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# Transcript of Dr. E. Fred Schubert

**Date:** December 9, 2024

**Case:** Xu Peicheng Optoelectronic Technology Co. -v- Semisilicon Technology Corp (PTAB)

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WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

1 UNITED STATES PATENT AND TRADEMARK OFFICE

2  
3 BEFORE THE PATENT TRIAL AND APPEAL BOARD

4  
5 Xu Peicheng (Hong Kong) Optoelectronic Technology  
6 Co., Limited,

7 Petitioner,

8 V.

9 Semisilicon Technology Corp.,

10 Patent Owner.

11  
12 Case No. IPR2024-00156  
U.S. Patent No. 8,884,546

13  
14 ORAL AND REALTIMED DEPOSITION OF

15 DR. E. FRED SCHUBERT

16 DECEMBER 9, 2024

17 TAKEN VIA ZOOM VIDEOCONFERENCE

18  
19 JOB NO.: 563718

20 PAGES: 1 - 95

21 REPORTED BY: ANNETTE PELTIER

1           ORAL AND REALTIMED DEPOSITION OF DR. E. FRED  
2           SCHUBERT, produced as a witness at the instance  
3           of the Patent Owner, and duly sworn, was taken in  
4           the above-styled and numbered cause on  
5           December 9, 2024, from 9:00 a.m. to 12:41 p.m.,  
6           Eastern Standard Time before Annette Peltier,  
7           CSR, Texas Certified Realtime Reporter, in and  
8           for the State of Texas, reported by machine  
9           shorthand pursuant to the PTAB Rules of Civil  
10          Procedure and the provisions stated on the record  
11          or attached hereto.

A P P E A R A N C E S

(All appearing via Zoom videoconference)

ON BEHALF OF THE PATENT OWNER:

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\* \* \* \* \*

Transcript of Dr. E. Fred Schubert  
Conducted on December 9, 2024

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|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | THE COURT REPORTER: I see you're                  | 08:56:16 |
| 2  | both on realtime.                                 | 08:56:23 |
| 3  | There's a same day rough                          | 08:56:30 |
| 4  | available. Do you both want that?                 | 08:56:32 |
| 5  | MR. RAJAN: Yes, please.                           | 08:56:33 |
| 6  | MR. HANDY: Yes, that would be                     | 08:56:34 |
| 7  | good, thanks.                                     | 08:56:36 |
| 8  | THE COURT REPORTER: Sure.                         | 08:56:38 |
| 9  | And then I was told the final                     | 08:56:44 |
| 10 | should be ready on the 12th, which is three days, | 08:56:45 |
| 11 | I think.                                          | 08:56:45 |
| 12 | Do you both want that on the 12th?                | 08:56:47 |
| 13 | MR. RAJAN: Yes, please.                           | 08:56:51 |
| 14 | MR. HANDY: Yeah, that would be                    | 08:56:55 |
| 15 | good for petitioner, as well, thanks.             | 08:56:58 |
| 16 | ERIC FRED SCHUBERT,                               | 08:59:25 |
| 17 | Having been first duly sworn, testified upon his  | 08:59:25 |
| 18 | oath as follows:                                  | 08:59:39 |
| 19 | EXAMINATION                                       | 08:59:39 |
| 20 | BY MR. RAJAN:                                     | 08:59:40 |
| 21 | Q. Good morning, Dr. Schubert.                    | 08:59:40 |
| 22 | A. Good morning.                                  | 08:59:54 |

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Transcript of Dr. E. Fred Schubert  
Conducted on December 9, 2024

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|    |                                                 |          |
|----|-------------------------------------------------|----------|
| 1  | Q. Could you please state your full name for    | 08:59:54 |
| 2  | the record?                                     | 08:59:58 |
| 3  | A. Yes. Eric Fred Schubert.                     | 08:59:58 |
| 4  | Q. And have you been deposed before?            | 09:00:07 |
| 5  | A. Yes.                                         | 09:00:11 |
| 6  | Q. How many times have you been deposed?        | 09:00:11 |
| 7  | A. More than 30 times.                          | 09:00:15 |
| 8  | Q. And when was your most recent deposition?    | 09:00:19 |
| 9  | A. In the summer of 2024.                       | 09:00:28 |
| 10 | Q. So in your over 30 depositions, were you     | 09:00:36 |
| 11 | deposed in your position as a technical expert? | 09:00:39 |
| 12 | A. Yes.                                         | 09:00:46 |
| 13 | Q. Were you deposed in any other capacity       | 09:00:46 |
| 14 | other than technical expert?                    | 09:00:51 |
| 15 | A. Yes.                                         | 09:01:03 |
| 16 | Q. Can you explain?                             | 09:01:07 |
| 17 | A. In about 2010, I was the patent owner in a   | 09:01:11 |
| 18 | litigation that related to LEDs; and in that    | 09:01:25 |
| 19 | litigation, I believe I was deposed as          | 09:01:31 |
| 20 | potentially a fact witness.                     | 09:01:39 |
| 21 | Q. Do you recall what the patent was about in   | 09:01:42 |
| 22 | that case?                                      | 09:01:46 |

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Transcript of Dr. E. Fred Schubert  
Conducted on December 9, 2024

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|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | A. The patent was on crystallographic wet         | 09:01:50 |
| 2  | chemical etching of gallium nitride.              | 09:01:56 |
| 3  | Q. Is that related to LED fabrication?            | 09:02:04 |
| 4  | A. Yes, among other things.                       | 09:02:19 |
| 5  | Q. So, Dr. Schubert, today I'm going to go        | 09:02:25 |
| 6  | over a couple of housekeeping items.              | 09:02:28 |
| 7  | I'll be asking questions. You'll be               | 09:02:30 |
| 8  | providing answers. And as you can see, we have a  | 09:02:33 |
| 9  | court reporter with us to record the              | 09:02:35 |
| 10 | conversation, and a transcript will be prepared.  | 09:02:37 |
| 11 | So in order for the reporter to                   | 09:02:40 |
| 12 | understand your answers, I'd just ask that you    | 09:02:42 |
| 13 | provide clear verbal answers, like "yes" or "no." | 09:02:44 |
| 14 | And silent responses, like shaking your head or   | 09:02:48 |
| 15 | nonverbal answers such as "uh-huh" won't be       | 09:02:51 |
| 16 | helpful for developing a clear transcript.        | 09:02:55 |
| 17 | Does that sound fair?                             | 09:02:56 |
| 18 | A. Yes.                                           | 09:02:58 |
| 19 | Q. If you don't understand any of my              | 09:03:00 |
| 20 | questions, please let me know what you don't      | 09:03:06 |
| 21 | understand about the question. Okay?              | 09:03:09 |
| 22 | A. Yes.                                           | 09:03:10 |

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|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | Q. If I ask a question and you answer it,         | 09:03:13 |
| 2  | I'll assume that you understood the question; is  | 09:03:16 |
| 3  | that fair?                                        | 09:03:19 |
| 4  | A. Yes.                                           | 09:03:19 |
| 5  | Q. Now, at times counsel may object to a          | 09:03:22 |
| 6  | question, but you're generally required to answer | 09:03:27 |
| 7  | the question. Okay?                               | 09:03:30 |
| 8  | A. Understood.                                    | 09:03:34 |
| 9  | Q. And you understand that you're under oath      | 09:03:35 |
| 10 | today as if you were sworn to tell the truth as   | 09:03:39 |
| 11 | if you were in a courtroom with a judge and a     | 09:03:42 |
| 12 | jury, right?                                      | 09:03:44 |
| 13 | A. Understood, yes.                               | 09:03:48 |
| 14 | Q. Dr. Schubert, have you taken any               | 09:03:49 |
| 15 | medication that would prevent you from giving     | 09:03:54 |
| 16 | full and truthful answers today?                  | 09:03:56 |
| 17 | A. No.                                            | 09:03:59 |
| 18 | Q. And is there anything that would prevent       | 09:04:01 |
| 19 | you from giving me full and truthful testimony    | 09:04:03 |
| 20 | today?                                            | 09:04:05 |
| 21 | A. No.                                            | 09:04:07 |
| 22 | Q. Now, because we're meeting virtually and       | 09:04:10 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | we aren't in the same room, I just have to ask a  | 09:04:15 |
| 2  | few questions about the room that you're in       | 09:04:18 |
| 3  | today.                                            | 09:04:20 |
| 4  | Where are you currently located                   | 09:04:20 |
| 5  | physically?                                       | 09:04:22 |
| 6  | A. I'm located in my office at RPI. That is       | 09:04:24 |
| 7  | Rensselaer Polytechnic Institute, which, in turn, | 09:04:34 |
| 8  | is located in Troy, New York.                     | 09:04:41 |
| 9  | Q. And are there other people in the room         | 09:04:45 |
| 10 | with you?                                         | 09:04:48 |
| 11 | A. No.                                            | 09:04:49 |
| 12 | Q. Do you have the ability to speak or text       | 09:04:50 |
| 13 | to other people while you're being deposed other  | 09:04:56 |
| 14 | than the people on this Zoom call?                | 09:05:01 |
| 15 | A. I have my Smartphone in my room, but I'm       | 09:05:02 |
| 16 | currently not using it.                           | 09:05:07 |
| 17 | Q. Okay. Can we agree that if you get any         | 09:05:09 |
| 18 | communications by text or e-mail or chat or       | 09:05:13 |
| 19 | otherwise today that you just let me know?        | 09:05:16 |
| 20 | A. I put my Smartphone on mute, so I may not      | 09:05:21 |
| 21 | realize if there is an incoming e-mail.           | 09:05:26 |
| 22 | Q. If you do realize that you receive a           | 09:05:32 |

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | communication, you'll let me know, right?        | 09:05:35 |
| 2  | A. If that is what you want, I can do that.      | 09:05:39 |
| 3  | Q. Thank you.                                    | 09:05:42 |
| 4  | Do you have any files or windows open            | 09:05:43 |
| 5  | on your computer besides this Zoom meeting?      | 09:05:47 |
| 6  | A. So just for clarification, you want me to     | 09:05:51 |
| 7  | monitor my e-mails and text messages, and when   | 09:05:54 |
| 8  | one comes up, I should notify you? Is that what  | 09:05:56 |
| 9  | you want?                                        | 09:05:59 |
| 10 | Q. Thanks for asking for clarification.          | 09:06:00 |
| 11 | So I'm just asking that if you do                | 09:06:03 |
| 12 | receive a notification such as -- sometimes a    | 09:06:06 |
| 13 | notification could still come through on a       | 09:06:10 |
| 14 | Smartphone that's in silent mode.                | 09:06:14 |
| 15 | If you do receive a notification or              | 09:06:16 |
| 16 | some kind of message in some other means, if you | 09:06:19 |
| 17 | could just let me know, but not that you should  | 09:06:21 |
| 18 | actively monitor anything.                       | 09:06:23 |
| 19 | Does that make sense?                            | 09:06:29 |
| 20 | A. Okay. Sure.                                   | 09:06:33 |
| 21 | Q. Thank you.                                    | 09:06:35 |
| 22 | So do you have any files or windows              | 09:06:37 |

Transcript of Dr. E. Fred Schubert  
Conducted on December 9, 2024

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|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | open on your computer besides this Zoom meeting?  | 09:06:40 |
| 2  | A. I just switched off my e-mail, and now I       | 09:06:44 |
| 3  | have only the Zoom video window open.             | 09:06:50 |
| 4  | Q. Do you have any printed or written             | 09:06:57 |
| 5  | materials related to this deposition on your desk | 09:07:01 |
| 6  | or within view in the room?                       | 09:07:04 |
| 7  | A. No.                                            | 09:07:07 |
| 8  | Q. Okay. So we'll take breaks about every         | 09:07:07 |
| 9  | hour, but if you need a break at any time, please | 09:07:12 |
| 10 | just let me know. Okay?                           | 09:07:15 |
| 11 | A. Sure.                                          | 09:07:18 |
| 12 | Q. And before we take a break, I would just       | 09:07:21 |
| 13 | ask that you complete your answer to any question | 09:07:24 |
| 14 | that's pending; is that fair?                     | 09:07:27 |
| 15 | A. Yes.                                           | 09:07:29 |
| 16 | Q. And do you agree that you won't discuss        | 09:07:35 |
| 17 | the substance of your testimony with counsel      | 09:07:37 |
| 18 | during any break?                                 | 09:07:39 |
| 19 | A. I do agree.                                    | 09:07:43 |
| 20 | Q. Thank you.                                     | 09:07:47 |
| 21 | Dr. Schubert, what did you do to                  | 09:07:48 |
| 22 | prepare for this deposition?                      | 09:07:51 |

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Transcript of Dr. E. Fred Schubert  
Conducted on December 9, 2024

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|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | A. I reviewed my first report of the fall         | 09:07:55 |
| 2  | 2023, I reviewed my second report of fall 2024, I | 09:08:07 |
| 3  | reviewed the '546 patent, I reviewed the prior    | 09:08:18 |
| 4  | art references, I reviewed Dr. Lebby's report,    | 09:08:30 |
| 5  | and I met with counsel on Friday.                 | 09:08:49 |
| 6  | Q. How much time did you spend preparing for      | 09:09:05 |
| 7  | the deposition overall?                           | 09:09:07 |
| 8  | A. I don't know off the top of my head.           | 09:09:09 |
| 9  | Q. Would you say more than 10 hours?              | 09:09:31 |
| 10 | A. Yes, more than 10 hours.                       | 09:09:37 |
| 11 | Q. More than 20 hours?                            | 09:09:38 |
| 12 | A. Well, that is a possibility.                   | 09:09:49 |
| 13 | Q. Would you say more than 30 hours to            | 09:09:52 |
| 14 | prepare?                                          | 09:09:56 |
| 15 | A. No.                                            | 09:09:58 |
| 16 | Q. And how long did you meet with counsel on      | 09:10:01 |
| 17 | Friday?                                           | 09:10:10 |
| 18 | A. Two hours.                                     | 09:10:11 |
| 19 | Q. Who specifically did you meet with on          | 09:10:27 |
| 20 | Friday?                                           | 09:10:32 |
| 21 | A. Attorney John Handy.                           | 09:10:36 |
| 22 | Q. And anyone else?                               | 09:10:41 |

