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# Transcript of Daniel Foty, Ph.D.

**Date:** February 23, 2024

**Case:** Mianyang BOE Optoelectronics Tech. Co., et al -v- Samsung Display Co.  
(PTAB)

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UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE PATENT TRIAL AND APPEAL BOARD

- - - - - x

MIANYANG BOE OPTOELECTRONICS :  
TECHNOLOGY CO., LTD.; WUHAN :  
CHINA STAR OPTOELECTRONICS : Case No.  
SEMICONDUCTOR DISPLAY : IPR2023-00941  
TECHNOLOGY CO., LTD; TIANMA :  
MICROELECTRONICS CO., LTD.; :  
and VISIONIX TECHNOLOGY, :  
INC., :  
Petitioners, :  
v. : U.S. Patent No.  
SAMSUNG DISPLAY CO., LTD. : 7,414,599  
Patent Owner. :  
- - - - - X

Videotaped Deposition of DANIEL P. FOTY, Ph.D.  
Conducted Virtually  
Friday, February 23, 2024, 9:05 a.m. EST  
Job No.: 525362  
Pages 1 - 140  
Reported by: Debra A. Whitehead

1           Videotaped Deposition of DANIEL P. FOTY, Ph.D.,  
2           conducted virtually.

3  
4  
5           Pursuant to notice, before Debra Ann Whitehead,  
6           E-Notary Public in and for the State of Maryland.

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MICHAEL SAFEE, A/V Technician

C O N T E N T S

| EXAMINATION OF DANIEL P. FOTY, Ph.D. | PAGE |
|--------------------------------------|------|
| By Mr. Frisch                        | 7    |
| By Mr. Hsu                           | 121  |
| By Mr. Frisch                        | 132  |

EXHIBITS MARKED IN TODAY'S SESSION

(Attached to the Transcript)

| DEPOSITION EXHIBIT                      | PAGE |
|-----------------------------------------|------|
| Exhibit 2008 Thorlabs, Thermal Rollover | 102  |
| Effect in Quantum and Interband         |      |
| Cascade Lasers                          |      |

EXHIBITS MARKED IN PRIOR SESSIONS

(Not Attached)

| DEPOSITION EXHIBIT                          | PAGE |
|---------------------------------------------|------|
| Exhibit 1002 U.S. Patent Application        | 27   |
| 2003/132931 A1, Kimura, et al.              |      |
| Exhibit 1003 Declaration of Dr. Daniel Foty | 12   |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | P R O C E E D I N G S                             | 09:04:53 |
| 2  | VIDEO SPECIALIST: Here begins Media               | 09:04:53 |
| 3  | Number 1 in the videotaped deposition of Daniel   | 09:05:18 |
| 4  | Foty, Ph.D.; in the matter of Mianyang BOE        | 09:05:20 |
| 5  | Optoelectronics Technology Co., et al., V Samsung | 09:05:27 |
| 6  | Display Co.; in the United States Patent and      | 09:05:30 |
| 7  | Trademark Office, Before the Patent Trial and     | 09:05:38 |
| 8  | Appeal Board, Case Number IPR2023-00941.          | 09:05:40 |
| 9  | Today's date is February 23rd, 2024. The          | 09:05:47 |
| 10 | time on the video monitor is 9:05 a.m. eastern    | 09:05:50 |
| 11 | time. The remote videographer today is Kylan      | 09:05:53 |
| 12 | Barry, representing Planet Depos. All parties of  | 09:05:57 |
| 13 | this video deposition are attending remotely.     | 09:06:01 |
| 14 | Would counsel please voice-identify               | 09:06:06 |
| 15 | themselves and state whom they represent.         | 09:06:09 |
| 16 | MR. FRISCH: Jared Frisch of Covington &           | 09:06:09 |
| 17 | Burling, representing the patent owner. And with  | 09:06:12 |
| 18 | me is my colleague Derek Andros.                  | 09:06:15 |
| 19 | MR. HSU: Johannes Hsu of Orrick,                  | 09:06:18 |
| 20 | Herrington & Sutcliffe. And with me is            | 09:06:23 |
| 21 | petitioner's lead counsel Travis Jensen.          | 09:06:24 |
| 22 | VIDEO SPECIALIST: The court reporter              | 09:06:28 |

1 today is Debbie Whitehead, representing Planet

09:06:28

2 Depos.

09:06:28

3 The witness will now be sworn.

09:06:38

4 DANIEL P. FOTY, Ph.D.,

09:06:38

5 having been duly sworn, testified as follows:

09:06:45

6 EXAMINATION BY COUNSEL FOR PATENT OWNER

09:06:45

7 BY MR. FRISCH:

09:06:45

8 Q Good morning, Dr. Foty.

09:06:46

9 A Good morning, Counselor.

09:06:48

10 Q Can you please state your full name, for  
11 the record.

09:06:50

09:06:51

12 A My full name is Daniel Patrick Foty.

09:06:53

13 Q You've been deposed before. Correct?

09:06:56

14 A Numerous times.

09:06:59

15 Q Approximately how many times?

09:07:00

16 A I stopped counting when it got in the  
17 30s. Probably I would say 50 times, roughly, at  
18 this point.

09:07:03

09:07:06

09:07:08

19 Q Do you recall when the last time you had  
20 your deposition taken was?

09:07:08

09:07:11

21 A Yes, I do.

09:07:13

22 Q When was that?

09:07:13

|    |   |                                                   |          |
|----|---|---------------------------------------------------|----------|
| 1  | A | Early November it was taken in another            | 09:07:16 |
| 2  |   | branch of this dispute.                           | 09:07:19 |
| 3  | Q | Have you ever been deposed as part of an          | 09:07:21 |
| 4  |   | IPR proceeding before?                            | 09:07:23 |
| 5  | A | Yes, I have; several times.                       | 09:07:25 |
| 6  | Q | You are kind of a pro at this, but I'll           | 09:07:27 |
| 7  |   | go through some of the ground rules anyway.       | 09:07:32 |
| 8  |   | During the deposition I'll be asking              | 09:07:35 |
| 9  |   | questions. If you don't understand one of my      | 09:07:36 |
| 10 |   | questions please let me know, and I'll try to     | 09:07:38 |
| 11 |   | clarify. If you answer a question that I've       | 09:07:40 |
| 12 |   | asked, I'm going to assume you understood it.     | 09:07:43 |
| 13 |   | Is that fair?                                     | 09:07:44 |
| 14 | A | That's fair, and that's typical.                  | 09:07:46 |
| 15 | Q | And we're taking this deposition remotely         | 09:07:48 |
| 16 |   | today. You understand, however, that this will be | 09:07:50 |
| 17 |   | treated the same as if it were in person?         | 09:07:53 |
| 18 | A | Yes, I understand that. And this is just          | 09:07:55 |
| 19 |   | for the record, this is not my first remote       | 09:07:58 |
| 20 |   | deposition, as you could probably tell from the   | 09:08:00 |
| 21 |   | chatter beforehand.                               | 09:08:03 |
| 22 | Q | Yes. And where are you taking the                 | 09:08:04 |

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | deposition from today?                           | 09:08:05 |
| 2  | A I'm in my residence in Fletcher, Vermont.      | 09:08:07 |
| 3  | Q Is there anyone else there with you?           | 09:08:10 |
| 4  | A Just cats.                                     | 09:08:13 |
| 5  | Q Do you have any communication utilities        | 09:08:14 |
| 6  | open on your computer, besides the Zoom platform | 09:08:18 |
| 7  | that we're using?                                | 09:08:21 |
| 8  | A No, I do not. And the voice over IP            | 09:08:22 |
| 9  | connection is disconnected. I disconnected that  | 09:08:25 |
| 10 | so that my landline can't ring during the        | 09:08:28 |
| 11 | deposition and interrupt us.                     | 09:08:32 |
| 12 | Q And do you have any folders saved on your      | 09:08:33 |
| 13 | computer with documents specific for today's     | 09:08:36 |
| 14 | deposition?                                      | 09:08:37 |
| 15 | A I don't have any to open. I have paper         | 09:08:39 |
| 16 | copies of the relevant documents to make this    | 09:08:41 |
| 17 | easier to handle.                                | 09:08:43 |
| 18 | Q You beat me to my next question.               | 09:08:44 |
| 19 | What documents do you have in paper copy         | 09:08:47 |
| 20 | with you?                                        | 09:08:49 |
| 21 | A I have my declaration. I have -- excuse        | 09:08:51 |
| 22 | me -- the exhibits. And I have copies of the     | 09:08:57 |

1 petition and your POP in paper copies around me.

09:08:59

2 There're clean copies, by the way.

09:09:11

3 Q Was the last thing you said the patent  
4 owner preliminary response?

09:09:14

09:09:16

5 A Yes. Sorry, I gave the initials. I have  
6 the patent owner preliminary response in a paper  
7 copy, along with the petition.

09:09:18

09:09:19

09:09:22

8 Q Great. And we'll put things on the  
9 screen for you if helpful, but feel free to use  
10 the paper copies.

09:09:23

09:09:26

09:09:28

11 Before we move on from that, are these  
12 all clean copies, or are any of them marked up in  
13 any way?

09:09:29

09:09:31

09:09:34

14 A Yes, they're all clean copies, as I said  
15 a moment ago.

09:09:34

09:09:36

16 Q And during today's session I'll just ask  
17 that you not communicate with anyone else on your  
18 computer. And if someone tries to communicate  
19 with you, if you could just let us know, for the  
20 record.

09:09:37

09:09:40

09:09:42

09:09:44

09:09:46

21 A I'll just ignore e-mails and everything  
22 until we're finished, is my usual policy.

09:09:48

09:09:50

|    |   |                                                    |          |
|----|---|----------------------------------------------------|----------|
| 1  | Q | And you understand that you're to answer           | 09:09:52 |
| 2  |   | truthfully and fully today as if you were in court | 09:09:56 |
| 3  |   | or in an administrative hearing?                   | 09:09:58 |
| 4  | A | Yes, I understand that.                            | 09:10:00 |
| 5  | Q | Is there any reason that you cannot give           | 09:10:01 |
| 6  |   | full and accurate testimony today?                 | 09:10:04 |
| 7  | A | Not that I'm aware of. I feel fine                 | 09:10:07 |
| 8  |   | today.                                             | 09:10:09 |
| 9  | Q | What did you do to prepare for today's             | 09:10:09 |
| 10 |   | deposition?                                        | 09:10:12 |
| 11 | A | I reviewed my materials, and I had a               | 09:10:14 |
| 12 |   | couple of meetings with counsel.                   | 09:10:16 |
| 13 | Q | How many meetings with counsel did you             | 09:10:18 |
| 14 |   | have?                                              | 09:10:22 |
| 15 | A | Two half-day meetings.                             | 09:10:23 |
| 16 | Q | And do you remember who attended those             | 09:10:25 |
| 17 |   | meetings?                                          | 09:10:33 |
| 18 | A | Mr. Jensen and Mr. Hsu.                            | 09:10:33 |
| 19 | Q | Anyone else?                                       | 09:10:35 |
| 20 | A | No.                                                | 09:10:36 |
| 21 | Q | And I think you mentioned that you also            | 09:10:36 |
| 22 |   | reviewed materials. Which materials did you        | 09:10:40 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | review?                                           | 09:10:42 |
| 2  | A The materials I just stated; mainly my --       | 09:10:42 |
| 3  | of course my declaration, which was filed on I    | 09:10:46 |
| 4  | believe June 9 of last year.                      | 09:10:50 |
| 5  | Q And did you speak with anyone other than        | 09:10:51 |
| 6  | counsel to prepare for today's deposition?        | 09:10:59 |
| 7  | A No, I did not.                                  | 09:11:00 |
| 8  | Q I'd like to start out with Exhibit 1003,        | 09:11:01 |
| 9  | which is your declaration.                        | 09:11:12 |
| 10 | MR. FRISCH: And if we could have that             | 09:11:17 |
| 11 | uploaded to chat as well for folks.               | 09:11:19 |
| 12 | (Exhibit 1003, previously marked, not             | 09:11:19 |
| 13 | attached.)                                        | 09:11:19 |
| 14 | A And I do have the paper copy next to me         | 09:11:21 |
| 15 | here.                                             | 09:11:23 |
| 16 | Q Sure. And like I said, feel free to use         | 09:11:23 |
| 17 | the paper copy or, you know, what's on the screen | 09:11:25 |
| 18 | or both, whatever is most convenient for you.     | 09:11:27 |
| 19 | (Discussion off the record with the A/V           | 09:11:43 |
| 20 | technician.)                                      | 09:11:46 |
| 21 | Q Dr. Foty, I'm sure you're aware that if         | 09:12:09 |
| 22 | you need or if it would be helpful we of course   | 09:12:11 |

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | can give you control over what's on the screen.  | 09:12:14 |
| 2  | A I appreciate the heads up. That's why,         | 09:12:18 |
| 3  | again, the paper copies hopefully will suffice.  | 09:12:20 |
| 4  | But if I think I need to do something, I'll ask  | 09:12:24 |
| 5  | for control with the screen.                     | 09:12:26 |
| 6  | Q Sure. And my first question for you is         | 09:12:27 |
| 7  | just to confirm, Exhibit 1003, that's your       | 09:12:30 |
| 8  | declaration. Right?                              | 09:12:32 |
| 9  | A Looking at the cover page, this appears        | 09:12:35 |
| 10 | to be the cover page of my declaration, which is | 09:12:36 |
| 11 | Exhibit 1003, it does, yes.                      | 09:12:39 |
| 12 | Q And if we can turn to Page 201 of your         | 09:12:41 |
| 13 | declaration. 201 is the last page of your        | 09:12:45 |
| 14 | declaration, and it includes your signature.     | 09:12:56 |
| 15 | Correct?                                         | 09:12:58 |
| 16 | A It does in both what I see on the screen       | 09:12:59 |
| 17 | and in my paper copy.                            | 09:13:01 |
| 18 | Q And it says here it was executed the 9th       | 09:13:02 |
| 19 | day of June, 2023.                               | 09:13:08 |
| 20 | Is that consistent with your memory, that        | 09:13:09 |
| 21 | you signed it on that day?                       | 09:13:11 |
| 22 | A Yes, that's consistent with my memory.         | 09:13:13 |

|    |   |                                                  |          |
|----|---|--------------------------------------------------|----------|
| 1  | Q | And is that when you finished work on            | 09:13:18 |
| 2  |   | your declaration?                                | 09:13:21 |
| 3  | A | That's when we finished it up, and it was        | 09:13:21 |
| 4  |   | filed on that date.                              | 09:13:23 |
| 5  | Q | When did you start working on your               | 09:13:24 |
| 6  |   | declaration?                                     | 09:13:27 |
| 7  | A | That's a ways back, but probably about a         | 09:13:30 |
| 8  |   | month earlier. Early May. But I'd have to go     | 09:13:32 |
| 9  |   | check my records. I didn't check that as part of | 09:13:36 |
| 10 |   | getting ready for today.                         | 09:13:38 |
| 11 | Q | When were you first hired for work in            | 09:13:40 |
| 12 |   | this proceeding?                                 | 09:13:42 |
| 13 | A | I believe I was contacted in March of            | 09:13:47 |
| 14 |   | last year, and I was retained in either March or | 09:13:50 |
| 15 |   | April. Again, I would have to go check my        | 09:13:52 |
| 16 |   | records.                                         | 09:13:56 |
| 17 | Q | Did you write your declaration?                  | 09:13:57 |
| 18 | A | Yes, I did.                                      | 09:13:59 |
| 19 | Q | Did anyone else help you write your              | 09:14:00 |
| 20 |   | declaration?                                     | 09:14:03 |
| 21 | A | Mr. Travis and I exchanged drafts and            | 09:14:05 |
| 22 |   | worked together on it, but I wrote the           | 09:14:08 |

1 declaration.

09:14:11

2 Q Were there any portions that were written  
3 by counsel?

09:14:11

09:14:13

4 A I received considerable help on the legal  
5 background, obviously, since I'm not an attorney.  
6 So I got considerable help with that. But I wrote  
7 all of the -- certainly I wrote all of the  
8 analysis and the technical background and all the  
9 other sections that are the engineering sections.

09:14:17

09:14:20

09:14:23

09:14:26

09:14:28

09:14:30

10 Q Beyond the legal standards section, are  
11 there any other sections that you received  
12 considerable help for?

09:14:34

09:14:37

09:14:40

13 A I received help everywhere, of course, as  
14 we do. But I wrote this declaration, and it's my  
15 declaration.

09:14:42

09:14:44

09:14:47

16 Q How much time did you spend working on  
17 the declaration?

09:14:47

09:14:50

18 A Again, I'd have to go check my records,  
19 but it was -- this is a long declaration, and it  
20 was a considerable amount of work. I would say  
21 probably -- it wouldn't surprise me if it was  
22 something on the order of 100 hours, 80 to 100

09:14:53

09:14:55

09:14:58

09:15:02

09:15:05

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | hours.                                           | 09:15:09 |
| 2  | Q If we go to the next page of the               | 09:15:09 |
| 3  | document, Page 202, there's an Appendix A there. | 09:15:14 |
| 4  | Correct?                                         | 09:15:18 |
| 5  | A The paper copy I have actually does have       | 09:15:21 |
| 6  | an appendix as well. So, yes, it's part of the   | 09:15:23 |
| 7  | same exhibit. Yes.                               | 09:15:27 |
| 8  | Q And Appendix A is a copy of your CV?           | 09:15:28 |
| 9  | A It was a copy of my CV at the time, yes.       | 09:15:32 |
| 10 | Q And it was an accurate copy of your CV at      | 09:15:34 |
| 11 | the time that you signed your declaration?       | 09:15:37 |
| 12 | A I believe so, yes.                             | 09:15:38 |
| 13 | Q And your CV lists your education and           | 09:15:39 |
| 14 | professional experience. Right?                  | 09:15:50 |
| 15 | A Among other things, yes.                       | 09:15:51 |
| 16 | Q Are there any errors in your CV, the one       | 09:15:52 |
| 17 | that you provided with your declaration, that    | 09:15:54 |
| 18 | you're aware of?                                 | 09:15:55 |
| 19 | A There may be the usual typos, but I'm not      | 09:15:56 |
| 20 | aware of any errors of any sort.                 | 09:15:58 |
| 21 | Q Are there any additions to your CV since       | 09:16:01 |
| 22 | you submitted it in connection with your         | 09:16:03 |

1 declaration?

09:16:06

2 A I have an updated CV from later last year  
3 simply because I was retained in some other  
4 matters not involving this, not this matter but  
5 some other matters.

09:16:07

09:16:10

09:16:13

09:16:16

6 Q So there are additional litigation  
7 consulting matters since then. Anything else?

09:16:17

09:16:19

8 A That's basically what it is, it's just  
9 the additional litigation consulting matters that  
10 I needed to add to it.

09:16:23

09:16:25

09:16:28

11 Q What is your current position?

09:16:29

12 A My main position is I run my little  
13 consulting firm, Gilgamesh Associates, LLC. And  
14 in recent years, past ten years or so, it's  
15 basically been litigation support. I've been very  
16 busy in that space.

09:16:33

09:16:35

09:16:40

09:16:42

09:16:45

17 Q So Gilgamesh Associates, that's a  
18 litigation consulting company?

09:16:46

09:16:50

19 A That's what it is nowadays, yes.

09:16:52

20 Q Was it previously anybody else?

09:16:53

21 A Twenty-five years ago it was involved  
22 with process design kits for fabless companies and

09:17:00

09:17:02

1 foundries, but that's been -- that was a long time 09:17:07  
2 ago. I didn't rebrand the company or anything; I 09:17:09  
3 just let it evolve. 09:17:12

4 Q Got it. And did that evolution take 09:17:14  
5 place about 25 years ago? Is that when you 09:17:16  
6 switched over to more litigation consulting? 09:17:18

7 A It wasn't an abrupt change. I started 09:17:20  
8 doing litigation consulting around 2002 and it 09:17:23  
9 just gradually took over. It just grew and grew 09:17:26  
10 and grew until it basically took over the company, 09:17:29  
11 per se. 09:17:32

12 Q And is litigation consulting primarily 09:17:33  
13 what you do now through Gilgamesh Associates? 09:17:36

14 A Through Gilgamesh Associates, yes. 09:17:39

15 Q And how long, as part of Gilgamesh 09:17:42  
16 Associates, has it been primarily litigation 09:17:44  
17 consulting? 09:17:46

18 A More than ten years, maybe 15. I'd have 09:17:50  
19 to go again check. 09:17:52

20 Q And in what percentage of your time would 09:17:53  
21 you say you spend on litigation consulting as part 09:18:01  
22 of your role at Gilgamesh Associates? 09:18:04

|    |   |                                                  |          |
|----|---|--------------------------------------------------|----------|
| 1  | A | Confined just to Gilgamesh Associates?           | 09:18:07 |
| 2  | Q | Yes.                                             | 09:18:10 |
| 3  | A | Okay. Gilgamesh Associates, the time I           | 09:18:11 |
| 4  |   | spend in Gilgamesh Associates is -- nowadays is  | 09:18:13 |
| 5  |   | 100 percent litigation support.                  | 09:18:15 |
| 6  | Q | And similar to my earlier question, but          | 09:18:17 |
| 7  |   | how long would you say it's been about 100       | 09:18:20 |
| 8  |   | percent?                                         | 09:18:23 |
| 9  | A | Confined to Gilgamesh Associates, I would        | 09:18:24 |
| 10 |   | say, you know, at least ten years, maybe 15.     | 09:18:26 |
| 11 | Q | And do you have roles outside of                 | 09:18:28 |
| 12 |   | Gilgamesh Associates?                            | 09:18:35 |
| 13 | A | I have roles in the sense that I manage          | 09:18:37 |
| 14 |   | my investments. And I also have a small aviation | 09:18:42 |
| 15 |   | company because of my flying activities that are | 09:18:46 |
| 16 |   | segregated in an LLC for that purpose.           | 09:18:48 |
| 17 | Q | Have you consulted in your career on             | 09:18:55 |
| 18 |   | engineering products besides for litigation?     | 09:19:00 |
| 19 | A | Sorry, what was that last part?                  | 09:19:04 |
| 20 | Q | Outside of your consulting for                   | 09:19:05 |
| 21 |   | litigation, have you consulted on engineering    | 09:19:08 |
| 22 |   | products?                                        | 09:19:10 |

|    |   |                                                    |          |
|----|---|----------------------------------------------------|----------|
| 1  | A | Yes, I have in the past.                           | 09:19:12 |
| 2  | Q | And when was the last time you did that?           | 09:19:14 |
| 3  | A | Again, maybe ten, 15 years ago.                    | 09:19:21 |
| 4  | Q | I would like to look quickly at Paper 1,           | 09:19:23 |
| 5  |   | which is the petition for inter partes review. I   | 09:19:29 |
| 6  |   | think you said you have a paper copy of that, but  | 09:19:32 |
| 7  |   | we'll put a copy in chat and bring it up on the    | 09:19:34 |
| 8  |   | screen as well.                                    | 09:19:37 |
| 9  | A | This is the petition, just to clarify,             | 09:19:47 |
| 10 |   | make sure I have the right document?               | 09:19:48 |
| 11 | Q | The petition, correct.                             | 09:19:50 |
| 12 | A | I have my paper copy in front of me now.           | 09:19:51 |
| 13 | Q | And have you reviewed the petition itself          | 09:19:53 |
| 14 |   | prior to today's deposition?                       | 09:20:15 |
| 15 | A | I did not review it in preparation for             | 09:20:18 |
| 16 |   | the deposition. I had reviewed this back at some   | 09:20:20 |
| 17 |   | point when we were preparing my declaration months | 09:20:23 |
| 18 |   | ago.                                               | 09:20:26 |
| 19 | Q | And do you remember if you reviewed the            | 09:20:27 |
| 20 |   | petition prior to working on your declaration?     | 09:20:30 |
| 21 | A | I probably reviewed a draft, because,              | 09:20:36 |
| 22 |   | obviously, the petition and the declaration were   | 09:20:38 |

1 finished simultaneously. So I probably reviewed a 09:20:40  
2 draft of the petition before I -- as I began to 09:20:43  
3 work on my declaration, as I worked on. 09:20:46

4 Q Did you, yourself, draft or edit any 09:20:51  
5 parts of the petition? 09:20:53

6 A The petition was edited by counsel. They 09:20:57  
7 might have used some of my writing because if they 09:21:00  
8 liked it, they might have included it. 09:21:03

9 Q And do you remember prior to today did 09:21:05  
10 you ever review a final copy of the petition? 09:21:13

11 A I might have reviewed it again as a 09:21:14  
12 sanity check before it was filed. But I did not 09:21:18  
13 review it recently. 09:21:20

14 Q But you reviewed drafts of the petition 09:21:21  
15 as well? 09:21:23

16 A I believe that I did. We're talking last 09:21:25  
17 May, so it's, you know, nine months ago. 09:21:28

18 Q And do you remember seeing drafts where 09:21:30  
19 there were changes that had been made from, you 09:21:37  
20 know, the previous draft that you had seen? 09:21:39

21 A It's possible. I don't have specific 09:21:44  
22 recollections of any red lines or what they were. 09:21:46

1 Again, it was nine months ago.

09:21:50

2 Q And were there particular portions of the  
3 petition or the drafts of the petition that you  
4 focused on?

09:21:52

09:21:54

09:21:56

5 A I don't recall any specifics. Again, it  
6 was just my main work was looking at the reference  
7 involved and writing my -- writing up my opinions  
8 and my analysis and conclusions.

