47 |
| 16 | Q. Now, putting aside the other details in the figures | 10:34:51 |
| 17 | like the vias, is there anything about that particular | 10:34:54 |
| 18 | pixel arrangement, the arrangement of four sub-pixels  | 10:34:58 |
| 19 | in a square, that prevents the use of active matrix    | 10:35:01 |
| 20 | circuitry?                                             | 10:35:06 |
| 21 | MR. KUDZIN: Objection.                                 | 10:35:07 |
| 22 | A. Yeah, I'm not sure I would describe it in that way, | 10:35:09 |

1 but, you know, I discuss this a fair bit in my 10:35:11  
2 report. 10:35:13

3 If we go to paragraph 123, I have a figure 10:35:13  
4 there and a little bit of discussion, and, you know, 10:35:21  
5 in Matthies, in the patent itself, it's pretty 10:35:26  
6 explicitly a passive matrix architecture, and he says 10:35:29  
7 so himself and offers a great deal of detail on how 10:35:33  
8 the display is made, including figures showing the 10:35:37  
9 cross-sectional layout and other features. 10:35:40

10 But of particular note is the figure that I 10:35:43  
11 made for Figure 8b at paragraph 123, which shows why 10:35:47  
12 it's so critical for the Matthies design to have the 10:35:54  
13 layout of the rows and columns, which he also calls 10:35:57  
14 out and describes again in great detail. 10:36:01

15 So, again, while -- if you're asking if -- 10:36:04  
16 in the abstract if we could do something, that's one 10:36:08  
17 question, but Matthies is very specific to passive 10:36:11  
18 matrix architecture, and that's what's disclosed and 10:36:14  
19 discussed in the -- in the patent. 10:36:17

20 BY MR. HERMAN: 10:36:18

21 Q. So I am asking the abstract question. I'm asking, in 10:36:18  
22 the abstract, would one of ordinary skill in the art 10:36:22

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | consider it possible to employ the pixel arrangement      | 10:36:23 |
| 2  | where there are four sub-pixels arranged in a square      | 10:36:30 |
| 3  | in an active-matrix driven display?                       | 10:36:33 |
| 4  | A. Yeah, to that I have to say no because it really       | 10:36:37 |
| 5  | depends on the details of how much space is               | 10:36:40 |
| 6  | available, what architecture is available,                | 10:36:42 |
| 7  | considerations like the white point, cost targets,        | 10:36:45 |
| 8  | what cross-section's available, what technologies are     | 10:36:48 |
| 9  | licensed.                                                 | 10:36:51 |
| 10 | I can offer many other considerations, and                | 10:36:52 |
| 11 | it's not obvious that one could just put squares on a     | 10:36:55 |
| 12 | page and make a display of that type.                     | 10:36:58 |
| 13 | Q. So is it your opinion that it is impossible to form an | 10:37:01 |
| 14 | active matrix display using square sub-pixels arranged    | 10:37:07 |
| 15 | in a quad pixel structure?                                | 10:37:10 |
| 16 | A. It is not my opinion that it is impossible. It is my   | 10:37:14 |
| 17 | opinion that it is not something that would be            | 10:37:17 |
| 18 | obvious to a person of ordinary skill in the art at       | 10:37:19 |
| 19 | that time, that it could be arbitrarily configured.       | 10:37:21 |
| 20 | Q. All right. So let's turn to paragraph 177 of your      | 10:37:28 |
| 21 | declaration.                                              | 10:37:30 |
| 22 | A. Okay.                                                  | 10:37:42 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | Q. In paragraph 177 of your declaration you reference a  | 10:37:42 |
| 2  | prior art reference to Arnold, which I believe is        | 10:37:45 |
| 3  | Exhibit 2011; is that right?                             | 10:37:50 |
| 4  | A. Yes. I don't have that reference in front of me. If   | 10:37:55 |
| 5  | you would like to post it in the Chat, I can load it     | 10:37:58 |
| 6  | as well.                                                 | 10:38:01 |
| 7  | Q. Sure.                                                 | 10:38:02 |
| 8  | ENTERED INTO THE RECORD:                                 | 10:38:09 |
| 9  | PREVIOUSLY MARKED EXHIBIT 2011                           | 10:38:09 |
| 10 | IPR2023-00987                                            | 10:38:09 |
| 11 | 10:38 a.m.                                               | 10:38:09 |
| 12 | BY MR. HERMAN:                                           | 10:38:09 |
| 13 | Q. Let me know when you have that.                       | 10:38:10 |
| 14 | A. Okay, great, I have Arnold and I have my declaration. | 10:38:25 |
| 15 | Q. Okay. So Arnold relates to OLED displays. Correct?    | 10:38:32 |
| 16 | A. That is correct.                                      | 10:38:36 |
| 17 | Q. And in column 4, starting at line 10, Arnold says     | 10:38:38 |
| 18 | that, "The present invention can be employed in most     | 10:38:48 |
| 19 | OLED device configurations," and it goes on to           | 10:38:51 |
| 20 | reference both passive matrix displays and active        | 10:38:53 |
| 21 | matrix displays. Correct?                                | 10:38:56 |
| 22 | A. That is what Arnold claims, yes.                      | 10:39:00 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | Q. And in Figure 5 of Arnold, Arnold provides an example | 10:39:02 |
| 2  | of a quad pixel with four square sub-pixels arranged     | 10:39:07 |
| 3  | in a square. Correct?                                    | 10:39:14 |
| 4  | A. That is correct.                                      | 10:39:19 |
| 5  | Q. So this is an example in the prior art to the '803    | 10:39:19 |
| 6  | patent of the prior art expressing that square           | 10:39:22 |
| 7  | sub-pixels with -- or square pixels with four            | 10:39:25 |
| 8  | sub-pixels arranged in a square can, in fact, be used    | 10:39:28 |
| 9  | in an OLED display that is active-matrix driven.         | 10:39:32 |
| 10 | Correct?                                                 | 10:39:36 |
| 11 | A. So, again, Arnold makes a declaratory statement that  | 10:39:38 |
| 12 | the technology can be applied. Whether that's            | 10:39:42 |
| 13 | actually true, again, depends on the details of the      | 10:39:45 |
| 14 | display that one is looking to make.                     | 10:39:48 |
| 15 | Q. So per at least Arnold, though, the quad pixel        | 10:39:51 |
| 16 | structure does not require and is not limited to just    | 10:39:55 |
| 17 | passive or just active-matrix driven circuitry.          | 10:39:59 |
| 18 | Correct?                                                 | 10:40:03 |
| 19 | A. So as a matter of limitation, no, that -- Arnold says | 10:40:04 |
| 20 | everything's possible, which is great.                   | 10:40:11 |
| 21 | Q. Okay. And this is one of the prior art references     | 10:40:13 |
| 22 | that one of ordinary skill in the art would have been    | 10:40:16 |

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|----|----------------------------------------------------------|----------|
| 1  | aware of as of the filing date of the '803 patent.       | 10:40:18 |
| 2  | True?                                                    | 10:40:21 |
| 3  | A. So -- yes, this has a priority date of 2002, and      | 10:40:23 |
| 4  | would have published a little after that, so it would    | 10:40:30 |
| 5  | be available to a person of ordinary skill.              | 10:40:32 |
| 6  | Q. Now, let's go back to paragraph 123 -- or go back to  | 10:40:37 |
| 7  | paragraph 123 of your '803 patent declaration.           | 10:40:42 |
| 8  | A. Okay. I'm there now.                                  | 10:40:46 |
| 9  | Q. All right. So paragraph 123 begins a discussion where | 10:40:57 |
| 10 | you identify issues that you believe one of ordinary     | 10:41:04 |
| 11 | skill in the art would have confronted when trying to    | 10:41:09 |
| 12 | change the size of Matthies' sub-pixels; is that         | 10:41:11 |
| 13 | right?                                                   | 10:41:14 |
| 14 | A. That is part of the discussion. I think I have        | 10:41:16 |
| 15 | several pages devoted to problems associated with        | 10:41:18 |
| 16 | that change.                                             | 10:41:23 |
| 17 | Q. Okay. So, for instance, in paragraph 123 you state    | 10:41:24 |
| 18 | that [as read]: If a person having ordinary skill in     | 10:41:27 |
| 19 | the art were to try to change the size of a pixel in     | 10:41:29 |
| 20 | PMOLED shown in Figure 8b, that would require changing   | 10:41:33 |
| 21 | the size of a row and/or column electrode, which would   | 10:41:37 |
| 22 | also change the size of all the other pixels defined     | 10:41:41 |