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|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | A. No.                                           | 09:10:47 |
| 2  | Q. Aside from your fall 2023 report, your        | 09:10:47 |
| 3  | fall 2024 report, the '546 patent, and the prior | 09:11:00 |
| 4  | art references and Dr. Lebby's report, did you   | 09:11:06 |
| 5  | review any other documents?                      | 09:11:09 |
| 6  | MR. HANDY: Privileged                            | 09:11:31 |
| 7  | communications.                                  | 09:11:32 |
| 8  | A. I may have reviewed the patent owner          | 09:11:38 |
| 9  | preliminary response and the patent owner        | 09:11:54 |
| 10 | response and the petition.                       | 09:12:00 |
| 11 | BY MR. RAJAN:                                    | 09:12:00 |
| 12 | Q. Did you review any other documents that       | 09:12:14 |
| 13 | are not exhibits or papers in this proceeding?   | 09:12:16 |
| 14 | MR. HANDY: Objection to the                      | 09:12:22 |
| 15 | extent it calls for privileged communications.   | 09:12:23 |
| 16 | A. I recall that I looked at the institution     | 09:12:33 |
| 17 | decision of the PTAB, P-T-A-B.                   | 09:12:37 |
| 18 | BY MR. RAJAN:                                    | 09:12:52 |
| 19 | Q. Any other documents?                          | 09:12:57 |
| 20 | MR. HANDY: Same objection.                       | 09:13:00 |
| 21 | A. I recall that I looked at                     | 09:13:19 |
| 22 | Merriam-Webster's Dictionary related to the word | 09:13:23 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | "synchronous."                                    | 09:13:41 |
| 2  | BY MR. RAJAN:                                     | 09:13:48 |
| 3  | Q. And that is not an exhibit in this             | 09:13:48 |
| 4  | proceeding; is that right?                        | 09:13:50 |
| 5  | A. I'm not sure.                                  | 09:13:52 |
| 6  | Q. And did you select all of the documents        | 09:13:59 |
| 7  | for review, or were they provided to you?         | 09:14:07 |
| 8  | A. I'm not sure if I understand the question.     | 09:14:12 |
| 9  | The report, for example, or, better,              | 09:14:33 |
| 10 | the declaration, is something that I created, and | 09:14:40 |
| 11 | I'm not sure if that was provided to me or I      | 09:14:50 |
| 12 | created myself. I mean, I created it myself,      | 09:14:52 |
| 13 | but -- I don't understand the question.           | 09:15:02 |
| 14 | Q. Sure. I'll rephrase it.                        | 09:15:04 |
| 15 | So the documents that you reviewed for            | 09:15:06 |
| 16 | your deposition today, was that list of documents | 09:15:08 |
| 17 | provided to you for review, or did you ask to     | 09:15:12 |
| 18 | review each of those documents?                   | 09:15:14 |
| 19 | MR. HANDY: Objection to the                       | 09:15:20 |
| 20 | extent it calls for privileged discussion.        | 09:15:21 |
| 21 | A. I decided which documents I wished to          | 09:15:26 |
| 22 | review.                                           | 09:15:33 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | BY MR. RAJAN:                                     | 09:15:34 |
| 2  | Q. And did you also decide to look up the         | 09:15:36 |
| 3  | definition of "synchronous" in the                | 09:15:41 |
| 4  | Merriam-Webster Dictionary yourself, as well?     | 09:15:43 |
| 5  | A. I believe that during my review, I             | 09:15:48 |
| 6  | reviewed my notes, and my notes included a note   | 09:16:00 |
| 7  | that I had looked up the Merriam-Webster          | 09:16:09 |
| 8  | Dictionary in the past.                           | 09:16:19 |
| 9  | So at this time or, better, during the            | 09:16:20 |
| 10 | last week, I did not go to the Merriam-Webster    | 09:16:26 |
| 11 | Dictionary, but in my notes I had a note that I   | 09:16:31 |
| 12 | looked up the Merriam-Webster Dictionary in the   | 09:16:36 |
| 13 | past. And my notes included what was written in   | 09:16:41 |
| 14 | the Merriam-Webster Dictionary.                   | 09:16:48 |
| 15 | Q. Do you recall what was written in the          | 09:16:56 |
| 16 | Merriam-Webster Dictionary?                       | 09:16:57 |
| 17 | A. It was a definition of the word                | 09:17:04 |
| 18 | "synchronous," and I believe that it included the | 09:17:19 |
| 19 | words "at the same time."                         | 09:17:25 |
| 20 | Q. Was that the entire definition?                | 09:17:35 |
| 21 | A. I do not recall the entire definition.         | 09:17:42 |
| 22 | Q. And this was not a definition that you         | 09:17:44 |

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | chose to include in either of your reports,      | 09:17:49 |
| 2  | right?                                           | 09:17:51 |
| 3  | MR. HANDY: Objection, form.                      | 09:17:55 |
| 4  | A. I don't think that's correct.                 | 09:18:05 |
| 5  | I believe that in my reports I                   | 09:18:06 |
| 6  | expressed my understanding that controlling in a | 09:18:14 |
| 7  | synchronous manner means controlling at the same | 09:18:22 |
| 8  | time.                                            | 09:18:27 |
| 9  | BY MR. RAJAN:                                    | 09:18:30 |
| 10 | Q. My question was specifically that you         | 09:18:36 |
| 11 | chose not to cite to the Merriam-Webster         | 09:18:38 |
| 12 | Dictionary definition in your reports, correct?  | 09:18:42 |
| 13 | MR. HANDY: Objection, form.                      | 09:18:45 |
| 14 | A. I would need to look at my report to          | 09:18:46 |
| 15 | confirm this.                                    | 09:18:59 |
| 16 | BY MR. RAJAN:                                    | 09:19:02 |
| 17 | Q. Are there any other documents that you        | 09:19:06 |
| 18 | reviewed in preparation for today's deposition?  | 09:19:07 |
| 19 | MR. HANDY: Objection to the                      | 09:19:14 |
| 20 | extent it calls for privileged communication.    | 09:19:15 |
| 21 | A. I don't recall any other documents at this    | 09:19:34 |
| 22 | time.                                            | 09:19:36 |

Transcript of Dr. E. Fred Schubert  
Conducted on December 9, 2024

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|    |                                                 |          |
|----|-------------------------------------------------|----------|
| 1  | BY MR. RAJAN:                                   | 09:19:36 |
| 2  | Q. Dr. Schubert, I'm passing through the        | 09:19:54 |
| 3  | chat a document that's marked in this matter as | 09:19:55 |
| 4  | Petitioner's Exhibit EX1003.                    | 09:20:03 |
| 5  | Please let me know once you've                  | 09:20:09 |
| 6  | downloaded it and if you're able to open it. I  | 09:20:12 |
| 7  | will also share it here so we can all see.      | 09:20:23 |
| 8  | A. Yes, I have downloaded the document.         | 09:20:49 |
| 9  | Q. Do you recognize EX1003, Dr. Schubert?       | 09:20:52 |
| 10 | A. I'm a bit confused about the document        | 09:21:29 |
| 11 | because the file name says, "Declaration of     | 09:21:32 |
| 12 | Dr. Schneider."                                 | 09:21:38 |
| 13 | Q. Yes, that's right.                           | 09:21:43 |
| 14 | Do you know a Dr. Schneider?                    | 09:21:47 |
| 15 | A. I don't know who that is.                    | 09:22:12 |
| 16 | Q. Okay. The first page of this file says       | 09:22:17 |
| 17 | that it is the declaration of E. Fred Schubert, | 09:22:19 |
| 18 | Ph.D., correct?                                 | 09:22:24 |
| 19 | A. Correct.                                     | 09:22:31 |
| 20 | Q. But as you noted, the file name says,        | 09:22:31 |
| 21 | "Declaration of Dr. Schneider," right?          | 09:22:38 |
| 22 | A. Right.                                       | 09:22:43 |

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1 Q. Is this a -- this was one of the files 09:22:52  
2 that you reviewed in preparation for today's 09:22:54  
3 deposition, right? 09:22:56

4 A. Assuming that the file name is a mistake, 09:23:38  
5 you know, that is -- Dr. Schneider has nothing to 09:23:42  
6 do with this report. Assuming that this is the 09:23:53  
7 case and assuming that this is my report, then I 09:23:58  
8 have reviewed this report in preparation for the 09:24:15  
9 deposition. 09:24:17

10 Q. Did you review a paper copy of this report 09:24:20  
11 or the electronic file in preparing for your 09:24:24  
12 deposition? 09:24:27

13 A. Electronic file. 09:24:31

14 Q. And the file that you reviewed did not 09:24:32  
15 have the -- the name "Dr. Schneider" in the file 09:24:37  
16 name; is that right? 09:24:46

17 A. I'm happy to check, but I believe that the 09:24:54  
18 report that I reviewed did not have 09:25:01  
19 "Dr. Schneider" in the file name. 09:25:06

20 Q. Do you recall what the file name was of 09:25:15  
21 your original report that you reviewed? 09:25:18

22 A. It may have had the following words in the 09:25:24

Transcript of Dr. E. Fred Schubert  
Conducted on December 9, 2024

19

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | file name: "2023," "declaration," "EFS," "IPR,"  | 09:25:29 |
| 2  | "'546" but I don't recall the exact file name.   | 09:25:44 |
| 3  | Q. The file that you reviewed in preparation     | 09:25:54 |
| 4  | for your deposition had your signature, correct? | 09:25:57 |
| 5  | A. Correct.                                      | 09:26:04 |
| 6  | Q. If I scroll down to Page 96 of this file      | 09:26:04 |
| 7  | of EX1003, which is numbered Page 92, that is    | 09:26:24 |
| 8  | your signature, correct?                         | 09:26:29 |
| 9  | A. Yes.                                          | 09:26:33 |
| 10 | Q. And the file that you reviewed in             | 09:26:33 |
| 11 | preparation for today's deposition also had the  | 09:26:38 |
| 12 | same execution date?                             | 09:26:42 |
| 13 | A. I think it was fall of 2023. I believe it     | 09:26:44 |
| 14 | was October, but I do not recall the date. I do  | 09:26:53 |
| 15 | not recall that it was October 16, 2023. I do    | 09:27:03 |
| 16 | recall that it was 2023 and probably October.    | 09:27:12 |
| 17 | Q. Do you have any reason to doubt that you      | 09:27:18 |
| 18 | signed the declaration on October 16th, 2023?    | 09:27:21 |
| 19 | A. No.                                           | 09:27:32 |
| 20 | Q. Dr. Schubert, what was your involvement in    | 09:27:32 |
| 21 | preparing this declaration?                      | 09:27:40 |
| 22 | A. I reviewed the challenged patent, the '546    | 09:27:51 |

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1 patent, and I reviewed various prior art

09:28:09

2 articles; and based on my review and based on

09:28:19

3 communication with counsel, I composed this

09:28:26

4 report.

09:28:35

5 Q. Did you prepare the first draft of the  
6 report yourself?

09:28:39

09:28:41

7 A. I do not recall. It's more than a year  
8 ago.

09:29:08

09:29:11

9 Q. Do you recall if you were provided with a  
10 draft?

09:29:13

09:29:15

11 MR. HANDY: Objection to the  
12 extent it calls for privileged communications.

09:29:19

09:29:19

13 A. I would need to speculate. I do not  
14 recall. It's more than a year ago.

09:29:48

09:29:52

15 BY MR. RAJAN:

09:29:57

16 Q. So what was counsel's involvement in  
17 preparing this declaration?

09:29:57

09:30:00

18 MR. HANDY: Objection, calls for  
19 privilege.

09:30:02

09:30:05

20 Cautioning the witness not to  
21 disclose any privileged communications.

09:30:14

09:30:16

22 A. Counsel informed me on the legal

09:30:25

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | background of the proceeding.                     | 09:30:27 |
| 2  | BY MR. RAJAN:                                     | 09:30:40 |
| 3  | Q. Did you draft all the technical positions      | 09:30:40 |
| 4  | in your declaration?                              | 09:30:42 |
| 5  | MR. HANDY: Objection, vague.                      | 09:30:51 |
| 6  | A. I do not recall details. This declaration      | 09:31:01 |
| 7  | was prepared more than a year ago.                | 09:31:07 |
| 8  | BY MR. RAJAN:                                     | 09:31:10 |
| 9  | Q. So you're unable to recall whether you         | 09:31:14 |
| 10 | yourself drafted the technical positions that are | 09:31:16 |
| 11 | in your original declaration?                     | 09:31:18 |
| 12 | MR. HANDY: Objection,                             | 09:31:21 |
| 13 | mischaracterizes testimony.                       | 09:31:22 |
| 14 | A. I submitted this report in October 2023,       | 09:31:32 |
| 15 | and I reviewed various documents in preparation   | 09:31:39 |
| 16 | for authoring this declaration, the October 2023  | 09:31:53 |
| 17 | declaration. I communicated with counsel.         | 09:32:03 |
| 18 | Ultimately, I signed the report. It's my report.  | 09:32:13 |
| 19 | And I do not recall all the details that led to   | 09:32:27 |
| 20 | the report.                                       | 09:32:41 |
| 21 | Generally, I communicate with counsel             | 09:32:42 |
| 22 | and I articulate my opinions. I express my        | 09:32:52 |

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | positions in the report, and once I am satisfied | 09:33:00 |
| 2  | with all positions and all opinions and          | 09:33:11 |
| 3  | everything that goes into my report, I sign the  | 09:33:19 |
| 4  | report.                                          | 09:33:24 |
| 5  | BY MR. RAJAN:                                    | 09:33:30 |
| 6  | Q. During the preparation of the report and      | 09:33:30 |
| 7  | before you signed it, did you exchange revisions | 09:33:32 |
| 8  | with counsel?                                    | 09:33:36 |
| 9  | MR. HANDY: Objection to the                      | 09:33:37 |
| 10 | extent it calls for privileged communications.   | 09:33:39 |
| 11 | A. I would think that there have been            | 09:33:53 |
| 12 | multiple revisions that have been shared, but I  | 09:34:01 |
| 13 | do not recall any specific details because you   | 09:34:12 |
| 14 | are asking about a time frame that is maybe the  | 09:34:21 |
| 15 | summer or fall of 2023. That is more than a year | 09:34:30 |
| 16 | ago.                                             | 09:34:38 |
| 17 | BY MR. RAJAN:                                    | 09:34:45 |
| 18 | Q. When exactly did you begin preparing the      | 09:34:46 |
| 19 | declaration?                                     | 09:34:48 |
| 20 | A. I do not recall the date, but it was in       | 09:34:52 |
| 21 | 2023.                                            | 09:34:58 |
| 22 | Q. And you said it may have been in the          | 09:35:00 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | summer of 2023; is that right?                    | 09:35:02 |
| 2  | MR. HANDY: Objection, vague.                      | 09:35:07 |
| 3  | A. I do not recall the specific month, but it     | 09:35:17 |
| 4  | may have been one, two, or three months, possibly | 09:35:26 |
| 5  | four months, before October 2023.                 | 09:35:32 |
| 6  | BY MR. RAJAN:                                     | 09:35:44 |
| 7  | Q. So you may have begun preparing your           | 09:35:44 |
| 8  | original declaration in June or July of 2023,     | 09:35:46 |
| 9  | right?                                            | 09:35:50 |
| 10 | A. I would need to speculate to answer the        | 09:35:51 |
| 11 | question.                                         | 09:36:07 |
| 12 | Q. But it would be safe to say that by July       | 09:36:07 |
| 13 | of 2023, you were working on your original        | 09:36:11 |
| 14 | declaration, right?                               | 09:36:12 |
| 15 | MR. HANDY: Objection, form.                       | 09:36:15 |
| 16 | A. I would need to speculate to answer the        | 09:36:20 |
| 17 | question.                                         | 09:36:24 |
| 18 | BY MR. RAJAN:                                     | 09:36:27 |
| 19 | Q. You mentioned that it may have been one,       | 09:36:31 |
| 20 | two, three, possibly four months before           | 09:36:34 |
| 21 | October 2023 that you started working on your     | 09:36:38 |
| 22 | original declaration. So three or four months     | 09:36:40 |

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | before October 2023 would have been June or July | 09:36:44 |
| 2  | of 2023, right?                                  | 09:36:47 |
| 3  | A. Yes.                                          | 09:37:41 |
| 4  | Q. How much time would you say you spent         | 09:37:41 |
| 5  | preparing your declaration, Dr. Schubert?        | 09:37:49 |
| 6  | A. Which declaration are you referring to?       | 09:37:53 |
| 7  | Q. So I'll restate the question.                 | 09:38:02 |
| 8  | So how much time would you say you               | 09:38:05 |
| 9  | spent preparing your original declaration,       | 09:38:08 |
| 10 | EX1003?                                          | 09:38:13 |
| 11 | A. I do not recall.                              | 09:38:16 |
| 12 | Q. Did you spend more than five hours?           | 09:38:23 |
| 13 | A. Yes.                                          | 09:38:26 |
| 14 | Q. More than 20 hours?                           | 09:38:27 |
| 15 | A. Potentially, yes, but I do not recall.        | 09:38:35 |
| 16 | Q. Is it possible that you spent more than 30    | 09:38:39 |
| 17 | hours?                                           | 09:38:41 |
| 18 | A. That is possible, but I do not recall.        | 09:38:45 |
| 19 | Q. Is it possible that you spent more than 40    | 09:38:50 |
| 20 | hours preparing this original declaration?       | 09:38:52 |
| 21 | A. That is possible, but I do not recall.        | 09:38:56 |
| 22 | Q. And is it possible that you spent more        | 09:38:58 |