09:22:00

09:22:03

09:22:06

09:22:09

9 Q Let's switch back to your declaration,  
10 Exhibit 1003.

09:22:11

09:22:16

11 A I have that back on my desk again.

09:22:32

12 Q And you're being compensated for your  
13 work in this proceeding at an hourly rate of \$425.

09:22:33

09:22:36

14 Right?

09:22:39

15 A Yes, I'm being compensated at that rate.  
16 I was retained for this matter through the agency  
17 Teklicon that does these kinds of things. And so  
18 the rate goes through them, of course, they have  
19 their markup.

09:22:39

09:22:41

09:22:44

09:22:48

09:22:51

20 Q Is that your standard consulting rate  
21 through Teklicon?

09:22:52

09:22:55

22 A It was back then. It's a little higher

09:22:57

1 now, but that was my rate at the time through --

09:22:59

2 that was my agency rate, shall we say.

09:23:02

3 Q And do you understand that there are four  
4 petitioners in this proceeding?

09:23:04

09:23:07

5 A I understand there are multiple  
6 petitioners as listed on the title page of my  
7 declaration.

09:23:11

09:23:13

09:23:15

8 Q Right. And, actually, let's go to the  
9 title page of your declaration.

09:23:16

09:23:18

10 And so as we look at here, these are the  
11 petitioners that you've listed, right, Mianyang  
12 BOE, TCL, Tianma, and Visionix. Right?

09:23:28

09:23:30

09:23:35

13 A Yes, my understanding those are the  
14 parties.

09:23:40

09:23:41

15 Q Were you hired by all four petitioners?

09:23:42

16 A I'm not exactly sure how all these pieces  
17 go together because there's been so many parts of  
18 this. But I know that I was hired as through BOE.  
19 I'm not exactly sure how these other pieces fit  
20 together right now.

09:23:51

09:23:53

09:23:56

09:24:01

09:24:05

21 Q Do you know who of these four entities is  
22 paying for your services?

09:24:05

09:24:09

|    |   |                                                    |          |
|----|---|----------------------------------------------------|----------|
| 1  | A | I believe BOE is paying for the services.          | 09:24:12 |
| 2  | Q | Do you know if any of the others, TCL,             | 09:24:14 |
| 3  |   | Tianma, or Visionox, are paying for your services? | 09:24:18 |
| 4  |   | MR. HSU: Objection. Scope.                         | 09:24:21 |
| 5  |   | THE WITNESS: Sorry, Hans, I didn't hear            | 09:24:26 |
| 6  |   | that.                                              | 09:24:28 |
| 7  |   | MR. HSU: Objection. Scope.                         | 09:24:28 |
| 8  | A | Okay. I invoice Teklicon, and Teklicon             | 09:24:30 |
| 9  |   | invoices the law firm, and the law firm invoices   | 09:24:34 |
| 10 |   | the parties. So I believe those have been all      | 09:24:37 |
| 11 |   | going to BOE, but I don't know for a hundred       | 09:24:40 |
| 12 |   | percent sure. And again, there's been, you know,   | 09:24:42 |
| 13 |   | several different threads of this matter.          | 09:24:44 |
| 14 | Q | As part of this proceeding, have you had           | 09:24:46 |
| 15 |   | any contact with TCL?                              | 09:24:49 |
| 16 | A | No, I have not.                                    | 09:24:52 |
| 17 | Q | As part of this proceeding, have you had           | 09:24:52 |
| 18 |   | any contact with Tianma?                           | 09:24:55 |
| 19 | A | No, I have not.                                    | 09:24:58 |
| 20 | Q | As part of this proceeding, have you had           | 09:24:59 |
| 21 |   | any contact with Visionox?                         | 09:25:02 |
| 22 | A | No, I have not.                                    | 09:25:03 |

|    |   |                                                   |          |
|----|---|---------------------------------------------------|----------|
| 1  | Q | And as part of this proceeding, this              | 09:25:04 |
| 2  |   | particular IPR proceeding, have you had any       | 09:25:13 |
| 3  |   | discussion with anyone at BOE?                    | 09:25:14 |
| 4  | A | As part of this proceeding, no.                   | 09:25:20 |
| 5  | Q | Can we go to Page 9 of your declaration.          | 09:25:21 |
| 6  |   | There's a Section 4 that starts on Page 9         | 09:25:29 |
| 7  |   | that says Materials Considered.                   | 09:25:35 |
| 8  |   | Am I correct that this section outlines           | 09:25:38 |
| 9  |   | the materials that you considered in preparing    | 09:25:42 |
| 10 |   | your declaration?                                 | 09:25:44 |
| 11 | A | I believe that's a complete list, yes.            | 09:25:52 |
| 12 |   | And they're all exhibits which were provided as   | 09:25:54 |
| 13 |   | well.                                             | 09:25:58 |
| 14 | Q | So you're not aware of any other                  | 09:25:58 |
| 15 |   | documents that you considered in connection with  | 09:26:00 |
| 16 |   | your declaration that are not listed here. Right? | 09:26:02 |
| 17 |   | MR. HSU: Objection. Form.                         | 09:26:04 |
| 18 | A | Not --                                            | 09:26:05 |
| 19 |   | THE WITNESS: Sorry, Hans, do you want to          | 09:26:05 |
| 20 |   | do that again?                                    | 09:26:07 |
| 21 |   | MR. HSU: Objection. Form.                         | 09:26:08 |
| 22 | A | My understanding -- well, these are the           | 09:26:11 |

1 documents I considered. Beyond these documents,  
2 it was my knowledge and experience in the field.

3 Q And the second exhibit listed here is  
4 U.S. Patent Publication 2003/0132931, that you  
5 have listed as Kimura. Right?

6 A That is correct. That particular patent  
7 publication is referred to throughout the document  
8 as Kimura.

9 Q Now, did you location Kimura, or was  
10 Kimura given to you by counsel?

11 A Counsel located Kimura.

12 Q As part of your work in this proceeding,  
13 did you carry out your own prior art search?

14 A I did some of my own prior art search as  
15 part of this, yes.

16 Q Were any of the exhibits that you list in  
17 your materials considered items that you found, as  
18 opposed to items that were provided to you by  
19 counsel?

20 A With the caveat that some of these names  
21 in the exhibit lists are a little bit terse, when  
22 I look at U.S. patent publication with a number, I

1 may not be sure what it is. But I can tell you 09:27:24  
2 that I found Exhibit 1008, the textbook. I found 09:27:26  
3 Exhibit 1009, which is the old Shichman and Hodges 09:27:33  
4 paper. I found Exhibit 1010, which is the late 09:27:38  
5 Andy Groves 1967 book on semiconductor technology. 09:27:43  
6 I found Exhibit 1011, which is the third edition 09:27:48  
7 of Kang and Leblebici. I'm looking at Exhibit 09:27:53  
8 1012, I'm not sure what patent that is. I found 09:28:00  
9 Exhibit 1013, though. That's a patent on 09:28:04  
10 temperature compensation. And I think those are 09:28:07  
11 certainly at least ones that I found. 09:28:11

12 Q Thank you. Let's take a look at Exhibit 09:28:16  
13 1002, Kimura. 09:28:19

14 (Exhibit 1002, previously marked, not 09:28:19  
15 attached.) 09:28:19

16 Q And is it okay if I call Exhibit 1002 09:28:28  
17 Kimura? I assume you know what I'm talking about 09:28:31  
18 when I use that? 09:28:33

19 A Yes. Just with the caution that there is 09:28:34  
20 another exhibit which is Kimura which is a 09:28:36  
21 different Kimura. And that one is Kimura 798. So 09:28:39  
22 if we discuss I believe it's Exhibit 1004, we'll 09:28:41

|    |                                                    |          |
|----|----------------------------------------------------|----------|
| 1  | just have to be very careful to call that Kimura   | 09:28:46 |
| 2  | 798.                                               | 09:28:51 |
| 3  | Q Sure.                                            | 09:28:52 |
| 4  | A As long as we do that we'll be okay,             | 09:28:52 |
| 5  | we'll keep ourselves out of trouble.               | 09:28:54 |
| 6  | Q I will try to make sure to use that              | 09:28:55 |
| 7  | distinction, if we talk about Exhibit 1004. And I  | 09:28:58 |
| 8  | would appreciate it if you would do the same, like | 09:29:01 |
| 9  | you said, to make sure the record is clear here.   | 09:29:04 |
| 10 | A It is a different -- by the way, if you          | 09:29:06 |
| 11 | look at the names, it's a different man, it's a    | 09:29:08 |
| 12 | different gentleman. It has a different first      | 09:29:10 |
| 13 | name on it.                                        | 09:29:12 |
| 14 | Q So the Kimura who is involved with               | 09:29:13 |
| 15 | Exhibit 1002 is a different Kimura than the Kimura | 09:29:14 |
| 16 | that's involved with Exhibit 1004?                 | 09:29:18 |
| 17 | A Unless he changed his name, it -- there's        | 09:29:20 |
| 18 | a different first name for the two gentlemen, so I | 09:29:24 |
| 19 | assume they're different. I don't know if they're  | 09:29:27 |
| 20 | related, but we just have to be careful when this  | 09:29:29 |
| 21 | happens.                                           | 09:29:32 |
| 22 | Q And Exhibit 1002, that is the Kimura             | 09:29:32 |

1 reference that you primarily rely on in your  
2 declaration. Right?

3 A Looking at this and comparing it with my  
4 paper copy, this appears to be the first page of  
5 Kimura, what we're calling Kimura.

6 Q And if we go back to your declaration for  
7 a moment, and we go to Page 18. On Page 18 in  
8 Section 6 you provide a summary of opinions.

9 Right?

10 A Yes, a brief summary.

11 Q And according to the summary of opinions,  
12 you were asked to compare the Kimura reference  
13 that we were just looking at to Claims 1 through  
14 18 of the '599 patent. Right?

15 A Yes, that's correct.

16 Q And who asked you to do that?

17 A Counsel for the petitioner.

18 Q What was your understanding of the  
19 analysis that was being requested from you?

20 A I believe that's summarized in my  
21 declaration in the legal standards sections. It  
22 was evaluating the patentability or

1 unpatentability of the claims of the '599 patent  
2 based on this prior art reference. And the  
3 standards were set up for what are -- what is  
4 required by the law to demonstrate on  
5 patentability.

6 Q If we switch back to Kimura. And I  
7 apologize, there's probably going to be a lot of  
8 going back and forth between your declaration and  
9 Kimura. So if you have those both handy and have  
10 the ability to put them near one another, it's  
11 probably a good idea.

12 A Thank you for that heads up. I'll pull  
13 out the other arm on the other side of me so I  
14 have -- to my left I have my declaration, to my  
15 right I have Kimura. And unless, of course, the  
16 cat comes and knocks everything over.

17 Q Okay. We'll proceed until then.

18 Kimura is an 85-page patent publication.

19 Correct?

20 A You have the soft copy up, and it says  
21 85. I was going to say that's at least close, but  
22 it appears to be precisely 85 pages, yes. It's a

1 big one.

09:31:52

2 Q Do you know who the assignee is for the  
3 Kimura publication?

09:31:53

09:31:57

4 A I did at some point because my  
5 understanding is that this did actually end up  
6 issuing as a patent at some point. And so the  
7 assignee was listed on the patent. I've  
8 forgotten. That was sometime last summer I did  
9 look that up. I was curious about who it was  
10 assigned to.

09:32:01

09:32:03

09:32:06

09:32:10

09:32:13

09:32:16

09:32:18

11 Q My understanding is it's assigned to  
12 Semiconductor Energy Laboratory Company.

09:32:19

09:32:21

13 Does that sound familiar to you?

09:32:22

14 A Of course if I wanted to be a hundred  
15 percent sure, I would have to go check. But that  
16 does sound familiar. My recollection was that it  
17 was a laboratory, not a named Japanese electronics  
18 company.

09:32:26

09:32:27

09:32:30

09:32:32

09:32:37

19 Q And are you familiar with Semiconductor  
20 Energy Laboratory Company?

09:32:38

09:32:40

21 A No, I am not.

09:32:42

22 Q Now, if we go to Paragraph 392 of Kimura,

09:32:43

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | which is on Page 11 of Kimura, although it's not | 09:33:00 |
| 2  | the -- it's not PDF Page 11, it's the Page 11.   | 09:33:03 |
| 3  | A Oh, you're referring to the number at the      | 09:33:08 |
| 4  | top when you say page number?                    | 09:33:10 |
| 5  | Q Yes.                                           | 09:33:12 |
| 6  | A Okay. I'm sorry, I'm at Page 392 of            | 09:33:12 |
| 7  | the -- of the text, the specification.           | 09:33:31 |
| 8  | Q Paragraph 392, correct.                        | 09:33:33 |
| 9  | A It's the -- it's on Page 11. There is a        | 09:33:35 |
| 10 | 392 numbered paragraph. I assume that's what you | 09:33:38 |
| 11 | mean.                                            | 09:33:40 |
| 12 | Q Yes. And there it says, Embodiment Modes       | 09:33:41 |
| 13 | of the Invention?                                | 09:33:43 |
| 14 | A Yes. And then it kicks off Embodiment          | 09:33:48 |
| 15 | Mode 1 in the next paragraph.                    | 09:33:50 |
| 16 | Q And if we move forward to Paragraph 473,       | 09:33:52 |
| 17 | which is on Page 18.                             | 09:34:00 |
| 18 | A 473 says Embodiments, and then it begins       | 09:34:14 |
| 19 | a walkthrough of embodiments from there.         | 09:34:17 |
| 20 | Q That's right. And so one of the things         | 09:34:20 |
| 21 | I'm trying to understand is, if you look at the  | 09:34:23 |
| 22 | previous page at 471, we have the last of the    | 09:34:25 |

1       embodiment modes, Embodiment Mode 11. And then       09:34:28  
2       when we get to Paragraph 473, we have the first of       09:34:31  
3       the embodiments.       09:34:37

4               What is the difference in Kimura between       09:34:39  
5       an embodiment mode and an embodiment?       09:34:40

6               A       I'm not exactly sure. I simply       09:34:54  
7       considered the embodiments in Kimura that were of       09:34:56  
8       interest to my work. I didn't tackle that issue.       09:34:58

9               Q       So did you consider all of the       09:35:02  
10       embodiments and embodiment modes in preparing your       09:35:07  
11       declaration?       09:35:10

12              A       I considered everything and focused on       09:35:12  
13       the embodiments that were of relevance to       09:35:14  
14       comparison with the '599 patent.       09:35:17

15              Q       And can you explain what you mean when       09:35:19  
16       you say "focused on the embodiments that were of       09:35:25  
17       relevance to comparison with the '599 patent"?       09:35:27

18              A       As per my declaration, there were       09:35:32  
19       particular embodiments that were -- essentially       09:35:34  
20       disclosed the same things as the '599 patent did.       09:35:40  
21       Kimura has numerous embodiments. Some of them       09:35:43  
22       were useful for that analysis; others were just       09:35:45

1 simply not useful for that.

09:35:48

2 Q And so were you starting with the claimed  
3 circuit of the '599 patent and then looking for  
4 which of the embodiments of Kimura you thought  
5 most closely resembled that?

09:35:52

09:36:00

09:36:03

09:36:06

6 MR. HSU: Object to form.

09:36:11

7 A No.

09:36:13

8 THE WITNESS: Sorry. Sorry, Hans. Go  
9 ahead.

09:36:14

09:36:17

10 MR. HSU: Objection. Form.

09:36:17

11 A That would be a relatively fair  
12 assessment. There is -- Kimura is not a single  
13 embodiment. Kimura is numerous embodiments; and  
14 therefore I studied the various embodiments and  
15 compared them to '599. And some were of more  
16 relevance to others, as I said a moment ago.

09:36:18

09:36:20

09:36:23

09:36:26

09:36:29

09:36:32

17 Q But you read all of Kimura in preparation  
18 of your declaration?

09:36:34

09:36:38

19 A At some point I did. It was a long time  
20 ago. Obviously once I found the pieces of  
21 interest, I paid little attention to the other  
22 pieces.

09:36:41

09:36:43

09:36:46

09:36:48

1 Q Did you consider the embodiment of Kimura  
2 shown in Figure 1 when preparing your declaration?

3 A I might have just considered it in my  
4 original scan, but I found it was not -- not a  
5 useful embodiment for my analysis, so I didn't  
6 provide any -- I didn't study it any further.

7 Q And why was it not useful?

8 A Again, I'd have to go -- you know, it's a  
9 long time ago. But some of these embodiments  
10 don't disclose what's in '599, and others do. So,  
11 obviously, I focused on the embodiments that  
12 disclosed '599 claims.

13 Q So you focused on the embodiments that  
14 you thought disclosed the '599 claims, and then  
15 you ignored the other embodiments?

16 A I wouldn't say I ignored them. But I  
17 just -- since Kimura had numerous embodiments,  
18 obviously this -- I analyzed and charted this,  
19 were the embodiments that in my opinion and  
20 conclusion disclosed the claims of the '599  
21 patent.