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|----|--------------------------------------------------------|----------|
| 1  | by that row and/or column electrode.                   | 10:41:44 |
| 2  | Do you see that?                                       | 10:41:47 |
| 3  | A. Yes, I do.                                          | 10:41:48 |
| 4  | Q. All right. So that issue that you raise in that     | 10:41:49 |
| 5  | paragraph is specific to passive matrix displays.      | 10:41:52 |
| 6  | Correct?                                               | 10:41:54 |
| 7  | A. Correct, that is -- that relates to, yeah, passive  | 10:41:58 |
| 8  | matrix displays fabricated using row and column        | 10:42:02 |
| 9  | stripe architecture which is described by Matthies in  | 10:42:05 |
| 10 | the patent.                                            | 10:42:10 |
| 11 | Q. All right. So that same issue would not arise in an | 10:42:10 |
| 12 | active matrix display. Correct? You would not have     | 10:42:12 |
| 13 | to change the size of the row and the column           | 10:42:16 |
| 14 | electrodes for the entire row or the column; is that   | 10:42:18 |
| 15 | correct?                                               | 10:42:20 |
| 16 | MR. KUDZIN: Objection.                                 | 10:42:22 |
| 17 | A. Yeah, I disagree with that as a general statement.  | 10:42:22 |
| 18 | It depends on how one lays out the active matrix.      | 10:42:26 |
| 19 | There are active matrix architectures that use         | 10:42:29 |
| 20 | certain common rows and columns, but my opinion is     | 10:42:32 |
| 21 | limited to the passive matrix architecture discussed   | 10:42:37 |
| 22 | at length in Matthies.                                 | 10:42:40 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | BY MR. HERMAN:                                            | 10:42:44 |
| 2  | Q. Okay. Now I'd like you to go back to Exhibit 1001 in   | 10:42:44 |
| 3  | the 1075 IPR. That's the '578 patent.                     | 10:42:52 |
| 4  | A. I'll get the paper version.                            | 10:43:01 |
| 5  | Okay. I have the '578 patent open.                        | 10:43:15 |
| 6  | Q. And I'd like you to turn to Figure 1 for me, please.   | 10:43:17 |
| 7  | A. Okay, I'm on Figure 1.                                 | 10:43:32 |
| 8  | Q. Now, in Figure 1, the green pixels are identified with | 10:43:33 |
| 9  | a capital G; is that right?                               | 10:43:36 |
| 10 | A. That is correct.                                       | 10:43:40 |
| 11 | Q. And those green pixels have a generally diamond shape; | 10:43:41 |
| 12 | is that true?                                             | 10:43:47 |
| 13 | A. That's correct.                                        | 10:43:48 |
| 14 | Q. Now, the red pixels are identified with a capital R;   | 10:43:49 |
| 15 | is that right?                                            | 10:43:56 |
| 16 | A. That's correct.                                        | 10:43:59 |
| 17 | Q. And the blue pixels are identified with a capital B;   | 10:44:00 |
| 18 | is that right?                                            | 10:44:02 |
| 19 | A. That's correct.                                        | 10:44:03 |
| 20 | Q. And in this figure the red and the blue pixels are     | 10:44:03 |
| 21 | shown with an octagon shape; is that fair?                | 10:44:07 |
| 22 | A. Yes.                                                   | 10:44:12 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | Q. All right. Now, turn to Figure 2.                      | 10:44:12 |
| 2  | A. Okay. I'm there.                                       | 10:44:21 |
| 3  | Q. Now, compared to Figure 1, in Figure 2 the green       | 10:44:22 |
| 4  | pixels have a different shape; is that right?             | 10:44:25 |
| 5  | A. That's correct.                                        | 10:44:29 |
| 6  | Q. So, for instance, now they appear to be an elongated   | 10:44:30 |
| 7  | parallelogram, perhaps. Is that a fair way to             | 10:44:36 |
| 8  | characterize the shape?                                   | 10:44:41 |
| 9  | A. Sure, yeah, I would -- I guess parallelograms are all  | 10:44:42 |
| 10 | elongated, but -- actually, that's not true. Yeah,        | 10:44:46 |
| 11 | we can say that. A rhombus can be a parallelogram,        | 10:44:50 |
| 12 | so... yes.                                                | 10:44:54 |
| 13 | Q. And the red and the blue pixels are still octagons.    | 10:44:55 |
| 14 | Correct?                                                  | 10:45:00 |
| 15 | A. That is correct.                                       | 10:45:01 |
| 16 | Q. Now, if you turn to Figure 3, in Figure 3 the shape of | 10:45:02 |
| 17 | the red pixel has changed compared to Figures 1 and 2;    | 10:45:12 |
| 18 | is that right?                                            | 10:45:13 |
| 19 | A. Correct, it's more hexagonal.                          | 10:45:13 |
| 20 | Q. And if you turn to Figure 4, now the shape of the blue | 10:45:16 |
| 21 | pixel is changed; is that right?                          | 10:45:21 |
| 22 | A. That is correct.                                       | 10:45:23 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | Q. Now the blue pixel is more hexagonal. Correct?        | 10:45:27 |
| 2  | A. That is correct. And the red pixel has reverted to    | 10:45:31 |
| 3  | its octagonal shape.                                     | 10:45:34 |
| 4  | Q. And if you turn to Figure 5, now both the red and the | 10:45:36 |
| 5  | blue pixels appear to be what look like squares; is      | 10:45:39 |
| 6  | that right?                                              | 10:45:42 |
| 7  | A. That is correct.                                      | 10:45:43 |
| 8  | Q. And the green seems like it has eight sides, so it's  | 10:45:47 |
| 9  | an octagon; is that right?                               | 10:45:48 |
| 10 | A. That's correct.                                       | 10:45:52 |
| 11 | Q. So across those figures that we looked at, Figures 1  | 10:45:53 |
| 12 | through 5, the different sub-pixels, the red, the        | 10:45:57 |
| 13 | green, and the blue are shown as having various          | 10:45:59 |
| 14 | different shapes. Correct?                               | 10:46:02 |
| 15 | A. Correct. The figures show different polygonal shapes  | 10:46:07 |
| 16 | for the pixels in the different example -- different     | 10:46:09 |
| 17 | examples.                                                | 10:46:12 |
| 18 | Q. And the '578 patent specification never says that any | 10:46:17 |
| 19 | particular shape is better than any other shape, does    | 10:46:17 |
| 20 | it?                                                      | 10:46:19 |
| 21 | MR. KUDZIN: Objection.                                   | 10:46:24 |
| 22 | A. So, I'm sorry, are we speaking about the claims or    | 10:46:25 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | are we speaking about the specification?                  | 10:46:27 |
| 2  | BY MR. HERMAN:                                            | 10:46:29 |
| 3  | Q. Specification.                                         | 10:46:29 |
| 4  | A. So while the specification doesn't specify the shape   | 10:46:30 |
| 5  | specifically, it does specify some features such as       | 10:46:34 |
| 6  | the space between the pixels which should be              | 10:46:36 |
| 7  | optimized, and that has an effect on the shape.           | 10:46:40 |
| 8  | Q. But the specification does not say that any particular | 10:46:42 |
| 9  | shape is necessary, preferred, or better than any         | 10:46:47 |
| 10 | other shape. True?                                        | 10:46:50 |
| 11 | MR. KUDZIN: Objection.                                    | 10:46:52 |
| 12 | A. So, again, the specification does discuss certain      | 10:46:52 |
| 13 | considerations in the geometry such as the space          | 10:46:56 |
| 14 | between the pixels, and certain shapes will have a        | 10:46:59 |
| 15 | larger space between the pixels than other shapes.        | 10:47:02 |
| 16 | BY MR. HERMAN:                                            | 10:47:04 |
| 17 | Q. I'm asking about the shapes themselves. Right? So      | 10:47:06 |
| 18 | the specification does not say that it is necessary to    | 10:47:08 |
| 19 | use any particular shape or that any particular shape     | 10:47:11 |
| 20 | is preferred over another shape. True?                    | 10:47:14 |
| 21 | A. So the specification does not declare a specific       | 10:47:18 |
| 22 | shape. It instead gives direction for how to decide       | 10:47:25 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | on the shapes, and that indirectly will have an           | 10:47:29 |
| 2  | effect on what the shape -- optimal shape is.             | 10:47:32 |
| 3  | Q. So, for instance, octagonal -- octagonal, I don't know | 10:47:35 |
| 4  | if I got that right, shapes or pixels are not required    | 10:47:41 |
| 5  | or preferred by either the claims or the                  | 10:47:45 |
| 6  | specification. Correct?                                   | 10:47:47 |
| 7  | A. Well, certainly not required by the claims, and,       | 10:47:48 |
| 8  | again, the specification does give some guidance as       | 10:47:50 |
| 9  | to what makes a better pixel layout.                      | 10:47:54 |
| 10 | And so, you know, the corners of the                      | 10:47:57 |
| 11 | octagon, if they increase the spacing between the         | 10:47:59 |
| 12 | pixels that does offer some advantage, but it does not    | 10:48:02 |
| 13 | specify, for example, that it should be octagonal or      | 10:48:06 |
| 14 | hexagonal specifically.                                   | 10:48:10 |
| 15 | Q. All right. So let's look at column 3, specifically     | 10:48:12 |
| 16 | the paragraph starting at about line 51 [sic].            | 10:48:22 |
| 17 | A. Okay.                                                  | 10:48:23 |
| 18 | Q. And this paragraph states that, "Even though each of   | 10:48:24 |
| 19 | the pixels are drawn as stereotypical polygonal shapes    | 10:48:30 |
| 20 | in the drawings, the present invention is not limited     | 10:48:33 |
| 21 | to this shape."                                           | 10:48:36 |
| 22 | Do you see that?                                          | 10:48:37 |

