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Transcript of Alan E. Willner, Ph.D.

Date: September 17, 2024
Case: Nokia of America Corporation -v- Soto, et al. (PTAB)

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WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

Nokia of America Corporation
IPR2023-00960, Ex. 1040
Ex. 1040.1

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

NOKIA OF AMERICA CORPORATION, Petitioner, v. ALEXANDER SOTO AND WALTER SOTO, Patent Owner.

Case No. IPR2023-00960
U.S. Patent No. 8,238,754

Virtual Videotaped Deposition of ALAN ELI WILLNER, Ph.D.
Tuesday, September 17, 2024
12:47 p.m. EST

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Videotaped deposition of ALAN ELI WILLNER, Ph.D., pursuant to notice, before Tiffany M. Pietrzyk, a Certified Shorthand Reporter in the States of Illinois, Texas, and California, Registered Professional Reporter, Certified Realtime Reporter, and a Notary Public in and for the State of Illinois.

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P R O C E E D I N G S

THE VIDEOGRAPHER: Here begins Media Number 1 in the videotaped deposition of Dr. Alan Willner, in the matter of Nokia of America Corporation vs. Soto, et al., PTAB, in the United States Patent and Trademark Office, case number IPR2023-00960.

Today's date is September 17, 2024, and the time on the video monitor is 12:47 p.m. Eastern Standard Time.

The videographer today is Nache Buie, representing Planet Depos. The video deposition is taking place at -- remotely.

Would counsel please voice identify themselves and state whom they represent.

MS. RIOLO: This is Mary Riolo, with Alston & Bird, on behalf of petitioner Nokia of America Corporation. And with me today is my colleague, Karlee Wroblewski.

MR. TONG: This is Peter Tong, from Russ August & Kabat, on behalf of patent owner. And with me is my colleague, Irene Lee.

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THE VIDEOGRAPHER: Thank you.

Today, the court reporter is Tiffany Pietrzyk, also representing Planet Depos.

The witness will now be sworn.

(Witness sworn.)

MS. RIOLO: And before we get started with the questioning, I just want to note for the record that the witness has the real-time feed open on his computer, which we object to and would ask that he close.

MR. TONG: And on behalf of patent owner, we do not think this is objectionable. I had looked through the trial practice guide. There appears to be no rule prohibiting the use of the real time feed.

WHEREUPON:

ALAN ELI WILLNER, Ph.D.,

called as a witness herein, having been first duly sworn, was examined and testified as follows:

EXAMINATION

BY MS. RIOLO:

Q. Good morning, Dr. Willner.

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A. Good morning.

Q. And my name is Mary Riolo, and I'll be the taking attorney for your deposition today.

So will you please state your full name for the record?

A. Alan Eli Willner.

Q. And I understand that you've been deposed as an expert before; is that correct?

A. Yes.

Q. How many times have you been deposed, would you say?

A. I'd say within a factor of two, about 20 times.

Q. And have all those depositions been relevant to patent infringement or validity proceedings?

A. Most of them.

Q. And you are familiar with the general rules of a deposition; is that fair?

A. Yes. And --

Q. Okay. Well --

A. -- I'll just ask that if there's no question pending, would I be able to ask to be able to take a

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break?
Q. Yes, of course. If you need a break, just let me know. And I can either finish my line of questioning and we can take one, or we can take one at your discretion.
A. Thank you.
Q. Sure.
So I'll just go over a few additional ground rules with you to make sure that things go smoothly. Is that okay?
A. Yes.
Q. And do you understand that you're testifying under oath today?
A. Yes. Under affirmation.
Q. Correct.
And do you understand that you are to answer truthfully?
A. Yes.
Q. And I'm going to ask that you give verbal answers to all of my questions so that the court reporter can write everything down. Is that okay?
A. Yes.

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Q. And if I ask you a question that you don't understand, please just let me know, and I'll try to clarify it; is that fair?
A. Yes.
Q. In addition, please just allow me to finish asking the question before you start your answer so that the court reporter has to chance to write down the end of the question and the beginning of your answer, and I will also try to let you finish your answer before I ask the next question. Is that okay?
A. Yes.
Q. If your counsel objects to my questions, you will still need to answer unless you're specifically instructed not to.
Do you understand that?
A. Yes.
Q. And like we discussed, if you need a break, please let me know. Otherwise, I'll try to take a break about every hour. Is that okay?
A. Yes.
Q. And is there any reason why you would have

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difficulty testifying here today?
A. I don't believe so.
Q. Do you have any health issues, or are you taking any medications that would impair your ability to testify today?
A. I don't believe so.
Q. And just for the record, and because this deposition is being held remotely, is there anyone in the room with you today?
A. No.
Q. Okay. So without revealing any substance of the communications with your counsel, can you please tell me what you did to prepare for today's deposition?
A. I reviewed my rebuttal declaration in the IPR. I reviewed the exhibits that pertain to that. And I met with counsel.
Q. And how long did you meet with counsel for?
A. In total, I don't know exactly.
Q. Was it over the course of one day or two days?
A. There were pockets of time over the course

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of a few days remotely and in person. And so there was some period of time.
Q. And was that period of time for a few hours or for the whole day?
A. A few hours in terms of each of the -- each of the times we met.
Q. And you mentioned your meetings were virtually; is that correct?
A. The meetings were both in person and remotely.
Q. And in person, were they in California where you're currently located?
A. Yes.
Q. And was anyone else other than counsel present at these meetings?
A. When you say "counsel," do you mean anyone who is part of the team of lawyers?
Q. I mean anyone other than the attorneys at Russ August & Kabat?
MR. TONG: And if you have a privilege question, we can discuss it. But for now, I'm going to instruct you to answer the question excluding

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anyone at Russ August & Kabat, excluding the staff and paralegals, and anyone else who happened to be present at Russ August & Kabat.
A. Under what Mr. Tong just said with those particulars, the answer would be no.
Q. Okay. And did you review any documents as part of your preparation?
MR. TONG: Caution the witness. You can answer yes or no to this question only.
A. Please repeat the question.
Q. Sure.
Did you review any documents as part of your preparation for this deposition?
A. Yes.
Q. And did you review the documents that were exhibits to Dr. Prucnal's declaration?
MR. TONG: Objection.
Caution the witness not to reveal privileged information. You can answer yes or no only if you can answer it that way.
A. So I don't remember all of his exhibits as I sit here. So ...

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Q. Did you review any of the exhibits to Dr. Prucnal's declaration?
MR. TONG: Objection.
Caution the witness for privilege. You can answer yes or no only.
A. I believe I reviewed some. But as I said, I don't remember all the details.
Q. Did any of the documents you reviewed in preparation for your deposition refresh your recollection?
MR. TONG: Objection. Privilege.
Don't answer that question.
Q. Okay. Dr. Willner, are you currently employed?
A. Yes.
Q. And who is your current employer?
A. University of Southern California.
Q. And what is your current job title at the University of Southern California?
A. Distinguished professor of electrical and computer engineering and the Andrew and Erma Viterbi professorial chair.

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Q. And do you teach classes as a professor at the University of Southern California?
A. Yes.
Q. And what classes do you teach there?
A. Optical fiber communications systems, introduction to communications.
Q. And you also work as a consultant in addition to your job as a professor; is that correct?
A. Yes.
Q. And how much time would you say you spend on your consulting work versus teaching as a professor?
A. Hard to say, and it varies.
Q. So in an average week, how much time do you spend working as an expert consultant, would you say?
A. So I believe your first question said consultant. And I believe your recent question said expert consultant. Is there a distinction?
Q. I was not trying to make a distinction unless there's a distinction in your mind.
A. So actually, there is.

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Q. Okay. Could you explain that for me?
A. So I do consulting for different activities, one of which is as an expert as we are doing today. But I have other activities that are as a technical consultant for companies, as an example.
Q. And what kind of companies do you do technical consultant work for?
A. I've served as a consultant and as a technical advisory board member over the past -- close to 30 years for many different kinds of companies. Many of them are in the optical communications, optical networking arena.
Q. Could you name some of those companies for me?
A. I didn't memorize them.
Q. Could you name one?
MR. TONG: I was gonna object -- object if it requires the disclosure of confidential information owed to a third party.
But you can answer to the extent it's not confidential unless we are agreeing to designate this transcript as confidential under a protective

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order that the parties will agree on.
Q. Can you name any of those consulting positions that you mentioned?
A. I would have to just spend a little bit of time thinking about it, trying to remember.
Q. That's okay. Can you think of one company that you are a consultant for?
MR. TONG: Same confidentiality objection.
A. You now said -- I believe you used the word "are," "you are." So does that mean I'm presently a consultant or have been in the past?
Q. I will clarify.
So can you name a single company that you have been or are currently a technical consultant for?
MR. TONG: Same confidentiality objection.
A. I have been a consultant for Ratheon, as one example. I've been a consultant for many other companies.
Q. And what is the general business of Ratheon?
A. I think Ratheon is involved with many businesses, although people think of it as an

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aerospace company. But I think it's involved in many technologies. So I was only involved with certain aspects.
Q. And did those aspects involve optical technology?
MR. TONG: Again, caution the witness not to reveal any confidential information for which you owe a duty of confidentiality to a third party.
A. Since I don't remember the -- the agreement that I signed with them, I don't know what I am at liberty to talk about.
Q. Okay. I understand. I'm not asking you to disclose any of the substance of your work with this company. I just generally am asking if it was related to optical technology. Can you tell me that?
MR. TONG: Same objection.
A. The same answer.
Q. Okay. And at what point in time or for what time period were you serving as a technical consultant for Ratheon?
A. I don't remember.

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Q. So is it safe to say it wasn't very recent?
A. What do you mean by very recent?
Q. Was it in the past five years?
A. Just -- I don't really remember. It was not in the last year.
Q. Okay. So now specifically moving to your expert consultant work, how many hours on average would you say you spend working as an expert consultant per week?
A. I cannot -- I'd have to be guessing. I don't really remember.
Q. Okay. Well, you can give me your best estimate.
A. I think even my best estimate would still be guessing at this point.
Q. And how many hours on average do you spend working on your professor duties at USC?
A. How many hours do I work?
Q. Yeah. How many hours a week do you spend working as a professor at the University of Southern California?
A. I -- every day I'm working as a professor.

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And when I say "professor," it's sort of -- I do many things as a professor beyond just the teaching. And it's hard to say how many hours a week I work. I'd have to really think about it, but 50. I don't know. 40, 50. I'd be guessing actually.
Q. Okay. And when did you first begin consulting as an expert on patent cases?
A. I don't really remember, but it was more than ten years ago.
Q. Was it more than 20 years ago?
A. Not -- I don't -- I don't remember.
Q. Okay. So you don't remember an exact time frame of when you began working as an expert consultant?
A. I just don't remember.
Q. And what hourly rate do you charge for your expert consulting services?
A. $425 per hour in -- I think that's what my rate is.
Q. And before you were a professor, did you have experience working in the industry?
A. Well, I've had experience in the industry

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even while I was a professor. I started a company. I have served as a consultant to many companies. And I've served on many technical advisory boards of companies. But in addition to those -- and when I started the company, I was the chief technical officer of that company. In addition to those, before I was a professor, I had worked as a -- at two different companies -- actually, three different companies. One as a summer intern at the RCA David Sarnoff Research Center. I worked as a -- in the area of optical communications at AT&T Bell Laboratories in the late '80s. I worked at Bell Communications Research, also in optical communications. And then I went to USC in 1992.

Q. And what kind of work did you do at AT&T Bell Labs in the '80s?

A. I was involved with optical communications technologies.

Q. So did that involve researching or designing optical communications devices?

A. I was involved in researching optical communications devices.

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Q. And would that include devices such as OLTs or ONTs?

A. It included technologies that one may find in OLTs and ONTs.

Q. So it wasn't necessarily the devices themselves but discrete components of those devices that made up your work at AT&T Bell Labs; is that correct?

A. I would say it's even more than that. It's the devices, the system, the architecture. And so although, at Bell Labs in the late '80s, I didn't work on what you would call an ONT or an OLT, I certainly was working on technologies that were related to the architecture system, the network, the devices that make up a lot of what is involved in OLTs and ONTs.

Q. And so would that research have included things like the communication modes and methods that an optical network would use?