22 Q If we look at Paragraph 307 of Kimura,

09:36:49

09:37:01

09:37:03

09:37:27

09:37:30

09:37:33

09:37:35

09:37:40

09:37:43

09:37:45

09:37:48

09:37:51

09:37:55

09:37:56

09:37:59

09:38:04

09:38:06

09:38:09

09:38:13

09:38:15

09:38:17

09:38:17

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | that's on Page 8.                                 | 09:38:23 |
| 2  | A Yeah, sorry. I have that in front of me         | 09:38:35 |
| 3  | now.                                              | 09:38:37 |
| 4  | Q Great. Thank you.                               | 09:38:37 |
| 5  | And there it says Figures 1A and 1B are           | 09:38:38 |
| 6  | diagrams showing the embodiment mode of the       | 09:38:43 |
| 7  | present invention. Right?                         | 09:38:44 |
| 8  | A Yes, it says that.                              | 09:38:46 |
| 9  | Q So these are the figures that go to one         | 09:38:46 |
| 10 | of the embodiment modes, as opposed to one of the | 09:38:48 |
| 11 | embodiments that we discussed?                    | 09:38:51 |
| 12 | A That's what it says. It says "embodiment        | 09:38:55 |
| 13 | mode" in that paragraph.                          | 09:38:57 |
| 14 | Q And if we take a look at the actual             | 09:38:59 |
| 15 | figure itself, if we turn to Figure 1, if you can | 09:39:04 |
| 16 | let me know when you're there.                    | 09:39:09 |
| 17 | A I have Figure 1, which is Figure 1A and         | 09:39:12 |
| 18 | 1B, of course.                                    | 09:39:14 |
| 19 | Q And Figure 1A is a circuit diagram for a        | 09:39:15 |
| 20 | pixel circuit. Right?                             | 09:39:18 |
| 21 | A It's one of the ones Kimura discloses or        | 09:39:22 |
| 22 | provides, yes.                                    | 09:39:24 |

1 Q And does Figure 1, does the circuit in 09:39:25  
2 that figure -- or let me be more precise. 09:39:30

3 Does the circuit in Figure 1A compensate 09:39:33  
4 for threshold voltage deviations? 09:39:37

5 A The biggest problem I have is that I 09:39:49  
6 didn't really analyze that embodiment. It's not 09:39:51  
7 in my declaration, obviously. I'd have to go 09:39:54  
8 check. 09:39:55

9 It appears that it's designed to do so, 09:39:56  
10 but I can't confirm that without actually going 09:39:58  
11 and analyzing that embodiment. I didn't analyze 09:40:00  
12 it during the preparation of my declaration. 09:40:03

13 Q Okay. Well, looking at Figure 1A, it 09:40:06  
14 uses four transistors. Right? 09:40:09

15 A This particular embodiment appears to use 09:40:15  
16 four transistors, yes. 09:40:17

17 Q And the figure that you have focused on, 09:40:23  
18 Figure 33, the circuit in that figure uses five 09:40:26  
19 transistors. Right? 09:40:29

20 A I just wanted to look to confirm that. 09:40:37  
21 That was my understanding. And, yes, the Figure 3 09:40:39  
22 embodiment contains five transistors as drawn. 09:40:43

|    |   |                                                    |          |
|----|---|----------------------------------------------------|----------|
| 1  | Q | I think you said Figure 3, but I presume           | 09:40:48 |
| 2  |   | you meant Figure 33?                               | 09:40:50 |
| 3  | A | I thought I said 33. Maybe I mumbled.              | 09:40:52 |
| 4  |   | But whatever it was, I meant Figure 33, double     | 09:40:55 |
| 5  |   | three. Three three.                                | 09:40:58 |
| 6  | Q | Would you agree with me that all else              | 09:41:00 |
| 7  |   | being equal, a person of ordinary skill in the art | 09:41:02 |
| 8  |   | would prefer to design a pixel circuit with less   | 09:41:04 |
| 9  |   | transistors?                                       | 09:41:08 |
| 10 |   | MR. HSU: Objection. Form.                          | 09:41:08 |
| 11 | A | I would not agree with that statement in           | 09:41:10 |
| 12 |   | general.                                           | 09:41:12 |
| 13 | Q | Using less transistors decreases                   | 09:41:14 |
| 14 |   | manufacturing variability. Correct?                | 09:41:23 |
| 15 | A | I would say it improves the simplicity,            | 09:41:24 |
| 16 |   | which has a number of advantages. But again,       | 09:41:30 |
| 17 |   | there's no right or wrong here. The basic          | 09:41:35 |
| 18 |   | engineering idea is there's tradeoffs. And I talk  | 09:41:37 |
| 19 |   | about that in my declaration.                      | 09:41:39 |
| 20 |   | So there are some advantages to having             | 09:41:40 |
| 21 |   | fewer transistors, and there's some disadvantages  | 09:41:43 |
| 22 |   | to having fewer transistors. And this is why       | 09:41:45 |

1 engineers get paid often, is to make the decision 09:41:48  
2 about how you optimize that tradeoff. So there's 09:41:51  
3 not a right or wrong. Sometimes it's better to 09:41:54  
4 have fewer, sometimes it's better to have more, as 09:41:56  
5 I actually did discuss in my declaration. 09:41:59

6 Q What are the advantages to having fewer 09:42:01  
7 transistors? 09:42:03

8 A The advantages to fewer transistors would 09:42:05  
9 be, you would have -- in this particular instance 09:42:09  
10 you would have less space taken up by the 09:42:12  
11 transistors. Since it's for an LED being used in 09:42:14  
12 a display, with fewer transistors you would have a 09:42:17  
13 better aperture ratio. There would also be some 09:42:22  
14 probably higher yield in manufacturing with fewer 09:42:27  
15 transistors. That's the benefits. But again, 09:42:30  
16 I'll reserve that there are downsides to having 09:42:33  
17 too few transistors, or too small a number of 09:42:37  
18 transistors, as it were. 09:42:40

19 Q Would having less transistors decrease 09:42:42  
20 the cost of manufacturing? 09:42:45

21 A It would decrease the cost in terms of 09:42:51  
22 the raw transistor numbers. If there are side 09:42:54

1 effects due to the circuit being less capable, it 09:42:58  
2 might increase the manufacturing cost because the 09:43:01  
3 overall yield of the entire pixel might decrease. 09:43:04

4 Again, these are tradeoffs. There's 09:43:09  
5 no -- this isn't a one-way street; there are 09:43:11  
6 tradeoffs. 09:43:14

7 Q Are there any other benefits, besides the 09:43:14  
8 ones you've already listed, that you can think of? 09:43:16

9 A I probably discuss some in my declaration 09:43:26  
10 somewhere, since I have a lot of familiarity with 09:43:30  
11 semiconductor manufacturing. If you want, I can 09:43:32  
12 go look for them. But I think the main themes 09:43:34  
13 we've already touched on, that fewer transistors 09:43:40  
14 means smaller area, lower cost, and again, the 09:43:44  
15 price you pay is you may not have enough 09:43:49  
16 transistors to do a particular functionality. So 09:43:52  
17 I think the key theme is it is a trade-off; it's 09:43:54  
18 not a one-way street. 09:43:57

19 Q But with respect to Figure 1A, you're not 09:44:03  
20 aware of the actual functionality of Figure 1A. 09:44:07  
21 Right? Because that's not one of the embodiments 09:44:10  
22 that you focused on? 09:44:12

1 MR. HSU: Objection. Misstates prior  
2 testimony.

3 A Well, as I said earlier, this is Kimura.  
4 It's a pixel-driving circuit. That we know. I  
5 see a capacitor of some sort there, 108. And so  
6 there is probably some form of threshold  
7 compensation. But again, I'm just looking at  
8 this, an embodiment I didn't study in great  
9 detail.

10 Q To your knowledge, have any of the  
11 circuits that are described in Kimura been  
12 implemented in commercial products?

13 MR. HSU: Objection. Foundation.

14 A I did not pursue that at all. I have no  
15 way of knowing that.

16 Well, let me correct that. I didn't  
17 pursue it. I have no way of knowing it from what  
18 I had in front of me, is what I meant. I didn't  
19 see any reason to pursue it, because that -- as  
20 far as I know, that's not a determining  
21 qualification for what we're doing here.

22 Q But sitting here today, you don't know

1 one way or the other whether any of the circuits  
2 have been commercialized?

3 A I do not know. And I did not even pursue  
4 that, so I don't -- I just don't know.

5 Q We can turn back to your declaration. IF  
6 we can go to Page 11. And specifically I'm  
7 looking at Section 5, Understanding of Law.

8 A What's on the screen is not my  
9 declaration. I believe that might be the  
10 petition.

11 There you go. Thank you. I was looking  
12 at it and it didn't match what was in front of me  
13 on paper. So what we have now is my declaration  
14 there. Now, yes, we now have Page 11 of my  
15 declaration in front of us.

16 Q And this is the legal standards section  
17 of your declaration?

18 A Yes, this is the legal standards with  
19 relevance to these, what we're doing here in these  
20 proceedings.

21 Q And you're not an attorney. Right?

22 A Fortunately, no.

|    |   |                                                    |          |
|----|---|----------------------------------------------------|----------|
| 1  | Q | And as you said, you had help with this            | 09:46:25 |
| 2  |   | section from counsel. Right?                       | 09:46:27 |
| 3  | A | Yes. And that's, again, standard                   | 09:46:30 |
| 4  |   | practice, having done this for a number of years.  | 09:46:32 |
| 5  | Q | If we move towards the end of this                 | 09:46:34 |
| 6  |   | section and go to Page 19. I apologize. Page 14,   | 09:46:38 |
| 7  |   | Paragraph 19.                                      | 09:46:50 |
| 8  | A | I'm there. And I have what's on the                | 09:47:01 |
| 9  |   | screen as well. They match up.                     | 09:47:02 |
| 10 | Q | Great. And in this paragraph you're                | 09:47:05 |
| 11 |   | discussing your understanding of the law regarding | 09:47:09 |
| 12 |   | secondary considerations. Right?                   | 09:47:12 |
| 13 | A | Yes, this paragraph summarizes my                  | 09:47:15 |
| 14 |   | understanding of secondary considerations.         | 09:47:18 |
| 15 | Q | But as you know, these are sometimes               | 09:47:22 |
| 16 |   | referred to as objective indicia of                | 09:47:25 |
| 17 |   | nonobviousness?                                    | 09:47:31 |
| 18 | A | Excuse me. Yes, my understanding is, per           | 09:47:37 |
| 19 |   | the parenthetical, is that sometimes they're       | 09:47:38 |
| 20 |   | referred to as you just described, objective       | 09:47:40 |
| 21 |   | indicia of nonobviousness.                         | 09:47:44 |
| 22 | Q | I'll try to use secondary considerations           | 09:47:46 |

1 because it's less of a mouthful. But I just  
2 wanted to make sure we both understood what we're  
3 talking about.

4 A If it's easier for you to call them SCs,  
5 feel free, it's even shorter.

6 Q Why don't we take a look at Page 201 of  
7 your declaration.

8 A Oh, sorry, I have Page 201 open in front  
9 of me, and it's on the screen as well.

10 Q Okay. Great. So you have a section  
11 here, 13, titled Secondary Considerations. Right?

12 A There as section, yes, with that title  
13 with one paragraph.

14 Q And in that paragraph you state that you  
15 are not aware of any secondary considerations of  
16 nonobviousness that were relevant to the  
17 challenged claims. Right?

18 A At the time I prepared this declaration,  
19 that was a correct assessment, I was not aware of  
20 any secondary considerations.

21 Q Did you conduct your own investigation to  
22 look for evidence of secondary considerations?

09:47:48

09:47:50

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09:47:59

09:48:01

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09:48:54

|    |   |                                                    |          |
|----|---|----------------------------------------------------|----------|
| 1  | A | No, I did not.                                     | 09:48:58 |
| 2  | Q | So as part of putting together your                | 09:48:59 |
| 3  |   | declaration, you didn't consider any secondary     | 09:49:02 |
| 4  |   | considerations. Right?                             | 09:49:04 |
| 5  | A | No, I did not.                                     | 09:49:06 |
| 6  | Q | I want to turn now to Figure 33 of                 | 09:49:07 |
| 7  |   | Kimura.                                            | 09:49:14 |
| 8  | A | Okay, we have Kimura on the screen. I              | 09:49:38 |
| 9  |   | have Kimura, which is Sheet 33 of 44 for Figure    | 09:49:40 |
| 10 |   | 33. There we go. Thank you.                        | 09:49:47 |
| 11 | Q | So you're looking at Figure 33 now?                | 09:49:49 |
| 12 | A | Yes; in both paper and on the screen.              | 09:49:52 |
| 13 | Q | Now, the embodiment contained in Figure            | 09:49:55 |
| 14 |   | 33 is the embodiment of most interest in your      | 09:49:58 |
| 15 |   | declaration. Correct?                              | 09:50:02 |
| 16 | A | We can discuss further details of the              | 09:50:06 |
| 17 |   | other pieces, but this was the embodiment I most   | 09:50:08 |
| 18 |   | focused on.                                        | 09:50:11 |
| 19 | Q | If we look at Paragraph 339 of Kimura.             | 09:50:12 |
| 20 |   | And this is a paragraph on what Kimura labels Page | 09:50:35 |
| 21 |   | 8. It's under the Description of Drawings.         | 09:50:40 |
| 22 | A | Page 8, you said?                                  | 09:50:44 |

|    |   |                                                   |          |
|----|---|---------------------------------------------------|----------|
| 1  | Q | Yes.                                              | 09:50:45 |
| 2  | A | Okay. Thank you. I just wanted to make            | 09:50:46 |
| 3  |   | sure I go to the right page.                      | 09:50:48 |
| 4  |   | Yes, I have that in front of me, and it's         | 09:50:58 |
| 5  |   | on the screen as well now.                        | 09:51:00 |
| 6  | Q | And that paragraph is the description of          | 09:51:01 |
| 7  |   | Figure 33. Right?                                 | 09:51:04 |
| 8  | A | It's the high-level description, yes.             | 09:51:07 |
| 9  | Q | And it says that Figures 33A through 33E          | 09:51:09 |
| 10 |   | are diagrams for explaining an additional         | 09:51:13 |
| 11 |   | structure -- structural example that differs from | 09:51:17 |
| 12 |   | the embodiment modes of the present invention.    | 09:51:19 |
| 13 |   | Right?                                            | 09:51:21 |
| 14 | A | That's what it says, yes.                         | 09:51:23 |
| 15 | Q | And how does the structure in Figure 33           | 09:51:25 |
| 16 |   | differ from the embodiment modes of the present   | 09:51:29 |
| 17 |   | invention?                                        | 09:51:32 |
| 18 | A | I regard it as just a separate                    | 09:51:39 |
| 19 |   | embodiment. I didn't concern myself with how it   | 09:51:42 |
| 20 |   | was different from the other embodiments. I       | 09:51:44 |
| 21 |   | treated it as a separate embodiment.              | 09:51:46 |
| 22 | Q | In terms of that difference between               | 09:51:50 |

1 embodiment versus an embodiment mode, here

09:51:52

2 Paragraph 339 says it differs from the embodiment  
3 modes.

09:51:55

09:51:57

4 Do you read any significance into that?

09:52:00

5 A The only significance I might read in is  
6 that Kimura's embodiments are related to each  
7 other. They're embodiments which are based on  
8 other embodiments; each embodiment is not  
9 necessarily completely isolated from other  
10 embodiments.

09:52:07

09:52:10

09:52:12

09:52:15

09:52:17

09:52:19

11 Some embodiments are clearly derivative  
12 of other embodiments.

09:52:23

09:52:25

13 Q As we discussed earlier, the circuit  
14 shown in Figure 33 has five transistors. Right?

09:52:35

09:52:38

15 A Yes, the particular embodiment disclosed  
16 in Figure 33 has five transistors.

09:52:45

09:52:47

17 Q What types of transistors does Kimura use  
18 for the transistors in Figure 33?

09:52:49

09:52:52

19 MR. HSU: Objection. Form.

09:52:57

20 A In the Figure 33 embodiment as it's  
21 drawn, the five transistors, he shows four that  
22 are NMOS transistors, and one that is a PMOS

09:53:00

09:53:03

09:53:08

|    |                                                    |          |
|----|----------------------------------------------------|----------|
| 1  | transistor.                                        | 09:53:10 |
| 2  | Q Are those transistors amorphous silicon?         | 09:53:11 |
| 3  | A Kimura identifies them as TFTs, which are        | 09:53:27 |
| 4  | thin film transistors. I believe those could be    | 09:53:31 |
| 5  | amorphous. TFT may encompass more than amorphous.  | 09:53:33 |
| 6  | However, it's a transistor-based circuit and would | 09:53:38 |
| 7  | be analyzed on that basis.                         | 09:53:41 |
| 8  | Someone could make this circuit if they            | 09:53:43 |
| 9  | wanted to in silicon, and it would function as a   | 09:53:45 |
| 10 | transistor circuit.                                | 09:53:48 |
| 11 | Q And you said TFTs may encompass more than        | 09:53:50 |
| 12 | amorphous silicon. What else could they            | 09:53:54 |
| 13 | encompass?                                         | 09:53:56 |
| 14 | A For example, they could encompass organic        | 09:53:59 |
| 15 | materials. One of the reasons people -- some       | 09:54:02 |
| 16 | people got excited a good 30 years ago. Thirty     | 09:54:06 |
| 17 | years ago I remember reviewing a funding proposal. | 09:54:10 |
| 18 | I used to review funding proposals for the         | 09:54:12 |
| 19 | Canadian equivalent of the NSF.                    | 09:54:15 |
| 20 | And I reviewed a proposal on organic               | 09:54:17 |
| 21 | transistors. And there was a lot of interest in    | 09:54:20 |
| 22 | those because of they could be made much lower     | 09:54:23 |

1 cost and they could even be made flexible. This  
2 was the idea you could actually make a display  
3 that you could roll up like a -- like a sheet of  
4 paper or a carpet.

5 And so I don't think Kimura specifically  
6 refers to amorphous silicon. If he does, I know  
7 he refers to TFTs. I'm just clarifying that my  
8 understanding is TFTs encompass more than just  
9 amorphous silicon.

10 Q So TFTs could also encompass organic  
11 transistors. And could it also encompass  
12 polysilicon transistors?

13 A I don't remember if polysilicon  
14 transistors are considered TFTs or not. It's been  
15 a while ago. But whatever TFTs would encompass  
16 that, and again the other -- the other thing as I  
17 said is he refers to TFTs, but this is a  
18 transistor-based circuit. So you could make that  
19 in silicon, you could make it a gallium arsenide,  
20 you could make it indium phosphide. You could  
21 make the MOS transistor, you could make a gate  
22 effect transistor in indium phosphide. The

09:54:26

09:54:29

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09:54:51

09:54:56

09:55:00

09:55:03

09:55:06

09:55:09

09:55:12

09:55:15

09:55:17

09:55:21

09:55:25

09:55:28

1 circuitry is a general transistor-based circuit.

09:55:30

2 Q So it would be just a design choice as to  
3 whether you would use any one of those materials  
4 that you just described?

09:55:33

09:55:38

09:55:42

5 A I presume that in the general circuitry  
6 it would be a simple design choice. Here Kimura  
7 is clearly focused on organic light-emitting diode  
8 display. But the circuitry would certainly not be  
9 restricted to that application.

09:55:45

09:55:48

09:55:51

09:55:59

09:56:02

10 Q So Figure 33A, it has a circuit with  
11 particular elements labeled with numbers, and then  
12 there's also Figures 33B through 33E. Right?

09:56:06

09:56:15

09:56:17

13 A Yes, that is correct.

09:56:25

14 Q And Figures 33B through 33E show points  
15 of operation for the circuit that's shown in  
16 Figure 33A. Right?

09:56:26

09:56:32

09:56:33

17 A Yes. For better or worse, Kimura  
18 provides a -- essentially an anatomy figure in  
19 33A, and where he provides the numbers for the  
20 transistors.

09:56:36

09:56:39

09:56:43

09:56:46

21 And then in 33B through 33E he provides  
22 essentially a physiology set of depictions showing

09:56:48

09:56:51

1 the functionality of the various stages. He 09:56:55

2 doesn't include the numbers in those, which 09:56:59

3 sometimes can make it a little tricky to -- to 09:57:01

4 look at them and study them. But that's what he 09:57:03

5 did. 09:57:06

6 So the first one he provides the numbers 09:57:07

7 and where the transistors are at the topological 09:57:09

8 description. And then in the remainder of the 09:57:11

9 figure he depicts the operating modes with 09:57:13

10 annotations. 09:57:16

11 Q Well, he certainly would have made both 09:57:17

12 of our lives easier had he labeled them all with 09:57:19

13 numbers. But I'll use the numbers in Figure 33A 09:57:22

14 to try to avoid confusion. Okay? 09:57:25

15 A We can try. But I'm sure there will be, 09:57:27

16 as you know. And if he had numbers on the -- on 09:57:29

17 each of these other figures, we would be 09:57:32

18 complaining the figures are too cluttered. 09:57:34

19 Q Kimura doesn't provide a timing diagram 09:57:36

20 for Figure 33. Right? 09:57:41

21 A He does not provide an explicit timing 09:57:45

22 diagram that he associates with Figure 33, that is 09:57:50

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | correct.                                          | 09:57:52 |
| 2  | Q And he doesn't provide a timing diagram         | 09:57:53 |
| 3  | for Figure 34. Right?                             | 09:57:56 |
| 4  | A Again, he does not explicitly provide a         | 09:57:57 |
| 5  | timing diagram that he associates in his          | 09:58:02 |
| 6  | specification with Figure 34.                     | 09:58:05 |
| 7  | Q He does not provide a timing diagram for        | 09:58:06 |
| 8  | Figure 36. Correct?                               | 09:58:10 |
| 9  | A Again, he does not explicitly provide a         | 09:58:13 |
| 10 | timing diagram and states that it applies to      | 09:58:15 |
| 11 | Figure 36.                                        | 09:58:19 |
| 12 | Q Let's focus on Figure 33B for a moment.         | 09:58:20 |
| 13 | MR. FRISCH: And if we can put that up on          | 09:58:28 |
| 14 | the screen as well, that would probably be        | 09:58:29 |
| 15 | helpful.                                          | 09:58:33 |
| 16 | Q And as we were just discussing, we're           | 09:58:42 |
| 17 | going to have to look a little bit back and forth | 09:58:45 |
| 18 | between Figure 33A and 33B so that we can         | 09:58:47 |
| 19 | reference by number here.                         | 09:58:49 |
| 20 | A The paper copy I hope will help. That's         | 09:58:51 |
| 21 | one reason I wanted to have the paper copy,       | 09:58:53 |
| 22 | because we can have two things in front of me at  | 09:58:56 |

1 the same time, if necessary.

09:58:58

2 Q Great. And what is Element 3314 in  
3 Figure 33A?

09:58:59

09:59:05

4 A I believe Kimura refers to that as being  
5 an electroluminescent element. That covers a  
6 variety of things, but one of them would be a  
7 light-emitting diode or an organic light-emitting  
8 diode. And before we proceed, Counselor, just  
9 one -- since that term just came up, just for  
10 clarity, when I use the term OLED or LED, I mean  
11 light-emitting diode. And the '599 patent early  
12 on does the same thing. So by OLED I'm referring  
13 to a light-emitting diode. D doesn't mean  
14 display, just for clarity.