|    |                                                         |          |
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| 1  | A. Yes, I do.                                           | 10:48:43 |
| 2  | Q. So the patent is expressing here that it is meant to | 10:48:43 |
| 3  | embrace shapes other than those that are shown in the   | 10:48:43 |
| 4  | drawings. Correct?                                      | 10:48:46 |
| 5  | MR. KUDZIN: Objection.                                  | 10:48:50 |
| 6  | A. Yeah. So as it says, it's not limited to that        | 10:48:54 |
| 7  | specific shape, and in that same paragraph gives some   | 10:48:57 |
| 8  | guidance as to possible ways to modify the pixel        | 10:49:01 |
| 9  | shape so as to provide some advantage. It says, for     | 10:49:04 |
| 10 | example, "The pixels may be modified to avoid           | 10:49:09 |
| 11 | interference with the other components of the OLED      | 10:49:10 |
| 12 | within the spirit and scope of the appended claims."    | 10:49:15 |
| 13 | So, if, for example, there's a line which,              | 10:49:18 |
| 14 | you know, adjusting the pixel to avoid, that may --     | 10:49:21 |
| 15 | that may give some advantage, and that then is a part   | 10:49:25 |
| 16 | of the guidance of the specification.                   | 10:49:28 |
| 17 | BY MR. HERMAN:                                          | 10:49:31 |
| 18 | Q. All right. So the pixel shape can change depending   | 10:49:31 |
| 19 | upon the circumstances in which it's used. Correct?     | 10:49:33 |
| 20 | MR. KUDZIN: Objection.                                  | 10:49:40 |
| 21 | A. Yeah, the pixel shape is part of the design of the   | 10:49:40 |
| 22 | display.                                                | 10:49:43 |

|    |                                                           |          |
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| 1  | BY MR. HERMAN:                                            | 10:49:44 |
| 2  | Q. Okay. Now, if you could go back to the Matthies prior  | 10:49:50 |
| 3  | art reference, and that's Exhibit 1004 in IPR 987, and    | 10:49:53 |
| 4  | I believe you already have a copy of that.                | 10:50:00 |
| 5  | A. I do. Just a moment. I have the paper copy in front    | 10:50:04 |
| 6  | of me.                                                    | 10:50:09 |
| 7  | Q. And if you could turn to column 12 for me.             | 10:50:09 |
| 8  | A. Okay. I'm there.                                       | 10:50:31 |
| 9  | Q. And starting at about line 58 in column 12 there's the | 10:50:36 |
| 10 | beginning of a discussion of Figure 3 of Matthies. Do     | 10:50:39 |
| 11 | you see that?                                             | 10:50:43 |
| 12 | A. Yes, I do.                                             | 10:50:45 |
| 13 | Q. And line 61 references a "transparent front plate."    | 10:50:46 |
| 14 | Do you see that?                                          | 10:50:52 |
| 15 | A. Yes, I do.                                             | 10:50:56 |
| 16 | Q. And then it says, "Transparent column electrodes 322   | 10:50:57 |
| 17 | are formed on the front plate 320."                       | 10:51:00 |
| 18 | Do you see that?                                          | 10:51:03 |
| 19 | A. Yes, I do.                                             | 10:51:06 |
| 20 | Q. And if you turn over to column 13, this paragraph      | 10:51:07 |
| 21 | continues and it explains that, "The display              | 10:51:10 |
| 22 | materials, red, green, and blue OLED materials 324 and    | 10:51:13 |

