

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

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SOTERA WIRELESS, INC.,
Petitioner,

v.

MASIMO CORPORATION,
Patent Owner.

-----x

Case IPR2020-00912
U.S. Patent 10,213.108

-----x

Case IPR2020-00954
U.S. Patent 9,788,735

-----x

Case IPR2020-01015
U.S. Patent 9,795,300

-----x

Case IPR2020-01054
U.S. Patent 9,872,623

-----x

REMOTE VIDEO DEPOSITION
OF
GEORGE EMANUEL YANULIS, Ph.D.
Tuesday, January 26, 2021

DIGITAL EVIDENCE GROUP
1730 M Street, NW, Suite 812
Washington, D.C. 20036
(202) 232-0646

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January 26, 2021

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11:02 a.m. Eastern Standard Time

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Remote video deposition of GEORGE

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EMANUEL YANULIS, Ph.D., taken by Patent Owner

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Masimo Corporation, pursuant to Notices, dated

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January, 20, 2021, before Brandon Rainoff, a

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Federal Certified Realtime Reporter and Notary

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Public of the State of New York.

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1 INDEX OF EXAMINATION

2

3 Witness:

4 George Emanuel Yanulis, Ph.D.

5

6 Examination:

7 By Ms. Lam.....Page 8

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9

10 PREVIOUSLY - MARKED EXHIBITS

11

12 Exhibit 1003Page 12

13 Multipage document entitled: Declaration of George E.

14 Yanulis in Support of Petition for Inter Partes

15 Review of U.S. Patent No. 10,213,108, dated May 6,

16 2020 (no Bates Nos.)

17

18 Exhibit 1001Page 56

19 Multipage document entitled: United States Patent

20 No.: US 9,872,623 B2, dated January 23, 2018 (no

21 Bates Nos.)

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P R O C E E D I N G

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Tuesday, January 26, 2021

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Remote Deposition

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11:02 a.m. Eastern Standard Time

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THE VIDEOGRAPHER: We are now on the

8

record.

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This is video No. 1 in the video

10

recorded deposition of Dr. George Yanulis, taken

11

in the matter of Sotera Wireless, Inc. v. Masimo

12

Corp. It is pending before the Patent and Trial

13

Appeals Board of the U.S. Patent and Trademark

14

Office. It's IPR No. 2020-00912 for patent

15

10,213,108.

16

This deposition is being conducted by

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Zoom video remote conferencing, and the physical

18

recording of this deposition taking place in

19

Culpeper, Virginia.

20

Today's date is January 26, 2021. The

21

time on the video screen is 11:02 a.m. Eastern

22

Standard Time.

1 My name is Daniel Holmstock. I am the
2 legal videographer and digital exhibit
3 technician from Digital Evidence Group. Our
4 court reporter today is Mr. Brad Rainoff, also
5 in association with Digital Evidence Group.

6 For the record now will counsel please
7 introduce themselves and whom they represent,
8 followed by the court reporter administering a
9 statement, then the oath.

10 MS. HOEKEL: Jennifer Hoekel and
11 Nathan Sportel of Husch Blackwell for Sotera
12 Wireless and the witness.

13 MS. LAM: Shannon Lam for Masimo Corp.
14 And with me are Daniel Kiang and Ben Everton.

15 THE COURT REPORTER: Counsel, before
16 swearing in the witness, I have a short
17 statement to put on the record.

18 The attorneys participating in this
19 deposition acknowledge that, due to the severity
20 of COVID-19 and following the practice of social
21 distancing, I am not physically present in the
22 deposition room, and that I will be swearing in

1 the witness and reporting this deposition
2 remotely.

3 Do all parties stipulate to the
4 validity of this remote swearing and remote
5 reporting via video conference, and that it will
6 be admissible in the courtroom as if it had been
7 taken pursuant to the applicable rules of civil
8 procedure?

9 Let's start with the noticing
10 attorney.

11 MS. LAM: Yes.

12 MS. HOEKEL: Yes.

13 GEORGE EMANUEL YANULIS,

14 having been duly sworn, was examined
15 and testified as follows:

16 MS. HOEKEL: Ms. Lam, before we get
17 started can I just ask one clarifying question,
18 please?

19 MS. LAM: Sure.

20 MS. HOEKEL: The videographer read us
21 on as being in the '108 deposition. Are you
22 intending on splitting these up among the four?

1 Or what is your intention?

2 MS. LAM: Yes, I was going to bring
3 that up.

4 So we're going to cover all four --

5 MS. HOEKEL: Under one caption.

6 MS. LAM: Yes.

7 MS. HOEKEL: Okay. Thank you.

8 (Pause)

9 EXAMINATION

10 BY MS. LAM:

11 Q. Dr. Yanulis, how are you doing?

12 A. I'm doing fine, counselor. How are
13 you?

14 Q. Good. Can you hear me all right?

15 A. Yes, I can. Can you hear me?

16 Q. Yes, I can.

17 If at any time you can't hear me, just
18 let me know.

19 A. Yeah -- I lowered the volume all the
20 way to here so I can hear a little bit and have
21 less feedback. So I want to make sure you --

22 Q. Okay. Great.

1 Dr. Yanulis, have you ever been
2 deposed before?

3 A. Yes, I have, counselor, on seven other
4 occasions.

5 Q. Did any of those seven other occasions
6 involve patents?

7 A. The last one -- only one of them
8 involved a patent litigation issue.

9 Q. Have you been deposed on Zoom before?

10 A. Yes, for that same one, and it was for
11 the same case.

12 Q. So you are familiar with how this
13 platform works?

14 A. Yes, ma'am.

15 Q. If you have any questions about the
16 platform at any time, please let us know.

17 A. No, I do not at this point.

18 Q. Is there any reason why you can't give
19 truthful testimony today?

20 A. No, there is not.

21 Q. Are you on any medication?

22 A. No, I am not.

1 Q. Are you in good health?

2 A. Yes.

3 Q. And do you understand that this is a
4 deposition for four IPRs?

5 A. Yes, I do.

6 Q. The first patent is U.S. Patent No.
7 10,213,108.

8 Is that correct?

9 A. Yes.

10 Q. Another patent is U.S. Patent No.
11 9,788,735.

12 Correct?

13 A. Correct.

14 Q. And the third one is U.S. Patent No.
15 9,795,300.

16 Correct?

17 A. Correct.

18 Q. And the fourth one is U.S. Patent No.
19 9,872,623.

20 Correct?

21 A. Correct.

22 Q. How did you prepare for this

1 deposition?

