

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

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LENOVO (UNITED STATES) INC. : IPR2023-00679
and MOTOROLA MOBILITY LLC, : and
Petitioners, : IPR2023-00698
vs. : Patent Nos.
THETA IP, LLC, : 10,129,825 B2
Patent Owner. : 10,524,202 B2
----- :

Remote Zoom Videotaped Deposition of
LAWRENCE E. LARSON, Ph.D.
Washington, D.C.
Thursday, April 18, 2024
10:00 a.m.

Job No. PA-6645999

Pages 1 - 149

Reported by: Robert M. Jakupciak, RPR

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Videotaped Deposition of LAWRENCE E.
LARSON, Ph.D., held at the offices of:
Veritext - Washington
1250 Eye Street, N.W.
Washington, D.C.

Pursuant to Notice, before Robert Michael
Jakupciak, RPR, a Notary Public in and for the
District of Columbia, when were present on behalf of
the respective parties:

A P P E A R A N C E S

On behalf of the Petitioners:

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Also Present: Videographer, Warren Brey

Jameson Ma, Esquire

C O N T E N T S

THE WITNESS: LAWRENCE E. LARSON, Ph.D.

EXAMINATION

PAGE NO.

By Mr. Uhr

6

E X H I B I T S

LARSON EXHIBIT NUMBER

PAGE NO.

2005 Larson Declaration 15

2015 Declaration of Lawrence Larson in 19

Support of Patent Owner's

Responses

1004 European Patent Application No. 21

EP 999,649 A2

1001 Patent No: 10,129,825 B2 59

1001-a '202 Patent marked in the 698 IPR 71

1016 Book entitled Analog Integrated 77

Circuit Design

1017 Book entitled RF and Microwave 98

Circuit Design for Wireless

Communications

(Exhibits attached to transcript.)

P R O C E E D I N G S

Whereupon,

VIDEOGRAPHER: Good morning. We are going on the record at 10:03 a.m. EST on March 18, 2024. This is media unit one of the video recorded deposition of Professor Lawrence Larson, Ph.D., taken by counsel for the Petitioner, in the matter of Lenovo United States Incorporated and Motorola Mobility, LLC, Petitioners, versus Theta IP, LLC, Patent Owner, filed in the U.S. Patent and Trademark Office. Patent Number 10,524,202 B2.

This deposition's location is a Zoom video conference with participants in various locations. My name is Warren Brey, representing Veritext Legal Solutions. I'm the videographer. The court reporter is Robert Jakupciak from the firm of Veritext Legal Solutions.

Counsel please introduce yourselves for the record.

MR. UHR: This is William Uhr from Bookoff McAndrews on behalf of Petitioners.

MR. MELWANI: This is Dinesh Melwani.

1 Also from the law firm of Bookoff McAndrews.

2 MR. AHN: This is Sangwoo Ahn, counsel for
3 Petitioners, at Bookoff McAndrews.

4 MR. MA: Jameson Ma from Bookoff
5 McAndrews.

6 MR. JOHANNINGMEIER: This is Corey
7 Johanningmeier of Bunsow De Mory, for Theta IP and
8 the witness. And with me on the line is one of our
9 attorneys, Aaron Hand.

10 VIDEOGRAPHER: And court reporter, please
11 swear in the witness.

12 Whereupon,

13 LAWRENCE E. LARSON, Ph.D.,
14 called as a witness, and having been first duly
15 sworn, was examined and testified as follows:

16 VIDEOGRAPHER: And you may proceed.

17 EXAMINATION BY COUNSEL FOR PETITIONERS

18 BY MR. UHR:

19 Q Good morning, Professor Larson.

20 A Good morning.

21 Q My name is William Uhr, and as you may
22 have just heard, I represent the Petitioners,

1 Motorola and Lenovo, in these two IPR matters.

2 Have you ever been deposed before?

3 A Yes, I have.

4 Q Okay. While you may already be familiar
5 with the procedures, but I'll just run through some
6 preliminaries to make sure we are on the same page.

7 I'm going to be asking you a series of
8 questions today. The court reporter is going to be
9 taking down every word each of us says. So it's
10 important that we both speak loudly, slowly and
11 clearly so that the reporter is able to hear and
12 understand what we are both saying. That way we
13 will get a complete and accurate record of today's
14 proceeding.

15 If you wouldn't mind, please allow me to
16 complete my questions in full before you begin your
17 answer. I will extend you the same courtesy and do
18 my best to allow you to complete your answer before
19 I ask the next question.

20 If you and I interrupt each other, the
21 record will be filled with dashes, which will make
22 the record very difficult to read. The reporter can

1 only write one person speaking at a time. So it's
2 important that we try to avoid speaking over each
3 other as much as possible.

4 From time to time counsel for patent owner
5 may object to my questions. Please allow counsel to
6 make his objections without speaking over him. Once
7 counsel has lodged his objection, you are required
8 to provide an answer to the pending question, unless
9 counsel has instructed you specifically not to
10 answer.

11 Does that all sound okay?

12 A Yes. That's fine.

13 Q Okay. When responding to my questions,
14 please give a verbal response, because that's the
15 only type of response that the court reporter can
16 record. The court reporter is not permitted to
17 interpret a nod or a shake of the head and phrases
18 or sounds like uh-huh or huh-uh may be difficult to
19 interpret on the record.

20 If you do not understand any of my
21 questions, please feel free to ask me to repeat or
22 clarify. I'm happy to do so. And if at any time

1 you would like to take a break, just let me know.
2 I'm happy to accommodate that. And we understand
3 that we will be breaking at least at 11:45 to about
4 1:15 today. Does that all sound fair?

5 A That's perfectly fair. Thank you.

6 Q Okay. Would you please state your full
7 legal name for the record?

8 A My full legal name is Lawrence Ernest
9 Larson.

10 Q Okay. Could you please state your
11 address?

12 A My address is 97 Condon Street,
13 Providence, Rhode Island.

14 Q And are you over the age of 18?

15 A I am over the age of 18.

16 Q Okay. And do you understand that you are
17 testifying under oath today; correct?

18 A I understand that, yes.

19 Q Okay. Did you take any medications or
20 substances that would impact your ability to testify
21 truthfully today?

22 A No, I have not taken any substances.

1 Q Okay. Is there anything preventing you
2 from answering questions truthfully today?

3 A No, there is nothing preventing me from
4 answering truthfully today.

5 Q Do you recognize the Case Numbers IPR
6 2023-00697 and IPR 2023-00698?

7 A Yes, I do.

8 Q Do you understand that your testimony
9 today relates to these two IPR proceedings?

10 A Yes. I understand that.

11 Q Are you currently at home?

12 A I am at home, yes.

13 Q Are there other people at home with you?

14 A Mr. Johanningmeier is sitting across from
15 me here. My wife Lynn is upstairs. That's all.

16 Q Do you have a reliable Internet connection
17 where you are?

18 A It's pretty reliable, yes. Every now and
19 then it will slow down once a day, and that may
20 happen some time today and I apologize if it does.
21 Otherwise, it's very reliable.

22 Q No problem. Thank you for letting me

1 know. And are you currently communicating with
2 anyone other than me?

3 A No. I'm not communicating with anyone
4 other than you at this time.

5 Q Do you have any electronic devices with
6 you other than your laptop?

7 A I have got my cell phone here. I guess I
8 could turn it off if you would prefer.

9 Q Could you please turn it off?

10 A Yes. Sure. Just a second. There we go.
11 Okay. It's turned off.

12 Q On your laptop do you have any electronic
13 messaging applications or browsers open?

14 A I actually have Chrome open right now. I
15 will shut it. And I have Internet Explorer open and
16 I will shut that as well.

17 Q Thank you.

18 A They are both shut now.

19 Q Thank you. I would ask that you keep them
20 closed while we are on the record and I'm asking you
21 questions.

22 A I will. I will keep them both closed.

1 Q Thank you. Do you have any documents open
2 on your computer?

3 A No. Not at this time.

4 Q Okay. Can you affirm that you will not
5 communicate with anyone electronically or otherwise
6 while you are providing testimony on the record?

7 A Yes. I will not communicate with anyone
8 by any means while we are on the record.

9 Q Did you bring any documents or notes with
10 you in physical form?

11 A Well, I have three documents here by my
12 side today that Mr. Johanningmeier provided for me.
13 But I have no notes of any kind.

14 Q Okay. What are those documents that you
15 have?

16 A Yes. So the first one is my declaration
17 on these two IPR matters, and that's dated January
18 29th. And I have two U.S. Patents, the so-called
19 '825 patent and the so-called '202 patent. And
20 those are the three documents that I have right
21 here.

22 Q Okay. Are there any annotations on those

1 documents?

2 A No. Those documents are all completely
3 clean of any markings or annotations.

4 Q Okay. Dr. Larson, did you prepare for
5 this deposition?

6 A Yes, I prepared for this deposition.

7 Q How did you prepare?

8 A Well, I reviewed my declaration, I
9 reviewed the patents, I reviewed some of the prior
10 artwork, and, you know, various other documents
11 related to the case.

12 Q Did you review the petitions?

13 A Those would have been like the -- I
14 believe I did review the petitions, yes. Maybe you
15 would have to show me the document or perhaps Mr.
16 Johanningmeier could show it to me and I could
17 verify that. But I think I reviewed the petitions,
18 yes.

19 Q Okay. Did you review the declarations
20 that were submitted by Dr. Baker?

21 A I was presented with them and I reviewed
22 those declarations briefly, yes.

1 Q And you said that Mr. Johanningmeier
2 helped you prepare for this deposition?

3 A Yeah. He did help me prepare for this
4 deposition.

5 Q Did anyone else help you?

6 A No. No one else helped me with this
7 deposition.

8 Q Did you have meetings with Mr.
9 Johanningmeier to prepare?

10 A Do you mean to prepare for this
11 deposition?

12 Q Yes.

13 A Yeah. Mr. Johanningmeier traveled to
14 Providence yesterday and we spent yesterday
15 discussing this deposition. So yes, we met as part
16 of my preparation.

17 Q Roughly how much time would you say you
18 spent preparing for today's deposition?

19 A Do you mean in total how much time did I
20 spend?

21 Q Yes.

22 A I would say 30 to 40 hours in total to

1 prepare.

2 Q I'm going to go ahead and introduce an
3 exhibit and I'm hoping that it will be available to
4 you within the Zoom meeting.

5 (Larson Exhibit Number 2005
6 was marked for identification.)

7 BY MR. UHR:

8 Q Did a file pop up for you?

9 A No. I'm sorry. It has not popped up for
10 me. If you are trying to do a screen share, I'm not
11 seeing it.

12 Q No. I'm not trying to do a screen share.
13 I'm trying to share the document with you through
14 the Veritext --

15 A Ah.

16 Q -- portal.

17 A If I have shut my browsers, that may not
18 be possible. Just a thought.

19 MR. JOHANNINGMEIER: You -- sometimes it
20 works with dropping PDFs into the chat. Let me see
21 if --

22 MR. UHR: Counsel, do you mind if we went

1 off the record quickly to get this exhibit situation
2 sorted?

3 MR. JOHANNINGMEIER: Yeah. Let's do that.
4 We don't need to record ourselves talking about it.
5 That's right.

6 MR. UHR: Thank you.

7 VIDEOGRAPHER: We are now off the record
8 at 10:18 a.m.

9 (Recessed at 10:18 a.m.)

10 (Reconvened at 10:23 a.m.)

11 VIDEOGRAPHER: We are now back on the
12 record at 10:23 a.m. You may proceed.

13 BY MR. UHR:

14 Q Okay. Dr. Larson, I asked you to reopen
15 your browser to open the Veritext portal; correct?

16 A Yes. That is correct.

17 Q And now you are able to see Exhibit 2005?

18 A I'm able to see it on the Veritext portal
19 and I also have a paper copy here.

20 Q Thank you for opening the portal. Is this
21 a copy of the declaration you submitted with the
22 patent owner's preliminary responses?

1 A Yes. This is the document from the
2 preliminary responses that was submitted last
3 summer, summer of 2023.

4 Q And in the version that I have posted to
5 the portal it is Exhibit 2005, and then it indicates
6 that it is in the proceeding IPR 2023-00698. Did
7 you submit the same declaration in substance in the
8 697 IPR?

9 A Hold on one second. And the reason that
10 I -- so you are referring to the 698 and you say
11 that because at the bottom right this particular
12 declaration is labeled IPR2023-00698, and yes, there
13 is a similar one that is IPR2023-00697 that was also
14 submitted, yes.

15 Q When you say similar, was the text of the
16 document the same except for that stamp in the
17 bottom right corner?

18 A You know, I would have to review the
19 documents. I think they are very, very
20 substantially similar. Whether they are exactly the
21 same, I would have to review both documents to
22 review that.

1 Q Okay. Could you look at the first page of
2 this document? It says underneath Theta IP, LLC,
3 Patent Owner, it says three cases, 694, 697 and 698.
4 Do you see that?

5 A This is on page one.

6 Q The cover page. Yes.

7 A The cover page. Yes. Yes. I see that.
8 It says 694, 697, 698.

9 Q Okay. Does that indicate to you that this
10 document was submitted in all three of those cases?

11 A Yes, it does. And then there are patents
12 associated with each of those below, the '330, '825
13 and '202.

14 Q Have you discovered anything in this
15 declaration that you believe may need to be
16 corrected or clarified?

17 A Well, you know, once again I would have to
18 review it. I haven't reviewed this document really
19 in detail since it was submitted. And so I think if
20 there has been anything that I would want to change,
21 I would want to take a look at it. But nothing
22 comes to my mind at this time.

1 Q Okay. And do you believe that this
2 declaration you submitted is still complete and
3 accurate?

4 A As far as I know, yes. Once again I would
5 probably want to review it in detail, but as far as
6 I can remember it's still complete and accurate.

7 Q I'm going to introduce another document
8 into the Veritext portal.

9 (Larson Exhibit Number 2015
10 was marked for identification.)

11 BY MR. UHR:

12 Q Please let me know when that becomes
13 available to you.

14 A Yes. I'm not seeing it on the screen yet.
15 Let me -- there we go. Now, this one is Exhibit
16 2015. Is that correct?

17 Q That's correct. This is previously marked
18 as Exhibit 2015 and this document again has the
19 identifier at the bottom for the 698 IPR.

20 A Okay. Let me open this. Yes. The cover
21 page says 697 and 698. I'm sorry. It says 698 at
22 the bottom. Thank you.

1 Q And is this a copy of the declaration you
2 submitted with patent owner's responses?

3 A I believe that this is also a declaration
4 that I submitted with the patent owner's responses,
5 yes. Let me just check the signature at the final
6 line. Yes. This was from January of this year.

7 Q That is your signature on page 32?

8 A That's my signature on page 32, yes.

9 Q And is it your recollection that you
10 submitted the same declaration in both the 697 and
11 698 IPRs?

12 A Yeah. My recollection is that this was
13 submitted for both the 697 and the 698 IPRs.

14 Q While preparing for this deposition did
15 you discover anything in this declaration that you
16 believed may need to be corrected or clarified?

17 A No. I have no corrections or
18 clarifications that I would like to put forward at
19 this time.

20 Q And sitting here today do you still
21 believe that this entire declaration is complete and
22 accurate?

1 A Yes. Sitting here today I still believe
2 it is complete and accurate.

3 Q So for our mutual orientation I may refer
4 to your declaration again today during the
5 deposition. And when I say your declaration, I'm
6 going to be referring to this document, Exhibit
7 2015. If I refer back to your earlier declaration,
8 I will specifically call that your preliminary
9 response declaration or Exhibit 2005. Is that okay?

10 A Yes. That's fine.

11 MR. UHR: I'm going to introduce another
12 exhibit. This was previously marked as Exhibit
13 1004.

14 (Larson Exhibit Number 1004
15 was marked for identification.)

16 A Okay. I don't see it on my screen yet,
17 but Mr. Johanningmeier gave me a paper copy. But I
18 will bring it up on my screen as well.

19 Q We can give it a second. Just let me know
20 when it becomes available for you.

21 A Yeah. Sometimes the screen has to
22 refresh. So, yes, I see it here and I see

1 exhibit -- the screen -- the wheel is spinning, but
2 I do see Exhibit 1004 on my screen.

3 Q Great. And this is a copy of EP 0999,649
4 A2, and I may refer to this as the Rauhala reference
5 for short. Do you recognize this document?

6 A Yes. I do recognize it. I have reviewed
7 it.

8 Q Can you please look at paragraph 13 of
9 this document?

10 A So, and just to the clarify, the
11 paragraphs are numbered with bold numbers kind of at
12 the beginning of the paragraph, so I see 0013 and it
13 starts, "Figure 2 shows a", et cetera.

14 Q Yes. That's correct.

15 A I see it.

16 Q So that first sentence says: "Figure 2
17 shows a similar signal path structure as Figure 1."
18 Do you see that?

19 A Yes. I see that.

20 Q Okay. So the Rauhala reference describes
21 a signal path; correct?

22 A Yes. Well, that sentence describes a

1 signal path, yes.

2 Q Okay. And that sentence refers to Figure
3 2?

4 A Yes. Let me just take a look at Figure 2
5 quickly just to confirm this. But -- yes. Figure 2
6 describes a signal path as described in that first
7 sentence.

8 Q Still looking at Figure 2 then, do you see
9 toward the left that there is a component labeled
10 with the letters ANT?

11 A Yes. I see an ANT there on the left in
12 Figure 2.

13 Q The component labeled ANT is an antenna,
14 correct?

15 A I believe that's correct, yes.

16 Q And based on the specification and this
17 reference, that antenna would receive an RF signal;
18 correct?

19 MR. JOHANNINGMEIER: Objection. Scope.

20 A Yes. Based on my understanding, that
21 antenna would receive an RF signal.

22 Q Okay. Do you see the line running

1 parallel to the bottom of the page from the antenna
2 component through F1, A1, F2, A2, and then through
3 to the block labeled DET? Do you see that line?

4 A I have to confess I'm a little confused by
5 what you have just described. Could you say that
6 again or maybe try to be a little more descriptive
7 in your, in which line you are referring to?

8 Q Sure. So do you see that the antenna
9 connects to the block labeled F1?

10 A Yes. I see that connection.

11 Q Okay. And then do you see that F1
12 connects to A1?

13 A I believe that F1 connects to A1 through
14 that horizontal line that goes between F1 and A1.
15 If that's what you are referring to, yes, I see it.

16 Q So there's a horizontal line between F1
17 and A1?

18 A I see that.

19 Q Similarly, there is a horizontal line
20 between A1 and F2; right?

21 A Correct. Between A1 and F2.

22 Q And is there a similar line between F2 and

1 A2?

2 A There is a similar line between F2 and A2,
3 yes.

4 Q Okay. And is there a similar line between
5 A2 and M1?

6 A Yes. There is a similar line between A2
7 and M1.

8 Q Is there a similar line between M1 and A3?

9 A Yes. There is a similar line between M1
10 and A3.

11 Q Is there a similar line between A3 and F3?

12 A Yes. There is a similar line between A3
13 and F3.

14 Q And is there a similar line between F3 and
15 M2?

16 A Yes.

17 Q Similar line between M2 and F4?

18 A Yes. Between M2 and F4.

19 Q And a similar line between F4 and DET?

20 A Yes. Correct.

21 Q Okay. Now that collection of lines,
22 that's a signal path; correct?

1 MR. JOHANNINGMEIER: Objection. Scope.

2 A I would say yes, the signal goes from the
3 antenna through that chain that you just led me
4 through to the, to the final block which is labeled
5 DET.

6 Q And do you see that there are rectangular
7 blocks, there are four of them, labeled with F and
8 with a numeral next to it?

9 A Yes. I see those blocks.

10 Q And those are intended to represent
11 filters; correct?

12 MR. JOHANNINGMEIER: Objection. Scope.

13 A Yeah. I believe those are meant to
14 represent filters in the signal chain.

15 Q Do you see the triangles marked A1, A2 and
16 A3?

17 A Yes. I see the A1, A2 and A3 triangles.

18 Q Those triangles are intended to represent
19 amplifiers in the signal path; correct?

20 MR. JOHANNINGMEIER: Objection. Scope.

21 A Yes. I believe those are intended to
22 represent amplifiers.

1 Q And the circles with the Xs through them
2 labeled M1 and M2, do you see those?

3 A Yes, I see those circles.

4 Q And those circles are intended to
5 represent mixers within the signal path; correct?

6 MR. JOHANNINGMEIER: Objection. Scope.

7 A Yes. Those, M1 and M2 are mixers in the
8 signal path.

9 Q Rauhala teaches adjusting bias currents of
10 amplifiers and mixers; correct?

11 MR. JOHANNINGMEIER: Objection. Scope.

12 A Well, it -- Rauhala teaches adjusting the
13 DC bias of amplifiers and mixers.

14 Q Could you please look at paragraph 13
15 again of the same document?

16 A Yes.

17 Q And do you see that second sentence
18 beginning with "unit 21"?

19 A So paragraph 13, the second sentence, yes;
20 "unit 21 includes the linear units, or amplifiers
21 A1, A2 and A3," et cetera. I see it, yes.

22 Q Okay. And Rauhala is referring there to

1 the amplifiers and mixers in Figure 2 as linear
2 units; right?

3 A Right. That sentence says unit 21
4 includes the linear units of those amplifiers and
5 mixers. Yes.

6 Q Would you please scroll down to paragraph
7 21 of the same document?

8 A 21. Yes. I'm there. The paragraph 21,
9 and paragraph 21 starts with: "Figure 6 shows an
10 example of," et cetera.

11 Q Okay. So you see the first sentence says:
12 "Figure 6 shows an example of a linear unit's supply
13 current control"; correct?

14 A Yes. That's the first sentence.

15 Q Okay. And do you see in the second
16 sentence where it says that linear unit 61 is an
17 amplifier?

18 A I see that second sentence, yes.

19 Q And A1, A2 and A3 of the signal path from
20 Figure 2 are all amplifiers; correct?

21 MR. JOHANNINGMEIER: Objection. Scope.

22 A Yes. I'll rely on my memory of Figure 2,

1 but I believe that's correct, yes.

2 Q Would you agree that the linear units
3 being referred to in paragraph 21 is an example of
4 one of the amplifiers in Figure 2?

5 MR. JOHANNINGMEIER: Objection. Scope.

6 A So let me just read the sentence again.
7 We are talking about the second sentence in Figure
8 21; is that correct?

9 Q Yes.

10 A So let me just read it again and then I'll
11 answer your question.

12 Yes. I believe these refer, the author is
13 referring to the amplifiers in that case.

14 Q Could you turn to Figure 6 of the same
15 document?

16 A Yes. I see it here.

17 Q Do you see that there is a -- there are
18 two portions here shown with dotted lines; one of
19 them is labeled 61 and one is labeled 62?

20 A Yes. I see that. 61 and 62 in Figure 6.

21 Q And the portion labeled 61 is the linear
22 unit that we were just discussing; right?

1 A Well, that's the amplifier, which is I
2 guess the linear unit from Figure 2.

3 Q Do you see the line extending downwardly
4 from that box labeled 61 and it's got the label I
5 next to it?

6 A Yes. I see that line connecting 61 and 62
7 and that line goes into the collector of transistor
8 Q2.

9 Q What is your understanding of what that I
10 indicates?

11 A Yeah. My understanding of that I is that
12 it is the DC bias current of the differential
13 amplifier.

14 Q When the differential amplifier 61 is
15 actively amplifying a signal, you would expect I to
16 be a non-zero value; correct?

17 A Well, yes. Every time an amplifier -- if
18 an amplifier is going to be amplifying a signal,
19 there has to be some DC current supplied to it to
20 provide the energy for amplification.

21 Q So if I were zero, differential amplifier
22 61 would not amplify the signal; correct?

1 MR. JOHANNINGMEIER: Objection. Scope.

2 A So if the DC bias current I were zero, the
3 differential amplifier would have no gain. Correct.

4 Q And what is your understanding of what
5 this portion of Figure 6 labeled 62 is?

6 A Well, 62 is a circuit that provides a
7 variable DC bias to differential amplifier 61, and
8 that DC bias is controlled by the switches at the
9 top of the circuit, which I guess are labeled Ka and
10 Kb here.

11 Q If you removed the entirety of the
12 circuits in 62, the value of I on the right side
13 would be zero; correct?

14 A Well, I'm a little confused by your
15 question and if I might ask, do you mean that, that
16 the circuit 62 is removed and that line that
17 connects the differential amplifier to 62 is simply
18 not connected to anything? Is that what, your
19 question? I'm trying to understand your question.

20 Q That's my question.

21 A Right. So if you removed 62 and the line
22 the between 61 and 62 were just unconnected to

1 anything, then there would be no DC current going
2 through the differential amplifier and there would
3 be no gain.

4 Q Do you see to the left of the box labeled
5 61 there are two lines and it says "in" next to
6 those two lines?

7 A Yes. I see two lines on the left-hand
8 side of 61 labeled "in".

9 Q And what does the "in" identify?

10 A Well, presumably the "in" identifies the
11 fact that these two lines represent the input of,
12 the signal input of the differential amplifier.

13 Q And do you see to the right of 61 where
14 there are two similar lines and next to it it says
15 the word "out"?

16 A Yes. I see two similar lines on the
17 right-hand side of 61 labeled "out".

18 Q And what does the "out" identify?

19 A Presumably the "out" identifies the output
20 signals of the differential amplifier.

21 Q And they may not be shown here, but you
22 would expect that there are electronic components

1 between the in and the out; correct?

2 A Yes. I think my interpretation of the,
3 this box labeled 61 is that there are electronic
4 components in there that perform the function of a
5 differential amplification.

6 Q And what type of signal would you expect
7 would be received at the in side of 61?

8 A Once again I'm not quite sure what you
9 mean by the in side of 61.

10 Q I was referring to the left side where it
11 includes the word "in".

12 A Right. So, well, I guess the types of
13 signals would be the signals that had been received
14 by the antenna and then passed down the signal
15 chain, and those signals, you know, would be varying
16 frequencies and levels.

17 Q You said that those signals would have
18 varying frequencies and levels. What do you mean by
19 levels?

20 A Well, by levels I guess I mean like
21 voltage levels. Voltage levels at the amplitude of
22 the voltage as a function of time.

1 Q As the frequency of a signal going into
2 the in side of the differential amplifier changes,
3 would that cause the value of I to change?

4 A As the frequency of the input signals
5 going into the in changes, would I change? And I
6 will assume by I you mean that DC current that is
7 being supplied by Q2 in element 62. It would not --
8 I would not normally change as the frequency of the
9 inputs change.

10 Q Would you clarify what you mean when you
11 said would not normally change? Are there some
12 instances where it would change?

13 MR. JOHANNINGMEIER: Objection. Scope.

14 A Yeah, I can't think of any when it would,
15 no.

16 Q Is there a reason that you said normally
17 it would not change?

18 A The only -- you'll have to remember that
19 I'm a professor and, you know, generally speaking as
20 circuits operate at higher frequencies, more DC
21 current is required. But that's, you know, not
22 really relevant to this particular class of circuits

1 that we are talking about. So there is no reason
2 that I said normally in this case.

3 Q And why do you say that it's not relevant
4 to this particular reference?

5 A Yeah. Because the changes in currents
6 that you might encounters, changes in DC bias
7 currents that you might encounter would be over the
8 range of frequency variation of many orders of
9 magnitude. For example, from ten kilohertz to 10
10 gigahertz. And that particular range of frequencies
11 is not something that's encountered in wireless
12 communications.

