

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ANKER INNOVATIONS LTD.,

Petitioner,

v.

POWERMAT TECHNOLOGIES, LTD.,

Patent Owner.

**IPR 2024-00995 Patent 9,083,204
(Attorney docket number 46570-0022IP1)
IPR 2024-00996 Patent 8,626,461
(Attorney docket number 46570-0023IP1)**

VIDEOCONFERENCE DEPOSITION OF:

PATRICK MERCIER, Ph.D.

ON BEHALF OF PATENT OWNER

POWERMAT TECHNOLOGIES, LTD.

AUGUST 7, 2025

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8:06 a.m. - 11:22 a.m. CST

REPORTED BY:

Tamara L. Houston

CA CSR No. 7244, RPR, CCRR No. 140

Job Number J13110714

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REMOTE VIDEOCONFERENCE DEPOSITION OF PATRICK
MERCIER, Ph.D., taken on behalf of the Patent Owner,
commencing from 8:06 a.m. to 11:22 a.m., CST, Thursday,
August 7, 2025, before Tamara L. Houston, CSR No. 7244,
CCRR, RPR.

APPEARANCE OF COUNSEL:

On behalf of the Petitioner:

**FISH & RICHARDSON P.C.
BY: NICHOLAS W. STEPHENS, ESQ.
60 South Sixth Street
Suite 3200
Minneapolis, Minnesota 55402
(202) 783-5070**

On behalf of the Patent Owner and Witness:

**MAYER BROWN LLP
WILLIAM B. NASH, ESQ.
1999 K Street, NW
Washington, DC 20006
(202) 263-3000
bnash@mayerbrown.com**

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ANKER INNOVATIONS vs. POWERMAT TECHNOLOGIES
AUGUST 7, 2025
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- REFERENCED EXHIBITS:**
- Ex 1001 - US8626461**
 - Ex 1001 - US9083204**
 - Ex 2003 - Mercier Declaration 461 Patent**
 - Ex 2009 - Mercier Second Declaration**
 - Paper 7 - 204 Institution Decision (IPR2024-00995)**

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1 Thursday, August 7, 2025, 8:06 CST

2 --o0o--

3 COURT REPORTER: My name is Tamara Houston,
4 California Certified Shorthand Reporter Number 7244.

5 --o0o--

6 PATRICK MERCIER, Ph.D.

7 having been called as a witness,
8 who was thereupon examined and testified as hereinafter
9 set forth:

10 EXAMINATION BY MR. STEPHENS:

11 Q. Welcome, Dr. Mercier. It's good to see you
12 again.

13 A. Likewise.

14 Q. I guess, before I proceed any further, am I
15 pronouncing your name correctly, Dr. Mercier?

16 A. That's exactly correct. Thank you.

17 Q. I'm Nick. I'm an attorney with Fish &
18 Richardson. I'll be taking the deposition today on
19 behalf of the petitioner, Anker.

20 Would counsel for patent owner like to make
21 their appearance?

22 MR. NASH: Yes. My name is Brady Nash with
23 Mayer Brown, and I'm representing patent owner Powermat
24 Technologies Ltd.

25 And I may have a couple of colleagues that may

1 join in off and on throughout today's proceedings, but
2 we don't need to wait for any of them.

3 MR. STEPHENS: Sounds good.

4 BY MR. STEPHENS:

5 Q. Dr. Mercier, you understand that we're here
6 today regarding two IPR proceedings?

7 A. I do.

8 Q. And one of those IPR proceedings is IPR
9 2024-00995 on the '204 patent.

10 Do you understand?

11 A. I do.

12 Q. And the other proceeding is the IPR 2025-00996
13 on the '461 patent.

14 Do you understand?

15 A. I do.

16 Q. And the deposition is being transcribed today.
17 Do you understand that?

18 A. Yes.

19 Q. So I'll do my best not to interrupt you while
20 you're providing responses to my questions. I'd ask for
21 you to do the same just so we can share a clean record.

22 Sound fair?

23 A. Yes.

24 Q. If you need a break at any time during the
25 deposition, don't hesitate to let me know. In general,

1 I'll need to break about every hour or so.

2 Does that sound okay?

3 A. Yes.

4 Q. Can you please state your full name?

5 A. Patrick Mercier.

6 Q. You understand that you're under oath?

7 A. I do.

8 Q. And is there any reason that you cannot give
9 truthful and accurate testimony today?

10 A. No.

11 Q. Can you describe how you prepared for today's
12 deposition?

13 MR. NASH: I'm just going to counsel the
14 witness not to divulge any attorney -- or any privileged
15 information.

16 But you may answer the question.

17 THE WITNESS: Yes, I reviewed documents as it
18 relates to the case, including my declaration and the
19 relevant prior art references, and I had meetings with
20 counsel to discuss the -- discuss the stuff.

21 BY MR. STEPHENS:

22 Q. Approximately how much time did you spend
23 preparing for the deposition?

24 A. Approximately three days' worth of effort.
25 Not full days, but approximately that.

1 Q. Are there any documents not in the record of
2 the IPRs that you referenced in preparation for your
3 deposition?

4 MR. NASH: Again, I'm going to counsel the
5 witness not to divulge any privileged information, but I
6 will permit him to answer the question to the extent he
7 can do so without divulging that -- divulging privileged
8 information.

9 THE WITNESS: Not any specific ones that I
10 recall. Of course, I work in this area and have a lot
11 of experience and have reviewed many, many documents
12 related to wireless charging and so on that I have kind
13 of in my head.

14 But there wasn't anything specific that I
15 referred to in preparation for this.

16 BY MR. STEPHENS:

17 Q. Without revealing any privileged
18 communications, can you describe the process by which
19 you prepared the declarations in these proceedings?

20 A. Certainly. So I read and reviewed the patents
21 in question --

22 (Court Reporter requested clarification.)

23 THE WITNESS: -- the patents related to this
24 matter, their prosecution history, as well as the prior
25 art references.

1 Began to form my opinions based on that
2 review. Had many discussions with counsel, after which
3 we collaborated on writing my declaration.

4 All of the opinions in my declaration are my
5 own, and I stand behind them.

6 BY MR. STEPHENS:

7 Q. Did you personally draft the words in the
8 declaration?

9 A. Again, all of the opinions are my own. They
10 were drafted in collaboration with counsel after lengthy
11 discussions about all of the topics.

12 Q. Were you familiar with the '461 patent before
13 your work on the declaration for this IPR?

14 MR. NASH: Again, I'm going to counsel the
15 witness not to divulge any privileged information.

16 You may answer the question if you can do so
17 without divulging privileged information.

18 THE WITNESS: I don't recall seeing or reading
19 the '461 patent prior to my hiring by the client.

20 BY MR. STEPHENS:

21 Q. And were you familiar with the '204 patent
22 before your work in connection with the IPR on the '204
23 patent?

24 A. Same answer. I haven't -- I don't recall
25 seeing or reading that prior to being hired for this.

1 Q. Have you submitted any testimony in co-pending
2 litigation on these patents prior to your work on the
3 IPRs?

4 A. I'm not sure I understand the scope of what
5 you're asking.

6 Q. Yeah, I'll try to rephrase.

7 Is -- before you prepared the declarations in
8 these IPRs, had you submitted any opinions in co-pending
9 litigation on the '204 or '461 patents?

10 MR. NASH: Again, I'll caution the witness not
11 to divulge any privileged information, but you may
12 answer the question to the extent you can do so without
13 divulging privileged information.

14 THE WITNESS: I did submit an initial
15 declaration for the '204 patent some months ago. I'm
16 not sure if that's what you're asking about.

17 BY MR. STEPHENS:

18 Q. Was that a declaration in support of the
19 patent owner's preliminary response in the '204 IPR?

20 A. I can't remember the exact timeline of when
21 that was submitted or after what had been submitted by
22 patent owners in that matter. Yeah, I just can't quite
23 recall the timeline.

24 But there certainly was a declaration that I
25 had authored earlier that contained kind of preliminary

1 opinions about some of the matter on the -- on the '204
2 patent.

3 Q. And that was a declaration in the IPR
4 proceeding on the '204 patent, correct?

5 A. I believe so, yes. Again, my timelines are a
6 little fuzzy on this, but I believe so.

7 Q. Sure.

8 Have you submitted any reports on the '204
9 patent outside of the IPR?

10 MR. NASH: Again, I'll caution the witness not
11 to divulge any privileged information, but you can
12 answer the question if you can do so without divulging
13 that information.

14 THE WITNESS: I -- I don't recall. I've been
15 hired by the client to offer opinions on a variety of
16 different patents as it relates to this litigation in
17 general. And I've authored a few different declarations
18 for these various different patents.

19 Off the top of my head, without referencing my
20 actual reports, I can't recall exactly what patents went
21 to where, if it's district court or IPRs or, you know,
22 things like this.

23 BY MR. STEPHENS:

24 Q. Are you aware of any errors in your
25 declaration that you submitted in the IPR on the '461

1 patent?

2 A. I'm sorry, you said any errors?

3 Q. Any errors in your declaration on the '461
4 patent.

5 A. Not to my knowledge. There may be typos that
6 I didn't catch but that -- I don't have anything off the
7 top of my head. And certainly I don't think that
8 there's anything that, if there is a typo, would change
9 my opinion. That I've caught, anyways.

10 Q. To the best of your knowledge, then, the
11 declaration on the '461 patent still reflects your
12 opinions on the -- with respect to the issues in the IPR
13 proceeding?

14 A. Yes.

15 Q. And then I'll ask the same on the '204 patent.
16 Are you aware of any errors in your declaration on the
17 '204 patent?

18 A. Same answer except for any possible typos that
19 I haven't caught. I'm not aware of any major errors,
20 and my opinions are consistent with what's in that
21 document.

22 Q. Your opinions haven't changed on -- since you
23 submitted your declaration in the '204 patent?

24 A. That's correct.

25 Q. Just for the record, I will be using a term,

1 an acronym, "POSITA," which I'm sure the court reporter
2 is very familiar with.