2 A. I reviewed all IPRs that I wrote.
3 Also reviewed all case history -- file
4 histories -- related to the case for the four
5 patents. I reviewed all IPR institution of
6 these four patents we are going to be discussing
7 today. And I reviewed the patents itself -- the
8 four patents.

9 Q. When you mentioned "IPRs that you
10 wrote," were those the declarations that --

11 A. Yes, ma'am. I'm sorry -- the
12 declarations.

13 Q. Did you review the patent owner's
14 preliminary responses?

15 A. I'm sorry. I didn't hear the
16 question.

17 Q. Have you reviewed the patent owner's
18 preliminary responses in the four IPRs?

19 A. Yes, I have.

20 MS. HOEKEL: George, make sure you let
21 her finish her question, because you are talking
22 over her.

1 BY MS. LAM:

2 Q. Are there any other documents you
3 reviewed other than the ones you have listed?

4 A. Not that I can recall.

5 (Pause)

6 MS. LAM: I am going to show you tab
7 1, which has been previously marked as Exhibit
8 1003 in IPR No. 2020-00912.

9 (Previously marked Exhibit 1003,
10 Multipage document entitled: Declaration of
11 George E. Yanulis in Support of Petition for
12 Inter Partes Review of U.S. Patent No.
13 10,213,108, dated May 6, 2020 (no Bates Nos.),
14 introduced)

15 BY MS. LAM:

16 Q. Is this a true and accurate copy of
17 your declaration in the IPR for the '108 patent?

18 A. Yes, it is.

19 Q. Does this declaration set forth all
20 your opinions regarding the patentability of the
21 '108 patent claim?

22 A. It does.

1 Q. Have you formed any opinions related
2 to the '108 patent other than the opinions
3 contained in this declaration?

4 A. No, I have not.

5 Q. As you sit here today are you aware of
6 any corrections that need to be made to the
7 declaration for the '108 patent?

8 A. I am not aware of any changes that
9 need to be made.

10 Q. Did you carefully prepare this
11 declaration?

12 A. Yes, I did.

13 Q. Were you asked to investigate any
14 issue in this IPR for the '108 patent that do
15 not appear in your declaration?

16 A. I didn't hear the whole question,
17 counselor. Could you repeat it?

18 Q. Were you asked to investigate any
19 issue in this IPR in the '108 patent that do not
20 appear in your declaration?

21 A. No.

22 MS. HOEKEL: I'm going to object to

1 the form of the question.

2 A. So everything that is written is -- is
3 as is. I don't see any change goes to be made
4 that reflect my opinion.

5 Q. Thank you.

6 Let's turn to paragraph 10 of your
7 declaration.

8 (Pause)

9 Q. So according to paragraph 10, you
10 conducted pulse oximetry research at the
11 University of South Florida from 1996 to 1997.

12 Is that correct?

13 A. Correct.

14 Q. What did this research involve?

15 A. Without getting into a lot of detail,
16 it involved improving the use of different
17 wavelengths of -- wavelengths currently used at
18 that time -- infrared and red; and trying to
19 improve the capabilities of sensing more
20 accurately with existing pulse oximetry units.

21 Q. While you were at the University of
22 South Florida, did you design any new medical

1 devices for measuring oxygen saturation?

2 A. No, I did not.

3 Q. Can you explain to me how pulse
4 oximetry sensors work?

5 MS. HOEKEL: Object to the form.

6 A. Pulse oximetry units work -- the ones
7 that I have had the most experience -- work with
8 the use of infrared and red detection device;
9 and emitting device sensors of the same type.

10 And it basically extracts peaks of the
11 information obtained from these two infrareds.

12 You can use either the least squares
13 or the ratio test to look at the red and
14 infrared wavelengths detected. And you
15 basically can extract the pulse oximetry levels
16 by this mechanism.

17 Q. Is pulse oximetry always performed
18 using light?

19 A. There have been devices that don't use
20 light.

21 Q. Can you explain those devices to me?

22 MS. HOEKEL: Object to the form.

1 A. As I alluded to, the devices that I am
2 most familiar with use the LED technology.

3 But there are technologies that I'm
4 not as familiar with that do not utilize the LED
5 technology.

6 I mean, they still have to use light
7 in some way, but it's not in the capacity that
8 I'm most used to seeing in pulse oximetry
9 devices.

10 Q. So can you explain to me -- sorry.

11 After the pulse oximetry sensors
12 collect data, how are they transformed to a
13 final SpO2 measurement?

14 MS. HOEKEL: Object to the form.

15 A. After the sensors have -- information
16 has been obtained, they are then transmitted,
17 processed, and detected only a display.

18 And, again, these are extracted
19 measurements. They are not direct pulse
20 oximetry measurement. But they are clinically
21 relevant to the measurements for a particular
22 patient being measured -- these devices.

1 Q. How are -- so you explained that the
2 pulse oximetry measurements are clinically
3 relevant to the measurements for a particular
4 patient being measured.