09:59:11

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09:59:43

09:59:47

15 Q And when you use OLED as opposed to LED,  
16 the O is for organic. Correct?

09:59:48

09:59:52

17 A That's correct. It would be light  
18 emitting diode and organic light-emitting diode.

09:59:55

09:59:56

19 Q I just want to go back to Element 3314,  
20 which I believe you said was the EL element.

09:59:59

10:00:02

21 My understanding is 33 -- 3313 is the EL  
22 element. Is that correct?

10:00:06

10:00:10

|    |          |                                                    |          |
|----|----------|----------------------------------------------------|----------|
| 1  | A        | Sorry. I mis -- I thought you said 13.             | 10:00:11 |
| 2  |          | I apologize. 3314 is the line on the wiring side   | 10:00:14 |
| 3  |          | of the electroluminescent element. 3313 is the     | 10:00:24 |
| 4  |          | electroluminescent element. 3314 is the wire, or   | 10:00:29 |
| 5  |          | the connection or whatever you wish to call it.    | 10:00:32 |
| 6  | Q        | And 3314 is connected to one of the                | 10:00:34 |
| 7  |          | terminals of the LED, or the electroluminescent    | 10:00:37 |
| 8  |          | element?                                           | 10:00:41 |
| 9  | A        | Yes, there is a wire which is connected            | 10:00:41 |
| 10 |          | to that terminal.                                  | 10:00:43 |
| 11 | Q        | What is the value on Line 3314 during the          | 10:00:44 |
| 12 |          | point of operation shown in Figure 33B?            | 10:00:50 |
| 13 | MR. HSU: | Objection. Form.                                   | 10:00:59 |
| 14 | A        | There's nothing specified here, but it's           | 10:01:02 |
| 15 |          | fairly clear from examining the figure that it has | 10:01:09 |
| 16 |          | to be a lower voltage than the -- let me correct   | 10:01:12 |
| 17 |          | that.                                              | 10:01:18 |
| 18 |          | The current is shown in Kimura going               | 10:01:19 |
| 19 |          | through from the top to the bottom. And if that    | 10:01:22 |
| 20 |          | is a diode, for that to emit light it would have   | 10:01:26 |
| 21 |          | to have a larger voltage on the top side than the  | 10:01:30 |
| 22 |          | bottom side so that the light-emitting element is  | 10:01:32 |

1 forward biased in order for it to emit light. As 10:01:35  
2 I actually discuss that in the technology 10:01:38  
3 background section describing how an LED 10:01:41  
4 functions. 10:01:43

5 Q Does Kimura provide any actual voltage 10:01:43  
6 values for the voltage on Line 3314? 10:01:48

7 MR. HSU: Objection. Format. 10:01:57

8 A I don't think that he does. Kimura is so 10:01:58  
9 big, maybe he did somewhere, but I don't recall 10:02:02  
10 seeing it. 10:02:04

11 But again, the bottom line essentially is 10:02:05  
12 if that's an LED and it's going to be used as an 10:02:08  
13 emitter, when current is going through it, the -- 10:02:11  
14 any of the structures, the voltage has to be 10:02:15  
15 higher on the above than below side of 3313 in 10:02:19  
16 order for 3313 to be forward biased. 10:02:23

17 Q You're not aware, though, of the 10:02:25  
18 particular voltage value on Line 3314 during the 10:02:30  
19 operation shown in Figure 33B. Right? 10:02:34

20 A I'm only aware in the relative terms of 10:02:39  
21 what one has to be higher on one side than the 10:02:42  
22 other for the diode to be forward biased. If the 10:02:44

1 voltage were larger on 3314 than on the top of 10:02:47  
2 that, then the diode will be reversed bias, it 10:02:50  
3 would not conduct current, and it would not emit 10:02:54  
4 light. 10:02:57

5 Q So it's important to provide a reference 10:02:57  
6 voltage value on Line 3314 to forward bias the EL 10:03:09  
7 element 3313? 10:03:15

8 A I wouldn't say it's 3314 alone. Voltage, 10:03:18  
9 of course, is relative. So you would -- if you're 10:03:21  
10 referring to the top and the bottom of the 10:03:24  
11 electroluminescent element, you could specify a 10:03:28  
12 voltage, but that would mean a voltage with 10:03:31  
13 respect to an earth ground, zero volts. All that 10:03:34  
14 matters is that there be a voltage difference from 10:03:37  
15 the top to the bottom, where you have a more 10:03:39  
16 positive voltage on the top of 3313 than on the 10:03:42  
17 bottom if you want to be able to forward bias it, 10:03:46  
18 have it carry current, have it emit light. 10:03:50

19 Q So the voltage that matters in terms of 10:03:54  
20 forward biassing the EL element is the relative 10:03:57  
21 voltage difference between one side of the EL and 10:04:02  
22 the other. Right? 10:04:05

|    |                                                    |          |
|----|----------------------------------------------------|----------|
| 1  | MR. HSU: Objection. Misstates                      | 10:04:06 |
| 2  | testimony.                                         | 10:04:07 |
| 3  | A You would have to have a voltage larger          | 10:04:07 |
| 4  | on the top than the bottom. And it would           | 10:04:09 |
| 5  | probably -- just because of the way diodes work,   | 10:04:12 |
| 6  | and again, I have a diagram earlier in my          | 10:04:15 |
| 7  | declaration in the technology background that      | 10:04:18 |
| 8  | shows that you need to have some amount of forward | 10:04:19 |
| 9  | bias voltage for a current to flow through the     | 10:04:23 |
| 10 | diode.                                             | 10:04:25 |
| 11 | You have to have -- silicon diode is               | 10:04:26 |
| 12 | typically .7 is when the diode will turn on,       | 10:04:29 |
| 13 | essentially, and conduct a large amount of         | 10:04:31 |
| 14 | current. But the bottom line is, as Kimura shows,  | 10:04:33 |
| 15 | since he's showing current going in 33B from the   | 10:04:37 |
| 16 | top to the bottom, is that there's a bias on the   | 10:04:40 |
| 17 | LED that has -- that meets those conditions across | 10:04:43 |
| 18 | 3313, the electroluminescent element.              | 10:04:45 |
| 19 | MR. FRISCH: I think we've been going               | 10:04:52 |
| 20 | about an hour. Why don't we take our first break.  | 10:04:53 |
| 21 | THE WITNESS: Five minutes, ten minutes,            | 10:04:55 |
| 22 | what do you gentlemen prefer?                      | 10:04:57 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | MR. FRISCH: Why don't we go off the               | 10:04:59 |
| 2  | record and we can figure it out.                  | 10:05:00 |
| 3  | VIDEO SPECIALIST: We are going off the            | 10:05:02 |
| 4  | record at 10:05 a.m.                              | 10:05:03 |
| 5  | (A recess was taken.)                             | 10:05:05 |
| 6  | VIDEO SPECIALIST: We are going back on            | 10:17:10 |
| 7  | the record at 10:17 a.m.                          | 10:17:12 |
| 8  | BY MR. FRISCH:                                    | 10:17:16 |
| 9  | Q I'd like to continue looking at Figure          | 10:17:18 |
| 10 | 33, where we left off before the break.           | 10:17:21 |
| 11 | A That's fine.                                    | 10:17:25 |
| 12 | Q Looking at Figure 33A, what is Element          | 10:17:25 |
| 13 | 3302?                                             | 10:17:30 |
| 14 | A 3302 is a signal wire that connects to          | 10:17:36 |
| 15 | the gate of Transistor 3306.                      | 10:17:40 |
| 16 | Q Do you know what the value is on that           | 10:17:44 |
| 17 | signal line during the operation shown in Figure  | 10:17:47 |
| 18 | 33B?                                              | 10:17:51 |
| 19 | A Kimura doesn't specify a value. He does         | 10:18:04 |
| 20 | specify through the operations that in 33B and    | 10:18:07 |
| 21 | 33C, that transistor is turned on. And it's worth | 10:18:12 |
| 22 | pointing out, by the way, that the specific       | 10:18:17 |

1 valuation that would be used for these voltages 10:18:19  
2 would depend on the manufacturing process that's 10:18:21  
3 being used as well. Those vary from process to 10:18:23  
4 process. 10:18:26

5 Q Can you explain to me what you mean by 10:18:26  
6 that? 10:18:28

7 A Well, the simple thing about that, for 10:18:29  
8 example, is that if you actually look at Moore's 10:18:31  
9 law for example in silicon, as it should be 10:18:35  
10 evaluated, the voltage should decrease in 10:18:39  
11 proportion of the reduction of the feature size of 10:18:43  
12 transistors. And so technically the voltage 10:18:46  
13 should change based on the dimensions of the 10:18:49  
14 process. 10:18:51

15 There may be other reasons why the 10:18:53  
16 voltage would be different. So obviously Kimura 10:18:55  
17 doesn't want to restrict that. So he specifies 10:18:59  
18 voltages indicating on and off features, which a 10:19:03  
19 person of skill in the art would understand to 10:19:06  
20 mean, you know, sufficient to turn transistors on 10:19:07  
21 and off. 10:19:09

22 Q What is Element 3303 in Figure 33A? 10:19:10

|    |   |                                                   |          |
|----|---|---------------------------------------------------|----------|
| 1  | A | That is another signal line which is              | 10:19:18 |
| 2  |   | connected to the gate of Transistor 3307.         | 10:19:25 |
| 3  |   | Apparently given the rest of the figures for      | 10:19:29 |
| 4  |   | the -- again, the purposes of turning that        | 10:19:31 |
| 5  |   | transistor on and off.                            | 10:19:33 |
| 6  | Q | Does Kimura specify any of the voltage            | 10:19:36 |
| 7  |   | values that are put on Element 3303?              | 10:19:38 |
| 8  | A | He doesn't directly specify numbers. He           | 10:19:45 |
| 9  |   | specifies to the extent showing that the          | 10:19:47 |
| 10 |   | transistor is turned on and off, which tells you  | 10:19:50 |
| 11 |   | if the voltage is appropriate to turn that        | 10:19:53 |
| 12 |   | transistor on or off.                             | 10:19:56 |
| 13 | Q | What is Element 3304 in Figure 33A?               | 10:19:58 |
| 14 | A | 3304 is another signal line. And this             | 10:20:05 |
| 15 |   | one connects to the gate of Transistor 3310.      | 10:20:09 |
| 16 | Q | Does Kimura specify any of the voltage            | 10:20:14 |
| 17 |   | values that are put on Line 3304?                 | 10:20:16 |
| 18 | A | Again, to repeat my previous answer, he           | 10:20:22 |
| 19 |   | does not specify particular voltages. But he      | 10:20:24 |
| 20 |   | specifies that that transistor is turned on and   | 10:20:27 |
| 21 |   | off. And so the voltages would be consistent with | 10:20:31 |
| 22 |   | the ability to turn that transistor on and off,   | 10:20:33 |

1 depending, of course, on the process in which the 10:20:35  
2 circuit is implemented. 10:20:37

3 Q Maybe to condense this a little bit, does 10:20:39  
4 Kimura describe any of the voltage values 10:20:43  
5 associated with Figure 33? 10:20:46

6 MR. HSU: Objection to form. 10:20:50

7 A He does not describe explicit values. 10:20:51  
8 But he describes, for example, VDD would be the 10:20:56  
9 power supply voltage level, the high level, as it 10:20:59  
10 were, for the particular manufacturing process in 10:21:02  
11 which the circuit was implemented. 10:21:05

12 Q When you say VDD, that's, for instance, 10:21:07  
13 the VDD that's labeled in Figure 33B? 10:21:10

14 A Yes. That is conventionally used to mean 10:21:17  
15 an NMOS -- with an NMOS transistor in particular, 10:21:19  
16 that's a -- that's a high voltage that's used. 10:21:22  
17 That's what that tends to indicate. And so he's 10:21:26  
18 indicating a voltage which is sufficient to -- to 10:21:28  
19 provide that VDD voltage. 10:21:31

20 Q Kimura doesn't specify the particular VDD 10:21:35  
21 voltage that's used in Figure 33, though. 10:21:37

22 Correct? 10:21:40

|    |   |                                                    |          |
|----|---|----------------------------------------------------|----------|
| 1  | A | He doesn't specify a number. Again,                | 10:21:40 |
| 2  |   | specifying a number would tie you to a subset of   | 10:21:43 |
| 3  |   | manufacturing processes.                           | 10:21:46 |
| 4  | Q | In Figure 33B there's also a label that            | 10:21:46 |
| 5  |   | says VData.                                        | 10:21:52 |
| 6  |   | Do you see that?                                   | 10:21:53 |
| 7  | A | I see that.                                        | 10:21:55 |
| 8  | Q | And what is your understanding of what's           | 10:21:56 |
| 9  |   | meant by VData?                                    | 10:21:57 |
| 10 | A | VData is the -- what Kimura I believe              | 10:22:06 |
| 11 |   | calls the image signal. And this is the signal     | 10:22:08 |
| 12 |   | that is used to program the programming            | 10:22:13 |
| 13 |   | transistor, as it were. That's the data -- that's  | 10:22:17 |
| 14 |   | the image signal telling you what you're going to  | 10:22:19 |
| 15 |   | be putting on the pixel.                           | 10:22:22 |
| 16 | Q | Would VData change depending on the image          | 10:22:22 |
| 17 |   | that you're trying to display?                     | 10:22:28 |
| 18 | A | I don't know if Kimura went into that              | 10:22:29 |
| 19 |   | detail. But, for example, it might be different    | 10:22:47 |
| 20 |   | if a pixel is going to be turned off or turned on, | 10:22:52 |
| 21 |   | if the pixel is going to be on or off during the   | 10:22:55 |
| 22 |   | particular cycle.                                  | 10:22:58 |

1 Q Does Kimura use VData to provide  
2 gradations in brightness level for the EL element  
3 that's connected to the pixel circuit?

10:22:59

10:23:05

10:23:12

4 MR. HSU: Objection to form.

10:23:16

5 A He might. And I would not be surprised  
6 if he did; but I'm just not sure, sitting here  
7 right at the moment. I would have to go restudy  
8 Kimura to see what he said specifically about his  
9 use of the VData voltage.

10:23:17

10:23:19

10:23:22

10:23:25

10:23:26

10 Q Does Kimura provide specific voltage  
11 values for VData as it's used in Figure 33?

10:23:28

10:23:31

12 A He does not do so, for the reasons I  
13 cited earlier. That would tie it to a specific  
14 manufacturing process if he did so.

10:23:36

10:23:38

10:23:41

15 Q Let's turn back to your declaration for a  
16 moment and go to Paragraph 133 on Page 70.

10:23:42

10:23:50

17 A Okay, I have that. And I'm trying to use  
18 Kimura on my right side, so if I need numbers. So  
19 I might be going -- looking back and forth. But  
20 I'm trying to use the two paper documents so I can  
21 look at 33B and have 33A in another paper document  
22 so I can get numbers.

10:24:13

10:24:16

10:24:19

10:24:21

10:24:23

10:24:28

|    |          |                                                    |          |
|----|----------|----------------------------------------------------|----------|
| 1  | Q        | Okay. Great. Thank you.                            | 10:24:31 |
| 2  | A        | We'll see what happens.                            | 10:24:32 |
| 3  | Q        | Now, in this paragraph of your                     | 10:24:33 |
| 4  |          | declaration you're discussing the operation of     | 10:24:35 |
| 5  |          | Figure 33B. Right?                                 | 10:24:36 |
| 6  | A        | That is correct, yes.                              | 10:24:40 |
| 7  | Q        | And the opinion that you offered here is           | 10:24:41 |
| 8  |          | that during the operation shown in Figure 33B,     | 10:24:46 |
| 9  |          | Transistors 3309 and 3310 will be on, and the      | 10:24:50 |
| 10 |          | voltage on the node that connects the gate of      | 10:24:54 |
| 11 |          | Transistor 3308 will be drained away. Correct?     | 10:24:57 |
| 12 | A        | Yes, this is the setup phase or                    | 10:25:07 |
| 13 |          | initialization where the voltage that was put onto | 10:25:09 |
| 14 |          | the capacitor to program Transistor 3308 in the    | 10:25:14 |
| 15 |          | prior cycle is now being removed to prepare it for | 10:25:19 |
| 16 |          | the next programming cycle.                        | 10:25:22 |
| 17 | Q        | And that's pulling the node low so that            | 10:25:23 |
| 18 |          | Transistor 3308 can turn on?                       | 10:25:28 |
| 19 | MR. HSU: | Objection. Misstates                               | 10:25:33 |
| 20 |          | testimony.                                         | 10:25:35 |
| 21 | A        | The main function here is as I describe            | 10:25:42 |
| 22 |          | it in my declaration. That the -- by opening that  | 10:25:44 |

1 path, the charge will drain off the capacitor as 10:25:48  
2 shown. Kimura provides his own annotations here. 10:25:55  
3 Will drain off the capacitor and go down through 10:25:58  
4 Transistor 3310 and through the electroluminescent 10:26:01  
5 element to the -- I believe that's the line that's 10:26:05  
6 3304. 10:26:09

7 Q But looking at Paragraph 133 you wrote, 10:26:11  
8 "As can be seen in the figure -- and for reasons 10:26:14  
9 that will be explained below -- with Transistors 10:26:17  
10 3309 and 3310 turned on, the voltage on the node 10:26:19  
11 that connects the gate of Transistor 3308 will be 10:26:22  
12 drained away, pulling the node low; this causes 10:26:25  
13 Transistor 3308 to turn on." 10:26:28

14 That's what you wrote. Right? 10:26:30

15 A That's correct. And because it's a PMOS 10:26:32  
16 transistor, by pulling that node low it turns on 10:26:34  
17 Transistor 3308. 10:26:38

18 Q And you still agree with that entire 10:26:39  
19 statement. Right? 10:26:43

20 A I would say that I do, yes. 10:26:47

21 Q What is it that would cause -- well, let 10:26:48  
22 me take a step back. 10:26:54

1           So the end of that statement is that this           10:26:54  
2           causes Transistor 3308 to turn on. Why is it that           10:26:57  
3           Transistor 3308 would be off?           10:27:02

4           A       When you do the programming step, the --           10:27:05  
5           which is -- occurs as described in Figure 33C, you           10:27:08  
6           push charge through the path that he shows in 33C.           10:27:14  
7           And it basically, with Transistor 3308 turned on,           10:27:20  
8           you're pushing current and charge into a dead end           10:27:26  
9           with the capacitor.           10:27:30

10           And so as you push charge onto that           10:27:32  
11           capacitor, the voltage on that node increases.           10:27:35  
12           And as the voltage on that node increases, because           10:27:38  
13           it's the PMOS so it's active low, the PMOS           10:27:40  
14           transistor turns off and retains that voltage it           10:27:45  
15           had when it turns off. And it cuts off the           10:27:49  
16           current path around that little loop de loop, or           10:27:52  
17           whatever, that little pathway to that dead end,           10:27:57  
18           through 3308, by turning 3308 off. That's the           10:28:00  
19           programming step.           10:28:03

20           Q       And after the programming step there's an           10:28:03  
21           emission step. Right?           10:28:09

22           A       That is correct. That's described in           10:28:11

1 33E, where he shows the transistors are turned on.

10:28:13

2 There's two other transistors that are turned on.

10:28:19

3 And that allows current to flow as shown through

10:28:22

4 the three transistors and through the

10:28:26

5 electroluminescent element. The

10:28:28

6 electroluminescent element is forward biased and,

10:28:30

7 therefore, emits light. That's the light-emitting

10:28:37

8 step.

10:28:39

9 Q And depending on the image that you want

10:28:40

10 to display, in certain instances you might not

10:28:42

11 want to display any light and you might have your

10:28:44

12 Transistor 3308 turned off. Right?

10:28:50

13 MR. HSU: Objection. Form.

10:29:07

14 A You could also, if you have with the --

10:29:22

15 you can also control that by the signals coming

10:29:25

16 from the -- that control the other two

10:29:28

17 transistors. If you leave those two transistors

10:29:33

18 off, then you will not emit light. That's another

10:29:35

19 way you could do it. And that's probably the

10:29:37

20 simpler way to do it, just looking at this

10:29:40

21 offhand.

10:29:42

22 Q But Kimura doesn't describe doing that

10:29:42

|    |                                                    |          |
|----|----------------------------------------------------|----------|
| 1  | with the circuit in Figure 33. Right?              | 10:29:46 |
| 2  | A I don't believe he describes it. But             | 10:29:51 |
| 3  | obviously, if you don't want the pixel to emit     | 10:29:53 |
| 4  | light, you have to do something to prevent it from | 10:29:56 |
| 5  | emitting light.                                    | 10:30:00 |
| 6  | Q And one of the things you could do is            | 10:30:01 |
| 7  | provide a VData value to turn off your Transistor  | 10:30:03 |
| 8  | 3308 during the light-emission phase. Right?       | 10:30:06 |
| 9  | A Well, you really can't change that during        | 10:30:17 |
| 10 | the light-emitting phase because 3308 is an        | 10:30:19 |
| 11 | isolated node at that point, the gate of 3308.     | 10:30:23 |
| 12 | I didn't -- I didn't study it because,             | 10:30:26 |
| 13 | obviously, it's -- we're concerned with the        | 10:30:28 |
| 14 | emission phase. The simplest way to not have       | 10:30:30 |
| 15 | emission would be to not turn on during the        | 10:30:33 |
| 16 | emission phase 3307 and 3310. And then no current  | 10:30:35 |
| 17 | would flow down through the LED, and it would not  | 10:30:41 |
| 18 | emit light.                                        | 10:30:43 |
| 19 | Q But as we discussed, Kimura doesn't ever         | 10:30:44 |
| 20 | discuss turning off 3307 and 3310 during the       | 10:30:48 |
| 21 | light-emission phase. Right?                       | 10:30:52 |
| 22 | A He appears not to be concerned with that,        | 10:30:56 |

1 because that's a fairly trivial instance. He's 10:30:58  
2 concerned with the programming step to program the 10:31:02  
3 middle transistor, the three in the current path. 10:31:03  
4 And then when you turn on the other two 10:31:07  
5 transistors, the -- as I essentially described in 10:31:10  
6 the declaration, the resistance of 3308 is higher 10:31:13  
7 than the resistance of 3307 and 3310. 10:31:17

8 And therefore, the resistance of 3308 10:31:21  
9 determines the current level for the applied 10:31:25  
10 voltage. And therefore, you get the current you 10:31:27  
11 want to get to have the L-I curve of the 10:31:30  
12 electroluminescent element emit the luminescence 10:31:35  
13 of light you seek. 10:31:39

14 Q Couldn't one of the values of current 10:31:40  
15 that you want to be zero? 10:31:41

16 A Yes. And as I said, that would be easily 10:31:44  
17 affected by simply controlling 3307 and 3310 just 10:31:46  
18 be turned off. That would just be a simple signal 10:31:53  
19 to not turn those transistors on. That's one way 10:31:56  
20 to do it. 10:32:00

21 Q So you think there are other phases of 10:32:00  
22 operation for the circuit of Figure 33 that are 10:32:03

1 not shown here in Kimura's depiction of Figure 33?

10:32:05

2 MR. HSU: Objection. Misstates the  
3 testimony.

10:32:11

10:32:12

4 A I wouldn't say there's phases not shown.  
5 I would just say that he depicts in Figure 33E the  
6 case where the pixel is being illuminated. What  
7 you care about in Kimura, what really matters, is  
8 during the light-emission phase is using the  
9 program transistor to compensate away threshold  
10 voltage reagents. And that's where you're dealing  
11 with the fluctuations of the difference, small  
12 differences in light emission between different  
13 pixel instances because of the variability of the  
14 threshold voltage during manufacturing.

10:32:13

10:32:15

10:32:19

10:32:24

10:32:26

10:32:28

10:32:32

10:32:35

10:32:38

10:32:40

10:32:43

15 And so that's what -- that's the part you  
16 care about. If you just don't turn it on then  
17 that issue doesn't arise, simply because there's  
18 no variability of between zero and zero, there's  
19 no light emitted.

10:32:45

10:32:48

10:32:51

10:32:54

10:32:58

20 Q I guess I'm just trying to understand  
21 your opinion in Paragraph 133 of your declaration.

10:32:59

10:33:08

22 So you say that in Figure 33B you pull

10:33:12

|    |                                                    |          |
|----|----------------------------------------------------|----------|
| 1  | the node on the gate of Transistor 3308 low to     | 10:33:16 |
| 2  | turn it on.                                        | 10:33:21 |
| 3  | A No. Turn -- okay. Wait a minute. That            | 10:33:24 |
| 4  | might be a typo. That is a typo, actually.         | 10:33:31 |
| 5  | Because what you're doing is you're turning -- and | 10:33:40 |
| 6  | Kimura says this right in the figure of 33C. He    | 10:33:44 |
| 7  | shows Figure 33C you turn that transistor during   | 10:33:47 |
| 8  | the programming phase -- hang on. Hang on a        | 10:33:50 |
| 9  | moment.                                            | 10:33:54 |
| 10 | No. I apologize. That's not a typo.                | 10:33:55 |
| 11 | Things are getting a little confused here. Let me  | 10:33:59 |
| 12 | start over.                                        | 10:34:01 |
| 13 | 33B is not the programming phase; it's             | 10:34:01 |
| 14 | the initialization phase. So in this phase what's  | 10:34:04 |
| 15 | happening is you're turning -- Transistor 3308,    | 10:34:09 |
| 16 | you want to turn it on so it can be programmed     | 10:34:14 |
| 17 | during the programming phase. And so what you      | 10:34:16 |
| 18 | want to do is that capacitor has been charged up,  | 10:34:19 |
| 19 | and it's raised the voltage on that node and has   | 10:34:23 |
| 20 | at least partially turned off that transistor.     | 10:34:28 |
| 21 | So you drain the charge off that                   | 10:34:30 |
| 22 | capacitor, you pull the node low. And now 3308 is  | 10:34:32 |

1 on, that is correct. I was confusing this with  
2 33C, which is the actual programming step where  
3 you go in and turn it back off.

