Deposition of

Brian W. Anthony

April 18, 2026

Volume II

Samsung Electronics Co.

vs.

Omni Medsci, Inc.

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD., SAMSUNG ELECTRONICS AMERICA, INC., FOSSIL GROUP, INC., FOSSIL STORES I, INC., FOSSIL PARTNERS, L.P., OURA HEALTH OY, AND ONEPLUS TECHNOLOGY (SHENZHEN) CO., LTD.,

Petitioners,
v.
OMNI MEDSCI,
Patent Owner.

Inter Partes Review No. IPR2025-01250
Inter Partes Review No. IPR2025-01251
Inter Partes Review No. IPR2025-01252
Inter Partes Review No. IPR2025-01253
Inter Partes Review No. IPR2025-01254

DEPOSITION OF BRIAN W. ANTHONY, PH.D.
VOLUME II
HELD VIA VIDEOCONFERENCE
Saturday, April 18, 2026
9:03 a.m. EDT

Pages: 266 - 397
Reported Stenographically by:
Cassidy Western, RPR, CRR, CA CSR NO. 14722
Job No.: 10188950

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DEPOSITION OF BRIAN W. ANTHONY, PH.D., VOLUME II, HELD VIA VIDEOCONFERENCE, TAKEN ON BEHALF OF THE PATENT OWNER, COMMENCING AT 9:03 A.M. AND CONCLUDING AT 12:37 P.M., SATURDAY, APRIL 18, 2026, BEFORE CASSIDY WESTERN, CALIFORNIA CERTIFIED SHORTHAND REPORTER NO. 14722

* * *

A P P E A R A N C E S
(ALL PARTIES APPEARING REMOTELY)

FOR THE PETITIONER SAMSUNG ELECTRONICS CO., LTD., SAMSUNG ELECTRONICS AMERICA, INC.:
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A P P E A R A N C E S (CONTINUED)

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I N D E X

W I T N E S S:

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PREVIOUSLY MARKED EXHIBITS:

NUMBER	PAGE
Exhibit 1003 in IPR2025-01254	271
Exhibit 1003 in IPR2025-01252	301
Exhibit 1030 in IPR2025-01250	344
Exhibit 1028 in each of the proceedings	371

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1 HELD VIA VIDEOCONFERENCE
2 SATURDAY, APRIL 18, 2026
3 9:03 A.M. - 12:37 P.M.
4 * * *
5 THE STENOGRAPHER: We are on the record
6 at 9:03 a.m. This is Volume II of the deposition
7 of Brian Anthony. My name is Cassidy Western. I
8 am a California Certified Shorthand Reporter, and
9 my license number is 14722.
10 You may proceed, Counsel.
11 EXAMINATION BY COUNSEL FOR PATENT OWNER
12 BY MR. CHRISTOPHER:
13 **Q Good morning, Dr. Anthony.**
14 A Good morning.
15 **Q You understand you're still under oath?**
16 A Yes.
17 **Q Okay. And any reason why you cannot**
18 **give complete, accurate, and truthful testimony**
19 **today?**
20 A No.
21 **Q Okay. And I think I know the answer**
22 **based on your background. But for the record,**
23 **where are you physically located today?**
24 A In my office at MIT, Cambridge,
25 Massachusetts.

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1 **Q Okay. And did you discuss your**
2 **testimony with anyone, including counsel, between**
3 **the end of yesterday's deposition and this**
4 **morning?**
5 A No.
6 **Q Okay. Did you review any documents in**
7 **connection with these proceedings between the end**
8 **of yesterday's deposition and this morning?**
9 A No.
10 **Q Okay. Sounds like you might have had a**
11 **nice Friday night, then.**
12 **So before we stopped yesterday, we were**
13 **discussing your declaration for the '475 patent.**
14 **If you still have a copy of that, that would be**
15 **great. But if not, I'm going to put --**
16 A I have the downloads from yesterday.
17 **Q Perfect. But for our court reporter,**
18 **I'll just put this in the --**
19 A Fair enough.
20 **Q -- Zoom chat so it's there.**
21 (Exhibit 1003 in IPR2025-01254 was
22 previously marked.)
23 BY MR. CHRISTOPHER:
24 **Q So we were discussing Exhibit 1003 in**
25 **IPR2025-01254 for the '475 patent. Do you have**

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1 **that in front of you?**
2 A You mean my declaration?
3 **Q Yes.**
4 A Yes.
5 **Q Okay. And we were discussing before we**
6 **ended yesterday some of the limitations in**
7 **Claim 1. I'd like to direct your attention now to**
8 **paragraph 135 in your declaration for the**
9 **'475 patent.**
10 A Okay. 135.
11 **Q Yeah. And at the top of paragraph 135,**
12 **you wrote:**
13 **'475 patent element [1.d] is**
14 **substantially identical to the corresponding**
15 **limitation in the '533 patent on which I**
16 **previously opined.**
17 **Do you see that?**
18 A Yes.
19 **Q And then in the next sentence, you**
20 **wrote:**
21 **Aside from differing turns of phrases,**
22 **the main differences between the two limitations**
23 **are (i) the '533 patent's additional use of**
24 **semiconductor sources that are light emitting**
25 **diodes; and (ii) the '533 patent's use of optical**

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1 **beam as opposed to the '475's use of optical**
2 **light.**
3 **Do you see that?**
4 A Yes.
5 **Q My question is: Would a person of skill**
6 **in the art understand that there's a difference**
7 **between the term "optical beam" and the term**
8 **"optical light"?**
9 A Well, as I explain in my following part
10 of that paragraph 135, I didn't need to opine on
11 the complete overlap between "beam" and "light,"
12 but certainly as I described, Lisogurski meets the
13 limitation.
14 Certainly as I described here, a person
15 of ordinary skill in the art would have understood
16 the patent's use of "optical beam" describes the
17 general propagation, radiation pattern or
18 directional shape of light, as does the '475's use
19 of "optical light."
20 So the difference of terms don't change
21 my analysis and my opinions of the '533 patent
22 apply equally to the '475 patent.
23 **Q You don't have any opinions on the**
24 **difference between optical beam and -- whether**
25 **there's a difference in scope between "optical**

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1 **beam" and "optical light." Your opinion is that**
2 **the prior art meets both terms. Is that correct?**
3 A That is correct.
4 **Q Would a person of skill in the art**
5 **understand that the term "optical beam" is**
6 **narrower than the term "optical light"?**
7 MR. KIM: Objection; form.
8 THE WITNESS: Again, as a -- in the
9 previous answer, I didn't need to opine about the
10 potential differences. But certainly in the
11 overlapping region, a POSITA would understand that
12 the terms -- the different use of terms, it
13 doesn't change my analysis. It's light that is
14 interacting with -- in either beam shape or not
15 beam shape. But it still -- the art meets the
16 limitation.
17 BY MR. CHRISTOPHER:
18 **Q Okay. You haven't formed any opinions**
19 **as to whether the term "optical beam" is narrower**
20 **than the term "optical light" as used in the**
21 **claims of the '475 and '533 patents. Is that**
22 **correct?**
23 MR. KIM: Objection; form.
24 THE WITNESS: Again, as I say here, I
25 didn't need to opine about the differences between

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1 the terms "optical beam" and "optical light." But
2 certainly in the overlapping region, the art
3 certainly meets the limitation, as I describe.
4 Optical beam, optical light, still light
5 interacting with the -- the tissue to analyze
6 properties therein.
7 BY MR. CHRISTOPHER:
8 **Q Okay. I'd like to direct your attention**
9 **now to paragraph 196 of your declaration for the**
10 **'475 patent. This would be page 106 of the PDF.**
11 **Let me know when you get there.**
12 A 196? Yes.
13 **Q 196. Okay. In paragraph 196 under the**
14 **subheading Element [1.n], you address element 1.n**
15 **in Claim 1 of the '475 patent. Correct?**
16 A Yes. Okay, yes. Yep.
17 **Q Okay. And then in paragraph 197 and**
18 **198, you go on to provide your opinions that**
19 **Lisogurski meets the requirements of element**
20 **[1.n]. Correct?**
21 A Right. As I describe in 197 and then
22 198, Lisogurski discloses a system to detect a
23 signal indicative of system errors such as a
24 physiologically impossible value or a probe-off
25 signal. A POSITA, a person of ordinary skill,

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1 would have understood or found it obvious that
2 Lisogurski's sensor within the system detects a
3 physiologically impossible value or probe-off
4 signal.
5 Lisogurski discloses the functionality,
6 again, may be combined in a single component. As
7 I discussed in prior, in IX.A.2, the detection of
8 the physiologically impossible value or probe-off
9 signal in Lisogurski's sensor would be consistent
10 with the growing trends towards integrating
11 digital features.
12 I go on: Lisogurski contemplates the
13 error condition not worn by the user when a
14 probe-off signal is detected. So Lisogurski's
15 sensor would determine if the apparatus is being
16 worn by the user or not. So yes.
17 **Q Okay. Yesterday, just to reorientate**
18 **you, you recall we discussed you had authored a**
19 **prior declaration concerning the '484 patent. Do**
20 **you recall that?**
21 A Yes.
22 **Q And you had also previously authored in**
23 **2019 a declaration concerning the '533 patent.**
24 **Correct?**
25 A Yes.

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1 **Q And you don't cite either of your prior**
2 **declarations for the '484 or the '533 patent in**
3 **paragraphs 197 and 198 of your declaration for the**
4 **'475 patent. Correct?**
5 A Well, for example, I mean, I cite back
6 to my earlier discussions in this declaration on
7 the '475 to Section IX.A.3.A and IX.A.3.G, and
8 others that -- where I do -- I am inciting -- or
9 I'm citing my prior both in the '484 and the '533.
10 **Q So it's a -- that's --**
11 A I don't -- I don't -- I'm not reciting
12 it here, but it's certainly incorporated as part
13 of the discussion what I include here in
14 paragraphs 196 and 197.
15 **Q So that's a fair point. Let's look at**
16 **paragraph 197. In paragraph 97, we'll take this**
17 **in pieces --**
18 A 97 or 197.
19 **Q 197. Sorry. 197.**
20 A Uh-huh.
21 **Q So looking at paragraph 197 of your**
22 **declaration for the '475 patent. And at the**
23 **beginning, it reads "Lisogurski discloses and**
24 **renders obvious wherein the apparatus," in bold.**
25 **Do you see that?**

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A Yes.
Q And then you refer to your discussion in Section IX.A.3.A for element [1.pre]. Correct?
A Yes.
Q And then the next text in bold from the claim reads:
Is at least in part configured to determine based at least in part on the output signal.
And you cite back to your discussion in Section IX.A.3.G for element [1.f.] Correct?
A Yes.
Q And the next bold text we see, "that the apparatus," you cite back to Section IX.A.3.A for element 1.pre. Correct?
A Yes.
Q And then finally, at the end of paragraph 197 in your declaration for the '475 patent in bold, it says "is being worn by the user." And you cite to two portions of Lisogurski.
Do you see that?
A Yes.
Q And for that final portion of element [1.n], "is being worn by the user," you

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don't cite back to a prior section of your declaration for the '475 patent. Correct?
A What's cited there at the end of that sentence, I refer back to Lisogurski 15:66 through 16:4, and 36:66 through 37:2, which is -- let me go there.
Q Well, I'm just asking, you cite Lisogurski here. Correct? Just yes or no?
A Yes, I do.
Q Okay. And you don't cite either of your prior declarations for the '484 or the '533 for that last portion of element [1.d] -- or sorry, [1.n]. Correct?
A I cite Lisogurski here. But, you know, respectfully, I'm citing Lisogurski every place because even in the prior '484 and '533, I was citing Lisogurski. So it's Lisogurski throughout. But I am citing there 15:66 through 16:4 and 36:66 through 37:2.
Q Understood. Let's look now at paragraph 236, which concerns element [8.d]. This would be on page 124 of the PDF.
A 236?
Q Paragraph 236. That's right. And in paragraph 236, you address element -- excuse me.

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Let me start over.
In paragraph 236, you address element [8.d] from independent Claim 8 of the '475 patent. Correct?
A Correct.
Q Okay. And then in paragraph 237, you write:
For the same reason I discuss above regarding claim elements [1.f] and [1.l], the majority of this limitation is met by Lisogurski.
Do you see that?
A Yes.
Q And then in paragraph 238, you write:
Regarding a processor, a person of ordinary skill in the art would have understood, or at least found it obvious, that using a processor for Lisogurski's front-end processing circuitry is a well-known concept.
Do you see that?
A Yes.
Q Okay. So the term "processor" in element [8.d] is a portion of element [8.d] that you had not addressed previously above for Claim 1 of the '475 patent. Correct?
A Well, in 1, I describe, for example, in

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paragraph 147, how Lisogurski meets the limitation of processing. And then as I described in 238, having the processing, a person of ordinary skill would have understood that using a processor for Lisogurski's front-end processing is well-known. Lisogurski discloses that front-end processing circuitry performs various analog and digital processing of the output signal. A POSITA would have understood or found it obvious that those are common functions of a processor. To this end, Lisogurski explicitly discloses all the concepts of physiological optical monitoring system which includes front-end processing circuitry can be realized in a processor circuit or in processor circuitry. And that's at Lisogurski 16:14 through 16.
Implementing a processor at the front end was well-known in the art. For example, in U.S. Patent 8,852,103, which is Exhibit 1054, further discloses a medical imaging system preprocessing circuitry that performs one or more functions on signals such as determining one or more characteristics of a received signal.
So I discuss processing in -- in one, and then processor explicitly. But Lisogurski, as

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1 I describe here, meets that limitation as well.
2 **Q Going back to paragraph 238 o your for**
3 **the '475 patent, you don't cite either of your**
4 **prior declarations for the '484 or '533 patents in**
5 **paragraph 238 of your declaration. Correct?**
6 A I'm citing Lisogurski and pointing out
7 how Lisogurski meets those limitations. And even
8 in the prior '484 and '533, those were also citing
9 Lisogurski. But, you know, in that paragraph, I'm
10 citing back to Lisogurski.
11 **Q Sorry. I don't think I got a clear**
12 **answer.**
13 **You don't directly cite your**
14 **declarations for the '484 or '533 patents, the**
15 **prior ones, in paragraph 238. Correct?**
16 MR. KIM: Objection; form.
17 THE WITNESS: As I answered, in that
18 paragraph, I'm describing Lisogurski meeting
19 limitations. I'm not specifically citing the
20 prior declarations, but those prior declarations
21 also were citing Lisogurski. But in that
22 paragraph 238, I'm citing back to Lisogurski. For
23 example, 12:42-50 for the output signal as single
24 digital processing. And that Lisogurski at
25 16:14-16, the functionality can be realized in the

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1 processor circuitry.
2 So Lisogurski clearly teaches the -- the
3 limitation there.
4 BY MR. CHRISTOPHER:
5 **Q Let's look at paragraph -- let's scroll**
6 **up. Paragraph 198 for your declaration of the**
7 **'475 patent. It's at page 107 of the PDF.**
8 A Okay. Got it.
9 **Q Got it. Okay.**
10 **In paragraph 198 in the first sentence,**
11 **you wrote:**
12 **Lisogurski discloses that its system**
13 **detects a signal indicative of a system error such**
14 **as a physiologically impossible value or a**
15 **probe-off signal.**
16 **And you cite Lisogurski, which is**
17 **Exhibit 1025, at Column 36, Line 66 through**
18 **Column 37, Line 2. Do you see that?**
19 A Yes.
20 **Q And I believe we discussed this passage**
21 **from Lisogurski yesterday, but if you could turn**
22 **for me to Column 36, line 66 of Lisogurski, which**
23 **is Exhibit 1025 in each of the five proceedings.**
24 A Yep.
25 **Q I need to catch up with you now.**