5 So how are those measurements
6 transformed to something that can be displayed
7 on a monitor?

8 A. Processing techniques that are well
9 known in the art and the device display allows
10 the pulse oximetry measurements that have been
11 extracted to be displayed.

12 Q. Will you please elaborate on those
13 processing techniques?

14 A. The techniques are pretty well known.

15 It can involve modulation techniques
16 involving FECK frequency shift modulation, space
17 shift modulation. They are pretty much well
18 known. And, you know, those are two of the
19 modulation techniques that have been utilized.

20 And, of course, the goal is to obtain
21 a good image that reflects the images -- excuse
22 me -- the values for that patient.

1 Q. What type of hardware is required to
2 perform these processing techniques?

3 A. Again, most of the techniques are
4 pretty well known.

5 Of course, if it's an analog signal,
6 you may want to -- you have to use a digital
7 analog converter. There are several types of
8 digital analog converters. Again, they are well
9 known in the art.

10 It also involves, of course, properly
11 transmitting the signal using standard
12 communication protocols, such as Mobitex. And
13 there are several others.

14 Again, this is pretty much well known
15 in the art. Any PHOSITA would know, and I
16 pretty much alluded to, the primary techniques
17 that are utilized and processing.

18 Q. Are there any other circuitry you
19 would need?

20 A. I'm sure there are.

21 But again, I'm just going to answer by
22 saying they are pretty well known.

1 You have to have the normal -- there
2 are several types of digital analog converters.
3 There are several -- of course, you have the
4 multiplexers, the demultiplexers.

5 Again, those are pretty much well
6 known to a first-year engineering student.

7 Q. Going back to our discussion of the
8 pulse oximetry sensors, can you give me an
9 example of a device that performs pulse oximetry
10 without light?

11 A. One of the patents that I discussed
12 does not use the same technology. And that's
13 the -- if I could look at the Money patent, just
14 to refresh my memory. It's the Money patent
15 that basically utilizes a digital light
16 technology.

17 If you could, that's -- you don't have
18 to take the time to look at it or to get it.

19 But that's one particular patent that
20 discusses the technology that you had asked
21 about.

22 Q. Sure. We can discuss Money in detail

1 later on.

2 A. All right. To save time, that's why I
3 said that.

4 Q. Great.

5 Are there any other examples you are
6 aware of?

7 A. I am sure there are many. I just
8 can't think of them at this point in time.

9 I will answer if I say most of the
10 pulse oximetry devices that I am familiar with
11 and have used are of the light-emitting type
12 technology devices and uses.

13 (Pause)

14 Q. While you were at the University of
15 South Florida, did you design any wearable
16 devices?

17 A. No, I did not.

18 But I worked with a lot of wearable
19 devices incorporating this technology.

20 I did have the opportunity to watch
21 Dr. Sharp in the LY utilize the devices at this
22 time in a clinical environment.

1 Q. What types of wearable devices were
2 you working with?

3 A. These were standard monitoring devices
4 to be used when patients are given a general
5 anesthetic.

6 Q. Where were these devices worn on the
7 body?

8 A. Primarily on the wrist.

9 Q. In the same paragraph of your
10 declaration, you mentioned your current work at
11 the Medical Device Consulting, LLC.

12 Is that correct?

13 A. Yes.

14 Q. What does this work involve?

15 A. I'm involved in three or four
16 different areas of medical device design
17 development, one of which is to utilize existing
18 pacemaker and IC devices and attach as a
19 potential sensing need on the pacing leads to
20 measure various physiological parameters.

21 I'm also involved in trying to utilize
22 a mechanism where I could replicate the sensing

1 of the -- or the action of the -- of the
2 pacing node, the primary pacing node.

3 And some of it is protected by future
4 patents, so I can't really discuss more on that.

5 Q. Is this related to the heart rate
6 monitoring system you mention in paragraph 10 of
7 your declaration?

8 A. Yes, ma'am. It's primarily going to
9 be utilized for patients in atrial fibrillation,
10 and New York State III and IV class heart
11 failure patients.

12 Q. What parameters does the heart rate
13 monitoring system measure?

14 A. It measures a lot.

15 But primarily I'm concerned with
16 the -- the -- some of the depolarization and
17 repolarization. I did a lot of work related to
18 RNR sensing of the timing of the RNR parameter.

19 I also looked at -- I'm looking at
20 ways especially looking at the R to T.

21 There is a lot of different areas.

22 But essentially, I'm looking at the

1 whole cardiac cycle to find out what can be done
2 to, first of all, sense it accurately -- or more
3 accurately -- in very sick patients -- as I
4 said, heart failure patients.

5 Q. Does the heart rate monitoring system
6 include a pulse oximetry sensor?

7 A. Yes, they will.

8 Q. How many sensors does the heart rate
9 monitoring system have?

10 A. Usually has a sensing mechanism for
11 the heart rate, pulse rate.

12 We would like to incorporate a
13 mechanism for recording respiratory, because
14 that's also an issue; electrolytes.

15 Those are the primary parameters.

16 You can incorporate other -- I mean,
17 the idea is we are going to incorporate as many
18 as we can safely and accurately without
19 jeopardizing the signal quality of the primary,
20 which is looking at the cardiac cycle and how
21 that's functioning in these patients.

22 Q. Does the heart rate monitor --

1 A. And -- I'm sorry. Go ahead.

2 Q. Did you have more to add?

3 A. Yeah -- I was saying we are primarily
4 looking at the timing cycles of the cardiac
5 cycle.

6 Q. Is the heart rate monitoring system
7 wearable?

8 A. Yes. The device that I'm working on
9 with colleagues -- it is going to be wearable.

10 Q. Where on the body will the system be
11 worn?

12 A. Primarily can be the leg of a patient;
13 can be any limb.

14 Obviously these patients have a lot of
15 areas that -- you know, they are very
16 uncomfortable to begin with considering their
17 state of health. So the idea is to design these
18 primarily on the leg. But any limb of the
19 patient can be utilized potentially.