10:34:36

10:34:38

10:34:41

4 Q Okay. Just to clarify the record. So --

10:34:45

5 A Sorry about that.

10:34:47

6 Q No. That's fine. So there are no typos  
7 that you're aware of in Paragraph 133 of your  
8 declaration. Right?

10:34:47

10:34:49

10:34:51

9 A That's correct. The -- I was confusing  
10 it for a moment with 33C, which is the actual  
11 programming step. We kind of got mixed up there a  
12 bit. So in 33B, this is the initialization step.  
13 And all you're doing here is draining the charge  
14 off the capacitor. This will pull the node  
15 connected to the gate of Transistor 3308 low,  
16 which will turn the transistor on. You're  
17 preparing it for the programming step which is  
18 coming in 33C. I'm sorry. I got confused there.  
19 We had too many things going on. But that's the  
20 correct answer there.

10:34:53

10:34:55

10:34:58

10:35:01

10:35:05

10:35:09

10:35:12

10:35:16

10:35:18

10:35:21

10:35:24

10:35:26

21 Q Is Phase 33B necessary to the overall  
22 function of the circuit?

10:35:28

10:35:31

1           A     Well, it's necessary to the extent that  
2     as Kimura describes it. Because Kimura is  
3     describing pulling that node low by draining the  
4     capacitor, draining that node of the gate of 3308  
5     so that 3308 is turned back on. And you can't do  
6     the programming step unless 3308 is on and can  
7     function as is shown in 33B.

10:35:45  
10:35:46  
10:35:49  
10:35:56  
10:36:00  
10:36:03  
10:36:07

8           Q     So just so I make sure I understand. So  
9     as Kimura describes it, the functionality of  
10    Figure 33B is necessary so that you can pull the  
11    node on the gate of Transistor 3308 low to turn  
12    that transistor on. Right?

10:36:09  
10:36:14  
10:36:19  
10:36:22  
10:36:28

13          A     That's the functionality he describes, is  
14    pulling it low. Because it's already not low;  
15    it's higher than it had been because of the  
16    previous programming phase.

10:36:41  
10:36:43  
10:36:45  
10:36:48

17          Q     In Figure 33B, all of the transistors are  
18    on except for Transistor 3307. Right?

10:36:49  
10:37:00

19          A     I just need ten seconds to go adjust the  
20    wood stove. Just give me a moment. I'll be right  
21    back.

10:37:06  
10:37:09  
10:37:12

22                 Sorry about that. You have to put up

10:37:23

1 with this with these rural depositions. So if you 10:37:25  
2 could repeat the question, I apologize for that. 10:37:27  
3 I forgot to do that before the break ended, and 10:37:30  
4 that will fix it before it got too hot. 10:37:33

5 Q Yes, let me just look back. 10:37:35

6 In Figure 33B, all of the transistors are 10:37:37  
7 on except for Transistor 3307. Right? 10:37:40

8 A The way he depicts it in 33B, that is the 10:37:53  
9 case. He shows the -- what he shows, they're all 10:37:55  
10 on except for 3307, and the operation that starts 10:38:00  
11 in 33B serves to turn off 3308, after which 3310 10:38:06  
12 is turned off. 10:38:15

13 Q But at the point of operation shown in 10:38:18  
14 Figure 33B, all the transistors are on except for 10:38:20  
15 Transistor 3307? 10:38:24

16 A That's what he shows, with the main 10:38:27  
17 operation here being the capacitor drains with 10:38:29  
18 3309 and 3310, and through the electroluminescent 10:38:33  
19 element, and then is taken away somewhere by the 10:38:38  
20 sewer system. 10:38:41

21 Q Why is Transistor 3307 off at this point? 10:38:42

22 A Because that transistor is only turned on 10:38:49

1 when you want to have the VDD power supply voltage 10:38:52  
2 come through, in order to drive current through 10:38:57  
3 that transistor, 3307, 3308, and 3310, and then 10:39:01  
4 down through the electroluminescent element during 10:39:06  
5 the emitting phase. 10:39:09

6 Q So why is it that you don't want VDD 10:39:11  
7 coming through in Figure 33B? 10:39:15

8 A Because VDD is -- doesn't have any data 10:39:22  
9 associated with it. There's no data regarding 10:39:26  
10 whether the pixel will be turned on or turned off 10:39:28  
11 or whatnot. 10:39:33

12 So the other thing is the data level may 10:39:34  
13 just be different. He specifies them as being 10:39:36  
14 different. The data level is a different voltage. 10:39:40  
15 They could be the same, I guess, but he separates 10:39:42  
16 them. 10:39:44

17 Q And by different, you mean VData is a 10:39:44  
18 different voltage than VDD. Right? 10:39:46

19 A It could be. It's possible you could 10:39:48  
20 have more than one voltage. It's a very common 10:39:50  
21 practice in transistor-based circuits. 10:39:52

22 Q And he separates them as two different 10:39:55

|    |                                                    |          |
|----|----------------------------------------------------|----------|
| 1  | voltages, VDD and VData. Right?                    | 10:39:58 |
| 2  | A He separates them because one is being           | 10:40:01 |
| 3  | used during 33B and 33C phases, which are the      | 10:40:03 |
| 4  | initialization and the programming phase. And      | 10:40:08 |
| 5  | then he uses VDD explicitly during the             | 10:40:11 |
| 6  | light-emission phase.                              | 10:40:17 |
| 7  | Q Is VDD generally higher than VData?              | 10:40:18 |
| 8  | A It could be. But my interpretation of it         | 10:40:29 |
| 9  | is that VData could be changed based on data;      | 10:40:31 |
| 10 | whereas VDD typically represents just a hard-wired | 10:40:35 |
| 11 | DC voltage.                                        | 10:40:39 |
| 12 | Q And if Transistor 3307 were on and VDD           | 10:40:42 |
| 13 | were allowed to come through, how would that       | 10:41:03 |
| 14 | impact the current going through the EL element?   | 10:41:05 |
| 15 | MR. HSU: Objection. Incomplete                     | 10:41:14 |
| 16 | hypothetical.                                      | 10:41:15 |
| 17 | A Well, I'll preface that by noting that's         | 10:41:18 |
| 18 | a circuit functionality. It would make no sense.   | 10:41:20 |
| 19 | You wouldn't want to do that. You wouldn't want    | 10:41:23 |
| 20 | to have those both on at the same time.            | 10:41:25 |
| 21 | You would -- you would probably have more          | 10:41:29 |
| 22 | current, and you might have too much current       | 10:41:32 |

1 through the electroluminescent element and damage 10:41:33  
2 it. It's possible. I'm speculating, though, 10:41:37  
3 because he didn't provide that embodiment. And it 10:41:40  
4 seems like having all the transistors on at the 10:41:42  
5 same time would be a bad idea. It generally is. 10:41:45

6 But, of course, Kimura doesn't discuss 10:41:47  
7 that. He simply provides his circuitry showing 10:41:50  
8 the different transistors being on and off to 10:41:52  
9 execute the functionality he does. 10:41:54

10 Q How long does the phase of operation 10:41:56  
11 that's shown in Figure 33B last? 10:42:09

12 A Kimura doesn't specify explicit time. 10:42:21  
13 But it's implicit from reading it that the amount 10:42:25  
14 of time has to last long enough for the operation 10:42:27  
15 where Transistor 3308 turns itself off as that 10:42:32  
16 capacitor charges. That's implicit because he 10:42:37  
17 shows in 33C, he has an explicit notation pointing 10:42:39  
18 to 3308 and saying it goes on to off. So 10:42:44  
19 presumably enough time has to pass to do that. 10:42:48  
20 And, of course, it's well known in the art that 10:42:50  
21 charging a capacitor is a time-dependent process. 10:42:54  
22 And in order for that to turn off, it would have 10:42:57

1 to have enough time to stuff enough charge on the 10:42:59  
2 capacitor to cause 3308 to turn off and complete 10:43:02  
3 the initialization phase. 10:43:05

4 Q Does the amount of time that that would 10:43:06  
5 take depend on the value of VData? 10:43:09

6 A I suppose it could. Although it would 10:43:21  
7 really depend more on -- actually, if the 10:43:27  
8 transistors are in saturation, that wouldn't 10:43:38  
9 matter. 10:43:40

10 There are many factors in that. So could 10:43:50  
11 you repeat the question, please, since there are 10:43:53  
12 so many factors I was considering in my head from 10:43:55  
13 my experience with transistor-based circuits in 10:43:58  
14 general? 10:44:01

15 Q Well, let me walk through it another way 10:44:01  
16 that may make it a little bit easier on us. 10:44:03

17 So in Figure 33C, Transistor 3308 starts 10:44:06  
18 as on. And then ultimately it will get turned 10:44:14  
19 off, and that's what's shown in Figure 33D. 10:44:17

20 Right? 10:44:20

21 A Yes, I have -- you're referring -- just 10:44:23  
22 because of the screen here, you're referring to 10:44:24

|    |                                                    |          |
|----|----------------------------------------------------|----------|
| 1  | 33C, Charlie, now, this next figure?               | 10:44:26 |
| 2  | Q Yes.                                             | 10:44:29 |
| 3  | A Okay. I just wanted to double-check              | 10:44:30 |
| 4  | since we have 33B on the screen. So we don't       | 10:44:32 |
| 5  | have, you know, a hiccup and waste half an hour.   | 10:44:35 |
| 6  | 33C shows the programming phase, where             | 10:44:38 |
| 7  | charge is passing through the what he shows to the | 10:44:43 |
| 8  | capacitor as a dead end. It's a DC dead end. And   | 10:44:46 |
| 9  | it's implicit that you put enough charge on the    | 10:44:50 |
| 10 | capacitor that it turns Transistor 3308 from on to | 10:44:53 |
| 11 | off. And that would take some amount of time to    | 10:44:58 |
| 12 | complete because you're charging a capacitor.      | 10:45:02 |
| 13 | Q And Figure 33D is showing when that              | 10:45:04 |
| 14 | transistor turns off. Right?                       | 10:45:06 |
| 15 | A Kimura provides a helpful, I guess,              | 10:45:11 |
| 16 | Figure 33D, where he shows the steady state that   | 10:45:13 |
| 17 | you reach after you've done the programming. So    | 10:45:17 |
| 18 | there's nothing happening in 33D. 33D is           | 10:45:20 |
| 19 | essentially static or quasistatic.                 | 10:45:23 |
| 20 | And he's showing there that 3308 is off            | 10:45:26 |
| 21 | because of the gate, the voltage that is on its    | 10:45:32 |
| 22 | gate as per the capacitor. And he's showing there  | 10:45:35 |

|    |                                                    |          |
|----|----------------------------------------------------|----------|
| 1  | all the transistors have been turned off. So       | 10:45:39 |
| 2  | again, that's a quasistatic state between the      | 10:45:41 |
| 3  | programming period and the emission period.        | 10:45:44 |
| 4  | Q The voltage -- well, he has a label here         | 10:45:47 |
| 5  | that says VData minus the absolute value of V      | 10:45:49 |
| 6  | threshold. Right?                                  | 10:45:53 |
| 7  | A Yes, he shows that. That effectively is          | 10:45:55 |
| 8  | the condition where you increase that to the point | 10:45:57 |
| 9  | when you essentially, you hit that voltage, then   | 10:46:00 |
| 10 | the transistor will turn off, and the programming  | 10:46:03 |
| 11 | step is completed.                                 | 10:46:05 |
| 12 | Q And so going back to my original question        | 10:46:06 |
| 13 | now that we've walked through that. Does the       | 10:46:10 |
| 14 | amount of time that it takes to put charge on the  | 10:46:13 |
| 15 | gate of Transistor 3308 to turn it off depend on   | 10:46:21 |
| 16 | the VData value?                                   | 10:46:25 |
| 17 | MR. HSU: Objection. Incomplete                     | 10:46:32 |
| 18 | hypothetical.                                      | 10:46:33 |
| 19 | A I didn't consider that, and before I             | 10:46:41 |
| 20 | provided an evaluation of that answer, I would     | 10:46:45 |
| 21 | have to go study the circuit in a lot more detail  | 10:46:48 |
| 22 | to verify that or not.                             | 10:46:50 |

1           As I said, what matters is that Kimura is  
2           just implicitly stating that enough time passes  
3           for all the voltages and transistors -- and this,  
4           again, would depend on the manufacturing process  
5           and the transistors and so forth -- to complete  
6           that. And there are probably ways to change the  
7           amount of time that would take.

10:46:52

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10:47:01

10:47:03

10:47:06

10:47:08

8           Kimura doesn't teach that. Kimura simply  
9           teaches that enough time is available for that,  
10          that programming step to complete itself.

10:47:09

10:47:12

10:47:14

11          Q     And you'd agree with me that timing is an  
12          important consideration with respect to display  
13          technology?

10:47:16

10:47:21

10:47:24

14          MR. HSU: Objection. Form.

10:47:26

15          A     Well, I would say in this particular  
16          instance it's important, because the --  
17          essentially there's three phases of operation.  
18          And each phase has to be completed before the next  
19          one can begin.

10:47:37

10:47:38

10:47:43

10:47:45

10:47:47

20          So to the extent that timing means that a  
21          task is completed before the next one begins, then  
22          it's important.

10:47:49

10:47:53

10:47:55

|    |          |                                                    |          |
|----|----------|----------------------------------------------------|----------|
| 1  | Q        | Displays also have refresh rates. Right?           | 10:47:56 |
| 2  | A        | Yes, that's one of the characteristics             | 10:48:05 |
| 3  |          | associated with a display, is the refresh rate.    | 10:48:07 |
| 4  | Q        | And that's the amount of time between              | 10:48:09 |
| 5  |          | when you put one image and the next on the         | 10:48:11 |
| 6  |          | display?                                           | 10:48:16 |
| 7  | A        | I believe it's typically specified in              | 10:48:20 |
| 8  |          | hertz as being the frequency of the refresh. But   | 10:48:23 |
| 9  |          | one over the hertz would be the amount of time     | 10:48:26 |
| 10 |          | between the cycles. Which is why displays have --  | 10:48:28 |
| 11 |          | displays have higher refresh rates, the quality of | 10:48:32 |
| 12 |          | the display tends to be better.                    | 10:48:36 |
| 13 | Q        | And you have to perform all of your steps          | 10:48:37 |
| 14 |          | that are seen here in Figure 33 for each refresh.  | 10:48:41 |
| 15 |          | Right?                                             | 10:48:48 |
| 16 | MR. HSU: | Objection. Form.                                   | 10:48:49 |
| 17 | A        | My understanding is the process is                 | 10:48:51 |
| 18 |          | repetitive. And so each time you do a cycle, a     | 10:48:52 |
| 19 |          | time cycle, you're redoing the three steps of the  | 10:48:56 |
| 20 |          | process and then repeating them again and again    | 10:48:59 |
| 21 |          | and again.                                         | 10:49:01 |
| 22 | Q        | At the end of the operation shown in               | 10:49:02 |

1 Figure 33B, what voltage will be on the node at  
2 the gate of Transistor 3308?

3 A At the end of the operation, as Kimura  
4 shows in 33D, it will be VData minus the magnitude  
5 of the threshold voltage of Transistor 3308.

6 Q Now I'm actually asking at the end of the  
7 operation shown in Figure 33B, as in boy.

8 A 33B bravo?

9 Q Yes.

10 A Okay. Sorry. I was looking at that -- I  
11 was looking at the wrong figure.

12 It would be pulled to the voltage  
13 associated with whatever is on Line 3304. Or  
14 pretty close to it. There may be a small voltage  
15 drop across the diode, for example. But otherwise  
16 the idea is to pull it to whatever voltage you've  
17 put on -- not 3304. 3314. Sorry.

18 Essentially you're opening up 3309, 3310,  
19 and the LED is forward biased. Essentially you  
20 would be pulling that node down to the voltage on  
21 3314. Or close -- very close to it.

22 Q And what changes are made to the circuit

1 to go from the operation shown in Figure 33B to  
2 the operation shown in Figure 33C?

3 A Transistor 3310 is turned off, and that  
4 blocks that path to 3314. And, therefore, that  
5 activates the path in C. You see here in 33C  
6 which I referred earlier as a DC dead end to the  
7 capacitor. And so the charge would flow on to  
8 that node until it turned off 3308 and cut off  
9 that current path.

10 Q And so at that point all of the  
11 transistors are on except for 3307 and 3310?

12 A Well, at that point 3308 would also be  
13 off, as per 33C. 3307 has just been turned off  
14 and left off. 330 -- sorry, 3310 has been turned  
15 off going from 33B to 33C. And 3308 has turned  
16 itself off as part of the programming step.

17 Q But the beginning of that programming  
18 step in 33C, Transistor 3308 is on. Right?

19 A Yes, it's been turned on during the --  
20 during the initialization phase. And then it's  
21 turned back off during the programming phase.

22 You said 3308. Correct?

10:51:12

10:51:14

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|    |   |                                                    |          |
|----|---|----------------------------------------------------|----------|
| 1  | Q | Correct.                                           | 10:53:00 |
| 2  | A | Okay. And that's what you're discussing.           | 10:53:01 |
| 3  | Q | Sorry. And that's what you ultimately              | 10:53:05 |
| 4  |   | see in Figure 33D. Right? That's the result of     | 10:53:07 |
| 5  |   | when Transistor 3308 turns itself off?             | 10:53:09 |
| 6  | A | 3308 is turned off. That node is                   | 10:53:16 |
| 7  |   | isolated and has the voltage specified. And at     | 10:53:19 |
| 8  |   | this point I said he's showing a quasistatic point | 10:53:22 |
| 9  |   | where everything is turned off because he's going  | 10:53:25 |
| 10 |   | now from the programming phase in C to the         | 10:53:28 |
| 11 |   | emission phase in E.                               | 10:53:29 |
| 12 | Q | And so he's showing the emission phase in          | 10:53:37 |
| 13 |   | Figure 33E. And in that phase Transistors 3307     | 10:54:02 |
| 14 |   | and 3310 are both turned on. Right?                | 10:54:07 |
| 15 | A | 3307 and 3310 are explicitly turned on by          | 10:54:13 |
| 16 |   | an input signal, yes.                              | 10:54:16 |
| 17 | Q | And that allows current to flow from VDD           | 10:54:18 |
| 18 |   | through the EL element to emit light?              | 10:54:22 |
| 19 | A | Yes. And as he shows also, because now             | 10:54:26 |
| 20 |   | he's applying different voltages, the Transistor   | 10:54:29 |
| 21 |   | 3308 will actually be on in this phase. It won't   | 10:54:35 |
| 22 |   | be on as strongly as the other two simple          | 10:54:38 |

|    |                                                    |          |
|----|----------------------------------------------------|----------|
| 1  | transistors, but that transistor will now be       | 10:54:42 |
| 2  | turned on. And, therefore, you have the path VDD.  | 10:54:44 |
| 3  | Down through the electroluminescent element, you   | 10:54:48 |
| 4  | drive forward bias current through the             | 10:54:52 |
| 5  | electroluminescent element, and it emits light.    | 10:54:53 |
| 6  | Q I want to turn to Figure 21 of Kimura.           | 10:54:56 |
| 7  | MR. FRISCH: If we can have that pulled             | 10:55:20 |
| 8  | up on the screen as well, that would be helpful.   | 10:55:22 |
| 9  | A I have that on my paper. I will just             | 10:55:24 |
| 10 | note as preface obviously this was not an          | 10:55:27 |
| 11 | embodiment I considered in my analysis.            | 10:55:29 |
| 12 | (Discussion off the record with the A/V            | 10:55:40 |
| 13 | technician.)                                       | 10:55:43 |
| 14 | Q And Figure 21 has three subparts, 21A,           | 10:56:08 |
| 15 | 21B, and 21C. Right?                               | 10:56:13 |
| 16 | A Yes, it has them all on the same page in         | 10:56:17 |
| 17 | the document.                                      | 10:56:19 |
| 18 | Q Having not considered this embodiment,           | 10:56:19 |
| 19 | are you aware of what's being shown in Figure 21B? | 10:56:26 |
| 20 | A Well I can tell, just because it's               | 10:56:37 |
| 21 | Kimura, I presume 2108 is an electroluminescent    | 10:56:38 |
| 22 | element, and this is some sort of a pixel circuit  | 10:56:42 |

1 for driving it. That's all I can assume from

10:56:45

2 this.

10:56:47

3 Q But looking at Figure 21B, do you know  
4 what the subframe period SF1 is?

10:56:47

10:56:50

5 A I did not consider that.

10:56:54

6 Q Did you consider what is labeled as Ta2  
7 is?

10:56:57

10:57:07

8 A No, I did not. I did not consider this  
9 embodiment, as I said.

10:57:13

10:57:15

10 Q In your declaration you have discussions  
11 about PMOS and NMOS transistors. Right?

10:57:28

10:57:30

12 A I have in two or three places, yes.

10:57:34

13 Q And one of the key differences I believe  
14 you discuss is that PMOS and NMOS transistors have  
15 differences in their threshold voltage?

10:57:36

10:57:40

10:57:45

16 A I don't recall explicitly saying anything  
17 about the PMOS/NMOS difference. Other than if you  
18 look at these transistors, how they're put  
19 together, they don't have a substrate contact.

10:57:51

10:57:53

10:57:59

10:58:03

20 So you would expect that the NMOS would  
21 run with a positive power supply voltage and have  
22 a positive threshold voltage, whereas the PMOS

10:58:05

10:58:08

10:58:10

1 would be like Andy Grove's description in 1967,  
2 which predates CMOS circuitry; where you have a  
3 negative power supply voltage and the threshold  
4 voltage would be negative. In that way they're  
5 off or on; that's how you turn them off or on.

6 Q And you talk about turning PMOS  
7 transistors on using active load signaling.

8 Right?

9 A I believe I do. If you want to point me  
10 to a particular place in my declaration, or I can  
11 look for it. I discuss NMOS and PMOS in several  
12 places, beginning with the technology background  
13 section.

14 Q Well, your understanding is that a PMOS  
15 transistor requires active low signaling to turn  
16 on. Right?

17 A That's my understanding as the  
18 conventional use of a PMOS transistor. The  
19 threshold voltage would be a negative value, and  
20 you would have to pull the gate below that value.

21 That's in a pure CMOS -- I cited Andy  
22 Grove's book because it shows using a negative

10:58:14

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10:58:59

10:59:01

10:59:04

10:59:06

10:59:08

10:59:11

1 voltage on the gate. I was trying to also -- if  
2 you look at conventional CMOS circuitry, you  
3 actually use low by being zero, not being  
4 negative.