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1 **Column 36, Line 66, Lisogurski discloses:**
2 **In some embodiments, the system may**
3 **detect a signal indicative of a system error such**
4 **as a physiologically impossible value, a probe-off**
5 **signal, any other suitable signal or any**
6 **combination thereof.**
7 **Do you see that?**
8 A Yes.
9 **Q And in the very first portion of that**
10 **sentence, it states:**
11 **The system may detect a signal**
12 **indicative of a system error.**
13 **Do you see that?**
14 A Yes.
15 **Q Lisogurski doesn't specify which**
16 **component within the system detects a signal**
17 **indicative of a system error as described here in**
18 **Column 36 starting at Line 66. Correct?**
19 MR. KIM: Objection; form.
20 THE WITNESS: Well, Lisogurski
21 explicitly discloses that all the functionality
22 can be realized in a single processor. And so
23 Lisogurski -- a POSITA reading Lisogurski would
24 have understood that all the functionality can be
25 realized in a single processor. That's what

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1 Lisogurski discloses.
2 BY MR. CHRISTOPHER:
3 **Q But just focusing specifically for**
4 **now -- we'll get to that. But focusing**
5 **specifically on Column 36, Line 66 through**
6 **Column 37, Line 2, in that sentence, Lisogurski,**
7 **you would agree, doesn't specify which component**
8 **in the system detects a signal indicative of a**
9 **system error. Correct?**
10 MR. KIM: Objection; form.
11 THE WITNESS: But -- so that word --
12 that sentence uses "system." The system may
13 detect. And furthermore, Lisogurski then says
14 that the system can be realized in a -- person of
15 ordinary -- let's see. Explicitly discloses all
16 of the components of the system can be realized in
17 a processor.
18 So certainly a POSITA reading that
19 sentence and the -- the Lisogurski in its entirety
20 would have understood that the signal, that
21 detection, would happen in a processor.
22 BY MR. CHRISTOPHER:
23 **Q Well, let's look at Figure 1.**
24 A Figure 1 of?
25 **Q Lisogurski. Let me know when you're**

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1 **there. It's page 3 of the PDF.**
2 A Okay.
3 **Q Okay. And this is a -- we talked about**
4 **this yesterday. This is showing a -- an example**
5 **system 100 in Figure 1 of Lisogurski. Correct?**
6 A Yes.
7 **Q And a moment ago, you said that**
8 **Lisogurski discloses that all the components of a**
9 **system can be realized in a processor. Do you**
10 **recall that?**
11 A As I was quoting from paragraph 238,
12 Lisogurski discloses all the components of the
13 physiological monitoring system, which includes
14 its front-end processing circuitry can be realized
15 in the processing -- in the processor circuit.
16 **Q Okay. Looking at the example system in**
17 **Figure 100, would a person of skill in the art**
18 **understand that all of the components shown in**
19 **Figure 1 can be realized in a processor?**
20 MR. KIM: Objection; form.
21 THE WITNESS: So, for example, as
22 described in Column 16 of Lisogurski at Line--
23 starting at 12:
24 In other embodiments, the functionality
25 of one or more of the components may be performed

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1 in a different order or may not be required. In
2 an embodiment all the components of the
3 physiological monitoring system can be realized in
4 the processor circuitry.
5 BY MR. CHRISTOPHER:
6 **Q Okay. You just quoted Lisogurski, but**
7 **that doesn't answer my question, which is: Can**
8 **all of the components of the exemplary system 100**
9 **shown in Figure 1 be realized in a processor?**
10 MR. KIM: Objection; form.
11 THE WITNESS: Well, a POSITA reading
12 Lisogurski would understand the functionality of
13 all the processing. The -- the -- the LEDs would
14 be a front end to that processing circuitry. So a
15 POSITA would understand that the LEDs, that they
16 are connected to the processing circuitry, but
17 that all the functionality, the processing
18 functionality, can be determined by -- with a
19 processor.
20 BY MR. CHRISTOPHER:
21 **Q So, in fact, it's not correct that all**
22 **of the components of the system 100 can be**
23 **realized in a processor. Correct?**
24 MR. KIM: Objection; form.
25 THE WITNESS: Lisogurski describes quite

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1 explicitly components can be split apart, put
2 together in various ways. A POSITA would
3 understand there are various ways to realize the
4 functionality. That they can be divided over
5 multiple components. For example, some or all of
6 the functionality can be performed in front-end
7 processing circuitry and back-end processing
8 circuitry or both. In other embodiments, the
9 functionality of one or more components may be
10 performed in a different order.
11 So Lisogurski is not just saying it all
12 has to be done in one thing. It's saying that it
13 can be split over multiple things. And certainly,
14 a POSITA would understand how to incorporate
15 processing into a processor.
16 BY MR. CHRISTOPHER:
17 **Q That doesn't answer my question. A few**
18 **moments ago, you said, and I'll quote:**
19 **Lisogurski explicitly discloses all of**
20 **the components of a system can be realized in a**
21 **processor.**
22 **Do you recall saying that?**
23 A And that is what Lisogurski states.
24 Yes.
25 **Q Okay. Now, if we look at Figure 1,**

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1 **let's take the light source, 130, for example.**
2 **Could you realize a light source, 130, in a**
3 **processor? Would a person of skill in the art**
4 **understand that?**
5 MR. KIM: Objection; form.
6 THE WITNESS: My analysis of Lisogurski
7 is Lisogurski in its entirety, not just a single
8 sentence. And Lisogurski explicitly explains how
9 the functionality in that paragraph at the top of
10 Column 16, that the functionality of the front-end
11 processing circuitry and back end processing
12 circuitry can be combined into a single processor.
13 In some of the embodiments, the functionality of
14 some of the components may be divided over
15 multiple.
16 For example, some or all of the
17 functionality of the control circuitry may be
18 performed in the front-end processing circuitry
19 and back end processing circuitry or both. In
20 other embodiments one or more of the
21 functionalities may be performed in a different
22 order or not at all or might not be required.
23 In an embodiment, all the components of
24 the physiological monitoring system can be
25 realized in processing circuitry.

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So it's describing, broadly, the components, the functionality can be distributed over -- in different ways. That some of the functionality can be excluded. Some can be included. So broadly, it's describing that there's a lot of flexibility in how these components are broken up, whether all of the functionality is included or not. And so it's quite -- quite clear a POSITA reading this would understand that the Figure 1 is representative of one possible configuration and that they can be arranged in -- by drawing different boxes around the different functionalities.

BY MR. CHRISTOPHER:

Q I don't think that answers the question. You just read Lisogurski for a minute.

I'm asking you specifically about the example in Figure 1, which includes, for example, a light source 130 within the sensor 102. Would a person of skill in the art understand that you could realize all of the components shown in system 100, including the light source 130, in a processor?

MR. KIM: Objection; form.

THE WITNESS: It may require a custom

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processor, but certainly a processor that would include both an analog front-end and a digital front end. It would be a -- an expensive -- relatively more expensive solution, but a POSITA could certainly make a single monolithic set of electronics that would incorporate everything.

But a POSITA in the design tradeoff space would likely instead have the LEDs separate from that. But could a POSITA, certainly through the teachings of Lisogurski, envision that, have all the functionality in a custom processor that has mixed a analog and digital functionality? Absolutely.

But a POSITA reading this would broadly understand in their design tradeoff space, they have the flexibility to do it in the way that makes sense, given cost, complexity, performance targets.

BY MR. CHRISTOPHER:

Q Okay. A few moments ago, we were talking about the signal indicative of a system error described in Lisogurski at Column 36, starting at Line 66. You recall that?

A Column 36, Line 66. Yes.

Q Okay. And sticking with Figure 1, in

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the exemplary system shown in Figure 1, which component would a person of ordinary skill in the art understand performs that detection of a signal indicative of a system error described in Lisogurski?

MR. KIM: Objection; form.

THE WITNESS: Well, as I describe, going back as well to paragraph 91 and 92 where I talk about the motivation to modify Lisogurski and -- and having the front-end processing circuitry, I think a POSITA looking at the Figure 1 by itself and also as I describe in the motivations to modify, that processing would occur in the front-end processing circuitry as part of the -- you know, the blue box that I label in -- in Figure 45 for -- or page 45 of my other modification of the sub-Figure 1.

BY MR. CHRISTOPHER:

Q Well, if you look at paragraph 198 of your declaration for the '475 patent --

A Uh-huh.

Q -- in the second sentence -- you have it in front of you?

A 198?

Q 198.

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A Yeah.

Q In paragraph 198 in the second sentence, you wrote:

A person of ordinary skill would have understood, or at least found it obvious, that it is Lisogurski's sensor within the system that detects is physiologically impossible value or probe-off signal.

Do you see that?

A Yes.

Q And so the opinion you gave in your declaration is that it's the sensor within Lisogurski's system that detects a signal indicative of a system error. Correct?

MR. KIM: Objection; form.

THE WITNESS: As I describe, for example, in paragraph 117, Lisogurski -- a person of ordinary skill would have understood that together a light source, detector, front end processing circuitry, all of which are contained within Lisogurski's sensor as modified would comprise a biosensor.

And so, you know, certainly that functionality of the detection off -- or the off is part of the biosensor.

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1 BY MR. CHRISTOPHER:
2 **Q So when you refer to it's Lisogurski's**
3 **sensor within the system in paragraph 198, it's**
4 **your testimony you were referring to the modified**
5 **version of Lisogurski in which the processing**
6 **circuitry is relocated into the sensor. Is that**
7 **correct?**
8 A Well, I'm broadly describing how a
9 POSITA would understand from Lisogurski that
10 functionality can be put into different
11 arrangements. And I'm also describing the
12 motivation to modify that a biosensor would
13 include processing. And you asked where the
14 probe-off signal would occur it would be, for
15 example, in the sensor functionality that would
16 include the biosensor functionality that has that
17 processing. For example, as I describe in the
18 modification in 117.
19 **Q You would agree that for the sensor to**
20 **be able to detect a signal indicative of a system**
21 **error, it would require that processing circuitry**
22 **you just described. Correct?**
23 MR. KIM: Objection; form.
24 BY MR. CHRISTOPHER:
25 **Q Are you still reviewing your**

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1 **declaration?**
2 A Yes.
3 Right. Again, as I point out back in
4 the paragraph 100 on page 55:
5 In sum, a person of ordinary skill would
6 have understood that the close integration of the
7 front-end processing circuitry and detector in a
8 sensor is highly advantageous for multiple
9 reasons: It enhances the signal integrity,
10 reduces noise, signal degradation.
11 And so Lisogurski teaches that the
12 front-end process -- a POSITA reading Lisogurski
13 would understand the integration of that and the
14 motivation to put that front-end processing
15 together as -- with the biosensor, and that's
16 where the -- the detection of the -- the off
17 signal would be determined.
18 **Q Okay. Now let's go back to Figure 1 of**
19 **Lisogurski. It's page 3 of the PDF. Let me know**
20 **when you get there.**
21 A Yep.
22 **Q Okay. And I want to be clear. I'm --**
23 **I'm not asking you about any modifications to**
24 **Figure 1. I'm asking about Figure 1, the example**
25 **system as it exists here on the page.**

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1 A person of skill in the art would
2 understand that the sensor 102 by itself would not
3 be able to detect a signal indicative of a system
4 error. Correct?
5 MR. KIM: Objection; form.
6 THE WITNESS: I was not opining on
7 Figure 1 in isolation by itself. I'm opining on
8 what Lisogurski teaches and what a person of skill
9 in the art would understand in Lisogurski in its
10 entirety including Figure 1. A POSITA --
11 Lisogurski explicitly explains how functionality
12 can be realized in different configurations. And
13 Lisogurski certainly discloses that detection
14 signal being calculated in the -- in the
15 biosensor, which is the combination, as Lisogurski
16 discloses, of the light source, light detector and
17 front-end processing.
18 MR. CHRISTOPHER: I'm going to move to
19 strike as nonresponsive.
20 BY MR. CHRISTOPHER:
21 **Q Let's try it again. I'm asking about**
22 **Figure 1, there's no modifications to the system.**
23 **It's exactly how it's described in Lisogurski**
24 **shown in Figure 1.**
25 **Would a person of skill in the art**

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1 **understand that the sensor 102 be able to detect a**
2 **signal indicative of a system error, yes or no?**
3 MR. KIM: Objection to form and also to
4 the motion to strike.
5 THE WITNESS: Yes, because they would
6 look at that figure in its entirety and the
7 understanding of what Lisogurski teaches. And a
8 POSITA looking at that figure would understand
9 that they could alternatively put the box that is
10 the front-end processing circuitry to include the
11 detector. And so yes.
12 BY MR. CHRISTOPHER:
13 **Q So absent modifying Figure 1 to put the**
14 **front-end processing circuitry into sensor 102,**
15 **you would agree that sensor 102 could not detect a**
16 **signal indicative of a system error. Correct?**
17 MR. KIM: Objection to form.
18 THE WITNESS: That's not what I said.
19 I said that a POSITA looking at Figure 1
20 through the context of the entire patent, they
21 would look at that and understand they had the
22 design flexibility to group that -- put the box in
23 a slightly different way than the way it's drawn
24 because Lisogurski didn't draw all the possible
25 combinations of the boxes, but they described all

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1 the combinations of the boxes.
2 And so a POSITA reading that would
3 understand that even though in Figure 1 it's shown
4 as a box that's separate, in the teachings of
5 Lisogurski, it's possible to have a box that's
6 combined, and indeed it would be natural to do so.
7 MR. CHRISTOPHER: I'll move to strike as
8 nonresponsive.
9 BY MR. CHRISTOPHER:
10 **Q I'm going to ask it one more time and**
11 **give you one more opportunity to answer because**
12 **you're not answering my question.**
13 **Could the sensor 102 that is shown in**
14 **Figure 1 detect a signal indicative of a system**
15 **error absent some sort of modification as you've**
16 **described to Lisogurski, yes or no?**
17 MR. KIM: Objection to form and move to
18 strike. And also, to be clear, he's answering the
19 question.
20 MR. CHRISTOPHER: Counsel, he's not
21 answering the question.
22 MR. KIM: Well, he's explaining why he
23 cannot answer the question the way that it is
24 asked.
25 MR. CHRISTOPHER: No, he's not.

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1 MR. KIM: He's explaining.
2 MR. CHRISTOPHER: No, he's not. No,
3 he's not.
4 MR. KIM: Yes, he is.
5 MR. CHRISTOPHER: He's -- he's being
6 evasive this entire deposition.
7 MR. KIM: No.
8 MR. CHRISTOPHER: He doesn't want to
9 answer the question.
10 MR. KIM: I -- I disagree.
11 MR. CHRISTOPHER: Okay. The Board will
12 read this and I think it will be quite clear that
13 he's being evasive.
14 So let me -- let me -- for a clean
15 record, I'll re-ask question and give the witness
16 one more opportunity to answer because he's not
17 answering.
18 BY MR. CHRISTOPHER:
19 **Q Could the sensor 102 shown in Figure 1**
20 **of Lisogurski detect a signal indicative of a**
21 **system error, absent one of the modifications**
22 **you've proposed, for example, putting the**
23 **front-end processing circuitry within the sensor?**
24 MR. KIM: Objection to form.
25 THE WITNESS: Yes. Because the

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1 figure -- I'm not modifying Lisogurski. I'm not
2 modifying the figure. Because implicitly what
3 Lisogurski is describing is this is the
4 functionality, and the functionality can be
5 grouped in different ways.
6 And so a POSITA would look at this
7 figure and understand, yes, I have that front-end
8 processing circuitry as a POSITA designing my
9 device, that functionality can be incorporated as
10 part of the biosensor. And yes, I can detect the
11 signal in the case of probe-off in that thing that
12 is the sensor.
13 BY MR. CHRISTOPHER:
14 **Q Okay. Let me see if I understand this.**
15 **In order for the sensor 102 to detect**
16 **the signal indicative of a system error, there has**
17 **to be processing circuitry inside the sensor 102.**
18 **Is that correct?**
19 MR. KIM: Objection to form.
20 THE WITNESS: As I described in the --
21 what Lisogurski teaches and in the motivations to
22 modify, a POSITA reading Lisogurski would
23 understand that that probe-off signal could be
24 part and done inside of the processing
25 functionality of the modified biosensor.