20 Q. Does the heart rate monitoring system
21 measure blood pressure?

22 A. Our device will. Usually you can have

1 an ambulatory or any kind of monitoring device
2 set up and do that kind of monitoring.

3 Q. So you are familiar with how blood
4 pressure monitoring systems work?

5 A. Yes.

6 Q. How do blood pressure monitoring
7 systems work?

8 A. Basically they are looking at pressure
9 fluctuations in a particular vein, and looking
10 at -- obviously, the two pressures that they are
11 looking at are systolic and diastolic.

12 And systolic reflects the emptying
13 pressure, if you will.

14 And the diastolic reflects the filling
15 pressure of the heart.

16 Q. How do the blood pressure monitors
17 measure the two pressures?

18 A. Usually by means of pneumatic-type
19 pressure X-raying devices that allow these two
20 measurements to be obtained.

21 Q. How does the pneumatic pressure
22 mechanism work?

1 A. They are actuated in such a manner
2 when you -- typically, blood pressure device
3 that most physicians use -- you wrap around the
4 arm; you pump it up; and you create the sort of
5 the pressures that you want.

6 And basically at a certain pressure
7 that they know, a clinician -- they will stop
8 pumping and that will reflect the two pressures.

9 Q. Is the pressure formed using an air
10 pump?

11 A. No. Most of the devices are
12 pneumatic-type pressure devices.

13 I'm sure there is many types of
14 devices. I haven't really looked at all the
15 current ones available now.

16 Q. But the system you've just described
17 explains how a blood pressure cuff works?

18 A. Well, basically I did the simple blood
19 pressure device.

20 But every blood pressure device -- to
21 the best of my knowledge -- works on a principle
22 of looking at pressure changes in the cardiac

1 cycle during the cardiac cycle. And those
2 reflect the systolic and diastolic pressures
3 respectively.

4 Q. Would you ever combine a blood
5 pressure monitoring system with a glucose
6 monitoring system?

7 MS. HOEKEL: Objection.

8 A. Sure, and I did.

9 Q. Why is that a great idea?

10 A. Because a lot of the cardiac
11 compromised patients are also either potentially
12 diabetic, or about to become diabetic-type
13 patients. So looking at glucose level will be a
14 great idea simultaneously with the other
15 parameters.

16 Q. How would you measure the glucose?

17 A. There is a lot -- most of the art is
18 pretty well known.

19 And most of them look at the glucose
20 level. And you can also -- I mean, we could
21 spend a lot of time talking about it -- but
22 basically looking at the glucolipid fluctuations

1 in these patients -- as far as how divergent
2 they are from the normal parameters in patients
3 that are not prediabetic or diabetic-type
4 patients.

5 (Pause)

6 Q. Let's turn to paragraph 19 of your
7 declaration.

8 (Pause)

9 Q. Is this the list of documents you
10 considered in preparing your declaration for the
11 '108 patent?

12 A. Yes, it is.

13 Q. Is everything you considered for this
14 IPR on this list?

15 THE WITNESS: If you could turn down
16 the page, I could better answer. I'd like to
17 see the next subsequent pages.

18 A. Now it's the complete list.

19 Q. Did you review Sotera's petition in
20 preparing your declaration?

21 A. Yes, I did.

22 Q. Did you review any nonfinal drafts of

1 Sotera's petition?

2 A. As part of review of the history file,
3 I did look at the office actions, the interviews
4 that you had with the Patent Office, etc. -- so,
5 yes.

6 Q. Does your declaration for the '108
7 patent contain all of the legal principles you
8 considered?

9 A. Yes, it does.

10 Q. In preparing your declaration for the
11 '108 patent, did you rely on any legal
12 principles that are not stated in your
13 declaration?

14 A. No, I did not.

15 Q. Let's turn to paragraph 25 of the
16 declaration.

17 Does your declaration set forth your
18 entire opinion regarding the level of ordinary
19 skill in the art for the '108 patent?

20 A. Yes, it does.

21 Q. Do you believe you were a person of
22 skill in the art as of March 25, 2002?

1 A. Yes, I do.

2 Q. Why do you believe you were a person
3 of skill?

4 A. At that point in time, I had been
5 involved in designing devices very similar to
6 this. I also am --

7 THE VIDEOGRAPHER: Counsel, sorry to
8 interrupt. Zoom has just crashed and witness
9 has gone out on the recording computer, so we
10 have to go off the record here.

11 Hold on.

12 (Pause)

13 THE VIDEOGRAPHER: So technically
14 since I haven't gone off the record and it is
15 recording, we may resume.

16 But I am getting these notifications
17 from Zoom that the witness's bandwidth is low,
18 periodically freezes in and out. But we are
19 good now, so continue.

20 THE WITNESS: Thanks.

21 A. To continue, in addition, the answer
22 to your question, counselor, I also received a

1 -- I had received most of a Master's in
2 biomedical engineering from the University of
3 Virginia.

4 I also had worked at the Patent
5 Office, having a lot of experience in these
6 types of patents.

7 I also have a Bachelor of Arts in
8 pre-medicine, where I had a lot of courses
9 related to the chemistry involved in pulse
10 oximetry-type devices and very similar.

11 Q. Let's turn to paragraph 29 of the
12 declaration.

13 Can you please read the third
14 sentence, beginning with "generally," into the
15 record?

16 A. Generally, when designing wearable
17 technology, PHOSITAs mainly attempted to improve
18 patient comfort when the device is being worn.
19 However, the best way to improve patient comfort
20 would be to minimize the size of the wearable
21 device and the number of sensors attached to the
22 patient. None of the claims are directed to

1 this problem.