A. I was certainly involved with different types of technologies that were involved with optical communications.

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Q. And were you involved with any standard-setting organizations?

A. I've given presentations -- I've given a presentation to a standards body, and I'm aware of standards, various standards that are for different types of optical communications technologies.

Q. Did you ever attend a standards meeting on behalf of a company involved in that standards-setting organization?

A. Although I was invited by a committee to give a presentation on optical technologies, I was not there as a committee member representing any company. I was there as an invited speaker representing myself.

Q. And do you recall -- sorry. Please finish.

A. And my affiliation was as USC.

Q. Understood.

A. That is Southern California.

Q. Understood.

So earlier you mentioned that you started a company. Can you please give me some more detail about that?

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A. In the late '90s, I started a company called Phaethon Communications. I believe it was spelled P-h-a-e-t-h-o-n. And it was involved with trying to overcome various degradations that may occur to an optical signal in an optical fiber.

Q. And is that company still around today?

A. The company -- the technology of the company is still around. The company itself is not. The technology was sold. And the technology was deployed in many networks.

Q. And who was the technology sold to?

A. So this was a while ago. I -- I might be guessing here so I want to be careful. And it may be in my resume somewhere. I can -- I can try to look it up if you want.

Q. Was it sold to telecommunications companies such as T-Mobile or Verizon or AT&T?

A. So my recollection is that the technology was sold to a company that then sold it sort of as an OEM, sold something that went into somebody else's equipment. And then that was then sold to or deployed on behalf of operators. So there -- you

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can think of it as almost like a supply chain in some ways. The technology was perhaps a module that would go inside of an equipment maker's module, and then that would be deployed and used by network operators.

Q. And, Dr. Willner, do you have any patents that you're a named inventor on?

A. Yes.

Q. How many patents would you say you're named an inventor on?

A. Approximately -- and it's just an -- it's roughly about 46.

Q. And are all of those patents related to optical communications?

A. I don't think so, although a majority are.

Q. In your own words, what would you consider your general field of expertise?

A. I -- I'm involved in different technologies. I -- I'm not sure what the question is insofar as your question includes the word "expert." And so I'm not sure how you're using the word "expert."

Q. I can ask a different question.

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So if you consider yourself an expert in a field, which I presume you do, what field do you consider yourself an expert in?

A. I'll still -- I'll still -- maybe I'll answer it without using the word "expert." So I'm involved in different technologies related to optics and phototonics, related to communications, networking, signal processing, in addition to others. But after -- I would say that I have a fair amount of knowledge and experience in those areas.

Q. Okay. Sorry I cut you off.

So has your work involved passive optical networks?

A. My work has involved the technologies that are involved with passive optical networks.

Q. And has your work involved optical transceiver modules?

A. My work has involved optical transceivers.

Q. Have you ever designed an optical transceiver module?

A. Please help me. When you -- are you limiting your question to a commercial product?

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Q. No.

A. So I've been involved with optical transceivers for a very long time and in terms of designing them, having them work in systems.

Q. I'm sorry. Was that a question at the end of your answer?

A. No, it was a period.

Q. Okay. My question was, have you ever designed an optical transceiver module?

MR. TONG: Objection. Asked and answered.

A. So I've been involved in optical transceivers in terms of designing them, in terms of having them work and having them work in systems.

Q. So you are saying that you have designed optical transceiver modules?

MR. TONG: Objection. Asked and answered.

A. I've -- I think I've answered the question. I can repeat it again.

Q. I'm looking for a yes-or-no answer. Have you ever designed an optical transceiver module?

MR. TONG: Objection. Asked and answered. Vague.

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A. So I have been involved with designing and the operation and -- of optical transceivers.

Q. Have you ever built an optical transceiver module?

A. I've been involved with optical transceivers being -- being built.

Q. In what way?

A. In terms of supervising people, technical discussions, design, reviews.

Q. Okay. So would you say you've overseen the technical build of an optical transceiver module?

A. I think I've been involved in the discussions. I've been involved in supervising and in technical design reviews of optical transceivers.

Q. And has this work been in your technical consultant career?

A. I believe it's been involved in my technical consultant career, as well as my work as a professor.

Q. And has your work involved network switches?

A. I've been involved with network switches as well.

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Q. And you prepared a declaration today regarding U.S. Patent --
(Reporter clarification.)
Q. Dr. Willner, you've prepared a declaration regarding U.S. Patent Number 8,238,754; is that correct?
A. Yes.
Q. And if I refer to this patent as the '754 patent, you'll understand what I mean?
A. Yes.
Q. So I'm gonna go ahead and put the first exhibit in the chat. And this should be marked as Willner 001.
(Exhibit 001 was marked for identification and is attached to the transcript.)
MS. RIOLO: And for the record, this is a copy of Dr. Willner's declaration in this proceeding.
BY MS. RIOLO:
Q. Please let me know when you're able to open it.

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A. I was able to download it. And I also have a printed copy in front of me.
Q. Okay. You have a clean, printed copy? No notes or anything?
A. I believe it's clean.
Q. Okay. So Dr. Willner, are you familiar with this document?
A. Yes. And I'd like to make a statement if that's okay.
Q. Okay.
A. So I'd like to retract paragraph 109.
Q. And what part of this paragraph do you no longer agree with?
A. So in terms of the paragraph, the issue of switch 64 does not have an optical module port because it does not sit at the boundary of an optical-electrical interface, and that's something that I don't think should have been in there.
Q. And why do you no longer agree with that statement?
A. I'm not sure I would phrase it as "no longer." I think it was inadvertently in there. I

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should have -- I don't think it should be in there.
Q. So what about that sentence is not correct, in your opinion?
A. The argument that it doesn't have an optical module port because it does not sit at the boundary of the optical-electrical interface. I don't think that would be the way to phrase it, so I don't think -- I don't think it should be there.
Q. And how would you phrase it so it does read correctly, in your opinion?
A. So I think it's what a lot of the other arguments describe before and after. And this is just an argument that -- that I don't think should be there.
Q. I'm not sure I understand what you mean when you say just like the arguments before and after.
Can you point me to something specifically that you think it should say instead?
A. Well, I'm not trying to correct it. So when you say "say instead," I'm retracting the paragraph. So I'm not -- I'm not trying to correct it in any way. It's just that that thought, that point I

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don't think should be there.
Q. Okay. So do you think that Shraga's switch 64 does have an optical module port?
A. I don't believe that that's what I was saying here either. So it's not as if I'm now saying that there is an optical port. There are issues, and the declaration goes through them. But that's not my point. The reason it doesn't have a -- the reason it may not have -- and I describe various points in other paragraphs of what issues there may be, that doesn't mean that I now think that there is an optical port -- excuse me -- an optical module port. That's not the point of this.
Q. Okay. Sorry.
So the part of this paragraph that you take issue with then -- I'm trying to just understand your reasoning -- is that it does not have an optical module port because it does not sit at the boundary of an optical interface.
Is that last portion of the sentence what you take issue with here?
A. So the -- my point is the -- I believe you

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said "optical interface." Maybe it should have been optical-electrical interface?
Q. If I said optical interface, I meant optical-electrical interface.
A. Thank you.
Q. Uh-huh.
A. I think that the issue of it that it does not sit at the boundary of an optical-electrical interface is the issue that I think is not something that should have been in here.
Q. Okay. And is that because you believe an optical module port is not at the boundary of an optical-electrical interface?
A. I'm not giving an opinion about that. I'm just giving an opinion -- I'm actually retracting this argument as opposed to giving any other affirmative argument. And I'm not correcting it either.
Q. So you said you're familiar with this document; correct?
A. Yes.
Q. And did you write this document?

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A. It's my report. It's my declaration. In terms of who drafted what, I'm not sure if that's your question.
Q. I'm asking if you personally wrote this document.
MR. TONG: Objection. Vague.
Caution the witness not to reveal privileged information.
A. So in terms of a first draft, there were sections that counsel wrote, sections that I wrote. I reviewed everything. These are all my opinions, and it's my declaration.
Q. So can you tell me the general process you follow when preparing your declaration?
MR. TONG: Again, caution the witness not to reveal privileged information.
A. I think the process was issues are -- were discussed. We -- counsel and I had discussions about the relevant issues. Then the draft -- draft was put together. There were more discussions. I went through everything to the best of my ability and made changes, comments, and then it was

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finalized.
Q. And did you review Dr. Prucnal's declaration in this case?
A. I believe I did.
Q. And how long did you spend reviewing that declaration?
A. I don't remember.
Q. Was it a few hours?
A. I just don't remember.
Q. And in reviewing Dr. Prucnal's declaration, did you have any disagreements with that declaration?
A. So I believe that my declaration is -- outlines my opinions, including where I might disagree with Dr. Prucnal based on his declaration, based on his deposition testimony.
Q. So any disagreements you have with Dr. Prucnal's declaration or deposition testimony are reported in your declaration; is that fair?
A. The ones that are in here are the ones that I've considered carefully. I may have other opinions. I'm not sure if they'll be -- other

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issues. But as of today, these are the ones that I've put down and described in detail.
Q. So are there any -- I'll withdraw that.
Are there any disagreements with Dr. Prucnal's declaration as of today that are not in your responsive declaration?
A. There might be. I just -- I haven't provided an accurate assessment. But I'm not going to say that I agree with everything else.
Q. And other than what we previously discussed in paragraph 109, is there anything that you would like to change in your responsive declaration?
A. I -- there are probably some typos that would be nice to correct, but I don't -- nothing jumps out at me right now.
Q. And did you review the '754 patent in preparing your declaration?
A. Yes.
Q. And did you review the prior art reference Shraga, which is U.S. Patent Number 6,697,374, in preparing your declaration?
A. Yes.

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Q. And did you review the prior art reference Togami, which is U.S. Patent Number 6,439,918, in preparing your declaration?
A. Yes.
Q. And did you review the other exhibits to Dr. Prucnal's declaration?
MR. TONG: Objection. Vague.
A. So I think I may have tried to answer this before. I just -- I don't remember all of -- all of the exhibits I tried to review. I just don't remember. But I certainly reviewed the ones that -- well, I reviewed -- I tried to review as much as I could. I just don't remember.
Q. And are there any documents other than what's identified in your declaration that you reviewed in preparing your declaration?
A. I don't remember.
Q. And in preparing your declaration, did you speak with anyone other than the employees at -- or attorneys at Russ August & Kabat?
A. I don't believe so.
Q. In preparing your report, did you speak to

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Walter Soto?
A. I don't believe so.
Q. In preparing your report, did you speak to Alexander Soto?
A. I don't believe so.
Q. And how much time would you say you spent preparing your declaration?
A. I don't remember.
Q. Okay.
MS. RIOLO: We've been going for almost an hour. Do you want to take a break here, or do you want to keep going?
THE WITNESS: We can keep going.
MR. TONG: I would suggest we take a break at the top of the hour.
MS. RIOLO: That works for me.
BY MS. RIOLO:
Q. So now I'm gonna put in the chat another exhibit, and this should be marked as Willner 002.
(Exhibit 002 was marked for identification and is attached to the transcript.)

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MS. RIOLO: For the record, this is a copy of the '754 patent.
Q. Please let me know when you have that open.
A. So I've downloaded it, and I also have a paper copy of the '754 patent.
Q. Okay. If that's a clean, paper copy, I have no objection to you referring to that copy either.
A. Thank you.
Q. Are you familiar with this document, Dr. Willner?
A. Yes.
Q. And when did you first become aware of the '754 patent?
A. I don't remember.
Q. Was it in relation to this case or before this case began?
A. I don't remember.
Q. You don't recall if the first time that you saw this was when you were hired as an expert consultant in this matter?
A. I don't remember.
Q. And have you talked to anyone other than

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counsel about the '754 patent?
A. I don't believe I have.
Q. Will you go ahead and flip to the bottom of column 16 of the '754 patent where the claims begin. And please let me know when you're there.
A. I'm there.
Q. And in column 16, do you see the beginning of Claim 1?
A. Yes.
Q. And Claim 1 continues onto column 17; correct?
A. Correct.
Q. So do you understand that Claim 1 is one of the challenged claims in this proceeding?
A. Yes.
Q. You reviewed Claim 1 in preparing your declaration; correct?
A. Yes.
Q. So I'd like to go through Claim 1 to make sure we're on the same page with what it requires. Is that all right?
A. Sure.