3 Do you understand what a POSITA means when I
4 refer to a POSITA?

5 A. I do.

6 Q. And that's a person of ordinary skill in the
7 art in the field of the invention, correct?

8 A. That's correct.

9 Q. Okay. With that, I will put into the chat two
10 documents.

11 I'm uploading Exhibit 1001 in the IPR in the
12 '461 patent, which is the '461 patent itself, and then
13 Exhibit 2003, which is the declaration that you
14 submitted in the IPR in the '461 patent.

15 Just let me know when you receive those
16 documents.

17 A. Okay. Yeah, just downloading them now.

18 Okay.

19 Q. Can you open the document that's been marked
20 Exhibit 1001?

21 A. Okay.

22 Q. Does this appear to be an accurate copy of the
23 '461 patent?

24 A. It appears to be, yeah.

25 Q. And could you open Exhibit 2003?

1 A. Okay.

2 Q. Does this appear to be a true copy of the
3 declaration that you submitted in this proceeding? I
4 should say on the '461 IPR.

5 A. It appears to be, yes.

6 Q. Do you have any other materials in front of
7 you apart from the two documents that I just shared?

8 A. I do not.

9 Q. All right. I'd like to turn to paragraph 47
10 of your declaration in the IPR in the '461 patent.

11 A. Okay.

12 Q. And in this paragraph, you indicated that you
13 will first review the '461 patent's disclosure as it
14 would have been viewed by a POSITA, correct?

15 A. Yes, that's what's written.

16 Q. So is it fair to say that you reviewed the
17 specification of the '461 patent?

18 A. I did.

19 Q. Let's turn, then, to Exhibit 1001, the '461
20 patent.

21 A. Okay.

22 Q. And I'd like to look at Figure 2a.

23 A. Okay.

24 Q. Are you familiar with Figure 2a?

25 A. I am.

1 Q. Figure 2a depicts an inductive power transfer
2 system, correct?

3 A. It does.

4 Q. And the system includes a primary side that
5 includes a primary coil, L1, and a secondary side that
6 includes a secondary coil, L2, correct?

7 A. That's correct.

8 Q. Figure 2c shows the circuitry for the primary
9 side, correct?

10 A. It does.

11 Q. And then Figure 2b shows the circuitry for the
12 secondary side, correct?

13 A. That's right.

14 Q. Can you describe generally how the inductive
15 power transfer system in Figure 2a operates to transfer
16 power from the primary side to the secondary side?

17 A. Sure.

18 So the primary side has inductor L1 that gets
19 energized by a current waveform $I_{10}(t)$ generated by the
20 power supply that is an oscillating signal that ends up
21 generating a magnetic field that gets emitted from
22 inductor L1 and couples through 2, inductor L2. L2 then
23 generates a voltage across its terminals, which is then
24 delivered to an electric load, optionally through an
25 AC-DC converter.

1 So that's generally how the inductive coupling
2 for wireless power transfer operation happens.

3 Figure 2a also describes a few other
4 circuits -- but not extensive -- or not a comprehensive
5 analysis, but they describe other important circuits to
6 the invention as it relates to things like communication
7 between the two coils.

8 And I'm happy to describe how those work as
9 well, if you'd like.

10 Q. Yeah, can you explain how the communication or
11 the signal transfer works in Figure 2a?

12 A. Sure.

13 So what's being depicted here is what I would
14 call uplink communication, so this is communication from
15 the secondary device to the primary device.

16 So in this case, the input signal, SN,
17 delivers some presumably digital signal to a switching
18 unit, which occasionally connects the ancillary load,
19 2142, across the terminals of inductor L2 on the
20 secondary side.

21 And what that does is it dynamically adjusts
22 the impedance on the secondary side. That dynamically
23 adjusting impedance can be sensed on the primary side
24 through current monitor, 2162, which decodes the
25 received bits through a correlator to generate the

1 upload signals.

2 Q. I'd like to maybe take a closer look at the
3 primary side circuitry.

4 I'll reference Figure 2c.

5 A. Okay.

6 Q. As shown in Figure 2c, there is a power
7 supply, 2240.

8 Do you see that?

9 A. I do.

10 Q. What's the function of the power supply, 2240,
11 in this circuit?

12 A. The power supply is to generate -- well, it's
13 to provide power and energize the system, as well as to
14 provide the appropriate drive signal or the appropriate
15 power waveform across the primary inductor L1.

16 Q. Would the power supply in 2240 be an AC power
17 source?

18 MR. NASH: Objection. Form.

19 BY MR. STEPHENS:

20 Q. I'll repeat the question for the record.

21 Would the power supply, 2240, be an
22 alternating current, or AC, power supply?

23 MR. NASH: Again, objection. Form.

24 THE WITNESS: So the inductor, in order to do
25 wireless power transfer, does need to receive an AC

1 signal. You can't do wireless power transfer in the way
2 that the system is constructed with a DC power signal.

3 So that power supply would have to eventually
4 generate an AC waveform and -- and pass that to the
5 primary inductor. Whether that comes directly from an
6 AC source or a DC source, it could be either one, but
7 ultimately it does generate an AC power waveform.

8 BY MR. STEPHENS:

9 Q. So the voltage V1 shown in Figure 2c would be
10 an AC waveform?

11 MR. NASH: Objection. Form.

12 THE WITNESS: Yes. And in the specification,
13 they describe the primary voltage, V1(t), oscillating at
14 the driving frequency.

15 BY MR. STEPHENS:

16 Q. The driving frequency is represented by the
17 notation FD in Figure 2c; is that correct?

18 A. That's correct.

19 Q. And the component labeled L1, that's the
20 primary inductive coil, correct?

21 A. Yes.

22 Q. There's also a current monitor, 2162,
23 depicted, correct?

24 A. That's right.

25 Q. And what is the function of the current

1 monitor, 2162?

2 MR. NASH: Objection. Form.

3 THE WITNESS: The function of the current
4 monitor is the monitor current that's passing through
5 inductor L1.

6 As you can see in Figure 2c, the current
7 monitor is wired in series with the inductor L1, so it's
8 directly measuring the current flowing through that
9 inductor.

10 BY MR. STEPHENS:

11 Q. The current monitor, 2162, would be measuring
12 the current I10(t), correct?

13 A. Yes.

14 Q. And then there's a frequency monitor, 2166,
15 depicted.

16 Do you see that?

17 A. I do.

18 Q. What does the frequency divider, 2166, do?

19 A. It appears to take the frequency FD generated
20 by the power supply and divide it by -- it appears to be
21 an integer -- not necessarily required by a POSITA for
22 it to be an integer, but -- it takes it and divides that
23 frequency by an integer to produce a lower frequency.

24 Q. Why would -- do you have an understanding of
25 why the frequency divider is employed to generate a

1 lower frequency?

2 MR. NASH: Objection. Form.

3 THE WITNESS: Well, the patent actually does
4 teach about the purpose of the frequency divider. It
5 describes how it takes the oscillating signal and
6 divides it down to generate a frequency that is
7 commensurate with the bit rate signal that would come
8 from the secondary source, or the secondary side of
9 things, and just add a little bit of color to that.

10 It's -- this sort of technique is often used
11 in wireless power transfer systems such that various
12 different communication modules are synchronized to the
13 exact same frequency so that it's easier to encode and
14 decode data.

15 BY MR. STEPHENS:

16 Q. Let's turn back to the current monitor, 2162.

17 So I think we established earlier that the
18 current monitor, 2162, is wired in series with the
19 primary inductive coil, L1. Correct?

20 A. Correct.

21 Q. And this allows the current monitor, 2162, to
22 measure the current that passes through the primary
23 inductive coil, L1, correct?

24 A. That's right.

25 Q. Are you -- have you -- do you have experience

1 implementing current monitors?

2 A. I do.

3 Q. What kind of circuitry would you use to
4 implement a current monitor?

5 A. There's many different forms a current monitor
6 could take.

7 One is -- and I'm speaking generally here.

8 One is you could take a small resistor, measure the
9 voltage drop across it, and through Ohm's Law, you can
10 measure the current.

11 Another is you could do a -- you could wire a
12 loop around the wire and measure the current that gets
13 generated in that loop from the magnetic field passing
14 through the wire.

15 Yeah, those are, I guess, I suppose, two
16 different examples.

17 Q. Would an idealized current monitor have zero
18 internal resistance?

19 A. If you're referring to the first example that
20 I described, then, yes, you could -- you could -- you
21 could envision an ideal ammeter that has zero internal
22 resistance.

23 (Court reporter requested clarification.)

24 THE WITNESS: Ammeter. A-m-m-e-t-e-r, I
25 think.

1 MR. STEPHENS: I believe that's correct.

2 BY MR. STEPHENS:

3 Q. Any real implementation -- strike that.

4 MR. NASH: All of these.

5 BY MR. STEPHENS:

6 Q. Would a real implementation of a current
7 monitor have some nonzero internal resistance?

8 A. I mean, that depends on the -- on the type of
9 current monitor that we're talking about, right? So if
10 we're talking about installing a small series resistor
11 and measuring the voltage across it, then, yes, through
12 Ohm's Law, it will have a voltage drop across it if the
13 current is not zero.

14 Typically POSITAs, when implementing such a
15 structure, will design that resistor such that its
16 losses are negligible relative to the rest of the
17 system, and then that's why they install an amplifier
18 after it, to amplify the resulting voltage so that they
19 can get a good read of what the current is.

20 However, if the current measurement device is
21 an alternative type -- for example, one that measures
22 the magnetic field -- then discussion of the, you know,
23 series resistance doesn't make sense in that case.

24 Q. Would there be at least some power loss
25 through the current monitor?

1 A. I mean, we have to be a little bit practical
2 here. No functionality comes for free in terms of
3 power. That's a fundamental law of physics.

4 But engineers are practical people, and we
5 design things so that they make sense for the
6 application. As it relates to a resistive-based current
7 monitor, of course, there will always be losses, but
8 they could be designed such that they are negligible
9 relative to the current that you're trying to measure,
10 for example, or the power that you're trying to measure.

11 As far as the magnetic sensor systems, I think
12 same answer. We can design those such that any losses
13 induced by that device are negligible relative to the
14 total power consumed in the system.

15 Q. But in either case, there would be a nonzero
16 power loss through the current monitor, correct?

17 A. Again, as I said, any device that you
18 implement will consume some finite amount of power.
19 It's not possible to do that otherwise.