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1 BY MR. CHRISTOPHER:
2 **Q Okay. Let me just ask it -- a simple**
3 **question. You would agree that in order to detect**
4 **a signal indicative of a system error, that**
5 **detection requires processing circuitry. Correct?**
6 MR. KIM: Objection to form.
7 THE WITNESS: I would agree that that is
8 what Lisogurski teaches and what a POSITA would
9 understand of how to do that into the integrated
10 biosensor as I've explained in the -- using the
11 front-end processing circuit together with the
12 sensor as part of the biosensor. Yes.
13 BY MR. CHRISTOPHER:
14 **Q Okay. Let's go -- do you still -- do**
15 **you still have, from yesterday, a copy of your**
16 **declaration for the '455 patent?**
17 A The '455?
18 **Q Yeah, for the '455.**
19 (Exhibit 1003 in IPR2025-01252 was
20 previously marked.)
21 **Q This is -- by the way, for the record**
22 **this is Exhibit 1003 in IPR 2025-01252.**
23 **Let me know when you have that available**
24 **to you.**
25 A Okay. '455.

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1 Q And when you have that open, can you
2 turn to paragraph 43 of your declaration, please?
3 A 43?
4 Q 43, please.
5 A Yep.
6 Q It's on page 25 of the PDF.
7 A Yep.
8 Q Okay. Paragraph 43, in the first
9 sentence, you wrote:
10 While the 353 -- let me restart. I got
11 my numbers backwards.
12 In the first sentence of paragraph 43,
13 you wrote: While the -- I did it again. Third
14 time's a charm.
15 In paragraph 43, you wrote:
16 While the '455 patent
17 claims additional -- claims include additional
18 limitations.
19 Do you see that?
20 A Yes.
21 Q Okay. And you would agree that the
22 claims of the '455 patent include additional
23 limitations that were not addressed during the
24 prior IPRs for the '533 and '484 patents.
25 Correct?

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1 MR. KIM: Objection; form.
2 THE WITNESS: I'm sorry. So can you
3 re-ask the question?
4 BY MR. CHRISTOPHER:
5 Q Yeah. Do you see where you -- you say
6 the term "additional limitations" in paragraph 43?
7 A Right. In paragraph 43, while the
8 '455 patent claims include additional limitations.
9 Q Right.
10 A They at most recite a common location to
11 place a wearable device, a generic driver and
12 associated driver circuitry for light sources, a
13 generic measurement or comparison technique using
14 multiple wavelengths, common configurations and
15 characteristics for light sources and detectors
16 and common analytical methods for data processing.
17 So yes.
18 Q Right. And when you said "additional
19 limitations" in paragraph 43 of your declaration,
20 you were referring to additional limitations
21 relative to the claims that were addressed in the
22 prior '533 and '484 patent IPRs. Correct?
23 A Yes, that is correct.
24 Q Okay. And if you could turn now to
25 paragraph 109 of your declaration for the '455

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1 patent. This is at the bottom of PDF page 62,
2 please.
3 A Okay.
4 Q Hold on. I'm sorry. I have completely
5 the wrong number down here.
6 Let's go to paragraph -- no, I don't.
7 It's a footnote. That's what the problem is.
8 Okay. Do you see in paragraph 109, it
9 bridges on between two pages, internal pages 59 to
10 60, there's a footnote 2?
11 A Yes.
12 Q Okay. And then in footnote 2, this is
13 at the bottom of internal page number 60, footer
14 page number 63, you write:
15 I have added certain emphasis to the
16 '455 patent's claim limitations throughout my
17 declaration.
18 Do you see that?
19 A Yes.
20 Q And so you've created this color coding
21 system where, according to footnote 2, green
22 emphasis indicates '455 patent claim limitations
23 that are identical to those addressed in the prior
24 '533 patent and '484 patent IPRs.
25 Do you see that?

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1 A Yes.
2 Q Black emphasis indicates 5 -- excuse
3 me -- '455 patent claim limitations that are
4 different from but are substantially identical to
5 those addressed in the prior '533 patent and '484
6 patent IPRs.
7 Do you see that?
8 A Yes.
9 Q And so throughout your analysis, if we
10 see black emphasis text, that indicates a claim
11 limitation or a portion of a claim limitation that
12 differs from the limitations that were addressed
13 in the prior '533 and '484 patent IPRs. Correct?
14 A But are --
15 MR. KIM: Objection; form.
16 THE WITNESS: But are substantially
17 identical to those addressed in the '533 and the
18 '484.
19 BY MR. CHRISTOPHER:
20 Q Different, though. Correct?
21 A Correct, but are substantially identical
22 to those addressed.
23 Q And then blue emphasis indicates
24 limitations similar to 5 -- excuse me -- '455
25 patent claim limitations as you discussed earlier.

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1 **Correct?**
2 A Earlier in this declaration --
3 **Q Right.**
4 A -- in the '455 declaration.
5 **Q Appreciate that.**
6 **And then at the very end of footnote 2,**
7 **you've got red text:**
8 **All other emphasis -- emphases, showed**
9 **new limitations in the '455 patent not addressed**
10 **in the prior '533 patent and '484 patent IPRs.**
11 **Do you see that?**
12 A Yes.
13 **Q Okay. And so if we see, for example,**
14 **text in red in your analysis, that would be a new**
15 **limitation that was not previously addressed in**
16 **the prior '533 and '484 patent IPRs. Correct?**
17 A Correct.
18 **Q Okay.**
19 A And I believe that -- that I use other
20 colors other than red to -- to separate the
21 different things that are not addressed.
22 **Q Okay.**
23 A So green and blue and black are as they
24 say. And then there's red and other colors that
25 are not green, black, and blue.

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1 **Q Got it. That's actually where I was**
2 **going to go next. I think you captured it.**
3 **If there's claim -- claim limitations**
4 **that are emphasized in a color other than green,**
5 **black, or blue, that would be a new limitation**
6 **compared to the '533 and '484 patent IPRs.**
7 **Correct?**
8 A Correct.
9 **Q Okay.**
10 A Yeah. It wasn't appropriate to make all
11 other a rainbow.
12 **Q If you could turn to paragraph 119.**
13 A Of the '455?
14 **Q Of the '455, correct. This is page 66**
15 **of the PDF.**
16 **Let me know when you're there.**
17 A Yes.
18 **Q And if you're red/green colorblind, this**
19 **could be difficult for you. But in Element [1.b],**
20 **do you see the text "a driver" in red?**
21 A Yes.
22 **Q Okay. So that would be an example of a**
23 **new limitation in element [1.b] relative to the**
24 **prior '533 and '484 patent IPRs. Correct?**
25 A That is correct.

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1 **Q Okay. And in element [1.b], it recites**
2 **the phrase, "a light source comprising a driver."**
3 **Do you see that?**
4 A In [1.b], yeah. Including a light
5 source comprising a driver and a plurality of
6 semiconductor sources, yes.
7 **Q And a person of skill in the art reading**
8 **element [1.b] would understand that the light**
9 **source includes a driver. Correct?**
10 A Comprising a driver and a plurality of
11 semiconductor sources, yes.
12 **Q If you could turn to paragraph 155 of**
13 **your declaration for the '455 patent.**
14 A Sorry. 155?
15 **Q Correct. 155.**
16 **In paragraph 155, the portion of element**
17 **[1.f] that reads "detectors that are spatial lie**
18 **separated from one another" is in black text.**
19 **Correct?**
20 A Yes.
21 **Q And so this would be -- as we talked**
22 **about a moment ago, this would be an example of a**
23 **claim limitation that is different, but in your**
24 **view, substantially similar to a prior limitation**
25 **for the '533 and '484 prior IPRs. Correct?**

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1 A Correct. Substantially identical to
2 those addressed in the prior '533 and '484.
3 **Q Okay. And if you could turn to**
4 **paragraph 197 of your declaration for the '455**
5 **patent. This bridges PDF page 114 onto page 115.**
6 **Let me know when you're there.**
7 A Yes.
8 **Q Okay. Now we have three different**
9 **colors here. The phrase in element -- strike**
10 **that. Let me back up.**
11 **In paragraph 197, you address element**
12 **[1.n] in Claim 1 of the '455 patent. Correct?**
13 A Yes.
14 **Q And within element [1.n], the phrase**
15 **comprises three optical wavelengths is in red**
16 **text. Do you see that?**
17 A Yes.
18 **Q And so the requirement of three optical**
19 **wavelengths is a new additional limitation**
20 **relative to the prior '484 and '533 IPRs.**
21 **Correct?**
22 A Correct.
23 **Q And then at the end of the element [1.n]**
24 **in paragraph 197, the phrase:**
25 **Wherein the optical wavelengths comprise**

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1 near infrared or invisible wavelengths is in
2 purple text.
3 Do you see that?
4 A Yes.
5 Q And so the phrase "wherein the optical
6 wavelengths comprise near infrared or invisible
7 wavelengths in element [1.n]," that's a new claim
8 limitation relative to the prior '484 and '533
9 IPRs. Correct?
10 A Correct.
11 Q We'll do a few more of these, and then
12 we'll take a short break.
13 If you can go to paragraph 248, please,
14 of your declaration for the '455 patent.
15 A Okay.
16 Q And in paragraph 248, you address
17 element [8.m]. Correct?
18 A Yes.
19 Q And you'll note that the word "six" is
20 in red text here in paragraph 248. Correct?
21 A Yes.
22 Q And so the requirement of six
23 light-emitting diodes is a new limitation relative
24 to the prior '484 and '533 IPRs. Correct?
25 A Correct.

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1 Q Okay. Let's go to paragraph -- a few
2 down. Paragraph 253 of your declaration for the
3 '455 patent.
4 Are you there?
5 A Yes.
6 Q Perfect. Okay. In paragraph 253, you
7 addressed dependent Claim 11 of the '455 patent.
8 Correct?
9 A Yes.
10 Q And the text comprises wavelengths
11 between 600 nanometers and 1,000 nanometers to
12 measure a level of oxyhemoglobin and
13 deoxyhemoglobin is in red. Do you see that?
14 A Yes.
15 Q And so the phrase "comprises between 600
16 nanometers and 1,000 nanometers to measure
17 oxyhemoglobin and deoxyhemoglobin" is a new
18 additional limitation relative to the prior '484
19 and '533 patent IPRs. Correct?
20 A Yes.
21 Q Okay. And then the last portion of
22 Claim 11 as quoted here in paragraph 253 of your
23 declaration, the phrase:
24 Corresponding to at least one of the
25 optical wavelengths is used to improve measurement

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1 of the one or more physiological parameters using
2 the output signal corresponding to the other two
3 optical wavelengths.
4 That phrase is annotated in purple text
5 here in paragraph 253. Correct?
6 A Yes.
7 Q Okay. And so once again, that
8 limitation "corresponding to at least one of the
9 optical wavelengths is used to improve measurement
10 of the one or more physiological parameters using
11 the output signal corresponding to the other two
12 optical signals" is a new additional limitation in
13 Claim 11 that was not previously addressed in the
14 prior '484 and '533 decisions. Correct?
15 A Correct.
16 Q Okay. If you can turn to paragraph 270.
17 Let me know when you're there. This is page 149
18 of the PDF.
19 A Yes.
20 Q Okay. In paragraph 270, you address
21 dependent Claim 2 of the '455 patent. Correct?
22 A Yes.
23 Q The phrase "plurality of semiconductor
24 sources" is annotated in purple. Do you see that?
25 A Yes.

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1 Q And the phrase plurality is based -- let
2 me start over.
3 The phrase "plurality of spatially
4 separated detectors are located on one more or
5 arcs" is annotated in yellow and gold. Correct?
6 A Yes.
7 Q And so the phrases "plurality of
8 semiconductor sources" and "plurality of spatially
9 separated detectors are located on one or more
10 arcs" are new additional limitations in Claim 2
11 relative to the '484 and '533 decisions. Correct?
12 A Yes.
13 Q Okay. If you can turn to paragraph 350
14 of your declaration for the '455 patent.
15 A I'm sorry. Which paragraph?
16 Q 350. This is on PDF page 170.
17 A Okay.
18 Q Okay. Are you there?
19 A Yes.
20 Q Perfect.
21 In paragraph 350, you address dependent
22 Claim 17 of the '455 patent. Correct?
23 A Yes.
24 Q The phrase, "a reflective surface to
25 receive and redirect at least some of the output

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1 optical light from the plurality of semiconductor
2 sources" is annotated in pink text.
3 Do you see that?
4 A Yes.
5 Q And so once again, based on the
6 annotations, we know "a reflective surface to
7 receive a redirect at least some of the output
8 optical light from the plurality of semiconductor
9 sources" is a new claim limitation in Claim 17 of
10 the '455 patent relative to the prior '484 and
11 '533 IPR decisions. Correct?
12 A Yes.
13 Q Okay. If you could turn to paragraph --
14 we'll do one more and then we'll take a short
15 break.
16 Paragraph 383 of your declaration. This
17 is PDF page 190.
18 A Yes.
19 Q Okay. In paragraph 383, you address
20 element [5.b] in Claim 5 of the '455 patent.
21 Correct?
22 A Yes.
23 Q And you'll note in paragraph 383, the
24 portion of element [5.b] reading, "configured to
25 apply one or more regression signal processing

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1 methodologies to at least a part of the output
2 signal" is annotated in red text. Correct?
3 A Correct.
4 Q And once again, the limitation
5 configured to apply one or more regression signal
6 processing methodologies to at least a part of the
7 output signal in element [5.b] in the '455 patent
8 is a new additional limitation relative to the
9 prior '484 and '533 IPR decisions. Correct?
10 A Correct.
11 Q Okay.
12 MR. CHRISTOPHER: Why don't we go off
13 the record and take a short break.
14 (Break held off the record from
15 10:12 a.m. to 10:24 a.m.)
16 BY MR. CHRISTOPHER:
17 Q Dr. Anthony, welcome back. Did you
18 discuss your testimony with anyone during our
19 break?
20 A No.
21 Q Okay. Can you turn for me to
22 paragraph 352 of your declaration for the '455
23 patent. This is PDF page 170.
24 A Okay.
25 Q And in paragraph 352, the text -- let me