|    |                                                         |          |
|----|---------------------------------------------------------|----------|
| 1  | 326...are deposited on top of the column electrodes to  | 10:51:21 |
| 2  | define the active area of the pixel."                   | 10:51:25 |
| 3  | Do you see that?                                        | 10:51:27 |
| 4  | MR. KUDZIN: Objection.                                  | 10:51:29 |
| 5  | A. Yes, I see that section.                             | 10:51:31 |
| 6  | BY MR. HERMAN:                                          | 10:51:33 |
| 7  | Q. So that's talking about OLED materials that are      | 10:51:33 |
| 8  | located directly on the column electrodes 322.          | 10:51:36 |
| 9  | Correct?                                                | 10:51:39 |
| 10 | A. That is correct.                                     | 10:51:42 |
| 11 | Q. So later in this same paragraph, at about line 16 in | 10:51:43 |
| 12 | column 13, there's reference to an insulating layer     | 10:51:49 |
| 13 | 330. Do you see that?                                   | 10:51:54 |
| 14 | A. Yes, I see that.                                     | 10:51:57 |
| 15 | Q. Now, can you flip to Figure 10a for me?              | 10:51:58 |
| 16 | A. Okay, I'm at 10a.                                    | 10:52:18 |
| 17 | Q. Now, Figure 10a is showing essentially a             | 10:52:20 |
| 18 | cross-sectional view of some of the structures we just  | 10:52:23 |
| 19 | discussed, including that front plate 320; is that      | 10:52:26 |
| 20 | right?                                                  | 10:52:32 |
| 21 | MR. KUDZIN: Objection.                                  | 10:52:33 |
| 22 | A. So Figure 10a has the -- yes, it has the front plate | 10:52:36 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | or the bottom -- it's actually the bottom, in my          | 10:52:44 |
| 2  | view, but, yes, it shows 320 and part of the              | 10:52:46 |
| 3  | cross-section.                                            | 10:52:48 |
| 4  | BY MR. HERMAN:                                            | 10:52:49 |
| 5  | Q. So that front plate 320 is essentially on the bottom   | 10:52:49 |
| 6  | of Figure 10a. Correct?                                   | 10:52:53 |
| 7  | A. That's correct.                                        | 10:52:55 |
| 8  | MR. KUDZIN: Objection.                                    | 10:52:56 |
| 9  | BY MR. HERMAN:                                            | 10:52:59 |
| 10 | Q. And so the column electrodes 322 are sitting on top of | 10:52:59 |
| 11 | that front plate 320?                                     | 10:53:02 |
| 12 | A. In Figure 10a it shows the column electrodes and only  | 10:53:05 |
| 13 | the column electrodes. Correct.                           | 10:53:08 |
| 14 | Q. And the OLED materials 324, they're not shown in       | 10:53:11 |
| 15 | Figure 10a; is that right?                                | 10:53:17 |
| 16 | MR. KUDZIN: Objection.                                    | 10:53:19 |
| 17 | A. That is correct. The OLED materials are not called     | 10:53:20 |
| 18 | out in Figure 10a.                                        | 10:53:25 |
| 19 | BY MR. HERMAN:                                            | 10:53:26 |
| 20 | Q. But per the section of Matthies that we just           | 10:53:26 |
| 21 | discussed, they're sitting on top of 322, the column      | 10:53:30 |
| 22 | electrodes. Correct?                                      | 10:53:33 |

|    |                                                        |          |
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| 1  | A. So, you know, Matthies shows -- well, I'll say      | 10:53:36 |
| 2  | they're not called out in Figure 10a and I'll leave    | 10:53:44 |
| 3  | it at that.                                            | 10:53:47 |
| 4  | Q. But in the specification of Matthies, Matthies      | 10:53:48 |
| 5  | discusses the depositing of them on top of the column  | 10:53:51 |
| 6  | electrodes 322. True?                                  | 10:53:55 |
| 7  | MR. KUDZIN: Objection.                                 | 10:53:57 |
| 8  | A. Yes, that is the order that Matthies discusses.     | 10:53:59 |
| 9  | BY MR. HERMAN:                                         | 10:54:02 |
| 10 | Q. Now, Figure 10a shows insulating layer 330 touching | 10:54:03 |
| 11 | the column electrodes, doesn't it?                     | 10:54:09 |
| 12 | A. So Figure 10a shows 330 on the back of the column   | 10:54:14 |
| 13 | electrodes. That's correct.                            | 10:54:18 |
| 14 | MR. HERMAN: I think now is probably a good             | 10:54:27 |
| 15 | time for another break. Do you want to take five       | 10:54:28 |
| 16 | minutes?                                               | 10:54:31 |
| 17 | THE WITNESS: Okay. That's fine.                        | 10:54:31 |
| 18 | VIDEO TECHNICIAN: We are going off the                 | 10:54:33 |
| 19 | record. The time is now 10:54 a.m.                     | 10:54:35 |
| 20 | (Off the record at 10:54 a.m.)                         | 10:54:38 |
| 21 | (Back on the record at 11:06 a.m.)                     | 11:06:10 |
| 22 | VIDEO TECHNICIAN: We're back on the                    | 11:06:10 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | record. The time is now 11:06 a.m.                        | 11:06:11 |
| 2  | BY MR. HERMAN:                                            | 11:06:13 |
| 3  | Q. Now, if you could look back at Matthies. That's        | 11:06:15 |
| 4  | Exhibit 1004.                                             | 11:06:17 |
| 5  | A. Okay. I have it here in front of me.                   | 11:06:19 |
| 6  | Q. And in column 2, about line 11, there's reference to   | 11:06:23 |
| 7  | one type of tiled display that's disclosed, and they      | 11:06:29 |
| 8  | give a U.S. Patent Number 5,644,327. Do you see that?     | 11:06:34 |
| 9  | A. Yes, I do.                                             | 11:06:39 |
| 10 | Q. Do you know if you reviewed that in arriving at your   | 11:06:40 |
| 11 | opinions?                                                 | 11:06:42 |
| 12 | A. I'm not sure if I remember. I read a lot of            | 11:06:46 |
| 13 | material. I would have to check my list of                | 11:06:50 |
| 14 | references to see if it's there.                          | 11:06:51 |
| 15 | Q. I don't believe it was there, so I'm going to give you | 11:06:54 |
| 16 | a copy of it --                                           | 11:06:57 |
| 17 | A. Okay.                                                  | 11:06:59 |
| 18 | Q. -- which I have marked as a new exhibit, Exhibit 1016  | 11:07:00 |
| 19 | in the 987 proceeding.                                    | 11:07:03 |
| 20 | A. Okay.                                                  | 11:07:08 |
| 21 | ENTERED INTO THE RECORD:                                  | 11:07:10 |
| 22 | PREVIOUSLY MARKED EXHIBIT 1016                            | 11:07:10 |

|    |                                                         |          |
|----|---------------------------------------------------------|----------|
| 1  | IPR2023-00987                                           | 11:07:10 |
| 2  | 11:07 a.m.                                              | 11:07:10 |
| 3  | BY MR. HERMAN:                                          | 11:07:10 |
| 4  | Q. Let me know when you've got that.                    | 11:07:11 |
| 5  | A. All right. Just a second.                            | 11:07:12 |
| 6  | Okay, I have it open. If you could just                 | 11:07:19 |
| 7  | give me a second to review it and take a look at it.    | 11:07:22 |
| 8  | Okay. I haven't read it in enormous detail              | 11:10:26 |
| 9  | but I think I've got the important points understood.   | 11:10:29 |
| 10 | Q. All right. So the abstract of this patent references | 11:10:31 |
| 11 | an electroluminescent display; is that right?           | 11:10:36 |
| 12 | A. That is what the first sentence says, yes. Correct.  | 11:10:41 |
| 13 | Q. So that could be an organic electroluminescent       | 11:10:43 |
| 14 | display. True?                                          | 11:10:50 |
| 15 | MR. KUDZIN: Objection.                                  | 11:10:51 |
| 16 | A. So, no, this patent is very specific to a technology | 11:10:51 |
| 17 | called thin film electroluminescence and also           | 11:10:55 |
| 18 | discusses the use of a cathode ray in order to          | 11:10:57 |
| 19 | stimulate the same phosphors that are used for thin     | 11:11:04 |
| 20 | film electroluminescence. I don't believe organics      | 11:11:07 |
| 21 | are mentioned at any point in the patent.               | 11:11:10 |
| 22 | The patent also uses a number of                        | 11:11:12 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | nonhermetic seal architectures which I think would       | 11:11:14 |
| 2  | make it difficult to extend significantly to organics    | 11:11:18 |
| 3  | without significant additional design and                | 11:11:22 |
| 4  | experimentation.                                         | 11:11:26 |
| 5  | BY MR. HERMAN:                                           | 11:11:28 |
| 6  | Q. But this was 1997 when this patent issued; is that    | 11:11:28 |
| 7  | true?                                                    | 11:11:33 |
| 8  | A. Yes, it issued in 1997. Correct.                      | 11:11:34 |
| 9  | Q. But ten years later, organic OLED displays would have | 11:11:37 |
| 10 | been known; is that true?                                | 11:11:45 |
| 11 | MR. KUDZIN: Objection.                                   | 11:11:45 |
| 12 | A. Correct. So, yeah, they're just not mentioned in      | 11:11:46 |
| 13 | this patent.                                             | 11:11:48 |
| 14 | BY MR. HERMAN:                                           | 11:11:49 |
| 15 | Q. All right. So the electroluminescent display in this  | 11:11:49 |
| 16 | particular patent can be either an active or a           | 11:11:53 |
| 17 | passive -- well, it can be an active-matrix driven       | 11:11:56 |
| 18 | display. Correct?                                        | 11:11:59 |
| 19 | MR. KUDZIN: Objection.                                   | 11:12:02 |
| 20 | A. So that's -- so thin film electroluminescence is      | 11:12:05 |
| 21 | actually pretty complicated, and a significant part      | 11:12:10 |
| 22 | of the patent discusses why matrixing the display is     | 11:12:13 |