20 But certainly a POSITA is capable of doing
21 that such that it's negligible relative to the overall
22 power consumption.

23 And I guess one other point to make here is
24 that we're talking about measuring current, and this
25 does measure -- of course, if you've done a good job

1 designing the current monitor, it does measure the
2 current accurately. There's no additional loss of
3 current by implementing it in this way.

4 Q. So in the case that you implemented a current
5 monitor with a series resistor, would that resistor not
6 impact the overall current flow through the circuit?

7 A. It depends on what's driving the circuit. If
8 you're driving the circuit with a current source and
9 that current source is, you know, a good current source,
10 then it wouldn't.

11 If you're driving it with a voltage source, it
12 may.

13 But, again, that current monitor implements
14 with the series resistor in this hypothetical is
15 designed such that its resistance is lower than the
16 total resistance seen by the circuit by a significant
17 fraction, such that the change in current, if it were
18 driven by a voltage source, is negligible.

19 And I've, by the way, personally designed
20 these kind of systems and was able to get that to
21 happen.

22 Q. So the current monitor, if it has a nonzero --
23 I'm sorry, strike that.

24 You would agree that a negligible resistance
25 is still a nonzero resistance, correct?

1 A. Of course. Any -- I mean, there is no
2 component that has zero resistance other than I suppose
3 super conductors. They are absolute zero. So under
4 that definition, even a wire has nonzero resistance.

5 But, again, context is important. And when
6 we're designing systems like that, a POSITA is capable
7 of analyzing the resistance of wires and -- and small
8 current measuring resistors and design them in
9 accordance with the -- with the needs of the
10 application.

11 Q. So when the current monitor, 2162, has some
12 resistance, there would be a voltage drop from one side
13 of the current monitor to the other, correct?

14 A. According to Ohm's Law, if there's a current
15 passing through a resistive element, there will be a
16 voltage drop, yes. But, again, the size of the resistor
17 of this type of current monitor that we're discussing is
18 designed such that that voltage drop is negligible
19 relative to the total voltage of the system.

20 And, again, I've personally designed these and
21 was able to ensure that that was the case in my designs,
22 for example.

23 Q. So part of the power that's delivered by power
24 supply 2240 will be used by the current monitor 2162,
25 correct?

1 MR. NASH: Objection. Form.

2 THE WITNESS: Well, if the current monitor is
3 implemented by measuring the magnetic fields of the wire
4 and whatever is doing that measurement is wired to a
5 different power supply, that wouldn't necessarily be the
6 case, for example.

7 BY MR. STEPHENS:

8 Q. Even in that case, wouldn't there be some
9 power that must emanate from the magnetic field to be
10 detected --

11 MR. NASH: Objection. Form.

12 THE WITNESS: The -- the magnetic field that's
13 passing through the wire is a reactive form of energy,
14 and that would exist whether a magnetic current probe
15 was there or not.

16 And so it is possible that there wouldn't be
17 any power consumed from the power supply, 2240, in that
18 situation.

19 BY MR. STEPHENS:

20 Q. So your testimony is that you can detect part
21 of the magnetic field without consuming any of the
22 energy -- any of the energy emanated by the current
23 monitor; is that correct?

24 A. So in that hypothetical, I'm assuming that the
25 power supply that's driving the sensing circuit for the

1 current monitor is coming from some other source. I'm
2 just trying to explain how it's -- it is possible that
3 the current monitor could take zero power from the power
4 supply, 2240.

5 Of course, in practice, you know, other ways
6 of doing current monitoring, such as the series
7 resistor, would dissipate some finite amount of power.
8 But, again, as I've said, that finite amount of power
9 could be designed to be negligible relative to the power
10 consumed, for example, by inductor L1.

11 Q. So I just want to be clear as to the
12 implementation that, with the magnetic field, are you
13 saying that there could be a completely lossless current
14 monitor?

15 MR. NASH: Objection. Mischaracterization.

16 THE WITNESS: So the application I had in mind
17 there is that the wire from the inductor is coming back
18 to the lower terminal of the power supply. That wire
19 emanates, or generates, a magnetic field.

20 And if you were to place a magnetic sensor in
21 there that effectively had a high impedance or, for
22 example, was implemented with a super conducting loop
23 and whatever readout circuitry is connected to that
24 sensor is powered by a different power supply, then
25 theoretically, I think, it's possible that you could

1 measure current without inducing any losses in the power
2 supply loop.

3 I think that's possible, although this is an
4 opinion that I'm coming up with on the fly here, and I
5 probably shouldn't be doing this, and I should probably
6 do some more analysis on this to -- to be certain.

7 BY MR. STEPHENS:

8 Q. Fair enough.

9 All right. I'd like to look at Column 9 of
10 the patent. At line 38 is the paragraph that begins:
11 "The input power $P_1(t)$ provided to the primary coil L1
12 is given by" -- and then there's an equation.

13 Do you see that?

14 A. I do.

15 Q. Okay. And in this equation, at line
16 approximately 41 or 42, this is said to characterize the
17 input power provided to the primary coil L1, correct?

18 A. That's right.

19 Q. And this equation references the voltage $V_1(t)$
20 from the power supply, 2240, correct?

21 A. That's right.

22 Q. And it refers to the current $I_{10}(t)$ that flows
23 through the coil L1, correct?

24 A. Correct.

25 Q. Because this equation uses the voltage V_1 of

1 the power supply rather than isolating it to the voltage
2 dropped across coil L1, the calculated power here would
3 include power loss from the current monitor 262,
4 correct?

5 MR. NASH: Objection. Form.

6 THE WITNESS: Again, I think, if -- if you're
7 doing a magnetic field-based measurement, that may not
8 be true. If you're doing a resistive-based measurement,
9 that would be true.

10 But, again, a well-designed current monitor
11 would make the voltage drop across the current monitor
12 to be very small, much smaller than the voltage V1, and,
13 therefore, negligible in the power calculation and
14 would -- to -- you know, degrees of precision allowable
15 or knowable by a POSITA in such an application would be
16 irrelevant.

17 BY MR. STEPHENS:

18 Q. If you'd turn back to the figures again,
19 Figure 2b.

20 A. Okay.

21 Q. This figure depicts the circuitry for the
22 secondary side of the system from Figure 2a, correct?

23 A. That's correct.

24 Q. And as shown in Figure 2b, there's a secondary
25 coil, L2; an AC-DC converter, 2270; an electric load,

1 2280; and a transmission circuit, 2140. Is that
2 correct?

3 A. That's right.

4 Q. And in that operation, secondary coil, L2,
5 would receive power inductively transferred from the
6 primary coil, L1, correct?

7 A. That's right.

8 Q. Figure 2b shows a voltage drop across the
9 electric load 2280 that's labeled $V_{22}(t)$, correct?

10 A. I see that, yeah.

11 Q. The current through electric load is
12 represented by $I_{22}(t)$, correct?

13 A. Yes.

14 Q. The power delivered to the electric load 2280
15 would then be V_{22} times I_{22} , correct?

16 A. Yes.

17 Q. Another portion of the power delivered by the
18 secondary coil, L2, would be delivered to the
19 transmission circuit, 2140, correct?

20 A. That's correct.

21 Q. The transmission circuit, 2140, as you
22 explained earlier, includes an ancillary load, 2142,
23 correct?

24 A. That's right.

25 Q. And Figure 2b gives the label $I_{24}(t)$ to the

1 current delivered to the transmission circuit, 2140,
2 correct?

3 A. Yes, that's correct.

4 Q. Another portion of the current delivered to
5 transmission circuit 2140 would include current to the
6 frequency divider, 2145, correct?

7 A. I wouldn't say that. Frequency dividers are
8 typically implemented as high input impedance devices.
9 They don't have input resistance, and so there wouldn't
10 be current flowing into them.

11 Q. So $I_{24}(t)$ would represent the total current
12 delivered to transmission circuit 2140?

13 A. I think that's fair to say. To be fair, as
14 labeled in Figure 2b. This may not be a complete
15 schematic of the envisioned system, but, yeah.

16 Q. And this circuit also includes an AC-DC
17 converter, 2270, correct?

18 A. Yes.

19 Q. The AC-DC converter, 2270, as shown in
20 Figure 2b, includes a diode, 2272, and a capacitor,
21 2274, correct?

22 A. That's right.

23 And I should note that, in Figure 2a and in
24 the description, this circuit is optional.

25 Q. So looking again at Figure 2b, would there be

1 a forward voltage drop across the diode, 2272, when the
2 diode is forward biassed?

3 A. It depends on the type of diode. Some diodes
4 do have forward voltage drops; some don't.

5 Q. Would there be any power loss through the
6 AC-DC converter, 2270?

7 A. Again, it depends on how that AC-DC converter
8 is implemented. There are ways that you can build, for
9 example, active diodes that effectively are a switch
10 that are turned on at very specific instances of time to
11 allow for a current to flow through and then shut off at
12 the appropriate time. In fact, I've designed those
13 myself in some applications.

14 At which point, we return to kind of a similar
15 discussion as to what we were just having about, you
16 know, the current monitor's internal resistance.

17 So it's possible that you could design a diode
18 such that its forward voltage drop and/or its effective
19 series resistance is negligible relative to the
20 resistance, the total resistance seen in the circuit or,
21 in other words, negligible relative to the total power
22 consumed in other portions of the circuit.

23 Q. As shown in Figure 2b, with a single diode,
24 2272, and this capacitor, 2274, is the AC-DC converter,
25 2270 -- would it have a power loss?

1 MR. NASH: Objection to form.

2 THE WITNESS: So -- so, again, I'll first note
3 that the AC-DC converter, 2270, is optional. Of course,
4 if it's not there, it wouldn't have a power loss at all.

5 If it is there, there are ways to design it
6 such that its power loss is negligible relative to the
7 overall power consumed by the system.

8 Can that be absolute zero? No. It will have
9 some finite loss. But it's within the capabilities of a
10 POSITA to design it such that its loss is negligible.

