

Deposition of
Dr. Patrick Mercier
June 11, 2026

Whoop, Inc.
vs.
Omni Medsci, Inc.



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22	Reporter: Renee Combs Quinby, RDR, CRR, CA CSR #11867,	22	(The original exhibits were provided to the court
23	TX CSR #12184, MO CCR #1291, IL CSR #084-004867	23	reporter electronically to be attached to the original
24	Job No.: 10192701	24	and copies of the transcript.)
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1	REMOTE APPEARANCES	1	UNITED STATES PATENT AND TRADEMARK OFFICE
2		2	BEFORE THE PATENT TRIAL AND APPEAL BOARD
3	FOR THE PETITIONER:	3	--000--
4	Nathan Scharn, Esq.	4	WHOOP, INC.,)
5	Eric Lu, Esq.	5	Petitioner,)
6	Gibson, Dunn & Crutcher LLP	6	vs.) Case No.
7	3161 Michelson Drive, Suite 1200	7	) PGR2026-00003
8	Irvine, CA 92612	8	OMNI MEDSCI, INC.,)
9	(949)451-3800	9	Patent Owner.)
10	nscharn@gibsondunn.com	10	--000--
11	el@gibsondunn.com	11	VIDEOCONFERENCE DEPOSITION OF DR. PATRICK
12	FOR THE PATENT OWNER:	12	MERCIER, produced, sworn, and examined on Thursday, June
13	Angelo Christopher, Esq.	13	11, 2026, with the witness appearing via
14	Sean O'Hanlon, Esq.	14	videoconference, taken on behalf of the Patent Owner,
15	Nixon Peabody LLP	15	before Renee Combs Quinby, RDR, CRR, CA CSR #11867, TX
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23		23	
24		24	
25		25	

Page 5 1 --oOo-- 2 IT IS HEREBY STIPULATED AND AGREED by and 3 between the parties that this deposition may be taken 4 remotely in machine shorthand by RENEE COMBS QUINBY, a 5 Certified Shorthand Reporter, and afterward transcribed 6 into typewriting by agreement of counsel and consent of 7 the witness. 8 --oOo-- 9 PROCEEDINGS 8:07 a.m. 10 THE REPORTER: My name is Renee Quinby, 11 California Certified Shorthand Reporter #11867. 12 DR. PATRICK MERCIER, 13 of lawful age, having been first duly sworn to testify 14 to the truth, the whole truth, and nothing but the truth 15 in the case aforesaid, was examined and testified as 16 follows: 17 --oOo-- 18 EXAMINATION 19 BY MR. CHRISTOPHER: 20 Q. Good morning. Can you please state your name 21 for the record. 22 A. Patrick Mercier. 23 Q. Is there any reason why you cannot give 24 complete, truthful, and accurate testimony today, 25 Dr. Mercier?	Page 7 1 to try to do so. Otherwise I'm going to assume you 2 understood the question and can answer it. 3 Is that fair? 4 A. That's fair. 5 Q. And if you need to take a break, of course, 6 you're not a prisoner. Just let me know. The only 7 caveat being that I would ask if a question is pending 8 you would answer the question before we take a break. 9 Sound fair? 10 A. Yes. 11 Q. Where are you physically located for today's 12 deposition? 13 A. In San Diego, California. 14 Q. Are you at your office or counsel's office? 15 A. I'm at a conference room on UCSD campus. 16 Q. And just for the record, could you identify 17 who else is in the room with you? I see counsel on the 18 Zoom but anybody else? 19 A. Yes. Nathan is here to my left, and Erik is 20 across the table from me. 21 Q. Okay. And you don't have any other programs 22 other than the Zoom you're using to connect to the 23 deposition? Open messaging apps, anything like that, 24 correct? 25 A. That's correct. Only Zoom.
Page 6 1 A. No. 2 Q. I understand you've been deposed before; is 3 that correct? 4 A. I have. 5 Q. How many times have you been deposed 6 approximately? 7 A. Approximately a dozen times. 8 Q. Okay. When was the last time you were 9 deposed? 10 A. Approximately last month. 11 Q. So I suspect you're familiar with the ground 12 rules, but I'll very quickly go over a few things just 13 to try to make things smooth today. You know, please 14 remember we have a court reporter here trying to write 15 down everything we say. So please try to verbalize your 16 answers as opposed to nodding or shaking your head. 17 Make sense? 18 A. Yes. 19 Q. Okay. And from time to time, counsel may 20 object. But unless he specifically instructs you not to 21 answer, you should answer the question. 22 Make sense? 23 A. Yes. 24 Q. Okay. And if you need me to clarify a 25 question, you know, please let me know. I'll be happy	Page 8 1 Q. Okay. Did you do anything to prepare for 2 today's deposition? 3 A. I did. 4 Q. Could you please describe for me -- strike 5 that. 6 Without revealing the substance of any 7 communications you had with counsel, could you please 8 describe for me what you did to prepare for today's 9 deposition? 10 A. Sure. I reviewed my declaration. I reviewed, 11 you know, some of the documents I cite within that 12 declaration as well as the patent in question here. And 13 I had discussions with counsel about all of this. 14 Q. You had meetings with, or a meeting with 15 counsel? 16 A. Two meetings with counsel. 17 Q. When were those meetings? 18 A. Yesterday and one meeting last week. 19 Q. Approximately how long did you meet with 20 counsel to prepare for today's deposition? 21 A. Approximately we went for not all of yesterday 22 but a good chunk of yesterday. And I think it was about 23 an hour and a half last week. 24 Q. I'm going to show you -- I'm going to put this 25 in the Zoom chat, a copy of what's already been

Page 9 1 submitted as Exhibit 1003 in the proceeding. 2 (Previously marked Exhibit 1003 was 3 shown to the witness.) 4 BY MR. CHRISTOPHER: 5 Q. I'll ask you, do you happen to have a copy of 6 your declaration in front of you there, or would you 7 prefer to open these up from the Zoom chat? 8 A. I do have fresh, unmarked copies here, but it 9 would be easier for me to just open it up in the Zoom 10 chat. 11 Q. Well, then, let's do that. So I've inserted 12 in the Zoom chat a copy of Exhibit 1003. If you could 13 open that up and let me know when you have that in front 14 of you, please. 15 A. Okay. One moment. 16 Okay. 17 Q. All right. Do you recognize Exhibit 1003 as 18 your declaration concerning the '970 Patent? 19 A. Yes. 20 Q. And if you could turn for me to page 169, 21 which is page 178 of the PDF. 22 Let me know when you're there. 23 A. Yes. 24 Q. Is that your signature that appears on 25 page 169 of Exhibit 1003?	Page 11 1 no, did you work with Whoop's attorneys on your 2 declarations? 3 A. I did in a collaborative manner. 4 Q. Okay. And did you speak with anyone other 5 than the attorneys for Whoop regarding your declaration 6 during the drafting process? 7 A. I did not. 8 Q. Who wrote the declaration? 9 A. Well, like I said, it was a collaborative 10 process, but the declaration is my own. All of the 11 opinions I stand behind. 12 Q. Did you physically type out all the text in 13 the declaration? 14 A. Some of the text. Not all of the text. Like 15 I said, it was a collaborative process, but all of the 16 text I did review and, you know, they are my opinions, 17 and I stand behind them. 18 Q. Can you approximate what percentage of the 19 text you typed? 20 MR. SCHARN: I'll object on the basis of 21 privilege. 22 THE WITNESS: That would frankly be very hard 23 for me to approximate. It was a very dynamic 24 collaborative working process with many kind of 25 back-and-forth changes and revisions and so on.
Page 10 1 A. It is. 2 Q. And this declaration was executed on 3 October 9th, 2025, correct? 4 A. That's right. 5 Q. Okay. How long did you spend preparing your 6 declaration concerning the '970 [sic] Patent? 7 A. That would be difficult for me to estimate off 8 the top of my head. I was retained by Whoop for a 9 number of different matters, and the work kind of -- you 10 know, somewhat similar patents between the various 11 different matters so the -- the work kind of blended 12 together. So it would be hard without going back to my 13 records to give you a precise number. 14 Q. Do you have an estimate of how long you spend 15 on -- spent on all of the matters combined? 16 A. Yes. It was approximately on the order of 100 17 hours. 18 Q. And I believe you've opined on -- you've 19 opined on four different patents; is that correct? 20 A. I believe so, yes. 21 Q. Be fair to approximate your time on each 22 declaration equally, perhaps 25 hours per declaration? 23 A. I suppose so. 24 Q. Okay. Did you work with -- without revealing 25 the substance of any conversations you had, just yes or	Page 12 1 BY MR. CHRISTOPHER: 2 Q. So just to be clear for the record, you don't 3 have a estimate on an approximate percentage of what you 4 typed versus what the attorneys typed? 5 MR. SCHARN: Same objection. 6 THE WITNESS: I don't. 7 BY MR. CHRISTOPHER: 8 Q. Okay. Now, you understand that this 9 declaration has been submitted in support of a petition 10 for post-grant review of the '970 Patent, correct? 11 A. That's my understanding, yes. 12 Q. I apologize. In my last question I think I 13 said '970. I meant '790. 14 A. Oh, yes, '790. 15 Q. I apologize for that. Hopefully I get that 16 right. 17 A. That's right. 18 Q. Have you reviewed the PGR petition itself for 19 the '790 Patent? 20 A. I did. 21 Q. That would have been after you executed your 22 declaration? 23 A. I don't recall the -- the timeline. 24 Q. Now, you're aware that Omni, the patent owner, 25 had filed a preliminary patent owner response responding

Page 13 1 to the PGR petition, correct? 2 A. Yes. 3 Q. Have you reviewed the preliminary patent owner 4 response? 5 A. I have. 6 Q. And are you aware that Omni submitted an 7 expert declaration from a Dr. Igor Efimov in support of 8 that preliminary patent owner response? 9 A. I am. 10 Q. Have you reviewed Dr. Efimov's declaration? 11 A. I have. 12 Q. Okay. Are you familiar with Dr. Efimov? 13 A. I was not prior to this case. 14 Q. Can you turn for me to paragraph 78 of your 15 declaration, which is on page 46 of the PDF if it gets 16 you there faster. 17 A. Okay. 18 Q. So I'd like to ask you about the materials 19 you've considered in forming your opinions. 20 In paragraph 78, do you see the third sentence 21 that starts with the word "additionally"? 22 A. Yes. 23 Q. In that sentence you wrote, (as read): 24 Additionally, in preparing this 25 Declaration, I have relied upon	Page 15 1 Q. Okay. In the first sentence you wrote (as 2 read): 3 As discussed below, I have reviewed 4 the challenged claims of the '533 5 Patent and the related '484 Patent 6 that were the subject of the IPR 7 proceedings and certain materials 8 from those proceedings. 9 Do you see that? 10 A. I do. 11 Q. When you say "certain materials from those 12 proceedings," that means that you did not consider all 13 of the materials from those proceedings, correct? 14 A. I'm not sure, to be honest. There might have 15 been a lot of materials that came out of those 16 proceedings, and I'm not sure if I looked at all of 17 them. 18 Q. Well, when you wrote "certain materials from 19 those proceedings," what did you mean by that? 20 A. Well, that's exactly what I mean. Certain 21 materials. I -- I don't know if all of the materials 22 were provided to me, so I was just being cautious in my 23 writing. 24 Q. So would it be fair to say that the materials 25 from those proceedings that you did consider would be
Page 14 1 '790 Patent and its file history, 2 the exhibits cited to below, and 3 the additional exhibits listed at 4 the beginning of this Declaration. 5 Do you see that? 6 A. I do. 7 Q. Okay. So in forming your opinions, you 8 considered the exhibits cited in the body of the 9 declaration below paragraph 78 and a list of exhibits at 10 the beginning of the declaration, right? 11 A. That's what I wrote, yes. 12 Q. Okay. Now, if you could turn to page -- it's 13 Roman numeral V, which is page 6 of the PDF. 14 A. Okay. 15 Q. And do you see where it says "Table of 16 Exhibits"? 17 A. I do. 18 Q. This is the list of exhibits that you had 19 referenced in paragraph 78 as exhibits you had 20 considered, correct? 21 A. That's right. 22 Q. If you can turn now to paragraph 77 of your 23 Declaration. Let me know when you're there. It's 24 page 46 of the PDF. 25 A. I see that.	Page 16 1 either cited in the body of the declaration or listed in 2 the list of exhibits we just looked at starting on page 3 Roman numeral V; is that fair? 4 MR. SCHARN: Objection. Form. 5 THE WITNESS: That's likely fair with the 6 exception of, you know, if there was an unintentional, 7 you know, uncited document or typo or something like 8 this. 9 BY MR. CHRISTOPHER: 10 Q. And scroll up for me to paragraph 75. It's on 11 the prior page. Let me know when you're there. 12 A. Okay. 13 Q. And in paragraph 75, you refer to a prior IPR 14 concerning the related '533 Patent, correct? 15 A. Yes. 16 Q. And is it your understanding that this prior 17 IPR petition was filed by Apple? 18 A. I believe so, yes. 19 Q. And you've reviewed the prior IPR petition for 20 the '533 Patent, correct? 21 A. That's right. 22 Q. And are you aware that the petitioner, Apple 23 in that proceeding, submitted a declaration from a 24 Dr. Brian Anthony in support of its petition? 25 A. That sounds familiar, yes.

Page 17 1 Q. Did you review Dr. Anthony's declaration for 2 the '533 Patent in the Apple IPR in forming your 3 opinions? 4 A. I believe I did. 5 Q. Okay. I'll represent to you it's not on the 6 list of exhibits from the proceeding, but it's your 7 testimony that you did review Dr. Anthony's declaration 8 for the '533 Patent? 9 A. I believe I did. It sounds very familiar. 10 You know, there -- there were many patents that -- that 11 I looked at in this matter, so I can't fully remember 12 all of the specific details of every document that I 13 reviewed. 14 Q. If you could scroll down to the next 15 paragraph, you -- you may predict where I'm going with 16 this. 17 In paragraph 76, you discuss a prior IPR 18 decision concerning the related '484 Patent, correct? 19 A. I do. 20 Q. And you understand that Apple was also the 21 petitioner in that proceeding, correct? 22 A. That sounds correct. 23 Q. And you're aware that Apple had submitted a 24 declaration from the same Dr. Anthony in support of that 25 IPR petition for the '484?	Page 19 1 A. I do. 2 Q. What's the basis for your understanding that 3 the Federal Circuit affirmed a decision that Omni did 4 not appeal? 5 A. So this is a legal conclusion. I'm not a 6 legal expert. I'm a technical expert. And so this was 7 through discussions with counsel. 8 Q. Okay. So the information in that sentence 9 would have been given to you by counsel; is that 10 correct? 11 A. Yeah, that's right. 12 Q. Can you turn to paragraph 78. And the portion 13 I'd like to ask you about is at the top of page 38. Let 14 me know when you're there. 15 A. Okay. 16 Q. In the very last sentence of paragraph 78, you 17 wrote (as read): 18 I have previously provided my 19 opinions in support of Petitioner's 20 requests for inter partes review of 21 the '533 Patent and two of its 22 child patents: U.S. Patent Nos. 23 11,160,455 (the '455 Patent) and 24 U.S. Patent No. 10,874,304 (the 25 '304 Patent.)
Page 18 1 A. Right. 2 Q. So did you review Dr. Anthony's declaration 3 for the '484 Patent in forming your opinions? 4 A. I believe I did. But my memory is a little 5 fuzzy. 6 Q. All right. If you could scroll down, I want 7 to ask you about a sentence in paragraph 76. It's on 8 the next page. 9 Do you see the sentence that reads, (as read): 10 I understand that Omni did not 11 cross-appeal as to the claims that 12 had been held unpatentable and that 13 the Federal Circuit therefore 14 affirmed the unpatentability of 15 those claims. 16 Do you see that sentence? 17 A. I do. 18 Q. And you state there that it's your 19 understanding that the Federal Circuit affirmed the 20 unpatentability of those claims. 21 Do you see that? 22 A. I do. 23 Q. And you also state that Omni did not 24 cross-appeal as to those claims in that sentence. 25 Do you see that?	Page 20 1 Do you see that? 2 A. I do. 3 Q. Are you aware that Samsung and other entities 4 have also filed IPR petitions challenging those patents? 5 A. I am. 6 Q. Have you reviewed any of the materials from 7 the Samsung IPRs challenging the '533, '455, and '304 8 Patents? 9 A. I don't recall if I did. 10 Q. Go to paragraph 72 of your declaration. 11 Excuse me. 73. 12 A. Okay. 13 Q. Page 44 of the PDF. 14 In the second sentence you state that the '970 15 Patent claims priority to certain provisional patent 16 applications filed on December 31st, 2012. 17 Do you see that? 18 A. I do. 19 Q. And did you review each of the provisional 20 patent applications to which the '970 Patent claims 21 priority when forming your opinions? 22 A. I did. 23 Q. Okay. But you haven't offered any opinions in 24 your declaration as to whether the provisional 25 applications provide adequate written description

Page 21 1 support for claim 7 of the '970 Patent, correct? 2 A. That's not something that I opined on here. 3 Q. You don't have any opinions on whether the 4 provisional applications provide adequate written 5 description in support for claim 7, correct? 6 A. No, I haven't done that analysis. 7 Q. Paragraph 50 of your declaration. 8 A. Okay. 9 Q. Okay. So starting on paragraph 50, under the 10 header "Technology Background," and continuing, it looks 11 like, through paragraph 67, you provide a technology 12 background related to the '970 Patent, correct? 13 A. That's right. 14 Q. Now, the technology background that you 15 provide in your declaration was adapted from Apple's IPR 16 petitions for the '484 and '533 Patents, correct? 17 MR. SCHARN: Objection. Foundation. 18 THE WITNESS: I wouldn't say that, no. 19 BY MR. CHRISTOPHER: 20 Q. Did you independently create this technology 21 background section in your declaration? 22 A. Yes, I did. Of course I reviewed those 23 documents you cited. But I, you know, wrote this 24 section. And, in fact, I included new materials and 25 figures that were not present, including citations to my	Page 23 1 was just using this figure just as a description prior 2 to the priority date of this patent that not only were 3 some of the concepts, or all of the concepts present in 4 the patent in the published literature, but I personally 5 had written about them. That's all I was trying to 6 convey with this paragraph and figure. 7 Q. Let's talk about claim construction. You're 8 generally familiar with what claim construction is, 9 correct? 10 A. Yes. 11 Q. Okay. You don't offer any opinions on claim 12 construction in your declaration, correct? 13 MR. SCHARN: Objection. Form. 14 THE WITNESS: I don't offer any specific 15 constructions. 16 BY MR. CHRISTOPHER: 17 Q. Can you turn to paragraph 196 of your 18 declaration. You're going to have to scroll a little 19 further this time. This is on page 145 of your PDF. 20 A. Yes. Okay. I'm here. 21 Q. All right. In paragraph 196 you state, (as 22 read): 23 I understand that the Board 24 previously construed 'identify an 25 object' to mean 'to recognize or
Page 22 1 own Ph.D. thesis and a figure that I created for that 2 thesis within this section, for example. 3 Q. So you mentioned new materials but you do cite 4 the same exact materials that Apple had relied on in its 5 technology background in its IPR petitions, correct? 6 MR. SCHARN: Objection. Foundation. 7 THE WITNESS: I do cite some of the same 8 material. But again, I read that material 9 independently. In fact, I was aware of much of this 10 material prior to being retained for this case. I read 11 it. It's a good review of the technology in this case. 12 And so I decided to cite some of the same materials. 13 BY MR. CHRISTOPHER: 14 Q. You mentioned your Ph.D. thesis, which I 15 believe you reference in paragraph 66. If you could 16 scroll there. Let me know when you're there. 17 A. Yes. 18 Q. All right. Paragraph 66, you provide it looks 19 like an image or a figure from your Ph.D. thesis. 20 Do you see that? 21 A. I do. 22 Q. Why didn't you include a copy of the thesis as 23 an exhibit with the declaration? 24 A. I'm not sure. I could have, I suppose. It's 25 a public document that's searchable online. It's -- I	Page 24 1 establish an object as being a 2 particular thing,' a construction 3 affirmed by the Federal Circuit. 4 Do you see that? 5 A. I do. 6 Q. And you applied that claim construction in 7 your analysis of claim 7, correct? 8 A. That's right. 9 Q. And you haven't offered any opinions 10 disagreeing with the Board's claim construction for 11 identifying an object, correct? 12 A. That's correct. 13 Q. What does it mean to a person of ordinary 14 skill in the art to recognize or establish an object as 15 being a particular thing? 16 MR. SCHARN: Objection. Form. 17 THE WITNESS: Well, exactly as it's stated. 18 It's some process or device or system that recognizes or 19 establishes an object as being a particular thing. 20 BY MR. CHRISTOPHER: 21 Q. You haven't attempted to provide a definition 22 for what "recognize" or "establish" means in the claim 23 construction, correct? 24 A. I have not. 25 Q. Now, you cite here in paragraph 196 the

