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# Transcript of Andrew Wolfe, Ph.D.

**Date:** May 17, 2024

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

**Planet Depos**

**Phone:** 888.433.3767

**Email:** [transcripts@planetdepos.com](mailto:transcripts@planetdepos.com)

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WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

Transcript of Andrew Wolfe, Ph.D.  
Conducted on May 17, 2024

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| <p>1 UNITED STATES PATENT AND TRADEMARK OFFICE<br/>2 -----<br/>3 BEFORE THE PATENT TRIAL AND APPEAL BOARD<br/>4 -----<br/>5 MIANYANG BOE OPTOELECTRONICS TECHNOLOGY CO., LTD.;<br/>6 WUHAN CHINA STAR OPTOELECTRONICS SEMICONDUCTOR<br/>7 DISPLAY TECHNOLOGY CO., LTD; TIANMA MICROELECTRONICS<br/>8 CO., LTD.; AND VISIONOX TECHNOLOGY, INC.,<br/>9<br/>10 Petitioner,<br/>11<br/>12 vs.<br/>13 SAMSUNG DISPLAY CO., LTD.<br/>14<br/>15 Patent Owner.<br/>16<br/>17 -----<br/>18 CASE IPR2023-00941<br/>19 US PATENT NO. 7,414,599<br/>20 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[REDACTED]

Transcript of Andrew Wolfe, Ph.D.  
Conducted on May 17, 2024

2 (5 to 8)

|    |                 |                            |    |                                               |  |
|----|-----------------|----------------------------|----|-----------------------------------------------|--|
| 5  |                 |                            | 7  |                                               |  |
| 1  | EXHIBITS INDEX: |                            | 1  | SANTA CLARA, CALIFORNIA; FRIDAY, MAY 17, 2024 |  |
| 2  | Wolfe           |                            | 2  | 9:01 A.M.                                     |  |
| 3  | Deposition      |                            | 3  |                                               |  |
| 4  | Exhibit         | Description                | 4  | P R O C E E D I N G S                         |  |
| 5  | Exhibit 1001    | United States Patent:      | 5  |                                               |  |
| 6  |                 | U.S. Patent                | 6  | THE TECHNICIAN: Thank you to                  |  |
| 7  | Exhibit 1002    | No. 7,414,599 B2           | 7  | everyone for attending this proceeding        |  |
| 8  |                 | (Chung)                    | 8  | remotely, which we anticipate will run        |  |
| 9  | Exhibit 1003    | Declaration of             | 9  | smoothly.                                     |  |
| 10 |                 | Dr. Daniel Foty            | 10 | Please remember to speak slowly and           |  |
| 11 | Exhibit 1023    | LinkedIn profile for       | 11 | do your best not to talk over one             |  |
| 12 |                 | Andrew Wolfe, Ph.D.        | 12 | another.                                      |  |
| 13 | Exhibit 1024    | Curriculum Vitae of        | 13 | Please be aware that we are                   |  |
| 14 |                 | Andrew Wolfe, Ph.D.        | 14 | recording this proceeding for backup          |  |
| 15 | Exhibit 1025    | on Santa Clara University  | 15 | purposes.                                     |  |
| 16 |                 | School of Engineering      | 16 | Any off-the-record discussions                |  |
| 17 |                 | website                    | 17 | should be had away from the computer.         |  |
| 18 | Exhibit 2008    | Curriculum Vitae of        | 18 | Please remember to mute your mic for          |  |
| 19 |                 | Andrew Wolfe, Ph.D.        | 19 | those conversations.                          |  |
| 20 |                 |                            | 20 | Please have your video enabled to             |  |
| 21 |                 |                            | 21 | help the reporter identify who is             |  |
| 22 |                 |                            | 22 | speaking. If you are unable to connect        |  |
| 6  |                 |                            | 8  |                                               |  |
| 1  | EXHIBITS INDEX: |                            | 1  | with video and are connecting via phone,      |  |
| 2  | Wolfe           |                            | 2  | please identify yourself each time before     |  |
| 3  | Deposition      |                            | 3  | speaking.                                     |  |
| 4  | Exhibit         | Description                | 4  | I apologize in advance for any                |  |
| 5  | Exhibit 2015    | Article: 302-ppi           | 5  | technical-related interruptions.              |  |
| 6  |                 | High-Resolution            | 6  | Thank you.                                    |  |
| 7  | Exhibit 2048    | AMOLED using Laser-Induced | 7  | THE VIDEOGRAPHER: Thank you,                  |  |
| 8  |                 | Thermal Imaging            | 8  | Lucien. Please stand by for video.            |  |
| 9  |                 |                            | 9  | Here begins media number one in the           |  |
| 10 |                 |                            | 10 | videotaped deposition of Andrew Wolfe,        |  |
| 11 |                 |                            | 11 | Ph.D. in the matter of Mianyang BOE           |  |
| 12 |                 |                            | 12 | Optoelectronics Tech Co., et al. versus       |  |
| 13 |                 |                            | 13 | Samsung Display, Co. in the United States     |  |
| 14 |                 |                            | 14 | Patent and Trademark Office before the        |  |
| 15 |                 |                            | 15 | Patent and Trial Appeal Board; IPR No.        |  |
| 16 |                 |                            | 16 | 2023-00941.                                   |  |
| 17 |                 |                            | 17 | Today's date is May 17th, 2024, and           |  |
| 18 |                 |                            | 18 | the time on the video monitor is              |  |
| 19 |                 |                            | 19 | 9:02 a.m. Pacific.                            |  |
| 20 |                 |                            | 20 | The remote videographer today is              |  |
| 21 |                 |                            | 21 | Lucas Shaker, representing Planet Depos.      |  |
| 22 |                 |                            | 22 | All parties of this video                     |  |

Conducted on May 17, 2024

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>9</p> <p>1 deposition are attending remotely.</p> <p>2 Would counsel please voice identify</p> <p>3 themselves and state whom they represent.</p> <p>4 MR. JENSEN: This is Travis Jensen</p> <p>5 representing Petitioner. I'm with the</p> <p>6 law firm Orrick, Herrington &amp; Sutcliffe,</p> <p>7 and with me virtually today is Johannes</p> <p>8 Hsu.</p> <p>9 MR. GARR: For Patent Owner, this</p> <p>10 is David Garr, along with my colleague,</p> <p>11 Jared Frisch. We are with Covington &amp;</p> <p>12 Burling.</p> <p>13 THE VIDEOGRAPHER: Thank you,</p> <p>14 Counsel.</p> <p>15 The court reporter is Tanya Page,</p> <p>16 representing Planet Depos.</p> <p>17 The witness will now be sworn.</p> <p>18</p> <p>19 Thereupon --</p> <p>20 ANDREW WOLFE, PH.D.,</p> <p>21 called as a witness, having been first duly sworn,</p> <p>22 was examined and testified as follows:</p>                                      | <p>11</p> <p>1 Q What is the approximate split between</p> <p>2 plaintiffs and defendants that you've worked for?</p> <p>3 A <b>It varies from time to time.</b></p> <p>4 Q On average, could you approximate what</p> <p>5 that split would be?</p> <p>6 A <b>Very, very roughly, probably 40 percent</b></p> <p>7 <b>plaintiff, 60 percent defendants.</b></p> <p>8 Q And have you participated in remote</p> <p>9 depositions before?</p> <p>10 A <b>Yes, quite a few.</b></p> <p>11 Q We'll probably still cover some -- some</p> <p>12 basics, but we'll -- we'll try to maybe short circuit</p> <p>13 that a little bit.</p> <p>14 Dr. Wolfe, have you and I ever met</p> <p>15 before?</p> <p>16 A <b>Not that I can recall.</b></p> <p>17 Q Is there any reason that you cannot give</p> <p>18 truthful testimony today?</p> <p>19 A <b>No.</b></p> <p>20 Q And even though you've been deposed a</p> <p>21 number of times, I'd like to briefly review a few of</p> <p>22 the basics just so we're -- we're on the same page.</p>                                                                                                                                                                  |
| <p>10</p> <p>1 EXAMINATION</p> <p>2 BY MR. JENSEN:</p> <p>3 Q Good morning, Dr. Wolfe. My name is</p> <p>4 Travis Jensen, and I represent the Petitioner in this</p> <p>5 IPR proceeding, and I'll be taking your deposition</p> <p>6 today.</p> <p>7 Could you state and spell your name for</p> <p>8 the record, please.</p> <p>9 A <b>Andrew Wolfe, W-O-L-F-E.</b></p> <p>10 Q And, Dr. Wolfe, where do you normally</p> <p>11 reside?</p> <p>12 A <b>Los Gatos, California.</b></p> <p>13 Q And where are you located today?</p> <p>14 A <b>Santa Clara, California.</b></p> <p>15 Q Is anyone else physically with you?</p> <p>16 A <b>No.</b></p> <p>17 Q Approximately how many times have you</p> <p>18 been deposed as an expert witness before?</p> <p>19 A <b>I don't know. Certainly in excess of</b></p> <p>20 <b>100.</b></p> <p>21 Q Were those primarily patent cases?</p> <p>22 A <b>Primarily, but not exclusively.</b></p> | <p>12</p> <p>1 We've provided a set is of exhibits for</p> <p>2 you to access locally. Do you have a -- it was a zip</p> <p>3 file with -- I don't know -- a few dozen PDF papers</p> <p>4 in it.</p> <p>5 A <b>I have downloaded those files. I haven't</b></p> <p>6 <b>checked them to make sure they open, but I've</b></p> <p>7 <b>downloaded them all.</b></p> <p>8 Q Okay. Thank you. We might have a couple</p> <p>9 of exhibits that were not included in that zip</p> <p>10 folder, and if we use those, we'll just drop them</p> <p>11 into the chat window in Zoom.</p> <p>12 Are you familiar with -- with the chat</p> <p>13 window and how to, you know, access a link there?</p> <p>14 A <b>Yeah. They change Zoom every few weeks</b></p> <p>15 <b>sometimes, but -- but I have done that before.</b></p> <p>16 Q Okay. And if we have any, you know,</p> <p>17 technical difficulties -- I hope we don't -- but if</p> <p>18 we do, will you let me know if you've got any</p> <p>19 problem, you know, hearing or accessing an exhibit?</p> <p>20 A <b>Sure.</b></p> <p>21 Q Okay. And we'll also be using the screen</p> <p>22 share feature so everybody can see what -- what it is</p> |

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>13</p> <p>1 that we're looking at.</p> <p>2 Are you familiar with the Zoom screen</p> <p>3 sharing option?</p> <p>4 <b>A Yes.</b></p> <p>5 Q Okay. And we've got several participants</p> <p>6 in the deposition today, including a court reporter.</p> <p>7 For her benefit, can you provide oral</p> <p>8 answers to my questions so she can write them down?</p> <p>9 <b>A Yes.</b></p> <p>10 Q The format of the deposition will be</p> <p>11 question and answer. I'll be asking you a series of</p> <p>12 questions related to your rebuttal and validity</p> <p>13 report and opinions.</p> <p>14 If you find any of my questions unclear,</p> <p>15 will you let me know so I can try to clarify or</p> <p>16 rephrase?</p> <p>17 <b>A Yes.</b></p> <p>18 Q Throughout the course of the deposition,</p> <p>19 counsel for patent owner may object. If he does so,</p> <p>20 he's objecting to my question. Not your answer.</p> <p>21 However, unless you are instructed by your counsel</p> <p>22 not to answer on the basis of privilege, you must</p> | <p>15</p> <p>1 <b>A There's always stuff running in the</b></p> <p>2 <b>background, but the only other thing I have open is a</b></p> <p>3 <b>window with the zip file that you sent me.</b></p> <p>4 Q Thank you. When were you first contacted</p> <p>5 about working on this IPR?</p> <p>6 <b>A I don't remember. Sometime last year.</b></p> <p>7 Q Can you be any more specific than that?</p> <p>8 <b>A Not with any real precision from memory.</b></p> <p>9 <b>It was probably around midyear.</b></p> <p>10 Q And from the time that you were first</p> <p>11 engaged to work on this matter until now,</p> <p>12 approximately how much time have you billed to this</p> <p>13 matter?</p> <p>14 <b>A I don't know off the top of my head.</b></p> <p>15 Q Can you give me an estimate?</p> <p>16 <b>A Not really. It's been spread out over a</b></p> <p>17 <b>year. So I don't really remember.</b></p> <p>18 Q Is it more or less than 100 hours?</p> <p>19 <b>A I don't know.</b></p> <p>20 Q Is it more or less than 20 hours?</p> <p>21 <b>A Oh, it's got to be more than 20 hours.</b></p> <p>22 Q Is it more or less than 50 hours?</p> |
| <p>14</p> <p>1 still answer the question.</p> <p>2 Do you understand that?</p> <p>3 <b>A I do.</b></p> <p>4 Q Okay. Perhaps, most importantly, we'll</p> <p>5 be taking periodic breaks today. If at any time</p> <p>6 you'd like a break, just let me know, and we can</p> <p>7 accommodate as long as there is not a question</p> <p>8 pending.</p> <p>9 Is that okay?</p> <p>10 <b>A Understood.</b></p> <p>11 Q Okay. And I think we're going to try be</p> <p>12 as efficient as we can today. So I'll emphasize, if</p> <p>13 I'm -- if you think I'm going too long, just ask for</p> <p>14 a brake, but I realize it's a Friday and everybody</p> <p>15 would probably like to have their Friday evening</p> <p>16 free. So I tend to take fewer breaks and shorter</p> <p>17 breaks, but I'm happy to accommodate whatever you</p> <p>18 need.</p> <p>19 <b>A Okay.</b></p> <p>20 Q Apart from the Zoom program that we're</p> <p>21 using for the deposition, do you have any other</p> <p>22 programs open on your computer?</p>                          | <p>16</p> <p>1 <b>A I don't know for certain, but I would</b></p> <p>2 <b>assume so.</b></p> <p>3 Q But you're not sure if it's -- if it's</p> <p>4 over 100 hours?</p> <p>5 <b>A Not -- not off the top of my head, no.</b></p> <p>6 Q Are you aware that there are other</p> <p>7 proceedings between the same parties on the patent</p> <p>8 that's at issue in this IPR?</p> <p>9 <b>A I am generally aware of that.</b></p> <p>10 Q Are you aware that there's an ITC matter</p> <p>11 involving this patent?</p> <p>12 <b>A Yes.</b></p> <p>13 Q Are you aware that there's a district</p> <p>14 court matter involving this patent?</p> <p>15 <b>A Yes.</b></p> <p>16 Q Are you working on either the ITC or the</p> <p>17 district court matter?</p> <p>18 <b>A No.</b></p> <p>19 Q Dr. Wolfe, what did you do to prepare for</p> <p>20 today's deposition?</p> <p>21 <b>A Well, everything I've done in the case,</b></p> <p>22 <b>in some sense, was preparing for today's deposition.</b></p>                                                                                                                                                  |

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| <p>17</p> <p>1 I began early on, after retention, reading the</p> <p>2 patent, understanding it, reading its file history,</p> <p>3 engaging in discussions with counsel about claim</p> <p>4 scope. Later, when this petition was brought to my</p> <p>5 attention, the actual filing and the declaration, I</p> <p>6 read those materials. I read all the exhibits that</p> <p>7 were provided with the petition. I had many</p> <p>8 discussions with counsel about forming my opinions,</p> <p>9 discussing my opinions. I prepared a declaration. I</p> <p>10 reviewed some of the PTAB documents, including their</p> <p>11 initial decision, and then, more recently, I went</p> <p>12 back and re-reviewed some of those materials, and I</p> <p>13 had a number of discussions with counsel.</p> <p>14 Q Yeah. So maybe I can narrow the question</p> <p>15 a little bit. What have you done in the last two</p> <p>16 weeks to prepare for this deposition?</p> <p>17 A I reviewed the filings in the case, and I</p> <p>18 have discussed those materials with counsel.</p> <p>19 Q Did you have any -- did you have</p> <p>20 conversations with anyone other than counsel to</p> <p>21 prepare for this deposition?</p> <p>22 A Not in the last two weeks.</p> | <p>19</p> <p>1 Q Have you read his deposition transcripts?</p> <p>2 A I've looked at portions of it.</p> <p>3 Q Have you read the entirety of his</p> <p>4 deposition?</p> <p>5 A No.</p> <p>6 Q Why not?</p> <p>7 A Actually -- you know, I may have, at one</p> <p>8 point, a long time ago, but I remember focusing on --</p> <p>9 well, I remember focusing on the portions that were</p> <p>10 relevant to my response, but now that I'm thinking</p> <p>11 about it again, I'm not sure how else I would have</p> <p>12 identified which portions were relevant to my</p> <p>13 response if I hadn't gone through the whole thing.</p> <p>14 So maybe when I -- maybe I did read it</p> <p>15 all when I was preparing my declaration.</p> <p>16 Q In preparing for your deposition, did you</p> <p>17 review any documents that are not part of the PTAB</p> <p>18 record?</p> <p>19 A Yes.</p> <p>20 Q What documents were those?</p> <p>21 A Well, let me make sure I understand your</p> <p>22 question. I looked at an exhibit, 2053, that my</p> |
| <p>18</p> <p>1 Q All right. What about in the last month?</p> <p>2 A No. There are -- there were some</p> <p>3 conversations in preparation of my declaration that</p> <p>4 are described in the declaration, but other than</p> <p>5 that, there haven't been any discussions with anyone</p> <p>6 else.</p> <p>7 Q And what counsel did you meet with to</p> <p>8 prepare for your deposition?</p> <p>9 A Mr. Frisch, Mr. Andros, Mr. Cho and</p> <p>10 Mr. Garr.</p> <p>11 Q And are all of those individuals</p> <p>12 attorneys for the Patent Owner in the case?</p> <p>13 A That's my understanding.</p> <p>14 Q How many meetings did you have with those</p> <p>15 individuals?</p> <p>16 A I believe three.</p> <p>17 Q And collectively, approximately, how many</p> <p>18 hours did you spend in discussions with them?</p> <p>19 A Ballpark six.</p> <p>20 Q Were you in attendance at the deposition</p> <p>21 of Dr. Foty?</p> <p>22 A No.</p>                                                                                                                                                                                                                                                                                                               | <p>20</p> <p>1 understanding is was produced to you but is not part</p> <p>2 of the PTAB record, if I'm using that term correctly.</p> <p>3 I couldn't find it on the PTAB website.</p> <p>4 Q You said that was Exhibit 2053?</p> <p>5 A Yes.</p> <p>6 Q What is Exhibit 2053?</p> <p>7 A I believe it was a declaration where I</p> <p>8 had authenticated some documents.</p> <p>9 Q Apart from Exhibit 2053, were there any</p> <p>10 other documents you reviewed that are not part of the</p> <p>11 PTAB record?</p> <p>12 A Not that I can recall, no.</p> <p>13 MR. JENSEN: And this is a question</p> <p>14 for counsel. I don't seem to have</p> <p>15 Exhibit 2053 in my files.</p> <p>16 Is that something that had either</p> <p>17 been filed or produced to us?</p> <p>18 MR. GARR: I think that's referring</p> <p>19 to the supplemental evidence declaration.</p> <p>20 It's a -- it was -- it would have been</p> <p>21 served on you but not filed.</p> <p>22 It's --</p>                                                                |

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| <p>21</p> <p>1 MR. JENSEN: Okay. We'll -- we'll</p> <p>2 check and see if we can -- we can find</p> <p>3 that.</p> <p>4 MR. GARR: Yeah. It's a two-pager.</p> <p>5 If you need me to send it to you, I can.</p> <p>6 MR. JENSEN: I'll just ask Johannes</p> <p>7 maybe to look for it, and we can circle</p> <p>8 back at a break or something if we</p> <p>9 don't -- we don't find it.</p> <p>10 THE WITNESS: Just to clarify my</p> <p>11 answer, my understanding is -- of your</p> <p>12 question is that I reviewed a number of</p> <p>13 things that were sealed that I can't find</p> <p>14 on the PTAB website, but I would think of</p> <p>15 those as being part of the PTAB record.</p> <p>16 BY MR. JENSEN:</p> <p>17 Q Yes. That was the intent of my question.</p> <p>18 We have the unredacted version of the confidential</p> <p>19 documents. Thank you.</p> <p>20 Apart from your involvement in this</p> <p>21 proceeding, have you done work for Samsung in the</p> <p>22 past?</p>                                                                                                                                                                         | <p>23</p> <p>1 <b>protective order disclosures, but -- but not things</b></p> <p>2 <b>where I didn't testify, for example.</b></p> <p>3 Q Okay. In that case, I would like to ask</p> <p>4 you to identify all of the matters in which you have</p> <p>5 worked for any Samsung entity?</p> <p>6 A <b>I can't do that off the top of my head.</b></p> <p>7 Q Why not?</p> <p>8 A <b>If -- yeah, I just don't remember them</b></p> <p>9 <b>all, and as I said, there are a bunch of Samsung</b></p> <p>10 <b>entities, and I can't necessarily keep them all</b></p> <p>11 <b>straight.</b></p> <p>12 Q What ones can you tell me? Understanding</p> <p>13 that it may not be a comprehensive list, can you tell</p> <p>14 me any of the matters in which you've worked for</p> <p>15 Samsung entities?</p> <p>16 A <b>Yes. I did a Western district -- or I'm</b></p> <p>17 <b>sorry -- I did an Eastern District Texas trial for a</b></p> <p>18 <b>Samsung entity against Maxell.</b></p> <p>19 Q In that case, were you for or against</p> <p>20 Samsung?</p> <p>21 A <b>For.</b></p> <p>22 Q Okay. And what other -- and maybe I --</p> |
| <p>22</p> <p>1 MR. GARR: Objection. Form.</p> <p>2 THE WITNESS: Let me explain my</p> <p>3 counsel's objection. There are many</p> <p>4 Samsung entities, and I have worked both</p> <p>5 for and against various Samsung entities</p> <p>6 in the past.</p> <p>7 BY MR. JENSEN:</p> <p>8 Q Are all of those entities listed in the</p> <p>9 CV document that was provided together with your</p> <p>10 declaration?</p> <p>11 A <b>No. The CV only goes back some number of</b></p> <p>12 <b>years and I believe only covers -- I have to look at</b></p> <p>13 <b>the exact language -- I think testimony where there</b></p> <p>14 <b>was a -- I think it's testimony under oath. I have</b></p> <p>15 <b>to look at the exact -- we can look at the exhibit,</b></p> <p>16 <b>if you'd like, later but it describes exactly what's</b></p> <p>17 <b>disclosed there.</b></p> <p>18 Q For the time period that is covered by</p> <p>19 your CV, does that list all of the work you have done</p> <p>20 for and against various Samsung entities?</p> <p>21 A <b>No. As I said, it describes the</b></p> <p>22 <b>categories that are generally required in -- in most</b></p> | <p>24</p> <p>1 let me maybe provide a little bit more context for</p> <p>2 the question.</p> <p>3 Let me ask the question this way: Apart</p> <p>4 from litigation-related work or litigation</p> <p>5 consulting, have you done any work for Samsung</p> <p>6 entities?</p> <p>7 A <b>No.</b></p> <p>8 Q Okay. So everything you've done for</p> <p>9 Samsung entities has been in the context of a</p> <p>10 litigation, consulting or testifying role?</p> <p>11 A <b>Yes.</b></p> <p>12 Q Okay. And you mentioned there was an ED</p> <p>13 Texas case against Maxell.</p> <p>14 What other matters can you recall having</p> <p>15 worked for a Samsung entity?</p> <p>16 A <b>It's hard for me to -- you know, I've</b></p> <p>17 <b>worked, in some way, on more than 200 cases over the</b></p> <p>18 <b>last 25 years, and I think I've been told that</b></p> <p>19 <b>Samsung is the most lit- -- the most litigated</b></p> <p>20 <b>against entity in the United States because of their</b></p> <p>21 <b>abundance of products. So they do come up reasonably</b></p> <p>22 <b>often.</b></p>                                  |

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| <p>25</p> <p>1 Q Do you know -- approximately how many</p> <p>2 matters have you been retained to work for a Samsung</p> <p>3 entity in?</p> <p>4 A <b>Probably a dozen or more for Samsung and</b></p> <p>5 <b>then a few against.</b></p> <p>6 Q And approximately how far back in time</p> <p>7 does that go? Or let me ask -- strike that.</p> <p>8 When was the first time you can recall</p> <p>9 doing work for a Samsung entity?</p> <p>10 A <b>That's a good question. So I had cases</b></p> <p>11 <b>against Samsung in the 2000s, a big case for AMD and</b></p> <p>12 <b>a big case for a non-practicing entity. So they</b></p> <p>13 <b>would have been after that. It could have been a</b></p> <p>14 <b>Samsung/Nvidia case maybe ten years ago, but, again,</b></p> <p>15 <b>I don't remember exactly.</b></p> <p>16 Q So let me introduce an exhibit at this</p> <p>17 point, and this is -- and just to keep the exhibit</p> <p>18 numbers straight, we plan to use the exhibit numbers,</p> <p>19 to the extent possible, that are already stamped on</p> <p>20 the papers that have been filed with the PTAB.</p> <p>21 So I'd like to start by introducing</p> <p>22 Exhibit 1001, and you can open that locally,</p> | <p>27</p> <p>1 Q Let me do it this way then. There we go.</p> <p>2 Did that take it down for you?</p> <p>3 A <b>Yes.</b></p> <p>4 Q Okay. Great. Before being contacted</p> <p>5 about working on this case, have you ever -- had you</p> <p>6 ever heard of the '599 patent?</p> <p>7 A <b>Not that I can recall. I look through a</b></p> <p>8 <b>lot of patents over the course of the year, but I</b></p> <p>9 <b>don't specifically recall seeing this one prior to</b></p> <p>10 <b>this case, well, prior to being contacted by Samsung</b></p> <p>11 <b>about these patents.</b></p> <p>12 Q Okay. Thank you. And you're aware that</p> <p>13 Petitioners retained Dr. Daniel Foty as an expert in</p> <p>14 this case, correct?</p> <p>15 A <b>I'm aware that he put a declaration in</b></p> <p>16 <b>supporting Petitioner.</b></p> <p>17 Q Correct. And that was on behalf of the</p> <p>18 Petitioner?</p> <p>19 A <b>It appears so.</b></p> <p>20 Q Okay. Do you know Dr. Foty?</p> <p>21 A <b>Not that I can recall.</b></p> <p>22 Q Have you ever read any of his</p> |
| <p>26</p> <p>1 Dr. Wolfe, if you'd like. I'll also share my screen</p> <p>2 here, and we'll see if that feature is working.</p> <p>3 Let me know if you're able to see my</p> <p>4 screen, Dr. Wolfe?</p> <p>5 A <b>I am.</b></p> <p>6 (Wolfe Deposition Exhibit No. 1001</p> <p>7 was marked for the record.)</p> <p>8 BY MR. JENSEN:</p> <p>9 Q And this is Exhibit 1001 on the screen.</p> <p>10 Do you recognize this exhibit?</p> <p>11 A <b>Yes. My understanding is this is the</b></p> <p>12 <b>patent at issue in this IPR.</b></p> <p>13 Q Okay. And would it be okay if I refer to</p> <p>14 that as the '599 patent or the challenged patent</p> <p>15 throughout the deposition?</p> <p>16 A <b>I would understand that.</b></p> <p>17 Q Okay. So we'll come back to this later,</p> <p>18 I just wanted to make sure we had the '599 patent in</p> <p>19 mind when I ask a couple of the next questions here.</p> <p>20 Let me see if I can take this off the screen.</p> <p>21 Did that stop sharing?</p> <p>22 A <b>No.</b></p>                                                                                                                                                                                              | <p>28</p> <p>1 publications?</p> <p>2 A <b>Not that I can recall.</b></p> <p>3 Q Are you familiar with an individual named</p> <p>4 Thomas Credelle?</p> <p>5 A <b>Not that I can recall.</b></p> <p>6 Q Let me introduce another exhibit here</p> <p>7 that I think will be familiar to you. This is</p> <p>8 Exhibit 1002, and I'm sharing that on the screen</p> <p>9 here.</p> <p>10 Do you see that?</p> <p>11 A <b>I do.</b></p> <p>12 (Wolfe Deposition Exhibit No. 1002</p> <p>13 was marked for the record.)</p> <p>14 BY MR. JENSEN:</p> <p>15 Q What is Exhibit 1002?</p> <p>16 A <b>I refer to it as the Kimura application,</b></p> <p>17 <b>and it's my understanding that this is the basis of</b></p> <p>18 <b>the grounds in the IPR challenge.</b></p> <p>19 Q And who are the two named inventors on</p> <p>20 the Kimura reference?</p> <p>21 A <b>I will do my best at pronunciation, but</b></p> <p>22 <b>it looks like Hajime Kimura and Yoshifumi Tanada.</b></p>                                                                                             |

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Mianyang BOE Ex. 1028

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| <p>29</p> <p>1 Q I'll go with your pronunciation,</p> <p>2 Dr. Wolfe.</p> <p>3 Prior to your involvement in this case,</p> <p>4 had you ever heard of either Hajime Kimura or</p> <p>5 Yoshifumi Tanada?</p> <p>6 <b>A Not that I can recall. Although, Kimura</b></p> <p>7 <b>and Tanada are pretty common names.</b></p> <p>8 Q And switching back to Exhibit 1001, which</p> <p>9 is the '599 patent, are you able to see the five</p> <p>10 named inventors listed on the '599 patent?</p> <p>11 <b>A Yes.</b></p> <p>12 Q And I'll just ask the question as to all</p> <p>13 of them, prior to your involvement on this case,</p> <p>14 Dr. Wolfe, did you know any of the five inventors</p> <p>15 listed on the '599 patent?</p> <p>16 <b>A No, I don't believe -- I don't recall</b></p> <p>17 <b>ever having met any of those five people.</b></p> <p>18 Q Did you know who they were?</p> <p>19 <b>A I don't think so. I may have read some</b></p> <p>20 <b>of their previous patents before, but it didn't</b></p> <p>21 <b>register.</b></p> <p>22 Q Now, prior to your involvement in this</p>       | <p>31</p> <p>1 going on in universities, primarily -- some of it at</p> <p>2 Princeton where I was from, and some at other</p> <p>3 universities, as well, and Sony and Samsung were both</p> <p>4 strong leading efforts to commercialize the OLED</p> <p>5 technology, and I'm trying to get the dates right.</p> <p>6 It may have -- LG may have been working on it at the</p> <p>7 time, as well.</p> <p>8 Q Do you know any individuals who were</p> <p>9 active in research or publishing in the area of</p> <p>10 AMOLED design in the early 2000s?</p> <p>11 <b>A The only one I can name off the top of my</b></p> <p>12 <b>head is Steve Forrest at Princeton who I had worked</b></p> <p>13 <b>with.</b></p> <p>14 Q And what was the last name? I didn't</p> <p>15 quite catch it.</p> <p>16 <b>A Forrest, F-O-R-R-E-S-T. At some point,</b></p> <p>17 <b>he went to Michigan. I don't remember the exact</b></p> <p>18 <b>year, but --</b></p> <p>19 Q And you said that was in the -- kind of</p> <p>20 in the early 2000 time frame?</p> <p>21 <b>A Probably '95 through 2010.</b></p> <p>22 Q During that time frame, were you actively</p>                                                                                                                                                                             |
| <p>30</p> <p>1 case, did you know Dr. Aris Silzars?</p> <p>2 <b>A Not that I can recall, no.</b></p> <p>3 Q Prior to your involvement in this case,</p> <p>4 Dr. Wolfe, did you know Kwangsae Lee? Last name</p> <p>5 spelled L-E-E.</p> <p>6 <b>A Not that I can recall.</b></p> <p>7 Q Prior to your involvement in this case,</p> <p>8 did you know Jihyun Ka, spelled J-I-H-Y-U-N, K-A?</p> <p>9 <b>A No.</b></p> <p>10 Q And do you recall approximately when the</p> <p>11 '599 patent application was -- was filed?</p> <p>12 <b>A I have it in front of me. It was filed</b></p> <p>13 <b>on July 6th, 2004.</b></p> <p>14 Q And was there a priority claim to an</p> <p>15 earlier application?</p> <p>16 <b>A My understanding is that there's a</b></p> <p>17 <b>presumption of priority to a July 7, 2003 Korean</b></p> <p>18 <b>application.</b></p> <p>19 Q In that kind of early 2000 time frame,</p> <p>20 who were the -- the thought leaders in AMOLED design?</p> <p>21 <b>A Thought leaders? That's a little bit of</b></p> <p>22 <b>a vague term. There was a great deal of research</b></p> | <p>32</p> <p>1 researching AMOLED technologies?</p> <p>2 <b>A I would characterize it more as adjacent</b></p> <p>3 <b>technologies.</b></p> <p>4 <b>So in the earliest part of that time</b></p> <p>5 <b>frame, I was working with people who were developing</b></p> <p>6 <b>AMOLED cells, and I was looking at ways to augment</b></p> <p>7 <b>both the cells and the overall devices to increase</b></p> <p>8 <b>their functionality, and I worked with a number of</b></p> <p>9 <b>people to get funding to build a state center for</b></p> <p>10 <b>optoelectronics in New Jersey, but as soon as it --</b></p> <p>11 <b>soon after it was formed, I decided to take a</b></p> <p>12 <b>different direction, and I had left to come to</b></p> <p>13 <b>California to join a chip manufacturer, and there,</b></p> <p>14 <b>among my other responsibilities, I ran a displayable</b></p> <p>15 <b>lab that built the chips that interfaced to displays,</b></p> <p>16 <b>including a wide range of displays, LCDs, plasmas and</b></p> <p>17 <b>eventually OLEDs.</b></p> <p>18 Q All right. We may return to that topic</p> <p>19 in a few minutes, but let me -- let me turn to</p> <p>20 another area right now.</p> <p>21 You prepared and submitted a rebuttal</p> <p>22 expert report regarding validity in this case,</p> |

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| <p>33</p> <p>1 correct?</p> <p>2 MR. GARR: Objection.</p> <p>3 THE WITNESS: A declaration.</p> <p>4 Not -- not an expert report, as that's</p> <p>5 normally described in a Federal trial.</p> <p>6 BY MR. JENSEN:</p> <p>7 Q I'll try to use the term you prefer,</p> <p>8 declaration, but will you understand if I use the</p> <p>9 term report, I'm referring to the -- Exhibit 2008</p> <p>10 that we'll introduce that you submitted in this</p> <p>11 proceeding?</p> <p>12 <b>A Okay. Exhibit 2008.</b></p> <p>13 Q Okay. And let's just go ahead and</p> <p>14 introduce that right now.</p> <p>15 <b>A I have it, and if it's okay with you, I</b></p> <p>16 <b>have a printed copy that may be a little bit easier</b></p> <p>17 <b>for me to look at sometimes.</b></p> <p>18 Q Which reminds me, apart from the hard</p> <p>19 copy of your declaration, do you have any other hard</p> <p>20 copy materials with you?</p> <p>21 <b>A Yes, the two exhibits that you've already</b></p> <p>22 <b>introduced.</b></p> | <p>35</p> <p>1 <b>A Yes.</b></p> <p>2 Q And when did you submit this report?</p> <p>3 <b>A I didn't submit it. I signed it on</b></p> <p>4 <b>March 8th, 2024, and at some point, counsel</b></p> <p>5 <b>submitted, I assume, very closely after that.</b></p> <p>6 Q Okay. Yeah, that's what I meant. When</p> <p>7 did you complete your declaration?</p> <p>8 <b>A March 8th, 2024.</b></p> <p>9 Q As of that date, did your declaration</p> <p>10 contain a complete and accurate statement of your</p> <p>11 opinions regarding the validity of the claims in the</p> <p>12 '599 patent?</p> <p>13 <b>A With respect to all the issues I was</b></p> <p>14 <b>asked to opine upon for this proceeding.</b></p> <p>15 Q Have any of your opinions regarding</p> <p>16 validity changed since the time you signed your</p> <p>17 report?</p> <p>18 <b>A Not that I'm aware of.</b></p> <p>19 Q When was the last time that you reviewed</p> <p>20 your declaration?</p> <p>21 <b>A Last night.</b></p> <p>22 Q At the outset, I always like to give a</p>                                                                                                                        |
| <p>34</p> <p>1 Q And so that would be the '599 patent, the</p> <p>2 Kimura reference and your expert report?</p> <p>3 <b>A Yes. I actually have a notebook here</b></p> <p>4 <b>that has the 2000 exhibits, but it's not on my desk</b></p> <p>5 <b>at the moment.</b></p> <p>6 Q So you said you have a hard copy set of</p> <p>7 the exhibits referenced in your report?</p> <p>8 <b>A Yes.</b></p> <p>9 Q Okay. But that's somewhere -- I don't</p> <p>10 know -- on another table?</p> <p>11 <b>A It's, yeah, over there (indicating).</b></p> <p>12 (Wolfe Deposition Exhibit No. 2008</p> <p>13 was marked for the record.)</p> <p>14 BY MR. JENSEN:</p> <p>15 Q Okay. And I've shared on the screen</p> <p>16 Exhibit 2008. Are you able to see that?</p> <p>17 <b>A Yes.</b></p> <p>18 Q And is this a copy of your expert</p> <p>19 declaration?</p> <p>20 <b>A It appears to be.</b></p> <p>21 Q And I'll just jump to the last -- to the</p> <p>22 last page. Is that your signature on the last page?</p>             | <p>36</p> <p>1 witness an opportunity if they've identified any</p> <p>2 errors or corrections in their report, and I'd like</p> <p>3 to do the same to you, Dr. Wolfe.</p> <p>4 Is there anything that you would like to</p> <p>5 correct about your report?</p> <p>6 <b>A No. I may have, at some point, noticed</b></p> <p>7 <b>some minor typos but nothing that would prevent</b></p> <p>8 <b>someone from understanding what I was saying.</b></p> <p>9 Q Were there any materials you would like</p> <p>10 to have reviewed when forming the opinions in your</p> <p>11 declaration but didn't have access to?</p> <p>12 <b>A No. As I mentioned, my declaration is</b></p> <p>13 <b>limited to a relatively narrow set of issues that</b></p> <p>14 <b>were raised in the petition.</b></p> <p>15 Q Is it fair to say that you had all of the</p> <p>16 materials you felt were necessary to prepare your</p> <p>17 declaration?</p> <p>18 <b>A Yes. I had all the materials that were</b></p> <p>19 <b>necessary for the opinions that are in my</b></p> <p>20 <b>declaration.</b></p> <p>21 Q I think I took the exhibit down. Let me</p> <p>22 just put that back up.</p> |