11 BY MR. STEPHENS:

12 Q. There's a voltage represented to the left of
13 the AC-DC converter, $V_2(t)$.

14 Do you see that?

15 A. I do.

16 Q. And $V_2(t)$ is the voltage across the secondary
17 coil, L2, correct?

18 A. That's right.

19 Q. And then there's a voltage represented to the
20 right of the AC-DC converter, 2270, which is $V_{22}(t)$.

21 Do you see that?

22 A. I do.

23 Q. And why would they represent two different
24 voltages on either side of the AC-DC converter?

25 MR. NASH: Objection. Form.

1 BY MR. STEPHENS:

2 Q. I'll rephrase that question.

3 Is there a difference between the voltage
4 $V_2(t)$ and $V_{22}(t)$?

5 A. If the AC-DC converter is present, which,
6 again, I'll note is optional, then $V_2(t)$ would be an AC
7 signal and $V_{22}(t)$ would be a DC signal, so that would
8 be one difference.

9 Q. In your experience, are those diodes used in
10 an AC-DC converter -- do they have a forward voltage
11 drop when biased in the forward direction?

12 MR. NASH: Objection to form.

13 THE WITNESS: I guess I'm not sure how to
14 answer that precisely because -- do most do? I don't
15 know. I guess I haven't surveyed all of the different
16 AC-DC converter designs that I've ever looked at.

17 Do some? Yes.

18 Do all? No.

19 So the answer is somewhere -- somewhere in
20 between there.

21 BY MR. STEPHENS:

22 Q. Like to refer to paragraph 82 of your
23 declaration, the '461 declaration.

24 A. Okay.

25 Q. And in this paragraph, you were discussing

1 Figure 14 from the Olson prior art reference, correct?

2 A. Yes.

3 Q. In the first sentence of paragraph 82, you
4 state that "Current flowing from the batteries to the
5 current measure block, 226, passes through multiple
6 switches and a diode, as depicted in Figure 14, each of
7 which would cause a voltage drop and have power loss
8 prior to reaching the current measure block, 226."

9 Do you see that?

10 A. I do.

11 Q. So I'm trying to reconcile the testimony that
12 you're giving to me with respect to the '461 patent and
13 what you've opined in paragraph 82.

14 You seem to be unsure whether there would be a
15 forward voltage drop across the diode in Figure 2b, and
16 yet you testified that there would be a voltage drop
17 across the diode in Olson's circuit.

18 So is there a basis in the reference for -- in
19 either Olson or the '461 patent that supports that
20 distinction?

21 MR. NASH: Objection. Mischaracterization and
22 form.

23 THE WITNESS: So I think a big difference here
24 is -- well, first of all, again, in the '461 patent,
25 that AC-DC converter is optional. But even if it were

1 included, it's certainly possible to design rectifiers
2 in certain modes of operation that have negligible
3 forward voltage drop or negligible power loss because
4 that's effectively just one switch or one -- one active
5 diode or something like this.

6 In Figure 14 of Olson, there's quite a few
7 things that are happening in series here. And my
8 experience as a POSITA, it's, if you have one element
9 that you need to really do a good design on and minimize
10 its power consumption, that is kind of a reasonable
11 thing to try and do, and you can probably make it
12 negligible.

13 But in this case, Olson is showing two
14 switches and the diode from the batteries to the current
15 measure block, and then, of course, the current measure
16 block goes through another DC-DC converter, through the
17 transmit signal, through another switch, and then
18 finally to possibly the primary inductor coil, although
19 it may also be coupled to the telemetry antenna.

20 So there's just a lot more going on there in
21 Olson that I find it improbable that a POSITA would be
22 able to make all of those things negligible.

23 BY MR. STEPHENS:

24 Q. Well, I'll just focus on the diode itself.

25 Is it impossible to implement Olson's

1 circuitry in Figure 14 with a diode that has no forward
2 voltage drop?

3 MR. NASH: Objection. Form.

4 THE WITNESS: So I think this is essentially
5 the same discussion we had about the current monitor
6 where it -- it's possible, if you only had one diode and
7 then kind of nothing else, then you could probably do a
8 good job as a POSITA to design it such that it has
9 negligible forward voltage drop or negligible power
10 loss.

11 But, again, in the context of everything else
12 going on in Figure 14 of Olson, I find it improbable
13 that a POSITA would be able to do that for all of these
14 things in series.

15 BY MR. STEPHENS:

16 Q. Let's turn back to the '461 patent.

17 A. Okay.

18 MR. NASH: Counsel, we've been going for about
19 an hour. If -- if you're coming up to, you know, a good
20 breaking point, I may suggest we continue to questions
21 there, but if it's going to be a while, maybe we can
22 take a break.

23 MR. STEPHENS: Yeah, I'd be happy to take a
24 break.

25 Would that be a good time for you,

1 Dr. Mercier?

2 THE WITNESS: Yeah, that sounds good.

3 MR. STEPHENS: Okay. How does ten minutes
4 sound?

5 THE WITNESS: Good.

6 MR. STEPHENS: All right. Why don't we
7 return, then, at -- I think we've got several different
8 time zones here. I'll say 11:20 Central.

9 (Recess: 11:20 a.m. to 11:22 a.m.)

10 BY MR. STEPHENS:

11 Q. Thank you, Dr. Mercier.

12 Did you have any discussions with counsel,
13 discussions of your testimony, during the break?

14 A. I did not.

15 Q. All right. I'd like to refer again to
16 Figure 2b of the '461 patent.

17 A. Okay.

18 Q. And we were looking earlier at the AC-DC
19 converter, 2270, in this diagram.

20 Do you recall?

21 A. I do.

22 Q. And in this diagram, the AC-DC converter is
23 implemented with a diode, 2272, and a capacitor, 2274,
24 correct?

25 A. That's right.

1 Q. Would this be recognized as a half-wave
2 rectifier?

3 A. I think that's fair to say.

4 Q. And there are other circuits, for example,
5 that would be -- that are known as a full-wave
6 rectifier, correct?

7 A. Correct.

8 Q. Do you know the distinction between a
9 half-wave rectifier and a full-wave rectifier?

10 A. I do.

11 Q. Can you explain what the difference is?

12 A. Sure.

13 So a halfway rectifier will take a, for
14 example, sinusoidally varying --

15 (Court reporter requested clarification.)

16 THE WITNESS: So a half-wave rectifier would
17 take a sinusoidally varying waveform and rectify half of
18 the -- say, for example, the upper half of the sinusoid,
19 whereas a full-wave rectifier will rectify both tops of
20 the sinusoid.

21 BY MR. STEPHENS:

22 Q. The half-wave rectifier would produce a
23 pulsating DC output, correct?

24 A. If there were no output smoothing capacitor,
25 that would be the case. But if there is an output

1 smoothing capacitor, then it would be -- then it could
2 be pretty close to the DC signal.

3 Q. Is there an output smoothing capacitor
4 depicted in Figure 2b?

5 A. Yes, capacitor 2274.

6 MR. NASH: I'm going to object to this line of
7 questioning as being outside the scope.

8 BY MR. STEPHENS:

9 Q. Would a half-wave rectifier generally have
10 higher or lower power losses than a full-wave rectifier?

11 MR. NASH: Objection. Scope and relevance.

12 THE WITNESS: It's a difficult -- to answer --
13 that's a difficult question to answer generally, simply
14 because there's a lot of information that would be
15 required in order to make that determination.

16 A half-wave rectifier has only one active
17 element, and so it's possible to design that active
18 element to have lower losses compared to a full-wave
19 rectifier, which would have many elements.

20 But a full-wave rectifier captures more of the
21 input signal. The ripple at the output is different.
22 The current loads, the input, and P_ins, all of these
23 things are different between these two cases, so it
24 would be very difficult to make a generalized assessment
25 like that.

1 BY MR. STEPHENS:

2 Q. All right. Let's turn to Column 9 again of
3 the '461 patent. And I'll look at the paragraph that
4 starts at line 26.

5 A. Okay.

6 Q. The last sentence of this paragraph, line 31,
7 reads: "Thus, with the ancillary load, 2144, connected,
8 the total power, P2, drawn by the secondary coil, L2, is
9 given by an equation that's provided at line 35."

10 Do you see that?

11 A. I do.

12 Q. And the power, P2, is set to equal the
13 voltage, V22(t), times the sum of the current, I22 and
14 I24.

15 Do you see that?

16 A. I do.

17 Q. So this power equation includes the power
18 delivered to the electric load, 2280, and power
19 delivered to the transmission circuit, 2140, correct?

20 A. Correct.

21 Q. This power equation does not include power
22 loss to the AC-DC converter, 2270, correct?

23 A. That's correct. Perhaps -- and I hate to
24 speculate on the authors of the patent, but -- that
25 AC-DC converter was marked optional, and so perhaps they

1 were just analyzing the case in which it wasn't there.

2 Q. You would agree, however, that V22 is the
3 voltage produced by the AC-DC converter, correct?

4 A. Yes. And I would also say that V22 would be
5 equal to V2 if the optional AC-DC converter weren't
6 there.

7 Q. And yet the authors used V22 as the output of
8 the AC-DC converter, correct?

9 A. They did, yeah. I can't speculate as to why.

10 Q. So this equation that gives the total power,
11 P2, drawn by the secondary coil, L2, does not account
12 for the power loss through the AC-DC converter, 2270,
13 when the converter is present, correct?

14 MR. NASH: Objection. Form.

15 THE WITNESS: When the AC-DC converter is
16 present, that's correct. That equation does not include
17 the losses.

18 It's possible those losses are negligible.
19 This is a pretty simple rectifier depicted here with
20 just one active element. So it's possible those losses
21 were negligible.

22 It's possible they were referring to this
23 without the AC -- the optional AC-DC converter. I'm not
24 sure. But I think a POSITA reading this could
25 understand those as possibilities.

1 BY MR. STEPHENS:

2 Q. So the power equation, $P_2(t)$, does not reflect
3 all of the power received by the secondary coil, L_2 ,
4 correct?

5 MR. NASH: Objection. Form.

6 THE WITNESS: That's not -- that's not quite
7 what I said. If the optional AC-DC converter is not
8 included, then it would. If the optional AC-DC
9 converter is included, then it's possible that its
10 losses are negligible and don't need to be accounted for
11 in that equation.

12 BY MR. STEPHENS:

13 Q. Why don't you need to account for a negligible
14 loss even if it's -- well, why don't you need to account
15 for a negligible loss in the power equation given at
16 line 35?