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Q. So looking at the preamble of Claim 1, it states "A network client optical transceiver module for a passive optical network"; is that correct?
A. Yes.
Q. And what is your understanding of what a network client is?
A. Network client could be users of a network.
Q. So in a passive optical network, for example, the network client of the network would be, for example, where the ONT is located; is that correct?
A. So a network client could be -- well, I want to be careful here. So that part of what you're describing now goes to the heart of what I think the innovation is here, where the network client, the optical transceiver module, is this unique thing. And so I want to be careful that trying to distinguish between the -- this thing that we're talking about is not -- is different than the ONTs that are out there prior to 2003.
Q. I understand the distinction that you're making, and I'm not trying to ask whether or not

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this specific device claimed is the same or different to any ONTs that may or may not have been available in 2003. I'm just asking about passive optical networks generally.
So if you have a passive optical network, the client side, the client end would be where the ONT could typically be found; is that correct?
A. So outside the context of the '754 patent, passive optical networks before 2003, generally one could assume that there could be clients that would be accessing the passive optical network, and that location could be wherein an ONT is.
Q. And in a typical passive optical network on the other side of that network, there would be a head end; is that correct?
A. So outside the context of the '754 and prior to 2003, the general -- a general passive optical network may have, at the other side -- quote/unquote, other side -- of the ONTs, there could be a head end.
Q. So I understand you're clarifying everything with outside the context of the '754.

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Do you believe that the '754 patent does not operate in a traditional passive optical network configuration such that there's a head end and a client end?
MR. TONG: Objection. Vague.
A. I'm trying to be very careful about the -- trying to understand the claim in its entirety so that I'm not necessarily taking issue to what you have said, but rather to draw a distinction that this is an -- there is an innovation and the claim is as it's read as a whole. And each of the items, I don't take issue, per se, with there being a head end.
Q. So the next part of this paragraph goes on to say that the passive optical network has one or more passive optical splitters to couple the network client optical transceiver module to the head end; is that correct?
MR. TONG: Objection. Foundation.
A. I'm not sure -- I can read it back and then -- I'm not sure it was read word for word. But does that matter?

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Q. I'll reread it.
So it goes on to say "The passive optical network having one or more passive optical splitters for coupling the network client optical transceiver module over one or more optical fibers to the head end of the passive optical network"; is that correct?
A. So outside the context of the '754 and prior to 2003, general passive optical networks and -- would -- could have one or more passive optical splitters for coupling.
Q. So, Dr. Willner, you're saying outside the context of the '754, but I'm reading from the claims of the '754. So do you believe the claims are different than what I've just read?
A. Well, I believe the claim is -- is read as a whole, and different parts inform a person of ordinary skill how to read the whole claim. So the -- there are unique parts to this whole thing that -- that should be read sort of in context with each other.
Q. Were passive optical networks known in the

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prior art preceding the '754 patent?
MR. TONG: Objection. Vague.
A. So passive optical networks in general existed that in terms of this very -- this general case of, you know, outside the context of the '754, there were passive optical networks that existed before 2003.
Q. And did those passive optical networks contain a splitter?
A. So those general passive optical networks that I just referred to that were sort of outside the context of the '754 and prior to 2003, some of them would have had optical splitters.
Q. What would they have had other than an optical splitter?
A. They may have had other things.
Q. If a passive optical network did not have a splitter to divide the signal into different fibers, what would it use instead?
A. I don't -- I don't remember what other things were used. I'd have to refresh my memory.
Q. So sitting here today in this deposition,

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you cannot recall if there were other components used to split signals in a passive optical network other than splitters; is that fair?
A. Yeah, I don't remember one way or the other.
Q. And do passive optical networks use optical fibers?
A. So outside the context of the '754 and prior to 2003, there were passive optical networks that used optical fiber.
Q. Does the '754 patent contemplate something other than optical fibers to connect it to the rest of the network?
A. I don't remember.
Q. You can take a minute to look at the reference and let me know if you see anything that connects the device claimed in the '754 patent to the network, other than optical fibers.
A. I -- I don't want to waste your time. It would take me a long -- to affirmatively say what is or is not in here, I'd -- it would take me quite a while. I don't want to waste your time. I also don't want to guess. And I don't know if it's in my

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report.
Q. Okay. So we just read the claim, correct, just now?
MR. TONG: Objection. Mischaracterizes.
A. I believe we had read pieces of the claim.
Q. Sure. I'm gonna read it again.
"The passive optical network having one or more passive optical splitters for coupling the network client optical transceiver module over one or more optical fibers to the head end of the passive optical network."
Did I read that right?
A. I believe you read that correctly.
Q. And this is in Claim 1 of the '754 patent, is it not?
A. I believe it's part of the preamble of Claim 1 of the '754 patent.
Q. So the passive optical network contemplated in the claims of the '754 patent contains splitters; correct?
MR. TONG: Objection. Calls for a legal conclusion.

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A. So the passive optical network having one or more passive optical splitters, so this is the preamble of the claim. Since I didn't memorize my report, I'm just gonna open it for a second.
Q. Okay. You can use it to refresh your recollection if you need to.
A. Thank you.
So I don't remember exactly, but I think, by memory, that I had -- I was told to assume that the preamble was limiting in my analysis. I believe -- I think that's the case. I could be wrong. But I think it's in my report somewhere, and I don't want to waste your time.
So in terms of the preamble, and if I'm to assume that it's limiting, then we're discussing this optical transceiver module for a passive optical network such that the passive optical network has one or more passive optical splitters. So the passive optical network of the '754 would have one or more passive optical splitters.
Q. And passive optical networks with passive optical splitters were known in the art prior to the

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'754 patent; is that true?
A. So in general, outside the '754 and prior to 2003, general passive optical networks were known and passive optical networks that used optical splitters were known.
MR. TONG: Mary, so we're at the top of the hour. Would this be a good time to take a short break?
MS. RIOLO: Yeah, this is fine. We can go ahead and take a break here.
MR. TONG: Okay. Let's go off the record. Ten-minute break.
THE VIDEOGRAPHER: Okay. Everyone please stand by. We're going off the record. The time is 2:00 p.m.
(A short break was had.)
THE VIDEOGRAPHER: Going back on the record. The time is 2:14 p.m.
BY MS. RIOLO:
Q. Dr. Willner, did you have any conversations with counsel on your break?
A. No.

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Q. Okay. So before we broke, we were reading the preamble of Claim 1 of the '754 patent; is that correct?
A. Yes.
Q. So I'd like to direct you back to the preamble. Please let me know when you have it up.
A. I have it.
Q. So the next part of the preamble reads, "the network client optical transceiver module having a pluggable form factor and configured to removably couple to an optical module port of a switch or router."
Did I read that right?
A. I believe so.
Q. So the network client optical transceiver module described here in Claim 1 must have a pluggable form factor; correct?
A. So the -- the network client optical transceiver module of the preamble of Claim 1 of the '754 is something that has having a pluggable form factor.
Q. Correct.

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So the network client optical transceiver module of Claim 1 must have a pluggable form factor; is that right?
MR. TONG: Objection. Asked and answered.
A. So the -- the preamble of Claim 1 of the '754 states that the network client optical transceiver module of the claim has a pluggable form factor.
Q. And what is your understanding of what a pluggable form factor is?
A. A pluggable form factor in general, outside the '754 in the -- is a -- some form factor that one can plug, unplug different elements together.
Q. So is the pluggable form factor referenced in Claim 1 of the '754 patent different than other pluggable form factors generally known?
A. The pluggable form factor here is something that is related to the other parts of the claim so that it's -- it's this optical transceiver module that's unique. And as part of that, it has a pluggable form factor. And there's different issues that are involved with that. If your question is

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were there pluggable -- were there pluggable form factors in general outside the context of this '754, there were pluggable form factors outside the context.
Q. What do you mean by "outside the context"?
A. The pluggable form factor here is tied to the -- is part of the optical transceiver module of the claim, so it's not taken in isolation. But the general idea of what is pluggable, pluggable form factors were the concept, in general, outside of the '754, before 2003, was known.
Q. And pluggable form factors must be able to removably couple to another device; is that correct?
A. I'd say the -- outside the context of the '754 and prior to 2003, the idea of a pluggable configured to removably couple, that concept was known.
Q. Can the pluggable described in the '754 removably couple?
A. The -- the optical transceiver module, that unique thing, which has a pluggable form factor of the '754 Claim 1 preamble, is configured to

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removably couple.
Q. And would pluggable form factors take on the format such as an SFP?
A. So outside the context of the '754 and prior to 2003, there were things called SFPs that were pluggable -- that had a pluggable form factor.
Q. And can pluggables also take on the format of XFPs?
A. Again, outside the context of the '754 and prior to 2003, XFPs could be considered to have a pluggable form factor.
Q. And could pluggable form factors take on the format such as XENPAK?
A. I'd have to refresh my memory.
Q. Okay. Well, let's go up to figure 13 of the '754 patent, if you will.
A. Please tell me again where to look.
Q. Figure 13. I believe it's on page 18 of the document.
Do you see the figure here is labeled as "Prior Art"?
A. Correct.

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Q. And do you see the figure here list various form factors, such as XFP, X2, XPAK, and XENPAK?
A. Yes.
Q. And these are all pluggable form factors; is that right?
A. I'm looking at the text that describes figure 13 to refresh my memory.
Q. That's fine.
A. Please repeat the question.
Q. Are the form factors shown in figure 13 pluggable form factors?
MR. TONG: Objection. Foundation.
A. So is your question if all of them in figure 13 are pluggable? Or the XENPAK.
Q. I'll reask the question again.
The figure here lists various form factors, such as XFP, X2, XPAK, and XENPAK; correct?
A. Correct.
Q. And those form factors are all pluggable form factors; is that true?
A. So in terms of the prior art, in terms of outside the context of the '754 and prior to 2003,

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the pluggable type of form factors could include XFP, XPAK, and XENPAK.
Q. And they could include SFP as well; is that fair?
A. The -- outside the context of the '754 and prior to 2003, that -- the SFP would have been considered a pluggable form factor.
Q. But pluggable form factors were known in the art prior to the '754 and prior to 2003; is that fair?
A. So the idea of a general pluggable form factor outside the context of the '754 was known in the industry prior to 2003.
Q. So, Dr. Willner, are you suggesting that the claims of the '754 contemplate a form factor that is not one of the form factors that we've just discussed?
MR. TONG: Objection. Mischaracterizes.
A. I don't know if I'm stating that here. I'm just, again, trying to be very careful about looking at the claim as a whole and, you know, each of the words carries meaning. So that -- you know, the

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general idea of a pluggable form factor was known outside the context of the '754.
Q. Will you flip to column 17, Claim 2, for me, and please let me know when you're there.
A. I'm there.
Q. So Claim 2 reads, "The network client optical transceiver module of Claim 1 wherein the pluggable form factor of the network client optical transceiver module is selected from the group consisting essentially of: ..."
Did I read that first part correctly?
A. Yes.
Q. And then it lists, "Small Form-factor Pluggable (SFP), 10 gigabit Small Form-factor Pluggable (XFP), XENPAK, X2, and XPAK"; is that correct?
A. I believe that's correct.
Q. So Claim 2 describes the pluggable form factors that the network client optical transceiver module of Claim 1 can be; is that correct?
A. So Claim 2, as a dependent claim to Claim 1, further -- further describes that the pluggable form

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factor of the optical transceiver module is selected from the group consisting essentially of, and the ones that you recited.

Q. Okay. Let's go back to Claim 1 at the bottom of column 16. Please tell me when you're there.

A. I'm there.

Q. So the last part of the preamble we've been walking through reads, "to removably couple to an optical module port of a switch or router"; is that correct?

A. I believe you read it correctly.

Q. So the network client optical transceiver module device described in Claim 1 plugs into a receiving port of whatever its host device is; is that correct?

A. "Whatever its host device is," I think it's fairly specific here that -- so I'm not sure I would agree with your statement.

Q. That's fair. Let me reask it. Sure.

A. With your characterization.

Q. I can reask the question.

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The network client optical transceiver module device of Claim 1 plugs into the optical module port of a switch or router; is that correct?