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| <p>37</p> <p>1 If we turn to Paragraph 3 of your expert</p> <p>2 report, it refers to -- it's a paragraph on your</p> <p>3 compensation, correct?</p> <p>4 <b>A Yes.</b></p> <p>5 Q And it says that you're being compensated</p> <p>6 at your standard consulting rate for the time spent</p> <p>7 on the matter?</p> <p>8 <b>A Yes.</b></p> <p>9 Q What is the standard consulting rate that</p> <p>10 you're being paid in connection with this -- this</p> <p>11 matter?</p> <p>12 <b>A \$650 an hour.</b></p> <p>13 Q Who prepared the first draft of your</p> <p>14 expert report?</p> <p>15 <b>A I'm pretty sure I did. Although, not</b></p> <p>16 <b>necessarily the first draft of every paragraph. I</b></p> <p>17 <b>discussed my opinions for quite some time with</b></p> <p>18 <b>counsel, and I started off with drafting the report,</b></p> <p>19 <b>but at various times, both counsel and I added text</b></p> <p>20 <b>that reflected the opinions that I had expressed.</b></p> <p>21 Q And your report -- your report doesn't</p> <p>22 have a table of contents, correct?</p> | <p>39</p> <p>1 <b>A I don't recall if I pulled that from</b></p> <p>2 <b>prior reports that I've done or whether I was</b></p> <p>3 <b>provided with that from counsel. I don't recall.</b></p> <p>4 <b>I read it. It reflected my understanding</b></p> <p>5 <b>of the law, but I don't remember where it originated</b></p> <p>6 <b>from.</b></p> <p>7 Q And in Paragraph 21, you say: I am not</p> <p>8 an attorney. For purposes of this declaration, I</p> <p>9 have been informed about certain aspects of the law</p> <p>10 that are relevant to forming my opinions, correct?</p> <p>11 <b>A Yes.</b></p> <p>12 Q Who informed you about the aspects of the</p> <p>13 law that were relevant to your opinions?</p> <p>14 <b>A Well, ultimately counsel did. Although,</b></p> <p>15 <b>again, I don't remember whether or not they read my</b></p> <p>16 <b>draft and confirmed that those were appropriate</b></p> <p>17 <b>aspects of the law for this proceeding or whether</b></p> <p>18 <b>they provided me with this text.</b></p> <p>19 <b>Again, I -- I did dozens of IPRs over the</b></p> <p>20 <b>last couple of years. So I'm very familiar with</b></p> <p>21 <b>these standards.</b></p> <p>22 Q And when you say that you relied on</p> |
| <p>38</p> <p>1 <b>A It does not.</b></p> <p>2 Q Okay. But if we flip through the report,</p> <p>3 there are these kind of Roman headings that appear</p> <p>4 denoting the different sections?</p> <p>5 <b>A Yes.</b></p> <p>6 Q Okay. Were there any of those sections</p> <p>7 for -- let's say -- the high-level heading that you</p> <p>8 did not draft?</p> <p>9 <b>A Well, I said I didn't draft any -- every</b></p> <p>10 <b>word of many of the sections, but these were all</b></p> <p>11 <b>drafted by counsel and me together based on the</b></p> <p>12 <b>opinions that I expressed in our discussions.</b></p> <p>13 Q If we turn to Paragraph 21 of your</p> <p>14 report -- strike that.</p> <p>15 If we turn to Heading 4 of your report,</p> <p>16 it's titled Relevant Legal Standards, correct?</p> <p>17 <b>A Yes.</b></p> <p>18 Q And that section spans from Paragraph 21</p> <p>19 to 30, correct?</p> <p>20 <b>A Correct.</b></p> <p>21 Q Who drafted the legal standard section of</p> <p>22 your report?</p>                                                              | <p>40</p> <p>1 counsel to confirm these standards, are you referring</p> <p>2 to counsel for the Patent Owner?</p> <p>3 <b>A Yes.</b></p> <p>4 Q Did you rely on any other counsel besides</p> <p>5 counsel for the Patent Owner for the legal standards</p> <p>6 you used?</p> <p>7 <b>A No.</b></p> <p>8 Q If we look at Paragraph 25 in the Legal</p> <p>9 Standards section, it's directed to the topic of</p> <p>10 objective indicia of non-obviousness, correct?</p> <p>11 <b>A Correct.</b></p> <p>12 Q And in the middle of that paragraph, you</p> <p>13 say: I have also been informed that this evidence</p> <p>14 may include, among other things, whether the claimed</p> <p>15 invention satisfied a long-felt but unmet need,</p> <p>16 etcetera.</p> <p>17 Do you see that section?</p> <p>18 <b>A I do.</b></p> <p>19 Q And I want to focus on that phrase, among</p> <p>20 other things, and ask you: Is the legal standard in</p> <p>21 Paragraph 25 the entirety of your understanding as to</p> <p>22 what the objective indicia of non-obviousness are?</p>                                                                                                                                                                             |

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| <p>41</p> <p>1 MR. GARR: Objection.</p> <p>2 THE WITNESS: This is what I</p> <p>3 applied in this case or this matter. You</p> <p>4 know, I -- I would normally refer to</p> <p>5 written documents to completely</p> <p>6 understand the criteria for indicia of</p> <p>7 non-obviousness, which is one of the</p> <p>8 reasons why I put it in my report.</p> <p>9 My recollection is that there are a</p> <p>10 few others that can be considered, but</p> <p>11 I'd need to go back and kind of look</p> <p>12 at -- look at the written factors to</p> <p>13 remember what those are.</p> <p>14 BY MR. JENSEN:</p> <p>15 Q Okay. And I'll represent to you that one</p> <p>16 of those other factors is industry acceptance in the</p> <p>17 form of licensing the patents. Are you aware that</p> <p>18 that is a -- a secondary -- or strike that.</p> <p>19 Are you aware that industry acceptance in</p> <p>20 the form of licensing the patent is an objective</p> <p>21 indicia of non-obviousness?</p> <p>22 A I'm aware that it can be, yes.</p>                       | <p>43</p> <p>1 evidence that the claim is invalid.</p> <p>2 I think that is incorrect in this</p> <p>3 proceeding. I apologize.</p> <p>4 Q And what is incorrect about that?</p> <p>5 A My understanding is that, in an IPR like</p> <p>6 this one, it is a preponderance of the evidence</p> <p>7 standard.</p> <p>8 Q Did you list the preponderance of the</p> <p>9 evidence standard in your declaration?</p> <p>10 A I don't recall, but that's what I</p> <p>11 applied.</p> <p>12 Q But that's not what you said you applied</p> <p>13 in your declaration, is it?</p> <p>14 A That's correct. That would be an error.</p> <p>15 Q And counsel for Samsung confirmed to you</p> <p>16 that Paragraph 22 was the correct standard to apply</p> <p>17 in this proceeding, correct?</p> <p>18 A They reviewed this section. Clearly they</p> <p>19 made the error, as well.</p> <p>20 Q And you said you read your report</p> <p>21 yesterday, correct, to prepare for the deposition?</p> <p>22 A I did, but I did not carefully re-review</p>                                                                                                                                                          |
| <p>42</p> <p>1 Q Is there a reason that you didn't</p> <p>2 consider that factor in forming your opinions in this</p> <p>3 report?</p> <p>4 MR. GARR: Objection.</p> <p>5 THE WITNESS: I didn't have any</p> <p>6 evidence of it one way or the other.</p> <p>7 BY MR. JENSEN:</p> <p>8 Q Did you ask counsel for Patent Owner if</p> <p>9 there were any other objective indicia of</p> <p>10 non-obviousness that were not listed in Paragraph 25?</p> <p>11 A No. I just evaluated the factors that I</p> <p>12 talked about in the declaration.</p> <p>13 Q Let's go back to Paragraph 22, and</p> <p>14 Paragraph 22 is in the Legal Standards section of</p> <p>15 your report, correct?</p> <p>16 A Correct.</p> <p>17 Q Can you go ahead and read that paragraph.</p> <p>18 A I have been informed that each issued</p> <p>19 claim of an issued patent is presumed to be valid. I</p> <p>20 have been further informed that, to overcome the</p> <p>21 presumption of validity, the party challenging the</p> <p>22 claim's validity must present clear and convincing</p> | <p>44</p> <p>1 the legal standards because I -- they generally don't</p> <p>2 change from report to report.</p> <p>3 Q Well, have you applied the clear and</p> <p>4 convincing evidence standard in other IPR standards?</p> <p>5 A No. I'm very aware -- well, years ago I</p> <p>6 believe that that was the standard in certain IPR</p> <p>7 proceedings, but for all the -- as far back as I can</p> <p>8 remember, I have applied a preponderance of the</p> <p>9 evidence standard for IPR proceedings.</p> <p>10 Q What is the difference between a clear</p> <p>11 and convincing evidence standard and a preponderance</p> <p>12 of the evidence standard?</p> <p>13 A I can't give you a legal opinion on that,</p> <p>14 but a preponderance of the evidence standard, as I've</p> <p>15 heard judges explain it, is anything more than 50/50.</p> <p>16 Where a clear and convincing evidence is more than</p> <p>17 that.</p> <p>18 Q So clear and convincing evidence -- you</p> <p>19 would agree -- is a higher standard than</p> <p>20 preponderance of the evidence?</p> <p>21 A It is, and it's the standard I would</p> <p>22 apply in district court but not in an IPR proceeding,</p> |

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| <p style="text-align: right;">45</p> <p><b>1 and it's not the standard I applied here.</b></p> <p>2 Q And so that's -- you're changing your</p> <p>3 opinion from what's in your report right now during</p> <p>4 your deposition?</p> <p>5 MR. GARR: Objection.</p> <p>6 THE WITNESS: I'm not changing my</p> <p>7 invalidity opinion, but I -- I did</p> <p>8 misstate the standard in Paragraph 22 in</p> <p>9 my declaration.</p> <p>10 BY MR. JENSEN:</p> <p>11 Q And you would agree with me, would you</p> <p>12 not, Dr. Wolfe, that a patent could be invalid under</p> <p>13 one standard but not the other?</p> <p>14 MR. GARR: Objection.</p> <p>15 THE WITNESS: I wouldn't phrase it</p> <p>16 that way. I would say one could have</p> <p>17 enough evidence to show that a patent is</p> <p>18 invalid under the preponderance of the</p> <p>19 evidence standard. Where that same</p> <p>20 evidence might not be adequate under a</p> <p>21 clear and convincing standard.</p> <p>22 BY MR. JENSEN:</p> | <p style="text-align: right;">47</p> <p>1 considered Dr. Foty's declaration as part</p> <p>2 of that to the extent that it was cited</p> <p>3 in the petition.</p> <p>4 BY MR. JENSEN:</p> <p>5 Q Did you render any opinion in your report</p> <p>6 about Dr. Foty's qualifications or expertise?</p> <p>7 A No.</p> <p>8 Q Did you render any opinion in your report</p> <p>9 about the qualifications or expertise of Thomas</p> <p>10 Credelle?</p> <p>11 A No.</p> <p>12 Q Are you familiar with the term priority</p> <p>13 dates in the context of a patent?</p> <p>14 A Yes.</p> <p>15 Q And what does the priority date refer to?</p> <p><b>16 A Again, I'm not a patent agent or an</b></p> <p><b>17 attorney, but my understanding is that it is the</b></p> <p><b>18 first filing with the U.S. or a foreign patent office</b></p> <p><b>19 that discloses each and every element of the claim</b></p> <p><b>20 arranged as claimed if one meets certain statutory</b></p> <p><b>21 timing deadlines and establishes certain compliance</b></p> <p><b>22 with certain continuity rules.</b></p> |
| <p style="text-align: right;">46</p> <p>1 Q Thank you.</p> <p>2 Are there any other errors or corrections</p> <p>3 that you would like to make to your report,</p> <p>4 Dr. Wolfe?</p> <p>5 A I'm not aware of any.</p> <p>6 Q Okay. Did you perform any testing as</p> <p>7 part of forming your opinions?</p> <p>8 A What do you mean by testing?</p> <p>9 Q Like testing any products?</p> <p><b>10 A No. I reviewed the teardown photos</b></p> <p><b>11 from -- that had been prepared, and I analyzed them,</b></p> <p><b>12 but I didn't test the operation of any products.</b></p> <p><b>13 The patent claims I looked at are</b></p> <p><b>14 essentially structural.</b></p> <p>15 Q Did you ask anyone else to perform any</p> <p>16 testing?</p> <p>17 A No.</p> <p>18 Q And is it correct that you prepared this</p> <p>19 report in response to the expert report of Dr. Foty?</p> <p>20 MR. GARR: Objection.</p> <p>21 THE WITNESS: I prepared it in</p> <p>22 response to the petition, but I</p>       | <p style="text-align: right;">48</p> <p>1 Q Where, in your report, did you identify</p> <p>2 the priority date to apply for the '599 patent?</p> <p><b>3 A I don't recall stating it explicitly. As</b></p> <p><b>4 I noted before, it's on the face of the patent.</b></p> <p>5 Q And what was the date that you used as</p> <p>6 the priority date?</p> <p><b>7 A I used July 7th, 2003. None of my</b></p> <p><b>8 opinions would be any different if I used July 6th,</b></p> <p><b>9 2004.</b></p> <p>10 Q Are you also aware that the priority date</p> <p>11 is the date from which you evaluate the knowledge of</p> <p>12 a POSITA?</p> <p><b>13 A Yes.</b></p> <p>14 Q And, perhaps, I'm using an acronym there,</p> <p>15 and maybe, for the court reporter's benefit, the term</p> <p>16 is POSITA, P-O-S-I-T-A.</p> <p>17 What does that acronym refer to,</p> <p>18 Dr. Wolfe?</p> <p><b>19 A Person Of Ordinary Skill In The Art.</b></p> <p>20 Q Let me go ahead and introduce another</p> <p>21 exhibit. Am I still sharing the screen, Dr. Wolfe?</p> <p><b>22 A Yes.</b></p>             |

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| <p style="text-align: right;">49</p> <p>1 (Wolfe Deposition Exhibit No. 1003</p> <p>2 was marked for the record.)</p> <p>3 BY MR. JENSEN:</p> <p>4 Q Let me go ahead and open -- this is</p> <p>5 Exhibit 1003, and what is Exhibit 1003, Dr. Wolfe?</p> <p>6 <b>A This was Dr. Foty's declaration that was</b></p> <p>7 <b>attached to the petition.</b></p> <p>8 Q Did you review this -- did you review</p> <p>9 Exhibit 1003 when preparing your opinions?</p> <p>10 <b>A Yes.</b></p> <p>11 Q Let me introduce another exhibit. Well,</p> <p>12 before I do that, let me ask you: What -- what is</p> <p>13 your current job or jobs, Dr. Wolfe?</p> <p>14 <b>A I'm a lecturer at Santa Clara University.</b></p> <p>15 <b>I also do some litigation-related consulting, and I'm</b></p> <p>16 <b>also a director of a company called Turtle Beach.</b></p> <p>17 Q What does Turtle Beach do?</p> <p>18 <b>A Make consumer electronics, primarily, in</b></p> <p>19 <b>the video gaming space, headsets, controllers, things</b></p> <p>20 <b>like that.</b></p> <p>21 Q And you mentioned that you're a lecturer</p> <p>22 at Santa Clara University; is that right?</p> | <p style="text-align: right;">51</p> <p>1 (Wolfe Deposition Exhibit No. 1024</p> <p>2 was marked for the record.)</p> <p>3 BY MR. JENSEN:</p> <p>4 Q What is Exhibit 1024?</p> <p>5 <b>A I think it's the web page they keep for</b></p> <p>6 <b>me at the university.</b></p> <p>7 Q Have you seen this web page before?</p> <p>8 <b>A At various times, yeah. They don't</b></p> <p>9 <b>always keep it up-to-date, but yes.</b></p> <p>10 Q Did you prepare this profile?</p> <p>11 <b>A I submitted various snippets. Someone</b></p> <p>12 <b>else actually compiles it and decides what to include</b></p> <p>13 <b>and what not to include.</b></p> <p>14 Q Did you approve the profile before it was</p> <p>15 posted publicly?</p> <p>16 <b>A No, but I think that, if I had objected</b></p> <p>17 <b>to it, they probably would have tried to change it.</b></p> <p>18 Q Okay. And this is just a one-page</p> <p>19 document, correct?</p> <p>20 <b>A Yes, with a link to a CV, and I have no</b></p> <p>21 <b>idea what CV that links to.</b></p> <p>22 Q Okay. Maybe we can circle back to that</p>       |
| <p style="text-align: right;">50</p> <p>1 <b>A Correct.</b></p> <p>2 Q Are you a professor there, or is there --</p> <p>3 I'm trying to figure if there is a distinction</p> <p>4 between a professor and a lecturer?</p> <p>5 <b>A Yes, a Santa Clara lecturer doesn't</b></p> <p>6 <b>conduct research and is 100 percent focused on</b></p> <p>7 <b>teaching.</b></p> <p>8 Q And do you have the title of professor at</p> <p>9 Santa Clara?</p> <p>10 <b>A No, but the titles are being revised for</b></p> <p>11 <b>next year. So my next appointment will be with a</b></p> <p>12 <b>professor title.</b></p> <p>13 Q Oh, well, congratulations.</p> <p>14 <b>A It's everybody. Not just me.</b></p> <p>15 Q Congratulations across the board.</p> <p>16 Let me go ahead -- and I think we'll try</p> <p>17 to the chat feature here. I'm just going to drop an</p> <p>18 exhibit into the chat, and I'll go ahead and open</p> <p>19 that on the screen share, but I wanted to make sure</p> <p>20 that you had a local copy of that, as well, and this</p> <p>21 is Exhibit 1024.</p> <p>22 <b>A Let me get the local copy to open. Okay.</b></p>                       | <p style="text-align: right;">52</p> <p>1 in a moment.</p> <p>2 Just take a moment to look at the</p> <p>3 one-page exhibit, and let me know if there's anything</p> <p>4 you see that's incorrect about this profile?</p> <p>5 <b>A I don't. Not all the courses that I've</b></p> <p>6 <b>taught are listed, but everything that's there, I</b></p> <p>7 <b>believe, is correct.</b></p> <p>8 Q Okay. And you mentioned that there's a</p> <p>9 number of courses that are listed that you teach; is</p> <p>10 that right?</p> <p>11 <b>A Yes.</b></p> <p>12 Q What -- do you know -- and there's -- I</p> <p>13 don't know the exact number -- eight or ten courses</p> <p>14 listed?</p> <p>15 <b>A Yes.</b></p> <p>16 Q What -- can you tell me what those</p> <p>17 courses are about?</p> <p>18 <b>A ELEN 120 is an Introduction to</b></p> <p>19 <b>Microprocessors Systems. ELEN 121 is Realtime</b></p> <p>20 <b>Embedding Computing. ELEN 123 is Mechatronics. ELEN</b></p> <p>21 <b>127 is Advanced Digital Logic Design. I don't</b></p> <p>22 <b>remember the names of ELEN 194, 195 and 196, but</b></p> |

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| <p>53</p> <p>1 that's the senior thesis sequence for all of our</p> <p>2 seniors. ELEN 502 is a graduate course in Realtime</p> <p>3 Computing. ELEN 510 is the graduate course in</p> <p>4 Computer Architecture. Engineering 110 is -- again,</p> <p>5 I don't remember its exact name, but it's Community</p> <p>6 Service Engineering, and ELEN 603, again, I don't</p> <p>7 remember the exact name, but it's the graduate</p> <p>8 advance Digital Logic course.</p> <p>9 Q Okay. Let me introduce another exhibit</p> <p>10 into the chat, as well, and I'll open it on the</p> <p>11 screen share, too.</p> <p>12 This is Exhibit 1023, and let me know</p> <p>13 when you've got that available.</p> <p>14 A Okay.</p> <p>15 (Wolfe Deposition Exhibit No. 1023</p> <p>16 was marked for the record.)</p> <p>17 BY MR. JENSEN:</p> <p>18 Q What is Exhibit 1023?</p> <p>19 A I don't know.</p> <p>20 Q And Exhibit 1023 is a two-page document,</p> <p>21 correct?</p> <p>22 A Yes.</p> | <p>55</p> <p>1 Exhibit 1023 and see if the substance of Exhibit 1023</p> <p>2 is consistent with your recollection and</p> <p>3 understanding of your LinkedIn profile?</p> <p>4 A It looks correct.</p> <p>5 Q Roughly when was the last time you</p> <p>6 updated your LinkedIn profile?</p> <p>7 A I don't recall, but it may be six or</p> <p>8 eight years. Oh, no, no. It has IEEE Fellow. So</p> <p>9 that was official beginning of 2022. So I must have</p> <p>10 added that.</p> <p>11 Q So this was updated sometime in 2022 or</p> <p>12 later?</p> <p>13 A At least in part, yes.</p> <p>14 Q Is there anything inaccurate or incorrect</p> <p>15 about your LinkedIn profile in Exhibit 1023?</p> <p>16 A I don't see anything incorrect right now.</p> <p>17 Because I listed my Ph.D. as '91, which is when I</p> <p>18 actually finished school. The official date on the</p> <p>19 degree is '92, but I listed the years that I was</p> <p>20 actually at school.</p> <p>21 Q Understood.</p> <p>22 A I don't see anything that's not correct</p> |
| <p>54</p> <p>1 Q Okay. And, Dr. Wolfe, do you have a</p> <p>2 LinkedIn profile?</p> <p>3 A I do.</p> <p>4 Q Do you recognize Exhibit 1023 as your</p> <p>5 LinkedIn profile?</p> <p>6 A I don't. I've never seen it quite in</p> <p>7 this form before, but I -- it certainly appears to be</p> <p>8 consistent with it.</p> <p>9 Q I'll represent to you that we printed</p> <p>10 this off of the LinkedIn website and any formatting</p> <p>11 that was done was, you know, done by the LinkedIn</p> <p>12 website itself. Not anybody for Petitioner.</p> <p>13 Can you take a moment to review Exhibit</p> <p>14 1023 and see if it -- well, before doing that --</p> <p>15 strike that.</p> <p>16 You mentioned that you have a LinkedIn</p> <p>17 profile, correct?</p> <p>18 A Yes.</p> <p>19 Q Who prepared your LinkedIn profile?</p> <p>20 A I did.</p> <p>21 Q Okay. Given that you prepared your</p> <p>22 LinkedIn profile, can you take a moment to review</p>                    | <p>56</p> <p>1 as I look at it here. It doesn't -- again, it</p> <p>2 doesn't list everything that I teach.</p> <p>3 Q Does your LinkedIn profile identify any</p> <p>4 expertise in Active Matrix Displays?</p> <p>5 A No. I didn't list really specific</p> <p>6 technology areas of expertise here, because I tend to</p> <p>7 consider whether I have expertise in a particular</p> <p>8 patent on a case by case basis.</p> <p>9 Q Does your LinkedIn profile, Exhibit 1023,</p> <p>10 indicate any expertise in AMOLED technology?</p> <p>11 A No. It really doesn't get into that</p> <p>12 level of detail on any technologies.</p> <p>13 Q Let's turn to your -- your CV then?</p> <p>14 A Okay.</p> <p>15 Q And you submitted a CV to counsel for</p> <p>16 Patent Owner in connection with your declaration,</p> <p>17 correct?</p> <p>18 A Yes.</p> <p>19 Q And let's go ahead and -- I'd like to</p> <p>20 introduce Exhibit 2048.</p> <p>21 (Wolfe Deposition Exhibit No. 2048</p> <p>22 was marked for the record.)</p>                              |

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| 57 | 1 BY MR. JENSEN:<br>2 Q What is Exhibit 2048, Dr. Wolfe?<br>3 A <b>That was a copy of my CV as of some date</b><br>4 <b>that I provided it to counsel.</b><br>5 Q And who prepared your CV?<br>6 A <b>I did.</b><br>7 Q And I think you mentioned earlier that<br>8 your Santa Clara profile had a link to your CV, as<br>9 well, correct?<br>10 A <b>I saw that.</b><br>11 Q Okay. Do you know if that link would<br>12 take you to the same CV that we're looking at here as<br>13 Exhibit 2048?<br>14 A <b>Unlikely. I don't update it regularly</b><br>15 <b>for the university. Although, I don't know for sure.</b><br>16 Q When was your CV last updated?<br>17 A <b>I -- let me clarify the question. Are</b><br>18 <b>you asking me when I last updated my CV or when this</b><br>19 <b>copy was updated last?</b><br>20 Q Let's go with the latter question. When<br>21 was Exhibit 2048 last updated?<br>22 A <b>I don't know exactly. I would -- my best</b> | 59 | 1 is a CV that I just downloaded from the Santa Clara<br>2 website using the link that we were looking at<br>3 earlier in Exhibit 1024, and I'll go ahead and open<br>4 that in the screen share, as well, but what I'd like<br>5 to ask you to do, Dr. Wolfe, is just take a peek and<br>6 see if you can identify any differences between the<br>7 CV on the Santa Clara website and the CV that you<br>8 provided in connection with this proceeding?<br>9 A <b>Yeah. I mean, I can't do a line-by-line</b><br>10 <b>right now, but certainly there are several pages of</b><br>11 <b>publications listed in the Santa Clara CV that are</b><br>12 <b>not in the one that I filed in this case, and there</b><br>13 <b>are lists of testimony in the one that I filed in</b><br>14 <b>this case that are not on the Santa Claire one.</b><br>15 Q Excuse me. Well, let's focus on Exhibit<br>16 2048 for now, which is the CV that you submitted in<br>17 connection with this proceeding?<br>18 A <b>Uh-huh.</b><br>19 Q Is there anything in your CV of Exhibit<br>20 2048 that indicates that you have experience in<br>21 Active Matrix Displays?<br>22 A <b>Yes.</b> |
| 58 | 1 <b>guess would be somewhere between in January or</b><br>2 <b>February of 2024.</b><br>3 Q This CV was not created just for this<br>4 litigation, correct?<br>5 A <b>Not in general. Although, I may have</b><br>6 <b>updated the case list just prior to the litigation.</b><br>7 Q And you make your CV publically available<br>8 on the Santa Clara website, correct?<br>9 MR. GARR: Objection.<br>10 THE WITNESS: Some version of it.<br>11 I don't think the one -- I don't think it<br>12 matches this one. I think there's some<br>13 overlaps, but I believe that's a more<br>14 academically oriented CV.<br>15 Again, I haven't looked at that one<br>16 in a very long time.<br>17 (Wolfe Deposition Exhibit No. 1025<br>18 was marked for the record.)<br>19 BY MR. JENSEN:<br>20 Q So let me -- bear with me just a moment.<br>21 I'm dropping into the chat what's going to be marked<br>22 as Exhibit 1025, and I'll represent to you that this         | 60 | 1 Q What?<br>2 A <b>Again, not everything is on my CV, and</b><br>3 <b>I'm happy to go into the details later, but I've</b><br>4 <b>lumped it into some general categories when I was at</b><br>5 <b>SONIC blue. I lumped it in with video research --</b><br>6 Q Excuse me. I'm sorry to interrupt. Can<br>7 you point me to the specific line that you're looking<br>8 at that indicates your experience with Active Matrix<br>9 Displays?<br>10 A <b>Sure. Page 2, Line -- under IP</b><br>11 <b>Management and Licensing, I noted that I managed</b><br>12 <b>video research and development. That was a -- about</b><br>13 <b>a 12-person team that developed interfaces and pixel</b><br>14 <b>drive strategies for Active Matrix Displays. I</b><br>15 <b>also --</b><br>16 Q Let me pause you there, and just while<br>17 we're on this topic, have I highlighted the correct<br>18 the bullet that you're referring to?<br>19 A <b>Yes.</b><br>20 Q Okay. That bullet doesn't say anything<br>21 about pixel drive strategies or Active Matrix<br>22 Displays, does it?                                                                                             |

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| <p>61</p> <p>1 MR. GARR: Objection.</p> <p>2 THE WITNESS: It doesn't use those</p> <p>3 words, but that's what was encompassed in</p> <p>4 that role. Again, I haven't listed every</p> <p>5 single word of everything that I've done</p> <p>6 in all my jobs here.</p> <p>7 BY MR. JENSEN:</p> <p>8 Q I'm sorry. Go ahead. What other items</p> <p>9 did you want to point out?</p> <p>10 A I don't actually list some of my other</p> <p>11 active matrix experiences in that job.</p> <p>12 As Assistant Professor at Princeton</p> <p>13 University, I just lumped it all into multimedia.</p> <p>14 Under The Graphics Technology Company,</p> <p>15 I'm happy to explain how my development of</p> <p>16 touch-sensitive components and systems involved</p> <p>17 active matrix technology, and then if we go to the</p> <p>18 patents, there are a number of them there --</p> <p>19 Q Let me pause for just a moment and then</p> <p>20 we'll go to the patents. I wanted to ask about what</p> <p>21 you reference for The Graphics Technology Company,</p> <p>22 and maybe just remind me.</p>                                                                                                                                                                                           | <p>63</p> <p>1 Matrix Display?</p> <p>2 A I don't remember the specific products</p> <p>3 that were active matrix and which ones were passive</p> <p>4 matrix, but we were doing both at the time. I worked</p> <p>5 on the first prototype for the Apple Newton, the</p> <p>6 Motorola Envoy, a number of different kinds of</p> <p>7 devices, and whether or not they actually</p> <p>8 commercially launched with Active Matrix Displays,</p> <p>9 many of them were -- were developed to be able to</p> <p>10 support Active Matrix Displays, so the prototypes had</p> <p>11 them.</p> <p>12 Q Did any of your work at The Graphics</p> <p>13 Technology Company involve AMOLED technology?</p> <p>14 A Not at that time. Those would have been</p> <p>15 active matrix LCDs or even using the active matrix</p> <p>16 transistors as part of the touch screen.</p> <p>17 Q All right. And now I'll circle back to</p> <p>18 the patent topic you raised. You mentioned that you</p> <p>19 filed and received a patent on Active Matrix Displays</p> <p>20 while at The Graphics Technology Company.</p> <p>21 Can you identify that patent for me in</p> <p>22 your CV?</p>                                                       |
| <p>62</p> <p>1 So you said this dealt with</p> <p>2 touch-sensitive components?</p> <p>3 A Yes. We had a factory that manufactured</p> <p>4 touch sensors, and I was involved in the design of</p> <p>5 touch sensors for numerous of the first generation of</p> <p>6 handheld devices, as well as other things, developing</p> <p>7 prototypes for AT&amp;T, Motorola, IBM, a number of</p> <p>8 other companies, and those were parts that were</p> <p>9 integrated with Active Matrix Displays, in many</p> <p>10 cases. They were often manufactured in the same</p> <p>11 manufacturing facilities as Active Matrix Displays</p> <p>12 using the same chemistry, and as part of that, I</p> <p>13 worked very, very closely with active matrix</p> <p>14 designers and developers in ensuring compatibility</p> <p>15 and also filed some -- or at least one patent, at</p> <p>16 that time, on active matrix technology, and then as</p> <p>17 we'll look on the next page, there are a number of</p> <p>18 additional patents that I filed and have received on</p> <p>19 Active Matrix Displays, including in Korea.</p> <p>20 Q And we'll go to those in just a moment.</p> <p>21 Did -- what product did you develop at</p> <p>22 The Graphics Technology Company that had an Active</p> | <p>64</p> <p>1 A Yeah, I don't think I characterized it</p> <p>2 exactly that way, but I believe it's 5,438,168, which</p> <p>3 uses the active -- the Amorphous Polysilicon</p> <p>4 Transistors from the Active Matrix Display to perform</p> <p>5 the touch detection function, as well, and then some</p> <p>6 of the later patents -- I don't know that I remember</p> <p>7 them all, but 8,203,541 is an AMOLED patent, Korean</p> <p>8 patent 101200740 is AMOLED patent. I believe U.S.</p> <p>9 Patent 8,243,045 is an AMOLED patent.</p> <p>10 Q Let's -- let's take these one at a time.</p> <p>11 All right. I'd like to look first at the '168 patent</p> <p>12 that you mentioned. Is this the patent you're</p> <p>13 referring to titled Touch Panel?</p> <p>14 A Yes.</p> <p>15 Q And is it your testimony that the U.S.</p> <p>16 Patent 5,438,168 is an Active Matrix Display patent?</p> <p>17 A No. It's a touch screen patent that</p> <p>18 describes using Active Matrix Display manufacturing</p> <p>19 technology to create a touch screen that goes along</p> <p>20 with the display.</p> <p>21 Q Would it surprise you if the '168 patent</p> <p>22 did not even use the term active matrix anywhere in</p> |

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| <p>65</p> <p>1 it at all?</p> <p>2 <b>A It would not. I would -- again, I was</b></p> <p>3 <b>more technical. I referred to the specific</b></p> <p>4 <b>transistor that was used in active matrix.</b></p> <p>5 <b>I have a -- again, that's a -- that's</b></p> <p>6 <b>almost a 30-year-old patent. So I don't recall</b></p> <p>7 <b>exactly how I described the correlation at that time,</b></p> <p>8 <b>but I used probably similar phrasing that meant the</b></p> <p>9 <b>same thing to me.</b></p> <p>10 Q And what was -- what was the other</p> <p>11 patents that you mentioned?</p> <p>12 <b>A 8,203,541, which I, I believe,</b></p> <p>13 <b>corresponds to Korean patent 101200740, and also</b></p> <p>14 <b>8,243,045, which I believe corresponds to Korean</b></p> <p>15 <b>patent 101200741. I thought, perhaps, there was</b></p> <p>16 <b>another one, but I'm not seeing it right here at the</b></p> <p>17 <b>moment.</b></p> <p>18 Q Do you believe that your experience with</p> <p>19 U.S. Patents 8,193,941 and 8,203,541 help to qualify</p> <p>20 you as a POSITA in this proceeding?</p> <p>21 <b>A I believe that the knowledge that I</b></p> <p>22 <b>gained that led to those patents qualify me as a</b></p> | <p>67</p> <p>1 patents over a decade later?</p> <p>2 MR. GARR: Objection.</p> <p>3 THE WITNESS: That was the genesis</p> <p>4 of the idea. I didn't have the -- the</p> <p>5 complete invention, but it's when I began</p> <p>6 learning about the existing</p> <p>7 state-of-the-art, and I continued to keep</p> <p>8 up-to-date on the existing</p> <p>9 state-of-the-art as I searched for a</p> <p>10 solution that I would later patent.</p> <p>11 BY MR. JENSEN:</p> <p>12 Q Dr. Wolfe, have you authored any books on</p> <p>13 Active Matrix Displays?</p> <p>14 <b>A I haven't authored any. I've read quite</b></p> <p>15 <b>a few.</b></p> <p>16 Q Have you authored any articles on Active</p> <p>17 Matrix Displays?</p> <p>18 MR. GARR: Objection.</p> <p>19 THE WITNESS: Not that I can</p> <p>20 recall.</p> <p>21 BY MR. JENSEN:</p> <p>22 Q Have you authored any books on pixel</p>                                                                            |
| <p>66</p> <p>1 <b>POSITA.</b></p> <p>2 Q And I note that the '941 patent is dated</p> <p>3 2012, as is the '541 patent, correct?</p> <p>4 <b>A Correct.</b></p> <p>5 Q And you're aware that the -- the relevant</p> <p>6 date for a POSITA in this case is 2003, as we</p> <p>7 discussed, right?</p> <p>8 <b>A Correct. So I began working on those</b></p> <p>9 <b>concepts as part of the proposal for funding at</b></p> <p>10 <b>Princeton in 1996 and 1997, but it took me a long</b></p> <p>11 <b>time to really feel like I had reduced them to</b></p> <p>12 <b>practice, but the core concepts of how existing</b></p> <p>13 <b>active matrix OLEDs worked was something that I had</b></p> <p>14 <b>learned well in advance of 2012, and those are the</b></p> <p>15 <b>issue dates. The filing dates are several years</b></p> <p>16 <b>before.</b></p> <p>17 Q Yeah. I'll represent to you that the</p> <p>18 filing dates are in 2009.</p> <p>19 <b>A Yes.</b></p> <p>20 Q I want to know is it your testimony that</p> <p>21 the work that you did at Princeton in 1996 and 1997</p> <p>22 is -- or led to the filing of the '941 and '541</p>                                                                                     | <p>68</p> <p>1 circuits?</p> <p>2 <b>A I haven't authored any books. I've</b></p> <p>3 <b>written some chapters, but that's not what they were</b></p> <p>4 <b>about.</b></p> <p>5 Q Have you authored any articles on pixel</p> <p>6 circuits?</p> <p>7 <b>A Not that I can recall.</b></p> <p>8 Q Dr. Wolfe, have you ever personally</p> <p>9 designed an Active Matrix Display?</p> <p>10 <b>A You mean one that would be manufactured?</b></p> <p>11 Q We can start with that. Have you ever</p> <p>12 designed an Active Matrix Display that has been</p> <p>13 manufactured?</p> <p>14 <b>A No.</b></p> <p>15 Q Have you ever designed a pixel circuit</p> <p>16 that's been manufactured?</p> <p>17 <b>A I don't believe so.</b></p> <p>18 Q Let's return to Exhibit 2008, which is</p> <p>19 your declaration, and I'd like to direct your</p> <p>20 attention to Section 7, which is titled Level Of</p> <p>21 Ordinary Skill In The Art.</p> <p>22 Do you see that?</p> |

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| <p>69</p> <p>1 A Yes.</p> <p>2 Q And this section spans Paragraphs 45 to</p> <p>3 49, correct?</p> <p>4 A Correct.</p> <p>5 Q And can you point me to the paragraph</p> <p>6 where you set forth your definition of a POSITA?</p> <p>7 A I don't state it in a single statement.</p> <p>8 What I do is I note in Paragraph 47 that, in my</p> <p>9 opinion, Petitioner's proposed definition is too</p> <p>10 broad and that the factors that I recite in Paragraph</p> <p>11 46 should be added to it to limit it.</p> <p>12 Q So let me make sure I understand that,</p> <p>13 and I'll ask the question this way: What is your</p> <p>14 definition of a POSITA?</p> <p>15 A I think if you put those two paragraphs</p> <p>16 together, it would be that a POSITA in the field of</p> <p>17 the '599 patent would have had a Bachelor's degree in</p> <p>18 Electrical Engineering, Computer Engineering,</p> <p>19 Material Science, Physics or the like, along with two</p> <p>20 to three years of circuit design/analysis experience</p> <p>21 in Active Matrix Display design and</p> <p>22 electroluminescence, and I would be fine with the</p>                                                                                      | <p>71</p> <p>1 So, for example, someone with a degree in</p> <p>2 electrical engineering who had spent to two to three</p> <p>3 years designing and analyzing radio transmitters</p> <p>4 would meet his definition. Where I don't think that</p> <p>5 would give them sufficient experience to be a person</p> <p>6 of ordinary skill in the art with respect to the '599</p> <p>7 patent, unless they had other experience, as well.</p> <p>8 Q Is it your testimony that a POSITA has to</p> <p>9 have two to three years of experience designing</p> <p>10 Active Matrix Displays?</p> <p>11 A No.</p> <p>12 Q Maybe I -- maybe I misunderstood what --</p> <p>13 what your definition is then. Could -- could you --</p> <p>14 could I trouble you to state your definition of a</p> <p>15 POSITA?</p> <p>16 A Okay. I gave it to you exactly before,</p> <p>17 but I'll try to repeat it. A POSITA would have had a</p> <p>18 Bachelor's degree in Electrical Engineering, Computer</p> <p>19 Engineering, Material Science, Physics or the like,</p> <p>20 or -- along with two to three years of circuit</p> <p>21 design/analysis -- circuit design or -- and/or</p> <p>22 analysis experience in Active Matrix Display design</p> |
| <p>70</p> <p>1 addition that the lack of work experience can be</p> <p>2 remedied by additional education and vice versa.</p> <p>3 Q Just to make sure that I understand that</p> <p>4 in terms of the sort of work experience component.</p> <p>5 Did I hear you correctly to say that a POSITA would</p> <p>6 have two to three years of circuit design experience</p> <p>7 in active matrix design and electroluminescence?</p> <p>8 A No. It could be circuit design or</p> <p>9 analysis, as Dr. Foty noted. It could be study.</p> <p>10 Q Okay. Do I understand you correctly then</p> <p>11 to have said that, in addition to the Bachelor's</p> <p>12 degree, a POSITA would have two to three years of</p> <p>13 circuit design, slash, analysis experience in active</p> <p>14 matrix design and electroluminescence?</p> <p>15 A Yes. Again, with the caveat that</p> <p>16 Dr. Foty added about how those skills could be</p> <p>17 achieved in other ways.</p> <p>18 Q How is that different than Dr. Foty's</p> <p>19 definition of a POSITA?</p> <p>20 A My understanding is that he does not seem</p> <p>21 to require any exposure or knowledge related to</p> <p>22 Active Matrix Display design or electroluminescence.</p> | <p>72</p> <p>1 and electroluminescence. A lack of work experience</p> <p>2 can be remedied by additional education and vice</p> <p>3 versa.</p> <p>4 Q So at that time, you interjected an</p> <p>5 and/or in your deposition. You said two to three</p> <p>6 years circuit design experience and/or active matrix</p> <p>7 design experience, and that's what I'm really trying</p> <p>8 to ferret out is the distinction between those two</p> <p>9 things, circuit design experience and active matrix</p> <p>10 design experience, and whether, in your opinion, both</p> <p>11 of those things are required or you could have just</p> <p>12 one of them?</p> <p>13 A Well, I think you're misplacing my</p> <p>14 and/or. I simply read the slash in Dr. Foty's</p> <p>15 definition as and/or, which is the way I would</p> <p>16 understand it.</p> <p>17 Q So -- so, as part of your definition,</p> <p>18 you're adopting Dr. Foty's definition and drafting on</p> <p>19 an additional requirement to have some amount of</p> <p>20 active matrix design and electroluminescence</p> <p>21 experience?</p> <p>22 A Well, more specifically, I'm saying that</p>                                                                  |