13 Q I believe you also said that the signals
14 received at the in side of the differential
15 amplifier would have varying amplitudes. Am I
16 remembering that correctly?

17 A The signals received at the input of the
18 differential amplifier could have varying
19 amplitudes, yes.

20 Q If the amplitude of that signal were to
21 change, would that cause the value of I at the
22 bottom of 61 to change?

1 MR. JOHANNINGMEIER: Objection. Scope.

2 A Yeah. If the, if the amplitude of the
3 input signals varied, the amplitude and voltage of
4 the input signals varied, I would not change.

5 Q I would not change?

6 A I would not change.

7 Q Would you please turn to paragraph 23 of
8 the same document?

9 A Yes. I see it on the screen here. It
10 starts at -- paragraph 23 starts with, "Figure 7
11 shows another example of," et cetera.

12 Q Okay. So that first sentence says:
13 "Figure 7 shows another example of controlling a
14 linear unit's supply current." And do you see that?

15 A I see that, yes.

16 Q Okay. And then the second sentence says:
17 "Linear unit 71 is an analog multiplier used as a
18 mixer." Do you see that?

19 A I see that, yes. Used as a mixer.

20 Q And with reference to Figure 2, we
21 discussed just a bit ago that the components labeled
22 M1 and M2 are mixers; right?

1 A Yes. M1 and M2 are mixers in Figure 2.

2 Q So would you agree that the linear unit 71
3 that's being referred to in paragraph 23 and appears
4 in Figure 7, could that be one of the mixers M1 or
5 M2 in Figure 2?

6 A So Figure 7, the circuit in Figure 7 could
7 be used as one of the mixers M1 or M2 in Figure 2.
8 And I'm now looking at Figure 7.

9 Q Okay. Thank you. That's where I was
10 going next. Do you see that there are two portions
11 shown by dotted lines labeled 71 and 72
12 respectively?

13 A Yes. In Figure 7 I see 71 and 72.

14 Q What is the function of the mixer 71?

15 A The mixer 71 performs a frequency
16 translation translating a signal at a certain
17 frequency to a signal at a different frequency.

18 Q Why is that useful in this type of
19 circuit?

20 A Mixers are useful because we communicate
21 wirelessly at frequencies that are much, much, much
22 higher than humans can process, and so we

1 communicate at these very, very high frequencies and
2 then we have to translate the information to a lower
3 frequency where humans or our machines can process
4 them. And so this process of frequency conversions
5 is used in wireless devices.

6 Q Do you see the two lines connecting 71 and
7 72 and they have the notation I over 2 next to them?

8 A Yes. I see the two lines. One is on the
9 left and the other is on the right.

10 Q What does that I over 2 indicate?

11 A I over 2 indicates a DC bias current
12 supplied by transistors Q1 and Q2.

13 Q But when the mixer 71 is functioning, both
14 of those I over 2 would have non-zero magnitudes;
15 correct?

16 A Yes. When the mixer is functioning, those
17 two lines labeled I over 2 would be carrying DC
18 current.

19 Q And if -- well, I'll refer to the two
20 instances of I over 2 collectively as just I . If I
21 is zero, you would expect that mixer 71 would not
22 operate; correct?

1 A If I were zero, mixer 71 would not
2 operate.

3 Q And what is the portion of this figure
4 labeled 72?

5 A 72 is the DC bias circuit for the mixer.
6 It provides the DC current required for the mixer to
7 operate correctly.

8 Q If you remove the circuitry shown in 72, I
9 would be zero; correct?

10 A If you remove the circuit 72 and you left
11 the lines connecting 71 and 72 open, then the mixer
12 would not function correctly and the DC current
13 would be zero.

14 Q Do you see to the left of the figure the
15 word "signal"?

16 A I see the word "signal" to the left of the
17 figure, yes.

18 Q And is that word, does it appear to be
19 associated with two lines?

20 A Yes. I believe that the word "signal" is
21 associated with two lines.

22 Q What does "signal" identify there?

1 A Presumably "signal" is the, you know, the
2 signal received by the antenna travels down the
3 signal chain and when it reaches the mixer, which is
4 one of the M1s or M2s in Figure 2, that's the signal
5 that is referred to here.

6 Q Is there a reason that you used the word
7 "presumably"?

8 A It's just a term of art meaning that's
9 normally how things are shown in diagrams like this.

10 Q So as an expert in the field, you would
11 understand that signal to represent what you just
12 described; correct?

13 A Yes. Correct. Yeah. This signal
14 represents the signal path, the signal that
15 encounters mixer M1 or M2 in Figure 2.

16 Q And do you see to the right of 72 where it
17 says "mixer out"?

18 A I believe you mean to the right of 71. Is
19 that correct?

20 Q That's correct. Thank you.

21 A Yes. I see to the right of 71 it says
22 "mixer out."

1 Q And what does "mixer out" identify there?

2 A So "mixer out" simply represents the
3 output signal of the mixer.

4 Q And what kind of output signal would exit
5 the mixer?

6 A Well, the kind of signal that would output
7 the mixer would be a voltage signal.

8 Q And there are electrical components
9 between the signal on the left and the mixer out on
10 the right; correct?

11 A Well, between the signal and, the signal
12 on the left and the mixer on the right, let me say
13 the signal, the middle left and the mixer out on the
14 top right, there are four transistors that are
15 connected to local oscillator out transistors.

16 Q Are there any other transistors in 71?

17 A There are two other transistors that are
18 connected to the signal input.

19 Q Those two other transistors that are
20 connected to the signal, would you understand those
21 to form a mirror?

22 A So the two transistors that are connected

1 to the signal, their bases are connected to the
2 signal. I would not characterize those as a mirror,
3 no.

4 Q Why not?

5 A Well, the term "mirror" typically refers
6 to two transistors who have the same current, and
7 under -- and not only do they have the same current,
8 but one current forces, one transistor forces the
9 other transistor to have the same current as the
10 first transistor.

11 In this case these two transistors have
12 the same current but that forcing -- sorry. Let me
13 clarify. They have the same DC current, but one
14 transistor is not forcing the other to have the same
15 current. And then the other thing is that under
16 signal operation they will have different currents.
17 So the two transistors connected to signal, I would
18 not call them mirrors. And I should say whose bases
19 are connected to the signal.

20 Q And the signal received on the left-hand
21 side at the signal portion of 71 would have a
22 frequency and an amplitude; correct?

1 A Yes. It will have a frequency and a
2 voltage amplitude. And it could have many
3 frequencies as well.

4 Q And in normal operation would the
5 frequency change over time?

6 A It could, yes. Yes. It could change over
7 time.

8 Q Why do you say that it could?

9 A Well, well, once again some wireless
10 systems have fixed frequencies and, therefore, if
11 the frequencies are fixed, the frequency won't
12 change. Other wireless systems the frequencies do
13 change and you'll change the frequency then. So
14 this is a system-specific set of conditions.

15 Q And what is your understanding of the type
16 of system that this mixer would be used in based on
17 the disclosure of Rauhala of this reference?

18 MR. JOHANNINGMEIER: Objection. Scope.

19 A Well, I would probably want to read -- I
20 have it in front of me here and, you know, I would
21 imagine that the frequencies would potentially
22 change with the Rauhala circuit as described.

1 Q Could you look at paragraph one of the
2 same document?

3 A Yes. I have it right here in front of me.
4 I have got Figure 7 and I have got paragraph one at
5 the same time. So I have paragraph one in front of
6 me.

7 Q Thank you for bearing with me. I know
8 that I'm moving around. But I will do my best to
9 try to not have you answer questions about two
10 portions at one time. But looking at paragraph one,
11 second sentence, it says: "The invention can be
12 advantageously applied in the reception circuits of
13 mobile stations."

14 What does that indicate to you?

15 A Yes. I see that paragraph and I see the
16 sentence. And that to me indicates a radio receiver
17 that would have to tune over a wide range of
18 frequencies as it, as the receiver itself moves
19 throughout the mobile environment.

20 Q So coming back to Figure 7, would you
21 expect that the signal encountered by mixer 71, the
22 frequency of that signal would change over time?

1 A Yes. In the context of this disclosure, I
2 would expect that it would vary over time.

3 Q And would a change in the frequency impact
4 the magnitude of I here?

5 A Changing the frequency at the input of the
6 signal input would not change I.

7 Q Okay. And would you expect that the
8 voltage amplitude of that signal input would change
9 over time?

10 A I would expect the voltage amplitude would
11 change over time at the signal input, yes.

12 Q If the voltage amplitude changes over
13 time, would that impact the magnitude of I?

14 A Changing the voltage amplitude over time
15 would not affect I.

16 MR. JOHANNINGMEIER: Counsel, when you get
17 a chance, can we get a five-minute bio break?

18 MR. UHR: Yeah. I have got just a couple
19 questions here.

20 MR. JOHANNINGMEIER: That's fine.

21 BY MR. UHR:

22 Q Okay. Dr. Larson, is it your view that

1 the claims of the '825 patent and the '202 patent
2 that are at issue here do not read on using a
3 control circuit to adjust a bias current for an
4 amplifier?

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

7 A So could you repeat your question? I'm
8 sorry.

9 Q Yes. Of course. Is it your understanding
10 that the claims of the '825 patent and the '202
11 patent that are at issue here do not read on using a
12 control circuit to adjust a bias current for an
13 amplifier?

14 MR. JOHANNINGMEIER: Same objection.

15 A Yeah, and you used this term "the claims
16 read", and that has a, perhaps a legal. Do you just
17 mean do the claims state this or imply this? Could
18 you maybe clarify what you mean by that word "read"
19 a bit?

20 Q Do the claims cover, substitute cover for
21 read?

22 A So --

1 MR. JOHANNINGMEIER: Objection.

2 A Yeah. So the claims in the '825 and the
3 '202 cover or describe changing bias currents in
4 response to signal and interference conditions.

5 Q Do they cover changing bias currents using
6 a control circuit?

7 MR. JOHANNINGMEIER: Objection. Form.

8 A Well, I guess I would like to review the
9 claims that you are talking about, in particular, in
10 the use of the word control circuit in particular.
11 The '825 and '202 patents describe controlling bias
12 currents in response to signals and interference and
13 those would be controlled using a circuit of some
14 kind.

15 MR. UHR: Okay. Counsel, we can take a
16 five-minute break.

17 MR. JOHANNINGMEIER: Yeah. A short break.

18 THE WITNESS: Thank you. Yes.

19 VIDEOGRAPHER: We are now off the record
20 at 11:18 a.m.

21 (Recessed at 11:18 a.m.)

22 (Reconvened at 11:25 a.m.)

1 VIDEOGRAPHER: We are now back on the
2 record at 11:25 a.m. You may proceed.

3 BY MR. UHR:

4 Q Could we turn to your declaration, Exhibit
5 2015?

6 A Yes. And I will bring it up on my screen.
7 I have it.

8 Q Can you please turn to paragraph 54?

9 A I have it here. Yes.

10 Q Do you see the third sentence of that
11 paragraph? It says: "Impedance is often symbolized
12 with Z," and then you provide a formula for Z?

13 A Yes. I see that sentence.

14 Q In that formula for Z, R represents
15 resistance; correct?

16 A Yes. R is resistance in that formula.

17 Q A resistor in a circuit would have a
18 resistance; right?

19 A A resistor in a circuit would have a
20 resistance, yes.

21 Q Thank you for indulging me there. Are
22 there other components of a circuit that would have

1 a resistance?

2 A Well, in an impedance there are some other
3 circuits that could have resistance within them, and
4 an example of that might be an antenna. An antenna
5 will have a resistive, resistance component of its
6 impedance as well as a reactive component.

7 Q Are there other types of components that
8 would have a resistive component other than
9 impedance?

10 A Another example of a circuit that might
11 have a resistive component to its impedance would be
12 a diode.

13 Q But in the formula for Z , $X_{\text{sub } L}$
14 represents inductive reactance; correct?

15 A Yes. $X_{\text{sub } L}$ is inductive reactance.

16 Q And there would be an inductor in a
17 circuit that would have an inductive reactance;
18 right?

19 A An inductor would have inductive
20 reactance, correct.

21 Q Are there other kinds of components of a
22 circuit that would have an inductive reactance?

1 A Well, I mentioned antennas earlier and an
2 antenna can have an inductive reactance component to
3 it.

4 Q You mean it can have. When would it have
5 an inductive reactive component?

6 A Well, antennas are designed -- you are
7 asking a question that depends on the physical
8 design. The answer depends on the physical design
9 of the antenna. And all I really meant by my answer
10 was that the, an antenna has a real component to its
11 reactance, which you called resistance, and then it
12 has imaginary component to its reactance, and if
13 that imaginary component is positive, it's called
14 inductive reactance. If it's negative, it's called
15 capacitive reactance. And whether a particular
16 antenna is inductive or capacitive will depend on
17 its physical design and there is no general answer
18 to that question.

19 Q So an antenna may have an inductive
20 reactance and it also may not have an inductive
21 reactance?

22 A Yes. That is true. It may or may not

1 have an inductive reactance.

2 Q What is inductive reactance?

3 A Well, as I answered previously, an
4 inductance is an AC or small signal quantity that
5 represents the, you know, push-back against current
6 flow or the ratio of the voltage to the current in
7 the circuit, and that quantity, the reactance, is a
8 complex quantity.

9 It has both real and imaginary
10 mathematical components. And those mathematical
11 components -- sorry -- those, the real component is
12 called the resistance of the impedance and the
13 imaginary component is called the reactance.

14 And if that imaginary quantity is
15 positive, we call it inductive. And the reason that
16 we do that is that an inductor, when you measure its
17 reactance, it's purely positive imaginary. So we
18 associate that positive value of the imaginary
19 component with an inductor, hence we call it
20 inductor.

21 And then conversely a capacitance has a
22 negative imaginary, purely negative imaginary

1 impedance, and so any impedance that has negative
2 imaginary component is called reactance, capacitive
3 reactance.

4 Q In the formula for Z that you provided, X
5 sub C represents capacitive reactance; correct?

6 A Yes. X sub C is capacitive reactance.

7 Q Is capacitive reactance the same as
8 capacitance or is it different?

9 A Well, typically it's different. And the
10 difference is that capacitance usually has units of
11 Farads, F-A-R-A-D-S. Whereas reactance has units of
12 Ohms. And Ohms is spelled O-H-M-S. So capacitance
13 and reactance are, have different units, they are
14 different.

15 Q Is the only difference the units?

16 A Well, the difference in the units
17 represents a very fundamental difference, which is
18 that a capacitance represents the physical capacitor
19 over the physical charge storage of a device,
20 whereas the reactance is a more abstracted quantity
21 related to impedance. And so you can derive
22 reactance from capacitance and you can -- well, you

1 can derive reactance from capacitance, but they are
2 fundamentally different things.

3 Q And a capacitor in a circuit would have a
4 capacitive reactance; correct?

5 A A capacitive in the circuit would have
6 capacitive reactance, yes.

7 Q And it would also have a capacitance?

8 A A capacitor in a circuit would also have a
9 capacitance, yes.

10 Q And are there other types of components
11 other than a capacitor that could have a capacitive
12 reactance?

13 A Well, I mentioned the antenna as one
14 example earlier and another example is a diode.

15 Q Does a diode always have a capacitive
16 reactance?

17 A Under reverse bias operation a capacitor
18 has a capacitive reaction, a reactance.

19 Q Are there components of circuits that have
20 no resistance?

21 A The only components of a circuit that have
22 no resistance are superconducting circuits and

1 that's not at issue here.

2 Q But in the -- in the formula you provided
3 for Z, R could be zero if you had a superconductor;
4 right?

5 A R could be zero in the case of a
6 superconductor, yes.

7 Q And there are components that do not have
8 an inductive reactance; correct?

9 A Yes. There are components that will not
10 have an inductive reactance.

11 Q So for those components the X_{L} in the
12 formula for Z would have a value of zero; right?

13 A That's correct. Yes. For circuits that
14 have no inductive reactance, X_{L} would be zero
15 in this equation.

16 Q And there are other components that have
17 no capacitive reactants?

18 A Yes. There can be components that have no
19 capacitive reactance.

20 Q But when a circuit has components and none
21 of the components have a capacitive reactance, X_{C}
22 would have a value of zero; right?

1 A $X_{sub C}$ would have a value of zero, yes,
2 if there is no capacitive reactance.

3 Q And looking again at the formula you
4 provided for Z, you could still calculate, you could
5 still calculate the value for Z if any of R, $X_{sub L}$
6 or $X_{sub C}$ are zero; correct?

7 A So I think you are asking if any one of R,
8 X_L or X_C is zero, could you still calculate Z, and
9 the answer to that is yes.

10 Q Would your answer change if two of those
11 variables were zero?

12 A No. My answer would not change if two
13 were zero.

14 Q Can you look back at the Rauhala reference
15 that's Exhibit 1004?

16 A Yes. I have a paper copyright here and I
17 will bring it up on the screen. Okay. I have it.

18 Q Okay. Please go to Figure 6 and let's
19 look at that again.

20 A Yes. I have it here in front of me.

21 Q And do you see the rectangles in the top
22 left corner labeled R1, R2 and R3?

1 A Yes. I see these.

2 Q Those are resistors; correct?

3 A Yes. They are resistors.

4 Q And do you see the labels Kb and Ka above
5 two of those resistors?

6 A Yes. I see Ka and Kb.

7 Q Those are switches; right?

8 A Yes. I believe they are switches.

9 Q Below the resistors do you see the label
10 KI next to the downward pointing arrow pointing to
11 Q1?

12 A Yes. I see KI. Yes. It's right above
13 transistor Q1.

14 Q And KI is the total current flowing from
15 the resistors; right?

16 A Yes. KI is the total current flowing
17 through all those resistors.

18 Q And do you see the components labeled Q1
19 and Q2?

20 A Yes. I see Q1 and Q2.

21 Q Those are transistors; right?

22 A Those are transistors, yes.

1 Q And together those transistors Q1 and Q2
2 form a current mirror; correct?

3 A Q1 and Q2 form a current mirror, yes.

4 Q Would you please navigate to paragraph 22
5 of this document?

6 A Okay. I'm on paragraph 22. It starts:
7 "In Figure 6, the supply current control", et
8 cetera.

9 Q And the rest of that sentence says: "The
10 supply current control circuit 62 is realized with
11 bipolar transistors."

12 Do you see that?

13 A I see that, yes.

14 Q So Rauhala is saying that Q1 and Q2 can be
15 bipolar transistors; right?

16 A Yes. Rauhala is saying they can be
17 bipolar transistors.

18 Q Okay.

19 MR. UHR: Counsel, I think we wanted to
20 stop at 11:45, and before I jump to a new exhibit, I
21 think this is a good time to break.

22 MR. JOHANNINGMEIER: All right. Thank you

1 for accommodating us on that.

2 THE WITNESS: Thank you very much. We
3 really appreciate it.

4 MR. JOHANNINGMEIER: Of course.

5 VIDEOGRAPHER: We are now off the record
6 at 11:43 a.m.

7 (Recessed at 11:43 a.m.)

8 (Reconvened at 1:17 p.m.)

9 VIDEOGRAPHER: We are now back on the
10 record at 1:17 p.m. You may proceed.

11 BY MR. UHR:

12 Q Thank you. Dr. Larson, understanding that
13 you are in the same room with Mr. Johanningmeier,
14 did you two discuss the merits of this case during
15 the break?

16 A No. Not at all.

17 Q Okay. Thank you. Earlier this morning I
18 asked you a question about what the claims of the
19 '825 patent and the '202 patent cover, and I won't
20 hold you to this, but my recollection is that you
21 said you would like to look at the claims of those
22 patents before you provided an answer.

1 So I'm going to go ahead and introduce the
2 '825 patent here. And that was previously marked as
3 Exhibit 1001 in the 697 IPR. And that should be
4 coming up in the portal shortly.

5 A Okay. And I have a paper copy here as
6 well. But I'll refer to the portal copy as much as
7 possible.

8 (Larson Exhibit Number 1001
9 was marked for identification.)

10 BY MR. UHR:

11 Q Okay. Thank you.

12 A We are almost there. The little circle is
13 still spinning.

14 Q No problem.

15 A It just came up. I have the '825 patent
16 in front of me.

17 Q Okay. Would you scroll down to the bottom
18 of page 24, and that's the bottom of column 12 where
19 claim one starts?

20 A Yes. Okay.

21 Q And is it your understanding that claim
22 one is at issue in the 697 IPR?

1 A I would have to review my notes on that
2 about claim one in particular. But I'll take it
3 that that is correct if that's what you say. I just
4 don't remember every specific claim of every patent.

5 Q Okay. I understand.

6 A So I have it in front of me here.

7 Q Now, is it your view that claim one does
8 not cover using a control circuit to adjust a bias
9 current for an amplifier?

10 MR. JOHANNINGMEIER: Objection. Scope.

11 A Well, when you read claim one, and let's
12 kind of -- let me pull the whole claim up here.

13 Q Please feel free if you would like to read
14 through the claim, feel free to take your time.

15 A Yeah. Give me a moment to read through
16 the claim to refresh my memory.

17 Q Sure.

18 A Claim one talks about, you know, receiving
19 a wireless signal, you know, with, you know, a
20 plurality of circuits, which we discussed earlier
21 this morning, and measurements of an interfere
22 signal and a, and an interfere signal and a desired

1 signal, and then, you know, determining bias current
2 variation based on that information.

3 Now, you asked about is there a control
4 circuit that performs that. You know, the claim
5 doesn't mention control circuit by name, but
6 presumably that determination, some circuit would
7 determine the relative levels of the signal and the
8 desired signal and interference signal and then make
9 those adjustments as required. So there would be
10 some circuit that would do that, but it's not called
11 a control circuit in the claims.

12 Q It's your view that claim one covers
13 making that adjustment at least with a control
14 circuit?

15 MR. JOHANNINGMEIER: Objection.

16 A Yeah. I would say that it makes that
17 adjustment with the circuit that controls the bias
18 currents. And if you want to call it a control
19 circuit, that's, that would be okay. But that's not
20 what the claim actually says, but it's implied
21 perhaps.

22 Q Okay. And that would -- scratch that.

1 Your answer would apply to changing a bias current
2 in an amplifier, correct, using a control circuit?

3 MR. JOHANNINGMEIER: Objection.

4 A And I'm sorry. Are we still talking about
5 claim one here?

6 Q Yeah. Claim one.

7 A Yeah. So, you know, claim one talks about
8 a plurality of circuits. An amplifier, you know,
9 certainly would be one of those whose bias current
10 could be controlled.

11 Q And does claim one cover adjusting a bias
12 current for a mixer using a control circuit?

13 MR. JOHANNINGMEIER: Objection. Scope.

14 A Well, at the very beginning of the claim,
15 you know, the claim refers to a plurality of
16 circuits, including an amplifier, filter and a
17 mixer. And certainly the amplifier and the mixer
18 could have variations in their DC bias currents in
19 response to the various signal conditions that are
20 described in claim one.

21 Q And the variations in the DC bias current
22 for the mixer could be controlled by a control

1 circuit according to claim one?

2 MR. JOHANNINGMEIER: Objection. Scope.
3 Legal conclusion.

4 A Yeah, I mean they would be controlled by
5 some circuit with some, you know, algorithm in it
6 that would determine the relative signal strengths
7 and then make bias current determinations.

8 Q Okay. How about if we look at claim three
9 of the same patent.

10 A Okay. I see claim three here.

11 Q Would your answers be the same for claim
12 three?

13 MR. JOHANNINGMEIER: Objection.

14 A If you don't mind, let me just spend a
15 moment reading claim three rather quickly to refresh
16 my memory.

17 Q Please. Take your time.

18 A Thank you. So I'm sorry. So I have read
19 claim three. Thank you. Could you repeat your
20 question, please?

21 Q Sure. Is it your view that claim three of
22 the '825 patent does not read on using a control

1 circuit to adjust a bias current for an amplifier?

2 MR. JOHANNINGMEIER: Objection.

3 A Well, I would say that as in claim one --
4 I'm looking for the relevant -- so like claim one,
5 claim three talks about measuring desired and
6 interfering signal strengths with these components,
7 you know, the plurality of circuits, amplifiers,
8 mixers, filters, and then adjusting the bias current
9 in accordance with those measurements, and that
10 adjustment would be of course calculated and
11 achieved by some kind of a circuit in the, you know,
12 in the transceiver.

13 Q Okay. And still for claim three, does
14 your answer change at all if it's a mixer instead of
15 an amplifier?

16 A No. My answer would not change if it's a
17 mixer instead of an amplifier.

18 Q Could you please take a look at claim
19 four? And I'm going to ask you the same question
20 here, so feel free to read through claim four.

21 A Yes. I have claim four here in front of
22 me and I've read it.

1 Q Okay. Is it your view that claim four of
2 the '825 patent does not cover using a control
3 circuit to adjust the bias current for an amplifier?

4 MR. JOHANNINGMEIER: Objection. Scope and
5 form. Legal conclusion.

6 A Yeah, well, claim four is a dependent
7 claim to claim three and it talks about a change in
8 the bias current in a similar manner to what was
9 described in claim three, which is, you know, a
10 measurement of interfering and desired signals and
11 then making a change in the bias current based on
12 that measurement, and that change would be, you
13 know, calculated by some circuit, some additional
14 circuit in the transceiver.

15 Q It would be calculated by some circuit and
16 would it also be, would the current change -- strike
17 that.

18 Would that same circuit also cause the
19 current to be changed?

20 MR. JOHANNINGMEIER: Objection. Scope.
21 Calls for a legal conclusion.

22 A And I'm sorry. Could you repeat the

1 question?

2 Q Yeah. You said that the bias current
3 would be calculated by some circuits and what I'm
4 asking is if the same circuits would also change the
5 bias current in addition to performing that
6 calculation?

7 MR. JOHANNINGMEIER: Objection. Scope.
8 Incomplete hypothetical.

9 A Yeah, I mean I think, you know, absent a
10 specific hardware implementation it's a little hard
11 to say, but certainly that circuit that's doing the
12 calculation would send a signal, I would imagine
13 would send a signal to some other circuit that would
14 literally change the bias. So there is a causal
15 connection here between that calculation of the new
16 required bias and the change in the bias and that's
17 all done with various circuit configurations.

18 Q Okay. I understand that you are thinking
19 in terms of circuit configurations. What I'm
20 wondering about is what your view is of what claim
21 four covers and I want to know whether claim four
22 covers making the calculations for the bias current

1 in a circuit and then actually adjusting the bias
2 current in that same circuit?

3 MR. JOHANNINGMEIER: And, counsel, I mean
4 I have to object here because you are literally
5 asking him what a claim covers which is outside the
6 scope of his declaration and a legal conclusion.
7 There is only so much of this before I'm going to
8 start objecting more strongly. Like this is not
9 germane, it's not relevant to the declaration.
10 Don't ask him legal conclusion questions. So I
11 object to the entire line.

12 MR. MELWANI: Counsel, speaking objections
13 are not permitted in an IPR deposition.

14 MR. JOHANNINGMEIER: It wasn't a speaking
15 objection. It was me threatening to call the court
16 if this goes on for too long. Ask questions about
17 the content. Don't ask him questions about what the
18 claims mean or we are going to have a problem. All
19 right?