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | than 60 hours preparing your original            | 09:39:04 |
| 2  | declaration?                                     | 09:39:06 |
| 3  | A. That is possible, but I do not recall.        | 09:39:07 |
| 4  | Q. So as of the date that you signed your        | 09:39:11 |
| 5  | declaration, October 16th, 2023, the original    | 09:39:18 |
| 6  | declaration, EX1003, contained the entirety of   | 09:39:23 |
| 7  | your opinion regarding this IPR proceeding,      | 09:39:27 |
| 8  | right?                                           | 09:39:31 |
| 9  | MR. HANDY: Objection, form.                      | 09:39:32 |
| 10 | A. Generally, yes. I tried to include all my     | 09:39:55 |
| 11 | opinions, but I may have pointed out that my     | 09:39:59 |
| 12 | analysis is ongoing and that I may have          | 09:40:03 |
| 13 | additional opinions in response to comments by   | 09:40:10 |
| 14 | the patent owner and its expert.                 | 09:40:23 |
| 15 | BY MR. RAJAN:                                    | 09:40:34 |
| 16 | Q. But as of October 16th, 2023, your            | 09:40:34 |
| 17 | original declaration, EX1003, contained the      | 09:40:41 |
| 18 | entirety of your opinion after spending          | 09:40:46 |
| 19 | potentially 60 hours or more over several months | 09:40:49 |
| 20 | in preparation, right?                           | 09:40:54 |
| 21 | MR. HANDY: Objection, vague as to                | 09:40:57 |
| 22 | "entirety."                                      | 09:41:04 |

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | A. I do not recall if my preparation was one     | 09:41:06 |
| 2  | month, two months, three months, or four months. | 09:41:09 |
| 3  | BY MR. RAJAN:                                    | 09:41:14 |
| 4  | Q. Okay. Dr. Schubert, on Page 4 of EX1003       | 09:41:31 |
| 5  | is a list of Petitioner's exhibits.              | 09:41:40 |
| 6  | Do you see this list?                            | 09:41:42 |
| 7  | A. Yes.                                          | 09:42:08 |
| 8  | Q. Did you review each of these exhibits         | 09:42:08 |
| 9  | while preparing your original declaration?       | 09:42:12 |
| 10 | A. Yes.                                          | 09:42:30 |
| 11 | Q. Number 1001 is U.S. Patent                    | 09:42:30 |
| 12 | Number 8,884,546, right?                         | 09:42:40 |
| 13 | A. Yes.                                          | 09:42:42 |
| 14 | Q. And when I refer to the "'546 patent"         | 09:42:43 |
| 15 | today, do you understand that I'm referring to   | 09:42:48 |
| 16 | the patent at issue in this proceeding?          | 09:42:50 |
| 17 | A. Yes.                                          | 09:42:57 |
| 18 | Q. You said you did review the '546 patent       | 09:42:57 |
| 19 | during the preparation of this declaration,      | 09:43:04 |
| 20 | correct?                                         | 09:43:06 |
| 21 | A. I don't recall the details, but when I        | 09:43:09 |
| 22 | sign a sworn declaration, I always review the    | 09:43:14 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | exhibits that accompany the declaration.          | 09:43:24 |
| 2  | Q. Did you read the '546 patent front to          | 09:43:29 |
| 3  | back?                                             | 09:43:34 |
| 4  | A. I do not recall what I read in 2023, but       | 09:43:48 |
| 5  | usually I read and generally I read a challenged  | 09:43:52 |
| 6  | patent -- and here it's the '546 patent --        | 09:44:00 |
| 7  | completely, from the first page to the last page. | 09:44:07 |
| 8  | Q. Do you typically read the challenged           | 09:44:16 |
| 9  | patent more than once when preparing your         | 09:44:19 |
| 10 | declaration?                                      | 09:44:22 |
| 11 | A. Certainly certain parts I read more than       | 09:44:31 |
| 12 | once. For example, the claims I read more than    | 09:44:35 |
| 13 | once. The abstract I read more than once.         | 09:44:41 |
| 14 | Q. How much time would you estimate you spent     | 09:44:51 |
| 15 | reviewing the '546 patent while preparing EX1003? | 09:44:54 |
| 16 | A. I don't recall any details, but I can just     | 09:45:09 |
| 17 | say generally that if I review a patent, it can   | 09:45:13 |
| 18 | take anywhere from four to eight hours in my      | 09:45:21 |
| 19 | first review.                                     | 09:45:27 |
| 20 | Q. While preparing EX1003, did you refer to       | 09:45:42 |
| 21 | the '546 patent specification to determine the    | 09:45:47 |
| 22 | scope or meaning of claim terms?                  | 09:45:50 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | A. Can I hear the question again?                 | 09:45:52 |
| 2  | Q. While preparing EX1003, did you refer to       | 09:46:06 |
| 3  | the '546 patent specification to determine the    | 09:46:11 |
| 4  | scope or meaning of claim terms?                  | 09:46:13 |
| 5  | A. It is my recollection that I assumed that      | 09:47:40 |
| 6  | the claim terms have their plain and ordinary     | 09:47:50 |
| 7  | meaning, and to arrive at that opinion, I         | 09:47:56 |
| 8  | reviewed the specification, as well as the claims | 09:48:07 |
| 9  | of the '546 patent.                               | 09:48:14 |
| 10 | Q. Staying within EX1003, Page 101 of EX1003      | 09:48:17 |
| 11 | is the beginning of your CV, right, Dr. Schubert? | 09:48:53 |
| 12 | A. Yes.                                           | 09:49:15 |
| 13 | Q. And this CV attached to your declaration,      | 09:49:16 |
| 14 | EX1003, is your complete CV as of the date you    | 09:49:23 |
| 15 | executed the declaration, correct?                | 09:49:27 |
| 16 | A. Yes.                                           | 09:49:36 |
| 17 | Q. At the bottom of this page, Page 101, the      | 09:49:36 |
| 18 | second bullet point from the bottom says a list   | 09:49:49 |
| 19 | of several devices that you have experience with, | 09:49:55 |
| 20 | including LED, semiconductor laser, vertical      | 09:49:59 |
| 21 | cavity surface-emitting laser, solar cell,        | 09:50:06 |
| 22 | photodetector, LED displays, micro-LED displays,  | 09:50:11 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | and LCD displays.                                 | 09:50:15 |
| 2  | Do you see that?                                  | 09:50:18 |
| 3  | A. Yes.                                           | 09:50:23 |
| 4  | Q. In the same paragraph, then, it says, you      | 09:50:24 |
| 5  | have expertise in, quote, "the design,            | 09:50:29 |
| 6  | fabrication, and packaging of the devices and the | 09:50:31 |
| 7  | use of the devices in circuits and systems (1981  | 09:50:36 |
| 8  | to present)," end quote.                          | 09:50:41 |
| 9  | Do you see that sentence?                         | 09:50:46 |
| 10 | A. Yes.                                           | 09:50:51 |
| 11 | Q. I'd like to get a little more information      | 09:50:52 |
| 12 | about each of these areas of your expertise in    | 09:50:57 |
| 13 | the context of LEDs.                              | 09:51:01 |
| 14 | So could you explain your expertise               | 09:51:02 |
| 15 | and experience in the design of LEDs?             | 09:51:05 |
| 16 | A. Yes. I have worked on the design of LEDs,      | 09:51:37 |
| 17 | and that includes the semiconductor chip, the     | 09:51:42 |
| 18 | phosphor placement, and the packaging of the      | 09:51:54 |
| 19 | LEDs.                                             | 09:52:10 |
| 20 | Q. Anything else?                                 | 09:52:15 |
| 21 | A. I have also worked in the driving of LEDs      | 09:52:35 |
| 22 | or the design of driving circuits in LEDs and the | 09:52:40 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | design of LED controls.                           | 09:52:51 |
| 2  | Q. What was your role in designing LED            | 09:53:02 |
| 3  | controls?                                         | 09:53:06 |
| 4  | A. I have designed LED systems that can be        | 09:53:07 |
| 5  | controlled in terms of their color composition,   | 09:53:33 |
| 6  | brightness, spatial emission distribution, color, | 09:53:44 |
| 7  | temperature, and polarization.                    | 09:53:57 |
| 8  | Q. So you're referring to how individual LEDs     | 09:54:12 |
| 9  | can emit light, right?                            | 09:54:18 |
| 10 | A. Yeah. If you wish to express it in this        | 09:54:31 |
| 11 | manner, I have worked in that field, as well.     | 09:54:33 |
| 12 | Q. Is there another field besides what I          | 09:54:56 |
| 13 | expressed?                                        | 09:54:59 |
| 14 | MR. HANDY: Objection, vague.                      | 09:55:03 |
| 15 | BY MR. RAJAN:                                     | 09:55:13 |
| 16 | Q. Let me rephrase the question.                  | 09:55:14 |
| 17 | You -- when you say that you designed             | 09:55:15 |
| 18 | LED systems that can be controlled in terms of    | 09:55:18 |
| 19 | their color composition, brightness, spatial      | 09:55:21 |
| 20 | emission distribution, color, temperature, and    | 09:55:26 |
| 21 | polarization, you're referring to the control of  | 09:55:30 |
| 22 | individual LEDs or multiple LEDs together?        | 09:55:34 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | A. Both.                                          | 09:55:42 |
| 2  | Q. And can you describe any systems that you      | 09:55:48 |
| 3  | worked on that involved such control of multiple  | 09:55:52 |
| 4  | LEDs together?                                    | 09:55:55 |
| 5  | A. Yes.                                           | 09:56:01 |
| 6  | I've worked under a research program              | 09:56:06 |
| 7  | of the U.S. National Science Foundation that was  | 09:56:11 |
| 8  | titled "Smart Lighting Engineering Research       | 09:56:19 |
| 9  | Center."                                          | 09:56:27 |
| 10 | In this research center, I conducted              | 09:56:34 |
| 11 | work that related to the controllability of LEDs  | 09:56:37 |
| 12 | and LED lighting systems, and the parameters that | 09:56:45 |
| 13 | we controlled included the list of parameters     | 09:56:53 |
| 14 | that we mentioned earlier, brightness, color      | 09:56:58 |
| 15 | composition, color temperature, spatial emission  | 09:57:04 |
| 16 | distribution, temporal modulability, and          | 09:57:13 |
| 17 | polarization.                                     | 09:57:27 |
| 18 | Q. Did you say "temporal," as in referring to     | 09:57:33 |
| 19 | time?                                             | 09:57:37 |
| 20 | A. Correct.                                       | 09:57:37 |
| 21 | Q. And how were these LEDs controlled with        | 09:57:37 |
| 22 | respect to temporal modulability -- excuse me --  | 09:57:47 |

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | temporal -- sorry, what was the term that you    | 09:57:53 |
| 2  | used? Temporal modulability?                     | 09:57:56 |
| 3  | A. Modulability.                                 | 09:58:00 |
| 4  | Q. And what is that?                             | 09:58:02 |
| 5  | A. That is the concept of transmitting           | 09:58:06 |
| 6  | information with light sources. So the light     | 09:58:12 |
| 7  | sources have an intensity that is modulated with | 09:58:17 |
| 8  | respect to time at a frequency not recognizable  | 09:58:28 |
| 9  | by the human eye, so that information can be     | 09:58:38 |
| 10 | transmitted by light sources such as room        | 09:58:50 |
| 11 | lighting sources.                                | 09:58:59 |
| 12 | This concept has developed into what             | 09:59:03 |
| 13 | is known as LiFi, instead of wi-fi, W-I-F-I,     | 09:59:08 |
| 14 | LiFi, L-I-F-I, which is the communication of     | 09:59:27 |
| 15 | information by employing light sources whose     | 09:59:35 |
| 16 | intensity is modulated with respect to time.     | 09:59:47 |
| 17 | Q. Would this LiFi system use multiple light     | 09:59:59 |
| 18 | sources to communicate information at the same   | 10:00:03 |
| 19 | time?                                            | 10:00:07 |
| 20 | A. I'm not certain if I understand what          | 10:00:07 |
| 21 | you're envisioning.                              | 10:00:26 |
| 22 | Q. I'm just asking whether the concept of        | 10:00:38 |

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | transmitting information with light sources used | 10:00:40 |
| 2  | more than one light source to transmit the       | 10:00:43 |
| 3  | information.                                     | 10:00:47 |
| 4  | A. It could involve one light source, or it      | 10:00:59 |
| 5  | could involve multiple light sources.            | 10:01:02 |
| 6  | Q. Did you work on a system that used            | 10:01:09 |
| 7  | multiple light sources?                          | 10:01:12 |
| 8  | A. Yes.                                          | 10:01:50 |
| 9  | Q. And were those light sources synchronized?    | 10:01:50 |
| 10 | A. And by "synchronized," do you mean that       | 10:02:12 |
| 11 | the light sources acted at the same time?        | 10:02:17 |
| 12 | Q. Is that the only way that you would           | 10:02:23 |
| 13 | understand that term?                            | 10:02:31 |
| 14 | MR. HANDY: Objection, form.                      | 10:02:36 |
| 15 | A. I assume that you're talking about the        | 10:02:53 |
| 16 | term "synchronized," and I assume that you're    | 10:02:56 |
| 17 | talking about the term "synchronized" in the     | 10:03:02 |
| 18 | context of the '546 patent.                      | 10:03:04 |
| 19 | And in the context of the '546 patent,           | 10:03:09 |
| 20 | as I expressed in my report, or, better,         | 10:03:14 |
| 21 | declarations, I have expressed my opinion that a | 10:03:18 |
| 22 | person of skill in the art would understand      | 10:03:26 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | synchronized control to happen at the same time.  | 10:03:39 |
| 2  | BY MR. RAJAN:                                     | 10:03:45 |
| 3  | Q. So under your interpretation of                | 10:03:46 |
| 4  | "synchronized," would the light sources in the    | 10:03:48 |
| 5  | LiFi system transmit light at the same time?      | 10:03:51 |
| 6  | A. I'm not sure which context you're talking      | 10:04:04 |
| 7  | about. You're talking about my previous work      | 10:04:07 |
| 8  | that is unrelated to the '546 patent, or are you  | 10:04:10 |
| 9  | talking about the '546 patent --                  | 10:04:13 |
| 10 | Q. I'm --                                         | 10:04:15 |
| 11 | A. -- correct?                                    | 10:04:15 |
| 12 | Q. I'm talking about the -- talking about         | 10:04:16 |
| 13 | your background in the field and your experience  | 10:04:20 |
| 14 | with working on the LiFi system right now.        | 10:04:22 |
| 15 | A. So unrelated to the '546 patent?               | 10:04:27 |
| 16 | Q. I'm not saying it's completely unrelated,      | 10:04:31 |
| 17 | but I'm asking about specifically your experience | 10:04:35 |
| 18 | and how the systems that you worked on operate.   | 10:04:37 |
| 19 | A. Understood.                                    | 10:04:51 |
| 20 | And what is the question?                         | 10:04:52 |
| 21 | Q. In the LiFi system, a LiFi system having       | 10:04:53 |
| 22 | multiple light sources, did those light sources   | 10:05:04 |

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | transmit light at the same time?                 | 10:05:08 |
| 2  | A. Well, those light sources were on at the      | 10:05:38 |
| 3  | same time.                                       | 10:05:44 |
| 4  | Q. Were they always transmitting information     | 10:05:44 |
| 5  | when they were on?                               | 10:05:47 |
| 6  | MR. HANDY: Objection, form.                      | 10:05:55 |
| 7  | A. Has my answer been received? I heard          | 10:07:02 |
| 8  | multiple people talking at the same time. I just | 10:07:06 |
| 9  | want to make sure that my last answer has been   | 10:07:08 |
| 10 | received.                                        | 10:07:10 |
| 11 | MR. RAJAN: I didn't hear an                      | 10:07:12 |
| 12 | answer. I'll ask the question again.             | 10:07:13 |
| 13 | BY MR. RAJAN:                                    | 10:07:15 |
| 14 | Q. Were the light sources always transmitting    | 10:07:16 |
| 15 | information when they were on?                   | 10:07:19 |
| 16 | MR. HANDY: Objection, form.                      | 10:07:22 |
| 17 | A. No.                                           | 10:07:27 |
| 18 | BY MR. RAJAN:                                    | 10:07:27 |
| 19 | Q. How were the light sources controlled to      | 10:07:33 |
| 20 | transmit information then?                       | 10:07:36 |
| 21 | A. The light sources had the capability of       | 10:07:57 |
| 22 | being modulable, of being able to be modulated   | 10:08:04 |

1 with respect to their intensity, and one can use  
2 the intensity modulation of the light sources to  
3 transmit information.

4 Q. And were there multiple light sources that  
5 were modulated at the same time to transmit  
6 information simultaneously?

7 A. That is a possibility. There can be  
8 multiple light sources in a room, and these  
9 multiple light sources can transmit the same  
10 information to a receiving device.