2 Do you want me to continue on?

3 Q. No, that's fine.

4 So in that last sentence, what do you
5 mean by "minimize the size"?

6 A. The design goal in this statement, a
7 PHOSITA would recognize, is trying to minimize
8 the size that maximizes patient comfort, and
9 allows the -- still the accurate measurements of
10 the parameters being sensed. So we are trying
11 to get something that wears comfortably, usually
12 over the wrist.

13 (Pause)

14 Q. Why are you usually trying to get
15 something that wears comfortably over the wrist?

16 A. Seeing the number of patients I have
17 in different clinical environments, they are
18 already, first of all, very sick to begin with.

19 No. two, they are already in a lot of
20 discomfort, so you don't need to add any device
21 that's going to be bigger or uncomfortable for
22 these patients to wear.

1 Q. How would a person of skill minimize
2 the size of the wearable device?

3 A. First of all, looking at probably
4 different patient pools -- pediatric patients,
5 women -- females, also patients of different
6 morphotype, for example, petite, normal size,
7 male or females, children, elderly; and probably
8 consult with a physician that's involved in
9 utilizing these devices.

10 In the past, I consulted with
11 anesthesiologists and cardiologists that are
12 involved in a lot of monitoring. So that's
13 usually the best way to optimize your
14 minimization without jeopardizing the signal
15 being monitored.

16 Q. So you mentioned that the patient
17 population who use these devices may be sick.
18 So --

19 A. They -- I'm sorry. Go ahead.

20 Q. But -- would you please clarify what
21 you mean by -- that the patient population may
22 be sick?

1 A. Well, these devices -- and they are
2 used a lot for individuals in physical training
3 regimes, and there is no reason why they can't
4 wear these wearable devices.

5 But as far as worrying about any kind
6 of device -- whether it be worn in an ambulatory
7 patient setting, critical care setting, or even
8 trying to improve your physiological regime --
9 you should be concerned with minimizing the size
10 of the device. No one likes to run with a
11 device that's too heavy.

12 Q. So how would you minimize the weight
13 of a device?

14 A. Try to -- again, that's something I've
15 always been concerned with -- not having it
16 weigh more than a pound.

17 Obviously -- and I'm sure they are
18 working on devices that are much smaller, so you
19 are doing your best to miniaturize the device.

20 Again, using good design principles --
21 which I had to do in the past and I'm sure I'll
22 have to do in the future -- and using that

1 protocol, you are designing the best type
2 device, the least likely to fail.

3 Q. Would you minimize the weight by
4 decreasing the hardware in the monitor?

5 A. You could.

6 And it's well known in the art that --
7 and most PHOSITAs would know that, or should
8 know that -- that any effort to minimize the
9 number of components will minimize power
10 requirements, which is good; minimize the number
11 of units; minimize the cost.

12 So any kind of design should involve a
13 very thorough cost/benefit analysis without
14 forgetting to make sure you accurately
15 reflecting the sensing measurements.

16 Q. How would a person of skill minimize
17 the cost of the wearable monitor?

18 A. Again, decreasing power requirements;
19 decreasing the number of components; decreasing
20 the size of the components.

21 It's well known in the art that
22 minaturization of components have revolutionized

1 the industry.

2 You also want to -- obviously, the
3 less time it takes to design the device, the
4 less likely is failure when it drops or
5 whatever.

6 Those factors are all involved in a
7 cost analysis benefit, which any company or
8 anybody in the -- as a PHOSITA would know, or
9 should know.

10 Q. You mentioned that a person of skill
11 would minimize the power requirements.

12 Why is that?

13 A. Because power requirements will
14 obviously decrease the life of the device.

15 It can also -- any kind of power
16 issues could affect the -- cause potential
17 failure to the device; related issues.

18 Q. So how would a person of skill
19 minimize the power requirement?

20 A. Again, to basically repeating the same
21 thing: You are utilizing smaller devices,
22 smaller components.

1 You are trying to optimize the battery
2 or power source that's being used, the power
3 devices in these devices.

4 There has been a lot of work with
5 batteries used in medical devices of all types.

6 The list can go on, but those are
7 things that a PHOSITA -- including myself --
8 would be aware of.

9 Q. Earlier we discussed minimizing the
10 weight of the wearable device.

11 Would a person of skill also try to
12 minimize the overall dimensions of the wearable
13 device?

14 A. Yes.

15 Q. How would a person of skill minimize
16 the dimensions of the device?

17 A. He could possible make the strap
18 smaller.

19 He could also, more importantly, make
20 the display somewhat smaller, if it's feasible.

21 He could make the wires shorter. You
22 know, he could be very keen on the wire

1 management of the different sensors.

2 Can also look at the sensor size.

3 Can look at the size of the ports.

4 There is a number of ways which are
5 pretty well known in the art, and every PHOSITA
6 would know that this is the best way.

7 I'm sure there is others. But just
8 very quickly, that would be my initial list.

9 Q. Is there anything else you can think
10 of?

11 A. I'm sure I may think of something
12 after the -- after the depo. But I think these
13 are the primary ones that should be of concern
14 and I would be concerned.

15 Q. You mentioned making the straps
16 smaller.

17 Which strap is that?

18 A. The strap that -- any kind of
19 attachment mechanism to the patient.

20 Some effort should be to try to
21 optimize patient comfort using materials that --
22 you know, there is a lot of work in material

1 science that I'm aware of.

2 Maybe some PHOSITAS wouldn't, but a
3 PHOSITA should realize some material should be
4 wearable; hopefully easily worn on the wrist, or
5 whatever limits apply.

6 Q. What considerations would a person of
7 skill think about when it comes to securing the
8 wearable monitor to the patient's wrist?

9 A. I think the attachment mechanisms they
10 have currently are fine.

11 It's just a question: Can they be
12 improved?

13 There is a lot of innovations being
14 done in those areas. And I'm not really privy
15 to all the current state of the art.