20 MR. MELWANI: You are welcome to call the
21 PTAB, but unless you give an instruction not to
22 answer based on privilege --

1 MR. JOHANNINGMEIER: I'm not giving an
2 instruction. I'm making an objection.

3 MR. MELWANI: You can continue to make
4 your objection.

5 MR. JOHANNINGMEIER: Uh-huh.

6 A So I do want to answer your question. If
7 you could maybe give it to me one more time just so
8 I'm super clear?

9 Q Does claim four cover adjusting a bias
10 current in an amplifier using a control circuit?

11 MR. JOHANNINGMEIER: Same objection.

12 A I would say that claim four talks about
13 changing the bias current, you know, in response to
14 these varying signal conditions that we discussed in
15 claim three. I think, I believe that answers your
16 question.

17 Q The one part of my question that I don't
18 think has been answered yet is whether that is, that
19 bias current is changed by a control circuit.

20 A Well, I think that the -- let's use your
21 term a control circuit. A control circuit will
22 cause the bias current to be changed. I mean I'm

1 not sure that I understand the distinction that you
2 are trying to make here. This control circuit as
3 you call it causes the bias current to be changed.
4 And does it change -- I'm not sure what the
5 distinction is between causing it to change and
6 changing it. I honestly don't understand that
7 distinction.

8 Q That's okay. I'm not trying to draw that
9 distinction. So let's keep moving forward. And
10 lastly, could you look at claim eight, please?

11 A Yes. Okay. I've got it right here.

12 Q And please feel free to take your time
13 reading through claim eight.

14 A Okay. Give me a minute here. Okay. I've
15 read claim eight.

16 Q Same question here. Is it your view that
17 claim eight of the '825 patent covers using a
18 control circuit to adjust a bias current for an
19 amplifier?

20 MR. JOHANNINGMEIER: Same objections.

21 A So as with the previous claims, you know,
22 this claim eight describes a transceiver with a

1 variety of components and circuits for measuring
2 desired and interfering signal strengths and
3 adjusting bias currents in the plurality of those,
4 one or more of those circuits and that adjustment is
5 calculated with a circuit, you call it a control
6 circuit, and that, the operation of that circuit
7 causes those bias currents to be changed.

8 Q Okay. And that was your answer for an
9 amplifier; correct?

10 A Yes. Yes. That's my answer for an
11 amplifier.

12 Q And if you substituted an amplifier for a
13 mixer, same question, would your answer change?

14 A My answer would not change for a mixer.

15 Q I'm going to put in another exhibit here.
16 Actually, before I do that I'll just clarify. The
17 '825 patent was marked as Exhibit 1001 in the 697
18 patent and for ease if I go back to the '825 patent,
19 I will refer to it as the '825 patent. If that's
20 okay with you?

21 A Yes. That's easier for me as well.

22 Q Sure. I'm going to introduce a new

1 exhibit here. And this exhibit was previously
2 marked 1001 in the 698 IPR. And this is the '202
3 patent.

4 A Thank you. I have a paper copy of that
5 here and but I will try to refer to the screen
6 version once it appears.

7 (Larson Exhibit Number 1001
8 was marked for identification.)

9 BY MR. UHR:

10 Q Just let me know when it appears on your
11 end. I don't have a problem with you referring to
12 the paper copy. I just want to be sure I'm sharing
13 the right document with you.

14 A Yes. Thank you. The '202 patent is
15 coming up on my screen now. Okay. The '202 patent
16 is on my screen.

17 Q Great. And just for clarity since this
18 patent bears the same Exhibit Number as the '825
19 patent, I will refer to this as the '202 patent from
20 here on out. I think that will be easier for all of
21 us.

22 A Yes. Thank you.

1 Q Could you please scroll to page 25 of the
2 document? And would you look at claim seven?

3 A Okay. I have claim seven in front of me.
4 Would you give me a moment to read it to refresh my
5 memory?

6 Q Yes. Please do.

7 A Okay. Thank you. Okay. I've read claim
8 seven.

9 Q Okay. So similar to the questions that I
10 just asked, is it your view that claim seven covers
11 using a control circuit to adjust a bias current for
12 an amplifier?

13 MR. JOHANNINGMEIER: Same objections. You
14 are literally killing our time with this. Please.
15 Outside the scope. You are asking for a legal
16 conclusion. I object to the form of the question.

17 MR. UHR: Again, counsel, that's a
18 speaking objection. Are you instructing the witness
19 not to answer?

20 MR. JOHANNINGMEIER: No. I'm not going to
21 instruct him not to answer. I'm pleading with you
22 to ask a decent question and do it on claim language

1 so we don't have to walk through five of these. You
2 do whatever you want. It's your depo. Go right
3 ahead.

4 MR. UHR: Thank you.

5 A Could you ask the question again? I just
6 want to be sure I have it correct.

7 Q Yes. Of course.

8 Is it your view that claim seven of the
9 '202 patent covers using a control circuit to adjust
10 the bias current for an amplifier?

11 MR. JOHANNINGMEIER: Same objection.

12 A So claim seven, as before, it talks about
13 a plurality of circuits, measurement of signal and
14 interferer, and then based on that information the
15 calculation is done, and then claim seven talks
16 about changing a bias circuit of one or more of
17 those circuits, could be an amplifier, could be a
18 mixer in the signal path, and that calculation is
19 done with something you call a control circuit.

20 Q And does the change --

21 A Yeah.

22 Q I'm sorry to cut you off. Please finish.

1 A I was going to say presumably, because the
2 word control circuit is not mentioned in the claim.
3 But some kind of circuit would have to do that
4 determination.

5 Q Okay. And would a control circuit make
6 the change in the bias current?

7 MR. JOHANNINGMEIER: Objection.

8 A You know, as before, the control, as you
9 call it the control circuit is doing the calculation
10 and causing it to be changed. Whether it changes
11 it, I guess, you know, once again the distinction
12 between causing it to be changed and changing it is
13 not clear to me in the circuit like this or in any
14 circuit.

15 Q Okay. I'm not looking to draw a
16 distinction between changing and causing it to be
17 changed. So generally when I ask the question it's,
18 encompasses causing to be changed.

19 A Okay. Thank you. I appreciate your
20 clarification on it.

21 Q Let me -- I know this is a little bit
22 painstaking. Let me see if I can try and make it go

1 a little bit quicker. Claims eight through ten are
2 dependent on claim seven. And I'm happy to let you
3 read through those.

4 A Yes. I think claims eight and nine depend
5 on seven and ten depends on nine.

6 Q Okay. Do you see anything in those claims
7 that would exclude using a control circuit to adjust
8 the bias current in an amplifier?

9 A Only possibly in claim eight, because
10 claim eight talks about dynamically increasing the
11 impedance in the circuits and that can be
12 accomplished without any change in the bias, in the
13 DC bias current. So claim eight would I would say
14 not preclude a change in DC bias, but it may, it
15 could be accomplished without a change in DC bias
16 current.

17 Q Okay. Would you mind looking at claim
18 eleven? We only have a few more of these to go
19 through, I promise.

20 A Perfectly fine. No problem. Claim
21 eleven. Let me just review it quickly and then --
22 okay. I've read claim eleven.

1 Q Okay. Do you see anything in claim eleven
2 that excludes changing the bias current of an
3 amplifier or a mixer using a control circuit?

4 A Yeah, I don't see anything in claim eleven
5 that precludes the changing of a bias current with a
6 control circuit.

7 Q Okay. Could I ask you to look at claim 13
8 and I'm going to ask you the same question for claim
9 13.

10 A Okay. Let me review claim 13.

11 Q Please do.

12 A Okay. I've read claim 13.

13 Q I'll read you the question again. Do you
14 see anything in claim 13 that excludes changing the
15 bias current of an amplifier or a mixer using a
16 control circuit?

17 MR. JOHANNINGMEIER: Objection. Scope.

18 A I don't see anything in claim 13 that
19 would preclude changing the bias current in an
20 amplifier or a mixer with what you call a control
21 circuit.

22 Q Okay. Last group of claims here. Could I

1 ask you to read over claims 19 through 21?

2 A Yes. Give me a moment. Okay. I've read
3 19 through 21.

4 Q Great. The same question here. Do you
5 see anything in claims 19 through 21 that would
6 exclude changing the bias current of an amplifier or
7 a mixer using a control circuit?

8 MR. JOHANNINGMEIER: Objection.

9 A I see nothing in claims 19 through 21 that
10 would preclude or exclude changing DC bias current
11 of either an amplifier or a mixer by what you refer
12 to as a control circuit.

13 Q Okay. Thank you for that. Let's go ahead
14 and move on. I'm going to introduce a new exhibit
15 here and I'm going to put this in as Exhibit 1016.
16 This has not previously been submitted in either of
17 the proceedings.

18 (Larson Exhibit Number 1016
19 was marked for identification.)

20 BY MR. UHR:

21 Q I just uploaded it. It should be
22 available to you shortly I hope.

1 A Thank you. I'm looking for it. Is this
2 Analog Integrated Circuit Design, 1245825.pdf?

3 Q Yes. That's correct.

4 A Okay. Clicking on it. The little wheel
5 is spinning.

6 Q It's a large document. It may take a
7 minute to come up.

8 A I'm sorry. It's still spinning. Don't
9 worry. It's coming.

10 Q Okay.

11 A I just got this message that says file
12 regeneration is still in progress. You can stay on
13 this page and keep trying manually or exit link
14 preview and return at a later time. So I'm going to
15 hit the reload button, which is what I think they
16 mean by -- I'm sorry.

17 Q No. It's not your fault. I would like to
18 give it a chance to come up on your screen if we
19 can, but if it ultimately doesn't work, I will
20 figure out some other way to do this.

21 A Yeah. You might want to send a PDF file
22 at some point or. Or actual link preview and return

1 at a later time. Let me just try again here. So
2 the wheel is still spinning but it's just slow.

3 Q All right. In the interests of time --

4 A I'm so sorry.

5 Q No. It's not your fault at all. Just to
6 keep us on track here, I'm going to go ahead and
7 share my screen hopefully and let's see how that
8 goes.

9 A Okay. And the little wheel is still
10 spinning so if it does pop up, I will let you know
11 and we can maybe revert to that.

12 Q Okay. How is that? Can you see my
13 screen?

14 A I can see your screen, yes.

15 Q Okay. And is it big enough for you to
16 read and see the text? I know this text is rather
17 large on this page. It may be smaller on subsequent
18 pages.

19 A Okay. Yeah. I can see the cover of the
20 book, yes.

21 Q Okay. Do you recognize this document?

22 A I do. Yes. It's a very well-known

1 textbook on analog integrated circuit design, and
2 just in the interest of full disclosure, Professor
3 Martin was on my Ph.D. committee at UCLA and I know
4 him very well.

5 Q Have you published any papers with Ken
6 Martin?

7 A I may have published one or two papers as
8 part of my Ph.D. dissertation with Ken, yes. I
9 would have to review my CV, but I'm pretty sure that
10 I have one or two co-authorships with him.

11 Q And do you have any other work experience
12 with Ken Martin?

13 A When I was at Hughes Research Labs in the
14 1980s and early 1990s he consulted for us. And so I
15 knew him, I also had a consulting relationship with
16 him when I was at Hughes.

17 Q And do you recall the subjects matter of
18 that consulting?

19 A Yes. It was on analog to digital
20 converters.

21 Q Okay. And what would be the application
22 for an analog digital converter?

1 A Well, you know, any time you have a, an
2 analog signal, which might be, for example, you
3 know, in this loss, in this case, the output, the
4 final output of the transceiver is an analog signal
5 and you would then want to convert it to digital so
6 that it could be processed by a computer. That's
7 one example.

8 Any kind of a sensor, analog sensor,
9 pressure temperature, fluid flow, those signals
10 typically have to be converted to digital form in
11 order to further process them. So analog to digital
12 converters have a very, very wide range of
13 applications. Digitizing audio for speech
14 processing, for example, another example.

15 Q Okay. And I understand from your CV that
16 you have -- you've taught electrical engineering
17 courses at the college level before; is that right?

18 A Yes. I have taught electrical engineering
19 at the college level for many decades.

20 Q Have you ever taught using this particular
21 textbook?

22 A I may have once in about 15 years ago when

1 I was a professor at UC San Diego.

2 Q But you can't recall exactly?

3 A I'm sorry. I cannot recall exactly.

4 Q Okay.

5 A This is a very good textbook. It is one
6 of several excellent textbooks in this field. So I
7 can't recall which one we were using for that course
8 and that's why I hesitate to give you a definitive
9 answer.

10 Q No problem. I'm going to scroll down here
11 to the third page of the PDF and I'm not sure how
12 this is showing up on your end, but can you see in
13 about the middle of the page it says Copyright 1997?

14 A I see that, yes.

15 Q Okay. And is it your understanding that
16 that date predates the date of both the patents at
17 issue here?

18 A I believe that's correct, yes.

19 Q Okay. I'm going to scroll down here to
20 page 42 of the textbook. And you let me know if
21 this text appears too small on your screen.

22 A No. It's fine. I can see it quite well

1 actually. Thank you.

2 Q Excellent. So do you see here at the
3 bottom of the page it says Bipolar Junction
4 Transistors?

5 A Yes. I see that.

6 Q And now I'm going to stay in the same
7 section here and scroll down a couple pages to page
8 44 and based on my scrolling, it appears we are in
9 the same section, correct, 1.4 Bipolar Transistors?

10 A Yes. I believe we are still in the same
11 section, Bipolar Transistors.

12 Q Okay. Do you see Figure 1.27A at the top
13 of the page?

14 A I do. Yes. 1.27A, an npn transistor.

15 Q Okay. And Figure 1.27A shows a bipolar
16 transistor having a base, a collector and an
17 emitter; correct?

18 A Correct.

19 Q And do you see the notations IB, IC and IE
20 there next to the arrows?

21 MR. JOHANNINGMEIER: I just want to lodge
22 a scope objection.

1 A Yes. I see IB, IC and IE labeled in
2 Figure 1.27A.

3 Q Okay. IB would be the base current?

4 A IB would be the base current.

5 Q Would IC be the collector current?

6 A IC would be the collector current.

7 Q And would IE be the emitter current?

8 A IE would be the emitter current.

9 Q I'm going to scroll down to page 46. And
10 we are still in that same section, 1.4, Bipolar
11 Transistors; right?

12 A Correct. We are still in the Bipolar
13 Transistors section.

14 Q Okay. Do you see Figure 1.29 toward the
15 top of the page?

16 A Yes. I do. Figure 1.29.

17 Q Okay. And then in the first line of text
18 below that, the text says: "A typical plot of the
19 collector current, IC, as a function of
20 collector-to-emitter voltage, VCE, for different
21 values of IB is shown in Figure 1.29 for a practical
22 transistor."

1 Do you see that text?

2 MR. JOHANNINGMEIER: Objection. Scope.

3 A Yes. That's like the second sentence in
4 that or the first full sentence in that page, "to
5 illustrate this point", et cetera, et cetera.

6 Q Yes. That is correct.

7 A Yes. I see it. Yes.

8 Q And that sentence uses the notation IB.
9 Is IB the base current there also?

10 A Yes. IB is the base current.

11 Q Okay. At the end of this section here
12 there is a sentence that says: "This dependency
13 results in a finite output impedance and can be
14 modelled by modifying equation 1.27."

15 Do you see that?

16 MR. JOHANNINGMEIER: Objection. Scope.

17 A Yes. I see that. And I think they are
18 referring to -- yes. I see that.

19 Q So a bipolar transistor has an output
20 impedance. Would you agree?

21 MR. JOHANNINGMEIER: Objection. Scope.

22 A A bipolar transistors has an output

1 impedance, yes, it does.

2 And perhaps I should clarify, just to
3 clarify what's in the text. By output impedance,
4 the authors mean from collector to emitter. Because
5 the collector is usually taken as the output of the
6 transistor in this mode of operation.

7 Q Could you measure the output impedance of
8 a bipolar transistor by calculating the ratio of the
9 collector-to-emitter voltage to the collector
10 current?

11 A If it is an AC measurement, then yes, that
12 impedance would be the ratio of the
13 collector/emitter, AC voltage to collector AC
14 current.

15 Q Okay. In Figure 1.29 at the top of the
16 page IC is plotted against the collector-to-emitter
17 voltage along five curves. Do you see that?

18 A Yes. I see it in 1.29.

19 Q And would each of these curves correspond
20 to a particular base current I_B ?

21 MR. JOHANNINGMEIER: Objection. Scope.

22 A Probably, yes. Each one of those curves

1 corresponds to a fixed IB current. And the reason I
2 hesitate a bit is sometimes it says in the plot
3 these are at fixed IB currents, but probably that's
4 the intention of the authors in this case.

5 Oh. I'm sorry. Let me clarify this a
6 bit. If you look at that first sentence there at
7 the top it does say for different values of IB. So
8 yes, each one of those curves corresponds to a
9 unique value of IB.

10 Q So is your clarification that each curve
11 corresponds to a steady value of IB?

12 A Steady or perhaps a fixed value of IB.

13 Q Okay.

14 A Correct.

15 Q And each of the curves in Figure 1.29 has
16 a different slope; right?

17 A Yes. It looks like the slopes are
18 slightly different for each one of those curves.
19 The slope being, just again to be particularly
20 precise, the change in the collector current over
21 the change in the collector/emitter voltage.

22 Q Okay. And I think you said earlier, and

1 correct me if I'm repeating this back incorrectly,
2 but I think you said that the output impedance could
3 be measured by taking the ratio of the
4 collector-to-emitter voltage to the collector
5 current; right?

6 A Taking that ratio for AC signals of both
7 the voltage and the current.

8 Q Assuming Figure 1.29 plots the voltage
9 against the current, would the slope of each curve
10 be indicative of the output impedance?

11 MR. JOHANNINGMEIER: Objection. Scope.

12 A So the slope of these curves, you used the
13 word indicative, and it would be indicative of the
14 real part of the impedance. It would not have any
15 bearing on the imaginary part of the impedance and
16 what we were calling the capacitive or inductive
17 reactances earlier today.

18 Q Since each of these different curves is
19 intended to correspond to a different value of the
20 base current, I_B , would you agree that the output
21 impedance of a bipolar transistor varies as the base
22 current varies?

1 MR. JOHANNINGMEIER: Objection. Scope.

2 A Well, let me be precise to answer your
3 question. For a fixed base current and a -- I'm
4 sorry. Could you repeat your question? I want to
5 make sure I get it just right.

6 Q Sure. So each of these curves is intended
7 to correspond to a different value of the base
8 current; right?

9 A That's correct. Each is different base
10 current.

11 Q Okay. And since each of these curves has
12 as different slope, wouldn't the curves suggest that
13 the output impedance of the bipolar transistor
14 varies as the base current I_B varies?

15 A I believe the answer to your question is
16 correct. And the, just once again to be very
17 precise, if you keep the collector/emitter voltage
18 constant and you change the base current, you can
19 expect the real part of the output impedance to
20 change as you vary that base current.

21 MR. UHR: Okay. Counsel, we've been going
22 for just about an hour. If you guys are ready to

1 take a break, I'm at a good place. Professor
2 Larson, are you ready for a break?

3 THE WITNESS: A break is fine. Yeah.
4 Yeah. I'm happy either way, but a break is always
5 welcome.

6 MR. UHR: Ten minutes? Does that sound
7 good.

8 THE WITNESS: Ten minutes is fine.

9 VIDEOGRAPHER: We are now off the record
10 at 2:15 p.m.

11 (Recessed at 2:15 p.m.)

12 (Reconvened at 2:26 p.m.)

13 VIDEOGRAPHER: We are now back on the
14 record at 2:26 p.m. You may proceed.

15 BY MR. UHR:

16 Q Okay. Dr. Larson, can I ask you to look
17 back at Exhibit 1004, the Rauhala reference?

18 A Yes.

19 Q And would you mind turning to Figure 6 on
20 the last page?

21 A Yes. I see it there. Figure 6 of page 10
22 of Exhibit 1004.

1 Q Correct. And you see the component
2 labeled Q1; right?

3 A Q1 is a bipolar transistor at the bottom
4 left of Figure 6.

5 Q And since it's a bipolar transistor, Q1
6 would have a base; right?

7 A Yes. Q1 will have a base.

8 Q Is the base of Q1 that horizontal line
9 extending from Q1 over to Q2?

10 A Well, I guess what I would say is that
11 there is a wire connecting the bases of Q1 and Q2.
12 And that horizontal line represents the bases of Q1
13 and Q2 as well as the wire that connects it.

14 Q So a current flowing to the base of Q1
15 along that wire would be a base current; right?

16 MR. JOHANNINGMEIER: Objection. Scope.

17 A I mean a current flowing through that wire
18 into the base of Q1 would be a base current, yes.

19 Q And that base current would change as KI
20 changes; right?

21 A Yes. As KI changes, the base current
22 going to Q1 will change as well.

1 Q So then would the output impedance of Q1
2 change as KI changes?

3 MR. JOHANNINGMEIER: Objection. Scope.

4 A So your question -- I'm sorry. Say your
5 question one more time please.

6 Q Would the output impedance of Q1 change as
7 KI changes?

8 A I believe the answer -- yes. As KI
9 changes, the output impedance of Q1 will change as
10 well. And let me also be very precise. By the
11 output impedance of Q1, I mean the ratio of the
12 voltage at the collector and base of that transistor
13 to the collector current and base current.
14 Collector plus base current.

15 Q Okay. And we talked about this a bit
16 earlier. Do you see in the right-hand corner the
17 box labeled 61 and it says "diff. amp" in it; right?

18 A Yes. I see box 61.

19 Q And diff. amp here means differential
20 amplifier; right?

21 A I believe that's correct, yes.
22 Differential amplifier.

1 Q I would ask you to go to paragraph 21 of
2 this document.

3 A Okay. I see paragraph 21. It says,
4 "Figure 6 shows an example of," et cetera.

5 Q Okay. And do you see in the second
6 sentence where it says: "In this example the linear
7 unit 61 is an amplifier realized by a differential
8 pair"?

9 A I see that sentence, yes.

10 Q Okay. And toward the middle of this
11 paragraph there is a sentence that says: "The
12 collector of transistor Q2 is coupled to amplifier
13 61 so that the total current I of the transistors in
14 the amplifier is brought to the collector."

15 Do you see that?

16 A I'm sorry. I'm trying to find it. There
17 is a lot of Q1s and Q2s in this paragraph.

18 Q Please take your time.

19 A What does the sentence begin with?

20 Q It begins, "the collector of transistor
21 Q2".

22 A Is coupled to amplifier 61?

1 Q Yes.

2 A Yes. I see that sentence.

3 Q And that sentence refers to transistors in
4 the amplifier; right?

5 A So I'm -- if you don't mind, I'm going to
6 refer to my paper copy as well, because there is a
7 figure and text and I want to be able to see both of
8 them simultaneously. So...

9 Q Sure.

10 A I just want to let you know I'm going to
11 partial paper.

12 Q Take your time.

13 A Okay. I see Figure 6 and I see that
14 sentence and I see how they are related to each
15 other.

16 Q Okay. So based on those two sentences
17 that we just read, would you agree that the
18 differential amplifier 61 includes a differential
19 pair that incorporates transistors?

20 MR. JOHANNINGMEIER: Objection. Scope.

21 A Could you repeat your question?

22 Q Based on those two sentences in paragraph

1 21 that we just looked at, would you agree that the
2 differential amplifier 61 includes a differential
3 pair that incorporates transistors?

4 A Yes. Differential amplifier 61
5 incorporates transistors, yes.

6 Q And would the transistors of linear unit
7 or differential amplifier 61 have impedances?

8 MR. JOHANNINGMEIER: Objection.

9 A If your question is do the transistors in
10 differential amplifier 61 include impedances? Yes,
11 they would have, they would have impedances.

12 Q And looking back at Figure 6, there is a
13 supply current that's labeled with the letter I
14 coming out of differential amplifier 61; right?

15 A Yes. That current I is leading into the
16 collector of the transistor labeled Q2.

17 Q If that current I changes, would the
18 impedances of the transistors in the differential
19 amplifier 61 change?

20 MR. JOHANNINGMEIER: Objection. Scope.
21 Speculation. Form.

22 A So could you ask me the question one more

1 time? Sorry.

2 Q Let me break it into pieces. So do we
3 agree that supply current I is changed over time
4 according to the teachings of this document?

5 A Yes. The supply current I will change
6 depending on the status of switches Ka and Kb as
7 shown in this figure.

8 Q And as supply current I changes, would the
9 impedances of the transistors in the differential
10 amplifier also change?

11 MR. JOHANNINGMEIER: Objection. Scope.
12 Speculation.

13 A Yeah. As the supply current I to the
14 differential amplifier changes, that will change the
15 DC bias current through the transistors and that
16 will change their impedances.

17 Q Okay. Can we switch over to the '202
18 patent?

19 A I have it here in front of me on the
20 screen.

21 Q Okay. Could you please go to column 8,
22 line 25?

1 A Okay. I'm there.

2 Q Okay. The specification here is
3 describing a block diagram shown in Figure 8A. Do
4 you see that?

5 A I do. That's the first sentence of that
6 line 25. And I'm sorry. I'm pulling up the paper
7 copy as well so I can refer both to the text and to
8 the figure.

9 Q Yeah. That's perfectly fine.

10 A Yes. I see the figure and I see the text.

11 Q And do you agree that Figure 8A in each
12 shows a block diagram?

13 A Yes. Figure 8A shows a block diagram.

14 Q Okay. Pointing you back to the text here,
15 at line 27 of column 8 there is a sentence that
16 says: "Functional block 820, like the functional
17 blocks in the following diagrams, may be a filter,
18 mixer, amplifier or other circuit or circuits in a
19 wireless transceiver or other electronic circuits or
20 system."

21 Do you see that sentence?

22 A Yes, I do.

1 Q Would you agree then that functional block
2 820 could include multiple circuits?

3 A Functional block 820 could certainly
4 contain multiple circuits.

5 Q Okay. I'm going to switch gears here a
6 little bit and introduce a new exhibit. I'm going
7 to mark this Exhibit 1017.

8 (Larson Exhibit Number 1017
9 was marked for identification.)

10 BY MR. UHR:

11 Q And if you bear with me a minute, go ahead
12 and put that in.

13 A I do not see it yet.

14 Q Okay. I have just hit the upload button
15 and let's give it a minute. This is another fairly
16 large file, so we may run into the same problem.
17 Let's give it a minute. And if it doesn't show up,
18 we can share our screen again.

19 A Okay. Yes. This is -- it just came up on
20 my screen and I will try to click on it and bring it
21 up. Once again spinning wheel. I'm sorry it's
22 taking so long again.

1 Q Not your fault at all.

2 A So I just got the same error message as I
3 got before. It's kind of suggesting that I try
4 return at a later time.

5 Q Okay. Let's do what we did last time.
6 Let's share our screen.

7 A Okay.

8 MR. UHR: Sangwoo, would you mind bringing
9 up Exhibit 1017?

10 THE WITNESS: I'm honored that you would
11 use my book.

12 BY MR. UHR:

13 Q I take it you recognize this document?

14 A Yes. I recognize this document.

15 Q And what is this document?

16 A The title of the book is RF and Microwave
17 Circuit Design for Wireless Communications,
18 published by Artech House. I was the editor of this
19 book.

20 Q And do you recall when this text was
21 published?

22 A I'm a little unclear on the exact date. I

1 would guess 1994, but you may have more accurate
2 information.

3 Q But it would be before -- this book would
4 predate the two patents at issue; correct?

5 A Yes. I believe that's correct.

6 Q And you are listed as an editor on the
7 cover. What exactly does that mean?

8 A Well, I collected and commissioned a set
9 of authors to write various chapters of this book.
10 And then I -- around this consistent theme of the
11 title of the book, and then I edited their
12 contributions and worked with the publisher to get
13 the final manuscript published.