11 Q. How would those multiple light sources  
12 transmit the same information simultaneously?

13 A. The multiple light sources would be  
14 subject to the same driving conditions.

15 Q. Would those driving conditions involve  
16 synchronized timing?

17 MR. HANDY: Objection, form,  
18 vague.

19 A. I am -- have difficulties with the  
20 question because I don't know if you're talking  
21 in the context of the '546 patent.

22 If you're not talking in the context

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | of the '546 patent, I don't recall us using those | 10:11:12 |
| 2  | words, "synchronous timing," in the context of    | 10:11:20 |
| 3  | the communication with lighting sources.          | 10:11:31 |
| 4  | BY MR. RAJAN:                                     | 10:11:49 |
| 5  | Q. In the LiFi system that you worked on,         | 10:11:49 |
| 6  | though, what kinds of driving conditions would    | 10:11:53 |
| 7  | ensure that the light sources transmit the same   | 10:11:57 |
| 8  | information simultaneously?                       | 10:12:00 |
| 9  | A. I'm just hesitating -- you know, at that       | 10:12:08 |
| 10 | time as we worked on this, we didn't call it      | 10:12:11 |
| 11 | "LiFi system." It was kind of pre-LiFi system     | 10:12:13 |
| 12 | age, and there is also standards that have been   | 10:12:17 |
| 13 | established for LiFi systems.                     | 10:12:23 |
| 14 | So, you know, if we say "LiFi system"             | 10:12:26 |
| 15 | today, we associate standards with that LiFi      | 10:12:29 |
| 16 | system. At the time we worked on communication    | 10:12:35 |
| 17 | with light sources, there were no standards.      | 10:12:37 |
| 18 | So, you know, I'm just hesitating, I'm            | 10:12:40 |
| 19 | just making you aware that we worked on           | 10:12:43 |
| 20 | communicating with light sources. We started the  | 10:12:49 |
| 21 | concept of communicating with lighting sources,   | 10:12:55 |
| 22 | room lighting sources; and, therefore, your --    | 10:13:02 |

1 your suggestion that I worked on LiFi systems is 10:13:10  
2 not fully characterizing my work that I did. You 10:13:17  
3 know, it may be a mischaracterization of my work. 10:13:24

4 I would say I worked on communication 10:13:26  
5 using room lighting sources. This concept has 10:13:31  
6 developed into a technology that is nowadays 10:13:38  
7 referred to as LiFi, L-I-F-I. 10:13:43

8 Q. Thank you for clarifying. 10:13:54

9 I wasn't intending to discuss LiFi, 10:13:56  
10 per se. I was using the term that you gave 10:14:00  
11 before. But I am trying to discuss the work that 10:14:02  
12 you did on the pre-LiFi system, as you call it, 10:14:05  
13 what -- however you want to refer to the system. 10:14:10

14 I'm just trying to understand that in 10:14:12  
15 the system that you worked on, what were the 10:14:15  
16 driving conditions that caused multiple light 10:14:18  
17 sources to transmit the same information at the 10:14:22  
18 same time. 10:14:25

19 A. The multiple light sources had the same 10:14:32  
20 driving conditions. They were subjected to the 10:14:34  
21 same electrical signals. 10:14:38

22 Q. And what do those electrical signals 10:14:49

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | include in terms of information that caused the  | 10:14:53 |
| 2  | light sources to transmit information?           | 10:14:55 |
| 3  | A. For example, the light sources can            | 10:15:02 |
| 4  | transmit a fire alarm; and in that case, the     | 10:15:05 |
| 5  | light sources would vary their intensity so that | 10:15:14 |
| 6  | a receiving device can receive information, such | 10:15:22 |
| 7  | as there is a fire alarm, while the human eye    | 10:15:28 |
| 8  | would not receive that information. The human    | 10:15:36 |
| 9  | eye would just see a regular light source.       | 10:15:40 |
| 10 | Q. And in such a situation, would it be          | 10:16:00 |
| 11 | necessary for the multiple light sources to      | 10:16:03 |
| 12 | transmit the same information at the same time?  | 10:16:07 |
| 13 | A. That is a possibility, but not a              | 10:16:25 |
| 14 | necessity.                                       | 10:16:35 |
| 15 | Q. Are there any other systems that you          | 10:16:38 |
| 16 | worked on that involved multiple light sources   | 10:16:41 |
| 17 | operating at the same time?                      | 10:16:45 |
| 18 | A. Yes.                                          | 10:16:47 |
| 19 | Q. Can you name them?                            | 10:17:10 |
| 20 | A. I've worked on regular lighting systems,      | 10:17:14 |
| 21 | and such regular lighting systems typically have | 10:17:24 |
| 22 | multiple light sources.                          | 10:17:29 |

1 Q. Can you describe any such lighting system  
2 that involved multiple light sources operating at  
3 the same time?

10:17:34

10:17:41

10:18:00

4 A. A room lighting system typically has  
5 multiple light sources that can be referred to as  
6 luminaires, and these luminaires are typically on  
7 at the same time and they are typically off at  
8 the same time -- that is, all of the luminaires  
9 can be on at the same time and all of the  
10 luminaires can be off at the same time.

10:18:00

10:18:08

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10:18:35

10:18:41

11 Q. And did you work on the control of these  
12 types of lighting systems?

10:18:55

10:18:57

13 A. Yes.

10:19:22

14 Q. And how were the luminaires controlled to  
15 turn on or turn off at the same time?

10:19:26

10:19:30

16 MR. HANDY: Objection,  
17 mischaracterizes testimony.

10:19:37

10:19:38

18 A. Can I hear the question again?

10:19:56

19 BY MR. RAJAN:

10:19:58

20 Q. How were the luminaires controlled to turn  
21 off or turn on at the same time?

10:19:59

10:20:02

22 MR. HANDY: Same objection.

10:20:06

1       A. If different luminaires are connected to  
2       the same power supply, then the luminaires will  
3       receive the same electrical power, and if the  
4       luminaires are the same, they will emit the same  
5       light, the same type of light.

6               That is, if we have like luminaires  
7       subjected to like power conditions, we obtain the  
8       same result.

9       BY MR. RAJAN:

10       Q. And you -- when you refer to "like power  
11       conditions," you're not referring to any  
12       synchronized timing or clock signals, right?

13               MR. HANDY: Objection, compound.

14       A. Can I hear the question again?

15       BY MR. RAJAN:

16       Q. When you refer to "like power conditions,"  
17       you're not referring to synchronized timing or  
18       clock signals, right?

19       A. The systems that I was describing do not  
20       require a clock signal.

21               MR. RAJAN: Okay. Dr. Schubert,  
22       we've been going for about an hour and a half.

10:20:23

10:20:29

10:20:39

10:20:57

10:21:01

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10:21:36

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10:21:41

10:21:50

10:22:08

10:22:10

10:22:11

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10:22:16

10:22:31

10:22:38

10:22:47

10:22:47

|    |                                                 |          |
|----|-------------------------------------------------|----------|
| 1  | Would you like to take a break?                 | 10:22:50 |
| 2  | THE WITNESS: Sure, yes.                         | 10:22:54 |
| 3  | MR. RAJAN: Okay. Let's go off                   | 10:22:55 |
| 4  | the record, please.                             | 10:22:57 |
| 5  | THE COURT REPORTER: We're off the               | 10:22:58 |
| 6  | record.                                         | 10:23:00 |
| 7  | (Break taken from 10:23 a.m. to                 | 10:23:01 |
| 8  | 10:34 a.m.)                                     | 10:34:01 |
| 9  | THE COURT REPORTER: We're back on               | 10:34:03 |
| 10 | the record.                                     | 10:34:05 |
| 11 | BY MR. RAJAN:                                   | 10:34:05 |
| 12 | Q. Welcome back, Dr. Schubert.                  | 10:34:08 |
| 13 | So before the break, I was asking               | 10:34:09 |
| 14 | about your areas of expertise discussed in your | 10:34:11 |
| 15 | CV in EX1003. I'd like to ask about the next    | 10:34:15 |
| 16 | area of your expertise listed in the bottom of  | 10:34:19 |
| 17 | Page 101, which says: "Fabrication."            | 10:34:23 |
| 18 | So could you discuss your expertise             | 10:34:26 |
| 19 | and experience in semiconductor fabrication?    | 10:34:28 |
| 20 | A. Yes.                                         | 10:34:33 |
| 21 | I have been involved in the                     | 10:34:53 |
| 22 | fabrication of semiconductor devices for a long | 10:34:54 |

1 time period, and this included the crystal growth  
2 of semiconductors and the fabrication of devices  
3 as well as systems; and the fabrication aspect  
4 includes the processing by the techniques that  
5 are common in microelectronics and  
6 optoelectronics.

7 Q. When you say "processing," are you  
8 referring to a fabrication technique or a  
9 computer processing?

10 A. I was referring to fabrication processing.

11 Q. And can you explain what fabrication  
12 processing is?

13 A. Fabrication processing includes the  
14 techniques that are common in microelectronics  
15 technology and optoelectronics technology, mostly  
16 relating to the fabrication of devices such as  
17 LEDs, lasers, and silicon integrated circuits.

18 Q. Between 1981 and around 2012, what would  
19 you say your percentage of time was devoted to  
20 semiconductor design and fabrication?

21 A. It changed over the years. Prior to 1995,  
22 I worked in the industry, so I was more

1 technology focused.

10:38:42

2 In 1995, I joined academia and I had  
3 teaching obligations, and so that changed the  
4 balance of the different activities; but putting  
5 that aside, I've always been involved in the  
6 topics of semiconductor fabrication,  
7 semiconductor design, and semiconductor  
8 processing continuously from 1981 to the present  
9 time.

10:38:45

10:38:53

10:39:02

10:39:08

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10:39:18

10:39:20

10:39:28

10 Q. So it would be fair to say, then, that  
11 your focus has been on semiconductor fabrication,  
12 design, and processing?

10:39:33

10:39:36

10:39:39

13 A. One focus area was on that topic. I had  
14 also other focus areas.

10:39:47

10:39:51

15 Q. What other focus areas did you have?

10:39:54

16 A. The application of semiconductor devices  
17 in systems was another focus area.

10:39:56

10:40:17

18 Q. And what percentage of your time did you  
19 devote to the application of semiconductor  
20 devices in systems?

10:40:27

10:40:30

10:40:33

21 A. It is difficult to give you a percentage  
22 because that percentage changed over the years.

10:40:39

10:40:41

1           At some point of my career, I had no  
2     teaching obligations. At the present time, I  
3     also have teaching obligations, and so I couldn't  
4     give you a percentage that would be applicable to  
5     the time frame you indicated.

6           Q. Dr. Schubert, in your CV, at the bottom of  
7     Page 101, the next area of expertise discussed is  
8     packaging of the devices.

9           Could you explain your expertise and  
10    experience in packaging of LEDs?

11          A. My work on packaging LEDs included  
12    encapsulation, included phosphor placement,  
13    included the use of light-diffusing particles to  
14    modify the emission pattern of LEDs.

15          The topics that I listed are exemplary  
16    and not meant to be comprehensive.

17          Q. So "packaging" in this context refers to  
18    the casing of the LED as opposed to a system that  
19    the LED is integrated into; is that right?

20          A. It refers to the packaging of the LED  
21    chips.

22          Q. Okay. Still looking at the second bullet

10:40:45

10:40:48

10:40:52

10:40:56

10:41:03

10:41:23

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10:41:48

10:41:56

10:42:06

10:42:18

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10:42:48

10:42:58

10:43:01

10:43:12

1 point from the bottom of Page 101 in EX1003, the 10:43:37  
2 end of the sentence in the second bullet point 10:43:43  
3 says: "The use of the devices in circuits and 10:43:46  
4 systems." 10:43:50

5 Can you name any other particular 10:43:56  
6 products or devices that you worked on that 10:43:59  
7 integrated LEDs into circuits or systems? 10:44:03

8 A. I have worked on lighting systems. I have 10:44:17  
9 worked on communication systems. I have worked 10:44:23  
10 on human aspects relating to lighting systems. I 10:44:30  
11 have worked on various LED configurations such as 10:44:49  
12 string lights. I have worked on power supplies 10:45:00  
13 or drivers for LED lighting systems, and the 10:45:11  
14 topics are, again, exemplary rather than 10:45:23  
15 comprehensive. 10:45:26

16 Q. Can you describe the string light LED 10:45:31  
17 configuration that you worked on? 10:45:34

18 A. Yes. I had multiple projects on holiday 10:45:39  
19 lighting systems, Christmas lighting systems, and 10:45:47  
20 the transition of these lighting systems from 10:45:57  
21 conventional incandescent string lighting systems 10:46:03  
22 to LED string lighting systems. 10:46:12

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | Q. Did these lighting systems involve one         | 10:46:23 |
| 2  | string of LEDs or were there multiple strings?    | 10:46:26 |
| 3  | A. Both is possible.                              | 10:46:36 |
| 4  | Q. Both -- you worked on both types of            | 10:46:39 |
| 5  | systems, systems having a single string of LEDs   | 10:46:47 |
| 6  | and systems having multiple strings of LEDs?      | 10:46:51 |
| 7  | A. Yes.                                           | 10:47:00 |
| 8  | Q. Did any of these Christmas lighting            | 10:47:01 |
| 9  | systems involve curtain lamps?                    | 10:47:04 |
| 10 | A. It depends a bit on how "curtain lamp" is      | 10:47:08 |
| 11 | used.                                             | 10:47:34 |
| 12 | And my understanding of "curtain lamp"            | 10:47:37 |
| 13 | is that it may include one or more strings, and   | 10:47:39 |
| 14 | each string can include one or more LEDs.         | 10:47:47 |
| 15 | And so if we take that understanding,             | 10:47:53 |
| 16 | I would say that I have worked on string lighting | 10:47:57 |
| 17 | systems in the past that could be termed or named | 10:48:01 |
| 18 | or called "curtain lamps."                        | 10:48:09 |
| 19 | Q. Can you give me a little more detail about     | 10:48:17 |
| 20 | how those lighting systems were configured?       | 10:48:20 |
| 21 | A. I assume you mean the string lighting          | 10:48:39 |
| 22 | systems that I mentioned earlier?                 | 10:48:41 |

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | Q. Yes.                                          | 10:48:43 |
| 2  | Let's take one particular example of             | 10:48:47 |
| 3  | such a system. Could you describe one of those   | 10:48:50 |
| 4  | systems that you worked on?                      | 10:48:53 |
| 5  | A. Sure.                                         | 10:48:54 |
| 6  | They are string lighting systems                 | 10:49:04 |
| 7  | typically used for holiday or Christmas          | 10:49:15 |
| 8  | decorations, and they may include 25 or 50 LEDs. | 10:49:21 |
| 9  | These LEDs can be configured in a series         | 10:49:35 |
| 10 | electrical circuit.                              | 10:49:44 |
| 11 | In addition to the series connections,           | 10:49:50 |
| 12 | there may also be parallel connections. And a    | 10:49:56 |
| 13 | particular issue in these lighting systems is if | 10:50:09 |
| 14 | one LED fails, the other LEDs should not go off  | 10:50:13 |
| 15 | when one LED fails.                              | 10:50:33 |
| 16 | And so that was a topic that I had               | 10:50:37 |
| 17 | worked on in the past.                           | 10:50:42 |
| 18 | Q. Are you referring to the power connections    | 10:50:47 |
| 19 | of the LEDs?                                     | 10:50:51 |
| 20 | MR. HANDY: Objection, vague.                     | 10:50:56 |
| 21 | A. Well, once in a while there is an LED that    | 10:51:04 |
| 22 | fails; and the failure could be internal -- that | 10:51:07 |

1 is, the semiconductor device stops to work 10:51:13  
2 properly and becomes an open circuit. And if we 10:51:16  
3 have multiple LEDs in a series electrical 10:51:23  
4 circuit, the current is interrupted and all LEDs 10:51:30  
5 go off. 10:51:39

6 That is not desirable that one failure 10:51:41  
7 can shut off the whole circuit; and so that 10:51:51  
8 problem needs to be addressed by some means. 10:52:01

9 BY MR. RAJAN: 10:52:14

10 Q. In the lighting systems having LEDs in 10:52:14  
11 parallel connections, were there any systems that 10:52:23  
12 had multiple control units for the LEDs? 10:52:29

