

UNITED STATES PATENT AND TRADEMARK OFFICE.

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MASIMO CORPORATION,)
 Petitioner,)
 v.) Case IPR 2023-00634
) U.S. Patent 10,627,783
APPLE INC.,)
 Patent Owner.)
_____)

VIDEOTAPED REMOTE DEPOSITION OF

BRIAN ANTHONY, PH.D.

March 15, 2024

10:32 a.m. Eastern Daylight Time

Reported by: Lori J. Goodin, RPR, CLR, CRR,
 RSA, California CSR #13959

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

1 REMOTE APPEARANCES:
2 FOR PETITIONER MASIMO CORPORATION:
3

4 KNOBBE MARTENS OLSON & BEAR, LLP
5 BY: PHILIP M. NELSON, ESQUIRE
6 2040 Main Street, 14th Floor
7 Irvine, California 92614
8 949-760-0404
9 philip.nelson@knobbe.com

10 AND

11 KNOBBE MARTENS OLSON & BEAR, LLP
12 BY: PAUL SPIEL, ESQUIRE
13 925 4th Avenue, #2500
Seattle, Washington 98104
14 206-405-2000
paul.spiel@knobbe.com

15
16 FOR PATENT OWNER APPLE INC.:
17 FISH & RICHARDSON P.C.
18 BY: KARAN JHURANI, ESQUIRE
60 South Sixth Street
19 Suite 3200
Minneapolis, Minnesota 55402
20 404-724-2807
jhurani@fr.com

21

Also Present:

22 Henry Marte, video/document technician

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2 WITNESS: BRIAN ANTHONY, PH.D.

3

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3 Masimo Corporation v. Apple Inc.
4 Friday, March 15, 2024
5 Lori J. Goodin, RPR, CLR, CRR,
6 RSA, California CSR #13959
7

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1 FRIDAY, MARCH 15, 2024, 10:32 a.m. EDT

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3

PROCEEDINGS

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THE VIDEOGRAPHER: We are now on the
record. My name is Henry Marte with Digital
Evidence Group.

7

8

Today's date is March 15th, 2024,
and the time is 10:30 a.m.

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12

This proceeding is being held in the
matter of Masimo Corporation versus Apple,
Inc. The deponent today is Dr. Brian
Anthony.

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All parties are appearing remotely
and have agreed to the witness being sworn in
remotely.

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Counsel, please identify themselves
for the record. Afterwards the court
reporter will administer the oath to the
witness.

20

21

22

MR. NELSON: Good morning. Philip
Nelson, counsel for Masimo. I am joined with
Paul Spiel, who will be listening in.

1 MR. JHURANI: Good morning. It is
2 Karan Jhurani with Fish & Richardson
3 appearing on behalf of patent owner, Apple
4 Incorporated.

5 * * *

6 Whereupon,

7 BRIAN ANTHONY, PH.D.,
8 a witness called for examination, having been
9 first duly sworn, was examined and testified as
10 follows:

11 * * *

12 EXAMINATION

13 BY MR. NELSON:

14 Q. Good morning, Dr. Anthony.

15 A. Good morning.

16 Q. Please state your full name for the
17 record.

18 A. Brian W. Anthony.

19 Q. Do you understand that you are under
20 oath as if testifying in court?

21 A. Yes.

22 Q. Have you ever been deposed before?

1 A. Yes.

2 Q. How many times?

3 A. Approximately eight.

4 Q. This is the ninth time or the eighth
5 time?

6 A. Yes.

7 Q. Have you testified at trial?

8 A. No.

9 Q. This deposition is being transcribed
10 by our court reporter, so we should avoid talking
11 over each other if we can.

12 Please wait for me to finish my
13 questions before you start your answer.

14 Can you do that?

15 A. Yes.

16 Q. Will you please let me know if you
17 don't understand a question?

18 A. Yes.

19 Q. Do you understand you need to give
20 audible answers?

21 A. Yes.

22 Q. Your attorney may make objections.

1 Do you understand you still need to
2 answer the question unless your attorney
3 instructs you not to answer?

4 A. Yes.

5 Q. So, we will periodically take
6 breaks. If you need a break, please feel free to
7 ask for one.

8 If a question is pending, though, I
9 would ask that you answer the question before
10 asking for a break. Is that okay?

11 A. Yes.

12 Q. Is there any reason, such as illness
13 or medications, that would prevent you from
14 giving truthful testimony today?

15 A. No.

16 Q. Are you aware that Apple has sued
17 Masimo alleging infringement of the '783 and
18 the '491 patents in the U.S. District Court for
19 the District of Delaware?

20 A. I am not aware of the, of that suit.

21 Q. This is the first time you are
22 hearing of it?

1 A. I am not immediately recalling. I
2 may have heard that. I have been cognizant of
3 the, the PTAB case.

4 I haven't been -- I may have heard
5 about it, I don't recall.

6 Q. Okay. So, it sounds like you have
7 not reviewed any documents related to the
8 Delaware suit; is that right?

9 A. I don't recall reviewing anything
10 about the Delaware suit.

11 Q. Have you talked to anyone at Apple
12 in connection with either of these two IPRs?

13 A. Counsel. Jhurani.

14 Q. But no one else at the company, at
15 Apple?

16 A. No.

17 Q. Have you talked with any of the
18 inventors, Fletcher Rothkopf, Jonathan Ive,
19 Julian Hoenig, or Rico Zorkendorfer?

20 A. No.

21 Q. Okay. Let's turn to the exhibit
22 previously marked as Exhibit 2019.

1 (Previously marked Exhibit 2019,
2 first referral.)

3 MR. JHURANI: And, counsel, I will
4 just state for the record and Dr. Anthony can
5 confirm this.

6 We -- I believe he has some unmarked
7 paper copies of his declaration and some of
8 the prior art references that he may refer
9 to.

10 I just wanted to flag that for the
11 record, that he may have that and be
12 referring to it as well.

13 You can ask some questions about
14 that, if you would like.

15 BY MR. NELSON:

16 Q. Dr. Anthony, do you have paper
17 copies of, a paper copy of this exhibit?

18 A. Yes, I do. I also have a digital
19 copy.

20 Q. And when did you obtain the paper
21 copy?

22 A. I printed it out over the last two

1 days or so.

2 Q. Who gave it to you?

3 A. I'm sorry?

4 Q. Who gave it to you?

5 A. Counsel Jhurani.

6 Q. Would you mind holding it up to show
7 me the front of it?

8 THE VIDEOGRAPHER: It is going to be
9 hard to see unless you unblur the background.

10 THE WITNESS: Let's see.

11 BY MR. NELSON:

12 Q. Okay. I see it has a Post-it on
13 there, a Post-it note?

14 A. It is just labeled the '783.

15 Q. I see. So, you have a three ring
16 binder there with exhibits?

17 A. Yes.

18 Q. And it is labeled '783, but what is
19 the exhibit number on it? Can you show me that?

20 A. 2019.

21 Q. Okay. And does that copy that you
22 have include any notes or markings?

1 A. No.

2 Q. Thank you. Is it okay if we refer
3 to the one on the screen, and then if you need to
4 refer to the separate copy on paper, you can do
5 that in parallel?

6 A. Yes, that is fine. It is -- I am
7 noting it is far easier for me to read it on
8 paper which is why I have it on paper.

9 Q. Understood.

10 Please turn to Page 8 in your
11 declaration, there. And I'm going to refer to
12 Paragraph 8.

13 If you wouldn't mind reading through
14 that paragraph briefly. You don't have to do it
15 on the record. I guess it starts on Page 7.

16 You note that -- at the end of the
17 paragraph, you mention solutions for problems
18 that are otherwise intractable. Do you see that?

19 A. Yes.

20 Q. Could you give me a few examples of
21 some of these solutions that you are talking
22 about?

1 A. So, we develop everything from
2 wearable devices for blood pressure monitoring,
3 for EEG monitoring, to imaging techniques that
4 combine analytics and signal processing,
5 combining optical engineering, ultrasound
6 engineering, computer science techniques.

7 We fabricate electronic devices,
8 integrated photonic devices, optical devices.

9 Q. And what are some of the intractable
10 problems you have had to solve in this process?

11 A. Well, if they are intractable and we
12 solve them, they are no longer intractable.

13 So, that is how we describe what we
14 do. We solve hard problems that didn't have a
15 previous solution.

16 Q. Are any of these problems in your
17 experience related to wireless charging?

18 A. We solve charging problems with both
19 electronics, wearable electronics, and battery
20 powered charging solutions.

21 Q. Have any of those solutions been
22 related to wireless charging in particular?

1 A. Components of, yes.

2 Q. Can you explain that further?

3 A. Certainly. We have designed devices
4 that are charged both passively with ultrasound,
5 acoustic, optical and electronics radiation.

6 Sometimes, you know, trickle charges
7 for low power operation or recharging of a
8 battery.

9 Q. Did you use the term, trickle
10 charges?

11 A. Yes.

12 Q. For low power operations?

13 A. That is one of the examples, yes.

14 Q. When you refer to trickle charging,
15 what is the approximate wattage of that low power
16 application?

17 A. So, we will do, like, for example,
18 low power patches for joint angle measurement.

19 We have done some higher power work
20 for things like a wearable ultrasound. That is
21 not trickle. That is sort of -- yes, so, it
22 depends on the complexity of the device and the

1 battery required.

2 Q. For the trickle charging
3 applications in particular, I understand that
4 they are not always -- that not all of your low
5 power devices have required a trickle charge or
6 been able to do a trickle charge.

7 But, for the trickle charge in
8 particular, it sounds like a trickle refers to a
9 slow or low wattage charge over a longer period
10 of time.

11 Is that right?

12 A. Yes. That is what would be a
13 trickle charge.

14 Q. So, is there a range of wattage
15 ratings for a trickle charge application?

16 MR. JHURANI: Objection, form.
17 Relevance.

18 THE WITNESS: Again, it depends on
19 the nature of the device. I mean, it depends
20 on whether you are doing something very, sort
21 of simple like in an electric -- or a
22 resistance change based on angle, or

1 something like an RFID tag.

2 So, microwatts to submilliwatts.

3 BY MR. NELSON:

4 Q. Okay. What do you mean by
5 submilliwatts there?

6 A. I am speaking generally.

7 I didn't have a definition that I
8 contrived today for defining trickle charge. But
9 things that are low power that can be background
10 charged with just a little bit of charge, for
11 intervention operation.

12 Q. Are there any benefits to trickle
13 charging?

14 MR. JHURANI: Objection, form.

15 THE WITNESS: Well, trickle charging
16 is a way of doing a little bit of charge when
17 you are in line of sight or line of field of
18 your power source.

19 So, harvest a little power when you
20 can.

21 BY MR. NELSON:

22 Q. Does trickle charging sometimes help

1 preserve the battery life?

2 A. Charging can be used to power -- to
3 recharge a battery or to provide a little bit of
4 a charge to a capacitor.

5 Q. What is the opposite of trickle
6 charging?

7 MR. JHURANI: Objection, form.

8 THE WITNESS: I didn't opine to
9 define the opposite of trickle charge. I
10 wouldn't define an opposite, per se.

11 I would put a rate of charge on a
12 spectrum from slow to fast, depending on what
13 it is you are trying to charge.

14 BY MR. NELSON:

15 Q. And trickle charging is on the
16 slower end; is that right?

17 A. Again, I was not opining about the
18 definition of trickle charge. I use that in
19 trying to explain the things that -- some of the
20 things that we do.

21 So, yes, I would generally say
22 trickle charge is relatively slow.

1 But again, it is, it is -- I am
2 talking about relative terms as opposed to
3 anything with a specific example.

4 Q. And faster charging is on the other
5 end of the spectrum; is that right?

6 A. Fast would generally suggest
7 something faster than trickle.

8 Q. So, when you charge one of these
9 devices using a trickle charge, will it typically
10 be charged overnight? Does it take a long time
11 like that?

12 MR. JHURANI: Objection, form.

13 THE WITNESS: Again, it depends on
14 the device and what you are using it for, the
15 environment in which you are using it.

16 Whether you are trying to do, for
17 example, directional charge while the device
18 is being used, or putting it on a charging
19 station. It depends on the details of what
20 you are trying to design.

21 BY MR. NELSON:

22 Q. Some of the solutions that you have

1 designed benefitted from having a slower charge.

2 MR. JHURANI: Objection, form.

3 THE WITNESS: Devices, depending on
4 their use and their function, can benefit
5 from either fast charge or trickle charge or
6 a little bit of charge.

7 So, it depends on what you are
8 trying to do with the device, and sort of the
9 intended use.

10 BY MR. NELSON:

11 Q. Turning to the next paragraph, 9.
12 Will you read that, please, to yourself.

13 I see you used the word
14 "optimization" in that paragraph.

15 Do you see that?

16 A. Yes.

17 Q. What does optimization usually
18 involve?

19 A. It depends on the, what you are
20 trying to optimize or improve.

21 Optimization generally involves
22 having some performance metric that, as an

1 engineer, you deem to be a thing that you want to
2 improve.

3 And either as an algorithm or as
4 hardware, iteratively, designing or computing to
5 minimize or maximize the metric that matters to
6 the system.

7 Q. So, if you are minimizing or
8 maximizing, it sounds like this process often
9 involves tradeoffs of some kind.

10 Is that right?

11 MR. JHURANI: Objection to form.

12 THE WITNESS: Again, it depends on
13 the details of what you are trying to
14 optimize. There may be tradeoffs. It may be
15 that there -- that have constraints.

16 You know, constrained optimization
17 versus unconstrained optimization.

18 So, it depends on what you are
19 trying to -- the system you are trying to
20 optimize.

21 BY MR. NELSON:

22 Q. And it often involves some kind of

1 balancing between factors?

2 MR. JHURANI: Objection, form.

3 THE WITNESS: Again, I wasn't
4 opining on a precise definition of the word,
5 optimization, here.

6 But optimization, depending on
7 whether you are doing constrained
8 optimization, unconstrained optimization, as
9 a balance of factors or not, depending on the
10 nature of the problem, whether it is convex
11 or non-convex, nonlinear or not nonlinear.

12 It depends on the details of the
13 problem, or the solution you are trying to
14 optimize.

15 BY MR. NELSON:

16 Q. When you refer to a convex problem,
17 you are not referring to an instrument that has
18 physical convexity, are you?

19 A. In that instance I was referring to
20 optimization problems that are described as being
21 linear or convex, meaning that the second
22 derivative is positive.

1 And that its -- or, sort of
2 constant, or that it has a local, or it has an
3 absolute minimum as opposed to local minimums.

4 Q. Okay. So, you are referring to the
5 mathematical solutions phase of the problem as
6 opposed to a physical object.

7 Is that right?

8 A. You were asking about optimization
9 and so I was talking about optimization.

10 Q. You mentioned having developed some
11 wearable devices. And I think you mentioned some
12 that included biometric measurement.

13 Is that right?

14 A. Correct.

15 Q. What were some of the examples of
16 the biometric-type devices?

17 A. So, we have developed sort of
18 wearable rings that will give sort of measures of
19 tremor.

20 We have developed bands, wearable
21 arm bands for measuring of blood pressure and
22 blood flow.

1 We have developed some neck worn
2 braces for venous pressure. To name a few.

3 Q. Were the wearable rings wirelessly
4 rechargeable?

5 A. The ring was not wirelessly
6 rechargeable, no.

7 Q. Were the arm bands wirelessly
8 rechargeable?

9 A. The batteries we used -- well, the
10 final devices, it was not a, a -- it was a
11 research devices.

12 So, the batteries would be recharged
13 wirelessly. But I wasn't designing it to be a
14 wirelessly recharged integrated device.

15 Q. So, the batteries came out and you
16 could recharge those separately.

17 Is that what you are saying?

18 A. For the bands, yes.

19 Q. How about the neck braces, were
20 those wirelessly rechargeable?

21 A. Similar situation with wireless
22 recharging of the batteries.

1 Q. But not the next braces?

2 A. No.

3 Q. Are there any wearable devices that
4 you developed that had wireless recharge?

5 A. Some of the, they were capacitive
6 charging for joint angle measurement. They
7 weren't charging a battery. They were charging a
8 capacitor.

9 Q. So, you are distinguishing a
10 capacitor from a battery based on the structure,
11 or the length of time it can charge?

12 A. The structure.

13 Q. How long did the joint angle
14 measurements -- measurement devices operate on a
15 single charge?

16 A. It depends on the usage, how
17 frequently they were used.

18 I mean it would be hours to day.

19 Q. All based on the charge of a single
20 capacitor?

21 A. Again it depends on the use or the
22 frequency of the use.

1 Q. What if you put one on a basketball
2 player, how long would it last?

3 MR. JHURANI: Objection, form.
4 Relevance.

5 THE WITNESS: I would have to do
6 some calculations to estimate it, and I did
7 not do that.

8 BY MR. NELSON:

9 Q. Did the joint angle devices use a
10 trickle charge?

11 A. I -- they charged. I'm not sure you
12 want to call -- I would call them a trickle
13 charge.

14 They were wirelessly charged.
15 Someplace in the spectrum between slow and fast.
16 I don't -- I wouldn't necessarily call it a
17 trickle.

18 Q. Is there any benefit for using a
19 trickle charge with a capacitive system, like
20 these joint angle devices?

21 MR. JHURANI: Objection, form.
22 Relevance.

1 THE WITNESS: Again, with any system
2 it depends on what you are trying to do and
3 the level of complexity of the electronics
4 and the use model benefits or tradeoffs in
5 various factors of design and use.

6 BY MR. NELSON:

7 Q. Turning to your Paragraph 12. It
8 refers to publishing various papers.

9 Did any of these papers describe
10 physiological monitoring or measurement?

11 A. I'm sorry. Please repeat that.

12 Q. Did any of these papers referred to
13 in Paragraph 12 describe physiological monitoring
14 or measurement?

15 A. Yes.

16 Q. About how many?

17 A. Order 10, 20.

18 Q. Did any of them involve a wearable
19 device?

20 A. I'm not sure if we published the
21 band. The rings were commercial products that
22 weren't published. They were product targeted.

1 Q. So, you don't recall any right now
2 from that group that were related to
3 physiological monitoring?

4 A. Well, a lot of them were handheld or
5 they were handheld and band, could have been used
6 in a band.

7 So, most of the devices are a mix of
8 use models. There could be band worn, or
9 handheld.

10 Q. Did any of the papers, patents or
11 projects involve a device with wireless charging?

12 A. Well, as I was describing, right, so
13 using the different capacitor and -- the focus of
14 the technologies were not the charging, and so
15 that wasn't what we would publish upon.

16 It wasn't designing the wireless
17 charging, per se, other than -- or optimizing it.

18 It was using it for the function of
19 the device.

20 Q. So, wireless charging may have been
21 mentioned incidentally, but it wasn't the main
22 point of the paper, project, or patent?

1 A. That is correct.

2 Q. Did any of your papers, projects, or
3 patents involve LEDs?

4 A. Yes.

5 Q. Were there any photodetectors in
6 these projects?

7 A. Yes.

8 Q. Do you remember how much it takes,
9 how much wattage it takes to charge an LED?

10 MR. JHURANI: Objection, form.

11 THE WITNESS: I'm not charging an
12 LED.

13 BY MR. NELSON:

14 Q. None of the projects involved that?

15 A. Charging an LED? No. You don't
16 charge an LED.

17 Q. How about charging a photodetector?

18 MR. JHURANI: Objection to form.

19 THE WITNESS: You don't charge a
20 photodetector.

21 BY MR. NELSON:

22 Q. How much wattage does it take to

1 operate a photodetector?

2 MR. JHURANI: Objection, form.

3 THE WITNESS: Again, it depends on
4 the photodetector and the specifications of
5 the photodetector.

6 BY MR. NELSON:

7 Q. Did any of your projects involve
8 deciding how many coils to include in a wireless
9 charging coil?

10 A. They did not -- similar to the
11 simulation techniques that are used to charge
12 coils, we do a lot of modeling that maps to both
13 finite element techniques and boundary element
14 techniques for simulating of all types of fields,
15 including acoustics and ultrasound and optics and
16 electromagnetic things.

17 Q. So, you have simulated wireless
18 charging using coils; is that right?

19 A. We have simulated many types of
20 physical phenomena that use the same techniques
21 as coil simulation. That use a combination of
22 finite element and boundary element methods to

1 simulate fields and forces, waves, that show up
2 similarly in electromagnetic propagation, optical
3 propagation, acoustic propagation and structures
4 for the same.

5 Q. Was this case the first time you had
6 simulated wireless charging using coils?

7 A. No.

8 Q. Have you ever built a device that
9 uses wireless charging using coils?

10 A. Yes.

11 Q. Which device was that?

12 A. These were for -- the wireless
13 charging devices were for a course that I taught
14 in physiological -- wearable physiological
15 monitoring.

16 Q. What were those devices?

17 A. These were devices that demonstrate
18 the principles and concepts of charging.

19 Q. This was not the joint angle devices
20 you referred to, then.

21 Is that right?

22 A. That is correct.

1 Q. They were demonstration devices for
2 a course?

3 A. Yes.

4 Q. How large were these devices?

5 A. Coils were on the size of two
6 inches, about an inch to three inches.

7 Q. Of diameter?

8 A. Yes.

9 Q. How many turns did the coils have?

10 A. I do not recall.

11 Q. More than one?

12 A. Yes.

13 Q. Do you remember the wire diameter?

14 A. I do not remember.

15 Q. Did you build these yourself or was
16 it a laboratory at the school that helped do
17 this?

18 A. It was done under my supervision. I
19 may have wound a coil or two as well.

20 But the creation of the multiples
21 that were wired for the course were done by the
22 team as well.

1 Q. Turning to Paragraph 14. This lists
2 various references.

3 Can you explain how you used these
4 references for your report?

5 A. I reviewed them, discussed them with
6 counsel, and used them as the -- to inform my
7 understanding and provide corroboration with the
8 various aspects of my opinions.

9 Q. Did you find anything in these
10 references that you disagreed with?

11 A. I do not recall a particular thing
12 that I would flag as disagreeing with.

13 Q. Did you review them all carefully?

14 A. Some I reviewed more in depth. Some
15 I discussed heavily with counsel.

16 So, there is a mix of the depth with
17 which I read individual.

18 Q. But you relied on all of them for
19 your report.

20 Is that correct?

21 A. As I highlighted, I have analyzed
22 the following materials that I cite in my

1 declaration.

2 Q. Turning down to Exhibit 2023, which
3 is listed there, toward the bottom of Page 10.

4 Do you see that exhibit in
5 particular?

6 A. 2023, yes.

7 Q. Why did you analyze and cite this
8 paper?

9 I assume you have a copy of that in
10 your notebook; is that right?

11 A. Actually, I am looking at my
12 declaration.

13 Q. Okay. We can bring up the copy on
14 the screen if you would like to refresh your
15 memory.

16 A. So, I would point to Paragraph 147
17 of my declaration.

18 As I was describing my modeling, so
19 I performed my modeling at Paragraph 147 on
20 Page 70 of my declaration. "I performed my
21 modeling using the methodology and approaches
22 highlighted in the references describing and

1 relating to wireless modeling."