14 Q So you would have had the power to correct
15 anything put forth by those authors that you
16 disagreed with; is that right?

17 A Well, I think perhaps the power to
18 correct -- I suppose that's true in theory. In
19 practice if an author and I disagreed about
20 something, we would talk about it together and come
21 up with some mutually agreeable compromise.

22 Q So you don't recall anything in this

1 textbook that you disagreed with; is that right?

2 A I do not recall anything that I disagreed
3 with.

4 Q Okay. And while you edited this text,
5 were you employed?

6 A Yes. I was employed at Hughes Research
7 Labs at the time.

8 Q And was editing this textbook related to
9 your role at Hughes?

10 A It was related in the sense that I was
11 working at the time on many of the issues that were
12 discussed in the book.

13 Q What was your job at Hughes during the
14 time you edited this book?

15 A Well, you know, I think -- I don't
16 remember the exact title that I had at that time.
17 It's in my CV. I was I think department head or
18 section head of a section within the research labs
19 and I can't remember the title of the section, but I
20 was a technical manager at the time.

21 Q What was the intended audience for this
22 textbook?

1 A The intended audience was engineers who
2 were working in the field of wireless communications
3 of all different types, both commercial and
4 military, mobile and fixed.

5 Q And do you recall that you provided an
6 opinion as to the level of skill a person of
7 ordinary skill in the art would have in your
8 declaration?

9 A Yes. I recall that.

10 Q Would you say that a person of ordinary
11 skill in the art would be able to understand the
12 concepts in this textbook?

13 A Yes. Based on my definition of a person
14 of ordinary skill in the art, I think they would be
15 able to understand the concepts in this book or
16 perhaps learn new concepts from the book.

17 Q Okay. I'm going to ask that we scroll to
18 page 51 of the textbook. Dr. Larson, please let us
19 know if the text is too small for you to read.

20 A It's a little small. That's fine. I can
21 read that. And to me from the art it looks like
22 perhaps this is Chapter 3, Professor Abidi's

1 chapter.

2 Q And would you have reviewed this chapter?

3 A Yes. I would have reviewed this chapter.

4 Q So if not now, at least at one point you
5 were familiar with the material in this chapter;
6 correct?

7 A Yes. That's correct.

8 Q Do you see in the bottom right-hand corner
9 there is a heading 3.3, ICs in Broadcast Radio
10 Receivers?

11 A Yes. I see that, Section 3.3.

12 Q What are ICs?

13 A IC is short for integrated circuits.

14 Q And what is an integrated circuit?

15 A Well, an integrated circuit is a
16 collection of transistors and other elements that
17 performs a complicated function and the particular
18 characteristic of it is that all of those functions
19 and all of those elements are integrated onto a
20 single small piece of usually silicon.

21 Q The heading also refers to broadcast radio
22 receivers. What are broadcast radio receivers?

1 A Well, broadcast radio receivers is a wide
2 range of different types of functions from pagers to
3 FM radio, AM radio. Those are the most common.
4 Emergency Broadcast System maybe also would be an
5 example. It's a wide range of services that are
6 cast across a wide range, hence the term broadcast.

7 Q Are there any other -- strike that.

8 A Yeah. You know, I -- you know, it might
9 help me if you would go to the next page. You know,
10 this term broadcast radio has kind of evolved over
11 the years and this is from 30 years ago.

12 So at that time we might have even been
13 considering mobile wireless like cell phones, analog
14 cell phones in those days as an example. But I'm
15 not quite sure. I just don't honestly remember what
16 Professor Abidi meant, if anything, more broadly
17 than what I have described.

18 Q And would a broadcast radio receiver
19 receive an RF signal?

20 A Yeah, a broadcast radio receiver would
21 receive an RF signal. You know, there is some
22 uncertainty about the lower frequency limit for,

1 quote/unquote, RF and does AM constitute RF, but
2 generally speaking yes, an RF radio receiver would
3 receive a broadcast transmission.

4 Q Okay. Could we scroll to page 52? We are
5 going to be staying in the same section here. And
6 is that big enough that you can see the text on the
7 left side of the page, Dr. Larson?

8 A I can, yes.

9 Q Okay. Now, in the bottom paragraph on
10 page 52, about two-thirds into the paragraph, there
11 is a sentence that says: "Kasperkovitz solved the
12 problem with an architectural innovation, by
13 dramatically lowering the IF from 10.7 megahertz to
14 70 kilohertz."

15 And feel free to read the text surrounding
16 that to give yourself some context.

17 A Okay. I think I remember this, yeah, this
18 innovation. I believe I remember it from back in
19 the day. So I'm -- okay.

20 Q Does IF in that sentence mean intermediate
21 frequency?

22 MR. JOHANNINGMEIER: Objection. Form. I

1 make an objection to this line as being way outside
2 the scope. Of course you can answer the question.

3 A Yeah. I believe IF stands for
4 intermediate frequency.

5 Q What is an intermediate frequency?

6 A Well, you know, we spoke earlier in the
7 day about taking high frequency signals and
8 translating them down to lower frequency signals for
9 consumption by humans or computers or whatever, and
10 for a variety of reasons that conversion is often
11 done in two steps.

12 And the second step -- so let me back up.
13 The first step converts that high frequency signal
14 down to an intermediate frequency or IF. And then
15 the second down conversion step would convert that
16 to the final frequency. So that's the origin of the
17 term IF.

18 Q Okay. And this particular portion that we
19 just read from the text says Kasperkovitz solved the
20 problem. Do you recall here what the problem was
21 that he solved?

22 MR. JOHANNINGMEIER: Objection. Scope.

1 A I think I remember the problem. And this
2 in particular is referring to FM radio receivers and
3 so the use of this IF frequency is problematic from
4 a cost and form factor perspective. And you know,
5 you need a second down conversion mixer, you need a
6 filter that is centered at ten megahertz, and so
7 there was an unmet need to dispense with this 10.7
8 megahertz IF and convert the -- and there was no
9 easy way to built an integrated circuit that would
10 replace the filtering necessary for that 10.7
11 megahertz IF.

12 So there was an unmet need for a single
13 down conversion or a down conversion to a much, much
14 lower frequency, and so I believe that this
15 particular innovation dispensed with the 10.7
16 megahertz and took it all the way down to 70
17 kilohertz, and at 70 kilohertz that's very easy to
18 realize on an integrated circuit forum. And so it
19 allowed really for the first time like a single chip
20 FM radio receiver, which 30 years ago was a major
21 innovation. So the, that's my memory of the kind of
22 history of this particular innovation.

1 Q Okay. Sticking with the, if we move over
2 to the top of page 53, can you see that okay?

3 A I can. Let me minimize the -- okay. I
4 can see it fine. Yes.

5 Q And then the first sentence says: At a 70
6 kilohertz IF, or intermediate frequency, the image
7 frequency lies halfway to the adjacent FM channel.
8 Do you see that?

9 A Yes, I do.

10 Q Now, what is the image frequency there?

11 MR. JOHANNINGMEIER: Objection. Scope.

12 A Well, you know, when you are
13 down-converting a signal using a mixer,
14 down-converting means taking the frequency down, the
15 resulting frequency is that the difference between
16 the frequency of the signal that you are trying to
17 down-convert and the frequency of the local
18 oscillator.

19 So, for example, if you want to
20 down-convert a 90 megahertz FM signal to 10.7
21 megahertz, the local oscillator would be at roughly
22 80 megahertz. And the problem is that there is

1 another frequency which also has a difference of 10
2 megahertz and that's a signal frequency of 70
3 megahertz.

4 So that other frequency of 70 megahertz
5 that you do not want to down-convert to 10.7
6 megahertz is the image. So the image is an
7 unwanted, it's a signal that's out there and it's
8 unwanted and you do not want to down-convert that to
9 your desired signal. And in the FM cases that would
10 correspond to roughly ten megahertz.

11 Q So the image frequency is not a desired
12 input to the radio receiver; correct?

13 A I would have to say in general you are
14 correct. I mean there are cases where you would
15 want -- you wouldn't want to down-convert that other
16 signal and then the image becomes the desired
17 signal. But for a particular channel that you want
18 to down-convert at that particular moment, the image
19 is something, yes, that you would not want to
20 down-convert.

21 Q And that would be the case in this section
22 of your textbook, right, that the image frequency is

1 not a signal that you want to down-convert?

2 A That's correct. In this particular
3 context an image is something you would not want to
4 down-convert to the desired frequency.

5 Q Okay. Staying on the same paragraph, the
6 third sentence says: "As an RF preselect filter
7 cannot possibly reject an image this close to the
8 desired signal, it will pass unattenuated to worsen
9 the received signal-to-noise ratio (SNR) by three
10 decibels."

11 Do you see that?

12 A I do. Yes.

13 Q Okay. And that sentence uses the term
14 image. Is that the same as the image frequency?

15 MR. JOHANNINGMEIER: Objection. Scope.

16 A Yeah, I believe that that means that they
17 are referring to -- in other words, as -- I'm just
18 reading that sentence. RF preselect filter cannot
19 possibly reject an image this close to the desired
20 signal. And I believe that image in that sentence
21 is what we have been referring to.

22 Now, let me -- let's be a little bit

1 careful, because an image can mean many different
2 types of things. So for this 70 kilohertz IF
3 architecture the image that we are talking about is
4 not a signal, it's the noise, and that sentence
5 states this, in this interchannel band.

6 So that's why the signal in this
7 particular case, the signal-to-noise ratio is
8 increased, or sorry, reduced by 3 dB. In other
9 words, the image in this case, it's not an adjacent
10 channel in FM, it is the noise that exists in
11 between the channels. And that noise floor is then
12 raised at the output by the down-conversion of that
13 interchannel noise and the degree that it is raised
14 is 3 dB just as that chapter states.

15 Q So here would it be the case that the
16 signal and the noise are received together?

17 A If I could have a clarifying questioning?
18 Which signal and which noise are you talking about?

19 Q Well, I believe that you referred to the
20 image frequency as noise in your past answer. Is
21 that, is that a correct restatement?

22 A Yes. So there is noise in the, at the

1 image frequency and it's called interchannel noise
2 in the text. So yes, that's received at the same
3 time as the signal and it's also received at the
4 same time as the noise in the signal band.

5 Q And that noise is undesired input;
6 correct?

7 MR. JOHANNINGMEIER: Objection.

8 A The noise is undesired input, yes.

9 Q And toward the end of that sentence it
10 refers to signal-to-noise ratio. Is the
11 signal-to-noise ratio referred to there, is that a
12 ratio of the desired signal to undesired input?

13 MR. JOHANNINGMEIER: Objection.

14 A Well, it's, it's the ratio of the desired
15 signal to the noise in the receive band of the
16 receiver, and it could be inputs, it could also be
17 noise that's intrinsic to the circuit. So the noise
18 is just the noise and its source is -- well, its
19 source would be complicated.

20 Q Can you explain why the source would be
21 complicated?

22 A Yeah. So all I really mean by that is

1 that noise in these circuits, in these signal chains
2 comes from the external world, which is received by
3 the antenna, and then it comes from internal circuit
4 noise that's generated internally in the system.

5 And the noise that finally appears at the
6 output at the very end of all of that chain is a
7 combination of those two sources; the source from
8 the external world and the source from the circuits
9 themselves. And we just talked about imaging noise.
10 You know, an image noise factors into all of that
11 stuff that accumulates at the output.

12 Q Within the undesired inputs that are used
13 to calculate that signal-to-noise ratio, that would
14 include the image frequency; right?

15 MR. JOHANNINGMEIER: Objection.

16 A It would include the noise in this
17 embodiment. It would include the noise that is at
18 the image frequency.

19 Q Could you clarify what you mean by noise
20 at the image frequency?

21 A Yes. In fact, it's the second sentence in
22 that paragraph. It says: "The image therefore is

1 the interchannel noise in the FM band." And what is
2 meant by that is that there is -- in between two FM
3 stations there's, ideally there would be nothing,
4 nothing at all. But in reality there is noise that
5 gets filled in, you know, once again from
6 potentially external sources as well as internal
7 circuit noise sources.

8 And so those two things add together to
9 create interchannel noise in the FM band. It's that
10 space in between two FM signals where there should
11 be nothing ideally, but in fact there is noise.

12 Q And the same sentence that we've been
13 looking at, it says that it would worsen the SNR by
14 3 dB. DB stands for decibel there; right?

15 A Yes. DB stands for decibel.

16 Q And a decibel is a unit of measurement;
17 right?

18 A Yes. A decibel is a unit of measure and 3
19 dB is equivalent to a factor of two.

20 Q Now, is it correct that a decibel
21 expresses a ratio of two values on a logarithmic
22 scale?

1 A Yes. A decibel is a logarithmic
2 measurement, and if it's dB and only dB, then it is
3 a ratio and a logarithmic measure of a ratio.

4 Q Okay. I would like to switch exhibits
5 here. Sang, I think you can stop sharing your
6 screen. Dr. Larson, could I ask you to turn to your
7 declaration, Exhibit 2015?

8 A Yes. Okay. I have it here in front of
9 me.

10 Q And would you mind going to paragraph 73?

11 A Yes. Okay. I'm at paragraph 73.

12 Q Okay. In the first sentence you wrote:
13 "Rauhala does not disclose any detection of signal
14 strength beyond the indication that a threshold has
15 been crossed." Actually, I --

16 A Do you mean paragraph 75?

17 Q That's my fault. I pointed you to the
18 wrong paragraph. I do want to start at paragraph
19 73. I'm sorry for jumping ahead though.

20 A That's fine.

21 Q He writes: "Lenovo and Professor Baker
22 point to mention in Rauhala of a signal-to-noise

1 ratio as supposedly disclosing the comparing the
2 signal strength of the desired signal and the signal
3 strength of the interferer signal, as claimed in the
4 '202 patent."

5 You see that, right?

6 A I do see that, yes.

7 Q Okay. And now if we move down to
8 paragraph 75, I think this was what I was trying to
9 read in the first place. "Rauhala does not disclose
10 any detection of signal strength beyond the
11 indication that a threshold has been crossed."

12 Do you see where you wrote that?

13 A I do. Yes.

14 Q And then in just the next sentence it
15 says: "A mere indication of a threshold crossing is
16 not suitable for directly comparing two numbers."

17 Do you see that?

18 A I see that, yes.

19 Q So is it your view that a person of
20 ordinary skill in the art would understand the
21 comparing element in the claims of the '202 patent
22 to require directly comparing a desired signal

1 strength value to an interferer's signal strength
2 value?

3 MR. JOHANNINGMEIER: Objection.

4 A Yeah, well, my belief is, and I might want
5 to review the exact wording, but my belief is that
6 the '202 patent claims talk about, you know,
7 measuring -- let me maybe pull up the, just make
8 sure I have the exact wording correct. Measuring --

9 I'm looking now, for example, at claim
10 seven. Determining signal strength of the desired
11 signal, determining signal strength through the
12 interfering signal, comparing the desired strength
13 relative to the strength of the interferer. Sorry.

14 So, yeah, the '202 talks about comparing
15 the strength of the desired signal relative to the
16 strength of the interferer.

17 Q And does that claim that you just read,
18 claim 7, does that use the word "directly"?

19 MR. JOHANNINGMEIER: Objection.

20 A Let me just check. Yes, I don't see the
21 word "directly" in claim seven.

22 Q Okay. And just going back to your

1 declaration one more time, in paragraph 75 you say:
2 "A mere indication of a threshold crossing is not
3 suitable for directly comparing two numbers."

4 So what I would like to know is what is
5 your basis for understanding that the claims require
6 directly comparing?

7 MR. JOHANNINGMEIER: Objection.

8 A Well, you know, I would say that the
9 claims in the '202 patent, for example, talk about
10 measuring a signal strength of a desired signal,
11 measuring the signal strength of an interferer, and
12 that's used to, you know, change various impedances
13 and bias currents and other aspects of the receiver,
14 and a threshold measurement by itself would not be
15 sufficient to optimize the performance of the
16 receiver.

17 Q Could you please turn back to the '202
18 patent and look at claim seven one more time?

19 A Yeah.

20 Q Now, I believe you just said that the '202
21 patent, for example, talks about measuring a signal
22 strength of a desired signal?

1 A Uh-huh.

2 Q Do you see the word "measuring" in claim
3 seven?

4 MR. JOHANNINGMEIER: Object.

5 A I do not see -- let me check. I do not
6 see the word "measure" in claim seven.

7 Q So what is the basis for your opinion that
8 claim seven requires measuring the strength of the
9 desired signal?

10 MR. JOHANNINGMEIER: Objection. He stated
11 no such opinion. Misstates testimony.

12 A Well, you know, I was just reading the
13 plain claim language here. Determining the strength
14 of the desired signal. That determination has to be
15 done somehow and a measurement would be the way to
16 determine that signal. Sorry. Determine the
17 strength of that signal.

18 Q Okay. I would like to look at the
19 specification of the '202 patent. In particular
20 could you please turn to column six and line 52?

21 A Okay. I'm going to use the paper version.

22 Q That's fine.

1 A Line 52 begins with, "Figure 4 illustrates
2 a portion," et cetera.

3 Q Yes. The whole sentence says: "Figure 4
4 illustrates a portion of a receiver consistent with
5 an embodiment of the present invention."

6 Do you see that sentence?

7 A I see that sentence, yes.

8 Q And then a bit lower down in the paragraph
9 it says: "Signal strength indicator circuits 440
10 and 450 are connected to input line 410 and output
11 line 460."

12 Do you see that?

13 A Yes. I see it.

14 Q And then moving on a couple of sentences
15 more, it says: "The signal strength indicators 440
16 and 450 do not provide information as to the
17 relative sizes of the desired and interfering
18 signals, rather a cumulative signal level is
19 provided at their outputs."

20 Do you see that?

21 A I do. Yes.

22 Q What is your understanding of what signal

1 strength indicator 440 is determining in Figure 4?

2 MR. JOHANNINGMEIER: Objection. Scope.

3 A So let me just -- I'm just going to look
4 at Figure 4 very quickly.

5 Q Please do.

6 A Figure 4 shows, you know, block 440
7 labeled SSI1 and block 450 labeled SSI2, and I
8 believe I presume that SSI stands for signal
9 strength indicator.

10 So there is a signal strength indicator at
11 the front of this block, which is 440, and there is
12 a signal strength indicator at the back, which is
13 450. And I guess each one of them measures the
14 total signal strength at that, those points in the
15 circuit, at the input and the output of the circuit.

16 Q Is either one of those signal strength
17 indicators 440 or 450 measuring a strength of only a
18 desired signal?

19 MR. JOHANNINGMEIER: Objection.

20 A Yeah, as the sentence that we were talking
21 about stated, I think it says it's the cumulative
22 signal. That's the word. And so I believe that

1 those signal strength indicators are measuring the
2 cumulative signals at that point.

3 Q So would your understanding be that the
4 cumulative signal includes both the desired signal
5 and the undesired signal?

6 MR. JOHANNINGMEIER: Objection.

7 A Yeah. And I think that this -- I think
8 it's said nicely in the patent, that the -- it does
9 not provide information as to the relative sizes of
10 the desired and interfering signals, rather a
11 cumulative. So there is no distinction between
12 desired and undesired signals in that case, and for
13 those two signal strength indicators.

14 Q And is it your understanding that the
15 signal levels measured by 440 and 450 would be
16 compared to each other?

17 A Well, I think that they would be compared
18 to each other and also evaluated separately. Under
19 like normal operation you would look at the
20 comparison and you would also look at their
21 individual values under kind of normal operation of
22 the receiver.

1 Q What do you mean by look at their
2 individual values? Could you explain that?

3 MR. JOHANNINGMEIER: Objection. Scope.

4 A Yeah. Well, the invention talks about
5 varying various bias currents and impedances, you
6 know, in response to signal conditions, and the
7 ratio of these two will tell you something about,
8 and this is actually discussed in the patent, but,
9 you know, the ratio of these two will tell you a
10 little something about where the interferers are and
11 where the desired signal is, and the individual
12 values will tell you a little bit about the signal
13 levels in particular at that point in the signal
14 chain, and all of that information can be used to
15 adjust the circuit appropriately, both in bias and
16 impedance and perhaps other measures as well.

17 So everything is important. Impedance --
18 maybe all of the information from both of these two
19 detectors is important.

20 Q So is there any direct comparison of
21 desired signals to interferer signals that's
22 happening in Figure 4?

1 A Well, let me review the discussion a
2 little bit, because I thought that this was
3 discussed perhaps on -- let me just review.

4 So, you know, if you go to the discussion
5 of this circuit, they talk about like in this
6 particular case, you know, in this specific example
7 they use the gain of the gain and filter circuit
8 combinations as shown as approximately one while the
9 interfering signals 414 and 416 are reduced.

10 So, you know, I guess all I'm saying
11 really is that these blocks do treat -- sorry -- can
12 treat interferers and desired signals differently
13 and the signal strength indicators would be -- could
14 be a measure of that, treating desired signals and
15 interferers differently. I'm just reading the
16 language of the patent here.

17 Q What is your basis for saying that those
18 signal strength indicators could, could treat
19 desired signals and interferer signals differently?

20 A Well, if we look at Figure 4 -- I'm sorry.
21 I believe it's 4. Well, Figure 4 I think shows it
22 rather nicely actually. And once again I'm just

1 looking at the patent here.

2 There is an element 420 is gain, element
3 430 is a filter, and once again 440 and 450 are the
4 signal strength indicators, and you can see in this
5 particular case I think they said that the desired
6 signal was 412 and the interferers were 414 and 416
7 at the input, and then at the output you notice that
8 those two little signals on the right are
9 dramatically reduced compared to the most left
10 signal, which is 462.

11 So like in this case, this is just from
12 the patent really, the filter is treating the
13 interferers a little differently from the desired
14 signal and you would see this at the outputs of SSI1
15 and SSI2. I'm really just describing what's in the
16 patent here.

17 Q Is it your understanding that 412, 414 and
18 416 are measurements taken by either of the signal
19 strength indicators 440 or 450?

20 MR. JOHANNINGMEIER: Objection.

21 A Well, I think what I would say is that 440
22 measures 412 -- in this example it measures the sum

1 of 412 through 414 and 416 and 450 measures the sum
2 of 462, 464 and 466.

3 Q So no components in this diagram measures
4 the desired signal on its own; correct?

5 MR. JOHANNINGMEIER: Objection. Scope.

6 A Yeah. So in this diagram Figure 4, and if
7 we are assuming that 412 is the desired signal of
8 the input and 462 is the desired signal at the
9 output, then nothing is measuring those two things
10 by themselves.

11 Q Okay.

12 MR. UHR: We have been going for about an
13 hour I think. Does this feel like a good time to
14 take another break?

15 MR. JOHANNINGMEIER: Yeah. Counsel, can I
16 just ask do you have a lot left?

17 MR. UHR: Not too much. I think we should
18 be able to get through it before having to take
19 another break so maybe this will be the last break.

20 MR. JOHANNINGMEIER: Hopefully. Yes. A
21 ten-minute break is fine.

22 MR. UHR: Okay.

1 VIDEOGRAPHER: We are now off the record
2 at 3:33 p.m.

3 (Recessed at 3:33 p.m.)

4 (Reconvened at 3:46 p.m.)

5 VIDEOGRAPHER: We are now back on the
6 record at 3:46 p.m. You may proceed.

7 BY MR. UHR:

8 Q Dr. Larson, do you still have the '202
9 patent handy?

10 A Yes. I have it right here.

11 Q And I would like to direct you to column
12 eight, line 25.

13 A Yes. I have it here. Column eight, line
14 25.

15 Q The specification here is describing a
16 block diagram shown in Figure 8A. Do you see that?

17 A Yeah, let me turn to that figure. Yes. I
18 see Figure 8A.

19 Q Okay. And then back to column eight, I'll
20 point you to line 30.

21 A I see it.

22 Q It says: "An input signal is received on

1 line 812 by the optional gain element 814."

2 Do you see that?

3 A Yes. I see it.

4 Q Okay. And down just a little bit farther
5 at line 35 there is a sentence that says: "The
6 functional block receives an output signal from the
7 optional gain element 810 and provides an output
8 VOUT on line 822."

9 Do you see that?

10 A Yes, I do.

11 Q So what is your understanding of what's
12 shown in Figure 8A?

13 MR. JOHANNINGMEIER: Objection. Scope.

14 A Well, to me it looks like a block diagram
15 of a, you know, a function that has some optional
16 gain, which is element 810, and then a function
17 block that, you know, passes the input to the
18 output. That function block I believe it says in
19 the specification could be an amplifier or a mixer
20 or a filter.

21 And then the impedance and DC bias
22 controls change characteristics of that function

1 block. That's what I think it shows.

2 Q Okay. Could I ask you to skip down to
3 Column nine, line one?

4 A Yes.

5 Q And the first sentence there says: "That
6 the input spectrum is as shown in Figure 8B can be
7 determined, for example, by low signal strength
8 indications on line VIN 812 and VOUT 822."

9 Do you see that?

10 A Yes. I see that. I'm sorry. I'm just
11 looking at the figure to kind of confirm that. I
12 see it.

13 Q Okay. So does Figure 8B show an input
14 signal spectrum?

15 A I believe so. I think by input signal
16 spectrum they mean like these three things, the
17 desired and the interferers 836, 837 and 838. I
18 think that's what they mean by the spectrum in that
19 case.

20 Q So 836 represents a desired signal; right?

21 A Yeah. 836 is labeled desired. Yes.

22 Q And 837 and 838 represent interferer

1 signals; right?

2 A Yes. They are both labeled interferer.

3 Q And how is the desired signal 836 measured
4 here?

5 MR. JOHANNINGMEIER: Objection.

6 A Well, I think the measurement that they
7 are referring to is not shown here. You know, I'm
8 just reading once again the text and it says that
9 the input spectrum can be determined, for example,
10 by low signal strength indicators on line 812 and
11 822. And if you refer back to, what was that Figure
12 4, they give, Figure 4 gives an example of how you
13 would actually determine those signal strength
14 indicators on line 812 and 822.

15 Q Is there any description in the '202
16 patent of a device that measures only the desired
17 signal 836 on VIN 812?

18 MR. JOHANNINGMEIER: Objection. Scope.

19 A Yeah. I mean there is nothing in the
20 patent that talks about a specific device that
21 measures the signal strength on 812 or 822. I
22 believe it's inferred from the discussion of Figure

1 4, for example.

2 Q And as we discussed with respect to Figure
3 4, there was no component in Figure 4 that measures
4 only the strength of the desired signal; right?

5 MR. JOHANNINGMEIER: Objection. Scope.

6 A Yeah, like in Figure 4, as we discussed
7 before, you know, there is, the signal strength
8 indicators in Figure 4 are measuring the total
9 signals on those lines.

10 Q So with respect to Figure 8A or Figure 8B,
11 does the '202 patent describe any direct comparison
12 of a desired signal strength to an interferer signal
13 strength?

14 MR. JOHANNINGMEIER: Objection. Scope.
15 Also calls for a conclusion.

16 A In the specification for 8 I guess figure
17 8, 8A, 8B and 8C there is no talk of comparing a
18 desired signal to an interferer.

19 Q Okay. I would like to point you to column
20 eleven, line 46, still in the '202 patent.

21 A I found the column. Let me look at the
22 figure now. Okay. I see Figure 14 and you said

1 column eleven, 46?