A. So by the way, I should be careful. I believe this is -- I'll just read it and give you an answer.

So the optical transceiver module is "configured to removably couple to an optical module port of a switch or router." And that -- of Claim 1.

Q. And the optical module port mentioned here would be a port on a switch or router to receive the pluggable; is that your understanding?

A. So the switch for a router would have an optical module port, which is a receptacle for plugging in -- for plugging in the unit.

Q. So that optical module port is located on the switch or router; is that correct?

A. So the optical module port of the '754 is located on a switch or router as per the understanding of a person of ordinary skill when reading this.

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Q. And prior to the '754 patent, were pluggable optical transceiver modules capable of being plugged into switches or routers?

A. So outside the context of the '754 and prior to 2003, there were switches and routers which could have optical module ports in which something could be plugged into it.

Q. Right. But that isn't exactly what my question was.

My question was prior to the '754 patent, were pluggable optical transceiver modules capable of being plugged into switches or routers?

A. So, again, outside the context of the '754 and prior to 2003, there were optical transceivers that were capable of being plugged into a -- a switch. But, again, that's outside the -- and a router, but that's outside the context of the '754.

Q. But in the prior art, regardless of what the '754 claims, pluggable optical transceiver modules could plug into switches or routers; is that correct?

A. So outside the context of '754 and prior to

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2003, I believe that, if I remember -- I think I remember that pluggable transceivers were capable of plugging into ports of a -- of a switch or router. But that's just going by memory. I'd have to refresh my memory.

Q. Okay. So let's continue on with the claim.

And the patent describes components of the network client optical transceiver module; correct?

A. I believe that following the preamble, there's some elements to the claim that describe what the optical transceiver module comprises.

Q. So the first component it describes is an optical port that couples to the optical fibers of the passive optical network; is that correct?

A. So the first element after the preamble describes "an optical port configured to optically couple to one or more optical fibers."

Q. So that optical port is on the side of the transceiver module that sends and receives transmissions onto the optical fiber; is that correct?

A. So I believe that the optical port would be

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on the side of -- where the transceiver module is communicated through optical means and over the optical fiber with the network.
Q. And prior to the '754 patent, optical transceiver modules contained optical ports; is that true?
A. So outside the context of the '754 and prior to 2003, there were optical transceivers that had optical -- optical ports.
Q. So pluggable optical transceivers containing optical ports for coupling to an optical fiber were known in the art prior to the '754 patent; is that fair?
A. So outside the context of the '754 and prior to 2003, optical ports configured to optically couple to one or more optical fibers in a pluggable format -- wait, did your question include pluggable?
Q. It did?
A. In a pluggable form factor was known.
Q. So then, next, the claim describes a bidirectional optical interface block.
Do you see that?

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A. Yes.
Q. And it reads "A bidirectional optical interface block optically coupled to the optical port and configured to perform optical-to-electrical and electrical-to-optical signal conversion.
Did I read that right?
A. I believe you did.
Q. So the claim says that the purpose of this component is to perform optical-to-electrical and electrical-to-optical signal conversion; is that fair?
A. You said the purpose. I would just say that that's -- that's what it says it should be capable of doing.
Q. That's fair.
A. So it's a bidirectional optical interface optically coupled to the optical port and configured to perform optical-to-electrical and electrical-to-optical conversion.
Q. Were optical-to-electrical and electrical-to-optical signal conversion known in the art prior to the '754 patent?

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A. So outside the context of the '754 and prior to 2003, the bidirectional optical interface is -- well, actually, your question was about optical to electrical and electrical to optical, I believe. So outside the context of the '754 and prior to 2003. Optical-to-electrical and electrical-to-optical conversion was known.
Q. And hardware components such as lasers that could perform this type of signal conversion were known in the art; is that fair?
A. Could you please repeat the question?
Q. Hardware components capable of performing optical-to-electrical and electrical-to-optical signal conversion were known in the art; is that fair?
A. So outside of the context of the '754 and prior to 2003, optical-to-electrical and electrical-to-optical hardware was -- was known in the art.
Q. And prior to the '754 patent, pluggable optical transceiver modules were capable of performing optical-to-electrical and

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electrical-to-optical signal conversion; is that true?
A. So outside the context of the '754, and prior to 2003, there were optical transceivers that were capable of performing optical-to-electrical and electrical-to-optical signal conversion.
Q. And this portion of the claim where it discusses the bidirectional optical interface block says that it's coupled on one side to the optical port; is that true?
A. Correct. I believe that's what it says.
Q. So the next component described here is the control module; is that right?
A. I believe that's correct.
Q. And what does the term "control module" mean to you?
A. So control module is a term in this element of the claim, and I believe the control module is -- it describes here what that control module is supposed to be capable of doing.
Q. So would a control module -- I'm sorry. Please finish.

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A. I could read the rest of the element, but it does describe certain things that that control module should be capable of doing.
Q. And in light of that description, would it be your understanding that a control module is a controller?
MR. TONG: Objection. Form.
A. I'd have to be careful about ascribing other words. Did I use "controller" in my report? I don't remember.
Q. I'm not sure. I'm asking you a separate question.
A. So I'm not sure if you're describing -- what kind of controller you're describing.
Q. I'm not trying to describe a particular type of controller. I'm just asking for your understanding as a POSITA and an expert in this field, would a control module be a controller?
MR. TONG: Objection. Form. Asked and answered.
A. I think a control module here is something that is capable of controlling as per the specifics

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of the text that follows inside that element of the claim and as it's read as a person of ordinary skill would read that element in the context of the rest of the claim.
Q. And the claim describes that the control module is coupled to the bidirectional optical interface block; correct?
A. So the control module of Claim 1 of the '754 is electrically coupled to the bidirectional optical interface block.
Q. And the control module described here is configured to receive and (Inaudible.) -- data communications representing one or more start times.
Do you see that?
A. I couldn't hear everything.
Q. I can repeat.
And the control module described in Claim 1 is described as being configured to receive from the head end of the passive optical network data communications representing one or more start times; is that correct?
A. I believe you read it correctly.

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Q. And prior to the '754 patent, were optical transceiver modules capable of receiving signals from the head end of the network?
A. So I think the -- this is a very specific thing for the claim. So this control module is not just receiving data communications. It's, as just one of the things, it's receiving data communications representing one or more start times for transmitting data communications to the head end. So if we're talking about outside the context of the '754 and prior to 2003, I don't believe that this control module represented here has been -- I believe that's, frankly, kind of what I think is an important issue.
Q. So I think -- different question.
I'm asking if optical transceiver modules, prior to the '754 patent, were physically capable of receiving signals from the head end of the network.
MR. TONG: Objection. Form.
A. So outside the context of the '754, outside the context of this control module, in terms of optical transceivers prior to 2003, the head end

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sends data. That transceiver at the ONT, as an -- sorry. Strike that. At the transceiver, the transceiver that's doing the optical-to-electrical conversion is receiving data and converting it to an electrical domain.
Q. And does data transmitted from the head end of the network to the client end of the passive optical network contain controlling information? And I can elaborate on what I mean by that if you need.
MR. TONG: Objection. Form.
A. So I don't completely understand the question.
Q. So one of the operations of a PON is that the head end of the network provides bandwidth allocation for the client end of the network to transmit signals upstream; is that fair?
A. Could you please point me to where that may be?
Q. Sure. I'm gonna introduce another exhibit.
MR. TONG: Mary, before you get into your actual question, we've been going for about an hour

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and we're near the top of an hour again, so whenever you get to a natural stopping point, I'd like to take a longer lunch break. I believe it's around noon in Dr. Willner's time zone.

MS. RIOLO: Okay. That's fair. I'll finish this line of questioning, and then we can break.

So we can go ahead and mark this exhibit as Willner 003.

(Exhibit 003 was marked for identification and is attached to the transcript.)

MS. RIOLO: And I've just placed it in the chat.

BY MS. RIOLO:

Q. So let me know when you have it pulled up.

MS. RIOLO: Just for the record, this is U.S. Patent Number 6,697,374, which is the Shraga reference and is Exhibit 1005 in this proceeding.

A. I've opened the file and I have a copy of Shraga in front of me.

Q. Okay. You can reference your physical copy if that's easier.

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A. Thank you.

Q. So on the first page of the Shraga reference, at line 22, do you see it says filed December 5, 2001?

A. I see that.

Q. And that filing date is before the filing date of the '754 patent; is that fair?

A. So I haven't memorized all of the dates, but I believe that in my report, I don't dispute -- I don't think I dispute that Shraga would be considered prior art.

Q. Okay. So if you could scroll to column 10 of Shraga, or flip?

A. I'm there.

Q. And in the very second sentence at the top of this column, it reads "Each downstream frame is transmitted from OLT 22 with a substantially equal period, hereinbelow termed a network period."

Did I read that right?

A. I believe you did.

Q. And then it goes on in the next sentence to say "Each downstream frame comprises a header 74, at

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least part of which serves, inter alia, as a means for receiving ONTs to identify a beginning of the frame, and thus act as a starting marker for frame timing throughout the PON."

Did I read that right?

A. I believe you did.

Q. So with this paragraph in mind, is it your understanding that Shraga teaches that the head end OLT transmits information about the start of the frame to ONTs?

A. I think that Shraga teaches that OLTs communicate with ONTs various information, including information acting as a starting marker for frame timing.

Q. Would you consider that starting marker to be control information?

A. So in terms of information, the -- Shraga is talking about, I believe, a large ONT. So this information is going to everything in Shraga, right, that big thing. In terms of control information as it would relate to the control module of Claim 1 of the '754, so that's a different -- a different

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thing, right, it's the -- that control module has some very specific issues. And it is part of the -- this -- the optical transceiver module as described in Claim 1.

So if you're offering to say that is this timing information considered control information and control, we're trying to somehow equate it to the control module of the '754 Claim 1, I'd say that there's some significant differences going on here.

Q. Okay. Let me rephrase because I'm not asking about in the context of the control module in the '754.

In Shraga and thus in the prior art prior to the '754 patent, was it known for OLTs to transmit control information downstream?

MR. TONG: Objection. Form.

A. So outside the context of the '754 and prior to 2003, it was known for an OLT to transmit information to the network, including information that can act as a starting marker for frame timing throughout the PON.

MR. TONG: Would this be a good stopping

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point?
MS. RIOLO: Yeah, let's actually go ahead and take another break here.
MR. TONG: Okay.
MS. RIOLO: We can go off the record.
THE VIDEOGRAPHER: All right. Everyone, please stand by.
We're going off the record. The time is 3:08 p.m.
(A short break was had.)
THE VIDEOGRAPHER: Going back on the record. The time is 3:43 p.m.
BY MS. RIOLO:
Q. Dr. Willner, did you discuss anything with counsel over the break?
A. No.
Q. So before the break, we were going through the control module element of Claim 1 of the '754 patent; is that correct?
A. I think before the break, we were discussing various topics, including the control module of the Claim 1 of the '754.

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Q. I'd like you to turn back to Claim 1 if you can, and let me know when you have it open.
A. I have it open.
Q. So the second half of this element of the claim reads that the control module is configured to transmit the data communications to the head end of the passive optical network responsive to start times.
Did I read that right?
A. More or less. I wasn't following along with you. My apologies. Where did you start from?
Q. Yes, I'll read it again.
Starting from the very last -- (Inaudible.)
A control module -- and then it reads, "configured to transmit the data communications to the head end of the passive optical network responsive to the start times."
Did I read that correctly?
A. I believe you did.
Q. So putting Claim 1 aside, prior to the '754 patent, were optical transceiver modules of a passive optical network capable of physically

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transmitting signals onto the passive optical network?
MR. TONG: Objection. Form.
A. So outside the context of the '754 patent and prior to 2003, there was the capability of optical transceivers that were pluggable to take electronic data from an ONT and convert it to the optical domain and then transmit that data.
Q. And that data you just mentioned, was it known prior to the '754 patent that that data would be transmitted in accordance with upstream bandwidth allocations from the head end of the network?
MR. TONG: Objection. Form.
A. So I'm not sure I have in my report about upstream bandwidth allocations. Can you please point me to something?
Q. Well, upstream bandwidth allocations could comprise start times; is that fair?
A. I think we're -- we might be talking about different things. So the claim element that we've been discussing talks about the control module that receives from the head end information about start

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times. In terms of -- it also is transmitting -- or sorry -- it's configured to transmit data communications responsive to the start times. I'm not sure if your question was that somehow the -- the client is transmitting start times, or is it transmitting responsive to start times.
Q. Okay. So that was not my question.
My question was prior to the '754 patent, in passive optical networks, were upstream signals transmitted from the client transmitted in accordance with start time allocations?
MR. TONG: Objection. Form.
A. So outside of the '754 and prior to 2003, ONTs were able to transmit data information in accordance with start times, and in the process of doing so, would be -- could be utilizing an optical transceiver that would convert that data from the electrical domain to the optical domain. And that was known.
Q. And did client-end devices like the ONT you just mentioned contain controllers?
A. So is -- is this a controller -- what does

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this controller do that you're -- that you're asking me?
Q. Did client-end devices such as the ONT you just mentioned contain a controller capable of receiving start time allocations from the head end of the network?
A. I didn't hear -- there was a word or two that I couldn't hear.
Q. I can reask it.
A. Thank you.
Q. So my question was did client-end devices such as the ONT that you mentioned contain controllers that were capable of receiving start time allocations from the head end of the network?
A. So outside the context of the '754 and prior to 2003, there were elements that were capable of performing -- receiving start times and allocating transmission of data.
Q. Okay. So you say there were elements capable of.
What would you call those elements that were capable of receiving start times?