2 Exhibits including 2023 to 2032.

3 Q. I understand. So, this supported
4 your modeling conclusions; is that right?

5 A. This -- I refer to it. It
6 highlights the techniques that I used for doing
7 my modeling.

8 Q. Turning to Exhibit 2024, the next
9 one down, why did you analyze and cite this
10 paper?

11 A. Again, all of the references in 2023
12 to 2032, as I describe in Paragraph 147, I
13 highlight and reference to the wireless modeling
14 that I did.

15 Q. Are there any differences between
16 the setup -- the experimental setup described in
17 Exhibit 2024 and the modeling that you performed?

18 A. Well, the, these various references
19 used tools like ANSYS and COMSOL and FEKO,
20 MATLAB, and used things like the Method of
21 Moments which is a boundary elements method and a
22 finite element method which are the two most

1 common methods to simulate -- certainly
2 electromagnetics and fields in general.

3 So, these various references will
4 use the different tools. They will use ANSYS.
5 They will use COMSOL. And some of them will use
6 Method of Moments, which is again boundary
7 element method. Some of them will use finite
8 element.

9 But these various references I used
10 to highlight both the modeling techniques that
11 are common and standard across all of these, and
12 that are consistent with the techniques that I
13 used.

14 Q. Did you learn any of these
15 techniques from these references?

16 A. I'm sorry?

17 Q. Did you learn the techniques from
18 these references?

19 A. Did I learn finite element methods?
20 No. Method of Moments for these references? No.

21 That is a fundamental technique for
22 modeling and simulation of waves. COMSOL and

1 Abaqus are standard tools that engineers use to
2 design systems: optical systems,
3 electromechanical systems, electrical systems.

4 So, they are pretty standard
5 numerical tools that show up in many domains for
6 modeling of things such as coils, such as wave
7 transmission, such as antenna fields, forces and
8 flows.

9 Q. Did you use any of these references
10 to understand the physics of the geometry of
11 two-coil charging?

12 MR. JHURANI: Objection, form.

13 THE WITNESS: No. These are all
14 references that use either two coil or
15 multiple coil but, you know, how -- no.

16 BY MR. NELSON:

17 Q. But you generally agree with the way
18 the references teach how to perform these methods
19 you described?

20 A. Well, again, the different
21 references will use different tools for modeling
22 different things such as sizes of coils,

1 alignments. And some of them will use finite
2 element methods. Some use boundary element or
3 Method of Moments.

4 And, those are the techniques.

5 Q. Is there any reference in particular
6 that describes the Method of Moments that you
7 have referred to?

8 A. I do have the, those references on
9 digital. So, I can, I forget which ones talk
10 about Method of Moments explicitly versus --

11 The details of Method of Moments
12 versus mentioning that they use it.

13 I would assume the ones that use
14 ANSYS -- so, can we pull up those references? I
15 can skim through them real quick and point to the
16 ones that talk more about Method of Moments.

17 Q. If you don't remember then that is
18 okay. We can move on for now.

19 A. I believe the ones that we talk
20 about -- let me just look at the titles real
21 quick. Let's see. What page was that?

22 Let's see, I believe 2032, my

1 recollection, without looking at it, I believe
2 2032 used ANSYS. I think they used Method of
3 Moments and Finite Element, 2030. I'm working
4 backwards.

5 2031, I don't remember whether that
6 was ANSYS or COMSOL.

7 Q. Does COMSOL correspond to finite
8 element?

9 A. It will support both. COMSOL would
10 be Method of Moments.

11 Again, the Method of Moments is a
12 boundary element technique as a finite element.

13 And boundary element methods allow
14 you to deal naturally with unbounded domains such
15 as you are propagating acoustics, antenna
16 radiation, seismic wave propagation, things that
17 are not -- that are propagating out into a deep
18 space or coupling.

19 So, those are the more natural
20 techniques for that.

21 It ends up being a -- finite element
22 methods end up being more of a sparse matrix

1 representation. Boundary elements tend to be
2 more dense matrices.

3 So, computationally it takes more
4 time. But -- and so you get a fully populated
5 and asymmetric matrices in your calculations.

6 But these techniques use both --
7 enable both. It is a discretization process for
8 simulating phenomena in wave propagation fields.

9 And so both COMSOL and Abaqus --
10 sorry, ANSYS support both techniques.

11 Now, in particular, whether or not
12 the specific references used the boundary
13 element, meaning Method of Moments or finite
14 element, I would have to go back and look at each
15 one.

16 But, I -- yeah, so, that is --

17 Q. Okay. Turning to Paragraph 15. I
18 see that you reviewed Dr. Duckworth's materials.

19 Are there any portions of
20 Dr. Duckworth's analysis that you agreed with?

21 A. Are there particular places in my
22 declaration where I am highlighting either an

1 agreement with Dr. Duckworth that you are curious
2 about?

3 I know I have cited him in some
4 places. I was just curious to find out where I
5 have done so.

6 Q. No, I don't have anything in mind
7 particularly. But there were places that you
8 expressed disagreement.

9 But I guess my question is for
10 aspects not giving rise to a statement of
11 rebuttal or disagreement in your expert
12 declaration, can we assume you agree with the
13 remainder of Dr. Duckworth's analysis?

14 MR. JHURANI: Objection, form.

15 THE WITNESS: I wouldn't say that I
16 agreed -- the things that I didn't highlight
17 that I either agreed or disagreed with, I
18 didn't cite his entire --

19 So, I have not gone through line by
20 line and flagged where I agree and where I
21 disagree.

22 BY MR. NELSON:

1 Q. Turning to Paragraph 16.

2 You mention the art related to
3 the '783 patent.

4 Do you see that on the second line?

5 A. Yes.

6 Q. How would you describe the field of
7 the art related to the '783 patent?

8 A. So as I describe in Paragraph 39 of
9 my declaration, "Based on the foregoing and upon
10 my experience in this area, a person of ordinary
11 skill in the art relating to the subject matter
12 of the '783 patent, as of December --
13 September 2nd, 2014 (critical date) would have
14 had at least a bachelor's degree in electrical
15 engineering, mechanical engineering, biomedical
16 engineering, computer engineering, physics or a
17 related field, and would have had at least two
18 years of relevant experience with capture and
19 processing of data or information, including but
20 not limited to physiological information or
21 equivalents thereof.

22 "Plus work experience may be

1 compensated by a higher level of education, and
2 vice versa."

3 Q. What you just read is a description
4 of the background for a person of ordinary skill
5 in the art, right?

6 A. Correct.

7 Q. And are you saying that is the same
8 thing as the field of the '783 patent?

9 A. So, as I point to in Paragraph 44
10 of, in Page 22 of my declaration which is
11 paraphrasing from the field of the '783 patent
12 which is Column 1, in the lines roughly 18
13 through 25, the field, "The following disclosure
14 generally relates to an electronic device and
15 more specifically to a wearable electronic device
16 having a range of features, among those wireless
17 powerless charging and health monitoring
18 functionality."

19 Q. So, that is not quite the same thing
20 as the relevant background for a person of
21 ordinary skill in the art.

22 Is that right?

1 MR. JHURANI: Objection to form.

2 THE WITNESS: I was explaining --

3 BY MR. NELSON:

4 Q. Go ahead.

5 A. I'm sorry. Can you re-ask the
6 question?

7 Q. You just read a portion of
8 Paragraph 44; is that right?

9 A. I was paraphrasing 44 -- or
10 reading 44. You had asked for the field. And
11 that is my, in my declaration, highlighting the
12 field section of the '783 patent.

13 And the background knowledge of one
14 skilled in the art of that field would be as I
15 described in Paragraph 39.

16 Q. Okay. You used the phrase, POSITA;
17 is that right?

18 A. Yes.

19 Q. Can you explain what that stands
20 for?

21 A. Person of ordinary skill in the art.

22 Q. Would a person of ordinary skill in

1 the art have possessed any physics knowledge?

2 A. As I highlighted again in
3 Paragraph 39, a POSITA would have had at least a
4 bachelor's degree in electrical engineering,
5 mechanical engineering, biomedical engineering,
6 computer engineering, physics or a related field
7 and would have had at least two years of relevant
8 work experience with capture and processing of
9 data or information, including but not limited to
10 physiological information.

11 So, physics is certainly one of the
12 things that a POSITA would have been familiar
13 with.

14 Q. Turning to Paragraph 34 of your
15 declaration.

16 Do you see that Item 3 refers to
17 unexpected results achieved by the invention?

18 A. Yes.

19 Q. Would it have been an unexpected
20 result for a wireless charging coil to work in a
21 watch in 2014?

22 MR. JHURANI: Objection, form.

1 THE WITNESS: For example, I would
2 point to Paragraph 137 of my declaration,
3 where a POSITA would have been aware of
4 wrist-worn devices such as the device
5 disclosed in Fraser that implements a larger
6 wireless charging receive coil covering a
7 substantial portion of the rear watch
8 surface.

9 So, a wireless charging in isolation
10 would not have been a surprising result to a
11 POSITA as to highlight there.

12 BY MR. NELSON:

13 Q. Turning to Paragraph 30 in your
14 declaration. This references improvements to a
15 device.

16 Is wireless charging an improvement
17 over wired charging for a consumer watch?

18 A. I didn't opine about wireless
19 charging in isolation compared to wireless
20 charging being an improvement relevant to other
21 design considerations that might go into a
22 consumer device.

1 But in some instances it could be,
2 and in others it may not be.

3 Q. Turning to Paragraph 40. This
4 relates to the capabilities of a person of
5 ordinary skill in the art.

6 For some reason I cannot bring
7 myself to say POSITA, but it means the same
8 thing.

9 So, you mentioned that you were an
10 individual at the time -- an individual that
11 meets this criteria at the time of the critical
12 date which is 2014.

13 Is that right?

14 A. Yes.

15 Q. Were you only a person of ordinary
16 skill in the art, or did your skills exceed this
17 level in any way?

18 A. I believe I probably exceeded it in
19 some ways. I hadn't opined on what those ways
20 might be, but I am certainly at least a POSITA in
21 those areas.

22 Q. At least. I understand.

1 So, turning to Paragraph 43. You
2 would say that you exceeded that standard as
3 well; is that right?

4 A. I am sorry. I didn't quite
5 understand the question.

6 Q. Paragraph 43 mentions that you
7 understand the capabilities of such a person.

8 But that is because you exceed that
9 standard. Is that right?

10 A. And I teach such persons and train
11 such persons, yes.

12 Q. Or such persons aspiring to become
13 so?

14 A. Correct.

15 MR. JHURANI: Counsel, we have been
16 going about an hour. Is this a good time to
17 take a break?

18 MR. NELSON: Let's ask the witness.
19 What do you think?

20 THE WITNESS: I wouldn't mind a
21 quick biobreak.

22 MR. NELSON: Okay.

1 THE VIDEOGRAPHER: Okay. Should I
2 go off the record?

3 All right. The time is 11:33 a.m.
4 off the record.

5 (Recess taken -- 11:33 a.m.)

6 (After recess -- 11:38 a.m.)

7 THE VIDEOGRAPHER: Okay. The time
8 is 11:38 a.m. Back on the record.

9 BY MR. NELSON:

10 Q. Turning to Paragraph 47. This
11 refers to the charging dock in the '783 patent.

12 Have you ever designed a patent -- a
13 product with a charging dock?

14 A. I have not designed a product with a
15 charging dock.

16 Q. Do you see the figure at the top of
17 the page there, Figure 19?

18 Does Figure 19 show air core style
19 charging coils?

20 A. I'm sorry. Can you repeat the
21 question?

22 Q. You see the charging coils, right?

1 A. Yes.

2 Q. And, does this figure show air core
3 style charging coils?

4 A. Just to be clear, I'm looking at, I
5 have a printout of the '783 patent. If you want
6 to bring that -- I guess I should ask to bring
7 that into the record so I can look at it.

8 Q. Are you familiar with the phrase,
9 air core charging coils?

10 A. Yes, I am. Before I answer --

11 Q. What does that mean?

12 A. I was trying to answer your previous
13 question which was does this figure show. And I
14 was reading it -- reviewing my familiarity with
15 the '783 patent before I gave my answer.

16 In general, air coils can refer to
17 the air being in the gap between the coil. But,
18 the magnets here in the context of the '783
19 patent are used for alignment as opposed to in
20 some way necessarily modifying the coil field.

21 So, I wanted to refamiliarize myself
22 before I gave an answer.

1 Q. So, you point out there are magnets
2 in the middle of the coils here.

3 Is that right?

4 A. I am now -- just which question am I
5 answering? I didn't finish answering the last
6 question.

7 Q. You can just answer the most recent
8 one.

9 A. Okay. So, please, can you re-ask
10 it?

11 Q. You mentioned that there are magnets
12 in the middle of the coils, right?

13 A. Yes. As drawn here.

14 Q. So, would you characterize these
15 coils as air core coils on that basis?

16 MR. JHURANI: Objection, form.
17 Incomplete hypothetical.

18 THE WITNESS: So, in the context of
19 this figure, in isolation, there are magnets
20 drawn.

21 In the context of the '783 patent,
22 however, these magnets are used for alignment

1 of the charging dock and the watch device.

2 And I was planning to re-review a
3 section of the '783 patent. There is a
4 magnet in there which takes up space that is
5 more than just air.

6 So, I think it is a -- I think it
7 depends on how you want to purely define the
8 nature of how the coils are operating
9 relative -- their intended use relative to
10 the size of the magnets and how they are
11 intended to be used.

12 So, there are magnets there which
13 take up -- which is more than air. But these
14 magnets were not designed necessarily. Or
15 they could have been, to -- they weren't
16 designed necessarily to modify the charging
17 mechanism, but instead to do alignment.

18 BY MR. NELSON:

19 Q. Would they affect charging?

20 I see you are diligently studying
21 something. Are you looking at the patent?

22 A. I'm looking at my declaration. I

1 was highlighting -- I was looking for the
2 sections where I do talk about the presence of
3 metal and magnets in the -- between coils.

4 So, I would point to Paragraph, for
5 example, 88 in my declaration where Honda
6 recognizes the gap between short -- Honda
7 recognizes that metal materials in the housing
8 can create eddy currents, which are detrimental.

9 As well as, I highlight in
10 Paragraph 131, "Specifically Honda teaches the
11 presence of metal material between the
12 transmitting and receiving coils giving rise to
13 eddy currents which reduces charging efficiency."

14 And then I highlight in my modeling
15 discussion on Page 76, Section F, the modeling
16 did not account for the impact of interfering
17 metal which would be more detrimental to the
18 smaller coil.

19 I believe it is in my other
20 declaration where I opine a little bit more
21 broadly about other materials in the center of
22 coils, and magnets having a, an impact -- or

1 materials in general having an impact as a
2 function of geometry and property.

3 So, they will have an impact.

4 Q. In this figure, do you know why the
5 coil -- there are a couple of coils shown here.

6 Do you see there is some items
7 labeled 1869 and 1832, all of which are also
8 labeled with the word, coil.

9 Do you see that?

10 A. Yes.

11 Q. Do you know why there are two items
12 labeled 1832 coil at the bottom? Is that two
13 different coils?

14 A. This is a cross-section through a
15 slice of the device such that the coil is sliced.

16 Q. So, does that mean that the magnet
17 is in the middle of a single coil there?

18 Just from looking at the figure, it
19 looks like there is a magnet in the charging dock
20 and a magnet in the watch device.

21 And based on this being a
22 cross-section, does that mean the magnet is in

1 the center or the core of each of these coils?

2 MR. JHURANI: Objection, form.

3 Speculation.

4 THE WITNESS: Again, it is showing a
5 magnet in, in between the sections of the
6 coil.

7 So, whether it is exactly centered
8 in the shape of the magnet, it is a schematic
9 showing general relationships.

10 BY MR. NELSON:

11 Q. What is your understanding of where
12 the coil would be, based on this cross-section in
13 the watch device, for example?

14 I expected you would understand that
15 just from looking at the figure.

16 Is it not clear just from the
17 figure?

18 A. I'm sorry. I was reviewing --
19 looking at the claims.

20 The figure is a certain figure.
21 Refresh my memory as to whether or not there is
22 any kind of statement in the claims that requires

1 the magnets in the center.

2 And so, I was trying to answer your
3 previous question before I moved onto the next
4 question.

5 Q. Well, just to focus on the current
6 question, if you don't mind.

7 The current question is, based on
8 looking at this figure here, the watch device
9 there in Figure 19, you mentioned that it is a
10 cross-section.

11 And so the coil would extend, I
12 guess toward us, out of the page and then back
13 into the page, through the other coil box there.

14 Can you describe basically the
15 geometry of the coil based on this figure?

16 MR. JHURANI: Objection, form.

17 THE WITNESS: I'm sorry. Can you
18 restate the question? You asked and answered
19 a question, I thought, there.

20 BY MR. NELSON:

21 Q. You mentioned that Figure 19 shows a
22 cross-section, right?

1 A. Yes.

2 Q. And, it has two boxes labeled 1869,
3 that each say coil. Right?

4 A. Correct.

5 Q. But those boxes actually label two
6 different portions of the same coil. Is that
7 right?

8 A. Yes.

9 Q. So, what is the orientation of that
10 coil with respect to this cross-section, based on
11 your understanding of this figure?

12 A. This figure is in the context of the
13 full patent, so it is likely a cross-section. It
14 could also be a plan projection view.

15 I think it is also -- and this
16 figure would also be explained if it were a
17 cross-section and the magnet were of course a
18 projection through.

19 But it is where the magnet could be
20 offset. And so I was looking to understand
21 whether the claims recited something about the --
22 refreshing my memory as to what the claims

1 recited, so I can answer the question regarding
2 the figure in fuller context of the patent.

3 Q. Okay. But my question didn't
4 mention the claims. But I think I understand the
5 figure based on your comments. So, we can move
6 on.

7 In Paragraph 49 of your declaration,
8 you have a quotation there about one or more
9 windings for inductively coupling with a transmit
10 coil.

11 What does one or more windings refer
12 to?

13 A. So, as I described there, the
14 receive coil further includes one or more
15 windings. Alternatively, I would describe it as
16 a loop as opposed to one loop of wire, two loops
17 of wire. It would be two windings, for example.

18 Q. So, a coil may have more than one
19 winding; is that right?

20 A. Not more than one winding. More
21 than one loop.

22 Q. More than one loop, okay.

1 What is the general effect on the
2 charging capability of a coil if it has more than
3 one winding or loop?

4 MR. JHURANI: Objection, form.

5 THE WITNESS: There is no single
6 answer to the general. It depends on how the
7 windings are made, the size of the device.

8 So, it will alter the charging
9 capabilities, as I highlight in my later
10 simulations.

11 BY MR. NELSON:

12 Q. Does it ever increase the capability
13 for it to charge more quickly?

14 A. As I highlighted in my simulations,
15 the number of windings can both increase and
16 decrease, but certainly it can.

17 Q. If the number of windings increases,
18 does that tend to increase the ability to charge
19 quickly?

20 MR. JHURANI: Objection, form.

21 THE WITNESS: Sorry. Can you please
22 re-ask the question?

1 BY MR. NELSON:

2 Q. If I have a loop --

3 If I have a coil with one winding
4 and then I add another winding that is the same
5 shape and size and everything, it is just further
6 along that same wire, does that tend to increase
7 the device's ability to charge quickly?

8 MR. JHURANI: Objection, form.

9 THE WITNESS: There is a section in
10 my declaration that I am going to refer to,
11 to help answer your question. So, please
12 give me a moment.

13 BY MR. NELSON:

14 Q. I actually have a note that
15 Paragraph 166 might be relevant to this question.
16 Maybe take a look at that and see if that helps.

17 A. So, that is one relevant paragraph.
18 And there is another paragraph that I talk
19 about -- so, the number of windings is a function
20 of -- it can, decreasing the number of
21 windings can have a -- increasing a number of
22 windings can have a positive impact.

1 It does depend on the geometry.

2 So, for example, taking all of the
3 windings to the center can have a -- be less
4 beneficial than not having it to the center.

5 But, in general for a non-closed,
6 having more windings.

7 Q. Okay. I see. So you are
8 contrasting windings in a plane versus windings
9 in a stack. Is that right?

10 A. Windings can happen in both the
11 plane and in a stack.

12 Q. And that happened in the same
13 device, both planed and stacked windings, in the
14 same coil, I mean?

15 A. Depending on space constraints, size
16 constraints, an engineer is free to, in general,
17 to design according to the space they have.

18 Q. Turning to Paragraph 50 of your
19 declaration. Toward the bottom of the paragraph
20 you mention a shield element.

21 Do you see that?

22 A. Yes.

1 Q. Is the shield element illustrated in
2 Figure 19?

3 A. There is no shield element indicated
4 in Figure 19.

5 Q. Turning to Paragraph 51. You
6 mention biometric sensing.

7 Does biometric sensing include skin
8 impedance measurements?

9 MR. JHURANI: Objection, form.

10 THE WITNESS: As I describe here,
11 the biosensor module that are used to
12 calculate a health metric, such as heart
13 rate, respiration rate, blood oxygenation
14 level, a blood volume estimate, blood
15 pressure or a combination thereof.

16 As examples of the biometric sensing
17 that the biosensor modules would do.

18 BY MR. NELSON:

19 Q. I don't see skin impedance in that
20 list.

21 Is that right?

22 A. Skin impedance is not in that list.

1 Q. But do you consider it to be
2 biometric -- a measurement of skin impedance, is
3 that something that should have been included in
4 that list in your view?

5 MR. JHURANI: Objection. Form.
6 Scope.

7 THE WITNESS: I was not the inventor
8 on the patent. I didn't opine as to whether
9 or not I would have modified the patent.

10 What is described as what the
11 biosensor module does is heart rate --
12 examples of what it does: heart rate,
13 respiration rate, blood oxygenation level,
14 blood volume estimate, blood pressure or a
15 combination thereof.

16 BY MR. NELSON:

17 Q. Turning to Paragraph 52. It
18 includes a figure, Figure 7 from the patent.

19 You see that?

20 It continues on the next page below
21 that.

22 MR. NELSON: Yeah, there we go.

1 THE WITNESS: Okay, Figure 7.

2 BY MR. NELSON:

3 Q. You will see that Paragraph 52
4 includes a quotation describing this figure.

5 Do you see that?

6 A. Yes. And I'm going to go to the
7 patent to that same place.

8 Q. My questions will focus on the
9 biosensor module, 710.

10 Do you see where that is in the
11 figure?

12 A. Yes.

13 Q. Do you know why the module is only
14 illustrated as a single disk here?

15 MR. JHURANI: Objection, form.

16 BY MR. NELSON:

17 Q. Are you reviewing the patent?

18 A. I am.

19 So, Figure 7 as highlighted in
20 paragraph -- or Column 26 of the patent at
21 Line 31.

22 "Figure 7 depicts an example

1 exploded view of various modules and
2 subassemblies of the device 100. As shown in
3 Figure 7 multiple components are configured to be
4 disposed within and/or attached to the housing,
5 601.

6 "The exploded view provided in
7 Figure 7 depicts one example arrangement of the
8 components of the device. However, and other
9 embodiment's arrangement placement and/or
10 groupings of the subassemblies and components of
11 the subassemblies may vary."