2 Q That's correct.

3 A Okay. I'm there.

4 Q Okay. And just for the record, since you
5 are one step ahead of me, that portion of the
6 specification is describing a block diagram shown in
7 Figure 14; right?

8 A I believe that's correct, yeah. It's a
9 block diagram of a receiver.

10 Q Okay. And if you look at line 50 in that
11 same paragraph, it says: "Signal strength detection
12 is done at the output of the low-noise amplifier by
13 a signal strength indicator 1470, at the output of
14 the mixer by signal strength indicator 1472, and at
15 the output of the filter by signal strength
16 indicator 1474."

17 Do you see that sentence?

18 A Yes, I do.

19 Q And is there any indication in this
20 paragraph that signal strength indicator 1470 is
21 measuring only the strength of the desired signal?

22 A There is no indication in this paragraph

1 that 1470 is only measuring the desired signal. It
2 simply says signal strength detection is done.

3 Q And how about signal strength indicator
4 1472; same question?

5 MR. JOHANNINGMEIER: Objection. Scope.

6 A Yeah. The -- once again this is all one
7 sentence, so signal strength detection is done at
8 the output of the mixer by 1472 as well.

9 Q So 1472 is not measuring only the strength
10 of a desired signal; correct?

11 A Well --

12 MR. JOHANNINGMEIER: Objection. Scope.

13 A Yeah, it depends. It depends a little bit
14 on the contents of the signal at that point, but it
15 doesn't necessarily have to measure only the desired
16 signal.

17 Q Could you explain a little bit what you
18 mean by it depends a little bit on the contents of
19 the signal?

20 A Yeah. In the cases, this is talked about
21 in the patent, like in a case where the interferer
22 signals are very low and the desired signal is very

1 high, this signal strength indicator would be
2 measuring the desired signal mostly, and as well as,
3 you know, other noise components and other things
4 that are there.

5 Q So the signal strength indicators would be
6 measuring interferer signal strength in addition to
7 desired signal strength even when the interferer
8 signal strengths are very small; right?

9 A Yes. They measure whatever, the signal
10 strength indicators measure whatever signals are
11 present at their input.

12 Q Okay. Sticking with the example that's
13 shown in Figure 14 and described in the
14 specification in column eleven where I pointed you
15 to, is a strength of a desired signal being compared
16 to a strength of an interferer signal?

17 A I'm sorry. I don't understand the
18 question. Do you mean in Figure 14? Or in -- can
19 you be more, perhaps clarify that for me?

20 Q Yes. I'm referring to Figure 14. Is
21 there anything in Figure 14 or the corresponding
22 portion of the specification that suggests that

1 there is a direct comparison between desired signal
2 strength and interferer signal strength?

3 MR. JOHANNINGMEIER: Objection.

4 A Well, if you look at Figure 14, it shows
5 signal strength being measured at several points in
6 the signal chain. And by the time the signal, the
7 final signal is in front of the element 1450 which
8 is labeled gain and ACC, presumably that is mostly
9 the desired signal. Otherwise the receiver would be
10 kind of nonfunctional.

11 So my presumption here is that the signal
12 strength that's being measure at 1474 is largely the
13 desired signal and you don't know 1470 and 1472 that
14 it will be a combination of them all, but you could
15 certainly compare, and of course the specification
16 doesn't say compare, sorry, these paragraphs don't
17 say compare, but, you know, 1474 is a measure of
18 the, close to the desired signal and these other
19 circuits measure something different, more
20 cumulative signals I guess.

21 And, you know, so the cumulative thing,
22 the cumulative measurements that are done here by

1 these three different signal strength indicators
2 kind of give you both the desired signal as well as
3 the, desired signal plus interference at various
4 places along the chain.

5 Q But to be clear, there is nothing here
6 that suggests a direct comparison of a desired
7 signal strength with an interferer signal strength;
8 right?

9 MR. JOHANNINGMEIER: Asked and answered.

10 A Well, I don't -- you know, all I can I
11 guess say is that the, you said that there is
12 nothing here that suggests. I mean the, the
13 circuits can clearly do this comparison or do these
14 measurements, so I presume that they are there for a
15 reason. The reason in my belief would be to measure
16 the desired signal and measure the other signals in
17 the chain, which will be both interferers and the
18 desired signal. So I guess the schematic itself
19 makes that suggestion. I'm sorry. The figure
20 itself makes that suggestion.

21 Q And are you aware of any other portion of
22 the '202 patent that describes directly comparing

1 the signal strength of the desired signal to the
2 signal strength of an interferer signal?

3 MR. JOHANNINGMEIER: Objection. Scope.

4 A Well, I would have to read over the '202
5 patent in some specificity, but nothing leaps to my
6 mind at this point in time. I'm sorry. I have a
7 dog.

8 Q I have a small dog too. Luckily he has
9 been behaving so far.

10 A Mine has been great until this moment.
11 Sorry.

12 Q Can I ask you to pick up the '825 patent
13 one more time?

14 A Yes. Okay. I have it right here.

15 Q And could you turn to the very last page,
16 please?

17 A Yeah. That's like page 26.

18 Q That's right. And in the right-hand
19 column you see claim eight there, right?

20 A Yes. I see claim eight.

21 Q And claim eight is one of the claims that
22 you considered when forming your opinions in this

1 case?

2 A I would have to go back and look at my
3 declaration, but I believe that's the case, yes.

4 Q Would you mind looking at your declaration
5 and just confirming?

6 A Yeah. So that's Exhibit 2015?

7 Q Yeah.

8 A Let's see. You know, I can't find it in
9 here right off the top, but I'll assume that that's
10 correct. That's perfectly fine.

11 Q Okay. If you look at line 40,
12 thereabouts, actually it's just below line 40
13 because 40 is between two lines of text in claim
14 eight. But do you see that there is a line that
15 begins "causing" colon?

16 A Yes. I see that.

17 Q Okay. And it continues: "Causing", Roman
18 numeral one, "the bias current of the one or more of
19 the plurality of circuits in the receiver signal
20 path of the wireless transceiver to be decreased."

21 A I see that. Yes.

22 Q What would a person of ordinary skill in

1 the art understand is required by that element?

2 MR. JOHANNINGMEIER: Okay. Outside the
3 scope. The reason he couldn't find it in his
4 clarification is because this kind of claim analysis
5 isn't in the scope. You can answer the question,
6 but calls for a legal conclusion. We object.

7 A Yeah. I'll answer the question. And I'm
8 sorry. Could you give me the question again?

9 Q Sure. So I'm not going to reread that
10 portion of the claim, but I'm referring to Roman
11 numeral I under "causing" and I would like to know
12 what your view is as to how a person of ordinary
13 skill in the art would understand what is required
14 by that element?

15 MR. JOHANNINGMEIER: Objection.

16 A By, you mean by the element that causes
17 the bias current to be decreased, circuit element?

18 Q I'm sorry. I'll clarify. What I mean by
19 element is that clause of the claim. So Roman
20 Numeral I, what is required by that?

21 MR. JOHANNINGMEIER: Objection. Outside
22 the scope. Calls for a legal conclusion.

1 A Well, you know, I would guess what's
2 required for that bias current to be decreased as
3 they say would be the conditions. I'm trying to
4 answer your question as best as I can.

5 The conditions would be described earlier
6 in that claim, you know. You receive a signal, you
7 know, worst case power dissipation, you know, the
8 power dissipation, reduction is accomplished by a
9 bias current and the signal strength of the
10 interferer is high and the signal strength of the
11 desired signal is low and then that causes some
12 changes to the bias and impedance.

13 And so all of those conditions would cause
14 the bias current to be decreased, which is Roman
15 Numeral I. So I'm trying to answer your question.
16 I hope I'm being responsive.

17 Q I understand. What is a bias current?

18 MR. JOHANNINGMEIER: Objection. Scope.

19 A So a bias current is a DC bias that's
20 applied to a circuit that, you know, provides it
21 with energy that then, and that energy is then used
22 for some function.

1 Q Okay. And then moving down to about line
2 47, it's the very last clause of claim eight. It
3 says: "Thereby causing a drive current of the one
4 or more of the plurality of circuits to be
5 decreased."

6 Do you see that?

7 A Yes. That's like the final sentence of
8 the patent.

9 Q What is a drive current?

10 MR. JOHANNINGMEIER: Okay. Objection.
11 You know as well as I do that drive current is a
12 claim construction issue in another case. I don't
13 think it's appropriate to be asking him on the fly
14 to interpret --

15 MR. UHR: Counsel, you can make your
16 objection. I'm going to ask you not to make
17 speaking objections.

18 MR. JOHANNINGMEIER: It's not a speaking
19 objection. I'm telling you what's wrong with this
20 question.

21 MR. UHR: Counsel, counsel, you are
22 coaching the witness.

1 MR. JOHANNINGMEIER: I'm not coaching.

2 MR. UHR: Make appropriate objections. We
3 let you speak. Let me finish. These are
4 inappropriate. You are coaching the witness and if
5 you have one more speaking objection, we are going
6 to stop the deposition and call the board and we
7 will use our full time. We are trying to wrap this
8 up.

9 MR. JOHANNINGMEIER: You are not. And
10 first off, you asked this question, this is not a
11 fair question. I'm making the objection. It's not
12 coaching him. He is going to answer. Okay? The
13 fact that I think it's an unfair question isn't
14 going to change his answer. I'm not trying to coach
15 him in any way.

16 MR. MELWANI: Let's take a ten-minute
17 break. Will, can you send Corey the Pevarello v.
18 Lan decision for him to read?

19 MR. JOHANNINGMEIER: No. I'm familiar.
20 Listen, I will back down. You can ask the question.
21 He can answer the question. All right? This is not
22 appropriate and so I'm making an objection for the

1 record. That's all. All right?

2 MR. UHR: Your objection is fine. What is
3 meant by the claim language couldn't be more
4 relevant to this proceeding. So we will take the
5 witness' answer and note your objection. Thank you.

6 MR. JOHANNINGMEIER: He is not here to
7 argue about objections. It's not relevant because
8 it's not in his declaration anywhere. Whether it's
9 relevant to the proceeding in general is a question
10 that, you know -- it's, it's not relevant to this
11 deposition. He can answer it. I'm going to let him
12 speak. I'm not telling him not to answer. I
13 haven't done that.

14 All day long you have been doing outside
15 of scope questions. I'm objecting. I will continue
16 to do that. He is going to answer the question. We
17 will be fine. I just want to be strong in objecting
18 to this whole line. We are not going to do claim
19 construction here today.

20 MR. MELWANI: We understand. We noted
21 your objection. We are going to continue with the
22 questions.

1 MR. JOHANNINGMEIER: Okay.

2 MR. MELWANI: Dialogue like this has been
3 deemed inappropriate, so why don't you continue with
4 the questions.

5 MR. JOHANNINGMEIER: The board can read it
6 and they can understand why and it will be fine.
7 All right? Let's move on.

8 A Mr. Uhr, could you perhaps give me the
9 question again?

10 Q Of course.

11 So, Dr. Larson, I was pointing to the very
12 last portion of claim eight. It says: "Thereby
13 causing a drive current of the one or more of the
14 plurality of circuits to be decreased," and you see
15 that; right?

16 A Yes. It's the final sentence in the
17 patent.

18 Q Okay. And the term drive current, what
19 would a person of ordinary skill in the art
20 understand that that means?

21 MR. JOHANNINGMEIER: Objection.

22 A Well, you know, a person of ordinary skill

1 in the art would think of drive current as like
2 your, you have a source of power, you know, a
3 voltage source. It's an AV voltage source or it's
4 providing a signal of some kind and the drive
5 current is the current that that source provides to
6 drive the load, the AV current that is required to
7 drive the load. So it's an AC current supplied by a
8 source to drive a load.

9 Q And what is the difference between a bias
10 current and a drive current?

11 MR. JOHANNINGMEIER: Objection.

12 A Well, drive is usually associated with
13 like some kind of a transient or some kind of a
14 signal, whereas, you know, DC bias is unchanging.

15 Q Can both a bias current and a DC current
16 exist in a circuit?

17 A Can both a bias current and a DC current
18 exist?

19 Q I'm sorry. I phrased that wrong. Could
20 both a bias current and a drive current exist in a
21 circuit?

22 MR. JOHANNINGMEIER: Objection.

1 A Yeah, a bias current and a DC current
2 could exist in a circuit, in a big circuit, yes.

3 MR. UHR: Okay. Counsel, we would like to
4 take a five-minute break here just to collect our
5 thoughts and then reconvene if that's okay.

6 MR. JOHANNINGMEIER: Sure.

7 MR. UHR: Thank you.

8 VIDEOGRAPHER: We are now off the record
9 at 4:19 p.m.

10 (Recessed at 4:19 p.m.)

11 (Reconvened at 4:30 p.m.)

12 VIDEOGRAPHER: We are now back on the
13 record at 4:30 p.m. You may proceed.

14 MR. UHR: Counsel, we have no further
15 questions for the witness on cross-examination.

16 MR. JOHANNINGMEIER: Okay. Well, I'll
17 just lodge an objection that I think less than 10
18 percent of your questions were actually legit cross,
19 but we don't have any questions at this point, so we
20 are done.

21 VIDEOGRAPHER: This now ends the
22 deposition of Dr. Larry Larson. We are off the

1 record at 4:30 p.m.

2 (Whereupon, at 4:30 p.m., the
3 deposition of LAWRENCE E. LARSON,
4 Ph.D., was concluded.)

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1 A C K N O W L E D G M E N T O F D E P O N E N T

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3

4 I, LAWRENCE E. LARSON, Ph.D., do hereby acknowledge

5 I have read and examined the foregoing pages of

6 testimony, and the same is a true, correct and

7 complete transcription of the testimony given by

8 me, and any changes or corrections, if any, appear

9 in the attached errata sheet signed by me.

10

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19 _____

20 Date

LAWRENCE E. LARSON, Ph.D.

21

22

1 UNITED STATES OF AMERICA)

2 ss:

3 DISTRICT OF COLUMBIA)

4 I, ROBERT M. JAKUPCIAK, an RPR and Notary
5 Public within and for the District of Columbia do
6 hereby certify:

7 That the witness whose deposition is
8 hereinbefore set forth, was duly sworn and that the
9 within transcript is a true record of the testimony
10 given by such witness.

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

15 IN WITNESS WHEREOF, I have hereunto set my
16 hand this 23rd day of April 2024.

17



18

19

20

21 My Commission Expires:

22 February 28, 2029

0	10:00 1:16	1980s 80:14	131:20 136:22
0013 22:12	10:03 5:4	1990s 80:14	137:4
0999,649 22:3	10:18 16:8,9	1994 100:1	2023 17:3
1	10:23 16:10,12	1997 82:13	2023-00697
1 1:21 22:17	11:18 47:20,21	1:15 9:4	10:6
1.27. 85:14	11:25 47:22	1:17 58:8,10	2023-00698
1.27a 83:12,14	48:2	2	10:6 17:6
83:15	11:43 58:6,7	2 22:13,16 23:3	2024 1:15 5:4
1.27a. 84:2	11:45 9:3 57:20	23:4,5,8,12	149:16
1.29 84:14,21	12 59:18	28:1,20,22	20250 149:17
86:15 87:15	1245825.pdf	29:4 30:2	2029 149:22
88:8	78:2	36:20 37:1,5,7	21 4:13 27:18
1.29. 84:16	1250 2:5	38:7,10,11,14	27:20 28:3,7,8
86:18	13 22:8 27:14	38:17,20 40:4	28:8,9 29:3,8
1.4 83:9 84:10	27:19 76:7,9	40:15	77:1,3,5,9 93:1
10 35:9 90:21	76:10,12,14,18	2000 3:7	93:3 95:1
109:1 146:17	14 131:22	20006 3:8	22 57:4,6
10,129,825 1:8	132:7 134:13	2005 4:9 15:5	23 36:7,10 37:3
4:15	134:18,20,21	16:17 17:5	23rd 149:16
10,524,202 1:9	135:4	21:9	24 59:18
5:11	1450 135:7	2015 4:10 19:9	25 72:1 96:22
10.7 105:13	1470 132:13,20	19:16,18 21:7	97:6 127:12,14
107:7,10,15	133:1 135:13	48:5 115:7	26 137:17
108:20 109:5	1472 132:14	138:6	27 97:15
1001 4:15,16	133:4,8,9	202 3:9 4:16	28 149:22
59:3,8 70:17	135:13	12:19 18:13	29th 12:18
71:2,7	1474 132:16	46:1,10 47:3	2:15 90:10,11
1004 4:13	135:12,17	47:11 58:19	2:26 90:12,14
21:13,14 22:2	149 1:21	71:2,14,15,19	3
55:15 90:17,22	15 4:9 81:22	73:9 96:17	3 102:22 111:8
1016 4:17	18 1:15 5:4	116:4,21 117:6	111:14 114:14
77:15,18	9:14,15	117:14 118:9	114:18
1017 4:19 98:7	19 4:10 77:1,3	118:17,20	3.3 103:9
98:8 99:9	77:5,9	119:19 127:8	3.3. 103:11
		130:15 131:11	

30 14:22 104:11 107:20 127:20 32 20:7,8 330 18:12 35 128:5 351-7248 3:18 3:33 127:2,3 3:46 127:4,6	450 120:10,16 121:7,13,17 122:15 125:3 125:19 126:1 46 84:9 131:20 132:1 460 120:11 462 125:10 126:2,8 464 126:2 466 126:2 47 141:2 4:19 146:9,10 4:30 146:11,13 147:1,2	32:13,17 33:3 33:7,9 35:22 92:17,18 93:7 93:13,22 94:18 95:2,4,7,10,14 95:19 62 29:19,20 30:6 31:5,6,12 31:16,17,21,22 34:7 57:10 650 3:18 6645999 1:20 694 18:3,8 697 17:8 18:3,8 19:21 20:10,13 59:3,22 70:17 698 4:16 17:10 18:3,8 19:19 19:21,21 20:11 20:13 71:2	72 37:11,13 38:7 39:4,5,8 39:10,11 40:16 73 115:10,11,19 75 115:16 116:8 118:1 77 4:17
4			8
4 120:1,3 121:1 121:4,6 123:22 124:20,21,21 126:6 130:12 130:12 131:1,3 131:3,6,8 40 14:22 138:11,12,13 4001 3:7 410 120:10 412 125:6,17,22 126:1,7 414 124:9 125:6,17 126:1 416 124:9 125:6,18 126:1 42 82:20 420 125:2 430 125:3 44 83:8 440 120:9,15 121:1,6,11,17 122:15 125:3 125:19,21	5 50 132:10 51 102:18 52 105:4,10 119:20 120:1 53 108:2 54 48:8 59 4:15 6 6 4:4 28:9,12 29:14,20 31:5 55:18 57:7 90:19,21 91:4 93:4 94:13 95:12 61 28:16 29:19 29:20,21 30:4 30:6,14,22 31:7,22 32:5,8	7 7 36:10,13 37:4 37:6,6,8,13 44:4,20 117:18 70 105:14 107:16,17 108:5 109:2,4 111:2 701 3:16 71 4:16 36:17 37:2,11,13,14 37:15 38:6,13 38:21 39:1,11 40:18,21 41:16 42:21 44:21	8 96:21 97:15 131:16,17 80 108:22 808-3497 3:9 810 128:7,16 812 128:1 129:8 130:10 130:14,17,21 814 128:1 820 97:16 98:2 98:3 822 128:8 129:8 130:11 130:14,21 825 12:19 18:12 46:1,10 47:2,11 58:19 59:2,15 63:22 65:2 69:17 70:17,18,19 71:18 137:12 836 129:17,20 129:21 130:3 130:17 837 129:17,22 838 129:17,22

8a 97:3,11,13 127:16,18 128:12 131:10 131:17 8b 129:6,13 131:10,17 8c 131:17	able 7:11 16:17 16:18 94:7 102:11,15 126:18 above 56:4,12 absent 66:9 abstracted 52:20 ac 51:4 86:11 86:13,13 88:6 145:7 acc 135:8 accommodate 9:2 accommodati... 58:1 accomplished 75:12,15 140:8 accordance 64:9 accumulates 113:11 accurate 7:13 19:3,6 20:22 21:2 100:1 achieved 64:11 acknowledge 148:4 action 149:12 actively 30:15 actual 78:22 actually 11:14 61:20 67:1 70:16 83:1 115:15 123:8	124:22 130:13 138:12 146:18 add 114:8 addition 66:5 134:6 additional 65:13 address 9:11,12 adjacent 108:7 111:9 adjust 46:3,12 60:8 64:1 65:3 69:18 72:11 73:9 75:7 123:15 adjusting 27:9 27:12 62:11 64:8 67:1 68:9 70:3 adjustment 61:13,17 64:10 70:4 adjustments 61:9 advantageous... 44:12 affect 45:15 affirm 12:4 age 9:14,15 ago 36:21 81:22 104:11 107:20 agree 29:2 37:2 85:20 88:20 94:17 95:1	96:3 97:11 98:1 agreeable 100:21 ah 15:15 ahead 15:2 59:1 73:3 77:13 79:6 98:11 115:19 132:5 ahn 3:4 6:2,2 algorithm 63:5 allow 7:15,18 8:5 allowed 107:19 america 149:1 amp 92:17,19 amplification 30:20 33:5 amplifier 28:17 30:1,13,14,17 30:18,21 31:3 31:7,17 32:2 32:12,20 34:2 35:15,18 46:4 46:13 60:9 62:2,8,16,17 64:1,15,17 65:3 68:10 69:19 70:9,11 70:12 72:12 73:10,17 75:8 76:3,15,20 77:6,11 92:20 92:22 93:7,12
9			
90 108:20 94063 3:17 97 9:12 98 4:19 999,649 4:14			
a			
a.m. 1:16 5:4 16:8,9,10,12 47:20,21,22 48:2 58:6,7 a1 24:2,12,13 24:14,17,20,21 26:15,17 27:21 28:19 a2 4:14 22:4 24:2 25:1,2,5,6 26:15,17 27:21 28:19 a3 25:8,10,11 25:12 26:16,17 27:21 28:19 aaron 3:14 6:9 abidi 104:16 abidi's 102:22 ability 9:20			

93:14,22 94:4 94:18 95:2,4,7 95:10,14,19 96:10,14 97:18 128:19 132:12 amplifiers 26:19,22 27:10 27:13,20 28:1 28:4,20 29:4 29:13 64:7 amplify 30:22 amplifying 30:15,18 amplitude 33:21 35:20 36:2,3 42:22 43:2 45:8,10 45:12,14 amplitudes 35:15,19 analog 4:17 36:17 78:2 80:1,19,22 81:2,4,8,11 104:13 analysis 139:4 annotations 12:22 13:3 answer 7:17,18 8:8,10 29:11 44:9 50:8,9,17 55:9,10,12 58:22 62:1 64:14,16 67:22 68:6 70:8,10	70:13,14 72:19 72:21 82:9 89:2,15 92:8 106:2 111:20 139:5,7 140:4 140:15 142:12 142:14,21 143:5,11,12,16 answered 51:3 68:18 136:9 answering 10:2 10:4 answers 63:11 68:15 ant 23:10,11,13 antenna 23:13 23:17,21 24:1 24:8 26:3 33:14 40:2 49:4,4 50:2,9 50:10,16,19 53:13 113:3 antennas 50:1 50:6 apologize 10:20 appeal 1:2 appear 39:18 148:8 appears 37:3 71:6,10 82:21 83:8 113:5 application 4:13 80:21 applications 11:13 81:13	applied 44:12 140:20 apply 62:1 appreciate 58:3 74:19 appropriate 141:13 142:2 142:22 appropriately 123:15 approximately 124:8 april 1:15 149:16 architectural 105:12 architecture 111:3 argue 143:7 arrow 56:10 arrows 83:20 art 40:8 102:7 102:11,14,21 116:20 139:1 139:13 144:19 145:1 artech 99:18 artwork 13:10 asked 16:14 58:18 61:3 72:10 136:9 142:10 asking 7:7 11:20 50:7 55:7 66:4 67:5	72:15 141:13 aspects 118:13 associated 18:12 39:19,21 145:12 association 51:18 assume 34:6 138:9 assuming 88:8 126:7 attached 4:22 148:9 attorneys 6:9 audience 101:21 102:1 audio 81:13 author 29:12 100:19 authors 86:4 87:4 100:9,15 authorships 80:10 av 145:3,6 available 15:3 19:13 21:20 77:22 avenue 3:7 avoid 8:2 aware 136:21 b b 4:7 b2 1:8,9 4:15 5:11
---	--	---	---

back 16:11 21:7 44:20 48:1 51:5 55:14 58:9 70:18 88:1 90:13,17 95:12 97:14 105:18 106:12 117:22 118:17 121:12 127:5,19 130:11 138:2 142:20 146:12 baker 13:20 115:21 band 111:5 112:4,15 114:1 114:9 base 83:16 84:3 84:4 85:9,10 86:20 88:20,21 89:3,7,9,14,18 89:20 91:6,7,8 91:14,15,18,18 91:19,21 92:12 92:13,14 based 23:16,20 43:16 61:2 65:11 67:22 73:14 83:8 94:16,22 102:13 bases 42:1,18 91:11,12 basis 118:5 119:7 124:17	bdiplaw.com 3:19 bear 98:11 bearing 44:7 88:15 bears 71:18 beginning 22:12 27:18 62:14 begins 93:20 120:1 138:15 behalf 2:10 3:2 3:12 5:21 behaving 137:9 belief 117:4,5 136:15 believe 13:14 18:15 19:1 20:3,21 21:1 23:15 24:13 26:13,21 29:1 29:12 35:13 39:20 40:18 56:8 68:15 82:18 83:10 89:15 92:8,21 100:5 105:18 106:3 107:14 110:16,20 111:19 118:20 121:8,22 124:21 128:18 129:15 130:22 132:8 138:3	believed 20:16 best 7:18 44:8 140:4 beyond 115:14 116:10 bias 27:9,13 30:12 31:2,7,8 35:6 38:11 39:5 46:3,12 47:3,5,11 53:17 60:8 61:1,17 62:1,9 62:11,18,21 63:7 64:1,8 65:3,8,11 66:2 66:5,14,16,16 66:22 67:1 68:9,13,19,22 69:3,18 70:3,7 72:11 73:10,16 74:6 75:8,12 75:13,14,15 76:2,5,15,19 77:6,10 96:15 118:13 123:5 123:15 128:21 138:18 139:17 140:2,9,12,14 140:17,19,19 145:9,14,15,17 145:20 146:1 big 79:15 105:6 146:2 bio 45:17	bipolar 57:11 57:15,17 83:3 83:9,11,15 84:10,12 85:19 85:22 86:8 88:21 89:13 91:3,5 bit 36:21 46:19 74:21 75:1 87:2,6 92:15 98:6 110:22 120:8 123:12 124:2 128:4 133:13,17,18 block 24:3,9 26:4 97:3,12 97:13,16 98:1 98:3 121:6,7 121:11 127:16 128:6,14,17,18 129:1 132:6,9 blocks 26:7,9 97:17 124:11 blood 149:12 board 1:2 142:6 144:5 bold 22:11 bomcip.com 3:10 book 4:17,19 79:20 99:11,16 99:19 100:3,9 100:11 101:12 101:14 102:15 102:16
---	--	---	--

bookoff 3:6 5:20 6:1,3,4 bottom 17:11 17:17 19:19,22 24:1 35:22 59:17,18 83:3 91:3 103:8 105:9 box 30:4 32:4 33:3 92:17,18 break 9:1 45:17 47:16,17 57:21 58:15 90:1,2,3 90:4 96:2 126:14,19,19 126:21 142:17 146:4 breaking 9:3 brey 3:21 5:14 briefly 13:22 bring 12:9 21:18 48:6 55:17 98:20 bringing 99:8 broadcast 103:9,21,22 104:1,4,6,10,18 104:20 105:3 broadly 104:16 brought 93:14 browser 16:15 browsers 11:13 15:17 built 107:9	bunsow 3:15 6:7 button 78:15 98:14 c c 3:1 4:1 5:1 52:5,6 54:22 55:1,6 148:1 calculate 55:4,5 55:8 113:13 calculated 64:10 65:13,15 66:3 70:5 calculating 86:8 calculation 66:6,12,15 73:15,18 74:9 calculations 66:22 california 3:17 call 21:8 42:18 51:15,19 61:18 67:15,20 69:3 70:5 73:19 74:9 76:20 142:6 called 6:14 12:18,19 50:11 50:13,14 51:12 51:13 52:2 61:10 112:1 calling 88:16 calls 65:21 131:15 139:6	139:22 camino 3:16 capacitance 51:21 52:8,10 52:12,18,22 53:1,7,9 capacitive 50:15,16 52:2 52:5,6,7 53:4,5 53:6,11,15,18 54:17,19,21 55:2 88:16 capacitor 52:18 53:3,8,11,17 careful 111:1 carrying 38:17 case 10:5 13:11 29:13 35:2 42:11 54:5 58:14 81:3 87:4 109:21 111:7,9,15 122:12 124:6 125:5,11 129:19 133:21 138:1,3 140:7 141:12 cases 18:3,10 109:9,14 133:20 cast 104:6 causal 66:14 cause 34:3 35:21 65:18 68:22 140:13	causes 69:3 70:7 139:16 140:11 causing 69:5 74:10,12,16,18 138:15,17 139:11 141:3 144:13 cell 11:7 104:13 104:14 centered 107:6 certain 37:16 certainly 62:9 62:17 66:11 98:3 135:15 certify 149:6,11 cetera 22:13 27:21 28:10 36:11 57:8 85:5,5 93:4 120:2 chain 26:3,14 33:15 40:3 113:6 123:14 135:6 136:4,17 chains 113:1 chance 45:17 78:18 change 18:20 34:3,5,8,9,11 34:12,17 35:21 35:22 36:4,5,6 43:5,6,12,13,13 43:22 44:22 45:3,6,8,11
--	--	--	--