Page 25 1 Board's prior decision in which it issued this claim 2 construction, Exhibit 1011, correct? 3 A. Yeah, I also cite Exhibit 1012 here. 4 Q. I'll represent for you Exhibit 1012, that's 5 the Federal Circuit decision that you -- that you 6 reference there. 7 A. Okay. 8 Q. So first question, did you review the entirety 9 of the Board's decision in which it issued its claim 10 construction for this phrase, "identifying an object"? 11 A. Yes, I -- I skimmed the whole thing. 12 Q. Now, you understand that in the Board's 13 decision in which it issued its claim construction, it 14 found that the phrase "to identify an object" has a 15 different meaning than the phrase "to detect an object," 16 correct? 17 MR. SCHARN: Objection. Foundation. 18 THE WITNESS: That sounds familiar but I'd 19 have to see the exhibit to confirm. 20 BY MR. CHRISTOPHER: 21 Q. What's the difference between the phrase 22 "identify an object" and "detect an object" under the 23 Board's claim construction? 24 MR. SCHARN: Objection. Form. Legal 25 conclusion.	Page 27 1 declaration? 2 A. That's right. 3 Q. So I'd like to spend a little time talking 4 about Lisogurski. 5 If you could turn for me to column 3, starting 6 at line 61 of Lisogurski. 7 A. Okay. 8 Q. All right. Do you see the sentence that 9 reads, (as read): 10 An oximeter is a medical device 11 that may determine the oxygen 12 saturation of an analyzed tissue? 13 A. I see that. 14 Q. And the next sentence reads, (as read): 15 One common type of oximeter is a 16 pulse oximeter which may 17 non-invasively measure the oxygen 18 saturation of a patient's blood. 19 Do you see that? 20 A. I do. 21 Q. So a pulse oximeter measures the ratio of 22 oxygenated and deoxygenated hemoglobin in order to 23 determine oxygen saturation of a patient's blood, 24 correct? 25 MR. SCHARN: Objection. Form.
Page 26 1 THE WITNESS: I didn't do that analysis. 2 BY MR. CHRISTOPHER: 3 Q. But you considered the Board's decision in 4 which it differentiated identifying an object from 5 detecting an object, correct? 6 A. I looked at the Board's decision, that's 7 right. 8 Q. And you don't discuss in your declaration the 9 difference between identifying an object and detecting 10 an object, correct? 11 A. No. I was just simply applying the 12 construction offered by or affirmed by the Federal 13 Circuit, and I applied it as a POSITA would in my 14 analysis. 15 Q. Introduce a new -- it's not a new exhibit, but 16 for us today, it's new. I'll show you what has been 17 previously submitted as Exhibit 1027 in the proceeding. 18 (Previously marked Exhibit 1027 was 19 shown to the witness.) 20 BY MR. CHRISTOPHER: 21 Q. Let me know when you have that PDF open, 22 please. 23 A. Sorry. Just getting this opened here. Okay. 24 Q. No problem. Do you recognize Exhibit 1027 as 25 the Lisogurski reference that you've opined on in your	Page 28 1 THE WITNESS: Well, it's a little bit more 2 complicated than that, but generally that's -- that's 3 fair. 4 BY MR. CHRISTOPHER: 5 Q. Okay. If you could turn to column 4, line 6? 6 A. Okay. 7 Q. Starting at column 6, Lisogurski states, (as 8 read): 9 An oximeter may include a light 10 sensor that is placed at a site on 11 a patient, typically a fingertip, 12 toe, forehead, or earlobe; or in 13 the case of a neonate, across a 14 foot. 15 Do you see that? 16 A. I do. 17 Q. Then it says, (as read): 18 The oximeter may use a light source 19 to pass light through 20 blood-perfused tissue and 21 photoelectrically sense the 22 absorption of the light in the 23 tissue. 24 Do you see that sentence? 25 A. Yes.

Page 29 1 Q. And so Lisogurski is explaining that one way 2 an oximeter can operate is to pass light through tissue 3 and detect the light on the other side. Correct? 4 A. I'm not sure it's strictly limited to 5 pass-through only in this passage here. That is one 6 possibility. Reflective-based sensors are also a 7 possibility. 8 Q. Right. Understood. I'm trying to get at 9 both -- both options. So one option for pulse oximetry, 10 but not necessarily the only option, would be to pass 11 light through the tissue and detect it on the other 12 side, right? 13 A. That's one option. That's right. 14 Q. The other option would be you would direct 15 light at the tissue and detect light that reflects back 16 off the tissue, correct? 17 A. That's correct. 18 Q. Is that sometimes called reflectance mode? 19 A. Yes, it is. 20 Q. And the other option, is that sometimes called 21 transmissive mode? 22 A. That's correct. 23 Q. Is it okay if we use that terminology today so 24 we're on the same page? 25 A. That sounds fine to me.	Page 31 1 saturation, correct? 2 MR. SCHARN: Objection. Form. 3 THE WITNESS: Well, it uses known absorption 4 characteristics -- characteristics of oxygenated 5 hemoglobin which are different from deoxygenated 6 hemoglobin as part of its mechanism to compute blood 7 oxygenation. 8 BY MR. CHRISTOPHER: 9 Q. So in order to estimate oxygen saturation in 10 blood, an oximeter doesn't need to identify whether 11 hemoglobin is present in the blood being measured, 12 correct? 13 MR. SCHARN: Objection. Form. 14 THE WITNESS: Well, it does. If there's no 15 hemoglobin, whether oxygenated or deoxygenated in the 16 blood, the measurements will produce nonsense. 17 BY MR. CHRISTOPHER: 18 Q. Well, if there was no hemoglobin in the blood, 19 you would still get a measurement, but in your words, 20 the measurement would be nonsense; is that right? 21 MR. SCHARN: Objection. Form. 22 THE WITNESS: Yeah, the -- the device wouldn't 23 know how to do the -- the computation because the 24 results wouldn't -- wouldn't make any sense. And 25 there's likely some sort of check to make sure the
Page 30 1 Q. Okay. Can you turn to column 4, same column 2 you're in, but further down starting at line 45? 3 A. Okay. 4 Q. Starting at line 45, Lisogurski reads, (as 5 read): 6 Red and infrared (IR) wavelengths 7 may be used because it has been 8 observed that highly oxygenated 9 blood will absorb relatively less 10 red light and more IR light than 11 blood with a lower oxygen 12 saturation. 13 Do you see that? 14 A. I do. 15 Q. So the fact that highly oxygenated blood 16 absorbs less red light and more IR light than blood with 17 a lower oxygen saturation, that's a known characteristic 18 of hemoglobin, correct? 19 MR. SCHARN: Objection. Form. 20 THE WITNESS: Well, it's known that oxygenated 21 hemoglobin absorbs light differently than deoxygenated 22 hemoglobin. 23 BY MR. CHRISTOPHER: 24 Q. In other words, oximetry uses known absorption 25 characteristics of hemoglobin to estimate oxygen	Page 32 1 results are making sense. 2 BY MR. CHRISTOPHER: 3 Q. When you refer to the computation, what are 4 you referring to? 5 A. Well, I'm referring to you -- you perform the 6 measurements with the different wavelengths of light, 7 and then there's, you know, some computation that occurs 8 to -- to produce a value representative of the blood 9 oxygen saturation. 10 Q. Let's talk about some of the figures in 11 Lisogurski. Could you flip to Figure 1 of Lisogurski? 12 A. Sure. 13 Q. Let me know when you're there. 14 A. Okay. 15 Q. Figure 1 is a block diagram for system 100, 16 correct? 17 A. That's right. 18 Q. And reference number 102 represents a sensor, 19 correct? 20 A. I don't recall exactly what the patent 21 specifies it to be. If you like, I can go and look what 22 they specifically call 102. 23 Q. Let's see. I'll direct you to there. One 24 moment. If you could turn to column 10 of Lisogurski at 25 line 44?

Page 33 1 A. Okay. I see that. 2 Q. All right. So line 44 it says "System 100 may 3 include a sensor 102 and a monitor 104." 4 Do you see that? 5 A. I do. 6 Q. All right. So if we go back to Figure 1, 102, 7 the box 102 is a sensor, correct? 8 A. Yes. That's what the Lisogurski calls it, 9 anyways. 10 Q. And the sensor is worn by a patient or a 11 subject, correct? 12 A. Yes, that's its -- its intended use. 13 Q. And in Figure 1, the sensor 102 includes a 14 light source 130 and a detector 140, correct? 15 A. That's right. 16 Q. Now, reference number 104, as we just saw at 17 column 10, line 44, is a monitor, correct? 18 A. Yes, that's what Lisogurski calls it. 19 Q. And the monitor 104 includes light drive 20 circuitry 120. 21 Do you see that? 22 A. I do. 23 Q. What would a person skilled in the art 24 understand to be the function of the light drive 25 circuitry 120?	Page 35 1 included in the light source. 2 Q. Could you explain what you mean by "circuitry 3 included in the light source"? 4 A. Sure. So this is a pretty high-level block 5 diagram. This is not a, you know, circuit schematic 6 level diagram here. And a POSITA understands that, you 7 know, sometimes the boundaries between blocks and a 8 block diagram can be blurred a little bit, depending on 9 if you want to include more functionality in one block 10 versus another block. 11 So if the light source 130 had a wireless 12 transceiver or an optical receiver or, you know, an 13 NFC-style circuit, perhaps it could have a wireless 14 connection to the light drive circuitry, or it could be 15 wired. It kind of depends on the exact implementation 16 details. 17 Q. Now, the light source 130 in Lisogurski could 18 include multiple LEDs, correct? 19 A. That's right. 20 Q. In a case where the light source includes 21 multiple LEDs, would a separate light drive circuit be 22 required for each LED? 23 A. Not necessarily. There could be a single 24 light drive circuit with a multiplexer at the output 25 that would select one of -- one or more of the light
Page 34 1 A. Well, the light drive circuitry is -- is some 2 sort of circuit that -- that is used to drive operation 3 of the light source. 4 Q. The light drive circuitry provides a signal 5 for the light source; is that -- is that right? 6 A. That's fair. It tells the light source to 7 turn on and with a certain amplitude, for example. 8 Q. Now, is that signal from the light drive 9 circuitry an analog signal or a digital signal? 10 A. That actually depends on the implementation. 11 If the light source is being driven with a square 12 wavelike signal, that could be considered digital. Some 13 people might consider that analog because it's hitting, 14 you know, a light source like an LED. That, you know, 15 can change the amplitude of -- of that square wave if a 16 square wave drive is used. 17 So, you know, an exact nomenclature here isn't 18 strictly appropriate. To be safe, I would perhaps call 19 it an analog signal, but someone could call it a digital 20 signal as well. 21 Q. Would a person skilled in the art understand 22 that the light drive circuitry 120 could send the 23 signals you've described to the light source 130 24 wirelessly? 25 A. That would depend on what kind of circuitry is	Page 36 1 sources at a time. A POSITA could instead choose to 2 design parallel light drive circuitries that are 3 operated independently. You know, those choices are 4 certainly available to a POSITA. 5 Q. Now, in Figure 1, the monitor 104 also 6 includes a front-end processing circuitry 150, correct? 7 A. That's right. 8 Q. And the front-end processing circuitry 9 communicates with the detector 140 in the sensor 102, 10 correct? 11 A. As drawn in Figure 1, that's right. 12 Q. Would a person skilled in the art understand 13 that the front-end processing circuitry includes a 14 processor? 15 A. It depends on the definition of the word 16 "processor." I will note that the back-end processing 17 circuitry 170 includes an explicit processor 172. But 18 the front-end processing circuitry 150 includes features 19 like decimator, interpolator, digital conditioner, dark 20 subtractor, and so on. And these may be implemented in 21 a form of a processor. So I suppose the answer is it 22 could be. 23 Q. Let's talk about the dark subtractor 162. Is 24 it possible to implement the dark subtractor 162 in the 25 front-end processing circuitry 150 without a processor?

Page 37 1 A. Yes. It could be done -- well, actually, let 2 me take a step back. 3 By "processor," do you mean digital processor? 4 Q. Sure. Let's start there. 5 A. Okay. So it's possible the dark subtraction 6 technique could be accomplished in the analog domain, 7 which I wouldn't call a digital processor. Or it's 8 possible that it could occur in the digital domain, but 9 using fixed-function digital circuits that could 10 arguably be called a processor but wouldn't be called a 11 general digital microprocessor. 12 Q. You mentioned the back-end processing 13 circuitry 170 which, as shown in Figure 1, includes a 14 processor 172 and a memory 174, correct? 15 A. That's right. 16 Q. If you turn to Lisogurski -- well, before we 17 do that, at least in Figure 1 of Lisogurski, the 18 back-end processing circuitry is shown as being in 19 communication with the front-end processing circuitry, 20 correct? 21 A. There's a line connecting the two. So yeah, 22 they're communicatively coupled somehow. 23 Q. Now, if you could turn to column 14 of 24 Lisogurski, which is page 39 of your PDF, and starting 25 at line 60. So column 14, line 60. Let me know when	Page 39 1 A. Okay. 2 Q. Do you see where it states, (as read): 3 The generated signals may be used 4 to determined physiological 5 parameters such as blood oxygen 6 saturation, hemoglobin, blood 7 pressure, pulse rate, other 8 suitable parameters or any 9 combination thereof. 10 Do you see that? 11 A. I do. 12 Q. These are examples of physiological parameters 13 that may be determined by the processor 172 in the 14 back-end processing circuitry 170, correct? 15 A. They're non-comprehensive examples, but I 16 think that's fair. 17 Q. Sure. So let's look at Figure 3 of 18 Lisogurski. Let me know when you're there. Up towards 19 the top. Page 6 of your PDF. 20 A. Okay. 21 Q. So Figure 3 is showing a different embodiment 22 than Figure 1, correct? 23 A. Yes. 24 Q. Okay. And in Figure 3, reference number 312, 25 do you see that one?
Page 38 1 you're there. 2 A. Okay. 3 Q. At column 14, line 60, Lisogurski states, (as 4 read): 5 Processor 172 may receive and 6 process physiological signals 7 received from front-end processing 8 circuitry 150. For example, 9 processor 172 may determine one or 10 more physiological parameters based 11 on the received physiological 12 signals. 13 Do you see that? 14 A. I do. 15 Q. So Lisogurski is teaching that the processor 16 172 in the back-end processing circuitry 170 receives 17 physiological signals from the front-end processing 18 circuitry 150? 19 A. That's what it says. 20 Q. And based on those physiological signals, the 21 processor 172 may determine one or more physiological 22 parameters, correct? 23 A. Yes, that's what it says. 24 Q. Now, let's go to column 1 of Lisogurski, 25 line 22.	Page 40 1 A. I do. 2 Q. That's pointing to a sensor unit, correct? 3 A. Again, I'd have to go back and -- and look at 4 the actual description here in Lisogurski. 5 Q. Well, go to column 17, line 35, page 41 of the 6 PDF. 7 A. Okay. 8 Q. So at line 35 Lisogurski states -- again, this 9 is column 17 -- "System 310 may include sensor unit 312 10 and monitor 314." 11 Do you see that? 12 A. I see that. 13 Q. All right. So let's go back to Figure 3. And 14 in the embodiment shown in Figure 3, the sensory unit 15 312 is connected to the monitor 314 with a wired 16 connection. Correct? 17 A. That's what's shown in Figure 3, right. 18 Q. Column 9 of Lisogurski, line 50 -- 19 A. Excuse me. Line what? 20 Q. 50. Five, zero. 21 A. 50, okay. 22 Q. So in that sentence, Lisogurski states (as 23 read): 24 The system may increase the 25 brightness of the light sources in

Page 41 1 response to the noise to improve 2 the signal-to-noise ratio. 3 Do you see that? 4 A. I do. 5 Q. Okay. And Lisogurski is directed to 6 increasing -- strike that. 7 Lisogurski is directed to techniques for 8 increasing the signal-to-noise ratio, correct? 9 MR. SCHARN: Objection. Form. 10 THE WITNESS: Well, I would say that 11 Lisogurski does describe in the specification techniques 12 that can be used to improve the signal-to-noise ratio of 13 the system. 14 BY MR. CHRISTOPHER: 15 Q. And Lisogurski teaches that there are multiple 16 potential sources of noise with respect to the signal, 17 correct? 18 A. I believe so. Though I'd have to check to 19 make sure where that's stated and how. 20 Q. Well, starting at -- let's take line 57 there 21 in column 9. Lisogurski is teaching that one form of 22 noise is motion, correct? Patient motion? 23 MR. SCHARN: Objection. Form. 24 THE WITNESS: Well, that's not quite what 25 Lisogurski says. Lisogurski says in -- in that line	Page 43 1 a safe way to say that. 2 Q. Got it. So if we look back at Figure 1 of 3 Lisogurski, for example, if I understand you correctly, 4 for example, the front-end processing circuitry 150 5 would be a source of noise, correct? 6 A. A source of noise where? 7 Q. Well, let me state it differently. In 8 operation, the front-end processing circuitry 150 would 9 generate noise, correct? 10 A. Well, all electronic circuits generate noise 11 and so that's, you know, always a safe thing to say. 12 However, saying that front-end processing circuitry 13 would generate noise that injects itself into the 14 detector would largely be incorrect regardless of the 15 location of the front-end processing circuitry provided 16 that it was designed by a person of ordinary skill in 17 the art. 18 Q. Well, in Figure 1, the front-end processing 19 circuitry is in the monitor 104, which is separate from 20 the sensor unit 102, correct? 21 A. Yes. As described in Figure 1, which is just 22 one embodiment, but that doesn't preclude a POSITA from 23 moving the front-end processing circuitry 150 into 24 sensor 102. In fact, Lisogurski itself describes that 25 the location of these blocks can be placed differently.
Page 42 1 it's -- it's responding to noise, patient motion, or 2 ambient light. So it qualifies patient motion as 3 ambient light as things that are different from noise, 4 in that sentence anyways. 5 BY MR. CHRISTOPHER: 6 Q. Okay. What forms of noise -- strike that. 7 So putting aside patient motion and ambient 8 light, what other types of noise would impact the signal 9 in Lisogurski? 10 A. Well, all electronic components suffer from 11 noise. This is a fundamental mechanism of the operation 12 of the electronics due to thermal fluctuations of 13 electrons and charge carriers. And so that's the -- the 14 most basic type of noise, and that would be a stochastic 15 process that is not predictable in advance. 16 That noise can take several different forms, 17 including thermal or shot noise, 1/f or flicker noise, 18 and so on. Those are the main forms of electronic 19 noise. 20 Q. You mentioned thermal noise. Is heat another 21 form of noise? 22 A. Not directly. No. I mean, heat -- let's see 23 how to say this at a understandable level. Heat is 24 responsible for changing the amount of noise that would 25 be present in electronic circuit. Yeah, I think that's	Page 44 1 And my knowledge of the prior art, including commercial 2 products that were released prior to the priority date 3 of this patent, successfully did put front-end 4 processing circuitry and back-end processing circuitry 5 into a single wearable sensor module. 6 Q. I'm going to move to strike that answer as 7 nonresponsive. 8 Let's look at -- let's look at Figure 2A in 9 Lisogurski. I will scroll there myself. This would be 10 page 4 of the PDF. 11 A. Okay. 12 Q. Now, just at a high level, Lisogurski 13 describes a technique for subtracting out ambient light 14 from the detection signal, correct? 15 A. That's correct. 16 Q. And in Figure 2A, we see on the Y axis a light 17 drive signal, right? 18 A. Right. 19 Q. And on the X axis, we have time, right? 20 A. Right. 21 Q. So in this figure, reference number 202, that 22 represents an on period, correct? 23 A. Yes. An on period for one of the light 24 signals. 25 Q. Red light, just to save some time, I'll