16 But most of the -- including from the
17 time frame when these were used -- are somewhat
18 comfortable for all types of patients:
19 Ambulatory, sick patients, very sick patients.

20 Any kind of device could be improved,
21 including the attachment.

22 Whether it needs to be is, you know

1 another discussion.

2 But, you know, if it works, don't fix
3 it.

4 Q. You mentioned the comfort of the
5 attachment mechanism.

6 Are there other design considerations
7 a person of skill would think about when
8 designing an attachment mechanism?

9 A. Yeah -- with elderly patients, you got
10 to worry that if they can get to the device and
11 unstrap it -- especially elderly patients that
12 are compromised mentally and physically.

13 You want to attach the device so it
14 won't easily be removed by the patient --
15 whether it be through movement, or whatever.

16 Or to give you an example, when a
17 person is running -- especially one that's in
18 very good shape -- you don't want to have a
19 device that comes off very easily.

20 Q. Are there any other considerations --

21 A. Pretty much all those
22 considerations --

1 Q. -- for the attachment mechanism?

2 A. I'm sorry?

3 (Pause)

4 Q. So in this same sentence that's
5 highlighted on the screen, you mention:
6 Minimizing the number of sensors attached to the
7 patient.

8 How would a person of skill minimize
9 the number of sensors attached to the patient?

10 A. He might reduce the size of the sensor
11 ports.

12 He might try and reduce the size of
13 the sensors that are going into the ports
14 itself.

15 He also definitely needs to keep in
16 mind: What are the parameters that are most
17 important to be sensed?

18 Now, obviously, every patient doesn't
19 have the same -- needs to monitor every
20 physiological parameter. So you want to have at
21 least one -- you want to at least keep in mind
22 that you want to get the main -- main parameters

1 that need to be -- you know, heart rate, pulse
2 rate, oximetry, pulse oximetry.

3 And if there are others, I will add
4 that, obviously, a patient that's in very good
5 health that goes in for one-day surgery does not
6 have the same clinical monitoring requirements
7 as somebody that is in heart failure. So that
8 would change the number of sensors that need to
9 be utilized.

10 Q. How would reducing the size of the
11 ports minimize the number of sensors?

12 THE VIDEOGRAPHER: Stand by again,
13 counsel. Zoom has done the same thing again.
14 And I'm getting reports from other people that
15 Zoom is having issues. Please don't say
16 anything yet until everybody returns.

17 (Pause)

18 THE VIDEOGRAPHER: All right. Again,
19 I see the witness has almost zero rating
20 bandwidth, even though he's coming across.

21 (Pause)

22 THE VIDEOGRAPHER: He has returned to

1 the screen. You may proceed.

2 MS. HOEKEL: Probably need to reask
3 the question.

4 BY MS. LAM:

5 Q. How would reducing the size of the
6 ports minimize the number of sensors?

7 A. That's not what I said.

8 I said: You may want to minimize the
9 number of ports.

10 Every -- it's nice to be able to
11 monitor every parameter under the sun. But most
12 of the ambulatory monitoring devices that I'm
13 aware of as a PHOSITA utilize a certain number
14 of ports.

15 Could be three to five.

16 But again, I'm going to just add that
17 you have to consider what type of patient is
18 being monitored with this device.

19 Most of the devices that are out there
20 are well known in the art; are very good.

21 But, again, if there is a need or if
22 there is some work being done -- I'm not aware

1 of all the work being done -- but I know there
2 is a lot of work being done to reduce the sensor
3 port size, the size of the sensors themselves,
4 and other various issues.

5 But, again, most of the devices that
6 we're talking about in this particular
7 discussion today work fine.

8 I'm just answering your question as
9 far as: What would you do?

10 Again, good design practices that any
11 PHOSITA realize, you have to look at the current
12 situation and, first of all, see if there is a
13 need for minimizing the size of the device.

14 Most of the devices work fine.

15 Q. Other than minimizing the size and the
16 number of sensors attached to the patient, are
17 there other ways to improve patient comfort?

18 A. Again, I think the use of materials
19 that are more compliant to the patient's
20 movements, no matter what their physiological
21 state are.

22 Telling them what you are doing;

1 keeping them involved in every step and telling
2 them what the device is going to monitor is also
3 a big help.

4 A lot of people that go in as
5 patients, even myself, are scared. So the more
6 you tell them, the more you explain what the
7 sensor is doing, the better the results.

8 Q. Is cable management a way to improve
9 patient comfort?

10 A. Most definitely.

11 Q. How would a person of skill try to
12 manage the cables?

13 A. Try to, first of all, minimize the
14 length; minimize the number of sensors that need
15 to be used.

16 Those are the two primary.

17 Q. Anything else?

18 A. The thickness of the sensors.

19 I mean, a sensor is a communication
20 mechanism. Any effort that can reduce the size
21 is great.

22 But if it works, again there is no

1 need to do anything.

2 Most of the devices as I have been
3 saying right along that are well known in the
4 art work fine.

5 Q. How would a person of skill reduce the
6 size of the sensors?

7 A. Depending on which sensor you are
8 talking about -- that's one area that I'm
9 interested as far as heart rate sensors looking
10 at the cardiac cycle -- that's an ongoing
11 struggle.

12 They are pretty small to begin with.

13 I don't know the exact dimensions.

14 But that's something that I'm working
15 on in my own research right now.

16 Just managing wire by, you know,
17 hooking the least number of sensors that need to
18 be utilized, according to the sensor ports --
19 excuse me.

20 (Pause)

21 Q. When designing a wearable monitor in
22 the March, 2002, time period, is there a

1 particular starting point a person of skill
2 would use to begin their design?