13 MR. HANDY: Objection, vague. 10:52:37

14 A. That is a possibility. 10:52:50

15 BY MR. RAJAN: 10:52:55

16 Q. Are you able to name any particular system 10:52:56  
17 that had multiple control units for LEDs? 10:53:00

18 A. Yes. 10:53:20

19 Lighting systems that have multiple 10:53:22  
20 lamps or luminaires or light sources; a 10:53:30  
21 controller or a power supply or a driver can be 10:53:42  
22 associated with each of these light sources. 10:53:49

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | Q. And in this particular system, how would       | 10:54:09 |
| 2  | the lights operate?                               | 10:54:13 |
| 3  | A. They would operate to emit light.              | 10:54:25 |
| 4  | Q. Would they emit light in any particular        | 10:54:41 |
| 5  | pattern?                                          | 10:54:45 |
| 6  | A. Frequently a uniform pattern is desired,       | 10:54:58 |
| 7  | and such a uniform emission pattern can be        | 10:55:09 |
| 8  | realized.                                         | 10:55:13 |
| 9  | Q. And are you familiar with how the system       | 10:55:19 |
| 10 | would control the LEDs to emit a uniform pattern? | 10:55:23 |
| 11 | A. It would depend on the individual              | 10:55:48 |
| 12 | configuration, or it would depend on the          | 10:55:51 |
| 13 | configuration of an individual LED.               | 10:55:58 |
| 14 | There are various technical features              | 10:56:05 |
| 15 | that can be implemented to make an LED emit       | 10:56:08 |
| 16 | either a directed light or a nondirected, uniform | 10:56:14 |
| 17 | emission of light.                                | 10:56:30 |
| 18 | Q. Referring particularly to the lighting         | 10:56:50 |
| 19 | system you mentioned earlier having multiple      | 10:56:52 |
| 20 | lamps or luminaires or light sources and a        | 10:56:56 |
| 21 | controller associated with each of these light    | 10:57:01 |
| 22 | sources, what kind of signals would be sent       | 10:57:04 |

|    |                                                 |          |
|----|-------------------------------------------------|----------|
| 1  | between the various controllers?                | 10:57:06 |
| 2  | MR. HANDY: Objection, form.                     | 10:57:10 |
| 3  | A. There can be a "on" signal or an "off"       | 10:57:32 |
| 4  | signal that is sent to the various controllers. | 10:57:39 |
| 5  | BY MR. RAJAN:                                   | 10:58:00 |
| 6  | Q. What other types of signals?                 | 10:58:01 |
| 7  | A. The signals can also relate to the           | 10:58:10 |
| 8  | brightness of the light source.                 | 10:58:15 |
| 9  | Q. And what else?                               | 10:58:20 |
| 10 | A. The signals can relate to the color          | 10:58:41 |
| 11 | composition of the light source.                | 10:58:47 |
| 12 | Q. So you mentioned on/off signals,             | 10:59:03 |
| 13 | brightness, color composition, and what else?   | 10:59:07 |
| 14 | A. For some light sources, that would be the    | 10:59:26 |
| 15 | parameters to be controlled.                    | 10:59:32 |
| 16 | Q. Did any of those systems involve             | 10:59:47 |
| 17 | synchronized timing between the multiple        | 10:59:51 |
| 18 | controllers?                                    | 10:59:53 |
| 19 | A. I don't know what you're referring to when   | 10:59:59 |
| 20 | you say "synchronized timing."                  | 11:00:06 |
| 21 | Q. Well, what do you understand "synchronized   | 11:00:08 |
| 22 | timing" to mean?                                | 11:00:11 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | MR. HANDY: Objection, answered.                   | 11:00:16 |
| 2  | A. I'm not sure if you talk about the context     | 11:00:24 |
| 3  | of the '546 patent or outside the context of the  | 11:00:26 |
| 4  | '546 patent.                                      | 11:00:33 |
| 5  | BY MR. RAJAN:                                     | 11:00:33 |
| 6  | Q. So I'm passing through the chat a document     | 11:00:38 |
| 7  | marked in this proceeding as EX3001. Let me know  | 11:00:50 |
| 8  | once you've downloaded it, Dr. Schubert, and I'll | 11:01:04 |
| 9  | also display it on the shared screen.             | 11:01:08 |
| 10 | A. Yes, I received the document.                  | 11:01:42 |
| 11 | Q. Great.                                         | 11:01:44 |
| 12 | Do you see, Dr. Schubert, that this is            | 11:01:45 |
| 13 | an excerpt from the Microsoft Computer            | 11:01:48 |
| 14 | Dictionary?                                       | 11:01:54 |
| 15 | A. Yes.                                           | 11:01:54 |
| 16 | Q. And did you review this -- this document       | 11:01:55 |
| 17 | in preparation for your deposition?               | 11:02:00 |
| 18 | A. I don't think I reviewed it during the         | 11:02:04 |
| 19 | last week.                                        | 11:02:15 |
| 20 | Q. Okay. You did say that you reviewed the        | 11:02:16 |
| 21 | board's institution decision, though, correct?    | 11:02:25 |
| 22 | A. Yes.                                           | 11:02:33 |

|    |                                                 |          |
|----|-------------------------------------------------|----------|
| 1  | Q. And do you recall that the board referred    | 11:02:33 |
| 2  | to this document in its institution decision?   | 11:02:38 |
| 3  | A. I don't recall it, but it may very well      | 11:02:52 |
| 4  | be --                                           | 11:02:55 |
| 5  | Q. Okay.                                        | 11:02:56 |
| 6  | A. -- correct.                                  | 11:02:57 |
| 7  | Q. Going to the third page of this file,        | 11:02:58 |
| 8  | which is Page 5 of 6 of EX3001, do you see the  | 11:03:04 |
| 9  | definition of "synchronous" as saying in full,  | 11:03:17 |
| 10 | quote: "Occurring at the same time. In computer | 11:03:26 |
| 11 | transmissions, a reference to activity governed | 11:03:30 |
| 12 | by a clock or" synchronized -- "or by           | 11:03:32 |
| 13 | synchronized timing"?                           | 11:03:35 |
| 14 | A. And where do you read this? I don't see      | 11:03:59 |
| 15 | it.                                             | 11:04:01 |
| 16 | Q. So on the shared screen here, I have         | 11:04:04 |
| 17 | EX3001, Page 5 of 6. And it has the definition  | 11:04:10 |
| 18 | of "synchronous" as: "Occurring at the same     | 11:04:14 |
| 19 | time. In computer transmissions, a reference to | 11:04:19 |
| 20 | activity governed by a clock or by synchronized | 11:04:24 |
| 21 | timing."                                        | 11:04:27 |
| 22 | A. Yes, I see that.                             | 11:04:31 |

1 Q. Are you able to understand the term 11:04:32  
2 "synchronized timing" in this definition? 11:04:37

3 A. Based on my understanding, the word that 11:04:45  
4 is being defined is "synchronous." And 11:04:50  
5 "synchronous" is defined as "occurring at the 11:04:55  
6 same time." 11:04:58

7 And then the dictionary refers to 11:05:01  
8 "computer transmissions." 11:05:04

9 Q. So the dictionary here is saying that in 11:05:10  
10 the context of computer transmissions, 11:05:12  
11 "synchronous" refers to activity governed by a 11:05:16  
12 clock or by synchronized timing, right? 11:05:20

13 MR. HANDY: Objection, form. 11:05:30

14 A. Yes, I see -- I see that. 11:05:49

15 BY MR. RAJAN: 11:05:50

16 Q. So what is your understanding of 11:05:51  
17 "synchronous" -- "synchronized timing" in this 11:05:54  
18 definition of "synchronous"? 11:05:58

19 A. Well, I have a reservation with respect to 11:06:01  
20 this definition because the word "synchronous" is 11:06:07  
21 defined by synchronous timing or a clock. 11:06:11

22 So if we have a word like 11:06:17

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | "synchronous" and then we define the word by      | 11:06:22 |
| 2  | reusing the word, in my view it's not helpful to  | 11:06:26 |
| 3  | get to the meaning of the word "synchronous."     | 11:06:36 |
| 4  | So I think the first definition is                | 11:06:43 |
| 5  | useful, "occurring at the same time." That is my  | 11:06:46 |
| 6  | understanding of "synchronous" in the present     | 11:06:55 |
| 7  | context that we're talking about.                 | 11:06:59 |
| 8  | We are not really talking about                   | 11:07:01 |
| 9  | computer transmissions. We're not really talking  | 11:07:03 |
| 10 | about data centers. We're not really talking      | 11:07:09 |
| 11 | about computer communication protocols.           | 11:07:14 |
| 12 | And so computer transmissions is like             | 11:07:18 |
| 13 | a specific area that relates to the activities of | 11:07:26 |
| 14 | the Microsoft Company; but computer               | 11:07:32 |
| 15 | transmissions, as used here and as found in the   | 11:07:43 |
| 16 | Microsoft Company Dictionary I would say is not   | 11:07:49 |
| 17 | on topic with respect to the '546 patent.         | 11:08:03 |
| 18 | Q. So if I understand correctly, your             | 11:08:17 |
| 19 | position is that the second sentence in this      | 11:08:19 |
| 20 | definition of "synchronous" does not apply to the | 11:08:24 |
| 21 | '546 patent because the '546 patent is not about  | 11:08:28 |
| 22 | computer transmissions; is that right?            | 11:08:32 |

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | MR. HANDY: Objection,                            | 11:08:38 |
| 2  | mischaracterizes testimony.                      | 11:08:38 |
| 3  | A. My opinion is that defining a word by         | 11:08:44 |
| 4  | reusing a modified version of the word is not    | 11:08:50 |
| 5  | helpful in gaining an understanding of the word. | 11:09:02 |
| 6  | And if we define "synchronous" as                | 11:09:11 |
| 7  | "synchronous timing," then we reuse a modified   | 11:09:17 |
| 8  | version of the word to explain the word. And I'm | 11:09:27 |
| 9  | just saying, I find the first definition more    | 11:09:33 |
| 10 | helpful because it spells out what we mean by    | 11:09:39 |
| 11 | "synchronous."                                   | 11:09:45 |
| 12 | "Synchronous" means occurring at the             | 11:09:46 |
| 13 | same time. That's the definition that I find     | 11:09:49 |
| 14 | more helpful.                                    | 11:09:50 |
| 15 | BY MR. RAJAN:                                    | 11:09:54 |
| 16 | Q. And you'd agree that "same time" relates      | 11:09:54 |
| 17 | to synchronized timing, right?                   | 11:09:58 |
| 18 | MR. HANDY: Objection, form.                      | 11:10:01 |
| 19 | A. Can I hear the question again?                | 11:10:18 |
| 20 | BY MR. RAJAN:                                    | 11:10:20 |
| 21 | Q. Sure.                                         | 11:10:22 |
| 22 | You would agree that "same time"                 | 11:10:22 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | relates to synchronized timing, right?            | 11:10:26 |
| 2  | MR. HANDY: Objection, form.                       | 11:10:34 |
| 3  | A. I'm not certain. It may, but I'm not           | 11:11:00 |
| 4  | sure.                                             | 11:11:04 |
| 5  | What they are talking about is a                  | 11:11:05 |
| 6  | specific technical area, computer transmissions.  | 11:11:07 |
| 7  | And so computer transmissions is, according to my | 11:11:16 |
| 8  | understanding, the transmission of information    | 11:11:20 |
| 9  | among various computers.                          | 11:11:25 |
| 10 | So, for example, the ethernet is a                | 11:11:34 |
| 11 | means for computer transmissions. And I hesitate  | 11:11:44 |
| 12 | to make statements about communication networks   | 11:12:00 |
| 13 | such as the ethernet because specific words as    | 11:12:12 |
| 14 | "synchronized timing" may have a different        | 11:12:27 |
| 15 | meaning in ethernet technology or computer        | 11:12:33 |
| 16 | transmissions technology. I just don't know that  | 11:12:37 |
| 17 | context well enough to give you a definite        | 11:12:46 |
| 18 | answer.                                           | 11:12:51 |
| 19 | "Synchronous" and "synchronized" have             | 11:12:51 |
| 20 | the same root word or are derived from the same   | 11:12:57 |
| 21 | word, or one is a modification of the other.      | 11:13:08 |
| 22 | "Synchronized" is another form of "synchronous."  | 11:13:16 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | Now, it's a different, modified word; and         | 11:13:23 |
| 2  | "synchronous," in my view, relates to "occurring  | 11:13:28 |
| 3  | at the same time."                                | 11:13:38 |
| 4  | The second definition -- or the second            | 11:13:40 |
| 5  | sentence of this dictionary entry refers to       | 11:13:44 |
| 6  | computer transmissions, such as an ethernet       | 11:13:50 |
| 7  | standard or internet standard or wi-fi standard.  | 11:13:59 |
| 8  | And I don't want to make statements in that       | 11:14:07 |
| 9  | context because I'm not a expert in computer      | 11:14:12 |
| 10 | transmissions, such as the ethernet standard, the | 11:14:21 |
| 11 | wi-fi standard, the cellular standard, or the     | 11:14:31 |
| 12 | internet communication protocol standard.         | 11:14:38 |
| 13 | BY MR. RAJAN:                                     | 11:14:47 |
| 14 | Q. And, Dr. Schubert, there's nothing in this     | 11:14:47 |
| 15 | definition that limits the scope of "synchronous" | 11:14:49 |
| 16 | to any particular type of communication protocol  | 11:14:53 |
| 17 | standard or any particular type of computer       | 11:14:59 |
| 18 | transmission technology, right?                   | 11:15:02 |
| 19 | A. In the first sentence, there is no such        | 11:15:09 |
| 20 | limitations.                                      | 11:15:12 |
| 21 | Q. And in the second sentence that discusses      | 11:15:16 |
| 22 | computer transmissions, there's nothing here that | 11:15:22 |

1 limits computer transmissions to any particular 11:15:25  
2 standard or computer transmission technology, 11:15:28  
3 right? 11:15:31

4 A. The second sentence is more specific, and 11:15:33  
5 the meaning of the second sentence is limited to 11:15:44  
6 computer transmissions. 11:15:56

7 Q. Dr. Schubert, is it your position that 11:16:01  
8 "synchronous" and "synchronized timing" mean the 11:16:07  
9 same thing? 11:16:10

10 MR. HANDY: Objection, form. 11:16:15

11 A. As I expressed before, I find the first 11:16:24  
12 definition helpful, "occurring at the same time." 11:16:31

13 If we define "synchronous" by using a 11:16:37  
14 modification of the word, by using "synchronized" 11:16:42  
15 instead of "synchronous," I find it more 11:16:48  
16 difficult to fully understand what somebody may 11:17:04  
17 try to express. 11:17:21

18 BY MR. RAJAN: 11:17:26

19 Q. But, Dr. Schubert, that didn't answer my 11:17:27  
20 question? 11:17:29

21 My question is about not 11:17:29  
22 "synchronized" by itself, but "synchronized 11:17:31

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | timing." So I'll ask the question again.         | 11:17:34 |
| 2  | Is it your position that "synchronous"           | 11:17:38 |
| 3  | and "synchronized timing" mean the same thing?   | 11:17:41 |
| 4  | MR. HANDY: Objection, asked and                  | 11:17:45 |
| 5  | answered.                                        | 11:17:46 |
| 6  | A. "Synchronous" being explained by              | 11:18:15 |
| 7  | "occurring at the same time" is clear to me.     | 11:18:17 |
| 8  | "Synchronous" explained by                       | 11:18:22 |
| 9  | "synchronous timing" is not 100 percent clear to | 11:18:24 |
| 10 | me.                                              | 11:18:29 |
| 11 | BY MR. RAJAN:                                    | 11:18:49 |
| 12 | Q. So then, you would not say that               | 11:18:49 |
| 13 | "synchronized" and -- I'm sorry. Let me rephrase | 11:18:51 |
| 14 | that.                                            | 11:18:56 |
| 15 | So you would say that "synchronous" is           | 11:18:56 |
| 16 | not the same as "synchronized timing," then,     | 11:18:59 |
| 17 | right?                                           | 11:19:02 |
| 18 | MR. HANDY: Objection,                            | 11:19:04 |
| 19 | mischaracterizes testimony.                      | 11:19:04 |
| 20 | A. "Synchronous timing" is used here in a        | 11:19:22 |
| 21 | specific context. The specific context is        | 11:19:24 |
| 22 | computer transmissions, and I'm not an expert in | 11:19:28 |