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| <p>73</p> <p>1 just general circuit design and and/or analysis</p> <p>2 experience may not be of value here. That one needs</p> <p>3 experience that is specific in helping to understand</p> <p>4 Active Matrix Display design and electroluminescence.</p> <p>5 Two to three years experience in battery</p> <p>6 chargers or radio transmitters would not be</p> <p>7 particularly helpful here.</p> <p>8 Q How much active matrix design experience</p> <p>9 must a POSITA have?</p> <p>10 A I don't know that they necessarily need</p> <p>11 design experience, but they need a combination of</p> <p>12 design/analysis experience.</p> <p>13 So studying other people's designs,</p> <p>14 analyzing circuits, studying circuits that have been</p> <p>15 designed, I think that would be acceptable, as long</p> <p>16 as that study and analysis was specific to the</p> <p>17 technologies that are at issue in this patent and not</p> <p>18 just to circuits in general.</p> <p>19 Q How much active matrix design, slash,</p> <p>20 analysis experience must a POSITA have?</p> <p>21 A Two to three years, unless there's some</p> <p>22 other combination of work experience or other</p> | <p>75</p> <p>1 THE WITNESS: A POSITA would know</p> <p>2 that there are trade-offs in doing so and</p> <p>3 would be able to analyze them and</p> <p>4 determine whether or not a particular</p> <p>5 reduction was advisable or not.</p> <p>6 BY MR. JENSEN:</p> <p>7 Q Do you agree that a POSITA, under your</p> <p>8 definition, would have known that the number of</p> <p>9 signal lines and transistors that are used in a pixel</p> <p>10 circuit affects the overall aperture ratio?</p> <p>11 MR. GARR: Objection.</p> <p>12 THE WITNESS: Under certain</p> <p>13 circumstances that would be true, but</p> <p>14 there are a number of considerations that</p> <p>15 a POSITA would be able to evaluate,</p> <p>16 including the size and shape of those</p> <p>17 transistors, whether or not it was a top</p> <p>18 emitter or bottom emitter and whether or</p> <p>19 not lines were shared between adjacent</p> <p>20 cells.</p> <p>21 So -- so a person of ordinary skill</p> <p>22 would have the ability to look at two</p> |
| <p>74</p> <p>1 learning experience that is equivalent.</p> <p>2 Q In Paragraphs 48 and 49 of your</p> <p>3 declaration, you walk through and identify a number</p> <p>4 of things that a POSITA with active matrix design</p> <p>5 experience would know; is that correct?</p> <p>6 A That they would know either through their</p> <p>7 own experience or that they would understand through</p> <p>8 reading the Kimura reference through the lens of</p> <p>9 being a POSITA.</p> <p>10 Q Does your definition of a POSITA impose</p> <p>11 additional requirements above and beyond the</p> <p>12 definition provided by Dr. Foty?</p> <p>13 A I wouldn't call them additional</p> <p>14 requirements. I would say that they need to be</p> <p>15 experiences that are more specifically related to the</p> <p>16 topic of this patent and not just to circuit design</p> <p>17 in general.</p> <p>18 Q Would a -- under your definition,</p> <p>19 Dr. Wolfe, would a POSITA know that it is desirable</p> <p>20 to reduce the number of control signals in a pixel</p> <p>21 circuit?</p> <p>22 MR. GARR: Objection.</p>                                                                            | <p>76</p> <p>1 designs and evaluate the impact of those</p> <p>2 factors.</p> <p>3 BY MR. JENSEN:</p> <p>4 Q Would a POSITA, under your definition,</p> <p>5 Dr. Wolfe, know what it means to initialize a pixel</p> <p>6 circuit?</p> <p>7 A I think that would be context dependent,</p> <p>8 but there are various forms of initialization that</p> <p>9 can be performed and a POSITA would be able to</p> <p>10 understand them in context.</p> <p>11 Q Would a POSITA with active matrix design</p> <p>12 experience, under your definition, know how to</p> <p>13 discharge a storage capacitor in a pixel circuit?</p> <p>14 MR. GARR: Objection.</p> <p>15 THE WITNESS: Yes. It would know</p> <p>16 various ways to do that and what the</p> <p>17 trade-offs are and the reaction of the</p> <p>18 circuit would be in each case and how it</p> <p>19 would fit into an overall design, and</p> <p>20 they would be able to analyze that for</p> <p>21 various circumstances.</p> <p>22 BY MR. JENSEN:</p>                         |

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| <p>77</p> <p>1 Q I wrote down a term that you used a</p> <p>2 little bit earlier that I wanted to ask about, and</p> <p>3 I'll -- I'll try the term, and you tell me if I'm</p> <p>4 pronouncing it correctly or not. I believe it was</p> <p>5 amorphous polysilicon?</p> <p>6 A Yes.</p> <p>7 Q What is amorphous polysilicon?</p> <p>8 A I am not a material scientist, but I can</p> <p>9 give you a very general definition. The silicon in</p> <p>10 the CPU in my computer is crystalline. All of the</p> <p>11 atoms are lined up in an exact crystal pattern.</p> <p>12 There -- amorphous silicon the crystal pattern is not</p> <p>13 locked in. The molecules are in a more mixed up</p> <p>14 pattern, and then there are also a thing called</p> <p>15 polycrystalline silicon, something that's in between,</p> <p>16 in which local atoms are lined up in a crystallin</p> <p>17 structure but the crystal structure is not uniform</p> <p>18 throughout the entire piece of material.</p> <p>19 Q Would a POSITA under your definition</p> <p>20 understand that polysilicon was a suitable substrate</p> <p>21 for an Active Matrix Display?</p> <p>22 A Under some circumstances, it would be.</p> | <p>79</p> <p>1 A As far as I'm aware, plastic and glass.</p> <p>2 There may have been some metal ones somewhere, but I</p> <p>3 don't recall seeing any.</p> <p>4 Q Were polysilicon substrates used in 2003</p> <p>5 for Active Matrix Displays?</p> <p>6 A Again, it would depend on context, but</p> <p>7 I'm not used to the term polysilicon being described</p> <p>8 as the substrate. It would be a material that would</p> <p>9 be deposited on a substrate in order to make</p> <p>10 transistors.</p> <p>11 Q All right. And so you're distinguishing</p> <p>12 between -- I'm trying to think of a way to -- to ask</p> <p>13 this question.</p> <p>14 Putting aside what the underlying</p> <p>15 substrate was, what materials were deposited on that</p> <p>16 substrate to form Active Matrix Displays in 2003?</p> <p>17 A Well, again, there were a variety of</p> <p>18 designs, but it would not be uncommon to use</p> <p>19 amorphous polysilicon for creating the transistor</p> <p>20 structures, along with deposited metals like aluminum</p> <p>21 or various aluminum alloys.</p> <p>22 Q All right. Let's turn to Exhibit 1001,</p> |
| <p>78</p> <p>1 Q And would a POSITA, under your</p> <p>2 definition, understand that amorphous polysilicon is</p> <p>3 a suitable substrate for an Active Matrix Display?</p> <p>4 A Not limited to OLED, under some</p> <p>5 circumstances, they can be. Again, there are many</p> <p>6 factors that need to be considered.</p> <p>7 Q What other materials would a POSITA</p> <p>8 consider for use as a substrate in an Active Matrix</p> <p>9 Display?</p> <p>10 A I can't recite them all off the top of my</p> <p>11 head, and it also depends what you mean by substrate.</p> <p>12 Often times what I call a substrate is glass, right.</p> <p>13 Other things are depositive on the substrate.</p> <p>14 Q In the context of an Active Matrix</p> <p>15 Display, what do you understand the term substrate to</p> <p>16 mean?</p> <p>17 A Again, it depends on the context, but</p> <p>18 usually that's the glass that the -- that the</p> <p>19 semiconductor materials are deposited on. It could</p> <p>20 be -- it could be a plastic film, as well.</p> <p>21 Q In 2003, what substrates were being used</p> <p>22 for Active Matrix Displays?</p>                                                     | <p>80</p> <p>1 which is the '599 patent. How many figures are</p> <p>2 included in the '599 patent?</p> <p>3 A There are seven labeled figures.</p> <p>4 Q Okay. And the first two are identified</p> <p>5 as prior art, correct?</p> <p>6 A Correct.</p> <p>7 Q Okay. Is it your understanding that</p> <p>8 Figure 3 is an embodiment of the invention in the</p> <p>9 '599 patent?</p> <p>10 A Yes.</p> <p>11 Q And Figure 3 is a -- is a schematic</p> <p>12 illustration, correct?</p> <p>13 A Yes. I mean, we would typically call it</p> <p>14 a transistor level schematic, even though not every</p> <p>15 element is a transistor.</p> <p>16 Q But it's not a layout of a pixel circuit,</p> <p>17 correct?</p> <p>18 A Correct. It's intended to explain the</p> <p>19 general circuit topology but not the physical layout</p> <p>20 structure.</p> <p>21 Q And Figure 4 is a timing diagram for the</p> <p>22 circuit of Figure 3, correct?</p>                                                                                                                                                                                                    |

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| <p>81</p> <p>1 <b>A For a portion of it, yes.</b></p> <p>2 Q And what do you mean by -- when you say a</p> <p>3 portion of it?</p> <p>4 <b>A Well, Figure 3 -- well, two things. One</b></p> <p>5 <b>is Figure 3 only illustrates one cell within a larger</b></p> <p>6 <b>display, and then Figure 4 does not illustrate the</b></p> <p>7 <b>VDATAm line, for example, which would change over</b></p> <p>8 <b>time.</b></p> <p>9 Q And Figures 5, 6 -- 5 and 6 illustrate</p> <p>10 different operational phases of the circuit of Figure</p> <p>11 3, correct?</p> <p>12 <b>A Yes. Along with the text that</b></p> <p>13 <b>accompanies them.</b></p> <p>14 Q And Figure 7, if you recall, was an error</p> <p>15 and it's just a duplicate of a prior figure.</p> <p>16 Do you recall that?</p> <p>17 <b>A Yes. I think it's a duplicate of Figure</b></p> <p>18 <b>6. Where if we go to the original -- prior -- the</b></p> <p>19 <b>original foreign application, there's clearly a</b></p> <p>20 <b>distinct Figure 7.</b></p> <p>21 Q So let's assume that the correct Figure 7</p> <p>22 from the Korean application was in the U.S. version,</p> | <p>83</p> <p>1 BY MR. JENSEN:</p> <p>2 Q And at the end of the patent, there are</p> <p>3 18 claims, right?</p> <p>4 <b>A Yes.</b></p> <p>5 Q Are you aware that all of those claims</p> <p>6 are being challenged in this IPR?</p> <p>7 <b>A Yes.</b></p> <p>8 Q And is it all right if I refer to those</p> <p>9 18 claims as the challenged claims?</p> <p>10 <b>A I will understand that.</b></p> <p>11 Q Do any of the challenged claims require</p> <p>12 an AMOLED display?</p> <p>13 <b>A I have not made that determination. One</b></p> <p>14 <b>is recited in the preambles, and I did not have to</b></p> <p>15 <b>consider whether or not the preambles were limiting</b></p> <p>16 <b>in order to render my opinions.</b></p> <p>17 Q Do any of the challenged claims require</p> <p>18 an Active Matrix Display?</p> <p>19 <b>A They don't recite it by name, but in my</b></p> <p>20 <b>experience, a display that includes transistors in</b></p> <p>21 <b>each cell would be referred to as an Active Matrix</b></p> <p>22 <b>Display, and these all do.</b></p>                                                                                                                                                                                                                            |
| <p>82</p> <p>1 with that understanding, is it correct that Figures</p> <p>2 5, 6 and 7 are all the same circuit that is</p> <p>3 illustrated in Figure 3?</p> <p>4 <b>A Yes.</b></p> <p>5 Q Okay. Are there any other embodiments of</p> <p>6 the invention of the '599 patent -- strike that.</p> <p>7 Does the '599 patent depict any other</p> <p>8 pixel circuit other than the one in Figure 3?</p> <p>9 MR. GARR: Objection.</p> <p>10 BY MR. JENSEN:</p> <p>11 Q -- as its invention? Strike that, too.</p> <p>12 How many embodiments of the invention in</p> <p>13 the '599 patent are illustrated?</p> <p>14 MR. GARR: Objection.</p> <p>15 THE WITNESS: Only one embodiment</p> <p>16 is illustrated through a drawing, but</p> <p>17 I -- my recollection is the text</p> <p>18 certainly contemplates other embodiments</p> <p>19 and refers to this as an exemplary</p> <p>20 embodiment and, as would be normal,</p> <p>21 expects the claims to define the</p> <p>22 invention.</p>                                                                                                                                                          | <p>84</p> <p>1 Q Really? Let's look at Claim 7, for</p> <p>2 example. What about it in Claim 7 says you have to</p> <p>3 have anything other than a single pixel?</p> <p>4 <b>A Well, that's a different level of</b></p> <p>5 <b>semantics. Why would a single pixel not be an Active</b></p> <p>6 <b>Matrix Display?</b></p> <p>7 Q Is it your testimony that a single pixel</p> <p>8 is an Active Matrix Display?</p> <p>9 <b>A Let me think. I guess -- I guess I've</b></p> <p>10 <b>never seen anybody use the term matrix for a single</b></p> <p>11 <b>pixel. So it's really not something I considered.</b></p> <p>12 <b>Yeah, it's something I haven't thought</b></p> <p>13 <b>about. In my experience, when you have a plurality</b></p> <p>14 <b>of transistors in a pixel, that's an Active Matrix</b></p> <p>15 <b>Display, otherwise there would be no reason to do</b></p> <p>16 <b>that, but I haven't considered whether or not it's</b></p> <p>17 <b>possible to practice the claim with a pixel</b></p> <p>18 <b>circuit -- I've never heard anybody use the term</b></p> <p>19 <b>pixel for something that wasn't a display element in</b></p> <p>20 <b>a matrix.</b></p> <p>21 Q And you understand there's a difference</p> <p>22 between a pixel and a display comprised of many</p> |

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| <p>85</p> <p>1 pixels, correct?</p> <p>2 <b>A Yeah. Again, it depends on context. I</b></p> <p>3 <b>mean, certainly those don't mean exactly the same</b></p> <p>4 <b>thing. A pixel is one pixel, and a display comprised</b></p> <p>5 <b>of many pixels is many pixels.</b></p> <p>6 Q Do any of the claims -- do any of the</p> <p>7 challenged claims require more than one pixel?</p> <p>8 <b>A Again, I didn't have to consider that in</b></p> <p>9 <b>part of my opinion because I didn't have to consider</b></p> <p>10 <b>whether or not the preamble was limiting.</b></p> <p>11 Q Did I understand you correctly to say</p> <p>12 that you rendered no opinion on whether the preamble</p> <p>13 of any challenged claims is a limitation?</p> <p>14 <b>A I don't recall doing that.</b></p> <p>15 Q Did you distinguish the Kimura reference</p> <p>16 from any of the challenged claims based on the</p> <p>17 preamble of the claim?</p> <p>18 <b>A Not that I can recall.</b></p> <p>19 THE VIDEOGRAPHER: Pardon the</p> <p>20 interruption, Counsel. This is the</p> <p>21 videographer. We have five to ten</p> <p>22 minutes before a media change is needed.</p> | <p>87</p> <p>1 <b>the inventors have alleged that they were in</b></p> <p>2 <b>possession of the invention as of the filing date,</b></p> <p>3 <b>but that presumption could be challenged at the</b></p> <p>4 <b>patent office or in court.</b></p> <p>5 Q Do you think that the claims in the '599</p> <p>6 patent are directed to an alleged invention or an</p> <p>7 actual invention?</p> <p>8 <b>A I think it's an actual invention, but</b></p> <p>9 <b>that's always at the discretion of the patent office</b></p> <p>10 <b>and the courts to decide.</b></p> <p>11 Q In Paragraph 1 of your report, though,</p> <p>12 you use the term alleged invention, correct?</p> <p>13 <b>A Yes.</b></p> <p>14 Q Okay. Let's turn to Paragraph 19 of your</p> <p>15 report, and let me know when you're able to see that.</p> <p>16 <b>A Uh-huh.</b></p> <p>17 Q And this is under the Roman II heading</p> <p>18 Materials Reviewed, correct?</p> <p>19 <b>A Yes.</b></p> <p>20 Q And Paragraph 19 includes a table that</p> <p>21 lists a number of exhibits and documents that you</p> <p>22 considered, correct?</p> |
| <p>86</p> <p>1 MR. JENSEN: Why don't we go ahead</p> <p>2 and take a break.</p> <p>3 THE VIDEOGRAPHER: We are going off</p> <p>4 the record. The time is 10:49 a.m.</p> <p>5 (Brief pause.)</p> <p>6 THE VIDEOGRAPHER: We are back on</p> <p>7 the record. The time is 11:02 a.m.</p> <p>8 BY MR. JENSEN:</p> <p>9 Q Welcome back, Dr. Wolfe.</p> <p>10 I'd like to turn back to your</p> <p>11 declaration, Exhibit 2008, and direct your attention</p> <p>12 to the first paragraph, and let me know when you're</p> <p>13 able to see that.</p> <p>14 <b>A I see it.</b></p> <p>15 Q Okay. And can I ask you to read the</p> <p>16 highlighted sentence a loud, please.</p> <p>17 <b>A I have also been asked to consider the</b></p> <p>18 <b>state-of-the-art and the prior art available before</b></p> <p>19 <b>the time of the alleged invention of the '599 patent.</b></p> <p>20 Q What do you mean by the alleged invention</p> <p>21 of the '599 patent?</p> <p>22 <b>A I mean that, in filing the '599 patent,</b></p>                                                                                                                                                  | <p>88</p> <p>1 <b>A Yes. Yes.</b></p> <p>2 Q Is Paragraph 19 a complete list of the</p> <p>3 materials you considered when forming your opinions?</p> <p>4 MR. GARR: Objection.</p> <p>5 THE WITNESS: As best as I can</p> <p>6 recall.</p> <p>7 BY MR. JENSEN:</p> <p>8 Q Which of any of the exhibits listed in</p> <p>9 Paragraph 19 did you identify in the first instance</p> <p>10 as opposed to being provided by counsel to you?</p> <p>11 <b>A I don't recall.</b></p> <p>12 Q Did you identify any of the exhibits in</p> <p>13 Paragraph 19 yourself in the first instance?</p> <p>14 <b>A Not that I recall, but -- but I can't</b></p> <p>15 <b>rule it out.</b></p> <p>16 Q Let's turn next to Section VII of your</p> <p>17 report titled Claim Construction, and let me know</p> <p>18 when you're there.</p> <p>19 <b>A Okay.</b></p> <p>20 Q And that section includes a single</p> <p>21 paragraph, Paragraph 50, correct?</p> <p>22 <b>A Correct.</b></p>                                                                                                                                            |

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| <p>89</p> <p>1 Q All right. Could you just go ahead and</p> <p>2 read that paragraph a loud, please?</p> <p>3 A After reviewing the specification and the</p> <p>4 prosecution history, I do not believe that any</p> <p>5 constructions other than the plain and ordinary</p> <p>6 meaning of the claim terms of the '599 patent are</p> <p>7 necessary, and, of course, what I meant, in context,</p> <p>8 was are necessary for this proceeding.</p> <p>9 Q What definition did you apply to claim</p> <p>10 terms that have not been construed?</p> <p>11 A The plain and ordinary meaning, in light</p> <p>12 of the understanding of a person of ordinary skill in</p> <p>13 the art who had reviewed the specification.</p> <p>14 Q Let me direct your attention to Exhibit</p> <p>15 1001, which is the '599 patent --</p> <p>16 A Uh-huh.</p> <p>17 Q -- and to Claim 8, in particular, and let</p> <p>18 me know when you're there.</p> <p>19 A Okay.</p> <p>20 Q Can you read a loud the claim limitation</p> <p>21 for Claim 8.</p> <p>22 A The pixel circuit in the organic</p> | <p>91</p> <p>1 have to be a PMOS transistor?</p> <p>2 MR. GARR: Objection.</p> <p>3 THE WITNESS: In general?</p> <p>4 BY MR. JENSEN:</p> <p>5 Q As it's used in Claim 8. So I'll ask a</p> <p>6 clean question: As the initialization transistor is</p> <p>7 used in Claim 8 of the '599 patent, does it have to</p> <p>8 be a PMOS transistor?</p> <p>9 A I haven't really considered that, because</p> <p>10 the allegations were that it was a PMOS transistor.</p> <p>11 Q But you don't know -- you have no</p> <p>12 opinion -- strike that.</p> <p>13 Do you have an opinion one way or the</p> <p>14 other whether Claim 8 requires that the</p> <p>15 initialization transistor be a PMOS transistor?</p> <p>16 A Not at present, no.</p> <p>17 Q Did the '599 patent invent a new kind of</p> <p>18 transistor?</p> <p>19 A Not that I'm aware of.</p> <p>20 Q Are you familiar with the acronym TFT?</p> <p>21 A Like Electronic Fund Transfer?</p> <p>22 Q I'm sorry. T, as in Travis, F, as in</p>                          |
| <p>90</p> <p>1 light-emitting device of Claim 7, further comprising:</p> <p>2 A sixth initialization transistor for discharging the</p> <p>3 data signal voltage stored in the capacitor in</p> <p>4 response to a scan signal just before the current</p> <p>5 scan signal upon initialization.</p> <p>6 Q And so Claim 8 refers to an</p> <p>7 initialization transistor, correct?</p> <p>8 A Yes.</p> <p>9 Q What is the plain and ordinary meaning of</p> <p>10 initialization transistor?</p> <p>11 A In the context of the '599 spec, it would</p> <p>12 be a transistor that sets the capacitor to a voltage</p> <p>13 prior to the programming phase, a desired voltage.</p> <p>14 Q Is the term initialization transistor a</p> <p>15 term of art?</p> <p>16 MR. GARR: Objection.</p> <p>17 THE WITNESS: Not in and of itself,</p> <p>18 but it's something that a person of</p> <p>19 ordinary skill in the art can understand</p> <p>20 in context.</p> <p>21 BY MR. JENSEN:</p> <p>22 Q Does -- does an initialization transistor</p>                                            | <p>92</p> <p>1 Frank, T as in Travis, TFT?</p> <p>2 A I'm familiar with that being used for</p> <p>3 Thin Film Transistor.</p> <p>4 Q Are you familiar with the acronym MOSFET,</p> <p>5 M-O-S-F-E-T?</p> <p>6 A Yes, lit -- yes.</p> <p>7 Q What is a thin film transistor?</p> <p>8 A Generally, a thin film transistor is one</p> <p>9 made out of thin film materials, and we usually refer</p> <p>10 to thin film materials as materials that are applied</p> <p>11 with certain techniques such as vapor deposition or</p> <p>12 sputtering, but in the industry, thin film transistor</p> <p>13 is usually used for the kind of transistor that's in</p> <p>14 an Active Matrix Display, one that's on a glass or</p> <p>15 plastic substrate that's created using --</p> <p>16 THE COURT REPORTER: I can't hear</p> <p>17 you. I'm sorry. The court reporter</p> <p>18 can't hear you.</p> <p>19 (Technical interruption)</p> <p>20 THE WITNESS: Is that better?</p> <p>21 THE COURT REPORTER: Yes, that's</p> <p>22 better.</p> |

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| <p>93</p> <p>1 THE WITNESS: I just re-set it. I</p> <p>2 don't know why the microphone just</p> <p>3 suddenly stopped working.</p> <p>4 Okay. Do I need to restart the</p> <p>5 answer to that question?</p> <p>6 BY MR. JENSEN:</p> <p>7 Q It did drop out. Maybe I can just re-ask</p> <p>8 the question so we have a clean transcript.</p> <p>9 What is a thin film transistor?</p> <p>10 A So in the industry, that's generally used</p> <p>11 to describe the kind of transistor that's used in</p> <p>12 display technology or other technologies where</p> <p>13 transistors are deposited on a glass or plastic</p> <p>14 substrate. They are manufactured using thin film</p> <p>15 materials, which are usually put on by sputtering or</p> <p>16 vapor deposition.</p> <p>17 Strangely enough, we would typically</p> <p>18 think of them in terms of their distinction from</p> <p>19 other transistors. The transistors on a traditional</p> <p>20 integrated circuit are actually thinner than a thin</p> <p>21 film transistor, but just because of the history of</p> <p>22 the terminology, we don't talk about it that way, and</p>                                                                            | <p>95</p> <p>1 AMOLED is Active Matrix Organic</p> <p>2 Light-Emitting Diode, and that is a subset of those</p> <p>3 displays that use organic light-emitting materials.</p> <p>4 Q What is the difference between a thin</p> <p>5 film transistor and a traditional MOSFET transistor?</p> <p>6 A Well, there could be many -- well, let's</p> <p>7 take a step back. I'm not quite sure what you mean</p> <p>8 by traditional MOSFET transistor.</p> <p>9 Q What is the difference between a thin</p> <p>10 film transistor and a MOSFET transistor?</p> <p>11 A Typically a thin film transistor is one</p> <p>12 type of a MOSFET transistor.</p> <p>13 Q What distinguishes the two?</p> <p>14 A Again, I don't know that you have to</p> <p>15 distinguish the two, but a MOSFET need not be</p> <p>16 manufactured out of thin film materials. It need not</p> <p>17 be on a glass or plastic substrate. It could be on a</p> <p>18 silicon crystal or other kinds of materials.</p> <p>19 Q Do they have different electrical</p> <p>20 characteristics?</p> <p>21 A Well, like I said, an active matrix TFT</p> <p>22 is a MOSFET. So it doesn't have different</p>                                   |
| <p>94</p> <p>1 then, theoretically, you could have a thick film</p> <p>2 transistor where you would use techniques like</p> <p>3 printing or stencils to make the various parts.</p> <p>4 Those are not very commercially</p> <p>5 interesting these days. So, in practice, we refer to</p> <p>6 the transistors in any kind of an Active Matrix</p> <p>7 Display or in any device that is integrated into an</p> <p>8 Active Matrix Display that uses the same transistor</p> <p>9 type as a thin film transistor. So it's mostly touch</p> <p>10 screens and displays.</p> <p>11 Q Why do Active Matrix Displays use thin</p> <p>12 film transistors?</p> <p>13 A Because they can be manufactured on</p> <p>14 plastic and glass substrates, and they can have -- in</p> <p>15 some cases, work with transparent materials or</p> <p>16 substantially transparent materials.</p> <p>17 Q What is the difference between an Active</p> <p>18 Matrix Display and an AMOLED display?</p> <p>19 A Active -- again, I don't know formal</p> <p>20 definitions, but colloquially Active Matrix Displays</p> <p>21 are any display that uses a transistor within the</p> <p>22 display cell to turn it on or off or modulate it.</p> | <p>96</p> <p>1 characteristics from itself, but MOSFETs -- any two</p> <p>2 MOSFETs might have different electrical</p> <p>3 characteristics.</p> <p>4 There are MOSFETs that are used to drive</p> <p>5 the motor in a Tesla, and there are MOSFETs that are</p> <p>6 used to turn a -- to generate a one or a zero inside</p> <p>7 of a microprocessor, and many of the electrical</p> <p>8 characteristics of those will be quite different.</p> <p>9 Q How is an Active Matrix Display different</p> <p>10 from a Passive Matrix Display?</p> <p>11 A Again, there could be many differences</p> <p>12 and particular examples, but the primary difference</p> <p>13 is that an Active Matrix Display would have</p> <p>14 transistors as part of or associated with each pixel</p> <p>15 and a Passive Matrix Display would not.</p> <p>16 Q Let's turn to Paragraph 32 of your</p> <p>17 declaration, Exhibit 2008, and I've highlighted a</p> <p>18 sentence in the middle of that paragraph on the</p> <p>19 screen that I'd like to ask you to read a loud,</p> <p>20 please.</p> <p>21 A Ordinarily, each row of the display will</p> <p>22 be written to individually, with the display cycling</p> |

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| <p>97</p> <p>1 through every row once per frame.</p> <p>2 Q And Paragraph 32 is talking about the</p> <p>3 Passive Matrix Display, correct?</p> <p>4 A Yes, at least up to that sentence.</p> <p>5 Q Okay. Yeah, and that was my -- my</p> <p>6 question -- my next question. Is the sentence that</p> <p>7 you read about cycling through every row once per</p> <p>8 frame limited to Passive Matrix Displays or does that</p> <p>9 same concept apply to Active Matrix Displays?</p> <p>10 A If you interpret row broadly, which I</p> <p>11 normally would, that would apply to Active Matrix</p> <p>12 Displays, as well.</p> <p>13 Q And you make a reference to a frame in</p> <p>14 that sentence. What is a frame in the context of a</p> <p>15 display?</p> <p>16 A A single image involving all of the</p> <p>17 pixels. So the way I explain it to my students is,</p> <p>18 if they've ever had one of those little flip books</p> <p>19 where the picture changes over time when you flip</p> <p>20 through the pages, each frame is a unique picture.</p> <p>21 If we show them in sequence, we can get animations or</p> <p>22 video or other kinds of perceived motion.</p>                                                    | <p>99</p> <p>1 and then you need to put it back up there again, and</p> <p>2 that's what's happening on these displays, as well.</p> <p>3 Q What is the refresh rate of a typical</p> <p>4 display?</p> <p>5 A Well, there is no typical. For -- for</p> <p>6 example, cell phone displays today, they tend to be</p> <p>7 at -- between 60 and 120 refreshes per second.</p> <p>8 Q In 2003, what was the typical refresh</p> <p>9 rate for a cell phone display?</p> <p>10 A Of any type?</p> <p>11 Q Of any type.</p> <p>12 A I don't know. I think everybody's goal</p> <p>13 would have probably been 60 frames per second, but</p> <p>14 for LCDs, I think there probably were some that were</p> <p>15 in the 15 to 60 range at the low end, maybe even as</p> <p>16 low as ten. These typically wouldn't have been color</p> <p>17 and wouldn't have had graphics.</p> <p>18 Q Let's turn to Exhibit 1002, which is the</p> <p>19 Kimura reference. Let me know when you've got that.</p> <p>20 A I have it.</p> <p>21 Q Did you read the entire Kimura reference?</p> <p>22 A At one point, yes.</p> |
| <p>98</p> <p>1 Q And what does it mean to cycle through</p> <p>2 every row once per frame?</p> <p>3 A We usually call that a refresh. It means</p> <p>4 to provide the illumination data for each row once</p> <p>5 per frame, and by providing the illumination data for</p> <p>6 each row, I really mean providing the illumination</p> <p>7 data for each pixel in each row.</p> <p>8 Q What is a -- well, you used the term</p> <p>9 refresh that I wanted to ask about. What did you</p> <p>10 mean by refresh?</p> <p>11 A There's a presumption that when you send</p> <p>12 data to certain kinds of displays, the more</p> <p>13 traditional kinds, which does include LCDs and AMOLED</p> <p>14 displays, that you provide it with the illumination</p> <p>15 data for each pixel for a fixed period of time.</p> <p>16 Often times there's a physical decay of</p> <p>17 that signal over time, and it would be necessary to</p> <p>18 refresh that information if it hasn't changed.</p> <p>19 This goes all the way back to old tube</p> <p>20 televisions, right. The idea that when you put up a</p> <p>21 picture it's going to stay reasonably constant for a</p> <p>22 short period of time, some number of milliseconds,</p> | <p>100</p> <p>1 Q Did you understand it?</p> <p>2 A Generally.</p> <p>3 Q Were there any portions of it that you</p> <p>4 didn't understand?</p> <p>5 A I think I understood what it said. It</p> <p>6 wasn't necessarily clear why certain ideas were</p> <p>7 presented, since they wouldn't have been very</p> <p>8 commercially interesting, but I think I understood</p> <p>9 what the reference explained.</p> <p>10 Q If we flip over to your declaration and</p> <p>11 go to Paragraph 129. I take that back. Let's go to</p> <p>12 Paragraph 51, and let me know when you're there.</p> <p>13 A I'm there.</p> <p>14 Q Okay. And Paragraph 51 is the first</p> <p>15 paragraph under Heading IX, Overview Of The Prior</p> <p>16 Art, correct?</p> <p>17 A Yes.</p> <p>18 Q Okay. And this is where you provide a</p> <p>19 summary of the Kimura reference?</p> <p>20 A Of Exhibit 1002, yes.</p> <p>21 Q And could you read the sentence that I've</p> <p>22 highlighted.</p>                                                                                                                      |

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| <p>101</p> <p>1 A It includes 11, quote, embodiment modes,<br/>2 unquote, and 17, quote, embodiments, unquote, that<br/>3 span 85 pages and 44 figures.</p> <p>4 Q What is the difference in Kimura between<br/>5 an embodiment and an embodiment mode?</p> <p>6 A Let me go back and look at it and see if<br/>7 it has exact wording.</p> <p>8 So those are actually the terms that<br/>9 Kimura himself uses, and, in general, my<br/>10 understanding is that he uses embodiment mode to<br/>11 describe a set of embodiments that have some similar<br/>12 characteristics.</p> <p>13 Q I want to go back to the topic we were<br/>14 just discussing for a second, which is the concept of<br/>15 a refresh rate in a -- in a display, and you<br/>16 mentioned I think that today, you know, typical<br/>17 refresh rates for a cell phone display were in the<br/>18 range of 60 to 120 Hertz; is that correct?</p> <p>19 A Yes. I think I -- I don't think I used<br/>20 the word Hertz in that answer, but that would be<br/>21 appropriate.</p> <p>22 Q Okay. I'll let you -- maybe if I could</p>                                                        | <p>103</p> <p>1 Q Okay. And could I have you read the<br/>2 first sentence of Paragraph 28.</p> <p>3 A I have been informed that where, as here,<br/>4 an obvious defense is based on a combination of prior<br/>5 art references, a patent claim is not obvious unless<br/>6 a POSITA would have been motivated to combine or<br/>7 modify prior art elements to obtain the invention as<br/>8 set forth in the claim with a reasonable expectation<br/>9 of success.</p> <p>10 Q What is the combination of prior art<br/>11 references that you're referring to in this IPR?</p> <p>12 A The various embodiments within Kimura.</p> <p>13 Q You consider those to be separate<br/>14 references?</p> <p>15 A Not in the sense that they are separate<br/>16 documents, but that they are based on references to<br/>17 separate inventions within one document.</p> <p>18 Q Let's turn to Paragraph 58 of your<br/>19 report. Let me know when you're there.</p> <p>20 A I'm there.</p> <p>21 Q And this is a section with the subheading<br/>22 a POSITA Would Not Have Been Motivated To Modify</p> |
| <p>102</p> <p>1 just ask you: What's a typical refresh rate of a<br/>2 display today?</p> <p>3 A It would typically -- again, on a cell<br/>4 phone today, it would typically refresh the screen 60<br/>5 to 120 times per second.</p> <p>6 Q Why don't they make displays for cell<br/>7 phones today that have much faster refresh rates?</p> <p>8 A I would -- you know, I can't get into<br/>9 other people's heads. My guess is they do. They are<br/>10 just not commercially used very much, and the reasons<br/>11 why they would not be optimal are that a typical<br/>12 person would not be able to perceive the difference<br/>13 between 120 Hertz display and a faster one, and also<br/>14 a faster display would likely use more power, and it<br/>15 is often commercially preferable to increase the<br/>16 number of pixels rather than to increase the refresh<br/>17 rate in order to have more pixels refreshed per<br/>18 second but not necessarily more frames.</p> <p>19 Q Let's go to your declaration in the<br/>20 Paragraph 28, and this is in the Legal Standards<br/>21 section. Let me know when you're there.</p> <p>22 A Yes.</p> | <p>104</p> <p>1 Kimura's Design To An All-PMOS Design (All Claims),<br/>2 correct?</p> <p>3 A Yes.</p> <p>4 Q And this section of your report spans<br/>5 from Paragraph 58 to Paragraph 78; is that correct?</p> <p>6 A This subsection, yes.</p> <p>7 Q In Paragraph 58, you state that many of<br/>8 the challenged claims requires certain transistors to<br/>9 be PMOS (e.g., Claims 3, 5 and 13), or have<br/>10 limitations relating to connections between, for<br/>11 example, the drains and sources of certain<br/>12 transistors that would require PMOS transistors,<br/>13 (e.g. Claims 15 and 17), correct?</p> <p>14 A Yes.</p> <p>15 Q So I want to drill down on that a little<br/>16 bit just to make sure we're on the same page here.<br/>17 What is the complete list of challenged<br/>18 claims that requires a PMOS transistor?</p> <p>19 A I didn't really have to consider that<br/>20 because Dr. Foty's opinions are all premised on the<br/>21 idea that he would convert all the transistors to<br/>22 PMOS at the beginning of his obvious analysis.</p>                 |