Page 45 1 represent to you. It's 202 is red light, 204 is IR 2 light. And then we see reference number 220 where the 3 light drive signal is zero. 4 Do you see that? 5 A. I do. 6 Q. And that would be a time period where the 7 light is off, correct? 8 A. Right. Both lights are off in that time 9 period. 10 Q. Right. And then if we look at Figure 2B, here 11 we have the detector current on the Y axis and time on 12 the X axis, right? 13 A. That's right. 14 Q. And so reference number 214 is pointing to the 15 detector current when the light is on, correct? 16 A. When one of the light sources is on, that's 17 right. 18 Q. Sure. And then reference number 222 is 19 pointing to the time period in which the light is off 20 and yet we have a non-zero detector current, correct? 21 A. That's correct. 22 Q. And the detector current we see at reference 23 number 222 would be due to ambient light, correct? 24 A. In part, yes. Ambient light could seep 25 through and -- and create a certain offset. There could	Page 47 1 room, and so on, you can perfectly predict how much 2 ambient light will enter; whereas, noise is meant to be 3 purely stochastic and is unpredictable. So I would not 4 call ambient light noise technically, although I 5 understand some people do say that. 6 Does that make sense? 7 BY MR. CHRISTOPHER: 8 Q. Yes. So if you don't call ambient light 9 noise, if I had a technique for eliminating ambient 10 light from my signal, would that elimination increase 11 the signal-to-noise ratio of the signal? 12 MR. SCHARN: Objection. Form. 13 THE WITNESS: Depends, again, on -- on how 14 we're using the word "noise." Again, this is something 15 that is frankly not very consistently used in the 16 literature. Generally, in the literature, a dark 17 subtraction technique is said to improve the 18 signal-to-noise ratio of the circuit -- or of the 19 signal, rather. 20 BY MR. CHRISTOPHER: 21 Q. But if I use your definition where ambient 22 light is not noise, eliminating ambient light is not 23 going to increase the signal-to-noise ratio, right? 24 MR. SCHARN: Objection. Form. 25 THE WITNESS: Well, it still could. So it
Page 46 1 be offset voltages present in the electronics as well. 2 And of course, there's noise that's riding on top of 3 this circuit. But I think ambient light would be a big 4 contributor to this non-zero value. 5 Q. So more generally, the detector current we see 6 at 222 when the light is off, both lights are off, is 7 due to noise, correct? 8 A. No, I wouldn't say it that way. But now we 9 have to be a little bit careful. The language in the 10 literature is -- sometimes mixes ambient light with 11 noise. From strictly speaking, noise is from electronic 12 noise that's purely stochastic. Ambient light is 13 technically, you know, measurable and predictable under 14 the right circumstances. So I wouldn't call it noise, 15 although some people do call it noise. So I think it 16 would be more correct to say the non-zero output during 17 region 222 is due primarily to ambient light. 18 Q. So if I understand you correctly, ambient 19 light would not be considered a form of noise; is that 20 right? 21 MR. SCHARN: Form. 22 THE WITNESS: Again, some people might call it 23 that, but theoretically, ambient light is perfectly 24 predictable. If you know the gap between the sensor and 25 the tissue, for example, and the light value in the	Page 48 1 depends on the type of noise that's present here. If 2 there's flicker noise, for example, this sort of 3 technique would, in fact, reduce that flicker noise. 4 And then, of course, by subtracting the dark signal, we 5 allow for higher dynamic range to be present in -- in 6 the circuit. So we can amplify things a little bit 7 more, have a little bit more amplitude, and so on. And 8 so that -- those two things combined does increase the 9 signal-to-noise ratio, even under my very strict 10 definition. 11 But under a more loose definition where 12 ambient light is considered noise, clearly the 13 signal-to-noise ratio would increase as well. 14 BY MR. CHRISTOPHER: 15 Q. Let's take a step back. 16 Would you agree that a person of skill in the 17 art would generally be motivated to increase the 18 signal-to-noise ratio? 19 MR. SCHARN: Objection. Form. 20 THE WITNESS: Generally, a person of ordinary 21 skill is interested in increasing signal-to-noise ratios 22 for signals they care about, yes. 23 BY MR. CHRISTOPHER: 24 Q. Person of skill in the art wouldn't want to 25 make a modification that reduces the signal-to-noise

Page 49 1 ratio, would they? 2 A. Not generally. 3 Q. Now, let's go back to Figure 1 of Lisogurski, 4 and we'll take a break here in about one minute, but 5 let's finish this. Let's go back to Figure 1 of 6 Lisogurski. Let me know when you're there. 7 A. Yes. 8 Q. Now, we talked about this earlier. Do you see 9 the dark subtractor 162? 10 A. I do. 11 Q. The dark subtractor 162 is the component that 12 subtracts the dark signal from the peak signal we were 13 just looking at in Figure 2B, correct? 14 A. That's right. 15 MR. CHRISTOPHER: All right. We've been going 16 roughly an hour. This would be a good spot to take a 17 short break. 18 Off the record. 19 (Recess taken.) 20 BY MR. CHRISTOPHER: 21 Q. Welcome back. Did you discuss your testimony 22 with anyone during our break? 23 A. I did not. 24 Q. Before the break, discussing the Lisogurski 25 reference, you turned to column 3, line 58, page 34 of	Page 51 1 is to reduce heating effects that, you know, might 2 adversely cause a reaction on the -- on the user of the 3 device. 4 Q. Now, in -- if we use Figure 1, for example, 5 the sensor 102 includes both the light source and the 6 detector. Right? 7 A. That's right. 8 Q. And wouldn't a person of skill in the art 9 understand that the heating effects caused by an emitter 10 could impact the detector that's in the same physical 11 device as the emitter? 12 MR. SCHARN: Objection. Form. 13 THE WITNESS: I suppose it's possible. Most 14 designs that I've seen don't have the light source and 15 detector right next to each other. There's some 16 physical separation between them, even if they're part 17 of the same device. I've personally never considered 18 heat from the light source adversely affecting noise on 19 the detector, for example, and I don't believe I've ever 20 seen that in the literature. 21 BY MR. CHRISTOPHER: 22 Q. Well, let me ask you generally. For what 23 reason or reasons is reducing the heating effects caused 24 by the emitter desirable? 25 A. Well, in electronics it's never desired to
Page 50 1 your PDF. 2 A. What line did you say? I'm sorry. 3 Q. So column 3, line 58. 4 A. 58, okay. 5 Q. Toward the bottom on the left-hand side 6 starting at line 58 in column 3, Lisogurski states (as 7 read): 8 It may also be desirable to reduce 9 the power consumption by the light 10 drive signal to reduce heating 11 effects caused by an emitter. 12 Do you see that? 13 A. I do. 14 Q. And so Lisogurski teaches that it's desirable 15 to reduce the heating effects caused by an emitter. 16 Correct? 17 A. Yes, that's what Lisogurski says. I think 18 reducing power and heat is always desirable. 19 Q. And the reason it's desirable to reduce the 20 heating effects caused by emitter is because the heating 21 effects affect the signal-to-noise ratio, correct? 22 A. Not necessarily. The heating effects here are 23 specifically cited to be from the emitter, which is not 24 part of the noise-limited signal processing chain. And 25 so if -- my understanding of this passage in Lisogurski	Page 52 1 heat unless, of course, there's a specific reason to do 2 so. If the device is battery-powered as an example, 3 heat is loss and impacts the battery life. And so what 4 Lisogurski is -- is talking about here is reducing the 5 power consumption, which would improve battery life. 6 Interestingly, reducing the power consumption by 7 reducing the amount of light output will actually reduce 8 the signal level and -- and, you know, so that's 9 something that a POSITA would need to take into account 10 when choosing to do this. 11 Q. What do you mean by reduce the signal level? 12 A. Well, the way to reduce power consumption of a 13 light drive signal is to reduce the amount of light 14 that's emitted. And that will, all other things 15 considered, reduce the signal that's received. 16 Q. Are you talking about the signal from the 17 light drive circuitry or the signal from the detector? 18 A. Well, I guess they're coupled in a way. The 19 way to reduce the power consumption of the -- of the 20 light source of the emitter is to reduce the amount of 21 light it emits. And if you reduce the amount of light 22 it emits, then there will be less signal emitted by the 23 emitter, and all other things considered -- or all other 24 things equal, rather, will reduce the signal received by 25 the detector.

Page 53 1 Q. Reduce the signal received by the detector. 2 Wouldn't that reduce the signal-to-noise ratio? 3 A. It would, yes. And so that's why in the 4 sentence above, Lisogurski talks about decreasing 5 brightness during a particular portion of the cardiac 6 cycle where perhaps having a high signal is not as 7 strictly necessary under the current conditions, for 8 example. 9 Q. All right. I'm going to insert into the chat 10 Exhibit 1001, the '970 Patent. Let me know when you 11 have that open, please. 12 (Previously marked Exhibit 1001 was 13 shown to the witness.) 14 THE WITNESS: Okay. 15 BY MR. CHRISTOPHER: 16 Q. Do you recognize Exhibit 1001 as the '970 17 Patent that you've opined on? 18 A. I do. 19 Q. Okay. You reviewed the '970 Patent in its 20 entirety when forming your opinions? 21 A. I did. 22 Q. Okay. And if you could turn to claim 7, this 23 is all the way down at column 86. Let me know when 24 you're there. 25 A. Yeah, just give me a moment. It's a long --	Page 55 1 or more lenses configured to 2 receive at least a portion of the 3 output optical light and to deliver 4 a lens output light to tissue 5 comprising skin. 6 Do you see that? 7 A. I do. 8 Q. So this limitation recites that the one or 9 more lenses are configured to receive at least a portion 10 of the output optical light. 11 Do you see that? 12 A. Yes. 13 Q. The term "output optical light" in this clause 14 that we're looking at refers back to the output optical 15 light recited earlier that was generated by the 16 plurality of semiconductor diodes, correct? 17 A. Yes. 18 Q. Now, if you could turn to paragraph -- you 19 could put the '970 Patent aside. 20 If you could turn to paragraph 139 of your 21 declaration. If I beat you there, I'll give you the 22 page number. 23 MR. SCHARN: We're at 85 of the PDF. 24 MR. CHRISTOPHER: Thank you. 25
Page 54 1 long file. 2 Q. I understand. It's a big -- it's a big PDF. 3 No worries. It's actually second-to-last page of the 4 PDF, 146. 5 A. Yeah, I'm here now. Thank you. 6 Q. All right. So bottom right-hand corner, 7 column 86, line 64 -- or line 60, you see claim 7? 8 A. I do. 9 Q. Okay. And then at line 64, column 86, claim 7 10 recites, (as read): 11 The wearable device including a 12 light source comprising a plurality 13 of semiconductor diodes that are 14 configured to generate an output 15 optical light having one or more 16 optical wavelengths. 17 Do you see that? 18 A. I do. 19 Q. And this limitation requires that the output 20 optical light is generated by the plurality of 21 semiconductor diodes, correct? 22 A. That's right. 23 Q. Now, if you go down to the next page, 24 column 87, starting at line 4, claim 7 reads, (as read): 25 The wearable device comprising one	Page 56 1 BY MR. CHRISTOPHER: 2 Q. Page 85 of the PDF. 3 A. Okay. 4 Q. In the second sentence, you state that "a 5 POSITA would have known that there are three primary 6 types of LEDs." 7 Do you see that? 8 A. I do. 9 Q. And the first type of LED is an LED without an 10 encapsulant. 11 Do you see that? 12 A. Yes. 13 Q. And the second type is in LEDs with an 14 optically inert encapsulant. 15 Do you see that? 16 A. Yes. 17 Q. What is an optically insert encapsulant? 18 A. That would be an encapsulant that doesn't 19 materially -- materially change the optical properties 20 of the light. 21 Q. What would constitute materially changing the 22 optical properties of the light? 23 A. Well, that depends on the context in -- in 24 which it's used. In the case of, for example, the '790 25 Patent, or Lisogurski, or prior art references like

Page 57 1 Carlson and so on, it would involve perhaps focusing the 2 light as one example. 3 Q. Now, the third type of LED that you list here 4 in paragraph 139, LEDs with an encapsulant functioning 5 as a lens, i.e., an optically active encapsulant. 6 Do you see that? 7 A. I do. 8 Q. What does it mean for an encapsulant to 9 function as a lens? 10 A. Well, similar to -- to what I just said. The 11 encapsulant could, for example, focus the light in a 12 more specific direction rather than omnidirectional 13 radiation of light. 14 Q. Do all optically active encapsulants function 15 as a lens? 16 MR. SCHARN: Objection. Form. 17 THE WITNESS: I'd have to consider that a 18 little bit more. Certainly some optically active 19 encapsulants would function as a lens. I'm not sure 20 about all. I'd have to consider that more carefully. 21 BY MR. CHRISTOPHER: 22 Q. Briefly going back to the second option, 23 optically insert encapsulant, an optically insert 24 encapsulant would not function as a lens, correct? 25 A. That's right.	Page 59 1 understand that. 2 Q. When you say "necessary," is it your opinion 3 that Lisogurski could not operate without an encapsulant 4 on the LED? 5 MR. SCHARN: Objection. Form. 6 THE WITNESS: No POSITA would build an optical 7 sensing system for use on tissue without an encapsulant 8 around the LED because the LED would quickly get 9 destroyed through various different mechanisms. 10 BY MR. CHRISTOPHER: 11 Q. In the very last portion of the very last 12 sentence of paragraph 139, you wrote, "as such an 13 approach would not likely operate reliably under 14 real-world use." 15 Do you see that? 16 A. I do. 17 Q. And your testimony today is that it -- that 18 such an approach would not operate under real-world use 19 at all? 20 MR. SCHARN: Objection. Form. 21 THE WITNESS: Well, I'm saying basically the 22 same thing. It's very -- very unlikely that you could 23 actually get such a system to work under real-world use 24 because an exposed LED to the environments would very 25 quickly get destroyed.
Page 58 1 Q. Now, if we scroll down, very last sentence in 2 paragraph 139, you wrote (as read): 3 Thus, it is my opinion that a 4 POSITA would have understood 5 Lisogurski teaches an LED with an 6 encapsulant that may or may not 7 function as a lens, rather than an 8 LED with no encapsulant at all, as 9 such an approach would likely -- 10 would not likely operate reliably 11 under real-world use. 12 Do you see that? 13 A. I do. 14 Q. Now, Lisogurski does not explicitly disclose 15 that an LED includes an encapsulant, correct? 16 A. I'm not sure. Lisogurski is a long patent. 17 I'd have to go back and -- and review, but as a POSITA 18 reading Lisogurski, that would be a necessary component. 19 It wouldn't make sense to put a bare LED on a device 20 that touches or gets near human tissue. 21 Q. Can we at least agree, you haven't cited any 22 explicit disclosure from Lisogurski of an encapsulant in 23 paragraph 139, correct? 24 A. I did not do that in -- in 139. But, again, I 25 think it would be necessary, and a POSITA would	Page 60 1 Could you perhaps get it to work for a, you 2 know, very short period of time? Maybe. But that's 3 just not a realistic option to a POSITA. 4 BY MR. CHRISTOPHER: 5 Q. Lisogurski also does not explicitly disclose 6 using a lens, correct? 7 A. Again, Lisogurski is long. I'd have to go 8 back and -- and look very specifically. My opinion, as 9 I recall reading Lisogurski, is that it doesn't 10 explicitly teach a lens. But a POSITA would understand 11 that a lens is a normal option that LEDs come with and 12 would be motivated to -- to use one. 13 MR. CHRISTOPHER: Introduce another exhibit in 14 our Zoom chat. This has been previously marked as 15 Exhibit 1028. 16 (Previously marked Exhibit 1028 was 17 shown to the witness.) 18 BY MR. CHRISTOPHER: 19 Q. Let me know when you have that open. 20 A. Okay. 21 Q. Do you recognize Exhibit 1028 as the Carlson 22 reference that you've opined on in your declaration? 23 A. I do. 24 Q. Let's turn back to paragraph 142 of your 25 declaration. This is page 87 of the PDF.

Page 61 1 A. Okay. 2 Q. And paragraph 142, you opine that Carlson 3 "teaches or renders obvious the use of a lens in 4 Lisogurski's system," correct? 5 A. That's right. 6 Q. Let's go back -- sorry to jump around. Let's 7 go back to Carlson, Exhibit 1028. 8 A. Okay. 9 Q. Make sure I have my copy open, which I don't. 10 All right. If you could turn to paragraph 6 of Carlson, 11 which is on PDF page 18. 12 A. Okay. 13 Q. Here Carlson states, (as read): 14 Human tissue scatters and transmits 15 light in the visible and near 16 infrared (NIR) wave light -- 17 wavelength range. Therefore, 18 suppression of environmental 19 optical radiation, e.g. sunlight, 20 is difficult by geometric means of 21 the architecture of the pulse 22 oximeter sensor. 23 Do you see that? 24 A. I do. 25 Q. Would you agree that Carlson is directed to	Page 63 1 increasing the Signal-to-Noise 2 ratio and Signal-to-Background 3 ratio. 4 Do you see that? 5 A. I do. 6 Q. And I think this is what we were discussing 7 previously. What is the difference between 8 signal-to-noise ratio and signal-to-background ratio? 9 A. Yes. This is referred or related to what we 10 were discussing previously, and I like that Carlson 11 explicitly differentiates between signal-to-noise and 12 signal-to-background ratios. Here, signal-to-background 13 ratio, "background" is referring to, you know, 14 environmental light that would be coming into the sensor 15 unintentionally, as an example. 16 Q. Understood. So when Carlson refers to a 17 signal increasing the signal-to-background ratio, that's 18 referring to, you know, eliminating the effects of 19 ambient light, for example; is that right? 20 A. That would generally be my understanding of 21 how Carlson is -- is defining this. And just for the 22 record, as I mentioned earlier, the entire literature is 23 not extremely consistent with this type of nomenclature, 24 unfortunately. 25 Q. Under -- understood. I appreciate the
Page 62 1 suppressing environmental optical radiation such as 2 sunlight? 3 A. Well, this is just one point that Carlson is 4 raising. Yes. 5 Q. And you see here in paragraph 6, Carlson 6 teaches that it is difficult to suppress environmental 7 optical radiation by geometric means. 8 Do you see that? 9 A. Yes. 10 Q. What would a person of skill in the art 11 understand Carlson to mean by geometric means of the 12 architecture? 13 A. My understanding of that is, you know, ways to 14 block the sunlight or ambient light of reaching the -- 15 the photo diodes. 16 Q. Geometric means of the architecture refers to 17 the physical arrangement of the sensor. Is that 18 correct? 19 A. That's my understanding of what Carlson is 20 saying here. 21 Q. In the right-hand column, same page, 22 paragraph 10, Carlson states, (as read): 23 It is therefore an object of the 24 present invention to define optical 25 and/or electronic means for	Page 64 1 explanation. 2 If you could turn to paragraph 14, just a few 3 down. 4 A. Okay. 5 Q. Paragraph 14 Carlson states, (as read): 6 The basic idea therefore is to use 7 a beam-shaping element such as 8 e.g., diffractive or refractive 9 lenses, to direct the emitted 10 optical radiation of e.g., the LED 11 light source into the human or 12 animal tissue and the photon 13 detecting element in order to 14 increase the optical signal power, 15 detected by the pulse oximeter 16 sensor, and thus increasing the 17 signal-to-noise and 18 signal-to-background ratio. 19 Do you see that? 20 A. I do. 21 Q. And so here, Carlson is describing using a 22 beam-shaping element to direct more of the light through 23 the tissue in order to increase the optical signal 24 power, correct? 25 A. That's right.