17 A. I mean, if it's negligible, it's immaterial to
18 the calculation, right? So let's say, for example,
19 you're delivering 10 watts of power and you're, you
20 know, thinking -- and the middle of your AC-DC converter
21 has a loss of a milliwatt, just as -- I'm making up
22 numbers here, but -- as an example.

23 That 1 milliwatt of loss is immaterial
24 relative to the 10 watts of power you're delivering to
25 the output. So a designer wouldn't worry about that.

1 It doesn't influence their design in any meaningful way.

2 Q. Let's turn to Claim 1 of the '461 patent.

3 A. Okay.

4 I'll just note, before we get started on this,
5 I didn't opine on Claim 1.

6 Q. I'm sorry, Claim 13.

7 A. Okay.

8 Q. And at line -- or Column 22, at line 3,
9 there's a limitation that reads: "At least one input
10 power monitor configured to measure input power received
11 by the primary coil from the power supply."

12 Do you see that?

13 A. I do.

14 Q. Can the measurement of input power in this
15 claim limitation include negligible power losses?

16 MR. NASH: Objection. Form.

17 THE WITNESS: Let me just think about this for
18 a moment. I haven't offered an opinion on exactly that
19 in my report. Let me just think for a moment.

20 So the claims need to be read in light of the
21 specification by a POSITA who has knowledge of how to
22 design things like this. And engineers are practical
23 people, generally, and if there's something in a circuit
24 that has a negligible impact on it, then it's usually
25 fair to ignore that.

1 For example, I live in California. I do lots
2 of experiments in my lab. I don't take seismic activity
3 into account in my experiments because, while there
4 probably is some seismic activity going on at many
5 times, it's negligible, right? It's not going to impact
6 my experiments in any meaningful way.

7 So when I, as a POSITA -- I'm reading this
8 claim language, I would say, "Yeah, if there's" -- "if
9 there's some component in there that is consuming a
10 negligible amount of power, I would say that that is not
11 required to be included in the reading of this claim
12 language. If it's not negligible, then that would not
13 satisfy the claim language.

14 BY MR. STEPHENS:

15 Q. How would you define negligible?

16 A. That depends on context and design goals and
17 things like this. So that's -- there's no kind of one
18 definition. It's really context and application
19 dependent.

20 Generally, it's if something is present but
21 doesn't materially impact a parameter that you care
22 about, like efficiency or something like this. Then I
23 would consider that to be negligible.

24 Q. All right. The next limitation -- this is at
25 Column 22, line 6 of Claim 13 -- refers to at least one

1 signal detector configured to detect signals carrying
2 data pertaining to output power received by the
3 secondary coil.

4 Do you see that?

5 A. I do.

6 Q. Can the signal's carrying data pertaining to
7 output power received by the secondary coil include
8 negligible power losses?

9 MR. NASH: Objection to form.

10 THE WITNESS: I think that's fair to say.
11 This claim language is looking at the output power
12 received by the secondary coil, which is kind of very
13 clearly defined in the specification of this patent.

14 If there are other things that are negligible,
15 like they simply just don't matter to that power
16 calculation, then, if they happen to be in there and
17 they're negligible, yeah, I think that's fine.

18 If -- if there's additional power in there
19 that's not negligible, then that's a different
20 consideration.

21 BY MR. STEPHENS:

22 Q. And, again, whether something is negligible
23 will be context dependent, correct?

24 A. Yeah. Content -- context and application
25 dependent, yes.

1 Q. Now, again, this claim limitation refers to a
2 signal detector configured to detect signals carrying
3 data pertaining to output power received by the
4 secondary coil.

5 With that in mind, can you point to any
6 circuitry in Figure 2b that measures the output power
7 received by the secondary coil?

8 A. So Figure 2b and all of the figures in
9 Figure 2 are not comprehensive schematics of an
10 embodiment of the '461 patent. So Figure 2b does not
11 include schematic-level details of how current, for
12 example, is measured, or power.

13 But it's my opinion that the '461 does teach a
14 sufficient amount of information for a POSITA to
15 understand how to do that. Certainly, for example, they
16 show how they do it on the primary side of the inductive
17 couple.

18 And, also, Figure 5 has a block diagram
19 showing how it would be monitored or how the output is
20 connected to the secondary coil, for example.

21 So that, along with the description of the
22 specifics of how they discuss monitoring the output
23 power, I think the '461 patent is -- it's quite clear
24 and gives good direction to the POSITA on how to do
25 this.

1 And that's in contrast to what, for example,
2 Olson does, which provides very little guidance or
3 detail on how to do this on the secondary side as well.

4 And on the primary side, they do provide good
5 teachings on how to do power monitoring on the primary,
6 except that it's doing it in a different location than
7 the '461 patent is describing.

8 Q. To be clear, then, there's no circuitry
9 depicted in Figure 2b for measuring the output power
10 received by the secondary coil, correct?

11 A. That's correct.

12 MR. NASH: Objection. Mischaracterization.

13 THE WITNESS: But, again, there's a lot I said
14 in my previous answer that describes how the teachings
15 of the '461 patent, including in Figure 5 and the text,
16 do teach a POSITA how -- how one might do current
17 monitoring, for example, on the secondary side.

18 BY MR. STEPHENS:

19 Q. I'll turn to Figure 5 in a moment.

20 But across figures 2a through 2d, is there any
21 circuit -- circuitry depicted in any of those figures
22 for measuring good power on the other -- secondary side?

23 MR. NASH: Objection. Form.

24 THE WITNESS: In figures 2a through -d, there
25 is not. But, again, in the text of the '461 patent, as

1 well as Figure 5 and so on, there is detail on how a
2 POSITA would be -- would do this.

3 BY MR. STEPHENS:

4 Q. All right. You've referenced Figure 5, so
5 let's turn there.

6 Generally, what's your understanding of what's
7 depicted in Figure 5?

8 A. Figure 5 shows a block diagram of the
9 inductive coupling system. They show how power is
10 delivered to a primary coil. The primary coil is wired
11 to an input power monitor and a processor. The
12 secondary coil is wired to an output power monitor and a
13 load.

14 And -- and the result from the output power
15 monitor is delivered to the processor on the primary
16 side by means of some wireless communication mechanism
17 to deliver that information.

18 Q. If you'll turn with me to Column 13 of the
19 '461 patent at line 15.

20 A. Okay.

21 Q. This is a paragraph that begins: "The input
22 power monitor, 4122, is configured to measure the input
23 power provided by the primary coil, 4220, and
24 communicate this value to the processor, 4162."

25 Correct?

1 A. That's right.

2 Q. Is the input power that's, quote, "provided by
3 the primary coil, 4220," the input power -- is it the
4 same as the input power received by the primary coil
5 from the power supply as recited in Claim 13?

6 MR. NASH: Objection. Form.

7 THE WITNESS: Yes.

8 BY MR. STEPHENS:

9 Q. Going back to Figure 5, the secondary side
10 includes a secondary coil, 4260; a load, 4280; and an
11 output power monitor, 4124, correct?

12 A. That's right.

13 Q. And this figure shows that the output power
14 monitor, 4124, receives a signal P_out from the
15 secondary coil, correct?

16 A. That is how it's depicted. I do have to say
17 this is a block diagram, so it may not be indicative of
18 exactly how it is implemented in practice. But as a
19 block diagram, I think this is fine, and that is what it
20 depicts.

21 Q. So the block diagram in Figure 5 doesn't
22 depict the underlying electrical components that would
23 be used to implement a real-world implementation of this
24 system, correct?

25 A. I mean, the block diagrams rarely do that in

1 electrical engineering. And, for example, the primary
2 coil connecting to the input power monitor via signal
3 P_in is depicted similarly.

4 And we have an embodiment in Figure 2a that
5 shows how that's done in more detail where that input
6 power monitor is actually in series with the primary
7 coil. It's just hard to show that in a simplified block
8 diagram.

9 So a POSITA looking at Figure 5 would see the
10 teachings of the primary coil connected to the input
11 power monitor, refer to Figure 2 to see how that's done,
12 and then would do something similar for the secondary
13 coil.

14 Q. Is there any more detailed disclosure about
15 the circuitry that's used to implement the output power
16 monitor, 4124, in the '461 patent?

17 MR. NASH: Objection. Form.

18 THE WITNESS: In terms of the -- so the '461
19 patent describes with specificity where the output power
20 of the secondary coil ought to be measured, which I have
21 to say is in contrast to, for example, what's done in
22 Olson.

23 And so it's very clear where it needs to be
24 measured. There is circuitry disclosed for how this is
25 done in the primary coil. There's a corresponding block

1 diagram that shows the relative positioning of that
2 circuitry relative to the primary coil in Figure 5,
3 which has the same arrangement for the secondary coil.

4 So while no explicit schematic is shown for
5 how to do this explicitly for the secondary coil,
6 it's -- a POSITA reading the '461 patent would
7 understand its teachings and would be able to implement
8 that output power monitor in a similar way to how it's
9 taught on the primary side.

10 That's my interpretation of this.

11 BY MR. STEPHENS:

12 Q. On the primary side, power is calculated based
13 on the voltage of the power supply, 2240, correct?

14 A. That's correct. Well, I would say the voltage
15 at the output of the power supply.

16 Q. And there's no corresponding power supply,
17 2240, on the secondary side, correct?

18 A. No, but there are similarly marked voltages in
19 V2(t) and V22(t) that could --

20 Q. You --

21 I'm sorry, go ahead.

22 A. Yeah, sorry.

23 -- that one could use, depending on whether
24 the AC-DC converter is there or not.

25 Q. So would you presume that you would need a

1 voltage monitor on the secondary side that's not used on
2 the primary side?

3 MR. NASH: Objection. Form.

4 THE WITNESS: I'd hesitate to say that there's
5 no voltage monitor on the primary side. It really
6 depends on how this power supply is constructed and the
7 type of waveforms that it generates.

8 It's possible that simply a measurement of the
9 DC power supply or the DC power supply whose voltage is
10 known could be used, or it's possible that they are
11 using a power monitor -- sorry, a voltage monitor to
12 measure that voltage. And so you could use a similar
13 voltage monitor on the secondary side.