1 computer transmissions, such as transmissions 11:19:39  
2 that occurs among computers and use-specific 11:19:47  
3 standards such as the ethernet standard, the 11:19:52  
4 wi-fi standard, the internet standard. 11:19:56

5 And for that reason, I hesitate to 11:20:08  
6 attribute a specific meaning to "synchronous 11:20:16  
7 timing" because, as I said, it's made in a 11:20:21  
8 specific context, the context of computer 11:20:26  
9 transmissions. 11:20:30

10 BY MR. RAJAN: 11:20:34

11 Q. And that context of computer 11:20:34  
12 transmissions is not limited to any of the 11:20:36  
13 particular protocols that you just named, right? 11:20:39

14 A. There are additional means of computer 11:20:51  
15 transmissions, such as Bluetooth. So I would 11:20:54  
16 agree with you that it's not limited to a few 11:21:11  
17 specific computer transmission standards. 11:21:18

18 Q. Let's see. I'm going to take down EX3001 11:21:38  
19 and bring up again EX1003. 11:21:54

20 Okay. Going to Page 184 of EX1003 -- 11:22:05  
21 let's see. I apologize, not 184. It is 129 of 11:22:36  
22 EX1003. 11:23:01

|    |                                                 |          |
|----|-------------------------------------------------|----------|
| 1  | This is a page of your CV that lists            | 11:23:04 |
| 2  | U.S. patents where you're named as an inventor; | 11:23:08 |
| 3  | is that right?                                  | 11:23:11 |
| 4  | A. Yes.                                         | 11:23:13 |
| 5  | Q. And scrolling down to Page 131, there's a    | 11:23:13 |
| 6  | total of 39 patents that you are named as an    | 11:23:22 |
| 7  | inventor on, right?                             | 11:23:25 |
| 8  | A. Yes.                                         | 11:23:30 |
| 9  | Q. Are you aware of any other patents that      | 11:23:31 |
| 10 | are not listed in this list?                    | 11:23:34 |
| 11 | A. Some of patents have resulted in foreign     | 11:23:38 |
| 12 | patents. So the U.S. patents have been used to  | 11:23:43 |
| 13 | apply for a patent in another country, and so   | 11:23:55 |
| 14 | those are -- would be additional patents, but I | 11:24:06 |
| 15 | have not listed them here.                      | 11:24:09 |
| 16 | Q. And you're referring to foreign              | 11:24:11 |
| 17 | counterpart patents that would have the same    | 11:24:14 |
| 18 | disclosure as these U.S. patents, right?        | 11:24:18 |
| 19 | A. Yes.                                         | 11:24:21 |
| 20 | Q. Okay. Is it fair to say that these           | 11:24:22 |
| 21 | patents all focus on semiconductor design and   | 11:24:30 |
| 22 | fabrication?                                    | 11:24:36 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | A. Can I hear the question again?                 | 11:24:47 |
| 2  | Q. Is it fair to say that these patents all       | 11:24:49 |
| 3  | focus on semiconductor design and fabrication?    | 11:24:52 |
| 4  | A. I would not express it in this manner.         | 11:25:01 |
| 5  | For example, Patent Number 35 that I              | 11:25:05 |
| 6  | listed here is related to liquid crystal          | 11:25:10 |
| 7  | displays.                                         | 11:25:19 |
| 8  | Q. You're referring to Number 35 with the         | 11:25:21 |
| 9  | full title: "Liquid crystal display with          | 11:25:24 |
| 10 | refractive index matched electrodes." Is that     | 11:25:27 |
| 11 | right?                                            | 11:25:30 |
| 12 | A. Yes.                                           | 11:25:31 |
| 13 | Q. So does this patent relate to                  | 11:25:32 |
| 14 | semiconductor design or fabrication related to    | 11:25:38 |
| 15 | liquid crystal displays?                          | 11:25:41 |
| 16 | A. To some extent, yes, but it's not limited      | 11:25:44 |
| 17 | to those areas.                                   | 11:25:47 |
| 18 | A liquid crystal display I would                  | 11:25:50 |
| 19 | characterize as a system and also the application | 11:25:53 |
| 20 | of semiconductor devices. The liquid crystal      | 11:25:56 |
| 21 | display employs semiconductor devices by -- but   | 11:26:03 |
| 22 | by itself, it's more like a system that has       | 11:26:07 |

1 multiple components. 11:26:11

2 Q. Do you recall whether the patent is 11:26:12  
3 directed to components other than the LEDs 11:26:13  
4 themselves in the liquid crystal display? 11:26:16

5 A. It is my recollection that this patent 11:26:20  
6 does not relate to LEDs. 11:26:23

7 Q. Does it relate to semiconductors 11:26:30  
8 generally? 11:26:32

9 A. It relates to the optics of a liquid 11:26:37  
10 crystal display, and a liquid crystal display 11:26:42  
11 uses semiconductor devices. But nowadays you 11:26:48  
12 find a semiconductor device in pretty much 11:26:56  
13 everything, you know. So it's a systems patent. 11:26:58  
14 It's like -- you know, you could say 5G 11:27:05  
15 technology is like a wireless technology, but it 11:27:11  
16 includes semiconductor devices; but 5G I would 11:27:20  
17 not describe as a semiconductor device 11:27:25  
18 technology. 11:27:32

19 So on the component level, we have 11:27:36  
20 semiconductors, but the patent goes beyond the 11:27:39  
21 component level and goes into the system level. 11:27:44  
22 And so a liquid crystal display is more of a 11:27:49

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | system that includes many semiconductor devices. | 11:27:53 |
| 2  | But I wouldn't say that this is limited to       | 11:27:59 |
| 3  | processing and fabrication of semiconductor      | 11:28:09 |
| 4  | devices. You know, there is optics. There is     | 11:28:11 |
| 5  | material science. There are semiconductor        | 11:28:15 |
| 6  | devices in that liquid crystal display.          | 11:28:18 |
| 7  | Q. Dr. Schubert, so we've been going about an    | 11:28:41 |
| 8  | hour. Before I start discussing another          | 11:28:44 |
| 9  | document, would you like to take a break?        | 11:28:47 |
| 10 | A. Sure.                                         | 11:28:49 |
| 11 | MR. RAJAN: Okay. Let's go off                    | 11:28:50 |
| 12 | the record, please.                              | 11:28:54 |
| 13 | THE COURT REPORTER: Okay. We're                  | 11:28:54 |
| 14 | off.                                             | 11:28:56 |
| 15 | (Break taken from 11:28 a.m. to                  | 11:28:56 |
| 16 | 11:39 a.m.)                                      | 11:39:58 |
| 17 | THE COURT REPORTER: We're on the                 | 11:40:03 |
| 18 | record.                                          | 11:40:04 |
| 19 | BY MR. RAJAN:                                    | 11:40:04 |
| 20 | Q. Dr. Schubert, I'm passing through the chat    | 11:40:06 |
| 21 | a document identified in this proceeding as      | 11:40:09 |
| 22 | Exhibit EX1010. Let me know once you've received | 11:40:13 |

|    |                                                 |          |
|----|-------------------------------------------------|----------|
| 1  | it, and I'll also display it on the shared      | 11:40:18 |
| 2  | screen.                                         | 11:40:22 |
| 3  | A. Yes, I received it.                          | 11:40:40 |
| 4  | Q. Great.                                       | 11:40:42 |
| 5  | Do you recognize EX1010, Dr. Schubert?          | 11:40:42 |
| 6  | A. Yes.                                         | 11:41:06 |
| 7  | Q. This is your reply declaration in this       | 11:41:06 |
| 8  | proceeding, correct?                            | 11:41:11 |
| 9  | A. Yes.                                         | 11:41:15 |
| 10 | Q. At the bottom of Page 40, which is           | 11:41:15 |
| 11 | numbered Page 36 of EX1010, is your signature,  | 11:41:24 |
| 12 | correct?                                        | 11:41:28 |
| 13 | A. Yes.                                         | 11:41:31 |
| 14 | Q. And you executed this declaration on         | 11:41:37 |
| 15 | November 4th, 2024, right?                      | 11:41:41 |
| 16 | A. Yes.                                         | 11:41:46 |
| 17 | Q. And as of November 4th, 2024, this           | 11:41:46 |
| 18 | declaration contained a complete description of | 11:41:52 |
| 19 | your opinion in this proceeding, right?         | 11:41:55 |
| 20 | A. Yes.                                         | 11:42:07 |
| 21 | Q. All right. Dr. Schubert, what was your       | 11:42:07 |
| 22 | involvement in the preparation of your reply    | 11:42:14 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | declaration?                                      | 11:42:17 |
| 2  | A. I reviewed the relevant documents and          | 11:42:23 |
| 3  | worked with counsel to compose the November 2024  | 11:42:34 |
| 4  | declaration.                                      | 11:42:44 |
| 5  | Q. Did you draft the declaration yourself?        | 11:42:47 |
| 6  | MR. HANDY: Objection, vague as to                 | 11:42:53 |
| 7  | "draft."                                          | 11:42:54 |
| 8  | Caution the witness not to                        | 11:42:55 |
| 9  | disclose privileged communications.               | 11:42:56 |
| 10 | A. Some areas or some sections of the             | 11:43:11 |
| 11 | declaration I drafted myself. At least one        | 11:43:14 |
| 12 | section was drafted by counsel, and the remainder | 11:43:23 |
| 13 | was the result of my discussions with counsel and | 11:43:33 |
| 14 | my review of the relevant documents and my        | 11:43:35 |
| 15 | experience and my opinions in this matter.        | 11:43:38 |
| 16 | BY MR. RAJAN:                                     | 11:43:45 |
| 17 | Q. Do you recall which sections were drafted      | 11:43:45 |
| 18 | by counsel?                                       | 11:43:47 |
| 19 | MR. HANDY: Objection to the                       | 11:43:48 |
| 20 | extent it calls for privileged communications.    | 11:43:49 |
| 21 | A. The legal section.                             | 11:43:54 |
| 22 | BY MR. RAJAN:                                     | 11:43:56 |

1 Q. And which section is that in your reply 11:43:58  
2 declaration? 11:44:01

3 A. I believe that my first declaration is 11:44:23  
4 incorporated into the second declaration, and my 11:44:26  
5 first declaration included a legal section and 11:44:30  
6 that legal section informs me of the legal 11:44:34  
7 context and that legal section was drafted by 11:44:38  
8 counsel. 11:44:44

9 Q. So with respect to your reply declaration, 11:44:48  
10 EX1010, which sections were drafted by counsel? 11:44:52

11 MR. HANDY: Objection, asked and 11:44:59  
12 answered. 11:45:01

13 To the extent it calls for 11:45:03  
14 privileged communications, caution the witness. 11:45:05

15 A. The reply declaration includes 11:45:26  
16 Exhibit 1003, which is my first declaration. And 11:45:32  
17 this first declaration includes a legal section, 11:45:42  
18 and that legal section was drafted by counsel. 11:45:47

19 BY MR. RAJAN: 11:45:55

20 Q. Dr. Schubert, I'm asking specifically with 11:45:56  
21 respect to EX1010, not EX1003. 11:45:57

22 So in EX1010, which is your reply 11:46:04

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | declaration, which particular sections were       | 11:46:11 |
| 2  | drafted by counsel?                               | 11:46:13 |
| 3  | MR. HANDY: Objection, asked and                   | 11:46:14 |
| 4  | answered.                                         | 11:46:14 |
| 5  | To the extent it calls for                        | 11:46:15 |
| 6  | privileged communications, I caution the witness. | 11:46:17 |
| 7  | A. Can I hear the question again?                 | 11:46:44 |
| 8  | BY MR. RAJAN:                                     | 11:46:46 |
| 9  | Q. Sure.                                          | 11:46:48 |
| 10 | In EX1010, which is your reply                    | 11:46:48 |
| 11 | declaration, which particular sections were       | 11:46:53 |
| 12 | drafted by counsel?                               | 11:46:55 |
| 13 | MR. HANDY: Maintain same                          | 11:46:58 |
| 14 | objections.                                       | 11:47:01 |
| 15 | A. I consider myself as the person who            | 11:47:16 |
| 16 | drafted and authored and wrote this declaration.  | 11:47:21 |
| 17 | It's my declaration.                              | 11:47:32 |
| 18 | BY MR. RAJAN:                                     | 11:47:35 |
| 19 | Q. And how much time did you spend working        | 11:47:36 |
| 20 | on this declaration?                              | 11:47:37 |
| 21 | A. I do not recall the number of hours, but       | 11:48:07 |
| 22 | it could have been 40 hours.                      | 11:48:14 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | Q. 40, four, zero?                                | 11:48:21 |
| 2  | A. Correct. Four, zero. One week,                 | 11:48:24 |
| 3  | basically.                                        | 11:48:29 |
| 4  | Q. Could you have spent more than 40 hours        | 11:48:34 |
| 5  | preparing this reply declaration?                 | 11:48:38 |
| 6  | A. That is possible.                              | 11:48:41 |
| 7  | Q. More than 60 hours?                            | 11:48:43 |
| 8  | A. That is possible.                              | 11:48:45 |
| 9  | Q. Did you spend more than one week preparing     | 11:48:46 |
| 10 | this declaration?                                 | 11:48:54 |
| 11 | A. That is possible. I do not recall the          | 11:48:56 |
| 12 | exact number of hours, but it could be -- it      | 11:48:58 |
| 13 | could have been more than a week.                 | 11:49:01 |
| 14 | Q. And when did you start working on your         | 11:49:03 |
| 15 | declaration?                                      | 11:49:05 |
| 16 | A. With respect to the reply declaration?         | 11:49:20 |
| 17 | Q. Yes.                                           | 11:49:23 |
| 18 | When did you begin working on your                | 11:49:24 |
| 19 | reply declaration?                                | 11:49:26 |
| 20 | A. I don't recall the date. It could have         | 11:49:32 |
| 21 | been one month before the submission date or more | 11:49:39 |
| 22 | than one month before the submission date.        | 11:49:44 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | Q. Did you work on your reply declaration in      | 11:49:49 |
| 2  | the month of September?                           | 11:49:52 |
| 3  | A. That is possible, but I don't recall.          | 11:49:58 |
| 4  | Q. Did you work on your reply declaration in      | 11:50:07 |
| 5  | the month of August?                              | 11:50:10 |
| 6  | A. I don't recall. Maybe not.                     | 11:50:17 |
| 7  | Q. Going to paragraph 22 of EX1010, do you        | 11:50:37 |
| 8  | see that the heading above paragraph 22 says:     | 11:50:44 |
| 9  | "Kuang discloses 'synchronous signals' as claimed | 11:50:51 |
| 10 | in 1[D]"?                                         | 11:50:54 |
| 11 | A. Yes.                                           | 11:50:57 |
| 12 | Q. Did you review Kuang in preparation for        | 11:50:57 |
| 13 | today's deposition?                               | 11:51:05 |
| 14 | A. Yes.                                           | 11:51:06 |
| 15 | Q. And when was the last time you reviewed        | 11:51:06 |
| 16 | Kuang?                                            | 11:51:11 |
| 17 | A. This morning.                                  | 11:51:12 |
| 18 | Q. Okay. Beginning in paragraph 24 of             | 11:51:14 |
| 19 | EX1010, which begins at the bottom of numbered    | 11:51:25 |
| 20 | Page 10, in this paragraph you discuss the        | 11:51:29 |
| 21 | concept of a shutoff command propagating from     | 11:51:32 |
| 22 | slave controller to slave controller; is that     | 11:51:39 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | right?                                            | 11:51:39 |
| 2  | A. Yes.                                           | 11:51:46 |
| 3  | Q. Okay. And on the next page of your reply       | 11:51:46 |
| 4  | declaration, you include an image reproduced from | 11:51:52 |
| 5  | Dr. Lebby's declaration.                          | 11:51:57 |
| 6  | Do you see that?                                  | 11:52:01 |
| 7  | A. Yes.                                           | 11:52:03 |
| 8  | Q. Are you familiar with the figure in the        | 11:52:04 |
| 9  | Kuang reference that is associated with this      | 11:52:10 |
| 10 | image?                                            | 11:52:13 |
| 11 | A. Yes.                                           | 11:52:21 |
| 12 | Q. This diagram is based on Kuang Figure 1,       | 11:52:22 |
| 13 | right?                                            | 11:52:27 |
| 14 | A. Yes.                                           | 11:52:36 |
| 15 | Q. Is it fair to say that the image here          | 11:52:36 |
| 16 | shows a rough sketch of a bus with ceiling lights | 11:52:41 |
| 17 | in the top of the bus?                            | 11:52:46 |
| 18 | A. Yes.                                           | 11:53:02 |
| 19 | Q. And in the image based on Kuang here,          | 11:53:02 |
| 20 | there are four ceiling lights, right?             | 11:53:10 |
| 21 | A. Yes.                                           | 11:53:22 |
| 22 | Q. Is it your understanding that there could      | 11:53:22 |