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A. Some type of circuit is one possibility.
Q. Would a controller receive those start time allocations?
A. So in a -- prior to the '754 -- excuse me.
Outside the context of the '754 and prior to 2003, there were ONTs that contained circuitry that would -- that could be responsive, that could receive timing information, and then enable the transmission of data upstream.
Q. Would you consider that circuitry to be a controller; yes or no?
A. That's not a term that I've defined, but -- so I think circuitry is fine.
Q. All right.
MS. RIOLO: I'm gonna note that in the record as nonresponsive.
Q. Let's open back up Willner Exhibit 3, which is the Shraga reference, please. Please let me know when you have that in front of you.
A. I have it.
Q. And could you flip to column 14 for me?
A. I'm there.

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Q. And do you see the second paragraph from the bottom that begins with "Figure 7"?
A. My apologies. Can you repeat that?
Q. Do you see the second paragraph from the bottom that begins with "Figure 7"?
A. I see that.
Q. So it describes that "Figure 7 is a schematic diagram showing details of an upstream window of an ONT"; is that fair?
A. Yes.
Q. And then in the next sentence, it says, "Data and upstream window 78 is generated and transmitted by ONT"; is that correct?
A. I believe so.
Q. And then can I direct you to column 15?
A. I'm there.
Q. And do you see that this continues the discussion of figure 7 that describes the upstream window of the ONT?
A. I didn't -- there was a little part I didn't -- I didn't hear clearly. If you can please repeat that.

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Q. I will.
And do you see that in column 15, it continues the discussion of figure 7?
A. I believe that's correct.
Q. And can I direct you to the bottom of the second paragraph in column 15?
And it says, "Each channel overhead section is followed by its channel payload section."
Did I read that right?
A. Well, "Each channel overhead section comprises a channel label field."
Q. Sorry. I think I -- I'm meaning to direct you to a different part of that paragraph. The last sentence of that paragraph.
A. Oh. "Each channel overhead section is followed by its channel payload section."
Q. And at the top of the next paragraph, it reads, "The length of each channel payload section is determined by CLU 46 of ONT."
Did I read that right?
A. I believe you did.
Q. So Shraga teaches a CLU that constructs a

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payload section in accordance with the length of a channel allocation; is that correct?
A. So outside the context of the '754 and prior to 2003, the CLU is -- of Shraga is determining various issues regarding the transmission.
Q. What do you mean by "various issues"?
A. As per the description on columns 14 and 15 -- my apologies. As per the description on column 15 of Shraga.
Q. What -- (Inaudible.) -- are you pointing to?
A. So there's a bunch of text about what the CLU does. It's in various places of Shraga. And ...
Q. And does one of those things that the CLU does construct a payload section of an upstream frame in accordance with allocation length from the head end?
A. Did you just read a section of the -- of the patent?
Q. No, I did not.
A. I think the paragraph starting on column 15, line 26 of Shraga is helpful in informing a person

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of ordinary skill what the CLU is doing in terms of the payload section. So the payload section, the length of each channel payload section is determined by the CLU according --
MR. TONG: Mary, I think we're getting some background noise from your microphone.
MS. RIOLO: I apologize for that. I didn't mean to interrupt you.
A. Oh, thank you.
And it's doing this, determining the length of each channel payload section, according to the overall constraint that the length of window is less than or equal to the maximum window length received in a pointer. And the CLU constructs the channel payload sections. And after the CLU is -- constructs this, it's -- it will be transmitted upstream --
Q. So the CLU --
A. -- in accordance with the start window transmission time that it received from the head end --
Q. To summarize what --

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A. -- so -- I'm sorry. I think that probably does answer your question.
Q. Yes.
And just for me to summarize, the CLU of Shraga determines the length of the channel payload section and then constructs that channel payload section in accordance with the allocated bandwidth; is that correct?
MR. TONG: Objection. Mischaracterizes.
A. So I -- again, sometimes I'm having a little trouble hearing parts of the audio.
Q. I can repeat myself.
The CLU of Shraga, as you just read, determines the length of each payload section and then constructs (Inaudible.) -- that's in accordance with the allocated bandwidth; is that correct?
MR. TONG: Same objection.
A. There was definitely part of that I did not hear.
MS. RIOLO: Am I breaking up for anyone else?
MR. TONG: You're breaking up for me. And

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I'll note that the real-time transcript also contains "Inaudible" in parentheses. So I think you're having some bandwidth issues.
A. Allocated bandwidth issues.
MS. RIOLO: Very apropos.
BY MS. RIOLO:
Q. All right. I'm gonna just try to repeat myself one more time. And if we keep having issues, I can go off the record and switch my audio to my phone or something like that.
A. It doesn't happen that often. So if you repeated it like twice or three times, the odds are very high, so I'm willing to listen.
Q. Okay. Well, let me try one more time and we'll see.
So the CLU of Shraga determines the length of the channel payload section and then constructs the channel payload section in accordance with the determination of allocated bandwidth; is that correct?
MR. TONG: Same objection.
A. So I'll just be careful in how I say this,

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that Shraga teaches that the CLU determines the length of each channel payload section according to the overall constraint that the length of the window is less than or equal to the maximum window length received in a pointer. And within this constraint, the CLU constructs the payload sections by reading from FIFO and FIFO parameters table and the primary table, specific channel data, data parameters, and the corresponding allocated bandwidth of each channel. And the allocated bandwidth of each channel may have come from the head end.

Q. Okay. And do you know what CLU stands for?

A. So according to Shraga, the CLU stands for control and logic unit.

Q. So control and logic unit would be some kind of circuitry that performs controlling functions; is that fair?

A. So the control and logic unit of Shraga does certain things such as controls via management software comprised the memory, the overall operation of Shraga's PON. And I should point out that CLU in figure 1 of Shraga, there are two different types.

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One is element 36 and one is element 46. And so -- but CLU is a designation that Shraga gives to both of them, although they may be a little different.

Q. The CLU that we've been talking about is CLU 46; is that right?

A. The CLU I've been thinking about I believe was the CLU 46 located in the ONT of Shraga.

Q. And CLU stands for control and logic unit; is that right?

MR. TONG: Objection. Asked and answered.

A. The CLU that we were discussing in reference to some of the text on column 15 of Shraga was generally relating to CLU 46. And the CLU stands for control and logic unit, according to Shraga.

Q. Let's turn back to the '754 patent, which is Willner Exhibit 2. And please turn to the top of column 17, and let me know when you're there.

A. I'm there.

Q. So the last -- described -- Claim 1 is an electrical network interface port; is that correct?

A. The last element that's listed here, although there's a bunch of text that follows that

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specific element, is an electrical network interface port.

Q. That element reads "An electrical network interface port electrically coupled to the control module and for electrically coupling into the optical module port of the switch or router and for communicating with the switch or router."

Did I read that right?

A. I believe you did.

Q. So this electrical network interface port is described as coupling into the optical module port of a switch or a router; is that correct?

A. So the element of Claim 1 of the '754, the electrical network interface port, is for electrically coupling into the optical module port of the switch or router.

Q. And it says the electrical network interface port communicates with the switch or router; correct?

A. The electrical network interface port of the Claim 1 of the '754 is for communicating with the switch or router.

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Q. And if that port is communicating with the switch or router, it would send signals to the switch or router; is that fair?

A. It's communicating -- are you referring to signal -- any specific signals? Are you referring to signals writ large? Any type of signals at all?

Q. Let me ask a clearer question.

The electrical network interface port communicating with the switch or router would communicate with the switch or router using electrical signals; is that correct?

A. I think that a person of ordinary skill would read this and understand that the electrical network interface port being electrically coupled and -- sorry -- being for electrically coupling into the optical module port of the switch or router and communicating with the switch or router, that the communication would be through electrical means.

Q. And prior to the '754 patent, did optical transceiver modules contain electrical interfaces?

A. Prior to the '754 and -- sorry -- outside the context of the '754 and prior to 2003,

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transceivers had electrical interfaces. Optical transceivers.
Q. And those electrical interfaces on the optical transceivers would connect to a device such as a switch or router; correct?
A. So outside the context of the '754 and prior to 2003, the electrical interfaces of optical transceivers could connect up to different -- (Inaudible.) -- and I don't know if I've given an opinion about directly into the switch or router -- into a switch or router. But I would say that it's not unlikely. I'm just trying to remember.
Q. Okay. I'm asking you, as a POSITA who was a POSITA at the time in 2003, would electrical network interface ports of optical transceiver modules be capable of coupling to a corresponding port in a switch or router?
A. So outside the context of the '754 and prior to 2003, electrical ports -- I think you used the words "electrical network interface ports" which is, now, again, a term of the claim. So let's just say the electrical port of an optical transceiver. That

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I would -- going from memory, it doesn't seem unlikely that there would be an electrical -- an electrical interface that -- or electrical port into a router or a switch.
Q. So in your opinion, it would be likely that an optical transceiver module's electrical port could interface with a corresponding port of a switch?
MR. TONG: Objection. Form.
A. So outside the context of the '754 and prior to 2003, that an optical transceiver having an electrical interface, I say that it's not unlikely that that could have been known to plug into a switch or router.
Q. Okay.
MS. RIOLO: I'm gonna introduce another exhibit, and this will be marked as Willner 004.
(Exhibit 004 was marked for identification and is attached to the transcript.)
MS. RIOLO: And this exhibit, for the record, is U.S. Patent Number 6,439,918, and this is

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the Togami reference that bears Exhibit Number 1007 in the underlying proceeding.
Q. Please let me know when you have that open. And if you have a paper copy, you're welcome to look at that as well.
A. I do have a paper copy. I downloaded the file. I opened the file. And I have the paper copy and will -- and I'm looking at it right now.
Q. Great. So if you could flip to column 1. And in Togami's column 1, it describes the background of the invention; is that fair?
A. There's a heading on the top of column 1 that says "Background of the Invention."
Q. And can I direct your attention to the beginning of the last paragraph in column 1? And it reads "Typically, a transceiver module is electrically interfaced with a host device -- such as a host computer, switching hub, network router, switch box, computer input/output and the like -- via a compatible connection port."
Did I read that right?
A. I believe you did.

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Q. So Togami says that a transceiver module interfaced with a host device, such as a switch, with a compatible connection port; is that fair?
A. So outside the context of the '754, that Togami describes a transceiver module that is electrically interfaced with -- with a switch via a compatible connection port.
Q. Thank you. Now, let's turn back to the '754 patent. And I'm gonna direct you again to the top of column 17. Please let me know when you're there.
A. I'm there.
Q. And, again, we see the element of the claim, an electrical network interface port; correct?
A. Correct.
Q. In reading this element of the claim, is there anything that requires control signals to be sent across the electrical interface to the switch or router?
MR. TONG: Objection. Form.
A. So I'm not sure I gave -- is that anywhere in my report?
Q. I'm just asking you, looking at this claim

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element in front of you, do you see anything that requires the transmission of control signals from the electrical interface port to the switch or router?
A. I -- I'd have to think about that. I don't know if I gave such an opinion. If I did, I just don't remember.
Q. That's okay because I'm asking you, sitting here today, if you see in Claim 1 anything in the element, an electrical network interface port that requires control signals to be transmitted to the switch or router?
MR. TONG: Objection. Form.
A. So, again, I -- you know, to refresh my memory, I may have it in my report. I just don't remember. I just don't remember.
Q. You can look in your report if you need to.
A. I -- you know, I don't want to waste your time looking through my report. As I said, I don't remember whether I gave such an opinion.
Q. Okay. I'm gonna ask my question again because it's very simple.