14 Voltage monitors are quite easy to build.
15 They are certainly, in most electronic devices, easier
16 to build than a current monitor. You can simply have a
17 buffer going into an analog-to-digital converter, for
18 example, to digitize the voltage at any point in the
19 circuit.

20 And so doing something like that is quite easy
21 for -- for a POSITA to do, in my opinion.

22 BY MR. STEPHENS:

23 Q. Turn to paragraph 76 of your declaration for
24 this.

25 A. Okay.

1 Q. In the second sentence in paragraph 76, you
2 state that Olson fails to disclose at least claim
3 limitations 13.1, 13.2, 13.3, 13.4, 14, 15.2, and 17.1.

4 Do you see that?

5 A. I do.

6 I think I'm -- I'm sorry, I'd like to -- I see
7 a typo. I think I did not opine on Claim 14.

8 Q. So you did not consider Claim 14?

9 A. Correct.

10 Q. Have you offered an opinion on Claim 14 in any
11 proceeding involving the '461 patent?

12 MR. NASH: I'm going to caution the witness
13 not to divulge any privileged information, but you may
14 answer the question to the extent you can do so without
15 disclosing privileged information.

16 THE WITNESS: I did not offer an opinion on
17 Claim 14 in this report. I can't recall off the top of
18 my head if I have in a previous report. I'd have to
19 refer to that to give a -- a good answer there.

20 BY MR. STEPHENS:

21 Q. Do you ever recall opining on Claim 14 outside
22 of this IPR?

23 MR. NASH: Again, I'm going to caution the
24 witness not to divulge any privileged information, but
25 you may answer the question if you can do so without

1 divulging privileged information.

2 BY MR. STEPHENS:

3 Q. And to be clear, I'm not asking for
4 discussions -- any opinions you may have discussed with
5 counsel.

6 What I'm interested in is have you submitted a
7 report or filed a report with a court or any other
8 tribunal or served it to another party and -- that -- in
9 a proceeding involving the '461 patent in which you
10 opined on Claim 14.

11 A. I -- I don't recall. It doesn't sound
12 familiar, but I can't say for certain without looking
13 through my old reports.

14 Q. Turn to paragraph 122 of your declaration.

15 A. Okay.

16 Q. And, here, you state that Stephens's power
17 requirement information could not be substituted in
18 Olson for Olson's efficiency calculation. Stephens's
19 power refinement information does not relate to power
20 delivered to the secondary coil but rather the actual
21 load, 46.

22 Do you see that?

23 A. I do.

24 Q. So you draw a distinction in this paragraph
25 between power delivered to a secondary coil and the

1 actual load, 46. Is that a fair characterization?

2 MR. NASH: Objection. Form. And objection.
3 Mischaracterization.

4 MR. STEPHENS: Well, fortunately, I've asked
5 the witness if that's a fair characterization.

6 THE WITNESS: So it's a little bit more
7 nuanced than that because Stephens -- my understanding
8 of Stephens is that he does not actually communicate the
9 instantaneous actual load power consumption but rather
10 the power requirement information, which is maybe
11 different from the actual power consumed.

12 And in addition, this is for the load itself
13 and not any ancillary circuitry before or after that.

14 BY MR. STEPHENS:

15 Q. So you mentioned that your understanding is
16 that Stephens does not actually communicate the
17 instantaneous actual load.

18 What do you mean by "the instantaneous actual
19 load"?

20 A. Load power is what I -- I think I said or at
21 least meant to say.

22 And what I mean by that is it's -- it's not --
23 my understanding of Stephens is it's not an actual load
24 power measurement that's happening but rather Stephens
25 is communicating this is the power required by the load,

1 which is known in advance.

2 And that may not be the same. It won't be
3 exactly the same as the actual power consumed by the
4 load.

5 MR. STEPHENS: I have no further questions on
6 the '461 patent at this time.

7 We haven't quite been going for an hour, but
8 before we turn to '204, would you like to take a break?

9 THE WITNESS: Yeah, that would be good.

10 MR. STEPHENS: Okay. 10 minutes? 15 minutes?
11 What would work best?

12 THE WITNESS: Let's do 15 minutes, if you
13 don't mind.

14 MR. STEPHENS: Okay. Let's -- 20 after the
15 hour, we'll be back.

16 (Recess: 12:04 p.m. to 12:21 p.m.)

17 BY MR. STEPHENS:

18 Q. During the break, Dr. Mercier, did you discuss
19 your testimony with counsel?

20 A. I did not.

21 Q. All right. As I mentioned before the break,
22 we'll turn to the '204 patent. And for these questions,
23 I have two documents that I'd like to reference. I'll
24 put them in the chat. Just let me know when you receive
25 them.

1 A. Okay. I'm downloading them now.

2 Okay.

3 Q. So one of the two documents that I just shared
4 is Exhibit 1001, which is the '204 patent.

5 Does it appear to be a true copy of the '204
6 patent?

7 A. It looks like it, yes.

8 Q. And the other document is the Board's
9 Institution Decision in this proceeding.

10 Does that appear to be a correct copy of the
11 Institution Decision?

12 A. It looks like it, yes.

13 Q. Okay. And I should have shared also your
14 declaration. So let me send that too.

15 A. Let me grab it here.

16 Okay.

17 Q. And this has been marked Exhibit 2009 in the
18 IPR in the '204 patent, which is the second declaration
19 you've submitted in this proceeding, correct?

20 A. That's correct.

21 Q. Have you ever reviewed the Board's Institution
22 Decision?

23 A. I -- I reviewed it, yes.

24 Q. All right. I'd like to refer to page 27 of
25 the Institution Decision.

1 A. Okay.

2 Q. And on this page, the Board begins the
3 discussion of incremental value as recited in Claim 1.

4 Do you see that?

5 A. Yes.

6 Q. Forwarding -- skipping a few pages ahead to
7 paragraph -- or I'm sorry, page 31, the last two lines
8 on page 31, the Board stated that: "At this early stage
9 of the proceeding, we do not agree with Patent Owner's
10 interpretation of 'incremental value,' and we decline to
11 read into the claim concepts such as a repeating
12 feedback loop, a series of adjustments, and the
13 exclusion of the selection of discrete frequency
14 values."

15 Do you see that?

16 A. I do.

17 Q. And then in the next paragraph, the Board
18 invites the parties to further discuss the meaning of
19 incremental value in further briefing.

20 Do you see that?

21 A. Yes.

22 Q. You've provided a construction of incremental
23 value in your declaration, correct?

24 A. I'm just going to pull up my declaration here
25 and quickly review what I wrote.

1 Is there an area in my report that you're
2 specifically referring to?

3 Q. No. I just wanted to establish that you've
4 opined on the meaning of incremental value. Is that
5 correct?

6 A. I have.

7 Q. All right. So I'd just like to -- going back
8 to pages 31 -- or 32 and 33 of the Institution Decision.

9 A. I'm sorry, which page? My apologies.

10 Q. I had it wrong. At the end of 31, last two
11 lines of 31.

12 A. Okay.

13 Q. First three lines of 32.

14 A. Yes.

15 Sorry, what was the question?

16 Q. So, again, here are the words that -- "we
17 decline to read into the claim concepts such as a
18 repeating feedback loop, a series of adjustments, and
19 the exclusions of the selection of discrete frequency
20 values," correct?

21 A. I see that's what the Board said, yes.

22 Q. In your view, does Claim 1 require a series of
23 incremental adjustments to the transmission frequency?

24 A. It does. In Claim 1, one of the sub claims --
25 or one of the limitations, rather, says "provide less

1 power by increasing said nonresonant transmission
2 frequency by an incremental value."

3 And they also do that for decreasing as well.

4 So, yes, Claim 1 requires incremental
5 adjustments of the transmission frequency.

6 Q. Does Claim 1 require a single adjustment -- a
7 single incremental adjustment or a series of incremental
8 adjustments?

9 MR. NASH: Objection. Form.

10 THE WITNESS: So Claim 1 doesn't directly use
11 that language, but the claims do need to be read in
12 light of the specification. And the specification
13 describes, if the power received by the load is too high
14 or too low, a series of feedback signals will be
15 transmitted. And, therefore, a series of incremental
16 adjustments will be made.

17 And so a POSITA reading Claim 1 in light of
18 the specification would understand that that's a likely
19 outcome.

20 BY MR. STEPHENS:

21 Q. What do you mean by "likely outcome"?

22 A. So I think perhaps that this question might be
23 best addressed by means of analogy. And what I'm going
24 to do is -- I want to emphasize the difference between
25 going through incremental adjustments of, say, a

1 transmission frequency as opposed to selection of a
2 handful of discrete possibilities.

3 And my analogy is driving a car. Okay? So
4 let's say you're driving a car. You're on the freeway.
5 There's lots of traffic, and your car can only select
6 from one of a small number of discrete speeds. It can
7 go 0 miles per hour, it can go 20 miles per hour, or it
8 can go 50 miles per hour. You're going to have a hard
9 time driving that car on the freeway and not crashing
10 into people.

11 That is an example, I would say, of a -- of a
12 feedback system. You, being the driver, is feeding back
13 with respect to visual information on the highway and
14 steering and adjusting the speed so that you can drive
15 safely and not crash.

16 In contrast, a car that has the ability to
17 incrementally adjust its speed by, say, integer
18 multiples of miles per hour -- so can you go 0, 1, 2, 3,
19 4, all the way up to, say, 65 miles per hour -- those
20 smaller incremental adjustments allows the driver, in
21 feedback with what's going on on the freeway, to adjust
22 their speed to be driving in a safe and stable manner.

23 So that's, I think, a nice analogy that
24 illustrates the difference between incremental
25 adjustments of some parameter and -- and selection from

1 a handful of course possibilities.

2 And that's very representative of what's going
3 on in the '204 patent where we describe operation in
4 this near-linear region and the feedback mechanism
5 allows for incremental adjustments within that
6 near-linear region so as to stably and accurately
7 control the performance of the system.

8 And that's a contrast from, for example,
9 Onishi, which only allows you to pick from one of three
10 different frequencies, which makes using the system
11 quite difficult to offer stable control, I would say.

12 And so with that analogy in mind, a POSITA
13 reading the claim language would understand, "Ah,
14 incremental adjustments allow for this fine-grain
15 control and allow for more precision in controlling the
16 device and, as a result, having more stability in the
17 system."