12 Q. Okay. But in this example, Item 710
13 is illustrated as a single disk. Is that right?

14 MR. JHURANI: Objection, form.

15 THE WITNESS: 710 is the bio --
16 biosensor module.

17 BY MR. NELSON:

18 Q. And when you say 710, you are
19 referring to that disk at the bottom?

20 A. 7 -- in Figure 7, that, at the
21 bottom, that is labeled as 710, which is
22 biosensor module.

1 Q. So, looking at that figure, does
2 that item 710 include any sensors?

3 A. I'm going to go to the digital
4 version of the patent so I can find what I was
5 looking for.

6 Q. Maybe you are looking for the
7 quotation in the next paragraph, 53.

8 Do you want to refer to that? That
9 refers to the patent.

10 A. 53 is a good place to go. "In some
11 embodiments, as referenced in Figure 16, "The
12 biosensor module may include one or more light
13 sources, one or more photodetectors and one or
14 more electrodes or conductive elements that are
15 configured to detect and measure a physiologic
16 condition or property of the user."

17 Q. And that paragraph refers to
18 Figure 16 which is shown below. Do you see that
19 there on the next page?

20 A. Yes.

21 Q. So, the light sources,
22 photodetectors, those are shown in Figure 16,

1 right?

2 A. Not all figures show all details, so
3 there are certainly light sensors and detectors
4 shown in 16.

5 That doesn't mean that they are not
6 in the biosensor in that, in Figure 7, because
7 that is representative of one embodiment which
8 could include, may include one or more light
9 sources, photodetectors, et cetera, as
10 highlighted in Paragraph 53.

11 Q. So, you will see in Figure 16 that
12 there is an item labeled 608.

13 Do you see that?

14 A. Yes.

15 Q. Is that the same as the item
16 labeled 710 in Figure 7?

17 A. So as described in Paragraph 55, "In
18 some embodiments the biosensor module (which
19 integrates some or all of the above-described
20 biosensors) is separate from and attached to the
21 housing 601 of the device 100.

22 "For example, as illustrated with

1 respect to Figures 7 and 16, the biosensors can
2 be disposed relative to or attached to a rear
3 cover, 608, that is formed from an optically
4 transparent material and configured to be
5 positioned with the opening of the housing
6 in 601."

7 Q. Right. So, with that background,
8 is 608 the same thing as 710?

9 A. So, reference on Column 38 of the
10 patent, with reference to Figure 16, "An example
11 device may include various sensors for measuring
12 and collecting data that may be used to calculate
13 a health metric.

14 "As one example the wearable
15 communications device can include an array of
16 light sources which are labeled 16,11 through 13,
17 and the detector 614 that are configured to
18 function as an optical sensor or sensors.

19 "In one example an optical sensor or
20 sensors may be implemented as a pairing of one or
21 more light sensors, 16, 11 through 13, and
22 detector 614.

1 "And in one example implementation,
2 the detector 614 is configured to collect light,
3 to convert the collected light into an electrical
4 sensor signal that corresponds to the amount of
5 light incident on the surface of the detector
6 614."

7 And then, "In one embodiment, the
8 detector may be a photodetector, such as
9 photodiode. In another embodiment the detector
10 614 may include a phototube, photosensor or other
11 light sensitive devices."

12 So, 16 is further elucidating what
13 can go into the arrangement of the light sources
14 and detectors.

15 Q. Right. I see the light sensor
16 detector illustrated in Figure 16.

17 Are they also illustrated in
18 Figure 7?

19 A. So, Figure 7 showing an exploded
20 view of an example embodiment, with not all of
21 the details of everything potentially included.

22 610, or the LEDs, detectors and

1 light sources are not shown.

2 Q. You mention an exploded view.

3 Does it seem like item 710 there
4 would fit into the opening that you can just
5 barely see in item 601.

6 Do you see the opening I'm referring
7 to in item 601?

8 A. Yes.

9 Q. Would 710, based on this figure,
10 appear to cover that opening?

11 A. The exploded view suggests that all
12 of those things fit together.

13 Tolerancing is not explicit, but it
14 would go align in some way with that section of
15 the housing.

16 Q. And referring back to Figure 16, do
17 you see where it labels items 1601 and item 1602?

18 A. Yes.

19 Q. Your Paragraph 54 talks about what
20 those items are. They are electrodes 1601 and
21 1602.

22 Can you tell from this figure, are

1 those the same electrode or there is some line of
2 differentiation between the two?

3 MR. JHURANI: Objection, form.

4 THE WITNESS: So, as described in
5 Column 39 returning -- Column 39 of the
6 patent, of the '783 patent, Line 40.

7 "Returning to Figure 16, the device
8 100 may also include one or more electrodes
9 to measure electrical properties of the
10 user's body.

11 "In this example, a first electrode
12 1601 and a second electrode 1602 are
13 disclosed on the rear surface of the device."

14 So, those are two different
15 electrodes.

16 BY MR. NELSON:

17 Q. From the figure, can you tell where
18 one stops and the other begins?

19 A. They are pointed to in Figure 16 as
20 they are. And indicating the electrodes at the
21 points on the cover.

22 Q. Does that imply that the cover is

1 made of metal?

2 MR. JHURANI: Objection, form.

3 Scope.

4 THE WITNESS: So, they are pointing
5 to places on the -- 601 is actually the
6 housing. Let's see.

7 BY MR. NELSON:

8 Q. Does that imply the housing is made
9 of metal?

10 A. It just implies that is where the
11 electrodes are.

12 Q. What are electrodes generally made
13 of?

14 A. I didn't opine broadly about what
15 general electrodes are made of, but electrodes
16 can be made of multiple different types of
17 materials depending on what you want them to do.

18 Q. Is there a particular property that
19 enables electrode functioning?

20 MR. JHURANI: Objection, form.

21 THE WITNESS: It depends on what you
22 want that functioning to be will dictate the

1 design of the electrode and the complementary
2 electronics that are attached to the
3 electrode.

4 BY MR. NELSON:

5 Q. Can electrodes sometimes be made of
6 metal?

7 A. In the abstract general sense,
8 certainly, electrodes can be made of metal.

9 Q. Why is that?

10 A. Why are electrodes sometimes made of
11 metal?

12 Sometimes metal is the right choice
13 for the thing that you would want to use the
14 electrodes for.

15 Q. Is it because of their conductivity
16 that that is sometimes useful?

17 A. Conductivity is certainly one of the
18 considerations. Resistivity, surface finish,
19 sensitive to moisture environment. Many factors
20 come in.

21 Here the electrodes are described as
22 a first electrode and a second electrode as

1 exposed on the rear surface.

2 Q. Turning to Paragraph 56, you mention
3 that there is a specific configuration in which
4 the same rear cover/opening of the device
5 facilitates both wireless power transmission and
6 the optical signal transmission.

7 Do you see that passage?

8 A. Yes.

9 Q. How does the cover facilitate
10 optical signal transmission?

11 A. So, the cover is described as being
12 the convex curved section, which as we look at
13 like Figure 19, for example, it is right below
14 the coils and magnets and coils between the
15 charging dock.

16 And so the cover there is configured
17 to allow both light and power to be passing
18 through the cover.

19 Q. Is there anything else that
20 facilitates transmission?

21 MR. JHURANI: Objection, form.

22 BY MR. NELSON:

1 Q. Let me rephrase.

2 The cover is across an opening. Is
3 that right?

4 A. Well, the cover is the cover. There
5 is, as I described there, a specific
6 configuration which the cover opening of the
7 device facilitates both wireless power
8 transmission to the received coil and optical
9 signal transmission to and from the biosensor.

10 Q. So, the opening facilitates
11 transmission, too, right?

12 A. So, the cover is in the opening
13 facilitating transition through that space.

14 Q. And together they facilitate
15 transmission; is that right?

16 A. So, as recited, for example, in
17 Claim 1, when the ceramic cover is configured to
18 pass optical signals generated by the biosensor
19 module, and the ceramic cover is configured to
20 pass wireless power.

21 Q. And that cover is in an opening of
22 the watch. Right?

1 A. In the figure as drawn there. But
2 the claim of the patent is highlighting that the
3 cover is configured. It is -- and then the cover
4 is in the opening.

5 Q. Turning to Paragraph 70 of your
6 declaration.

7 A. Sorry, which paragraph?

8 Q. 70.

9 A. 70. 7-0.

10 Q. Do you see the figure there?

11 A. Yes.

12 Q. Do you know what figure -- where
13 that figure comes from, or those figures come
14 from?

15 A. This is where I am discussing the
16 Kotanagi reference, Exhibit 1005.

17 (Previously marked Exhibit 1005,
18 first referral.)

19 BY MR. NELSON:

20 Q. So, these depict the Kotanagi
21 device. Is that right?

22 A. Yes.

1 THE WITNESS: I wouldn't mind at
2 some point taking a water break.

3 MR. NELSON: Okay. Just one quick
4 question before we do that.

5 BY MR. NELSON:

6 Q. Is there anything -- you see the
7 shape of the device in these figures here.

8 Is there anything about the shape of
9 the device that makes it incompatible with the
10 charging station shown in the Honda reference?

11 MR. JHURANI: Objection, form.

12 THE WITNESS: I'm going to pull up
13 the Honda reference.

14 So, as I understand it, the Masimo
15 petition proposed a construction using the
16 Kotanagi device in combination with the
17 teachings of Honda.

18 Honda teaches various things about
19 coils and charging stations, having a socket
20 of a station to facilitate charging
21 operation.

22 BY MR. NELSON:

1 Q. And is there anything about the
2 shape of that Kotanagi device that makes it
3 incompatible with Honda's socket?

4 A. Well, they are different devices.
5 In isolation they are different devices.

6 But my understanding is that there
7 is a proposed combination of the teachings of
8 Kotanagi with Honda.

9 Q. That's right. That is why I am
10 asking this question.

11 So, I'm asking about the shape of
12 the device itself.

13 Is there any reason that the Honda
14 watch would be incompatible with the shape of
15 the -- sorry.

16 The Kotanagi watch would be
17 incompatible with the shape of the Honda socket?

18 MR. JHURANI: Objection, form.
19 Scope.

20 THE WITNESS: I didn't opine as to
21 whether or not the Kotanagi watch fit into
22 the Honda socket. That is not the task that

1 was before me.

2 MR. NELSON: Okay. You proposed a
3 break. Maybe this is a good time for that.

4 THE WITNESS: Okay.

5 THE VIDEOGRAPHER: All right. The
6 time is 12:40 p.m. --

7 MR. JHURANI: Well, before -- let's
8 go off the record. But let's chat about the
9 Eastern time lunch time. Dr. Anthony, do you
10 need a lunch break at this point or how are
11 you feeling about that?

12 THE WITNESS: I would be fine maybe
13 just going another hour after -- taking just
14 a short break and then going another hour,
15 because I know we have a bit of time ahead of
16 us.

17 MR. JHURANI: Okay. So, five
18 minutes for now and then a break for lunch
19 after an hour?

20 THE WITNESS: Yes. Does that sound
21 reasonable?

22 MR. JHURANI: Fine with me.

1 MR. NELSON: Okay.

2 THE WITNESS: Okay. So five minutes
3 now?

4 MR. NELSON: Good.

5 THE WITNESS: Okay.

6 (Recess taken -- 12:42 p.m.)

7 (After recess -- 12:47 p.m.)

8 THE VIDEOGRAPHER: The time
9 is 12:47 p.m. Back on the record.

10 BY MR. NELSON:

11 Q. Dr. Anthony, referring to the
12 figures you include in your Paragraph 74. Do you
13 see these figures from Kotanagi?

14 A. Yes.

15 Q. These are based on Figure 5 of
16 Kotanagi; is that right?

17 A. Yes, based on Figure 5.

18 Q. Now, in my view, the protrusion here
19 looks a little bit like a monkey with its ears
20 sticking out the side.

21 Do you see what I am talking about
22 there?

1 A. I believe in the Kotanagi
2 description, it is referred as a keyhole.

3 Q. Oh, a keyhole, okay.

4 So, the keyhole shape, is that
5 circular?

6 A. It is described as having a circular
7 center with two additional circles.

8 Q. So, the overall keyhole shape isn't
9 circular, but it includes circles; is that right?

10 A. In this figure, yes.

11 Q. Now let me just ask a general
12 question.

13 In the figures in Kotanagi, is it
14 your understanding that they are generally drawn
15 to the same scale?

16 A. Well, the different drawings are
17 different sizes. They have different scaling
18 factors.

19 So, the general dimensions of the --
20 are as described in the text. Like, for example,
21 Figure 5 is very large and a different scale than
22 Figures 8 through 10, for example.

1 Q. So, there are some more figures
2 shown down at Paragraph 77, in between 77 and 78.

3 Do you see those?

4 These include a central portion that
5 does not have the keyhole shape, right?

6 A. Correct.

7 Q. Are there any other differences
8 between these figures and Figure 5?

9 A. So, Figure 5 shows more detail than
10 figures -- what is shown in figures -- in some of
11 the components than what is shown in Figures 8
12 through 10 of Kotanagi.

13 Q. And those details that are not
14 present in Figure 8, 9, and 10, include the
15 electrodes, right?

16 A. So, 4 is the protruding part 4,
17 lower surfaces 4a. 2a is lower surface of the
18 housing.

19 And so, it is not showing a
20 photodetector, electrode. Yes.

21 Q. Turning to the next paragraph, 78.
22 I want to get your understanding of this phrase

1 from the patent.

2 It states that, "The diameter of the
3 protruding part is not greater than
4 20 millimeters."

5 I assume this sentence here is with
6 reference to Figures 8 through 10. Is that
7 right?

8 A. I think that sentence is also
9 applicable to the embodiment shown in Figure 5.
10 You know, the, the general teaching is to have
11 something that is not -- has a diameter not
12 greater than 20 millimeters, so the protruding
13 part can be easily pressed against the living
14 body surface with light force.

15 Q. Okay. That is what my question is
16 about. Do you understand why the diameter
17 achieves that purpose?

18 MR. JHURANI: Objection, form.

19 THE WITNESS: So as described on
20 Paragraph 72, for example, as I describe
21 Kotanagi. In Paragraph 72, "Kotanagi
22 explains because a device that is fixed to

1 the wrist the feeling of pressure on the
2 wrist increases when attached by a band which
3 makes it difficult to wear."

4 And 73, "Kotanagi's invention seeks
5 to provide a biological information
6 measurement device which enhances adherence
7 and can be worn for a long time."

8 And so Kotanagi creates a protruding
9 part that is not too large, not to exceed
10 20 millimeters, so as to be comfortably worn
11 and having good contact, as I understand it.

12 BY MR. NELSON:

13 Q. Okay. Can you point me to in the
14 patent where this 20-millimeter number applies to
15 Figure 5?

16 A. So, as I highlight in Paragraph 109,
17 for example, "Kotanagi sets an upper bound of the
18 diameter of the protruding part shown in the rear
19 surface of the device."

20 Annotated in blue in Figure 5 on
21 Page 53 of my declaration.

22 And Paragraph 110, "Specifically

1 Kotanagi states that the device according to its
2 invention has a diameter of its protruding part 4
3 set to not greater than 20 millimeters."

4 And that is in Paragraph 36 and 37
5 of Kotanagi.

6 "Indeed Kotanagi discloses the
7 diameter of the protruding part is set to not
8 greater than 20 millimeters so the protruding
9 part can be easily pressed against the living
10 body surface with light force."

11 Go to 36 and 37 of Kotanagi, just to
12 make sure I'm quoting correctly.

13 In 36, "The biological information
14 measurement device is configured biological -- a
15 diameter of the protruding part is set to not
16 greater than 20 millimeters."

17 And then in 37, "The diameter of the
18 protruding part is not greater than
19 20 millimeters so the protruding part can be
20 easily pressed against the living body with light
21 force."

22 Q. Do either of those paragraphs, 36

1 and 37, refer to Figure 5, specifically?

2 A. Those paragraphs apply to the
3 description at large, before getting into
4 specific instantiations.

5 Q. But they don't refer to Figure 5?

6 A. They refer in broad to the invention
7 that Kotanagi states that the device has a
8 diameter of a protruding part not greater than
9 20 millimeters.

10 Q. How do you measure a diameter for a
11 keyhole shape?

12 A. So, a diameter of the protruding
13 part. So, the keyhole there is a dominant
14 circle. So, the diameter is that section that is
15 the circular section.

16 Q. Which circle?

17 A. Well, as I highlight on Page 54 when
18 I draw the 20-millimeter diameter of the
19 protruding part on the annotated version of
20 Figure 5, it is the, that central large circle.

21 Q. You measure the diameter from the
22 base of the protrusion?

1 A. So, in Paragraph 33, for example, in
2 the biological information measuring device, the
3 outer edge of the protruding part is formed with
4 a curved surface.

5 So, when the main body is mounted to
6 the wrist the adherence can be enhanced even
7 further.

8 So, the curved outer edge is
9 including -- is included as part of the defined
10 protruding part.

11 So, yes, as I have drawn in the top
12 of Page 53. The protruding part would include
13 the red line from the, as I have drawn it.

14 Q. I don't see a red line on Page 53.

15 A. I'm sorry, 54. My apologizes.
16 Page 54.

17 Q. Okay. So, you did measure it from
18 the base of the protruding part; is that right?

19 A. Yes. As I said, and that is
20 supported if you look at again Paragraph 33. The
21 outer edge of the protruding part is formed with
22 a curved surface so when the main body is mounted

1 to the wrist the adherence can be enhanced even
2 further.

3 So, that outer edge, that curved
4 surface is included as part of the protruding
5 part, and as I have drawn there.

6 Q. Drawing you to Paragraph 79 in your
7 declaration.

8 You state that, "The protruding
9 part 4 protrudes 2 to 4 millimeters from the
10 lower surface of the main body."

11 If the protruding part 4 protrudes
12 by 4 millimeters, the upper end of your range
13 there, how thick would the watch be, based on the
14 figures?

15 MR. JHURANI: Objection, form.

16 THE WITNESS: I didn't need to opine
17 on the complete dimensions of the watch. It
18 was not a -- that analysis wasn't necessary
19 in understanding the proposed construction.

20 BY MR. NELSON:

21 Q. So, you didn't do that extrapolation
22 from that protrusion; is that right?

1 A. It wasn't necessary in understanding
2 the proposed construction or informing my opinion
3 with what the whole dimension of the watch would
4 be.

5 Q. Turning to Paragraph 81. Do you
6 remember including this figure in your
7 declaration?

8 A. Yes.

9 Q. What is the item labeled 9 in this
10 figure?

11 A. So, as described in Paragraph 49 of
12 Kotanagi, Exhibit 1005, "As illustrated in
13 Figures 6 and 7, a main board 12 is provided
14 inside the housing 2, the data processing part 9,
15 and the display part 11." And it goes on.

16 Q. So, keep that data processing part 9
17 in mind, just the relative size of that compared
18 to the overall watch.

19 And then I want you to look, if you
20 wouldn't mind, at Exhibit 1029.

21 You have that on the screen here if
22 you want to look at it there.

1 (Previously marked Exhibit 1029,
2 first referral.)

3 THE WITNESS: Okay.

4 BY MR. NELSON:

5 Q. Do you see the watch device
6 cross-section on the face of this patent?

7 A. I wouldn't call that a watch device.
8 I would call it an electrode.

9 But I see the device you are
10 pointing to.

11 Q. You would call it an electrode
12 device?

13 A. It is an electrode for detecting
14 bioelectrical signals.

15 Q. Is there only a single electrode
16 shown on that figure?

17 A. This is an electrode unit as
18 described by Schmid and it has two electrodes, 21
19 and -- the two 21s, I believe.

20 Q. Is this a wrist-worn device?

21 A. I did print out Schmid. I'm going
22 to pull Schmid for a second.

1 I have a printout of Schmid.

2 Q. Okay. And you are checking to see
3 if it is wrist worn, right?

4 A. I am reviewing Schmid. Would you
5 post Schmid in the electronic, please?

6 THE VIDEOGRAPHER: I did.

7 THE WITNESS: I have it. Thank you.

8 So, pointing to Column 5, for example, "The
9 heart frequency measuring assembly shown in
10 Figure 1 comprising a housing 2 which can be
11 similar to a wristwatch housing or case in
12 which contains the electrodes, an electrode
13 set or a plurality of such electrode sets,
14 which can be connected by cables, contact
15 pins or the like to conventional recordings,
16 evaluation or registration circuit."

17 So, it has a -- it can be similar to
18 a wristwatch housing.

19 And I think more broadly, a POSITA,
20 the object of the invention includes being
21 able to put it on the wrist but broadly as it
22 is an electrode to solve the problem of gels

1 and good contact during such things as, for
2 example, in Column 2, "Further object of this
3 invention is to provide an improved EKG
4 electrode unit which includes all of the
5 electrodes -- all of the electrodes, for
6 monitoring cardiac function and which can be
7 applied to the patient elsewhere than in the
8 chest region, especially for monitoring
9 cardiac activity during chest surgery or
10 other manipulations of the patient which
11 limit access to the chest regions in the
12 vicinity of the heart."

13 A person reading that would
14 understand it has a wrist -- it can have a
15 wristwatch housing, but in that paragraph,
16 starting at Line 5 of Column 2, for example,
17 that is -- I read that as when you do
18 a 12 lead electrode set for cardiac care, you
19 end up putting these gel pads with sticky
20 tape and stuff all over the body.

21 And so I think one of the objects of
22 this invention is not a -- it can have a

1 wristwatch housing type thing, but it is to
2 broadly enable -- solve the problems as it
3 states of gel free and artifact free
4 electrodes for cardiac care.

5 And so there is an embodiment
6 described as having a wristwatch form factor.

7 But I wouldn't describe this as a
8 invention that is intended to mainly be a
9 wrist-worn or a watch.

10 BY MR. NELSON:

11 Q. Referring to the figure on the face,
12 is that the watch light form factor?

13 A. Figure 1, comprising a housing which
14 can be similar to a wristwatch housing or case in
15 which contains the electrodes and electrode set
16 or a plurality of such electrodes.

17 Q. Okay. And that has a wristband 100,
18 right?

19 A. Housing 2 can be provided with a
20 metallic arm band 100 shown in the dot line so it
21 can be applied in the region of the wrist in a
22 manner analogous to a wristwatch.

1 Q. Now before this we referred to
2 item 9, the processor in Kotanagi.

3 So, if you can just refer to that
4 while keeping this Schmid device cross-section on
5 the screen.

6 Do you think that item 9 would have
7 fit within the Schmid device?

8 MR. JHURANI: Objection, form.
9 Scope.

10 THE WITNESS: I didn't not need to
11 opine as to whether or not figure -- or
12 element 9 of Kotanagi would fit into this
13 wristwatch form factor of Schmid.

14 BY MR. NELSON:

15 Q. So, you have no opinion on that?

16 A. I did not need to form an opinion
17 about whether 9 fit into this, in forming my
18 opinions.

19 Q. Are you willing to form an opinion
20 now?

21 MR. JHURANI: Objection, form.

22 THE WITNESS: I, again, it is not --

1 it wasn't necessary in forming.

2 I didn't take a lot of time to
3 analyze it and look at it in more detail.

4 But it wasn't necessary in forming
5 my opinions.

6 BY MR. NELSON:

7 Q. Turning back to Paragraph 81 in your
8 declaration. Do you agree with the color and
9 shading in this figure?

10 MR. JHURANI: Objection, form.

11 THE WITNESS: Do I agree with the
12 color and shading?

13 I'm not clear what you are asking,
14 sorry.

15 BY MR. NELSON:

16 Q. Do you see any problems with how it
17 has been shaded?

18 You have included that in your
19 report.

20 A. I know. And you are asking whether
21 I am confirming that I didn't make a mistake.
22 So, I'm confirming that the shading is as I have

1 labeled it.