Page 65 1 Q. And when we increase the optical signal power, 2 that increases the amount of light that goes through the 3 tissue, correct? 4 A. That's right. 5 Q. Of course that means a corresponding increase 6 in the amount of light that is detected by the detector, 7 correct? 8 A. Yes, all other conditions being equal. 9 Q. Right. Can you turn to paragraph 53 of 10 Carlson? 11 A. Okay. 12 Q. You can -- you can read it to yourself. 13 Carlson is discussing in paragraph 53 how ambient light 14 can influence measurements, correct? 15 A. Yes, generally. 16 Q. And then in paragraph 54, Carlson teaches, (as 17 read): 18 It is proposed, as shown in 19 Figure 4, to use beam-shaping 20 optics 20 to direct the emitted 21 optical radiation 8 emitted from 22 the two LEDs 15 to the middle of 23 the earlobe. 24 Do you see that? 25 A. I do.	Page 67 1 A. Correct. As described in Carlson. 2 Q. Right. And in this embodiment in Figure 4, 3 there is one lens for each LED, correct? 4 A. In this particular embodiment, yes. Although 5 that's not strictly necessary. You could have one lens 6 to cover both LEDs. 7 Q. Right. But what's shown here is two lenses, 8 two LEDs, right? 9 A. That's what's shown here, yes. 10 Q. Now, claim 7 of the '970 Patent is directed to 11 a wearable device that's adapted to be worn on a wrist, 12 correct? 13 A. That's right. 14 Q. And if Lisogurski's system were implemented in 15 a wrist-worn device, the wrist is typically pointed away 16 from sunlight, which would help prevent the 17 environmental interference described in Carlson, 18 correct? 19 A. Not necessarily. You know, people move their 20 arms and wrists all day. And my experimental evidence 21 suggests that sunlight and other ambient light can and 22 does fluctuate during the wearing of a wrist-worn 23 optical device. 24 Q. Now, in a wrist-worn device, a person of skill 25 in the art would understand that if you increase the
Page 66 1 Q. And so if we look at Figure 4 of Carlson -- 2 this is page 5 of your PDF -- you may want to rotate it 3 clockwise. Let me know when you're there. 4 A. Yeah. Just give me a moment on this one. 5 Figure out how to rotate. 6 Q. You know, it may be easier. I think you've 7 already rotated it in your declaration. Why don't we 8 look at paragraph 143 of your declaration. Page -- this 9 is on page 91 of the PDF. 10 A. Yes. There we go. Thank you. 11 Q. So now we're looking at Figure 4 of Carlson, 12 correct? 13 A. Correct. 14 Q. Okay. And in Figure 4 there are two LEDs 15, 15 correct? 16 A. Correct. 17 Q. And each of those LEDs 15 emits radiation 18 that's labeled with reference number 8, correct? 19 A. That's right. 20 Q. Just trying to understand what's shown here. 21 You then have the lenses 21 that direct the radiation 8 22 into bundled beams 12, correct? 23 A. Correct. 24 Q. And those bundled beams 12 converge on to a 25 point on the earlobe 2, correct?	Page 68 1 surface area of blood flow that's exposed to the sensor, 2 that would increase the signal intensity, correct? 3 MR. SCHARN: Objection. Form. 4 THE WITNESS: I'm not sure that I agree with 5 what you said. Although, frankly, I'm not sure I 6 understood exactly what you meant. Perhaps you could 7 rephrase. 8 BY MR. CHRISTOPHER: 9 Q. Yeah. Why don't we look at -- let me show you 10 another exhibit that's been previously marked, 11 Exhibit 1032. Let me know when you have that open. 12 Wait. I think I used the wrong -- strike 13 that. 14 Ignore what I just put in the chat. Huh. I 15 think the wrong -- I just realized I think the wrong 16 exhibit was submitted with the petition. Give me -- 17 we'll come back to this. I'll have to find it on a 18 break. Exhibit 1032 is supposed to be Valencell, but it 19 appears to be LeBoeuf instead of Valencell, so I'll go 20 back to that. 21 Let's go to paragraph 98 of your declaration. 22 A. Okay. 23 Q. Sorry. I'm still scrolling. All right. 24 So in paragraph 98 you wrote, (as read): 25 Carlson provides multiple ways of

Page 69 1 accomplishing this objective, 2 including using a beam-shaping 3 element such as e.g., diffractive 4 or refractive lenses. 5 Do you see that? 6 A. I do. 7 Q. What other ways does Carlson provide for 8 achieving its objective besides using a beam-shaping 9 element? 10 A. I don't recall off the top of my head. I'd 11 have to reread Carlson to -- to recall. 12 Q. But there are other ways of accomplishing the 13 objective other than using a beam-shaping element? 14 That's what you wrote in paragraph 98, correct? 15 A. Well, I wrote Carlson provides multiple ways 16 of accomplishing the objective. 17 Q. And one way would be a beam-shaping element, 18 correct? 19 A. Correct. 20 Q. But not the only way? 21 A. I believe so. 22 Q. To paragraph 110. This is -- starts on 23 page 66 of the PDF. My question is regarding the 24 sentence on page 67 of the PDF. Let me know when you're 25 there.	Page 71 1 and so a POSITA would have a 2 reasonable expectation of success 3 implementing Carlson's filter 4 teaching. 5 Do you see that? 6 A. I do. 7 Q. What are you referring to by Carlson's filter 8 teaching? 9 A. So Carlson, for example, in paragraph 17, 10 refers to an optical wavelength filter. 11 Q. And are you proposing to modify Lisogurski to 12 include Carlson's filter? 13 A. It could. A POSITA is aware of the techniques 14 described in Carlson and other prior art that uses 15 lenses and filters to improve the signal strength of 16 optical signals entering and reflecting back from 17 tissue, as examples. So these are all well within the 18 wheelhouse of a POSITA. 19 Q. You're not relying on the filter for the lens 20 claimed in claim 7 of the '970 Patent, correct? 21 MR. SCHARN: Objection. Form. 22 THE WITNESS: Well, the filter could be a 23 lens. And so I'm just kind of making a comprehensive or 24 semi-comprehensive discussion of what is in Carlson in 25 motivating and justifying my opinions.
Page 70 1 A. Okay. 2 Q. So in paragraph 110, you wrote, for example 3 (as read): 4 It was well-known to use filters 5 with detectors and light sensors to 6 reduce the amount of unwanted 7 signals being detected, and so a 8 POSITA would have had -- would have 9 a reasonable expectation of success 10 implementing Carlson's filter 11 teaching to Lisogurski. 12 Do you see that? 13 A. I do. 14 Q. Okay. A filter is not a lens, correct? 15 A. A filter can be a lens. 16 Q. Okay. Do you see in the next sentence where 17 you refer to Carlson's filter teaching? 18 A. Oh, sorry. Which next sentence? The 19 "similarly" one? 20 Q. The sentence that starts with "for example." 21 It says (as read): 22 For example, it was well-known to 23 use filters with detectors and 24 light sensors to reduce the amount 25 of unwanted signals being detected,	Page 72 1 BY MR. CHRISTOPHER: 2 Q. Okay. So in Carlson the filter is between the 3 detector and the tissue, correct? 4 A. It can be. 5 Q. Does Carlson disclose a filter between the 6 emitter and the tissue? 7 A. I'm not sure. I would have to go back and 8 read Carlson again. 9 Q. You wrote, if we go back to paragraph 110, 10 same sentence we were just looking at, (as read): 11 It was well-known to use filters 12 with detectors in light sensors to 13 reduce the amount of unwanted 14 signals being detected. 15 Do you see that? 16 A. I do. 17 Q. And wouldn't that refer to a filter position 18 between the detector and the tissue? 19 A. In this particular sentence, yes. But that 20 doesn't necessarily mean that you can't use a filter 21 between the LED and the tissue. And I'm not sure if 22 Carlson mentions that explicitly or not, but certainly 23 that sort of consideration would be in the wheelhouse of 24 a POSITA. 25 Q. You agree in claim 7, the lens recited in

Page 73 1 claim 7 would be between the light source and the 2 tissue, correct? 3 A. Yes, in claim 7. 4 Q. Bear with me one moment. I'm trying to see if 5 I can figure out that exhibit issue. We'll do that 6 after the next break. 7 Let's go to paragraph 149 of your declaration, 8 Exhibit 1003. It starts on page 97 of your PDF. 9 A. And you said paragraph 140 what? I'm sorry. 10 Q. 149, please. 11 A. Okay, thank you. 12 Q. Okay. So if you scroll down to paragraph 149, 13 this is on -- internal page 89, PDF page 98, you have an 14 annotated version of Figure 1 of Lisogurski. 15 Do you see that? 16 A. I do. 17 Q. And in paragraph 149 you're proposing to 18 rearrange Figure 1 of Lisogurski such that the front-end 19 processing circuitry 150 is in the sensor 102, correct? 20 A. That's right. That would be a routine 21 modification a POSITA would consider. 22 Q. Now, if the front-end processing circuitry 150 23 were relocated to the sensor 102, the front-end 24 processing circuitry 150 would communicate back with the 25 monitor 104, correct?	Page 75 1 that I do. 2 BY MR. CHRISTOPHER: 3 Q. Likewise in paragraph 150, the next paragraph, 4 you don't mention the back-end processing circuitry 170, 5 correct? 6 A. Not in paragraph 150. 7 Q. Staying with paragraph 150, in the second 8 sentence you wrote (as read): 9 It is my opinion that a POSITA 10 would have understood the 11 functional relationship between the 12 detector and the monitor; 13 specifically, the signal received 14 by the detector would preferably 15 need to be converted from analog to 16 digital form in order to be 17 wirelessly transmitted to the 18 monitor. 19 Do you see that? 20 A. I do. 21 Q. Just for terminology, maybe we could do some 22 shorthand. Is an analog-to-digital converter sometimes 23 referred to as an ADC in the art? 24 A. It is, yes. 25 Q. Okay. In that sentence when you say that "the
Page 74 1 A. If that were the only modification that was 2 performed, then, yes. 3 Q. Right. So the front-end circuitry -- 4 front-end processing circuitry 150 would communicate 5 with, for example, the back-end processing circuitry 170 6 and the monitor 104, correct? 7 A. That's right. If -- again, if that were the 8 only modification that were made. Although, of course, 9 one could consider also putting in the back-end 10 processing circuitry in the sensor as well. That would 11 be within the wheelhouse of a POSITA. 12 Q. Your declaration doesn't propose putting the 13 back-end processing circuitry 170 in the sensor 102, 14 correct? 15 A. I'd have to go back and look through the 16 declaration to -- to verify that statement. It's 17 certainly, as I mentioned, within the wheelhouse of a 18 POSITA. And in fact, Lisogurski itself teaches that 19 these items can be located in -- in any sort of 20 position. 21 Q. Well, at least in -- you would agree with me 22 in paragraph 149, you don't say anything about the 23 back-end processing circuitry in 170, correct? 24 MR. SCHARN: Objection. Form. 25 THE WITNESS: In paragraph 149 I don't believe	Page 76 1 signal received by the detector would preferably need to 2 be converted from analog to digital," what do you mean 3 by "preferably"? 4 A. Well, it's not strictly necessary. You can 5 transmit an analog signal either wirelessly or via wired 6 connection over any distance, wire or wireless. Or you 7 can do so digitally. Digital wireless and, frankly, 8 wired communication tends to be a little bit more 9 robust. And so that's why it's often a preferable 10 choice to a POSITA. 11 Q. If you could turn down to paragraph 151. In 12 paragraph 151, I'll read it. First two sentences you 13 wrote, (as read): 14 Thus, in order to satisfy 15 Lisogurski's disclosed embodiment 16 of wirelessly connecting the 17 monitor to the detector, a POSITA 18 would have understood that the 19 analog-to-digital conversion 20 processing circuitry would need to 21 be integrated into the sensor where 22 the signal is initially 23 captured/received by the detection 24 system. A POSITA would have 25 understood that adding this

Page 77 1 additional necessary circuitry in 2 the sensor would not affect the 3 device's operation. 4 Do you see that? 5 A. I do. 6 Q. But as we just established, an 7 analog-to-digital converter is not necessary to satisfy 8 Lisogurski's disclosed embodiment of wirelessly 9 connecting the monitor to the detector, correct? 10 MR. SCHARN: Objection. Form. 11 THE WITNESS: Well, if we're moving front-end 12 processing circuitry into sensor 102, that then needs to 13 communicate directly to the back-end processing 14 circuitry 170 which includes a digital processor. That 15 would need to be converted to digital. In fact, the ADC 16 is included in the front-end processing circuitry 150. 17 And so that wireless communication link, given the 18 modification that I'm proposing here, would necessarily 19 require that analog digital converter to be there 20 because it's part of front-end processing circuitry; and 21 therefore, the wireless transmission would be done in a 22 digital manner. 23 BY MR. CHRISTOPHER: 24 Q. I don't think that answers the question. 25 If -- in order to satisfy Lisogurski's disclosed	Page 79 1 102, correct? 2 MR. SCHARN: Objection. Form. Foundation. 3 THE WITNESS: So now we're talking about 4 changes that I've not considered in my analysis. In 5 general, yeah, I mean, you can communicate information 6 analog or digital in a wireless manner. The 7 modification that I specifically proposed would involve 8 digital wireless communication. 9 BY MR. CHRISTOPHER: 10 Q. But the reason you provided in your 11 declaration for why a POSITA would modify the sensor is 12 that ADC is necessary in order to satisfy Lisogurski's 13 disclosed embodiment of wirelessly connecting the 14 monitor to the detector, correct? 15 MR. SCHARN: Objection. Form. 16 THE WITNESS: I'm not sure I fully understood 17 what you meant. 18 BY MR. CHRISTOPHER: 19 Q. In paragraph 151, you see where you refer to 20 "additional necessary circuitry"? 21 A. Okay. 22 Q. You're referring to analog-to-digital 23 conversion processing circuitry, correct? That's what 24 you say in the prior sentence? 25 A. In order to connect to a digital processor,
Page 78 1 embodiment of wirelessly connecting the monitor to the 2 detector, an ADC is not strictly necessary in the sensor 3 for wireless communication, correct? 4 MR. SCHARN: Objection. Argumentative. Form. 5 THE WITNESS: Well, again, in my analysis, I'm 6 putting the front-end processing circuitry 150 into the 7 detector area, and that does include the ADC. And so in 8 that specific condition, it would be necessary. 9 BY MR. CHRISTOPHER: 10 Q. But the sensor doesn't require an ADC to 11 wirelessly communicate with the monitor, correct? 12 MR. SCHARN: Objection. Form. 13 THE WITNESS: It depends how the monitor is 14 built. 15 BY MR. CHRISTOPHER: 16 Q. So earlier you testified that an ADC is not 17 strictly necessary for wireless communication. 18 Do you recall that? 19 MR. SCHARN: Objection. Form. 20 THE WITNESS: I do recall that. 21 BY MR. CHRISTOPHER: 22 Q. So if an ADC is not strictly necessary for 23 wireless communication, in fact, you could implement a 24 wireless connection between the sensor 102 and the 25 monitor 104 in Lisogurski without an ADC in the sensor	Page 80 1 yes. 2 Q. Where do you refer to a digital processor in 3 paragraph 151? 4 A. Well, the digital processor is part of the 5 monitor 104. And we're connecting the monitor 104 to 6 the sensor. 7 Q. But you would agree that in Figure 1 of 8 Lisogurski, the detector could send an analog signal 9 wirelessly to the monitor 104, specifically the 10 front-end processing circuitry 150, which would convert 11 the analog signal to digital signal, correct? 12 MR. SCHARN: Objection. Form. 13 THE WITNESS: I'd have to think about that 14 some more. I'm not sure what modification I would make 15 to Lisogurski to make that happen. 16 BY MR. CHRISTOPHER: 17 Q. Couldn't a person skilled in the art modify 18 Lisogurski to put the ADC in the back-end processing 19 circuitry? 20 A. Well, what you're describing is more of a box 21 drawing exercise here. You know, where are we putting a 22 certain element where. Figure 1 in Lisogurski is a 23 high-level block diagram. And a POSITA reading this 24 would understand that, you know, there's -- there's 25 different ways you could implement this block diagram,

Page 81 1 and some components might not strictly go in one box 2 versus another. And it's within the wheelhouse of a 3 POSITA to make those decisions. 4 Q. So just to be clear, in order to satisfy 5 Lisogurski's disclosed embodiment of wirelessly 6 connecting the monitor to the detector, it is not 7 strictly necessary to integrate the analog-to-digital 8 conversion processing circuitry into the sensor, 9 correct? 10 MR. SCHARN: Objection. Form. 11 THE WITNESS: In general, I'm not sure. I 12 haven't done all of the different permutation analysis. 13 The analysis that I did is putting that front-end 14 processing circuitry next to the detector and the 15 sensor. 16 BY MR. CHRISTOPHER: 17 Q. In paragraph 151, do you see where he 18 states -- where you say -- excuse me -- such circuitry 19 is "small and power inefficient"? 20 Do you see that? 21 A. Yes. 22 Q. What qualifies as small? 23 A. Well, in the context of a wearable device 24 outfitted for the wrist or on the finger or something 25 like this, it would have to be smaller than the	Page 83 1 THE WITNESS: I hesitate to speculate but I 2 will anyways. I would guess that they would be lower 3 than the power consumption of the light emitters as an 4 example. 5 BY MR. CHRISTOPHER: 6 Q. What about the detectors? Or detector, 7 singular? 8 MR. SCHARN: Objection. Form. 9 THE WITNESS: I'm not sure about that one. 10 I'd have to do that analysis. 11 BY MR. CHRISTOPHER: 12 Q. Now, you would agree that in a wireless 13 embodiment of Lisogurski, the sensor 102 would need 14 circuitry to accomplish wireless communication with the 15 monitor, correct? 16 A. Yes. 17 Q. And in a wireless environment of Lisogurski, 18 you would agree that the sensor would need to be powered 19 by a battery, correct? 20 A. That's right. 21 Q. And that battery would need to power all of 22 the components in the sensor, including the front-end 23 processing circuitry 150 if a person skilled in the art 24 modified the sensor to include the circuitry 150, 25 correct?
Page 82 1 anatomical geometries present as an example. 2 Q. What qualifies as power efficient? 3 A. Again, context matters here. So if it's a 4 wrist-worn or finger-worn type of device, this is a 5 battery-powered device, and so this additional circuitry 6 would have to be low enough power such that the device 7 can operate with an appreciable or, you know, usable 8 battery life by the user. 9 And these are all things that a POSITA would 10 have the ability to calculate and consider when making a 11 design. And in fact, as I mentioned, there are 12 commercial products that had indeed done exactly this 13 prior to the priority date of the '790 Patent. 14 Q. In the 2012/2013 time frame, what were the 15 power requirements for an analog-to-digital converter? 16 A. Well, I -- I wouldn't be able to cite that off 17 the top of my head. It does depend on many things, 18 including the sampling rate, the bit resolution, the 19 input-referred noise, and so on. And even if I did have 20 those numbers, I'd have to go back to the literature and 21 look to see what was available at that time frame. 22 Q. In the 2012/2013 time frame, how would the 23 power requirements for the analog-to-digital converter 24 compare to the emitters and detectors in the sensor? 25 MR. SCHARN: Objection. Form.	Page 84 1 A. That's right. 2 Q. Now, Lisogurski also teaches that in some 3 embodiments, the sensor can draw power from the monitor 4 104, for example, via wired connection, correct? 5 A. I believe that's the case, yes. 6 Q. And Lisogurski teaches that the monitor can be 7 powered by a battery or a conventional power source such 8 as a wall outlet, correct? 9 A. Right. 10 Q. Now, sticking on the topic of the battery, 11 would you agree that from a user's perspective, a key 12 metric for a wearable device is the length of time the 13 device can operate before its battery must be completely 14 recharged? 15 MR. SCHARN: Objection. Form. 16 THE WITNESS: That is a metric that users care 17 about, yes. 18 BY MR. CHRISTOPHER: 19 Q. It's a key metric, correct? 20 MR. SCHARN: Objection. Form. 21 THE WITNESS: I don't know if it's a key 22 metric. It's certainly a metric that users consider 23 when buying a wearable or using a wearable device. 24 BY MR. CHRISTOPHER: 25 Q. Now, would you agree that in the years leading