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1 back up.
2 Paragraph 350, you're addressing
3 dependent Claim 17 of the '455 patent. Correct?
4 A Yes.
5 Q And, you know, based on our discussion
6 prior to the break, do you see the text, "a
7 reflective surface to receive and redirect at
8 least some of the output optical light from the
9 plurality of semiconductor sources" is in pink?
10 Do you see that?
11 A Yes.
12 Q Okay. And once again, that additional
13 limitation in Claim 17 of the '455 patent was not
14 addressed in the prior '484 and '533 IPRs.
15 Correct?
16 A Correct.
17 Q Okay. And then in paragraph 352, you
18 rely on LeBoeuf, Exhibit 1026, for the additional
19 limitation recited in Claim 17 of the '455 patent.
20 Correct?
21 A Right. Lisogurski in view of LeBoeuf.
22 Q Sure. Lisogurski in view of LeBoeuf.
23 Correct?
24 A Yes. Yes.
25 Q Okay. Now, in paragraph 353, in the

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1 first sentence, you wrote:
2 LeBoeuf discloses that earbud housing 16
3 is partially reflective to scatter light within
4 the cavity defined by the earbud housing 16.
5 Do you see that?
6 A Yes.
7 Q Okay. And then in the next sentence,
8 you wrote:
9 An advantage of this configuration is
10 that it allows the light emitted from optical
11 emitters 24 to, quote, be focused on a particular
12 region of the ear or particular physiological
13 activity maybe located, end quote, enabling,
14 quote, interrogation of that region, end quote, to
15 obtain physiological information.
16 Do you see that?
17 A Yes.
18 Q And so the purpose of the reflective
19 surface in LeBoeuf is to focus light from the
20 emitters onto a particular region of the ear.
21 Correct?
22 MR. KIM: Objection; form.
23 BY MR. CHRISTOPHER:
24 Q Are you reading your declaration?
25 A I'm going back to my declaration where I

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1 first introduce LeBoeuf just to orient myself to
2 LeBoeuf at a high level first.
3 I think it was a -- when I first
4 described LeBoeuf back in the overview of LeBoeuf
5 and motivation to combine LeBoeuf.
6 So, for example, taking the teachings of
7 LeBoeuf around reflective surfaces in paragraph
8 265, LeBoeuf's reflective surfaces, surface
9 teachings, a person of ordinary skill would have
10 been motivated to combine -- to apply LeBoeuf's
11 reflective surface teachings to Lisogurski's
12 system to receive or redirect at least some of the
13 output light to improve performance. LeBoeuf
14 discloses an earbud with earbud housing that's at
15 least partially reflective to scatter light within
16 the cavity.
17 LeBoeuf teaches this configuration
18 offers two advantages. It would help focus the
19 light generated by optical emitters 24 onto a
20 particular region where the particular
21 physiological activity may be located. And two,
22 to reduce unwanted optical signals from regions
23 that may not be relevant to the physiological
24 activity.
25 Such advantages were well understood in

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1 the art. And I cite a number of other exhibits,
2 1041. By controlling the emitted light, combining
3 it to physiological meaningful regions, the
4 reflective material enhances the efficiency of
5 light delivery and collection. This, in turn,
6 improves the signal-to-noise ratio by increasing
7 the proportion of relative signal relative to
8 background, resulting in more accurate and
9 reliable signals.
10 So a POSITA would have understood the
11 reflective surfaces used a guide and redirect
12 optical signals within wearable physiological
13 monitors well-known and routinely implemented.
14 Yeah. So yes, some of the reflective
15 surface helps to guide and collect light.
16 **Q Yeah. I think a small portion of that**
17 **answer answered the question, which I just -- I**
18 **just want to confirm. The purpose -- or at least**
19 **one purpose of the reflective surface in LeBoeuf**
20 **is to focus light onto a particular region of the**
21 **ear. Correct?**
22 A I -- it's at least one of those --
23 that's one of the -- amongst the teachings of
24 LeBoeuf, yeah, on not just the ear, but to a
25 region of the body. Uh-huh.

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1 **Q Okay. So then conversely, if all other**
2 **things being equal in LeBoeuf, if we remove the**
3 **reflective surface, the light would be more spread**
4 **out on the ear. Correct?**
5 MR. KIM: Objection to form.
6 THE WITNESS: Well, are you talking
7 about a -- so the general teachings of LeBoeuf are
8 how to use reflective surfaces to help -- I mean,
9 a POSITA taking the teachings of LeBoeuf in
10 combination with Lisogurski would know how to
11 apply them.
12 But if you were to take a particular
13 embodiment and remove the reflective surfaces, it
14 would modify its performance in some way, light
15 would go other places if the reflective surfaces
16 were not there.
17 BY MR. CHRISTOPHER:
18 **Q Well, let's look at Figure 8A of**
19 **LeBoeuf. Let me know when you're there.**
20 **This is page 8 of the PDF. And I can**
21 **resend it to you if you need it.**
22 A I got it.
23 **Q All right. In Figure 8, in this**
24 **particular embodiment that's shown in Figure 8,**
25 **there is no reflective surface on the earbud**

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1 **housing 16. Correct?**
2 A You're talking about 8A or 8C? Because
3 in my declaration, I'm pointing to 8C and how
4 that's --
5 **Q I'm asking about Figure 8A of LeBoeuf.**
6 A Okay.
7 **Q In Figure 8A of LeBoeuf, there is no**
8 **reflective surface on the earbud housing 16.**
9 **Correct?**
10 **Are you reviewing LeBoeuf?**
11 A I'm going -- I'm reviewing LeBoeuf where
12 it's describing, again, Figures 8A and 8C.
13 So in -- LeBoeuf describes the 8A as --
14 let's see -- the earbud housing 16 includes a
15 light blocking region that blocks light from
16 passing through. Let's see. Bottom portion
17 (indiscernible reading).
18 **Q Let's do it this way because this is**
19 **taking too long. Look at Figure 8A. We talked**
20 **about this yesterday.**
21 A Okay.
22 **Q You see the earbud housing 16 in**
23 **Figure 8A?**
24 A Yes.
25 **Q And do you see how the -- the light 111**

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1 **passes through the earbud housing 16?**
2 A Yes.
3 **Q And doesn't that tell you, without**
4 **reading LeBoeuf, that there is no reflective**
5 **surface on the earbud housing 16?**
6 MR. KIM: Objection; form.
7 THE WITNESS: Well, I mean, because the
8 figure as described in paragraph 124, yeah, I
9 agree with you there's a line there. But further,
10 the description says:
11 This light blocking region 16A may be
12 painted black and not to be opaque region or
13 material structure that blocks light transmission.
14 The illustrated configuration may help confine
15 inspection light.
16 So there's some transmitting through in
17 the figure, but it also -- I think the
18 description -- so it describes that some of it's
19 not passing through that as well.
20 BY MR. CHRISTOPHER:
21 **Q And we talked about this yesterday.**
22 **Other than the light blocking region 16A, you**
23 **agree that light can pass through the earbud**
24 **housing 16. Correct?**
25 MR. KIM: Objection; form.

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1 THE WITNESS: Well, what's drawn there
2 is there's light passing through the dotted line.
3 Paragraph 124, although it describes there may be
4 some optically opaque materials that are made so
5 that it doesn't pass through. And then
6 furthermore, 8C incorporates 16 with partially
7 reflective to scatter the light.
8 So we see in 8C where it's staying more
9 constrained with the -- the -- the dotted line
10 staying on the inside of 16.
11 BY MR. CHRISTOPHER:
12 **Q So you would agree that the light**
13 **exiting the embodiment in Figure 8C is more**
14 **constrained than the light that exits the**
15 **embodiment shown in Figure 8A of LeBoeuf.**
16 **Correct?**
17 A I mean, as -- as drawn with those lines
18 in 8A and 8C, in 8A, the light coming out is also
19 going through. Some of it's going through 16 and
20 out the front. And in 8C, it's coming out the
21 smaller region.
22 **Q Coming out the smaller region in**
23 **Figure 8C relative to Figure 8A. Correct?**
24 A In those particular figures the way
25 they're drawn, yes.

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1 **Q Thank you.**
2 **Can you turn back to paragraph 354 of**
3 **your declaration for the '455 patent?**
4 A 354, you said?
5 **Q 354, please.**
6 A Okay.
7 **Q Okay. And in paragraph 354, you've**
8 **annotated Figure 8C of LeBoeuf. Do you see that?**
9 A Yes.
10 **Q And in particular, you've annotated the**
11 **earbud housing 16 shown here in Figure 8C in pink.**
12 **Do you see that?**
13 A Yes.
14 **Q Would a person of skill in the art**
15 **understand that the entirety of the earbud housing**
16 **16 that you've annotated in pink has a reflective**
17 **surface?**
18 A So as I -- in paragraph 353, right,
19 where we talk about the partially reflective,
20 LeBoeuf disclosed the earbud housing 16 is
21 partially reflective to scatter light within the
22 cavity defined by the earbud housing. LeBoeuf --
23 and I cite LeBoeuf 123, 125, and also 17.
24 For example, if you go to 125, in some
25 embodiments, as illustrated as Figure 8C, the

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1 earbud housing 16 may be at least partially
2 reflective to scatter light within the cavity
3 defined by the earbud housing. In such case, the
4 optical energy 111 may exit the earbud through
5 apertures 34a, 34b and the housing 16 and cover
6 18.
7 The advantages of this configuration is
8 that the light 111 can be focused on a particular
9 region of the ear where a particular physiological
10 activity may be located. Also this configuration
11 may reduce unwanted optical signals from regions
12 that may not be relevant to the physiological
13 activity of interest.
14 So it discloses that, you know, at least
15 part of the housing would be covered -- would be
16 at least partially reflective to scatter light
17 within the cavity.
18 **Q I don't think that quite answered my**
19 **question, which was: Looking at your annotation**
20 **in Figure 354 of your declaration and the earbud**
21 **housing that you've annotated in pink, is the**
22 **entirety of the surface partially reflective?**
23 MR. KIM: Objection; form.
24 THE WITNESS: Well, I've labeled the
25 earbud housing. Right?

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BY MR. CHRISTOPHER:
Q Got it.
A And the figure as described that in that earbud housing 16 may be at least partially reflective to scatter light within the cavity defined by the earbud housing. So it's at least partially. A POSITA could choose to make it partial, it could choose to make it full. I've annotated -- I've labeled it so it's clear what it is. But a POSITA in reading Lisogurski, both looking at the figure and reading about it, would understand it's at least partially. And partially could include all of it.
Q Okay. Do you see how the earbud housing kind of wraps around in a curve on the right-hand side of Figure 8C? Do you see that?
A I'm -- I'm sorry.
Q Well, let's -- let's look at the top. So there's two portions of the earbud housing 16. Do you see that?
A Do you want to share your screen to point out what you're -- so I'm making sure I'm understanding --
Q Are you looking at paragraph 354 of your declaration?

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A I am.
Q Okay.
A Yeah.
Q And there's -- you've annotated the earbud housing --
A Yep.
Q -- 16 in pink.
A Yeah.
Q And kind of in the top half of the figure, it looks almost like an upside down J. Do you see that?
A Upside down J.
Q Sideways.
A You mean the earbud housing? Are you talking about the earbud housing.
Q Yeah. I'm talking about the earbud housing.
A Okay. So the upper -- the -- the upper portion of the earbud housing?
Q Yeah, the upper portion. And it kind of curves around. Do you see that?
A Yes.
Q Okay. And you've annotated the optical emitters in purple. Correct?
A Yes.

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Q And we see on both of the optical emitters that Lisogurski has drawn on Figure 8C the light with reference 111. And in the figure, it appears to be exiting the emitter at approximately a 45-degree angle. Do you see that?
A Yes.
Q Now, you see where you drew the purple lines to the top of each of the emitter in your annotated version of Figure 8C?
A Yes.
Q Now, I want you to imagine that light exits each of the emitters along the path shown by your purple error -- arrows. Are you with me?
A Sure.
Q That light would then reach a portion of the earbud housing 16 that is shown by your purple arrows. Correct?
A So you're -- you're talking about the -- the purple arrow. That's -- that's just labeling. That's -- that's...
Q Right. I'm using that as a -- as a visual guide. I want you to imagine that light exits the emitter and travels along a path using your purple arrow. Imagine that's the path. The light propagates out of the emitter. You with me?

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A Okay.
Q Okay. That light would then be incident upon a portion of the earbud housing 16 directly across from the emitter. Correct?
A Sure, yeah.
Q Okay. And if that portion of the earbud 16 was reflective, the earbud housing 16 would reflect the light back towards the emitter. Correct?
MR. KIM: Objection; form.
THE WITNESS: Well, in the hypothetical situation, if that entire -- if the entire pink thing is internal reflective, light's going to come out and it's going to bounce on the inside -- you know, the dotted line there is representative of one of the paths. And even if it bounces, it would bounce again and eventually come out the -- the hole of 34a. 34a, 34b.
BY MR. CHRISTOPHER:
Q So if -- you would agree, then, if -- if the earbud housing 16, the entire surface was reflective, there would be internal reflection within the earbud housing 16. Correct?
MR. KIM: Objection; form.
THE WITNESS: Right. I mean, LeBoeuf

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1 teaches a general use of -- of, as I describe in
2 paragraph 266, of using reflective coating to get
3 the light where you want it to. If it's using
4 reflection, it's -- it's going to bounce and then
5 go someplace else. And if that full thing were
6 reflective, then yes, it would only come out the
7 aperture of the hole of 34a, 34b.
8 BY MR. CHRISTOPHER:
9 **Q Okay. So your view is if that entire**
10 **earbud housing 16 were reflective, eventually, the**
11 **light would bounce around and exit the earbud**
12 **housing 16 through the aperture. Correct?**
13 MR. KIM: Objection; form.
14 THE WITNESS: In the hypothetical
15 situation that this was all in general most of the
16 light, yeah, would -- would come out the -- the
17 front there.
18 BY MR. CHRISTOPHER:
19 **Q You said most of the light, but not all**
20 **of the light in that example. Correct?**
21 A It's a hypothetical situation, so it
22 depends on how perfectly reflective that surface
23 is -- surface is. But -- but certainly, a POSITA
24 reading LeBoeuf understands the benefit of using
25 reflective materials to put the light where you

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1 want it to. And it relies on reflection, so even
2 if there's some loss on the reflective coating,
3 it's still a net positive to get the light to
4 where you want it to go.
5 **Q A person of skill in the art would know**
6 **that the emitters 24 in LeBoeuf could be LEDs.**
7 **Correct?**
8 A Correct, as I've opined.
9 **Q Yeah. And wouldn't a person of ordinary**
10 **skill in the art know that an LED could reabsorb**
11 **light that's reflected back at the LED?**
12 MR. KIM: Objection; form.
13 THE WITNESS: So the surface area of
14 that LED relative to the area of the -- that
15 reflect -- that volume of where the light is being
16 emitted is relatively inconsequential. So even if
17 some light fell back on the LED, compared to the
18 amount that it's emitting, you're getting most of
19 that light still out of the LED and out into the
20 hole.
21 So a POSITA would understand, you know,
22 how to design this to use the LEDs in a way and
23 the reflective coating in a way to get the light
24 where they want it to be in a physiologically
25 relative region.