2 6 is the photo detector, orange.

3 23 is the cover glass. 5, LED. 8, the

4 biological sensing part. And through-hole 22.

5 So, yes.

6 Q. Do you see how item 8 is labeled
7 with an arrow?

8 A. Yes.

9 Q. What is your understanding of what
10 that is pointing to?

11 A. As I have described, the biological
12 sensing part.

13 Q. The most immediate thing that is the
14 arrow is the cover glass 23, right?

15 A. In Paragraph 46, at least in
16 Kotanagi, the biological sensor part 8 includes
17 an LED 5 for emitting light towards the living
18 body with contact and photo detector. Light
19 emitting diode generating a pulse signal.

20 Contact detection means 7. LED is 6, 5 and 6.

21 And as I highlight -- I'm sorry.

22 Can you re-ask the question? I'm sorry.

1 Q. I was looking at the arrow on this
2 figure. The biological sensor part is pointing
3 to -- it looks like it points to the cover glass
4 and the photo detector and the LED; is that
5 right?

6 MR. JHURANI: Objection, form.
7 Foundation.

8 BY MR. NELSON:

9 Q. Are you scrutinizing the figure in
10 great detail to help answer this?

11 A. I am reviewing what I discussed
12 about the cover and the biosensor in my
13 declaration.

14 So, the -- as I highlight there in
15 the figure, the cover glass is labeled red. And
16 as described in Paragraph 46 of Kotanagi, the
17 biological sensor part 8 includes the LED 5 for
18 emitting light while in contact with the living
19 body surface.

20 A photo detector 6 for receiving
21 light by the light emitting diode LED 5.

22 Contact detection means 7 for

1 detecting whether the LED 5 and 6 are in contact.

2 So, Figure 8 -- or 8 is pointing
3 to -- it is not touching anything. It is
4 pointing to the location of the biological sensor
5 part which they describe there is capturing what
6 it encompasses.

7 Q. Is it your opinion that the arrow 8
8 is not pointing to the cover glass?

9 A. It is pointing to the biological
10 sensor part.

11 Q. Turning to Paragraph 95 of your
12 declaration.

13 A. 95?

14 Q. Yes. Do you see that quotation from
15 Honda?

16 It says that, "Honda contemplates
17 the use of an insulating material that results in
18 a transmission efficiency ten times as high as
19 the one achieved by a stainless steel product."

20 Does this mean, in your opinion,
21 that no charging at all can occur through
22 stainless steel?

1 A. I was here quoting from Honda
2 contemplates, "The use of an insulating material
3 such as glass that results in a transmission
4 efficiency ten times as high as the one achieved
5 by stainless steel."

6 Q. But you understand Honda to be
7 teaching that some charging can occur through
8 stainless steel?

9 A. So, as is described in -- as I quote
10 and reference in 22, pointing to Honda,
11 Column 13.

12 So, in the preceding paragraph,
13 column -- at Paragraph -- at Line 45. "Referring
14 to the data in Figure 15, the use of an
15 insulating material for the external housing
16 results in a transmission efficiency ten times as
17 high as one achieved by a stainless product."

18 If you refer to Figure 15 of Honda
19 it breaks down the transmission efficiency
20 showing stainless with a thickness of one
21 millimeter, thickness of .8 millimeters,
22 thickness of .5 millimeters, and then glass with

1 various depositions and paints.

2 Q. So, some of those data points in
3 that figure show that transmission does occur
4 through metal surfaces, right?

5 A. What Honda is teaching is the --
6 here specifically, Honda contemplates the use of
7 an insulating material that results in
8 transmission efficiency ten times as high as the
9 one achieved by stainless steel.

10 Q. And you refer to Figure 15.

11 A. In Honda, that gives a summary
12 overview of transmission, transmission efficiency
13 comparing stainless steel and glass.

14 MR. NELSON: Referring to that
15 Figure 15 in Honda, let's pull that up. That
16 is the exhibit --

17 THE WITNESS: 1006.

18 (Previously marked Exhibit 1006,
19 first referral.)

20 MR. NELSON: -- 1006. Would you
21 mind going to Figure 15.

22 BY MR. NELSON:

1 Q. Do you see where it refers to foil
2 at the bottom of that figure? There are two data
3 bars that refer to foil.

4 Do you see those?

5 A. Yes.

6 Q. Is it your understanding that that
7 foil is metal?

8 Are you looking for some special
9 meaning of foil in Honda?

10 A. I am looking where Honda refers to
11 foil.

12 Q. Are you seeing this Figure 15 for
13 the first time here?

14 A. No, I'm not seeing 15 for the first
15 time.

16 I have not contemplated too
17 specifically deeply whether foil was meant to be
18 described as metal or other polymer type foils.

19 And so I'm re-reviewing Honda to --

20 I am reading Honda in isolation for
21 whether the foil is contemplated to be metal or
22 it could be another polymer foil. It is in

1 isolation. I -- it is not clear.

2 I didn't opine deeply as to whether
3 the foil in that case meant in the Honda
4 referenced by itself whether it is a metal foil
5 or another type of foil.

6 Q. Looking at Figure 15, does it show
7 that there is a possibility for transmitting
8 through foil?

9 A. Yes, it does. It shows, relatively
10 speaking, stainless steel by itself as the
11 lowest. Glass with deposition, as is described,
12 1-micron thick deposit of metal such as aluminum.
13 And 1-micron or foil, 10-micron or 15-micron.

14 Q. Based on that, transmission is
15 possible through metal if it is thin enough; is
16 that right?

17 MR. JHURANI: Objection, form.
18 Misstates document.

19 THE WITNESS: Again, it is unclear
20 as to whether the foil is meant to be a metal
21 foil or some other type of material, like a
22 polymer.

1 It talks about stainless steel. It
2 talks about glass deposition -- or, not
3 glass. Micron thick deposition of metal.

4 And then a plated surface or a
5 printed surface or foiled surface.

6 So, there are polymer foils. There
7 are metal foils. It is unclear what is meant
8 or what foil was actually used here.

9 BY MR. NELSON:

10 Q. You mentioned a layer that is
11 1-micron thick of metal, right?

12 A. In Figure 15 what is described in
13 the Honda reference, "It is also learned that
14 even one side of an insulating material is coated
15 with a 1-micron thick deposit of metal, such as
16 aluminum, any degradation attributed to any
17 currents does not take place."

18 Q. But you are not sure whether that
19 description there matches up with the foil on
20 Figure 15; is that right?

21 A. Well, as described separately in the
22 description of that figure, the 1-micron thick

1 deposit is described of metal.

2 And that is the, one, two, three,
3 four, fifth bar down from the top, which is glass
4 plus deposit of 1 micron.

5 And then glass plus plate, glass
6 plus paint, and glass plus foil at 10 microns and
7 15 microns.

8 The deposition of metal -- metal is
9 only elucidated in the 1-micron thick and then
10 foil is left ambiguous as to whether it is a --
11 the material of the foil.

12 Q. Oh, understood.

13 So, the description you read shows
14 that the fifth line down in that figure does
15 include metal for transmission. Is that right?

16 A. As is described in Column 13,
17 line -- I lost it, Line 49, "Insulating material
18 coated with 1-micron thick deposit of metal, such
19 as aluminum, degradation to eddy currents does
20 not take place."

21 THE WITNESS: If we could at some
22 point take a lunch break. But, maybe next

1 question.

2 MR. NELSON: I would be okay doing
3 that now.

4 THE VIDEOGRAPHER: Okay. I'm going
5 to get us off the record.

6 The time is 1:47 p.m. Off the
7 record.

8 (Recess taken -- 1:47 p.m.)

9 (After recess -- 2:48 p.m.)

10 THE VIDEOGRAPHER: The time
11 is 2:48 p.m. We are back on the record.

12 BY MR. NELSON:

13 Q. Dr. Anthony, welcome back.

14 A. Thank you.

15 Q. If we could turn to Exhibit 2028.

16 (Previously marked Exhibit 2028,
17 first referral.)

18 BY MR. NELSON:

19 Q. Do you recognize this paper?

20 A. Yes, this is one of the papers that
21 I pointed to in terms of supporting the modeling
22 techniques.

1 Q. Supporting the modeling you
2 described in your declaration; is that right?

3 A. Correct, yes.

4 Q. If you could turn to Page 2 of this
5 paper. Do you see Figure 3?

6 A. Yes.

7 Q. What does Figure 3 show?

8 MR. NELSON: If you could zoom out a
9 little bit, there is a paragraph above it
10 that might be useful for him to refer to.

11 THE WITNESS: I am also going to
12 pull it up. I have an additional copy as
13 well so it would be easier for me to look at
14 it.

15 So, "Figure 3 shows a block diagram
16 of circular loop-based wireless power
17 transfer by resonant inductive coupling.
18 Hardware implementation of the wireless power
19 transfer system is divided into three
20 components, namely the transmitter circuit,
21 receiver circuit and microcontroller-based
22 monitoring systems. Simulation and

1 development of wireless power systems have
2 been reported in 17."

3 Q. And you see those arrows, three
4 arrows, two of them are curved in the middle of
5 this figure?

6 A. Yes.

7 Q. What do those represent?

8 A. The magnetic flux between the two
9 coils.

10 Q. Is the magnetic flux sometimes
11 annotated with a B vector?

12 A. Yes.

13 Q. But that is not what they do here.
14 Right?

15 A. Correct.

16 Q. Are you familiar with the concept of
17 field lines?

18 A. Yes.

19 Q. Are there any field lines shown in
20 this figure?

21 A. Well, arguably, the field sort of
22 has that shade. It is not showing a full

1 schematic of the field.

2 But the general field will follow
3 that -- is following that shape between the two.

4 Q. Okay. So, if the full field lines
5 were shown, can you describe what that would look
6 like, generally?

7 A. Well, in isolation of this coil, I
8 mean it depends on what is around it, but they
9 would tend to encircle the coils.

10 Q. So, the field lines pass through the
11 middle as shown here. And then would extend
12 around the outer periphery as well?

13 A. Again, depending on what is
14 surrounding the coil. What is, what else is
15 going on in the coil, the field lines of the
16 field itself will vary.

17 But in coils and air like this,
18 yeah, they would tend to encircle.

19 Q. So, does this figure, is it
20 consistent with your understanding of the physics
21 and geometry of wireless charging?

22 A. Well, this --

1 MR. JHURANI: Objection, form.

2 THE WITNESS: This particular paper
3 is talking about a resonant coupling. There
4 are multiple, several types -- oversimplified
5 there are two types of coupling, one can be
6 resonant and one can be nonresonant.

7 But this paper in particular is
8 talking about resonant coupling.

9 BY MR. NELSON:

10 Q. How would the field lines change if
11 the physical geometry was the same but if it were
12 nonresonant?

13 A. The field lines are a function of
14 distance and the materials, sort of any
15 surrounding materials.

16 So, it is -- and frequency. And so,
17 frequency would impact as well. And tends to be
18 higher frequency for a resonant coupling.

19 Q. But, would the field lines shape
20 change, assuming all else being equal as between
21 resonant and nonresonant?

22 A. Again, yes. Because it is a

1 function of the actual shape. It is a function
2 of frequency. And that you are going to be at
3 different frequencies for resonance versus
4 nonresonance.

5 And all of the surrounding
6 materials, surrounding framing, all will dictate
7 and change different things as a function of
8 frequency as well.

9 Q. Do you know what the diameter of the
10 coils were in this paper?

11 A. Let's see. Three coils and
12 different types of numbers. Diameter transmitter
13 coil set to 6.5 millimeters and 9.5 millimeters.

14 And, as highlighted in Table 3, for
15 example.

16 Q. Okay. So, all of the diameters were
17 less than 10 millimeters in this paper. Right?

18 A. I believe the use of 6.5 and 9.5,
19 throughout.

20 Q. Millimeters?

21 A. Yes. Yes.

22 Q. If you could turn to the bottom of

1 Page 22 in this paper, Section C.

2 Do you see how the heading says

3 Output Power Transfer Over Distance?

4 A. Yes.

5 Q. And you will see that it uses

6 three -- well, I guess it has different

7 transmitter coils, TX1, TX2, and TX3.

8 Can you describe the three different

9 transmitter coils?

10 A. I'm sorry.

11 What was your question again?

12 Q. Can you tell from this paper what

13 those, what the characteristics of those coils

14 are?

15 So, number of turns, size.

16 A. It is specifically in Figure 11 you

17 are asking about?

18 Q. Well, the data is in Figure 11. But

19 it looks like there is a table in Figure -- on

20 Page 20 that tells us about those coil types.

21 Do you see the table at the bottom

22 of 20?

1 A. Yes.

2 Q. So, this is for TX1, TX2, and TX3.

3 How many turns do those have; can
4 you see?

5 A. In TX1 it is three turns. TX2 is
6 five. TX3 is nine.

7 Q. And then how about for TX4, TX5, and
8 TX6?

9 A. 3, 5, and 9.

10 Q. Okay. So, now turning back to
11 Figure 11. You understand the data that is shown
12 in Figure 11?

13 A. So, Figure 11 is labeled Output
14 Power Over Distance Using TX1.

15 TX1, if we go up there is number of
16 turns, three. Number of turns in LN2, three.
17 Total number of turns, six.

18 Over a distance of -- what is DT,
19 where the diameters being both 9.5 millimeters,
20 showing the power over -- power wattage versus
21 distance.

22 Q. So, the Y axis shows watts, right?

1 A. Correct.

2 Q. And the distance is on the X axis,
3 right?

4 A. I'll sorry, the --

5 Q. The separation distance between
6 coils is on the X axis, right?

7 A. Correct.

8 Q. So, can you read off some example
9 data from this graph?

10 So, for example, for a three-turn,
11 9 and a half millimeter diameter transmit and
12 receive coil, how many watts is output at a
13 spacing of 1 centimeter?

14 A. For example, RX5 at 1 centimeter, it
15 indicates about 2, 2 watts.

16 Q. Okay. And that, you are reading
17 that off of the lowest data block, right?

18 A. And the other plots show that
19 distance of 1 at about 5 watts, 6 and a half, and
20 about a little over 8.

21 Q. Okay. So, in your experience with
22 wearable devices, are these wattages sufficient

1 to charge a small wearable?

2 MR. JHURANI: Objection, scope.

3 THE WITNESS: So, these are, these
4 watts, the wattages are a good power level.
5 These are using resonant coupling. I
6 would -- I just want to orient myself for a
7 moment.

8 The resonant coupling -- again there
9 are multiple. There is resonant coupling
10 which is, takes a little bit more complexity
11 in the electronics. And then there is
12 inductive coupling which operates off
13 resonance.

14 And so, I didn't analyze this
15 reference in particular for looking at all of
16 the other details that are in this particular
17 paper.

18 But more pointing to it as
19 corroboration of types of coils and the types
20 of experiments that would be done to analyze
21 the coils.

22 BY MR. NELSON:

1 Q. If you turn to the conclusion
2 paragraph, which is down on Page 23, it looks
3 like.

4 Do you see the very last sentence of
5 the conclusion it says, "Thus, the developed
6 wireless power transfer is suitable to charge
7 wearable and medical devices," as well as others.

8 A. Yes, I see that.

9 Q. Is there anything that you disagree
10 with about that?

11 A. So, again, this is a setup where
12 there is nothing in the, in the, in the coil.

13 There is no other -- it is pretty
14 isolated from anything else around it.

15 So, I didn't analyze these
16 particular coils in terms of, like, how they
17 would fit into a device.

18 So, I can either, you know,
19 completely support with that, not knowing what
20 the IoT device or what the wearable device might
21 be that they are pondering here.

22 But more analysis for the how this

1 would be implemented in the device would be
2 required.

3 Q. Okay. Let's turn to Exhibit 2023.
4 (Previously marked Exhibit 2023,
5 first referral.)

6 BY MR. NELSON:

7 Q. Are you familiar with this
8 reference?

9 A. Yes.

10 Q. And what did you use it for, if
11 anything?

12 A. Again, I -- most of these references
13 I used to corroborate, as I explained, the
14 modeling approaches with COMSOL and Abaqus and
15 finite element and foundry element techniques.

16 Q. Okay. Let's turn to Figure 4.1 --
17 or Figure 4.2, which is on Page 28.

18 I apologize. It is Page 40 if you
19 are using those.

20 MR. NELSON: There we go. Page 28
21 of the document, still.

22 BY MR. NELSON:

1 Q. Yes, do you see that Figure 4.2?

2 A. Figure 4.2. Yes.

3 Q. Do you understand the purpose of
4 this figure?

5 MR. JHURANI: Objection, form.

6 THE WITNESS: So, 4.2, the author is
7 describing the calculation of mutual
8 inductance from a magnetic vector potential.

9 So, Figure 4.2 shows a current I
10 passing through a closed loop path L1,
11 creating a magnetic flux whose density at any
12 point is represented by vector B.

13 The normal vector is, would be
14 effective normal to the surface enclosed by
15 path L2.

16 And then it is describing the flux,
17 you know, how do you use that flux linkage
18 and mutual inductance to calculate the
19 magnetic flux between the, between the coils.

20 BY MR. NELSON:

21 Q. So, are the flux arrows labeled with
22 the B vector here generally corresponding to the

1 ones we looked at in Exhibit 2028?

2 A. Yes, the ones being described just
3 as the magnetic flux, the other is using sort of
4 the classical lettering B.

5 Q. And in each case the flux lines pass
6 through the center of the two coils, right?

7 A. Well, it passes through the coil.

8 Q. Through the center?

9 A. Well, many, all, throughout the --
10 throughout the coil.

11 Q. Do you know why the field lines
12 appear to be a little closer in the center of the
13 ring?

14 A. I'm sorry. I didn't understand your
15 question.

16 Q. Referring to Figure 4.2, and the
17 Figure 3 in Exhibit 2028, in both cases the field
18 lines appear to be closer to each other in the
19 center of the ring.

20 Is that right?

21 A. All of the lines are being, as we
22 discussed, the lines would sort of encircle and

1 so it is showing the geometric level set field
2 across the magnetic flux.

3 Q. Is the flux density greater in the
4 center of the coil?

5 A. As drawn here, that is --

6 MR. JHURANI: Objection, form.

7 THE WITNESS: That is what this
8 would tend to suggest. And again the details
9 of what this is a schematic highlighting
10 approach as opposed to any kind of specific
11 physical geometry.

12 BY MR. NELSON:

13 Q. Okay. Let's turn back to
14 Exhibit 2019, which is your declaration. And
15 let's look at -- starting at Paragraph 144.

16 So, this section of your declaration
17 describes your modeling approach. Is that right?

18 A. Yes.

19 Q. Looking at Paragraph 147, this
20 refers to a matrix Z.

21 Do you see that?

22 A. Yes.

1 Q. Did you include the matrix Z in your
2 declaration or accompanying materials?

3 A. Well, as I described, and as we are
4 pointing to the references here, I pointed to
5 these various papers to elucidate the modeling
6 approach, for example.

7 And so it was not necessary to plot
8 or show matrix Z. That is highlighting what the
9 Method of Moments approach is that is used in
10 COMSOL and Abaqus.

11 So, this was describing that
12 numerical approach be the tools to calculate
13 these for you.

14 Q. But you didn't include them in the
15 materials after they were calculated; is that
16 right?

17 A. That is correct.

18 Q. And is that same case for these
19 other matrices, matrix V, matrix I, and matrix R?

20 A. Correct. These are the summary of
21 the techniques that are used by COMSOL, Abaqus,
22 FEKO, that applies boundary element methods such

1 as Method of Moments to calculate field patterns.

2 And so, in general, this is the
3 process that is used to discretize that space and
4 do that simulation.

5 Q. Okay. And in the same paragraph,
6 Section A, right below there, it refers to
7 meshing under discretization of metals.

8 Is meshing the same thing as
9 three-dimensional integration?

10 A. Meshing describes the discretization
11 of a space into discrete elements that are then
12 stitched together once they are discrete enough
13 to approximate a continuous medium.

14 Q. So, it is not the same thing as
15 mathematical integration of that surface, right?

16 A. I'm sorry, say that again?

17 Q. It is not the same thing as
18 three-dimensional integration over the surface
19 then, right?

20 A. When you say three-dimensional
21 integration over the surface, I'm not sure what
22 you are referring to.

1 Q. If it were the same then I assume
2 you would say yes, right?

3 A. I'm just asking for clarification as
4 to what you are asking with respect to 3D
5 integration.

6 There are many ways that you could
7 integrate surface, volumes -- sorry. I'm just
8 unclear on what your question is.

9 Q. So, this is more of a numerical
10 computational method, not a mathematical one
11 where you just integrate the function, right?

12 MR. JHURANI: Objection, form.

13 THE WITNESS: Numerical modeling is
14 mathematical. It has a solid mathematical
15 foundation.

16 So, things that you would do via, if
17 you had a simplified -- similar like
18 geometries, for example, with analytic forms,
19 you can perform integration analytically.
20 Using numerical techniques, you can perform
21 integration numerically, discretized.

22 But you can certainly accomplish

1 mathematical functions such as integration
2 with discretized domains.

3 BY MR. NELSON:

4 Q. And here you talk about subdividing
5 into triangles.

6 Are the triangles all assumed to be
7 the same shape?

8 A. There are multiple techniques for
9 meshing. These are the underlying tools that are
10 used in the, people that -- in the tools such as
11 COMSOL and Abaqus to intelligently mesh surfaces.

12 One of the common aspects of meshing
13 is to put more dense triangles, therefore smaller
14 triangles into regions that have more complex
15 geometry or that are less smooth.

16 And so meshing -- the meshing
17 function within these tools tries to be
18 intelligent and mesh such that it doesn't violate
19 spatial Nyquist.

20 So, a surface, whether it be in time
21 or space, can be described by how fast it varies.

22 And discretization and the sizes of

1 triangles in a meshing process are coupled to the
2 smoothness of the local geometry.

3 And so they will quite typically not
4 be uniform triangles, but will be set to capture
5 a sufficiently -- to appropriately represent in
6 the discrete domain the smoothness or lack of
7 smoothness in the material so that you have good
8 agreement between the discretized representation
9 of the continuous world and the continuous world.

10 Q. Did you include a, an output from
11 the tool of how this discretization was
12 accomplished for your modeling?

13 A. I did not. The point of the
14 modeling was to -- was consistent with what is
15 shown in Honda and employed these techniques to
16 highlight some of the trade-offs with different
17 decisions.

18 So, it was not necessary in a
19 POSITA -- it was not necessary in forming and
20 explaining my opinions to sort of fully dump the
21 output of a tool such as COMSOL into a report.

22 It would be terabytes big -- not

1 terabytes, but much larger.

2 Q. So, would a person of order skill in
3 the art be able to recreate your model based on
4 what you have provided?

5 A. Yes.

6 Q. Did you provide the basis functions
7 in your materials?

8 A. Again, these are the -- I explained
9 the mechanism by which the tools such as COMSOL
10 and Abaqus, as a tool, helped to do this type of
11 analysis.

12 I didn't include the sub-outputs of
13 the analysis in my declaration.

14 Q. Are COMSOL and Abaqus referred to in
15 your declaration?

16 A. I referred to the Exhibits 2023
17 and 2032, as I describe to perform my modeling
18 using the methodology and approaches highlighted
19 in the references describing and relating to
20 wireless transfer modeling.