Page 85 1 up to 2013, the pace of battery miniaturization was 2 slow? 3 A. I would. 4 Q. Okay. All right. All right. I'm introducing 5 a new exhibit. This is actually a new exhibit in the 6 proceeding. It will be Exhibit 2050. 7 (Whereupon, Exhibit 2050 was marked 8 for identification.) 9 BY MR. CHRISTOPHER: 10 Q. Let me know when you have Exhibit 2050 open. 11 A. It's a big file, so just give me a moment. 12 Q. Yeah, I understand. 13 A. Okay. 14 Q. It should look familiar. Do you recognize 15 Exhibit 2050 as your 2012 thesis? 16 A. I do, yes. 17 Q. All right. If you could scroll to page 29 of 18 your PDF, please, under the section heading 1.2. Let me 19 know when you're there. 20 A. Okay. 21 Q. All right. The second paragraph that bridges 22 onto the next page, your thesis states, (as read): 23 From a patient's perspective, a key 24 metric for such wearable devices is 25 operational lifetime; that is, the	Page 87 1 A. Okay. 2 Q. The abstract you wrote, (as read): 3 Advances in sensor technologies and 4 integrated electronics are 5 revolutionizing how humans access 6 and receive healthcare. However, 7 many envisioned wearable or 8 implantable systems are not 9 deployable in practice due to high 10 energy consumption and 11 anatomically-limited size 12 constraints necessitating 13 large-form factors for external 14 devices, or eventual surgical 15 reimplantation procedures for 16 in-vivo applications. 17 That's what you wrote in the abstract of your 18 thesis, correct? 19 A. That's right. 20 Q. Let's go back to Lisogurski. 21 Lisogurski is designed to constantly measure 22 health conditions such as blood oxygen saturation, 23 correct? 24 A. Yes, that's one of its functions, yes. 25 Q. Now, in a wireless embodiment of Lisogurski,
Page 86 1 length of time the device can 2 operate before its energy storage 3 element (e.g. a battery) must be 4 completely recharged. 5 That's what you wrote in your thesis, correct? 6 A. I see that, yes. 7 Q. And then on page 29, the next page, we see at 8 the top Figure 1-3. 9 Do you see that? 10 A. I do, yeah. This is the figure that I brought 11 into my declaration. 12 Q. Right. That's what I was going to ask you. 13 And then in the first full paragraph that you 14 see on page 29, it states, (as read): 15 From a system perspective, it makes 16 sense to push complexity away from 17 locations where weight and volume 18 (and as a result, energy) are 19 constrained, and move this 20 complexity to locations where 21 energy is more abundant. 22 That's what you wrote in your thesis, correct? 23 A. That's right. 24 Q. If we could turn back to -- one more question 25 about this, page 3, the "Abstract."	Page 88 1 which we've been discussing, there would be active 2 wireless communication between the sensor and the 3 monitor, correct? 4 A. That's right. 5 Q. Would you agree that constantly measuring 6 health conditions and active wireless communications 7 require substantial amounts of peak and average power 8 draws? 9 A. Well, that depends on the context and the 10 application. And let me elaborate on this just a little 11 bit. 12 In my thesis, I was focused on small, mostly 13 implantable electronics where obviously size and energy 14 constraints are extremely constrained. And furthermore, 15 I was focused more on, we'll call them, high data rate 16 sensing applications. 17 In contrast, an optical sensing system is 18 operating at relatively low data rates. And so the 19 wireless communication system doesn't require a lot of 20 activation. So while the comment about peak power being 21 high may be correct, the average power might, in fact, 22 actually be low because there's not a lot of data that 23 you need to transmit, and you can duty cycle that 24 transmitter. 25 On top of that, the power consumption of the

Page 89 1 light source typically dominates the power consumption 2 of wearable optical-based devices. And although I 3 haven't done this analysis, I would expect would exceed 4 the power consumption of any radio that you would add to 5 make a wireless connection in this application. 6 Q. I think you were drawing a distinction between 7 an implantable health-monitoring device and a wearable 8 health-monitoring device; is that correct? 9 A. Well, my previous answer was quite long and 10 there were many facets there. But in general, yes. An 11 implantable device will have much more strict battery 12 requirements than a wearable device. 13 Q. So I'll reask my question in the context of a 14 wearable health-monitoring device. 15 Would you agree that constantly monitoring 16 health conditions and active wireless communications 17 both require substantial amounts of peak and average 18 power draws? 19 MR. SCHARN: Objection. Form. 20 THE WITNESS: Well, it depends on what we're 21 monitoring, what the bandwidth and -- and requirements 22 are, and so on. 23 BY MR. CHRISTOPHER: 24 Q. If we're measuring blood oxygen saturation? 25 A. Then in that case, the -- the peak power	Page 91 1 A. I see that. 2 Q. Would this happen to be the proceeding you 3 were recently deposed in that we talked about earlier 4 this morning? 5 A. Yes, I believe so. 6 Q. And this declaration was executed under oath 7 just like your declaration in this case, correct? 8 A. That's correct. 9 Q. All right. If you could turn for me to 10 paragraph 139. This is on page 78 of the PDF. Sorry. 11 I might have said 139. 138. 12 A. Okay. 13 Q. In paragraph 138 of your declaration in this 14 prior proceeding, IPR 202500147, you wrote, (as read): 15 The power requirements of Schröder 16 and Mestas would also be different, 17 given that Mestas is constantly 18 monitoring health conditions and 19 features active wireless 20 communications, both of which 21 require substantial amounts of peak 22 and average power draws, while 23 Schröder only takes vein pattern 24 images in a security validation 25 event, and communicates via NFC or
Page 90 1 comment is -- remains correct regardless. But the 2 average power would probably be quite low because the 3 refresh rate of wireless communication would be quite 4 low, and you could aggressively duty-cycle the radio to 5 significantly reduce its power consumption, as I did in 6 my thesis, actually. 7 Q. Okay. You've authored declarations and other 8 IPR proceedings involving parties other than Whoop and 9 Omni, correct? 10 A. That's correct. 11 Q. You've authored at least one declaration in an 12 IPR proceeding involving Samsung and Oura Ring; is that 13 correct? 14 A. I can't remember if that -- those were IPR or 15 PGRs but something like that. 16 Q. Fair enough. I'm going to show you -- this 17 will be Exhibit 2051. 18 (Whereupon, Exhibit 2051 was marked 19 for identification.) 20 BY MR. CHRISTOPHER: 21 Q. Another somewhat large file. Let me know when 22 you have it open. 23 A. Okay. 24 Q. Do you recognize Exhibit 2051 as a declaration 25 you offered in IPR 202500147?	Page 92 1 RFID, which are backscatter systems 2 that can be 1,000 X lower power 3 than active communications such as 4 Bluetooth, for example. 5 Did I read that correctly? 6 A. Yes. 7 MR. CHRISTOPHER: Okay. I lost track of time. 8 I think we've been going over an hour. Why don't we go 9 off and take a short break. 10 MR. SCHARN: Okay. 11 (Recess taken.) 12 BY MR. CHRISTOPHER: 13 Q. Back on the record. Welcome back. 14 Did you discuss your testimony with anyone 15 during our break? 16 A. No. 17 Q. Okay. Could you please turn to paragraph 181 18 of your declaration for the '970 Patent. 19 A. '790. 20 Q. I did it again. '790. Let's get the right 21 patent. This is page 125 of the PDF. 22 A. Okay. 23 Q. In paragraph 181 of your declaration, you 24 write, (as read): 25 Furthermore, to the extent required

Page 93 1 by the claims for the light drive 2 circuitry to be in the same unit as 3 the light source, a POSITA would 4 have understood that the light 5 drive circuitry 120 and control 6 circuitry 110 (which together with 7 the front-end processing circuitry 8 150 control the parameters of the 9 light source 130) could be 10 integrated from the monitor 104 11 directly in the sensor unit 102. 12 Do you see that? 13 A. I do. 14 Q. Have you formed an opinion as to whether the 15 claims require the light drive circuitry to be in the 16 same unit as the light source? 17 A. Well, claim 7 claims a wearable device adapted 18 to be placed on the wrist of a user. And so it would 19 make sense that the electronic components would be part 20 of that wearable device. 21 Q. Let me see if I understand that. Let's maybe 22 look at this visually. 23 If you turn to Figure 1 of Lisogurski, let me 24 know when you're there. 25 A. Okay.	Page 95 1 A. I do. 2 Q. Keep that -- we were doing paper copies. I 3 would tell you to keep it close by, but let's keep that 4 declaration, paragraph 208, page 152 of the PDF? 5 A. Okay. 6 Q. Page 208, page -- paragraph 208, you state, 7 (as read): 8 Lamego teaches a multi-wavelength 9 physiological monitor with at least 10 three LEDs. Each LED is configured 11 to emit different wavelengths of 12 light. 13 Do you see that? 14 A. I do. 15 Q. And by using three wavelengths of light and 16 mathematical modeling, Lamego determines the levels 17 and/or concentrations of certain blood constituents, 18 correct? 19 A. That's right. 20 Q. Okay. Now, let's turn to Figure 3 of Lamego 21 of 1062. 22 A. Okay. 23 Q. This is on the PDF and you might want to 24 rotate it clockwise. 25 A. Okay.
Page 94 1 Q. So let's assume you've relocated, as you've 2 proposed, the front-end processing circuitry 150 from 3 the monitor 104 to the sensor 102, but the light drive 4 circuitry 120 and the control circuitry 110 remain in 5 the monitor 104, and no other changes to monitor 104 are 6 made, would that satisfy the requirements of claim 7? 7 MR. SCHARN: Objection. Form. 8 THE WITNESS: I'm not sure that I did that 9 analysis. I -- I think the analysis and the opinions 10 that I derived were showing that, you know, a POSITA 11 could and -- and would be motivated to move the light 12 drive circuitry and consult -- control circuitry into 13 the wearable device 102. But I don't believe I provided 14 any opinions on if that's strictly necessary to meet the 15 claim language. 16 BY MR. CHRISTOPHER: 17 Q. All right. I'm going to show you -- virtually 18 show you through the Zoom chat Exhibit 1062. 19 (Previously marked Exhibit 1062 was 20 shown to the witness.) 21 BY MR. CHRISTOPHER: 22 Q. Let me know when you have that open. 23 A. Okay. Lamego. 24 Q. Right. Do you recognize Exhibit 1062 as the 25 Lamego reference?	Page 96 1 Q. All right. So let's -- let's talk about 2 what's shown in Figure 3. 3 Do you see the sensor 300? 4 A. Yes. 5 Q. And the sensor 300 includes emitters 302; 6 there's two shown in Figure 3 but there's a dash line so 7 there could be more, but 302 represents emitters, 8 correct? 9 A. Correct. 10 Q. And then 320 is a detector, correct? 11 A. Yes. 12 Q. And we have a -- what appears to be a finger 13 310 between the emitters and the detector, correct? 14 A. Yes. 15 Q. So this would be an example of transmissive 16 mode that we talked about earlier, correct? 17 A. As drawn in this embodiment, that's right. 18 Q. And then to the right-hand side of center 300, 19 you see "Front End: Analog Signal Conditioning." 20 A. I see that. 21 Q. And then the next box to the right, 332, 22 "Analog to Digital Conversion." 23 Do you see that? 24 A. Yes. 25 Q. Would it be fair to say that those components,

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1 330 and 332, are analogous to the front-end processing
2 circuitry 150 of Lisogurski?
3 MR. SCHARN: Objection. Form.
4 THE WITNESS: They would be similar. Of
5 course there -- there may be some differences between
6 them.
7 BY MR. CHRISTOPHER:
8 Q. Fair. Do you see the 334, the next box to the
9 right, "Digital Signal Processing System"?
10 A. I do.
11 Q. Would it be fair to say that that digital
12 signal processing system is similar or analogous to the
13 back-end processing circuitry 170 in Lisogurski?
14 MR. SCHARN: Objection. Form.
15 THE WITNESS: That's a little bit more
16 nebulous because there are some digital processing
17 operations that are happening in the front-end
18 processing or the front-end circuits in Lisogurski. So
19 again, this is where the lines between some of these
20 boxes might be blurred a little bit. And a POSITA
21 understands the exact positioning of various different
22 elements could shift a little bit, but at a very high
23 level, somewhat analogous, yes.
24 BY MR. CHRISTOPHER:
25 Q. Sure. And do you see to the right of the

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1 Digital Signal Processing System there are three arrows
2 with the text "Oxygen Saturation," "Heart Rate" -- I'll
3 say PPG because I don't want to pronounce the full word,
4 and "waveform"?
5 A. I see that.
6 Q. Okay. And those are physiological parameters
7 that would be determined by the digital signal
8 processing system, correct?
9 A. Well, the wave -- I don't -- I don't know if a
10 waveform is a parameter per se. But at a high level,
11 these are -- these are physiological signals we'll say.
12 Q. Would that perhaps be a PPG waveform, like one
13 term together? Would that be a reasonable way to
14 understand it?
15 A. Right. But a PPG waveform is not a parameter.
16 It's a waveform, right.
17 Q. Oh. Sure. And so in that sense, the digital
18 signal processing system 334 in Lamego is analogous to
19 the back-end processing circuitry of 170 in Lisogurski
20 that determines physiological parameters, correct?
21 MR. SCHARN: Objection. Form.
22 THE WITNESS: With the same caveats that I
23 mentioned earlier, at a very high level, it's loosely
24 analogous.
25

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1 BY MR. CHRISTOPHER:
2 Q. Do you see the emitter's current drivers 340
3 on the bottom left-hand side of Figure 3?
4 A. I do.
5 Q. We talked about this a little bit this
6 morning. I notice it says "drivers" plural. Would a
7 person of skill in the art understand that each emitter
8 requires its own driver?
9 A. It could. But I don't think that's strictly
10 necessary. As I mentioned earlier this morning, it
11 could be a single driver with a multiplexer, or it could
12 be multiple parallel drivers. Those are both choices a
13 POSITA could make in -- in making a design.
14 Q. Now, a moment ago, we discussed how your
15 declaration, you state that Lamego is capable of
16 determining the levels and/or concentrations of
17 constituents.
18 Do you recall that?
19 A. Yes.
20 Q. That determination would occur in Figure 3 in
21 the digital signal processing system 334, correct?
22 A. I -- I would say likely most of the parameters
23 discussed in Lamego that would be the case. I don't
24 know if that's strictly true for all parameters that
25 Lamego can measure.

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1 Q. Turn back to paragraph 215 of your
2 declaration, which is on PDF page 160.
3 A. Okay.
4 Q. In the second sentence of paragraph 215 (as
5 read):
6 A POSITA would have had a
7 reasonable expectation of success
8 implementing Lamego's
9 multi-wavelength sensor into a
10 system based on Lisogurski because
11 Lamego's sensor is comprised of
12 conventional LEDs.
13 Do you see that?
14 A. I do.
15 Q. And when you refer to Lamego's multiwavelength
16 sensor, you're referring to the sensor that includes
17 three LEDs that emit different wavelengths, correct?
18 A. Well, Lamego discloses that many LEDs could be
19 used. Three LEDs is one embodiment, and yes, these are
20 conventional LEDs that Lamego uses.
21 Q. When you use the term "multiwavelength
22 sensor," does that refer to at least three wavelengths?
23 A. That is what is described in Lamego, yes.
24 Q. All right. I've virtually handed you through
25 the Zoom chat Exhibit 1030.

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1 (Previously marked Exhibit 1030 was
2 shown to the witness.)
3 BY MR. CHRISTOPHER:
4 **Q. Let me know when you have that open.**
5 A. Okay.
6 **Q. Did you recognize Exhibit 1030 as the Soller**
7 **reference that you opine on in your declaration?**
8 A. Yes.
9 **Q. Turn to column 1 of Soller, perhaps Soller,**
10 **depending on how you want to pronounce it. Column 1,**
11 **line 17?**
12 A. Okay.
13 **Q. So at line 17, column 1, Soller states, (as**
14 **read):**
15 This invention relates to
16 measurement of blood hematocrit
17 (Hct). Hematocrit is the volume
18 percent of red blood cells in a
19 blood sample.
20 Do you see that?
21 A. I do.
22 **Q. Okay. And then further down in column 1 in**
23 **the background at line 30, Soller states, (as read):**
24 Hematocrit can also be measured
25 non-invasively. Two approaches

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1 have been reported for such
2 non-invasive monitoring of
3 hematocrit, an optical approach and
4 an impedance method.
5 Do you see that?
6 A. I do.
7 **Q. And then it looks like line 36, Soller states,**
8 **(as read):**
9 All of the reported optical
10 techniques are variations on
11 oximetric -- oximetric methods
12 where hematocrit is measured using
13 only the concentrations of
14 oxygenated and deoxygenated
15 hemoglobin.
16 Do you see that?
17 A. I do.
18 **Q. So an optical approach is one approach for**
19 **non-invasively measuring hematocrit, correct?**
20 A. That's what Soller says, yes.
21 **Q. Right. And Soller is teaching here in the**
22 **background that the prior optical techniques for**
23 **hematocrit could measure hematocrit based on the amount**
24 **of oxygenated and deoxygenated hemoglobin, correct?**
25 A. That's what he's saying, yeah.

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1 **Q. Right. And if you're measuring blood oxygen**
2 **saturation, such as in Lisogurski, you also are**
3 **measuring oxygenated and deoxygenated hemoglobin,**
4 **correct?**
5 A. That's right.
6 **Q. If you go to column 5 of Soller -- Soller.**
7 **Line 33, very first sentence under "Detailed**
8 **Description," Soller provides a very helpful**
9 **explanation, (as read):**
10 Hemoglobin constitutes
11 approximately 90 percent of the red
12 blood cell and is mostly present in
13 the oxygenated and deoxygenated
14 forms. However, other forms of
15 hemoglobin are also present in the
16 red blood cell, including -- and it
17 lists three other forms of
18 hemoglobin.
19 Do you see that?
20 A. I do.
21 **Q. And then Soller goes on to say (as read):**
22 To accurately measure hematocrit,
23 not only must these additional
24 forms of hemoglobin be accounted
25 for, but so must the remaining

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1 10 percent of the cellular
2 components such as the nucleus and
3 cell membranes.
4 Do you see that?
5 A. I do.
6 **Q. And then very next sentence, Soller says (as**
7 **read):**
8 The invention provides an optical
9 and mathematical method to measure
10 hematocrit with increased accuracy
11 relative to other methods, e.g.,
12 impedance and oximetric methods.
13 Do you see that?
14 A. I do.
15 **Q. And so what Soller is teaching is a technique**
16 **to more accurately measure hematocrit by measuring all**
17 **forms of hemoglobin, correct?**
18 MR. SCHARN: Objection. Form.
19 THE WITNESS: He said other forms of
20 hemoglobin that might be present and other things.
21 MR. CHRISTOPHER: Right. So Soller is
22 teaching a technique to more accurately measure
23 hematocrit by additionally measuring other forms of
24 hematocrit besides deoxygenated and oxygenated and other
25 cellular structures in the blood; is that fair?