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| <p>105</p> <p>1 So I simply accepted that that was the</p> <p>2 challenge.</p> <p>3 Q Do you know one way or the other what</p> <p>4 claims do not require a PMOS transistor?</p> <p>5 A I haven't done that analysis because,</p> <p>6 again, only the all-PMOS designs were presented to me</p> <p>7 for analysis.</p> <p>8 Q Do you have any opinion on whether an</p> <p>9 unmodified version of Kimura Figure 3 would render</p> <p>10 any of the challenged claims invalid?</p> <p>11 A I haven't considered that yet.</p> <p>12 Q Do you have any opinion as to whether an</p> <p>13 unmodified version of Kimura Figure 36 would render</p> <p>14 any of the challenged claims invalid?</p> <p>15 A I have not considered that yet.</p> <p>16 Q Is Claim 7 of the '599 patent limited to</p> <p>17 an embodiment comprising PMOS transistors?</p> <p>18 A I haven't really done that analysis yet.</p> <p>19 Again, all the challenges were based on an all-PMOS</p> <p>20 design. So I simply looked at whether or not the</p> <p>21 intentions in the petition invalidated the patent.</p> <p>22 Q So let's look at Claim 7 in Exhibit 1001,</p> | <p>107</p> <p>1 A The transistor labeled 3308.</p> <p>2 Q And how can you tell that that's PMOS</p> <p>3 transistor?</p> <p>4 A It's drawn with the symbol for -- one of</p> <p>5 the symbols for PMOS transistor, we usually refer to</p> <p>6 it as having a bubble on the gate. It's that small</p> <p>7 circle.</p> <p>8 Q And the remainder of the transistors in</p> <p>9 Figure 33 are NMOS transistors, correct?</p> <p>10 A Yes.</p> <p>11 Q Okay. And I believe you render an</p> <p>12 opinion in your report that it would not have been</p> <p>13 obvious to a POSITA to change the four NMOS</p> <p>14 transistors to PMOS transistors; is that correct?</p> <p>15 A Correct. There would have been no</p> <p>16 motivation to do that, and there are reasons why one</p> <p>17 would not have done it with respect to Figure 33.</p> <p>18 Q Do you agree that it would have been</p> <p>19 obvious to change any of the NMOS transistors in</p> <p>20 Figure 33 to a PMOS transistor?</p> <p>21 MR. GARR: Objection.</p> <p>22 THE WITNESS: I'm not aware of any</p>                                                                               |
| <p>106</p> <p>1 and let me know when you're able to see that.</p> <p>2 A Okay.</p> <p>3 Q Would you agree with me that Claim 7</p> <p>4 recites five transistors identified as first, second,</p> <p>5 third, fourth and fifth transistors?</p> <p>6 A It does.</p> <p>7 Q Okay. And if we look at Kimura, Exhibit</p> <p>8 1002, there's a Figure 33 in that reference that is a</p> <p>9 pixel circuit, correct?</p> <p>10 A Yes. 33A is the pixel circuit. 33B</p> <p>11 through E illustrate aspects of its operation.</p> <p>12 Q And you would agree that Figures 33B, C,</p> <p>13 D and E are the same circuit shown in Figure 33A?</p> <p>14 A With annotations, yes.</p> <p>15 Q And I believe you render an opinion in</p> <p>16 your report that it would not have been obvious --</p> <p>17 strike that.</p> <p>18 Let's -- let me ask this question: Of</p> <p>19 the five transistors in Figure 33, how many of them</p> <p>20 are PMOS transistors?</p> <p>21 A One.</p> <p>22 Q And which transistor is that?</p>                                                                                                                         | <p>108</p> <p>1 motivation or reason to do so.</p> <p>2 BY MR. JENSEN:</p> <p>3 Q Would it have been within the knowledge</p> <p>4 and skill of a POSITA to change the NMOS transistors</p> <p>5 in Figure 33A to PMOS transistors?</p> <p>6 A It certainly would have been within the</p> <p>7 ability to make the substitution. However, one would</p> <p>8 not normally make such a substitution without a</p> <p>9 motivation to do so, and one would have to go through</p> <p>10 a relatively sophisticated analysis to figure out</p> <p>11 whether or not that would make the circuit better or</p> <p>12 worse or, in some cases, even nonoperational, and</p> <p>13 Kimura doesn't really teach one how to do that</p> <p>14 analysis.</p> <p>15 So there would be quite a bit of</p> <p>16 experimentation, perhaps, even invention involved.</p> <p>17 Q I want to make sure I've got your</p> <p>18 testimony on this point clear, Dr. Wolfe.</p> <p>19 Is it your testimony that it would have</p> <p>20 required an invention to change one of the NMOS</p> <p>21 transistors in Figure 33 to a PMOS transistor?</p> <p>22 MR. GARR: Objection.</p> |

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| <p>109</p> <p>1 THE WITNESS: No, but it may have</p> <p>2 required an invention to determine which</p> <p>3 of the transistors and which combination</p> <p>4 of transistors should be switched and how</p> <p>5 to do so in a particular way that would</p> <p>6 make a suitable display cell or that</p> <p>7 would -- that was equivalent or better</p> <p>8 than the display cell that one already</p> <p>9 has in Figure 33A.</p> <p>10 BY MR. JENSEN:</p> <p>11 Q Let's go to the '599 patent, Exhibit</p> <p>12 1001, and we talked earlier about Figure 3 in the</p> <p>13 '599 patent being an embodiment of the invention,</p> <p>14 correct?</p> <p>15 <b>A Correct.</b></p> <p>16 Q Okay. And are all of the transistors in</p> <p>17 Figure 3 PMOS transistors?</p> <p>18 <b>A Yes.</b></p> <p>19 Q Do all of the transistors in Figure 3</p> <p>20 have to be PMOS transistors?</p> <p>21 MR. GARR: Objection.</p> <p>22 THE WITNESS: In order for it to be</p>                                                                                                                 | <p>111</p> <p>1 and skill of a POSITA to modify Figure 3 in the '599</p> <p>2 patent to use one or more NMOS transistors instead of</p> <p>3 PMOS transistors?</p> <p>4 <b>A Physically it would have, but there would</b></p> <p>5 <b>have been, again, quite a bit of analysis and,</b></p> <p>6 <b>perhaps, experimentation and invention in order to</b></p> <p>7 <b>have a useful circuit.</b></p> <p>8 Q Does the '599 patent teach a POSITA all</p> <p>9 of those things that you just said would need to be</p> <p>10 done to make such a change?</p> <p>11 <b>A For a non-PMOS embodiment? I don't know.</b></p> <p>12 <b>I haven't done that analysis.</b></p> <p>13 Q Could you look and see if the '599 patent</p> <p>14 teaches a POSITA anything about how to make such a</p> <p>15 substitution?</p> <p>16 <b>A Again, there -- there are various</b></p> <p>17 <b>equations. I'd have to go through and consider, you</b></p> <p>18 <b>know, each line of the teaching in that context. I</b></p> <p>19 <b>haven't done it.</b></p> <p>20 Q Yeah. I'd like you to take some time to</p> <p>21 do that, and I'll give you, you know, if you need ten</p> <p>22 or 15 minutes, because I'd like to see if you can</p> |
| <p>110</p> <p>1 Figure 3, they do.</p> <p>2 BY MR. JENSEN:</p> <p>3 Q Let's go to Column 8 at Lines 37 to 39 of</p> <p>4 the '599 patent and I'd like for you to read those</p> <p>5 lines that I've highlighted.</p> <p>6 MR. GARR: What page are we on?</p> <p>7 Sorry. I missed it.</p> <p>8 MR. JENSEN: This is Column 8,</p> <p>9 Lines 37 to 39.</p> <p>10 MR. GARR: Thank you.</p> <p>11 BY MR. JENSEN:</p> <p>12 Q Could you read that passage, Dr. Wolfe.</p> <p>13 <b>A Moreover, the pixel circuit can be</b></p> <p>14 <b>configured of an NMOS transistor, a CMOS transistor</b></p> <p>15 <b>or the like other than the PMOS transistor.</b></p> <p>16 Q What do you understand that to mean?</p> <p>17 <b>A In context, I think that the author is</b></p> <p>18 <b>saying that one could build similar solutions using</b></p> <p>19 <b>other kinds of transistors. I haven't tried to</b></p> <p>20 <b>determine whether or not those would be within the</b></p> <p>21 <b>scope of any particular claim or not.</b></p> <p>22 Q Would it have been within the knowledge</p> | <p>112</p> <p>1 find any teaching whatsoever in the '599 patent</p> <p>2 concerning how to change a PMOS transistor to an NMOS</p> <p>3 transistor?</p> <p>4 <b>A That's not really an analysis that I'm</b></p> <p>5 <b>comfortable doing on the fly.</b></p> <p>6 Q Assuming, for the sake of this</p> <p>7 deposition, that the '599 patent does not teach a</p> <p>8 POSITA anything about how to substitute a PMOS</p> <p>9 transistor for an NMOS transistor, do you know why</p> <p>10 that is?</p> <p>11 <b>A I don't know why.</b></p> <p>12 Q Could it be because it's within the</p> <p>13 knowledge and skill of a POSITA?</p> <p>14 <b>A Again, the physical substitution is. The</b></p> <p>15 <b>analysis may be more difficult. I would suspect that</b></p> <p>16 <b>it is, in fact, because the Figure 3 solution, as</b></p> <p>17 <b>illustrated, is commercially viable and very</b></p> <p>18 <b>effective and that that discussion of variations was</b></p> <p>19 <b>a possibility but -- but not really a commercial</b></p> <p>20 <b>necessity.</b></p> <p>21 Q Yeah, I'm not sure that was responsive to</p> <p>22 my question. Let me ask the question again.</p>                                       |

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| <p>113</p> <p>1 Could it be the case that the '599 patent</p> <p>2 does not provide teachings regarding substituting an</p> <p>3 NMOS transistor for a PMOS transistor because</p> <p>4 performing such a substitution is within the</p> <p>5 knowledge and skill of a POSITA?</p> <p>6 MR. GARR: Objection.</p> <p>7 THE WITNESS: I don't want to</p> <p>8 speculate as to why the author included</p> <p>9 certain things or didn't.</p> <p>10 BY MR. JENSEN:</p> <p>11 Q You simply don't know one way or the</p> <p>12 other?</p> <p>13 A <b>The author's motivations, no.</b></p> <p>14 Q Well, putting aside the author's</p> <p>15 motivations, right, do you have -- well, let me</p> <p>16 strike that.</p> <p>17 Let me ask this question: Do you teach</p> <p>18 any digital circuits courses, Dr. Wolfe?</p> <p>19 A <b>Yes.</b></p> <p>20 Q What -- what digital circuits courses do</p> <p>21 you teach?</p> <p>22 A <b>Well, I teach Advanced Logic Design at</b></p>                                                                                                         | <p>115</p> <p>1 correctly. Is it your testimony that you have never</p> <p>2 taught, as part of your college-level digital logic</p> <p>3 courses, how to analyze whether you could substitute</p> <p>4 an NMOS transistor for a PMOS transistor?</p> <p>5 A <b>That was not my testimony.</b></p> <p>6 Q Okay. What -- what is your testimony?</p> <p>7 A <b>That, for any particular circuit, I would</b></p> <p>8 <b>teach students how to analyze the suitability of an</b></p> <p>9 <b>NMOS transistor and the suitability of a PMOS</b></p> <p>10 <b>transistor and what the trade-offs are, and those</b></p> <p>11 <b>trade-offs differ in different circumstances, and</b></p> <p>12 <b>they differ based on whether or not it is a purely</b></p> <p>13 <b>digital circuit or whether or not the circuit has</b></p> <p>14 <b>some analog characteristics, as well.</b></p> <p>15 Q So turning to Kimura Figure 33, what are</p> <p>16 the specific trade-offs that would have to be</p> <p>17 considered when deciding whether to substitute an</p> <p>18 NMOS transistor for a PMOS transistor?</p> <p>19 A <b>There are a number of them. They would</b></p> <p>20 <b>include the permittivity or conductivity of each</b></p> <p>21 <b>transistor. They would cons- -- they would involve</b></p> <p>22 <b>the current gain of the transistors 3308 and 3310.</b></p> |
| <p>114</p> <p>1 <b>the undergraduate and graduate level. I teach</b></p> <p>2 <b>various aspects of digital circuits in other classes,</b></p> <p>3 <b>as well.</b></p> <p>4 Q As part of the digital logic courses that</p> <p>5 you teach, have you ever taught your students how to</p> <p>6 make a substitution between an NMOS and CMOS</p> <p>7 transistor?</p> <p>8 MR. GARR: Objection.</p> <p>9 THE WITNESS: No, not really. I</p> <p>10 teach them how to analyze the suitability</p> <p>11 of each one in particular circumstances.</p> <p>12 BY MR. JENSEN:</p> <p>13 Q What textbook do you use for your digital</p> <p>14 logic course?</p> <p>15 A <b>I don't -- I don't remember their names.</b></p> <p>16 Q Do you remember the name of any of the</p> <p>17 textbooks you use?</p> <p>18 A <b>The graduate course has no textbook. The</b></p> <p>19 <b>undergraduate course has one, but I don't rely on</b></p> <p>20 <b>them very heavily. So I mostly just use my own</b></p> <p>21 <b>teaching materials.</b></p> <p>22 Q I just want to make sure I've got this</p> | <p>116</p> <p>1 <b>They would involve leakage currents. They would</b></p> <p>2 <b>involve the size requirements and the placement</b></p> <p>3 <b>requirements of the individual transistors, whether</b></p> <p>4 <b>or not they can share a physical region during</b></p> <p>5 <b>manufacturing, and they would involve the ability or</b></p> <p>6 <b>desirability to share control signals, among other</b></p> <p>7 <b>things.</b></p> <p>8 Q All right. So let's take those one by</p> <p>9 one. The first one you mentioned was the</p> <p>10 conductivity of the transistor.</p> <p>11 What do you mean by conductivity?</p> <p>12 A <b>At various gate to source voltages, the</b></p> <p>13 <b>transistor has an effective resistance that's</b></p> <p>14 <b>dependent on a number of factors, including the</b></p> <p>15 <b>materials, the transistor width, and the gate's</b></p> <p>16 <b>spacing, and it tends to be similar between PMOS</b></p> <p>17 <b>transistors that have been manufactured on the same</b></p> <p>18 <b>process, but NMOS transistors of a similar size tend</b></p> <p>19 <b>to have two to three times lower resistance.</b></p> <p>20 <b>So there are many situations where you</b></p> <p>21 <b>can't just drop in a PMOS transistor and get the same</b></p> <p>22 <b>circuit behavior.</b></p>                                     |

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| <p>117</p> <p>1 Q Does Kimura discuss that consideration</p> <p>2 that you just mentioned?</p> <p>3 A I don't recall. Kimura simply chooses</p> <p>4 NMOS transistors where he feels they are appropriate.</p> <p>5 Q If we turn to Kimura Figure 34A, do you</p> <p>6 see that the transistor 3406 is a PMOS transistor?</p> <p>7 A Yes.</p> <p>8 Q When Kimura substituted the NMOS</p> <p>9 transistor for the PMOS transistor 3406 in Figure</p> <p>10 34A, did Kimura discuss any of the considerations</p> <p>11 that you mentioned, the conductivity, leakage or the</p> <p>12 size of the transistor, when making that</p> <p>13 substitution?</p> <p>14 A I don't recall him directly addressing</p> <p>15 those issues, but there's some -- some of those</p> <p>16 issues are less concerned with that particular</p> <p>17 transistor in particular.</p> <p>18 So, for example, because of the way it's</p> <p>19 configured, one could not, in this configuration,</p> <p>20 change both 3405 and 3406. He's specifically made</p> <p>21 that a complementary type different from 3405.</p> <p>22 Also, that particular transistor, because</p> | <p>119</p> <p>1 PMOS modification in Figure 33 to those transistors.</p> <p>2 Q Again, I don't want to quibble over</p> <p>3 something like that. In the PMOS modification that</p> <p>4 Petitioner and Dr. Foty relied on, the transistors</p> <p>5 one through five were mapped to Figure 33, correct?</p> <p>6 A That's my recollection. I'd have to go</p> <p>7 back and check to be certain.</p> <p>8 Q I'll represent to you that that's the</p> <p>9 case, and I'm going to identify those transistors</p> <p>10 here for ease of reference, and you can check this if</p> <p>11 you'd like, but I'll represent to you that this is</p> <p>12 the mapping of transistors one, two, three, four and</p> <p>13 five that was used in the petition and by Dr. Foty</p> <p>14 with the clarification you pointed out that it's an</p> <p>15 all-PMOS version in the petition and Dr. Foty's</p> <p>16 declaration?</p> <p>17 A Okay.</p> <p>18 MR. GARR: Sorry. Counsel, what --</p> <p>19 what are we looking at here? I didn't</p> <p>20 quite catch the document.</p> <p>21 MR. JENSEN: This is Kimura Figure</p> <p>22 33 that simply identifies the transistor</p> |
| <p>118</p> <p>1 of what it's connected to, has less analog behavior</p> <p>2 than, for example, transistor 3409, which would</p> <p>3 require a more detailed analysis.</p> <p>4 Q So we talked a minute ago about Claim 7</p> <p>5 reciting five different transistors.</p> <p>6 Do you remember that?</p> <p>7 A Yes.</p> <p>8 Q And they were identified as the first</p> <p>9 through the fifth transistors?</p> <p>10 A Yes.</p> <p>11 Q Okay. And in Dr. Foty's report in the</p> <p>12 petition, those first through fifth transistors were</p> <p>13 mapped to specific transistors in Figure 33, correct?</p> <p>14 A No. They were mapped to PMOS</p> <p>15 substitutes. Not specific transistors in Figure 33.</p> <p>16 MR. GARR: Objection.</p> <p>17 BY MR. JENSEN:</p> <p>18 Q Okay. With that clarification, you'd</p> <p>19 agree that the petition and Dr. Foty mapped the PMOS</p> <p>20 transistor version of Figure 33 to transistors one</p> <p>21 through five in Claim 7?</p> <p>22 A I wouldn't call it a PMOS inversion. A</p>                                                                                                     | <p>120</p> <p>1 mapping to Claim 7.</p> <p>2 MR. GARR: So these are annotations</p> <p>3 that you've added to the document here?</p> <p>4 MR. JENSEN: Well, they are the</p> <p>5 annotations that the petition and that</p> <p>6 Dr. Foty used to identify the</p> <p>7 transistors.</p> <p>8 THE WITNESS: I don't see that</p> <p>9 exact annotation in Dr. Foty's, but it</p> <p>10 seems to be a combination of figures that</p> <p>11 he spread across 20 pages or so.</p> <p>12 BY MR. JENSEN:</p> <p>13 Q Well, I think you're making this more</p> <p>14 complicated than it needs to be. Let's go ahead and</p> <p>15 just look at petition and make sure everybody is on</p> <p>16 the same page that we didn't switch the transistor</p> <p>17 numbers.</p> <p>18 So I'll go ahead and open up a copy of</p> <p>19 the petition. I'll open a copy of Dr. Foty's</p> <p>20 declaration, because I happen to have that here. So</p> <p>21 this is Exhibit 1003, and if we get to the right</p> <p>22 section, we'll be able to look at this.</p>                                                                                                                  |

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| <p>121</p> <p>1           So I just want to find Claim 7 here.</p> <p>2   Okay. So here we go. We're looking at Dr. Foty's</p> <p>3   declaration, Claim Element 7A, and that recites a</p> <p>4   first transistor, correct?</p> <p>5       <b>A   Yes.</b></p> <p>6       Q   Okay. And the first transistor is</p> <p>7   identified as 3306, correct?</p> <p>8       <b>A   As a PMOS substitution for 3306.</b></p> <p>9       Q   Correct. So -- but the transistor number</p> <p>10   is 3306? You would agree?</p> <p>11       <b>A   In the drawing that Dr. Foty created,</b></p> <p>12   <b>that is true.</b></p> <p>13       Q   Okay. And he created this by taking a</p> <p>14   screen shot of Figure 33, correct?</p> <p>15       <b>A   No.</b></p> <p>16       Q   Do you know how Dr. Foty created the</p> <p>17   figure labeled 33A?</p> <p>18       MR. GARR: Objection.</p> <p>19       THE WITNESS: No, but it has</p> <p>20   different transistors in it than the</p> <p>21   actual Figure 33A.</p> <p>22   BY MR. JENSEN:</p>                                                                                                                                                                                      | <p>123</p> <p>1       <b>A   Yes, but that's a big difference.</b></p> <p>2   <b>Nothing like the opposite.</b></p> <p>3       Q   This -- you would agree that in Figure</p> <p>4   33A the transistor labeled 3306 corresponds to</p> <p>5   Dr. Foty's PMOS version of transistor 3306 in his</p> <p>6   declaration?</p> <p>7       MR. GARR: Objection.</p> <p>8   BY MR. JENSEN:</p> <p>9       Q   Correct?</p> <p>10       <b>A   Dr. Foty's PMOS transistor is in the same</b></p> <p>11   <b>physical location as transistor 3306 in Kimura's</b></p> <p>12   <b>Figure 33A.</b></p> <p>13       Q   Okay. Very good. So let's go to Claim</p> <p>14   Element 7B, and we're in Dr. Foty's declaration, and</p> <p>15   Claim Element 7B recites a second transistor,</p> <p>16   correct?</p> <p>17       <b>A   Yes.</b></p> <p>18       Q   And Dr. Foty has mapped the second</p> <p>19   transistor to the transistor number 3308, correct?</p> <p>20       <b>A   Yes.</b></p> <p>21       MR. GARR: Objection.</p> <p>22   BY MR. JENSEN:</p>                                                                                                                                                                                    |
| <p>122</p> <p>1       Q   All right. Let's take a look at that.</p> <p>2   So in Kimura, Exhibit 1002, there's a transistor</p> <p>3   labeled 3306?</p> <p>4       <b>A   An NMOS transistor, correct.</b></p> <p>5       Q   Correct, and in Dr. Foty's declaration,</p> <p>6   there is a PMOS version of Figure 33 where transistor</p> <p>7   3306 is labeled as the first transistor, correct?</p> <p>8       <b>A   There is a drawing that Dr. Foty has</b></p> <p>9   <b>created where he has substituted a PMOS transistor</b></p> <p>10   <b>into Figure 33.</b></p> <p>11       Q   Correct, and that transistor number is</p> <p>12   3306, correct?</p> <p>13       <b>A   That he's assigned it. It is not the</b></p> <p>14   <b>3306 in Kimura.</b></p> <p>15       Q   Apart from the fact that transistor 3306</p> <p>16   in Dr. Foty's declaration is a PMOS transistor, it's</p> <p>17   located in the same location in the circuit of Figure</p> <p>18   33A as the transistor labeled 3306, correct?</p> <p>19       <b>A   It is a different transistor in the same</b></p> <p>20   <b>location.</b></p> <p>21       Q   And the only difference of the transistor</p> <p>22   is its NMOS versus PMOS, correct?</p> | <p>124</p> <p>1       Q   And in Kimura Figure 33A of Exhibit 1002,</p> <p>2   we place the identifier two on the transistor 3308,</p> <p>3   correct?</p> <p>4       <b>A   You have done that, yes.</b></p> <p>5       Q   And Dr. Foty did that in his declaration,</p> <p>6   as well, correct?</p> <p>7       <b>A   He did. He identified with a two</b></p> <p>8   <b>transistor 3308.</b></p> <p>9       Q   He didn't identify transistor 3308 as the</p> <p>10   third or the fourth or the fifth transistor, correct?</p> <p>11       <b>A   Not in this section, no.</b></p> <p>12       Q   Okay. Let's go back to Dr. Foty's</p> <p>13   declaration here. If we go to Claim Element 7C, that</p> <p>14   recites a third transistor, correct?</p> <p>15       <b>A   Yes.</b></p> <p>16       Q   And Dr. Foty has labeled the transistor</p> <p>17   number 3309 as the third transistor, correct?</p> <p>18       <b>A   No -- well, he has labeled the transistor</b></p> <p>19   <b>that he has labeled 3309 as the third transistor.</b></p> <p>20   <b>It's a different transistor than the one Kimura</b></p> <p>21   <b>labels as 3309 in Figure 33A.</b></p> <p>22       Q   And the difference being, again, what we</p> |

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| <p>125</p> <p>1 talked about before is it's NMOS versus PMOS?</p> <p>2 <b>A It is a different kind of transistor. A</b></p> <p>3 <b>PMOS transistor instead of an NMOS transistor.</b></p> <p>4 Q Okay. Very good, but he didn't label</p> <p>5 transistor 3309 as the first or the second or the</p> <p>6 fourth or the fifth transistor, did he?</p> <p>7 <b>A Not here.</b></p> <p>8 Q Okay. So let's go to Claim Element 7E,</p> <p>9 which recites a fourth transistor, correct?</p> <p>10 <b>A Correct.</b></p> <p>11 Q And with the same caveat about the NMOS</p> <p>12 versus PMOS, Dr. Foty labeled the transistor 3307 as</p> <p>13 the fourth transistor, correct?</p> <p>14 MR. GARR: Objection.</p> <p>15 THE WITNESS: He has labeled the</p> <p>16 PMOS transistor that he has substituted</p> <p>17 into Kimura's Figure 33A and labeled 3307</p> <p>18 with a four.</p> <p>19 BY MR. JENSEN:</p> <p>20 Q And we placed the label four on the</p> <p>21 transistor 3307 in the Kimura Figure 33A of Exhibit</p> <p>22 1002, correct?</p>                                                                                                        | <p>127</p> <p>1 we're going to probe that.</p> <p>2 If we go back to Dr. Foty's declaration</p> <p>3 and look at Claim Element 7F, that refers to a fifth</p> <p>4 transistor, correct?</p> <p>5 <b>A Yes.</b></p> <p>6 Q Okay. And Dr. Foty labeled the</p> <p>7 transition number 3310 as the fifth transistor,</p> <p>8 correct?</p> <p>9 <b>A No. He substituted a PMOS transistor</b></p> <p>10 <b>into Figure 33A of Kimura's design, and he labeled</b></p> <p>11 <b>his substitute transistor as five.</b></p> <p>12 Q Correct. And if we look at Kimura Figure</p> <p>13 33A, I have labeled the transistor 3310 with a number</p> <p>14 five, correct?</p> <p>15 <b>A You have.</b></p> <p>16 Q Yes. Will you understand then, if I</p> <p>17 refer to the first transistor in Figure 33, that I'm</p> <p>18 referring to the transistor at 3306?</p> <p>19 <b>A That's the one you've labeled with a one.</b></p> <p>20 <b>Again, I haven't associated it with the first</b></p> <p>21 <b>transistor of the claim.</b></p> <p>22 Q Correct. I'm just asking you, for</p>                                                                          |
| <p>126</p> <p>1 <b>A You have done that.</b></p> <p>2 Q Yes, I put it there. Do you disagree</p> <p>3 with that labeling in any way that I've assigned it</p> <p>4 for discussion purposes as the number four?</p> <p>5 <b>A Yes. I haven't analyzed that NMOS</b></p> <p>6 <b>transistor with respect to the claim. So I have no</b></p> <p>7 <b>opinion regarding that.</b></p> <p>8 Q Okay. Would you prefer to call that</p> <p>9 something else, some other identifier?</p> <p>10 <b>A No. I haven't done an analysis of Figure</b></p> <p>11 <b>33A with respect to the claim without the all-PMOS</b></p> <p>12 <b>modification.</b></p> <p>13 Q But I believe you testified earlier that</p> <p>14 you read the entirety of the Kimura reference,</p> <p>15 correct?</p> <p>16 <b>A I read it all, but I did not analyze</b></p> <p>17 <b>arbitrary portions of it with respect to the claim.</b></p> <p>18 <b>I focused on the allegations in the petition.</b></p> <p>19 Q Well, yes. So my question is: Do you</p> <p>20 understand how Figure 33 works, Dr. Wolfe?</p> <p>21 <b>A Yes.</b></p> <p>22 Q Okay. That's the important thing because</p> | <p>128</p> <p>1 purposes of this deposition, will you understand, if</p> <p>2 I say the first transistor in Figure 33, that I'm</p> <p>3 referring to the transistor 3306?</p> <p>4 <b>A I'd prefer that we not use claim</b></p> <p>5 <b>language, and we refer to it as the transistor</b></p> <p>6 <b>labeled with a one.</b></p> <p>7 Q Okay. I can try to do that, but you'll</p> <p>8 understand that, if I'm referring to the transistor</p> <p>9 labeled one, that it's referring to transistor 3306?</p> <p>10 <b>A Yes.</b></p> <p>11 Q Okay. And the same holds true for the</p> <p>12 other labels, two, three, four and five and their</p> <p>13 respective transistor numbers?</p> <p>14 <b>A Okay.</b></p> <p>15 Q Okay. Very good. And if we go back to</p> <p>16 Dr. Foty's declaration, we can see, for example, in</p> <p>17 Paragraph 266, he includes an all-PMOS version that</p> <p>18 has all five of those labels, one, two, three, four</p> <p>19 and five, correct?</p> <p>20 <b>A Yeah. That's with respect to Claim 14,</b></p> <p>21 <b>but that's -- that's fine.</b></p> <p>22 Q And I'll represent to you it's the same</p> |

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| <p>129</p> <p>1 mapping for Claim 7.</p> <p>2 <b>A Okay.</b></p> <p>3 Q So returning to Kimura, right, we talked</p> <p>4 about Figure 34A in which Kimura substituted a PMOS</p> <p>5 for an NMOS transistor at transistor 3406, correct?</p> <p>6 <b>A Well, and made other changes.</b></p> <p>7 Q Among other changes. Yes, among other</p> <p>8 changes, but one of the changes was he substituted</p> <p>9 the NMOS transistor for a PMOS transistor, correct?</p> <p>10 <b>A He substituted a PMOS transistor for an</b></p> <p>11 <b>NMOS transistor and changed the connection to its</b></p> <p>12 <b>gate.</b></p> <p>13 Q Thank you for that clarification. I</p> <p>14 flopped them, and I'll restate it just to be clear.</p> <p>15 In Kimura Figure 34, the transistor 3406</p> <p>16 substituted a PMOS transistor for an NMOS transistor,</p> <p>17 correct?</p> <p>18 <b>A No, only in 34A. Not in 34B.</b></p> <p>19 Q Yes. Thank you. Only in 34A, and that's</p> <p>20 what we're looking at on the screen, right, is Figure</p> <p>21 34A?</p> <p>22 <b>A That's part of what's on the screen.</b></p> | <p>131</p> <p>1 <b>A All using the same transistor type. The</b></p> <p>2 <b>same type of PMOS or the same type of NMOS within the</b></p> <p>3 <b>cell.</b></p> <p>4 Q And what do you mean by Kimura's</p> <p>5 embodiments of its inventions?</p> <p>6 <b>A I mean the illustrations that are shown</b></p> <p>7 <b>or described that Kimura distinguishes from the prior</b></p> <p>8 <b>art.</b></p> <p>9 Q So let's turn to Kimura, and let's look</p> <p>10 at Figure 32. Let me know when you're able to see</p> <p>11 that.</p> <p>12 <b>A Okay.</b></p> <p>13 Q And what is Figure 32A in Kimura?</p> <p>14 <b>A Diagrams for explaining an additional</b></p> <p>15 <b>structural example that differs from the embodiment</b></p> <p>16 <b>modes of the present invention.</b></p> <p>17 Q Are you reading from the text of Kimura?</p> <p>18 <b>A Yes. Paragraph 338.</b></p> <p>19 Q And if we turn to Paragraph 643 of</p> <p>20 Kimura, what is being described starting at Paragraph</p> <p>21 643 and the subsequent paragraphs?</p> <p>22 <b>A It seems to be a description of some of</b></p> |
| <p>130</p> <p>1 Q Okay. So in Figure 34A, Kimura</p> <p>2 substituted a PMOS transistor for an NMOS transistor</p> <p>3 for 3406, correct?</p> <p>4 MR. GARR: Objection.</p> <p>5 THE WITNESS: In 34A, as compared</p> <p>6 to 33A, he has replaced a particular NMOS</p> <p>7 transistor with a PMOS transistor and</p> <p>8 changed its gate connection.</p> <p>9 BY MR. JENSEN:</p> <p>10 Q Let's go to Paragraph 59 of your</p> <p>11 declaration, and let me know when you're there.</p> <p>12 <b>A Okay.</b></p> <p>13 Q And this is under the section dealing</p> <p>14 with the all-PMOS design, correct?</p> <p>15 <b>A Correct.</b></p> <p>16 Q Okay. Could you read the first sentence</p> <p>17 of Paragraph 59.</p> <p>18 <b>A It is worth noting at the outset that</b></p> <p>19 <b>none of Kimura's embodiments of its invention teach</b></p> <p>20 <b>an all-PMOS or any single species configuration.</b></p> <p>21 Q What do you mean by a single species</p> <p>22 configuration?</p>                                                                                                                   | <p>132</p> <p>1 <b>the behaviors in Figure 32A.</b></p> <p>2 Q And if we turn back to Figure 32A, would</p> <p>3 you agree that Figure 32A is a pixel circuit?</p> <p>4 <b>A It appears to be one.</b></p> <p>5 Q It has a capacitor, correct, labeled</p> <p>6 3210?</p> <p>7 <b>A Yes.</b></p> <p>8 Q And it has an electroluminescent element</p> <p>9 at number 3212?</p> <p>10 <b>A Yes.</b></p> <p>11 Q And it has five transistors, correct?</p> <p>12 <b>A Yes.</b></p> <p>13 Q Are any of the transistors PMOS</p> <p>14 transistors?</p> <p>15 <b>A No.</b></p> <p>16 Q In fact, they are all NMOS transistors,</p> <p>17 correct?</p> <p>18 <b>A Yes.</b></p> <p>19 Q Would you agree with me that Kimura</p> <p>20 Figure 32A depicts a single species pixel circuit?</p> <p>21 <b>A It appears to, but, again, the language</b></p> <p>22 <b>and the spec seems to say that that -- that it</b></p>                                                                                                                                                                                                  |

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| <p>133</p> <p>1 <b>differs from the invention.</b></p> <p>2 Q Is it your testimony, Dr. Wolfe, that</p> <p>3 Figure 32A is not an embodiment of Kimura's</p> <p>4 invention?</p> <p>5 <b>A There is some ambiguity, but I relied on</b></p> <p>6 <b>the statement that it was -- that it differed from</b></p> <p>7 <b>the invention.</b></p> <p>8 Q In that case, would you agree with me</p> <p>9 that Figure 32A is a prior art pixel circuit?</p> <p>10 <b>A I don't know. Again, Figure 32A wasn't</b></p> <p>11 <b>the subject of the petition. So I didn't spend a lot</b></p> <p>12 <b>of time in analyzing it.</b></p> <p>13 Q But regardless of whether it's a circuit</p> <p>14 from the prior art or an embodiment of Kimura's</p> <p>15 invention, you would agree with me that it's a single</p> <p>16 species pixel circuit, correct?</p> <p>17 <b>A It is a single species pixel circuit.</b></p> <p>18 Q Let's turn to Figure 38 in Kimura, and</p> <p>19 let me know when you're able to see that.</p> <p>20 <b>A I can see it.</b></p> <p>21 Q Okay. Would you agree with me that this</p> <p>22 is a pixel circuit?</p> | <p>135</p> <p>1 <b>A Again, it uses the same language, but</b></p> <p>2 <b>differing from the embodiment modes of the invention.</b></p> <p>3 <b>So I took that at face value.</b></p> <p>4 Q Well, let me probe on that a little bit,</p> <p>5 right. So Kimura discloses a number of different</p> <p>6 embodiments and embodiment modes of its invention,</p> <p>7 correct?</p> <p>8 <b>A Yes.</b></p> <p>9 Q And some of them differ from others?</p> <p>10 <b>A Yes.</b></p> <p>11 Q Okay. Is it your understanding that just</p> <p>12 because one embodiment differs from another one that</p> <p>13 it's not an embodiment of Kimura's inventions?</p> <p>14 <b>A No.</b></p> <p>15 Q Okay. Let's look at Figure 39 in Kimura,</p> <p>16 and let me know when you're able to see Figure 39A.</p> <p>17 <b>A I see it.</b></p> <p>18 Q Would you agree with me that Figure 39A</p> <p>19 is a pixel circuit?</p> <p>20 <b>A It certainly appears to be.</b></p> <p>21 Q And how many transistors are in Figure</p> <p>22 39A?</p> |
| <p>134</p> <p>1 <b>A It appears to be. Again, I don't</b></p> <p>2 <b>recall -- it's been a long time since I analyzed this</b></p> <p>3 <b>circuit, or I'm not sure I ever analyzed this</b></p> <p>4 <b>circuit, but I read about it, and it appears to be a</b></p> <p>5 <b>pixel circuit.</b></p> <p>6 Q How many transistors does the pixel</p> <p>7 circuit in Figure 38A have?</p> <p>8 <b>A Five NMOS transistors.</b></p> <p>9 Q Well, let's -- maybe I'll give you a</p> <p>10 chance to recount.</p> <p>11 <b>A Oh, I'm sorry. There are six NMOS</b></p> <p>12 <b>transistors.</b></p> <p>13 Q And you said they are all NMOS</p> <p>14 transistors, correct?</p> <p>15 <b>A Yes.</b></p> <p>16 Q You would agree with me that Figure 33 --</p> <p>17 excuse me -- you would agree with me that Figure 38A</p> <p>18 in Kimura depicts a single species pixel circuit,</p> <p>19 correct?</p> <p>20 <b>A It appears to.</b></p> <p>21 Q Do you know if Figure 38A is an</p> <p>22 embodiment of Kimura's invention?</p>                                                                                                         | <p>136</p> <p>1 <b>A Seven.</b></p> <p>2 Q What type of transistors are all of</p> <p>3 those?</p> <p>4 <b>A NMOS.</b></p> <p>5 Q You would agree with that Kimura Figure</p> <p>6 39A is a single species pixel circuit, correct?</p> <p>7 <b>A It is.</b></p> <p>8 Q Do you know one way or the other if 39A</p> <p>9 is an embodiment of Kimura's invention?</p> <p>10 <b>A I didn't really evaluate it.</b></p> <p>11 Q Let's look at Figure 40. Let me know</p> <p>12 when you're able to see Figure 40A.</p> <p>13 <b>A I see it.</b></p> <p>14 Q You would agree with me that Figure 40A</p> <p>15 is a pixel circuit?</p> <p>16 <b>A Yes.</b></p> <p>17 Q How many transistors are in Figure 40A?</p> <p>18 <b>A Seven.</b></p> <p>19 Q And what type of transistors are all of</p> <p>20 those?</p> <p>21 <b>A NMOS.</b></p> <p>22 Q Is Figure 40A an embodiment of a single</p>                                                                                                                                                |

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| <p style="text-align: right;">137</p> <p>1 species pixel circuit?</p> <p>2 <b>A I think it's a single species pixel</b></p> <p>3 <b>circuit.</b></p> <p>4 Q Let's go next to -- well, before we do</p> <p>5 that, let's go back to your declaration here in</p> <p>6 Paragraph 59, and this is the paragraph where you</p> <p>7 begin your analysis by noting that none of Kimura's</p> <p>8 embodiments teach an all-PMOS or any single species</p> <p>9 configuration, correct?</p> <p>10 <b>A Yes.</b></p> <p>11 Q Having looked at Kimura Figures 32, 38,</p> <p>12 39 and 40, do you still maintain that none of</p> <p>13 Kimura's embodiments teach a single species pixel</p> <p>14 circuit?</p> <p>15 <b>A I didn't comment on the pixel circuit.</b></p> <p>16 <b>It's -- but even so, the pixel circuit as a whole,</b></p> <p>17 <b>including the drivers that Kimura teaches and</b></p> <p>18 <b>discloses, those are all CMOS.</b></p> <p>19 <b>Kimura is all about CMOS circuits, and he</b></p> <p>20 <b>teaches all about the idea that you want to put the</b></p> <p>21 <b>drivers and the pixel cell on the same substrate, and</b></p> <p>22 <b>I don't know of any way to do Kimura's peripheral</b></p>                                                                                                                              | <p style="text-align: right;">139</p> <p>1 <b>alleged motivations would be that you wouldn't have</b></p> <p>2 <b>to make NMOS transistors if you did an all-PMOS</b></p> <p>3 <b>design, and in Kimura, he's very clear that you do</b></p> <p>4 <b>need NMOS transistors on that substrate in that same</b></p> <p>5 <b>manufacturing process.</b></p> <p>6 Q Let me ask this question, Dr. Wolfe: Did</p> <p>7 any of the challenged claims recite driver circuitry</p> <p>8 or control circuitry or peripheral circuitry?</p> <p>9 <b>A Not that I can recall, but that doesn't</b></p> <p>10 <b>change the context of Kimura's teaching and how that</b></p> <p>11 <b>impacts the motivation to substitute the transistors.</b></p> <p>12 Q Yeah, and I'm not asking about the</p> <p>13 motivation at this point. I just want to see if we</p> <p>14 can agree on the simple point that, excluding any</p> <p>15 peripheral circuitry, that Kimura teaches a number</p> <p>16 of -- of single species pixel circuits?</p> <p>17 <b>A Well, I will point out that you're asking</b></p> <p>18 <b>me about a paragraph that right under the heading</b></p> <p>19 <b>about motivation, but -- so my statements are</b></p> <p>20 <b>certainly in the context of motivation, but as I</b></p> <p>21 <b>said, the pixel cell itself in certain Kimura designs</b></p> <p>22 <b>can be all-NMOS, but the entirety of the pixel</b></p> |
| <p style="text-align: right;">138</p> <p>1 <b>cells, part of his design, part of his invention,</b></p> <p>2 <b>without CMOS.</b></p> <p>3 <b>So as far as I can tell, all of the</b></p> <p>4 <b>embodiments of Kimura's invention, when you look at</b></p> <p>5 <b>them in their entirety, both the pixel cells and the</b></p> <p>6 <b>peripheral cells on the same substrate, they are all</b></p> <p>7 <b>CMOS. They are all mixed species.</b></p> <p>8 Q So let me ask the question again because</p> <p>9 I want to focus on -- on the pixel circuits</p> <p>10 themselves that we were just looking at.</p> <p>11 Would you agree with me then that Kimura</p> <p>12 teaches a number of single species pixel circuits?</p> <p>13 <b>A No all-PMOS pixel circuits that I'm aware</b></p> <p>14 <b>of, but there are some all -- there's -- no, there</b></p> <p>15 <b>are no -- there are all-NMOS pixel cells, but the</b></p> <p>16 <b>entire pixel circuit, including the drivers that</b></p> <p>17 <b>drive those lines that we see in Figure 40, for</b></p> <p>18 <b>example, are CMOS and periphery --</b></p> <p>19 Q Yeah, let's exclude the drivers -- oh,</p> <p>20 I'm sorry. Go ahead finish.</p> <p>21 <b>A Well, it's very important in this context</b></p> <p>22 <b>to think about the drivers because the -- one of the</b></p> | <p style="text-align: right;">140</p> <p>1 <b>circuit includes both the drivers and the cell.</b></p> <p>2 Q So you're making a distinction -- because</p> <p>3 I want to make sure we've got the nomenclature</p> <p>4 straight going forward, if we go back to Kimura, for</p> <p>5 example, Figure 33, you testified earlier that Kimura</p> <p>6 Figure 33A showed a pixel circuit, did you not?</p> <p>7 <b>A Yes, and a portion of a circuit is a</b></p> <p>8 <b>circuit. So it is a circuit, but it is not the</b></p> <p>9 <b>entirety of Kimura's pixel circuit.</b></p> <p>10 Q Okay. But the portion of the circuit</p> <p>11 that's depicted in Figure 33A is a -- you would agree</p> <p>12 is a pixel circuit?</p> <p>13 MR. GARR: Objection.</p> <p>14 THE WITNESS: I would refer to it</p> <p>15 as the pixel cell circuit, but it is --</p> <p>16 it's the portion of the pixel circuit</p> <p>17 that is unique to a particular pixel.</p> <p>18 BY MR. JENSEN:</p> <p>19 Q I'll try to use that phrase pixel cell</p> <p>20 circuit just to keep things straight.</p> <p>21 <b>A Okay.</b></p> <p>22 Q You would agree with me then that Kimura</p>                                                                                                                                                                                                                                                                 |