21 So, that is Exhibits 2023 and 2032.
22 They review -- not all of them I believe talk

1 about which tool they are using, but many of them
2 do. And it is a mix of ANSYS and COMSOL and
3 MATLAB and FEKO.

4 Q. Would you mind spelling those four
5 tools out? I'm not sure if I understand them?

6 A. COMSOL, is C-O-M-S-O-L. ANSYS,
7 A-N-S-Y-S. It is FEKO, F-E-K-O, finite element,
8 I forget what the K-O stands for.

9 And, MATLAB, M-A-T-L-A-B.

10 Q. Referring to Section C here, the
11 interaction matrix, did you provide the
12 interaction matrix in your materials?

13 A. I did not. Again, these are
14 under-the-hood mechanisms that these highly
15 engineered tools use to make the engineer's life
16 easy to simulate such phenomena.

17 And these are standard methods
18 that -- these are just standard methods of how
19 these calculations are done.

20 Q. Okay. So, I assume the answer is
21 similar for the other under-the-hood portions
22 below such as the Green function. Is that right?

1 A. Correct. As I described, these are
2 the -- the POSITA or reading what I described is
3 the approach, in terms of the geometry, would
4 know how to use a COMSOL or Abaqus, and these are
5 straightforward geometries, very straightforward
6 geometries to simulate.

7 Q. Did you empirically excite a
8 specific antenna to confirm any of these modeling
9 results?

10 A. For my analysis, I did not do a
11 physical experiment.

12 I highlight these in, as well
13 highlighting the consistence with -- and actually
14 made some nicer assumptions in terms of what is
15 seen in Honda.

16 But, no, I did not do a physical
17 experiment.

18 Q. And then at the bottom of Page 71,
19 you mention, "a resultant system of equations
20 yield the unknown currents."

21 I assume that the resultant system
22 of equations is not provided in your materials

1 either; is that right?

2 A. Again, this is the underlying
3 approach.

4 You know, fundamentally it is three
5 matrices, E equals IR , or V equals IZ .

6 It is, you know, basically a
7 numerical differentiation -- a numerical
8 representation of a bunch of electrical
9 components, all right.

10 And, as I describe in 147, you know,
11 a generic electrical component could be
12 represented as its relationship between current
13 and voltage which has an impedance which is Z .

14 And so this is just the standard --
15 if you think about the relationship in a
16 capacitor or an inductor or a resistor, there is
17 a relationship between current and voltage
18 through its impedance, either constant or time
19 derivative.

20 And these are just the standard
21 techniques that are used to discretize how a
22 continuous medium in tools such as COMSOL and

1 Abaqus, and the tools that are highlighted in the
2 references.

3 Q. Did you have to assume a particular
4 current for your modeling?

5 A. These are showing the relative
6 relationship between different designs.

7 Q. Okay. So, let's turn to Page 74 in
8 your report.

9 Can you describe what this is
10 showing?

11 A. So, I would first point to the
12 descriptions that I provide in Paragraph 145
13 where I have assumed that devices of a particular
14 range -- 30 to 40 millimeters wide in the context
15 of the Kotanagi device -- when accounting for the
16 20-millimeter diameter of the protruding part, I
17 have assumed a Fraser-like coil would extend
18 centrally from the outer extent of the protruding
19 part at 20 millimeters to the extent of the
20 device at 30 to 40.

21 And, one example of a coil that
22 would fit in this space would be a ring-shaped

1 coil with an inner radius for central core
2 spanning 12.5 millimeters in inner radius, and
3 extending from there to 30 millimeters extent of
4 the device.

5 Another example of a coil that would
6 fit in this space would be a ring-shaped coil
7 with an inner radius for a central core spanning
8 17.5 millimeters in inner radius, extending to
9 the 40 millimeter extent of the device.

10 I have used both 20-loop coils
11 and 10-loop coils, with a distance between the
12 transmit to receive coils of 3.5 millimeters.

13 And then in Paragraph 146, for the
14 10 millimeter diameter called for by petitioner's
15 proposed configuration, I assumed a coil with an
16 air core type coil core with a 10 millimeter
17 outer diameter and a 5 millimeter inner diameter.

18 In modeling I used a 2.5 millimeter
19 inner radius -- or I note in my modeling, using a
20 2.5 millimeter inner radius achieved a better
21 performance, a coil with a smaller radius.

22 As such, to be conservative I used

1 the 2.5 millimeter radius with a relatively
2 better performance.

3 And in this modeling, I used both
4 20-loop and 10 loop with a distance between 3
5 and 4 -- or 3 and 5 millimeters.

6 Q. Okay.

7 A. So, in looking at these --

8 Q. The paragraphs right before that it;
9 is that right, 145, 146, and 147.

10 You are reading from those?

11 A. Yes, as I said, to further explain
12 this figure, the results are showing relative
13 power transfer for these different configurations
14 as a function of frequency.

15 So, the bottom cluster, if you will,
16 that is labeled distance between -- that is where
17 the legend is over the middle of it, this is a
18 coil that has an inner radius of 2.5 millimeters,
19 an outer radius of 5.0 millimeters, with either
20 10 or 20 loops in the coil, and the -- at
21 distances between 3 to 8 millimeters.

22 And then correspondingly to a

1 bigger -- correspondingly, bigger coils with the
2 Fraser-type device at the top and the closed
3 construction type coil at the bottom.

4 Q. Okay. So, there is a pair of data
5 streams. It looks like there is one, two, three,
6 four, five, six pairs of data sets in the bottom
7 cluster.

8 And are those the, does each pair
9 correspond to coils 3 to 8 millimeters, for
10 three, four, five, six, seven, and eight?

11 A. So, in that bottom -- so, in the
12 bottom cluster, if you will, where the legend is
13 over the middle, there are one, two, three, four,
14 five, six different lines that are close to each
15 other.

16 And those correspond -- each one of
17 those double lines corresponds to a distance
18 between 3, 4, 5, 6, 7, and 8 millimeters in
19 distance.

20 And 10 to 20 loops for the coil that
21 has an inner radius of 2.5 and an outer radius
22 of 5.

1 Q. So, the bottom line in each pair
2 corresponds to 10 loops, probably. And the top
3 line corresponds to 20 loops; is that right?

4 A. So, for example, if you look at the
5 legend, the orange and blue highlight -- the
6 bottom two -- highlight the ring with an inner
7 that the legend indicates the 2.5, the first
8 number ring underscore 0025. That is an inner
9 radius of 2.5 millimeters.

10 Underscore 0050, that is the outer
11 radius of 5 millimeters. Underscore 20 -- 2025
12 is actually 20 and a quarter loops as opposed
13 to -- that is what the 2025 means.

14 And, in the one below it is the same
15 with the loop of, a loop count of 10.

16 Q. Okay. So the convention for your
17 data labelling is inner radius and outer radius.
18 And what was the third position again?

19 A. Inner radius, outer radius, number
20 of loops.

21 Q. Number of loops, okay.

22 And then the last part is? It is

1 very small. It is hard to see.

2 A. Is the distance.

3 Q. Separation distance?

4 A. Separation distance.

5 Q. Got it.

6 Okay. So, looking at the top
7 cluster of data it says that the distance between
8 the coils is 3 to 5 millimeters.

9 Did you intend to label that 3
10 to 8 millimeters?

11 Because there are six data sets
12 there?

13 A. So, no. This is, there are actually
14 two clusters at the top. It is highlighting --
15 so, I will just count down in the legend from the
16 top.

17 There are -- if you look at where
18 12.5, or 12 5. So, ring underscore, there is a
19 first cluster of ring underscore 0175. There is
20 one, two, three, four, five, six of those.

21 And then there are one, two, three,
22 four, five, six where the inner radius is

1 17.5 millimeters.

2 And then another one, two, three,
3 four, five, six, where the inner radius is
4 12.5 millimeters.

5 For those, that same -- for those
6 same ones, you know, for the ones that have an
7 inner radius of 17.5, they have an outer -- it
8 has an outer radius of 20.

9 And for the ring that has an inner
10 radius of 12.5 and an outer radius of 15, right.

11 And then the distances there are 3,
12 4, and 5 millimeters in separation.

13 Q. Are there any data spots that are
14 superimposed here that are just so closed that
15 they are hard to distinguish on the top end?

16 THE WITNESS: If you scroll to the
17 -- up a little bit.

18 So, yes. The top three correspond
19 to the larger coil.

20 But where the -- in that case the
21 number of loops is not making significant
22 variation.

1 And so, they are -- you can see it
2 subtly, at least in the top one at least on
3 the screen it looks like it.

4 In the printout I have it is a
5 little more clear.

6 But they are those -- the top three
7 plots correspond to the coils that have an
8 inner radius of 17.5, outer radius of 20.

9 And both the ones that are in this
10 case superimposed upon each other because the
11 small variation at this size coil, loops
12 of 20.5 -- or, roughly 20 and roughly 10
13 loops.

14 Yes, specifically 20 and a quarter
15 and 10 and a quarter loops.

16 BY MR. NELSON:

17 Q. Okay. So, am I understanding this
18 right that the number of turns or the number of
19 loops matters more for a smaller radius coil than
20 a larger radius coil?

21 A. Yes.

22 Q. Okay. When you say -- you labeled

1 the Y axis, relative power transfer performance.

2 What are the units of the Y axis?

3 A. Effectively, DB down. So,
4 normalizing the best coil at its peak performance
5 at 1 megahertz. And then it is the reduction in
6 relative power transfer.

7 Q. Okay. And, if it is relative, then
8 we can't really plot any particular device on any
9 of these data streams, right?

10 MR. JHURANI: Objection, form.

11 THE WITNESS: So, again, I'm showing
12 the relative. And describing, you know, for,
13 in the context of the Kotanagi and the Honda
14 descriptions, the relative merits of the
15 coils of different sizes.

16 BY MR. NELSON:

17 Q. But no absolute data here, right?

18 A. I did not put that -- these are
19 relative measures in this plot.

20 Q. As opposed to absolute measures,
21 right?

22 A. Correct.

1 Q. Did the data plotted here result
2 from a table of values that you stored in a
3 spreadsheet somewhere?

4 A. These are the results of simulations
5 of these -- of coils through the found D element
6 or the Method of Moments techniques in -- as I
7 described in MATLAB and COMSOL.

8 So, it is not, it is not Excel. It
9 is the outputs of these simulations as a function
10 of coil, size and diameter and separation.

11 Q. So, these tools don't give you a
12 numerical output. They only provide a graphical
13 output like this?

14 A. I programmed it to generate the
15 plots, as opposed to putting the plots into Excel
16 and then creating a table that was -- I generated
17 the plots directly.

18 Q. You show three diagrams of coils off
19 to the right of your modeling output.

20 Does this indicate that the larger
21 diameter coils correspond to the data toward the
22 top of the graph?

1 A. Yes. So, as they are labeled, the
2 plot, the text.

3 So, the graphics on the far right
4 indicate the relative size of the coils with the
5 description describing what is in each of those
6 clusters. The top one being the inner radius,
7 12.5 to 17.5. The middle with the inner radius
8 of 5, and the bottom of the inner radius of 2.5.

9 Q. So, from the modeling here, it seems
10 to show that greater separation distance causes
11 weaker or slower charging.

12 Is that right?

13 A. I'm sorry. Repeat your question,
14 please.

15 Q. From the modeling, it seems to show
16 that a greater separation distance for coils
17 causes weaker or slower charging.

18 Is that right?

19 A. That is correct. And that is -- as
20 described in Honda, right, with the separation
21 from 3 to 5 millimeters, going two orders of
22 magnitude in reduction, in charging ability.

1 Q. And was this correlation a surprise
2 to you, based on your experience?

3 MR. JHURANI: Objection, form.

4 THE WITNESS: The correlation
5 between reduction and power and distance?

6 BY MR. NELSON:

7 Q. Yes.

8 A. No.

9 Q. Why not?

10 A. Counter of physics.

11 Q. So, it was as expected that the
12 farther apart they are, the more slowly the
13 charging would occur?

14 A. As is also described in -- as
15 referenced in Honda.

16 Q. You mentioned that some of this
17 modeling is similar to Fraser. Remind me which
18 cluster is attempting to model Fraser.

19 A. The upper cluster is what I
20 described as what a POSITA would have done when
21 realizing that the detrimental effect of having
22 not only coils of smaller radius, but coils with

1 interfering metal to induce eddy currents,
2 highlighted that the Fraser -- using Fraser
3 would -- in putting it in the same size of device
4 would be that upper, upper cluster.

5 Q. Let's turn to the Fraser exhibit.

6 I may not have provided that in any
7 of the materials. So let's go to where it is
8 referred to in Exhibit 2019.

9 Paragraph 139. Do you see that
10 figure?

11 A. Yes.

12 Q. Is this a figure from Fraser?

13 A. Fraser is Exhibit 1041, and that is
14 Figures 1 and 3 as I call out above it from
15 Fraser.

16 Q. So, this figure shows that Fraser's
17 charging receive coil does not have an air core.
18 Right?

19 A. Again, it was just a note. I was
20 not analyzing Fraser in isolation.

21 But I was using Fraser, as I
22 describe in Paragraph 137, that a -- or prior

1 in 136, right, that a POSITA in view of the above
2 described degradations and wireless signal
3 transmission issues associated with interfering
4 metal and size limitations.

5 "A POSITA would have been aware of a
6 wrist-worn device -- such as the device disclosed
7 in Fraser -- that implements a larger wireless
8 charging receive coil covering a substantial
9 portion of the rear watch surface and in doing
10 so, counteracts the signal degradations that come
11 from the interposing materials and/or spacing
12 between the wireless charging receive and
13 transmit coils."

14 So, I was not analyzing Fraser by
15 itself.

16 It was describing how Fraser -- a
17 POSITA would have likely applied Fraser,
18 recognizing the issues with the smaller coils and
19 interfering metals.

20 Q. Understood.

21 Where is the charging coil in
22 Fraser; is it shown on this figure?

1 THE WITNESS: Can you post the
2 Fraser reference here?

3 I also have a digital copy -- I
4 might have a paper copy. Let's see. Did I
5 print it out.

6 I'm sorry. Can you repeat your
7 question?

8 BY MR. NELSON:

9 Q. Can you point to the element that is
10 the charging coil in Fraser? I think it is
11 labeled here in the figure, from your
12 declaration.

13 A. Okay, yes. Charging coil is on
14 there, 310.

15 Q. And can you tell if this is a
16 planar-type coil or whether it is a -- I forgot
17 what you called the other kind where they are
18 stacked.

19 What kind of coil is this showing?

20 A. Again, I did not need to opine
21 exactly what the construction of the coil.

22 But it is likely, given the context

1 of it, that it is a -- the electronics
2 fabrication technique, so not wound coil, so
3 printed.

4 So, it would be likely traced, as a
5 planar structure.

6 Q. And on the figure shown here, you
7 see the light emitters 322, et cetera, and the
8 light detector 130?

9 Do you see those components?

10 A. Yes.

11 Q. Are those located within the core of
12 the charging coil 310?

13 A. So the Fraser coil circumscribes the
14 light emitter, light detector.

15 And as I described, you know, the
16 POSITA would look to using a coil such as this
17 because it would be more tolerant to the
18 degradation effects of having metal interposed,
19 in the -- between coils.

20 Q. Are these optical elements within
21 the power transmission path that you would expect
22 for this Fraser style coil?

1 A. So, as I describe, yes. And as I
2 pointed in 137, a POSITA would have been aware of
3 Fraser, the larger coil.

4 In doing so counteracts with some of
5 the signal degradation that comes from the
6 proposed material and/or the spacing between the
7 wireless charge and receive coils.

8 Q. You refer to Fraser as actually
9 functioning in several places; is that right?

10 A. I'm sorry. Can you repeat the
11 question?

12 Q. I just noticed this phrase, actually
13 functioning. And it seems to apply to Fraser
14 every time it appears in your declaration.

15 I can point you to some paragraphs
16 to give you an example. But the closest one here
17 is 136.

18 Do you see where it says that there
19 is an actually functioning device, and then as
20 corroborated by Fraser?

21 A. Right. So, as I described in the
22 preceding, with the, with the proposed

1 combination with the size constraints, distance
2 constraints and metal and the proposed
3 construction, a Honda coil with Kotanagi would
4 not be something that a POSITA would view to
5 work.

6 And instead they would lean towards
7 something like Fraser that would actually work.

8 And constructing a coil that is
9 larger and mitigates, as I describe in 137, the
10 detrimental effects of interposing metal and
11 distance.

12 Q. I understand that you are
13 contrasting Fraser with this other combination.

14 But you keep saying actually
15 functioning. I'm wondering if there is a
16 standard by which you measured this concept of
17 actually functioning.

18 Is there a particular wattage that
19 you think of as actually functioning?

20 MR. JHURANI: Objection to form.

21 THE WITNESS: So, as I describe in,
22 at least paragraph -- Page 75 and, B in the

1 analysis of my simulations, right, what I
2 mean by actually is a POSITA in looking at
3 the detrimental effect of the combination --
4 proposed combination of Honda with Kotanagi,
5 where a device would take in comparison
6 100 hours to charge, a device configured with
7 the Fraser-like coil in Kotanagi would take
8 an hour.

9 So, 100 hours does not sound like an
10 actual working. An hour sounds like an
11 actual working.

12 BY MR. NELSON:

13 Q. Okay. But that is a relative
14 measure not an absolute measure, right?

15 A. Well, one hour is a real number.
16 100 hours is a real number.

17 Q. I understand the comparison you are
18 making.

19 Does Fraser ever describe the
20 diameter of its coil?

21 A. Fraser does not -- in my quick
22 review here -- sort of explicitly give a number

1 for the larger coil.

2 But as I described, you know, it is
3 a larger coil that has some of the positive
4 benefits as I have described.

5 And so, it is a general teaching
6 that Fraser offers of a larger coil that doesn't
7 have the detrimental effects that would impact
8 smaller coils with interposing metal. And, small
9 size.

10 Q. Does Fraser show or teach how many
11 loops it has in its coil?

12 A. So, again, I use Fraser to elucidate
13 what a POSITA, looking to deal with the
14 unrealistic combination of Honda and Kotanagi,
15 dealing with the detrimental effect of metal and
16 distance and size.

17 Yeah, I use the relative measures of
18 the simulation that is consistent with what we
19 see in Honda to show the relative effect and the
20 relative extreme benefit that comes from what a
21 POSITA would do. And that the larger coil as
22 well, as I highlight in Page 76, you know, there

1 are other things that will matter.

2 And so the detrimental effects are
3 going to have a larger detrimental effect on the
4 smaller coil, like interposing metal.

5 Alignment is going to have a larger
6 effect on the smaller coil.

7 And so a POSITA, as I describe,
8 would use Fraser to deal with the signal
9 degradation that comes from the interposing
10 material and spacing and the other benefits that
11 would come from, as I described, larger coils.

12 Q. Okay. So, referring back to
13 Page 74, which was in your Paragraph 149. You
14 have some data that we have discussed as being
15 Fraser-like, and that is the top cluster, right?

16 A. Correct.

17 Q. And that has a larger diameter for
18 the coil and it has a certain number of loops as
19 well, right?

20 A. Correct.

21 Q. So, where did you get those numbers,
22 if not from Fraser?

1 A. Again, what I was trying to do is
2 show the relative comparison.

3 So, we could certainly increase the
4 number of coils. We could increase the number of
5 coils in the small and the big. Increasing the
6 number of coils would have a more beneficial
7 effect in the larger coil.

8 Increasing -- having metal in the
9 middle is going to have a larger detrimental
10 effect on the smaller coil.

11 Alignment is going to have a more
12 detrimental degradation to the smaller coil.

13 So, the intent here was not to do a
14 full factorial analysis of all of the possible
15 variations, but to show a relative comparison to
16 elucidate that a -- as taught by Honda, and with
17 the implication of distance and what was known by
18 a POSITA would be, and as taught by Honda would
19 be complications with interposing metal.

20 The POSITA would look at using
21 Fraser -- the larger coils as represented by
22 Fraser to deal with the issues of interposing

1 metal and distance.

2 Q. I think you misspoke a minute ago
3 when you mentioned that the increasing the number
4 of coils would have a greater effect on the
5 larger data.

6 And we -- didn't we see earlier that
7 it has a greater effect on the smaller coils if
8 you increase the number of turns?

9 A. So, fair point. And I would
10 highlight what I should have clarified is the
11 number of coils that you can fit is also a
12 function of the thickness of the ring.

13 And so, if you were on par with the
14 thickness of the ring having the larger coil, it
15 gives you more opportunity to have that thickness
16 and to have the beneficial.

17 Q. Understood. As a function of the
18 perimeter being longer?

19 A. Correct.

20 Q. Okay. Turning to Paragraph 153.

21 A. I'm sorry. What paragraph?

22 Q. 153. You included a figure here.

1 It is kind of a three-part figure.

2 Do you remember making this figure?

3 A. I -- these are the figures that are
4 consistent with my opinions.

5 Q. So, you didn't draw this yourself;
6 is that what you are saying?

7 A. My declaration, you know, the way we
8 created it was collaborative in nature, but these
9 are all my opinions.

10 Q. Okay. So, let's look at the right
11 side. What are these outer blue arrows that
12 point upward intended to represent?

13 A. Power, as labeled, power
14 transmission from the transmit to the receive
15 coil.

16 Q. So, the transmit coil is on the
17 bottom, right?

18 A. Yes.

19 Q. And the receive coil is on the top.
20 Right?

21 A. Yes.

22 Q. Are those blue arrows intended to

1 represent magnetic flux?

2 A. No. It is the direction of -- it is
3 really indicating the assembly stack, cover on
4 the bottom -- the charging station on the bottom,
5 device sitting on top of it, and power goes from
6 one to the other.

7 Q. So, they are merely directional?

8 A. Correct.

9 Q. If you were to draw field lines
10 showing the magnetic flux in this arrangement,
11 would the field lines flow through the center
12 where the cover is?

13 A. So, there would be field lines
14 between the coils, you know, as we described
15 previously. They would encircle.

16 The functional power transfer is
17 happening in the field that is happening between
18 the two coils.

19 Q. Okay. And would that field pass
20 through the cover?

21 A. So, as I described in Paragraph 151
22 leading up to the illustration that I make.

1 If we were to configure the wireless
2 charging coil similar to that of Fraser, the
3 POSITA would have recognized that the wireless
4 charge receiving coil would extend beyond the
5 space provided between Kotanagi's cover glass and
6 even the protruding part of Kotanagi's device
7 because of the space constraints that sandwich
8 the rear cover 23 and the optical elements.

9 In such a configuration, the POSITA
10 would have recognized that the wireless power
11 that passes in the context of Claim 9 does not
12 pass through the cover, but instead it passes
13 through the devices's rear housing surface beyond
14 the protrusion.

15 So, there may be field lines that
16 are passing out but the power is happening
17 transfer between the coils.

18 Q. So, you are saying there is no power
19 that transfers to the center of the cover at all?

20 A. The power is transferred between the
21 coils. There is field lines that are happening
22 outside that go through the cover, but the power

1 transfer is happening between the coils.

2 Q. Are you distinguishing the place of
3 the power transfer from the field lines; are
4 those two totally separate concepts?

5 A. So, as I describe in 152, in the
6 context was understood in view of the record, the
7 power would not pass through the alleged cover.