Page 105 1 THE WITNESS: Other forms of hemoglobin I 2 think you meant to say. And if so, yes. 3 BY MR. CHRISTOPHER: 4 Q. Well, line 40, do you see where it says, (as 5 read): 6 The remaining 10 percent of the 7 cellular components, such as the 8 nucleus and cell membranes which do 9 not contain hemoglobin? 10 A. I do see that. 11 Q. So Soller is teaching that if you want to more 12 accurately measure hematocrit, you have to account for 13 both additional forms of hemoglobin and the remaining 14 10 percent of the cellular components which do not 15 contain hemoglobin, correct? 16 A. That's right. 17 Q. Okay. Turn back to your declaration, 18 paragraph 118. It's on PDF page 71. 19 A. Okay. 20 Q. Third line down, do you see where you wrote, 21 (as read): 22 A POSITA would have been motivated 23 to combine optical and mathematical 24 techniques from Soller, including 25 the increased number of light	Page 107 1 Q. Well, let's use that as an example. If seven 2 wavelengths were used, that would require seven light 3 sources? 4 A. Seven different, for example, LEDs that emit 5 different wavelengths, yes. 6 Q. And a person of skill in the art would 7 understand that increasing the number of LEDs in the 8 device would increase power consumption, correct? 9 A. It depends on the rate of firing of those LEDs 10 and the light intensity and so on. 11 Q. Well, assuming all things being equal in terms 12 of light intensity, would adding LEDs increase the power 13 consumption of the device? 14 A. If you don't change the firing rate or light 15 intensity of the original LEDs that you had, then adding 16 new LEDs would increase the power consumption, yes. But 17 it's possible by adding new LEDs, you would need to fire 18 the other LEDs less frequently. I haven't done that 19 specific analysis, though. 20 Q. If the number of light sources and wavelengths 21 is increased, would that require a corresponding 22 increase in the number of detectors? 23 A. Not necessarily. Most detectors are pretty 24 broadband and can detect infrared, red, and other 25 wavelengths of light. And most likely, you would be
Page 106 1 sources and wavelengths into 2 Lisogurski's system. 3 Do you see that? 4 A. I do. 5 Q. The optical and mathematical techniques from 6 Soller are techniques for measuring hematocrit, correct? 7 A. Well, that is the end application of Soller. 8 But in the pursuit of achieving that end application, 9 Soller is able to measure other forms of hemoglobin, 10 which may be useful in doing more accurate measurements 11 of oxygenated and deoxygenated hemoglobin, which is the 12 main objective of Lisogurski. 13 Q. And in the same sentence, you referred to the 14 increased number of light sources and wavelengths. 15 Do you see that? 16 A. Yes. 17 Q. It starts the fourth line of the paragraph 18 118. When you say "increased number," increased by how 19 many? 20 A. Well, Lisogurski teaches at least two light 21 sources, although Lisogurski says that any number of 22 light sources can be used. And I don't recall the 23 minimum number of light sources that Soller teaches, 24 although, you know, one example in Soller is seven or 25 more wavelengths.	Page 108 1 firing LEDs individually and not at the same time. So 2 it wouldn't necessarily require an increased number of 3 detectors, although certainly that's possible. 4 Q. Back to the Lisogurski Figure 2A. 5 A. Okay. 6 Q. All right. You talked about this earlier. 7 Reference number 202 shows you the light drive signal. 8 I believe for red light, 204 is IR light. Correct? 9 A. I don't remember if it's flipped or not, but 10 one of those two, yes. 11 Q. Let's make -- let's make it easy. 202 is a 12 first wavelength. 204 is a second wavelength. Is that 13 fair? 14 A. That's fair. Thank you. 15 Q. Okay. Now, you see where it says 1 cycle 218? 16 A. I do. 17 Q. Now, if we were to modify Lisogurski to 18 include, for example, seven wavelengths, we would have 19 seven different signals in one cycle, correct? 20 A. I'm not sure that's strictly necessary. I 21 don't know, or I didn't do the analysis of how 22 frequently the other light sources would need to be 23 fired. This is one cycle in terms of repetition rate of 24 the LED's firing rates themselves. This figure may or 25 may not be to scale, by the way. It's possible that

Page 109 1 these light firing periods or pulse widths, rather, are 2 smaller relative to the overall period. And the cardiac 3 cycle is not shown on this either. 4 And so yeah, I guess it's basically hard to 5 say how a waveform like this would look if we add 6 additional light sources without a POSITA going ahead 7 and doing the analysis of what would be required. 8 Q. Go to paragraph -- back to your declaration. 9 Paragraph 77. It's on page 46 of the PDF. 10 A. Okay. 11 Q. And in the first sentence, you state (as 12 read): 13 I have reviewed the challenged 14 claims of the '533 Patent and the 15 related '484 Patent." 16 Do you see that? 17 A. I do. 18 Q. And the second sentence, you wrote, (as read): 19 It is my opinion that a POSITA 20 would have understood the invention 21 described in the challenged claims 22 of the '970 Patent significantly 23 overlaps with and is not 24 meaningfully distinct from the 25 challenged claims of those two	Page 111 1 some of the related patents to help reinforce the 2 opinions that -- that I had made about the '790 patent 3 claim 7. 4 Q. Can you turn to -- back to the '790 Patent? 5 Exhibit 1001, turn to claim 7. 6 A. Okay. 7 Q. And this is in column 87, so the very last 8 page of the PDF, starting at around line 32, claim 7 9 recites, (as read): 10 Wherein the wearable device is at 11 least in part configured to 12 identify an object. 13 Do you see that? 14 A. I see that. 15 Q. I'm going to show you via Zoom chat 16 Exhibit 1004. Let me know when you have that open. 17 (Previously marked Exhibit 1004 was 18 shown to the witness.) 19 THE WITNESS: Okay. 20 BY MR. CHRISTOPHER: 21 Q. Do you recognize Exhibit 1004 as the '533 22 Patent? 23 A. I do. 24 Q. Now, none of the claims in the '533 Patent 25 recite the phrase "identified object," correct?
Page 110 1 patents. 2 Do you see that? 3 A. I do. Except, again, it's '790, not '970. 4 Q. Oh, boy. You corrected me. '790 Patent. I 5 may have had another case of the '970 Patent which is 6 why I'm mixing it up. 7 Okay. In paragraph 77 you state that claim 7 8 is not meaningfully distinct from the challenged claims 9 of the '533 and '484 Patent. Correct? 10 A. Yes. That's what I said. 11 Q. Okay. What do you mean by "meaningfully 12 distinct"? 13 A. Well, I mean, they're very, very similar. 14 Obviously it's not exactly the same claim language, but 15 they cover the -- essentially the same invention and use 16 very, very similar language. So I was just stating that 17 there's a lot of similarities with those two patents. 18 Q. Now, in forming this opinion in paragraph 77 19 of your declaration, did you compare each and every 20 limitation of claim 7 to each and every limitation of 21 the challenged claims from the '533 and '484 Patents? 22 A. I didn't do a claim-by-claim analysis. 23 Instead for the '790 Patent, I did comprehensive 24 analysis of claim 7. I did reference some similar claim 25 elements, or essentially identical claim elements, from	Page 112 1 A. I'd have to go and -- and look. 2 Q. Your PDF should be searchable if you want to 3 search for the phrase "identifying object." Tell me 4 whether you see it in any of the claims. 5 A. This is a scanned document. I don't know how 6 accurate this search feature is on a scanned document. 7 Q. Fair enough. Off the top of your head, are 8 you aware of any claim in the '533 Patent that recites 9 the phrase "identifying object"? 10 MR. SCHARN: Objection. Form. 11 THE WITNESS: Off the top of my head, I don't 12 recall. 13 BY MR. CHRISTOPHER: 14 Q. Okay. Now, if you could turn to independent 15 claim 5 of the '533 Patent, this is in column 29? 16 A. Okay. 17 Q. Okay. Do you see where it says a "receiver 18 configured"? 19 A. I see that. 20 Q. And specifically it says, (as read): 21 A receiver configured to receive 22 and process at least a portion of 23 the analysis output beam reflected 24 or transmitted from the sample. 25 Do you see that?

Page 113 1 A. I do. 2 Q. Now, if you could turn to independent 3 claim 13. This is in column 30. 4 A. Okay. 5 Q. There's a limitation, a wearable device 6 further comprising a receiver. 7 Do you see that? 8 A. Yes. 9 Q. (As read): 10 Receiver is configured to receive 11 and process at least a portion of 12 the analysis output beam reflected 13 or transmitted from the sample. 14 Do you see that? 15 A. I do. 16 Q. And then if we go back to claim 7 of the -- 17 the '790 Patent, Exhibit 1001, column 87, starting at 18 line 8? 19 A. Okay. 20 Q. Claim 7 states, (as read): 21 The wearable device further 22 comprising a detection system 23 configured to receive at least a 24 portion of the lens output light 25 reflected from the tissue.	Page 115 1 line 62. Claim 7 requires, (as read): 2 The wearable device adapted to be 3 placed on the wrist of a user. 4 Do you see that? 5 A. I do. 6 Q. Now, if we turn back to independent claim 5 of 7 the '533 Patent in Exhibit 1004, claim 5 does not recite 8 a wearable device, correct? 9 A. Claim 5 does not. Some of the other claims 10 do. 11 Q. That's where I'm going next. 12 Claim 13, independent claim 13, recites a 13 wearable measurement device. 14 Do you see that? 15 A. I do. 16 Q. Claim 13 in the '533 Patent does not specify 17 where the wearable device is adapted to be placed on the 18 user, correct? 19 A. I believe that's correct. 20 Q. Now, if we imagine a wrist-worn embodiment, 21 would transmissive mode be viable if the emitter were on 22 one side of the wrist and the detector were on the 23 opposite side of the wrist? 24 A. Generally, no, that's not a choice a POSITA 25 would make. A POSITA understands the -- the tradeoffs
Page 114 1 Do you see that? 2 A. I do. 3 Q. So the independent claims of the '533 Patent 4 refer to a beam reflected or transmitted from the 5 sample, correct? 6 A. That's right. 7 Q. So the '533 Patent claims cover transmissive 8 mode or reflective mode, correct? 9 A. That's right. 10 Q. And claim 7 of the '790 Patent instead states, 11 (as read): 12 A detection system configured to 13 receive at least a portion of the 14 lens output light reflected from 15 the tissue. 16 Correct? 17 A. That's right. 18 Q. And so unlike the independent claims of the 19 '533 Patent, claim 7 of the '790 Patent is limited to 20 reflectance mode, correct? 21 A. That's right. There are some small, in my 22 opinion, immaterial differences between some of the 23 claim elements. 24 Q. If you still have the '790 in front of you, 25 very beginning of claim 7, this is in column 86,	Page 116 1 associated with transmissive and reflective mode 2 sensors. These are basic techniques that have been 3 known in the literature for many years prior to the 4 priority date of this patent and would choose the best 5 method for the tissue that it's designing for, and for a 6 wrist transmissive is not practical. 7 Q. What are the tradeoffs associated with 8 transmissive and reflective mode sensors? 9 A. There are many tradeoffs. Transmissive mode 10 sensors are typically used in thinner anatomical areas 11 like a finger or an earlobe, where a good amount of the 12 light can pass through the tissue and make its way to 13 the other side; whereas, reflective mode sensors are 14 typically used in applications where that's not 15 realistically possible. Like, for example, on the 16 wrist. 17 Q. Can you give me any additional examples of 18 tradeoffs associated with transmissive and reflective 19 mode sensors? 20 A. Sure. There are -- there are some other 21 tradeoffs. The reflective mode sensors obviously 22 received a reflected signal, which may or may not be 23 weaker, depending on where it's physically located on 24 the body compared to a transmissive mode sensor. And so 25 there's different tradeoffs associated with -- with that

Page 117 1 as well. 2 Q. Any other tradeoffs you can think of between 3 transmissive and reflective mode sensors? 4 A. Well, somewhat related to the two tradeoffs 5 that I did mention is power consumption, depending on 6 the tissue type, where the -- the veins and arteries are 7 located relative to the position of the wearable device 8 and so on. One or both techniques -- or one technique 9 will consume more power than the other in order to get 10 an adequate amount of light through. So power 11 consumption is another one. 12 The physical location of where the -- the 13 veins and arteries are located also impacts the relative 14 absorption of light, so there's several different 15 tradeoffs that a POSITA would have to look into when 16 making a design decision. 17 Q. So you've mentioned power consumption and the 18 position of physical locations and things of that 19 nature. Any other tradeoffs you can think of between 20 transmissive and reflective mode sensors? 21 A. And comfort too. You know, in some locations 22 it's appropriate and comfortable to have, you know, a 23 device on one side and on the other side of the anatomy, 24 and in other locations it's less comfortable to do that. 25 Q. If you go back to claim 7 of the '790 patent.	Page 119 1 Q. Claim 7 of the '790, column 87 at line 14 2 recites, (as read): 3 Wherein the detection system 4 comprises a plurality of detectors 5 that are spatially separated from 6 each other, and wherein at least 7 one analog-to-digital converter is 8 coupled to at least one of the 9 plurality of detectors. 10 Do you see that? 11 A. I do. 12 Q. Are you aware of any claim in the '533 Patent 13 that recites a plurality of spaced apart -- spatially 14 separated detectors? 15 A. Again, I'd have to review the -- the claims in 16 detail to say for certain. 17 Q. Are you aware of any claim in the '533 Patent 18 that recites an analog-to-digital converter? 19 A. Same answer. I'd have to review carefully. 20 Q. All right. I've inserted into our Zoom chat 21 Exhibit 1005. If you could please open that, and let me 22 know when you have it. 23 (Previously marked Exhibit 1005 was 24 shown to the witness.) 25 THE WITNESS: Okay.
Page 118 1 A. Okay. 2 Q. Very end of -- towards the end of claim 7, 3 this is column 87, line 24. 7 requires that, (as read): 4 The detection system further 5 configured to: Generate a first 6 signal responsive to light received 7 while the semiconductor diodes are 8 off, generate a second signal 9 responsive to light received while 10 at least one of the semiconductor 11 diodes is on, and increase the 12 signal-to-noise ratio by comparing 13 the first signal and the second 14 signal. 15 Do you see that? 16 A. I do. 17 Q. Now, for shorthand, can we refer to that as an 18 on/off control, on/off scheme? You tell me which you 19 prefer. 20 A. On/off scheme, okay. 21 Q. None of the claims -- if you go back to 22 Exhibit 1004 of the '533 Patent, none of the claims of 23 the '533 Patent recite this on/off scheme, correct? 24 A. I'm not sure. I'd have to review them to say 25 for certain.	Page 120 1 BY MR. CHRISTOPHER: 2 Q. Okay. Do you recognize Exhibit 1005 as a copy 3 of the '484 Patent? 4 A. I do. 5 Q. Okay. If you could scroll all the way down to 6 page 65 of the PDF, I'd like to ask you about some of 7 these claims. Let me know when you are there. 8 Do you see claim 1? 9 A. Okay. 10 Q. At line 49, this is column 36. 11 Do you see where it says, (as read): 12 A wearable device adapted to be 13 placed on a wrist or an ear of a 14 user? 15 A. I do. 16 Q. And then if you scroll down to the next 17 independent claim, which is claim 7, this is column 38, 18 line 12, thereabout. Claim 7 recites, (as read): 19 A wearable device adapted to be 20 placed on a wrist or an ear of a 21 user. 22 Do you see that? 23 A. I do. 24 Q. And then there's one more independent claim. 25 Independent claim 15 on the next page, it's column 39,

Page 121 1 around line 41 or 42. Claim 15 recites, (as read): 2 A wearable device adapted to be 3 placed on a wrist or an ear of a 4 user. 5 Do you see that? 6 A. I do. 7 Q. Now, claim 7 of the '970 -- strike that. 8 Let's get the number right. 9 Claim 7 of the '790 Patent is limited to a 10 wearable device adapted to be placed on a wrist, 11 correct? 12 A. That's right. And again, a POSITA would 13 understand that the tradeoffs at play here of wrist or 14 ear are very similar, and the prior art would cover both 15 cases. 16 Q. But as we discussed earlier, a transmissive 17 mode sensor would not be viable for wrist-worn 18 embodiment, correct? 19 A. That's right. 20 Q. And a transmissive mode sensor may be viable 21 for an ear-worn embodiment, correct? 22 A. Yes, I think so. 23 Q. Okay. Now, if we go back to the '790 Patent, 24 claim 7. We have one more of these. And I'll direct 25 your attention to the bottom of column 86. Let me know	Page 123 1 THE WITNESS: I can't recall. There was a lot 2 of materials I reviewed and I don't recall the order in 3 which I did so. 4 BY MR. CHRISTOPHER: 5 Q. So in the second sentence in paragraph 231, 6 you write, (as read): 7 In my opinion, and applying the 8 interpretation advanced by Omni in 9 its opening appeal brief, the 10 language of claim 7, in view of the 11 specification and the prosecution 12 history, would not have informed a 13 POSITA of the scope and boundaries 14 of the 'identify an object' 15 limitation with reasonable 16 certainty. 17 Do you see that? 18 A. I do. 19 Q. And your opinion here regarding indefiniteness 20 is based on the interpretation advanced by Omni in its 21 opening appeal brief, correct? 22 A. That's right. And further emphasized by what 23 I read in the patent owner's preliminary response, I 24 believe that's what that document is called. 25 Q. Right. But you don't discuss the preliminary
Page 122 1 when you're there. 2 A. Okay. 3 Q. Very last line is line 67. Claim 7 recites, 4 (as read): 5 Wherein at least a portion of the 6 one or more optical wavelengths is 7 a near infrared wavelength between 8 700 nanometers and 2500 nanometers. 9 Do you see that? 10 A. I do. 11 Q. And none of the claims in the '484 Patent 12 specifically recite a range of wavelengths, correct? 13 A. Again, I'd have to look through carefully to 14 answer that question. 15 Q. Back to your declaration. Paragraph 231, 16 please. This is on PDF page 169. 17 A. Okay. 18 Q. So in paragraph 231, you state here that you 19 have reviewed the specification, prosecution history, 20 and patent owner's arguments in its opening appeal brief 21 in the '484 IPR, correct? 22 A. That's right. 23 Q. Okay. In what order did you review those 24 materials? 25 MR. SCHARN: Objection. Form.	Page 124 1 response in your declaration because it didn't exist 2 then, correct? 3 A. That's correct. 4 Q. All right. And you don't opine here that 5 claim 7 of the '790 Patent is indefinite, having 6 reviewed the specification and the prosecution history 7 alone, correct? 8 A. That's right. Because when I reviewed that in 9 the first three grounds in -- in my declaration here, I 10 was applying the agreed-upon construction for that 11 specific claim element. 12 Q. And you understand that definiteness is 13 evaluated from the perspective of a person of skill in 14 the art as the effective filing date of the patent, 15 correct? 16 A. That's right. 17 Q. And this appeal brief didn't exist as of the 18 effective filing date of the patent, did it? 19 A. It did not. And again, I applied the 20 agreed-upon construction in forming my opinions in 21 grounds 1 through 3. In ground 4, I'm saying that if 22 for whatever reason my opinions are not agreed upon in 23 the first three grounds, and I take Omni's -- what I 24 understand to be Omni's interpretation of that claim 25 construction, then my opinion is that claim 7 is