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In this element of Claim 1 where it describes the electrical network interface port, does anything in this element require control signals to be transmitted across that port to the switch?
MR. TONG: Objection. Form. Asked and answered.
A. So I -- there might be. As I sit here today, I don't remember whether I've given such an opinion. Might be in my report and I just don't remember.
MS. RIOLO: Okay. I want to stop here and just take a quick five-minute break, if that's all right with everyone.
MR. TONG: Sure. Yeah. Let's do five minutes.
THE VIDEOGRAPHER: Everyone, please stand by.
Going off the record. The time is 4:32 p.m.
(A short break was had.)
THE VIDEOGRAPHER: Going back on the record. The time is 4:42 p.m.

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BY MS. RIOLO:
Q. Dr. Willner, did you talk to counsel over the break?
A. No.
MS. RIOLO: I'm gonna go ahead and introduce the next exhibit, which should be marked as Willner 005.
(Exhibit 005 was marked for identification and is attached to the transcript.)
Q. Please let me know when you have it open.
MS. RIOLO: And for the record, this is a copy of the SFP multisource agreement that has been marked as Exhibit 1016 in the underlying proceeding.
A. I have it open.
Q. Okay. And have you seen this document before, Dr. Willner?
A. I can scroll through it, but I probably did.
Q. Yeah. Take your time if you need to.
A. Is it all right if I print this out and come right back? It will be, like, a minute.
Q. I would prefer if you could view it on your

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computer screen, just because I don't know how long printing will take.
A. Okay. I have -- I have a printout actually here. I can just grab it, actually.
Q. If it's a clean copy, you can use a printed version.
A. Okay. Thank you. I'll just ...
Thank you very much.
Q. Sure.
A. And is this Exhibit 1016?
Q. That's correct. In the underlying proceeding, it's 1016.
A. So I'm -- I don't want to waste your time, but if the file you uploaded is the same as this one, then I believe I have it.
Q. Great.
So are you familiar with this document?
A. I'm familiar.
Q. And when was the first time you became aware of this document?
A. I don't remember.
Q. Was it in connection to this proceeding?

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A. I just don't remember.
Q. So this document is titled "SFP (Small Formfactor Pluggable)"; is that right?
A. When you say titled, it's discussing that. I'm not quite sure what the title is.
Q. Yeah. So if you'll scroll to the second page.
And at the top there, it says "SFF Committee, INF-8074i, Specification for SFP (Small Formfactor Pluggable) Transceiver"; is that right?
A. I believe so.
Q. And SFP stands for small form-factor pluggable; is that fair?
A. Yes.
Q. And this is a multiple source agreement standard; are you aware of that?
MR. TONG: Objection. Foundation.
I'm sorry. Withdrawn.
Q. I can direct you to a helpful portion of this if that would be helpful.
A. Please.
Q. On that same second page, in the abstract

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just below the title, do you see that?
A. Yes.
Q. And it reads, "This specification describes the SFP (Small Formfactor Pluggable) Transceivers developed by the MSA (Multiple Source Agreement) group.
Did I read that right?
A. I believe you did.
Q. And are you familiar with the MSA group?
A. I have familiarity.
Q. And based on your familiarity, is it your understanding that the MSA group, one of their goals was to standardize pluggable form factors in the optical transceiver industry?
A. Well, their -- one of their goals was for standardization of optical transceivers outside the context of the '754 in -- in the industry.
Q. And an SFP transceiver described in this standard would be able to plug into a host device; is that correct?
A. The SFP of this document could plug into different host devices.

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Q. And could those host devices comprise switches and routers?
A. So SFPs -- SFPs are -- could be plugged into host devices that could include switches and routers.
Q. And is it your understanding that what an SFP --
A. And --
Q. I'm sorry. Please, continue.
A. And that would be outside the context of the '754.
Q. And is it your understanding that when an SFP device is plugged into a switch or router, for example, it's communicating with that switch or router?
MR. TONG: Objection. Form.
A. So outside of the context of the '754, that an SFP that would be plugged into a switch or router, that there would be some type of signalling that is occurring if this is an optical transceiver. And when I say "is," it's capable of.
Q. And would this signalling it's capable of

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communicating be in the form of electrical signals?
A. So the SFP outside the context of the '754, the SFP could be plugged into a switch or router such that there will be signals passing through the interface, and those signals would -- could be electrical signals.
Q. Would those signals be in any format other than electrical signals?
A. I -- I don't -- I don't remember, but the very common one is electrical signals. Electrical -- electrical signals.
Q. So one of the functions of a pluggable transceiver is to convert an optical signal to an electrical signal; is that right?
A. So outside the context of the '754 and prior to 2003, one of the -- the issue of the SFP is to convert optical signals to electrical signals and electrical signals to optical signals in those transceivers.
Q. So the SFP device would receive an optical signal on one end from the optical fiber; is that fair?

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A. Outside the context of the '754 prior to 2003, the SFP would have two sides. On one side, it would be the -- an optical connection that is receiving and transmitting optical data through an optical fiber. And so that was known.
Q. And that received optical data, the pluggable transceiver would then convert that to electrical data; is that fair?
A. So outside of the '754 and before 2003, the SFP, being a pluggable optical transceiver, would accept -- would receive optical data in its optical port and convert it to electrical domain.
Q. And that data and the electrical domain would then pass through the electrical interface port of the pluggable transceiver to the host device, such as a switch; is that fair?
A. So --
MR. TONG: Objection. Form.
A. Yeah. So the -- outside the context of the '754 and prior to 2003, the SFP, being a pluggable optical transceiver, would convert the incoming optical data to electronic data, and then it

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would -- it could transmit that data through an optical -- excuse me -- through an electrical interface to another device, such as a switch or a router.
Q. Now, I'd like you to scroll to page 21 of this document or flip to page 21.
And I actually believe it may be denoted as page 20 on the document, even though it's technically the 21st page in the PDF.
Do you see at the top --
MR. TONG: For the record, what's the exhibit stamp page number, like Ex. 1016 dot what?
MS. RIOLO: It's Ex. 1016.021.
MR. TONG: Thank you.
BY MS. RIOLO:
Q. And do you see at the top of this page, it says "Appendix B. Electrical Interface"?
A. I see that.
Q. So is it fair to say that this section describes the electrical interface of the SFP device?
A. It's fair to say that the electrical

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interface is discussed in Appendix B.
Q. Do you see the first section there is titled "B1. Introduction"?
A. Yes, I see that.
Q. And the first sentence in that section reads, "This annex contains pin definition data for the small form-factor pluggable (SFP) transceiver."
Did I read that right?
A. I believe you did.
Q. And then the second sentence says, "The pin definition data is specific to gigabit rate datacom applications such as Fibre Channel and Gigabit Ethernet."
Did I read that right?
A. I believe so.
Q. So the pins of this electrical interface have applications in fiber channel and gigabit Ethernet transmissions; is that fair?
A. Well, it's gigabit rate datacom applications and it's -- gives examples of fiber channel and gigabit Ethernet.
Q. So gigabit Ethernet and fiber channel are

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examples of applications where this pin definition described in the electrical interface is relevant; is that fair?
A. I think that's -- if I were just to rephrase it, that this pin definition is specific to gigabit rate datacom. And examples of that would be fiber channel and gigabit Ethernet.
Q. Do you see figure 1 at the bottom of this page labeled "Diagram of Host Board Connector Block Pin Numbers and Names"?
A. Yes, I do.
Q. And is it your understanding that this is a diagram of the pin connector that interfaces with the board of a host device?
A. So I think that's a -- that's very -- that's possible. I'm just trying to figure out the details.
But this is likely or it seems to be possible that that's true. I just haven't memorized everything.
Q. That's okay. I'm not asking you to memorize anything.

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I'm asking if looking at this figure and the title of this figure, if it's your understanding that this is a diagram of the pin connectors of the electrical interface of the SFP device described in this document?
A. So I believe it is the electrical pins at the interface.
Q. And on one side, it says "Toward Bezel."
Do you see that?
A. And that would be outside the context of the '754, yeah.
I'm sorry?
Q. And do you see that one side of this diagram, it says "Toward Bezel"?
A. Uh-huh. Yeah.
Q. And would toward bezel -- (Inaudible.) -- electrical interface?
A. I didn't -- I didn't hear that clearly.
Q. Did I break up? Can you hear me now?
A. We may be doing a commercial.
REMOTE TECHNICIAN: Yes, I can hear you.
MS. RIOLO: Can anyone else hear me?

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MR. TONG: You're having audio issues. I can hear you sporadically.
THE WITNESS: You were going -- it was fine for quite a while.
REMOTE TECHNICIAN: Yeah. It was going in and out on my end as well.
A. So please repeat the question.
BY MS. RIOLO:
Q. Yeah. Does everything sound fine now? Can everyone hear the words I'm saying?
A. I can hear.
REMOTE TECHNICIAN: Me as well.
MS. RIOLO: Thank you. Might have been a small blip, then.
BY MS. RIOLO:
Q. So my question was (Inaudible.) -- this diagram; is that correct?
MR. TONG: I'm gonna object that I could not hear because you cut out again.
MS. RIOLO: All right.
REMOTE TECHNICIAN: Yeah, you're still cutting out. Sorry about that, Counsel. Every

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other word.
MS. RIOLO: I'm gonna switch to the audio on my phone if that's all right. We can go off the record.
MR. TONG: Short five-minute break while you deal with technical difficulties?
MS. RIOLO: Yes.
THE VIDEOGRAPHER: Everyone please stand by. We're gonna go off the record. The time is 5:07 p.m.
(A short break was had.)
THE VIDEOGRAPHER: Going back on the record. The time is 5:17 p.m.
BY MS. RIOLO:
Q. Dr. Willner, did you speak to your counsel over the break?
A. No.
Q. Now, I'd like to direct you back to the figure in Exhibit 5 that we were looking at prior to the break. Please tell me when you have it up.
A. Figure 1 on 1016.021?
Q. That's correct. And this is a diagram of a

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pin connector of an SFP; is that correct?
A. This is a diagram of a host board connector block, pin numbers, and names.
Q. And it has one side of the diagram that says "Towards bezel."
Do you see that?
A. Yes.
Q. And does "towards bezel" mean towards the edge of the connector to you?
A. I'd have to refresh my memory of what that means, but --
Q. You can refresh your memory.
A. -- perhaps could you point me to where it might be in the document?
Q. I don't believe there's a description of it in the document.
Are you familiar with the term "bezel" as it relates to a pluggable optical transceiver module?
A. I'm familiar.
Q. You are familiar?
A. Yes.
Q. And what is a bezel of a pluggable optical

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transceiver module?
A. So it could mean different things in different contexts, but for this context, I can try to refresh my memory and go through the document, if you want me to.
Q. Please go ahead.
A. So one part of the description of bezel would be in Section A6 of the document that we're looking at.
Q. And what page are you referencing?
A. 1016.014.
Q. So this Section A6 describes the bezel of the SFP transceiver; is that correct?
A. Well, it -- it's giving guidance as to the bezel design for system using SFP transceivers.
Q. And is it your understanding that the bezel is located on the side of the SFP transceiver that interfaces with the host device?
A. So from memory, I didn't memorize this, but I think that's quite possible.
Q. Okay. So let's go back to the page that's labeled 1016.021. Please tell me when you're there.