8 It is passing between the coils, and
9 the cover is outside of where the power is
10 transferred.

11 Q. What do you mean by outside?

12 A. Below the, below the coils.

13 Q. So, where on this figure would the
14 power transfer occur?

15 A. The power transfer is occurring
16 between the coils.

17 Q. Only in the very tiny space that is
18 sandwiched between the two coils there, the very
19 thin gray line?

20 A. The field that is on the other side
21 of the coil -- on the other side of the cover is
22 not being captured by the companion coil.

1 So, the power transfer is happening
2 between the coils.

3 Q. Can you help me understand what you
4 mean by the field you just described?

5 MR. JHURANI: Objection, form.

6 THE WITNESS: Sorry. Can you re-ask
7 or restate the question, or re-ask it?

8 BY MR. NELSON:

9 Q. I'm just going to review what you
10 stated and ask you to help me understand it.
11 Just a moment.

12 So, reading back from the
13 transcript, you said the field that is on the
14 other side of the coil, on the other side of the
15 cover, is not being captured by the companion
16 coil.

17 What did you mean by that?

18 A. So, as I have described, the power
19 is transferring from one coil to the next, within
20 the field that is between the two coils. The
21 field that is outside going through the, that is
22 drawn here on the bottom, the field that is going

1 through. It is not transferring power to the
2 upper coil.

3 Q. If power isn't transferred through
4 magnetic flux, how is it transferred?

5 MR. JHURANI: Objection, form.

6 THE WITNESS: It is transferred in
7 the magnetic flux between the coils.

8 BY MR. NELSON:

9 Q. And in this arrangement here, where
10 would the magnetic flux lines be?

11 A. The magnetic flux lines would go
12 through the area between the coil and through the
13 cover.

14 But the power that is being
15 transferred is not going through the cover as I
16 describe in 152.

17 Q. So, power is not transferred through
18 magnetic flux.

19 Is that your position?

20 A. That is not what I said. I said the
21 power is being transferred by magnetic flux
22 between the two coils.

1 And the magnetic flux that is
2 outside the coils, that is not being captured by
3 the coil, that is not transferring power.

4 And I described that in 152. "A
5 POSITA would have recognized any power that
6 passes to the wireless charging coil in the
7 context of Claim 9 in view of the intrinsic
8 record would not pass through the alleged cover
9 and instead would pass through the device's rear
10 housing beyond the protrusion."

11 Q. So these two blue arrows you have
12 drawn in this figure, the ones we have been
13 discussing, are those merely directional or are
14 they intended to show where the actual power
15 transfer occurs?

16 A. They are showing power that -- it is
17 going from coil 1 to coil 2, right.

18 It is not showing the exact location
19 of where the power is all transferred. But it is
20 showing that the power is going from coil 1 to
21 coil 2 in that region.

22 Q. And if you were to draw arrows that

1 did show the exact location of power transfer,
2 where would you put those arrows?

3 A. Within the dashed box. Power is
4 going between the two coils in the dashed box but
5 not through the cover.

6 Q. Throughout the dashed box, but only
7 where the orange coils are shown. Is that right?

8 A. Correct.

9 Q. So there would be a series of arrows
10 connecting the two orange coil cross-sections --

11 A. Within the dashed box. So, I
12 misspoke there. Not just within where the coils
13 are.

14 But in the space that encompasses
15 the dashed box which includes the coils, the
16 space between the coils. That is where the field
17 is that is transferring from coil 1 to coil 2.

18 So, power is transferring in that
19 region from coil 1 to coil 2 in the dashed box.

20 Power is not transferring through
21 the cover.

22 Q. Okay. So I'm imagining what these

1 arrows would look like.

2 There would be a series of arrows
3 basically filling the dash box all of the way
4 across, including in the center of the coils, but
5 not down below the dashed box where the cover is
6 illustrated, the red cover.

7 Is that right?

8 A. There is --

9 MR. JHURANI: Objection to form.

10 THE WITNESS: Power, as I described
11 is transferring from in between the coils.
12 There may be the field outside those coils,
13 but the power is being transferred between
14 the coils, not passing through the coils.

15 BY MR. NELSON:

16 Q. And the field, a coil, the
17 configuration like this are continuous field
18 lines, right?

19 MR. JHURANI: Objection to form.

20 THE WITNESS: There are field lines
21 that I'm sitting in that are not transferring
22 power to me because of electromagnetic

1 radiation from my monitors and the WiFi.

2 The power is being transferred
3 between the coils in the presence of the
4 field between the coils.

5 MR. JHURANI: Counsel, we have been
6 going for well over an hour now. Is this a
7 good time to take a break? And, Dr. Anthony,
8 would you like a break?

9 THE WITNESS: Sure. Whenever he
10 finishes this question, recognizing that he
11 wants to finish a question when we take a
12 break.

13 MR. NELSON: I think now is a good
14 time. Thank you.

15 THE WITNESS: Okay.

16 THE VIDEOGRAPHER: Okay. The time
17 is 4:12 p.m. Off the record.

18 (Recess taken -- 4:12 p.m.)

19 (After recess -- 4:19 p.m.)

20 THE VIDEOGRAPHER: The time
21 is 4:19 p.m. Back on the record.

22 BY MR. NELSON:

1 Q. If we could turn back to
2 Exhibit 2019. And I was going to refer to
3 Paragraph 83.

4 It looks like this is a quotation
5 from Kotanagi --

6 A. Sorry. 183 or 83?

7 MR. NELSON: 83.

8 BY MR. NELSON:

9 Q. This is referring to the Kotanagi
10 reference. And you have some quotations here.

11 "The electrodes," referring to
12 Kotanagi's electrodes, "detect whether there is
13 contact with the living body surface."

14 From your study of Kotanagi, do you
15 know how this works? How did the electrodes
16 detect contact?

17 Are you studying Kotanagi to answer
18 this question?

19 A. I am reviewing Kotanagi, yes. And I
20 do note that I think most of -- I had a bunch of
21 discussion around the electrodes in my other
22 declaration, which I -- but not in the '783

1 declaration.

2 So, I'm re-reviewing the Kotanagi.

3 Q. Okay. We can turn to that after
4 this.

5 A. So, as what is described in
6 Paragraph 14 of Kotanagi -- or, I'm sorry, 0014
7 of Kotanagi.

8 "In the biological information
9 measuring device, according to this invention,
10 when the main body is mounted to the arm, the
11 pair of electrodes come into contact with the
12 living body surface so that the discharge occurs
13 through the living body surface.

14 "As a result, the potential between
15 the electrodes decreases."

16 So, the -- "By detecting the
17 potential differences between the pair of
18 electrodes, it can be easily and reliably
19 detected whether the light-emitting pair and the
20 light-receiving part are indeed in contact with
21 the living body surface."

22 Q. That process that you have just

1 described from Kotanagi is the same as using
2 impedance to detect skin contact?

3 MR. JHURANI: Objection, form.
4 Scope.

5 THE WITNESS: What they are
6 describing here is by checking the potential
7 difference between the pair of electrodes.
8 Potential being a voltage.

9 BY MR. NELSON:

10 Q. Okay. So there will be an
11 associated impedance but it is measuring the
12 voltage drawn, right?

13 A. The potential between the electrodes
14 decreases by detecting the potential difference
15 between the pair of electrodes. It can be
16 detected whether it is in contact with the body.

17 Q. Does impedance play any role in this
18 process?

19 MR. JHURANI: Objection, form.
20 Scope.

21 THE WITNESS: So, it is described
22 here as measuring the potential.

1 Potential, like we have just
2 described previously in our discussion around
3 simulation, you know, any electrical
4 component has a, in the relationship between
5 voltage and currents, there is a, an
6 impedance.

7 BY MR. NELSON:

8 Q. But, from Kotanagi, it is your
9 position that this is not an impedance
10 measurement; is that right?

11 MR. JHURANI: Objection, misstates
12 testimony.

13 THE WITNESS: So, as I have
14 described, for example again in Paragraph 59
15 of Kotanagi, "The pair of electrodes, 7a
16 and 7b, have a function of detecting whether
17 there is contact of a living body surface
18 based on potential differences between the
19 electrodes."

20 In Paragraph 64, "When the pair of
21 electrodes comes in contact with a living
22 body, discharge occurs through the living

1 body so the voltage between the electrodes
2 drop."

3 So, it is measuring a voltage drop.

4 BY MR. NELSON:

5 Q. So, there is an impedance associated
6 with that based on the V equals IZ relationship
7 that you described earlier.

8 But is it your understanding that
9 that impedance is not being measured, rather it
10 is the voltage that is being measured?

11 MR. JHURANI: Objection to form.

12 THE WITNESS: As described there,
13 just looking at the receiving, the voltage
14 drop between those electrodes to detect
15 contact.

16 BY MR. NELSON:

17 Q. So, impedance is not being measured?

18 A. It is detecting a voltage drop.

19 Voltage is voltage. Impedance is impedance.

20 There is relationships, but what is
21 being detected is the voltage drop between the
22 electric.

1 Q. Do you know what current should be
2 assumed for this measurement?

3 MR. JHURANI: Objection, form.
4 Scope.

5 THE WITNESS: So again in
6 Paragraph 64, a pair of electrodes comes in
7 contact, a discharge occurs between the
8 living body surface, so the voltage between
9 the electrodes drop. On receiving this
10 voltage drop, for example, a drop below a
11 given threshold, the data processing part
12 detects a pair of electrodes are indeed in
13 contact with the living body surface.

14 So, in my re-review, I think it is
15 silent on the actual current that would be
16 used, but it would be based on the, obviously
17 safety limits and what was appropriately
18 detectable by the data processing
19 functionality.

20 BY MR. NELSON:

21 Q. So, the skin completes the circuit
22 between the electrodes and that is how this

1 discharge occurs.

2 Is that how you understand it?

3 A. So, as is described, right, the
4 electrodes comes in contact with the body. The
5 discharge occurs through the living body.

6 Q. The skin, right?

7 A. I'm sorry.

8 Q. When it says through the living
9 body, that refers to the skin, right?

10 A. Well, the actual path, the path that
11 the connectivity, you know, the -- there is a
12 path between the two electrodes that consists of
13 the body. It is not necessarily constrained to
14 the skin surface.

15 It is going to be a function of
16 hydration, you know, hair, oil, at least the
17 surface of the skin is present there.

18 But, again, it is detecting a
19 voltage drop between the electrodes.

20 Q. And, do you know the purpose of this
21 sensing in Kotanagi?

22 What happens after skin contact is

1 detected?

2 A. So, for example, as described in
3 Paragraph 65, upon detecting that there is
4 contact, by using the contact electrodes LED 5
5 and 6, emit light from the LED 5 towards the
6 body. Portion of the emitted light is absorbed.

7 So, the switch closure of the
8 electrodes is detected and then other things
9 happen.

10 Q. And what are those other things
11 again?

12 A. As I was describing in 65, a portion
13 of the emitted light -- oh, sorry.

14 Upon detecting that the LED 5 and 6
15 are in contact with the living body surface, the
16 data processing part emits light from the LED
17 towards the body.

18 A portion of the emitted light is
19 absorbed by hemoglobin, for example, in blood,
20 and another portion of light is reflected.

21 The photo detector receives the
22 reflected light, generates a pulse signal

1 corresponding to the amount of received light,
2 outputs the signal to the data processing part.

3 Q. So, the skin contact electrodes
4 trigger optical detection; is that right?

5 MR. JHURANI: Objection to form.

6 THE WITNESS: So, at least as is
7 described, there is contact detection that is
8 used. And the photo detectors are not being
9 fired. They are being fired as described
10 in 65 when that detection is made.

11 And an example in Paragraph 59 also
12 highlights that it may also be set when there
13 is not contact to forego FFT processing when
14 there is no contact with the living body.

15 BY MR. NELSON:

16 Q. Okay. Let's turn to Paragraph 87.
17 This section discusses the Honda reference.

18 Do you see that you quote from Honda
19 here referring to non-contact. Do you see that?
20 Enables power transmission in a non-contact
21 fashion.

22 Do you see that?

1 A. Yes, I do.

2 Q. Does that refer to wireless
3 charging?

4 A. So, as it is further elucidated in
5 Column 1, Line 24, giving background art on the
6 Honda reference.

7 "If the charging and signal
8 transmission are performed through electrical
9 contacts in such a system, the contacts are
10 exposed and the apparatus is weak in terms of
11 waterproofness.

12 "For this reason the charging and
13 the signal transmission are preferably performed
14 in a non-contact fashion through an
15 electromagnetic coupling."

16 So, it is elucidating that it is not
17 having electrical contacts, metal or conductors
18 contacting each other, but instead doing it
19 through electromagnetic coupling.

20 Q. So, wireless or non-contact charging
21 is preferred over wired charging for this
22 purpose. Is that right?

1 A. I'm not judging whether it is better
2 or not.

3 The problem -- the background is
4 described is in the case of a water --
5 waterproofness of a background art relative to
6 Honda suggests that having not exposed electrical
7 connections is preferable.

8 Q. And down in the bottom of
9 Paragraph 88 you mention the concept of quick
10 charging.

11 You say that, "Honda recognizes that
12 metal materials in the housing can create eddy
13 currents which in turn can weaken the
14 electromagnetic coupling between the charging
15 coils and limit the quick charging of the
16 device's battery."

17 What do you mean by limit the quick
18 charging?

19 A. So as is described in Honda, in
20 Column 2, starting at roughly Line 39, "For this
21 reason the gap between the primary and secondary
22 coils is increased.

1 "The degree of magnetic coupling
2 weakens substantially reducing the charging
3 currents for the secondary battery for charging.
4 The quick charging of the secondary battery
5 cannot be made in the short period of time.

6 "If the handle 53 of the toothbrush
7 or the housing of the stand is constructed of a
8 metal having a high rigidity, such as stainless
9 steel, the gap between the primary and secondary
10 coils can be reduce.

11 "In this case, however, eddy
12 currents take place in the electrically
13 conductive metal material, weakening the
14 electromagnet coupling. As a result the quick
15 charging of the secondary battery cannot be
16 performed in the short period of time."

17 So, in the context of what is
18 described here, quick charging is taking more
19 time -- or less time, sorry. Quick meaning
20 faster -- having interposing metal inducing eddy
21 currents and larger gaps would be encountered to
22 being quick.

1 Q. Earlier we talked about trickle
2 charging.

3 Do you remember that discussion?

4 A. Yes.

5 Q. Are you familiar with any devices
6 that use eddy currents on purpose to slow down
7 the charging?

8 MR. JHURANI: Objection, form.
9 Scope.

10 THE WITNESS: I didn't opine about
11 analyzing the infinite realm of wireless
12 charging techniques.

13 There might be. There may not be.

14 BY MR. NELSON:

15 Q. But Honda seems to think that slower
16 charging is less desirable.

17 Is that your position?

18 A. I was not taking a position on
19 Honda. I was describing how they described quick
20 charging cannot be performed in a short period of
21 time.

22 Q. In your experience is it always

1 beneficial to charge as fast as possible?

2 MR. JHURANI: Objection to form.

3 THE WITNESS: I didn't opine about
4 the relative merits of quick charging or the
5 trade-offs.

6 But certainly depending on your
7 system, and depending on available power,
8 depending on the thing you are trying to
9 charge, there are, based on other design
10 considerations, rates of charge that can be
11 better for some types of batteries than
12 others.

13 You could potentially,
14 hypothetically, use eddy currents to mitigate
15 that. Other techniques can be used as well.

16 But I did not opine about that in
17 particular for forming my analysis here.

18 BY MR. NELSON:

19 Q. All right. In Paragraph 92, you
20 have a figure here --

21 By the way, do you recognize this
22 figure?

1 I will represent to you that it is,
2 it comes from the Honda reference. This is a
3 Honda figure.

4 A. Confirming. Yes, that is Figure 2
5 of Honda.

6 Q. And you see the cover glass that is
7 labeled here 211 and 111?

8 A. Yes.

9 Q. Do you assess if there were any
10 material differences between this cover glass in
11 Honda and the cover glass 23 shown in Kotanagi?

12 MR. JHURANI: Objection to form.

13 THE WITNESS: So, I was not opining
14 about the construction of Figure 2
15 necessarily, other than to elucidate and
16 describe the Honda reference.

17 My analysis was in the context of
18 the proposed construction which used the
19 Kotanagi device in the cover glass there with
20 additional teachings from Honda.

21 So, now that I'm clarifying that, if
22 you could please re-ask your question.

1 BY MR. NELSON:

2 Q. My question is about the cover
3 glass.

4 You can see that Honda has a cover
5 glass here, right?

6 A. Yes.

7 Q. And, there is also a cover glass
8 described in Kotanagi. Right?

9 A. Yes.

10 Q. And in the watch device of Honda and
11 the watch device of Kotanagi, the cover glass is
12 positioned in approximately the same place in
13 each, right?

14 MR. JHURANI: Objection to form.
15 And scope.

16 THE WITNESS: I was not opining
17 about the relative geometric similarities of
18 cover glass in the two devices.

19 Instead, I was understanding the
20 proposed combination of Kotanagi and the --
21 with the teachings of Honda as proposed, in
22 forming my opinions as such.

1 BY MR. NELSON:

2 Q. Does Honda provide any particular
3 size for its watch side coil that is shown here
4 as item 210 in the figure.

5 Does it provide a particular size
6 for that?

7 A. A particular size for what? I'm
8 sorry.

9 Q. The watch side coil. That is
10 labeled 210 in this figure.

11 Do you see it?

12 A. Yes.

13 Q. Does Honda provide a particular size
14 for that watch side coil?

15 A. Well, first, in my analysis I was
16 considering the proposed construction of the
17 petitioner which was the integration of Honda
18 teaching into the space that would be
19 permissible -- or that was proposed in the
20 Kotanagi device.

21 Happy if you would point out
22 particular places where you would want me to

1 consider the dimension named in the Honda device.

2 But, in my quick review of it here
3 they are talking about relative alignment and
4 size ratios.

5 But there is a particular size as
6 proposed that would fit according to the proposed
7 construction within the Kotanagi device.

8 Q. I am not aware of any cites in the
9 Honda reference, but I'm wondering if you
10 disagree if there was a size that is designated
11 for that coil?

12 A. Again, I was not opining about it --
13 in my re-review, I did not see a particular size,
14 relative sizes and particular dimensions and
15 differences between sizes.

16 But as I highlight in the, in my
17 understanding of the proposed construction of how
18 the Honda teachings would be integrated into the
19 Kotanagi device, it would have a diameter of a
20 coil that was not greater than the 10 millimeters
21 as described.

22 Q. And that constraint comes only from

1 Kotanagi, right? Not from Honda.

2 A. Well, that constraint comes from the
3 proposed construction, as I understand it, which
4 is putting the Honda-like coil in the Kotanagi
5 device.

6 Q. Understood. Turning to
7 Paragraph 94.

8 This refers to magnetic coupling.
9 Do you see that?

10 It mentions that the two coils are
11 physically out of contact with each other but
12 magnetically coupled with each other.

13 MR. JHURANI: Sorry, this is
14 Paragraph 94 -- yes, 94, sorry.

15 BY MR. NELSON:

16 Q. Right.

17 A. Yes, I see that.

18 Q. Do you understand what that means?

19 A. So, in the context of the Honda
20 reference, that means that there is an inductive
21 coupling between the two devices -- or between
22 the two coils.

1 Q. So, if there is a magnetic flux
2 between them, does that mean there is also
3 inductive coupling?

4 A. I'm sorry. Please ask again?

5 Q. If there is magnetic flux between
6 the two coils, does that mean there is inductive
7 coupling?

8 A. The magnetic, the B field is the
9 magnetic field that is inducive, helping to
10 induce the inductive power transfer.

11 Q. Does this mean that the two coils
12 would be physically attracted to each other as
13 well?

14 MR. JHURANI: Objection, form and
15 scope.

16 THE WITNESS: So, in the context of
17 the -- my declaration and in the context of
18 the, what my analysis here, this magnetic
19 coupling is to indicate inductive power
20 transfer.

21 And, magnetic coupling in the
22 context at least of the '783 patent, uses

1 magnets to do alignment for magnetic
2 coupling, but that is different than the
3 inductive coupling that is indicated here
4 with the magnetic coupling between coils.

5 BY MR. NELSON:

6 Q. Does Honda ever distinguish
7 electronic watches from nonelectronic watches?

8 MR. JHURANI: Objection to form.

9 THE WITNESS: I didn't opine too
10 deeply about whether or not Honda ever
11 considered a nonelectronic watch.

12 But a quick search here most of the
13 places that watch are mentioned are described
14 as being an electronic watch.

15 There are instances where it doesn't
16 have that modifier, but I think it is safe to
17 consider those mainly electronic.

18 BY MR. NELSON:

19 Q. And in particular when it talks
20 about the benefits of an air core type watch side
21 coil, do you see where it refers to that, you
22 quoted it in Paragraph 94 here.

1 You are quoting Column 6, Lines 41
2 through 49.

3 Please turn to that section of
4 Honda.

5 Does it make any distinction between
6 electronic and nonelectronic watches in that
7 section?

8 MR. JHURANI: Counsel, just so the
9 record is clear, you are referring to
10 Column 6, Lines 41 through 49 of Honda?

11 MR. NELSON: Of Honda, yes.

12 MR. JHURANI: Okay, got it.

13 THE WITNESS: I'm sorry. So, the
14 question is then?

15 BY MR. NELSON:

16 Q. Do you see where it says, "When the
17 present invention is applied to an electronic
18 apparatus in which these concerns are not
19 important, a coil having a core can be used."

20 Do you see that section?

21 A. Yes.

22 Q. What is your understanding of what

1 Honda is teaching by that?

2 A. So, for example, Honda teaches
3 applicability of two devices such as watches,
4 toothbrushes. The weight of my watch matters a
5 lot. The weight of my toothbrush probably not as
6 much.

7 So, I think that is at least one
8 example of a difference between a device that
9 would have less implications of weight.

10 But design trade-offs for any of the
11 instances would matter.

12 Q. Okay. So, you are saying these
13 concerns might be avoiding an increase in weight?

14 A. Well, not only weight, but it is,
15 you know, the concerns are limit magnetization,
16 avoid increase in weight of the watch, prevent
17 exposure of magnetic metals.

18 So, when the present invention is
19 applied to an electronic apparatus that doesn't
20 matter whether it has been magnetized or the
21 weight, or the exposure to magnetic metal, then
22 any coil having a core can be used.

1 Q. Based on this teaching, would it
2 matter -- would the core type matter more for a
3 mechanical watch or an electronic watch?

4 MR. JHURANI: Objection to form.

5 THE WITNESS: I'm sorry. I'm a bit
6 confused why we are talking about analog
7 watches now?

8 BY MR. NELSON:

9 Q. Can the watch mechanism of an
10 electronic watch be magnetized?

11 A. So, the components of a watch can be
12 magnetized, depending on the -- again, the design
13 trade-offs.

14 I mean, can you have an electronic
15 watch that has components that move? Certainly.

16 I wasn't opining necessarily about
17 all of the infinite combinations of a watch that
18 has electronics that either show a display or
19 show moving components.

20 Q. Okay. So there are some types of
21 watch where a magnetic core type coil might be
22 fine, depending on these other considerations you

1 mentioned?