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1 BY MR. CHRISTOPHER:
2 **Q And I understand your point about the**
3 **volume of light and the size of the LEDs. But it**
4 **sounds like you agree that it is possible in a**
5 **situation where the earbud housing 16 is -- the**
6 **entire surface is reflective that some of that**
7 **light could be reflected back and absorbed into**
8 **the LED. Correct?**
9 MR. KIM: Objection; form.
10 THE WITNESS: A POSITA would not be
11 concerned in -- would understand how to use LED
12 and reflective surfaces to get light to a
13 physiologically relevant region. The light that
14 is bouncing around -- if you just take this
15 hypothetical situation of light bouncing around in
16 there and you draw -- assume perfect angular
17 reflections, it's a -- that's one -- less than --
18 eyeballing it, less than 1 percent of the surface
19 area if you just take the proportions of the
20 figures as drawn.
21 And that's not -- and even if -- and
22 then there's not going to be perfect absorption,
23 it's going to reflect off of -- so the point that
24 you're making, it's inconsequentially tiny for the
25 amount of energy going back perfectly into the

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1 LED. And that's not at all going to teach away
2 from using a reflective coating in combination
3 with LED to get light where you want it. I mean,
4 LeBoeuf explicitly teaches how to do this.
5 MR. CHRISTOPHER: Yeah, I'm going to
6 move to strike as nonresponsive.
7 BY MR. CHRISTOPHER:
8 **Q I just asked: A person of skill in the**
9 **art would know that if the earbud housing 16 where**
10 **the entire surface was reflective, some of the**
11 **light could be reflected back into the LED.**
12 **Correct?**
13 MR. KIM: Objection form and also to the
14 motion to strike. He's answering the question.
15 MR. CHRISTOPHER: No. He's giving a
16 totally different off topic answer. I'm asking a
17 straightforward question, and he's expounding on
18 and giving new opinions, and it's completely
19 improper.
20 MR. KIM: Again, he's answering the
21 question in a way that's explains what his answer
22 is at it relates to your question.
23 MR. CHRISTOPHER: No. He's giving
24 completely new opinions.
25 MR. KIM: We can go on forever. But

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1 just move on.
2 BY MR. CHRISTOPHER:
3 **Q Let me re-ask my question. I'll try it**
4 **one more time.**
5 A person of skill in the art would know
6 that if the earbud housing 16, the entire surface
7 was reflective, some of the light could be
8 internally reflected back into the emitters 24.
9 Correct?
10 MR. KIM: Same objections.
11 THE WITNESS: A person of skill in the
12 art would understand that the reflective surface
13 used in conjunction in this particular embodiment,
14 if all of it were reflective, that the light is
15 leaving the LED, hitting reflective surfaces,
16 bouncing around, but most of it is going to be
17 coming out the front face. Would some of it fall
18 back onto the LED? Some. But it's a relative
19 amount. It's tiny.
20 And that would not be a issue at all.
21 It doesn't teach away from the benefit of using an
22 LED with reflective surfaces to direct light to a
23 physiologically relevant region.
24 MR. CHRISTOPHER: I'll move to strike
25 the part of the answer that starts with "and that

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1 would not be an issue at all." Because I didn't
2 ask whether it would be an issue. I just asked
3 whether it would occur.
4 MR. KIM: I'll leave an objection again.
5 MR. CHRISTOPHER: We'll move on.
6 BY MR. CHRISTOPHER:
7 **Q Okay. Let's go to paragraph -- the next**
8 **paragraph from where we've been.**
9 A The next one is which one?
10 **Q 355, please. Right below where we were**
11 **just looking at, the annotated figure.**
12 **Are you there?**
13 A Yes.
14 **Q Perfect. Okay. In paragraph 355, do**
15 **you see where you wrote:**
16 A person of ordinary skill in the art
17 would have been motivated to apply LeBoeuf's
18 teachings to the Lisogurski system to enhance the
19 efficiency with which light is delivered to the
20 target tissue.
21 Do you see that?
22 A Yes.
23 **Q Okay. Let's go back to the paragraph**
24 **above, Figure 8C of LeBoeuf. Do you see it?**
25 A Yes.

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1 **Q Which, if any, components of Figure 8C**
2 **would be implemented in Lisogurski in the proposed**
3 **combination?**
4 MR. KIM: Objection; form.
5 THE WITNESS: Well, I'm not proposing a
6 wholesale copying of a particular embodiment, but
7 the teachings of Lisogurski in terms of using
8 reflective coatings. So if I go back into the
9 motivation to combine and I talk about, you know,
10 how those reflective surfaces would be used to --
11 to guide light to the target tissue. So it's not
12 presupposing a particular amalgamation of an
13 embodiment.
14 But the teachings clearly demonstrate
15 how to use reflective material -- reflective
16 coatings to deliver light to the target tissue.
17 BY MR. CHRISTOPHER:
18 **Q Okay. Are you proposing to modify**
19 **Lisogurski to include the earbud housing 16 from**
20 **LeBoeuf?**
21 MR. KIM: Objection; form.
22 THE WITNESS: So as I describe in
23 paragraph 265, with respect to LeBoeuf's
24 reflective surface teachings, a person of ordinary
25 skill in the art would have been motivated to

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1 apply LeBoeuf's reflective surface teachings to
2 Lisogurski's system to receive or redirect at
3 least some of the output light to improve the
4 performance of Lisogurski's physiological
5 monitoring system.
6 It goes on:
7 LeBoeuf teaches the configuration offers
8 advantages to help focusing light on a particular
9 region, reduces unwanted optical signals. Such
10 advantages of using reflective coatings,
11 reflective surfaces to direct and guide light were
12 well understood in the art as shown by U.S. Patent
13 No. 2 -- 2012-019793, which is Exhibit 1041, which
14 also has a -- in Exhibit 1041, there's a sensor
15 surrounded by reflective material that also is
16 helping to direct light and/or from the sensor
17 module blood flow region within the body part.
18 Thus by controlling the emitted light, confining
19 it to physiological meaningful regions, the
20 reflective material enhances the efficiency of the
21 light drive -- light delivery and collection.
22 This, in turn, improves signal to noise by
23 increasing the portion of relevant signal relative
24 to the background.
25 So Lisogurski, in combination with

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1 LeBoeuf, Lisogurski would use the teachings of the
2 reflective coating applied to the relevant
3 surfaces of the particular device that a POSITA
4 was trying to -- to realize.
5 BY MR. CHRISTOPHER:
6 **Q Respectfully, it doesn't answer my**
7 **question.**
8 MR. CHRISTOPHER: I'm going to move to
9 strike.
10 BY MR. CHRISTOPHER:
11 **Q I know what your declaration says. I**
12 **can read it. I'm asking you a specific question,**
13 **which is: In your proposed combination of**
14 **Lisogurski and LeBoeuf, are you proposing to**
15 **modify Lisogurski to include the earbud housing 16**
16 **from LeBoeuf shown in Figure 8C?**
17 MR. KIM: Objection to form and the
18 motion to strike.
19 He just answered the question. It may
20 not be the answer you'd like or you wanted to
21 hear, but --
22 MR. CHRISTOPHER: Counsel --
23 MR. KIM: -- he answered the question.
24 MR. CHRISTOPHER: It's ridiculous. He's
25 just reading the declaration. I'm asking a

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1 specific question. He goes on and reads for
2 minutes at a time. It's ridiculous.
3 MR. KIM: Well, he's answering the
4 question, also trying to orient you to the right
5 paragraph in his declaration. So he's answering
6 the question.
7 MR. CHRISTOPHER: No, he's not. So let
8 me re-ask my question.
9 BY MR. CHRISTOPHER:
10 **Q In your proposed combination of**
11 **Lisogurski and LeBoeuf, are you proposing to**
12 **modify Lisogurski to include the earbud housing 16**
13 **shown in Figure 8C of LeBoeuf, yes or no?**
14 MR. KIM: Same objections.
15 THE WITNESS: As I answered, I'm not
16 proposing the earbud housing. I'm proposing the
17 teachings of the reflective surface. And that
18 particular -- in Lisogurski -- or in LeBoeuf by
19 itself, that reflective coating is on a -- a
20 particular surface. But in the combination, what
21 I'm teaching is the teaching -- I'm opining a
22 POSITA in combination of LeBoeuf would use the
23 reflective coating -- reflective surface to
24 enhance as I described.
25

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1 BY MR. CHRISTOPHER:
2 **Q Thank you. That answered the question.**
3 **You're not relying -- you're not proposing to**
4 **modify Lisogurski to physically insert the earbud**
5 **housing 16 from LeBoeuf. Correct?**
6 A I think I answered that in the prior
7 one. But I'm proposing the combination, which is
8 using the reflective surface, not arbitrarily
9 stamping of an earbud housing into something. It
10 is the teachings of the both of them.
11 **Q Thank you.**
12 **Let's turn now to your declaration for**
13 **the '533 patent. This --**
14 A '533?
15 **Q Yes, '533.**
16 MR. CHRISTOPHER: Let me read the number
17 for the record. This is Exhibit 1003 in
18 IPR 2025-01250.
19 THE WITNESS: Okay.
20 BY MR. CHRISTOPHER:
21 **Q Now, if you could turn for me to**
22 **paragraph 138.**
23 A 38?
24 **Q Yeah, it's page 75 of the PDF. Let me**
25 **know when you're there, please.**

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1 A Okay.
2 **Q Okay. In paragraph 138, you address**
3 **dependent Claim 6 of the '533 patent. Correct?**
4 A Yes.
5 **Q Okay. And do you see the text in green:**
6 **Emits light with a bandwidth between 20**
7 **nanometers to 40 nanometers.**
8 **Do you see that?**
9 A Yes.
10 **Q The prior IPR decision for the**
11 **'533 patent did not address that claim language in**
12 **Claim 6. Correct?**
13 A Yeah. In the prior, I address Claim 5,
14 but not Claim 6, which has the 20 nanometer, 40
15 nanometer.
16 **Q Okay. Let's look at paragraph 142 of**
17 **your declaration for the '533 patent.**
18 A Okay. 142?
19 **Q 142, please.**
20 A Uh-huh.
21 **Q Okay. In the first sentence, you write:**
22 **Additionally, Lisogurski discloses, and**
23 **at minimum renders obvious, that at least one of**
24 **its LEDs emits light with a bandwidth between**
25 **20 nanometers to 40 nanometers.**

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1 **Do you see that?**
2 A Yes.
3 **Q And you cite Lisogurski Exhibit 1025 at**
4 **Column 10, Lines 48 through 56. Do you see that?**
5 A Yes.
6 **Q And we'll look at that in a moment. But**
7 **before we do that, Column 10, Lines 48 through 56**
8 **of Lisogurski, that's the only citation to**
9 **Lisogurski here in paragraph 142. Correct?**
10 A At the end of that sentence, it's
11 Lisogurski 10:48 through 56 in this paragraph.
12 Yes.
13 **Q Okay. Now, let's look at Lisogurski at**
14 **Column 10, starting at Line 48. That's on page 37**
15 **of the PDF if it helps you get there any faster.**
16 A Okay.
17 **Q Okay. Can you read between Lines 48 and**
18 **56, and let me know when you've reviewed it?**
19 A Okay.
20 **Q Okay. Lisogurski doesn't explicitly**
21 **disclose the bandwidth of the LEDs here at**
22 **Column 10, Lines 48 through 56. Correct?**
23 MR. KIM: Objection; form.
24 THE WITNESS: Well, what I'm describing
25 in my -- what Lisogurski discloses is the use of

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1 LEDs, and a POSITA at the time would understand
2 what the typical bandwidth is of an LED. As I
3 describe further in that paragraph, as
4 corroborating the Tam reference of 20 to 40
5 nanometers.
6 BY MR. CHRISTOPHER:
7 **Q Okay. But you agree in the passage that**
8 **we just read from Lisogurski, it doesn't**
9 **explicitly disclose a bandwidth. Correct?**
10 A It explicitly discloses using LEDs. And
11 as I've described, a POSITA would know what the
12 typical bandwidth is of an LED.
13 **Q But no explicit disclosure of the**
14 **bandwidth itself in Lisogurski. Correct?**
15 A As I said, yes. And what a POSITA
16 reading Lisogurski would also understand they're
17 using LEDs that have a typical bandwidth at the
18 time of 20 to 40 nanometers.
19 **Q Okay. At Line 56, this is Column 10 of**
20 **Lisogurski, Exhibit 1025. At Column 56, do you**
21 **see where it discloses:**
22 **In one embodiment, the red wavelength**
23 **may be between about 600 nanometers and about 700**
24 **nanometers, and the IR wavelength may be between**
25 **about 800 nanometers and about 1,000 nanometers.**

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1 **Do you see that?**
2 A Yes.
3 **Q Would a person of skill in the art be**
4 **able to determine the bandwidth of an LED based on**
5 **the range of wavelengths of light emitted by the**
6 **LED?**
7 A Well, that's -- I don't think a POSITA
8 reading that would interpret that as being the
9 range that's emitted by the LED. A POSITA reading
10 that would understand that an LED could have, for
11 example, a nominal center wavelength of 600 or a
12 nominal center wavelength of 650. And a POSITA
13 reading that would understand an LED has a
14 bandwidth of 60 -- of 20 to 40 nanometers. That a
15 POSITA reading this would understand those are the
16 ranges that would correspond to red or IR, and
17 that would be correspondent to the nominal center
18 wavelength, the center frequency, if you will,
19 center wavelength of the LED with the
20 corresponding 20- to 40-nanometer bandwidth.
21 (Exhibit 1030 in IPR2025-01250 was
22 previously marked.)
23 **Q Look at paragraph -- rather than a**
24 **paragraph, I'm going to show you Exhibit 1030 from**
25 **IPR 2025-01250. Let me know when you have that**

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1 **downloaded and available to you.**
2 A This is the Tam. Yep. Okay.
3 **Q Yeah, that was my next question, do you**
4 **recognize that Exhibit 1030 is the Tam reference**
5 **you opined on in your declaration?**
6 A Yes.
7 **Q Okay. Did you review Tam in forming**
8 **your opinions?**
9 A Well, yes. I mean, it's cited here in
10 my declaration.
11 **Q Of course. And did you review Tam's**
12 **teachings in their entirety when you formed your**
13 **opinions?**
14 A Yes.
15 **Q Okay. Can you turn to Column 13 of Tam**
16 **starting at Line 45? Let me know when you're**
17 **there. It's on page 24 of the PDF.**
18 A Okay.
19 **Q Okay. Starting at Line 45, Tam**
20 **discloses:**
21 **It is clear that small optical**
22 **components alone, such as LEDs having bandwidths**
23 **from about 7 to 100 nanometers, would not allow**
24 **accurate measurements or even have the capability**
25 **of distinction between hemoglobin derivatives.**

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1 **Do you see that?**
2 A Yes.
3 **Q Now, if you could turn back to**
4 **paragraph 196 of your declaration for the '533**
5 **patent, let me know when you're there.**
6 A I'm sorry. What paragraph?
7 **Q 196, please.**
8 A 96.
9 **Q Yeah, I'll get you a page number in a**
10 **moment if you bear with me.**
11 A Okay.
12 **Q Paragraph 196 starts on PDF page 113.**
13 **I'd like to ask you about a portion of it that's**
14 **on PDF page 114. Let me know when you're there.**
15 A Okay.
16 **Q Okay. So do you see the sentence that**
17 **reads:**
18 **Indeed, Tam discloses that light sources**
19 **with high bandwidth, e.g., 100 nanometers, would**
20 **not allow accurate measurements.**
21 **Do you see that?**
22 A Yes.
23 **Q But as we just read from Tam, you would**
24 **agree Tam states that LEDs having bandwidths from**
25 **about 7 to 100 nanometers would not allow accurate**

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1 **measurements or even have the capability of**
2 **distinction between hemoglobin derivatives in**
3 **Column 13, starting at Line 45 of Tam. Correct?**
4 A As described what is there, Tam
5 discloses light sources with high bandwidth would
6 not allow accurate measurements or in -- even have
7 the capability of distinction between hemoglobin
8 derivatives while bandwidth filters such as 40
9 nanometer width filter, could improve the accuracy
10 of the measurement device.
11 **Q But the range in Tam that's disclosed is**
12 **not allowing accurate measurements or even having**
13 **the capability of distinction between hemoglobin**
14 **derivatives is 7 to 10 nanometers. Correct?**
15 MR. KIM: Objection; form.
16 THE WITNESS: Well, I mean, what's
17 described there is LEDs having bandwidths of --
18 but a POSITA would understand that LEDs of 40
19 nanometer bandwidths are available would also
20 understand that the -- the accuracy of the
21 measurement could be changed with the different
22 quality of LEDs.
23 But certainly, a POSITA would be very
24 familiar with, you know, selecting the right LEDs
25 with a narrow bandwidth to increase accuracy.