18 So a POSITA reading this claim language
19 would -- would understand the reason for -- for why
20 incremental values are important and understand that
21 they -- they could be adjusted in sequence in order to
22 get to the operating point that you need to be at.

23 That was a bit of a long answer, but hopefully
24 it answered your question.

25 Q. Well, it's close. And I think I understand

1 your -- your take on what the specification describes.

2 But what I'm really interested in is the claim
3 language, what's required and what's not required.

4 So looking at the claim language,
5 Limitation 1.7 refers to "said driver is configured to
6 provide less power by increasing said nonresident
7 transmission frequency by an incremental value when said
8 first signal is detected by the detector."

9 Is there anything in that claim language that
10 requires a series of adjustments to the transmission
11 frequency?

12 MR. NASH: Objection. Form.

13 THE WITNESS: So -- so, again, the claim
14 language doesn't have that explicit discussion, but the
15 claims need to be read in light of the specification and
16 the knowledge of the POSITA.

17 And I wouldn't find a system that has some
18 operating point somewhere in that near-linear region and
19 can only adjust itself by one or two values
20 incrementally in that near-linear region as having
21 beneficial -- having benefits for control and stability
22 of control and being able to adjust power and so on.

23 And so if the claim language is limited to,
24 say, you can -- you only adjust by one incremental
25 value, that's not a very high use to a POSITA or to a

1 user of this technology.

2 So while the claim language -- and sorry, and
3 that's in contrast to what Onishi is suggesting in his
4 example where there's only three possible frequencies.

5 So the claim language, when read in light of
6 the specification and the knowledge of the POSITA --
7 would understand that the intention of allowing for
8 incremental adjustments is such that you have a broad
9 spectrum of possibilities of where that incremental
10 adjustment could take you in order to control for power
11 and, you know, have stable control operation and so on.

12 So while it's not explicitly stated, a POSITA
13 would understand that that is a key aim of the -- of the
14 patent is to allow for that gradual control.

15 BY MR. STEPHENS:

16 Q. Just to boil it down, could Claim 1 be met by
17 a single adjustment to the transmission frequency?

18 MR. NASH: Objection. Form.

19 THE WITNESS: I haven't considered that. I'm
20 just thinking about this.

21 Yeah, I guess I'm not sure. I think, again,
22 the intent of the patent and the specification
23 discussion and, frankly, the claim language is to allow
24 for incremental adjustments for the purposes of stable
25 and predictable control.

1 If you only adjust by one notch and never do
2 anything other than that, would that satisfy the claim
3 language? I guess I don't know. I'd have to -- I'd
4 have to think about that further.

5 If -- yeah, I don't know. I guess in the
6 context of -- of the prior art references, for
7 example -- for example, Onishi -- not clear that any of
8 those frequencies in Onishi are in the near-linear
9 region. And so as a result, I don't believe -- it's not
10 my opinion that Onishi satisfies that claim language.

11 But for your specific question, I guess I'm
12 not sure. I'd have to think about that more.

13 BY MR. STEPHENS:

14 Q. Do you agree that, if a series of incremental
15 adjustments were to be required, that the claim could
16 have been drafted to include that language?

17 MR. NASH: Objection. Form.

18 THE WITNESS: I'm not sure. You know, I don't
19 really want to speculate on behalf of the inventors.

20 And, frankly, I'm not sure that it's necessary
21 to do that, simply because the claims, when read in
22 light of the specification, make it clear how the device
23 would be operated, and that would include a series of
24 adjustments as described directly in the -- in the
25 specification.

1 BY MR. STEPHENS:

2 Q. Okay. Let's turn to the '204 patent,
3 Exhibit 1001.

4 A. Okay.

5 Q. And let's look at Figure 6b.

6 MR. NASH: You said Figure 6b?

7 BY MR. STEPHENS:

8 Q. 6b.

9 A. Okay.

10 Q. What's your understanding of what's depicted
11 in Figure 6b?

12 A. Figure 6b is a plot of the operational voltage
13 on the Y-axis versus transmission frequency on the
14 X-axis. It shows -- and this is of the inductive
15 couple. It shows a peaking behavior at the resonant
16 frequency, and it shows near-linear regions on either
17 side of that resonant frequency. Those would be regions
18 6 and 8.

19 And it shows a transmission frequency in one
20 of those regions, specifically Region 8, with upper and
21 lower bounds of operation frequency within that
22 near-linear region.

23 Q. And there are several frequencies depicted
24 along the X-axis, correct?

25 A. That's correct.

1 Q. What does f_R represent?

2 A. That represents the characteristic resonant
3 frequency of the inductive couple.

4 Q. What does f_U represent?

5 A. f_U is the lower bound of frequency of the
6 near-linear region which corresponds to the upper bound
7 of voltage of near-linear Region 8.

8 Q. And what does f_b represent?

9 A. f_b is the upper bound in frequency of the
10 near-linear region which corresponds to the lower bound
11 of the voltage in the near-linear region.

12 Q. What does f_t represent?

13 A. That represents the instantaneous transmission
14 frequency.

15 Q. And as shown in Figure 6b, the transmission
16 frequency can be shifted by ΔF from a lower
17 frequency here to a higher frequency ΔF ; is that
18 correct?

19 A. That's right.

20 Q. To make an incremental change, is it required
21 to add an incremental value to your instantaneous
22 transmission frequency?

23 MR. NASH: Objection. Form.

24 THE WITNESS: To make an incremental change,
25 you can add or subtract a frequency, an incremental

1 Delta.

2 BY MR. STEPHENS:

3 Q. So I'm going to posit a hypothetical here.

4 In the near-linear Region 8, between
5 frequencies f_U and f_b , let's assume that there are a
6 series of frequencies separated by a distance ΔF .
7 And we're starting with an instantaneous transmission
8 frequency at f_U .

9 If the system were to select a predetermined
10 frequency that was a ΔF more than f_U , would that be
11 an incremental adjustment to the transmission frequency?

12 Does that -- and let me know if you need
13 clarification.

14 MR. NASH: Objection. Form. Objection.
15 Improper hypothetical.

16 THE WITNESS: So maybe let me try and under --
17 repeat your question to make sure that I understand and
18 can answer it clearly.

19 So you're saying, in this hypothetical, we
20 start at frequency f_U , which is at the upper voltage
21 bound/lower frequency bound of the near-linear region in
22 Figure 6b. And we then subsequently switch to a
23 predetermined frequency that is -- how far away from f_U ?

24 BY MR. STEPHENS:

25 Q. ΔF .

1 A. Delta F. Okay.

2 And your question after that was what?

3 Q. When you make the shift from fU to the
4 predetermined frequency that's delta F from fU, would
5 that be an incremental increase to the transmission
6 frequency?

7 MR. NASH: Objection. Form. Objection.
8 Improper hypothetical. And objection. Relevance and
9 scope.

10 THE WITNESS: So I guess the answer is it
11 depends on a lot of things, right? So how large is
12 delta F? What is the window between fU and fb? In
13 other words, how large is this near-linear region? How
14 many other steps are available to the designer? And so
15 on.

16 So there would be a lot more information that
17 I would need to make a clear determination there.

18 BY MR. STEPHENS:

19 Q. Well, let's take delta F as the same size as
20 is contemplated in Figure 6b, the near-linear region is
21 as wide as shown as in Figure 6b, and we're using the
22 same range from fU to fb as the near-linear region. So
23 I'm not changing any of that.

24 In that scenario, would the selection of a
25 predetermined frequency that was delta F greater than fU

1 constitute an incremental change to the transmission
2 frequency?

3 MR. NASH: Objection. Form. Improper
4 hypothetical. Relevance. Scope.

5 THE WITNESS: So first of all, I'll have to
6 say, my understanding as a POSITA, Figure 6b is that
7 delta F is a -- is an exaggerated incremental frequency
8 drawn for clarity in Figure 6b. I wouldn't anticipate
9 an incremental advance, which appears to occupy
10 approximately half of the frequency range, to represent
11 an incremental frequency change.

12 My guess is that the authors just drew it that
13 way for clarity, and we often do this in engineering for
14 non-to-scale drawings just to make sure people
15 understand what we're doing and so that there is enough
16 room to write "delta F," you know, in this case, but
17 between those two dashed lines.

18 So assuming that delta F is much smaller than
19 depicted here and there's many other steps that it could
20 take such that there's room for a series of incremental
21 adjustments within the near linear region, then, yeah,
22 it's possible a control system could start at f_U and
23 increment up to higher and higher frequencies for the
24 purposes of control.

25 But it's -- if there's only one other option

1 and it's that far away as -- as depicted in Figure 6b,
2 that would be difficult to say that that would be an
3 incremental adjustment.

4 So, again, I think the answer basically boils
5 down to we need more information about everything in
6 order to make an accurate assessment in this
7 hypothetical.

8 BY MR. STEPHENS:

9 Q. Is it your opinion, then, that the size of
10 delta F, as given in Figure 6b, would not constitute an
11 incremental adjustment for the '204 patent?

12 MR. NASH: Objection. Mischaracterization.

13 THE WITNESS: I think that the purpose of
14 Figure 6b is to explain to the reader the general shape
15 of the curve, where the upper and lower bounds are, and
16 to show that the frequency will change by an incremental
17 amount marked as delta F here.

18 The figure is not to scale. And so I don't
19 think that a POSITA reading this should infer much about
20 the relative sizes of these regions or the relative step
21 size and so on.

22 And as I mentioned earlier, I think delta F is
23 probably exaggerated here for visual clarity of the
24 figure. If it were much closer together, it would be
25 much harder to read and understand of what's going on.

1 But, again, a POSITA reading this can
2 understand what the patent is teaching and that it's
3 establishing upper and lower bounds and that it allows
4 for a series of incremental adjustments within those --
5 within those bounds.

6 BY MR. STEPHENS:

7 Q. Does the '204 patent describe any maximum step
8 size for the incremental adjustment?

9 MR. NASH: Objection. Form. Relevance. And
10 scope.

11 THE WITNESS: I'm not sure. I don't have the
12 patent memorized. It describes delta F, but I don't
13 recall if it offers any specific range. And if it
14 doesn't, I'm not sure that that's even necessary.