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| <p>141</p> <p>1 teaches a number of pixel cell circuits that are</p> <p>2 single species, correct?</p> <p>3 <b>A Kimura does teach all-NMOS pixel cell</b></p> <p>4 <b>circuits within a broader CMOS manufacturing process.</b></p> <p>5 Q And, in fact, Kimura teaches an all-PMOS</p> <p>6 pixel cell circuit, doesn't it?</p> <p>7 <b>A I don't recall one. Is there one?</b></p> <p>8 Q Let me direct your attention to Kimura</p> <p>9 Figure 20 -- let me find it here. Give me just a</p> <p>10 moment. Okay. I think I've found it. Let me share</p> <p>11 my screen again.</p> <p>12 All right. Let me direct your attention</p> <p>13 to Kimura Figure 22A. Would you agree with me that</p> <p>14 Kimura Figure 22A is a pixel cell circuit?</p> <p>15 <b>A It is a prior art pixel cell circuit,</b></p> <p>16 <b>yes.</b></p> <p>17 Q Okay. And how many transistors are in</p> <p>18 Figure 22A?</p> <p>19 <b>A Four.</b></p> <p>20 Q And what type of transistor are those?</p> <p>21 <b>A Those are PMOS.</b></p> <p>22 Q All four of them?</p>                                                                                             | <p>143</p> <p>1 <b>A Yes.</b></p> <p>2 Q And is Figure 1A a pixel cell circuit?</p> <p>3 <b>A Yes.</b></p> <p>4 Q And how many transistors does it have?</p> <p>5 <b>A Four.</b></p> <p>6 Q How many of them are PMOS?</p> <p>7 <b>A Two.</b></p> <p>8 Q And which two are those?</p> <p>9 <b>A 105 and 107.</b></p> <p>10 Q And how many NMOS transistors does Figure</p> <p>11 1A have?</p> <p>12 <b>A Two.</b></p> <p>13 Q And what are those?</p> <p>14 <b>A 104 and 106.</b></p> <p>15 Q Is there any reason that NMOS transistors</p> <p>16 104 and 106 could not be changed to PMOS transistors?</p> <p>17 MR. GARR: Objection.</p> <p>18 THE WITNESS: I haven't analyzed</p> <p>19 it. It wasn't part of the petition.</p> <p>20 BY MR. JENSEN:</p> <p>21 Q Let's turn to Paragraph 396 in Kimura,</p> <p>22 and I'd like for you to read the last sentence of</p>                                                                                                                                                                                                                                                                                                                          |
| <p>142</p> <p>1 <b>A Yes.</b></p> <p>2 Q Would you agree with me that Figure 22A</p> <p>3 in Kimura is an all-PMOS pixel cell circuit?</p> <p>4 <b>A Yes. Not in any way compatible with</b></p> <p>5 <b>Figure 33 or not part of Kimura's invention, which he</b></p> <p>6 <b>describes as a CMOS process, but within its own</b></p> <p>7 <b>context, in the prior art, it is an all-PMOS pixel</b></p> <p>8 <b>cell.</b></p> <p>9 Q So you would agree with me that all-PMOS</p> <p>10 pixel cells were known in the prior art?</p> <p>11 <b>A They were, just not with respect to the</b></p> <p>12 <b>functionality of Figure 33A or the asserted claims.</b></p> <p>13 Q All right. Let's go to Figure 1B in</p> <p>14 Kimura. I'm sorry. Let's go to Figure 2 in Kimura.</p> <p>15 I think I stopped sharing my screen. Let</p> <p>16 me put that back up. Let me know when you're able to</p> <p>17 see that.</p> <p>18 <b>A I can see that.</b></p> <p>19 Q Okay. And, actually, let me back up just</p> <p>20 a little bit here. Let's go to Figure 1A. So Figure</p> <p>21 1A is the first figure in the Kimura reference,</p> <p>22 correct?</p> | <p>144</p> <p>1 that paragraph a loud, please.</p> <p>2 <b>A However, the TFTs 104 and 106 function as</b></p> <p>3 <b>simple switching devices, and therefore any polarity</b></p> <p>4 <b>may be used.</b></p> <p>5 Q What do you understand that to mean?</p> <p>6 <b>A I think that it means that, in the very</b></p> <p>7 <b>specific circuit of Figure 1A, TFTs 104 and 106 are</b></p> <p>8 <b>being used merely as on/off switching devices without</b></p> <p>9 <b>any concern for what voltage levels they can transmit</b></p> <p>10 <b>and, therefore, in that particular case, either NMOS</b></p> <p>11 <b>or CMOS transistors can be used.</b></p> <p>12 Q And did you say --</p> <p>13 <b>A I'm sorry. NMOS or PMOS transistors can</b></p> <p>14 <b>be used.</b></p> <p>15 Q Okay. Thank you. And if transistors 104</p> <p>16 and 106 were PMOS transistors, that would result in</p> <p>17 an all-PMOS pixel cell circuit, correct, in Figure</p> <p>18 1A?</p> <p>19 <b>A If one were to make that substitution,</b></p> <p>20 <b>then -- for this particular circuit, that would be</b></p> <p>21 <b>true, yes.</b></p> <p>22 Q And so you agree that, with respect to at</p> |

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| <p style="text-align: right;">145</p> <p>1 least some embodiments in Kimura, the reference</p> <p>2 teaches that you can make an all-PMOS pixel cell</p> <p>3 circuit, correct?</p> <p>4 <b>A Not explicably, but it does hint towards</b></p> <p>5 <b>that modification for Figure 1A where, for example,</b></p> <p>6 <b>the drive transistor is already PMOS.</b></p> <p>7 Q And what is the drive transistor in</p> <p>8 Figure 1A?</p> <p>9 <b>A Transistor 107.</b></p> <p>10 MR. JENSEN: Okay. Well, why don't</p> <p>11 we take a lunch break now.</p> <p>12 THE VIDEOGRAPHER: We are going off</p> <p>13 the record. The time is 12:31 p.m.</p> <p>14 (Brief pause.)</p> <p>15 THE VIDEOGRAPHER: We are back on</p> <p>16 the record. The time is 1:16 p.m.</p> <p>17 BY MR. JENSEN:</p> <p>18 Q Welcome back, Dr. Wolfe.</p> <p>19 Let's continue with our discussion of the</p> <p>20 Kimura reference, and let me direct your attention to</p> <p>21 Figure 14D of Kimura, and let me know when you're</p> <p>22 able to -- to see that.</p> | <p style="text-align: right;">147</p> <p>1 Q And what do you understand the driving</p> <p>2 circuit portion to be?</p> <p>3 <b>A I didn't spend a lot of time to get more</b></p> <p>4 <b>specific, but it's essentially a portion of the --</b></p> <p>5 <b>what we would call the peripheral circuit that</b></p> <p>6 <b>creates the signals on the lines that come into the</b></p> <p>7 <b>individual pixel cells.</b></p> <p>8 Q And what would be included in the pixel</p> <p>9 portion?</p> <p>10 <b>A There's kind of an implication that that</b></p> <p>11 <b>is a pixel cell. Although -- let me see if I can</b></p> <p>12 <b>find -- I'm not sure that I have a detailed</b></p> <p>13 <b>explanation given what it means in this particular</b></p> <p>14 <b>drawing.</b></p> <p>15 Q Would it be fair to say that, in general,</p> <p>16 the pixel portion are where the pixel cell circuits</p> <p>17 where the LEDs are located and the driving circuit</p> <p>18 portion is where the control circuitry is located?</p> <p>19 <b>A I think that's likely what's intended in</b></p> <p>20 <b>Figure 14D.</b></p> <p>21 Q And Kimura, among other things, discusses</p> <p>22 a manufacturer --</p>              |
| <p style="text-align: right;">146</p> <p>1 <b>A I do.</b></p> <p>2 Q What is Figure 14D?</p> <p>3 <b>A I don't recall off the top of my head. I</b></p> <p>4 <b>have to go look at the description.</b></p> <p>5 Q That's fine.</p> <p>6 <b>A It's a CMOS driver circuit that's been</b></p> <p>7 <b>being used to illustrate the manufacturing process at</b></p> <p>8 <b>the heart of Kimura.</b></p> <p>9 Q And Figure 14D is a cross-section of some</p> <p>10 transistors, correct?</p> <p>11 <b>A Transistors and some interconnect, yes.</b></p> <p>12 Q It's not a circuit schematic like some of</p> <p>13 the other figures we were looking at earlier,</p> <p>14 correct?</p> <p>15 <b>A That's true.</b></p> <p>16 Q Okay. And Kimura divides Figure 14D into</p> <p>17 two portions.</p> <p>18 Do you see that?</p> <p>19 <b>A Yes.</b></p> <p>20 Q And what are those two portions?</p> <p>21 <b>A The driving circuit portion and the pixel</b></p> <p>22 <b>portion.</b></p>                                                             | <p style="text-align: right;">148</p> <p>1 <b>A Sorry. Just a motorcycle just drove by.</b></p> <p>2 <b>Can you try again.</b></p> <p>3 Q Yeah. I'll start over. Among other</p> <p>4 things, Kimura discusses the manufacturing process in</p> <p>5 which the driving circuit portion and the pixel</p> <p>6 portion can be formed in the same manufacturing</p> <p>7 process, correct?</p> <p>8 <b>A Yes, it's clear that that's his intent.</b></p> <p>9 Q And is it correct that Figure 14D</p> <p>10 illustrates both N-type and P-type TFTs in the</p> <p>11 driving circuit portion?</p> <p>12 <b>A Yes. And that's corroborated by many</b></p> <p>13 <b>other figures, as well, that show things such as CMOS</b></p> <p>14 <b>inverters.</b></p> <p>15 Q And if a POSITA were to manufacture a</p> <p>16 display in which the pixel portion comprised the</p> <p>17 single species of transistor and the driving portion</p> <p>18 comprised CMOS transistors -- strike that.</p> <p>19 Would it be possible using Kimura's</p> <p>20 manufacturing process to make a display in which the</p> <p>21 driving circuit portion had CMOS transistors and the</p> <p>22 pixel circuit portion had only a single species of</p> |

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| <p>1 transistor?</p> <p>2 MR. GARR: Objection.</p> <p>3 THE WITNESS: It would be possible,</p> <p>4 but it would not provide any of the</p> <p>5 advantages that Dr. Foty relied upon as a</p> <p>6 motivation.</p> <p>7 BY MR. JENSEN:</p> <p>8 Q So I want to put aside anything that</p> <p>9 Dr. Foty said. Because I want to ask you about your</p> <p>10 opinions. Using such a manufacturing process, would</p> <p>11 still provide the benefits of a CMOS architecture for</p> <p>12 the driving circuit portion, correct?</p> <p>13 <b>A Yes. Of course, I'm only responding to</b></p> <p>14 <b>Dr. Foty's opinions as represented in the petition,</b></p> <p>15 <b>but you could get the benefits of a CMOS driver</b></p> <p>16 <b>circuit along with a single species pixel circuit,</b></p> <p>17 <b>but in doing so, you would lose all the benefits that</b></p> <p>18 <b>Dr. Foty had recited.</b></p> <p>19 Q Would the manufacturing process change if</p> <p>20 one or more of the transistors in the pixel -- pixel</p> <p>21 portion were changed to a different species?</p> <p>22 MR. GARR: Objection.</p> | <p>149</p> <p>1 than you would if you only did them</p> <p>2 elsewhere, but -- and, in general, once</p> <p>3 you have the manufacturing process for a</p> <p>4 CMOS, you might as well just build</p> <p>5 everything out of CMOS.</p> <p>6 BY MR. JENSEN:</p> <p>7 Q Yeah, which -- that's not quite -- quite</p> <p>8 my question. Let me try and ask it again. If</p> <p>9 someone in 2003 were to switch one of the transistors</p> <p>10 in the pixel portion from NMOS to PMOS, what</p> <p>11 additional manufacturing step would have to be added?</p> <p>12 <b>A Here I think because it's already a CMOS</b></p> <p>13 <b>process, I don't think you'd add -- have to add an</b></p> <p>14 <b>additional manufacturing step. I think you'd simply</b></p> <p>15 <b>not have any benefits.</b></p> <p>16 Q All right. And what -- what benefit does</p> <p>17 having both CMOS -- strike that.</p> <p>18 What benefit does having both PMOS and</p> <p>19 NMOS transistors in the pixel portion provide?</p> <p>20 <b>A It allows the NMOS transistors to be</b></p> <p>21 <b>smaller. It allows you to have transistors to have</b></p> <p>22 <b>an opposite response to the same control line. It</b></p> |
| <p>150</p> <p>1 THE WITNESS: Portions of the</p> <p>2 process would change.</p> <p>3 BY MR. JENSEN:</p> <p>4 Q What process step would change if you</p> <p>5 change one of the transistors in the pixel portion to</p> <p>6 a different species?</p> <p>7 <b>A You would need different masks and you</b></p> <p>8 <b>would need different -- and you would have different</b></p> <p>9 <b>uniformity requirements.</b></p> <p>10 Q So put aside the mask, because, of course</p> <p>11 of, the mask would change, but my question is about</p> <p>12 the manufacturing process itself.</p> <p>13 Would any of the manufacturing steps have</p> <p>14 to be, you know, added or removed just because you</p> <p>15 changed the species of a transistor in the pixel</p> <p>16 portion?</p> <p>17 MR. GARR: Objection.</p> <p>18 THE WITNESS: If you wanted a good</p> <p>19 result, because you have analog</p> <p>20 transistors in the cells, you would have</p> <p>21 a different set of parameters and</p> <p>22 different set of quality requirements</p>                                                                     | <p>151</p> <p>1 allows you to have low leakage on some of the</p> <p>2 transistors.</p> <p>3 <b>There are a number of advantages that it</b></p> <p>4 <b>could provide.</b></p> <p>5 Q Yeah. I think that's maybe -- maybe I</p> <p>6 didn't phrase the question correctly because I think</p> <p>7 you're answering a slightly different question. Let</p> <p>8 me see if I can try it again.</p> <p>9 Let me take something that you mentioned</p> <p>10 to see if we can advance a discussion around that.</p> <p>11 You said that, having the ability to make both NMOS</p> <p>12 and PMOS transistors in the pixel portion, would</p> <p>13 allow the NMOS transistors to be made smaller; is</p> <p>14 that correct?</p> <p>15 <b>A In some situations, yes.</b></p> <p>16 Q And how is it that the presence of a PMOS</p> <p>17 transistor in the pixel portion allows a POSITA to</p> <p>18 make an NMOS transistor smaller?</p> <p>19 <b>A I don't think it does. I think you can</b></p> <p>20 <b>have both PMOS and NMOS transistors in the pixel</b></p> <p>21 <b>portion, which allows you to use a circuit such as</b></p> <p>22 <b>Kimura's Figure 33 or Kimura's Figure 44. In</b></p> <p>152</p>     |

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| <p>153</p> <p>1 particularly, Figure 34 wouldn't be possible without</p> <p>2 a combination of NMOS and PMOS.</p> <p>3 Q You're not saying that the presence of a</p> <p>4 PMOS transistor in the pixel portion allows the NMOS</p> <p>5 transistor to be smaller? Rather, it's simply that</p> <p>6 you could use an NMOS transistor instead of a PMOS</p> <p>7 transistor?</p> <p>8 A We're kind of way off in abstract land</p> <p>9 here. The actual Kimura embodiment that was in the</p> <p>10 petition starts with Figure 33, which already uses</p> <p>11 NMOS and PMOS transistors.</p> <p>12 Q Yeah. So I'm trying to understand what</p> <p>13 are the benefits that you think exist in a pixel cell</p> <p>14 circuit that has both NMOS and PMOS, and one you</p> <p>15 said, well, the NMOS transistors could be smaller,</p> <p>16 and I'm trying to understand. Is that -- does that</p> <p>17 have anything to do with whether or not there's also</p> <p>18 a PMOS transistor somewhere else in the circuit?</p> <p>19 A It could. Again, the question is the</p> <p>20 benefits compared to what, right? We're starting</p> <p>21 here with Figure 33 as a baseline. So I'm not sure</p> <p>22 what you want me to compare that to.</p> | <p>155</p> <p>1 a common usage of the term. Because if you need both</p> <p>2 kinds of transistors to be present, then you need a</p> <p>3 CMOS process.</p> <p>4 Q Yes. So that's what I'm trying to ferret</p> <p>5 out. Is there a difference in your understanding</p> <p>6 between a CMOS process and a CMOS circuit</p> <p>7 architecture?</p> <p>8 A You know, in certain context, I guess</p> <p>9 there could be, but in my normal usage, there --</p> <p>10 there wouldn't be any meaningful distinction.</p> <p>11 Q And you mentioned that NMOS transistors</p> <p>12 can be made smaller than PMOS transistors in a pixel</p> <p>13 cell circuit, correct?</p> <p>14 A In some cases.</p> <p>15 Q Are there other cases where the PMOS</p> <p>16 transistor can be made the same size as the NMOS</p> <p>17 transistor in a pixel cell circuit?</p> <p>18 A There could be, depending on -- on</p> <p>19 exactly how that transistor is being used. It's a</p> <p>20 case by case analysis.</p> <p>21 Q How about in -- well, strike that.</p> <p>22 So apart from the size benefit you</p> |
| <p>154</p> <p>1 Q Well, I think we can compare it to Figure</p> <p>2 33, right? Would you agree that Figure 33 in Kimura</p> <p>3 has a PMOS transistor in it?</p> <p>4 A Yes.</p> <p>5 Q Okay. And how does the presence of that</p> <p>6 PMOS transistor allow the NMOS transistors in the</p> <p>7 pixel cell circuit of Figure 33 to be any smaller</p> <p>8 than they would if an NMOS transistor was used for</p> <p>9 the driving transistor?</p> <p>10 A I'm not sure it does. Figure 33 is a</p> <p>11 COMS design. It is designed around a mixture of NMOS</p> <p>12 and PMOS transistors. It does what's disclosed.</p> <p>13 Q What do you mean by a CMOS design?</p> <p>14 A No, a CMOS design.</p> <p>15 Q What do you mean by a CMOS design?</p> <p>16 A One that includes both PMOS and NMOS</p> <p>17 devices.</p> <p>18 Q Regardless of how they are configured?</p> <p>19 A I think that's -- in general, that's</p> <p>20 right, regardless of how they are configured.</p> <p>21 Because you would need a CMOS process. That may not</p> <p>22 strictly match all the literature, but that's kind of</p>                                                                                                                              | <p>156</p> <p>1 mentioned, what other benefits, if any, are there of</p> <p>2 using an NMOS transistor in a pixel cell circuit</p> <p>3 instead of a PMOS transistor?</p> <p>4 A I'm still not sure. What circuit are we</p> <p>5 talking about?</p> <p>6 Q Any pixel cell circuit?</p> <p>7 A Well, I don't think I can generalize to</p> <p>8 any pixel cell circuit. I would have to look at a</p> <p>9 particular transistor in a particular pixel cell</p> <p>10 circuit that was already PMOS to understand the</p> <p>11 impact of substituting an NMOS for it.</p> <p>12 Q Well, before we turn to the circuit</p> <p>13 schematics, let me ask you one more question about</p> <p>14 Figure 14D here.</p> <p>15 Do you see in Figure 14D, in the pixel</p> <p>16 portion, there are two types of transistors that are</p> <p>17 labeled?</p> <p>18 A Yeah. Let me look a little more closely</p> <p>19 here. Yes.</p> <p>20 Q And what are those two types of</p> <p>21 transistors?</p> <p>22 A An N-type, which is what we would</p>                                                          |

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| <p style="text-align: right;">157</p> <p>1 normally refer to as an NMOS, and a P-type, which we</p> <p>2 would typically call a PMOS.</p> <p>3 Q Yeah. Sorry. Let me direct your</p> <p>4 attention to the pixel portion of the figure on the</p> <p>5 right-hand side.</p> <p>6 A Oh, you're asking about the switching TFT</p> <p>7 and the driving TFT?</p> <p>8 Q Yes. So in the pixel portion, Kimura</p> <p>9 identifies two types of TFTs, correct?</p> <p>10 A I don't know if they are two types, but</p> <p>11 they have two different names.</p> <p>12 Q Okay. Two names. We'll go with that.</p> <p>13 Kimura identifies two names of TFTs in</p> <p>14 the pixel portion of Figure 14D, correct?</p> <p>15 A Yeah, and based on the cross-hatching,</p> <p>16 one of them appears to be N-type and one of them</p> <p>17 appears to be P-type.</p> <p>18 Q And what are the names, though, of these</p> <p>19 types of transistors?</p> <p>20 A In this Figure, one's called the</p> <p>21 switching TFT and one's called the driving TFT.</p> <p>22 Q And what's your understanding of what a</p>      | <p style="text-align: right;">159</p> <p>1 that it drives something, but there are lots of</p> <p>2 things to drive.</p> <p>3 So I'd refer -- I'd rely on the text to</p> <p>4 tell me specifically what's being intended here.</p> <p>5 Q Well, I'll suggest that you can search on</p> <p>6 driver TFT, as well, and you'll get numerous hits in</p> <p>7 Kimura, and if that helps you, great, and we can talk</p> <p>8 about whether there's a difference between a driver</p> <p>9 TFT and a driving TFT, but I'll give you a moment to</p> <p>10 just look for that -- that term, and then I'll ask</p> <p>11 the same question again, or drive TFT, any of them:</p> <p>12 Drive, driver, driving, and you discuss it in your</p> <p>13 declaration, as well, and say they mean the same</p> <p>14 thing. So I'm surprised that you don't -- you don't</p> <p>15 know.</p> <p>16 A So he uses the term driver TFT to refer</p> <p>17 to the pixel driver, the EL driver.</p> <p>18 Q Okay. And in Figure 14D, the other label</p> <p>19 applied to the transistors in the pixel portion is a</p> <p>20 switching TFT, correct?</p> <p>21 A Yes.</p> <p>22 Q Do you have an understanding of what a</p> |
| <p style="text-align: right;">158</p> <p>1 driving TFT is?</p> <p>2 A It would depend on context. I'm not</p> <p>3 quite sure right now what that corresponds to in the</p> <p>4 other diagrams.</p> <p>5 Q Well, in the context of pixel circuit in</p> <p>6 Kimura, do you understand what a driving TFT is?</p> <p>7 A I don't recall his use of that term</p> <p>8 offhand. Is there a place where it's described in</p> <p>9 the spec?</p> <p>10 Q I think it's described in numerous places</p> <p>11 throughout the spec, and it's something I would</p> <p>12 expect a POSITA to be familiar with.</p> <p>13 Do you know what a driving TFT is,</p> <p>14 Dr. Wolfe?</p> <p>15 A Well, it could be lots of things, but</p> <p>16 it's context dependent, right. So -- I mean, when I</p> <p>17 search, it only pops up in this figure. So I'd have</p> <p>18 to look at it in context.</p> <p>19 Q Well, in the context of this figure, do</p> <p>20 you understand what a driving TFT is?</p> <p>21 A In the context of this figure, not off</p> <p>22 the top of my head. Clearly there's a suggestion</p> | <p style="text-align: right;">160</p> <p>1 switches TFT is?</p> <p>2 A Well, again, that could be a very broad</p> <p>3 term that would be context dependent, but if we look,</p> <p>4 for example, at Figure 20, it's TFT 2003.</p> <p>5 Q Yes. So that's an example of a -- of a</p> <p>6 switching TFT, correct, in Figure 20?</p> <p>7 A Yeah, as used in this patent.</p> <p>8 Q Do you have a more general understanding</p> <p>9 in the context of pixel circuits what a switching TFT</p> <p>10 is?</p> <p>11 A Generally, it would be one that's either</p> <p>12 100 percent on or 100 percent off, and its detailed</p> <p>13 voltages don't matter.</p> <p>14 Q Are you referring to like -- like a</p> <p>15 binary state on/off; is that correct?</p> <p>16 A Yes, but more than that. It's that --</p> <p>17 the exact voltages of the on and off, as long as they</p> <p>18 are within a broad range, don't matter.</p> <p>19 Q Okay. And does that stand in contrast to</p> <p>20 the driving TFT?</p> <p>21 A Yes. Usually the driving TFT is more of</p> <p>22 an analog amplifier that's supposed to have various</p>                                                                     |

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| <p>161</p> <p>1 <b>current levels.</b></p> <p>2 Q Okay. And I think you mentioned earlier,</p> <p>3 when we were looking at Figure 14D, that, in the</p> <p>4 pixel portion with the switching TFT label, the</p> <p>5 cross-hatching indicated there was both an NMOS and a</p> <p>6 PMOS TFT; is that right?</p> <p>7 A <b>No. What I'm seeing -- I'm sorry. Ask</b></p> <p>8 <b>the question again.</b></p> <p>9 Q Well, I mean, I can just ask a -- maybe a</p> <p>10 clean question. Can you tell looking at the</p> <p>11 cross-hatching in the pixel portion with the</p> <p>12 switching TFTs what type of TFTs are illustrated?</p> <p>13 A <b>Those appear to be NMOS.</b></p> <p>14 Q Both of them?</p> <p>15 A <b>Yes.</b></p> <p>16 Q Okay.</p> <p>17 A <b>And, again, this is a cross slice. So</b></p> <p>18 <b>it's not necessarily going to show you all the TFTs</b></p> <p>19 <b>in the cell.</b></p> <p>20 Q Let's turn to Kimura Figure 33. Well,</p> <p>21 let me -- let me ask this first: We talked a little</p> <p>22 bit about how Kimura discloses a manufacturing</p>                                               | <p>163</p> <p>1 A <b>I think Figure 22 was prior art. Not for</b></p> <p>2 <b>his process.</b></p> <p>3 Q Could the pixel cell circuit in Figure 22</p> <p>4 be made using the manufacturing process disclosed in</p> <p>5 Kimura?</p> <p>6 A <b>I don't know. I haven't analyzed it.</b></p> <p>7 Q In your declaration, you include some</p> <p>8 discussion of something called mobility, correct?</p> <p>9 A <b>Yes.</b></p> <p>10 Q What does mobility refer to?</p> <p>11 A <b>So it's the ability of -- or it's a</b></p> <p>12 <b>quantitative measure of the ability of charge</b></p> <p>13 <b>carriers to flow through a semiconductor material,</b></p> <p>14 <b>but it's basically somewhat equivalent in this case</b></p> <p>15 <b>to the resistance, the amount of electricity that can</b></p> <p>16 <b>flow through a given geometry.</b></p> <p>17 Q And why did you discuss the concept of</p> <p>18 mobility in your declaration?</p> <p>19 A <b>Because, again, the whole point of this</b></p> <p>20 <b>whole section is that Dr. Foty has been both</b></p> <p>21 <b>conclusory about using an all-PMOS design based on</b></p> <p>22 <b>some oversimplifications and also has ignored</b></p>                                   |
| <p>162</p> <p>1 process in which the control circuitry and the pixel</p> <p>2 cell circuits can be made in the same fabrication</p> <p>3 process, correct?</p> <p>4 A <b>Yeah, and even more than that. I mean,</b></p> <p>5 <b>he essentially says that's the purpose of his design.</b></p> <p>6 Q Was that the sole purpose of -- well,</p> <p>7 strike that.</p> <p>8 You would agree with me that Kimura also</p> <p>9 discloses many pixel cell circuit designs in the</p> <p>10 specification, correct?</p> <p>11 A <b>Yes. That are manufacturable in his</b></p> <p>12 <b>manufacturing process.</b></p> <p>13 Q And that includes a number of designs</p> <p>14 that are -- have a single species of the transistor</p> <p>15 in the pixel cell circuit, correct?</p> <p>16 A <b>He does describe some NMOS-based pixel</b></p> <p>17 <b>cells that he would use together with his CMOS</b></p> <p>18 <b>drivers on the same substrate.</b></p> <p>19 Q And Kimura also included a pixel cell</p> <p>20 circuit that was all-PMOS in the Pixel cell, correct?</p> <p>21 A <b>Are you referring to Figure 22?</b></p> <p>22 Q Yes.</p> | <p>164</p> <p>1 <b>critical factors in Kimura, and one of the reasons</b></p> <p>2 <b>why you cannot just substitute arbitrarily any</b></p> <p>3 <b>transistor in Kimura's Figure 33A with a PMOS</b></p> <p>4 <b>transistor is because it would change the mobility,</b></p> <p>5 <b>and that could change the behavior of the circuit in</b></p> <p>6 <b>numerous ways, including changing the amount of</b></p> <p>7 <b>brightness that you can get from the OLED display.</b></p> <p>8 Q Does the '599 patent discuss mobility?</p> <p>9 A <b>Not that I can recall.</b></p> <p>10 Q And I think in your declaration you</p> <p>11 render an opinion regarding the relative mobility of</p> <p>12 NMOS versus PMOS transistors, correct?</p> <p>13 A <b>Yes. In general, NMOS transistors have a</b></p> <p>14 <b>higher mobility for a given geometry.</b></p> <p>15 Q What is the relationship between mobility</p> <p>16 and brightness?</p> <p>17 A <b>All else being equal, higher mobility</b></p> <p>18 <b>could mean higher brightness.</b></p> <p>19 Q You said it could mean higher brightness.</p> <p>20 Does it always mean higher brightness?</p> <p>21 A <b>No, there's a possibility that you're</b></p> <p>22 <b>maxed out.</b></p> |

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| <p>165</p> <p>1 Q And you mentioned that mobility was a</p> <p>2 quantitative measure of the ability of the carriers</p> <p>3 to flow; is that right?</p> <p>4 A Yes.</p> <p>5 Q In 2003, what was the quantitative</p> <p>6 mobility of electrons in an NMOS TFT?</p> <p>7 A Oh, I don't know. That would have</p> <p>8 depended on the manufacturing process, and I -- I</p> <p>9 don't have that number right in front of me, but</p> <p>10 consistently through my career, it's always been</p> <p>11 substantially better for NMOS than it has been for</p> <p>12 PMOS.</p> <p>13 Q And are you referring to a particular</p> <p>14 manufacturing process when you say that?</p> <p>15 A All the ones I'm familiar with.</p> <p>16 Q So let's talk about polysilicon. All</p> <p>17 right. So I think we mentioned that term earlier,</p> <p>18 and we said that was a material that could be used in</p> <p>19 2003 to manufacture displays; is that right?</p> <p>20 A Yeah. More specifically, at that time,</p> <p>21 probably amorphous polysilicon.</p> <p>22 Q So we'll maybe talk about each of those,</p> | <p>167</p> <p>1 polysilicon, which, I think, is the material you said</p> <p>2 that would have been more likely to be used in the</p> <p>3 2003 time frame for a display --</p> <p>4 A Yes.</p> <p>5 Q -- is that correct?</p> <p>6 A Generally.</p> <p>7 Q Okay. Do you know -- strike that.</p> <p>8 What are the quantitative values of</p> <p>9 the carrier mobility in amorphous silicon for NMOS</p> <p>10 and PMOS transistors in 2003?</p> <p>11 A Again, it would have varied from</p> <p>12 manufacturer to manufacturer, but I don't have any</p> <p>13 exemplary numbers at hand.</p> <p>14 Q And I think I said amorphous silicon, and</p> <p>15 I want to make sure I've got the term right. Is it</p> <p>16 amorphous silicon or amorphous polysilicon that you</p> <p>17 were referring to?</p> <p>18 A Amorphous polysilicon.</p> <p>19 Q Okay. So I'll just ask the question</p> <p>20 again with -- with respect to amorphous polysilicon,</p> <p>21 did you provide any quantitative values for the</p> <p>22 carrier mobility of PMOS and NMOS transistors in the</p> |
| <p>166</p> <p>1 and I'll just start with maybe polysilicon first.</p> <p>2 In the 2003 time frame, what was the</p> <p>3 relative difference in mobility between an NMOS and</p> <p>4 PMOS transistor in polysilicon?</p> <p>5 A It would have varied between</p> <p>6 manufacturers, and I don't have the exact data in</p> <p>7 front of me, but, you know, typical rule of thumb</p> <p>8 would have been two to three X.</p> <p>9 Q And that's with the NMOS transistor</p> <p>10 having a higher relative mobility than a PMOS</p> <p>11 transistor?</p> <p>12 A Yes.</p> <p>13 Q Do you cite anything in your declaration</p> <p>14 that confirms that?</p> <p>15 A I didn't cite anything extrinsic because</p> <p>16 Dr. Foty agreed with it in his deposition prior to me</p> <p>17 writing my declaration.</p> <p>18 Q Do you know what material Dr. Foty was</p> <p>19 testifying about when he said there was a relative</p> <p>20 difference?</p> <p>21 A I don't recall the exact context, no.</p> <p>22 Q Okay. So let's turn to amorphous</p>                                                           | <p>168</p> <p>1 2003 time frame?</p> <p>2 A Same answer.</p> <p>3 Q Okay. Did you have an opinion as to what</p> <p>4 the relative carrier mobility between NMOS and PMOS</p> <p>5 transistors in amorphous polysilicon was in the 2003</p> <p>6 time frame?</p> <p>7 A No. Like I said, it would have been --</p> <p>8 it would have varied from manufacturer to</p> <p>9 manufacturer. My whole point in the declaration is</p> <p>10 that you can't simply substitute them without</p> <p>11 performing that analysis. Not for every transistor.</p> <p>12 Q Do you know whether PMOS and NMOS</p> <p>13 transistors in amorphous polysilicon had different</p> <p>14 mobilities in 2003?</p> <p>15 A In my experience, they always have.</p> <p>16 Q Do you know one way or the other what the</p> <p>17 relative difference was between NMOS and PMOS</p> <p>18 mobilities in amorphous polysilicon in 2003?</p> <p>19 A From my recollection, NMOS always had</p> <p>20 better mobility.</p> <p>21 Q By approximately how much?</p> <p>22 A Again, it would have varied from</p>     |

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| 169 | <p>1 manufacturing process to manufacturing process, but</p> <p>2 it has to be considered before you do a substitution,</p> <p>3 particularly with the -- with respect to things like</p> <p>4 the drive transistor.</p> <p>5 Q Do you know what the difference in</p> <p>6 mobilities for an NMOS transistor would be between</p> <p>7 amorphous silicon and amorphous polysilicon in 2003?</p> <p>8 A I'm not familiar with the use of</p> <p>9 amorphous silicon in displays at that time.</p> <p>10 Q But whatever the mobility of -- strike</p> <p>11 that.</p> <p>12 Regardless of what the quantitative value</p> <p>13 of the NMOS mobility in amorphous silicon was in</p> <p>14 2003, would you agree that it was sufficient for</p> <p>15 purposes of making an Active Matrix Display?</p> <p>16 MR. GARR: Objection.</p> <p>17 THE WITNESS: Certainly, for some</p> <p>18 kinds of Active Matrix Displays, that</p> <p>19 would have been the case.</p> <p>20 BY MR. JENSEN:</p> <p>21 Q Do you know what the relative difference</p> <p>22 between the NMOS mobility in polysilicon and the PMOS</p> | 171 | <p>1 Q Okay. What do you mean by amorphous</p> <p>2 silicon in your declaration?</p> <p>3 A That would be a thin film deposited</p> <p>4 silicon.</p> <p>5 Q And could that be used to manufacture the</p> <p>6 TFTs for an Active Matrix Display?</p> <p>7 A I think it -- I think it can.</p> <p>8 Q And can polysilicon be used to</p> <p>9 manufacture the TFTs in an Active Matrix Display?</p> <p>10 A Well, amorphous silicon can. I meant the</p> <p>11 adjective to apply to both.</p> <p>12 Q I see. Okay. Do you know if polysilicon</p> <p>13 can be used to manufacture TFTs for an Active Matrix</p> <p>14 Display?</p> <p>15 A Yeah. There's another form, I think,</p> <p>16 called polycrystalline polysilicon that is sometimes</p> <p>17 used.</p> <p>18 Q And let's maybe go to Kimura Paragraph</p> <p>19 357. I'll zoom in on that, because it's kind of</p> <p>20 small, and Paragraph 357 in Kimura refers to both</p> <p>21 polycrystalline silicon, which he calls polysilicon,</p> <p>22 and another type of material called amorphous</p> |
| 170 | <p>1 mobility -- strike that. Let me try the question</p> <p>2 again.</p> <p>3 In 2003, what was the relative difference</p> <p>4 in the NMOS mobility of amorphous polysilicon and</p> <p>5 PMOS mobility in polysilicon?</p> <p>6 A I'm not sure what you mean by just</p> <p>7 polysilicon.</p> <p>8 Q Do you know what polysilicon is?</p> <p>9 A Yes.</p> <p>10 Q Okay. What's your understanding of</p> <p>11 polysilicon?</p> <p>12 A Well, when we just use it that way, we're</p> <p>13 typically talking about the polysilicon that was used</p> <p>14 in certain silicon chip processes. Not in displays.</p> <p>15 Q Okay. So let's -- let's maybe go into</p> <p>16 your declaration here so we can make sure we're on</p> <p>17 the same page. Can you read the highlighted portion</p> <p>18 of Paragraph 34 of your declaration a loud, please.</p> <p>19 A Sure. A transistor controls a flow of</p> <p>20 current. Transistors can be made from different</p> <p>21 materials, for example, amorphous silicon and</p> <p>22 polysilicon, and can have different polarities.</p>                 | 172 | <p>1 silicon, correct?</p> <p>2 A Yes.</p> <p>3 Q In 2003, do you know what the difference</p> <p>4 was between the mobility of an NMOS transistor made</p> <p>5 using amorphous silicon was relative to the PMOS</p> <p>6 mobility of a polysilicon TFT?</p> <p>7 A No. Again, there would have been</p> <p>8 variations based on the manufacturing processes.</p> <p>9 Q So you don't know one way or the other if</p> <p>10 the PMOS would have had higher mobility or a lower</p> <p>11 mobility than the NMOS transistor?</p> <p>12 A Not if they are made of different</p> <p>13 materials and different processes. You'd have to --</p> <p>14 you'd have to gather the data before you made a</p> <p>15 decision as to whether or not each one was suitable.</p> <p>16 Q All right. Let's turn to Paragraph 63 in</p> <p>17 your declaration, and let me know when you're able to</p> <p>18 see that.</p> <p>19 A Yep.</p> <p>20 Q And in this paragraph, you discuss the</p> <p>21 leakage current, correct?</p> <p>22 A Correct.</p>                         |