1 actually generally not possible, and this particular 11:12:17  
2 patent deals with individually addressing each of the 11:12:21  
3 elements using a custom-integrated circuit because 11:12:23  
4 high voltages need to be applied, and when the 11:12:28  
5 display is driven in a matrix configuration it has an 11:12:30  
6 extremely large paracytic capacitance, and that's the 11:12:35  
7 main thing that the patent is looking to overcome. 11:12:39

8 So I would disagree just as an absolute 11:12:42  
9 statement that this could be an active matrix display, 11:12:46  
10 given what the patent is about. 11:12:50

11 BY MR. HERMAN: 11:12:52

12 Q. So if you turn to column 6, at about line 64, there's 11:12:52  
13 a paragraph that begins, "Electrical vias through the 11:12:59  
14 ceramic substrate provide direct connections." 11:13:02

15 Do you see that? 11:13:07

16 A. Yes, I do. 11:13:07

17 Q. And it goes on to say, "from signal processing 11:13:08  
18 circuitry to small groups of pixels as shown in 11:13:11  
19 Figure 13." 11:13:14

20 You see that? 11:13:14

21 A. Yes, I do. 11:13:15

22 Q. "Or even to individual pixels as shown in Figure 6 for 11:13:16

|    |                                                        |          |
|----|--------------------------------------------------------|----------|
| 1  | completely active drive of the display."               | 11:13:21 |
| 2  | Do you see that?                                       | 11:13:24 |
| 3  | A. Yes, I do.                                          | 11:13:25 |
| 4  | Q. So Figure 6 is meant to show a display in which the | 11:13:26 |
| 5  | individual pixels are completely actively driven.      | 11:13:31 |
| 6  | Correct?                                               | 11:13:35 |
| 7  | A. So, again, I think we're mixing two terms here. So  | 11:13:36 |
| 8  | the individual pixels are actively driven; however,    | 11:13:40 |
| 9  | they are individually addressed.                       | 11:13:44 |
| 10 | So when we think about the hierarchy of                | 11:13:47 |
| 11 | display addressing, at the bottom of the hierarchy is  | 11:13:49 |
| 12 | what we call direct addressing, which is what this     | 11:13:53 |
| 13 | patent describes in which there is an individual wire  | 11:13:57 |
| 14 | going to each pixel.                                   | 11:13:59 |
| 15 | We then have the passive matrix kind of                | 11:14:01 |
| 16 | architecture in which we have wires that address more  | 11:14:04 |
| 17 | than 1 pixel, and that allows us, instead of -- if we  | 11:14:09 |
| 18 | have a million pixels we may have, you know, two times | 11:14:12 |
| 19 | square root of a million wires coming in, whereas in a | 11:14:18 |
| 20 | direct addressing we have external circuitry that then | 11:14:19 |
| 21 | drives each pixel.                                     | 11:14:23 |
| 22 | So, yes, each pixel is actively driven, but            | 11:14:24 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | I would disagree that it is an active matrix because      | 11:14:27 |
| 2  | we're not driving it using that matrix architecture.      | 11:14:32 |
| 3  | The whole point of the patent is to make holes in the     | 11:14:35 |
| 4  | substrate so that we can go and touch each individual     | 11:14:39 |
| 5  | pixel with circuitry on the outside and provide that      | 11:14:42 |
| 6  | large number of contacts coming in.                       | 11:14:46 |
| 7  | Q. And those contacts are coming through vias in this     | 11:14:51 |
| 8  | particular patent; is that right?                         | 11:14:54 |
| 9  | A. That is correct. The patent speaks pretty explicitly   | 11:14:56 |
| 10 | about a multilayer ceramic module which then has vias     | 11:14:59 |
| 11 | that bring the wires from the backside, which then        | 11:15:02 |
| 12 | has more complicated electronics available than would     | 11:15:07 |
| 13 | be on the panel for EL.                                   | 11:15:14 |
| 14 | Q. Now, if you could go back to your '803 patent          | 11:15:15 |
| 15 | declaration.                                              | 11:15:20 |
| 16 | A. Sure.                                                  | 11:15:20 |
| 17 | Q. And if you could turn to paragraph 32 for me.          | 11:15:28 |
| 18 | A. Okay, I'm there now.                                   | 11:15:43 |
| 19 | Q. So paragraph 32 explains that the combination of color | 11:15:43 |
| 20 | elements in the display can be referred to as the         | 11:15:49 |
| 21 | single pixel, with the smaller units containing           | 11:15:51 |
| 22 | individual colors being referred to as the sub-pixels.    | 11:15:55 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | Do you see that?                                          | 11:16:00 |
| 2  | A. Yes, that's correct.                                   | 11:16:01 |
| 3  | Q. Now, in the '803 patent's examples, in the figures in  | 11:16:02 |
| 4  | particular, the sub-pixels within a pixel have            | 11:16:09 |
| 5  | different sizes; is that right?                           | 11:16:14 |
| 6  | A. Yes, that is correct, at least -- in the '803 patent,  | 11:16:17 |
| 7  | at least the -- two of the pixels have to have a          | 11:16:21 |
| 8  | different size.                                           | 11:16:24 |
| 9  | Q. So in Figure 5, for instance, the green sub-pixel is   | 11:16:25 |
| 10 | smallest, but the blue sub-pixel is largest.              | 11:16:30 |
| 11 | A. Yeah, just give me a second to pull up the '805 [sic]  | 11:16:35 |
| 12 | patent. Sorry, are we done with the other reference?      | 11:16:39 |
| 13 | Q. Yes.                                                   | 11:16:42 |
| 14 | A. No problem. Sorry. I just want to shift gears.         | 11:16:42 |
| 15 | Okay, so looking at the '803 patent, yes,                 | 11:16:59 |
| 16 | the green pixels -- Figure 5, the green pixel is the      | 11:17:02 |
| 17 | smallest, the red pixel is next largest, and the blue     | 11:17:06 |
| 18 | is the -- is the largest.                                 | 11:17:10 |
| 19 | Q. Now, in that same figure, Figure 5, all of the pixels, | 11:17:11 |
| 20 | not the sub-pixels, have exactly the same size; is        | 11:17:15 |
| 21 | that right?                                               | 11:17:19 |
| 22 | MR. KUDZIN: Objection.                                    | 11:17:21 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | A. Yes. So the pixels have the same size uniformly in     | 11:17:22 |
| 2  | the display, yes.                                         | 11:17:30 |
| 3  | BY MR. HERMAN:                                            | 11:17:31 |
| 4  | Q. All right. And that's the case for all of the          | 11:17:31 |
| 5  | patent's figures; the pixels uniformly have the same      | 11:17:33 |
| 6  | size across the display. Correct?                         | 11:17:37 |
| 7  | MR. KUDZIN: Objection.                                    | 11:17:40 |
| 8  | A. So, yes, that is correct.                              | 11:17:43 |
| 9  | BY MR. HERMAN:                                            | 11:17:44 |
| 10 | Q. Now, if you could turn to paragraph 39.                | 11:17:46 |
| 11 | A. Okay, I'm there now.                                   | 11:17:56 |
| 12 | Q. That paragraph discusses LCD displays.                 | 11:17:58 |
| 13 | A. Okay.                                                  | 11:18:02 |
| 14 | Q. Do you see that?                                       | 11:18:03 |