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A. I'm there.
Q. So on the other side of this diagram, it says "Towards ASIC."
Do you see that?
A. Yes, I do.
Q. And what is an ASIC?
A. ASIC generally stands for application-specific integrated circuit, which is a very broad category.
Q. So an ASIC is an integrated circuit; is that fair?
A. I would say that the IC of ASIC stands for integrated circuit.
Q. So one side of the pin connectors of this diagram is pointed towards the ASIC; is that fair?
A. According to the diagram, that seems to be what it's -- what it's showing.
Q. Now, I'd like you to scroll to page 25 of this document that ends in Ex. 1016.025.
A. I'm at page 1016.025.
Q. And the top of this page reads "B3. Timing Requirements of Control and Status I/O."

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Did I read that right?
A. I believe so.
Q. And as we mentioned earlier, Section B of this document relates to the electrical interface of the SFP transceiver; is that correct?
A. So Appendix B relates to the electrical interface of the SFP.
Q. And Section B3 of Appendix B would still be relevant to the electrical interface of the SFP transceiver; is that fair?
A. B3 is part of the Section B, and its title is "Timing Requirements of Control and Status Input/Output."
Q. So I/O stands for input/output; is that fair?
A. Correct.
Q. So the SFP transceiver described in this document contains a control and status input/output; is that fair?
A. So outside the context of the '754 and prior to 2003, there are things that were -- seem to be included about -- that relate to some aspects of

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timing, again, outside the context of the '754, and control and status outside the context of the '754.
Q. And the first line of this section reads "The timing requirements of the control and status lines."
Do you see that?
A. Yes.
MS. RIOLO: Okay. I'm gonna introduce the next exhibit. And this will be marked as Willner 006.
(Exhibit 006 was marked for identification and is attached to the transcript.)
MS. RIOLO: I'm placing it in the chat now.
Q. Please let me know when you have it open.
A. Is this Exhibit 1017 in the IPR?
Q. That's correct.
A. And I have a printout here. Is it all right if I take a moment just to go back and grab it?
Q. Yes, if you have a clean printout, you may use it.
A. Thank you.

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So I have in my hand a printout, which I believe to be clean, of Exhibit 1017 in the IPR case.
Q. And are you familiar with this document?
A. I have some familiarity with it.
Q. So you've seen this document before; correct?
A. I believe I have seen it.
Q. Do you recall when you first became aware of this document?
A. I don't remember.
Q. And XFP stands for 10-gigabit small form factor; is that correct?
A. The XFP is, looking at 1017.009, that XFP relates to the 10-gigabit small form-factor pluggable module.
Q. Sorry. I forgot to unmute.
And this document is a specification for the XFP pluggable module; is that fair?
A. So this specification, which is 1017, defines the electrical management and mechanical interfaces of the XFP module.

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Q. And the XFP module is a form factor pluggable module like an SFP; is that correct?
A. Did you say the word "small" before form factor?
Q. If I did, I didn't mean to. Let me repeat my question.
Is an XFP device a form-factor pluggable transceiver module similar to that of an SFP device?
A. So there -- an XFP is a small form factor pluggable transceiver module, outside the context of the '754, and there are some similarities to an SFP.
Q. Would it be fair to say that the primary difference between an SFP transceiver and an XFP transceiver is the rate of data that it's capable of transmitting and receiving?
MR. TONG: Objection. Form.
A. So I -- I don't remember the details of the differences. I -- it's a fairly long document. So I -- the details I just don't remember about what the differences are.
Q. So just as we discussed with the SFP device, an XFP device can be removably coupled to another

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host device; is that fair?
A. So outside the context of the '754 and prior to 2000 -- well, this is a revision of 2005, but the -- so I'll just say more generally. Outside the context of the '754 patent, an XFP is a pluggable that could be connected electrically to a host device.
Q. And the host device it could be connected to would include devices such as switches or routers; is that fair?
A. To append to my previous answer, that outside the context of the '754, that yes, I think that host device could include switches and routers.
Q. Now, I'd like you to scroll to page 27 of this document. Or flip to page 27.
MR. TONG: Which page numbers are we going by? Is it the PDF page, the bottom right-hand corner page or --
MS. RIOLO: Yeah, I'm looking to confirm. So it will be page that ends in Ex. 1017.027.
BY MS. RIOLO:
Q. Please let me know when you're there.

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A. Does this say page 3 on the bottom?
Q. It does say page 3 in the middle on the bottom.
A. So I'm there.
Q. And do you see at the top, it says Chapter 2?
A. Yes.
Q. And Chapter 2 reads "XFP Electrical Interface"; is that right?
A. Correct.
Q. So is it your understanding that the context of Chapter 2 would relate to the XFP's electrical interface in the specification?
A. I believe that's a fair -- a fair assumption. I don't know -- I'd have to go through this chapter to give you a more definitive answer, but I'd say that's a fair -- a fair thing to say, that it relates to the XFP electrical interface.
Q. And at the bottom of this page, do you see Section 2.3 entitled "XFP Host Connector Definition"?
A. Yes, I do.

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Ex. 1040.30

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Q. And if you flip to the next page, it contains a diagram of the host printed circuit board XFP pinout.
Do you see that?
A. My apologies. Can you repeat that?
Q. If you'll scroll to the next page, please, and it will end in Ex. 1017.028.
A. I see it.
Q. And do you see on this page, it contains a diagram titled "Figure 1 Host PCB XFP Pinout Top View"?
A. Yes, that's what it says.
Q. And does PCB in the description of this figure stand for printed circuit board, to your understanding?
A. Correct.
Q. And is it your understanding that these pins are the pins at the electrical interface that connects to the host device?
MR. TONG: Objection. Form.
A. So I'm not sure if my report included anything from this document. I'd like to -- I

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didn't -- not only didn't I memorize it, I didn't really -- I don't know if I quoted from it. So I'd probably want to really -- to answer specific questions about this, I'd want to be -- take the time to really refresh my memory, and it's not gonna be quick.
Q. Dr. Willner, do you recall that this is an exhibit to Dr. Prucnal's opening declaration in this proceeding?
A. Yes. I -- yes, I'm aware of that.
Q. And do you recall earlier today when you testified that you reviewed the documents that were exhibits to Dr. Prucnal's declaration?
A. Yes.
MR. TONG: Objection to form.
A. I said that I reviewed -- I didn't remember reviewing all of them and how much in detail, but I reviewed some of them in more details than I reviewed others.
Q. And is this one of the documents you reviewed?
A. So I did -- I did look at this document.

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Q. Okay. And I'm asking -- go ahead.
A. Dr. Prucnal was not -- the XFP was not intrinsic to his grounds, and so I focused on the -- I focused much more on the SFP.
Q. That's fair. I believe he cited this in the background section of his report.
But regardless, I'm asking you questions based on your understanding of the document today. So I would like you to answer my questions based on your understanding of that. Is that fair?
A. Yes, except that because I didn't incorporate technical details, I -- it would take me a while to be able to give you an accurate answer on things like pinouts.
Q. So you can't tell me, sitting here right now, if this figure, figure 1, is a diagram of an XFP pinout?
A. I can tell you that figure 1 states that it's a host PCB XFP pinout top view. I'd -- I just don't remember the text that goes around it, and I don't believe I have this as part of my declaration. But I don't remember if -- I didn't memorize my

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declaration, so I -- it could be in there. If it is, please let me know, but I don't think it was.
Q. Okay. If you scroll to the next page, which ends in Ex. 1017.029.
Do you see there's a table that says "Module Electrical Pin Definition"?
A. Yes.
Q. And is it your understanding that these module electrical pin definitions would correspond to the pins that we saw in the preceding figure?
A. I'd really just have to read the text that surrounds it. If I was to guess, I look at the figure and I see pins 1 to 30 on table 1, and I see pins 1 to 30 on figure 1. So as a guess, it's possible.
Q. Okay. Well --
A. But I'd have to really read and -- to become comfortable and familiar to give you an accurate answer.
Q. Yeah. So I don't believe we need to guess.
So if you'll scroll to the page that's labeled with Ex. 1017.027, please.

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A. I'm there.
Q. At the bottom of that page, you'll recall we discussed this earlier, it's section 2.3, and it reads "XFP Host Connector Definition."
Do you see that?
A. Yes.
Q. And in the second sentence of that description underneath that title, it says, "Host PCB pin assignment is given by figure 1 and pin definition are listed in table 1. All XFP compliance points are defined using this connector."
Do you see that?
A. Yes.
Q. So based on that description, is it your understanding that figure 1 describes the pin assignments of the host connector of the XFP?
A. It seems likely.
Q. And based on that description, is it your understanding that the pin definitions related to figure 1 are listed in table 1 on the following page?
A. Again, based on the sentence you read, that

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seems likely.
Q. Now, will you scroll to the page with the number Ex. 1017.030?
A. I'm there.
Q. And at the top of this document, there's a section 2.4 titled "Low Speed Electrical Hardware Pins."
Do you see that?
A. Yes.
Q. And the description of this section reads, "In addition to the 2-wire serial interface, the XFP module has the following low-speed pins for control and status."
Did I read that right?
A. Yes.
Q. So based on this description, is it your understanding that this XFP module contains pins for control and status?
A. So outside the context of the '754, the sentence says that the XFP module has "low-speed pins for control and status."
Q. And I want you to look to the top of this

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document -- I'm sorry -- the top of this page of the document. And it reads, "XFP Electrical Interface"; is that right?
A. So the top of the page says "XFP Electrical Interface."
Q. Okay. So you can go ahead and put this exhibit away. I'm gonna place another exhibit into the chat.
A. Ms. Riolo, can I take a five-minute break?
Q. Yes, we can take a five-minute break.
A. Thank you.
THE VIDEOGRAPHER: Stand by.
We're going off the record. The time is 5:53 p.m.
(A short break was had.)
THE VIDEOGRAPHER: Going back on the record. The time is 6:00 p.m.
BY MS. RIOLO:
Q. Dr. Willner, did you talk with counsel over the break?
A. No.
Q. Okay.

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MS. RIOLO: I'm gonna go ahead and introduce the next exhibit, which should be marked as Willner 007.
(Exhibit 007 was marked for identification and is attached to the transcript.)
Q. And please let me know when you have that downloaded.
A. Is this Exhibit 2025 of the IPR?
Q. Yes.
MS. RIOLO: For the record, this is a copy of what has been marked as Exhibit 2025 in the underlying IPR proceeding.
A. Would it be all right if I grab a copy that I have?
Q. Yes. If you have a clean copy, you may go ahead and get it.
A. Thank you.
I have a document. It's two pages. That is Exhibit 2025 in the IPR, and I just want to confirm that it's the same. It looks like it's the same as the document you uploaded and I downloaded.

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Q. And this document is a data sheet for Motorola ONT6000GVT; is that correct?
A. Correct.
Q. And this is described as a "GPON ONT for Multi-Dwelling Unit"; is that right?
A. Correct.
Q. And are you familiar with this document?
A. Yes.
Q. And did you review this document in preparing your declaration?
A. I did.
Q. Have you ever worked with a Motorola ONT6000GVT?
A. I've seen them. I may have used --
Q. Have you seen Motorola -- please, go ahead.
A. So I've seen them. I may have used them.
Q. When, if you recall, did you see this Motorola ONT?
A. Oh, so my apologies. I'm not -- I won't say affirmatively that I've seen this model. But in this general class, I've seen Motorola types like this. And in terms of the time frame, I just don't

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remember.
Q. So the general class you're referring to is Motorola ONTs generally or Motorola ONTs in this particular series?
A. I think Motorola ONTs generally.
Q. And in your work, have you ever opened up a Motorola ONT6000GVT to look at the internal components?
A. I don't remember.
Q. So you're not familiar with the size and layout of the components that would comprise the Motorola ONT6000GVT, such as the one in this document?
A. So I'm familiar with ONTs like this one. I'm familiar roughly with the layout, various technical issues involved. Have I opened up this specific model and looked at all of the details? I just don't remember.
Q. Would this Motorola ONT6000GVT contain control circuitry?
A. What kind of control circuitry are you referring to?