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1 As -- as -- as -- you know, as I opined in the
2 dec.
3 BY MR. CHRISTOPHER:
4 **Q I don't think that answers the question.**
5 **Do you see in that sentence we were**
6 **reading from paragraph 196 from your declaration**
7 **was e.g. 100 nanometers? Do you see that?**
8 A Yes. Yes.
9 **Q Okay. The range that's described in the**
10 **portion of Tam that you cite in the declaration is**
11 **actually 7 to 10 nanometers. Correct?**
12 **Excuse me. 7 to 100 nanometers.**
13 **Correct?**
14 A Yes.
15 **Q Okay. Now, if you could turn to -- same**
16 **paragraph.**
17 A Sorry?
18 **Q Same paragraph, actually.**
19 A So 196.
20 **Q Yeah, 196. It's actually -- we're not**
21 **going far. We're in the same sentence.**
22 A Okay.
23 **Q You see where you wrote:**
24 **While bandwidth filters such as a**
25 **40-nanometer bandwidth filter would improve the**

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1 **accuracy of the measurement device.**
2 **Do you see that?**
3 A Yes.
4 **Q What's a bandwidth filter?**
5 A It's a filter that transmits a band
6 of -- of frequencies, or wavelengths in this case.
7 **Q Is the bandwidth filter part of an LED?**
8 MR. KIM: Objection; form.
9 THE WITNESS: So I'm just re- --
10 rereading my paragraph here. Can you re-ask the
11 question, please?
12 BY MR. CHRISTOPHER:
13 **Q I'm just trying to understand. Is the**
14 **bandwidth filter part of an LED, or is it a**
15 **separate component?**
16 MR. KIM: Objection; form.
17 THE WITNESS: Well, a POSITA would
18 understand you could potentially buy -- you could
19 certainly have a separate optical element be a
20 filter. Or, you know, an optical filter in front
21 of an LED. Could it be possible to buy an
22 integrated LED filter stack? Certainly. But a
23 filter could either -- it would be a separate
24 thing or it could be an integrated package that
25 you could buy.

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1 BY MR. CHRISTOPHER:
2 **Q So a bandwidth filter could be a**
3 **separate optical component that narrows the**
4 **bandwidth of light emitted by an LED. Correct?**
5 A A POSITA -- it would have design
6 tradeoffs in either selecting a narrow bandwidth
7 LED if they wanted a narrower band of light. Or
8 if they wanted a wider band of LED if using a
9 filter, designing cost tradeoffs. But certainly,
10 what's taught is -- the knowledge of a POSITA
11 would know how to source a narrow band LED with --
12 or a wider band LED with a application of optical
13 filter.
14 **Q So the one option that's available to a**
15 **person of skill in the art is to use, say, for**
16 **example, an LED with a bandwidth of 100 nanometers**
17 **and then use a bandwidth filter, say a**
18 **40-nanometer bandwidth filter, to narrow the**
19 **bandwidth. Correct?**
20 MR. KIM: Objection to form.
21 THE WITNESS: Well, and to properly
22 expand to make sure that I'm communicating
23 clearly, a POSITA, in considering a design, could
24 choose to use a narrow band LED that has a 20- to
25 40-nanometer bandwidth inherently based on the

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1 precision with which it was designed and
2 manufactured, or a wider band LED in using an
3 optical filter, or both in combination.
4 So all those options are -- a POSITA
5 would be familiar with certainly from the -- the
6 teachings.
7 BY MR. CHRISTOPHER:
8 **Q So you mentioned a moment ago -- let me**
9 **find it so I don't put words in your mouth.**
10 **You mentioned one of the tradeoffs in**
11 **selecting an LED is cost. Do you recall that?**
12 A I -- I'm sure I said that, yeah.
13 **Q Okay. And when you refer to cost, one**
14 **cost tradeoff would be that a narrower band LED is**
15 **generally more expensive than a wider band LED.**
16 **Correct?**
17 A Well, it's going to depend on the
18 wavelength and the other specifications. Other
19 design -- you know, power and -- and what have
20 you. And then the cost is not just of a -- of a
21 device is not just associated with the LED. It's
22 the complexity of the -- of manufacturing, so
23 there's design tradeoffs in cost of components,
24 and design factors and usability and size and
25 manufacturing all come into play.

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1 **Q Okay. A fair point. But all things**
2 **otherwise being equal, would a person of skill in**
3 **the art understand that generally a narrower**
4 **bandwidth LED is more expensive than a wider**
5 **bandwidth LED?**
6 MR. KIM: Objection to form.
7 THE WITNESS: I think my answer -- it's
8 going to depend on other factors about the LED in
9 terms of, you know, the -- the rate with which you
10 want to fire it, the overall power you're trying
11 to get out of it, lifetime expectations. So
12 it's -- but, you know, all that being said, you
13 know, it's not just the cost of an LED. It's
14 the -- it's one component in the system.
15 And so a POSITA could use either a
16 narrow band LED or wider band LED with a filter
17 or -- or both, or a combination.
18 BY MR. CHRISTOPHER:
19 **Q Okay. But my -- my question**
20 **specifically asked you assume all of those things**
21 **you just described are otherwise equal between two**
22 **LEDs. Generally speaking, one of skill in the art**
23 **understands, again, assuming all those things you**
24 **just described are otherwise equal, a narrower**
25 **band LED would be more expensive than a wider band**

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1 **LED. Correct?**
2 MR. KIM: Objection; form.
3 THE WITNESS: Generally speaking, LEDs
4 are rather inexpensive. I haven't looked at the
5 price sheet recently of LEDs. Might there be a
6 change in cost? Sure. But it's not going to be
7 anything significant that would teach away from
8 using a narrow band LED.
9 It's going to be -- if you want sort of
10 your light source to have a narrow band, you
11 either get a narrow band source natively or a
12 narrow band source with a filter -- or a slightly
13 wider band source with a filter. A POSITA would
14 make those cost tradeoffs.
15 BY MR. CHRISTOPHER:
16 **Q Did you frame that answer from the**
17 **perspective of 2012?**
18 A Yes. That's the date that is the -- I
19 think it was December of -- I have to look at the
20 date, but it's roughly when, yes.
21 **Q Can you turn to Tam, Exhibit 1030? This**
22 **is Column 9, which is page 22 of your PDF.**
23 A I'm sorry. You said Tam, Column 9?
24 **Q Yeah, Tam Column 9. It's page 22 of**
25 **your PDF.**

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1 A Okay.
2 **Q And I'll direct your attention starting**
3 **at Line 61, which is toward the bottom of the**
4 **left-hand column. Let me know when you see**
5 **Column 61.**
6 A Okay.
7 **Q Tam teaches here that LEDs are available**
8 **in tighter bandwidths by selection at a premium**
9 **price.**
10 **Correct?**
11 A Yes.
12 **Q Okay. Now, let's look at paragraph 144**
13 **of your declaration for the '533 patent.**
14 MR. CHRISTOPHER: You know what? We've
15 been going about an hour. Why don't we take a
16 short break, this is a new segment, and then we'll
17 come back.
18 (Break held off the record from
19 11:25 a.m. to .)
20 BY MR. CHRISTOPHER:
21 **Q Welcome back, Dr. Anthony. Did you**
22 **discuss your testimony with anyone during our**
23 **break?**
24 A No.
25 **Q Okay. I'm going to direct you now to**

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1 **paragraph 144 of your declaration for the '533**
2 **patent.**
3 A 144?
4 **Q 144, correct.**
5 A Okay.
6 **Q It's on -- it looks like page 77 of your**
7 **PDF it starts and we're just onto the next page.**
8 **Are you there?**
9 A Yep.
10 **Q Okay. And in paragraph 144 you address**
11 **dependent Claim 12 of the '533 patent. Correct?**
12 A Yes.
13 **Q Okay. And you've annotated portions of**
14 **Claim 12 in different colors, including the**
15 **phrase, "in part by comparing signals at different**
16 **optical wavelengths," in purple.**
17 **Do you see that?**
18 A Yes.
19 **Q And that additional limitation in**
20 **purple, "in part by comparing signals in different**
21 **optical wavelengths," was not addressed in the**
22 **prior decision for the '533 patent. Correct?**
23 A Correct. But as I describe, is still
24 met by Lisogurski.
25 **Q Okay. Now, if we take a step back and**

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1 **just look at the language of Claim 12, Claim 12**
2 **requires that the output signal is generated in**
3 **part by comparing signals at different optical**
4 **wavelengths.**
5 **Do you see that?**
6 A Yes.
7 **Q Okay. One of skill in the art would**
8 **understand that in order to generate an output**
9 **signal in part by comparing signals at different**
10 **optical wavelengths, the comparison between**
11 **different optical wavelengths would need to occur**
12 **prior to generating the output signal. Correct?**
13 MR. KIM: Objection; form.
14 THE WITNESS: Well, as recited there, if
15 the system Claim 5 were in the output optical beam
16 which comprises a plurality of optical wavelengths
17 then the output signal is generated in part by
18 comparing signals at different optical
19 wavelengths.
20 So signals for different wavelengths are
21 generated -- used to generate output signal.
22 BY MR. CHRISTOPHER:
23 **Q The comparison of signals at different**
24 **optical wavelengths is used to generate the output**
25 **signal. Correct?**

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1 A That's what's disclosed there.
2 **Q Okay. Let's look at paragraph 150 of**
3 **your declaration for the '533 patent.**
4 A Okay.
5 **Q Okay. And in paragraph 150, in the**
6 **first sentence, you write:**
7 **Lisogurski additionally discloses that**
8 **the output signal, (e.g., processed signals), is**
9 **generated in part by comparing signals in**
10 different optical wavelengths, (e.g., comparing
11 the intensities of red and infrared (IR)
12 wavelengths).
13 Do you see that?
14 A Yes.
15 **Q And at the end of that sentence, you**
16 **have three citations to Lisogurski. Correct?**
17 A Yes.
18 **Q And then, you know, further down in**
19 **paragraph 150, you have three more citations to**
20 **Lisogurski. Do you see those?**
21 A Lisogurski 4:52-53 and Lisogurski 52:56.
22 **Q Right. And those overlap with your**
23 **first citation in the first sentence, Column 4,**
24 **Lines 42 to 56. Correct?**
25 A Yes.

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1 **Q Okay. Let's turn back. Lisogurski,**
2 **Exhibit 1025. And I'll direct you to Column 4,**
3 **Line 42. It's page --**
4 A Column 4?
5 **Q Yeah, Column 4, Line 42. This is**
6 **page 34 of your PDF.**
7 **Actually, I'll direct you to Line 48**
8 **within the paragraph that starts at Line 42. At**
9 **Line 48, Lisogurski discloses:**
10 **By comparing the intensities of two**
11 **wavelengths at different points in the pulse**
12 **cycle, it is possible to estimate the blood oxygen**
13 **saturation of hemoglobin in arterial blood.**
14 **Do you see that?**
15 A Yes.
16 **Q And then at Line 53, the next paragraph,**
17 **Lisogurski discusses:**
18 **For example, the system may determine**
19 **blood oxygen saturation using two wavelengths of**
20 **light and a ratio of ratios calculation.**
21 **Do you see that?**
22 A Yes.
23 **Q And that sentence doesn't mention**
24 **intensity. Correct?**
25 A Well, you don't compare -- it's -- I

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1 mean, it's not mentioning intensity but it's not
2 comparing wavelengths. It's comparing the light
3 received at different wavelengths. So intensity
4 is implied.
5 **Q Okay. Let's look at -- let's look at**
6 **Column 12 of Lisogurski, Line 42.**
7 A I'm sorry. Line what?
8 **Q Line 42, please.**
9 A 42. Okay.
10 **Q Let me know when you're there.**
11 A Okay.
12 **Q So here, starting at Line 42, Lisogurski**
13 **discloses:**
14 **Front-end processing circuitry 150 may**
15 **receive a detection signal from detector 140 and**
16 **provide one or more process signals to back-end**
17 **processes circuitry 170.**
18 **Do you see that?**
19 A Yes.
20 **Q Let's turn now to Column 14, Line 60.**
21 **Actually, let's start at 56. Let me know when**
22 **you're there.**
23 A You said 14?
24 **Q Correct.**
25 A Okay.

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1 **Q Column 14, starting at Line 56,**
2 **Lisogurski discloses:**
3 **Back-end processing circuitry 170 may**
4 **include processor 172 and memory 174.**
5 **Do you see that?**
6 A Yes.
7 **Q And then at Line 60, a few lines down,**
8 **Lisogurski discloses:**
9 **Process 172 may receive and process**
10 **physiological signals received from front-end**
11 **processing circuitry 150.**
12 **Do you see that?**
13 A Yes.
14 **Q Now, if we go back to that portion of**
15 **Lisogurski we discussed in Column 4, starting at**
16 **Line 42, about comparing the intensities of the**
17 **wavelengths, one of skill in the art would**
18 **understand that the back-end processing circuitry**
19 **170 performs that comparison. Correct?**
20 MR. KIM: Objection; form.
21 BY MR. CHRISTOPHER:
22 **Q Are you reviewing Lisogurski or your**
23 **declaration?**
24 A My declaration where I talk about
25 Lisogurski.

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1 Well, I mean, as I describe in -- first
2 in paragraph 150, Lisogurski discloses the output
3 signal is generated in part by comparing signals
4 at different optical wavelengths, comparing the
5 red and infrared wavelengths. Lisogurski
6 discloses that the physiological monitoring system
7 may process data to determine physiological
8 parameters using techniques well-known in the art.
9 For example, a system may determine
10 blood oxygen saturation using two wavelengths and
11 a ratio of ratios. That's Lisogurski 4:50 through
12 56.
13 Such calculations include comparing the
14 intensities of two wavelengths, red and IR, to
15 estimate blood oxygen saturation because highly
16 oxygenated blood will absorb more light -- or
17 relatively less red and more IR. Corroborated as
18 I go onto 151 with other -- other art.
19 In 152, I go on:
20 Lisogurski thus teaches at a minimum and
21 renders obvious the process signals generated by
22 the front-end processing circuitry, which the
23 Board rely on to meet the claimed output signal,
24 are generated in part by comparing intensities of
25 two different wavelengths, IR and red.

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A person of ordinary skill, in 153, would have understood the described comparison of optical wavelengths, red and IR. Well-known standard technique. The explicit disclosure in Lisogurski, supported by standard industry practices would have made it clear that the art in Claim 12's limitation related to comparing signals at different wavelengths were explicitly taught and at least rendered obvious by the teachings of Lisogurski.

Q Did you identify anywhere in that answer which component in Lisogurski forms the comparison between the wavelengths?

MR. KIM: Objection; form.

BY MR. CHRISTOPHER:

Q Do you understand the question? My question is: Which component in Lisogurski would a person of skill in the art understand performs the comparison between -- comparison of intensities of two different wavelengths?