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| <p>173</p> <p>1 Q And you say that NMOS transistors had a</p> <p>2 lower leakage current than PMOS transistors, correct?</p> <p>3 A In general, yes.</p> <p>4 Q Do NMOS transistors have any leakage</p> <p>5 current?</p> <p>6 A All transistors have leakage current.</p> <p>7 Q And that would include had NMOS</p> <p>8 transistors?</p> <p>9 A Yes.</p> <p>10 Q And in the context of Kimura Figure 33 --</p> <p>11 well, let me -- I'll just strike that and ask the</p> <p>12 question this way: Why, in your opinion, is leakage</p> <p>13 current relative -- relevant to whether or not a</p> <p>14 POSITA would be able to change an NMOS transistor to</p> <p>15 a PMOS transistor in Kimura Figures 33 and 36?</p> <p>16 A A charge is being held on a capacitor,</p> <p>17 and we don't want that charge to leak off of that</p> <p>18 capacitor any faster than it was designed to. So, in</p> <p>19 making a substitution, we would have to analyze the</p> <p>20 leakage currents.</p> <p>21 Q Would you agree any leakage current could</p> <p>22 alter the stored brightness level?</p> | <p>175</p> <p>1 circuit in Figures 33 and 36 of Kimura?</p> <p>2 MR. GARR: Objection.</p> <p>3 THE WITNESS: As designed in Kimura</p> <p>4 and as designed in the '599, they are</p> <p>5 both represented as having low enough</p> <p>6 leakage to work. If you made</p> <p>7 modifications, you would need to go back</p> <p>8 and reanalyze them.</p> <p>9 BY MR. JENSEN:</p> <p>10 Q What is a capacitor?</p> <p>11 A What is a capacitor? A capacitor is an</p> <p>12 electronic component that can store charge.</p> <p>13 Q And is that what the capacitor in Figure</p> <p>14 3 in Kimura is used to do?</p> <p>15 A Yes.</p> <p>16 MR. GARR: Objection.</p> <p>17 BY MR. JENSEN:</p> <p>18 Q And is the capacitor -- is the</p> <p>19 capacitor --</p> <p>20 A Oh, I'm sorry. It's Figure 3 of the '599</p> <p>21 patent that I assumed we were talking about.</p> <p>22 Q Yeah, I'll -- let me just re-ask the</p>                                                                                                                                            |
| <p>174</p> <p>1 A Could, but not necessarily in a</p> <p>2 perceptible manner. The idea is to design something</p> <p>3 so that the impact of the leakage is imperceptible.</p> <p>4 Q The pixel circuit shown in Figure 3 of</p> <p>5 the '599 patent is an all-PMOS pixel circuit,</p> <p>6 correct?</p> <p>7 A It is.</p> <p>8 Q Does the '599 patent discuss leakage</p> <p>9 current?</p> <p>10 A Not that I recall.</p> <p>11 Q What, if anything, is it about Figure 3</p> <p>12 that addresses the leakage current problem you</p> <p>13 identify in your declaration?</p> <p>14 A The leakage current problem that I</p> <p>15 identify in my declaration is that one needs to</p> <p>16 understand the leakage current of a particular</p> <p>17 manufacturing process before one changes from one</p> <p>18 transistor to another. That doesn't occur just by</p> <p>19 locking at Figure 3.</p> <p>20 Q Do you have an opinion whether issues</p> <p>21 related to leakage current would be any different in</p> <p>22 Figure 3 of the '599 patent relative to the pixel</p>                   | <p>176</p> <p>1 question because I might have goofed.</p> <p>2 Is the capacitor C31 in Figure 3 of the</p> <p>3 '599 patent used for the purpose that you described?</p> <p>4 A Yes, it is used to store charge.</p> <p>5 Q Is the capacitor 3311 in Kimura Figure</p> <p>6 33A used for the purpose you described?</p> <p>7 A That capacitor is also used to store</p> <p>8 charge.</p> <p>9 Q Is the capacitor in -- strike that.</p> <p>10 Is the capacitor 3613 in Kimura Figure</p> <p>11 36A used for the purpose you described?</p> <p>12 A 3613 is also used to store charge.</p> <p>13 Q Does either Kimura or the '599 patent</p> <p>14 provide any quantitative description of the size of</p> <p>15 their respective capacitors?</p> <p>16 A No.</p> <p>17 Q Do you have an understanding in the 2003</p> <p>18 time frame what size ranges of capacitors were used</p> <p>19 in Active Matrix Displays?</p> <p>20 A Not particularly.</p> <p>21 Q In Figure 3 of the '599 patent, how long</p> <p>22 does the capacitor C31 need to hold a charge for?</p> |

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| <p>177</p> <p>1 <b>A During the emitting period?</b></p> <p>2 Q In Figure 33A of Kimura, how long does</p> <p>3 the capacitor 3311 need to hold a charge for?</p> <p>4 <b>A During the time that it goes through</b></p> <p>5 <b>whatever is described in Figures 33D and 33E.</b></p> <p>6 Q In Kimura Figure 36, how long does the</p> <p>7 capacitor at 3613 need to hold a charge for?</p> <p>8 <b>A During the time that it's in the states</b></p> <p>9 <b>illustrated in 35D and 35E.</b></p> <p>10 Q I think you said 35. Did you mean 36?</p> <p>11 <b>A I'm looking at 35. Sorry. Thirty --</b></p> <p>12 Q I'll just ask the question again so we</p> <p>13 have it clean.</p> <p>14 In Figure 36 of Kimura, how long does the</p> <p>15 capacitor 3613 need to hold a charge for?</p> <p>16 <b>A During the time when it's performing the</b></p> <p>17 <b>operations illustrated in 36D and 36E.</b></p> <p>18 Q In Kimura -- strike that.</p> <p>19 In Figure 3 of the '599 patent, why does</p> <p>20 the capacitor only need to hold a charge during the</p> <p>21 emitting period?</p> <p>22 <b>A Because that's the only time when there's</b></p>                                                                                                         | <p>179</p> <p>1 What happens to the charge on capacitor</p> <p>2 C31 in Figure 3 of the '599 patent during the</p> <p>3 initialization period?</p> <p>4 <b>A The voltage across the terminals of C31</b></p> <p>5 <b>is determined by -- by the charge on that capacitor</b></p> <p>6 <b>to be at or near a predetermined level.</b></p> <p>7 Q And in Figure 3, is that predetermined</p> <p>8 level level B in it?</p> <p>9 <b>A The way I stated it, no.</b></p> <p>10 Q Would it be one threshold voltage</p> <p>11 different than B in it?</p> <p>12 <b>A No.</b></p> <p>13 Q What would it be?</p> <p>14 <b>A It would be approximately VDD minus</b></p> <p>15 <b>Vinit.</b></p> <p>16 Q I see. So you're saying the voltage</p> <p>17 across the two terminal of the capacitor?</p> <p>18 <b>A Right. That's what I had previously</b></p> <p>19 <b>said.</b></p> <p>20 Q Okay. Thank you.</p> <p>21 Is it your understanding that, during the</p> <p>22 initialization phase, depending on what the Vinit</p>                                                                                         |
| <p>178</p> <p>1 <b>a visible response to the voltage across the</b></p> <p>2 <b>capacitor.</b></p> <p>3 Q In Kimura Figure 33, why does -- why does</p> <p>4 the capacitor not need to hold a charge after the</p> <p>5 operations in Figure 33D and E are completed?</p> <p>6 <b>A I believe that -- I believe that's the</b></p> <p>7 <b>visible -- visibility period, as well, or the time</b></p> <p>8 <b>between the capacitor charge and the visibility</b></p> <p>9 <b>period.</b></p> <p>10 Q In Kimura Figure 36, why does the</p> <p>11 capacitor 3613 not need to hold a charge after the</p> <p>12 operations in Figure 36D and E are completed?</p> <p>13 <b>A I believe that there's no longer visible</b></p> <p>14 <b>display after that time until after the next</b></p> <p>15 <b>capacitor charging phase. 33 there act- -- yeah, 33</b></p> <p>16 <b>there actually can be some additional visibility, but</b></p> <p>17 <b>I guess it happens whether or not the capacitor holds</b></p> <p>18 <b>its discharge.</b></p> <p>19 Q Okay. And if we go back to Figure 3 of</p> <p>20 the '599 patent, what happens during the</p> <p>21 initialization period so that a charge -- strike</p> <p>22 that. Let me ask the question -- a better question.</p> | <p>180</p> <p>1 voltage is, that the charge on the capacitor C31</p> <p>2 could either be increased or decreased?</p> <p>3 <b>A As compared to what?</b></p> <p>4 Q As compared to what was on that node</p> <p>5 during the emitting period?</p> <p>6 <b>A I don't -- again, it would depend on the</b></p> <p>7 <b>design and on the selection of values, but</b></p> <p>8 <b>conceptually, it could, within the scope of the</b></p> <p>9 <b>design.</b></p> <p>10 Q And that would depend, at least in part,</p> <p>11 on what the Vinit voltage was selected to be?</p> <p>12 <b>A In part.</b></p> <p>13 Q Let's look at your declaration. In</p> <p>14 Paragraph -- starting in Paragraph 97. Let me know</p> <p>15 when you're able to see that.</p> <p>16 <b>A Yes.</b></p> <p>17 Q And there's a heading above that stating</p> <p>18 Kimura Does Not Teach or Suggest that the "Current</p> <p>19 Light-Emitting Signal" Controls the Fourth and fifth</p> <p>20 Transistors for Certain Claims or Fifth and Sixth</p> <p>21 Transistors for other claims, correct?</p> <p>22 <b>A Correct.</b></p> |

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| 181 | 1 Q And this section of your report spans<br>2 from Paragraph 97 to Paragraph 107, correct?<br>3 A Yes.<br>4 Q Okay. And I notice here that you<br>5 identify specific claims, 13 to 18, and 1 through 6,<br>6 correct?<br>7 A Yes.<br>8 Q Will you agree with me that the other<br>9 claims, which are not listed -- in particular, Claims<br>10 7 to 12 -- have no requirement for a shared<br>11 light-emitting signal?<br>12 A Certainly not -- well, they don't require<br>13 this specific one.<br>14 Q Did they require any shared<br>15 light-emitting signal?<br>16 A I didn't really consider that.<br>17 Q But you didn't render an opinion in your<br>18 report with respect to the light-emitting signal<br>19 limitation for Claims 7 to 12, did you?<br>20 A Correct.<br>21 Q Okay. Let me jump back to the '599<br>22 patent for one more question, and I want to direct     | 183 | 1 period for that particular row.<br>2 Q And that's when the next image would be<br>3 refreshed in a display?<br>4 A Yes, with respect to that scan line.<br>5 Again, each scan line's a little bit offset in time<br>6 from each other.<br>7 Q And the general idea is that the cycle<br>8 would progress at one row at a time until it has<br>9 cycled through all of the rows, and then it would<br>10 start over again with the first row?<br>11 A That's the general idea. Although,<br>12 sometimes people do all the odd rows and then go back<br>13 and do all of the even rows.<br>14 Q Okay. And if we look at Kimura Figure<br>15 33, there are four operations shown in Figures 33B,<br>16 C, D and E, correct?<br>17 A Yes.<br>18 Q Okay. Is it your understanding that,<br>19 after the operation shown in 33E, that it would cycle<br>20 back around and begin Figure 33B?<br>21 A I believe that's correct.<br>22 Q Is the same true -- is your answer the |
| 182 | 1 your attention to Figure 4.<br>2 Figure 4 is a timing diagram, correct?<br>3 A An exemplary one, yes.<br>4 Q I didn't hear that. Sorry.<br>5 A An exemplary timing diagram.<br>6 Q Okay. Yes, an exemplary one, and the<br>7 timing diagram in Figure 4 identifies three periods,<br>8 correct?<br>9 A Yes.<br>10 Q Okay. What happens at the end of the<br>11 emitting period?<br>12 A You would repeat the process for another<br>13 line.<br>14 Q And when you say line, are you referring<br>15 to the -- like the rows in a display?<br>16 A Yeah. Of course, you can always rotate<br>17 it. So they can be the rows or the column, but, yes,<br>18 the -- what you might call the row.<br>19 Q And for a given row, does this same<br>20 three-cycle operation repeat?<br>21 A So the emitting period goes on for quite<br>22 a while, and it goes on until the next initialization | 184 | 1 same for Kimura Figure 36?<br>2 A Yes. I think it goes through from 36B to<br>3 36E and then back again.<br>4 Q So let's look at Claim 13. That's the<br>5 first claim that you reference in the heading above<br>6 Paragraph 97, correct?<br>7 A Yes.<br>8 Q So let's look at Claim 13 in the patent.<br>9 Is it your understanding that Claim 13 requires two<br>10 particular transistors to share a common<br>11 light-emitting signal?<br>12 A Yes. The gate of the fourth transistor<br>13 and the gate of the fifth transistor need to be<br>14 connected to the same current light-emitting signal.<br>15 Q And if we look at Kimura Figure 33, I had<br>16 labeled transistor 3307 with the identifier four and<br>17 transistor 3310 with the identifier five.<br>18 Do you see that?<br>19 A I see those annotations.<br>20 Q Would you agree with me that, in Figure<br>21 33, figure -- or transistors 3307 and 3310 do not<br>22 share a common signal?    |

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| <p>185</p> <p>1     <b>A   Correct. Moreover, they cannot.</b></p> <p>2     Q   And is that because, in Figure 33B, those</p> <p>3   two transistors are shown as having different</p> <p>4   operational states with transistor 3307 being off,</p> <p>5   while transistor 3310 has to be on?</p> <p>6     <b>A   Yes.</b></p> <p>7     Q   In Figure 33C, you would agree that both</p> <p>8   transistor 3307 and 3310 are off, correct?</p> <p>9     <b>A   They are.</b></p> <p>10    Q   And would you agree with me that, in</p> <p>11   Figure 33D, transistors 3307 and 3310 are both off?</p> <p>12   <b>A   They are.</b></p> <p>13    Q   Would you agree with me that, in Figure</p> <p>14   33E, transistors 3307 and 3310 are both on?</p> <p>15   <b>A   They are.</b></p> <p>16    Q   Is there anything about Figures 33C, D,</p> <p>17   or E that would preclude the use of a shared</p> <p>18   light-emitting signal for those two transistors?</p> <p>19       MR. GARR: Objection.</p> <p>20       THE WITNESS: Yes. They are part</p> <p>21   of a process that include the step of</p> <p>22   33B, as well.</p> | <p>187</p> <p>1     <b>A   I don't know if I would phrase it that</b></p> <p>2   <b>way. The teachings of Kimura are that they are</b></p> <p>3   <b>separately controlled and separately timed. 33B</b></p> <p>4   <b>illustrates that, but it is the nature of the design.</b></p> <p>5     Q   You would agree, at least, though, that</p> <p>6   Figures 33C, D and E do not themselves depict that</p> <p>7   transistors 3307 and 3310 are separately controlled</p> <p>8   or timed, correct?</p> <p>9     <b>A   They do. They just illustrate a portion</b></p> <p>10   <b>of the process in which the separate controls have</b></p> <p>11   <b>the same value.</b></p> <p>12    Q   All right. I'm not sure I understood</p> <p>13   that. Maybe -- can you try to explain that again?</p> <p>14   <b>A   There are two different wires coming in</b></p> <p>15   <b>controlling them separately, which -- that turn them</b></p> <p>16   <b>on and off at different times. We're just looking at</b></p> <p>17   <b>a -- if we only look at 33C, D and E, we're just</b></p> <p>18   <b>looking at a portion of the process where we happen</b></p> <p>19   <b>to see -- if we've got two things, they can either be</b></p> <p>20   <b>the same or different. If we ignore the times</b></p> <p>21   <b>they're different, then the other times they will be</b></p> <p>22   <b>the same, but that's a very myopic view of what's</b></p> |
| <p>186</p> <p>1       So the way it's taught in Kimura</p> <p>2   you need all four steps to have an</p> <p>3   operable device.</p> <p>4   BY MR. JENSEN:</p> <p>5     Q   Yeah. I'm asking you a hypothetical</p> <p>6   question here. So assume Figure 33B is out of the</p> <p>7   picture. Is there anything about Figure 33C, D or E</p> <p>8   by themselves that would prohibit the use of a shared</p> <p>9   light-emitting signal for transistors 3307 and 3310?</p> <p>10       MR. GARR: Objection.</p> <p>11       THE WITNESS: So hypothetically, if</p> <p>12   you did not build what Kimura actually</p> <p>13   teaches, you could go through phases 33</p> <p>14   C, D and E with the -- both 3307 and</p> <p>15   3310's gates tied together, but you</p> <p>16   wouldn't get the same behavior as Kimura</p> <p>17   actually teaches.</p> <p>18   BY MR. JENSEN:</p> <p>19     Q   And it's really 33B that's the main</p> <p>20   problem in Figure 33 as to why you couldn't use a</p> <p>21   shared light-emitting signal for transistor 3307 and</p> <p>22   3310, correct?</p>                              | <p>188</p> <p>1   <b>going on.</b></p> <p>2     Q   Well, and that's my point exactly. In</p> <p>3   Figure 33, the only time they are shown being</p> <p>4   different is in Figure 33B, correct?</p> <p>5     <b>A   Yes. But that is a portion of the signal</b></p> <p>6   <b>that is throughout -- that is on those wires. So --</b></p> <p>7     Q   Let's -- oh, sorry. Were you done?</p> <p>8     <b>A   Yeah. That's fine.</b></p> <p>9     Q   Let's turn to Kimura Figure 36, and the</p> <p>10   transistor -- I've labeled the transistor 3608 with</p> <p>11   the numeral four.</p> <p>12       Do you see that?</p> <p>13    <b>A   Yes.</b></p> <p>14     Q   And I've labeled the transistor 3611 as</p> <p>15   number five.</p> <p>16       Do you see that?</p> <p>17    <b>A   Yes.</b></p> <p>18     Q   Let me ask this first: What -- how many</p> <p>19   transistors are there in Kimura Figure 33A?</p> <p>20    <b>A   Five.</b></p> <p>21     Q   How many capacitors are there in Figure</p> <p>22   33?</p>                                                                                                                                                                                                                                                                                                                                                                                                           |

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| <p>189</p> <p>1 <b>A There's one that's illustrated.</b></p> <p>2 Q And how many LEDs are illustrated in</p> <p>3 Kimura Figure 33A?</p> <p>4 <b>A One.</b></p> <p>5 Q In Kimura Figure 36, how many capacitors</p> <p>6 are illustrated?</p> <p>7 <b>A There's one that's illustrated.</b></p> <p>8 Q In Kimura Figure 36, how many LEDs are</p> <p>9 illustrated?</p> <p>10 <b>A One.</b></p> <p>11 Q And in Kimura Figure 36, how many</p> <p>12 transistors are illustrated?</p> <p>13 <b>A Six.</b></p> <p>14 Q So Kimura Figure 36 has one additional</p> <p>15 transistor relative to Kimura Figure 33, correct?</p> <p>16 <b>A Yes, the erase transistor.</b></p> <p>17 Q And is that transistor 3612 that you're</p> <p>18 referring to?</p> <p>19 <b>A Yes.</b></p> <p>20 Q And what did you call transistor 3612?</p> <p>21 <b>A The erase transistor. I believe that's</b></p> <p>22 <b>correct.</b></p>                                                                                                            | <p>191</p> <p>1 Q And in Figure 36E, are the operational</p> <p>2 phases of transistors 3608 and 3611 the same?</p> <p>3 <b>A In 36E, both of those transistors are on.</b></p> <p>4 Q Is it correct that, in all of the</p> <p>5 operational phases depicted in Kimura Figure 36, that</p> <p>6 the transistors 3608 and 3611 have the same on/off</p> <p>7 states?</p> <p>8 <b>A In the depicted phases.</b></p> <p>9 <b>Of course, the penalty for that is you</b></p> <p>10 <b>have to add another transistor to have the opposite</b></p> <p>11 <b>state with another control line.</b></p> <p>12 Q Yeah. So let me just ask that question</p> <p>13 again. Is it correct that, in the operational phases</p> <p>14 of Figure 36B, C, D and E, that the transistors 3608</p> <p>15 and 3611 always have the same on/off states?</p> <p>16 <b>A They do during the illustrative times.</b></p> <p>17 <b>Although, there are trade-offs to get there.</b></p> <p>18 Q How, if at all, would the functionality</p> <p>19 depicted in Figures 36B, C, D and E change if</p> <p>20 transistors 3608 and 3611 used a common control</p> <p>21 signal?</p> <p>22 <b>A The illustrated functionality would be</b></p> |
| <p>190</p> <p>1 Q Okay. We can -- we'll come back to that</p> <p>2 topic later, but for now, I want to return to the</p> <p>3 line of questions that I was on before, and in Kimura</p> <p>4 Figure 36, the operational phases of the circuit are</p> <p>5 illustrated in Figures 36B, C, D and E, correct?</p> <p>6 <b>A Yes.</b></p> <p>7 Q Are the operational phases of the</p> <p>8 transistors 3608 and 3611 the same in Figure 36B?</p> <p>9 MR. GARR: Objection.</p> <p>10 THE WITNESS: They are both off</p> <p>11 during 36B while another transistor is</p> <p>12 turned on.</p> <p>13 BY MR. JENSEN:</p> <p>14 Q In Figure 36C, are the operational phases</p> <p>15 of transistor 3608 and 3611 the same?</p> <p>16 MR. GARR: Objection.</p> <p>17 THE WITNESS: In 36C, both those</p> <p>18 transistors are off.</p> <p>19 BY MR. JENSEN:</p> <p>20 Q In Figure 36D, are the operational phases</p> <p>21 of transistors 3608 and 3611 the same?</p> <p>22 <b>A Both of those transistors are off in 36D.</b></p> | <p>192</p> <p>1 <b>the same, but the motivation to get there from Figure</b></p> <p>2 <b>33 would be nonexistent because you wouldn't have</b></p> <p>3 <b>saved any wires.</b></p> <p>4 Q Why would you need a motivation to modify</p> <p>5 something in Figure 33 when you're just looking at</p> <p>6 Figure 36?</p> <p>7 <b>A Because the allegation, as I understood</b></p> <p>8 <b>it in the petition, was you would start with Figure</b></p> <p>9 <b>33 and add characteristics of Figure 36.</b></p> <p>10 Q Let's look at Dr. Foty's report where he</p> <p>11 first addresses the requirement to have a shared</p> <p>12 light-emitting signal, and that's in connection with</p> <p>13 Claim 13.</p> <p>14 So this is Exhibit 1003, and do you see</p> <p>15 the subheading G is for Claim 13?</p> <p>16 <b>A Yes.</b></p> <p>17 Q And that analysis spans Paragraph 251</p> <p>18 through 265?</p> <p>19 <b>A Yes, but, of course, refers back to the</b></p> <p>20 <b>analysis for Claim 7.</b></p> <p>21 Q Yeah. Claim 13 is a dependent claim,</p> <p>22 correct? It depends on Claim 7?</p>                                                                                                     |

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| 193 | <p>1     <b>A   Right. So some of the elements take an</b></p> <p>2     <b>antecedent basis from Claim 7.</b></p> <p>3       Q   Yeah, and, in fact, in Paragraph 251,</p> <p>4     Dr. Foty says exactly that, correct? Claim 13</p> <p>5     depends from Claim 7, and it was shown above that</p> <p>6     Kimura renders Claim 7 obvious?</p> <p>7     <b>A   That is what he said.</b></p> <p>8       Q   Okay. And when analyzing the limitations</p> <p>9     of Claim 13, including the shared light-emitting</p> <p>10    signal, what figure in Kimura does Dr. Foty refer to,</p> <p>11    and I can direct your attention, for example, to</p> <p>12    Paragraph 261?</p> <p>13    <b>A   There he refers to 36E, but he -- I don't</b></p> <p>14    <b>believe he mentioned 36E in his analysis of 7. So</b></p> <p>15    <b>I'm assuming he's simply taking those features and</b></p> <p>16    <b>combining them into what he analyzed for Claim 7 and</b></p> <p>17    <b>not starting over again with a new design.</b></p> <p>18       Q   Do you understand Kimura Figure 36 to be</p> <p>19     a completely totally new and different circuit or</p> <p>20     just a modification to the circuit disclosed in</p> <p>21     Kimura Figure 33?</p> <p>22    <b>A   It is a solution to a problem in Figure</b></p> | 195 | <p>1     Dr. Foty's declaration at Paragraph 130, and this is</p> <p>2     where he's discussing the Kimura prior art reference,</p> <p>3     correct?</p> <p>4     <b>A   I'm still finding it. Okay. Yes.</b></p> <p>5       Q   Okay. Can you read a loud Paragraph 130,</p> <p>6     please?</p> <p>7     <b>A   This particular embodiment in Kimura is</b></p> <p>8     <b>contained in Figure 33 and described at Paragraphs</b></p> <p>9     <b>654 to 657. It is important to note, at the outset,</b></p> <p>10    <b>that Kimura Figure 36 is just an extension of Kimura</b></p> <p>11    Figure 33 and that (unless noted) the analysis and</p> <p>12    discussion of one figure applies equally to the other</p> <p>13    throughout this declaration.</p> <p>14       Q   You can pause right there.</p> <p>15       Were you aware of that statement when you</p> <p>16    prepared your opinions in your expert declaration.</p> <p>17       THE WITNESS: Yes. I don't think</p> <p>18     one can arbitrarily take an analysis of</p> <p>19     one and move it to the other because</p> <p>20     there are a different number of input</p> <p>21     timing signals and -- and a different</p> <p>22     number of transistors. The phase is</p> |
| 194 | <p>1     <b>33.</b></p> <p>2       Q   Can you point me to anything in</p> <p>3     Dr. Foty's analysis for Claim 13 where he says he's</p> <p>4     applying the teaching of Figure 36 to modify Figure</p> <p>5     33?</p> <p>6       MR. GARR: Objection.</p> <p>7       THE WITNESS: He's used Figure 33</p> <p>8     to show all the other claim elements.</p> <p>9     BY MR. JENSEN:</p> <p>10    Q   And do you think his analysis for Claim</p> <p>11    33 for transistors one, two, three, four and five is</p> <p>12    any different for Kimura Figure 33 versus Kimura</p> <p>13    Figure 36?</p> <p>14       MR. GARR: Objection.</p> <p>15       THE WITNESS: He hasn't identified</p> <p>16     those elements in Figure 36.</p> <p>17       I'll also note he doesn't actually</p> <p>18     explain why he would change the added</p> <p>19     transistor in 36 from NMOS to PMOS,</p> <p>20     but --</p> <p>21    BY MR. JENSEN:</p> <p>22    Q   Let me direct your attention to</p>                                                                                                                                                                                                                                                                                                                           | 196 | <p>1     different, right. It's not correct to</p> <p>2     say that it's simply an extension.</p> <p>3     Because, as you noted, the operation of</p> <p>4     two of the transistors changes.</p> <p>5    BY MR. JENSEN:</p> <p>6       Q   In fact, that's going to be critical when</p> <p>7     we talk about the third obviousness opinion in your</p> <p>8     report regarding the reset transistor.</p> <p>9       MR. GARR: Objection.</p> <p>10       THE WITNESS: So there simply --</p> <p>11     Figure 36 is not simply an addition to</p> <p>12     Figure 33.</p> <p>13       The timing phase has changed and</p> <p>14     the levels provided to various</p> <p>15     transistors in the first step operate</p> <p>16     differently.</p> <p>17    BY MR. JENSEN:</p> <p>18       Q   And, in fact, it is precisely that change</p> <p>19     that you're referring to in the operational state of</p> <p>20     transistor 3611 that makes it match -- in Kimura 36B</p> <p>21     that makes it match the operational state of</p> <p>22     transistor 3608, correct?</p>                                                                                                                                                                   |

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| 197 | <p>1 MR. GARR: Objection.</p> <p>2 THE WITNESS: It is, but he hasn't</p> <p>3 gone back and analyzed this particular</p> <p>4 transistor configuration with respect to</p> <p>5 the prior claim elements.</p> <p>6 BY MR. JENSEN:</p> <p>7 Q I think we have a disagreement about</p> <p>8 that, but we're not going to debate that at your</p> <p>9 deposition.</p> <p>10 If we go to your declaration in Exhibit</p> <p>11 2008 in the section about the shared light-emitting</p> <p>12 signal, you render an opinion that deploying a shared</p> <p>13 light-emitting signal in Kimura Figure 33 would</p> <p>14 render the circuit inoperable, correct?</p> <p>15 <b>A Yes. It would no longer operate in the</b></p> <p>16 <b>manner that Kimura intended.</b></p> <p>17 Q Did you render an opinion anywhere in</p> <p>18 your report that implementing a shared light-emitting</p> <p>19 signal in transistors 3608 and 3611 of Kimura Figure</p> <p>20 36 would render Kimura Figure 36 inoperable?</p> <p>21 MR. GARR: Objection.</p> <p>22 THE WITNESS: I did not opine on</p> | 199 | <p>1 transistor?</p> <p>2 <b>A The fourth transistor, which, as he's</b></p> <p>3 <b>mapped the claim, is a transistor in Figure 33.</b></p> <p>4 Q And when he's analyzing the fourth</p> <p>5 transistor in Claim Element 13A, he specifically</p> <p>6 points to Figure 36, does he not?</p> <p>7 <b>A He does, but he hasn't gone back and</b></p> <p>8 <b>mapped the prior limitation to it.</b></p> <p>9 <b>So my assumption is that he's somehow</b></p> <p>10 <b>taking transistors from Figure 36 and putting them</b></p> <p>11 <b>into 33.</b></p> <p>12 Q Okay. And that's an assumption you made,</p> <p>13 correct, is what you just said?</p> <p>14 <b>A Well, it's an understanding of the way he</b></p> <p>15 <b>structured his analysis.</b></p> <p>16 Q Okay. And the way you said it first,</p> <p>17 though, it was an assumption you made, was it not?</p> <p>18 <b>A An assumption based on my understanding</b></p> <p>19 <b>of the way he's presented his analysis. It's not an</b></p> <p>20 <b>assumption I made out of thin air.</b></p> <p>21 Q And figure -- or strike that.</p> <p>22 Claim Element 13B refers to the fifth</p> |
| 198 | <p>1 starting with the Figure 36 design.</p> <p>2 BY MR. JENSEN:</p> <p>3 Q Do you have an opinion one way or the</p> <p>4 other whether the pixel cell circuit in Kimura Figure</p> <p>5 36 is inoperable?</p> <p>6 MR. GARR: Counsel, I'm going to</p> <p>7 object to this line of questions as out</p> <p>8 of scope.</p> <p>9 THE WITNESS: I haven't seen an</p> <p>10 allegation that specifically says what</p> <p>11 the fourth and fifth transistor would be</p> <p>12 in Figure 36.</p> <p>13 So I haven't gone through and</p> <p>14 analyzed the claim under that mapping.</p> <p>15 BY MR. JENSEN:</p> <p>16 Q Well, let's turn back to Dr. Foty's</p> <p>17 declaration and look at Claim 13.</p> <p>18 And claim element -- and so we're in</p> <p>19 Exhibit 1003, Paragraph 261, and this is where</p> <p>20 Dr. Foty addresses Claim Element 13A, correct?</p> <p>21 <b>A Yes.</b></p> <p>22 Q And Claim Element 13A recites the fourth</p>                                                                                                                              | 200 | <p>1 transistor, correct?</p> <p>2 <b>A Yes.</b></p> <p>3 Q And in Paragraph 263 of his declaration,</p> <p>4 Dr. Foty mapped the fifth transistor onto Kimura</p> <p>5 Figure 36, correct?</p> <p>6 <b>A He does.</b></p> <p>7 Q Okay. Going back to the Kimura reference</p> <p>8 itself, is it your opinion that Figure 36 in Kimura</p> <p>9 is inoperable?</p> <p>10 <b>A No. Only that it operates differently</b></p> <p>11 <b>than Figure 33.</b></p> <p>12 Q And apart from the transistor 36- -- the</p> <p>13 addition of transistor 3612 and the different</p> <p>14 operational state of the transistor at 3611 as shown</p> <p>15 in Figure 36B, are there any other differences you</p> <p>16 can identify between the pixel circuit in 36 and the</p> <p>17 pixel circuit in Figure 33?</p> <p>18 MR. GARR: Objection.</p> <p>19 THE WITNESS: Yes. It requires an</p> <p>20 additional control line and also an</p> <p>21 additional current sink that's not</p> <p>22 particularly well described.</p>                                                                                                                                         |

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| 201 | <p>1 BY MR. JENSEN:</p> <p>2 Q And what control -- are you talking about</p> <p>3 the control line for transistor 3612?</p> <p>4 A Yes.</p> <p>5 Q And what was -- what was the other thing</p> <p>6 you mentioned?</p> <p>7 A 3617.</p> <p>8 Q Okay. Yeah, and that's connected to</p> <p>9 either the source or the drain of transistor 3612?</p> <p>10 A Yes.</p> <p>11 Q So both the control line and the</p> <p>12 additional line 3617 both pertain to transistor 3612,</p> <p>13 correct?</p> <p>14 A Correct.</p> <p>15 Q Apart from that transistor and its</p> <p>16 control and source or drain lines and the difference</p> <p>17 of the operational state in Figure 36B for transistor</p> <p>18 3611, are there any other differences you can</p> <p>19 identify between Figure 36 and Figure 33?</p> <p>20 A Those are the four differences that I --</p> <p>21 that I see.</p> <p>22 Q Okay. How, if at all, would the</p> | 203 | <p>1 A Yes.</p> <p>2 Q Can you describe for me what's being</p> <p>3 shown in Kimura Figure 33B?</p> <p>4 A It is the first phase of the capacitor</p> <p>5 programming in this embodiment.</p> <p>6 Q And do you see there's some heavy black</p> <p>7 lines with arrows on them in Figure 33B?</p> <p>8 A Yes.</p> <p>9 Q What do you understand those to depict?</p> <p>10 A They are illustrating an exemplary</p> <p>11 current flow.</p> <p>12 Q And is it fair to say that the current</p> <p>13 would be flowing in the direction that the arrow --</p> <p>14 the arrows point?</p> <p>15 A That's what I think it's intended to</p> <p>16 illustrate.</p> <p>17 Q What is happening to the charge on the</p> <p>18 node that is shared between the capacitor and</p> <p>19 transistor 3308 in Figure 33B?</p> <p>20 A There appears to be some discharging of</p> <p>21 that node, but the details would depend on some</p> <p>22 aspects that are not really disclosed.</p>                                                                       |
| 202 | <p>1 operational states depicted in Figure 36B, C, D and E</p> <p>2 be any different if transistors 3608 and 3611 were</p> <p>3 controlled by a shared light-emitting signal?</p> <p>4 MR. GARR: Objection.</p> <p>5 THE WITNESS: If you start from</p> <p>6 Figure 36 and you combine them and you</p> <p>7 only have the illustrated operations,</p> <p>8 then I don't think there would be a</p> <p>9 difference.</p> <p>10 MR. JENSEN: Why don't we maybe go</p> <p>11 ahead and take a break before we switch</p> <p>12 gears.</p> <p>13 THE VIDEOGRAPHER: We are going off</p> <p>14 the record. The time is 2:43 p.m.</p> <p>15 (Brief pause.)</p> <p>16 THE VIDEOGRAPHER: We are back on</p> <p>17 the record. The time is 2:56 p.m.</p> <p>18 BY MR. JENSEN:</p> <p>19 Q All right. Welcome back, Dr. Wolfe.</p> <p>20 Let me direct your attention to Kimura</p> <p>21 Figure 33B, as in boy.</p> <p>22 Do you see that?</p>     | 204 | <p>1 Q And if we look at Kimura Figure 33C, what</p> <p>2 is happening to the charge on the node that is shared</p> <p>3 between the capacitor and transistor 3308?</p> <p>4 A That node is being approximately charged</p> <p>5 to VData minus Vth.</p> <p>6 Q And in Figure 33D, what is happening to</p> <p>7 the charge on the node shared between the capacitor</p> <p>8 and transistor 3308?</p> <p>9 A The charge is being maintained at</p> <p>10 approximately VData minus Vth.</p> <p>11 Q And is that the same in Kimura Figure</p> <p>12 33E?</p> <p>13 A To some extent, yes. 33E is a much</p> <p>14 larger period of time. So you will start to get some</p> <p>15 leakage at that point.</p> <p>16 Q Let's turn to Kimura Figure 36. Well,</p> <p>17 let me go back to Figure 33 first and ask one more</p> <p>18 question.</p> <p>19 In the operational phase that's shown in</p> <p>20 Kimura Figure 33B, you said that current was flowing</p> <p>21 off of the node shared by the capacitor and</p> <p>22 transistor 3308, correct?</p> |