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Q. Do you recall earlier when we were discussing control circuitry in the context of the claims of the '754 patent?
A. Yes.
Q. And do you recall testifying that ONTs in the art prior to the '754 patent contained control circuitry?
MR. TONG: Objection. Mischaracterizes.
A. So I believe when I said that, I may have been saying outside the context of the '754, because the '754 is talking about control in its terms. And a person of ordinary skill would have a certain understanding of what control is in the context of the '754. So I think I was -- if I remember correctly, we were discussing issues of timing, issues of communicating, and that was as part of this control module of that element of Claim 1 of the '754. So in terms of control here, that's -- that's not necessarily what I was talking about.
Q. Do ONTs -- please, go ahead.
A. So when you -- I believe we were talking about Shraga at the time as well. And Shraga talks

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about ONTs and about different things that it's -- what it calls its CLU and what it does as part of its ONT. Not inside of a pluggable transceiver. And so in terms of those various technical functions that Shraga has in its ONT, there are certain functions that would also be found in this ONT by Motorola.
Q. And similar to the CLU of Shraga we discussed earlier, would this Motorola ONT have similar control circuitry as Shraga's CLU?
A. I'm not sure --
MR. TONG: Objection. Form.
A. -- I'm not sure I talked about control circuitry. I'm not sure I used that term for Shraga. The -- in terms of the specific functions, the various functions are described. I was using this data sheet as an example of the size and power of ONTs of the time. And I believe it was consistent with Dr. Prucnal's recollection as well. In terms of the specific functions, if I can take some moments to look at it, I'm not sure if we want to go point by point on functions, but if I may,

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I'll just look more carefully.
MS. RIOLO: I'd like to note for the record that response was nonresponsive to my question.
Q. So, Dr. Willner, would this Motorola ONT6000 contain components that would be programmed to receive time slot assignment signals from the head end of a passive optical network?
MR. TONG: Objection. Form.
A. So outside the context of the '754, the -- this Motorola ONT is -- follows various protocols. And if my memory, it seems like those protocols may include time slot assignments from a head end of a passive optical network that's outside the context of the '754.
Q. So then this Motorola ONT6000GVT would, therefore, contain components that are capable of receiving those time slot assignments in the protocols that you just described; is that fair?
A. So outside the context of the '754, the Motorola ONT, given that it follows certain protocols, my memory, I think, would be that it would have internal components capable of receiving

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time slot assignments outside the context of the '754.
Q. And similarly, the Motorola ONT6000GVT described in this document would contain components that are capable of compiling signals for transmission in the upstream according to those time slot assignments; is that fair?
MR. TONG: Objection. Form.
A. So outside the context of the '754, this Motorola ONT, if it's following these protocols and if my memory is correct that the protocols include transmission in the upstream according to time slot assignments, then -- and outside the context of the '754, that may be -- that may be the case here.
Q. So then this Motorola ONT, in following those protocols, would contain components for implementing those protocols; is that fair?
A. I think that the -- this device, the Motorola ONT, if it's following protocols, then whether it's -- well, I'll say that if it's following the protocols, then it would have components that would help it follow the protocols.

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Q. And is one of the protocols that this ONT follows the ITU-T C.984.3 standard?
A. One of the protocols that this Motorola ONT, according to the data sheet, that it follows would be -- would include G.984.3.
Q. So, therefore, this Motorola ONT6000GVT would contain components for implementing the provisions found in the ITU-T standard G.984.3; is that correct.
A. I think it's fair to say that the Motorola ONT would contain components that would help it implement various provisions of the -- of the G.984.3. But that's -- I think that's a fair statement.
Q. Do you see the section of -- sorry. I'll withdraw that.
Do you see the section of this document that is titled "Highlights Include"?
A. Is that on page 1, the right column?
Q. That's correct.
A. So I see that.
Q. And is it your understanding that this

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section describes certain characteristics of this Motorola ONT?
A. I think the -- this section -- Ms. Riolo, after I answer, I -- in another one or two questions, if I could take a break as well -- but I believe that this section describes certain aspects of the Motorola ONT.
Q. I'd like you to look at the third bullet point down in that "Highlights Include" section.
Do you see that?
A. Yes.
Q. And do you see where it reads "Provides 24 lines of class 5 or soft-switch VoIP quality voice service"?
Do you see that?
A. Yes, I do.
Q. And what does VoIP stand for?
A. It's often referring to voice over IP.
Q. And what is voice over IP?
A. I'd -- transmission of voice as an example, and I'd have to refresh my memory, but it's -- I don't think it's in my report. Please tell me if it

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is. But sort of sending voice over the internet is one -- one -- I think one aspect of it.
Q. So is it fair to say that voice over IP involves transmitting voice calls using broadband internet connection instead of over regular analog phone lines?
A. I'd have to refresh my memory to give you an accurate answer.
Q. Are you familiar with voice over IP?
A. Yes. That's -- so I gave you a general idea, an example. I'm not sure that I would want to give it a specific definition in which there's things in it and things out of it. So I think the idea of transmitting voice calls using broadband internet sounds consistent with my knowledge. But, again, I'd want to refresh that.
You used the issue of analog phone lines, which, again, that's -- there are different kinds of phone lines as well. So there's all sorts of services, and I just want to be careful about what -- that I'm not giving it a definition that says this is in and this is out. But I think it's a

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fair statement that, in my memory, that you're transmitting voice calls using a broadband internet connection. That sounds consistent with what my familiarity is.
And, Ms. Riolo, if I could take a fairly short break?
Q. We can take a five-minute break.
A. Thank you.
THE VIDEOGRAPHER: Everyone please stand by. Going off the record. The time is 6:26 p.m.
(A short break was had.)
THE VIDEOGRAPHER: Going back on the record. The time is 6:32 p.m.
BY MS. RIOLO:
Q. Dr. Willner, did you discuss anything with your attorney over the break?
A. No.
Q. So before the break, we were discussing the data sheet of this Motorola ONT6000GVT.
Do you recall that?
A. Yes.
Q. And we were discussing specifically that

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this device states that it provides 24 lines of voice over IP service; is that right?
A. It states in a bullet under "Highlights Include" that the Motorola ONT provides 24 lines of class 5 or soft-switch voice-over-IP-quality voice service.
Q. Are you aware of what soft-switch means?
A. I've heard it. I don't remember.
Q. Does voice over IP use a packet switch network to transmit calls?
A. I'd have to refresh my memory on -- on the specifics.
Q. What is your understanding of what this data sheet indicates when it states that it provides 24 lines of class 5 or soft-switch voice over IP?
A. My understanding is that there could be 24 different lines, users, that can access this Motorola ONT.
Q. And would that mean that -- go ahead.
A. Sorry. Users, I'm broadly defining that.
Q. Understood. So would that mean that there would be 24 output ports on this Motorola

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ONT6000GVT?
A. I'm not sure that I included that in my report. And I would have to be careful about affirmatively giving an answer to that.
Q. So you testified a moment ago that this Motorola ONT6000GVT -- 24 lines; is that right?
A. I've had -- I testified that, according to the data sheet, the highlights include the ability, I guess, to provide 24 lines of class 5 or soft-switch VoIP-quality voice service. In terms of the number of output ports, I wasn't affirmatively stating that.
Q. Are you finished with your answer?
A. Yeah.
Q. In preparation of your declaration, did you look at any other ONT data sheets?
A. I don't remember.
Q. Is this Motorola ONT6000GVT the only data sheet that you looked at for ONTs in preparing your declaration?
A. I don't remember.
Q. Did you look at any other ONT data sheets in

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preparing for this deposition today?
A. I don't remember.
Q. Are you familiar with what other ONTs were on the market in 2003?
A. I have some idea. I don't -- I'd have to spend time and think more deeply, but there were others, of course, on the market.
Q. And sitting here today, can you recall what other ONTs on the market in 2003 were called?
A. As I sit here today, I don't remember.
Q. Okay. Can we please go back to the Shraga reference that we were discussing earlier, Dr. Willner? And this has been previously marked as Exhibit Willner 003.
A. I have Shraga in front of me.
Q. And you testified earlier that you're familiar with this document; correct?
A. Correct.
Q. And you reviewed this document in preparing your declaration; is that correct?
A. Correct.
Q. And Shraga describes, in part, an ONT; is

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that right?
A. I believe your statement that it describes, in part, an ONT is -- is reasonable.
Q. Is there any description in Shraga that describes the size of the ONT contemplated in Shraga?
A. I don't remember if it does or doesn't. Is it -- I don't know if it's in my report. I -- in fact, it might be, actually, that -- but I'd have to go -- I'm -- there may be something.
So I don't remember if Shraga -- if Shraga's ONT, if the patent discusses limitations on size. It may be in my report. I don't remember.
Q. So sitting here today in your deposition, you can't recall if Shraga describes the size of the ONT it contemplates; is that fair?
A. I think it's fair to say that my opinions, they're in the report and my declaration, and so it may be there. Other -- I don't remember. I would say that consistent with my report, with my declaration is that a person of ordinary skill would look at Shraga and think of a pluggable optical

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transceiver of the time as being the optical interface and not including all the other things that Shraga's ONT has.
And so a person of ordinary skill at the time would probably read Shraga and have an understanding that it's thinking about the ONTs of the time, which were large and consumed a lot of power. And I think that does help answer the question.
MS. RIOLO: I'd like to note for the record that that answer was non-responsive to my question.
Q. Dr. Willner, is there any description in Shraga that describes the dimensions of an ONT as contemplated in Shraga?
A. I don't remember. It may be in my report.
MS. RIOLO: Okay. Thank you, Dr. Willner. That's all the questions I have at this moment.
THE WITNESS: Okay.
EXAMINATION
BY MR. TONG:
Q. Dr. Willner, could we please turn back to Willner Exhibit 005, which is IPR Exhibit 1016.

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A. I have that.
Q. And could we please turn back to page number in the bottom right-hand corner Ex. 1016.025.
A. I have that.
Q. And do you see table 2, "Timing Requirements of Control and Status I/0" on this page?
A. Yes.
Q. Do you see in the first column, the parameter names?
A. Yes.
Q. What's the first parameter name?
A. "Transmitter Disable Assert Time."
Q. What's the second parameter name?
A. "Transmitter Disable Negate Time."
Q. And what's the third parameter name?
A. "Time to initialize, including reset of Transmitter_Fault."
Q. And what's the fourth parameter name?
A. "Transmitter Fault Assert Time."
Q. And the fifth parameter name?
A. "Transmitter Disable to Reset."
Q. And the next parameter name?

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A. "LOS," which probably stands for loss of signal, "Assert Time."
Q. And the next parameter name?
A. "LOS," again assuming the loss of signal, Deassert Time."
Q. And the next parameter name?
A. "Rate-Select Change Time."
Q. And the last parameter name?
A. "Serial ID Clock Rate."
Q. And could you -- sorry if I interrupted. Were you gonna say something else?
A. (Shaking head) No.
Q. Could you please take a moment to read to yourself the conditions in the final column, and just let me know when you're done reading?
A. I've read that.
Q. Based on the parameter names and the conditions, do these look like they have anything to do with controlling a switch?
A. I don't believe so.
MR. TONG: Pass the witness.
MS. RIOLO: I have no further questions.

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THE VIDEOGRAPHER: Okay. Are we ready to go off the record?
MR. TONG: Yes.
MS. RIOLO: Yes.
THE VIDEOGRAPHER: Okay. Everyone, please stand by.
Here ends today's deposition. We're going off the record. The time is 6:52 p.m.
(Off the record at 6:52 p.m.)

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CERTIFICATE OF COURT REPORTER - NOTARY PUBLIC

I, TIFFANY M. PIETRZYK, Certified Shorthand Reporter No. 084-004371, CSR, RPR, CRR, and a Notary Public within and for the State of Illinois, do hereby certify:
That ALAN ELI WILLNER, Ph.D., the witness whose deposition is hereinbefore set forth, was duly sworn by me before the commencement of such deposition and that such deposition was taken before me and is a true record of the testimony given by such witness.
I further certify that the adverse party, ALEXANDER SOTO AND WALTER SOTO, was represented by counsel at the deposition.
I further certify that the deposition of ALAN ELI WILLNER, Ph.D. occurred virtually, via Zoom videoconference, on Tuesday September 17, 2024, commencing at 12:47 p.m. EST to 6:52 p.m. EST.
I further certify that I am not related to any of the parties to this action by blood or marriage, I am not employed by or an attorney to any

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of the parties to this action, and that I am in no way interested, financially or otherwise, in the outcome of this matter.
IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal this 30th day of September, 2024.

My commission expires: February 28th, 2028

Tiffany M Pietrzyk

NOTARY PUBLIC IN AND FOR THE STATE OF ILLINOIS

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