A A processor would determine that. And, you know, as we've discussed extensively, you know, Lisogurski teaches processing being able to be put in a number of different places. But certainly the front-end processing as I opined in

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the combination -- motivation to combine -- or motivation to modify would calculate the -- would detect the signals and calculate the comparisons.

Q You're referring to a modified version of the front-end processing circuitry relative to the examples shown in Figure 1. Correct?

A Well, again, I'm -- it's the teachings of Lisogurski, which include sort of the possibility of putting the functionality into different blocks, if you will, as we discussed previously. But certainly, the teachings of Lisogurski. And a processor would generate that comparison by comparing different optical wavelengths.

Q Let's go look at Figure 1 again. Lisogurski, please. Let me know when you're there.

A Yep.

Q Okay. Now, I know you've discussed rearranging the components in Figure 1. But do you agree that one implementation of Lisogurski would be the system as it's shown with these boxes in Figure 1? You agree with that?

A I'm agreeing with Lisogurski teaching a number of configurations. There's a configuration

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of boxes shown here, and that puts components and functionality in particular places. I also opined the teachings of Lisogurski where the arrangement would be different.

And certainly, that processor functionality would acquire the generated data to process the signals at two different wavelengths.

Q Okay. So looking at Figure 1, I want you to assume that this question pertains to the exact configuration shown in Figure 1, not rearranging it.

In the system shown in Figure 1, in this arrangement, a person of ordinary skill in the art would understand the back-end processing circuitry 170 performs the comparison between different intensities. Correct?

MR. KIM: Objection; form.

THE WITNESS: I wasn't opining that Lisogurski perfectly anticipates. I was making an obvious argument in what Lisogurski teaches. So Lisogurski -- a POSITA reading Lisogurski would understand what is taught both based on the figure and the text, and how Lisogurski meets the limitation.

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BY MR. CHRISTOPHER:

Q Okay. You don't have an opinion on which component in Figure 1, assuming the system is arranged exactly as shown in Figure 1, performs the comparison between different intensities. Is that right?

MR. KIM: Objection; form.

THE WITNESS: Well, the functionality exists in processing. So in the Figure 1, it could occur in the processing circuitry of 150, in 170. And as I opined in the combination, that process or functionality would be combined in the place where the light is collected and compared in generating the signal in other combinations as I described.

BY MR. CHRISTOPHER:

Q So it's your testimony that if we're focused on the exact arrangement shown in Figure 1, the comparison between intensities could occur in either the front-end processing circuitry 150 or the back-end processing circuitry 170. Is that fair?

MR. KIM: Objection; form.

THE WITNESS: Or in the combinations that I described as well where that front-end

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1 processing is up with the 102, the sensor head.
2 BY MR. CHRISTOPHER:
3 **Q I just want to be clear because I don't**
4 **think that clearly answered the question. I'm not**
5 **asking about combinations, and I just want to**
6 **understand.**
7 **Your testimony, focused on the exact**
8 **configuration and arrangement we see in Figure 1,**
9 **is that one of skill in the art would understand**
10 **that the comparison between wavelengths could**
11 **occur in box 150 or box 170. Correct?**
12 MR. KIM: Objection; form.
13 THE WITNESS: A POSITA reading
14 Lisogurski and the teachings of Lisogurski, the
15 different functionality can be accomplished
16 different places would understand that yes, the
17 functionality of processing and comparing those
18 could be done in 105 -- or sorry, 150 or in 170.
19 And in the combination as well, as I taught it.
20 As I opined that a POSITA would construct it.
21 BY MR. CHRISTOPHER:
22 **Q Okay. Can you turn to paragraph 181?**
23 A Of '533?
24 **Q Of '533, please. This would be page 103**
25 **of your PDF.**

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1 A Okay.
2 **Q Okay. Paragraph 181, you opine on**
3 **dependent Claims 11 and 18 of the '533 patent.**
4 **Correct?**
5 A Yes.
6 **Q And your opinion is Lisogurski in view**
7 **of Carlson renders obvious Claims 11 and 18.**
8 **Correct?**
9 A Lisogurski in view of Carlson. Yes.
10 **Q Okay. And can you turn to**
11 **paragraph 185? It's on -- two pages down.**
12 **Page 105 of your PDF.**
13 A Yes.
14 **Q And in paragraph 185, you opine that:**
15 **Carlson further discloses one or more**
16 **filters, e.g., optical wavelength filter or double**
17 **pass filter, to select a fraction of one or more**
18 **optical wavelengths.**
19 **Do you see that?**
20 A I'm sorry. You were reading 185?
21 **Q 185, please.**
22 A Carlson further discloses one or more
23 filters to select a fraction of one or more
24 optical wavelengths, yes.
25 **Q So your opinion is that Carlson**

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1 **discloses one more filters. Correct?**
2 **I'm sorry. Are you reviewing a**
3 **different paragraph of your declaration?**
4 A I'm going back -- I'm going back to
5 where I introduce Carlson -- or reveal Carlson in
6 my declaration.
7 **Q Okay. But I'm asking you about**
8 **paragraph 185 and you literally state:**
9 **Carlson further discloses one or more**
10 **filters to select a fraction of one or more**
11 **optical wavelengths.**
12 **Correct?**
13 MR. KIM: Objection; form.
14 THE WITNESS: Right. I'm just making
15 sure -- I'm orienting myself to Carlson to make
16 sure that I'm reading my paragraph there in the
17 context of how I introduced Carlson. So just give
18 me a moment to read Carlson here, or my discussion
19 of Carlson.
20 BY MR. CHRISTOPHER:
21 **Q So to be clear, you need to review your**
22 **overview of Carlson to be able to answer this**
23 **question?**
24 MR. KIM: Objection; form.
25 THE WITNESS: I'm sorry. Maybe I don't

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1 understand the question. Can you repeat it?
2 BY MR. CHRISTOPHER:
3 **Q I'm just asking you --**
4 A Uh-huh.
5 **Q -- and I'm showing you the paragraph**
6 **where you literally say it.**
7 **You opine that Carlson further discloses**
8 **one or more filters, e.g., optical wavelength**
9 **filter or double pass filter, to select a fraction**
10 **of one or more optical wavelengths as claimed in**
11 **Claims 11 and 18. Correct?**
12 A So this is Carlson in combination with
13 Lisogurski. But, you know, I'm citing Carlson
14 there. I was just going to go back and confirm my
15 cites there. But I can read my paragraph there,
16 and I agree with what I wrote there.
17 **Q Right. So let me get to my next**
18 **question, which is: You are not opining that**
19 **Lisogurski by itself discloses one or more filters**
20 **as claimed in Claims 11 and 18 of the '533 patent.**
21 **Correct?**
22 MR. KIM: Objection; form.
23 THE WITNESS: I am proposing Lisogurski
24 in view of Carlson.
25

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1 BY MR. CHRISTOPHER:
2 **Q Okay. Now, let's go to paragraph 188 of**
3 **your declaration.**
4 **In paragraph 188:**
5 A person of ordinary skill in the art
6 would have been motivated to apply Carlson's
7 filter teachings to Lisogurski's wireless sensor
8 to advantageously filter out unwanted background
9 noise and ambient light before they reach the
10 detectors in Lisogurski's sensor.
11 Do you see that?
12 A Yes.
13 **Q In your proposed combination of**
14 **Lisogurski and Carlson, Carlson's filter would be**
15 **applied to Lisogurski's sensor. Correct?**
16 A And as I discussed in detail in
17 Section IX.B.2, and so I would go back and confirm
18 what I said there just to orient myself.
19 **Q I'm sorry. You're telling me you need**
20 **to read the other portion of your declaration to**
21 **finish your answer?**
22 A You're asking me to comment on
23 paragraph 188, and I reference a section that's
24 in -- also in my dec, but is part of 188.
25 **Q Now, in paragraph 188, according to your**

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1 **opinion, the purpose of adding Carlson's filter**
2 **teachings to Lisogurski would be to prevent**
3 **ambient light from reaching Lisogurski's**
4 **detectors. Correct?**
5 A Well, Carlson's teachings to
6 Lisogurski's sensor to filter out unwanted
7 background noise or ambient light before they
8 reach the detector.
9 **Q Right. And the -- the benefit a person**
10 **of skill in the art would understand the benefit**
11 **of filtering out unwanted background noise and**
12 **ambient light by adding a filter from Carlson**
13 **would be to increase the signal-to-noise ratio of**
14 **the detection signal described in Lisogurski.**
15 **Correct?**
16 A Well, to filter out noise and ambient
17 light, so to reduce noise, thereby would be
18 increasing the ratio of signal to noise.
19 **Q Okay. Let me show you Exhibit 1028,**
20 **Carlson. I don't think we've looked at this one**
21 **yet.**
22 (Exhibit 1028 in each of the proceedings
23 was previously marked.)
24 BY MR. CHRISTOPHER:
25 **Q Let me know when you have Exhibit 1028.**

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1 A Yep.
2 **Q All right. Can you turn to paragraph --**
3 **well, first of all, do you recognize Exhibit 1028**
4 **that I'm showing you as the Carlson reference?**
5 A Yes.
6 **Q Okay. Let's turn to paragraph 56.**
7 A I'm sorry. Which one?
8 **Q 56, please.**
9 **I'll scroll there myself. This is page**
10 **20 of the PDF.**
11 A Yes.
12 **Q And you see in paragraph 56,**
13 **approximately halfway down, Carlson discloses:**
14 **In addition, it is possible to arrange**
15 **an optical wavelength filter or double pass filter**
16 **which is e.g. light permeable at the wavelength of**
17 **approximately 660 nanometers and in the range of**
18 **approximately 850 nanometers to 910 nanometers.**
19 **Do you see that?**
20 A Yes.
21 **Q And when Carlson says that the filter is**
22 **permeable at those wavelengths, that means that**
23 **light having those wavelengths can pass through**
24 **the filter. Correct?**
25 A Light permeable at the -- yes, I think

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1 that's true.
2 **Q Okay. And conversely, the filter would**
3 **prevent light having wavelengths other than those**
4 **listed in the sentence from passing through the**
5 **filter. Correct?**
6 A What Carlson is generally teaching there
7 is a -- a band pass filter they're wanting to
8 particular center frequencies and wavelength and a
9 range of -- yes.
10 **Q Okay. And so if we were to modify**
11 **Lisogurski to include, for example, the sensor**
12 **described in paragraph 56 of Carlson -- strike**
13 **that.**
14 **If Lisogurski were modified to include**
15 **the filter taught by Carlson in paragraph 56, that**
16 **filter would not filter out light having a**
17 **wavelength of approximately 660 nanometers and**
18 **light in the range of approximately 850 to 910**
19 **nanometers. Correct?**
20 MR. KIM: Objection; form.
21 THE WITNESS: I'm sorry. Can you re-ask
22 question?
23 BY MR. CHRISTOPHER:
24 **Q Yeah. I'm just wondering if Lisogurski**
25 **were modified to include Carlson's sensor --**

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1 A Yeah.
2 **Q -- that's described in paragraph 56 with**
3 **those values, the filter would not prevent light**
4 **with the wavelengths listed in paragraph 56 from**
5 **reaching the detector. Correct?**
6 MR. KIM: Objection; form.
7 THE WITNESS: I'm just -- before I
8 answer the question, I want to clarify something
9 that I said now that I'm rereading this.
10 So this is describing a double pass
11 filter that has sort of a double band, a double
12 pass, so it's nominally in the range of 660 and
13 nominally in the range between 850 and 910.
14 So I think I misstated having 660 being
15 the center. So that's the center of one of the
16 bands and average of 850 is probably the nominal
17 center of the other band.
18 BY MR. CHRISTOPHER:
19 **Q Okay. Let me -- let me re-ask my**
20 **question.**
21 A Yeah.
22 **Q If Lisogurski were modified to include**
23 **the filter that is described in paragraph 56 with**
24 **these wavelength values, that filter would not**
25 **prevent light with the wavelengths listed in**

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1 **paragraph 56 from reaching the detector. Correct?**
2 MR. KIM: Objection; form.
3 THE WITNESS: Well, I mean, I'm not
4 proposing -- I'm proposing the teachings of
5 Carlson using filters. I mean, a POSITA would
6 pick the right filters for the wavelengths of
7 light they were interested in. But, you know, if
8 you were to take that filter, that filter does
9 what it does at those wavelengths.
10 BY MR. CHRISTOPHER:
11 **Q Okay. Can you turn to paragraph --**
12 **we'll use this declaration, so just allow me to**
13 **change the paragraph numbers around.**
14 **Let's turn to paragraph 55 of your**
15 **declaration for the '533 patent.**
16 A 55, you said?
17 **Q Yes, 55, please. It's page 26 of your**
18 **PDF.**
19 A Yeah.
20 **Q Okay. So starting in paragraph 55, you**
21 **opine on the level of ordinary skill in the art**
22 **for the '533 patent. Correct?**
23 A Yes.
24 **Q Okay. And you state in paragraph 57**
25 **that the level of ordinary skill in the art you've**

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1 **opined on in this declaration, Exhibit 1003, is**
2 **the same level of ordinary skill in the art as you**
3 **opined in your prior '533 declaration. Correct?**
4 A Correct.
5 **Q Okay. And your opinion on the level of**
6 **ordinary skill in the art is the same across each**
7 **of the five patents in these proceedings, the**
8 **'533, the '304, the '455, the '970, and the '475**
9 **patents. Correct?**
10 A Without going through and verifying
11 that, I believe that is the case. I don't think I
12 make any differences in any of them, yes.
13 **Q Okay. Let's turn back to paragraph --**
14 **let's turn to paragraph 56. And I'd like to**
15 **direct your attention to a portion that's on**
16 **page 24, 27 of the PDF at the top of the page,**
17 **paragraph 56, you wrote:**
18 **In my opinion, on or before the priority**
19 **date, a person of ordinary skill in the art, at**
20 **the time the application that matured into the**
21 **'533 patent was filed would have had a good**
22 **working knowledge of optical sensing techniques**
23 **and their applications and some familiarity with**
24 **optical system design and signal processing**
25 **techniques.**

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1 **Do you see that?**
2 A Yes.
3 **Q What do you mean by "good working**
4 **knowledge"?**
5 A Well, I mean, familiarity with optical
6 system designs, signal processing techniques, you
7 know, the ability to make the design tradeoffs as
8 I've been opining throughout here in terms of the
9 optical, electrical, sensors, sensing systems.
10 So, you know, it's understanding the -- you know,
11 how to use sensors and optical components to
12 collect light in a -- and process the resulting
13 signals.
14 **Q You see at the last clause of that**
15 **sentence, you refer to "some familiarity"?**
16 A Yes.
17 **Q How does "some familiarity" compare to**
18 **"good working knowledge"?**
19 A They're comparable. Some familiarity
20 with optical system design -- you know, we don't
21 need somebody to design a telescope that is trying
22 to see the outer reaches of the solar system.
23 Right? But being able to apply the lenses and
24 filters, optical elements that are relevant to
25 the -- the art at hand.