3 A. I think the first place would be
4 looking at all the current companies involved at
5 the time: Your company, Nellcor, some of the
6 other biggies. There is a lot more companies
7 involved now.

8 Look and see what they have available;
9 see what the market is; see what the market
10 demands are; see what the clinical user needs
11 are.

12 And that's a good list to start from.

13 Q. Would you look at the best available
14 design?

15 A. Hopefully.

16 All the companies have designed very
17 solid systems, including your company.

18 So, you know, I'd -- again, looking
19 and developing a list with advantages,
20 disadvantages, of all the different sensors
21 being used at that point in time; using his own
22 design expertise as a PHOSITA; and then looking

1 at the variables we have been talking right
2 along.

3 And start from there in order to pick
4 which one you think should be utilized.

5 And all discussions -- I want to just
6 add -- you should have with a clinician. Any
7 good biomedical engineer would try to -- and
8 usually has -- a good relationship with a
9 clinician that can help -- providing his input.

10 Q. So would you start with designs most
11 accepted by clinicians at that time?

12 A. Yes.

13 Q. Let's turn to paragraph 33 of your
14 declaration.

15 (Pause)

16 Q. Can you please read paragraph 33 of
17 your declaration into the record?

18 A. Sure.

19 I have been informed that a proceeding
20 for inter partes review, claims terms in an
21 unexpired patent are to be given their plain and
22 ordinary meaning, as understood by a person

1 having ordinary skill in the art, in view of
2 patents' specifications.

3 And you have listed them -- I have
4 listed them: CFR 42, and some of the court
5 rulings: Phillips versus AWH Corp.; and the
6 federal circuits you will find citing.

7 Q. Does paragraph 33 set forth the
8 complete legal standards that you used in
9 analyzing claim construction in this IPR?

10 A. Yes, it is.

11 Q. So in forming your opinions on the
12 claims of the '108 patent for this proceeding,
13 you applied the plain and ordinary meaning, as
14 understood by a person having ordinary skill in
15 the art, in view of the patents' specification
16 to each claim term.

17 Correct?

18 A. Yes, it is.

19 Q. Can you please read paragraph 34 of
20 your declaration into the record?

21 A. I believe that all claim terms --

22 THE WITNESS: I don't know what

1 happened -- oh, okay. I'm sorry.

2 A. I believe that all claim terms, for
3 the purposes of inter partes review can be given
4 their plain and ordinary meaning.

5 Q. So after reading the patent
6 specification, it is your opinion that all of
7 the claim terms in the '108 patent can be given
8 their plain and ordinary meaning.

9 Correct?

10 A. Correct.

11 Q. One of the terms in the claims of the
12 '108 patent is a "separate monitoring device."

13 Correct?

14 We can turn to paragraph 95 of your
15 declaration.

16 A. If you will, thank you.

17 (Pause)

18 A. Would you like me to read that?

19 Q. No, I'll just repeat the question.

20 So one of the terms in the claims of
21 the '108 patent is a "separate monitoring
22 device."

1 Correct?

2 A. Correct.

3 Q. The '108 patent doesn't provide any
4 specific definition for "separate monitoring
5 device."

6 Correct?

7 A. It doesn't directly state it, but
8 there is enough information that enables me to
9 determine and make that statement.

10 MS. HOEKEL: Shannon, when you are
11 asking questions about: Separate monitoring
12 device," you have paragraph 95 up.

13 I think you actually want the little
14 (n) preamble, the paragraph above it, because
15 this paragraph doesn't have this term in it.

16 MS. LAM: Sure.

17 Maybe we can enlarge the (n) subtitle?

18 (Pause)

19 THE VIDEOGRAPHER: Counsel, can you
20 direct me to where you are talking about?

21 MS. LAM: Top of the page where it
22 says (n) .

1 THE WITNESS: Can I read that first,
2 counselor?

3 MS. LAM: Sure.

4 (Pause)

5 THE WITNESS: Yes, I have read it.
6 Please repeat your question.

7 BY MS. LAM:

8 Q. The '108 patent doesn't provide any
9 specific definition for "separate monitor
10 device."

11 Correct?

12 MS. HOEKEL: Object to the form.

13 A. As I stated previously, it doesn't
14 directly state it.

15 But there is enough information that a
16 PHOSITA would be enabled to understand that it
17 is a separate monitoring device, configured as
18 such.

19 (Pause)

20 Q. So a person of skill would understand
21 that a separate monitoring device would be
22 interpreted according to its plain and ordinary

1 meaning?

2 A. They should. I do as a PHOSITA.

3 Q. The '108 patent doesn't say the
4 separate monitoring device has to be any
5 specific device, right?

6 A. A PHOSITA should understand --
7 including myself -- that with the information
8 provided and his knowledge as a PHOSITA, there
9 has to be a separate monitoring device to allow
10 the parameters of oxygen saturation, pulse rate,
11 or what other parameter, be properly received
12 and transmitted so they can be displayed.

13 Q. So the separate monitoring device
14 could be any remote monitoring device, correct?

15 MS. HOEKEL: Object to the form.

16 A. Yes, it could.

17 But I'm basing the statement on what's
18 written in the patent and my knowledge as a
19 PHOSITA.

20 Q. And after reviewing the file history
21 of the '108 patent, you did not find that the
22 prosecution history limits the types of separate

1 monitoring devices either, correct?

2 MS. HOEKEL: Object to the form.

3 A. Could you repeat your question? I
4 need to think about a little more.

5 Q. The prosecution history of the '108
6 patent does not limit the type of separate
7 monitoring devices, correct?

8 A. That's correct.

9 But a PHOSITA should also consider, as
10 I said, his knowledge of what's currently
11 available and well known in the art measuring
12 oxygen saturation or pulse rate.