|    |                                                 |          |
|----|-------------------------------------------------|----------|
| 1  | be additional ceiling lights beyond these four  | 11:53:29 |
| 2  | that are shown?                                 | 11:53:31 |
| 3  | A. I would assume so, yes.                      | 11:53:50 |
| 4  | Q. Okay. So at the top -- at the top left --    | 11:53:52 |
| 5  | actually, let me back up.                       | 11:54:00 |
| 6  | So in this diagram here, there are              | 11:54:02 |
| 7  | four diagrams of the bus showing a sequence of  | 11:54:04 |
| 8  | events, right?                                  | 11:54:09 |
| 9  | A. Yes.                                         | 11:54:12 |
| 10 | Q. And at the top left, do you see that in      | 11:54:13 |
| 11 | this diagram all of the lights are illuminated? | 11:54:17 |
| 12 | A. Yes.                                         | 11:54:24 |
| 13 | Q. And then as shown in red in this diagram,    | 11:54:25 |
| 14 | a shutoff command is sent from a master node as | 11:54:30 |
| 15 | indicated by this red arrow and writing.        | 11:54:33 |
| 16 | Do you see that?                                | 11:54:37 |
| 17 | A. Which image are you referring to? Top        | 11:54:44 |
| 18 | left?                                           | 11:54:46 |
| 19 | Q. Top left, yes.                               | 11:54:47 |
| 20 | A. Yes, top left is basically a master          | 11:54:48 |
| 21 | shutoff command, yes.                           | 11:54:53 |
| 22 | Q. Okay. And then this diagram proceeds to      | 11:54:55 |

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | the image at the top right where the shutoff     | 11:54:59 |
| 2  | command is received by the first slave node,     | 11:55:06 |
| 3  | which turns off its lights, right?               | 11:55:11 |
| 4  | A. Correct.                                      | 11:55:14 |
| 5  | Q. And then this -- the first slave node         | 11:55:20 |
| 6  | sends the shutoff command to the second slave    | 11:55:25 |
| 7  | node, as shown on the bottom left diagram here,  | 11:55:28 |
| 8  | which shuts off its lights, right?               | 11:55:31 |
| 9  | A. The signal propagates from the first to       | 11:55:34 |
| 10 | the second slave node and then propagates to the | 11:55:39 |
| 11 | third slave node, yes. If that's what you are    | 11:55:43 |
| 12 | referring to, yes, I agree that the signal       | 11:55:46 |
| 13 | propagates from slave node to slave node.        | 11:55:48 |
| 14 | Q. Okay. And then between the bottom left        | 11:55:51 |
| 15 | and the bottom right diagrams here, the signal   | 11:55:55 |
| 16 | propagates from the third slave node to the      | 11:55:59 |
| 17 | fourth slave node, right?                        | 11:56:03 |
| 18 | A. Right.                                        | 11:56:08 |
| 19 | Q. And you'd expect that this sequence of        | 11:56:11 |
| 20 | diagrams would continue if there were additional | 11:56:14 |
| 21 | slave nodes, right?                              | 11:56:16 |
| 22 | A. Correct.                                      | 11:56:22 |

|    |                                                 |          |
|----|-------------------------------------------------|----------|
| 1  | Q. Okay. I'm going to take down EX1010          | 11:56:23 |
| 2  | and -- let's see. I'm passing through the chat  | 11:56:46 |
| 3  | another document identified as EX1008. Please   | 11:56:49 |
| 4  | let me know once you receive it.                | 11:57:00 |
| 5  | A. Yes, I received it.                          | 11:57:18 |
| 6  | Q. Okay. Do you recognize EX1008,               | 11:57:19 |
| 7  | Dr. Schubert?                                   | 11:57:23 |
| 8  | A. Yes.                                         | 11:57:25 |
| 9  | Q. This is the Lys reference discussed in       | 11:57:26 |
| 10 | your declarations, correct?                     | 11:57:31 |
| 11 | A. Correct.                                     | 11:57:33 |
| 12 | Q. And did you review Lys in preparation for    | 11:57:34 |
| 13 | today?                                          | 11:57:36 |
| 14 | A. Yes.                                         | 11:57:38 |
| 15 | Q. When's the last time you reviewed Lys?       | 11:57:39 |
| 16 | A. Yesterday.                                   | 11:57:46 |
| 17 | Q. On the third page of EX1008, do you see      | 11:57:46 |
| 18 | that the "Abstract" section says that Lys       | 11:57:59 |
| 19 | discloses: "Methods and apparatus for sensor    | 11:58:04 |
| 20 | responsive illumination of liquids in a variety | 11:58:09 |
| 21 | of environments"?                               | 11:58:11 |
| 22 | A. Yes.                                         | 11:58:28 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | Q. And the next sentence discusses that: "In      | 11:58:28 |
| 2  | one example, multi-colored LED-based sensor       | 11:58:36 |
| 3  | responsive light sources are employed." Right?    | 11:58:40 |
| 4  | A. Yes.                                           | 11:58:49 |
| 5  | Q. Turning to Column 2 of EX1008, which is at     | 11:58:51 |
| 6  | Page 24, the "Field of the Invention" section     | 11:59:07 |
| 7  | starting at line 25 says that Lys's invention is  | 11:59:09 |
| 8  | directed to "illumination of liquids, including   | 11:59:14 |
| 9  | illumination of liquids in environments such as   | 11:59:20 |
| 10 | pools or spas," right?                            | 11:59:24 |
| 11 | MR. HANDY: Objection, improper                    | 11:59:25 |
| 12 | narrative of the text.                            | 11:59:28 |
| 13 | A. Can I hear the question again?                 | 11:59:36 |
| 14 | BY MR. RAJAN:                                     | 11:59:38 |
| 15 | Q. Sure.                                          | 11:59:39 |
| 16 | In Column 2 of Lys, which is at                   | 11:59:39 |
| 17 | Page 24, the "Field of the Invention" section,    | 11:59:43 |
| 18 | which begins at line 25, discusses that the field | 11:59:47 |
| 19 | of invention relates to, quote, "illumination of  | 11:59:50 |
| 20 | liquids, including illumination of liquids in     | 11:59:56 |
| 21 | environments such as pools or spas," right?       | 11:59:59 |
| 22 | MR. HANDY: Maintain objection.                    | 12:00:04 |

|    |                                                  |          |
|----|--------------------------------------------------|----------|
| 1  | A. Your description has been somewhat            | 12:00:18 |
| 2  | incomplete because the first sentence says: "The | 12:00:20 |
| 3  | present invention relates generally to           | 12:00:26 |
| 4  | illumination and lighting control."              | 12:00:29 |
| 5  | And then it goes on and refers to the            | 12:00:33 |
| 6  | specific lighting system for pools or spas.      | 12:00:37 |
| 7  | BY MR. RAJAN:                                    | 12:00:48 |
| 8  | Q. Okay. And then if we look to Column 3 of      | 12:00:55 |
| 9  | Lys, starting at line 33, Lys discloses using    | 12:00:58 |
| 10 | light sources having "differently colored LEDs," | 12:01:11 |
| 11 | right?                                           | 12:01:15 |
| 12 | A. Correct.                                      | 12:01:30 |
| 13 | Q. So is it your understanding, then, that       | 12:01:30 |
| 14 | Lys discloses light sources that use             | 12:01:33 |
| 15 | light-emitting diodes?                           | 12:01:38 |
| 16 | A. Yes.                                          | 12:01:47 |
| 17 | Q. Looking ahead to Column 33 of Lys, which      | 12:01:47 |
| 18 | is at Page 40 of EX1008, could you please take a | 12:01:58 |
| 19 | moment and read the paragraph between line --    | 12:02:09 |
| 20 | between lines 18 and 36.                         | 12:02:12 |
| 21 | A. Column 33?                                    | 12:02:19 |
| 22 | Q. Column 33, lines 18 to 36.                    | 12:02:22 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | A. Okay. I'll read it.                            | 12:02:29 |
| 2  | Q. Thank you. Let me know when you're ready.      | 12:02:30 |
| 3  | A. (Witness reviewing the document.)              | 12:02:36 |
| 4  | Yes, I have read the paragraph.                   | 12:03:00 |
| 5  | Q. Do you see that in lines 31 to 36, Lys         | 12:03:48 |
| 6  | discusses various package types of an LED?        | 12:03:56 |
| 7  | A. Yes.                                           | 12:04:07 |
| 8  | Q. So here Lys is discussing the -- the           | 12:04:08 |
| 9  | casing of the LED as opposed to a system that the | 12:04:18 |
| 10 | LED is integrated into, right?                    | 12:04:21 |
| 11 | A. Can I hear the question again?                 | 12:04:27 |
| 12 | Q. Sure.                                          | 12:04:29 |
| 13 | So here in lines 31 to 36, where Lys              | 12:04:30 |
| 14 | is discussing package type of an LED, Lys is      | 12:04:35 |
| 15 | discussing the packaging of the LED chips rather  | 12:04:39 |
| 16 | than a system that the LEDs are integrated into,  | 12:04:45 |
| 17 | right?                                            | 12:04:48 |
| 18 | A. Lys describes various packaged LEDs, and       | 12:05:24 |
| 19 | these packaged LEDs can be incorporated in a      | 12:05:30 |
| 20 | light source -- in a system of light sources.     | 12:05:36 |
| 21 | Q. And the disclosures here between lines 31      | 12:05:45 |
| 22 | to 36 of column 33 is directed to the package     | 12:05:49 |

1 types of those LED chips, right? 12:05:53

2 A. To some extent, yes. Lys also included 12:06:00

3 nonpackaged LEDs, and the nonpackaged LEDs would 12:06:05

4 be LED chips, I would assume, and then various 12:06:09

5 other types of LEDs; for example, a surface mount 12:06:12

6 LED or a chip-on-board LED. 12:06:15

7 Q. And aside from mentioning the surface 12:06:25

8 mount LEDs or the chip-on-board LED packages, 12:06:29

9 there's no discussion here about how the LEDs 12:06:33

10 would be integrated into a lighting device, 12:06:35

11 right? 12:06:39

12 MR. HANDY: Objection, form. 12:06:40

13 A. Lys, in line 32, refers -- refers to all 12:06:47

14 other configurations. 12:07:03

15 So the disclosure of Lys is somewhat 12:07:07

16 broad because it includes all other 12:07:14

17 configurations; and these other configurations, I 12:07:16

18 would assume, can include multi LED light 12:07:20

19 sources. 12:07:32

20 BY MR. RAJAN: 12:07:32

21 Q. And the context of this sentence is the 12:07:34

22 LED chip packaging, right? 12:07:36

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | MR. HANDY: Objection, vague.                      | 12:07:42 |
| 2  | A. I would assume that -- the term that Lys       | 12:07:46 |
| 3  | defines here is "LED," as mentioned in line 31.   | 12:07:53 |
| 4  | So Lys discusses the term "LED" and then says     | 12:08:04 |
| 5  | what Lys means by LED can include nonpackaged     | 12:08:14 |
| 6  | LEDs, packaged LEDs, surface mount LEDs,          | 12:08:24 |
| 7  | chip-on-board LEDs, and LEDs of all other -- all  | 12:08:35 |
| 8  | other configurations.                             | 12:08:40 |
| 9  | Now, let me just say a word about                 | 12:08:41 |
| 10 | chip-on-board LEDs. Chip-on-board LEDs includes   | 12:08:45 |
| 11 | multiple LED chips; so chip-on-board means that   | 12:08:53 |
| 12 | we have a board and we put on that board multiple | 12:09:00 |
| 13 | LED chips.                                        | 12:09:06 |
| 14 | So the term "LED" that Lys refers to              | 12:09:10 |
| 15 | can include multiple LED chips, and then Lys goes | 12:09:15 |
| 16 | on to describe all other configurations. And all  | 12:09:27 |
| 17 | other configurations, one has to assume, includes | 12:09:32 |
| 18 | configurations in which a light source has        | 12:09:39 |
| 19 | multiple LEDs; and Lys apparently refers to such  | 12:09:43 |
| 20 | multi LED light sources as LEDs.                  | 12:09:52 |
| 21 | BY MR. RAJAN:                                     | 12:10:03 |
| 22 | Q. And you see that the sentence we're            | 12:10:03 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | discussing begins at line 29 of this column that  | 12:10:05 |
| 2  | says: "It should be understood that the term LED  | 12:10:11 |
| 3  | does not restrict the package type of an LED, for | 12:10:14 |
| 4  | example." Right?                                  | 12:10:22 |
| 5  | A. Correct, yes.                                  | 12:10:23 |
| 6  | Q. So here you would agree with me that the       | 12:10:24 |
| 7  | context of this sentence, as it begins in line    | 12:10:29 |
| 8  | 29, is discussing the package type of the LED,    | 12:10:34 |
| 9  | right?                                            | 12:10:36 |
| 10 | A. Well, what I understand here is that Lys       | 12:10:39 |
| 11 | expresses the desire that the term "LED" not be   | 12:10:48 |
| 12 | restricted to a certain package type; but the     | 12:10:59 |
| 13 | term "LED" has a broader meaning to include all   | 12:11:07 |
| 14 | package types, include package types that have    | 12:11:14 |
| 15 | multiple LED chips and all other configurations.  | 12:11:17 |
| 16 | And "for all other configurations" is             | 12:11:25 |
| 17 | a pretty broad statement, and I would say that    | 12:11:27 |
| 18 | all other configurations may be guided by the     | 12:11:36 |
| 19 | embodiments that are shown in Lys.                | 12:11:40 |
| 20 | Q. I'm taking down EX1008, and I'm passing        | 12:12:00 |
| 21 | through the chat a document identified as EX1001. | 12:12:04 |
| 22 | Please let me know once you've received it.       | 12:12:16 |