| 15 | A. Yes.                                                   | 11:18:03 |
| 16 | Q. And it notes that in such a display, it's also -- it's | 11:18:04 |
| 17 | often comprised of a "triplet of red, green, and blue     | 11:18:07 |
| 18 | pixels forming a unit that is repeated multiple           | 11:18:11 |
| 19 | times."                                                   | 11:18:14 |
| 20 | A. That is correct.                                       | 11:18:17 |
| 21 | Q. So in an LCD display, the same unit pixel is repeated  | 11:18:23 |
| 22 | identically again and again to form a display; is that    | 11:18:23 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | right?                                                    | 11:18:27 |
| 2  | MR. KUDZIN: Objection.                                    | 11:18:33 |
| 3  | A. That is correct. So there's a pixel which is formed    | 11:18:33 |
| 4  | of sub-pixels and then the pixels repeat, and the         | 11:18:35 |
| 5  | pixels form the picture element, and the image that       | 11:18:39 |
| 6  | you see in the display is the -- is the assemblage of     | 11:18:42 |
| 7  | those elements.                                           | 11:18:45 |
| 8  | BY MR. HERMAN:                                            | 11:18:46 |
| 9  | Q. Is that a standard way to form a display, by repeating | 11:18:46 |
| 10 | the same unit pixel again and again and again across      | 11:18:49 |
| 11 | the display?                                              | 11:18:52 |
| 12 | A. Yes, it is.                                            | 11:18:53 |
| 13 | Q. Would it be unusual for a display to have various      | 11:18:58 |
| 14 | different-sized pixels across the display?                | 11:19:01 |
| 15 | A. So the overall pixels are generally the same size.     | 11:19:04 |
| 16 | It's not impossible to have variable sizes. For           | 11:19:10 |
| 17 | example, when we look at very large displays, such as     | 11:19:13 |
| 18 | those that are used -- like the NASDAQ building in        | 11:19:17 |
| 19 | Times Square has a curved side of the display. So,        | 11:19:20 |
| 20 | you know, there the pixels are not all uniform in         | 11:19:25 |
| 21 | size, but, you know, as a -- as a general matter in       | 11:19:28 |
| 22 | like a liquid crystal display, for example, they          | 11:19:32 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | would be repeated.                                        | 11:19:35 |
| 2  | Q. And that's also the case for an OLED display. As a     | 11:19:36 |
| 3  | general matter, the pixels are generally the same         | 11:19:40 |
| 4  | across the display; is that true?                         | 11:19:43 |
| 5  | A. So for the displays that we're speaking about, the     | 11:19:47 |
| 6  | pixels are the same size across the display.              | 11:19:52 |
| 7  | Q. Okay. Now, in paragraph -- can you turn to             | 11:19:55 |
| 8  | paragraph 224 in your declaration?                        | 11:20:07 |
| 9  | A. Okay. I'm there.                                       | 11:20:25 |
| 10 | Q. In paragraph 224, you note that it was not uncommon to | 11:20:30 |
| 11 | see displays designed to have spacings between each       | 11:20:36 |
| 12 | set of individual pixel groups. Do you see that?          | 11:20:39 |
| 13 | A. Correct. I see that.                                   | 11:20:45 |
| 14 | Q. And then following that statement you have what appear | 11:20:47 |
| 15 | to be at least eight different images of pixel            | 11:20:52 |
| 16 | arrangements.                                             | 11:20:55 |
| 17 | A. That is correct.                                       | 11:20:58 |
| 18 | Q. Now, in each of those arrangements, the pixels are     | 11:21:00 |
| 19 | repeated and have the same shape across at least the      | 11:21:06 |
| 20 | portion of the display that you've shown in the image;    | 11:21:08 |
| 21 | is that right?                                            | 11:21:11 |
| 22 | A. That's correct. Each of those has a unique sub-pixel   | 11:21:13 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | shape, which is itself not totally regular, and then      | 11:21:18 |
| 2  | those are repeated in an overall display pixel            | 11:21:21 |
| 3  | format.                                                   | 11:21:24 |
| 4  | Q. So none of them are examples of displays that have     | 11:21:25 |
| 5  | differently sized pixels or pixels that would vary        | 11:21:29 |
| 6  | across the display. True?                                 | 11:21:31 |
| 7  | A. Correct. Not the pixels themselves. The sub-pixels     | 11:21:33 |
| 8  | have different sizes.                                     | 11:21:38 |
| 9  | Q. So now talking about those images, sitting here today, | 11:21:40 |
| 10 | do you know whether any of those are prior art to the     | 11:21:44 |
| 11 | '803 patent?                                              | 11:21:47 |
| 12 | A. So I would have to check to be sure. Several of        | 11:21:52 |
| 13 | these are micro LED, the first two, which are             | 11:21:59 |
| 14 | definitely not prior art. That technology is              | 11:22:01 |
| 15 | relatively new.                                           | 11:22:04 |
| 16 | There are two OLED images, and I would need               | 11:22:06 |
| 17 | to check the dates there. Both of those are from a        | 11:22:10 |
| 18 | panel from LG. That's the -- I would need to look at      | 11:22:13 |
| 19 | exactly what the date is of those -- of those layouts     | 11:22:17 |
| 20 | being frozen. They just -- it's possible, but I can't     | 11:22:21 |
| 21 | be certain.                                               | 11:22:24 |
| 22 | Q. All right. So sitting here today, some of them you     | 11:22:25 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | know are not prior art. Correct?                         | 11:22:28 |
| 2  | A. Correct. Several of these are from some recent        | 11:22:32 |
| 3  | papers and are not prior art.                            | 11:22:36 |
| 4  | Q. And other of them, you're not sure whether they're    | 11:22:37 |
| 5  | prior art or not. Correct?                               | 11:22:39 |
| 6  | A. I would have to check to be certain, but -- yeah,     | 11:22:43 |
| 7  | I'll leave it at that.                                   | 11:22:45 |
| 8  | Q. All right. So sitting here today, do you know if any  | 11:22:46 |
| 9  | of these particular displays that you show in these      | 11:22:49 |
| 10 | images employ both static pixels and dynamic pixels      | 11:22:52 |
| 11 | like the Phan reference teaches?                         | 11:22:57 |
| 12 | MR. KUDZIN: Objection.                                   | 11:23:00 |
| 13 | A. Yeah, I guess I'm not totally sure what you're asking | 11:23:04 |
| 14 | because the -- the Phan has a lot of -- you know,        | 11:23:10 |
| 15 | Phan has a lot of algorithmic analysis that's done in    | 11:23:15 |
| 16 | it. You know, Phan is primarily discussing how to        | 11:23:19 |
| 17 | upscale images, and that actually really only is         | 11:23:22 |
| 18 | determined at the -- at the system level, not at the     | 11:23:28 |
| 19 | display level.                                           | 11:23:30 |
| 20 | BY MR. HERMAN:                                           | 11:23:36 |
| 21 | Q. So do you know if any of these displays engage in the | 11:23:36 |
| 22 | same type of image upscaling that Phan does?             | 11:23:36 |