5 But overall the symbology which I show in  
6 Paragraph 48 of my report, which has the circle,  
7 is a way of indicating that NMOS has active high,  
8 PMOS has active low. And in this case the active  
9 low would actually be negative.

10 Q I think you were starting to go into it a  
11 little bit. But what is the difference in the  
12 PMOS transistor and an NMOS transistor that leads  
13 to that difference in threshold voltage?

14 A Well, the threshold voltage is a  
15 parameter you can set during processing. That's  
16 how you choose a threshold voltage. It's not  
17 something that just happens.

18 The conventional practice is, for what's  
19 called an enhancement mode transistor, you would  
20 want to have, for example the NMOS you would have  
21 a positive threshold voltage, and you would turn  
22 on and off by having a signal voltage where the

10:59:15

10:59:17

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11:00:08

11:00:09

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11:00:18

11:00:21

1 voltage goes higher than the threshold voltage to

11:00:25

2 turn it on, and it goes below it to turn it off.

11:00:27

3 In PMOS, as raw, as first done -- and

11:00:32

4 that's why I liked Andy Grove's description in 1967

11:00:36

5 where this is all they had -- it's the mirror

11:00:40

6 image.

11:00:42

7 You have, the threshold voltage you make

11:00:43

8 it negative so that you can turn the transistor on

11:00:45

9 by pulling the voltage below to be more negative

11:00:48

10 than the threshold voltage to turn it on, and

11:00:51

11 putting it above the threshold voltage to turn

11:00:54

12 that transistor off.

11:00:57

13 The caveat on that is you can actually

11:00:59

14 make transistors that are turned on when there's

11:01:02

15 no voltage applied to the gate. Those are called

11:01:05

16 depletion load transistors that were used very

11:01:07

17 extensively in what was known as NMOS logic, where

11:01:10

18 you have an enhancement transistor and a depletion

11:01:13

19 transistor in the same circuit.

11:01:16

20 My understanding of the transistors here

11:01:18

21 in everything we've looked at is they're all

11:01:22

22 enhancement mode transistors, which are as I just

11:01:24

1 described them. The bottom line is the threshold  
2 voltage is generally a parameter which is set by  
3 the processing when you do the manufacturing.  
4 It's designed into the process by the engineers  
5 developing the process.

6 Q And NMOS and PMOS transistors are  
7 generally fabricated by different methods.

8 Correct?

9 MR. HSU: Objection. Form.

10 A I wouldn't say they're different methods.  
11 They can be fabricated in the same process, and  
12 some process steps will be shared in general.  
13 Others will apply only for NMOS. And others will  
14 apply only for PMOS.

15 Q So, for example, one of those operation  
16 steps would be doping, right, that you would use a  
17 different dopant for PMOS than NMOS?

18 A When you're actually getting to  
19 individual transistors, you would have -- the way  
20 this typically works, at least in silicon, is you  
21 may have some blanket doping for the whole  
22 substrate. And then you would do different

1 dopings for the NMOS and the PMOS to make them  
2 NMOS or PMOS transistors.

3 So it's -- I'm just trying to emphasize  
4 that they're -- they do share some things, and  
5 there are some differences between them to make  
6 both NMOS and PMOS if they're going to be on the  
7 same substrate together.

8 Q And a dopant you might use for PMOS would  
9 be boron?

10 A In silicon, that's the common -- pretty  
11 much the only dopant you can really use. All  
12 other types of have essentially failed  
13 spectacularly.

14 Q And in silicon for NMOS you may use  
15 phosphorus or arsenic?

16 A Again, those are the two common, most  
17 common ones. And the -- those have been  
18 successful for a number of years. So that's  
19 typically what's used.

20 Q Now, NMOS transistors, they have higher  
21 electron mobility than PMOS transistors. Right?

22 A That's an interesting question. Because

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | that was typically the case years ago in silicon. | 11:03:24 |
| 2  | It used to be three to one, then it became two to | 11:03:28 |
| 3  | one. And nowadays it's basically, because of      | 11:03:30 |
| 4  | using strain, they become the same.               | 11:03:34 |
| 5  | So it depends on the material used and            | 11:03:36 |
| 6  | the conditions. So again, it's a manufacturing    | 11:03:38 |
| 7  | process of -- type of choice.                     | 11:03:41 |
| 8  | Q And you said it went from about three to        | 11:03:46 |
| 9  | one, to two to one, to nowadays being similar.    | 11:03:49 |
| 10 | When did those transitions happen?                | 11:03:52 |
| 11 | A Let me think a minute. This is deep             | 11:03:56 |
| 12 | history. Three to one was the old days. By the    | 11:03:57 |
| 13 | 1980s it had become two to one. And it's been in, | 11:04:03 |
| 14 | like, the past maybe ten years when ThinFETs      | 11:04:07 |
| 15 | became a big deal as looking at the use of the    | 11:04:12 |
| 16 | drain in the PMOS transistors, they've become     | 11:04:14 |
| 17 | pretty close to one to one. And, of course, that  | 11:04:16 |
| 18 | could change again. Who knows what's going to     | 11:04:19 |
| 19 | come next. But so the idea that NMOS are always   | 11:04:21 |
| 20 | faster than PMOS is not what it used to be.       | 11:04:25 |
| 21 | Q In the time periods where you did have          | 11:04:28 |
| 22 | these differences in speed between NMOS and PMOS, | 11:04:36 |

1 would PMOS transistors generally be made larger to 11:04:40  
2 account for that? 11:04:43

3 A Well, again, it depends on the 11:04:47  
4 application you're doing it in. A good example of 11:04:48  
5 that would be in the CMOS inverter. To make the 11:04:50  
6 current the same between the two transistors, 11:04:54  
7 you'd look at the mobility ratio, and then you 11:04:56  
8 make one -- the PMOS wider based on the mobility 11:04:58  
9 ratio. 11:05:03

10 When I was a cub engineer it was two to 11:05:04  
11 one. So you typically made the PMOS transistors 11:05:06  
12 in a CMOS logic circuit twice as wide as the NMOS. 11:05:09  
13 So the current would be the same in both and, 11:05:12  
14 therefore, the switching characteristic would be 11:05:15  
15 symmetric. Now you could muck around with the 11:05:17  
16 dimensions to make the switching characteristic 11:05:20  
17 not symmetric. But that was the basic 11:05:22  
18 understanding we had. 11:05:24

19 Q In terms of NMOS and PMOS we've talked 11:05:26  
20 about a few differences just now, and you were 11:05:30  
21 talking about how you would go about designing 11:05:32  
22 circuits using them. Are there other differences 11:05:35

1 between the two that you would normally consider 11:05:37  
2 when you were designing things using NMOS and 11:05:39  
3 PMOS? 11:05:49

4 A If you're using CMOS logic you're going 11:05:50  
5 to have to have NMOS and PMOS. So you would 11:05:52  
6 simply consider those because they're both going 11:05:55  
7 to be there. Again, this is a trade-off. Because 11:05:57  
8 if you only had only NMOS or only PMOS you have a 11:05:58  
9 simpler manufacturing process, with all the 11:06:03  
10 benefits you'd get. The reason we use CMOS is 11:06:05  
11 it's so advantageous as a circuit technology it's 11:06:08  
12 worth paying the price, literally and 11:06:11  
13 figuratively, to have both NMOS and PMOS together 11:06:13  
14 on the same substrate. 11:06:16

15 So the considerations basically are that 11:06:17  
16 they're both there. CMOS is a circuit 11:06:20  
17 architecture that requires both NMOS and PMOS. 11:06:23  
18 And so that's just what you run with. 11:06:27

19 And, by the way, one thing I also just 11:06:29  
20 for clarity, a CMOS circuit has a particular 11:06:31  
21 architecture. A CMOS process can have both NMOS 11:06:36  
22 and PMOS transistors. But I don't call it a CMOS 11:06:41

1 process for the manufacturing because CMOS is 11:06:44  
2 actually an architecture. So I call that a dual 11:06:47  
3 mode. 11:06:49

4 So if I say CMOS, I'm referring to 11:06:49  
5 circuitry, not to a manufacturing process, just 11:06:51  
6 for clarity. 11:06:53

7 Q That's helpful. Thank you. 11:06:59

8 NMOS and PMOS also differ in their 11:07:04  
9 leakage current. Right? 11:07:07

10 A Not necessarily. That's typically a 11:07:12  
11 threshold voltage issue is the main leakage issue. 11:07:15

12 Q Can you explain what you mean when you 11:07:18  
13 say it's a "threshold voltage issue"? 11:07:20

14 A I have a very helpful figure in my 11:07:28  
15 declaration on Page 35 at Paragraph 63. I'm 11:07:31  
16 waiting. I have it in front of me. But if you 11:07:40  
17 want to pull it up, it's on Page 35 of my 11:07:42  
18 declaration. 11:07:45

19 Q Yes. Why don't we pull it up. 11:07:47

20 A If you could scroll down just a little 11:07:58  
21 bit so the figure -- sorry. Sorry. If you can 11:07:59  
22 have the whole figure on the screen. There we go. 11:08:02

1 To explain this I need to have the whole figure on  
2 the screen. Sorry, now that we have that,  
3 probably best if you reask the question since some  
4 will be confused by not having your question in  
5 the transcript right now.

6 Q Let me go find it.

7 A I'm sorry. I figure that if someone is  
8 reading this they're going to get lost because  
9 your question is a page back.

10 Q So I think you were talking about leakage  
11 voltage being based on threshold voltage. And I  
12 had asked if you could explain what you meant by  
13 that.

14 A Well, I believe your question was do PMOS  
15 have higher leakage than NMOS. And this figure,  
16 actually, I didn't necessarily put it in here for  
17 that purpose. I said earlier that you choose the  
18 threshold voltage. You select that. And so,  
19 basically, if you choose when you're designing --  
20 when you're developing your process to take that  
21 threshold voltage, you can see there's in this log  
22 linear plot, there's a straight line. The current

1       decays -- the current changes exponentially below  
2       the threshold.

3               And so the leakage current would be where  
4       it intersects the Y axis, based on that threshold  
5       voltage.

6               So if you change the threshold voltage in  
7       your process, you would actually change where that  
8       intersection happens. You could just take this  
9       curve and move it right or left, and you could  
10      tell from that I think readily that the -- where  
11      it hits the Y axis would change. That's how the  
12      leakage current of a transistor is typically  
13      characterized.

14              When PMOS transistors in some -- in the  
15      older technologies used all N plus polysilicon  
16      gates, the slope of the PMOS transistor was less  
17      steep. So for the same threshold voltage in N and  
18      P would have a higher leakage current. But you  
19      could compensate for that by slightly increasing  
20      the threshold.

21              Again, these are engineering tradeoffs  
22      and questions. Rather than -- there is not a

1 physics answer; it's an engineering concern. 11:10:09

2 Q Earlier we were talking about 11:10:11  
3 light-emitting devices, and you clarified that you 11:10:14  
4 were using OLED and LED to refer to light-emitting 11:10:19  
5 diodes. 11:10:24

6 Are you familiar with lasers? 11:10:24

7 A Yes, I am. In fact, I have -- I have 11:10:26  
8 made both LEDs and lasers during my time. 11:10:28

9 Q What is the -- at a high level, what are 11:10:33  
10 the differences between an LED versus a laser? 11:10:36

11 A Well, back in the day when we'd say we 11:10:39  
12 made LEDs when we failed to make the lasers 11:10:43  
13 properly. 11:10:47

14 But a laser essentially is giving a 11:10:48  
15 coherent emission, where you actually have the -- 11:10:51  
16 again, you're going back here a ways. I hope I 11:10:55  
17 don't screw up how a laser works. I haven't 11:10:58  
18 thought about that in a long time, and I haven't 11:11:01  
19 thought about it in prepping today. 11:11:03

20 But all these emitters amount to your 11:11:04  
21 having a recombination holes of electrons at 11:11:04  
22 light. That's how all these light emitters work. 11:11:09

1 The laser -- what the laser has versus the OLED is 11:11:11  
2 essentially you're able to have cavity. You 11:11:16  
3 actually -- when you make those in gallium 11:11:19  
4 arsenide, you basically have essentially a 11:11:22  
5 resonant cavity. 11:11:24

6 And if you can have a resonant cavity 11:11:25  
7 that will allow the resonance of the light to 11:11:27  
8 occur inside that cavity, then it can emit as a 11:11:29  
9 laser rather than simply as an LED. That -- 11:11:32  
10 again, that's something I haven't thought about in 11:11:34  
11 a good 20-plus years, so I hope that's close 11:11:36  
12 enough for anyone reading this. 11:11:39

13 Q Are you familiar with quantum cascade 11:11:40  
14 lasers? 11:11:43

15 A I've -- not recently. I vaguely am. 11:11:44  
16 These again, what you're doing is -- I actually 11:11:47  
17 worked on some of those years ago, something 11:11:49  
18 similar. The idea is that if you can use the -- 11:11:51  
19 it's a unique feature of gallium arsenide and its 11:11:55  
20 cousin aluminum arsenide. They have the same -- 11:12:00  
21 different band gap, same lattice constant. 11:12:00

22 So you can make an alloy of aluminum 11:12:04

1 gallium arsenide, and you can use that to create a 11:12:06  
2 confinement area inside the material. 11:12:07

3 It's not a physical confinement area in 11:12:11  
4 terms of if you look at the material; it's an 11:12:15  
5 electrostatic confinement area. And by confining 11:12:16  
6 the carriers more closely together, you get more 11:12:17  
7 efficient recombination and more efficient 11:12:20  
8 emission. And that cavity can provide -- if you 11:12:22  
9 have good material and it's clean, you can provide 11:12:25  
10 resonant cavity with a laser. 11:12:28

11 Q If you can go to your declaration at Page 11:12:33  
12 45? 11:12:37

13 A I have that in front of me, yes. 11:12:37

14 Q And here you show an image that is 11:12:49  
15 labeled at the top Example L-I Curve Set. 11:12:52

16 A Yes. This is an exemplary figure I 11:12:57  
17 found, which is the L-I curve. The light -- the 11:13:00  
18 light-emission power versus the current through a 11:13:03  
19 typical -- this is a typical profile of how -- 11:13:06  
20 what an LED looks like. 11:13:08

21 Q And you pulled this image? 11:13:10

22 A There is a footnote at the bottom with 11:13:15

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | the link to the figure.                          | 11:13:17 |
| 2  | Q But you were the one who found this            | 11:13:18 |
| 3  | image, though.                                   | 11:13:21 |
| 4  | A Yes. Yes. I just wanted to find a              | 11:13:22 |
| 5  | generic example of the L-I curve of a            | 11:13:24 |
| 6  | light-emitting diode. And it shows if you apply  | 11:13:27 |
| 7  | forward bias, and this is the light versus       | 11:13:30 |
| 8  | current, result you get.                         | 11:13:32 |
| 9  | Q And this is taken from Thorlabs,               | 11:13:34 |
| 10 | according to that footnote that you've just      | 11:13:36 |
| 11 | pointed us to in Footnote 9?                     | 11:13:39 |
| 12 | A Yes, that's where I found it. And again,       | 11:13:41 |
| 13 | I just found this as being exemplary of my       | 11:13:43 |
| 14 | understanding of past experience of what an L-I  | 11:13:46 |
| 15 | curve of a light-emitting diode looks like.      | 11:13:49 |
| 16 | MR. FRISCH: I am actually going to mark          | 11:13:53 |
| 17 | a new exhibit which we'll drop in the chat here, | 11:13:55 |
| 18 | which I'd like to mark at Exhibit 2008.          | 11:13:57 |
| 19 | (Exhibit 2008 marked for identification          | 11:13:57 |
| 20 | and is attached to the transcript.)              | 11:14:19 |
| 21 | Q I believe that is coming through on your       | 11:14:19 |
| 22 | end. But let me know when it does.               | 11:14:20 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | (Discussion off the record with the A/V           | 11:14:26 |
| 2  | technician.)                                      | 11:14:30 |
| 3  | A No. This is the first one I have to go          | 11:14:31 |
| 4  | find. So I may need some help walking through how | 11:14:32 |
| 5  | to find this. Is it over in the chat area?        | 11:14:37 |
| 6  | Q That's right. If you go to the chat box.        | 11:14:39 |
| 7  | If you click Chat at the bottom of the screen.    | 11:14:41 |
| 8  | A Oops. I went there and then it -- okay.         | 11:14:45 |
| 9  | Then it disappeared. So this is the one that says | 11:14:47 |
| 10 | Thorlabs printout?                                | 11:14:50 |
| 11 | Q That's right.                                   | 11:14:52 |
| 12 | A Okay. Come on. It asks me to download           | 11:15:00 |
| 13 | it. Can I just open it, or do I have to download  | 11:15:02 |
| 14 | it to open it?                                    | 11:15:05 |
| 15 | Q I think you might have to download it to        | 11:15:06 |
| 16 | open it. But we can put it on the screen if       | 11:15:08 |
| 17 | that's easier for you.                            | 11:15:11 |
| 18 | A Let me download it. It's not going where        | 11:15:13 |
| 19 | I wanted it to go, so let me ...                  | 11:15:15 |
| 20 | Why don't we go ahead. If I need to pull          | 11:15:25 |
| 21 | it up I think I know where you're going, so ...   | 11:15:27 |
| 22 | Q Sure. So this is a printout that was            | 11:15:31 |

1 taken from Thorlabs. And I just -- if we can go  
2 to the third page of this document.

3 Is this the image that you pulled for  
4 your declaration -- or, sorry, let me go back. On  
5 Page 3 there's two images. There's one on the top  
6 that says, Example L-I Curve, and it only has a  
7 blue line on it. And then there is a second image  
8 on the bottom that says, Example L-I Curve Set,  
9 and that has three lines; a red, a blue, and a  
10 green.

11 That's the image, the second image that I  
12 just discussed, that's the image that's in your  
13 declaration. Right?

14 A That appears to be the case. That's the  
15 image I found when I did a search on LED L-I curve  
16 or something to that effect.

17 Q And if we look at the description under  
18 it, it says Figure 2, this set of L-I curves for a  
19 QCL laser, and then it goes on. Right?

20 A Yeah. It's the same for an LED and a  
21 laser.

22 Q Okay. But this specific one is being

11:15:34

11:15:39

11:15:48

11:15:50

11:15:54

11:15:57

11:16:00

11:16:02

11:16:05

11:16:08

11:16:08

11:16:11

11:16:13

11:16:14

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11:16:32

11:16:33

|    |                                                    |          |
|----|----------------------------------------------------|----------|
| 1  | provided for a QCL laser. Right?                   | 11:16:35 |
| 2  | A That's what the caption says. But again,         | 11:16:40 |
| 3  | I found it by doing a search for LED L-I curve, or | 11:16:41 |
| 4  | something similar. And I know from experience      | 11:16:45 |
| 5  | that a laser is also a light-emitting diode; it's  | 11:16:47 |
| 6  | one that just can lase as well. It's not           | 11:16:53 |
| 7  | different in the terms of essentially from a       | 11:16:56 |
| 8  | light. It's a diode that emits light; it just      | 11:16:57 |
| 9  | does so in a laser fashion. So this is perfectly   | 11:17:00 |
| 10 | acceptable to get across the idea of how the L-I   | 11:17:02 |
| 11 | curve event OLED or any LED behaves.               | 11:17:06 |
| 12 | MR. FRISCH: Okay. Why don't we take our            | 11:17:11 |
| 13 | second break.                                      | 11:17:13 |
| 14 | VIDEO SPECIALIST: We are going off the             | 11:17:14 |
| 15 | record at 11:17 a.m.                               | 11:17:15 |
| 16 | (A recess was taken.)                              | 11:17:23 |
| 17 | VIDEO SPECIALIST: We are going back on             | 11:31:57 |
| 18 | the record. The time is 11:32 a.m.                 | 11:32:01 |
| 19 | BY MR. FRISCH:                                     | 11:32:07 |
| 20 | Q If we can focus next on Paragraph -- or          | 11:32:07 |
| 21 | sorry, Page 108 of your declaration. Let me know   | 11:32:12 |
| 22 | when you're there.                                 | 11:32:29 |

|    |   |                                                    |          |
|----|---|----------------------------------------------------|----------|
| 1  | A | Oh, sorry, I'm there. Yes, I'm in the              | 11:32:30 |
| 2  |   | paper copy. And I'll try to remember to turn back  | 11:32:32 |
| 3  |   | to talk due to the problems we had.                | 11:32:34 |
| 4  | Q | Sure. So Page 108 starts with your                 | 11:32:36 |
| 5  |   | analysis of Claim Element 7e. Right?               | 11:32:40 |
| 6  | A | That's correct.                                    | 11:32:44 |
| 7  | Q | And just for the record, that claim                | 11:32:44 |
| 8  |   | element is, "A fourth transistor for delivering a  | 11:32:46 |
| 9  |   | power supply voltage to the second transistor when | 11:32:50 |
| 10 |   | the light is emitted." Right?                      | 11:32:52 |
| 11 | A | Yes, that's what the claim element says.           | 11:32:56 |
| 12 | Q | As you've shown in the diagrams below on           | 11:32:59 |
| 13 |   | the same page, you have identified Transistor 3307 | 11:33:08 |
| 14 |   | in Figure 33A of Kimura as the claimed fourth      | 11:33:14 |
| 15 |   | transistor. Right?                                 | 11:33:19 |
| 16 | A | Yes, that's the annotation provided to             | 11:33:20 |
| 17 |   | indicate that. Yes.                                | 11:33:22 |
| 18 | Q | If we go to the next page, you reference           | 11:33:23 |
| 19 |   | a corrected version of Figure 7 of the '599        | 11:33:29 |
| 20 |   | patent. Right?                                     | 11:33:33 |
| 21 | A | Yes. There was this problem that the               | 11:33:38 |
| 22 |   | '599 patent for some reason got all the way        | 11:33:40 |

|    |                                                    |          |
|----|----------------------------------------------------|----------|
| 1  | through it being issued with what it says is       | 11:33:42 |
| 2  | Figure 7. I think it's just a copy of Figure 6.    | 11:33:44 |
| 3  | And so that's why this figure, which from the      | 11:33:48 |
| 4  | specification is clearly what should have been     | 11:33:52 |
| 5  | there and wasn't. So we went and used that. And    | 11:33:54 |
| 6  | I think I explained that somewhere in the          | 11:33:57 |
| 7  | declaration.                                       | 11:33:59 |
| 8  | Q And you've labeled in that image as              | 11:34:01 |
| 9  | Transistor 4 T35. Correct?                         | 11:34:04 |
| 10 | A Yes. It's the same numbering of the              | 11:34:12 |
| 11 | transistors in both Figure 7 of the Korean         | 11:34:17 |
| 12 | application and Figure 3 of the '599 patent.       | 11:34:19 |
| 13 | Q And you note that during the                     | 11:34:22 |
| 14 | light-emission phase, Transistor T35 is turned on. | 11:34:33 |
| 15 | Correct?                                           | 11:34:36 |
| 16 | A Yes. During the light-emission phase,            | 11:34:47 |
| 17 | that transistor is turned on.                      | 11:34:49 |
| 18 | Q If you look at the paragraph under the           | 11:34:54 |
| 19 | corrected Figure 7 on Page 109, the last sentence  | 11:34:55 |
| 20 | on the page, you say, "In particular the fourth    | 11:35:00 |
| 21 | transistor when turned on enters a state of        | 11:35:04 |
| 22 | negligible resistance - and thus the VDD voltage   | 11:35:07 |

|    |                                                    |          |
|----|----------------------------------------------------|----------|
| 1  | appears on both sides, source and drain of the     | 11:35:11 |
| 2  | fourth transistor."                                | 11:35:15 |
| 3  | Do you see that?                                   | 11:35:16 |
| 4  | A Yes, I see that. That's my explanation           | 11:35:17 |
| 5  | of what's going on there.                          | 11:35:19 |
| 6  | Q And can you explain what you mean by "a          | 11:35:24 |
| 7  | state of negligible resistance"?                   | 11:35:26 |
| 8  | A Yes. I touched on this earlier at some           | 11:35:27 |
| 9  | point. I know I -- in the transcript I touched on  | 11:35:30 |
| 10 | this, that the way this circuitry works, when you  | 11:35:33 |
| 11 | have the three transistors between VDD and the     | 11:35:38 |
| 12 | electroluminescent element, the programming step   | 11:35:43 |
| 13 | for the second transistor for what's T31 in the    | 11:35:47 |
| 14 | patent, in the '599 patent, is -- has a gate       | 11:35:50 |
| 15 | voltage, essentially, which turns it on to -- a    | 11:35:56 |
| 16 | gate source voltage which turns it on, less on     | 11:36:02 |
| 17 | than the other two transistors.                    | 11:36:05 |
| 18 | Therefore, the resistance in the path              | 11:36:06 |
| 19 | from -- through those three transistors is going   | 11:36:09 |
| 20 | to be -- you can treat it as being entirely across | 11:36:13 |
| 21 | Transistor 2, Transistor T31. And Transistor T35   | 11:36:17 |
| 22 | and T36 have very little voltage drop across them. | 11:36:22 |