Page 125 1 indefinite. 2 Q. Now, in paragraph 231 you refer to the opening 3 appeal brief. Have you reviewed that brief in its 4 entirety? 5 A. I believe so. 6 Q. Do you understand that Apple, being the 7 petitioner in the '484 IPR, is the appellee in that 8 appeal? 9 A. That's my recollection, yes. 10 Q. And do you understand that Apple filed a 11 response brief on October 27th, 2025 in the appeal? 12 A. I don't recall the specifics at this moment. 13 Q. Have you reviewed Apple's response for the 14 '484 IPR? 15 A. I don't recall at this moment. 16 Q. Do you understand that patent owner Omni filed 17 a reply brief in this appeal in December of 2025? 18 A. I don't. I'm not certain. 19 Q. So you don't recall having reviewed Omni's 20 reply brief in the appeal? 21 A. I -- I don't recall. And if what you say is 22 true, that would have been after I submitted this 23 declaration. 24 Q. Sure. I'm not -- not trying to trick you on 25 the dates. I'm just wondering, have you -- have you	Page 127 1 A. Well, you can't establish if a target is what 2 it is without identifying what it is, right? So an 3 example would be, you know, if you had a farm and you 4 say how many pigs are in the field and there's pigs, 5 roosters, and horses, and so on, you have to first 6 identify what the pigs are before counting them. Right? 7 Q. I -- I think I understand. Let me see if I 8 can state this back to you. 9 Are you saying that identifying an object is a 10 two-step process whereby one step would be to establish 11 the presence of the object as a first step? 12 MR. SCHARN: Objection. Form. 13 THE WITNESS: I don't -- I'm not sure if 14 that's strictly necessary. Again, this is pretty simple 15 nomenclature here identifying an object, establishes -- 16 or you do so by establishing the presence of that 17 object. If that object is there, you can identify it. 18 Right? If it's not there, you can't identify it because 19 it isn't there. 20 BY MR. CHRISTOPHER: 21 Q. I mean, there's a difference between 22 establishing the presence of an object and identifying 23 an object, correct? 24 MR. SCHARN: Objection. Form. 25 THE WITNESS: Well, part of establishing the
Page 126 1 ever reviewed either the response brief or the reply 2 brief from that appeal? 3 A. I just don't recall. There's been so many 4 documents I've reviewed for this matter that specific 5 documents I just don't recall. 6 Q. So in the next paragraph, 232, I'd like to ask 7 you about the sentence that's on the next page. 8 Do you see a sentence that starts "The 9 specification describes identifying"? Top of page 170 10 of your PDF? Right before the first bullet point. 11 A. "The specification describes." I see. Yeah. 12 Q. So in paragraph 232 of your declaration you 13 wrote, (as read): 14 The specification describes 15 identifying objects is establishing 16 the presence of the target. 17 Do you see that? 18 A. That's right. 19 Q. Does establishing the presence of a target 20 qualify as identifying an object? 21 A. Well, in order to identify an object, you have 22 to confirm that that object is there, and that's what 23 establishing the presence of the target means. 24 Q. So if all I've done is establish the presence 25 of a target, does that qualify as identifying an object?	Page 128 1 presence of the object is knowing what that object is, 2 which means you've identified that object. Right? 3 BY MR. CHRISTOPHER: 4 Q. I mean, I think I understand the point you're 5 making in terms of identifying an object, but I don't 6 think that answers -- there's a difference between 7 identifying -- strike that. 8 There is a difference between detecting the 9 presence of an object versus identifying an object. 10 Establishing the object is being a particular thing, 11 correct? 12 MR. SCHARN: Objection. Form, foundation. 13 THE WITNESS: I think we're using different 14 words but trying to say the same thing. And, you know, 15 establishing the presence -- if you're trying to 16 establish the presence of an object but there's other 17 objects there, you need to identify what specific object 18 you are establishing the presence of. And so it's -- 19 it's essentially the same as identifying the object. 20 BY MR. CHRISTOPHER: 21 Q. So establishing the presence of an object is 22 essentially the same as identifying the object? 23 MR. SCHARN: Objection. Form. 24 THE WITNESS: Well, yes. And so that if 25 there's other objects there, you need to identify the

Page 129 1 object that you're trying to establish the presence of 2 in order to establish its presence. Right? So 3 effectively we're saying the same thing. 4 BY MR. CHRISTOPHER: 5 Q. I'll try to give one analogy before we move on 6 on this. Behind me in the conference room is a shade on 7 the glass. So, you know, imagine a situation where I 8 could see the silhouette of a person through the shade 9 but I don't know who it is. That would be detecting the 10 presence of a person but not identifying who the person 11 is. 12 Do you agree with that? 13 A. I would say that you are detecting the 14 presence of a person but not detecting the presence of a 15 specific person. So you are identifying a person but 16 you're not identifying which person, so they're both the 17 same. It's just what -- what specific feature of the 18 object you're trying to identify is what you're looking 19 for. 20 MR. CHRISTOPHER: I think we've been going 21 roughly an hour, so why don't we go off and talk 22 logistics on when to do our lunch break. 23 MR. SCHARN: No objection. 24 (Recess taken.) 25	Page 131 1 A. Yes. 2 Q. So for example, hemoglobin would be an example 3 of an object as recited in claim 7 of the '790 Patent, 4 correct? 5 A. Well, I would say oxygenated hemoglobin or 6 deoxygenated hemoglobin or the various forms of 7 hemoglobin would be considered objects. 8 Q. Now, in paragraph 236 -- this is the next page 9 of your declaration -- you write in the first sentence, 10 (as read): 11 Omni appears to be arguing that 12 oxygenated hemoglobin and 13 deoxygenated hemoglobin are not, in 14 terms of the '484 and '790 Patents, 15 separate objects capable of 16 identification through optical 17 (spectral) methods. 18 Do you see that? 19 A. I do. 20 Q. Is it your understanding that Omni has argued 21 in its appeal brief that Lisogurski does not disclose 22 identifying an object because oxygenated hemoglobin and 23 deoxygenated hemoglobin are not separate objects? Is 24 that your understanding? 25 MR. SCHARN: Objection. Form.
Page 130 1 BY MR. CHRISTOPHER: 2 Q. Okay. Back on the record. Welcome back. 3 Hope you enjoyed your lunch break. 4 A. Thank you. 5 Q. Did you discuss the substance of your 6 testimony with anyone during the lunch break? 7 A. No. 8 Q. Okay. So before the break, we were talking 9 about your opinion in ground 4 regarding definiteness or 10 indefiniteness. If you could turn to paragraph 234 of 11 your declaration, this is page 171 of the PDF. Let me 12 know when you're there. 13 A. Okay. 14 Q. So in the second sentence you write, (as 15 read): 16 Indeed, as noted above, the 17 specification suggests that 18 building materials, blood 19 constituents, and soil may all be 20 "objects." 21 Do you see that? 22 A. I do. 23 Q. And you would agree that a blood constituent 24 would be an example of an object as recited in claim 7 25 of the '790 Patent, correct?	Page 132 1 THE WITNESS: My understanding is that Omni 2 had argued that oxygenated and deoxygenated hemoglobin 3 are just different forms of hemoglobin, and therefore, 4 not different objects. 5 BY MR. CHRISTOPHER: 6 Q. And what's the basis for your understanding? 7 A. I believe that came from the opening appeal 8 brief in the '484 IPR. 9 Q. And you cite in paragraph 236, Exhibit 1061, 10 pages 39 to 41. 11 Do you see that? 12 A. Yes. 13 Q. Okay. And so your understanding, as stated 14 here in paragraph 236, comes from pages 39 to 41 of the 15 appeal brief which is Exhibit 1061; is that correct? 16 A. I believe that's correct. 17 Q. I've placed Exhibit 1061 in the Zoom chat. 18 Let me know when you have that open. 19 (Previously marked Exhibit 1061 was 20 shown to the witness.) 21 BY MR. CHRISTOPHER: 22 Q. It's a somewhat large file. It might take a 23 moment. 24 A. Okay. 25 Q. All right. And if you would turn to page 39

Page 133 1 of the PDF. Let me know when you're there. 2 A. Yes. 3 Q. All right. Now that you have page 39, the 4 appeal brief in front of you, and feel free to look at 5 page 39, page 40, page 41, can you point me to where 6 Omni argued that oxygenated hemoglobin and deoxygenated 7 hemoglobin are not separate objects? 8 A. Well, in the first sentence of the first 9 paragraph on PDF page 39, document page 27, it says 10 that, (as read): 11 According to Apple's own expert, 12 oximetry focuses on a single blood 13 constituent hemoglobin that is 14 known to be inherently present in 15 the blood. An oximeter does not 16 identify one unknown substance as 17 being oxygenated hemoglobin and 18 identify another unknown substance 19 as being deoxygenated hemoglobin 20 because such identification is 21 unnecessary to its functionality. 22 Q. Neither of those sentences say that oxygenated 23 hemoglobin and deoxygenated hemoglobin are not separate 24 objects, correct? 25 MR. SCHARN: Objection. Form.	Page 135 1 BY MR. CHRISTOPHER: 2 Q. I understand that's your opinion, but where is 3 Omni saying that they are not separate objects? Where 4 is that? 5 MR. SCHARN: Objection. Asked and answered. 6 THE WITNESS: Well, like I said in the -- in 7 this argument from Omni, they're talking about measuring 8 the ratio of different forms of hemoglobin and then not 9 discriminating hemoglobin as a singular thing from 10 anything else. And that, again, in my opinion, is not 11 necessary to meet the claim limitation. So I'm reading 12 from this that this is Omni's interpretation of the 13 terms. 14 BY MR. CHRISTOPHER: 15 Q. Can you point me to anywhere where Omni 16 explicitly says oxygenated and deoxygenated hemoglobin 17 are not separate objects? 18 MR. SCHARN: Objection. Form. 19 THE WITNESS: I don't know that Omni 20 specifically used that precise language, but that's my 21 understanding of what they're trying to say here based 22 on -- on reading these relevant paragraphs. 23 BY MR. CHRISTOPHER: 24 Q. Now, if we -- we go back to the top of 25 page 39, the second sentence, which you read a moment
Page 134 1 THE WITNESS: And then later in that paragraph 2 it says, (as read): 3 It explains that oximetry is 4 focused on just the ratio of two 5 forms of hemoglobin and does not 6 discriminate hemoglobin from 7 anything else. 8 So the arguments that are being made here, my 9 understanding of them, anyways, is -- is that Omni is 10 arguing that the prior art is not identifying different 11 objects in the forms of oxygenated and deoxygenated 12 hemoglobin and therefore isn't, you know, making claim 13 term 7 obvious, which is something I disagree with. 14 BY MR. CHRISTOPHER: 15 Q. Sure. But where does it say that oxygenated 16 and deoxygenated hemoglobin are not separate objects? 17 MR. SCHARN: Objection. Form. 18 THE WITNESS: Well, it's -- it's saying that 19 by -- by talking about its -- it's talking about 20 different forms of hemoglobin and not discriminating 21 hemoglobin as a singular concept from anything else. 22 And it's my opinion is that is unnecessary because the 23 different forms of hemoglobin are themselves different 24 objects. 25	Page 136 1 ago, states, (as read): 2 An oximeter does not identify one 3 unknown substance as being 4 oxygenated hemoglobin and identify 5 another unknown substance as being 6 deoxygenated hemoglobin because 7 such identification is unnecessary 8 to its functionality. 9 Do you see that? 10 A. I do. 11 Q. And it's not saying here that an oximeter does 12 not identify an unknown substance as oxygenated 13 hemoglobin and another unknown substance as deoxygenated 14 hemoglobin because they're not separate objects, right? 15 MR. SCHARN: Objection. Form. 16 THE WITNESS: That's not what this specific 17 sentence says. 18 BY MR. CHRISTOPHER: 19 Q. This specific sentence says that such 20 identification is unnecessary to its functionality, 21 correct? 22 MR. SCHARN: Objection. Form. 23 THE WITNESS: That's what this specific 24 sentence says. I don't agree with that, but that's what 25 this says.

Page 137 1 BY MR. CHRISTOPHER: 2 Q. If you go back to your declaration, 3 paragraph 238, this is on PDF page 173, let me know when 4 you're there. 5 A. Sorry, I have a lot of files open here. I 6 think I need to close. 7 Q. Understood. We're getting towards the end. 8 I'll try not to add to your -- your list? 9 A. Okay. Sorry. You said PDF 173 -- 10 Q. Yeah, paragraph 238. 11 A. Okay. 12 Q. Okay. So again, you conclude here, (as read): 13 In sum, under Omni's apparent 14 interpretation of the 'identify an 15 object' limitation, a POSITA 16 reading the specification of the 17 '970 Patent would not have 18 understood with reasonable 19 certainty which materials and 20 things qualify as "objects" for 21 identification by the optical 22 system. 23 Do you see that? 24 A. I see that. 25 Q. And again, your conclusion is based on Omni's	Page 139 1 of you. 2 Do you see paragraph 239 under the heading 3 "Ground 5"? 4 A. Yes, I -- I do. 5 Q. And here you opine that claim 7 is not 6 enabled, correct? 7 A. That's right. 8 Q. And in the second sentence of paragraph 239 9 you state that this opinion is "under Omni's definition 10 and arguments in the '484 IPR appeal." 11 Do you see that? 12 A. I see that. 13 Q. So again, your opinion in ground 5 regarding 14 enablement is based on your understanding of Omni's 15 arguments in the '484 IPR appeal, correct? 16 A. In part, yes. 17 Q. Okay. Scroll down to paragraph 242. It's on 18 page 175 of the PDF. 19 A. Okay. 20 Q. Starting at the top, "Under Omni's 21 interpretation of the identifying object limitation." 22 Do you see that? 23 A. I do. 24 Q. So again, this opinion is couched under Omni's 25 interpretation of the limitation, correct?
Page 138 1 apparent interpretation of the identifying object 2 limitation, correct? 3 A. Right. 4 Q. And you would agree that if your understanding 5 of Omni's interpretation were incorrect, that would 6 change your opinion, correct? 7 MR. SCHARN: Objection. Form. 8 THE WITNESS: Possibly. My understanding is 9 based on, you know, reading that document, that exhibit 10 we were just looking at, and making my opinions based on 11 my understanding of that. So I don't -- I don't 12 think -- you know, rereading this, my opinion hasn't 13 changed. 14 BY MR. CHRISTOPHER: 15 Q. No, I understand. My -- my question was 16 simply if your understanding of Omni's argument turned 17 out to be incorrect, that would change your opinion in 18 ground 4, correct? 19 MR. SCHARN: Objection. Form. Hypothetical. 20 THE WITNESS: I guess I don't know. I'd have 21 to study, restudy, and reanalyze under an alleged 22 different interpretation. 23 BY MR. CHRISTOPHER: 24 Q. All right. Let's look at ground 5. Same page 25 of your declaration, assuming you still have it in front	Page 140 1 A. In part, yes. 2 Q. Well, not in part. You say under Omni's 3 interpretation of the 'identify an object' limitation 4 without qualification, correct? 5 MR. SCHARN: Objection. Form. 6 THE WITNESS: Right. But I'm using the rest 7 of the specification and prosecution history and so on 8 to complete my opinion presented in this paragraph. 9 BY MR. CHRISTOPHER: 10 Q. If Omni had never made the argument you 11 believe they made in their appeal brief, how would that 12 have changed your opinion? 13 MR. SCHARN: Objection. Form. 14 THE WITNESS: I'm not sure. I didn't do that 15 analysis. I did the analysis in this section using 16 Omni's interpretation of the identifying object 17 limitation in making -- in forming my opinions. 18 BY MR. CHRISTOPHER: 19 Q. So you have not opined limiting yourself to 20 the intrinsic record, the specification, and prosecution 21 history in excluding the appeal brief that claim 7 is 22 not enabled, correct? 23 MR. SCHARN: Objection. Form. 24 THE WITNESS: Yeah, I did not do that 25 analysis.

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1 BY MR. CHRISTOPHER:
2 **Q. Sticking with paragraph 242, that same**
3 **sentence, you state the specification of the -- start**
4 **over.**
5 **In paragraph 242 you write, (as read):**
6 **The specification of the '790**
7 **Patent would not have informed a**
8 **POSITA how to make and use a device**
9 **capable of non-invasively**
10 **identifying and monitoring glucose**
11 **levels in a patient with any degree**
12 **of certainty without undue**
13 **experimentation.**
14 **Do you see that?**
15 A. I do.
16 **Q. Now, claim 7 in the '790 Patent recites that,**
17 **(quote as read):**
18 **The wearable device is configured**
19 **at least in part to identify an**
20 **object, correct?**
21 A. That's right.
22 **Q. Claim 7 of the '790 Patent does not require**
23 **identifying and monitoring glucose levels, correct?**
24 A. Well, glucose is a representative object that
25 is discussed in detail in the '790 Patent.