|    |                                                         |          |
|----|---------------------------------------------------------|----------|
| 1  | A. So I haven't offered any opinion on or done any      | 11:23:39 |
| 2  | analysis on whether or not these do the same            | 11:23:48 |
| 3  | upscaling.                                              | 11:23:48 |
| 4  | Q. All right. So you -- sitting here today, you don't   | 11:23:48 |
| 5  | know one way or the other whether they do or do not.    | 11:23:50 |
| 6  | Correct?                                                | 11:23:53 |
| 7  | A. That is correct.                                     | 11:23:54 |
| 8  | Q. Okay.                                                | 11:23:56 |
| 9  | A. Sorry, just to be clear, you're asking whether these | 11:23:59 |
| 10 | displays today implement the Phan architecture?         | 11:24:01 |
| 11 | Q. Well, whether the displays discussed or depicted     | 11:24:04 |
| 12 | following paragraph 224 in your declaration do what     | 11:24:09 |
| 13 | Phan teaches.                                           | 11:24:14 |
| 14 | MR. KUDZIN: Objection.                                  | 11:24:16 |
| 15 | A. Okay. Yeah. I -- yeah, I would need -- I would need  | 11:24:18 |
| 16 | to check and get back to you on that on the exact       | 11:24:25 |
| 17 | dates.                                                  | 11:24:27 |
| 18 | BY MR. HERMAN:                                          | 11:24:28 |
| 19 | Q. So that's not something you've considered one way or | 11:24:28 |
| 20 | the other already. Correct?                             | 11:24:30 |
| 21 | A. Not about the drive architecture. Here, I'm          | 11:24:34 |
| 22 | specifically talking about the pixel layout.            | 11:24:38 |

|    |                                                         |          |
|----|---------------------------------------------------------|----------|
| 1  | Q. Now, if you could flip back to the Phan prior art    | 11:24:41 |
| 2  | reference, and I believe I've given you a copy of       | 11:24:47 |
| 3  | that. It's Exhibit 1005 in the 987 IPR.                 | 11:24:51 |
| 4  | A. Okay. I'm there now.                                 | 11:25:04 |
| 5  | Q. And if you could turn to column 1, starting about    | 11:25:05 |
| 6  | line 17, there's a section entitled Field of the        | 11:25:17 |
| 7  | Invention. Do you see that?                             | 11:25:20 |
| 8  | A. Yes, I do.                                           | 11:25:28 |
| 9  | Q. There's a number of different display technologies   | 11:25:29 |
| 10 | that are discussed in the first paragraph of that       | 11:25:33 |
| 11 | Field of the Invention section; is that right?          | 11:25:36 |
| 12 | A. Yes. So Phan lists a large number of display         | 11:25:42 |
| 13 | technologies and also several technologies that I am    | 11:25:44 |
| 14 | not familiar with, such as Biotronics, and then also    | 11:25:49 |
| 15 | qualifies that it also includes all light sources       | 11:25:53 |
| 16 | known or invented in the future as well as the          | 11:25:57 |
| 17 | methods for controlling those displays.                 | 11:26:01 |
| 18 | Q. Now, a person having ordinary skill in the art as of | 11:26:03 |
| 19 | the '803 patent filing would understand and know what   | 11:26:09 |
| 20 | Phan is referring to when he mentions a cathode ray     | 11:26:17 |
| 21 | tube (CRT); is that right?                              | 11:26:17 |
| 22 | A. Yes. A person of ordinary skill in the art would be  | 11:26:20 |

|    |                                                         |          |
|----|---------------------------------------------------------|----------|
| 1  | familiar with a cathode ray tube.                       | 11:26:24 |
| 2  | Q. And a person of ordinary skill in the art would also | 11:26:27 |
| 3  | be familiar and know what Phan is referring to when he  | 11:26:30 |
| 4  | mentions a plasma display panel (PDP); is that right?   | 11:26:33 |
| 5  | A. Yes, that is correct. A person of ordinary skill in  | 11:26:37 |
| 6  | the art would be familiar with a plasma display         | 11:26:39 |
| 7  | panel.                                                  | 11:26:42 |
| 8  | Q. And a person of ordinary skill in the art as of the  | 11:26:42 |
| 9  | '803 patent filing would also know what Phan is         | 11:26:45 |
| 10 | referring to when he mentions a liquid crystal display  | 11:26:49 |
| 11 | (LCD); is that right?                                   | 11:26:52 |
| 12 | A. Yes, a person of ordinary skill in the art at the    | 11:26:56 |
| 13 | time of the '803 patent filing would be familiar with   | 11:26:58 |
| 14 | a liquid crystal display.                               | 11:27:01 |
| 15 | Q. And a person of ordinary skill in the art would also | 11:27:03 |
| 16 | know what Phan is referring to when he mentions an      | 11:27:05 |
| 17 | organic light-emitting diode (OLED) display; is that    | 11:27:08 |
| 18 | right?                                                  | 11:27:12 |
| 19 | A. So a person of ordinary skill in the art would be    | 11:27:14 |
| 20 | familiar with organic light-emitting diode displays,    | 11:27:16 |
| 21 | but I disagree that they would necessarily apply it     | 11:27:19 |
| 22 | to Phan's teaching specifically.                        | 11:27:23 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | Q. All right. But when those words are used in Phan, one | 11:27:25 |
| 2  | of ordinary skill in the art would understand what       | 11:27:30 |
| 3  | Phan is referring to with the words organic              | 11:27:31 |
| 4  | light-emitting diode (OLED) display. True?               | 11:27:38 |
| 5  | A. Yes, so a person of ordinary skill in the art would,  | 11:27:42 |
| 6  | while reading Phan, understand that Phan is referring    | 11:27:45 |
| 7  | to an organic light-emitting diode display.              | 11:27:47 |
| 8  | Q. Okay.                                                 | 11:27:49 |
| 9  | MR. HERMAN: So those are all the questions               | 11:27:54 |
| 10 | that I have.                                             | 11:27:56 |
| 11 | So, Matt, I pass the witness to you.                     | 11:27:56 |
| 12 | THE WITNESS: Okay.                                       | 11:27:58 |
| 13 | MR. KUDZIN: Can I take a couple minutes                  | 11:27:59 |
| 14 | and we'll go back on the record?                         | 11:28:02 |
| 15 | MR. HERMAN: Sure. Yep. Take your time.                   | 11:28:04 |
| 16 | MR. KUDZIN: Thanks.                                      | 11:28:06 |
| 17 | VIDEO TECHNICIAN: We are going off the                   | 11:28:07 |
| 18 | record. The time is 11:28 a.m.                           | 11:28:08 |
| 19 | (Off the record at 11:28 a.m.)                           | 11:41:38 |
| 20 | (Back on the record at 11:41 a.m.)                       | 11:41:38 |
| 21 | VIDEO TECHNICIAN: We're back on the                      | 11:41:38 |
| 22 | record. The time is now 11:41 a.m.                       | 11:41:41 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | MR. KUDZIN: Thanks, I just have a couple                 | 11:41:44 |
| 2  | quick questions.                                         | 11:41:46 |
| 3  | EXAMINATION                                              | 11:41:46 |
| 4  | BY MR. KUDZIN:                                           | 11:41:46 |
| 5  | Q. Dr. Kymissis, you were asked earlier about creating   | 11:41:50 |
| 6  | televisions. Do you recall some of that testimony?       | 11:41:59 |
| 7  | A. Yes, I did.                                           | 11:42:01 |
| 8  | Q. And you also recall being asked about, for example,   | 11:42:02 |
| 9  | jumbotrons?                                              | 11:42:05 |
| 10 | A. Yes, I was.                                           | 11:42:07 |
| 11 | Q. The -- this -- the '803 patent talks about fine metal | 11:42:07 |
| 12 | masks; is that correct?                                  | 11:42:20 |
| 13 | A. That is correct.                                      | 11:42:21 |
| 14 | Q. Is fine metal mask technology used to manufacture     | 11:42:21 |
| 15 | jumbotrons?                                              | 11:42:27 |
| 16 | A. No, it is not.                                        | 11:42:28 |
| 17 | Q. Why is that?                                          | 11:42:28 |
| 18 | A. So fine metal masks are used to create relatively     | 11:42:29 |
| 19 | small and fine features. Jumbotrons have relatively      | 11:42:32 |
| 20 | large pixels and so it's not necessary to create fine    | 11:42:35 |
| 21 | features when the pixels themselves are large.           | 11:42:39 |
| 22 | So different technologies are used to make               | 11:42:42 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | large, medium, and small displays.                        | 11:42:45 |
| 2  | Q. Are -- is fine metal mask used to create full-sized    | 11:42:48 |
| 3  | televisions?                                              | 11:42:54 |
| 4  | A. No, generally it is not.                               | 11:42:56 |
| 5  | Q. The '803 patent also talks about deposition            | 11:42:58 |
| 6  | reliability; is that correct?                             | 11:43:08 |
| 7  | A. Yes, that is correct.                                  | 11:43:09 |
| 8  | Q. Are the deposition reliability concerns the same for   | 11:43:11 |
| 9  | large-scale displays as they are for small-scale          | 11:43:17 |
| 10 | displays?                                                 | 11:43:20 |
| 11 | A. No, they are not.                                      | 11:43:21 |
| 12 | MR. HERMAN: Objection to form.                            | 11:43:21 |
| 13 | BY MR. KUDZIN:                                            | 11:43:23 |
| 14 | Q. Are the aperture ratio concerns for large-scale        | 11:43:26 |
| 15 | displays the same as they are for small-scale             | 11:43:29 |
| 16 | displays?                                                 | 11:43:33 |
| 17 | MR. HERMAN: Objection to form.                            | 11:43:33 |
| 18 | A. No, they're different.                                 | 11:43:34 |
| 19 | BY MR. KUDZIN:                                            | 11:43:36 |
| 20 | Q. In your opinion, considering the entirety of the '803, | 11:43:36 |
| 21 | '683, and '578 patents, including not just the claims     | 11:43:43 |
| 22 | but the specification, is it your opinion that the        | 11:43:48 |