2 MR. JHURANI: Objection to form and
3 scope.

4 THE WITNESS: Can you re-ask the
5 question?

6 BY MR. NELSON:

7 Q. Here it says, "When the present
8 invention is applied to an electronic apparatus
9 in which these concerns are not important."

10 And those concerns are referring to
11 the ones in the previous sentence like we have
12 discussed.

13 So in that context, is it true that,
14 depending on the design trade-offs for a
15 particular device, there might be some times
16 where an air core coil is not necessary but that
17 one with a magnetized core is fine?

18 MR. JHURANI: Objection to form and
19 scope.

20 THE WITNESS: I have to admit I lost
21 you a little bit there.

22 I didn't opine necessarily about

1 that paragraph extensively. Let me go back
2 to where I cite it. Let's see.

3 So, again, I mean as I say in Honda
4 in paragraph, as I teach in -- as I describe
5 in Paragraph 94, "Honda teaches the station
6 side coil 110 and the watch side coil are of
7 an air core type without any core to limit
8 the magnetization of a watch mechanism."

9 So, to avoid increase in weight of
10 the watch and to prevent exposure of magnetic
11 metal, and, I think in the context that
12 further part of paragraph is talking about
13 devices such as toothbrushes.

14 It is applying an electronic
15 apparatus, not calling out a watch,
16 necessarily.

17 So it is really trying to avoid
18 having the magnetization of a watch mechanism
19 to avoid an increase in the weight of the
20 watch and to prevent exposure of magnetic
21 metal.

22 BY MR. NELSON:

1 Q. Okay. So, you've had time to review
2 it carefully now.

3 It sounds like it is your position
4 that the drawbacks to having anything other than
5 an air coil type never applied to watches.

6 Is that right?

7 MR. JHURANI: Objection, form.
8 Misstates testimony.

9 THE WITNESS: Again, I was
10 considering Honda in combination with
11 Kotanagi. And what is taught here is to
12 limit magnetization of the watch mechanism.

13 I wasn't opining about other
14 devices, other designs.

15 But what was elucidated in the
16 proposed combination between Kotanagi and
17 Honda.

18 BY MR. NELSON:

19 Q. So, when it says -- you did quote
20 this sentence in that passage, in Paragraph 94.

21 But the very next sentence says,
22 "When the present invention is applied to an

1 electronic apparatus in which these concerns are
2 not important, the coil having a core can be
3 used."

4 Are you saying that those concerns
5 are always important in a watch so that caveat
6 never applies to watches?

7 MR. JHURANI: Objection to form.

8 THE WITNESS: Again, I was, so, in
9 isolation, I wasn't analyzing Honda by
10 itself.

11 It is with Kotanagi and the
12 combination of Honda with Kotanagi.

13 Yeah, I didn't need to --

14 I think, you know, what is stated
15 there is to limit the station side coil for a
16 watch -- "to limit the magnetization of a
17 watch mechanism, to avoid an increase in the
18 weight of the watch and to prevent the
19 exposure of a magnetic metal."

20 So it is teaching that it is
21 preferable in the case of a watch to limit
22 those issues.

1 BY MR. NELSON:

2 Q. Okay. Let's move to exhibit --

3 THE WITNESS: When we get a chance,
4 I'm not sure how long we have been going
5 since we last broke. But --

6 MR. NELSON: Now might be a good
7 time for a break if you would like one.

8 THE WITNESS: Sounds good.

9 THE VIDEOGRAPHER: The time
10 is 5:15 p.m. Off the record.

11 (Recess taken -- 5:15 p.m.)

12 (After recess -- 5:22 p.m.)

13 THE VIDEOGRAPHER: The time
14 is 5:22 p.m. Back on the record.

15 BY MR. NELSON:

16 Q. If we could turn briefly in Honda to
17 this same place where we were, Column 6.

18 Do you see how at Line 59 --
19 about 50 to 59, Honda refers to, "The primary and
20 secondary coils being identically wound using a
21 wire of the same length."

22 And then it points to a length of

1 3 meters. Do you see that?

2 A. Yes.

3 Q. And under your analysis, the
4 combination of Kotanagi and Honda would have been
5 constrained to having a 10-millimeter radius.

6 Is that right -- or a 10-millimeter
7 diameter.

8 A. Correct.

9 Q. So, if the coil that is 3 meters
10 long has a 10-millimeter diameter, how many
11 windings would that be?

12 A. So, 3, to -- so, 16 --

13 So, it would be, depending on the
14 length -- it is going to also depend.

15 The space, again, the space that
16 is -- that is available in the Kotanagi device is
17 going to constrain the teachings of Honda.

18 And this, and this is highlighting
19 in that particular place simulations that are
20 done, of the, of a particular coil, but not that
21 that is the only size coil that can be used.

22 So, there would be, if it were

1 3 meters, let's see, so 10-millimeter diameter,
2 call it, say 2, that is, that is 10, 20 -- that
3 is 10-millimeter times, so, 630, 30 millimeters.

4 So, hundreds, if I did my mental
5 math correctly.

6 Q. More than 100?

7 A. Mental math, yes. That sounds
8 about, you know. But again this is as, you know,
9 it is not length that is required for these, the
10 teachings of Honda.

11 It is going to depend upon the
12 spaces available in the Kotanagi device to
13 actually constrain what is actually achievable as
14 I elucidate.

15 Q. Okay. Let's go back to
16 Exhibit 2019. Paragraph 167.

17 MR. NELSON: And there is a figure
18 right below that, if you wouldn't mind
19 showing it. Yes.

20 BY MR. NELSON:

21 Q. Do you recognize this figure?

22 A. Yes. That is which ever figure it

1 is from Kotanagi. That is figure, that ends in
2 Figure 7 from Kotanagi.

3 Q. So, this shows a cross-section of
4 the Kotanagi device. Right?

5 A. Yes.

6 Q. And is this a good figure to use to
7 see how much room there is for coils in Kotanagi?

8 A. Not necessarily. In the particular
9 proposed construction where the coils surround
10 the -- and are behind the cover glass, yes.

11 So, it is, as I describe it is
12 not -- it doesn't fit behind the cover glass as a
13 construction.

14 But the -- I do describe, you know,
15 putting it in that, that highlighted orange'ish
16 pink'ish area as being the size of coil that
17 could fit in that case.

18 Q. Okay. So, yes. You make a good
19 point. This is a cross-section so you don't see
20 how much room there is for coils in the planar
21 view.

22 Is that what you are saying?

1 Just trying to understand why you
2 said is not necessarily a good figure for that.

3 A. Well, the reason I say that is if I,
4 I would say that a better representation of the
5 available space for Kotanagi is on Page 56 of my
6 declaration with the available space behind the
7 cover glass.

8 On Page 85, this would not meet the
9 limitation of the power going through the cover
10 glass. And so it is -- I would say the better
11 figure, the better annotated figure is, as I have
12 done it in Page 56, instead of as I have done it
13 on 85.

14 But, nonetheless, I do consider that
15 space that is the orange yellow space where a
16 coil could be placed.

17 Q. Okay. And you have also annotated
18 this flexible board in purple here. Is that
19 right?

20 A. Flexible board shown in purple, yes.

21 Q. Does that flexible board extend
22 beyond the LED and the PD? Those are shown

1 labeled with 6 and 5 here. I know they are not
2 annotated.

3 But you remember that those are
4 below the flexible board; right?

5 A. I was just re-familiarizing myself
6 with that section of my declaration.

7 I'm sorry. Can you ask the question
8 again.

9 Q. Yes. I was going to ask about the
10 footprint of the flexible board that you have
11 colored purple here.

12 It is -- in this figure, it is above
13 the LED and the photo detector, which are 6
14 and 5, right?

15 A. Flexible board restricts the
16 vertical space and this is the board to which the
17 optical elements are affixed, yes.

18 Q. So, just referring to this figure,
19 you have annotated this flexible board in purple
20 in this figure, right?

21 A. Correct.

22 Q. And can you tell from this figure

1 how far the flexible board extends in the
2 direction, perpendicular to the cross-section, in
3 other words, into the page and out of the page
4 toward the viewer?

5 A. Well, the board needs to be
6 connected someplace. Right? So, it is going to
7 not just sit there in isolation.

8 So, there is going to be, as I
9 describe, it is going to constrain.

10 As I describe in Paragraph 168, "If
11 the wireless charging receive coil is positioned
12 around the optical elements, a POSITA would
13 recognize that the coil could not extend much
14 further horizontally or vertically given the
15 presence of the housing electrodes and the
16 flexible board adjacent to the optical elements."

17 So, it doesn't just sit there
18 magically. It is going to provide a constraint
19 for how a coil could fit in there.

20 Q. Right. I understand that you are
21 arguing that it provides a constraint.

22 And what I am wondering is whether

1 it constrains the entire vertical space, or --
2 the entire horizontal space of the opening.

3 It appears to do so here because it
4 is just a cross-section, right, across the middle
5 of the device.

6 But does that flexible board extend
7 to fill the entire opening 22?

8 A. Well, again that flexible board
9 needs to be connected. It is not just -- however
10 it is connected, if there is physical material
11 that comes in and ends up being parallel to it in
12 there.

13 And so as I have said, it is going
14 to constrain it both horizontally and vertically
15 and limit the spaces available.

16 Q. Is there a figure in Kotanagi that
17 shows the flexible board from any other view?

18 We can turn to Exhibit 1005. That
19 is Kotanagi.

20 Are you seeing anywhere in Kotanagi
21 the footprint of that board?

22 A. So, what I am spending my time

1 looking at is I'm noting -- so, here I'm noting
2 in my Paragraph 167, "Flexible board 15 shown in
3 purple below." As I was looking to answer your
4 question.

5 So, flexible board is 24. And
6 subboard is 15.

7 Q. Oh.

8 A. So, what is labeled there as
9 flexible board 15 is actually -- let's see, sub,
10 subboard.

11 Q. I don't see that what you have
12 colored purple was ever labeled with a reference
13 number.

14 A. Well, here, "Flexible board 15 shown
15 in purple."

16 Q. The purple does not appear on 15.
17 15 is higher, right?

18 A. So, for example, looking at -- so,
19 as labeled in Figure 7, if I'm re-reading this
20 correctly. Subboard is 15. So, the 15 that is
21 over there -- my bad. Sorry. I'm getting myself
22 confused.

1 So, subboard is 15.

2 Q. Okay.

3 A. And, flexible board -- okay, I'm
4 confusing myself.

5 Flexible board is 24, right. Which
6 is not shown --

7 Q. I see a flexible, I see 24 labeled
8 in Figure 6.

9 Is that what you are looking for?

10 A. Well, I am noting -- so, here I have
11 labeled -- I have confused myself, because here I
12 have labeled in the text 167, flexible board 15.

13 And flexible board is actually 24.

14 And, subboard is 15. Yes. The subboard --
15 looking at Paragraph 56 to confirm. Let's see.

16 "Subboard 15 and the flexible board
17 24 are formed with an integral structure. In
18 addition, the flexible board to which the LED 5
19 and 6 are mounted may be affixed to the lower
20 side of the housing."

21 So, I would have labeled there as --
22 or I would have called 15, is 15 is subboard.

1 Flexible board is 24.

2 Q. 24 isn't shown in Figure 7. Is it?

3 A. 24 is flexible board.

4 Q. The only place I see 24 is in
5 Figure 6.

6 A. This is subboard. So, 15, is the
7 subboard, which is going to constrain the,
8 cover 23. Yes. So, the subboard.

9 Q. Had you intended to just label that
10 item 15 as the particle constraint?

11 A. Optical elements. So, the vertical
12 space that is constrained by the thing labeled
13 15. So, 5 and 6.

14 Q. Okay. I think we can move on, if
15 you would like, to go to Honda.

16 A. Okay.

17 Q. Honda Figure 10. Are you familiar
18 with this document?

19 A. Of Honda, yes.

20 Q. And this Figure 10, have you seen
21 this before?

22 A. Yes.

1 Q. Do you understand this figure?

2 A. It is explaining the simulated
3 magnetic flux relative to positional alignment
4 and different diameters, equal diameter or
5 different diameters of the two coils.

6 Q. And do you see this line that snakes
7 through each of these four simulated situations?
8 It is labeled Magnetic Flux in the top left-hand
9 corner but it is not labeled in the others.

10 Do you see that line?

11 A. Yes.

12 Q. Do you understand what that line is
13 plotting?

14 A. As is labeled, the magnetic flux,
15 plus and minus.

16 Q. So does this represent the amount of
17 flux present at different lateral points --
18 lateral positions from left to right through this
19 configuration?

20 A. Can you repeat your question?
21 Sorry.

22 Q. Does that line represent the amount

1 of magnetic flux present?

2 A. That line is plotting the simulated
3 magnetic flux between the two coils positionally
4 left to right, as you said.

5 Q. And where is the peak of the
6 magnetic flux in each case?

7 A. It would be relative to the 0 line.
8 There is peak negative to the outside of the coil
9 and peak positive in the center of the coil.

10 Q. Okay. Why do you refer to those
11 troughs as peaks?

12 A. It is magnetic flux. It is just, it
13 is, just -- it is the magnitude of the flux, plus
14 and minus.

15 So, it is shown, yeah, I mean, it is
16 peaking in the negative direction on the outside
17 and peaking in the positive direction in the
18 center.

19 Q. I see. So, the -- whether it is a
20 peak or a trough just tells you whether it is
21 going in one direction or the other.

22 But, it is the magnitude that

1 matters for the actual flux level; is that right?

2 A. Yes. But I flipped it around. Plus
3 is minus. Minus is plus.

4 Q. Okay. So, you understand why it
5 would have a peak in the center?

6 A. Well, the simulations of the
7 magnetic field would have this general contour.

8 Q. Does this mean that the flux density
9 is greatest at the center of the coils?

10 A. The magnetic flux is high on the
11 outer edge there and high in the center.

12 Q. As between the two, is it greater in
13 the middle or on the outer edge?

14 A. I'm sorry. Say that again.

15 Q. Comparing the center of the coils to
16 the outer edge of the coils, which is greater?

17 A. Well, if I draw through the center
18 line which is along the, the place where plus and
19 minus, they look symmetric.

20 And this is just a static field, you
21 know, with -- this would be again up and down,
22 plus or minus.

1 But, it looks symmetric in the
2 magnitude.

3 Q. The width of the outer negative
4 peaks is narrower, though, right?

5 A. Well, given the symmetry, for
6 example, I mean it is, it is, it is a
7 symmetric -- at least the upper left, it is a
8 symmetric construction.

9 And so, the combined width of the
10 outer is -- should be pretty close to the same as
11 the combined width of the inner.

12 Q. So, does that mean that there is as
13 much magnetic flux flowing to the outside of the
14 coils as there is to the inside of the coils?

15 MR. JHURANI: Objection to form.

16 THE WITNESS: In magnitude -- the
17 magnitude of the flux is, I believe what they
18 are plotting here in terms of looking at the
19 misalignments.

20 And so the magnitude is roughly the
21 same on the inner axis and the outer
22 surrounding it.

1 Again these are coils in isolation,
2 so --

3 BY MR. NELSON:

4 Q. So, when you add up all of the
5 magnetic flux on the outside, it adds up to the
6 same magnetic flux on the inside?

7 MR. JHURANI: Objection to form and
8 scope.

9 THE WITNESS: I mean I didn't
10 integrate these curves. I mean I'm -- just
11 based on how they are drawn.

12 You know, and whether or not the
13 alignment and the, is represented correctly
14 relative to the scale.

15 So, it is, it is -- it looks roughly
16 that the area under the curve integrated
17 across would be close to 0, at least for the
18 upper.

19 BY MR. NELSON:

20 Q. Can you help me understand if this
21 plot is consistent with the flux diagrams that we
22 looked at earlier in Exhibits 2028 and 2023.

1 Remember those flux diagrams with
2 the magnetic field lines?

3 A. Yes.

4 Q. Is this magnetic flux plot in Honda
5 consistent with those?

6 MR. JHURANI: Objection to form.

7 THE WITNESS: So, field lines give
8 you direction, and spacing of the field lines
9 would give you a relative magnitude.

10 So, it is -- you know, here we are
11 not elucidating it seems the direction.

12 But, if -- again, I hadn't opined
13 too deeply about this figure, but I would
14 opine that if you were to draw the flux lines
15 on here, they would be more dense in the
16 center and more dense on the outer edges.

17 But it is not -- they are not the
18 same figure. I mean, it is showing
19 information about the magnetic field and
20 flux.

21 BY MR. NELSON:

22 Q. Well, the direction of the peak or

1 trough corresponds to the direction of the arrow
2 on the flux line. Right?

3 A. I'm sorry. Can you say that again?

4 Q. You mentioned that there is no
5 directionality here.

6 But it does show positive in the
7 middle and negative on the outside. So that
8 would correspond to the arrows on those flux
9 lines. Right?

10 A. No.

11 Q. Why not?

12 A. The arrows -- the magnitude would
13 roughly correspond to the relative spacing of the
14 flux lines. Not the direction -- the
15 directionality here is not showing the field
16 lines. It is showing the magnitude, purely the
17 magnitude at that location which is a different
18 representation of what is going on than showing
19 the field lines.

20 Q. Okay. But it might correspond with
21 the density of those field lines because it is
22 higher in the middle, right?

1 A. That is plausibly the more accurate
2 interpretation.

3 Q. Moving down to figure -- or maybe up
4 to Figure 1 in Honda.

5 Does this figure shows any wiggle
6 room for the watch and the charging dock?

7 MR. JHURANI: Objection, form.

8 Scope.

9 THE WITNESS: I didn't opine about
10 whether there was a wiggle room shown in
11 this.

12 But -- so as I describe in
13 Paragraph 196, as I opined upon this, "Honda
14 provides alignment mechanisms to address
15 misalignment issues between the charge and
16 transmit coils.

17 "And petitioner has offered no
18 evidence that these mechanisms would be
19 deemed insufficient by a POSITA. Thereby
20 leading a POSITA to look to additional or
21 different mechanisms to address any
22 misalignment.

1 "Honda provides an effective
2 alignment mechanism in the form of the design
3 of its socket into which the watch body is
4 seated in alignment as the petition
5 recognizes." As the petition 56.

6 "Honda further defines acceptable
7 misalignment and variations in dimensions
8 between transmit and receive coils without
9 impacting wireless charging efficiency,
10 further confirming that a system already
11 contemplated and accounted for," as you say,
12 I think wiggle room, "for alignment issues."

13 So, "Petitioner has not identified
14 any other evidence in Honda or in Park that
15 discloses or suggests the alignment
16 mechanisms used in Honda are deficient," or
17 have wiggle room, as you say, "or otherwise
18 negatively impact the wireless charging
19 efficiency."

20 BY MR. NELSON:

21 Q. Okay. So, Honda teaches ways to
22 deal with misalignment, right?

1 A. So again, as I was pointing to in
2 Paragraphs 194 and before 193, right.

3 So, there is nothing in the proposed
4 Kotanagi/Honda combination that suggests
5 coupling, that the used housing or the, the
6 docking mechanism elucidated there is deficient
7 in achieving the alignment necessary.

8 So, you know, it is, if Honda
9 already applies an alignment mechanism to address
10 misalignment issues.

11 Q. I understand that is your position
12 there.

13 But tell me if I am characterizing
14 this wrong.

15 In my opinion, Honda has some wiggle
16 room, but it addresses its own problems by having
17 coils that are slightly different sizes in order
18 to address the wiggle room problem.

19 So, it solves its own problem with
20 coil sizes; is that right?

21 A. Well, coil sizes that are within
22 the -- coupled with the housing mechanism.

1 Q. Right. So, two mechanisms. One
2 physical constraint that we see in this Figure 1.
3 And the other is a relative coil size solution
4 that makes up for any potential misalignment. Is
5 that right?

6 A. Well, I mean, you know, applying the
7 Kotanagi -- Honda applied the Kotanagi, a POSITA
8 doing that combination would do the same thing in
9 terms of, you know, providing the coil sizes to
10 help facilitate the alignment as taught by the
11 combination of Kotanagi and Honda.

12 Q. Understood. So, is there anything
13 about this dock that would prevent the watch from
14 being inserted face down?

15 MR. JHURANI: Objection, form.

16 THE WITNESS: I didn't -- let's see.

17 The dock particularly --

18 When you say the dock, which dock
19 are you talking about?

20 BY MR. NELSON:

21 Q. Well, the charging dock shown in
22 Figure 1. You see that there is a watch in the

1 middle and a charging dock that it is inserted
2 into it. Right?

3 A. Yes.

4 Q. This same dock is shown in cross
5 section in Figure 2.

6 So, looking at these two figures
7 together, is there anything about the charging
8 dock that would prevent the watch from being
9 inserted face down?

10 A. So, there is the -- there is a
11 mating geometry between the dock and the watch.

12 Q. Yes. Okay. I see it in Figure 2.

13 You are saying that it fits better
14 as far as that mating geometry if you insert it
15 as shown here, face up.

16 Is that right?

17 A. So, there is a mating geometry that
18 has it fit in one way.

19 Q. Would it charge properly if it were
20 inserted face down?

21 MR. JHURANI: Objection, form and
22 scope.

1 THE WITNESS: I didn't opine about
2 the relative charging capabilities of doing
3 something that is opposite of what is taught.

4 BY MR. NELSON:

5 Q. I assume that it would not charge
6 well based on Figure 2, though, because the coils
7 would be farther apart, right?

8 MR. JHURANI: Objection, form.

9 THE WITNESS: I don't disagree with
10 your analysis, but I have not done that
11 analysis in forming my opinion.

12 BY MR. NELSON:

13 Q. Well, your modeling showed that
14 distance matters a lot for coil separation.
15 Right?

16 A. Yes.

17 Q. So, if you flip this over, the coils
18 will be farther apart, right?

19 A. Again, I think a user of said device
20 is unlikely to try to do the incorrect thing when
21 putting their watch into this charging cradle.

22 Q. Can you tell from the Fraser

1 reference -- remember we looked at that before.

2 Is Fraser intended to charge its
3 coil through the top or through the bottom of the
4 device?

5 MR. JHURANI: Objection, form.
6 Scope.

7 THE WITNESS: Can we pull the --
8 actually let me go back to the download.
9 Fraser. Oh, that is why I don't have Fraser.
10 Have you posted the Fraser?

11 BY MR. NELSON:

12 Q. Maybe not. It looks like maybe when
13 we were looking at Fraser before we were
14 referring to Exhibit 2019.

15 But from your memory or from your
16 earlier analysis, without taking the time to
17 review the whole thing, do you remember if the
18 coils are closer to the top or the bottom in
19 Fraser?

20 A. Does Fraser talk about it?

21 So, looking on Page 67 of my
22 declaration. And I talk about Fraser, the coils

1 are likely closer to the bottom.

2 Q. On which paragraph? Oh, there it
3 is, 139.

4 Are you sure Fraser isn't upside
5 down? In the figure you have shown there, it has
6 the light transmissive section at the top.

7 Do you see item 144?

8 A. Let me pull up the Fraser reference
9 and just --

10 Q. So, you are referring to
11 Exhibit 1041, right?

12 A. Yes. Right, so, the 144 is the
13 light transmission section which comes out the
14 bottom of the watch.

15 So, what is shown there is the
16 side-by-side figures but the figure in 3 is
17 flipped, relative to the figure of the band.