Conducted on May 17, 2024

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| <p>205</p> <p>1     <b>A</b>    <b>Yes, through the electroluminescent</b><br/> 2 <b>element.</b><br/> 3     <b>Q</b>    And that charge from the capacitor node<br/> 4 is passing through two transistors, correct?<br/> 5     <b>A</b>    <b>Two transistors and an electroluminescent</b><br/> 6 <b>element, but there's also this VData coming in, which</b><br/> 7 <b>is also going through two transistors. So that's</b><br/> 8 <b>going to increase the current through transistor 3310</b><br/> 9 <b>and make the voltage drop in 3310 potentially larger.</b><br/> 10    <b>Q</b>    So there's -- there's two current paths<br/> 11 being shown in Figure 33B that join up, and both of<br/> 12 them go through transistor 3310 and the LED 3313,<br/> 13 correct?<br/> 14    <b>A</b>    <b>Yes.</b><br/> 15    <b>Q</b>    Okay. And the black arrow depicting the<br/> 16 current coming off of the capacitor node passes<br/> 17 through transistor 3309, transistor 3310 and the LED<br/> 18 3313, correct?<br/> 19       MR. GARR: Objection.<br/> 20       THE WITNESS: That appears to be<br/> 21 what's illustrated. That would depend on<br/> 22 certain assumptions of the value of VData</p> | <p>207</p> <p>1 Dr. Wolfe: Does Figure 33B depict any current from<br/> 2 the capacitor passing through transistor 3306, 3307<br/> 3 or 3308?<br/> 4     <b>A</b>    <b>I think I answered that. Depending on</b><br/> 5 <b>how you interpret the figure, the current could flow</b><br/> 6 <b>through 3306, 3308.</b><br/> 7       There's really no reason, based on just<br/> 8 the figure and the text that's there, to assume the<br/> 9 current would always flow in the direction of the<br/> 10 arrows.<br/> 11    <b>Q</b>    Well, if we assume that the direction of<br/> 12 the arrows is intended to depict the direction of<br/> 13 current flow, would you agree that Figure 33B does<br/> 14 not show any current from the capacitor node passing<br/> 15 through transistors 3306, 3307 and 3308?<br/> 16       MR. GARR: Objection.<br/> 17       THE WITNESS: If you make those<br/> 18 assumptions, but I'm not sure those are<br/> 19 valid assumptions.<br/> 20       So, for example, if a pixel were<br/> 21 going from white to black, that would not<br/> 22 be the case.</p>                                                                                                                                                                                                                              |
| <p>206</p> <p>1     and the relative resistivity of the four<br/> 2 transistors.<br/> 3 BY MR. JENSEN:<br/> 4     <b>Q</b>    But it's fair to say that any current<br/> 5 that's coming off of the capacitor node is not<br/> 6 passing through transistor 3306, 3307 or 3308,<br/> 7 correct?<br/> 8     <b>A</b>    <b>It's true for 3307. If VData had a</b><br/> 9 <b>different value and the ability to sink current,</b><br/> 10 <b>again, it could go through 3308 and 3306.</b><br/> 11       So that's why there's not really enough<br/> 12 information given to do a full analysis of those<br/> 13 current flows.<br/> 14    <b>Q</b>    But that's not depicted in Figure 33B, is<br/> 15 it?<br/> 16       MR. GARR: Objection.<br/> 17       THE WITNESS: Let's see what it<br/> 18 says about 33B. It tells us very little.<br/> 19 Just that an image signal is input.<br/> 20       So --<br/> 21 BY MR. JENSEN:<br/> 22    <b>Q</b>    Let me ask the question this way,</p>                                                                                                                                                                                                                    | <p>208</p> <p>1 BY MR. JENSEN:<br/> 2     <b>Q</b>    Let's turn to Figure 36 and Figure 36B in<br/> 3 particular. What is being depicted in Figure 36B?<br/> 4     <b>A</b>    <b>Again, it's not completely clear. The</b><br/> 5 <b>first stage of a two-stage programming process.</b><br/> 6 <b>Without knowing all the voltages and the -- and the</b><br/> 7 <b>transistor parameters, you can't tell exactly what's</b><br/> 8 <b>happening here, but some current is being apparently</b><br/> 9 <b>pulled from the capacitor and now being discharged</b><br/> 10 <b>around the electroluminescent element to some other</b><br/> 11 <b>voltage, 3617. I don't -- let me see what that is</b><br/> 12 <b>described as. I don't recall it being clear what</b><br/> 13 <b>that was.</b><br/> 14    <b>Q</b>    I can refer you to Paragraph 666 in<br/> 15 Kimura where it says what that is?<br/> 16    <b>A</b>    <b>Yes, just an electric power source line.</b><br/> 17 <b>So it doesn't tell us much about what that is, other</b><br/> 18 <b>than the fact that it can -- what it says is source</b><br/> 19 <b>current. What's being illustrated is it's sinking</b><br/> 20 <b>current.</b><br/> 21       So, again, I think that these are very<br/> 22 rough illustrations of, you know, the first part of a</p> |

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| 209 | <p>1 <b>programming phase.</b></p> <p>2 Q And the -- the charge that's being pulled</p> <p>3 off of the capacitor onto the Line 3617 is passing</p> <p>4 through two transistors 3612 and 3610?</p> <p>5 MR. GARR: Objection.</p> <p>6 THE WITNESS: Some charge is.</p> <p>7 Again, similarly, if you went from a</p> <p>8 white pixel to a black pixel, some of</p> <p>9 that charge would flow back up through</p> <p>10 3609 and 3607, in that particular</p> <p>11 circumstance. You have to analyze all</p> <p>12 the charge flows together, and we're not</p> <p>13 given enough information to do that.</p> <p>14 BY MR. JENSEN:</p> <p>15 Q Do any of the operational phases of</p> <p>16 Figure 36B, C, D, or E show current flowing through</p> <p>17 transistor 3609 from the bottom to the top of that</p> <p>18 transistor?</p> <p>19 MR. GARR: Objection.</p> <p>20 THE WITNESS: As I said, I think</p> <p>21 the disclosure is vague. I think if you</p> <p>22 understood the full operation, you would</p>                                                                                                                        | 211 | <p>1 <b>A I do.</b></p> <p>2 Q Okay. Which is the driving transistor in</p> <p>3 Figure 3?</p> <p>4 <b>A As I've used that term previously, it</b></p> <p>5 <b>would be T36.</b></p> <p>6 Q Is it your opinion that in Figure 3 of</p> <p>7 the '599 patent that current could flow through the</p> <p>8 transistor T31 from the bottom to the top of that</p> <p>9 transistor as it's depicted in Figure 3?</p> <p>10 MR. GARR: Objection.</p> <p>11 THE WITNESS: I don't think so.</p> <p>12 BY MR. JENSEN:</p> <p>13 Q And why not?</p> <p>14 <b>A I don't see a source of current at the</b></p> <p>15 <b>bottom that could cause it to flow in the other</b></p> <p>16 <b>direction.</b></p> <p>17 Q What if it was discharging a voltage</p> <p>18 stored on the capacitor through T33, could that</p> <p>19 current then flow back up through T31?</p> <p>20 <b>A No. That's the idea of the diode biasing</b></p> <p>21 <b>of T31. That's why it's -- that's what it means to</b></p> <p>22 <b>be in diode mode.</b></p>                                            |
| 210 | <p>1 understand that that could happen.</p> <p>2 BY MR. JENSEN:</p> <p>3 Q Which is not quite my question. My</p> <p>4 question is: Is that depicted in Figures 36B, C, D</p> <p>5 or E?</p> <p>6 <b>A It's ambiguous.</b></p> <p>7 Q What's ambiguous about the arrow pointing</p> <p>8 down?</p> <p>9 <b>A Well, given that a person of ordinary</b></p> <p>10 <b>skill would understand that at times the current may</b></p> <p>11 <b>be flowing in the other direction, it's not clear</b></p> <p>12 <b>that that arrow pointing down is intended to be the</b></p> <p>13 <b>only direction of current flow.</b></p> <p>14 <b>I mean, for example, there's no real</b></p> <p>15 <b>concept of -- of current flowing down the VDD line at</b></p> <p>16 <b>one point and in the other direction on the VDD line</b></p> <p>17 <b>in the other point. Those are -- those are like</b></p> <p>18 <b>rhetoical flourishes, right. That's not supposed to</b></p> <p>19 <b>represent anything physical.</b></p> <p>20 Q Let's look at Figure 3 in the '599</p> <p>21 patent, and let me know when you've got that in front</p> <p>22 of you.</p> | 212 | <p>1 Q So let's go back to Kimura, and let's</p> <p>2 look at Kimura Figure 36. Would you agree with me</p> <p>3 that Kimura Figure 36 has a diode connected</p> <p>4 configuration?</p> <p>5 <b>A It does in 36B and 36C.</b></p> <p>6 Q And how about Kimura Figure 33? Let me</p> <p>7 ask you a clean question.</p> <p>8 Does Kimura Figure 33A have a diode</p> <p>9 connected transistor configuration?</p> <p>10 <b>A The terms are used a little loosely in</b></p> <p>11 <b>pixels. When 3309 is on, it does.</b></p> <p>12 Q And going back to the '599 patent, Figure</p> <p>13 3, which transistors in Figure 3 have a diode</p> <p>14 connected configuration?</p> <p>15 <b>A T31 and T33.</b></p> <p>16 Q Does the diode configuration of</p> <p>17 transistors T31 and T33 in Figure 3 depend on whether</p> <p>18 either of those transistors is on?</p> <p>19 <b>A It's only operating as a diode when T33</b></p> <p>20 <b>is on.</b></p> <p>21 Q Okay. And so -- you're saying the same</p> <p>22 thing for Figure 3 as you are for the Kimura diode</p> |

Conducted on May 17, 2024

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| <p>213</p> <p>1 connected transistors, that they have the diode</p> <p>2 connected configuration in a particular state?</p> <p>3 MR. GARR: Objection.</p> <p>4 THE WITNESS: This particular kind</p> <p>5 of a diode configuration is -- works when</p> <p>6 the -- when the gate to drain connection</p> <p>7 through the other transistor is on.</p> <p>8 BY MR. JENSEN:</p> <p>9 Q Did the '599 patent invent a diode</p> <p>10 connected transistor configuration, or was that</p> <p>11 configuration known in the prior art?</p> <p>12 <b>A It was known in the prior art.</b></p> <p>13 Q Let's go to your declaration, Dr. Wolfe.</p> <p>14 Well, let's go back to Kimura Figure 36.</p> <p>15 So we talked a little bit about Kimura</p> <p>16 Figure 36B, correct, and the current flows in that</p> <p>17 figure?</p> <p>18 <b>A Yes.</b></p> <p>19 Q Okay. And as depicted in Kimura Figure</p> <p>20 36B, in that operational state, current is flowing</p> <p>21 through the transistor 3612, correct?</p> <p>22 MR. GARR: Objection.</p> | <p>215</p> <p>1 <b>A It is a source of electric power to the</b></p> <p>2 <b>circuit.</b></p> <p>3 Q Do you have an understanding as to</p> <p>4 whether an electric power source line in Kimura is</p> <p>5 intended to refer to a low-voltage or a high-voltage</p> <p>6 line?</p> <p>7 <b>A What do you mean by a low-voltage or</b></p> <p>8 <b>high-voltage?</b></p> <p>9 Q Well, let's say a low-voltage is zero and</p> <p>10 a high-voltage is five.</p> <p>11 Do you have an understanding, with that</p> <p>12 as a reference point, as to what the electric power</p> <p>13 source line voltage would refer to?</p> <p>14 <b>A It's not very clear from Kimura, but</b></p> <p>15 <b>Kimura refers to both source lines and supply lines.</b></p> <p>16 <b>I think generally current would flow from</b></p> <p>17 <b>a supply line to a source line in Kimura.</b></p> <p>18 Q And that would mean that the supply line</p> <p>19 would be a higher voltage than the source line,</p> <p>20 correct?</p> <p>21 <b>A Yes.</b></p> <p>22 Q Okay. So that's what I -- whether it's</p>                                         |
| <p>214</p> <p>1 THE WITNESS: It would depend on</p> <p>2 the value of that voltage source 3617,</p> <p>3 but it could be.</p> <p>4 BY MR. JENSEN:</p> <p>5 Q Yeah, and assuming that's the low voltage</p> <p>6 supply line, then the current would be flowing</p> <p>7 through transistor 3612, correct?</p> <p>8 <b>A If we assume that. I don't think that's</b></p> <p>9 <b>disclosed, but if we assume that, that would be true.</b></p> <p>10 Q Let's look at Kimura Paragraph 666 where</p> <p>11 it describes what that line 3617 is, and I can jump</p> <p>12 there.</p> <p>13 <b>A It looks to me like it just says an</b></p> <p>14 <b>electric power source line.</b></p> <p>15 Q Exactly. So Kimura discloses that the</p> <p>16 line 3617 is an electric power source line, correct?</p> <p>17 <b>A Yes.</b></p> <p>18 Q You understand, Dr. Wolfe, what an</p> <p>19 electric power source line is in the context of</p> <p>20 Kimura?</p> <p>21 <b>A Very generally, yes.</b></p> <p>22 Q What is it?</p>                               | <p>216</p> <p>1 0-volts or 5-volts, it doesn't matter, but you would</p> <p>2 agree with me that in Kimura the electric power</p> <p>3 source line is referring to a line that has a lower</p> <p>4 voltage than the electric current supply line?</p> <p>5 <b>A I believe that's the intent.</b></p> <p>6 Q Okay. Very good. So let's go back to</p> <p>7 Kimura Figure 36. So with the understanding that we</p> <p>8 just discussed that the line 3617 is the -- oops, I</p> <p>9 lost it -- is the electric power source line, would</p> <p>10 you agree that in Figures 36B, that current is</p> <p>11 flowing off of the capacitor through the transistor</p> <p>12 3612 to the line 3617?</p> <p>13 MR. GARR: Objection.</p> <p>14 THE WITNESS: I think that's the</p> <p>15 typical case that they are trying to</p> <p>16 illustrate.</p> <p>17 BY MR. JENSEN:</p> <p>18 Q What is the state of the transistor at</p> <p>19 3612 in Kimura Figures 36C, D and E?</p> <p>20 <b>A It is turned off.</b></p> <p>21 Q So the only time that the transistor 3612</p> <p>22 is shown as being turned on is in Kimura Figure 36B?</p> |

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| <p>217</p> <p>1 A Yes, to illustrate the erase phase.</p> <p>2 Q What is being erased in Figure 36B?</p> <p>3 A Erase, in Kimura, means turning off the</p> <p>4 emitter. So this is the time after the pixel has</p> <p>5 been displayed where it's turned off in preparation</p> <p>6 for re-programming.</p> <p>7 Q And is it your testimony that Kimura</p> <p>8 Figure 36B shows an erase phase?</p> <p>9 A That's my understanding, yes.</p> <p>10 Q Does Kimura Figure 36C show an erase</p> <p>11 phase?</p> <p>12 A No, that's the programming phase. That's</p> <p>13 just the way the terminology works in Kimura.</p> <p>14 Q Let's go to your declaration in Paragraph</p> <p>15 85. Let me know when you're there. I'd like you to</p> <p>16 read the last sentence of that paragraph.</p> <p>17 A I also note that Dr. Foty acknowledged</p> <p>18 during his deposition that he had not considered the</p> <p>19 embodiment of Figure 21, which describes erasure in</p> <p>20 detail, and makes clear that erasure is a wholly</p> <p>21 different concept than initialization in Kimura's</p> <p>22 disclosures.</p> | <p>219</p> <p>1 Figure 21A?</p> <p>2 A Okay.</p> <p>3 Q Would you agree that Figure 21A is a</p> <p>4 pixel cell circuit?</p> <p>5 A Yes, generally.</p> <p>6 Q And which element is the LED in Figure</p> <p>7 21A?</p> <p>8 A 2108.</p> <p>9 Q And which transistor is the driving</p> <p>10 transistor in Figure 21A?</p> <p>11 A 2105.</p> <p>12 Q And Figure 21A has a capacitor, correct?</p> <p>13 A It does.</p> <p>14 Q And that's labeled 2107?</p> <p>15 A Yes.</p> <p>16 Q And would you agree that the line 2109 is</p> <p>17 a power supply line?</p> <p>18 A Let me look at the description. It's not</p> <p>19 explicit, but if you compare it to other similar</p> <p>20 diagrams, that would be the logical conclusion.</p> <p>21 Q And relative to an electric power source</p> <p>22 line, the current supply line would have a higher</p>                                                                                                                                                                                                                                          |
| <p>218</p> <p>1 Q What do you mean by the last part of that</p> <p>2 that erasure is a wholly different concept than</p> <p>3 initialization in Kimura?</p> <p>4 A It's shown a number of places, but in</p> <p>5 Figure 21, erasure is shown as a blanking interval,</p> <p>6 as a period where the primary focus is that -- that</p> <p>7 the LED is dark, and it's removing charge from the</p> <p>8 prior emission phase, and that's consistent</p> <p>9 throughout Kimura, and there are other places -- let</p> <p>10 me see if I can find a good one.</p> <p>11 Q Well, you mentioned Figure 21. So maybe</p> <p>12 we can take a look at Figure 21. Would that be all</p> <p>13 right?</p> <p>14 A Yeah.</p> <p>15 Q And that's the figure that you referenced</p> <p>16 in Paragraph 85 of your declaration, correct?</p> <p>17 A Yes.</p> <p>18 Q So let's go to Kimura Figure 21. Let me</p> <p>19 know if you're able to see that.</p> <p>20 A Yes, that's only part of it. There's</p> <p>21 21A, B and C.</p> <p>22 Q The schematic portion I should say.</p>                                                            | <p>220</p> <p>1 voltage, correct?</p> <p>2 A As those terms are used in Kimura.</p> <p>3 Q Okay. And how would the circuit in</p> <p>4 Figure 21A operate to make the LED 2108 emit light?</p> <p>5 A So a brightness voltage is placed on line</p> <p>6 2101, then that's coupled through 2104 to program the</p> <p>7 capacitor, which would then turn on the light. Then</p> <p>8 during the erasure period, 2106 discharges the</p> <p>9 capacitor.</p> <p>10 So it creates an erasure-liking interval.</p> <p>11 Q So all of the transistors in Figure 21A</p> <p>12 are NMOS transistors, correct?</p> <p>13 A Yes.</p> <p>14 Q And that means that they turn on in</p> <p>15 response to a high-voltage on the gate, correct?</p> <p>16 A A voltage higher than the source.</p> <p>17 Q And that's in contrast to a PMOS</p> <p>18 transistor that turns on when a low-voltage is</p> <p>19 applied to its gate, correct?</p> <p>20 A A voltage lower than the source, yes.</p> <p>21 The normal type of NMOS and PMOS transistors that we</p> <p>22 would ordinarily find in these circuit.</p> |

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| <p>221</p> <p>1 Q So to turn on the driving transistor</p> <p>2 2105, you need to have a high-voltage on the</p> <p>3 capacitor node during the light-emitting period,</p> <p>4 correct?</p> <p>5 A <b>Higher than the source of transistor</b></p> <p>6 <b>2105.</b></p> <p>7 Q Right. And that voltage can be applied</p> <p>8 to the capacitor through the NMOS transistor 2104,</p> <p>9 correct?</p> <p>10 A <b>Yes.</b></p> <p>11 Q And did I hear you correctly to say that</p> <p>12 the purpose of transistor 2106 is to discharge the</p> <p>13 capacitor 2107?</p> <p>14 A <b>2106 is described as an erasure TFT, and</b></p> <p>15 <b>I believe that its role is to discharge the</b></p> <p>16 <b>capacitor.</b></p> <p>17 Q And we talked earlier that the line 2109</p> <p>18 is the current supply line, correct?</p> <p>19 A <b>Yes.</b></p> <p>20 Q Which reflects that it has a higher</p> <p>21 voltage than the power source line 2110, right?</p> <p>22 A <b>I would have to check that in this</b></p>                                                                                                                            | <p>223</p> <p>1 <b>which, again, would be very difficult, because it</b></p> <p>2 <b>would mean that line 2102 would have to be higher</b></p> <p>3 <b>than the power supply.</b></p> <p>4 <b>So that's kind of a weird understanding,</b></p> <p>5 <b>but if that were the case, then there would be a</b></p> <p>6 <b>high-voltage on both sides of 2107.</b></p> <p>7 Q And in such a circumstance, would the</p> <p>8 NMOS transistor 2105 be turned on or off?</p> <p>9 A <b>It would probably be turned on in that</b></p> <p>10 <b>case, which, again, is inconsistent with the general</b></p> <p>11 <b>description. So it's probably not a good set of</b></p> <p>12 <b>assumptions in the first place.</b></p> <p>13 Q And you mentioned that Kimura describes</p> <p>14 the transistor 2106 as an erasure transistor,</p> <p>15 correct?</p> <p>16 A <b>Yes.</b></p> <p>17 Q And in the circumstance we just</p> <p>18 described, when the erasure transistor 2106 is turned</p> <p>19 on and a high-voltage is applied to the capacitor</p> <p>20 node, that would turn on transistor 2105, correct?</p> <p>21 A <b>There were a lot of ifs there. That's</b></p> <p>22 <b>why I think that your -- your hypothetical is not</b></p>                                                                                                                                    |
| <p>222</p> <p>1 <b>particular design.</b></p> <p>2 Q You can look at, for example, Paragraph</p> <p>3 352, if you'd like. It describes the electric power</p> <p>4 source line.</p> <p>5 A <b>Yeah, that appears to be similar.</b></p> <p>6 Q Okay. And so that is a -- relatively</p> <p>7 speaking, a lower voltage than is on the current</p> <p>8 supply line 2109, correct?</p> <p>9 A <b>At certain times. It's not completely</b></p> <p>10 <b>clear to me that 2109 is on all the time.</b></p> <p>11 Q In the event that 2109 is on and the</p> <p>12 transistor 2106 turns on, what voltage will be</p> <p>13 applied to the capacitor node?</p> <p>14 A <b>That would be a high-voltage, which is</b></p> <p>15 <b>somewhat inconsistent with the functional</b></p> <p>16 <b>description. That's why I think, perhaps, 2109</b></p> <p>17 <b>switches from high to low.</b></p> <p>18 Q All right. If it's, in fact, high, would</p> <p>19 you agree with me that a high-voltage is applied to</p> <p>20 the capacitor node when the transistor 2106 is turned</p> <p>21 on?</p> <p>22 A <b>If 2109 is high and 2106 is turned on --</b></p> | <p>224</p> <p>1 <b>accurate. Because, using a normal set of supply</b></p> <p>2 <b>voltages for this kind of a device, 2106 would only</b></p> <p>3 <b>turn on when -- when it could have a positive VGS,</b></p> <p>4 <b>which would mean that the gate of 2105 was below the</b></p> <p>5 <b>supply voltage, and it also doesn't match kind of the</b></p> <p>6 <b>description of it as -- as turning it off.</b></p> <p>7 <b>So -- it talks about the light-emission</b></p> <p>8 <b>period being shorter. So I think those -- if you</b></p> <p>9 <b>made all those assumptions, that would be the</b></p> <p>10 <b>operation, but I don't think those assumptions are</b></p> <p>11 <b>consistent with the disclosure.</b></p> <p>12 Q Is there anything in Kimura that supports</p> <p>13 your hypothesis that the supply line 2109 toggles</p> <p>14 between a high- and low-voltage?</p> <p>15 A <b>I think, just a general understanding of</b></p> <p>16 <b>what's being disclosed here, it wouldn't make sense</b></p> <p>17 <b>to -- to flash the LED on in maximum brightness</b></p> <p>18 <b>during the erasure period instead of disclosed in the</b></p> <p>19 <b>timing diagram.</b></p> <p>20 Q Isn't that similar to what happened in</p> <p>21 Kimura Figure 33B where there is spurious light</p> <p>22 emission that occurs while you're discharging the</p> |

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| 225 | 1 capacitor?<br>2 <b>A It is, and it's described as a problem</b><br>3 <b>that has to be resolved.</b><br>4 Q Do you know if Kimura Figure 21 was an<br>5 embodiment of Kimura's invention or a prior art<br>6 circuit that Kimura was intending to improve?<br>7 <b>A My understanding is it's prior art.</b><br>8 Q Let's go back to your declaration,<br>9 Exhibit 2008, and look at Paragraph 83. Let me know<br>10 when you have that.<br>11 <b>A I do.</b><br>12 Q Before we go there -- I'm sorry -- let's<br>13 go back to Kimura Figure 21, and I want to ask a<br>14 follow-up question or two about the erasure<br>15 transistor 2106, and adopting your hypothesis that,<br>16 when erasure transistor 2106 is on, that the line<br>17 2109 has a low-voltage, what is happening to the<br>18 voltage stored on the capacitor?<br>19 MR. GARR: Objection.<br>20 THE WITNESS: It would be<br>21 discharged.<br>22 BY MR. JENSEN: | 227 | 1 <b>erasure.</b><br>2 Q Okay. So let's -- let's look at that.<br>3 Is it your understanding that the -- strike that.<br>4 Does Figure 16B illustrate a timing<br>5 diagram?<br>6 <b>A Yes.</b><br>7 Q Is it your understanding that Figure 16B<br>8 illustrates a timing diagram for the circuit shown in<br>9 Figure 16A?<br>10 <b>A For portions of it, yes.</b><br>11 Q Are there any portions of Figure 16B that<br>12 are inapplicable to Figure 16A?<br>13 <b>A No. It's just that it's a partial timing</b><br>14 <b>diagram from 16A.</b><br>15 Q Oh, I think I understand what you're<br>16 saying. It's just -- the way of saying it the figure<br>17 would continue on to the right, and we're just<br>18 looking at a -- essentially -- I don't know if it's<br>19 one or two cycles -- but a cycle and a half of the<br>20 timing diagram?<br>21 <b>A Well, let me be more clear. 16B contains</b><br>22 <b>the timing information for three rows. 16A only</b> |
| 226 | 1 Q And it would be discharged through the<br>2 erasure capacity 2106, correct?<br>3 <b>A Yes.</b><br>4 Q Does the erasure 21 -- strike that.<br>5 Does the erasure transistor 2106 do<br>6 any -- perform any other function than discharging<br>7 the capacitor 2107?<br>8 MR. GARR: Objection.<br>9 THE WITNESS: It discharges the<br>10 gate of 2104 which causes blanking.<br>11 BY MR. JENSEN:<br>12 Q That's the same node that is connected to<br>13 the capacitor 2107, correct?<br>14 <b>A Yes.</b><br>15 Q Let's go to Kimura Figure 16, and I'll<br>16 focus your attention on Figure 16A. Let me know when<br>17 you see that.<br>18 <b>A I do.</b><br>19 Q Are you familiar with the circuit in<br>20 Figure 16A?<br>21 <b>A Generally. Mostly I relied on the</b><br>22 <b>distinction in 16B between initialization and</b>                                                                                                 | 228 | 1 <b>shows one row, and not every signal in 16A is</b><br>2 <b>depicted in 16B.</b><br>3 Q Okay. I got it. So let's look at Figure<br>4 16B. As illustrated in Figure 16B, there is an<br>5 erasure period, correct?<br>6 <b>A Yes, after the light emission.</b><br>7 Q And there's also a light-emitting period<br>8 that is depicted for each of the first gate signal<br>9 lines, correct?<br>10 <b>A Yes.</b><br>11 Q And I -- and just to go back to the<br>12 erasure period, for each of the three gate signal<br>13 lines -- the three first gate signal lines in Figure<br>14 16B, there's an erasure period shown, correct?<br>15 <b>A Yes.</b><br>16 Q And is it your understanding that the<br>17 three first gate signal lines shown in Figure 16B<br>18 each relate to a different row of pixels?<br>19 <b>A Yes.</b><br>20 Q And those are denoted by (i-1)th row, the<br>21 i-th row and the (i+1)th row?<br>22 <b>A Yes.</b>                                |

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| <p>229</p> <p>1 Q Is it your understanding that those rows</p> <p>2 would be adjacent to one another in a display?</p> <p>3 A <b>They would be close to one another. As I</b></p> <p>4 <b>said, sometimes you progressively scan, and you do</b></p> <p>5 <b>every adjacent row, and sometimes you interlace scan</b></p> <p>6 <b>where you do all the odd rows and then all the even</b></p> <p>7 <b>rows.</b></p> <p>8 Q And I'll zoom in just a little bit</p> <p>9 because some of the text is a little bit small here.</p> <p>10 So if we look at the first gate signal</p> <p>11 line for the (i-th) row.</p> <p>12 Do you see that?</p> <p>13 A <b>Yes.</b></p> <p>14 Q And from top to bottom, that's the second</p> <p>15 waveform that's shown in the figure?</p> <p>16 A <b>Yes.</b></p> <p>17 Q And there's a portion of that waveform</p> <p>18 that is identified as the i-th row erasure, correct?</p> <p>19 A <b>Yes.</b></p> <p>20 Q And does Figure 16B also depict an</p> <p>21 initialization period for the i-th row? And I can</p> <p>22 direct your attention to the kind of upper left</p>                 | <p>231</p> <p>1 from your declaration. If we go back to Paragraph</p> <p>2 83, and in Paragraph 83, you're discussing the same</p> <p>3 Figure 16B that we've been looking at?</p> <p>4 A <b>Yes.</b></p> <p>5 Q And in Paragraph 83, you say that the</p> <p>6 timing diagram of Figure 16B in Kimura (reproduced</p> <p>7 below), which identifies an "initialization" period</p> <p>8 that is distinct from the "erasure" period, i.e., the</p> <p>9 two periods are not co-extensive?</p> <p>10 A <b>Correct.</b></p> <p>11 Q What do you mean by the statement that an</p> <p>12 initialization period is distinct from the erasure</p> <p>13 period?</p> <p>14 A <b>That the two periods are not</b></p> <p>15 <b>co-extensive.</b></p> <p>16 Q Would you agree with me that Figure 16B</p> <p>17 shows that the initialization and erasure periods for</p> <p>18 a given row -- a given row partially overlap?</p> <p>19 A <b>The time in which those signals -- there</b></p> <p>20 <b>is a time in which both the initialization signal and</b></p> <p>21 <b>the erasure signal are both asserted, but they do not</b></p> <p>22 <b>begin at the same time. So they are not the same</b></p> |
| <p>230</p> <p>1 portion of the figure where it references i-th</p> <p>2 initialization?</p> <p>3 A <b>Yes.</b></p> <p>4 Q Okay. And is the initialization period</p> <p>5 for the i-th row illustrated in Figure 16B as being</p> <p>6 the time period in which the (i-1)th row has a signal</p> <p>7 pulse on it?</p> <p>8 A <b>It's illustrated as the time when the</b></p> <p>9 <b>first gate signal line of the (i-1)th row has a pulse</b></p> <p>10 <b>on it.</b></p> <p>11 Q Correct. So it's the -- it's the row</p> <p>12 before the i-th row that is used to perform the -- or</p> <p>13 provide the initialization signal to the i-th row,</p> <p>14 correct?</p> <p>15 A <b>There's a particular signal that's</b></p> <p>16 <b>associated with the (i-1)th row that provides the</b></p> <p>17 <b>initialization signal to the i-th row.</b></p> <p>18 Q So you'd agree that Figure 16B depicts</p> <p>19 both an erasure period for a given row and an</p> <p>20 initialization period for that same row?</p> <p>21 A <b>It does. Two distinct measures.</b></p> <p>22 Q And that's what I wanted to understand</p> | <p>232</p> <p>1 <b>signal, and they are not co-extensive.</b></p> <p>2 Q And you said that the erasure and</p> <p>3 initialization periods for a given row don't begin at</p> <p>4 the same point in time, correct?</p> <p>5 A <b>Correct.</b></p> <p>6 Q Would you agree with me that, as shown in</p> <p>7 Kimura Figure 16B, the initialization and erasure</p> <p>8 periods end at the same point in time?</p> <p>9 A <b>That's what's illustrated.</b></p> <p>10 Q And you would agree with me that the</p> <p>11 initialization period for a given row, as illustrated</p> <p>12 in Kimura Figure 16B, is -- occurs entirely within</p> <p>13 the erasure period?</p> <p>14 A <b>The initialization signal is asserted</b></p> <p>15 <b>during the time that the erasure signal is asserted,</b></p> <p>16 <b>but they are not the same signal, and they are not --</b></p> <p>17 <b>they don't begin at the same time.</b></p> <p>18 Q So they don't begin at the same time, but</p> <p>19 they end at the same time?</p> <p>20 A <b>In this example, yes.</b></p> <p>21 Q Okay. So you're not saying that those</p> <p>22 two signals are somehow mutually exclusive of one</p>               |

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| <p style="text-align: right;">233</p> <p>1 another and there's no overlap of the time in which<br/>2 they occur?</p> <p>3 <b>A I'm not saying there's no overlap in the</b><br/>4 <b>time in which they occur. What I'm saying is they</b><br/>5 <b>need to be distinct signals, and they're distinct</b><br/>6 <b>functions because they don't happen co-extensively.</b></p> <p>7 Q Let's go back to Kimura, Figure 16A.</p> <p>8 <b>A Uh-huh.</b></p> <p>9 Q And the Kimura Figure 16A shows an LED<br/>10 labeled 1611, correct?</p> <p>11 <b>A Yes.</b></p> <p>12 Q And there's a capacitor labeled 1610?</p> <p>13 <b>A Yes.</b></p> <p>14 Q What is the purpose of capacitor 1610 in<br/>15 Figure 16A?</p> <p>16 <b>A It stores an electric potential applied</b><br/>17 <b>to the gate electrode of the TFT 1608 during the</b><br/>18 <b>light-emitting period.</b></p> <p>19 Q So it -- it stores a voltage that is used<br/>20 during the light-emitting period to turn on the<br/>21 transistors to provide current for the LED?</p> <p>22 <b>A To control the amount of current that</b></p> | <p style="text-align: right;">235</p> <p>1 <b>embodiment mode four, but just, on the fly here, it's</b><br/>2 <b>not clear to me exactly what the function of 1607 is.</b></p> <p>3 Q What signal controls the gate of<br/>4 transistor 1607?</p> <p>5 <b>A 1604.</b></p> <p>6 Q Let me zoom in.</p> <p>7 <b>A I'm sorry. I lined that up wrong. 1602.</b></p> <p>8 Q Okay. Just so we have that clean: What<br/>9 signal controls the gate of transistor 1607?</p> <p>10 <b>A 1602.</b></p> <p>11 Q Is transistor 1607 an NMOS or a PMOS<br/>12 transistor?</p> <p>13 <b>A It's an NMOS, and it specifically says in</b><br/>14 <b>Paragraph 424 it needs to be an NMOS.</b></p> <p>15 Q And why -- why is it that in Figure 16A<br/>16 transistor 1607 has to be an NMOS transistor?</p> <p>17 <b>A I haven't sufficiently studied it to</b><br/>18 <b>answer that question right now. I can just see that</b><br/>19 <b>it says it.</b></p> <p>20 Q Does Paragraph 424 say it has to be an<br/>21 NMOS or just that, in this example, it's an NMOS?</p> <p>22 <b>A In this example, which I took to mean in</b></p>                               |
| <p style="text-align: right;">234</p> <p>1 <b>goes through 1608.</b></p> <p>2 Q Okay. In Kimura Figure 33, is the<br/>3 capacitor 3611 intended to perform in a similar<br/>4 function of storing a voltage at the desired level<br/>5 during the light-emitting phase?</p> <p>6 <b>A It's a generally similar function.</b></p> <p>7 Q And in Kimura Figure 36A, is the<br/>8 capacitor 3613 intended to store a desired voltage<br/>9 that is used to provide a desired current during the<br/>10 light-emitting phase?</p> <p>11 <b>A That's generally its purpose.</b></p> <p>12 Q Do you see the transistor 1607 in Figure<br/>13 16A?</p> <p>14 <b>A Yes.</b></p> <p>15 Q What is the purpose of the transistor<br/>16 1607 in Figure 16A?</p> <p>17 <b>A I'm not completely sure. There's some</b><br/>18 <b>kind of a mechanism being used where it's used to</b><br/>19 <b>generate control signals for other rows.</b></p> <p>20 Q Are you looking at a particular paragraph<br/>21 in Kimura?</p> <p>22 <b>A I'm looking at the entirety of the</b></p>                                         | <p style="text-align: right;">236</p> <p>1 <b>this circuit.</b></p> <p>2 Q Okay. And continuing to look at<br/>3 Paragraph 1424, I'll give you a moment to review that<br/>4 and after reviewing that, I'd like to ask if you have<br/>5 an understanding as to what the transistor -- what<br/>6 function the transistor 1607 is intended to perform?</p> <p>7 <b>A Not at the moment. There's -- there's a</b><br/>8 <b>lot of -- a lot of unclear language around 1607. So</b><br/>9 <b>I don't want to try to reach a conclusion about it</b><br/>10 <b>right here on the fly.</b></p> <p>11 Q Well, let's -- let's just go ahead and<br/>12 look at that 424 paragraph, and Paragraph 424 is<br/>13 discussing the operation of the circuit in Figures 16<br/>14 and 17, correct?</p> <p>15 <b>A Yes.</b></p> <p>16 Q Okay. And if we look at the latter part<br/>17 of Paragraph 244 where it's discussing the TFT at<br/>18 1607, it says: When the TFT 1607 is on,<br/>19 initialization is performed.</p> <p>20 Do you see that?</p> <p>21 <b>A No. It says: When the TFT 1607 is on</b><br/>22 <b>and initialization is performed.</b></p> |

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| 237 | <p>1 Q So first let me ask: Do you have an</p> <p>2 understanding of what initialization means in the</p> <p>3 Kimura reference?</p> <p>4 A <b>My primary understanding in looking at</b></p> <p>5 <b>the issues that I opined on was that it's distinct</b></p> <p>6 <b>from erasure and that they are separate functions.</b></p> <p>7 <b>Initialization appears to be part of</b></p> <p>8 <b>programming the capacitor in Kimura.</b></p> <p>9 Q Let's go back to Kimura Figure 16A.</p> <p>10 Well, no. Let's actually look at Kimura Figure 17A,</p> <p>11 which shows an operational state of Figure 16A.</p> <p>12 Do you see Kimura Figure 17A?</p> <p>13 A <b>Yes.</b></p> <p>14 Q Okay. And you would agree with me that</p> <p>15 Figure 17A is the same circuit shown in Kimura Figure</p> <p>16 16A?</p> <p>17 A <b>Yes.</b></p> <p>18 Q And in Kimura Figure 17A, the transistor</p> <p>19 1607 is on, correct?</p> <p>20 A <b>Yes.</b></p> <p>21 Q And what is happening to the charge</p> <p>22 stored on the capacitor during the phase shown in</p> | 239 | <p>1 for Patent Owner?</p> <p>2 A <b>I spoke to Mr. Garr once.</b></p> <p>3 Q Did you and Mr. Garr discuss anything in</p> <p>4 relation to the substance of the testimony that you</p> <p>5 have given or may give in redirect examination?</p> <p>6 A <b>No.</b></p> <p>7 Q Both the '599 the patent and the Kimura</p> <p>8 reference discuss the concept of initialization,</p> <p>9 correct?</p> <p>10 A <b>Yes. Each one uses it in their own way,</b></p> <p>11 <b>in their own context, but they both discuss that</b></p> <p>12 <b>concept.</b></p> <p>13 Q How does Kimura -- strike that.</p> <p>14 How does Kimura's discussion of</p> <p>15 initialization differ from the '599 patent's</p> <p>16 discussion of initialization?</p> <p>17 A <b>Kimura limits it to very specific</b></p> <p>18 <b>embodiments and uses different circuit structures and</b></p> <p>19 <b>different timing and in, at least many of the</b></p> <p>20 <b>embodiments, combines it with a separate erasure.</b></p> <p>21 Q Would you agree that -- that, in the '599</p> <p>22 patent, the purpose of the initialization operation</p>                   |
| 238 | <p>1 Figure 17A?</p> <p>2 A <b>The voltage on that node that connects</b></p> <p>3 <b>the capacitor to 1308 drops, and that's what's</b></p> <p>4 <b>described as initialization in Paragraph 426.</b></p> <p>5 Q And in Kimura Figure 17A, do you see the</p> <p>6 signal line -- it's the second one from the bottom --</p> <p>7 where the charge is going?</p> <p>8 A <b>Yes. That is both the erase control line</b></p> <p>9 <b>and also a charge sink'd at various times.</b></p> <p>10 <b>So when it's not erasing, it can be a</b></p> <p>11 <b>charge sink.</b></p> <p>12 MR. JENSEN: Why don't we go ahead</p> <p>13 and take a short break.</p> <p>14 THE VIDEOGRAPHER: We are going off</p> <p>15 the record. The time is 4:00 p.m.</p> <p>16 (Brief pause.)</p> <p>17 THE VIDEOGRAPHER: We are back on</p> <p>18 the record. The time is 4:16 p.m.</p> <p>19 BY MR. JENSEN:</p> <p>20 Q Welcome back, Dr. Wolfe.</p> <p>21 Throughout the breaks that we have taken</p> <p>22 at the deposition today, have you spoken with counsel</p>                   | 240 | <p>1 is to discharge the storage capacitor prior to</p> <p>2 programming?</p> <p>3 A <b>I don't know that I would say discharge</b></p> <p>4 <b>it. It's to -- to set it at a -- at a predetermined</b></p> <p>5 <b>value.</b></p> <p>6 Q And by that, do you mean that the</p> <p>7 initialization operation could either charge the</p> <p>8 capacitor or discharge it, depending on the circuit</p> <p>9 design?</p> <p>10 A <b>Depending on the value of Vinit. So</b></p> <p>11 <b>Vinit doesn't have to be a specific value. It would</b></p> <p>12 <b>be selected for a particular embodiment, but it</b></p> <p>13 <b>doesn't always have to be a value that would</b></p> <p>14 <b>discharge the capacitor.</b></p> <p>15 Q And the value of Vinit is something that</p> <p>16 could be selected by the circuit designer?</p> <p>17 A <b>Yes, or potentially even the system</b></p> <p>18 <b>designer.</b></p> <p>19 Q Would you agree with me that there are at</p> <p>20 least some embodiments in Kimura in which a</p> <p>21 transistor is used to either charge or discharge the</p> <p>22 storage capacitor prior to programming?</p> |