55:10,12 64:14 64:16 65:7,11 65:12,16 66:4 66:14,16 69:4 69:5 70:13,14 73:20 74:6 75:12,14,15 87:20,21 89:18 89:20 91:19,22 92:2,6,9 95:19 96:5,10,14,16 118:12 128:22 142:14 changed 65:19 68:19,22 69:3 70:7 74:10,12 74:17,18 96:3 changes 34:2,5 35:5,6 45:12 74:10 91:20,21 92:2,7,9 95:17 96:8,14 140:12 148:8 changing 45:5 45:14 47:3,5 62:1 68:13 69:6 73:16 74:12,16 76:2 76:5,14,19 77:6,10 channel 108:7 109:17 111:10 channels 111:11	chapter 102:22 103:1,2,3,5 111:14 chapters 100:9 characteristic 103:18 characteristics 128:22 characterize 42:2 charge 52:19 chat 15:20 check 20:5 117:20 119:5 chip 107:19 chrome 11:14 circle 59:12 circles 27:1,3,4 circuit 4:18,20 31:6,9,16 37:6 37:19 39:5,10 43:22 46:3,12 47:6,10,13 48:17,19,22 49:10,17,22 51:7 53:3,5,8 53:21 54:20 57:10 60:8 61:4,5,6,10,11 61:14,17,19 62:2,12 63:1,5 64:1,11 65:3 65:13,14,15,18 66:11,13,17,19 67:1,2 68:10	68:19,21,21 69:2,18 70:5,6 70:6 72:11 73:9,16,19 74:2,3,5,9,13 74:14 75:7 76:3,6,16,21 77:7,12 78:2 80:1 97:18 99:17 103:14 103:15 107:9 107:18 112:17 113:3 114:7 121:15,15 123:15 124:5,7 139:17 140:20 145:16,21 146:2,2 circuitry 39:8 circuits 31:12 34:20,22 44:12 49:3 53:19,22 54:13 60:20 62:8,16 64:7 66:3,4 70:1,4 73:13,17 75:11 97:18,19 98:2 98:4 103:13 113:1,8 120:9 135:19 136:13 138:19 141:4 144:14 city 3:17 cjohanningm... 3:19	claim 59:19,21 60:2,4,7,11,12 60:14,16,18 61:4,12,20 62:5,6,7,11,14 62:15,20 63:1 63:8,10,11,15 63:19,21 64:3 64:4,5,13,18,20 64:21 65:1,6,7 65:7,9 66:20 66:21 67:5 68:9,12,15 69:10,13,15,17 69:22 72:2,3,7 72:10,22 73:8 73:12,15 74:2 75:2,9,10,13,17 75:20,22 76:1 76:4,7,8,10,12 76:14,18 117:9 117:17,18,21 118:18 119:2,6 119:8,13 137:19,20,21 138:13 139:4 139:10,19 140:6 141:2,12 143:3,18 144:12 claimed 116:3 claims 46:1,10 46:15,17,20 47:2,9 58:18 58:21 61:11
--	--	--	--

67:18 69:21 75:1,4,6 76:22 77:1,5,9 116:21 117:6 118:5,9 137:21 clarification 74:20 87:10 139:4 clarifications 20:18 clarified 18:16 20:16 clarify 8:22 22:10 34:10 42:13 46:18 70:16 86:2,3 87:5 113:19 134:19 139:18 clarifying 111:17 clarity 71:17 class 34:22 clause 139:19 141:2 clean 13:3 clear 68:8 74:13 136:5 clearly 7:11 136:13 click 98:20 clicking 78:4 close 110:7,19 135:18 closed 11:20,22	coach 142:14 coaching 141:22 142:1,4 142:12 collect 146:4 collected 100:8 collection 25:21 103:16 collectively 38:20 collector 30:7 83:16 84:5,6 84:19,20 86:4 86:5,9,9,13,13 86:16 87:20,21 88:4,4 89:17 92:12,13,14 93:12,14,20 95:16 college 81:17 81:19 colon 138:15 columbia 2:10 149:3,5 column 59:18 96:21 97:15 119:20 127:11 127:13,19 129:3 131:19 131:21 132:1 134:14 137:19 combination 113:7 135:14 combinations 124:8	come 78:7,18 100:20 comes 18:22 113:2,3 coming 44:20 59:4 71:15 78:9 95:14 commercial 102:3 commission 149:21 commissioned 100:8 committee 80:3 common 104:3 communicate 12:5,7 37:20 38:1 communicating 11:1,3 communicati... 4:21 35:12 99:17 102:2 compare 135:15,16,17 compared 122:16,17 125:9 134:15 comparing 116:1,16,21,22 117:12,14 118:3,6 131:17 136:22 comparison 122:20 123:20	131:11 135:1 136:6,13 complete 7:13 7:16,18 19:2,6 20:21 21:2 148:7 completely 13:2 complex 51:8 complicated 103:17 112:19 112:21 component 23:9,13 24:2 49:5,6,8,11 50:2,5,10,12,13 51:11,13,19 52:2 91:1 131:3 components 32:22 33:4 36:21 41:8 48:22 49:7,21 51:10,11 53:10 53:19,21 54:7 54:9,11,16,18 54:20,21 56:18 64:6 70:1 126:3 134:3 compromise 100:21 computer 12:2 81:6 computers 106:9
--	--	---	---

concepts 102:12,15,16 concluded 147:4 conclusion 63:3 65:5,21 67:6 67:10 72:16 131:15 139:6 139:22 conditions 43:14 47:4 62:19 68:14 123:6 140:3,5 140:13 condon 9:12 conference 5:13 confess 24:4 configurations 66:17,19 confirm 23:5 129:11 confirming 138:5 confused 24:4 31:14 connected 31:18 41:15,18 41:20,22 42:1 42:17,19 120:10 connecting 30:6 38:6 39:11 91:11	connection 10:16 24:10 66:15 connects 24:9 24:12,13 31:17 91:13 considered 137:22 considering 104:13 consistent 100:10 120:4 constant 89:18 constitute 105:1 construction 141:12 143:19 consulted 80:14 consulting 80:15,18 consumption 106:9 contain 98:4 content 67:17 contents 133:14,18 context 45:1 105:16 110:3 continue 68:3 143:15,21 144:3 continues 138:17	contributions 100:12 control 28:13 46:3,12 47:6 47:10 57:7,10 60:8 61:3,5,11 61:13,18 62:2 62:12,22 63:22 65:2 68:10,19 68:21,21 69:2 69:18 70:5 72:11 73:9,19 74:2,5,8,9 75:7 76:3,6,16,20 77:7,12 controlled 31:8 47:13 62:10,22 63:4 controlling 36:13 47:11 controls 61:17 128:22 conversely 51:21 conversion 106:10,15 107:5,13,13 111:12 conversions 38:4 convert 81:5 106:15 107:8 108:17,20 109:5,8,15,18 109:20 110:1,4	converted 81:10 converter 80:22 converters 80:20 81:12 converting 108:13,14 converts 106:13 copy 16:19,21 20:1 21:17 22:3 59:5,6 71:4,12 94:6 97:7 copyright 55:16 82:13 corey 3:13 6:6 142:17 corner 17:17 55:22 92:16 103:8 correct 9:17 16:15,16 19:16 19:17 22:14,21 23:14,15,18 24:21 25:20,22 26:11,19 27:5 27:10 28:13,20 29:1,8 30:16 30:22 31:3,13 33:1 38:15,22 39:9 40:12,13 40:19,20 41:10 42:22 48:15
---	--	---	--

49:14,20 52:5 53:4 54:8,13 55:6 56:2 57:2 60:3 62:2 70:9 73:6 78:3 82:18 83:9,17 83:18 84:12 85:6 87:14 88:1 89:9,16 91:1 92:21 100:4,5,14,18 103:6,7 109:12 109:14 110:2 111:21 112:6 114:20 117:8 126:4 132:2,8 133:10 138:10 148:6 corrected 18:16 20:16 corrections 20:17 148:8 correctly 35:16 39:7,12 correspond 86:19 88:19 89:7 109:10 corresponding 134:21 corresponds 87:1,8,11 cost 107:4 counsel 5:7,18 6:2,17 8:4,5,7,9 15:22 45:16	47:15 57:19 67:3,12 72:17 89:21 126:15 141:15,21,21 146:3,14 couple 45:18 83:7 120:14 coupled 93:12 93:22 course 46:9 58:4 64:10 73:7 82:7 106:2 135:15 144:10 courses 81:17 court 5:15 6:10 7:8 8:15,16 67:15 courtesy 7:17 cover 18:6,7 19:20 46:20,20 47:3,5 58:19 60:8 62:11 65:2 68:9 79:19 100:7 covers 61:12 66:21,22 67:5 69:17 72:10 73:9 create 114:9 cross 146:15,18 crossed 115:15 116:11 crossing 116:15 118:2	cumulative 120:18 121:21 122:2,4,11 135:20,21,22 current 28:13 30:12,19 31:2 32:1 34:6,21 36:14 38:11,18 39:6,12 42:6,7 42:8,9,12,13,15 46:3,12 51:5,6 56:14,16 57:2 57:3,7,10 60:9 61:1 62:1,9,12 62:21 63:7 64:1,8 65:3,8 65:11,16,19 66:2,5,22 67:2 68:10,13,19,22 69:3,18 72:11 73:10 74:6 75:8,13,16 76:2,5,15,19 77:6,10 84:3,4 84:5,6,7,8,19 85:9,10 86:10 86:14,20 87:1 87:20 88:5,7,9 88:20,22 89:3 89:8,10,14,18 89:20 91:14,15 91:17,18,19,21 92:13,13,14 93:13 95:13,15 95:17 96:3,5,8	96:13,15 138:18 139:17 140:2,9,14,17 140:19 141:3,9 141:11 144:13 144:18 145:1,5 145:5,6,7,10,10 145:15,15,17 145:17,20,20 146:1,1 currently 10:11 11:1 currents 27:9 35:5,7 42:16 47:3,5,12 61:18 62:18 70:3,7 87:3 118:13 123:5 curve 87:10 88:9 curves 86:17,19 86:22 87:8,15 87:18 88:12,18 89:6,11,12 cut 73:22 cv 80:9 81:15 101:17
d			
d 5:1 52:11 148:1,1 d.c. 1:14 2:6 3:8 dashes 7:21 date 82:16,16 99:22 148:20			

dated 12:17 day 10:19 105:19 106:7 143:14 149:16 days 104:14 db 111:8,14 114:14,14,15 114:19 115:2,2 dc 27:13 30:12 30:19 31:2,7,8 32:1 34:6,20 35:6 38:11,17 39:5,6,12 42:13 62:18,21 75:13,14,15 77:10 96:15 128:21 140:19 145:14,15,17 146:1 de 3:15 6:7 decades 81:19 decent 72:22 decibel 114:14 114:15,16,18 114:20 115:1 decibels 110:10 decision 142:18 declaration 4:9 4:10 12:16 13:8 16:21 17:7,12 18:15 19:2 20:1,3,10 20:15,21 21:4 21:5,7,9 48:4 67:6,9 102:8	115:7 118:1 138:3,4 143:8 declarations 13:19,22 decreased 138:20 139:17 140:2,14 141:5 144:14 deemed 144:3 definition 102:13 definitive 82:8 degree 111:13 department 101:17 depend 50:16 75:4 dependency 85:12 dependent 65:6 75:2 depending 96:6 depends 50:7,8 75:5 133:13,13 133:18 depo 73:2 deposed 7:2 deposition 1:12 2:2 5:6 13:5,6 14:2,4,7,11,15 14:18 20:14 21:5 67:13 142:6 143:11 146:22 147:3 149:7	deposition's 5:12 derive 52:21 53:1 describe 47:3 47:11 131:11 described 23:6 24:5 40:12 43:22 62:20 65:9 104:17 134:13 140:5 describes 22:20 22:22 23:6 69:22 136:22 describing 97:3 125:15 127:15 132:6 description 130:15 descriptive 24:6 design 4:18,20 50:8,8,17 78:2 80:1 99:17 designed 50:6 desired 60:22 61:8 64:5 65:10 70:2 109:9,11,16 110:4,8,19 112:12,14 116:2,22 117:10,12,15 118:10,22 119:9,14	120:17 121:18 122:4,10,12 123:11,21 124:12,14,19 125:5,13 126:4 126:7,8 129:17 129:20,21 130:3,16 131:4 131:12,18 132:21 133:1 133:10,15,22 134:2,7,15 135:1,9,13,18 136:2,3,6,16,18 137:1 140:11 det 24:3 25:19 26:5 detail 18:19 19:5 detection 115:13 116:10 132:11 133:2,7 detectors 123:19 determination 61:6 74:4 119:14 determinations 63:7 determine 61:7 63:6 119:16,16 130:13 determined 129:7 130:9
---	---	--	---

determining 61:1 117:10,11 119:13 121:1 device 52:19 130:16,20 devices 11:5 38:5 diagram 97:3 97:12,13 126:3 126:6 127:16 128:14 132:6,9 diagrams 40:9 97:17 dialogue 144:2 diego 82:1 diff 92:17,19 difference 52:10,15,16,17 108:15 109:1 145:9 different 37:17 42:16 52:8,9 52:13,14 53:2 84:20 87:7,16 87:18 88:18,19 89:7,9,12 102:3 104:2 111:1 135:19 136:1 differential 30:12,14,21 31:3,7,17 32:2 32:12,20 33:5 34:2 35:14,18 92:19,22 93:7	94:18,18 95:2 95:2,4,7,10,14 95:18 96:9,14 differently 124:12,15,19 125:13 difficult 7:22 8:18 digital 80:19,22 81:5,10,11 digitizing 81:13 dinesh 3:5 5:22 diode 49:12 53:14,15 direct 123:20 127:11 131:11 135:1 136:6 directly 116:16 116:22 117:18 117:21 118:3,6 136:22 disagreed 100:16,19 101:1,2 disclose 115:13 116:9 disclosing 116:1 disclosure 43:17 45:1 80:2 discover 20:15 discovered 18:14	discuss 58:14 discussed 36:21 60:20 68:14 101:12 123:8 124:3 131:2,6 discussing 14:15 29:22 discussion 124:1,4 130:22 dispense 107:7 dispensed 107:15 dissertation 80:8 dissipation 140:7,8 distinction 69:1 69:5,7,9 74:11 74:16 122:11 district 2:10 149:3,5 document 13:15 15:13 17:1,16 18:2 18:10,18 19:7 19:18 21:6 22:5,9 27:15 28:7 29:15 36:8 44:2 57:5 71:13 72:2 78:6 79:21 93:2 96:4 99:13,14,15 documents 12:1,9,11,14,20	13:1,2,10 17:19,21 dog 137:7,8 doing 66:11 74:9 143:14 dotted 29:18 37:11 downward 56:10 downwardly 30:3 dr 13:4,20 16:14 45:22 58:12 90:16 102:18 105:7 115:6 127:8 144:11 146:22 dramatically 105:13 125:9 draw 69:8 74:15 drive 141:3,9 141:11 144:13 144:18 145:1,4 145:6,7,8,10,12 145:20 dropping 15:20 duly 6:14 149:8 dynamically 75:10
e			
e 1:13 2:2 3:1,1 4:1,2,7 5:1,1 6:13 147:3 148:1,1,1,1,4			

148:20 earlier 21:7 50:1 53:14 58:17 60:20 87:22 88:17 92:16 106:6 140:5 early 80:14 ease 70:18 easier 70:21 71:20 easy 107:9,17 edited 100:11 101:4,14 editing 101:8 editor 99:18 100:6 eight 69:10,13 69:15,17,22 75:1,4,9,10,13 127:12,13,19 137:19,20,21 138:14 141:2 144:12 either 77:11,16 90:4 121:16 125:18 el 3:16 electrical 41:8 81:16,18 electronic 11:5 11:12 32:22 33:3 97:19 electronically 12:5	element 34:7 116:21 125:2,2 128:1,7,16 135:7 139:1,14 139:16,17,19 elements 103:16,19 eleven 75:18,21 75:22 76:1,4 131:20 132:1 134:14 embodiment 113:17 120:5 emergency 104:4 emitter 83:17 84:7,8,20 86:4 86:9,13,16 87:21 88:4 89:17 employed 101:5,6 encompasses 74:18 encounter 35:7 encountered 35:11 44:21 encounters 35:6 40:15 ends 146:21 energy 30:20 140:21,21 engineering 81:16,18	engineers 102:1 entire 20:21 67:11 entirety 31:11 entitled 4:17,19 environment 44:19 ep 4:14 22:3 equation 54:15 85:14 equivalent 114:19 ernest 9:8 errata 148:9 error 99:2 esquire 3:3,4,5 3:13,14,22 est 5:4 et 22:13 27:21 28:10 36:11 57:7 85:5,5 93:4 120:2 european 4:13 evaluated 122:18 evolved 104:10 exact 99:22 101:16 117:5,8 exactly 17:20 82:2,3 100:7 examination 4:3 6:17 146:15	examined 6:15 148:5 example 28:10 28:12 29:3 35:9 36:11,13 49:4,10 53:14 53:14 81:2,7 81:14,14 93:4 93:6 104:5,14 108:19 117:9 118:9,21 124:6 125:22 129:7 130:9,12 131:1 134:12 excellent 82:6 83:2 except 17:16 exclude 75:7 77:6,10 excludes 76:2 76:14 exhibit 4:8 15:3 15:5 16:1,17 17:5 19:9,15 19:18 21:6,9 21:12,12,14 22:1,2 48:4 55:15 57:20 59:3,8 70:15 70:17 71:1,1,7 71:18 77:14,15 77:18 90:17,22 98:6,7,8 99:9 115:7 138:6
---	--	---	--

exhibits 4:22 115:4 exist 145:16,18 145:20 146:2 exists 111:10 exit 41:4 78:13 expect 30:15 32:22 33:6 38:21 44:21 45:2,7,10 89:19 experience 80:11 expert 40:10 expires 149:21 explain 112:20 123:2 133:17 explorer 11:15 expresses 114:21 extend 7:17 extending 30:3 91:9 external 113:2 113:8 114:6 eye 2:5	f4 25:17,18,19 fact 32:11 113:21 114:11 142:13 factor 107:4 114:19 factors 113:10 fair 9:4,5 142:11 fairly 98:15 familiar 7:4 103:5 142:19 far 19:4,5 137:9 farads 52:11 farther 128:4 fault 78:17 79:5 99:1 115:17 february 149:22 feel 8:21 60:13 60:14 64:20 69:12 105:15 126:13 field 40:10 82:6 102:2 figure 22:13,16 22:17 23:2,4,5 23:8,12 28:1,9 28:12,20,22 29:4,7,14,20 30:2 31:5 36:10,13,20 37:1,4,5,6,6,7,8	37:13 39:3,14 39:17 40:4,15 44:4,20 55:18 57:7 78:20 83:12,15 84:2 84:14,16,21 86:15 87:15 88:8 90:19,21 91:4 93:4 94:7 94:13 95:12 96:7 97:3,8,10 97:11,13 120:1 120:3 121:1,4 121:6 123:22 124:20,21 126:6 127:16 127:17,18 128:12 129:6 129:11,13 130:11,12,22 131:2,3,6,8,10 131:10,16,22 131:22 132:7 134:13,18,20 134:21 135:4 136:19 file 15:8 78:11 78:21 98:16 filed 5:10 filled 7:21 114:5 filter 62:16 97:17 107:6 110:6,18 124:7 125:3,12	128:20 132:15 filtering 107:10 filters 26:11,14 64:8 final 20:5 26:4 81:4 100:13 106:16 135:7 141:7 144:16 finally 113:5 find 93:16 138:8 139:3 fine 8:12 21:10 45:20 75:20 82:22 90:3,8 97:9 102:20 108:4 115:20 119:22 126:21 138:10 143:2 143:17 144:6 finish 73:22 142:3 finite 85:13 firm 5:16 6:1 first 6:14 12:16 18:1 22:16 23:6 28:11,14 36:12 42:10 84:17 85:4 87:6 97:5 106:13 107:19 108:5 115:12 116:9 129:5 142:10 five 45:17 47:16 73:1
f			
f 26:7 52:11 148:1 f1 24:2,9,11,13 24:14,16 f2 24:2,20,21 24:22 25:2 f3 25:11,13,14			

86:17 146:4 fixed 43:10,11 87:1,3,12 89:3 102:4 floor 111:11 flow 51:6 81:9 flowing 56:14 56:16 91:14,17 fluid 81:9 fly 141:13 fm 104:3 107:2 107:20 108:7 108:20 109:9 111:10 114:1,2 114:9,10 following 97:17 follows 6:15 forces 42:8,8 forcing 42:12 42:14 foregoing 148:5 form 12:10 41:21 46:6 47:7 57:2,3 65:5 72:16 81:10 95:21 105:22 107:4 forming 137:22 formula 48:12 48:14,16 49:13 52:4 54:2,12 55:3 forth 100:15 149:8	forum 107:18 forward 20:18 69:9 found 131:21 four 26:7 41:14 64:19,20,21 65:1,6 66:21 66:21 68:9,12 free 8:21 60:13 60:14 64:20 69:12 105:15 frequencies 33:16,18 34:20 35:10 37:21 38:1 43:3,10 43:11,12,21 44:18 frequency 34:1 34:4,8 35:8 37:15,17,17 38:3,4 42:22 43:1,5,11,13 44:22 45:3,5 104:22 105:21 106:4,5,7,8,13 106:14,16 107:3,14 108:6 108:7,10,14,15 108:16,17 109:1,2,4,11,22 110:4,14 111:20 112:1 113:14,18,20 front 43:20 44:3,5 55:20	59:16 60:6 64:21 72:3 96:19 115:8 121:11 135:7 full 7:16 9:6,8 80:2 85:4 142:7 function 33:4 33:22 37:14 39:12 84:19 103:17 128:15 128:16,18,22 140:22 functional 97:16,16 98:1 98:3 128:6 functioning 38:13,16 functions 103:18 104:2 fundamental 52:17 fundamentally 53:2 further 81:11 146:14 149:11	generally 34:19 74:17 105:2 generated 113:4 germane 67:9 gigahertz 35:10 give 8:14 21:19 60:15 67:21 68:7 69:14 72:4 77:2 78:18 82:8 98:15,17 105:16 130:12 136:2 139:8 144:8 given 148:7 149:10 gives 130:12 giving 68:1 go 11:10 15:2 19:15 55:18 59:1 70:18 73:2 74:22 75:18 77:13 79:6 93:1 96:21 98:11 104:9 124:4 138:2 goes 24:14 26:2 30:7 67:16 79:8 going 5:3 7:7,8 15:2 19:7 21:6 21:11 30:18 32:1 34:1,5
		g g 5:1 148:1 gain 31:3 32:3 124:7,7 125:2 128:1,7,16 135:8 gears 98:5 general 50:17 109:13 143:9	

37:10 59:1 64:19 67:7,18 70:15,22 72:20 74:1 76:8 77:14,15 78:14 79:6 82:10,19 83:6 84:9 89:21 91:22 94:5,10 98:5,6 102:17 105:5 115:10 117:22 119:21 121:3 126:12 139:9 141:16 142:5 142:12,14 143:11,16,18 143:21 good 5:3 6:19 6:20 57:21 82:5 90:1,7 126:13 great 22:3 71:17 77:4 137:10 group 76:22 guess 11:7 30:2 31:9 33:12,20 47:8 74:11 91:10 100:1 121:13 124:10 131:16 135:20 136:11,18 140:1 guys 89:22	h h 4:7 52:12 halfway 108:7 hand 3:14 6:9 32:7,17 42:20 92:16 103:8 137:18 149:16 handy 127:9 happen 10:20 happening 123:22 happy 8:22 9:2 75:2 90:4 hard 66:10 hardware 66:10 head 8:17 101:17,18 heading 103:9 103:21 hear 7:11 heard 6:22 held 2:3 help 14:3,5 104:9 helped 14:2,6 hereinbefore 149:8 hereunto 149:15 hesitate 82:8 87:2 high 38:1 106:7 106:13 134:1 140:10	higher 34:20 37:22 history 107:22 hit 78:15 98:14 hold 17:9 58:20 home 10:11,12 10:13 honestly 69:6 104:15 honored 99:10 hope 77:22 140:16 hopefully 79:7 126:20 hoping 15:3 horizontal 24:14,16,19 91:8,12 hour 89:22 126:13 hours 14:22 house 99:18 hughes 80:13 80:16 101:6,9 101:13 huh 8:18,18 68:5 119:1 humans 37:22 38:3 106:9 hypothetical 66:8	87:1,3,7,9,11 87:12 88:20 89:14 ic 83:19 84:1,5 84:6,19 86:16 103:13 ics 103:9,12 ideally 114:3 114:11 identification 15:6 19:10 21:15 59:9 71:8 77:19 98:9 identifier 19:19 identifies 32:10 32:19 identify 32:9 32:18 39:22 41:1 illustrate 85:5 illustrates 120:1,4 image 108:6,10 109:6,6,11,16 109:18,22 110:3,7,14,14 110:19,20 111:1,3,9,20 112:1 113:10 113:14,18,20 113:22 imaginary 50:12,13 51:9 51:13,14,17,18
		i	
		ib 83:19 84:1,3 84:4,21 85:8,9 85:10 86:20	