|    |                                                           |          |
|----|-----------------------------------------------------------|----------|
| 1  | inventions claimed in the patents are particularly        | 11:43:53 |
| 2  | beneficial to creating mobile displays?                   | 11:43:55 |
| 3  | A. Yes.                                                   | 11:43:59 |
| 4  | MR. HERMAN: Objection to form.                            | 11:43:59 |
| 5  | A. Yes. The claims that are in those patents are          | 11:44:02 |
| 6  | particularly beneficial for mobile displays in which      | 11:44:06 |
| 7  | we need a high resolution, small pixel pitch, and         | 11:44:09 |
| 8  | relatively small pixel size.                              | 11:44:15 |
| 9  | BY MR. KUDZIN:                                            | 11:44:21 |
| 10 | Q. In your opinion, considering the entirety of the '803, | 11:44:21 |
| 11 | '683, and '578 patents, are the pixel arrangement         | 11:44:24 |
| 12 | structures claimed in those patents beneficial in         | 11:44:27 |
| 13 | analog displays?                                          | 11:44:33 |
| 14 | MR. HERMAN: Objection to form.                            | 11:44:34 |
| 15 | A. Yes, they are -- yes, they are especially beneficial   | 11:44:35 |
| 16 | for active matrix organic light-emitting diode            | 11:44:40 |
| 17 | displays.                                                 | 11:44:43 |
| 18 | BY MR. KUDZIN:                                            | 11:44:44 |
| 19 | Q. You were also asked a number of questions about the    | 11:44:45 |
| 20 | resolution of different displays; is that correct?        | 11:44:48 |
| 21 | A. That is correct.                                       | 11:44:52 |
| 22 | Q. What effect did the diamond pixel patents, meaning the | 11:44:53 |

|    |                                                          |          |
|----|----------------------------------------------------------|----------|
| 1  | '803, '683, and '578 patent, have on the resolution of   | 11:45:02 |
| 2  | cell phone displays?                                     | 11:45:08 |
| 3  | A. So the diamond pixel patent permitted a significant   | 11:45:10 |
| 4  | increase in the available resolution for active          | 11:45:13 |
| 5  | matrix OLED displays, and that allowed the               | 11:45:17 |
| 6  | development of displays with a much higher resolution    | 11:45:20 |
| 7  | and a much higher pixel pitch than what was -- than      | 11:45:23 |
| 8  | what was previously possible.                            | 11:45:26 |
| 9  | Q. You were also asked a number of questions about the   | 11:45:28 |
| 10 | extent to which the patents require particular shapes    | 11:45:40 |
| 11 | of pixels. Do you recall that?                           | 11:45:43 |
| 12 | A. Yes, I do.                                            | 11:45:45 |
| 13 | Q. Okay. If you could turn to the '578 patent, please.   | 11:45:46 |
| 14 | A. Yes.                                                  | 11:45:52 |
| 15 | Q. And if you look at -- will you please read Claim 13,  | 11:45:59 |
| 16 | please?                                                  | 11:46:02 |
| 17 | A. Yep. "The pixel arrangement structure of Claim 12,    | 11:46:03 |
| 18 | wherein neighboring ones of the plurality of first       | 11:46:06 |
| 19 | pixels have octagonal shapes that are symmetrical to     | 11:46:10 |
| 20 | each other."                                             | 11:46:14 |
| 21 | Q. So does the '578 patent have some restrictions on the | 11:46:15 |
| 22 | shapes of the pixels used?                               | 11:46:18 |

1       A.     Yes.   I'm sorry if I misspoke.   Claim 1 does not       11:46:20  
2             speak to those shapes, but some of the other claims       11:46:23  
3             do speak about hexagonal and octagonal shapes.       11:46:29

4                     MR. KUDZIN:   That's all I have, so I'll       11:46:34  
5             pass the witness back.       11:46:35

6                     MR. HERMAN:   Thank you.   I don't have       11:46:36  
7             anything further.       11:46:38

8                     VIDEO TECHNICIAN:   All right, just a       11:46:39  
9             moment, please.       11:46:40

10                    We are going off the record.   The time is       11:46:41  
11            now 11:46 a.m.   This concludes today's deposition.       11:46:43

12                               (Proceedings concluded at 11:46 a.m.)

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1 CERTIFICATE OF SHORTHAND REPORTER - NOTARY PUBLIC

2  
3 I, ALISON WEBSTER, Certified Reporter and  
4 Notary Public within and for the State of Michigan  
5 do hereby certify:

6 That IOANNIS KYMISSIS, Ph.D., the witness whose  
7 deposition is hereinbefore set forth, was duly sworn  
8 by me before the commencement of such deposition and  
9 that such deposition was taken before me and is a  
10 true record of the testimony given by such witness.

11 I further certify that the adverse party  
12 was represented by counsel at the deposition.

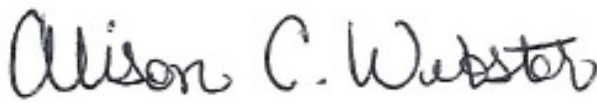
13 I further certify that the deposition of  
14 IOANNIS KYMISSIS, Ph.D., was conducted virtually via  
15 Zoom on Wednesday, June 12, 2024, commencing at  
16 9:00 a.m. to 11:46 a.m.

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

1 IN WITNESS WHEREOF, I have hereunto set my  
2 hand this 17th day of June, 2024.

3 My commission expires:

4 May 1, 2029

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ACKNOWLEDGMENT OF DEPONENT

I, IOANNIS KYMISSIS, Ph.D., 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.

\_\_\_\_\_  
(SIGNATURE)

\_\_\_\_\_  
(DATE)

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