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| 241 | <p>1     <b>A   In certain embodiments, that's true.</b></p> <p>2     Q   All right. Let's turn back to your</p> <p>3 report in Exhibit 2008, and I'll direct you to a</p> <p>4 particular section here in just a minute, but before</p> <p>5 we go there, let me ask you another -- another</p> <p>6 question:</p> <p>7       Do you have an understanding of the</p> <p>8 concept of reset in the pixel circuit context?</p> <p>9       MR. GARR: Objection.</p> <p>10      THE WITNESS: It could mean a lot</p> <p>11 of things depending on context.</p> <p>12 BY MR. JENSEN:</p> <p>13     Q   Could one of those things, depending on</p> <p>14 context, mean the same thing as initialization?</p> <p>15     <b>A   I'd have to see it in context. That's</b></p> <p>16 <b>not something I'm familiar with.</b></p> <p>17     Q   Would a POSITA refer to the function of</p> <p>18 discharging a capacitor to a predetermined known</p> <p>19 value as a form of resetting the capacitor in a pixel</p> <p>20 circuit?</p> <p>21     <b>A   Yeah. I'd have to see the context, but</b></p> <p>22 <b>that's not something I am familiar with.</b></p>                                                                       | 243 | <p>1     <b>A   It seems to be defined as VDD minus the</b></p> <p>2 <b>absolute value of the threshold voltage.</b></p> <p>3     Q   Do you know the purpose of the VReset</p> <p>4 voltage in Figure 17A?</p> <p>5     <b>A   I believe it's intended to initialize the</b></p> <p>6 <b>voltage on the capacitor prior to programming.</b></p> <p>7     Q   Do you know why Kimura calls that voltage</p> <p>8 VReset?</p> <p>9     <b>A   No.</b></p> <p>10    Q   Is it because --</p> <p>11    <b>A   I mean, it's also called erase sub i, and</b></p> <p>12 <b>it has other names.</b></p> <p>13    Q   Could it be called VReset because it's</p> <p>14 being use to do reset the voltage on the storage</p> <p>15 capacitor?</p> <p>16    <b>A   Could be, but I wouldn't try to correlate</b></p> <p>17 <b>that with anyone else's use of the word reset.</b></p> <p>18    Q   All right. Let's turn to your</p> <p>19 declaration starting at Paragraph 108.</p> <p>20    <b>A   Okay.</b></p> <p>21    Q   And this paragraph begins a section that</p> <p>22 you've labeled Objective Initiative of</p> |
| 242 | <p>1     Q   Okay. Well, let's -- let's look at</p> <p>2 Kimura then. That's Exhibit 1002, and I'll direct</p> <p>3 you to a paragraph here in just a moment. Let's go</p> <p>4 to Paragraph 425, and let me know when you have it.</p> <p>5     <b>A   I have it front of me.</b></p> <p>6     Q   Okay. And is Paragraph 425 discussing</p> <p>7 the Kimura embodiment shown in Figures 16 and 17?</p> <p>8     <b>A   Yes.</b></p> <p>9     Q   Okay. And we talked about the function</p> <p>10 of the transistor 1607 in Kimura Figure 16, correct?</p> <p>11    <b>A   Yes.</b></p> <p>12    Q   Do you know what voltage is applied to</p> <p>13 the capacitor when transistor 1607 is turned on?</p> <p>14    <b>A   I believe it would be whatever -- well,</b></p> <p>15 <b>it depends how it's turned on.</b></p> <p>16       <b>In the operation that's disclosed, it's</b></p> <p>17 <b>turned on when 1605 is turned off, and in that case,</b></p> <p>18 <b>it would be at the voltage of the erase line, which I</b></p> <p>19 <b>believe is low at this point in time.</b></p> <p>20    Q   Do you know what the voltage VReset</p> <p>21 refers to in Paragraph 425 that is discussing Figure</p> <p>22 17A?</p> | 244 | <p>1 Non-Obviousness for the '599 Patent, correct?</p> <p>2     <b>A   Yes.</b></p> <p>3     Q   And this goes on for a number of</p> <p>4 paragraphs, through almost the end of your report,</p> <p>5 correct --</p> <p>6     <b>A   Yes.</b></p> <p>7     Q   -- Paragraph 170?</p> <p>8     <b>A   Yes.</b></p> <p>9     Q   Okay. Is one of the things that you</p> <p>10 discuss in this section of your report aperture</p> <p>11 ratio?</p> <p>12    <b>A   I do discuss that in one area.</b></p> <p>13    Q   Okay. And what is aperture ratio in the</p> <p>14 context of a pixel circuit?</p> <p>15    <b>A   It's the percentage of the area at each</b></p> <p>16 <b>cell that is emitting light.</b></p> <p>17    Q   In 2003, what would be -- what would have</p> <p>18 been considered a good aperture ratio?</p> <p>19    <b>A   That's really a judgment call, but for</b></p> <p>20 <b>the bottom emitting displays that were kind of around</b></p> <p>21 <b>at the time, I think 30, 40 percent was typically</b></p> <p>22 <b>good.</b></p>                                                   |

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| <p>245</p> <p>1 Q What are some of the factors that</p> <p>2 determine the aperture ratio of a pixel circuit?</p> <p>3 A <b>It's whether the OLED material -- well,</b></p> <p>4 <b>of any pixel circuit or an AMOLED?</b></p> <p>5 Q Any pixel circuit.</p> <p>6 A <b>Yeah. It's just the ratio between the --</b></p> <p>7 <b>of the emitting area to the total pixel size, and</b></p> <p>8 <b>that's going to include different things depending on</b></p> <p>9 <b>what the technology is.</b></p> <p>10 Q And you mentioned AMOLED. So I'll ask</p> <p>11 you about that. What are the factors that contribute</p> <p>12 to the aperture ratio in an AMOLED pixel in the 2003</p> <p>13 time frame?</p> <p>14 A <b>It varies between top emitting and bottom</b></p> <p>15 <b>emitting displays. It's primarily an issue on bottom</b></p> <p>16 <b>emitting displays where the aperture ratio can be</b></p> <p>17 <b>limited by the number of transistors, the number of</b></p> <p>18 <b>row and column interconnects, the size of the</b></p> <p>19 <b>capacitor, the size of the transistors and then in</b></p> <p>20 <b>all display -- in all AMOLED displays, it's limited</b></p> <p>21 <b>by the required separation between pixels of</b></p> <p>22 <b>different colors and the -- the -- what's called the</b></p> | <p>247</p> <p>1 Q Okay. I'm happy to do the same, and how</p> <p>2 many conversations did you have with Mr. Ka?</p> <p>3 A <b>One.</b></p> <p>4 Q Approximately how long did that last?</p> <p>5 A <b>May be 40 minutes, 45 minutes.</b></p> <p>6 Q Prior to your conversation with Mr. Ka,</p> <p>7 did you know who he was?</p> <p>8 A <b>His role and level of expertise had been</b></p> <p>9 <b>explained to me.</b></p> <p>10 Q Prior to speaking with him in connection</p> <p>11 with preparing your declaration, had you ever</p> <p>12 previously spoken with Mr. Ka?</p> <p>13 A <b>No.</b></p> <p>14 Q Have you spoken with him since?</p> <p>15 A <b>No.</b></p> <p>16 Q Did Mr. Ka provide a declaration in this</p> <p>17 case?</p> <p>18 A <b>I don't know.</b></p> <p>19 Q Was any of the information that Mr. Ka</p> <p>20 provided to you given under oath?</p> <p>21 A <b>I didn't receive it under oath.</b></p> <p>22 Q Whose idea was it to speak with Mr. Ka?</p>                     |
| <p>246</p> <p>1 <b>black mask. The physical material that's used to</b></p> <p>2 <b>separate the pixels.</b></p> <p>3 Q Is one of the things that can affect the</p> <p>4 aperture ratio in the 2003 time frame the number of</p> <p>5 control signals that are used for a pixel circuit?</p> <p>6 A <b>If, by that, you're referring to the row</b></p> <p>7 <b>and column signals that I just mentioned, then that</b></p> <p>8 <b>would be yes.</b></p> <p>9 Q Would a POSITA have known that in 2003?</p> <p>10 A <b>Yes.</b></p> <p>11 Q Would a POSITA have known that one way to</p> <p>12 improve the aperture ratio of a pixel circuit would</p> <p>13 be to reduce the number of signal lines being used?</p> <p>14 A <b>In some cases, depending on a number of</b></p> <p>15 <b>other factors.</b></p> <p>16 Q Let's go to Paragraph 136 of your</p> <p>17 declaration, and in this paragraph, you reference a</p> <p>18 telephonic discussion you had with Jihyun Ka at</p> <p>19 Samsung, correct?</p> <p>20 A <b>Yes.</b></p> <p>21 Q And how do you pronounce his name?</p> <p>22 A <b>I called him Mr. Ka.</b></p>                                                                                                                                                                                                  | <p>248</p> <p>1 A <b>I don't recall who first came up with the</b></p> <p>2 <b>idea of speaking to an expert at Samsung. That came</b></p> <p>3 <b>out in a conversation with counsel, but Mr. Ka, as an</b></p> <p>4 <b>individual, was selected by counsel or the client.</b></p> <p>5 <b>Not by me.</b></p> <p>6 Q Does Mr. -- is Mr. Ka a native English</p> <p>7 speaker?</p> <p>8 A <b>I don't believe so. I spoke to him</b></p> <p>9 <b>through a translator.</b></p> <p>10 Q Was your conversation with Mr. Ka</p> <p>11 recorded?</p> <p>12 A <b>Not as far as I know.</b></p> <p>13 Q Do you speak Korean, Mr. Wolfe?</p> <p>14 A <b>Nothing beyond ordering at a restaurant.</b></p> <p>15 Q That's more than I can say.</p> <p>16 Is Mr. Ka an inventor on the '599 patent?</p> <p>17 A <b>I do not believe so.</b></p> <p>18 Q Is Mr. Ka a patent attorney, to your</p> <p>19 knowledge?</p> <p>20 MR. GARR: Objection.</p> <p>21 THE WITNESS: I don't know one way</p> <p>22 or the other.</p> |

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| 249 | 1 BY MR. JENSEN:<br>2 Q Did Mr. Ka perform an analysis to the<br>3 claims of the '599 patent?<br>4 A I don't know. I didn't discuss the<br>5 claims with him.<br>6 Q Did you speak with anyone else at Samsung<br>7 besides Mr. Ka?<br>8 A With respect to this matter, no.<br>9 Q Why did you speak with Mr. Ka?<br>10 A I had a number of questions, which are<br>11 reflected in the declaration, about the history of<br>12 commercial adoption of this technology, how it's used<br>13 within Samsung, what variations or embodiments of the<br>14 patent are currently in use, what measurements they<br>15 make to show its effectiveness.<br>16 So I asked him about some of those<br>17 things.<br>18 Q Let me follow-up on one of those topics.<br>19 You said, if I heard correctly, that you spoke to<br>20 Mr. Ka to understand what embodiments of the patent<br>21 are in use at Samsung; is that correct?<br>22 A Yes.                                                                                                                                                     | 251 | 1 as an OLED display.<br>2 Q Did you discuss the Galaxy S21 for<br>3 analysis?<br>4 A No, that was chosen by counsel as an<br>5 exemplar.<br>6 Q Do you know where they picked the Galaxy<br>7 S21?<br>8 A I don't. My understanding is it's -- my<br>9 understanding is that it's representative of the<br>10 Galaxy products.<br>11 Q Where, in your report, is your<br>12 independent analysis of the Galaxy S21 contained?<br>13 A It's in one of the exhibits, the claim<br>14 chart.<br>15 Q Is there -- is it anywhere in your<br>16 declaration?<br>17 A Yeah, Paragraph 137.<br>18 Q And that's the paragraph that refers to<br>19 Exhibit 2018 and 2019; is that correct?<br>20 A Yes, along with 2046.<br>21 Q And is your analysis of the Galaxy S21<br>22 contained in Paragraph 137, or is the analysis |
| 250 | 1 Q Why couldn't you make that determination<br>2 yourself?<br>3 A Maybe I could have, but I was asking him<br>4 the other questions, and I asked to see if he knew<br>5 the answer to that one, as well.<br>6 Q Did you undertake your own independent<br>7 analysis to determine what embodiments in the '599<br>8 patent are in use by Samsung?<br>9 A Yes, with respect to the Galaxy S21.<br>10 Q Did you conduct an analysis of any other<br>11 products besides the Galaxy S21 to determine whether<br>12 Samsung is using the embodiments of the '599 patent<br>13 in those other products?<br>14 A No. Because Mr. Ka represented that the<br>15 other displays are quite similar.<br>16 Q What do you mean by quite similar?<br>17 A That they use the same basic technology,<br>18 the same -- the same steps, that they are not --<br>19 that -- at least with respect to the diode connected<br>20 transistors and the compensation capability and the<br>21 initialization, that all those features are generally<br>22 present in most or all of what Samsung Display sells | 252 | 1 contained in a separate claim chart?<br>2 A The conclusion that the claims are<br>3 practiced is in 137, but the details of the analysis<br>4 are in a separate claim chart.<br>5 I do give a summary starting at Paragraph<br>6 140.<br>7 [REDACTED]<br>8 [REDACTED]<br>9 [REDACTED]<br>10 [REDACTED]<br>11 [REDACTED]<br>12 [REDACTED]<br>13 [REDACTED]<br>14 [REDACTED]<br>15 [REDACTED]<br>16 [REDACTED]<br>17 [REDACTED]<br>18 [REDACTED]<br>19 [REDACTED]<br>20 [REDACTED]<br>21 [REDACTED]<br>22 [REDACTED]                                                                                                                                                                                                                                                                                                  |

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| <p>253</p> <p>1 [REDACTED]</p> <p>2 [REDACTED]</p> <p>3 [REDACTED]</p> <p>4 [REDACTED]</p> <p>5 [REDACTED]</p> <p>6 Q So let's flip ahead a few paragraphs here</p> <p>7 to Paragraph 156 of your report.</p> <p>8 Do you see that?</p> <p>9 A Yes.</p> <p>10 Q And this is where you begin a subsection</p> <p>11 of your report titled Copying, correct?</p> <p>12 A Yes.</p> <p>13 Q And in the subsequent paragraph, 157, you</p> <p>14 include two pixel circuit images, correct?</p> <p>15 A Correct.</p> <p>16 Q And the one on the left is labeled</p> <p>17 Samsung Display AMOLED (Galaxy S21), correct?</p> <p>18 A Yes.</p> <p>19 Q And the image on the right is labeled</p> <p>20 Mianyang BOE AMOLED (iPhone 12), correct?</p> <p>21 A Yes.</p> <p>22 Q Where did the image in -- where did the</p>                                                                                                                                                           | <p>255</p> <p>1 produced in a prior litigation.</p> <p>2 Q That's not one of the ones that</p> <p>3 Dr. Silzars provided?</p> <p>4 A Not directly to me, no.</p> <p>5 Q And the image on the right has a number</p> <p>6 of annotations on it in white.</p> <p>7 Do you see those?</p> <p>8 A Yes.</p> <p>9 Q Who put those annotations there?</p> <p>10 A I don't know who put them on there, but I</p> <p>11 confirmed that they were accurate.</p> <p>12 Q Who prepared the Mianyang BOE AMOLED</p> <p>13 image that you relied on?</p> <p>14 A I don't know. It was represented to me</p> <p>15 that it was from the prior case, and it was an</p> <p>16 accurate image of the product, and based on that</p> <p>17 assumption, I analyzed it.</p> <p>18 Q Who did you rely on for that</p> <p>19 representation?</p> <p>20 A Was that one of the ones from</p> <p>21 Mr. Silzars? I don't recall. It could have been in</p> <p>22 a prior complaint.</p>                                                                                                                                                                          |
| <p>254</p> <p>1 Samsung display image come from?</p> <p>2 A A consultant was used to dismantle the</p> <p>3 phone and take a photograph of the pixel circuit with</p> <p>4 a microscope and then provide that to me.</p> <p>5 Q And who was that consultant?</p> <p>6 A I'll pull up his name. We have a</p> <p>7 declaration from him.</p> <p>8 Q Was it Mr. Aris Silzars?</p> <p>9 A Yes.</p> <p>10 Q And it might be Dr. Aris Silzars. I</p> <p>11 don't recall. I believe it is Dr. Silzars.</p> <p>12 Have you ever spoken with Dr. Silzars?</p> <p>13 A No.</p> <p>14 Q Did you ask Dr. Silzars to perform any</p> <p>15 work?</p> <p>16 A No. Just to give me copies of the</p> <p>17 photographs he had taken, and he had represented in a</p> <p>18 declaration that I read that those were accurate</p> <p>19 photographs.</p> <p>20 Q Where did the image on the right in</p> <p>21 Paragraph 157 come from?</p> <p>22 A I believe that was an image that was</p> | <p>256</p> <p>1 Q And I'll represent to you that Exhibit</p> <p>2 2047 that you cite is a District Court complaint. Do</p> <p>3 you know who prepared the District Court complaint</p> <p>4 that you relied on?</p> <p>5 A It's signed by a couple of attorneys,</p> <p>6 but, no, I don't know who prepared it.</p> <p>7 Q Do you see near the bottom of the BOE</p> <p>8 image there are three horizontal lines that, to me,</p> <p>9 look purple in color?</p> <p>10 A Yes.</p> <p>11 Q And how many horizontal lines are there</p> <p>12 in the Samsung image on the left near the bottom?</p> <p>13 A There are two. Those two intersect with</p> <p>14 some particular -- with a particular transistor, and</p> <p>15 only two of the three on the BOE phone intersect with</p> <p>16 a corresponding transistor.</p> <p>17 Q Do you know why there's an additional</p> <p>18 horizontal line in the BOE circuit relative to the</p> <p>19 Samsung circuit?</p> <p>20 A I do not. It does not seem to be</p> <p>21 interacting with the portion of the circuit that I'm</p> <p>22 looking at right now. It could be a second</p> |

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| <p>257</p> <p>1 <b>initialization voltage.</b></p> <p>2 Q Do you see on the top of the BOE image</p> <p>3 there are three horizontal purple lines labeled Vint</p> <p>4 1, Vint 2 and Sn-1?</p> <p>5 A <b>Yes.</b></p> <p>6 Q How many horizontal lines are there at</p> <p>7 the top of the Samsung circuit?</p> <p>8 A <b>Well, that's the same structure. It's</b></p> <p>9 <b>just shown twice.</b></p> <p>10 Q And how many transistors are in the BOE</p> <p>11 circuit?</p> <p>12 A <b>Seven.</b></p> <p>13 Q And how many transistors are disclosed in</p> <p>14 the embodiment of the '599 patent?</p> <p>15 A <b>There are only six that are required. As</b></p> <p>16 <b>I described in my declaration, Samsung commonly adds</b></p> <p>17 <b>a seventh in production.</b></p> <p>18 Q Have you ever prepared the circuit layout</p> <p>19 for a pixel circuit?</p> <p>20 A <b>Depends what you mean by prepared. I've</b></p> <p>21 <b>drawn them with respect to patent applications.</b></p> <p>22 Q For a commercial product?</p>                                                                                                                                                                                                                                                                   | <p>259</p> <p>1 <b>them.</b></p> <p>2 MR. JENSEN: Yes. I'll move to</p> <p>3 strike that answer.</p> <p>4 BY MR. JENSEN:</p> <p>5 Q My question is specifically with respect</p> <p>6 to just BOE.</p> <p>7 Do you have any evidence, besides the</p> <p>8 images in Paragraph 157, that supports your assertion</p> <p>9 that BOE copied Samsung?</p> <p>10 A <b>I really have done my best to answer</b></p> <p>11 <b>that. I don't know.</b></p> <p>12 I have one design that appears to me to</p> <p>13 be a copy that has been identified as being produced</p> <p>14 by BOE.</p> <p>15 There's a very limited number of OLED</p> <p>16 manufacturers. There are a number of other designs</p> <p>17 on the market that, in my opinion, have been copied,</p> <p>18 but I don't know who manufactured them.</p> <p>19 Q Well, so what other manufacturers are you</p> <p>20 asserting copied Samsung?</p> <p>21 A <b>Whoever manufactured these other displays</b></p> <p>22 <b>like the MobileSentry, the Injured Gadgets, the</b></p>                                                  |
| <p>258</p> <p>1 A <b>Not for a commercial product. I've done</b></p> <p>2 <b>it for teaching. I've done it for patent</b></p> <p>3 <b>applications, but not for a commercial product.</b></p> <p>4 I have drawn touch sensor circuits using</p> <p>5 similar structures and materials.</p> <p>6 Q Apart from the images in Paragraph 157 of</p> <p>7 your report, do you have any other basis for your</p> <p>8 assertion that BOE copied Samsung's '599 patent?</p> <p>9 A <b>All I did was compare the images. To the</b></p> <p>10 <b>extent that BOE has manufactured any of the other</b></p> <p>11 <b>products, that would be additional evidence, as well,</b></p> <p>12 <b>but I don't know the manufacturers.</b></p> <p>13 For purposes of secondary considerations,</p> <p>14 I was focused on widespread copying.</p> <p>15 Q And maybe I'll just ask that question</p> <p>16 again. With respect to just BOE, do you have any</p> <p>17 other evidence apart from the images in Paragraph 157</p> <p>18 that BOE copied Samsung?</p> <p>19 A <b>I'll try again. There's evidence that</b></p> <p>20 <b>many people have copied Samsung. I have not</b></p> <p>21 <b>personally linked any of the other copies to BOE, but</b></p> <p>22 <b>I have not attempted to determine whose manufactured</b></p> | <p>260</p> <p>1 <b>Mengtor, but, again, I -- my analysis was simply that</b></p> <p>2 <b>the wide -- that the copied products are widespread.</b></p> <p>3 <b>Not who in particular copied them.</b></p> <p>4 Q So let's -- you're referring to the</p> <p>5 images in Paragraph 160 and 161 of your report.</p> <p>6 A <b>Yes.</b></p> <p>7 Q And let's just walk through those. The</p> <p>8 first one I think is MobileSentry, correct?</p> <p>9 A <b>Yes.</b></p> <p>10 Q Is MobileSentry a display manufacturer?</p> <p>11 A <b>My understanding is that they sell the</b></p> <p>12 <b>display. I don't know if they manufacture it</b></p> <p>13 <b>themselves. I would doubt it.</b></p> <p>14 Q Do you know if MobileSentry designs</p> <p>15 their own pixel circuit?</p> <p>16 A <b>I don't.</b></p> <p>17 Q Do you know if Mengtor manufactures</p> <p>18 display?</p> <p>19 A <b>I don't know.</b></p> <p>20 Q Do you know if Mengtor designs displays?</p> <p>21 A <b>I don't know. I assume, again, you're</b></p> <p>22 <b>asking about pixel circuits. I don't know.</b></p> |

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| <p>261</p> <p>1 Q Does Phone LCD Parts manufacture</p> <p>2 displays?</p> <p>3 A <b>From scratch, I don't know.</b></p> <p>4 Q Does Phone LCD Parts design their own</p> <p>5 displays.</p> <p>6 A <b>I don't know.</b></p> <p>7 Q Does Mobile Defenders manufacture its own</p> <p>8 displays?</p> <p>9 A <b>I don't know.</b></p> <p>10 Q Does Mobile Defenders design its own</p> <p>11 displays?</p> <p>12 A <b>I don't know.</b></p> <p>13 Q Does Injured Gadgets manufacture its own</p> <p>14 displays?</p> <p>15 A <b>I don't know.</b></p> <p>16 Q Does Injured Gadgets -- oh, forget it.</p> <p>17 I've already asked. I'll just move on.</p> <p>18 Does Gadgetfix manufacture its only</p> <p>19 displays?</p> <p>20 A <b>I don't know.</b></p> <p>21 Q Does Gadgetfix design its own displays?</p> <p>22 A <b>I don't know.</b></p>                                                                                                                                | <p>263</p> <p>1 Q And what sentence in Paragraph 160 are</p> <p>2 you referring to?</p> <p>3 A <b>That based on the similarity between the</b></p> <p>4 <b>devices, the only reasonable inference one could draw</b></p> <p>5 <b>is that someone with access to the displays or</b></p> <p>6 <b>confidential technical information determined to</b></p> <p>7 <b>replicate the pixel circuits.</b></p> <p>8 Q And can you finish reading that sentence.</p> <p>9 A <b>In the MobileSentry product.</b></p> <p>10 Q Do you render an opinion anywhere in your</p> <p>11 report that any company other than MobileSentry</p> <p>12 copied Samsung?</p> <p>13 A <b>Paragraph 156.</b></p> <p>14 Q And what sentence are you referring to</p> <p>15 there?</p> <p>16 A <b>I have reviewed evidence indicating that</b></p> <p>17 <b>numerous display manufacturers, including Petitioner</b></p> <p>18 <b>Mianyang BOE, copied Samsung Display's patented pixel</b></p> <p>19 <b>service and replicated Samsung display's AMOLED</b></p> <p>20 <b>displays.</b></p> <p>21 Q Anything else?</p> <p>22 A <b>That's all that's here, and then, of</b></p>                                                       |
| <p>262</p> <p>1 Q Does Group Vertical manufacture its own</p> <p>2 displays?</p> <p>3 A <b>I don't know.</b></p> <p>4 Q Does Group Vertical design its own</p> <p>5 displays?</p> <p>6 A <b>I don't know.</b></p> <p>7 Q Would your answers be the same for the</p> <p>8 rest of the entities listed in Paragraph 161 of your</p> <p>9 report?</p> <p>10 A <b>Yes.</b></p> <p>11 Q Okay. Do you know if Samsung supplies</p> <p>12 displays for any of the companies listed in Paragraph</p> <p>13 161 of your report?</p> <p>14 A <b>I asked the Samsung representative, and</b></p> <p>15 <b>he told me no.</b></p> <p>16 Q And what representative was that?</p> <p>17 A <b>I don't recall if I asked counsel or</b></p> <p>18 <b>Mr. Ka, but I did inquire.</b></p> <p>19 Q Where in your report do you render an</p> <p>20 opinion that the companies in -- for which you</p> <p>21 provide images in Paragraph 161 copied Samsung?</p> <p>22 A <b>Paragraph 160.</b></p> | <p>264</p> <p>1 <b>course, I reference to the analysis. Let's see. No,</b></p> <p>2 <b>I think that's it.</b></p> <p>3 Q And in Paragraph 156, you say that</p> <p>4 numerous display manufacturers copied Samsung,</p> <p>5 correct?</p> <p>6 A <b>Yes.</b></p> <p>7 Q But none of the -- we just went through</p> <p>8 the litany of companies, and you didn't know if any</p> <p>9 of those were display manufacturers, correct?</p> <p>10 A <b>Well, they manufacture -- well, it</b></p> <p>11 <b>probably would have been more accurate to say display</b></p> <p>12 <b>distributors. It is possible that these are all</b></p> <p>13 <b>sourced from a small number or even a single</b></p> <p>14 <b>manufacturer, but they are all distinct designs or</b></p> <p>15 <b>many of them are distinct designs.</b></p> <p>16 Q And how can you tell that many of them</p> <p>17 are distinct designs?</p> <p>18 A <b>There are trivial minor variations in</b></p> <p>19 <b>measurements. That could be because they've been</b></p> <p>20 <b>copied from different Samsung products. So that is</b></p> <p>21 <b>also a possibility.</b></p> <p>22 Q Could the trivial differences also be due</p> |

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| <p>265</p> <p>1 to manufacturing tolerances?</p> <p>2 <b>A I don't think so.</b></p> <p>3 Q Why not?</p> <p>4 <b>A I think that they were likely copied from</b></p> <p>5 <b>multiple products rather than all being copied from</b></p> <p>6 <b>the S21.</b></p> <p>7 Q Well, in the interest of time, let's go</p> <p>8 ahead and move on here.</p> <p>9 You mentioned before, when we were</p> <p>10 discussing your [REDACTED]</p> <p>11 [REDACTED]</p> <p>12 [REDACTED] correct?</p> <p>13 <b>A</b> [REDACTED]</p> <p>14 [REDACTED]</p> <p>15 [REDACTED]</p> <p>16 [REDACTED]</p> <p>17 [REDACTED]</p> <p>18 [REDACTED]</p> <p>19 [REDACTED]</p> <p>20 [REDACTED]</p> <p>21 [REDACTED]</p> <p>22 [REDACTED]</p> | <p>267</p> <p>1 BY MR. JENSEN:</p> <p>2 Q Welcome back, Dr. Wolf.</p> <p>3 I wanted to ask you about one more</p> <p>4 exhibit that you reference and rely on in your</p> <p>5 report, and I'll direct your attention to Paragraph</p> <p>6 132 and 133. Let me know if you see that.</p> <p>7 <b>A I see that.</b></p> <p>8 Q And in those paragraphs, you're</p> <p>9 discussing an Exhibit 2015 titled Yoo, Y-O-O,</p> <p>10 correct?</p> <p>11 <b>A Yes.</b></p> <p>12 Q For what purpose do you rely on 2015?</p> <p>13 <b>A To demonstrate a long-standing technical</b></p> <p>14 <b>need. One of the things that paper describes is why</b></p> <p>15 <b>Samsung developed this technology and how they</b></p> <p>16 <b>recognized that there had been a long-time effort to</b></p> <p>17 <b>try to develop a commercially viable AMOLED display,</b></p> <p>18 <b>and the fact that the paper was published is another</b></p> <p>19 <b>indication of the fact that other people were</b></p> <p>20 <b>interested in the results.</b></p> <p>21 (Wolfe Deposition Exhibit No. 2015</p> <p>22 was marked for the record.)</p> |
| <p>266</p> <p>1 [REDACTED]</p> <p>2 [REDACTED]</p> <p>3 [REDACTED]</p> <p>4 [REDACTED]</p> <p>5 [REDACTED]</p> <p>6 [REDACTED]</p> <p>7 [REDACTED]</p> <p>8 [REDACTED]</p> <p>9 [REDACTED]</p> <p>10 [REDACTED]</p> <p>11 [REDACTED]</p> <p>12 [REDACTED]</p> <p>13 [REDACTED]</p> <p>14 [REDACTED]</p> <p>15 [REDACTED]</p> <p>16 MR. JENSEN: Why don't we go ahead</p> <p>17 and take a break, maybe a short one.</p> <p>18 THE VIDEOGRAPHER: We are going off</p> <p>19 the record. The time is 5:00 p.m.</p> <p>20 (Brief pause.)</p> <p>21 THE VIDEOGRAPHER: We are back on</p> <p>22 the record. The time is 5:06 p.m.</p>                                                                                     | <p>268</p> <p>1 BY MR. JENSEN:</p> <p>2 Q And let me introduce Exhibit 2015. Do</p> <p>3 you recognize this?</p> <p>4 <b>A I do.</b></p> <p>5 Q Okay. Did you read this article?</p> <p>6 <b>A Yes.</b></p> <p>7 Q And what is the title of the article?</p> <p>8 <b>A 302-Pixel Per Inch High-Resolution AMOLED</b></p> <p>9 <b>using Laser-Induced Thermal Imaging.</b></p> <p>10 Q And was this article authored by a number</p> <p>11 of Samsung employees?</p> <p>12 <b>A Yes.</b></p> <p>13 Q When you read this article, did you</p> <p>14 identify anything that you thought was incorrect or</p> <p>15 with which you disagreed?</p> <p>16 <b>A Not that I can recall.</b></p> <p>17 MR. JENSEN: Subject to any</p> <p>18 recross, I pass the witness.</p> <p>19 MR. GARR: Thanks. Can we take a</p> <p>20 15-minute break?</p> <p>21 MR. JENSEN: Yeah, are we off the</p> <p>22 record?</p>                                                                                                                                                                                                                                   |

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| 269 | 1 THE VIDEOGRAPHER: We are off the<br>2 record. The time is 5:08 p.m.<br>3 (Brief pause.)<br>4 THE VIDEOGRAPHER: We are back on<br>5 the record. The time is 5:25 p.m.<br>6 MR. GARR: Dr. Wolfe, I have a few<br>7 questions following up on some of the<br>8 testimony you gave prior to the break.<br>9 EXAMINATION<br>10 BY MR. GARR:<br>11 Q Counsel asked you about your opinions<br>12 relating to copying.<br>13 Do you remember that?<br>14 A Yes.<br>15 Q And counsel directed you to Paragraph 160<br>16 in which you noted about what the basis was for<br>17 opinions you had reached about copying with respect<br>18 to a MobileSentry product?<br>19 A Yes.<br>20 Q And what was the conclusion that you<br>21 reached, just to refresh the record, on whether the<br>22 pictures that you reviewed were indicative of copying                                                                                                                            | 271 | 1 Q And what products are you referring to?<br>2 A The products on Page 87, 88 and 89 of my<br>3 report – declaration.<br>4 Q Okay. Counsel also asked you about the<br>5 meaning of erasure with respect to the Kimura<br>6 reference.<br>7 Do you recall that?<br>8 A I do.<br>9 Q And did you provide direct testimony<br>10 about the meaning of erasure in your declaration?<br>11 A Yes, based on how it's been defined in<br>12 Kimura, among other things.<br>13 Q Okay. And where did you do that?<br>14 A Starting at Paragraph 82 and going at<br>15 least through 84.<br>16 Q Okay. And do you stand by the testimony<br>17 that you provided in Paragraphs 82, 83 and 84?<br>18 A Yes.<br>19 Q And can you explain what erasure means in<br>20 reference with Kimura?<br>21 MR. JENSEN: Object to form.<br>22 THE WITNESS: If we start at the |
| 270 | 1 with respect to the MobileSentry product?<br>2 A That the most reasonable inference was<br>3 that those products had been copied.<br>4 Q And what was the reason for that that you<br>5 found that that to be the most reasonable inference?<br>6 A Primarily the structural similarity at<br>7 the transistor and interconnect level, together with<br>8 the fact that these products could be substituted for<br>9 Samsung products.<br>10 Q And you also provided additional teardown<br>11 images of other replacement display products in<br>12 Paragraph 161, correct?<br>13 A Yes.<br>14 Q And did you form any opinions with<br>15 respect to those products as to whether the pictures<br>16 were indicative of copying?<br>17 A Yes.<br>18 Q And what was that conclusion?<br>19 A What I think is indicated in Paragraph<br>20 156, that the evidence leads to the inference – the<br>21 most reasonable inference is that also were copied<br>22 products. | 272 | 1 top of Page 40: Kimura uses erasure to<br>2 mean forcibly placing the<br>3 electroluminescent device in a<br>4 non-light-emitting state.<br>5 BY MR. GARR:<br>6 Q And what is the purpose of that<br>7 operation?<br>8 A It's what I call a blanking phase. It's<br>9 to make sure that the electroluminescent light is off<br>10 during periods where you may be changing from one<br>11 illumination level to another.<br>12 Q In Paragraph 84 of your declaration, you<br>13 cite to language from the Board's institution ruling.<br>14 Do you see that?<br>15 A Yes.<br>16 Q Could you read the part of the Board's<br>17 ruling that you quote in that paragraph?<br>18 MR. JENSEN: Object to form and<br>19 scope. I didn't ask any questions about<br>20 the Board's institutions decision in my<br>21 examination.<br>22 BY MR. GARR:           |

Conducted on May 17, 2024

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| <p>273</p> <p>1 Q You can answer.</p> <p>2 A <b>Paragraph 84: I note that the Board, in</b></p> <p>3 <b>instituting this IPR proceeding, agreed with Samsung</b></p> <p>4 <b>Display that Kimura uses "erasure" to mean forcibly</b></p> <p>5 <b>placing the EL device in a non-emitting state, citing</b></p> <p>6 <b>that Kimura at Paragraph 410, and that the erasure</b></p> <p>7 <b>transistor disclosed in Kimura "does not discharge</b></p> <p>8 <b>the capacitor to initialize the capacitor through the</b></p> <p>9 <b>EL device, dot, dot, dot, instead the EL device is</b></p> <p>10 <b>forcibly placed into a non-light-emitting state in an</b></p> <p>11 <b>erasure operation".</b></p> <p>12 Q The question is whether you would agree</p> <p>13 or disagree that the Board was accurate in its</p> <p>14 understanding of erasure as in the passages that you</p> <p>15 just read?</p> <p>16 MR. JENSEN: Object to form and</p> <p>17 scope.</p> <p>18 THE WITNESS: I agree that that is</p> <p>19 what Kimura teaches.</p> <p>20 BY MR. GARR:</p> <p>21 Q Did you also provide opinions in your</p> <p>22 declaration about what initialization means in the</p> | <p>275</p> <p>1 to use your two full hours of recross?</p> <p>2 MR. JENSEN: Merciful, no.</p> <p>3 THE VIDEOGRAPHER: I'll take us</p> <p>4 off.</p> <p>5 This marks the end of the</p> <p>6 deposition of Andrew Wolf, Ph.D.</p> <p>7 We are going off the record. The</p> <p>8 time is 5:34 p.m. Pacific.</p> <p>9</p> <p>10 (Thereupon, the deposition was</p> <p>11 concluded at approximately 5:34 p.m.)</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p>                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p>274</p> <p>1 context of Kimura?</p> <p>2 A <b>Yes, I believe so.</b></p> <p>3 Q And where did you do that?</p> <p>4 A <b>I believe that's primarily in Paragraph</b></p> <p>5 <b>83 where I point out the distinction between</b></p> <p>6 <b>initialization and erasure in Kimura.</b></p> <p>7 Q What is that distinction?</p> <p>8 A <b>That they happen during different time</b></p> <p>9 <b>periods. As I explained below, they don't start at</b></p> <p>10 <b>the same time, and the initialization period is</b></p> <p>11 <b>distinct from the erasure period in that they are not</b></p> <p>12 <b>co-extensive.</b></p> <p>13 MR. GARR: I have no further</p> <p>14 questions.</p> <p>15 MR. JENSEN: Thank you for your</p> <p>16 time, Dr. Wolfe.</p> <p>17 THE WITNESS: Okay. Thank you.</p> <p>18 THE VIDEOGRAPHER: Anything else</p> <p>19 before we close out, Counsel?</p> <p>20 MR. JENSEN: Nothing from</p> <p>21 Petitioner.</p> <p>22 MR. GARR: Travis, you're not going</p>                                                                                                                                                                                 | <p>276</p> <p>1 CERTIFICATE OF SHORTHAND REPORTER - NOTARY PUBLIC</p> <p>2 I, Tanya L. Verhoven-Page, Reporter and Notary</p> <p>3 Public within and for the State of Georgia do hereby</p> <p>4 certify:</p> <p>5 That Andrew Wolfe, Ph.D., the witness whose</p> <p>6 deposition is hereinbefore set forth, was duly sworn</p> <p>7 by me before the commencement of such deposition and</p> <p>8 that such deposition was taken before me and is a</p> <p>9 true record of the testimony given by such witness.</p> <p>10 I further certify that the adverse party,</p> <p>11 Petitioner, was represented by counsel at the</p> <p>12 deposition.</p> <p>13 I further certify that the deposition of Andrew</p> <p>14 Wolfe, Ph.D. occurred via Zoom conference (Santa</p> <p>15 Clara, California), on Friday, May 17, 2024,</p> <p>16 commencing at 9:01 a.m. to 5:34 p.m.</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> |

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

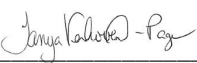
7 IN WITNESS WHEREOF, I have hereunto set my hand  
8 this 19th day of May, 2024.

9 My commission expires:  
10 April 31, 2026

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15 NOTARY PUBLIC IN AND FOR THE  
16 STATE OF GEORGIA

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