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1 **Q. Glucose level is not an object, is it?**
2 MR. SCHARN: Objection. Form.
3 THE WITNESS: Glucose level is not an object,
4 but in order to measure glucose levels, you need to
5 identify and monitor glucose molecules as objects.
6 BY MR. CHRISTOPHER:
7 **Q. Right. So if you -- if glucose is an object,**
8 **the claim would only require that you identify a glucose**
9 **molecule, correct?**
10 A. That's fair. And in my opinion, that's not
11 enabled in the '790 Patent.
12 **Q. Under Omni's interpretation, correct?**
13 A. That's right.
14 **Q. Now, you also refer to, in that sentence in**
15 **paragraph 242, "any degree of certainty."**
16 **Do you see that?**
17 A. I see that.
18 **Q. Okay. Claim 7 does not require that the**
19 **identification of an object have any degree of**
20 **certainty, does it?**
21 A. Well, a POSITA reading this would understand
22 that to be the case, right? If I built a device that
23 can identify an object, and it has a very poor
24 identification rate, then as a POSITA, I would not call
25 that something that can identify an object because most

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1 of the time it gets it wrong, and it might just be
2 random chance that it correctly identifies the object.
3 So a POSITA would understand that there is
4 some degree of accuracy required in order to meet the
5 claim limitation.
6 **Q. What degree of accuracy is required to meet**
7 **the claim limitation?**
8 A. That depends on the application. In this case
9 if we're trying to identify and monitor glucose, for
10 example, if this is used for diabetic monitoring
11 applications, it would be very important to monitor this
12 extremely accurately so that we can give useful
13 information to the diabetic patient. If we give
14 information that's inaccurate, that could lead to
15 complications or death of the patient.
16 If this is for other non-clinical or
17 non-medical applications such as athletics or nutrition,
18 it's still important to give accurate information for
19 the user to be able to, you know, use that data to do
20 something useful.
21 **Q. Claim 7 is not limited to either of the two**
22 **use cases you just described in your prior answer,**
23 **correct?**
24 A. That's fair. But they are representative of
25 applications in which monitoring of glucose is

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1 important.
2 **Q. So you'd agree that a person skilled in the**
3 **art would understand that you do not have to identify an**
4 **object with 100 percent certainty in claim 7, correct?**
5 MR. SCHARN: Objection. Form.
6 THE WITNESS: That's fair. There are very few
7 identifying and detection elements that can do such
8 functions with 100 percent accuracy, but a POSITA would
9 understand that it needs to reach a certain level of
10 accuracy to be useful.
11 BY MR. CHRISTOPHER:
12 **Q. When you refer to "a degree of certainty" in**
13 **that sentence in paragraph 242 of your declaration,**
14 **you're referring to a glucose level, correct?**
15 A. No, not necessarily. What I mean by that is
16 in a real application of a non-invasive wrist-worn
17 device, worn on a person, there are so many different
18 blood constituents, tissue types, and all sorts of
19 things going on here that even identifying that there is
20 glucose, never mind the level of glucose in that sample,
21 is extremely difficult. And I've cited some -- some
22 research saying that even as of 2023, and even frankly
23 as of today, that that's simply not possible.
24 **Q. Let's -- let's get into that. That's the last**
25 **sentence in paragraph 242. You state this is, (as**

Page 145 1 read): 2 Has not been accomplished in the 3 art to the present day. Never mind 4 by the prior date of the patent. 5 Do you see that? 6 A. I do. 7 Q. And do you recall from earlier you executed 8 this declaration in October of 2025, correct? 9 A. That's right. 10 Q. Is that statement still true today in 11 June 2026? 12 A. It is. 13 Q. And so it's your testimony that nobody has 14 developed a device capable of non-invasive optical 15 monitoring of glucose to a degree of certainty that 16 would be useful in health or disease monitoring as of 17 today, June-- in June 2026, correct? 18 A. Yes, that's correct. That's my understanding. 19 I work in this field. In fact, I get contacted by press 20 very frequently every time new companies release new 21 wearable devices. There's always rumors that they're 22 going to include glucose function, non-invasive glucose 23 monitoring as a function, and they always ask me if this 24 is actually realizable. I don't actually respond to 25 those requests, but if I did, my answer would be no.	Page 147 1 molecules that exhibit distinct 2 characteristics in different light 3 frequencies, such as ultrasonic 4 waves, near-infrared (NIR), and 5 visible light. 6 Do you see that? 7 A. I do. 8 Q. And then in the next sentence, the first -- 9 next sentence reads, (as read): 10 While these methods enable 11 real-time quantitative monitoring, 12 they do not offer the same level of 13 accuracy as traditional 14 electrochemical blood glucose 15 meters in clinical settings. 16 Do you see that? 17 A. I do. 18 Q. And so according to this article from 2023, 19 optical techniques could be used to enable real-time 20 quantitative monitoring of blood glucose, correct? 21 A. Well, in the very next sentence, they say, (as 22 read): 23 As a result, improving the accuracy 24 and precision of non-invasive 25 monitoring devices remains a
Page 146 1 Doing so accurately would be extremely lucrative. 2 Q. If you could turn to the next paragraph, 3 paragraph 243. In the second sentence, you reference a 4 2023 scientific paper, Exhibit 1065. 5 Do you see that? 6 A. That's right. 7 Q. Did you review Exhibit 1065 in its entirety 8 when you prepared your declaration? 9 A. I did. 10 Q. Okay. I've inserted Exhibit 1065 in the chat, 11 if you could open that up. 12 (Previously marked Exhibit 1065 was 13 shown to the witness.) 14 THE WITNESS: Okay. 15 BY MR. CHRISTOPHER: 16 Q. Hold on. I need to get my copy opened. 17 Okay. Can you turn to the second page, and 18 I'll direct your attention to the first full paragraph 19 in the left-hand column of that second page. 20 A. I do. 21 Q. All right. So that paragraph reads, (as 22 read): 23 Nowadays, most non-invasive blood 24 glucose monitoring techniques rely 25 on the quantification of glucose	Page 148 1 critical technical challenge in the 2 field of diabetes treatment. 3 So this is kind of showing that while there -- 4 there is some capability to distinguish between 5 different absorption of light by glucose molecules 6 versus other molecules, doing so in the presence of 7 complex human tissue is extraordinarily challenging when 8 other things are changing in the body which, of course, 9 happens all the time. 10 So this is actually underscoring my argument 11 that there are, you know, some ideas out there that may 12 eventually lead to a good solution for this. But there 13 are critical challenges that remain, and no one to this 14 date, June 2026, has, to the best of my knowledge, 15 commercialized or successfully demonstrated one that can 16 actually work under real-world conditions accurately. 17 Q. Well, let's go back to the language of 18 claim 7. Claim 7 doesn't require that you identify an 19 object to the same level of accuracy as traditional 20 electrochemical blood glucose meters in a clinical 21 setting, does it? 22 MR. SCHARN: Objection. Form. 23 THE WITNESS: It doesn't. But in order -- but 24 in order to identify an object in this case, glucose, a 25 POSITA would understand that you have to identify it

Page 149 1 with a certain degree of accuracy. Otherwise, it's just 2 not really actually doing identification. It's just 3 guessing. 4 BY MR. CHRISTOPHER: 5 Q. And if we go back to that paragraph we just 6 read in Exhibit 1065, it literally says that optical 7 methods can enable real-time quantitative monitoring of 8 blood glucose levels, correct? 9 MR. SCHARN: Objection. Form. 10 THE WITNESS: And then it says (as read): 11 They do not offer the same level of 12 accuracy as traditional 13 electrochemical blood glucose 14 meters. 15 So this paragraph is saying that there are 16 methods that can potentially enable this, but they're 17 not ready yet. 18 BY MR. CHRISTOPHER: 19 Q. Well, sure. It says it's not the same level 20 of accuracy as a traditional meter in a clinical 21 setting, but it doesn't say that the accuracy is such 22 that it's useless to use an optical method to measure 23 blood glucose, correct? 24 MR. SCHARN: Objection. Form. 25 THE WITNESS: It doesn't say it in this	Page 151 1 blood glucose concentration is not 2 feasible without stable measurement 3 conditions. 4 Do you see that? 5 A. I do. 6 Q. And that's what you quoted from paragraph 243 7 of your declaration? 8 A. That's right. 9 Q. Now, this paragraph that you quoted from, if 10 you scroll up to page 9, the bottom right-hand corner, 11 it is in a section titled "Conclusions and outlook." 12 Do you see that? 13 A. I do. 14 Q. And then at the top of page 10, do you see 15 there's a Table 1, Summary of the sensors measured in 16 this article"? 17 A. Mentioned in this article, yes. 18 Q. Excuse me, yes, sensors. "Summary of the 19 sensors mentioned in this article." 20 So the statements in this conclusion are 21 referring to all of these sensors mentioned in the 22 article, correct? 23 A. It appears so, yes. 24 Q. And so the observation that accurate detection 25 of blood glucose concentration is not feasible without
Page 150 1 paragraph. But the overall conclusion of this document, 2 and in the field, is that it's simply not feasible at 3 the moment, as of 2026. And that's evidenced by the 4 fact that there's no commercial products that actually 5 do this. Because if there were, they would be extremely 6 lucrative. 7 BY MR. CHRISTOPHER: 8 Q. When you refer to "actually do this," you're 9 referring to a device that would non-invasively measure 10 blood glucose with the same level of accuracy as a 11 traditional meter in a clinical setting, correct? 12 MR. SCHARN: Objection. Form. 13 THE WITNESS: I think there would be even 14 utility if it wasn't the same level of accuracy, but as 15 long as it was a reasonable level of accuracy. And at 16 the moment, these devices don't even offer that. 17 BY MR. CHRISTOPHER: 18 Q. If we go to page 10 of Exhibit 1065, and I'll 19 direct your attention to the right-hand column with the 20 paragraph that begins with the word "Specificity." 21 Do you see that? 22 A. Yes. 23 Q. And very last sentence in that paragraph 24 states, (as read): 25 Therefore, accurate detection of	Page 152 1 stable measurement conditions would apply to all the 2 sensors listed in Table 1, not just an optical sensor, 3 correct? 4 MR. SCHARN: Objection. Form. 5 THE WITNESS: It might. I'm not sure. I'd 6 have to read the rest of the section in detail. 7 In general, specificity, especially under 8 changing measurement conditions, is indeed a big 9 challenge across many different types of measurement 10 techniques, specifically for measuring glucose, and 11 particularly for non-invasive optical techniques. 12 BY MR. CHRISTOPHER: 13 Q. And again, that last sentence states, (as 14 read): 15 Accurate detection of blood glucose 16 concentration is not feasible 17 without -- (indiscernible.) 18 (Reporter requested clarification.) 19 BY MR. CHRISTOPHER: 20 Q. Let me restart. 21 That last sentence in the paragraph we were 22 looking at on page 10 of Exhibit 1065 and it states (as 23 read): 24 Accurate detection of blood glucose 25 concentration is not feasible

Page 153 1 without stable measurement 2 conditions. 3 Right? 4 A. Yes, that's what it says. 5 Q. And doesn't that sentence suggest to a person 6 of skill in the art that accurate detection of blood 7 glucose concentration is feasible with stable 8 measurement conditions? 9 A. So essentially what that's referring to is, 10 you know, if you put this device on a human and the only 11 thing that changed in the human physiology is glucose 12 concentration, and everything else remained the same 13 under that very confined situation, one of these sensors 14 might work. I don't know the level of accuracy it would 15 have, but it might work. 16 And in fact, this is where most of the 17 literature in this area has -- has done this, using not 18 actual on-body testing but in vitro tests on a lab bench 19 where they can control these things. 20 But in reality on, for example, a wrist-worn 21 device, many things change over time. Many blood 22 constituents, many interstitial fluid components, and so 23 on, change over time. And accurately detecting the 24 change in glucose versus the change in anything else is 25 extremely difficult, and that's why specificity, which	Page 155 1 "specifically" in paragraph 25 of your declaration, you 2 provide the definition of a person of skill in the art 3 with respect to the '790 Patent, correct? 4 A. That's correct. 5 Q. And you state that a person of skill in the 6 art would have had an undergraduate degree in 7 engineering. 8 Do you see that? 9 A. Yes. 10 Q. Or a related field of study? 11 A. Yes. 12 Q. Along with -- and then there's a -- there's a 13 part A and there's a part B that bridges down to the 14 next page. 15 Do you see that? 16 A. I do. 17 Q. And part A says, (as read): 18 Relevant industrial experience 19 studying or developing 20 physiological monitoring devices 21 (e.g., non-invasive optical 22 biosensors) in industry. 23 Do you see that? 24 A. I do. 25 Q. All right. So for option A, how much relevant
Page 154 1 is an important component in identifying objects, is so 2 challenging in these conditions. 3 Q. Couldn't you run one of the situations, 4 confined situations, where everything remains the same 5 with a wrist-worn device? 6 MR. SCHARN: Objection. Form. 7 THE WITNESS: I don't think humans generally 8 have such consistent conditions. 9 BY MR. CHRISTOPHER: 10 Q. Let's go to paragraph 25 of your declaration. 11 This is on page 20 of the PDF. 12 A. Okay. 13 Q. All right. And about one, two, three, four, 14 five, six, seven lines down there's a sentence that 15 starts with "Specifically." 16 Do you see that? 17 A. Yes, I do. 18 Q. And here you provide the definition of a 19 person skilled in the art with respect to the '970 20 Patent, correct? 21 A. That's correct. 22 Q. Sorry '790. Let me -- let me strike that and 23 restart. I have another case with a '970 Patent, so 24 it's killing me. 25 In the sentence that starts with	Page 156 1 industrial experience would a person need to qualify as 2 a person of skill in the art? 3 A. I see that I didn't actually put any time in 4 that definition. Usually such a definition, and I think 5 this is probably fair for this case, would be around 6 two years. 7 Q. And would that be the same for part B, how 8 much additional experience -- focused on the experience 9 part, how much additional experience in academia, 10 studying or developing physiological monitoring devices 11 would be required under part B to qualify as a person of 12 skill in the art? 13 A. I think that's fair. Again, I didn't offer 14 that precise language in my report but two years is 15 approximately fair. 16 MR. CHRISTOPHER: All right. We can go off 17 for about five minutes. I think I can probably wrap up 18 pretty quickly after that. I just need to go over a 19 couple notes here. 20 MR. SCHARN: Sounds good. 21 (Recess taken.) 22 BY MR. CHRISTOPHER: 23 Q. Did you discuss your testimony with anyone 24 during our break? 25 A. No.

Page 157 1 Q. Okay. So I just have a few follow-up 2 questions. 3 You know earlier today we discussed the 4 effects of ambient light sensor. 5 Do you recall that? 6 A. Yes. 7 Q. Okay. And we talked about how claim 7 of the 8 '790 Patent is directed to a wearable device that's 9 adapted to be worn on a wrist. Correct? 10 A. That's right. 11 Q. A person of skill in the art would understand 12 that if a pulse oximeter sensor was pointed at a wrist, 13 that would help prevent interference from ambient light 14 such as sunlight, correct? 15 A. It's -- it can certainly help. The watch 16 itself or the device on the wrist itself would block a 17 large portion of the direct sunlight from reaching the 18 photo detectors. But there's always going to be some 19 light leakage underneath the contact point of the 20 wrist-worn device and the actual sensors. 21 Q. All right. So I've put in the chat 22 Exhibit 1032. And the confusion earlier was my fault. 23 This is referred to as Valencell or Valencell 93, which 24 is actually the assignee and not the inventor, thus my 25 confusion what I was looking at.	Page 159 1 Do you see that? 2 A. I see it says that, yeah. 3 Q. And then a couple lines down it says, (as 4 read): 5 The tilting of the sensor module 6 700, 800 serves at least the 7 following functions. 8 Do you see that? 9 A. Yes. 10 Q. And then "1, protection from sunlight." 11 Do you see that? 12 A. Yes. 13 Q. And then the next sentence reads, (as read): 14 Sunlight immunity may be improved 15 in this fashion because a human's 16 wrist is typically pointed away 17 from sunlight, and so pointing the 18 sensor module down along the arm 19 may help prevent environmental 20 (i.e., sunlight) interference. 21 Do you see that? 22 A. I do. 23 Q. Okay. And then the last sentence of that 24 paragraph states, (as read): 25 Also, pointing the sensor module
Page 158 1 (Previously marked Exhibit 1032 was 2 shown to the witness.) 3 BY MR. CHRISTOPHER: 4 Q. So if you could open up Exhibit 1032 whenever 5 you have it. 6 A. Okay. 7 Q. Do you recognize Exhibit 1032 as the reference 8 referred to as Valencell 93 in your declaration? 9 A. Yes. 10 Q. And if we could turn to paragraph 153, 11 Exhibit 1032. If I beat you there, I'll give you the 12 PDF page number. 13 Looks like PDF page 44 or 46? 14 A. Just give me a moment here. Okay. You said 15 150 ... 16 Q. It's on page 44 of 46 in the PDF. It's in the 17 left-hand column. 18 A. I got it. Thank you. 19 Q. Okay. So in the third line of paragraph 153, 20 Valencell states, (as read): 21 In the illustrated embodiments of 22 Figures 28 and 29, the center 23 module 700, 800 is tilted towards 24 the wrist (away from the upper 25 arm).	Page 160 1 700, 800 towards the wrist may 2 increase the surface area of blood 3 flow exposed to the sensor module 4 700, 800, thus increasing the blood 5 flow intensity for PPG and the 6 like. 7 Do you see that? 8 A. I do. 9 Q. And so the Valencell is teaching that it's 10 beneficial to increase the surface area that is exposed 11 to light to increase the blood flow signal intensity for 12 PPG, correct? 13 MR. SCHARN: Objection. Form. 14 THE WITNESS: Not sure you stated it exactly 15 as how it's in Valencell here, but generally it said 16 that, yeah, pointing the sensor module towards the wrist 17 may increase the surface area of blood flow exposed to 18 the sensor module, and therefore improve signal 19 intensity for PPG. 20 BY MR. CHRISTOPHER: 21 Q. When it says "increase the surface area of 22 blood flow exposed to the sensor module," would a person 23 skilled in the art understand that to mean increasing 24 the surface area, you know, of tissue that receives 25 light from the sensor module?

Page 161 1 A. I believe so. And this particular reference 2 uses these light-guiding regions to help, in some sense, 3 focus the light or, in some sense, expand the area of 4 light that gets exposed to the tissues so that more 5 reflected light can come back into the sensor module. 6 Q. So would it be fair to say that in a 7 reflectance mode embodiment, a person of skill in the 8 art would find it beneficial to increase the amount of 9 surface area of the tissue that's illuminated to 10 increase the amount of light that's reflected back into 11 the detector? 12 MR. SCHARN: Objection. Form. 13 THE WITNESS: It could be. There's -- there's 14 a number of different tradeoffs associated with making 15 that design decision. I would say that generally 16 increasing the amount of light that gets shown into 17 tissue will then increase the amount of light that 18 either gets reflected back out of the tissue in a 19 reflective mode device or transmitted through the tissue 20 in a transmissive mode device; therefore, increasing the 21 signal amplitude received by the detector. 22 So generally that statement is true for both 23 reflectance and transmissive mode devices. And, of 24 course, the tradeoff of doing so is you're shining more 25 light into tissue and so you need more power consumption	Page 163 CERTIFICATE OF REPORTER I, RENEE COMBS QUINBY, California Certified Shorthand Reporter #11867, hereby certify that the witness in the foregoing deposition was by me duly sworn to tell the truth, the whole truth, and nothing but the truth in the within-entitled cause; That said deposition was taken in shorthand by me, a disinterested person, at the time and place therein stated, and that the testimony of the said witness was thereafter reduced to typewriting under my direction and supervision; That before completion of the deposition, review of the transcript was not specified. If requested, any changes made by the deponent (and provided to the reporter) during the period allowed are appended hereto. I further certify that I am not of counsel or attorney for either or any of the parties to the said deposition, nor in any way interested in the event of this cause, and that I am not related to any of the parties thereto. Dated: 06/22/2026 <i>Renee Quinby</i> ----- Renee Combs Quinby, RDR, CRR, CA CSR #11867
Page 162 1 to generate said light. 2 MR. CHRISTOPHER: Well, Dr. Mercier, I 3 appreciate your time today answering our questions, and 4 with that, I'll pass the witness. 5 MR. SCHARN: No questions from me. Thank you 6 everybody for your time. 7 MR. CHRISTOPHER: Thank you. 8 THE WITNESS: Thank you very much. 9 (Whereupon, signature was not 10 specified and the witness was 11 excused at 1:22 p.m.) 12 --oOo-- 13 14 15 16 17 18 19 20 21 22 23 24 25	Page 164 DECLARATION UNDER PENALTY OF PERJURY Case Name: Whoop, Inc. vs. Omni Medsci, Inc. Date of Deposition: 06/11/2026 Job No.: 10192701 I, DR. PATRICK MERCIER, hereby certify under penalty of perjury under the laws of the State of _____ that the foregoing is true and correct. Executed this _____ day of _____, 2026, at _____. _____ DR. PATRICK MERCIER NOTARIZATION (If Required) State of _____ County of _____ Subscribed and sworn to (or affirmed) before me on this _____ day of _____, 20____, by _____, proved to me on the basis of satisfactory evidence to be the person who appeared before me. Signature: _____ (Seal)

1 DEPOSITION ERRATA SHEET Case Name: Whoop, Inc. 2 vs. Omni Medsci, Inc. Name of Witness: Dr. Patrick Mercier 3 Date of Deposition: 06/11/2026 Job No.: 10192701 4 Reason Codes: 1. To clarify the record. 2. To conform to the facts. 5 3. To correct transcription errors. 6 Page ____ Line ____ Reason ____ 7 From ____ to ____ 8 Page ____ Line ____ Reason ____ 9 From ____ to ____ 10 Page ____ Line ____ Reason ____ 11 From ____ to ____ 12 Page ____ Line ____ Reason ____ 13 From ____ to ____ 14 Page ____ Line ____ Reason ____ 15 From ____ to ____ 16 Page ____ Line ____ Reason ____ 17 From ____ to ____ 18 Page ____ Line ____ Reason ____ 19 From ____ to ____ 20 Page ____ Line ____ Reason ____ 21 From ____ to ____ 22 Page ____ Line ____ Reason ____ 23 From ____ to ____ 24 Page ____ Line ____ Reason ____ 25 From ____ to ____	Page 165
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