|    |                                               |          |
|----|-----------------------------------------------|----------|
| 1  | A. I received it.                             | 12:12:33 |
| 2  | Q. Okay. Do you recognize EX1001,             | 12:12:35 |
| 3  | Dr. Schubert?                                 | 12:12:38 |
| 4  | A. Yeah, yes. This is the '546 patent.        | 12:12:40 |
| 5  | Q. And this is the '546 that's the subject of | 12:12:46 |
| 6  | this proceeding, right?                       | 12:12:49 |
| 7  | A. Correct.                                   | 12:12:52 |
| 8  | Q. Dr. Schubert, when was the last time you   | 12:12:52 |
| 9  | reviewed the '546 patent?                     | 12:12:57 |
| 10 | A. In the last two days.                      | 12:13:01 |
| 11 | Q. Scrolling ahead to Figure 7, which is on   | 12:13:04 |
| 12 | Page 8 of EX1001, are you familiar with this  | 12:13:13 |
| 13 | figure of the '546 patent, Dr. Schubert?      | 12:13:17 |
| 14 | A. Yes.                                       | 12:13:26 |
| 15 | Q. Do you recognize this to be an example of  | 12:13:27 |
| 16 | a curtain lamp?                               | 12:13:31 |
| 17 | MR. HANDY: Objection to the                   | 12:13:36 |
| 18 | extent it calls for a legal conclusion.       | 12:13:37 |
| 19 | A. You said "example of a curtain lamp"?      | 12:13:56 |
| 20 | BY MR. RAJAN:                                 | 12:13:58 |
| 21 | Q. Yes.                                       | 12:13:58 |
| 22 | A. Yes.                                       | 12:14:12 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | Q. Are you familiar with the components that      | 12:14:12 |
| 2  | are illustrated in this figure?                   | 12:14:17 |
| 3  | A. Yes.                                           | 12:14:27 |
| 4  | Q. And let me just confirm, do you understand     | 12:14:27 |
| 5  | that this Figure 7 of EX1001 is showing a circuit | 12:14:38 |
| 6  | diagram?                                          | 12:14:43 |
| 7  | A. A block diagram; could be called a block       | 12:14:59 |
| 8  | diagram, could be called a circuit diagram, yes.  | 12:15:02 |
| 9  | Q. Scrolling ahead to Column 2 of EX1001, you     | 12:15:11 |
| 10 | see that line 34 says: "Figure 7 shows a circuit  | 12:15:20 |
| 11 | diagram of the light-emitting diode curtain       | 12:15:23 |
| 12 | lamp." Right?                                     | 12:15:27 |
| 13 | A. What column?                                   | 12:15:30 |
| 14 | Q. Column 2, lines 34 to 35.                      | 12:15:33 |
| 15 | A. Yes.                                           | 12:15:47 |
| 16 | Q. Okay. Scrolling back up to Figure 7 on         | 12:15:47 |
| 17 | Page 8 of EX1001, Reference Number 102 you would  | 12:15:52 |
| 18 | understand to be pointing to the master control   | 12:16:07 |
| 19 | unit in this figure, right?                       | 12:16:09 |
| 20 | A. Yes.                                           | 12:16:15 |
| 21 | Q. And Reference Number 104 points to a slave     | 12:16:16 |
| 22 | control unit, right?                              | 12:16:21 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | A. Yes.                                           | 12:16:28 |
| 2  | Q. And although there's only one reference        | 12:16:29 |
| 3  | number label here, there are, in fact, several    | 12:16:33 |
| 4  | slave control units in this Figure 7, right?      | 12:16:36 |
| 5  | A. Yes.                                           | 12:16:43 |
| 6  | Q. Do you see the dashed line box that is         | 12:16:44 |
| 7  | labeled "Number 50" in this figure?               | 12:16:51 |
| 8  | A. Yes.                                           | 12:16:57 |
| 9  | Q. Is it your understanding that this dashed      | 12:16:58 |
| 10 | line box, which encircles the master control unit | 12:17:02 |
| 11 | and the slave control units, refers to the        | 12:17:07 |
| 12 | driving apparatus for the curtain lamp?           | 12:17:10 |
| 13 | A. I think it could be called that way.           | 12:18:01 |
| 14 | Those are the components that drive and control   | 12:18:03 |
| 15 | the LEDs; and 50 goes around 102, which is the    | 12:18:08 |
| 16 | master control unit, and goes around 104, the     | 12:18:18 |
| 17 | slave control units. So in that sense, if you     | 12:18:28 |
| 18 | want to call this the driving apparatus, it could | 12:18:34 |
| 19 | be reasonable to say this is the driving          | 12:18:42 |
| 20 | apparatus.                                        | 12:18:45 |
| 21 | Q. Okay. Do you recognize that Item 52            | 12:18:50 |
| 22 | points to an LED?                                 | 12:18:56 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | A. Let me just add to my previous answer, if      | 12:19:10 |
| 2  | I may, that, you know, looking at the             | 12:19:13 |
| 3  | specification, 50 is identified as light-emitting | 12:19:16 |
| 4  | string, or, better, light-emitting diode string   | 12:19:27 |
| 5  | 50.                                               | 12:19:32 |
| 6  | Q. And where are you looking in the patent?       | 12:19:32 |
| 7  | A. I'm looking at Column 6, line 33 to 34.        | 12:19:42 |
| 8  | It states: "One light-emitting diode string,      | 12:19:52 |
| 9  | 50."                                              | 12:20:00 |
| 10 | So I'm just pointing out that the '546            | 12:20:00 |
| 11 | patent identifies Element 50 as light-emitting    | 12:20:05 |
| 12 | diode string.                                     | 12:20:13 |
| 13 | Q. Do you see that the sentence in Column 6,      | 12:20:15 |
| 14 | beginning at line 32, says: "The driving          | 12:20:20 |
| 15 | apparatus for light-emitting diode curtain lamp   | 12:20:26 |
| 16 | with single light-emitting diode and one          | 12:20:29 |
| 17 | light-emitting diode string 50"?                  | 12:20:34 |
| 18 | A. Yes, I see that.                               | 12:20:40 |
| 19 | Q. And looking down on the same column            | 12:20:41 |
| 20 | beginning at line 53, do you see that the same    | 12:20:46 |
| 21 | text appears? It says: "The light" -- I'm         | 12:20:52 |
| 22 | sorry. At line 53 it says: "The driving           | 12:20:54 |

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | apparatus for light-emitting diode curtain lamp   | 12:20:58 |
| 2  | with single light-emitting diode and one          | 12:21:00 |
| 3  | light-emitting diode string 50."                  | 12:21:05 |
| 4  | Do you see that?                                  | 12:21:08 |
| 5  | A. Yes, I see that.                               | 12:21:21 |
| 6  | Q. So based on these two excerpts of text in      | 12:21:22 |
| 7  | conjunction with Item 50 shown in Figure 7, you   | 12:21:27 |
| 8  | would agree with me that 50 refers to the driving | 12:21:32 |
| 9  | apparatus, correct?                               | 12:21:36 |
| 10 | A. Generally, yes; but as I said, 50 is           | 12:21:53 |
| 11 | identified in the '546 patent as a light-emitting | 12:21:58 |
| 12 | diode string 50. I'm just going by the words      | 12:22:34 |
| 13 | that I read.                                      | 12:22:46 |
| 14 | Q. And the words that I read to you before in     | 12:22:48 |
| 15 | those two parts of -- in the two parts of the     | 12:22:50 |
| 16 | same Figure 6 in the '546 patent, both sentences  | 12:23:02 |
| 17 | that include Item Number 50 begin with "the       | 12:23:08 |
| 18 | driving apparatus" and -- correct?                | 12:23:11 |
| 19 | A. That is correct. The sentence starts with      | 12:23:18 |
| 20 | "the driving apparatus" and then continues and at | 12:23:20 |
| 21 | some point mentions "light-emitting diode string  | 12:23:25 |
| 22 | 50."                                              | 12:23:29 |

1           So what I'm saying is, if we go by the           12:23:29  
2           narrative disclosure, 50 is identified as           12:23:32  
3           light-emitting diode string.           12:23:45

4           If we go by the pictorial disclosure,           12:23:47  
5           Figure 7, 50 could be identified as the driving           12:23:52  
6           apparatus.           12:24:06

7           Q.   Would it be fair to say that the narrative           12:24:12  
8           disclosure is also referring to the driving           12:24:15  
9           apparatus when you consider the larger group of           12:24:21  
10          text immediately preceding Item 50?           12:24:26

11          MR. HANDY:   Objection, confusing.           12:24:31

12          A.   Well, the narrative disclosure refers to           12:24:40  
13          Figure 7, and the first sentence mentioning           12:24:46  
14          light-emitting diode string 50 refers to a           12:24:56  
15          curtain lamp with a single light-emitting diode           12:25:01  
16          in one light-emitting diode string 50.           12:25:09

17          So it appears to me that the '546           12:25:15  
18          patent refers to a light-emitting diode string 50           12:25:18  
19          that has a single light-emitting diode; however,           12:25:23  
20          Figure 7 has multiple LEDs in the string.           12:25:31

21          And so, you know, I see a little           12:25:47  
22          inconsistency between the pictorial disclosure of           12:25:50

1 Figure 7, where we have four diodes in a string,  
2 and the narrative disclosure, which appears to  
3 refer to a single light-emitting diode in one  
4 string.

5 BY MR. RAJAN:

6 Q. When you say Figure 7 has multiple LEDs in  
7 the string, are you referring to the icon here  
8 labeled "52" and the other icons of the same  
9 appearance?

10 A. Generally, yes.

11 If we look at the group of LEDs, the  
12 top LED is labeled "52" in Figure 7; and then we  
13 have a second, third, and fourth LED  
14 vertically -- arranged vertically, and this  
15 vertical arrangement can be called a string.

16 Q. And Figure 7 shows several of these  
17 strings, right?

18 A. Correct. Figure 7 shows several strings,  
19 each string including -- or consisting of in this  
20 case four LEDs.

21 Q. Looking at Figure 8, this is another  
22 circuit diagram of a curtain lamp embodiment in

|    |                                                   |          |
|----|---------------------------------------------------|----------|
| 1  | the '546 patent, right?                           | 12:28:50 |
| 2  | A. Yes.                                           | 12:29:12 |
| 3  | Q. And in Column 6, do you see that at line       | 12:29:12 |
| 4  | 57, Item Reference Number 146 is a second curtain | 12:29:25 |
| 5  | lamp, right?                                      | 12:29:31 |
| 6  | A. Yes.                                           | 12:29:42 |
| 7  | Q. Looking back to Figure 8, do you see that      | 12:29:43 |
| 8  | 146 labels a dashed line box encircling this      | 12:29:54 |
| 9  | middle portion of the figure, right?              | 12:30:01 |
| 10 | A. Yes.                                           | 12:30:05 |
| 11 | Q. So you agree with me that Figure 8 shows       | 12:30:05 |
| 12 | multiple curtain lamps?                           | 12:30:11 |
| 13 | A. Yes.                                           | 12:30:21 |
| 14 | Q. Aside from Figures 7 and 8, there are no       | 12:30:22 |
| 15 | other circuit diagrams of the curtain lamp in the | 12:30:35 |
| 16 | '546 patent, right?                               | 12:30:40 |
| 17 | MR. HANDY: Objection, form.                       | 12:30:41 |
| 18 | A. The other diagrams -- and you may call         | 12:31:26 |
| 19 | them block diagram or circuit diagram -- relate   | 12:31:29 |
| 20 | to parts of a curtain lamp. For example, Figure   | 12:31:32 |
| 21 | 10 relates to a rectification circuit for a       | 12:31:47 |
| 22 | curtain lamp.                                     | 12:32:08 |

1 BY MR. RAJAN:

12:32:19

2 Q. Aside from Figure 7 and Figure 8 of the  
3 '546 patent, there are no other circuit diagrams  
4 of a complete curtain lamp embodiment, right?

12:32:19

12:32:24

12:32:27

5 MR. HANDY: Objection, vague.

12:32:41

6 MR. RAJAN: Counsel, I have to  
7 caution you that "vague" is not a proper  
8 objection under the PTAB. I've let it go several  
9 times, but it's got to stop.

12:32:49

12:32:50

12:32:53

12:32:57

10 A. I generally agree with your statement;  
11 however, I would like to note that in addition to  
12 the pictorial disclosures of the curtain lamps  
13 shown in Figures 7 and 8, there are also  
14 narrative disclosures of a curtain lamp; and in  
15 particular, the narrative disclosures of the  
16 curtain lamp include embodiments in which we have  
17 only one LED string and also includes embodiments  
18 in which one LED string has one LED or has only  
19 one LED.

12:33:32

12:33:37

12:33:42

12:33:49

12:33:55

12:34:03

12:34:08

12:34:15

12:34:21

12:34:31

20 Q. Okay.

12:34:43

21 MR. RAJAN: Why don't we take a  
22 quick break. Let's go off the record, please.

12:34:48

12:34:50

Transcript of Dr. E. Fred Schubert  
Conducted on December 9, 2024

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|    |                                                 |          |
|----|-------------------------------------------------|----------|
| 1  | THE COURT REPORTER: We're off the               | 12:34:55 |
| 2  | record.                                         | 12:34:57 |
| 3  | (Break taken from 12:34 p.m. to                 | 12:34:58 |
| 4  | 12:40 p.m.)                                     | 12:40:27 |
| 5  | THE COURT REPORTER: We're back on               | 12:40:30 |
| 6  | the record.                                     | 12:40:32 |
| 7  | BY MR. RAJAN:                                   | 12:40:32 |
| 8  | Q. Dr. Schubert, thank you for your time        | 12:40:35 |
| 9  | today. I have no further questions on direct.   | 12:40:36 |
| 10 | A. Thank you.                                   | 12:40:39 |
| 11 | MR. HANDY: Okay. There's no                     | 12:40:41 |
| 12 | questions from petitioner.                      | 12:40:42 |
| 13 | THE COURT REPORTER: Okay. Did                   | 12:40:46 |
| 14 | you want the exhibits that you showed attached? | 12:40:50 |
| 15 | MR. HANDY: That would be good,                  | 12:40:54 |
| 16 | for reference.                                  | 12:40:55 |
| 17 | MR. RAJAN: Yeah, please.                        | 12:40:55 |
| 18 | THE COURT REPORTER: Okay. And                   | 12:40:57 |
| 19 | anything else for the record?                   | 12:40:58 |
| 20 | MR. RAJAN: Nothing for patent                   | 12:41:02 |
| 21 | owner.                                          | 12:41:04 |
| 22 | MR. HANDY: Nothing for                          | 12:41:04 |

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1 petitioner.

12:41:07

2 THE COURT REPORTER: Okay. We're

12:41:09

3 off the record.

12:41:10

4 (Deposition concluded.)

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Transcript of Dr. E. Fred Schubert  
Conducted on December 9, 2024

93

1 I, DR. E. FRED SCHUBERT, have read the  
2 foregoing deposition and hereby affix my  
3 signature that same is true and correct, except  
4 as noted above.

5 \_\_\_\_\_  
6 DR. E. FRED SCHUBERT

7 THE STATE OF \_\_\_\_\_)

8 COUNTY OF \_\_\_\_\_)

9 Before me, \_\_\_\_\_, on  
10 this day personally appeared DR. E. FRED  
11 SCHUBERT, known to me (or proved to me under oath  
12 or through \_\_\_\_\_)

13 (description of identity card or other document)  
14 to be the person whose name is subscribed to the  
15 foregoing instrument and acknowledged to me that  
16 they executed the same for the purposes and  
17 consideration therein expressed.

18 Given under my hand and seal of office this  
19 \_\_\_\_\_ day of \_\_\_\_\_,  
20 \_\_\_\_\_.

21 \_\_\_\_\_  
22 NOTARY PUBLIC IN AND FOR  
THE STATE OF \_\_\_\_\_  
COMMISSION EXPIRES: \_\_\_\_\_

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1 UNITED STATES PATENT AND TRADEMARK OFFICE

2  
3 BEFORE THE PATENT TRIAL AND APPEAL BOARD

4  
5 Xu Peicheng (Hong Kong) Optoelectronic Technology  
6 Co., Limited,

7 Petitioner,

8 V.

9 Semisilicon Technology Corp.,

10 Patent Owner.

11 Case No. IPR2024-00156  
12 U.S. Patent No. 8,884,546

13 REPORTER'S CERTIFICATION  
14 DEPOSITION OF DR. E. FRED SCHUBERT  
15 DECEMBER 9, 2014

16 I, Annette Peltier, Certified Shorthand  
17 Reporter in and for the State of Texas, hereby  
18 certify to the following:

19 That the witness, DR. E. FRED SCHUBERT, was  
20 duly sworn by the officer and that the transcript  
21 of the oral deposition is a true record of the  
22 testimony given by the witness;

That the original deposition was delivered to

1 Mr. Kai Rajan, Custodial Attorney.

2 I further certify that the signature of the  
3 deponent was not requested by the deponent or  
4 party before the completion of the deposition.

5 I further certify that I am neither counsel  
6 for, related to, nor employed by any of the  
7 parties or attorneys in the action in which this  
8 testimony was taken. Further, I am not a  
9 relative or employee of any attorney of record in  
10 this cause, nor am I financially or otherwise  
11 interested in the outcome of the action.

12 Certified to by me this 10th day of December,  
13 2024.

14   
15 \_\_\_\_\_  
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Fax: 888.503.3767

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Transcript of Dr. E. Fred Schubert  
Conducted on December 9, 2024

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Transcript of Dr. E. Fred Schubert  
Conducted on December 9, 2024

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Transcript of Dr. E. Fred Schubert  
Conducted on December 9, 2024

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