51:22,22 52:2 88:15 imagine 43:21 66:12 imaging 113:9 impact 9:20 45:3,13 impedance 48:11 49:2,6,9 49:11 51:12 52:1,1,21 75:11 85:13,20 86:1,3,7,12 88:2,10,14,15 88:21 89:13,19 92:1,6,9,11 123:16,17 128:21 140:12 impedances 95:7,10,11,18 96:9,16 118:12 123:5 implementati... 66:10 implied 61:20 imply 46:17 important 7:10 8:2 123:17,19 inappropriate 142:4 144:3 include 95:10 98:2 113:14,16 113:17 includes 27:20 28:4 33:11	94:18 95:2 122:4 including 62:16 incomplete 66:8 incorporated 5:8 incorporates 94:19 95:3,5 incorrectly 88:1 increased 111:8 increasing 75:10 indicate 18:9 38:10 44:14 indicates 17:5 30:10 38:11 44:16 indication 115:14 116:11 116:15 118:2 132:19,22 indications 129:8 indicative 88:10,13,13 indicator 120:9 121:1,9,10,12 132:13,14,16 132:20 133:3 134:1 indicators 120:15 121:17	122:1,13 124:13,18 125:4,19 130:10,14 131:8 134:5,10 136:1 individual 122:21 123:2 123:11 inductance 51:4 inductive 49:14 49:15,17,19,22 50:2,5,14,16,19 50:20 51:1,2 51:15 54:8,10 54:14 88:16 inductor 49:16 49:19 51:16,19 51:20 indulging 48:21 inferred 130:22 information 38:2 61:2 73:14 100:2 120:16 122:9 123:14,18 innovation 105:12,18 107:15,21,22 input 32:11,12 34:4 35:17 36:3,4 41:18 45:5,6,8,11	109:12 112:5,8 112:12 120:10 121:15 125:7 126:8 127:22 128:17 129:6 129:13,15 130:9 134:11 inputs 34:9 112:16 113:12 instances 34:12 38:20 instruct 72:21 instructed 8:9 instructing 72:18 instruction 67:21 68:2 integrated 4:17 78:2 80:1 103:13,14,15 103:19 107:9 107:18 intended 26:10 26:18,21 27:4 88:19 89:6 101:21 102:1 intention 87:4 interchannel 111:5,13 112:1 114:1,9 interest 80:2 interested 149:13 interests 79:3
---	--	--	---

interfere 60:21 60:22 interference 47:4,12 61:8 136:3 interferer 73:14 116:3 117:13,16 118:11 123:21 124:19 129:22 130:2 131:12 131:18 133:21 134:6,7,16 135:2 136:7 137:2 140:10 interferer's 117:1 interferers 123:10 124:12 124:15 125:6 125:13 129:17 136:17 interfering 64:6 65:10 70:2 117:12 120:17 122:10 124:9 intermediate 105:20 106:4,5 106:14 108:6 internal 113:3 114:6 internally 113:4	internet 10:16 11:15 interpret 8:17 8:19 141:14 interpretation 33:2 interrupt 7:20 intrinsic 112:17 introduce 5:18 15:2 19:7 21:11 59:1 70:22 77:14 98:6 invention 44:11 120:5 123:4 ip 1:8 5:9 6:7 18:2 ipr 4:16 7:1 10:5,6,9 12:17 17:6,8 19:19 59:3,22 67:13 71:2 ipr2023-00679 1:4 ipr2023-00697 17:13 ipr2023-00698 1:6 17:12 iprs 20:11,13 island 9:13 issue 46:2,11 54:1 59:22 82:17 100:4 141:12	issues 101:11 j jakupciak 1:22 2:9 5:16 149:4 jameson 3:22 6:4 january 12:17 20:6 job 1:20 101:13 johanningme... 3:13 6:6,7 10:14 12:12 13:16 14:1,9 14:13 15:19 16:3 21:17 23:19 26:1,12 26:20 27:6,11 28:21 29:5 31:1 34:13 36:1 43:18 45:16,20 46:5 46:14 47:1,7 47:17 57:22 58:4,13 60:10 61:15 62:3,13 63:2,13 64:2 65:4,20 66:7 67:3,14 68:1,5 68:11 69:20 72:13,20 73:11 74:7 76:17 77:8 83:21 85:2,16,21 86:21 88:11 89:1 91:16	92:3 94:20 95:8,20 96:11 105:22 106:22 108:11 110:15 112:7,13 113:15 117:3 117:19 118:7 119:4,10 121:2 121:19 122:6 123:3 125:20 126:5,15,20 128:13 130:5 130:18 131:5 131:14 133:5 133:12 135:3 136:9 137:3 139:2,15,21 140:18 141:10 141:18 142:1,9 142:19 143:6 144:1,5,21 145:11,22 146:6,16 jump 57:20 jumping 115:19 junction 83:3
			k k 148:1 ka 31:9 56:4,6 96:6 kasperkovitz 105:11 106:19 kb 31:10 56:4,6 96:6

keep 11:19,22 69:9 78:13 79:6 89:17 ken 80:5,8,12 ki 56:10,12,14 56:16 91:19,21 92:2,7,8 killing 72:14 kilohertz 35:9 105:14 107:17 107:17 108:6 111:2 kind 12:13 22:11 41:4,6 47:14 60:12 64:11 74:3 81:8 99:3 104:10 107:21 122:21 129:11 135:10 136:2 139:4 145:4,13 145:13 kinds 49:21 knew 80:15 know 9:1 11:1 13:10 17:18 18:17 19:4,12 21:19 33:15 34:19,21 40:1 43:20 44:7 51:5 60:18,19 60:19 61:1,4 62:7,8,15 63:5 64:7,11 65:9 65:13 66:9,21	68:13 69:21 71:10 74:8,11 74:21 79:10,16 80:3 81:1,3 82:20 94:10 101:15 102:19 104:8,8,9,21 106:6 107:4 108:12 113:10 114:5 117:6 118:4,8,12 119:12 121:6 123:6,9 124:4 124:6,10 128:15,17 130:7 131:7 134:3 135:13 135:17,21 136:10 138:8 139:11 140:1,6 140:7,7,20 141:11 143:10 144:22 145:2 145:14 known 79:22	32:4,8,17 33:3 36:21 37:11 38:17 39:4 55:22 56:18 84:1 91:2 92:17 95:13,16 121:7,7 129:21 130:2 135:8 labels 56:4 labs 80:13 101:7,18 lan 142:18 language 72:22 119:13 124:16 143:3 laptop 11:6,12 large 78:6 79:17 98:16 largely 135:12 larry 146:22 larson 1:13 2:3 4:2,8,9,10 5:6 6:13,19 9:9 13:4 15:5 16:14 19:9 21:14 45:22 58:12 59:8 71:7 77:18 90:2,16 98:8 102:18 105:7 115:6 127:8 144:11 146:22 147:3 148:4,20 lastly 69:10	law 6:1 lawrence 1:13 2:2 4:2,10 5:6 6:13 9:8 147:3 148:4,20 leading 95:15 leaps 137:5 learn 102:16 led 26:3 left 23:9,11 32:4,7 33:10 38:9 39:10,14 39:16 41:9,12 41:13 42:20 55:22 91:4 105:7 125:9 126:16 legal 5:14,17 9:7,8 46:16 63:3 65:5,21 67:6,10 72:15 139:6,22 legit 146:18 lenovo 1:4 5:8 7:1 115:21 letter 95:13 letters 23:10 letting 10:22 level 81:17,19 102:6 120:18 levels 33:16,18 33:19,20,21,21 61:7 122:15 123:13
	l		
	l 49:13,15 54:11,14 55:5 148:1 label 30:4 56:9 labeled 17:12 23:9,13 24:3,9 26:4,7 27:2 29:19,19,21 30:4 31:5,9		

lies 108:7 limit 104:22 line 6:8 20:6 23:22 24:3,7 24:14,16,19,22 25:2,4,6,8,9,11 25:12,14,17,19 30:3,6,7 31:16 31:21 67:11 84:17 91:8,12 96:22 97:6,15 106:1 119:20 120:1,10,11 127:12,13,20 128:1,5,8 129:3,8 130:10 130:14 131:20 132:10 138:11 138:12,14 141:1 143:18 linear 27:20 28:1,4,12,16 29:2,21 30:2 36:14,17 37:2 93:6 95:6 lines 25:21 29:18 32:5,6,7 32:11,14,16 37:11 38:6,8 38:17 39:11,19 39:21 131:9 138:13 link 78:13,22 listed 100:6	listen 142:20 literally 66:14 67:4 72:14 little 24:4,6 31:14 59:12 66:10 74:21 75:1 78:4 79:9 98:6 99:22 102:20 110:22 123:10,12 124:2 125:8,13 128:4 133:13 133:17,18 llc 1:5,8 5:9,9 18:2 llp 3:15 load 145:6,7,8 local 41:15 108:17,21 location 5:12 locations 5:13 lodge 83:21 146:17 lodged 8:7 logarithmic 114:21 115:1,3 long 67:16 98:22 143:14 look 18:1,21 22:8 23:4 27:14 44:1 55:14,19 58:21 63:8 64:18 69:10 72:2 76:7 87:6	90:16 118:18 119:18 121:3 122:19,20 123:1 124:20 131:21 132:10 135:4 138:2,11 looked 95:1 looking 23:8 37:8 44:10 55:3 64:4 74:15 75:17 78:1 95:12 114:13 117:9 125:1 129:11 138:4 looks 87:17 102:21 128:14 loss 81:3 lot 93:17 126:16 loudly 7:10 low 129:7 130:10 132:12 133:22 140:11 lower 38:2 104:22 106:8 107:14 120:8 lowering 105:13 luckily 137:8 lynn 10:15	m1 25:5,7,8,9 27:2,7 36:22 37:1,4,7 40:15 m1s 40:4 m2 25:15,17,18 27:2,7 36:22 37:1,5,7 40:15 m2s 40:4 ma 3:22 6:4,4 machines 38:3 magnitude 35:9 45:4,13 magnitudes 38:14 major 107:20 make 7:6,21 8:6 61:8 63:7 68:3 69:2 74:5 74:22 89:5 106:1 117:7 141:15,16 142:2 makes 61:16 136:19,20 making 61:13 65:11 66:22 68:2 142:11,22 manager 101:20 manner 65:8 manually 78:13 manuscript 100:13 march 5:4
		m	
		m 1:22 52:12 148:1 149:4	

mark 98:7	134:18 136:12	118:10,11,21	met 14:15
marked 4:16	139:16,18	119:2,8 121:17	michael 2:8
15:6 19:10,17	meaning 40:8	122:1 126:9	microwave
21:12,15 26:15	means 12:8	131:8 132:21	4:19 99:16
59:2,9 70:17	92:19 108:14	133:1,9 134:2	middle 41:13
71:2,8 77:19	110:16 144:20	134:6	82:13 93:10
98:9	meant 26:13	media 5:5	military 102:4
markings 13:3	50:9 104:16	medications	mind 7:15
marriage	114:2 143:3	9:19	15:22 18:22
149:13	measure 51:16	meeting 15:4	63:14 75:17
martin 80:3,6	86:7 114:18	meetings 14:8	90:19 94:5
80:12	115:3 119:6	megahertz	99:8 115:10
material 103:5	124:14 133:15	105:13 107:6,8	137:6 138:4
mathematical	134:9,10	107:11,16	mine 137:10
51:10,10	135:12,17,19	108:20,21,22	minimize 108:3
matter 5:7	136:15,16	109:2,3,4,6,10	minute 45:17
80:17 149:14	measured 88:3	melwani 3:5	47:16 69:14
matters 7:1	122:15 130:3	5:22,22 67:12	78:7 98:11,15
12:17	135:5	67:20 68:3	98:17 126:21
mcandrews 3:6	measurement	142:16 143:20	142:16 146:4
5:21 6:1,3,5	65:10,12 73:13	144:2	minutes 90:6,8
mean 14:10,19	86:11 114:16	memory 28:22	mirror 41:21
31:15 33:9,18	115:2 118:14	60:16 63:16	42:2,5 57:2,3
33:20 34:6,10	119:15 130:6	72:5 107:21	mirrors 42:18
40:18 46:17,18	measurements	mention 61:5	misstates
50:4 63:4 66:9	60:21 64:9	115:22	119:11
67:3,18 68:22	125:18 135:22	mentioned 50:1	mixer 36:18,19
78:16 86:4	136:14	53:13 74:2	37:14,15 38:13
91:17 92:11	measures	mere 116:15	38:16,21 39:1
100:7 105:20	121:13 123:16	118:2	39:5,6,11 40:3
109:14 111:1	125:22,22	merits 58:14	40:15,17,22
112:22 113:19	126:1,3 130:16	message 78:11	41:1,2,3,5,7,9
115:16 123:1	130:21 131:3	99:2	41:12,13 43:16
129:16,18	measuring 64:5	messaging	44:21 62:12,17
130:19 133:18	70:1 117:7,8	11:13	62:17,22 64:14

64:17 70:13,14 73:18 76:3,15 76:20 77:7,11 97:18 107:5 108:13 128:19 132:14 133:8 mixers 27:5,7 27:10,13 28:1 28:5 36:22 37:1,4,7,20 64:8 mobile 44:13 44:19 102:4 104:13 mobility 1:5 5:9 mode 86:6 modelled 85:14 modifying 85:14 moment 60:15 63:15 72:4 77:2 109:18 137:10 morning 5:3 6:19,20 58:17 60:21 mory 3:15 6:7 motorola 1:5 5:8 7:1 move 77:14 108:1 116:7 144:7 moves 44:18	moving 44:8 69:9 120:14 141:1 multiple 98:2,4 multiplier 36:17 mutual 21:3 mutually 100:21	noise 110:9 111:4,7,10,11 111:13,16,18 111:20,22 112:1,4,5,8,10 112:11,15,17 112:17,18 113:1,4,5,9,10 113:13,16,17 113:19 114:1,4 114:7,9,11 115:22 132:12 134:3 non 30:16 38:14 nonfunctional 135:10 normal 43:4 122:19,21 normally 34:8 34:11,16 35:2 40:9 nos 1:7 notary 2:9 149:4 notation 38:7 85:8 notations 83:19 note 143:5 noted 143:20 notes 12:9,13 60:1 notice 2:8 125:7	nbn 83:14 number 4:8 5:11 15:5 19:9 21:14 59:8 71:7,18 77:18 98:8 numbered 22:11 numbers 10:5 22:11 116:16 118:3 numeral 26:8 138:18 139:11 139:20 140:15
	n		o
	n 3:1 4:1,1 5:1 148:1,1,1,1 n.w. 2:5 3:7 name 5:14 6:21 9:7,8 61:5 navigate 57:4 necessarily 133:15 necessary 107:10 need 16:4 18:15 20:16 107:5,5 107:7,12 negative 50:14 51:22,22 52:1 new 57:20 66:15 70:22 77:14 98:6 102:16 nicely 122:8 124:22 nine 75:4,5 129:3 nod 8:17		o 4:1 5:1 52:12 148:1,1,1 oath 9:17 object 8:5 67:4 67:11 72:16 119:4 139:6 objecting 67:8 143:15,17 objection 8:7 23:19 26:1,12 26:20 27:6,11 28:21 29:5 31:1 34:13 36:1 43:18 46:5,14 47:1,7 60:10 61:15 62:3,13 63:2 63:13 64:2 65:4,20 66:7 67:15 68:2,4

68:11 72:18 73:11 74:7 76:17 77:8 83:22 85:2,16 85:21 86:21 88:11 89:1 91:16 92:3 94:20 95:8,20 96:11 105:22 106:1,22 108:11 110:15 112:7,13 113:15 117:3 117:19 118:7 119:10 121:2 121:19 122:6 123:3 125:20 126:5 128:13 130:5,18 131:5 131:14 133:5 133:12 135:3 137:3 139:15 139:21 140:18 141:10,16,19 142:5,11,22 143:2,5,21 144:21 145:11 145:22 146:17 objections 8:6 67:12 69:20 72:13 141:17 142:2 143:7 office 1:1 5:11 offices 2:3	oh 87:5 ohms 52:12,12 okay 7:4 8:11 8:13 9:6,10,16 9:19 10:1 11:11 12:4,14 12:22 13:4,19 16:14 18:1,9 19:1,20 21:9 21:16 22:20 23:2,22 24:11 25:4,21 27:22 28:11,15 36:12 36:16 37:9 45:7,22 47:15 55:17,18 57:6 57:18 58:17 59:5,11,17,20 60:5 61:19,22 63:8,10 64:13 65:1 66:18 69:8,11,14,14 70:8,20 71:15 72:3,7,7,9 74:5 74:15,19 75:6 75:17,22 76:1 76:7,10,12,22 77:2,13 78:4 78:10 79:9,12 79:15,19,21 80:21 81:15 82:4,15,19 83:12,15 84:3 84:14,17 85:11 86:15 87:13,22	89:11,21 90:16 92:15 93:3,5 93:10 94:13,16 96:17,21 97:1 97:2,14 98:5 98:14,19 99:5 99:7 101:4 102:17 105:4,9 105:17,19 106:18 108:1,2 108:3 110:5,13 115:4,8,11,12 116:7 117:22 119:18,21 126:11,22 127:19 128:4 129:2,13 131:19,22 132:3,4,10 134:12 137:14 138:11,17 139:2 141:1,10 142:12 144:1 144:18 146:3,5 146:16 once 8:6 10:19 18:17 19:4 33:8 43:9 71:6 74:11 81:22 89:16 98:21 114:5 124:22 125:3 130:8 133:6 open 11:13,14 11:15 12:1	16:15 19:20 39:11 opening 16:20 operate 34:20 38:22 39:2,7 operation 42:16 43:4 53:17 70:6 86:6 122:19,21 opinion 102:6 119:7,11 opinions 137:22 optimize 118:15 optional 128:1 128:7,15 order 81:11 orders 35:8 ordinary 102:7 102:10,14 116:20 138:22 139:12 144:19 144:22 orientation 21:3 origin 106:16 oscillator 41:15 108:18,21 outcome 149:14 output 32:19 41:3,4,6 81:3,4 85:13,19,22 86:3,5,7 88:2
--	--	--	---

88:10,20 89:13 89:19 92:1,6,9 92:11 111:12 113:6,11 120:10 121:15 125:7 126:9 128:6,7,18 132:12,13,15 133:8 outputs 120:19 125:14 outside 67:5 72:15 106:1 139:2,21 143:14 own 126:4 owner 1:9 3:12 5:10 8:4 18:3 owner's 4:11 16:22 20:2,4	82:20 83:3,7 83:13 84:9,15 85:4 86:16 90:20,21 102:18 104:9 105:4,7,10 108:2 137:15 137:17 pagers 104:2 pages 1:21 79:18 83:7 148:5 painstaking 74:22 pair 93:8 94:19 95:3 paper 16:19 21:17 55:16 59:5 71:4,12 94:6,11 97:6 119:21 papers 80:5,7 paragraph 22:8,12 27:14 27:19 28:6,8,9 29:3 36:7,10 37:3 44:1,4,5 44:10,15 48:8 48:11 57:4,6 93:1,3,11,17 94:22 105:9,10 110:5 113:22 115:10,11,16 115:18,18 116:8 118:1	120:8 132:11 132:20,22 paragraphs 22:11 135:16 parallel 24:1 part 14:15 68:17 80:8 88:14,15 89:19 partial 94:11 participants 5:13 particular 17:11 34:22 35:4,10 47:9 47:10 50:15 60:2 81:20 86:20 103:17 106:18 107:2 107:15,22 109:17,18 110:2 111:7 119:19 123:13 124:6 125:5 particularly 87:19 parties 2:11 149:12 pass 110:8 passed 33:14 passes 128:17 past 111:20 patent 1:1,2,7,9 3:12 4:11,13 4:15,16 5:10 5:10,11 8:4	12:19,19 16:22 18:3 20:2,4 46:1,1,10,11 58:19,19 59:2 59:15 60:4 63:9,22 65:2 69:17 70:17,18 70:18,19 71:3 71:14,15,18,19 71:19 73:9 96:18 116:4,21 117:6 118:9,18 118:21 119:19 122:8 123:8 124:16 125:1 125:12,16 127:9 130:16 130:20 131:11 131:20 133:21 136:22 137:5 137:12 141:8 144:17 patents 12:18 13:9 18:11 47:11 58:22 82:16 100:4 path 22:17,21 23:1,6 25:22 26:19 27:5,8 28:19 40:14 73:18 138:20 pdf 78:21 82:11 pdfs 15:20 pending 8:8
p			
p 3:1,1 5:1 148:1 p.m. 58:8,10 90:10,11,12,14 127:2,3,4,6 146:9,10,11,13 147:1,2 pa 1:20 page 4:3,8 7:6 18:1,5,6,7 19:21 20:7,8 24:1 59:18 72:1 78:13 79:17 82:11,13			

pennsylvania 3:7 people 10:13 percent 146:18 perfectly 9:5 75:20 97:9 138:10 perform 33:4 performance 118:15 performing 66:5 performs 37:15 61:4 103:17 permitted 8:16 67:13 person 8:1 102:6,10,13 116:19 138:22 139:12 144:19 144:22 perspective 107:4 petitioner 5:7 petitioners 1:6 3:2 5:9,21 6:3 6:17,22 petitions 13:12 13:14,17 pevarello 142:17 ph.d. 1:13 2:3 4:2 5:6 6:13 80:3,8 147:4 148:4,20	phone 11:7 phones 104:13 104:14 phrased 145:19 phrases 8:17 physical 12:10 50:7,8,17 52:18,19 pick 137:12 piece 103:20 pieces 96:2 place 90:1 116:9 places 136:4 plain 119:13 pleading 72:21 please 5:18 6:10 7:15 8:5 8:14,21 9:6,10 11:9 19:12 22:8 27:14 28:6 36:7 48:8 55:18 57:4 60:13 63:17,20 64:18 69:10,12 72:1,6,14 73:22 76:11 92:5 93:18 96:21 102:18 118:17 119:20 121:5 137:16 pllc 3:6 plot 84:18 87:2 plots 88:8	plotted 86:16 plurality 60:20 62:8,15 64:7 70:3 73:13 138:19 141:4 144:14 plus 92:14 136:3 point 78:22 85:5 103:4 115:22 122:2 123:13 127:20 131:19 133:14 137:6 146:19 pointed 115:17 134:14 pointing 56:10 56:10 97:14 144:11 points 121:14 135:5 pop 15:8 79:10 popped 15:9 portal 15:16 16:15,18,20 17:5 19:8 59:4 59:6 portion 29:21 31:5 39:3 42:21 106:18 120:2,4 132:5 134:22 136:21 139:10 144:12 portions 29:18 37:10 44:10	positive 50:13 51:15,17,18 possible 8:3 15:18 59:7 possibly 75:9 110:7,19 posted 17:4 potentially 43:21 114:6 power 100:14 100:17 140:7,8 145:2 practical 84:21 practice 100:19 precise 87:20 89:2,17 92:10 preclude 75:14 76:19 77:10 precludes 76:5 predate 100:4 predates 82:16 prefer 11:8 preliminaries 7:6 preliminary 16:22 17:2 21:8 preparation 14:16 prepare 13:4,7 14:2,3,9,10 15:1 prepared 13:6 preparing 14:18 20:14
--	--	---	--

preselect 110:6 110:18 present 2:10 3:21 120:5 134:11 presented 13:21 pressure 81:9 presumably 32:10,19 40:1 40:7 61:6 74:1 135:8 presume 121:8 136:14 presumption 135:11 pretty 10:18 80:9 preventing 10:1,3 preview 78:14 78:22 previous 69:21 previously 19:17 21:12 51:3 59:2 71:1 77:16 prior 13:9 privilege 67:22 probably 19:5 43:19 86:22 87:3 problem 10:22 59:14 67:18 71:11 75:20	82:10 98:16 105:12 106:20 106:20 107:1 108:22 problematic 107:3 procedures 7:5 proceed 6:16 16:12 48:2 58:10 90:14 127:6 146:13 proceeding 7:14 17:6 143:4,9 proceedings 10:9 77:17 process 37:22 38:3,4 81:11 processed 81:6 processing 81:14 professor 5:6 6:19 34:19 80:2 82:1 90:1 102:22 104:16 115:21 progress 78:12 promise 75:19 provide 8:8 30:20 48:12 120:16 122:9 provided 12:12 52:4 54:2 55:4 58:22 102:5 120:19	providence 9:13 14:14 provides 31:6 39:6 128:7 140:20 145:5 providing 12:6 145:4 ptab 67:21 public 2:9 149:5 published 80:5 80:7 99:18,21 100:13 publisher 100:12 pull 60:12 117:7 pulling 97:6 purely 51:17,22 pursuant 2:8 push 51:5 put 20:18 70:15 77:15 98:12 100:15 q q1 38:12 56:11 56:13,18,20 57:1,3,14 91:2 91:3,5,7,8,9,11 91:12,14,18,22 92:1,6,9,11 q1s 93:17 q2 30:8 34:7 38:12 56:19,20 57:1,3,14 91:9	91:11,13 93:12 93:21 95:16 q2s 93:17 quantity 51:4,7 51:8,14 52:20 question 7:19 8:8 29:11 31:15,19,19,20 46:7 50:7,18 58:18 63:20 64:19 66:1 68:6,16,17 69:16 70:13 72:16,22 73:5 74:17 76:8,13 77:4 89:3,4,15 92:4,5 94:21 95:9,22 106:2 133:4 134:18 139:5,7,8 140:4,15 141:20 142:10 142:11,13,20 142:21 143:9 143:16 144:9 questioning 111:17 questions 7:8 7:16 8:5,13,21 10:2 11:21 44:9 45:19 67:10,16,17 72:9 143:15,22 144:4 146:15 146:18,19
--	---	--	--

quicker 75:1 quickly 16:1 23:5 63:15 75:21 121:4 quite 33:8 82:22 104:15 quote 105:1	123:7,9 rauhala 22:4 22:20 27:9,12 27:22 43:17,22 55:14 57:14,16 90:17 115:13 115:22 116:9 reaches 40:3 reactance 49:14,15,17,20 49:22 50:2,11 50:12,14,15,20 50:21 51:1,2,7 51:13,17 52:2 52:3,5,6,7,11 52:13,20,22 53:1,4,6,12,16 53:18 54:8,10 54:14,19,21 55:2 reactances 88:17 reactants 54:17 reaction 53:18 reactive 49:6 50:5 read 7:22 29:6 29:10 43:19 46:2,11,16,18 46:21 60:11,13 60:15 63:18,22 64:20,22 69:15 72:4,7 75:3,22 76:12,13 77:1 77:2 79:16	94:17 102:19 102:21 105:15 106:19 116:9 117:17 137:4 142:18 144:5 148:5 reading 63:15 69:13 110:18 119:12 124:15 130:8 ready 89:22 90:2 real 3:16 50:10 51:9,11 88:14 89:19 reality 114:4 realize 107:18 realized 57:10 93:7 really 18:18 34:22 50:9 58:3 107:19 112:22 124:11 125:12,15 reason 17:9 34:16 35:1 40:6 51:15 87:1 136:15,15 139:3 reasons 106:10 recall 80:17 82:2,3,7 99:20 100:22 101:2 102:5,9 106:20	receive 23:17 23:21 104:19 104:21 105:3 112:15 140:6 received 33:7 33:13 35:14,17 40:2 42:20 110:9 111:16 112:2,3 113:2 127:22 receiver 44:16 44:18 104:18 104:20 105:2 107:20 109:12 112:16 118:13 118:16 120:4 122:22 132:9 135:9 138:19 receivers 103:10,22,22 104:1 107:2 receives 128:6 receiving 60:18 reception 44:12 recessed 16:9 47:21 58:7 90:11 127:3 146:10 recognize 10:5 22:5,6 79:21 99:13,14 recollection 20:9,12 58:20 reconvene 146:5
r			
r 3:1 5:1 48:14 48:16 52:11 54:3,5 55:5,7 r1 55:22 r2 55:22 r3 55:22 radio 44:16 103:9,21,22 104:1,3,3,10,18 104:20 105:2 107:2,20 109:12 raised 111:12 111:13 range 35:8,10 44:17 81:12 104:2,5,6 rather 63:15 79:16 120:18 122:10 124:22 ratio 51:6 86:8 86:12 88:3,6 92:11 110:9 111:7 112:10 112:11,12,14 113:13 114:21 115:3,3 116:1			