18 Q. And does that mean that the charging
19 coil 310 transmits power -- or receives power
20 through the housing 210?

21 MR. JHURANI: Objection, form and
22 scope.

1 THE WITNESS: So, the larger coil of
2 Fraser as we have discussed is able to --
3 light emitting, Fraser --

4 All right. So, I mean the Fraser
5 has a large wireless coil that is covering a
6 substantial portion of the rear watch
7 surface.

8 Fraser's charging coil includes the
9 optical elements in the core section. Let's
10 see.

11 So the Fraser coil sits behind the
12 housing, behind the, the lens.

13 BY MR. NELSON:

14 Q. So, the power would traverse the
15 housing in the Fraser embodiment, in the Fraser
16 situation; is that right?

17 A. Correct.

18 MR. NELSON: Okay. Is now a good
19 time for our next break?

20 THE VIDEOGRAPHER: The time
21 is 6:19 p.m. Going off the record.

22 (Recess taken -- 6:19 p.m.)

1 (After recess -- 6:27 p.m.)

2 THE VIDEOGRAPHER: The time
3 is 6:27 p.m. Back on the record.

4 BY MR. NELSON:

5 Q. Could we turn to Exhibit 1011. Do
6 you recognize this document?

7 A. I'm not seeing anything.

8 THE VIDEOGRAPHER: Unless you
9 uploaded it recently, I don't have a 1011.

10 BY MR. NELSON:

11 Q. Oh, this is the Choi reference.
12 Exhibit 1011. This is Apple's exhibit.

13 THE VIDEOGRAPHER: So, I don't have
14 a 1011 that was uploaded.

15 MR. NELSON: If I neglected to
16 upload it, I mean I asked my colleague Paul
17 Spiel to see if he can be uploading that.

18 Oh yeah, that is Choi. That is our
19 exhibit. My mistake. All right.

20 Let's come back to that.

21 We are going to upload that, Henry,
22 while we work, if that is okay with you.

1 THE VIDEOGRAPHER: Yes, no problem.

2 MR. NELSON: So, I will get that to
3 you shortly, Exhibit 1011.

4 Did I give you Exhibit 1012?

5 THE VIDEOGRAPHER: Yes.

6 (Previously marked Exhibit 1012,
7 first referral.)

8 BY MR. NELSON:

9 Q. Okay. Do you recognize this?

10 A. 1012. Yes.

11 Q. And do you see on the cover, it has
12 a diagram showing very schematically the concept
13 of wireless charging?

14 A. Yes.

15 Q. And if you scroll down to Figure 5.
16 And you see here a charging dock with a phone
17 sitting on top of it?

18 Do you see that?

19 A. Yes.

20 Q. And down in Figure 14, you can see a
21 cross-section view of the charging dock with the
22 phone on top.

1 Do you see that?

2 A. Yes.

3 Q. Does this figure show any permanent
4 magnets?

5 A. I'm going to look at my electronic
6 copy of -- let's see, is that posted? Here it
7 is.

8 Q. Well, there is a little clue on the
9 figure itself. You can see something is labeled
10 with a north and a south.

11 A. I'm just re-familiarizing myself
12 with my declaration where I talk about that part.

13 Okay, so, yes. I think 12 is the --
14 it is called the first magnets. And second
15 magnet is 30.

16 Q. Can you tell from this figure where
17 those magnets are located with respect to the
18 charging coils?

19 A. Transmit coils 210.

20 Q. Do you see the items labeled 32?

21 A. I do. Let's see. 32. That is
22 Figure 14.

1 Okay, so, 32, 32 is coil, and
2 transmit coil is 14.

3 Q. So, this Park reference shows
4 permanent magnets in the core of the charging
5 coils.

6 Is that right?

7 A. So Park is using these magnets as
8 they describe in 198 to achieve alignment of the
9 device.

10 Q. Yes. But my question is, where are
11 the magnets?

12 A. Well, as drawn there in this figure,
13 the permanent magnet is 12 is in the coil 14.

14 But the use of Park, Park is using
15 this to provide alignment for the device, not to
16 impact the coil in some way.

17 MR. NELSON: Okay. Henry, do you
18 have figure, or, Exhibit 1011 now?

19 THE VIDEOGRAPHER: I do, yes.

20 (Previously marked Exhibit 1011,
21 first referral.)

22 BY MR. NELSON:

1 Q. Let's turn to that.

2 A. 1011 is?

3 Q. This is the Choi reference. It is
4 on the screen now.

5 Do you see that?

6 A. I do. Let me download it here.
7 Let's see. Choi, yep.

8 Q. Do you recognize this document?

9 A. Yes.

10 Q. Please turn to Paragraphs 99 to 101.
11 This is on Page 15. I will give you a minute to
12 read those.

13 A. 99, to what, did you say?

14 Q. 101.

15 A. Okay.

16 Q. Would it be fair to characterize the
17 center described here as the impedance center?

18 A. I would actually -- can I, before I
19 answer that, I know I discussed this reference in
20 my other declaration.

21 Can we make that --

22 Q. Sure, that is in Exhibit 2038.

1 (Previously marked Exhibit 2038,
2 first referral.)

3 THE WITNESS: I do have a printout
4 of that as well. I just want to make sure
5 that is in the record.

6 BY MR. NELSON:

7 Q. So, do you recognize this
8 Exhibit 2038?

9 A. Yes.

10 Q. Is this a declaration that you
11 signed in the IPR related to the '491 patent?

12 A. Yes.

13 Q. Is there any overlap between the
14 analysis or arguments you included in this
15 declaration and the material you included in
16 Exhibit 2019 from the IPR on the '783 patent that
17 we discussed earlier?

18 A. There are significant overlaps. But
19 there are some differences. In particular some
20 of the discussion around the electrodes.

21 Q. Okay. And that is why you wanted to
22 refer to this with respect to Choi. Is that

1 right?

2 A. That is correct.

3 Q. And in case you haven't found it
4 already, I will refer you to Paragraph 100, which
5 is where I believe you begin your discussion of
6 the Choi reference.

7 So, have you had a chance to review
8 Paragraphs 100 to 116 where you discuss Choi?

9 A. Yes, that is what I am reading
10 through now.

11 Q. Where did you go?

12 A. Sorry, I was leaning forward. My
13 apologies.

14 So, and your question now? Sorry.

15 Q. I wanted to ask about this sensor
16 that is referred to in Paragraphs 99 to 101.

17 Is it fair to characterize this
18 sensor as an impedance sensor?

19 A. Referring to Figure 7, "The wearable
20 device detects from the wearing detection sensor
21 the change of the impedance input to the wearable
22 device."

1 The device is detached, okay.

2 It is detecting a change in the
3 impedance.

4 Q. Now is this similar to the skin
5 contact sensor we discussed earlier in Kotanagi?

6 MR. JHURANI: Objection to form.

7 THE WITNESS: So, I believe, so
8 what it is doing is described the wearable
9 device -- let's see. From the wearing
10 detection sensor, which is highlighted in
11 Figure 3, labeled 360, which is different
12 than the first sensor and the second sensor.

13 And it is using that sensor to
14 detect the change of impedance indicative of
15 whether contact is made with the device in
16 the body.

17 BY MR. NELSON:

18 Q. So, this is a skin contact sensor,
19 right?

20 A. It is the -- it is described as the
21 wearing detection sensor.

22 Q. And it detects wearing based on skin

1 contact?

2 A. So, for example, in Paragraph 101,
3 When a value of the impedance input to the
4 wearable device is greater than a predetermined
5 level or is changed, the wearable device may
6 determine that the wearable device is detached
7 from the user.

8 Q. So, contact with the user's skin is
9 required for Choi to authenticate the user,
10 right?

11 MR. JHURANI: Objection to form.

12 THE WITNESS: What is, it is -- it
13 is using this to detect the wear detection.

14 BY MR. NELSON:

15 Q. And it wouldn't work if you did it
16 on your sleeve. It has to be skin contact.
17 Right?

18 MR. JHURANI: Objection to form.

19 THE WITNESS: I would disagree. For
20 example, in 104, the, "According to another
21 example, the wear detection sensor may
22 include a photosensor detecting the amount of

1 light reflected on the back of the wearable
2 device or a tension sensor on the band.

3 "In this example the wearable device
4 may be determined where the wearable device
5 is detached from the user in the same or
6 similar manner as described based on the
7 characteristic of each sensor."

8 So, Choi envisions a wear detection
9 sensor which could be enabled with multiple
10 embodiments here. One being described, as
11 you pointed out, in Paragraph 99. Others
12 being detecting with the band -- or
13 stretching of the band which wouldn't have to
14 be in contact with the skin nor would the
15 photodiode -- photosensor have to be in
16 contact with the skin, either.

17 BY MR. NELSON:

18 Q. Okay. So, it was just the impedance
19 version that would require skin contact. Is that
20 right?

21 A. Well, to be honest, it is not --
22 well, an impedance change could be detected by

1 making contact with -- or just detection of
2 wearing depending on the clothing, depending on
3 impedance could be detected just not making the
4 skin contact.

5 But, you know, probably skin. But,
6 you know, no guarantee. And also just the wear
7 detection sensor has multiple embodiments which
8 aren't requiring skin contact.

9 So, I wouldn't necessarily attribute
10 requiring skin contact with the description of,
11 in 99 to 101.

12 Q. Does Choi ever show what the
13 hardware looks like for this sensor?

14 A. So the wear detection sensor is
15 described in Figure 3 as 360. And this text
16 description -- as a block diagram. And this text
17 description in the sections that I described.

18 It is such a simple sensor and sort
19 of multiple embodiments that it is, I think, that
20 is probably why they didn't choose to put it in
21 more detail in the figures, in the other figures.

22 But it is labeled only in the, as I

1 can see here, only in the wear detection sensor
2 of Figure 3.

3 Q. And would the electrodes shown in
4 Figure 1 be used as a wear detection sensor?

5 MR. JHURANI: Objection to form.
6 Scope.

7 THE WITNESS: So, as I describe in
8 Paragraph 103, for example, "Once the user
9 authentication process is initiated, the
10 wearable device uses a second biosignal
11 detected by sensor 131 provided in the front
12 surface 130 or a sensor 151 provided on the
13 back to measure biosignals."

14 The -- furthermore in, for example,
15 Paragraph 221, "Choi teaches that to detect
16 ECG signals, detected at least two different
17 portions of the body."

18 Respect -- and, "Thus the sensors
19 131 and 151 are provided in the front, 130 in
20 the back, respectively."

21 The -- those sensors are the ones
22 that are indicated as first sensor and second

1 sensor.

2 The wearing detection sensor is a
3 simpler sensor as we described. So those --
4 and something different than what those
5 sensors are.

6 BY MR. NELSON:

7 Q. But you don't think they can be used
8 for wearing detection or they can, for the
9 impedance version?

10 MR. JHURANI: Objection to form and
11 scope.

12 THE WITNESS: I think it is clear
13 that the wear detection sensor is used to do
14 a very simple thing, in terms of contact and
15 it being worn. And the first and second
16 sensor are doing things like measuring the
17 biosensor, or biosignal such as ECG.

18 BY MR. NELSON:

19 Q. And impedance is not a biosignal?

20 MR. JHURANI: Objection to form and
21 scope.

22 THE WITNESS: Just contact closure

1 is not a biosignal, no.

2 BY MR. NELSON:

3 Q. Okay. If you wouldn't mind turning
4 to Exhibit 2038. And, you may be there already.

5 A. 2038 is my declaration?

6 Q. Yes.

7 A. Okay.

8 Q. Paragraph 221. This is on Page 116.

9 This refers to that same figure we
10 were just looking at.

11 A. Right. And I just paraphrased from
12 this paragraph as well.

13 Q. So, do you see how this quotation
14 from Choi says the body of the user may be
15 needed.

16 Why do you think Choi didn't say is
17 required here?

18 MR. JHURANI: Objection,
19 speculation.

20 THE WITNESS: So, in Paragraph 52,
21 "To detect ECG signal as an example of the
22 second biosignal, a signal detected in at

1 least two different portions of the body of
2 the user may be needed.

3 "And thus, the sensors 131 and 151
4 are provided on the front 130 and on the back
5 150, respectively.

6 "In an example of detecting a
7 biosignal unique to the user from a body
8 part, for example, a voice of the user and/or
9 an impedance signal generated by the body of
10 the user, aside from the ECG signal. A
11 sensor used to receive the second biosignal
12 may be provided on either the front or back.

13 "A number of the sensors used to
14 detect the first biosignal and second
15 biosignal may vary based on need."

16 So, I think it is describing, you
17 know, the context of things vary, but it is
18 for ECG, you are going to, you know, use the
19 front and back sensors. And you may
20 configure it like this. You may configure it
21 like this for other biosignals.

22 MR. NELSON: Okay. Let's go off the

1 record now.

2 THE VIDEOGRAPHER: All right. The
3 time is 7:03 p.m. Off the record.

4 (Recess taken -- 7:03 p.m.)

5 (After recess -- 7:30 p.m.)

6 THE VIDEOGRAPHER: The time
7 is 7:30 p.m. Back on the record.

8 EXAMINATION

9 BY MR. JHURANI:

10 Q. Welcome back, Dr. Anthony.

11 A few questions for you. So, you
12 testified earlier that presence of magnet in the
13 core of a coil could affect wireless charging.
14 Do you recall that?

15 A. Yes.

16 Q. Could you turn to Paragraph 50 of
17 your declaration, which is Exhibit 2019.

18 Thank you. And there is a part of
19 it that bleeds over into the next page.

20 Feel free to review that and let me
21 know when you've had a chance to do so.

22 A. Okay.

1 Q. Okay. And you see the reference in
2 this paragraph to a shield element.

3 A. Yes. "The '783 patent further
4 explains that the transmit coil 1832 may be
5 shielded with a shield element that may be
6 disposed or formed around portions of the
7 transmit coil 1832.

8 "And, similarly, the receive coil
9 1869 may also include a shield element that may
10 be disposed or formed around a portion of the
11 receive coil."

12 Q. What is a shield element?

13 A. It is an element that provides
14 shielding to that which, for example, block
15 propagation of magnetic flux.

16 Q. Okay. And what impact would a
17 shield element have in a setup where there is a
18 magnet presented in the core of a coil?

19 A. Shielding can prevent the
20 detrimental effects of the magnet, permanent
21 magnet to the coil or vice versa. It could
22 protect electronic components from the field of

1 the coil.

2 Q. Okay. Could you turn to
3 Exhibit 1012, which is a Park reference, I
4 believe.

5 A. 1012?

6 Q. 1012.

7 A. Okay.

8 Q. And in particular, could you bring
9 up Figure 14. All right.

10 And I believe you testified here
11 that there is a permanent magnet 30, I believe,
12 that was between the coil in the device?

13 Do you recall that?

14 A. Yes.

15 Q. Okay. Would the presence of the
16 magnet in the core of a coil, if that is what is
17 being shown in Park, affect wireless charging in
18 Park?

19 A. Yes a magnet can have an impact on
20 the field in the charging.

21 Q. Okay. And, would that -- strike
22 that.

1 What, if anything, does Park do to
2 mitigate that effect of the magnet's presence?

3 A. Park also contemplates shielding.
4 Looking for example at Paragraph 114 of Park,
5 "The terminal 20 may include a shielding member
6 26, a receive coil 32, and a second magnet 30.

7 "The receiving coil 32, a magnet may
8 be disposed on the same plane."

9 The receive coil, in Paragraph 123.
10 "The receive coil in the second magnet may be
11 attached to the back of a shielding member using
12 adhesive on the shielding member. It would be
13 disposed a printed circuit board having
14 electronic parts."

15 And 124, "Shielding member may
16 shield a magnetic field used by the coil, such
17 that the magnetic field could not affect the
18 electronic parts, thereby preventing a
19 malfunction."

20 In Paragraph 217, "A predetermined
21 shielding material for minimizing the effects of
22 a magnetic field, an electric field may be used

1 between the first magnet 12 and the transmitting
2 coil 14."

3 So, Park contemplates using
4 shielding materials to mitigate the impact of
5 coil on devices, frying components and
6 potentially being an impact of the magnets on the
7 field of the coil.

8 Q. Does Honda describe any shielding?

9 A. Honda is --

10 Q. That is Exhibit 1006.

11 A. 1006. There is no mention of
12 shielding in Honda.

13 Q. All right. Thank you. Can we turn
14 back to your declaration, Exhibit 2019.

15 And in particular I want to draw
16 your attention to Paragraph 167. And there is a
17 figure under Paragraph 167 that counsel asked you
18 about.

19 MR. JHURANI: That one, yes, thank
20 you.

21 BY MR. JHURANI:

22 Q. Do you recall being asked questions

1 about this figure in Paragraph 167?

2 A. Yes.

3 Q. All right. So, looking at the
4 figure shown on Page 85, which is shown here, do
5 you see the reference to elements 5 and 6 here?

6 A. Yes.

7 Q. What are elements 5 and 6?

8 A. As described in Paragraph 167, they
9 are LED 5 and photo detector 6, and also
10 alternatively in Paragraph 168, the optical
11 elements 5 and 6.

12 Q. What does Kotanagi tell us the use
13 elements are connected to?

14 A. It tells us they are connected to
15 the flexible board.

16 Q. And what reference number does
17 Kotanagi give to flexible board?

18 A. 24.

19 Q. So, looking at Paragraph 167, when
20 it says flexible board 15, should that say
21 flexible board 24?

22 A. That is correct.

1 Q. And is flexible board 24 shown in
2 the figure?

3 A. It is, as I highlighted in purple.
4 And we know that because the photo detectors are
5 attached -- or the optical elements are attached
6 to the flexible board.

7 MR. JHURANI: All right. Thank you,
8 Dr. Anthony. I have no further questions.

9 FURTHER EXAMINATION

10 BY MR. NELSON:

11 Q. Okay. I have a few follow-up based
12 on that questioning just now.

13 Right before Mr. Jhurani asked his
14 questions, we took a 20-minute break; is that
15 right?

16 A. Yes.

17 Q. Did you confer with counsel,
18 Mr. Jhurani, during that time?

19 A. Yes.

20 Q. For how long did you confer?

21 A. Maybe ten minutes. 15 minutes.

22 Q. Did you confer about the substance

1 of your testimony today?

2 MR. JHURANI: Dr. Anthony, I'm going
3 to advise you to answer that question in the
4 form of a yes or no.

5 To the extent that you can do so,
6 please do. But, please do not get into the
7 substance of the conversation we had during
8 our conference.

9 THE WITNESS: Please can you repeat
10 the question?

11 BY MR. NELSON:

12 Q. Did you confer about the substance
13 of your testimony today?

14 A. Yes.

15 Q. Did you confer about counsel's
16 questions that would be asked on redirect?

17 MR. JHURANI: Again, if you can
18 answer that with a yes or no, please do so.

19 Otherwise, I will instruct you not
20 to answer about the substance of our
21 discussion.

22 THE WITNESS: Please can you repeat

1 the question?

2 BY MR. NELSON:

3 Q. Did you confer about counsel's
4 questions that would be asked on redirect?

5 A. Yes.

6 MR. JHURANI: Same caution. But
7 thank you.

8 BY MR. NELSON:

9 Q. Did you discuss the shield element?

10 MR. JHURANI: Dr. Anthony, I'm going
11 to instruct you not to -- that goes to the
12 substance of what was discussed during our
13 conference. And I'm going to instruct you
14 not to answer that question.

15 BY MR. NELSON:

16 Q. Did you discuss the flexible board?

17 MR. JHURANI: Same instruction that
18 goes to substance of discussion during
19 conference.

20 I'm going to instruct you not to
21 answer that question.

22 BY MR. NELSON:

1 Q. Is the shielding described in Park
2 that you discussed just now, made of metal?

3 A. So, Park is silent on the material
4 other than, for example, in Paragraph 217, "A
5 predetermined shielding material for minimizing
6 the effects of magnetic field may be used."

7 Q. Does Park show where that shielding
8 material would be placed?

9 A. So, first, referring to
10 Paragraph 217, "A predetermined shielding
11 material for minimizing the effects of magnetic
12 field, an electric field may be used between the
13 first magnet 12 and the transmitting coil."

14 So, it describes as being between.
15 So, the person reading that and looking at the
16 figure, for example, Figure 8, would understand
17 that it be between items 12 and 14.

18 Shielding element, shielding
19 member 26. Shielding member 26 is in -- at least
20 this embodiment pointed to as in the, above the
21 coils.

22 But could also be in other places as

1 further elucidated as being between 12 and 14.

2 Q. The shielding element you mentioned
3 that shields item 12 is within the core of the
4 coil 14?

5 A. I'm sorry. Can you repeat that?

6 Q. You mentioned there is some
7 shielding between 12 and 14. Right?

8 A. So, in Paragraph 217, "Shielding
9 material is described as shielding material for
10 minimizing effects, et cetera, may be used
11 between the first magnet 12 and the transmitting
12 coil 14."

13 And so if we go back to --

14 Q. That would place it within the core
15 of 14, right?

16 MR. JHURANI: Objection to form.

17 THE WITNESS: In that instance, yes.

18 It would place it between 12 and 14 as
19 described there.

20 BY MR. NELSON:

21 Q. Which is within the core of 14?

22 A. Well, it could also -- shielding

1 material could also be -- as drawn, the 12 is
2 within the center of the coil.

3 Q. What paragraph are you referring to
4 just now?

5 A. Paragraph 2 -- 0217, "A
6 predetermined shielding material for minimizing
7 the effects of a magnetic field and an electric
8 field may be used between the first magnet and
9 the transmitting coil."

10 And then, furthermore, for example,
11 shielding is further discussed in
12 Paragraph 114 -- 0114. "Shielding member 26."

13 And in Paragraph 123, "Receiving
14 coil 32 and the second magnet may be attached to
15 the back of a shielding member."

16 And then in 124, "Shielding member
17 may shield a magnetic field induced by the coil
18 such that the magnetic field cannot affect all
19 electronic parts therefore preventing
20 malfunction."

21 So it elucidates that a shielding
22 member can be used to insulate, if you will,

1 protect the propagation of either field on to
2 components or vice versa.

3 Q. Were you aware of these passages in
4 Park discussing shielding prior to conferring
5 with counsel?

6 MR. JHURANI: Dr. Anthony, I'm going
7 to -- if you can answer that question with a
8 yes or no, you may.

9 But please do not get into any
10 substance of communications between us during
11 the conference that we had.

12 THE WITNESS: So, I do discuss
13 shielding in my declaration. I am aware of
14 shielding.

15 BY MR. NELSON:

16 Q. Okay.

17 MR. NELSON: No further questions.

18 MR. JHURANI: I have no further
19 questions, either.

20 THE VIDEOGRAPHER: Okay. So I'm
21 going to get us off the record.

22 This marks the end of today's

1 deposition. The time is 7:48 p.m.

2 (Whereupon, signature not having been waived,

3 the deposition suspended at 7:48 p.m. EDT)

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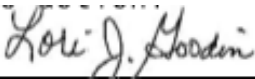
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22

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4 hereby certify that the witness whose testimony
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1 Brian Anthony, Ph.D., c/o
FISH & RICHARDSON P.C.

2 60 South Sixth Street, Suite 3200
Minneapolis, Minnesota 55402

3
Case: Masimo Corporation v. Apple Inc.

4 Date of deposition: March 15, 2024
Deponent: Brian Anthony, Ph.D.

5

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