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1 **Q So in your view, the phrases "good**
2 **working knowledge" and "some familiarity" are**
3 **comparable. Correct?**
4 A They have good working knowledge of
5 optical sensing techniques and their applications
6 and some familiarity of optical system designs and
7 signal processing techniques.
8 So yeah. The knowledge would have been
9 gained -- that type of knowledge would have been
10 gained via an undergraduate education in something
11 like electrical, mechanical, biomedical, optical
12 or related field of study along with relevant
13 experience in studying or developing physiological
14 monitoring. For example, noninvasive optical
15 biosensors in industry or academia.
16 And, again, that description is
17 approximate. Varying combinations of education
18 and practical experience would also be sufficient.
19 So it's a range of familiarity with the various
20 design axes of a physiological monitoring device
21 of a noninvasive optical biosensor.
22 **Q Would a person with some familiarity**
23 **have less familiarity than someone with good**
24 **working knowledge?**
25 MR. KIM: Objection; form.

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1 THE WITNESS: Well, I mean, I clarify.
2 I expand. You know, the person that is a POSITA
3 is going to be gaining their knowledge, that good
4 working knowledge and that some familiarity, via
5 an undergraduate education in one of the mentioned
6 electrical, mechanical, biomedical or optical
7 fields or related study along with experience in
8 studying or develop sensors in industry and
9 academia.
10 So it's -- this is the familiarity and
11 working knowledge that would come from that range
12 of study and experience. But various -- you know,
13 more experience, less education, more education,
14 less experience in that broad area.
15 BY MR. CHRISTOPHER:
16 **Q Understood. But I'm focused on your**
17 **terminology in the sentence. Is there a**
18 **difference between "good working knowledge" and**
19 **"some familiarity" as you used those phrases in**
20 **the sentence of your declaration?**
21 A I think that captures the approximate --
22 so what I further say in the last sentence with:
23 This description is approximate; varying
24 levels of education and practical experience would
25 also be sufficient.

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1 So this captures the general control
2 volume of the knowledge that a POSITA in this art
3 would have.
4 **Q That doesn't answer the question, which**
5 **is: By using the different phrases "good working**
6 **knowledge" and "some familiarity" in this**
7 **sentence, were you attempting to draw a**
8 **distinction between those two terms?**
9 MR. KIM: Objection; form.
10 THE WITNESS: Not extensively, because
11 as I further describe, this description is
12 approximate; various combinations of education and
13 practical experience would also be sufficient.
14 BY MR. CHRISTOPHER:
15 **Q Okay. And you refer in the sentence to**
16 **"optical sensing techniques." Do you see that?**
17 A Yes.
18 **Q Can you give me an example of optical**
19 **sensing techniques?**
20 A Well, for example, you know, related to
21 physiological monitoring, noninvasive optical
22 biosensors and using lenses and filters and
23 detectors to measure -- to turn light photons into
24 electrons and process it and make estimates of
25 physiological properties.

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1 **Q Would one optical sensing technique be**
2 **estimating blood oxygen saturation?**
3 A That's a noninvasive optical biosensor.
4 **Q Okay. And your definition of optical**
5 **sensing techniques here in the definition is not**
6 **limited to something like estimating blood oxygen**
7 **saturation. Correct?**
8 A No --
9 **Q Okay.**
10 A -- that's an example.
11 **Q Okay. Now, in the next sentence, this**
12 **is paragraph 56 of your declaration for the '533**
13 **patent. The next sentence, you opine:**
14 **That knowledge would have been gained**
15 **via an undergraduate degree in education,**
16 **parentheses --**
17 A Right undergraduate education in
18 engineering.
19 **Q Excuse me. Let me just skip ahead to**
20 **what I really want to ask you about.**
21 **Do you see the second half of the**
22 **sentence where you wrote:**
23 **Along with relative -- excuse me. Not**
24 **enough coffee this morning.**
25 **Along with relevant experience in**

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1 **studying or developing physiological monitoring**
2 **devices, e.g., noninvasive optical biosensors in**
3 **industry or academia.**
4 **Do you see that?**
5 A Yes.
6 **Q How much experience studying or**
7 **developing physiological monitoring devices would**
8 **a person of skill in the art require?**
9 A You said how much -- say that again?
10 **Q Sure. How long would a person need to**
11 **spend gaining relevant experience in studying or**
12 **developing physiological monitoring devices to be**
13 **considered a person of ordinary skill in the art?**
14 A It's not necessarily the length of time.
15 It's what they do during that time. So it's the
16 integral of what they're doing to gain that
17 experience over the time. So it's relative
18 experience in that domain, either studying or
19 developing physiological monitors. So it's not
20 going to -- it's -- it depends on what they're
21 doing during that time studying.
22 But it's, you know, a couple years.
23 **Q You said a couple years?**
24 A Yeah. But, I mean, again, it's -- I
25 mean, it's -- it depends on what they're doing.

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1 It's hard to put an exact number of years
2 experience because it depends -- it's not just the
3 length of time, it's what they're doing during
4 that time. And if they're -- if all they're doing
5 is work in the area of developing physiological
6 monitors during a period of time, it's going to be
7 a shorter duration than if they're only doing that
8 10 percent of the time. It would be longer.
9 So...
10 **Q And in the -- in the same phrase we've**
11 **been looking at, you see where you say "studying**
12 **or developing physiological monitoring devices"?**
13 A Yes.
14 **Q Is studying physiological devices --**
15 **monitoring devices different than developing**
16 **physiological monitoring devices?**
17 A With relevant experience in studying or
18 developing. So studying, you're studying, which
19 can include also fabricating and lab work. And
20 developing also includes -- it's studying and
21 developing, studying would generally relate to the
22 academic hat versus developing, more of an
23 industry hat.
24 But depending on the curriculum that
25 they're in and the job they're in, you know, it's

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1 a mix of developing and studying.
2 **Q You said studying would include**
3 **fabricating and lab work. Is that right?**
4 A It certainly could.
5 **Q Is that necessary to be a person of**
6 **skill in the art?**
7 A Again, here the description --
8 MR. KIM: Objection; form.
9 THE WITNESS: The description here is
10 approximate with a range of experiences. You
11 know, broadly, it's somebody that has these
12 various experiences along with knowledge and --
13 and at the undergraduate level, electrical,
14 mechanical, biomedical or optical. Relevant
15 experience studying or developing physiological
16 monitoring devices. A combination of stuff they
17 would potentially do in school or academic
18 environment, and then something they would do in a
19 commercial environment in industry or academia.
20 BY MR. CHRISTOPHER:
21 **Q So you haven't formulated a specific**
22 **time frame that a person would need to spend**
23 **gaining experience in studying or developing**
24 **physiological monitoring devices in order to be**
25 **qualified as a person of skill in the art.**

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1 **Correct?**
2 MR. KIM: Objection; form.
3 THE WITNESS: Well, as I described, it's
4 likely gained via undergraduate education, which
5 typically is four to five years. And then the
6 relevant experience, again, that's a function of
7 what they're doing during their time of gaining
8 experience. If they're spending all their time in
9 a environment where they're developing
10 physiological monitoring devices, it takes some
11 period of time. If they're spending half of their
12 time or a tenth of their time in that area, then
13 they need more time to get that equivalent
14 experience.
15 But, you know, I'm not defining a
16 particular amount of time.
17 BY MR. CHRISTOPHER:
18 **Q Okay. You've attached a copy of your CV**
19 **as Appendix A to each of these declarations.**
20 **Correct?**
21 A Yes.
22 **Q Okay. Let's -- we have the '533**
23 **declaration open. Let's go to your Appendix A,**
24 **page 119 of the PDF. Let me know when you're**
25 **there.**

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1 A Sorry, I didn't have it open. I was
2 looking in the paper version, and in the paper
3 version, I didn't print out my --
4 **Q Do you need me to give you a PDF version**
5 **in the --**
6 A Yeah, that would be faster.
7 **Q Okay. And then when you have it open,**
8 **it starts at 119 of the PDF.**
9 A Okay.
10 **Q And you see at the top where it says**
11 **date: November 20th, 2024?**
12 A Yes.
13 **Q Do you have a more up-to-date version of**
14 **your CV?**
15 A I'm not looking for a job, so I haven't
16 updated it recently. But I think that's probably
17 the most recent version.
18 **Q Fair enough. Any major changes that you**
19 **would add to your CV from December 20, 2024 [sic]**
20 **through the present date?**
21 A Let's see here. More professional
22 service to other committees. Some additional
23 patent disclosures. Probably 20 new papers.
24 **Q Okay. But your employment --**
25 A A bunch -- a bunch of new students.

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1 **Q Your employment's the same. Correct?**
2 A Yeah. I'm still here at MIT.
3 **Q Okay. Can you turn to, is it section or**
4 **paragraph 9? This is page 120 of the PDF. And**
5 **you see where it says "Consulting Record"?**
6 A 120. Yes.
7 **Q Okay. And then at the very bottom of**
8 **that list, it lists Samsung beginning 2024, ending**
9 **2025. Do you see that?**
10 A Yes. Yes.
11 **Q Is that in connection with your**
12 **declarations for these proceedings?**
13 A Yes.
14 **Q Okay. Have you done any other**
15 **consulting for Samsung?**
16 A I've been involved in other IPRs in
17 addition this one.
18 **Q That was -- that was my next question.**
19 **I haven't seen it in your CV. Do you have a list**
20 **of all of the matters in which you've testified**
21 **either live or by declaration in the last four**
22 **years?**
23 A I don't.
24 **Q Okay. On page -- starting on page 124,**
25 **you list a number of papers that you've written.**

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1 **Correct?**
2 A Yes.
3 **Q And those are based on research you've**
4 **performed. Correct?**
5 A Or supervised, yes, and performed.
6 **Q Has any of the research that you**
7 **performed or supervised been funded by Samsung?**
8 A No.
9 **Q What about any of the other Petitioners?**
10 A No.
11 **Q Okay. Let's look at -- I changed which**
12 **declaration I'm asking about, so I have to find**
13 **which paragraph. Let's see.**
14 **Paragraph 18, please. Your declaration**
15 **for the '533 patent.**
16 A Paragraph 18?
17 **Q Correct.**
18 A Okay.
19 **Q Okay. And you state here you earned a**
20 **Bachelor of Science in engineering from Carnegie**
21 **Mellon and a master's in engineering from MIT. Do**
22 **you see that?**
23 A Yes.
24 **Q What type of engineering?**
25 A The degree was in mechanical

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1 engineering, but my specialty was in
2 electro-mechanical system design, so automation,
3 robotics, sensors, algorithms, measurement
4 systems.
5 **Q And that's for both the bachelor and**
6 **master's degree?**
7 A Yes.
8 **Q What about your Ph.D.?**
9 A Same thing.
10 **Q Okay.**
11 A As I say there, my research -- you know,
12 and that's research focused on high-performance
13 computation, signal processing, electro-mechanical
14 system design. That's in line with the Ph.D.
15 **Q Got it. I was just wondering which type**
16 **of engineering.**
17 **Let's look at paragraph -- in paragraph**
18 **19, you'll see about halfway down, you describe**
19 **your work on an optical ring. Do you see that?**
20 A Yes.
21 **Q Did that product measure blood oxygen?**
22 A It did not, no.
23 **Q And in paragraph 20, the very end of**
24 **that paragraph, you wrote:**
25 **Many of the courses, projects, and**

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1 **papers my students undertake involve technologies**
2 **relevant to the patent at issue. For example,**
3 **sensor devices including non-invasive optical**
4 **biosensors.**
5 **Do you see that?**
6 A Yes.
7 **Q Did any of those biosensors measure**
8 **blood oxygen saturation?**
9 A Yes. I used to teach a class in
10 biomedical electronics. Shoot, that was back in
11 '97 through -- '97, '98, '99 even. But we had
12 students that would design both EKG systems that,
13 you know, we actually ended up that over in the
14 Museum of Science and non-invasive techniques for
15 pulse rate and heart rate and blood oxygenation as
16 the lab activities.
17 **Q And then in paragraph 22, you refer to a**
18 **new facility. Do you see that?**
19 A Yeah. MIT.nano, you mean?
20 **Q Yeah. When did that open?**
21 A We've been open, what, five -- let's
22 see. Let's look back at my CV. Six years.
23 Let's see, 2017. I've been associated
24 with it, though, since 2016. So yeah.
25 **Q Okay. Have you ever built a pulse**

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1 **oximeter?**
2 A Yes.
3 **Q Okay. Have you ever designed an**
4 **algorithm for measuring blood oxygen saturation?**
5 A Yes.
6 **Q Okay. When was that?**
7 A Oh, back in '97, '98, '99, during the
8 biomedical electronics courses. But, you know,
9 that's been a while ago.
10 **Q And what was -- what was the algorithm**
11 **for measuring blood oxygen saturation? Could you**
12 **describe it?**
13 A Very similar to what's described here.
14 You know, measuring the -- the ratio of received
15 light. What we're trying to do now, actually,
16 fast-forward a couple of decades is we're using
17 multiple wavelengths to try to disambiguate
18 between all the commercially available
19 physiological -- not all of them, but like a lot
20 of the pulse-ox sensor have an inherent racial
21 bias. They work well for people of our -- with my
22 skin tone. And to make it less sensitive to
23 variation in melanin, the skin variation are now
24 using three or four wavelengths in trying to that
25 in a compact form factor.

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1 But -- so that's been over the last six
2 years we've been working on -- on that. Yeah.
3 **Q So using three or more -- or I think you**
4 **said three or more wavelengths is more of a recent**
5 **trend?**
6 A We're trying to -- there was a -- I was
7 co-author on a -- I guess I wasn't the author, but
8 I was co-cited in a New York Times article with
9 faculty here that was -- really came down hard on
10 the racial disparities in the physiological in --
11 pulse-ox. So that has led to some internal
12 funding being made available to try to eliminate
13 that complication.
14 **Q Okay.**
15 MR. CHRISTOPHER: Why don't we go off
16 the record for about five minutes. Let me check
17 my notes and see if we can wrap up here and get
18 everyone back to their Saturday.
19 (Break held off the record from to
20 .)
21 MR. CHRISTOPHER: Dr. Anthony, I thank
22 you for your time. I have no further questions
23 for you at this time.
24 THE WITNESS: Thank you.
25 MR. KIM: No questions either.

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1 THE STENOGRAPHER: And Counsel, before
2 we go off the record, if I could please get
3 transcript orders for the record.
4 MR. CHRISTOPHER: I think we made them
5 yesterday, so I don't want to be inconsistent.
6 But I think it was a rough and the final by
7 Wednesday.
8 MR. KIM: That's my recollection too.
9 THE WITNESS: Mine as well, if it
10 matters.
11 (Off the record at 12:37 p.m.)
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REPORTER'S CERTIFICATE

I, CASSIDY WESTERN, RPR, CRR, CA CSR, WA CCR, the officer before whom the foregoing deposition was taken, do hereby certify that the foregoing transcript is a true and correct record of the testimony given; that said testimony was taken by me stenographically and thereafter reduced to typewriting under my direction; that reading and signing was requested; and that I am neither counsel for, related to, nor employed by any of the parties to this case and have no interest, financial or otherwise, in its outcome.

IN WITNESS WHEREOF, I have hereunto set my hand this 22nd day of April, 2026.

_____

Cassidy Western, RPR, CRR, CA CSR NO. 14722

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DECLARATION UNDER PENALTY OF PERJURY

Case Name: Samsung Electronics Co.
vs. Omni Medsci, Inc.
Date of Deposition: 04/18/2026
Job No.: 10188950

I, BRIAN W. ANTHONY, 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 _____.

_____

BRIAN W. ANTHONY

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)

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Case Name: Samsung Electronics Co.
vs. Omni Medsci, Inc.
Name of Witness: Brian W. Anthony
Date of Deposition: 04/18/2026
Job No.: 10188950
Reason Codes: 1. To clarify the record.
2. To conform to the facts.
3. To correct transcription errors.

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