13 Q. Your declaration does not provide a
14 construction for a separate monitoring device,
15 correct?

16 A. Again, as a PHOSITA, I had enough
17 information that enabled me to make the
18 statement that there is a separate monitoring
19 device that allows you, in such a way as
20 configured, to obtain these measurements.

21 (Pause)

22 Q. So it's your opinion that a separate

1 monitoring device should be given its plain and
2 ordinary meaning, correct?

3 MS. HOEKEL: Object to the form.

4 A. To the point that I have looked at the
5 information, the figures, the file history, my
6 knowledge as a PHOSITA, and the state of the art
7 at this point in time when the patent was -- as
8 discussed in the file history, is basically my
9 answer.

10 Q. And a person of skill would have
11 understood that the plain and ordinary meaning
12 of "separate monitoring device" includes any
13 type of remote monitoring device, correct?

14 MS. HOEKEL: Object to the form.

15 A. To the best of my knowledge and as a
16 PHOSITA, I would agree.

17 But then again, you'd have to look at
18 the whole patent and not just this statement.

19 But looking at the entire patent,
20 patent history, and what's currently available,
21 well known in the art, and what information --
22 which is provided in the patent to make the

1 statement that I make.

2 And that's the enabling disclosure.

3 And that allowed me to make that statement.

4 Q. One of the claim terms in the '735
5 patent is a "separate computing device."

6 Correct?

7 A. Correct.

8 Q. The term "separate computing device"
9 also appears in the claims of the '623 patent.

10 Correct?

11 MS. HOEKEL: Counsel, I think we
12 should probably be looking at the patents.

13 MS. LAM: Sure.

14 I'm going to show you tab 8, which has
15 been previously marked as Exhibit 1001 in
16 IPR2020-01054.

17 (Previously marked Exhibit 1001,
18 Multipage document entitled: United States
19 Patent No.: US 9,872,623 B2, dated January 23,
20 2018 (no Bates Nos.), introduced)

21 MS. LAM: We can scroll down to claim
22 1.

1 (Pause)

2 MS. HOEKEL: Page 36.

3 THE VIDEOGRAPHER: Is that visible on
4 the screen?

5 MS. HOEKEL: It is, but we are still
6 on 37.

7 There you go.

8 (Pause)

9 THE WITNESS: Can I read this very
10 quickly, counselor?

11 MS. LAM: Sure, go ahead.

12 THE WITNESS: Okay. I've read it.

13 BY MS. LAM:

14 Q. The term "separate computing device"
15 also appears in the claims of the 623 patent.

16 Correct?

17 A. To the best of my knowledge, yes.

18 MS. HOEKEL: The top again, Daniel,
19 please?

20 (Pause)

21 (Discussion off the record)

22 THE WITNESS: I'm sorry, counselor, go

1 ahead.

2 Could you repeat your question? I
3 know you said: A separate computing device.

4 MS. LAM: Yes.

5 BY MS. LAM:

6 Q. So you agree that the term "separate
7 computing device" also appears in the claims of
8 the '623 patent.

9 Correct?

10 MS. HOEKEL: Object to the form.

11 A. I'm looking at the '623, column 14.

12 It's saying: A separate computing
13 device configured to display the measurements of
14 oxygen saturation.

15 So that's the patent you are referring
16 to -- the claim.

17 Q. Yes.

18 A. Okay. I do see that.

19 Q. It's your opinion that a separate
20 computing device should be given a plain and
21 ordinary meaning, correct?

22 A. Correct.

1 Q. And a person of skill would have
2 understood that the plain and ordinary meaning
3 of separate computing device includes any type
4 of remote monitoring device, correct?

5 MS. HOEKEL: Object to the form.

6 A. Again, when I review a patent, I don't
7 look at just the claim. I look at everything
8 that's disclosed in the entire specifications.
9 And I also look at what's enable -- the enabling
10 information.

11 So with that said, I would agree with
12 the statement, but in combination with the
13 figures, what's discussed in the patents, and my
14 knowledge as a PHOSITA.

15 (Pause)

16 MS. HOEKEL: We have been going a
17 little over an hour, so when we get to a good
18 stopping point, let's take a break.

19 MS. LAM: Take a break in a couple
20 questions.

21 THE VIDEOGRAPHER: Stand by everybody,
22 the time is 12:07 p.m. We are going off the

1 record.

2 (Recess)

3 MS. HOEKEL: I think the parties are
4 in agreement that we are going to adjourn the
5 deposition for today, given the internet outages
6 around the country and the intermittent
7 technical problems we have had.

8 We will re-adjourn tomorrow morning
9 which was on the original schedule.

10 MS. HOEKEL: And we will also continue
11 the deposition on Monday, February 1st.

12 * * *

13 E N D O F P R O C E E D I N G

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1 C E R T I F I C A T E

2

3 I, BRANDON RAINOFF, a Federal Certified
4 Realtime Reporter and Notary Public within and for
5 the State of New York, do hereby certify:

6 That GEORGE EMANUEL YANULIS, Ph.D., the
7 witness whose deposition is hereinbefore set forth,
8 was duly sworn by me and that such deposition is a
9 true record of the testimony given by the witness.

10 I further certify that I am not related
11 to any of the parties to this action by blood or
12 marriage, and that I am in no way interested in the
13 outcome of this matter.

14 IN WITNESS WHEREOF, I have hereunto set
15 my hand this 26th day of January, 2021.

16

17

18

19

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22


BRANDON R. RAINOFF, RMR, CRR, RPR, FCRR

1 George Emanuel Yanulis, Ph.D., c/o
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2 190 Carondelet Plaza, Suite 600
St. Louis, Missouri 63105

3
Case: Sotera Wireless, Inc. v. Masimo Corp.

4 Date of deposition: January 26, 2021

Deponent: George Emanuel Yanulis, Ph.D.

5

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