1 And, therefore, they effectively can be treated as 11:36:27  
2 having negligible resistance. 11:36:29

3 Q They have more of a voltage drop across 11:36:33  
4 them if T31 was not there? 11:36:36

5 MR. HSU: Objection. Incomplete 11:36:40  
6 hypothetical. 11:36:42

7 A Basically if you look at Figure 3 we have 11:36:44  
8 in front of us, you have the current path goes 11:36:46  
9 from VDD on the upper left, through Transistor 11:36:51  
10 T35, through Transistor T31, through Transistor 11:36:56  
11 T36 I believe that is, and then through the 11:37:00  
12 electroluminescent element. And so you have to 11:37:08  
13 drop from the voltage across that from VDD to VSS, 11:37:10  
14 has to be dropped across those various elements. 11:37:14

15 And this is again, this is a typical 11:37:17  
16 transistor circuit thing you do if you have 11:37:19  
17 multiple transistors, and you use this quite a bit 11:37:21  
18 in analog circuit design. 11:37:26

19 If one of the transistors has -- is 11:37:28  
20 biased so it has a higher resistance, then you'll 11:37:31  
21 have more voltage drop across that. It's simply a 11:37:34  
22 matter of resistance. Think of it as a 1 ohm, a 1 11:37:37

1 ohm, and 1,000 ohm resistor. Voltage drop is 11:37:42  
2 going to be across the thousand ohm resistor by 11:37:45  
3 1,000 to 1,002 effectively. That's all I'm 11:37:48  
4 pointing out here, is that's how this circuit is 11:37:55  
5 configured to do that. 11:37:57

6 Q If we can switch back to Kimura for a 11:38:11  
7 moment. And I'd like to go to Paragraph 688. 11:38:14

8 A Paragraph 688, you said? 11:38:43

9 Q Yes. And it's on Page 32 of Kimura. 11:38:45

10 A Yes. This appears to relate to the 11:38:53  
11 Figure 39 embodiment, which again just as a 11:38:55  
12 preface is an embodiment I didn't consider in my 11:38:57  
13 analysis and doesn't appear in my declaration. 11:39:00

14 Q Is it fair to say if an embodiment didn't 11:39:02  
15 appear in your declaration, it was one of the ones 11:39:11  
16 you didn't consider? 11:39:13

17 A I believe that's a -- 11:39:18

18 MR. HSU: Objection. 11:39:19

19 THE WITNESS: Go ahead, Hans. Sorry. 11:39:21

20 MR. HSU: Misstates testimony. 11:39:23

21 A I believe that's a relatively fair 11:39:28  
22 assessment. Kimura has numerous embodiments, and 11:39:30

|    |                                                    |          |
|----|----------------------------------------------------|----------|
| 1  | I considered the embodiments I thought were of     | 11:39:33 |
| 2  | interest to the -- what we're doing here.          | 11:39:36 |
| 3  | Q I believe you said that Paragraph 688            | 11:39:38 |
| 4  | goes with Figure 39. And I agree. I'm going to     | 11:39:45 |
| 5  | ask you a question about Figure 39 here, so it may | 11:39:49 |
| 6  | be helpful if you can put your paper copy to       | 11:39:52 |
| 7  | Figure 39 and we can have the text here on the     | 11:39:55 |
| 8  | screen.                                            | 11:39:57 |
| 9  | A I'll try to stick a pen in here so I can         | 11:40:01 |
| 10 | flip back and forth between the two. But I can't   | 11:40:03 |
| 11 | promise nondisaster.                               | 11:40:06 |
| 12 | Q Sure. In Paragraph 688 there's a                 | 11:40:10 |
| 13 | discussion of about Transistor or TFT 3912.        | 11:40:14 |
| 14 | Do you see that?                                   | 11:40:18 |
| 15 | A Yes, I see that discussion.                      | 11:40:19 |
| 16 | Q And if we look at Figure 39A, Transistor         | 11:40:40 |
| 17 | 3912 is the transistor that's just above the EL    | 11:40:45 |
| 18 | element 3916. Right?                               | 11:40:50 |
| 19 | A Yes, one side of that transistor's               | 11:40:55 |
| 20 | current path is connected to the one terminal of   | 11:40:57 |
| 21 | the electroluminescent element.                    | 11:41:01 |
| 22 | Q And I apologize. If we can stay on               | 11:41:03 |

1 Paragraph 688 on the screen, that would be 11:41:09  
2 helpful. I think we're both looking at hard 11:41:11  
3 copies of this figure. 11:41:13

4 A For what it's worth, I can do whatever is 11:41:19  
5 simpler for anyone. It's not too bad. There's 11:41:21  
6 only two pages here, so I can keep track of the 11:41:24  
7 two pages and flip back and forth if need be. 11:41:26

8 Q Sure. It would be helpful for me, 11:41:29  
9 though, if we could just put Paragraph 688 back on 11:41:31  
10 the screen. Perfect. 11:41:35

11 And it says here in Paragraph 688, An 11:41:36  
12 electric current path to the EL device 3916 can be 11:41:39  
13 cut off by turning the TFT 3912 off. 11:41:43

14 Do you see that? 11:41:48

15 A Yes. And it seems pretty 11:41:51  
16 straightforward, even though I haven't evaluated 11:41:53  
17 this embodiment, that if you turn 3912 off, you 11:41:55  
18 are interrupting the current path from the top to 11:41:59  
19 the bottom that goes down through the LED. 11:42:03

20 Q So that's what they mean by cut off, is 11:42:07  
21 that 3912 is along the current path from the top 11:42:11  
22 to the bottom as it goes down through the LED? 11:42:17

|    |                                                    |          |
|----|----------------------------------------------------|----------|
| 1  | MR. HSU: Objection. Form.                          | 11:42:21 |
| 2  | A Well, I would -- I would agree that -- I         | 11:42:24 |
| 3  | treat the term "cut off" to mean like turning a    | 11:42:26 |
| 4  | water faucet off. That the water is not flowing    | 11:42:29 |
| 5  | out of the faucet anymore because you've turned it | 11:42:32 |
| 6  | off. So there's no current flowing down that       | 11:42:34 |
| 7  | current path.                                      | 11:42:37 |
| 8  | Q If we can turn back to your declaration          | 11:42:38 |
| 9  | for a moment. I want to go to Page 128. If you     | 11:42:49 |
| 10 | can let me know when you're there.                 | 11:42:59 |
| 11 | A I have the paper copy of Page 128 to my          | 11:43:05 |
| 12 | left here.                                         | 11:43:07 |
| 13 | Q And on Page 128 of your declaration you          | 11:43:10 |
| 14 | included a modified version of Figure 33A. Right?  | 11:43:17 |
| 15 | A That is correct, that's what that figure         | 11:43:24 |
| 16 | shows.                                             | 11:43:26 |
| 17 | Q It's been modified in two respects. The          | 11:43:26 |
| 18 | first is that you have made it all PMOS, and the   | 11:43:31 |
| 19 | second is that you have added a transistor that    | 11:43:34 |
| 20 | you've labeled here with a red 6. Right?           | 11:43:37 |
| 21 | A That is correct. I advertised that as            | 11:43:41 |
| 22 | being a combined embodiment.                       | 11:43:43 |

|    |   |                                                    |          |
|----|---|----------------------------------------------------|----------|
| 1  | Q | Did you create this modified image?                | 11:43:46 |
| 2  |   | MR. HSU: Objection. Form.                          | 11:43:51 |
| 3  | A | I'm not sure what you mean by created.             | 11:43:55 |
| 4  |   | Do you mean created it in a drawing or created it  | 11:43:57 |
| 5  |   | as a circuit?                                      | 11:44:00 |
| 6  | Q | Created it as a drawing. Right?                    | 11:44:01 |
| 7  |   | So it originally started as the Figure             | 11:44:04 |
| 8  |   | 33A we see in Kimura. And then someone has kind    | 11:44:06 |
| 9  |   | of put in circles to make these transistors PMOS   | 11:44:10 |
| 10 |   | and added a transistor and labeled it as all PMOS. | 11:44:13 |
| 11 |   | Did you take those steps?                          | 11:44:16 |
| 12 | A | Well, I took the steps. I took the steps           | 11:44:18 |
| 13 |   | of doing the circuit design. I believe that in     | 11:44:21 |
| 14 |   | terms of generating the artwork, I believe         | 11:44:23 |
| 15 |   | Mr. Jensen did it, because he was a better artist  | 11:44:26 |
| 16 |   | than me.                                           | 11:44:28 |
| 17 | Q | Fair enough. And the point of this                 | 11:44:29 |
| 18 |   | figure, this modified Figure 33A on Page 128 of    | 11:44:37 |
| 19 |   | your declaration, that's to depict how the         | 11:44:40 |
| 20 |   | operation that was previously shown in Figure 33B  | 11:44:46 |
| 21 |   | would operate under your modified approach?        | 11:44:52 |
| 22 |   | MR. HSU: Objection. Form.                          | 11:44:55 |

|    |   |                                                    |          |
|----|---|----------------------------------------------------|----------|
| 1  | A | Yes, this is a modification to 33A and             | 11:45:01 |
| 2  |   | the 33s that -- follow I guess you would say,      | 11:45:08 |
| 3  |   | since those are all the same circuit. But it's a   | 11:45:11 |
| 4  |   | modification that changes the way you do the       | 11:45:13 |
| 5  |   | drainage during the initialization period to       | 11:45:17 |
| 6  |   | remove the charge from the capacitor, the          | 11:45:20 |
| 7  |   | programming capacitor, as it were.                 | 11:45:23 |
| 8  | Q | So what is the point of new Transistor 6?          | 11:45:26 |
| 9  | A | The point --                                       | 11:45:32 |
| 10 |   | MR. HSU: Objection to form.                        | 11:45:33 |
| 11 |   | THE WITNESS: Oh, sorry. Go ahead, Hans.            | 11:45:35 |
| 12 |   | Sorry.                                             | 11:45:37 |
| 13 |   | MR. HSU: Objection. Form.                          | 11:45:37 |
| 14 | A | The purpose of Transistor 6 is to provide          | 11:45:39 |
| 15 |   | a path to deprogram the node at the gate of        | 11:45:42 |
| 16 |   | Transistor 3308, which is the capacitor charge     | 11:45:50 |
| 17 |   | node. That does not drain through the -- the LED.  | 11:45:51 |
| 18 |   | The 33 embodiment as drawn by Kimura, and          | 11:45:57 |
| 19 |   | he discusses this problem, he drains the capacitor | 11:46:03 |
| 20 |   | in that embodiment through the LED. So there is a  | 11:46:05 |
| 21 |   | little bit of light emission which can degrade the | 11:46:10 |
| 22 |   | image quality.                                     | 11:46:14 |

1           So again the trade-off, which he has in  
2 another embodiment, is that the -- you add a  
3 transistor, you pay a price for that. But you  
4 improve the image quality by not having that  
5 additional bit of light emission during the  
6 drainage of that capacitor.

7           Q     The transistor you've added as Transistor  
8 6, that was taken from the embodiments shown in  
9 Figures 16 and 17. Correct?

10          A     Let me just verify for sanity. I believe  
11 that's correct.

12                Yes. It's taken from the embodiment of  
13 Figure 16A.

14          Q     And feel free to look at your paper copy.  
15 But it's the transistor here that's Transistor 6,  
16 that is based on Transistor 1607 in Figure 16A.

17                Right?

18          A     I believe that's a correct assessment.  
19 That is Transistor 1607 from Figure 16A.

20          Q     And in the modified image that you have  
21 on Page 128 of your declaration, you've tied the  
22 drain of Transistor 6 to a ground symbol. Right?

|    |              |                                                   |          |
|----|--------------|---------------------------------------------------|----------|
| 1  | A            | That's what's depicted, yes.                      | 11:47:37 |
| 2  | Q            | And is that symbol meant to be ground?            | 11:47:39 |
| 3  | A            | It's drawn here as a ground. It                   | 11:47:50 |
| 4  |              | represents something lower than the capacitor so  | 11:47:53 |
| 5  |              | that you're draining the charge off to provide -- | 11:47:55 |
| 6  |              | the annotation shows the current flow going off   | 11:47:57 |
| 7  |              | the capacitor and down through the transistor. So | 11:48:01 |
| 8  |              | it's evacuated.                                   | 11:48:03 |
| 9  | Q            | And although you've drawn it as a ground          | 11:48:04 |
| 10 |              | symbol, there would have to be a line to provide  | 11:48:09 |
| 11 |              | that signal to this pixel circuit. Right?         | 11:48:12 |
| 12 | MR. HSU:     | Objection. Form.                                  | 11:48:17 |
| 13 | A            | You are referring to --                           | 11:48:18 |
| 14 | THE WITNESS: | Sorry. Go ahead, Hans.                            | 11:48:19 |
| 15 | MR. HSU:     | Objection. Form.                                  | 11:48:21 |
| 16 | A            | Yeah, you're -- you would -- there has to         | 11:48:23 |
| 17 |              | be something there. The ground symbol indicates   | 11:48:25 |
| 18 |              | there is some sort of a connection which provides | 11:48:27 |
| 19 |              | a low signal out via which that charge can be     | 11:48:30 |
| 20 |              | evacuated.                                        | 11:48:34 |
| 21 | Q            | You would expect that each pixel circuit          | 11:48:34 |
| 22 |              | would have this new transistor you've added,      | 11:48:38 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | right, under your modification?                   | 11:48:41 |
| 2  | A Yes, it would have a dedicated transistor       | 11:48:44 |
| 3  | for the initialization period.                    | 11:48:47 |
| 4  | Q And all of those transistors would be           | 11:48:48 |
| 5  | connected down to the same ground line?           | 11:48:51 |
| 6  | MR. HSU: Objection. Form.                         | 11:48:55 |
| 7  | A They -- they would have to be connected         | 11:49:00 |
| 8  | to -- it could be one line, ground line, it could | 11:49:02 |
| 9  | be multiple ground lines. There just has to be    | 11:49:05 |
| 10 | something to provide the evacuation path.         | 11:49:08 |
| 11 | The reason I say that is in digital               | 11:49:10 |
| 12 | circuits you typically have one ground. In analog | 11:49:13 |
| 13 | circuits you might have many. So it's not         | 11:49:16 |
| 14 | precluded to be one ground. The bottom line is    | 11:49:18 |
| 15 | that there has to be some place for the -- there  | 11:49:20 |
| 16 | has to be a sewer system there to evacuate the    | 11:49:23 |
| 17 | charge.                                           | 11:49:25 |
| 18 | Q And you haven't tied the drain of that          | 11:49:25 |
| 19 | Transistor 6 to Line 3304. Correct?               | 11:49:31 |
| 20 | A As drawn here, no, I have not.                  | 11:49:39 |
| 21 | Q Line 3304, that's the line that's going         | 11:49:41 |
| 22 | to control the gate of Transistor 3310?           | 11:49:45 |

|    |   |                                                 |          |
|----|---|-------------------------------------------------|----------|
| 1  | A | That appears to be the one job that Line        | 11:49:48 |
| 2  |   | 3304 has in this depiction. It connects to the  | 11:49:56 |
| 3  |   | gate of Transistor 3310.                        | 11:49:59 |
| 4  | Q | And if you look, if we look at Figure           | 11:50:02 |
| 5  |   | 16A. And why don't we put it on the screen just | 11:50:06 |
| 6  |   | to make it easier for everyone. I think it's on | 11:50:08 |
| 7  |   | sheet 16 of 44.                                 | 11:50:18 |
| 8  | A | I do have my paper copy in front of me.         | 11:50:24 |
| 9  | Q | Okay. Great. I'll go off that, then,            | 11:50:28 |
| 10 |   | for now.                                        | 11:50:30 |
| 11 |   | In Figure 16A, Transistor 1607 is NMOS.         | 11:50:33 |
| 12 |   | Right?                                          | 11:50:39 |
| 13 | A | As drawn in 16 -- sorry, as drawn in            | 11:50:43 |
| 14 |   | Figure 16 A, it's drawn as an NMOS transistor,  | 11:50:46 |
| 15 |   | yes.                                            | 11:50:50 |
| 16 | Q | And Transistor 1607 in Figure 16A has its       | 11:50:50 |
| 17 |   | source tied to Line 1604?                       | 11:50:58 |
| 18 | A | It has that lower line connected to 1604,       | 11:51:07 |
| 19 |   | yes.                                            | 11:51:10 |
| 20 | Q | And 1604 controls the gate of Transistor        | 11:51:10 |
| 21 |   | 1609. Correct?                                  | 11:51:15 |
| 22 | A | It also controls the gate of 1609, yes.         | 11:51:21 |

|    |                   |                                                    |          |
|----|-------------------|----------------------------------------------------|----------|
| 1  | Q                 | So in Figure 16A, the source of                    | 11:51:24 |
| 2  |                   | Transistor 1607 and the gate of Transistor 1609    | 11:51:32 |
| 3  |                   | share the same line. Right?                        | 11:51:35 |
| 4  | A                 | As drawn, that is what it shows.                   | 11:51:40 |
| 5  | Q                 | If we go back to the modified version of           | 11:52:00 |
| 6  |                   | Figure 33A that we're looking at in -- on Page 128 | 11:52:04 |
| 7  |                   | of your declaration, there's no current path       | 11:52:09 |
| 8  |                   | through Transistor 6 that also leads through the   | 11:52:12 |
| 9  |                   | EL element. Right?                                 | 11:52:16 |
| 10 | A                 | Yes. That's the point of the                       | 11:52:20 |
| 11 |                   | modification, to have that capacitor be drained    | 11:52:22 |
| 12 |                   | without having it go through the                   | 11:52:25 |
| 13 |                   | electroluminescent element. And Kimura does        | 11:52:30 |
| 14 |                   | actually, as I describe, describe that being a     | 11:52:33 |
| 15 |                   | problem to do it that way.                         | 11:52:34 |
| 16 | MR. FRISCH:       | Why don't we actually take                         | 11:52:43 |
| 17 |                   | another break here.                                | 11:52:44 |
| 18 | VIDEO SPECIALIST: | We're going off the                                | 11:52:47 |
| 19 |                   | record at 11:52 a.m.                               | 11:52:48 |
| 20 |                   | (A recess was taken.)                              | 11:52:50 |
| 21 | VIDEO SPECIALIST: | We are going back on                               | 12:10:18 |
| 22 |                   | the record at 12:10 p.m.                           | 12:10:34 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | MR. FRISCH: Thank you, Dr. Foty. I have           | 12:10:39 |
| 2  | no further questions at this time, and I pass the | 12:10:40 |
| 3  | witness.                                          | 12:10:47 |
| 4  | MR. HSU: Can we resume in 15 minutes?             | 12:10:47 |
| 5  | MR. FRISCH: Sure.                                 | 12:10:50 |
| 6  | VIDEO SPECIALIST: We're going off the             | 12:10:51 |
| 7  | record at 12:10 p.m.                              | 12:10:53 |
| 8  | (A recess was taken.)                             | 12:10:55 |
| 9  | VIDEO SPECIALIST: We're going back on             | 12:30:07 |
| 10 | the record at 12:30 p.m.                          | 12:30:14 |
| 11 | EXAMINATION BY COUNSEL FOR PETITIONERS            | 12:30:18 |
| 12 | BY MR. HSU:                                       | 12:30:18 |
| 13 | Q Hi, Dr. Foty. Do you recall discussing          | 12:30:18 |
| 14 | Figure 33 being the embodiment of most interest   | 12:30:25 |
| 15 | with counsel?                                     | 12:30:29 |
| 16 | A Yes, I recall making that statement.            | 12:30:29 |
| 17 | Q Now, let's turn to Paragraph 130 in your        | 12:30:32 |
| 18 | declaration.                                      | 12:30:37 |
| 19 | MR. HSU: For the tech, it's on Page 68.           | 12:30:45 |
| 20 | A I have that open in front of me.                | 12:30:48 |
| 21 | Q In the -- I'll just start reading the           | 12:30:50 |
| 22 | first full sentence -- sentences in that          | 12:30:57 |

1 paragraph. "This particular embodiment in Kimura  
2 is contained Figure 33 and described at [0654] -  
3 [0657]. It is important to note at the outset  
4 that Kimura Figure 36 is just an extension of  
5 Kimura Figure 33."

6 Did I read that correctly?

7 A I believe you did, yes.

8 Q What do you mean by that in particular as  
9 it relates to Kimura Figure 36 and Figure 33?

10 MR. FRISCH: Objection to form.

11 A What I mean is that there's figure, the  
12 Figure 33 embodiment. And Figure 36 is otherwise  
13 identical, except for the addition of one  
14 transistor. And so it's, as Kimura states  
15 somewhere, it's a related embodiment. It's almost  
16 identical. There were some -- he makes a small  
17 change to it. And so it's an extension rather  
18 than a completely new embodiment. And Kimura does  
19 group those together in the specification.