15 Given the aim and scope of the patent, a
16 POSITA is capable of deciding what an appropriate value
17 for the incremental frequency would be when they go
18 ahead and design that wireless power transfer system.

19 BY MR. STEPHENS:

20 Q. Almost done here.

21 I guess one last question on Figure 6b. Based
22 on your experience, if the size of delta F were
23 significant, would you expect that the authors would
24 have been careful to draw delta F to scale in Figure 6b?

25 MR. NASH: Objection. Form. Calls for

1 speculation.

2 THE WITNESS: Well, I'm not quite sure I
3 understood your question. Maybe you could rephrase.

4 BY MR. STEPHENS:

5 Q. Well, I guess I'm trying to understand. You
6 seem to be -- at least my understanding of your position
7 is that the size of delta F is relevant to determining
8 whether a change of the transmission frequency is an
9 incremental value. Is that correct?

10 A. That's correct, yeah. To be incremental,
11 you'd need to be small relative to the range that you're
12 working in.

13 Q. And yet, as we see from Figure 6b, delta F is
14 quite large relative to the overall range from fU to fb.

15 So my question is: If the size of delta F is
16 significant to the invention, why don't we see, in
17 Figure 6b, delta F drawn to scale?

18 MR. NASH: Objection. Form. Objection.
19 Calls for speculation.

20 BY MR. STEPHENS:

21 Q. You can answer, Dr. Mercier.

22 A. Yeah, yeah.

23 I don't know that that's necessary. The word
24 "incremental" as it relates to things like control loops
25 is a very common term in the art.

1 And, again, I don't want to speculate on
2 behalf of the inventors, but if I was drawing this --
3 and certainly as I was reading this, I didn't find any
4 things that were unclear based on their picture here in
5 Figure 6b, which is not drawn to scale, because 6b is --
6 the purpose of 6b is to teach the reader how the system
7 is supposed to work.

8 And the important parts in Figure 6b are to
9 establish the upper and lower bounds and the fact that
10 incremental adjustments can be made within that
11 near-linear region.

12 Because the word "incremental" is very well
13 understood in the art, it was very clear to me, reading
14 this, that -- what the intended operation was and that
15 these incremental adjustments should be small relative
16 to the area of the near-linear region.

17 And this was just an illustrative drawing that
18 was exaggerated a bit to make things clear, which is
19 something we often do when we're drawing -- as engineers
20 when we're drawing drawings to teach how something
21 works.

22 Q. Figure 6b depicts only a single incremental
23 adjustment to the transmission frequency, correct?

24 A. That's -- that's correct.

25 And, again, not to speculate on behalf of the

1 authors, but if I were doing -- if I were making a
2 drawing like this, I would probably do the same thing
3 because, if I showed a bunch of really small incremental
4 adjustments, it would clutter the graph and make it less
5 easy to -- for a person reading this to understand.

6 MR. STEPHENS: All right. I think I'm just
7 about done.

8 Can we take five minutes?

9 MR. NASH: Sure.

10 MR. STEPHENS: Okay. Let's -- five after the
11 hour, we'll be back.

12 (Recess: 1:00 p.m. to 1:06 p.m.)

13 BY MR. STEPHENS:

14 Q. Dr. Mercier, did you discuss your testimony
15 with counsel during the break?

16 A. I did not.

17 MR. STEPHENS: Petitioner has no further
18 questions.

19 MR. NASH: I'd like to take another
20 five-minute break, if that's all right.

21 MR. STEPHENS: Sure.

22 (Recess: 1:07 p.m. to 1:15 p.m.)

23 EXAMINATION BY MR. NASH:

24 Q. Okay. Dr. Mercier, before the break, you were
25 discussing Exhibit 1001 from the '204 IPR.

1 Do you recall that?

2 A. I do.

3 Q. And specifically, you discussed Figure 6b.

4 Do you recall that?

5 A. Yes.

6 Q. And can you pull up Figure 6b?

7 A. I have it here, yes.

8 Q. In your opinion as a person of skill, what
9 would you say are the relevant aspects of this graph
10 that you consider looking at it? And just kind of as
11 it -- maybe a point of clarification, I'll repeat my
12 question.

13 You discussed, you know, this delta F and how
14 even maybe it's not drawn to scale and the graph itself
15 may not be drawn to scale.

16 So my question is: What are the relevant
17 features or aspects of this graph that you consider as a
18 person of skill when looking at it and evaluating it?

19 MR. STEPHENS: Objection. Form.

20 THE WITNESS: So as a person of skill in the
21 art looking at this, I'm looking at the shape of the
22 curve, the relative shape of the curve.

23 I'm looking at the fact that it's disclosing a
24 characteristic resonant frequency of an inductive
25 couple.

1 And I'm looking at that it's disclosing a
2 near-linear region -- well, two regions, 6 and 8, and
3 then it gives some exemplary details about Region 8,
4 including the upper and lower bounds of frequency and
5 voltage and the fact that incremental adjustments are
6 possible within that near-linear range.

7 That's the main things that I'm getting out of
8 this.

9 BY MR. NASH:

10 Q. And what information do you glean from the
11 labels on the axes on the Y-axis and the X-axis?

12 MR. STEPHENS: Objection. Form.

13 THE WITNESS: That the Y-axis is operational
14 voltage and the X-axis is transmission frequency.

15 And just as a note, in contrast to, for
16 example, Onishi, which doesn't have axes labels, this
17 block is quite clear in terms of what it's trying to
18 describe.

19 BY MR. NASH:

20 Q. And what is operational voltage?

21 MR. STEPHENS: Objection. Scope.

22 THE WITNESS: Operational voltage is the -- my
23 understanding is the output voltage of the inductive
24 couple.

25 BY MR. NASH:

1 Q. And how does operational voltage relate to
2 power transfer efficiency?

3 MR. STEPHENS: Objection. Scope.

4 Counsel, is there a portion of my direct or
5 redirect -- sorry, cross-examination that these
6 questions are based off of?

7 I get the sense that you are trying to
8 dovetail some testimony from your expert --

9 MR. NASH: It's directly related to your
10 examination at Figure 6b and your questions on the
11 accuracy of different graphs that have been depicted.

12 MR. STEPHENS: I asked no question about
13 operational voltage.

14 MR. NASH: But you asked questions about
15 Figure 6b.

16 BY MR. NASH:

17 Q. Dr. Mercier, my question is: How does --

18 MR. STEPHENS: I --

19 (Court reporter admonishment for simultaneous
20 speaking.)

21 MR. STEPHENS: I'll renew my objection to this
22 line of questions as beyond the scope of
23 cross-examination.

24 MR. NASH: Understood.

25 BY MR. NASH:

1 Q. Dr. Mercier, how does operation voltage relate
2 to power transfer efficiency?

3 MR. STEPHENS: Objection. Scope. Relevance.
4 Form.

5 THE WITNESS: So these are two different
6 things. Obviously voltage is a measure of voltage, and
7 efficiency is typically a measure of the ratio of power
8 numbers.

9 While there are formulas that can convert
10 voltage to power and subsequently to efficiency, this
11 depends a lot on the relative impedances seen by both
12 sides at the primary and secondary coils and so on.

13 And so a plot of operational voltage versus
14 transmission frequency might look quite a bit different
15 than a plot of power transfer efficiency versus
16 transmission frequency, for example, even on the exact
17 same system. It really depends on a lot of other
18 parameters.

19 MR. NASH: No further questions.

20 FURTHER EXAMINATION BY MR. STEPHENS:

21 Q. Dr. Mercier, did you discuss the questions
22 that counsel was going to ask on your -- on his redirect
23 before the break?

24 A. No. I didn't speak to counsel at all during
25 any of the breaks.

1 MR. STEPHENS: No further questions.

2 COURT REPORTER: May I get transcript requests
3 on the record, please?

4 MR. STEPHENS: We'd like a rough, please. I
5 think we requested by tomorrow. And the final, I
6 believe, in a week.

7 MR. NASH: And we'll take the same.

8 (Whereupon the proceedings concluded at
9 11:22 a.m.)

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ERRATA SHEET

NAME OF CASE: ANKER INNOVATIONS v. POWERMAT TECHNOLOGIES

DATE OF DEPOSITION: AUGUST 7, 2025

NAME OF WITNESS: PATRICK MERCIER, Ph.D.

Reason Codes:

1: To clarify the record.

2: To conform to the facts.

3: To correct transcription error.

Page _____ Line _____ Reason _____

From _____ to _____

Page _____ Line _____ Reason _____

From _____ to _____

Page _____ Line _____ Reason _____

From _____ to _____

Page _____ Line _____ Reason _____

From _____ to _____

Page _____ Line _____ Reason _____

From _____ to _____

Page _____ Line _____ Reason _____

From _____ to _____

Page _____ Line _____ Reason _____

From _____ to _____

Deponent's Signature _____

Date_____

THE SULLIVAN GROUP OF COURT REPORTERS

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DECLARATION UNDER PENALTY OF PERJURY

I, PATRICK MERCIER, Ph.D., do hereby certify under penalty of perjury that I have read the foregoing transcript of my deposition taken on August 7, 2025; that I have made such corrections as appear noted on the Deposition Errata Page(s), attached hereto, signed by me; that my testimony as contained herein, as corrected, is true and correct.

This Declaration is executed this _____ day of _____, 20____, at _____, California.

PATRICK MERCIER, Ph.D.

STATE OF CALIFORNIA) ss.

**I, Tamara Houston, RPR, CCRR, CSR No. 7244, a
Certified Shorthand Reporter in the State of California,
duly empowered to administer oaths, do hereby certify:**

That, prior to being examined, the witness named in the foregoing deposition was by me duly sworn to testify to the truth, the whole truth, and nothing but the truth;

That said deposition was taken down by me in shorthand at the time and place therein named, and thereafter reduced to typewriting by computer-aided transcription under my direction;

That the dismantling, unsealing, or unbinding of the original transcript will render the reporter's certification null and void.

I further certify that I am not interested in the event of the action.

In witness whereof, I have hereunto subscribed my
name.

Dated: 11th of August, 2025.

Zamara L. Houston

TAMARA L. HOUSTON
CSR 7244, RPR, CCRR 140