reconvened 16:10 47:22 58:8 90:12 127:4 146:11	90:17 referred 29:3 37:3 40:5 111:19 112:11	reliable 10:16 10:18,21 reload 78:15 rely 28:22	51:5 52:5,17 52:18 91:12 129:20
record 5:4,19 7:13,21,22 8:16,19 9:7 11:20 12:6,8 16:1,4,7,12 47:19 48:2 58:5,10 90:9 90:14 127:1,6 132:4 143:1 146:8,13 147:1 149:9	referring 17:10 21:6 24:7,15 27:22 29:13 33:10 71:11 85:18 107:2 110:17,21 130:7 134:20 139:10	remember 19:6 34:18 60:4 101:16,19 104:15 105:17 105:18 107:1	require 116:22 118:5 required 8:7 34:21 39:6 61:9 66:16 139:1,13,20 140:2 145:6
recorded 5:5 rectangles 55:21 rectangular 26:6	refers 23:2 42:5 62:15 94:3 103:21 112:10 refresh 21:22 60:16 63:15 72:4	remembering 35:16 remote 1:12 remove 39:8,10 removed 31:11 31:16,21 reopen 16:14	requires 119:8 reread 139:9 research 80:13 101:6,18 resistance 48:15,16,18,20 49:1,3,5 50:11 51:12 53:20,22
reduced 111:8 124:9 125:9 reduction 140:8 redwood 3:17 refer 21:3,7 22:4 29:12 38:19 59:6 70:19 71:5,19 77:11 94:6 97:7 130:11	reject 110:7,19 related 13:11 52:21 94:14 101:8,10 149:11 relates 10:9 relationship 80:15 relative 61:7 63:6 117:13,15 120:17 122:9	repeating 88:1 replace 107:10 reported 1:22 reporter 5:16 6:10 7:8,11,22 8:15,16 represent 6:22 26:10,14,18,22 27:5 32:11 40:11 129:22	resistive 49:5,8 49:11 resistor 48:17 48:19 resistors 56:2,3 56:5,9,15,17 respect 131:2 131:10 respective 2:11 respectively 37:12 responding 8:13
reference 22:4 22:20 23:17 35:4 36:20 43:17 55:14	relevant 34:22 35:3 64:4 67:9 143:4,7,9,10	representing 5:14 represents 40:14 41:2 48:14 49:14	response 8:14 8:15 21:9 47:4 47:12 62:19 68:13 123:6

responses 4:12 16:22 17:2 20:2,4 responsive 140:16 rest 57:9 restatement 111:21 resulting 108:15 results 85:13 return 78:14,22 99:4 reverse 53:17 revert 79:11 review 13:12 13:14,19 17:18 17:21,22 18:18 19:5 47:8 60:1 75:21 76:10 80:9 117:5 124:1,3 reviewed 13:8 13:9,9,17,21 18:18 22:6 103:2,3 rf 4:19 23:17 23:21 99:16 104:19,21 105:1,1,2 110:6,18 rhode 9:13 right 11:14 12:20 16:5 17:11,17 24:20	28:2,3 29:22 31:12,21 32:13 32:17 33:12 36:22 38:9 40:16,18,21 41:10,12,14 44:3 48:18 49:18 54:4,12 54:22 56:7,12 56:15,21 57:15 57:22 67:19 69:11 71:13 73:2 79:3 81:17 84:11 87:16 88:5 89:5,8 91:2,6 91:15,20 92:16 92:17,20 94:4 95:14 100:16 101:1 103:8 109:22 113:14 114:14,17 116:5 125:8 127:10 129:20 130:1 131:4 132:7 134:8 136:8 137:14 137:18,18,19 138:9 142:21 143:1 144:7,15 robert 1:22 2:8 5:16 149:4 role 101:9 roman 138:17 139:10,19	140:14 room 58:13 roughly 14:17 108:21 109:10 rpr 1:22 2:9 149:4 run 7:5 98:16 running 23:22 s s 3:1 4:1,7 5:1 52:11,12 san 82:1 sang 115:5 sangwoo 3:4 6:2 99:8 saying 7:12 57:14,16 124:10,17 says 7:9 18:2,3 18:8 19:21,21 22:16 28:3,11 28:16 32:5,14 36:12,16 40:17 40:21 44:11 48:11 57:9 61:20 78:11 82:13 83:3 84:18 85:12 87:2 92:17 93:3,6,11 97:16 105:11 106:19 108:5 110:6 113:22 114:13 116:15 120:3,9,15	121:21 127:22 128:5,18 129:5 130:8 132:11 133:2 141:3 144:12 scale 114:22 schematic 136:18 scope 23:19 26:1,12,20 27:6,11 28:21 29:5 31:1 34:13 36:1 43:18 46:5 60:10 62:13 63:2 65:4,20 66:7 67:6 72:15 76:17 83:22 85:2,16 85:21 86:21 88:11 89:1 91:16 92:3 94:20 95:20 96:11 106:2,22 108:11 110:15 121:2 123:3 126:5 128:13 130:18 131:5 131:14 133:5 133:12 137:3 139:3,5,22 140:18 143:15 scratch 61:22 screen 15:10,12 19:14 21:16,18
---	---	---	--

21:21 22:1,2 36:9 48:6 55:17 71:5,15 71:16 78:18 79:7,13,14 82:21 96:20 98:18,20 99:6 115:6 scroll 28:6 59:17 72:1 82:10,19 83:7 84:9 102:17 105:4 scrolling 83:8 second 11:10 17:9 21:19 27:17,19 28:15 28:18 29:7 36:16 44:11 85:3 93:5 106:12,15 107:5 113:21 section 83:7,9 83:11 84:10,13 85:11 101:18 101:18,19 103:11 105:5 109:21 see 15:20 16:17 16:18 18:4,7 21:16,22,22 22:2,12,15,18 22:19 23:8,11 23:22 24:3,8 24:10,11,15,18	26:6,9,15,17 27:2,3,17,21 28:11,15,18 29:16,17,20 30:3,6 32:4,7 32:13,16 36:9 36:14,15,18,19 37:10,13 38:6 38:8 39:14,16 40:16,21 44:15 44:15 48:10,13 55:21 56:1,4,6 56:9,12,18,20 57:12,13 63:10 74:22 75:6 76:1,4,14,18 77:5,9 79:7,12 79:14,16,19 82:12,14,22 83:2,5,12,19 84:1,14 85:1,7 85:15,17,18 86:17,18 90:21 91:1 92:16,18 93:3,5,9,15 94:2,7,13,13,14 97:4,10,10,21 98:13 103:8,11 105:6 108:2,4 108:8 110:11 116:5,6,12,17 116:18 117:20 119:2,5,6 120:6,7,12,13 120:20 125:4	125:14 127:16 127:18,21 128:2,3,9 129:9,10,12 131:22 132:17 137:19,20 138:8,14,16,21 141:6 144:14 seeing 15:11 19:14 send 66:12,13 78:21 142:17 sense 101:10 sensor 81:8,8 sentence 22:16 22:22 23:2,7 27:17,19 28:3 28:11,14,16,18 29:6,7 36:12 36:16 44:11,16 48:10,13 57:9 85:3,4,8,12 87:6 93:6,9,11 93:19 94:2,3 94:14 97:5,15 97:21 105:11 105:20 108:5 110:6,13,18,20 111:4 112:9 113:21 114:12 115:12 116:14 120:3,6,7 121:20 128:5 129:5 132:17 133:7 141:7	144:16 sentences 94:16 94:22 120:14 separately 122:18 series 7:7 services 104:5 set 43:14 100:8 149:8,15 seven 72:2,3,8 72:10 73:8,12 73:15 75:2,5 117:10,21 118:18 119:3,6 119:8 several 82:6 135:5 shake 8:17 share 15:10,12 15:13 79:7 98:18 99:6 sharing 71:12 115:5 sheet 148:9 short 22:5 47:17 103:13 shortly 59:4 77:22 show 13:15,16 98:17 129:13 showing 82:12 shown 29:18 32:21 37:11 39:8 40:9 84:21 96:7
---	---	---	---

97:3 124:8 127:16 128:12 129:6 130:7 132:6 134:13 shows 22:13,17 28:9,12 36:11 36:13 83:15 93:4 97:12,13 121:6 124:21 129:1 135:4 shut 11:15,16 11:18 15:17 side 12:12 31:12 32:8,17 33:7,9,10 34:2 35:14 42:21 105:7 signal 22:17,21 23:1,6,17,21 25:22 26:2,14 26:19 27:5,8 28:19 30:15,18 30:22 32:12 33:6,14 34:1 35:20 37:16,17 39:15,16,20,22 40:1,2,3,4,11 40:13,14,14 41:3,4,6,7,9,11 41:11,13,18,20 42:1,2,16,17,19 42:20,21 44:21 44:22 45:6,8 45:11 47:4 51:4 60:19,22	60:22 61:1,7,8 61:8 62:19 63:6 64:6 66:12,13 68:14 70:2 73:13,18 81:2,4 104:19 104:21 106:13 108:13,16,20 109:2,7,9,16,17 110:1,8,9,20 111:4,6,7,16,18 112:3,4,10,11 112:12,15 113:1,13 115:13,22 116:2,2,2,3,10 116:22 117:1 117:10,11,11 117:12,15 118:10,10,11 118:21,22 119:9,14,16,17 120:9,15,18,22 121:8,10,12,14 121:16,18,22 122:1,4,4,5,13 122:15 123:6 123:11,12,13 124:13,18 125:4,6,10,14 125:18 126:4,7 126:8 127:22 128:6 129:7,14 129:15,20 130:3,10,13,17	130:21 131:4,7 131:12,12,18 132:11,13,14 132:15,20,21 133:1,2,3,7,10 133:14,16,19 133:22 134:1,2 134:5,6,7,8,9 134:15,16 135:1,2,5,6,6,7 135:9,11,13,18 136:1,2,3,7,7 136:16,18 137:1,1,2,2 138:19 140:6,9 140:10,11 145:4,14 signals 32:20 33:13,13,15,17 34:4 35:13,17 36:3,4 47:12 65:10 81:9 88:6 106:7,8 114:10 120:18 122:2,10,12 123:21,21 124:9,12,14,19 124:19 125:8 130:1 131:9 133:22 134:10 135:20 136:16 signature 20:5 20:7,8 149:17 signed 148:9	silicon 103:20 similar 17:13 17:15,20 22:17 24:22 25:2,4,6 25:8,9,11,12,14 25:17,19 32:14 32:16 65:8 72:9 similarly 24:19 simply 31:17 41:2 133:2 simultaneously 94:8 single 103:20 107:12,19 sitting 10:14 20:20 21:1 situation 16:1 six 119:20 sizes 120:17 122:9 skill 102:6,7,11 102:14 116:20 138:22 139:13 144:19,22 skip 129:2 slightly 87:18 slope 87:16,19 88:9,12 89:12 slopes 87:17 slow 10:19 79:2 slowly 7:10 small 51:4 82:21 102:19 102:20 103:20
---	--	---	--

134:8 137:8 smaller 79:17 snr 110:9 114:13 solutions 5:15 5:17 solved 105:11 106:19,21 sorry 15:9 19:21 42:12 46:8 51:11 62:4 63:18 65:22 73:22 78:8,16 79:4 82:3 87:5 89:4 92:4 93:16 96:1 97:6 98:21 111:8 115:19 117:13 119:16 124:11 124:20 129:10 134:17 135:16 136:19 137:6 137:11 139:8 139:18 145:19 sorted 16:2 sound 8:11 9:4 90:6 sounds 8:18 source 112:18 112:19,20 113:7,8 145:2 145:3,3,5,8 sources 113:7 114:6,7	space 114:10 speak 7:10 142:3 143:12 speaking 8:1,2 8:6 34:19 67:12,14 72:18 105:2 141:17 141:18 142:5 specific 43:14 60:4 66:10 124:6 130:20 specifically 8:9 21:8 specification 23:16 97:2 119:19 127:15 128:19 131:16 132:6 134:14 134:22 135:15 specificity 137:5 spectrum 129:6 129:14,16,18 130:9 speculation 95:21 96:12 speech 81:13 spelled 52:12 spend 14:20 63:14 spent 14:14,18 spinning 22:1 59:13 78:5,8 79:2,10 98:21	spoke 106:6 ss 149:2 ssi 121:8 ssi1 121:7 125:14 ssi2 121:7 125:15 stamp 17:16 stands 106:3 114:14,15 121:8 start 67:8 115:18 starts 22:13 28:9 36:10,10 57:6 59:19 state 9:6,10 46:17 stated 119:10 121:21 states 1:1,4 5:8 111:5,14 149:1 stations 44:13 114:3 status 96:6 stay 78:12 83:6 staying 105:5 110:5 steady 87:11,12 step 106:12,13 106:15 132:5 steps 106:11 sticking 108:1 134:12	stop 57:20 115:5 142:6 storage 52:19 street 2:5 9:12 strength 115:14 116:2,3 116:10 117:1,1 117:10,11,12 117:13,15,16 118:10,11,22 119:8,13,17 120:9,15 121:1 121:9,10,12,14 121:16,17 122:1,13 124:13,18 125:4,19 129:7 130:10,13,21 131:4,7,12,13 132:11,13,14 132:15,20,21 133:2,3,7,9 134:1,5,6,7,10 134:15,16 135:2,2,5,12 136:1,7,7 137:1,2 140:9 140:10 strengths 63:6 64:6 70:2 134:8 strike 65:16 104:7 strong 143:17
--	---	--	--

strongly 67:8 structure 22:17 stuff 113:11 sub 49:13,15 52:5,6 54:11 54:14,21 55:1 55:5,6 subjects 80:17 submit 17:7 submitted 13:20 16:21 17:2,14 18:10 18:19 19:2 20:2,4,10,13 77:16 subsequent 79:17 substance 17:7 substances 9:20,22 substantially 17:20 substitute 46:20 substituted 70:12 sufficient 118:15 suggest 89:12 suggesting 99:3 suggestion 136:19,20 suggests 134:22 136:6,12	suitable 116:16 118:3 suite 3:7 sum 125:22 126:1 summer 17:3,3 super 68:8 superconduct... 53:22 superconductor 54:3,6 supplied 30:19 34:7 38:12 145:7 supply 28:12 36:14 57:7,10 95:13 96:3,5,8 96:13 support 4:11 suppose 100:18 supposedly 116:1 sure 7:6 11:10 24:8 33:8 60:17 63:21 69:1,4 70:22 71:12 73:6 80:9 82:11 89:5,6 94:9 104:15 117:8 139:9 146:6 surrounding 105:15 swear 6:11	switch 96:17 98:5 115:4 switches 31:8 56:7,8 96:6 sworn 6:15 149:8 symbolized 48:11 system 43:14 43:16 97:20 104:4 113:4 systems 43:10 43:12	62:4 111:3,18 121:20 talks 60:18 62:7 64:5 65:7 68:12 73:12,15 75:10 117:14 118:21 123:4 130:20 taught 81:16 81:18,20 teaches 27:9,12 teachings 96:4 technical 101:20 tell 123:7,9,12 telling 141:19 143:12 temperature 81:9 ten 35:9 75:1,5 90:6,8 107:6 109:10 126:21 142:16 term 40:8 42:5 46:15 68:21 104:6,10 106:17 110:13 144:18 terms 66:19 testified 6:15 testify 9:20 testifying 9:17 testimony 10:8 12:6 119:11 148:6,7 149:9
		t	
		t 4:1,1,7 148:1 148:1 take 9:1,19 18:21 23:4 47:15 60:2,14 63:17 64:18 69:12 78:6 90:1 93:18 94:12 99:13 126:14,18 142:16 143:4 146:4 taken 5:7 9:22 86:5 125:18 talk 100:20 117:6 118:9 124:5 131:17 talked 92:15 113:9 133:20 talking 16:4 29:7 35:1 47:9	

text 17:15 79:16,16 82:21 84:17,18 85:1 86:3 94:7 97:7 97:10,14 99:20 101:4 102:19 105:6,15 106:19 112:2 130:8 138:13 textbook 80:1 81:21 82:5,20 101:1,8,22 102:12,18 109:22 textbooks 82:6 thank 9:5 10:22 11:17,19 12:1 16:6,20 19:22 37:9 40:20 44:7 47:18 48:21 57:22 58:2,12,17 59:11 63:18,19 71:4,14,22 72:7 73:4 74:19 77:13 78:1 83:1 143:5 146:7 theme 100:10 theory 100:18 thereabouts 138:12 theta 1:8 5:9 6:7 18:2	thing 42:15 135:21 things 40:9 53:2 111:2 114:8 126:9 129:16 134:3 think 13:17 17:19 18:19 33:2 34:14 55:7 57:19,21 66:9 68:15,18 68:20 71:20 75:4 78:15 85:17 87:22 88:2 100:17 101:15,17 102:14 105:17 107:1 115:5 116:8 121:21 122:7,7,17 124:21 125:5 125:21 126:13 126:17 129:1 129:15,18 130:6 141:13 142:13 145:1 146:17 thinking 66:18 third 48:10 82:11 110:6 thirds 105:10 thought 15:18 124:2 thoughts 146:5	threatening 67:15 three 12:11,20 18:3,10 63:8 63:10,12,15,19 63:21 64:5,13 65:7,9 68:15 110:9 129:16 136:1 threshold 115:14 116:11 116:15 118:2 118:14 thursday 1:15 time 8:1,4,4,22 10:20 11:4 12:3 14:17,19 18:22 20:19 30:17 33:22 43:5,7 44:5,10 44:22 45:2,9 45:11,13,14 57:21 60:14 63:17 68:7 69:12 72:14 78:14 79:1,3 81:1 92:5 93:18 94:12 96:1,3 99:4,5 101:7,11,14,16 101:20 104:12 107:19 112:3,4 118:1,18 126:13 135:6 137:6,13 142:7	title 99:16 100:11 101:16 101:19 today 7:8 9:4 9:17,21 10:2,4 10:9,20 12:12 20:20 21:1,4 88:17 143:19 today's 7:13 14:18 together 57:1 100:20 111:16 114:8 took 107:16 top 31:9 41:14 55:21 83:12 84:15 86:15 87:7 108:2 138:9 total 14:19,22 56:14,16 93:13 121:14 131:8 toward 23:9 84:14 93:10 112:9 track 79:6 trademark 1:1 5:10 transceiver 64:12 65:14 69:22 81:4 97:19 138:20 transcript 4:22 149:9
---	--	---	--

transcription 148:7	treating 124:14 125:12	42:11,17 44:9 55:10,12 56:5 58:14 80:7,10 94:16,22 100:4 105:10 106:11 113:7 114:2,8 114:10,19,21 116:16 118:3 122:13 123:7,9 123:18 125:8 126:9 138:13	77:20 89:21 90:6,15 98:10 99:8,12 126:12 126:17,22 127:7 141:15 141:21 142:2 143:2 144:8 146:3,7,14
transient 145:13	trial 1:2	type 8:15 33:6 37:18 43:15	ultimately 78:19
transistor 30:7 42:8,9,10,14 56:13 83:14,16 84:22 85:19 86:6,8 88:21 89:13 91:3,5 92:12 93:12,20 95:16	triangles 26:15 26:17,18	types 33:12 49:7 53:10 102:3 104:2 111:2	unattenuated 110:8
transistors 38:12 41:14,15 41:16,17,19,22 42:6,11,17 56:21,22 57:1 57:11,15,17 83:4,9,11 84:11,13 85:22 93:13 94:3,19 95:3,5,6,9,18 96:9,15 103:16	true 50:22 100:18 148:6 149:9	typical 84:18	uncertainty 104:22
translate 38:2	truthfully 9:21 10:2,4	typically 42:5 52:9 81:10	unchanging 145:14
translating 37:16 106:8	try 8:2 24:6 44:9 71:5 74:22 79:1 98:20 99:3	u	unclear 99:22
translation 37:16	trying 15:10,12 15:13 31:19 69:2,8 78:13 93:16 108:16 116:8 140:3,15 142:7,14	u.s. 5:10 12:18 uc 82:1 ucla 80:3 uh 8:18,18 68:5 119:1 uhr 3:3 4:4 5:20,20 6:18 6:21 15:7,22 16:6,13 19:11 21:11 45:18,21 47:15 48:3 57:19 58:11 59:10 71:9 72:17 73:4	unconnected 31:22
transmission 105:3	tune 44:17		under 9:17 42:7,15 53:17 122:18,21 139:11
traveled 14:13	turn 11:8,9 29:14 36:7 48:4,8 115:6 118:17 119:20 127:17 137:15		underneath 18:2
travels 40:2	turned 11:11		understand 7:12 8:20 9:2 9:16,18 10:8 10:10 31:19 40:11 41:20 60:5 66:18 69:1,6 81:15 102:11,15 116:20 134:17 139:1,13
treat 124:11,12 124:18	turning 90:19		
	two 7:1 10:9 12:17,18 29:18 32:5,6,7,11,14 32:16 37:10 38:6,8,17,19 39:19,21 41:17 41:19,22 42:6		

140:17 143:20 144:6,20 understanding 23:20 30:9,11 31:4 43:15 46:9 58:12 59:21 82:15 118:5 120:22 122:3,14 125:17 128:11 undesired 112:5,8,12 113:12 122:5 122:12 unfair 142:13 unique 87:9 unit 5:5 27:18 27:20 28:3,16 29:22 30:2 36:17 37:2 93:7 95:6 114:16,18 unit's 28:12 36:14 united 1:1,4 5:8 149:1 units 27:20 28:2,4 29:2 52:10,11,13,15 52:16 unmet 107:7,12 unquote 105:1 unwanted 109:7,8	upload 98:14 uploaded 77:21 upstairs 10:15 use 47:10 68:20 99:11 107:3 117:18 119:21 124:7 142:7 used 36:17,19 37:7 38:5 40:6 43:16 46:15 88:12 113:12 118:12 123:14 140:21 useful 37:18,20 uses 85:8 110:13 using 46:2,11 47:5,13 60:8 62:2,12 63:22 65:2 68:10 69:17 72:11 73:9 75:7 76:3 76:15 77:7 81:20 82:7 108:13 usually 52:10 86:5 103:20 145:12	87:12 88:19 89:7 117:1,2 values 84:21 87:7 114:21 122:21 123:2 123:12 variable 31:7 variables 55:11 variation 35:8 61:2 variations 62:18,21 varied 36:3,4 varies 88:21,22 89:14,14 variety 70:1 106:10 various 5:13 13:10 62:19 66:17 100:9 118:12 123:5 136:3 vary 45:2 89:20 varying 33:15 33:18 35:15,18 68:14 123:5 vce 84:20 verbal 8:14 verify 13:17 veritext 2:4 5:14,17 15:14 16:15,18 19:8 version 17:4 71:6 119:21	versus 5:9 video 5:5,12 videographer 3:21 5:3,15 6:10,16 16:7 16:11 47:19 48:1 58:5,9 90:9,13 127:1 127:5 146:8,12 146:21 videotaped 1:12 2:2 view 45:22 60:7 61:12 63:21 65:1 66:20 69:16 72:10 73:8 116:19 139:12 vin 129:8 130:17 voltage 33:21 33:21,22 36:3 41:7 43:2 45:8 45:10,12,14 51:6 84:20 86:9,13,17 87:21 88:4,7,8 89:17 92:12 145:3,3 vout 128:8 129:8 vs 1:7
	v		
	v 142:17 value 30:16 31:12 34:3 35:21 51:18 54:12,22 55:1 55:5 87:9,11		

w	104:6	work 78:19	46:15 47:2,17
w 148:1	wife 10:15	80:11	60:15 61:16
walk 73:1	william 3:3	worked 100:12	62:6,7 63:4
want 18:20,21	5:20 6:21	working	65:6 66:2,9
19:5 43:19	wire 91:11,13	101:11 102:2	73:21 76:4
61:18 66:21	91:15,17	works 15:20	78:21 79:19
68:6 71:12	wireless 4:20	world 113:2,8	90:3,4 96:13
73:2,6 78:21	35:11 38:5	worry 78:9	97:9 104:8,20
81:5 83:21	43:9,12 60:19	worsen 110:8	105:17 106:3
89:4 94:7,10	97:19 99:17	114:13	110:16 112:22
108:19 109:5,8	102:2 104:13	worst 140:7	117:4,14
109:15,15,17	138:20	wrap 142:7	118:19 121:20
109:19 110:1,3	wirelessly	write 8:1 100:9	122:7 123:4
115:18 117:4	37:21	writes 115:21	126:6,15
143:17	witness 4:2 6:8	wrong 115:18	127:17 129:21
wanted 57:19	6:11,14 47:18	141:19 145:19	130:19 131:6
warren 3:21	58:2 72:18	wrote 115:12	132:8 133:6,13
5:14	90:3,8 99:10	116:12	133:20 137:17
washington	141:22 142:4	wuhr 3:10	138:6,7 139:7
1:14 2:4,6 3:8	143:5 146:15	x	146:1
way 7:12 78:20	149:7,10,15	x 4:7 49:13,15	year 20:6
90:4 106:1	wondering	52:4,6 54:11	years 81:22
107:9,16	66:20	54:14,21 55:1	104:11,11
119:15 142:15	word 7:9 32:15	55:5,6	107:20
149:13	33:11 39:15,16	xc 55:8	yesterday
we've 89:21	39:18,20 40:6	xl 55:8	14:14,14
114:12	46:18 47:10	xs 27:1	z
welcome 67:20	74:2 88:13	y	z 48:12,12,14
90:5	117:18,21	yeah 14:3,13	49:13 52:4
went 15:22	119:2,6 121:22	16:3 20:12	54:3,12 55:4,5
wheel 22:1 78:4	wording 117:5	21:21 26:13	55:8
79:2,9 98:21	117:8	30:11 34:14	zero 30:16,21
whereof 149:15	words 110:17	35:5 36:2	31:2,13 38:14
wide 44:17	111:9	40:13 45:18	38:21 39:1,9
81:12 104:1,5			39:13 54:3,5

54:12,14,22
55:1,6,8,11,13
zoom 1:12 5:12
15:4

Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

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THE ABOVE RULES ARE CURRENT AS OF APRIL 1, 2019. PLEASE REFER TO THE APPLICABLE FEDERAL RULES OF CIVIL PROCEDURE FOR UP-TO-DATE INFORMATION.

VERITEXT LEGAL SOLUTIONS

COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

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