20 Q And in Paragraph 130 you continue by  
21 saying, "And that (unless noted) the analysis and  
22 discussion of one figure applies equally to the

12:31:01

12:31:05

12:31:13

12:31:19

12:31:21

12:31:24

12:31:26

12:31:27

12:31:34

12:31:40

12:31:42

12:31:44

12:31:51

12:31:54

12:31:59

12:32:03

12:32:07

12:32:10

12:32:12

12:32:15

12:32:21

12:32:30

|    |                                                |          |
|----|------------------------------------------------|----------|
| 1  | other throughout this declaration."            | 12:32:32 |
| 2  | Do you see that?                               | 12:32:33 |
| 3  | A Yes, I do.                                   | 12:32:34 |
| 4  | Q Did your analysis in discussion of Figure    | 12:32:34 |
| 5  | 36 (indiscernible) to Figure 33?               | 12:32:47 |
| 6  | MR. FRISCH: Objection. Leading.                | 12:32:49 |
| 7  | Outside the scope.                             | 12:32:51 |
| 8  | A Sorry, what was the question again?          | 12:32:55 |
| 9  | Q Sure. You said --                            | 12:32:57 |
| 10 | A You muddled, so maybe speak with the         | 12:32:59 |
| 11 | microphone a little closer in. I don't know.   | 12:33:03 |
| 12 | Q How about this?                              | 12:33:05 |
| 13 | A That's much better. That helped quite a      | 12:33:06 |
| 14 | bit.                                           | 12:33:08 |
| 15 | Q Okay. Do your analysis in discussions of     | 12:33:08 |
| 16 | Figure 36 in your declaration apply equally to | 12:33:14 |
| 17 | Figure 33?                                     | 12:33:17 |
| 18 | MR. FRISCH: Same objections.                   | 12:33:20 |
| 19 | A They apply to the extent that most of the    | 12:33:22 |
| 20 | two embodiments are the same. So when the two  | 12:33:26 |
| 21 | embodiments are the same, the discussion, as I | 12:33:28 |
| 22 | said there, applies to both.                   | 12:33:30 |

1 Q Now, Dr. Foty, do you recall discussing  
2 Transistor 3310 with counsel?

3 A We discussed it I believe several times,  
4 yes.

5 Q That's -- actually, that's fine. Let's  
6 turn to Kimura Figure 33.

7 A I have the Kimura paper 33 in front of  
8 me. For the videographer, it's Sheet 33 of 44 I  
9 was going to say, but you found it.

10 Q And do you recall also discussing certain  
11 jobs that these transistors perform in the context  
12 in the operation of these circuits?

13 MR. FRISCH: Objection to form.

14 A I recall some discussion, several  
15 different discussions along the point of it's a  
16 transistor-based circuit and its functionality is  
17 implemented by the transistors, essentially.

18 Q Looking at Kimura Figure 33B through  
19 Figure 33E, what job does Transistor 3310 perform?

20 MR. FRISCH: Objection to form.

21 A Well, it actually -- in this embodiment  
22 it actually has two jobs. One job is to pass the

1 charge being drained off the capacitor to the 12:35:27  
2 sewer pipe during the initialization phase. And 12:35:30  
3 the second job is, it's turned on during the 12:35:36  
4 emission phase as one of the transistors in the 12:35:40  
5 path between VDD and the electroluminescent 12:35:42  
6 elements so that the electroluminescent element 12:35:46  
7 could be forward biased and emit light. 12:35:49

8 MR. FRISCH: I would just like to object 12:35:54  
9 to this line of questioning as outside the scope 12:35:56  
10 of the direct as well. 12:35:57

11 Q Dr. Foty, do you recall discussing the 12:35:59  
12 initialization transistor with counsel? 12:36:05

13 A We had a discussion at some point of 12:36:12  
14 that. Perhaps, you know, you have a more specific 12:36:16  
15 context of the questioning. 12:36:18

16 Q Certainly. Let's turn back to your 12:36:19  
17 declaration. And particularly let's turn to Page 12:36:23  
18 128, Paragraph 228. 12:36:29

19 A I have that open in front of me. If we 12:36:38  
20 want to wait for it to be on the screen, Page 128 12:36:40  
21 of my declaration. There we go. Thank you. 12:36:43

22 Q Do you recall discussing the figure on 12:36:45

|    |                                                    |          |
|----|----------------------------------------------------|----------|
| 1  | this -- on this page with counsel?                 | 12:36:50 |
| 2  | A I recall that we had a discussion of this        | 12:36:57 |
| 3  | figure, yes.                                       | 12:36:58 |
| 4  | Q Now, let's scroll down to the next page,         | 12:36:59 |
| 5  | Page 229.                                          | 12:37:07 |
| 6  | A Page 129?                                        | 12:37:09 |
| 7  | Q Sorry. Paragraph -- sorry, Paragraph             | 12:37:10 |
| 8  | 229. And starting from Line 4 of Paragraph 229.    | 12:37:14 |
| 9  | And I'll just read it. Actually, I'll start from   | 12:37:25 |
| 10 | the middle of Line 6, after the dash.              | 12:37:31 |
| 11 | "Thus a current path (shown by purple              | 12:37:38 |
| 12 | arrow in the annotated figure above) is created    | 12:37:42 |
| 13 | that discharges the node connected to the gate of  | 12:37:47 |
| 14 | the second transistor (by discharging the charge   | 12:37:50 |
| 15 | from the capacitor) to ground (or similar) with no | 12:37:56 |
| 16 | current passing through the light-emitting         | 12:38:05 |
| 17 | element."                                          | 12:38:07 |
| 18 | Do you see that?                                   | 12:38:07 |
| 19 | A Yes, I see that text.                            | 12:38:08 |
| 20 | Q What do you mean by "ground or similar"?         | 12:38:10 |
| 21 | A Ground would be -- there's again that            | 12:38:19 |
| 22 | could be open to definition, whether it means      | 12:38:20 |

1 earth ground, zero volts, or a reference voltage.

12:38:23

2 But essentially what that means, I keep using the

12:38:28

3 analogy because plumbing analogies are very useful

12:38:30

4 here, of the sewage pipe. That the voltage there

12:38:37

5 has to be lower than the voltage on the capacitor

12:38:40

6 in order to pull that charge off. And as that

12:38:42

7 charge is pulled off, that node connected to the

12:38:44

8 gate of -- the gate of 3308 will be pulled down to

12:38:47

9 the voltage, whether it's ground or similar, some

12:38:50

10 lower voltage, to do that job. It's the sewer

12:38:53

11 pipe, essentially.

12:38:57

12 Q So let's go back up to the previous page,

12:38:58

13 Page 128. I'm going to ask you if you take

12:39:04

14 another look at this figure that we have been

12:39:10

15 discussing just so that you have the image,

12:39:14

16 because we're going to jump to another page.

12:39:18

17 Let me know when you're ready.

12:39:20

18 A You're going to go to a different page

12:39:22

19 now, you said?

12:39:23

20 Q Right. But I just want you to have a

12:39:24

21 mental picture of this particular figure,

12:39:26

22 annotated figure.

12:39:30

|    |   |                                                    |          |
|----|---|----------------------------------------------------|----------|
| 1  | A | To make this work, what I'll do is I'll            | 12:39:31 |
| 2  |   | at least keep a finger on this page so I can have  | 12:39:34 |
| 3  |   | this figure. We might have -- I have the figure    | 12:39:37 |
| 4  |   | in paper, and we have wherever you're going on the | 12:39:39 |
| 5  |   | screen in front of us.                             | 12:39:42 |
| 6  | Q | Okay. Thank you. That works.                       | 12:39:43 |
| 7  |   | So let's go to Page 165.                           | 12:39:46 |
| 8  | A | I have that. I have both 128 and 165               | 12:40:03 |
| 9  |   | readily available to me at this point.             | 12:40:06 |
| 10 | Q | Do you see also another annotated Figure           | 12:40:11 |
| 11 |   | 33A on Page 165?                                   | 12:40:16 |
| 12 | A | Yes, I see that.                                   | 12:40:22 |
| 13 | Q | And you see here the what's been                   | 12:40:24 |
| 14 |   | annotated as Transistor 6 is coupled to a signal   | 12:40:29 |
| 15 |   | called Vreset?                                     | 12:40:34 |
| 16 | A | Yes, I see that.                                   | 12:40:37 |
| 17 | Q | And whereas in the figure on Page 128 in           | 12:40:38 |
| 18 |   | Paragraph 229, that same sixth transistor is       | 12:40:45 |
| 19 |   | coupled to what's appear to be a ground symbol.    | 12:40:52 |
| 20 |   | Is that fair?                                      | 12:40:55 |
| 21 | A | That's what's drawn. In the text we were           | 12:40:58 |
| 22 |   | looking at earlier of Paragraph 229, I made the    | 12:41:01 |

1 comment about ground or similar.

12:41:04

2 Q So let me make sure I understand you. So  
3 what you're saying is this Vreset here is similar  
4 to the ground that's shown in Paragraph 229?

12:41:09

12:41:13

12:41:16

5 MR. FRISCH: Objection. Leading.  
6 Misstates testimony. And outside the scope of the  
7 direct questioning.

12:41:22

12:41:23

12:41:25

8 A What I mean here in this figure is it's  
9 showing what -- I meant that you don't have to  
10 have a specific ground, that's an easy way to  
11 understand it. You could also use something  
12 similar, which is a voltage which is not exactly  
13 as earth ground as defined, but it would serve the  
14 same function. You need to have a lower voltage  
15 so that the charge will drain off that node  
16 connected to the gate of 3308. And as a result,  
17 that will put, in this particular depiction we see  
18 in front of us, that node will be pulled to  
19 Vreset.

12:41:29

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12:41:59

12:42:02

12:42:04

20 Q Dr. Foty, do you recall discussing PMOS  
21 versus NMOS with counsel?

12:42:05

12:42:25

22 A We had at least one discussion of that,

12:42:28

|    |                                                 |          |
|----|-------------------------------------------------|----------|
| 1  | that I recall, yes.                             | 12:42:30 |
| 2  | Q And do you recall discussing Figure 21 of     | 12:42:31 |
| 3  | Kimura with counsel?                            | 12:42:40 |
| 4  | MR. HSU: Actually, can we put back up           | 12:42:44 |
| 5  | Kimura Figure 21. That's Exhibit 1002. That may | 12:42:46 |
| 6  | trigger your memory.                            | 12:42:54 |
| 7  | A It's Sheet 21, for what that's worth, to      | 12:42:55 |
| 8  | help you find it. Next page. Thank you.         | 12:42:59 |
| 9  | Q So I will ask again, do you recall            | 12:43:13 |
| 10 | discussing Figure 21 with counsel?              | 12:43:15 |
| 11 | A Yes, we had a discussion of this figure.      | 12:43:19 |
| 12 | Q Now, how many transistors are there in        | 12:43:23 |
| 13 | Figure 21A?                                     | 12:43:30 |
| 14 | A I count three.                                | 12:43:39 |
| 15 | Q And what types of transistors are they,       | 12:43:41 |
| 16 | NMOS or PMOS or CMOS?                           | 12:43:46 |
| 17 | A All three of these transistors are NMOS       | 12:43:51 |
| 18 | transistors.                                    | 12:43:53 |
| 19 | Q Now, let's move down to the next page,        | 12:43:56 |
| 20 | Figure 22A.                                     | 12:43:59 |
| 21 | How many transistors are there in this          | 12:44:09 |
| 22 | Figure 22A?                                     | 12:44:11 |

|    |                                                    |          |
|----|----------------------------------------------------|----------|
| 1  | MR. FRISCH: Objection. Outside the                 | 12:44:14 |
| 2  | scope of the direct.                               | 12:44:15 |
| 3  | A I count four transistors.                        | 12:44:18 |
| 4  | Q Which type of transistor are they, PMOS,         | 12:44:21 |
| 5  | NMOS, or CMOS?                                     | 12:44:27 |
| 6  | A By my inspection, I see that all four of         | 12:44:30 |
| 7  | them here are PMOS transistors.                    | 12:44:32 |
| 8  | Q Based on your understanding of Kimura, is        | 12:44:38 |
| 9  | there any indication that either the pixel circuit | 12:44:44 |
| 10 | of Figure 21A or the pixel circuit -- strike that. | 12:44:52 |
| 11 | Based on your understanding, is there any          | 12:44:58 |
| 12 | indication that the pixel circuit of Figure 21A    | 12:45:04 |
| 13 | would not work with the driver circuits that       | 12:45:07 |
| 14 | Kimura discusses?                                  | 12:45:14 |
| 15 | MR. FRISCH: Objection to form, and                 | 12:45:17 |
| 16 | outside the scope of the direct.                   | 12:45:18 |
| 17 | A You would have to -- since there's the           | 12:45:26 |
| 18 | switching transistors would have to be changed     | 12:45:30 |
| 19 | from having active high and active low, active     | 12:45:35 |
| 20 | high for NMOS and active high for PMOS, other than | 12:45:38 |
| 21 | that, again, I didn't study these embodiments.     | 12:45:42 |
| 22 | There may be some further details as how -- if the | 12:45:47 |

1 transistor is programmed. But that's the main  
2 change you need to make. You can keep the power  
3 supply and the low power supply as are -- as they  
4 are.

5 Q Is there any indication in Kimura that  
6 the pixel circuit in Figure 22A would not work  
7 with a driver circuit that Kimura discusses?

8 MR. FRISCH: Objection. Outside the  
9 scope. I'm just going to note that I did not ask  
10 any questions about either Figure 22 or the drive  
11 circuitry that would go along with that.

12 A Kimura gives a general indication which I  
13 quote in my declaration that either NMOS or PMOS  
14 transistors can be used in these embodiments. And  
15 my conclusion would be that any of these  
16 embodiments can be changed from NMOS to PMOS or  
17 vice versa with minimal experimentation, and a  
18 POSA would know how to do that.

19 MR. HSU: No further questions.

20 EXAMINATION BY COUNSEL FOR PATENT OWNER

21 BY MR. FRISCH:

22 Q A few questions, Dr. Foty.

12:45:51

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12:46:06

12:46:06

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12:47:26

|    |          |                                                    |          |
|----|----------|----------------------------------------------------|----------|
| 1  | A        | Sure.                                              | 12:47:28 |
| 2  | Q        | You were just asked a number of questions          | 12:47:28 |
| 3  |          | about Figure 22. Is Figure 22 a circuit diagram    | 12:47:47 |
| 4  |          | that represents any of the embodiments of the      | 12:47:53 |
| 5  |          | alleged inventions of Kimura?                      | 12:47:57 |
| 6  | MR. HSU: | Objection. Form.                                   | 12:48:02 |
| 7  | A        | It's an embodiment. I presume that                 | 12:48:09 |
| 8  |          | Kimura included an embodiment as either an         | 12:48:12 |
| 9  |          | invention or as a demonstration of something to    | 12:48:13 |
| 10 |          | enlighten the reader about his inventions.         | 12:48:16 |
| 11 | Q        | I guess my question is a little bit more           | 12:48:19 |
| 12 |          | specific, though. We talked about embodiments and  | 12:48:21 |
| 13 |          | embodiment modes earlier that Kimura lays out with | 12:48:24 |
| 14 |          | respect to his alleged inventions.                 | 12:48:27 |
| 15 |          | Do you know if Figure 22 is any of those           | 12:48:30 |
| 16 |          | embodiments or embodiment modes?                   | 12:48:33 |
| 17 | A        | At Paragraphs 328 Kimura -- Kimura states          | 12:48:59 |
| 18 |          | that these figures are diagrams showing example of | 12:49:04 |
| 19 |          | the structure of a pixel which performs TFT,       | 12:49:07 |
| 20 |          | threshold value correction.                        | 12:49:12 |
| 21 |          | So it's a function that appears in Kimura          | 12:49:16 |
| 22 |          | that's something that Kimura's circuitry does in   | 12:49:20 |

1 various places.

12:49:22

2 Q But Kimura doesn't describe this as an  
3 embodiment or embodiment mode of any of his  
4 inventions. Correct?

12:49:24

12:49:26

12:49:28

5 MR. HSU: Objection. Form.

12:49:33

6 A He describes it as an example showing  
7 something that he uses elsewhere in his  
8 embodiments. That's about the closest I can get.  
9 We can read 328, and it says what it says.

12:49:41

12:49:44

12:49:46

12:49:49

10 Q And just to be clear, we looked at  
11 Paragraph 307 earlier, which is on the same page.  
12 And there it says Figures 1A and 1B are diagrams  
13 showing an embodiment mode of the present  
14 invention. Right?

12:49:53

12:49:55

12:49:57

12:50:01

12:50:03

15 A Yes, he says that there. And he -- if  
16 you look further down, for example, he refers to  
17 Figures 19, 20, 21, for example, as -- well, 19  
18 and 21, for example, in particular as being  
19 explaining. So as I said earlier, he has some  
20 things as explaining and then are used in the  
21 embodiments, is the way I would interpret that.

12:50:08

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22 Q In terms of the actual section headers

12:50:31

1 and sections that Kimura puts forward in his own  
2 specification where he labels them as Embodiment  
3 Mode 1, Embodiment Mode 2, et cetera, Figure 22 is  
4 not included in any of those embodiment modes.

5 Correct?

6 A In those paragraphs we were just  
7 discussing, describing the figures, the  
8 big-picture view of the pictures, those figures do  
9 not include the word "embodiment" in them.

10 Q Thank you. But my question is slightly  
11 different. If you look at all of the -- his  
12 specification, for instance at Paragraph 393,  
13 starts out and says, Embodiment Mode 1. Right?

14 A Yes, that's what it says.

15 Q And then he continues, for instance,  
16 Paragraph 402 says Embodiment Mode 2?

17 A I see that. And this continues further.  
18 And he does mention Figure 20 and 21 in Embodiment  
19 Mode 4, for example. He mentions them within  
20 there.

21 Q Yes. And within any of those embodiment  
22 mode sections, do you see any reference to Figure

1 22?

12:51:59

2 A With the caveat I just did a review right  
3 now that I hadn't done before, I don't see a  
4 mention of Figure 22 in those embodiments.

12:53:19

12:53:22

12:53:24

5 Q If we can go back to your declaration and  
6 go to Page 165.

12:53:26

12:53:28

7 A I have it in my paper copy in front of  
8 me.

12:53:39

12:53:40

9 Q And you were just asked a number of  
10 questions about the Figure 33A and modification on  
11 Page 165. Correct?

12:53:40

12:53:42

12:53:45

12 A That's my recollection, yes.

12:53:48

13 Q And this is different than the Figure 33A  
14 modification image that we looked at earlier in  
15 that is it's now labeled Vreset on the drain of  
16 Transistor T6. Correct?

12:53:48

12:53:54

12:53:57

12:54:00

17 A That's a facial difference, yes.

12:54:03

18 Q With respect to the modification shown on  
19 this page of your declaration, Page 165, what is  
20 Vreset?

12:54:05

12:54:08

12:54:12

21 A Vreset is basically encompasses the or  
22 similar that I had in the earlier -- with the

12:54:15

12:54:22

1 earlier figure, that that voltage can be many  
2 different things, but it has to serve the function  
3 of being able to pull the node connected to the  
4 gate at 3308 down. And the goal is it has to be  
5 pulled down sufficiently to turn 3308 off. And so  
6 typically with a PMOS, a ground would do that.  
7 But more broadly you could use a different voltage  
8 to accomplish that task.

9 Q The voltage line would be necessary to  
10 bring that voltage to the drain of what you  
11 labeled here as the Transistor 6?

12 A You would have to connect the Vreset.  
13 I'll just go there, rather than getting bogged  
14 down on which side is the source and which is the  
15 drain.

16 The lower side in the figure would have  
17 to be connected to something, which would serve as  
18 the what I keep calling the sewer pipe is the  
19 analogy that the charge is drained away and has to  
20 be somewhere.

21 Q And just as in the figure we looked at  
22 earlier, and I'll use your terminology, the bottom

12:54:24  
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12:54:52  
12:54:55  
12:54:58  
12:55:05  
12:55:07  
12:55:09  
12:55:12  
12:55:12  
12:55:14  
12:55:16  
12:55:19  
12:55:23  
12:55:23  
12:55:26

|    |                                                |          |
|----|------------------------------------------------|----------|
| 1  | side of the transistor labeled as 6 is not     | 12:55:31 |
| 2  | connected to Line 3304. Correct?               | 12:55:34 |
| 3  | A As depicted here, it is not.                 | 12:55:42 |
| 4  | MR. FRISCH: No further questions. Thank        | 12:55:43 |
| 5  | you.                                           | 12:55:45 |
| 6  | MR. HSU: No further questions.                 | 12:55:47 |
| 7  | VIDEO SPECIALIST: This marks the end of        | 12:55:50 |
| 8  | the deposition of Daniel Foty. We're going off | 12:55:52 |
| 9  | the record. The time is 12:55 p.m.             | 12:55:55 |
| 10 | (Off the record at 12:55 p.m. EST.)            |          |
| 11 |                                                |          |
| 12 |                                                |          |
| 13 |                                                |          |
| 14 |                                                |          |
| 15 |                                                |          |
| 16 |                                                |          |
| 17 |                                                |          |
| 18 |                                                |          |
| 19 |                                                |          |
| 20 |                                                |          |
| 21 |                                                |          |
| 22 |                                                |          |

C E R T I F I C A T E

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

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

I further certify that the adverse  
parties, Mianyang BOE Optoelectronics Technology  
Co., Ltd.; Wuhan China Star Optoelectronics  
Semiconductor Display Technology Co., Ltd; Tianma  
Microelectronics Co., Ltd.; and Visionix Technology,  
Inc., were represented by counsel at the deposition.

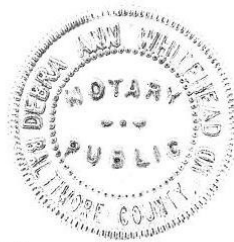
I further certify that the deposition of  
DANIEL P. FOTY, Ph.D., occurred virtually, on  
Friday, February 23, 2024, from 9:05 a.m. to 12:55  
p.m. EST.

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

7  
8 IN WITNESS WHEREOF, I have hereunto set my  
9 hand this 6th day of March, 2024.

10  
11 My commission expires:

12 April 30, 2027  
13



15  
16  
17 Daniel A. Whitehead

18 E-NOTARY PUBLIC IN AND FOR THE

19 STATE OF MARYLAND  
20  
21  
22

| A                 |                   |                       |                 |
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| 137:8             | <b>added</b>      | 105:2, 109:15,        | <b>alleged</b>  |
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Transcript of Daniel Foty, Ph.D.  
Conducted on February 23, 2024

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Transcript of Daniel Foty, Ph.D.  
Conducted on February 23, 2024

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Transcript of Daniel Foty, Ph.D.  
Conducted on February 23, 2024

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